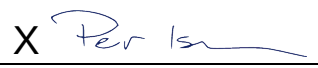


|                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |                                                            |                                                                     |                                                                                       |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                               | <b>60412005-003</b>                                                                 | <b>Auftrags-Nr.:</b><br>Order no.:                         | 23870414 030                                                        | Seite 1 von 55<br>Page 1 of 55                                                        |                                        |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                      | 1005969                                                                             | <b>Auftragsdatum:</b><br>Order date:                       | 2020.07.02                                                          |                                                                                       |                                        |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                           | Spotify USA Inc                                                                     |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                      | Car Thing                                                                           |                                                            |                                                                     |                                                                                       |                                        |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                               | FCC ID: 2AP3D-YX5H6679                                                              |                                                            |                                                                     |                                                                                       |                                        |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                 | Certified testing according to FCC Part 15 subpart C                                |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                              | FCC 47 CFR Part 15.247 with parts 15.207 & 15.209<br>ANSI C63.10: 2013              |                                                            |                                                                     |                                                                                       |                                        |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                     | 2020.07.02                                                                          |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                | See section 2.3                                                                     |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                   | 2020.09.07 – 2020.11.11                                                             |                                                            |                                                                     |                                                                                       |                                        |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                              | Lund, Sweden                                                                        |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                           | TÜV Rheinland Sweden                                                                |                                                            |                                                                     |                                                                                       |                                        |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                    | Pass                                                                                |                                                            |                                                                     |                                                                                       |                                        |
| <b>überprüft von:</b><br>reviewed by:                                                                                                                                                                                                                                                                                                                                                                     |  |                                                            | <b>genehmigt von:</b><br>authorized by:                             |  |                                        |
| <b>Datum: 2020.11.16</b><br>Date:                                                                                                                                                                                                                                                                                                                                                                         | Signed by: Niall Forrester                                                          |                                                            | <b>Datum: 2020.11.16</b><br>Date:                                   | Signed by: Per Isacson                                                                |                                        |
| <b>Stellung / Position:</b>                                                                                                                                                                                                                                                                                                                                                                               | Senior Technical Expert                                                             |                                                            | <b>Stellung / Position:</b>                                         | Lab Manager                                                                           |                                        |
| <b>Sonstiges / Other:</b>                                                                                                                                                                                                                                                                                                                                                                                 | This report covers Bluetooth BDR/EDR only                                           |                                                            |                                                                     |                                                                                       |                                        |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                           | Prüfmuster vollständig und unbeschädigt<br>Test item complete and undamaged         |                                                            |                                                                     |                                                                                       |                                        |
| * Legende:                                                                                                                                                                                                                                                                                                                                                                                                | 1 = sehr gut<br>P(ass) = entspricht o.g. Prüfgrundlage(n)                           | 2 = gut<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 3 = befriedigend<br>F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 4 = ausreichend<br>N/A = nicht anwendbar                                              | 5 = mangelhaft<br>N/T = nicht getestet |
| * Legend:                                                                                                                                                                                                                                                                                                                                                                                                 | 1 = very good<br>P(ass) = passed a.m. test specification(s)                         | 2 = good<br>F(ail) = failed a.m. test specification(s)     | 3 = satisfactory<br>F(ail) = failed a.m. test specification(s)      | 4 = sufficient<br>N/A = not applicable                                                | 5 = poor<br>N/T = not tested           |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.</i></p> |                                                                                     |                                                            |                                                                     |                                                                                       |                                        |

## Revision History60412005-00360412005-003

| REVISION                                                       | DATE       | REMARKS                                                         | AUTHOR          |
|----------------------------------------------------------------|------------|-----------------------------------------------------------------|-----------------|
| 001                                                            | 2020.10.02 | First release                                                   | Niall Forrester |
| 002                                                            | 2020.10.06 | Corrected test specification and client information in appendix | Niall Forrester |
| 003                                                            | 2020.11.16 | Updated conducted radio results                                 | Niall Forrester |
| Note: Latest revision report will replace all previous reports |            |                                                                 |                 |
| This report based on FCC Part 15.247 Template version 1.1      |            |                                                                 |                 |

## Summary of Test Results

| FCC 47 CFR Rule Part | Test Description                                          | Applicability | Report Section | RESULT | REMARKS                    |
|----------------------|-----------------------------------------------------------|---------------|----------------|--------|----------------------------|
| 15.207               | AC Power Line Conducted Emissions (Intentional Radiators) | YES           | 4.1            | N.P.   | See BLE report for results |
| 15.209               | Radiated Emissions (Intentional Radiators)                | YES           | 4.2            | PASS   |                            |
| 15.247 (d)           | Out of Band Emissions                                     | YES           | 4.3            | PASS   |                            |
| 15.247 (d)           | Band Edge Compliance (Authorized Band)                    | YES           | 4.4            | PASS   |                            |
| 15.247 (d)           | Band Edge Compliance (Restricted Band)                    | YES           | 4.5            | PASS   |                            |
| 15.247 (a)(1)        | 20dB Bandwidth                                            | YES           | 4.6            | PASS   |                            |
| 15.247 (a)(1)        | Carrier (Hopping Channel) Separation                      | YES           | 4.7            | PASS   |                            |
| 15.247 (a)(1)        | Number of Hopping Channels                                | YES           | 4.8            | PASS   |                            |
| 15.247 (a)(1)        | Time of Occupancy (Dwell Time)                            | YES           | 4.9            | PASS   |                            |
| 15.247 (a)(2)        | 6dB Bandwidth                                             | NO            | 4.10           | N/A    | BT supports freq. hopping  |
| 15.247 (b)           | Peak Conducted Output Power                               | YES           | 4.11           | PASS   |                            |
| 15.247 (e)           | Power Spectral Density                                    | NO            | 4.12           | N/A    | BT supports freq. hopping  |

Possible test case verdicts:

- |                                                |                       |
|------------------------------------------------|-----------------------|
| - Test case does not apply to the test object: | N/A                   |
| - Test object complies with the requirement:   | PASS or COMPLIANT     |
| - Test object does not meet the requirement:   | FAIL or NOT COMPLIANT |
| - Test case not performed on the test object:  | N.P.                  |

## Table of Contents

|                                                                                     |    |
|-------------------------------------------------------------------------------------|----|
| 1. GENERAL INFORMATION .....                                                        | 4  |
| 1.1 Test Site.....                                                                  | 4  |
| 1.2 Client Information.....                                                         | 4  |
| 2. PRODUCT INFORMATION.....                                                         | 5  |
| 2.1 General Description.....                                                        | 5  |
| 2.2 Device Characteristics.....                                                     | 5  |
| 2.3 Test Samples .....                                                              | 5  |
| 2.4 Wireless Technologies and Bands Supported by the EUT.....                       | 5  |
| 2.5 Antenna Information.....                                                        | 6  |
| 2.6 Wireless Technology Details .....                                               | 6  |
| 2.7 Ancillary Equipment.....                                                        | 6  |
| 2.8 EUT Diagrams.....                                                               | 6  |
| 3. TEST METHODS .....                                                               | 7  |
| 3.1 Test Standards.....                                                             | 7  |
| 3.2 Additional references.....                                                      | 7  |
| 3.3 Limits .....                                                                    | 8  |
| 3.4 Description of Test Methods and Equipment Setup .....                           | 9  |
| 3.5 EUT Configuration During Test.....                                              | 14 |
| 3.6 EUT Operation Modes.....                                                        | 14 |
| 3.7 Deviations from the Test Standard .....                                         | 14 |
| 3.8 Environmental Conditions.....                                                   | 15 |
| 4. TEST RESULTS .....                                                               | 15 |
| 4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter)..... | 15 |
| 4.2 Test Results – Radiated Emissions (Intentional Transmitter) .....               | 16 |
| 4.3 Test Results – Out of Band Emissions .....                                      | 35 |
| 4.4 Test Results – Band Edge Compliance (Authorized Band) .....                     | 37 |
| 4.5 Test Results – Band Edge Compliance (Restricted Band).....                      | 39 |
| 4.6 Test Results – 20dB Bandwidth.....                                              | 42 |
| 4.7 Test Results – Carrier (Hopping Channel) Separation .....                       | 44 |
| 4.8 Test Results – Number of Hopping Channels.....                                  | 46 |
| 4.9 Test Results – Time of Occupancy (Dwell Time) .....                             | 48 |
| 4.10 Test Results – 6dB Bandwidth.....                                              | 50 |
| 4.11 Test Results – Peak Conducted Output Power .....                               | 51 |
| 4.12 Test Results – Power Spectral Density.....                                     | 52 |
| 5. TEST EQUIPMENT STATUS.....                                                       | 53 |
| 5.1 List of Hardware with Calibration Dates .....                                   | 53 |
| 5.2 Software / Firmware Versions.....                                               | 54 |
| 6. MEASUREMENT UNCERTAINTY .....                                                    | 55 |
| 6.1 Measurement Uncertainty for CTE .....                                           | 55 |
| 6.2 Measurement Uncertainty for Conducted Emissions .....                           | 55 |
| 6.3 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge) .....        | 55 |
| 7. PHOTOGRAPHS.....                                                                 | 55 |

Appendix 1     Photographs (separate document)

## 1. GENERAL INFORMATION

### 1.1 Test Site

|                                     |                         |
|-------------------------------------|-------------------------|
| Test Facility:                      | TÜV Rheinland Sweden AB |
| Address:                            | Mobilvägen 10           |
|                                     | 223 62 Lund             |
|                                     | Sweden                  |
|                                     |                         |
| Swedac Registration Number:         | 10325                   |
| FCC Test Firm Registration Number:  | 517458                  |
| ISED Test Site Registration Number: | 24753                   |

### 1.2 Client Information

|                            |                                                                                       |
|----------------------------|---------------------------------------------------------------------------------------|
| Company Name:              | Spotify USA Inc.                                                                      |
| Address:                   | 4 World Trade Center, 63 <sup>rd</sup> floor                                          |
|                            | New York, NY 10007                                                                    |
|                            | USA                                                                                   |
|                            |                                                                                       |
| Contact Person:            | Daniel Bromand                                                                        |
| Contact e-Mail / Telephone | <a href="mailto:Danielb@spotify.com">Danielb@spotify.com</a> /<br>+1 (0) 646-512-0729 |

## 2. PRODUCT INFORMATION

### 2.1 General Description

|                                |                                                                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model name:                    | Car Thing                                                                                                                                                                      |
| Manufacturer:                  | Spotify USA Inc.                                                                                                                                                               |
| Model number / Marketing name: | YX5H6679                                                                                                                                                                       |
| FCC ID:                        | 2AP3D-YX5H6679                                                                                                                                                                 |
| Description:                   | A voice controlled accessory for phone/Spotify App with supporting display and buttons. Bluetooth enabled for communication with the Car Head Unit. Powered from a 12V outlet. |
| Ancillary Equipment:           | See section 2.7                                                                                                                                                                |

### 2.2 Device Characteristics

|                                   |                           |
|-----------------------------------|---------------------------|
| Type of Power Supply              | 12V to 5V USB car charger |
| Nominal Supply Voltage            | 5V                        |
| Supply Voltage Range              | 4.75-5.25V                |
| Operating Temperature Range       | -20 + 45 deg C            |
| Operating Air Humidity Range      |                           |
| Highest Internal Frequency Source | 24 MHz XO, 2480 MHz radio |

### 2.3 Test Samples

| EUT # | EUT ID         | Description                                 | Used For:             |
|-------|----------------|---------------------------------------------|-----------------------|
| 1     | A002893981-001 | Standard Sample                             | Radiated emissions    |
| 2     | A002893981-002 | Sample with semi-rigid antenna and DUT Mode | Conducted radio tests |

### 2.4 Wireless Technologies and Bands Supported by the EUT

| Technology           | Band    | Frequency Range (Tx) | Evaluation Performed* |
|----------------------|---------|----------------------|-----------------------|
| Bluetooth BDR/EDR    | 2.4 GHz | 2402 MHz - 2480 MHz  | YES                   |
| Bluetooth Low Energy | 2.4 GHz | 2402 MHz - 2480 MHz  | NO                    |

\*This statement refers only to this report. Other wireless technologies may be covered by other reports.

## 2.5 Antenna Information

| Technology                     | Band    | Number of Antennas | Antenna Type(s)     | Gain  |
|--------------------------------|---------|--------------------|---------------------|-------|
| Bluetooth BDR/EDR & Low Energy | 2.4 GHz | 1                  | Internal inverted F | -1.33 |

## 2.6 Wireless Technology Details

| Technology           | Band    | Modulation Type(s)           | No. of Channels | Channel Spacing | Adaptivity |
|----------------------|---------|------------------------------|-----------------|-----------------|------------|
| Bluetooth BDR/EDR    | 2.4 GHz | GFSK, $\pi/4$ -DQPSK, 8-DPSK | 79              | 1 MHz           | N/A        |
| Bluetooth Low Energy | 2.4 GHz | GFSK                         | 40              | 2 MHz           | N/A        |

## 2.7 Ancillary Equipment

| ID             | Description               | Manufacturer / Model | Hardware & Software Versions |
|----------------|---------------------------|----------------------|------------------------------|
| A002893981-008 | USB-A to USB-C Cable      | -                    | -                            |
| A002893981-014 | Dual Port USB Car Charger | IBD322 – 3.1A        | -                            |
| A002893981-016 | 12V Car Charger Cable     | -                    | -                            |

## 2.8 EUT Diagrams

N/A

### 3. TEST METHODS

#### 3.1 Test Standards

Testing was performed according to the following standards / references

| Standard          | Version | Description                                                                 |
|-------------------|---------|-----------------------------------------------------------------------------|
| FCC 47 CFR 15.247 | -       | Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. |
| FCC 47 CFR 15.207 | -       | Conducted limits                                                            |
| FCC 47 CFR 15.209 | -       | Radiated emission limits; general requirements                              |

#### 3.2 Additional references

The following standards / references were also considered for the testing

| Standard    | Version | Description                                                                                    |
|-------------|---------|------------------------------------------------------------------------------------------------|
| ANSI C63.10 | 2013    | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices |

### 3.3 Limits

| FCC 47 CFR Rule Part | Test Description                                          | Limit Reference (FCC 47 CFR Reference)                 |
|----------------------|-----------------------------------------------------------|--------------------------------------------------------|
| 15.207               | AC Power Line Conducted Emissions (Intentional Radiators) | 15.207 (a)                                             |
| 15.209               | Radiated Emissions (Intentional Radiators)                | 15.209 (a)<br>*See Note 1                              |
| 15.247 (d)           | Out of Band Emissions                                     | 15.247 (d)                                             |
| 15.247 (d)           | Band Edge Compliance (Authorized Band)                    | 15.247 (d)                                             |
| 15.247 (d)           | Band Edge Compliance (Restricted Band)                    | 15.247 (d)                                             |
| 15.247 (a)(1)        | 20dB Bandwidth                                            | 15.247 (a)(1)                                          |
| 15.247 (a)(1)        | Carrier (Hopping Channel) Separation                      | 15.247 (a)(1)                                          |
| 15.247 (a)(1)        | Number of Hopping Channels                                | 15.247 (a)(1)                                          |
| 15.247 (a)(1)        | Time of Occupancy (Dwell Time)                            | 15.247 (a)(1)                                          |
| 15.247 (a)(2)        | 6dB Bandwidth                                             | 15.247 (a)(2)                                          |
| 15.247 (b)           | Peak Conducted Output Power                               | 15.247 (b)(1) [Hopping]<br>15.247 (b)(3) [Non-Hopping] |
| 15.247 (e)           | Power Spectral Density                                    | 15.247 (e)                                             |

#### Note 1

Radiated Emissions limits in the tables from 47 CFR sections 15.109 & 15.209 are presented in  $\mu\text{V/m}$ . Measurements on the test system are made in  $\text{dB}\mu\text{V/m}$ . To convert between these, the following adjustment is used:

$$\text{New Limit} = 20 \log \left( \frac{\text{Original Limit}}{10^6} \right) + 120$$

Example: from 15.209(a) the limit for 30MHz – 88MHz is  $100\mu\text{V/m}$  at 3m. This gives:

$$\text{New Limit} = 20 \log \left( \frac{100}{10^6} \right) + 120 = 40\text{dB}\mu\text{V/m at 3m}$$

Additionally, in some cases testing has been performed at distances other than those specified in the tables. When this has occurred, the limits have been adjusted in accordance with the requirements in 47 CFR 15.31, using an extrapolation factor of 40dB/decade at frequencies below 30MHz and 20dB/decade at or above 30MHz

Example: from 15.209(a) the limit for 1.705MHz – 30MHz is  $30\mu\text{V/m}$  (=29.54  $\text{dB}\mu\text{V/m}$ ) at 30m

$$\text{Limit@3m} = \text{Limit@30m} + 40 \log \left( \frac{30}{3} \right) = 29.54 + 40.00 = 69.54 \text{ dB}\mu\text{V/m at 3m}$$

Example: from 15.209(a) the limit for 1GHz – 18GHz is  $500\mu\text{V/m}$  (=53.98  $\text{dB}\mu\text{V/m}$ ) at 3m

$$\text{Limit@1m} = \text{Limit@3m} + 20 \log \left( \frac{3}{1} \right) = 53.98 + 9.54 = 63.52 \text{ dB}\mu\text{V/m at 1m}$$

### 3.4 Description of Test Methods and Equipment Setup

#### 3.4.1 General Description

Testing was performed in accordance with the various requirements of ANSI C63.4 and ANSI C63.10. Any deviations from the test methods are described in section 3.7

Where different arrangements of equipment were used for different types of measurements, these are tabulated in section 3.4.2 and details of each arrangement are included in subsequent sections

#### 3.4.2 Test Equipment Setup Used by Test Type

| FCC 47 CFR Rule Part | Test Description                                          | Test Equipment Used |
|----------------------|-----------------------------------------------------------|---------------------|
| 15.207               | AC Power Line Conducted Emissions (Intentional Radiators) | N.P.                |
| 15.209               | Radiated Emissions (Intentional Radiators)                | SAC5                |
| 15.247 (d)           | Out of Band Emissions                                     | CTE                 |
| 15.247 (d)           | Band Edge Compliance (Authorized band)                    | CTE                 |
| 15.247 (d)           | Band Edge Compliance (Restricted band)                    | SAC 5               |
| 15.247 (a)(1)        | 20dB Bandwidth                                            | CTE                 |
| 15.247 (a)(1)        | Carrier (Hopping Channel) Separation                      | CTE                 |
| 15.247 (a)(1)        | Number of Hopping Channels                                | CTE                 |
| 15.247 (a)(1)        | Time of Occupancy (Dwell Time)                            | CTE                 |
| 15.247 (a)(2)        | 6dB Bandwidth                                             | CTE                 |
| 15.247 (b)           | Peak Conducted Output Power                               | CTE                 |
| 15.247 (e)           | Power Spectral Density                                    | CTE                 |

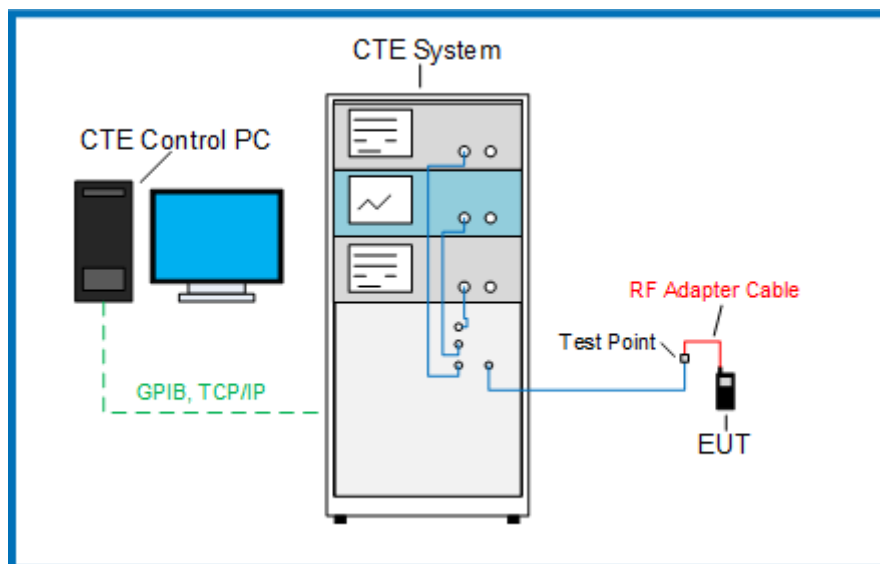
### 3.4.3 Test Equipment Setup – CTE System

The Comprehensive Test Environment (CTE) system consists of a number of instruments (see section 5.1.1) mounted in a rack together with automated relays and interconnecting hardware. The instruments and other equipment are controlled from a standard PC running software provided by the manufacturer. The RF output of the EUT is connected to the test system via a coaxial cable.

