Emergency Profile (EMP)

***Bluetooth*® Test Suite**

- **Revision:** EMP.TS.p1
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- **Prepared By:** PUID WG
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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 Emergency Profile (EMP) 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 5.0 or later

[2] Test Strategy and Terminology Overview

[3] Emergency Profile

[4] GATT Test Suite, GATT.TS

[5] GAP Test Suite

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

[7] ICS Proforma for Emergency Profile

[8] IXIT Proforma for Emergency Profile

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 Emergency Profile requires the presence of L2CAP, GAP, SM, ATT, and GATT. This is illustrated in Figure 3.1.

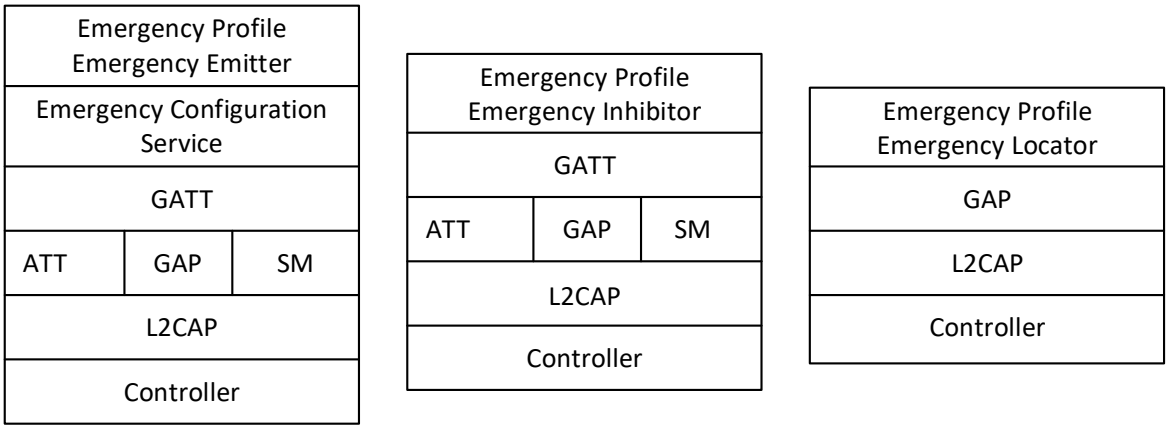

Figure 3.1: Emergency Profile test models

3.2 Test Strategy

The test objectives are to verify functionality of the Emergency Profile 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:

- Service and Characteristic Discovery
- Emergency Profile Features

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>**.

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
EMP	Emergency Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
EEM	Emergency Emitter Role
ELO	Emergency Locator Role
Identifier Abbreviation	**Feature Identifier <feat>**
EPF	Emergency Profile Features

Table 4.1: EMP TC feature naming conventions

4.1.2 Conformance

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

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

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions not excluded by the specification
- That capabilities enabled by the implementations are sustained over durations expected by the use case
- That the implementation gracefully handles any quantity of data expected by the use case
- That in cases where more than one valid interpretation of the specification exists, the implementation complies with at least one interpretation and gracefully handles other interpretations
- That the implementation is immune to attempted security exploits

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

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

4.1.3 Pass/Fail verdict conventions

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

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

4.2 Setup Preambles and Generic Test Sequences

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

Use the GATT TS [4] Section 4.2.1.2 preamble procedure [Set up ATT Bearer over LE].

4.3 Emergency Emitter Profile Features

The procedures defined in this test group verify Emergency Emitter IUT implementation of the Features defined in the Emergency Profile.

EMP/EEM/EPF/BV-01-C [Emitter Advertisement]

- Test Purpose

  Verify that the IUT (Emitter) attempts to reconnect with a known Alert Inhibitor in an implementation dependent time, and if that time expires without reconnection, the IUT enters GAP Broadcast Mode and advertises the specified data. Upon reestablishment of the connection to the Alert Inhibitor, the IUT ends advertisements.

- Reference

  [3] 3.1, 3.2

- Initial Condition

  - Run the preamble procedure for the IUT to initiate connection to a Lower Tester included in Section 4.2.1.

- Test Procedure

  1. The Lower Tester (Inhibitor) is disconnected from the IUT (Emitter) and starts scanning for advertisements from the IUT.
  2. Upon expiration of the timer defined in the IXIT [8], the Lower Tester verifies that the IUT advertises the Service Data AD Type, the EMCS UUID, and the Emergency ID and the Emergency Text defined in the IXIT [8].

