Current Time Service (CTS)

***Bluetooth*® Test Suite**

- **Revision:** CTS.TS.p4
- **Revision Date:** 2023-06-29
- **Prepared By:** BTI
- **Published during TCRL:** TCRL.2023-1

Contents

1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Current Time 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 hereafter. Additional definitions and abbreviations can be found in [1] and [2].

[1] Test Strategy and Terminology Overview

[2] Bluetooth Core Specification, Version 4.0 or later

[3] ICS Proforma for Current Time Service

[4] Current Time Service Specification, Version 1.0

[5] GATT Test Suite

[6] Reference Time Update Service Test Suite

[7] Current Time Service Specification, Version 1.1

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 Current Time Service requires the presence of GAP, L2CAP, SM (for LE), SDP (for BR/EDR), and GATT. This is illustrated in Figure 3.1.

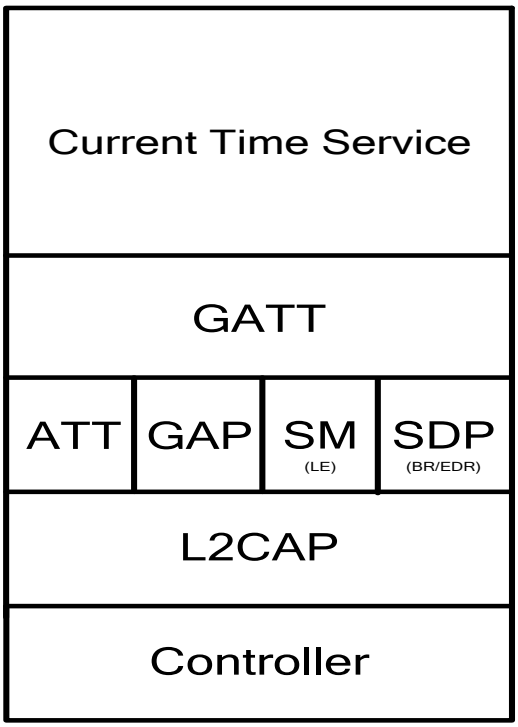

Figure 3.1: Current Time Service model

3.2 Test Strategy

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

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

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

3.3 Test groups

The following test groups have been defined.

- Generic GATT Integrated Tests
- Configure Notification tests
- Characteristic Write tests
- Service Procedures tests

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [1]. The convention used here is:
<spec abbreviation>/<IUT role>/<class>/**<feat>**/<func>/<subfunc>/<cap>/**<xx>-<nn>-<y>**.

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

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
CTS	Current Time Service
Identifier Abbreviation	**Role Identifier <IUT role>**
SR	Server Role
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
SGGIT	Server Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
SDP	Validate SDP Record
SER	Service
Identifier Abbreviation	**Feature Identifier <feat>**
CCC	Current Time Service Client Configuration Characteristics Configuration
CCN	Current Time Service Characteristics Notification
CCR	Current Time Service Characteristics Read
CCW	Current Time Service Characteristic Write
CSP	Current Time Service Procedures

Table 4.1: CTS 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 Launch Studio, with the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an erratum request such that the issue may be addressed.

4.1.3 Pass/Fail Verdict Conventions

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

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

4.2 Setup preambles

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

4.2.1 ATT Bearer on LE Transport

Follow the preamble procedure described in [5] Section 4.2.1.2.

4.2.2 ATT Bearer on BR/EDR Transport

Follow the preamble procedure described in [5] Section 4.2.1.1.

4.3 Generic GATT Integrated Tests

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

TCID	Service / Characteristic / Descriptor	Reference	Properties	Value Length (Octets)	Service Type
CTS/SR/SGGIT/SER/BV-01-C [Service GGIT – Current Time]	Current Time Service	[4] 2	-	-	Primary Service
CTS/SR/SGGIT/SDP/BV-01-C [SDP Record]	Current Time Service	[7] 4	-	-	-
CTS/SR/SGGIT/CHA/BV-01-C [Characteristic GGIT – Current Time]	Current Time Characteristic	[4] 3.1	0x12 (Read, Notify)	10	-
CTS/SR/SGGIT/CHA/BV-02-C [Characteristic GGIT – Current Time with write]	Current Time Characteristic	[4] 3.1	0x1A (Read, Notify, Write)	10, Skip-Write	-
CTS/SR/SGGIT/CHA/BV-03-C [Characteristic GGIT – Local Time Information]	Local Time Information Characteristic	[4] 3.2	0x02 (Read)	2	-
CTS/SR/SGGIT/CHA/BV-04-C [Characteristic GGIT – Local Time Information with write]	Local Time Information Characteristic	[4] 3.2	0x0A (Read, Write)	2, Skip-Write	-
CTS/SR/SGGIT/CHA/BV-05-C [Characteristic GGIT – Reference Time Information]	Reference Time Information Characteristic	[4] 3.3	0x02 (Read)	4	-

Table 4.2: Input for the GGIT Server Test Procedure

4.4 Characteristic Read

CTS/SR/CCR/BV-01-C [Current Time Characteristic – Read]

- Test Purpose

  Read the Current Time characteristic on the IUT and verify that read value is matched to the IUT's capability/availability.

