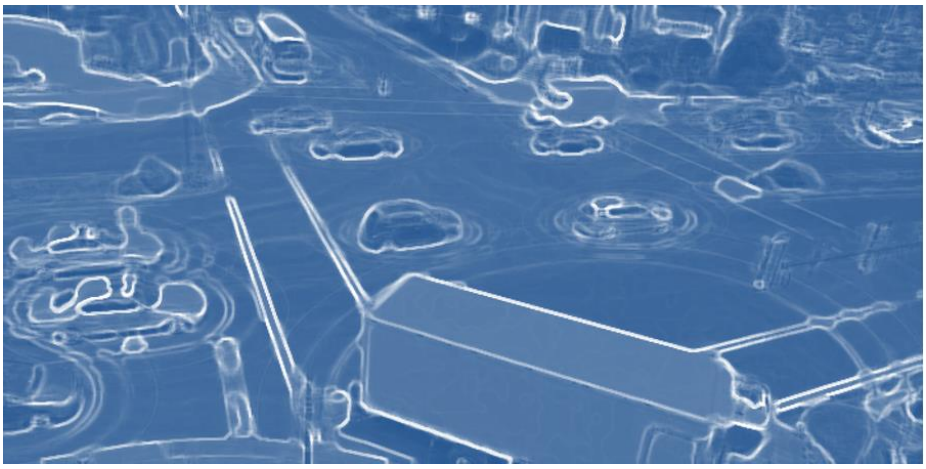

Conformance test specifications for

Wireless Access in Vehicular Environments (WAVE) — Networking Services

Test Suite Structure and Test Purposes (TSS & TP)

Document Mnemonics:	WAVENS-TSS&TP
Revision:	[V1.3.3]
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Table of Contents

1 Scope

This document provides the Test Suite Structure and Test Purposes for WAVE Network Services (WNS) as defined in IEEE 1609.3 [2]. The document defines a set of Test Purposes including Test Descriptions and the structure for the Test Suite.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [3] and ISO/IEC 9646-2 [4]) as well as the ETSI rules for conformance testing (ETS 300 406 [7]) are used as a basis for the test methodology.

2 References

2.1 Normative References

The following referenced documents are necessary for the application of the present document.

[1] SAE J2945/1 MAR2016: “Surface Vehicle Standard - On-board System Requirements for V2V Safety Communications”

[2] IEEE Std 1609.3-2016 “IEEE Standard for Wireless Access in Vehicular Environments (WAVE) — Network Services”.

[3] ISO/IEC 9646-1 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework - Part 1: General concepts".

[4] ISO/IEC 9646-2 (1994): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 2: Abstract Test Suite specification".

[5] IEEE Std. 1609.12-2016 “IEEE Standard for Wireless Access in Vehicular Environments – Identifier Allocations”.

[6] ISO/IEC 9646-7 (1995): "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[7] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[8] IEEE Std. 1609.2-2016: "IEEE Standard for Wireless Access in Vehicular Environments - security Services for Applications and Management Messages".

[9] IETF RFC 4862, IPv6 Stateless Address Configuration.

[10] IEEE Std. 1609.4-2016 “IEEE Standard for Wireless Access in Vehicular Environments (WAVE) -- Multi-Channel Operation”.

[11] TCIS (V0.6.0): “Test Control Interface Specification.”: Revision date 4/21/2017, download from https://github.com/certificationoperatingcouncil/TCI_ASN1.

2.2 Informative References

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EG 202 798 (V1.1.1): "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in IEEE 1609.3 [2], ISO/IEC 9646-1 [3] and in ISO/IEC 9646-7 [6] apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BI	Behavior Invalid
BSM	Basic Safety Message
BV	Behavior Valid
CH[#]	Operating Channel
CCH	Control Channel
DSRC	Dedicated Short Range Communication
EIRP	Equivalent Isotropically Radiated Power
ICMP	Internet Control Message Protocol
IETF	Internet Engineering Task Force
ITS	Intelligent Transport Systems
IUT	Implementation Under Test
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PSID	Provider Service Identifier
SCH	Service Channel
SUT	System Under Test
TAI	International Atomic Time
TC	Test Configuration
TP	Test Purposes
TS	Test System
TSS	Test Suite Structure
WAVE	Wireless Access in Vehicular Environments
WME	WAVE Management Entity
WNS	WAVE Network Services
WRA	WAVE Routing Advertisement
WSA	WAVE Service Advertisement
WSM	WAVE Short Message
SAP	Service Access Point
TSF	Timing Synchronization Function

Terminology adopted in this document is chosen to be consistent with the analogous terms used in ETSI specifications [i.1]. For example, the IUT may be viewed as a reference to a physical device subjected to the testing. However, unlike device testing, the tests described in this document are focused on testing a subset of the overall device functionality. Therefore, a device neutral term is adopted to refer to a device such as an Implementation-Under-Test (IUT).

Test Purposes (TPs) and test descriptions described in this document are analogous to test cases commonly used in many test methodologies. These terms are also adopted for consistency with [i.1]. Note, that the goal for TPs is to describe an abstract test approach in terms of test requirements regardless of the test system implementation.

When the implementation of a conformance test system is considered, the notion of the IUT is replaced with the SUT (System-Under-Test). The SUT is comprised of the IUT with additional components which are used to facilitate testing, but are not part of the IUT. For example, the SUT may include the IUT with a special testing port, additional software and a specific configuration supporting an interface to a test system.

4 Prerequisites and Test Configurations

4.1 Test Configurations

This clause introduces the test configurations that is used for the definition of test purposes. The test configurations cover the various scenarios of the WAVE Network Services (WNS) tests.

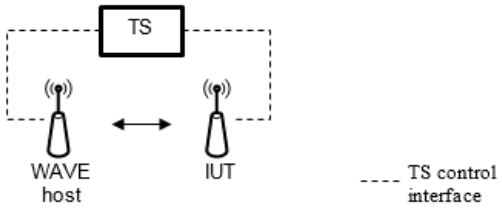


Figure 4-1 Test Configuration 1 (TC1) – Sending/Receiving WSMs

The Test Configuration 1 as shown in Figure 4-1is applied for the tests dealing with transmission and reception of WAVE Short Messages (WSM).

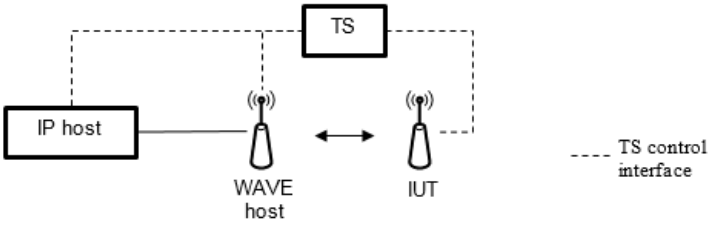


Figure 4-2 Test Configuration 2 (TC2) – IPv6 Host Communications

The Test Configuration 2 as shown in Figure 4-2 is applied for the communication test group dealing with exchange between IUT and IP host using IPv6 protocol. TC2 depicts an IP host connected to the WAVE host via a wired Ethernet link with the corresponding routing tables established to facilitate two-way packet exchanges between the IUT and the IP host.

4.1.1 Global Test Parameters

Below are listed global test parameters / conditions that are applicable to all test cases in this specification.

Note: All the WSM messages transmitted from the IUT will be of a broadcast type unless otherwise specified.

4.1.1.1 Channels

Select test values for Channel specified using *pChannel* according to the following table:

Table 4-1: Channels

Parameter name	Range of permitted values	Setting used for testing	Reference
Channel specified as *pChannel*	10MHz channels: 172, 174, 176, 178, 180, 182, 184 20MHz channels: 175, 181	172	[2]
Channels specified as CH1 and CH2		Perform test sequence with the following channel sets: CH1=178, CH2 = 174 CH1=178, CH2 = 182 CH1=172, CH2 = 184	[2]

Deleted: 74

Deleted: 7

Deleted: CH1=178, CH2 = 178¶
CH1=174, CH2 = 174¶

For those TPs where tests must be repeated using different channels defined by *pChannel*, set *pChannel* consecutively to values 172, 176, 178, 182, and 184.

4.1.1.2 Data Rate

Select test values for Data Rate specified using *pDataRate* according to the following table.

Table 4-2: Data Rates

Parameter name	Range of permitted values	Setting used for testing	Reference
Data Rate (Mbps)	10MHz channels: 3, 4.5, 6, 9, 12, 18, 24, 27	6	[2]

If test require repetition using different data rates, use the following discrete values 3, 6, 12, 27Mbps

4.1.1.3 Transmit Power

The transmit power out of the DSRC Radio Subsystem measured at the antenna connector of the Subsystem housing, unless otherwise stated in the Test Purpose shall use *pTxPowerDefault, where*

pTxPowerDefault = Round_Up (((MaxTxPowerCap - PwrRange) + MaxTxPowerCap) / 2)

The rationale for parameters *MaxTxPowerCap, vPwrRange, vTxPwrCtrlStep* used in this document is as specified in SAE J2945/1 [1].

PwrRange is calculated per [1] as: MaxTxPowerCap – (vRPMax – vTxPwrRange) + MinSectorAntGain – CLoss

Assuming

vRPMax = 20dBm [[1]].

vTxPwrRange = 10dBm [[1]].

MinSectorAntGain – CLoss = 0 (for module testing at connector port)

Then PwrRange = MaxTxPowerCap – 10dBm

MaxTxPowerCap is the maximum conducted transmit power setting in dBm of the DSRC Radio Subsystem at which 802.11 transmitter requirements are met. *MaxTxPowerCap* will need to be provided with the IUT by the test requestor.

Table 4-3: Transmit Power

Parameter name	Range of permitted values	Setting used for testing[1]	Reference
Transmit Power (dBm)	Transmit Power (EIRP): Class A: -92 to 23 dBm Class B: -92 to 23 dBm Class C: -92 to 33 dBm Class D: non-government use: -92 to 33 dBm government use : -92 to 44.8 dBm	*pTxPowerDefault*	Default setting selected per [[1]]

If test must be repeated using different values of *pTxPower*, the following discrete settings will be used (dBm):

- *pTxPowerDefault* – 2 * vTxPwrCtrlStep
- *pTxPowerDefault* – vTxPwrCtrlStep
- *pTxPowerDefault*
- *pTxPowerDefault* + vTxPwrCtrlStep
- *pTxPowerDefault* + 2 * vTxPwrCtrlStep

Where vTxPwrCtrlStep = 1dB [1]

4.1.1.4 PSID

Select test values for PSID specified using *pPSID* according to the following table.

Table 4-4: PSID

Parameter name	Range of permitted values (p-encoded)	Setting used for testing	Reference
PSID	1byte PSID: 0p00 to 0p7F 2byte PSID: 0p80-00 to 0pBF-FF 3byte PSID: 0pC0-00-00 to 0pDF-FF-FF 4byte PSID: 0pE0-00-00-00 to 0pEF-FF-FF-FF	0p7F 0pBF-FF 0pDF-FF-FF 0pEF-FF-FF-FF	[5]
PSID1 PSID2		0p7F 0pBF-FF	[5]
PSID for WSA WAVE Sec Mgmt BSM IP routing		 0p80-07 0p23 0p20 0pEF-FF-FF-FE	[5]

4.1.1.5 User Priority

Table 4-5: User Priority

Parameter name	Range of permitted values	Setting used for testing	Reference
User Priority	0-7	3	[2]

[1] Specified transmit power setting may be higher than acceptable receiver input and cause damage to the receiver. Use of an attenuator may be warranted to protect receiver input circuits.

4.1.1.6 WSM Max Data Length

Set the value for *WsmMaxDataLength* to 1400 bytes

4.1.1.7 Transmission Repeat Rates

Select test values for message repeat rates according to the following table.

Table 4-6: Repeat Rate

Parameter name	Range of permitted values (msg/sec)	Setting used for testing	Reference
Repeat Rate for WSA transmissions (*pWSARepeatRate*) *Repeat Period Tolerance for WSA (pWSARepeatPeriodTolerance)*	0 – 51	2 msg/sec or 500ms repeat period Repeat period tolerance 10ms	Recommended practice Repeat period tolerance derived from [1]
Repeat Rate for WSM transmissions *(pWSMRepeatRate)* *Repeat Period Tolerance for WSM (pWSMRepeatPeriodTolerance)*	0 – 51	10 msg/sec or 100ms repeat period Repeat period tolerance 10ms	Recommended practice Repeat period tolerance derived from [1]

Where relationship between the Repeat Rate and the Repeat Period is as follows:

pWSMRepeatPeriod = 1 / pWSMRepeatRate

pWSARepeatPeriod = 1 / pWSARepeatRate

Message Repeat Rates in Table 4-6 show the number of messages per 1 sec interval whereas in [11] the Repeat Rates are defined as the number of messages per 5 sec interval. When pWSARepeatRate and pWSMRepeatRate are used in a test system which uses the TCI interface from [11], the test settings in **Table 4-6** must be multiplied by 5. For example, when the SUT is tested at a repeat rate of 10 messages per second, it will receive a TCI message with the repeat rate value set to 50 messages (per 5 seconds).

4.1.1.8 Average Repeat Rates for Received Messages

Use the following method to determine the uppler and lower limits of the Repeat Period Mean for sample received messages:

Record reception times for the received messages as T_n. The total number of the received message in the test sample is denoted as MsgRvcCount. The index "n" refers to individual messages in the test sample.

The minimum recommended value for MsgRcvCount is 100.