Tests are in the form of pre-defined scripts that can be loaded on the PC. The scripts, as well as the hardware setup, have been verified for conformance with the relevant test specifications.

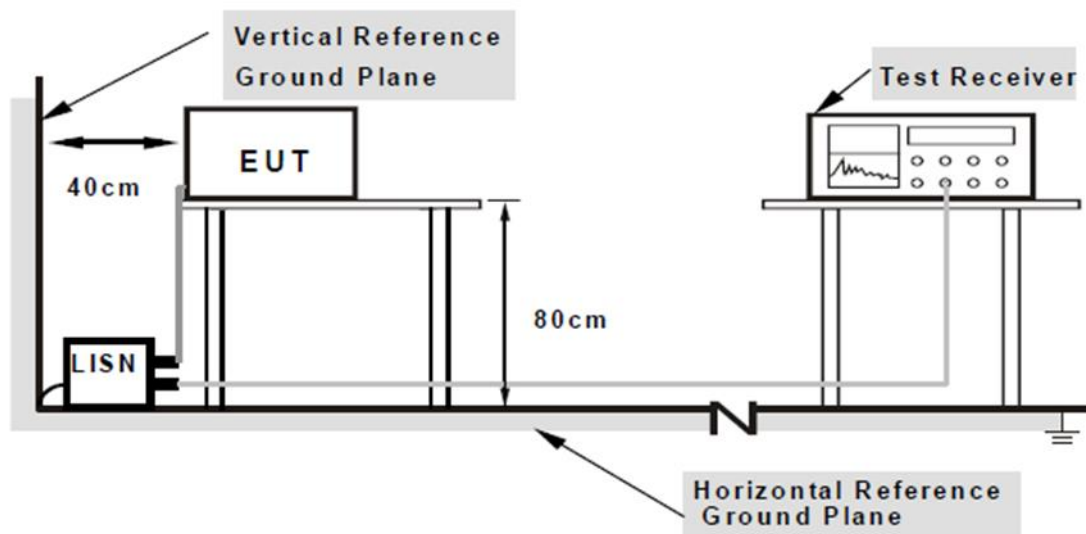
Losses in the cables and interconnects have been measured using the system's own automated routines and are compensated for automatically. Any additional loss in RF adapter cables supplied together with the EUT can be compensated for using the known characteristics of that adapter.

**CTE Block Diagram**



#### 3.4.4 Test Equipment Setup – Conducted Emissions

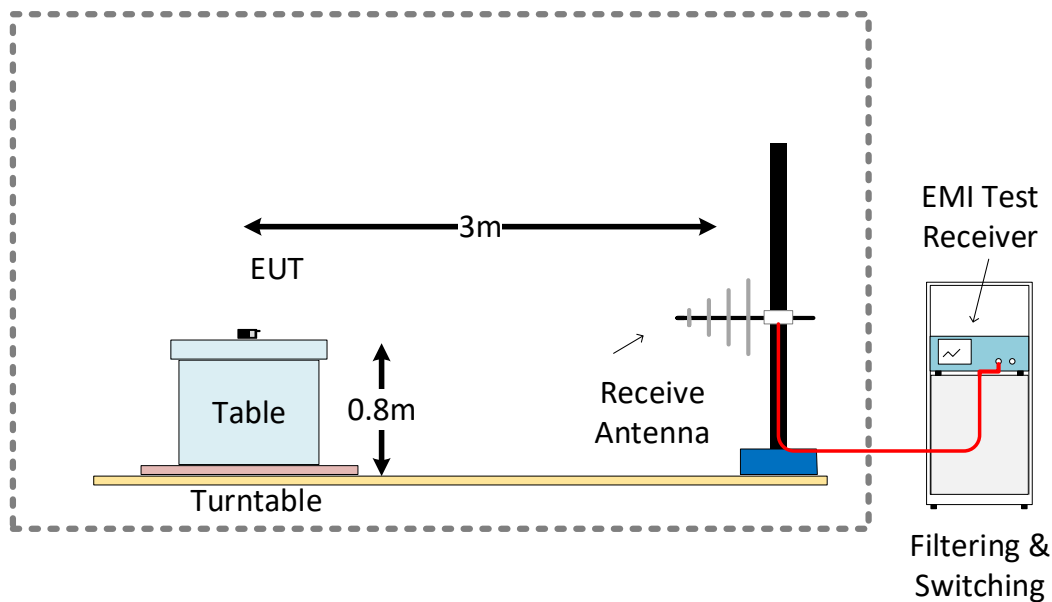
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The LISNs provide  $50\Omega/50\mu\text{H}$  of coupling impedance for the measuring instrument.
- The lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10 dB under the prescribed limits could not be reported.



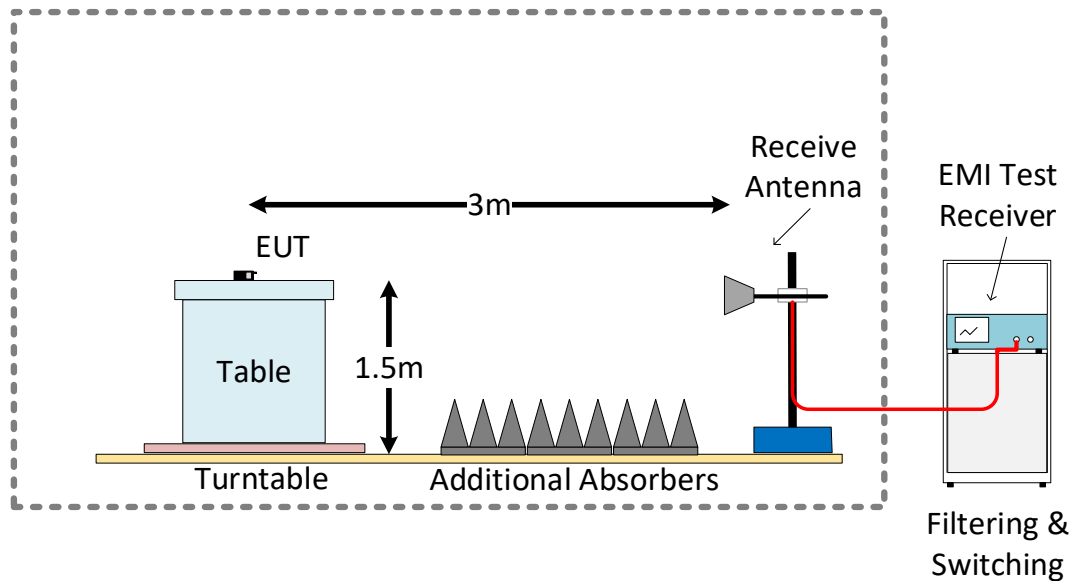
### 3.4.5 Test Equipment Setup – SAC 5 (Radiated Emissions and Restricted Band Edge)

- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to 150 cm from floor, and 1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.
- For all frequency ranges the turntable was rotated 360° for obtaining the maximum emission.

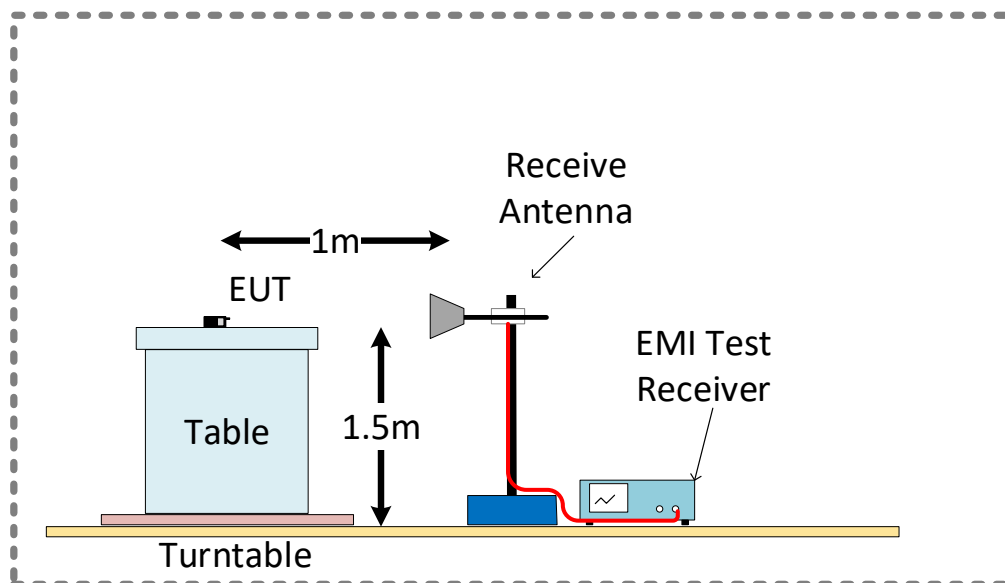
**SAC 5 Test Setup Configuration 30MHz – 1GHz**



**SAC 5 Test Setup Configuration 1GHz – 18GHz**



**SAC 5 Test Setup Configuration 18GHz – 40GHz**



### 3.5 EUT Configuration During Test

See individual tests

### 3.6 EUT Operation Modes

| Operation mode | Description                                                                                 |
|----------------|---------------------------------------------------------------------------------------------|
| 1              | Continuous Transmit – Device is set to transmit random data continuously                    |
| 2              | Test Mode – Device is controlled by the test equipment using Bluetooth Test Mode (DUT Mode) |

### 3.7 Deviations from the Test Standard

None

## 3.8 Environmental Conditions

### 3.8.1 Environmental Conditions – CTE System

#### Environmental Conditions Log - CTE

| Date       | Time  | Temperature (°C) | Relative Humidity (%) |
|------------|-------|------------------|-----------------------|
| 2020/11/10 | 07:35 | 19.7             | 43 %                  |
| 2020/11/11 | 08:10 | 21.7             | 36 %                  |

### 3.8.2 Environmental Conditions – SAC5 (Radiated Emissions)

#### Environmental Conditions Log – SAC5

| Date       | Time  | Temperature (°C) | Relative Humidity (%) |
|------------|-------|------------------|-----------------------|
| 2020/09/10 | 09:03 | 18.7             | 62 %                  |
| 2020/09/11 | 08:16 | 18.8             | 58 %                  |
| 2020/09/14 | 10:25 | 18.4             | 63 %                  |
| 2020/09/15 | 07:53 | 18.6             | 63 %                  |
| 2020/09/16 | 07:33 | 18.9             | 65 %                  |
| 2020/09/17 | 07:41 | 19.3             | 62 %                  |
| 2020/09/18 | 08:00 | 18.6             | 56 %                  |
| 2020/09/19 | 12:20 | 18.7             | 65 %                  |
| 2020/09/20 | 11:50 | 20.0             | 58 %                  |
| 2020/09/21 | 07:11 | 18.4             | 61 %                  |
| 2020/09/22 | 07:18 | 18.5             | 61 %                  |

## 4. TEST RESULTS

### 4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter)

#### 4.1.1 AC Power Line Conducted Emissions (Intentional) – Test Summary

Testing performed with device in Bluetooth Low Energy mode. Please see results in corresponding report

## 4.2 Test Results – Radiated Emissions (Intentional Transmitter)

### 4.2.1 Radiated Emissions (Intentional) – Test Summary

|                                        |  |                                                                    |                                                    |
|----------------------------------------|--|--------------------------------------------------------------------|----------------------------------------------------|
| <b>Test Specification</b>              |  | FCC 47 CFR 15.209 (Part 15 Subpart C)                              |                                                    |
| <b>Test Engineer &amp; Date</b>        |  | Joel Efraimsson<br>Niall Forrester<br>Sam Ebadeh<br>Fariborz Abasi | 2020.09.10 – 2020.09.22                            |
| <b>EUT and Ancillary Equipment IDs</b> |  | A002893981-001                                                     | A002893981-008<br>A002893981-014<br>A002893981-016 |
| <b>EUT Operation Mode(s)</b>           |  | Continuous Transmit                                                |                                                    |
| <b>EUT Wireless Configuration(s)</b>   |  | Bluetooth BDR EDR 3-DH5<br>(8-DPSK Low / Mid / High channels)      |                                                    |
| <b>EUT Hardware Configuration(s)</b>   |  | Power from USB Charger connected to 12V DC                         |                                                    |
| <b>Overall Result</b>                  |  | PASS                                                               |                                                    |

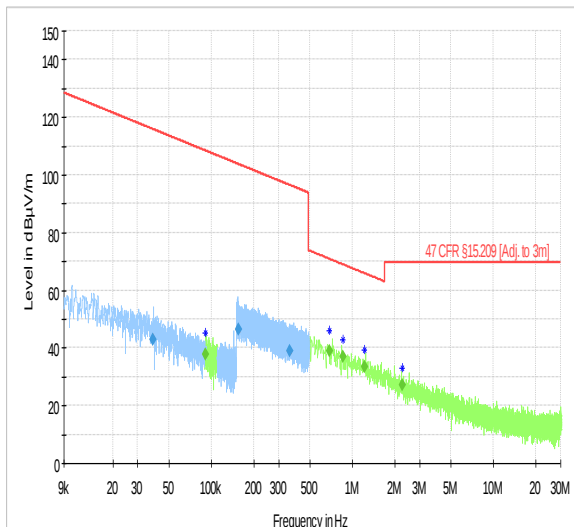
  

| Test Parameter     | Wireless Configuration                                | Frequency Range | Result |
|--------------------|-------------------------------------------------------|-----------------|--------|
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Low Ch. (8-DPSK 2402 MHz)  | 9 kHz – 30 MHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Low Ch. (8-DPSK 2402 MHz)  | 30 MHz – 1 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Low Ch. (8-DPSK 2402 MHz)  | 1 GHz – 18 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Low Ch. (8-DPSK 2402 MHz)  | 18 GHz – 40 GHz | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Mid Ch. (8-DPSK 2441 MHz)  | 9 kHz – 30 MHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Mid Ch. (8-DPSK 2441 MHz)  | 30 MHz – 1 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Mid Ch. (8-DPSK 2441 MHz)  | 1 GHz – 18 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>Mid Ch. (8-DPSK 2441 MHz)  | 18 GHz – 40 GHz | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>High Ch. (8-DPSK 2480 MHz) | 9 kHz – 30 MHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>High Ch. (8-DPSK 2480 MHz) | 30 MHz – 1 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>High Ch. (8-DPSK 2480 MHz) | 1 GHz – 18 GHz  | PASS   |
| Radiated Emissions | Bluetooth BDR EDR 3-DH5<br>High Ch. (8-DPSK 2480 MHz) | 18 GHz – 40 GHz | PASS   |

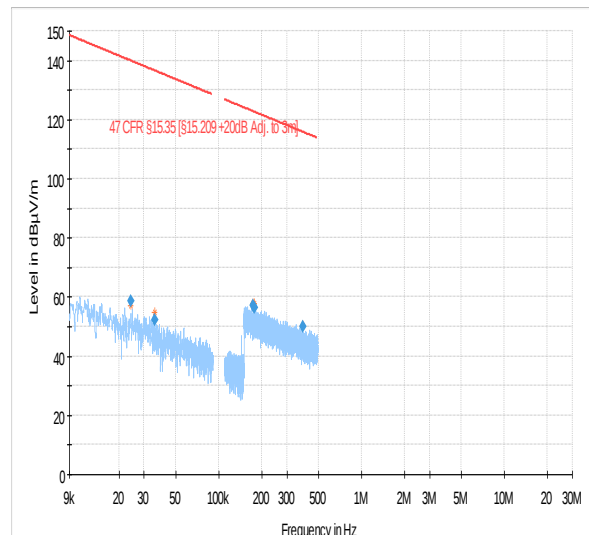
#### 4.2.2 Radiated Emissions (Intentional) – Test Details

##### Low Channel 9kHz – 30MHz –Parallel to Axis

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Loop Antenna Parallel to Axis                                        |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-19 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



PreviewResult 2-PK+  
 Critical\_Freqs PK+  
 47 CFR §15.209 (Adj. to 3m)  
 Final\_Result QPK  
 PreviewResult 1-AVG  
 Critical\_Freqs AVG  
 Final\_Result AVG

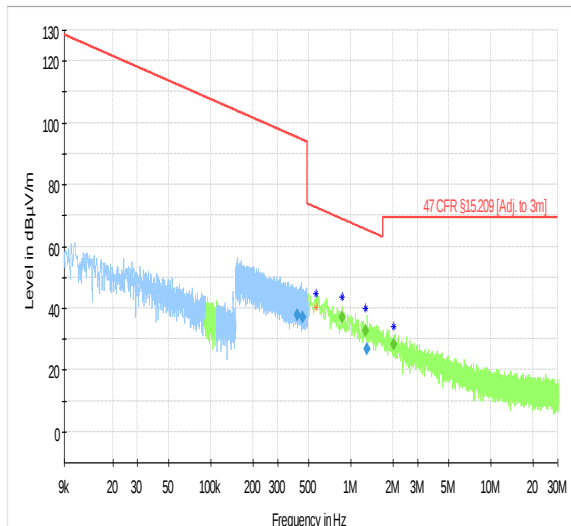


PreviewResult 1-PK+  
 47 CFR §15.35 (S15.209+20dB Adj. to 3m)  
 MaxPeak-PK+ (Single)  
 Critical\_Freqs PK+  
 Final\_Result PK+

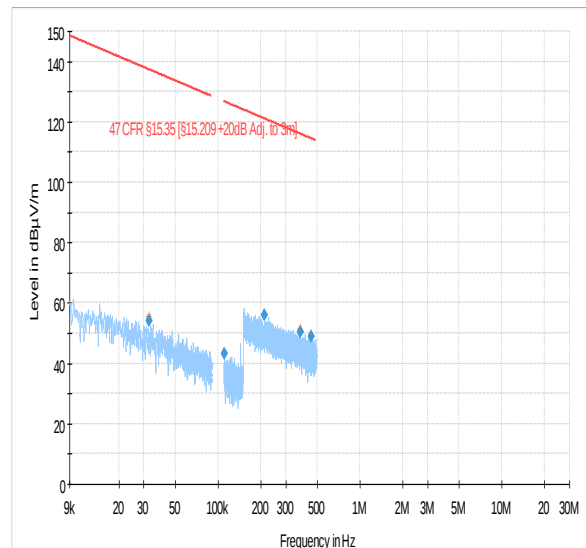
| Frequency (MHz) | Average (dBμV/m) | QuasiPeak (dBμV/m) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.038489        | 43.10            | ---                | ---              | 115.90         | 72.79       | 1000.0          | 0.200           | 100.0       | H   | 281.0         |
| 0.090646        | ---              | 37.99              | ---              | 108.46         | 70.47       | 1000.0          | 0.200           | 100.0       | H   | 49.0          |
| 0.156547        | 46.50            | ---                | ---              | 103.71         | 57.21       | 1000.0          | 9.000           | 100.0       | H   | 127.0         |
| 0.359569        | 39.05            | ---                | ---              | 96.49          | 57.44       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 0.686140        | ---              | 39.08              | ---              | 70.88          | 31.80       | 1000.0          | 9.000           | 100.0       | H   | 205.0         |
| 0.860367        | ---              | 36.85              | ---              | 68.91          | 32.06       | 1000.0          | 9.000           | 100.0       | H   | 25.0          |
| 1.213534        | ---              | 33.36              | ---              | 65.92          | 32.57       | 1000.0          | 9.000           | 100.0       | H   | 244.0         |
| 2.254051        | ---              | 27.00              | ---              | 69.54          | 42.54       | 1000.0          | 9.000           | 100.0       | H   | 11.0          |
| 0.024200        |                  |                    | 58.81            | 139.93         | 81.11       | 1000.0          | 0.200           | 100.0       | H   | 177.0         |
| 0.035510        |                  |                    | 52.23            | 136.60         | 84.37       | 1000.0          | 0.200           | 100.0       | H   | 88.0          |
| 0.173509        |                  |                    | 57.16            | 122.82         | 65.66       | 1000.0          | 9.000           | 100.0       | H   | -15.0         |
| 0.176985        |                  |                    | 56.50            | 122.65         | 66.14       | 1000.0          | 9.000           | 100.0       | H   | -15.0         |
| 0.387616        |                  |                    | 49.84            | 115.84         | 66.00       | 1000.0          | 9.000           | 100.0       | H   | 165.0         |

