3D Synchronization Profile (3DSP)

***Bluetooth*®** **Test Specification**

- ▪ **Revision:** 3DSP.TS.1.0.3.1
- ▪ **Revision Date:** 2017-07-03
- ▪ **Group Prepared By:** BTI
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Abstract:

This test specification defines interoperability testing requirements for devices using the Bluetooth 3D Synchronization Profile over a Bluetooth® wireless communications link.

Revision History

Revision Number	Date	Comments
D05r00	2012-01-04	Draft version of 0.5
D07r00	2012-03-16	Draft version of 0.7
D07r01	2012-05-28	Modifications to synchronize with profile D05r20
D07r02	2012-06-04	Update in sync with profile
D07r03	2012-06-19	Synchronize with profile version D05r22
D07r04	2012-06-22	Updated Test Groups and Test Purposes
D07r05	2012-07-25	Accepted all changes from preliminary BTI review, added test cases, and updated TCMT
D07r06	2012-07-30	Updated TCMT and made clarifications
D07r07	2012-08-19	Amended to address BTI comments and amended Test Purposes
D07r08	2012-09-06	Added 3DG Connection Announcement Test Group and Test Purpose and a Battery Level Reporting Test Purpose (BTI-approved V0.7)
D09r00	2012-09-13	Initial version of V0.9
D09r01	2012-09-30	Update test procedures and add MSCs
D09r02	2012-10-03	Updated test procedures, added test setup descriptions, and eliminated some test cases
D09r03	2012-11-21	Updated definitions, added more information about test setup descriptions, added Lens Shutter Control Signal waveform examples, and updated test procedures.
D10r00	2012-12-03	Initial draft of V1.0 (BTI-approved V0.9)
1.0.0	2013-02-18	BTI Approved for Prototyping
1.0.0	2013-03-12	BQRB Approval
1.0.0	2013-03-18	Prepare for Publication
1.0.1r1	2013-08-15	TCRL 2013-2 TSE 5241: Addition of line item for TP/BLR/BV-03-C in the TCMT.
1.0.1	2013-12-03	Prepare for Publication
1.0.2.0r00	2015-05-20	TSE 6283: Updated Octet1 value in MSC for TP/BLR/BV-08-C ESR08: Incremented revision number to match spec (1.0.2) and added 4th digit for TS revision (1.0.2.0).
1.0.2.0	2015-07-14	Prepared for TCRL 2015-1 publication
1.0.3.0r00	2015-10-28	Updated version numbering to align with Specification version change to 1.0.3 for ESR09.
1.0.3.0	2015-12-22	Prepared for TCRL 2015-2 publication.
1.0.3.1r00	2017-02-02	Updated Test Spec Template.
1.0.3.1r01	2017-04-05	Converted to new Test Case ID conventions as defined in TSTO v4.1
1.0.3.1	2017-07-03	Approved by BTI. Prepared for TCRL 2017-1 publication.

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Contents

1   Scope

This Bluetooth document contains the Test Suite Structure (TSS) and Test Cases (TC) to test the 3D Synchronization Profile (3DSP).

The objective of this document is to provide a basis for the conformance tests for Bluetooth devices giving a high probability of air interface interoperability between different manufacturers' Bluetooth devices.

2   References, Definitions, and Abbreviations

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.

[1]   Bluetooth Core Specification v4.0 or later

[2]   Bluetooth Core Specification Addendum 4

[3]   Bluetooth Test Strategy and Terminology Overview

[4]   Bluetooth 3D Synchronization Profile Specification

[5]   Bluetooth 3D Synchronization Profile ICS

[6]   Bluetooth Specification Guidelines

[7]   ITU-T X.290 series, OSI CONFORMANCE TESTING METHODOLOGY AND FRAMEWORK PROTOCOL RECOMMENDATIONS FOR ITU-T APPLICATIONS, ITU Recommendation X.290 series (equivalent to ISO 9646)

[8]   ITU-T Z.120, Formal description techniques (FDT) - Message Sequence Chart

[9]   3D Synchronization Profile Implementation eXtra Information for Test, IXIT

2.2   Definitions

For the purpose of this Bluetooth document, the definitions from [1], [2], [3], and [4] apply.

For the purpose of this Bluetooth document, the following definitions also apply.

Lower Tester 3DD – a lower level tester that implements all of the features of the Bluetooth 3D Synchronization Profile and operates in the Role of a Bluetooth 3D Display in order to be used to test Bluetooth 3D Glasses IUTs.

Lower Tester 3DG – a lower level tester that implements all of the features of the Bluetooth 3D Synchronization Profile and operates in the Role of a Bluetooth 3D Glasses in order to be used to test Bluetooth 3D Display IUTs.

Role - Bluetooth devices conforming to the Bluetooth 3D Synchronization Profile may act in the role of a Bluetooth 3D Display or a pair of Bluetooth 3D Glasses. For a given test, the Implementation Under Test will act in either the role of a Bluetooth 3D Display or a pair of Bluetooth 3D Glasses while the Tester will act in the opposite role as the Implementation Under Test.

2.3   Abbreviations

For the purpose of this Bluetooth document, the abbreviations from [1], [2], [3], and [4] apply.

3   Test Suite Structure (TSS)

3.1   Test Setup Descriptions

The testing of Bluetooth 3D Displays and Bluetooth 3D Glasses requires a square wave signal generator that is capable of generating an analog 0 - 10 volt peak-to-peak square wave signal in the frequency range of 1-240 Hz. This signal generator generates the reference Frame Sync signal that is supplied to the external Frame Sync input on a 3DD IUT and on a Lower Tester 3DD in the test setups.

The testing also requires an oscilloscope for measuring and observing the left and right lens shutter control signal outputs from a 3DG IUT and from the Lower Tester 3DG in the test setups. The oscilloscope shall have a minimum bandwidth of 20 MHz, a minimum of four channels, two of which are capable of performing channel math, i.e. Channel A minus Channel B to measure the differential voltage applied to the shutter.

3.1.1   3DD IUT Test Setup

The following figure describes the test setup for testing a 3DD IUT.
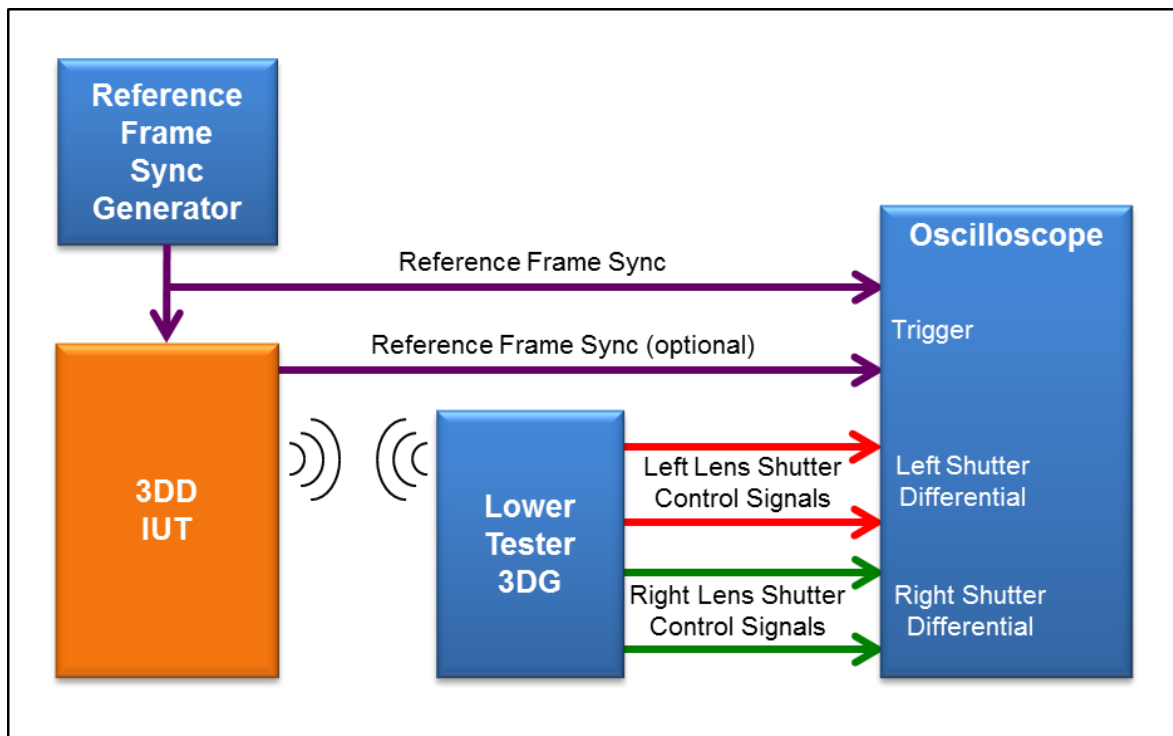
Figure 3.1: *3DD IUT Test Setup*

3.1.1.1   Reference Frame Sync Generator Setup

The Reference Frame Sync Generator shall be configured as follows:

- Frequency: as required by the test procedure

- Waveform: Square Wave

- Output Voltage: as specified in the 3DD IUT's IXIT identifiers: TSPX_frame_sync_input_signal_lower_voltage and TSPX_frame_sync_input_signal_upper_voltage.

3.1.1.2   3DD IUT Setup

The 3DD IUT submitted for qualification shall be provided as follows:

- The 3DD IUT shall have a signal input for an external Frame Sync signal with the parameters for this external Frame Sync input signal specified in the 3DD IUT's IXIT.

- The Reference Frame Sync Generator shall be connected the 3DD IUT's external Frame Sync input.

3.1.1.3   Lower Tester 3DG Setup

The Lower Tester 3DG shall be configured as follows:

- The Lower Tester 3DG shall be configured with the following shutter timing adjustments set to zero.

    - TSPX_shutter_open_3DG_timing_offset_adjustment

    - TSPX_shutter_close_3DG_timing_offset_adjustment

- The 3DD Lower Tester shall be connected to an oscilloscope per Section 3.1.1.4.

3.1.1.4   Lower Tester 3DG Oscilloscope Setup

The setup of the oscilloscope is unique to the make and model chosen to perform the testing. The following is a general guideline for setting up an oscilloscope to measure the Left Lens Shutter Control Signals and their timing parameters. The Right Lens Shutter Control Signals are tested likewise. The voltage level parameters for measuring these signals are defined in the Lower Tester 3DG's operational specifications.

- Channel A: Reference Frame Sync

- Channel B: Not used

- Channel C: Left Lens Shutter Control Signal A (1 of 2)

- Channel D: Left Lens Shutter Control Signal B (2 of 2)

- Trigger Source: Channel A

- Channel Math: Channel C minus Channel D

- Timebase: 4ms/division initially, 2ms/division for measurement.

- Channel volts/division: Refer to the voltage level parameters specified in the Lower Tester 3DG's operational specifications. Set the volts/division for each channel accordingly.

3.1.1.4.1   Oscilloscope Measured Parameters

The oscilloscope will be used to measure: 1) the time that the shutters open and close relative to the Reference Frame Sync instance and 2) the average Regenerated Frame Sync period.

When the shutter open instance (or the shutter close instance) occurs before the leading edge of the Reference Frame Sync instance, the time difference between them shall be recorded as a negative value, otherwise it shall be recorded as a positive value.

The following are the terms and their definitions for the shutter timing parameters measured using the oscilloscope. These terms are depicted in the oscilloscope waveforms examples shown in Section 2.4.2.5.

* tLeftOpen – The time from the leading edge of the Frame Sync instance to the leading edge of the left shutter open voltage instance.

* tLeftClose - The time from the leading edge of the Frame Sync instance to the leading edge of the left shutter close voltage instance.

* tRightOpen – The time from the leading edge of the Frame Sync instance to the leading edge of the right shutter open voltage instance.

* tRightClose - The time from the leading edge of the Frame the Sync instance to the leading edge of the right shutter close voltage instance.

* tRegenerated Frame Sync Period X 10 – The total time of ten cycles of the left shutter opening and closing.

3.1.2   3DG IUT Test Setup

The following figure describes the test setup for testing a 3DG IUT.
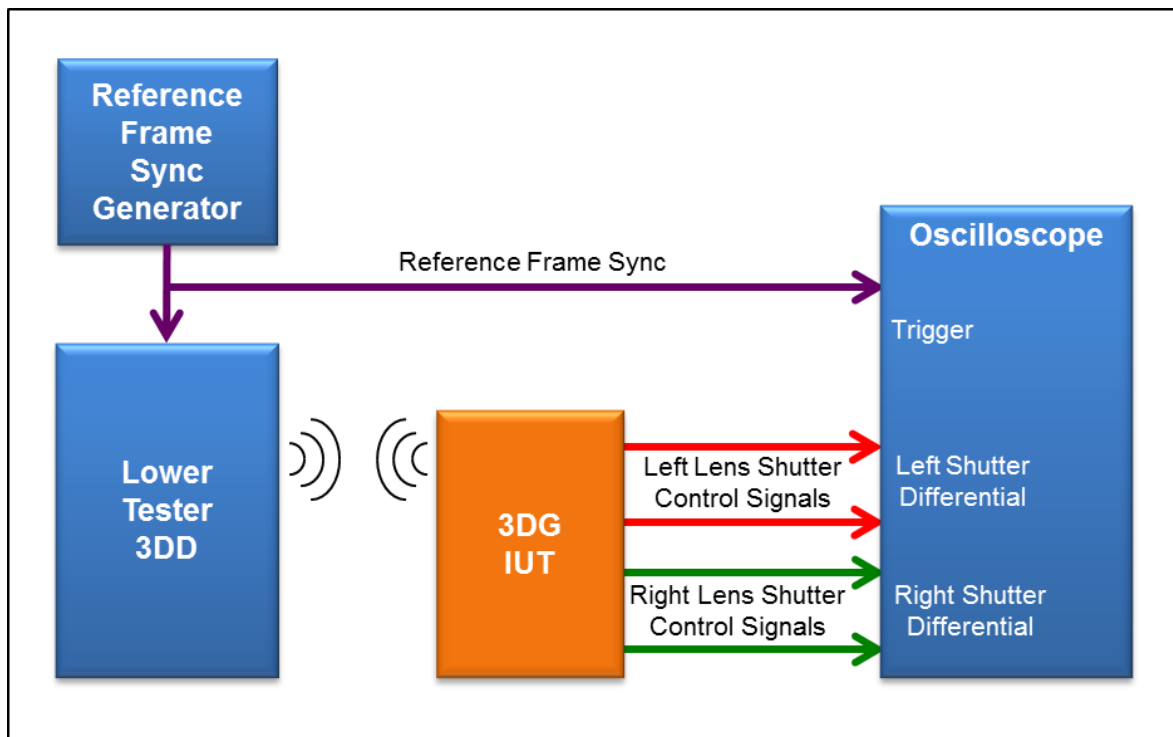
Figure 3.2: *3DG IUT Test Setup*

3.1.2.1   Reference Frame Sync Generator Setup

The Reference Frame Sync Generator shall be configured as follows:

* Frequency: as required by the test procedure

* Waveform: Square Wave

- Output Voltage: as required by the Lower Tester 3DD

3.1.2.2 3DG IUT Setup

The 3DG IUT submitted for qualification shall be provided as follows:

- The LCD lens shutters shall be disconnected from the analog control drive signals in order to eliminate any distortion of the lens shutter control signal waveforms caused by the capacitance of the LCD shutters. This improves the accuracy of measuring the timing associated with these signals.

- Test Points shall be provided for the following signals and shall be suitable for attaching oscilloscope probes and probe ground leads.

  - Left Shutter Control Signal A (1 of 2)

  - Left Shutter Control Signal B (2 of 2)

  - Right Shutter Control Signal A (1 of 2)

  - Right Shutter Control Signal B (2 of 2)

  - Common Voltage Reference, i.e. Ground,

- Representative drawings or oscilloscope photographs of the expected waveforms for 3D and 2D modes of operations shall be provided by the 3DG implementer to aid in the oscilloscope setup and observation of the shutter control waveforms.

3.1.2.3 Lower Tester 3DD Setup

The Lower Tester 3DD shall be configured as follows:

- The Reference Frame Sync Generator shall be connected to the Lower Tester 3DD Frame Sync Input with the parameters for this Frame Sync input signal defined in the Lower Tester 3DD's operational specifications.

- The Lower Tester 3DD Lens Shutter Timing Parameters shall be set according to the following rules:

  - Use Table 2.1 for test procedures specifying a Reference Frame Sync Frequency of 50 Hz.

  - Use Table 2.2 for test procedures specifying a Reference Frame Sync frequency of 59.94 Hz.

  - Use Table 2.2 for test procedures specifying a Reference Frame Sync other than 59.94 Hz or 50 Hz.

  - Randomly select one of the Shutter Timing Test Sets from Table 2.1 or Table 2.2 based upon the Reference Frame Sync Frequency required by the test procedure. Configure the following Lower Tester 3DD's 3D Broadcast Message payload parameters with the values from the respective table. If multiple tests are performed, do not reuse the same values until all Shutter Timing Test Sets have been used at least once.

