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IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Identifier Allocations

IEEE Vehicular Technology Society

Sponsored by the
Intelligent Transportation Systems Committee

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IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Identifier Allocations

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of the
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Abstract: Wireless Access in Vehicular Environments (WAVE) is specified in the IEEE 1609 family of standards, within which a number of identifiers are used. This document describes the use of these identifiers, indicates identifier values that have been allocated for use by WAVE systems, and specifies the allocation of values of identifiers specified in the WAVE standards.
Keywords: IEEE 1609.12, management ID, PSID, WAVE

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Introduction

This introduction is not part of IEEE Std 1609.12-2012, IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Identifier Allocations.

This standard specifies allocations of wireless access in vehicular environments (WAVE) identifiers defined in the IEEE 1609™ series of standards.

Contents

IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Identifier Allocations

1. Overview

1.1 Scope

This standard specifies allocations of wireless access in vehicular environments (WAVE) identifiers defined in the IEEE 1609™ series of standards.

1.2 Purpose

This standard records the WAVE identifier allocation decisions made by the IEEE 1609™ Working Group.

1.3 Conventions

Numbers are decimal unless otherwise indicated.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std 802.11™, IEEE Standard for Information Technology—Telecommunications and Information Exchange Between Systems—Local and Metropolitan Area Networks—Specific Requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.[1, 2]

IEEE Std 1609.3™, IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Networking Services.

IEEE Std 1609.4™, IEEE Standard for Wireless Access in Vehicular Environments (WAVE)—Multi-Channel Operation.

3. Acronyms

AID	application identifier
CEN	European Committee for Standardization (Comité Européen de Normalisation)
DSRC	dedicated short range communications
IPv6	Internet Protocol version 6
ISO	International Organization for Standardization
LLC	logical link control
MIB	management information base
OID	object identifier
OUI-36	organizationally unique identifier
PSID	provider service identifier
TC	technical committee
WAVE	wireless access in vehicular environments
WG	working group
WSMP	WAVE short message protocol

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4. WAVE identifiers

4.1 Provider service identifier (PSID)

4.1.1 PSID background and use

A PSID is a variable-length field whose format is specified in IEEE Std 1609.3.[3] Each allocated PSID is associated with an organization that is authorized to describe the use of that PSID.

PSIDs have two uses specified in IEEE Std 1609.3. First, a service provider indicates offered services by the PSID values in WAVE Service Advertisement messages it transmits. Second, the WAVE Short Message Protocol (WSMP) delivers WAVE Short Message content to higher layer entities based on the PSID value set by the sender in the message header. A third use of the PSID is specified in IEEE P1609.2/D16. A security certificate lists the PSID value(s) that a sender is authorized to include in either a WAVE Service Advertisement or a WAVE Short Message.

The fixed-length PSID format and values specified in trial-use IEEE Std 1609.3-2007 are deprecated and the registration process described in that document is no longer in effect. None of these values was fielded for other than experimental purposes. The IEEE Registration Authority assignment procedures specified in that standard are inoperative.

The intention of the IEEE 1609 Working Group is to harmonize the PSID with similar identifiers being specified in other international Intelligent Transportation Systems standards organizations including ISO.

4.1.2 PSID format

The PSID format is specified in IEEE Std 1609.3. The most significant bit(s) indicate the length of the PSID field. A binary ‘0’ in the most significant bit indicates a one octet PSID; a binary ‘10’ in the two most significant bits indicates a two octet PSID; a binary ‘110’ in the three most significant bits indicates a three octet PSID; and a binary ‘1110’ in the four most significant bits indicates a four octet PSID. PSID values are assigned as unique octet strings of length one, two, three, or four octets. Details and examples may be found in IEEE Std 1609.3.

