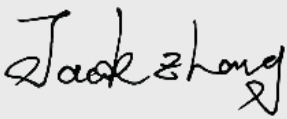


Test report No:  
2340774R-RF-US-P06V02

## FCC & ISED TEST REPORT

|                                             |                                                                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Product Name                                | Universal base                                                                                                               |
| Trademark                                   | Honeywell                                                                                                                    |
| Model and /or type reference                | CCBU                                                                                                                         |
| FCC ID                                      | HD5-CCBU                                                                                                                     |
| IC                                          | 1693B-CCBU                                                                                                                   |
| Applicant's name / address                  | HONEYWELL INTERNATIONAL INC<br>Honeywell Safety and Productivity Solutions<br>9680 OLD BAILES RD FORT MILL SC 29707-7539,USA |
| Test method requested, standard             | CFR 47, FCC Part 15 C<br>ANSI C63.10: 2013<br>RSS-Gen / RSS-247                                                              |
| Verdict Summary                             | IN COMPLIANCE                                                                                                                |
| Documented by (name / position & signature) | Jun Xu/ Project Engineer<br>              |
| Approved by (name / position & signature)   | Jack Zhang/ Manager<br>                   |
| Date of issue                               | 2023-06-05                                                                                                                   |
| Report Version                              | V1.0                                                                                                                         |
| Report template No                          | Template_FCC Part 15C-RF-V1.0                                                                                                |

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## COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

**IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

## GENERAL CONDITIONS

|                      |                                                                        |
|----------------------|------------------------------------------------------------------------|
| Test Location        | No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China |
| Date(receive sample) | Apr. 27, 2023                                                          |
| Date (start test)    | Apr. 28, 2023                                                          |
| Date (finish test)   | May. 29, 2023                                                          |

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

## ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

|                       |               |
|-----------------------|---------------|
| Ambient temperature   | 15 °C – 35 °C |
| Relative Humidity air | 30% - 60%     |

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

## POSSIBLE TEST CASE VERDICTS

|                                         |                 |
|-----------------------------------------|-----------------|
| Test case does not apply to test object | N/A             |
| Test object does meet requirement       | P (Pass) / PASS |
| Test object does not meet requirement   | F (Fail) / FAIL |
| Not measured                            | N/M             |

## ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

|       |                               |
|-------|-------------------------------|
| EUT   | : Equipment Under Test        |
| QP    | : Quasi-Peak                  |
| CAV   | : CISPR Average               |
| AV    | : Average                     |
| CDN   | : Coupling Decoupling Network |
| SAC   | : Semi-Anechoic Chamber       |
| OATS  | : Open Area Test Site         |
| BW    | : Bandwidth                   |
| AM    | : Amplitude Modulation        |
| PM    | : Pulse Modulation            |
| HCP   | : Horizontal Coupling Plane   |
| VCP   | : Vertical Coupling Plane     |
| $U_N$ | : Nominal voltage             |
| $T_x$ | : Transmitter                 |
| $R_x$ | : Receiver                    |
| N/A   | : Not Applicable              |
| N/M   | : Not Measured                |

## DOCUMENT HISTORY

| Report No.            | Version | Description              | Issued Date |
|-----------------------|---------|--------------------------|-------------|
| 2340774R-RF-US-P06V02 | V1.0    | Initial issue of report. | 2023-06-05  |
|                       |         |                          |             |
|                       |         |                          |             |
|                       |         |                          |             |
|                       |         |                          |             |
|                       |         |                          |             |

## REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.247, RSS-Gen Issue 5, RSS-247 Issue 2.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
  - Chapter 1.1 General Description of the Item(s);
  - Chapter 1.2 Antenna Informaion;
  - Chapter 1.3 Channel List.

## USED EQUIPMENT

### AC Power Line Conducted Emission / TR1

| Instrument                      | Manufacturer | Model No.   | Serial No. | Cal. Date  | Next Cal. Date |
|---------------------------------|--------------|-------------|------------|------------|----------------|
| EMI Test Receiver               | R&S          | ESCI        | 100906     | 2022.09.04 | 2023.09.03     |
| Two-Line V-Network              | R&S          | ENV216      | 101189     | 2023.05.14 | 2024.05.13     |
| Two-Line V-Network              | R&S          | ENV216      | 101044     | 2023.01.07 | 2024.01.06     |
| Artificial Mains Network        | SCHWARZBECK  | NNLK 8129   | 8129-294   | 2023.02.25 | 2024.02.24     |
| Impedance Stabilization Network | Teseq GmbH   | ISN T800    | 57318      | 2023.03.07 | 2024.03.06     |
| Impedance Stabilization Network | Teseq GmbH   | ISN T8-Cat6 | 29680      | 2023.03.07 | 2024.03.06     |
| 50ohm Coaxial Switch            | Anritsu      | MP59B       | 6200464462 | N/A        | N/A            |
| Coaxial Cable                   | Suhner       | RG 223      | TR1-C1     | 2023.05.14 | 2024.05.13     |
| Temperature/Humidity Meter      | RTS          | RTS-8S      | TR1-TH     | 2022.07.07 | 2023.07.06     |

### Conducted Test/ TR8

| Instrument                                                    | Manufacturer | Model No.     | Serial No. | Cal. Date  | Next Cal. Date |
|---------------------------------------------------------------|--------------|---------------|------------|------------|----------------|
| Wireless Connectivity Tester                                  | R&S          | CMW 270       | 102593     | 2022.05.21 | 2023.05.20     |
| Wireless Connectivity Tester                                  | R&S          | CMW 270       | 102593     | 2023.05.20 | 2024.05.19     |
| Coaxial Cable                                                 | N/A          | N/A           | 2189       | 2022.06.09 | 2023.06.08     |
| High and low temperature and fast temperature change test box | ASTUOD       | ASTD-FBT-225K | N/A        | 2022.08.24 | 2023.08.23     |
| Temperature/Humidity Meter                                    | RTS          | RTS-8S        | RF08       | 2022.07.07 | 2023.07.06     |
| Test system                                                   |              |               |            |            |                |
| 4TX MIMO Power Sensor                                         | Keysight     | X8750A        | MY59400102 | 2023.02.25 | 2024.02.24     |
| MAX Signal Analyzer                                           | Keysight     | N9020B        | MY59050482 | 2022.09.17 | 2023.09.16     |
| Switch Box                                                    | Keysight     | X8749A        | N/A        | N/A        | N/A            |
| High and low temperature and fast temperature change test box | ASTUOD       | ASTD-FBT-225K | N/A        | 2022.08.24 | 2023.08.23     |
| MXG-B RF Vector Signal Generator                              | Keysight     | N5182B        | MY61252529 | 2022.07.14 | 2023.07.13     |
| Frequency extender for EXG or MXG                             | Keysight     | N5182BX07     | MY59362500 | 2022.07.14 | 2023.07.13     |
| EXG-B MW Analog Signal Generator                              | Keysight     | N5173B        | MY61252566 | 2022.09.28 | 2023.09.27     |



## Radiated Emission(9KHz-1GHz) / AC3

| Instrument                 | Manufacturer | Model No. | Serial No. | Cal. Date  | Next Cal. Date |
|----------------------------|--------------|-----------|------------|------------|----------------|
| EMI Test Receiver          | R&S          | ESCI      | 100573     | 2022.07.10 | 2023.07.09     |
| Bilog Antenna              | Teseq GmbH   | CBL6112D  | 27611      | 2022.08.28 | 2023.08.27     |
| Coaxial Cable              | Huber+Suhner | RG 214    | AC2-C      | 2023.03.15 | 2024.03.14     |
| Loop Antenna               | R&S          | HFH2-Z2   | 833799/003 | 2023.02.25 | 2024.02.24     |
| Temperature/Humidity Meter | RTS          | RTS-8S    | AC2-TH     | 2022.07.07 | 2023.07.06     |

## Radiated Emission (1GHz-40GHz) / AC5

| Instrument              | Manufacturer | Model No.          | Serial No. | Cal. Date  | Next Cal. Date |
|-------------------------|--------------|--------------------|------------|------------|----------------|
| MXA Signal Analyzer     | Keysight     | N9020B             | MY60112218 | 2022.12.08 | 2023.12.07     |
| Preamplifier            | Chengyi      | EMC184045SE        | 980263     | 2022.07.19 | 2023.07.18     |
| DRG Horn                | ETS-Lindgren | 3117               | 00123988   | 2022.08.29 | 2023.08.28     |
| Broad-Band Horn Antenna | SCHWARZBECK  | BBHA 9170          | 01249      | 2022.09.22 | 2023.09.21     |
| Coaxial Cable           | ROSENBERGER  | LA1-C011-2000/3000 | AC5-40G    | 2023.03.04 | 2024.03.03     |

## UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95% .

| Test item                        | Uncertainty                                                                                                                                |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| AC Power Line Conducted Emission | 9kHz~150kHz: 2.80dB<br>150kHz~30MHz: 2.40dB                                                                                                |
| Peak Power Output                | $\pm 1.27$ dB                                                                                                                              |
| Radiated Emission(30MHz~1GHz)    | Horizontal: 30MHz~200MHz: 3.50 dB<br>300MHz~1GHz: 3.60 dB<br>Vertical: 30MHz~200MHz: 3.60 dB<br>300MHz~1GHz: 3.50 dB                       |
| Radiated Emission(1GHz~26.5GHz)  | Horizontal: 1GHz~18GHz: 5.00 dB<br>Vertical: 1GHz~18GHz: 4.80 dB<br>Horizontal: 18GHz~26.5GHz: 5.30 dB<br>Vertical: 18GHz~26.5GHz: 4.90 dB |
| RF antenna conducted test        | $\pm 1.27$ dB                                                                                                                              |
| Radiated Emission Band Edge      | $\pm 3.9$ dB                                                                                                                               |
| DTS Bandwidth                    | $\pm 150$ Hz                                                                                                                               |
| Occupied Bandwidth               | $\pm 1$ kHz                                                                                                                                |
| Power Density                    | $\pm 1.27$ dB                                                                                                                              |

## 1 GENERAL INFORMATION

### 1.1 General Description of the Item(s)

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| Product Name .....        | Universal base                                                             |
| Model No. ....            | CCBU                                                                       |
| Trademark. ....           | Honeywell                                                                  |
| FCC ID .....              | HD5-CCBU                                                                   |
| IC .....                  | 1693B-CCBU                                                                 |
| Hardware Version .....    | CCBU ver01                                                                 |
| Software Version .....    | CCBU ver02                                                                 |
| Manufacturer .....        | HONEYWELL INTERNATIONAL INC<br>Honeywell Safety and Productivity Solutions |
| Manufacturer Address..... | 9680 OLD BAILES RD FORT MILL SC 29707-7539,USA                             |
| Factory .....             | Metro(Suzhou)Technologies Co.,Ltd                                          |
| Factory address.....      | No.221 Xinghai street China-Singapore Suzhou Industrial Park               |

|                              |                                     |         |                          |         |                                         |
|------------------------------|-------------------------------------|---------|--------------------------|---------|-----------------------------------------|
| Wireless specification.....  | Bluetooth (LE)                      |         |                          |         |                                         |
| Operating frequency range(s) | 2402~2480MHz                        |         |                          |         |                                         |
| Type of Modulation.....      | GFSK                                |         |                          |         |                                         |
| PHYs .....                   | <input checked="" type="checkbox"/> | LE 1M   | <input type="checkbox"/> | LE 2M   | <input type="checkbox"/> LE Coded S=2/8 |
| Data Rate .....              | <input checked="" type="checkbox"/> | 1Mbit/s | <input type="checkbox"/> | 2Mbit/s | <input type="checkbox"/> 500/125 Kbit/s |
| Number of channel.....       | 40                                  |         |                          |         |                                         |

|                            |                                     |                                  |
|----------------------------|-------------------------------------|----------------------------------|
| Rated power supply ..... : | Voltage and Frequency               |                                  |
|                            | <input type="checkbox"/>            | AC: 220 – 240 V, 50 / 60 Hz,     |
|                            | <input type="checkbox"/>            | AC: 100 – 240 V, 50 / 60 Hz      |
|                            | <input type="checkbox"/>            | DC: 12 V                         |
|                            | <input type="checkbox"/>            | Battery: 12 Vdc                  |
|                            | <input checked="" type="checkbox"/> | Adapter:                         |
| Adapter ..... :            | Model: ADS-25SGP-06 05015E          |                                  |
|                            | INPUT: 100-240V~50-60Hz Max.0.7A    |                                  |
|                            | OUTPUT: 5.0V ,3.0A, 15.0W           |                                  |
| Mounting position ..... :  | <input checked="" type="checkbox"/> | Table top equipment              |
|                            | <input type="checkbox"/>            | Wall/Ceiling mounted equipment   |
|                            | <input type="checkbox"/>            | Floor standing equipment         |
|                            | <input type="checkbox"/>            | Hand-held equipment              |
|                            | <input type="checkbox"/>            | Other: vehicle-mounted equipment |

## 1.2 Antenna Information

|                                   |                                       |               |                                                  |
|-----------------------------------|---------------------------------------|---------------|--------------------------------------------------|
| Antenna model / type number ..... | N/A                                   |               |                                                  |
| Antenna serial number .....       | N/A                                   |               |                                                  |
| Antenna Delivery .....            | <input checked="" type="checkbox"/>   | 1TX + 1RX     |                                                  |
|                                   | <input type="checkbox"/>              | 2TX + 2RX     |                                                  |
|                                   | <input type="checkbox"/>              | Others: ..... |                                                  |
| Antenna technology .....          | <input checked="" type="checkbox"/>   | SISO          |                                                  |
|                                   | <input type="checkbox"/>              | MIMO          | <input type="checkbox"/> CDD                     |
|                                   | <input type="checkbox"/> Beam-forming |               |                                                  |
| Antenna Type .....                | <input type="checkbox"/>              | External      | <input type="checkbox"/> Dipole                  |
|                                   | <input type="checkbox"/>              |               | <input type="checkbox"/> Sectorized              |
|                                   | <input checked="" type="checkbox"/>   | Internal      | <input type="checkbox"/> Ceramic Chip            |
|                                   |                                       |               | <input type="checkbox"/> PIFA                    |
|                                   |                                       |               | <input checked="" type="checkbox"/> Chip Antenna |
|                                   |                                       |               | <input type="checkbox"/> Others.....             |
| Antenna Gain .....                | 2.90dBi                               |               |                                                  |

### 1.3 Channel List

| Bluetooth Working Frequency of Each Channel: (For LE) |           |         |           |         |           |         |           |
|-------------------------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                                               | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 00                                                    | 2402 MHz  | 01      | 2404 MHz  | 02      | 2406 MHz  | 03      | 2408 MHz  |
| 04                                                    | 2410 MHz  | 05      | 2412 MHz  | 06      | 2414 MHz  | 07      | 2416 MHz  |
| 08                                                    | 2418 MHz  | 09      | 2420 MHz  | 10      | 2422 MHz  | 11      | 2424 MHz  |
| 12                                                    | 2426 MHz  | 13      | 2428 MHz  | 14      | 2430 MHz  | 15      | 2432 MHz  |
| 16                                                    | 2434 MHz  | 17      | 2436 MHz  | 18      | 2438 MHz  | 19      | 2440 MHz  |
| 20                                                    | 2442 MHz  | 21      | 2444 MHz  | 22      | 2446 MHz  | 23      | 2448 MHz  |
| 24                                                    | 2450 MHz  | 25      | 2452 MHz  | 26      | 2454 MHz  | 27      | 2456 MHz  |
| 28                                                    | 2458 MHz  | 29      | 2460 MHz  | 30      | 2462 MHz  | 31      | 2464 MHz  |
| 32                                                    | 2466 MHz  | 33      | 2468 MHz  | 34      | 2470 MHz  | 35      | 2472 MHz  |
| 36                                                    | 2474 MHz  | 37      | 2476 MHz  | 38      | 2478 MHz  | 39      | 2480 MHz  |

Note: The General Description of the Item , antenna information and Channel List for the EUT in clause 1 are provided and confirmed by the client.

## 2 DESCRIPTION OF TEST SETUP

### 2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

|                         |                              |
|-------------------------|------------------------------|
| Test Mode For Bluetooth | Mode 1: Transmit by LE_1Mbps |
|-------------------------|------------------------------|

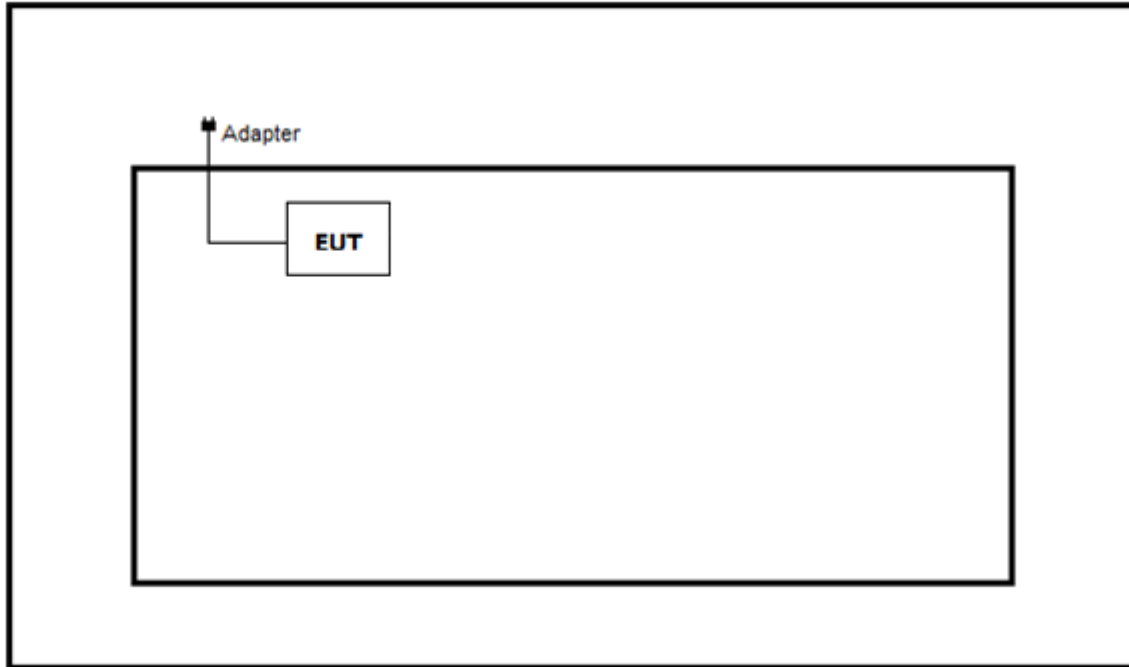
### 2.2 Auxiliary equipment / Test software for the EUT

| Auxiliary equipment   | Type / Version | Manufacturer | Supplied by |
|-----------------------|----------------|--------------|-------------|
| (1) CMA 270           | N/A            | R&S          | 230Vac      |
| (2) USB Control Cable | N/A            | N/A          | N/A         |
| (3) USB Control Cable | N/A            | N/A          | N/A         |
| software              | Type / Version | Manufacturer | Supplied by |
| N/A                   | N/A            | N/A          | N/A         |