Low Channel 9kHz – 30MHz –Perpendicular to Axis

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Loop Antenna Perpendicular to Axis                                   |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-10 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



PreviewResult2-PK+  
 Critical\_Freqs PK+  
 47 CFR §15.209 (Adj. to 3m)  
 Final\_Result QPK  
 PreviewResult1-AVG  
 Critical\_Freqs AVG  
 Final\_Result AVG

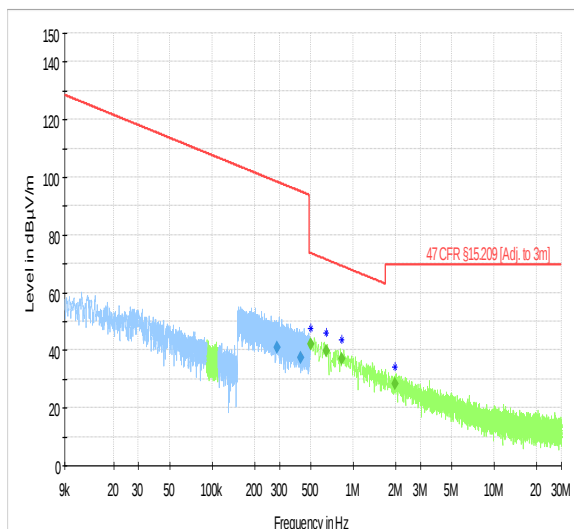


PreviewResult1-PK+  
 47 CFR §15.35 (S15.209+20dB Adj. to 3m)  
 MaxPeak-PK+ (Single)  
 Critical\_Freqs PK+  
 Final\_Result PK+

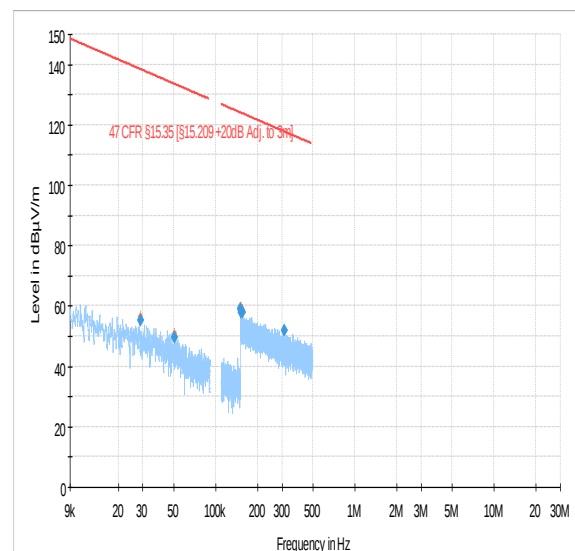
| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.412532        | 37.78            | ---                | ---              | 95.30          | 57.52       | 1000.0          | 9.000           | 100.0       | H   | 293.0         |
| 0.454120        | 37.01            | ---                | ---              | 94.46          | 57.45       | 1000.0          | 9.000           | 100.0       | H   | 225.0         |
| 0.862689        | ---              | 36.85              | ---              | 68.89          | 32.03       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 1.279231        | ---              | 32.79              | ---              | 65.47          | 32.67       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 1.304476        | 26.59            | ---                | ---              | 65.30          | 38.71       | 1000.0          | 9.000           | 100.0       | H   | -26.0         |
| 2.024761        | ---              | 28.19              | ---              | 69.54          | 41.35       | 1000.0          | 9.000           | 100.0       | H   | 281.0         |
| 0.032572        | ---              | ---                | 54.05            | 137.35         | 83.29       | 1000.0          | 0.200           | 100.0       | H   | 113.0         |
| 0.111037        | ---              | ---                | 43.25            | 126.70         | 83.45       | 1000.0          | 0.200           | 100.0       | H   | 45.0          |
| 0.211161        | ---              | ---                | 55.98            | 121.11         | 65.13       | 1000.0          | 9.000           | 100.0       | H   | 214.0         |
| 0.378736        | ---              | ---                | 50.27            | 116.04         | 65.76       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 0.453435        | ---              | ---                | 48.77            | 114.47         | 65.71       | 1000.0          | 9.000           | 100.0       | H   | 304.0         |

### Low Channel 9kHz – 30MHz –Parallel to Floor

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Loop Antenna Parallel to Floor                                       |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-20 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



PreviewResult 2-PK+  
 Critical\_Freqs PK+  
 47 CFR §15.209 (Adj. to 3m)  
 Final\_Result QPK

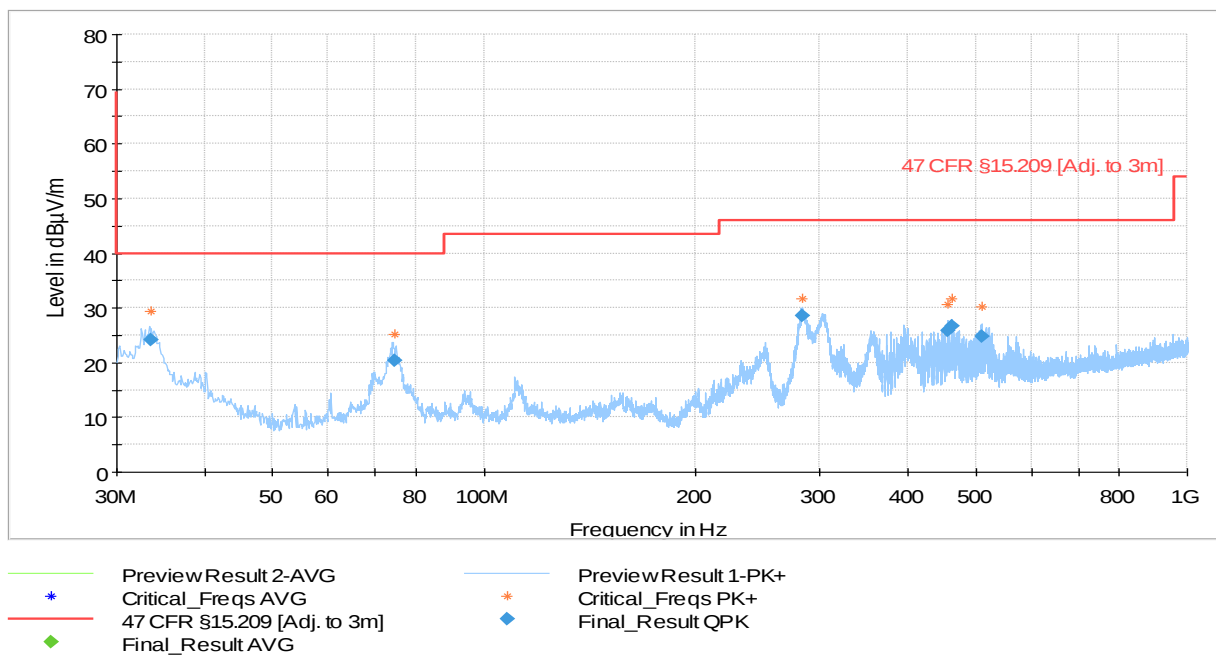


PreviewResult 1-PK+  
 47 CFR §15.35 (S15.209+20dB Adj. to 3m)  
 MaxPeak-PK+ (Single)  
 Critical\_Freqs PK+  
 Final\_Result PK+

| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.288434        | 40.87            | ---                | ---              | 98.40          | 57.53       | 1000.0          | 9.000           | 100.0       | H   | 192.0         |
| 0.425139        | 37.59            | ---                | ---              | 95.03          | 57.44       | 1000.0          | 9.000           | 100.0       | H   | 49.0          |
| 0.499746        | ---              | 42.11              | ---              | 73.63          | 31.52       | 1000.0          | 9.000           | 100.0       | H   | 24.0          |
| 0.644387        | ---              | 39.66              | ---              | 71.42          | 31.76       | 1000.0          | 9.000           | 100.0       | H   | -41.0         |
| 0.831191        | ---              | 37.20              | ---              | 69.21          | 32.01       | 1000.0          | 9.000           | 100.0       | H   | 217.0         |
| 1.981348        | ---              | 28.23              | ---              | 69.54          | 41.32       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 0.029016        | ---              | ---                | 55.44            | 138.35         | 82.91       | 1000.0          | 0.200           | 100.0       | H   | 45.0          |
| 0.050834        | ---              | ---                | 49.77            | 133.48         | 83.71       | 1000.0          | 0.200           | 100.0       | H   | 22.0          |
| 0.151032        | ---              | ---                | 59.03            | 124.02         | 65.00       | 1000.0          | 9.000           | 100.0       | H   | -27.0         |
| 0.151891        | ---              | ---                | 57.96            | 123.97         | 66.02       | 1000.0          | 9.000           | 100.0       | H   | 223.0         |
| 0.155086        | ---              | ---                | 58.00            | 123.79         | 65.80       | 1000.0          | 9.000           | 100.0       | H   | 255.0         |
| 0.310024        | ---              | ---                | 52.01            | 117.78         | 65.77       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |

### Low Channel 30MHz – 1GHz

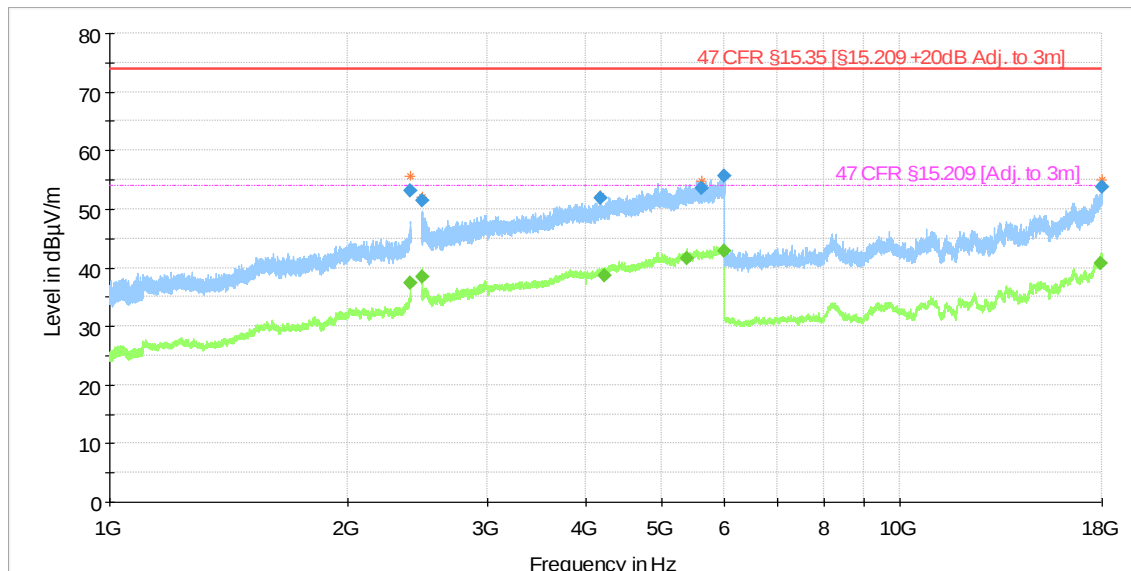
|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 30 MHz – 1 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-16 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



| Frequency (MHz) | QuasiPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 33.545240       | 24.21              | ---              | 40.00          | 15.79       | 1000.0          | 120.000         | 100.0       | V   | 202.0         |
| 74.498000       | 20.31              | ---              | 40.00          | 19.69       | 1000.0          | 120.000         | 125.0       | V   | -4.0          |
| 284.013480      | 28.59              | ---              | 46.02          | 17.43       | 1000.0          | 120.000         | 125.0       | V   | -18.0         |
| 456.213640      | 25.88              | ---              | 46.02          | 20.14       | 1000.0          | 120.000         | 100.0       | H   | 112.0         |
| 462.335600      | 26.73              | ---              | 46.02          | 19.29       | 1000.0          | 120.000         | 100.0       | H   | 112.0         |
| 511.511240      | 24.76              | ---              | 46.02          | 21.26       | 1000.0          | 120.000         | 270.0       | H   | 112.0         |

Low Channel 1GHz – 18GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 1 GHz – 18 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-14 |
| Chamber details     | Chamber: SAC 5                                                       |                  |

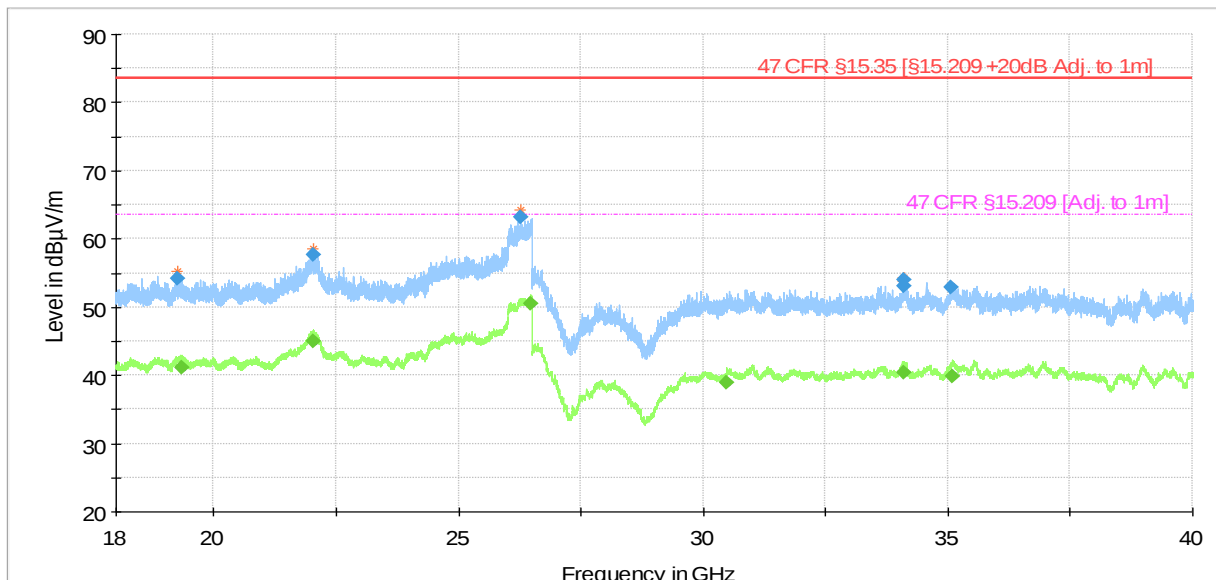


—◆— PreviewResult 2-AVG  
—◆— PreviewResult 1-PK+  
—◆— Critical\_Freqs AVG  
—◆— Critical\_Freqs PK+  
—◆— 47 CFR §15.35 [\$15.209 +20dB Adj. to 3m]  
—◆— 47 CFR §15.209 [Adj. to 3m]  
◆ Final\_Result PK+  
◆ Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBm) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|---------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2399.979500     | ---           | 37.36            | 53.98          | 16.62       | 1000.0          | 1000.000        | 148.0       | H   | -18.0         |
| 2483.543500     | ---           | 38.40            | 53.98          | 15.58       | 1000.0          | 1000.000        | 147.0       | H   | 155.0         |
| 4234.240000     | ---           | 38.70            | 53.98          | 15.28       | 1000.0          | 1000.000        | 175.0       | V   | 158.0         |
| 5372.049000     | ---           | 41.51            | 53.98          | 12.47       | 1000.0          | 1000.000        | 175.0       | H   | -18.0         |
| 5978.940000     | ---           | 42.90            | 53.98          | 11.08       | 1000.0          | 1000.000        | 125.0       | V   | 280.0         |
| 17930.780000    | ---           | 40.80            | 53.98          | 13.18       | 1000.0          | 1000.000        | 206.0       | V   | 26.0          |

Low Channel 18GHz – 40GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Low Channel (2402 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 18 GHz – 40 GHz                                                      |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-22 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



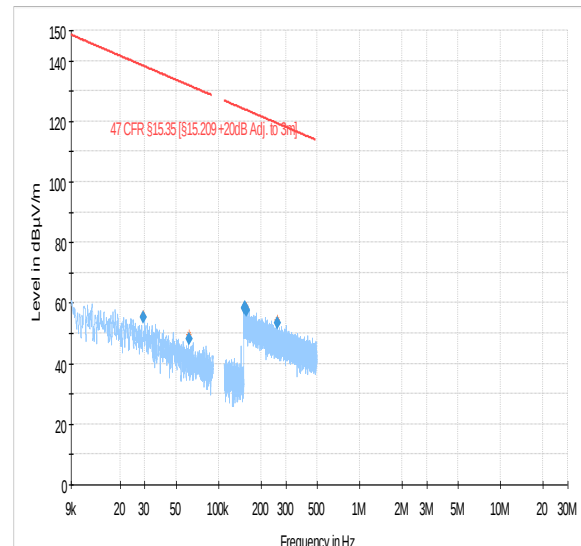
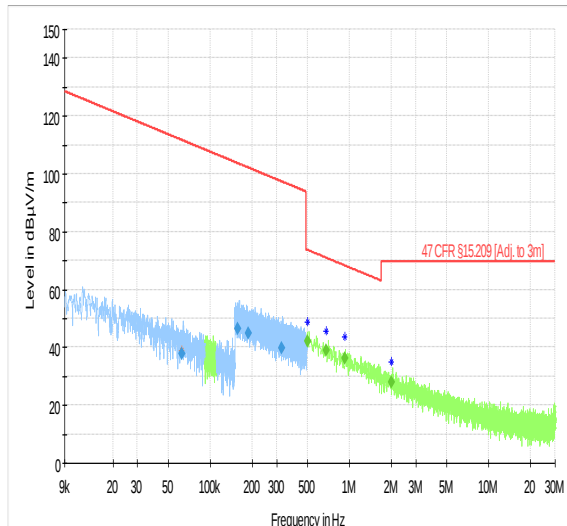
— PreviewResult 2-AVG  
\* Critical\_Freqs AVG  
— 47 CFR §15.35 [S15.209 +20dB Adj. to 1m]  
◆ Final\_Result PK+

— PreviewResult 1-PK+  
\* Critical\_Freqs PK+  
— 47 CFR §15.209 [Adj. to 1m]  
◆ Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 19244.026000    | 54.15            | ---              | 83.52          | 29.37       | 1000.0          | 1000.000        | 155.0       | H   | 116.0         |
| 19352.844000    | ---              | 41.11            | 63.52          | 22.41       | 1000.0          | 1000.000        | 155.0       | H   | 98.0          |
| 22025.350000    | ---              | 44.97            | 63.52          | 18.55       | 1000.0          | 1000.000        | 155.0       | H   | 312.0         |
| 22030.103000    | 57.72            | ---              | 83.52          | 25.80       | 1000.0          | 1000.000        | 155.0       | H   | 162.0         |
| 26259.291000    | 63.16            | ---              | 83.52          | 20.36       | 1000.0          | 1000.000        | 155.0       | V   | 338.0         |
| 26470.876000    | ---              | 50.48            | 63.52          | 13.04       | 1000.0          | 1000.000        | 155.0       | H   | 128.0         |
| 30474.559000    | ---              | 38.89            | 63.52          | 24.63       | 1000.0          | 1000.000        | 155.0       | V   | 292.0         |
| 34098.534000    | ---              | 40.37            | 63.52          | 23.15       | 1000.0          | 1000.000        | 155.0       | V   | 158.0         |
| 34103.064000    | 53.15            | ---              | 83.52          | 30.37       | 1000.0          | 1000.000        | 155.0       | H   | 306.0         |
| 34103.551000    | 53.96            | ---              | 83.52          | 29.56       | 1000.0          | 1000.000        | 155.0       | H   | 308.0         |
| 35068.704000    | 52.94            | ---              | 83.52          | 30.58       | 1000.0          | 1000.000        | 155.0       | H   | 52.0          |
| 35103.742000    | ---              | 39.91            | 63.52          | 23.62       | 1000.0          | 1000.000        | 155.0       | V   | 308.0         |

