Coordinated Set Identification Service (CSIS)

***Bluetooth*® Test Suite**

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1 Scope

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

2 References, definitions, and abbreviations

2.1 References

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

[1] Bluetooth Core Specification, Version 4.2 or later

[2] Test Strategy and Terminology Overview

[3] Coordinated Set Identification Service Specification, Version 1.0

[4] ICS Proforma for Coordinated Set Identification Service (CSIS)

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

[6] GATT Test Suite, GATT.TS

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 Coordinated Set Identification Service [3] requires the presence of GAP, SM (when used over LE transport), SDP (when used over BR/EDR transport), L2CAP, and GATT. EATT can optionally be used. This is illustrated in Figure 3.1.

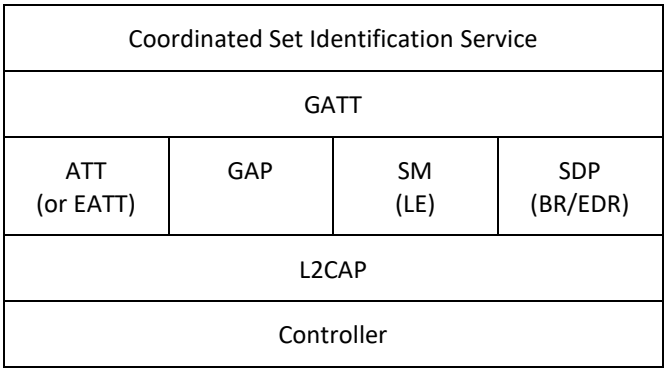

Figure 3.1: Coordinated Set Identification Service test model

3.2 Test Strategy

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

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

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

CSIS allows for an OOB Procedure to retrieve the SIRK without reading of the Set Identity Resolving Key characteristic. This OOB Procedure is not defined by the CSIS specification [3], so there are no qualification tests to validate its behavior.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Service Definition
- 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 GGIT test cases are referred to through a TCID string using the following convention:
<Spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
CSIS	Coordinated Set Identification Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SR	Server Role
Identifier Abbreviation	**Feature Identifier <feat>**
CN	Characteristic Notifications
SD	Service Definition
SGGIT	Server Generic GATT Integrated Tests
SP	Service Procedure
SPE	Service Procedure – Error handling
Identifier Abbreviation	**Function Identifier <func>**
CHA	Characteristic GGIT
SER	Service GGIT

Table 4.1: CSIS 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 used to achieve specific conditions on the IUT and the test equipment within the tests defined in this document. The preambles here are commonly used to establish initial conditions.

4.2.1 ATT Bearer on LE Transport

Preamble procedure:

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

4.2.2 ATT Bearer on BR/EDR Transport

Preamble procedure:

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

4.2.3 EATT Bearer on LE Transport

Preamble procedure:

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

4.2.4 EATT Bearer on BR/EDR Transport

Preamble procedure:

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

4.3 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)
CSIS/SR/SGGIT/SER/BV-01-C [Service GGIT – Coordinated Set Identification]	Coordinated Set Identification Service	[3] 2	-	-
CSIS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Set Identity Resolving Key]	Set Identity Resolving Key Characteristic	[3] 4.1	0x02 (Read)	skip
CSIS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Set Identity Resolving Key, Notify]	Set Identity Resolving Key Characteristic	[3] 4.1	0x12 (Read, Notify)	skip
CSIS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Coordinated Set Size]	Coordinated Set Size Characteristic	[3] 4.2	0x02 (Read)	1
CSIS/SR/SGGIT/CHA/BV-06-C [Characteristic GGIT – Coordinated Set Size, Notify]	Coordinated Set Size Characteristic	[3] 4.2	0x12 (Read, Notify)	1
CSIS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Set Member Lock]	Set Member Lock Characteristic	[3] 4.3	0x1A (Read, Write, Notify)	skip
CSIS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Set Member Rank]	Set Member Rank Characteristic	[3] 4.4	0x02 (Read)	1
CSIS/SR/SGGIT/SDP/BV-01-C [SDP Record]	Coordinated Set Identification Service	[3] 5	-	-

Table 4.2: Input for the GGIT Server test procedure

4.4 Service Procedures

Test group to verify service procedures.