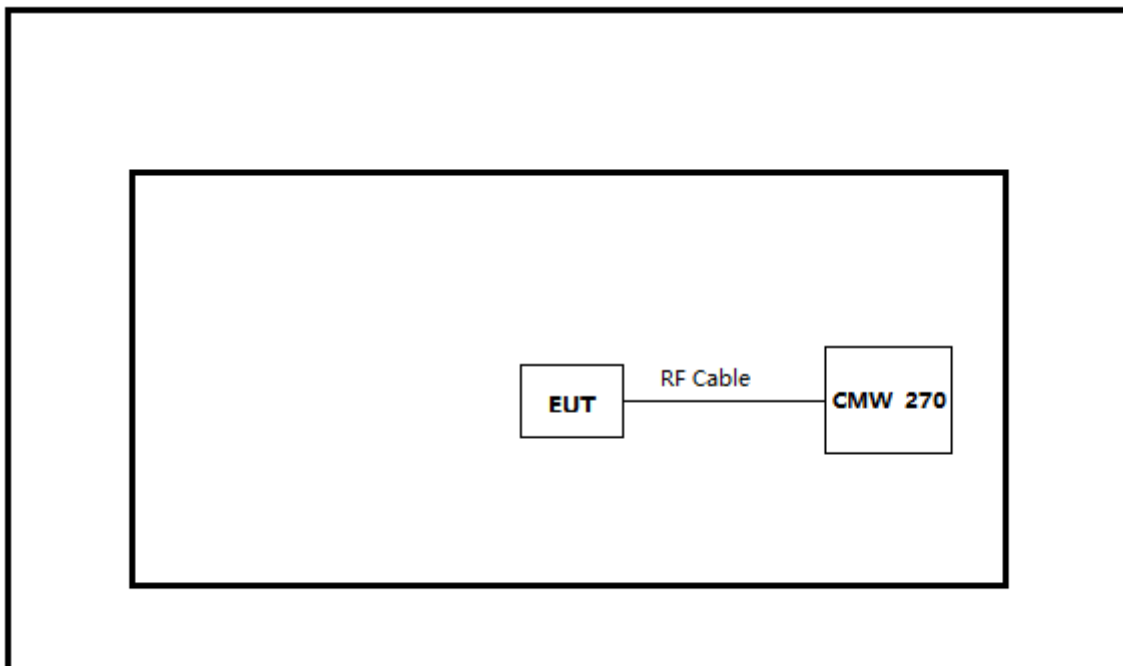
| Accessories Information | Cable                          |                                     |                                     |
|-------------------------|--------------------------------|-------------------------------------|-------------------------------------|
|                         | Length used during test<br>[m] | Attached during<br>test             | Shielded                            |
| (2)USB Control Cable    | 1                              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| (3)USB Control Cable    | 8                              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

## 2.3 Test Configuration / Block diagram used for tests

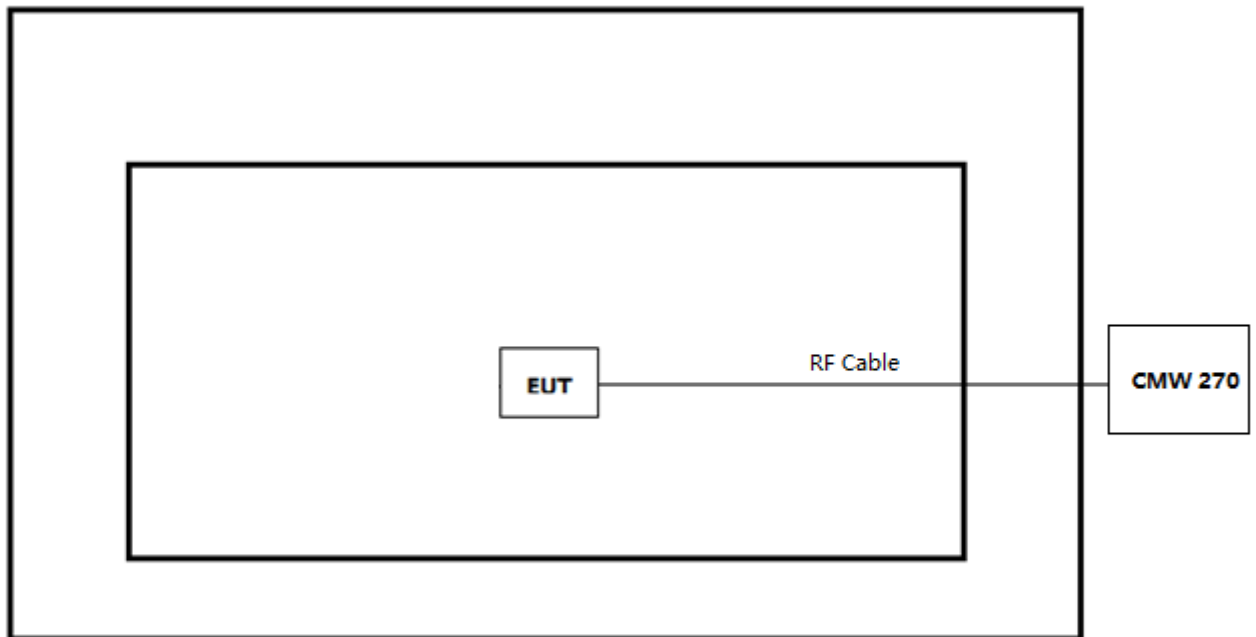
Test setup Diagram- Conducted test



Test setup Diagram- Conducted test



Test setup Diagram- Ratiated test





---

## 2.4 Testing process

|   |                                                               |
|---|---------------------------------------------------------------|
| 1 | Setup the EUT shown in Section 2.3.                           |
| 2 | Configure the test mode, the test channel, and the data rate. |
| 3 | Verify that the EUT works properly.                           |

### 3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

#### 3.1 Standards

| Standard                    | Year | Description                                                                                                                  |
|-----------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| CFR 47, FCC Part 15 C       | 2023 | Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.                                                  |
| ANSI C63.10                 | 2013 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices                               |
| RSS-Gen Issue 5 Amendment 1 | 2019 | General Requirements for Compliance of Radio Apparatus                                                                       |
| RSS-247 Issue 2             | 2017 | Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices |

#### 3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

*(Please define the deviations from the standard(s) if applicable)*

### 3.3 Overview of results

| Requirement – Test Item of FCC   | Standard(s)                               | Verdict | Remark                                      |
|----------------------------------|-------------------------------------------|---------|---------------------------------------------|
| DTS Bandwidth                    | FCC 15.247(a)(2)                          | PASS    | Test data please refer to <b>Appendix A</b> |
| Maximum conducted output power   | 15.247 (b)(3)                             | PASS    | Test data please refer to <b>Appendix C</b> |
| Maximum power spectral density   | FCC 15.247(e)                             | PASS    | Test data please refer to <b>Appendix D</b> |
| Band edge measurements           | FCC 15.247(d)<br>FCC 15.205<br>FCC 15.209 | PASS    | Test data please refer to <b>Appendix E</b> |
| Conducted Spurious Emission      | FCC 15.247(d), FCC 15.209                 | PASS    | Test data please refer to <b>Appendix F</b> |
| Duty cycle                       | ANSI C63.10:2013                          | PASS    | Test data please refer to <b>Appendix G</b> |
| Emissions in Restricted Bands    | FCC 15.205<br>FCC 15.209                  | PASS    | Test data please refer to <b>Appendix H</b> |
| AC Power Line Conducted Emission | FCC 15.207                                | PASS    | Test data please refer to <b>Appendix I</b> |
| Antenna Requirement              | FCC 15.203                                | PASS    | ---                                         |

| Requirement – Test case of ISED  | Standard(s)                                                          | Verdict | Remark                                         |
|----------------------------------|----------------------------------------------------------------------|---------|------------------------------------------------|
| DTS Bandwidth                    | RSS-Gen Issue 5<br>Paragraph 6.7<br>RSS-247 Issue 2<br>Paragraph 5.2 | PASS    | Test data please refer to<br><b>Appendix A</b> |
| Occupied Channel Bandwidth       | RSS-Gen Issue 5<br>Paragraph 6.7<br>RSS-247 Issue 2<br>Paragraph 5.2 | PASS    | Test data please refer to<br><b>Appendix B</b> |
| Maximum conducted output power   | RSS-247 Issue 2<br>Paragraph 5.4(d)                                  | PASS    | Test data please refer to<br><b>Appendix C</b> |
| Maximum power spectral density   | RSS-247 Issue 2<br>Paragraph 5.2(b)                                  | PASS    | Test data please refer to<br><b>Appendix D</b> |
| Band edge measurements           | RSS-Gen Issue 5<br>Paragraph 8.10                                    | PASS    | Test data please refer to<br><b>Appendix E</b> |
| Conducted Spurious Emission      | RSS-247 Issue 2<br>Paragraph 5.5                                     | PASS    | Test data please refer to<br><b>Appendix F</b> |
| Duty cycle                       | ANSI C63.10:2013                                                     | PASS    | Test data please refer to<br><b>Appendix G</b> |
| Emissions in Restricted Bands    | RSS-Gen Issue 5<br>Paragraph 8.9                                     | PASS    | Test data please refer to<br><b>Appendix H</b> |
| AC Power Line Conducted Emission | RSS-Gen Issue 5<br>Paragraph 8.8                                     | PASS    | Test data please refer to<br><b>Appendix I</b> |
| Antenna Requirement              | RSS-Gen Issue 5<br>Paragraph 6.8                                     | PASS    | ---                                            |

### 3.4 Power setting in test

| Mode     | Channel | Frequency (MHz) | Power setting |
|----------|---------|-----------------|---------------|
| LE_1Mbps | 00      | 2402            | 50            |
|          | 19      | 2440            | 50            |
|          | 39      | 2480            | 50            |

### 3.5 Test Matrix

| Test item                        | CCBU                                |                                     |
|----------------------------------|-------------------------------------|-------------------------------------|
|                                  | 1(#1)                               | 2(#2)                               |
| DTS Bandwidth                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Occupied Channel Bandwidth       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Maximum conducted output power   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Maximum power spectral density   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Band edge measurements           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Conducted Spurious Emission      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Duty cycle                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Emissions in Restricted Bands    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| AC Power Line Conducted Emission | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

### 3.6 Test Facility

|     |   |                                |
|-----|---|--------------------------------|
| USA | : | FCC Designation Number: CN1199 |
| CA  | : | ISED CAB identifier: CN0040    |

## 4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

### 4.1 DTS Bandwidth

**VERDICT: PASS**

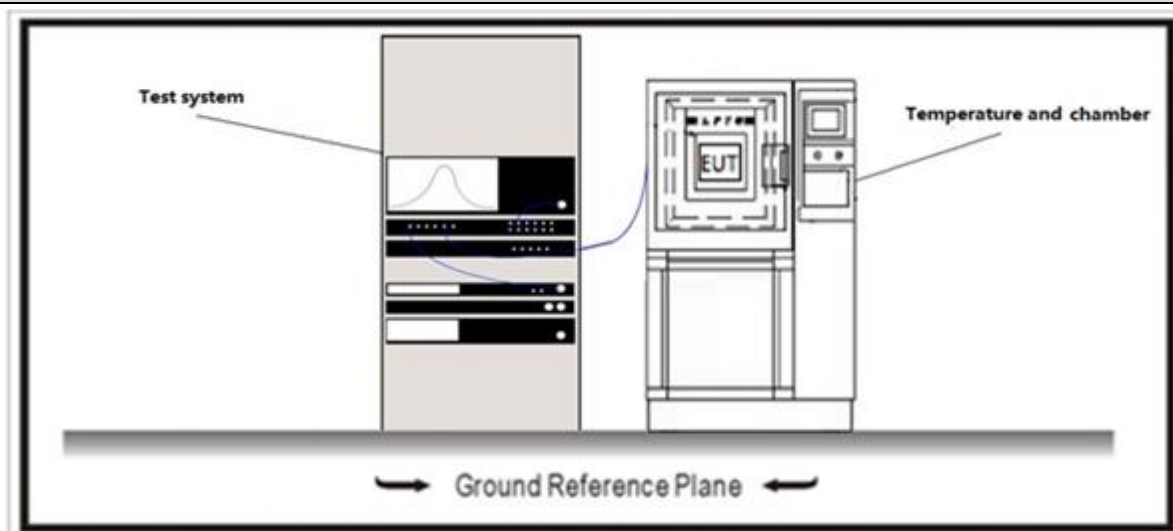
#### 4.1.1 Limit

**Standard**

FCC Part 15 Subpart C Paragraph 15.247 (a)(2); RSS-247 Issue 2 Paragraph 5.2.

Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

#### 4.1.2 Test Setup



#### 4.1.3 Test Procedure

|                                     | Reference Rule | Chapter | Description   |
|-------------------------------------|----------------|---------|---------------|
| <input checked="" type="checkbox"/> | ANSI C63.10    | 11.8    | DTS bandwidth |
| <input type="checkbox"/>            | ANSI C63.10    | 11.8.1  | Option 1      |
| <input checked="" type="checkbox"/> | ANSI C63.10    | 11.8.2  | Option 2      |

## 4.2 Occupied Channel Bandwidth

**VERDICT: PASS**

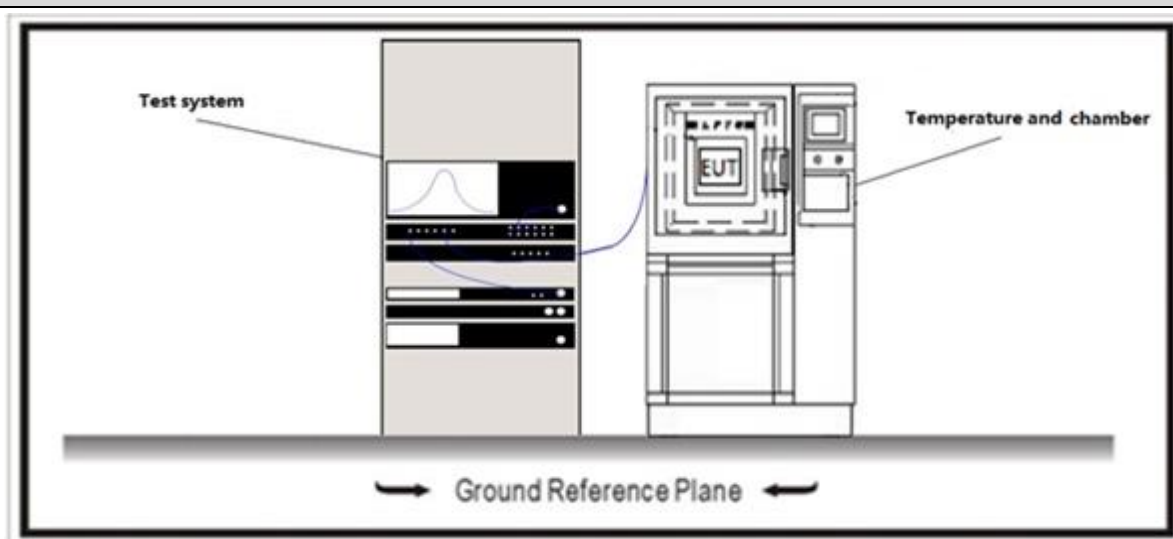
### 4.2.1 Limit

**Standard**

RSS-Gen Issue 5 Paragraph 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs

### 4.2.2 Test Setup



### 4.2.3 Test Procedure

|                                     | Reference Rule                      |             | Chapter | Description   |
|-------------------------------------|-------------------------------------|-------------|---------|---------------|
| <input checked="" type="checkbox"/> | ANSI C63.10                         |             | 11.8    | DTS bandwidth |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.8.1  | Option 1      |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 11.8.2  | Option 2      |



### 4.3 Maximum Conducted Output Power

**VERDICT: PASS**

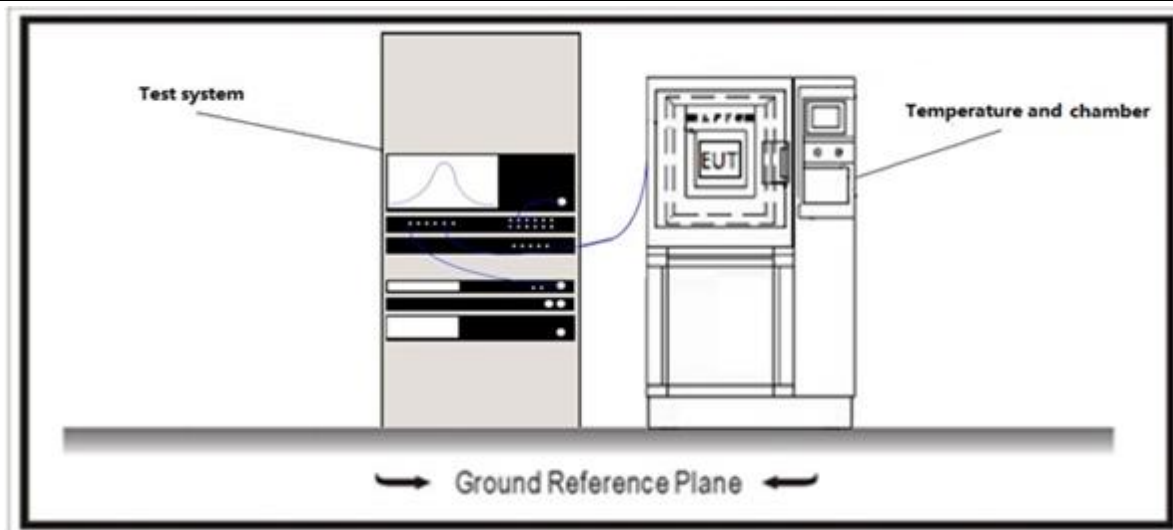
#### 4.3.1 Limit

| Standard                            |                                                         | FCC Part 15 Subpart C Paragraph 15.247 (b)(3);<br>RSS-247 Issue 2 Paragraph 5.4(d). |
|-------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | GTX < 6dBi                                              | Pout≤30dBm                                                                          |
| <input type="checkbox"/>            | GTX > 6dBi                                              |                                                                                     |
| <input type="checkbox"/>            | Non-Fix point-point                                     | Pout≤30-( GTX -6)                                                                   |
| <input type="checkbox"/>            | Fix point-point                                         | Pout≤30-[(GTX-6)]/3                                                                 |
| <input type="checkbox"/>            | Point-to-multipoint                                     | Pout≤30-(GTX-6)                                                                     |
| <input type="checkbox"/>            | Overlap Beams                                           | Pout≤30-[(GTX-6)]/3                                                                 |
| <input type="checkbox"/>            | Aggregate power transmitted simultaneously on all beams | Pout≤30-[(GTX-6)]/3                                                                 |
| <input type="checkbox"/>            | single directional beam                                 | Pout≤30-[(GTX-6)]/3+8dB                                                             |

Note 1 : GTX directional gain of transmitting antennas.

Note 2 : Pout is maximum peak conducted output power .

