

## TEST REPORT

On behalf of

Savant Technologies LLC dba GE Lighting, a Savant company

Product Name: Direct Connect Full Color A19

Model No.: CLEDA199CD1, CLEDA199CDRV

FCC ID: PUU-A19-DMFCV

Prepared For: Savant Technologies LLC dba GE Lighting, a Savant company  
1975 Noble Road Cleveland Ohio United States 44112

Prepared By: Audix Technology (Shanghai) Co., Ltd.  
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File No. : C1D2201039  
Report No. : ACI-F22043  
Date of Test : 2022.01.20-28  
Date of Report : 2022.02.22

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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## TEST REPORT

Applicant : Savant Technologies LLC dba GE Lighting, a Savant company  
EUT Description : Direct Connect Full Color A19  
(A) Model No. : Refer to Sec.2.1  
(B) Power Supply : 120V AC 60Hz  
(C) Test Voltage : 120V/60Hz

### Test Procedure Used:

#### FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10-2013

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

***The test results for EUT's WIFI function are contained in No.ACI-F22044 report.***

Date of Test : 2022.01.20-28 Date of Report : 2022.02.22

Producer : Huimin Yan  
HUIMIN YAN / Assistant

Review : Byron Wu  
BYRON WU/ Deputy Assistant Manager

 For and on behalf of  
Audix Technology (Shanghai) Co., Ltd.

Signatory :   
Authorized Signature(s) BYRON KWO/Assistant General Manager

# 1 SUMMARY OF STANDARDS AND RESULTS

## 1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

| Description / Test Item                    | Test Standard                                                          | Results | Meets Limit               |
|--------------------------------------------|------------------------------------------------------------------------|---------|---------------------------|
| <b>EMISSION</b>                            |                                                                        |         |                           |
| Conducted Emission                         | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.207                    |
| Radiated Emission                          | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.209(a)<br>15.205(a)(c) |
| 6 dB Bandwidth<br>Measurement              | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.247(a)(2)              |
| Maximum Peak Output<br>Power Measurement   | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.247(b)(3)              |
| Emission Limitations<br>Measurement        | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.247(d)                 |
| Band Edge<br>Measurement                   | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.247(d)                 |
| Power Spectral Density<br>Measurement      | FCC RULES AND REGULATIONS PART 15<br>SUBPART C<br>AND ANSI C63.10:2013 | Pass    | 15.247(e)                 |
| N/A is an abbreviation for Not Applicable. |                                                                        |         |                           |

## 2 GENERAL INFORMATION

### 2.1 Description of Equipment Under Test

Description : Direct Connect Full Color A19

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : CLEDA199CD1, CLEDA199CDRV

Radio Tech : BLE 4.2;  
IEEE 802.11 b/g/n.

Note: : 802.11n-HT40 not support.

Channel Freq. : BLE: 2402MHz-2480MHz;  
802.11b/g/n: 2412MHz-2462MHz.

Modulation : BLE: GFSK;  
802.11b: DSSS (CCK, DQPSK, DBPSK);  
802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK).

Antenna Info. : Antenna Type: PCB Antenna  
Antenna Gain: 0.5 dBi  
The Antenna was a permanently attached antenna  
that is comply with 15.203 requirement.

Test Mode : The EUT was set at continuous TX during all the test  
in the report.

Applicant : Savant Technologies LLC dba GE Lighting, a Savant company  
1975 Noble Road Cleveland Ohio United States 44112

Manufacturer : same as Applicant

Factory : Foshan Electrical and Lighting Co., Ltd.  
64 North of Fenjiang Rd, Foshan, Guangdong, China

## 2.2 EUT Specifications Assessed in Current Report

| Mode | Modulation | Data Rate(Mbps) |
|------|------------|-----------------|
| BLE  | GFSK       | 1               |

| Channel List |                 |             |                 |
|--------------|-----------------|-------------|-----------------|
| Channel No.  | Frequency (MHz) | Channel No. | Frequency (MHz) |
| 00           | 2402            | 20          | 2442            |
| 01           | 2404            | 21          | 2444            |
| 02           | 2406            | 22          | 2446            |
| ...          | ...             | ...         | ...             |
| ...          | ...             | ...         | ...             |
| ...          | ...             | ...         | ...             |
| 17           | 2436            | 37          | 2476            |
| 18           | 2438            | 38          | 2478            |
| 19           | 2440            | 39          | 2480            |

## 2.3 Test Information

The test software “RTLBTAPP.exe” was used to control EUT work in TX mode, Power Setting and select test channel.

| Modulation | data rate (Mbps) | Power Setting | Test Channel |    | Frequency (MHz) |
|------------|------------------|---------------|--------------|----|-----------------|
| BLE        | 1                | Default       | Low:         | 00 | 2402            |
|            |                  | Default       | Middle:      | 20 | 2442            |
|            |                  | Default       | High:        | 39 | 2480            |

## 2.4 Sample Description

| Test Item          | Model Number | Sample Number  | Date of receipted |
|--------------------|--------------|----------------|-------------------|
| Conducted Emission | CLEDA199CD1  | E2201058-01/06 | 2022.01.17        |
| Radiated Emission  | CLEDA199CD1  | E2201058-05/06 | 2022.01.17        |
| Conducted RF Test  | CLEDA199CD1  | E2201058-03/06 | 2022.01.17        |

## 2.5 Supported equipment

|               |   |                        |
|---------------|---|------------------------|
| Brand         | : | Acer                   |
| Product Name: | : | Notebook PC            |
| Model Name    | : | TravelMate P238 series |
| Model Number  | : | N15W8                  |

## 2.6 Description of Test Facility

|                               |   |                                                                                           |
|-------------------------------|---|-------------------------------------------------------------------------------------------|
| Name of Firm                  | : | Audix Technology (Shanghai) Co., Ltd.                                                     |
| Site Location                 | : | 3F and 4F, 34Bldg, 680 Guiping Rd.,<br>Caohejing Hi-Tech Park,<br>Shanghai 200233, China. |
| Accredited by NVLAP, Lab Code | : | 200371-0                                                                                  |
| FCC Designation Number        | : | CN5027                                                                                    |
| Test Firm Registration Number | : | 954668                                                                                    |

### 3 CONDUCTED EMISSION TEST

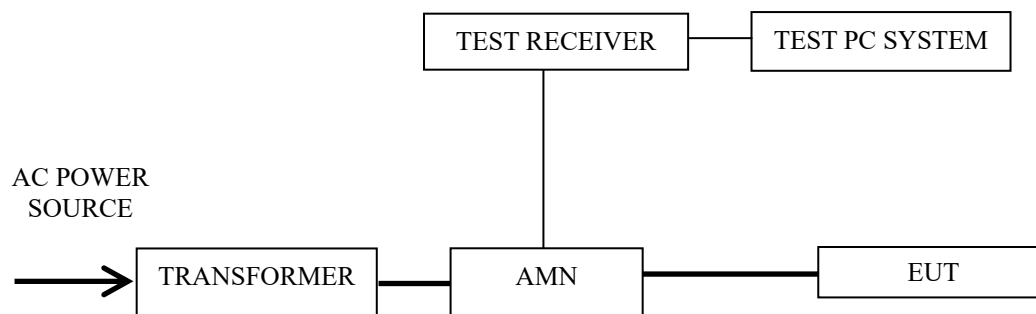
#### 3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

| Item | Type                           | Manufacturer | Model No. | Serial No.  | Cal. Date  | Cal. Interval |
|------|--------------------------------|--------------|-----------|-------------|------------|---------------|
| 1.   | Test Receiver                  | R&S          | ESCI      | 101302      | 2021.04.26 | 1 Year        |
| 2.   | Artificial Mains Network (AMN) | R&S          | ENV4200   | 100125      | 2021.06.24 | 1 Year        |
| 3.   | Software                       | Audix        | e3        | 6.2009-1-15 | --         | --            |

#### 3.2 Block Diagram of Test Setup

##### 3.2.1 Conducted Disturbance Test Setup



— : Signal Line  
— : Power Line

### 3.3 Conducted Emission Limits (§15.207)

| Frequency Range<br>(MHz)                                                                                                                                                        | Limits dB(μV) |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------|
|                                                                                                                                                                                 | Quasi-peak    | Average |
| 0.15 ~ 0.5                                                                                                                                                                      | 66~56         | 56~46   |
| 0.5 ~ 5                                                                                                                                                                         | 56            | 46      |
| 5 ~ 30                                                                                                                                                                          | 60            | 50      |
| NOTE 1 – The lower limit shall apply at the transition frequencies.<br>NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz |               |         |

### 3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

### 3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

3.5.3 Turn the EUT on the test mode, and then test.

### 3.6 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50 Ω coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 Subpart C and ANSI C63.10: 2013 requirements during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7

### 3.7 Test Results

< **PASS** >

The frequency and amplitude of the highest conducted emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Worst case emission:

| No. | Operation    | Modulation | Channel | Frequency (MHz) | Data Page |
|-----|--------------|------------|---------|-----------------|-----------|
| 1.  | Transmitting | --         | --      | --              | P12       |

NOTE 1 – Level = Read Level + AMN Factor + Cable Loss

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – The emission levels which not reported are too low against the official limit.

