

Annex C Test Procedures [N]informative

C.1 Purpose

Annex C defines the detailed, but generic, test procedures for testing an implementation of NTCIP 1204 v04.

C.1.1 Scope

Annex C defines test procedures in a format that is consistent with NTCIP 8007 v01 and that covers the entire scope of NTCIP 1204 v04. It includes tests of some of the features defined in NTCIP 1201 ~~v03:2005~~, but only to the extent that these features have been incorporated by reference in NTCIP 1204 v04.

The procedures are intended to be used as a portion of the overall set of tests that would be performed during the component testing of a device.

Note: The NTCIP 8007 v01 test procedure format focuses on the testing of a device and is largely silent on testing a management station. Test procedures for the component testing of a management station and or test procedures for integration testing may be added at a future date.

C.1.2 Keywords

C.1.2.1 Additional Keywords

Keywords are words that are presented in all capital letters within the test procedures. Definitions of keywords are presented below. Keywords that are not defined below are defined in NTCIP 8007 v01.

Keyword	Definition
APPROPRIATE	This keyword is intended to direct the tester to ensure that the device is reporting the value provided by the sensor or set by the management station, not to test the accuracy of the sensor. The exact mechanism used to determine the appropriate value is beyond the scope of NTCIP 1204 v04, but should be defined within a test plan that references these procedures. For example, the appropriate values may be determined by using external software to check the values currently stored in the device, providing a subjective assessment of current conditions, emulating sensor inputs to create known values, etc. The mechanism chosen for a given test may be dependent upon the environment within which the device is being tested.
IF	This keyword causes the user (or application) to perform a comparison and take one action if the comparison evaluates to true and another action if the comparison evaluates to false. It is comparable to the "if...else..." expression in C.
FOR EACH	This keyword causes the user (or application) to begin a looping process that increments through a series of values. It is comparable to the "for...next" expression in C.

C.1.2.2 Keyword Combinations

These test procedures frequently use the "SET-UP" and "VERIFY" keywords as defined in NTCIP 8007 v01 in the definition of a single step. When used jointly in these procedures, the failure logic of the "SET-

UP" keyword shall override that of the "VERIFY" keyword. In other words, a failure of a step that uses both the "SET-UP" and "VERIFY" keywords means that the test case neither passes nor fails.

C.1.3 Rules for Following Test Procedures

To component test a device for conformance to NTCIP 1204 v04, the user shall follow the steps as written, filling in the pass/fail information in the 'Device' column.

C.2 Testing Requirements

C.2.1 Field Device Test Environment

All Test Cases covered by this Testing Requirements documentation require the Device Under Test (DUT) to be configured for the site and connected to a test application as depicted in Figure 26. A data analyzer may also be used to capture the data exchanged between the two components. The test environment should be designed to minimize any complicating factors that may result in anomalies unrelated to the specific test case. Failure to isolate such variables in the test environment may result in false results to the test. For example, the device may be conformant with NTCIP 1204 v04, but communication delays could result in timeouts and be misinterpreted as failures.

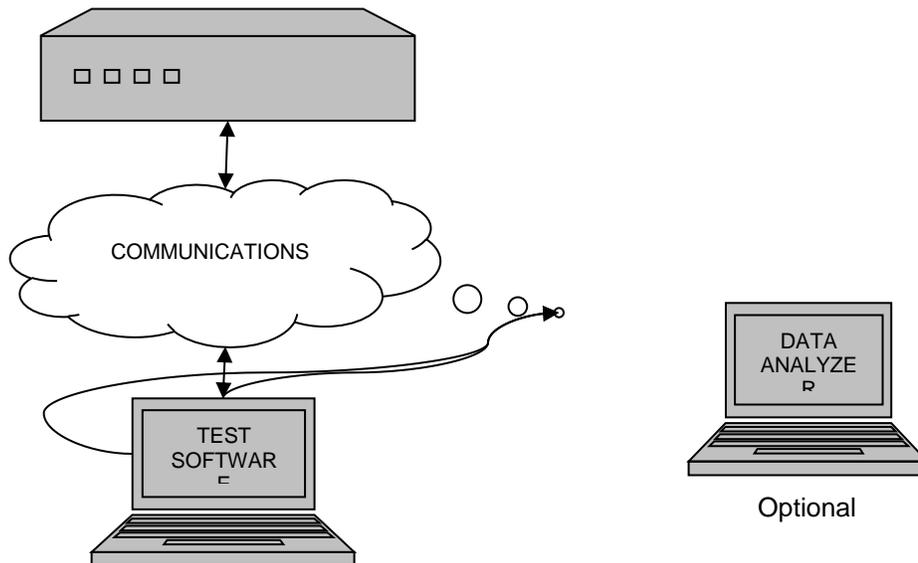


Figure 26 Field Device Test Environment

The following pre-conditions apply to all test cases unless otherwise defined:

- a) All components should be turned on and be provided sufficient time to start up prior to starting any test case
- b) The test software, data analyzer, and DUT should all be configured to use a common set of communication settings, including data rates, lower layer protocols, community names, etc.

C.2.2 Traceability Table

Annex C.2.2 defines the relationships between the Requirements of NTCIP 1204 v04 Section 3 and the Test Cases presented in Annex C.2.3.

[To confirm that an implementation fulfills a requirement, the DUT shall successfully pass all test cases that trace to that requirement.](#)

Table 36 Requirements to Test Case Traceability Table

Requirement		Test Case	
ID	Title	ID	Title
3.4	Architectural Requirements	-	-
3.5	Data Exchange and Operational Environment Requirements	-	-
3.5.1	ESS Manager Requirements	-	-
3.5.1.1	ESS Configuration Requirements	-	-
3.5.1.1.1	Retrieve ESS Characteristics	-	-
		C.2.3.1.1	ESS Characteristics
3.5.1.1.2	Retrieve Compressed Station Metadata [Deprecated]	-	-
3.5.1.1.3	Configure ESS Manager	-	-
		C.2.3.1.1	ESS Characteristics
3.5.1.2	ESS Status Monitoring Requirements	-	-
3.5.1.2.1	Retrieve ESS Door Status	-	-
		C.2.3.1.3	Retrieve ESS Door Status
3.5.1.2.2	Retrieve Battery Status	-	-
		C.2.3.1.4	Retrieve Battery Status
3.5.1.2.3	Retrieve Line Volts	-	-
		C.2.3.1.5	Retrieve Line Volts
3.5.1.2.4	Retrieve ESS Status	-	-
		C.2.3.1.8	Retrieve ESS Status
3.5.1.3	ESS Data Retrieval Requirements	-	-
3.5.1.3.1	Retrieve Mobile ESS Movement	-	-
		C.2.3.1.6	Retrieve Mobile ESS Movement
3.5.1.3.2	Retrieve Mobile Treatment Information [Obsolete] [Deprecated in v03]	-	-
3.5.1.3.3	Retrieve Compressed Mobile ESS Data [Version 03 - Deprecated in v04]	-	-
3.5.1.4	ESS Control Requirements	-	-
3.5.2	Sensor Manager Requirements	-	-
3.5.2.1	Sensor Configuration Requirements	-	-
3.5.2.1.1	Retrieve Atmospheric Pressure Height [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.1.2	Retrieve Metadata for Each Wind Sensor - Text Description	-	-
		C.2.3.2.2	Retrieve Metadata for Each Wind Sensor
3.5.2.1.3	Retrieve Temperature Sensor Metadata - Height	-	-
		C.2.3.2.3	Retrieve Temperature Sensor Metadata
3.5.2.1.4	Retrieve Pavement Sensor Metadata	-	-

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.2.4	Retrieve Pavement Sensor Metadata
3.5.2.1.5	Retrieve Subsurface Sensor Metadata - Text Description	-	-
		C.2.3.2.5	Retrieve Subsurface Sensor Metadata
3.5.2.1.6	Configure Pavement Sensor	-	-
		C.2.3.2.6	Configure Pavement Sensor
3.5.2.1.7	Configure Subsurface Sensor - Text Description	-	-
		C.2.3.2.7	Configure Subsurface Sensor
3.5.2.1.8	Configure Passive Ice Detection Logic	-	-
		C.2.3.2.8	Configure Passive Ice Detection Logic
3.5.2.1.9	Configure Snapshot Camera	-	-
		C.2.3.2.9	Configure Snapshot Camera
3.5.2.1.10	Manage Atmospheric Pressure Metadata	-	-
3.5.2.1.10.1	Retrieve Atmospheric Pressure Metadata - Location	-	-
		C.2.3.2.10	Retrieve Atmospheric Pressure Metadata - Location
3.5.2.1.10.2	Retrieve Atmospheric Pressure Metadata - Sensor Information	-	-
		C.2.3.2.11	Retrieve Atmospheric Pressure Metadata - Sensor Information
3.5.2.1.10.3	Configure Atmospheric Pressure Metadata - Location	-	-
		C.2.3.2.12	Configure Atmospheric Pressure Metadata - Location
3.5.2.1.11	Manage Wind Sensor Metadata	-	-
3.5.2.1.11.1	Retrieve Metadata for Each Wind Sensor - Location Retrieve Metadata for Each Wind Sensor - Coordinates	-	-
		C.2.3.2.13	Retrieve Wind Sensor Metadata - Location
3.5.2.1.11.2	Retrieve Metadata for Each Wind Sensor - Sensor Information	-	-
		C.2.3.2.14 5	Retrieve Wind Sensor Metadata - Sensor Information
3.5.2.1.11.3	Configure Wind Sensor Metadata - Location	-	-
		C.2.3.2.15 6	Configure Wind Sensor Metadata - Location
3.5.2.1.12	Manage Temperature Sensor Metadata	-	-
3.5.2.1.12.1	Retrieve Temperature Sensor Metadata - Location	-	-
		C.2.3.2.16	Retrieve Temperature Sensor Metadata - Location
3.5.2.1.12.2	Retrieve Temperature Sensor Metadata - Sensor Information	-	-

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.2.179	Retrieve Temperature Sensor Metadata – Sensor Information
3.5.2.1.12.3	Configure Temperature Sensor Metadata - Location	-	-
		C.2.3.2.182	Configure Temperature Sensor Metadata - Location
3.5.2.1.13	Manage Humidity Sensor Metadata	-	-
3.5.2.1.13.1	Retrieve Humidity Sensor Metadata - Location	-	-
		C.2.3.2.192	Retrieve Humidity Sensor Metadata - Location
3.5.2.1.13.2	Retrieve Humidity Sensor Metadata - Sensor Information	-	-
		C.2.3.2.203	Retrieve Humidity Sensor Metadata - Sensor Information
3.5.2.1.13.3	Configure Humidity Sensor Metadata - Location	-	-
		C.2.3.2.214	Configure Humidity Sensor Metadata - Location
3.5.2.1.14	Manage Precipitation Sensor Metadata	-	-
3.5.2.1.14.1	Retrieve Precipitation Sensor Metadata - Location	-	-
		C.2.3.2.226	Retrieve Precipitation Sensor Metadata – Location
3.5.2.1.14.2	Retrieve Precipitation Sensor Metadata - Sensor Information	-	-
		C.2.3.2.237	Retrieve Precipitation Sensor Metadata - Sensor Information
3.5.2.1.14.3	Configure Precipitation Sensor Metadata - Location	-	-
		C.2.3.2.248	Configure Precipitation Sensor Metadata - Location
3.5.2.1.14.4	Configure Precipitation Total User Specified Period	-	-
		C.2.3.2.253	Configure Precipitation Sensor Total User Specified Period
3.5.2.1.15	Manage Solar Radiation Sensor Metadata	-	-
3.5.2.1.15.1	Retrieve Solar Radiation Sensor Metadata - Location	-	-
		C.2.3.2.263	Retrieve Solar Radiation Sensor Metadata - Location
3.5.2.1.15.2	Retrieve Solar Radiation Sensor Metadata - Sensor Information	-	-
		C.2.3.2.273	Retrieve Solar Radiation Sensor Metadata - Sensor Information
3.5.2.1.15.3	Configure Solar Radiation Sensor Metadata - Location	-	-
		C.2.3.2.283	Configure Solar Radiation Sensor Metadata - Location

Requirement		Test Case	
ID	Title	ID	Title
3.5.2.1.16	Manage Visibility Sensor Metadata	-	-
3.5.2.1.16.1	Retrieve Visibility Sensor Metadata - Location	-	-
-	-	C.2.3.2.29	Retrieve Visibility Sensor Metadata - Location
3.5.2.1.16.2	Retrieve Visibility Sensor Metadata - Sensor Information	-	-
-	-	C.2.3.2.30	Retrieve Visibility Sensor Metadata - Sensor Information
3.5.2.1.16.3	Configure Visibility Sensor Metadata - Location	-	-
-	-	C.2.3.2.31	Configure Visibility Sensor Metadata - Location
3.5.2.1.17	Manage Pavement Sensor Metadata	-	-
3.5.2.1.17.1	Retrieve Pavement Sensor Metadata - Location	-	-
-	-	C.2.3.2.32	Retrieve Pavement Sensor Metadata - Location
3.5.2.1.17.2	Retrieve Pavement Sensor Metadata - Sensor Information	-	-
-	-	C.2.3.2.33	Retrieve Pavement Sensor Metadata - Sensor Information
3.5.2.1.17.3	Configure Pavement Sensor - Location	-	-
-	-	C.2.3.2.34	Configure Pavement Sensor Metadata - Location
3.5.2.1.18	Manage Subsurface Sensor Metadata	-	-
3.5.2.1.18.1	Retrieve Subsurface Sensor Metadata - Location	-	-
-	-	C.2.3.2.35	Retrieve SubSurface Sensor Metadata - Location
3.5.2.1.18.2	Retrieve Subsurface Sensor Metadata - Sensor Information	-	-
-	-	C.2.3.2.36	Retrieve SubSurface Sensor Metadata - Sensor Information
3.5.2.1.18.3	Configure Subsurface Sensor - Location	-	-
-	-	C.2.3.2.37	Configure SubSurface Sensor Metadata - Location
3.5.2.1.19	Manage Air Quality Sensor Metadata	-	-
3.5.2.1.19.1	Retrieve Air Quality Sensor Metadata - Location	-	-
-	-	C.2.3.2.38	Retrieve Air Quality Sensor Metadata - Location
3.5.2.1.19.2	Retrieve Air Quality Sensor Metadata - Sensor Information	-	-
-	-	C.2.3.2.39	Retrieve Air Quality Sensor Metadata - Sensor Information
3.5.2.1.19.3	Configure Air Quality Sensor Metadata - Location	-	-

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.2.405	Configure Air Quality Sensor Metadata - Location
3.5.2.1.20	Manage Water Level Sensor Metadata	-	-
3.5.2.1.20.1	Retrieve Water Level Metadata - Location	-	-
		C.2.3.2.415	Retrieve Water Level Sensor Metadata - Location
3.5.2.1.20.2	Retrieve Water Level Metadata - Sensor Information	-	-
		C.2.3.2.425	Retrieve Water Level Sensor Metadata - Sensor Information
3.5.2.1.20.3	Retrieve Water Level Metadata - Warning Level	-	-
		C.2.3.2.435	Retrieve Water Level Sensor Metadata - Warning Level
3.5.2.1.20.4	Configure Water Level Metadata - Location	-	-
		C.2.3.2.445	Configure Water Level Sensor Metadata - Location
3.5.2.1.20.5	Configure Water Level Metadata - Warning Level	-	-
		C.2.3.2.455	Configure Water Level Sensor Metadata - Warning Level
3.5.2.1.21	Manage Pavement Treatment System Metadata	-	-
3.5.2.1.21.1	Retrieve Pavement Treatment System Metadata - Location	-	-
		C.2.3.2.46	Retrieve PTS Metadata - Location
3.5.2.1.21.2	Retrieve Pavement Treatment Metadata - System Information	-	-
		C.2.3.2.47	Retrieve PTS Metadata - Sensor Information
3.5.2.1.21.3	Configure Pavement Treatment System Metadata - Location	-	-
		C.2.3.2.48	Configure PTS Metadata - Location
3.5.2.2	Sensor Status Monitoring Requirements	-	-
3.5.2.3	Sensor Data Retrieval Requirements	-	-
3.5.2.3.1	Retrieve Weather Profile with Mobile Sources [Version 03 Only - Deprecated in v04]	-	-
3.5.2.3.2	Monitor Weather Condition	-	-
3.5.2.3.2.1	Retrieve Atmospheric Pressure [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.3.2.2	Retrieve Wind Data	-	-
		C.2.3.3.3	Retrieve Wind Data
3.5.2.3.2.3	Retrieve Air Temperature	-	-

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.3.4	Retrieve Temperature
3.5.2.3.2.4	Retrieve Daily Minimum and Maximum Temperature	-	-
		C.2.3.3.5	Retrieve Daily Minimum and Maximum Temperature
3.5.2.3.2.5	Retrieve Humidity [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.3.2.6	Monitor Precipitation	-	-
3.5.2.3.2.6.1	Retrieve Precipitation Presence [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.3.2.6.2	Retrieve Precipitation Rates [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.3.2.6.3	Retrieve Precipitation Totals [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.2.3.2.6.4	Retrieve Precipitation Presence	-	-
		C.2.3.3.13	Retrieve Precipitation Presence
3.5.2.3.2.6.5	Retrieve Precipitation Rates	-	-
		C.2.3.3.14	Retrieve Precipitation Rates
3.5.2.3.2.6.6	Retrieve Precipitation Totals	-	-
		C.2.3.3.15	Retrieve Precipitation Totals
3.5.2.3.2.6.7	Retrieve Precipitation Totals - User Specified	-	-
		C.2.3.3.16	Retrieve Precipitation Totals – User Specified
3.5.2.3.2.6.8	Retrieve Precipitation Type	-	-
		C.2.3.5.2	Retrieve Precipitation Situation
3.5.2.3.2.7	Retrieve Solar Radiation [Versions 01 to 03 Only - Deprecated in v04]	-	-
		C.2.3.3.10	Retrieve Solar Radiation
3.5.2.3.2.8	Retrieve Visibility	-	-
		C.2.3.3.11	Retrieve Visibility
3.5.2.3.2.9	Retrieve Compressed Weather Data [Deprecated] [Version 03]	-	-
3.5.2.3.2.10	Retrieve Atmospheric Pressure	-	-
		C.2.3.3.17	Retrieve Atmospheric Pressure
3.5.2.3.2.11	Retrieve Relative Humidity	-	-
		C.2.3.3.18	Retrieve Relative Humidity Sensor
3.5.2.3.2.12	Retrieve Solar Radiation	-	-
		C.2.3.3.19	Retrieve Solar Radiation
3.5.2.3.3	Monitor Pavement Condition	-	-
3.5.2.3.3.1	Retrieve Pavement Surface Condition [Versions 01 to 03 - Deprecated in v04]	-	-

Requirement		Test Case	
ID	Title	ID	Title
3.5.2.3.3.2	Retrieve Conditions for Freezing Algorithms - Active	-	-
		C.2.3.4.2	Retrieve Icing Conditions—Active
3.5.2.3.3.3	Retrieve Conditions for Freezing Algorithms - Passive	-	-
		C.2.3.4.3	Retrieve Icing Conditions—Passive
3.5.2.3.3.4	Retrieve Adjacent Snow Depth [Versions 01 to 03 - Deprecated in v04]	-	-
		C.2.3.4.4	Retrieve Adjacent Snow Depth
3.5.2.3.3.5	Retrieve Roadway Snow Depth [Versions 01 to 03 - Deprecated in v04]	-	-
		C.2.3.4.5	Retrieve Roadway Snow Depth
3.5.2.3.3.6	Retrieve Roadway Ice Thickness [Versions 01 to 03 - Deprecated in v04]	-	-
		C.2.3.4.6	Retrieve Roadway Ice Thickness
3.5.2.3.3.7	Retrieve Compressed Pavement Condition Data [Deprecated]	-	-
3.5.2.3.3.8	Retrieve Pavement Surface Condition	-	-
		C.2.3.4.11	Retrieve Pavement Surface Condition
3.5.2.3.3.9	Retrieve Forecasted Pavement Surface Condition	-	-
		C.2.3.4.12	Retrieve Forecasted Pavement Surface Condition
3.5.2.3.3.10	Retrieve Roadway Friction Coefficient	-	-
		C.2.3.4.13	Retrieve Roadway Friction Coefficient
3.5.2.3.3.11	Retrieve Adjacent Snow Depth	-	-
		C.2.3.4.14	Retrieve Adjacent Snow Depth
3.5.2.3.3.12	Retrieve Roadway Snow Depth	-	-
		C.2.3.4.15	Retrieve Roadway Snow Depth
3.5.2.3.3.13	Retrieve Roadway Ice Thickness	-	-
		C.2.3.4.16	Retrieve Roadway Ice Thickness
3.5.2.3.4	Monitor Subsurface Conditions	-	-
3.5.2.3.4.1	Retrieve Subsurface Temperature	-	-
		C.2.3.4.8	Retrieve Basic Subsurface Conditions
3.5.2.3.4.2	Retrieve Subsurface Moisture	-	-
		C.2.3.4.9	Retrieve Subsurface Moisture
3.5.2.3.4.3	Retrieve Compressed Subsurface Condition Data [Deprecated]	-	-
3.5.2.3.5	Monitor Situation Assessments	-	-
3.5.2.3.5.1	Retrieve Wind Situation	-	-
		C.2.3.5.1	Retrieve Wind Situation
3.5.2.3.5.2	Retrieve Precipitation Situation Retrieve Precipitation Situation	-	-
		C.2.3.5.2	Retrieve Precipitation Situation

Requirement		Test Case	
ID	Title	ID	Title
3.5.2.3.5.3	Retrieve Cloud Situation [Versions 01 to 03 Only - Deprecated in v04]	-	-
		C.2.3.5.3	Retrieve Cloud Situation [Versions 01 to 03]
3.5.2.3.5.4	Retrieve Visibility Situation	-	-
		C.2.3.5.4	Retrieve Visibility Situation
3.5.2.3.5.5	Retrieve Ground State [Versions 01 to 03 Only - Deprecated in v04] Retrieve Ground State	-	-
		C.2.3.5.5	Retrieve Ground State [Versions 01 to 03]
3.5.2.3.5.6	Retrieve Pavement State [Versions 01 to 03 Only - Deprecated in v04]	-	-
		C.2.3.5.6	Retrieve Pavement State [Versions 01 to 03]
3.5.2.3.5.7	Retrieve Cloud Situation	-	-
		C.2.3.5.7	Retrieve Cloud Situation
3.5.2.3.5.8	Retrieve Ground State	-	-
		C.2.3.5.8	Retrieve Ground State
3.5.2.3.5.9	Retrieve Pavement State	-	-
		C.2.3.5.9	Retrieve Pavement State
3.5.2.3.6	Monitor Air Quality and Biohazard Conditions	-	-
3.5.2.3.6.1	Retrieve Carbon Monoxide Reading	-	-
		C.2.3.6.1	Retrieve Carbon Monoxide Reading
3.5.2.3.6.2	Retrieve Carbon Dioxide Reading	-	-
		C.2.3.6.2	Retrieve Carbon Dioxide Reading
3.5.2.3.6.3	Retrieve Nitrous Oxide Reading	-	-
		C.2.3.6.3	Retrieve Nitrous Oxide Reading
3.5.2.3.6.4	Retrieve Nitrogen Dioxide Reading	-	-
		C.2.3.6.4	Retrieve Nitrogen Dioxide Reading
3.5.2.3.6.5	Retrieve Sulfur Dioxide Reading	-	-
		C.2.3.6.5	Retrieve Sulfur Dioxide Reading
3.5.2.3.6.6	Retrieve Ozone Reading	-	-
		C.2.3.6.6	Retrieve Ozone Reading
3.5.2.3.6.7	Retrieve Small Particulate Matter Reading	-	-
		C.2.3.6.7	Retrieve Small Particulate Matter Reading
3.5.2.3.6.8	Retrieve Compressed Air Quality Data [Deprecated]-[Version 03]	-	-
3.5.2.3.6.9	Retrieve Particulate Matter (2.5) Reading	-	-
		C.2.3.6.9	Retrieve Particulate Matter (2.5) Reading
3.5.2.3.7	Retrieve Water Level	-	-
		C.2.3.7.1	Retrieve Water Level
3.5.2.3.8	Retrieve Snapshot	-	-
		C.2.3.7.2	Retrieve Snapshot

Requirement		Test Case	
ID	Title	ID	Title
3.5.2.3.9	Retrieve Snapshot Camera Configuration	-	-
		C.2.3.7.2	Retrieve Snapshot
3.5.2.3.10	Retrieve Sensor Profile with Mobile Sources	-	-
		C.2.3.12.1C 2.3.11.13	Retrieve Sensor Profile with Mobile Sources
3.5.2.4	Sensor Control Requirements	-	-
3.5.2.4.1	Capture Snapshot Image	-	-
		C.2.3.7.2	Retrieve Snapshot
3.5.2.4.2	Delete Snapshot	-	-
		C.2.3.7.2	Retrieve Snapshot
3.5.2.4.3	Copy Snapshot - [Obsolete] [Deprecated]	-	-
		C.2.3.7.2	Retrieve Snapshot
3.5.3	PTS Manager Requirements	-	-
3.5.3.1	PTS Configuration Requirements	-	-
3.5.3.1.1	Retrieve Stationary Pavement Treatment Configuration	-	-
		C.2.3.8.1	Retrieve Stationary Pavement Treatment Configuration
3.5.3.1.2	Configure Stationary Pavement Treatment System	-	-
		C.2.3.8.2	Configure Stationary Pavement Treatment System
3.5.3.1.3	Retrieve Mobile Pavement Treatment Configuration [Versions 01 to 03 Only - Deprecated in v04]	-	-
3.5.3.1.4	Configure Mobile Pavement Treatment System	-	-
		C.2.3.8.4	Configure Mobile Pavement Treatment System
3.5.3.1.5	Retrieve Mobile Pavement Treatment Configuration	-	-
		C.2.3.8.9	Retrieve Mobile Pavement Treatment Configuration
3.5.3.2	PTS Status Monitoring Requirements	-	-
3.5.3.2.1	Retrieve Pavement Treatment Status	-	-
		C.2.3.8.5	Retrieve Pavement Treatment Status
3.5.3.3	PTS Data Retrieval Requirements	-	-
3.5.3.3.1	Retrieve Pavement Treatment Profile with Mobile Sources	-	-
		C.2.3.8.8	Retrieve Pavement Treatment Profile with Mobile Sources
3.5.3.4	PTS Control Requirements	-	-
3.5.3.4.1	Set PTS Operational Mode	-	-
		C.2.3.8.6	Set PTS Operational Mode
3.5.3.4.2	Manually Activate PTS Sprayer	-	-
		C.2.3.8.7	Manually Activate PTS Sprayer

Requirement		Test Case	
ID	Title	ID	Title
3.5.4	Backward Compatibility Requirements	-	-
3.5.4.1	NTCIP 1204 v01 Wind Sensor Meta Data	-	-
		C.2.3.11.1	Version 1 Wind Sensor Meta Data
3.5.4.2	NTCIP 1204 v01 Average Wind Sensor Data	-	-
		C.2.3.11.2	Version 1 Average Wind Sensor Data
3.5.4.3	NTCIP 1204 v01 Spot Wind Sensor Data	-	-
		C.2.3.11.3	Version 1 Spot Wind Sensor Data
3.5.4.4	NTCIP 1204 v01 Wind Gust Data	-	-
		C.2.3.11.4	Version 1 Wind Gust Data
3.5.4.5	NTCIP 1204 v01 Wind Situation	-	-
		C.2.3.11.5	Version 1 Wind Situation
3.5.4.6	NTCIP 1204 v01 Water Depth	-	-
		C.2.3.11.6	Version 1 Water Depth
3.5.4.7	NTCIP 1204 v01 Solar Radiation	-	-
		C.2.3.11.7	Version 1 Solar Radiation
3.5.4.8	NTCIP 1204 v01 Surface Water Depth	-	-
		C.2.3.11.8	Version 1 Surface Water Depth
3.5.4.9	NTCIP 1204 v01 Surface Conductivity	-	-
		C.2.3.11.9	Version 1 Surface Conductivity
3.5.4.10	NTCIP 1204 v02 Station Meta Data Block	-	-
		C.2.3.11.10	Version 2 Station Meta Data Block
3.5.4.11	NTCIP 1204 v02 Weather Block	-	-
		C.2.3.11.11	Version 2 Weather Block Version 2 We
3.5.4.12	NTCIP 1204 v02 Pavement Block	-	-
		C.2.3.11.12	Version 2 Pavement Block
3.5.4.13	NTCIP 1204 v03 Retrieve External Port Information	-	-
		C.2.3.11.13	Version 3 Monitor External Port Information
3.5.4.14	NTCIP 1204 v03 Configure Port Information	-	-
		C.2.3.11.13	Version 3 Monitor External Port Information
3.5.4.15	NTCIP 1204 v03 Monitor Status of External Device	-	-
		C.2.3.11.14	Version 3 Configure External Port
3.5.4.16	NTCIP 1204 v03 Control External Device	-	-
		C.2.3.11.14	Version 3 Configure External Port
3.5.4.17	NTCIP 1204 v03 Station Metadata Block	-	-
		C.2.3.1.2	Retrieve Compressed Station Metadata
3.5.4.18	NTCIP 1204 v03 Mobile ESS Data Block	-	-

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.1.7	Retrieve Compressed Mobile Station Data
3.5.4.19	NTCIP 1204 v01-v03 Atmospheric Pressure Height		
		C.2.3.2.1	Retrieve Atmospheric Pressure Height [Versions 01 to 03]
3.5.4.20	NTCIP 1204 v03 Weather Profile with Mobile Sources		
		C.2.3.3.1	Retrieve Weather Profile with Mobile Sources
3.5.4.21	NTCIP 1204 v01-v03 Atmospheric Pressure		
		C.2.3.3.2	Retrieve Atmospheric Pressure [Versions 01 to 03]
3.5.4.22	NTCIP 1204 v01-v03 Humidity		
		C.2.3.3.6	Retrieve Humidity [Versions 01 to 03]
3.5.4.23	NTCIP 1204 v01-v03 Precipitation Presence		
		C.2.3.3.7	Retrieve Precipitation Presence [Versions 01 to 03]
3.5.4.24	NTCIP 1204 v01-v03 Precipitation Rates		
		C.2.3.3.8	Retrieve Precipitation Rates [Versions 01 to 03]
3.5.4.25	NTCIP 1204 v01-v03 Precipitation Totals		
		C.2.3.3.9	Retrieve Precipitation Totals [Versions 01 to 03]
3.5.4.26	NTCIP 1204 v03 Solar Radiation		
		C.2.3.3.10	Retrieve Solar Radiation [Versions 01 to 03]
3.5.4.27	NTCIP 1204 v03 Weather Block		
		C.2.3.3.12	Retrieve Compressed Weather Data
3.5.4.28	NTCIP 1204 v01-v03 Pavement Surface Condition		
		C.2.3.4.1	Retrieve Pavement Surface Condition [Versions 01 to 03]
3.5.4.29	NTCIP 1204 v03 Pavement Condition Block		
		C.2.3.4.7	Retrieve Compressed Pavement Condition Data
3.5.4.30	NTCIP 1204 v01-v03 Adjacent Snow Depth		
		C.2.3.4.4	Retrieve Adjacent Snow Depth [Versions 01 to 03]
3.5.4.31	NTCIP 1204 v01-v03 Roadway Snow Depth		
		C.2.3.4.5	Retrieve Roadway Snow Depth [Versions 01 to 03]
3.5.4.32	NTCIP 1204 v01-v03 Roadway Ice Thickness		

Requirement		Test Case	
ID	Title	ID	Title
		C.2.3.4.6	Retrieve Roadway Ice Thickness [Versions 01 to 03]
3.5.4.33	NTCIP 1204 v03 Subsurface Condition Block		
		C.2.3.4.10	Retrieve Compressed Subsurface Condition Data
3.5.4.34	NTCIP 1204 v01-v03 Cloud Situation		
		C.2.3.5.3	Retrieve Cloud Situation [Versions 01 to 03]
3.5.4.35	NTCIP 1204 v01-v03 Ground State		
		C.2.3.5.5	Retrieve Ground State [Versions 01 to 03]
3.5.4.36	NTCIP 1204 v01-v03 Pavement State		
		C.2.3.5.6	Retrieve Pavement State [Versions 01 to 03]
3.5.4.37	NTCIP 1204 v03 Air Quality Block		
		C.2.3.6.8	Retrieve Compressed Air Quality Data
3.5.4.38	NTCIP 1204 v03 Mobile Pavement Treatment Block		
		C.2.3.8.3	Retrieve Mobile Pavement Treatment Configuration
3.6	Supplemental Non-Communications Requirements		
3.6.1	Required Number of Atmospheric Pressure Sensors		
		C.2.3.3.17G 2.3.3.2	Retrieve Atmospheric Pressure Retrieve Atmospheric Pressure
3.6.2	Required Number of Wind Sensors		
		C.2.3.3.3	Retrieve Wind Data
3.6.3	Required Number of Temperature Sensors		
		C.2.3.3.4	Retrieve Temperature
3.6.4	Required Number of Humidity Sensors		
		C.2.3.3.18G 2.3.3.6	Retrieve Relative Humidity Sensor Retrieve Humidity
3.6.5	Required Number of Precipitation Sensors		
		C.2.3.3.13G 2.3.3.7	Retrieve Precipitation Presence Retrieve Precipitation Presence
3.6.6	Required Number of Solar Radiation Sensors		
		C.2.3.3.19G 2.3.3.10	Retrieve Solar Radiation Retrieve Solar Radiation
3.6.7	Required Number of Visibility Sensors		
		C.2.3.3.11	Retrieve Visibility
3.6.8	Required Number of Pavement Sensors		

Requirement		Test Case	
ID	Title	ID	Title
-	-	C.2.3.4.11	Retrieve Pavement Surface Condition
3.6.9	Active Pavement Treatment Sensors	-	-
-	-	C.2.3.4.2	Retrieve Icing Conditions—Active
3.6.10	Passive Pavement Treatment Sensors	-	-
-	-	C.2.3.4.3	Retrieve Icing Conditions—Passive
3.6.11	Required Number of Subsurface Sensors	-	-
-	-	C.2.3.4.8	Retrieve Basic Subsurface Conditions
3.6.12	Required Number of Pavement Treatment Products	-	-
-	-	C.2.3.8.1	Retrieve Stationary Pavement Treatment Configuration
-	-	C.2.3.8.3	Retrieve Mobile Pavement Treatment Configuration
3.6.13	Required Number of Carbon Monoxide Sensors	-	-
-	-	C.2.3.6.1	Retrieve Carbon Monoxide Reading
3.6.14	Required Number of Carbon Dioxide Sensors	-	-
-	-	C.2.3.6.2	Retrieve Carbon Dioxide Reading
3.6.15	Required Number of Nitrous Oxide Sensors	-	-
-	-	C.2.3.6.3	Retrieve Nitrous Oxide Reading
3.6.16	Required Number of Nitrogen Dioxide Sensors	-	-
-	-	C.2.3.6.4	Retrieve Nitrogen Dioxide Reading
3.6.17	Required Number of Sulfur Dioxide Sensors	-	-
-	-	C.2.3.6.5	Retrieve Sulfur Dioxide Reading
3.6.18	Required Number of Ozone Sensors	-	-
-	-	C.2.3.6.6	Retrieve Ozone Reading
3.6.19	Required Number of Small Particulate Matter Sensors	-	-
-	-	C.2.3.6.7	Retrieve Small Particulate Matter Reading
3.6.20	Required Number of Snapshot Cameras	-	-
-	-	C.2.3.7.2	Retrieve Snapshot
3.6.21	Maximum Response Time for Requests	-	-
-	-	C.2.3	Test Procedures
3.6.22	Required Number of Water Level Sensors Maximum Transmission Start Time	-	-
-	-	C.2.3.7.1	Retrieve Water Level
3.6.23	Support Camera Number in Filename	-	-
-	-	C.2.3.2.9	Configure Snapshot Camera

Requirement		Test Case	
ID	Title	ID	Title
3.6.24	Support Sequence Number in Filename	-	-
		C.2.3.2.9	Configure Snapshot Camera
3.6.25	Support Date in Filename	-	-
		C.2.3.2.9	Configure Snapshot Camera
3.6.26	Support Time in Filename	-	-
		C.2.3.2.9	Configure Snapshot Camera
3.6.27	Support Long Filenames	-	-
		C.2.3.2.9	Configure Snapshot Camera
Required Number of Water Level Sensors 3.6.28	Required Number of Small Particulate Matter (2.5) Sensors	-	-
		C.2.3.6.9	Retrieve Particulate Matter (2.5) Reading
F.2.1	Generic Architectural Requirements	-	-
F.2.1.1	Support Basic Communications	-	-
F.2.1.1.1	Retrieve Data	-	-
		C.2.3.1.1	ESS Characteristics
F.2.1.1.2	Deliver Data	-	-
		C.2.3.1.1	ESS Characteristics
F.2.1.1.3	Explore Data	-	-
		C.2.3.10.1	Explore Data
F.2.1.2	Support Logged Data	-	-
F.2.1.2.1	Retrieve Current Configuration of Logging Service	-	-
		C.2.3.9.13	Determine Configuration of Logging Service
F.2.1.2.2	Configure Logging Service	-	-
		C.2.3.9.2	Configure Event Log
		C.2.3.9.7	Verify Support for an On-Change Event
		C.2.3.9.8	Verify Support for a Greater Than Event
		C.2.3.9.9	Verify Support for a Less Than Event
		C.2.3.9.10	Verify Support for a Hysteresis Event
		C.2.3.9.11	Verify Support for a Periodic Event
		C.2.3.9.12	Verify Support for a Bit-flag Event
F.2.1.2.3	Retrieve Logged Data	-	-
		C.2.3.9.3	Retrieve Logged Data
F.2.1.2.4	Clear Log	-	-
		C.2.3.9.4	Clear Log
F.2.1.2.5	Retrieve Capabilities of Event Logging Service	-	-
		C.2.3.9.1	Determine Capabilities of Event Logging Service
F.2.1.2.6	Retrieve Total Number of Logged Events	-	-
		C.2.3.9.5	Determine Total Number of Events

Requirement		Test Case	
ID	Title	ID	Title
F.2.2	Generic Functional Requirements	-	-
F.2.2.1	Generic Configuration Requirements	-	-
F.2.2.1.1	Retrieve Device Component Information	-	-
-	-	C.2.3.10.2	Determine Device Component Information
F.2.2.1.2	Retrieve Device Configuration Identifier	-	-
-	-	C.2.3.10.3	Retrieve Device Configuration Identifier
F.2.2.1.3	Retrieve Supported Standards	-	-
-	-	C.2.3.10.4	Determine Supported Standards
F.2.2.1.4	Retrieve System Name	-	-
-	-	C.2.3.10.5	Retrieve System Name
F.2.2.1.5	Manage Time	-	-
F.2.2.1.5.1	Set Time	-	-
-	-	C.2.3.10.6	Set Time
F.2.2.1.5.2	Retrieve Current Time	-	-
-	-	C.2.3.10.6	Set Time
F.2.2.1.6	Retrieve External Port Information	-	-
-	-	C.2.3.10.7	Monitor External Port Information
F.2.2.1.7	Configure Port Information	-	-
-	-	C.2.3.10.8	Configure External Port
F.2.2.2	Generic Status Monitoring Requirements	-	-
F.2.2.2.1	Monitor Status of External Device	-	-
-	-	C.2.3.10.7	Monitor External Port Information
F.2.2.3	Generic Data Retrieval Requirements	-	-
F.2.2.4	Generic Control Requirements	-	-
F.2.2.4.1	Control External Device	-	-
-	-	C.2.3.10.8	Configure External Port
F.2.3	Generic Supplemental Requirements	-	-
F.2.3.1	Supplemental Requirements for Event Monitoring	-	-
F.2.3.1.1	Record and Timestamp Events	-	-
-	-	C.2.3.9.3	Retrieve Logged Data
-	-	C.2.3.9.6	Verify Log Limit Storage
F.2.3.1.2	Support a Number of Event Classes	-	-
-	-	C.2.3.9.1	Determine Capabilities of Event Logging Service
F.2.3.1.3	Support a Number of Event Types to Monitor	-	-
-	-	C.2.3.9.1	Determine Capabilities of Event Logging Service
F.2.3.1.4	Support Monitoring of Event Types	-	-
F.2.3.1.4.1	Support On-Change Events	-	-
-	-	C.2.3.9.7	Verify Support for an On-Change Event
F.2.3.1.4.2	Support Greater Than Events	-	-
-	-	C.2.3.9.8	Verify Support for a Greater Than Event

Requirement		Test Case	
ID	Title	ID	Title
F.2.3.1.4.3	Support Less Than Events	-	-
-	-	C.2.3.9.9	Verify Support for a Less Than Event
F.2.3.1.4.4	Support Hysteresis Events	-	-
-	-	C.2.3.9.10	Verify Support for a Hysteresis Event
F.2.3.1.4.5	Support Periodic Events	-	-
-	-	C.2.3.9.11	Verify Support for a Periodic Event
F.2.3.1.4.6	Support Bit Flag Events	-	-
-	-	C.2.3.9.12	Verify Support for a Bit-flag Event
F.2.3.1.5	Support Event Monitoring on Any Data	-	-
-	-	C.2.3.9.2	Configure Event Log
F.2.3.1.6	Support a Number of Events to Store in Log	-	-
-	-	C.2.3.9.1	Determine Capabilities of Event Logging Service
-	-	C.2.3.9.6	Verify Log Limit Storage
F.2.3.2	Required Number of Auxiliary Ports	-	-
-	-	C.2.3.10.7	Monitor External Port Information

C.2.3 Test Procedures

Annex C.2.3 provides detailed test procedures.

~~The definition for e~~Each field in each Test Case is defined in [NTCIP 8007 v01 Section 2.4.2, Required Elements in NTCIP 8007 v01](#). In addition to these definitions, the Variables field may contain a reference, in parentheses, that indicates where the value to be used for a test case for a Variable may be found. In certain instances, that value may be found ~~in~~under the Additional Specifications column (for the appropriate User Need ID or FR ID) in the PRL ~~Table~~ in Section 3.3.3 ~~of NTCIP 1204 v04~~. ~~Finally, the Device field may contain a reference, in parentheses, where the requirement, dialog, or object definition that is being tested for that Test Step can be found.~~

[C.2.3.1](#) ESS Manager Tests

C.2.3.1

C.2.3.1.1 ESS Characteristics

Test Case: 1.1	Title:	ESS Characteristics
	Description:	This test case verifies that the ESS accurately reports its type, category and location and allows a management station to edit the site description.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essNtcipCategory.0 »essNtcipSiteDescription.0 »essTypeofStation.0 »essLatitude.0 »essLongitude.0 »essReferenceHeight.0	Pass / Fail (Sec. 3.5.1.1.1)
2	VERIFY that the RESPONSE VALUE for essNtcipCategory.0 is APPROPRIATE. Note: See NTCIP 1204 v04 Sec. 5.2.1 for valid enumerated values.	Pass / Fail (Sec. 5.2.1)
3	VERIFY that the RESPONSE VALUE for essNtcipSiteDescription.0 contains only display string characters.	Pass / Fail (Sec. 5.2.2)
4	VERIFY that the RESPONSE VALUE for essTypeofStation.0 is APPROPRIATE. Note: See NTCIP 1204 v04 Sec. 5.3.1 for the definition of valid values.	Pass / Fail (Sec. 5.3.1)
5	VERIFY that the RESPONSE VALUE for essLatitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.1)
6	VERIFY that the RESPONSE VALUE for essLongitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.2)
7	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)
8	Determine the RESPONSE VALUE for essNtcipSiteDescription.0. RECORD this information as: »Orig_Description	
9	Calculate a random test value for the site description containing between 1 and 255 DisplayString characters. RECORD this information as: »New_Description	
10	SET the following object(s) to the value(s) shown: »essNtcipSiteDescription.0 = New_Description	Pass / Fail (Sec. 3.5.1.1.3)
11	GET the following object(s): »essNtcipCategory.0 »essNtcipSiteDescription.0 »essTypeofStation.0 »essLatitude.0 »essLongitude.0 »essReferenceHeight.0	Pass / Fail (Sec. 3.5.1.1.1)
12	VERIFY that the RESPONSE VALUE for essNtcipSiteDescription.0 is equal to New_Description.	Pass / Fail (Sec. 3.5.1.1.3)

13	SET the following object(s) to the value(s) shown: »essNtcipSiteDescription.0 = Orig_Description	Pass / Fail (Sec. 3.5.1.1.3)
14	GET the following object(s): »essNtcipSiteDescription.0	Pass / Fail (RFC 1157)
15	VERIFY that the RESPONSE VALUE for essNtcipSiteDescription.0 is equal to Orig_Description.	Pass / Fail (Sec. 3.5.1.1.3)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.1.2 Retrieve Compressed Station Metadata

Test Case: 1.2	Title:	Retrieve Compressed Station Metadata		
	Description:	This test case verifies that the ESS accurately reports its type, category, location, sensor locations, and pavement treatment information in a compressed form.		
	Variables:	Pressure_Supported	PRL 2.5.2.1.1	
		Wind_Supported	PRL 2.5.2.1.2	
		Required_Wind_Sensors	PRL 3.6.2	
		Temperature_Supported	PRL 2.5.2.1.3	
		Required_Temp_Sensors	PRL 3.6.3	
		Pavement_Supported	PRL 2.5.2.2	
		Required_Pavement_Sensors	PRL 3.6.8	
		Subsurface_Supported	PRL 2.5.2.3	
		Required_Subsurface_Sensors	PRL 3.6.11	
		Pavement_Treatment_Supported	PRL 2.5.3	
Required_Pavement_Treatment_Products	PRL 3.6.12			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the ESS is required to monitor atmospheric pressure (PRL 2.5.2.1.1). RECORD this information as: »Pressure_Supported	
2	CONFIGURE: Determine the number of wind sensors that are supported. RECORD this information as: »Wind_Supported (whether the ESS is required to monitor winds—PRL 2.5.2.1.2) »Required_Wind_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.2)	
3	CONFIGURE: Determine whether the ESS is required to support temperature sensors and, if so, how many sensors are required. RECORD this information as: »Temperature_Supported (whether the ESS is required to monitor temperature—PRL 2.5.2.1.3) »Required_Temp_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.3)	
4	CONFIGURE: Determine whether the ESS is required to support pavement sensors and, if so, how many sensors are required. RECORD this information as: »Pavement_Supported (whether the ESS is required to monitor the pavement—PRL 2.5.2.2) »Required_Pavement_Sensors (the number of pavement sensors that the ESS is required to support—PRL 3.6.8)	
5	CONFIGURE: Determine whether the ESS is required to support subsurface sensors and, if so, how many sensors are required. RECORD this information as: »Subsurface_Supported (whether the ESS is required to monitor the subsurface - PRL 2.5.2.3) »Required_Subsurface_Sensors (the number of subsurface sensors that the ESS is required to support—PRL 3.6.11)	
6	CONFIGURE: Determine whether the ESS is required to provide pavement treatment capabilities and, if so, how many treatment products the device is required to support. RECORD this information as: »Pavement_Treatment_Supported (whether pavement treatment capabilities are required—PRL 2.5.3) »Required_Pavement_Treatment_Products (number of pavement treatment products	

	required—PRL 3.6.12)	
7	GET the following object(s): »essStationMetaDataV3Block.0	Pass / Fail (Sec. 3.5.1.1.2)
8	Decode the essStationMetaDataV3Block.0 structure.	
9	VERIFY that the essStationMetaDataV3Block.0 structure was decoded without error.	Pass / Fail (Sec. 5.3.8)
10	VERIFY that the RESPONSE VALUE for the essNtcipCategory.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.1.1.1)
11	VERIFY that the RESPONSE VALUE for the essNtcipCategory.0 field of the essStationMetaDataV3Block.0 object is APPROPRIATE. NOTE—See NTCIP 1204 v04 Sec. 5.2.1 for valid enumerated values.	Pass / Fail (Sec. 5.2.1)
12	VERIFY that the RESPONSE VALUE for the essTypeOfStation.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.1.1.1)
13	VERIFY that the RESPONSE VALUE for the essTypeOfStation.0 field of the essStationMetaDataV3Block.0 object is APPROPRIATE. Note: See NTCIP 1204 v04 Sec. 5.3.1 for the definition of valid values.	Pass / Fail (Sec. 5.3.1)
14	VERIFY that the RESPONSE VALUE for the essLatitude.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.1.1.1)
15	VERIFY that the RESPONSE VALUE for the essLatitude.0 field of the essStationMetaDataV3Block.0 object indicates an APPROPRIATE.	Pass / Fail (Sec. 5.4.1)
16	VERIFY that the RESPONSE VALUE for the essLongitude.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.1.1.1)
17	VERIFY that the RESPONSE VALUE for the essLongitude.0 field of the essStationMetaDataV3Block.0 object indicates an APPROPRIATE.	Pass / Fail (Sec. 5.4.2)
18	VERIFY that the RESPONSE VALUE for the essReferenceHeight.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.1.1.1)
19	VERIFY that the RESPONSE VALUE for the essReferenceHeight.0 field of the essStationMetaDataV3Block.0 object is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)
20	IF Pressure_Supported is equal to true, then proceed to Step 20.1; otherwise, proceed to Step 21.	
20.1	VERIFY that the RESPONSE VALUE for the essPressureHeight.0 field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.1)
20.2	VERIFY that the RESPONSE VALUE for essPressureHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.2)
21	IF Wind_Supported is equal to true, then proceed to Step 21.1; otherwise, proceed to Step 22.	
21.1	VERIFY that the windMetaData field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.2)
21.2	VERIFY that the windMetaData field of the essStationMetaDataV3Block.0 object contains at least Required_Wind_Sensors entries.	Pass / Fail (Sec. 3.6.2)

21.3	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 21.3.1 through 21.3.4.	
21.3.1	VERIFY that the RESPONSE VALUE for the windSensorIndex.0 field is present in the Nth WindMetaData structure.	Pass / Fail (Sec. 3.5.2.1.2)
21.3.2	VERIFY that the RESPONSE VALUE for the windSensorIndex.x field in the Nth WindMetaData structure is equal to N.	Pass / Fail (Sec. 5.6.10.1)
21.3.3	VERIFY that the RESPONSE VALUE for the windSensorHeight.x field is present in the Nth WindMetaData structure.	Pass / Fail (Sec. 3.5.2.1.2)
21.3.4	VERIFY that the RESPONSE VALUE for windSensorHeight.x field in the Nth WindMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.2)
22	IF Temperature_Supported is equal to true, then proceed to Step 22.1; otherwise, proceed to Step 23.	
22.1	VERIFY that the RESPONSE VALUE for the temperatureMetaData field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.3)
22.2	VERIFY that the temperatureMetaData field contains at least Required_Temp_Sensors entries.	Pass / Fail (Sec. 3.6.3)
22.3	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 22.3.1 through 22.3.4.	
22.3.1	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.0 field is present in the Nth TemperatureMetaData structure.	Pass / Fail (Sec. 3.5.2.1.3)
22.3.2	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.0 field in the Nth TemperatureMetaData structure is equal to N.	Pass / Fail (Sec. 5.7.3.1)
22.3.3	VERIFY that the RESPONSE VALUE for the essTemperatureSensorHeight.0 field is present in the Nth TemperatureMetaData structure.	Pass / Fail (Sec. 3.5.2.1.3)
22.3.4	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.0 field in the Nth TemperatureMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.2)
23	IF Pavement_Supported is equal to true, then proceed to Step 23.1; otherwise, proceed to Step 24.	
23.1	VERIFY that the RESPONSE VALUE for the pavementMetaData field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.4)
23.2	VERIFY that the pavementMetaData field contains at least Required_Pavement_Sensors entries.	Pass / Fail (Sec. 3.6.8)
23.3	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 23.3.1 through 23.3.10.	
23.3.1	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 3.5.2.1.4)
23.3.2	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.0 field in the Nth PavementMetaData structure is equal to N.	Pass / Fail (Sec. 5.11.3.1)
23.3.3	VERIFY that the RESPONSE VALUE for the essPavementType.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 3.5.2.1.4)
23.3.4	VERIFY that the RESPONSE VALUE for the essPavementType.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.3)

23.3.5	VERIFY that the RESPONSE VALUE for the essPavementElevation.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 3.5.2.1.4)
23.3.6	VERIFY that the RESPONSE VALUE for the essPavementElevation.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.4)
23.3.7	VERIFY that the RESPONSE VALUE for the essPavementExposure.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 3.5.2.1.4)
23.3.8	VERIFY that the RESPONSE VALUE for the essPavementExposure.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.5)
23.3.9	VERIFY that the RESPONSE VALUE for the essPavementSensorType.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 3.5.2.1.4)
23.3.10	VERIFY that the RESPONSE VALUE for the essPavementSensorType.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.6)
24	IF Subsurface_Supported is equal to true, then proceed to Step 24.1; otherwise, proceed to Step 25.	
24.1	VERIFY that the RESPONSE VALUE for the SubSurfaceMetaData field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.5)
24.2	VERIFY that the SubSurfaceMetaData field contains at least Required_Subsurface_Sensors entries.	Pass / Fail (Sec. 3.6.11)
24.3	FOR EACH value, N, from 1 to Required_Subsurface_Sensors, perform Steps 24.3.1 through 24.3.6.	
24.3.1	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorIndex.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 3.5.2.1.5)
24.3.2	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorIndex.0 field in the Nth SubSurfaceMetaData structure is equal to N.	Pass / Fail (Sec. 5.11.6.1)
24.3.3	VERIFY that the RESPONSE VALUE for the essSubSurfaceType.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 3.5.2.1.5)
24.3.4	VERIFY that the RESPONSE VALUE for the essSubSurfaceType.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.3)
24.3.5	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorDepth.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 3.5.2.1.5)
24.3.6	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorDepth.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.4)
25	IF Pavement_Treatment_Supported is equal to true, then proceed to Step 25.1; otherwise, proceed to EXIT.	
25.1	VERIFY that the RESPONSE VALUE for the treatmentMetaData field of the essStationMetaDataV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.1.8)
25.2	VERIFY that the treatmentMetaData field contains at least Required_Pavement_Treatment_Products entries.	Pass / Fail (Sec. 3.6.12)
25.3	FOR EACH value, N, from 1 to Required_Pavement_Treatment_Products, perform Steps 25.3.1 through 25.3.11.	
25.3.1	VERIFY that the RESPONSE VALUE for the essPavementTreatmentIndex.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 3.5.2.1.8)

25.3.2	VERIFY that the RESPONSE VALUE for the essPavementTreatmentIndex.0 field in the Nth TreatmentMetaData structure is equal to N.	Pass / Fail (Sec. 5.13.3.1)
25.3.3	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 3.5.2.1.8)
25.3.4	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.0 field in the Nth TreatmentMetaData structure is between 1 and 14, inclusive.	Pass / Fail (Sec. 5.13.3.2)
25.3.5	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.x field in the Nth TreatmentMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
25.3.6	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 3.5.2.1.8)
25.3.7	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field in the Nth TreatmentMetaData structure is between 1 and 4, inclusive.	Pass / Fail (Sec. 5.13.3.3)
25.3.8	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field in the Nth TreatmentMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.3)
25.3.9	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 3.5.2.1.8)
25.3.10	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field in the Nth TreatmentMetaData structure is between 0 and 100, inclusive.	Pass / Fail (Sec. 5.13.3.4)
25.3.11	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field in the Nth TreatmentMetaData structure is APPROPRIATE for the subject pavement treatment.	Pass / Fail (Sec. 5.13.3.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.1.3 Retrieve ESS Door Status

Test Case: 1.3	Title:	Retrieve ESS Door Status
	Description:	This test case verifies that the ESS allows a management station to determine whether any of the doors related to the ESS are open.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	Verify that all doors associated with the ESS are closed.	
2	GET the following object(s): »essDoorStatus.0	Pass / Fail (Sec. 3.5.1.2.1)
3	VERIFY that the RESPONSE VALUE for essDoorStatus.0 is equal to 0.	Pass / Fail (Sec. 5.3.2)
4	Open at least one door associated with the ESS	
5	GET the following object(s): »essDoorStatus.0	Pass / Fail (Sec. 3.5.1.2.1)
6	VERIFY that the RESPONSE VALUE for essDoorStatus.0 is equal to 1.	Pass / Fail (Sec. 5.3.2)
7	Return all doors to their original state.	