#### 4.3.2 Test Setup



### 4.3.3 Test Procedure

|                                     | References Rule                     |                                     |                                     | Chapter     | Description                       |                                          |                                            |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------|-----------------------------------|------------------------------------------|--------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10                         |                                     |                                     | 11.9        | Fundamental emission output power |                                          |                                            |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10                         |                                     |             | 11.9.1                            | Maximum peak conducted output power      |                                            |
|                                     |                                     | <input type="checkbox"/>            | ANSI C63.10                         | 11.9.1.1    | RBW ≥ DTS bandwidth               |                                          |                                            |
|                                     |                                     | <input type="checkbox"/>            | ANSI C63.10                         | 11.9.1.2    | Integrated band power method      |                                          |                                            |
|                                     |                                     | <input type="checkbox"/>            | ANSI C63.10                         | 11.9.1.3    | PKPM1 Peak power meter method     |                                          |                                            |
|                                     | <input type="checkbox"/>            | ANSI C63.10                         |                                     |             | 11.9.2                            | Maximum conducted (average) output power |                                            |
|                                     |                                     | <input type="checkbox"/>            | ANSI C63.10                         |             |                                   | 11.9.2.2                                 | Measurement using a spectrum analyzer (SA) |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.2                        | Method AVGSA-1(Duty cycle ≥98%)          |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.3                        | Method AVGSA-1A(Duty cycle ≥98%)         |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.4                        | Method AVGSA-2(Duty cycle ≤98%)          |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.5                        | Method AVGSA-2A(Duty cycle ≤98%)         |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.4                        | Method AVGSA-3                           |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.2.5                        | Method AVGSA-3A                          |                                            |
|                                     |                                     | <input checked="" type="checkbox"/> | ANSI C63.10                         |             |                                   | 11.9.2.3                                 | Measurement using a power meter (PM)       |
|                                     |                                     |                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 11.9.2.3.1                        | Method AVGPM                             |                                            |
|                                     |                                     |                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.9.2.3.2                        | Method AVGPM-G                           |                                            |

#### 4.4 Maximum Power Spectral Density

**VERDICT: PASS**

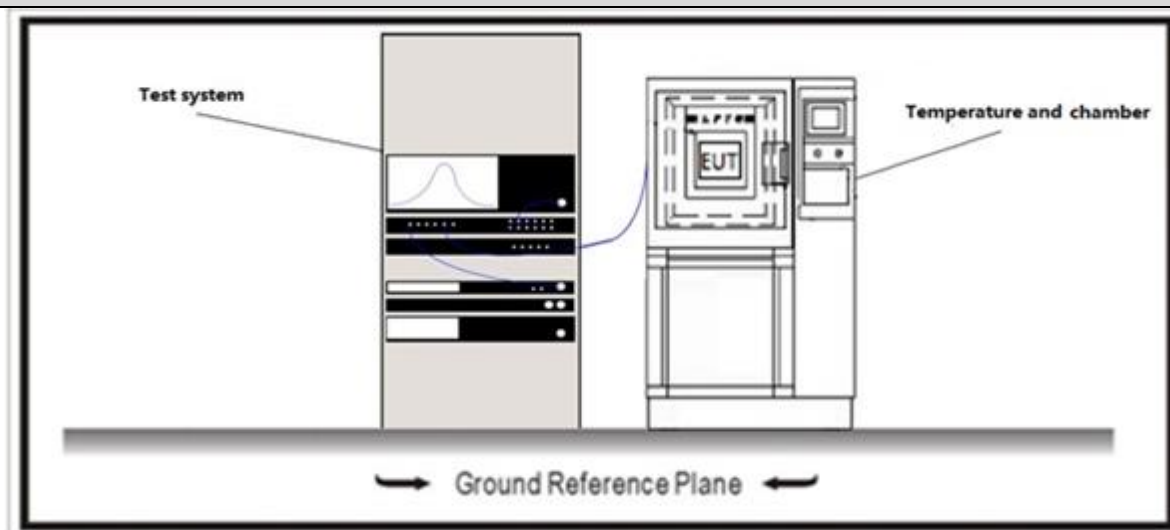
##### 4.4.1 Limit

**Standard**

 FCC Part 15 Subpart C Paragraph 15.247 (b)(3);  
 RSS-247 Issue 2 Paragraph 5.2(b).

 Power Spectral Density  $\leq 8\text{dBm}/3\text{kHz}$ 

##### 4.4.2 Test Setup



##### 4.4.3 Test Procedure

|                                     | References Rule                     |             | Chapter | Description                                                      |
|-------------------------------------|-------------------------------------|-------------|---------|------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10                         |             | 11.10   | Maximum power spectral density level in the fundamental emission |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 11.10.2 | Method PKPSD (peak PSD)                                          |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.3 | Method AVGPSD-1(Duty cycle $\geq 98\%$ )                         |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.4 | Method AVGPSD-1A(Duty cycle $\geq 98\%$ )                        |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.5 | Method AVGPSD-2(Duty cycle $< 98\%$ )                            |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.6 | Method AVGPSD-2A(Duty cycle $< 98\%$ )                           |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.7 | Method AVGPSD-3                                                  |
|                                     | <input type="checkbox"/>            | ANSI C63.10 | 11.10.8 | Method AVGPSD-3A                                                 |

## 4.5 Band Edge Measurements

**VERDICT: PASS**

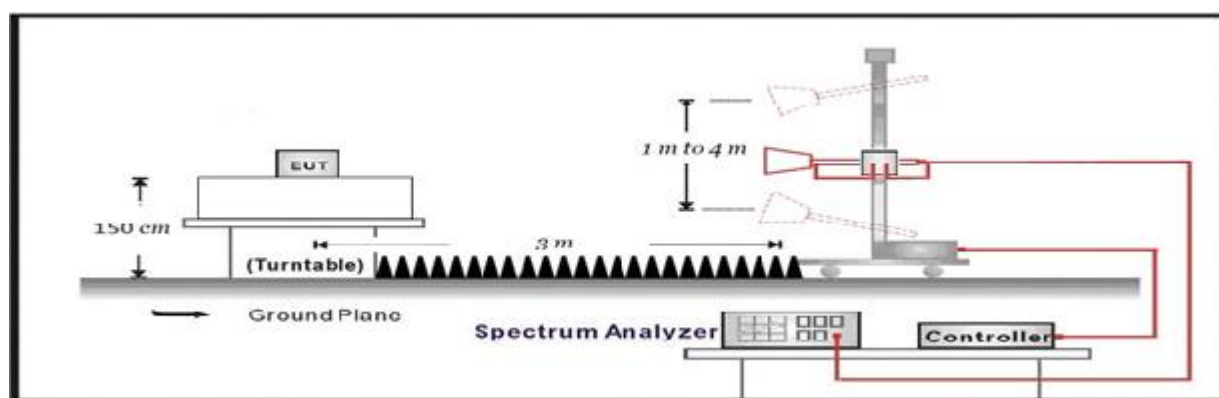
### 4.5.1 Limit

| Standard              |          | FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209;<br>RSS-Gen Issue 5 Paragraph 8.10. |           |              |
|-----------------------|----------|----------------------------------------------------------------------------------------|-----------|--------------|
| Frequency bands (MHz) | Detector | Limit (dB $\mu$ V/m)                                                                   | RBW (MHz) | Distance (m) |
| 2310-2390             | PK       | 74                                                                                     | 1         | 3            |
| 2483.5-2500           | AV       | 54                                                                                     | 1         | 3            |

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

### 4.5.2 Test Setup

Above 1GHz Test Setup:



### 4.5.3 Test Procedure

|                                     | References Rule | Chapter   | Description                                                                                      |
|-------------------------------------|-----------------|-----------|--------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10     | 6.10      | Band-edge testing                                                                                |
| <input checked="" type="checkbox"/> | ANSI C63.10     | 6.10.5    | Restricted-band band-edge measurements                                                           |
| <input type="checkbox"/>            | ANSI C63.10     | 6.10.6    | Marker-delta method                                                                              |
| <input checked="" type="checkbox"/> | ANSI C63.10     | 11.12     | Emissions in restricted frequency bands                                                          |
| <input checked="" type="checkbox"/> | ANSI C63.10     | 11.12.1   | Radiated emission measurements                                                                   |
| <input checked="" type="checkbox"/> | ANSI C63.10     | 11.12.2.7 | Radiated spurious emission test                                                                  |
| <input type="checkbox"/>            | ANSI C63.10     | 6.4       | Radiated emissions from unlicensed wireless devices below 30 MHz                                 |
| <input type="checkbox"/>            | ANSI C63.10     | 6.5       | Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz |
| <input checked="" type="checkbox"/> | ANSI C63.10     | 6.6       | Radiated emissions from unlicensed wireless devices above 1 GHz                                  |

## 4.6 Conducted Spurious Emission

**VERDICT: PASS**

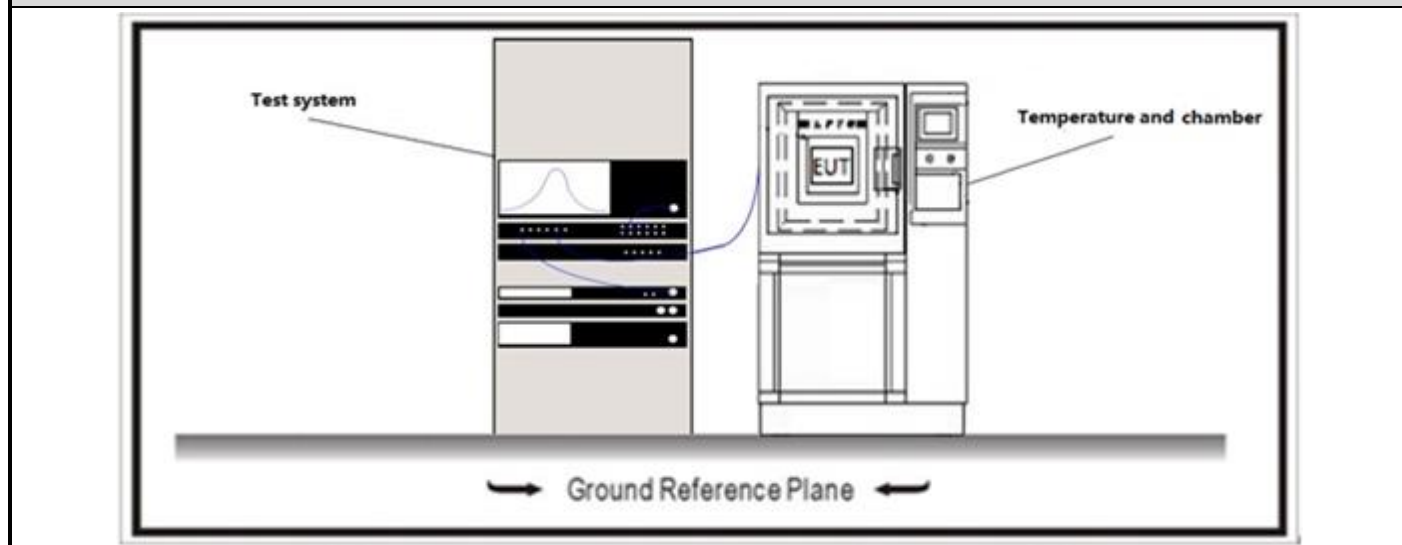
### 4.6.1 Limit

| Standard                            | FCC Part 15 Subpart C Paragraph 15.247(d); RSS-247 Issue 2 Paragraph 5.5. |
|-------------------------------------|---------------------------------------------------------------------------|
| RF Output power (Detection methods) | Limit(dB)                                                                 |
| RF Output power(Average detector)   | 30dBc(Note1)                                                              |
| RF Output power(PK detector)        | 20dBc(Note2)                                                              |

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

### 4.6.2 Test Setup



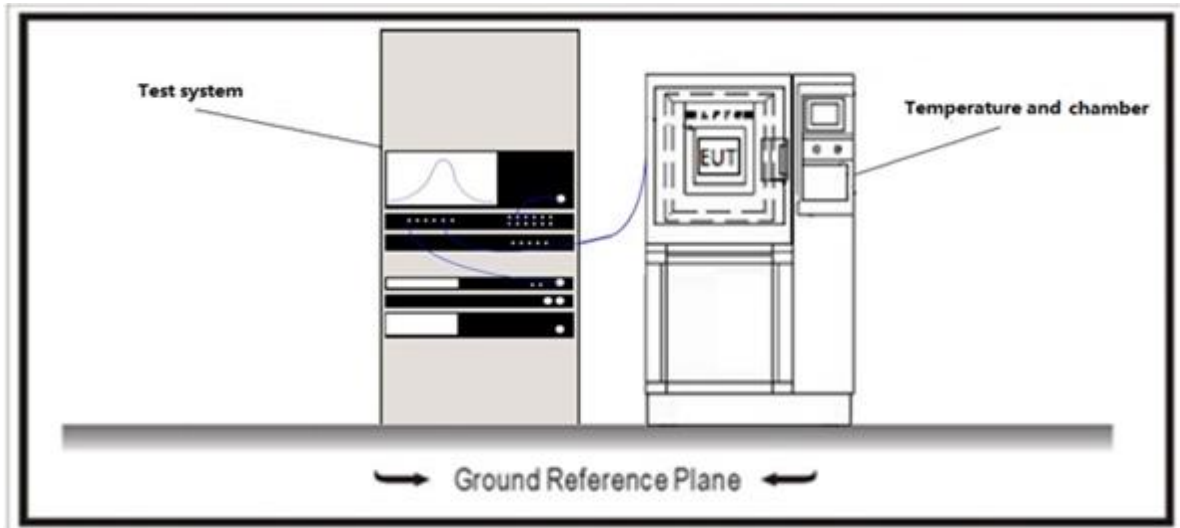
### 4.6.3 Test Procedure

| References Rule                                 | Chapter | Description                                 |
|-------------------------------------------------|---------|---------------------------------------------|
| <input checked="" type="checkbox"/> ANSI C63.10 | 11.11   | Emissions in non-restricted frequency bands |
| <input checked="" type="checkbox"/> ANSI C63.10 | 11.11.1 | General                                     |
| <input checked="" type="checkbox"/> ANSI C63.10 | 11.11.2 | Reference level measurement                 |
| <input checked="" type="checkbox"/> ANSI C63.10 | 11.11.3 | Emission level measurement                  |

|                       |                      |
|-----------------------|----------------------|
| <b>4.7 Duty cycle</b> | <b>VERDICT: PASS</b> |
|-----------------------|----------------------|

**4.7.1 Limit**

N/A

**4.7.2 Test Setup****4.7.3 Test Procedure**

| References Rule                     |             | Chapter | Description                                                                |
|-------------------------------------|-------------|---------|----------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10 | 11.6    | Duty cycle (D), transmission duration (T), and maximum power control level |

**4.8 Emissions in Restricted Bands****VERDICT: PASS****4.8.1 Limit****Standard**

FCC Part 15 Subpart C Paragraph 15.205

## Restricted Bands of operation

| Frequency (MHz)     | Frequency (MHz)       | Frequency (MHz) | Frequency (GHz) |
|---------------------|-----------------------|-----------------|-----------------|
| 0.090 – 0.110       | 16.42 – 16.423        | 399.9 – 410     | 4.5 – 5.15      |
| 0.495 – 0.505       | 16.69475 – 16.69525   | 608 – 614       | 5.35 – 5.46     |
| 2.1735 – 2.1905     | 16.80425 – 16.80475   | 960 – 1240      | 7.25 – 7.75     |
| 4.125 – 4.128       | 25.5 – 25.67          | 1300 – 1427     | 8.025 – 8.5     |
| 4.17725 – 4.17775   | 37.5 – 38.25          | 1435 – 1626.5   | 9.0 – 9.2       |
| 4.20725 – 4.20775   | 73 – 74.6             | 1645.5 – 1646.5 | 9.3 – 9.5       |
| 6.215 – 6.218       | 74.8 – 75.2           | 1660 – 1710     | 10.6 – 12.7     |
| 6.26775 – 6.26825   | 108 – 121.94          | 1718.8 – 1722.2 | 13.25 – 13.4    |
| 6.31175 – 6.31225   | 123 – 138             | 2200 – 2300     | 14.47 – 14.5    |
| 8.291 – 8.294       | 149.9 – 150.05        | 2310 – 2390     | 15.35 – 16.2    |
| 8.362 – 8.366       | 156.52475 – 156.52525 | 2483.5 – 2500   | 17.7 – 21.4     |
| 8.37625 – 8.38675   | 156.7 – 156.9         | 2690 – 2900     | 22.01 – 23.12   |
| 8.81425 – 8.81475   | 162.0125 – 167.17     | 3260 – 3267     | 23.6 – 24.0     |
| 12.29 – 12.293      | 167.72 – 173.2        | 3332 – 3339     | 31.2 – 31.8     |
| 12.51975 – 12.52025 | 240 – 285             | 3345.8 – 3358   | 36.43 – 36.5    |
| 12.57675 – 12.57725 | 322 – 335.4           | 3600 – 4400     |                 |
| 13.36 – 13.41       |                       |                 |                 |

**Standard**

RSS-Gen Issue 5 Paragraph 8.10

## Restricted Bands of operation for IC

|                     |                       |                 |               |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 - 0.110       | 13.36 - 13.41         | 960 - 1427      | 9.0 - 9.2     |
| 0.495 - 0.505       | 16.42 - 16.423        | 1435 - 1626.5   | 9.3 - 9.5     |
| 2.1735 - 2.1905     | 16.69475 - 16.69525   | 1645.5 - 1646.5 | 10.6 - 12.7   |
| 3.020 - 3.026       | 16.80425 - 16.80475   | 1660 - 1710     | 13.25 - 13.4  |
| 4.125 - 4.128       | 25.5 - 25.67          | 1718.8 - 1722.2 | 14.47 - 14.5  |
| 4.17725 - 4.17775   | 37.5 - 38.25          | 2200 - 2300     | 15.35 - 16.2  |
| 4.20725 - 4.20775   | 73 - 74.6             | 2310 - 2390     | 17.7 - 21.4   |
| 5.677 - 5.683       | 74.8 - 75.2           | 2483.5 - 2500   | 22.01 - 23.12 |
| 6.215 - 6.218       | 108 - 138             | 2655 - 2900     | 23.6 - 24.0   |
| 6.26775 - 6.26825   | 149.9 - 150.05        | 3260 - 3267     | 31.2 - 31.8   |
| 6.31175 - 6.31225   | 156.52475 - 156.52525 | 3332 - 3339     | 36.43 - 36.5  |
| 8.291 - 8.294       | 156.7 - 156.9         | 3345.8 - 3358   | Above 38.6    |
| 8.362 - 8.366       | 162.0125 - 167.17     | 3500 - 4400     |               |
| 8.37625 - 8.38675   | 167.72 - 173.2        | 4500 - 5150     |               |
| 8.41425 - 8.41475   | 240 - 285             | 5350 - 5460     |               |
| 12.29 - 12.293      | 322 - 335.4           | 7250 - 7750     |               |
| 12.51975 - 12.52025 | 399.9 - 410           | 8025 - 8500     |               |
| 12.57675 - 12.57725 | 608 - 614             | --              |               |

## Restricted Band Emissions Limit

## FCC Part 15 Subpart C Paragraph 15.209

| Frequency (MHz) | Field strength ( $\mu\text{V/m}$ ) | Field strength ( $\text{dB}\mu\text{V/m}$ ) | Measurement distance (m) |
|-----------------|------------------------------------|---------------------------------------------|--------------------------|
| 0.009 - 0.49    | $2400/F(\text{kHz})$               | 48.5 – 13.8                                 | 300 <sub>(Note 1)</sub>  |
| 0.49 - 1.705    | $24000/F(\text{kHz})$              | 33.8 - 23                                   | 30 <sub>(Note 1)</sub>   |
| 1.705 - 30      | 30                                 | 29.5                                        | 30 <sub>(Note 1)</sub>   |
| 30 - 88         | 100                                | 40                                          | 3 <sub>(Note 2)</sub>    |
| 88 - 216        | 150                                | 43.5                                        | 3 <sub>(Note 2)</sub>    |
| 216 - 960       | 200                                | 46                                          | 3 <sub>(Note 2)</sub>    |
| Above 960       | 500                                | 54                                          | 3 <sub>(Note 2)</sub>    |

## RSS-Gen Issue 5 Paragraph 8.9.

| Frequency (MHz) | Field strength                     | Field strength ( $\text{dB}\mu\text{V/m}$ ) | Measurement distance (m) |
|-----------------|------------------------------------|---------------------------------------------|--------------------------|
| 0.009 - 0.49    | $6.37/F(\text{kHz}) \mu\text{A/m}$ | 48.5 – 13.8                                 | 300 <sub>(Note 1)</sub>  |
| 0.49 - 1.705    | $63.7/F(\text{kHz}) \mu\text{A/m}$ | 33.8 - 23                                   | 30 <sub>(Note 1)</sub>   |
| 1.705 - 30      | 30 $\mu\text{V/m}$                 | 29.5                                        | 30 <sub>(Note 1)</sub>   |
| 30 - 88         | 100 $\mu\text{V/m}$                | 40                                          | 3 <sub>(Note 2)</sub>    |
| 88 - 216        | 150 $\mu\text{V/m}$                | 43.5                                        | 3 <sub>(Note 2)</sub>    |
| 216 - 960       | 200 $\mu\text{V/m}$                | 46                                          | 3 <sub>(Note 2)</sub>    |
| Above 960       | 500 $\mu\text{V/m}$                | 54                                          | 3 <sub>(Note 2)</sub>    |