**Worst case emission**

EUT : Direct Connect Full Color A19 Temperature : 22°C

Model No. : CLEDA199CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.01.26

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | AMN Factor (dB) | Cable Loss (dB) | Emission Level dB (μV) | Limits dB (μV) | Margin (dB) | Remark    |
|--------------|-----------------|-----------------------|-----------------|-----------------|------------------------|----------------|-------------|-----------|
| Line         | 0.15            | 57.69                 | 0.2             | 0.03            | 57.92                  | 66             | 8.08        | QP        |
|              | 0.15            | 32.9                  | 0.2             | 0.03            | 33.13                  | 56             | 22.87       | Average   |
|              | 0.3003          | 47.25                 | 0.2             | 0.03            | 47.48                  | 60.24          | 12.76       | QP        |
|              | 0.3003          | 19.32                 | 0.2             | 0.03            | 19.55                  | 50.24          | 30.69       | Average   |
|              | 0.4468          | 37.28                 | 0.2             | 0.04            | 37.52                  | 56.93          | 19.41       | QP        |
|              | 0.4468          | 15.7                  | 0.2             | 0.04            | 15.94                  | 46.93          | 30.99       | Average   |
|              | 0.9997          | 17.4                  | 0.2             | 0.06            | 17.66                  | 56             | 38.34       | QP        |
|              | 0.9997          | 5.23                  | 0.2             | 0.06            | 5.49                   | 46             | 40.51       | Average   |
|              | 2.765           | 21.73                 | 0.25            | 0.11            | 22.09                  | 56             | 33.91       | QP        |
|              | 2.765           | 7.8                   | 0.25            | 0.11            | 8.16                   | 46             | 37.84       | Average   |
|              | 2.993           | 20.6                  | 0.3             | 0.11            | 21.01                  | 56             | 34.99       | QP        |
|              | 2.993           | 7.7                   | 0.3             | 0.11            | 8.11                   | 46             | 37.89       | Average   |
| Neutral      | <b>0.15</b>     | <b>57.89</b>          | <b>0.2</b>      | <b>0.03</b>     | <b>58.12</b>           | <b>66</b>      | <b>7.88</b> | <b>QP</b> |
|              | 0.15            | 33.02                 | 0.2             | 0.03            | 33.25                  | 56             | 22.75       | Average   |
|              | 0.3003          | 46.03                 | 0.2             | 0.03            | 46.26                  | 60.24          | 13.98       | QP        |
|              | 0.3003          | 19.12                 | 0.2             | 0.03            | 19.35                  | 50.24          | 30.89       | Average   |
|              | 0.4564          | 35.24                 | 0.2             | 0.04            | 35.48                  | 56.76          | 21.28       | QP        |
|              | 0.4564          | 15.3                  | 0.2             | 0.04            | 15.54                  | 46.76          | 31.22       | Average   |
|              | 0.9997          | 15.99                 | 0.2             | 0.06            | 16.25                  | 56             | 39.75       | QP        |
|              | 0.9997          | 3.56                  | 0.2             | 0.06            | 3.82                   | 46             | 42.18       | Average   |
|              | 2.765           | 20.7                  | 0.25            | 0.11            | 21.06                  | 56             | 34.94       | QP        |
|              | 2.765           | 7.4                   | 0.25            | 0.11            | 7.76                   | 46             | 38.24       | Average   |
|              | 3.025           | 20.7                  | 0.3             | 0.11            | 21.11                  | 56             | 34.89       | QP        |
|              | 3.025           | 6.9                   | 0.3             | 0.11            | 7.31                   | 46             | 38.69       | Average   |

TEST ENGINEER: Jarey

## 4 RADIATED EMISSION TEST

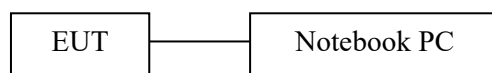
### 4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

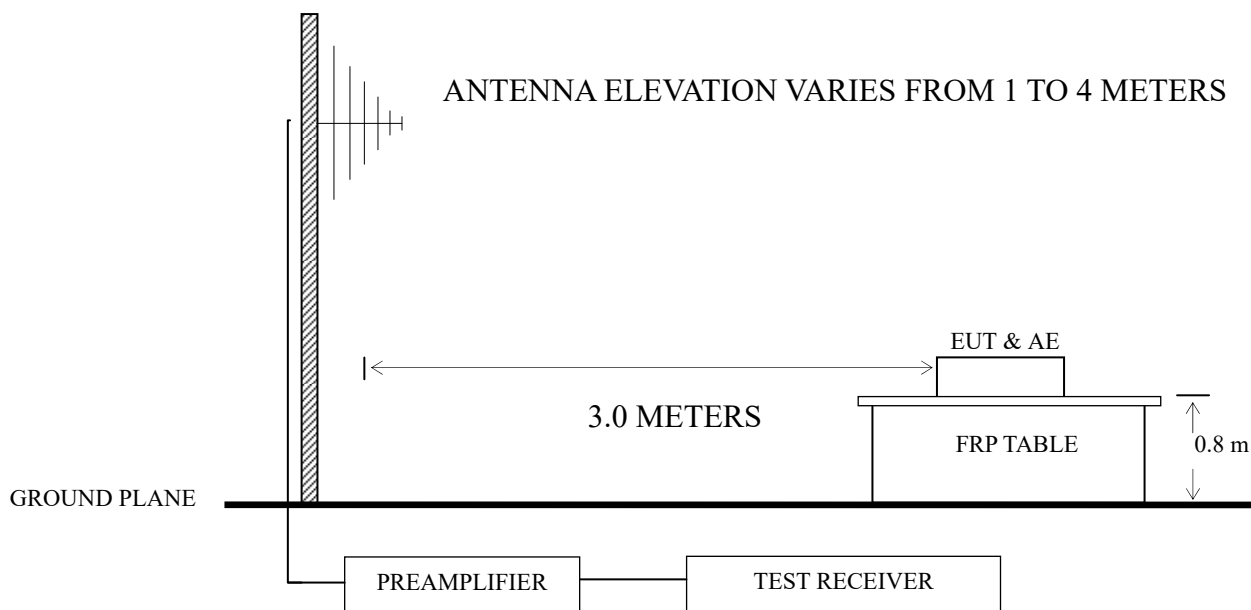
| Item | Type                         | Manufacturer | Model No.             | Serial No.          | Cal. Date  | Cal. Interval |
|------|------------------------------|--------------|-----------------------|---------------------|------------|---------------|
| 1.   | Preamplifier                 | Agilent      | 8447D                 | 2944A10548          | 2021.03.08 | 1 Year        |
| 2.   | Preamplifier                 | HP           | 8449B                 | 3008A00864          | 2021.03.08 | 1 Year        |
| 3.   | Spectrum Analyzer            | Agilent      | N9010A                | MY52221182          | 2021.09.16 | 1 Year        |
| 4.   | Test Receiver                | R&S          | ESCI                  | 101303              | 2021.03.08 | 1 Year        |
| 5.   | Bilog Antenna+6dB Attenuator | Schwarz beck | VULB 9168+EMCI-N-6-06 | 707+AT-N0637        | 2021.03.30 | 1 Year        |
| 6.   | Horn Antenna                 | EMCO         | 3115                  | 9607-4878           | 2021.07.27 | 1 Year        |
| 7.   | Horn Antenna                 | EMCO         | 3116                  | 00062643            | 2021.10.10 | 1 Year        |
| 8.   | Cavity Band Rejection Filter | Microwave    | WT-A3882-R 10         | WT200312-1-1        | 2021.09.15 | 1 Year        |
| 9.   | Software                     | Audix        | e3                    | SET00200 9912M295-2 | --         | --            |

### 4.2 Block Diagram of Test Setup

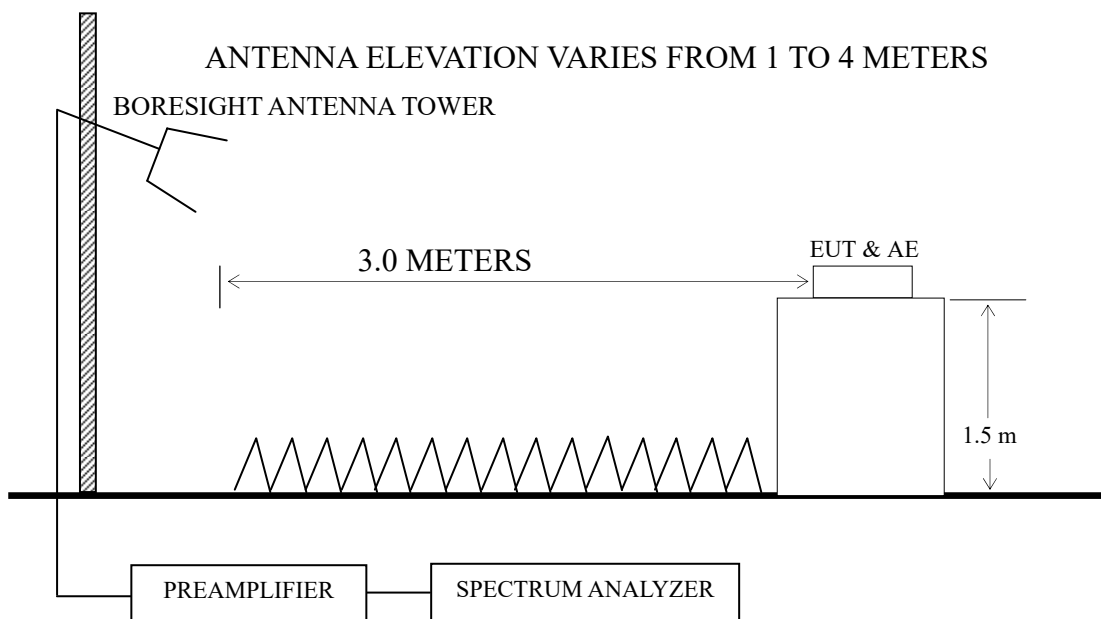
#### 4.2.1 EUT & Peripherals



#### 4.2.2 Below 1GHz



#### 4.2.3 Above 1GHz



#### 4.3 Radiated Emission Limit (§15.209)

| Frequency<br>(MHz) | Distance<br>(m) | Field strength limits (μV/m) |          |
|--------------------|-----------------|------------------------------|----------|
|                    |                 | (μV/m)                       | dB(μV/m) |
| 30 ~ 88            | 3               | 100                          | 40.0     |
| 88 ~ 216           | 3               | 150                          | 43.5     |
| 216 ~ 960          | 3               | 200                          | 46.0     |
| Above 960          | 3               | 500                          | 54.0     |

NOTE 1 - Emission Level dB (μV/m) = 20 log Emission Level (μV/m)

NOTE 2 - The tighter limit applies at the band edges.

NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

#### 4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

## 4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 4.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

## 4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of Agilent N9010A was set at 1MHz for above 1GHz.

The frequency range from 30 MHz to 25 GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.4.7.

## 4.7 Test Results

### <PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

Frequency range: below 1GHz (Worst case emission)

| No. | Operation    | Modulation | Channel | Frequency | Data Page |
|-----|--------------|------------|---------|-----------|-----------|
| 1.  | Transmitting | BLE        | 00      | 2402 MHz  | P17       |
| 2.  |              |            | 20      | 2442 MHz  | P17       |
| 3.  |              |            | 39      | 2480 MHz  | P18       |

Frequency range: above 1GHz

| No. | Operation    | Modulation | Channel | Frequency | Data Page |
|-----|--------------|------------|---------|-----------|-----------|
| 1.  | Transmitting | BLE        | 00      | 2402 MHz  | P19       |
| 2.  |              |            | 20      | 2442 MHz  | P19       |
| 3.  |              |            | 39      | 2480 MHz  | P20       |

Band-Edge:

| No. | Operation    | Modulation | Channel | Frequency | Data Page |
|-----|--------------|------------|---------|-----------|-----------|
| 1.  | Transmitting | BLE        | 00      | 2402 MHz  | P21       |
| 2.  |              |            | 39      | 2480 MHz  | P21       |

Restricted bands:

| No. | Operation    | Modulation | Channel | Frequency | Data Page |
|-----|--------------|------------|---------|-----------|-----------|
| 1.  | Transmitting | BLE        | 00      | 2402 MHz  | P22       |
| 2.  |              |            | 39      | 2480 MHz  | P22       |

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

NOTE 2 – “QP” means “Quasi-Peak” values

NOTE 3 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The emission levels which not reported are too low against the official limit.

NOTE 5 – The emission levels recorded below is data of EUT configured in Standing direction, for Standing direction was the maximum emission direction during the test. The data of Side & Lying direction are too low against the official limit to be reported.

NOTE 6 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

NOTE 7 – The frequency range 2310-2390MHz & 2483.5-2500MHz were tested for Restricted bands.