- Reference

  [4] 3.1.1

  [7] 3.1.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time characteristic value 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.

- Test Procedure

  1. The Lower Tester sends an ATT_READ_REQ PDU to the IUT to read the characteristic value.
  2. The Upper Tester reads the date and time from the IUT.
  3. The Lower Tester receives an ATT_READ_RSP PDU from the IUT.

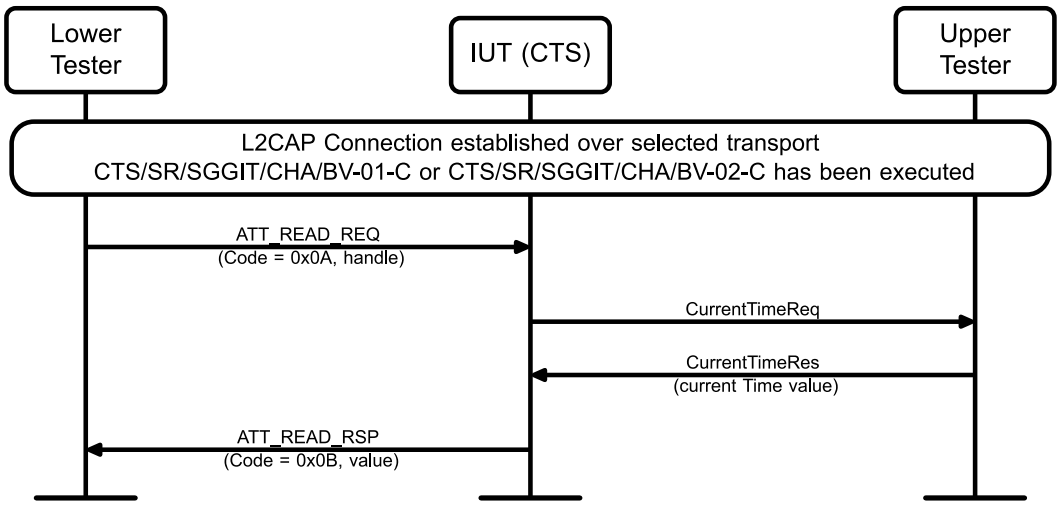

Figure 4.1: CTS/SR/CCR/BV-01-C [Current Time Characteristic - Read]

- Expected Outcome

  Pass verdict

  The characteristic is successfully read and the value of characteristic matches the capability/availability of the IUT.

  If the IUT is capable of showing 1/256 seconds, the value is shown correct 1/256 seconds, otherwise set to '0'.

  If the IUT is capable of showing Day of Week, the value is shown correct Day of Week, otherwise set to '0'.

If the IUT is capable of showing Year, the value is shown correct Year, otherwise set to ‘0’.

If the IUT is capable of showing Month, the value is shown correct Month, otherwise set to ‘0’.

If the IUT is capable of showing Day, the value is shown correct Day, otherwise set to ‘0’.

The valid time and date values read from the IUT matches the time and date in the IUT as read by the Upper Tester. The time and date values are considered to match if the difference in time is less than or equal to what can be explained by distance in time between the Upper Tester reading the time from the IUT and the Lower Tester reading the time from the IUT.

CTS/SR/CCR/BV-02-C [Local Time Information Characteristic – Read]

- Test Purpose

  Read and verify that the Local Time Information characteristic value that is set meets the requirements of the service.

- Reference

  [4] 3.2

  [7] 3.2.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Local Time Information characteristic value 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.

- Test Procedure

  1. The Lower Tester requests the Local Time Information characteristic value from the IUT by sending an ATT_READ_REQ PDU.
  2. The IUT requests the Local Time Information from the Upper Tester immediately.
  3. The Upper Tester responds with the Local Time Information to the IUT according to the latest Local Time Information.
  4. The IUT responds with the Local Time Information characteristic value to the Lower Tester by sending an ATT_READ_RSP PDU.