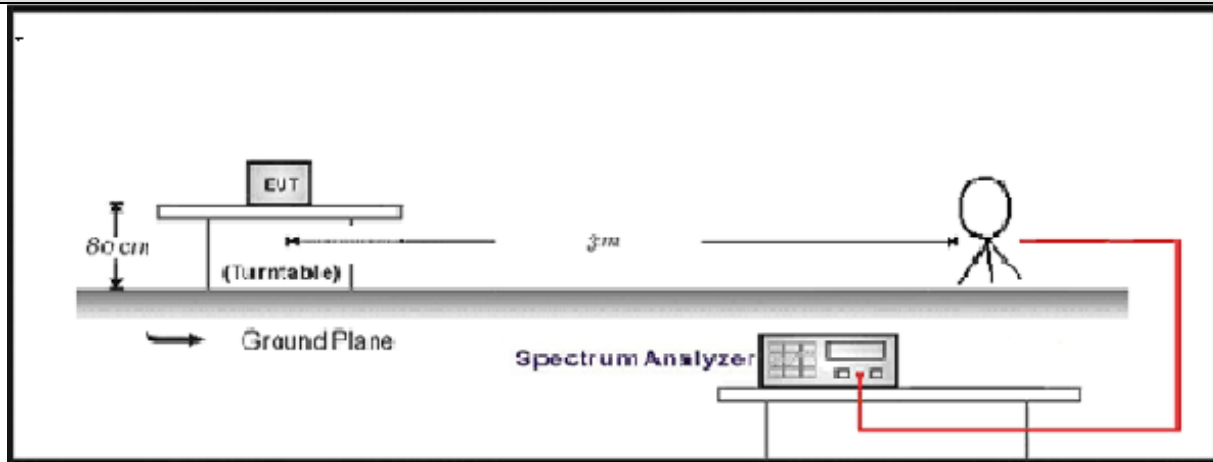
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

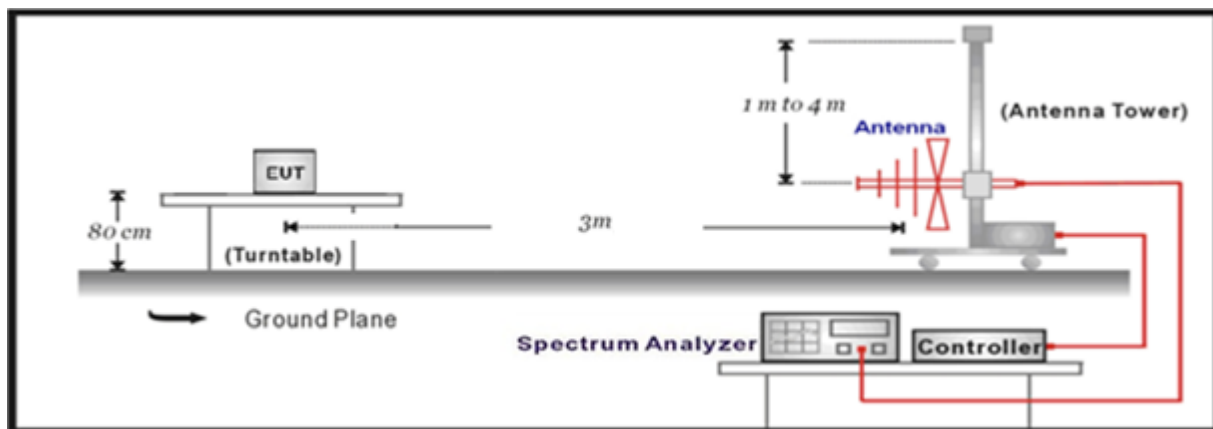


## 4.8.2 Test Setup

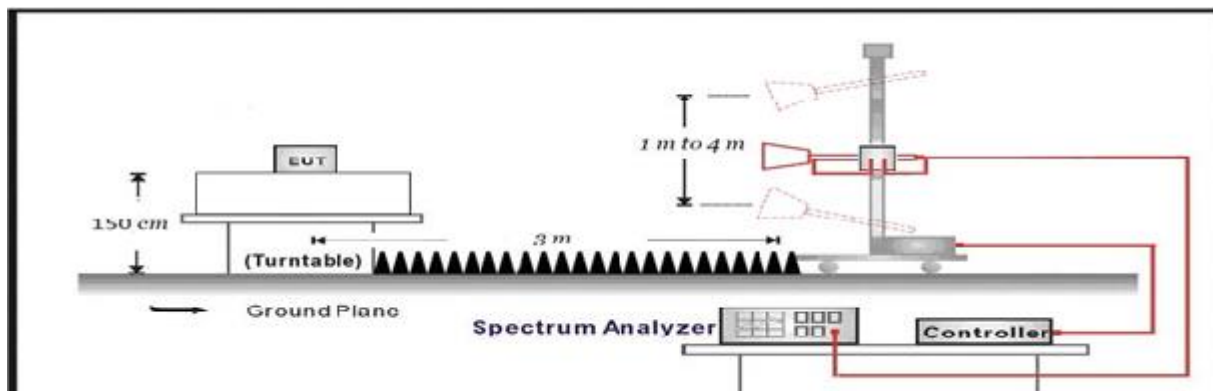
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



#### 4.8.3 Test Procedure

|                                     | References Rule                     |             | Chapter   | Description                                                                                      |
|-------------------------------------|-------------------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10                         |             | 11.12     | Emissions in restricted frequency bands                                                          |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 11.12.1   | Radiated emission measurements                                                                   |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 11.12.2.7 | Radiated spurious emission test                                                                  |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 6.4       | Radiated emissions from unlicensed wireless devices below 30 MHz                                 |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 6.5       | Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz |
|                                     | <input checked="" type="checkbox"/> | ANSI C63.10 | 6.6       | Radiated emissions from unlicensed wireless devices above 1 GHz                                  |

## 4.9 AC Power Line Conducted Emission

**VERDICT: PASS**

### 4.9.1 Limit

| Standard              | FCC Part 15 Subpart C Paragraph 15.207; RSS-Gen Issue 5 Paragraph 8.8. |                                   |
|-----------------------|------------------------------------------------------------------------|-----------------------------------|
| Frequency range [MHz] | Limit: QP [dB(μV) <sup>1)</sup> ]                                      | Limit: AV [dB(μV) <sup>1)</sup> ] |
| 0,15 - 0,50           | 66 - 56 <sup>2)</sup>                                                  | 56 - 46 <sup>2)</sup>             |
| 0,50 - 5,0            | 56                                                                     | 46                                |
| 5,0 - 30              | 60                                                                     | 50                                |

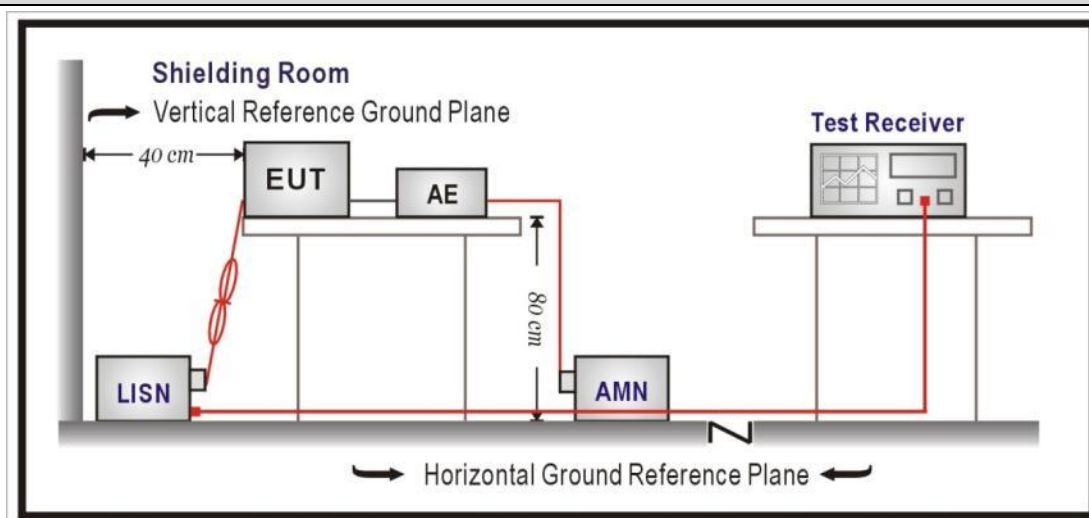
<sup>1)</sup> At the transition frequency, the lower limit applies.

<sup>2)</sup> The limit decreases linearly with the logarithm of the frequency.

**NOTE 1:** The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

**NOTE 2:** Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

### 4.9.2 Test Setup



### 4.9.3 Test Procedure

|                                     | References Rule  | Chapter | Item                                                                                        |
|-------------------------------------|------------------|---------|---------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | ANSI C63.10-2013 | 6.2     | Standard test method for ac power-line conducted emissions from unlicensed wireless devices |

**4.10 Antenna Requirement****VERDICT: PASS****4.10.1 Limit:****Standard**FCC Part 15 Subpart C Paragraph 15.203;  
RSS-Gen Issue 5 Paragraph 6.8.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

**4.10.2 Antenna Connector Construction:**

|                                                                                            |                                                                  |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <input checked="" type="checkbox"/>                                                        | The use of a permanently attached antenna                        |
| <input type="checkbox"/>                                                                   | The antenna use of a unique coupling to the intentional radiator |
| <input type="checkbox"/>                                                                   | The use of a nonstandard antenna jack or electrical connector    |
| Please refer to the attached document "Internal Photograph" to show the antenna connector. |                                                                  |

**5 TEST SETUP PHOTO AND EUT PHOTO**

Remark: The test setup photo and EUT Photo please see appendix.

## 6 TEST RESULT

### Appendix A: DTS Bandwidth

| TestMode | Frequency[MHz] | DTS BW [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|----------|----------------|--------------|----------|----------|------------|---------|
| BLE_1M   | 2402           | 0.656        | 2401.696 | 2402.352 | 0.5        | PASS    |
|          | 2440           | 0.656        | 2439.688 | 2440.344 | 0.5        | PASS    |
|          | 2480           | 0.660        | 2479.688 | 2480.348 | 0.5        | PASS    |

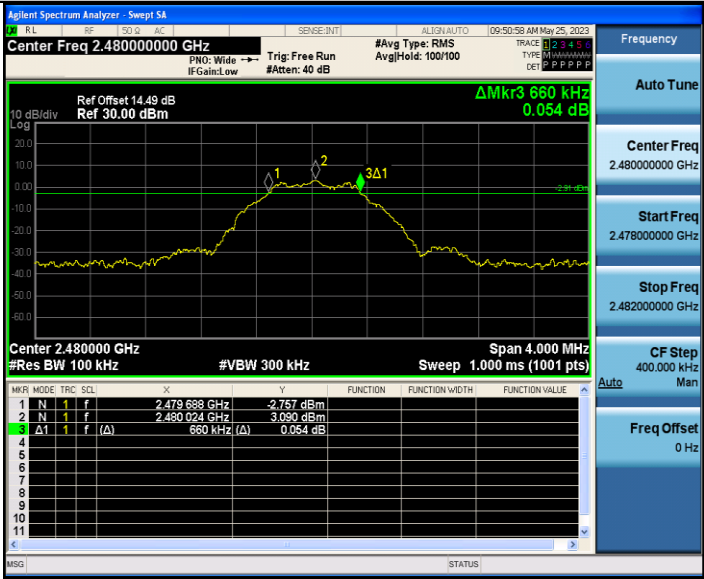
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



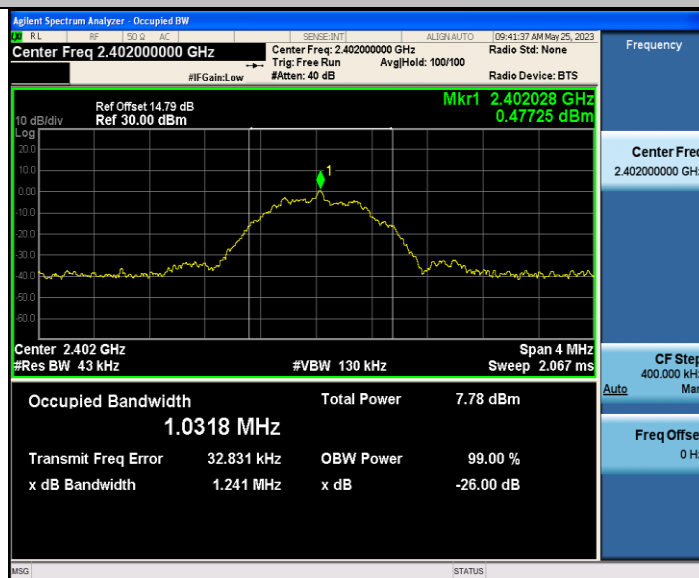
BLE\_1M\_Ant1\_2480



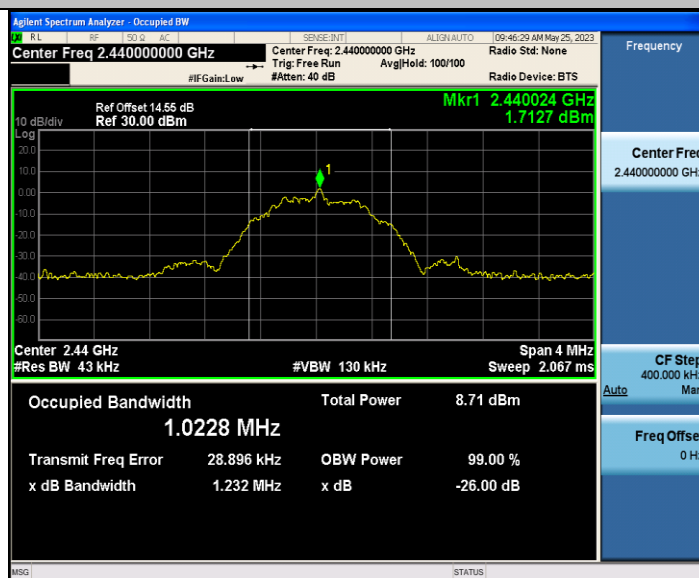
## Appendix B: Occupied Channel Bandwidth

| TestMode | Frequency[MHz] | OCB [MHz] | FL[MHz]   | FH[MHz]   |
|----------|----------------|-----------|-----------|-----------|
| BLE_1M   | 2402           | 1.0318    | 2401.5169 | 2402.5487 |
|          | 2440           | 1.0228    | 2439.5175 | 2440.5403 |
|          | 2480           | 1.0306    | 2479.5169 | 2480.5475 |

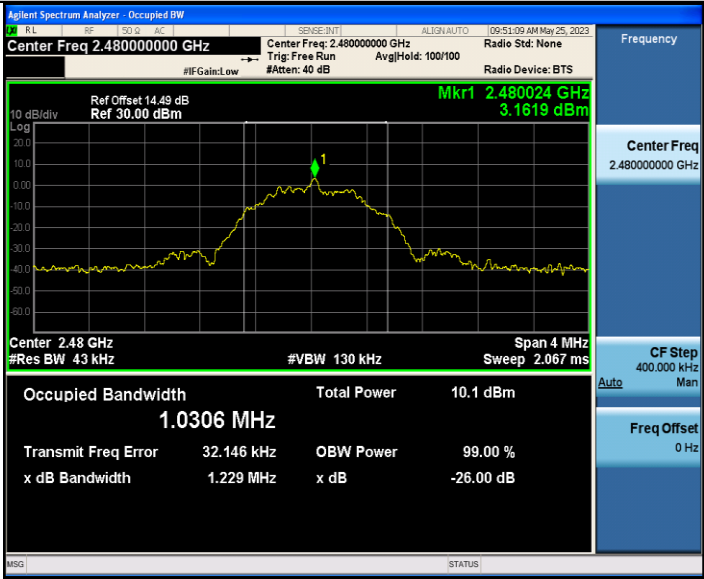
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440



BLE\_1M\_Ant1\_2480





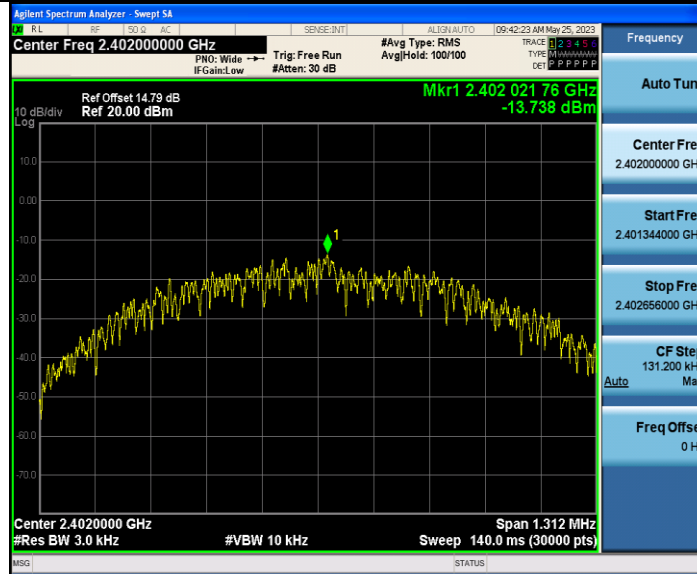
## Appendix C: Maximum conducted output power

| TestMode | Frequency[MHz] | Conducted Power[dBm] | Conducted Limit[dBm] | EIRP[dBm] | EIRP Limit[dBm] | Verdict |
|----------|----------------|----------------------|----------------------|-----------|-----------------|---------|
| BLE_1M   | 2402           | -0.92                | ≤30                  | 1.98      | ≤36             | PASS    |
|          | 2440           | -0.01                | ≤30                  | 2.89      | ≤36             | PASS    |
|          | 2480           | 1.18                 | ≤30                  | 4.08      | ≤36             | PASS    |

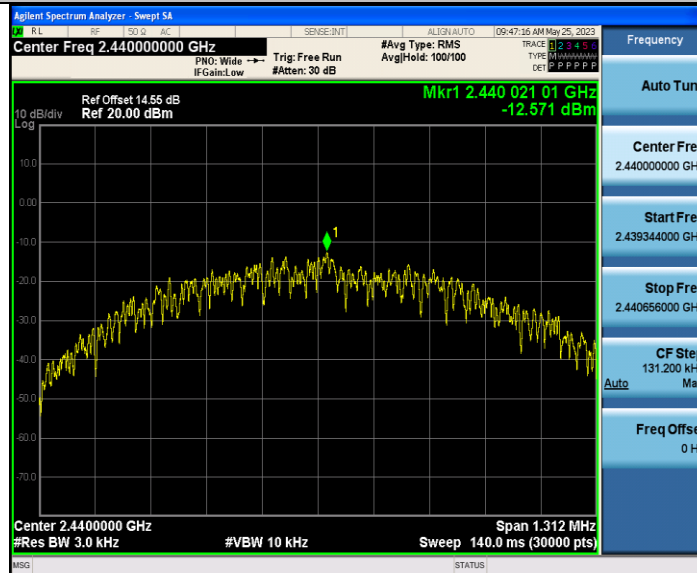
## Appendix D: Maximum power spectral density

| TestMode | Frequency[MHz] | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|----------|----------------|------------------|-----------------|---------|
| BLE_1M   | 2402           | -13.74           | ≤8.00           | PASS    |
|          | 2440           | -12.57           | ≤8.00           | PASS    |
|          | 2480           | -11.25           | ≤8.00           | PASS    |

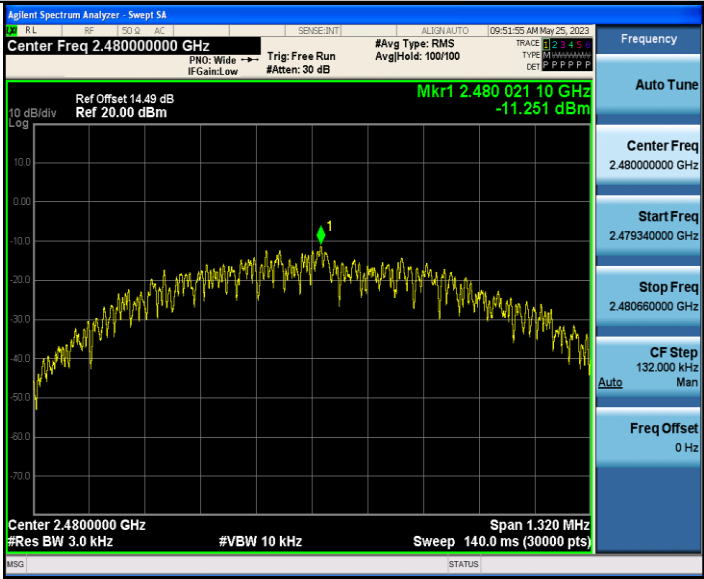
BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440

