# Spot Check Evaluation

| | | |
|---|---|---|
| APPLICANT | : | Xiaomi Communications Co., Ltd. |
| EQUIPMENT | : | Mobile Phone |
| BRAND NAME | : | POCO |
| MODEL NAME | : | 24095PCADG |
| FCC ID | : | 2AFZZRA8EG |
| STANDARD | : | 47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(O), 27(Q), Part96<br>47 CFR Part 15 Subpart C §15.247<br>47 CFR Part 15 Subpart E §15.407 |
| TEST DATE(S) | : | Aug. 15, 2024 ~ Oct. 16, 2024 |

**We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.**

Jason Jia

**Approved by: Jason Jia**

ACCREDITED
Cert #5145.02

***Sporton International Inc. (Kunshan)***
***No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China***

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**APPENDIX A. RADIATED SPURIOUS EMISSION TEST DATA**

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR471506-01B | Rev. 01 | Initial issue of report | Sep. 10, 2024 |
| FR471506-01B | Rev. 02 | 1. Added Conducted power for L/M/H test channels across all frequency bands<br>2. Added Radiated spurious emissions test data for LTE Band 48 in Appendix A | Oct. 17, 2024 |
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| Conformity Assessment Condition: |
|---|
| 1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.<br>2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty” |
| **Disclaimer:** |
| The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity. |

# 1 General Description

## 1.1 Applicant

**Xiaomi Communications Co., Ltd.**
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

## 1.2 Manufacturer

**Xiaomi Communications Co., Ltd.**
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | Mobile Phone |
| **Brand Name** | POCO |
| **Model Name** | 24095PCADG |
| **FCC ID** | 2AFZZRA8EG |
| **IMEI Code** | Conducted:<br>862769070026585/862769070026593 for BT/WLAN<br>862769070029589/862769070029597 for WWAN<br>Radiation:<br>862769070028524 for BT/WLAN<br>862769070029282/862769070029290 for WWAN<br>Conduction: 862669070025702/862769070025710<br>DFS: 862769070026585/862769070026593 |
| **HW Version** | 135300O16 |
| **SW Version** | Xiaomi HyperOS 1.0 |
| **EUT Stage** | Identical Prototype |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.5 Testing Site

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

| | | | |
|---|---|---|---|
| **Test Firm** | Sporton International Inc. (Kunshan) | | |
| **Test Site Location** | No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China<br>TEL : +86-512-57900158 | | |
| **Test Site No.** | **Sporton Site No.** | **FCC Designation No.** | **FCC Test Firm Registration No.** |
| | CO01-KS<br>TH01-KS<br>DFS01-KS<br>03CH03-KS<br>03CH04-KS | CN1257 | 314309 |

## 1.6 Test Software

| Item | Site | Manufacturer | Name | Version |
|---|---|---|---|---|
| 1. | TH01-KS | Tonscend | JS1120-3 test system China_210602 | 3.3.10 |
| 2. | DFS01-KS | Sporton | Test Tools | 1.0 |
| 3. | CO01-KS | AUDIX | E3 | 6.2009-8-24 |
| 4. | 03CH03-KS | AUDIX | E3 | 210616 |
| 5. | 03CH04-KS | AUDIX | E3 | 210616 |

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC KDB 484596 D01 Referencing Test Data v02r03
- 47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(O), 27(Q), Part96
- 47 CFR Part 15 Subpart C §15.247
- 47 CFR Part 15 Subpart E §15.407
- ANSI C63.10-2013
- ANSI C63.26-2015

# 2 Re-use of Measured Data

## 2.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: 24095PCADG, FCC ID: 2AFZZRA8EG) is electrically identical to the reference device (Model: 24090RA29G, FCC ID: 2AFZZRA29G) for the portions of the circuitry corresponding to the data being re-used, following the FCC KDB 484596 D01 Referencing Test Data v02r03.

ECR Data Referencing Inquiry has been approved by FCC, and the data referencing and spot check test plan includes RF/EMC, the details are presented in section 2.3 of this report, and for SAR Reference detail, please refer to FCC SAR report FA471506-01.

The criteria set in section 3 of KDB 484596 D01 v02r03 is followed to determine whether the data referencing is justified. For SAR, the higher between the referenced value and the spot check value is used to determine compliance in both standalone and simultaneous transimission conditions

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: 2AFZZRA8EG .

## 2.2 Model Difference Information

The **main** difference between FCC ID: 2AFZZRA29G and FCC ID: 2AFZZRA8EG is as below:

- Removed LTE Band 12/13/17/26/32
- Removed TX1 B20 alternative path of B20 which used for low band + low band CA and ENDC

Other differences and all the details of similarity and difference can be found in the confidential documents (2AFZZRA8EG Operational Description of Product Equality Declaration).

