Media Control Service (MCS)

***Bluetooth*® Test Suite**

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Contents

1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Media Control Service Specification and the Generic Media Control Service Specification 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. Additional definitions and abbreviations can be found in [1] and [2].

[1] Bluetooth Core Specification, Version 4.2 or later

[2] Test Strategy and Terminology Overview

[3] Media Control Service Specification, Version 1.0

[4] ICS Proforma for Media Control Service (MCS)

[5] GATT Test Suite, GATT.TS

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

[7] Object Transfer Service Test Suite, OTS.TS

[8] Media Control Service IXIT proforma

2.2 Definitions

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

2.2.1 Object Transfer Channel

The Object Transfer Channel is an L2CAP connection-oriented channel that is suitable for bulk data transfer. The Object Transfer Channel may be supported over the LE transport or the BR/EDR transport.

2.3 Acronyms and abbreviations

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

3 Test Suite Structure (TSS)

3.1 Overview

The Media Control Service requires the presence of GAP, SM (when used over LE transport), SDP (when used over BR/EDR transport), L2CAP, and GATT. EATT can optionally be used. This is illustrated in Figure 3.1.

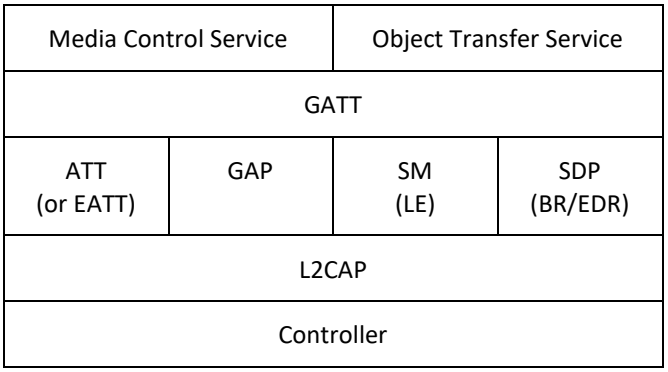

Figure 3.1: Media Control Service test model

3.2 Test Strategy

The test objectives are to verify the functionality of the Media Control 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. Since there is no distinction between instances of GMCS and MCS, besides the service UUID, when running the tests in this Test Suite, the GATT handle of the target IUT will be defined in the TSPX_IUT_Handle IXIT entry.

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.

For notifications that are asynchronous and arrive in any order, the Pass verdict uses the verbiage "after Step X", where X would be the step that causes the notification, i.e., GATT Write to Media Control Point.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Control Point Procedures
- Service Procedures
- Service Procedure – Error Handling

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 test cases in GGIT 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>**
GMCS	Generic Media Control Service
MCS	Media Control Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SR	Server
Identifier Abbreviation	**Feature Identifier <feat>**
MCP	Media Control Point Procedures
SCP	Search Control Point Procedures
SGGIT	Server Generic GATT Integrated Tests
SP	Service Procedures
SPE	Service Procedure – Error Handling
Identifier Abbreviation	**Function Identifier <func>**
CHA	Characteristic GGIT
SER	Service GGIT

Table 4.1: MCS TC feature naming conventions

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 exists, 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, with 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, then the outcome of the test is a Fail verdict.

4.2 Setup preambles

The procedures defined in this section are provided as information, as they are used by test equipment in achieving the specific conditions in certain tests.

4.2.1 ATT Bearer on LE Transport

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0004 between the IUT and the Lower Tester over that LE transport.

4.2.2 ATT Bearer on BR/EDR Transport

Preamble procedure:

1. Establish a BR/EDR transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel (PSM 0x001F) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.3 EATT Bearer on LE Transport

Preamble procedure:

1. Establish an LE transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0005 for signaling and one L2CAP channel (for ATT bearers) with EATT PSM (as defined in Assigned Numbers) between the IUT and the Lower Tester over that LE transport.

4.2.4 EATT Bearer on BR/EDR Transport

Preamble procedure:

1. Establish a BR/EDR transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0001 for signaling and one L2CAP channel (for ATT bearers) with EATT PSM (as defined in Assigned Numbers) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.5 Media Control Point preamble

Preamble procedure:

1. Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
2. The handle of the Media Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or Section 4.4 or is known to the Lower Tester by other means.
3. The handle of the Client Configuration descriptor of the Media Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.4 or is known to the Lower Tester by other means.
4. If the IUT requires bonding, then the Lower Tester performs a bonding procedure.

4.2.6 Search Control Point preamble

Preamble procedure:

1. Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
2. The handle of the Search Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or Section 4.4 or is known to the Lower Tester by other means.
3. The handle of the Client Configuration descriptor of the Search Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or Section 4.4 or is known to the Lower Tester by other means.
4. If the IUT requires bonding, then the Lower Tester performs a bonding procedure.

4.2.7 Select OTS Object preamble

Preamble parameters:

ObjectID – object ID for Object that will be retrieved

Preamble procedure:

1. If IUT permissions for the Object List Control Point characteristic require a specific security mode or security level, establish a connection meeting those requirements. If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
2. The handle of each supported characteristic and characteristic descriptor referenced in the procedure below is discovered by the Lower Tester during the test procedure in Section 4.3 or Section 4.4 or is known to the Lower Tester by other means.
3. Enable indication by writing the value 0x0002 using the GATT Write Characteristic Descriptor sub-procedure for the OLCP CCCD.

4. If the IUT supports the Object List Filter characteristics, the Lower Tester writes the value ‘No Filter’ (0x00), with no parameter, to all three instances of the Object List Filter.
5. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Object List Control Point characteristic with the Goto opcode (0x05) with the ObjectID as the parameter.
6. The Lower Tester receives a Write Response indicating that the IUT has accepted the opcode.
7. The Lower Tester receives a GATT Characteristic Value Indication for the Object List Control Point characteristic.
8. The Lower Tester sends a GATT Indication Confirmation to the IUT.
9. If the Result Code received in Step 7 was not ‘Success’, the IUT has failed to respond as expected and this procedure must terminate unsuccessfully at this point.

4.2.8 OTS preamble

Preamble parameters:

ObjectID – object ID for Object that will be retrieved

Preamble procedure:

1. Select the Current Object in the Object Transfer Service by performing the “Select OTS Object Preamble” in Section 4.2.7 with the ObjectID.
2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Object Size characteristic.
3. The Lower Tester opens an Object Transfer Channel to the IUT.
4. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Object Action Control Point characteristic with a Length parameter value equal to the Current Size field of the Object Size characteristic value read in Step 2, and the Offset parameter is set to 0.
5. The Lower Tester receives a Write Response indicating that the IUT has accepted the opcode.
6. The Lower Tester receives a GATT Characteristic Value Indication for the Object Action Control Point characteristic.
7. The IUT sends data to the Lower Tester via the Object Transfer Channel opened in Step 3.
8. The Lower Tester waits for the object transfer operation to complete.

4.3 Generic GATT Integrated Tests

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

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)
MCS/SR/SGGIT/SER/BV-01-C [Service GGIT – Media Control]	Media Control Service	[3] 2.1	-	-
MCS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Media Player Name, MCS]	Media Player Name Characteristic	[3] 3.1	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Media Player Icon Object ID]	Media Player Icon Object ID Characteristic	[3] 3.2	0x02 (Read)	6
MCS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Media Player Icon URL]	Media Player Icon URL Characteristic	[3] 3.3	0x02 (Read)	skip
MCS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Track Changed]	Track Changed Characteristic	[3] 3.4	0x10 (Notify)	0
MCS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Track Title]	Track Title Characteristic	[3] 3.5	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Track Duration]	Track Duration Characteristic	[3] 3.6	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	4
MCS/SR/SGGIT/CHA/BV-07-C [Characteristic GGIT – Track Position]	Track Position Characteristic	[3] 3.7	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	4
MCS/SR/SGGIT/CHA/BV-08-C [Characteristic GGIT – Playback Speed]	Playback Speed Characteristic	[3] 3.8	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-09-C [Characteristic GGIT – Seeking Speed]	Seeking Speed Characteristic	[3] 3.9	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	1
MCS/SR/SGGIT/CHA/BV-10-C [Characteristic GGIT – Current Track Segments Object ID]	Current Track Segments Object ID Characteristic	[3] 3.10	0x02 (Read)	skip
MCS/SR/SGGIT/CHA/BV-11-C [Characteristic GGIT – Current Track Object ID]	Current Track Object ID Characteristic	[3] 3.11	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)
MCS/SR/SGGIT/CHA/BV-12-C [Characteristic GGIT – Next Track Object ID]	Next Track Object ID Characteristic	[3] 3.12	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-13-C [Characteristic GGIT – Parent Group Object ID]	Parent Group Object ID Characteristic	[3] 3.13	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-14-C [Characteristic GGIT – Current Group Object ID]	Current Group Object ID Characteristic	[3] 3.14	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip
MCS/SR/SGGIT/CHA/BV-15-C [Characteristic GGIT – Playing Order]	Playing Order Characteristic	[3] 3.15	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	1
MCS/SR/SGGIT/CHA/BV-16-C [Characteristic GGIT – Playing Order Supported]	Playing Order Supported Characteristic	[3] 3.16	0x02 (Read)	2
MCS/SR/SGGIT/CHA/BV-17-C [Characteristic GGIT – Media State]	Media State Characteristic	[3] 3.17	0x12 (Notify, Read)	1
MCS/SR/SGGIT/CHA/BV-18-C [Characteristic GGIT – Media Control Point]	Media Control Point Characteristic	[3] 3.18	0x1C (Write, WriteWithoutResponse, Notify)	skip
MCS/SR/SGGIT/CHA/BV-19-C [Characteristic GGIT – Media Control Point Opcodes Supported]	Media Control Point Opcodes Supported Characteristic	[3] 3.19	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	4
MCS/SR/SGGIT/CHA/BV-20-C [Characteristic GGIT – Search Control Point]	Search Control Point Characteristic	[3] 3.20	0x1C (Write, WriteWithoutResponse, Notify)	skip
MCS/SR/SGGIT/CHA/BV-21-C [Characteristic GGIT – Search Result Object ID]	Search Results Object ID Characteristic	[3] 3.21	0x12 (Notify, Read)	skip-read
MCS/SR/SGGIT/CHA/BV-22-C [Characteristic GGIT – Content Control ID]	Content Control ID Characteristic	[3] 3.22	0x02 (Read)	1
MCS/SR/SGGIT/SDP/BV-01-C [SDP GGIT – Media Control Service]	Media Control Service	[3] 5	-	-
GMCS/SR/SGGIT/SER/BV-01-C [Service GGIT – Generic Media Control]	Generic Media Control Service	[3] 2.1	-	-

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)
GMCS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Media Player Name, GMCS]	Media Player Name Characteristic	[3] 3.1	0x12 (Read, Notify)	skip
GMCS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Media Player Icon Object ID]	Media Player Icon Object ID Characteristic	[3] 3.2	0x02 (Read)	6
GMCS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Media Player Icon URL]	Media Player Icon URL Characteristic	[3] 3.3	0x02 (Read)	skip
GMCS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Track Changed]	Track Changed Characteristic	[3] 3.4	0x10 (Notify)	0
GMCS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Track Title]	Track Title Characteristic	[3] 3.5	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	skip
GMCS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Track Duration]	Track Duration Characteristic	[3] 3.6	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	4
GMCS/SR/SGGIT/CHA/BV-07-C [Characteristic GGIT – Track Position]	Track Position Characteristic	[3] 3.7	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	4
GMCS/SR/SGGIT/CHA/BV-08-C [Characteristic GGIT – Playback Speed]	Playback Speed Characteristic	[3] 3.8	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip
GMCS/SR/SGGIT/CHA/BV-09-C [Characteristic GGIT – Seeking Speed]	Seeking Speed Characteristic	[3] 3.9	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	1
GMCS/SR/SGGIT/CHA/BV-10-C [Characteristic GGIT – Current Track Segments Object ID]	Current Track Segments Object ID Characteristic	[3] 3.10	0x02 (Read)	skip-read
GMCS/SR/SGGIT/CHA/BV-11-C [Characteristic GGIT – Current Track Object ID]	Current Track Object ID Characteristic	[3] 3.11	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip-read
GMCS/SR/SGGIT/CHA/BV-12-C [Characteristic GGIT – Next Track Object ID]	Next Track Object ID Characteristic	[3] 3.12	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip-read
GMCS/SR/SGGIT/CHA/BV-13-C [Characteristic GGIT – Parent Group Object ID]	Parent Group Object ID Characteristic	[3] 3.13	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	skip-read

