Tire Pressure Monitoring System Service (TPMSS)

***Bluetooth*® Test Suite**

- **Revision:** TPMSS.TS.p0
- **Revision Date:** 2026-08-11
- **Prepared By:** Automotive Working Group
- **Published during TCRL:** TCRL.pkg104-addition

Contents

1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Tire Pressure Monitoring System Service with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

2 References, definitions, and abbreviations

2.1 References

This document incorporates provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter.

[1] Bluetooth Core Specification, Version 6.1 or later

[2] Test Strategy and Terminology Overview

[3] Tire Pressure Monitoring System Profile Specification

[4] Tire Pressure Monitoring System Service Specification

[5] GATT Test Suite, GATT.TS

[6] Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers

[7] Bluetooth Core Specification Supplement (CSS), Version 7

[8] ICS Proforma for Tire Pressure Monitoring System Service, TPMSS.ICS

[9] Tire Pressure Monitoring System Service Implementation Extra Information for Test, IXIT

2.2 Definitions

In this Bluetooth document, the definitions from [1] and [2] apply.

2.3 Acronyms and abbreviations

In Bluetooth document, the definitions from [1] and [2] apply.

3 Test Suite Structure (TSS)

3.1 Overview

The Tire Pressure Monitoring System Service requires the presence of GAP, SM, and GATT. This is illustrated in Figure 3.1.

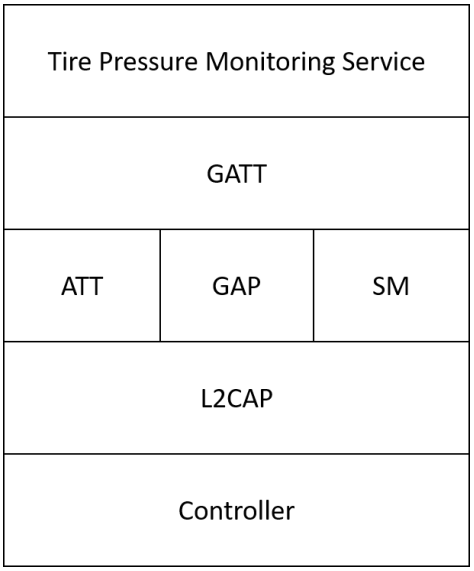

Figure 3.1: Tire Pressure Monitoring System Service Test Model

3.2 Test Strategy

The test objectives are to verify functionality of the Tire Pressure Monitoring System Service within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices. The testing approach covers mandatory and optional requirements in the specification and matches these to the support of the IUT as described in the ICS. Any defined test herein is applicable to the IUT if the ICS logical expression defined in the Test Case Mapping Table (TCMT) evaluates to true.

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in this Test Suite. A Lower Tester acts as the IUT's peer device and interacts with the IUT over-the-air interface. The configuration, including the IUT, needs to implement similar capabilities to communicate with the test equipment. For some test cases, it is necessary to stimulate the IUT from an Upper Tester. In practice, this could be implemented as a special test interface, a Man Machine Interface (MMI), or another interface supported by the IUT.

This Test Suite contains Valid Behavior (BV) tests complemented with Invalid Behavior (BI) tests where required. The test coverage mirrored in the Test Suite Structure is the result of a process that started with catalogued specification requirements that were logically grouped and assessed for testability enabling coverage in defined test purposes.

The manufacturer is required to provide details of how to place the IUT in the appropriate condition for testing via the ICS/IXIT documents as required by the test case.

Read, Notify, and Indicate service characteristic tests are executed using the Generic GATT Integrated Tests (GGIT) located in GATT.TS [5]. Because the characteristic write operations require that the client be a Primary Monitor, those tests are not executed using GGIT.

For Monitoring Mode testing, the Advertising State Duration and Standby State Duration fields of the TPMS Monitor Mode Duty Cycle characteristic, if supported, are set to values that are conducive to

executing the associated tests in a relatively short time. The default Standby State Duration may be very long.

Certain test cases may require a second Lower Tester. For example, one Lower Tester may represent a Primary Monitor while a second Lower Tester acts as a Secondary Monitor. Either two Lower Testers or one item of test equipment that has the capability to simulate two Lower Testers with different Bluetooth addresses may be employed.