    - Left Lens Shutter Open Offset

    - Left Lens Shutter Close Offset

    - Right Lens Shutter Open Offset

    - Right Lens Shutter Close Offset

50 Hz Reference Frame Sync Frequency Shutter Timing Offsets

Shutter Timing Test Set #	Left lens shutter open offset (μsec)	Left lens shutter close offset (μsec)	Right lens shutter open offset (μsec)	Right lens shutter close offset (μsec)
1	-750	10000	9250	20000
2	-500	9750	9500	19750
3	-250	9500	9750	19500
4	0	9250	10000	19250
5	250	9000	10250	19000
6	500	8750	10500	18750
7	750	8500	10750	18500

Table 3.1: *Lower Tester 3DD Shutter Timing Offsets - 50 Hz*

59.94 Hz Reference Frame Sync Frequency Shutter Timing Offsets				
Shutter Timing Test Set #	Left lens shutter open offset (μsec)	Left lens shutter close offset (μsec)	Right lens shutter open offset (μsec)	Right lens shutter close offset (μsec)
1	-750	8341	7593	16683
2	-500	8092	7842	16432
3	-250	7843	8093	16183
4	0	7592	8342	15932
5	250	7343	8593	15683
6	500	7092	8842	15432
7	750	6843	9093	15183

Table 3.2: *Lower Tester 3DD Shutter Timing Offsets – 59.94 Hz*

3.1.2.4   3DG IUT Oscilloscope Setup

The setup of the oscilloscope specified in Section 3.1.1.4 for the Lower Tester 3DG should be used for the oscilloscope setup for the 3DG IUT. The Channel volts/division should be should be set according to the expected signal voltage levels specified in the 3DG IUT's IXIT.

3.1.2.5   3DG Lens Shutter Control Signal Example Waveforms

The lens shutter control waveform and voltage requirements are unique to the liquid crystal technology implemented in the 3DG lens shutters. Currently available Twisted Nemantic (TN) liquid crystal shutters typically require several volts applied to the shutter to close. Conversely, the TN shutter is open when the voltage applied to the shutter is zero. Since a constant DC voltage differential will damage the liquid crystal material, liquid crystal shutters are typically driven by a bipolar DC differential voltage for closing the shutter and a zero DC differential voltage for open.

The oscilloscope photos shown in Figures 2.3 through 2.9 are representative of the lens shutter control signals for a hypothetical 3DG's TN shutter implementation as well as for the Lower Tester 3DG. Each shutter control signal has three voltage states, +5 volts, -5 volts and 0 volts relative to a common ground. When observed on the oscilloscope without channel math, the values shown in Table 2.3 columns A & B will be observed as two waveforms for Lens Shutter Control Signal A and Lens Shutter Control Signal B, respectively. With channel math set to A-B, the values shown in Table 2.3 column A-B will be observed

with a single waveform depicting the actual differential voltage applied to the liquid crystal shutter being seen on the oscilloscope.

Lens Shutter State	Lens Shutter Control Signals		
	A	B	A - B
Closed	+5 Volts	-5 Volts	+10 Volts
Open	0 Volts	0 Volts	0 Volts
Closed	-5 Volts	+5 Volts	-10 Volts

Table 3.3: *Example Shutter State Voltages*

This differential voltage measurement method has been used for all of the following oscilloscope photos shown in Figures 2.3 through 2.9 below.
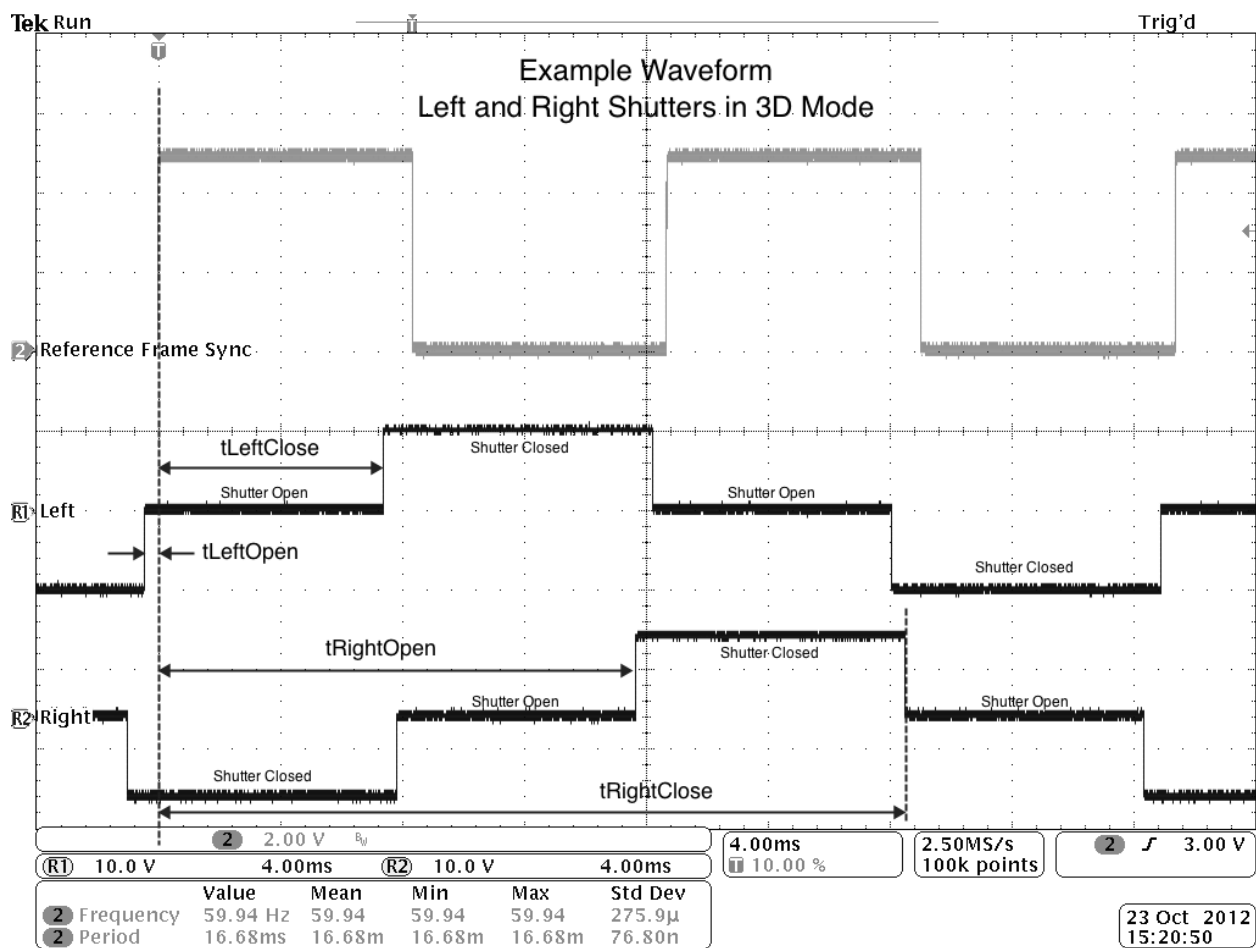
Figure 3.3: *3D Mode Lens Shutter Control Signal Waveforms*
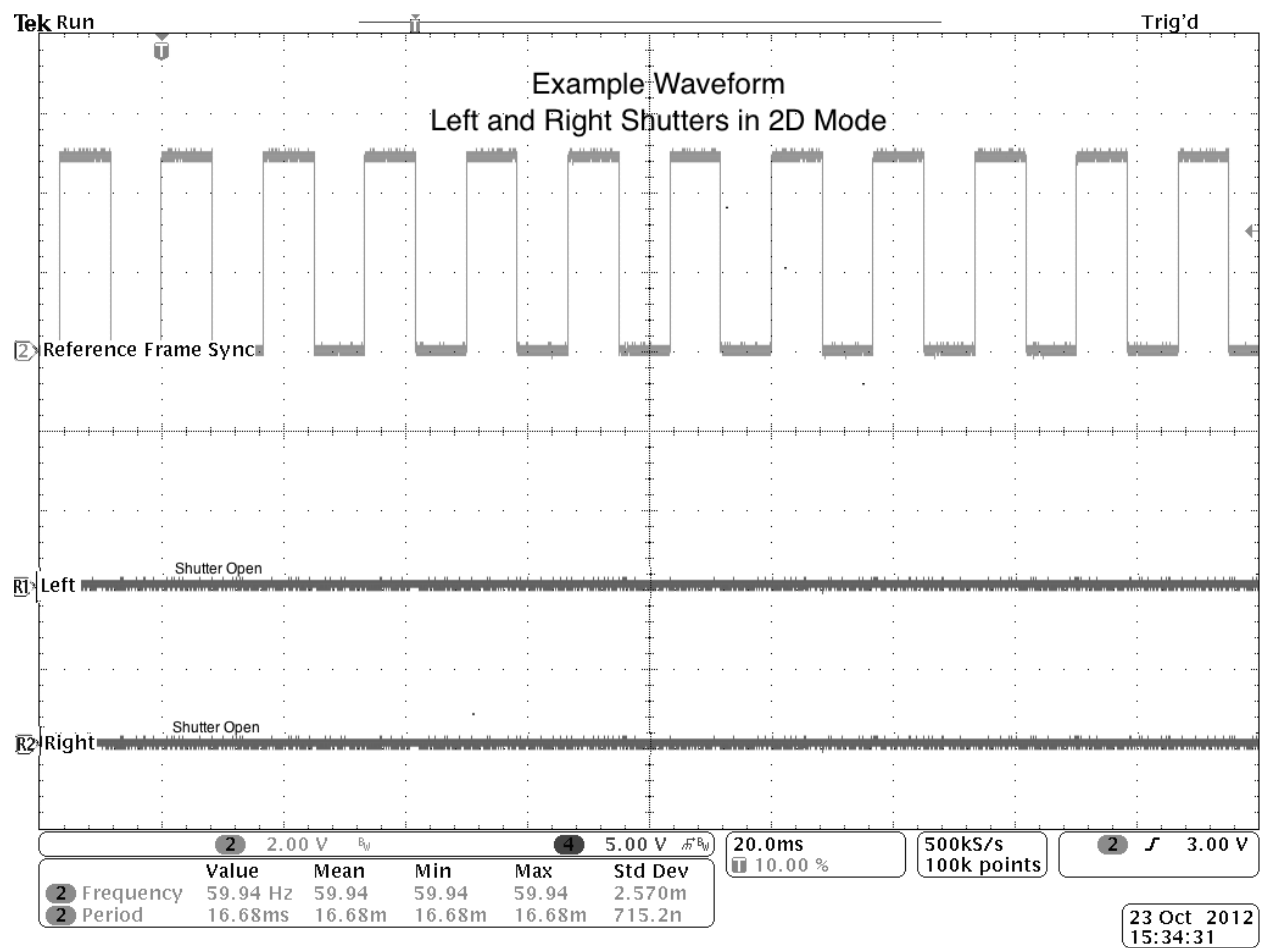
Figure 3.4: 2D Mode Lens Shutter Control Signal Waveforms
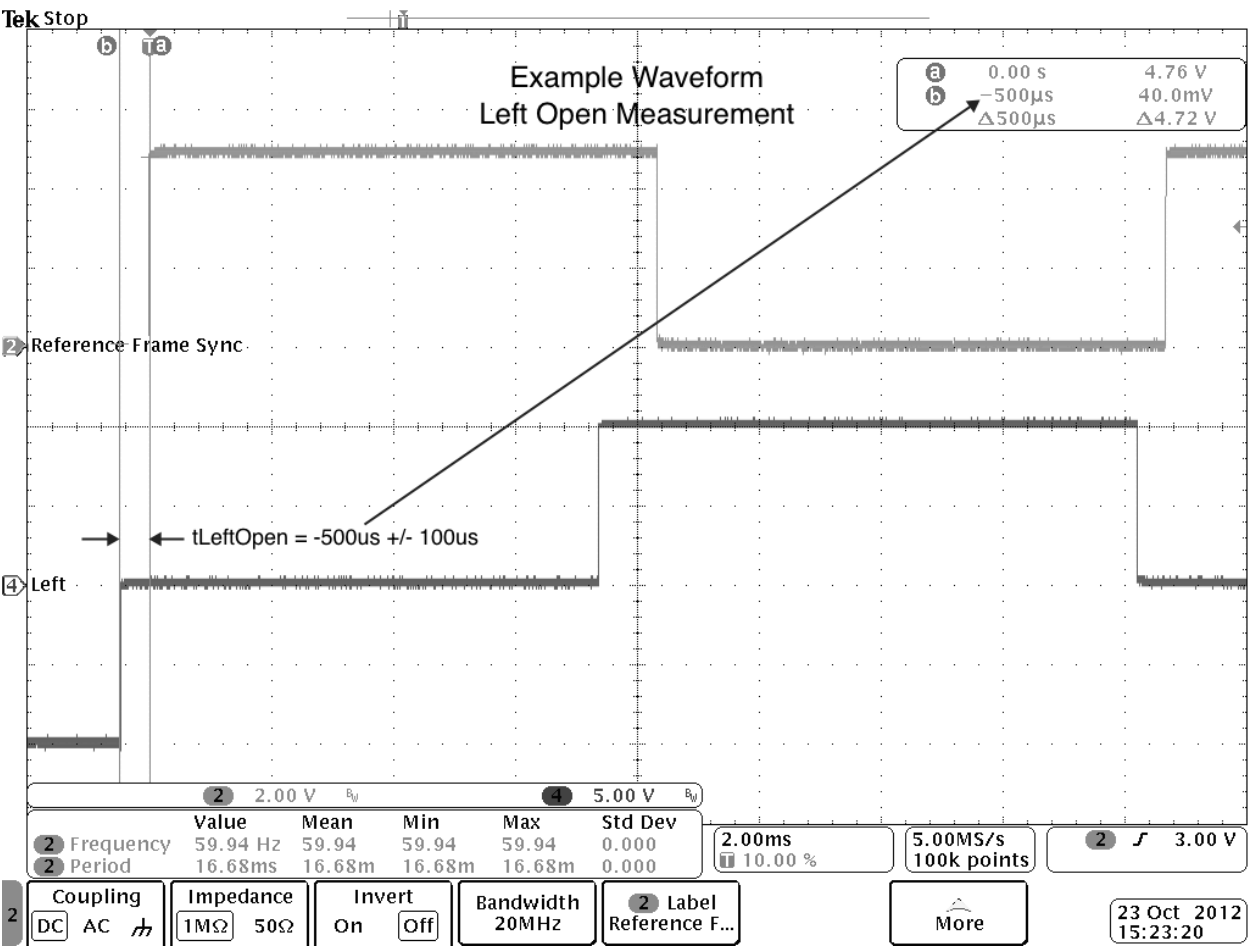
Figure 3.5: *Left Lens Shutter Open Timing Measurement*
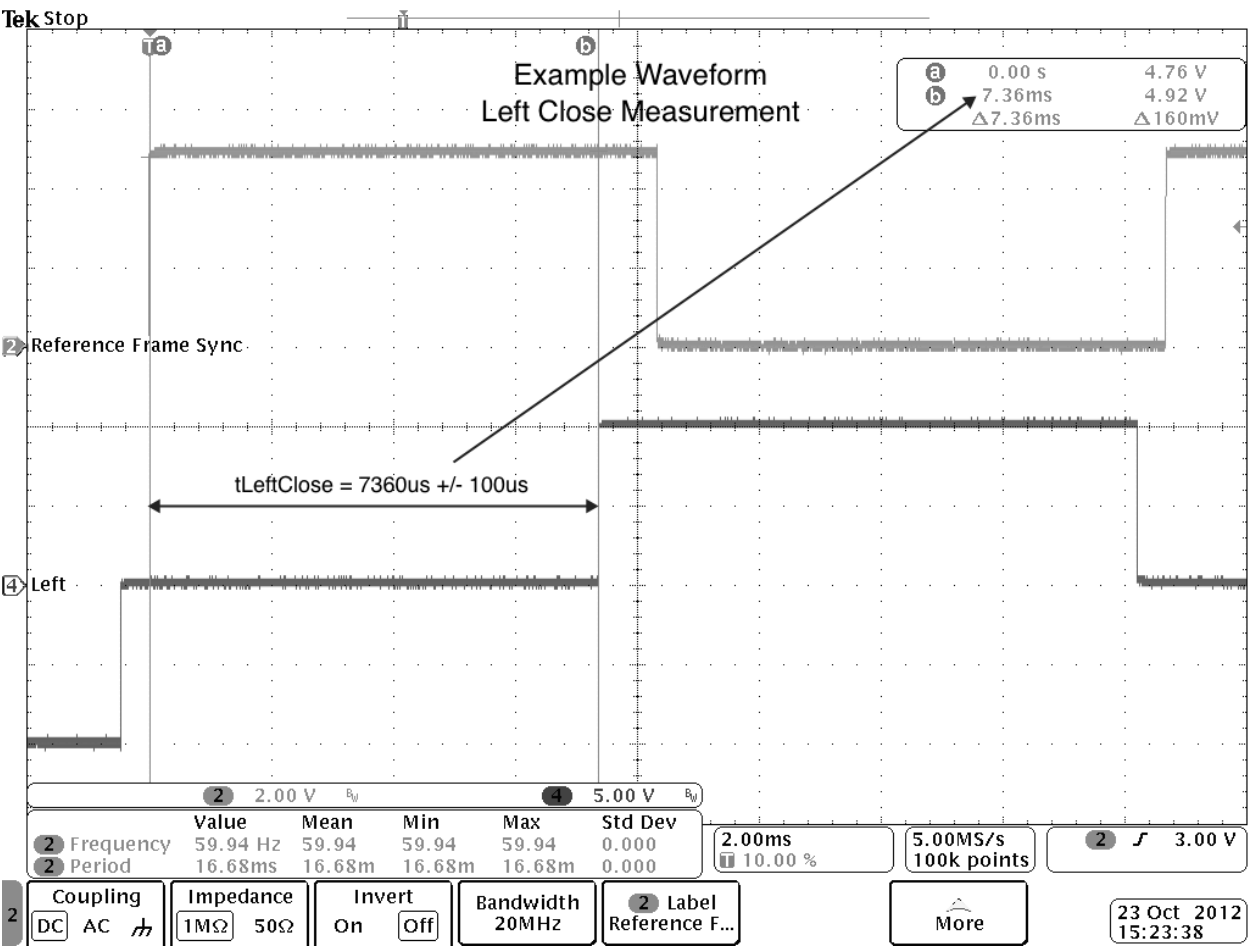
Figure 3.6: *Left Lens Shutter Close Timing Measurement*
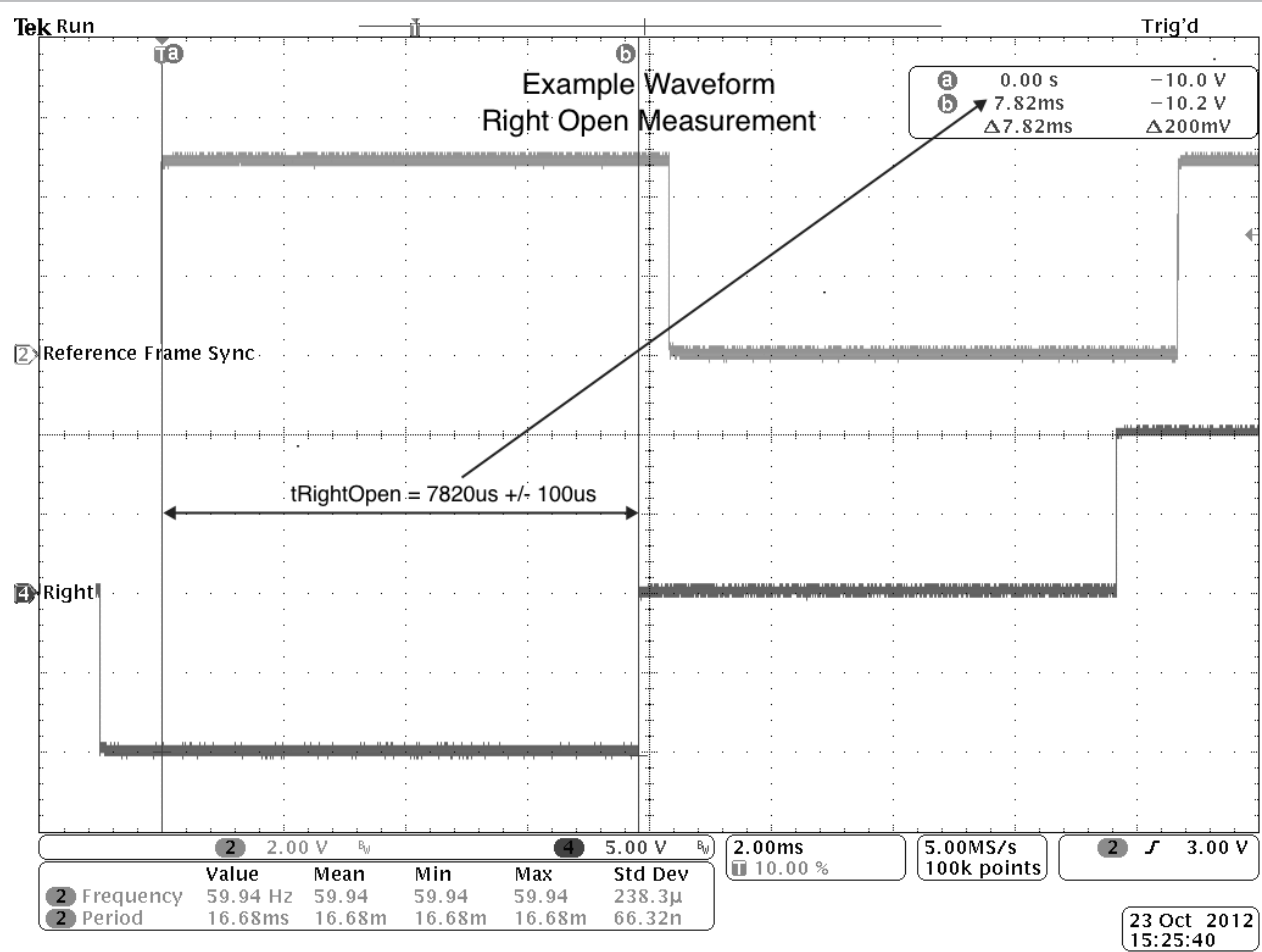
Figure 3.7: Right Lens Shutter Open Timing Measurement
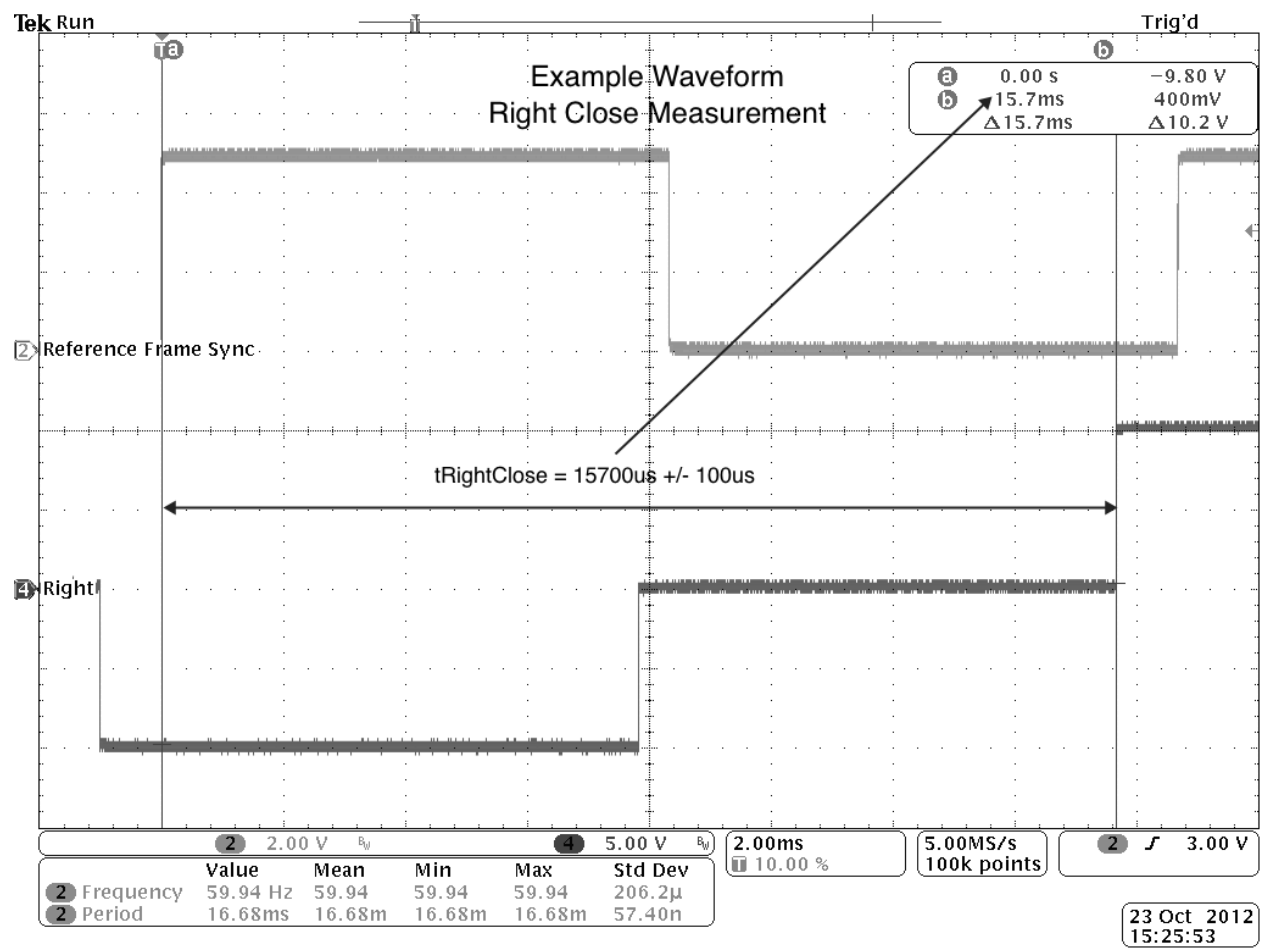
Figure 3.8: *Right Lens Shutter Close Timing Measurement*
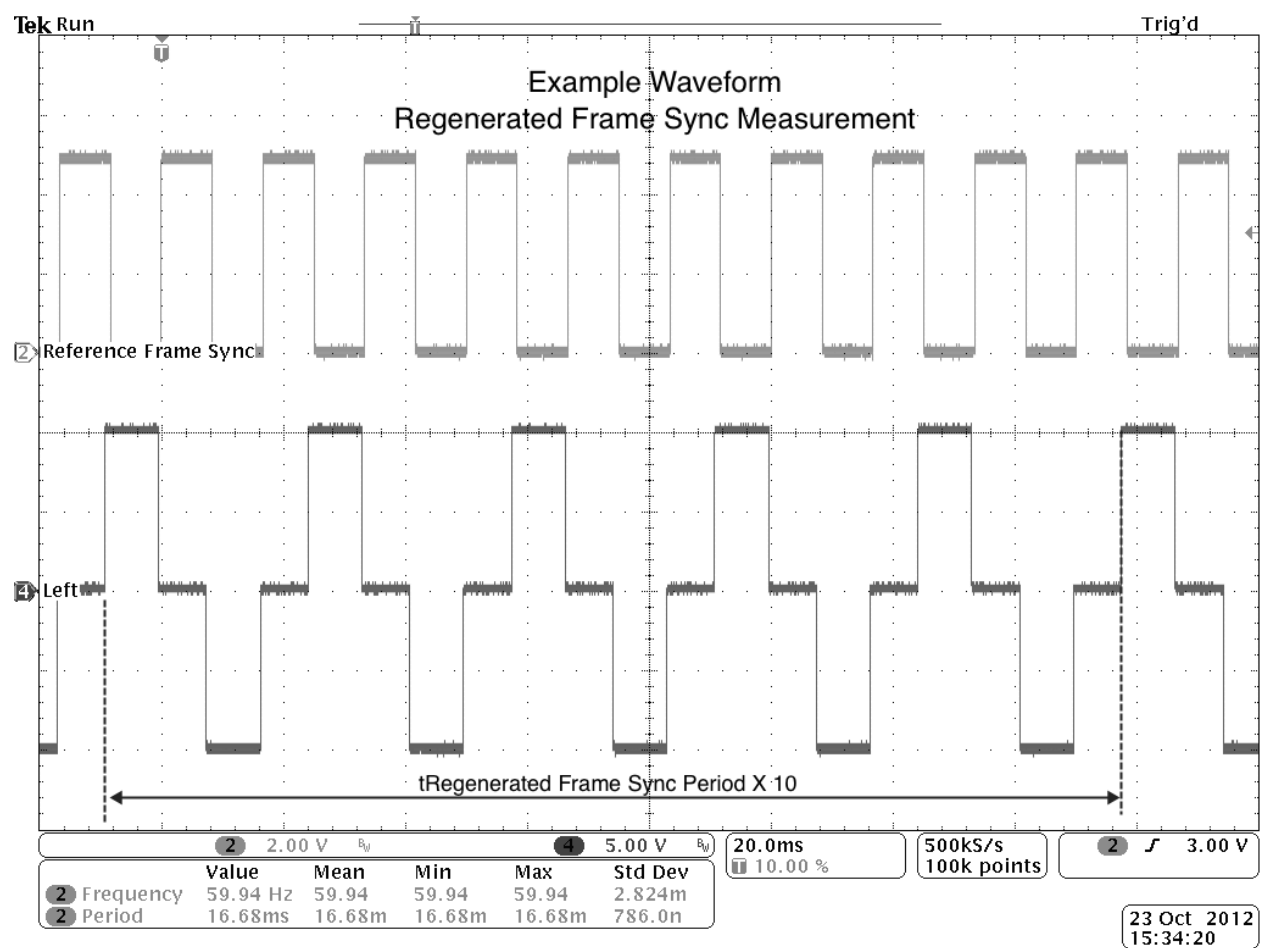
Figure 3.9: *Frame Sync Period Timing Accuracy Measurement*