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.1.4 Retrieve Battery Status

Test Case: 1.4	Title:	<i>Retrieve Battery Status</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the charge status of the battery.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essBatteryStatus.0	Pass / Fail (Sec. 3.5.1.2.2)
2	VERIFY that the RESPONSE VALUE for essBatteryStatus.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.3.3)
3	VERIFY that the RESPONSE VALUE for essBatteryStatus.0 is less than or equal to 101.	Pass / Fail (Sec. 5.3.3)
4	VERIFY that the RESPONSE VALUE for essBatteryStatus.0 is APPROPRIATE.	Pass / Fail (Sec. 5.3.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.1.5 Retrieve Line Volts

Test Case: 1.5	Title:	Retrieve Line Volts	
	Description:	This test case verifies that the ESS allows a management station to determine the voltage on the incoming A/C power.	
	Variables:		
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	
Step	Test Procedure	Device	
1	GET the following object(s): »essLineVolts.0	Pass / Fail (Sec. 3.5.1.2.3)	
2	VERIFY that the RESPONSE VALUE for essLineVolts.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.3.4)	
3	VERIFY that the RESPONSE VALUE for essLineVolts.0 is less than or equal to 255.	Pass / Fail (Sec. 5.3.4)	
4	VERIFY that the RESPONSE VALUE for essLineVolts.0 is APPROPRIATE.	Pass / Fail (Sec. 5.3.4)	
Test Case Results			
Tested By:		Date Tested:	Pass / Fail
Test Case Notes:			

C.2.3.1.6 Retrieve Mobile ESS Movement

Test Case: 1.6	Title:	Retrieve Mobile ESS Movement
	Description:	This test case verifies that the ESS allows a management station to determine the speed, location and direction of the management station
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essLatitude.0 »essLongitude.0 »essVehicleSpeed.0 »essVehicleBearing.0 »essOdometer.0 »essReferenceHeight.0	Pass / Fail (Sec. 3.5.1.3.1)
2	VERIFY that the RESPONSE VALUE for essLatitude.0 is greater than or equal to -90000000.	Pass / Fail (Sec. 5.4.1)
3	VERIFY that the RESPONSE VALUE for essLatitude.0 is less than or equal to 90000001.	Pass / Fail (Sec. 5.4.1)
4	VERIFY that the RESPONSE VALUE for essLatitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.1)
5	VERIFY that the RESPONSE VALUE for essLongitude.0 is greater than or equal to -180000000.	Pass / Fail (Sec. 5.4.2)
6	VERIFY that the RESPONSE VALUE for essLongitude.0 is less than or equal to 180000001.	Pass / Fail (Sec. 5.4.2)
7	VERIFY that the RESPONSE VALUE for essLongitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.2)
8	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.3)
9	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is less than or equal to 255.	Pass / Fail (Sec. 5.4.3)
10	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.3)
11	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.4)
12	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is less than or equal to 361.	Pass / Fail (Sec. 5.4.4)
13	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.4)
14	VERIFY that the RESPONSE VALUE for essOdometer.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.5)
15	VERIFY that the RESPONSE VALUE for essOdometer.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.4.5)

16	VERIFY that the RESPONSE VALUE for essOdometer.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.5)
17	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is greater than or equal to -400.	Pass / Fail (Sec. 5.5.1)
18	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is less than or equal to 8001.	Pass / Fail (Sec. 5.5.1)
19	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.1.7 Retrieve Compressed Mobile Station Data

Test Case: 1.7	Title:	<i>Retrieve Compressed Mobile Station Data</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location of, speed of, and pavement treatment being applied by the mobile platform</i>	
	Variables:	<i>Weather_Profile_Supported</i>	<i>PRL 3.5.2.3.1</i>
		<i>PTS_Supported</i>	<i>PRL 2.5.3.2</i>
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the device supports retrieving mobile weather profiles (PRL 3.5.2.3.1). RECORD this information as: »Weather_Profile_Supported	
2	CONFIGURE: Determine whether the device supports pavement treatment operations (PRL 2.5.3.2). RECORD this information as: »PTS_Supported	
3	GET the following object(s): »essMobileBlock.0	Pass / Fail (Sec. 3.5.1.3.3)
4	Decode the essMobileBlock.0 structure.	
5	VERIFY that the essMobileBlock.0 structure was decoded without error.	Pass / Fail (Sec. 5.3.7)
6	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essLatitude.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
7	VERIFY that the essLatitude.0 field has a value between -90000000 and 90000001, inclusive.	Pass / Fail (Sec. 5.4.1)
8	VERIFY that the essLatitude.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.4.1)
9	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essLongitude.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
10	VERIFY that the essLongitude.0 field has a value between -180000000 and 180000001, inclusive.	Pass / Fail (Sec. 5.4.2)
11	VERIFY that the essLongitude.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.4.2)
12	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essReferenceHeight.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
13	VERIFY that the essReferenceHeight.0 field has a value between -400 and 8001, inclusive.	Pass / Fail (Sec. 5.5.1)
14	VERIFY that the essReferenceHeight.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)
15	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essVehicleSpeed.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
16	VERIFY that the essVehicleSpeed.0 field has a value between 0 and 255, inclusive.	Pass / Fail

		(Sec. 5.4.3)
17	VERIFY that the essVehicleSpeed.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.4.3)
18	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essVehicleBearing.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
19	VERIFY that the essVehicleBearing.0 field has a value between 0 and 361, inclusive.	Pass / Fail (Sec. 5.4.4)
20	VERIFY that the essVehicleBearing.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.4.4)
21	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essVehicleOdometer.0 field.	Pass / Fail (Sec. 3.5.1.3.1)
22	VERIFY that the essVehicleOdometer.0 field has a value between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.4.5)
23	VERIFY that the essVehicleOdometer.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.4.5)
24	IF Weather_Profile_Supported is equal to true, then proceed to Step 24.1; otherwise, proceed to Step 25.	
24.1	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essMobileFriction.0 field.	Pass / Fail (Sec. 3.5.2.3.1)
24.2	VERIFY that the essMobileFriction.0 field has a value between 0 and 101, inclusive.	Pass / Fail (Sec. 5.12.1)
24.3	VERIFY that the essMobileFriction.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.12.1)
24.4	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essMobileObservationGroundState.0 field.	Pass / Fail (Sec. 3.5.2.3.1)
24.5	VERIFY that the essMobileObservationGroundState.0 field has a value between 1 and 18, inclusive.	Pass / Fail (Sec. 5.12.2)
24.6	VERIFY that the essMobileObservationGroundState.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.12.2)
24.7	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essMobileObservationPavement.0 field.	Pass / Fail (Sec. 3.5.2.3.1)
24.8	VERIFY that the essMobileObservationPavement.0 field has a value between 1 and 25, inclusive.	Pass / Fail (Sec. 5.12.3)
24.9	VERIFY that the essMobileObservationPavement.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.12.3)
25	IF PTS_Supported is equal to true, then proceed to Step 25.1; otherwise, proceed to EXIT.	
25.1	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essPaveTreatmentAmount.0 field.	Pass / Fail (Sec. 3.5.3.1.4)
25.2	VERIFY that the essTreatmentAmount.0 field has a value between 0 and 255, inclusive.	Pass / Fail (Sec. 5.13.4)

25.3	VERIFY that the essTreatmentAmount.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.13.4)
25.4	VERIFY that the RESPONSE VALUE for essMobileBlock.0 contains an essPaveTreatmentWidth.0 field.	Pass / Fail (Sec. 3.5.3.1.4)
25.5	VERIFY that the essPaveTreatmentWidth.0 field has a value between 0 and 255, inclusive.	Pass / Fail (Sec. 5.13.5)
25.6	VERIFY that the essPaveTreatmentWidth.0 field is APPROPRIATE.	Pass / Fail (Sec. 5.13.5)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.1.8 Retrieve ESS Status

<u>Test Case: 1.8</u>	<u>Title:</u>	<u>Retrieve ESS Status</u>
	<u>Description:</u>	<u>This test case verifies that the ESS allows a management station to retrieve ESS Status.</u>
	<u>Variables:</u>	
	<u>Pass/Fail Criteria:</u>	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>GET the following object(s): » essStatus</u>	<u>Pass / Fail (Clause 3.5.1.2.4)</u>
2	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "noError".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
3	<u>CONFIGURE: Disconnect the ESS from the primary power source. NOTE-This assumes that the ESS will continue to operate on a secondary power source.</u>	
4	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "powerError".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
5	<u>CONFIGURE: Reconnect the ESS to the primary power source.</u>	
6	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "noError".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
7	<u>CONFIGURE: Disconnect a sensor from the ESS or create a condition that prevents a sensor from properly reporting a sensor value to the ESS.</u>	
8	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "sensorFailure".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
9	<u>CONFIGURE: Reconnect the disconnected sensor to the ESS or remove the condition that prevented the sensor from properly reporting a sensor value to the ESS.</u>	
10	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "noError".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
11	<u>CONFIGURE: Determine the duration of time, in seconds, that must elapse before a watchdog timer is triggered. RECORD this information as: » Watchdog_Timeout</u>	
12	<u>CONFIGURE: Manually terminate an ESS process or task that will trigger watchdog failure.</u>	
13	<u>DELAY for Watchdog_Timeout seconds.</u>	
14	<u>VERIFY that the RESPONSE VALUE for essStatus is equal to "watchdogFailure".</u>	<u>Pass / Fail (Clause 5.3.10)</u>
15	<u>CONFIGURE: Reset the ESS or restart the ESS process or task terminated in STEP 12.</u>	

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>



C.2.3.2 Weather Metadata Tests

C.2.3.2.1 Retrieve Atmospheric Pressure Height [\[Versions 01 to 03\]](#)

Test Case: 2.1	Title:	Retrieve Atmospheric Pressure Height v01-v03
	Description:	This test case verifies that the ESS allows a management station to determine the relative height of the atmospheric pressure sensor
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essPressureHeight.0	Pass / Fail (Sec. 3.5.2.1.1)
2	VERIFY that the RESPONSE VALUE for essPressureHeight.0 is greater than or equal to -1000.	Pass / Fail (Sec. 5.5.2)
3	VERIFY that the RESPONSE VALUE for essPressureHeight.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.5.2)
4	VERIFY that the RESPONSE VALUE for essPressureHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.2.2 Retrieve Metadata for Each Wind Sensor

Test Case: 2.2	Title:	Retrieve Metadata for Each Wind Sensor
	Description:	This test case verifies that the ESS allows a management station to determine the location and relative height of each wind sensor
	Variables:	Required_Wind_Sensors (PRL 3.6.2)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of wind sensors that the ESS is required to support (PRL 3.6.2). RECORD this information as: »Required_Wind_Sensors	
2	GET the following object(s): »windSensorTableNumSensors.0	Pass / Fail (Sec. 3.5.2.1.2)
3	VERIFY that the RESPONSE VALUE for windSensorTableNumSensors.0 is greater than or equal to Required_Wind_Sensors.	Pass / Fail (Sec. 3.6.2)
4	Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as: »Supported_Wind_Sensors	
5	FOR EACH value, N, from 1 to Supported_Wind_Sensors, perform Steps 5.1 through 5.6.	
5.1	GET the following object(s): »windSensorHeight.N »windSensorLocation.N	Pass / Fail (Sec. 3.5.2.1.2)
5.2	VERIFY that the RESPONSE VALUE for windSensorHeight.N is greater than or equal to -1000.	Pass / Fail (Sec. 5.6.10.2)
5.3	VERIFY that the RESPONSE VALUE for windSensorHeight.N is less than or equal to 1001.	Pass / Fail (Sec. 5.6.10.2)
5.4	VERIFY that the RESPONSE VALUE for windSensorHeight.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.2)
5.5	VERIFY that the RESPONSE VALUE for windSensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Sec. 5.6.10.3)
5.6	VERIFY that the RESPONSE VALUE for windSensorLocation.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.2.3 Retrieve Temperature Sensor Metadata

Test Case: 2.3	Title:	Retrieve Temperature Sensor Metadata	
	Description:	This test case verifies that the ESS allows a management station to determine the relative height of each temperature sensor	
	Variables:	Required_Temp_Sensors	(PRL 3.6.3)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of temperature sensors required by the specification (PRL 3.6.3). RECORD this information as: »Required_Temp_Sensors	
2	GET the following object(s): »essNumTemperatureSensors.0	Pass / Fail (Sec. 3.5.2.1.3)
3	VERIFY that the RESPONSE VALUE for essNumTemperatureSensors.0 is greater than or equal to Required_Temp_Sensors.	Pass / Fail (Sec. 3.6.3)
4	Determine the RESPONSE VALUE for essNumTemperatureSensors.0. RECORD this information as: »Supported_Temp_Sensors	
5	FOR EACH value, N, from 1 to Supported_Temp_Sensors, perform Steps 5.1 through 5.4.	
5.1	GET the following object(s): »essTemperatureSensorHeight.N	Pass / Fail (Sec. 3.5.2.1.3)
5.2	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is greater than or equal to -1000.	Pass / Fail (Sec. 5.7.3.2)
5.3	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is less than or equal to 1001.	Pass / Fail (Sec. 5.7.3.2)
5.4	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.2.4 Retrieve Pavement Sensor Metadata

Test Case: 2.4	Title:	Retrieve Pavement Sensor Metadata
	Description:	This test case verifies that the ESS allows a management station to determine available meta-data for each pavement sensor.
	Variables:	Required_Pavement_Sensors (PRL 3.6.8)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	GET the following object(s): »numEssPavementSensors.0	Pass / Fail (Sec. 3.5.2.1.4)
3	VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Required_Pavement_Sensors.	Pass / Fail (Sec. 3.6.8)
4	Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as: »Supported_Pavement_Sensors	
5	FOR EACH value, N, from 1 to Supported_Pavement_Sensors, perform Steps 5.1 through 5.15.	
5.1	GET the following object(s): »essPavementSensorLocation.N »essPavementType.N »essPavementElevation.N »essPavementExposure.N »essPavementSensorType.N	Pass / Fail (Sec. 3.5.2.1.4)
5.2	VERIFY that the RESPONSE VALUE for essPavementSensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Sec. 5.11.3.2)
5.3	VERIFY that the RESPONSE VALUE for essPavementSensorLocation.N is APPROPRIATE.	
5.4	VERIFY that the RESPONSE VALUE for essPavementType.N is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.3)
5.5	VERIFY that the RESPONSE VALUE for essPavementType.N is less than or equal to 9.	Pass / Fail (Sec. 5.11.3.3)
5.6	VERIFY that the RESPONSE VALUE for essPavementType.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.3)
5.7	VERIFY that the RESPONSE VALUE for essPavementElevation.N is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.4)
5.8	VERIFY that the RESPONSE VALUE for essPavementElevation.N is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.4)
5.9	VERIFY that the RESPONSE VALUE for essPavementElevation.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.4)
5.10	VERIFY that the RESPONSE VALUE for essPavementExposure.N is greater than or	Pass / Fail

	equal to 0.	(Sec. 5.11.3.5)
5.11	VERIFY that the RESPONSE VALUE for essPavementExposure.N is less than or equal to 101.	Pass / Fail (Sec. 5.11.3.5)
5.12	VERIFY that the RESPONSE VALUE for essPavementExposure.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.5)
5.13	VERIFY that the RESPONSE VALUE for essPavementSensorType.N is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.6)
5.14	VERIFY that the RESPONSE VALUE for essPavementSensorType.N is less than or equal to 8.	Pass / Fail (Sec. 5.11.3.6)
5.15	VERIFY that the RESPONSE VALUE for essPavementSensorType.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.6)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.2.5 Retrieve Subsurface Sensor Metadata

Test Case: 2.5	Title:	Retrieve Subsurface Sensor Metadata
	Description:	This test case verifies that the ESS allows a management station to determine available meta-data for each subsurface sensor.
	Variables:	Required_Subsurface_Sensors (PRL 3.6.11)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of subsurface sensors required by the specification (3.6.11). RECORD this information as: »Required_Subsurface_Sensors	
2	GET the following object(s): »numEssSubSurfaceSensors.0	Pass / Fail (Sec. 3.5.2.1.5)
3	VERIFY that the RESPONSE VALUE for numEssSubSurfaceSensors.0 is greater than or equal to Required_Subsurface_Sensors.	Pass / Fail (Sec. 3.6.11)
4	Determine the RESPONSE VALUE for numEssSubSurfaceSensors.0. RECORD this information as: »Supported_Subsurface_Sensors	
5	FOR EACH value, N, from 1 to Supported_Subsurface_Sensors, perform Steps 5.1 through 5.9.	
5.1	GET the following object(s): »essSubSurfaceSensorLocation.N »essSubSurfaceType.N »essSubSurfaceSensorDepth.N	Pass / Fail (Sec. 3.5.2.1.5)
5.2	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Sec. 5.11.6.2)
5.3	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.2)
5.4	VERIFY that the RESPONSE VALUE for essSubSurfaceType.N is greater than or equal to 1.	Pass / Fail (Sec. 5.11.6.3)
5.5	VERIFY that the RESPONSE VALUE for essSubSurfaceType.N is less than or equal to 12.	Pass / Fail (Sec. 5.11.6.3)
5.6	VERIFY that the RESPONSE VALUE for essSubSurfaceType.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.3)
5.7	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is greater than or equal to 0.	Pass / Fail (Sec. 5.11.6.4)
5.8	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is less than or equal to 1001.	Pass / Fail (Sec. 5.11.6.4)
5.9	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.4)

Test Case Results		
Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.2.6 Configure Pavement Sensor

Test Case: 2.6	Title:	Configure Pavement Sensor
	Description:	This test case verifies that the ESS allows a management station to store configuration information for a specified pavement sensor.
	Variables:	Required_Pavement_Sensors (PRL 3.6.8)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	Determine a random value between 1 and Required_Pavement_Sensors. RECORD this information as: »Subject_Pavement_Sensor	
3	Determine a random DisplayString with a length between 1 and 255 characters. RECORD this information as: »Pavement_Sensor_Location	
4	Determine a random number between 1 and 9. RECORD this information as: »Pavement_Type	
5	Determine a random number between 0 and 101. RECORD this information as: »Pavement_Exposure	
6	GET the following object(s): »essPavementSensorLocation.Subject_Pavement_Sensor »essPavementType.Subject_Pavement_Sensor »essPavementExposure.Subject_Pavement_Sensor	Pass / Fail (RFC 1157)
7	Determine the RESPONSE VALUE for essPavementSensorLocation.Subject_Pavement_Sensor. RECORD this information as: »Orig_Pavement_Sensor_Location	
8	Determine the RESPONSE VALUE for essPavementType.Subject_Pavement_Sensor. RECORD this information as: »Orig_Pavement_Type	
9	Determine the RESPONSE VALUE for essPavementExposure.Subject_Pavement_Sensor. RECORD this information as: »Orig_Pavement_Exposure	
10	SET the following object(s) to the value(s) shown: »essPavementSensorLocation.Subject_Pavement_Sensor = Pavement_Sensor_Location »essPavementType.Subject_Pavement_Sensor = Pavement_Type »essPavementExposure.Subject_Pavement_Sensor = Pavement_Exposure	Pass / Fail (Sec. 3.5.2.1.6)
11	GET the following object(s): »essPavementSensorLocation.Subject_Pavement_Sensor »essPavementType.Subject_Pavement_Sensor »essPavementExposure.Subject_Pavement_Sensor	Pass / Fail (RFC 1157)
12	VERIFY that the RESPONSE VALUE for essPavementSensorLocation.Subject_Pavement_Sensor is equal to Pavement_Sensor_Location.	Pass / Fail (Sec. 5.11.3.2)

13	VERIFY that the RESPONSE VALUE for essPavementType.Subject_Pavement_Sensor is equal to Pavement_Type.	Pass / Fail (Sec. 5.11.3.3)
14	VERIFY that the RESPONSE VALUE for essPavementExposure.Subject_Pavement_Sensor is equal to Pavement_Exposure.	Pass / Fail (Sec. 5.11.3.5)
15	SET the following object(s) to the value(s) shown: »essPavementSensorLocation.Subject_Pavement_Sensor = Orig_Pavement_Sensor_Location »essPavementType.Subject_Pavement_Sensor = Orig_Pavement_Type »essPavementExposure.Subject_Pavement_Sensor = Orig_Pavement_Exposure	Pass / Fail (Sec. 3.5.2.1.6)
16	GET the following object(s): »essPavementSensorLocation.Subject_Pavement_Sensor »essPavementType.Subject_Pavement_Sensor »essPavementExposure.Subject_Pavement_Sensor	Pass / Fail (RFC 1157)
17	VERIFY that the RESPONSE VALUE for essPavementSensorLocation.Subject_Pavement_Sensor is equal to Orig_Pavement_Sensor_Location.	Pass / Fail (Sec. 5.11.3.2)
18	VERIFY that the RESPONSE VALUE for essPavementType.Subject_Pavement_Sensor is equal to Orig_Pavement_Type.	Pass / Fail (Sec. 5.11.3.3)
19	VERIFY that the RESPONSE VALUE for essPavementExposure.Subject_Pavement_Sensor is equal to Orig_Pavement_Exposure.	Pass / Fail (Sec. 5.11.3.5)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.2.7 Configure Subsurface Sensor

Test Case: 2.7	Title:	Configure Subsurface Sensor
	Description:	This test case verifies that the ESS allows a management station to store configuration information for a specified subsurface sensor.
	Variables:	Required_Subsurface_Sensors (PRL 3.6.11)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of subsurface sensors as required by the specification (PRL 3.6.11). RECORD this information as: »Required_Subsurface_Sensors	
2	Determine a random value between 1 and Required_Subsurface_Sensors. RECORD this information as: »Subject_Subsurface_Sensor	
3	Determine a random DisplayString with a length between 1 and 255 characters. RECORD this information as: »Subsurface_Sensor_Location	
4	Determine a random number between 1 and 12. RECORD this information as: »Subsurface_Type	
5	Determine a random value between 0 and 1001. RECORD this information as: »Subsurface_Depth	
6	GET the following object(s): »essSubSurfaceSensorLocation.Subject_Subsurface_Sensor »essSubSurfaceType.Subject_Subsurface_Sensor »essSubSurfaceSensorDepth.Subject_Subsurface_Sensor	Pass / Fail (RFC 1157)
7	Determine the retrieved information. RECORD this information as: »Orig_Subsurface_Sensor_Location (the original value of the subsurface sensor location object) »Orig_Subsurface_Type (the original value of the subsurface type object) »Orig_Subsurface_Depth (the original value of the subsurface depth object)	
8	SET the following object(s) to the value(s) shown: »essSubSurfaceSensorLocation.Subject_Subsurface_Sensor = Subsurface_Sensor_Location »essSubSurfaceType.Subject_Subsurface_Sensor = Subsurface_Type »essSubSurfaceSensorDepth.Subject_Subsurface_Sensor = Subsurface_Depth	Pass / Fail (Sec. 3.5.2.1.7)
9	GET the following object(s): »essSubSurfaceSensorLocation.Subject_Subsurface_Sensor »essSubSurfaceType.Subject_Subsurface_Sensor »essSubSurfaceSensorDepth.Subject_Subsurface_Sensor	Pass / Fail (RFC 1157)
10	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.Subject_Subsurface_Sensor is equal to Subsurface_Sensor_Location.	Pass / Fail (Sec. 5.11.6.2)
11	VERIFY that the RESPONSE VALUE for essSubSurfaceType.Subject_Subsurface_Sensor is equal to Subsurface_Type.	Pass / Fail (Sec. 5.11.6.3)
12	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.Subject_Subsurface_Sensor is equal to Subsurface_Depth.	Pass / Fail (Sec. 5.11.6.4)

13	SET the following object(s) to the value(s) shown: »essSubSurfaceSensorLocation.Subject_Subsurface_Sensor = Orig_Subsurface_Sensor_Location »essSubSurfaceType.Subject_Subsurface_Sensor = Orig_Subsurface_Type »essSubSurfaceSensorDepth.Subject_Subsurface_Sensor = Orig_Subsurface_Depth	Pass / Fail (Sec. 3.5.2.1.7)
14	GET the following object(s): »essSubSurfaceSensorLocation.Subject_Subsurface_Sensor »essSubSurfaceType.Subject_Subsurface_Sensor »essSubSurfaceSensorDepth.Subject_Subsurface_Sensor	Pass / Fail (RFC 1157)
15	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.Subject_Subsurface_Sensor is equal to Orig_Subsurface_Sensor_Location.	Pass / Fail (Sec. 5.11.6.2)
16	VERIFY that the RESPONSE VALUE for essSubSurfaceType.Subject_Subsurface_Sensor is equal to Orig_Subsurface_Type.	Pass / Fail (Sec. 5.11.6.3)
17	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.Subject_Subsurface_Sensor is equal to Orig_Subsurface_Depth.	Pass / Fail (Sec. 5.11.6.4)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.2.8 Configure Passive Ice Detection Logic

Test Case: 2.8	Title:	<i>Configure Passive Ice Detection Logic</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store configuration information regarding the pavement treatments being applied.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »numEssTreatments.0	Pass / Fail (RFC 1157)
2	Determine the RESPONSE VALUE for numEssTreatments. RECORD this information as: »Num_Treatments	
3	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 3.1 through 3.2.	
3.1	GET the following object(s): »essPaveTreatProductType.N »essPaveTreatProductForm.N »essPercentProductMix.N	Pass / Fail (RFC 1157)
3.2	Determine the values for the retrieved information. RECORD this information as: »Product_Type[N] (the type of the Nth product read from the device) »Product_Form[N] (the form of the Nth product read from the device) »Product_Percent[N] (the percentage of the Nth product read from the device)	
4	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 3.5.2.1.8)
5	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	
6	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 6.1 through 6.3.	
6.1	Determine a random value from 1 to 14. RECORD this information as: »Treatment_Type	
6.2	Determine a random value from 1 to 4. RECORD this information as: »Treatment_Form	
6.3	SET the following object(s) to the value(s) shown: »essPaveTreatProductType.N = Treatment_Type »essPaveTreatProductForm.N = Treatment_Form	Pass / Fail (Sec. 3.5.2.1.8)
7	Determine the total percentage of products (i.e., 100). RECORD this information as: »Percentage_Available	
8	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 8.1 through 8.3.	
8.1	IF N is equal to Num_Treatments, then proceed to Step 8.1.1; otherwise, proceed to Step 8.2.1.	
8.1.1	Determine Percentage_Available. RECORD this information as: »Treatment_Percent GO TO Step 8.3.	

8.2.1	Determine a random value between 0 and Percentage_Available. RECORD this information as: »Treatment_Percent	
8.2.2	Determine the remaining percentage available by subtracting Product_Percent from Percentage_Available. RECORD this information as: »Percentage_Available	
8.3	SET the following object(s) to the value(s) shown: »essPercentProductMix.N = Percentage_Available	Pass / Fail (Sec. 3.5.2.1.8)
9	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 3.5.2.1.8)
10	FOR EACH value, N, from 1 to Num_Treatments, perform Step 10.1.	
10.1	SET the following object(s) to the value(s) shown: »essPaveTreatProductType.N = Product_Type[N] »essPaveTreatProductForm.N = Product_Form[N]	Pass / Fail (Sec. 3.5.2.1.8)
11	FOR EACH value, N, from 1 to Num_Treatments, perform Step 11.1.	
11.1	SET the following object(s) to the value(s) shown: »essPercentProductMix.N = Product_Percent[N]	Pass / Fail (Sec. 3.5.2.1.8)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.2.9 Configure Snapshot Camera

Test Case: 2.9	Title:	Configure Snapshot Camera		
	Description:	This test case verifies that the ESS allows a management station to store the storage location for newly taken snapshot images.		
	Variables:	Required_Cameras	(PRL 3.6.20)	
		Camera_Number_Supported	(PRL 3.6.23)	
		Sequence_Numbers_Supported	(PRL 3.6.24)	
		Date_Supported	(PRL 3.6.25)	
		Time_Supported	(PRL 3.6.26)	
Long_Filenames_Supported	(PRL 3.6.27)			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of cameras required by the specification (PRL 3.6.20). RECORD this information as: »Required_Cameras	
2	CONFIGURE: Determine whether the ESS allows the filename to include a camera number field (PRL 3.6.23). RECORD this information as: »Camera_Number_Supported	
3	CONFIGURE: Determine whether the ESS allows the filenames to include sequence numbers (PRL 3.6.24). RECORD this information as: »Sequence_Numbers_Supported	
4	CONFIGURE: Determine whether the camera allows a date to be included in the filename (PRL 3.6.25). RECORD this information as: »Date_Supported	
5	CONFIGURE: Determine whether the ESS allows the filenames to include a time field (PRL 3.6.26). RECORD this information as: »Time_Supported	
6	CONFIGURE: Determine whether the ESS allows the filenames to exceed eight characters in length (PRL 3.6.27). RECORD this information as: »Long_Filenames_Supported	
7	GET the following object(s): »essSnapshotNumberOfCameras.0	Pass / Fail (Sec. 3.5.2.3.9)
8	VERIFY that the RESPONSE VALUE for essSnapshotNumberOfCameras.0 is greater than or equal to Required_Cameras.	Pass / Fail (Sec. 3.6.20)
9	Determine the RESPONSE VALUE for essSnapshotNumberOfCameras.0. RECORD this information as: »Num_Cameras	
10	Determine a random number between 1 and Required_Cameras. RECORD this information as: »Subject_Camera	
11	FOR EACH value, N, from 1 to Num_Cameras, perform Steps 11.1 through 11.4.	
11.1	GET the following object(s): »essSnapshotCameraDescription.N	Pass / Fail (Sec. 3.5.2.3.9)

	»essSnapshotCameraStoragePath.N	
11.2	IF N is equal to Subject_Camera, then proceed to Step 11.2.1; otherwise, proceed to Step 11.3.	
11.2.1	Determine the RESPONSE VALUE for essSnapshotCameraDescription.N. RECORD this information as: »Orig_Description	
11.3	GET the following object(s): »essSnapshotCameraFilename.N	Pass / Fail (Sec. 3.5.2.3.9)
11.4	IF N is equal to Subject_Camera, then proceed to Step 11.4.1; otherwise, proceed to Step 12.	
11.4.1	Determine the RESPONSE VALUE for essSnapshotCameraFilename.N. RECORD this information as: »Orig_Filename	
12	Determine a random string of 3 characters. RECORD this information as: »Base_Filename	
13	Determine a random DisplayString containing between 1 and 255 characters. RECORD this information as: »Camera_Location	
14	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)
15	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = Base_Filename	Pass / Fail (Sec. 3.5.2.1.9)
16	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	Pass / Fail
17	IF Camera_Number_Supported is equal to 1, then proceed to Step 17.1; otherwise, proceed to Step 18.	
17.1	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)
17.2	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = '.jpg'	Pass / Fail (Sec. 3.5.2.1.9)
17.3	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	
18	IF Sequence_Numbers_Supported is equal to 1, then proceed to Step 18.1; otherwise, proceed to Step 19.	
18.1	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)
18.2	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = '.jpg'	Pass / Fail (Sec. 3.5.2.1.9)
18.3	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	
19	IF Date_Supported is equal to 1, then proceed to Step 19.1; otherwise, proceed to Step 20.	
19.1	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)

19.2	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = '.jpg'	Pass / Fail (Sec. 3.5.2.1.9)
19.3	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	
20	IF Time_Supported is equal to 1, then proceed to Step 20.1; otherwise, proceed to Step 21.	
20.1	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)
20.2	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = '.jpg'	Pass / Fail (Sec. 3.5.2.1.9)
20.3	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	
21	IF Long_Filenames_Supported is equal to 1, then proceed to Step 21.1; otherwise, proceed to Step 22.	
21.1	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Camera_Location	Pass / Fail (Sec. 3.5.2.1.9)
21.2	CONFIGURE: Determine a random string of 25 characters pre-pended to the string ".jpg". RECORD this information as: »Long_Filename	
21.3	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = Long_Filename	Pass / Fail (Sec. 3.5.2.1.9)
21.4	PERFORM the test case labeled 'Retrieve Snapshot' (2.3.7.2).	
22	SET the following object(s) to the value(s) shown: »essSnapshotCameraDescription.Subject_Camera = Orig_Description	Pass / Fail (Sec. 3.5.2.1.9)
23	SET the following object(s) to the value(s) shown: »essSnapshotCameraFilename.Subject_Camera = Orig_Filename	Pass / Fail (Sec. 3.5.2.1.9)
24	GET the following object(s): »essSnapshotCameraDescription.Subject_Camera	Pass / Fail (RFC 1157)
25	VERIFY that the RESPONSE VALUE for essSnapshotCameraDescription.Subject_Camera is equal to Orig_Description.	Pass / Fail (Sec. 3.5.2.1.9)
26	GET the following object(s): »essSnapshotCameraFilename.Subject_Camera	Pass / Fail (RFC 1157)
27	VERIFY that the RESPONSE VALUE for essSnapshotCameraFilename.Subject_Camera is equal to Orig_Filename.	Pass / Fail (Sec. 3.5.2.1.9)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.2.10 Retrieve Atmospheric Pressure Metadata - Location

Test	Title:	<u>Retrieve Metadata for Each Atmospheric Pressure Sensor - Location</u>
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Case: 2.10	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each atmospheric pressure sensor</i>
	Variables:	<i>Supported Pressure Sensors (FR 3.5.2.1.10.1 PRL 3.6.1)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pressure sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>»essNumPressureSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.10.1)</u>
3	<u>VERIFY that the RESPONSE VALUE for essNumPressureSensors.0 is greater than or equal to Supported Pressure Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.1)</u>
4	<u>Determine the RESPONSE VALUE for essNumPressureSensors.0. RECORD this information as:</u> <u>»Supported Pressure Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Pressure Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essPressureSensorHeight.N</u> <u>»essPressureSensorLatitude.N</u> <u>»essPressureSensorLongitude.N</u> <u>»essPressureSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.10.1)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essPressureSensorHeight.N is greater than or equal to -1000.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.2)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essPressureSensorHeight.N is less than or equal to 1001.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.2)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essPressureSensorHeight.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.2)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLatitude.N is greater than or equal to -90000000.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.3)</u>
5.6	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLatitude.N is less than or equal to 90000001.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.3)</u>
5.7	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLatitude.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.3)</u>
5.8	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLongitude.N is greater than or equal to -180000000.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.4)</u>
5.9	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLongitude.N is less than or equal to 180000001.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.4)</u>
5.10	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLongitude.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.4)</u>
5.11	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLocation.N is a valid DisplayString with no more than 255 characters.</u>	<u>Pass / Fail</u> <u>(Clause 5.5.7.5)</u>
5.12	<u>VERIFY that the RESPONSE VALUE for essPressureSensorLocation.N is</u>	<u>Pass / Fail</u>

	<u>APPROPRIATE.</u>	<u>(Clause 5.5.7.5)</u>
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.11 Retrieve Atmospheric Pressure Metadata - Sensor Information

Test Case: 2.11	Title:	<i>Retrieve Metadata for Each Atmospheric Pressure Sensor – Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each atmospheric pressure sensor</i>
	Variables:	<i>Supported Pressure Sensors (PRL 3.6.1)FR 3.5.2.1.10.2</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of pressure sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>»essNumPressureSensors.0</u>	Pass / Fail (Clause 3.5.2.1.10.2)
3	<u>VERIFY that the RESPONSE VALUE for essNumPressureSensors.0 is greater than or equal to Supported Pressure Sensors.</u>	Pass / Fail (PRL 3.6.1)
4	<u>Determine the RESPONSE VALUE for essNumPressureSensors.0. RECORD this information as:</u> <u>»Supported Pressure Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Pressure Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essPressureSensorModelInformation.N</u>	Pass / Fail (Clause 3.5.2.1.10.2)
5.2	<u>VERIFY that the RESPONSE VALUE for essPressureSensorModelInformation.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.5.7.6)
5.3	<u>VERIFY that the RESPONSE VALUE for essPressureSensorModelInformation.N is less than or equal to 255.</u>	Pass / Fail (Clause 5.5.7.6)
5.4	<u>VERIFY that the RESPONSE VALUE for essPressureSensorModelInformation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.5.7.6)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.2.12 Configure Atmospheric Pressure Metadata - Location

Test Case: 2.12	Title:	<u>Configure Atmospheric Pressure Metadata – Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and height information regarding atmospheric pressure sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>»essNumPressureSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.10.3)</u>
2	<u>Determine the RESPONSE VALUE for essNumPressureSensors.0. RECORD this information as:</u> <u>»Num_Pressure_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»essPressureSensorHeight.N</u> <u>»essPressureSensorLatitude.N</u> <u>»essPressureSensorLongitude.N</u> <u>»essPressureSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.10.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth pressure sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth pressure sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth pressure sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth pressure sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»essPressureSensorHeight.N = Sensor_Height_Random.N</u> <u>»essPressureSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»essPressureSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»essPressureSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.10.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 5.1 through 5.5.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essPressureSensorHeight.N</u> <u>»essPressureSensorLatitude.N</u> <u>»essPressureSensorLongitude.N</u> <u>»essPressureSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.10.3)</u>

5.2	VERIFY that the RESPONSE VALUE for essPressureSensorHeight.N is equal to Sensor_Height_Random.N.	Pass / Fail (Clause 5.5.7.2)
5.3	VERIFY that the RESPONSE VALUE for essPressureSensorLatitude.N is equal to Sensor_Latitude_Random.N.	Pass / Fail (Clause 5.5.7.3)
5.4	VERIFY that the RESPONSE VALUE for essPressureSensorLongitude.N is equal to Sensor_Longitude_Random.N.	Pass / Fail (Clause 5.5.7.4)
5.5	VERIFY that the RESPONSE VALUE for essPressureSensorLocation.N is equal to Sensor_Location_Random.N.	Pass / Fail (Clause 5.5.7.5)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »essPressureSensorHeight.N = Sensor_Height.N »essPressureSensorLatitude.N = Sensor_Latitude.N »essPressureSensorLongitude.N = Sensor_Longitude.N »essPressureSensorLocation.N = Sensor_Location.N	Pass / Fail (Clause 3.5.2.10.3)
7	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »essPressureSensorHeight.N »essPressureSensorLatitude.N »essPressureSensorLongitude.N »essPressureSensorLocation.N	Pass / Fail (Clause 3.5.2.1.10.3)
7.2	VERIFY that the RESPONSE VALUE for essPressureSensorHeight.N is equal to Sensor_Height.N.	Pass / Fail (Clause 5.5.7.2)
7.3	VERIFY that the RESPONSE VALUE for essPressureSensorLatitude.N is equal to Sensor_Latitude.N.	Pass / Fail (Clause 5.5.7.3)
7.4	VERIFY that the RESPONSE VALUE for essPressureSensorLongitude.N is equal to Sensor_Longitude.N.	Pass / Fail (Clause 5.5.7.4)
7.5	VERIFY that the RESPONSE VALUE for essPressureSensorLocation.N is equal to Sensor_Location.N.	Pass / Fail (Clause 5.5.7.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.13 Retrieve Wind Sensor Metadata - Location

Test Case: 2.1314	Title:	<i>Retrieve Metadata for Each Wind Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each wind sensor</i>
	Variables:	<i>Supported_Wind_Sensors (PRL 3.6.2)FR 3.5.2.1.11.1</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of wind sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>»windSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.11.1)
3	<u>VERIFY that the RESPONSE VALUE for windSensorTableNumSensors.0 is greater than or equal to Supported_Wind_Sensors.</u>	Pass / Fail (PRL 3.6.2)
4	<u>Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported_Wind_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Wind_Sensors, perform Steps 5.1 through 5.7.</u>	-
5.1	<u>GET the following object(s):</u> <u>»windSensorLatitude.N</u> <u>»windSensorLongitude.N</u>	Pass / Fail (Clause 3.5.2.1.11.1)
5.2	<u>VERIFY that the RESPONSE VALUE for windSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.6.10.11)
5.3	<u>VERIFY that the RESPONSE VALUE for windSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.6.10.11)
5.4	<u>VERIFY that the RESPONSE VALUE for windSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.6.10.11)
5.5	<u>VERIFY that the RESPONSE VALUE for windSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.6.10.12)
5.6	<u>VERIFY that the RESPONSE VALUE for windSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.6.10.12)
5.7	<u>VERIFY that the RESPONSE VALUE for windSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.6.10.12)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.14 Retrieve Wind Sensor Metadata – Sensor Information

Test Case: 2.145	Title:	<u>Retrieve Metadata for Each Wind Sensor – Sensor Information</u>	
	Description:	<u>This test case verifies that the ESS allows a management station to determine the sensor information of each wind sensor</u>	
	Variables:	<u>Supported Wind Sensors</u>	<u>FR 3.5.2.1.11.2(PRL 3.6.2)</u>
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>	

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of wind sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s): » windSensorTableNumSensors.0</u>	<u>Pass / Fail (Clause 3.5.2.1.11.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for windSensorTableNumSensors.0 is greater than or equal to Supported Wind Sensors.</u>	<u>Pass / Fail (PRL 3.6.2)</u>
4	<u>Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as: »Supported Wind Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Wind Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s): »windSensorModelInformation.N</u>	<u>Pass / Fail (Clause 3.5.2.1.11.2)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for windSensorModelInformation.N is greater than or equal to 0.</u>	<u>Pass / Fail (Clause 5.6.10.13)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for windSensorModelInformation.N is less than or equal to 255.</u>	<u>Pass / Fail (Clause 5.6.10.13)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for windSensorModelInformation.N is APPROPRIATE.</u>	<u>Pass / Fail (Clause 5.6.10.13)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.2.15 Configure Wind Sensor Metadata - Location

Test Case: 2.156	Title:	<u>Configure Wind Sensor Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding wind sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» windSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.11.3)</u>
2	<u>Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as:</u> <u>»Num_Wind_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_Wind_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»windSensorHeight.N</u> <u>»windSensorLatitude.N</u> <u>»windSensorLongitude.N</u> <u>»windSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.11.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth wind sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth wind sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth wind sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth wind sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»windSensorHeight.N = Sensor_Height_Random.N</u> <u>»windSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»windSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»windSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.11.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_Wind_Sensors, perform Steps 5.1 through 5.5.</u>	-
5.1	<u>GET the following object(s):</u> <u>»windSensorHeight.N</u> <u>»windSensorLatitude.N</u> <u>»windSensorLongitude.N</u> <u>»windSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.11.3)</u>

5.2	VERIFY that the RESPONSE VALUE for windSensorHeight.N is equal to Sensor_Height_Random.N.	Pass / Fail (Clause 5.6.10.2)
5.3	VERIFY that the RESPONSE VALUE for windSensorLatitude.N is equal to Sensor_Latitude_Random.N.	Pass / Fail (Clause 5.6.10.11)
5.4	VERIFY that the RESPONSE VALUE for windSensorLongitude.N is equal to Sensor_Longitude_Random.N.	Pass / Fail (Clause 5.6.10.12)
5.5	VERIFY that the RESPONSE VALUE for windSensorLocation.N is equal to Sensor_Location_Random.N.	Pass / Fail (Clause 5.6.10.3)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »windSensorHeight.N = Sensor_Height.N »windSensorLatitude.N = Sensor_Latitude.N »windSensorLongitude.N = Sensor_Longitude.N »windSensorLocation.N = Sensor_Location.N	Pass / Fail (Clause 3.5.2.11.3)
7	FOR EACH value, N, from 1 to Num_Wind_Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »windSensorHeight.N »windSensorLatitude.N »windSensorLongitude.N »windSensorLocation.N	Pass / Fail (Clause 3.5.2.1.11.3)
7.2	VERIFY that the RESPONSE VALUE for windSensorHeight.N is equal to Sensor_Height.N.	Pass / Fail (Clause 5.6.10.2)
7.3	VERIFY that the RESPONSE VALUE for windSensorLatitude.N is equal to Sensor_Latitude.N.	Pass / Fail (Clause 5.6.10.11)
7.4	VERIFY that the RESPONSE VALUE for windSensorLongitude.N is equal to Sensor_Longitude.N.	Pass / Fail (Clause 5.6.10.12)
7.5	VERIFY that the RESPONSE VALUE for windSensorLocation.N is equal to Sensor_Location.N.	Pass / Fail (Clause 5.6.10.3)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.16 Retrieve Temperature Sensor Metadata - Location

Test Case: 2.168	Title:	<i>Retrieve Metadata for Each Temperature Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each temperature sensor</i>
	Variables:	<i>Supported Temperature Sensors (PRL 3.6.3)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of temperature sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» essNumTemperatureSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.12.1)</u>
3	<u>VERIFY that the RESPONSE VALUE for essNumTemperatureSensors.0 is greater than or equal to Supported Temperature Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.3)</u>
4	<u>Determine the RESPONSE VALUE for essNumTemperatureSensors.0. RECORD this information as:</u> <u>»Supported Temperature Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Temperature Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essTemperatureSensorHeight.N</u> <u>»essTemperatureSensorLatitude.N</u> <u>»essTemperatureSensorLongitude.N</u> <u>»essTemperatureSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.12.1)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is greater than or equal to -1000.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.2)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is less than or equal to 1001.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.2)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.2)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLatitude.N is greater than or equal to -90000000.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.4)</u>
5.6	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLatitude.N is less than or equal to 90000001.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.4)</u>
5.7	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLatitude.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.4)</u>
5.8	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLongitude.N is greater than or equal to -180000000.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.5)</u>
5.9	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLongitude.N is less than or equal to 180000001.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.5)</u>
5.10	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorLongitude.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.5)</u>

5.11	VERIFY that the RESPONSE VALUE for essTemperatureSensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Clause 5.7.3.6)
5.12	VERIFY that the RESPONSE VALUE for essTemperatureSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.7.3.6)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.17 Retrieve Temperature Sensor Metadata – Sensor Information

Test Case: 2.197	Title:	<u>Retrieve Metadata for Each Temperature Sensor – Sensor Information</u>
	Description:	<u>This test case verifies that the ESS allows a management station to determine the sensor information of each temperature sensor</u>
	Variables:	<u>Supported_Temperature_Sensors</u> (PRL 3.6.3)
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of temperature sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» essNumTemperatureSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.12.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for essNumTemperatureSensors.0 is greater than or equal to Supported_Temperature_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.3)</u>
4	<u>Determine the RESPONSE VALUE for essNumTemperatureSensors.0. RECORD this information as:</u> <u>»Supported_Temperature_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Temperature_Sensors, perform Steps 5.1 through 5.4.</u>	-
<u>5.1</u>	<u>GET the following object(s):</u> <u>»essTemperatureSensorModelInformation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.12.2)</u>
<u>5.2</u>	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorModelInformation.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.7)</u>
<u>5.3</u>	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorModelInformation.N is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.7)</u>
<u>5.4</u>	<u>VERIFY that the RESPONSE VALUE for essTemperatureSensorModelInformation.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.7.3.7)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.18 Configure Temperature Sensor Metadata - Location

Test Case: 2.1820	Title:	<i>Configure Temperature Sensor Metadata – Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store location and relative height information regarding temperature sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): » <u>essNumTemperatureSensors.0</u>	Pass / Fail (Clause 3.5.2.1.12.3)
2	Determine the RESPONSE VALUE for <u>essNumTemperatureSensors.0</u> . RECORD this information as: » <u>Num_Temperature_Sensors</u>	-
3	FOR EACH value, N, from 1 to <u>Num_Temperature_Sensors</u> , perform Steps 3.1 through 3.2.	-
3.1	GET the following object(s): » <u>essTemperatureSensorHeight.N</u> » <u>essTemperatureSensorLatitude.N</u> » <u>essTemperatureSensorLongitude.N</u> » <u>essTemperatureSensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.12.3)
3.2	Determine the values for the retrieved information. RECORD this information as: » <u>Sensor_Height[N]</u> (the height of the Nth temperature sensor from the device) » <u>Sensor_Latitude[N]</u> (the latitude of the Nth temperature sensor from the device) » <u>Sensor_Longitude[N]</u> (the longitude of the Nth temperature sensor from the device) » <u>Sensor_Location[N]</u> (the location of the Nth temperature sensor from the device)	-
4	FOR EACH value, N, from 1 to <u>Num_Pressure_Sensors</u> , perform Steps 4.1 through 4.5.	-
4.1	Determine a random value from -1000 to 1001. RECORD this information as: » <u>Sensor_Height_Random.N</u>	-
4.2	Determine a random value from -90000000 to 90000001. RECORD this information as: » <u>Sensor_Latitude_Random.N</u>	-
4.3	Determine a random value from -180000000 to 180000001. RECORD this information as: » <u>Sensor_Longitude_Random.N</u>	-
4.4	Determine a random display string from 1 to 255 characters in length. RECORD this information as: » <u>Sensor_Location_Random.N</u>	-
4.5	SET the following object(s) to the value(s) shown: » <u>essTemperatureSensorHeight.N = Sensor_Height_Random.N</u> » <u>essTemperatureSensorLatitude.N = Sensor_Latitude_Random.N</u> » <u>essTemperatureSensorLongitude.N = Sensor_Longitude_Random.N</u> » <u>essTemperatureSensorLocation.N = Sensor_Location_Random.N</u>	Pass / Fail (Clause 3.5.2.1.12.3)
5	FOR EACH value, N, from 1 to <u>Num_Temperature_Sensors</u> , perform Steps 5.1 through 5.5.	-
5.1	GET the following object(s): » <u>essTemperatureSensorHeight.N</u> » <u>essTemperatureSensorLatitude.N</u> » <u>essTemperatureSensorLongitude.N</u>	Pass / Fail (Clause 3.5.2.1.12.3)

	»essTemperatureSensorLocation.N	
5.2	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is equal to Sensor Height Random.N.	Pass / Fail (Clause 5.7.3.2)
5.3	VERIFY that the RESPONSE VALUE for essTemperatureSensorLatitude.N is equal to Sensor Latitude Random.N.	Pass / Fail (Clause 5.7.3.4)
5.4	VERIFY that the RESPONSE VALUE for essTemperatureSensorLongitude.N is equal to Sensor Longitude Random.N.	Pass / Fail (Clause 5.7.3.5)
5.5	VERIFY that the RESPONSE VALUE for essTemperatureSensorLocation.N is equal to Sensor Location Random.N.	Pass / Fail (Clause 5.7.3.6)
6	FOR EACH value, N, from 1 to Num Pressure Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »essTemperatureSensorHeight.N = Sensor Height.N »essTemperatureSensorLatitude.N = Sensor Latitude.N »essTemperatureSensorLongitude.N = Sensor Longitude.N »essTemperatureSensorLocation.N = Sensor Location.N	Pass / Fail (Clause 3.5.2.12.3)
7	FOR EACH value, N, from 1 to Num Temperature Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »essTemperatureSensorHeight.N »essTemperatureSensorLatitude.N »essTemperatureSensorLongitude.N »essTemperatureSensorLocation.N	Pass / Fail (Clause 3.5.2.1.12.3)
7.2	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.N is equal to Sensor Height.N.	Pass / Fail (Clause 5.7.3.2)
7.3	VERIFY that the RESPONSE VALUE for essTemperatureSensorLatitude.N is equal to Sensor Latitude.N.	Pass / Fail (Clause 5.7.3.4)
7.4	VERIFY that the RESPONSE VALUE for essTemperatureSensorLongitude.N is equal to Sensor Longitude.N.	Pass / Fail (Clause 5.7.3.5)
7.5	VERIFY that the RESPONSE VALUE for essTemperatureSensorLocation.N is equal to Sensor Location.N.	Pass / Fail (Clause 5.7.3.6)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

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C.2.3.2.19 Retrieve Humidity Sensor Metadata - Location

Test Case: 2.1922	Title:	<i>Retrieve Metadata for Each Humidity Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each humidity sensor</i>
	Variables:	<i>Supported Humidity Sensors (PRL 3.6.4)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of humidity sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» humiditySensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.13.1)
3	<u>VERIFY that the RESPONSE VALUE for humiditySensorTableNumSensors.0 is greater than or equal to Supported Humidity Sensors.</u>	Pass / Fail (PRL 3.6.4)
4	<u>Determine the RESPONSE VALUE for humiditySensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported Humidity Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Humidity Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»humiditySensorHeight.N</u> <u>»humiditySensorLatitude.N</u> <u>»humiditySensorLongitude.N</u> <u>»humiditySensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.13.1)
5.2	<u>VERIFY that the RESPONSE VALUE for humiditySensorHeight.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.8.27.2)
5.3	<u>VERIFY that the RESPONSE VALUE for humiditySensorHeight.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.8.27.2)
5.4	<u>VERIFY that the RESPONSE VALUE for humiditySensorHeight.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.2)
5.5	<u>VERIFY that the RESPONSE VALUE for humiditySensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.8.27.3)
5.6	<u>VERIFY that the RESPONSE VALUE for humiditySensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.8.27.3)
5.7	<u>VERIFY that the RESPONSE VALUE for humiditySensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.3)
5.8	<u>VERIFY that the RESPONSE VALUE for humiditySensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.8.27.4)
5.9	<u>VERIFY that the RESPONSE VALUE for humiditySensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.8.27.4)
5.10	<u>VERIFY that the RESPONSE VALUE for humiditySensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.4)

5.11	VERIFY that the RESPONSE VALUE for humiditySensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Clause 5.8.27.5)
5.12	VERIFY that the RESPONSE VALUE for humiditySensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.8.27.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.20 Retrieve Humidity Sensor Metadata - Sensor Information

Test Case: 2.2023	Title:	<i>Retrieve Metadata for Each Humidity Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each humidity sensor</i>
	Variables:	<i>Supported_Humidity_Sensors (PRL 3.6.4)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of humidity sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » humiditySensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.13.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for humiditySensorTableNumSensors.0 is greater than or equal to Supported_Humidity_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.4)</u>
4	<u>Determine the RESPONSE VALUE for humiditySensorTableNumSensors.0. RECORD this information as:</u> <u> »Supported_Humidity_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Humidity_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u> »humiditySensorModelInformation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.13.2)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for humiditySensorModelInformation.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.27.6)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for humiditySensorModelInformation.N is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.27.6)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for humiditySensorModelInformation.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.27.6)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.21 Configure Humidity Sensor Metadata - Location

Test Case: 2.2124	Title:	<i>Configure Humidity Sensor Metadata – Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store location and relative height information regarding humidity sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): » humiditySensorTableNumSensors.0	Pass / Fail (Clause 3.5.2.1.13.3)
2	Determine the RESPONSE VALUE for humiditySensorTableNumSensors.0. RECORD this information as: »Num_Humidity_Sensors	-
3	FOR EACH value, N, from 1 to Num_Humidity_Sensors, perform Steps 3.1 through 3.2.	-
3.1	GET the following object(s): »humiditySensorHeight.N »humiditySensorLatitude.N »humiditySensorLongitude.N »humiditySensorLocation.N	Pass / Fail (Clause 3.5.2.1.13.3)
3.2	Determine the values for the retrieved information. RECORD this information as: »Sensor_Height[N] (the height of the Nth humidity sensor from the device) »Sensor_Latitude[N] (the latitude of the Nth humidity sensor from the device) »Sensor_Longitude[N] (the longitude of the Nth humidity sensor from the device) »Sensor_Location[N] (the location of the Nth humidity sensor from the device)	-
4	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.	-
4.1	Determine a random value from -1000 to 1001. RECORD this information as: »Sensor_Height_Random.N	-
4.2	Determine a random value from -90000000 to 90000001. RECORD this information as: »Sensor_Latitude_Random.N	-
4.3	Determine a random value from -180000000 to 180000001. RECORD this information as: »Sensor_Longitude_Random.N	-
4.4	Determine a random display string from 1 to 255 characters in length. RECORD this information as: »Sensor_Location_Random.N	-
4.5	SET the following object(s) to the value(s) shown: »humiditySensorHeight.N = Sensor_Height_Random.N »humiditySensorLatitude.N = Sensor_Latitude_Random.N »humiditySensorLongitude.N = Sensor_Longitude_Random.N »humiditySensorLocation.N = Sensor_Location_Random.N	Pass / Fail (Clause 3.5.2.13.3)
5	FOR EACH value, N, from 1 to Num_Humidity_Sensors, perform Steps 5.1 through 5.5.	-
5.1	GET the following object(s): »humiditySensorHeight.N »humiditySensorLatitude.N »humiditySensorLongitude.N »humiditySensorLocation.N	Pass / Fail (Clause 3.5.2.1.13.3)

5.2	VERIFY that the RESPONSE VALUE for humiditySensorHeight.N is equal to Sensor_Height_Random.N.	Pass / Fail (Clause 5.8.27.2)
5.3	VERIFY that the RESPONSE VALUE for humiditySensorLatitude.N is equal to Sensor_Latitude_Random.N.	Pass / Fail (Clause 5.8.27.3)
5.4	VERIFY that the RESPONSE VALUE for humiditySensorLongitude.N is equal to Sensor_Longitude_Random.N.	Pass / Fail (Clause 5.8.27.4)
5.5	VERIFY that the RESPONSE VALUE for humiditySensorLocation.N is equal to Sensor_Location_Random.N.	Pass / Fail (Clause 5.8.27.5)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »humiditySensorHeight.N = Sensor_Height.N »humiditySensorLatitude.N = Sensor_Latitude.N »humiditySensorLongitude.N = Sensor_Longitude.N »humiditySensorLocation.N = Sensor_Location.N	Pass / Fail (Clause 3.5.2.13.3)
7	FOR EACH value, N, from 1 to Num_Humidity_Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »humiditySensorHeight.N »humiditySensorLatitude.N »humiditySensorLongitude.N »humiditySensorLocation.N	Pass / Fail (Clause 3.5.2.1.13.3)
7.2	VERIFY that the RESPONSE VALUE for humiditySensorHeight.N is equal to Sensor_Height.N.	Pass / Fail (Clause 5.8.27.2)
7.3	VERIFY that the RESPONSE VALUE for humiditySensorLatitude.N is equal to Sensor_Latitude.N.	Pass / Fail (Clause 5.8.27.3)
7.4	VERIFY that the RESPONSE VALUE for humiditySensorLongitude.N is equal to Sensor_Longitude.N.	Pass / Fail (Clause 5.8.27.4)
7.5	VERIFY that the RESPONSE VALUE for humiditySensorLocation.N is equal to Sensor_Location.N.	Pass / Fail (Clause 5.8.27.5)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.22 Retrieve Precipitation Sensor Metadata – Location

Test Case: 2.2226	Title:	<i>Retrieve Metadata for Each Precipitation Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each precipitation sensor</i>
	Variables:	<i>Supported_Precipitation_Sensors (PRL 3.6.5)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» precipitationSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.14.1)
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	Pass / Fail (PRL 3.6.5)
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»precipitationSensorHeight.N</u> <u>»precipitationSensorLatitude.N</u> <u>»precipitationSensorLongitude.N</u> <u>»precipitationSensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.14.1)
5.2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorHeight.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.8.24.2)
5.3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorHeight.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.8.24.2)
5.4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorHeight.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.2)
5.5	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.8.24.3)
5.6	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.8.24.3)
5.7	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.3)
5.8	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.8.24.4)
5.9	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.8.24.4)
5.10	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.4)
5.11	<u>VERIFY that the RESPONSE VALUE for precipitationSensorLocation.N is a valid</u>	Pass / Fail

	DisplayString with no more than 255 characters.	(Clause 5.8.24.5)
5.12	VERIFY that the RESPONSE VALUE for precipitationSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.8.24.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.23 Retrieve Precipitation Sensor Metadata - Sensor Information

Test Case: 2.2327	Title:	<u>Retrieve Metadata for Each Precipitation Sensor - Sensor Information</u>
	Description:	<u>This test case verifies that the ESS allows a management station to determine the sensor information of each precipitation sensor</u>
	Variables:	<u>Supported Precipitation Sensors</u> (PRL 3.6.5)
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » precipitationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.5)</u>
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u> »Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u> »precipitationSensorModelInformation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.2)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorModelInformationV4.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.24.6)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorModelInformationV4.N is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.24.6)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorModelInformationV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.24.6)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.24 Configure Precipitation Sensor Metadata - Location