## 2.3 Reference detail Section:

| Rule Part | Equipment Class | Frequency Band (MHz) | Reference FCC ID (Parent) | Reference on test | Reference Title | FCC ID Filling (Variant) | Test on the variant | Data Referencing (Y/N) |
|---|---|---|---|---|---|---|---|---|
| 15C | DSS (BR/EDR) | 2400~2483.5 | 2AFZZRA29G | Full test | FR471506A | 2AFZZRA8EG | Spot check | Y, All test items |
| | DTS (BLE) | 2400~2483.5 | 2AFZZRA29G | Full test | FR471506B | 2AFZZRA8EG | Spot check | Y, All test items |
| | DTS (WLAN) | 2400~2483.5 | 2AFZZRA29G | Full test | FR471506C | 2AFZZRA8EG | Spot check | Y, All test items |
| 15E | U-NII | 5180~5240 | 2AFZZRA29G | Full test | FR471506E | 2AFZZRA8EG | Spot check | Y, All test items |
| | | 5260~5320 | 2AFZZRA29G | Full test | FR471506E | 2AFZZRA8EG | Spot check | Y, All test items |
| | | 5500~5720 | 2AFZZRA29G | Full test | FR471506E | 2AFZZRA8EG | Spot check | Y, All test items |
| | | 5745~5825 | 2AFZZRA29G | Full test | FR471506E | 2AFZZRA8EG | Spot check | Y, All test items |
| | | 5260~5320<br>5500~5720 | 2AFZZRA29G | Full test | FZ471506 | 2AFZZRA8EG | Spot check | Y, All test items |
| 22, 24, 27, 96, | PCE (GSM) | GSM 850/1900 | 2AFZZRA29G | Full test | FG471506A | 2AFZZRA8EG | Spot check | Y, All test items |
| | PCE (WCDMA) | Band II, IV, V | 2AFZZRA29G | Full test | FG471506A | 2AFZZRA8EG | Spot check | Y, All test items |
| | PCE/CBE (LTE) | B2/4/7/7C/38/38C/41/42//48/66 | 2AFZZRA29G | Full test | FG471506B<br>FG471506C<br>FG471506E<br>FG471506F<br>FG471506G | 2AFZZRA8EG | Spot check | Y, All test items |
| | PCE/CBE (NR) | n2/n5/n7/n38/n41/ n48/n66/n77/n78 | 2AFZZRA29G | Full test | FG471506I<br>FG471506J<br>FG471506K<br>FG471506L<br>FG471506M<br>FG471506N | 2AFZZRA8EG | Spot check | Y, All test items |

Y: Pointer to spot-check exhibit; N: Pointer to full test exhibit

## 2.4 Spot Check Verification Data Section

All test items test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.
All test procedures follow the related section of parent report.

Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, show a deviation $d_{dB}$ from the reference data no larger than 3 dB:

$$d_{dB} = | V_{dB} – R_{dB} | \leq 3 \text{ dB} \quad (1)$$

$V_{dB}$, the variant spot-check level
$R_{dB}$, the corresponding measurement level for the reference model

An alternative to the limit of eq. (1) is available, and is based on considering how far the reference data $R_{dB}$ is from the compliance threshold $C_{dB}$ (also expressed in dB), for the particular test under consideration. In this case, if $M_{dB} =|C_{dB} – R_{dB}|$ is the margin in dB from the compliance limit, a spot check may be considered acceptable when the deviation ddB from the reference data satisfies the following condition:

$$d_{dB} = | V_{dB} – R_{dB} | \leq (3 + M_{dB} /20) \text{ dB , for } 0 \leq M_{dB} \leq 60 \text{ dB}$$

$$d_{dB} = | V_{dB} – R_{dB} | = 6 \text{ dB} \quad \text{, for } M_{dB} > 60 \text{ dB} \quad (2)$$

where “| |” is the absolute value of the measured quantity.
When using the option in eq. (2), $d_{dB}$ increases linearly from 3 dB to 6 dB.

