Fitness Machine Service (FTMS)

***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 Fitness Machine 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 4.0 or later

[2] Test Strategy and Terminology Overview

[3] Fitness Machine Profile Specification, Version 1.0 or later

[4] Fitness Machine Service Specification, Version 1.0 or later

[5] Fitness Machine Service ICS, FTMS.ICS

[6] GATT Test Suite, GATT.TS

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

[8] Fitness Machine Service Implementation eXtra Information for Test, FTMS.IXIT

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

[10] Fitness Machine Characteristics, Version 1.0

[11] Fitness Machine Service Specification, Version 1.0.1

2.2 Definitions

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

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 Fitness Machine Service requires the presence of GAP, SM, and GATT. This is illustrated in Figure 3.1.

<table>
<tr><td colspan="4">Fitness Machine Service</td></tr>
<tr><td colspan="4">GATT</td></tr>
<tr><td>ATT</td><td>GAP</td><td>SM
(LE)</td><td>SDP
(BR/EDR)</td></tr>
<tr><td colspan="4">L2CAP</td></tr>
<tr><td colspan="4">Controller</td></tr>
</table>

Figure 3.1: Fitness Machine Service test model

3.2 Test Strategy

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

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

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

The interface between the IUT and the Upper Tester may be:

- An MMI
- Provided by the IUT manufacturer

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Service Data AD Type
- Characteristic Read
- Characteristic Read Long
- Characteristic Write
- Configure Notification

- Configure Indication
- Characteristic Notification
- Training Status Notification
- Fitness Machine Status Notification
- 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 [6] 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 Abbreviation Identifier <spec abbreviation>**
FTMS	Fitness Machine Service
Identifier Abbreviation	**IUT role Identifier <IUT role>**
SR	Fitness Machine Server
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
ISFC	Indication Supported Features Characteristic
SDP	Validate SDP Record
SER	Service
Identifier Abbreviation	**Feature Identifier <feat>**
CN	Characteristic Notification
CON	Configure Indication or Notification
CR	Characteristic Read
CW	Characteristic Write
FMSN	Fitness Machine Status Notification
SPE	Service Procedure – Error Handling
TSN	Training Status Notification

Table 4.1: FTMS 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, 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 initial 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 several L2CAP channels (PSM 0x001F) between the IUT and the Lower Tester over that BR/EDR transport.

4.2.3 Fitness Machine Control Point

- Preamble Purpose

  Follow this preamble procedure to enable the IUT for use with the Fitness Machine Control Point.

- Preamble Procedure

  1. Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  2. The handle of the Fitness Machine Control Point characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or is known to the Lower Tester by other means.
  3. The handle of the Client Configuration descriptor of the Fitness Machine Control Point Characteristic has been previously discovered by the Lower Tester during a test procedure in Section 4.3 or is known to the Lower Tester by other means.
  4. If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  5. The IUT configures the Fitness Machine Control Point characteristic for indications, and if the test case requires notifications, then the IUT configures these characteristics for notifications. Those configurations may happen in any order.

4.3 Generic GATT Integrated Tests

Execute the Generic GATT Integrated Tests defined in Section 6.3, Server test procedures (SGGIT), in [6] using Table 4.2 below as input:

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
FTMS/SR/SGGIT/SER/BV-01-C [Service GGIT – Fitness Machine]	Fitness Machine Service	[4] 2	-	-	Primary or Secondary Service
FTMS/SR/SGGIT/SDP/BV-01-C [SDP Record]	Fitness Machine Service	[4] 2	-	-	-
FTMS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Fitness Machine Feature]	Fitness Machine Feature Characteristic	[4] 4.3	0x02 (Read)	Skip	-
FTMS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Treadmill Data]	Treadmill Data Characteristic	[4] 4.4	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Cross Trainer Data]	Cross Trainer Data Characteristic	[4] 4.5	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Step Climber Data]	Step Climber Data Characteristic	[4] 4.6	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Stair Climber Data]	Stair Climber Data Characteristic	[4] 4.7	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Rower Data]	Rower Data Characteristic	[4] 4.8	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-07-C [Characteristic GGIT – Indoor Bike Data]	Indoor Bike Data Characteristic	[4] 4.9	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-08-C [Characteristic GGIT – Training Status Data]	Training Status Characteristic	[4] 4.10	0x12 (Read, Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-09-C [Characteristic GGIT – Supported Speed Range]	Supported Speed Range Characteristic	[4] 4.11	0x02 (Read)	Skip	-
FTMS/SR/SGGIT/CHA/BV-10-C [Characteristic GGIT – Supported Inclination Range]	Supported Inclination Range Characteristic	[4] 4.12	0x02 (Read)	Skip	-
FTMS/SR/SGGIT/CHA/BV-11-C [Characteristic GGIT – Supported Resistance Level Range]	Supported Resistance Level Range Characteristic	[4] 4.13	0x02 (Read)	Skip	-

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
FTMS/SR/SGGIT/CHA/BV-12-C [Characteristic GGIT – Supported Power Range]	Supported Power Range Characteristic	[4] 4.14	0x02 (Read)	Skip	-
FTMS/SR/SGGIT/CHA/BV-13-C [Characteristic GGIT – Supported Heart Rate Range]	Supported Heart Rate Range Characteristic	[4] 4.15	0x02 (Read)	Skip	-
FTMS/SR/SGGIT/CHA/BV-14-C [Characteristic GGIT – Fitness Machine Control Point]	Fitness Machine Control Point Characteristic	[4] 4.16	0x28 (Write, Indicate)	Skip	-
FTMS/SR/SGGIT/CHA/BV-15-C [Characteristic GGIT – Fitness Machine Status]	Fitness Machine Status Characteristic	[4] 4.17	0x10 (Notify)	Skip	-
FTMS/SR/SGGIT/CHA/BV-16-C [Characteristic GGIT – Fitness Machine Feature – Indicate]	Fitness Machine Feature Characteristic	[11] 4, 4.3.1	0x22 (Read, Indicate)	Skip	-

Table 4.2: Input for the GGIT Server test procedure

4.3.1 Generic GATT Indication Supported Features Characteristic

Execute the Generic GATT Indication Supported Features Characteristic Tests defined in Section 6.3, Server test procedures (SGGIT), in [6] using Table 4.3 below as input:

TCID	Characteristic	Reference	TC Configuration
FTMS/SR/SGGIT/ISFC/BV-01-C [Characteristic GGIT – Fitness Machine Feature Indication]	Fitness Machine Feature Characteristic	[11] 4.3.1	N/A

Table 4.3 Input for the GGIT Indication Supported Features Characteristic tests

4.4 Characteristic Read

Read and verify that the characteristic values required by the service are compliant.

FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature]

- Test Purpose

  Verify that the characteristic value meets the requirements of the service.

- Reference

  [4] 4.3.1 and 4.4.1

- Initial Condition

  - The handle of the Fitness Machine Feature characteristic value referenced in the test has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. The Lower Tester sends an ATT_Read_Request to the IUT to read the characteristic value.
  2. The IUT sends an ATT_Read_Response to the Lower Tester.
  3. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The characteristic is successfully read, and the characteristic value is 8 octets with RFU bits set to 0. ([4] 4.3.1).

4.4.1 Characteristic Reads – Generic Procedure

- Test Purpose

  Read and verify characteristic values supported by the Fitness Machine Service. The verification is done one value at a time, as enumerated in the test cases in Table 4.4, using this generic test procedure.

- Reference

  [4] 4.3.1 and 4.4.1

- Initial Condition

  - The handle of each characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.

- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
- If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Value (Requirements)	Target Setting Features Bit (bit number)
FTMS/SR/CR/BV-02-C [Characteristic Read – Training Status]	2 octets (minimum, but could be variable as defined in [4] 4.10.1) with RFU bits set to 0. ([4] 4.10.1)	N/A
FTMS/SR/CR/BV-03-C [Characteristic Read – Supported Speed Range]	6 octets [4] 4.11.1	Speed Target Setting Supported (0)
FTMS/SR/CR/BV-04-C [Characteristic Read – Supported Inclination Range]	6 octets [4] 4.12.1	Inclination Target Setting Supported (1)
FTMS/SR/CR/BV-05-C [Characteristic Read – Supported Resistance Level Range]	6 octets [4] 4.13.1	Resistance Target Setting Supported (2)
FTMS/SR/CR/BV-06-C [Characteristic Read – Supported Power Range]	6 octets [4] 4.14.1	Power Target Setting Supported (3)
FTMS/SR/CR/BV-07-C [Characteristic Read – Supported Heart Rate Range]	3 octets [4] 4.15.1	Heart Rate Target Setting Supported (4)

Table 4.4: Characteristic Read Value test cases

- Test Procedure

1. The Lower Tester sends an ATT_Read_Request to the IUT to read the characteristic value.
2. The IUT sends an ATT_Read_Response to the Lower Tester.
3. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

Pass verdict

The characteristic is successfully read, and the characteristic value meets the requirements of the service.

The specified Target Setting Features Bit of the Target Setting Features field of the Fitness Machine Feature characteristic is set to 1.

4.5 Configure Indication and Notification

- Test Purpose

Verify compliant operation in response to enabling and disabling characteristic indication or notification. The verification is done one value at a time, as enumerated in the test cases in Table 4.5, using this generic test procedure.

- Reference

[4] 4

- Initial Condition
  - The handle of each characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - The handle of the client characteristic configuration descriptor of each characteristic referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the characteristic descriptor require a specific security mode or security level, establish a connection meeting those requirements.
- Test Case Configuration

Test Case	Requirements
FTMS/SR/CON/BV-01-C [Configure Notification – Treadmill Data]	0x0001, [4] 4.4
FTMS/SR/CON/BV-02-C [Configure Notification – Cross trainer Data]	0x0001, [4] 4.5
FTMS/SR/CON/BV-03-C [Configure Notification – Step Climber Data]	0x0001, [4] 4.6
FTMS/SR/CON/BV-04-C [Configure Notification – Stair Climber]	0x0001, [4] 4.7
FTMS/SR/CON/BV-05-C [Configure Notification – Rower Data]	0x0001, [4] 4.8
FTMS/SR/CON/BV-06-C [Configure Notification – Indoor Bike Data]	0x0001, [4] 4.9
FTMS/SR/CON/BV-07-C [Configure Notification – Training Status]	0x0001, [4] 4.10
FTMS/SR/CON/BV-08-C [Configure Indication – Fitness Machine Control Point]	0x0002, [4] 4.16
FTMS/SR/CON/BV-09-C [Configure Notification – Fitness Machine Status]	0x0001, [4] 4.17

Table 4.5: Configure Indication and Notification test cases

- Test Procedure
  1. Disable indication or notification by writing value 0x0000 to the client characteristic configuration descriptor of the characteristic.
  2. If the test case is for notification, enable notification by writing value 0x0001 to the client characteristic configuration descriptor of the characteristic.
  3. Otherwise, if the test case is for indication, enable indication by writing value 0x0002 to the client characteristic configuration descriptor of the characteristic.
  4. The Lower Tester reads the value of the client characteristic configuration descriptor.
- Expected Outcome

  Pass verdict

  The characteristic descriptor is successfully written and the value returned when read is consistent with the value written.

4.6 Characteristic Notification

FTMS/SR/CN/BV-01-C [Treadmill Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Treadmill Data characteristic that include the mandatory fields (i.e., Flags and Instantaneous Speed fields) when complete Data Record is received

- Reference

  [4] 4.4.1.1, 4.4.1.2

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Treadmill Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1 if using an LE transport or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Treadmill Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send Treadmill-related Data Record, which consists of one or more notifications of the Treadmill Data characteristic along with the Flags field. The Instantaneous Speed field is included if the bit flag of More Data is set to 0.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. The Lower Tester configures the Treadmill Data characteristic to disable notifications.
  7. Repeat steps 1–2 with notifications disabled.
  8. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Treadmill Data characteristic.