Test Case: 2.2428	Title:	<u>Configure Precipitation Sensor Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding precipitation sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» precipitationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.3)</u>
2	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Num_Precipitation_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»precipitationSensorHeight.N</u> <u>»precipitationSensorLatitude.N</u> <u>»precipitationSensorLongitude.N</u> <u>»precipitationSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth precipitation sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth precipitation sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth precipitation sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth precipitation sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»precipitationSensorHeight.N = Sensor_Height_Random.N</u> <u>»precipitationSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»precipitationSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»precipitationSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 5.1 through 5.5.</u>	-
5.1	<u>GET the following object(s):</u> <u>»precipitationSensorHeight.N</u> <u>»precipitationSensorLatitude.N</u> <u>»precipitationSensorLongitude.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.14.3)</u>

	»precipitationSensorLocation.N	
5.2	VERIFY that the RESPONSE VALUE for precipitationSensorHeight.N is equal to Sensor Height Random.N.	Pass / Fail (Clause 5.8.24.2)
5.3	VERIFY that the RESPONSE VALUE for precipitationSensorLatitude.N is equal to Sensor Latitude Random.N.	Pass / Fail (Clause 5.8.24.3)
5.4	VERIFY that the RESPONSE VALUE for precipitationSensorLongitude.N is equal to Sensor Longitude Random.N.	Pass / Fail (Clause 5.8.24.4)
5.5	VERIFY that the RESPONSE VALUE for precipitationSensorLocation.N is equal to Sensor Location Random.N.	Pass / Fail (Clause 5.8.24.5)
6	FOR EACH value, N, from 1 to Num Pressure Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »precipitationSensorHeight.N = Sensor Height.N »precipitationSensorLatitude.N = Sensor Latitude.N »precipitationSensorLongitude.N = Sensor Longitude.N »precipitationSensorLocation.N = Sensor Location.N	Pass / Fail (Clause 3.5.2.14.3)
7	FOR EACH value, N, from 1 to Num Precipitation Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »precipitationSensorHeight.N »precipitationSensorLatitude.N »precipitationSensorLongitude.N »precipitationSensorLocation.N	Pass / Fail (Clause 3.5.2.1.14.3)
7.2	VERIFY that the RESPONSE VALUE for precipitationSensorHeight.N is equal to Sensor Height.N.	Pass / Fail (Clause 5.8.24.2)
7.3	VERIFY that the RESPONSE VALUE for precipitationSensorLatitude.N is equal to Sensor Latitude.N.	Pass / Fail (Clause 5.8.24.3)
7.4	VERIFY that the RESPONSE VALUE for precipitationSensorLongitude.N is equal to Sensor Longitude.N.	Pass / Fail (Clause 5.8.24.4)
7.5	VERIFY that the RESPONSE VALUE for precipitationSensorLocation.N is equal to Sensor Location.N.	Pass / Fail (Clause 5.8.24.5)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		



C.2.3.2.25 Configure Precipitation Sensor Total User Specified Period

Test Case: 2.3025	Title:	<i>Configure Precipitation Sensor Total User Specified Period</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store total user specified period regarding precipitation sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): » precipitationSensorTableNumSensors.0	Pass / Fail (Clause 3.5.2.1.14.4)
2	Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0. RECORD this information as: » Num_Precipitation_Sensors	-
3	FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 3.1 through 3.2.	-
3.1	GET the following object(s): » precipitationSensorPeriod.N	Pass / Fail (Clause 3.5.2.1.14.4)
3.2	Determine the values for the retrieved information. RECORD this information as: » Total_Precipitation_Period[N] (the total precipitation period of the Nth precipitation sensor from the device)	-
4	FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 4.1 through 4.2.	-
4.1	Determine a random value from 0 to 86,400. RECORD this information as: » Total_Precipitation_Period_Random.N	-
4.2	SET the following object(s) to the value(s) shown: » precipitationSensorPeriod.N = Total_Precipitation_Period_Random.N	Pass / Fail (Clause 3.5.2.1.14.4)
5	FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 5.1 through 5.2.	-
5.1	GET the following object(s): » precipitationSensorPeriod.N	Pass / Fail (Clause 3.5.2.1.14.4)
5.2	VERIFY that the RESPONSE VALUE for precipitationSensorPeriod.N is equal to Total_Precipitation_Period_Random.N.	Pass / Fail (Clause 5.8.24.7)
6	FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: » precipitationSensorPeriod.N = Total_Precipitation_Period.N	Pass / Fail (Clause 3.5.2.1.14.4)
7	FOR EACH value, N, from 1 to Num_Precipitation_Sensors, perform Steps 7.1 through 7.2.	-
7.1	GET the following object(s): » precipitationSensorPeriod.N	Pass / Fail (Clause 3.5.2.1.14.4)
7.2	VERIFY that the RESPONSE VALUE for precipitationSensorPeriod.N is equal to Total_Precipitation_Period.N.	Pass / Fail (Clause 5.8.24.7)

<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.26 Retrieve Solar Radiation Sensor Metadata - Location

Test Case: 2.2634	Title:	<i>Retrieve Metadata for Each Solar Radiation Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each solar radiation sensor</i>
	Variables:	<i>Supported Solar Radiation Sensors (PRL 3.6.6)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of solar radiation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» radiationSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.15.1)
3	<u>VERIFY that the RESPONSE VALUE for radiationSensorTableNumSensors.0 is greater than or equal to Supported_Radiation_Sensors.</u>	Pass / Fail (PRL 3.6.6)
4	<u>Determine the RESPONSE VALUE for radiationSensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported Solar Radiation Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Radiation_Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»radiationSensorHeight.N</u> <u>»radiationSensorLatitude.N</u> <u>»radiationSensorLongitude.N</u> <u>»radiationSensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.15.1)
5.2	<u>VERIFY that the RESPONSE VALUE for radiationSensorHeight.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.9.10.2)
5.3	<u>VERIFY that the RESPONSE VALUE for radiationSensorHeight.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.9.10.2)
5.4	<u>VERIFY that the RESPONSE VALUE for radiationSensorHeight.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.9.10.2)
5.5	<u>VERIFY that the RESPONSE VALUE for radiationSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.9.10.3)
5.6	<u>VERIFY that the RESPONSE VALUE for radiationSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.9.10.3)
5.7	<u>VERIFY that the RESPONSE VALUE for radiationSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.9.10.3)
5.8	<u>VERIFY that the RESPONSE VALUE for radiationSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.9.10.4)
5.9	<u>VERIFY that the RESPONSE VALUE for radiationSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.9.10.4)
5.10	<u>VERIFY that the RESPONSE VALUE for radiationSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.9.10.4)
5.11	<u>VERIFY that the RESPONSE VALUE for radiationSensorLocation.N is a valid</u>	Pass / Fail

	DisplayString with no more than 255 characters.	(Clause 5.9.10.5)
5.12	VERIFY that the RESPONSE VALUE for radiationSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.9.10.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.27 Retrieve Solar Radiation Sensor Metadata - Sensor Information

Test Case: 2.2732	Title:	<i>Retrieve Metadata for Each Solar Radiation Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each solar radiation sensor</i>
	Variables:	<i>Supported Solar Radiation Sensors (PRL 3.6.6)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of solar radiation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» radiationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.15.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for radiationSensorTableNumSensors.0 is greater than or equal to Supported Radiation Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.6)</u>
4	<u>Determine the RESPONSE VALUE for radiationSensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported Radiation Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Radiation Sensors, perform Steps 5.1 through 5.4.</u>	-
<u>5.1</u>	<u>GET the following object(s):</u> <u>»radiationSensorModelInformation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.15.2)</u>
<u>5.2</u>	<u>VERIFY that the RESPONSE VALUE for radiationSensorModelInformation.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.10.6)</u>
<u>5.3</u>	<u>VERIFY that the RESPONSE VALUE for radiationSensorModelInformation.N is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.10.6)</u>
<u>5.4</u>	<u>VERIFY that the RESPONSE VALUE for radiationSensorModelInformation.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.10.6)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.28 Configure Solar Radiation Sensor Metadata - Location

Test Case: 2.2833	Title:	<u>Configure Solar Radiation Sensor Metadata – Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding solar radiation sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» radiationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.15.3)</u>
2	<u>Determine the RESPONSE VALUE for radiationSensorTableNumSensors.0. RECORD this information as:</u> <u>»Num_Solar_Radiation_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_Solar_Radiation_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»radiationSensorHeight.N</u> <u>»radiationSensorLatitude.N</u> <u>»radiationSensorLongitude.N</u> <u>»radiationSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.15.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth radiation sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth radiation sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth radiation sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth radiation sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»radiationSensorHeight.N = Sensor_Height_Random.N</u> <u>»radiationSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»radiationSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»radiationSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.15.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_Solar_Radiation_Sensors, perform Steps 5.1 through 5.5.</u>	-
5.1	<u>GET the following object(s):</u> <u>»radiationSensorHeight.N</u> <u>»radiationSensorLatitude.N</u> <u>»radiationSensorLongitude.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.15.3)</u>

	»radiationSensorLocation.N	
5.2	VERIFY that the RESPONSE VALUE for radiationSensorHeight.N is equal to Sensor Height Random.N.	Pass / Fail (Clause 5.9.10.2)
5.3	VERIFY that the RESPONSE VALUE for radiationSensorLatitude.N is equal to Sensor Latitude Random.N.	Pass / Fail (Clause 5.9.10.3)
5.4	VERIFY that the RESPONSE VALUE for radiationSensorLongitude.N is equal to Sensor Longitude Random.N.	Pass / Fail (Clause 5.9.10.4)
5.5	VERIFY that the RESPONSE VALUE for radiationSensorLocation.N is equal to Sensor Location Random.N.	Pass / Fail (Clause 5.9.10.5)
6	FOR EACH value, N, from 1 to Num Pressure Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »radiationSensorHeight.N = Sensor Height.N »radiationSensorLatitude.N = Sensor Latitude.N »radiationSensorLongitude.N = Sensor Longitude.N »radiationSensorLocation.N = Sensor Location.N	Pass / Fail (Clause 3.5.2.15.3)
7	FOR EACH value, N, from 1 to Num Solar Radiation Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »radiationSensorHeight.N »radiationSensorLatitude.N »radiationSensorLongitude.N »radiationSensorLocation.N	Pass / Fail (Clause 3.5.2.1.15.3)
7.2	VERIFY that the RESPONSE VALUE for radiationSensorHeight.N is equal to Sensor Height.N.	Pass / Fail (Clause 5.9.10.2)
7.3	VERIFY that the RESPONSE VALUE for radiationSensorLatitude.N is equal to Sensor Latitude.N.	Pass / Fail (Clause 5.9.10.3)
7.4	VERIFY that the RESPONSE VALUE for radiationSensorLongitude.N is equal to Sensor Longitude.N.	Pass / Fail (Clause 5.9.10.4)
7.5	VERIFY that the RESPONSE VALUE for radiationSensorLocation.N is equal to Sensor Location.N.	Pass / Fail (Clause 5.9.10.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

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C.2.3.2.29 Retrieve Visibility Sensor Metadata - Location

Test Case: 2.2936	Title:	<i>Retrieve Metadata for Each Visibility Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each visibility sensor</i>
	Variables:	<i>Supported Visibility Sensors (PRL 3.6.7)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
PRL 3.6.71	<u>GET the following object(s):</u> »visibilitySensorHeight »visibilitySensorLatitude »visibilitySensorLongitude »visibilitySensorLocation	Pass / Fail (Clause 3.5.2.1.16.1)
2	<u>VERIFY that the RESPONSE VALUE for visibilitySensorHeight is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.10.3)
3	<u>VERIFY that the RESPONSE VALUE for visibilitySensorHeight is less than or equal to 1001.</u>	Pass / Fail (Clause 5.10.3)
4	<u>VERIFY that the RESPONSE VALUE for visibilitySensorHeight is APPROPRIATE.</u>	Pass / Fail (Clause 5.10.3)
5	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLatitude is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.10.4)
6	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLatitude is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.10.4)
7	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLatitude is APPROPRIATE.</u>	Pass / Fail (Clause 5.10.4)
8	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLongitude is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.10.5)
9	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLongitude is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.10.5)
10	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLongitude is APPROPRIATE.</u>	Pass / Fail (Clause 5.10.5)
11	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLocation is a valid DisplayString with no more than 255 characters.</u>	Pass / Fail (Clause 5.10.6)
12	<u>VERIFY that the RESPONSE VALUE for visibilitySensorLocation is APPROPRIATE.</u>	Pass / Fail (Clause 5.10.6)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.30 Retrieve Visibility Sensor Metadata - Sensor Information

Test Case: 2.302	Title:	<i>Retrieve Metadata for Each Visibility Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each visibility sensor</i>
	Variables:	<i>Required_Visibility_Sensors (PRL 3.6.7)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of visibility sensors that the ESS is required to support (PRL 3.6.7). RECORD this information as:</u> » <u>Required_Visibility_Sensors</u>	-
2	<u>Determine the number of visibility sensors supported by the ESS. RECORD this value as:</u> » <u>Supported_Visibility_Sensors</u>	
3	<u>VERIFY that Supported_Visibility_Sensors is greater than or equal to Required_Visibility_Sensors.</u> <u>NOTE: NTCIP 1204 v04 does not report the number of visibility sensors supported by the ESS.</u>	<u>Pass / Fail (PRL 3.6.7)</u>
4	<u>GET the following object(s):</u> » <u>visibilitySensorModelInformation</u>	<u>Pass / Fail (Clause 3.5.2.1.16.2)</u>
5	<u>VERIFY that the RESPONSE VALUE for visibilitySensorModelInformation is greater than or equal to 0.</u>	<u>Pass / Fail (Clause 5.10.7)</u>
6	<u>VERIFY that the RESPONSE VALUE for visibilitySensorModelInformation is less than or equal to 255.</u>	<u>Pass / Fail (Clause 5.10.7)</u>
7	<u>VERIFY that the RESPONSE VALUE for visibilitySensorModelInformation is APPROPRIATE.</u>	<u>Pass / Fail (Clause 5.10.7)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

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C.2.3.2.31 Configure Visibility Sensor Metadata - Location

Test Case: 2.318	Title:	<i>Configure Visibility Sensor Metadata – Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store location and relative height information regarding visibility sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): » visibilitySensorTableNumSensors.0	Pass / Fail (Clause 3.5.2.1.16.3)
2	Determine the RESPONSE VALUE for visibilitySensorTableNumSensors.0. RECORD this information as: »Num_Visibility_Sensors	-
3	FOR EACH value, N, from 1 to Num_Visibility_Sensors, perform Steps 3.1 through 3.2.	-
3.1	GET the following object(s): »visibilitySensorHeight.N »visibilitySensorLatitude.N »visibilitySensorLongitude.N »visibilitySensorLocation.N	Pass / Fail (Clause 3.5.2.1.16.3)
3.2	Determine the values for the retrieved information. RECORD this information as: »Sensor_Height[N] (the height of the Nth visibility sensor from the device) »Sensor_Latitude[N] (the latitude of the Nth visibility sensor from the device) »Sensor_Longitude[N] (the longitude of the Nth visibility sensor from the device) »Sensor_Location[N] (the location of the Nth visibility sensor from the device)	-
4	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.	-
4.1	Determine a random value from -1000 to 1001. RECORD this information as: »Sensor_Height_Random.N	-
4.2	Determine a random value from -90000000 to 90000001. RECORD this information as: »Sensor_Latitude_Random.N	-
4.3	Determine a random value from -180000000 to 180000001. RECORD this information as: »Sensor_Longitude_Random.N	-
4.4	Determine a random display string from 1 to 255 characters in length. RECORD this information as: »Sensor_Location_Random.N	-
4.5	SET the following object(s) to the value(s) shown: »visibilitySensorHeight.N = Sensor_Height_Random.N »visibilitySensorLatitude.N = Sensor_Latitude_Random.N »visibilitySensorLongitude.N = Sensor_Longitude_Random.N »visibilitySensorLocation.N = Sensor_Location_Random.N	Pass / Fail (Clause 3.5.2.16.3)
5	FOR EACH value, N, from 1 to Num_Visibility_Sensors, perform Steps 5.1 through 5.5.	-
5.1	GET the following object(s): »visibilitySensorHeight.N »visibilitySensorLatitude.N »visibilitySensorLongitude.N »visibilitySensorLocation.N	Pass / Fail (Clause 3.5.2.1.16.3)

5.2	VERIFY that the RESPONSE VALUE for visibilitySensorHeight.N is equal to Sensor_Height_Random.N.	Pass / Fail (Clause 5.10.5.2)
5.3	VERIFY that the RESPONSE VALUE for visibilitySensorLatitude.N is equal to Sensor_Latitude_Random.N.	Pass / Fail (Clause 5.10.5.3)
5.4	VERIFY that the RESPONSE VALUE for visibilitySensorLongitude.N is equal to Sensor_Longitude_Random.N.	Pass / Fail (Clause 5.10.5.4)
5.5	VERIFY that the RESPONSE VALUE for visibilitySensorLocation.N is equal to Sensor_Location_Random.N.	Pass / Fail (Clause 5.10.5.5)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »visibilitySensorHeight.N = Sensor_Height.N »visibilitySensorLatitude.N = Sensor_Latitude.N »visibilitySensorLongitude.N = Sensor_Longitude.N »visibilitySensorLocation.N = Sensor_Location.N	Pass / Fail (Clause 3.5.2.16.3)
7	FOR EACH value, N, from 1 to Num_Visibility_Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »visibilitySensorHeight.N »visibilitySensorLatitude.N »visibilitySensorLongitude.N »visibilitySensorLocation.N	Pass / Fail (Clause 3.5.2.1.16.3)
7.2	VERIFY that the RESPONSE VALUE for visibilitySensorHeight.N is equal to Sensor_Height.N.	Pass / Fail (Clause 5.10.5.2)
7.3	VERIFY that the RESPONSE VALUE for visibilitySensorLatitude.N is equal to Sensor_Latitude.N.	Pass / Fail (Clause 5.10.5.3)
7.4	VERIFY that the RESPONSE VALUE for visibilitySensorLongitude.N is equal to Sensor_Longitude.N.	Pass / Fail (Clause 5.10.5.4)
7.5	VERIFY that the RESPONSE VALUE for visibilitySensorLocation.N is equal to Sensor_Location.N.	Pass / Fail (Clause 5.10.5.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		



C.2.3.2.32 Retrieve Pavement Sensor Metadata - Location

Test Case: 2.3240	Title:	<i>Retrieve Metadata for Each Pavement Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each pavement sensor</i>
	Variables:	<i>Supported Pavement Sensors (PRL 3.6.8)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssPavementSensors.0</u>	Pass / Fail (Clause 3.5.2.1.17.1)
3	<u>VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Supported_Pavement_Sensors.</u>	Pass / Fail (PRL 3.6.8)
4	<u>Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as:</u> <u>»Supported_Pavement_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Pavement_Sensors, perform Steps 5.1 through 5.18.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essPavementElevation.N</u> <u>»pavementSensorLatitude.N</u> <u>»pavementSensorLongitude.N</u> <u>»pavementSensorLocation.N</u> <u>»pavementMonitorLatitude.N</u> <u>»pavementMonitorLongitude.N</u>	Pass / Fail (Clause 3.5.2.1.17.1)
5.2	<u>VERIFY that the RESPONSE VALUE for essPavementElevation.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.11.3.4)
5.3	<u>VERIFY that the RESPONSE VALUE for essPavementElevation.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.11.3.4)
5.4	<u>VERIFY that the RESPONSE VALUE for essPavementElevation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.3.4)
5.5	<u>VERIFY that the RESPONSE VALUE for pavementSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.11.3.20)
5.6	<u>VERIFY that the RESPONSE VALUE for pavementSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.11.3.20)
5.7	<u>VERIFY that the RESPONSE VALUE for pavementSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.3.20)
5.8	<u>VERIFY that the RESPONSE VALUE for pavementSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.11.3.21)
5.9	<u>VERIFY that the RESPONSE VALUE for pavementSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.11.3.21)
5.10	<u>VERIFY that the RESPONSE VALUE for pavementSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.3.21)

5.11	VERIFY that the RESPONSE VALUE for pavementMonitorLatitude.N is greater than or equal to -90000000.	Pass / Fail (Clause 5.11.3.25)
5.12	VERIFY that the RESPONSE VALUE for pavementMonitorLatitude.N is less than or equal to 90000001.	Pass / Fail (Clause 5.11.3.25)
5.13	VERIFY that the RESPONSE VALUE for pavementMonitorLatitude.N is APPROPRIATE.	Pass / Fail (Clause 5.11.3.25)
5.14	VERIFY that the RESPONSE VALUE for pavementMonitorLongitude.N is greater than or equal to -180000000.	Pass / Fail (Clause 5.11.3.26)
5.15	VERIFY that the RESPONSE VALUE for pavementMonitorLongitude.N is less than or equal to 180000001.	Pass / Fail (Clause 5.11.3.26)
5.16	VERIFY that the RESPONSE VALUE for pavementMonitorLongitude.N is APPROPRIATE.	Pass / Fail (Clause 5.11.3.26)
5.17	VERIFY that the RESPONSE VALUE for pavementSensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Clause 5.11.3.2)
5.18	VERIFY that the RESPONSE VALUE for pavementSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.11.3.2)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.33 Retrieve Pavement Sensor Metadata - Sensor Information

Test Case: 2.3344	Title:	<i>Retrieve Metadata for Each Pavement Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each pavement sensor</i>
	Variables:	<i>Supported Pavement Sensors (PRL 3.6.8)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pavement sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssPavementSensors.0</u>	Pass / Fail (Clause 3.5.2.1.17.2)
3	<u>VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Supported_Pavement_Sensors.</u>	Pass / Fail (PRL 3.6.8)
4	<u>Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as:</u> <u>»Supported_Pavement_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Pavement_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»pavementSensorModelInformation.N</u>	Pass / Fail (Clause 3.5.2.1.17.2)
5.2	<u>VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.11.3.18)
5.3	<u>VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.N is less than or equal to 255.</u>	Pass / Fail (Clause 5.11.3.18)
5.4	<u>VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.3.18)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.34 Configure Pavement Sensor Metadata - Location

Test Case: 2.3442	Title:	<i>Configure Pavement Sensor Metadata - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store location and relative height information regarding pavement sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): » numEssPavementSensors.0	Pass / Fail (Clause 3.5.2.1.17.3)
2	Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as: »Num_Pavement_Sensors	-
3	FOR EACH value, N, from 1 to Num_Pavement_Sensors, perform Steps 3.1 through 3.2.	-
3.1	GET the following object(s): »essPavementElevation.N »pavementSensorLatitude.N »pavementSensorLongitude.N »pavementMonitorLatitude.N »pavementMonitorLongitude.N »pavementSensorLocation.N	Pass / Fail (Clause 3.5.2.1.17.3)
3.2	Determine the values for the retrieved information. RECORD this information as: »Sensor_Height[N] (the height of the Nth pavement sensor from the device) »Sensor_Latitude[N] (the latitude of the Nth pavement sensor from the device) »Sensor_Longitude[N] (the longitude of the Nth pavement sensor from the device) »Monitor_Latitude[N] (the latitude of the Nth location being monitored by the device) »Monitor_Longitude[N] (the longitude of the Nth location being monitored by the device) »Sensor_Location[N] (the location of the Nth pavement sensor from the device)	-
4	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.7.	-
4.1	Determine a random value from -1000 to 1001. RECORD this information as: »Sensor_Height_Random.N	-
4.2	Determine a random value from -90000000 to 90000001. RECORD this information as: »Sensor_Latitude_Random.N	-
4.3	Determine a random value from -180000000 to 180000001. RECORD this information as: »Sensor_Longitude_Random.N	-
4.4	Determine a random value from -90000000 to 90000001. RECORD this information as: »Monitor_Latitude_Random.N	-
4.5	Determine a random value from -180000000 to 180000001. RECORD this information as: »Monitor_Longitude_Random.N	-
4.6	Determine a random display string from 1 to 255 characters in length. RECORD this information as: »Sensor_Location_Random.N	-
4.7	SET the following object(s) to the value(s) shown:	Pass / Fail

	<ul style="list-style-type: none"> »essPavementElevation.N = Sensor_Height_Random.N »pavementSensorLatitude.N = Sensor_Latitude_Random.N »pavementSensorLongitude.N = Sensor_Longitude_Random.N »pavementMonitorLatitude.N = Monitor_Latitude_Random.N »pavementMonitorLongitude.N = Monitor_Longitude_Random.N »pavementSensorLocation.N = Sensor_Location_Random.N 	(Clause 3.5.2.17.3)
5	FOR EACH value, N, from 1 to Num_Pavement_Sensors, perform Steps 5.1 through 5.7.	-
5.1	GET the following object(s): <ul style="list-style-type: none"> »essPavementElevation.N »pavementSensorLatitude.N »pavementSensorLongitude.N »pavementMonitorLatitude.N »pavementMonitorLongitude.N »pavementSensorLocation.N 	Pass / Fail (Clause 3.5.2.1.17.3)
5.2	VERIFY that the RESPONSE VALUE for essPavementElevation.N is equal to Sensor_Height_Random.N .	Pass / Fail (Clause 5.11.3.4)
5.3	VERIFY that the RESPONSE VALUE for pavementSensorLatitude.N is equal to Sensor_Latitude_Random.N .	Pass / Fail (Clause 5.11.3.20)
5.4	VERIFY that the RESPONSE VALUE for pavementSensorLongitude.N is equal to Sensor_Longitude_Random.N .	Pass / Fail (Clause 5.11.3.21)
5.5	VERIFY that the RESPONSE VALUE for pavementMonitorLatitude.N is equal to Monitor_Latitude_Random.N .	Pass / Fail (Clause 5.11.3.25)
5.6	VERIFY that the RESPONSE VALUE for pavementMonitorLongitude.N is equal to Monitor_Longitude_Random.N .	Pass / Fail (Clause 5.11.3.26)
5.7	VERIFY that the RESPONSE VALUE for pavementSensorLocation.N is equal to Sensor_Location_Random.N .	Pass / Fail (Clause 5.11.3.2)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Step 6.1.	-
6.1	SET the following object(s) to the value(s) shown: <ul style="list-style-type: none"> »essPavementElevation.N = Sensor_Height.N »pavementSensorLatitude.N = Sensor_Latitude.N »pavementSensorLongitude.N = Sensor_Longitude.N »pavementMonitorLatitude.N = Monitor_Latitude.N »pavementMonitorLongitude.N = Monitor_Longitude.N »pavementSensorLocation.N = Sensor_Location.N 	Pass / Fail (Clause 3.5.2.17.3)
7	FOR EACH value, N, from 1 to Num_Pavement_Sensors, perform Steps 7.1 through 7.7.	-
7.1	GET the following object(s): <ul style="list-style-type: none"> »essPavementElevation.N »pavementSensorLatitude.N »pavementSensorLongitude.N »pavementMonitorLatitude.N »pavementMonitorLongitude.N »pavementSensorLocation.N 	Pass / Fail (Clause 3.5.2.1.17.3)
7.2	VERIFY that the RESPONSE VALUE for essPavementElevation.N is equal to Sensor_Height.N .	Pass / Fail (Clause 5.11.3.4)
7.3	VERIFY that the RESPONSE VALUE for pavementSensorLatitude.N is equal to Sensor_Latitude.N .	Pass / Fail (Clause 5.11.3.20)

7.4	<u>VERIFY that the RESPONSE VALUE for pavementSensorLongitude.N is equal to Sensor_Longitude.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.21)</u>
7.5	<u>VERIFY that the RESPONSE VALUE for pavementMonitorLatitude.N is equal to Monitor_Latitude.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.25)</u>
7.6	<u>VERIFY that the RESPONSE VALUE for pavementMonitorLongitude.N is equal to Monitor_Longitude.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.26)</u>
7.7	<u>VERIFY that the RESPONSE VALUE for pavementSensorLocation.N is equal to Sensor_Location.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.2)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

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C.2.3.2.35 Retrieve SubSurface Sensor Metadata - Location

Test Case: 2.3544	Title:	<i>Retrieve Metadata for Each SubSurface Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each subsurface sensor</i>
	Variables:	<i>Supported SubSurface Sensors (PRL 3.6.11)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of subsurface sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssSubSurfaceSensors.0</u>	Pass / Fail (Clause 3.5.2.1.18.1)
3	<u>VERIFY that the RESPONSE VALUE for numEssSubSurfaceSensors.0 is greater than or equal to Supported_SubSurface_Sensors.</u>	Pass / Fail (Clause 3.5.2.1.18.1)
4	<u>Determine the RESPONSE VALUE for numEssSubSurfaceSensors.0. RECORD this information as:</u> <u>»Supported_SubSurface_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_SubSurface_Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essSubSurfaceSensorDepth.N</u> <u>»essSubSurfaceSensorLatitude.N</u> <u>»essSubSurfaceSensorLongitude.N</u> <u>»essSubSurfaceSensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.18.1)
5.2	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.11.6.4)
5.3	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.11.6.4)
5.4	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.6.4)
5.5	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.11.6.8)
5.6	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.11.6.8)
5.7	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.6.8)
5.8	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.11.6.9)
5.9	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.11.6.9)
5.10	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.6.9)
5.11	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is a valid</u>	Pass / Fail

	DisplayString with no more than 255 characters.	(Clause 5.11.6.2)
5.12	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.11.6.2)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.36 Retrieve SubSurface Sensor Metadata - Sensor Information

Test Case: 2.3645	Title:	<i>Retrieve Metadata for Each SubSurface Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each subsurface sensor</i>
	Variables:	<i>Supported SubSurface Sensors (PRL 3.6.11)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pavement sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssSubSurfaceSensors.0</u>	Pass / Fail (Clause 3.5.2.1.18.2)
3	<u>VERIFY that the RESPONSE VALUE for numEssSubSurfaceSensors.0 is greater than or equal to Supported SubSurface Sensors.</u>	Pass / Fail (PRL 3.6.11)
4	<u>Determine the RESPONSE VALUE for numEssSubSurfaceSensors.0. RECORD this information as:</u> <u>»Supported SubSurface Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported SubSurface Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essSubSurfaceSensorModelInformation.N</u>	Pass / Fail (Clause 3.5.2.1.18.2)
5.2	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorModelInformation.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.11.6.10)
5.3	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorModelInformation.N is less than or equal to 255.</u>	Pass / Fail (Clause 5.11.6.10)
5.4	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorModelInformation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.11.6.10)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.37 Configure SubSurface Sensor Metadata - Location

Test Case: 2.3746	Title:	<u>Configure SubSurface Sensor Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding subsurface sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» numEssSubSurfaceSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.18.3)</u>
2	<u>Determine the RESPONSE VALUE for numEssSubSurfaceSensors.0. RECORD this information as:</u> <u>»Num_SubSurface_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_SubSurface_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»essSubSurfaceSensorDepth.N</u> <u>»essSubSurfaceSensorLatitude.N</u> <u>»essSubSurfaceSensorLongitude.N</u> <u>»essSubSurfaceSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.18.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth pavement sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth pavement sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth pavement sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth pavement sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»essSubSurfaceSensorDepth.N = Sensor_Height_Random.N</u> <u>»essSubSurfaceSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»essSubSurfaceSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»essSubSurfaceSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.18.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_SubSurface_Sensors, perform Steps 5.1 through 5.5.</u>	-

5.1	<u>GET the following object(s):</u> » <u>essSubSurfaceSensorDepth.N</u> » <u>essSubSurfaceSensorLatitude.N</u> » <u>essSubSurfaceSensorLongitude.N</u> » <u>essSubSurfaceSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.18.3)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is equal to</u> <u>Sensor_Height_Random.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.4)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLatitude.N is equal to</u> <u>Sensor_Latitude_Random.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.8)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLongitude.N is equal to</u> <u>Sensor_Longitude_Random.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.9)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is equal to</u> <u>Sensor_Location_Random.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.2)</u>
6	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.</u>	-
6.1	<u>SET the following object(s) to the value(s) shown:</u> » <u>essSubSurfaceSensorDepth.N = Sensor_Height.N</u> » <u>essSubSurfaceSensorLatitude.N = Sensor_Latitude.N</u> » <u>essSubSurfaceSensorLongitude.N = Sensor_Longitude.N</u> » <u>essSubSurfaceSensorLocation.N = Sensor_Location.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.18.3)</u>
7	<u>FOR EACH value, N, from 1 to Num_SubSurface_Sensors, perform Steps 7.1 through</u> <u>7.5.</u>	-
7.1	<u>GET the following object(s):</u> » <u>essSubSurfaceSensorDepth.N</u> » <u>essSubSurfaceSensorLatitude.N</u> » <u>essSubSurfaceSensorLongitude.N</u> » <u>essSubSurfaceSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.18.3)</u>
7.2	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorDepth.N is equal to</u> <u>Sensor_Height.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.4)</u>
7.3	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLatitude.N is equal to</u> <u>Sensor_Latitude.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.8)</u>
7.4	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLongitude.N is equal to</u> <u>Sensor_Longitude.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.9)</u>
7.5	<u>VERIFY that the RESPONSE VALUE for essSubSurfaceSensorLocation.N is equal to</u> <u>Sensor_Location.N.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.6.2)</u>
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.38 Retrieve Air Quality Sensor Metadata - Location

Test Case: 2.3850	Title:	<u>Retrieve Metadata for Each Air Quality Sensor - Location</u>		
	Description:	<u>This test case verifies that the ESS allows a management station to determine the location and relative height of each air quality sensor</u>		
	Variables:	<u>Required CO Sensors</u>	<u>(PRL 3.6.13)-Need to update</u>	
		<u>Required CO2 Sensors</u>	<u>(PRL 3.6.14)</u>	
		<u>Required NO Sensors</u>	<u>(PRL 3.6.15)</u>	
		<u>Required NO2 Sensors</u>	<u>(PRL 3.6.16)</u>	
		<u>Required SO2 Sensors</u>	<u>(PRL 3.6.17)</u>	
		<u>Required O3 Sensors</u>	<u>(PRL 3.6.18)</u>	
		<u>Required PM10 Sensors</u>	<u>(PRL 3.6.19)</u>	
<u>Required PM25 Sensors</u>	<u>(PRL 3.6.28)</u>			
Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>			

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of air quality sensors that the ESS is required to support. This is greater than or equal to the greater of Required CO Sensors, Required CO2 Sensors, Supported NO Sensors, Required NO2 Sensors, Required SO2 Sensors, Supported O3 Sensors, Required PM10 Sensors, or Required PM25 Sensors. RECORD this information as:</u> <u>» Required AirQuality Sensors</u>	-
2	<u>GET the following object(s):</u> <u>» airQualitySensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.1)</u>
3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required AirQuality Sensors.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.1)</u>
4	<u>Determine the RESPONSE VALUE for airQualitySensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported AirQuality Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported AirQuality Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»airQualitySensorHeight.N</u> <u>»airQualitySensorLatitude.N</u> <u>»airQualitySensorLongitude.N</u> <u>»airQualitySensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.1)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for airQualitySensorHeight.N is greater than or equal to -1000.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.2)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorHeight.N is less than or equal to 1001.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.2)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for airQualitySensorHeight.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.2)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for airQualitySensorLatitude.N is greater than or equal to -90000000.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.3)</u>
5.6	<u>VERIFY that the RESPONSE VALUE for airQualitySensorLatitude.N is less than or equal to 90000001.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.3)</u>

5.7	VERIFY that the RESPONSE VALUE for airQualitySensorLatitude.N is APPROPRIATE.	Pass / Fail (Clause 5.14.12.3)
5.8	VERIFY that the RESPONSE VALUE for airQualitySensorLongitude.N is greater than or equal to -180000000.	Pass / Fail (Clause 5.14.12.4)
5.9	VERIFY that the RESPONSE VALUE for airQualitySensorLongitude.N is less than or equal to 180000001.	Pass / Fail (Clause 5.14.12.4)
5.10	VERIFY that the RESPONSE VALUE for airQualitySensorLongitude.N is APPROPRIATE.	Pass / Fail (Clause 5.14.12.4)
5.11	VERIFY that the RESPONSE VALUE for airQualitySensorLocation.N is a valid DisplayString with no more than 255 characters.	Pass / Fail (Clause 5.14.12.5)
5.12	VERIFY that the RESPONSE VALUE for airQualitySensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.14.12.5)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.39 Retrieve Air Quality Sensor Metadata - Sensor Information

Test Case: 2.3954	Title:	<u>Retrieve Metadata for Each Air Quality Sensor - Sensor Information</u>		
	Description:	<u>This test case verifies that the ESS allows a management station to determine the sensor information of each air quality sensor</u>		
	Variables:	<u>Required CO Sensors</u>	<u>(PRL 3.6.13)</u>	
		<u>Required CO2 Sensors</u>	<u>(PRL 3.6.14)</u>	
		<u>Required NO Sensors</u>	<u>(PRL 3.6.15)</u>	
		<u>Required NO2 Sensors</u>	<u>(PRL 3.6.16)</u>	
		<u>Required SO2 Sensors</u>	<u>(PRL 3.6.17)</u>	
		<u>Required O3 Sensors</u>	<u>(PRL 3.6.18)</u>	
		<u>Required PM10 Sensors</u>	<u>(PRL 3.6.19)</u>	
<u>Required PM25 Sensors</u>		<u>(PRL 3.6.28)</u>		
Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>			

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of air quality sensors that the ESS is required to support. This is greater than or equal to the greater of Required_CO_Sensors, Required_CO2_Sensors, Supported_NO_Sensors, Required_NO2_Sensors, Required_SO2_Sensors, Supported O3_Sensors, Required_PM10_Sensors, or Required_PM25_Sensors. RECORD this information as:</u> <u>» Required AirQuality_Sensors</u>	-
2	<u>GET the following object(s):</u> <u>» airQualitySensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.2)</u>
3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_AirQuality_Sensors.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.2)</u>
4	<u>Determine the RESPONSE VALUE for airQualitySensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported_AirQuality_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_AirQuality_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»airQualitySensorModelInformation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.2)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for airQualitySensorModelInformation.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.6)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorModelInformation.N is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.6)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for airQualitySensorModelInformation.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.14.12.6)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

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C.2.3.2.40 Configure Air Quality Sensor Metadata - Location

Test Case: 2.5240	Title:	<u>Configure Air Quality Sensor Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding air quality sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» airQualitySensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.3)</u>
2	<u>Determine the RESPONSE VALUE for airQualitySensorTableNumSensors.0. RECORD this information as:</u> <u>»Num_AirQuality_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_AirQuality_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»airQualitySensorHeight.N</u> <u>»airQualitySensorLatitude.N</u> <u>»airQualitySensorLongitude.N</u> <u>»airQualitySensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.3)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth air quality sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth air quality sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth air quality sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth air quality sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»airQualitySensorHeight.N = Sensor_Height_Random.N</u> <u>»airQualitySensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»airQualitySensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»airQualitySensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.20.3)</u>
5	<u>FOR EACH value, N, from 1 to Num_AirQuality_Sensors, perform Steps 5.1 through 5.5.</u>	-
5.1	<u>GET the following object(s):</u> <u>»airQualitySensorHeight.N</u> <u>»airQualitySensorLatitude.N</u> <u>»airQualitySensorLongitude.N</u> <u>»airQualitySensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.20.3)</u>

5.2	VERIFY that the RESPONSE VALUE for airQualitySensorHeight.N is equal to Sensor_Height_Random.N.	Pass / Fail (Clause 5.14.12.2)
5.3	VERIFY that the RESPONSE VALUE for airQualitySensorLatitude.N is equal to Sensor_Latitude_Random.N.	Pass / Fail (Clause 5.14.12.3)
5.4	VERIFY that the RESPONSE VALUE for airQualitySensorLongitude.N is equal to Sensor_Longitude_Random.N.	Pass / Fail (Clause 5.14.12.4)
5.5	VERIFY that the RESPONSE VALUE for airQualitySensorLocation.N is equal to Sensor_Location_Random.N.	Pass / Fail (Clause 5.14.12.5)
6	FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 6.1 through 6.1.	-
6.1	SET the following object(s) to the value(s) shown: »airQualitySensorHeight.N = Sensor_Height.N »airQualitySensorLatitude.N = Sensor_Latitude.N »airQualitySensorLongitude.N = Sensor_Longitude.N »airQualitySensorLocation.N = Sensor_Location.N	Pass / Fail (Clause 3.5.2.20.3)
7	FOR EACH value, N, from 1 to Num_AirQuality_Sensors, perform Steps 7.1 through 7.5.	-
7.1	GET the following object(s): »airQualitySensorHeight.N »airQualitySensorLatitude.N »airQualitySensorLongitude.N »airQualitySensorLocation.N	Pass / Fail (Clause 3.5.2.1.20.3)
7.2	VERIFY that the RESPONSE VALUE for airQualitySensorHeight.N is equal to Sensor_Height.N.	Pass / Fail (Clause 5.14.12.2)
7.3	VERIFY that the RESPONSE VALUE for airQualitySensorLatitude.N is equal to Sensor_Latitude.N.	Pass / Fail (Clause 5.14.12.3)
7.4	VERIFY that the RESPONSE VALUE for airQualitySensorLongitude.N is equal to Sensor_Longitude.N.	Pass / Fail (Clause 5.14.12.4)
7.5	VERIFY that the RESPONSE VALUE for airQualitySensorLocation.N is equal to Sensor_Location.N.	Pass / Fail (Clause 5.14.12.5)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.41 Retrieve Water Level Sensor Metadata - Location

Test Case: 2.4154	Title:	<i>Retrieve Metadata for Each Water Level Sensor - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location and relative height of each water level sensor</i>
	Variables:	<i>Supported WaterLevel Sensors (PRL 3.6.282)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of water level sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» waterLevelSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.21.1)
3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorTableNumSensors.0 is greater than or equal to Supported WaterLevel Sensors.</u>	Pass / Fail (PRL 3.6.282)
4	<u>Determine the RESPONSE VALUE for waterLevelSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported WaterLevel Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported WaterLevel Sensors, perform Steps 5.1 through 5.12.</u>	-
5.1	<u>GET the following object(s):</u> <u>»waterLevelSensorHeight.N</u> <u>»waterLevelSensorLatitude.N</u> <u>»waterLevelSensorLongitude.N</u> <u>»waterLevelSensorLocation.N</u>	Pass / Fail (Clause 3.5.2.1.21.1)
5.2	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorHeight.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.8.21.4)
5.3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorHeight.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.8.21.4)
5.4	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorHeight.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.21.4)
5.5	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLatitude.N is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.8.21.5)
5.6	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLatitude.N is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.8.21.5)
5.7	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLatitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.21.5)
5.8	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLongitude.N is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.8.21.6)
5.9	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLongitude.N is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.8.21.6)
5.10	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLongitude.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.21.6)
5.11	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLocation.N is a valid</u>	Pass / Fail

	DisplayString with no more than 255 characters.	(Clause 5.8.21.7)
5.12	VERIFY that the RESPONSE VALUE for waterLevelSensorLocation.N is APPROPRIATE.	Pass / Fail (Clause 5.8.21.7)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.42 Retrieve Water Level Sensor Metadata - Sensor Information

Test Case: 2.4255	Title:	<i>Retrieve Metadata for Each Water Level Sensor - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of each water level sensor</i>
	Variables:	<i>Supported WaterLevel Sensors (PRL 3.6.228)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of water level sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» waterLevelSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.21.2)
3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorTableNumSensors.0 is greater than or equal to Supported WaterLevel Sensors.</u>	Pass / Fail (PRL 3.6.228)
4	<u>Determine the RESPONSE VALUE for waterLevelSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported WaterLevel Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported WaterLevel Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»waterLevelSensorModelInformation.N</u>	Pass / Fail (Clause 3.5.2.1.21.2)
5.2	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorModelInformation.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.21.8)
5.3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorModelInformation.N is less than or equal to 255.</u>	Pass / Fail (Clause 5.8.21.8)
5.4	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorModelInformation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.21.8)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.43 Retrieve Water Level Sensor Metadata - Warning Level

Test Case: 2.4356	Title:	<i>Retrieve Metadata for Each Water Level Sensor - Warning Level</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the warning level information of each water level sensor</i>
	Variables:	<i>Supported WaterLevel_Sensors (PRL 3.6.228)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of water level sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» waterLevelSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.21.3)
3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorTableNumSensors.0 is greater than or equal to Supported_WaterLevel_Sensors.</u>	Pass / Fail (PRL 3.6.282)
4	<u>Determine the RESPONSE VALUE for waterLevelSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported_WaterLevel_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_WaterLevel_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»waterLevelSensorWarningLevel.N</u>	Pass / Fail (Clause 3.5.2.1.21.3)
5.2	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorWarningLevel.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.21.3)
5.3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorWarningLevel.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.8.21.3)
5.4	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorWarningLevel.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.21.3)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.44 Configure Water Level Sensor Metadata - Location

Test Case: 2.4457	Title:	<u>Configure Water Level Sensor Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location and relative height information regarding water level sensors.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>» waterLevelSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.4)</u>
2	<u>Determine the RESPONSE VALUE for waterLevelSensorTableNumSensors.0. RECORD this information as:</u> <u>»Num_WaterLevel_Sensors</u>	-
3	<u>FOR EACH value, N, from 1 to Num_WaterLevel_Sensors, perform Steps 3.1 through 3.2.</u>	-
3.1	<u>GET the following object(s):</u> <u>»waterLevelSensorHeight.N</u> <u>»waterLevelSensorLatitude.N</u> <u>»waterLevelSensorLongitude.N</u> <u>»waterLevelSensorLocation.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.4)</u>
3.2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»Sensor_Height[N] (the height of the Nth water level sensor from the device)</u> <u>»Sensor_Latitude[N] (the latitude of the Nth water level sensor from the device)</u> <u>»Sensor_Longitude[N] (the longitude of the Nth water level sensor from the device)</u> <u>»Sensor_Location[N] (the location of the Nth water level sensor from the device)</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Pressure_Sensors, perform Steps 4.1 through 4.5.</u>	-
4.1	<u>Determine a random value from -1000 to 1001. RECORD this information as:</u> <u>»Sensor_Height_Random.N</u>	-
4.2	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»Sensor_Latitude_Random.N</u>	-
4.3	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»Sensor_Longitude_Random.N</u>	-
4.4	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»Sensor_Location_Random.N</u>	-
4.5	<u>SET the following object(s) to the value(s) shown:</u> <u>»waterLevelSensorHeight.N = Sensor_Height_Random.N</u> <u>»waterLevelSensorLatitude.N = Sensor_Latitude_Random.N</u> <u>»waterLevelSensorLongitude.N = Sensor_Longitude_Random.N</u> <u>»waterLevelSensorLocation.N = Sensor_Location_Random.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.21.4)</u>
5	<u>FOR EACH value, N, from 1 to Num_WaterLevel_Sensors, perform Steps 5.1 through 5.5.</u>	-

5.1	<u>GET the following object(s):</u> » <u>waterLevelSensorHeight.N</u> » <u>waterLevelSensorLatitude.N</u> » <u>waterLevelSensorLongitude.N</u> » <u>waterLevelSensorLocation.N</u>	<u>Pass / Fail</u> (<u>Clause 3.5.2.1.21.4</u>)
5.2	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorHeight.N is equal to</u> <u>Sensor Height Random.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.4???</u>)
5.3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLatitude.N is equal to</u> <u>Sensor Latitude Random.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.45</u>)
5.4	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLongitude.N is equal to</u> <u>Sensor Longitude Random.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.56</u>)
5.5	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLocation.N is equal to</u> <u>Sensor Location Random.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.67</u>)
6	<u>FOR EACH value, N, from 1 to Num Pressure Sensors, perform Steps 6.1 through 6.1.</u>	-
6.1	<u>SET the following object(s) to the value(s) shown:</u> » <u>waterLevelSensorHeight.N = Sensor Height.N</u> » <u>waterLevelSensorLatitude.N = Sensor Latitude.N</u> » <u>waterLevelSensorLongitude.N = Sensor Longitude.N</u> » <u>waterLevelSensorLocation.N = Sensor Location.N</u>	<u>Pass / Fail</u> (<u>Clause 3.5.2.21.4</u>)
7	<u>FOR EACH value, N, from 1 to Num WaterLevel Sensors, perform Steps 7.1 through</u> <u>7.5.</u>	-
7.1	<u>GET the following object(s):</u> » <u>waterLevelSensorHeight.N</u> » <u>waterLevelSensorLatitude.N</u> » <u>waterLevelSensorLongitude.N</u> » <u>waterLevelSensorLocation.N</u>	<u>Pass / Fail</u> (<u>Clause 3.5.2.1.21.4</u>)
7.2	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorHeight.N is equal to</u> <u>Sensor Height.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.4</u>)
7.3	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLatitude.N is equal to</u> <u>Sensor Latitude.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.5</u>)
7.4	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLongitude.N is equal to</u> <u>Sensor Longitude.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.6</u>)
7.5	<u>VERIFY that the RESPONSE VALUE for waterLevelSensorLocation.N is equal to</u> <u>Sensor Location.N.</u>	<u>Pass / Fail</u> (<u>Clause 5.8.21.7</u>)
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.45 Configure Water Level Sensor Metadata - Warning Level

Test Case: 2.4559	Title:	<i>Configure Water Level Sensor Metadata - Warning Level</i>
	Description:	<i>This test case verifies that the ESS allows a management station to store warning level information regarding water level sensors.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>GET</u> the following object(s): » <u>waterLevelSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.1.21.6)
2	Determine the RESPONSE VALUE for <u>waterLevelSensorTableNumSensors.0</u> . <u>RECORD</u> this information as: » <u>Num_WaterLevel_Sensors</u>	-
3	<u>FOR EACH</u> value, N, from 1 to <u>Num_WaterLevel_Sensors</u> , perform Steps 3.1 through 3.2.	-
3.1	<u>GET</u> the following object(s): » <u>waterLevelSensorWarningLevel.N</u>	Pass / Fail (Clause 3.5.2.1.21.6)
3.2	Determine the values for the retrieved information. <u>RECORD</u> this information as: » <u>Sensor_Warning_Level[N]</u> (the sensor warning level of the Nth water level sensor from the device)	-
4	<u>FOR EACH</u> value, N, from 1 to <u>Num_WaterLevel_Sensors</u> , perform Steps 4.1 through 4.2.	-
4.1	Determine a random value from 0 to 65535. <u>RECORD</u> this information as: » <u>Sensor_Warning_Level_Random.N</u>	-
4.2	<u>SET</u> the following object(s) to the value(s) shown: » <u>waterLevelSensorWarningLevel.N = Sensor_Model_Information_Random.N</u>	Pass / Fail (Clause 3.5.2.21.6)
5	<u>FOR EACH</u> value, N, from 1 to <u>Num_WaterLevel_Sensors</u> , perform Steps 5.1 through 5.2.	-
5.1	<u>GET</u> the following object(s): » <u>waterLevelSensorWarningLevel.N</u>	Pass / Fail (Clause 3.5.2.1.21.6)
5.2	<u>VERIFY</u> that the RESPONSE VALUE for <u>waterLevelSensorWarningLevel.N</u> is equal to <u>Sensor_Warning_Level_Random.N</u> .	Pass / Fail (Clause 5.8.21.3)
6	<u>FOR EACH</u> value, N, from 1 to <u>Num_WaterLevel_Sensors</u> , perform Steps 6.1 through 6.1.	-
6.1	<u>SET</u> the following object(s) to the value(s) shown: » <u>waterLevelSensorWarningLevel.N = Sensor_Warning_Level.N</u>	Pass / Fail (Clause 3.5.2.21.6)
7	<u>FOR EACH</u> value, N, from 1 to <u>Num_WaterLevel_Sensors</u> , perform Steps 7.1 through 7.2.	-
7.1	<u>GET</u> the following object(s): » <u>waterLevelSensorWarningLevel.N</u>	Pass / Fail (Clause 3.5.2.1.21.6)
7.2	<u>VERIFY</u> that the RESPONSE VALUE for <u>waterLevelSensorWarningLevel.N</u> is equal to <u>Sensor_Warning_Level.N</u> .	Pass / Fail (Clause 5.8.21.3)

<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.2.46 Retrieve PTS Metadata - Location

Test Case: 2.46550	Title:	<i>Retrieve Metadata for a PTS - Location</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the location of a pavement treatment system</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> »essPavementTreatmentLatitude.0 »essPavementTreatmentLongitude.0 »essPavementTreatmentLocation.0	Pass / Fail (Clause 3.5.2.1.21.1)
2	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLatitude.0 is greater than or equal to -90000000.</u>	Pass / Fail (Clause 5.13.21)
3	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLatitude.0 is less than or equal to 90000001.</u>	Pass / Fail (Clause 5.13.21)
4	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLatitude.0 is APPROPRIATE.</u>	Pass / Fail (Clause 5.13.21)
5	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLongitude.0 is greater than or equal to -180000000.</u>	Pass / Fail (Clause 5.13.22)
6	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLongitude.0 is less than or equal to 180000001.</u>	Pass / Fail (Clause 5.13.22)
7	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLongitude.0 is APPROPRIATE.</u>	Pass / Fail (Clause 5.13.22)
8	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLocation.0 is a valid DisplayString with no more than 255 characters.</u>	Pass / Fail (Clause 5.13.23)
9	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLocation.0 is APPROPRIATE.</u>	Pass / Fail (Clause 5.13.23)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.2.47 Retrieve PTS Metadata - Sensor Information

Test Case: 2.4754	Title:	<i>Retrieve Metadata for a PTS - Sensor Information</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the sensor information of the pavement treatment system</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>GET</u> the following object(s): »essPavementTreatmentModelInformation.0	Pass / Fail (Clause 3.5.2.1.21.2)
2	<u>VERIFY</u> that the RESPONSE VALUE for essPavementTreatmentModelInformation.0 is greater than or equal to 0.	Pass / Fail (Clause 5.13.24)
3	<u>VERIFY</u> that the RESPONSE VALUE for essPavementTreatmentModelInformation.N is less than or equal to 255.	Pass / Fail (Clause 5.13.24)
4	<u>VERIFY</u> that the RESPONSE VALUE for essPavementTreatmentModelInformation.N is APPROPRIATE.	Pass / Fail (Clause 5.13.24)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.2.48 Configure PTS Metadata - Location

Test Case: 2.4852	Title:	<u>Configure PTS Metadata - Location</u>
	Description:	<u>This test case verifies that the ESS allows a management station to store location information regarding the pavement treatment system.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>»essPavementTreatmentLatitude.0</u> <u>»essPavementTreatmentLongitude.0</u> <u>»essPavementTreatmentLocation.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.3)</u>
2	<u>Determine the values for the retrieved information. RECORD this information as:</u> <u>»PTS_Latitude (the latitude of the pavement treatment system)</u> <u>»PTS_Longitude (the longitude of the pavement treatment system)</u> <u>»PTS_Location (the location of the pavement treatment system)</u>	-
3	<u>Determine a random value from -90000000 to 90000001. RECORD this information as:</u> <u>»PTS_Latitude_Random</u>	
4	<u>Determine a random value from -180000000 to 180000001. RECORD this information as:</u> <u>»PTS_Longitude_Random</u>	
5	<u>Determine a random display string from 1 to 255 characters in length. RECORD this information as:</u> <u>»PTS_Location_Random</u>	-
6	<u>SET the following object(s) to the value(s) shown:</u> <u>»essPavementTreatmentLatitude.0 = PTS_Latitude_Random</u> <u>»essPavementTreatmentLongitude.0 = PTS_Longitude_Random</u> <u>»essPavementTreatmentLocation.0 = PTS_Location_Random</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.3)</u>
7	<u>GET the following object(s):</u> <u>»essPavementTreatmentLatitude.0</u> <u>»essPavementTreatmentLongitude.0</u> <u>»essPavementTreatmentLocation.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.1)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLatitude.0 is equal to PTS_Latitude_Random.</u>	<u>Pass / Fail</u> <u>(Clause 5.13.21)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLongitude.0 is equal to PTS_Longitude_Random.</u>	<u>Pass / Fail</u> <u>(Clause 5.13.22)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLocation.0 is equal to PTS_Location_Random</u>	<u>Pass / Fail</u> <u>(Clause 5.13.23)</u>
6.1	<u>SET the following object(s) to the value(s) shown:</u> <u>»essPavementTreatmentLatitude.0 = PTS_Latitude</u> <u>»essPavementTreatmentLongitude.0 = PTS_Longitude</u> <u>»essPavementTreatmentLocation.0 = PTS_Location</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.3)</u>
7.1	<u>GET the following object(s):</u> <u>»essPavementTreatmentLatitude.0</u> <u>»essPavementTreatmentLongitude.0</u> <u>»essPavementTreatmentLocation.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.1.21.1)</u>
7.2	<u>VERIFY that the RESPONSE VALUE for essPavementTreatmentLatitude.0 is equal to</u>	<u>Pass / Fail</u>

	PTS_Latitude.	(Clause 5.13.21)
7.4	VERIFY that the RESPONSE VALUE for essPavementTreatmentLongitude.0 is equal to PTS_Longitude.	Pass / Fail (Clause 5.13.22)
7.5	VERIFY that the RESPONSE VALUE for essPavementTreatmentLocation.0 is equal to PTS_Location.	Pass / Fail (Clause 5.13.23)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.3 Weather Data Tests