Calculate average repeat rate AvgRP = $\frac{\sum_{n=2}^{MsgRcv} \Delta(T_n)}{MsgRcvCount}$, where $\Delta(T_n) = T_n - T_{n-1}$

Calculate standard deviation RPStdDev= $\sqrt{\frac{\sum(\Delta(T_n) - AvgRP)^2}{MsgRcvCount - 1}}$

Following the statistics outlined in the article "Standard Error" on Wikipedia [https://en.wikipedia.org/wiki/Standard_error]

Calculate the standard error of the mean SEM = $\frac{RPStdDev}{\sqrt{MsgRcvCount}}$

Assuming 95% confidence,

The Upper limit of the Repeat Period Mean RPMup = AvgRP + (1.96 x SEM)

The Lower limit of the Repeat Period Mean RPMlo = AvgRP - (1.96 x SEM)

4.1.1.8.1 Test Criteria for Repeat Rates

Test criteria are established by comparing Repeat Period and Tolerance established in the Table 4-6 with the Repeat Period Mean calculated from a test sample.

The Upper Limit of the Repeat Period Mean expected to be less or equal than the requested Repeat Period plus the Repeat Period Tolerance

$$RPMup \leq RepeatPeriod + RepeatPeriodTolerance$$

The Lower Limit of the Repeat Period Mean expected to be greater or equal than the requested Repeat Period minus the Repeat Period Tolerance

$$RPMlo \geq RepeatPeriod - RepeatPeriodTolerance$$

Where RepeatPeriod and RepeatPeriodTolerance for WSM and WSA are listed in Table 4-6.

4.1.1.9 IP transmission and reception

For IP datagrams, the channel, transmit power, and data rate parameters (default values) to be used are stored in a transmitter profile. This transmitter profile will be provided by the equipment vendor and used to parameterize the test.

4.2 Feature Restriction and Behavior Description

4.2.1 Feature Restriction

In this clause all feature restrictions are listed:

- For multiple radio devices only one radio is tested at a time.
- 20MHz channels are not considered in the scope of this document
- Testing for other IETF protocols except ICMPv6 is not considered
- Immediate/extended access to communication media is not considered
- No testing for Channel Load
- No testing for TSF messages
- Only signed WSAs are considered
- Multicast IPv6 is not tested
- Testing for the SAP defined in [2] is not considered

4.3 Rules for the Behavior Description

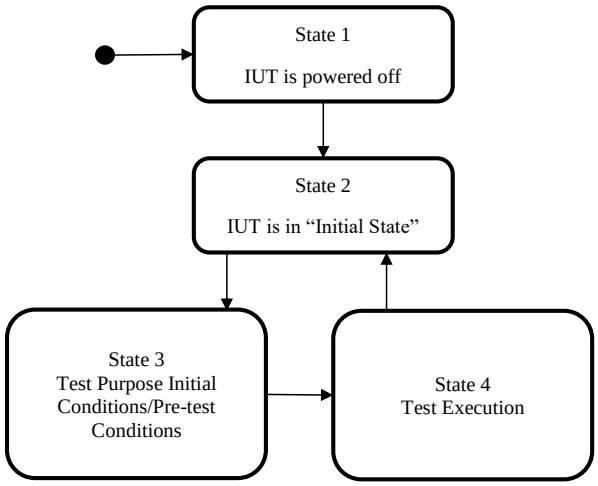
The description of the TP is built according to EG 202 798 [i.1].

Test purposes use a generic "Initial State" that corresponds to a state where the IUT is ready for starting the test execution. Furthermore, the IUT shall be left in this "Initial State", when the test is completed.

Being in the "Initial State" refers to the starting point of the initial device configuration. There are no pending actions, no instantiated buffers or variables, which could disturb the execution of a test.

4.3.1 Conditions for the Initial State

Overall state diagram for a test system is shown below.



Most of the TPs start from the “initial state” which is defined as follows:

- Test Environment and Test System has reached room temperature (21 degrees Celsius +/- 5 degrees).
- No external DSRC units within range of IUT, DSRC Packet Capture Tool, and DSRC Reference Unit are transmitting outside of the test setup.
- The IUT is powered up
- Radio interface is initialized but does not transmit or receive messages over any DSRC channels
- Radio acquired and locked its position based on GNSS
- MAC address is assigned to the DSRC interface
- Unless otherwise stated, the IUT is not transmitting
- Unless otherwise stated, Congestion Control is disabled
- The IUT is provisioned with any required security credentials to enable transmission or reception of messages over DSRC
- The IUT is running Certification Interface Application [11]
- If device supports IPv6 addressing, it performed stateless configuration procedure and assignment of link-local IPv6 address to the radio DSRC interface.

Some TPs may from a different initial condition. Initial conditions required for specific test cases defined in the Initial condition section of a Test Purpose. However, the “initial state” defined above is the starting point before the different initial conditions are established.

When execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.

5 Test Suite Structure (TSS)

5.1 Structure for Network Services Tests

The test suite is structured as a tree with the root defined as 16093. The tree is of rank 3 with the first rank a Group, the second a Sub-group, and the third a category. The third rank is the standard ISO conformance test categories.

5.1.1 Root

The root identifies the 1609.3 protocol given in IEEE 1609.3 [2].

5.1.2 Groups

This level contains three message types identified as:

WAVE Short Messages
WAVE Service Advertisements
Internet Protocol

5.1.3 Sub-Groups

This level contains functional areas identified in the Table 5-1

Table 5-1: Functional areas

Functional areas	Description
Configuration	Validation of IUT configuration parameters
Service Change	WSA alterations due to changes in provider service
Communications	Testing communications in continuous and alternating operation
Message Structure	Validation of message structure
Protocol Operation	Testing for message payload boundaries
Packet Processing	Message reception and processing
Radio Operation	Consistency between radio settings and those included in messages

5.1.4 Categories

This level contains the standard ISO conformance test categories limited to the behavior valid event and behavior invalid event.

6 Test Purposes (TP)

6.1 Introduction

6.1.1 TP definition conventions

The TPs are defined by the rules shown in Table 6-1 built according to EG 202 798 [i.1].

Table 6-1: TP definition rules

Test Purpose ID	The Test Purpose ID is a unique identifier. It shall be specified according to the TP naming conventions defined in the clause below.
Summary	Short description of test purpose objective according to the requirements from the base standard.
References	The reference indicates the sub-clauses of the reference standard specifications in which the conformance requirement is expressed.

Test Configuration	The Config Id references the test configuration selected for this TP.
PICS Selection	Reference to the PICS statement involved for selection of the TP. It may contain a Boolean expression.
Pre-Test Conditions	A list of test specific pre-conditions that need to be met by the SUT including information about equipment configuration, i.e. precise description of the initial state of the SUT required to start executing the test sequence
Test Sequence	An ordered list of equipment operation and observations. In case of a conformance test description the test sequence contains also the conformance checks as part of the observations
IUT	IUT category for which this test is applicable
Event Types	
Stimulus	Corresponds to an event that enforces an IUT to proceed with a specific protocol action, like sending a message for instance.
Check	Ensures the conditions are appropriate to move to the next step in the test procedure, e.g. the receipt of protocol messages on reference points (i.e. output of the test system) with valid content, typically before the IUT stimulus is triggered. These events are not associated with the verdict evaluation (i.e. Pass/Fail)
Verify	Consists of verifying that the IUT behaves according to the expected behavior (for instance the IUT behavior shows that it receives the expected message). Outcome of this event typically evaluate for verdict (i.e. Pass/Fail)
Configure	Corresponds to an action to modify the IUT configuration.
Procedure	Procedural action directing the flow of TP execution.

6.1.2 TP Identifier Naming Conventions

TP identifiers are built according to Table 6-2.

Table 6-2: TP naming convention

Identifier	**TP-<root>-<gr>-<sgr>-<x>-<nn> or TP-<root>-<gr>-<x>-<nn> when no <sgr>**		
	<root> = root	16093	
	<gr> = group	WSM	WAVE Short Messages
		WSA	WAVE Service Advertisements
		IP	Internet Protocol
	<sgr> =sub- group	CFG	Configuration
		CHG	Service Change
		COM	Communications
		MST	Message Structure
		POP	Protocol Operation
		PP	Packet Processing
		ROP	Radio Operation
	<x> = type of testing	BV	Valid Behavior tests
		BI	Invalid Syntax or Behavior Tests
	<nn> = sequential number		01 to 99

6.1.3 Naming Convention for Variants

Some TPs use the concept of variants to provide more concise description. Their definition, how they are used and their naming conventions are defined in this clause.

In case where for a single parameter multiple values can be tested, then a table is appended after the TP. This table lists all the different value which need to be tested. The TP identifier is appended with –X (e.g. **TP-16093-WSA-MST-BV-04-X**). If there are fields for which multiple values can be tested then X is appended. The field itself is written as X_FIELD_NAME (e.g. **X_WAVE_Element_ID**).

Any TP which contains variants must be repeated for all values of X enabled by appropriate selection of PICS identified for an IUT in the PICS proforma.

6.1.4 References

All Test Purposes are derived from requirements defined in [2]. Traceability between TPs and sub-clauses of referenced standard specifications is established in the Table A- 1. For each PICS, a reference section from [2] is listed and an applicable test purposes are identified in the TP ID column.

6.1.5 PICS selection and mnemonics for reference

Table A- 1 includes a complete list of PICS defined in [2] with a traceability to TPs included in the TP ID column.

Table 6-3 lists mnemonic names and maps them to a subset of PICS item number. This is a partial list of PICS used in selecting of certain TPs or TPs which incorporated variances.

Table 6-3: Mnemonics for PICS reference

Mnemonic	PICS item
PIC_ChannelNumber	[2] Annex D, N1.3.2.4.
PIC_DataRate	[2] Annex D, N1.3.2.5.
PIC_TransmitPowerUser	[2] Annex D, N1.3.2.6.
PIC_URepeatRate	[2] Annex D, N2.1.6.4.1.
PIC_U2DLocation	[2] Annex D, N2.1.6.4.2.
PIC_U3DLocation	[2] Annex D, N2.1.6.4.3.
PIC_UAdvertiserId	[2] Annex D, N2.1.6.4.4.
PIC_UPSC	[2] Annex D, N2.1.7.2.1.
PIC_UIPV6Address	[2] Annex D, N2.1.7.2.2.
PIC_UServicePort	[2] Annex D, N2.1.7.2.3.
PIC_UProviderMACAddress	[2] Annex D, N2.1.7.2.4.
PIC_URCPIThreshold	[2] Annex D, N2.1.7.2.5.
PIC_UWSACountThreshold	[2] Annex D, N2.1.7.2.6.
PIC_UWSACountThresholdInt	[2] Annex D, N2.1.7.2.6.1.
PIC_UChannelAccess	[2] Annex D, N2.1.8.2.2.
PIC_UEDCAParamSet	[2] Annex D, N2.1.8.2.1.
PIC_USecondaryDNS	[2] Annex D, N2.1.9.1.1.
PIC_UGatewayMACAddress	[2] Annex D, N2.1.9.1.2.
PIC_PRepeatRate	[2] Annex D, N2.2.6.1.
PIC_P2DLocation	[2] Annex D, N2.2.6.2.
PIC_P3DLocation	[2] Annex D, N2.2.6.3.
PIC_PAdvertiserId	[2] Annex D, N2.2.6.4.
PIC_PPSC	[2] Annex D, N2.2.9.1.
PIC_PIPV6Address	[2] Annex D, N2.2.9.2.
PIC_PServicePort	[2] Annex D, N2.2.9.3.
PIC_PProviderMACAddress	[2] Annex D, N2.2.9.4.
PIC_PRCPIThreshold	[2] Annex D, N2.2.9.5.
PIC_PWSACountThreshold	[2] Annex D, N2.2.9.6.
PIC_PWSACountThresholdInt	[2] Annex D, N2.2.9.6.1.
PIC_PChannelAccess	[2] Annex D, N2.2.12.2.
PIC_PEDCAParamSet	[2] Annex D, N2.2.12.1.
PIC_PSecondaryDNS	[2] Annex D, N2.2.13.1.1.
PIC_PGatewayMACAddress	[2] Annex D, N2.2.13.1.2.

6.1.6 Sources of TP definitions

All TPs are specified according to IEEE 1609.3 [2]. Traceability from PICS to TPs is included in the Appendix A.

The Appendix A includes a full list of PICs from IEEE 1609.3. SAE J2945/1 [[1]] uses a subset of PICS from IEEE 1609.3. Those PICS are identified with status V2V and SCMS. The remaining PICS excluded from the SAE J2945/1 are identified with the status RSE.