Summary for spot check for each rule entry and technology is listed as below:

| Mode | Test Item | 2AFZZRA29G Parent Worst mode Test Result | 2AFZZRA8EG Variant Check Test Result | Deviation (dB) | Deviation Limit (dB) |
|---|---|---|---|---|---|
| BT 1Mbps (DH5-CH00) | Number of Channels (N) | 79 | 79 | 0 | 3 |
| | Hopping Channel Separation (MHz) | 1.004 | 1.002 | 0.002 | 3 |
| | Dwell Time of Each Channel(s) | 0.31 | 0.31 | 0 | 3 |
| | 20dB Bandwidth(MHz) | 0.86 | 0.86 | 0 | 3 |
| | 99% Bandwidth(MHz) | 0.76 | 0.76 | 0 | 3 |
| | Conducted Band Edges(dBm) | -48.06 | -49.2 | 1.14 | 3 |
| | Conducted Spurious Emission(dBm) | -50.22 | -50.55 | 0.33 | 3 |
| BT (Ch78) | Radiated Band Edges and Radiated Spurious Emission (dBuV/m) | 51.51 | 51.02 | 0.49 | 3 |
| BT | AC Conducted Emission (dBuV) | 34.93 | 33.95 | 0.98 | 3 |
| BLE 1Mbps (CH00) | 6dB Bandwidth (MHz) | 0.7 | 0.69 | 0.01 | 3 |
| | 99% Bandwidth (MHz) | 1.04 | 1.04 | 0 | 3 |
| | Power Spectral Density (dBm/3KHz) | -8.4 | -8.6 | 0.2 | 3 |
| | Conducted Band Edges and Spurious Emission (dBm) | -51.86 | -52.32 | 0.46 | 3 |
| | Conducted Spurious Emission (dBm) | -50.91 | -51.88 | 0.97 | 3 |
| BLE (CH38) | Radiated Band Edges and Radiated Spurious Emission (dBuV/m) | 40.2 | 40.22 | 0.02 | 3 |
| BLE | AC Conducted Emission (dBuV) | 34.93 | 33.95 | 0.98 | 3 |
| WIFI 2.4G (802.11b CH11) | 6dB Bandwidth (MHz) | 8.04 | 8.02 | 0.02 | 3 |
| | 99% Bandwidth (MHz) | 13.23 | 13.14 | 0.09 | 3 |
| | Power Spectral Density (dBm/3KHz) | -7.64 | -7.88 | 0.24 | 3 |
| | Conducted Band Edges and Spurious Emission (dBm) | -34.74 | -35.55 | 0.81 | 3 |
| | Conducted Spurious Emission (dBm) | -41.41 | -42.08 | 0.67 | 3 |
| WIFI 2.4G (802.11ax HE20 CH01) | Radiated Band Edges and Spurious Emission (dBuV/m) | 50.96 | 50.50 | 0.46 | 3 |
| WLAN 2.4G | AC Conducted Emission (dBuV) | 34.93 | 33.95 | 0.98 | 3 |
| WIFI 5G (802.11a CH116) | 26dB Emission Bandwidth (MHz) | 23.73 | 23.66 | 0.07 | 3 |
| | 99% Occupied Bandwidth (MHz) | 17.41 | 17.38 | 0.03 | 3 |
| | Power Spectral Density (dBm/MHz) | 6.9 | 6.88 | 0.02 | 3 |
| WIFI 5G (802.11ax HE80 CH42) | Radiated Band Edges and Spurious Emission (dBuV/m) | 50.86 | 50.89 | 0.03 | 3 |
| WLAN 5G | AC Conducted Emission (dBuV) | 38.5 | 40.8 | 2.3 | 3 |
| WLAN 5G | DFS (S) | 0.846028 | 0.848428 | 0.0024 | 3 |

| Mode | Test Item | 2AFZZRA29G Parent Worst mode Test Result | 2AFZZRA8EG Variant Check Test Result | Deviation (dB) | Deviation Limit (dB) |
|---|---|---|---|---|---|
| Part 22/24/27 (LTE Band 48) | Peak-to-Average Ratio (dB) | 5.42 | 5.16 | 0.26 | 3 |
| | Occupied Bandwidth (MHz) | 17.94 | 17.90 | 0.04 | 3 |
| | Conducted Band Edge (dBm/MHz) | -14.08 | -14.87 | 0.79 | 3 |
| | Conducted Spurious Emission (dBm/MHz) | -42.80 | -44.75 | 1.95 | 3 |
| | Frequency Stability (ppm) | 0.0016 | 0.0003 | 0.0013 | 3 |
| Part 96 (LTE Band 48) | Radiated Spurious Emission (dBm) | -47.27 | -49.88 | 2.61 | 3 |