C.2.3.3.1 Retrieve Weather Profile with Mobile Sources

Test Case: 3.1	Title:	Retrieve Weather Profile with Mobile Sources		
	Description:	This test case verifies that the ESS allows a management station to retrieve a list of records recorded by the ESS over a period of time.		
	Variables:	Pressure_Supported	PRL 2.5.2.1.1	
		Wind_Supported	PRL 2.5.2.1.2	
		Required_Wind_Sensors	PRL 3.6.2	
		Temperature_Supported	PRL 2.5.2.1.3	
		Required_Temp_Sensors	PRL 3.6.3	
		Humidity_Supported	PRL 2.5.2.1.4	
		Precip_Supported	PRL 2.5.2.1.5	
		Required_Water_Level_Sensors	PRL 3.6.22	
		Adjacent_Snow_Depth_Supported	PRL 3.5.2.3.3.4	
		Roadway_Snow_Depth_Supported	PRL 3.5.2.3.3.5	
		Ice_Thickness_Supported	PRL 3.5.2.3.3.6	
		Precip_Rates_Supported	PRL 3.5.2.3.2.6.2	
		Situation_Supported	PRL 2.5.2.4	
Visibility_Supported	PRL 2.5.2.1.7			
Radiation_Supported	PRL 2.5.2.1.6			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the ESS is required to monitor atmospheric pressure (PRL 2.5.2.1.1). RECORD this information as: »Pressure_Supported	
2	CONFIGURE: Determine the number of wind sensors supported. RECORD this information as: »Wind_Supported (whether the ESS is required to monitor winds—PRL 2.5.2.1.2) »Required_Wind_Sensors (the number of wind sensors that the ESS is required to support - PRL 3.6.2)	
3	CONFIGURE: Determine the number of temperature sensors supported. RECORD this information as: »Temperature_Supported (whether the ESS is required to monitor temperature—PRL 2.5.2.1.3) »Required_Temp_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.3) »Humidity_Supported (whether the ESS is required to monitor humidity—PRL 2.5.2.1.4)	

4	<p>CONFIGURE: Determine the number of precipitation sensors supported. RECORD this information as:</p> <ul style="list-style-type: none"> »Precip_Supported (whether the ESS is required to monitor precipitation—PRL 2.5.2.1.5) »Required_Water_Level_Sensors (the number of water level sensors that the ESS is required to support—PRL 3.6.22) »Adjacent_Snow_Depth_Supported (whether the ESS is required to monitor the adjacent snow depth—PRL 3.5.2.3.3.4) »Roadway_Snow_Depth_Supported (whether the ESS is required to monitor the roadway snow depth—PRL 3.5.2.3.3.5) »Ice_Thickness_Supported (whether the ESS is required to monitor the snow pack depth and ice thickness - PRL 3.5.2.3.3.6) »Precip_Rates_Supported (whether the ESS is required to monitor the precipitation rates—PRL 3.5.2.3.2.6.2) 	
5	<p>CONFIGURE: Determine whether the ESS is required to report situation data (PRL 2.5.2.4). RECORD this information as:</p> <ul style="list-style-type: none"> »Situation_Supported 	
6	<p>CONFIGURE: Determine whether the ESS is required to provide visibility capabilities (PRL 2.5.2.1.7). RECORD this information as:</p> <ul style="list-style-type: none"> »Visibility_Supported 	
7	<p>CONFIGURE: Determine whether the ESS is required to monitor solar radiation (PRL 2.5.2.1.6). RECORD this information as:</p> <ul style="list-style-type: none"> »Radiation_Supported 	
8	<p>GET the following object(s):</p> <ul style="list-style-type: none"> »essWeatherV3Block.0 »essLatitude.0 »essLongitude.0 »essVehicleSpeed.0 »essVehicleBearing.0 »essOdometer.0 »essReferenceHeight.0 »essMobileFriction.0 »essMobileObservationGroundState.0 »essMobileObservationPavement.0 	<p>Pass / Fail (Sec. 3.5.2.3.1)</p>
9	Decode the essWeatherV3Block.0 structure.	
10	VERIFY that the essWeatherV3Block.0 structure was decoded without error.	<p>Pass / Fail (Sec. 5.3.9)</p>
11	IF Pressure_Supported is equal to true, then proceed to Step 11.1; otherwise, proceed to Step 12.	
11.1	VERIFY that the RESPONSE VALUE for the essAtmosphericPressure.0 field of the essWeatherV3Block.0 object is present.	<p>Pass / Fail (Sec. 3.5.2.3.2.1)</p>
11.2	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is between 0 and 65535, inclusive.	<p>Pass / Fail (Sec. 5.5.4)</p>
11.3	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is APPROPRIATE.	<p>Pass / Fail (Sec. 5.5.4)</p>
12	IF Wind_Supported is equal to true, then proceed to Step 12.1; otherwise, proceed to Step 13.	
12.1	VERIFY that the RESPONSE VALUE for the essWindData field of the essWeatherV3Block.0 object is present.	<p>Pass / Fail (Sec. 3.5.2.3.2.2)</p>
12.2	VERIFY that the essWindData field contains at least Required_Wind_Sensors entries.	<p>Pass / Fail (Sec. 3.6.2)</p>

12.3	FOR EACH value, N, from 1 to Required_Wind_Sensors, perform Steps 12.3.1 through 12.3.21.	
12.3.1	VERIFY that the windSensorIndex.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.2	VERIFY that the RESPONSE VALUE for windSensorIndex.x in the Nth essWindDataV3 structure is equal to N.	Pass / Fail (Sec. 5.6.10.1)
12.3.3	VERIFY that the windSensorAvgSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.4	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.2)
12.3.5	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.2)
12.3.6	VERIFY that the windSensorAvgDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.7	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.5)
12.3.8	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.5)
12.3.9	VERIFY that the windSensorSpotSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.10	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.6)
12.3.11	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.6)
12.3.12	VERIFY that the windSensorSpotDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.13	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.7)
12.3.14	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.7)
12.3.15	VERIFY that the windSensorGustSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.16	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.8)
12.3.17	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.8)
12.3.18	VERIFY that the windSensorGustDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.19	VERIFY that the RESPONSE VALUE for windSensorGustDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.9)
12.3.20	VERIFY that the RESPONSE VALUE for windSensorGustDirection.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.9)

12.3.21	IF Situation_Supported is equal to true, then proceed to Step 12.3.21.1; otherwise, proceed to Step 13.	
12.3.21.1	VERIFY that the windSensorSituation.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.5.1)
12.3.21.2	VERIFY that the RESPONSE VALUE for windSensorSituation.x in the Nth essWindDataV3 structure is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.6.10.10)
12.3.21.3	VERIFY that the RESPONSE VALUE for windSensorSituation.x is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.10)
13	IF Temperature_Supported is equal to true, then proceed to Step 13.1; otherwise, proceed to Step 14.	
13.1	VERIFY that the essTemperatureData field of the essWeatherV3Block object is present.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.2	VERIFY that the RESPONSE VALUE for the essMaxTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.4)
13.3	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.6)
13.4	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.6)
13.5	Determine the maximum temperature reading reported by the device. RECORD this information as: »Max_Temp	
13.6	VERIFY that the RESPONSE VALUE for the essMinTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.4)
13.7	VERIFY that the RESPONSE VALUE for essMinTemp.0 is between -1000 and Max_Temp, inclusive.	Pass / Fail (Sec. 5.7.7)
13.8	VERIFY that the RESPONSE VALUE for essMinTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.7)
13.9	IF Humidity_Supported is equal to 1, then proceed to Step 13.9.1; otherwise, proceed to Step 13.10.	
13.9.1	VERIFY that the RESPONSE VALUE for the essWetBulbTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.2	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.4)
13.9.3	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.4)
13.9.4	VERIFY that the RESPONSE VALUE for the essDewpointTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.5	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.5)
13.9.6	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.5)

13.9.7	VERIFY that the RESPONSE VALUE for the essRelativeHumidity.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.8	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is between 0 and 101, inclusive.	Pass / Fail (Sec. 5.8.1)
13.9.9	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.1)
13.10	VERIFY that the temperatureTable field contains at least Required_Temp_Sensors entries.	Pass / Fail (Sec. 3.6.3)
13.11	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 13.11.1 through 13.11.5.	
13.11.1	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.11.2	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field in the Nth Temperature structure is equal to N.	Pass / Fail (Sec. 5.7.3.1)
13.11.3	VERIFY that the RESPONSE VALUE for the essAirTemperature.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.11.4	VERIFY that the RESPONSE VALUE for essAirTemperature.x field in the Nth Temperature structure is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.3.3)
13.11.5	VERIFY that the RESPONSE VALUE for essAirTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.3)
14	IF Precip_Supported is equal to true, then proceed to Step 14.1; otherwise, proceed to Step 15.	
14.1	VERIFY that the RESPONSE VALUE for the essPrecipData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.6.1)
14.2	VERIFY that the waterLevelSensorTable field contains at least Required_Water_Level_Sensors entries.	Pass / Fail (Sec. 3.6.22)
14.3	FOR EACH value, N, from 1 to Required_Water_Level_Sensors, perform Steps 14.3.1 through 14.3.5.	
14.3.1	VERIFY that the RESPONSE VALUE for the waterLevelSensorIndex.x field is present in the Nth WaterLevel structure.	Pass / Fail (Sec. 3.5.2.3.7)
14.3.2	VERIFY that the RESPONSE VALUE for the waterLevelSensorIndex.x field in the Nth WaterLevel structure is equal to N.	Pass / Fail (Sec. 5.8.21.1)
14.3.3	VERIFY that the RESPONSE VALUE for the waterLevelSensorReading.x field is present in the Nth WaterLevel structure.	Pass / Fail (Sec. 3.5.2.3.7)
14.3.4	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.x field in the Nth WaterLevel structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.21.2)
14.3.5	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.x is APPROPRIATE.	Pass / Fail (Sec. 5.8.21.2)
14.4	IF Adjacent_Snow_Depth_Supported is equal to 1, then proceed to Step 14.4.1; otherwise, proceed to Step 14.5.	
14.4.1	VERIFY that the RESPONSE VALUE for the essAdjacentSnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.4)

14.4.2	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.3)
14.4.3	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.3)
14.5	IF Roadway_Snow_Depth_Supported is equal to 1, then proceed to Step 14.5.1; otherwise, proceed to Step 14.6.	
14.5.1	VERIFY that the RESPONSE VALUE for the essRoadwaySnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.5)
14.5.2	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.4)
14.5.3	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.4)
14.6	IF Ice_Thickness_Supported is equal to 1, then proceed to Step 14.6.1; otherwise, proceed to Step 14.7.	
14.6.1	VERIFY that the RESPONSE VALUE for the essRoadwaySnowPackDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.6)
14.6.2	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.5)
14.6.3	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.5)
14.6.4	VERIFY that the RESPONSE VALUE for the essIceThickness.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.6)
14.6.5	VERIFY that the RESPONSE VALUE for essIceThickness.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.10)
14.6.6	VERIFY that the RESPONSE VALUE for essIceThickness.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.10)
14.7	VERIFY that the RESPONSE VALUE for the essPrecipYesNo.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.1)
14.8	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is between 1 and 3, inclusive.	Pass / Fail (Sec. 5.8.6)
14.9	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.6)
14.10	IF Precip_Rates_Supported is equal to 1, then proceed to Step 14.10.1; otherwise, proceed to Step 14.11.	
14.10.1	VERIFY that the RESPONSE VALUE for the essPrecipRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.2	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.7)
14.10.3	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.7)
14.10.4	VERIFY that the RESPONSE VALUE for the essSnowfallAccumRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)

14.10.5	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.8)
14.10.6	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.8)
14.10.7	VERIFY that the RESPONSE VALUE for the essPrecipitationStartTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.8	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.11)
14.10.9	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.11)
14.10.10	VERIFY that the RESPONSE VALUE for the essPrecipitationEndTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.11	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.12)
14.10.12	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.12)
14.11	IF Situation_Supported is equal to true, then proceed to Step 14.11.1; otherwise, proceed to Step 15.	
14.11.1	VERIFY that the RESPONSE VALUE for the essPrecipSituation.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.5.2)
14.11.2	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is between 1 and 15, inclusive.	Pass / Fail (Sec. 5.8.9)
14.11.3	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.9)
15	IF Visibility_Supported is equal to true, then proceed to Step 15.1; otherwise, proceed to Step 16.	
15.1	VERIFY that the RESPONSE VALUE for the essVisibilityData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.8)
15.2	VERIFY that the RESPONSE VALUE for the essVisibility.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.2.8)
15.3	VERIFY that the RESPONSE VALUE for essVisibility.0 is between 0 and 1000001, inclusive.	Pass / Fail (Sec. 5.10.1)
15.4	VERIFY that the RESPONSE VALUE for essVisibility.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.1)
15.5	IF Situation_Supported is equal to true, then proceed to Step 15.5.1; otherwise, proceed to Step 16.	
15.5.1	VERIFY that the RESPONSE VALUE for the essVisibilitySituation.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.5.4)
15.5.2	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.10.2)
15.5.3	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.2)

16	IF Radiation_Supported is equal to 1, then proceed to Step 16.1; otherwise, proceed to Step 17.	
16.1	VERIFY that the RESPONSE VALUE for the essRadiationData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.2	VERIFY that the RESPONSE VALUE for the essTotalSun.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.3	VERIFY that the RESPONSE VALUE for essTotalSun.0 is between 0 and 1441, inclusive.	Pass / Fail (Sec. 5.9.2)
16.4	VERIFY that the RESPONSE VALUE for essTotalSun.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.2)
16.5	VERIFY that the RESPONSE VALUE for the essInstantaneousTerrestrialRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.6	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.4)
16.7	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.4)
16.8	VERIFY that the RESPONSE VALUE for the essInstantaneousSolarRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.9	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.5)
16.10	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.5)
16.11	VERIFY that the RESPONSE VALUE for the essTotalRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.12	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.6)
16.13	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.6)
16.14	VERIFY that the RESPONSE VALUE for the essTotalRadiationPeriod.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.15	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is between 0 and 86400, inclusive.	Pass / Fail (Sec. 5.9.7)
16.16	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.7)
16.17	IF Situation_Supported is equal to true, then proceed to Step 16.17.1; otherwise, proceed to Step 17.	
16.17.1	VERIFY that the RESPONSE VALUE for the essCloudSituation.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.5.3)
16.17.2	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is between 1 and 5, inclusive.	Pass / Fail (Sec. 5.9.3)
16.17.3	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.3)

17	VERIFY that the RESPONSE VALUE for essLatitude.0 is greater than or equal to -90000000.	Pass / Fail (Sec. 5.4.1)
18	VERIFY that the RESPONSE VALUE for essLatitude.0 is less than or equal to 90000001.	Pass / Fail (Sec. 5.4.1)
19	VERIFY that the RESPONSE VALUE for essLatitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.1)
20	VERIFY that the RESPONSE VALUE for essLongitude.0 is greater than or equal to -180000000.	Pass / Fail (Sec. 5.4.2)
21	VERIFY that the RESPONSE VALUE for essLongitude.0 is less than or equal to 180000001.	Pass / Fail (Sec. 5.4.2)
22	VERIFY that the RESPONSE VALUE for essLongitude.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.2)
23	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.3)
24	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is less than or equal to 255.	Pass / Fail (Sec. 5.4.3)
25	VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.3)
26	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.4)
27	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is less than or equal to 361.	Pass / Fail (Sec. 5.4.4)
28	VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.4)
29	VERIFY that the RESPONSE VALUE for essOdometer.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.4.5)
30	VERIFY that the RESPONSE VALUE for essOdometer.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.4.5)
31	VERIFY that the RESPONSE VALUE for essOdometer.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.5)
32	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is greater than or equal to -400.	Pass / Fail (Sec. 5.5.1)
33	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is less than or equal to 8001.	Pass / Fail (Sec. 5.5.1)
34	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)
35	VERIFY that the RESPONSE VALUE for essMobileFriction.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.12.1)
36	VERIFY that the RESPONSE VALUE for essMobileFriction.0 is less than or equal to 101.	Pass / Fail (Sec. 5.12.1)
37	VERIFY that the RESPONSE VALUE for essMobileFriction.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.1)

38	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.12.2)
39	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is less than or equal to 18.	Pass / Fail (Sec. 5.12.2)
40	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.2)
41	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.12.3)
42	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is less than or equal to 25.	Pass / Fail (Sec. 5.12.3)
43	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.2 Retrieve Atmospheric Pressure [\[Versions 01 to 03\]](#)

Test Case: 3.2	Title:	Retrieve Atmospheric Pressure [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to determine the current atmospheric pressure.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essAtmosphericPressure.0	Pass / Fail (Sec. 3.5.2.3.2.1)
2	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.5.4)
3	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.5.4)
4	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.3 Retrieve Wind Data

Test Case: 3.3	Title:	Retrieve Wind Data	
	Description:	This test case verifies that the ESS allows a management station to determine current wind information.	
	Variables:	Required_Wind_Sensors	PRL 3.6.2
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of wind sensors required by the specification (PRL 3.6.2). RECORD this information as: »Required_Wind_Sensors	
2	GET the following object(s): »windSensorTableNumSensors.0	Pass / Fail (Sec. 3.5.2.3.2.2)
3	VERIFY that the RESPONSE VALUE for windSensorTableNumSensors.0 is greater than or equal to Required_Wind_Sensors.	Pass / Fail (Sec. 3.6.2)
4	Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as: »Supported_Wind_Sensors	
5	FOR EACH value, N, from 1 to Supported_Wind_Sensors, perform Steps 5.1 through 5.22.	
5.1	GET the following object(s): »windSensorAvgSpeed.N »windSensorAvgDirection.N »windSensorSpotSpeed.N »windSensorSpotDirection.N »windSensorGustSpeed.N »windSensorGustDirection.N »windSensorSituation.N	Pass / Fail (Sec. 3.5.2.3.2.2)
5.2	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.4)
5.3	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.N is less than or equal to 65535.	Pass / Fail (Sec. 5.6.10.4)
5.4	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.4)
5.5	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.5)
5.6	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.N is less than or equal to 361.	Pass / Fail (Sec. 5.6.10.5)
5.7	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.5)
5.8	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.6)
5.9	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.N is less than or equal to 65535.	Pass / Fail (Sec. 5.6.10.6)

5.10	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.6)
5.11	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.7)
5.12	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.N is less than or equal to 361.	Pass / Fail (Sec. 5.6.10.7)
5.13	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.7)
5.14	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.8)
5.15	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.N is less than or equal to 65535.	Pass / Fail (Sec. 5.6.10.8)
5.16	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.8)
5.17	VERIFY that the RESPONSE VALUE for windSensorGustDirection.N is greater than or equal to 0.	Pass / Fail (Sec. 5.6.10.9)
5.18	VERIFY that the RESPONSE VALUE for windSensorGustDirection.N is less than or equal to 361.	Pass / Fail (Sec. 5.6.10.9)
5.19	VERIFY that the RESPONSE VALUE for windSensorGustDirection.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.9)
5.20	VERIFY that the RESPONSE VALUE for windSensorSituation.N is greater than or equal to 1.	Pass / Fail (Sec. 5.6.10.10)
5.21	VERIFY that the RESPONSE VALUE for windSensorSituation.N is less than or equal to 12.	Pass / Fail (Sec. 5.6.10.10)
5.22	VERIFY that the RESPONSE VALUE for windSensorSituation.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.10)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.3.4 Retrieve Temperature

Test Case: 3.4	Title:	Retrieve Air Temperature	
	Description:	This test case verifies that the ESS allows a management station to determine the current temperature from a temperature sensor.	
	Variables:	Required_Temperature_Sensors	PRL 3.6.3
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of temperature sensors required by the specification (PRL 3.6.3). RECORD this information as: »Required_Temperature_Sensors	
2	GET the following object(s): »essNumTemperatureSensors.0	Pass / Fail (RFC 1157)
3	VERIFY that the RESPONSE VALUE for essNumTemperatureSensors.0 is greater than or equal to Required_Temperature_Sensors.	Pass / Fail (Sec. 3.6.3)
4	Determine a random number between 1 and Required_Temperature_Sensors. RECORD this information as: »Subject_Sensor	
5	GET the following object(s): »essAirTemperature.Subject_Sensor	Pass / Fail (Sec. 3.5.2.3.2.3)
6	VERIFY that the RESPONSE VALUE for essAirTemperature.Subject_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.7.3.3)
7	VERIFY that the RESPONSE VALUE for essAirTemperature.Subject_Sensor is less greater than or equal to 1000.	Pass / Fail (Sec. 5.7.3.3)
8	VERIFY that the RESPONSE VALUE for essAirTemperature.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.5 Retrieve Daily Minimum and Maximum Temperature

Test Case: 3.5	Title:	<i>Retrieve Daily Minimum and Maximum Temperature</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the minimum and maximum temperatures recorded during the previous 24 hours.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essMaxTemp.0 »essMinTemp.0	Pass / Fail (Sec. 3.5.2.3.2.4)
2	VERIFY that the RESPONSE VALUE for essMinTemp.0 is greater than or equal to -1000.	Pass / Fail (Sec. 5.7.7)
3	VERIFY that the RESPONSE VALUE for essMinTemp.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.7.7)
4	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.7)
5	Determine the RESPONSE VALUE for essMinTemp.0. RECORD this information as: »Minimum_Temp	
6	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is greater than or equal to Minimum_Temp.	Pass / Fail (Sec. 5.7.6)
7	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.7.6)
8	VERIFY that the RESPONSE VALUE for essMinTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.6 Retrieve Humidity [\[Versions 01 to 03\]](#)

Test Case: 3.6	Title:	Retrieve Humidity [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to determine the current humidity information.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essWetbulbTemp.0 »essDewpointTemp.0 »essRelativeHumidity.0	Pass / Fail (Sec. 3.5.2.3.2.5)
2	VERIFY that the RESPONSE VALUE for essWetbulbTemp.0 is greater than or equal to -1000.	Pass / Fail (Sec. 5.7.4)
3	VERIFY that the RESPONSE VALUE for essWetbulbTemp.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.7.4)
4	VERIFY that the RESPONSE VALUE for essWetbulbTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.4)
5	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is greater than or equal to -1000.	Pass / Fail (Sec. 5.7.5)
6	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.7.5)
7	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.5)
8	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.1)
9	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is less than or equal to 101.	Pass / Fail (Sec. 5.8.1)
10	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.7 Retrieve Precipitation Presence [\[Versions 01 to 03\]](#)

Test Case: 3.7	Title:	Retrieve Precipitation Presence [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to determine the presence of precipitation and the make and model of the device sensor.
	Variables:	Device_Version Test Plan
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the version of the NTCIP 1204 standard to which the ESS claims conformance (Test Plan). RECORD this information as: »Device_Version	
2	GET the following object(s): »globalMaxModules.0	Pass / Fail (RFC 1157)
3	Determine the RESPONSE VALUE for globalMaxModules.0. RECORD this information as: »Num_Modules	
4	GET the following object(s): »essPrecipYesNo.0 »precipitationSensorModellInformation.0	Pass / Fail (Sec. 3.5.2.3.2.6.14.2.12)
5	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.8.6)
6	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is less than or equal to 3.	Pass / Fail (Sec. 5.8.6)
7	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.6)
8	IF Device_Version is greater than 1, then proceed to Step 8.1; otherwise, proceed to Step 9.	
8.1	GET the following object(s): »precipitationSensorModellInformation.0	Pass / Fail (Sec. 4.2.12)
8.2	VERIFY that the RESPONSE VALUE for precipitationSensorModellInformation.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.8.18)
8.3	VERIFY that the RESPONSE VALUE for precipitationSensorModellInformation.0 is less than or equal to Num_Modules.	Pass / Fail (Sec. 5.8.18)
8.4	VERIFY that the RESPONSE VALUE for precipitationSensorModellInformation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.18)
9	GET the following object(s): »precipitationSensorModellInformation.0 VERIFY that the RESPONSE ERROR is equal to 'NoSuchName'.	Pass / Fail (RFC 1157)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.8 Retrieve Precipitation Rates [\[Versions 01 to 03\]](#)

Test Case: 3.8	Title:	Retrieve Precipitation Rates [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to determine the rate at which precipitation is falling and the most recent start and stop times of precipitation.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essPrecipRate.0 »essSnowfallAccumRate.0 »essPrecipitationStartTime.0 »essPrecipitationEndTime.0	Pass / Fail (Section 3.5.2.3.2.6.2)
2	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.7)
3	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.7)
4	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.7)
5	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.8)
6	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.8)
7	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.8)
8	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.11)
9	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.8.11)
10	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.11)
11	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.12)
12	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.8.12)
13	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.12)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.9 Retrieve Precipitation Totals [\[Versions 01 to 03\]](#)

Test Case: 3.9	Title:	<i>Retrieve Precipitation Totals [Versions 01 to 03]</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the total amounts of precipitation recorded during previous standardized time intervals.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essPrecipitationOneHour.0 »essPrecipitationThreeHours.0 »essPrecipitationSixHours.0 »essPrecipitationTwelveHours.0 »essPrecipitation24Hours.0	Pass / Fail (Sec. 3.5.2.3.2.6.3)
2	VERIFY that the RESPONSE VALUE for essPrecipitationOneHour.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.13)
3	VERIFY that the RESPONSE VALUE for essPrecipitationOneHour.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.13)
4	VERIFY that the RESPONSE VALUE for essPrecipitationOneHour.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.13)
5	VERIFY that the RESPONSE VALUE for essPrecipitationThreeHours.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.14)
6	VERIFY that the RESPONSE VALUE for essPrecipitationThreeHours.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.14)
7	VERIFY that the RESPONSE VALUE for essPrecipitationThreeHours.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.14)
8	VERIFY that the RESPONSE VALUE for essPrecipitationSixHours.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.15)
9	VERIFY that the RESPONSE VALUE for essPrecipitationSixHours.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.15)
10	VERIFY that the RESPONSE VALUE for essPrecipitationSixHours.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.15)
11	VERIFY that the RESPONSE VALUE for essPrecipitationTwelveHours.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.16)
12	VERIFY that the RESPONSE VALUE for essPrecipitationTwelveHours.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.16)
13	VERIFY that the RESPONSE VALUE for essPrecipitationTwelveHours.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.16)
14	VERIFY that the RESPONSE VALUE for essPrecipitation24Hours.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.17)
15	VERIFY that the RESPONSE VALUE for essPrecipitation24Hours.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.17)

16	VERIFY that the RESPONSE VALUE for essPrecipitation24Hours.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.17)
<i>Test Case Results</i>		
<i>Tested By:</i>	<i>Date Tested:</i>	<i>Pass / Fail</i>
<i>Test Case Notes:</i>		

C.2.3.3.10 Retrieve Solar Radiation [\[Versions 01 to 03\]](#)

Test Case: 3.10	Title:	Retrieve Solar Radiation [Versions 01 to 03]	
	Description:	This test case verifies that the ESS allows a management station to retrieve the solar radiation data stored in the device.	
	Variables:	Device_Version	Test Plan
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the version of the NTCIP 1204 standard to which the ESS claims conformance (Test Plan). RECORD this information as: »Device_Version	
2	GET the following object(s): »essTotalSun.0 »essInstantaneousTerrestrialRadiation.0 »essInstantaneousSolarRadiation.0 »essTotalRadiation.0 »essTotalRadiationPeriod.0	Pass / Fail (Sec. 3.5.2.3.2.74.2.13)
3	VERIFY that the RESPONSE VALUE for essTotalSun.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.9.2)
4	VERIFY that the RESPONSE VALUE for essTotalSun.0 is less than or equal to 1441.	Pass / Fail (Sec. 5.9.2)
5	VERIFY that the RESPONSE VALUE for essTotalSun.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.2)
6	IF Device_Version is greater than 1, then proceed to Step 6.1; otherwise, proceed to Step 7.1.	
6.1	GET the following object(s): »essInstantaneousTerrestrialRadiation.0 »essInstantaneousSolarRadiation.0 »essTotalRadiation.0 »essTotalRadiationPeriod.0	Pass / Fail (Sec. 4.2.13)
6.2	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is greater than or equal to -2048.	Pass / Fail (Sec. 5.9.4)
6.3	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is less than or equal to 2049.	Pass / Fail (Sec. 5.9.4)
6.4	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.4)
6.5	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is greater than or equal to -2048.	Pass / Fail (Sec. 5.9.5)
6.6	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is less than or equal to 2049.	Pass / Fail (Sec. 5.9.5)
6.7	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.5)
6.8	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is greater than or equal to -2048.	Pass / Fail (Sec. 5.9.6)

6.9	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is less than or equal to 2049.	Pass / Fail (Sec. 5.9.6)
6.10	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.6)
6.11	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.9.7)
6.12	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is less than or equal to 86400.	Pass / Fail (Sec. 5.9.7)
6.13	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.7)
7.1	GET the following object(s): »essInstantaneousTerrestrialRadiation.0 »essInstantaneousSolarRadiation.0 »essTotalRadiation.0 »essTotalRadiationPeriod.0 VERIFY that the RESPONSE ERROR is equal to 'NoSuchName'.	Pass / Fail (Sec. 4.2.13)
7.2	GET the following object(s): »essSolarRadiation.0	Pass / Fail (RFC 1157)
7.3	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.9.1)
7.4	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.9.1)
7.5	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.11 Retrieve Visibility

Test Case: 3.11	Title:	<i>Retrieve Visibility</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the current visibility distance.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essVisibility.0	Pass / Fail (Sec. 3.5.2.3.2.8)
2	VERIFY that the RESPONSE VALUE for essVisibility.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.10.1)
3	VERIFY that the RESPONSE VALUE for essVisibility.0 is less than or equal to 1000001.	Pass / Fail (Sec. 5.10.1)
4	VERIFY that the RESPONSE VALUE for essVisibility.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.12 Retrieve Compressed Weather Data

Test Case: 3.12	Title:	<i>Retrieve Compressed Weather Data</i>		
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve all current weather information in compressed form.</i>		
	Variables:	<i>Pressure_Supported</i>	<i>PRL 2.5.2.1.1</i>	
		<i>Wind_Supported</i>	<i>PRL 2.5.2.1.2</i>	
		<i>Required_Wind_Sensors</i>	<i>PRL 3.6.2</i>	
		<i>Temperature_Supported</i>	<i>PRL 2.5.2.1.3</i>	
		<i>Required_Temp_Sensors</i>	<i>PRL 3.6.3</i>	
		<i>Precip_Supported</i>	<i>PRL 2.5.2.1.5</i>	
		<i>Required_Water_Level_Sensors</i>	<i>PRL 3.6.22</i>	
		<i>Adjacent_Snow_Depth_Supported</i>	<i>PRL 3.5.2.3.3.4</i>	
		<i>Roadway_Snow_Depth_Supported</i>	<i>PRL 3.5.2.3.3.5</i>	
		<i>Ice_Thickness_Supported</i>	<i>PRL 3.5.2.3.3.6</i>	
		<i>Precip_Rates_Supported</i>	<i>PRL 3.5.2.3.2.6.2</i>	
		<i>Humidity_Supported</i>	<i>PRL 2.5.2.1.4</i>	
		<i>Situation_Supported</i>	<i>PRL 2.5.2.4</i>	
<i>Visibility_Supported</i>	<i>PRL 2.5.2.1.7</i>			
<i>Radiation_Supported</i>	<i>PRL 2.5.2.1.6</i>			
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>			

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the ESS is required to monitor atmospheric pressure (PRL 2.5.2.1.1). RECORD this information as: »Pressure_Supported	
2	CONFIGURE: Determine the number of wind sensors supported. RECORD this information as: »Wind_Supported (whether the ESS is required to monitor winds—PRL 2.5.2.1.2) »Required_Wind_Sensors (the number of wind sensors that the ESS is required to support—PRL 3.6.2)	
3	CONFIGURE: Determine the number of temperature sensors supported. RECORD this information as: »Temperature_Supported (whether the ESS is required to monitor temperature—PRL 2.5.2.1.3) »Required_Temp_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.3)	

4	<p>CONFIGURE: Determine the number of precipitation sensors supported. RECORD this information as:</p> <ul style="list-style-type: none"> »Precip_Supported (whether the ESS is required to monitor precipitation—PRL 2.5.2.1.5) »Required_Water_Level_Sensors (the number of water level sensors that the ESS is required to support—PRL 3.6.22) »Adjacent_Snow_Depth_Supported (whether the ESS is required to monitor the adjacent snow depth—PRL 3.5.2.3.3.4) »Roadway_Snow_Depth_Supported (whether the ESS is required to monitor the roadway snow depth—PRL 3.5.2.3.3.5) »Ice_Thickness_Supported (whether the ESS is required to monitor the snow pack depth and ice thickness—PRL 3.5.2.3.3.6) »Precip_Rates_Supported (whether the ESS is required to monitor the precipitation rates—PRL 3.5.2.3.2.6.2) »Humidity_Supported (Whether the ESS is required to monitor humidity—PRL 2.5.2.1.4) 	
5	<p>CONFIGURE: Determine whether the ESS is required to report situation data (PRL 2.5.2.4). RECORD this information as:</p> <ul style="list-style-type: none"> »Situation_Supported 	
6	<p>CONFIGURE: Determine whether the ESS is required to provide visibility capabilities (PRL 2.5.2.1.7). RECORD this information as:</p> <ul style="list-style-type: none"> »Visibility_Supported 	
7	<p>CONFIGURE: Determine whether the ESS is required to monitor solar radiation (PRL 2.5.2.1.6). RECORD this information as:</p> <ul style="list-style-type: none"> »Radiation_Supported 	
8	<p>GET the following object(s):</p> <ul style="list-style-type: none"> »essWeatherV3Block.0 	Pass / Fail (Sec. 3.5.2.3.2.9)
9	Decode the essWeatherV3Block.0 structure.	
10	VERIFY that the essWeatherV3Block.0 structure was decoded without error.	Pass / Fail (Sec. 5.3.9)
11	IF Pressure_Supported is equal to true, then proceed to Step 11.1; otherwise, proceed to Step 12.	
11.1	VERIFY that the RESPONSE VALUE for the essAtmosphericPressure.0 field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.1)
11.2	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.5.4)
11.3	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.4)
12	IF Wind_Supported is equal to true, then proceed to Step 12.1; otherwise, proceed to Step 13.	
12.1	VERIFY that the RESPONSE VALUE for the essWindData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.2	VERIFY that the essWindData field contains at least Required_Wind_Sensors entries.	Pass / Fail (Sec. 3.6.2)
12.3	FOR EACH value, N, from 1 to Required_Wind_Sensors, perform Steps 12.3.1 through 12.3.21.	
12.3.1	VERIFY that the windSensorIndex.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)

12.3.2	VERIFY that the RESPONSE VALUE for windSensorIndex.x in the Nth essWindData structure is equal to N.	Pass / Fail (Sec. 5.6.10.1)
12.3.3	VERIFY that the windSensorAvgSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.4	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.4)
12.3.5	VERIFY that the RESPONSE VALUE for windSensorAvgSpeed.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.4)
12.3.6	VERIFY that the windSensorAvgDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.7	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.5)
12.3.8	VERIFY that the RESPONSE VALUE for windSensorAvgDirection.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.5)
12.3.9	VERIFY that the windSensorSpotSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.10	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.6)
12.3.11	VERIFY that the RESPONSE VALUE for windSensorSpotSpeed.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.6)
12.3.12	VERIFY that the windSensorSpotDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.13	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.7)
12.3.14	VERIFY that the RESPONSE VALUE for windSensorSpotDirection.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.7)
12.3.15	VERIFY that the windSensorGustSpeed.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.16	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.x in the Nth essWindDataV3 structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.10.8)
12.3.17	VERIFY that the RESPONSE VALUE for windSensorGustSpeed.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.8)
12.3.18	VERIFY that the windSensorGustDirection.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)
12.3.19	VERIFY that the RESPONSE VALUE for windSensorGustDirection.x in the Nth essWindDataV3 structure is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.10.9)
12.3.20	VERIFY that the RESPONSE VALUE for windSensorGustDirection.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.9)
12.3.21	IF Situation_Supported is equal to true, then proceed to Step 12.3.21.1; otherwise, proceed to Step 13.	
12.3.21.1	VERIFY that the windSensorSituation.x field is present in the Nth essWindDataV3 structure.	Pass / Fail (Sec. 3.5.2.3.2.2)

12.3.21.2	VERIFY that the RESPONSE VALUE for windSensorSituation.x in the Nth essWindDataV3 structure is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.6.10.10)
12.3.21.3	VERIFY that the RESPONSE VALUE for windSensorSituation.x in the Nth essWindDataV3 structure is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.10)
13	IF Temperature_Supported is equal to true, then proceed to Step 13.1; otherwise, proceed to Step 14.	
13.1	VERIFY that the essTemperatureData field of the essWeatherV3Block object is present.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.2	VERIFY that the RESPONSE VALUE for the essMaxTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.4)
13.3	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.6)
13.4	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.6)
13.5	Determine the maximum temperature reading reported by the device. RECORD this information as: »Max_Temp	
13.6	VERIFY that the RESPONSE VALUE for the essMinTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.4)
13.7	VERIFY that the RESPONSE VALUE for essMinTemp.0 is between -1000 and Max_Temp, inclusive.	Pass / Fail (Sec. 5.7.7)
13.8	VERIFY that the RESPONSE VALUE for essMinTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.7)
13.9	IF Humidity_Supported is equal to 1, then proceed to Step 13.9.1; otherwise, proceed to Step 13.10.	
13.9.1	VERIFY that the RESPONSE VALUE for the essWetBulbTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.2	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.4)
13.9.3	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.4)
13.9.4	VERIFY that the RESPONSE VALUE for the essDewpointTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.5	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.5)
13.9.6	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.5)
13.9.7	VERIFY that the RESPONSE VALUE for the essRelativeHumidity.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 3.5.2.3.2.5)
13.9.8	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is between 0 and 101, inclusive.	Pass / Fail (Sec. 5.8.1)

13.9.9	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.1)
13.10	VERIFY that the temperatureTable field contains at least Required_Temp_Sensors entries.	Pass / Fail (Sec. 3.6.3)
13.11	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 13.11.1 through 13.11.5.	
13.11.1	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.11.2	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field in the Nth Temperature structure is equal to N.	Pass / Fail (Sec. 5.7.3.1)
13.11.3	VERIFY that the RESPONSE VALUE for the essAirTemperature.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 3.5.2.3.2.3)
13.11.4	VERIFY that the RESPONSE VALUE for essAirTemperature.x field in the Nth Temperature structure is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.3.3)
13.11.5	VERIFY that the RESPONSE VALUE for essAirTemperature.x field in the Nth Temperature structure is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.3)
14	IF Precip_Supported is equal to true, then proceed to Step 14.1; otherwise, proceed to Step 15.	
14.1	VERIFY that the RESPONSE VALUE for the essPrecipData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.6.1)
14.2	VERIFY that the waterLevelSensorTable field contains at least Required_Water_Level_Sensors entries.	Pass / Fail (Sec. 3.6.22)
14.3	FOR EACH value, N, from 1 to Required_Water_Level_Sensors, perform Steps 14.3.1 through 14.3.5.	
14.3.1	VERIFY that the RESPONSE VALUE for the waterLevelSensorIndex.x field is present in the Nth WaterLevel structure.	Pass / Fail (Sec. 3.5.2.3.7)
14.3.2	VERIFY that the RESPONSE VALUE for the waterLevelSensorIndex.x field in the Nth WaterLevel structure is equal to N.	Pass / Fail (Sec. 5.8.21.1)
14.3.3	VERIFY that the RESPONSE VALUE for the waterLevelSensorReading.x field is present in the Nth WaterLevel structure.	Pass / Fail (Sec. 3.5.2.3.7)
14.3.4	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.x field in the Nth WaterLevel structure is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.21.2)
14.3.5	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.x field in the Nth WaterLevel structure is APPROPRIATE.	Pass / Fail (Sec. 5.8.21.2)
14.4	IF Adjacent_Snow_Depth_Supported is equal to 1, then proceed to Step 14.4.1; otherwise, proceed to Step 14.5.	
14.4.1	VERIFY that the RESPONSE VALUE for the essAdjacentSnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.4)
14.4.2	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.3)
14.4.3	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.3)

14.5	IF Roadway_Snow_Depth_Supported is equal to 1, then proceed to Step 14.5.1; otherwise, proceed to Step 14.6.	
14.5.1	VERIFY that the RESPONSE VALUE for the essRoadwaySnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.5)
14.5.2	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.4)
14.5.3	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.4)
14.6	IF Ice_Thickness_Supported is equal to 1, then proceed to Step 14.6.1; otherwise, proceed to Step 14.7.	
14.6.1	VERIFY that the RESPONSE VALUE for the essRoadwaySnowPackDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.6)
14.6.2	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.5)
14.6.3	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.5)
14.6.4	VERIFY that the RESPONSE VALUE for the essIceThickness.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.3.6)
14.6.5	VERIFY that the RESPONSE VALUE for essIceThickness.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.10)
14.6.6	VERIFY that the RESPONSE VALUE for essIceThickness.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.10)
14.7	VERIFY that the RESPONSE VALUE for the essPrecipYesNo.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.1)
14.8	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is between 1 and 3, inclusive.	Pass / Fail (Sec. 5.8.6)
14.9	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.6)
14.10	IF Precip_Rates_Supported is equal to 1, then proceed to Step 14.10.1; otherwise, proceed to Step 14.11.	
14.10.1	VERIFY that the RESPONSE VALUE for the essPrecipRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.2	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.7)
14.10.3	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.7)
14.10.4	VERIFY that the RESPONSE VALUE for the essSnowfallAccumRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.5	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.8)
14.10.6	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.8)

14.10.7	VERIFY that the RESPONSE VALUE for the essPrecipitationStartTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.8	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.11)
14.10.9	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.11)
14.10.10	VERIFY that the RESPONSE VALUE for the essPrecipitationEndTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.2.6.2)
14.10.11	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.12)
14.10.12	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.12)
14.11	IF Situation_Supported is equal to true, then proceed to Step 14.11.1; otherwise, proceed to Step 15.	
14.11.1	VERIFY that the RESPONSE VALUE for the essPrecipSituation.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 3.5.2.3.5.2)
14.11.2	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is between 1 and 15, inclusive.	Pass / Fail (Sec. 5.8.9)
14.11.3	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.9)
15	IF Visibility_Supported is equal to true, then proceed to Step 15.1; otherwise, proceed to Step 16.	
15.1	VERIFY that the RESPONSE VALUE for the essVisibilityData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.8)
15.2	VERIFY that the RESPONSE VALUE for the essVisibility.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.2.8)
15.3	VERIFY that the RESPONSE VALUE for essVisibility.0 is between 0 and 1000001, inclusive.	Pass / Fail (Sec. 5.10.1)
15.4	VERIFY that the RESPONSE VALUE for essVisibility.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.1)
15.5	IF Situation_Supported is equal to true, then proceed to Step 15.5.1; otherwise, proceed to Step 16.	
15.5.1	VERIFY that the RESPONSE VALUE for the essVisibilitySituation.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.5.4)
15.5.2	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.10.2)
15.5.3	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.2)
16	IF Radiation_Supported is equal to 1, then proceed to Step 16.1; otherwise, proceed to EXIT.	
16.1	VERIFY that the RESPONSE VALUE for the essRadiationData field of the essWeatherV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.2.7)

16.2	VERIFY that the RESPONSE VALUE for the essTotalSun.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.3	VERIFY that the RESPONSE VALUE for essTotalSun.0 is between 0 and 1441, inclusive.	Pass / Fail (Sec. 5.9.2)
16.4	VERIFY that the RESPONSE VALUE for essTotalSun.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.2)
16.5	VERIFY that the RESPONSE VALUE for the essInstantaneousTerrestrialRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.6	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.4)
16.7	VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.4)
16.8	VERIFY that the RESPONSE VALUE for the essInstantaneousSolarRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.9	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.5)
16.10	VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.5)
16.11	VERIFY that the RESPONSE VALUE for the essTotalRadiation.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.12	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.9.6)
16.13	VERIFY that the RESPONSE VALUE for essTotalRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.6)
16.14	VERIFY that the RESPONSE VALUE for the essTotalRadiationPeriod.0 field of the essRadiationData field is present.	Pass / Fail (Sec. 3.5.2.3.2.7)
16.15	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is between 0 and 86400, inclusive.	Pass / Fail (Sec. 5.9.7)
16.16	VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.7)
16.17	IF Situation_Supported is equal to true, then proceed to Step 16.17.1; otherwise, proceed to EXIT.	
16.17.1	VERIFY that the RESPONSE VALUE for the essCloudSituation.0 field of the essVisibilityDataV3 field is present.	Pass / Fail (Sec. 3.5.2.3.5.3)
16.17.2	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is between 1 and 5, inclusive.	Pass / Fail (Sec. 5.9.3)
16.17.3	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.3.13 Retrieve Precipitation Presence

Test Case: 3.13	Title:	<i>Retrieve Precipitation Presence</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve precipitation presence.</i>	
	Variables:	<i>Supported_Precipitation_Sensors</i>	<i>(PRL 3.6.5)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>	

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » precipitationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.2.6.4)</u>
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.5)</u>
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u> »Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.3.</u>	-
<u>5.1</u>	<u>GET the following object(s):</u> <u> »precipitationSensorPrecipYesNo.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.2.6.4)</u>
<u>5.2</u>	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipYesNo.N is equal to one of the following values:</u> <u>precip (1)</u> <u>noPrecip (2)</u> <u>error (3).</u>	<u>Pass / Fail</u> <u>(Clause 5.8.24.11)</u>
<u>5.3</u>	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipYesNo.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.8.24.11)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.3.14 Retrieve Precipitation Rates

Test Case: 3.14	Title:	<i>Retrieve Precipitation Rates for Each Precipitation Sensor</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the precipitation rates of each precipitation sensor.</i>
	Variables:	<i>Supported_Precipitation_Sensors (PRL 3.6.5)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» precipitationSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.3.2.6.5)
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	Pass / Fail (PRL 3.6.5)
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.13.</u>	-
5.1	<u>GET the following object(s):</u> <u>»precipitationSensorPrecipRate.N</u> <u>»precipitationSensorSnowfallAccumRate.N</u> <u>»precipitationSensorPrecipitationStartTime.N</u> <u>»precipitationSensorPrecipitationEndTime.N</u>	Pass / Fail (Clause 3.5.2.3.2.6.5)
5.2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipRate.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.12)
5.3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipRate.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.8.24.12)
5.4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipRate.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.12)
5.5	<u>VERIFY that the RESPONSE VALUE for precipitationSensorSnowfallAccumRate.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.13)
5.6	<u>VERIFY that the RESPONSE VALUE for precipitationSensorSnowfallAccumRate.N is less than or equal to 65,535.</u>	Pass / Fail (Clause 5.8.24.13)
5.7	<u>VERIFY that the RESPONSE VALUE for precipitationSensorSnowfallAccumRate.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.13)
5.8	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationStartTime.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.16)
5.9	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationStartTime.N is less than or equal to 4,294,967,295.</u>	Pass / Fail (Clause 5.8.24.16)
5.10	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationStartTime.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.16)
5.11	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationEndTime.N is</u>	Pass / Fail

	greater than or equal to 0.	(Clause 5.8.24.17)
5.12	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationEndTime.N is less than or equal to 4,294,967,295.	Pass / Fail (Clause 5.8.24.17)
5.13	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationEndTime.N is APPROPRIATE.	Pass / Fail (Clause 5.8.24.17)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.3.15 Retrieve Precipitation Totals

Test Case: 3.15	Title:	<i>Retrieve Precipitation Totals for Each Precipitation Sensor</i>
	Description:	<i>This test case verifies that the ESS allows a management station to determine the precipitation totals of each precipitation sensor.</i>
	Variables:	<u>Supported Precipitation Sensors</u> (PRL 3.6.5)
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» precipitationSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.3.2.6.6)
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	Pass / Fail (PRL 3.6.5)
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u>»Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.16.</u>	-
5.1	<u>GET the following object(s):</u> <u>»precipitationSensorPrecipitationOneHour.N</u> <u>»precipitationSensorPrecipitationThreeHours.N</u> <u>»precipitationSensorPrecipitationSixHours.N</u> <u>»precipitationSensorPrecipitationTwelveHours.N</u> <u>»precipitationSensorPrecipitation24Hours.N</u>	Pass / Fail (Clause 3.5.2.3.2.6.6)
5.2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationOneHour.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.18)
5.3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationOneHour.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.8.24.18)
5.4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationOneHour.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.18)
5.5	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationThreeHours.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.19)
5.6	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationThreeHours.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.8.24.19)
5.7	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationThreeHours.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.19)
5.8	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationSixHours.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.20)
5.9	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationSixHours.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.8.24.20)
5.10	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationSixHours.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.20)

5.11	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationTwelveHours.N is greater than or equal to 0.	Pass / Fail (Clause 5.8.24.21)
5.12	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationTwelveHours.N is less than or equal to 65535.	Pass / Fail (Clause 5.8.24.21)
5.13	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationTwelveHours.N is APPROPRIATE.	Pass / Fail (Clause 5.8.24.21)
5.14	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitation24Hours.N is greater than or equal to 0.	Pass / Fail (Clause 5.8.24.22)
5.15	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitation24Hours.N is less than or equal to 65535.	Pass / Fail (Clause 5.8.24.22)
5.16	VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitation24Hours.N is APPROPRIATE.	Pass / Fail (Clause 5.8.24.22)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.3.16 Retrieve Precipitation Totals – User Specified

Test Case: 3.16	Title:	<i>Retrieve Precipitation Totals – User Specified</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve precipitation totals – user specified.</i>	
	Variables:	<i>Supported_Precipitation_Sensors</i>	<i>(PRL 3.6.5)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>	

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of precipitation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » precipitationSensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.3.2.6.7)
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorTableNumSensors.0 is greater than or equal to Supported_Precipitation_Sensors.</u>	Pass / Fail (PRL 3.6.5)
4	<u>Determine the RESPONSE VALUE for precipitationSensorTableNumSensors.0.</u> <u>RECORD this information as:</u> <u> »Supported_Precipitation_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Precipitation_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u> »precipitationSensorPeriod.N</u>	Pass / Fail (Clause 3.5.2.3.2.6.7)
5.2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPeriod.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.7)
5.3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPeriod.N is less than or equal to 86400.</u>	Pass / Fail (Clause 5.8.24.7)
5.4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPeriod.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.7)
5.5	<u>GET the following object(s):</u> <u> »precipitationSensorPrecipitationUserDefined.N</u>	Pass / Fail (Clause 3.5.2.3.2.6.7)
5.6	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationUserDefined.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.24.23)
5.7	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationUserDefined.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.24.23)
5.8	<u>VERIFY that the RESPONSE VALUE for precipitationSensorPrecipitationUserDefined.N is less than or equal to 86400.</u>	Pass / Fail (Clause 5.8.24.23)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.3.17 Retrieve Atmospheric Pressure

Test Case: 3.17	Title:	<i>Retrieve Atmospheric Pressure for Each Atmospheric Pressure Sensor</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the atmospheric pressure reading of each atmospheric pressure sensor.</i>
	Variables:	<i>Supported_Pressure_Sensors (PRL 3.6.1)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of atmospheric sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>»essNumPressureSensors.0</u>	Pass / Fail (Clause 3.5.2.3.2.10)
3	<u>VERIFY that the RESPONSE VALUE for essNumPressureSensors.0 is greater than or equal to Supported_Pressure_Sensors.</u>	Pass / Fail (PRL 3.6.1)
4	<u>Determine the RESPONSE VALUE for essNumPressureSensors.0. RECORD this information as:</u> <u>»Supported_Pressure_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Pressure_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essPressureSensorAtmosphericPressure.N</u>	Pass / Fail (Clause 3.5.2.3.2.10)
5.2	<u>VERIFY that the RESPONSE VALUE for essPressureSensorAtmosphericPressure.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.5.7.7)
5.3	<u>VERIFY that the RESPONSE VALUE for essPressureSensorAtmosphericPressure.N is less than or equal to 65535.</u>	Pass / Fail (Clause 5.5.7.7)
5.4	<u>VERIFY that the RESPONSE VALUE for essPressureSensorAtmosphericPressure.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.5.7.7)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.3.18 Retrieve Relative Humidity Sensor

Test Case: 3.18	Title:	<i>Retrieve Relative Humidity for Each Humidity Sensor</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the relative humidity reading of each humidity sensor.</i>
	Variables:	<i>Supported_Humidity_Sensors (PRL 3.6.4)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of humidity sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» humiditySensorTableNumSensors.0</u>	Pass / Fail (Clause 3.5.2.3.2.11)
3	<u>VERIFY that the RESPONSE VALUE for humiditySensorTableNumSensors.0 is greater than or equal to Supported_Humidity_Sensors.</u>	Pass / Fail (PRL 3.6.4)
4	<u>Determine the RESPONSE VALUE for humiditySensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported_Humidity_Sensors</u>	-
5	<u>GET the following object(s):</u> <u>» essNumTemperatureSensors.0</u>	
6	<u>FOR EACH value, N, from 1 to Supported_Humidity_Sensors, perform Steps 6.1 through 6.10.</u>	-
6.1	<u>GET the following object(s):</u> <u>»humiditySensorRelativeHumidity.N</u> <u>»humiditySensorTemperatureInformation.N</u> <u>»humiditySensorWetbulbTemp.N</u> <u>»humiditySensorDewpointTemp.N</u>	Pass / Fail (Clause 3.5.2.3.2.11)
6.2	<u>VERIFY that the RESPONSE VALUE for humiditySensorRelativeHumidity.N is greater than or equal to 0.</u>	Pass / Fail (Clause 5.8.27.7)
6.3	<u>VERIFY that the RESPONSE VALUE for humiditySensorRelativeHumidity.N is less than or equal to 101.</u>	Pass / Fail (Clause 5.8.27.7)
6.4	<u>VERIFY that the RESPONSE VALUE for humiditySensorRelativeHumidity.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.7)
6.5	<u>VERIFY that the RESPONSE VALUE for humiditySensorTemperatureInformation.N is greater than or equal to 1.</u>	Pass / Fail (Clause 5.8.27.8)
6.6	<u>VERIFY that the RESPONSE VALUE for humiditySensorTemperatureInformation.N is less than or equal to essNumTemperatureSensors.</u>	Pass / Fail (Clause 5.8.27.8)
6.7	<u>VERIFY that the RESPONSE VALUE for humiditySensorTemperatureInformation.N is APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.8)
6.8	<u>VERIFY that the RESPONSE VALUE for humiditySensorWetbulbTemp.N is greater than or equal to -1000.</u>	Pass / Fail (Clause 5.8.27.9)
6.9	<u>VERIFY that the RESPONSE VALUE for humiditySensorWetbulbTemp.N is less than or equal to 1001.</u>	Pass / Fail (Clause 5.8.27.9)
6.10	<u>VERIFY that the RESPONSE VALUE for humiditySensorWetbulbTemp.N is</u>	Pass / Fail

	APPROPRIATE.	(Clause 5.8.27.9)
6.11	VERIFY that the RESPONSE VALUE for humiditySensorDewpointTemp.N is greater than or equal to -1000.	Pass / Fail (Clause 5.8.27.10)
6.12	VERIFY that the RESPONSE VALUE for humiditySensorDewpointTemp.N is less than or equal to 1001.	Pass / Fail (Clause 5.8.27.10)
6.13	VERIFY that the RESPONSE VALUE for humiditySensorDewpointTemp.N is <u>APPROPRIATE.</u>	Pass / Fail (Clause 5.8.27.10)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.3.19 Retrieve Solar Radiation

Test Case: 3.19	Title:	<u>Retrieve Solar Radiation</u>
	Description:	<u>This test case verifies that the ESS allows a management station to retrieve the solar radiation data stored in the device.</u>
	Variables:	<u>Supported Radiation Sensors</u> (PRL 3.6.6)
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of solar radiation sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>»radiationSensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.2.12)</u>
3	<u>VERIFY that the RESPONSE VALUE for radiationSensorTableNumSensors.0 is greater than or equal to Supported Radiation Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.6)</u>
4	<u>Determine the RESPONSE VALUE for radiationSensorTableNumSensors.0. RECORD this information as:</u> <u>»Supported Radiation Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Radiation Sensors, perform Steps 5.1 through 5.13.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essTotalSunV4.N</u> <u>»essInstantaneousTerrestrialRadiation.N</u> <u>»essInstantaneousSolarRadiation.N</u> <u>»essTotalRadiation.N</u> <u>»essTotalRadiationPeriod.0</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.2.3.2.12)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essTotalSunV4.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.7)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essTotalSunV4.N is less than or equal to 1441.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.7)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essTotalSunV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.7)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiationV4.N is greater than or equal to -2048.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.8)</u>
5.6	<u>VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiationV4.N is less than or equal to 2049.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.8)</u>
5.7	<u>VERIFY that the RESPONSE VALUE for essInstantaneousTerrestrialRadiationV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.8)</u>
5.8	<u>VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiationV4.N is greater than or equal to -2048.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.9)</u>
5.9	<u>VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiationV4.N is less than or equal to 2049.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.9)</u>
5.10	<u>VERIFY that the RESPONSE VALUE for essInstantaneousSolarRadiationV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.9)</u>

5.11	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationV4.N is greater than or equal to -2048.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.10)</u>
5.12	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationV4.N is less than or equal to 2049.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.10)</u>
5.13	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.10.10)</u>
6	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.7)</u>
7	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is less than or equal to 86400.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.7)</u>
8	<u>VERIFY that the RESPONSE VALUE for essTotalRadiationPeriod.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.9.7)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.4 Pavement Tests

C.2.3.4.1 Retrieve Pavement Surface Condition [\[Versions 01 to 03\]](#)

Test Case: 4.1	Title:	Retrieve Pavement Surface Condition [Versions 01 to 03]	
	Description:	This test case verifies that the ESS allows a management station to retrieve the current temperature and moisture of the pavement.	
	Variables:	Required_Pavement_Sensors	PRL 3.6.8
		Device_Version	Test Plan
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	CONFIGURE: Determine the version of the NTCIP 1204 standard to which the ESS claims conformance (Test Plan). RECORD this information as: »Device_Version	
3	SET-UP: GET the following object(s): »globalMaxModules.0	
4	SET-UP: Determine the RESPONSE VALUE for globalMaxModules.0. RECORD this information as: »Num_Modules	
5	GET the following object(s): »numEssPavementSensors.0	Pass / Fail (RFC 1157)
6	VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Required_Pavement_Sensors.	Pass / Fail (Sec. 5.11.1)
7	Determine a random number between 1 and Required_Pavement_Sensors. RECORD this information as: »Subject_Sensor	
8	GET the following object(s): »essSurfaceStatus.Subject_Sensor »essSurfaceTemperature.Subject_Sensor »essPavementSensorError.Subject_Sensor »pavementSensorModelInformation.Subject_Sensor	Pass / Fail (Sec. 3.5.2.3.3.14.2.14)
9	VERIFY that the RESPONSE VALUE for essSurfaceStatus.Subject_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.7)
10	VERIFY that the RESPONSE VALUE for essSurfaceStatus.Subject_Sensor is less than or equal to 14.	Pass / Fail (Sec. 5.11.3.7)
11	VERIFY that the RESPONSE VALUE for essSurfaceStatus.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.7)
12	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Subject_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.8)
13	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Subject_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.8)