6.2 Test Purposes for 1609.3

6.2.1 WSM packet validation

Identifier	TP-16093-WSM-MST-BV-01
Summary	To verify that the IUT will transmit a WSM with the correct LLC EtherType, WSMP-N Header Subtype, WSMP-N Header Option Indicator and WSMP-N Header WSMP version.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSM_without_nExt** in Table 7-1.	
2	Stimulus	The IUT transmits WSM	
3	Verify	The IUT transmitted WSM	Pass/Fail
4	Verify	WSM is included in 802.11 frame, containing Logical-Link Control section, containing 'Type' field indicating EtherType value 0x88DC.	Pass/Fail
4	Verify	WSM N-Header contains 'Subtype' (bits 4-7) indicating '0'	Pass / Fail
5	Verify	WSM N-Header contains 'WSMP-N Header Option Indicator' (bit 3) indicating '0' for **WSM_without_nExt,** or indicating '1' for **WSM_nExt.**	Pass / Fail
6	Verify	WSM-N-Header containing 'WSMP Version' indicating '3'	Pass/Fail
7	Configure	The IUT is configured to transmit **WSM_nExt** in Table 7-2.	
8	Procedure	Repeat steps 2-6	

Identifier	TP-16093-WSM-MST-BV-02
Summary	Verify that the IUT will transmit WSM containing valid WSM-N-Header TPID, WSM-T-Header, containing PSID and WSM Data.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSM_without_nExt** in Table 7-1. with '*pPSID*' and the 'WSM Payload' of a valid length identified by pWSM_Length	
2	Stimulus	The IUT transmits WSM	
3	Verify	The IUT transmitted WSM	Pass / Fail
4	Verify	WSM N-Header contains 'TPID' indicating '0'	Pass / Fail
5	Verify	WSM T-Header contains 'ProviderServiceIdentifier' indicating '*pPSID*'	Pass / Fail
6	Verify	WSM T-Header does not contain 'WAVE Information Elements'	Pass / Fail
7	Verify	WSM Payload contains 'WSMLength', indicating the value equal to *pWSM_Length*.	Pass / Fail

Deleted: equal

8	Verify	WSM Payload contains 'WSMData'. The length of WSMData is equal to pWSM_Length	Pass / Fail
9	Procedure	Repeat steps 1-8 for '*pPSID*' with sizes 1,2,3 and 4 Bytes listed in Table 4-4.	
10	Configure	The IUT is configured to transmit **WSM_nExt** in Table 7-2.	
11	Procedure	Repeat steps 2-9	

6.2.2 WSM transmission parameters

Identifier		TP-16093-WSM-ROP-BV-01	
Summary		Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Channel Number' and matching the actual channel used by the IUT.	
Test Configuration		TC1	
IUT			
Reference:			
PICS Selection		PIC_ChannelNumber	
Pre-test conditions			
• The IUT is in the initial state			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is configured to transmit **WSM_nExt** in Table 7-2 using channel '*pChannel*' and include WAVE Element Extension fields 'Channel Number'.	
2	Stimulus	The IUT transmits WSM	
3	Verify	The IUT transmitted WSM	Pass / Fail
4	Verify	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x0B' (Subtype=0, Opt Ind = 1, Version = 3)	Pass / Fail
5	Verify	WSM N-Header contains 'Wave Info Element' contains 'Count' matching the number of 'Wave Info Element' included in the message (>= 1, cannot be '0')	Pass / Fail
6	Verify	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '15' (Channel Number)	Pass / Fail
7	Verify	WSM N-Header contains 'WAVE Elem Length' indicating '1'	Pass / Fail
8	Verify	WSM N-Header contains 'WAVE Elem' data indicating the Channel Number value equal to '*pChannel*'	Pass / Fail
9	Verify	The Channel value in the WSM N-Header matches the actual channel used by the IUT	Pass / Fail
10	Procedure	Repeat steps 1-9 for other values of '*pChannel*' listed in Section 4.1.1.1.	

Identifier		TP-16093-WSM-ROP-BV-02	
Summary		Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Data Rate' and matching the actual data rate used by the IUT.	
Test Configuration		TC1	
IUT			
Reference:			
PICS Selection		PIC_DataRate	
Pre-test conditions			
• The IUT is in the initial state			
Test Sequence			

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSM_nExt** in Table 7-2 using '*pDataRate*' and include WAVE Element Extension fields 'Data Rate'	
2	Stimulus	The IUT transmits WSM	
3	Verify	The IUT transmitted WSM	Pass / Fail
4	Verify	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x0B' (Subtype=0, Opt Ind = 1, Version = 3)	Pass / Fail
5	Verify	WSM N-Header contains 'Wave Info Element' containing 'Count' matching the number of 'Wave Info Element' included in the message (>= 1, cannot be '0')	Pass / Fail
6	Verify	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '16' (Data Rate)	Pass / Fail
7	Verify	WSM N-Header contains 'WAVE Elem Length' indicating '1'	Pass / Fail
8	Verify	WSM N-Header contains 'WAVE Elem' data indicating the Data Rate value equal to '*pDataRate*'	Pass / Fail
9	Verify	The Data Rate value in the WSM N-Header matches the actual data rate used by the IUT	Pass / Fail
10	Procedure	Repeat steps 1-9 for other values of '*pDataRate'* listed in Section 4.1.1.2.	

Identifier	TP-16093-WSM-ROP-BV-03
Summary	Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Transmit Power Used'.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	PIC_TransmitPowerUsed

Deleted: and matching the actual transmit power used by the IUT

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSM_nExt** in Table 7-2 using '*pTxPower*' and include WAVE Element Extension fields 'Transmit Power Used'	
2	Stimulus	The IUT transmits WSM	
3	Verify	The IUT transmitted WSM	Pass / Fail
4	Verify	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x0B' (Subtype=0, Opt Ind = 1, Version = 3)	Pass / Fail
5	Verify	WSM N-Header contains 'Wave Info Element' containing 'Count' matching the number of 'Wave Info Element' included in the message (>= 1, cannot be '0')	Pass / Fail
6	Verify	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '4' (Transmit Power Used)	Pass / Fail
7	Verify	WSM N-Header contains 'WAVE Elem Length' indicating '1'	Pass / Fail
8	Verify	WSM N-Header contains 'WAVE Elem' data indicating the Transmit Power Used value equal to '*pTxPower*'.	Pass / Fail
9	Procedure	Repeat steps 1-8 for other values of '*pTxPower'* listed in the Section 4.1.1.3	

6.2.3 Reception of WSMs

Identifier	TP-16093-WSM-PP-BV-01
Summary	Verify that the IUT registered for a PSID service will receive a WSM containing valid WSM-N-Header, valid WSM-T-Header, WSM Data field and excluding optional WAVE Info Element extensions.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state
- The WAVE Host is transmitting on a fixed channel '*pChannel*' in continuous mode messages ***WSM_without_nExt*** defined in Table 7-1 with a '*pPSID*'

Test Sequence

Step	Type	Description	Verdict
1	Configure	IUT configured to received WSMs with '*pPSID*' in continuous mode on channel '*pChannel*'	
2	Check	WSMs is detected on channel '*pChannel*'	
3	Check	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x03' (Subtype=0, Opt Ind = 0, Version = 3)	
4	Check	WSM N-Header contains 'TPID' indicating '0'	
5	Check	WSM T-Header contains 'ProviderServiceIdentifier' indicating '*pPSID*'	
6	Check	WSM T-Header does not contain 'WAVE Information Elements'	
7	Check	WSM T-Header contains 'WSM Length'	
8	Check	WSM contains 'WSM Data' field	
9	Verify	The IUT receives WSMs with '*pPSID*'	Pass / Fail
10	Procedure	Repeat steps 1-9 for '*pPSID*' with sizes 1,2,3 and 4 Bytes listed in Table 4-4.	

Identifier	TP-16093-WSM-PP-BV-02
Summary	Verify that the IUT registered for a PSID service will receive a WSM containing valid WSM-N-Header, valid WSM-T-Header, optional WAVE Info Element extensions, and WSM Data field.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state
- The WAVE Host is transmitting on a fixed channel '*pChannel*' in continuous mode messages ***WSM_nExt*** defined in Table 7-2 with '*pPSID*'.

Test Sequence

Step	Type	Description	Verdict
1	Configure	IUT configured to received WSMs with '*pPSID*' in continuous mode on channel '*pChannel*'	
2	Check	WSMs is detected on channel '*pChannel*'	
3	Check	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x0B' (Subtype=0, Opt Ind = 1, Version = 3)	
4	Check	WSM N-Header contains 'WAVE Info Element' containing 'Count' indicating '3'	

5	Check	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '15' (Channel), 'WAVE Elem Length' indicating '1' and 'WAVE Elem' data indicating value matching '*pChannel*'	
6	Check	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '16' (Data Rate), 'WAVE Elem Length' indicating '1' and 'WAVE Elem' data.	
7	Check	WSM N-Header contains 'WAVE Info Element' containing 'WAVE Element ID' indicating '4' (Transmit Power Used), 'WAVE Elem Length' indicating '1' and 'WAVE Elem' data	
8	Check	WSM N-Header contains 'TPID' indicating '0'	
9	Check	WSM T-Header contains 'ProviderServiceIdentifier' indicating '*pPSID*'	
10	Check	WSM T-Header does not contain 'WAVE Information Elements'	
11	Check	WSM T-Header contains 'WSM Length'	
12	Check	WSM contains 'WSM Data'	
13	Verify	The IUT receives WSMs with '*pPSID*'	Pass / Fail
14	Procedure	Repeat steps 1-13 for '*pPSID*' with sizes 1,2,3 and 4 Bytes listed in Table 4-4.	

6.2.4 WSM communications with continuous channel access

Identifier	TP-16093-WSM-COM-BV-01
Summary	Verify that the IUT will transmit WSMs in continuous operation on a selected channel
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit ***WSM_nExt_ch*** defined in Table 7-3 in continuous operation on a fixed channel '*pChannel*'	
2	Stimulus	The IUT to transmits WSMs continuously with an average rate '*pWSMRepeatRate*'	
3	Verify	WSMs are detected on the channel '*pChannel*'	Pass / Fail
4	Verify	WSMs N-Header contains 'WAVE Info Element' containing 'Channel Number' indicating '*pChannel*'	Pass / Fail
5	Verify	For *n* samples of WSMs calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
6	Procedure	Repeat steps 1-5 for '*pChannel*' specified in the Section 4.1.1.1.	

Identifier	TP-16093-WSM-COM-BV-02
Summary	Verify that the IUT will receive WSMs in continuous operation on a selected channel.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

• The WAVE Host is transmitting on a channel '*pChannel*' in continuous mode messages ***WSM_nExt_ch*** defined in Table 7-3 with an average rate '*pWSMRepeatRate*'			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is configured to receive WSMs in continuous operation on a fixed channel '*pChannel*' with '*pPSID*'	
2	Check	WSMs are transmitted continuously on channel '*pChannel*'	
3	Check	WSMs N-Header contains 'WAVE Info Element' containing 'Channel Number' indicated '*pChannel*'	
4	Check	WSMs contains ProviderServiceIdentifier indicating 'PSID'	
5	Check	WSMs are transmitted continuously with an average rate '*pWSMRepeatRate*'	
6	Verify	For *n* samples of WSMs calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
7	Procedure	Repeat steps 1-6 for '*pChannel*' specified in the Section 4.1.1.1.	

6.2.5 WSM communications with alternating channel access

Identifier	TP-16093-WSM-COM-BV-03		
Summary	Verify that the IUT will transmit WSM1 and WSM2 on the channels CH1 and CH2 respectively in alternating operation.		
Test Configuration	TC1		
IUT			
Reference:			
PICS Selection			
Pre-test conditions			
• The IUT is in the initial state			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is configured to transmit WSM1 with '*PSID1'* using ***WSM_nExt_ch*** defined in Table 7-3, on channel '*CH1*' in alternating operation during time slot 1.	
2	Configure	The IUT is configured to transmit WSM2 with '*PSID2'* using ***WSM_nExt_ch*** defined in Table 7-3 on channel '*CH2*' in alternating operation during time slot 2.	
3	Stimulus	The IUT transmits WSM1 and WSM2 with an average rate '*pWSMRepeatRate*' for each message.	
4	Verify	WSM1 is detected on the channel '*CH1*' time slot 1.	Pass / Fail
5	Verify	WSM1 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicating '*CH1*'.	Pass / Fail
6	Verify	For *n* samples of WSM1 calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
7	Verify	WSM2 is detected on the channel '*CH2*' time slot 2.	Pass / Fail
8	Verify	WSM2 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicating '*CH2*'.	Pass / Fail
9	Verify	For *n* samples of WSM2 calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
10	Procedure	Repeat steps 1-9 for combination of 'CH1' and 'CH2' specified in Table 4-1.	

Identifier	TP-16093-WSM-COM-BV-04
Summary	Verify that the IUT will transmit WSM1 on the channel CH1 and receive WSM2 on the channel CH2.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state
- The WAVE Host is transmitting WSM2 with '*PSID2*' using ***WSM_nExt_ch*** defined in Table 7-3 on channel '*CH2*' in alternating operation during slot 2 with an average repeat rate '*pWSMRepeatRate*'

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit WSM1 with '*PSID1*' using ***WSM_nExt_ch*** defined in Table 7-3 on channel '*CH1*' in alternating operation during slot 1.	
2	Configure	The IUT is configured to receive WSM2 in alternating operation on channel 'CH2' during time slot 2.	
3	Stimulus	The IUT transmits WSM1 with an average rate 'pWSMRepeatRate'.	
4	Verify	WSM1 are transmitted on channel '*CH1*' time slot 1.	Pass / Fail
5	Verify	WSM1 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicated '*CH1*'.	Pass / Fail
6	Verify	For *n* samples of WSM1 calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
7	Check	WSM2 is detected on the channel '*CH2*' during time slot 2.	
8	Check	WSM2 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicated '*CH2*'.	
9	Verify	The IUT indicates WSM messages available on 'CH2'.	Pass / Fail
10	Verify	For *n* samples of WSM2 received by the IUT, calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
11	Procedure	Repeat steps 1-10 for combination of 'CH1' and 'CH2' specified in the Table 4-1.	

Identifier	TP-16093-WSM-COM-BV-05
Summary	Verify that the IUT will receive WSMs on channels CH1 and CH2 in alternating operation.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state
- The WAVE Host is transmitting WSM1 with '*PSID1*' using ***WSM_nExt_ch*** defined in Table 7-3 on channel '*CH1*' in alternating operation during time slot 1 with an average rate '*pWSMRepeatRate*'
- The WAVE Host is transmitting WSM2 with '*PSID2*' using ***WSM_nExt_ch*** defined in Table 7-3 on channel '*CH2*' in alternating operation during time slot 2 with an average rate '*pWSMRepeatRate*'

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to receive WSM1 and WSM2 in alternating operation on channels 'CH1' and 'CH2' respectively.	
2	Check	WSM1 is detected on the channel 'CH1' in time slot 1.	