**Worst case emission < 1GHz**

EUT : Direct Connect Full Color A19 Temperature : 22°C

Model No. : CLEDA199CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.01.28

**BLE CH2402MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 41.713          | 24.51                 | 19.07                 | 0.68            | 28.24                    | 16.02                    | 40               | 23.98       | QP     |
|              | 60.492          | 24.45                 | 19.15                 | 0.84            | 28.16                    | 16.28                    | 40               | 23.72       | QP     |
|              | 139.85          | 32.33                 | 18.5                  | 1.27            | 27.83                    | 24.27                    | 43.5             | 19.23       | QP     |
|              | 248.55          | 29.51                 | 17.47                 | 1.68            | 27.16                    | 21.5                     | 46               | 24.5        | QP     |
|              | 423.54          | 25.45                 | 21.83                 | 2.23            | 27.7                     | 21.81                    | 46               | 24.19       | QP     |
|              | 766.06          | 24.01                 | 27.7                  | 2.94            | 27.11                    | 27.54                    | 46               | 18.46       | QP     |
| Vertical     | 42.6            | 24.62                 | 19.1                  | 0.69            | 28.23                    | 16.18                    | 40               | 23.82       | QP     |
|              | 57.191          | 25.8                  | 19.4                  | 0.82            | 28.17                    | 17.85                    | 40               | 22.15       | QP     |
|              | 140.84          | 25.58                 | 18.6                  | 1.28            | 27.83                    | 17.63                    | 43.5             | 25.87       | QP     |
|              | 263.82          | 25.44                 | 17.84                 | 1.74            | 27.1                     | 17.92                    | 46               | 28.08       | QP     |
|              | 429.52          | 25.68                 | 22                    | 2.24            | 27.72                    | 22.2                     | 46               | 23.8        | QP     |
|              | 752.74          | 24.36                 | 27.7                  | 2.9             | 27.2                     | 27.76                    | 46               | 18.24       | QP     |

**BLE CH2442MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 41.713          | 25.26                 | 19.07                 | 0.68            | 28.24                    | 16.77                    | 40               | 23.23       | QP     |
|              | 60.492          | 24.55                 | 19.15                 | 0.84            | 28.16                    | 16.38                    | 40               | 23.62       | QP     |
|              | 140.34          | 32.65                 | 18.55                 | 1.27            | 27.83                    | 24.64                    | 43.5             | 18.86       | QP     |
|              | 263.82          | 31.72                 | 17.84                 | 1.74            | 27.1                     | 24.2                     | 46               | 21.8        | QP     |
|              | 454.31          | 26.3                  | 22.8                  | 2.29            | 27.81                    | 23.58                    | 46               | 22.42       | QP     |
|              | 755.39          | 23.93                 | 27.8                  | 2.9             | 27.16                    | 27.47                    | 46               | 18.53       | QP     |
| Vertical     | 40.135          | 24.73                 | 19                    | 0.67            | 28.24                    | 16.16                    | 40               | 23.84       | QP     |
|              | 58.613          | 25.22                 | 19.4                  | 0.82            | 28.17                    | 17.27                    | 40               | 22.73       | QP     |
|              | 138.87          | 25.69                 | 18.4                  | 1.27            | 27.83                    | 17.53                    | 43.5             | 25.97       | QP     |
|              | 265.68          | 25.03                 | 17.93                 | 1.74            | 27.1                     | 17.6                     | 46               | 28.4        | QP     |
|              | 455.91          | 24.95                 | 22.8                  | 2.32            | 27.81                    | 22.26                    | 46               | 23.74       | QP     |
|              | 821.71          | 24.14                 | 28                    | 3.12            | 26.75                    | 28.51                    | 46               | 17.49       | QP     |

**BLE CH2480MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB)  | Remark    |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------|--------------------------|------------------|--------------|-----------|
| Horizontal   | 40.702          | 25.36                 | 19                    | 0.67            | 28.24              | 16.79                    | 40               | 23.21        | QP        |
|              | 61.132          | 24.01                 | 19.1                  | 0.84            | 28.16              | 15.79                    | 40               | 24.21        | QP        |
|              | 139.85          | 32.86                 | 18.5                  | 1.27            | 27.83              | 24.8                     | 43.5             | 18.7         | QP        |
|              | 263.82          | 30.67                 | 17.84                 | 1.74            | 27.1               | 23.15                    | 46               | 22.85        | QP        |
|              | 465.6           | 27.14                 | 22.7                  | 2.34            | 27.84              | 24.34                    | 46               | 21.66        | QP        |
|              | <b>798.98</b>   | <b>25.07</b>          | <b>27.8</b>           | <b>3.06</b>     | <b>26.9</b>        | <b>29.03</b>             | <b>46</b>        | <b>16.97</b> | <b>QP</b> |
| Vertical     | 44.587          | 24.92                 | 19.26                 | 0.71            | 28.22              | 16.67                    | 40               | 23.33        | QP        |
|              | 58.203          | 25.1                  | 19.4                  | 0.82            | 28.17              | 17.15                    | 40               | 22.85        | QP        |
|              | 141.33          | 25.65                 | 18.6                  | 1.28            | 27.82              | 17.71                    | 43.5             | 25.79        | QP        |
|              | 241.68          | 24.92                 | 17.27                 | 1.66            | 27.2               | 16.65                    | 46               | 29.35        | QP        |
|              | 465.6           | 25.06                 | 22.7                  | 2.34            | 27.84              | 22.26                    | 46               | 23.74        | QP        |
|              | 810.27          | 24.36                 | 28.1                  | 3.09            | 26.85              | 28.7                     | 46               | 17.3         | QP        |

TEST ENGINEER: Jarey

**Radiated Emission > 1GHz**

EUT : Direct Connect Full Color A19 Temperature : 22°C

Model No. : CLEDA199CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.01.28

**BLE CH2402MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 3256            | 41.6                  | 30.73                 | 6.14            | 35.21                    | 43.26                    | 74               | 30.74       | Peak   |
|              | 4792            | 40.01                 | 33.15                 | 7.55            | 34.76                    | 45.95                    | 74               | 28.05       | Peak   |
|              | 6616            | 37.01                 | 34.69                 | 8.93            | 34.76                    | 45.87                    | 74               | 28.13       | Peak   |
|              | 8080            | 36.97                 | 37.87                 | 10.28           | 34.79                    | 50.33                    | 74               | 23.67       | Peak   |
|              | 9772            | 36.14                 | 38.36                 | 11.24           | 34.62                    | 51.12                    | 74               | 22.88       | Peak   |
|              | 11380           | 35.25                 | 38.8                  | 11.87           | 34.32                    | 51.6                     | 74               | 22.4        | Peak   |
| Vertical     | 3364            | 41.31                 | 31.01                 | 6.23            | 35.18                    | 43.37                    | 74               | 30.63       | Peak   |
|              | 4792            | 39.51                 | 33.15                 | 7.55            | 34.76                    | 45.45                    | 74               | 28.55       | Peak   |
|              | 6940            | 36.72                 | 35.46                 | 9.18            | 34.79                    | 46.57                    | 74               | 27.43       | Peak   |
|              | 8428            | 35.16                 | 38.47                 | 10.46           | 34.76                    | 49.33                    | 74               | 24.67       | Peak   |
|              | 10180           | 35.49                 | 38.36                 | 11.42           | 34.57                    | 50.7                     | 74               | 23.3        | Peak   |
|              | 11824           | 34.69                 | 38.93                 | 12.22           | 34.23                    | 51.61                    | 74               | 22.39       | Peak   |

**BLE CH2442MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|--------|
| Horizontal   | 3136            | 41.51                 | 30.44                 | 6.05            | 35.25                    | 42.75                    | 74               | 31.25       | Peak   |
|              | 4768            | 38.51                 | 33.04                 | 7.49            | 34.76                    | 44.28                    | 74               | 29.72       | Peak   |
|              | 6424            | 37.64                 | 34.39                 | 8.76            | 34.74                    | 46.05                    | 74               | 27.95       | Peak   |
|              | 8092            | 36.03                 | 37.87                 | 10.28           | 34.79                    | 49.39                    | 74               | 24.61       | Peak   |
|              | 9700            | 35.11                 | 38.34                 | 11.15           | 34.63                    | 49.97                    | 74               | 24.03       | Peak   |
|              | 11392           | 34.22                 | 38.8                  | 11.87           | 34.32                    | 50.57                    | 74               | 23.43       | Peak   |
| Vertical     | 3244            | 40.89                 | 30.71                 | 6.14            | 35.22                    | 42.52                    | 74               | 31.48       | Peak   |
|              | 4048            | 38.81                 | 32.44                 | 6.81            | 34.98                    | 43.08                    | 74               | 30.92       | Peak   |
|              | 5872            | 38.04                 | 34.25                 | 8.3             | 34.7                     | 45.89                    | 74               | 28.11       | Peak   |
|              | 7972            | 35.46                 | 37.66                 | 10.22           | 34.8                     | 48.54                    | 74               | 25.46       | Peak   |
|              | 9652            | 36.01                 | 38.33                 | 11.15           | 34.63                    | 50.86                    | 74               | 23.14       | Peak   |
|              | 11680           | 33.91                 | 38.87                 | 12.1            | 34.26                    | 50.62                    | 74               | 23.38       | Peak   |

## BLE CH2480MHz

| Polarization | Frequency<br>(MHz) | Meter<br>Reading<br>dB (μV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Preamp<br>Factor<br>(dB) | Emission<br>Level dB<br>(μV/m) | Limits<br>dB<br>(μV/m) | Margin<br>(dB) | Remark |
|--------------|--------------------|-----------------------------|-----------------------------|-----------------------|--------------------------|--------------------------------|------------------------|----------------|--------|
| Horizontal   | 3160               | 41.6                        | 30.51                       | 6.05                  | 35.25                    | 42.91                          | 74                     | 31.09          | Peak   |
|              | 4612               | 38.98                       | 32.41                       | 7.36                  | 34.81                    | 43.94                          | 74                     | 30.06          | Peak   |
|              | 6268               | 37.56                       | 34.35                       | 8.6                   | 34.73                    | 45.78                          | 74                     | 28.22          | Peak   |
|              | 8128               | 36.01                       | 37.96                       | 10.28                 | 34.79                    | 49.46                          | 74                     | 24.54          | Peak   |
|              | 9652               | 35.68                       | 38.33                       | 11.15                 | 34.63                    | 50.53                          | 74                     | 23.47          | Peak   |
|              | 11272              | 34.85                       | 38.8                        | 11.87                 | 34.35                    | 51.17                          | 74                     | 22.83          | Peak   |
| Vertical     | 2908               | 42.32                       | 29.82                       | 5.82                  | 35.37                    | 42.59                          | 74                     | 31.41          | Peak   |
|              | 4684               | 38.37                       | 32.69                       | 7.42                  | 34.79                    | 43.69                          | 74                     | 30.31          | Peak   |
|              | 6220               | 37.48                       | 34.34                       | 8.6                   | 34.72                    | 45.7                           | 74                     | 28.3           | Peak   |
|              | 8092               | 36.05                       | 37.87                       | 10.28                 | 34.79                    | 49.41                          | 74                     | 24.59          | Peak   |
|              | 9544               | 35.5                        | 38.31                       | 11.06                 | 34.65                    | 50.22                          | 74                     | 23.78          | Peak   |
|              | 11056              | 34.76                       | 38.8                        | 11.64                 | 34.39                    | 50.81                          | 74                     | 23.19          | Peak   |