4.1.3 PSID allocations

At the time of publication of this standard, PSID values are allocated as specified in Table 1. Those allocated to ISO are consistent with the list of AIDs published in ISO standards including ISO 15628:2007. Any future allocations made by the IEEE 1609 Working Group will be published in a future revision of this standard. It is expected that one or more authorities will be identified to manage the values that are not allocated in Table 1; until such time, requests for future allocations should be made to the IEEE 1609 Working Group Chair (http://standards.ieee.org/develop/wg/1609_WG.html).

[3] Information on references can be found in Clause 2.

Table 1—PSID allocations

PSID values (hexadecimal)	Application area	Organization	Number of values (decimal)
PSID length: 1 octet			
00	system	ISO[a]	1
01	electronic-fee-collection	ISO[a]	1
02	freight-fleet-management	ISO[a]	1
03	public-transport	ISO[a]	1
04	traffic-traveller-information	ISO[a]	1
05	traffic-control	ISO[a]	1
06	parking management	ISO[a]	1
07	geographic-road-database	ISO[a]	1
08	medium-range-preinformation	ISO[a]	1
09	man-machine-interface	ISO[a]	1
0A	intersystem-interface	ISO[a]	1
0B	automatic-vehicle-identification	ISO[a]	1
0C	emergency-warning	ISO[a]	1
0D	private	ISO[a]	1
0E	multi-purpose-payment	ISO[a]	1
0F	dsrc-resource manager	ISO[a]	1
10	after-theft-systems	ISO[a]	1
11	cruise-assist-highway-system	ISO[a]	1
12	multi-purpose-information-system	ISO[a]	1
13	multi-mobile-information-system	ISO[a]	1
14	efc-compliance-check-communication -applications	ISO[b]	1
15	efc-localisation-augumentation -communication-applications	ISO[c]	1
16 to 1C	reserved for ISO/CEN-dsrc-applications	ISO[a]	7
1D to 1E	reserved for private use	ISO[a]	2
1F	reserved for ISO/CEN-dsrc-applications	ISO[a]	1
20	vehicle to vehicle safety and awareness[d]	SAE DSRC TC[e]	1
21	limited sensor vehicle to vehicle safety and awareness[d]	SAE DSRC TC	1
22	tracked vehicle safety and awareness[d]	SAE DSRC TC	1
23	WAVE security management	IEEE 1609 WG[f]	1
24 to 7E		Not allocated	91
7F	testing[g]	IEEE 1609 WG	1
PSID length: 2 octets			
80-00	differential GPS corrections, uncompressed[d]	SAE DSRC TC	1
80-01	differential GPS corrections, compressed[d]	SAE DSRC TC	1
80-02	intersection safety and awareness[d]	SAE DSRC TC	1
80-03	traveller information and roadside signage[d]	SAE DSRC TC	1
80-04	mobile probe exchanges[d]	SAE DSRC TC	1
80-05	emergency and erratic vehicles present in roadway[d]	SAE DSRC TC	1
80-06 to BD-FF		Not allocated	15 866
BE-00 to BF-9F	Reserved[h]	IEEE 1609 WG	416
BF-A0 to BF-DF	Private use[i]	IEEE 1609 WG	64
BF-E0 to BF-FF	Testing[g]	IEEE 1609 WG	32
PSID length: 3 octets			
C0-00-00 to DF-FF-FF		Not allocated	2 097 152

PSID values (hexadecimal)	Application area	Organization	Number of values (decimal)
PSID length: 4 octets			
E0-00-00-00 to EF-FF-FF-FF		Not allocated	268 435 456
PSID length: ≥ 5 octets			
	Reserved[h]		