3	Check	WSM1 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicated 'CH1'.	
4	Check	WSM2 is detected on the channel 'CH2' in time slot 2.	
5	Check	WSM2 N-Header contains 'WAVE Info Element' containing 'Channel Number' indicated 'CH2'.	
6	Verify	The IUT indicates WSM1 messages available on 'CH1'	Pass / Fail
7	Verify	For *n* samples of WSM1 received by the IUT, calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
8	Verify	The IUT indicates WSM2 messages available on 'CH2'.	Pass / Fail
9	Verify	For *n* samples of WSM2 received by the IUT calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail
10	Procedure	Repeat steps 1-9 for combination of 'CH1' and 'CH2' specified in the Table 4-1.	

6.2.6 Transmission of WSMs with payload exceeding WsmMaxLength

Identifier	TP-16093-WSM-POP-BI-01
Summary	Verify that the IUT will transmit WSMs with payload not exceeding *WsmMaxLength*, and will not transmit WSMs with payload exceeding *WsmMaxLength*.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	Set the IUT MIB *WsmMaxLength* to be 1400 bytes Configure the IUT to transmit ***WSM_without_nExt*** defined in Table 7-1 where WSM-T-Header 'WSM Length' is equal 'WsmMaxLength – h - 1, where h is the length of WSMP header (may range between 4-7 bytes depending on size of PSID).	
2	Stimulus	The IUT transmits WSMs	
3	Verify	WSMs are detected over the air	Pass / Fail
4	Configure	Configure the IUT to transmit ***WSM_without_nExt*** defined in Table 7-1 where WSM-T-Header 'WSM Length' is greater than 'WsmMaxLength'	
5	Stimulus	The IUT to transmit WSMs	
6	Verify	WSMs are NOT detected over the air during the 1sec after the Step 5 Stimulus.	Pass / Fail

6.2.7 WSA packet validation

Identifier	TP-16093-WSA-MST-BV-01
Summary	Verify that the IUT will transmit a WSM with a valid WSM header required for the WSA message.
Test Configuration	TC1
IUT	IUT (Provider role)

Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_1** as defined in Table 7-6, Table 7-4, and Table 7-5	
2	Stimulus	The IUT transmits WSA	
3	Verify	WSA is transmitted	Pass / Fail
4	Verify	WSM N-Header contains 'Subtype/Option Indicator/WSMP Version' indicating '0x03' (Subtype=0, Opt Ind = 0, Version = 3)	Pass / Fail
5	Verify	WSM N-Header contains 'TPID' indicating '0'	Pass / Fail
6	Verify	WSM T-Header contains 'ProviderServiceIdentifier' indicating 0p80-07	Pass / Fail
7	Verify	WSM T-Header contains WSM Length greater than '0'	Pass / Fail

Identifier	TP-16093-WSA-MST-BV-02
Summary	Verify that the IUT will transmit WSA with the correct version number and valid WSA Header.
Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_1** as defined in Table 7-6, Table 7-4, and Table 7-5	
2	Stimulus	The IUT transmits WSA	
3	Verify	WSA is transmitted	Pass / Fail
4	Verify	WSA Header containing WSA Version indicating '3'	Pass / Fail
5	Verify	WSA Header containing field 'WSA Header Option Indicator' indicating '0b1110'	Pass / Fail
6	Verify	WSA Header containing field 'WSA Identifier' (4bits).	Pass / Fail
7	Verify	WSA Header containing field 'Content Count' (4bits).	Pass / Fail

Identifier	TP-16093-WSA-MST-BV-03
Summary	Verify that the IUT will transmit WSM containing a signed WSA.
Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_1** as defined in Table 7-6, Table 7-4, and Table 7-5	
2	Stimulus	The IUT transmits WSA	
3	Verify	WSA is transmitted	Pass / Fail

4	Verify	WSM T-Header contains 'ProviderServiceIdentifier' indicating 0p80-07	Pass / Fail
5	Verify	WSM Payload contains 'Ieee1609Dot2Data' containing 'protocolVersion' indicating '3'	Pass / Fail
6	Verify	Ieee1609Dot2Data contains 'content' indicating 'signedData'	Pass / Fail
7	Verify	Ieee1609Dot2Data contains 'tbsData' containing 'payload' containing 'protocolVersion' indicating '3'	Pass / Fail
8	Verify	Ieee1609Dot2Data contains 'tbsData' containing 'content' indicating 'unsecuredData'	Pass / Fail
9	Verify	Ieee1609Dot2Data contains 'tbsData' containing 'headerInfo' containing 'psid' indicating '0p80-07' (WSA PSID)	Pass / Fail
10	Verify	Ieee1609Dot2Data contains 'signer'	Pass / Fail
11	Verify	Ieee1609Dot2Data contains 'signature'	Pass / Fail

Identifier		TP-16093-WSA-MST-BV-04-X	
Summary		Verify that the IUT will transmit WSA containing valid WSA Header Info Element Extension fields	
Test Configuration		TC1	
IUT		IUT (Provider role)	
Reference:			
PICS Selection		Select appropriate PICS from sub-table **Variants**, column **PICS Selection**	
Pre-test conditions			
• The IUT is in the initial state			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is configured to transmit **WSA_nExt_1** as defined in Table 7-6, Table 7-4, and Table 7-5, using WSAheader_3D in Table 7-8.	
2	Stimulus	The IUT transmits WSA	
3	Verify	The IUT transmitted WSA	Pass / Fail
4	Verify	WSA Header contains 'Header Option Indicator' indicating 'WAVE Info Element Extension field' (Bit 3) is set.	Pass / Fail
5	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Count' matching the number of Info Elements present in the message (cannot be '0')	Pass / Fail
6	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Info Element' containing 'WAVE Element ID' indicating '**X_WAVE_Element_ID**' (containing X_Info_Element field)	Pass / Fail
7	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'WAVE Elem Length' indicating the value specified by '**X_Size**'	Pass / Fail
8	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'WAVE Elem' data	Pass / Fail
9	Procedure	Repeat steps 6-8 for all variants **X** selected by '**PICS Selection**'	

Variants			
X	**X_Info_Element (X_Size)**	**X_WAVE_Element_ID**	**PICS Selection**
A	Repeat Rate (1)	17	PIC_PRepeatRate
B	3D Location (10)	6	PIC_P3DLocation
C	Advertiser Identifier (range 1-32)	7	PIC_PAdvertiserId

Identifier	TP-16093-WSA-MST-BV-05-X
Summary	Verify that the IUT will transmit WSA containing a valid Service Info Segment

Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	Select appropriate PICS from sub-table **Variants**, column **PICS Selection**

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_IP** as defined in Table 7-7 and containing one 'Service Info Segment' with a service '*pPSID*' available on '*pChannel*' and referenced in 'Channel Info Segment'.	
2	Stimulus	The IUT transmits WSA	
3	Verify	The IUT transmitted WSA	Pass / Fail
4	Verify	WSA Header contains 'Header Option Indicator' indicating 'Service Info Segment' (Bit 2) is set.	Pass / Fail
5	Verify	WSA Service Info Segment contains 'Count' indicating '1'	Pass / Fail
6	Verify	WSA Service Info Segment contains 'Service Info Instance' containing '*pPSID*'	Pass / Fail
7	Verify	WSA Service Info Segment contains 'Service Info Instance' containing 'Channel Index' indicating '1' (i.e. pointer to channel parameters within the 'Channel Info Segment')	Pass / Fail
8	Verify	WSA Service Info Segment contains 'Service Info Instance' containing 'Service Info Option Indicator' indicating '1' (presence of the Service Info Information Element Extension field)	Pass / Fail
9	Verify	WSA Service Info Segment contains 'Service Info Instance' contains 'Info Element Extension field' containing 'Count' matching the number of Info Element present (>=1, cannot be 0)	Pass / Fail
10	Verify	WSA Service Info Segment contains 'Service Info Instance' contains 'Info Element Extension field' contains 'Info Element' containing 'WAVE Element ID' indicating '**X_WAVE_Element_ID**' (containing X_Info_Element_Ext_Field)	Pass / Fail
11	Verify	WSA Service Info Segment contains 'Service Info Instance' contains 'Info Element Extension field' contains 'Info Element' containing 'WAVE Elem Length' indicating the value specified by '**X_Size**'.	Pass / Fail
12	Verify	WSA Service Info Segment contains 'Service Info Instance' contains 'Info Element Extension field' contains 'Info Element' containing 'WAVE Elem' data.	Pass / Fail
13	Procedure	Repeat steps 10-12 for all variants **X** selected by '**PICS Selection**'	

Variants

X	X_Info_Element_Ext_Field (X_Size)	X_WAVE_Element_ID	PICS Selection
A	Provider Service Context (range 1- 31)	8	PIC_PPSC
B	IPv6 Address (16)	9	PIC_PIPV6Address
C	Service Port (2)	10	PIC_PServicePort
D	Provider MAC Address (6)	11	PIC_PProviderMACAddress
E	RCPI Threshold (1)	19	PIC_PRCPIThreshold
F	WSA Count Threshold (1)	20	PIC_PWSACountThreshold
G	WSA Count Threshold Interval (1)	22	PIC_PWSACountThresholdInt

Identifier	TP-16093-WSA-MST-BV-06-X
Summary	Verify that the IUT will transmit WSA containing a valid Channel Info Segment

Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	Select appropriate PICS from sub-table **Variants**, column **PICS Selection**

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_IP** as defined in Table 7-7.	
2	Stimulus	The IUT transmits WSA	
3	Verify	The IUT transmitted WSA	Pass / Fail
4	Verify	WSA Header contains 'Header Option Indicator' contains 'Channel Info Segment' (Bit 1) is set.	Pass / Fail
5	Verify	WSA Channel Info Segment contains 'Count' indicating '1'	Pass / Fail
6	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Operating Class' indicating '17'	Pass / Fail
7	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Channel Number' (size 1 octet)	Pass / Fail
8	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Transmit Power Level' (size 1 octet)	Pass / Fail
9	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Adaptable' (size 1 bit)	Pass / Fail
10	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Data Rate' (size 7 bits) (value in the range from 0x02 through 0x7F)	Pass / Fail
11	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Channel Info Option Indicator' indicating '1' (Info Element Extension field is present)	Pass / Fail
12	Verify	WSA Channel Info Segment contains 'Channel Info Instance' contains 'Info Element Extension field' containing 'Count' indicating '2' (the number of Info Element Extension fields)	Pass / Fail
13	Verify	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Info Element Extension field' containing 'WAVE Element ID' indicating '**X_WAVE_Element_ID**' (containing X_Info_Element)	Pass / Fail
14	Verify	WSA Channel Info Segment contains 'Channel Info Instance' contains 'Info Element Extension field' containing 'WAVE Elem Length' indicating the value specified by '**X_Size**'	Pass / Fail
15	Verify	WSA Channel Info Segment contains 'Channel Info Instance' contains 'Info Element Extension field' containing 'WAVE Elem' data matching data in the sample WSA.	Pass / Fail
16	Procedure	Repeat steps 13-15 for all variants X selected by 'PICS Selection'	

Variants

X	X_Info_Element (X_Size)	X_WAVE_Element_ID	PICS Selection
A	Channel Access (1)	21	PIC_PChannelAccess
B	EDCA Parameter Set (16)	12	PIC_PEDCAParamSet

Identifier	TP-16093-WSA-MST-BV-07-X
Summary	Verify that the IUT will transmit WSA containing valid WRA Segment
Test Configuration	TC1

IUT	IUT (Provider role)
Reference:	
PICS Selection	Select appropriate PICS from sub-table **Variants**, column **PICS Selection**

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to transmit **WSA_nExt_IP** as defined in Table 7-7.	
2	Stimulus	The IUT transmits WSA	
3	Verify	The IUT transmitted WSA	Pass / Fail
4	Verify	WSA Header contains 'Header Option Indicator' contains 'WAVE Routing Advertisement' (Bit 0) is set.	Pass / Fail
5	Verify	Only one instance of WSA WAVE Routing Advertisement is present	Pass / Fail
6	Verify	WSA WAVE Routing Advertisement contains 'Router Lifetime' (size 2 octets)	Pass / Fail
7	Verify	WSA WAVE Routing Advertisement contains 'IpPrefix' (size 16 octets)	Pass / Fail
8	Verify	WSA WAVE Routing Advertisement contains 'Prefix Length' (size 1 octets)	Pass / Fail
9	Verify	WSA WAVE Routing Advertisement contains 'Default Gateway' (size 16 octets)	Pass / Fail
10	Verify	WSA WAVE Routing Advertisement contains 'Primary DNS' (size 16 octets)	Pass / Fail
11	Verify	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'Count' indicating the number of 'Info Elements'	Pass / Fail
12	Verify	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'WAVE Element ID' indicating '**X_Info_Element**'	Pass / Fail
13	Verify	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'WAVE Elem Length' not exceeding '**X_Size**'	Pass / Fail
14	Verify	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'WAVE Elem' data matching data in the sample WSA.	Pass / Fail
15	Procedure	Repeat steps 12-14 for all variants X selected by 'PICS Selection'	

Variants

X	X_Info_Element (X_Size)	X_WAVE_Element_ID	PICS Selection
A	Secondary DNS (size 16 octets)	13	PIC_PSecondaryDNS
B	Gateway MAC Address (size 6 octets)	14	PIC_PGatewayMACAddress

Identifier	TP-16093-WSA-MST-BV-08
Summary	Verify that the IUT will transmit WSA containing valid WSA Header Info Element Extension field 2D Location.
Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	PIC_P2DLocation

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict

1	Configure	The IUT is configured to transmit **WSA_nExt_1** as defined in Table 7-6, Table 7-4, and Table 7-5, using **WSAheader_2D** in Table 7-9.	
2	Stimulus	The IUT transmits WSA	
3	Verify	The IUT transmitted WSA	Pass / Fail
4	Verify	WSA Header contains 'Header Option Indicator' indicating 'WAVE Info Element Extension field' (Bit 3) is set.	Pass / Fail
5	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Count' matching the number of Info Elements present in the message (cannot be '0')	Pass / Fail
6	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Info Element' containing 'WAVE Element ID' indicating '5' (containing 2D Location)	Pass / Fail
7	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'WAVE Elem Length' not exceeding '9 octets'	Pass / Fail
8	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'WAVE Elem' data	Pass / Fail
Note: This TP is similar to TP-16093-WSA-PP-BV-04-B except WSA Header contains 2D instead of 3D location.			