3.2   Test Strategy

The test objectives are to verify Bluetooth 3D Synchronization Profile functionality as specified for both 3DD and 3DG and to ensure interoperability between 3DD and 3DG made by different manufacturers or different models of 3DG and 3DD made by the same manufacturer. The testing approach is to cover mandatory and optional requirements in the 3D Synchronization Profile and to also verify recovery mechanisms for common errors.

The test equipment shall provide an implementation of the Radio, Bluetooth Controller, and the Bluetooth Host needed to perform the test cases defined in the 3D Synchronization Profile Test Specification. The test equipment is expected to handle tests for IUT as either 3DD or 3DG.

The 3DD and 3DG test suite contain Behavior Valid (BV) tests complemented with Behavior Invalid (BI) tests. The Profile ICS includes any requirements on lower layer features that go beyond what supporting the nominal requirements of the lower layer means.

Testing will be limited to the over the air portion of the behavior and the mandatory lens shutter rates. Testing of the optical performance of 3DG is outside the scope of Bluetooth testing.

When testing the Bluetooth 3DD role on an IUT, a suitable test system is used to emulate the role of a Bluetooth 3DG for interoperability and conformance tests.

When testing the Bluetooth 3DG role on an IUT, a suitable test system is used to emulate the role of a Bluetooth 3DD for interoperability and conformance tests.

Certain tests within this test specification require the presence of multiple Lower Tester 3DDs in order to verify the functionality of the 3DG IUT.

The following table shows the Test Suite Structure for the 3D Synchronization Profile interoperability and conformance tests.

Test Group	IUT Role	Test Purposes
Proximity Association	**3DG**	Association to 3DD
		Association to Legacy 3DD
		Class of Device Ignored During Proximity Association
		Association Failure on Excess Path Loss
		Association Failure on Missing EIR Data
		Ignore Additional Data in an Extended 3D Information EIR Field
	3DD	Reporting Class of Device
		Valid EIR Data Format – 3D Information EIR Field
		Valid EIR Data Format – TX Power Level Field
		Valid EIR Data Format – Legacy 3D Information EIR Field
3DG Connection Announcement	**3DD**	Invalid 3D Communications Channel Message Opcode
Association Notification	**3DG**	Association Notification Transmission
		Association Notification Not Transmitted when Not Supported by 3DD
		Legacy Association Notification Not Transmitted to 3DD
	3DD	Association Notification Reception
		Reference Protocol Association Notification Reception
Battery Level Reporting	**3DG**	Battery Level Transmission at Association Notification
		Battery Level Transmission at Start-up Synchronization
		Battery Level Transmission at User Action requesting Battery Level Display
		Battery Level Report Not Transmitted at Start-up Synchronization when Not Supported by 3DD
		Battery Level Reporting Not Supported indicated when sending 3DG Connection Announcement message
	3DD	Battery Level Reception at Association Notification
		Battery Level Reception at Start-up Synchronization
		Battery Level Reception at User Request for Battery Level Display
	3DG	3D Broadcast Message Reception

Test Group	IUT Role	Test Purposes
3D Broadcast	**3DD**	3D Broadcast Message Transmission
Frame Sync	**3DD**	3DD Timing Accuracy
		Invalid Frame Sync Period
Shutter Control	**3DG**	3DG Timing Accuracy
		3D-to-2D Switch on Exceeding Maximum Timing Error
		3D-to-2D Switch on Invalid Frame Sync Period
Service Discovery	3DD	Service Discovery
	3DG	Service Discovery

Table 3.4: Test Suite Structure

3.3   Test Groups

The test suite verifies profile operations and communication flows between profile layers. Tests are grouped according to profile operations and individual tests verify aspects of the profile operation and/or communication flows. The following is the list of Test Groups.