Conducted power for Unlicensed bands

| Test Item | Mode | 2AFZZRA29G Parent Worst mode Test Result | 2AFZZRA8EG Variant Check Test Result | Deviation (dB) | Deviation Limit (dB) |
|---|---|---|---|---|---|
| Conducted Power (dBm) | BT BR/EDR -CH 00-DH5 | 10.09 | 8.65 | 1.44 | 3 |
| | BT BR/EDR -CH 39-DH5 | 8.29 | 7.04 | 1.25 | 3 |
| | BT BR/EDR -CH 78-DH5 | 11.29 | 9.64 | 1.65 | 3 |
| | BT BR/EDR -CH 00-2DH1 | 9.09 | 7.72 | 1.37 | 3 |
| | BT BR/EDR -CH 39-2DH1 | 7.19 | 6.20 | 0.99 | 3 |
| | BT BR/EDR -CH 78-2DH1 | 10.36 | 8.96 | 1.40 | 3 |
| | BT BR/EDR -CH 00-3DH1 | 8.89 | 7.56 | 1.33 | 3 |
| | BT BR/EDR -CH 39-3DH1 | 6.95 | 6.04 | 0.91 | 3 |
| | BT BR/EDR -CH 78-3DH1 | 10.19 | 8.80 | 1.39 | 3 |
| | BLE 1Mbps -CH00 | 6.49 | 7.02 | 0.31 | 3 |
| | BLE 1Mbps -CH19 | 7.33 | 5.88 | 0.43 | 3 |
| | BLE 1Mbps -CH39 | 6.31 | 6.12 | 0.43 | 3 |
| | BLE 2Mbps -CH00 | 6.55 | 6.12 | 0.43 | 3 |
| | BLE 2Mbps -CH19 | 7.37 | 7.05 | 0.32 | 3 |
| | BLE 2Mbps -CH39 | 6.49 | 6.08 | 0.41 | 3 |
| | 11b-CH 01 | 17.18 | 16.87 | 0.31 | 3 |
| | 11b-CH 06 | 20.52 | 20.28 | 0.24 | 3 |
| | 11b-CH 11 | 16.96 | 16.64 | 0.32 | 3 |
| | 11g-CH 01 | 24.5 | 24.46 | 0.04 | 3 |
| | 11g-CH 06 | 24.88 | 24.42 | 0.46 | 3 |
| | 11g-CH 11 | 24.4 | 23.98 | 0.42 | 3 |
| | 11n HT20-CH 01 | 25.15 | 24.86 | 0.29 | 3 |
| | 11n HT20-CH 06 | 25 | 24.65 | 0.35 | 3 |
| | 11n HT20-CH 11 | 24.88 | 24.53 | 0.35 | 3 |
| | 11ax HE20-CH 01 | 24.4 | 24.08 | 0.32 | 3 |
| | 11ax HE20-CH 06 | 24.66 | 24.35 | 0.31 | 3 |
| | 11ax HE20-CH 11 | 24.31 | 24.02 | 0.29 | 3 |
| | 11a-CH 36 | 16.98 | 16.51 | 0.47 | 3 |
| | 11a-CH 44 | 16.91 | 16.58 | 0.33 | 3 |
| | 11a-CH 48 | 16.89 | 16.49 | 0.40 | 3 |
| | 11a-CH 52 | 16.88 | 16.65 | 0.23 | 3 |
| | 11a-CH 60 | 16.96 | 16.54 | 0.42 | 3 |
| | 11a-CH 64 | 16.82 | 16.59 | 0.23 | 3 |
| | 11a-CH 100 | 16.85 | 16.45 | 0.40 | 3 |
| | 11a-CH 116 | 17.06 | 16.91 | 0.15 | 3 |
| | 11a-CH 140 | 12.49 | 12.45 | 0.04 | 3 |
| | 11a-CH 149 | 17.17 | 16.91 | 0.26 | 3 |
| | 11a-CH 157 | 17.29 | 16.97 | 0.32 | 3 |
| | 11a-CH 165 | 17.21 | 16.92 | 0.29 | 3 |
| | 11n HT20-CH 36 | 16.02 | 15.65 | 0.37 | 3 |
| | 11n HT20-CH 44 | 16.00 | 15.53 | 0.47 | 3 |
| | 11n HT20-CH 48 | 15.79 | 15.32 | 0.47 | 3 |
| | 11n HT20-CH 52 | 15.72 | 15.42 | 0.30 | 3 |
| | 11n HT20-CH 60 | 15.87 | 15.45 | 0.42 | 3 |
| | 11n HT20-CH 64 | 15.84 | 15.51 | 0.33 | 3 |
| | 11n HT20-CH 100 | 15.89 | 15.40 | 0.49 | 3 |
| | 11n HT20-CH 116 | 16.13 | 16.04 | 0.09 | 3 |
| | 11n HT20-CH 140 | 11.50 | 11.48 | 0.02 | 3 |
| | 11n HT20-CH 149 | 16.06 | 16.00 | 0.06 | 3 |
| | 11n HT20-CH 157 | 16.26 | 15.96 | 0.30 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| | 11n HT20-CH 165 | 16.20 | 16.02 | 0.18 | 3 |