  The Treadmill Data characteristic Data Records contain at least the Flags field, and the Instantaneous Speed field is included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Treadmill Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.1 Treadmill Data Notifications – Supported Fields

- Test Purpose

  This is a generic procedure to verify that the IUT can send a Data Record consisting of one or more notifications of the Treadmill Data characteristic that includes the supported field specified in Table 4.6 with a valid value. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.6

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Treadmill Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Treadmill Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-02-C [Treadmill Data Notifications – Average Speed Supported]	[4] 4.4.1.3	Average Speed	Average Speed Present	Average Speed Supported
FTMS/SR/CN/BV-03-C [Treadmill Data Notifications – Total Distance Supported]	[4] 4.4.1.4	Total Distance	Total Distance Present	Total Distance Supported
FTMS/SR/CN/BV-04-C [Treadmill Data Notifications – Inclination Supported]	[4] 4.4.1.5 [4] 4.4.1.6	Inclination, Ramp Angle Setting	Inclination and Ramp Angle Setting Present	Inclination Supported
FTMS/SR/CN/BV-05-C [Treadmill Data Notifications – Elevation Gain Supported]	[4] 4.4.1.7	Positive Elevation Gain and Negative Elevation Gain Pair	Elevation Gain Present	Elevation Gain Supported
FTMS/SR/CN/BV-06-C [Treadmill Data Notifications – Pace Supported]	[4] 4.4.1.8 [4] 4.4.1.9	Instantaneous Pace, Average Pace	Instantaneous Pace Present, Average Pace Present	Pace Supported
FTMS/SR/CN/BV-07-C [Treadmill Data Notifications – Expended Energy Supported]	[4] 4.4.1.10 [4] 4.4.1.11 [4] 4.4.1.12	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-08-C [Treadmill Data Notifications – Heart Rate Measurement Supported]	[4] 4.4.1.13	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-09-C [Treadmill Data Notifications – Metabolic Equivalent Supported]	[4] 4.4.1.14	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-10-C [Treadmill Data Notifications – Remaining Time Supported]	[4] 4.4.1.16	Remaining Time	Remaining Time Present	Remaining Time Supported
FTMS/SR/CN/BV-11-C [Treadmill Data Notifications – Force On Belt and Power Output Supported]	[4] 4.4.1.17 [4] 4.4.1.18	Force on Belt, Power Output	Force on Belt and Power Output Present	Force on Belt and Power Output Supported

Table 4.6: Treadmill Data Notifications – Supported Fields

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send a treadmill-related Data Record, which consists of one or more notifications of the Treadmill Data characteristic. The Data Record contains the Included Fields specified in Table 4.6.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.6.
  7. The Lower Tester configures the Treadmill Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Treadmill Data characteristic.

  The Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Features field of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-12-C [Treadmill Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Treadmill Data characteristic that include the Elapsed Time value. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is re-established.

- Reference

  [4] 4.4.1.15, 4.18

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Treadmill Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Treadmill Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send treadmill-related Data Record, which consists of one or more notifications of the Treadmill Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
  7. The Lower Tester terminates the link between the IUT and the Lower Tester.
  8. After 10 seconds, reestablish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.
  9. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic handle and value.
  10. Verify that the characteristic value meets the requirements of the service.
  11. Repeat steps 9–10 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
  12. The Lower Tester configures the Treadmill Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Treadmill Data characteristic.

  The Treadmill Data Characteristic Data Records contain at least the Flags field and the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

The value of each field of the characteristic meets the requirements of the service.

The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

In all cases, ensure that the RFU bits of the Flags field are set to zero.

After step 8, the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Treadmill Data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 9 is at least 9 seconds later than the Elapsed Time value received in step 4.

FTMS/SR/CN/BV-13-C [Cross Trainer Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Cross Trainer Data characteristic that include the mandatory fields (i.e., Flags and Instantaneous Speed fields) when complete Data Record is received.

- Reference

  [4] 4.5.1.1, 4.5.1.2

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Cross Trainer Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Cross Trainer Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send cross trainer-related Data Record, which consists of one or more notifications of the Cross Trainer Data characteristic along with the Flags field and the Instantaneous Speed field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Cross Trainer Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. The Lower Tester configures the Cross Trainer Data characteristic to disable notifications.
  7. Repeat steps 1–2 with notifications disabled.
  8. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Cross Trainer Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Cross Trainer Data characteristic.

  The Cross Trainer Data Characteristic Data Records contain at least the Flags field and the Instantaneous Speed field is included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Cross Trainer Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.2 Cross Trainer Data Notifications – Supported Fields

- Test Purpose

  This is a generic procedure to verify that the IUT can send a Data Record consisting of one or more notifications of the Cross Trainer Data characteristic that include the supported field specified in Table 4.7 with a valid value/s. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.7.

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Cross Trainer Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Cross Trainer Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-14-C [Cross Trainer Data Notifications – Average Speed Supported]	[4] 4.5.1.3	Average Speed	Average Speed Present	Average Speed Supported
FTMS/SR/CN/BV-15-C [Cross Trainer Data Notifications – Total Distance Supported]	[4] 4.5.1.4	Total Distance	Total Distance Present	Total Distance Supported
FTMS/SR/CN/BV-16-C [Cross Trainer Data Notifications – Step Count Supported]	[4] 4.5.1.5 [4] 4.5.1.6	Step per Minute, Average Step Rate	Step Count Present	Step Count Supported

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-17-C [Cross Trainer Data Notifications – Stride Count Supported]	[4] 4.5.1.7	Stride Count	Stride Count Present	Stride Count Supported
FTMS/SR/CN/BV-18-C [Cross Trainer Data Notifications – Elevation Gain Supported]	[4] 4.5.1.8	Positive Elevation Gain and Negative Elevation Gain	Elevation Gain Present	Elevation Gain Supported
FTMS/SR/CN/BV-19-C [Cross Trainer Data Notifications – Inclination Supported]	[4] 4.5.1.9 [4] 4.5.1.10	Inclination, Ramp Angle Setting	Inclination and Ramp Angle Setting Present	Inclination Supported
FTMS/SR/CN/BV-20-C [Cross Trainer Data Notifications – Resistance Level Supported]	[4] 4.5.1.11	Resistance Level	Resistance Level Present	Resistance Level Supported
FTMS/SR/CN/BV-21-C [Cross Trainer Data Notifications – Power Measurement Supported]	[4] 4.5.1.12 [4] 4.5.1.13	Instantaneous Power, Average Power	Instantaneous Power Present, Average Power Present	Power Measurement Supported
FTMS/SR/CN/BV-22-C [Cross Trainer Data Notifications – Expended Energy Supported]	[4] 4.5.1.14 [4] 4.5.1.15 [4] 4.5.1.16	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported
FTMS/SR/CN/BV-23-C [Cross Trainer Data Notifications – Heart Rate Measurement Supported]	[4] 4.5.1.17	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-24-C [Cross Trainer Data Notifications – Metabolic Equivalent Supported]	[4] 4.5.1.18	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-26-C [Cross Trainer Data Notifications – Remaining Time Supported]	[4] 4.5.1.20	Remaining Time	Remaining Time Present	Remaining Time Supported

Table 4.7: Cross Trainer Data Notifications – Supported Fields test cases

- Test Procedure

1. Perform an action on the IUT that will induce it, once connected, to send a cross trainer-related Data Record, which consists of one or more notifications of the Cross Trainer Data characteristic. The Data Record contains the Included Fields specified in Table 4.7.
2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g. by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Cross Trainer Data characteristic handle and value.

5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.7.
7. The Lower Tester configures the Cross Trainer Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Cross Trainer Data characteristic.

  The Cross Trainer Data Characteristic Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-25-C [Cross Trainer Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Cross Trainer Data characteristic that include the Elapsed Time value. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is re-established.

- Reference

  [4] 4.5.1.19, 4.18

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Cross Trainer Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Cross Trainer Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send cross trainer-related Data Record, which consists of one or more notifications of the Cross Trainer Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Cross Trainer Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.

7. The Lower Tester terminates the link between the IUT and the Lower Tester.
8. After 10 seconds, reestablish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.
9. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Cross Trainer Data characteristic handle and value.
10. Verify that the characteristic value meets the requirements of the service.
11. Repeat steps 9–10 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
12. The Lower Tester configures the Cross Trainer Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Cross Trainer Data characteristic.

  The Cross Trainer Data characteristic Data Records contain at least the Flags field and at least one includes the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

  After step 8, the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Cross Trainer Data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 9 is at least 9 seconds later than the Elapsed Time value received in step 4.

FTMS/SR/CN/BV-27-C [Step Climber Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Step Climber Data characteristic that include the mandatory fields (i.e., Flags, Floors, and Step Count fields) when complete Data Record is received.

- Reference

  [4] 4.6.1.1, 4.6.1.2, 4.6.1.3

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Step Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Step Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send step climber-related Data Record, which consists of one or more notifications of the Step Climber Data characteristic along with the Flags field, Floors field, and the Step per Minute field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Step Climber Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. The Lower Tester configures the Step Climber Data characteristic to disable notifications.
  7. Repeat steps 1–2 with notifications disabled.
  8. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Step Climber Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Step Climber Data characteristic.

  The Step Climber Data characteristic Data Records contain at least the Flags field, Floors field, and the Steps Per Minute field are included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Step Climber Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.3 Step Climber Data Notifications – Supported Fields

- Test Purpose

  This is a generic procedure to verify that the IUT can send a Data Record consisting of one or more notifications of the Step Climber Data characteristic that include the supported field specified in Table 4.8 with a valid value. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.8.

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Step Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Step Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-28-C [Step Climber Data Notifications – Step Count Supported]	[4] 4.6.1.4 [4] 4.6.1.5	Step per Minute, Average Step Rate	Step per Minute Present, Step Count Present	Step Count Supported
FTMS/SR/CN/BV-29-C [Step Climber Data Notifications – Elevation Gain Supported]	[4] 4.6.1.6	Positive Elevation Gain	Positive Elevation Gain Present	Elevation Gain Supported
FTMS/SR/CN/BV-30-C [Step Climber Data Notifications – Expended Energy Supported]	[4] 4.6.1.7 [4] 4.6.1.8 [4] 4.6.1.9	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported
FTMS/SR/CN/BV-31-C [Step Climber Data Notifications – Heart Rate Measurement Supported]	[4] 4.6.1.10	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-32-C [Step Climber Data Notifications – Metabolic Equivalent Supported]	[4] 4.6.1.11	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-34-C [Step Climber Data Notifications – Remaining Time Supported]	[4] 4.6.1.13	Remaining Time	Remaining Time Present	Remaining Time Supported

Table 4.8: Step Climber Data Notifications – Supported Fields test cases

- Test Procedure

1. Perform an action on the IUT that will induce it, once connected, to send a step climber-related Data Record, which consists of one or more notifications of the Step Climber Data characteristic. The Data Record contains the Included Fields specified in Table 4.8.
2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Step Climber Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.8.
7. The Lower Tester configures the Step Climber Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Step Climber Data characteristic.

  The Step Climber Data characteristic Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Features field of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-33-C [Step Climber Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Step Climber Data characteristic that include the Elapsed Time value. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is re-established.

- Reference

  [4] 4.6.1.12, 4.18

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Step Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Step Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send step climber-related Data Record, which consists of one or more notifications of the Step Climber Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Step Climber Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
  7. The Lower Tester terminates the link between the IUT and the Lower Tester.
  8. After 10 seconds, re-establish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.

9. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Treadmill Data characteristic handle and value.
10. Verify that the characteristic value meets the requirements of the service.
11. Repeat steps 9–10 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
12. The Lower Tester configures the Step Climber Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Step Climber Data characteristic.

  The Step Climber Data characteristic Data Records contain at least the Flags field and the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

  After step 8, the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Step Climber Data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 9 is at least 9 seconds later than the Elapsed Time value received in step 4.

FTMS/SR/CN/BV-35-C [Stair Climber Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Stair Climber Data characteristic that include the mandatory fields (i.e., Flags, and Floors fields) when complete Data Record is received.

- Reference

  [4] 4.7.1.1, 4.7.1.2

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Stair Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Stair Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send stair climber-related Data Record, which consists of one or more notifications of the Stair Climber Data characteristic along with the Flags field, and Floors field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Stair Climber Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. The Lower Tester configures the Stair Climber Data characteristic to disable notifications.
7. Repeat steps 1–2 with notifications disabled.
8. Verify that the Lower Tester does not receive the complete Data Record, which consists of an ATT_Handle_Value_Notification from the IUT containing the Stair Climber Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Stair Climber Data characteristic.