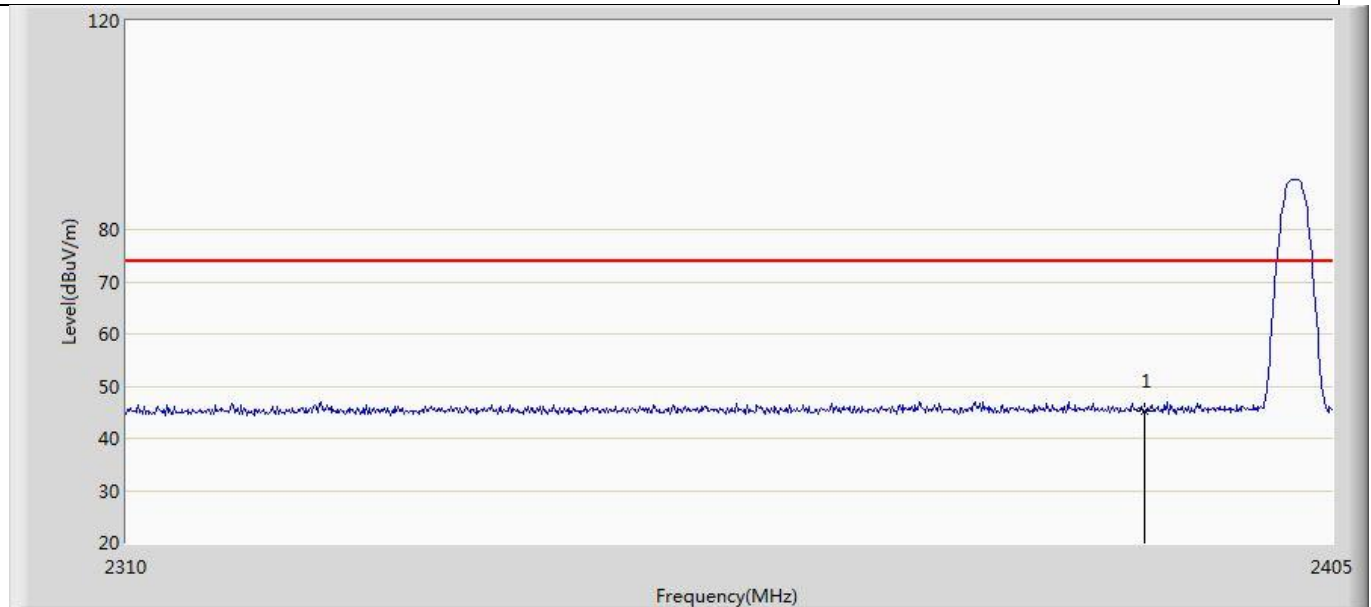


BLE\_1M\_Ant1\_2480



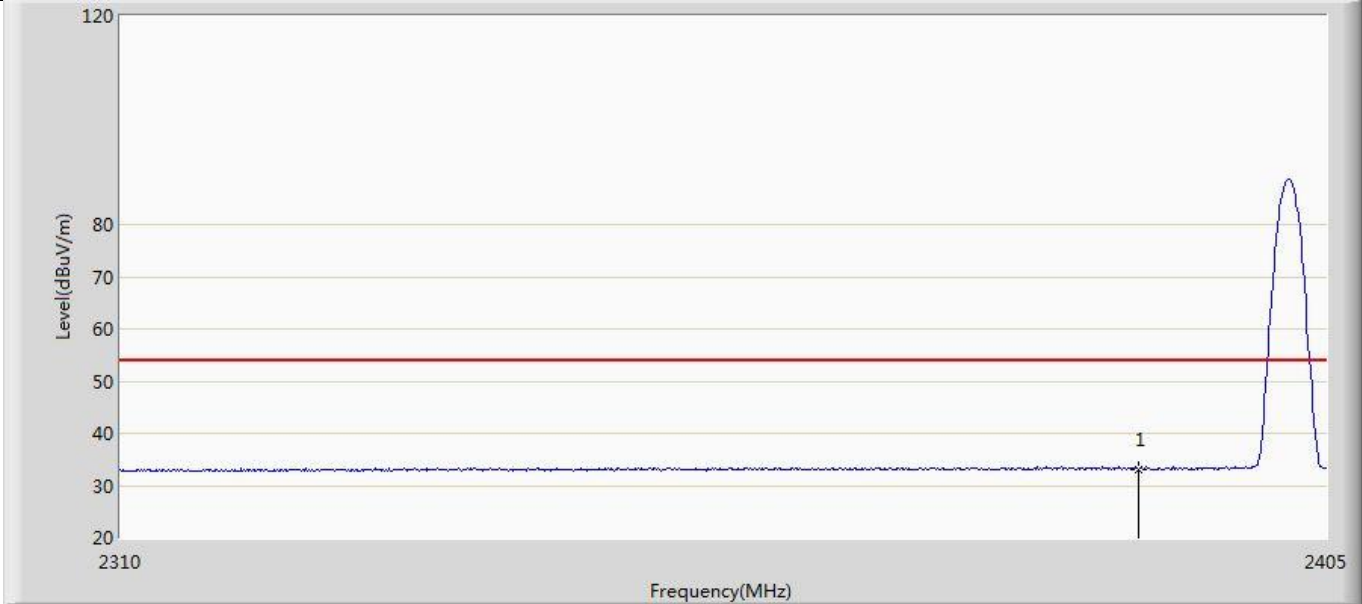
## Appendix E: Band edge measurements

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 1              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:03 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Horizontal     |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps |                          |



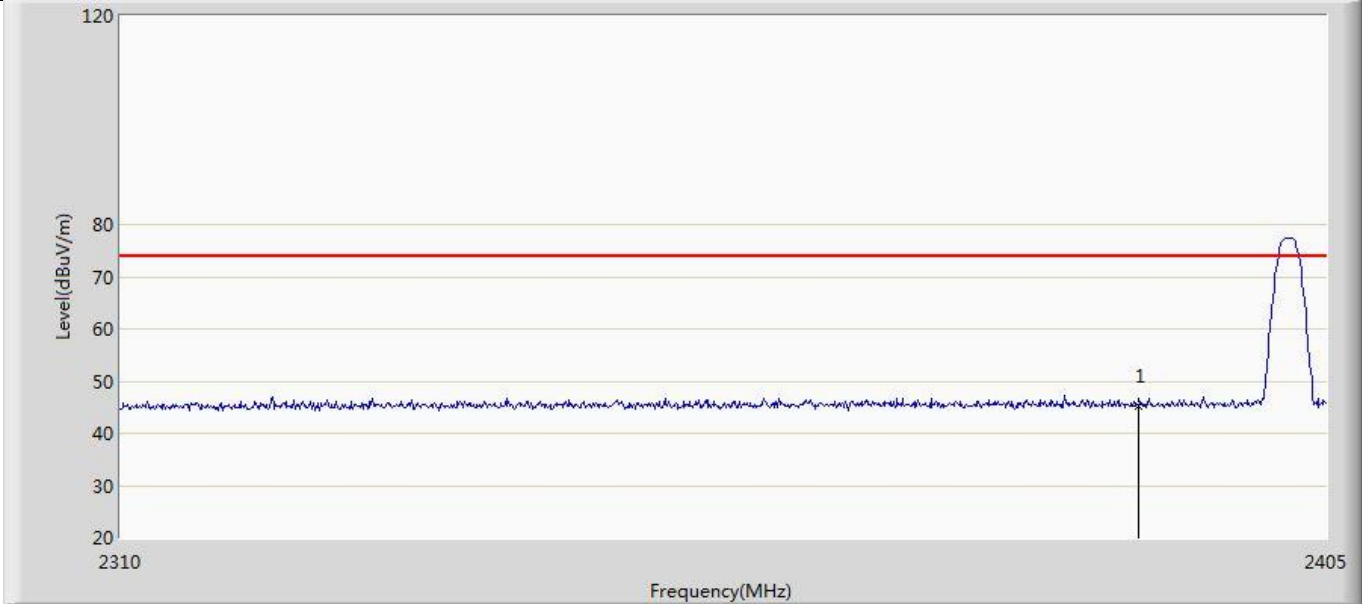
| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2390.000        | 45.203                 | 11.119               | -28.797         | 74.000         | 34.084      | PK   |

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 2              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:11 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Horizontal     |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps |                          |



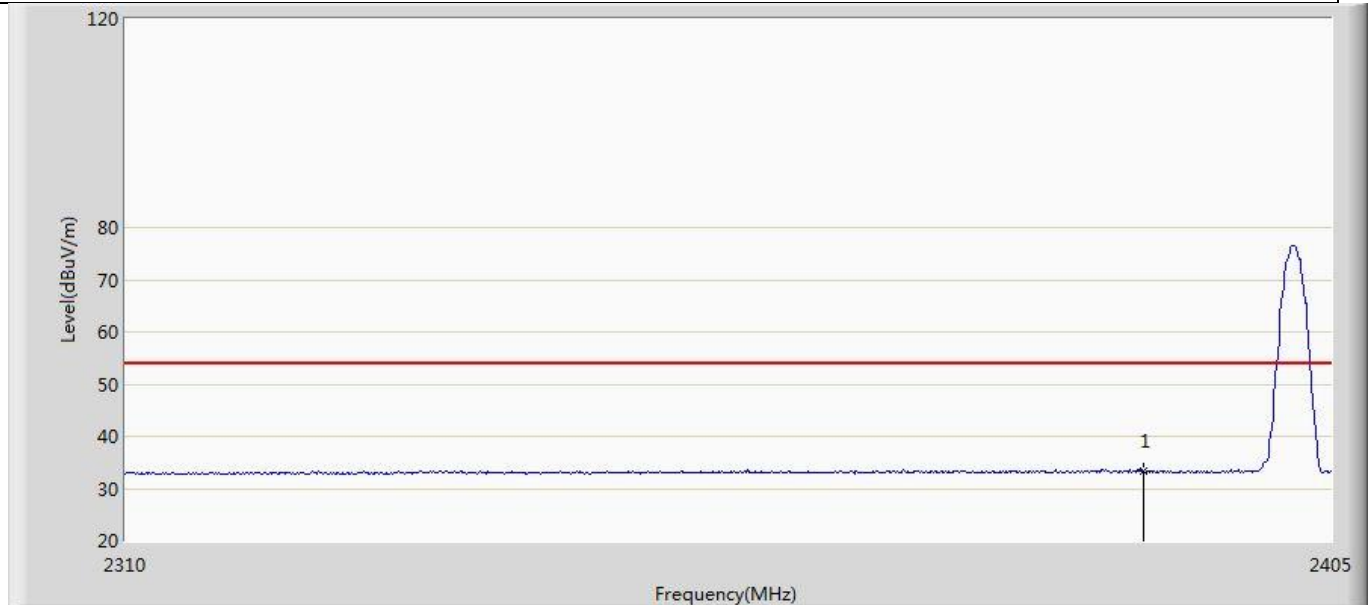
| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2390.000        | 33.077                 | -1.007               | -20.923         | 54.000         | 34.084      | AV   |

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 3              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:12 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Vertical       |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps |                          |



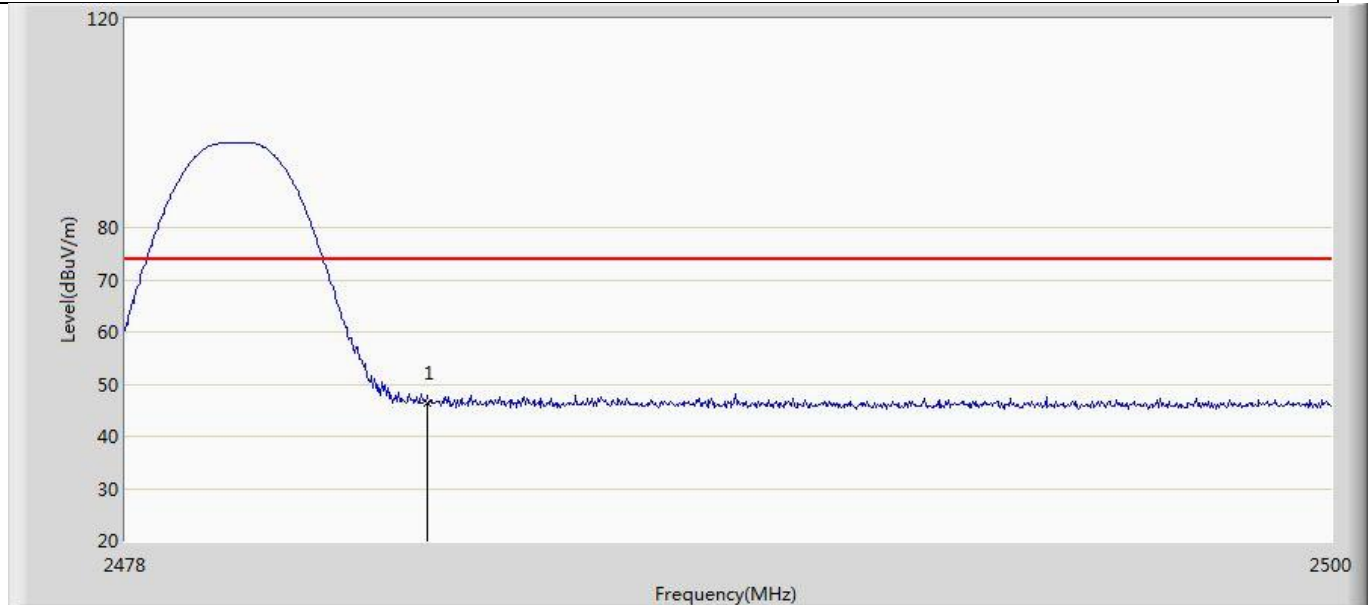
| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2390.000        | 45.245                 | 11.161               | -28.755         | 74.000         | 34.084      | PK   |

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 4              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:13 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Vertical       |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2402MHz by LE_1Mbps |                          |



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2390.000        | 33.233                 | -0.851               | -20.767         | 54.000         | 34.084      | AV   |

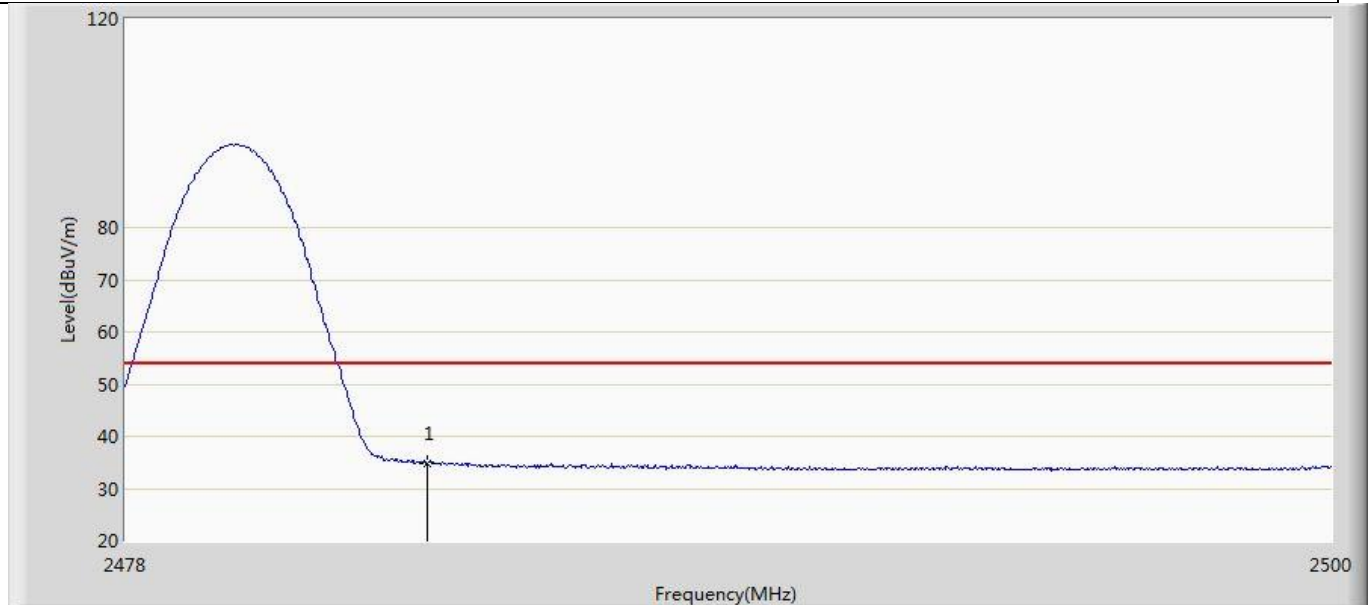
|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 5              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:14 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Horizontal     |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps |                          |



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2483.500        | 46.235                 | 11.744               | -27.765         | 74.000         | 34.491      | PK   |

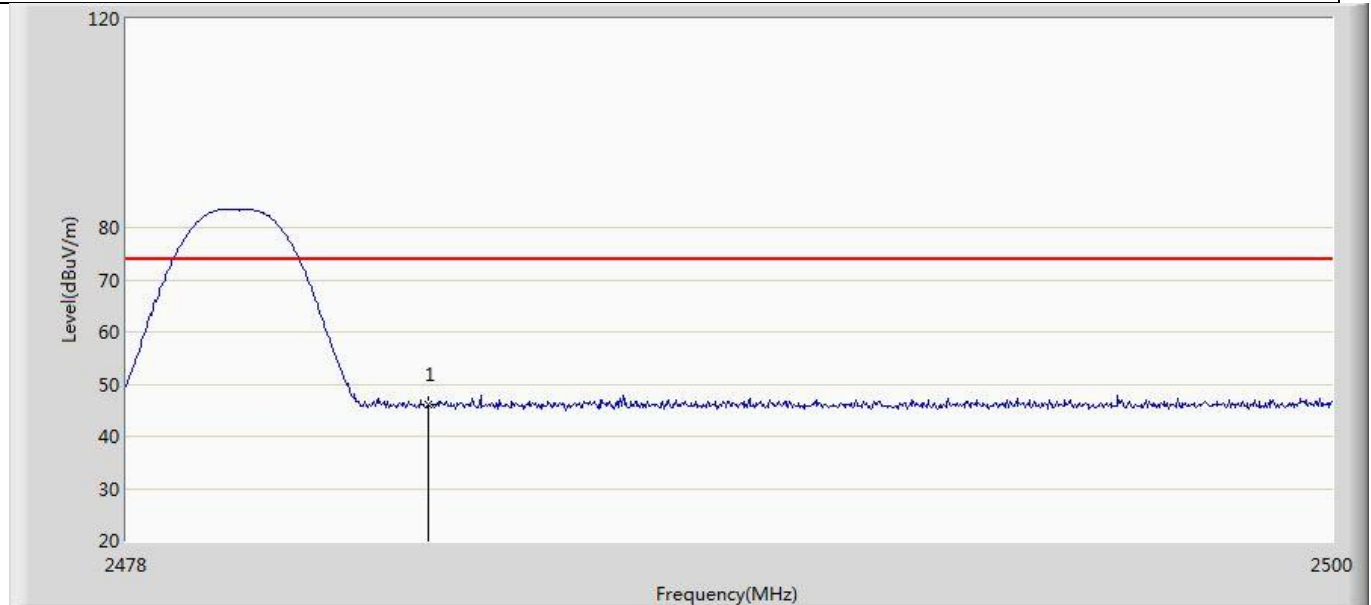


|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 6              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:16 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Horizontal     |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps |                          |