14	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)
15	VERIFY that the RESPONSE VALUE for essPavementSensorError.Subject_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.15)
16	VERIFY that the RESPONSE VALUE for essPavementSensorError.Subject_Sensor is less than or equal to 6.	Pass / Fail (Sec. 5.11.3.15)
17	VERIFY that the RESPONSE VALUE for essPavementSensorError.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)
18	IF Device_Version is greater than 1, then proceed to Step 18.1; otherwise, proceed to Step 19.1.	
18.1	GET the following object(s): »pavementSensorModelInformation.Subject_Sensor	Pass / Fail (Sec. 4.2.14)
18.2	VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.Subject_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.18)
18.3	VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.Subject_Sensor is less than or equal to Num_Modules.	Pass / Fail (Sec. 5.11.3.18)
18.4	VERIFY that the RESPONSE VALUE for pavementSensorModelInformation.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.18)
19.1	GET the following object(s): »pavementSensorModelInformation.Subject_Sensor VERIFY that the RESPONSE ERROR is equal to 'NoSuchName'.	Pass / Fail (Sec. 4.2.14)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.2 Retrieve Icing Conditions—Active

Test Case: 4.2	Title:	Retrieve Icing Conditions—Active	
	Description:	This test case verifies that the ESS allows a management station to retrieve icing condition information from an active sensor.	
	Variables:	Active_Pavement_Sensor	Test Plan
		Device_Version	Test Plan
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the identifier of an active pavement sensor (Test Plan). RECORD this information as: »Active_Pavement_Sensor	
2	CONFIGURE: Determine the version of the NTCIP 1204 standard to which the ESS claims conformance (Test Plan). RECORD this information as: »Device_Version	
3	GET the following object(s): »essSurfaceTemperature.Active_Pavement_Sensor »essPavementTemperature.Active_Pavement_Sensor »essSurfaceFreezePoint.Active_Pavement_Sensor »essSurfaceBlackIceSignal.Active_Pavement_Sensor »essPavementSensorError.Active_Pavement_Sensor »essSurfaceIceOrWaterDepth.Active_Pavement_Sensor »pavementSensorTemperatureDepth.Active_Pavement_Sensor	Pass / Fail (Sec. 3.5.2.3.3.24.2.15)
4	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Active_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.8)
5	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Active_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.8)
6	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)
7	VERIFY that the RESPONSE VALUE for essPavementTemperature.Active_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.9)
8	VERIFY that the RESPONSE VALUE for essPavementTemperature.Active_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.9)
9	VERIFY that the RESPONSE VALUE for essPavementTemperature.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.9)
10	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Active_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.13)
11	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Active_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.13)
12	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.13)
13	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Active_Pavement_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.14)

14	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Active_Pavement_Sensor is less than or equal to 4.	Pass / Fail (Sec. 5.11.3.14)
15	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.14)
16	VERIFY that the RESPONSE VALUE for essPavementSensorError.Active_Pavement_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.15)
17	VERIFY that the RESPONSE VALUE for essPavementSensorError.Active_Pavement_Sensor is less than or equal to 6.	Pass / Fail (Sec. 5.11.3.15)
18	VERIFY that the RESPONSE VALUE for essPavementSensorError.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)
19	IF Device_Version is greater than 1, then proceed to Step 19.1; otherwise, proceed to Step 20.1.	
19.1	GET the following object(s): »essSurfaceIceOrWaterDepth.Active_Pavement_Sensor »pavementSensorTemperatureDepth.Active_Pavement_Sensor	Pass / Fail (Sec. 4.2.15)
19.2	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Active_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.16)
19.3	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Active_Pavement_Sensor is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.16)
19.4	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.16)
19.5	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Active_Pavement_Sensor is greater than or equal to 2.	Pass / Fail (Sec. 5.11.3.19)
19.6	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Active_Pavement_Sensor is less than or equal to 11.	Pass / Fail (Sec. 5.11.3.19)
19.7	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Active_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.19)
20.1	GET the following object(s): »essSurfaceIceOrWaterDepth.Active_Pavement_Sensor »pavementSensorTemperatureDepth.Active_Pavement_Sensor VERIFY that the RESPONSE ERROR is equal to 'NoSuchName'.	Pass / Fail (Sec. 4.2.15)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.4.3 Retrieve Icing Conditions—Passive

Test Case: 4.3	Title:	<i>Retrieve Icing Conditions—Passive</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve icing condition information from an passive sensor.</i>	
	Variables:	<i>Passive_Pavement_Sensor</i>	<i>Test Plan</i>
		<i>Device_Version</i>	<i>Test Plan</i>
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine the identifier of a passive pavement sensor (Test Plan). RECORD this information as: »Passive_Pavement_Sensor	
2	CONFIGURE: Determine the version of the NTCIP 1204 standard to which the ESS claims conformance (Test Plan). RECORD this information as: »Device_Version	
3	GET the following object(s): »essSurfaceTemperature.Passive_Pavement_Sensor »essPavementTemperature.Passive_Pavement_Sensor »essSurfaceSalinity.Passive_Pavement_Sensor »essSurfaceFreezePoint.Passive_Pavement_Sensor »essSurfaceBlackIceSignal.Passive_Pavement_Sensor »essPavementSensorError.Passive_Pavement_Sensor »essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor »essSurfaceConductivityV2.Passive_Pavement_Sensor »pavementSensorTemperatureDepth.Passive_Pavement_Sensor	Pass / Fail (Sec. 4.2.6.b)
4	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Passive_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.8)
5	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Passive_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.8)
6	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)
7	VERIFY that the RESPONSE VALUE for essPavementTemperature.Passive_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.9)
8	VERIFY that the RESPONSE VALUE for essPavementTemperature.Passive_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.9)
9	VERIFY that the RESPONSE VALUE for essPavementTemperature.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.9)
10	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.Passive_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.11)
11	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.Passive_Pavement_Sensor is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.11)
12	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.11)

13	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Passive_Pavement_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.13)
14	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Passive_Pavement_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.13)
15	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.13)
16	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Passive_Pavement_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.14)
17	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Passive_Pavement_Sensor is less than or equal to 4.	Pass / Fail (Sec. 5.11.3.14)
18	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.14)
19	VERIFY that the RESPONSE VALUE for essPavementSensorError.Passive_Pavement_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.15)
20	VERIFY that the RESPONSE VALUE for essPavementSensorError.Passive_Pavement_Sensor is less than or equal to 6.	Pass / Fail (Sec. 5.11.3.15)
21	VERIFY that the RESPONSE VALUE for essPavementSensorError.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)
22	IF Device_Version is greater than 1, then proceed to Step 22.1; otherwise, proceed to Step 23.1.	
22.1	GET the following object(s): »essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor »essSurfaceConductivityV2.Passive_Pavement_Sensor »pavementSensorTemperatureDepth.Passive_Pavement_Sensor	Pass / Fail (Sec. 4.2.6.c)
22.2	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.16)
22.3	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.16)
22.4	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.16)
22.5	VERIFY that the RESPONSE VALUE for essSurfaceConductivityV2.Passive_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.17)
22.6	VERIFY that the RESPONSE VALUE for essSurfaceConductivityV2.Passive_Pavement_Sensor is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.17)
22.7	VERIFY that the RESPONSE VALUE for essSurfaceConductivityV2.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.17)
22.8	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Passive_Pavement_Sensor is greater than or equal to 2.	Pass / Fail (Sec. 5.11.3.19)
22.9	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Passive_Pavement_Sensor is less than or equal to 11.	Pass / Fail (Sec. 5.11.3.19)

22.10	VERIFY that the RESPONSE VALUE for pavementSensorTemperatureDepth.Passive_Pavement_Sensor is APPROPRIATE. GO TO Step 24.	Pass / Fail (Sec. 5.11.3.19)
23.1	GET the following object(s): »essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor »essSurfaceConductivityV2.Passive_Pavement_Sensor »pavementSensorTemperatureDepth.Passive_Pavement_Sensor VERIFY that the RESPONSE ERROR is equal to 'NoSuchName'.	Pass / Fail (Sec. 4.2.6.c)
24	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 4.2.6.dc)
25	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Products	
26	FOR EACH value, N, from 1 to Num_Products, perform Steps 32.1 through 32.10.	
26.1	GET the following object(s): »essPaveTreatProductType.N »essPaveTreatProductForm.N »essPercentProductMix.N	Pass / Fail (Sec. 4.2.6.de)
26.2	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is greater than or equal to 1.	Pass / Fail (Sec. 5.13.3.2)
26.3	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is less than or equal to 14.	Pass / Fail (Sec. 5.13.3.2)
26.4	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
26.5	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is greater than or equal to 1.	Pass / Fail (Sec. 5.13.3.3)
26.6	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is less than or equal to 4.	Pass / Fail (Sec. 5.13.3.3)
26.7	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.3)
26.8	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is greater than or equal to 0.	Pass / Fail (Sec. 5.13.3.4)
26.9	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is less than or equal to 100.	Pass / Fail (Sec. 5.13.3.4)
26.10	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.4 Retrieve Adjacent Snow Depth [\[Versions 01 to 03\]](#)

Test Case: 4.4	Title:	Retrieve Adjacent Snow Depth [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the current depth of snow adjacent to the traveled way.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essAdjacentSnowDepth.0	Pass / Fail (Sec. 3.5.2.3.3.4)
2	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.3)
3	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is less than or equal to 3001.	Pass / Fail (Sec. 5.8.3)
4	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.5 Retrieve Roadway Snow Depth [\[Versions 01 to 03\]](#)

Test Case: 4.5	Title:	Retrieve Roadway Snow Depth [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the current depth of snow and packed snow on the traveled way.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essRoadwaySnowDepth.0	Pass / Fail (Sec. 3.5.2.3.3.5)
2	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.4)
3	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is less than or equal to 3001.	Pass / Fail (Sec. 5.8.4)
4	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.4)
54	GET the following object(s): »essRoadwaySnowPackDepth.0	Pass / Fail (Sec. 3.5.2.3.3.5)
62	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.4)
73	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is less than or equal to 3001.	Pass / Fail (Sec. 5.8.4)
84	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.4.6 Retrieve Roadway Ice Thickness [Versions 01 to 03]e

Test Case: 4.6	Title:	Retrieve Roadway Ice Thickness [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the current thickness of ice on the traveled way.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): →essRoadwaySnowPackDepth.0 »essIceThickness.0	Pass / Fail (Sec. 3.5.2.3.3.6)
2	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.5)
3	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is less than or equal to 3004.	Pass / Fail (Sec. 5.8.5)
4	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.5)
25	VERIFY that the RESPONSE VALUE for essIceThickness.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.10)
36	VERIFY that the RESPONSE VALUE for essIceThickness.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.10)
47	VERIFY that the RESPONSE VALUE for essIceThickness.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.10)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.7 Retrieve Compressed Pavement Condition Data

Test Case: 4.7	Title:	<i>Retrieve Compressed Pavement Condition Data</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve all current pavement condition data in compressed form.</i>	
	Variables:	<i>Required_Pavement_Sensors</i>	<i>PRL 3.6.8</i>
		<i>Support_Icing</i>	<i>PRL 2.5.2.2.2</i>
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	CONFIGURE: Determine whether the ESS is required to support icing detection per the specification (PRL 2.5.2.2.2). RECORD this information as: »Support_Icing	
3	GET the following object(s): »essPavementV3Block.0	Pass / Fail (Sec. 3.5.2.3.3.7)
4	Decode the essPavementV3Block.0 structure.	
5	VERIFY that the essPavementV3Block.0 structure was decoded without error.	Pass / Fail (Sec. 5.11.9)
6	VERIFY that the EssPavementDataV3 structure contains at least Required_Pavement_Sensors entries.	Pass / Fail (Sec. 3.6.8)
7	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 7.1 through 7.12.	
7.1	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.1)
7.2	VERIFY that the RESPONSE VALUE for essPavementSensorIndex.x is equal to N.	Pass / Fail (Sec. 5.11.3.1)
7.3	VERIFY that the RESPONSE VALUE for the essSurfaceStatus.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.1)
7.4	VERIFY that the RESPONSE VALUE for essSurfaceStatus.x is between 1 and 14, inclusive.	Pass / Fail (Sec. 5.11.3.7)
7.5	VERIFY that the RESPONSE VALUE for essSurfaceStatus.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.7)
7.6	VERIFY that the RESPONSE VALUE for the essSurfaceTemperature.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.1)
7.7	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.3.8)
7.8	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)

7.9	IF Support_Icing is equal to true, then proceed to Step 7.9.1; otherwise, proceed to Step 7.10.	
7.9.1	VERIFY that the RESPONSE VALUE for the essPavementTemperature.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.2 or 3.5.2.3.3.3)
7.9.2	VERIFY that the RESPONSE VALUE for essPavementTemperature.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.3.9)
7.9.3	VERIFY that the RESPONSE VALUE for essPavementTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.9)
7.9.4	VERIFY that the RESPONSE VALUE for the essSurfaceFreezePoint.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.2 or 3.5.2.3.3.3)
7.9.5	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.3.13)
7.9.6	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.13)
7.9.7	VERIFY that the RESPONSE VALUE for the essSurfaceBlackIceSignal.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.2 or 3.5.2.3.3.3)
7.9.8	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.x is between 1 and 4, inclusive.	Pass / Fail (Sec. 5.11.3.14)
7.9.9	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.14)
7.9.10	VERIFY that the RESPONSE VALUE for the essSurfaceIceOrWaterDepth.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.2 or 3.5.2.3.3.3)
7.9.11	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.x is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.11.3.16)
7.9.12	VERIFY that the RESPONSE VALUE for essSurfaceIceOrWaterDepth.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.16)
7.9.13	GET the following object(s): »essPavementSensorType.N	Pass / Fail (RFC 1157)
7.9.14	IF the RESPONSE VALUE for essPavementSensorType.Subject_Pavement_Sensor is equal to contactPassive, then proceed to Step 7.9.14.1; otherwise, proceed to Step 7.10.	
7.9.14.1	VERIFY that the RESPONSE VALUE for the essSurfaceSalinity.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.3)
7.9.14.2	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.x is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.11.3.11)
7.9.14.3	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.11)
7.9.14.4	VERIFY that the RESPONSE VALUE for the essSurfaceConductivityV2.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.3)
7.9.14.5	VERIFY that the RESPONSE VALUE for essSurfaceConductivityV2.x is between 0 and	Pass / Fail

	65535, inclusive.	(Sec. 5.11.3.17)
7.9.14.6	VERIFY that the RESPONSE VALUE for essSurfaceConductivityV2.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.17)
7.10	VERIFY that the RESPONSE VALUE for the essPavementSensorError.x field of the essPavementV3Block.0 object is present.	Pass / Fail (Sec. 3.5.2.3.3.1)
7.11	VERIFY that the RESPONSE VALUE for essPavementSensorError.x is between 1 and 6, inclusive.	Pass / Fail (Sec. 5.11.3.15)
7.12	VERIFY that the RESPONSE VALUE for essPavementSensorError.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.4.8 Retrieve Basic Subsurface Conditions

Test Case: 4.8	Title:	Retrieve Basic Subsurface Conditions	
	Description:	This test case verifies that the ESS allows a management station to retrieve the current subsurface information.	
	Variables:	Required_Subsurface_Sensors	PRL 3.6.11
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of subsurface sensors required by the specification (PRL 3.6.11). RECORD this information as: »Required_Subsurface_Sensors	
2	GET the following object(s): »numEssSubSurfaceSensors.0	Pass / Fail (RFC 1157)
3	VERIFY that the RESPONSE VALUE for numEssSubSurfaceSensors.0 is greater than or equal to Required_Subsurface_Sensors.	Pass / Fail (Sec. 5.11.4)
4	Determine a random number between 1 and Required_Subsurface_Sensors. RECORD this information as: »Subject_Sensor	
5	GET the following object(s): »essSubSurfaceTemperature.Subject_Sensor »essSubSurfaceSensorError.Subject_Sensor	Pass / Fail (Sec. 3.5.2.3.4.1)
6	VERIFY that the RESPONSE VALUE for essSubSurfaceTemperature.Subject_Sensor is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.6.5)
7	VERIFY that the RESPONSE VALUE for essSubSurfaceTemperature.Subject_Sensor is less than or equal to 1001.	Pass / Fail (Sec. 5.11.6.5)
8	VERIFY that the RESPONSE VALUE for essSubSurfaceTemperature.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.5)
9	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorError.Subject_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.6.7)
10	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorError.Subject_Sensor is less than or equal to 5.	Pass / Fail (Sec. 5.11.6.7)
11	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorError.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.9 Retrieve Subsurface Moisture

Test Case: 4.9	Title:	Retrieve Subsurface Moisture	
	Description:	This test case verifies that the ESS allows a management station to retrieve the amount of moisture currently present in the subsurface of the roadway.	
	Variables:	Required_Subsurface_Sensors	PRL 3.6.11
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of subsurface sensors required by the specification (PRL 3.6.11). RECORD this information as: »Required_Subsurface_Sensors	
2	Determine a random number between 1 and Required_Subsurface_Sensors. RECORD this information as: »Subject_Sensor	
3	GET the following object(s): »essSubSurfaceMoisture.Subject_Sensor	Pass / Fail (Sec. 3.5.2.3.4.2)
4	VERIFY that the RESPONSE VALUE for essSubSurfaceMoisture.Subject_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.6.6)
5	VERIFY that the RESPONSE VALUE for essSubSurfaceMoisture.Subject_Sensor is less than or equal to 101.	Pass / Fail (Sec. 5.11.6.6)
6	VERIFY that the RESPONSE VALUE for essSubSurfaceMoisture.Subject_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.10 Retrieve Compressed Subsurface Condition Data

Test Case: 4.10	Title:	Retrieve Compressed Subsurface Condition Data	
	Description:	This test case verifies that the ESS allows a management station to retrieve all current subsurface condition information in a compressed form.	
	Variables:	Required_Subsurface_Sensors	PRL 3.6.11
		Moisture_Supported	PRL 3.5.2.3.4.2
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of subsurface sensors required by the specification (PRL 3.6.11). RECORD this information as: »Required_Subsurface_Sensors	
2	CONFIGURE: Determine whether the ESS is required to monitor subsurface moisture (PRL 3.5.2.3.4.2). RECORD this information as: »Moisture_Supported	
3	GET the following object(s): »essSubsurfaceDataessSubsurfaceBlock.0	Pass / Fail (Sec. 3.5.2.3.4.3)
4	Decode the essSubsurfaceDataessSubsurfaceBlock.0 structure.	
5	VERIFY that the essSubsurfaceBlock.0 structure was decoded without error.	Pass / Fail (Sec. 5.11.8)
6	VERIFY that the SubSurfaceSensorData structure contains at least Required_Subsurface_Sensors entries.	Pass / Fail (Sec. 3.6.11)
7	FOR EACH value, N, from 1 to Required_Subsurface_Sensors, perform Steps 7.1 through 7.9.	
7.1	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorIndex.x field of the Nth SubSurfaceSensorData field is present.	Pass / Fail (Sec. 3.5.2.3.4.1)
7.2	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorIndex.x is equal to N.	Pass / Fail (Sec. 5.11.6.1)
7.3	VERIFY that the RESPONSE VALUE for the essSubSurfaceTemperature.x field of the Nth SubSurfaceSensorData field is present.	Pass / Fail (Sec. 3.5.2.3.4.1)
7.4	VERIFY that the RESPONSE VALUE for essSubSurfaceTemperature.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.6.5)
7.5	VERIFY that the RESPONSE VALUE for essSubSurfaceTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.5)
7.6	IF Moisture_Supported is equal to 1, then proceed to Step 7.6.1; otherwise, proceed to Step 7.7.	
7.6.1	VERIFY that the RESPONSE VALUE for the essSubSurfaceMoisture.x field of the Nth SubSurfaceSensorData field is present.	Pass / Fail (Sec. 3.5.2.3.4.2)
7.6.2	VERIFY that the RESPONSE VALUE for essSubSurfaceMoisture.x is between 0 and 101, inclusive.	Pass / Fail (Sec. 5.11.6.6)

7.6.3	VERIFY that the RESPONSE VALUE for essSubSurfaceMoisture.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.6)
7.7	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorError.x field of the Nth SubSurfaceSensorData field is present.	Pass / Fail (Sec. 3.5.2.3.4.1)
7.8	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorError.x is between 1 and 5, inclusive.	Pass / Fail (Sec. 5.11.6.7)
7.9	VERIFY that the RESPONSE VALUE for essSubSurfaceSensorError.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.4.11 Retrieve Pavement Surface Condition

Test Case: 4.11	Title:	<i>Retrieve Pavement Surface Condition</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve pavement surface condition readings of each pavement sensor.</i>
	Variables:	<i>Supported Pavement Sensors (PRL 3.6.8)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pavement sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssPavementSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.8)</u>
3	<u>VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Supported Pavement Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.8)</u>
4	<u>Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as:</u> <u>»Supported Pavement Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported Pavement Sensors, perform Steps 5.1 through 5.8.</u>	-
5.1	<u>GET the following object(s):</u> <u>»essSurfaceTemperature.N</u> <u>»essPavementSensorError.N</u> <u>»pavementSensorSurfaceCondition.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.8)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for essSurfaceTemperature.N is greater than or equal to -1000.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.8)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essSurfaceTemperature.N is less than or equal to 1001.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.8)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for essSurfaceTemperature.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.8)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essPavementSensorError.N is equal to one of the following values:</u> <u>other (1).</u> <u>none (2).</u> <u>noResponse (3).</u> <u>cutCable (4).</u> <u>shortCircuit (5).</u> <u>dirtyLens (6)</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.15)</u>
5.6	<u>VERIFY that the RESPONSE VALUE for essPavementSensorError.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.15)</u>
5.7	<u>VERIFY that the RESPONSE VALUE for pavementSensorSurfaceCondition.N is equal to one of the following values:</u> <u>other (1).</u> <u>error (2).</u> <u>dry (3).</u> <u>moist (4).</u> <u>chemicallyMoist (5).</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.22)</u>

	wet (6). chemicallyWet (7). standingWater (8). frost (9). slush (10). snow (11). ice (12). noReport (13).	
5.8	VERIFY that the RESPONSE VALUE for pavementSensorSurfaceCondition.N is APPROPRIATE.	Pass / Fail (Clause 5.11.3.22)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.4.12 Retrieve Forecasted Pavement Surface Condition

Test Case: 4.12	Title:	<i>Retrieve Forecasted Pavement Surface Condition</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve forecasted pavement surface condition readings of each pavement sensor.</i>
	Variables:	<i>Supported_Pavement_Sensors (PRL 3.6.8)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pavement sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u>» numEssPavementSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.9)</u>
3	<u>VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Supported_Pavement_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.8)</u>
4	<u>Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as:</u> <u>»Supported_Pavement_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Pavement_Sensors, perform Steps 5.1 through 5.3.</u>	-
<u>5.1</u>	<u>GET the following object(s):</u> <u>»pavementSensorForecastCondition.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.9)</u>
<u>5.2</u>	<u>VERIFY that the RESPONSE VALUE for pavementSensorForecastCondition.N is equal to one of the following values:</u> <u>other (1).</u> <u>error (2).</u> <u>noAdvisoryForecasted (3).</u> <u>iceAdvisory (4).</u> <u>slushAdvisory(5).</u> <u>freezeAdvisory (6).</u> <u>freezeHazard (7).</u> <u>noReport (8).</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.23)</u>
<u>5.3</u>	<u>VERIFY that the RESPONSE VALUE for pavementSensorForecastCondition.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.23)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.4.13 Retrieve Roadway Friction Coefficient

Test Case: 4.13	Title:	<i>Retrieve Roadway Friction Coefficient</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the roadway friction readings of each pavement sensor.</i>
	Variables:	<i>Supported_Pavement_Sensors (PRL 3.6.8)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of pavement sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » numEssPavementSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.10.1)</u>
3	<u>VERIFY that the RESPONSE VALUE for numEssPavementSensors.0 is greater than or equal to Supported_Pavement_Sensors.</u>	<u>Pass / Fail</u> <u>(PRL 3.6.8)</u>
4	<u>Determine the RESPONSE VALUE for numEssPavementSensors.0. RECORD this information as:</u> <u> »Supported_Pavement_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Pavement_Sensors, perform Steps 5.1 through 5.4.</u>	-
5.1	<u>GET the following object(s):</u> <u> »pavementSensorFrictionCoefficient.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.3.10.1)</u>
5.2	<u>VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.24)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.N is less than or equal to 101.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.24)</u>
5.4	<u>VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.11.3.24)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.4.14 Retrieve Adjacent Snow Depth

<u>Test Case:</u> <u>4.14</u>	<u>Title:</u>	<u>Retrieve Adjacent Snow Depth</u>
	<u>Description:</u>	<u>This test case verifies that the ESS allows a management station to retrieve the current depth of snow adjacent to the traveled way.</u>
	<u>Variables:</u>	
	<u>Pass/Fail Criteria:</u>	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>GET the following object(s):</u> <u>»precipitationSensorAdjacentSnowDepth.0</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.2.3.3.4)</u>
2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorAdjacentSnowDepth.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.8)</u>
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorAdjacentSnowDepth.0 is less than or equal to 3001.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.8)</u>
4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorAdjacentSnowDepth.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.8)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>

<u>Test Case Notes:</u>

C.2.3.4.15 Retrieve Roadway Snow Depth

Test Case: 4.15	Title:	<u>Retrieve Roadway Snow Depth</u>
	Description:	<u>This test case verifies that the ESS allows a management station to retrieve the current depth of snow and packed snow on the traveled way.</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

Step	Test Procedure	Device
1	<u>GET the following object(s):</u> <u>»precipitationSensorRoadwaySnowDepth.0</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.2.3.3.5)</u>
2	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowDepth.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.9)</u>
3	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowDepth.0 is less than or equal to 3001.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.9)</u>
4	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowDepth.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.9)</u>
5	<u>GET the following object(s):</u> <u>»precipitationSensorRoadwaySnowPackDepth.0</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.2.3.3.5)</u>
6	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowPackDepth.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.10)</u>
7	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowPackDepth.0 is less than or equal to 3001.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.10)</u>
8	<u>VERIFY that the RESPONSE VALUE for precipitationSensorRoadwaySnowPackDepth.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.8.24.10)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.4.16 Retrieve Roadway Ice Thickness

Test Case: 4.16	Title:	<i>Retrieve Roadway Ice Thickness</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the current thickness of ice on the traveled way.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »precipitationSensorIceThickness.0	Pass / Fail (Sec. 3.5.2.3.3.6)
2	VERIFY that the RESPONSE VALUE for precipitationSensorIceThickness.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.24.14)
3	VERIFY that the RESPONSE VALUE for precipitationSensorIceThickness.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.24.14)
4	VERIFY that the RESPONSE VALUE for precipitationSensorIceThickness.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.24.14)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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Test Case Notes:

C.2.3.5 Situation Tests

C.2.3.5.1 Retrieve Wind Situation

Test Case: 5.1	Title:	Retrieve Wind Situation
	Description:	This test case verifies that the ESS allows a management station to retrieve the assessment of the wind situation.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »windSensorTableNumSensors.0	Pass / Fail (Sec. 3.5.2.3.5.1)
2	Determine the RESPONSE VALUE for windSensorTableNumSensors.0. RECORD this information as: »Supported_Wind_Sensors	
3	FOR EACH value, N, from 1 to Supported_Wind_Sensors, perform Steps 3.1 through 3.4.	
3.1	GET the following object(s): »windSensorSituation.N	Pass / Fail (Sec. 3.5.2.3.5.1)
3.2	VERIFY that the RESPONSE VALUE for windSensorSituation.N is greater than or equal to 1.	Pass / Fail (Sec. 5.6.10.10)
3.3	VERIFY that the RESPONSE VALUE for windSensorSituation.N is less than or equal to 12.	Pass / Fail (Sec. 5.6.10.10)
3.4	VERIFY that the RESPONSE VALUE for windSensorSituation.N is APPROPRIATE.	Pass / Fail (Sec. 5.6.10.10)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.2 Retrieve Precipitation Situation

Test Case: 5.2	Title:	<i>Retrieve Precipitation Situation</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the assessment of the precipitation situation.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essPrecipSituation.0	Pass / Fail (Sec. 3.5.2.3.5.2)
2	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.8.9)
3	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is less than or equal to 15.	Pass / Fail (Sec. 5.8.9)
4	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.9)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.3 Retrieve Cloud Situation [\[Versions 01 to 03\]](#)

Test Case: 5.3	Title:	Retrieve Cloud Situation [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the assessment of the cloud situation.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essCloudSituation.0	Pass / Fail (Sec. 3.5.2.3.5.3)
2	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.9.3)
3	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is less than or equal to 5.	Pass / Fail (Sec. 5.9.3)
4	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.4 Retrieve Visibility Situation

Test Case: 5.4	Title:	<i>Retrieve Visibility Situation</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the assessment of the visibility situation.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essVisibilitySituation.0	Pass / Fail (Sec. 3.5.2.3.5.4)
2	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.10.2)
3	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is less than or equal to 12.	Pass / Fail (Sec. 5.10.2)
4	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.5 Retrieve Ground State [\[Versions 01 to 03\]](#)

Test Case: 5.5	Title:	Retrieve Ground State [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the assessment of the ground state next to the roadway.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essMobileObservationGroundState.0	Pass / Fail (Sec. 3.5.2.3.5.5)
2	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.12.2)
3	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is less than or equal to 18.	Pass / Fail (Sec. 5.12.2)
4	VERIFY that the RESPONSE VALUE for essMobileObservationGroundState.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.6 Retrieve Pavement State [\[Versions 01 to 03\]](#)

Test Case: 5.6	Title:	Retrieve Pavement State [Versions 01 to 03]
	Description:	This test case verifies that the ESS allows a management station to retrieve the assessment of the pavement state.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essMobileObservationPavement.0	Pass / Fail (Sec. 3.5.2.3.5.6)
2	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.12.3)
3	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is less than or equal to 25.	Pass / Fail (Sec. 5.12.3)
4	VERIFY that the RESPONSE VALUE for essMobileObservationPavement.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.5.7 Retrieve Cloud Situation

<u>Test Case:</u> <u>5.7</u>	<u>Title:</u>	<u>Retrieve Cloud Situation</u>
	<u>Description:</u>	<u>This test case verifies that the ESS allows a management station to retrieve the cloud situation of each visibility sensor. (Measured in Oktas.)</u>
	<u>Variables:</u>	<u>Supported_Visibility_Sensors</u> <u>FR 3.6.7</u>
	<u>Pass/Fail Criteria:</u>	<u>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of visibility sensors that the ESS is required to support.</u>	-
2	<u>GET the following object(s):</u> <u> » visibilitySensorTableNumSensors.0</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.5.7)</u>
3	<u>VERIFY that the RESPONSE VALUE for visibilitySensorTableNumSensors.0 is greater than or equal to Supported_Visibility_Sensors.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.5.7)</u>
4	<u>Determine the RESPONSE VALUE for visibilitySensorTableNumSensors.0. RECORD this information as:</u> <u> »Supported_Visibility_Sensors</u>	-
5	<u>FOR EACH value, N, from 1 to Supported_Visibility_Sensors, perform Steps 5.1 through 5.4.</u>	-
<u>5.1</u>	<u>GET the following object(s):</u> <u> »essCloudSituationV4.N</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.5.7)</u>
<u>5.2</u>	<u>VERIFY that the RESPONSE VALUE for essCloudSituationV4.N is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.11)</u>
<u>5.3</u>	<u>VERIFY that the RESPONSE VALUE for essCloudSituationV4.N is less than or equal to 8.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.11)</u>
<u>5.4</u>	<u>VERIFY that the RESPONSE VALUE for essCloudSituationV4.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Clause 5.9.11)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.5.8 Retrieve Ground State

Test Case: 5.8	Title:	<i>Retrieve Ground State</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the assessment of the ground state next to the roadway.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essMobileObservationGroundStateV4.0	Pass / Fail (Sec. 3.5.2.3.5.8)
2	VERIFY that the RESPONSE VALUE for essMobileObservationGroundStateV4.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.12.4)
3	VERIFY that the RESPONSE VALUE for essMobileObservationGroundStateV4.0 is less than or equal to 18.	Pass / Fail (Sec. 5.12.4)
4	VERIFY that the RESPONSE VALUE for essMobileObservationGroundStateV4.0 is APPROPRIATE.	Pass / Fail (Sec. 5.12.4)

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.5.9 Retrieve Pavement State

<u>Test Case: 5.9</u>	<u>Title:</u>	<u>Retrieve Pavement State</u>
	<u>Description:</u>	<u>This test case verifies that the ESS allows a management station to retrieve the assessment of the pavement state.</u>
	<u>Variables:</u>	
	<u>Pass/Fail Criteria:</u>	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>GET the following object(s): » essMobileObservationPavementV4.0</u>	<u>Pass / Fail (Sec. 3.5.2.3.5.9)</u>
2	<u>VERIFY that the RESPONSE VALUE for essMobileObservationPavementV4.0 is greater than or equal to 1.</u>	<u>Pass / Fail (Sec. 5.12.5)</u>
3	<u>VERIFY that the RESPONSE VALUE for essMobileObservationPavementV4.0 is less than or equal to 14.</u>	<u>Pass / Fail (Sec. 5.12.5)</u>
4	<u>VERIFY that the RESPONSE VALUE for essMobileObservationPavementV4.0 is APPROPRIATE.</u>	<u>Pass / Fail (Sec. 5.12.5)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

C.2.3.6 Air Quality Tests

C.2.3.6.1 Retrieve Carbon Monoxide Reading

Test Case: 6.1	Title:	Retrieve Carbon Monoxide Reading		
	Description:	This test case verifies that the ESS allows a management station to retrieve the current carbon monoxide reading.		
	Variables:	<table border="1"> <tr> <td>Required_CO_Sensors</td> <td>(PRL 3.6.13)</td> </tr> </table>	Required_CO_Sensors	(PRL 3.6.13)
	Required_CO_Sensors	(PRL 3.6.13)		
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.13). RECORD this information as: »Required_CO_Sensors	
2	GET the following object(s): »airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_CO_Sensors.	Pass / Fail (Sec. 3.6.13)
44	GET the following object(s): »essCO.0	Pass / Fail (Sec. 3.5.2.3.6.1)
52	VERIFY that the RESPONSE VALUE for essCO.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.1)
63	VERIFY that the RESPONSE VALUE for essCO.0 is less than or equal to 255.	Pass / Fail (Sec. 5.14.1)
74	VERIFY that the RESPONSE VALUE for essCO.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.2 Retrieve Carbon Dioxide Reading

Test Case: 6.2	Title:	Retrieve Carbon Dioxide Reading
	Description:	This test case verifies that the ESS allows a management station to retrieve the current carbon dioxide reading.
	Variables:	Required_CO2_Sensors (PRL 3.6.14)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.14). RECORD this information as: » Required_CO2_Sensors	
2	GET the following object(s): » airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_CO2_Sensors.	Pass / Fail (Sec. 3.6.14)
41	GET the following object(s): » essCO2.0	Pass / Fail (Sec. 3.5.2.3.6.2)
52	VERIFY that the RESPONSE VALUE for essCO2.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.2)
63	VERIFY that the RESPONSE VALUE for essCO2.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.14.2)
74	VERIFY that the RESPONSE VALUE for essCO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.3 Retrieve Nitrous Oxide Reading

Test Case: 6.3	Title:	Retrieve Nitrous Oxide Reading
	Description:	This test case verifies that the ESS allows a management station to retrieve the current nitrous oxide reading.
	Variables:	Required CO Sensors (PRL 3.6.13)
		Required NO Sensors (PRL 3.6.15)
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.15). RECORD this information as: » Required NO Sensors	
2	GET the following object(s): » airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required NO Sensors.	Pass / Fail (Sec. 3.6.15)
44	GET the following object(s): » essNO.0	Pass / Fail (Sec. 3.5.2.3.6.3)
52	VERIFY that the RESPONSE VALUE for essNO.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.3)
63	VERIFY that the RESPONSE VALUE for essNO.0 is less than or equal to 255.	Pass / Fail (Sec. 5.14.3)
74	VERIFY that the RESPONSE VALUE for essNO.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.4 Retrieve Nitrogen Dioxide Reading

Test Case: 6.4	Title:	Retrieve Nitrogen Dioxide Reading
	Description:	This test case verifies that the ESS allows a management station to retrieve the current nitrogen dioxide reading.
	Variables:	Required NO2 Sensors (PRL 3.6.16)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.16). RECORD this information as: » Required NO2 Sensors	
2	GET the following object(s): » airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required NO2 Sensors.	Pass / Fail (Sec. 3.6.16)
14	GET the following object(s): »essNO2.0	Pass / Fail (Sec. 3.5.2.3.6.4)
52	VERIFY that the RESPONSE VALUE for essNO2.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.4)
63	VERIFY that the RESPONSE VALUE for essNO2.0 is less than or equal to 255.	Pass / Fail (Sec. 5.14.4)
74	VERIFY that the RESPONSE VALUE for essNO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.5 Retrieve Sulfur Dioxide Reading

Test Case: 6.5	Title:	Retrieve Sulfur Dioxide Reading		
	Description:	This test case verifies that the ESS allows a management station to retrieve the current sulfur dioxide reading.		
	Variables:	<table border="1"> <tr> <td>Required SO2 Sensors</td> <td>(PRL 3.6.17)</td> </tr> </table>	Required SO2 Sensors	(PRL 3.6.17)
	Required SO2 Sensors	(PRL 3.6.17)		
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.17). RECORD this information as: »Required SO2 Sensors	
2	GET the following object(s): »airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required SO2 Sensors.	Pass / Fail (Sec. 3.6.17)
41	GET the following object(s): »essSO2.0	Pass / Fail (Sec. 3.5.2.3.6.5)
52	VERIFY that the RESPONSE VALUE for essSO2.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.5)
63	VERIFY that the RESPONSE VALUE for essSO2.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.14.5)
74	VERIFY that the RESPONSE VALUE for essSO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.5)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.6 Retrieve Ozone Reading

Test Case: 6.6	Title:	Retrieve Ozone Reading
	Description:	This test case verifies that the ESS allows a management station to retrieve the current ozone reading.
	Variables:	<u>Required_O3_Sensors</u> (PRL 3.6.18)
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.18). RECORD this information as:</u> » <u>Required_O3_Sensors</u>	
2	<u>GET the following object(s):</u> » <u>airQualitySensorTableNumSensors.0</u>	
3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_O3_Sensors.</u>	<u>Pass / Fail (Sec. 3.6.18)</u>
41	GET the following object(s): »essO3.0	Pass / Fail (Sec. 3.5.2.3.6.6)
52	VERIFY that the RESPONSE VALUE for essO3.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.6)
63	VERIFY that the RESPONSE VALUE for essO3.0 is less than or equal to 255.	Pass / Fail (Sec. 5.14.6)
74	VERIFY that the RESPONSE VALUE for essO3.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.7 Retrieve Small Particulate Matter Reading

Test Case: 6.7	Title:	Retrieve Small Particulate Matter Reading		
	Description:	This test case verifies that the ESS allows a management station to retrieve the current small particular matter reading.		
	Variables:	<table border="1"> <tr> <td>Required_PM10_Sensors</td> <td>(PRL 3.6.19)</td> </tr> </table>	Required_PM10_Sensors	(PRL 3.6.19)
	Required_PM10_Sensors	(PRL 3.6.19)		
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.19). RECORD this information as: » Required_PM10_Sensors	
2	GET the following object(s): » airQualitySensorTableNumSensors.0	
3	VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_PM10_Sensors.	Pass / Fail (Sec. 3.6.19)
41	GET the following object(s): »essPM10.0	Pass / Fail (Sec. 3.5.2.3.6.7)
52	VERIFY that the RESPONSE VALUE for essPM10.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.14.7)
63	VERIFY that the RESPONSE VALUE for essPM10.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.14.7)
74	VERIFY that the RESPONSE VALUE for essPM10.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.6.8 Retrieve Compressed Air Quality Data

Test Case: 6.8	Title:	<i>Retrieve Compressed Air Quality Data</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve all of the current air quality data in compressed form.</i>	
	Variables:	<i>Support_CO</i>	<i>PRL3.6.13</i>
		<i>Support_CO2</i>	<i>PRL 3.6.14</i>
		<i>Support_NO</i>	<i>PRL 3.6.15</i>
<i>Support_NO2</i>		<i>PRL 3.6.16</i>	
<i>Support_SO2</i>		<i>PRL 3.6.17</i>	
	<i>Support_O3</i>	<i>PRL 3.6.18</i>	
	<i>Support_PM10</i>	<i>PRL 3.6.19</i>	
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the device is required to support a carbon monoxide sensor (PRL3.6.13). RECORD this information as: »Support_CO	
2	CONFIGURE: Determine whether the device is required to support a carbon dioxide sensor (PRL 3.6.14). RECORD this information as: »Support_CO2	
3	CONFIGURE: Determine whether the device is required to support a nitrous oxide sensor (PRL 3.6.15). RECORD this information as: »Support_NO	
4	CONFIGURE: Determine whether the device is required to support a nitrogen dioxide sensor (PRL 3.6.16). RECORD this information as: »Support_NO2	
5	CONFIGURE: Determine whether the device is required to support a sulfur dioxide sensor (PRL 3.6.17). RECORD this information as: »Support_SO2	
6	CONFIGURE: Determine whether the device is required to support a ozone sensor (PRL 3.6.18). RECORD this information as: »Support_O3	
7	CONFIGURE: Determine whether the device is required to support a particulate matter sensor (PRL 3.6.19). RECORD this information as: »Support_PM10	
8	GET the following object(s): » essAirQualityData essAirQualityBlock.0	Pass / Fail (Sec. 3.5.2.3.6.8)
9	Decode the essAirQualityData essAirQualityBlock.0 structure.	
10	VERIFY that the essAirQualityBlock.0 structure was decoded without error.	Pass / Fail (Sec. 5.14.8)
11	IF Support_CO is equal to true, then proceed to Step 11.1; otherwise, proceed to Step 12.	
11.1	VERIFY that the RESPONSE VALUE for the essCO.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.1)

11.2	VERIFY that the RESPONSE VALUE for essCO.0 is between 0 and 255, inclusive.	Pass / Fail (Sec. 5.14.1)
11.3	VERIFY that the RESPONSE VALUE for essCO.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.1)
12	IF Support_CO2 is equal to true, then proceed to Step 12.1; otherwise, proceed to Step 13.	
12.1	VERIFY that the RESPONSE VALUE for the essCO2.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.2)
12.2	VERIFY that the RESPONSE VALUE for essCO2.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.14.2)
12.3	VERIFY that the RESPONSE VALUE for essCO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.2)
13	IF Support_NO is equal to true, then proceed to Step 13.1; otherwise, proceed to Step 14.	
13.1	VERIFY that the RESPONSE VALUE for the essNO.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.3)
13.2	VERIFY that the RESPONSE VALUE for essNO.0 is between 0 and 255, inclusive.	Pass / Fail (Sec. 5.14.3)
13.3	VERIFY that the RESPONSE VALUE for essNO.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.3)
14	IF Support_NO2 is equal to true, then proceed to Step 14.1; otherwise, proceed to Step 15.	
14.1	VERIFY that the RESPONSE VALUE for the essNO2.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.4)
14.2	VERIFY that the RESPONSE VALUE for essNO2.0 is between 0 and 255, inclusive.	Pass / Fail (Sec. 5.14.4)
14.3	VERIFY that the RESPONSE VALUE for essNO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.4)
15	IF Support_SO2 is equal to true, then proceed to Step 15.1; otherwise, proceed to Step 16.	
15.1	VERIFY that the RESPONSE VALUE for the essSO2.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.5)
15.2	VERIFY that the RESPONSE VALUE for essSO2.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.14.5)
15.3	VERIFY that the RESPONSE VALUE for essSO2.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.5)
16	IF Support_O3 is equal to true, then proceed to Step 16.1; otherwise, proceed to Step 17.	
16.1	VERIFY that the RESPONSE VALUE for the essO3.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.6)
16.2	VERIFY that the RESPONSE VALUE for essO3.0 is between 0 and 255, inclusive.	Pass / Fail (Sec. 5.14.6)

16.3	VERIFY that the RESPONSE VALUE for essO3.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.6)
17	IF Support_PM10 is equal to true, then proceed to Step 17.1; otherwise, proceed to EXIT.	
17.1	VERIFY that the RESPONSE VALUE for the essPM10.0 field of the essAirQualityData field is present.	Pass / Fail (Sec. 3.5.2.3.6.7)
17.2	VERIFY that the RESPONSE VALUE for essPM10.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.14.7)
17.3	VERIFY that the RESPONSE VALUE for essPM10.0 is APPROPRIATE.	Pass / Fail (Sec. 5.14.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.6.9 Retrieve Particulate Matter (2.5) Reading

Test Case: 6.9	Title:	<i>Retrieve Particulate Matter (2.5) Reading for Each Air Quality Sensor</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the particulate matter (2.5) reading of each air quality sensor.</i>
	Variables:	<i>Supported_PM25_Sensors (PRL 3.6.28)</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of carbon monoxide sensors required by the specification (PRL 3.6.28). RECORD this information as:</u> <u>»Required_PM25_Sensors</u>	
2	<u>GET the following object(s):</u> <u>»airQualitySensorTableNumSensors.0</u>	
3	<u>VERIFY that the RESPONSE VALUE for airQualitySensorTableNumSensors.0 is greater than or equal to Required_PM25_Sensors.</u>	<u>Pass / Fail (Sec. 3.6.28)</u>
4	<u>GET the following object(s):</u> <u>»essPM25.0</u>	<u>Pass / Fail (Sec. 3.5.2.3.6.7)</u>
5	<u>VERIFY that the RESPONSE VALUE for essPM25.0 is greater than or equal to 0.</u>	<u>Pass / Fail (Sec. 5.14.9)</u>
6	<u>VERIFY that the RESPONSE VALUE for essPM25.0 is less than or equal to 65535.</u>	<u>Pass / Fail (Sec. 5.14.9)</u>
7	<u>VERIFY that the RESPONSE VALUE for essPM25.0 is APPROPRIATE.</u>	<u>Pass / Fail (Sec. 5.14.9)</u>

Test Case Results

<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
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<u>Test Case Notes:</u>

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C.2.3.7 Water Level and Snapshot Tests

C.2.3.7.1 Retrieve Water Level

Test Case: 7.1	Title:	Retrieve Water Level	
	Description:	This test case verifies that the ESS allows a management station to retrieve the current depth of water at defined locations.	
	Variables:	Required_Sensors	PRL 3.6.22
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of water level sensors required by the specification (PRL 3.6.22). RECORD this information as: »Required_Sensors	
2	GET the following object(s): »waterLevelSensorTableNumSensors.0	Pass / Fail (Sec. 3.5.2.3.7)
3	VERIFY that the RESPONSE VALUE for waterLevelSensorTableNumSensors.0 is greater than or equal to Required_Sensors.	Pass / Fail (Sec. 3.6.22)
4	Determine the RESPONSE VALUE for waterLevelSensorTableNumSensors.0. RECORD this information as: »Supported_Sensors	
5	FOR EACH value, N, from 1 to Supported_Sensors, perform Steps 5.1 through 5.4.	
5.1	GET the following object(s): »waterLevelSensorReading.N	Pass / Fail (Sec. 3.5.2.3.7)
5.2	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.N is greater than or equal to 0.	Pass / Fail (Sec. 5.8.21.2)
5.3	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.N is less than or equal to 65535.	Pass / Fail (Sec. 5.8.21.2)
5.4	VERIFY that the RESPONSE VALUE for waterLevelSensorReading.N is APPROPRIATE.	Pass / Fail (Sec. 5.8.21.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.7.2 Retrieve Snapshot

Test Case: 7.2	Title:	Retrieve Snapshot	
	Description:	This test case verifies that the ESS allows a management station to retrieve a specified snapshot image.	
	Variables:	Required_Cameras	PRL 3.6.20
		FTP_Username	3.5.2.3.8
		FTP_Password	PRL 3.5.2.3.8
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	PRE-CONDITION: The controller shall have at least one image stored.	
2	CONFIGURE: Determine the number of snapshot cameras required by the specification (PRL 3.6.20). RECORD this information as: »Required_Cameras	
3	CONFIGURE: Determine the user name and password for the FTP connection. RECORD this information as: »FTP_Username (the FTP username as defined in Sec. 3.5.2.3.8) »FTP_Password (the FTP password as defined—PRL 3.5.2.3.8)	
4	GET the following object(s): »essSnapshotNumberOfCameras.0	Pass / Fail (Sec. 4.2.11)
5	VERIFY that the RESPONSE VALUE for essSnapshotNumberOfCameras.0 is greater than or equal to Required_Cameras.	Pass / Fail (Sec. 3.6.20)
6	Determine a random number between 1 and Required_Cameras. RECORD this information as: »Subject_Camera	
7	FOR EACH value, N, from 1 to Required_Cameras, perform Steps 7.1 through 7.2.	
7.1	GET the following object(s): »essSnapshotCameraDescription.N »essSnapshotCameraStoragePath.N	Pass / Fail (Sec. 4.2.11)
7.2	IF N is equal to Subject_Camera, then proceed to Step 7.3.1; otherwise, proceed to Step 8.	
7.2.1	Determine the RESPONSE VALUE for essSnapshotCameraStoragePath.N. RECORD this information as: »Subject_Directory	
8	FOR EACH value, N, from 1 to Required_Cameras, perform Steps 8.1.	
8.1	GET the following object(s): »essSnapshotCameraFilename.N	Pass / Fail (Sec. 4.2.11)
9	Create an FTP connection to the Subject_Directory directory using FTP_Username as the username and FTP_Password as the password.	Pass / Fail (Sec. 4.2.2)
10	List all of the files in the following directory: Subject_Directory.	Pass / Fail (Sec. 4.2.2)

11	Calculate the file specification for the image files in the subject directory (e.g., Subject_Directory + *.jpg). RECORD this information as: »Delete_File_Spec	
12	Delete Delete_File_Spec using FTP.	Pass / Fail (Sec. 4.2.3)
13	List all of the files in the following directory: Subject_Directory. VERIFY that there are 0 files following the file format: "*.jpg".	Pass / Fail (Sec. 4.2.3)
14	SET the following object(s) to the value(s) shown: »essSnapshotCameraCommand.Subject_Camera = 'captureSnapshot' VERIFY that there is no response.	Pass / Fail (Sec. 4.2.1)
14.1	GET the following object(s): »essSnapshotCameraCommand.Subject_Camera	Pass / Fail (Sec. 4.2.1)
14	IF the RESPONSE VALUE for essSnapshotCameraCommand.Subject_Camera is equal to 'captureSnapshot', then proceed to Step 14.1; otherwise, proceed to Step 15.	
15	GET the following object(s): »essSnapshotCameraError.Subject_Camera	Pass / Fail (Sec. 4.2.1)
16	VERIFY that the RESPONSE VALUE for essSnapshotCameraError.Subject_Camera is equal to 'none'.	Pass / Fail (Sec. 4.2.1)
17	List all of the files in the following directory: Subject_Directory.	Pass / Fail (Sec. 4.2.2)
18	Determine the name of the image file in the directory. RECORD this information as: »Subject_File_Name	
19	Retrieve Subject_File_Name using FTP.	Pass / Fail (Sec. 4.2.2)
20	Delete Subject_File_Name using FTP.	Pass / Fail (Sec. 4.2.3)
21	POST-CONDITION: All image files previously stored on the device have been deleted from the Subject_Camera's directory.	