CSIS/SR/SP/BV-01-C [Lock Request]

- Test Purpose

  Verify that a CSIS Server IUT will respond to acquiring the Coordinated Set Lock.

- Reference

  [3] 4.3.1.1

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - The Set Member Lock characteristic value is set to Unlocked (0x01).

- Test Procedure

  1. The Lower Tester enables notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  4. The Lower Tester receives a Write Response.
  5. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Unlocked (0x01) from Step 2.

  The Set Member Lock characteristic value is Locked (0x02) from Step 5.

  The IUT does not send a notification of the Set Member Lock characteristic to the Lower Tester.

CSIS/SR/SP/BV-02-C [Lock Release]

- Test Purpose

  Verify that a CSIS Server IUT will respond to releasing the Coordinated Set Lock.

- Reference

  [3] 4.3.1.2

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.

- Test Procedure

  1. The Lower Tester enables notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.
  2. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  3. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  4. The Lower Tester receives a Write Response.
  5. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  6. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Unlocked (0x01).
  7. The Lower Tester receives a Write Response.
  8. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Unlocked (0x01) from Steps 2 and 8.

  The IUT does not send a notification of the Set Member Lock characteristic to the Lower Tester after Step 3 or 6.

  The Set Member Lock characteristic value is Locked (0x02) from Step 5.

CSIS/SR/SP/BV-03-C [Lock Timeout]

- Test Purpose

  Verify that a CSIS Server IUT will time out after acquiring the Coordinated Set Lock.

- Reference

  [3] 4.3.1.2

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  3. The Lower Tester receives a Write Response.
  4. The Lower Tester terminates the link.
  5. A connection is established between the Lower Tester and the IUT.
  6. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  7. The Lower Tester waits for half of TSPX_Lock_Timeout IXIT entry seconds.
  8. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  9. The Lower Tester receives an Error Response of Lock Already Granted.
  10. The Lower Tester terminates the link.
  11. The Lower Tester waits for half of TSPX_Lock_Timeout IXIT entry seconds.
  12. A connection is established between the Lower Tester and the IUT.
  13. If bonded, the Lower Tester receives a GATT Characteristic Value Notification for the Set Member Lock characteristic.
  14. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Unlocked (0x01) from Step 1.

  The Set Member Lock characteristic value is Locked (0x02) from Step 6.

The IUT sends a Lock Already Granted error response in Step 9.

If bonded, the IUT sends a notification of the Set Member Lock characteristic with the value set to 0x01 in Step 13.

The Set Member Lock characteristic value is Unlocked (0x01) from Step 14.

CSIS/SR/SP/BV-04-C [Not Bonded Lock Release]

- Test Purpose

  Verify that a CSIS Server IUT will release the Coordinated Set Lock upon disconnect.

- Reference

  [3] 4.3.1.1

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - The IUT does not bond with the Lower Tester.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  3. The Lower Tester receives a Write Response.
  4. The Lower Tester terminates the link.
  5. A connection is established between the Lower Tester and the IUT.
  6. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Unlocked (0x01) in Steps 1 and 6.

4.4.1 Request SIRK

- Test Purpose

  Verify that the IUT responds with a Plaintext or Encrypted SIRK when reading the SIRK characteristic.