[a] Defined in ISO 15628 as dsrcApplicationEntityId (AID)
[b] Published in ISO TS 12813:2009; planned for publication in ISO 15628
[c] Published in ISO TS 13141:2010; planned for publication in ISO 15628
[d] This PSID value is used with selected messages defined in SAE J2735
[e] http://www.sae.org/servlets/works/committeeHome.do?comtID=TEVDSRC
[f] Use of this PSID is specified in IEEE P1609.2
[g] A PSID value allocated to the IEEE 1609 WG for testing purposes is not identified with a standard application area. It is expected to be used only in testing environments, not to convey information about deployed applications. The meaning associated with a given Testing PSID value will be specific to the testing environment in which it is used. The means by which a WAVE device determines the meaning of a Testing PSID value are outside the scope of this standard.
[h] A reserved PSID value is not available for allocation in the current version of the standard. The IEEE 1609 WG may allocate the reserved values in a future version.
[i] A PSID value allocated to the IEEE 1609 WG for private use is not identified with a standard application area. A set of WAVE devices can use a private value to convey a mutually agreed meaning. Both the meaning and the means by which the devices determine the meaning are outside the scope of this standard. There is no guarantee that all devices operating in a given area attach the same meaning to the value.

4.2 Object identifier (OID)

In IEEE 1609 standards, OID is used to identify management information bases (MIBs) and objects within MIBs. OID format is specified in ISO/IEC 8824-1 and ISO/IEC 8825-1.

The values are hierarchically assigned, in this case through ISO and IEEE. The IEEE 1609 Working Group is assigned value 1609 by the IEEE Standards Association[4] at the fifth level of the hierarchy as shown below. Both the numeric value (in parentheses) and the text descriptor of each of the five levels of OID allocation are shown.

iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) wave-stds(1609)

Within the 1609 numbering space, at the sixth level of the hierarchy, each value is reserved for the standard bearing that number. For example IEEE Std 1609.3 uses dot3(3), IEEE Std 1609.4 uses dot4(4), etc. Within an IEEE 1609 MIB, values within that standard's numbering space may be assigned. For example, IEEE Std 1609.3 uses the next lower level number (at the seventh level of the hierarchy) to distinguish the 2010 Full Use standard MIB (value 2) from the 2007 Trial Use standard MIB (value 1).

4.3 Ethertype

Ethertype is a 2-octet field with values assigned by the IEEE Registration Authority;[5] it is used to identify the networking protocol employed above the LLC sublayer. IEEE Std 1609.3 specifies the use of two Ethertype values (i.e., networking protocols): IPv6 and WSMP.

The hexadecimal value indicating WSMP is '88DC.' The hexadecimal value indicating IPv6 is '86DD.'

[4] For a description of OIDs in the context of IEEE standards, please see http://standards.ieee.org/develop/regauth/tut/oid.pdf.
[5] Allocations can be published at http://standards.ieee.org/develop/regauth/ethertype/eth.txt.

4.4 Individual address block (OUI-36)

The OUI-36 identifier is a 36-bit value used to identify the organization responsible for the definition of the content of "vendor specific" messages. Specifically, an OUI-36 identifier is used in Vendor Specific Action Frames and in the Vendor Specific information element in other frames as specified in IEEE Std 1609.4 and IEEE Std 802.11 and as illustrated in Figure 1, where field lengths are in bits.

An OUI-36 identifier with hexadecimal value '00 50 C2 4A 4' has been assigned to the IEEE 1609 Working Group by the IEEE Registration Authority.