| | 11ac VHT20-CH 36 | 16.08 | 15.68 | 0.40 | 3 |
| | 11ac VHT20-CH 44 | 16.06 | 15.58 | 0.48 | 3 |
| | 11ac VHT20-CH 48 | 15.85 | 15.45 | 0.40 | 3 |
| | 11ac VHT20-CH 52 | 15.79 | 15.45 | 0.34 | 3 |
| | 11ac VHT20-CH 60 | 15.90 | 15.47 | 0.43 | 3 |
| | 11ac VHT20-CH 64 | 15.87 | 15.54 | 0.33 | 3 |
| | 11ac VHT20-CH 100 | 15.94 | 15.46 | 0.48 | 3 |
| | 11ac VHT20-CH 116 | 16.17 | 16.06 | 0.11 | 3 |
| | 11ac VHT20-CH 140 | 11.58 | 11.52 | 0.06 | 3 |
| | 11ac VHT20-CH 149 | 16.12 | 16.01 | 0.11 | 3 |
| | 11ac VHT20-CH 157 | 16.33 | 15.98 | 0.35 | 3 |
| | 11ac VHT20-CH 165 | 16.24 | 16.04 | 0.20 | 3 |
| | 11ax HE20-CH 36 | 16.18 | 15.76 | 0.42 | 3 |
| | 11ax HE20-CH 44 | 16.14 | 15.67 | 0.47 | 3 |
| | 11ax HE20-CH 48 | 15.94 | 15.53 | 0.41 | 3 |
| | 11ax HE20-CH 52 | 15.86 | 15.53 | 0.33 | 3 |
| | 11ax HE20-CH 60 | 16.00 | 15.57 | 0.43 | 3 |
| | 11ax HE20-CH 64 | 15.97 | 15.62 | 0.35 | 3 |
| | 11ax HE20-CH 100 | 16.06 | 15.59 | 0.47 | 3 |
| | 11ax HE20-CH 116 | 16.24 | 16.13 | 0.11 | 3 |
| | 11ax HE20-CH 140 | 11.64 | 11.60 | 0.04 | 3 |
| | 11ax HE20-CH 149 | 16.24 | 16.10 | 0.14 | 3 |
| | 11ax HE20-CH 157 | 16.41 | 16.06 | 0.35 | 3 |
| | 11ax HE20-CH 165 | 16.35 | 16.13 | 0.22 | 3 |
| | 11n HT40-CH 38 | 14.11 | 13.65 | 0.46 | 3 |
| | 11n HT40-CH 46 | 15.06 | 14.57 | 0.49 | 3 |
| | 11n HT40-CH 54 | 15.01 | 14.60 | 0.41 | 3 |
| | 11n HT40-CH 62 | 14.52 | 14.20 | 0.32 | 3 |
| | 11n HT40-CH 102 | 13.80 | 13.62 | 0.18 | 3 |
| | 11n HT40-CH 110 | 14.77 | 14.62 | 0.15 | 3 |
| | 11n HT40-CH 134 | 15.23 | 15.06 | 0.17 | 3 |
| | 11n HT40-CH 151 | 15.32 | 15.13 | 0.19 | 3 |
| | 11n HT40-CH 159 | 15.36 | 15.09 | 0.27 | 3 |
| | 11ac VHT40-CH 38 | 14.34 | 14.16 | 0.18 | 3 |
| | 11ac VHT40-CH 46 | 15.80 | 15.32 | 0.48 | 3 |
| | 11ac VHT40-CH 54 | 15.88 | 15.40 | 0.48 | 3 |
| | 11ac VHT40-CH 62 | 14.44 | 14.07 | 0.37 | 3 |
| | 11ac VHT40-CH 102 | 13.72 | 13.44 | 0.28 | 3 |
| | 11ac VHT40-CH 110 | 15.76 | 15.39 | 0.37 | 3 |
| | 11ac VHT40-CH 134 | 15.51 | 15.40 | 0.11 | 3 |
| | 11ac VHT40-CH 151 | 16.10 | 15.94 | 0.16 | 3 |
| | 11ac VHT40-CH 159 | 16.24 | 15.86 | 0.38 | 3 |
| | 11ax40-CH 38 | 14.24 | 13.76 | 0.48 | 3 |
| | 11ax40-CH 46 | 15.17 | 14.69 | 0.48 | 3 |
| | 11ax40-CH 54 | 15.12 | 14.70 | 0.42 | 3 |
| | 11ax40-CH 62 | 14.65 | 14.29 | 0.36 | 3 |
| | 11ax40-CH 102 | 13.94 | 13.70 | 0.24 | 3 |
| | 11ax40-CH 110 | 14.88 | 14.73 | 0.15 | 3 |
| | 11ax40-CH 134 | 15.35 | 15.16 | 0.19 | 3 |
| | 11ax40-CH 151 | 15.41 | 15.21 | 0.20 | 3 |
| | 11ax40-CH 159 | 15.47 | 15.19 | 0.28 | 3 |
| | 11ac VHT80-CH 042 | 13.40 | 12.98 | 0.42 | 3 |
| | 11ac VHT80-CH 058 | 12.70 | 12.53 | 0.17 | 3 |
| | 11ac VHT80-CH 106 | 13.30 | 13.08 | 0.22 | 3 |