3.2.1 Test strategy for removing the bond with the Primary Monitor

When a test procedure calls for removing the bond with the Primary Monitor, which allows it to potentially bond with a new Primary Monitor, four approaches are available.

1. The IUT may be factory reset as defined in Section 3.1 of the Tire Pressure Monitoring System Service specification [3].
2. If the IUT supports the Bond Management Service, it may be used to remove the bond with the Primary Monitor as referenced in Section 3.1 of [3].
3. An IUT can be placed into a mode in which it accepts a new Primary Monitor as described in Section 5.1.2.1 of the Tire Pressure Monitoring System Profile specification [4].
4. The bond may be removed by some implementation defined means.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Characteristic Write and Multiple Reads
- Configure Notification and Indication
- Service Procedure – Error Handling
- Primary and Secondary Monitor behaviors

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [2]. The convention used here is:
<spec abbreviation>/<IUT role>/<class>/**<feat>**/<func>/<subfunc>/<cap>**/<xx>-<nn>-<y>**.

Additionally, testing of this specification includes tests from the GATT Test Suite [5] referred to as Generic GATT Integrated Tests (GGIT); when used, the GGIT tests are referred to through a TCID string using the following convention:
<spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
TPMSS	Tire Pressure Monitoring System Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SEN	TPMS Sensor
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
SER	Service
Identifier Abbreviation	**Feature Identifier <feat>**
CON	Configure Notification or Indication
CWMR	Characteristic Write and Multiple Reads
PSM	Primary and Secondary Monitor behaviors
SGGIT	Server Generic GATT Integrated Tests
SPE	Service Procedure – Error Handling

Table 4.1: TPMSS TC feature naming convention

4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner. The mandated tests from this Test Suite depend on the capabilities to which conformance is claimed.

The Bluetooth Qualification Program may employ tests to verify implementation robustness. The level of implementation robustness that is verified varies from one specification to another and may be revised for cause based on interoperability issues found in the market.

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions not excluded by the specification
- That capabilities enabled by the implementations are sustained over durations expected by the use case
- That the implementation gracefully handles any quantity of data expected by the use case

- That in cases where more than one valid interpretation of the specification exist, the implementation complies with at least one interpretation and gracefully handles other interpretations
- That the implementation is immune to attempted security exploits

A single execution of each of the required tests is required to constitute a Pass verdict. However, it is noted that to provide a foundation for interoperability, it is necessary that a qualified implementation consistently and repeatedly pass any of the applicable tests.

In any case, where a member finds an issue with the test plan generated by the Bluetooth SIG qualification tool , the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an erratum request such that the issue may be addressed.

4.1.3 Pass/Fail verdict conventions

Each test case has an Expected Outcome section. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

The convention in this Test Suite is that, unless there is a specific set of fail conditions outlined in the test case, the IUT fails the test case as soon as one of the pass criteria conditions cannot be met. If this occurs, the outcome of the test is a Fail verdict.

4.2 Setup preambles

The procedures defined in this section are used to achieve specific conditions on the IUT and the test equipment within the tests defined in this document. The preambles here are commonly used to establish initial conditions.

4.2.1 Encrypted connection on LE Transport

- Preamble Purpose

  Establish an encrypted LE transport connection.

- Preamble Procedure

  1. The Sensor may need to be in either the Early Driving or Service state.
  2. The Central initiates a Pairing Request command.
  3. The Peripheral responds with a Pairing Response command.
  4. The two devices perform phase 2 of the LE pairing and establish an encrypted link with the key generated in Step 2.