- Expected Outcome

  Pass verdict

  Verify that the IUT advertises the Service Data AD Type, the correct values of the EMCS UUID, and the expected value of the Emergency ID defined in the IXIT [8]. Verify that the IUT advertises the expected value of the Emergency Text in the IXIT [8] (can have 0 length if not supported by the IUT).

EMP/EEM/EPF/BV-02-C [Emitter Reconnection before alerting]

- Test Purpose

  Verify that the IUT (Emitter) reconnects with a known Inhibitor when the IUT after connection is lost but prior to emergency advertising.

- Reference

  [3] 3.1

- Initial Condition

  - Run the preamble procedure for the IUT to initiate connection to a Lower Tester included in Section 4.2.1.

- Test Procedure

  1. The Lower Tester (Inhibitor) is disconnected from the IUT (Emitter).
  2. Reconnect the Lower Tester to the IUT by connecting to connectable advertising from the IUT.

- Expected Outcome

  Pass verdict

  Verify that the IUT successfully reconnects with the Lower Tester.

EMP/EEM/EPF/BV-03-C [Emitter Reconnection after alerting]

- Test Purpose

  Verify that the IUT (Emitter) can reconnect with a known Alert Inhibitor when the IUT is advertising emergency messages.

- Reference

  [3] 3.1

- Initial Condition

  - Run the test case EMP/EEM/EPF/BV-01-C [Emitter Advertisement] to get the IUT in an alerting state.

- Test Procedure

  1. Reconnect the Lower Tester to the IUT by connecting to connectable advertising from the IUT.

- Expected Outcome

  Pass verdict

  Verify that the IUT successfully reconnects with the Lower Tester.

EMP/EEM/EPF/BV-04-C [Emitter not connectable during alerting]

- Test Purpose

  Verify that the IUT (Emitter) does not enable reconnection to a known Alert Inhibitor when the IUT is advertising emergency messages.

- Reference

  [3] 3.1

- Initial Condition
  - Run the test case EMP/EEM/EPF/BV-01-C [Emitter Advertisement] to get the IUT in an alerting state.
- Test Procedure
  1. The Lower Tester is verifying that the Emergency Data advertisement packets are non-connectable and non-scannable (using the LE link layer ADV_NONCPNN_IND PDU).
- Expected Outcome

  Pass verdict

  The IUT advertising is non-connectable and non-scannable.

4.4 Emergency Locator Profile Features

EMP/ELO/EPF/BV-01-C [Locator GAP Observer]

- Test Purpose

  Verify that the IUT (Locator) scans and receives an advertisement from a Lower Tester (Emitter) containing the Emergency ID and optionally the Emergency Text.
- Reference

  [3] 5
- Initial Condition
  - The IUT is in Link Layer state ‘Standby’.
  - The advertising data used in Broadcast mode from the Lower Tester is known from the IXIT [8].
- Test Procedure
  1. The Lower Tester enters Broadcast Mode using the specified advertising data.
  2. The Upper Tester orders the IUT to perform the Observation procedure with either Active or Passive Scanning.
- Expected Outcome

  Pass verdict

  The IUT receives the specified advertising data and scan response data from 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 the Emergency Profile (EMP) [7].

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

Item	Feature	Test Case(s)
EMP 3/2	Emitter Advertisement Data	EMP/EEM/EPF/BV-01-C
EMP 3/3	Emitter Reconnection before alerting	EMP/EEM/EPF/BV-02-C
EMP 3/4	Emitter Reconnection during alerting	EMP/EEM/EPF/BV-03-C
EMP 3/5	Emitter not allowing reconnect during alerting	EMP/EEM/EPF/BV-04-C
EMP 6/1	Locator Advertisement Data	EMP/ELO/EPF/BV-01-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2019-07-02	Emergency Profile adopted by the Board of Directors. Prepared for publication.
	p1r00–r01	2023-10-21 – 2023-11-07	TSE 23268 (rating 1): Converted -I tests to -C tests as appropriate; updated the TCMT and TCRL accordingly. Performed editorials to align the document with the latest TS template, including updates to the Test Strategy and Test groups sections and conversion of single-TC section headings from Heading 3 to Heading 8. Added a Publication Number column to the revision history and revised the document numbering convention, setting the last released publication of 1.0.0 as p0. Deleted draft revision history comments prior to p0. Replaced the Bluetooth logo in the footer and updated the copyright page to align with v2 of the DNMD.
1	p1	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.

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