- Proximity Association:

Tests verifying the proper operation of Proximity Association between 3DD and 3DG, including proper transmission by 3DD and reception by 3DG of EIR Data.

- 3DG Connection Announcement:

Tests verifying the proper operation by the 3DD when receiving the 3DG Connection Announcement message.

- Association Notification:

Tests verifying the proper operation of Association Notification and Legacy Association Notification transmission by the 3DG and reception by the 3DD.

- Battery Level Reporting:

Tests verifying the proper operation of Battery Level Reporting transmission by the 3DG and reception by the 3DD.

- 3D Broadcast:

Tests verifying the proper transmission by the 3DD and reception by the 3DG of the 3D Broadcast Message.

- Frame Sync:

Tests verifying the 3DD can properly and accurately perform the operations of capturing and formatting frame sync timing information associated with the displayed image.

- Shutter Control:

Tests verifying that the 3DG can properly and accurately perform the operation of lens shutter control based on frame sync timing information received in the 3D Broadcast Message.

- Service Discovery:

Tests verifying the proper implementation of SDP service records by the 3DD and the 3DG.

4   Test Cases (TC)

4.1   Introduction

4.1.1   Test Case Identification Conventions

Test cases shall be assigned unique identifiers per the conventions in [3]. 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 specification to test specification, but shall be consistent within each individual test specification.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
3DSP	3D Synchronization Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
3DD	Bluetooth 3D Display role
3DG	Bluetooth 3D Glasses role
Identifier Abbreviation	**Feature Identifier <feat>**
PA	Proximity Association
CA	3DG Connection Announcement
AN	Association Notification
BLR	Battery Level Reporting
3DB	3D Broadcast
FS	Frame Sync
SC	Shutter Control
SDP	Service Discovery

Table 4.1: 3DSP TC Feature Naming Conventions

4.1.2   Conformance

When conformance is claimed, all capabilities indicated as mandatory for this Specification shall be supported in the specified manner (process-mandatory).This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth Qualification Program.

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, OR

- That capabilities enabled by the implementations are sustained over durations expected by the use case, OR

- That the implementation gracefully handles any quantity of data expected by the use case, OR

- That in cases where more than one valid interpretation of the Specification exist, the implementation complies with at least one interpretation and gracefully handles other interpretations OR

- 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 Generator, the Test Case as described in the Test Specification, 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, which outlines all the detailed pass criteria conditions that shall be met by the IUT to merit a Pass Verdict.

The convention in this test specification is that, unless there are 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 shall be the Fail Verdict.

4.2   Proximity Association

Test Group Objective:

4.2.1   The purpose of the tests described in this section is to check that 3DD and 3DG can properly perform Proximity Association.3DG

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DG can properly perform Proximity Association.

  The following Message Sequence Chart (MSC) depicts the generic message sequence for 3DG IUT Proximity Association test cases.
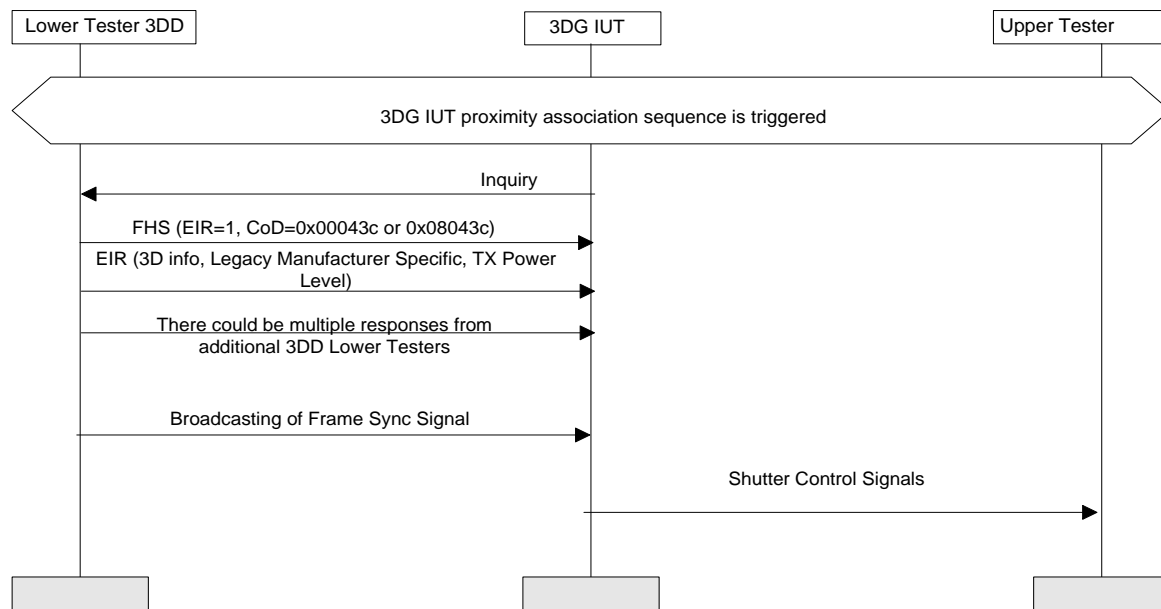
Figure 4.1: MSC for 3DG IUT Proximity Association Test Cases

4.2.1.1   3DSP/3DG/PA/BV-01-C [Association to 3DD]

- Test Purpose

  Verify that a 3DG can properly associate with a 3DD.

- Reference

  [4] 5.3

- Initial Condition

  The 3DG IUT is in OFF mode and is not currently associated with either Lower Tester 3DD #1 or Lower Tester 3DD #2.

  Both Lower Tester 3DD #1 and Lower Tester 3DD #2 are in the ON mode, are configured as described in Section 3.1.2, and are ready to perform Proximity Association.

  The Lower Tester 3DD #1 and Lower Tester 3DD #2 are each being supplied a different Reference Frame Sync frequency both of which are within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

  The Lower Tester 3DD #1 is set to operate at a TX power level of 0 dBm and the Path Loss Threshold value set to 80 dB in both its 3D Information EIR Field and its Legacy 3D Information EIR Field.

  The Lower Tester 3DD #2 is set to operate at a TX power level of -20 dBm and the Path Loss Threshold value set to 80 dB in both its 3D Information EIR Field and its Legacy 3D Information EIR Field.

  The 3DG IUT is placed at a distance of 50 cm from both the Lower Tester 3DD #1 and Lower Tester 3DD #2.

- Test Procedure

  1. The 3DG IUT is triggered to turn on and begin Proximity Association.
  2. Both Lower Tester 3DD #1 and Lower Tester 3DD #2 respond to 3DG IUT's inquiry with correct Class of Device, followed by EIR with properly-formatted 3D Information EIR Field, Legacy 3D Information EIR Field, and TX Power Level Field.
  3. The 3DG IUT receives the response from both Lower Tester 3DD #1 and Lower Tester 3DD #2 and selects Lower Tester 3DD #1 with which to associate based on its higher TX power level.

- Expected Outcome

  Pass verdict:

  The 3DG IUT lens shutter timing signals shall be in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD #1 thus indicating that the 3DG IUT has properly associated with Lower Tester 3DD #1 having a higher TX power level than Lower Tester 3DD #2.

4.2.1.2 3DSP/3DG/PA/BV-02-C [Association to Legacy 3DD]

- Test Purpose

  Verify that a 3DG can properly associate with a Legacy 3DD.

- Reference

  [4] 5.3

- Initial Condition

  The 3DG IUT is in OFF mode and is not currently associated with either Lower Tester 3DD #1 or Lower Tester 3DD #2.

  Both Lower Tester 3DD #1 and Lower Tester 3DD #2 are in the ON mode, are configured as described in Section 3.1.2, and are ready to perform Proximity Association.

  Both Lower Tester 3DD #1 and Lower Tester 3DD #2 are configured to send only the Legacy 3D Information EIR Field and not the 3D Information EIR Field.

  The Lower Tester 3DD #1 and Lower Tester 3DD #2 are each being supplied a different Reference Frame Sync frequency both of which are within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

  The Lower Tester 3DD #1 is set to operate at a TX power level of 0 dBm and its Legacy 3D Information EIR Field Path Loss Threshold value set to 80 dB.

  The Lower Tester 3DD #2 is set to operate at a TX power level of -20 dBm and its Legacy 3D Information EIR Field Path Loss Threshold value set to 80 dB.

  The 3DG IUT is placed at a distance of 50 cm from both the Lower Tester 3DD #1 and Lower Tester 3DD #2.

- Test Procedure

  1. The 3DG IUT is triggered to turn on and begin Proximity Association.

2. Both Lower Tester 3DD #1 and Lower Tester 3DD #2 respond to 3DG IUT's inquiry with properly-formatted Class of Device field, TX Power Level Field, and the Legacy 3D Information EIR Field but does not respond with the 3D Information EIR Field.

3. The 3DG IUT receives the response from both Lower Tester 3DD #1 and Lower Tester 3DD #2 and selects Lower Tester 3DD #1 with which to associate based on its higher TX power level.

- Expected Outcome

Pass verdict:

The 3DG IUT lens shutter timing signals shall be in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD #1 thus indicating that the 3DG IUT has properly associated with Lower Tester 3DD #1 having a higher TX power level than Lower Tester 3DD #2.

4.2.1.3   3DSP/3DG/PA/BV-03-C [Class of Device Ignored During Proximity Association]

- Test Purpose

Verify that a 3DG ignores Class of Device during Proximity Association.

- Reference

[4] 5.1.1, 5.3

- Initial Condition

The 3DG IUT is in OFF mode and is not currently associated with the Lower Tester 3DD.

The Lower Tester 3DD is in the ON mode, is configured as described in Section 3.1.2, and is ready to perform Proximity Association.

The Lower Tester 3DD is set to operate with its maximum TX power level.

The Lower Tester 3DD is being supplied a Reference Frame Sync frequency which is within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

The 3DG IUT is placed at a distance of 50 cm from the Lower Tester 3DD.

- Test Procedure

1. The 3DG IUT is triggered to turn on and begin Proximity Association.
2. The Lower Tester 3DD responds to 3DG IUT's inquiry with a Class of Device field set to one of the following values 0x400204, 0x40020C, or 0x00010C followed by EIR that has properly-formatted 3D Information EIR Field, Legacy 3D Information EIR Field, and TX Power Level Field.

- Expected Outcome

Pass verdict:

The 3DG IUT lens shutter timing signals shall be in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD thus indicating that the 3DG IUT has properly associated with the Lower Tester 3DD.

4.2.1.4   3DSP/3DG/PA/BV-04-C [Association Failure on Excess Path Loss]

- Test Purpose

Verify that a 3DG will not associate with a 3DD having a path loss that is greater than the Path Loss Threshold specified by the 3DD.

- Reference

  [4] 5.1, 5.3

- Initial Condition

  The 3DG IUT is in OFF mode and is not currently associated with the Lower Tester 3DD.

  The Lower Tester 3DD is in the ON mode, is configured as described in Section 3.1.2, and is ready to perform Proximity Association.

  The Lower Tester 3DD is set to operate with a TX power level of -20 dBm.

  The Lower Tester 3DD is being supplied a Reference Frame Sync frequency which is within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

  The 3DG IUT is placed at a distance of 50 cm from the Lower Tester 3DD.

- Test Procedure

  1. The 3DG IUT is triggered to turn on and begin Proximity Association.
  2. The Lower Tester 3DD responds to 3DG IUT's inquiry with properly-formatted 3D Information EIR Field and Legacy 3D Information EIR Field both with a Path Loss Threshold set to 0 dB and TX Power Level Field set to a TX Power Level = 0 dBm.
  3. The 3DG IUT receives the response from Lower Tester 3DD.

- Expected Outcome

  Pass verdict:

  The 3DG IUT lens shutter timing signals shall not be switching in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD thus indicating that the 3DG IUT has not associated with Lower Tester 3DD.

4.2.1.5   3DSP/3DG/PA/BI-05-C [Association Failure on Missing EIR Data]

- Test Purpose

  Verify that a 3DG will not associate with a 3DD when receiving from the 3DD an EIR packet that does not contain the 3D Information EIR Field and the Legacy 3D Information EIR Field.

- Reference

  [4] 5.1.2.2, 5.3

- Initial Condition

  The 3DG IUT is in OFF mode and is not currently associated with the Lower Tester 3DD.

  The Lower Tester 3DD is in the ON mode, is configured as described in Section 3.1.2, and is ready to perform Proximity Association.

  The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

The Lower Tester 3DD is being supplied a Reference Frame Sync frequency which is within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

The 3DG IUT is placed at a distance of 50 cm from the Lower Tester 3DD.

- Test Procedure

    4. The 3DG IUT is triggered to turn on and begin Proximity Association.
    5. The Lower Tester 3DD responds to 3DG IUT's inquiry with a properly-formatted Class of Device field and TX Power Level Field, but with no 3D Information EIR Field and no Legacy 3D Information EIR Field.
    6. The 3DG IUT receives the response from Lower Tester 3DD.

- Expected Outcome

    Pass verdict:

    The 3DG IUT lens shutter timing signals shall not be switching in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD thus indicating that the 3DG IUT has not associated with Lower Tester 3DD.

4.2.1.6   3DSP/3DG/PA/BV-06-C [Ignore Additional Data in an Extended 3D Information EIR Field]

- Test Purpose

    Verify that a 3DG will properly associate with a 3DD when receiving from the 3DD an extended 3D Information EIR Field.

- Reference

    [4] 5.1, 5.3

- Initial Condition

    The 3DG IUT is in OFF mode and is not currently associated with the Lower Tester 3DD.

    The Lower Tester 3DD is in the ON mode, is configured as described in Section 3.1.2, and is ready to perform Proximity Association.

    The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

    The Lower Tester 3DD is being supplied a Reference Frame Sync frequency which is within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

    The 3DG IUT is placed at a distance of 50 cm from the Lower Tester 3DD.

- Test Procedure

    1. The 3DG IUT is triggered to turn on and begin Proximity Association.
    2. The Lower Tester 3DD responds to the 3DG IUT inquiry with properly-formatted Class of Device Field, Legacy 3D Information EIR Field, TX Power Level Field, but is transmitting a 3D Information EIR Field indicating support for Association Notification and Battery Level Reporting and having four additional bytes of data (Byte 4 = 0xFF, Byte 5 = 0, Byte 6 = 0xFF, Byte 7 = 0).

- Expected Outcome

Pass verdict:

The 3DG IUT shall properly associate with the Lower Tester 3DD, the lens shutter timing signals shall be in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD, and the 3DG IUT shall send a properly-formatted Association Notification and Battery Level Report, if supported, thus indicating that the additional data in the 3D Information EIR Field had no effect on the 3DG IUT.

4.2.2   3DD

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DD can properly perform Proximity Association.

The following Message Sequence Chart (MSC) depicts the generic message sequence for 3DD IUT Proximity Association test cases.
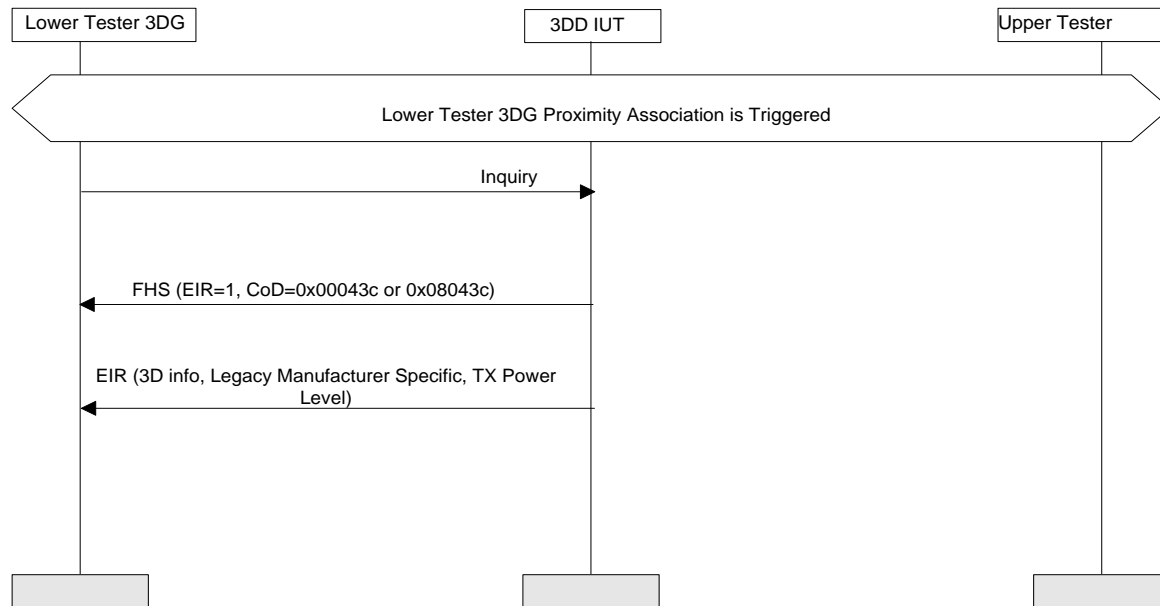
Figure 4.2: MSC for 3DD IUT Proximity Association Test Cases

4.2.2.1   3DSP/3DD/PA/BV-07-I [Reporting Class of Device]

- Test Purpose

Verify that a 3DD properly reports Class of Device that is necessary for supporting Proximity Association with a Legacy 3DG.