4.3 Generic GATT Integration Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3, Server test procedures (SGGIT), in [5] using Table 4.2 below as input:

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
TPMSS/SEN/SGGIT/SER/BV-01-C [Service GGIT – Tire Pressure Monitoring]	Tire Pressure Monitoring System Service	[4] 2.6	-	-	Primary Service
TPMSS/SEN/SGGIT/CHA/BV-01-C [Characteristic GGIT – Tire Pressure]	Tire Pressure Characteristic	[4] 3.2	0x12 (Read, Notify)	3	-
TPMSS/SEN/SGGIT/CHA/BV-02-C [Characteristic GGIT – Tire Temperature]	Tire Temperature Characteristic	[4] 3.3	0x12 (Read, Notify)	2	-
TPMSS/SEN/SGGIT/CHA/BV-03-C [Characteristic GGIT – Tire Acceleration]	Tire Acceleration Characteristic	[4] 3.4	0x02 (Read)	2	-
TPMSS/SEN/SGGIT/CHA/BV-04-C [Characteristic GGIT – TPMS Properties]	TPMS Properties Characteristic	[4] 3.5	0x02 (Read)	1	-
TPMSS/SEN/SGGIT/CHA/BV-08-C [Characteristic GGIT – TPMS Duty Cycle]	TPMS Duty Cycle Characteristic	[4] 3.6	0x02 (Read)	13	-
TPMSS/SEN/SGGIT/CHA/BV-11-C [Characteristic GGIT – TPMS Duty Cycle, Write]	TPMS Duty Cycle Characteristic	[4] 3.6	0x0A (Read, Write)	13, Skip-Write	-
TPMSS/SEN/SGGIT/CHA/BV-10-C [Characteristic GGIT – TPMS Position]	TPMS Position Characteristic	[4] 3.7	0x02 (Read)	1	-
TPMSS/SEN/SGGIT/CHA/BV-12-C [Characteristic GGIT – TPMS Position, Write]	TPMS Position Characteristic	[4] 3.7	0x0A (Read, Write)	1, Skip-Write	-
TPMSS/SEN/SGGIT/CHA/BV-13-C [Characteristic GGIT – TPMS Signing Key]	TPMS Signing Key	[4] 3.8	0x22 (Read, Indicate)	Skip-Read	-

Table 4.2: Input for the GGIT Server Test Procedure

4.4 Characteristic Write and Multiple Reads

This test group contains test cases to verify that the characteristics that support characteristic writes allow this operation, multiple reads are supported, and RFU bits are set to 0.

TPMSS/SEN/CWMR/BV-03-C [Characteristic Write – TPMS Duty Cycle]

- Test Purpose

  Verify that the IUT's TPMS Duty Cycle characteristic can be written to by the Primary Monitor and that the IUT updates its duty cycle accordingly.

- Reference

  [4] 3, 3.6

- Initial Condition

  - The Lower Tester acts as a Primary Monitor.
  - The Lower Tester and IUT have previously bonded.
  - An encrypted ATT Bearer connection is established between the IUT and Lower Tester as described in Section 4.2.1.
  - The handle of the TPMS Duty Cycle characteristic is discovered by the Lower Tester.
  - The TSPX_Active_State identifies the state that is active and will be used in this test procedure. For this state, the corresponding Standby State Duration and (Advertising) State duration can be configured in the TPMS Duty Cycle characteristic.
  - The Advertising State duration field of the IUT's TPMS Duty Cycle characteristic is no greater than 1.66 seconds to allow it to be increased by 20% in this procedure.
  - The active Standby State duration indicated by TSPX_Active_State is between 30 seconds and two minutes to ensure the test procedure does not take an excessively long time to execute.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure with the TPMS Duty Cycle characteristic, retaining the Advertising State duration and Standby State duration of the TSPX_Active_State.
  2. The Lower Tester disconnects from the IUT.
  3. The Upper Tester commands the IUT to enter the TSPX_Active_State.
  4. The Lower Tester waits for the IUT to send the first advertising packet and marks the time.
  5. The Lower Tester waits for the IUT to stop sending any advertising packets, marks the time, and determines the IUT's Advertising State Duration.
  6. The Lower Tester waits for the IUT to once again begin advertising, marks the time, and determines the IUT's Standby State Duration.
  7. The Upper Tester commands the IUT to enter connectable state.
  8. The Lower Tester establishes an encrypted LE connection with the IUT as described in Section 4.2.1.
  9. The Lower Tester executes the GATT Write Characteristic Value sub-procedure with the TPMS Duty Cycle characteristic, increasing Advertising State duration by 20% and Standby State duration of the TSPX_Active_State by 20%.
  10. The Lower Tester disconnects from the IUT.
  11. The Upper Tester commands the IUT to enter the TSPX_Active_State.
  12. The Lower Tester waits for the IUT to send the first advertising packet and marks the time.