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)
GMCS/SR/SGGIT/CHA/BV-14-C [Characteristic GGIT – Current Group Object ID]	Current Group Object ID Characteristic	[3] 3.14	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	skip-read
GMCS/SR/SGGIT/CHA/BV-15-C [Characteristic GGIT – Playing Order]	Playing Order Characteristic	[3] 3.15	Mandatory: 0x0E (Read, Write, WriteWithoutResponse) Optional: 0x10 (Notify)	1
GMCS/SR/SGGIT/CHA/BV-16-C [Characteristic GGIT – Playing Order Supported]	Playing Order Supported Characteristic	[3] 3.16	0x02 (Read)	2
GMCS/SR/SGGIT/CHA/BV-17-C [Characteristic GGIT – Media State]	Media State Characteristic	[3] 3.17	0x12 (Notify, Read)	1
GMCS/SR/SGGIT/CHA/BV-18-C [Characteristic GGIT – Media Control Point]	Media Control Point Characteristic	[3] 3.18	0x1C (Write, WriteWithoutResponse, Notify)	skip
GMCS/SR/SGGIT/CHA/BV-19-C [Characteristic GGIT – Media Control Point Opcodes Supported]	Media Control Point Opcodes Supported Characteristic	[3] 3.19	Mandatory: 0x02 (Read) Optional: 0x10 (Notify)	4
GMCS/SR/SGGIT/CHA/BV-20-C [Characteristic GGIT – Search Control Point]	Search Control Point Characteristic	[3] 3.20	0x1C (Write, WriteWithoutResponse, Notify)	skip
GMCS/SR/SGGIT/CHA/BV-21-C [Characteristic GGIT – Search Result Object ID]	Search Results Object ID Characteristic	[3] 3.21	0x12 (Notify, Read)	skip-read
GMCS/SR/SGGIT/CHA/BV-22-C [Characteristic GGIT – Content Control ID]	Content Control ID Characteristic	[3] 3.22	0x02 (Read)	1
GMCS/SR/SGGIT/SDP/BV-01-C [SDP GGIT – Generic Media Control Service]	Generic Media Control Service	[3] 5	-	-

Table 4.2: Generic GATT Integrated Test configuration

4.4 Media Control Point procedures

Test group to test Media Control Point procedures.

4.4.1 Play and Pause

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Play and Pause opcode and updates all required characteristics and data values in the Media State characteristic. The verification is done one value at a time, as enumerated in the test cases in Table 4.3 below.

- Reference

  [3] 3.18.1.1, 3.18.1.2

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - The IUT has its current track set to a valid track.

- Test Case Configuration

TCID	Target Opcode	Initial State	End State
MCS/SR/MCP/BV-01-C [Play from Paused]	Play	Paused	Playing
MCS/SR/MCP/BV-02-C [Play from Seeking]	Play	Seeking	Playing
MCS/SR/MCP/BV-70-C [Play from Inactive]	Play	Inactive	Playing
MCS/SR/MCP/BV-03-C [Pause from Playing]	Pause	Playing	Paused
MCS/SR/MCP/BV-04-C [Pause from Seeking]	Pause	Seeking	Paused
MCS/SR/MCP/BV-71-C [Pause from Inactive]	Pause	Inactive	Paused
GMCS/SR/MCP/BV-01-C [Play from Paused]	Play	Paused	Playing
GMCS/SR/MCP/BV-02-C [Play from Seeking]	Play	Seeking	Playing
GMCS/SR/MCP/BV-70-C [Play from Inactive]	Play	Inactive	Playing
GMCS/SR/MCP/BV-03-C [Pause from Playing]	Pause	Playing	Paused
GMCS/SR/MCP/BV-04-C [Pause from Seeking]	Pause	Seeking	Paused
GMCS/SR/MCP/BV-71-C [Pause from Inactive]	Pause	Inactive	Paused

Table 4.3: Play and Pause test cases

- Test Procedure

  1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.3.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Media State characteristic.

3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.3.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT sends a GATT Characteristic Value Notification for the Media State characteristic.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media State characteristic after Step 3.
  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - The Media State is set to the End State specified in Table 4.3.

4.4.2 Fast Rewind and Fast Forward

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Fast Rewind and Fast Forward opcodes and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.4 below.

- Reference

  [3] 3.18.1.3, 3.18.1.4

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - If Seeking Speed CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Seeking Speed CCCD.
  - The IUT has its current track set to a valid track.
  - The IUT’s initial track position is greater than 0 and less than the duration of the track.

- Test Case Configuration

TCID	Target Opcode	Initial State
MCS/SR/MCP/BV-05-C [Fast Rewind from Playing]	Fast Rewind	Playing
MCS/SR/MCP/BV-06-C [Fast Rewind from Paused]	Fast Rewind	Paused
MCS/SR/MCP/BV-72-C [Fast Rewind from Inactive]	Fast Rewind	Inactive
MCS/SR/MCP/BV-07-C [Fast Forward from Playing]	Fast Forward	Playing
MCS/SR/MCP/BV-08-C [Fast Forward from Paused]	Fast Forward	Paused
MCS/SR/MCP/BV-73-C [Fast Forward from Inactive]	Fast Forward	Inactive
GMCS/SR/MCP/BV-05-C [Fast Rewind from Playing]	Fast Rewind	Playing
GMCS/SR/MCP/BV-06-C [Fast Rewind from Paused]	Fast Rewind	Paused
GMCS/SR/MCP/BV-72-C [Fast Rewind from Inactive]	Fast Rewind	Inactive
GMCS/SR/MCP/BV-07-C [Fast Forward from Playing]	Fast Forward	Playing
GMCS/SR/MCP/BV-08-C [Fast Forward from Paused]	Fast Forward	Paused
GMCS/SR/MCP/BV-73-C [Fast Forward from Inactive]	Fast Forward	Inactive

Table 4.4: Fast Rewind and Fast Forward test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.4.
2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Media State characteristic.
3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
4. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.4.
5. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
6. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

Pass verdict

Either:

- The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic in Step 5 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

Or:

- The IUT sends a notification of the Media Control Point characteristic in Step 5 with the correct requested opcode and a Result Code of SUCCESS.
- The Track Position from Step 3 to Step 6 moves in the direction appropriate for the Target Opcode specified in Table 4.4.

4.4.3 Stop

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Stop opcode and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.5 below.

- Reference

  [3] 3.18.1.5

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - The IUT has its current track set to a valid track.

- Test Case Configuration

TCID	Initial State
MCS/SR/MCP/BV-09-C [Stop from Playing]	Playing
MCS/SR/MCP/BV-10-C [Stop from Paused]	Paused
MCS/SR/MCP/BV-11-C [Stop from Seeking]	Seeking
MCS/SR/MCP/BV-74-C [Stop from Inactive]	Inactive
GMCS/SR/MCP/BV-09-C [Stop from Playing]	Playing
GMCS/SR/MCP/BV-10-C [Stop from Paused]	Paused
GMCS/SR/MCP/BV-11-C [Stop from Seeking]	Seeking
GMCS/SR/MCP/BV-74-C [Stop from Inactive]	Inactive

Table 4.5: Stop test cases

- Test Procedure

  1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.5.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Media State characteristic.
  3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Stop opcode.
  4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
     a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.

5. If the initial state is not Paused, the IUT sends a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - The IUT optionally sends a notification of the Media State characteristic after Step 3.
  - The Media State is set to the Paused state.
  - The Track Position characteristic value in Step 6 is 0.

4.4.4 Move Relative

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Move Relative opcode and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.6 below.

- Reference

  [3] 3.18.1.6

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - The IUT has its current track set to a valid track.
  - The IUT's initial track position is greater than 0 and less than the duration of the track.

- Test Case Configuration

TCID	Initial State
MCS/SR/MCP/BV-12-C [Move Relative from Playing]	Playing
MCS/SR/MCP/BV-13-C [Move Relative from Paused]	Paused
MCS/SR/MCP/BV-14-C [Move Relative from Seeking]	Seeking
MCS/SR/MCP/BV-75-C [Move Relative from Inactive]	Inactive

TCID	Initial State
GMCS/SR/MCP/BV-12-C [Move Relative from Playing]	Playing
GMCS/SR/MCP/BV-13-C [Move Relative from Paused]	Paused
GMCS/SR/MCP/BV-14-C [Move Relative from Seeking]	Seeking
GMCS/SR/MCP/BV-75-C [Move Relative from Inactive]	Inactive

Table 4.6: Move Relative test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.6.
2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Duration characteristic.
3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
4. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Move Relative opcode and the Offset parameter set to (Track Duration + 10) x -1.
    a. The test ends here if the Notification returns the Result Code of MEDIA PLAYER INACTIVE.
5. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
6. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
7. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Move Relative opcode and the Offset parameter set to a random value that is a fraction of the Track Duration.
8. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
10. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Move Relative opcode and the Offset parameter set to Track Duration – Offset used in Step 7.
11. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
12. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Steps 4, 7, and 10 with the correct requested opcode and a Result Code of SUCCESS.
  - The Track Position is less than 600 after Step 6.
  - The Track Position is within 600 of the $Offset_{step7}$ after Step 9.
  - If the IUT supports Track Position notification, the Track Position is equal to the Track Duration after Step 12.

4.4.5 Segment Movement

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Previous Segment, Next Segment, First Segment, and Last Segment opcodes and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.7 below.

- Reference

  [3] 3.18.1.7, 3.18.1.8, 3.18.1.9, 3.18.1.10

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - The IUT has its current track set to a valid track with multiple segments where each segment is at least 30 seconds and the track position is set to a position outside the first or last segment.