6.2.8 WSA reception

Identifier	TP-16093-WSA-PP-BV-01
Summary	Verify that the IUT will indicate to the upper layer availability of a provider service when the IUT receives secure WSAs containing WSA Header Info Elem Extension fields.
Test Configuration	TC1
IUT	IUT (User role)
Reference:	
PICS Selection	PIC_URepeatRate, PIC_U3DLocation, PIC_UAdvertiserId, PIC_U2DLocation

Pre-test conditions

- The IUT is in the initial state.
- The WAVE Host is transmitting **WSA_nExt_1** as defined in Table 7-6, using WSAheader_3D in Table 7-8. WSA_nExt_1 contains one PSID service 'pPSID'. WSAs are transmitted on channel 'pChannel' with 'pWSARepeatRate'.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to receive WSA on channel 'pChannel'.	
2	Check	WSAs are transmitted	
3	Check	WSA is included in WSM containing T-Header containing 'ProviderServiceIdentifier' indicating '0p80-07 (WSA).	
4	Check	WSA is included in WSM containing 'WSMData' containing 'Ieee1609Dot2Data', containing 'protocolVersion' indicating '3'	
5	Check	WSA is included in WSM containing 'Ieee1609Dot2Data', containing 'content' indicating 'signedData'.	
6	Check	WSA is included in WSM containing 'Ieee1609Dot2Data', containing 'tbsData', containing 'headerInfo', containing 'psid' indicating '0p80-07' (WSA PSID)	
7	Check	WSA is included in WSM containing 'Ieee1609Dot2Data', containing 'signer'	

8	Check	WSA is included in WSM containing 'Ieee1609Dot2Data', containing 'signature'	
9	Check	WSA Header contains 'Header Option Indicator' indicating 'WAVE Info Element Extension field' (Bit 3) is set.	
10	Check	WSA Header containing field 'WSA Identifier'.	
11	Check	WSA Header containing field 'Content Count'.	
12	Check	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Count' indicating '3' (3 extensions are present)	
13	Check	WSA Header contains 'WSA Header Info Elem Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '17' (containing Repeat Rate)	
14	Check	WSA Header contains 'WSA Header Info Elem Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '6' (containing 3D Location)	
15	Check	WSA Header contains 'WSA Header Info Elem Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '7' (containing Advertiser Identifier)	
16	Check	WSA includes one instance of 'Service Info Segment' containing 'ProviderServiceIdentifier' indicating '**pPSID'**.	
17	Verify	The IUT indicates availability of service with '**pPSID'**.	Pass / Fail
18	Procedure	Repeat steps 1-17 with WAVE Host transmitting **WSA_nExt_1** as defined in Table 7-6, using WSAheader_2D in Table 7-9.	

Identifier	TP-16093-WSA-PP-BV-02
Summary	Verify that the IUT will indicate to the upper layer availability of a provider service when the IUT receives WSAs containing Service Info Segment with Info Element Extension fields.
Test Configuration	TC1
IUT	IUT (User role)
Reference:	
PICS Selection	PIC_UPSC, PIC_UIPV6Address, PIC_UServicePort, PIC_UProviderMACAddress, PIC_URCPIThreshold, PIC_UWSACountThreshold, PIC_UWSACountThresholdInt

Pre-test conditions

- The IUT is in the initial state.
- The WAVE Host transmitting **WSA_nExt_IP** as defined in Table 7-7. WSA_nExt_IP contains one PSID service 'pPSID'. WSAs are transmitted on channel 'pChannel' with 'pWSARepeatRate'.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to receive WSA on channel 'pChannel'.	
2	Check	WSAs are transmitted	
3	Check	WSA Header contains 'Header Option Indicator' indicating 'Service Info Segment' (Bit 2) is set.	
4	Check	WSA Service Info Segment contains 'Count' indicating '1'	
5	Check	WSA Service Info Segment contains 'Service Info Instance' containing 'pPSID'	
6	Check	WSA Service Info Segment contains 'Service Info Instance' containing 'Channel Index' indicating '1' (i.e. pointer to channel parameters within the 'Channel Info Segment').	
7	Check	WSA Service Info Segment contains 'Service Info Instance' containing 'Service Info Option Indicator' indicating '1' (presence of the Service Info Information Element Extension field)	

8	Check	WSA Service Info Segment contains 'Service Info Instance' contains 'Info Element Extension field' containing 'Count' indicating '7' (7 extensions are present)	
9	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '8' (containing PSC)	
10	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '9' (containing IPv6 Address).	
11	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '10' (containing Service Port).	
12	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '11' (containing Provider MAC Address).	
13	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '19' (containing RCPI Threshold).	
14	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '20' (containing WSA Count Threshold).	
15	Check	WSA Service Info Segment contains 'Service Info Instance', containing 'Info Element Extension field', containing 'Info Element', containing 'WAVE Element ID' indicating '22' (containing WSA Count Threshold Interval).	
16	Verify	The IUT indicates availability of service with '**pPSID'**.	Pass / Fail

Identifier	TP-16093-WSA-PP-BV-03
Summary	Verify that the IUT will indicate to the upper layer availability of a provider service when the IUT receives WSAs containing Channel Info Segment with Info Element Extension fields.
Test Configuration	TC1
IUT	IUT (User role)
Reference:	
PICS Selection	PIC_UChannelAccess, PIC_UEDCAParamSet

Pre-test conditions

- The IUT is in the initial state.
- The WAVE Host transmitting **WSA_nExt_IP** as defined in Table 7-7. WSA_nExt_IP contains one PSID service 'pPSID'. WSAs are transmitted on channel 'pChannel' with 'pWSARepeatRate'.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to receive WSA on channel 'pChannel'.	
2	Check	WSAs are transmitted	
3	Check	WSA Header contains 'Header Option Indicator' contains 'Channel Info Segment' (Bit 1) is set.	

4	Check	WSA Service Info Segment contains 'Service Info Instance' containing 'pPSID'	
5	Check	WSA Channel Info Segment contains 'Count' indicating '1'	
6	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Operating Class'	
7	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Channel Number'	
8	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Transmit Power Level'	
9	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Adaptable'	
10	Check	WSA Channel Info Segment contains 'Channel Info Instance', containing 'Data Rate' (size 7 bits) (value in the range from 0x02 through 0x7F)	
11	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'Channel Info Option Indicator' indicating '1' (Info Element Extension field is present)	
12	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'WAVE Info Element Extension', containing 'Count' indicating '2' (2 Info Element Extension fields are present)	
13	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'WAVE Info Element Extension', containing 'Info Element', containing 'WAVE Element ID' indicating '21' (containing Channel Access).	
14	Check	WSA Channel Info Segment contains 'Channel Info Instance' containing 'WAVE Info Element Extension', containing 'Info Element', containing 'WAVE Element ID' indicating '12' (containing EDCA Parameter Set).	
15	Verify	The IUT indicates availability of service with '**pPSID'**.	Pass / Fail

Identifier	TP-16093-WSA-PP-BV-04
Summary	Verify that the IUT will indicate to the upper layer availability of a provider service when the IUT receives WSAs containing WAVE Router Advertisement with Info Element Extension fields.
Test Configuration	TC1
IUT	IUT (User role)
Reference:	
PICS Selection	PIC_USecondaryDNS, PIC_UGatewayMACAddress

Pre-test conditions

- The IUT is in the initial state.
- The WAVE Host transmitting **WSA_nExt_IP** as defined in Table 7-7. WSA_nExt_IP contains one PSID service 'pPSID'. WSAs are transmitted on channel 'pChannel' with 'pWSARepeatRate'.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT is configured to receive WSA on channel 'pChannel'.	
2	Check	WSAs are transmitted	
3	Check	WSA Header contains 'Header Option Indicator' contains 'WAVE Routing Advertisement' (Bit 0) is set.	
4	Check	WSA Service Info Segment contains 'Service Info Instance' containing 'pPSID'	

5	Check	Only one instance of WSA WAVE Routing Advertisement is present	
6	Check	WSA WAVE Routing Advertisement contains 'Router Lifetime'	
7	Check	WSA WAVE Routing Advertisement contains 'IpPrefix'	
8	Check	WSA WAVE Routing Advertisement contains 'Prefix Length'	
9	Check	WSA WAVE Routing Advertisement contains 'Default Gateway'	
10	Check	WSA WAVE Routing Advertisement contains 'Primary DNS'	
11	Check	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'Count' indicating the number of 'Info Elements' indicating '2' (2 Info Element Extension fields are present)	
12	Check	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'WAVE Element ID' indicating '13' (containing Secondary DNS).	
13	Check	WSA WAVE Routing Advertisement contains 'Info Element Extension field' containing 'WAVE Element ID' indicating '14' (containing Gateway MAC Address).	
14	Verify	The IUT indicates availability of service with '**pPSID'**.	Pass / Fail

6.2.9 WSA transmission parameters

Identifier	TP-16093-WSA-ROP-BV-01
Summary	Verify that the IUT will transmit WSA at a specified repeat rate.
Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The IUT configured to transmit **WSA_nExt_1** as defined in Table 7-6, using WSAheader_3D in Table 7-8, with the WSA repeat rate set to '*pWSARepeatRate*'	
2	Stimulus	The IUT transmitted WSAs	
3	Verify	WSAs are detected	Pass / Fail
4	Verify	WSA Header contains 'WSA Header Info Elem Extension field' containing 'Info Element' 'Repeat Rate' indicating value '*pWSARepeatRate*' ([2] specifies that the Repeat Rate value is encoded as the number of messages per 5 sec interval)	Pass / Fail
5	Verify	For *n* samples of WSA calculate *RPMup* and *RPMlo* per Section 4.1.1.8, and apply the test criteria stated in 4.1.1.8.1	Pass / Fail

6.2.10 WSA changes

Identifier	TP-16093-WSA-CHG-BV-01
Summary	Verify the IUT ability to change WSA when PSC of an advertised service changes in WSA.
Test Configuration	TC1
IUT	IUT (Provider role)
Reference:	
PICS Selection	

Pre-test conditions

• The IUT is in the initial state.			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is transmitting **WSA_1srvPSC** defined in Table 7-14 with one 'vPSID1' service and 'PSC' set to any valid value.	
2	Check	WSA contains one 'Service Info Instance', containing PSID indicating value 'vPSID1' and containing a PSC value.	
3	Stimulus	The IUT is requested to change the PSC value included in WSA to a different valid value.	
4	Verify	WSA is transmitted in the format of **WSA_1srvPSC** defined in Table 7-14 containing one 'Service Info Instances', containing value 'vPSID1'.	Pass / Fail
5	Verify	WSA Header containing 'Content Count' (CC) changed. The current value of 'CC' = ('Previous value of CC'+1) mod 16.	Pass / Fail
6	Verify	WSA is included in WSM containing 'WSMData' containing 'Ieee1609Dot2Data'. 'Ieee1609Dot2Data' contains 'signature'. The current value of 'signature' is different from the 'signature' In the WSA before the update.	Pass / Fail

Identifier	TP-16093-WSA-CHG-BV-02		
Summary	Verify the IUT ability to change WSA when a service is deleted from WSA		
Test Configuration	TC1		
IUT	IUT (Provider role)		
Reference:			
PICS Selection			
Pre-test conditions			
• The IUT is in the initial state.			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT is transmitting **WSA_2srv** defined in Table 7-16 with two services 'vPSID1' and 'vPSID2'.	
2	Check	WSA contains two 'Service Info Instances', containing PSIDs indicating values 'vPSID1' and 'vPSID2' respectively.	
3	Stimulus	The IUT is request to deleted one service from WSA with 'vPSID2'.	
4	Verify	WSA is transmitted in the format of **WSA_1srv** defined in Table 7-15 containing one 'Service Info Instances', containing PSID indicating value 'vPSID1'.	Pass / Fail
5	Verify	WSA Header containing 'Content Count' (CC) changed. The current value of 'CC' = ('Previous value of CC'+1) mod 16.	Pass / Fail
6	Verify	WSA is included in WSM containing 'WSMData' containing 'Ieee1609Dot2Data'. 'Ieee1609Dot2Data' contains 'signature'. The current value of 'signature' is different from the 'signature' In the WSA before the update.	Pass / Fail

6.2.11 IP Configuration

Identifier	TP-16093-IP-CFG-BV-01
Summary	Verify that the IUT will use WaveRoutingAdvertisement information in WSA to configure its global IPv6 address.
Test Configuration	TC1