13. The Lower Tester waits for the IUT to stop sending any advertising packets, marks the time, and determines the IUT's Advertising State Duration.
14. The Lower Tester waits for the IUT to once again begin advertising, marks the time, and determines the IUT's Standby State Duration.

- Expected Outcome

  Pass verdict

  In Step 5, the IUT's Advertising State Duration is within +/- 20% of the TSPX_Active_State Advertising State duration.

  Between Steps 5 and 6, the IUT does not advertise.

  In Step 6, the IUT's Standby State Duration is within +/- 20% of the TSPX_Active_State Standby State duration.

  In Step 9, the IUT's TPMS Duty Cycle characteristic is successfully written.

  In Step 13, the IUT's Advertising State Duration is within +/- 20% of the revised TSPX_Active_State Advertising State duration.

  Between Steps 13 and 14, the IUT does not advertise.

  In Step 14, the IUT's Standby State Duration is within +/- 20% of the revised TSPX_Active_State Standby State duration.

TPMSS/SEN/CWMR/BV-04-C [Characteristic Write – TPMS Position]

- Test Purpose

  Verify that the IUT's TPMS Position characteristic can be written to by the Primary Monitor, and that the IUT updates its advertised position accordingly.

- Reference

  [4] 3, 3.7

- Initial Condition

  - The Lower Tester acts as a Primary Monitor.
  - The Lower Tester and IUT have previously bonded.
  - The handle of the TPMS Position characteristic is discovered by the Lower Tester.
  - An encrypted ATT Bearer connection is established between the IUT and Lower Tester as described in Section 4.2.1.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure with the TPMS Position characteristic and disconnects the link.
  2. The IUT uses the TPMS position value in its advertising.
  3. The Lower Tester establishes an encrypted LE connection with the IUT as described in Section 4.2.1
  4. The Lower Tester executes the GATT Write Characteristic Value sub-procedure with the TPMS Position characteristic and value set to a different value compared to the one it read in Step 1.
  5. The Lower Tester disconnects.
  6. The IUT enters Monitoring Mode and begins using the revised TPMS position in its advertising.

- Expected Outcome

  Pass verdict

  The TPMS Position characteristic is successfully written.

  The IUT's advertised TPMS Position updates to reflect the revised value.

TPMSS/SEN/CWMR/BI-02-C [Characteristic Write – TPMS Duty Cycle – RFU Values]

- Test Purpose

  Verify that the IUT does not accept an RFU (out of range) value in a characteristic write to the TPMS Duty Cycle characteristic.

- Reference

  [4] 3.6.2

- Initial Condition

  - The handle of the characteristic is discovered by the Lower Tester.
  - The Lower Tester is acting as a Primary Monitor. Note that establishing this condition generally requires the Lower Tester to be the first Monitor device with which the IUT is bonded.
  - An encrypted ATT Bearer connection is established between the IUT and Lower Tester as described in Section 4.2.1.

- Test Procedure

  Execute Step 1 for all rounds in Table 4.3:

  1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure with the TPMS Duty Cycle characteristic and all characteristic fields set to valid values except for the field and value specified in Table 4.3.

Round	Field	Value
1	Advertising State Duration	1
2	Standby State Duration in Parked State	3601
3	Standby State Duration in Early Driving State	3601
4	Standby State Duration in Driving State	3601
5	Standby State Duration in Early Parked State	3601
6	Early Driving State Duration	11
7	Early Driving Primary Monitor Pairing State Duration	11
8	Early Parked State Duration	11
9	Service State Duration	0

Table 4.3: Characteristic Write – TPMS Duty Cycle – RFU Values rounds

- Expected Outcome

  Pass verdict

  In every round, the IUT sends an Out of Range (0xFF) Attribute Protocol Error code to the Lower Tester.

TPMSS/SEN/CWMR/BI-03-C [Characteristic Write – TPMS Position – RFU Value]

- Test Purpose

  Verify that the IUT does not accept an RFU value in a characteristic write to the TPMS Position characteristic.