- Test Case Configuration

TCID	Target Opcode	Initial State	Result Position
MCS/SR/MCP/BV-15-C [Previous Segment from Playing]	Previous Segment	Playing	Previous Segment
MCS/SR/MCP/BV-16-C [Previous Segment from Paused]	Previous Segment	Paused	Previous Segment
MCS/SR/MCP/BV-17-C [Previous Segment from Seeking]	Previous Segment	Seeking	Previous Segment

TCID	Target Opcode	Initial State	Result Position
MCS/SR/MCP/BV-76-C [Previous Segment from Inactive]	Previous Segment	Inactive	Previous Segment
MCS/SR/MCP/BV-18-C [Next Segment from Playing]	Next Segment	Playing	Next Segment
MCS/SR/MCP/BV-19-C [Next Segment from Paused]	Next Segment	Paused	Next Segment
MCS/SR/MCP/BV-20-C [Next Segment from Seeking]	Next Segment	Seeking	Next Segment
MCS/SR/MCP/BV-77-C [Next Segment from Inactive]	Next Segment	Inactive	Next Segment
MCS/SR/MCP/BV-21-C [First Segment from Playing]	First Segment	Playing	First Segment
MCS/SR/MCP/BV-22-C [First Segment from Paused]	First Segment	Paused	First Segment
MCS/SR/MCP/BV-23-C [First Segment from Seeking]	First Segment	Seeking	First Segment
MCS/SR/MCP/BV-78-C [First Segment from Inactive]	First Segment	Inactive	First Segment
MCS/SR/MCP/BV-24-C [Last Segment from Playing]	Last Segment	Playing	Last Segment
MCS/SR/MCP/BV-25-C [Last Segment from Paused]	Last Segment	Paused	Last Segment
MCS/SR/MCP/BV-26-C [Last Segment from Seeking]	Last Segment	Seeking	Last Segment
MCS/SR/MCP/BV-79-C [Last Segment from Inactive]	Last Segment	Inactive	Last Segment
GMCS/SR/MCP/BV-15-C [Previous Segment from Playing]	Previous Segment	Playing	Previous Segment
GMCS/SR/MCP/BV-16-C [Previous Segment from Paused]	Previous Segment	Paused	Previous Segment
GMCS/SR/MCP/BV-17-C [Previous Segment from Seeking]	Previous Segment	Seeking	Previous Segment
GMCS/SR/MCP/BV-76-C [Previous Segment from Inactive]	Previous Segment	Inactive	Previous Segment
GMCS/SR/MCP/BV-18-C [Next Segment from Playing]	Next Segment	Playing	Next Segment
GMCS/SR/MCP/BV-19-C [Next Segment from Paused]	Next Segment	Paused	Next Segment
GMCS/SR/MCP/BV-20-C [Next Segment from Seeking]	Next Segment	Seeking	Next Segment
GMCS/SR/MCP/BV-77-C [Next Segment from Inactive]	Next Segment	Inactive	Next Segment
GMCS/SR/MCP/BV-21-C [First Segment from Playing]	First Segment	Playing	First Segment
GMCS/SR/MCP/BV-22-C [First Segment from Paused]	First Segment	Paused	First Segment

TCID	Target Opcode	Initial State	Result Position
GMCS/SR/MCP/BV-23-C [First Segment from Seeking]	First Segment	Seeking	First Segment
GMCS/SR/MCP/BV-78-C [First Segment from Inactive]	First Segment	Inactive	First Segment
GMCS/SR/MCP/BV-24-C [Last Segment from Playing]	Last Segment	Playing	Last Segment
GMCS/SR/MCP/BV-25-C [Last Segment from Paused]	Last Segment	Paused	Last Segment
GMCS/SR/MCP/BV-26-C [Last Segment from Seeking]	Last Segment	Seeking	Last Segment
GMCS/SR/MCP/BV-79-C [Last Segment from Inactive]	Last Segment	Inactive	Last Segment

Table 4.7: Segment Movement test cases

- Test Procedure

  1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.7.
  2. If Object IDs are supported, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Segments Object ID characteristic.
  3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
  4. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.7.
  5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
  6. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
     a. The test ends here if the Notification returns the Result Code of MEDIA PLAYER INACTIVE.
  7. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
  8. If Object IDs are supported, the Lower Tester executes the OTS preamble described in Section 4.2.7 for the Track Segments Object [3] using the Current Track Segments Object ID.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of SUCCESS.

- If Object IDs are supported:
  - The Result Position specified in Table 4.7 is equal to the track position with the ranges defined in the blob return in Step 7.
- Else:
  - The Upper Tester confirms that the segment is at the Result Position specified in Table 4.7.

4.4.6 Goto Segment

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Goto Segment opcode and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.8 below.

- Reference

  [3] 3.18.1.11

- Initial Condition
  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - The IUT has its current track set to the first segment of a valid track with multiple segments.
  - The number of Tracks is defined by the TSPX_Number_Segments IXIT entry.

- Test Case Configuration

TCID	Initial State
MCS/SR/MCP/BV-27-C [Goto Segment from Playing]	Playing
MCS/SR/MCP/BV-28-C [Goto Segment from Paused]	Paused
MCS/SR/MCP/BV-29-C [Goto Segment from Seeking]	Seeking
MCS/SR/MCP/BV-80-C [Goto Segment from Inactive]	Inactive
GMCS/SR/MCP/BV-27-C [Goto Segment from Playing]	Playing
GMCS/SR/MCP/BV-28-C [Goto Segment from Paused]	Paused
GMCS/SR/MCP/BV-29-C [Goto Segment from Seeking]	Seeking
GMCS/SR/MCP/BV-80-C [Goto Segment from Inactive]	Inactive

Table 4.8: Goto Segment test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.8.
2. If Object IDs are supported, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Segments Object ID characteristic.
3. If Object IDs are supported, the Lower Tester executes the OTS preamble described in Section 4.2.7 for the Track Segments Object [3] using the Current Track Segments Object ID.

Repeat Steps 4–7 for each round specified in Table 4.9.

4. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
5. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Segment opcode with the N parameter set as specified in Table 4.9.
6. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
7. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

Round	N
1	Random value between 1 and TSPX_Number_Segments that is not the current segment number
2	Random negative value between 1 and TSPX_Number_Segments other than the value used in round 1

Table 4.9: Rounds for Goto Segment test cases

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 6 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 5 with the correct requested opcode and a Result Code of SUCCESS.
  - If Object IDs are supported:
    - Round 1 results in the IUT moving the Track Position within segment N_{round1} of the Track Segments Object from Step 3.
    - Round 2 results in the IUT moving the Track Position within segment (Total Number of Segments – abs(N_{round2})) of the Track Segments Object from Step 3.
  - Else:
    - The Upper Tester confirms that the Current Track Segment in Round 1 and Round 2 is the same as segment N in Step 5.

4.4.7 Previous and Next Track

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Previous Track and Next Track opcodes and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.10 below.

- Reference

  [3] 3.18.1.12, 3.18.1.13

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
  - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
  - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
  - The IUT has its current track set to a track other than the first or last track within a group of tracks.

- Test Case Configuration

TCID	Initial State	Target Opcode	Object ID Pass Verdict
MCS/SR/MCP/BV-30-C [Previous Track from Playing]	Playing	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
MCS/SR/MCP/BV-31-C [Previous Track from Paused]	Paused	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
MCS/SR/MCP/BV-32-C [Previous Track from Seeking]	Seeking	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
MCS/SR/MCP/BV-34-C [Next Track from Playing]	Playing	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$
MCS/SR/MCP/BV-35-C [Next Track from Paused]	Paused	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$

TCID	Initial State	Target Opcode	Object ID Pass Verdict
MCS/SR/MCP/BV-36-C [Next Track from Seeking]	Seeking	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-30-C [Previous Track from Playing]	Playing	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-31-C [Previous Track from Paused]	Paused	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-32-C [Previous Track from Seeking]	Seeking	Previous Track	Current Track Object ID_{step2b} == Next Track Object $ID_{step10b}$ or Current Track Object ID_{step2b} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-34-C [Next Track from Playing]	Playing	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-35-C [Next Track from Paused]	Paused	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$
GMCS/SR/MCP/BV-36-C [Next Track from Seeking]	Seeking	Next Track	Next Track Object ID_{step2c} == Current Track Object $ID_{step10a}$

Table 4.10: Previous and Next Track test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.10.
2. If Object IDs are supported:
    a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    c. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Next Track Object ID characteristic.
3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.10.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. The IUT may send a GATT Characteristic Value Notification for the Track Changed characteristic.

9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
10. If Object IDs are supported:
    a. If Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. If Next Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Next Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Next Track Object ID characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.

  If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3.

  If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 5.

  The IUT may send a Track Changed characteristic notification after Step 3.

  The Track Position is less than 600 after Step 9.

  If Object IDs are supported:

  - Use the Track Object ID from Step 2b to verify that the IUT has moved to the track specified in Target Opcode in Table 4.10 after Step 3.
  - The Object IDs match as specified in the Object ID Pass Verdict specified in Table 4.10.

  Else:

  - The Upper Tester confirms that the IUT moved the track to the track specified in the Target Opcode specified in Table 4.10.

4.4.8 Previous and Next Track from Inactive

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Previous Track and Next Track opcodes and updates all required characteristics and data values when it has an inactive state. The verification is done one value at a time, as enumerated in the test cases in Table 4.11 below.

- Reference

  [3] 3.18.1.12, 3.18.1.13

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.

- Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
- Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
- If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
- If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
- If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
- If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.

- Test Case Configuration

TCID	Initial State	Target Opcode
MCS/SR/MCP/BV-33-C [Previous Track from Inactive]	Inactive	Previous Track
MCS/SR/MCP/BV-37-C [Next Track from Inactive]	Inactive	Next Track
GMCS/SR/MCP/BV-33-C [Previous Track from Inactive]	Inactive	Previous Track
GMCS/SR/MCP/BV-37-C [Next Track from Inactive]	Inactive	Next Track

Table 4.11: Previous and Next Track From Inactive test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.11.
2. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.11.
3. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
4. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
5. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
6. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
7. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.
8. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

Pass verdict

The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

Or:

- The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
- If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 2.
- If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 2.
- The IUT sends a Track Changed characteristic notification after Step 2.
- The Track Position is less than 600 after Step 8.
- The Upper Tester confirms that the IUT moved the track to the track specified in the Target Opcode specified in Table 4.11.

4.4.9 First and Last Track

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the First Track and Last Track opcodes and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.12 below.

- Reference

  [3] 3.18.1.14, 3.18.1.15

- Initial Condition
  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
  - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
  - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
  - If the IUT supports transitioning to an active state, it has its current track set to a track other than the first or last within a group of tracks.

- Test Case Configuration

TCID	Target Opcode	Initial State	Resulting Track
MCS/SR/MCP/BV-38-C [First Track from Playing]	First Track	Playing	First Track
MCS/SR/MCP/BV-39-C [First Track from Paused]	First Track	Paused	First Track
MCS/SR/MCP/BV-40-C [First Track from Seeking]	First Track	Seeking	First Track
MCS/SR/MCP/BV-41-C [First Track from Inactive]	First Track	Inactive	First Track
MCS/SR/MCP/BV-42-C [Last Track from Playing]	Last Track	Playing	Last Track
MCS/SR/MCP/BV-43-C [Last Track from Paused]	Last Track	Paused	Last Track
MCS/SR/MCP/BV-44-C [Last Track from Seeking]	Last Track	Seeking	Last Track
MCS/SR/MCP/BV-45-C [Last Track from Inactive]	Last Track	Inactive	Last Track
GMCS/SR/MCP/BV-38-C [First Track from Playing]	First Track	Playing	First Track
GMCS/SR/MCP/BV-39-C [First Track from Paused]	First Track	Paused	First Track
GMCS/SR/MCP/BV-40-C [First Track from Seeking]	First Track	Seeking	First Track
GMCS/SR/MCP/BV-41-C [First Track from Inactive]	First Track	Inactive	First Track
GMCS/SR/MCP/BV-42-C [Last Track from Playing]	Last Track	Playing	Last Track
GMCS/SR/MCP/BV-43-C [Last Track from Paused]	Last Track	Paused	Last Track
GMCS/SR/MCP/BV-44-C [Last Track from Seeking]	Last Track	Seeking	Last Track
GMCS/SR/MCP/BV-45-C [Last Track from Inactive]	Last Track	Inactive	Last Track

Table 4.12: First Track and Last Track test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.12.
2. If Object IDs are supported:
    a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    c. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object [3] using the Current Group Object ID.
3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.12.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.