- Reference

[4] 5.1.1

- Initial Condition

The Lower Tester 3DG and the 3DD IUT are in ON mode.

- Test Procedure

  1. The Lower Tester 3DG sends an inquiry to the 3DD IUT.

- Expected Outcome

  Pass verdict:

  The Lower Tester 3DG receives a properly-formatted Class of Device field from the 3DD IUT.

4.2.2.2   3DSP/3DD/PA/BV-08-I [Valid EIR Data Format – 3D Information EIR Field]

- Test Purpose

  Verify that a 3DD properly reports the 3D Information EIR Field in its EIR data.

- Reference

  [4] 5.1.2

- Initial Condition

  The Lower Tester 3DG and the 3DD IUT are in ON mode.

- Test Procedure

  The Lower Tester 3DG sends an inquiry to the 3DD IUT.

- Expected Outcome

  Pass verdict:

  The Lower Tester 3DG receives a properly-formatted 3D Information EIR Field from the 3DD IUT in an EIR packet.

4.2.2.3   3DSP/3DD/PA/BV-09-I [Valid EIR Data Format – TX Power Level Field]

- Test Purpose

  Verify that a 3DD properly reports the TX Power Level Field in its EIR data.

- Reference

  [1] Volume 3, Part C, Section 8.1.5

  [4] 5.1.2.3

- Initial Condition

  The Lower Tester 3DG and the 3DD IUT are in ON mode.

- Test Procedure

  The Lower Tester 3DG sends an inquiry to the 3DD IUT.

- Expected Outcome

  Pass verdict:

The Lower Tester 3DG receives a properly-formatted TX Power Level Field from the 3DD IUT in an EIR packet.

4.2.2.4 3DSP/3DD/PA/BV-10-I [Valid EIR Data Format – Legacy 3D Information EIR Field]

- Test Purpose

Verify that a 3DD properly reports the Legacy 3D Information EIR Field in its EIR data.

- Reference

[4] 5.1.2.2

- Initial Condition

The Lower Tester 3DG and the 3DD IUT are in ON mode.

- Test Procedure

The Lower Tester 3DG sends an inquiry to the 3DD IUT.

- Expected Outcome

Pass verdict:

The Lower Tester 3DG receives a properly-formatted Legacy 3D Information EIR Field from the 3DD IUT in an EIR packet.

4.3 3DG Connection Announcement

Test Group Objective:

- The purpose of the tests described in this section is to check that 3DD can filter based on the value of the 3D Opcode field in the 3DG Connection Announcement message.

4.3.1 3DD

4.3.1.1 3DSP/3DD/CA/BI-01-C [Invalid 3D Communications Channel Message Opcode]

- Test Purpose

Verify that a 3DD will ignore a received 3D Communications Channel message that appears to be a 3DG Connection Announcement message except such message has a non-zero 3D Communications Channel Message Opcode field.

- Reference

[1] Volume 3, Part A, Section 7.6

[4] 6.2

- Initial Condition

An ACL connection exists between the Lower Tester 3DG and the 3DD IUT.

- Test Procedure

The Lower Tester 3DG sends a 3D Communications Channel Message to the 3DD IUT with the 3D Communications Channel Message Opcode set to a non-zero value.
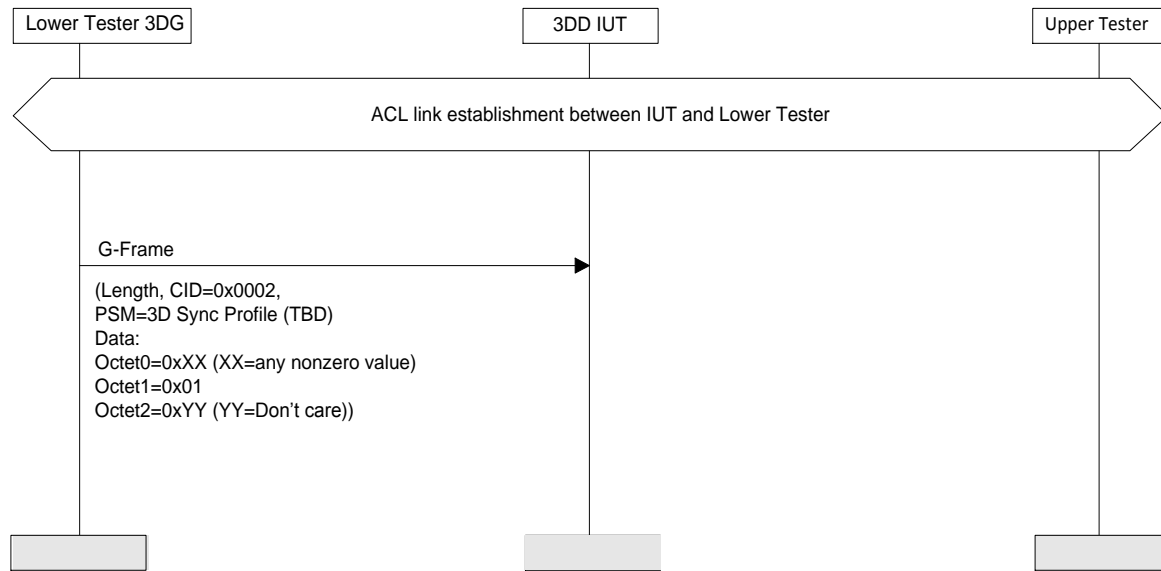
Figure 4.3: MSC for 3DSP/3DD/CA/BI-01-C

- Expected Outcome

  Pass verdict:

  The 3DD IUT does not send a message to the Upper Tester indicating reception of a 3D Communications Channel Message.

4.4   Association Notification

Test Group Objective:

- The purpose of the tests described in this section is to check that 3DD and 3DG can properly perform Association Notification and Legacy Association Notification.

4.4.1   3DG

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DG can properly perform various functions associated with Association Notification.

4.4.1.1   3DSP/3DG/AN/BV-01-C [Association Notification Transmission]

- Test Purpose

  Verify that a 3DG can properly transmit the Association Notification.

- Reference

  [1] Volume 3, Part A, Section 7.6

  [4] 6.3.1

- Initial Condition

Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

The Lower Tester 3DD has indicated support for Association Notification and no support for Battery Level Reporting in its 3D Information EIR Field.

An ACL connection exists between the Lower Tester 3DD and the 3DG IUT.

- Test Procedure

The 3DG IUT sends a 3D Connection Announcement Message to the Lower Tester 3DD.
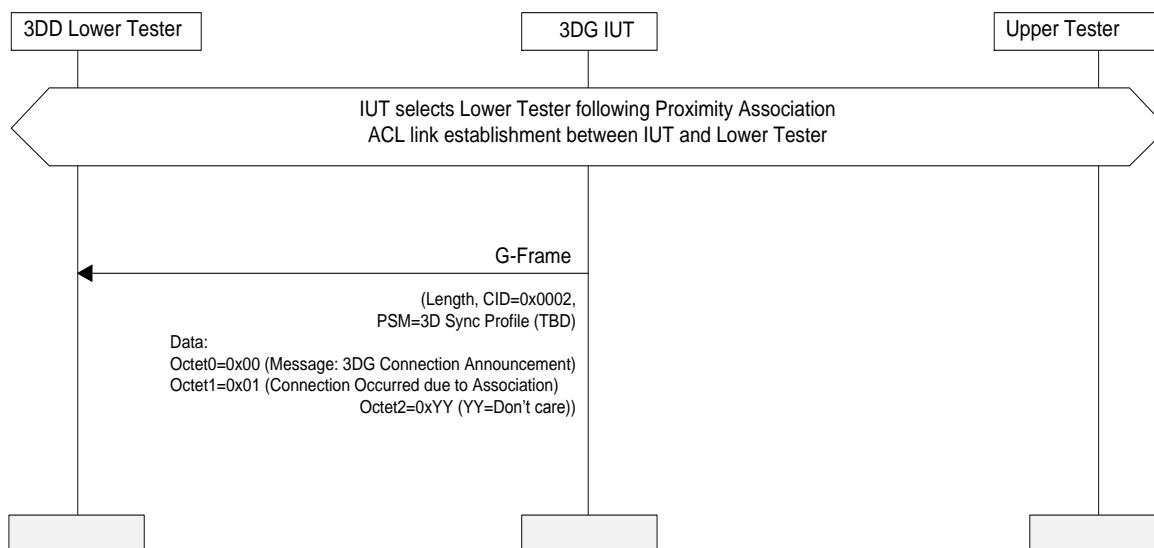
Figure 4.4: *MSC for 3DSP/3DG/AN/BV-01-C*

- Expected Outcome

<u>Pass verdict:</u>

The 3DG IUT sends a properly formatted 3D Communications Channel Message with the Association Notification bit set to "Connection Occurred due to Association".

4.4.1.2   3DSP/3DG/AN/BV-02-C [Association Notification Not Transmitted when Not Supported by 3DD]

- Test Purpose

Verify that a 3DG does not transmit the Association Notification to a 3DD that does not support Association Notification.

- Reference

[1] Volume 3, Part A, Section 7.6

[4] 6.3.1

- Initial Condition

Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

The Lower Tester 3DD has indicated no support for Association Notification in the 3D Information EIR Field.

- Test Procedure

The Lower Tester 3DD waits for 5 seconds to determine if the 3DG IUT attempts to establish an ACL connection.
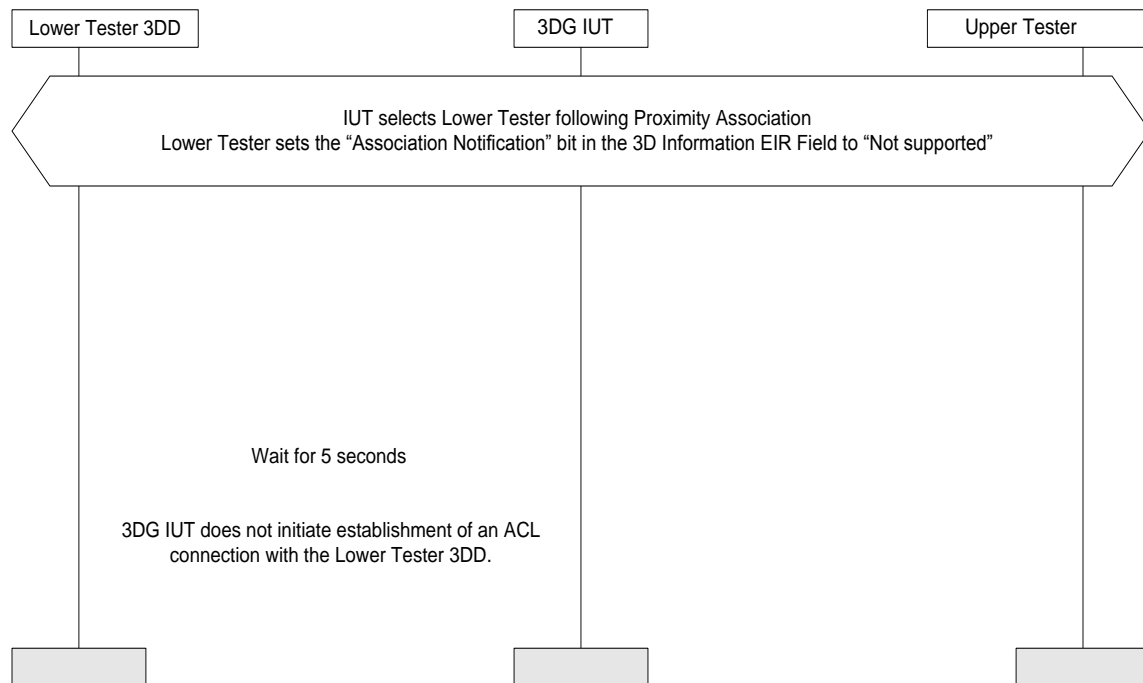
Figure 4.5: *MSC for 3DSP/3DG/AN/BV-02-C*

- Expected Outcome

Pass verdict:

The 3DG IUT does not initiate establishment of an ACL connection with the Lower Tester 3DD.

4.4.1.3 3DSP/3DG/AN/BV-03-C [Legacy Association Notification Not Transmitted to 3DD]

- Test Purpose

Verify that a 3DG does not transmit the Legacy Association Notification to a 3DD that is not a Legacy 3DD.

- Reference

[4] 7, 7.1, 7.5

- Initial Condition

The 3DG IUT is in OFF mode and is not currently associated with the Lower Tester 3DD.

The Lower Tester 3DD is in the ON mode, is configured as described in Section 3.1.2, and is ready to perform Proximity Association.

The Lower Tester 3DD is set to operate with a properly-formatted Class of Device, Legacy 3D Information EIR Field, TX Power Level Field, and 3D Information EIR Field indicating support for Association Notification and no support for Battery Level Reporting.

The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

The 3DG IUT is placed at a distance of 50 cm from the Lower Tester 3DD.

- Test Procedure

The 3DG IUT is triggered to turn on and to successfully complete Proximity Association.

Lower Tester 3DD	3DG IUT	Upper Tester

3DG IUT selects Lower Tester 3DD following Proximity Association
Both support Non-legacy association notification

No Legacy Association
Notification from 3DG IUT
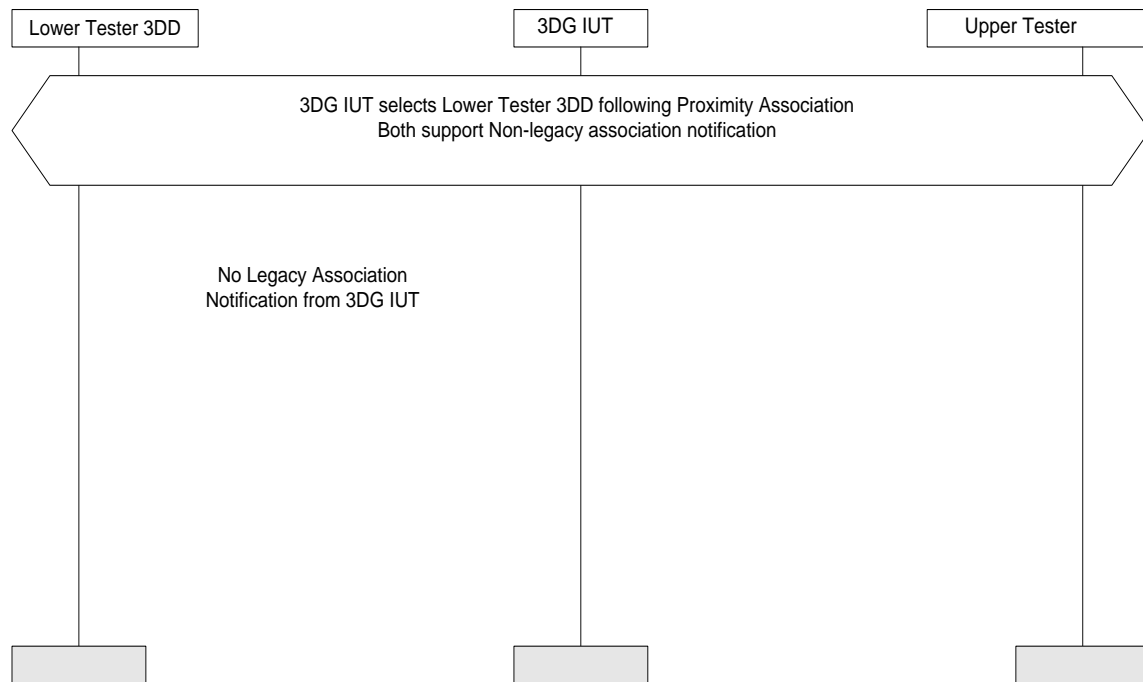
Figure 4.6: MSC for 3DSP/3DG/AN/BV-03-C

- Expected Outcome

Pass verdict:

The Lower Tester 3DD confirms that the 3DG IUT does not transmit a Legacy Association Notification message.

4.4.2 3DD

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DD can properly perform Association Notification.

4.4.2.1 3DSP/3DD/AN/BV-04-C [Association Notification Reception]

- Test Purpose

Verify that a 3DD can properly receive the Association Notification.

- Reference

  [1] Volume 3, Part A, Section 7.6

  [4] 6.3.2

- Initial Condition

Proximity Association has been performed by the Lower Tester 3DG and the Lower Tester 3DG has selected the 3DD IUT to associate with.

An ACL connection exists between the Lower Tester 3DG and the 3DD IUT.