  The Stair Climber Data characteristic Data Records contain at least the Flags field and the Floors field is included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Stair Climber Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.4 Stair Climber Data Notifications – Supported Fields

- Test Purpose

  This is a generic procedure to verify that the IUT can send a Data Record consisting of one or more notifications of the Step Climber Data characteristic that include the supported field specified in Table 4.9 with a valid value. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.9

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Stair Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Stair Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-36-C [Stair Climber Data Notifications – Step Count Supported]	[4] 4.7.1.3 [4] 4.7.1.4	Step per Minute, Average Step Rate	Step per Minute Present, Step Count Present	Step Count Supported
FTMS/SR/CN/BV-37-C [Stair Climber Data Notifications – Elevation Gain Supported]	[4] 4.7.1.5	Positive Elevation Gain	Positive Elevation Gain Present	Elevation Gain Supported
FTMS/SR/CN/BV-38-C [Stair Climber Data Notifications – Stride Count Supported]	[4] 4.7.1.6	Stride Count	Stride Count Present	Stride Count Supported
FTMS/SR/CN/BV-39-C [Stair Climber Data Notifications – Expended Energy Supported]	[4] 4.7.1.7 [4] 4.7.1.8 [4] 4.7.1.9	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported
FTMS/SR/CN/BV-40-C [Stair Climber Data Notifications – Heart Rate Measurement Supported]	[4] 4.7.1.10	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-41-C [Stair Climber Data Notifications – Metabolic Equivalent Supported]	[4] 4.7.1.11	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-43-C [Stair Climber Data Notifications – Remaining Time Supported]	[4] 4.7.1.13	Remaining Time	Remaining Time Present	Remaining Time Supported

Table 4.9: Stair Climber Data Notifications – Supported Fields test cases

- Test Procedure

1. Perform an action on the IUT that will induce it, once connected, to send a stair climber-related Data Record, which consists of one or more notifications of the Stair Climber Data characteristic. The Data Record contains the Included Fields specified in Table 4.9.
2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Stair Climber Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.9.
7. The Lower Tester configures the Stair Climber Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Stair Climber Data characteristic.

  The Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Features field of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-42-C [Stair Climber Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Stair Climber Data characteristic that include the Elapsed Time value when complete Data Record is received. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is re-established.

- Reference

  [4] 4.7.1.12

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Stair Climber Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Stair Climber Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send a stair climber-related Data Record, which consists of one or more notifications of the Stair Climber Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Stair Climber Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
  7. The Lower Tester terminates the link between the IUT and the Lower Tester.
  8. After 10 seconds, reestablish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.

9. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Step Climber Data characteristic handle and value.
10. Verify that the characteristic value meets the requirements of the service.
11. Repeat steps 9–10 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
12. The Lower Tester configures the Stair Climber Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Stair Climber Data characteristic.

  The Data Records contain at least the Flags field and the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

  After step 8 the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Stair Climber data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 9 is at least 9 seconds later than the Elapsed Time value received in step 4.

FTMS/SR/CN/BV-44-C [Rower Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Rower Data characteristic that include the mandatory fields (i.e., Flags, Stroke Rate, and Stroke Count fields) when complete Data Record is received.

- Reference

  [4] 4.8.1.1, 4.8.1.2, 4.8.1.3

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Rower Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Rower Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send rower-related Data Record, which consists of one or more notifications of the Rower Data characteristic along with the Flags field, Stroke Rate, and Stroke Count field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Rower Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. The Lower Tester configures the Rower Data characteristic to disable notifications.
7. Repeat steps 1–2 with notifications disabled.
8. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Rower Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Rower Data characteristic.

  The Data Records contain at least the Flags field, Stroke Rate, and the Stroke Count field are included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Rower Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.5 Rower Data Notifications – Supported Fields

- Test Purpose

  This is a generic procedure to verify that the IUT can send a Data Record consisting of one or more notifications of the Rower Data characteristic that include the supported field specified in Table 4.10 with a valid value. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.10.

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Rower Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Rower Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-45-C [Rower Data Notifications – Average Stroke Rate Supported]	[4] 4.8.1.4	Average Stroke Rate	Average Stroke Rate Present	Cadence Supported
FTMS/SR/CN/BV-46-C [Rower Data Notifications – Total Distance Supported]	[4] 4.8.1.5	Total Distance	Total Distance Present	Total Distance Supported
FTMS/SR/CN/BV-47-C [Rower Data Notifications – Pace Supported]	[4] 4.8.1.6 [4] 4.8.1.7	Instantaneous Pace, Average Pace	Instantaneous Pace Present, Average Pace Present	Pace Supported
FTMS/SR/CN/BV-48-C [Rower Data Notifications – Instantaneous Power Supported]	[4] 4.8.1.8 [4] 4.8.1.9	Instantaneous Power, Average Power	Instantaneous Power Present, Average Power Present	Power Measurement Supported
FTMS/SR/CN/BV-49-C [Rower Data Notifications – Resistance Level Supported]	[4] 4.8.1.10	Resistance Level	Resistance Level	Resistance Level Supported
FTMS/SR/CN/BV-50-C [Rower Data Notifications – Expended Energy Supported]	[4] 4.8.1.11 [4] 4.8.1.12 [4] 4.8.1.13	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported
FTMS/SR/CN/BV-51-C [Rower Data Notifications – Heart Rate Measurement Supported]	[4] 4.8.1.14	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-52-C [Rower Data Notifications – Metabolic Equivalent Supported]	[4] 4.8.1.15	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-53-C [Rower Data Notifications – Remaining Time Supported]	[4] 4.8.1.17	Remaining Time	Remaining Time Present	Remaining Time Supported

Table 4.10: Rower Data Notifications – Supported Fields test cases

- Test Procedure

1. Perform an action on the IUT that will induce it, once connected, to send a rower-related Data Record, which consists of one or more notifications of the Rower Data characteristic. The Data Record contains the Included Fields specified in Table 4.10.
2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Rower Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.10.
7. The Lower Tester configures the Rower Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Rower Data characteristic.

  The Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Features field of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-54-C [Rower Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Rower Data characteristic that include the Elapsed Time value. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is reestablished.

- Reference

  [4] 4.8.1.16, 4.18

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Rower Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Rower Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send rower-related Data Record, which consists of one or more notifications of the Rower Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g. by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Rower Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
7. The Lower Tester terminates the link between the IUT and the Lower Tester.
8. After 10 seconds, reestablish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.
9. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Rower Data characteristic handle and value.
10. Verify that the characteristic value meets the requirements of the service.
11. Repeat steps 9–10 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
12. The Lower Tester configures the Rower Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Rower Data characteristic.

  The Data Records contain at least the Flags field, and the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

  After step 8, the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Rower Data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 9 is at least 9 seconds later than the Elapsed Time value received in step 4.

FTMS/SR/CN/BV-55-C [Indoor Bike Data Notifications – Receive Complete Data Record]

- Test Purpose

  Verify that the IUT can send notifications of the Indoor Bike Data characteristic that include the mandatory fields (i.e., Flags, and Instantaneous Speed) when complete Data Record is received.

- Reference

  [4] 4.9.1.1, 4.9.1.2, 4.8.1.3

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Indoor Bike Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Indoor Bike Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send indoor bike-related Data Record, which consists of one or more notifications of the Indoor Bike Data characteristic along with the Flags field and Instantaneous Speed field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Indoor Bike Data characteristic handle and value.
  5. Verify that the characteristic value meets the requirements of the service.
  6. The Lower Tester configures the Indoor Bike Data characteristic to disable notifications.
  7. Repeat steps 1–2 with notifications disabled.
  8. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Indoor Bike Data characteristic.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Indoor Bike Data characteristic.

  The Data Records contain at least the Flags field, and Instantaneous Speed field is included when the More Data bit of the Flags field is set to 0.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Indoor Bike Data characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.6.6 Indoor Bike Data Notifications – Supported Fields

- Test Purpose

  Verify that the IUT can send a Data Record consisting of one or more notifications of the Rower Data characteristic that include the supported field specified in Table 4.11 with a valid value. The test is repeated for each Fitness Machine Feature supported by the IUT.

- Reference

  See Table 4.11.

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Indoor Bike Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Indoor Bike Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Reference	Included Fields	Flags Bits	Fitness Machine Features Bit
FTMS/SR/CN/BV-56-C [Indoor Bike Data Notifications – Average Speed Supported]	[4] 4.9.1.3	Average Speed	Average Speed Present	Average Speed Supported
FTMS/SR/CN/BV-57-C [Indoor Bike Data Notifications – Cadence Supported]	[4] 4.9.1.4 [4] 4.9.1.5	Instantaneous Cadence, Average Cadence	Instantaneous Cadence, Average Cadence	Cadence Supported
FTMS/SR/CN/BV-58-C [Indoor Bike Data Notifications – Total Distance Supported]	[4] 4.9.1.6	Total Distance	Total Distance Present	Total Distance Supported
FTMS/SR/CN/BV-59-C [Indoor Bike Data Notifications – Resistance Level Supported]	[4] 4.9.1.7	Resistance Level	Resistance Level Present	Resistance Level Supported
FTMS/SR/CN/BV-60-C [Indoor Bike Data Notifications – Power Measurement Supported]	[4] 4.9.1.8 [4] 4.9.1.9	Instantaneous Power, Average Power	Instantaneous Power Present, Average Power Present	Power Measurement Supported
FTMS/SR/CN/BV-61-C [Indoor Bike Data Notifications – Expended Energy Supported]	[4] 4.9.1.10 [4] 4.9.1.11 [4] 4.9.1.12	Total Energy, Energy per Hour, Energy per Minute	Expended Energy Present	Expended Energy Supported
FTMS/SR/CN/BV-62-C [Indoor Bike Data Notifications – Heart Rate Measurement Supported]	[4] 4.9.1.13	Heart Rate	Heart Rate Present	Heart Rate Measurement Supported
FTMS/SR/CN/BV-63-C [Indoor Bike Data Notifications – Metabolic Equivalent Supported]	[4] 4.9.1.14	Metabolic Equivalent	Metabolic Equivalent Present	Metabolic Equivalent Supported
FTMS/SR/CN/BV-64-C [Indoor Bike Data Notifications – Remaining Time Supported]	[4] 4.9.1.16	Remaining Time	Remaining Time Present	Remaining Time Supported

Table 4.11: Indoor Bike Data Notifications – Supported Fields test cases

- Test Procedure

1. Perform an action on the IUT that will induce it, once connected, to send an indoor bike-related Data Record, which consists of one or more notifications of the Indoor Bike Data characteristic. The Data Record contains the Included Fields specified in Table 4.11.
2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Indoor Bike Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record with the Included Fields specified in Table 4.11.
7. The Lower Tester configures the Indoor Bike Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Indoor Bike Data characteristic.

  The Data Records contain at least the Flags field, and the Included Fields are present when the specified Flags Bits are set to 1.

  The values for the specified Included Fields meet the requirements of the service.

  The specified Fitness Machine Features Bit of the Fitness Machine Features field of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/CN/BV-65-C [Indoor Bike Data Notifications – Elapsed Time]

- Test Purpose

  Verify that the IUT can send notifications of the Indoor Bike Data characteristic that include the Elapsed Time value. Additionally, verify that when link loss occurs while the server sends a Data Record, the Data Record is discarded and not sent to the Client if the connection is reestablished.

- Reference

  [4] 4.9.1.15, 4.18

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Indoor Bike Data characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Indoor Bike Data characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send indoor bike-related Data Record, which consists of one or more notifications of the Indoor Bike Data characteristic along with the Elapsed Time field (e.g., start a training session).
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).

4. The Lower Tester receives a Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Indoor Bike Data characteristic handle and value.
5. Verify that the characteristic value meets the requirements of the service.
6. Repeat steps 4–5 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
7. The Lower Tester terminates the link between the IUT and the Lower Tester.
8. After 10 seconds, reestablish the connection between the Lower Tester and IUT meeting the security requirements of the IUT.
9. The Indoor Bike Data characteristic is re-configured for notification if the IUT does not support bonding.
10. The Lower Tester receives Data Record, which consists of one or more ATT_Handle_Value_Notification from the IUT containing the Indoor Bike Data characteristic handle and value.
11. Verify that the characteristic value meets the requirements of the service.
12. Repeat steps 10–11 until the Lower Tester receives a Data Record, which includes the Elapsed Time field.
13. The Lower Tester configures the Indoor Bike Data characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Indoor Bike Data characteristic.

  The Data Records contain at least the Flags field, and the Elapsed Time value is included when the Elapsed Time Present bit of the Flags field is set to 1.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Elapsed Time Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

  After step 9, the IUT sends one or more Data Records where each Data Record consists of one or more notifications of the Indoor Bike Data characteristic until the Elapsed Time field is present. The Elapsed Time value received in step 10 is at least 9 seconds later than the Elapsed Time value received in step 4.