Mid Channel 9kHz – 30MHz –Parallel to Axis

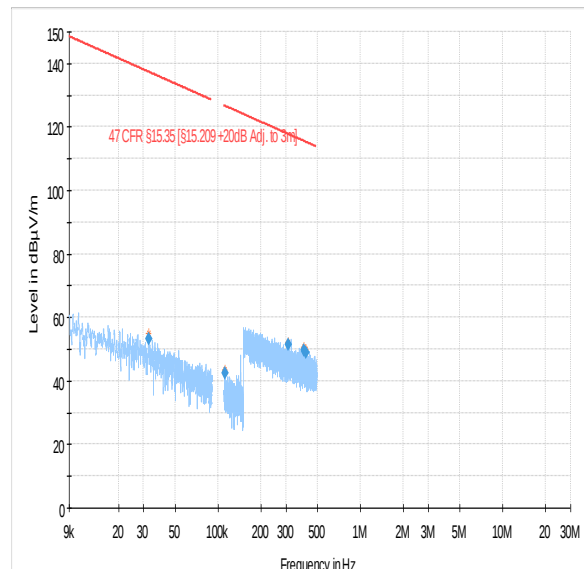
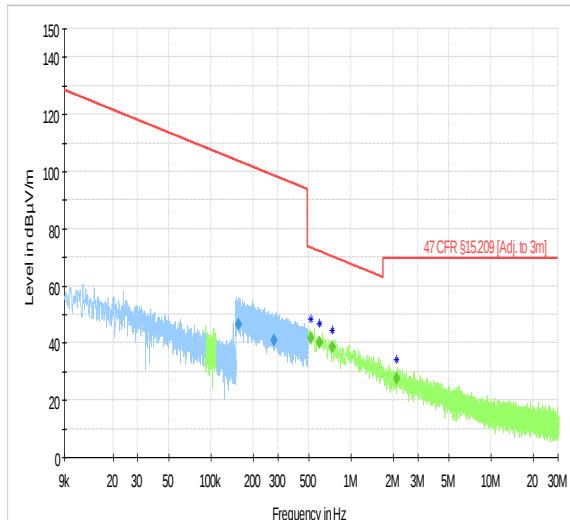
|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Loop Antenna Parallel to Axis                                        |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-19 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.062740        | 37.95            | ---                | ---              | 111.65         | 73.70       | 1000.0          | 0.200           | 100.0       | H   | 89.0          |
| 0.157159        | 46.49            | ---                | ---              | 103.68         | 57.19       | 1000.0          | 9.000           | 100.0       | H   | 281.0         |
| 0.187660        | 44.99            | ---                | ---              | 102.14         | 57.15       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 0.325363        | 39.85            | ---                | ---              | 97.36          | 57.50       | 1000.0          | 9.000           | 100.0       | H   | 256.0         |
| 0.497245        | ---              | 42.14              | ---              | 73.67          | 31.54       | 1000.0          | 9.000           | 100.0       | H   | 76.0          |
| 0.678973        | ---              | 39.10              | ---              | 70.97          | 31.87       | 1000.0          | 9.000           | 100.0       | H   | 101.0         |
| 0.929022        | ---              | 36.12              | ---              | 68.24          | 32.12       | 1000.0          | 9.000           | 100.0       | H   | 49.0          |
| 1.998891        | ---              | 28.10              | ---              | 69.54          | 41.44       | 1000.0          | 9.000           | 100.0       | H   | 217.0         |
| 0.029066        | ---              | ---                | 55.41            | 138.34         | 82.93       | 1000.0          | 0.200           | 100.0       | H   | 315.0         |
| 0.061561        | ---              | ---                | 47.98            | 131.82         | 83.84       | 1000.0          | 0.200           | 100.0       | H   | 225.0         |
| 0.152674        | ---              | ---                | 58.34            | 123.93         | 65.58       | 1000.0          | 9.000           | 100.0       | H   | 113.0         |
| 0.153421        | ---              | ---                | 58.51            | 123.89         | 65.38       | 1000.0          | 9.000           | 100.0       | H   | 313.0         |
| 0.157477        | ---              | ---                | 57.43            | 123.66         | 66.23       | 1000.0          | 9.000           | 100.0       | H   | 124.0         |
| 0.261873        | ---              | ---                | 53.43            | 119.24         | 65.82       | 1000.0          | 9.000           | 100.0       | H   | 223.0         |

Mid Channel 9kHz – 30MHz –Perpendicular to Axis

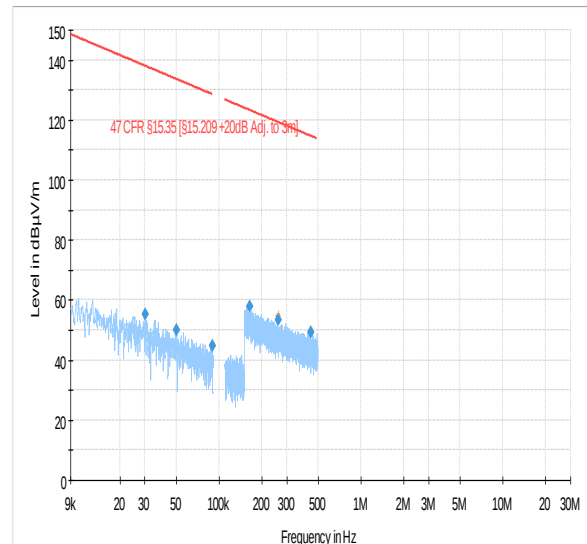
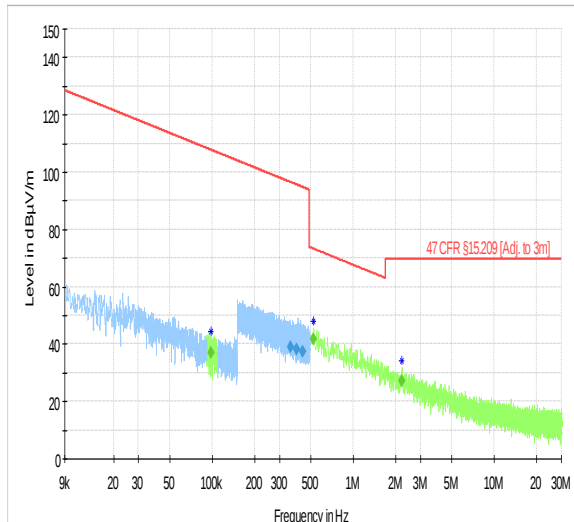
|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Loop Antenna Perpendicular to Axis                                   |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Fariborz Abasi                                                       | Date: 2020-09-10 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.157317        | 46.51            | ---                | ---              | 103.67         | 57.16       | 1000.0          | 9.000           | 100.0       | H   | 225.0         |
| 0.282643        | 41.07            | ---                | ---              | 98.58          | 57.51       | 1000.0          | 9.000           | 100.0       | H   | 216.0         |
| 0.519330        | ---              | 41.80              | ---              | 73.30          | 31.49       | 1000.0          | 9.000           | 100.0       | H   | 49.0          |
| 0.596254        | ---              | 40.23              | ---              | 72.10          | 31.87       | 1000.0          | 9.000           | 100.0       | H   | 101.0         |
| 0.736758        | ---              | 38.51              | ---              | 70.26          | 31.75       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 2.110271        | ---              | 27.68              | ---              | 69.54          | 41.86       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 0.032660        | ---              | ---                | 53.27            | 137.32         | 84.06       | 1000.0          | 0.200           | 100.0       | H   | 191.0         |
| 0.112017        | ---              | ---                | 42.57            | 126.62         | 84.05       | 1000.0          | 0.200           | 100.0       | H   | 135.0         |
| 0.312876        | ---              | ---                | 51.53            | 117.70         | 66.17       | 1000.0          | 9.000           | 100.0       | H   | 223.0         |
| 0.403025        | ---              | ---                | 49.69            | 115.50         | 65.81       | 1000.0          | 9.000           | 100.0       | H   | 75.0          |
| 0.414743        | ---              | ---                | 49.09            | 115.25         | 66.16       | 1000.0          | 9.000           | 100.0       | H   | 223.0         |

Mid Channel 9kHz – 30MHz –Parallel to Floor

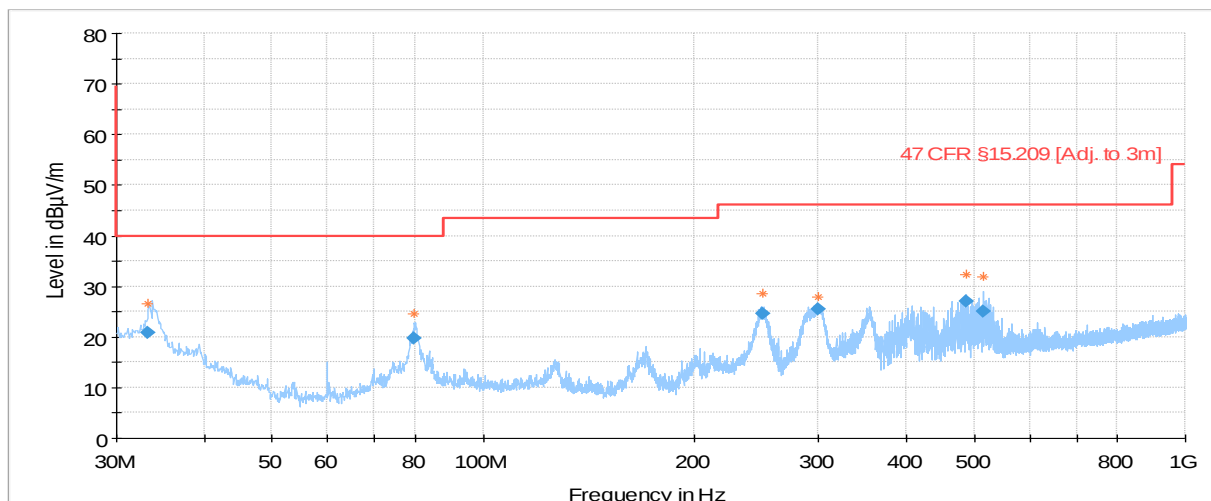
|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Loop Antenna Parallel to Floor                                       |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-20 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.098494        | ---              | 37.03              | ---              | 107.74         | 70.70       | 1000.0          | 0.200           | 100.0       | H   | -13.0         |
| 0.360813        | 38.90            | ---                | ---              | 96.46          | 57.56       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 0.398117        | 38.09            | ---                | ---              | 95.60          | 57.52       | 1000.0          | 9.000           | 100.0       | H   | 179.0         |
| 0.436571        | 37.33            | ---                | ---              | 94.80          | 57.47       | 1000.0          | 9.000           | 100.0       | H   | -45.0         |
| 0.520589        | ---              | 41.78              | ---              | 73.27          | 31.49       | 1000.0          | 9.000           | 100.0       | H   | 281.0         |
| 2.206200        | ---              | 27.06              | ---              | 69.54          | 42.48       | 1000.0          | 9.000           | 100.0       | H   | -41.0         |
| 0.030355        | ---              | ---                | 55.21            | 137.96         | 82.75       | 1000.0          | 0.200           | 100.0       | H   | 23.0          |
| 0.050031        | ---              | ---                | 49.85            | 133.62         | 83.77       | 1000.0          | 0.200           | 100.0       | H   | 88.0          |
| 0.089534        | ---              | ---                | 44.57            | 128.56         | 83.99       | 1000.0          | 0.200           | 100.0       | H   | -14.0         |
| 0.164550        | ---              | ---                | 57.79            | 123.28         | 65.48       | 1000.0          | 9.000           | 100.0       | H   | 243.0         |
| 0.260282        | ---              | ---                | 53.29            | 119.30         | 66.01       | 1000.0          | 9.000           | 100.0       | H   | 135.0         |
| 0.443453        | ---              | ---                | 49.24            | 114.67         | 65.42       | 1000.0          | 9.000           | 100.0       | H   | 225.0         |

Mid Channel 30MHz – 1GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 30 MHz – 1 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-17 |
| Chamber details     | Chamber: SAC 5                                                       |                  |

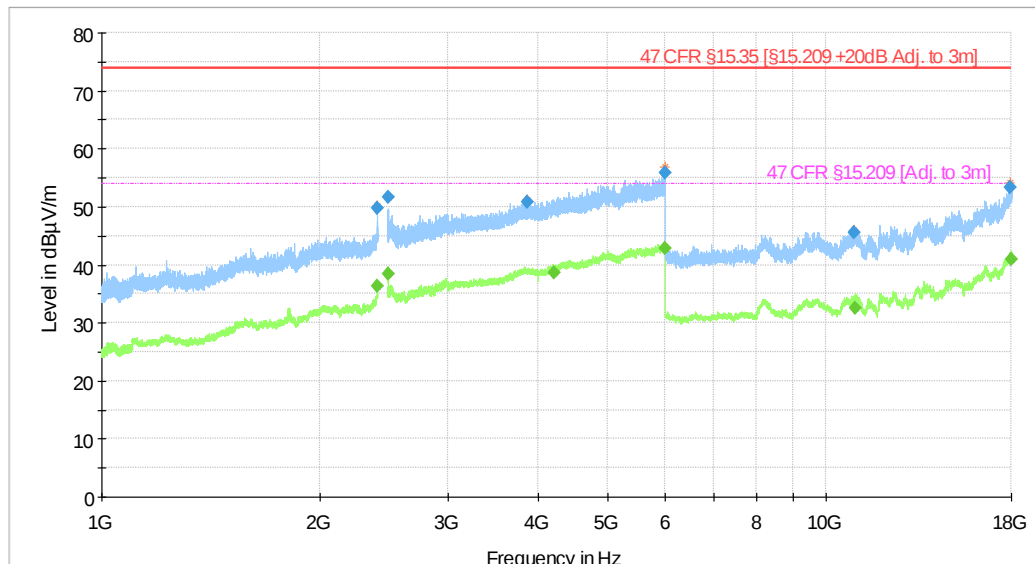


|                             |                        |
|-----------------------------|------------------------|
| PreviewResult 2-AVG         | PreviewResult 1-PK+    |
| * Critical_Freqs AVG        | * Critical_Freqs PK+   |
| 47 CFR §15.209 [Adj. to 3m] | ◆ Final_Result QPK     |
| ◆ Final_Result AVG          | × MaxPeak-PK+ (Single) |
| + QuasiPeak-QPK (Single)    | × Average-AVG (Single) |

| Frequency (MHz) | QuasiPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 33.316680       | 20.73              | ---              | 40.00          | 19.27       | 1000.0          | 120.000         | 108.0       | V   | 109.0         |
| 79.787520       | 19.71              | ---              | 40.00          | 20.29       | 1000.0          | 120.000         | 125.0       | V   | 322.0         |
| 250.213160      | 24.50              | ---              | 46.02          | 21.52       | 1000.0          | 120.000         | 108.0       | H   | 292.0         |
| 299.718600      | 25.38              | ---              | 46.02          | 20.64       | 1000.0          | 120.000         | 100.0       | V   | 72.0          |
| 486.910200      | 27.13              | ---              | 46.02          | 18.89       | 1000.0          | 120.000         | 133.0       | V   | 22.0          |
| 514.545240      | 25.10              | ---              | 46.02          | 20.92       | 1000.0          | 120.000         | 233.0       | H   | 72.0          |

Mid Channel 1GHz – 18GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 1 GHz – 18 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-15 |
| Chamber details     | Chamber: SAC 5                                                       |                  |

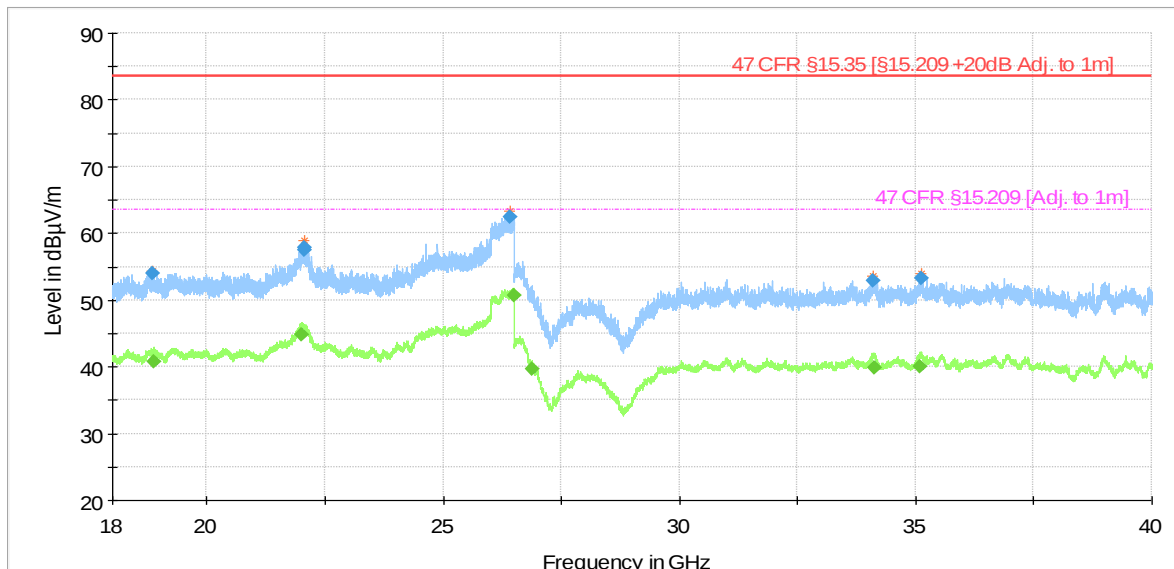


— PreviewResult 2-AVG  
— PreviewResult 1-PK+  
\* Critical\_Freqs AVG  
\* Critical\_Freqs PK+  
— 47 CFR §15.35 [§15.209 +20dB Adj. to 3m]  
— 47 CFR §15.209 [Adj. to 3m]  
◆ Final\_Result PK+  
◆ Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBm) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|---------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2399.963064     | ---           | 36.23            | 53.98          | 17.75       | 1000.0          | 1000.000        | 112.0       | H   | 112.0         |
| 2483.525258     | ---           | 38.49            | 53.98          | 15.49       | 1000.0          | 1000.000        | 125.0       | V   | 68.0          |
| 4204.818000     | ---           | 38.69            | 53.98          | 15.29       | 1000.0          | 1000.000        | 177.0       | H   | 116.0         |
| 5985.162000     | 55.86         | ---              | 73.98          | 18.12       | 1000.0          | 1000.000        | 210.0       | V   | 290.0         |
| 5988.140000     | ---           | 42.76            | 53.98          | 11.22       | 1000.0          | 1000.000        | 112.0       | H   | 112.0         |
| 17991.665000    | ---           | 40.84            | 53.98          | 13.14       | 1000.0          | 1000.000        | 100.0       | V   | 10.0          |

Mid Channel 18GHz – 40GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 Mid Channel (2440 MHz)                               |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 18 GHz – 40 GHz                                                      |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-22 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



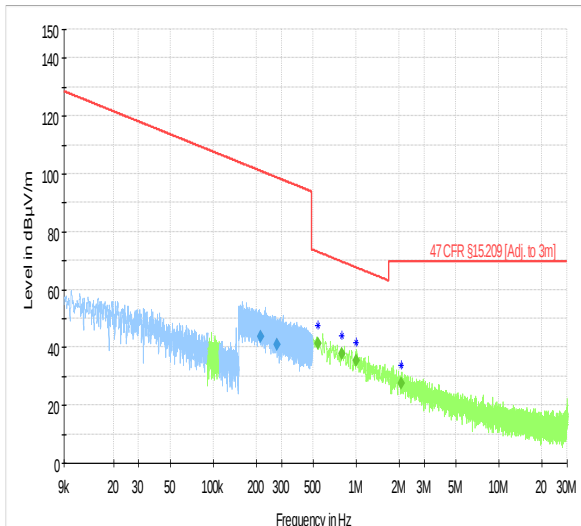
— PreviewResult 2-AVG  
\* Critical\_Freqs AVG  
— 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]  
◆ Final\_Result PK+

— PreviewResult 1-PK+  
\* Critical\_Freqs PK+  
— 47 CFR §15.209 [Adj. to 1m]  
◆ Final\_Result AVG