- Reference

  [3] 5.1

- Initial Condition
  - The handle of the SIRK 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.
  - The IUT exposes a SIRK as specified in the Initial Condition field in Table 4.3.
- Test Case Configuration

TCID	Initial Condition	Type	Transport
CSIS/SR/SP/BV-05-C [Request Plaintext SIRK]	Plain Text SIRK	0x01 (Plain Text)	BR/EDR or LE
CSIS/SR/SP/BV-06-C [Request Encrypted SIRK, BR/EDR]	Encrypted SIRK	0x00 (Encrypted)	BR/EDR
CSIS/SR/SP/BV-08-C [Request Encrypted SIRK, LE]	Encrypted SIRK	0x00 (Encrypted)	LE

Table 4.3: Input Table for Request SIRK test cases

- Test Procedure
  1. Establish a Bearer connection over the Transport specified in Table 4.3 between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  2. If the IUT requires a bonding procedure, then perform a bonding procedure.
  3. If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  4. The Lower Tester discovers the CSI service, characteristics, and descriptors on the IUT.
  5. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the SIRK characteristic.
  6. The Lower Tester decodes the SIRK characteristic value.
- Expected Outcome

  Pass verdict

  The IUT sends a Read Response where the Type field is equal to Type as specified in Table 4.3 and 16 Uint8 in the Value field in Step 5.

CSIS/SR/SP/BV-07-C [OOB Only]

- Test Purpose

  Verify that the IUT responds with an OOB SIRK Only when reading the SIRK characteristic.
- Reference

  [3] 5.1

- Initial Condition
  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the SIRK 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.
  - The IUT exposes a SIRK via an OOB Procedure only.
- Test Procedure
  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the SIRK characteristic.
  2. The IUT sends an Error Response.
- Expected Outcome

  Pass verdict

  The IUT sends an Error Response with an “OOB SIRK Only” value in Step 2.

4.4.2 Characteristic Notifications – Connected Client

- Test Purpose

  This test group verifies the behavior of the CSIS Server IUT when it updates its characteristics while a Client is connected.
- Reference

  [3] 5.1, 5.2
- Initial Condition
  - A bearer connection is established between the Lower Tester and IUT as described in Section 4.2.1 if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE Transport, or 4.2.4 if using EATT over a BR/EDR Transport.
  - The Lower Tester has cached the CSIS service and characteristics handles (e.g., by running the procedures in Section 4.3).
  - The Lower Tester enables notification for the characteristic in Table 4.4 by writing the value 0x0001 to the CCCD associated with the specified characteristic using the GATT Write Characteristic Descriptor sub-procedure.
- Test Case Configuration

Test Case	Characteristic UUID
CSIS/SR/CN/BV-01-C [SIRK Notifications, Connected Client]	<< Set Identity Resolving Key >>
CSIS/SR/CN/BV-02-C [Coordinated Set Size Notifications, Connected Client]	<< Coordinated Set Size >>

Table 4.4: Characteristics Notifications – Connected Client test cases

- Test Procedure

  1. The Lower Tester reads the characteristic value for the characteristic specified by the Characteristic UUID referenced in Table 4.4 by executing the GATT Read Characteristic Value sub-procedure.
  2. The Upper Tester commands the IUT to update the characteristic read in Step 1 with different data.
  3. The IUT sends a notification containing the updated value of the characteristic as specified in Table 4.4.

- Expected Outcome

  Pass verdict

  In Step 1, the characteristic value is correctly formatted.

  In Step 3, the characteristic value is correctly formatted and is different from the one received in Step 1.

4.4.3 Characteristics Notifications – Bonded Client

- Test Purpose

  This test group verifies the behavior of the CSIS Server IUT when it updates the CSIS Characteristics while a bonded Client is not connected.

- Reference

  [3] 5.1, 5.2

- Initial Condition

  - A bearer connection is established between the Lower Tester and IUT as described in Section 4.2.1 if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE Transport, or 4.2.4 if using EATT over a BR/EDR Transport.
  - The Lower Tester has cached the CSIS service and characteristics handles (e.g., by running the procedures in Section 4.3).
  - The Lower Tester enables notification for the characteristics in Table 4.5 by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure.
  - The Lower Tester and the IUT have completed a bonding procedure.