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.8 Pavement Treatment Tests

C.2.3.8.1 Retrieve Stationary Pavement Treatment Configuration

Test Case: 8.1	Title:	Retrieve Stationary Pavement Treatment Configuration	
	Description:	This test case verifies that the ESS allows a management station to retrieve the current pavement treatment configuration for a stationary device.	
	Variables:	Required_Treatments	PRL 3.6.12
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of treatments that the specification requires the device to support (PRL 3.6.12). RECORD this information as: »Required_Treatments	
2	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 4.2.5)
3	VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.	Pass / Fail (Sec. 3.6.12)
4	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	
5	Determine the initial percentage to be equal to 0. RECORD this information as: »Total_Percent	
6	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 6.1 through 6.12.	
6.1	GET the following object(s): »essPaveTreatProductType.N »essPaveTreatProductForm.N »essPercentProductMix.N	Pass / Fail (Sec. 4.2.5)
6.2	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is greater than or equal to 1.	Pass / Fail (Sec. 5.13.3.2)
6.3	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is less than or equal to 14.	Pass / Fail (Sec. 5.13.3.2)
6.4	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
6.5	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is greater than or equal to 1.	Pass / Fail (Sec. 5.13.3.3)
6.6	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is less than or equal to 4.	Pass / Fail (Sec. 5.13.3.3)
6.7	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.3)
6.8	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is greater than or equal to 0.	Pass / Fail (Sec. 5.13.3.4)
6.9	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is less than or equal	Pass / Fail

	to 100.	(Sec. 5.13.3.4)
6.10	VERIFY that the RESPONSE VALUE for essPercentProductMix.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.4)
6.11	Determine the RESPONSE VALUE for essPercentProductMix.N. RECORD this information as: »Current_Percentage	
6.12	Determine the total of Total_Percentage and Current_Percentage. RECORD this information as: »Total_Percentage	
7	VERIFY that Total_Percentage is greater than or equal to 99.	PASS / Fail (Sec. 5.1.3.3.4)
8	VERIFY that Total_Percentage is less than or equal to 101.	Pass / Fail (Sec. 5.13.3.4)
9	GET the following object(s): »ptsSignalDuration.0 »ptsMonitoringDetectors.0	Pass / Fail (Sec. 4.2.5)
10	VERIFY that the RESPONSE VALUE for ptsSignalDuration.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.10)
11	VERIFY that the RESPONSE VALUE for ptsSignalDuration.0 is less than or equal to 3600000.	Pass / Fail (Sec. 5.13.10)
12	VERIFY that the RESPONSE VALUE for ptsSignalDuration.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.10)
13	VERIFY that ptsMonitoringDetectors.0 is a 4-byte value.	Pass / Fail (Sec. 5.13.18)
14	VERIFY that the RESPONSE VALUE for ptsMonitoringDetectors.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.18)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.8.2 Configure Stationary Pavement Treatment System

Test Case: 8.2	Title:	<i>Configure Stationary Pavement Treatment System</i>	
	Description:	<i>This test case verifies that the ESS allows a management station to configure the pavement treatment configuration for a stationary system.</i>	
	Variables:	<i>Required_Treatments</i>	<i>PRL 3.6.12</i>
		<i>Selected_Detectors</i>	
<i>Duration</i>			
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of treatments that the ESS is required to support per the specification (PRL 3.6.12). RECORD this information as: »Required_Treatments	
2	CONFIGURE: Determine An octet string representing the detector numbers that should be used to control the PTS. RECORD this information as: »Selected_Detectors	
3	CONFIGURE: Determine the duration for which the device should signal the PTS unit. RECORD this information as: »Duration	
4	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 4.2.7)
5	VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.	Pass / Fail (Sec. 3.6.12)
6	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	
7	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 7.1 through 7.4.	
7.1	Determine values to test for product type and form. RECORD this information as: »Product_Type (a random number between 2 and 14) »Product_Form (a random number between 2 and 4)	
7.2	SET-UP: GET the following object(s): »essPaveTreatProductType.N »essPaveTreatProductForm.N	
7.3	Determine the retrieved values. RECORD this information as: »Orig_Type[N] »Orig_Form[N]	
7.4	SET the following object(s) to the value(s) shown: »essPaveTreatProductType.N = Product_Type »essPaveTreatProductForm.N = Product_Form	Pass / Fail (Sec. 4.2.7)
8	Determine the initial percentage available to be one hundred (100). RECORD this information as: »Percentage_Available	
9	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 9.1 through 9.5.	
9.1	IF N is equal to Num_Treatments. then proceed to Step 9.1.1: otherwise, proceed to	

	Step 9.2.1.	
9.1.1	Determine the value stored in Percentage_Available. RECORD this information as: »Current_Percentage GO TO Step 9.3.	
9.2.1	Determine a random number between 0 and Percentage_Available. RECORD this information as: »Current_Percentage	
9.2.2	Determine the value defined by Percentage_Available minus the Current_Percentage. RECORD this information as: »Percentage_Available	
9.3	SET-UP: GET the following object(s): »essPercentProductMix.N	
9.4	Determine the RESPONSE VALUE for essPercentProductMix.N. RECORD this information as: »Orig_Mix[N]	
9.5	SET the following object(s) to the value(s) shown: »essPercentProductMix.N = Current_Percentage	Pass / Fail (Sec. 4.2.7)
10	SET-UP: GET the following object(s): »ptsSignalDuration.0 »ptsMonitoringDetectors.0	
11	Determine the retrieved values. RECORD this information as: »Orig_Duration »Orig_Detectors	
12	SET the following object(s) to the value(s) shown: »ptsSignalDuration.0 = Duration »ptsMonitoringDetectors.0 = Selected_Detectors	Pass / Fail (Sec. 4.2.7)
13	FOR EACH value, N, from 1 to Num_Treatments, perform Step 13.1.	
13.1	SET the following object(s) to the value(s) shown: »essPaveTreatProductType.N = Orig_Type[N] »essPaveTreatProductForm.N = Orig_Form[N]	Pass / Fail (RFC 1157)
14	FOR EACH value, N, from 1 to Num_Treatments, perform Step 14.1.	
14.1	SET the following object(s) to the value(s) shown: »essPercentProductMix.N = Orig_Percentage[N]	Pass / Fail (RFC 1157)
15	SET the following object(s) to the value(s) shown: »ptsSignalDuration.0 = Orig_Duration »ptsMonitoringDetectors.0 = Orig_Detectors	Pass / Fail (RFC 1157)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.8.3 Retrieve Mobile Pavement Treatment Configuration

Test Case: 8.3	Title:	Retrieve Mobile Pavement Treatment Configuration	
	Description:	This test case verifies that the ESS allows a management station to retrieve the current pavement treatment configuration for a mobile platform.	
	Variables:	Required_Treatments	PRL 3.6.12
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of treatments that the specification requires the device to support (PRL 3.6.12). RECORD this information as: »Required_Treatments	
2	GET the following object(s): »numEssTreatments.0	Pass / Fail (RFC 1157)
3	VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.	Pass / Fail (Sec. 3.6.12)
4	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	
5	GET the following object(s): »pavementTreatmentBlock.0	Pass / Fail (Sec. 3.5.3.1.3)
6	Decode the pavementTreatmentBlock.0 structure.	
7	VERIFY that the RESPONSE VALUE for the treatmentInfo field of the pavementTreatmentBlock.0 object is present.	Pass / Fail (Sec. 5.13.6)
8	VERIFY that the treatmentInfo field of the pavementTreatmentBlock.0 object contains Num_Treatments entries.	Pass / Fail (Sec. 3.6.12)
9	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 9.1 through 9.11.	
9.1	VERIFY that the RESPONSE VALUE for the essPavementTreatmentIndex.x field of the treatmentInfo field is present.	Pass / Fail (Sec. 5.13.6)
9.2	VERIFY that the essPavementTreatmentIndex.x field is equal to N.	Pass / Fail (Sec. 5.13.6)
9.3	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.x field of the treatmentInfo field is present.	Pass / Fail (Sec. 5.13.6)
9.4	VERIFY that the essPaveTreatProductType.x field is between 1 and 14.	Pass / Fail (Sec. 5.13.3.2)
9.5	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.x is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
9.6	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.x field of the treatmentInfo field is present.	Pass / Fail (Sec. 5.13.6)
9.7	VERIFY that the essPaveTreatProductForm.x field is between 1 and 4.	Pass / Fail (Sec. 5.13.3.3)
9.8	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.x is	Pass / Fail

	APPROPRIATE.	(Sec. 5.13.3.3)
9.9	VERIFY that the RESPONSE VALUE for the essPercentProductMix.x field of the treatmentInfo field is present.	Pass / Fail (Sec. 5.13.6)
9.10	VERIFY that the essPercentProductMix.x field is between 0 and 100.	Pass / Fail (Sec. 5.13.3.4)
9.11	VERIFY that the RESPONSE VALUE for essPercentProductMix.x is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.4)
10	VERIFY that the RESPONSE VALUE for the essPaveTreatmentAmount.0 field of the pavementTreatmentBlock.0 object is present.	Pass / Fail (Sec. 5.13.6)
11	VERIFY that the essPaveTreatmentAmount.0 field is between 0 and 255.	Pass / Fail (Sec. 5.13.4)
12	VERIFY that the RESPONSE VALUE for essPaveTreatmentAmount.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.4)
13	VERIFY that the RESPONSE VALUE for the essPaveTreatmentWidth.0 field of the pavementTreatmentBlock.0 object is present.	Pass / Fail (Sec. 5.13.6)
14	VERIFY that the essPaveTreatmentWidth.0 field is between 0 and 255.	Pass / Fail (Sec. 5.13.5)
15	VERIFY that the RESPONSE VALUE for essPaveTreatmentWidth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.5)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.8.4 Configure Mobile Pavement Treatment System

Test Case: 8.4	Title:	Configure Mobile Pavement Treatment System	
	Description:	This test case verifies that the ESS allows a management station to configure the pavement treatment configuration for a mobile system.	
	Variables:	Required_Treatments	
		Selected_Detectors	
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of treatments that the ESS is required to support per the specification (). RECORD this information as: »Required_Treatments	
2	CONFIGURE: Determine the detector numbers that should be used to control the PTS. RECORD this information as: »Selected_Detectors	
3	GET the following object(s): »numEssTreatments.0	Pass / Fail (Sec. 4.2.9)
4	VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.	Pass / Fail (Sec. 3.6.12)
5	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	
6	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 6.1 through 6.2.	
6.1	Determine the product type and form to use in the test. RECORD this information as: »Product_Type (a random number between 2 and 14) »Product_Form (a random number between 2 and 4)	
6.2	SET the following object(s) to the value(s) shown: »essPaveTreatProductType.N = Product_Type »essPaveTreatProductForm.N = Product_Form	Pass / Fail (Sec. 4.2.9)
7	Determine the initial percentage available to be one hundred (100). RECORD this information as: »Percentage_Available	
8	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 8.1 through 8.3.	
8.1	IF N is equal to Num_Treatments, then proceed to Step 8.1.1; otherwise, proceed to Step 8.2.1.	
8.1.1	Determine the value stored in Percentage_Available. RECORD this information as: »Current_Percentage GO TO Step 8.3.	
8.2.1	Determine a random number between 0 and Percentage_Available. RECORD this information as: »Current_Percentage	
8.2.2	Determine the value defined by Percentage_Available minus the Current_Percentage. RECORD this information as: »Percentage_Available	

8.3	SET the following object(s) to the value(s) shown: »essPercentProductMix.N = Current_Percentage	Pass / Fail (Sec. 4.2.9)
9	Determine test values for the amount and width. RECORD this information as: »Amount (a random amount of chemical to be sprayed between 0 and 255) »Width (a random width to spray between 0 and 255)	
10	SET the following object(s) to the value(s) shown: »essPaveTreatmentAmount.0 = Amount »essPaveTreatmentWidth.0 = Width	Pass / Fail (Sec. 4.2.9)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.8.5 Retrieve Pavement Treatment Status

Test Case: 8.5	Title:	<i>Retrieve Pavement Treatment Status</i>
	Description:	<i>This test case verifies that the ESS allows a management station to retrieve the status of the pavement treatment system.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »ptsSprayerState.0 »ptsSignalEventCount.0 »ptsLastSignalEvent.0 »ptsActiveEventCount.0 »ptsInactiveEventCount.0 »ptsLastActiveEvent.0 »ptsLastInactiveEvent.0 »ptsError.0	Pass / Fail (Sec. 3.5.3.2.1)
2	VERIFY that the RESPONSE VALUE for ptsSprayerState.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.13.9)
3	VERIFY that the RESPONSE VALUE for ptsSprayerState.0 is less than or equal to 3.	Pass / Fail (Sec. 5.13.9)
4	VERIFY that the RESPONSE VALUE for ptsSprayerState.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.9)
5	VERIFY that the RESPONSE VALUE for ptsSignalEventCount.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.11)
6	VERIFY that the RESPONSE VALUE for ptsSignalEventCount.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.13.11)
7	VERIFY that the RESPONSE VALUE for ptsSignalEventCount.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.11)
8	VERIFY that the RESPONSE VALUE for ptsLastSignalEvent.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.12)
9	VERIFY that the RESPONSE VALUE for ptsLastSignalEvent.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.13.12)
10	VERIFY that the RESPONSE VALUE for ptsLastSignalEvent.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.12)
11	VERIFY that the RESPONSE VALUE for ptsActiveEventCount.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.13)
12	VERIFY that the RESPONSE VALUE for ptsActiveEventCount.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.13.13)
13	VERIFY that the RESPONSE VALUE for ptsActiveEventCount.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.13)
14	VERIFY that the RESPONSE VALUE for ptsInactiveEventCount.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.14)
15	VERIFY that the RESPONSE VALUE for ptsInactiveEventCount.0 is less than or equal	Pass / Fail

	to 4294967295.	(Sec. 5.13.14)
16	VERIFY that the RESPONSE VALUE for ptsInactiveEventCount.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.14)
17	VERIFY that the RESPONSE VALUE for ptsLastActiveEvent.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.15)
18	VERIFY that the RESPONSE VALUE for ptsLastActiveEvent.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.13.15)
19	VERIFY that the RESPONSE VALUE for ptsLastActiveEvent.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.15)
20	VERIFY that the RESPONSE VALUE for ptsLastInactiveEvent.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.13.16)
21	VERIFY that the RESPONSE VALUE for ptsLastInactiveEvent.0 is less than or equal to 4294967295.	Pass / Fail (Sec. 5.13.16)
22	VERIFY that the RESPONSE VALUE for ptsLastInactiveEvent.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.16)
23	VERIFY that the RESPONSE VALUE for ptsError.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.13.17)
24	VERIFY that the RESPONSE VALUE for ptsError.0 is less than or equal to 4.	Pass / Fail (Sec. 5.13.17)
25	VERIFY that the RESPONSE VALUE for ptsError.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.17)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.8.6 Set PTS Operational Mode

Test Case: 8.6	Title:	<i>Set PTS Operational Mode</i>
	Description:	<i>This test case verifies that the ESS allows a management station to set the operational mode of the pavement treatment system to off, manual, and automatic.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	SET-UP: GET the following object(s): »ptsOperationalModeV3.0	Pass / Fail (RFC 1157)
2	Determine the RESPONSE VALUE for ptsOperationalModeV3.0. RECORD this information as: »Orig_State	
3	SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = 'off'	Pass / Fail (Sec. 3.5.3.4.1)
4	DELAY for 2 seconds.	
5	SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = 'manual'	Pass / Fail (Sec. 3.5.3.4.1)
6	DELAY for 2 seconds.	
7	SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = 'automatic'	Pass / Fail (Sec. 3.5.3.4.1)
8	DELAY for 2 seconds.	
9	SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = Orig_State	Pass / Fail (Sec. 3.5.3.4.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.8.7 Manually Activate PTS Sprayer

Test Case: 8.7	Title:	<i>Manually Activate PTS Sprayer</i>
	Description:	<i>This test case verifies that the ESS allows a management station to manually activate the sprayer.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	SET-UP: GET the following object(s): »ptsOperationalModeV3.0 »ptsSignalDuration.0	Pass / Fail (RFC 1157)
2	Determine the RESPONSE VALUE for ptsOperationalModeV3.0. RECORD this information as: »Orig_Mode	
3	Determine the RESPONSE VALUE for ptsSignalDuration.0. RECORD this information as: »Orig_Duration	
4	SET-UP: SET the following object(s) to the value(s) shown: »ptsSignalDuration.0 = 1000	Pass / Fail (RFC 1157)
5	SET-UP: SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = 'manual'	Pass / Fail (RFC 1157)
6	SET the following object(s) to the value(s) shown: »ptsCommandStateV3.0 = 'activate'	Pass / Fail (Sec. 3.5.3.4.2)
7	VERIFY that the PTS signals the sprayer sprays the product mixture for a period of 1.000 seconds.	Pass / Fail (Sec. 3.5.3.4.2)
8	Delay for 1 seconds. VERIFY that the sprayer sprayed the product mixture.	Pass / Fail (Sec. 3.5.3.4.2)
9	SET-UP: GET the following object(s): »ptsCommandStateV3.0	Pass / Fail (RFC 1157)
10	SET-UP: VERIFY that the RESPONSE VALUE for ptsCommandStateV3.0 is equal to 'inactive'.	Pass / Fail (Sec. 5.13.208)
11	SET the following object(s) to the value(s) shown: »ptsOperationalModeV3.0 = Orig_Mode »ptsSignalDuration.0 = Orig_Duration	Pass / Fail (RFC 1157)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.8.8 Retrieve Pavement Treatment Profile with Mobile Sources

Test Case: 8.8	Title:	<u>Retrieve Pavement Treatment Profile with Mobile Sources</u>
	Description:	<u>This test case verifies that the ESS allows a management station to determine the speed, location and direction of a mobile pavement treatment system and the quantity of pavement treatment</u>
	Variables:	
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>GET the following object(s):</u> <u>»essLatitude.0</u> <u>»essLongitude.0</u> <u>»essVehicleSpeed.0</u> <u>»essVehicleBearing.0</u> <u>»essOdometer.0</u> <u>»essReferenceHeight.0</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.3.3.1)</u>
2	<u>VERIFY that the RESPONSE VALUE for essLatitude.0 is greater than or equal to -90000000.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.1)</u>
3	<u>VERIFY that the RESPONSE VALUE for essLatitude.0 is less than or equal to 90000001.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.1)</u>
4	<u>VERIFY that the RESPONSE VALUE for essLatitude.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.1)</u>
5	<u>VERIFY that the RESPONSE VALUE for essLongitude.0 is greater than or equal to -180000000.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.2)</u>
6	<u>VERIFY that the RESPONSE VALUE for essLongitude.0 is less than or equal to 180000001.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.2)</u>
7	<u>VERIFY that the RESPONSE VALUE for essLongitude.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.2)</u>
8	<u>VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.3)</u>
9	<u>VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is less than or equal to 255.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.3)</u>
10	<u>VERIFY that the RESPONSE VALUE for essVehicleSpeed.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.3)</u>
11	<u>VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.4)</u>
12	<u>VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is less than or equal to 361.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.4)</u>
13	<u>VERIFY that the RESPONSE VALUE for essVehicleBearing.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.4)</u>
14	<u>VERIFY that the RESPONSE VALUE for essOdometer.0 is greater than or equal to 0.</u>	<u>Pass / Fail</u> <u>(Sec. 5.4.5)</u>
15	<u>VERIFY that the RESPONSE VALUE for essOdometer.0 is less than or equal to</u>	<u>Pass / Fail</u>

	4294967295.	(Sec. 5.4.5)
16	VERIFY that the RESPONSE VALUE for essOdometer.0 is APPROPRIATE.	Pass / Fail (Sec. 5.4.5)
17	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is greater than or equal to -400.	Pass / Fail (Sec. 5.5.1)
18	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is less than or equal to 8001.	Pass / Fail (Sec. 5.5.1)
19	VERIFY that the RESPONSE VALUE for essReferenceHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.1)
20	CONFIGURE: Determine the number of treatments that the specification requires the device to support (PRL 3.6.12). RECORD this information as: »Required_Treatments	-
21	GET the following object(s): »numEssTreatments.0	Pass / Fail (RFC 1157)
22	VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.	Pass / Fail (Sec. 3.6.12)
23	Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as: »Num_Treatments	-
24	FOR EACH value, N, from 1 to Num_Treatments, perform Steps 24.1 through 24.7.	
24.1	GET the following object(s): »essPaveTreatProductType.N »essPaveTreatProductForm.N »essPercentProductMix.N	Pass / Fail (Sec. 3.5.3.3.1)
24.2	VERIFY that the essPaveTreatProductType.N field is between 1 and 14.	Pass / Fail (Sec. 5.13.3.2)
24.3	VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
24.4	VERIFY that the essPaveTreatProductForm.N field is between 1 and 4.	Pass / Fail (Sec. 5.13.3.3)
24.5	VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.3)
24.6	VERIFY that the essPercentProductMix.N field is between 0 and 100.	Pass / Fail (Sec. 5.13.3.4)
24.7	VERIFY that the RESPONSE VALUE for essPercentProductMix.xN is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.4)
25	VERIFY that the essPaveTreatmentAmount.0 field is between 0 and 255.	Pass / Fail (Sec. 5.13.4)
26	VERIFY that the RESPONSE VALUE for essPaveTreatmentAmount.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.4)
27	VERIFY that the essPaveTreatmentWidth.0 field is between 0 and 255.	Pass / Fail (Sec. 5.13.5)

<u>28</u>	<u>VERIFY that the RESPONSE VALUE for essPaveTreatmentWidth.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.5)</u>
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.8.9 Retrieve Mobile Pavement Treatment Configuration

Test Case: 8.9	Title:	<u>Retrieve Mobile Pavement Treatment Configuration</u>
	Description:	<u>This test case verifies that the ESS allows a management station to retrieve the current pavement treatment configuration for a mobile platform.</u>
	Variables:	<u>Required_Treatments</u> <u>PRL 3.6.12</u>
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of treatments that the specification requires the device to support (PRL 3.6.12). RECORD this information as:</u> <u>»Required_Treatments</u>	-
2	<u>GET the following object(s):</u> <u>»numEssTreatments.0</u>	<u>Pass / Fail</u> <u>(RFC 1157)</u>
3	<u>VERIFY that the RESPONSE VALUE for numEssTreatments.0 is greater than or equal to Required_Treatments.</u>	<u>Pass / Fail</u> <u>(Sec. 3.6.12)</u>
4	<u>Determine the RESPONSE VALUE for numEssTreatments.0. RECORD this information as:</u> <u>»Num_Treatments</u>	-
5	<u>FOR EACH value, N, from 1 to Num_Treatments, perform Steps 5.1 through 5.7.</u>	
5.1	<u>GET the following object(s):</u> <u>»essPaveTreatProductType.N</u> <u>»essPaveTreatProductForm.N</u> <u>»essPercentProductMix.N</u>	<u>Pass / Fail</u> <u>(Sec. 3.5.3.1.5)</u>
5.2	<u>VERIFY that the essPaveTreatProductType.N field is between 1 and 14.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.2)</u>
5.3	<u>VERIFY that the RESPONSE VALUE for essPaveTreatProductType.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.2)</u>
5.4	<u>VERIFY that the essPaveTreatProductForm.N field is between 1 and 4.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.3)</u>
5.5	<u>VERIFY that the RESPONSE VALUE for essPaveTreatProductForm.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.3)</u>
5.6	<u>VERIFY that the essPercentProductMix.N field is between 0 and 100.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.4)</u>
5.7	<u>VERIFY that the RESPONSE VALUE for essPercentProductMix.xN is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.3.4)</u>
6	<u>VERIFY that the essPaveTreatmentAmount.0 field is between 0 and 255.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.4)</u>
7	<u>VERIFY that the RESPONSE VALUE for essPaveTreatmentAmount.0 is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.4)</u>
8	<u>VERIFY that the essPaveTreatmentWidth.0 field is between 0 and 255.</u>	<u>Pass / Fail</u> <u>(Sec. 5.13.5)</u>

9	VERIFY that the RESPONSE VALUE for essPaveTreatmentWidth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.13.5)
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.9 Event Logging Tests

C.2.3.9.1 Determine Capabilities of Event Logging Service

Test Case: 9.1	Title:	<i>Determine Capabilities of Event Logging Service</i>	
	Description:	<i>This test case verifies that the device indicates that it supports the logging capabilities required by the specification</i>	
	Variables:	<i>Required_Event_Classes</i>	<i>PRL F.2.3.1.2</i>
		<i>Required_Event_Configurations</i>	<i>PRL F.2.3.1.3</i>
<i>Required_Event_Log_Size</i>		<i>PRL F.2.3.1.6</i>	
Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of event classes required by the specification (PRL F.2.3.1.2). RECORD this information as: »Required_Event_Classes	
2	CONFIGURE: Determine the number of event configurations required by the specification (PRL F.2.3.1.3). RECORD this information as: »Required_Event_Configurations	
3	CONFIGURE: Determine the number of events that the log is required to be able to store (PRL F.2.3.1.6). RECORD this information as: »Required_Event_Log_Size	
4	GET the following object(s): »maxEventClasses.0 »maxEventLogConfigs.0 »maxEventLogSize.0	Pass / Fail (Sec. 3.3.2.5)
5	VERIFY that the RESPONSE VALUE for maxEventClasses.0 is greater than or equal to Required_Event_Classes.	Pass / Fail (Sec. D.3.2.2.2)
6	VERIFY that the RESPONSE VALUE for maxEventLogConfigs.0 is greater than or equal to Required_Event_Configurations.	Pass / Fail (Sec. D.3.2.2.3)
7	VERIFY that the RESPONSE VALUE for maxEventLogSize.0 is greater than or equal to Required_Event_Log_Size.	Pass / Fail (Sec. D.3.2.2.6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.9.2 Configure Event Log

Test Case: 9.2	Title:	Configure Event Log		
	Description:	This test case configures the event log according to the tester inputs and ensures that the values were accepted and implemented in the device.		
	Variables:	Required_Event_Classes	PRL F.2.3.1.2	
		Required_Number_Of_Events	PRL F.2.3.1.6	
		Class_Clear_Time		
		Class_Description		
		Event_Index		
		Event_Mode		
		Event_Compare_Value1		
		Event_Compare_Value2		
Event_Watch_Object				
Event_Log_Object				
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine the event class to use for this test (PRL F.2.3.1.2). RECORD this information as: »Required_Event_Classes	
2	CONFIGURE: Determine the number of events that the device is required to support (PRL F.2.3.1.6). RECORD this information as: »Required_Number_Of_Events	
3	CONFIGURE: Determine the time from which all earlier logs will be cleared (e.g., per the test plan). RECORD this information as: »Class_Clear_Time	
4	CONFIGURE: Determine the description to be used for the log class (e.g., per the test plan). RECORD this information as: »Class_Description	
5	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
6	CONFIGURE: Determine the mode for the event (e.g., the comparison operator) (e.g., per the test plan). RECORD this information as: »Event_Mode	
7	CONFIGURE: Determine the first comparison value for the event (e.g., per the test plan). RECORD this information as: »Event_Compare_Value1	
8	CONFIGURE: Determine the second comparison value for the event (e.g., per the test plan). RECORD this information as: »Event_Compare_Value2	
9	CONFIGURE: Determine the object to which the value will be compared (e.g., per the test plan). RECORD this information as: »Event_Watch_Object	
10	CONFIGURE: Determine the object that should be logged upon the detection of the	

	event (e.g., per the test plan). RECORD this information as: »Event_Log_Object	
11	Calculate a random value between 1 and Required_Event_Classes. RECORD this information as: »Class_Index	
12	Calculate a random value between 1 and Required_Number_Of_Events. RECORD this information as: »Class_Size_Limit	
13	SET the following object(s) to the value(s) shown: »eventClassLimit.Class_Index = Class_Size_Limit »eventClassClearTime.Class_Index = Class_Clear_Time »eventClassDescription.Class_Index = Class_Description	Pass / Fail (Sec. 3.3.2.2)
14	SET the following object(s) to the value(s) shown: »eventConfigClass.Event_Index = Class_Index »eventConfigMode.Event_Index = Event_Mode »eventConfigCompareValue.Event_Index = Event_Compare_Value1 »eventConfigCompareValue2.Event_Index = Event_Compare_Value2 »eventConfigCompareOID.Event_Index = Event_Watch_Object »eventConfigLogOID.Event_Index = Event_Log_Object »eventConfigAction.Event_Index = 'log' Note: Valid enumerated values for eventConfigMode are defined in NTCIP 1204-1103 v02 Sec. 2.5.4.3A.7.5.3 .	Pass / Fail (Sec. 3.3.2.2)
15	GET the following object(s): »eventConfigStatus.Event_Index	Pass / Fail (Sec. 3.3.2.2)
16	POST-CONDITION: An event type has been configured in the controller.	

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.3 Retrieve Logged Data

Test Case: 9.3	Title:	Retrieve Logged Data	
	Description:	This test case verifies that the device allows a user to retrieve the logged data.	
	Variables:	Class_Index	
		Last_Log_Time	
Last_Log_ID			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the class for which the logged data is to be retrieved (e.g., per the test plan). RECORD this information as: »Class_Index	
2	CONFIGURE: Determine the information about the final log entry; if known (otherwise enter zeros). RECORD this information as: »Last_Log_Time (the time at or before which the last event to be logged occurred) »Last_Log_ID (the ID of the last event to be logged)	
3	GET the following object(s): »eventClassNumRowsInLog.Class_Index »eventClassNumEvents.Class_Index	Pass / Fail (Sec. 3.3.2.3)
4	Determine the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index. RECORD this information as: »Rows	
5	FOR EACH value, N, from 1 to Rows, perform Steps 5.1 through 5.2.	
5.1	GET the following object(s): »eventLogID.Class_Index.N »eventLogTime.Class_Index.N »eventLogValue.Class_Index.N	Pass / Fail (Sec. 3.3.2.3)
5.2	IF N is equal to Rows, then proceed to Step 5.2.1; otherwise, proceed to EXIT.	
5.2.1	IF Last_Log_Time is greater than 0, then proceed to Step 5.2.1.1; otherwise, proceed to EXIT.	
5.2.1.1	VERIFY that the RESPONSE VALUE for eventLogTime.Class_Index.N is greater than or equal to Last_Log_Time.	Pass / Fail (Sec. 3.3.2.3)
5.2.1.2	VERIFY that the RESPONSE VALUE for eventLogID.Class_Index.N is equal to Last_Log_ID.	Pass / Fail (Sec. 3.3.2.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.4 Clear Log

Test Case: 9.4	Title:	Clear Log	
	Description:	This test case verifies that the device allows the user to clear the log for a specified class.	
	Variables:	Class_Index	
		Class_Clear_Time	
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the class of events to be cleared from the log (e.g., per the test plan). RECORD this information as: »Class_Index	
2	CONFIGURE: Determine the time from which all earlier logs will be cleared (e.g., per the test plan). RECORD this information as: »Class_Clear_Time	
3	SET the following object(s) to the value(s) shown: »eventClassClearTime.Class_Index = Class_Clear_Time	Pass / Fail (Sec. 3.3.2.4)
4	GET the following object(s): »eventClassNumRowsInLog.Class_Index	Pass / Fail (RFC 1157)
5	Determine the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index. RECORD this information as: »Rows	
6	FOR EACH value, N, from 1 to Rows, perform Steps 6.1 through 6.2.	
6.1	GET the following object(s): »eventLogTime.Class_Index.N	Pass / Fail (RFC 1157)
6.2	VERIFY that the RESPONSE VALUE for eventLogTime.Class_Index.N is greater than Class_Clear_Time.	Pass / Fail (Sec. 3.3.2.4)
7	POST-CONDITION: Log entries older than Class_Clear_Time have been deleted from the log.	

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.5 Determine Total Number of Events

Test Case: 9.5	Title:	<i>Determine Total Number of Events</i>
	Description:	<i>This test case verifies that the device allows the user to determine the total number of events in the log.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »maxEventClasses.0 »maxEventLogConfigs.0 »maxEventLogSize.0	Pass / Fail (Sec. 3.3.2.5)
2	Determine the RESPONSE VALUE for maxEventClasses.0. RECORD this information as: »Max_Event_Classes	
3	Determine the value of 0. RECORD this information as: »Total_Events	
4	FOR EACH value, N, from 1 to Max_Event_Classes, perform Steps 4.1 through 4.2.	
4.1	GET the following object(s): »eventClassNumRowsInLog.N »eventClassNumEvents.N	Pass / Fail (RFC 1157)
4.2	Calculate the sum of Total_Events and eventClassNumRowsInLog.N. RECORD this information as: »Total_Events	
5	GET the following object(s): »numEvents.0	Pass / Fail (Sec. 3.3.2.6)
6	VERIFY that the RESPONSE VALUE for numEvents.0 is equal to Total_Events. Note: If an event occurred during this process, this condition will not hold true.	Pass / Fail (Sec. 3.3.2.6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.6 Verify Log Limit Storage

Test Case: 9.6	Title:	Verify Log Limit Storage	
	Description:	This test case verifies that the device stores only the latest of the maximum number of events per class.	
	Variables:	Class_Index	
		Class_Size_Limit	
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the class for which the logged data is to be retrieved (e.g., per the test plan). RECORD this information as: »Class_Index	
2	CONFIGURE: Determine the log size limit that the test will impose on the class (e.g., per the test plan). RECORD this information as: »Class_Size_Limit	
3	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2).	Pass / Fail
4	Create conditions to cause the device to log the event Class_Size_Limit times. Note: This may require physically changing a sensor reading or setting an object within the device.	
5	GET the following object(s): »eventClassNumRowsInLog.Class_Index »eventClassNumEvents.Class_Index	Pass / Fail (Sec. 3.3.2.3)
6	VERIFY that the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index is equal to Class_Size_Limit.	Pass / Fail (Sec. 3.3.2.2)
7	Determine the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index. RECORD this information as: »Rows	
8	FOR EACH value, N, from 1 to Rows, perform Steps 8.1 through 8.3.	
8.1	GET the following object(s): »eventLogID.Class_Index.N »eventLogTime.Class_Index.N »eventLogValue.Class_Index.N	Pass / Fail (Sec. 3.3.2.3)
8.2	IF N is equal to 1, then proceed to Step 8.2.1; otherwise, proceed to Step 8.3.1.	
8.2.1	Determine the RESPONSE VALUE for eventLogTime.Class_Index.N. RECORD this information as: »Old_Timestamp GO TO Step 9 (after any looping logic is completed).	
8.3.1	Determine the RESPONSE VALUE for eventLogTime.Class_Index.N. RECORD this information as: »Limit_Timestamp	
9	Create conditions to cause the device to log the event one more time.	

10	GET the following object(s): »eventClassNumRowsInLog.Class_Index »eventClassNumEvents.Class_Index	Pass / Fail (Sec. 3.3.2.3)
11	VERIFY that the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index is equal to Class_Size_Limit.	Pass / Fail (Sec. 3.3.2.2)
12	Determine the RESPONSE VALUE for eventClassNumRowsInLog.Class_Index. RECORD this information as: »Rows	
13	FOR EACH value, N, from 1 to Rows, perform Steps 13.1 through 13.3.	
13.1	GET the following object(s): »eventLogID.Class_Index.N »eventLogTime.Class_Index.N »eventLogValue.Class_Index.N	Pass / Fail (Sec. 3.3.2.3)
13.2	IF N is equal to 1, then proceed to Step 13.2.1; otherwise, proceed to Step 13.3.1.	
13.2.1	VERIFY that the RESPONSE VALUE for eventLogTime.Class_Index.N is greater than Old_Timestamp. GO TO Step 14 (after any looping logic is completed).	Pass / Fail (Sec. 3.3.2.3)
13.3.1	IF N is equal to Rows, then proceed to Step 13.3.1.1; otherwise, proceed to Step 14.	
13.3.1.1	VERIFY that the RESPONSE VALUE for eventLogTime.Class_Index.N is greater than Limit_Timestamp.	Pass / Fail (Sec. 3.3.2.3)
14	POST-CONDITION: The event log has been filled for subject event class.	
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.9.7 Verify Support for an On-Change Event

Test Case: 9.7	Title:	Verify Support for an On-Change Event
	Description:	This test case verifies that the device allows configuration of an on-change event and the device logs events appropriately.
	Variables:	Event_Index
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 2	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.8 Verify Support for a Greater Than Event

Test Case: 9.8	Title:	Verify Support for a Greater Than Event	
	Description:	This test case verifies that the device allows configuration of a greater than event and the device logs events appropriately.	
	Variables:	Event_Index	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 3	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.9 Verify Support for a Less Than Event

Test Case: 9.9	Title:	Verify Support for a Less Than Event
	Description:	This test case verifies that the device allows configuration of a less than event and the device logs events appropriately.
	Variables:	Event_Index
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 4	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.10 Verify Support for a Hysteresis Event

Test Case: 9.10	Title:	Verify Support for a Hysteresis Event
	Description:	This test case verifies that the device allows configuration of a hysteresis event and the ESSDMS logs events appropriately.
	Variables:	Event_Index
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 5	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.11 Verify Support for a Periodic Event

Test Case: 9.11	Title:	Verify Support for a Periodic Event
	Description:	This test case verifies that the device allows configuration of a Periodic event and the DMS-ESS logs events appropriately.
	Variables:	Event_Index
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 6	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.12 Verify Support for a Bit-flag Event

Test Case: 9.12	Title:	Verify Support for a Bit-flag Event	
	Description:	This test case verifies that the device allows configuration of a bit-flag event and the device logs events appropriately.	
	Variables:	Event_Index	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the index of the event type to configure as a part of the test (e.g., per the test plan). RECORD this information as: »Event_Index	
2	PERFORM the test case labeled 'Configure Event Log' (2.3.9.2) with the following parameters: »Event_Mode = 7	Pass / Fail
3	GET the following object(s): »globalTime.0	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »Time	
5	Create an event for the device to log. Note: This may require physically changing a sensor reading or setting an object within the device.	
6	PERFORM the test case labeled 'Retrieve Logged Data' (2.3.9.3) with the following parameters: »Last_Log_Time = Time »Last_Log_ID = Event_Index	Pass / Fail

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.9.13 Determine Configuration of Logging Service

Test Case: 9.13	Title:	<i>Determine Configuration of Logging Service</i>
	Description:	<i>This test case verifies that the device returns the configuration of the logging service.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »maxEventClasses.0 »maxEventLogConfigs.0 »maxEventLogSize.0	Pass / Fail (Sec. 3.3.2.5)
2	Determine the values retrieved from the device. RECORD this information as: »Max_Event_Classes »Max_Configs »Max_Log_Size	
3	FOR EACH value, N, from 1 to Max_Event_Classes, perform Step 3.1.	
3.1	GET the following object(s): »eventClassLimit.N »eventClassClearTime.N »eventClassDescription.N	Pass / Fail (Sec. 3.3.2.1)
4	FOR EACH value, N, from 1 to Max_Configs, perform Step 4.1.	
4.1	GET the following object(s): »eventConfigClass.N »eventConfigMode.N »eventConfigCompareValue.N »eventConfigCompareValue2.N »eventConfigCompareOID.N »eventConfigLogOID.N »eventConfigAction.N »eventConfigStatus.N	Pass / Fail (Sec. 3.3.2.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10 Global Tests

C.2.3.10.1 Explore Data

Test Case: 10.1	Title:	Explore Data
	Description:	This test case verifies that the device properly responds to a GET-NEXT request.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	Determine the OID value of 'null'. RECORD this information as: »Last_Object	
2.1	Send a GET-NEXT request for the following object(s): »Last_Object VERIFY that the RESPONSE ERROR is equal to 'noError' or 'noSuchName'.	Pass / Fail (Sec. F.2.1.1.3F.3.2)
2.2	Determine whether the OID of the returned object is lexicographically larger than the OID contained in the request. RECORD this information as: »Continue	
2.3	IF the RESPONSE ERROR is equal to noError, then proceed to Step 2.3.1; otherwise, proceed to Step 2.4.1.	
2.3.1	VERIFY that Continue is equal to true. GO TO Step 2.5.	Pass / Fail (RFC 1157)
2.4.1	VERIFY that the returned OID is identical to that sent in the request.	Pass / Fail (RFC 1157)
2.5	Determine the OID of the retrieved object. RECORD this information as: »Last_Object	
2	IF the RESPONSE ERROR is equal to noError and Continue equals true, then proceed to Step 2.1; otherwise, proceed to EXIT.	

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10.2 Determine Device Component Information

Test Case: 10.2	Title:	Determine Device Component Information
	Description:	This test case verifies that the data stored in the module table reflects the information about the device.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »globalMaxModules.0	Pass / Fail (Sec. F.2.2.1.1)(D.3.1.1)
2	Determine the RESPONSE VALUE for globalMaxModules.0. RECORD this information as: »Num_Modules	
3	FOR EACH value, N, from 1 to Num_Modules, perform Steps 3.1 through 3.6.	
3.1	GET the following object(s): »moduleDeviceNode.N »moduleMake.N »moduleModel.N »moduleVersion.N »moduleType.N	Pass / Fail (Sec. F.2.2.1.1)(D.3.1.1)
3.2	VERIFY that the RESPONSE VALUE for moduleDeviceNode.N is APPROPRIATE. Note: Should be equal to '1.3.6.1.4.1.1206.4.2.53' for DMSESS	Pass / Fail (Sec. F.2.2.1.1)(Sec. D.3.1.1)
3.3	VERIFY that the RESPONSE VALUE for moduleMake.N is APPROPRIATE.	Pass / Fail (Sec. F.2.2.1.1)(Sec. D.3.1.1)
3.4	VERIFY that the RESPONSE VALUE for moduleModel.N is APPROPRIATE.	Pass / Fail (Sec. F.2.2.1.1)(Sec. D.3.1.1)
3.5	VERIFY that the RESPONSE VALUE for moduleVersion.N is APPROPRIATE.	Pass / Fail (Sec. F.2.2.1.1)(Sec. D.3.1.1)
3.6	VERIFY that the RESPONSE VALUE for moduleType.N is APPROPRIATE.	Pass / Fail (Sec. F.2.2.1.1)(Sec. D.3.1.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10.3 Retrieve Device Configuration Identifier

Test Case: 10.3	Title:	Retrieve Device Configuration Identifier
	Description:	This test case verifies that the device allows the user to retrieve a code that only changes when changes are made to the controller configuration.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »globalSetIDParameter.0	Pass / Fail (Sec. F.2.2.1.2)
2	Determine the RESPONSE VALUE for globalSetIDParameter.0. RECORD this information as: »ID	
3	DELAY for 5 seconds.	
4	GET the following object(s): »globalSetIDParameter.0	Pass / Fail (Sec. F.2.2.1.2)
5	VERIFY that the RESPONSE VALUE for globalSetIDParameter.0 is equal to ID.	Pass / Fail (NTCIP 1201 V03 2.2.1)
6	GET the following object(s): »essNtcipSiteDescription.0	Pass / Fail (RFC 1157)
7	Determine the RESPONSE VALUE for essNtcipSiteDescription.0. RECORD this information as: »Description	
8	SET the following object(s) to the value(s) shown: »essNtcipSiteDescription.0 = 'Test Location'	Pass / Fail (Sec. 3.5.1.1.3)
9	GET the following object(s): »globalSetIDParameter.0	Pass / Fail (RFC 1157)
10	VERIFY that the RESPONSE VALUE for globalSetIDParameter.0 is not equal to ID.	Pass / Fail (NTCIP 1201 v032 2.2.1)
11	SET the following object(s) to the value(s) shown: »essNtcipSiteDescription.0 = Description	Pass / Fail (Sec. 3.5.1.1.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10.4 Determine Supported Standards

Test Case: 10.4	Title:	Determine Supported Standards
	Description:	This test case verifies that the device indicates the standards that it supports.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »controllerBaseStandards.0 <i>Note: NTCIP 1203 uses hyphenated names when referring to some NTCIP 1201 objects; these test procedures have been updated to use the actual object names without hyphens.</i>	Pass / Fail (Sec. F.2.2.1.3D.3.1.4)
2	VERIFY that the RESPONSE VALUE for controllerBaseStandards.0 properly identifies the standards that the device supports and the information is presented in the correct format.	Pass / Fail (Sec. F.2.2.1.3D.3.1.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10.5 Retrieve System Name

Test Case: 10.5	Title:	Retrieve System Name
	Description:	This test case verifies that the device allows the user to retrieve the system name of the device.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »sysName.0	Pass / Fail (Sec. F.2.2.1.4)
2	VERIFY that the RESPONSE VALUE for sysName.0 is APPROPRIATE.	Pass / Fail (RFC 1213 Clause 6)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.10.6 Set Time

Test Case: 10.6	Title:	<i>Set Time</i>
	Description:	<i>This test case verifies that the device allows a set to the UTC time to a new value and ensure that the new value was accepted, implemented and that the clock is still working.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	Determine the time the test started according to the test computer. RECORD this information as: »Test_Time	
2	GET the following object(s): »globalTime.0	Pass / Fail (Sec. F.2.2.1.5.1 D.3.1.2.4)
3	Determine the RESPONSE VALUE for globalTime.0. RECORD this information as: »UTC_Time	
4	Calculate the value of UTC_Time plus 7200 seconds. RECORD this information as: »New_UTC_Time	
5	SET the following object(s) to the value(s) shown: »globalTime.0 = New_UTC_Time Note: This advances the clock by two hours.	Pass / Fail (Sec. F.2.2.1.5.1 D.3.1.2.4)
6	Calculate UTC_Time plus 7200 plus the amount of time that has elapsed since Step 1. RECORD this information as: »Expected_Time	
7	GET the following object(s): »globalTime.0	Pass / Fail (Sec. F.2.2.1.5.2 D.3.1.2.4)
8	VERIFY that the RESPONSE VALUE for globalTime.0 is roughly equal to Expected_Time.	Pass / Fail (Sec. F.2.2.1.5.2 D.3.1.2.4)
9	DELAY for 15 seconds.	
10	GET the following object(s): »globalTime.0 <i>Note: NTCIP 1203 uses hyphenated names when referring to some NTCIP 1201 objects; these test procedures have been updated to use the actual object names without hyphens.</i>	Pass / Fail (Sec. F.2.2.1.5.2 D.3.1.2.4)
11	VERIFY that the RESPONSE VALUE for globalTime.0 is roughly equal to Expected_Time plus 15 seconds.	Pass / Fail (Sec. F.2.2.1.5.2 D.3.1.2.4)
12	Calculate the time to set in the agent to restore the original value. RECORD this information as: »Restore_UTC_Time	
13	SET the following object(s) to the value(s) shown:	Pass / Fail

	»globalTime.0 = Restore.UTC_Time	(Sec. F.2.2.1.5.1 D.3.1.2.4)
Test Case Results		
Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.10.7 Monitor External Port Information

Test Case: 10.7	Title:	Monitor External Port Information	
	Description:	This test case verifies that the device allows the user to retrieve information about the device's external port(s).	
	Variables:	Required_Ports	F.2.3.2
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of external analog ports required by the specification (F.2.3.2). RECORD this information as: »Required_Ports	
2	GET the following object(s): » maxAuxOv2TableNumAnalogPorts.0 VERIFY that there is no response.	Pass / Fail (Sec. F.2.2.1.6)
3	Determine the RESPONSE VALUE for maxAuxOv2TableNumAnalogPortsauxIOTableNumAnalogPorts.0 . RECORD this information as: »Num_Ports	
4	FOR EACH value, N, from 1 to Num_Ports, perform Steps 4.1 through 4.17.	
4.1	GET the following object(s): » auxIOv2PortType.2.N » auxIOv2PortNumber.2.N » auxIOv2PortDescription.2.N » auxIOv2PortResolution.2.N » auxIOv2PortDirection.2.N	Pass / Fail (Sec. F.2.2.1.6)
4.2	VERIFY that the RESPONSE VALUE for auxIOv2PortTypeauxIOPortType.2.N is equal to 2.	Pass / Fail (NTCIP 1201 v032 Sec. 2.98.3.1)
4.3	VERIFY that the RESPONSE VALUE for auxIOv2PortNumberauxIOPortNumber.2.N is equal to N.	Pass / Fail (NTCIP 1201 v032 Sec. 2.89.3.2)
4.4	VERIFY that the RESPONSE VALUE for auxIOv2PortDescriptionauxIOPortDescription.2.N is no more than 255 characters and contains only DisplayString characters.	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.3)
4.5	VERIFY that the RESPONSE VALUE for auxIOv2PortDescriptionauxIOPortDescription.2.N is APPROPRIATE.	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.3)
4.6	VERIFY that the RESPONSE VALUE for auxIOv2PortResolutionauxIOPortResolution.2.N is greater than or equal to 1.	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.4)
4.7	VERIFY that the RESPONSE VALUE for auxIOv2PortResolutionauxIOPortResolution.2.N is less than or equal to 32.	Pass / Fail (NTCIP 1201 v032 Sec. 2.98.3.4)
4.8	VERIFY that the RESPONSE VALUE for auxIOv2PortResolutionauxIOPortResolution.2.N is APPROPRIATE.	Pass / Fail (NTCIP 1201 v032 Sec. 2.98.3.4)

4.9	Determine the RESPONSE VALUE for auxIOv2PortResolutionauxIOPortResolution.2.N . RECORD this information as: »Resolution	
4.10	VERIFY that the RESPONSE VALUE for auxIOv2PortDirectionauxIOPortDirection.2.N is greater than or equal to 1.	Pass / Fail (NTCIP 1201 v032 Sec. 2.89.3.6)
4.11	VERIFY that the RESPONSE VALUE for auxIOv2PortDirectionauxIOPortDirection.2.N is less than or equal to 3.	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.6)
4.12	VERIFY that the RESPONSE VALUE for auxIOv2PortDirectionauxIOPortDirection.2.N is APPROPRIATE.	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.6)
4.13	GET the following object(s): »auxIOv2PortValue.2.N »auxIOv2PortLastCommandedState.2.N	Pass / Fail (Sec. F.2.2.2.1)
4.14	VERIFY that the RESPONSE VALUE for auxIOv2PortValueauxIOPortValue.2.N is greater than 0 and less than the port's maximum value as defined by auxIOv2PortResolutionauxIOPortResolution.2.N (i.e., (2^Resolution) - 1).	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.5)
4.15	VERIFY that the RESPONSE VALUE for auxIOv2PortValueauxIOPortValue.2.N is APPROPRIATE.	Pass / Fail (NTCIP 1201 v032 Sec. 2.89.3.5)
4.16	VERIFY that the RESPONSE VALUE for auxIOv2PortLastCommandedStateauxIOPortLastCommandedState.2.N is greater than 0 and less than the port's maximum value as defined by auxIOv2PortResolutionauxIOPortResolution.2.N (i.e., (2^Resolution) - 1).	Pass / Fail (NTCIP 1201 v023 Sec. 2.98.3.7)
4.17	VERIFY that the RESPONSE VALUE for auxIOv2PortLastCommandedStateauxIOPortLastCommandedState.2.N is APPROPRIATE.	Pass / Fail (NTCIP 1201 v032 Sec. 2.98.3.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.10.8 Configure External Port

Test Case: 10.8	Title:	Configure External Port
	Description:	This test case verifies that the device allows the user to configure the external port.
	Variables:	Required_Ports F.2.3.2
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of external analog ports required by the specification (F.2.3.2). RECORD this information as: »Required_Ports	
2	Determine a random port from 1 to Required_Ports. RECORD this information as: »Subject_Port	
3	GET the following object(s): »auxIOv2PortDescription-2.Subject_Port »auxIOv2PortResolution-2.Subject_Port	Pass / Fail (RFC 1157)
4	Determine the RESPONSE VALUE for auxIOv2PortDescriptionauxIOPortDescription-2 .Subject_Port. RECORD this information as: »Description	
5	Determine the RESPONSE VALUE for auxIOv2PortResolutionauxIOPortResolution-2 .Subject_Port. RECORD this information as: »Resolution	
6	Calculate a random value between 0 and the maximum value supported by the device. RECORD this information as: »Value	
7	SET the following object(s) to the value(s) shown: » auxIOv2PortDescriptionauxIOPortDescription-2 .Subject_Port = 'Test'	Pass / Fail (Sec. F.2.2.1.7)
8	GET the following object(s): » auxIOv2PortDescriptionauxIOPortDescription-2 .Subject_Port	Pass / Fail (RFC 1157)
9	VERIFY that the RESPONSE VALUE for auxIOv2PortDescriptionauxIOPortDescription-2 .Subject_Port is equal to "Test".	Pass / Fail (NTCIP 1201 v023 Sec. 2.89.3.3)
10	SET the following object(s) to the value(s) shown: » auxIOv2PortDescriptionauxIOPortDescription-2 .Subject_Port = Description	Pass / Fail (Sec. F.2.2.1.7)
11	SET the following object(s) to the value(s) shown: »auxIOv2PortValue-2.Subject_Port = Value	Pass / Fail (Sec. F.2.2.4.1)
12	GET the following object(s): » auxIOv2PortValueauxIOPortValue-2 .Subject_Port » auxIOv2PortLastCommandedState-2 .Subject_Port	Pass / Fail (Sec. F.2.2.2.1)
13	VERIFY that the RESPONSE VALUE for auxIOv2PortLastCommandedStateauxIOPortLastCommandedState-2 .Subject_Port is equal to Value.	Pass / Fail (NTCIP 1201 v023 Sec. 2.89.3.7)

Test Case Results		
Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.11 Backward Compatibility Tests

C.2.3.11.1 Version 1 Wind Sensor Meta Data

Test Case: 11.1	Title:	Version 1 Wind Sensor Meta Data
	Description:	This test case verifies that the device allows the user to retrieve the version 1 wind sensor meta data.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essWindSensorHeight.0	Pass / Fail (Sec. 3.5.4.1)
2	VERIFY that the RESPONSE VALUE for essWindSensorHeight.0 is greater than or equal to -1000.	Pass / Fail (Sec. 5.5.3)
3	VERIFY that the RESPONSE VALUE for essWindSensorHeight.0 is less than or equal to 1001.	Pass / Fail (Sec. 5.5.3)
4	VERIFY that the RESPONSE VALUE for essWindSensorHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.3)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.2 Version 1 Average Wind Sensor Data

Test Case: 11.2	Title:	Version 1 Average Wind Sensor Data
	Description:	This test case verifies that the device allows the user to retrieve the version 1 average wind data.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essAvgWindDirection.0 »essAvgWindSpeed.0	Pass / Fail (Sec. 3.5.4.2)
2	VERIFY that the RESPONSE VALUE for essAvgWindDirection.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.1)
3	VERIFY that the RESPONSE VALUE for essAvgWindDirection.0 is less than or equal to 361.	Pass / Fail (Sec. 5.6.1)
4	VERIFY that the RESPONSE VALUE for essAvgWindDirection.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.1)
5	VERIFY that the RESPONSE VALUE for essAvgWindSpeed.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.2)
6	VERIFY that the RESPONSE VALUE for essAvgWindSpeed.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.6.2)
7	VERIFY that the RESPONSE VALUE for essAvgWindSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.3 Version 1 Spot Wind Sensor Data

Test Case: 11.3	Title:	Version 1 Spot Wind Sensor Data
	Description:	This test case verifies that the device allows the user to retriever retrieve the version 1 spot wind data.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essSpotWindDirection.0 »essSpotWindSpeed.0	Pass / Fail (Sec. 3.5.4.3)
2	VERIFY that the RESPONSE VALUE for essSpotWindDirection.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.3)
3	VERIFY that the RESPONSE VALUE for essSpotWindDirection.0 is less than or equal to 361.	Pass / Fail (Sec. 5.6.3)
4	VERIFY that the RESPONSE VALUE for essSpotWindDirection.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.3)
5	VERIFY that the RESPONSE VALUE for essSpotWindSpeed.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.4)
6	VERIFY that the RESPONSE VALUE for essSpotWindSpeed.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.6.4)
7	VERIFY that the RESPONSE VALUE for essSpotWindSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.4 Version 1 Wind Gust Data

Test Case: 11.4	Title:	Version 1 Wind Gust Data
	Description:	This test case verifies that the device allows the user to retriever retrieve the version 1 wind gust data.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essMaxWindGustSpeed.0 »essMaxWindGustDir.0	Pass / Fail (Sec. 3.5.4.4)
2	VERIFY that the RESPONSE VALUE for essMaxWindGustSpeed.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.6)
3	VERIFY that the RESPONSE VALUE for essMaxWindGustSpeed.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.6.6)
4	VERIFY that the RESPONSE VALUE for essMaxWindGustSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.6)
5	VERIFY that the RESPONSE VALUE for essMaxWindGustDir.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.6.7)
6	VERIFY that the RESPONSE VALUE for essMaxWindGustDir.0 is less than or equal to 361.	Pass / Fail (Sec. 5.6.7)
7	VERIFY that the RESPONSE VALUE for essMaxWindGustDir.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.7)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.5 Version 1 Wind Situation

Test Case: 11.5	Title:	Version 1 Wind Situation
	Description:	This test case verifies that the device allows the user to retriever retrieve the version 1 wind situation.
	Variables:	
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.

Step	Test Procedure	Device
1	GET the following object(s): »essWindSituation.0	Pass / Fail (Sec. 3.5.4.5)
2	VERIFY that the RESPONSE VALUE for essWindSituation.0 is greater than or equal to 1.	Pass / Fail (Sec. 5.6.5)
3	VERIFY that the RESPONSE VALUE for essWindSituation.0 is less than or equal to 12.	Pass / Fail (Sec. 5.6.5)
4	VERIFY that the RESPONSE VALUE for essWindSituation.0 is APPROPRIATE. Note: Valid enumerated values are defined in NTCIP 1204 v04 Sec. 5.6.5	Pass / Fail (Sec. 5.6.5)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.6 Version 1 Water Depth

Test Case: 11.6	Title:	<i>Version 1 Water Depth</i>
	Description:	<i>This test case verifies that the device allows the user to retrieverretrieve the version 1 water depth.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essWaterDepth.0	Pass / Fail (Sec. 3.5.4.6)
2	VERIFY that the RESPONSE VALUE for essWaterDepth.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.8.2)
3	VERIFY that the RESPONSE VALUE for essWaterDepth.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.8.2)
4	VERIFY that the RESPONSE VALUE for essWaterDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.2)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.7 Version 1 Solar Radiation

Test Case: 11.7	Title:	<i>Version 1 Solar Radiation</i>
	Description:	<i>This test case verifies that the device allows the user to retrieve the version 1 solar radiation.</i>
	Variables:	
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	GET the following object(s): »essSolarRadiation.0	Pass / Fail (Sec. 3.5.4.7)
2	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is greater than or equal to 0.	Pass / Fail (Sec. 5.9.1)
3	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is less than or equal to 65535.	Pass / Fail (Sec. 5.9.1)
4	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.1)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.8 Version 1 Surface Water Depth

Test Case: 11.8	Title:	Version 1 Surface Water Depth	
	Description:	This test case verifies that the device allows the user to retriever retrieve the version 1 surface water depth.	
	Variables:	Required_Pavement_Sensors	PRL 3.6.8
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 2.1 through 2.4.	
2.1	GET the following object(s): »essSurfaceWaterDepth.N	Pass / Fail (Sec. 3.5.4.8)
2.2	VERIFY that the RESPONSE VALUE for essSurfaceWaterDepth.N is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.10)
2.3	VERIFY that the RESPONSE VALUE for essSurfaceWaterDepth.N is less than or equal to 255.	Pass / Fail (Sec. 5.11.3.10)
2.4	VERIFY that the RESPONSE VALUE for essSurfaceWaterDepth.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.10)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

C.2.3.11.9 Version 1 Surface Conductivity

Test Case: 11.9	Title:	Version 1 Surface Conductivity	
	Description:	This test case verifies that the device allows the user to retrieve the version 1 surface conductivity.	
	Variables:	Required_Pavement_Sensors	PRL 3.6.8
	Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.	