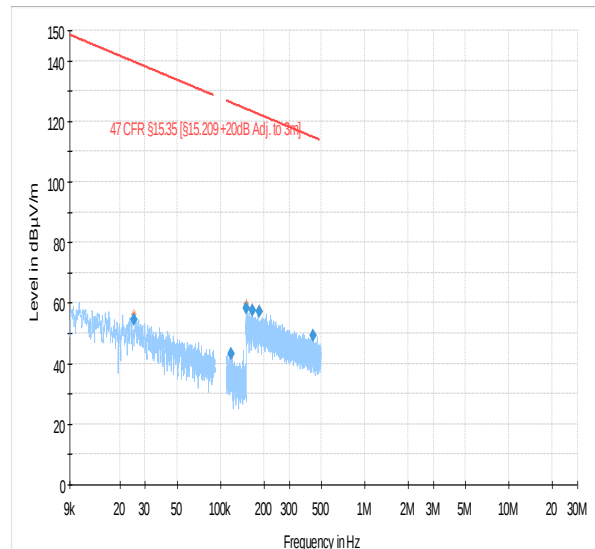
| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 18840.381000    | 54.00            | ---              | 83.52          | 29.52       | 1000.0          | 1000.000        | 155.0       | V   | 202.0         |
| 18878.111000    | ---              | 40.76            | 63.52          | 22.76       | 1000.0          | 1000.000        | 155.0       | V   | 262.0         |
| 22005.023000    | ---              | 44.86            | 63.52          | 18.67       | 1000.0          | 1000.000        | 155.0       | V   | 158.0         |
| 22049.380000    | 57.77            | ---              | 83.52          | 25.75       | 1000.0          | 1000.000        | 155.0       | H   | 8.0           |
| 22053.611000    | 57.43            | ---              | 83.52          | 26.09       | 1000.0          | 1000.000        | 155.0       | H   | -8.0          |
| 26409.917000    | 62.46            | ---              | 83.52          | 21.07       | 1000.0          | 1000.000        | 155.0       | V   | 102.0         |
| 26499.821080    | ---              | 50.65            | 63.52          | 12.87       | 1000.0          | 1000.000        | 155.0       | H   | 322.0         |
| 26886.526000    | ---              | 39.61            | 63.52          | 23.91       | 1000.0          | 1000.000        | 155.0       | H   | 338.0         |
| 34091.594000    | 52.86            | ---              | 83.52          | 30.66       | 1000.0          | 1000.000        | 155.0       | V   | 156.0         |
| 34125.553000    | ---              | 39.85            | 63.52          | 23.67       | 1000.0          | 1000.000        | 155.0       | V   | 232.0         |
| 35096.169000    | ---              | 40.01            | 63.52          | 23.51       | 1000.0          | 1000.000        | 155.0       | V   | 188.0         |
| 35132.372000    | 53.28            | ---              | 83.52          | 30.24       | 1000.0          | 1000.000        | 155.0       | H   | 338.0         |

### High Channel 9kHz – 30MHz –Parallel to Axis

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Loop Antenna Parallel to Axis                                        |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-19 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



— PreviewResult 2-PK+  
+ Critical\_Freqs PK+  
— 47 CFR §15.209 (Adj. to 3m)  
♦ Final\_Result QPK  
— PreviewResult 1-AVG  
+ Critical\_Freqs AVG  
♦ Final\_Result AVG

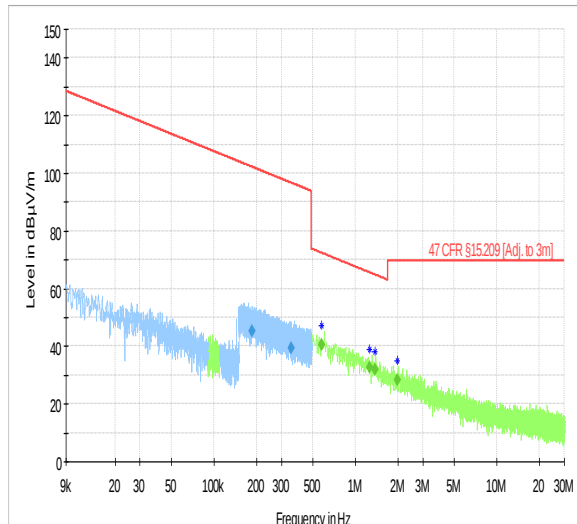


— PreviewResult 1-PK+  
— 47 CFR §15.35 (S15.209+20dB Adj. to 3m)  
x MaxPeak-PK+ (Single)  
+ Critical\_Freqs PK+  
♦ Final\_Result PK+

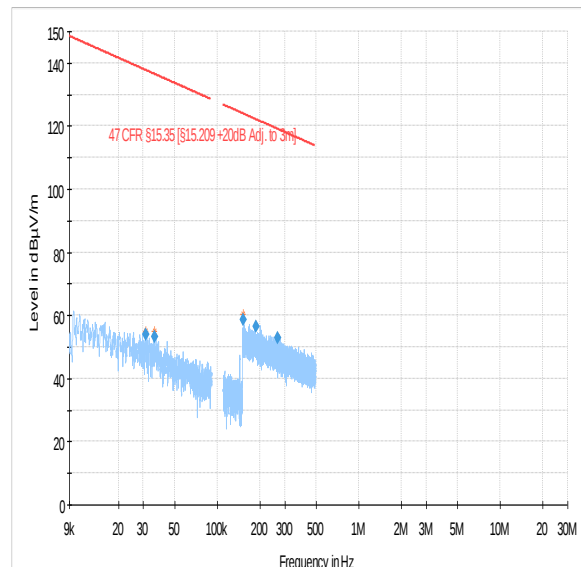
| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.213188        | 43.85            | ---                | ---              | 101.03         | 57.18       | 1000.0          | 9.000           | 100.0       | H   | 217.0         |
| 0.279792        | 41.11            | ---                | ---              | 98.67          | 57.56       | 1000.0          | 9.000           | 100.0       | H   | 195.0         |
| 0.542385        | ---              | 41.46              | ---              | 72.92          | 31.46       | 1000.0          | 9.000           | 100.0       | H   | 229.0         |
| 0.790351        | ---              | 37.70              | ---              | 69.65          | 31.95       | 1000.0          | 9.000           | 100.0       | H   | 101.0         |
| 1.004446        | ---              | 35.41              | ---              | 67.57          | 32.16       | 1000.0          | 9.000           | 100.0       | H   | 139.0         |
| 2.062888        | ---              | 27.75              | ---              | 69.54          | 41.79       | 1000.0          | 9.000           | 100.0       | H   | 135.0         |
| 0.025030        | ---              | ---                | 54.63            | 139.64         | 85.00       | 1000.0          | 0.200           | 100.0       | H   | 202.0         |
| 0.118174        | ---              | ---                | 43.18            | 126.15         | 82.97       | 1000.0          | 0.200           | 100.0       | H   | 135.0         |
| 0.150455        | ---              | ---                | 58.31            | 124.06         | 65.75       | 1000.0          | 9.000           | 100.0       | H   | -45.0         |
| 0.167061        | ---              | ---                | 57.48            | 123.15         | 65.67       | 1000.0          | 9.000           | 100.0       | H   | 135.0         |
| 0.185440        | ---              | ---                | 57.29            | 122.24         | 64.95       | 1000.0          | 9.000           | 100.0       | H   | 225.0         |
| 0.439766        | ---              | ---                | 49.42            | 114.74         | 65.32       | 1000.0          | 9.000           | 100.0       | H   | 100.0         |

### High Channel 9kHz – 30MHz –Perpendicular to Axis

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Loop Antenna Perpendicular to Axis                                   |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Fariborz Abasi                                                       | Date: 2020-09-10 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



PreviewResult 2-PK+  
 Critical\_Freqs PK+  
 47 CFR §15.209 (Adj. to 3m)  
 Final\_Result QPK  
 PreviewResult 1-AVG  
 Critical\_Freqs AVG  
 Final\_Result AVG

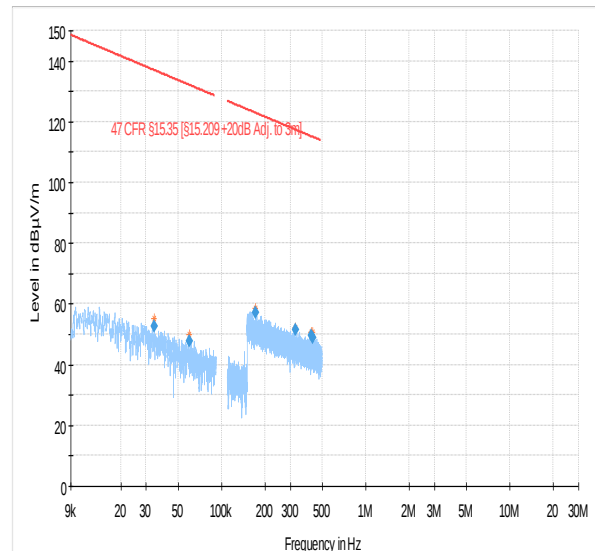
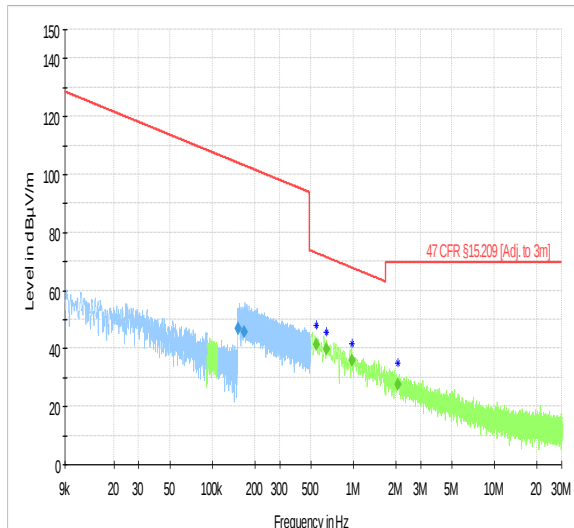


PreviewResult 1-PK+  
 47 CFR §15.35 (S15.209+20dB Adj. to 3m)  
 Critical\_Freqs PK+  
 Final\_Result PK+

| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.184941        | 45.11            | ---                | ---              | 102.26         | 57.15       | 1000.0          | 9.000           | 100.0       | H   | 11.0          |
| 0.351662        | 39.20            | ---                | ---              | 96.68          | 57.48       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 0.578036        | ---              | 40.56              | ---              | 72.37          | 31.80       | 1000.0          | 9.000           | 100.0       | H   | 135.0         |
| 1.264794        | ---              | 32.79              | ---              | 65.56          | 32.78       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 1.373618        | ---              | 32.03              | ---              | 64.85          | 32.82       | 1000.0          | 9.000           | 100.0       | H   | 271.0         |
| 1.987784        | ---              | 28.28              | ---              | 69.54          | 41.26       | 1000.0          | 9.000           | 100.0       | H   | 23.0          |
| 0.031350        | ---              | ---                | 53.95            | 137.68         | 83.73       | 1000.0          | 0.200           | 100.0       | H   | 43.0          |
| 0.036033        | ---              | ---                | 53.19            | 136.47         | 83.28       | 1000.0          | 0.200           | 100.0       | H   | 243.0         |
| 0.151841        | ---              | ---                | 58.55            | 123.98         | 65.43       | 1000.0          | 9.000           | 100.0       | H   | 165.0         |
| 0.187356        | ---              | ---                | 56.58            | 122.15         | 65.57       | 1000.0          | 9.000           | 100.0       | H   | 315.0         |
| 0.268436        | ---              | ---                | 52.76            | 119.03         | 66.26       | 1000.0          | 9.000           | 100.0       | H   | 10.0          |

### High Channel 9kHz – 30MHz –Parallel to Floor

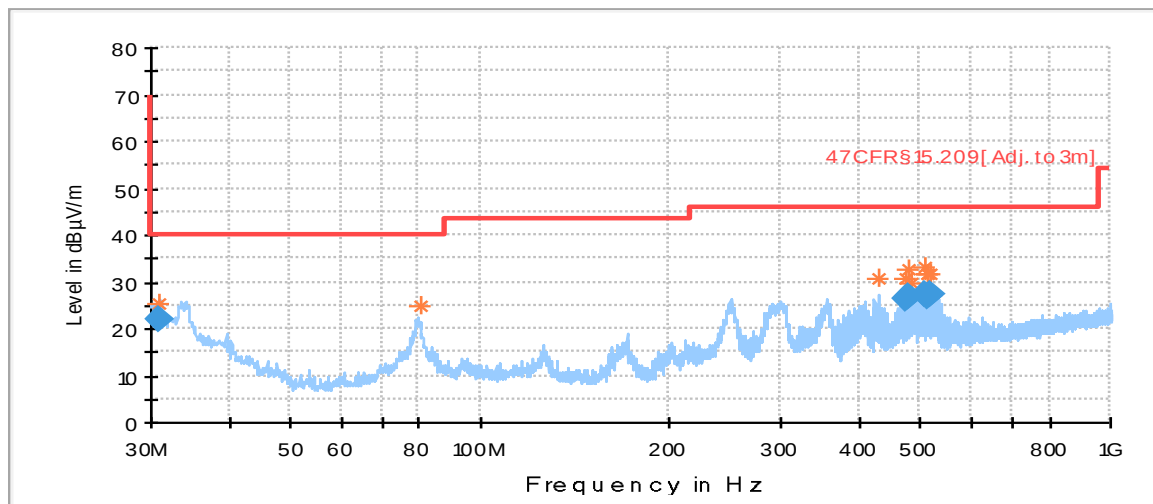
|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Loop Antenna Parallel to Floor                                       |                  |
| Sweep frequency     | 9 kHz – 30 MHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Joel Efraimsson                                                      | Date: 2020-09-20 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



| Frequency (MHz) | Average (dBµV/m) | QuasiPeak (dBµV/m) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 0.151894        | 46.76            | ---                | ---              | 103.97         | 57.21       | 1000.0          | 9.000           | 100.0       | H   | 127.0         |
| 0.168422        | 45.86            | ---                | ---              | 103.08         | 57.22       | 1000.0          | 9.000           | 100.0       | H   | 179.0         |
| 0.544502        | ---              | 41.25              | ---              | 72.88          | 31.64       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 0.642363        | ---              | 39.66              | ---              | 71.45          | 31.79       | 1000.0          | 9.000           | 100.0       | H   | -41.0         |
| 0.982479        | ---              | 35.76              | ---              | 67.76          | 31.99       | 1000.0          | 9.000           | 100.0       | H   | 225.0         |
| 2.072711        | ---              | 27.75              | ---              | 69.54          | 41.79       | 1000.0          | 9.000           | 100.0       | H   | 45.0          |
| 0.034110        | ---              | ---                | 52.55            | 136.95         | 84.40       | 1000.0          | 0.200           | 100.0       | H   | 293.0         |
| 0.060045        | ---              | ---                | 47.73            | 132.04         | 84.30       | 1000.0          | 0.200           | 100.0       | H   | 124.0         |
| 0.171089        | ---              | ---                | 57.21            | 122.94         | 65.73       | 1000.0          | 9.000           | 100.0       | H   | 229.0         |
| 0.325216        | ---              | ---                | 51.58            | 117.36         | 65.79       | 1000.0          | 9.000           | 100.0       | H   | 243.0         |
| 0.417333        | ---              | ---                | 49.49            | 115.20         | 65.71       | 1000.0          | 9.000           | 100.0       | H   | 255.0         |
| 0.430015        | ---              | ---                | 48.95            | 114.94         | 65.99       | 1000.0          | 9.000           | 100.0       | H   | 139.0         |

### High Channel 30MHz – 1GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 30 MHz – 1 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Sam Ebadeh                                                           | Date: 2020-09-17 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



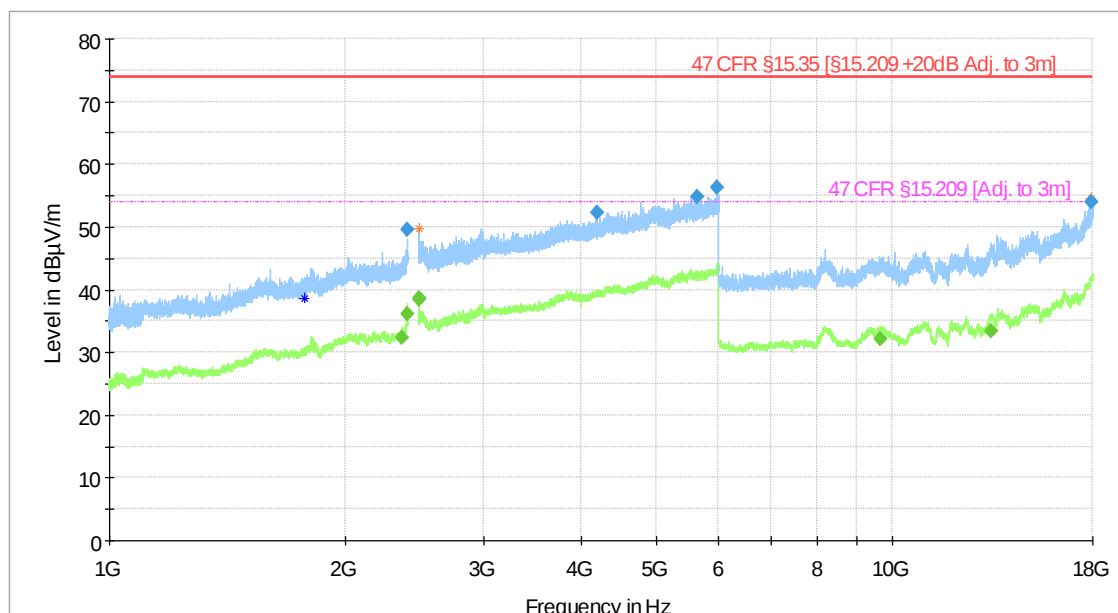
\* Preview Result 2-AVG  
\* Critical\_Freqs AVG  
\* 47CFR§15.209[ Adj. to 3m]  
♦ Final\_Result AVG

\* Preview Result 1-PK+  
♦ Critical\_Freqs PK+  
♦ Final\_Result QPK

| Frequency (MHz) | QuasiPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|--------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 33.316680       | 20.73              | ---              | 40.00          | 19.27       | 1000.0          | 120.000         | 108.0       | V   | 109.0         |
| 79.787520       | 19.71              | ---              | 40.00          | 20.29       | 1000.0          | 120.000         | 125.0       | V   | 322.0         |
| 250.213160      | 24.50              | ---              | 46.02          | 21.52       | 1000.0          | 120.000         | 108.0       | H   | 292.0         |
| 299.718600      | 25.38              | ---              | 46.02          | 20.64       | 1000.0          | 120.000         | 100.0       | V   | 72.0          |
| 486.910200      | 27.13              | ---              | 46.02          | 18.89       | 1000.0          | 120.000         | 133.0       | V   | 22.0          |
| 514.545240      | 25.10              | ---              | 46.02          | 20.92       | 1000.0          | 120.000         | 233.0       | H   | 72.0          |

### High Channel 1GHz – 18GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 1 GHz – 18 GHz                                                       |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-14 |
| Chamber details     | Chamber: SAC 5                                                       |                  |

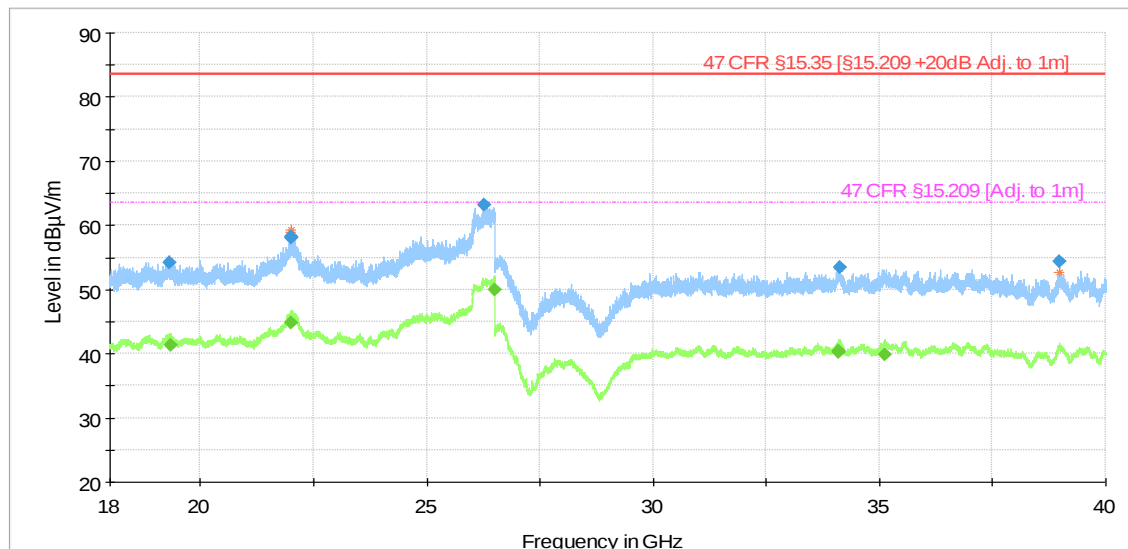


— PreviewResult 2-AVG  
— PreviewResult 1-PK+  
\* Critical\_Freqs AVG  
\* Critical\_Freqs PK+  
— 47 CFR §15.35 [§15.209 +20dB Adj. to 3m]  
— 47 CFR §15.209 [Adj. to 3m]  
◆ Final\_Result PK+  
◆ Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBm) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|---------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2399.934336     | ---           | 36.16            | 53.98          | 17.82       | 1000.0          | 1000.000        | 175.0       | V   | 162.0         |
| 2483.518744     | ---           | 38.58            | 53.98          | 15.40       | 1000.0          | 1000.000        | 125.0       | H   | 68.0          |
| 2483.556500     | ---           | 38.42            | 53.98          | 15.56       | 1000.0          | 1000.000        | 140.0       | V   | 116.0         |
| 5637.912000     | 54.87         | ---              | 73.98          | 19.10       | 1000.0          | 1000.000        | 170.0       | H   | 338.0         |
| 5977.507000     | 56.29         | ---              | 73.98          | 17.69       | 1000.0          | 1000.000        | 177.0       | V   | 292.0         |
| 17932.523000    | 53.99         | ---              | 73.98          | 19.99       | 1000.0          | 1000.000        | 175.0       | V   | 338.0         |