4.7 Training Status Notifications

Verify that characteristic value notifications of the Training Status characteristic required by the service are compliant.

FTMS/SR/TSN/BV-01-C [Training Status Notifications]

- Test Purpose

  Verify that the IUT can send notifications Training Status characteristic that includes the mandatory fields (i.e., Flags and Training Status fields) when complete Data Record is received.

- Reference

  [4] 4.10.1.1, 4.10.1.2

- Initial Condition
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Training Status characteristic is configured for notification.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Training Status characteristic require a specific security mode or security level, establish a connection meeting those requirements.
- Test Procedure
  1. Perform an action on the IUT that will induce it, once connected, to send Training Status characteristic along with the Flags field and Training Status field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester receives one ATT_Handle_Value_Notification from the IUT containing the Training Status characteristic handle and value along with the Flags field and Training Status field.
  4. Verify that the characteristic value meets the requirements of the service.
  5. Repeat steps 1–2 with notifications disabled.
  6. Verify that the Lower Tester does not receive an ATT_Handle_Value_Notification from the IUT containing the Training Status characteristic.
- Expected Outcome

  Pass verdict

  The IUT sends one notification of the Training Status characteristic along with the Flags field and Training Status field.

  The Training Status characteristic contains at least the Flags field and Training Status field.

  The value of each field of the characteristic meets the requirements of the service.

  The IUT stops sending notifications of the Training Status characteristic after the Lower Tester configures the characteristic to disable notifications.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/TSN/BV-02-C [Training Status Notifications – Training Status String]

- Test Purpose

  Verify that the IUT can send notifications of the Training Status characteristic that include the Training Status String value when complete Data Record is received.

- Reference

  [4] 4.10.1.3

- Initial Condition
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Training Status characteristic is configured for notification.

- Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
- If IUT permissions for the Training Status characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send Training Status String characteristic along with the Training Status String field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester receives one ATT_Handle_Value_Notification from the IUT containing the Training Status characteristic handle and value along with the Training Status String field.
  4. Verify that the characteristic value meets the requirements of the service.
  5. The Lower Tester configures the Training Status characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one notification of the Training Status characteristic, which includes the Training Status String value with the appropriate flag set in the Flags field.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Training Status String Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

FTMS/SR/TSN/BV-03-C [Training Status Notifications – Training Status Extended String]

- Test Purpose

  Verify that the IUT can send notifications of the Training Status characteristic when the characteristic exceeds the current MTU size due to a large Training Status String value.

- Reference

  [4] 4.10.1.3

- Initial Condition

  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - The Training Status characteristic is configured for notification.
  - The Training Status characteristic size exceeds the current MTU size. The IXIT specifies a value of the Training Status String field that exceeds the negotiated MTU size minus 5 octets.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the Training Status characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Procedure

  1. Perform an action on the IUT that will induce it, once connected, to send Training Status String characteristic along with the Training Status String field.
  2. A connection is established between the Lower Tester and IUT meeting the security requirements of the IUT, if not already done so prior to step 1.
  3. The Lower Tester receives one ATT_Handle_Value_Notification from the IUT containing the Training Status characteristic handle and value. In the Flags field of the characteristic, the Training Status String present bit is set to 1, the Extended String present bit is set to 1, and the Training Status String field is present.
  4. Read the characteristic value by executing the GATT Read Long Characteristic Values sub-procedure.
  5. Verify that the characteristic value meets the requirements of the service.
  6. The Lower Tester configures the Training Status characteristic to disable notifications.

- Expected Outcome

  Pass verdict

  The IUT sends one notification of the Training Status characteristic, which includes the Training Status String value with the Training Status String present and Extended String present flags set in the Flags field.

  The value of each field of the characteristic meets the requirements of the service.

  The value of the Training Status String Supported bit of the Fitness Machine Feature characteristic is set to 1.

  In all cases, ensure that the RFU bits of the Flags field are set to zero.

4.8 Fitness Machine Status Notifications

- Test Purpose

  Verify that characteristic value notifications of the Fitness Machine Status characteristic required by the service are compliant. The verification is done for each supported characteristic value notification, as enumerated in the test cases in Table 4.12, using this generic test procedure.

- Reference

  [4] 4.17

- Initial Condition

  - The handle of each characteristic value referenced in the test cases below has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.

- Test Case Configuration

Test Case	Op Code (Requirements)	Parameter
FTMS/SR/FMSN/BV-01-C [Fitness Machine Status Notifications - Reset]	Reset (0x01)	N/A
FTMS/SR/FMSN/BV-02-C [Fitness Machine Status Notifications – Fitness Machine Stopped by the User]	Fitness Machine Stopped by the User (0x02)	0x01
FTMS/SR/FMSN/BV-03-C [Fitness Machine Status Notifications – Fitness Machine Paused by the User]	Fitness Machine Paused by the User (0x02)	0x02
FTMS/SR/FMSN/BV-04-C [Fitness Machine Status Notifications – Fitness Machine Stopped by the Safety Key]	Fitness Machine Stopped by Safety Key (0x03)	N/A
FTMS/SR/FMSN/BV-05-C [Fitness Machine Status Notifications – Fitness Machine Started or Resumed by the User]	Fitness Machine Started or Resumed by the User (0x04)	N/A
FTMS/SR/FMSN/BV-06-C [Fitness Machine Status Notifications – Target Speed Changed]	Target Speed Changed (0x05)	New Target Value (UINT16 in kilometer per hour with a resolution 0.01 km/h) e.g., 50 km/h
FTMS/SR/FMSN/BV-07-C [Fitness Machine Status Notifications – Target Incline Changed]	Target Incline Changed (0x06)	New Target Value (SINT16 in % with a resolution of 0.1 %) e.g., +1.0 %
FTMS/SR/FMSN/BV-08-C [Fitness Machine Status Notifications – Target Resistance Level Changed – UINT8]	Target Resistance Level Changed (0x07)	New Target Value (UINT8, unitless with a resolution of 0.1) e.g., 5.0
FTMS/SR/FMSN/BV-25-C [Fitness Machine Status Notifications – Target Resistance Level Changed – SINT16]	Target Resistance Level Changed (0x07)	New Target Value (SINT16, unitless with a resolution of 0.1) e.g., 5.0
FTMS/SR/FMSN/BV-09-C [Fitness Machine Status Notifications – Target Power Changed]	Target Power Changed (0x08)	New Target Power (SINT16, in Watt with a resolution of 1) e.g., +100W
FTMS/SR/FMSN/BV-10-C [Fitness Machine Status Notifications – Target Heart Rate Changed]	Target Heart Rate Changed (0x09)	New Target Heart Rate (UINT8, in BPM with a resolution of 1) e.g., 135 bpm
FTMS/SR/FMSN/BV-11-C [Fitness Machine Status Notifications – Targeted Expended Energy Changed]	Targeted Expended Energy Changed (0x0A)	New Targeted Expended Energy (UINT16, in Calories with a resolution of 1) e.g., 500 calories
FTMS/SR/FMSN/BV-12-C [Fitness Machine Status Notifications – Targeted Number of Steps Changed]	Targeted Number of Steps Changed (0x0B)	New Targeted Number of Steps Value (UINT16, in Steps with a resolution of 1) e.g., 2000 steps
FTMS/SR/FMSN/BV-13-C [Fitness Machine Status Notifications – Targeted Number of Strides Changed]	Targeted Number of Strides Changed (0x0C)	New Targeted Number of Strides (UINT16, in Stride with a resolution of 1) e.g., 2000 strides

Test Case	Op Code (Requirements)	Parameter
FTMS/SR/FMSN/BV-14-C [Fitness Machine Status Notifications – Targeted Distance Changed]	Targeted Distance Changed (0x0D)	New Targeted Distance (UINT24, in Meters with a resolution of 1) e.g., 5000 m
FTMS/SR/FMSN/BV-15-C [Fitness Machine Status Notifications – Targeted Training Time Changed]	Targeted Training Time Changed (0x0E)	New Targeted Training Time (UINT16, in Seconds with a resolution of 1) e.g., 3600 s
FTMS/SR/FMSN/BV-16-C [Fitness Machine Status Notifications – Targeted Training Time in Two Heart Rate Zones Changed]	Targeted Time In Two Heart Rate Zones Changed (0x0F)	New Targeted Time Array with Targeted Time in Fat Burn Zone and Targeted Time in Fitness Zone (both UINT16, in Seconds) e.g., Targeted Time in Fat Burn Zone: 1800 s Targeted Time in Fitness Zone: 1800 s
FTMS/SR/FMSN/BV-17-C [Fitness Machine Status Notifications – Targeted Training Time in Three Heart Rate Zones Changed]	Targeted Time In Three Heart Rate Zones Changed (0x10)	New Targeted Time Array with Targeted Time in Light Zone and Targeted Time in Moderate Zone and Targeted time in Hard Zone (all UINT16, in Seconds) e.g., Targeted Time in Light Zone: 500 s Targeted Time in Moderate Zone: 600 s Targeted Time in Hard Zone: 1800 s
FTMS/SR/FMSN/BV-18-C [Fitness Machine Status Notifications – Targeted Training Time in Five Heart Rate Zones Changed]	Targeted Time In Five Heart Rate Zones Changed (0x011)	New Targeted Time Array with Targeted Time in Very Light Zone, Targeted Time in Light Zone, Targeted Time in Moderate Zone, Targeted Time in Hard Zone, and Targeted Time in Maximum Zone (all UINT16, in Seconds) e.g., Targeted Time in Very Light Zone: 600 s, Targeted Time in Light Zone: 1200 s, Targeted Time in Moderate Zone: 1200 s, Targeted Time in Hard Zone: 600 s, Targeted Time in Maximum Zone: 300 s

Test Case	Op Code (Requirements)	Parameter
FTMS/SR/FMSN/BV-19-C [Fitness Machine Status Notifications – Indoor Bike Simulation Parameters Changed]	Indoor Bike Simulation Parameters Changed (0x12)	New Indoor Bike Simulation Parameters with Wind Speed (SINT16 in Meters per Second with a resolution of 0.001) and Grade (SINT16 in Percentage with a resolution of 0.01) and Coefficient of Rolling Resistance (UINT8 unitless with a resolution of 0.0001) and Wind Resistance Coefficient in Kilogram per Meter with a resolution of 0.01) e.g., Simulation Parameter Array: Wind Speed: 10 mps Grade: 5%, Crr: 1, Cw: 1 kg/m
FTMS/SR/FMSN/BV-20-C [Fitness Machine Status Notifications – Wheel Circumference Changed]	Wheel Circumference Changed (0x13)	New Wheel Circumference (UINT16, in Millimeters with resolution of 0.1 Millimeter) e.g., 20.0 mm
FTMS/SR/FMSN/BV-21-C [Fitness Machine Status Notifications – Spin Down Status - Request]	Spin Down Status (0x14)	Any value from 0x01 to 0x04
FTMS/SR/FMSN/BV-22-C [Fitness Machine Status Notifications – Targeted Cadence Changed Status - Request]	Targeted Cadence Changed (0x15)	New Targeted Cadence (UINT16, in 1/minute with a resolution of 0.5) e.g., 100 1/minute (with a resolution of 0.5 1/minute)

Table 4.12: Fitness Machine Status Characteristic Notification test cases

- Test Procedure

  1. Perform an action on the IUT (e.g., via its UI or any other means) that will induce the sending of the Fitness Machine Status notification with the Op Code and Parameter specified in Table 4.12.
  2. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends a notification containing the expected Op Code and valid Parameter values. The Parameter value sent by the IUT is verified by the Lower Tester and confirmed by the user.

FTMS/SR/FMSN/BV-23-C [Fitness Machine Status Notifications – Control Permission Lost]

- Test Purpose

  Verify that the IUT sends a Fitness Machine Status notification with the value set to Control Permission Lost when the control permission is revoked by the IUT.

- Reference

  [4] 4.17

- Initial Condition
  - The handle of the characteristic value referenced in the test case has been previously discovered by the Lower Tester during the test procedure in Section 4.3 or is known to the Lower Tester by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - Lower Tester is acting as client.
- Test Procedure
  1. Lower Tester establishes control permission with the IUT by performing the Request Control Procedure with the IUT (e.g., by executing test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure]).
  2. While Lower Tester has control permission, the Upper Tester performs an action to revoke the control permission of the Lower Tester (e.g., by pressing a button on the UI of the IUT).
  3. Lower Tester receives a Fitness Machine Status notification from the IUT with the Op Code of 0xFF (“Control Permission Lost”) and no additional parameters.
  4. Verify that the characteristic value meets the requirements of the service.
- Expected Outcome

  Pass verdict

  The IUT sends a Fitness Machine Status notification with the Op Code of 0xFF after Lower Tester successfully performs the Request Control Procedure with the IUT.