- Test Procedure

The Lower Tester 3DG sends a 3D Communications Channel Message to the 3DD IUT with the 3D Communications Channel Message Opcode field set to 0x00.

Lower Tester 3DG	3DD IUT	Upper Tester

Lower Tester selects IUT following Proximity Association
ACL link establishment between IUT and Lower Tester

G-frame

(Length, CID=0x0002,
PSM=3D Sync Profile (TBD)
Data:
Octet0=0x00 (Message: 3DG Connection Announcement)
Octet1=0x01 (Connection Occurred due to Association)
Octet2=0xYY (YY=Don't care))

Association Notification
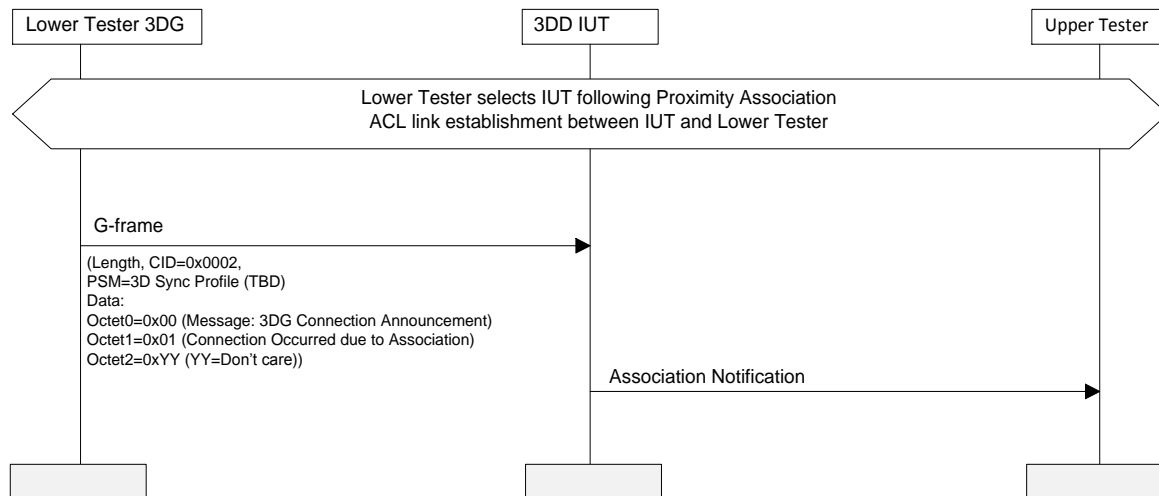
Figure 4.7: *MSC for 3DSP/3DD/AN/BV-04-C*

- Expected Outcome

Pass verdict:

The 3DD IUT indicates to the Upper Tester confirming reception of the Association Notification.

4.4.2.2 3DSP/3DD/AN/BV-05-C [Reference Protocol Association Notification Reception]

- Test Purpose

Verify that a 3DD can properly receive the Reference Protocol Association Notification.

- Reference

  [4] 7, 7.1, 7.3, 7.4

- Initial Condition

Proximity Association has been performed by the Lower Tester 3DG and the Lower Tester 3DG has selected the 3DD IUT to associate with.

- Test Procedure

The Lower Tester 3DG sends Reference Protocol Association Notification to 3DD IUT after receiving the EIR packet from the 3DD IUT.
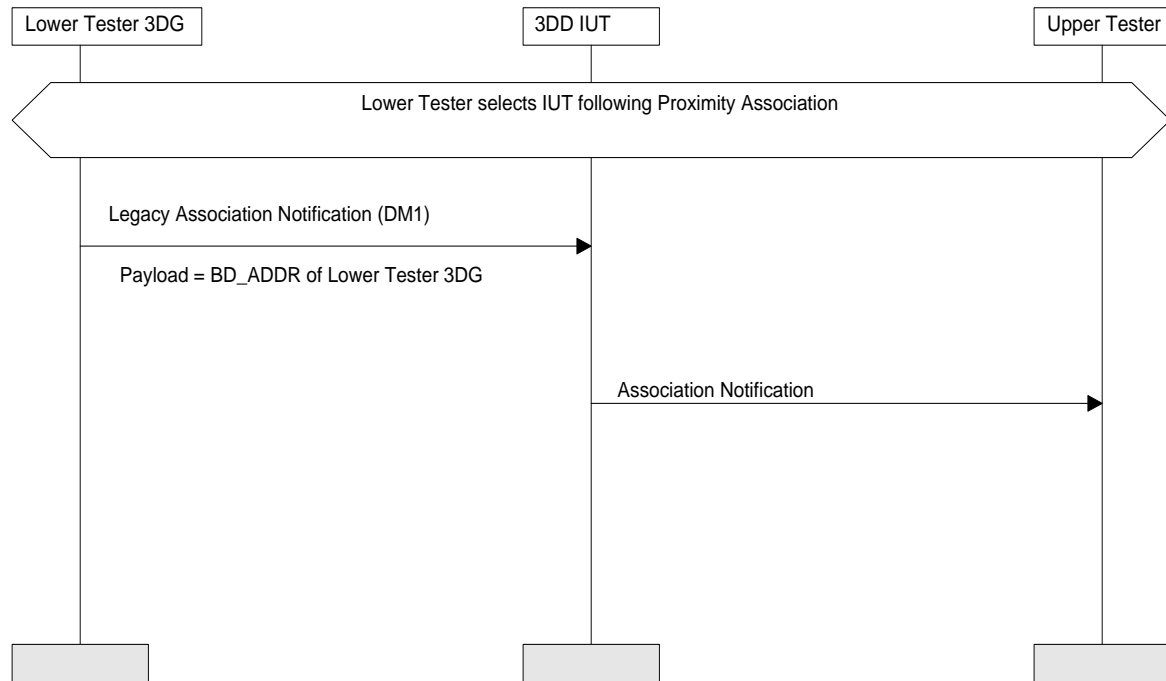
Figure 4.8: *MSC for 3DSP/3DD/AN/BV-05-C*

- Expected Outcome

Pass verdict:

The 3DD IUT reports reception of Reference Protocol Association Notification message to the Upper Tester.

- Notes

If the 3DD IUT does not report reception of Reference Protocol Association Notification message, the Test Procedure can be rerun up to 3 times with a 10 second time out between re-tries.

4.5   Battery Level Reporting

Test Group Objective:

- The purpose of the tests described in this section is to check that 3DD and 3DG can properly perform Battery Level reporting.

4.5.1   3DG

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DG can properly perform the Battery Level reporting function.

4.5.1.1 3DSP/3DG/BLR/BV-01-C [Battery Level Transmission at Association Notification]

- Test Purpose

Verify that a 3DG properly transmits its Battery Level at the time of transmitting Association Notification.

- Reference

[1] Volume 3, Part A, Section 7.6

[4] 6.3.1

- Initial Condition

Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

Lower Tester 3DD indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

Lower Tester 3DD sets "Send Battery Level Report on Start-up Synchronization" bit set to 0 in its 3D Information EIR Field.

An ACL connection exists between the Lower Tester 3DD and the 3DG IUT.

- Test Procedure

The 3DG IUT sends a 3D Connection Announcement Message to the Lower Tester 3DD.

Figure 4.9: MSC for 3DSP/3DG/BLR/BV-01-C

- Expected Outcome

Pass verdict:

The 3DG IUT sends a properly formatted 3D Communications Channel Message with the Association Notification bit set to "Connection Occurred due to Association".

The 3DG IUT sets the Battery Level field in the 3DG Connection Announcement message to its current value.

The 3DG IUT sets the "User Request for Battery Level Display" bit to 0.

4.5.1.2 3DSP/3DG/BLR/BV-02-C [Battery Level Transmission at Start-up Synchronization]

- Test Purpose

Verify that a 3DG properly transmits its Battery Level following the 3DG's transition from standby or powered-off state to a powered-on and synchronized state when the 3DD has the "Send Battery Level Report on Start-up Synchronization" bit set in its 3D Information EIR Field.

- Reference

[4] 5.1.2.1, 6.2, 6.4

- Initial Condition

Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

Lower Tester 3DD indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

Lower Tester 3DD sets "Send Battery Level Report on Start-up Synchronization" bit set to 1 in its 3D Information EIR Field.

The 3DG IUT is in OFF mode and is currently associated with the Lower Tester 3DD.

The Lower Tester 3DD is in the ON mode and is configured as specified in Section 3.1.2.

- Test Procedure

1. The 3DG IUT is turned on and allowed to synchronize with the Lower Tester 3DD.
2. The 3DG IUT establishes an ACL link connection with Lower Tester 3DD.
3. The 3DG IUT sends the 3DG Connection Announcement Message to Lower Tester 3DD.
4. The Lower Tester 3DD indicates the reception of the 3DG Connection Announcement Message.
5. The Lower Tester 3DD disconnects 3DG IUT.

Figure 4.10: *MSC for 3DSP/3DG/BLR/BV-02-C*

- Expected Outcome

  Pass verdict:

  The 3DG IUT transmits a 3DG Connection Announcement Message to the Lower Tester 3DD with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 0, the User Request for Battery Level Display bit set to 0, and the Battery Level field indicating the current battery level of the 3DG IUT.

4.5.1.3 3DSP/3DG/BLR/BV-03-C [Battery Level Transmission at User Action requesting Battery Level Display]

- Test Purpose

  Verify that a 3DG properly transmits its Battery Level at the time of an implementation-specific user action that triggers Battery Level reporting.

- Reference

  [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

  Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

  Lower Tester 3DD indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

  Lower Tester 3DD sets "Send Battery Level Report on Start-up Synchronization" bit set to 0 in its 3D Information EIR Field.

- Test Procedure

   1. The 3DG IUT is powered on.
   2. A user action is initiated on the 3DG IUT, as specified in the 3DG IUT IXIT, to specifically request the 3DG IUT to send its Battery Level report.

Figure 4.11: *MSC for 3DSP/3DG/BLR/BV-03-C*

- Expected Outcome

   Pass verdict:

   The 3DG IUT transmits a 3DG Connection Announcement Message with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 0, the User Request for Battery Level Display bit set to 1, and the Battery Level field indicating the current battery level of the 3DG IUT.

4.5.1.4 3DSP/3DG/BLR/BV-04-C [Battery Level Report Not Transmitted at Start-up Synchronization when Not Supported by 3DD]

- Test Purpose

   Verify that a 3DG does not send a 3DG Connection Announcement with the Battery Level report sent as part of Start-up Synchronization when the 3DD indicates in its 3D Information EIR Field that it does not support Battery Level reporting during Start-up Synchronization.

- Reference

   [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

   Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

Lower Tester 3DD indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

Lower Tester 3DD sets "Send Battery Level Report on Start-up Synchronization" bit to 0 in its 3D Information EIR Field.

- Test Procedure

  1. The 3DG IUT sends correct Association Notification message to Lower Tester 3DD.
  2. The 3DG IUT is placed in a stand-by or powered-off state.
  3. The 3DG IUT is powered on.
  4. The 3DG IUT does not send Association Notification to Lower Tester 3DD within 2 seconds.
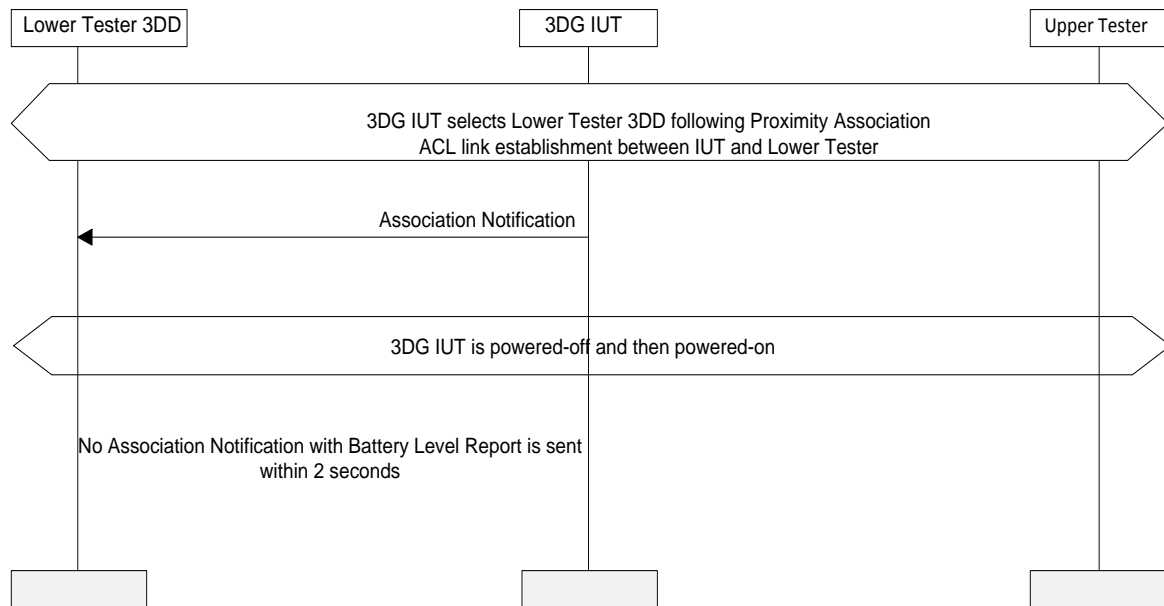
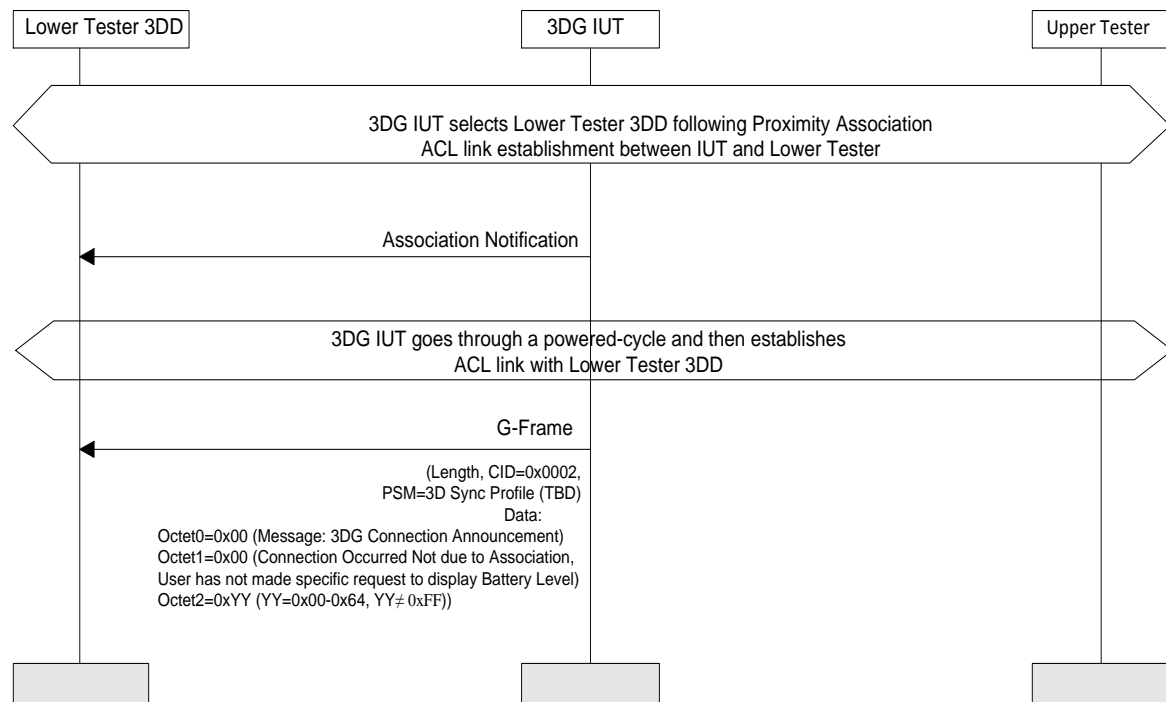**Figure 4.12:** *MSC for 3DSP/3DG/BLR/BV-04-C*

- Expected Outcome

  Pass verdict:

  The 3DG IUT does not transmit a 3DG Connection Announcement Message to the Lower Tester 3DD.

4.5.1.5 3DSP/3DG/BLR/BV-05-C [Battery Level Reporting Not Supported indicated when sending 3DG Connection Announcement message]

- Test Purpose

  Verify that a 3DG not supporting Battery Level Reporting Transmission will set the "Battery Level" field in the 3DG Connection Announcement message to "Battery Level Reporting not supported".

- Reference

  [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

Proximity Association has been performed by the 3DG IUT and the 3DG IUT has selected the Lower Tester 3DD to associate with.

Lower Tester 3DD indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

Lower Tester 3DD sets "Send Battery Level Report on Start-up Synchronization" bit set to 0 in its 3D Information EIR Field.

An ACL connection exists between the Lower Tester 3DD and the 3DG IUT.