### High Channel 18GHz – 40GHz

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth 3-DH5 High Channel (2480 MHz)                              |                  |
| Antenna orientation | Horizontal and Vertical                                              |                  |
| Sweep frequency     | 18 GHz – 40 GHz                                                      |                  |
| Standard            | FCC part 15 subpart C                                                |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020-09-22 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



— PreviewResult 2-AVG  
— PreviewResult 1-PK+  
\* Critical\_Freqs AVG  
\* Critical\_Freqs PK+  
— 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]  
— 47 CFR §15.209 [Adj. to 1m]  
♦ Final\_Result PK+  
♦ Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 19303.561000    | 54.19            | ---              | 83.52          | 29.33       | 1000.0          | 1000.000        | 155.0       | V   | 202.0         |
| 19338.907000    | ---              | 41.29            | 63.52          | 22.23       | 1000.0          | 1000.000        | 155.0       | V   | 262.0         |
| 22003.931000    | 57.99            | ---              | 83.52          | 25.54       | 1000.0          | 1000.000        | 155.0       | V   | 202.0         |
| 22004.002000    | ---              | 44.88            | 63.52          | 18.64       | 1000.0          | 1000.000        | 155.0       | V   | 142.0         |
| 22007.774000    | 58.14            | ---              | 83.52          | 25.38       | 1000.0          | 1000.000        | 155.0       | V   | 206.0         |
| 26279.334000    | 63.25            | ---              | 83.52          | 20.27       | 1000.0          | 1000.000        | 155.0       | V   | 142.0         |
| 26498.477500    | ---              | 49.99            | 63.52          | 13.54       | 1000.0          | 1000.000        | 155.0       | V   | 68.0          |
| 34100.890000    | ---              | 40.38            | 63.52          | 23.14       | 1000.0          | 1000.000        | 155.0       | V   | 22.0          |
| 34107.879000    | ---              | 40.18            | 63.52          | 23.34       | 1000.0          | 1000.000        | 155.0       | V   | 22.0          |
| 34126.928000    | 53.39            | ---              | 83.52          | 30.13       | 1000.0          | 1000.000        | 155.0       | H   | 86.0          |
| 35109.185000    | ---              | 39.88            | 63.52          | 23.64       | 1000.0          | 1000.000        | 155.0       | V   | 27.0          |
| 38976.228000    | 54.34            | ---              | 83.52          | 29.18       | 1000.0          | 1000.000        | 155.0       | H   | 146.0         |

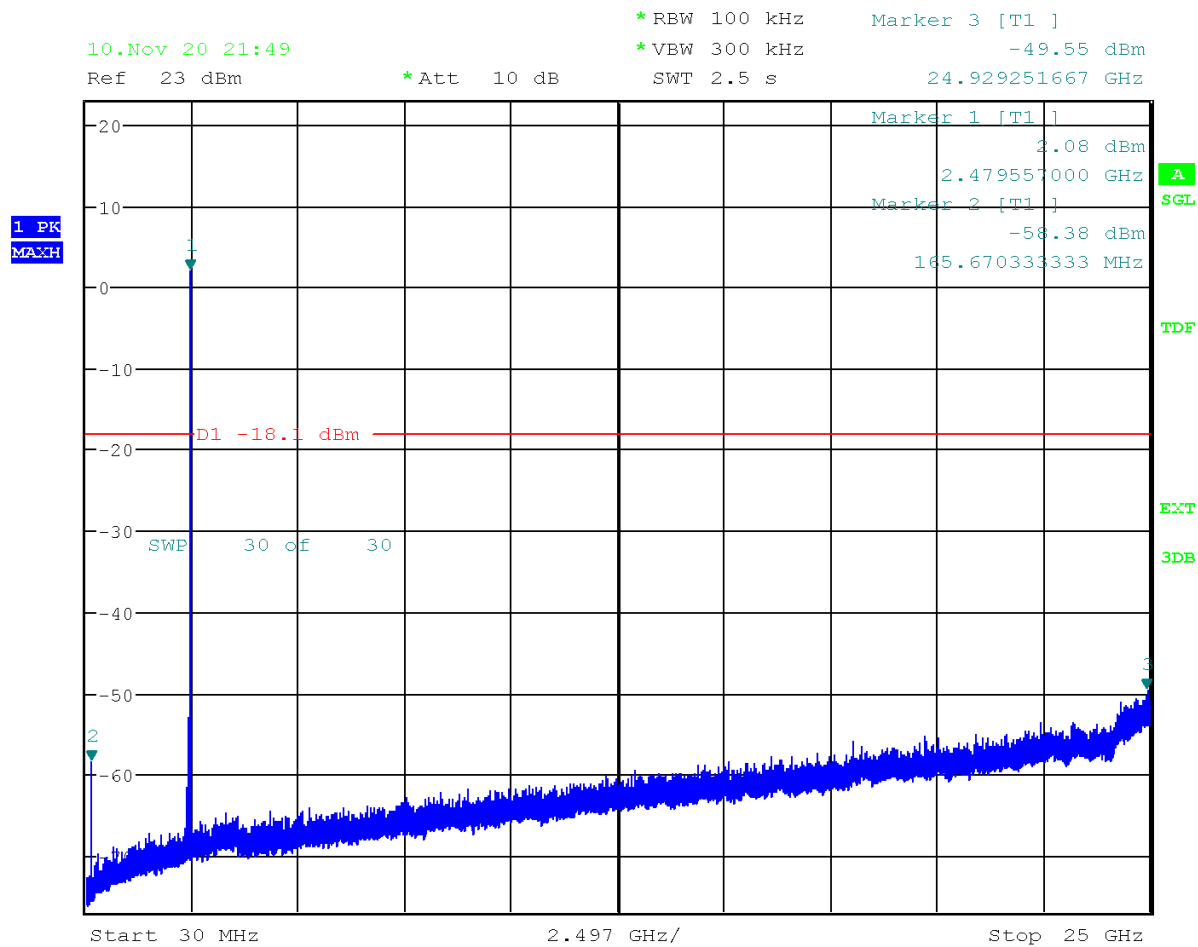
## 4.3 Test Results – Out of Band Emissions

### 4.3.1 Out of Band Emissions – Test Summary

|                                 |  |                                                    |  |            |  |
|---------------------------------|--|----------------------------------------------------|--|------------|--|
| Test Specification              |  | 47 CFR 15.247 (d)                                  |  |            |  |
| Test Engineer & Date            |  | Niall Forrester                                    |  | 2020.11.10 |  |
| EUT and Ancillary Equipment IDs |  | A002893981-002                                     |  |            |  |
| EUT Operation Mode(s)           |  | Test Mode                                          |  |            |  |
| EUT Wireless Configuration(s)   |  | Bluetooth BDR DER (See below for details)          |  |            |  |
| EUT Hardware Configuration(s)   |  | Power from lab power supply via modified USB cable |  |            |  |
| Overall Result                  |  | PASS                                               |  |            |  |

| Test Parameter                       | Wireless Configuration                                      | Tx Pwr (dBm) | Measured Lvl (dBm) | Limit (dBm) | Result |
|--------------------------------------|-------------------------------------------------------------|--------------|--------------------|-------------|--------|
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR DH5 (GFSK Hopping)                        | 4.65         | -50.61             | -15.35      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 2-DH5 ( $\pi/4$ -DQPSK Hopping)           | 3.00         | -50.80             | -17.00      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 3-DH5 (8-DPSK Hopping)                    | 3.81         | -50.34             | -16.19      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2402 MHz)               | 3.33         | -49.42             | -16.67      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 2-DH5 Low Ch. ( $\pi/4$ -DQPSK 2402 MHz)  | 2.97         | -50.07             | -17.03      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 3-DH5 Low Ch. (8-DPSK 2402 MHz)           | 3.22         | -50.26             | -16.78      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2441 MHz)               | 3.70         | -50.19             | -16.30      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 2-DH5 Mid Ch. ( $\pi/4$ -DQPSK 2441 MHz)  | 2.10         | -50.01             | -17.90      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 3-DH5 Mid Ch. (8-DPSK 2441 MHz)           | 2.51         | -50.57             | -17.49      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR DH5 High Ch. (GFSK 2480 MHz)              | 1.94         | -49.55             | -18.06      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 2-DH5 High Ch. ( $\pi/4$ -DQPSK 2480 MHz) | 1.46         | -50.29             | -18.54      | PASS   |
| Spurious Emissions (30 MHz – 25 GHz) | Bluetooth BDR EDR 3-DH5 High Ch. (8-DPSK 2480 MHz)          | 1.68         | -50.35             | -18.32      | PASS   |

#### 4.3.2 Out of Band Emissions – Test Details (Worst Case Plot)



Date: 10.NOV.2020 21:49:50

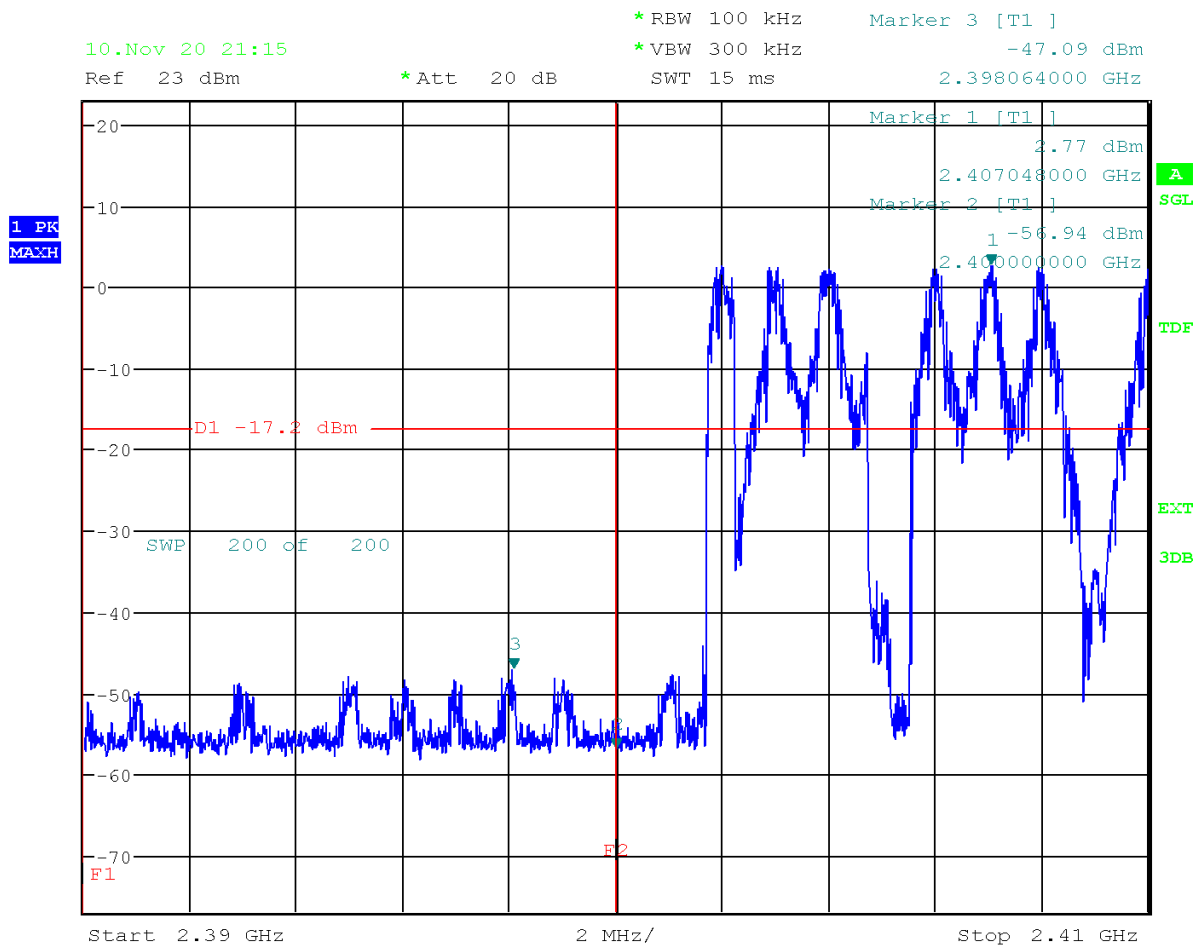
## 4.4 Test Results – Band Edge Compliance (Authorized Band)

### 4.4.1 Band Edge Compliance (Authorized Band) – Test Summary

|                                 |                                                    |  |            |  |
|---------------------------------|----------------------------------------------------|--|------------|--|
| Test Specification              | 47 CFR 15.247 (d)                                  |  |            |  |
| Test Engineer & Date            | Niall Forrester                                    |  | 2020.11.10 |  |
| EUT and Ancillary Equipment IDs | A002893981-002                                     |  |            |  |
| EUT Operation Mode(s)           | Test Mode                                          |  |            |  |
| EUT Wireless Configuration(s)   | Bluetooth BDR DER (See below for details)          |  |            |  |
| EUT Hardware Configuration(s)   | Power from lab power supply via modified USB cable |  |            |  |
| Overall Result                  | PASS                                               |  |            |  |

| Test Parameter                                  | Wireless Configuration                                      | Measured Level (dBm) | Limit (dBm) | Result |
|-------------------------------------------------|-------------------------------------------------------------|----------------------|-------------|--------|
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR DH5 (GFSK Hopping)                        | -47.09               | -17.23      | PASS   |
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR 2-DH5 ( $\pi/4$ -DQPSK Hopping)           | -49.76               | -17.59      | PASS   |
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR 3-DH5 (8-DPSK Hopping)                    | -48.69               | -17.70      | PASS   |
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2402 MHz)               | -52.39               | -16.79      | PASS   |
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR 2-DH5 Low Ch. ( $\pi/4$ -DQPSK 2402 MHz)  | -50.23               | -17.05      | PASS   |
| Emissions at Band Edge (Auth. Band – Low Edge)  | Bluetooth BDR EDR 3-DH5 Low Ch. (8-DPSK 2402 MHz)           | -50.81               | -16.89      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR DH5 (GFSK Hopping)                        | -51.32               | -18.80      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR 2-DH5 ( $\pi/4$ -DQPSK Hopping)           | -51.33               | -19.02      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR 3-DH5 (8-DPSK Hopping)                    | -52.34               | -19.01      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR DH5 High Ch. (GFSK 2480 MHz)              | -52.25               | -18.19      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR 2-DH5 High Ch. ( $\pi/4$ -DQPSK 2480 MHz) | -53.24               | -18.38      | PASS   |
| Emissions at Band Edge (Auth. Band – High Edge) | Bluetooth BDR EDR 3-DH5 High Ch. (8-DPSK 2480 MHz)          | -52.02               | -18.52      | PASS   |

#### 4.4.2 Band Edge Compliance (Authorized Band) – Test Details (Worst Case Plot)



Date: 10.NOV.2020 21:15:59

## 4.5 Test Results – Band Edge Compliance (Restricted Band)

### 4.5.1 Band Edge Compliance (Restricted Band) – Test Summary

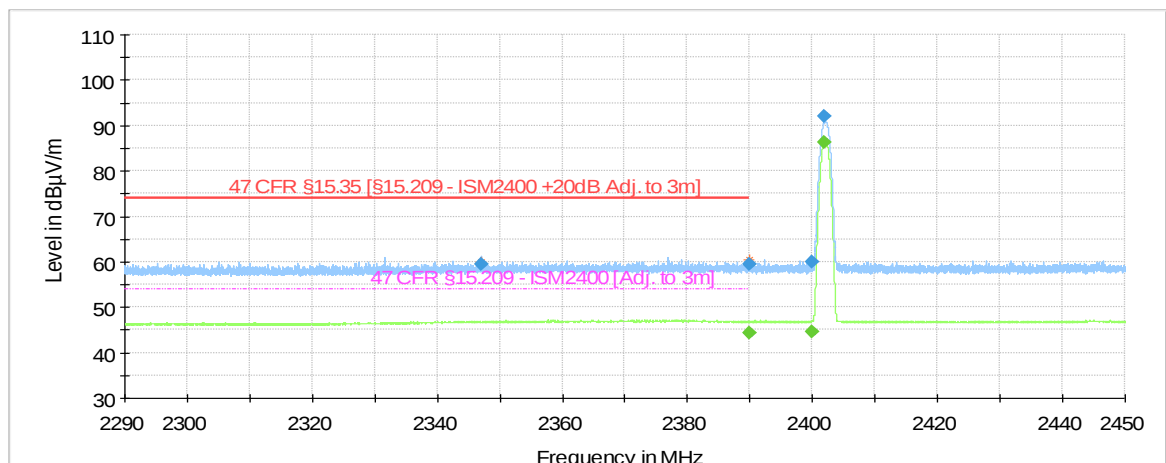
| <b>Test Specification</b>                          | 47 CFR 15.209 & 15.247 (d)                                |                                                    |
|----------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------|
| <b>Test Engineer &amp; Date</b>                    | Niall Forrester                                           | 2020.09.14                                         |
| <b>EUT and Ancillary Equipment IDs</b>             | A002893981-001                                            | A002893981-008<br>A002893981-014<br>A002893981-016 |
| <b>EUT Operation Mode(s)</b>                       | Continuous Transmit                                       |                                                    |
| <b>EUT Wireless Configuration(s)</b>               | Bluetooth BDR EDR 3-DH5<br>(8-DPSK Low and High channels) |                                                    |
| <b>EUT Hardware Configuration(s)</b>               | Power from USB Charger connected to 12V DC                |                                                    |
| <b>Overall Result</b>                              | PASS                                                      |                                                    |
| <b>Test Parameter</b>                              | <b>Wireless Configuration</b>                             | <b>Result*</b>                                     |
| Emissions at Band Edge<br>(Rest. Band – Low Edge)  | Bluetooth BDR EDR 3-DH5<br>Low Ch. (8-DPSK 2402 MHz)      | PASS                                               |
| Emissions at Band Edge<br>(Rest. Band – High Edge) | Bluetooth BDR EDR 3-DH5<br>High Ch. (8-DPSK 2480 MHz)     | PASS                                               |

\* For detailed measurements, see tables and graphs in sections below

#### 4.5.2 Band Edge Compliance (Restricted Band) – Test Details

##### Restricted Band – Low Edge

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth BDR EDR 3-DH5 Low Channel (2402 MHz)                       |                  |
| Antenna orientation | Horizontal and vertical                                              |                  |
| Sweep frequency     | 1 GHz – 18 GHz Lower Band Edge                                       |                  |
| Standard            | 47 CFR Part 15 subpart C                                             |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020.09.14 |
| Chamber details     | Chamber: SAC 5                                                       |                  |