FTMS/SR/FMSN/BV-24-C [Fitness Machine Status Notifications – Multiple Clients]

- Test Purpose

  Verify that the IUT sends a Fitness Machine Status notification to the other connected Clients with the appropriate value when a connected Client performs an action on the IUT.
- Reference

  [4] 4.17
- Initial Condition

  This Test Case requires two Lower Testers: Lower Tester 1 and Lower Tester 2.
  - The handle of the characteristic value referenced in the test case has been previously discovered by the Lower Testers during the test procedure in Section 4.3 or is known to the Lower Testers by other means.
  - If the IUT requires a bonding procedure, then perform a bonding procedure.
  - Establish an ATT Bearer connection between the Lower Testers and IUT as described in Section 4.2.1, if using an LE transport, or Section 4.2.2 if using a BR/EDR transport.
  - If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - Lower Testers are acting as client.

- Test Procedure

  1. Lower Tester 1 establishes a connection with the IUT and preforms the Request Control Procedure with the IUT (e.g., by executing test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure]).
  2. Lower Tester 1 reads the Fitness Machine Features characteristic (e.g., by executing the test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature]).
  3. Lower Tester 2 establishes a connection with the IUT and enables the notifications of the Fitness Machine Status characteristic.
  4. The Lower Tester 1 has control permission and performs one of the supported control procedure (e.g., if the Targeted Distance Configuration feature is supported, then the Set Targeted Distance procedure should be used).
  5. Lower Tester 2 receives a Fitness Machine Status notification from the IUT with the appropriate Op Code and parameter, if any.
  6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends a Fitness Machine Status notification with the expected Op Code to Lower Tester 2 (e.g., Targeted Speed Changed with the expected New Target Value).

4.9 Characteristic Write

Verify compliant operation when the Lower Tester uses Fitness Machine Control Point to set operations.

FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure]

- Test Purpose

  Verify that the IUT can accept a Fitness Machine Control Point write characteristic with Request Control Procedure Op Code and will notify with the resulting Op Code.

- Reference

  [4] 4.16.2.1

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  3. The Lower Tester writes the Request Control Procedure Op Code (0x00) to the Fitness Machine Control Point with no additional parameters.
  4. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x00) followed by the Result Code for ‘Success’ (0x01) without Response Parameter.
  5. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  6. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  7. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value.

4.9.1 Fitness Machine Control Point Procedures

- Test Purpose

  Verify that the IUT can accept a Fitness Machine Control Point write characteristic with the specified Op Code and will notify with the resulting Op Code. This test procedure is to be repeated for all rows in Table 4.13.

- Reference

  See Table 4.13.

- Initial Condition

  - Perform the preamble described in Section 4.2.3.
  - For test cases that require a stopping or pausing procedure a connection is established by the Lower Tester and a training session is started.
  - For test cases that require a resuming procedure, a connection is established by the Lower Tester and a training session is started and paused.

- Test Case Configuration

Test Case	Reference	Op Code	Op Code Parameter Value	Target Setting Features Bit (bit number)
FTMS/SR/CW/BV-02-C [Fitness Machine Control Point – Reset Procedure]	[4] 4.16.2.2	0x01	N/A	N/A
FTMS/SR/CW/BV-03-C [Fitness Machine Control Point – Set Target Speed Procedure]	[4] 4.16.2.3	0x02	UINT16 value	Speed Target Setting Supported (0)
FTMS/SR/CW/BV-04-C [Fitness Machine Control Point – Set Target Inclination Procedure]	[4] 4.16.2.4	0x03	SINT16 value	Inclination Target Setting Supported (1)
FTMS/SR/CW/BV-05-C [Fitness Machine Control Point – Set Target Resistance Level Procedure]	[4] 4.16.2.5	0x04	SINT16 value	Resistance Target Setting Supported (2)
FTMS/SR/CW/BV-06-C [Fitness Machine Control Point – Set Target Power Procedure]	[4] 4.16.2.6	0x05	SINT16 value	Power Target Setting Supported (3)
FTMS/SR/CW/BV-07-C [Fitness Machine Control Point – Set Target Heart Rate Procedure]	[4] 4.16.2.7	0x06	UINT8 value	Heart Rate Target Setting Supported (4)

Test Case	Reference	Op Code	Op Code Parameter Value	Target Setting Features Bit (bit number)
FTMS/SR/CW/BV-08-C [Fitness Machine Control Point – Start or Resume Procedure]	[4] 4.16.2.8	0x07	N/A	N/A
FTMS/SR/CW/BV-09-C [Fitness Machine Control Point – Stop Procedure]	[4] 4.16.2.9	0x08	0x01	N/A
FTMS/SR/CW/BV-10-C [Fitness Machine Control Point – Pause Procedure]	[4] 4.16.2.9	0x08	0x02	N/A
FTMS/SR/CW/BV-11-C [Fitness Machine Control Point – Set Targeted Expended Energy Procedure]	[4] 4.16.2.10	0x09	UINT16	Targeted Expended Energy Configuration Supported (5)
FTMS/SR/CW/BV-12-C [Fitness Machine Control Point – Set Targeted Number of Steps Procedure]	[4] 4.16.2.11	0x0A	UINT16 value	Targeted Step Number Configuration Supported (6)
FTMS/SR/CW/BV-13-C [Fitness Machine Control Point – Set Targeted Number of Strides Procedure]	[4] 4.16.2.12	0X0B	UINT16 value	Targeted Stride Number Configuration Supported (7)
FTMS/SR/CW/BV-14-C [Fitness Machine Control Point – Set Targeted Distance Procedure]	[4] 4.16.2.13	0x0C	UINT24 value	Targeted Distance Configuration Supported (8)
FTMS/SR/CW/BV-15-C [Fitness Machine Control Point – Set Targeted Training Time Procedure]	[4] 4.16.2.14	0x0D	UINT16 value	Targeted Training Time Configuration Supported (9)
FTMS/SR/CW/BV-16-C [Fitness Machine Control Point – Set Targeted Time in Two Heart Rate Zones Procedure]	[4] 4.16.2.15	0x0E	Targeted Time Array (as described in [4] 4.16.2.15)	Targeted Time In Two Heart Rate Zones Configuration Supported (10)
FTMS/SR/CW/BV-17-C [Fitness Machine Control Point – Set Targeted Time in Three Heart Rate Zones Procedure]	[4] 4.16.2.16	0x0F	Targeted Time Array (as described in [4] 4.16.2.16)	Targeted Time In Three Heart Rate Zones Configuration Supported (11)
FTMS/SR/CW/BV-18-C [Fitness Machine Control Point – Set Targeted Time in Five Heart Rate Zones Procedure]	[4] 4.16.2.17	0x10	Targeted Time Array (as described in [4] 4.16.2.17)	Targeted Time In Five Heart Rate Zones Configuration Supported (12)
FTMS/SR/CW/BV-19-C [Fitness Machine Control Point – Set Indoor Bike Simulation Parameters Procedure]	[4] 4.16.2.18	0x11	Simulation Parameter Array (as described in [4] 4.16.2.18)	Indoor Bike Simulation Parameters Supported (13)

Test Case	Reference	Op Code	Op Code Parameter Value	Target Setting Features Bit (bit number)
FTMS/SR/CW/BV-20-C [Fitness Machine Control Point – Set Wheel Circumference Procedure]	[4] 4.16.2.19	0x12	UINT16 value	Wheel Circumference Configuration Supported (14)
FTMS/SR/CW/BV-21-C [Fitness Machine Control Point – Spin Down Control Procedure]	[4] 4.16.2.20	0x13	0x01 or 0x02	Spin Down Control Supported (15)
FTMS/SR/CW/BV-22-C [Fitness Machine Control Point – Set Targeted Cadence]	[4] 4.16.2.21	0x14	UINT16 value	Targeted Cadence Configuration Supported (16)

Table 4.13: Fitness Machine Control Point Procedures test cases

- Test Procedure

  1. A connection is established or has already been established between the Lower Tester and IUT.
  2. The Lower Tester reads the Fitness Machine Feature characteristic (e.g., by executing test case FTMS/SR/CR/BV-01-C [Characteristic Read – Fitness Machine Feature] or by other means).
  3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
  4. The Lower Tester writes the Op Code specified in the Op Code column from Table 4.13 to the Fitness Machine Control Point with additional parameter values of the type specified by the Op Code Parameter Value column.
  5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code equal to the value of the Op Code sent in step 3 followed by the Result Code for ‘Success’ (0x01) without Response Parameter.
  6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  8. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 2.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the procedure executed in step 4.

  The specified Target Setting Features Bit of the Target Setting Features field of the Fitness Machine Feature characteristic is set to 1.

4.10 Service Procedure – Error Handling

Verify compliant operation in response to characteristic writes that are expected to generate error conditions.

FTMS/SR/SPE/BV-01-C [Fitness Machine Control Point – Invalid Start or Resume Procedure]

- Test Purpose

  Verify that the IUT will respond with an “Operation Failed” Result Code when receiving a Start or Resume Op Code after correctly responding to a previously received Start or Resume Op Code.

- Reference

  [4] 4.16.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
  3. The Lower Tester writes the Start or Resume Op Code (0x07) to the Fitness Machine Control Point with no additional parameters.
  4. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x07) followed by the Result Code for ‘Success’ (0x01) without any following Response Parameters.
  5. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  6. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  7. The Lower Test writes the Start or Resume Op Code (0x07) to the Fitness Machine Control Point with no additional Parameters.
  8. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x07) followed by the Result Code for ‘Operation Failed’ (0x04) without any following Response Parameters.
  9. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  10. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  11. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 3.

  The IUT sends two indications of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value for steps 5 and 9.

  The second indication contains the Result Code for “Operation Failed” (0x04).

FTMS/SR/SPE/BV-02-C [Fitness Machine Control Point – Invalid Stop or Pause Procedure]

- Test Purpose

  Verify that the IUT will respond with an “Operation Failed” Result Code when receiving a Stop or Pause Op Code after correctly responding to a previously received Stop or Pause Op Code.

- Reference

  [4] 4.16.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
  3. The Lower Tester writes the Start or Resume Op Code (0x07) to the Fitness Machine Control Point.
  4. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x07) followed by the Result Code for ‘Success’ (0x01) without any following Response Parameters.
  5. The Lower Tester writes the Stop or Pause Op Code (0x08) to the Fitness Machine Control Point with a Control Information Parameter value of 0x01 (“Stop”).
  6. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x08) followed by the Result Code for ‘Success’ (0x01) without any following Response Parameters.
  7. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  8. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  9. The Lower Test writes the Stop or Pause Op Code (0x08) to the Fitness Machine Control Point with a Control Information Parameter value of 0x01 (“Stop”).
  10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x08) followed by the Result Code for ‘Operation Failed’ (0x04) without any following Response Parameters.
  11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 3.

  The IUT sends three indications of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value for steps 5 and 9.

  The second indication received in step 12 contains the Result Code for ‘Operation Failed’ (0x04).

FTMS/SR/SPE/BV-03-C [Fitness Machine Control Point – Unsupported Op Code]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester writes an unsupported Op Code of (0x81) to the Fitness Machine Control Point with no additional parameters.
  3. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x81) followed by the Result Code for ‘op code not supported’ (0x02) without any following Response Parameters.
  4. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  5. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value.

  The indication contains the Result Code for ‘Op Code Not Supported’ (0x02).

FTMS/SR/SPE/BV-04-C [Fitness Machine Control Point – Out of Range Parameter Set Target Speed Procedure]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester reads the Supported Speed Range characteristic (e.g., by executing test case FTMS/SR/CR/BV-03-C [Characteristic Read – Supported Speed Range] or by other means).
  3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].