7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.
9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
10. If Object IDs are supported:
    a. If Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3.
  - If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 3.
  - The IUT sends a Track Changed characteristic notification after Step 3.
  - If Object IDs are supported:
    - The Current Track Object ID from Step 2a is different than the one in Step 10a.
    - The Track Position is less than 600 after Step 9.
    - The IUT moved the current track to the Resulting Track specified in Table 4.12 in the current playing order within the Group Object.
  - Else:
    - The Upper Tester confirms that the Track is moved to the Resulting Track specified in Table 4.12.

4.4.10 Goto Track

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Goto Track opcode and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.13 below.

- Reference

  [3] 3.18.1.16

- Initial Condition
  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
  - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
  - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
  - If the IUT supports transitioning to an active state, it has its current track set within a group of tracks.
  - The number of Tracks is defined by the TSPX_Number_Tracks IXIT entry.
- Test Case Configuration

TCID	Initial State
MCS/SR/MCP/BV-46-C [Goto Track from Playing]	Playing
MCS/SR/MCP/BV-47-C [Goto Track from Paused]	Paused
MCS/SR/MCP/BV-48-C [Goto Track from Seeking]	Seeking
MCS/SR/MCP/BV-49-C [Goto Track from Inactive]	Inactive
GMCS/SR/MCP/BV-46-C [Goto Track from Playing]	Playing
GMCS/SR/MCP/BV-47-C [Goto Track from Paused]	Paused
GMCS/SR/MCP/BV-48-C [Goto Track from Seeking]	Seeking
GMCS/SR/MCP/BV-49-C [Goto Track from Inactive]	Inactive

Table 4.13: Goto Track test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.13.
2. If Object IDs are supported:
   a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
   b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
   c. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object [3] using the Current Group Object ID.

Repeat Steps 3–10 for each round specified in Table 4.14.

3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Track opcode and the N parameter set as specified in Table 4.14.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
9. If Object IDs are not supported, go to Step 10. Otherwise, if Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
10. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.

Round	N
1	Random value between 1 and TSPX_Number_Tracks that is not the current track number
2	Random negative value between 1 and TSPX_Number_Tracks other than the value used in round 1

Table 4.14: Rounds for Goto Track test cases

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3.
  - If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 3.
  - The IUT sends a Track Changed characteristic notification after Step 3.

- If Object IDs are supported:
  - Round 1 results in the Current Track Object ID from Step 9 being set to track N_{round1} of the Group Object from Step 2c.
  - Round 2 results in the Current Track Object ID from Step 9 being set to track (number of tracks – abs(N_{round2})) of the Group Object from Step 2c.
  - The Track Position is less than 600.
- Else:
  - The Upper Tester confirms that after rounds 1 and 2, the track is moved to the track specified in Table 4.13 in Step 3.

4.4.11 Previous and Next Group

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Previous Group and Next Group opcodes and updates all required characteristics and data values in the Media State characteristic. The verification is done one value at a time, as enumerated in the test cases in Table 4.15 below.

- Reference

  [3] 3.18.1.17, 3.18.1.18

- Initial Condition
  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
  - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
  - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
  - If Current Group Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Group Object ID CCCD.
  - If the IUT supports transitioning to an active state, it has its current group set to a group other than the first or last group within a group of groups.

- Test Case Configuration

TCID	Initial State	Target Opcode
MCS/SR/MCP/BV-50-C [Previous Group from Playing]	Playing	Previous Group
MCS/SR/MCP/BV-51-C [Previous Group from Paused]	Paused	Previous Group
MCS/SR/MCP/BV-52-C [Previous Group from Seeking]	Seeking	Previous Group
MCS/SR/MCP/BV-53-C [Previous Group from Inactive]	Inactive	Previous Group
MCS/SR/MCP/BV-54-C [Next Group from Playing]	Playing	Next Group
MCS/SR/MCP/BV-55-C [Next Group from Paused]	Paused	Next Group
MCS/SR/MCP/BV-56-C [Next Group from Seeking]	Seeking	Next Group
MCS/SR/MCP/BV-57-C [Next Group from Inactive]	Inactive	Next Group
GMCS/SR/MCP/BV-50-C [Previous Group from Playing]	Playing	Previous Group
GMCS/SR/MCP/BV-51-C [Previous Group from Paused]	Paused	Previous Group
GMCS/SR/MCP/BV-52-C [Previous Group from Seeking]	Seeking	Previous Group
GMCS/SR/MCP/BV-53-C [Previous Group from Inactive]	Inactive	Previous Group
GMCS/SR/MCP/BV-54-C [Next Group from Playing]	Playing	Next Group
GMCS/SR/MCP/BV-55-C [Next Group from Paused]	Paused	Next Group
GMCS/SR/MCP/BV-56-C [Next Group from Seeking]	Seeking	Next Group
GMCS/SR/MCP/BV-57-C [Next Group from Inactive]	Inactive	Next Group

Table 4.15: Previous and Next Group test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.15.
2. If Object IDs are supported:
    a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Parent Group Object ID characteristic.
    c. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    d. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object [3] using the Parent Group Object ID.
3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.15.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.

9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
10. If Object IDs are supported:
    a. If Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. If Current Group Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Group Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    c. If the Object ID is supported, the Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object [3] using the Current Group Object ID from Step 10b.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3.
  - If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 3.
  - The IUT sends a Track Changed characteristic notification after Step 3.
  - If Object IDs are supported:
    - The Current Group Object ID from Step 2 is different than the one in Step 10b.
    - The IUT has moved to the Group as specified in the Target Opcode column of Table 4.15 after Step 3.
    - The Current Track Object ID from Step 10a is set to the first track in the Group Object from Step 10c.
    - The Track Position from Step 9 is less than 600.
  - Else:
    - The Upper Tester confirms that the Current Track is moved to the Group specified in the Target Opcode column of Table 4.15.

4.4.12 First and Last Group

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the First Group and Last Group opcodes and updates all required characteristics and data values in the Media State characteristic. The verification is done one value at a time, as enumerated in the test cases in Table 4.16 below.

- Reference

  [3] 3.18.1.19, 3.18.1.20

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
  - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
  - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
  - If Current Group Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Group Object ID CCCD.
  - If the IUT supports transitioning to an active state, it has its current group set to the Initial Group specified in Table 4.16 within a group of groups.

- Test Case Configuration

TCID	Initial Group	Initial State	Target Opcode
MCS/SR/MCP/BV-58-C [First Group from Playing]	2nd Group	Playing	First Group
MCS/SR/MCP/BV-59-C [First Group from Paused]	2nd Group	Paused	First Group
MCS/SR/MCP/BV-60-C [First Group from Seeking]	2nd Group	Seeking	First Group
MCS/SR/MCP/BV-61-C [First Group from Inactive]	2nd Group	Inactive	First Group
MCS/SR/MCP/BV-62-C [Last Group from Playing]	Next to last	Playing	Last Group

TCID	Initial Group	Initial State	Target Opcode
MCS/SR/MCP/BV-63-C [Last Group from Paused]	Next to last	Paused	Last Group
MCS/SR/MCP/BV-64-C [Last Group from Seeking]	Next to last	Seeking	Last Group
MCS/SR/MCP/BV-65-C [Last Group from Inactive]	Next to last	Inactive	Last Group
GMCS/SR/MCP/BV-58-C [First Group from Playing]	2nd Group	Playing	First Group
GMCS/SR/MCP/BV-59-C [First Group from Paused]	2nd Group	Paused	First Group
GMCS/SR/MCP/BV-60-C [First Group from Seeking]	2nd Group	Seeking	First Group
GMCS/SR/MCP/BV-61-C [First Group from Inactive]	2nd Group	Inactive	First Group
GMCS/SR/MCP/BV-62-C [Last Group from Playing]	Next to last	Playing	Last Group
GMCS/SR/MCP/BV-63-C [Last Group from Paused]	Next to last	Paused	Last Group
GMCS/SR/MCP/BV-64-C [Last Group from Seeking]	Next to last	Seeking	Last Group
GMCS/SR/MCP/BV-65-C [Last Group from Inactive]	Next to last	Inactive	Last Group

Table 4.16: First and Last Group test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.16.
2. If Object IDs are supported:
    a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Parent Group Object ID characteristic.
    b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    c. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object [3] using the Parent Group Object ID.
3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.16.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.
9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

10. If Object IDs are supported:
    a. If Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. If Current Group Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Group Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    c. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object using the Current Group Object ID from Step 10b.
11. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Target Opcode specified in Table 4.16.
12. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
13. If Object IDs are supported, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
14. If Track Position is changed or Track is paused and notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
15. If Object IDs are supported, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - If the IUT does not send Track Position in Step 14, the value read by the Lower Tester is equal to the one received in Step 9.
  - The IUT has moved to the Group specified in the Target Opcode column of Table 4.16 after Step 3.
  - The IUT sends a notification of the Media Control Point characteristic after Steps 3 and 11 with the correct requested opcode and a Result Code of SUCCESS.
  - If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3 but not after Step 11.
  - If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 3 but not after Step 11.
  - The IUT sends a Track Changed characteristic notification after Step 3 but not after Step 11.
  - If Object IDs are supported:
    - The Current Group Object ID from Step 2 is different than the one in Step 10b.
    - The Current Group Object ID from Step 10b is the same as the one in Step 15.

        - The IUT has moved to the first track within the Group Object from Step 11.
        - The Track Position is less than 600.
    - Else:
        - The Upper Tester confirms that the current group is equal to the group in the Target Opcode specified in Table 4.16.

4.4.13 Goto Group

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to setting the Goto Group opcode and updates all required characteristics and data values in the Media State characteristic. The verification is done one value at a time, as enumerated in the test cases in Table 4.17 below.

- Reference

  [3] 3.18.1.21

- Initial Condition
    - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
    - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
    - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media State CCCD.
    - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
    - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
    - If Track Duration CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Duration CCCD.
    - If Track Title CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Title CCCD.
    - If Current Track Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Track Object ID CCCD.
    - If Current Group Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Group Object ID CCCD.
    - If the IUT supports transitioning to an active state, it has its current group set within a group of groups.
    - The number of groups is defined by the TSPX_Number_Groups IXIT entry.

- Test Case Configuration

TCID	Initial State
MCS/SR/MCP/BV-66-C [Goto Group from Playing]	Playing
MCS/SR/MCP/BV-67-C [Goto Group from Paused]	Paused
MCS/SR/MCP/BV-68-C [Goto Group from Seeking]	Seeking
MCS/SR/MCP/BV-69-C [Goto Group from Inactive]	Inactive
GMCS/SR/MCP/BV-66-C [Goto Group from Playing]	Playing
GMCS/SR/MCP/BV-67-C [Goto Group from Paused]	Paused
GMCS/SR/MCP/BV-68-C [Goto Group from Seeking]	Seeking
GMCS/SR/MCP/BV-69-C [Goto Group from Inactive]	Inactive

Table 4.17: Goto Group test cases

- Test Procedure

1. The Upper Tester orders the IUT to be in the Initial State specified in Table 4.17.
2. If Object IDs are supported:
    a. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Parent Group Object ID characteristic.
    b. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.
    c. The Lower Tester executes the OTS Preamble described in Section 4.2.7 for the Group Object [3] using the Parent Group Object ID.

Repeat Steps 3–10 for each round in Table 4.18.

3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Group opcode and the N parameter specified in Table 4.18.
4. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
    a. The test ends here if the Notification returns a Result Code of MEDIA PLAYER INACTIVE.
5. The IUT may send a GATT Characteristic Value Notification for the Media State characteristic.
6. If Track Title notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Title characteristic.
7. If Track Duration notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Duration characteristic.
8. The IUT sends a GATT Characteristic Value Notification for the Track Changed characteristic.
9. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
10. If Object IDs are supported:
    a. If Current Track Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Track Object ID characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
    b. If Current Group Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Group Object ID characteristic; otherwise, the Lower

Tester executes the GATT Read Characteristic Value sub-procedure for the Current Group Object ID characteristic.

c. The Lower Tester executes the OTS preamble described in Section 4.2.7 for the Group Object using the Current Group Object ID from Step 10b.