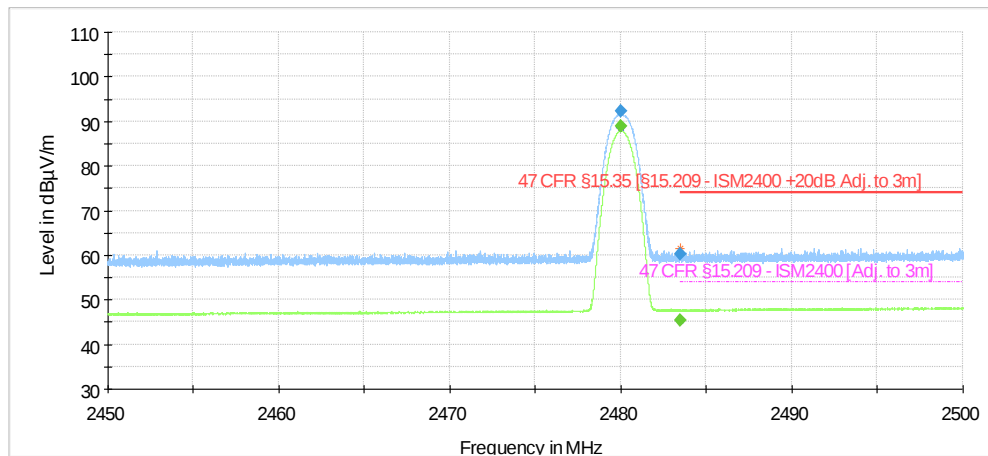


- PreviewResult 2-AVG
- PreviewResult 1-PK+
- Critical\_Freqs AVG
- Critical\_Freqs PK+
- 47 CFR §15.35 [§15.209 - ISM2400 +20dB Adj. to 3m]
- 47 CFR §15.209 - ISM2400 [Adj. to 3m]
- Final\_Result PK+
- Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2347.120000     | 59.52            | ---              | 73.98          | 14.45       | 1000.0          | 1000.000        | 101.0       | V   | 264.0         |
| 2390.000000     | ---              | 44.45            | 53.98          | 9.53        | 1000.0          | 1000.000        | 159.0       | V   | 31.0          |
| 2390.000000     | 59.38            | ---              | 73.98          | 14.60       | 1000.0          | 1000.000        | 181.0       | V   | 178.0         |
| 2400.000000     | ---              | 44.57            | ---            | ---         | 1000.0          | 1000.000        | 145.0       | V   | 240.0         |
| 2400.000000     | 59.86            | ---              | ---            | ---         | 1000.0          | 1000.000        | 182.0       | V   | 0.0           |
| 2402.000000     | ---              | 86.33            | ---            | ---         | 1000.0          | 1000.000        | 100.0       | V   | 291.0         |
| 2402.000000     | 92.06            | ---              | ---            | ---         | 1000.0          | 1000.000        | 101.0       | V   | 301.0         |

### Restricted Band – High Edge

|                     |                                                                      |                  |
|---------------------|----------------------------------------------------------------------|------------------|
| Test mode condition | Bluetooth BDR EDR 3-DH5 High Channel (2480 MHz)                      |                  |
| Antenna orientation | Horizontal and vertical                                              |                  |
| Sweep frequency     | 1 GHz – 18 GHz Upper Band Edge                                       |                  |
| Standard            | 47 CFR Part 15 subpart C                                             |                  |
| EUT                 | A002893981-001                                                       |                  |
| Ancillary Equipment | A002893981-014, A002893981-008, A002893981-016<br>12VDC Power Supply |                  |
| Test Engineer       | Niall Forrester                                                      | Date: 2020.09.14 |
| Chamber details     | Chamber: SAC 5                                                       |                  |



- PreviewResult 2-AVG
- PreviewResult 1-PK+
- Critical\_Freqs AVG
- Critical\_Freqs PK+
- 47 CFR §15.35 [§15.209 - ISM2400 +20dB Adj. to 3m]
- 47 CFR §15.209 - ISM2400 [Adj. to 3m]
- Final\_Result PK+
- Final\_Result AVG

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|-----------------|------------------|------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|
| 2480.000000     | ---              | 88.76            | ---            | ---         | 1000.0          | 1000.000        | 100.0       | V   | 290.0         |
| 2480.005000     | 92.29            | ---              | ---            | ---         | 1000.0          | 1000.000        | 100.0       | V   | 290.0         |
| 2483.500000     | ---              | 45.27            | 53.98          | 8.71        | 1000.0          | 1000.000        | 101.0       | V   | 277.0         |
| 2483.500000     | 60.36            | ---              | 73.98          | 13.62       | 1000.0          | 1000.000        | 122.0       | V   | 204.0         |

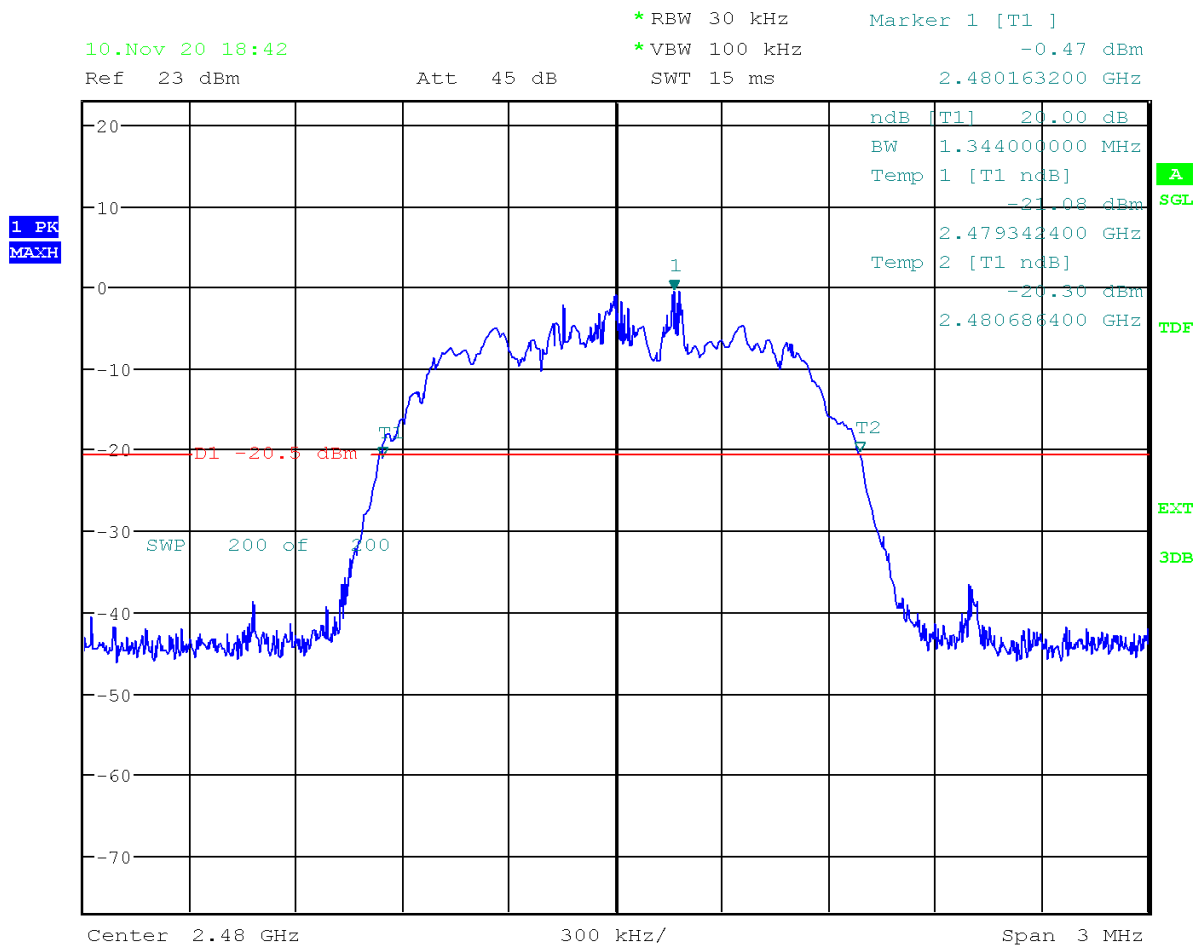
## 4.6 Test Results – 20dB Bandwidth

### 4.6.1 20dB Bandwidth – Test Summary

|                                 |  |                                                    |            |  |
|---------------------------------|--|----------------------------------------------------|------------|--|
| Test Specification              |  | 47 CFR 15.247 (a)(1)                               |            |  |
| Test Engineer & Date            |  | Niall Forrester                                    | 2020.11.10 |  |
| EUT and Ancillary Equipment IDs |  | A002893981-002                                     |            |  |
| EUT Operation Mode(s)           |  | Test Mode                                          |            |  |
| EUT Wireless Configuration(s)   |  | Bluetooth BDR DER (See below for details)          |            |  |
| EUT Hardware Configuration(s)   |  | Power from lab power supply via modified USB cable |            |  |
| Overall Result                  |  | PASS                                               |            |  |

| Test Parameter | Wireless Configuration                                      | Bandwidth (kHz) | Limit Max (kHz) | Result |
|----------------|-------------------------------------------------------------|-----------------|-----------------|--------|
| 20dB Bandwidth | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2402 MHz)               | 890.40          | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 2-DH5 Low Ch. ( $\pi/4$ -DQPSK 2402 MHz)  | 1341.60         | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 3-DH5 Low Ch. (8-DPSK 2402 MHz)           | 1322.40         | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR DH5 Mid Ch. (GFSK 2441 MHz)               | 892.80          | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 2-DH5 Mid Ch. ( $\pi/4$ -DQPSK 2441 MHz)  | 1348.80         | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 3-DH5 Mid Ch. (8-DPSK 2441 MHz)           | 1327.20         | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR DH5 High Ch. (GFSK 2480 MHz)              | 904.80          | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 2-DH5 High Ch. ( $\pi/4$ -DQPSK 2480 MHz) | 1344.00         | 2000.0          | PASS   |
| 20dB Bandwidth | Bluetooth BDR EDR 3-DH5 High Ch. (8-DPSK 2480 MHz)          | 1341.60         | 2000.0          | PASS   |

#### 4.6.2 20dB Bandwidth – Test Details (Worst Case Plot)



Date: 10.NOV.2020 18:42:40

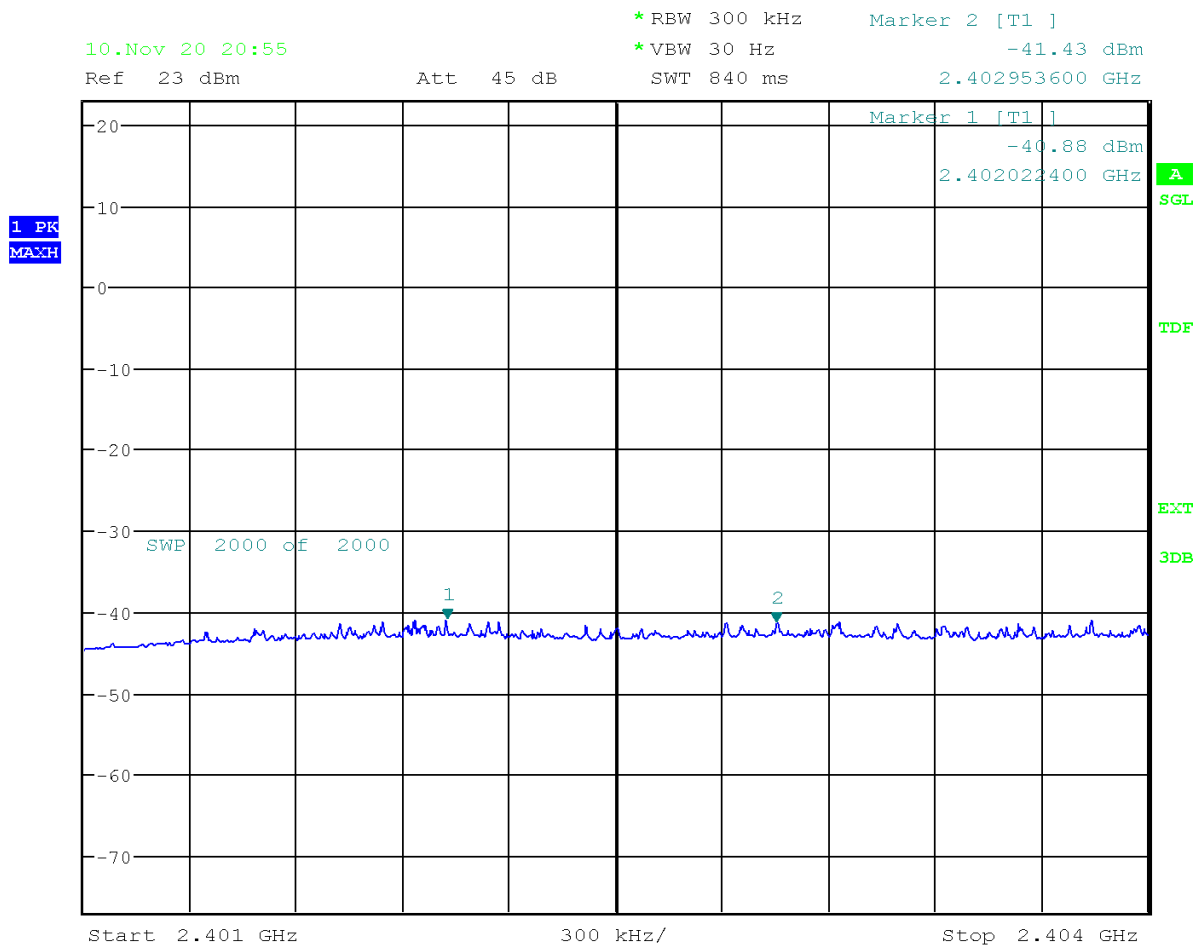
## 4.7 Test Results – Carrier (Hopping Channel) Separation

### 4.7.1 Carrier (Hopping Channel) Separation – Test Summary

|                                 |  |                                                    |            |  |
|---------------------------------|--|----------------------------------------------------|------------|--|
| Test Specification              |  | 47 CFR 15.247 (a)(1)                               |            |  |
| Test Engineer & Date            |  | Niall Forrester                                    | 2020.11.10 |  |
| EUT and Ancillary Equipment IDs |  | A002893981-002                                     |            |  |
| EUT Operation Mode(s)           |  | Test Mode                                          |            |  |
| EUT Wireless Configuration(s)   |  | Bluetooth BDR DER (See below for details)          |            |  |
| EUT Hardware Configuration(s)   |  | Power from lab power supply via modified USB cable |            |  |
| Overall Result                  |  | PASS                                               |            |  |

| Test Parameter                            | Wireless Configuration                            | Separation (kHz) | Limit Min (kHz) | Result |
|-------------------------------------------|---------------------------------------------------|------------------|-----------------|--------|
| Carrier Frequency Separation 2401-2404MHz | Bluetooth BDR EDR DH1 (GFSK Hopping)              | 1082.40          | 544.00          | PASS   |
| Carrier Frequency Separation 2401-2404MHz | Bluetooth BDR EDR 2-DH1 ( $\pi/4$ -DQPSK Hopping) | 979.20           | 846.60          | PASS   |
| Carrier Frequency Separation 2401-2404MHz | Bluetooth BDR EDR 3-DH1 (8-DPSK Hopping)          | 931.20           | 875.20          | PASS   |
| Carrier Frequency Separation 2440-2443MHz | Bluetooth BDR EDR DH1 (GFSK Hopping)              | 962.40           | 537.60          | PASS   |
| Carrier Frequency Separation 2440-2443MHz | Bluetooth BDR EDR 2-DH1 ( $\pi/4$ -DQPSK Hopping) | 1012.80          | 864.00          | PASS   |
| Carrier Frequency Separation 2440-2443MHz | Bluetooth BDR EDR 3-DH1 (8-DPSK Hopping)          | 998.40           | 870.40          | PASS   |

#### 4.7.2 Carrier (Hopping Channel) Separation – Test Details (Worst Case Plot)



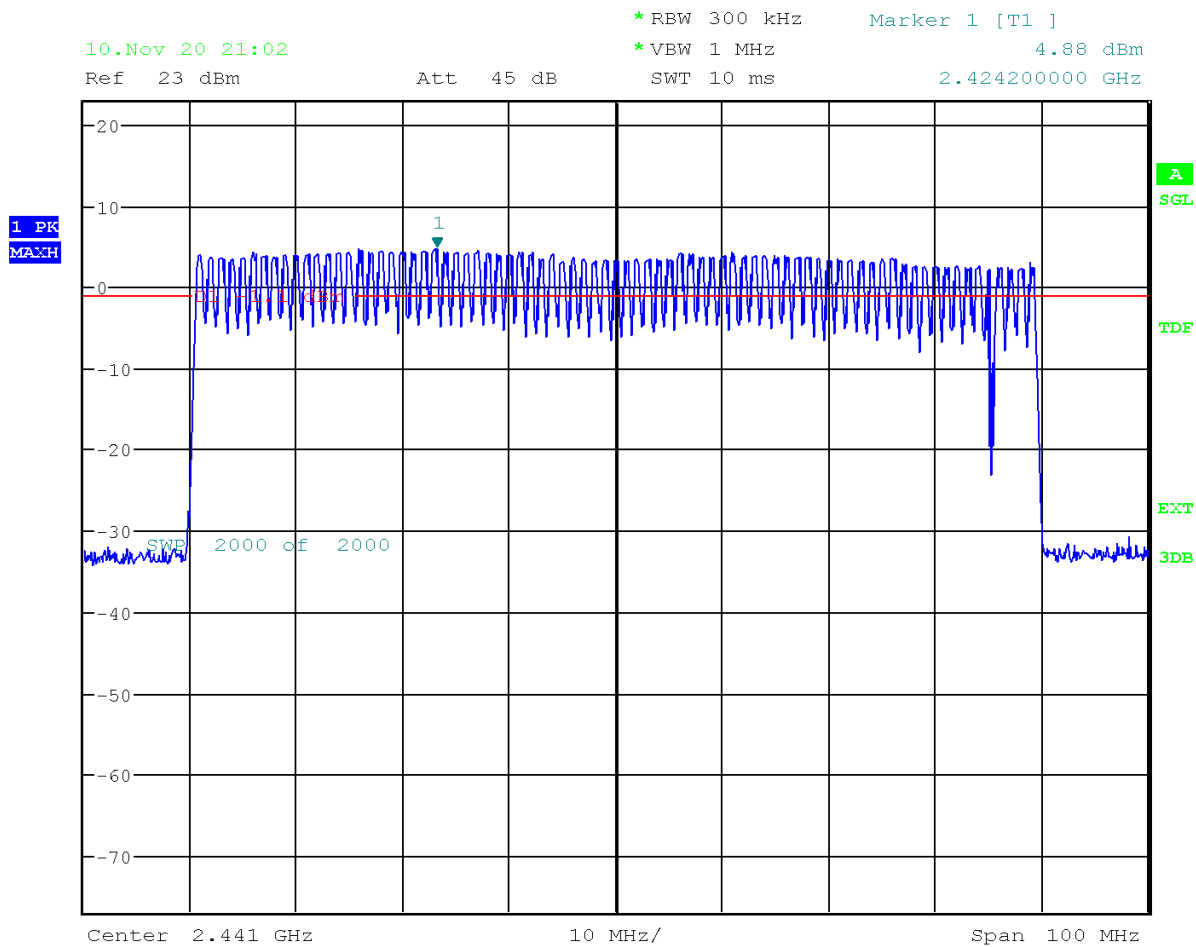
Date: 10.NOV.2020 20:55:02

## 4.8 Test Results – Number of Hopping Channels

### 4.8.1 Number of Hopping Channels – Test Summary

| Test Specification              | 47 CFR 15.247 (a)(1)                               |                 |             |        |
|---------------------------------|----------------------------------------------------|-----------------|-------------|--------|
| Test Engineer & Date            | Niall Forrester                                    |                 | 2020.11.10  |        |
| EUT and Ancillary Equipment IDs | A002893981-002                                     |                 |             |        |
| EUT Operation Mode(s)           | Test Mode                                          |                 |             |        |
| EUT Wireless Configuration(s)   | Bluetooth BDR DER (See below for details)          |                 |             |        |
| EUT Hardware Configuration(s)   | Power from lab power supply via modified USB cable |                 |             |        |
| Overall Result                  | PASS                                               |                 |             |        |
|                                 |                                                    |                 |             |        |
| Test Parameter                  | Wireless Configuration                             | Measured Number | Limit (Min) | Result |
| Number of Hopping Channels      | Bluetooth BDR EDR DH1 (GFSK Hopping)               | 79              | 15          | PASS   |