| | | | | | |
|---|---|---|---|---|---|
| | 11ac VHT80-CH 122 | 14.15 | 13.86 | 0.29 | 3 |
| | 11ac VHT80-CH 138 | 14.01 | 13.93 | 0.08 | 3 |
| | 11ac VHT80-CH 155 | 14.21 | 13.88 | 0.33 | 3 |
| | 11ax HE80-CH 042 | 13.57 | 13.09 | 0.48 | 3 |
| | 11ax HE80-CH 058 | 12.84 | 12.63 | 0.21 | 3 |
| | 11ax HE80-CH 106 | 13.43 | 13.16 | 0.27 | 3 |
| | 11ax HE80-CH 122 | 14.24 | 13.97 | 0.27 | 3 |
| | 11ax HE80-CH 138 | 14.13 | 14.02 | 0.11 | 3 |
| | 11ax HE80-CH 155 | 14.33 | 13.98 | 0.35 | 3 |

Conducted power/ERP/EIRP for Licensed bands

| Test Item | Mode | Bandwidth | Channel | Frequency | Modulation | 2AFZZRA29G Parent Worst mode Test Result | | 2AFZZRA8EG Variant Check Test Result | | Deviation (dB) | Deviation Limit (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Coducted (dBm) | ERP/EIRP (W) | Coducted (dBm) | ERP/EIRP (W) | | |
| Conducted Power /ERP/EIRP | GSM 850 | / | 128 | 824.2 | GMSK | 32.4 | 1.7378 | 32.15 | 1.6406 | 0.25 | 3 |
| | GSM 850 | / | 189 | 836.4 | GMSK | 32.46 | 1.7620 | 32.26 | 1.6827 | 0.2 | 3 |
| | GSM 850 | / | 251 | 848.8 | GMSK | 32.45 | 1.7579 | 32.28 | 1.6904 | 0.17 | 3 |
| | GSM 1900 | / | 512 | 1850.2 | GMSK | 29.31 | 0.8531 | 29.12 | 0.8166 | 0.19 | 3 |
| | GSM 1900 | / | 661 | 1880 | GMSK | 29.45 | 0.8810 | 29.22 | 0.8356 | 0.23 | 3 |
| | GSM 1900 | / | 810 | 1909.8 | GMSK | 29.43 | 0.8770 | 29.18 | 0.8279 | 0.25 | 3 |
| | WCDMA 850 | / | 4132 | 826.4 | BPSK | 24.48 | 0.2805 | 24.36 | 0.2729 | 0.12 | 3 |
| | WCDMA 850 | / | 4182 | 836.4 | BPSK | 24.5 | 0.2818 | 24.38 | 0.2742 | 0.12 | 3 |
| | WCDMA 850 | / | 4233 | 846.6 | BPSK | 24.44 | 0.2780 | 24.29 | 0.2685 | 0.15 | 3 |
| | WCDMA1900 | / | 9262 | 1852.4 | BPSK | 22.91 | 0.1954 | 22.85 | 0.1928 | 0.06 | 3 |
| | WCDMA1900 | / | 9400 | 1880 | BPSK | 22.98 | 0.1986 | 22.90 | 0.1950 | 0.08 | 3 |
| | WCDMA1900 | / | 9538 | 1907.6 | BPSK | 22.93 | 0.1963 | 22.82 | 0.1914 | 0.11 | 3 |
| | WCDMA1700 | / | 1312 | 1712.4 | BPSK | 23.91 | 0.2460 | 23.69 | 0.2339 | 0.22 | 3 |
| | WCDMA1700 | / | 1413 | 1732.6 | BPSK | 23.96 | 0.2489 | 23.75 | 0.2371 | 0.21 | 3 |
| | WCDMA1700 | / | 1513 | 1752.6 | BPSK | 23.92 | 0.2466 | 23.63 | 0.2307 | 0.29 | 3 |
| | B2 | 20M | 18700 | 1860 | QPSK | 23.01 | 0.2000 | 22.61 | 0.1824 | 0.4 | 3 |