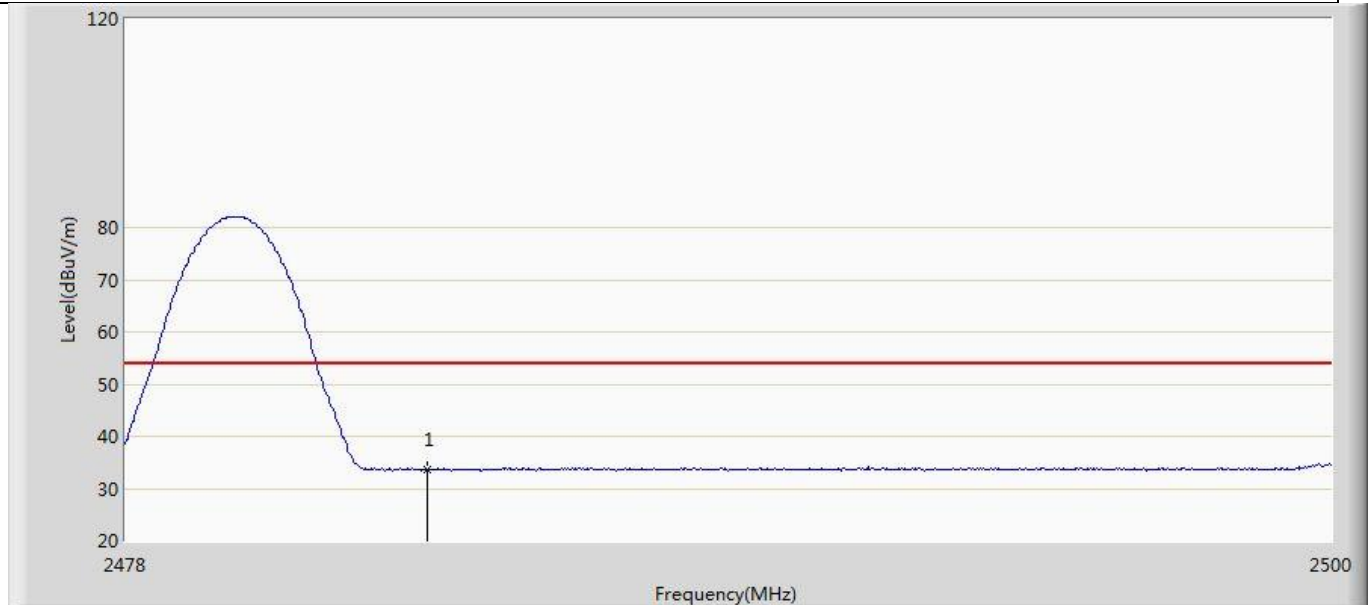
| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2483.500        | 34.910                 | 0.419                | -19.090         | 54.000         | 34.491      | AV   |

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 7              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:17 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Vertical       |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps |                          |



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2483.500        | 45.978                 | 11.487               | -28.022         | 74.000         | 34.491      | PK   |

|                                                |                          |
|------------------------------------------------|--------------------------|
| Profile: 2340774R                              | Page No.: 8              |
| Engineer: Yuliu                                |                          |
| Site: AC5                                      | Time: 2023/05/22 - 20:18 |
| Limit: FCC_Part15.209_RE(3m)                   | Margin: 0                |
| Probe: Horn_3117_00167055(1-18GHz)             | Polarity: Vertical       |
| EUT: Universal base                            | Power: 120 Vac / 50 Hz   |
| Note: Mode 1 : Transmit at 2480MHz by LE_1Mbps |                          |



| No | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  | *    | 2483.500        | 33.659                 | -0.832               | -20.341         | 54.000         | 34.491      | AV   |

## Appendix F: Conducted Spurious Emission

Test Result for Reference level :

| TestMode | Freq(MHz) | Max.Point[MHz] | Result[dBm] |
|----------|-----------|----------------|-------------|
| BLE_1M   | 2402      | 2402.02        | 0.74        |
|          | 2440      | 2440.02        | 1.68        |
|          | 2480      | 2480.02        | 3.10        |

Test Result for Band edge :

| TestMode | ChName | Frequency [MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|--------|-----------------|---------------|-------------|------------|---------|
| BLE_1M   | Low    | 2402            | 0.74          | -40.56      | ≤-29.26    | PASS    |
|          | High   | 2480            | 3.10          | -40.4       | ≤-26.9     | PASS    |

Test Result for Spurious Emission :

| TestMode | Frequency [MHz] | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|----------|-----------------|-----------------|----------------|-------------|------------|---------|
| BLE_1M   | 2402            | 30~1000         | 0.74           | -49.93      | ≤-29.26    | PASS    |
|          |                 | 1000~3000       | 0.74           | -48.42      | ≤-29.26    | PASS    |
|          |                 | 3000~5000       | 0.74           | -32.42      | ≤-29.26    | PASS    |
|          |                 | 5000~7000       | 0.74           | -48.12      | ≤-29.26    | PASS    |
|          |                 | 7000~9000       | 0.74           | -47.89      | ≤-29.26    | PASS    |
|          |                 | 9000~11000      | 0.74           | -48.05      | ≤-29.26    | PASS    |
|          |                 | 11000~13000     | 0.74           | -48.71      | ≤-29.26    | PASS    |
|          |                 | 13000~15000     | 0.74           | -44.18      | ≤-29.26    | PASS    |
|          |                 | 15000~17000     | 0.74           | -42.36      | ≤-29.26    | PASS    |
|          |                 | 17000~19000     | 0.74           | -41.99      | ≤-29.26    | PASS    |
|          |                 | 19000~21000     | 0.74           | -40.53      | ≤-29.26    | PASS    |
|          |                 | 21000~23000     | 0.74           | -39.77      | ≤-29.26    | PASS    |
|          |                 | 23000~25000     | 0.74           | -36.66      | ≤-29.26    | PASS    |
|          | 2440            | 30~1000         | 1.68           | -50.61      | ≤-28.32    | PASS    |
|          |                 | 1000~3000       | 1.68           | -47.88      | ≤-28.32    | PASS    |
|          |                 | 3000~5000       | 1.68           | -32.08      | ≤-28.32    | PASS    |
|          |                 | 5000~7000       | 1.68           | -47.44      | ≤-28.32    | PASS    |
|          |                 | 7000~9000       | 1.68           | -49.28      | ≤-28.32    | PASS    |
|          |                 | 9000~11000      | 1.68           | -47.55      | ≤-28.32    | PASS    |
|          |                 | 11000~13000     | 1.68           | -48.41      | ≤-28.32    | PASS    |
|          |                 | 13000~15000     | 1.68           | -44.3       | ≤-28.32    | PASS    |
|          |                 | 15000~17000     | 1.68           | -42.59      | ≤-28.32    | PASS    |
|          |                 | 17000~19000     | 1.68           | -41.81      | ≤-28.32    | PASS    |
|          |                 | 19000~21000     | 1.68           | -40.36      | ≤-28.32    | PASS    |
|          |                 | 21000~23000     | 1.68           | -40.29      | ≤-28.32    | PASS    |
|          |                 | 23000~25000     | 1.68           | -37.89      | ≤-28.32    | PASS    |
|          | 2480            | 30~1000         | 3.10           | -50.14      | ≤-26.9     | PASS    |
|          |                 | 1000~3000       | 3.10           | -48.38      | ≤-26.9     | PASS    |
|          |                 | 3000~5000       | 3.10           | -28.14      | ≤-26.9     | PASS    |

|  |  |             |      |        |              |      |
|--|--|-------------|------|--------|--------------|------|
|  |  | 5000~7000   | 3.10 | -47.76 | $\leq -26.9$ | PASS |
|  |  | 7000~9000   | 3.10 | -48.63 | $\leq -26.9$ | PASS |
|  |  | 9000~11000  | 3.10 | -47.8  | $\leq -26.9$ | PASS |
|  |  | 11000~13000 | 3.10 | -48.84 | $\leq -26.9$ | PASS |
|  |  | 13000~15000 | 3.10 | -44.51 | $\leq -26.9$ | PASS |
|  |  | 15000~17000 | 3.10 | -42.54 | $\leq -26.9$ | PASS |
|  |  | 17000~19000 | 3.10 | -41.78 | $\leq -26.9$ | PASS |
|  |  | 19000~21000 | 3.10 | -40.44 | $\leq -26.9$ | PASS |
|  |  | 21000~23000 | 3.10 | -39.85 | $\leq -26.9$ | PASS |
|  |  | 23000~25000 | 3.10 | -38.46 | $\leq -26.9$ | PASS |

Test Graphs for Reference level :

BLE\_1M\_Ant1\_2402



BLE\_1M\_Ant1\_2440

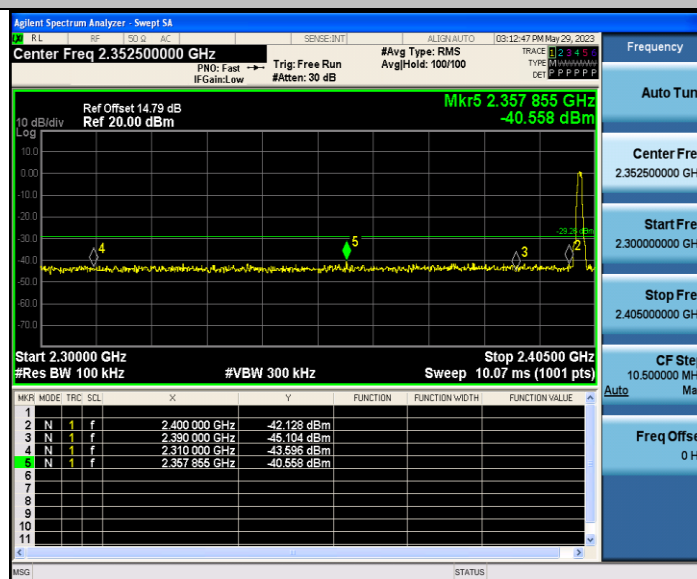


BLE\_1M\_Ant1\_2480

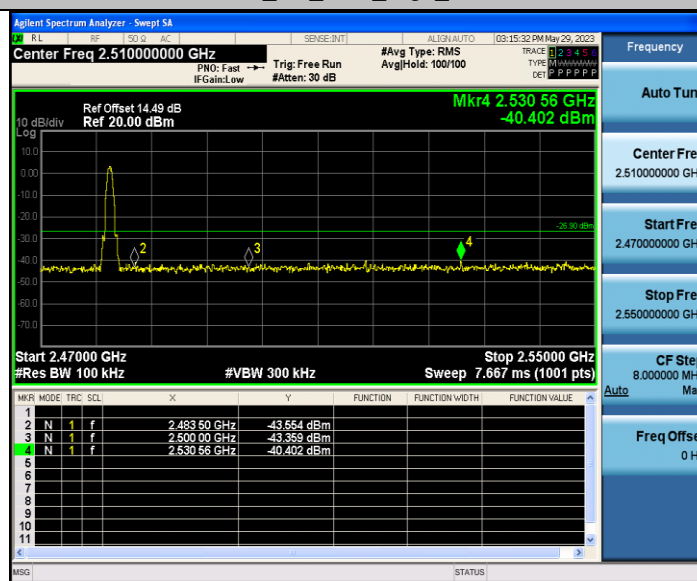


## Test Graphs for Band edge :

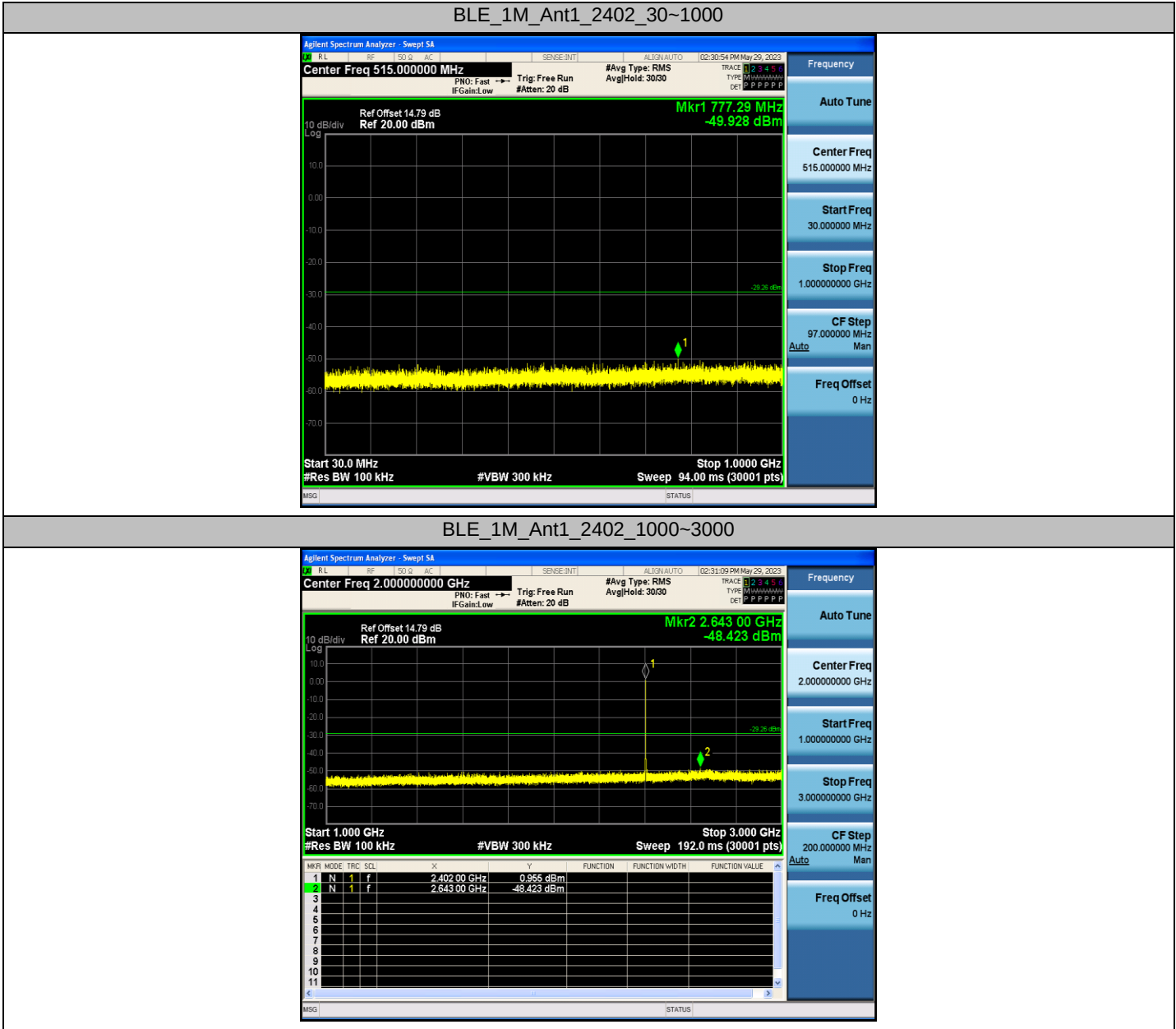
BLE\_1M\_Ant1\_Low\_2402



BLE\_1M\_Ant1\_High\_2480

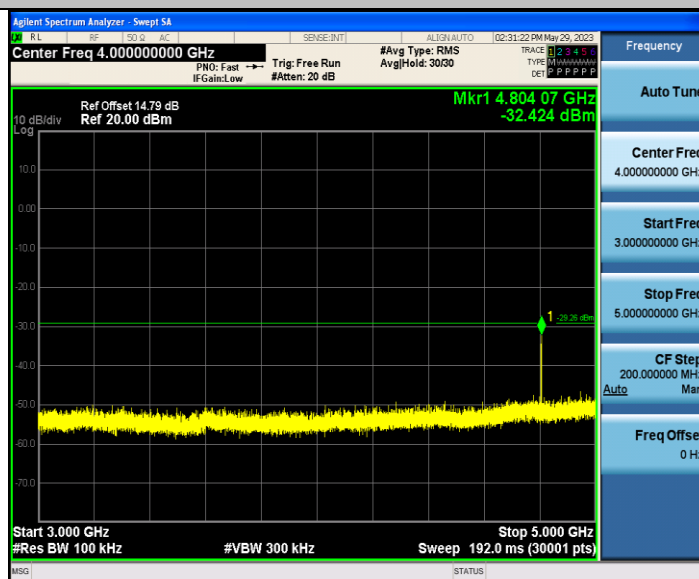


Test Graphs for Spurious Emission :