TEST ENGINEER: Jarey

**Band-Edge:**

EUT : Direct Connect Full Color A19 Temperature : 22°C

Model No. : CLEDA199CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.01.28

**BLE CH2402MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB)  | Remark         |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|--------------|----------------|
| Horizontal   | 2390            | 50.48                 | 28.21                 | 5.36            | 35.86                    | 48.19                    | 74               | 25.81        | Peak           |
|              | <b>2390</b>     | <b>39.25</b>          | <b>28.21</b>          | <b>5.36</b>     | <b>35.86</b>             | <b>36.96</b>             | <b>54</b>        | <b>17.04</b> | <b>Average</b> |
| Vertical     | 2390            | 51.42                 | 28.21                 | 5.36            | 35.86                    | 49.13                    | 74               | 24.87        | Peak           |
|              | 2390            | 36.44                 | 28.21                 | 5.36            | 35.86                    | 34.15                    | 54               | 19.85        | Average        |

**BLE CH2480MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2483.5          | 47                    | 28.46                 | 5.43            | 35.76                    | 45.13                    | 74               | 28.87       | Peak    |
|              | 2483.5          | 36.4                  | 28.46                 | 5.43            | 35.76                    | 34.53                    | 54               | 19.47       | Average |
| Vertical     | 2483.5          | 48.49                 | 28.46                 | 5.43            | 35.76                    | 46.62                    | 74               | 27.38       | Peak    |
|              | 2483.5          | 33.55                 | 28.46                 | 5.43            | 35.76                    | 31.68                    | 54               | 22.32       | Average |

TEST ENGINEER: Jarey

**Emissions in restricted frequency bands:**

EUT : Direct Connect Full Color A19 Temperature : 22°C

Model No. : CLEDA199CD1 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2022.01.28

**BLE CH2402MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2315.2          | 47.46                 | 28.01                 | 5.29            | 35.94              | 44.82                    | 74               | 29.18       | Peak    |
|              | 2315.2          | 37.24                 | 28.01                 | 5.29            | 35.94              | 34.6                     | 54               | 19.4        | Average |
|              | 2349.1          | 46.68                 | 28.1                  | 5.32            | 35.9               | 44.2                     | 74               | 29.8        | Peak    |
|              | 2349.1          | 34.57                 | 28.1                  | 5.32            | 35.9               | 32.09                    | 54               | 21.91       | Average |
|              | 2389.3          | 50.52                 | 28.21                 | 5.36            | 35.86              | 48.23                    | 74               | 25.77       | Peak    |
|              | 2389.3          | 37.35                 | 28.21                 | 5.36            | 35.86              | 35.06                    | 54               | 18.94       | Average |
| Vertical     | 2321.6          | 45.21                 | 28.03                 | 5.29            | 35.93              | 42.6                     | 74               | 31.4        | Peak    |
|              | 2321.6          | 34.52                 | 28.03                 | 5.29            | 35.93              | 31.91                    | 54               | 22.09       | Average |
|              | 2357.5          | 45.21                 | 28.14                 | 5.32            | 35.89              | 42.78                    | 74               | 31.22       | Peak    |
|              | 2357.5          | 34.22                 | 28.14                 | 5.32            | 35.89              | 31.79                    | 54               | 22.21       | Average |
|              | 2388.9          | 50.23                 | 28.21                 | 5.36            | 35.86              | 47.94                    | 74               | 26.06       | Peak    |
|              | 2388.9          | 37.62                 | 28.21                 | 5.36            | 35.86              | 35.33                    | 54               | 18.67       | Average |

**BLE CH2480MHz**

| Polarization | Frequency (MHz) | Meter Reading dB (μV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Emission Level dB (μV/m) | Limits dB (μV/m) | Margin (dB) | Remark  |
|--------------|-----------------|-----------------------|-----------------------|-----------------|--------------------|--------------------------|------------------|-------------|---------|
| Horizontal   | 2483.7          | 48.94                 | 28.46                 | 5.43            | 35.76              | 47.07                    | 74               | 26.93       | Peak    |
|              | 2483.7          | 36.49                 | 28.46                 | 5.43            | 35.76              | 34.62                    | 54               | 19.38       | Average |
|              | 2489.8          | 47.52                 | 28.48                 | 5.47            | 35.76              | 45.71                    | 74               | 28.29       | Peak    |
|              | 2489.8          | 38.55                 | 28.48                 | 5.47            | 35.76              | 36.74                    | 54               | 17.26       | Average |
|              | 2496.3          | 48.49                 | 28.48                 | 5.47            | 35.76              | 46.68                    | 74               | 27.32       | Peak    |
|              | 2496.3          | 38.15                 | 28.48                 | 5.47            | 35.76              | 36.34                    | 54               | 17.66       | Average |
| Vertical     | 2483.9          | 48.77                 | 28.46                 | 5.43            | 35.76              | 46.9                     | 74               | 27.1        | Peak    |
|              | 2483.9          | 34.38                 | 28.46                 | 5.43            | 35.76              | 32.51                    | 54               | 21.49       | Average |
|              | 2491.9          | 44.96                 | 28.48                 | 5.47            | 35.76              | 43.15                    | 74               | 30.85       | Peak    |
|              | 2491.9          | 34.4                  | 28.48                 | 5.47            | 35.76              | 32.59                    | 54               | 21.41       | Average |
|              | 2498.1          | 44.95                 | 28.5                  | 5.47            | 35.76              | 43.16                    | 74               | 30.84       | Peak    |
|              | 2498.1          | 35.7                  | 28.5                  | 5.47            | 35.76              | 33.91                    | 54               | 20.09       | Average |

TEST ENGINEER: Jarey

## 5 6 dB BANDWIDTH MEASUREMENT

### 5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type              | Manufacturer  | Model No.          | Serial No.         | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|--------------------|--------------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A             | MY52221182         | 2021.09.15 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F<br>LEX | F02-150819-<br>045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+          | 001                | 2021.08.06 | 1 Year        |

### 5.2 Block Diagram of Test Setup



### 5.3 Specification Limits (§15.247(a)(2))

The minimum 6 dB bandwidth shall be at least 500 kHz.

### 5.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with settings: RBW = 100kHz, VBW  $\geq 3 \times$  RBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is lower than peak power minus 6 dB .

The test procedure is defined in ANSI C63.10-2013 (the 11.8.2 Measurement Procedure “Option 2” was used).

## 5.6 Test Results

### **PASSED.**

All the test results are attached in next pages.

(Test Date: 2022.01.26 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency<br>(MHz) | 6dB Bandwidth<br>(kHz) | Limit   |
|------------|---------|--------------------|------------------------|---------|
| BLE        | 00      | 2402               | <b>665</b>             | 500 kHz |
|            | 20      | 2442               | <b>666.2</b>           | 500 kHz |
|            | 39      | 2480               | <b>657</b>             | 500 kHz |

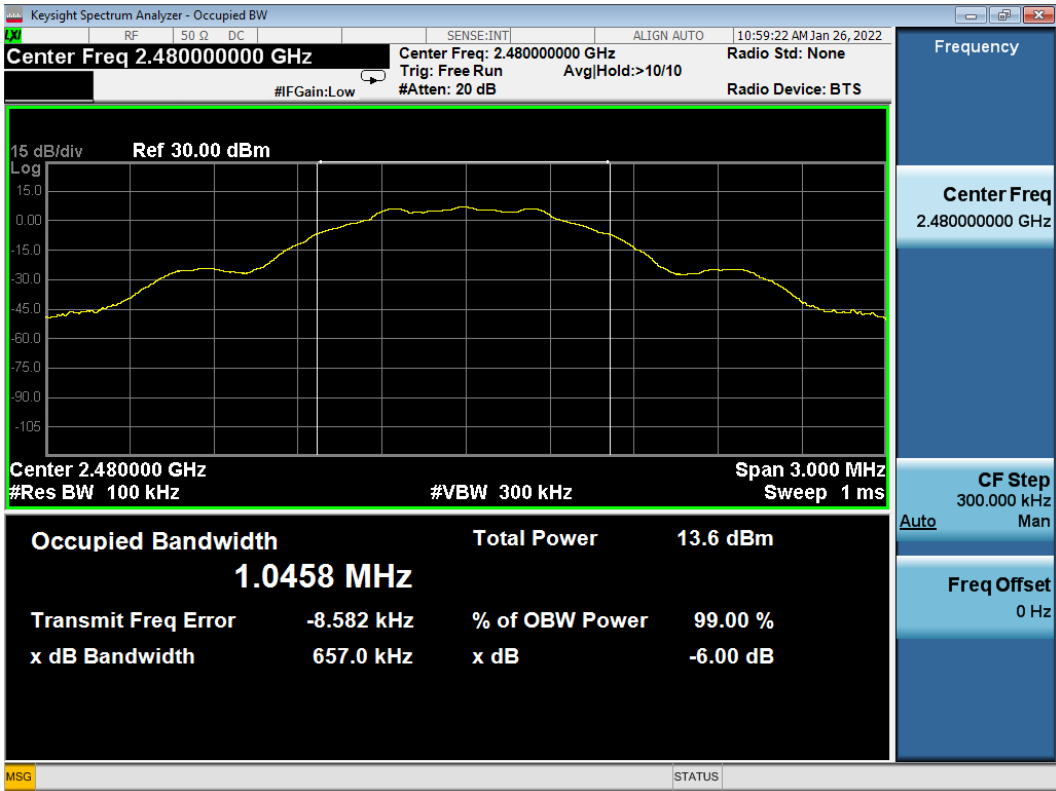
BLE CH2402MHz



BLE CH2442MHz



BLE CH2480MHz



## 6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 6.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

| Item | Type              | Manufacturer  | Model No.          | Serial No.         | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|--------------------|--------------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A             | MY52221182         | 2021.09.15 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F<br>LEX | F02-150819-<br>045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+          | 001                | 2021.08.06 | 1 Year        |

### 6.2 Block Diagram of Test Setup

The Same as Section. 5.2.

### 6.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

### 6.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a)  $RBW \geq DTS \text{ Bandwidth}$ .
- b)  $VBW \geq [3 \times RBW]$ .
- c)  $\text{Span} \geq [3 \times RBW]$ .
- d) Sweep time = auto.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

The test procedure is defined in ANSI C63.10-2013 ( 11.9.1.1 Measurement Procedure “  $RBW \geq DTS \text{ bandwidth}$ ” was used).