- Test Procedure

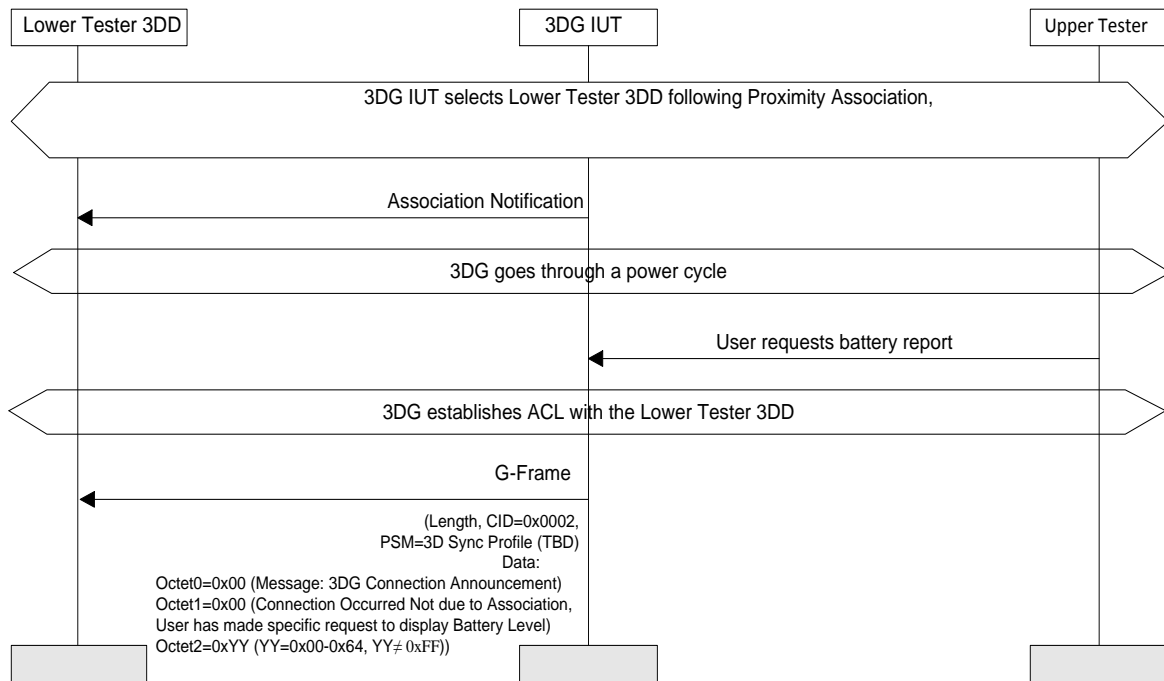 1. The 3DG IUT sends a 3DG Connection Announcement Message to the Lower Tester 3DD.
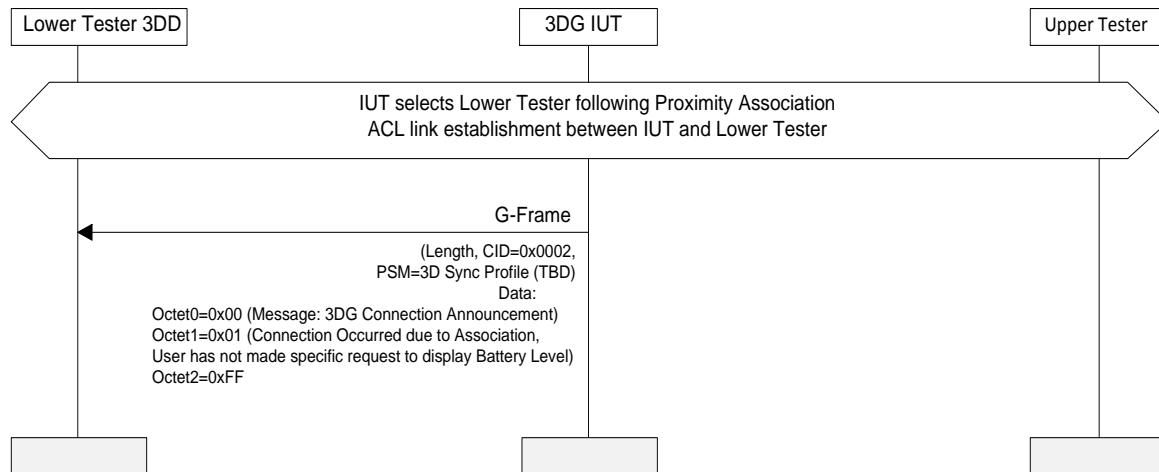
Figure 4.13: *MSC for 3DSP/3DG/BLR/BV-05-C*

- Expected Outcome

  Pass verdict:

  The 3DG IUT transmits a 3DG Connection Announcement Message to the Lower Tester 3DD with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 1, the User Request for Battery Level Display bit set to 0, and the Battery Level field set to 0xFF indicating Battery Level Reporting is not supported.

4.5.2   3DD

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DD can properly perform the Battery Level Reporting function.

4.5.2.1   3DSP/3DD/BLR/BV-06-C [Battery Level Reception at Association Notification]

- Test Purpose

  Verify that a 3DD can properly receive the Battery Level report from a 3DG at the time of transmitting Association Notification.

- Reference

  [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

Proximity Association has been performed by the 3DD IUT and the Lower Tester 3DG has selected the IUT 3DD to associate with.

The 3DD IUT indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

- Test Procedure

The Lower Tester 3DG is triggered to send a 3DG Connection Announcement Message with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 1, the User Request for Battery Level Display bit set to 0, and the Battery Level field set to a random number between 0-100.
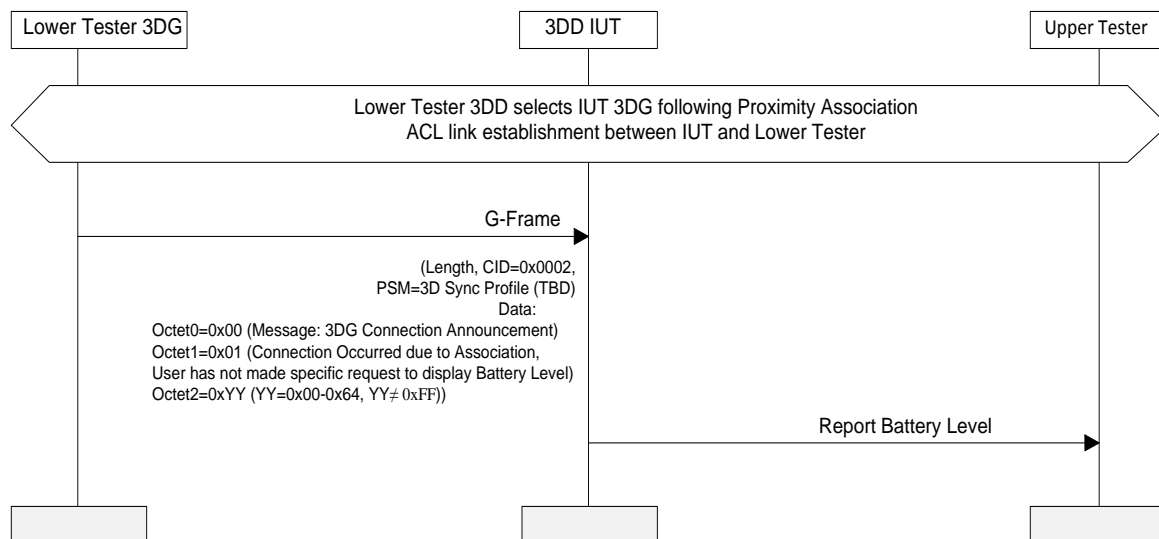
Figure 4.14: MSC for 3DSP/3DD/BLR/BV-06-C

- Expected Outcome

Pass verdict:

The 3DD IUT reports the Association Notification and the random number value for the Battery Level field sent by the Lower Tester 3DG to the Upper Tester.

- Notes

The random number value used by the Lower Tester 3DG for its Battery Level should be changed to a different value each time the Lower Tester 3DG sends a 3DG Connection Announcement message.

4.5.2.2 3DSP/3DD/BLR/BV-07-C [Battery Level Reception at Start-up Synchronization]

- Test Purpose

Verify that a 3DD can properly receive the Battery Level report from a 3DG following the 3DG's transition from standby or powered-off state to a powered-on and synchronized state when the 3DD has the "Send Battery Level Report on Start-up Synchronization" bit set in its 3D Information EIR Field.

- Reference

  [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

Proximity Association has been performed by the Lower Tester 3DG and the Lower Tester 3DG has selected the 3DD IUT to associate with.

The 3DD IUT indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

The 3DD IUT sets "Send Battery Level Report on Start-up Synchronization" bit = 1 in its 3D Information EIR Field.

- Test Procedure

  1. The Lower Tester 3DG sends Association Notification message to 3DD IUT.
  2. The Lower Tester 3DG is placed in a stand-by or powered-off state.
  3. The Lower Tester 3DG is powered on.
  4. The Lower Tester 3DG is triggered to send a 3DG Connection Announcement Message with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 0, the User Request for Battery Level Display bit set to 0, and the Battery Level field set to a random number between 0-100.
  5. The 3DD IUT indicates the reception of Association Notification with properly-formatted Battery Level report.
  6. The 3DD IUT disconnects from Lower Tester 3DG.

Figure 4.15: *MSC for 3DSP/3DD/BLR/BV-07-C*

- Expected Outcome

  Pass verdict:

  The 3DD IUT reports the same random number value for the Battery Level field sent by the Lower Tester 3DG to the Upper Tester.

- Notes

  The random number value used by the Lower Tester 3DG for its Battery Level should be changed to a different value each time the Lower Tester 3DG sends a 3DG Connection Announcement message.

4.5.2.3　　3DSP/3DD/BLR/BV-08-C [Battery Level Reception at User Request for Battery Level Display]

- Test Purpose

  Verify that a 3DD can properly receive the Battery Level report from a 3DG whose 3DG Connection Announcement Message indicates the user requests Battery Level display.

- Reference

  [4] 5.1.2.1, 6.2, 6.4

- Initial Condition

  Proximity Association has been performed by the Lower Tester 3DG and the Lower Tester 3DG has selected the 3DD IUT to associate with.

  3DD IUT indicates support for Association Notification and Battery Level Reporting in its 3D Information EIR Field.

- Test Procedure

  1. The Lower Tester 3DG is triggered to send a 3DG Connection Announcement Message with the 3D Communications Channel Message Opcode field set to 0x00, the Association Notification bit set to 0, the User Request for Battery Level Display bit set to 1, and the Battery Level field set to a random number between 0-100.
 2. The 3DD IUT indicates the reception of Association Notification with correct Battery Level report.
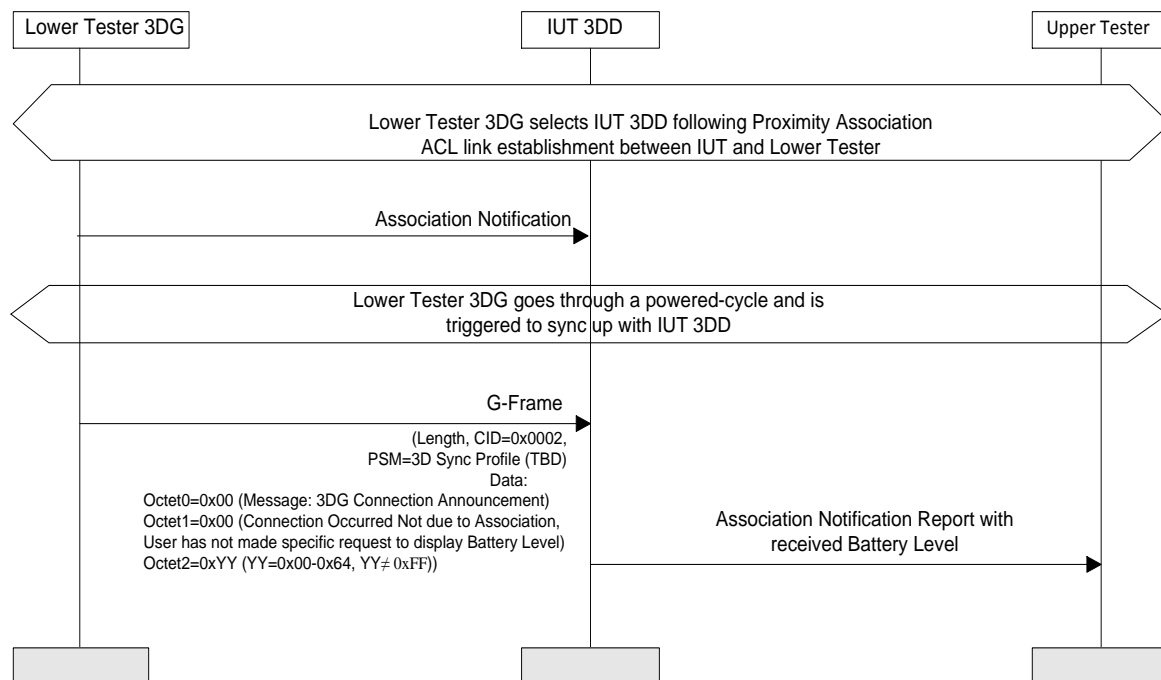 3. The 3DD IUT disconnects Lower Tester 3DG.
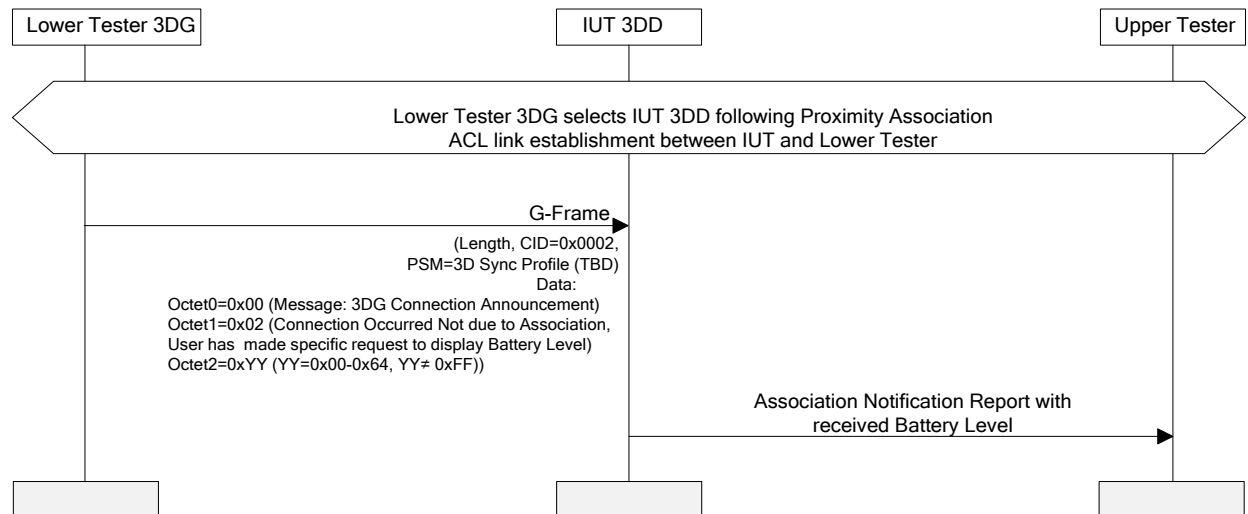
Figure 4.16: MSC for 3DSP/3DD/BLR/BV-08-C

- Expected Outcome

  Pass verdict:

  The 3DD IUT reports the same random number value for the Battery Level field sent by the Lower Tester 3DG to the Upper Tester.

- Notes

  The random number value used by the Lower Tester 3DG for its Battery Level should be changed to a different value each time the Lower Tester 3DG sends a 3DG Connection Announcement message.

4.6   3D Broadcast

Test Group Objective:

- The purpose of the tests described in this section is to check that 3DD can properly perform 3D Broadcast Message transmission and 3DG can properly perform 3D Broadcast Message reception.

4.6.1   3DG

Test Subgroup Objective:

- The purpose of the test described in this section is to check that 3DG can properly receive the 3D Broadcast Message.

4.6.1.1   3DSP/3DG/3DB/BV-01-C [3D Broadcast Message Reception]

- Test Purpose

  Verify that a 3DG can properly perform Synchronization establishment and then receive and decode the 3D Broadcast Message sent from a 3DD.

- Reference

  [2] Volume 3, Part C, Section 7.5

[4] 8.5

- Initial Condition

  The 3DG IUT is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the Lower Tester 3DD.

  The Lower Tester 3DD is in the ON mode and is configured as described in Section 3.1.2.

  The Lower Tester 3DD is set to operate with a properly-formatted Class of Device, Legacy 3D Information EIR Field, TX Power Level Field, and 3D Information EIR Field indicating support for Association Notification and no support for Battery Level Reporting.

  The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

  The Lower Tester 3DD is being supplied a Reference Frame Sync frequency which is within the supported lens shutter frequency range specified in the 3DG IUT's IXIT.