#### 4.8.2 Number of Hopping Channels – Test Details



Date: 10.NOV.2020 21:02:25

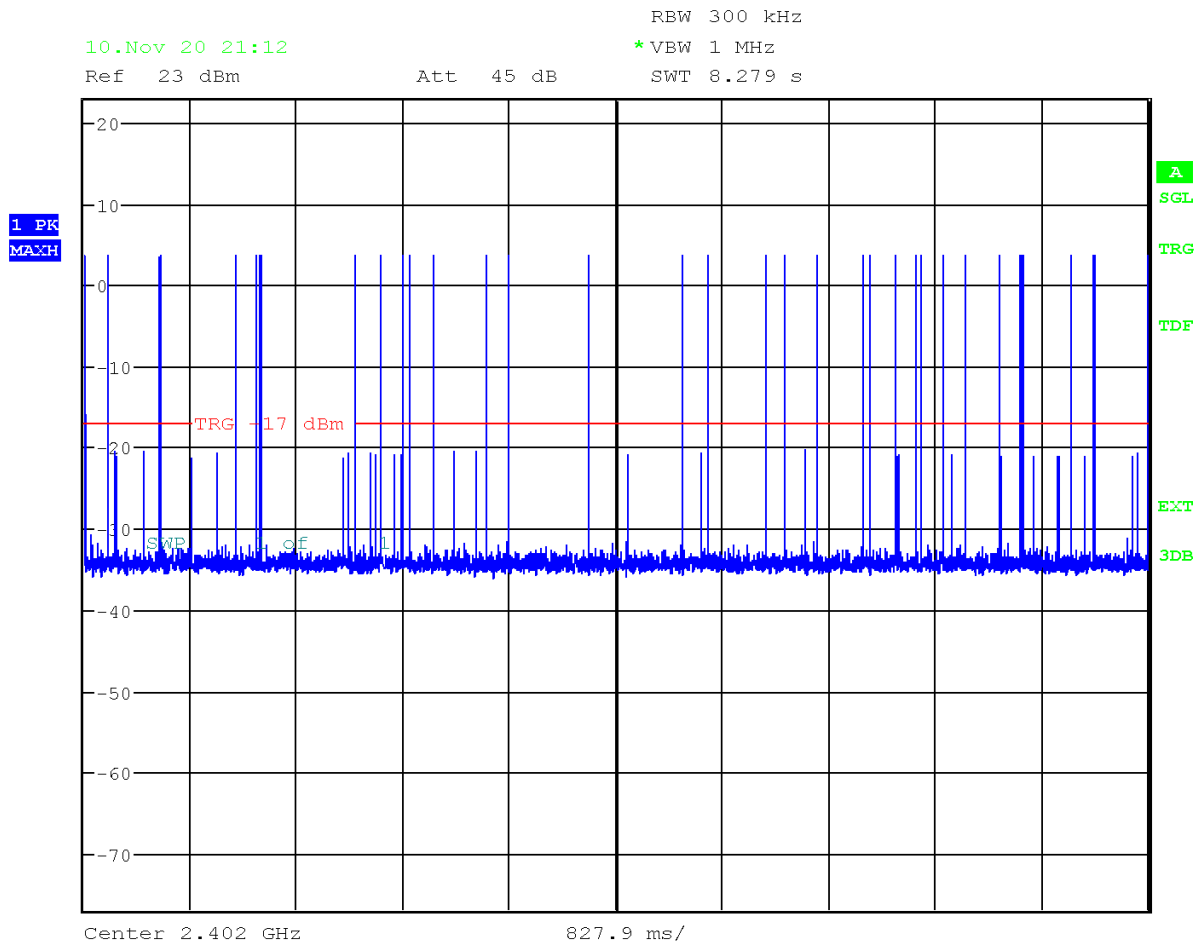
## 4.9 Test Results – Time of Occupancy (Dwell Time)

### 4.9.1 Time of Occupancy (Dwell Time) – Test Summary

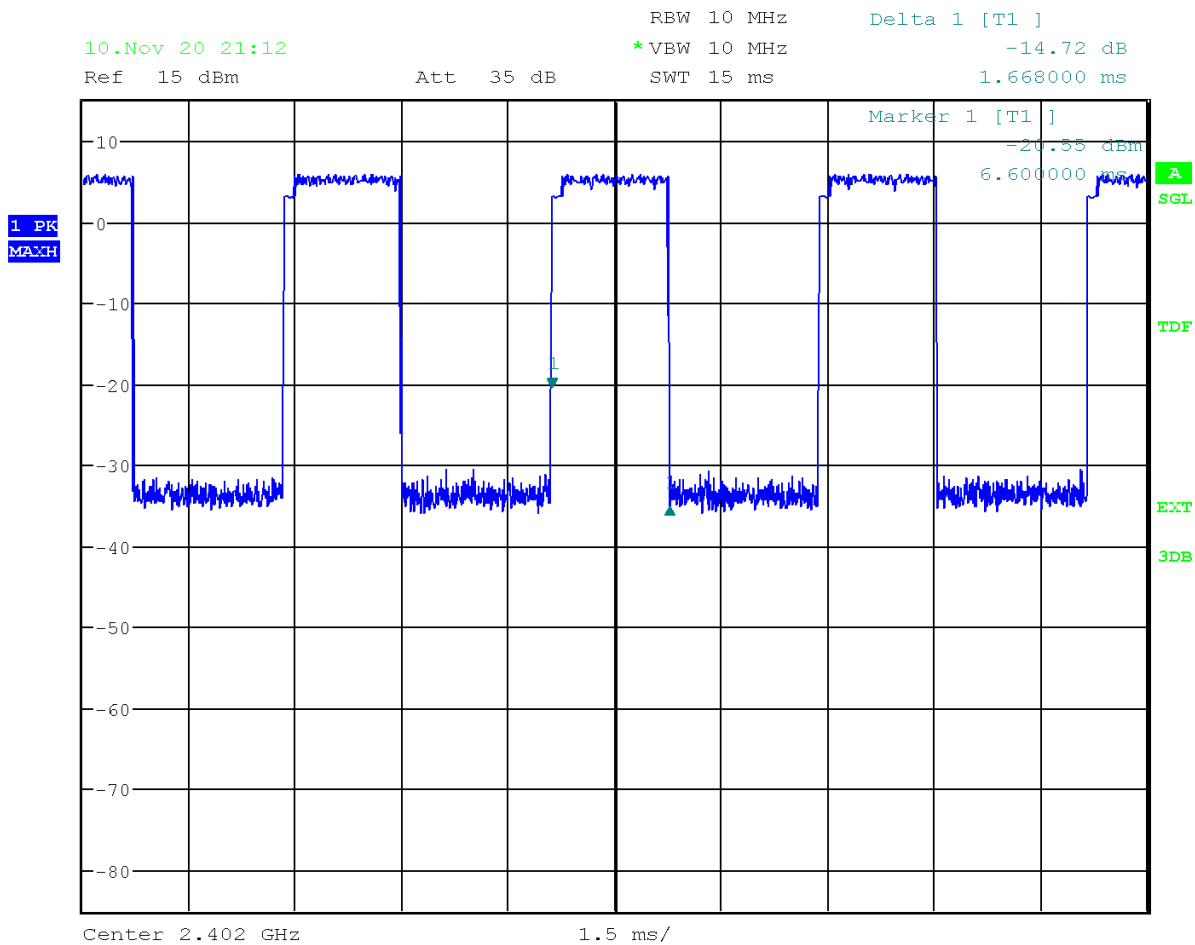
|                                 |  |                                                    |            |  |
|---------------------------------|--|----------------------------------------------------|------------|--|
| Test Specification              |  | 47 CFR 15.247 (a)(1)                               |            |  |
| Test Engineer & Date            |  | Niall Forrester                                    | 2020.11.10 |  |
| EUT and Ancillary Equipment IDs |  | A002893981-002                                     |            |  |
| EUT Operation Mode(s)           |  | Test Mode                                          |            |  |
| EUT Wireless Configuration(s)   |  | Bluetooth BDR DER (See below for details)          |            |  |
| EUT Hardware Configuration(s)   |  | Power from lab power supply via modified USB cable |            |  |
| Overall Result                  |  | PASS                                               |            |  |

| Test Parameter | Wireless Configuration                            | Measured Time (ms) | Limit (ms) | Result |
|----------------|---------------------------------------------------|--------------------|------------|--------|
| Dwell Time     | Bluetooth BDR EDR DH1 (GFSK Hopping)              | 132.693            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 2-DH1 ( $\pi/4$ -DQPSK Hopping) | 139.012            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 3-DH1 (8-DPSK Hopping)          | 132.693            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR DH3 (GFSK Hopping)              | 195.881            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 2-DH3 ( $\pi/4$ -DQPSK Hopping) | 195.881            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 3-DH3 (8-DPSK Hopping)          | 202.200            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR DH5 (GFSK Hopping)              | 176.925            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 2-DH5 ( $\pi/4$ -DQPSK Hopping) | 164.287            | 400        | PASS   |
| Dwell Time     | Bluetooth BDR EDR 3-DH5 (8-DPSK Hopping)          | 151.650            | 400        | PASS   |

#### 4.9.2 Time of Occupancy (Dwell Time) – Test Details (Worst Case Plots)



Date: 10.NOV.2020 21:12:44



Date: 10.NOV.2020 21:12:22

## 4.10 Test Results – 6dB Bandwidth

### 4.10.1 6dB Bandwidth – Test Summary

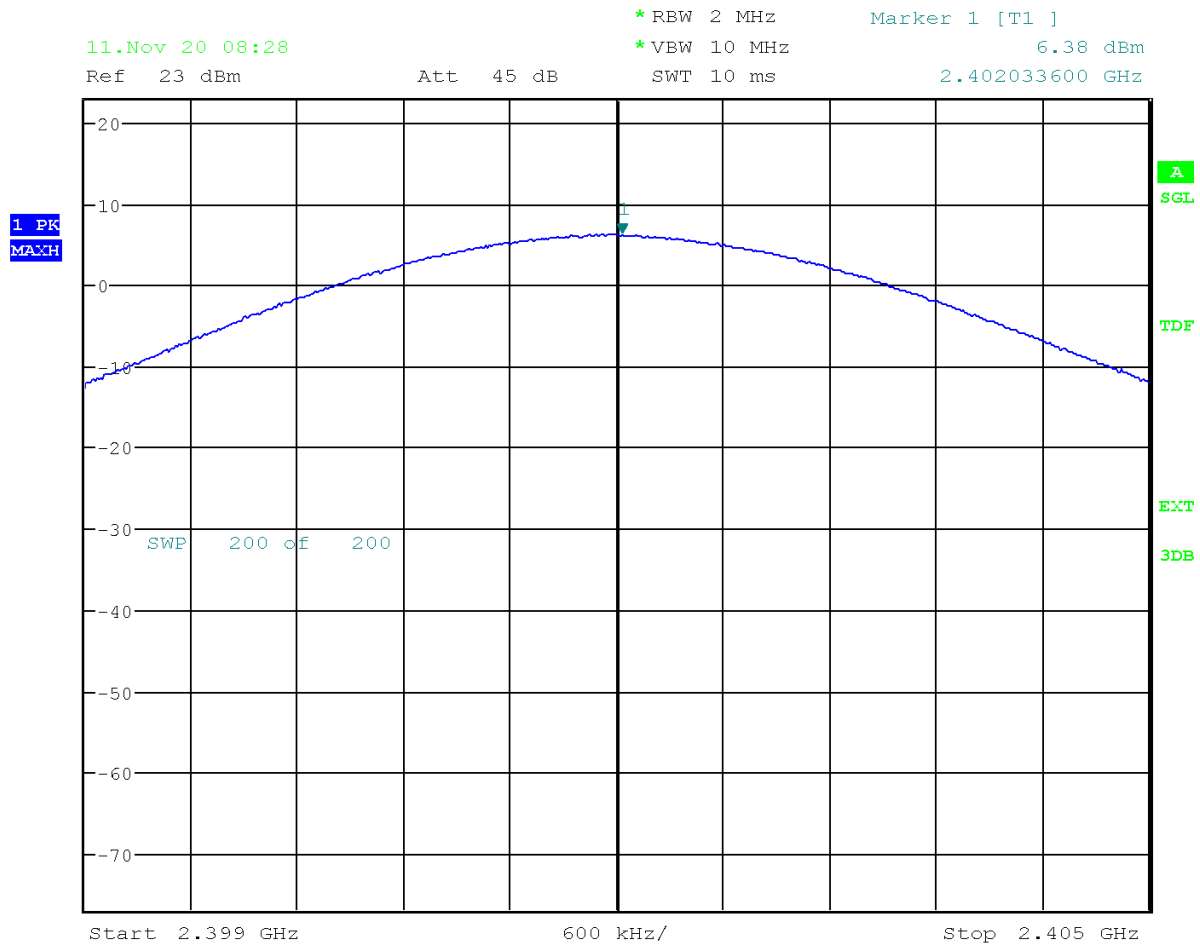
Requirement is not applicable as the device supports frequency hopping

## 4.11 Test Results – Peak Conducted Output Power

### 4.11.1 Peak Conducted Output Power – Test Summary

| Test Specification              |                                                             | 47 CFR 15.247(b)                                   |           |                         |             |        |
|---------------------------------|-------------------------------------------------------------|----------------------------------------------------|-----------|-------------------------|-------------|--------|
| Test Engineer & Date            |                                                             | Niall Forrester                                    |           | 2020.11.10 – 2020.11.11 |             |        |
| EUT and Ancillary Equipment IDs |                                                             | A002893981-002                                     |           |                         |             |        |
| EUT Operation Mode(s)           |                                                             | Test Mode                                          |           |                         |             |        |
| EUT Wireless Configuration(s)   |                                                             | Bluetooth BDR DER (See below for details)          |           |                         |             |        |
| EUT Hardware Configuration(s)   |                                                             | Power from lab power supply via modified USB cable |           |                         |             |        |
| Overall Result                  |                                                             | PASS                                               |           |                         |             |        |
| Test Parameter                  | Wireless Configuration                                      | Measured Level (dBm)                               |           |                         | Limit (dBm) | Result |
|                                 |                                                             | Low 4.75V                                          | Nom 5.00V | High 5.25V              |             |        |
| Peak Conducted Output Power     | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2402 MHz)               | 3.75                                               | 3.68      | 3.78                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 2-DH5 Low Ch. ( $\pi/4$ -DQPSK 2402 MHz)  | 5.89                                               | 5.80      | 5.89                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 3-DH5 Low Ch. (8-DPSK 2402 MHz)           | 6.38                                               | 6.24      | 6.35                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR DH5 Low Ch. (GFSK 2441 MHz)               | 3.47                                               | 3.43      | 3.49                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 2-DH5 Mid Ch. ( $\pi/4$ -DQPSK 2441 MHz)  | 5.45                                               | 5.32      | 5.35                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 3-DH5 Mid Ch. (8-DPSK 2441 MHz)           | 5.92                                               | 5.78      | 5.91                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR DH5 High Ch. (GFSK 2480 MHz)              | 2.46                                               | 2.28      | 2.42                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 2-DH5 High Ch. ( $\pi/4$ -DQPSK 2480 MHz) | 4.40                                               | 4.31      | 4.43                    | 30          | PASS   |
| Peak Conducted Output Power     | Bluetooth BDR EDR 3-DH5 High Ch. (8-DPSK 2480 MHz)          | 4.89                                               | 4.79      | 4.85                    | 30          | PASS   |

#### 4.11.2 Peak Conducted Output Power – Test Details (Worst Case Plot)



Date: 11.NOV.2020 08:28:37

### 4.12 Test Results – Power Spectral Density

#### 4.12.1 Power Spectral Density – Test Summary

Requirement is not applicable as the device supports frequency hopping

## 5. TEST EQUIPMENT STATUS

### 5.1 List of Hardware with Calibration Dates

#### 5.1.1 Hardware List – CTE System

| Type                                 | Manufacturer                  | Model       | Serial Number<br>/ ID        | Calibration<br>Date | Calibration<br>Due |
|--------------------------------------|-------------------------------|-------------|------------------------------|---------------------|--------------------|
| Comprehensive<br>Testing Environment | TÜV Rheinland<br>LGA Products | HWE<br>6000 | 00139                        | N/A                 | N/A                |
| Bluetooth Signaling<br>Unit          | Rohde &<br>Schwarz            | CMW500      | 163750<br>2711468            | 16.07.2020          | 16.07.2021         |
| Spectrum Analyzer                    | Rohde &<br>Schwarz            | FSU26       | 100308<br>2704108            | 14.07.2020          | 14.07.2021         |
| Vector Signal<br>Generator           | Rohde &<br>Schwarz            | SMU200A     | 101584<br>2704111            | 04.08.2020          | 04.08.2021         |
| Power Supply                         | Keithley                      | 2303        | 1198722<br>2717714           | 24.07.2020          | 24.07.2021         |
| Multimeter                           | Keithley                      | 2700        | 1035251<br>2704115           | 09.07.2020          | 09.07.2021         |
| Average Power<br>Sensor              | Rohde &<br>Schwarz            | NRP-Z31     | 102145<br>2704104            | 17.07.2020          | 17.07.2021         |
| Temperature<br>Chamber               | Vötsch                        | VT4002      | 58566081940010<br>2717693    | N/A                 | N/A                |
| Temp. & Humidity<br>Logger           | Lufft                         | Opus 20     | 113.0118.0802.033<br>2771025 | 31.07.2020          | 31.07.2022         |

### 5.1.2 Hardware List – SAC5 System

| Type                                 | Manufacturer    | Model           | Serial Number / ID           | Calibration Date | Calibration Due |
|--------------------------------------|-----------------|-----------------|------------------------------|------------------|-----------------|
| EMI Test Receiver                    | Rohde & Schwarz | ESW44           | 101760<br>2881044            | 17.07.2020       | 17.07.2021      |
| Ultra Broadband Antenna              | Rohde & Schwarz | HL562E          | 100988<br>2823181            | 23.07.2019       | 23.07.2021      |
| Double Ridged Waveguide Horn Antenna | Rohde & Schwarz | HF907           | 102678<br>2823164            | 15.07.2019       | 15.07.2021      |
| Loop Antenna                         | EMCO            | 6502            | 9206-2775<br>2759035         | 16.07.2020       | 16.07.2021      |
| Horn Antenna – 40GHz                 | ETS Lindgren    | UG-600A/U       | 20623<br>2814834             | 27.07.2020       | 27.07.2022      |
| Horn Antenna                         | ETS Lindgren    | UG-596A/U       | 20898<br>2814839             | 27.07.2020       | 27.07.2022      |
| Control Device                       | Maturo          | NCD             | NCD/393/2372.01              | N/A              | N/A             |
| Open Switch & Control Unit           | Rohde & Schwarz | OSP150          | 100081<br>2884198            | 04.08.2020       | 04.08.2021      |
| Open Switch & Control Unit           | Rohde & Schwarz | OSP120          | 100084<br>2761253            | 04.08.2020       | 04.08.2021      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F Extension | 101333<br>2761265            | 04.08.2020       | 04.08.2021      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F Extension | 101335<br>2761266            | 04.08.2020       | 04.08.2021      |
| Shielded Filter Unit                 | Rohde & Schwarz | OSP-F Base Unit | 101330<br>2761262            | 04.08.2020       | 04.08.2021      |
| Temp. & Humidity Logger              | Lufft           | Opus 20         | 126.0118.0802.033<br>2771042 | 31.07.2020       | 31.07.2022      |

### 5.2 Software / Firmware Versions

| Equipment                               | Software / Firmware Name | Version   |
|-----------------------------------------|--------------------------|-----------|
| Comprehensive Testing Environment (CTE) | CTE – TMF                | V47.5     |
| SAC 5                                   | EMC 32                   | V10.60.10 |

## 6. MEASUREMENT UNCERTAINTY

### 6.1 Measurement Uncertainty for CTE

| Parameter                                                       | Uncertainty (Coverage Factor k=2) |
|-----------------------------------------------------------------|-----------------------------------|
| Maximum Output Power (15.247b)                                  | ±0.51 dB                          |
| 6dB / 20dB Channel Bandwidth & 99% Occupied bandwidth (15.247a) | <5%                               |
| Carrier Frequency Separation (15.247a)                          | N/A                               |
| Number of Hopping Channels (15.247a)                            | N/A                               |
| Time of Occupancy – Dwell Time (15.247a)                        | N/A                               |
| Band Edge Compliance of Conducted Emissions (15.247a)           | ±1.04 dB                          |
| Conducted Spurious Emissions (15.247d)                          | ±2.98 dB                          |
| Power Spectral Density (15.247e)                                | ±0.51 dB                          |

### 6.2 Measurement Uncertainty for Conducted Emissions

| Parameter                                      | Uncertainty (Coverage Factor k=2) |
|------------------------------------------------|-----------------------------------|
| Conducted emissions with LISN 150KHz to 30 MHz | 2.98 dB                           |

### 6.3 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)

| Parameter                       | Uncertainty (Coverage Factor k=2) |
|---------------------------------|-----------------------------------|
| Field Strength 10 Hz -9 kHz     | 3.38 dB                           |
| Field Strength 9 kHz -30 MHz    | 3.38 dB                           |
| Field Strength 30 MHz -1000 MHz | 3.38 dB                           |
| Field Strength 1 GHz -18 GHz    | 4.88 dB                           |
| Field Strength 18 GHz - 40 GHz  | 5.14 dB                           |

## 7. PHOTOGRAPHS

See Appendix 1