IUT	IUT (User role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Configure	The WAVE Host is transmitting **WSA_IProuting** as defined in Table 7-17 with 'pWSARepeatRate'.	
2	Check	WSA Service Info Segment containing 'Provider Service Identifier' indicating 'IP routing' (0pEF-FF-FF-FE)	
3	Check	WSA WAVE Routing Advertisement containing 'IpPrefix' indicating value 'IPP'	
3	Check	WSA WAVE Routing Advertisement containing 'Default Gateway' indicating value 'DG'	
4	Check	WSA WAVE Routing Advertisement containing 'Primary DNS' indicating value 'PD'	
5	Check	WSA WAVE Routing Advertisement containing 'Gateway MAC Address' indicating value 'GMA'	
6	Configure	The IUT is requested to register for the 'IP routing' service indicated by PSID (0pEF-FF-FF-FE)	
7	Stimulus	The IUT received WSAs, generated an indication of available service 'IP routing' and joined the service.	
8	Verify	The IUT assigned a new IPv6 address to for the WAVE interface.	Pass / Fail
9	Verify	The IUT WAVE interface IP configuration contains 'IPv6' address indicating 'a combination of 'IPP' and the MAC address of the WAVE Interface' derived using stateless configuration procedure [9].	Pass / Fail
10	Verify	The IUT WAVE interface IP configuration contains 'Default Gateway IP' address indicating 'DG'.	Pass / Fail
11	Verify	IUT Wave Interface IP configuration contains 'Primary DNS' address indicating 'PD'.	Pass / Fail
12	Verify	IUT Wave Interface IP configuration contains 'Gateway MAC' address indicating 'GMA'.	Pass / Fail

Identifier	TP-16093-IP-CFG-BV-02
Summary	Verify that the IUT will simultaneously be configured with the following IPv6 addresses for the WAVE interface: link-local (from its MAC) and global IPv6.
Test Configuration	TC1
IUT	
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state

Test Sequence

Step	Type	Description	Verdict
1	Stimulus	The IUT is configured with a link-local IPv6 address derived from MAC address via IPv6 Stateless Address Configuration [9].	
2	Verify	The IUT WAVE interface is assigned a linked-local IPv6 address derived from MAC address via IPv6 Stateless Address Configuration [9].	Pass / Fail

3	Stimulus	The IUT WAVE interface is configured with a global static IPv6 address provided via static configuration.	
4	Verify	The IUT WAVE interface is assigned a global IPv6 address provided via static configuration.	Pass / Fail

6.2.12 Changing IP configuration

Identifier		TP-16093-IP-CHG-BV-01	
Summary		Verify that IUT will reset link-local IPv6 address of the WAVE interface to a specific value.	
Test Configuration		TC1	
IUT			
Reference:			
PICS Selection			
Pre-test conditions			
• The IUT is in the initial state.			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT WAVE interface is configured with a link-local IPv6 address.	
2	Check	The link-local IPv6 address derived from MAC address via IPv6 Stateless Address Configuration [9].	
3	Stimulus	The IUT is requested to reset link-local IPv6 address to a specific value 'newIPv6-linked-local'.	
4	Verify	The IUT WAVE interface is configured with a new link-local IPv6 address matching 'newIPv6-link-local'.	Pass / Fail

Identifier		TP-16093-IP-CHG-BV-02	
Summary		Verify that IUT will reset IPv6 address of the WAVE interface to a different value	
Test Configuration		TC1	
IUT			
Reference:			
PICS Selection			
Pre-test conditions			
• The IUT is in the initial state.			
Test Sequence			
Step	**Type**	**Description**	**Verdict**
1	Configure	The IUT WAVE interface is configured with a link-local IPv6 address.	
2	Check	The link-local IPv6 address indicating value 'IPv6-link-local' address derived from MAC address via IPv6 Stateless Address Configuration [9].	
3	Stimulus	The IUT is requested to reset link-local IPv6 address to a new undefined value.	
4	Verify	The IUT WAVE interface is configured with a new link-local IPv6 address different from 'IPv6-link-local' value.	Pass / Fail
5	Procedure	Repeat steps 3-4 for 10 times and record 'IPv6-link-local' value for each iteration.	
6	Verify	'IPv6-link-local' value changes to different non-repeated values	Pass / Fail

6.2.13 Communication using IPv6

Identifier	TP-16093-IP-COM-BV-01
Summary	Verify that the IUT will initiate a 2-way communication using IPv6 protocol to a Remote Host on a different subnet.
Test Configuration	TC2
IUT	IUT (User role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The WAVE Host is transmitting **WSA_IProuting** defined in Table 7-17 containing 'IP routing' service.	
2	Configure	The IP Host is connected to the WAVE Host and configured with a global IPv6 address on a different subnet than the IUT's subnet.	
3	Configure	The IUT received WSAs, generated an indication of the available service 'IP routing'.	
4	Check	The IUT configured the WAVE interface IPv6 information using WSA's WRA information.	
5	Stimulus	The IUT is sending IPv6 packets (e.g. ICMP ping6) to the IP Host global IPv6 address.	
6	Verify	The IUT receives responses (e.g. ICMP ping 6 echo) from the IP Host.	Pass / Fail

Identifier	TP-16093-IP-COM-BV-02
Summary	Verify that the IUT will initiate a 2-way communication using IPv6 protocol to a WAVE Host using link-local address.
Test Configuration	TC2
IUT	IUT (User role)
Reference:	
PICS Selection	

Pre-test conditions

- The IUT is in the initial state.

Test Sequence

Step	Type	Description	Verdict
1	Configure	The WAVE Host is transmitting **WSA_IProuting** defined in Table 7-17 containing 'IP routing' service.	
2	Configure	The IUT received WSAs, generated an indication of the available service 'IP routing'.	
3	Check	The IUT configured the WAVE interface IPv6 information using WSA's WRA information.	
4	Stimulus	The IUT is sending IPv6 packets (e.g. ICMP ping6) to the WAVE Host link-local IPv6 address.	
5	Verify	The IUT receives responses (e.g. ICMP ping 6 echo) from the WAVE Host to the IUT link-local IPv6 address.	Pass / Fail

7 Messages and Information Element Contents

This section contains the default values of common messages and information elements used in TPs.

7.1 WAVE Short Messages

7.1.1 Message defaults

The following assumptions apply to all messages defined in this section.

- All WSMs containing WSA payload are transmitted with the IEEE 1609.2 security (see 7.2.2).
- All other WSMs are transmitted without IEEE 1609.2 security.
- Default values for message parameters are defined in 4.1.1

7.1.2 Message details

7.1.2.1 WAVE Short Messages without optional extensions

Table 7-1 WSM_without_nExt

Information Element	Value/Remark	Comment
WSM_without_nExt ::= SEQUENCE {		
controlField SEQUENCE {		
Subtype	0 (nullNetworking)	
optionIndicator	0 (not present)	
Version	3	
}		
nExtensions SEQUENCE {}	Not present	
transport	bcMode (tpid = 0)	PSID addressing with no WAVE Information Element Extension field
destAddress	pPSID	PSID values defined in Table 4-4
Body	A valid WSM payload	Payload is comprised of the WSMLength and WSMData fields as specified in 8.1.3 in [2]
}		

7.1.2.2 WAVE Short Messages with optional extensions

Table 7-2 WSM_nExt

Information Element	Value/Remark	Comment
WSM_nExt ::= SEQUENCE {		
controlField SEQUENCE {		
Subtype	0 (nullNetworking)	
optionIndicator	1 (present)	
Version	3	
}		
nExtensions SEQUENCE {		
{ extensionId	15 (Channel Number)	
value	Any valid value	Default values defined in Table 4-1
}		
{ extensionId	16 (Data Rate)	
value	Any valid value	Default values defined in Table 4-2
}		
{ extensionId	4 (Tx Power Used)	
value	Any valid value	Default values defined in Table 4-3
}		
}		

transport	tpid = 0	PSID addressing with no WAVE Information Element Extension field
destAddress	vPSID	PSID values defined in Table 4-4
body	A valid WSM payload	Payload is comprised of the WSMLength and WSMData fields as specified in 8.1.3 in [2]
}		

7.1.2.3 WAVE Short Messages with channel information

Table 7-3 WSM_nExt_ch

Information Element	Value/Remark	Comment
WSM_nExt_ch ::= SEQUENCE {		
controlField SEQUENCE {		
Subtype	0 (nullNetworking)	
optionIndicator	1 (present)	
Version	3	
}		
nExtensions SEQUENCE {		
{ extensionId	15 (Channel Number)	
value	Any valid value	Default values defined in Table 4-1
}		
{}		Other extensions are optional
}		
transport	bcMode (tpid = 0)	PSID addressing with no WAVE Information Element Extension field
destAddress	pPSID	PSID values defined in Table 4-4
body	A valid WSM payload	Payload is comprised of the WSMLength and WSMData fields as specified in 8.1.3 in [2]
}		

7.2 WAVE Service Advertisement (WSA)

7.2.1 Message defaults

The following assumptions apply to all messages defined in this section.

- All WSA message contents are transmitted inside 1609.2 signed message data structure.
- Default values for message parameters are defined in 4.1.1

7.2.2 Message details

7.2.2.1 WSM and security wrapper for WSA

Table 7-4 WSMheader_WSA

Information Element	Value/Remark	Comment
WSMheader_WSA ::= SEQUENCE {		
controlField SEQUENCE {		
Subtype	0 (nullNetworking)	
optionIndicator	0 (not present)	
Version	3	
}		

nExtensions SEQUENCE {}	Not present	
transport	bcMode (tpid = 0)	PSID addressing with no WAVE Information Element Extension field
destAddress	135 (psid=0p80-07)	PSID value for WSA is 0p80-07 as defined in [5].
body	Valid WSA payload	WSM payload created according to **Ieee1609Dot2Data**
}		

Table 7-5 Ieee1609Dot2Data

Information Element	Value/Remark	Comment
Requires WSMheader_WSA in Table 7-4		
Ieee1609Dot2Data ::= SEQUENCE {		
protocolVersion	3	
content	signedData	
hashID	sha256	
tbsData SEQUENCE {		
payload SEQUENCE {		
protocolVersion	3	
content unsecuredData	Valid WSA payload	WSA payload created according to **WSA_nExt_1, WSA_nExt_IP,** or **WSA_min**
}		
headerInfo SEQUENCE {		
psid	135 (psid=0p80-07)	PSID value for WSA is 0p80-07
}		
}		
signer SEQUENCE {}	Any valid value	Constructed according to [8]
signature SEQUENCE {}	Any valid value	Constructed according to [8]
}		

7.2.2.2 WSA with optional extension parameters

Table 7-6 WSA_nExt_1

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_nExt_1 ::= SEQUENCE {		
WSAheader SEQUENCE {}	WSAheader_3D or WSAheader_2D	See definition in Table 7-8 or Table 7-9
WSAserviceInfos SEQUENCE {}	WSAserviceInfos	See definition in Table 7-10
WSAchannelInfos SEQUENCE {}	WSAchannelInfos	See definition in Table 7-12
WSAroutingAdvertisement SEQUENCE{}	Not present	
}		

Table 7-7 WSA_nExt_IP

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_nExt_IP ::= SEQUENCE {		
WSAheader SEQUENCE {}	WSAheader_3D or WSAheader_2D	See definition in Table 7-8 or Table 7-9
WSAserviceInfos_IP SEQUENCE {}	WSAserviceInfos	See definition in Table 7-11
WSAchannelInfos SEQUENCE {}	WSAchannelInfos	See definition in Table 7-12

WSAroutingAdvertisement SEQUENCE{}	WSAroutingAdvertisement	See definition in Table 7-13
}		

Table 7-8 WSAheader_3D

Information Element	Value/Remark	Comment
Requires WSA_nExt_1 in Table 7-6		
WSAheader_3D ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b1110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {		
{ extensionId	17 (Repeat Rate)	
value	Any valid value	
}		
{ extensionID	6 (3D location)	
value SEQUENCE {		
latitude	Any valid value	
longitude	Any valid value	
elevation	Any valid value	
}		
}		
{ extensionID	7 (Advertiser ID)	
value	Any valid value	
}		
}		
}		
}		

Table 7-9 WSAheader_2D

Information Element	Value/Remark	Comment
Requires WSA_nExt_1 in Table 7-6		
WSAheader_3D ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b1110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {		
{ extensionId	17 (Repeat Rate)	
value	Any valid value	
}		
{ extensionID	5 (2D location)	

value SEQUENCE {		
latitude	Any valid value	
longitude	Any valid value	
}		
}		
{ extensionID	7 (Advertiser ID)	
value	Any valid value	
}		
}		
}		
}		

Table 7-10 WSAserviceInfos

Information Element	Value/Remark	Comment
Requires WSA_nExt_1 in Table 7-6		
WSAserviceInfos ::= SEQUENCE {		
{		
serviceID	pPSID	PSID values defined in **Table 4-4**
channelIndex	firstEntry	1st entry in Channel Info Segment
extension SEQUENCE {		
extensionId	8 (PSC)	
psc	Any valid value	
}		
}		
}		