- Reference

  [4] 3.7.2

- Initial Condition

  - The handle of the characteristic is discovered by the Lower Tester.
  - The Lower Tester is acting as a Primary Monitor.
  - Establish an encrypted ATT Bearer connection between the IUT and Lower Tester as described in Section 4.2.1.

- Test Procedure

  1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure with the TPMS Position characteristic and value set to an RFU value.

- Expected Outcome

  Pass verdict

  The IUT sends a Write Request Rejected (0xFC) Attribute Protocol Error code to the Lower Tester.

TPMSS/SEN/CWMR/BV-06-C [TPMS Properties RFU bits]

- Test Purpose

  Verify that the IUT RFU bits in the TPMS Properties characteristic are returned set to 0.

- Reference

  [4] 3.5.1

- Initial Condition

  - Establish an encrypted ATT Bearer connection between the IUT and Lower Tester as described in Section 4.2.1.
  - The handle of the TPMS Properties characteristic is discovered by the Lower Tester.
  - The Lower Tester is acting as a Secondary Monitor.

- Test Procedure

  1. Execute the Read Characteristic Value sub-procedure to read the TPMS Properties characteristic.

- Expected Outcome

  Pass verdict

  The IUT successfully provides the TPMS Properties characteristic.

  Bits 2 to 7 are all set to 0.

4.4.1 Multiple Reads

Verify that the IUT properly handles multiple characteristic read requests.

TPMSS/SEN/CWMR/BV-05-C [Multiple Reads]

- Test Purpose

  Verify that the IUT properly handles multiple reads of the TPMS characteristics.

- Reference

  [4] 3.1, 3.2

- Initial Condition

  - The handles of the Tire Pressure and Tire Temperature characteristics are discovered by the Lower Tester.
  - The Lower Tester is acting as a Primary Monitor.
  - All other initial conditions as required to execute the Read Multiple Characteristics Values sub-procedure.

- Test Procedure

  1. Execute the Multiple Read Characteristic Values sub-procedure using the Tire Pressure and Tire Temperature characteristics for the read operations.

- Expected Outcome

  Pass verdict

  The IUT successfully provides the Tire Pressure and Tire Temperature characteristic values.

4.5 Configure Notification and Indication

- Test Purpose

  This test group contains one or more test cases to verify writing to the client characteristic configuration descriptor for each characteristic that supports notification or indications and that the IUT then generates events.

- Reference

  [4] 3, 3.2.2, 3.3.2, 3.8.2

- Initial Condition

  - The Lower Tester acts as a Primary Monitor.
  - The handle of the specified characteristic is discovered by the Lower Tester.
  - The handle of the client characteristic configuration descriptor of the Characteristic referenced in Table 4.4 has been previously discovered by the Lower Tester.
  - An ATT encrypted Bearer connection is established between the Lower Tester and IUT as described in Section 4.2.1.

- Test Case Configuration

Test Case	Characteristic	Value
TPMSS/SEN/CON/BV-01-C [Configure Notification – Tire Pressure]	Tire Pressure	0x0001
TPMSS/SEN/CON/BV-02-C [Configure Notification – Tire Temperature]	Tire Temperature	0x0001
TPMSS/SEN/CON/BV-03-C [Configure Indication – TPMS Signing Key]	TPMS Signing Key	0x0002

Table 4.4: Configure Notification and Indication test cases

- Test Procedure

  1. The Lower Tester enables notification or indication by writing the value specified in Table 4.4 to the client characteristic configuration descriptor of the characteristic specified in Table 4.4.
  2. The Upper Tester commands the IUT to update the characteristic. In the case of tire pressure and tire temperature, the change necessary to generate a notification is implementation specific.
  3. The IUT generates a notification or an indication.

- Expected Outcome

  Pass verdict

  The characteristic descriptor is successfully written.

  The IUT generates a notification or indication.

4.6 Service Procedure – Error Handling

This test group contains test cases to verify compliant operation in response to characteristic writes that are expected to generate error conditions.

4.6.1 Characteristic Write from Secondary Monitor

- Test Purpose

  Verify that the IUT rejects a write from a Secondary Monitor when it attempts to write to a characteristic in the Tire Pressure Monitoring System Service. It returns the Write Request Rejected error even when the attempted value is out of range.