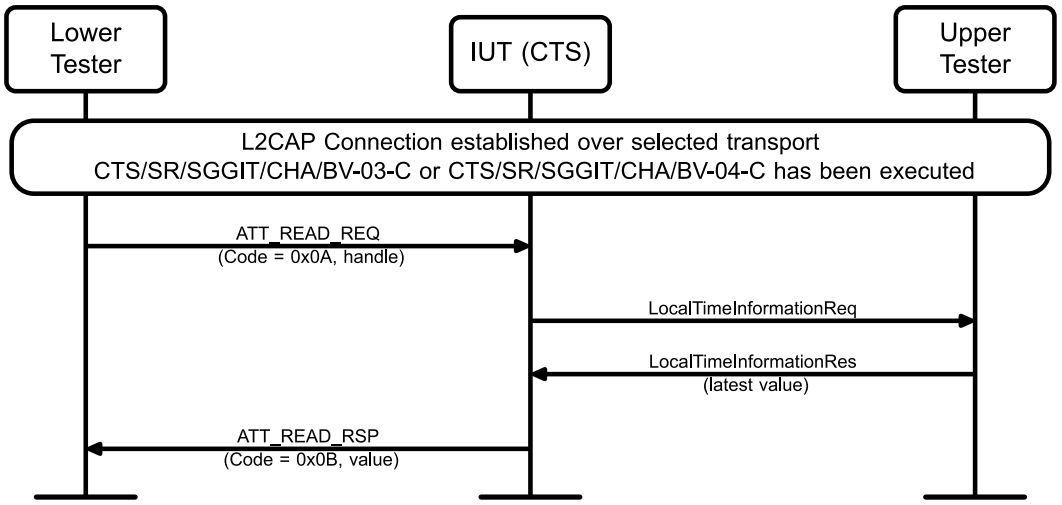

Figure 4.2: CTS/SR/CCR/BV-02-C [Local Time Information Characteristic - Read]

- Expected Outcome

  Pass verdict

  The characteristic is successfully read and the characteristic value meets the requirements of the service (two octets, first octet is greater than or equal to -48 and less than or equal to +56, second octet is 0, 2, 4 or 8).

CTS/SR/CCR/BV-03-C [Reference Time Information Characteristic – Read]

- Test Purpose

  Read and verify that the Reference Time Information characteristic value that is set meets the requirements of the service.

- Reference

  [4] 3.3

  [7] 3.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle range of Reference Time Information characteristic value 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.

- Test Procedure

  1. The Lower Tester requests the Reference Time Information characteristic value from the IUT by sending an ATT_READ_REQ PDU.
  2. The IUT requests the Reference Time Information from the Upper Tester immediately.
  3. The Upper Tester responds with the Reference Time Information to the IUT according to the latest Reference Time Information.
  4. The IUT responds with the Reference Time Information characteristic value to the Lower Tester by sending an ATT_READ_RSP PDU.

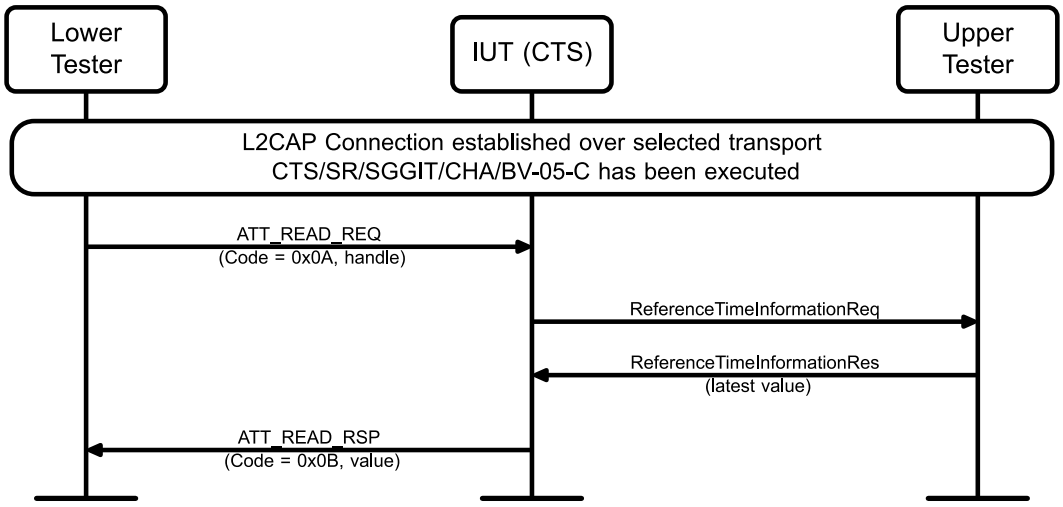

Figure 4.3: CTS/SR/CCR/BV-03-C [Reference Time Information Characteristic - Read]

- Expected Outcome

  Pass verdict

  The characteristic is successfully read and the characteristic value meets the requirements of the service (four octets, first octet is greater or equal to 0 and less than 7).

4.5 Configure Notification

CTS/SR/CCC/BV-01-C [Configure Notification – Current Time]

- Test Purpose

  Verify compliant operation in response to enable and disable Current Time characteristic notification requests.

- Reference

  [4] 3.1.1

  [7] 3.1.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time characteristic value 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.
  - If IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - The handle of the Client Characteristic Configuration Descriptor (CCCD) 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.

- Test Procedure

  1. Disable notification by writing value 0x0000 to the CCCD of the characteristic.
  2. If the test case is for notification, enable notification by writing value 0x0001 to the CCCD of the characteristic.
  3. The Lower Tester reads the value of the CCCD.