Round	N
1	Random value between 1 and TSPX_Number_Groups that is not the current group number
2	Random negative value between 1 and TSPX_Number_Groups, other than the number used in round 1

Table 4.18: Rounds for Goto Group test cases

- Expected Outcome

  Pass verdict

  Either:

  - The Initial State of the IUT is Inactive in the test case and the IUT sends a notification of the Media Control Point characteristic after Step 4 with the correct requested opcode and a Result Code of MEDIA PLAYER INACTIVE.

  Or:

  - The IUT sends a notification of the Media Control Point characteristic after Step 3 with the correct requested opcode and a Result Code of SUCCESS.
  - If Track Title notification is supported, the IUT sends a Track Title characteristic notification after Step 3.
  - If Track Duration notification is supported, the IUT sends a Track Duration characteristic notification after Step 3.
  - The IUT sends a Track Changed characteristic notification after Step 3.
  - If Object IDs are supported:
    - The Current Group Object ID from Step 10b (round 1) is set to group N_{round1} of the Group Object from Step 2c.
    - The Current Group Object ID from Step 10b (round 2) is set to group (number of groups – abs(N_{round2})) of the Group Object from Step 2c.
    - The IUT has moved to the first track within the Group Object from Step 10c.
    - The Track Position is less than 600.
  - Else:
    - The Upper Tester confirms that the current group is the same as the target group in Step 3.

4.5 Update Characteristics – Oversized Values

- Test Purpose

  This test group contains one or more test cases to verify the behavior of the Server IUT when it updates its characteristics when the characteristic value is greater than (ATT_MTU-3).

- Reference

  [3] 3

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The Lower Tester has cached the service and characteristics handles (e.g., by running the procedures in Section 4.3).
  - The Lower Tester enables notification for the characteristic in Table 4.19 by writing the value 0x0001 to the CCCD associated with the specified characteristic using the GATT Write Characteristic Descriptor sub-procedure.
  - The characteristic in Table 4.19 has a value whose length is greater than the (ATT_MTU-3) length.

- Test Case Configuration

TCID	Characteristic UUID	Service
MCS/SR/SPN/BV-01-C [Update Media Player Name – Oversized Value]	<< Media Player Name >>	MCS
MCS/SR/SPN/BV-02-C [Update Track Title – Oversized Value]	<< Track Title >>	MCS
GMCS/SR/SPN/BV-01-C [Update Media Player Name – Oversized Value]	<< Media Player Name >>	GMCS
GMCS/SR/SPN/BV-02-C [Update Track Title – Oversized Value]	<< Track Title >>	GMCS

Table 4.19: Characteristics Update – Oversized Data

- Test Procedure

  1. The Lower Tester reads the characteristic value for the characteristic specified by the Characteristic UUID referenced in Table 4.19 by executing the GATT Read Long Characteristic Value sub-procedure with a Value Offset of 0.
  2. The Upper Tester commands the IUT to update the characteristic specified by the Characteristic UUID referenced in Table 4.19 with a different value whose length is greater than the (ATT_MTU-3).
  3. Upon the update in Step 2, the IUT sends a notification containing the updated value of the characteristic in Table 4.19.
  4. The Lower Tester reads the characteristic value for the characteristic specified by the Characteristic UUID referenced in Table 4.19 by executing the GATT Read Long Characteristic Value sub-procedure with a Value Offset of (ATT_MTU-3).
  5. The IUT returns a Value Changed During Read Long application error code.

6. The Lower Tester reads the characteristic value for the characteristic specified by the Characteristic UUID referenced in Table 4.19 by executing the GATT Read Long Characteristic Value sub-procedure with a Value Offset of 0.
7. The IUT responds successfully to the read in Step 6.

- Expected Outcome

  Pass verdict

  In Step 3, the characteristic value has a length that is equal to ATT_MTU-3.

  In Step 5, the IUT returns a Value Changed During Read Long error code.

  In Step 7, the IUT successfully returns data to the GATT Read Long Characteristic Value sub-procedure.

4.6 Service procedures

4.6.1 No Parent Group

- Test Purpose

  This test group contains test cases to verify that the Server IUT properly sets the Parent Group Object ID when there is a group with no parent. The verification is done one value at a time, as enumerated in the test cases in Table 4.20 below.

- Reference

  [3] 3.13

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Current Group Object ID and Parent Group Object ID characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.2.5 or is known to the Lower Tester by other means.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - The IUT has its current track set to a track within a group of tracks with no parent group.

- Test Case Configuration

TCID	Service
MCS/SR/SP/BV-01-C [No Parent Group]	Media Control Service
GMCS/SR/SP/BV-01-C [No Parent Group]	Generic Media Control Service

Table 4.20: No Parent Group test cases

- Test Procedure

1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Current Track Object ID characteristic.
2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Parent Group Object ID characteristic.

- Expected Outcome

  Pass verdict

  The Current Group Object ID from Step 1 is equal to the Parent Group Object ID from Step 2.

4.6.2 Valid Track Position Writes

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to writing positive and negative values to the Track Position characteristic by updating to correct values. The verification is done one value at a time, as enumerated in the test cases in Table 4.21 below, using this generic test procedure.

- Reference

  [3] 3.7

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Track Position and Track Duration characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.2.5 or is known to the Lower Tester by other means.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - The IUT has its current track set to a track.

- Test Case Configuration

TCID	Service
MCS/SR/SP/BV-02-C [Valid Track Position Writes]	Media Control Service
GMCS/SR/SP/BV-02-C [Valid Track Position Writes]	Generic Media Control Service

Table 4.21: Valid Track Position Writes test cases

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Duration characteristic.
  2. The Lower Tester executes the GATT Write Without Response sub-procedure for the Track Position characteristic with the value (Track Duration * 2/3) x -1.
  3. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
  4. The Lower Tester executes the GATT Write Without Response sub-procedure for the Track Position characteristic with the value (Track Duration * 2/3).
  5. If Track Position notification is supported, the IUT sends a GATT Characteristic Value Notification for the Track Position characteristic; otherwise, the Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

  Pass verdict

  The Track Position after Step 3 is a positive value less than the Track Duration.

  The Track Position after Step 5 is a positive value less than the Track Duration.

4.6.3 CCID Does Not Change

- Test Purpose

  Verify that the Server IUT does not change the CCID value.

- Reference

  [3] 3.13

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the CCID characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.2.5 or is known to the Lower Tester by other means.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.

- Test Case Configuration

TCID	Service
MCS/SR/SP/BV-03-C [CCID Has Not Changed]	Media Control Service
GMCS/SR/SP/BV-03-C [CCID Has Not Changed]	Generic Media Control Service

Table 4.22: CCID Has Not Changed test cases

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the CCID characteristic.
  2. The Lower Tester drops the bearer connection and re-establishes the bearer connection.
  3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the CCID characteristic.

- Expected Outcome

  Pass verdict

  The CCID value from Step 1 is equal to the CCID value from Step 3.

4.7 Search Control Point procedures

Test group for the purpose of testing Search Control Point procedures.

4.7.1 Search Control Point

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to various Types specified in Search Control Point and updates all required characteristics and data values. The verification is done one value at a time, as enumerated in the test cases in Table 4.23 below.

- Reference

  [3] 3.20, 3.21

- Initial Condition

  - Enable the IUT for use with the Search Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Search Results Object CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Search Control Point CCCD.
  - Enable indication by writing the value 0x0002 using the GATT Write Characteristic Descriptor sub-procedure for the Object Action Control Point CCCD.
  - The IUT has valid collection tracks and groups that are searchable.

- Test Case Configuration

TCID	Service
MCS/SR/SCP/BV-01-C [Search Control Point]	Media Control Service
GMCS/SR/SCP/BV-01-C [Search Control Point]	Generic Media Control Service

Table 4.23: Search Control Point test cases

- Test Procedure

  Repeat Steps 1–4 for each Round in Table 4.24.

  1. The Lower Tester executes the GATT Write Without Response sub-procedure for the Search Control Point characteristic with the Type Value specified in Table 4.24 and its parameter set to the value of “IXIT Entry”. Optionally a second parameter is sent if specified in Table 4.24.
  2. The Lower Tester receives a GATT Characteristic Value Notification for the Search Control Point characteristic.
  3. The Lower Tester receives a GATT Characteristic Value Notification for the Search Results Object ID characteristic.
  4. Execute the OTS preamble in Section 4.2.8 or other OTS procedures for the Object ID from Step 3 above.

Round	Name	1st Search Control Item		2nd Search Control Item
		Type Value	IXIT Entry	Type Value
1	Track Name	0x01	TSPX_Track_Name	none
2	Artist Name	0x02	TSPX_Artist_Name	none

Round	Name	1st Search Control Item		2nd Search Control Item
		Type Value	IXIT Entry	Type Value
3	Album Name	0x03	TSPX_Album_Name	none
4	Group Name	0x04	TSPX_Group_Name	none
5	Earliest Year	0x05	TSPX_Earliest_Year	none
6	Latest Year	0x06	TSPX_Latest_Year	none
7	Genre	0x07	TSPX_Genre	none
8	Only Tracks	0x02	TSPX_Artist_Name	Only Tracks (0x08)
9	Only Groups	0x02	TSPX_Artist_Name	Only Groups(0x09)

Table 4.24: Search Control Point test configuration

- Expected Outcome

  Pass verdict

  After Step 1, the IUT sends a notification of the Search Results Object ID characteristic.

  After Step 1, the IUT sends a notification of the Search Control Point characteristic where the Result Code is SUCCESS (0x01).

  The Lower Tester successfully retrieves the object from Object Transfer Service.

  The data retrieved is a Group Object that is a list of group records with valid UINT48 IDs.

4.8 Service Procedure Error Handling

4.8.1 Media Control Point – Opcode not Supported

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to calling a Media Control Point procedure with an unsupported opcode by returning an Opcode Not Supported notification. The verification is done one value at a time, as enumerated in the test cases in Table 4.25 below.

- Reference

  [3] 1.6

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-01-C [Media Control Point – Opcode not Supported]	Media Control Service
GMCS/SR/SPE/BI-01-C [Media Control Point – Opcode not Supported]	Generic Media Control Service

Table 4.25: Media Control Point – Opcode not Supported test cases

- Test Procedure

  1. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the opcode set to an RFU value.
  2. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
  3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Media Control Point Opcodes Supported characteristic.

  Execute Steps 4–5 for each opcode indicated as not supported.

  4. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the opcode set to the unsupported opcode.
  5. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a notification of the Media Control Point characteristic after Steps 1 and 4 with the requested opcode and a Result Code of OPCODE NOT SUPPORTED (0x02).

4.8.2 Search Control Point – Invalid Type Value

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to calling a Search Control Point procedure with an invalid Type Value by returning a FAILURE error response. The verification is done one value at a time, as enumerated in the test cases in Table 4.26 below.

- Reference

  [3] 3.20.2

- Initial Condition

  - Enable the IUT for use with the Search Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Search Control Point CCCD.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-02-C [Search Control Point – Invalid Type Value]	Media Control Service
GMCS/SR/SPE/BI-02-C [Search Control Point – Invalid Type Value]	Generic Media Control Service

Table 4.26: Search Control Point – Invalid Type Value test cases

- Test Procedure

  1. The Lower Tester executes the GATT Write Without Response sub-procedure for the Search Control Point characteristic with the Type Value set to an RFU value.
  2. The Lower Tester receives a GATT Characteristic Value Notification for the Search Control Point characteristic.
  3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Search Results Object ID characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a Search Control Point characteristic notification after Step 1 where the Result Code is FAILURE (0x02).