4. The Lower Tester writes the Set Target Speed Procedure Op Code (0x02) to the Fitness Machine Control Point with a value that is greater than the Maximum Speed Field of the Supported Speed Range characteristic found in the previous step.
5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x02) followed by the Result Code for 'Invalid Parameter' (0x03) without any following Response Parameters.
6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
8. Verify that the characteristic value meets the requirements of the service.
9. The Lower Tester writes the Set Target Speed Procedure Op Code (0x02) to the Fitness Machine Control Point with a value that is larger than the Maximum Speed Field of the Supported Speed Range characteristic found in the previous step.
10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x02) followed by the Result Code for 'Invalid Parameter' (0x03) without any following Response Parameters.
11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  Steps 1–8:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 4.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Speed procedure executed in step 5.

  The indication contains the Result Code for 'Invalid Parameter' (0x03).

  Steps 9–13:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Speed procedure executed in step 10.

  The indication contains the Result Code for 'Invalid Parameter' (0x03).

FTMS/SR/SPE/BI-05-C [Fitness Machine Control Point – Out of Range Parameter Set Target Inclination Procedure]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.4, 4.16.2.22

- Initial Condition
  - Perform the preamble described in Section 4.2.3.
- Test Procedure

1. A connection is established between the Lower Tester and IUT.
2. The Lower Tester reads the Supported Inclination Range characteristic (e.g. by executing test case FTMS/SR/CR/BV-04-C [Characteristic Read – Supported Inclination Range] or by other means).
3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
4. Alternative 1:
   - The Lower Tester writes the Set Target Inclination Procedure Op Code (0x03) to the Fitness Machine Control Point with a value that is smaller than the Minimum Inclination Field value of the Supported Inclination Range characteristic found in step 2.

   Alternative 2:
   - If the IUT supports the minimum value defined of the range, the Lower Tester writes the Set Target Inclination Procedure Op Code (0x03) to the Fitness Machine Control Point with the Minimum Inclination Field value of the Supported Inclination Range characteristic.
5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x03) followed by the correct Result Code.

   Alternative 1:
   - If the IUT does not support the minimum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

   Alternative 2:
   - If the IUT does support the minimum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.
6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
8. Verify that the characteristic value meets the requirements of the service.
9. Alternative 3:
   - The Lower Tester writes the Set Target Inclination Procedure Op Code (0x03) to the Fitness Machine Control Point with a value that is larger than the Maximum Inclination Field value of the Supported Inclination Range characteristic found in step 2.

   Alternative 4:
   - If the IUT supports the maximum value defined of the range, the Lower Tester writes the Set Target Inclination Procedure Op Code (0x03) to the Fitness Machine Control Point with the Maximum Inclination Field value of the Supported Inclination Range characteristic.

10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x03) followed by the correct Result Code.

    Alternative 3:

    - If the IUT does not support the maximum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

    Alternative 4:

    - If the IUT does support the maximum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.

11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  Steps 1–8:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 4.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Inclination procedure executed in step 5.

  Alternative 1: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 2: The indication contains the Result Code for ‘Success’ (0x01).

  Steps 9–13:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Inclination procedure executed in step 10.

  Alternative 3: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 4: The indication contains the Result Code for ‘Success’ (0x01).

FTMS/SR/SPE/BI-06-C [Fitness Machine Control Point – Out of Range Parameter Set Target Resistance Level Procedure]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.5, 4.16.2.22

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

1. A connection is established between the Lower Tester and IUT.
2. The Lower Tester reads the Supported Resistance Level Range characteristic (e.g. by executing test case FTMS/SR/CR/BV-05-C [Characteristic Read – Supported Resistance Level Range] or by other means).
3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
4. Alternative 1:
   - The Lower Tester writes the Set Target Resistance Level Procedure Op Code (0x04) to the Fitness Machine Control Point with a value that is smaller than the Minimum Resistance Field value of the Supported Resistance Level Range characteristic found in step 2.

   Alternative 2:
   - If the IUT supports the minimum value defined of the range, the Lower Tester writes the Set Target Resistance Level Procedure Op Code (0x04) to the Fitness Machine Control Point with the Minimum Resistance Field value of the Supported Resistance Level Range characteristic.
5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x04) followed by the correct Result Code.

   Alternative 1:
   - If the IUT does not support the minimum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

   Alternative 2:
   - If the IUT does support the minimum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.
6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
8. Verify that the characteristic value meets the requirements of the service.
9. Alternative 3:
   - The Lower Tester writes the Set Target Resistance Level Procedure Op Code (0x04) to the Fitness Machine Control Point with a value that is larger than the Maximum Resistance Level Field value of the Supported Resistance Range characteristic found in step 2.

   Alternative 4:
   - If the IUT supports the maximum value defined of the range, the Lower Tester writes the Set Target Resistance Level Procedure Op Code (0x04) to the Fitness Machine Control Point with the Maximum Resistance Level Field value of the Supported Inclination Range characteristic.

10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x04) followed by the correct Result Code.

    Alternative 3:

    - If the IUT does not support the maximum value defined of the range the IUT sends the Result Code for 'Invalid Parameter' (0x03) without any following Response Parameters.

    Alternative 4:

    - If the IUT does support the maximum value defined of the range the IUT sends the Result Code for 'Success' (0x01) without any following Response Parameters.

11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  Steps 1–8:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 4.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Resistance Level procedure executed in step 5.

  Alternative 1: The indication contains the Result Code for 'Invalid Parameter' (0x03).

  Alternative 2: The indication contains the Result Code for 'Success' (0x01).

  Steps 9–13:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Resistance Level procedure executed in step 10.

  Alternative 3: The indication contains the Result Code for 'Invalid Parameter' (0x03).

  Alternative 4: The indication contains the Result Code for 'Success' (0x01).

FTMS/SR/SPE/BI-07-C [Fitness Machine Control Point – Out of Range Parameter Set Target Power Procedure]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.6, 4.16.2.22

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

1. A connection is established between the Lower Tester and IUT.
2. The Lower Tester reads the Supported Power Range characteristic (e.g. by executing test case FTMS/SR/CR/BV-06-C [Characteristic Read – Supported Power Range] or by other means).
3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].
4. Alternative 1:

   - The Lower Tester writes the Set Target Power Procedure Op Code (0x05) to the Fitness Machine Control Point with a value that is smaller than the Minimum Power Field value of the Supported Power Range characteristic found in step 2.

   Alternative 2:

   - If the IUT supports the minimum value defined of the range, the Lower Tester writes the Set Target Power Procedure Op Code (0x05) to the Fitness Machine Control Point with the Minimum Power Field value of the Supported Power Range characteristic.

5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x05) followed by the correct Result Code.

   Alternative 1:

   - If the IUT does not support the minimum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

   Alternative 2:

   - If the IUT does support the minimum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.

6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
8. Verify that the characteristic value meets the requirements of the service.
9. Alternative 3:

   - The Lower Tester writes the Set Target Power Procedure Op Code (0x05) to the Fitness Machine Control Point with a value that is larger than the Maximum Power Field value of the Supported Power Range characteristic found in step 2.

   Alternative 4:

   - If the IUT supports the maximum value defined of the range, the Lower Tester writes the Set Target Power Procedure Op Code (0x05) to the Fitness Machine Control Point with the Maximum Power Field value of the Supported Power Range characteristic.

10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x05) followed by the correct Result Code.

    Alternative 3:

    - If the IUT does not support the maximum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

    Alternative 4:

    - If the IUT does support the maximum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.

11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  Steps 1–8:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 4.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Power procedure executed in step 5.

  Alternative 1: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 2: The indication contains the Result Code for ‘Success’ (0x01).

  Steps 9–13:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Power procedure executed in step 10.

  Alternative 3: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 4: The indication contains the Result Code for ‘Success’ (0x01).

FTMS/SR/SPE/BI-08-C [Fitness Machine Control Point – Out of Range Parameter Set Target Heart Rate Procedure]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.7, 4.16.2.22

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester reads the Supported Heart Rate Range characteristic (e.g. by executing test case FTMS/SR/CR/BV-07-C [Characteristic Read – Supported Heart Rate Range] or by other means).
  3. The Lower Tester requests the control of the IUT by executing the test procedure of the test case FTMS/SR/CW/BV-01-C [Fitness Machine Control Point – Request Control Procedure].

4. Alternative 1:
   - The Lower Tester writes the Set Target Heart Rate Procedure Op Code (0x06) to the Fitness Machine Control Point with a value that is smaller than the Minimum Heart Rate Field value of the Supported Heart Rate Range characteristic found in step 2.

   Alternative 2:
   - If the IUT supports the minimum value defined of the range, the Lower Tester writes the Set Target Heart Rate Procedure Op Code (0x06) to the Fitness Machine Control Point with the Minimum Heart Rate Field value of the Supported Heart Rate Range characteristic.
5. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x06) followed by the correct Result Code.

   Alternative 1:
   - If the IUT does not support the minimum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

   Alternative 2:
   - If the IUT does support the minimum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.
6. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
7. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
8. Verify that the characteristic value meets the requirements of the service.
9. Alternative 3:
   - The Lower Tester writes the Set Target Heart Rate Procedure Op Code (0x06) to the Fitness Machine Control Point with a value that is larger than the Maximum Heart Rate Field value of the Supported Heart Rate Range characteristic found in step 2.

   Alternative 4:
   - If the IUT supports the maximum value defined of the range, the Lower Tester writes the Set Target Heart Rate Procedure Op Code (0x06) to the Fitness Machine Control Point with the Maximum Heart Rate Field value of the Supported Heart Rate Range characteristic.
10. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x06) followed by the correct Result Code.

    Alternative 3:
    - If the IUT does not support the maximum value defined of the range, the IUT sends the Result Code for ‘Invalid Parameter’ (0x03) without any following Response Parameters.

    Alternative 4:
    - If the IUT does support the maximum value defined of the range, the IUT sends the Result Code for ‘Success’ (0x01) without any following Response Parameters.
11. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
12. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
13. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  Steps 1–8:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Success in response to the Request Control procedure executed in step 4.

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Heart Rate procedure executed in step 5.

  Alternative 1: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 2: The indication contains the Result Code for ‘Success’ (0x01).

  Steps 9–13:

  The IUT sends one indication of the Fitness Machine Control Point characteristic with the Response Code Op Code containing a valid Parameter Value in response to the Set Target Heart Rate procedure executed in step 10.

  Alternative 3: The indication contains the Result Code for ‘Invalid Parameter’ (0x03).

  Alternative 4: The indication contains the Result Code for ‘Success’ (0x01).

FTMS/SR/SPE/BV-09-C [Fitness Machine Control Point – Control Not Permitted]

- Test Purpose

  Verify that the IUT will respond with the correct response Op Code.

- Reference

  [4] 4.16.2.21

- Initial Condition

  - Perform the preamble described in Section 4.2.3.

- Test Procedure

  1. A connection is established between the Lower Tester and IUT.
  2. The Lower Tester writes the Start or Resume Op Code (0x07) to the Fitness Machine Control Point with no additional parameters.
  3. The IUT sends an indication of the Fitness Machine Control Point characteristic with the Response Code Op Code (0x80), a Parameter Value representing Request Op Code (0x07) followed by the Result Code for ‘Control Not Permitted’ (0x05) without any following Response Parameters.
  4. The Lower Tester receives an ATT_Handle_Value_Indication from the IUT containing the Fitness Machine Control Point characteristic handle and value.
  5. The Lower Tester sends an ATT_Handle_Value_Confirmation to the IUT.
  6. Verify that the characteristic value meets the requirements of the service.

- Expected Outcome

  Pass verdict

  The IUT sends one indication of the Fitness Machine Control Point characteristic with a Result Code set to Control Not Permitted in response to the Start or Resume procedure executed in step 3.

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 Fitness Machine Service (FTMS) [5].