- Test Case Configuration

Test Case	Characteristic UUID
CSIS/SR/CN/BV-03-C [SIRK Notifications, Bonded Client]	<< Set Identity Resolving Key >>
CSIS/SR/CN/BV-04-C [Coordinated Set Size Notifications, Bonded Client]	<< Coordinated Set Size >>

Table 4.5: Characteristics Notifications – Bonded Client test cases

- Test Procedure

  1. The Lower Tester reads and caches the characteristic value for the characteristic indicated in Table 4.5 by executing the GATT Read Characteristic Value sub-procedure.
  2. The Lower Tester disconnects from the IUT.

3. The Upper Tester commands the IUT to update the characteristic read in Step 1 and to enter connectable mode.
4. The Lower Tester re-establishes a bearer connection with the IUT.
5. The IUT sends a notification containing the updated value of the specified characteristic as updated in Step 3.

- Expected Outcome

  Pass verdict

  In Step 1, the characteristic value is correctly formatted.

  In Step 5, the notified characteristic value is correctly formatted and is a different value from the one received in Step 1.

4.5 Service Procedures – Error Handling

Test group to verify service procedures error handling.

CSIS/SR/SPE/BI-01-C [Lock Denied]

- Test Purpose

  Verify that a CSIS Server IUT returns an error response of “Lock Denied” when trying to acquire an already acquired Coordinated Set Lock.

- Reference

  [3] 4.3.1.1

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.
  - The IUT has been locked by another Lower Tester by executing CSIS/SR/SP/BV-01-C [Lock Request] or by the Upper Tester.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Locked (0x02).
  3. The Lower Tester receives an Error Response with an error code from the IUT.
  4. The Lower Tester waits for at most TSPX_Lock_Timeout IXIT entry seconds or until it receives a GATT Characteristic Value Notification for the Set Member Lock characteristic.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Locked (0x02) from Step 1.

  The IUT sends an error response of “Lock Denied” to the Lower Tester.

  The IUT sends a notification in Step 4 before the timeout expires.

CSIS/SR/SPE/BI-02-C [Lock Release Not Allowed]

- Test Purpose

  Verify that a CSIS Server IUT returns an error response of “Lock Release Not Allowed” when the Lower Tester tries to acquire the Coordinated Set Lock when it is not the one that acquired it.

- Reference

  [3] 4.3.1.2

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.
  - The IUT has been locked by another Lower Tester by executing CSIS/SR/SP/BV-01-C [Lock Request] or by the Upper Tester.

- Test Procedure

  1. The Lower Tester executes the GATT Read Characteristic Value sub-procedure for the Set Member Lock characteristic.
  2. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with the value Unlocked (0x01).
  3. The Lower Tester receives an Error Response with an error code from the IUT.

- Expected Outcome

  Pass verdict

  The Set Member Lock characteristic value is Locked (0x02) from Step 1.

  The IUT sends an error response of “Lock Release Not Allowed” to the Lower Tester.

CSIS/SR/SPE/BI-03-C [Invalid Lock Values]

- Test Purpose

  Verify that a CSIS Server IUT will return an error response of “Invalid Lock Value” when writing RFU values to the Set Member Lock characteristic.

- Reference

  [3] 4.3.1

- Initial Condition

  - Establish a Bearer connection between the Lower Tester and the IUT as described in Section 4.2.1, if using ATT over an LE transport, or 4.2.2 if using ATT over a BR/EDR transport, or 4.2.3 if using EATT over an LE transport, or 4.2.4 if using EATT over a BR/EDR transport.
  - The handle of the Set Member Lock 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.
  - The handle of the Client Configuration descriptor of the Set Member Lock 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.
  - If the IUT requires bonding, then the Lower Tester performs a bonding procedure.
  - Enable notification by writing the value 0x0001 using the GATT Write Characteristic Descriptor sub-procedure for the Lock CCCD.

- Test Procedure

  1. The Lower Tester executes the GATT Write Characteristic Value sub-procedure for the Set Member Lock characteristic with an RFU value.
  2. The Lower Tester receives an Error Response with an error code from the IUT.

- Expected Outcome

  Pass verdict

  The IUT sends an error response of “Invalid Lock Value” to the Lower Tester.

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 Coordinated Set Identification Service [4].