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 2.1 through 2.4.	
2.1	GET the following object(s): »essSurfaceConductivity.N	Pass / Fail (Sec. 3.5.4.9)
2.2	VERIFY that the RESPONSE VALUE for essSurfaceConductivity.N is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.12)
2.3	VERIFY that the RESPONSE VALUE for essSurfaceConductivity.N is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.12)
2.4	VERIFY that the RESPONSE VALUE for essSurfaceConductivity.N is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.12)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.10 Version 2 Station Meta Data Block

Test Case: 11.10	Title:	Version 2 Station Meta Data Block		
	Description:	This test case verifies that the device allows the user to retrieve the version 2 Station Meta Data Block.		
	Variables:	Pressure_Supported	PRL 2.5.2.1.1	
		Wind_Supported	PRL 2.5.2.1.2	
		Required_Wind_Sensors	PRL 3.6.2	
		Temperature_Supported	PRL 2.5.2.1.3	
		Required_Temp_Sensors	PRL 3.6.3	
		Pavement_Supported	PRL 2.5.2.2	
		Required_Pavement_Sensors	PRL 3.6.8	
		Subsurface_Supported	PRL 2.5.2.3	
Required_Subsurface_Sensors		PRL 3.6.11		
Pavement_Treatment_Supported	PRL 2.5.3			
Required_Pavement_Treatment_Products	PRL 3.6.12			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the ESS is required to monitor atmospheric pressure (PRL 2.5.2.1.1). RECORD this information as: »Pressure_Supported	
2	CONFIGURE: Determine <u>whether the ESS is required to monitor winds (PRL 2.5.2.1.2)</u> . RECORD this information as: »Wind_Supported (whether the ESS is required to monitor winds—PRL 2.5.2.1.2) <u>If so, determine how many -wind sensors that the ESS is required to support (PRL 3.6.2)</u> . RECORD this information as: »Required_Wind_Sensors (the number of temperature sensors that the ESS is required to support - PRL 3.6.2)	
3	CONFIGURE: Determine whether the ESS is required to support temperature sensors <u>(PRL 2.5.2.1.3)</u> . RECORD this information as: and, if so, <u>how many sensors are required</u> . RECORD this information as: »Temperature_Supported (whether the ESS is required to monitor temperature - PRL 2.5.2.1.3—PRL 2.5.2.1.3) <u>If so, determine how many temperature sensors that the ESS is required to support (PRL 3.6.3)</u> . RECORD this information as: »Required_Temp_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.3—PRL 3.6.3)	
4	CONFIGURE: Determine whether the ESS is required to support pavement sensors <u>(PRL 2.5.2.2)</u> . <u>and, if so, how many sensors are required</u> . RECORD this information as: »Pavement_Supported <u>If so, determine how many pavement sensors that the ESS is required to support (PRL 3.6.8)</u> . RECORD this information as: (whether the ESS is required to monitor the pavement - PRL 2.5.2.2—PRL 2.5.2.2) »Required_Pavement_Sensors (the number of pavement sensors that the ESS is required to support—PRL 3.6.8 through PRL 3.6.8)	

5	<p>CONFIGURE: Determine whether the ESS is required to support subsurface sensors (PRL 2.5.2.3). and, if so, how many sensors are required. RECORD this information as:</p> <p>»Subsurface_Supported (whether the ESS is required to monitor the subsurface—PRL 2.5.2.3 through PRL 2.5.2.3)</p> <p>If so, determine how many subsurface sensors that the ESS is required to support (PRL 3.6.11). RECORD this information as:</p> <p>»Required_Subsurface_Sensors (the number of subsurface sensors that the ESS is required to support—PRL 3.6.11 through PRL 3.6.11)</p>	
6	<p>CONFIGURE: Determine whether the ESS is required to provide pavement treatment capabilities (PRL 2.5.3). and, if so, how many treatment products the device is required to support. RECORD this information as:</p> <p>»Pavement_Treatment_Supported</p> <p>If so, determine how many pavement treatment products that the ESS is required to support (PRL 3.6.12). RECORD this information as: (whether pavement treatment capabilities are required—PRL 2.5.3 through PRL 2.5.3)</p> <p>»Required_Pavement_Treatment_Products (number of pavement treatment products required—PRL 3.6.12 through PRL 3.6.12)</p>	
7	<p>GET the following object(s):</p> <p>»essStationMetaDataBlock.0</p>	Pass / Fail (Sec. 3.5.4.10)
8	Decode the essStationMetaDataBlock.0 structure.	
9	VERIFY that the essStationMetaDataBlock.0 structure was decoded without error.	Pass / Fail (Sec. 5.3.5)
10	VERIFY that the RESPONSE VALUE for the essNtcipCategory.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
11	<p>VERIFY that the RESPONSE VALUE for the essNtcipCategory.0 field of the essStationMetaDataBlock.0 object is APPROPRIATE.</p> <p>Note: See NTCIP 1204 v04 Sec. 5.2.1 for valid enumerated values.</p>	Pass / Fail (Sec. 5.2.13-5)
12	VERIFY that the RESPONSE VALUE for the essTypeOfStation.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
13	<p>VERIFY that the RESPONSE VALUE for the essTypeOfStation.0 field of the essStationMetaDataBlock.0 object is APPROPRIATE.</p> <p>Note: See NTCIP 1204 v04 Sec. 5.3.1 for the definition of valid values.</p>	Pass / Fail (Sec. 5.3.15)
14	VERIFY that the RESPONSE VALUE for the essLatitude.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
15	VERIFY that the RESPONSE VALUE for the essLatitude.0 field of the essStationMetaDataBlock.0 object is APPROPRIATE.	Pass / Fail (Sec. 5.4.13-5)
16	VERIFY that the RESPONSE VALUE for the essLongitude.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
17	VERIFY that the RESPONSE VALUE for the essLongitude.0 field of the essStationMetaDataBlock.0 object is APPROPRIATE.	Pass / Fail (Sec. 5.4.23-5)
18	VERIFY that the RESPONSE VALUE for the essReferenceHeight.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
19	VERIFY that the RESPONSE VALUE for the essReferenceHeight.0 field of the essStationMetaDataBlock.0 object is APPROPRIATE.	Pass / Fail (Sec. 5.3.55.1)

20	IF Pressure_Supported is equal to true, then proceed to Step 20.1; otherwise, proceed to Step 21.	
20.1	VERIFY that the RESPONSE VALUE for the essPressureHeight.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
20.2	VERIFY that the RESPONSE VALUE for essPressureHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.23-5)
21	IF Wind_Supported is equal to true, then proceed to Step 21.1; otherwise, proceed to Step 22.	
21.1	VERIFY that the RESPONSE VALUE for the essWindSensorHeight.0 field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
21.2	VERIFY that the RESPONSE VALUE for essWindSensorHeight.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.33-5)
22	IF Temperature_Supported is equal to true, then proceed to Step 22.1; otherwise, proceed to Step 23.	
22.1	VERIFY that the RESPONSE VALUE for the temperatureMetaData field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
22.2	VERIFY that the temperatureMetaData field contains at least Required_Temp_Sensors entries.	Pass / Fail (Sec. 5.3.5)
22.3	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 22.3.1 through 22.3.4.	
22.3.1	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.0 field is present in the Nth TemperatureMetaData structure.	Pass / Fail (Sec. 5.3.5)
22.3.2	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.0 field in the Nth TemperatureMetaData structure is equal to N.	Pass / Fail (Sec. 5.7.3.13-5)
22.3.3	VERIFY that the RESPONSE VALUE for the essTemperatureSensorHeight.0 field is present in the Nth TemperatureMetaData structure.	Pass / Fail (Sec. 5.3.5)
22.3.4	VERIFY that the RESPONSE VALUE for essTemperatureSensorHeight.0 field in the Nth TemperatureMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.23-5)
23	IF Pavement_Supported is equal to true, then proceed to Step 23.1; otherwise, proceed to Step 24.	
23.1	VERIFY that the RESPONSE VALUE for the pavementMetaData field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
23.2	VERIFY that the pavementMetaData field contains at least Required_Pavement_Sensors entries.	Pass / Fail (Sec. 5.3.5)
23.3	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 23.3.1 through 23.3.10.	
23.3.1	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 5.3.5)
23.3.2	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.0 field in the Nth PavementMetaData structure is equal to N.	Pass / Fail (Sec. 5.11.3.13-5)
23.3.3	VERIFY that the RESPONSE VALUE for the essPavementType.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 5.3.5)

23.3.4	VERIFY that the RESPONSE VALUE for the essPavementType.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.33.5)
23.3.5	VERIFY that the RESPONSE VALUE for the essPavementElevation.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 5.3.5)
23.3.6	VERIFY that the RESPONSE VALUE for the essPavementElevation.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.43.5)
23.3.7	VERIFY that the RESPONSE VALUE for the essPavementExposure.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 5.3.5)
23.3.8	VERIFY that the RESPONSE VALUE for the essPavementExposure.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.53.5)
23.3.9	VERIFY that the RESPONSE VALUE for the essPavementSensorType.0 field is present in the Nth PavementMetaData structure.	Pass / Fail (Sec. 5.3.5)
23.3.10	VERIFY that the RESPONSE VALUE for the essPavementSensorType.0 field in the Nth PavementMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.63.5)
24	IF Subsurface_Supported is equal to true, then proceed to Step 24.1; otherwise, proceed to Step 25.	
24.1	VERIFY that the RESPONSE VALUE for the SubSurfaceMetaData field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
24.2	VERIFY that the SubSurfaceMetaData field contains at least Required_Subsurface_Sensors entries.	Pass / Fail (Sec. 5.3.5)
24.3	FOR EACH value, N, from 1 to Required_Subsurface_Sensors, perform Steps 24.3.1 through 24.3.6.	
24.3.1	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorIndex.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 5.3.5)
24.3.2	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorIndex.0 field in the Nth SubSurfaceMetaData structure is equal to N.	Pass / Fail (Sec. 5.11.6.13.5)
24.3.3	VERIFY that the RESPONSE VALUE for the essSubSurfaceType.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 5.3.5)
24.3.4	VERIFY that the RESPONSE VALUE for the essSubSurfaceType.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.33.5)
24.3.5	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorDepth.0 field is present in the Nth SubSurfaceMetaData structure.	Pass / Fail (Sec. 5.3.5)
24.3.6	VERIFY that the RESPONSE VALUE for the essSubSurfaceSensorDepth.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.11.6.43.5)
25	IF Pavement_Treatment_Supported is equal to true, then proceed to Step 25.1; otherwise, proceed to EXIT.	
25.1	VERIFY that the RESPONSE VALUE for the treatmentMetaData field of the essStationMetaDataBlock.0 object is present.	Pass / Fail (Sec. 5.3.5)
25.2	VERIFY that the treatmentMetaData field contains at least Required_Pavement_Treatment_Products entries.	Pass / Fail (Sec. 5.3.5)
25.3	FOR EACH value, N, from 1 to Required_Pavement_Treatment_Products, perform Steps 25.3.1 through 25.3.11.	

25.3.1	VERIFY that the RESPONSE VALUE for the essPavementTreatmentIndex.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 5.3.5)
25.3.2	VERIFY that the RESPONSE VALUE for the essPavementTreatmentIndex.0 field in the Nth TreatmentMetaData structure is equal to N.	Pass / Fail (Sec. 5.13.3.13-5)
25.3.3	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 5.3.5)
25.3.4	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.0 field in the Nth TreatmentMetaData structure is between 1 and 14, inclusive.	Pass / Fail (Sec. 5.13.3.23-5)
25.3.5	VERIFY that the RESPONSE VALUE for the essPaveTreatProductType.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.2)
25.3.6	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 5.3.5)
25.3.7	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field in the Nth TreatmentMetaData structure is between 1 and 4, inclusive.	Pass / Fail (Sec. 5.13.3.33-5)
25.3.8	VERIFY that the RESPONSE VALUE for the essPaveTreatProductForm.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.3)
25.3.9	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field is present in the Nth TreatmentMetaData structure.	Pass / Fail (Sec. 5.3.5)
25.3.10	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field in the Nth TreatmentMetaData structure is between 0 and 100, inclusive.	Pass / Fail (Sec. 5.13.3.43-5)
25.3.11	VERIFY that the RESPONSE VALUE for the essPercentProductMix.0 field in the Nth SubSurfaceMetaData structure is APPROPRIATE.	Pass / Fail (Sec. 5.13.3.4)

Test Case Results

Tested By:	Date Tested:	Pass / Fail
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Test Case Notes:

C.2.3.11.11 Version 2 Weather Block

Test Case: 11.11	Title:	Version 2 Weather Block		
	Description:	This test case verifies that the device allows the user to retrieve the version 2 Weather Data Block Object.		
	Variables:	Pressure_Supported	PRL 2.5.2.1.1	
		Wind_Supported	PRL 2.5.2.1.2	
		Required_Wind_Sensors	PRL 3.6.2	
		Temperature_Supported	PRL 2.5.2.1.3	
		Required_Temp_Sensors	PRL 3.6.3	
		Precip_Supported	PRL 2.5.2.1.5	
		Required_Water_Level_Sensors	PRL 3.6.22	
Situation_Supported		PRL 2.5.2.4		
Visibility_Supported	PRL 2.5.2.1.7			
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.			

Step	Test Procedure	Device
1	CONFIGURE: Determine whether the ESS is required to monitor atmospheric pressure (PRL 2.5.2.1.1). RECORD this information as: »Pressure_Supported	
2	CONFIGURE: Determine . RECORD this information as: »Wind_Supported (whether the ESS is required to monitor winds—PRL 2.5.2.1.2) »Required_Wind_Sensors (the number of wind sensors that the ESS is required to support—PRL 3.6.2)	
3	CONFIGURE: Determine . RECORD this information as: »Temperature_Supported (whether the ESS is required to monitor temperature - PRL 2.5.2.1.3) »Required_Temp_Sensors (the number of temperature sensors that the ESS is required to support—PRL 3.6.3)	
4	CONFIGURE: Determine . RECORD this information as: »Precip_Supported (whether the ESS is required to monitor precipitation—PRL 2.5.2.1.5) »Required_Water_Level_Sensors (the number of water level sensors that the ESS is required to support—PRL 3.6.22)	
5	CONFIGURE: Determine whether the ESS is required to report situation data (PRL 2.5.2.4). RECORD this information as: »Situation_Supported	
6	CONFIGURE: Determine whether the ESS is required to provide visibility capabilities (PRL 2.5.2.1.7). RECORD this information as: »Visibility_Supported	
7	GET the following object(s): »essWeatherBlock.0	Pass / Fail (Sec. 3.5.4.11)
8	Decode the essWeatherBlock.0 structure.	
9	VERIFY that the essWeatherBlock.0 structure was decoded without error.	Pass / Fail (Sec. 5.3.6)

10	IF Pressure_Supported is equal to true, then proceed to Step 10.1; otherwise, proceed to Step 11.	
10.1	VERIFY that the RESPONSE VALUE for the essAtmosphericPressure.0 field of the essWeatherBlock.0 object is present.	Pass / Fail (Sec. 5.5.43.6)
10.2	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.5.43.6)
10.3	VERIFY that the RESPONSE VALUE for essAtmosphericPressure.0 is APPROPRIATE.	Pass / Fail (Sec. 5.5.4)
11	IF Wind_Supported is equal to true, then proceed to Step 11.1; otherwise, proceed to Step 12.	
11.1	VERIFY that the RESPONSE VALUE for the essWindData field of the essWeatherBlock.0 object is present.	Pass / Fail (Sec. 5.3.6)
11.2	VERIFY that the essAvgWindDirection.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.3.6)
11.3	VERIFY that the RESPONSE VALUE for essAvgWindDirection.0 is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.6.13.6)
11.4	VERIFY that the RESPONSE VALUE for essAvgWindDirection.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.1)
11.5	VERIFY that the essAvgWindSpeed.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.3.6.2)
11.6	VERIFY that the RESPONSE VALUE for essAvgWindSpeed.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.23.6)
11.7	VERIFY that the RESPONSE VALUE for essAvgWindSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.2)
11.8	VERIFY that the essMaxWindGustSpeed.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.63.6)
11.9	VERIFY that the RESPONSE VALUE for essMaxWindGustSpeed.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.63.6)
11.10	VERIFY that the RESPONSE VALUE for essMaxWindGustSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.6)
11.11	VERIFY that the essMaxWindGustDir.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.3.6.7)
11.12	VERIFY that the RESPONSE VALUE for essMaxWindGustDir.0 is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.3.66.7)
11.13	VERIFY that the RESPONSE VALUE for essMaxWindGustDir.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.7)
11.14	VERIFY that the essSpotWindDirection.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.3.6)
11.15	VERIFY that the RESPONSE VALUE for essSpotWindDirection.0 is between 0 and 361, inclusive.	Pass / Fail (Sec. 5.3.66.3)
11.16	VERIFY that the RESPONSE VALUE for essSpotWindDirection.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.3)

11.17	VERIFY that the essSpotWindSpeed.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.6.43-6)
11.18	VERIFY that the RESPONSE VALUE for essSpotWindSpeed.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.6.43-6)
11.19	VERIFY that the RESPONSE VALUE for essSpotWindSpeed.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.4)
11.20	IF Situation_Supported is equal to true, then proceed to Step 11.20.1; otherwise, proceed to Step 12.	
11.20.1	VERIFY that the essWindSituation.0 field is present in the essWindData structure.	Pass / Fail (Sec. 5.3-6.5)
11.20.2	VERIFY that the RESPONSE VALUE for essWindSituation.0 is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.6.53-6)
11.20.3	VERIFY that the RESPONSE VALUE for essWindSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.6.5)
12	IF Temperature_Supported is equal to true, then proceed to Step 12.1; otherwise, proceed to Step 13.	
12.1	VERIFY that the essTemperatureData field of the essWeatherBlock object is present.	Pass / Fail (Sec. 5.3.6)
12.2	VERIFY that the RESPONSE VALUE for the essWetBulbTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 5.7.43-6)
12.3	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.43-6)
12.4	VERIFY that the RESPONSE VALUE for essWetBulbTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.4)
12.5	VERIFY that the RESPONSE VALUE for the essDewpointTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 5.7.53-6)
12.6	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.53-6)
12.7	VERIFY that the RESPONSE VALUE for essDewpointTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.5)
12.8	VERIFY that the RESPONSE VALUE for the essMaxTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 5.73.6)
12.9	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.73.6)
12.10	VERIFY that the RESPONSE VALUE for essMaxTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.6)
12.11	Determine the maximum temperature reading reported by the device. RECORD this information as: »Max_Temp	
12.12	VERIFY that the RESPONSE VALUE for the essMinTemp.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 5.3.6)

12.13	VERIFY that the RESPONSE VALUE for essMinTemp.0 is between -1000 and Max_Temp, inclusive.	Pass / Fail (Sec. 5.7.7.3-6)
12.14	VERIFY that the RESPONSE VALUE for essMinTemp.0 is APPROPRIATE.	Pass / Fail (Sec. 5.7.7)
12.15	VERIFY that the RESPONSE VALUE for the essRelativeHumidity.0 field of the essTemperatureData field is present.	Pass / Fail (Sec. 5.3.6)
12.16	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is between 0 and 101, inclusive.	Pass / Fail (Sec. 5.8.13-6)
12.17	VERIFY that the RESPONSE VALUE for essRelativeHumidity.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.1)
12.18	VERIFY that the temperatureTable field contains at least Required_Temp_Sensors entries.	Pass / Fail (Sec. 5.3.6)
12.19	FOR EACH value, N, from 1 to Required_Temp_Sensors, perform Steps 12.19.1 through 12.19.5.	
12.19.1	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 5.3.6)
12.19.2	VERIFY that the RESPONSE VALUE for the essTemperatureSensorIndex.x field in the Nth Temperature structure is equal to N.	Pass / Fail (Sec. 5.7.3.13-6)
12.19.3	VERIFY that the RESPONSE VALUE for the essAirTemperature.x field is present in the Nth Temperature structure.	Pass / Fail (Sec. 5.7.3.3-6)
12.19.4	VERIFY that the RESPONSE VALUE for essAirTemperature.x field in the Nth Temperature structure is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.7.3.33-6)
12.19.5	VERIFY that the RESPONSE VALUE for essAirTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.7.3.3)
13	IF Precip_Supported is equal to true, then proceed to Step 13.1; otherwise, proceed to Step 14.	
13.1	VERIFY that the RESPONSE VALUE for the essPrecipData field of the essWeatherBlock.0 object is present.	Pass / Fail (Sec. 5.3.6)
13.2	VERIFY that the RESPONSE VALUE for the essWaterDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.8.23-6)
13.3	VERIFY that the RESPONSE VALUE for essWaterDepth.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.23-6)
13.4	VERIFY that the RESPONSE VALUE for essWaterDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.2)
13.5	VERIFY that the RESPONSE VALUE for the essAdjacentSnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.6	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.33-6)
13.7	VERIFY that the RESPONSE VALUE for essAdjacentSnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.3)
13.8	VERIFY that the RESPONSE VALUE for the essRoadwaySnowDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.8.43-6)

13.9	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.43.6)
13.10	VERIFY that the RESPONSE VALUE for essRoadwaySnowDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.4)
13.11	VERIFY that the RESPONSE VALUE for the essRoadwaySnowPackDepth.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.12	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is between 0 and 3001, inclusive.	Pass / Fail (Sec. 5.8.53.6)
13.13	VERIFY that the RESPONSE VALUE for essRoadwaySnowPackDepth.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.5)
13.14	VERIFY that the RESPONSE VALUE for the essPrecipYesNo.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.15	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is between 1 and 3, inclusive.	Pass / Fail (Sec. 5.83.6)
13.16	VERIFY that the RESPONSE VALUE for essPrecipYesNo.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.6)
13.17	VERIFY that the RESPONSE VALUE for the essPrecipRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.18	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.73.6)
13.19	VERIFY that the RESPONSE VALUE for essPrecipRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.7)
13.20	VERIFY that the RESPONSE VALUE for the essSnowfallAccumRate.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.21	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.83.6)
13.22	VERIFY that the RESPONSE VALUE for essSnowfallAccumRate.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.8)
13.23	IF Situation_Supported is equal to true, then proceed to Step 13.23.1; otherwise, proceed to Step 13.24.	
13.23.1	VERIFY that the RESPONSE VALUE for the essPrecipSituation.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.23.2	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is between 1 and 15, inclusive.	Pass / Fail (Sec. 5.8.93.6)
13.23.3	VERIFY that the RESPONSE VALUE for essPrecipSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.9)
13.24	VERIFY that the RESPONSE VALUE for the essIceThickness.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.25	VERIFY that the RESPONSE VALUE for essIceThickness.0 is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.8.103.6)
13.26	VERIFY that the RESPONSE VALUE for essIceThickness.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.10)

13.27	VERIFY that the RESPONSE VALUE for the essPrecipitationStartTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.28	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.11 3.6)
13.29	VERIFY that the RESPONSE VALUE for essPrecipitationStartTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.11)
13.30	VERIFY that the RESPONSE VALUE for the essPrecipitationEndTime.0 field of the essPrecipData field is present.	Pass / Fail (Sec. 5.3.6)
13.31	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is between 0 and 4294967295, inclusive.	Pass / Fail (Sec. 5.8.12 3.6)
13.32	VERIFY that the RESPONSE VALUE for essPrecipitationEndTime.0 is APPROPRIATE.	Pass / Fail (Sec. 5.8.12)
14	IF Visibility_Supported is equal to true, then proceed to Step 14.1; otherwise, proceed to EXIT.	
14.1	VERIFY that the RESPONSE VALUE for the essVisibilityData field of the essWeatherBlock.0 object is present.	Pass / Fail (Sec. 5.3.6)
14.2	VERIFY that the RESPONSE VALUE for the essSolarRadiation.0 field of the essVisibilityData field is present.	Pass / Fail (Sec. 5.3.6)
14.3	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is between -2048 and 2049, inclusive.	Pass / Fail (Sec. 5.3.6 9.1)
14.4	VERIFY that the RESPONSE VALUE for essSolarRadiation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.1)
14.5	VERIFY that the RESPONSE VALUE for the essTotalSun.0 field of the essVisibilityData field is present.	Pass / Fail (Sec. 5.3.6)
14.6	VERIFY that the RESPONSE VALUE for essTotalSun.0 is between 0 and 1441, inclusive.	Pass / Fail (Sec. 5.3.6 9.2)
14.7	VERIFY that the RESPONSE VALUE for essTotalSun.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.2)
14.8	VERIFY that the RESPONSE VALUE for the essVisibility.0 field of the essVisibilityData field is present.	Pass / Fail (Sec. 5.3.6)
14.9	VERIFY that the RESPONSE VALUE for essVisibility.0 is between 0 and 1000001, inclusive.	Pass / Fail (Sec. 5.3.6 10.1)
14.10	VERIFY that the RESPONSE VALUE for essVisibility.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.1)
14.11	IF Situation_Supported is equal to true, then proceed to Step 14.11.1; otherwise, proceed to EXIT.	
14.11.1	VERIFY that the RESPONSE VALUE for the essCloudSituation.0 field of the essVisibilityData field is present.	Pass / Fail (Sec. 5.3.6)
14.11.2	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is between 1 and 5, inclusive.	Pass / Fail (Sec. 5.9.3 3.6)
14.11.3	VERIFY that the RESPONSE VALUE for essCloudSituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.9.3)

14.11.4	VERIFY that the RESPONSE VALUE for the essVisibilitySituation.0 field of the essVisibilityData field is present.	Pass / Fail (Sec. 5.3.6)
14.11.5	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is between 1 and 12, inclusive.	Pass / Fail (Sec. 5.10.23.6)
14.11.6	VERIFY that the RESPONSE VALUE for essVisibilitySituation.0 is APPROPRIATE.	Pass / Fail (Sec. 5.10.2)
Test Case Results		
Tested By:		Date Tested:
		Pass / Fail
Test Case Notes:		

C.2.3.11.12 Version 2 Pavement Block

Test Case: 11.12	Title:	Version 2 Pavement Block	
	Description:	This test case verifies that the device allows the user to retrieve the version 2 Pavement Block Object.	
	Variables:	Required_Pavement_Sensors	PRL 3.6.8
		Support_Icing	PRL 2.5.2.2.2
Pass/Fail Criteria:	The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.		

Step	Test Procedure	Device
1	CONFIGURE: Determine the number of pavement sensors required by the specification (PRL 3.6.8). RECORD this information as: »Required_Pavement_Sensors	
2	CONFIGURE: Determine whether the ESS is required to support icing detection per the specification (PRL 2.5.2.2.2). RECORD this information as: »Support_Icing	
3	GET the following object(s): »essPavementBlock.0	Pass / Fail (Sec. 3.5.4.12)
4	Decode the essPavementBlock.0 structure.	
5	VERIFY that the EssPavementData structure contains at least Required_Pavement_Sensors entries.	Pass / Fail (Sec. 5.11.7)
6	FOR EACH value, N, from 1 to Required_Pavement_Sensors, perform Steps 6.1 through 6.12.	
6.1	VERIFY that the RESPONSE VALUE for the essPavementSensorIndex.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.2	VERIFY that the RESPONSE VALUE for essPavementSensorIndex.x is equal to N.	Pass / Fail (Sec. 5.11.3.17)
6.3	VERIFY that the RESPONSE VALUE for the essSurfaceStatus.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.4	VERIFY that the RESPONSE VALUE for essSurfaceStatus.x is between 1 and 14, inclusive.	Pass / Fail (Sec. 5.11.3.7)
6.5	VERIFY that the RESPONSE VALUE for essSurfaceStatus.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.7)
6.6	VERIFY that the RESPONSE VALUE for the essSurfaceTemperature.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.7	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.73.8)
6.8	VERIFY that the RESPONSE VALUE for essSurfaceTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)
6.9	IF Support_Icing is equal to true, then proceed to Step 6.9.1; otherwise, proceed to Step 6.10.	

6.9.1	VERIFY that the RESPONSE VALUE for the essPavementTemperature.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.2	VERIFY that the RESPONSE VALUE for essPavementTemperature.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.3.97)
6.9.3	VERIFY that the RESPONSE VALUE for essPavementTemperature.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.9)
6.9.4	VERIFY that the RESPONSE VALUE for the essSurfaceFreezePoint.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.5	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.x is between -1000 and 1001, inclusive.	Pass / Fail (Sec. 5.11.73.13)
6.9.6	VERIFY that the RESPONSE VALUE for essSurfaceFreezePoint.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.13)
6.9.7	VERIFY that the RESPONSE VALUE for the essSurfaceBlackIceSignal.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.8	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.x is between 1 and 4, inclusive.	Pass / Fail (Sec. 5.11.3.147)
6.9.9	VERIFY that the RESPONSE VALUE for essSurfaceBlackIceSignal.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.14)
6.9.10	VERIFY that the RESPONSE VALUE for the essSurfaceWaterDepth.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.11	VERIFY that the RESPONSE VALUE for essSurfaceWaterDepth.x is between 0 and 255, inclusive.	Pass / Fail (Sec. 5.11.3.167)
6.9.12	VERIFY that the RESPONSE VALUE for essSurfaceWaterDepth.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.16)
6.9.13	GET the following object(s): »essPavementSensorType.N	Pass / Fail (Sec. RFC 1157)
6.9.14	IF the RESPONSE VALUE for essPavementSensorType.Subject_Pavement_Sensor is equal to contactPassive, then proceed to Step 6.9.14.1; otherwise, proceed to Step 6.10.	
6.9.14.1	VERIFY that the RESPONSE VALUE for the essSurfaceSalinity.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.14.2	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.x is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.11.3.117)
6.9.14.3	VERIFY that the RESPONSE VALUE for essSurfaceSalinity.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.11)
6.9.14.4	VERIFY that the RESPONSE VALUE for the essSurfaceConductivity.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)
6.9.14.5	VERIFY that the RESPONSE VALUE for essSurfaceConductivity.x is between 0 and 65535, inclusive.	Pass / Fail (Sec. 5.11.3.127)
6.9.14.6	VERIFY that the RESPONSE VALUE for essSurfaceConductivity.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.12)
6.10	VERIFY that the RESPONSE VALUE for the essPavementSensorError.x field of the essPavementBlock.0 object is present.	Pass / Fail (Sec. 5.11.7)

6.11	VERIFY that the RESPONSE VALUE for essPavementSensorError.x is between 1 and 6, inclusive.	Pass / Fail (Sec. 5.11.3.157)
6.12	VERIFY that the RESPONSE VALUE for essPavementSensorError.x is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)
Test Case Results		
Tested By:	Date Tested:	Pass / Fail
Test Case Notes:		

(PRL 3.6.5)

(PRL 3.6.5)PRL5

C.2.3.11.13 Version 3 Monitor External Port Information

Test Case: 11.13	Title:	<u>Monitor External Port Information (Version 03)</u>
	Description:	<u>This test case verifies that the device allows the user to retrieve information about the device's external port(s).</u>
	Variables:	<u>Required_Ports</u> <u>F.2.3.2</u>
	Pass/Fail Criteria:	<u>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</u>

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>CONFIGURE: Determine the number of external analog ports required by the specification (F.2.3.2). RECORD this information as: »Required_Ports</u>	-
2	<u>GET the following object(s): »auxIOTableNumAnalogPorts.0 VERIFY that there is no response.</u>	Pass / Fail (Sec. F.2.2.1.6)
3	<u>Determine the RESPONSE VALUE for auxIOTableNumAnalogPorts.0. RECORD this information as: »Num_Ports</u>	-
4	<u>FOR EACH value, N, from 1 to Num_Ports, perform Steps 4.1 through 4.17.</u>	-
4.1	<u>GET the following object(s): »auxIOPortType.N »auxIOPortNumber.N »auxIOPortDescription.N »auxIOPortResolution.N »auxIOPortDirection.N</u>	Pass / Fail (Sec. F.2.2.1.6)
4.2	<u>VERIFY that the RESPONSE VALUE for auxIOPortType.N is equal to 2.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.1)
4.3	<u>VERIFY that the RESPONSE VALUE for auxIOPortNumber.N is equal to N.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.2)
4.4	<u>VERIFY that the RESPONSE VALUE for auxIOPortDescription.N is no more than 255 characters and contains only DisplayString characters.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.3)
4.5	<u>VERIFY that the RESPONSE VALUE for auxIOPortDescription.N is APPROPRIATE.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.3)
4.6	<u>VERIFY that the RESPONSE VALUE for auxIOPortResolution.N is greater than or equal to 1.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.4)
4.7	<u>VERIFY that the RESPONSE VALUE for auxIOPortResolution.N is less than or equal to 32.</u>	Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.4)

4.8	<u>VERIFY that the RESPONSE VALUE for auxIOPortResolution.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.4)</u>
4.9	<u>Determine the RESPONSE VALUE for auxIOPortResolution.N. RECORD this information as:</u> <u> »Resolution</u>	-
4.10	<u>VERIFY that the RESPONSE VALUE for auxIOPortDirection.N is greater than or equal to 1.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.6)</u>
4.11	<u>VERIFY that the RESPONSE VALUE for auxIOPortDirection.N is less than or equal to 3.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.6)</u>
4.12	<u>VERIFY that the RESPONSE VALUE for auxIOPortDirection.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.6)</u>
4.13	<u>GET the following object(s):</u> <u> »auxIOPortValue.N</u> <u> »auxIOPortLastCommandedState.N</u>	<u>Pass / Fail</u> <u>(Sec. F.2.2.2.1)</u>
4.14	<u>VERIFY that the RESPONSE VALUE for auxIOPortValue.N is greater than 0 and less than the port's maximum value as defined by auxIOPortResolution.N (i.e., (2^Resolution) - 1).</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.5)</u>
4.15	<u>VERIFY that the RESPONSE VALUE for auxIOPortValue.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.5)</u>
4.16	<u>VERIFY that the RESPONSE VALUE for auxIOPortLastCommandedState.N is greater than 0 and less than the port's maximum value as defined by auxIOPortResolution.N (i.e., (2^Resolution) - 1).</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.7)</u>
4.17	<u>VERIFY that the RESPONSE VALUE for auxIOPortLastCommandedState.N is APPROPRIATE.</u>	<u>Pass / Fail</u> <u>(NTCIP 1201 v02 Sec. 2.8.3.7)</u>
<u>Test Case Results</u>		
<u>Tested By:</u>		<u>Date Tested:</u>
		<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

C.2.3.11.14 Version 3 Configure External Port

Test Case: 11.14	Title:	<i>Configure External Port (Version 03)</i>
	Description:	<i>This test case verifies that the device allows the user to configure the external port.</i>
	Variables:	<i>Required Ports F.2.3.2</i>
	Pass/Fail Criteria:	<i>The device under test (DUT) shall pass every verification step included within the Test Case to pass the Test Case.</i>

Step	Test Procedure	Device
1	<u>CONFIGURE: Determine the number of external analog ports required by the specification (F.2.3.2). RECORD this information as:</u> » <u>Required Ports</u>	-
2	<u>Determine a random port from 1 to Required Ports. RECORD this information as:</u> » <u>Subject Port</u>	-
3	<u>GET the following object(s):</u> » <u>auxIOPortDescription.Subject Port</u> » <u>auxIOPortResolution.Subject Port</u>	<u>Pass / Fail (RFC 1157)</u>
4	<u>Determine the RESPONSE VALUE for auxIOPortDescription.2.Subject Port. RECORD this information as:</u> » <u>Description</u>	-
5	<u>Determine the RESPONSE VALUE for auxIOPortResolution.2.Subject Port. RECORD this information as:</u> » <u>Resolution</u>	-
6	<u>Calculate a random value between 0 and the maximum value supported by the device. RECORD this information as:</u> » <u>Value</u>	-
7	<u>SET the following object(s) to the value(s) shown:</u> » <u>auxIOPortDescription.Subject Port = 'Test'</u>	<u>Pass / Fail (Sec. F.2.2.1.7)</u>
8	<u>GET the following object(s):</u> » <u>auxIOPortDescription.Subject Port</u>	<u>Pass / Fail (RFC 1157)</u>
9	<u>VERIFY that the RESPONSE VALUE for auxIOPortDescription.Subject Port is equal to "Test".</u>	<u>Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.3)</u>
10	<u>SET the following object(s) to the value(s) shown:</u> » <u>auxIOPortDescription.Subject Port = Description</u>	<u>Pass / Fail (Sec. F.2.2.1.7)</u>
11	<u>SET the following object(s) to the value(s) shown:</u> » <u>auxIOPortValue.Subject Port = Value</u>	<u>Pass / Fail (Sec. F.2.2.4.1)</u>
12	<u>GET the following object(s):</u> » <u>auxIOPortValue.Subject Port</u> » <u>auxIOPortLastCommandedState.Subject Port</u>	<u>Pass / Fail (Sec. F.2.2.2.1)</u>
13	<u>VERIFY that the RESPONSE VALUE for auxIOPortLastCommandedState.Subject Port is equal to Value.</u>	<u>Pass / Fail (NTCIP 1201 v02 Sec. 2.8.3.7)</u>

<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

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C.2.3.12 Mobile Sources Tests

PRL 3.6.5
(PRL 3.6.1)PRL 3.6.1
(PRL 3.6.4)PRL 3.6.4
(PRL 3.6.29)

C.2.3.12.1 Retrieve Sensor Profile with Mobile Sources

<u>Test Case:</u> <u>12.1</u>	<u>Title:</u>	<i>Retrieve Sensor Profile with Mobile Sources</i>	
	<u>Description:</u>	<i>This test case verifies that the ESS returns a list of records recorded by the ESS mobile station over a period of time.</i>	
	<u>Variables:</u>	<u>PrecipRate_Supported</u>	<u>PRL 3.5.2.3.2.6.5</u>
		<u>PrecipTotal_Supported</u>	<u>PRL 3.5.2.3.2.6.6</u>
		<u>PrecipUser_Supported</u>	<u>PRL 3.5.2.3.2.6.7</u>
		<u>Visibility_Supported</u>	<u>PRL 2.5.2.1.7</u>
		<u>AdjSnowDepth_Supported</u>	<u>PRL 3.5.2.3.3.4</u>
		<u>RoadwaySnowDepth_Supported</u>	<u>PRL 3.5.2.3.3.5</u>
		<u>IceThickness_Supported</u>	<u>PRL 3.5.2.3.3.6</u>
		<u>Passive_Pavement_Sensor</u>	<u>Test Plan</u>
		<u>PrecipSituation_Supported</u>	<u>3.5.2.3.5.2</u>
		<u>WindSituation_Supported</u>	<u>3.5.2.3.5.1</u>
		<u>VisibilitySituation_Supported</u>	<u>3.5.2.3.5.4</u>
		<u>GroundState_Supported</u>	<u>3.5.2.3.5.5</u>
		<u>PavementState_Supported</u>	<u>3.5.2.3.5.6</u>
	<u>CloudSituation_Supported</u>	<u>3.5.2.3.5.7</u>	
	<u>Pass/Fail Criteria:</u>	<i>The device under test (DUT) shall pass every verification step included within the Test Case in order to pass the Test Case.</i>	

<u>Step</u>	<u>Test Procedure</u>	<u>Device</u>
1	<u>GET the following object(s):</u> <u>»globalTime.0</u> <u>»globalDaylightSaving.0</u>	
2	<u>VERIFY that the RESPONSE VALUE for globalTime.0 and globalDaylightSaving.0 are appropriate.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.10)</u>
3	<u>GET the following object(s):</u> <u>»essLatitude.0</u> <u>»essLongitude.0</u> <u>»essVehicleSpeed.0</u> <u>»essVehicleBearing.0</u> <u>»essReferenceHeight.0</u>	
4	<u>If supported, VERIFY that the RESPONSE VALUE for essLatitude.0, essLongitude.0 and essReferenceHeight.0 are appropriate.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.10)</u>
5	<u>If supported, VERIFY that the RESPONSE VALUE essVehicleSpeed.0 and essVehicleBearing.0 are appropriate.</u>	<u>Pass / Fail</u> <u>(Clause 3.5.2.3.10)</u>
6	<u>GET the following object(s):</u> <u>» windSensorTableNumSensors.0</u>	

7	IF windSensorTableNumSensors.0 is greater than 0, PERFORM the test case labeled 'Retrieve Wind Data' (C.2.3.3.3)	Pass / Fail (Clause 3.5.2.3.10)
8	GET the following object(s): »essNumTemperatureSensors.0	
9	IF essNumTemperatureSensors.0 is greater than 0, PERFORM the test case labeled 'Retrieve Temperature' (C.2.3.3.4)	Pass / Fail (Clause 3.5.2.3.10)
10	GET the following object(s): »precipitationSensorTableNumSensors.0	
11	IF precipitationSensorTableNumSensors.0 is greater than 0, then PROCEED to Step 11.1; otherwise, proceed to Step 12.	
11.1	PERFORM the test case labeled 'Retrieve Precipitation Presence' (C.2.3.3.13)	Pass / Fail (Clause 3.5.2.3.10)
11.2	IF PrecipRate_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Precipitation Rates' (C.2.3.3.14)	Pass / Fail (Clause 3.5.2.3.10)
11.3	IF PrecipTotal_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Precipitation Totals' (C.2.3.3.15)	Pass / Fail (Clause 3.5.2.3.10)
12	IF AdjSnowDepth_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Adjacent Snow Depth' (C.2.3.4.14)	Pass / Fail (Clause 3.5.2.3.10)
13	IF RoadwaySnowDepth_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Roadway Snow Depth' (C.2.3.4.15)	Pass / Fail (Clause 3.5.2.3.10)
14	IF IceThickness_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Roadway Ice Thickness' (C.2.3.4.16)	Pass / Fail (Clause 3.5.2.3.10)
15	IF Visibility_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Visibility' (C.2.3.3.11).	Pass / Fail (Clause 3.5.2.3.10)
16	GET the following object(s): »essNumPressureSensors.0	
17	IF essNumPressureSensors.0 is greater than 0, PERFORM the test case labeled 'Retrieve Atmospheric Pressure for Each Atmospheric Pressure Sensor' (C.2.3.3.17)	Pass / Fail (Clause 3.5.2.3.10)
18	GET the following object(s): »humiditySensorTableNumSensors.0	
19	IF humiditySensorTableNumSensors.0 is greater than 0, PERFORM the test case labeled 'Retrieve Relative Humidity Sensor' (C.2.3.3.18)	Pass / Fail (Clause 3.5.2.3.10)
20	IF Pavement_Supported is equal to true, then PROCEED to Step 20.1; otherwise, proceed to Step 21.	
20.1	CONFIGURE: Determine the identifier of a passive pavement sensor (Test Plan). RECORD this information as: »Passive_Pavement_Sensor	

20.2	GET the following object(s): <ul style="list-style-type: none"> »essSurfaceTemperature.Passive_Pavement_Sensor »essSurfaceSalinity.Passive_Pavement_Sensor »essSurfaceFreezePoint.Passive_Pavement_Sensor »essPavementSensorError.Passive_Pavement_Sensor »essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor »pavementSensorSurfaceCondition.Passive_Pavement_Sensor »pavementSensorForecastCondition.Passive_Pavement_Sensor »pavementSensorFrictionCoefficient.Passive_Pavement_Sensor »pavementIcePercentage.Passive_Pavement_Sensor 	
20.3	VERIFY that the RESPONSE VALUE for <u>essSurfaceTemperature.Passive_Pavement_Sensor</u> is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.8)
20.4	VERIFY that the RESPONSE VALUE for <u>essSurfaceTemperature.Passive_Pavement_Sensor</u> is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.8)
20.5	VERIFY that the RESPONSE VALUE for <u>essSurfaceTemperature.Passive_Pavement_Sensor</u> is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.8)
20.6	VERIFY that the RESPONSE VALUE for <u>essSurfaceSalinity.Passive_Pavement_Sensor</u> is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.11)
20.7	VERIFY that the RESPONSE VALUE for <u>essSurfaceSalinity.Passive_Pavement_Sensor</u> is less than or equal to 65535.	Pass / Fail (Sec. 5.11.3.11)
20.8	VERIFY that the RESPONSE VALUE for <u>essSurfaceSalinity.Passive_Pavement_Sensor</u> is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.11)
20.9	VERIFY that the RESPONSE VALUE for <u>essSurfaceFreezePoint.Passive_Pavement_Sensor</u> is greater than or equal to -1000.	Pass / Fail (Sec. 5.11.3.13)
20.10	VERIFY that the RESPONSE VALUE for <u>essSurfaceFreezePoint.Passive_Pavement_Sensor</u> is less than or equal to 1001.	Pass / Fail (Sec. 5.11.3.13)
20.11	VERIFY that the RESPONSE VALUE for <u>essSurfaceFreezePoint.Passive_Pavement_Sensor</u> is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.13)
20.12	VERIFY that the RESPONSE VALUE for <u>essPavementSensorError.Passive_Pavement_Sensor</u> is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.15)
20.13	VERIFY that the RESPONSE VALUE for <u>essPavementSensorError.Passive_Pavement_Sensor</u> is less than or equal to 6.	Pass / Fail (Sec. 5.11.3.15)
20.14	VERIFY that the RESPONSE VALUE for <u>essPavementSensorError.Passive_Pavement_Sensor</u> is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.15)
20.15	VERIFY that the RESPONSE VALUE for <u>essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor</u> is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.27)
20.16	VERIFY that the RESPONSE VALUE for <u>essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor</u> is less than or equal to 101.	Pass / Fail (Sec. 5.11.3.27)
20.17	VERIFY that the RESPONSE VALUE for <u>essSurfaceIceOrWaterDepth.Passive_Pavement_Sensor</u> is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.27)
20.18	VERIFY that the RESPONSE VALUE for <u>pavementSensorSurfaceCondition.Passive_Pavement_Sensor</u> is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.22)
20.19	VERIFY that the RESPONSE VALUE for <u>pavementSensorSurfaceCondition.Passive_Pavement_Sensor</u> is less than or equal to 14.	Pass / Fail (Sec. 5.11.3.22)

20.20	VERIFY that the RESPONSE VALUE for pavementSensorSurfaceCondition.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.22)
20.21	VERIFY that the RESPONSE VALUE for pavementSensorForecastCondition.Passive_Pavement_Sensor is greater than or equal to 1.	Pass / Fail (Sec. 5.11.3.23)
20.22	VERIFY that the RESPONSE VALUE for pavementSensorForecastCondition.Passive_Pavement_Sensor is less than or equal to 8.	Pass / Fail (Sec. 5.11.3.23)
20.23	VERIFY that the RESPONSE VALUE for pavementSensorForecastCondition.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.23)
20.24	VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.Passive_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.24)
20.25	VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.Passive_Pavement_Sensor is less than or equal to 101.	Pass / Fail (Sec. 5.11.3.24)
20.26	VERIFY that the RESPONSE VALUE for pavementSensorFrictionCoefficient.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.24)
20.27	VERIFY that the RESPONSE VALUE for pavementIcePercentage.Passive_Pavement_Sensor is greater than or equal to 0.	Pass / Fail (Sec. 5.11.3.27)
20.28	VERIFY that the RESPONSE VALUE for pavementIcePercentage.Passive_Pavement_Sensor is less than or equal to 101.	Pass / Fail (Sec. 5.11.3.27)
20.29	VERIFY that the RESPONSE VALUE for pavementIcePercentage.Passive_Pavement_Sensor is APPROPRIATE.	Pass / Fail (Sec. 5.11.3.27)
21	IF PrecipSituation_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Precipitation Situation' (C.2.3.5.2)	Pass / Fail
22	IF VisibilitySituation_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Visibility Situation' (C.2.3.5.4)	Pass / Fail
23	IF GroundState_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Ground State' (C.2.3.5.5)	Pass / Fail
24	IF PavementState_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Pavement State' (C.2.3.5.8)	Pass / Fail
25	IF CloudSituation_Supported is equal to true, then PERFORM the test case labeled 'Retrieve Cloud Situation' (C.2.3.5.7)	Pass / Fail
<u>Test Case Results</u>		
<u>Tested By:</u>	<u>Date Tested:</u>	<u>Pass / Fail</u>
<u>Test Case Notes:</u>		

Annex D

Documentation of Revisions [Informative]

Annex D identifies the changes that have been made to NTCIP 1204 v04. The NTCIP effort makes reasonable efforts to ensure that standards are as backward compatible as possible, but the primary purpose of NTCIP 1204 v04 is to provide interoperability by developing standards in a consensus environment. When changes are required to meet these objectives, the problematic objects are refined (if the issue is primarily editorial) or deprecated and, in most cases, replaced with new objects. Annex D identifies why each of these changes has been made. New implementations should support the new/replacement objects; they may also support deprecated objects.

D.1 NTCIP 1204 v01 to NTCIP 1204 V02

General edits were made to the MIB header to reflect updates to other MIBs from which this MIB imports data.

All DESCRIPTION fields were updated to conform to NTCIP 8004 v02.

The STATUS of all objects was changed to "mandatory" to reflect the fact that conformance is now measured through the use of the PRL as contained in Section 3 and the RTM contained in Annex A.

References to Global Objects are now made through the RTM rather than through comments in the MIB.

Several objects were added to reflect new user needs.

The following identify additional edits that were made.

D.1.1 Station Category

The definition of essNtcipCategory was modified to reflect the fact that this parameter relates to "category" rather than "type".

D.1.2 Latitude

The definition of the essLatitude object was modified to reference the datum set to be used.

D.1.3 Wind Sensor Information

The various wind objects were deprecated and replaced with a table to allow the standard to support multiple wind sensors. The deprecated objects and their replacements are listed as follows:

- a) essWindSensorHeight was replaced with windSensorHeight and windSensorLocation
- b) essAvgWindDirection was replaced with windSensorAvgDirection
- c) essAvgWindSpeed was replaced with windSensorAvgSpeed
- d) essSpotWindDirection was replaced with windSensorSpotDirection
- e) essSpotWindSpeed was replaced with windSensorSpotSpeed
- f) essWindSituation was replaced with windSensorSituation
- g) essMaxWindGustSpeed was replaced with windSensorGustSpeed
- h) essMaxWindGustDir was replaced with windSensorGustDirection

In addition, the meaning of zero was clarified for the wind direction objects.

New implementations should support the replacement objects but may also support the original objects for backwards compatibility purposes. If the original objects are supported, they should report the values reported by the first wind sensor.

D.1.4 Water Depth

The `essWaterDepth` object was deprecated to reflect the fact that the ESS may support multiple Water Level Sensors. New implementations should support the replacement objects (i.e., those associated with the Water Level Sensor Table) but may also support `essWaterDepth` for backwards compatibility purposes.

D.1.5 Solar Radiation

The `essSolarRadiation` object was deprecated to reflect the fact that this value should be an instantaneous value rather than a value integrated over 24 hours to provide maximum compatibility with BUFR. New implementations should support the replacement object (`essInstantaneousSolarRadiation`) but may also support `essSolarRadiation` for backwards compatibility purposes.

D.1.6 Surface Water Depth

The `essSurfaceWaterDepth` object was deprecated to allow more precise measurements as required in practice. New implementations should support the replacement object (`essSurfaceIceOrWaterDepth`) but may also support `essSurfaceWaterDepth` for backwards compatibility purposes.

D.1.7 Surface Conductivity

The `essSurfaceConductivity` object was deprecated to correct the units of the object. New implementations should support the replacement object (`essSurfaceConductivityV2`) but may also support `essSurfaceConductivity` for backwards compatibility purposes.

D.1.8 NTCIP 1204 V02 Errata

Prior to publishing NTCIP 1204 v02, a few minor errors were identified in the document that led to the release of an Errata Sheet that corrected the issues as identified in Annex D.1.9 and D.1.10.

D.1.9 Correct OID Numbers

The Object Identifiers for `essSubSurfaceMoisture` and `essSubSurfaceSensorError` were inadvertently changed in NTCIP 1204 v02. This change was corrected in the Errata by returning the assigned Object Identifiers to their original values (as defined in NTCIP 1204 v01).

D.1.10 Correct Snapshot Camera Details

Sections 4.2.1 (Capture Snapshot Image) and 5.16.3.4 (`essSnapshotCameraCommand`) contained slight inconsistencies within their definitions of how a snapshot camera would operate. The dialog in Section 4.2.1 was corrected to allow the operation suggested by the `essSnapshotCameraCommand` object, namely that the SNMP response to the snapshot command does not have to wait for action of capturing and storing the snapshot image. Likewise, the ACCESS of `essSnapshotCameraCommand` (Section 5.16.3.4) was corrected from read-only to read-write to allow for the operation discussed in both the object DESCRIPTION as well as Section 4.2.1 (Capture Snapshot Image).

D.2 NTCIP 1204 v02 to NTCIP 1204 v03

The primary change from NTCIP 1204 v02 to NTCIP 1204 v03 was the addition of the test procedures in Annex C. However, adding these procedures also identified a few other anomalies, which are addressed.

D.2.1 NTCIP References

Annex D.2.1 identifies changes that have been made in relation to referenced standards.

References to the MIB Module name (especially in block objects) has been revised from “NTCIP1204-200x,” where the suffix was the year of Joint Approval, to “NTCIP1204-v03,” with the suffix as the Major Version number, as an editorial change.

D.2.1.1 NTCIP 1201 Reference

The reference for the definition of global objects was updated to NTCIP 1201:2005 with Amendment 2. The only changes that this created are as follows:

- a) Event Logging Objects—These objects are unchanged, but have been moved from NTCIP 1201 to NTCIP 1103 v01.
- b) Auxiliary I/O Objects—These objects were renamed to prevent any naming conflicts from objects previously defined in NTCIP 1203⁴ that have now been deprecated. This change has no effect on deployments (i.e., the textual name is not used within a data exchange.).

D.2.1.2 NTCIP 1103 v01 Reference

Because Auxiliary objects have been moved to NTCIP 1103 v01, NTCIP 1103 v01 has been made a normative reference.

D.2.1.3 NTCIP 8004 v02 Reference

NTCIP 8004 v02 publication is anticipated shortly. NTCIP 8004 v02 does not require any changes to NTCIP 1204 v03.

D.2.1.4 NTCIP 8007 v01 Reference

Since NTCIP 1204 v03 includes test procedures, 1204 v03 now includes a reference to NTCIP 8007 v01.

D.2.2 Deletion of Requirement 3.5.1.3.2

A review of NTCIP 1204 v02 revealed that Requirement 3.5.1.3.2 (Retrieve Mobile Treatment Information) was redundant with Requirement 3.5.3.1.3 (Retrieve Mobile Pavement Treatment Configuration). After consideration, it was determined that the requirement was more appropriately defined in Section 3.5.3.1.3 (i.e., according to the terms used in this standard, the ESS Manager does not include pavement treatment information; that information would be stored in the PTS Manager); therefore Section 3.5.1.3.2 was deleted.

D.2.3 Clarify Snapshot Camera Configuration

Requirements 3.5.2.1.9 and 3.5.2.3.9 were edited to more accurately reflect the intent and design of NTCIP 1204 v03.

D.2.4 Remove Copy Snapshot Requirement

Requirement 3.5.2.4.3 and its corresponding dialog defined in Section 4.2.4 were deprecated because the defined FTP mechanism does not support the copy operation. After discussing this issue, it was determined that there was not really a need to support the copy operation if the snapshot filename can be defined to use a sequence field (see Requirement 3.6.24).

D.2.5 Correct Stationary Pavement Treatment System Configuration

Item b of Requirements 3.5.3.1.1.b, 3.5.3.1.2.b, and 3.5.3.4.2 were revised to reflect the design of the MIB objects. Originally, the requirement stated that the "spray duration" was a configurable parameter. This statement did not properly capture the intent; however, the intent was properly implemented in the design. The intent was to define how long the PTS is required to signal the external sprayer device to ensure that the PTS sprayer acts upon the signal. The duration of the spray is not a configurable parameter. This change did not require any change to the ptsSignalDuration object, but did require a change to the ptsCommandState object (Section 5.13.8). related object definition (Section 5.13.10). Further, the change to the ptsCommandState object required a change to the ptsOperationalMode object (Section 5.13.7), since it references ptsCommandState within its definition. Therefore, both of these objects were changed to obsolete status, since there were no known deployments at the time of the change, and new objects were added to accommodate the change in a backward compatible fashion.

D.2.6 Required Number of Water Level Sensors

Version 3 added Requirement 3.6.22 to allow a user of NTCIP 1204 v03 an easy way to specify the number of water level sensors to be included in a deployment when using the PRL.

D.2.7 Addition of Configurable Filenames for Snapshot Images

A number of requirements (Sections 3.6.23 through 3.6.27) were added to allow a management station to configure the name that the ESS should use when saving snapshot images.

D.2.8 Modify Set Constraints

A review of NTCIP 1204 v02 indicated that the following objects were defined as read-write, but had a set constraint that prevented it from being set:

- a) essNtcipSiteDescription
- b) essPaveTreatProductType

These typos were corrected.

D.2.9 Clarify essTypeofStation

The definition of the essTypeofStation object was clarified with an <Informative> statement to clarify that the value of 2 is reserved and that a hybrid station requires two instances of the MIB.

D.2.10 Correct Block Objects

A review of NTCIP 1204 v02 revealed that the following newly created block objects referenced deprecated objects within the block object structure:

- a) Station Meta Data Block
- b) Weather Block
- c) Pavement Block

To rectify this problem, the existing block objects were deprecated and new replacement block objects were created.

[NOTE: All block objects were removed in NTCIP 1204 v04.](#)

D.2.11 Correct Access of `essSnapshotCameraCommand`

Shortly after NTCIP 1204 v02 was released, implementers realized that the `essSnapshotCameraCommand` object has to be read-write for the snapshot feature to have any useful functionality. While this was a significant technical change on paper, the object has no use when implemented read-only, converting it to read-write should not create any backwards compatibility problems with existing deployments, many implementers have already implemented it as read-write, and it has been determined to be the approach that results in the smallest impact to existing deployments.

D.2.12 Added a Backward Compatibility User Need and Associated Requirements

Additional user needs and requirements were added to address backward compatibility concerns.

D.2.13 Added Dialogs to Separate NTCIP 1204 v01 and NTCIP 1204 v02 Objects

A few of the standardized dialogs in NTCIP 1204 v02 combined NTCIP 1204 v01 and NTCIP 1204 v02 objects into a single request. As a result, if the standardized dialog was used to interface with an NTCIP 1204 v01 device, the request would fail with a `noSuchName` error.

~~This version NTCIP 1202~~ v03 ~~has~~ modified these dialogs to separate the NTCIP 1204 v01 objects from the NTCIP 1204 v02 objects. This separation has affected the standardized dialogs for the following requirements:

- a) 3.5.2.3.2.6.1 Retrieve Precipitation Presence
- b) 3.5.2.3.2.7 Retrieve Solar Radiation
- c) 3.5.2.3.3.1 Retrieve Pavement Surface Condition
- d) 3.5.2.3.3.2 Retrieve Icing Conditions – Active
- e) 3.5.2.3.3.3 Retrieve Icing Conditions – Passive

Table 37 summarizes the impact that this change has on backward and forward compatibility.

Table 37 Backward and Forward Compatibility Impacts

Central	Device	Interoperable	Notes
v01	v01	Maybe [1]	1204 version v01 did not define any standardized dialogs; however, interoperability is provided through the rules of Section 4 (for v02 and v03) and RFC 1157. Interoperability will be obtained as long as the v02/v03 device supports the deprecated objects used by the central, if any.
v01	v02	Maybe	
v01	v03	Maybe	
v02	v01	Maybe—With additional logic in central	A few of the standardized dialogs grouped v01 and v02 data into a single request; using these dialogs would result in a <code>noSuchName</code> error. This is a forward-compatible response since the v02 central could then implement logic that would only request v01 data; however, such logic would be outside the scope of the standardized dialog.
v02	v02	Yes	
v02	v03	Yes	While v03 defines a slightly different standardized dialog, the rules of Section 4 and RFC 1157 require the device to support requests that combine data in any combination that do not break the rules defined in Section 4.3. Thus, interoperability is maintained.

Central	Device	Interoperable	Notes
v03	v01	Maybe	Data defined in different versions are separated into different requests with logic used to determine if and when deprecated objects or v02 objects should be requested. Thus, interoperability is maintained and automatically provided.
v03	v02	Yes	While v03 defines a slightly different standardized dialog, the rules of Section 4 and RFC 1157 require the device to support requests that combine data in any combination that do not break the rules defined in Section 4.3. Thus, interoperability is maintained.
v03	v03	Yes	
[Note 1] If the v01 to v02 change was because of an ambiguity, the original interoperability problems remain with any implementation of v01 objects.			

D.2.14 Clarified Handling of globalSetIDParameter

Annex H was added to clarify exactly what parameters would affect the value of the globalSetIDParameter object. This was deemed to be a simple clarification since the definition of these objects did not change the written intent of the object definition.

D.2.15 Clarify Meaning of Static Tables

Objects that define how many rows exist in static tables were clarified with an informative statement to explain that the device may have internal logic to add and delete rows based on sensors being connected and disconnected from the device. These tables are still considered static from an NTCIP perspective since the size of the table is not managed using the protocol.

D.2.16 Seven Corrections Prior to Publication

- 0—Edited section 3.6.21 and other sections to modify the term "Response Time" to "Maximum Response Time".
- 1—Edited the SYNTAX for waterLevelSensorIndex and essSnapshotCameraIndex to INTEGER (1..255) from INTEGER (0..255), as an editorial change.
- 2—Edited all occurrences of <table object>.0 to read <table object>.x, as an editorial change.
- 3—Edited the <Definition> of essSnapshotCameraFilename to read "and the following case-sensitive field names enclosed in chevrons (<>);" as an editorial change.
- 4—Added an informative subfield to the DESCRIPTION field of essSnapshotCameraFilename which partially reads "<Informative>The filename ...," as an editorial change.
- 5—Added comments to the object definition, and an informative subfield, regarding the SYNTAX for essSnapshotCameraFilename, to alert implementers that syntax may change to OCTET STRING (SIZE (1..255)) from OCTET STRING (SIZE (0..255)), to prevent zero length names.
- 6—Edited the occurrences of the MIB Module name (especially in block objects) from "NTCIP1204-200x" to "NTCIP1204-v03," as an editorial change.

D.3 NTCIP 1204 v03 to NTCIP 1204 v04

[The primary change from NTCIP 1204 v03 to NTCIP 1204 v04 was improved support for multiple sensor readings of the same sensor type, improved support for new infrared technologies that collect different sensor readings from a single device, and expanded support for metadata.](#)

D.3.1 NTCIP References

[Annex D.3.1 identifies changes that have been made in relation to referenced standards.](#)

References to the MIB Module name (especially in block objects) has been revised from "NTCIP1204-200x," where the suffix was the year of Joint Approval, to "NTCIP1204-v03," with the suffix as the Major Version number, as an editorial change.