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)
FTMS 2/1 OR FTMS 2/2	Fitness Machine Service - Service Definition	FTMS/SR/SGGIT/SER/BV-01-C
FTMS 2/1	Fitness Machine Service – SDP Record	FTMS/SR/SGGIT/SDP/BV-01-C
FTMS 4/1	Fitness Machine Feature Characteristic	FTMS/SR/CR/BV-01-C
FTMS 4/1 AND NOT FTMS 4a/2	Fitness Machine Feature Characteristic	FTMS/SR/SGGIT/CHA/BV-01-C
FTMS 4a/2	Fitness Machine Feature Indication	FTMS/SR/SGGIT/CHA/BV-16-C FTMS/SR/SGGIT/ISFC/BV-01-C
FTMS 4/3 AND FTMS 4/40	Treadmill Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-01-C
FTMS 4/3	Treadmill Data Characteristic	FTMS/SR/SGGIT/CHA/BV-02-C FTMS/SR/CON/BV-01-C
FTMS 4/4 AND FTMS 4/40	Cross Trainer Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-13-C
FTMS 4/4	Cross Trainer Data Characteristic	FTMS/SR/SGGIT/CHA/BV-03-C FTMS/SR/CON/BV-02-C
FTMS 4/5 AND FTMS 4/40	Step Climber Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-27-C
FTMS 4/5	Step Climber Data Characteristic	FTMS/SR/SGGIT/CHA/BV-04-C FTMS/SR/CON/BV-03-C
FTMS 4/6 AND FTMS 4/40	Stair Climber Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-35-C
FTMS 4/6	Stair Climber Data Characteristic	FTMS/SR/SGGIT/CHA/BV-05-C FTMS/SR/CON/BV-04-C
FTMS 4/7 AND FTMS 4/40	Rower Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-44-C
FTMS 4/7	Rower Data Characteristic	FTMS/SR/SGGIT/CHA/BV-06-C FTMS/SR/CON/BV-05-C

Item	Feature	Test Case(s)
FTMS 4/8 AND FTMS 4/40	Indoor Bike Data Characteristic, Transmission of a Data Record	FTMS/SR/CN/BV-55-C
FTMS 4/8	Indoor Bike Data Characteristic	FTMS/SR/SGGIT/CHA/BV-07-C FTMS/SR/CON/BV-06-C
FTMS 4/9	Training Status	FTMS/SR/SGGIT/CHA/BV-08-C FTMS/SR/CR/BV-02-C FTMS/SR/CON/BV-07-C
FTMS 3/18 AND FTMS 4/2 AND FTMS 4/10	Supported Speed Range	FTMS/SR/SGGIT/CHA/BV-09-C FTMS/SR/CR/BV-03-C
FTMS 3/19 AND FTMS 4/2 AND FTMS 4/11	Supported Inclination Range	FTMS/SR/SGGIT/CHA/BV-10-C FTMS/SR/CR/BV-04-C
FTMS 3/20 AND FTMS 4/2 AND FTMS 4/12	Supported Resistance Level Range	FTMS/SR/SGGIT/CHA/BV-11-C FTMS/SR/CR/BV-05-C
FTMS 3/21 AND FTMS 4/2 AND FTMS 4/13	Supported Power Range	FTMS/SR/SGGIT/CHA/BV-12-C FTMS/SR/CR/BV-06-C
FTMS 3/22 AND FTMS 4/2 AND FTMS 4/14	Supported Heart Rate Range	FTMS/SR/SGGIT/CHA/BV-13-C FTMS/SR/CR/BV-07-C
FTMS 4/15	Fitness Machine Control Point	FTMS/SR/SGGIT/CHA/BV-14-C FTMS/SR/CON/BV-08-C
FTMS 4/16	Fitness Machine Status	FTMS/SR/SGGIT/CHA/BV-15-C FTMS/SR/CON/BV-09-C
FTMS 3/1 AND FTMS 5/1	Average Speed Supported, Treadmill Data - Average Speed	FTMS/SR/CN/BV-02-C
FTMS 3/3 AND FTMS 5/2	Total Distance Supported, Treadmill Data – Total Distance	FTMS/SR/CN/BV-03-C
FTMS 3/4 AND FTMS 5/3 AND FTMS 5/4	Inclination Supported, Treadmill Data – Inclination, Treadmill Data – Ramp Angle Setting	FTMS/SR/CN/BV-04-C
FTMS 3/5 AND FTMS 5/5	Elevation Gain Supported, Treadmill Data – Positive Elevation Gain and Negative Elevation Gain Pair	FTMS/SR/CN/BV-05-C
FTMS 3/6 AND FTMS 5/6 AND FTMS 5/7	Pace Supported, Treadmill Data – Instantaneous Pace, Average Pace	FTMS/SR/CN/BV-06-C
FTMS 3/10 AND FTMS 5/8 AND FTMS 5/9 AND FTMS 5/10	Expended Energy Supported, Treadmill Data – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-07-C
FTMS 3/11 AND FTMS 5/11	Heart Rate Measurement Supported, Treadmill Data – Heart Rate	FTMS/SR/CN/BV-08-C
FTMS 3/12 AND FTMS 5/12	Metabolic Equivalent Supported, Treadmill Data – Metabolic Equivalent	FTMS/SR/CN/BV-09-C

Item	Feature	Test Case(s)
FTMS 3/14 AND FTMS 5/14	Remaining Time Supported, Treadmill Data – Remaining Time	FTMS/SR/CN/BV-10-C
FTMS 3/16 AND FTMS 5/15 AND FTMS 5/16	Force on Belt and Power Output Supported, Treadmill Data – Force on Belt, Power Output	FTMS/SR/CN/BV-11-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 5/13	Elapsed Time Supported, Treadmill Data – Elapsed Time	FTMS/SR/CN/BV-12-C
FTMS 3/1 AND FTMS 6/1	Average Speed Supported, Cross Trainer Data - Average Speed	FTMS/SR/CN/BV-14-C
FTMS 3/3 AND FTMS 6/2	Total Distance Supported, Cross Trainer Data – Total Distance	FTMS/SR/CN/BV-15-C
FTMS 3/7 AND FTMS 6/3 AND FTMS 6/4	Step Count Supported, Cross Trainer Data – Step per Minute, Average Step Rate	FTMS/SR/CN/BV-16-C
FTMS 3/9 AND FTMS 6/5	Stride Count Supported, Cross Trainer Data – Stride Count	FTMS/SR/CN/BV-17-C
FTMS 3/5 AND FTMS 6/6	Elevation Gain Supported, Cross Trainer Data – Positive Elevation Gain and Negative Elevation Gain Pair	FTMS/SR/CN/BV-18-C
FTMS 3/4 AND FTMS 6/7 AND FTMS 6/8	Inclination Supported, Cross Trainer Data – Inclination, Ramp Angle Setting	FTMS/SR/CN/BV-19-C
FTMS 3/8 AND FTMS 6/9	Resistance Level Supported, Cross Trainer Data – Resistance Level	FTMS/SR/CN/BV-20-C
FTMS 3/15 AND FTMS 6/10 AND FTMS 6/11	Power Measurement Supported, Cross Trainer Data – Instantaneous Power, Average Power	FTMS/SR/CN/BV-21-C
FTMS 3/10 AND FTMS 6/12 AND FTMS 6/13 AND FTMS 6/14	Expended Energy Supported, Cross Trainer Data – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-22-C
FTMS 3/11 AND FTMS 6/15	Heart Rate Measurement Supported, Cross Trainer Data – Heart Rate	FTMS/SR/CN/BV-23-C
FTMS 3/12 AND FTMS 6/16	Metabolic Equivalent Supported, Cross Trainer Data – Metabolic Equivalent	FTMS/SR/CN/BV-24-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 6/17	Elapsed Time Supported, Cross Trainer Data – Elapsed Time	FTMS/SR/CN/BV-25-C
FTMS 3/14 AND FTMS 6/18	Remaining Time Supported, Cross Trainer Data – Remaining Time	FTMS/SR/CN/BV-26-C
FTMS 3/7 AND FTMS 7/1 AND FTMS 7/2	Step Count Supported, Step Climber Data – Step per Minute, Average Step Rate	FTMS/SR/CN/BV-28-C
FTMS 3/5 AND FTMS 7/3	Elevation Gain Supported, Step Climber Data – Positive Elevation Gain	FTMS/SR/CN/BV-29-C

Item	Feature	Test Case(s)
FTMS 3/10 AND FTMS 7/4 AND FTMS 7/5 AND FTMS 7/6	Step Climber Data – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-30-C
FTMS 3/11 AND FTMS 7/7	Heart Rate Measurement Supported, Step Climber Data – Heart Rate	FTMS/SR/CN/BV-31-C
FTMS 3/12 AND FTMS 7/8	Metabolic Equivalent Supported, Step Climber Data – Metabolic Equivalent	FTMS/SR/CN/BV-32-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 7/9	Elapsed Time Supported, Step Climber Data – Elapsed Time	FTMS/SR/CN/BV-33-C
FTMS 3/14 AND FTMS 7/10	Remaining Time Supported, Step Climber Data – Remaining Time	FTMS/SR/CN/BV-34-C
FTMS 3/7 AND FTMS 8/1 AND FTMS 8/2	Step Count Supported, Stair Climber Data – Step per Minute, Average Step Rate	FTMS/SR/CN/BV-36-C
FTMS 3/5 AND FTMS 8/3	Stair Climber Data – Positive Elevation Gain	FTMS/SR/CN/BV-37-C
FTMS 3/9 AND FTMS 8/4	Stride Count Supported, Stair Climber Data – Stride Count	FTMS/SR/CN/BV-38-C
FTMS 3/10 AND FTMS 8/5 AND FTMS 8/6 AND FTMS 8/7	Expended Energy Supported, Stair Climber Data – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-39-C
FTMS 3/11 AND FTMS 8/8	Heart Rate Measurement Supported, Stair Climber Data – Heart Rate	FTMS/SR/CN/BV-40-C
FTMS 3/12 AND FTMS 8/9	Metabolic Equivalent Supported, Stair Climber Data – Metabolic Equivalent	FTMS/SR/CN/BV-41-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 8/10	Elapsed Time Supported, Stair Climber Data – Elapsed Time	FTMS/SR/CN/BV-42-C
FTMS 3/14 AND FTMS 8/11	Remaining Time Supported, Stair Climber Data – Remaining Time	FTMS/SR/CN/BV-43-C
FTMS 3/2 AND FTMS 9/1	Cadence Supported, Rower Data – Average Stroke Rate	FTMS/SR/CN/BV-45-C
FTMS 3/3 AND FTMS 9/2	Total Distance Supported, Rower Data – Total Distance	FTMS/SR/CN/BV-46-C
FTMS 3/6 AND FTMS 9/3 AND FTMS 9/4	Pace Supported, Rower Data – Instantaneous Pace, Average Pace	FTMS/SR/CN/BV-47-C
FTMS 3/15 AND FTMS 9/5 AND FTMS 9/6	Power Measurement Supported, Rower Data – Instantaneous Power, Average Power	FTMS/SR/CN/BV-48-C
FTMS 3/8 AND FTMS 9/7	Resistance Level Supported, Rower Data – Resistance Level	FTMS/SR/CN/BV-49-C

Item	Feature	Test Case(s)
FTMS 3/10 AND FTMS 9/8 AND FTMS 9/9 AND FTMS 9/10	Expended Energy Supported, Rower Data – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-50-C
FTMS 3/11 AND FTMS 9/11	Heart Rate Measurement Supported, Rower Data – Heart Rate	FTMS/SR/CN/BV-51-C
FTMS 3/12 AND FTMS 9/12	Metabolic Equivalent Supported, Rower Data – Metabolic Equivalent	FTMS/SR/CN/BV-52-C
FTMS 3/14 AND FTMS 9/14	Remaining Time Supported, Rower Data – Remaining Time	FTMS/SR/CN/BV-53-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 9/13	Elapsed Time Supported, Rower Data – Elapsed Time	FTMS/SR/CN/BV-54-C
FTMS 3/1 AND FTMS 10/1	Average Speed Supported, Indoor Bike – Average Speed	FTMS/SR/CN/BV-56-C
FTMS 3/2 AND FTMS 10/2 AND FTMS 10/3	Cadence Supported, Indoor Bike – Instantaneous Cadence, Average Cadence	FTMS/SR/CN/BV-57-C
FTMS 3/3 AND FTMS 10/4	Total Distance Supported, Indoor Bike – Total Distance	FTMS/SR/CN/BV-58-C
FTMS 3/8 AND FTMS 10/5	Resistance Level Supported, Indoor Bike – Resistance Level	FTMS/SR/CN/BV-59-C
FTMS 3/15 AND FTMS 10/6 AND FTMS 10/7	Power Measurement Supported, Indoor Bike – Instantaneous Power, Average Power	FTMS/SR/CN/BV-60-C
FTMS 3/10 AND FTMS 10/8 AND FTMS 10/9 AND FTMS 10/10	Expended Energy Supported, Indoor Bike – Total Energy, Energy per Hour, Energy per Minute	FTMS/SR/CN/BV-61-C
FTMS 3/11 AND FTMS 10/11	Heart Rate Measurement Supported, Indoor Bike – Heart Rate	FTMS/SR/CN/BV-62-C
FTMS 3/12 AND FTMS 10/12	Metabolic Equivalent Supported, Indoor Bike – Metabolic Equivalent	FTMS/SR/CN/BV-63-C
FTMS 3/14 AND FTMS 10/14	Remaining Time Supported, Indoor Bike – Remaining Time	FTMS/SR/CN/BV-64-C
FTMS 3/13 AND FTMS 4/39 AND FTMS 10/13	Elapsed Time Supported, Indoor Bike – Elapsed Time	FTMS/SR/CN/BV-65-C
FTMS 4/9	Training Status	FTMS/SR/TSN/BV-01-C
FTMS 11/1	Training Status String	FTMS/SR/TSN/BV-02-C
FTMS 11/2	Training Status Extended String	FTMS/SR/TSN/BV-03-C
FTMS 4/17 AND FTMS 12/2	Fitness Machine Status Reset, Reset Procedure	FTMS/SR/FMSN/BV-01-C FTMS/SR/CW/BV-02-C
FTMS 4/18 AND FTMS 12/9	Fitness Machine Stopped by the User	FTMS/SR/FMSN/BV-02-C FTMS/SR/CW/BV-09-C