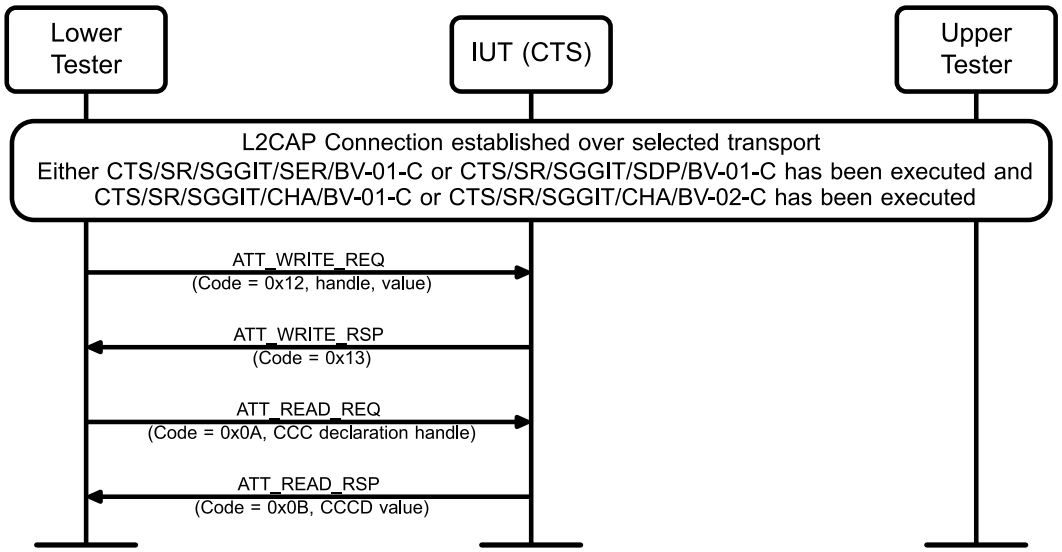

Figure 4.4: CTS/SR/CCC/BV-01-C [Configure Notification - Current Time]

- 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 Write

CTS/SR/CCW/BV-01-C [Current Time Characteristic – Write]

- Test Purpose

  Write the Current Time characteristic on the IUT and verify that the value is accepted by the IUT or that the IUT sends an error response.

- Reference

  [7] 3.1.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time characteristic value 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.

- Test Procedure

  1. The Lower Tester sends an ATT_WRITE_REQ PDU to the IUT to write a Current Time value.
  2. The IUT sends the received value to the Upper Tester.

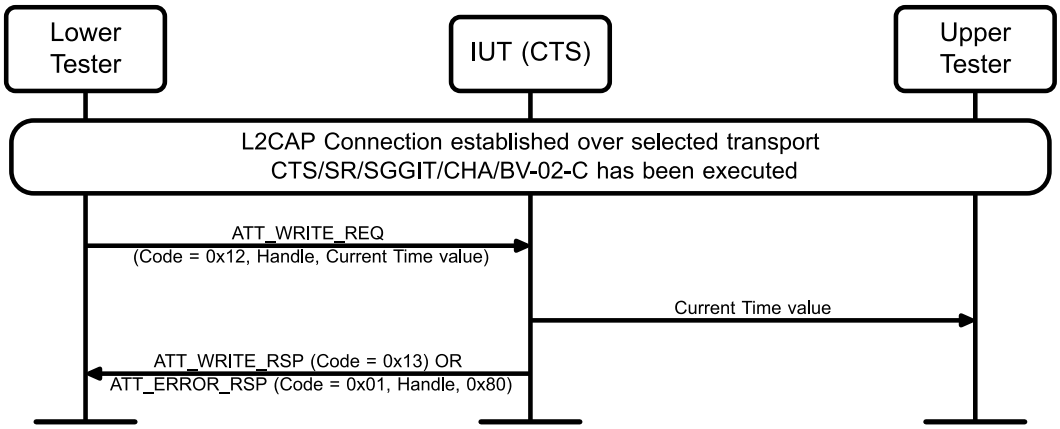

Figure 4.5: CTS/SR/CCW/BV-01-C [Current Time Characteristic - Write]

- Expected Outcome

  Pass verdict

  The Upper Tester verifies that the value written by the Lower Tester was received correctly by the IUT.

  The IUT responds with an ATT_WRITE_RSP PDU or an ATT_ERROR_RSP PDU with the handle of the Current Time characteristic and the error code 0x80.

CTS/SR/CCW/BI-01-C [Current Time Characteristic – Illegal Write]

- Test Purpose

  Verify that the IUT sends an error response if the client writes an illegal value in the Current Time characteristic on the IUT.

- Reference

  [7] 3.1.3

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time characteristic value 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.

- Test Procedure

  1. The Lower Tester sends an ATT_WRITE_REQ PDU to the IUT to write a Current Time value with a tester generated DateTime value with an illegal field value.