## 6.6 Test Results

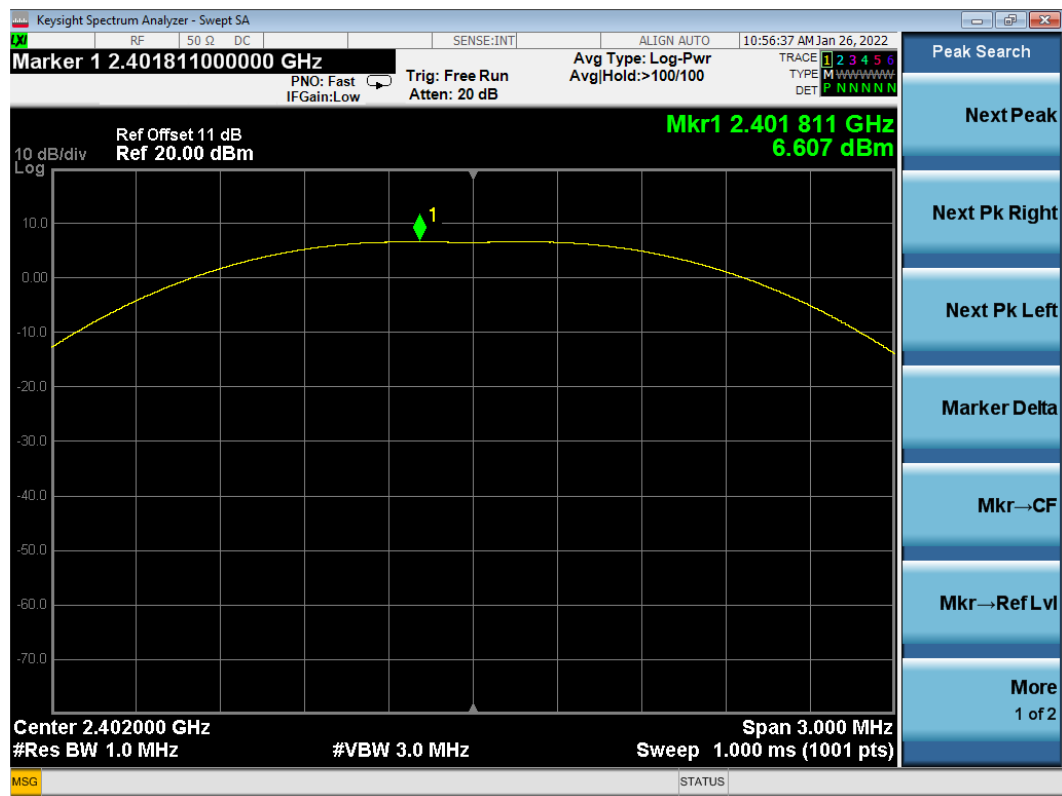
### **PASSED.**

All the test results are listed below.

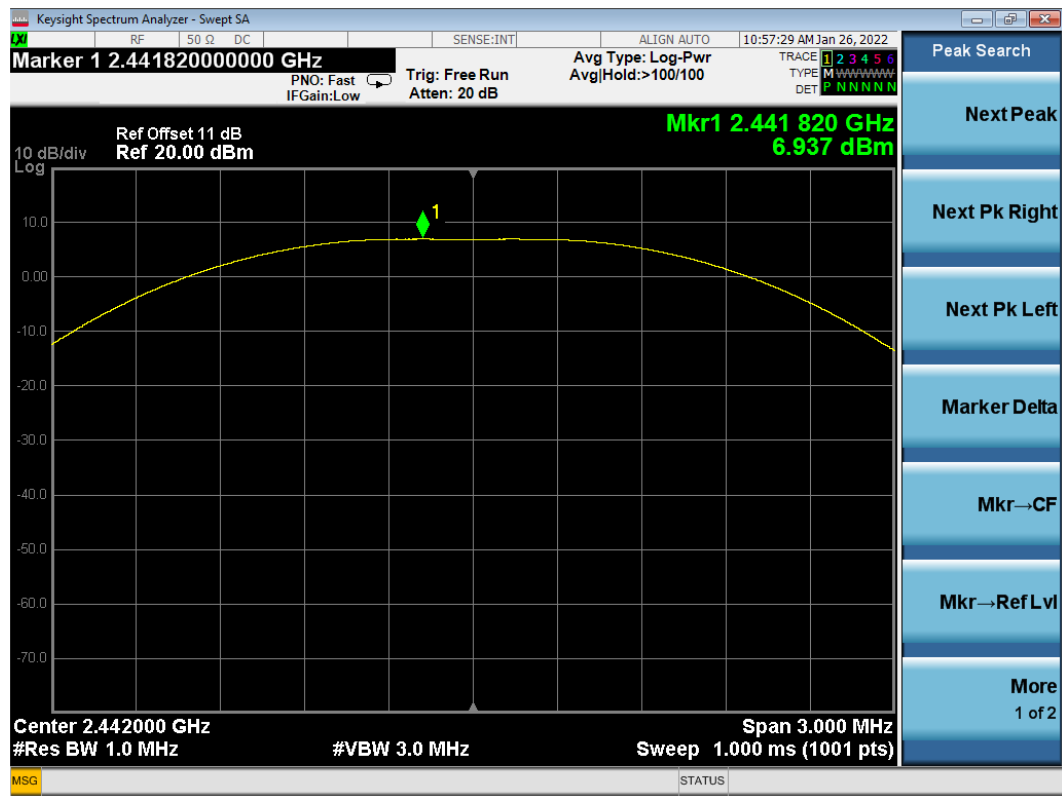
(Test Date: 2022.01.26 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency<br>(MHz) | Peak Output<br>Power (dBm) | Limit  |
|------------|---------|--------------------|----------------------------|--------|
| BLE        | 00      | 2402               | <b>6.607</b>               | 30 dBm |
|            | 20      | 2442               | <b>6.937</b>               | 30 dBm |
|            | 39      | 2480               | <b>7.106</b>               | 30 dBm |

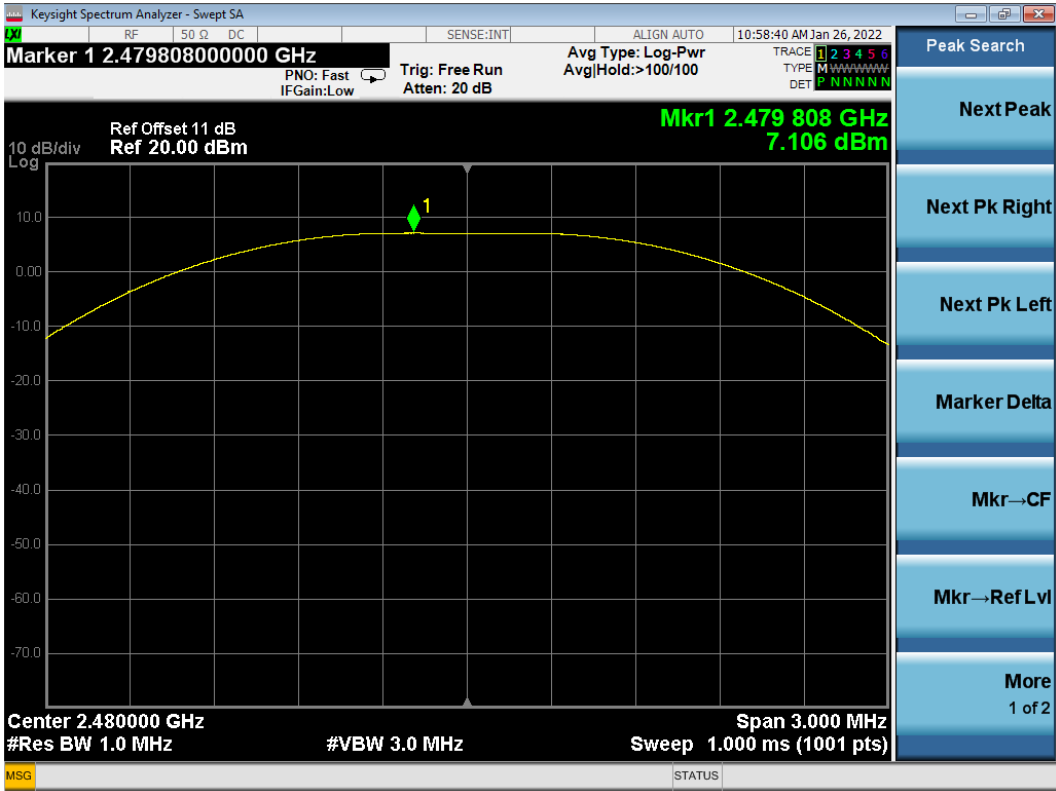
BLE CH2402MHz



BLE CH2442MHz



BLE CH2480MHz



## 7 EMISSION LIMITATIONS MEASUREMENT

### 7.1 Test Equipment

The following test equipment was used during the emission limitations test:

| Item | Type              | Manufacturer  | Model No.       | Serial No.     | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A          | MY52221182     | 2021.09.15 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F LEX | F02-150819-045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+       | 001            | 2021.08.06 | 1 Year        |

### 7.2 Block Diagram of Test Setup

The Same as Section. 5.2.

### 7.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). (※ This test result attaching to Section. 3.7)

### 7.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

Establish a reference level by using the following procedure:

- Set instrument center frequency to DTS channel center frequency.
- Set the span to  $\geq 1.5$  times the DTS bandwidth.
- Set the RBW = 100 kHz.
- Set the VBW  $\geq [3 \times \text{RBW}]$ .
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to

establish the reference level.

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq [3 \times \text{RBW}]$ .
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Scan up through 10<sup>th</sup> harmonic.

The test procedure is defined in ANSI C63.10-2013 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

## 7.6 Test Results

### **PASSED.**

The test data was attached in the next pages.