Table 7-11 WSAserviceInfos_IP

Information Element	Value/Remark	Comment
Requires WSA_nExt_1 in Table 7-6		
WSAserviceInfos_IP ::= SEQUENCE {		
{		
serviceID	pPSID	PSID values defined in 4.1.1.4
channelIndex	firstEntry	1st entry in Channel Info Segment
extension SEQUENCE {		
{ extensionId	8 (PSC)	
psc	Any valid value	
}		
{ extensionId	9 (IPv6Address)	
IPv6Address	Any valid value	
}		
{ extensionId	10 (ServicePort)	
ServicePort	Any valid value	
}		
{ extensionId	11 (ProviderMACAddress)	
ProviderMACAddress	Any valid value	
}		
{ extensionId	19 (RcpiThreshold)	
RcpiThreshold	Any valid value	
}		
{ extensionId	20 (WsaCountThreshold)	
WsaCountThreshold	Any valid value	
}		

{ extensionId	22 (WsaCountThresholdInterval)	
WsaCountThresholdInterval	Any valid value	
}		
}		
}		
}		

Table 7-12 WSAchannelInfos

Information Element	Value/Remark	Comment
Requires WSA_nExt_1 in Table 7-6		
WSAchannelInfos ::= SEQUENCE {		
{		
operatingClass	17	
channelNumber	Any valid value	
powerLevel	Any valid value	
dataRate	Any valid value	
adaptable	Any valid value	
extensions SEQUENCE {		
{ extensionId	12 (EDCA)	
EdcaParameterSet {}	Any valid value	
}		
{ extensionId	21 (Channel Access)	
value	alternatingSCH	
}		
}		
}		
}		

Deleted: Any valid value

Table 7-13 WSAroutingAdvertisement

Information Element	Value/Remark	Comment
WSAroutingAdvertisement ::= SEQUENCE {		
{		
lifetime	Any valid value	
ipPrefix	Any valid value	
ipPrefixLength	Any valid value	
defaultGateway	Any valid value	
primaryDns	Any valid value	
extensions SEQUENCE {		
{ extensionId	14 (Gateway MAC)	
value	Any valid value	
}		
{ extensionId	13 (Secondary DNS)	
value	Any valid value	
}		
}		
}		
}		

7.2.2.3 WSA containing multiple service instances

Table 7-14 WSA_1srvPSC

Information Element	Value/Remark	Comment

Requires Ieee1609Dot2Data in Table 7-5		
WSA_1srv ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b0110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {}	Not present	
serviceInfos SEQUENCE {		
serviceID	pPSID	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
extension SEQUENCE {		
extensionId	8 (PSC)	
psc	Any valid value	
}		
}		
channelInfos SEQUENCE {		
operatingClass	17	
channelNumber	Any valid value	Default values defined in Table 4-1
powerLevel	Any valid value	Default values defined in Table 4-3
dataRate	Any valid value	Default values defined in Table 4-2
adaptable	Any valid value	
extensions SEQUENCE {}	Not present	
routingAdvertisement SEQUENCE{}	Not present	
}		

Table 7-15 WSA_1srv

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_1srv ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b0110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {}	Not present	
serviceInfos SEQUENCE {		
serviceID	vPSID1	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
chOptions SEQUENCE {}	Not present	
}		
channelInfos SEQUENCE {		
operatingClass	17	
channelNumber	Any valid value	Default values defined in Table 4-1
powerLevel	Any valid value	Default values defined in Table 4-3
dataRate	Any valid value	Default values defined in Table 4-2

adaptable	Any valid value	
extensions SEQUENCE {}	Not present	
routingAdvertisement SEQUENCE{}	Not present	
}		

Table 7-16 WSA_2srv

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_2srv ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b0110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {}	Not present	
serviceInfos SEQUENCE {		
{ serviceID	vPSID1	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
chOptions SEQUENCE {}	Not present	
}		
{ serviceID	vPSID2 (different from pPSID)	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
chOptions SEQUENCE {}	Not present	
}		
}		
channelInfos SEQUENCE {		
operatingClass	17	
channelNumber	Any valid value	Default values defined in Table 4-1
powerLevel	Any valid value	Default values defined in Table 4-3
dataRate	Any valid value	Default values defined in Table 4-2
adaptable	Any valid value	
extensions SEQUENCE {}	Not present	
routingAdvertisement SEQUENCE{}	Not present	
}		

7.2.2.4 WSA containing IP routing service

Table 7-17 WSA_IProuting

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_IProuting ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b0111	
}		
body SEQUENCE {}	Any valid value	
serviceInfos SEQUENCE {		

serviceID	0pEF-FF-FF-FE	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
chOptions SEQUENCE {}	Any valid value	
}		
channelInfos SEQUENCE {}	Any valid value	
routingAdvertisement SEQUENCE{		
lifetime	Any valid value	Duration of the test
ipPrefix	Any valid value	Supports generation of global IPv6
ipPrefixLength	Any valid value	
defaultGateway	Any valid value	IPv6 address of the WAVE Host
primaryDns	Any valid value	
extensions SEQUENCE {		
{ extensionId	14 (Gateway MAC)	
Value	Any valid value	
}		
}		
}		
}		

7.2.2.5 WSA containing minimum optional information

This configuration is not used and reserved for future use.

Table 7-18 WSA_min

Information Element	Value/Remark	Comment
Requires Ieee1609Dot2Data in Table 7-5		
WSA_min ::= SEQUENCE {		
version SEQUENCE {		
messageID	saMessage	
rsvAdvPrtVersion	3 (WSA version 3)	
headerOptionIndicator	0b0110	
}		
body SEQUENCE {		
changeCount SEQUENCE {		
saID	Any valid value	
contentCount	Any valid value	
}		
extensions SEQUENCE {}	Not present	
serviceInfos SEQUENCE {		
serviceID	pPSID	PSID values defined in Table 4-4
channelIndex	firstEntry	1st entry in Channel Info Segment
chOptions SEQUENCE {}	Not present	
}		
channelInfos SEQUENCE {		
operatingClass	17	
channelNumber	Any valid value	Default values defined in Table 4-1
powerLevel	Any valid value	Default values defined in Table 4-3
dataRate	Any valid value	Default values defined in Table 4-2
Adaptable	False	
extensions SEQUENCE {		
extensionId	21 (Channel Access)	
Value	alternatingSCH	
}		
routingAdvertisement SEQUENCE{}	Not present	
}		

Appendix A: Traceability Matrix

This Section shows traceability from the requirements identified by PICS from IEEE 1609.3 [2] to the Test Purposes defined in this document.

For each element in the PICS table, the Support profile is identified based on the information provided in SAE J2945/1 [1]. The following support profiles are included:

- V2V – mandatory features required for in-vehicle safety applications requiring transmission or reception of signed BSM messages.
- SCMS – Items marked SCMS are required if IPv6 communication over DSRC is supported, e.g. for communication with security service SCMS and to download security certificates from SCMS.
- RSE – mandatory feature required for roadside equipment

V2V and SCMS profiles are derived from SAE J2934/1 [1]. Items left blank in the Support column are optional.

Table A- 1 IEEE 1609.3 PICS traceability to TPs

1609.3 PICS from [2]	Features in [2]	Reference section in [2]	Status (J2945-1 [1])	Support (J2945-1 [1])	TP ID	TP Description
N1.	**DATA PLANE**					
N1.1.	**LLC**	5.2	M		TP-16093-WSM-MST-BV-01	To verify that the IUT will transmit a WSM with the correct version number and EtherType.
N1.1.1.	LLC extensions for WSMP	7.5	N1.3: M		TP-16093-WSM-MST-BV-01	See above
N1.2.	**IPv6**	5.3, 6.4	O1	SCMS, RSE		See TPs for N1.2.-N1.2.7.
N1.2.1.	Use stateless configuration	6.4	O	SCMS	TP-16093-IP-CFG-BV-01	Verify that the IUT will use WaveRoutingAdvertisement information in WSA to configure its global IPv6 address.
N1.2.2.	IP readdressing	6.4.2	M	SCMS	TP-16093-IP-CHG-BV-01	Verify that IUT will reset link-local IPv6 address of the WAVE interface to a specific value.
					TP-16093-IP-CHG-BV-02	Verify that IUT will reset IPv6 address of the WAVE interface to a different value.
N1.2.3.	Send IP datagrams	5.3	O2	SCMS, RSE	TP-16093-IP-COM-BV-01	Verify that the IUT will initiate a 2-way communication using IPv6 protocol to a Remote Host on a different subnet, all IP communications are carried on a Service channel.
N1.2.4.	Receive IP datagrams	5.3	O2	SCMS, RSE	TP-16093-IP-COM-BV-01	See TP for N1.2.3.
N1.2.4.1.	Receive by link-local address	6.4	M	SCMS, RSE	TP-16093-IP-COM-BV-02	Verify that the IUT will initiate a 2-way communication using IPv6 protocol to a WAVE Host using link-local address.

					TP-16093-IP-CFG-BV-02	Verify that the IUT will simultaneously be configured with the following IPv6 addresses for the WAVE interface: link-local (from its MAC) and global IPv6.
N1.2.4.2.	Receive by global address	6.4	M	SCMS, RSE	TP-16093-IP-COM-BV-01	Verify that the IUT will initiate a 2-way communication using IPv6 protocol to a Remote Host on a different subnet, all IP communications are carried on a Service channel.
					TP-16093-IP-CFG-BV-02	Verify that the IUT will simultaneously be configured with the following IPv6 addresses for the WAVE interface: link-local (from its MAC) and global IPv6.
N1.2.4.3.	Receive by host multicast addresses	6.4	O3			Not considered.
N1.2.4.4.	Receive by router multicast addresses	6.4	O3			Not considered.
N1.2.5.	UDP	5.4	O	RSE	TP-16093-IP-COM-BV-01	See TP for N1.2.3.
N1.2.6.	TCP	5.4	O	SCMS, RSE	TP-16093-IP-COM-BV-01	See TP for N1.2.3.
N1.2.7.	Other IETF protocols	5.4	O			Not considered
N1.3.	**WSMP**	5.5	O1	V2V, RSE	TP-16093-WSM-PP-BV-01	Verify that the IUT will receive WSM containing valid WSM-N-Header, excluding optional WAVE Info Element extensions, WSM-T-Header, and WSM Data, and matching registered PSID.
					TP-16093-WSM-PP-BV-02	Verify that the IUT will receive WSM containing valid WSM-N-Header, optional WAVE Info Element extensions, WSM-T-Header, and WSM Data, and matching registered PSID.
N1.3.1.	***WSM reception***	5.5.3	O4	V2V, RSE	TP-16093-WSM-PP-BV-01 … -02	See TPs for N1.3.
					TP-16093-WSM-COM-BV-02	Verify that the IUT will receive WSMs in continuous operation on a selected channel.
					TP-16093-WSM-	Verify that the IUT will transmit WSMs in alternating operation

					COM-BV-04	on a channel CH1 and receive WSMs on a channel CH2.
					TP-16093-WSM-COM-BV-05	Verify that the IUT will receive WSMs in alternating operation on channels CH1 and CH2.
N1.3.1.1.	Check WSMP Version number	5.5.3, 8.3.2	M	V2V, RSE (Version = 3)	TP-16093-WSM-PP-BV-01 … -02	See TPs for N1.3.
N1.3.1.2.	Check Subtype field	5.5.3, 8.3.2	M	V2V, RSE (Subtype = 0 or 1)	TP-16093-WSM-PP-BV-01 … -02	See TPs for N1.3.
N1.3.1.3.	Check TPID field	5.5.3, 8.3.2	M	V2V, RSE (TPID = 0)	TP-16093-WSM-PP-BV-01 … -02	See TPs for N1.3.
N1.3.1.4.	WAVE Info Elem Extension field	8.1.1	M	V2V, RSE	TP-16093-WSM-PP-BV-02	Verify that the IUT will receive WSM containing valid WSM-N-Header, excluding optional WAVE Info Element extensions, WSM-T-Header, and WSM Data, and matching registered PSID.
N1.3.1.5.	Deliver message based on Destination Address (PSID)	5.5.3	M	V2V, RSE	TP-16093-WSM-PP-BV-01 … -02	See TPs for N1.3.
N1.3.2.	***WSM transmission***	5.5.2	O4	V2V, RSE	TP-16093-WSM-MST-BV-01	To verify that the IUT will transmit a WSM with the correct version number and EtherType
					TP-16093-WSM-COM-BV-01	Verify that the IUT will transmit WSMs in continuous operation on a selected channel
					TP-16093-WSM-COM-BV-03	Verify that the IUT will transmit WSM1 and WSM2 on channels CH1 and CH2 respectively in alternating operation.
					TP-16093-WSM-COM-BV-04	Verify that the IUT will transmit WSMs in alternating operation on a channel CH1 and receive WSMs on a channel CH2.
					TP-16093-WSM-POP-BI-01	Verify that the IUT will not transmit WSM with payload exceeding WsmMaxLength.
N1.3.2.1.	Insert WSMP version number	8.3.2	M	V2V, RSE (Version =3)	TP-16093-WSM-MST-BV-01	See above
N1.3.2.2.	Insert Destination Address (PSID)	8.3.2	M	V2V, RSE	TP-16093-WSM-MST-BV-02	Verify that the IUT will transmit WSM containing valid WSM-T-Header, PSID and WSM Data

N1.3.2.3.	Outbound message size	5.5.2	M	V2V, RSE	TP-16093-WSM-MST-BV-02	See above
N1.3.2.4.	Transmit channel number	8.3.4.2	O	RSE	TP-16093-WSM-ROP-BV-01	Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Channel Number' and matching the actual channel used by the IUT
N1.3.2.5.	Transmit data rate	8.3.4.3	O	RSE	TP-16093-WSM-ROP-BV-02	Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Data Rate' and matching the actual data rate used by the IUT
N1.3.2.6.	Transmit Power Used	8.3.4.4	O	RSE	TP-16093-WSM-ROP-BV-03	Verify that the IUT will transmit WSM containing valid WSM-N-Header including WAVE Info Element Extension 'Transmit Power Used' and matching the actual transmit power used by the IUT.
N1.3.2.7.	Channel Load	8.3.4.5	O			Not considered
N1.3.2.8.	Insert Subtype features	8.3.2	M	V2V, RSE (Subtype = 0)	TP-16093-WSM-MST-BV-01	To verify that the IUT will transmit a WSM with the correct version number and EtherType.
					TP-16093-WSM-MST-BV-02	Verify that the IUT will transmit WSM containing valid WSM-T-Header, PSID and WSM Data.
N1.3.2.9.	Insert TPID	8.3.2	M	V2V, RSE (TPID = 0)	TP-16093-WSM-MST-BV-01 … - 02	See TPs for N1.3.2.8.
N2	MANAGEMENT PLANE	-	-			Not considered
N2.1.	**User role**	6.2.1	O	SCMS		See TPs for N2.1.1.- N2.1.9.1.3.
N2.1.1.	Receive WSAs over WSMP	6.3.2	O5	SCMS	TP-16093-WSA-PP-BV-01	Verify that the IUT will indicate to the upper layer availability of a provider service when it the IUT receives WSAs.
N2.1.2.	Verify and accept Secured WSA	6.3.3, 8.2.1	O5	SCMS	TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.3.	Accept unsecured WSA	6.3.3, 8.2.1	O5			Not considered.
N2.1.4.	WAVE Info Elem Extension fields	8.1.1	M		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.5.	Calculate avail service link quality	6.3.4	O			Not considered
N2.1.6.	***WSA header***	8.2.2	M		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.