- Reference

  [4] 3.1, 3.6.2, 3.7.2

- Initial Condition

  - The handle of the specified characteristic is discovered by the Lower Tester.
  - An encrypted ATT Bearer connection is established between the IUT and Lower Tester as described in Section 4.2.1.
  - The Lower Tester acts as a Secondary Monitor. Note that establishing this condition may require a different Lower Tester to have previously bonded with the IUT as the Primary Monitor.

- Test Case Configuration

Test Case	Characteristic	Invalid Values
TPMSS/SEN/SPE/BV-03-C [Characteristic Write from Secondary Monitor – TPMS Duty Cycle]	TPMS Duty Cycle	Advertising State Duration=201 Standby State Duration in Driving State = 3601 Standby State Duration in Early Driving State = 3601 Standby State Duration in Driving State = 3601 Standby State Duration in Early Parked State = 3601 Early Driving State Duration = 11 Early Driving Primary Monitor Pairing State Duration = 11 Early Parked State Duration = 11 Service State Duration = 0
TPMSS/SEN/SPE/BV-04-C [Characteristic Write from Secondary Monitor – TPMS Position]	TPMS Position	0x00

Table 4.5: Characteristic Write from Secondary Monitor test cases

- Test Procedure

1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure with the Characteristic specified in Table 4.5.
2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure on the same characteristic and with the same value it read in Step 1.
3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure with the specified Characteristic and Invalid Values from Table 4.5.

- Expected Outcome

Pass verdict

The IUT rejects the Write Requests and sends an Error Response with the Attribute Protocol Error code set to Write Request Rejected (0xFC) for both attempts.

Fail verdict

The IUT sends an Error Response with the Attribute Protocol Error code set to Out of Range (0xFF).

4.7 Primary and Secondary Monitor behaviors

This test group contains test cases to verify behaviors specific to how the TPMS Sensor handles Primary and Secondary Monitors.

TPMSS/SEN/PSM/BV-01-C [Monitors attempt to read TPMS Signing Key characteristic]

- Test Purpose

  Verify that the IUT rejects a read from a Secondary Monitor of the TPMS Signing Key characteristic over an encrypted link but accepts a read of the characteristic over an encrypted link from the Primary Monitor.

- Reference

  [4] 3.1, 3.8.2

- Initial Condition

  - Lower Tester 1 has been established with the IUT as a Primary Monitor.
  - Lower Tester 2 acts as a Secondary Monitor.
  - The handle of the TPMS Signing Key characteristic is discovered by Lower Tester 1.
  - An encrypted LE connection has been established between Lower Tester 1 and the IUT as described in Section 4.2.1.

- Test Procedure

  1. Lower Tester 1 executes the GATT Read Characteristic Value sub-procedure with the TPMS Signing Key characteristic.
  2. Lower Tester 1 disconnects from the IUT.
  3. Lower Tester 2 establishes an encrypted LE connection with the IUT as described in Section 4.2.1.
  4. Lower Tester 2 discovers the handle of the TPMS Signing Key characteristic.
  5. Lower Tester 2 executes the GATT Read Characteristic Value sub-procedure with the TPMS Signing Key characteristic.

- Expected Outcome

  Pass verdict

  The IUT allows Lower Tester 1 to read the characteristic but rejects Lower Tester 2 by returning an error response with the error code set to Insufficient Authorization (0x08).

TPMSS/SEN/PSM/BV-02-C [Signing Key Refresh upon new Primary Monitor]

- Test Purpose

  Verify that the IUT changes the value of the TPMS Signing Key characteristic when the IUT is paired with a new Primary Monitor.

- Reference

  [4] 3.8.2

- Initial Condition

  - Lower Tester 1 has been established with the IUT as a Primary Monitor.

- Lower Tester 2 acts as a new Primary Monitor.
- The handle of the TPMS Signing Key characteristic is discovered by Lower Tester 1.
- An encrypted LE connection has been established between Lower Tester 1 and the IUT as described in Section 4.2.1.