Item	Feature	Test Case(s)
FTMS 4/18 AND FTMS 12/10	Fitness Machine Paused by the User	FTMS/SR/FMSN/BV-03-C FTMS/SR/CW/BV-10-C
FTMS 4/19	Fitness Machine Stopped by Safety Key	FTMS/SR/FMSN/BV-04-C
FTMS 4/20 AND FTMS 12/8	Fitness Machine Started or Resumed by the User	FTMS/SR/FMSN/BV-05-C FTMS/SR/CW/BV-08-C
FTMS 3/18 AND FTMS 12/3	Speed Target Setting Supported, Set Target Speed	FTMS/SR/FMSN/BV-06-C FTMS/SR/CW/BV-03-C
FTMS 3/19 AND FTMS 12/4	Inclination Target Setting Supported, Set Target Inclination Procedure	FTMS/SR/FMSN/BV-07-C FTMS/SR/CW/BV-04-C
FTMS 3/20 AND FTMS 12/5	Resistance Target Setting Supported, Set Target Resistance Level	FTMS/SR/CW/BV-05-C
FTMS 3/20 AND FTMS 12/5 AND NOT FTMS 0b/1	Resistance Target Setting Supported, Set Target Resistance Level – UINT8	FTMS/SR/FMSN/BV-08-C
FTMS 3/20 AND FTMS 12/5 AND FTMS 0b/1	Resistance Target Setting Supported, Set Target Resistance Level – SINT16	FTMS/SR/FMSN/BV-25-C
FTMS 3/21 AND FTMS 12/6	Power Target Setting Supported, Set Target Power	FTMS/SR/FMSN/BV-09-C FTMS/SR/CW/BV-06-C
FTMS 3/22 AND FTMS 12/7	Heart Rate Target Setting Supported, Set Target Heart Rate	FTMS/SR/FMSN/BV-10-C FTMS/SR/CW/BV-07-C
FTMS 3/23 AND FTMS 4/26 AND FTMS 12/11	Targeted Expended Energy Configuration Supported, Set Targeted Expended Energy	FTMS/SR/FMSN/BV-11-C FTMS/SR/CW/BV-11-C
FTMS 3/24 AND FTMS 4/27 AND FTMS 12/12	Targeted Step Number Configuration Supported, Set Targeted Number of Steps	FTMS/SR/FMSN/BV-12-C FTMS/SR/CW/BV-12-C
FTMS 3/25 AND FTMS 4/28 AND FTMS 12/13	Targeted Stride Number Configuration Supported, Set Targeted Number of Strides	FTMS/SR/FMSN/BV-13-C FTMS/SR/CW/BV-13-C
FTMS 3/26 AND FTMS 4/29 AND FTMS 12/14	Targeted Distance Configuration Supported, Set Targeted Distance	FTMS/SR/FMSN/BV-14-C FTMS/SR/CW/BV-14-C
FTMS 3/27 AND FTMS 4/30 AND FTMS 12/15	Targeted Training Time Configuration Supported, Set Targeted Training Time	FTMS/SR/FMSN/BV-15-C FTMS/SR/CW/BV-15-C
FTMS 3/28 AND FTMS 4/31 AND FTMS 12/16	Targeted Time in Two Heart Rate Zones Configuration Supported, Set Targeted Time in Two Heart Rate Zones	FTMS/SR/FMSN/BV-16-C FTMS/SR/CW/BV-16-C
FTMS 3/29 AND FTMS 4/32 AND FTMS 12/17	Targeted Time in Three Heart Rate Zones Configuration Supported, Set Targeted Time in Three Heart Rate Zones	FTMS/SR/FMSN/BV-17-C FTMS/SR/CW/BV-17-C
FTMS 3/30 AND FTMS 4/33 AND FTMS 12/18	Targeted Time in Five Heart Rate Zones Configuration Supported, Set Targeted Time in Five Heart Rate Zones	FTMS/SR/FMSN/BV-18-C FTMS/SR/CW/BV-18-C

Item	Feature	Test Case(s)
FTMS 12/19 AND FTMS 4/34 AND FTMS 3/31	Indoor Bike Simulation Parameters Supported, Set Indoor Bike Simulation	FTMS/SR/FMSN/BV-19-C FTMS/SR/CW/BV-19-C
FTMS 12/20 AND FTMS 4/35 AND FTMS 3/32	Set Wheel Circumference, Wheel Circumference Configuration Supported	FTMS/SR/FMSN/BV-20-C FTMS/SR/CW/BV-20-C
FTMS 3/33 AND FTMS 4/36 AND FTMS 12/21	Spin Down Control Supported, Spin Down Control	FTMS/SR/FMSN/BV-21-C FTMS/SR/CW/BV-21-C
FTMS 3/34 AND FTMS 4/41 AND FTMS 12/22	Targeted Cadence Configuration Supported, Targeted Cadence	FTMS/SR/FMSN/BV-22-C FTMS/SR/CW/BV-22-C
FTMS 12/1 AND FTMS 4/37 AND FTMS 4/43	Request Control Procedure	FTMS/SR/FMSN/BV-23-C FTMS/SR/CW/BV-01-C
FTMS 4/42	FTM Status - Server Supports Connections to Multiple Clients	FTMS/SR/FMSN/BV-24-C
FTMS 12/8	Invalid Start or Resume Procedure	FTMS/SR/SPE/BV-01-C
FTMS 12/9 AND FTMS 12/10	Invalid Stop or Pause Procedure	FTMS/SR/SPE/BV-02-C
FTMS 4/15	Fitness Machine Control Point – Unsupported Op Code	FTMS/SR/SPE/BV-03-C
FTMS 4/21 AND FTMS 3/18	Out of Range Parameter Set Target Speed Procedure	FTMS/SR/SPE/BV-04-C
FTMS 4/22 AND FTMS 3/19	Out of Range Parameter Set Target Inclination Procedure	FTMS/SR/SPE/BI-05-C
FTMS 4/23 AND FTMS 3/20	Out of Range Parameter Set Target Resistance Level Procedure	FTMS/SR/SPE/BI-06-C
FTMS 4/24 AND FTMS 3/21	Out of Range Parameter Set Target Power Procedure	FTMS/SR/SPE/BI-07-C
FTMS 4/25 AND FTMS 3/22	Out of Range Parameter Set Target Heart Rate Procedure	FTMS/SR/SPE/BI-08-C
FTMS 4/15	Fitness Machine Control Point – Control Not Permitted	FTMS/SR/SPE/BV-09-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2017-02-17	Prepared for publication by Bluetooth SIG staff.
	1.0.1r00	2017-08-17	TSE 9488: For FTMS/SR/CW/BV-05-C, revise the Op Code Parameter Value in the Test Case Table.
1	1.0.1	2017-11-28	Approved by BTI. Prepared for TCRL 2017-2 publication.
	1.0.2r00	2018-05-10	TSE 10625 (rating 3): In the Fitness Machine Status Notifications section, added Test Purpose heading, revised Pass Verdict, and revised the parameter for test cases FTMS/SR/FMSN/BV-06-C to 20-C and 22-C in the pass verdict table. Removed test case applicable from the TCMT. Added 12/9 to FTMS 4/18 and removed paused as part of the feature for test cases FTMS/SR/FMSN/BV-02-C and FTMS/SR/CW/BV-09-C. Separated test cases FTMS/SR/FMSN/BV-03-C and FTMS/SR/CW/BV-10-C from FTMS/SR/FMSN/BV-02-C and FTMS/SR/CW/BV-09-C in its own row and added FTMS 4/18 AND FTMS 12/10. Added 12/8 to FTMS 4/20 for test cases FTMS/SR/FMSN/BV-05-C and FTMS/SR/CW/BV-08-C.
2	1.0.2	2018-06-27	Approved by BTI. Prepared for TCRL 2018-1 publication.
	1.0.3r00-r01	2018-10-02 - 2018-10-29	TSE 10623 (rating 3): Updated Initial Condition and Test Procedure for FTMS/SR/CW/BV-02-C - 22-C. TSE 10804 (rating 4): Updated FTMS/SR/SPE/BV-05-C – 08-C in spec body and TCMT: Changed test behavior from valid to invalid; updated References, Test Procedure, Pass verdict. Updated reference for test case FTMS/SR/SPE/BI-07-C.
3	1.0.3	2018-11-21	Approved by BTI. Prepared for TCRL 2018-2 publication.
	p4r00–r04	2022-03-18 – 2022-05-18	TSE 17262 (rating 2): Converted tests to GGIT: the new GGIT TCIDs are: FTMS/SR/SGGIT/SDP/BV-01-C, FTMS/SR/SGGIT/SER/BV-01-C, and FTMS/SR/SGGIT/CHA/BV-01-C – -15-C; the deleted TCIDs are FTMS/SR/SD/BV-01-C and -02-C, FTMS/SR/DEC/BV-01-C – -15-C, and FTMS/DES/BV-01-C – -09-C. Updated the “Test groups” section and added the GGIT material to the TCID conventions section. Updated the cross-references from the deleted Characteristic Declaration and Characteristic Descriptor sections to the new GATT Integrated Tests section globally. Updated the TCMT accordingly. TSE 18431 (rating 1): Removed direct references to GATT test cases in FTMS/SR/CR/BV-01-C – -07-C, FTMS/SR/CON/BV-01-C – -09-C, and FTMS/SR/TSN/BV-03-C and in the Preambles

Publication Number	Revision Number	Date	Comments
			sections for ATT Bearer on LE Transport and ATT Bearer on BR/EDR Transport. TSE 18719 (rating 1): Editorials to align the document with the latest TS template in anticipation of a future .Z release. Performed template-related formatting fixes. Assigned publication number 3 to previous v1.0.3 and aligned copyright page with v2 of the DNMD. Consistency checker editorials.
4	p4	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p5r00	2023-10-23	TSE 23234 (rating 2): Added one step to the test procedure for FTMS/SR/CN/BV-65-C. Performed other editorials to align the document with the latest TS template, including updates to the scope, references, Test Strategy, test case identification conventions, conformance, Pass/Fail verdict conventions, and TCMT introductory text. Deleted draft revision history comments prior to p0.
5	p5	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p6r00–05	2024-07-24 – 2024-10-08	TSE 16708 (rating 4): Per E16264, added new test group ISFC. Added new test cases FTMS/SR/SGGIT/CHA/BV-16-C and FTMS/SR/SGGIT/ISFC/BV-01-C, and updated the TCMT accordingly. Updated the TCMT for FTMS/SR/SGGIT/CHA/BV-01-C. Added a reference for FTMS Specification v1.0.1 and updated reference numbering. TSE 22632 (rating 4): Per E10194, added new test case FTMS/SR/FMSN/BV-25-C, updated test case FTMS/SR/FMSN/BV-08-C, and updated the TCMT accordingly.
6	p6	2024-10-08	Approved by BTI on 2024-09-11. FTMS v1.0.1 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.

Acknowledgments

Name	Company
Dejan Berec	Bluetooth SIG, Inc.
Jeff Drake	Bluetooth SIG, Inc.
Jim Harper	Bluetooth SIG, Inc.
Jawid Mirani	Bluetooth SIG, Inc.
Nathaniel Roby	Bluetooth SIG, Inc.
Josh Toole	Bluetooth SIG, Inc.
Guillaume Schatz	Polar