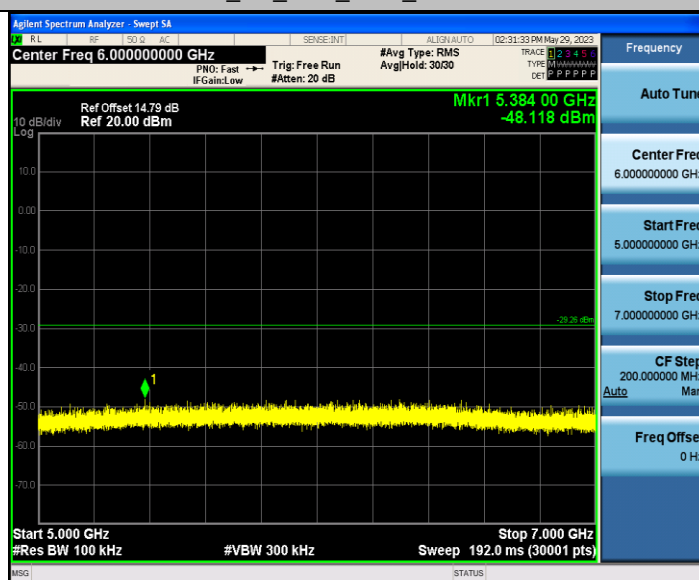




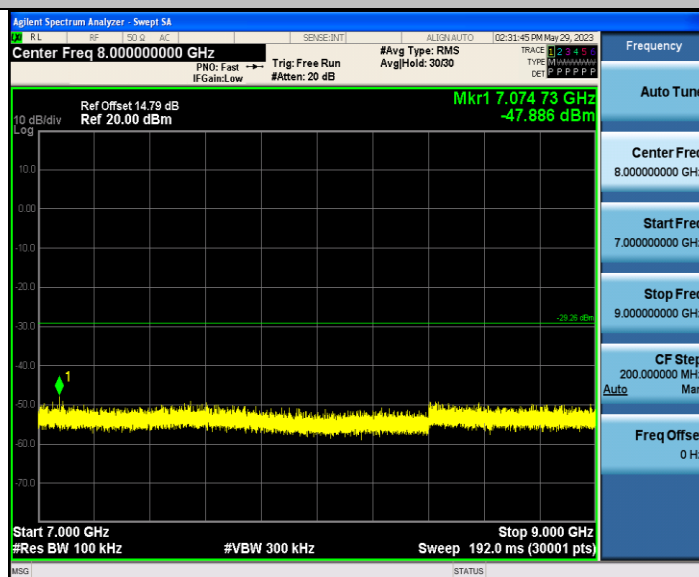
## BLE\_1M\_Ant1\_2402\_3000~5000



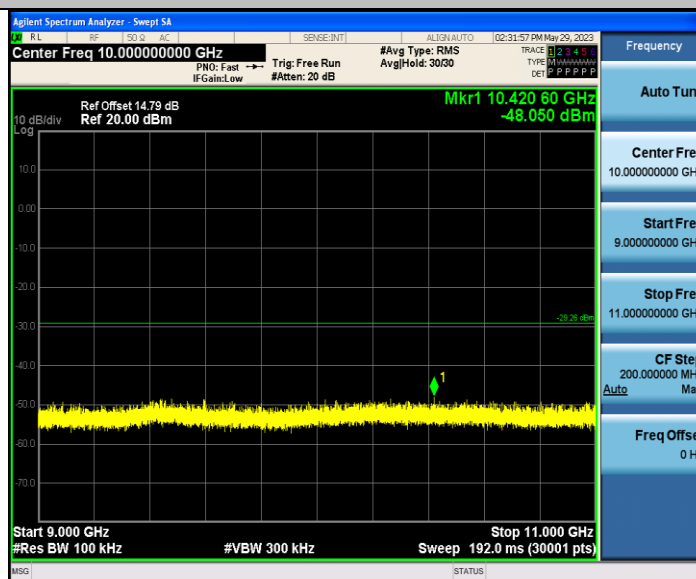
## BLE\_1M\_Ant1\_2402\_5000~7000



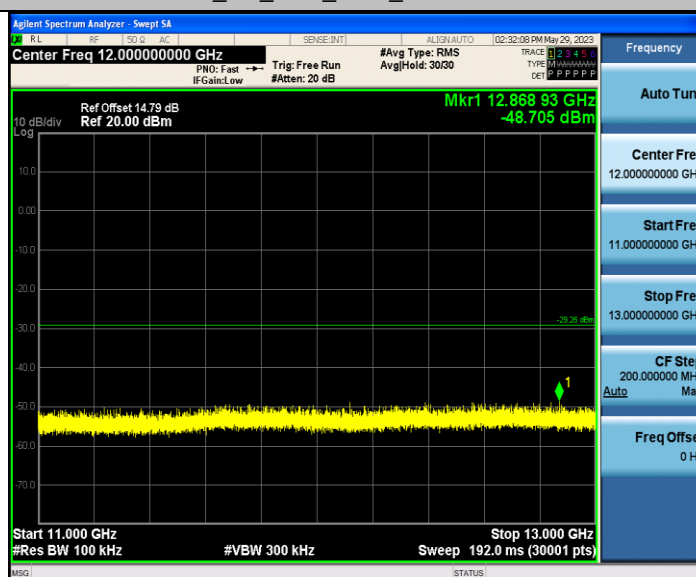
## BLE\_1M\_Ant1\_2402\_7000~9000



## BLE\_1M\_Ant1\_2402\_9000~11000



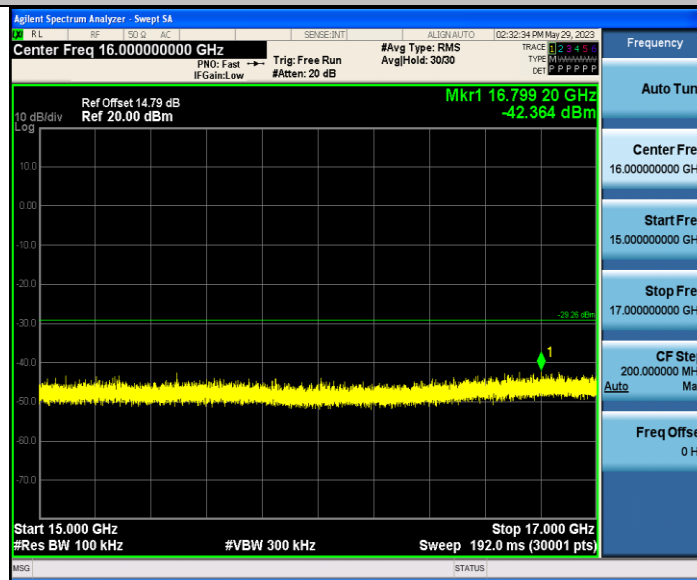
## BLE\_1M\_Ant1\_2402\_11000~13000



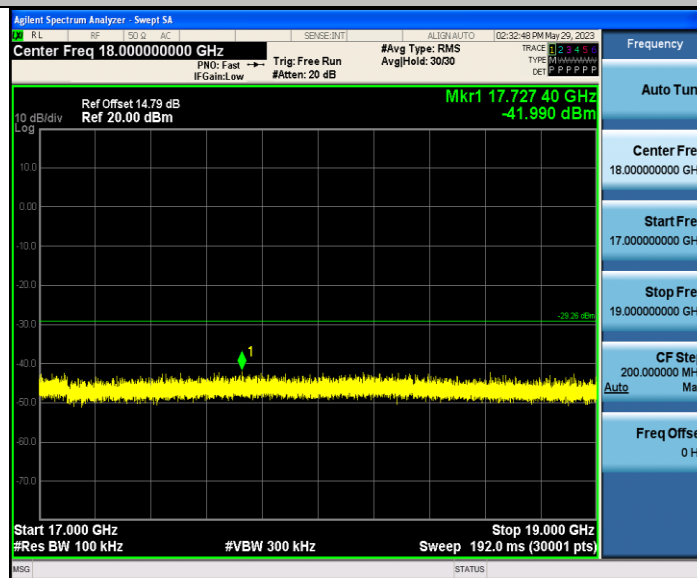
## BLE\_1M\_Ant1\_2402\_13000~15000



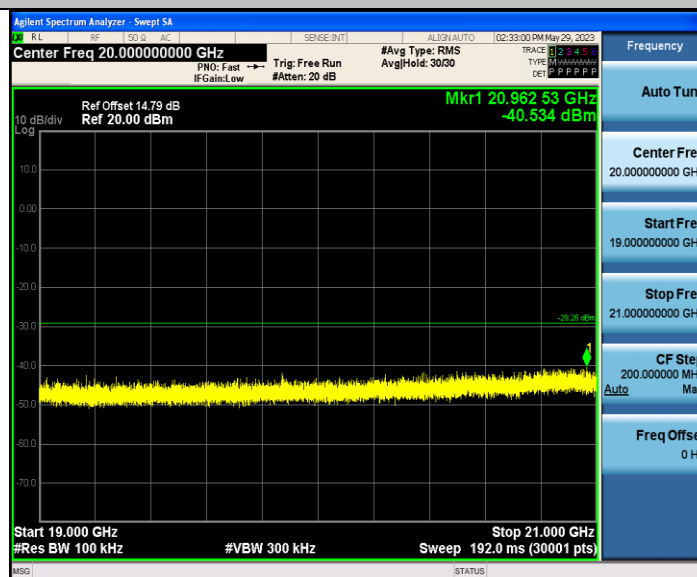
## BLE\_1M\_Ant1\_2402\_15000~17000



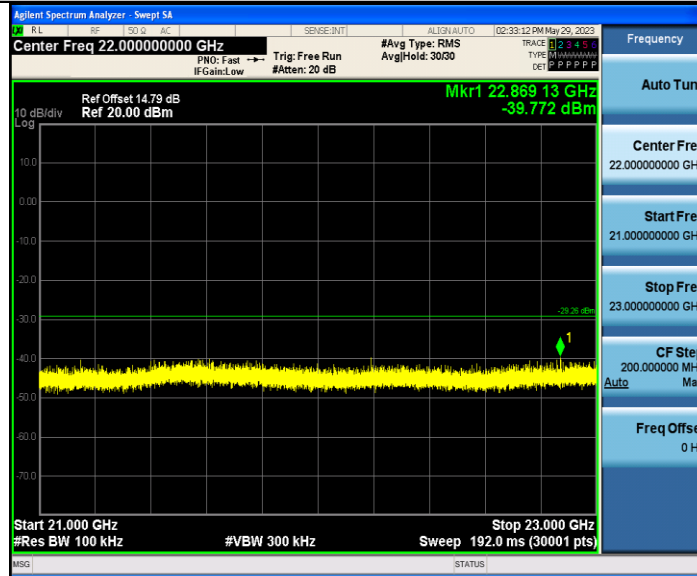
## BLE\_1M\_Ant1\_2402\_17000~19000



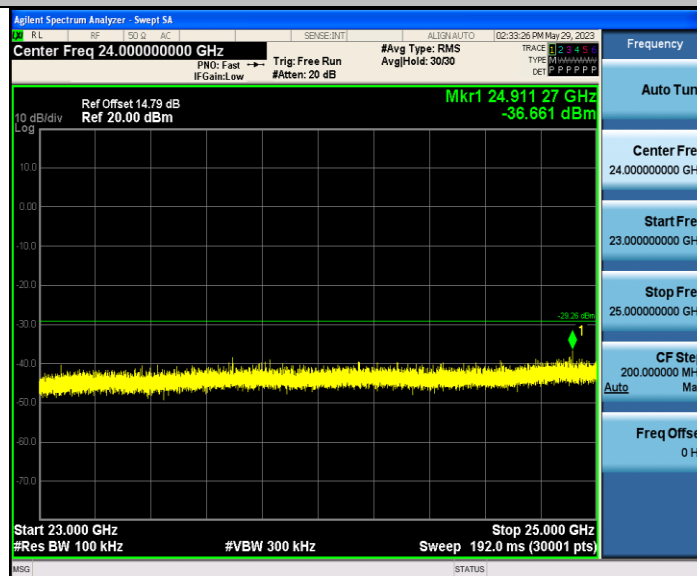
## BLE\_1M\_Ant1\_2402\_19000~21000



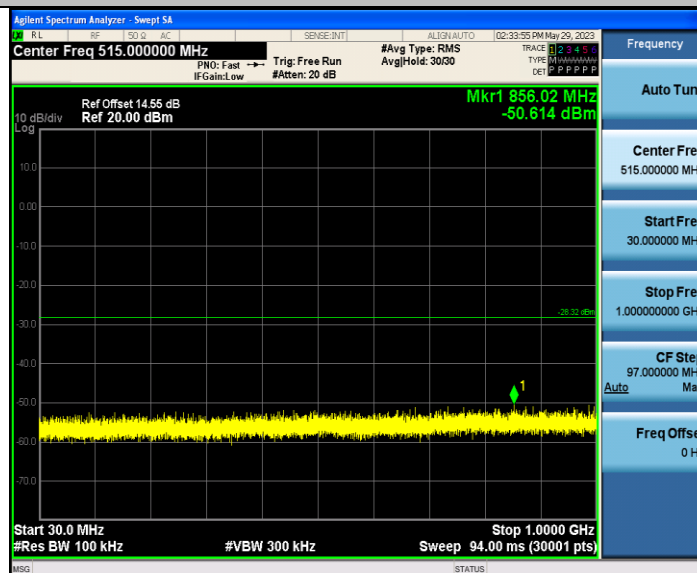
## BLE\_1M\_Ant1\_2402\_21000~23000



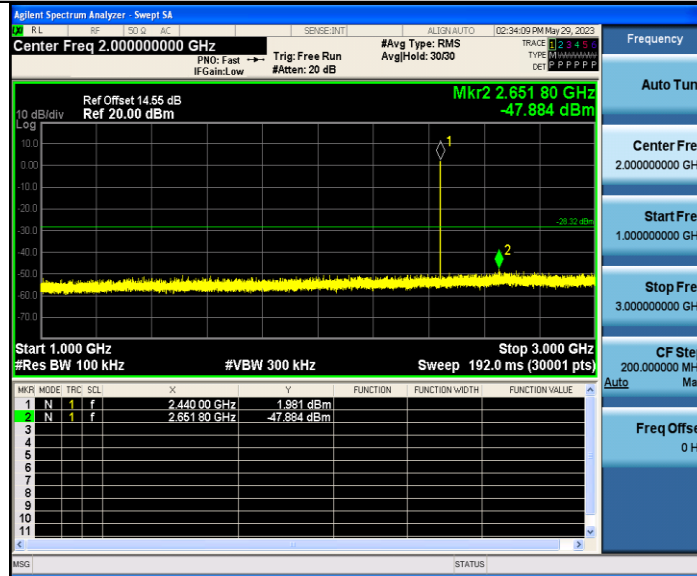
## BLE\_1M\_Ant1\_2402\_23000~25000



## BLE\_1M\_Ant1\_2440\_30~1000



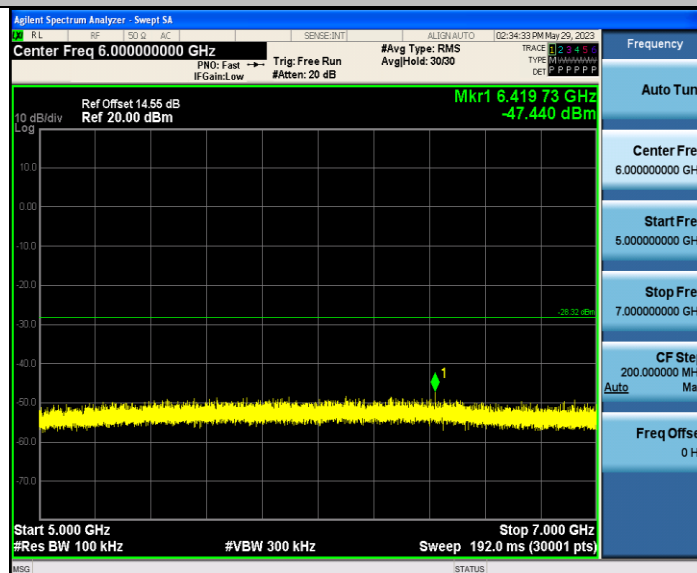
## BLE\_1M\_Ant1\_2440\_1000~3000



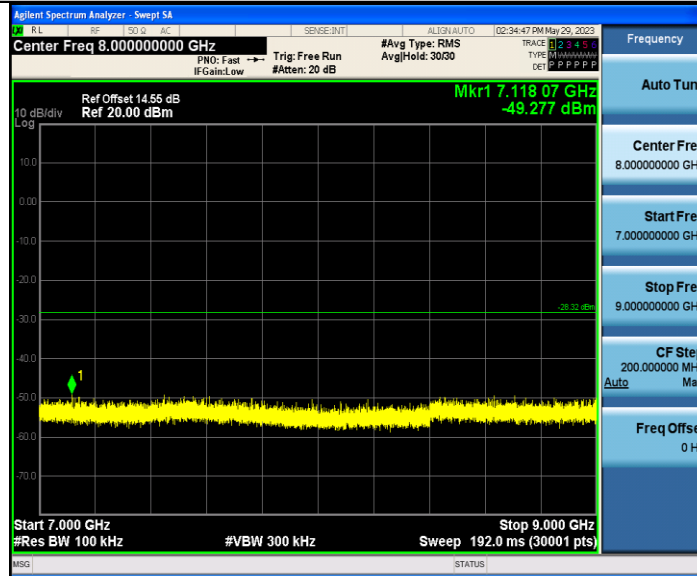
## BLE\_1M\_Ant1\_2440\_3000~5000



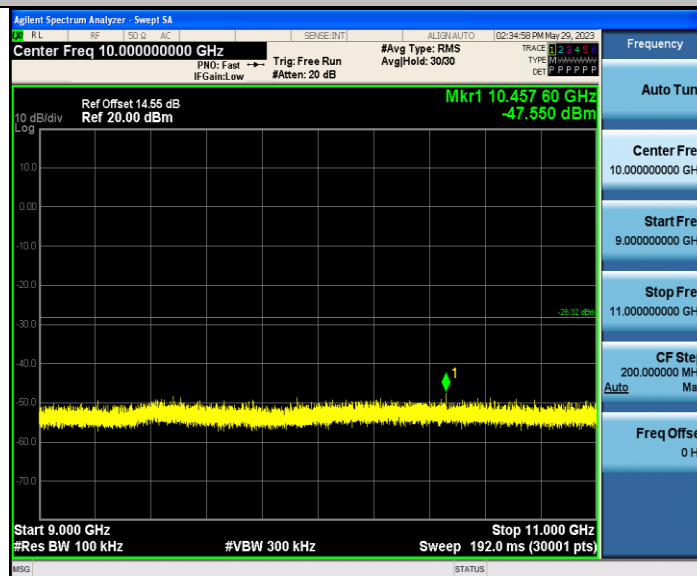
## BLE\_1M\_Ant1\_2440\_5000~7000



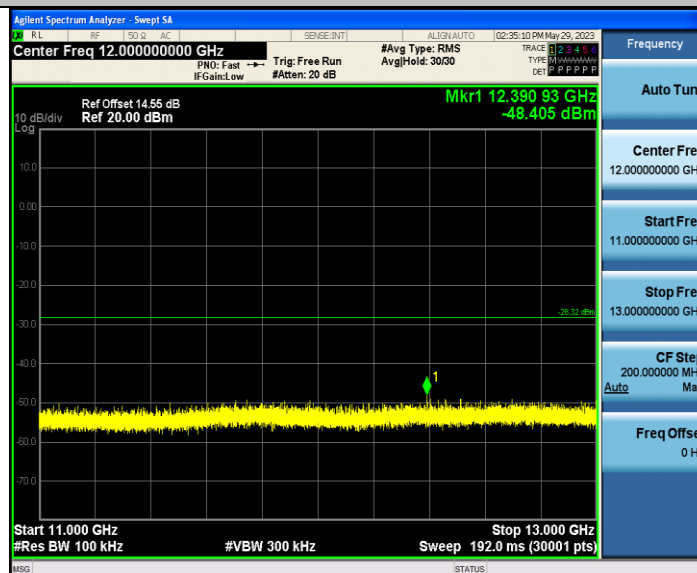
## BLE\_1M\_Ant1\_2440\_7000~9000



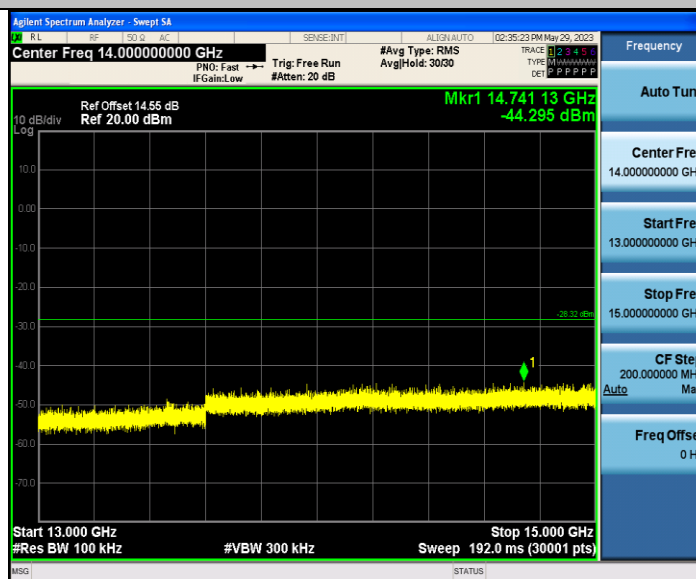
## BLE\_1M\_Ant1\_2440\_9000~11000



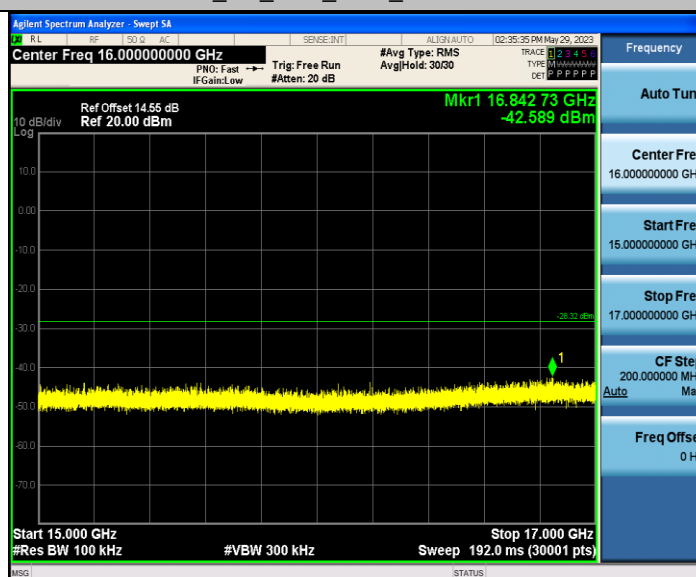