N2.1.6.1.	Check WSA version number	8.2.2.2	M	SCMS	TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.2.	Check WSA Identifier	8.2.2.4	O		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.3.	Check Content Count	8.2.2.5	O		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.4.	WSA Header Info Element Ext field	8.2.2.6	M	SCMS	TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.4.1.	Repeat Rate	8.2.2.6.1	O		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.4.2.	2DLocation	8.2.2.6.2	O		TP-16093-WSA-PP-BV-01	Verify that the IUT will receive WSA with Secure WSA envelope, WSA Header containing Info Element Extension field 2D Location, and will indicate to the upper layer availability of a provider service included in the WSA.
N2.1.6.4.3.	3DLocation	8.2.2.6.3	O		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.4.4.	Advertiser Identifier	8.2.2.6.4	O		TP-16093-WSA-PP-BV-01	See TP for N2.1.1.
N2.1.6.4.5.	Other info elements	8.2.2.6	O			Not considered
N2.1.7.	**Service Info Segment**	8.2.3	M	SCMS	TP-16093-WSA-PP-BV-02	Verify that the IUT will receive WSA containing Service Info Segment with Info Element Extension fields, and will indicate to the upper layer availability of a provider service included in the WSA.
N2.1.7.1.	Number of Service Info Instances	8.2.3	M	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.	WAVE Info Element Extension field	8.2.3.5	M	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.1.	PSC	8.2.3.5.1	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.2.	IPv6Address	8.2.3.5.2	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.3.	Service Port	8.2.3.5.3	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.4.	Provider MAC Address	8.2.3.5.4	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.

N2.1.7.2.5.	RCPI Threshold	8.2.3.5.5	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.6.	WSA Count Threshold	8.2.3.5.6	O	SCMS	TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.6.1.	WSA Count Threshold Interval	8.2.3.5.7	O		TP-16093-WSA-PP-BV-02	See TP for N2.1.7.
N2.1.7.2.7.	Other info elements	8.2.3.5	O	SCMS		Not considered
N2.1.8.	**Channel Info Segment**	8.2.4	M	SCMS	TP-16093-WSA-PP-BV-03	Verify that the IUT will receive WSA containing Channel Info Segment containing Info Element Extension fields, and will indicate to the upper layer availability of a provider service included in the WSA.
N.2.1.8.1.	Number of Channel Info Instances	8.2.4	M	SCMS	TP-16093-WSA-PP-BV-03	See TP for N2.1.8.
N.2.1.8.2.	WAVE Info Elem Extension field	8.2.4.8	M	SCMS	TP-16093-WSA-PP-BV-03	See TP for N2.1.8.
N.2.1.8.2.1.	EDCA Parameter Set	8.2.4.8.1	O	SCMS	TP-16093-WSA-PP-BV-03	See TP for N2.1.8.
N.2.1.8.2.2.	Channel Access	8.2.4.8.2	O	SCMS	TP-16093-WSA-PP-BV-03	See TP for N2.1.8.
N.2.1.8.2.3.	Other info elements	8.2.4.8	O			Not considered
N2.1.9.	***WAVE Router Advertisement***	8.2.5.1	O	SCMS	TP-16093-WSA-PP-BV-04	Verify that the IUT will receive WSA containing WAVE Router Advertisement containing Info Element Extension fields, and will indicate to the upper layer availability of a provider service included in the WSA.
N2.1.9.1.	WAVE Info Elem Extension field	8.2.5.7	M	SCMS	TP-16093-WSA-PP-BV-04	See TP for N2.1.9.
N2.1.9.1.1.	Secondary DNS	8.2.5.7.1	O	SCMS	TP-16093-WSA-PP-BV-04	See TP for N2.1.9.
N2.1.9.1.2.	Gateway MAC Address	8.2.5.7.2	O	SCMS	TP-16093-WSA-PP-BV-04	See TP for N2.1.9.
N2.1.9.1.3.	Other info elements	8.2.5.7	O			Not considered
N2.2.	**Provider role**	6.2.1	O	RSE		See TPs for N2.2.- N2.2.13.1.2
N2.2.1.	Send Service Advertisements	6.2.3.3	M	RSE	TP-16093-WSA-MST-BV-01	Verify that the IUT will transmit a valid WSM containing WSA with valid WSM headers.

	over WSMP					
N2.2.1.1.	Send secured WSA	6.2.4.2.1, 8.2.1	O6	RSE	TP-16093-WSA-MST-BV-03	Verify that the IUT will transmit WSM containing a secure WSA.
N2.2.1.2.	Send unsecured WSA	6.2.4.2.1, 8.2.1	O6	RSE		Not considered
N2.2.2.	Send repeated advertisements	6.2.4.2.1	O	RSE	TP-16093-WSA-ROP-BV-01	Verify that the IUT operating as provider will transmit WSA with a specific repeat rate.
N2.2.3.	Change ongoing advertisements	6.2.2.2, 6.2.4.2.2	O	RSE	TP-16093-WSA-CHG-BV-01	Verify the IUT ability to change WSA when a new service added
N2.2.4.	Delete application-service	6.2.3.6	O	RSE	TP-16093-WSA-CHG-BV-02	Verify the IUT ability to change WSA when a service is deleted from WSA
N2.2.5.	***WSA header***	8.2.2	M	RSE	Various	See TPs for N2.2.5.1-N2.2.6.5.
N2.2.5.1.	Set WSA Version	8.2.2.2	M	RSE	TP-16093-WSA-MST-BV-02	Verify that the IUT will transmit WSA with the correct version number and valid WSA Header.
N2.2.5.2.	Set WSA Identifier	8.2.2.4	M	RSE	TP-16093-WSA-MST-BV-02	See TP for N2.2.5.1.
N2.2.5.3.	Set Content Count	8.2.2.5	M	RSE	TP-16093-WSA-MST-BV-02	See TP for N2.2.5.1.
N2.2.6.	WSA Header Info Element Ext field	8.2.2.6	M	RSE	TP-16093-WSA-MST-BV-04-X	Verify that the IUT will transmit WSA containing valid WSA Header Info Element Extension fields
N2.2.6.1.	Repeat Rate	8.2.2.6.1	O	RSE	TP-16093-WSA-MST-BV-04-A	See TP for N2.2.6.
N2.2.6.2.	2DLocation	8.2.2.6.2	O	RSE	TP-16093-WSA-MST-BV-08	Verify that the IUT will transmit WSA containing valid WSA Header Info Element Extension field 2D Location.
N2.2.6.3.	3DLocation	8.2.2.6.3	O	RSE	TP-16093-WSA-MST-BV-04-B	See TP for N2.2.6.
N2.2.6.4.	AdvertiserIdentifier	8.2.2.6.4	O	RSE	TP-16093-WSA-MST-BV-04-C	See TP for N2.2.6.
N2.2.6.5.	Other info elements	8.2.2.6	O	RSE		Not considered
N2.2.7.	***Service Info Segment***	8.2.3	M	RSE	TP-16093-WSA-MST-BV-05-X	Verify that the IUT will transmit WSA containing a valid Service Info Segment
N2.2.8.	Number of Service Info Instances	8.2.3	M	RSE	TP-16093-WSA-MST-BV-05-X	See TP for N2.2.7.
N2.2.9.	WAVE Info Elem Extension field	8.2.3.5	O	RSE	TP-16093-WSA-MST-BV-05-X	See TP for N2.2.7.
N2.2.9.1.	PSC	8.2.3.5.1	O	RSE	TP-16093-WSA-MST-BV-05-A	See TP for N2.2.7.

N2.2.9.2.	IPv6Address	8.2.3.5.2	O	RSE	TP-16093-WSA-MST-BV-05-B	See TP for N2.2.7.
N2.2.9.3.	Service Port	8.2.3.5.3	O	RSE	TP-16093-WSA-MST-BV-05-C	See TP for N2.2.7.
N2.2.9.4.	Provider MAC Address	8.2.3.5.4	O	RSE	TP-16093-WSA-MST-BV-05-D	See TP for N2.2.7.
N2.2.9.5.	RCPI Threshold	8.2.3.5.5	O	RSE	TP-16093-WSA-MST-BV-05-E	See TP for N2.2.7.
N2.2.9.6.	WSA Count Threshold	8.2.3.5.6	O	RSE	TP-16093-WSA-MST-BV-05-F	See TP for N2.2.7.
N2.2.9.6.1.	WSA Count Threshold Interval	8.2.3.5.7	O	RSE	TP-16093-WSA-MST-BV-05-G	See TP for N2.2.7.
N2.2.9.7.	Other info elements	8.2.3.5	O	RSE		Not considered
N2.2.10.	***Channel Info Segment***	8.2.4	M	RSE	TP-16093-WSA-MST-BV-06-X	Verify that the IUT will transmit WSA containing a valid Channel Info Segment
N2.2.11.	Number of Channel Info Instances	8.2.4	M	RSE	TP-16093-WSA-MST-BV-06-X	See TP for N2.2.10.
N2.2.12.	WAVE Info Elem Extension field	8.2.4.8	O	RSE	TP-16093-WSA-MST-BV-06-X	See TP for N2.2.10.
N2.2.12.1.	EDCA Parameter Set	8.2.4.8.1	O	RSE	TP-16093-WSA-MST-BV-06-B	See TP for N2.2.10.
N2.2.12.2.	Channel Access	8.2.4.8.2	O	RSE	TP-16093-WSA-MST-BV-06-A	See TP for N2.2.10.
N2.2.12.3.	Other info elements	8.2.4.8	O	RSE		Not considered
N2.2.13.	***Send WRA***	8.2.5	O	RSE	TP-16093-WSA-MST-BV-07-X	Verify that the IUT will transmit WSA containing valid WRA Segment
N2.2.13.1.	WAVE Info Elem Extension field	8.2.5.7	O	RSE	TP-16093-WSA-MST-BV-07-X	See TP for N2.2.13.
N2.2.13.1.1.	Secondary DNS	8.2.5.7.1	O	RSE	TP-16093-WSA-MST-BV-07-A	See TP for N2.2.13.
N2.2.13.1.2	Gateway MAC address	8.2.5.7.2	O	RSE	TP-16093-WSA-MST-BV-07-B	See TP for N2.2.13.
N2.2.13.1.3.	Other info elements	8.2.5.7	O			Not considered
N2.3.	**Timing advertisement**	-				Not considered
N2.3.1.	Timing Advertisement generation	6.2.4.3	O			Not considered
N2.4.	**MIB maintenance**	6.5				Not considered

N2.4.1.	Managed WAVE device	6.5	O			Not considered
N2.4.2.	MIB per standard	6.5	N2.4.1: M			Not considered
N2.4.3.	Other MIB	6.5	O			Not considered

Revision History

V0.1.0	Sep 2015	Initial Draft
V0.2.0	Sep 17, 2015	Editorial comments
V0.4.0	Nov 18, 2015	- Added message templates for WSM and WSAs. - Specified default values for WSM/WSA parameters - Removed test cases related to IPv6 multi-casting
V0.5.0	Dec 1, 2015	- Revised traceability table, updated some TPs
V0.6.0	Jan 6, 2016	- Multiple changes based on peer review/comments
V1.0	Mar 29, 2016	- Incorporated comments from reviewers
V1.1.0	Oct 9, 2016	- Incorporated comments from CAMP reviewers - Clarifications to terminology and cleanup
V1.2.0	Apr 26, 2017	- Clarifications and corrections in section 4 - Modified criteria for testing Repeat Rate in section 4.1.1.8 and 4.1.1.8.1. - Updates to TP-16093-WSA-ROP-BV-01, TP-16093-WSM-COM-BV-[01 – 05], - Updates to TP-16093-WSM-ROP-BV-[01, 02]
V1.3.3	Oct 2017	Editorial changes to TP-16093-WSM-MST-BV-01, -02, TP-16093-WSM-ROP-BV-03 TP-16093-WSM-POP-BI-01 Table 7-12 WSAchannelInfos: set operatingClass equal 17 *pWSARepeatRate* changed to 2msg/sec

◙ End of Document ◙