(Test Date: 2022.01.26 Temperature: 23°C Humidity: 51 %)

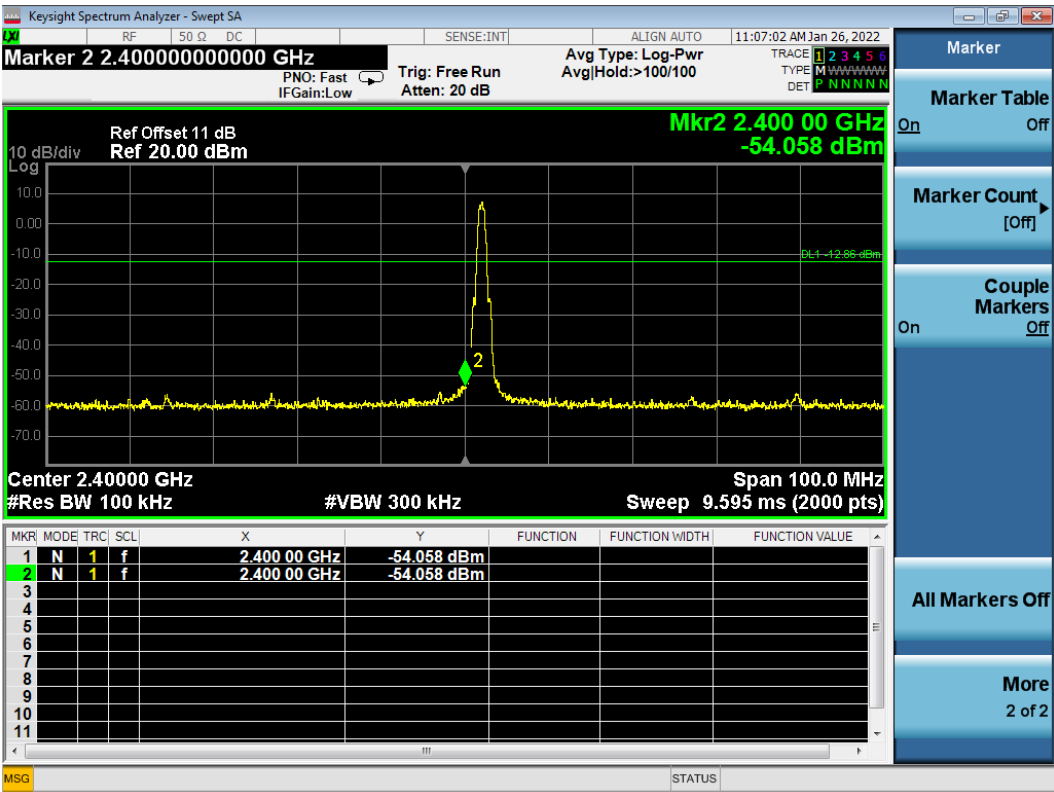
| Modulation | Channel | Frequency<br>(MHz) | Data Page |
|------------|---------|--------------------|-----------|
| BLE        | 00      | 2402               | P34-36    |
|            | 20      | 2442               | P37-38    |
|            | 39      | 2480               | P39-41    |