D.3.1.1 NTCIP 1201 Reference

The reference for the definition of global objects was updated to NTCIP 1201 v03. The only changes that this created are as follows:

- a) Auxiliary I/O Objects - These objects were updated to reference the new auxiliary I/O objects in NTCIP 1201 v03.
- b) Global Time Objects - These objects were added to improve support for daylight saving time mechanisms as referenced in NTCIP 1201 v03.

D.3.1.2 NTCIP 1103 v02 Reference

The reference for the definition of global objects and the procedures and data formats for use within NTCIP systems was updated to NTCIP 1103 v02. The only changes that this created are as follows:

- a) Event Logging Objects - These objects are unchanged, but were moved within NTCIP 1103 v02 to a different section.

D.3.2 Requirements for Compressed Data

Annex D.3.2 identifies changes that have been made in relation to compressed data.

A review of the block objects indicated that the block objects were mostly unused and no longer needed. The block objects were created to minimize overhead requirements when transmitting the data over wireless communications networks or low speed communications lines. However, the participating agencies and vendors indicated that with the current communications technologies, block objects were not being used.

Thus, the following requirements and their associated block object were deprecated.

- a) Section 3.5.1.1.2, Retrieve Compressed Station Metadata (essStationMetaDataV3Block)
- b) Section 3.5.1.3.3, Retrieve Compressed Mobile ESS Data (essMobileBlock)
- c) Section 3.5.2.3.1, Retrieve Weather Profile with Mobile Sources (essWeatherV3Block)
- d) Section 3.5.2.3.2.9, Retrieve Compressed Weather Data
- e) Section 3.5.2.3.3.7, Retrieve Compressed Pavement Condition Data
- f) Section 3.5.2.3.4.3, Retrieve Compressed Subsurface Condition Data
- g) Section 3.5.2.3.6.9, Retrieve Compressed Air Quality Data (5.14.8)
- h) Section 3.5.3.1.3, Retrieve Mobile Pavement Treatment Configuration (5.13.6)

D.3.3 Multiple Sensors

Several weather sensor objects were deprecated and replaced with a table to allow the standard to support reporting sensor readings from multiple sensors of the same type.

New implementations should support the replacement objects but may also support the original objects for backwards compatibility purposes. If the original objects are supported, they should report the values reported by the first sensor in the table.

D.3.3.1 Atmospheric Pressure Sensor

The various atmospheric pressure objects were deprecated and replaced with a table to allow the standard to support multiple atmospheric pressure sensors. The deprecated objects and their replacements are listed as follows:

- a) essPressureHeight was replaced with essPressureSensorHeight
- b) essAtmosphericPressure was replaced with essPressureSensorAtmosphericPressure

New implementations should support the replacement objects but may also support the original objects for backwards compatibility purposes. If the original objects are supported, they should report the values reported by the first atmospheric pressure sensor.

D.3.3.2 Humidity Sensor

The various humidity objects were deprecated and replaced with a table to allow the standard to support multiple humidity sensors.

The deprecated requirements and their replacements are listed as follows:

- a) Section 3.5.2.3.2.5, Retrieve Humidity was replaced by Section 3.5.2.3.2.11

The deprecated objects and their replacements are listed as follows:

- a) essRelativeHumidity was replaced with humiditySensorRelativeHumidity

New implementations should support the replacement objects but may also support the original objects for backwards compatibility purposes. If the original objects are supported, they should report the values reported by the first humidity sensor.

D.3.3.3 Precipitation Sensor

The various precipitation objects were deprecated and replaced with a table to allow the standard to support multiple precipitation sensors.

The deprecated requirements and their replacements are listed as follows:

- a) Section 3.5.2.3.2.6.1, Retrieve Precipitation Presence was replaced by Section 3.5.2.3.2.6.4
- b) Section 3.5.2.3.2.6.2, Retrieve Precipitation Rates was replaced by Section 3.5.2.3.2.6.5
- c) Section 3.5.2.3.2.6.3, Retrieve Precipitation Totals was replaced by Section 3.5.2.3.2.6.6

The deprecated objects and their replacements are listed as follows:

- a) essAdjacentSnowDepth was replaced with precipitationSensorAdjacentSnowDepth
- b) essRoadwaySnowDepth was replaced with precipitationSensorRoadwaySnowDepth
- c) essRoadwaySnowPackDepth was replaced with precipitationSensorRoadwaySnowPackDepth
- d) essPrecipYesNo was replaced with precipitationSensorPrecipYesNo
- e) essPrecipRate was replaced with precipitationSensorPrecipRate
- f) essSnowfallAccumRate was replaced with precipitationSensorSnowfallAccumRate
- g) essPrecipSituation was replaced with precipitationSensorPrecipSituation
- h) essPrecipitationStartTime was replaced with precipitationSensorPrecipitationStartTime
- i) essPrecipitationEndTime was replaced with precipitationSensorPrecipitationEndTime
- j) essPrecipitationOneHour was replaced with precipitationSensorPrecipitationOneHour
- k) essPrecipitationThreeHours was replaced with precipitationSensorPrecipitationThreeHours
- l) essPrecipitationSixHours was replaced with precipitationSensorPrecipitationSixHours
- m) essPrecipitationTwelveHours was replaced with precipitationSensorPrecipitationTwelveHours

- n) [_essPrecipitation24Hours](#) was replaced with [precipitationSensorPrecipitation24Hours](#)
- o) [_precipitationSensorModelInformation](#) was replaced with [precipitationSensorModelInformationV4](#)

[New implementations should support the replacement objects but may also support the original objects for backwards compatibility purposes. If the original objects are supported, they should report the values reported by the first humidity sensor.](#)

D.3.3.4 Radiation Sensor

[The various radiation objects were deprecated and replaced with a table to allow the standard to support reporting of multiple radiation sensor values.](#)

[The deprecated requirements and their replacements are listed as follows:](#)

- a) [Section 3.5.2.3.2.7, Retrieve Solar Radiation](#) was replaced by [Section 3.5.2.3.2.12](#)

[The deprecated objects and their replacements are listed as follows:](#)

- a) [_essTotalSun](#) was replaced with [essTotalSunV4](#)
- b) [_essInstantaneousTerrestrialRadiation](#) was replaced with [essInstantaneousTerrestrialRadiationV4](#)
- c) [_essInstantaneousSolarRadiation](#) was replaced with [essInstantaneousSolarRadiationV4](#)
- d) [_essTotalRadiation](#) was replaced with [essTotalRadiationV4](#)

D.3.3.5 Friction

[The _essMobileFriction object was deprecated and moved to the pavement sensor table to allow the standard to support reporting of coefficient of friction sensor values from multiple pavement sensors.](#)

[The deprecated object and its replacement is listed as follows:](#)

- a) [_essMobileFriction](#) was replaced with [pavementSensorFrictionCoefficient](#)

D.3.4 Expanded Support for Metadata

[Added support for metadata for all environmental sensors that were not already supported. Metadata consists of a table with the make, model, and version number of the sensor.](#)

D.3.5 Removed <Set Constraint>

[Removed the <Set Constraint> data dictionary meta attribute for each object specification. The <Set Constraint> meta attribute is not defined in NTCIP 8004 v02, and the definition of this meta attribute is unclear.](#)

D.3.6 Added <Object Identifier>

[Added the full identifier from the root node to the DESCRIPTION field of each object specification, as required by NTCIP 8004 v02.](#)

D.3.7 Updated Cloud Situation

[The cloud situation object was deprecated and replaced with a new object that requirement used values as defined by the World Meteorological Organization. The replacement was made because the values used in the retired requirement were too subjective.](#)

[The deprecated requirement and its replacement is listed as follows:](#)

- a) [Section 3.5.2.3.5.3, Retrieve Cloud Situation](#) was replaced by [Section 3.5.2.3.5.7](#)

The deprecated object and its replacement is listed as follows:

- a) essCloudSituation was replaced with essCloudSituationV4

D.3.8 Updated Pavement Surface Condition

The surface status condition object was deprecated and replaced with two new objects that distinguished between observed pavement surface conditions and forecasted surface conditions.

The deprecated objects and their replacements are listed as follows:

- a) essSurfaceStatus was replaced with the pavementSensorSurfaceCondition and pavementSensorForecastCondition

D.3.9 Updated Ground State Assessment

Section 3.5.2.3.5.5, Retrieve Ground State was deprecated, resulting in the object essMobileObservationGroundState being deprecated. This replacement was made because the valid values were expanded to be more consistent with the valid values for the assessment of the pavement state in addition to several requested values. The replacement can be found in Section 3.5.2.3.5.8 and the new object essMobileObservationGroundStateV4.

D.3.10 Updated Pavement State Assessment

Section 3.5.2.3.5.5, Retrieve Pavement State was deprecated, resulting in the object essMobileObservationPavement being deprecated. This replacement was made because the valid values were expanded. The replacement can be found in Section 3.5.2.3.5.9 and the new object essMobileObservationPavementV4.

D.3.11 Pavement Monitoring Location

Added objects to indicate the location of the pavement surface that is being monitored. This location may be different from the location of the pavement sensor. This change was made to support pavement surface readings using non-intrusive technologies such as infrared or laser sensors.

D.3.12 Pavement Ice Percentage

Upon user request, support for reading the percentage of ice on the pavement surface, by volume, was added.

D.3.13 Added Support for Particulate Matter (2.5) Readings

Upon user request, support for reading the current concentration in the air of small particulate matter of 2.5 micrometers or less in diameter was added.

D.3.14 Retrieve Mobile Treatment Information Requirement

Section 3.5.2.4.3, Copy Snapshot was changed to obsolete.

D.3.15 Retrieve Mobile Treatment Information Requirement

Section 3.5.2.4.3, Copy Snapshot was changed to obsolete.

D.3.16 Height Objects

Changed essTemperatureSensorHeight, windSensorHeight, essPavementElevation, essPaveTreatmentAmount, and essPaveTreatmentWidth to read-write from read-only to support new requirements to allow agencies to update the height of the temperature, wind sensors and pavement surface using NTCIP. For the pavement treatment objects, these objects should have been read-write because requirement 3.5.3.1.4 allows a management station to configure the pavement treatment system.

Annex E User Requests [Informative]

Annex E identifies features that were suggested for NTCIP 1204 v04⁴³, but are either supported by mechanisms that may not be readily obvious, or are not supported by NTCIP 1204 v04³⁴.

E.1 Features Indirectly Supported

The following identifies how certain features are supported by NTCIP 1204 v04³⁴.

E.1.1 Archiving Data on a Periodic Basis for Dial-up Operations

Some users wish to configure their ESS to archive data into memory on a periodic basis so that multiple readings may be retrieved in bulk at a later time (e.g., because of a long polling cycle over a dial-up link). To operate in a meaningful manner, each entry into the archive needs to have a timestamp that identifies when the measurement was taken.

This capability is provided through the "Provide Off-Line Log Data" Architectural Need defined in Annex F.1.1.3. This architectural need can be used in conjunction with any data supported by the device.

E.1.2 Precision and Accuracy Information

Some users need to know precision and accuracy information for each sensor, in addition to the type of sensor. Some users need this information to calibrate their weather models. The ESS WG discussed this feature and concluded direct support of this feature would result in a standard that is roughly two times the size and complexity of NTCIP 1204 v04. To support this capability indirectly, NTCIP 1204 v04 added support to provide metadata about the sensor. The metadata includes the make and model of each sensor. A user needing precision, accuracy, and type information about the sensor can then look up that information based on the sensor make and model.

Note: At the time NTCIP 1204 v04 was developed, USDOT's Weather Data Environment (WxDE) was maintaining a list of all known sensor types used in the United States for environmental sensor stations. Each known sensor type is assigned a unique identifier in the WxDE. USDOT has suggested using the unique identifier, or using the sensor make and model name in the list, in describing the sensor make and model for naming consistency.

E.1.3 Retrieve Sensor Profile with Mobile Sources

One of the user needs identified was to collect sensor data from a mobile platform at regular intervals or on a conditional exception-based reporting (e.g., if an ice patch is detected). This feature requires that each sensor data record be either time-stamped or location-stamped or both. One method to collect this data with a time-stamp is to log the sensor data in an event log along with a time stamp, and optionally with the location of the mobile platform, then retrieve the event logs. NTCIP 1204 v03 also added block objects that supported this feature, but these block objects were removed in NTCIP 1204 v04 (See Annex D.3.2).

Requirement 3.5.2.3.10 supports recovering the sensor data from a mobile platform, including the time the sensor data is retrieved, but that is not a timestamp.

Conditional exception-based reporting, once it is supported, will also help with the collection of sensor data from a mobile platform. NTCIP 1103 v03 is expected to add support for exception-based reporting.

Another possibility is the development of an XML mobile block for communication between mobile platforms (e.g., snow plows) and a center (e.g., maintenance management or traffic management center). This requires a translation of the MIB/ASN.1 definition contained in the NTCIP 1204 v04 to an XML Schema definition. The XML Schema defines XML content (i.e., messages). NTCIP 2306 v01, ~~entitled "Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications (NTCIP-C2CXML)"~~ provides guidance on the transport and compression of XML based on web services. NTCIP 2306 v01 also includes a method for describing message exchange combinations called dialogs, written in Web Services Description Language (WSDL). NTCIP 2306 v01 defines the following dialogs: Request-Response, Subscription-Publication, and One-way.

The Internet Engineering Task Force has developed RFC 5935, which defines the expression of Management Information Base (MIB) datatypes into XML Schema Definition (XSD) language. The primary objective of ~~RFC 5935~~~~the IETF memo~~ is to enable the production of XML documents that are as faithful to the MIB as possible, using XSD as the validation mechanism.

The following example is taken from NTCIP 1204 v03. The example is NOT an endorsement by the ESS WG that the proposed example is an official interpretation of NTCIP 1204 v04 in XML format, but is for provided for informational purposes only. The MIB definition of the Mobile Block ~~follows~~~~is shown below~~. The XML translation of a SEQUENCE is not included in the ~~RFC 5935~~~~IETF standard~~, but XML has a corresponding concept, which is ~~follows~~~~shown below~~ the MIB definition.

E.1.3.1 Example Mobile Block MIB

essMobileBlock OBJECT-TYPE
SYNTAX OerString
ACCESS read-only
STATUS mandatory
DESCRIPTION "<Definition>An OER encoded string of the EssMobileData structure as defined below. This object is used for uploading current mobile station data from the ESS in a bandwidth efficient manner.

The OPTIONAL fields shall be present if the data is supported by the implementation and is valid. The OPTIONAL fields shall be omitted for any data that is invalid or not supported by the implementation.

```
EssMobileData ::= SEQUENCE {  
    essLatitude.0                OPTIONAL, -- @NTCIP1204-v03  
    essLongitude.0               OPTIONAL, -- @NTCIP1204-v03  
    essReferenceHeight.0        OPTIONAL, -- @NTCIP1204-v03  
    essVehicleSpeed.0           OPTIONAL, -- @NTCIP1204-v03  
    essVehicleBearing.0         OPTIONAL, -- @NTCIP1204-v03  
    essVehicleOdemeter.0        OPTIONAL, -- @NTCIP1204-v03  
    essMobileFriction.0         OPTIONAL, -- @NTCIP1204-v03  
    essMobileObservationGroundState.0  OPTIONAL, -- @NTCIP1204-v03  
    essMobileObservationPavement.0    OPTIONAL, -- @NTCIP1204-v03  
    essPaveTreatmentAmount.0       OPTIONAL, -- @NTCIP1204-v03  
    essPaveTreatmentWidth.0       OPTIONAL, -- @NTCIP1204-v03  
    }  
<SetConstraint>read-only  
<DescriptiveName>MobilePlatform.mobileBlock:frame  
<Data Concept Type>Data Element"  
 ::= { essNtcipInstrumentation 6 }
```

E.1.3.2 Example Mobile Block XML Schema

The XML Schema representation follows is shown below:

```
<xs:complexType name="EssMobileData">
  <xs:sequence>
    <xs:element name="essLatitude" type="EssLatitude"/>
    <xs:element name="essLongitude" type="EssLongitude"/>
    <xs:element name="essReferenceHeight" type="EssReferenceHeight"/>
    <xs:element name="essVehicleSpeed" type="EssVehicleSpeed"/>
    <xs:element name="essVehicleBearing" type="EssVehicleBearing"/>
    <xs:element name="essVehicleOdometer" type="EssVehicleOdometer"/>
    <xs:element name="essMobileFriction" type="xs:integer"/>
    <xs:element name="essMobileObservationGroundState" type="xs:integer"/>
    <xs:element name="essMobileObservationPavement" type="xs:integer"/>
    <xs:element name="essPaveTreatmentAmount" type="xs:integer"/>
    <xs:element name="essPaveTreatmentWidth" type="xs:integer"/>
  </xs:sequence>
  <!-- This is from v03 -->
</xs:complexType>
```

E.1.3.3 Example Latitude MIB and XML Schema

An example of the translation of a MIB definition for essLatitude follows is shown below, with followed by its XML schema counter-part.

Latitude

```
essLatitude OBJECT-TYPE
SYNTAX      INTEGER (-90000000..90000001)
ACCESS      read-only
STATUS      mandatory
DESCRIPTION "<Definition>The latitude in 10^-6 degrees of the ESS station,
per WGS-84 datum.
<SetConstraint>read-only
<DescriptiveName>ESS.latitude:quantity
<Valid Value Rule>
The essLatitude at the North Pole is 90,000,000.  The essLatitude at the
South Pole is -90,000,000.  The value 90,000,001 shall indicate a missing
value.
<Data Concept Type>Data Element
<Unit>latitude"
REFERENCE   "Resolution based on on-going location referencing activities;
the WMO Binary Code Form FM 94 BUFR Table B item 0 05 001 can be obtained by
dividing this value by 10."
 ::=      { essNtcipLocation 1}
```

```
<xs:simpleType name="EssLatitude">
  <xs:annotation>
    <xs:documentation>
      <objectClass>ESS</objectClass>
      <valueDomainTerm>qty</valueDomainTerm>
      <units>latitude</units>
      <!-- <Unit> -->
    </xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="-90000000"/>
  </xs:restriction>
</xs:simpleType>
```

```
<xs:maxInclusive value="90000001"/>  
<!-- INTEGER translates to xs:integer -->  
</xs:restriction>  
</xs:simpleType>
```

E.2 Features Not Supported by This Version

E.2.1 User Defined Sampling Periods

Some users have requested the ability to configure the details about how a device calculates the current reading. For example, some have requested the ability to configure an overall sampling period that is used to archive data and then, for each entry into the archive, a second sampling period over which measurements are actually taken and averaged.

ESS WG discussed this feature and concluded that it would:

- a) result in a standard that was not backward compatible with NTCIP 1204 v01.
- b) result in a standard that was roughly three times the size and complexity of NTCIP 1204 v03
- c) be difficult to implement and test

Instead, ESS WG has followed an approach that allows all data to be monitored, measured, and archived continuously using averaging periods that are appropriate and in wide use for each parameter. This data can be uploaded to a central system for further statistical analysis, if needed.

E.3 File Transfer Protocol (FTP)

Some agencies do not allow the use of FTP to transfer files, such as camera snapshots, across their agency's network. To conform to NTCIP 1204 v04, the implementation ~~must~~ is still required to support the use of FTP as specified by NTCIP 1204 v04, but those implementations are allowed to use other protocols, such as HTTPS:, FTPS: or SFTP:, to transfer camera snapshots.

Annex F Generic Clauses [Normative]

Annex F contains user needs, requirements, and dialogs that are considered to be generic to many types of NTCIP field devices. It is expected that the text contained in Annex F may eventually be defined in a separate standard. However, Annex F serves as a placeholder until this is achieved.

In the context of NTCIP 1204 v04, the word "device" in Annex F refers to the ESS.

F.1 External Concept of Operations

F.1.1 Generic Architectural Needs

NTCIP 1204 v04 addresses the interface between an ESS and one or more management stations (e.g., central computers, laptops, etc.). The data collected by the ESS may include data from multiple sensors. When communicating with a management station, each reading needs to be clearly associated with a specific sensor. After the management station has retrieved the data of interest, the operator can use the retrieved data to make decisions and initiate other events (such as changes to DMS messages) to better manage the transportation system.

To enable communications between these components, the transportation system manager needs to establish a communication system that links the ESS with a management station. For some systems, the resources required for communications may be minimal and as such the system may be designed for constant polling; other systems may require significant resources for communicating with the ESS and as such the system may be designed to minimize data exchanges. When deploying an ESS, the system designer needs to consider which of the following operational environments need to be supported.

F.1.1.1 Provide Live Data

The typical operational environment allows the management system to monitor and control the device by issuing requests (e.g., requests to access information, alter information, or control the device). In this environment, the device responds to requests from the management station (e.g., through the provision of live data, success/failure notice of information alteration, or success/failure of the command).

F.1.1.2 Provide Compressed Data

Some operational environments have limited data capacity because of limitations in the data rates of the media and/or because of multiple devices sharing the same communications channel. In such environments, compressed data provides the capability for grouping sets of data together so that data can be transmitted more efficiently over telecommunications networks, thereby conserving the limited data capacity of the channel.

F.1.1.3 Provide Off-line Log Data

Some operational environments do not have always-on connections (e.g., dial-up links). In such environments, a transportation system operator may wish to define conditions under which data will be placed into a log, which can then be uploaded at a later time. For example, the operator may wish to maintain a log of when the cabinet door is opened.

F.1.1.4 Condition-based Exception Reporting

Condition-based exception reporting is not supported by NTCIP 1204 v04. ~~automatically transmit data to the management station when certain conditions occur. Under this scenario, the transportation system operator can define under what conditions s/he wishes to be notified and the device automatically notifies~~

~~the management station when the condition occurs. An example may be the transportation system manager who wants to know when a sensor on a mobile platform detects a patch of ice on the roadway.~~

~~NTCIP 1201 v03 Derived Functional Requirements, and Dialogs~~ ~~[NORMATIVE]~~

~~The annex content serves as a reference for NTCIP 1204 v03. NTCIP 1201 v3 does contain a Concept of Operations for 1~~

~~F.1.2 Generic Features~~

~~Annexes F.1.2.1 and F.1.2.2 document features of an ESS that are generic to most devices.~~

~~E.2.1.1~~ **F.1.2.1 Retrieve Device Identity**

~~Retrieve~~ relevant function that might be used in conjunction with ESS (Set Time). The ESS WG, with support from the NTCIP Globals WG and from NEMA, decided to develop and provide the following temporary references within an annex in this standard (NTCIP 1204 v04). Annex H will be deleted when NTCIP 1201 supports the information contained within via an amendment.

~~Introduction~~

~~Content within this annex exists to serve as a reference for NTCIP 1204 v04. Eventually this information needed for reference may exist within the standard referenced.~~

~~E.3 Derived GLOBAL Functional Requirements~~

~~The following functional requirements address features defined in NTCIP 1201 v03.~~

~~E.3.1.1 Determine Device Component Information~~ **Identity**

~~The device shall allow a management station~~ A transportation system operator may need to determine identification basic information for each module contained in about the device including:

- ~~a) An indication of, such as its location, and the type of device~~
- ~~b) The manufacturer of the module~~
- ~~c) The make, model number or firmware reference of the module~~
- ~~d) The, and version of the module~~
- ~~e) An indication of whether it is a device components. The device components can be a hardware, software, or firmware component, and could be a physical or hardware module~~

~~E.3.2 Determine Device Configuration Identifier~~

~~The device shall allow a management station~~ logical entity in nature. This feature allows the operator to determine an identifier when changes are made to verify the identity of the configuration.

~~E.3.3 Determine Supported Standards~~

~~The device shall allow a management station to determine~~ device in the NTCIP standards which it supports field and what software or firmware version is installed.

~~E.3.4 Determine System Name~~

~~The device shall allow a management station to determine the system name of the device.~~

~~Manage Time~~

F.1.2.2 Control External Devices

A transportation system operator may need to turn simple auxiliary devices on and off. For example, the ESS may be co-located with a warning sign equipped with flashing beacons; this feature would allow the ESS controller to activate and deactivate the beacons rather than requiring an additional controller at the site.

F.2 External Requirements

F.2.1 Generic Architectural Requirements

Requirements for communication capabilities follow.

F.2.1.1 Support Basic Communications

Requirements for making requests follow.

F.2.1.1.1 Retrieve Data

A management station shall be able to retrieve any set of data from the device at any time.

F.2.1.1.2 Deliver Data

A management station shall be able to deliver **data (e.g., configuration data, commands, etc.)** to the device at any time.

Note: Other requirements may place restrictions on how the device may respond under certain scenarios.

~~E.3.4.1.4~~ **F.2.1.1.3 Explore Data**

A management station shall be able to dynamically discover what data and data instances are supported **managing by the sign-controller's clock device.**
~~are provided in the following subsections.~~

~~E.3.4.2~~ **Set Time**

~~The device shall allow a management station to set the coordinated universal time to the nearest second.~~

~~E.3.4.3~~ **Set Time Zone**

~~The device shall allow a management station to configure the time zone in which the device is located.~~

~~E.3.4.4~~ **Set Daylight Savings Mode**

~~The device shall allow a management station to indicate whether or not day light savings time adjustments should be performed when determining local time.~~

~~E.3.4.5~~ **Verify Current Time**

~~TheA device shall allow a management station to determine the current time settings within the controller.~~

~~E.3.4.6~~ **F.2.1.2 Support Logged Data**

Requirements for managing the logged data are provided in the following subsectionsfollow.

~~E.3.4.6.1~~F.2.1.2.1 **Retrieve Current Configuration of Logging Service**

Upon request from a management station, the device shall return the current configuration of the event logging service, including the classes and types of events that are currently configured.

~~E.3.4.6.2~~F.2.1.2.2 **Configure Logging Service**

Upon request from a management station, the device shall configure the event logging service as requested, including configuration of the event classes and event types to log.

~~E.3.4.6.3~~F.2.1.2.3 **Retrieve Logged Data**

Upon request from a management station, the device shall return the event log.

~~E.3.4.6.4~~F.2.1.2.4 **Clear Log**

Upon request from a management station, the device shall clear the indicated log entries of a given event class.

~~E.3.4.6.5~~F.2.1.2.5 **~~DR~~etermine Capabilities of Event Logging Service**

Upon request from a management station, the device shall return the capabilities of the event logging service, including the number of classes, number of event types, and number of events that can be supported by the device.

~~E.3.4.6.6~~F.2.1.2.6 **~~DR~~etermine Total Number of Logged Events**

Upon request from a management station, the device shall return the total number of events that the device has detected.

~~E.3.4.7~~ **~~Supplemental Requirements for Event Monitoring~~**

~~Supplemental requirements for monitoring for the occurrence of certain events are provided in the following subsections.~~

~~E.3.4.7.1~~ **~~Record and Timestamp Events~~**

~~The~~

F.2.2 Generic Functional Requirements

Requirements for data exchange capabilities follow.

F.2.2.1 Generic Configuration Requirements

Requirements for configuring a device controller follow.

F.2.2.1.1 Retrieve Device Component Information

Upon request from a management station, the device shall ~~support~~return identification information for each module contained in the device, including:

- a) an indication of the ~~capability~~type of device
- b) the manufacturer of the module
- c) the model number or firmware reference of the module
- d) the version of the module
- e) an indication of whether it is a software or hardware module

F.2.2.1.2 Retrieve Device Configuration Identifier

Upon request from a management station, the device shall return a code that only changes when changes are made to the controller configuration. This requirement allows the management station to verify the version of the database stored in the ESS. The controller configuration shall consist of the objects identified in Annex H ~~<Note: Reference to be completed in the design document>~~.

F.2.2.1.3 Retrieve Supported Standards

Upon request from a management station, the device shall return the NTCIP standards that it supports.

F.2.2.1.4 Retrieve System Name

Upon request from a management station, the device shall return the (system) name of the device.

E.3.4.7.2 F.2.2.1.5 Manage Time

Requirements for managing the controller's clock follow.

F.2.2.1.5.1 Set Time

Upon request from a management station, the device shall set the coordinated universal time to that requested.

F.2.2.1.5.2 Retrieve Current Time

Upon request from a management station, the device shall return the current time settings within the controller.

E.3.4.7.3 F.2.2.1.6 Retrieve External Port Information

Upon request from a management station, the device shall return the number of auxiliary ports and the following information for each port:

- a) an indication of whether the port is analog or digital
- b) a description of the port
- c) an indication of the port resolution
- d) an indication of whether the port can be used for input, output, or both

E.3.4.7.4 F.2.2.1.7 Configure Port Information

Upon request from a management station, the device shall store the indicated description for the indicated auxiliary port.

E.3.4.8 F.2.2.2 Generic Status Monitoring Requirements

Requirements for monitoring the status of a device controller follow.

E.3.4.8.1 F.2.2.2.1 Monitor Status of External Device

Upon request from a management station, the device shall return the following information for the indicated auxiliary port:

- a) Current state

b) Last commanded state

F.2.2.3 Generic Data Retrieval Requirements

There are no data retrieval requirements for a generic device controller.

F.2.2.4 Generic Control Requirements

Requirements for controlling a device controller follow.

E.3.4.8.2 F.2.2.4.1 Control External Device

Upon request from a management station, the device shall activate or de-activate, as requested, a simple external device connected through an analog auxiliary port.

F.2.3 Generic Supplemental Requirements

Supplemental requirements follow.

E.3.4.9 F.2.3.1 Supplemental Requirements for Event Monitoring

Supplemental requirements for monitoring for the occurrence of certain events follow.

E.3.4.9.4 F.2.3.1.1 Record and Timestamp Events

Upon detection of a configured event types with timestamps, the device shall record the event type, the current time, and the configured log information in a local log (log contained in the device controller), upon request by the user and/or the management station.

E.3.4.9.2 F.2.3.1.2 Support a Number of Event Classes

The device shall support the number of event classes as defined by the specification. If the specification does not define the number of event classes, the device shall support at least one event class.

E.3.4.9.3 F.2.3.1.3 Support a Number of Event Types to Monitor

The device shall support the number of event types as defined by the specification. If the specification does not define the number of event types, the device shall support at least one event type.

E.3.4.9.4 F.2.3.1.4 Support Monitoring of Event Types

E.3.4.9.5 Support a Number of Event Classes

The device shall support the number of event classes as defined by the specification. If the specification does not define the number of event classes, the device shall support at least one event class.

E.3.4.9.6 Support a Number of Event Types to Monitor

The device shall support the number of event types as defined by the specification. If the specification does not define the number of event types, the device shall support at least one event type.

E.3.4.9.7 Support Monitoring of Event Types

Supplemental requirements for monitoring types of events are provided in the following subsections follow.

E.3.4.9.7.4 F.2.3.1.4.1 Support On-Change Events

The device shall allow any event type configuration to monitor data for changes in value.

~~E.3.4.9.7.2~~F.2.3.1.4.2 **Support Greater Than Events**

The device shall allow any event type configuration to monitor data for values exceeding a defined threshold for a period of time.

~~E.3.4.9.7.3~~F.2.3.1.4.3 **Support Less Than Events**

The device shall allow any event type configuration to monitor data for values falling below a defined threshold for a period of time.

~~E.3.4.9.7.4~~F.2.3.1.4.4 **Support Hysteresis Events**

The device shall allow any event type configuration to monitor data for values exceeding an upper limit or dropping below a lower limit.

~~E.3.4.9.7.5~~F.2.3.1.4.5 **Support Periodic Events**

The device shall allow any event type configuration to monitor data on a periodic basis.

~~E.3.4.9.7.6~~F.2.3.1.4.6 **Support Bit-fFlag Events**

The device shall allow any event type configuration to monitor one or more bits of a value becoming true (i.e.g., obtaining a value of one).

~~E.3.4.9.8~~F.2.3.1.5 **Support Event Monitoring on Any Data**

The device shall allow ~~a management station to configure~~ any event type configuration to monitor any piece of data supported by the device within the logical rules of the type of event (e.g., ASCII strings should not be monitored with greater than or less than conditions).

~~NOTE—This allows a user to monitor an event based on the value of any data.~~

~~E.3.4.9.9~~F.2.3.1.6 **Support a Number of Events to Store in Log**

The device event log shall support the number of events as defined by the specification. If the specification does not define the number of events for the log, the device shall support at least one event in the log.

~~E.3.4.10~~F.2.3.2 **Required Number of Auxiliary Ports**

The device shall support the number of analog auxiliary ports of the resolution and direction (input, output, or bidirectional) specified in the specification. If the specification does not define the number, resolution, or direction of analog ports, the device shall support at least one binary analog output port for external device control.

F.3 Derived GLOBAL Dialogs

F.3.1 Manage Communications Environment

Standardized dialogs for managing the communications environment that are more complex than simple GETs or SETs are defined in the following subsections.

F.3.1.1 Retrieving Logged Data

The standardized dialog for a management station to retrieve logged data shall be as follows:

- a) (Precondition) The management station shall be aware of the number of events that had previously been reported for the device for the subject event class (e.g., from the previous performance of this operation).
- a) The management station shall GET the following data:
 - 1) eventClassNumRowsInLog.x
 - 2) eventClassNumEvents.x
- b) If eventClassNumEvents.x has not changed since the previous reading, the management station shall exit the process. Otherwise, the management station shall determine the additional number of events that have occurred since the last read.

Note: This is generally determined by subtracting the previous number of events from eventClassNumEvents; however, since this object wraps at 65535, the management station should be prepared to determine the differential if eventClassNumEvents is less than the previous number.
- c) The management station shall determine the lesser of eventClassNumRowsInLog and the additional number of events that have occurred since the last read. This number shall be termed the Events to Read.
- d) Starting with y = eventClassNumRowsInLog and working down until y = (eventClassNumRowsInLog - Events to Read), the management station shall GET the following data:
 - 1) eventLogID.x.y
 - 2) eventLogTime.x.y
 - 3) eventLogValue.x.y
- e) Repeat the same GET operation with y decremented by one (1) for each set of duplicated values (until y reaches a value of zero (0)).

Note: If the event class is full and another event occurs, the new event is recorded in the last entry and all previously logged data is moved to one index lower with index 1 being deleted from the table. Thus, if a duplicate row is detected (e.g., same event at same time), it is likely an indication that the same event is being read and that a new event was added to the log.

Note: The management station may wish to clear the event log after the read to minimize the above problem.

Where:

 x = event log class
 y = event log number

F.3.1.2 Determining Current Configuration of Event Reporting/Logging Service

The standardized dialog for a management station to determine the current configuration of the logging service and/or exception reporting events shall be as follows:

- a) (Precondition) The management station shall be aware of the number of classes and event configurations supported by the SCP. (See Annex A for Requirement 3.4.2.5)
- b) For each row of the event class table, the management station shall GET the following data:
 - 1) eventClassLimit.x
 - 2) eventClassClearTime.x
 - 3) eventClassDescription.x
- c) For each row of the event configuration table, the management station shall GET the following data:
 - 1) eventConfigClass.y
 - 2) eventConfigMode.y
 - 3) eventConfigCompareValue.y
 - 4) eventConfigCompareValue2.y
 - 5) eventConfigCompareOID.y
 - 6) eventConfigLogOID.y
 - 7) eventConfigAction.y
 - 8) eventConfigStatus.y

Where:

- _____ x = event class number
- _____ y = event configuration identifier

F.3.1.3 Configuring Reporting/Logging Service

The standardized dialog for a management station to configure the logging service or events to be reported shall be as follows:

- a) (Precondition) The management station shall determine that there are sufficient rows in the event configuration and event class tables to download the proposed configuration.
- b) The management station shall SET the following data to the desired values to configure each desired event class:
 - 1) eventClassLimit.x
 - 2) eventClassClearTime.x
 - 3) eventClassDescription.x

Note: Each event type to be monitored is classified into one event class. For example, critical events may be grouped into Class 1 events and warnings may be grouped into Class 2 events. This step, defines the structure of each class of events.
- c) The management station shall SET the following data to the desired values to configure each desired event to be monitored:
 - 1) eventConfigClass.y
 - 2) eventConfigMode.y
 - 3) eventConfigCompareValue.y
 - 4) eventConfigCompareValue2.y
 - 5) eventConfigCompareOID.y
 - 6) eventConfigLogOID.y
 - 7) eventConfigAction.y

Note: Depending on the value of eventConfigMode, not all other objects may be necessary for the event to be defined, however, they shall always be SET as a part of the standardized dialog.
- d) The management station shall GET eventConfigStatus.y to check that there is not an error in the configuration.

Where:

- _____ x = event class number
- _____ y = event configuration identifier

F.3.2 Automatic Reporting of Events (SNMP Traps)

Note: ~~Ultimately, t~~The NTCIP-specific handling of traps is proposed to ~~will~~ be defined in NTCIP 1103 v03. However, the current version (NTCIP 1103 v02) does not contain any trap definitions. Therefore, NTCIP 1204 v04 does not address traps.

F.3.3 Manage Tables

Need some text about tables. Standardized dialogs for managing tables are defined in the following subsections.

F.3.3.1 Generic Retrieve Table Dialog

Note: This is a generic dialog that is referenced by requirements in the RTM with specific object names.

The list of objects provided by the specific dialog shall include:

- a) an object that indicates the number of rows in the table,

- b) the object(s) that serve as the index field of the table row, and
- c) the list of columnar objects to be retrieved from the table.

The standardized dialog for a management station to retrieve a table shall be as follows:

- a) The management station shall GET the number of rows in the table.
- b) For each row of the table, the management station shall GET all objects referenced by the specific dialog that references this generic dialog, except for the number of rows object and the index object(s).

For example, The standardized dialog for a management station to identify the hardware and software configuration of a NTCIP device would be as follows:

- a) The management station shall GET the object globalMaxModules.0.
- b) For each row in the module table, the management station shall GET the following objects:
 - 1) moduleDeviceNode.x,
 - 2) moduleMake.x,
 - 3) moduleModel.x,
 - 4) moduleVersion.x,
 - 5) moduleType.x.

Where:

_____ x = module number.

F.3.3.2 Generic Retrieve Table Row Dialog

Note: This is a generic dialog that is referenced by other dialogs with specific object names.

The list of objects provided by the specific dialog shall include:

- a) the object(s) that serve as the index field of the table row, and
- b) the list of columnar objects to be retrieved from the table.

The standardized dialog for a management station to retrieve a table shall be as follows:

- a) (Precondition) The management station shall be aware of which row of the table is to be retrieved.
- b) For the specified row, the management station shall GET all objects referenced by the specific dialog that references this generic dialog, except for the index object(s).

F.3.3.3 Generic Configure Table Row

Note: This is a generic dialog that is referenced by other dialogs with specific object names.

The list of objects provided by the specific dialog shall include:

- a) the object(s) that serve as the index field of the table row, and
- b) the list of columnar objects to be configured and their desired values.

The standardized dialog for a management station to configure a table row shall be as follows:

- a) (Precondition) The management station shall be aware of which row in the table is to be configured.
- b) For the specified row, the management station shall SET all objects (to their desired values) referenced by the specific dialog that references this generic dialog, except for the index object(s).

F.3.4 Global Time Data

The following subsection identifies the interface to a field device to obtain and manage time related information.

F.3.4.1 Graphical Depiction of Global Time Data

See Figure 27.

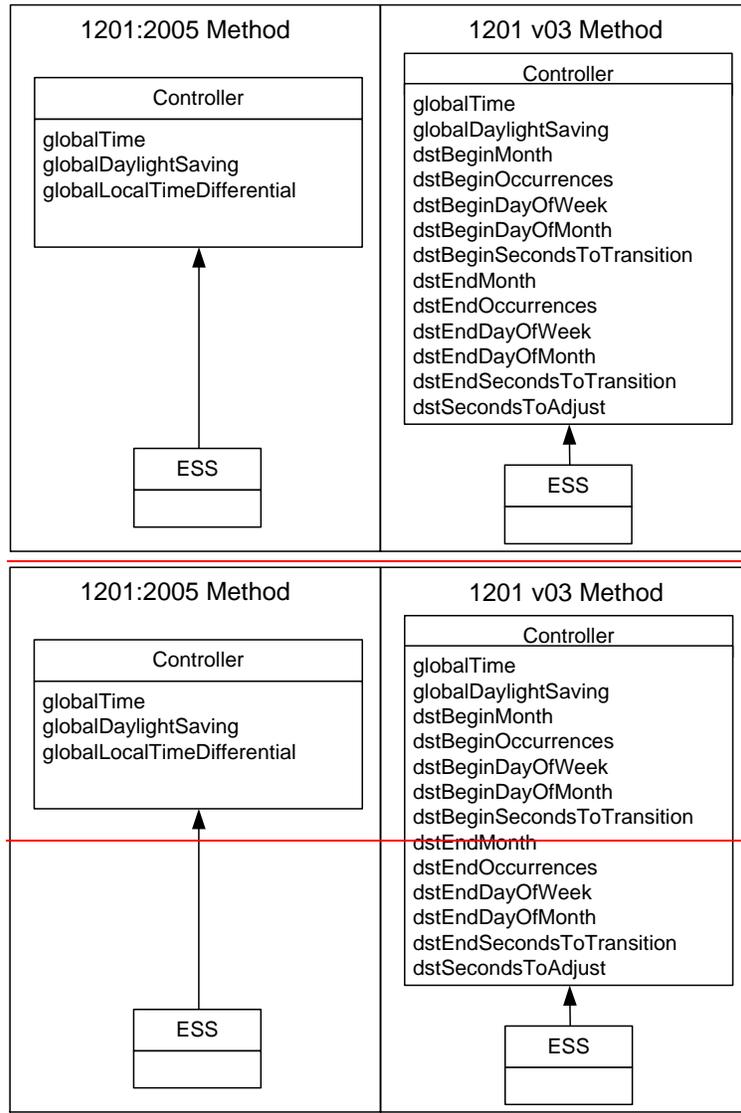


Figure 27 Global Time Data

F.4 External Data Elements

NTCIP 1204 v04 references data elements within this annex that are physically defined within NTCIP 1201 v03. See NTCIP 1201 v03.

Annex G SNMP Interface [Normative]

The ESS shall conform to the requirements for the Simple Network Management Protocol (SNMP) as defined in NTCIP 1103 v02. Annexes G.1 through G.4 provide a description of the key services offered by SNMP assuming no errors. Precise rules and procedures are defined in NTCIP 1103 v02. Annex G.5 extends the requirements of NTCIP 1103 v02 by providing additional requirements that supplement, but do not replace any requirements of NTCIP 1103 v02.

Note: To promote interoperability and to reflect marketplace realities, NTCIP requires support for SNMP. Use of other protocols defined in NTCIP 1103 v02 (e.g., the Simple Transportation Management Protocol and the Simple Fixed Message Protocol) is discouraged for ESS as these have not been widely implemented in DMESS and thus would likely result in decreased interoperability, limited competition, and increased resources for testing, integration, and maintenance.

G.1 Generic SNMP Get Interface

SNMP defines a generic process by which a management station can retrieve data from a device to fulfill the requirement as defined in [Section Annex F.2.1.1.13.4-1.4](#). This process consists of a Get request (GET) and a GetResponse as depicted in Figure 28. Both the Get request and the GetResponse messages contain a list of objects as defined by the varBindingList structure (see Annex G.4).

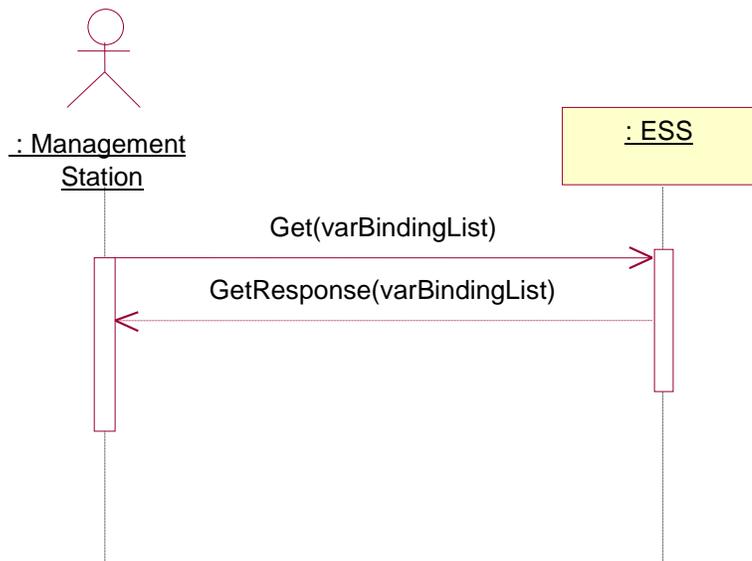


Figure 28 SNMP Get Interface

This generic process is customized by sections of NTCIP 1204 v04, by referencing the 'GET' operation, and directly by the RTM, by section number, to fulfill a wide range of the requirements defined in Section 3.

G.2 Generic SNMP Get-Next Interface

SNMP defines a process by which a management station can explore data within a device to fulfill the requirement as defined in [Section Annex F.2.1.1.33.4](#). This process consists of a Get-Next request and a

GetResponse as depicted in Figure 29. Both the Get-Next request and the GetResponse messages contain a list of objects as defined by the varBindingList structure (see Annex G.4).

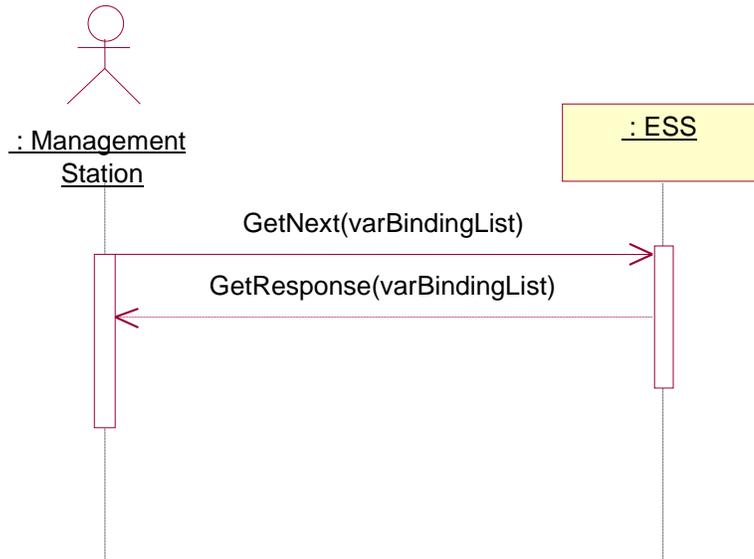


Figure 29 SNMP Get-Next Interface

G.3 Generic SNMP Set Interface

SNMP defines a generic process by which a management station can send data to a device to fulfill the requirement as defined in Annex Section F.2.1.1.23.4.1.2. This process consists of a Set request and a GetResponse (sic) as depicted in Figure 30. Both the Set request and the GetResponse messages contain a list of objects as defined by the varBindingList structure (see Annex G.4).

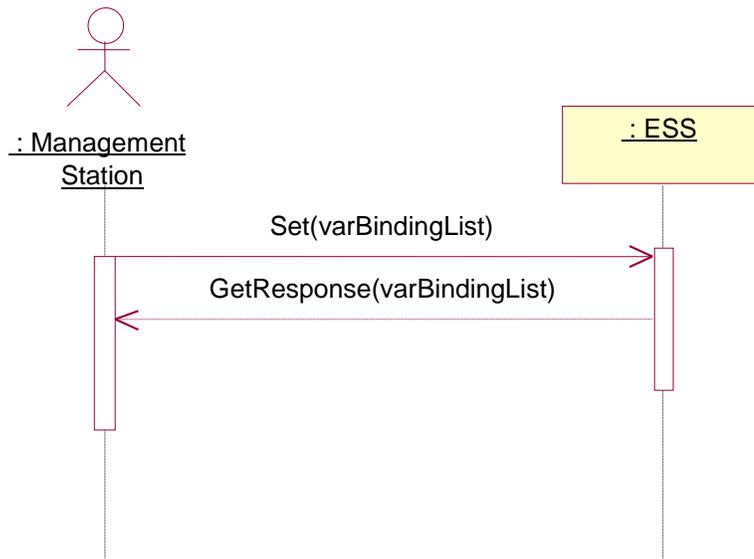


Figure 30 SNMP Set Interface

Note: The response message issued to an SNMP Set request is the same message structure as used to respond to an SNMP Get request. The SNMP standard calls this response message a GetResponse, but it is in fact a response to either a GET or a SET.

This generic process is customized, subsequently, in NTCIP 120444 v044, by referencing the 'SET' operation, and directly by the RTM, by section number, to fulfill a wide range of the requirements defined in Section 3.

G.4 Variable Binding List Structure

The requests and responses for the Get, Get Next and Set operations, all use the varBindingList structure. NTCIP 1103 v02 defines this structure as containing zero or more varBindings, where each varBinding is defined to consist of an object name (as indicated by an Object Identifier (OID)) and the associated object value. This relationship is depicted in Figure 31.

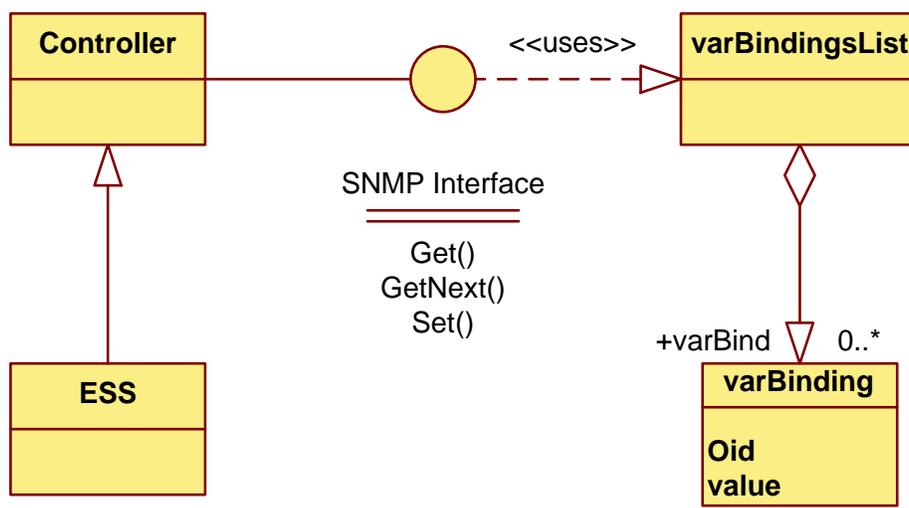


Figure 31 SNMP Interface—View of Participating Classes

G.5 Additional Requirements

G.5.1 Grouping of Objects in a Request

The ESS shall allow the management station to perform a single Get, Get-Next, or Set operation on any combination of supported objects with the objects listed in any order within the message, unless otherwise restricted by NTCIP 1204 v04.

The ESS shall not associate any semantics to the ordering of objects within the varBindingsList. As required by RFC 1157, Section 4.1.5, each object shall be affected “as if simultaneously set with respect to all other assignments specified in the same message.”

G.5.2 Support of Get

The ESS shall allow the management station to perform the Get operation on any supported object for which support for the Get Operation is indicated in Annex G.4.

G.5.3 Support of Get-Next

The ESS shall allow the management station to perform the Get-Next operation on any OBJECT IDENTIFIER.

G.5.4 Support of Set

The ESS shall allow the management station to perform the Set operation on any supported object for which support for the Set Operation is indicated in Annex G.4.

G.5.5 Performance

The ESS shall process the Get, Get-Next, or Set request in accordance with all of the rules of NTCIP 1103 v02, including updating the value in the database and initiating the transmission of the appropriate response (assuming that the ESS has permission to transmit) within 100 milliseconds of receiving the last byte of the request.

Note: Users desiring a different response time may indicate this in an agency specification or in Section 3.3.3, Protocol Requirements List (PRL) Table, FR ID 3.6.1.

~~The annex content serves as a reference for NTCIP 1204 v04. Eventually this reference information may be moved to successors of NTCIP 1204 v03.~~

~~Note: At the time, the ESS WG needed to reference certain information from NTCIP 1204 (Global Object Definitions) such as functional requirements, and dialogs, NTCIP 1204 did not contain this type of information to the extent necessary. Requirements for managing the auxiliary input and output ports are provided in the following subsections.~~

~~Retrieve External Port Information~~

~~Upon request from a management station, the device shall return the number of auxiliary ports and the following information for each port:~~

- ~~an indication of whether the port is analog or digital~~
- ~~a description of the port~~
- ~~an indication of the port resolution~~
- ~~an indication of whether the port can be used for input, output, or both~~

~~Configure Port Information~~

~~Upon request from a management station, the device shall store the indicated description for the indicated auxiliary port.~~

~~Monitor Status of External Device~~

~~Upon request from a management station, the device shall return the following information for the indicated auxiliary port:~~

- ~~Current state~~
- ~~Last commanded state~~

~~NTCIP 1204 v3 does contain a Concept of Operations for one relevant function that might be used in conjunction with ESS (Set Time). The ESS WG, with support from the NTCIP Globals WG and from NEMA, decided to develop and provide the following temporary references within an annex in this standard (NTCIP 1204 v04). Annex H is intended for deletion when NTCIP 1204 supports the information contained.~~

E.4 Introduction

~~Content within this annex exists to serve as a reference for NTCIP 1204 v04. Eventually this information needed for reference may exist within the standard referenced.~~

~~Upon request from a management station, the device shall activate or de-activate, as requested, a simple external device connected through an analog auxiliary port.~~

Annex H Controller Configuration Objects [Normative]

H.1 Controller Configuration - Version 03

The controller configuration for an implementation conformant to NTCIP 1204 v03 shall be defined by all instances of the following objects that are supported by the device:

- a) globalMaxModules
- b) moduleDeviceNode
- c) moduleMake
- d) moduleModel
- e) moduleVersion
- f) moduleType
- g) essNtcipCategory
- h) essNtcipSiteDescription
- i) essTypeOfStation
- j) essPressureHeight
- k) windSensorTableNumSensors
- l) windSensorHeight
- m) windSensorLocation
- n) essNumTemperatureSensors
- o) essTemperatureSensorHeight
- p) precipitationSensorModelInformation
- q) waterLevelSensorTableNumSensors
- r) numEssPavementSensors
- s) essPavementSensorLocation
- t) essPavementType
- u) essPavementElevation
- v) essPavementExposure
- w) essPavementSensorType
- x) pavementSensorModelInformation
- y) pavementSensorTemperatureDepth
- z) numEssSubSurfaceSensors
- aa) essSubSurfaceSensorLocation
- bb) essSubSurfaceType
- cc) essSubSurfaceSensorDepth
- dd) numEssTreatments
- ee) essPaveTreatProductType
- ff) essPaveTreatProductForm
- gg) essPercentProductMix
- hh) essPaveTreatmentAmount
- ii) essPaveTreatmentWidth
- jj) ptsSignalDuration
- kk) ptsMonitoringDetectors
- ll) essSnapshotNumberOfCameras
- mm) essSnapshotCameraDescription

A change to any of these object values shall also cause a change to the value for globalSetIDParameter.

H.2 Controller Configuration - Version 04

The controller configuration for an implementation conformant to NTCIP 1204 v03 shall be defined by all instances of the following objects that are supported by the device:

[a\) globalMaxModules](#)
[b\) moduleDeviceNode](#)
[c\) moduleMake](#)
[d\) moduleModel](#)
[e\) moduleVersion](#)
[f\) moduleType](#)
[g\) essNtcipCategory](#)
[h\) essNtcipSiteDescription](#)
[i\) essTypeOfStation](#)
~~a)j) essNumPressureSensors~~
~~b)k) essPressureSensorHeight~~
[l\) essPressureSensorLocation](#)
[m\) essPressureSensorModelInformation](#)
[n\) windSensorTableNumSensors](#)
[o\) windSensorHeight](#)
~~e)p) windSensorLocation~~
[q\) windSensorModelInformation](#)
[r\) essNumTemperatureSensors](#)
~~d)s) essTemperatureSensorHeight~~
~~a)t) essTemperatureSensorLocation~~
[u\) essTemperatureSensorModelInformation](#)
~~e)v) waterLevelSensorTableNumSensors~~
~~b)w) waterLevelSensorHeight~~
~~e)x) waterLevelSensorLocation~~
~~d)y) waterLevelSensorModelInformation~~
[z\) waterLevelSensorReferencePoint](#)
~~e)aa) precipitationSensorTableNumSensors~~
~~f)bb) precipitationSensorHeight~~
~~e)cc) precipitationSensorLocation~~
~~h)dd) precipitationSensorModelInformationV4~~
~~i)ee) humiditySensorTableNumSensorsHeight~~
~~j)ff) humiditySensorLocation~~
~~k)gg) humiditySensorModelInformation~~
~~l)hh) humiditySensorTemperatureInformation~~
~~m)ii) radiationSensorTableNumSensors~~
~~n)jj) radiationSensorHeight~~
~~e)kk) radiationSensorLocation~~
~~p)ll) radiationSensorModelInformation~~
~~e)mm) visibilitySensorHeight~~
~~r)nn) visibilitySensorLocation~~
~~e)oo) visibilitySensorModelInformation~~
[pp\) numEssPavementSensors](#)
[qq\) essPavementSensorLocation](#)
[rr\) essPavementType](#)
[ss\) essPavementElevation](#)
[tt\) essPavementExposure](#)
[uu\) essPavementSensorType](#)
[vv\) pavementSensorModelInformation](#)
[ww\) pavementSensorTemperatureDepth](#)
[xx\) numEssSubSurfaceSensors](#)
[yy\) essSubSurfaceSensorLocation](#)
[zz\) essSubSurfaceType](#)
~~f)aaa) essSubSurfaceSensorDepth~~
~~bbb) essSubSurfaceSensorModelInformation~~
[ccc\) numEssTreatments](#)
[ddd\) essPaveTreatProductType](#)

[eee\) __essPaveTreatProductForm](#)
[fff\) __essPercentProductMix](#)
[ggg\) __ptsSignalDuration](#)
[hhh\) __ptsMonitoringDetectors](#)
[iii\) __essSnapshotNumberOfCameras](#)
[g\)jjj\) __essSnapshotCameraDescription](#)
~~kkk) __airQualitySensorTableNumSensors~~
~~lll) __airQualitySensorHeight~~
~~mmm) __airQualitySensorLocation~~
[nnn\) __airQualitySensorModelInformation.](#)

[A change to any of these object values shall also cause a change to the value for globalSetIDParameter.](#)

§