- Test Procedure

  1. Lower Tester 1 executes the GATT Read Characteristic Value sub-procedure with the TPMS Signing Key characteristic. The value of the TPMS Signing Key characteristic is captured for comparison in the Pass verdict.
  2. Lower Tester 1 executes one of the procedures described in Section 3.2.1 to remove its bond with the IUT and no longer be the Primary Monitor.
  3. Lower Tester 2 establishes an encrypted LE connection with the IUT as described in Section 4.2.1.
  4. Lower Tester 2 bonds with the IUT, becoming the new Primary Monitor.
  5. Lower Tester 2 discovers the handle of the TPMS Signing Key characteristic.
  6. Lower Tester 2 executes the GATT Read Characteristic Value sub-procedure with the TPMS Signing Key characteristic. The value of the TPMS Signing Key characteristic is captured for comparison in the Pass verdict.

- Expected Outcome

  Pass verdict

  The TPMS Signing Key characteristic values returned to Lower Tester 1 and Lower Tester 2 are different.

5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The IUT is tested in all roles for which support is declared in the ICS document.

The columns for the TCMT are defined as follows:

Item: Contains a logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for Tire Pressure Monitoring System Service [8].

If a test case is mandatory within the respective layer, then the y/x reference is omitted.

Feature: A brief, informal description of the feature being tested.

Test Case(s): The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [2].

For the purpose and structure of the ICS/IXIT, refer to [2].

Item	Feature	Test Case(s)
TPMSS 2/2	Service Supported over LE	TPMSS/SEN/SGGIT/SER/BV-01-C
TPMSS 4/1	Tire Pressure Characteristic	TPMSS/SEN/SGGIT/CHA/BV-01-C TPMSS/SEN/CON/BV-01-C
TPMSS 4/2	Tire Temperature Characteristic	TPMSS/SEN/SGGIT/CHA/BV-02-C TPMSS/SEN/CON/BV-02-C
TPMSS 4/1 AND TPMSS 4/2 AND TPMSS 5/2	Tire Pressure Characteristic Tire Temperature Characteristic GATT Read Multiple Characteristic Values	TPMSS/SEN/CWMR/BV-05-C
TPMSS 4/3	Tire Acceleration Characteristic	TPMSS/SEN/SGGIT/CHA/BV-03-C
TPMSS 4/4	TPMS Properties Characteristic	TPMSS/SEN/SGGIT/CHA/BV-04-C TPMSS/SEN/CWMR/BV-06-C
TPMSS 4/6	TPMS Monitoring Mode Duty Cycle Characteristic	TPMSS/SEN/CWMR/BI-02-C TPMSS/SEN/SPE/BV-03-C TPMSS/SEN/CWMR/BV-03-C TPMSS/SEN/SGGIT/CHA/BV-11-C
TPMSS 4/5 AND NOT TPMSS 4/6	Read TPMS Monitoring Mode Duty Cycle Characteristic	TPMSS/SEN/SGGIT/CHA/BV-08-C
TPMSS 4/8	TPMS Position Characteristic	TPMSS/SEN/CWMR/BI-03-C TPMSS/SEN/SPE/BV-04-C TPMSS/SEN/SGGIT/CHA/BV-12-C TPMSS/SEN/CWMR/BV-04-C
TPMSS 4/7 AND NOT TPMSS 4/8	Read TPMS Position Characteristic	TPMSS/SEN/SGGIT/CHA/BV-10-C

Item	Feature	Test Case(s)
TPMSS 4/9	TPMS Signing Key Characteristic	TPMSS/SEN/SGGIT/CHA/BV-13-C TPMSS/SEN/PSM/BV-01-C TPMSS/SEN/PSM/BV-02-C TPMSS/SEN/CON/BV-03-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2026-08-11	Approved by BTI on 2026-06-28. TPMSS v1.0 adopted by the BoD on 2026-08-10. Prepared for initial publication.

Acknowledgments

Name	Company
Dejan Berec	Bluetooth SIG, Inc.
Nathan Burns	Bluetooth SIG, Inc.
Andreea Dumitrache	Bluetooth SIG, Inc.
Tharon Hall	Bluetooth SIG, Inc.
Jim Harper	Bluetooth SIG, Inc.
Jawid Mirani	Bluetooth SIG, Inc.
Victor Zhodzishsky	Infineon Technologies AG
Alicia Courtney	Broadcom