## BLE\_1M\_Ant1\_2440\_11000~13000



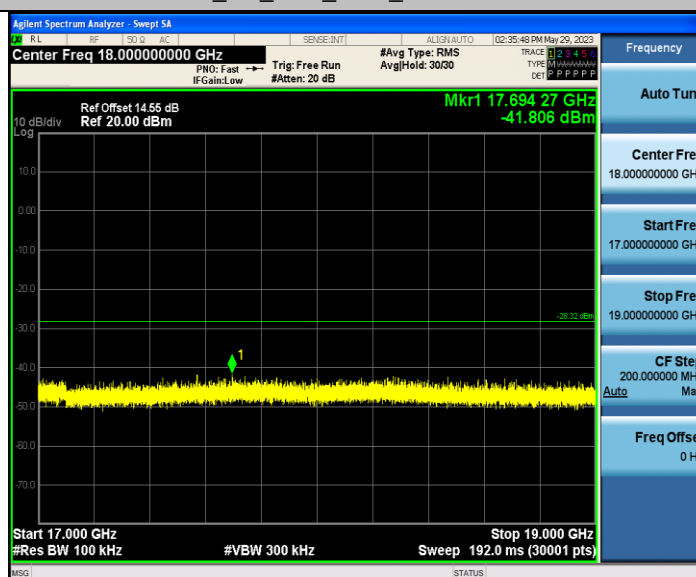
## BLE\_1M\_Ant1\_2440\_13000~15000



## BLE\_1M\_Ant1\_2440\_15000~17000

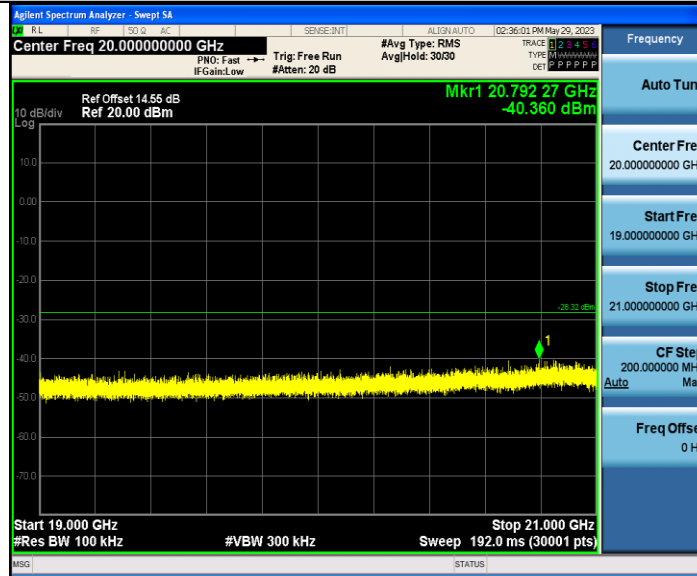


## BLE\_1M\_Ant1\_2440\_17000~19000

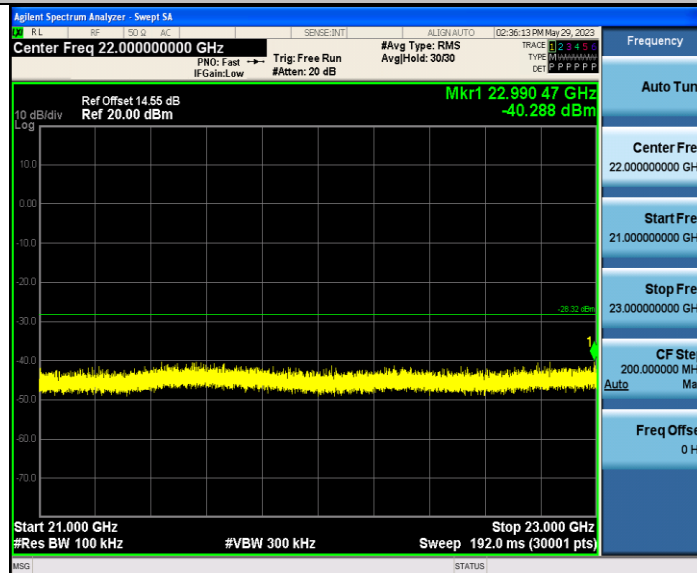




## BLE\_1M\_Ant1\_2440\_19000~21000



## BLE\_1M\_Ant1\_2440\_21000~23000

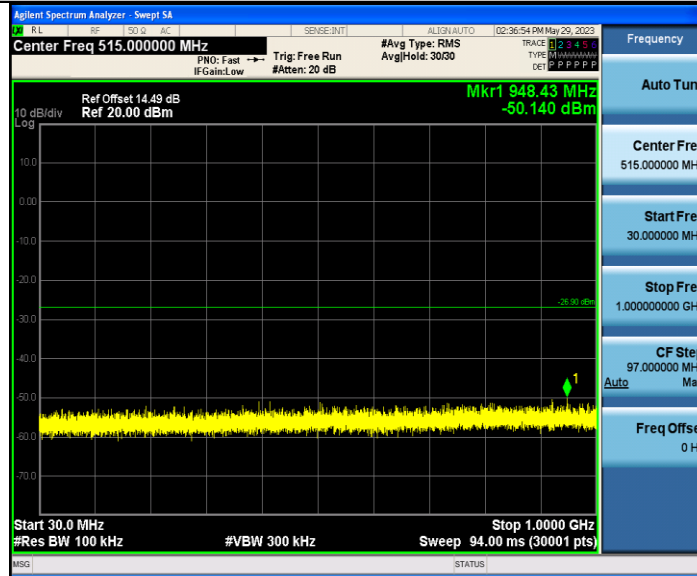


## BLE\_1M\_Ant1\_2440\_23000~25000

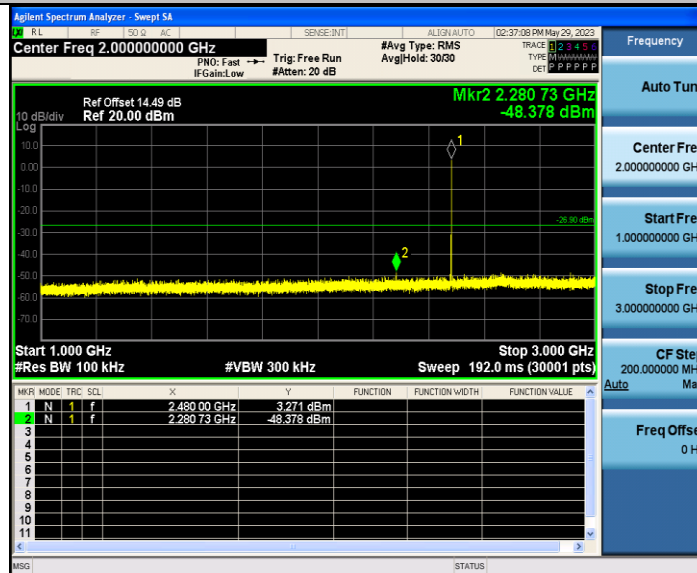




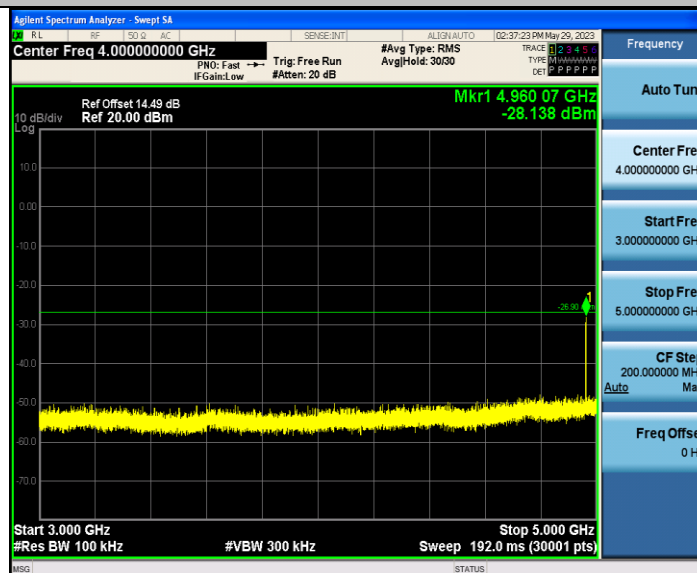
## BLE\_1M\_Ant1\_2480\_30~1000



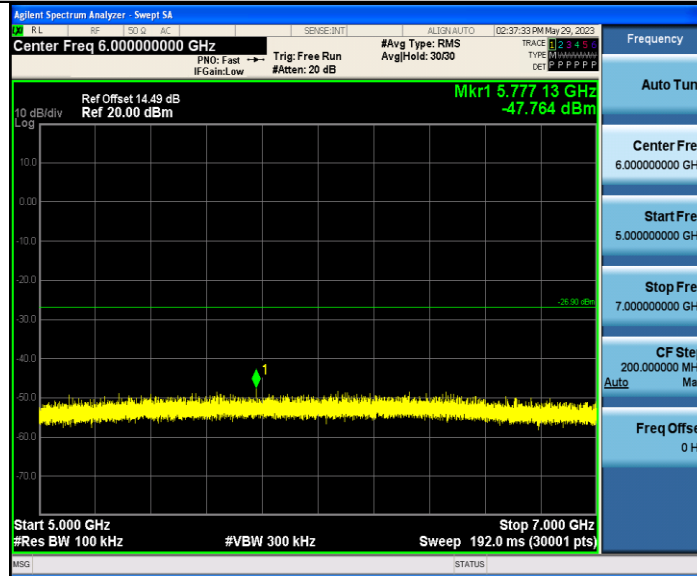
## BLE\_1M\_Ant1\_2480\_1000~3000



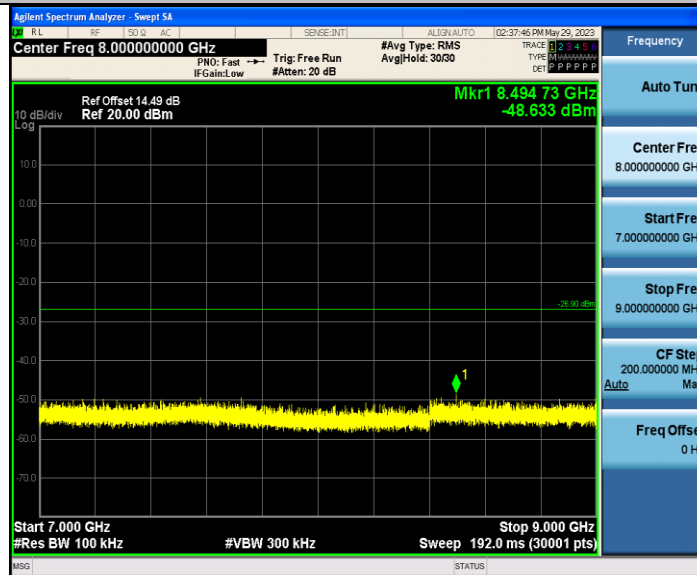
## BLE\_1M\_Ant1\_2480\_3000~5000



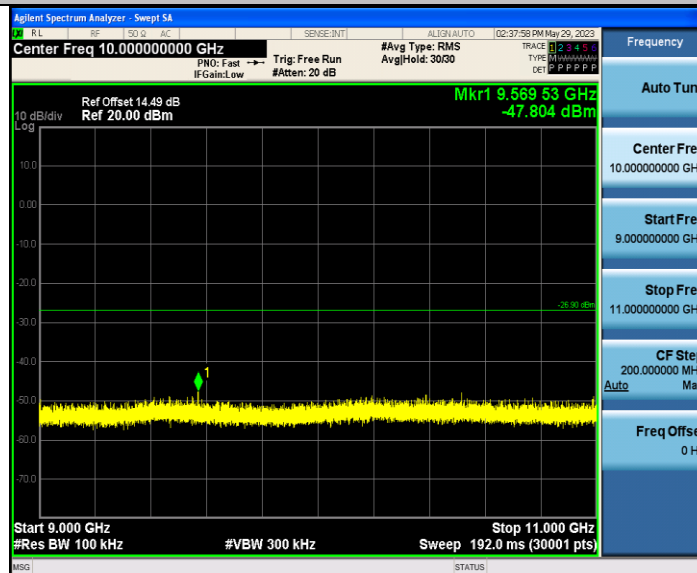
## BLE\_1M\_Ant1\_2480\_5000~7000



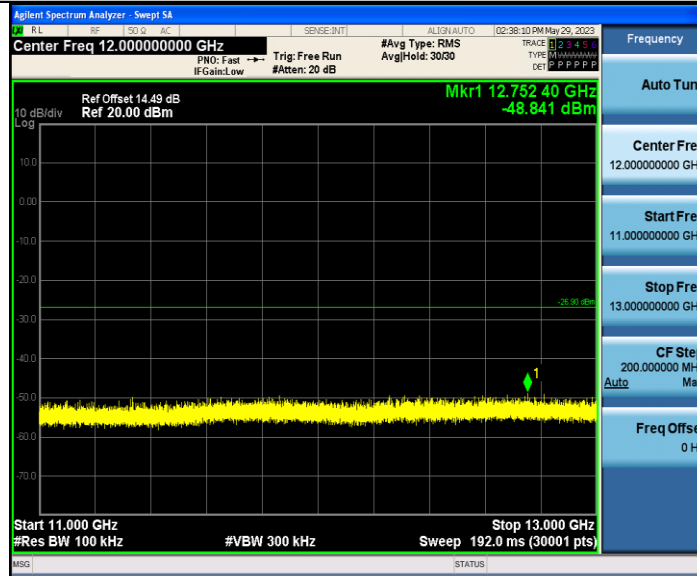
## BLE\_1M\_Ant1\_2480\_7000~9000



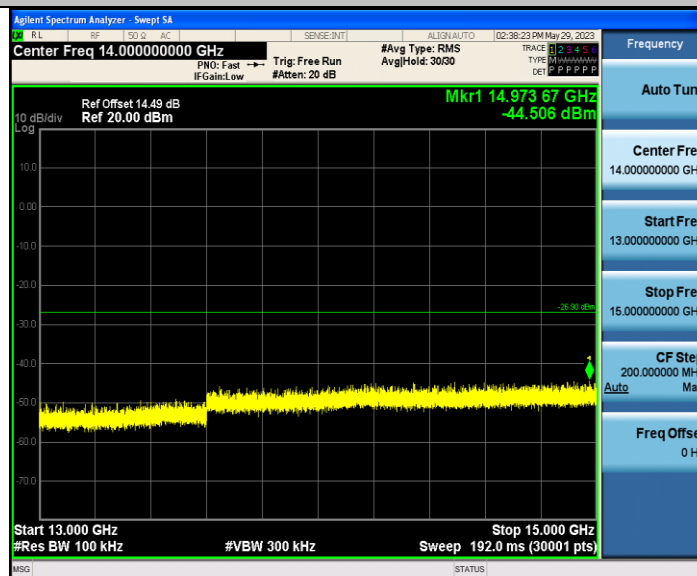
## BLE\_1M\_Ant1\_2480\_9000~11000



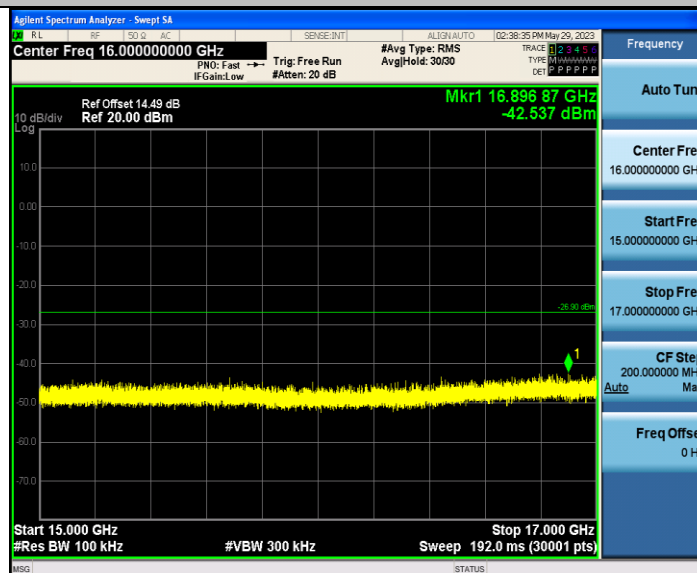
## BLE\_1M\_Ant1\_2480\_11000~13000



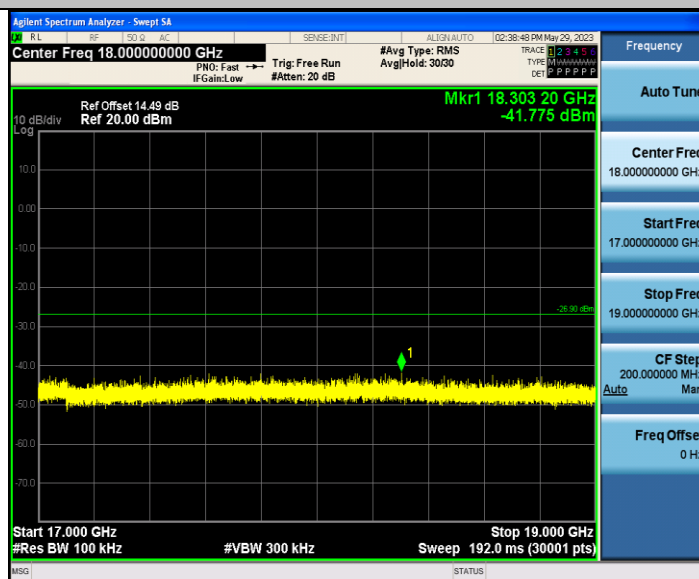
## BLE\_1M\_Ant1\_2480\_13000~15000



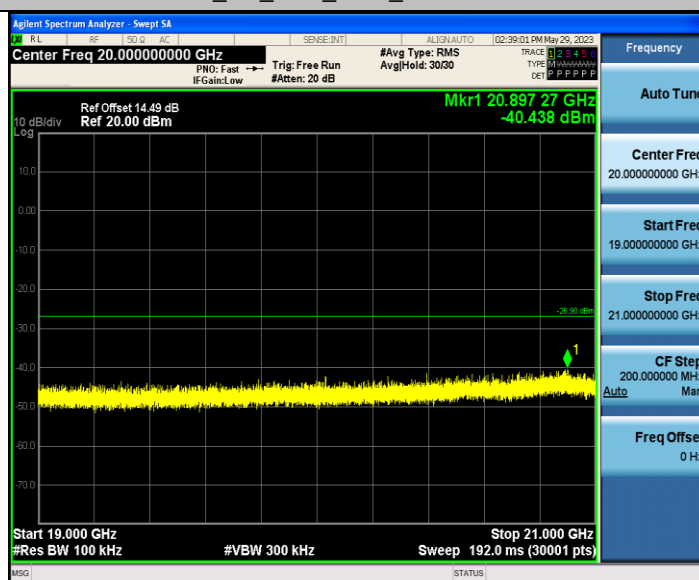
## BLE\_1M\_Ant1\_2480\_15000~17000



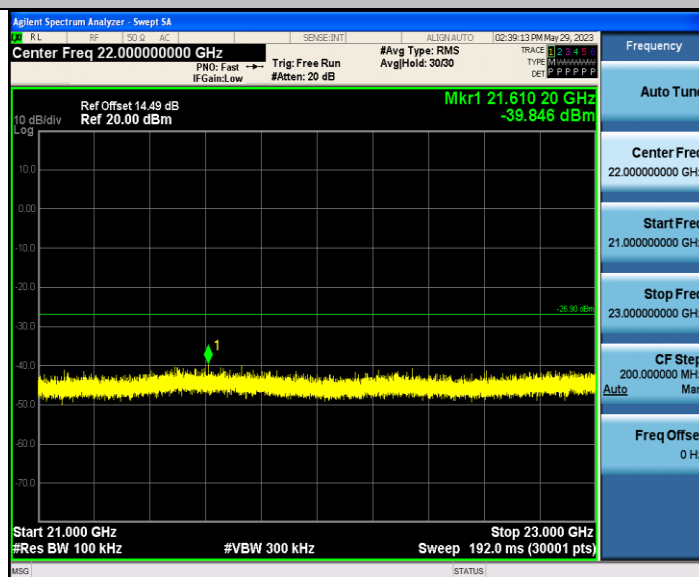
## BLE\_1M\_Ant1\_2480\_17000~19000



## BLE\_1M\_Ant1\_2480\_19000~21000



## BLE\_1M\_Ant1\_2480\_21000~23000



BLE\_1M\_Ant1\_2480\_23000~25000

