Occupancy Sensor NLC Profile (OCSNLCP)

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 Occupancy Sensor NLC Profile (OCSNLCP) 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 [5].

[1]   Bluetooth Core Specification, Version 4.2 or later

[2]   Mesh Protocol Specification, Version 1.1 or later

[3]   Mesh Model Specification, Version 1.1 or later

[4]   Test Strategy and Terminology Overview

[5]   Occupancy Sensor NLC Profile Specification, Version 1.0 or later

[6]   ICS Proforma for Occupancy Sensor NLC Profile

[7]   Mesh Model Specification Test Suite, Annex: Generic Mesh Integrated Tests

2.2   Definitions

In this Bluetooth document, the definitions from all references apply.

2.3   Acronyms and abbreviations

In this Bluetooth document, the acronyms and abbreviations from all references apply.

3   Test Suite Structure (TSS)

3.1   Overview

Bluetooth NLC profile specifications are high layer profiles on top of the Mesh Protocol and Mesh Model layers, and they mandate several features that are optional in these specifications, and additionally define performance requirements for an end-product.

This document defines tests for OCSNLCP that verify basic end-to-end functionality focusing on the extra requirements that are not or cannot be properly tested in Mesh Protocol and Mesh Model qualification testing. To execute any test case in this Test Suite, the IUT is expected to contain a fully functional Mesh Protocol stack with all the features and models mandated by OCSNLCP.

3.2   Test Strategy

The test objectives are to verify the functionality of OCSNLCP on mesh devices. The testing approach covers mandatory and optional requirements in OCSNLCP 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 OCSNLCP and all underlying mesh specifications. A Lower Tester acts as the IUT's peer device and interacts with the IUT's 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:

- GMIT

4   Test cases (TC)

4.1   Introduction

4.1.1   Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [4]. The convention used here is:
<spec abbreviation>/**<IUT role**>/<class>**/<feat>**/**<func>/**<subfunc>/<cap>/**<xx>-<nn>-<y>**.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
OCSNLCP	Occupancy Sensor NLC Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
OCS	Occupancy Sensor
Identifier Abbreviation	**Group Identifier <class>**
GMIT	Generic Mesh Integrated Tests
Identifier Abbreviation	**Features and Behaviors Identifier <feat>**
FEAT	Features and models
PBGT	Provisioning over PB-GATT
PDES	Device properties in Sensor Descriptor
PERF	Performance

Table 4.1: OCSNLCP 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, the outcome of the test is a Fail verdict.

4.2   Generic Mesh Integrated Tests (GMIT)

Execute the GMIT test procedures, defined in [7], using the input table defined below:

OCSNLCP/OCS/GMIT/PBGT/BV-01-I [Provisioning over PB-GATT]	
Reference	[5] 3.1
_SCAN_NAME_	Yes
OCSNLCP/OCS/GMIT/FEAT/BV-01-I [Features and models]	
Reference	[5] 3.2, 3.3
CRPL	32
_MESH_PROFILE_UUID_	«Occupancy Sensor NLC Profile»
OCSNLCP/OCS/GMIT/PERF/BV-01-I [Device performance]	
Reference	[5] 3.4
_NET_KEYS_	2
_APP_KEYS_	3
_SUB_LIST_	N/A
_PROXY_FILTER_SIZE	8
_NET_CACHE_SIZE_	64
OCSNLCP/OCS/GMIT/PDES/BV-01-I [Motion Sensed device property in Sensor Descriptor]	
Reference	[5] 3.5
_DESCRIPTOR_PROPERTIES_	Motion Sensed, Time Since Motion Sensed (optional), and no other properties
OCSNLCP/OCS/GMIT/PDES/BV-02-I [People Count device property in Sensor Descriptor]	
Reference	[5] 3.5
_DESCRIPTOR_PROPERTIES_	People Count, and no other properties
OCSNLCP/OCS/GMIT/PDES/BV-03-I [Presence Detected device property in Sensor Descriptor]	
Reference	[5] 3.5
_DESCRIPTOR_PROPERTIES_	Presence Detected, and no other properties

Table 4.2: GMIT input table

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 Occupancy Sensor NLC Profile [6].

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 [4].

For the purpose and structure of the ICS/IXIT, refer to [4].

Item	Feature	Test Case(s)
OCSNLCP 2/2	Mandatory profile requirements for Occupancy Sensor NLC Profile	OCSNLCP/OCS/GMIT/PBGT/BV-01-I OCSNLCP/OCS/GMIT/FEAT/BV-01-I OCSNLCP/OCS/GMIT/PERF/BV-01-I
OCSNLCP 4/1	Motion Sensing	OCSNLCP/OCS/GMIT/PDES/BV-01-I
OCSNLCP 4/2	People Counting	OCSNLCP/OCS/GMIT/PDES/BV-02-I
OCSNLCP 4/3	Presence Detection	OCSNLCP/OCS/GMIT/PDES/BV-03-I

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2023-09-19	Approved by BTI on 2023-08-27. OCSNLCP v1.0 adopted by the BoD on 2023-09-12. Prepared for initial publication.

Acknowledgments

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Bogdan Alexandru	Bluetooth SIG