  The Search Results Object ID characteristic value in Step 3 has a zero length.

4.8.3 Goto Segment Zero

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to calling a Media Control Point procedure with the Goto Segment opcode with an N parameter of 0 by not moving the track position. The verification is done one value at a time, as enumerated in the test cases in Table 4.27 below.

- Reference

  [3] 3.18.1.11

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - If Track Position CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Position CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - The IUT has its current track set to a valid track and is in Playing or Paused state and Track Position is more than 6 seconds from the end.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-03-C [Goto Segment Zero]	Media Control Service
GMCS/SR/SPE/BI-03-C [Goto Segment Zero]	Generic Media Control Service

Table 4.27: Goto Segment Zero test cases

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
  2. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Segment opcode and the N parameter set to 0.

3. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
4. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a notification of the Media Control Point characteristic after Step 1 with the requested opcode and a Result Code of SUCCESS (0x01).

  The IUT does not send a notification of the Track Position characteristic.

  The value (Track Position$_{step4}$ – Track Position$_{step1}$) is less than 600.

4.8.4 Goto Track Zero

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to calling a Media Control Point procedure with the Goto Track opcode with an N parameter of 0 by not changing the track. The verification is done one value at a time, as enumerated in the test cases in Table 4.28 below.

- Reference

  [3] 3.18.1.16

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Track Changed CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - The IUT has its current track set within a group of tracks.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-04-C [Goto Track Zero]	Media Control Service
GMCS/SR/SPE/BI-04-C [Goto Track Zero]	Generic Media Control Service

Table 4.28: Goto Track Zero test cases

- Test Procedure

1. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Track opcode and the N parameter set to 0.
2. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a notification of the Media Control Point characteristic after Step 1 with the requested opcode and a Result Code of SUCCESS (0x01).

  The IUT does not send a notification of the Track Changed characteristic.

4.8.5 Goto Group Zero

- Test Purpose

  This test group contains test cases to verify that the Server IUT responds to calling a Media Control Point procedure with the Goto Group opcode with an N parameter of 0 by not changing the group. The verification is done one value at a time, as enumerated in the test cases in Table 4.29 below.

- Reference

  [3] 3.18.1.21

- Initial Condition

  - Enable the IUT for use with the Media Control Point by performing the preamble described in Section 4.2.5.
  - If Current Group Object ID CCCD notification is supported, enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Current Group Object ID CCCD.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Media Control Point CCCD.
  - The IUT has its current group set within a group of groups.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-05-C [Goto Group Zero]	Media Control Service
GMCS/SR/SPE/BI-05-C [Goto Group Zero]	Generic Media Control Service

Table 4.29: Goto Group Zero test cases

- Test Procedure

  1. The Lower Tester executes the GATT Write Without Response sub-procedure for the Media Control Point characteristic with the Goto Group opcode and the N parameter set to 0.
  2. The IUT sends a GATT Characteristic Value Notification for the Media Control Point characteristic.
  3. If Current Group Object ID notification is supported, the IUT sends a GATT Characteristic Value Notification for the Current Group Object ID characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends a notification of the Media Control Point characteristic after Step 1 with the requested opcode and a Result Code of SUCCESS (0x01).

  If Current Group Object ID notification is supported, the IUT does not send a notification of the Current Group Object ID

4.8.6 Playing Order Ignored

- Test Purpose

  This test group contains test cases to verify that the Server IUT properly ignores writing the Playing Order characteristic with values that are not supported. The verification is done one value at a time, as enumerated in the test cases in Table 4.30 below.

- Reference

  [3] 3.15, 3.16

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Playing Order and Playing Order Supported characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.4 or is known to the Lower Tester by other means.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - The IUT has its current track set to a valid track.

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-06-C [Playing Order Ignored]	Media Control Service
GMCS/SR/SPE/BI-06-C [Playing Order Ignored]	Generic Media Control Service

Table 4.30: Playing Order Ignored test cases

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Playing Order characteristic.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Playing Order Supported characteristic.

  Repeat Steps 3–4 for each bit not set in the Playing Order Supported characteristic.

  3. The Lower Tester executes the GATT Write Without Response sub-procedure for the Playing Order characteristic with the bit value being tested.
  4. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Playing Order characteristic.

- Expected Outcome

  Pass verdict

  The IUT does not change the value of the Playing Order characteristic from Step 1 and after each read in Step 4.

4.8.7 Invalid Track Position

- Test Purpose

  This test group contains test cases to verify that the Server IUT properly ignores writing to the Track Position characteristic with values that are out of range. The verification is done one value at a time, as enumerated in the test cases in Table 4.31 below.

- Reference

  [3] 3.7.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2 if using ATT over a BR/EDR transport, or Section 4.2.3 if using EATT over an LE transport, or Section 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Track Position and Track Duration characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.4 or is known to the Lower Tester by other means.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - The IUT has its current track set to a valid track.
  - The IUT has its track position set to a value other than UNAVAIABLE (0xFFFFFFFF).

- Test Case Configuration

TCID	Service
MCS/SR/SPE/BI-07-C [Invalid Track Position]	Media Control Service
GMCS/SR/SPE/BI-07-C [Invalid Track Position]	Generic Media Control Service

Table 4.31: Invalid Track Position test cases

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Duration characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Track Position characteristic with a position value greater than the Track Duration.
  3. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.
  4. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Track Position characteristic with a negative value greater than the Track Duration.
  5. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Track Position characteristic.

- Expected Outcome

  Pass verdict

  The Track Position read from Step 3 and Step 5 is within the range of 0 and Track Duration.

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 the Generic Media Control Service (GMCS) and Media Control Service [4].

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)
MCS 2/1 AND MCS 1/1	Service Supported over BR/EDR – Media Control Service	MCS/SR/SGGIT/SDP/BV-01-C
MCS 2/1	Media Control Service	MCS/SR/SGGIT/SER/BV-01-C
MCS 2/3	Media Player Name Characteristic	MCS/SR/SGGIT/CHA/BV-01-C
MCS 2/3 AND MCS 2/4	Media Player Name Oversized Values	MCS/SR/SPN/BV-01-C
MCS 2/5	Media Player Icon Object Characteristic	MCS/SR/SGGIT/CHA/BV-02-C
MCS 2/6	Media Player Icon URL Characteristic	MCS/SR/SGGIT/CHA/BV-03-C
MCS 2/7	Track Changed Characteristic	MCS/SR/SGGIT/CHA/BV-04-C
MCS 2/8	Track Title Characteristic	MCS/SR/SGGIT/CHA/BV-05-C
MCS 2/8 AND MCS 2/9	Track Title Oversized Values	MCS/SR/SPN/BV-02-C
MCS 2/10	Track Duration Characteristic	MCS/SR/SGGIT/CHA/BV-06-C
MCS 2/11	Track Position Characteristic	MCS/SR/SGGIT/CHA/BV-07-C MCS/SR/SPE/BI-07-C MCS/SR/SP/BV-02-C
MCS 2/12	Playback Speed	MCS/SR/SGGIT/CHA/BV-08-C
MCS 2/13	Seeking Speed Characteristic	MCS/SR/SGGIT/CHA/BV-09-C
MCS 2/14	Current Track Segments Object Characteristic	MCS/SR/SGGIT/CHA/BV-10-C
MCS 2/15	Current Track Object Characteristic	MCS/SR/SGGIT/CHA/BV-11-C
MCS 2/16	Next Track Object Characteristic	MCS/SR/SGGIT/CHA/BV-12-C
MCS 2/17	Parent Group Object Characteristic	MCS/SR/SGGIT/CHA/BV-13-C MCS/SR/SP/BV-01-C
MCS 2/18	Current Group Object Characteristic	MCS/SR/SGGIT/CHA/BV-14-C
MCS 2/19	Playing Order Characteristic	MCS/SR/SGGIT/CHA/BV-15-C

Item	Feature	Test Case(s)
MCS 2/20	Playing Order Supported Characteristic	MCS/SR/SGGIT/CHA/BV-16-C
MCS 2/19 AND MCS 2/20	Playing Order Ignored	MCS/SR/SPE/BI-06-C
MCS 2/21	Media State Characteristic	MCS/SR/SGGIT/CHA/BV-17-C
MCS 2/22	Media Control Point Characteristic	MCS/SR/SGGIT/CHA/BV-18-C MCS/SR/SPE/BI-01-C
MCS 2/23	Media Control Opcodes Supported Characteristic	MCS/SR/SGGIT/CHA/BV-19-C
MCS 2/24	Search Results Object and Search Control Point Characteristic	MCS/SR/SGGIT/CHA/BV-20-C MCS/SR/SGGIT/CHA/BV-21-C MCS/SR/SCP/BV-01-C MCS/SR/SPE/BI-02-C
MCS 2/26	Content Control Characteristic	MCS/SR/SGGIT/CHA/BV-22-C MCS/SR/SP/BV-03-C
MCS 3/1 AND MCS 4/4	Play from Inactive	MCS/SR/MCP/BV-70-C
MCS 3/1 AND MCS 4/3	Play from Seeking	MCS/SR/MCP/BV-02-C
MCS 3/2 AND MCS 4/4	Pause from Inactive	MCS/SR/MCP/BV-71-C
MCS 3/1 AND MCS 4/2	Play from Paused	MCS/SR/MCP/BV-01-C
MCS 3/2 AND MCS 4/1	Pause from Playing	MCS/SR/MCP/BV-03-C
MCS 3/2 AND MCS 4/3	Pause from Seeking	MCS/SR/MCP/BV-04-C
MCS 3/3 AND MCS 4/4	Fast Rewind from Inactive	MCS/SR/MCP/BV-72-C
MCS 3/3 AND MCS 4/1	Fast Rewind from Playing	MCS/SR/MCP/BV-05-C
MCS 3/3 AND MCS 4/2	Fast Rewind from Paused	MCS/SR/MCP/BV-06-C
MCS 3/4 AND MCS 4/4	Fast Forward from Inactive	MCS/SR/MCP/BV-73-C
MCS 3/4 AND MCS 4/1	Fast Forward from Playing	MCS/SR/MCP/BV-07-C
MCS 3/4 AND MCS 4/2	Fast Forward from Paused	MCS/SR/MCP/BV-08-C
MCS 3/5 AND MCS 4/4	Stop from Inactive	MCS/SR/MCP/BV-74-C
MCS 3/5 AND MCS 4/1	Stop from Playing	MCS/SR/MCP/BV-09-C
MCS 3/5 AND MCS 4/2	Stop from Paused	MCS/SR/MCP/BV-10-C
MCS 3/5 AND MCS 4/3	Stop from Seeking	MCS/SR/MCP/BV-11-C