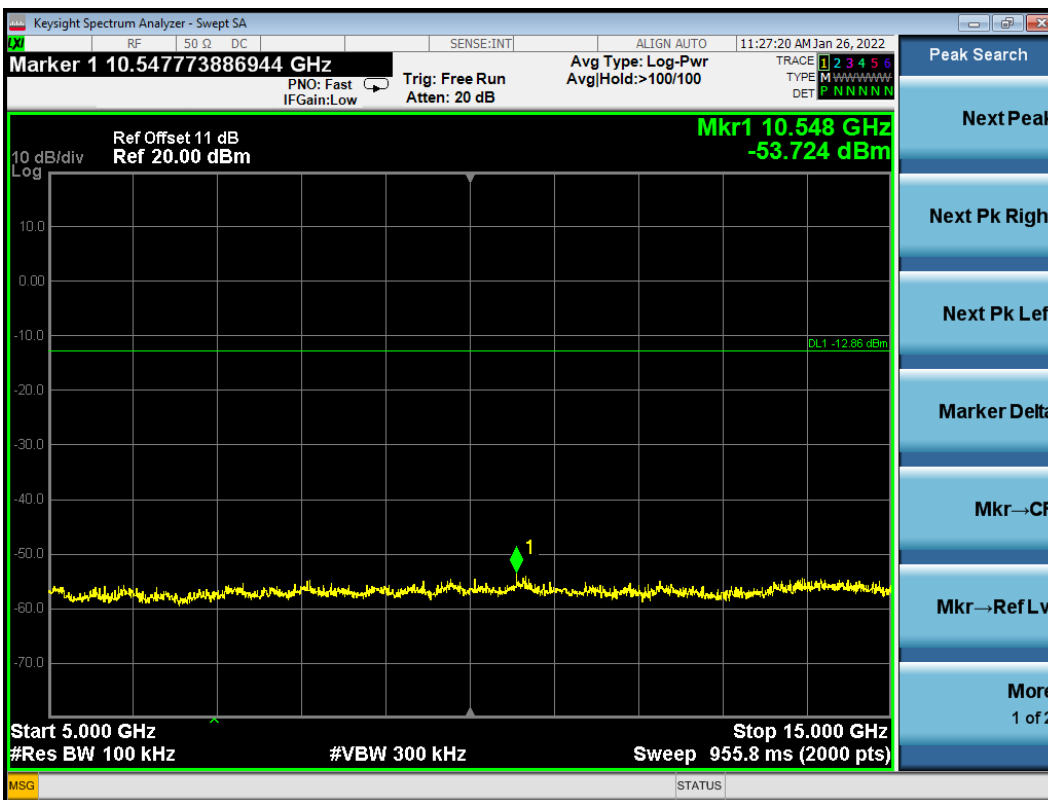
BLE CH2402MHz

Reference level



Emission level

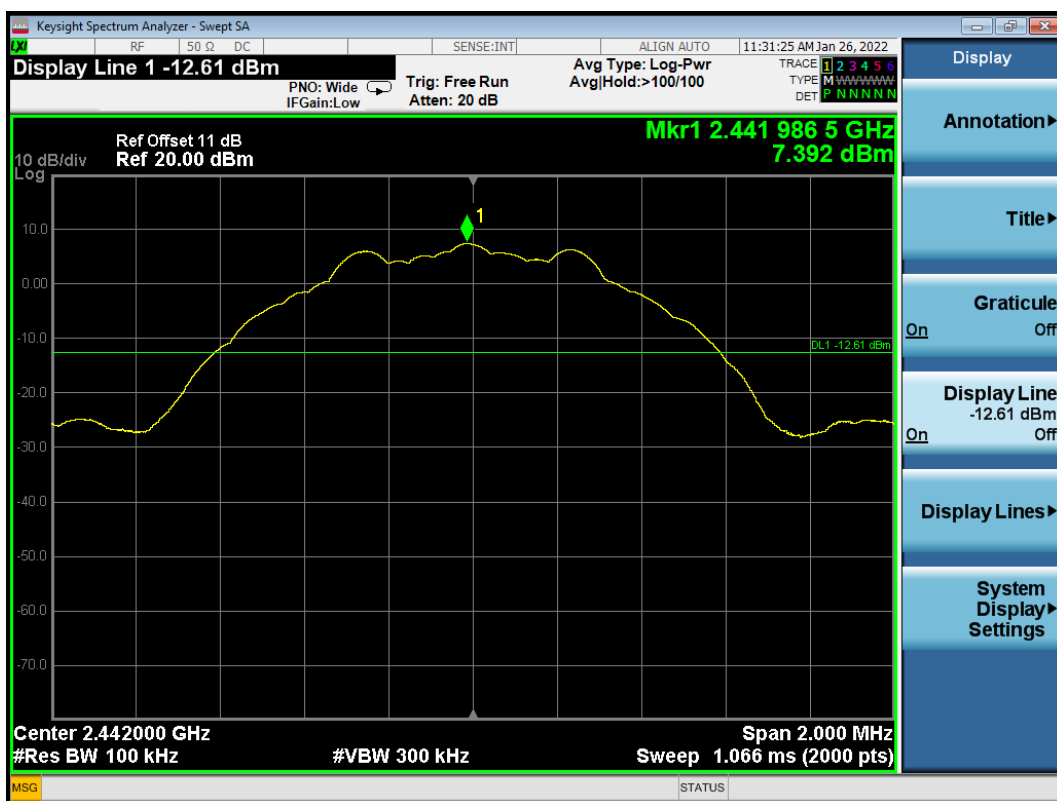




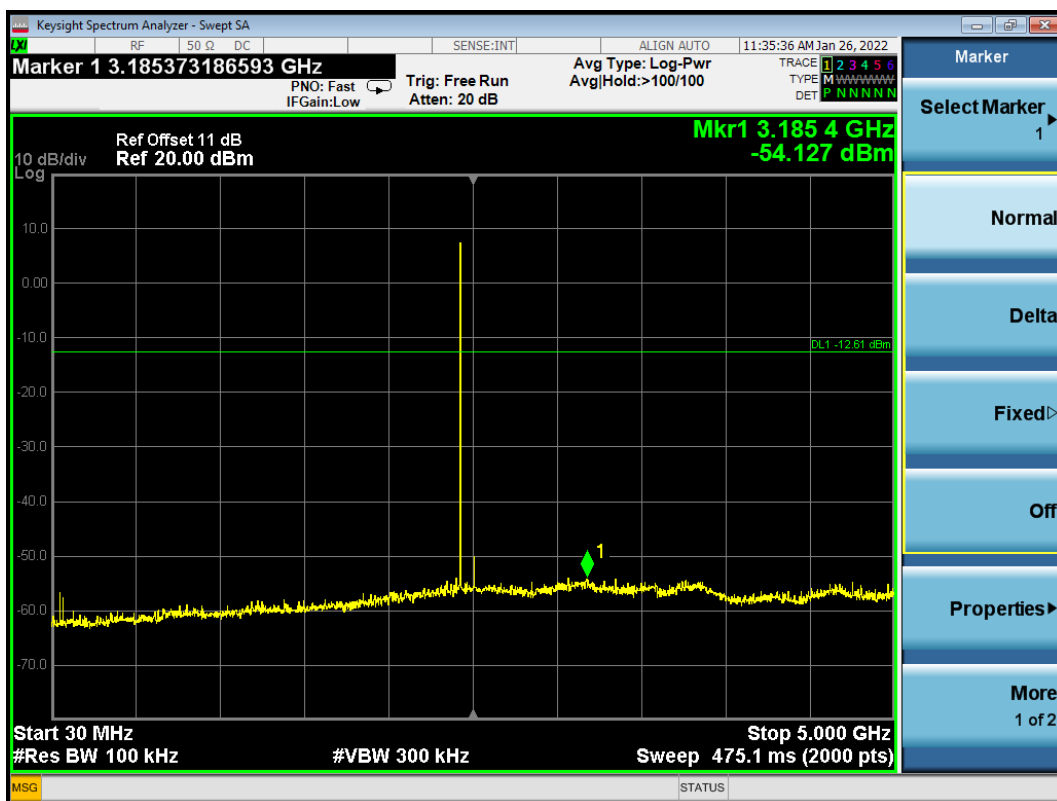


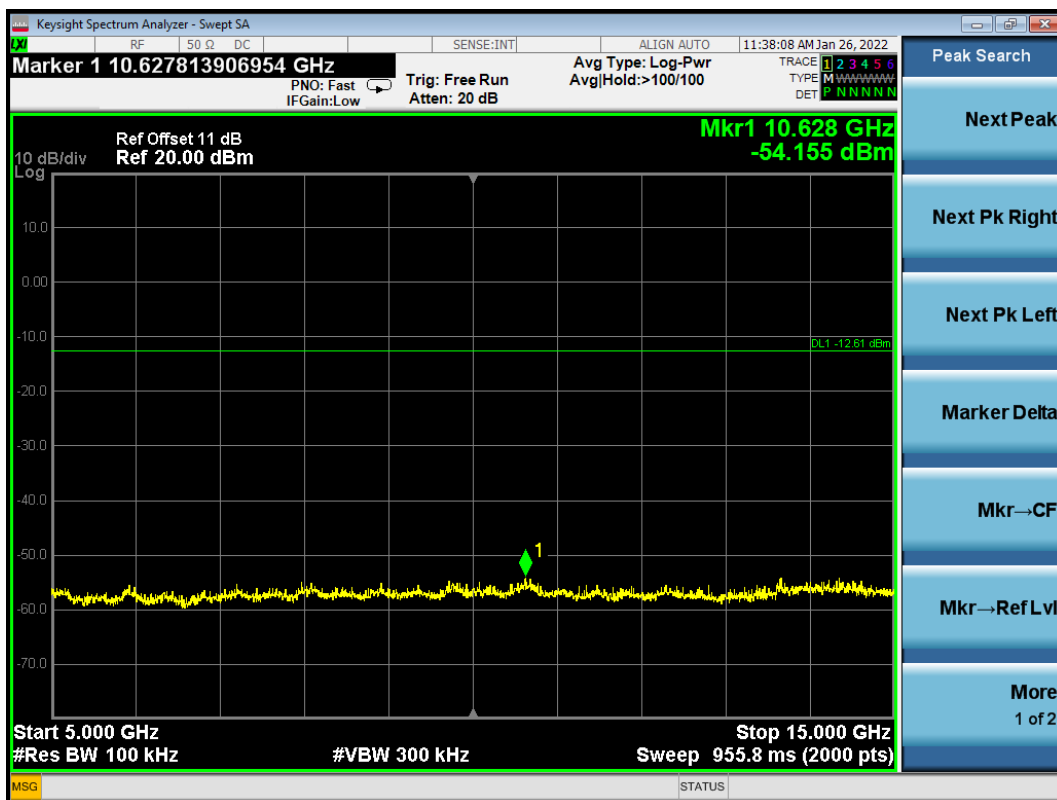
## BLE CH2442MHz

### Reference level



### Emission level



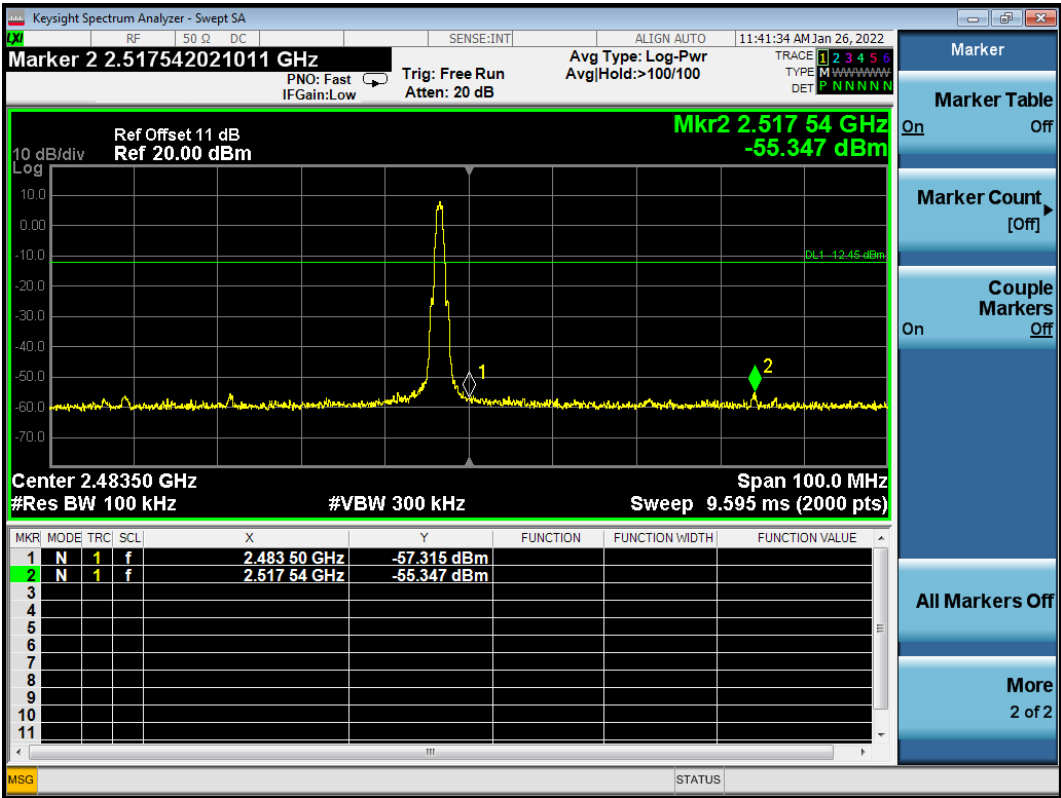


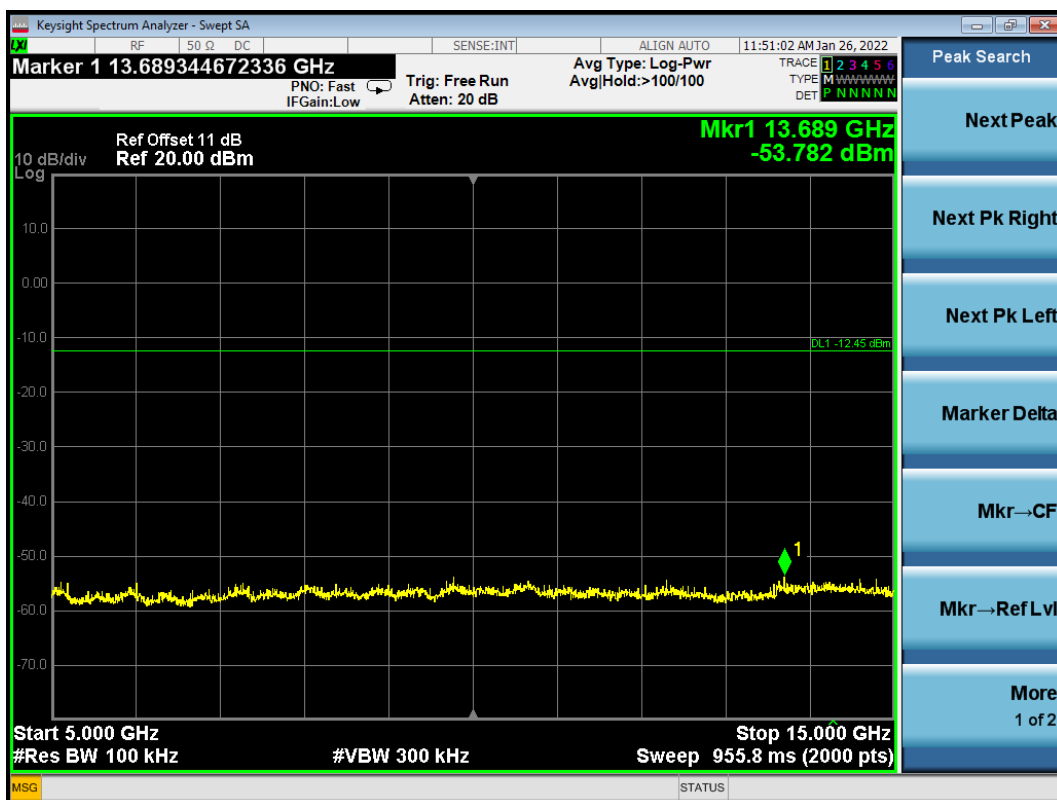
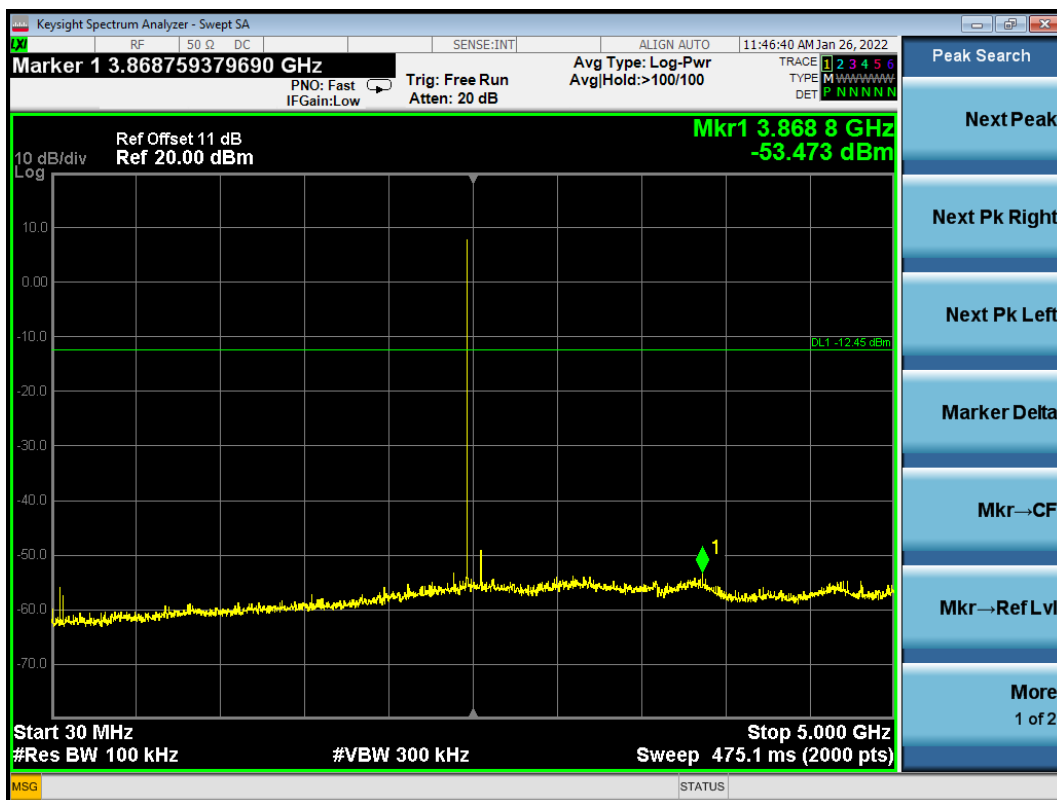
BLE CH2480MHz

Reference level



Emission level







## 8 POWER SPECTRAL DENSITY MEASUREMENT

### 8.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

| Item | Type              | Manufacturer  | Model No.          | Serial No.         | Cal. Date  | Cal. Interval |
|------|-------------------|---------------|--------------------|--------------------|------------|---------------|
| 1.   | Spectrum Analyzer | Agilent       | N9010A             | MY52221182         | 2021.09.15 | 1 Year        |
| 2.   | Coaxial Cable     | WOKEN         | SFL402-105F<br>LEX | F02-150819-<br>045 | 2021.03.08 | 1 Year        |
| 3.   | 10 dB Attenuator  | Mini-Circuits | VAT-10W2+          | 001                | 2021.08.06 | 1 Year        |

### 8.2 Block Diagram of Test Setup

The Same as section 5.2.