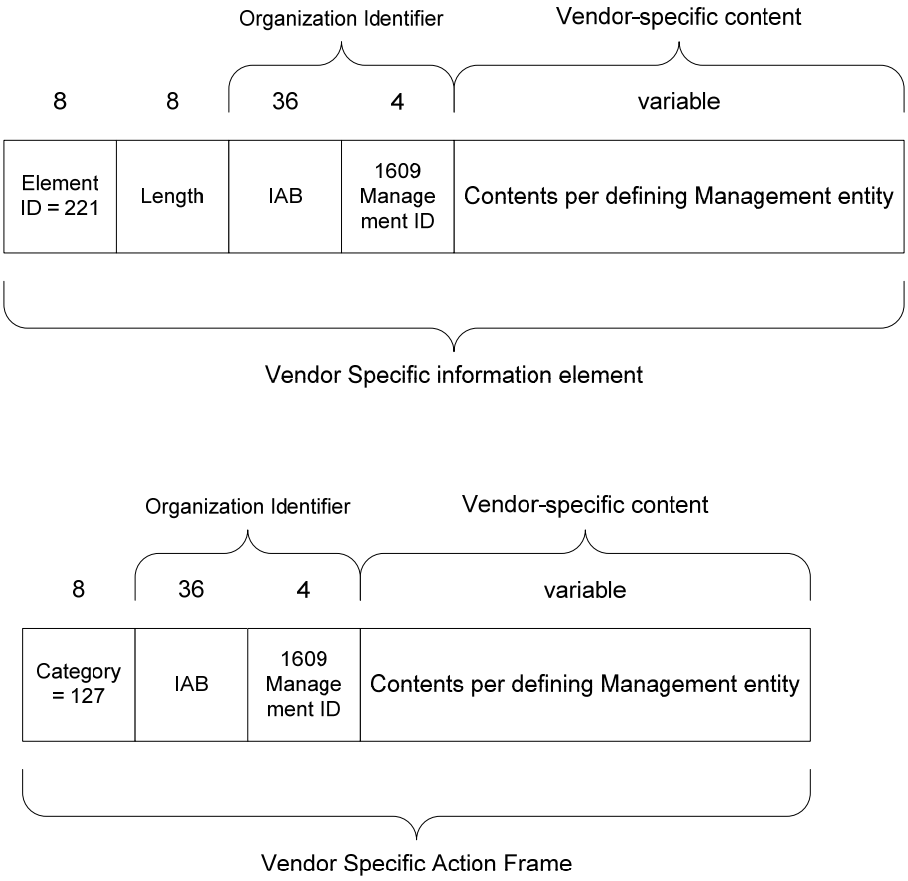

Figure 1—Use of OUI-36 identifier and management ID

4.5 Management ID

Management ID is used by the WAVE Medium Access Control (MAC) Layer Management Entity (MLME) specified in IEEE Std 1609.4 to distinguish among different WAVE management functions that may send or receive management information (e.g., in Vendor Specific Action frames). See Figure 1.

Values are allocated as shown in the list below. The Expansion code accounts for the eventuality that the 4-bit space may be exhausted, but its use is not currently specified.

Management ID value (decimal)	Use defined in:
0	reserved
1	reserved
2	reserved
3	IEEE Std 1609.3
4	reserved
5	reserved
6	IEEE P1609.6
7	reserved
8	reserved
9	reserved
10	reserved
11	reserved
12	reserved
13	reserved
14	reserved
15	expansion code

Annex A

(informative)

Bibliography

Bibliographical references are resources that provide additional or helpful material but do not need to be understood or used to implement this standard. Reference to these resources is made for informational use only.

[B1] IEEE P1609.2™/D16 (August 2012), IEEE Draft Standard for Wireless Access in Vehicular Environments—Security Services for Applications and Management Messages.[6]

[B2] IETF RFC 1042, Standard for the Transmission of IP Datagrams over IEEE 802 Networks.[7]

[B3] ISO 15628:2007, Road transport and traffic telematics—Dedicated short range communication (DSRC)—DSRC application layer.[8]

[B4] ISO/IEC 8824-1, Information technology—Abstract Syntax Notation One (ASN.1): Specification of basic notation.

[B5] ISO/IEC 8825-1, Information technology—ASN.1 encoding rules: Specification of Basic Encoding Rules (BER). Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).

[B6] ISO TS 12813:2009, Electronic fee collection—Compliance check communication for autonomous systems.

[B7] ISO TS 13141:2010, Electronic fee collection—Localisation augmentation communication for autonomous systems.

[B8] SAE J2735, Dedicated Short Range Communications (DSRC) Message Set Dictionary.[9]

[6] This IEEE standards project was not approved by the IEEE-SA Standards Board at the time this publication went to press. For information about obtaining a draft, contact the IEEE.
[7] IETF documents (i.e. RFCs) are available for download at http://www.rfc-archive.org/.
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