Item	Feature	Test Case(s)
MCS 3/6 AND MCS 4/4	Move Relative from Inactive	MCS/SR/MCP/BV-75-C
MCS 3/6 AND MCS 4/1	Move Relative from Playing	MCS/SR/MCP/BV-12-C
MCS 3/6 AND MCS 4/2	Move Relative from Paused	MCS/SR/MCP/BV-13-C
MCS 3/6 AND MCS 4/3	Move Relative from Seeking	MCS/SR/MCP/BV-14-C
MCS 3/7 AND MCS 4/4	Previous Segment from Inactive	MCS/SR/MCP/BV-76-C
MCS 3/7 AND MCS 4/1	Previous Segment from Playing	MCS/SR/MCP/BV-15-C
MCS 3/7 AND MCS 4/2	Previous Segment from Paused	MCS/SR/MCP/BV-16-C
MCS 3/7 AND MCS 4/3	Previous Segment from Seeking	MCS/SR/MCP/BV-17-C
MCS 3/8 AND MCS 4/4	Next Segment from Inactive	MCS/SR/MCP/BV-77-C
MCS 3/8 AND MCS 4/1	Next Segment from Playing	MCS/SR/MCP/BV-18-C
MCS 3/8 AND MCS 4/2	Next Segment from Paused	MCS/SR/MCP/BV-19-C
MCS 3/8 AND MCS 4/3	Next Segment from Seeking	MCS/SR/MCP/BV-20-C
MCS 3/9 AND MCS 4/4	First Segment from Inactive	MCS/SR/MCP/BV-78-C
MCS 3/9 AND MCS 4/1	First Segment from Playing	MCS/SR/MCP/BV-21-C
MCS 3/9 AND MCS 4/2	First Segment from Paused	MCS/SR/MCP/BV-22-C
MCS 3/9 AND MCS 4/3	First Segment from Seeking	MCS/SR/MCP/BV-23-C
MCS 3/10 AND MCS 4/4	Last Segment from Inactive	MCS/SR/MCP/BV-79-C
MCS 3/10 AND MCS 4/1	Last Segment from Playing	MCS/SR/MCP/BV-24-C
MCS 3/10 AND MCS 4/2	Last Segment from Paused	MCS/SR/MCP/BV-25-C
MCS 3/10 AND MCS 4/3	Last Segment from Seeking	MCS/SR/MCP/BV-26-C
MCS 3/11 AND MCS 4/4	Goto Segment from Inactive	MCS/SR/SPE/BI-03-C
MCS 3/11 AND MCS 4/4	Goto Segment from Inactive	MCS/SR/MCP/BV-80-C
MCS 3/11 AND MCS 4/1	Goto Segment from Playing	MCS/SR/MCP/BV-27-C

Item	Feature	Test Case(s)
MCS 3/11 AND MCS 4/2	Goto Segment from Paused	MCS/SR/MCP/BV-28-C
MCS 3/11 AND MCS 4/3	Goto Segment from Seeking	MCS/SR/MCP/BV-29-C
MCS 3/12 AND MCS 4/4	Previous Track from Inactive	MCS/SR/MCP/BV-33-C
MCS 3/12 AND MCS 4/1	Previous Track from Playing	MCS/SR/MCP/BV-30-C
MCS 3/12 AND MCS 4/2	Previous Track from Paused	MCS/SR/MCP/BV-31-C
MCS 3/12 AND MCS 4/3	Previous Track from Seeking	MCS/SR/MCP/BV-32-C
MCS 3/13 AND MCS 4/4	Next Track from Inactive	MCS/SR/MCP/BV-37-C
MCS 3/13 AND MCS 4/1	Next Track from Playing	MCS/SR/MCP/BV-34-C
MCS 3/13 AND MCS 4/2	Next Track from Paused	MCS/SR/MCP/BV-35-C
MCS 3/13 AND MCS 4/3	Next Track from Seeking	MCS/SR/MCP/BV-36-C
MCS 3/14 AND MCS 4/4	First Track from Inactive	MCS/SR/MCP/BV-41-C
MCS 3/14 AND MCS 4/1	First Track from Playing	MCS/SR/MCP/BV-38-C
MCS 3/14 AND MCS 4/2	First Track from Paused	MCS/SR/MCP/BV-39-C
MCS 3/14 AND MCS 4/3	First Track from Seeking	MCS/SR/MCP/BV-40-C
MCS 3/15 AND MCS 4/4	Last Track from Inactive	MCS/SR/MCP/BV-45-C
MCS 3/15 AND MCS 4/1	Last Track from Playing	MCS/SR/MCP/BV-42-C
MCS 3/15 AND MCS 4/2	Last Track from Paused	MCS/SR/MCP/BV-43-C
MCS 3/15 AND MCS 4/3	Last Track from Seeking	MCS/SR/MCP/BV-44-C
MCS 3/16	Goto Track	MCS/SR/SPE/BI-04-C
MCS 3/16 AND MCS 4/4	Goto Track from Inactive	MCS/SR/MCP/BV-49-C
MCS 3/16 AND MCS 4/1	Goto Track from Playing	MCS/SR/MCP/BV-46-C
MCS 3/16 AND MCS 4/2	Goto Track from Paused	MCS/SR/MCP/BV-47-C
MCS 3/16 AND MCS 4/3	Goto Track from Seeking	MCS/SR/MCP/BV-48-C
MCS 3/17 AND MCS 4/4	Previous Group from Inactive	MCS/SR/MCP/BV-53-C

Item	Feature	Test Case(s)
MCS 3/17 AND MCS 4/1	Previous Group from Playing	MCS/SR/MCP/BV-50-C
MCS 3/17 AND MCS 4/2	Previous Group from Paused	MCS/SR/MCP/BV-51-C
MCS 3/17 AND MCS 4/3	Previous Group from Seeking	MCS/SR/MCP/BV-52-C
MCS 3/18 AND MCS 4/4	Next Group from Inactive	MCS/SR/MCP/BV-57-C
MCS 3/18 AND MCS 4/1	Next Group from Playing	MCS/SR/MCP/BV-54-C
MCS 3/18 AND MCS 4/2	Next Group from Paused	MCS/SR/MCP/BV-55-C
MCS 3/18 AND MCS 4/3	Next Group from Seeking	MCS/SR/MCP/BV-56-C
MCS 3/19 AND MCS 4/4	First Group from Inactive	MCS/SR/MCP/BV-61-C
MCS 3/19 AND MCS 4/1	First Group from Playing	MCS/SR/MCP/BV-58-C
MCS 3/19 AND MCS 4/2	First Group from Paused	MCS/SR/MCP/BV-59-C
MCS 3/19 AND MCS 4/3	First Group from Seeking	MCS/SR/MCP/BV-60-C
MCS 3/20 AND MCS 4/4	Last Group from Inactive	MCS/SR/MCP/BV-65-C
MCS 3/20 AND MCS 4/1	Last Group from Playing	MCS/SR/MCP/BV-62-C
MCS 3/20 AND MCS 4/2	Last Group from Paused	MCS/SR/MCP/BV-63-C
MCS 3/20 AND MCS 4/3	Last Group from Seeking	MCS/SR/MCP/BV-64-C
MCS 3/21	Goto Group	MCS/SR/SPE/BI-05-C
MCS 3/21 AND MCS 4/4	Goto Group from Inactive	MCS/SR/MCP/BV-69-C
MCS 3/21 AND MCS 4/1	Goto Group from Playing	MCS/SR/MCP/BV-66-C
MCS 3/21 AND MCS 4/2	Goto Group from Paused	MCS/SR/MCP/BV-67-C
MCS 3/21 AND MCS 4/3	Goto Group from Seeking	MCS/SR/MCP/BV-68-C
Generic Media Control Service		
MCS 22/1 AND MCS 21/1	Service Supported over BR/EDR – Generic Media Control Service	GMCS/SR/SGGIT/SDP/BV-01-C
MCS 22/1	Generic Media Control Service	GMCS/SR/SGGIT/SER/BV-01-C
MCS 22/3	Media Player Name Characteristic	GMCS/SR/SGGIT/CHA/BV-01-C
MCS 22/3 AND MCS 22/4	Media Player Name Oversized Values	GMCS/SR/SPN/BV-01-C

Item	Feature	Test Case(s)
MCS 22/5	Media Player Icon Object Characteristic	GMCS/SR/SGGIT/CHA/BV-02-C
MCS 22/6	Media Player Icon URL Characteristic	GMCS/SR/SGGIT/CHA/BV-03-C
MCS 22/7	Track Changed Characteristic	GMCS/SR/SGGIT/CHA/BV-04-C
MCS 22/8	Track Title Characteristic	GMCS/SR/SGGIT/CHA/BV-05-C
MCS 22/8 AND MCS 22/9	Track Title Oversized Values	GMCS/SR/SPN/BV-02-C
MCS 22/10	Track Duration Characteristic	GMCS/SR/SGGIT/CHA/BV-06-C
MCS 22/11	Track Position Characteristic	GMCS/SR/SGGIT/CHA/BV-07-C GMCS/SR/SPE/BI-07-C GMCS/SR/SP/BV-02-C
MCS 22/12	Playback Speed	GMCS/SR/SGGIT/CHA/BV-08-C
MCS 22/13	Seeking Speed Characteristic	GMCS/SR/SGGIT/CHA/BV-09-C
MCS 22/14	Current Track Segments Object Characteristic	GMCS/SR/SGGIT/CHA/BV-10-C
MCS 22/15	Current Track Object Characteristic	GMCS/SR/SGGIT/CHA/BV-11-C
MCS 22/16	Next Track Object Characteristic	GMCS/SR/SGGIT/CHA/BV-12-C
MCS 22/17	Parent Group Object Characteristic	GMCS/SR/SGGIT/CHA/BV-13-C GMCS/SR/SP/BV-01-C
MCS 22/18	Current Group Object Characteristic	GMCS/SR/SGGIT/CHA/BV-14-C
MCS 22/19	Playing Order Characteristic	GMCS/SR/SGGIT/CHA/BV-15-C
MCS 22/20	Playing Order Supported Characteristic	GMCS/SR/SGGIT/CHA/BV-16-C
MCS 22/19 AND MCS 22/20	Playing Order Ignored	GMCS/SR/SPE/BI-06-C
MCS 22/21	Media State Characteristic	GMCS/SR/SGGIT/CHA/BV-17-C
MCS 22/22	Media Control Point Characteristic	GMCS/SR/SGGIT/CHA/BV-18-C GMCS/SR/SPE/BI-01-C
MCS 22/23	Media Control Opcodes Supported Characteristic	GMCS/SR/SGGIT/CHA/BV-19-C
MCS 22/24	Search Results Object and Search Control Point Characteristic	GMCS/SR/SGGIT/CHA/BV-20-C GMCS/SR/SGGIT/CHA/BV-21-C GMCS/SR/SCP/BV-01-C GMCS/SR/SPE/BI-02-C
MCS 22/26	Content Control Characteristic	GMCS/SR/SGGIT/CHA/BV-22-C GMCS/SR/SP/BV-03-C
MCS 23/1 AND MCS 24/4	Play from Inactive	GMCS/SR/MCP/BV-70-C
MCS 23/1 AND MCS 24/3	Play from Seeking	GMCS/SR/MCP/BV-02-C
MCS 23/2 AND MCS 24/4	Pause from Inactive	GMCS/SR/MCP/BV-71-C
MCS 23/1 AND MCS 24/2	Play from Paused	GMCS/SR/MCP/BV-01-C
MCS 23/2 AND MCS 24/2	Pause from Playing	GMCS/SR/MCP/BV-03-C