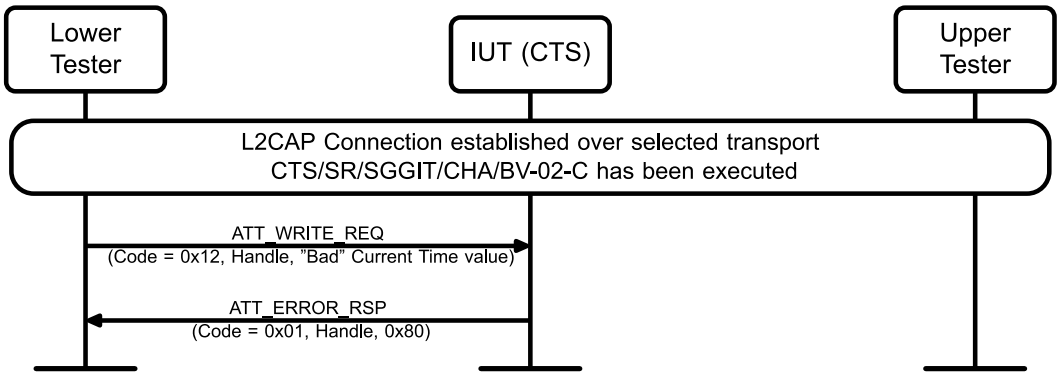

Figure 4.6: CTS/SR/CCW/BI-01-C [Current Time Characteristic – Illegal Write]

- Expected Outcome

  Pass verdict

  The IUT responds with an ATT_ERROR_RSP PDU with the handle of the Current Time characteristic and the error code 0x80.

CTS/SR/CCW/BV-02-C [Local Time Information Characteristic – Write]

- Test Purpose

  Write the Local Time Information characteristic on the IUT and verify that the value is accepted by the IUT or that the IUT sends an error response.

- Reference

  [7] 3.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Local Time Information characteristic value 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.

- Test Procedure

  1. The Lower Tester sends an ATT_WRITE_REQ PDU to the IUT to write a Local Time Information value.
  2. The IUT sends the received value to the Upper Tester.

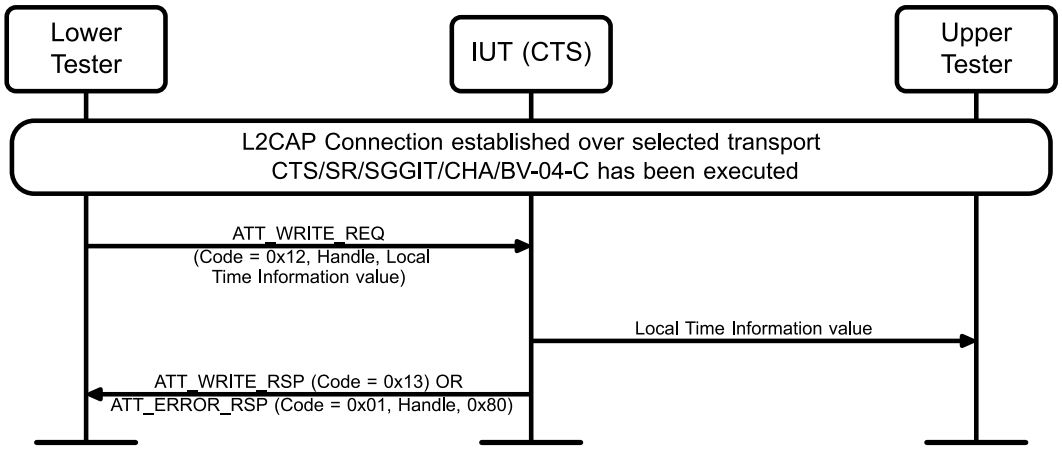

Figure 4.7: CTS/SR/CCW/BV-02-C [Local Time Information Characteristic – Write]

- Expected Outcome

  Pass verdict

  The Upper Tester verifies that the value written by the Lower Tester was received correctly by the IUT.

  The IUT responds with an ATT_WRITE_RSP PDU or an ATT_ERROR_RSP PDU with the handle of the Local Time Information characteristic and the error code 0x80.

CTS/SR/CCW/BI-02-C [Local Time Information Characteristic – Illegal Write]

- Test Purpose

  Verify that the IUT sends an error response when the client writes the Local Time Information characteristic on the IUT with an illegal value.

- Reference

  [7] 3.2.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Local Time Information characteristic value 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.

- Test Procedure

  1. The Lower Tester sends an ATT_WRITE_REQ PDU to the IUT to write a Local Time Information value with a tester generated characteristic value with an illegal field value for either the Time Zone field or the DST Offset field.

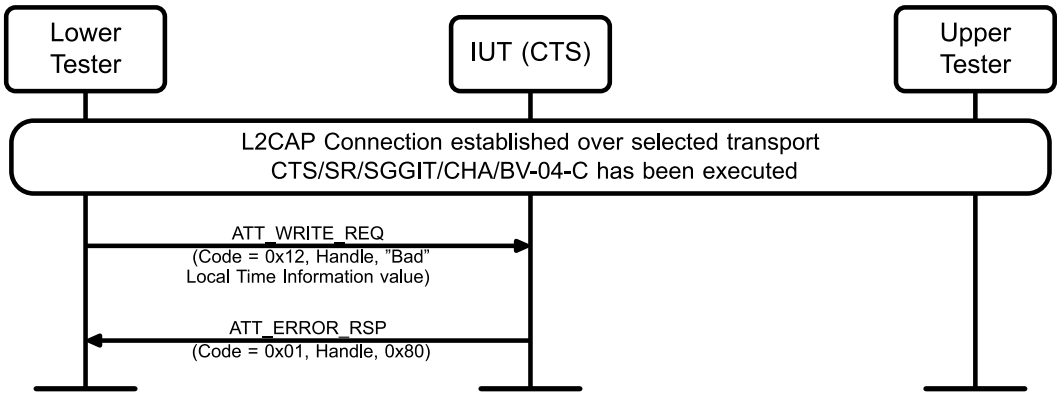

Figure 4.8: CTS/SR/CCW/BI-02-C [Local Time Information Characteristic – Illegal Write]

