

# Mesh Configuration Database Profile (MCDB)

## **Bluetooth® Test Suite**

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# 1 Scope

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This Bluetooth document contains the Test Suite Structure (TSS) and test cases (TC) to test a subset of the Mesh Configuration Database (MCDB) Profile 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

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### 2.1 References

This Bluetooth document incorporates, by dated or undated reference, provisions from other publications. These normative 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].

[1] Mesh Configuration Database Profile Specification

[2] Test Strategy and Terminology Overview

### 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 from [1] and [2] apply.

## 3 Test Suite Structure

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### 3.1 Overview

The MCDB specification defines a format that will be used when exporting the management and configuration information of a mesh network.

### 3.2 Test strategy

Testing will be performed using an Upper Tester acting as a Configuration Manager that is able to verify the format of a database. The test interface between the IUT and the Upper Tester is implementation specific. Any such interface needs to be able to transfer the JSON file between the two entities.

A JSON schema file that may be used by the Upper Tester to verify the validity of the generated database files is available on the Bluetooth website after the specification adoption such that member companies can verify their own implementations of the Mesh Configuration Database; this document provides the instructions for how to do this.

## 4 Test cases (TC)

### 4.1.1 Test case identification conventions

Test cases shall be 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>**.

Bolded ID parts shall appear in the order prescribed. Non-bolded ID parts (if applicable) shall appear between the bolded parts. The order of the non-bolded parts may vary from Test Suite to Test Suite, but shall be consistent within each individual Test Suite.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
MCDB	Mesh Configuration database
Identifier Abbreviation	Role Identifier <IUT role>
MMNG	Mesh Manager
Identifier Abbreviation	Feature Identifier <feat>
CDB	Configuration Database

Table 4.1: Test case identification conventions

### 4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner (process-mandatory). 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 that is 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 in order to constitute a pass verdict. However, it is noted that in order 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, 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 errata 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 Mesh Manager

### MCDB/MMNG/CDB/BV-01-I [Generate Valid JSON]

- Test Purpose

Verify that the IUT generates a valid JSON file containing a mesh configuration database.

- Reference

[1] Section 2

- Initial Condition

The IUT is a Mesh Manager for a mesh network with at least one node.

- Test Procedure

1. The Upper Tester orders the IUT to export the mesh configuration database as a JSON file.
2. The IUT generates the JSON file and transfers it to the Upper Tester.
3. The Upper Tester verifies the format and contents of the JSON file.

- Expected Outcome

#### Pass verdict

The IUT generates a JSON file that conforms to the Mesh Configuration Database JSON schema, and the Mesh object correctly describes the network information and satisfies the following rules:

For each Provisioner object contained in the *provisioners* property, the *allocatedUnicastRange*, *allocatedGroupRange*, and *allocatedSceneRange* properties contain a low value (*lowAddress* / *firstScene*) that is less than or equal to the high value (*highAddress* / *lastScene*). If the *provisioners* array contains more than one value, then these ranges are not overlapping for any pair of Provisioner objects.

For each Network Key object contained in the *netKeys* property, the *oldKey* property is present if the *phase* property is different than zero and is excluded otherwise.

For each Node object contained in the *nodes* property, the *elements* property contains exactly one Element object with the value of the *index* property equal to zero.



For each Group object contained in the *groups* property, the value of the *parentAddress* property is different than the value of the *address* property.

## 5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific capabilities in the ICS. Profiles, protocols, and services may define multiple roles, and it is possible that a product may implement more than one role. The product shall be 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 y/x reference, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS Proforma for the Mesh Configuration Database Profile specification [1]. If the item is defined with a Protocol, Profile, or Service abbreviation before y/x, the table and feature number referenced are defined in the abbreviated ICS proforma document.

**Feature:** recommended to be the primary feature defined in the ICS being tested or may be the test case name.

**Test Case(s):** the applicable test case identifiers required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported.

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

Item	Feature	Test Case(s)
MCDB 0/1	Mesh Configuration Database Profile v1.0	MCDB/MMNG/CDB/BV-01-I

Table 5.1: Test case mapping

## 6 Revision history and acknowledgments

### Revision History

Publication Number	Revision Number	Date	Comments
	r01–r06	2018-08-16 – 2019-05-14	Initial draft for discussion. Updated draft after Kirkland F2F. Updated the tests based on the 0.9 version of the specification. Resolved BTI review comments through two rounds of review.
	0.9 r07_D1.0– r10_D1.0	2020-11-06 – 2021-03-09	Updated to align with the latest document structure conventions and resolved issues per BTI feedback. Added a TCMT. Reorganized to align with the latest template.
0	p0	2021-09-21	Approved by BTI on 2021-03-23 (final package sent to BQRB via email; BTI voting item from 2021-01-13 subsequently updated in BQRB). Mesh Configuration Database Profile v1.0 adopted by the BoD on 2021-09-14. Prepared for initial publication.

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