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

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

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

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

Item	Feature	Test Case(s)
CSIS 1/1	Service Supported over BR/EDR	CSIS/SR/SGGIT/SDP/BV-01-C
CSIS 1/1 OR CSIS 1/2	Coordinated Set Identification Service	CSIS/SR/SGGIT/SER/BV-01-C
CSIS 2/1 AND NOT CSIS 2a/1	Set Identity Resolving Key Characteristic	CSIS/SR/SGGIT/CHA/BV-01-C
CSIS 2a/1	Set Identity Resolving Key Characteristic, Notify	CSIS/SR/SGGIT/CHA/BV-05-C CSIS/SR/CN/BV-01-C
CSIS 2a/1 AND (CSIS 5/1 OR CSIS 5/2)	Set Identity Resolving Key Characteristic, Notify, Bonded Client	CSIS/SR/CN/BV-03-C
CSIS 1/1 AND CSIS 2/1 AND CSIS 2/5	SIRK – Encrypted – BR/EDR	CSIS/SR/SP/BV-06-C
CSIS 1/2 AND CSIS 2/1 AND CSIS 2/5	SIRK – Encrypted – LE	CSIS/SR/SP/BV-08-C
CSIS 2/1 AND CSIS 2/6	SIRK – Plaintext	CSIS/SR/SP/BV-05-C
CSIS 2/1 AND CSIS 2/7	OOB SIRK Only	CSIS/SR/SP/BV-07-C
CSIS 2/2 AND NOT CSIS 2a/2	Coordinated Set Size Characteristic	CSIS/SR/SGGIT/CHA/BV-02-C
CSIS 2a/2	Coordinated Set Size Characteristic, Notify	CSIS/SR/SGGIT/CHA/BV-06-C CSIS/SR/CN/BV-02-C
CSIS 2a/2 AND (CSIS 5/1 OR CSIS 5/2)	Coordinated Set Size Characteristic, Notify, Bonded Client	CSIS/SR/CN/BV-04-C

Item	Feature	Test Case(s)
CSIS 2/3	Set Member Lock Characteristic	CSIS/SR/SGGIT/CHA/BV-03-C CSIS/SR/SP/BV-01-C CSIS/SR/SP/BV-02-C CSIS/SR/SP/BV-03-C CSIS/SR/SP/BV-04-C CSIS/SR/SPE/BI-01-C CSIS/SR/SPE/BI-02-C CSIS/SR/SPE/BI-03-C
CSIS 2/4	Set Member Rank Characteristic	CSIS/SR/SGGIT/CHA/BV-04-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2021-03-30	Approved by BTI on 2021-02-25. CSIS v1.0 adopted by the BoD on 2021-03-23. Prepared for publication.
	p1r00–r02	2021-09-15 – 2021-09-21	TSE 17490 (rating 4): Changes in response to E17454 (Encrypted SIRK over different transports). Added CSIS/SR/SP/BV-08-C (Request Encrypted SIRK, LE). Modified CSIS/SR/SP/BV-06-C to only apply on BR/EDR and associated TCMT changes. Modified CSIS/SR/SP/BV-05-C test procedure to include the added transport column in the table. Editorials to address BTI comments.
1	p1	2021-10-12	Approved by BTI on 2021-09-28. Expedited Erratum 17454 adopted by the BoD on 2021-10-05. Prepared for publication.
	p2r00	2024-11-07	TSE 23023 (rating 4): Added new TCs CSIS/SR/SGGIT/CHA/BV-05-C and -06-C and CSIS/SR/CN/BV-01-C – -04-C; updated the TCMT accordingly. Updated the properties value for CSIS/SR/SGGIT/CHA/BV-01-C and -02-C. Updated the test case ID conventions table. Performed editorial work to align with the current TS template, including updates to the references, test strategy, test groups, test case ID conventions, conformance, GGIT introduction, and TC mapping sections. Deleted draft revision history comments prior to p0.
2	p2	2025-02-18	Approved by BTI on 2025-02-09. Prepared for TCRL 2025-1 publication.

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