| | B2 | 20M | 18900 | 1880 | QPSK | 23.05 | 0.2018 | 22.67 | 0.1849 | 0.38 | 3 |
| | B2 | 20M | 19100 | 1900 | QPSK | 22.98 | 0.1986 | 22.65 | 0.1841 | 0.33 | 3 |
| | B4 | 20M | 20050 | 1720 | QPSK | 23.81 | 0.2404 | 23.75 | 0.2371 | 0.06 | 3 |
| | B4 | 20M | 20175 | 1732.5 | QPSK | 23.86 | 0.2432 | 23.80 | 0.2399 | 0.06 | 3 |
| | B4 | 20M | 20300 | 1745 | QPSK | 23.83 | 0.2415 | 23.72 | 0.2355 | 0.11 | 3 |
| | B66 | 20M | 132072 | 1720 | QPSK | 23.83 | 0.2415 | 23.68 | 0.2333 | 0.15 | 3 |
| | B66 | 20M | 132322 | 1745 | QPSK | 23.94 | 0.2477 | 23.73 | 0.2360 | 0.21 | 3 |
| | B66 | 20M | 132572 | 1770 | QPSK | 23.93 | 0.2472 | 23.65 | 0.2317 | 0.28 | 3 |
| | B7 | 20M | 20850 | 2510 | QPSK | 23.68 | 0.2333 | 23.64 | 0.2312 | 0.04 | 3 |
| | B7 | 20M | 21100 | 2535 | QPSK | 23.75 | 0.2371 | 23.68 | 0.2333 | 0.07 | 3 |
| | B7 | 20M | 21350 | 2560 | QPSK | 23.66 | 0.2323 | 23.61 | 0.2296 | 0.05 | 3 |
| | B7C | 20M+20M | 20850_21048 | 2510_2529.8 | QPSK | 23.24 | 0.2109 | 23.22 | 0.2099 | 0.02 | 3 |
| | B7C | 20M+20M | 21001_21199 | 2525.1_2544.9 | QPSK | 23.29 | 0.2133 | 23.24 | 0.2109 | 0.05 | 3 |
| | B7C | 20M+20M | 21152_21350 | 2540.2_2560 | QPSK | 23.28 | 0.2128 | 23.13 | 0.2056 | 0.15 | 3 |
| | B38 | 20M | 37850 | 2580 | QPSK | 23.43 | 0.2203 | 23.40 | 0.2188 | 0.03 | 3 |
| | B38 | 20M | 38000 | 2595 | QPSK | 23.52 | 0.2249 | 23.43 | 0.2203 | 0.09 | 3 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B38 | 20M | 38150 | 2610 | QPSK | 23.48 | 0.2228 | 23.38 | 0.2178 | 0.1 | 3 |
| | B41 | 20M | 39750 | 2506 | QPSK | 23.44 | 0.2208 | 23.40 | 0.2188 | 0.04 | 3 |
| | B41 | 20M | 40620 | 2593 | QPSK | 23.6 | 0.2291 | 23.49 | 0.2234 | 0.11 | 3 |
| | B41 | 20M | 41490 | 2680 | QPSK | 23.54 | 0.2259 | 23.39 | 0.2183 | 0.15 | 3 |
| | B38C-20M+20M | 20M+20M | 37850_38048 | 2580_2599.8 | QPSK | 23.38 | 0.2178 | 23.31 | 0.2143 | 0.07 | 3 |
| | B38C-20M+20M | 20M+20M | 37901_38099 | 2585.1_2604.9 | QPSK | 23.39 | 0.2183 | 23.35 | 0.2163 | 0.04 | 3 |
| | B38C-20M+20M | 20M+20M | 37952_38150 | 2590.2_2610 | QPSK | 23.36 | 0.2168 | 23.27 | 0.2123 | 0.09 | 3 |
| | B42 | 20M | 42190 | 3460 | QPSK | 24.56 | 0.2858 | 24.34 | 0.2716 | 0.22 | 3 |
| | B42 | 20M | 42590 | 3500 | QPSK | 24.59 | 0.2877 | 24.45 | 0.2786 | 0.14 | 3 |
| | B42 | 20M | 42990 | 3540 | QPSK | 24.54 | 0.2844 | 24.47 | 0.2799 | 0.07 | 3 |