- Expected Outcome

  Pass verdict

  The IUT responds with an ATT_ERROR_RSP PDU with the handle of the Local Time Information characteristic and the error code 0x80.

4.7 Service Procedures

CTS/SR/CSP/BV-01-C [Current Time Characteristic – Notify disabled]

- Test Purpose

  Verify that the IUT doesn't issue notification of the Current Time characteristic when the value of Client Characteristic Configuration descriptor is 0x0000.

- Reference

  [4] 3.1.1

  [7] 3.1.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time 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 IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - To disable notification of the Current Time characteristics, configure the Client Configuration characteristic of the Current Time by executing the CTS/SR/CCC/BV-01-C [Configure Notification – Current Time] test procedure.

- Test Procedure

  1. Upper Tester drives the event of a time adjustment caused by External Reference Time Update OR Change of Time Zone OR Change of DST OR Manual Time Update to the IUT.

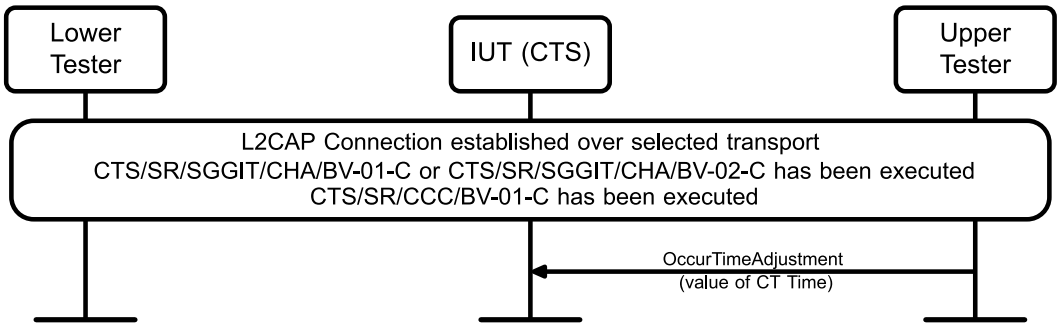

Figure 4.9: CTS/SR/CSP/BV-01-C [Current Time Characteristic- Notify disabled]

- Expected Outcome

  Pass verdict

  The IUT doesn't send an ATT_HANDLE_VALUE_NTF PDU to the Lower Tester.

CTS/SR/CSP/BV-02-C [Current Time Characteristic – Notify, Manual Change]

- Test Purpose

  Verify that the IUT can perform notification of the Current Time characteristic.

- Reference

  [4] 3.1.1.1

  [7] 3.1.2.1

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time 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 IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - To enable notification of the Current Time characteristics, configure the Client Configuration characteristic of the Current Time by executing the CTS/SR/CCC/BV-01-C [Configure Notification – Current Time] test procedure.

- Test Procedure

  1. Trigger the Manual Time Update event from the Upper Tester.

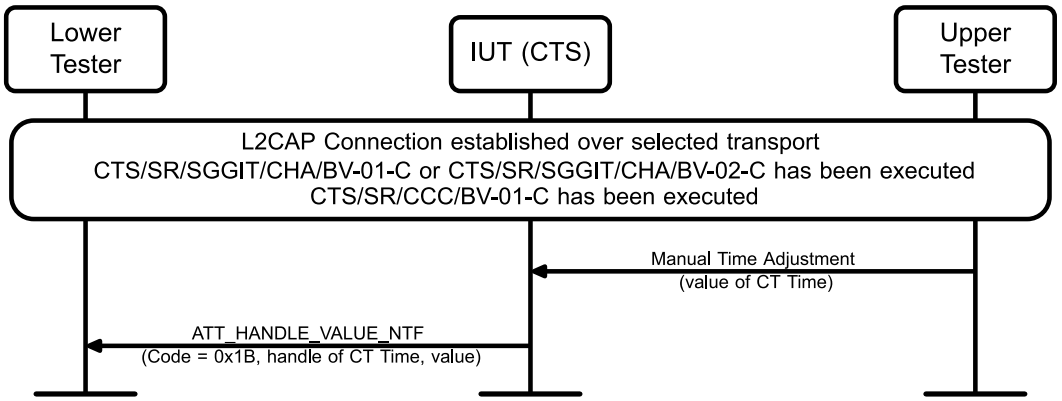

Figure 4.10: CTS/SR/CSP/BV-02-C [Current Time Characteristic-Notify, Manual Change]

- Expected Outcome

  Pass verdict

  The IUT sends a correctly formatted ATT_HANDLE_VALUE_NTF PDU of the Current Time Characteristic.