- Test Procedure

  1. The 3DG IUT is turned on and performs Synchronization establishment with the Associated Lower Tester 3DD.
  2. After successfully completing Synchronization establishment, the 3DG IUT starts receiving the 3D Broadcast Messages.
  3. The Lower Tester 3DD continuously broadcasts 3D Broadcast Messages at a 100% duty cycle and containing Frame Sync Instant, Frame Sync Period, and Lens Shutter offsets in synchronization with its Bluetooth Clock.
  4. After confirming the 3DG IUT is successfully receiving the 3D Broadcast Messages and is synchronized with the Lower Tester 3DD, the Lower Tester 3DD is adjusted to transmit 3D Broadcast Messages at a 33% duty cycle (only 1 out of 3 3D Broadcast Messages are transmitted).

- Expected Outcome

  Pass verdict:

  While the Lower Tester 3DD is broadcasting at a 100% duty cycle, the 3DG IUT lens shutter timing signals shall be in synchronization with the Reference Frame Sync being fed into the Lower Tester 3DD.

  When the Lower Tester 3DD begins broadcasting at a 33% duty cycle, the 3DG IUT shall repeat Synchronization establishment with the Associated Lower Tester 3DD.

4.6.2   3DD

Test Subgroup Objective:

- The purpose of the test described in this section is to check that 3DD can properly enter Synchronizable mode and transmit the 3D Broadcast Message.

4.6.2.1   3DSP/3DD/3DB/BV-02-C [3D Broadcast Message Transmission]

- Test Purpose

Verify that a 3DD can operate in Synchronizable mode and properly format and transmit the 3D Broadcast Message.

- Reference

  [2] Volume 3, Part C, Section 4.4.2

  [4] 8.1, 8.2, 8.3, 8.4

- Initial Condition

  The Lower Tester 3DG is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the 3DD IUT.

  The 3DD IUT is in the ON mode and is configured as described in Section 3.1.2.

  The 3DD IUT is being supplied a Reference Frame Sync frequency which is one of the supported frame sync frequencies specified in the 3DD IUT's IXIT.

  The 3DD IUT is continuously operating in or enters into Synchronizable mode and begins sending 3D Broadcast Messages.

- Test Procedure

  1. The Lower Tester 3DG is turned on and performs Synchronization establishment with the 3DD IUT.
  2. After successfully completing Synchronization establishment, the Lower Tester 3DG starts receiving the 3D Broadcast Messages being sent from the 3DD IUT.

- Expected Outcome

  <u>Pass verdict:</u>

  The Lower Tester 3DG's lens shutter timing signals are in synchronization with the Reference Frame Sync being fed into the 3DD IUT.

4.7   Frame Sync

Test Group Objective:

- The purpose of the tests described in this section is to check that 3DD can properly and accurately perform the operations of capturing and formatting frame sync timing information associated with the displayed image.

4.7.1   3DD

Test Subgroup Objective:

- The purpose of the tests described in this section is to check that 3DD can properly and accurately perform the operations of capturing and formatting frame sync timing.

4.7.1.1   3DSP/3DD/FS/BV-01-I [3DD Timing Accuracy]
- Test Purpose

Verify that a 3DD can properly and accurately perform the operations of capturing and formatting frame sync timing information within the required accuracy.

- Reference

  [4] 4.1.2.1, 4.1.3, 4.1.3.1, 9.3

- Initial Condition

  The Lower Tester 3DG is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the 3DD IUT.

  The 3DD IUT is in the ON mode and is configured as described in Section 3.1.2.

  The 3DD IUT is being supplied a Reference Frame Sync frequency which is one of the supported frame sync frequencies specified in the 3DD IUT's IXIT.

- Test Procedure

  The Lower Tester 3DG is turned on and allowed to synchronize with the 3DD IUT.

- Expected Outcome

  Pass verdict:

  The Lower Tester 3DG's lens shutter timing signals are stable and in synchronization with the Reference Frame Sync being fed into the 3DD IUT within the specified Lens Shutter Control Timing Accuracy requirement.

4.7.1.2 3DSP/3DD/FS/BI-02-C [Invalid Frame Sync Period]

- Test Purpose

  Verify that a 3DD will not broadcast a value for the Frame Sync Period greater than the maximum allowed limit.

- Reference

  [4] 4.1.3

- Initial Condition

  The Lower Tester 3DG is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the 3DD IUT.

  The 3DD IUT is in the ON mode and is configured as described in Section 3.1.2.

  The 3DD IUT is being supplied a Reference Frame Sync signal that is set at a random frequency which is one of the supported frame sync frequencies specified in the 3DD IUT's IXIT.

- Test Procedure

  1. The Lower Tester 3DG is turned on and allowed to synchronize with the 3DD IUT.
  2. The Reference Frame Sync signal being fed to the 3DD IUT is then changed to a random frequency between 1-24 Hz.

- Expected Outcome

Pass verdict:

The 3DD IUT sends 3D Broadcast Message with the Left Lens Shutter Open Offset field set to the value of 0xFFFF and the Frame Sync Period and the Frame Sync Period Fraction fields set to a value of 0.

4.8   Shutter Control

Test Group Objective:

• The purpose of the tests described in this section is to check that a 3DG can properly and accurately perform the operation of lens shutter control based on frame sync timing information received in the 3D Broadcast Message.

4.8.1   3DG

Test Subgroup Objective:

• The purpose of the tests described in this section is to check that 3DG can properly and accurately perform the operation of lens shutter control based on frame sync timing information.

4.8.1.1   3DSP/3DG/SC/BV-01-I [3DG Timing Accuracy]

• Test Purpose

Verify that a 3DG can properly perform the operation of lens shutter control within the required accuracy.

• Reference

[4] 9.2, 9.3

• Initial Condition

The 3DG IUT is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the Lower Tester 3DD.

The Lower Tester 3DD is in the ON mode and is configured to operate with a Frame Sync frequency of 50 Hz as described in Section 3.1.2.

The Lower Tester 3DD is set to operate with a properly-formatted Class of Device, Legacy 3D Information EIR Field, TX Power Level Field, and 3D Information EIR Field indicating support for Association Notification and no support for Battery Level Reporting.

The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

The Lower Tester 3DD is supplied a Reference Frame Sync frequency of 50 Hz.

• Test Procedure

1. Record the Lower Tester 3DD's shutter open and close delay parameters selected from Table 2.1 for use during the 50 Hz test and from Table 2.2 for use during the 59.94 Hz test.
2. The 3DG IUT is powered on and allowed to synchronize with the Lower Tester 3DD operating at 50 Hz.

3. Using the oscilloscope, measure and record the shutter timing parameters specified in Section 3.1.1.4.1 for 50Hz operation.
4. After confirming that the 3DG IUT has synchronized with the Lower Tester 3DD at 50 Hz, the Lower Tester 3DD is configured to operate with a Frame Sync frequency of 59.94 Hz as described in Section 3.1.2 by changing the Reference Frame Sync signal being fed to the Lower Tester 3DD to 59.94 Hz.
5. The 3DG IUT is powered off.
6. The 3DG IUT is powered on and allowed to synchronize with Lower Tester 3DD operating at 59.94 Hz.
7. Using the oscilloscope, measure and record the shutter timing parameters specified in Section 3.1.1.4.1 for 59.94Hz operation.

- Expected Outcome

Pass verdict:

The 3DG IUT's lens shutter timing signals are stable and in synchronization with the Reference Frame Sync signal at both 50 Hz and 59.94 Hz within the specified Lens Shutter Control Timing Accuracy requirement. The test shall be deemed passed if all of the following five equations are true for synchronized operation for 50 Hz and for 59.94 Hz Reference Frame Sync frequencies.

- Left Shutter Open Delay = tLeftOpen + TSPX_shutter_open_adjustment ± 100µs.
- Left Shutter Close Delay = tLeftClose + TSPX_shutter_close_adjustment ± 100µs.
- Right Shutter Open Delay = tRightOpen + TSPX_shutter_open_adjustment ± 100µs.
- Right Shutter Close Delay = tRightClose + TSPX_shutter_close_adjustment ± 100µs.
- Reference Frame Sync Period = (tRegenerated Frame Sync Period X10) ÷ 10 ± 5µs.

4.8.1.2 3DSP/3DG/SC/BV-02-C [3D-to-2D Switch on Exceeding Maximum Timing Error]

- Test Purpose

Verify that a 3DG switches from 3D to 2D mode (both lens shutters open) when the maximum timing error is exceeded.

- Reference

[4] 8.4, 9.3

- Initial Condition

The 3DG IUT is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the Lower Tester 3DD.

The Lower Tester 3DD is in the ON mode and is configured as described in Section 3.1.2.

The Lower Tester 3DD is set to operate with a properly-formatted Class of Device, Legacy 3D Information EIR Field, TX Power Level Field, and 3D Information EIR Field indicating support for Association Notification and no support for Battery Level Reporting.

The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

The Lower Tester 3DD is being supplied a Reference Frame Sync frequency of 59.94 Hz.

- Test Procedure

    1. The 3DG IUT is turned on and allowed to synchronize with the Lower Tester 3DD operating at 59.94 Hz.
    2. The Lower Tester 3DD is triggered to stop transmitting 3D Broadcasts and a timer is started.
    3. Plot the 3DG IUT's average lens shutter timing error over the elapsed time since stopping the Lower Tester 3DD's transmission of the 3D Broadcasts.
    4. Note the time on the timer when the 3DG IUT switches to the 2D mode (both lens shutters open).
    5. If the average lens shutter timing error does not exceed the specified Lens Shutter Control Timing Accuracy requirement after 60 seconds from stopping the 3D Broadcasts, then end the test.

- Expected Outcome

    Pass verdict:

    The 3DG IUT's lens shutter timing signals are stable and in synchronization with the Reference Frame Sync signal at 59.94 Hz.

    After two seconds since stopping the transmission of the 3D Broadcasts, the 3DG IUT's lens shutter timing signals are still stable and in synchronization with the Reference Frame Sync signal at 59.94 Hz and within the specified Lens Shutter Control Timing Accuracy requirement.

    When the average lens shutter timing error exceeds the specified Lens Shutter Control Timing Accuracy requirement, the 3DG IUT switch into 2D mode (both lens shutters open).

    If the average lens shutter timing error does not exceed the specified Lens Shutter Control Timing Accuracy requirement after 60 seconds from stopping the 3D Broadcasts, then test shall be considered passed.

4.8.1.3   3DSP/3DG/SC/BV-03-C [3D-to-2D Switch on Invalid Frame Sync Period]

- Test Purpose

    Verify that a 3DG switches from 3D to 2D mode (both lens shutters open) when it receives a 3D Broadcast Message with an invalid value for the Frame Sync Period.

- Reference

    [4] 9.3

- Initial Condition

    The 3DG IUT is in OFF mode, is configured as described in Section 3.1.2, and is currently associated with the Lower Tester 3DD.

    The Lower Tester 3DD is in the ON mode and is configured as described in Section 3.1.2.

    The Lower Tester 3DD is set to operate with a properly-formatted Class of Device, Legacy 3D Information EIR Field, TX Power Level Field, and 3D Information EIR Field indicating support for Association Notification and no support for Battery Level Reporting.

    The Lower Tester 3DD is set to operate with a TX power level of 0 dBm.

    The Lower Tester 3DD is being supplied a Reference Frame Sync frequency of 59.94 Hz.

- Test Procedure

    1. The 3DG IUT is turned on and allowed to synchronize with the Lower Tester 3DD operating at 59.94 Hz.
    2. The Lower Tester 3DD is triggered to begin transmitting 3D Broadcast Messages with a Frame Sync Period set to 50,000.

- Expected Outcome

    Pass verdict:

    The 3DG IUT's lens shutter timing signals are stable and in synchronization with the Reference Frame Sync signal at 59.94 Hz.

    Upon sending 3D Broadcast Messages with the Frame Sync Period set to 50,000, the 3DG IUT switches into 2D mode (both lens shutters open).

4.9   Service Discovery

Test Group Objective:

- The purpose of tests in this section are to verify correct implementation of the SDP service records defined in Section 10.4 of [4]. In particular, that values of mandatory service attributes are compliant with the definitions in Section 10.4 of [4] and that values of optionally implemented service attributes are compliant with those supplied via IXIT.

4.9.1.1   Service Discovery

- Test Purpose

    Verify that 3DD and 3DG IUT correctly implement the service records defined in [4] and return a correctly formatted SDP record in response to a query by an SDP client.

- Test Case ID(s)

    3DSP/3DD/SDP/BV-01-I

    3DSP/3DG/SDP/BV-01-I

- Reference

    [4] 10.4

- Initial Condition

    The value for the service attribute "ServiceName", if supported, is supplied via IXIT.

    An ACL connection exists between the IUT and Lower Tester.

- Test Procedure

    1. The Lower Tester initiates an L2CAP connection to the IUT on PSM 0x0001 (SDP)
    2. The Lower Tester queries the IUT SDP service record.

- Expected Outcome

    Pass verdict:

3DD:

All mandatory service attributes returned by the IUT exist with valid and correctly formatted values matching those defined in Section 10.4.1 of [4].

All optional service attributes declared as supported in the ICS exist with valid and correctly formatted values matching those supplied via IXIT.

3DG:

All mandatory service attributes returned by the IUT exist with valid and correctly formatted values matching those defined in Section 10.4.2 of [4].

All optional service attributes declared as supported in the ICS exist with valid and correctly formatted values matching those supplied via IXIT.

5 Test Case Mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. 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 3D Synchronization Profile (3DSP) [5]. If the item is defined with 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.

Test Case Applicable: May be used to note if a test is required based on the supported features.

For purpose and structure of the ICS/IXIT Proforma and instructions for completing the ICS/IXIT Proforma refer to the Bluetooth ICS and IXIT Proforma document.

Item	Feature	Test Case(s)	Test Case Applicable
3DSP 4/1	Proximity Association 3DG	3DSP/3DG/PA/BV-01-C 3DSP/3DG/PA/BV-02-C	
3DSP 5/1	Proximity Association 3DG: Class of Device	3DSP/3DG/PA/BV-03-C	
3DSP 5/2	Proximity Association 3DG: Path Loss Threshold	3DSP/3DG/PA/BV-04-C	
3DSP 5/3	Proximity Association 3DG: 3D Information EIR Field	3DSP/3DG/PA/BI-05-C 3DSP/3DG/PA/BV-06-C	
3DSP 3/1	Proximity Association 3DD: Class of Device	3DSP/3DD/PA/BV-07-I	
3DSP 3/2	Proximity Association 3DD: 3D Information EIR Field	3DSP/3DD/PA/BV-08-I	
3DSP 3/4	Proximity Association 3DD: TX Power Level Field	3DSP/3DD/PA/BV-09-I	
3DSP 3/3	Proximity Association 3DD: Legacy 3D Information EIR Field	3DSP/3DD/PA/BV-10-I	
3DSP 2/4	3DG Connection Announcement: Invalid 3D Opcode	3DSP/3DD/CA/BI-01-C	

Item	Feature	Test Case(s)	Test Case Applicable
3DSP 4/3 AND 3DSP 4/5	Association Notification 3DG	3DSP/3DG/AN/BV-01-C 3DSP/3DG/AN/BV-02-C	
3DSP 4/2	Legacy Association Notification 3DG	3DSP/3DG/AN/BV-03-C	
3DSP 2/4 AND 3DSP 2/6	Association Notification 3DD	3DSP/3DD/AN/BV-04-C	
3DSP 2/3	Reference Protocol Association Notification 3DD	3DSP/3DD/AN/BV-05-C	
3DSP 4/3 AND 3DSP 4/4	Battery Level Reporting 3DG	3DSP/3DG/BLR/BV-01-C 3DSP/3DG/BLR/BV-02-C 3DSP/3DG/BLR/BV-04-C	
3DSP 4/3 AND 3DSP 4/4 AND 3DSP 4/4a	Battery Level Reporting 3DG – User Requests Display	3DSP/3DG/BLR/BV-03-C	
3DSP 4/3 AND NOT 3DSP 4/4	Battery Level Reporting not supported by 3DG	3DSP/3DG/BLR/BV-05-C	
3DSP 2/4 AND 3DSP 2/5	Battery Level Reporting 3DD	3DSP/3DD/BLR/BV-06-C 3DSP/3DD/BLR/BV-07-C 3DSP/3DD/BLR/BV-08-C	
3DSP 4/6	3D Broadcast 3DG	3DSP/3DG/3DB/BV-01-C	
3DSP 2/7	3D Broadcast 3DD	3DSP/3DD/3DB/BV-02-C	
3DSP 2/1	Frame Sync	3DSP/3DD/FS/BV-01-I 3DSP/3DD/FS/BI-02-C	
3DSP 4/7	Shutter Control	3DSP/3DG/SC/BV-01-I 3DSP/3DG/SC/BV-02-C 3DSP/3DG/SC/BV-03-C	
3DSP 1/1	Service Discovery	3DSP/3DD/SDP/BV-01-I	
3DSP 1/2	Service Discovery	3DSP/3DG/SDP/BV-01-I	

Table 5.1: *Test Case Mapping*