Item	Feature	Test Case(s)
MCS 23/2 AND MCS 24/3	Pause from Seeking	GMCS/SR/MCP/BV-04-C
MCS 23/3 AND MCS 24/4	Fast Rewind from Inactive	GMCS/SR/MCP/BV-72-C
MCS 23/3 AND MCS 24/1	Fast Rewind from Playing	GMCS/SR/MCP/BV-05-C
MCS 23/3 AND MCS 24/2	Fast Rewind from Paused	GMCS/SR/MCP/BV-06-C
MCS 23/4 AND MCS 24/4	Fast Forward from Inactive	GMCS/SR/MCP/BV-73-C
MCS 23/4 AND MCS 24/1	Fast Forward from Playing	GMCS/SR/MCP/BV-07-C
MCS 23/4 AND MCS 24/2	Fast Forward from Paused	GMCS/SR/MCP/BV-08-C
MCS 23/5 AND MCS 24/4	Stop from Inactive	GMCS/SR/MCP/BV-74-C
MCS 23/5 AND MCS 24/1	Stop from Playing	GMCS/SR/MCP/BV-09-C
MCS 23/5 AND MCS 24/2	Stop from Paused	GMCS/SR/MCP/BV-10-C
MCS 23/5 AND MCS 24/3	Stop from Seeking	GMCS/SR/MCP/BV-11-C
MCS 23/6 AND MCS 24/4	Move Relative from Inactive	GMCS/SR/MCP/BV-75-C
MCS 23/6 AND MCS 24/1	Move Relative from Playing	GMCS/SR/MCP/BV-12-C
MCS 23/6 AND MCS 24/2	Move Relative from Paused	GMCS/SR/MCP/BV-13-C
MCS 23/6 AND MCS 24/3	Move Relative from Seeking	GMCS/SR/MCP/BV-14-C
MCS 23/7 AND MCS 24/4	Previous Segment from Inactive	GMCS/SR/MCP/BV-76-C
MCS 23/7 AND MCS 24/1	Previous Segment from Playing	GMCS/SR/MCP/BV-15-C
MCS 23/7 AND MCS 24/2	Previous Segment from Paused	GMCS/SR/MCP/BV-16-C
MCS 23/7 AND MCS 24/3	Previous Segment from Seeking	GMCS/SR/MCP/BV-17-C
MCS 23/8 AND MCS 24/4	Next Segment from Inactive	GMCS/SR/MCP/BV-77-C
MCS 23/8 AND MCS 24/1	Next Segment from Playing	GMCS/SR/MCP/BV-18-C
MCS 23/8 AND MCS 24/2	Next Segment from Paused	GMCS/SR/MCP/BV-19-C
MCS 23/8 AND MCS 24/3	Next Segment from Seeking	GMCS/SR/MCP/BV-20-C

Item	Feature	Test Case(s)
MCS 23/9 AND MCS 24/4	First Segment from Inactive	GMCS/SR/MCP/BV-78-C
MCS 23/9 AND MCS 24/1	First Segment from Playing	GMCS/SR/MCP/BV-21-C
MCS 23/9 AND MCS 24/2	First Segment from Paused	GMCS/SR/MCP/BV-22-C
MCS 23/9 AND MCS 24/3	First Segment from Seeking	GMCS/SR/MCP/BV-23-C
MCS 23/10 AND MCS 24/4	Last Segment from Inactive	GMCS/SR/MCP/BV-79-C
MCS 23/10 AND MCS 24/1	Last Segment from Playing	GMCS/SR/MCP/BV-24-C
MCS 23/10 AND MCS 24/2	Last Segment from Paused	GMCS/SR/MCP/BV-25-C
MCS 23/10 AND MCS 24/3	Last Segment from Seeking	GMCS/SR/MCP/BV-26-C
MCS 23/11	Goto Segment	GMCS/SR/SPE/BI-03-C
MCS 23/11 AND MCS 24/4	Goto Segment from Inactive	GMCS/SR/MCP/BV-80-C
MCS 23/11 AND MCS 24/1	Goto Segment from Playing	GMCS/SR/MCP/BV-27-C
MCS 23/11 AND MCS 24/2	Goto Segment from Paused	GMCS/SR/MCP/BV-28-C
MCS 23/11 AND MCS 24/3	Goto Segment from Seeking	GMCS/SR/MCP/BV-29-C
MCS 23/12 AND MCS 24/4	Previous Track from Inactive	GMCS/SR/MCP/BV-33-C
MCS 23/12 AND MCS 24/1	Previous Track from Playing	GMCS/SR/MCP/BV-30-C
MCS 23/12 AND MCS 24/2	Previous Track from Paused	GMCS/SR/MCP/BV-31-C
MCS 23/12 AND MCS 24/3	Previous Track from Seeking	GMCS/SR/MCP/BV-32-C
MCS 23/13 AND MCS 24/4	Next Track from Inactive	GMCS/SR/MCP/BV-37-C
MCS 23/13 AND MCS 24/1	Next Track from Playing	GMCS/SR/MCP/BV-34-C
MCS 23/13 AND MCS 24/2	Next Track from Paused	GMCS/SR/MCP/BV-35-C
MCS 23/13 AND MCS 24/3	Next Track from Seeking	GMCS/SR/MCP/BV-36-C
MCS 23/14 AND MCS 24/4	First Track from Inactive	GMCS/SR/MCP/BV-41-C
MCS 23/14 AND MCS 24/1	First Track from Playing	GMCS/SR/MCP/BV-38-C
MCS 23/14 AND MCS 24/2	First Track from Paused	GMCS/SR/MCP/BV-39-C

Item	Feature	Test Case(s)
MCS 23/14 AND MCS 24/3	First Track from Seeking	GMCS/SR/MCP/BV-40-C
MCS 23/15 AND MCS 24/4	Last Track from Inactive	GMCS/SR/MCP/BV-45-C
MCS 23/15 AND MCS 24/1	Last Track from Playing	GMCS/SR/MCP/BV-42-C
MCS 23/15 AND MCS 24/2	Last Track from Paused	GMCS/SR/MCP/BV-43-C
MCS 23/15 AND MCS 24/3	Last Track from Seeking	GMCS/SR/MCP/BV-44-C
MCS 23/16	Goto Track	GMCS/SR/SPE/BI-04-C
MCS 23/16 AND MCS 24/4	Goto Track from Inactive	GMCS/SR/MCP/BV-49-C
MCS 23/16 AND MCS 24/1	Goto Track from Playing	GMCS/SR/MCP/BV-46-C
MCS 23/16 AND MCS 24/2	Goto Track from Paused	GMCS/SR/MCP/BV-47-C
MCS 23/16 AND MCS 24/3	Goto Track from Seeking	GMCS/SR/MCP/BV-48-C
MCS 23/17 AND MCS 24/4	Previous Group from Inactive	GMCS/SR/MCP/BV-53-C
MCS 23/17 AND MCS 24/1	Previous Group from Playing	GMCS/SR/MCP/BV-50-C
MCS 23/17 AND MCS 24/2	Previous Group from Paused	GMCS/SR/MCP/BV-51-C
MCS 23/17 AND MCS 24/3	Previous Group from Seeking	GMCS/SR/MCP/BV-52-C
MCS 23/18 AND MCS 24/4	Next Group from Inactive	GMCS/SR/MCP/BV-57-C
MCS 23/18 AND MCS 24/1	Next Group from Playing	GMCS/SR/MCP/BV-54-C
MCS 23/18 AND MCS 24/2	Next Group from Paused	GMCS/SR/MCP/BV-55-C
MCS 23/18 AND MCS 24/3	Next Group from Seeking	GMCS/SR/MCP/BV-56-C
MCS 23/19 AND MCS 24/4	First Group from Inactive	GMCS/SR/MCP/BV-61-C
MCS 23/19 AND MCS 24/1	First Group from Playing	GMCS/SR/MCP/BV-58-C
MCS 23/19 AND MCS 24/2	First Group from Paused	GMCS/SR/MCP/BV-59-C
MCS 23/19 AND MCS 24/3	First Group from Seeking	GMCS/SR/MCP/BV-60-C
MCS 23/20 AND MCS 24/4	Last Group from Inactive	GMCS/SR/MCP/BV-65-C
MCS 23/20 AND MCS 24/1	Last Group from Playing	GMCS/SR/MCP/BV-62-C

Item	Feature	Test Case(s)
MCS 23/20 AND MCS 24/2	Last Group from Paused	GMCS/SR/MCP/BV-63-C
MCS 23/20 AND MCS 24/3	Last Group from Seeking	GMCS/SR/MCP/BV-64-C
MCS 23/21 AND MCS 24/4	Goto Group from Inactive	GMCS/SR/SPE/BI-05-C GMCS/SR/MCP/BV-69-C
MCS 23/21 AND MCS 24/1	Goto Group from Playing	GMCS/SR/MCP/BV-66-C
MCS 23/21 AND MCS 24/2	Goto Group from Paused	GMCS/SR/MCP/BV-67-C
MCS 23/21 AND MCS 24/3	Goto Group from Seeking	GMCS/SR/MCP/BV-68-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2021-03-16	Approved by BTI on 2021-02-25. MCS v1.0 adopted by the BoD on 2021-03-09. Prepared for publication.
	p1r00	2021-08-12	TSE 16884 (rating 2): Updated “Value Length (Octets)” column values for TCs MCS/SR/SGGIT/CHA/BV-10-C – -14-C and -21-C and GMCS/SR/SGGIT/CHA/BV-10-C – -14-C and -21-C. TSE 16909 (rating 2): Updated initial conditions for sections affecting TCs MCS/SR/MCP/BV-41-C and -45-C and GMCS/SR/MCP/BV-41-C and -45-C; MCS/SR/MCP/BV-49-C and GMCS/SR/MCP/BV-49-C; MCS/SR/MCP/BV-53-C and -57-C and GMCS/SR/MCP/BV-53-C and -57-C; MCS/SR/MCP/BV-61-C and -65-C and GMCS/SR/MCP/BV-61-C and -65-C; MCS/SR/MCP/BV-69-C and GMCS/SR/MCP/BV-69-C. Performed template-related fixes. Updated Scope and the introduction text before the TCMT to align with the template. Updated copyright page to align with v2 of the DNMD.
1	p1	2022-01-25	Approved by BTI on 2021-12-15. Prepared for TCRL 2021-2 publication.
	p2r00	2022-04-07	TSE 18149 (rating 2): Updated the Value Length column for GGIT tests MCS/SR/SGGIT/CHA/BV-10-C – -14-C.
2	p2	2022-06-28	Approved by BTI on 2022-06-20. Prepared for TCRL 2022-1 publication.
	p3r00–r02	2022-09-28 – 2022-11-08	TSE 20395 (rating 4): To address the issue raised in E18693, added a new section with new TCs GMCS/SR/SP/BV-03-C and MCS/SR/SP/BV-03-C. Updated TCMT accordingly. Template-related editorials, including removing the pre-p0 (draft) rev history entries to align with current conventions.
3	p3	2023-02-07	Approved by BTI on 2022-12-19. Prepared for TCRL 2022-2 publication.
	p4r00–r03	2023-08-15 – 2023-12-05	TSE 23301 (rating 1): Corrected the TCID descriptions for MCS/SR/SGGIT/CHA/BV-02-C and -03-C. Updated the TCMT and TCRL accordingly. TSE 23742 (rating 1): Corrected the TCID descriptions for GMCS/SR/SGGIT/CHA/BV-02-C and -03-C. Updated the TCMT and TCRL accordingly. TSE 24007 (rating 2): To support the merging of the GMCS ICS into the MCS ICS, removed the item for the GMCS ICS from the References section and updated all GMCS references in the TCMT to references in the merged MCS ICS.

Publication Number	Revision Number	Date	Comments
4	p4	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p5r00–r03	2024-11-12 – 2024-11-18	TSE 24634 (rating 2): Updated the test procedure and expected outcome for MCS/SR/MCP/BV-58-C – 65-C and GMCS/SR/MCP/BV-58-C – 65-C. TSE 24842 (rating 2): Updated the test procedure for MCS/SR/MCP/BV-12-C – -14-C and -75-C and GMCS/SR/MCP/BV-12-C – -14-C and -75-C. Updated the TCMT introduction to align with the current TS template.
5	p5	2025-02-18	Approved by BTI on 2025-02-09. Prepared for TCRL 2025-1 publication.

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