4.7.1 Current Time Characteristic – Notify

- Test Purpose

  Verify a notification of the Current Time characteristic.

- Reference

  [4] 3.1.1.1, 3.1.1.2, 3.1.1.3, 3.1.1.4

  [7] 3.1.2.1, 3.1.2.2, 3.1.2.3, 3.1.2.4

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time 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 IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - To enable notification of the Current Time characteristics, configure the Client Configuration characteristic of the Current Time by executing the CTS/SR/CCC/BV-01-C [Configure Notification – Current Time] test procedure.

- Test Case Configuration

Test Case	Notification Event Cause	Value (Requirements)
CTS/SR/CSP/BV-03-C [Current Time Characteristic – Notify, Time Zone Change]	Change of the Time Zone	Adjust reason “Change of Time Zone” bit is set, if the time zone was changed manually the “Manual Time Update” bit will also be set.

Test Case	Notification Event Cause	Value (Requirements)
CTS/SR/CSP/BV-04-C [Current Time Characteristic – Notify, DST Change]	Change of the DST Offset	Adjust reason “Change of DST Offset” bit is set, if the time zone was changed manually the “Manual Time Update” bit will also be set.
CTS/SR/CSP/BV-05-C [Current Time Characteristic – Notify by “Get Reference Update” command, with the Reference Time Update service]	Reference Time Change	Adjust reason “External Reference Time Update” bit is set.

Table 4.3: Current Time Characteristic - Notify test cases

- Test Procedure

  The following test procedure applies to the test cases listed in Table 4.3:

  1. Trigger the event that can cause the local time in the server device to change with the time update cause as listed in Table 4.3.
  2. If the cause for the update event is a Reference Time Update,the Lower Tester executes the test procedure of RTUS/SR/CW/BV-01-C with the Command ID set to "Get Reference Update" in [6] within 15 minutes from procedure 1.

- Expected Outcome

  Pass verdict

  Notification with the correct format is emitted with the value requirements in Table 4.3.

CTS/SR/CSP/BV-06-C [Current Time Characteristic – With and Without Notification by Reference Time Change]

- Test Purpose

  Verify a notification of the Current Time characteristic when the External Reference Time Update has occurred.

- Reference

  [4] 3.1.1

  [7] 3.1.2

- Initial Condition

  - Establish an ATT Bearer connection between the Lower Tester and IUT as described in Section 4.2.1.
  - The handle of the Current Time 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 IUT permissions for the characteristic require a specific security mode or security level, establish a connection meeting those requirements.
  - To enable notification of the Current Time characteristics, configure the Client Configuration characteristic of the Current Time by executing the CTS/SR/CCC/BV-01-C [Configure Notification – Current Time] test procedure.

- Drive/Feed the External Reference Time Update event again from the Upper Tester and make IUT notify the Current Time Characteristic to the Lower Tester.

- Test Procedure

  1. Drive/Feed the External Reference Time Update event again from the Upper Tester within 15 minutes from the last notification of Current Time characteristic. The Adjusting Time is less than a one minute difference from the original time.
  2. Drive/Feed the External Reference Time Update event again from the Upper Tester within 15 minutes from last Notification of Current Time characteristic. The Adjusting Time is more than a one minute difference from the original time.
  3. Drive/Feed the External Reference Time Update event from the Upper Tester more than 15 minutes from the last notification of Current Time characteristic.

- Expected Outcome

  Pass verdict

  No Notification is emitted in procedure step 1, but Notification with the correct format is emitted in procedure steps 2 and 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 Current Time Service (CTS) [3].

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 [1].

For the purpose and structure of the ICS/IXIT, refer to [1].

Item	Feature	Test Case(s)
CTS 1/2 AND CTS 3/1	Current Time Service over LE	CTS/SR/SGGIT/SER/BV-01-C
CTS 1/1 AND CTS 3/1	Current Time Service SDP Record	CTS/SR/SGGIT/SDP/BV-01-C
CTS 3/2 AND NOT CTS 3/16	Current Time Characteristic	CTS/SR/SGGIT/CHA/BV-01-C
CTS 3/2 AND CTS 3/16	Current Time Characteristic with write	CTS/SR/SGGIT/CHA/BV-02-C
CTS 3/4	Read Current Time	CTS/SR/CCR/BV-01-C
CTS 3/5 AND NOT CTS 3/17	Local Time Information Characteristic	CTS/SR/SGGIT/CHA/BV-03-C
CTS 3/5 AND CTS 3/17	Local Time Information Characteristic with write	CTS/SR/SGGIT/CHA/BV-04-C
CTS 3/6	Read Local Time Information	CTS/SR/CCR/BV-02-C
CTS 3/7	Reference Time Information Characteristic	CTS/SR/SGGIT/CHA/BV-05-C
CTS 3/8	Read Reference Time Information Characteristic	CTS/SR/CCR/BV-03-C
CTS 3/9	Current Time Characteristic, Configure to set Notification – enable/disable	CTS/SR/CCC/BV-01-C
CTS 3/10	Current Time Characteristic, Notify disabled	CTS/SR/CSP/BV-01-C
CTS 3/11	Current Time Characteristic, Notify by Manual Change	CTS/SR/CSP/BV-02-C
CTS 3/12	Current Time Characteristic, Notify by Time Zone Change	CTS/SR/CSP/BV-03-C
CTS 3/13	Current Time Characteristic, Notify by DST Change	CTS/SR/CSP/BV-04-C