### 8.3 Specification Limits (§15.247(e))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

### 8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

### 8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set the VBW  $\geq [3 \times \text{RBW}]$ .
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

The test procedure is defined in ANSI C63.10-2013 ( 11.10.2 Measurement Procedure “Method PKPSD (peak PSD)” was used).

## 8.6 Test Results

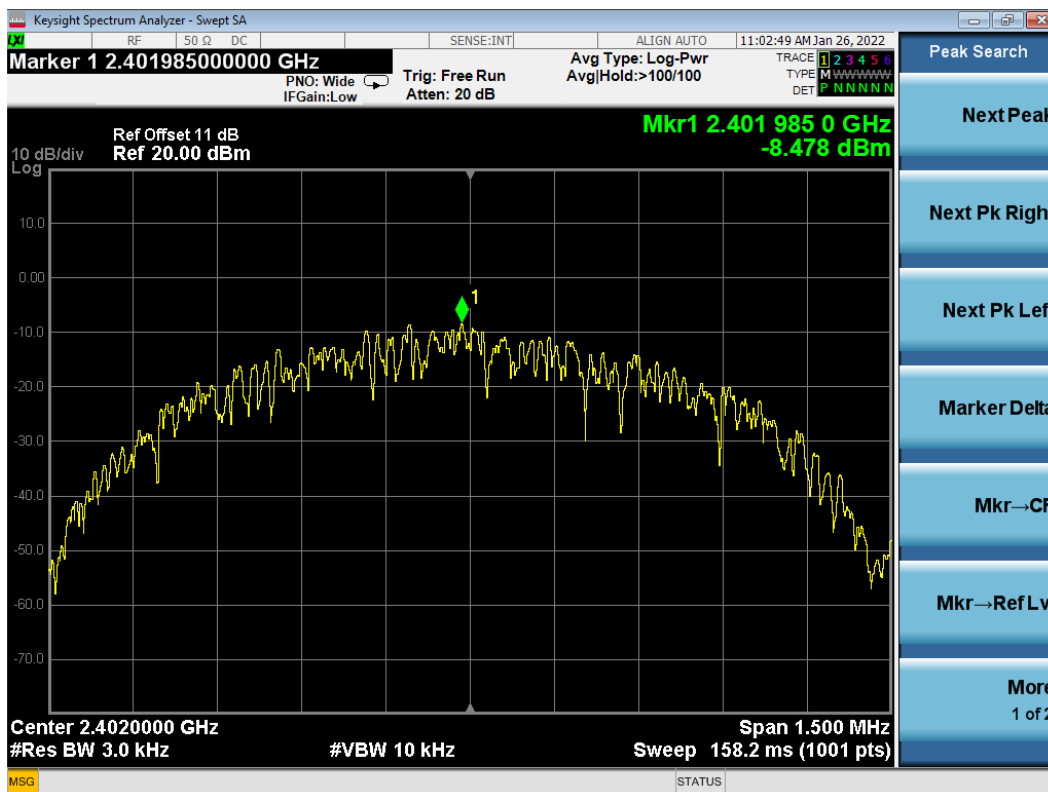
### **PASSED.**

All the test results are attached in next pages.

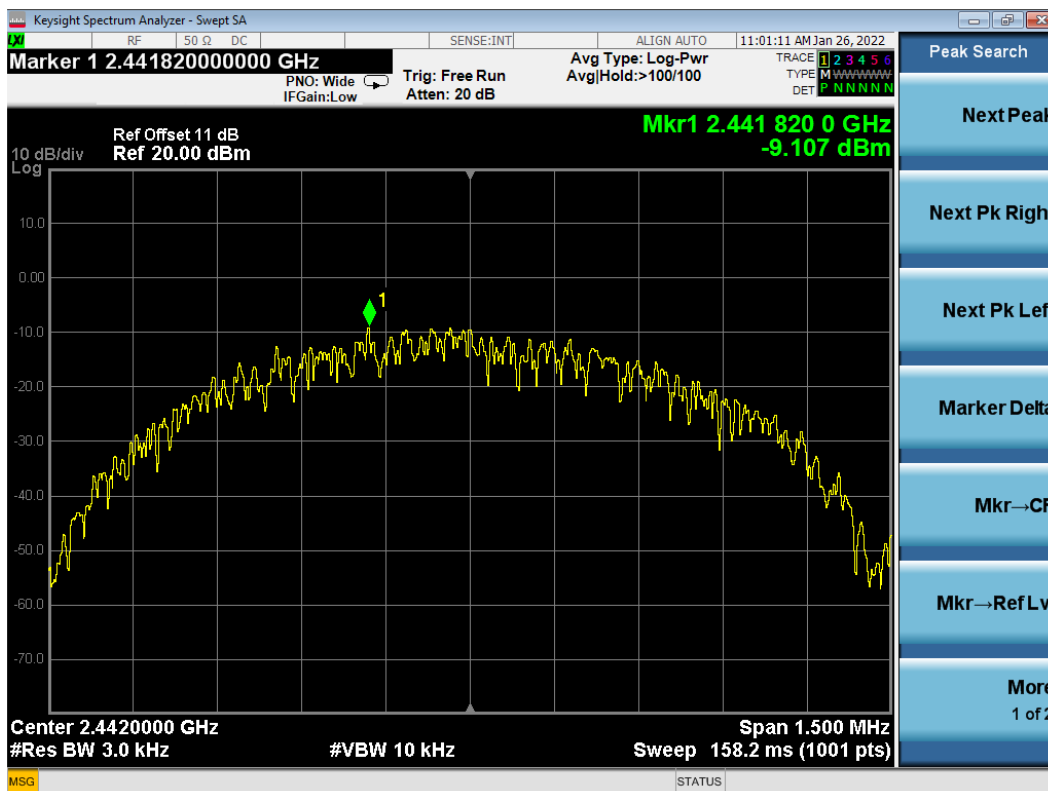
(Test Date: 2022.01.26 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency<br>(MHz) | Power Spectral<br>Density (dBm) | Limit |
|------------|---------|--------------------|---------------------------------|-------|
| BLE        | 00      | 2402               | <b>-8.478</b>                   | 8 dBm |
|            | 20      | 2442               | <b>-9.107</b>                   | 8 dBm |
|            | 39      | 2480               | <b>-7.537</b>                   | 8 dBm |

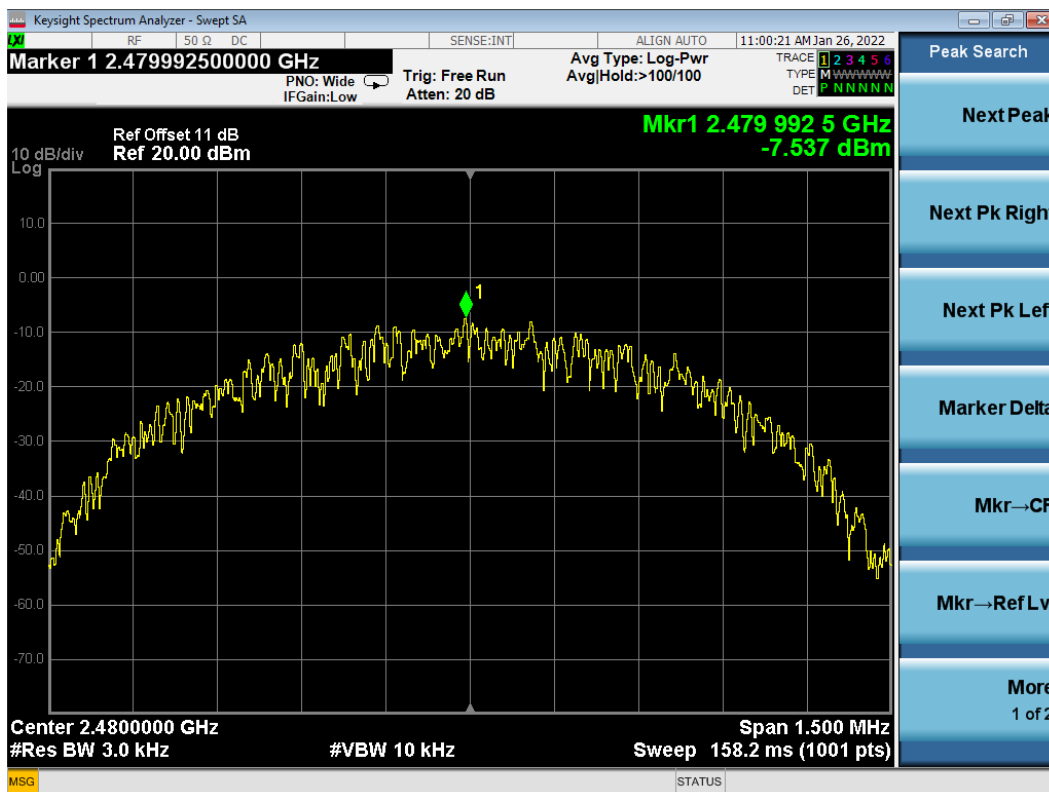
## BLE CH2402 MHz



## BLE CH2442 MHz



## BLE CH2480 MHz



## **9 DEVIATION TO TEST SPECIFICATIONS**

None.

## 10 MEASUREMENT UNCERTAINTY LIST

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

| Test Items/Facilities                    | Frequency/Equipment/Unit   | Uncertainty          |
|------------------------------------------|----------------------------|----------------------|
| Conducted Emission<br>No.1 Shielded Room | 9kHz~150kHz                | ±3.1 dB              |
|                                          | 150kHz~30MHz               | ±2.6 dB              |
| Conducted Emission<br>No.3 Shielded Room | 9kHz~150kHz                | ±3.1 dB              |
|                                          | 150kHz~30MHz               | ±2.6 dB              |
| Radiated Emission                        | 30MHz~200MHz, Horizontal   | ±3.8 dB              |
|                                          | 30MHz~200MHz, Vertical     | ±4.1 dB              |
|                                          | 200MHz~1000MHz, Horizontal | ±3.6 dB              |
|                                          | 200MHz~1000MHz, Vertical   | ±5.1 dB              |
|                                          | 1GHz~6GHz                  | ±5.3 dB              |
|                                          | 6GHz~18GHz                 | ±5.3 dB              |
|                                          | 18GHz~40GHz                | ±3.5 dB              |
| Output Power Test                        | 50MHz~18GHz                | 0.77 dB              |
| Power Density Test                       | 9kHz~6GHz                  | 1.08 dB              |
| RF Frequency Test                        | 9kHz~40GHz                 | $6 \times 10^{-4}$   |
| Bandwidth Test                           | 9kHz~6GHz                  | $1.5 \times 10^{-3}$ |
| RF Radiated Power Test                   | 30MHz~1000MHz              | 3.06 dB              |
| Conducted Output Power Test              | 50MHz~18GHz                | 0.83 dB              |
| AC Voltage(<10kHz) Test                  | 120V~230V                  | 0.04 %               |
| DC Power Test                            | 0V~30V                     | 0.4 %                |
| Temperature                              | -40°C~+100°C               | 0.52 °C              |
| Humidity                                 | 30%~95%                    | 2.6 %                |