Item	Feature	Test Case(s)
CTS 3/15	Current Time Characteristic, Notify by “Get Reference Update” command, Reference Time Change with the Reference Time Update service	CTS/SR/CSP/BV-05-C
CTS 3/14	Current Time Characteristic, With and Without Notify by Reference Time Change	CTS/SR/CSP/BV-06-C
CTS 3/16	Current Time Characteristic Write	CTS/SR/CCW/BV-01-C CTS/SR/CCW/BI-01-C
CTS 3/17	Local Time Information Characteristic Write	CTS/SR/CCW/BV-02-C CTS/SR/CCW/BI-02-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2011-09-13	Adopted by the Bluetooth SIG Board of Directors
	D1.1.0r0	2012-08-14	Updated to CTS version 1.1
	D1.1.0r1	2013-09-11	Added a BI test case for writing of Current Time
	D1.1.0r2	2014-05-19	Update to include writable Local Time Information
	D1.1.0r3	2014-08-10	Responses to first round of BTI & legal review
	D1.1.0r4	2014-08-11	Updated references after discussion on BTI call 8/11
	D1.1.0r5	2014-08-21	PUID responses to second round of BTI comments
	D1.1.0r6	2014-09-08	Submission to BTI as draft 1.0 adoption candidate
1	1.1.0	2014-10-14	BoD Approval of CTS 1.1
	1.1.1r00	2015-05-10	TSE 6104: Updated TP/CDC/BV-01-C and 02-C (CTS/SR/CDC/BV-01-C after ID conversion) to add other available values.
2	1.1.1	2015-07-14	Prepared for TCRL 2015-1 publication
	1.1.2r00	2016-03-29	Converted to new Test Case ID conventions as defined in TSTO v4.1
	1.1.2r01	2016-04-13	TSE 6994: Updated Test Procedure, MSC, and Pass verdict for test case CTS/SR/CSP/BV-02-C.
	1.1.2r01-conv	2016-04-17	Re-organized tests for Current Time Characteristic Notify into table form. Updated the test case ids in the MSCs. Corrected the references from GATT Client tests to GATT Server tests.
3	1.1.2	2016-07-13	Prepared for TCRL 2016-1 publication.
	1.1.2 edition 2r00	2018-11-29	Editorial changes only. Template updated. Revision History and contributors moved to the end of the document.
	1.1.2 edition 2	2019-12-03	Updated copyright page and confidentiality markings to support new Documentation Marking Requirements, performed minor formatting updates, and accepted all tracked changes to prepare for edition 2 publication.
	p4r00–r03	2023-04-18 – 2023-05-01	TSE 20638 (rating 2): Converted the following test cases to GGIT: CTS/SR/CSD/BV-01-C and -02-C, CTS/SR/CDC/BV-01-C – -03-C, and CTS/SR/CDS/BV-01-C. The new GGIT TCIDs are: CTS/SR/SGGIT/SER/BV-01-C, CTS/SR/SGGIT/SDP/BV-01-C, CTS/SR/SGGIT/CHA/BV-01-C – -05-C. Updated MSCs to refer to the new GGIT TCs and corrected typos in the legacy MSCs. Updated the TCMT accordingly.

Publication Number	Revision Number	Date	Comments
			TSE 20639 (rating 1): Removed direct references to GATT test cases from CTS/SR/CCR/BV-01-C, CTS/SR/CCC/BV-01-C, CTS/SR/CCW/BV-01-C, CTS/SR/CCW/BI-01-C, CTS/SR/CCW/BV-02-C, and CTS/SR/CCW/BI-02-C. TSE 20640 (rating 1): Corrected the Pass verdict in CTS/SR/CCW/BV-02-C and CTS/SR/CCW/BI-02-C to refer to the Local Time Information characteristic. Introduced editorial changes to align the test steps and Pass verdicts to the updated MSCs. Template-related editorials to align the document with the latest TS template, including setting the last release publication of v1.1.2 as p3 and aligning the copyright page with v3 of the DNMD.
4	p4	2023-06-29	Approved by BTI on 2023-05-28. Prepared for TCRL 2023-1 publication.

Acknowledgments

Name	Company
Ismail Mohamud	Bluetooth SIG, Inc.
Sadao Nagashima	Casio
Daisuke Matsuoh	Citizen
Frank Berntsen	Nordic Semiconductor