| | B48 | 20M | 55340 | 3560 | QPSK | 24.41 | 0.2761 | 24.33 | 0.2710 | 0.08 | 3 |
| | B48 | 20M | 55830 | 3609 | QPSK | 24.48 | 0.2805 | 24.36 | 0.2729 | 0.12 | 3 |
| | B48 | 20M | 56640 | 3690 | QPSK | 24.38 | 0.2742 | 24.29 | 0.2685 | 0.09 | 3 |
| | N2-L | 20M | 372000 | 1860 | PI/2 BPSK | 22.83 | 0.1919 | 22.78 | 0.1897 | 0.05 | 3 |
| | N2-M | 20M | 376000 | 1880 | PI/2 BPSK | 22.78 | 0.1897 | 22.72 | 0.1871 | 0.06 | 3 |
| | N2-H | 20M | 380000 | 1900 | PI/2 BPSK | 22.64 | 0.1837 | 22.61 | 0.1824 | 0.03 | 3 |
| | N5-L | 20M | 166800 | 834 | PI/2 BPSK | 24.37 | 0.2735 | 24.33 | 0.2710 | 0.04 | 3 |
| | N5-M | 20M | 167300 | 836.5 | PI/2 BPSK | 24.46 | 0.2793 | 24.41 | 0.2761 | 0.05 | 3 |
| | N5-H | 20M | 167800 | 839 | PI/2 BPSK | 24.4 | 0.2754 | 24.28 | 0.2679 | 0.12 | 3 |
| | N7-L | 50M | 505000 | 2525 | PI/2 BPSK | 22.85 | 0.1928 | 22.81 | 0.1910 | 0.04 | 3 |
| | N7-M | 50M | 507000 | 2535 | PI/2 BPSK | 23.01 | 0.2000 | 22.98 | 0.1986 | 0.03 | 3 |
| | N7-H | 50M | 509000 | 2545 | PI/2 BPSK | 23.3 | 0.2138 | 23.13 | 0.2056 | 0.17 | 3 |
| | N38-L | 40M | 518000 | 2590 | QPSK | 23.16 | 0.2070 | 23.11 | 0.2046 | 0.05 | 3 |
| | N38-M | 40M | 519000 | 2595 | QPSK | 23.16 | 0.2070 | 23.09 | 0.2037 | 0.07 | 3 |
| | N38-H | 40M | 520000 | 2600 | QPSK | 23.18 | 0.2080 | 23.15 | 0.2065 | 0.03 | 3 |
| | N41-L | 100M | 509202 | 2546.01 | QPSK | 23.16 | 0.2070 | 23.11 | 0.2046 | 0.05 | 3 |
| | N41-M | 100M | 518598 | 2592.99 | QPSK | 23.23 | 0.2104 | 23.18 | 0.2080 | 0.05 | 3 |
| | N41-H | 100M | 528000 | 2640 | QPSK | 23.03 | 0.2009 | 22.98 | 0.1986 | 0.05 | 3 |
| | N66-L | 40M | 346000 | 1730 | PI/2 BPSK | 24.2 | 0.2630 | 24.16 | 0.2606 | 0.04 | 3 |
| | N66-M | 40M | 349000 | 1745 | PI/2 BPSK | 24 | 0.2512 | 23.96 | 0.2489 | 0.04 | 3 |
| | N66-H | 40M | 352000 | 1760 | PI/2 BPSK | 24.09 | 0.2564 | 24.03 | 0.2529 | 0.06 | 3 |
| | N48-L | 40M | 638000 | 3570 | PI/2 BPSK | 24.23 | 0.2649 | 24.14 | 0.2594 | 0.09 | 3 |
| | N48-M | 40M | 641666 | 3624.99 | PI/2 BPSK | 24.58 | 0.2871 | 24.48 | 0.2805 | 0.1 | 3 |
| | N48-H | 40M | 645332 | 3679.98 | PI/2 BPSK | 24.15 | 0.2600 | 24.10 | 0.2570 | 0.05 | 3 |
| | N77 27O-L | 100M | 650000 | 3750 | PI/2 BPSK | 26.17 | 0.4140 | 26.14 | 0.4111 | 0.03 | 3 |
| | N77 27O-M | 100M | 656000 | 3840 | PI/2 BPSK | 26.19 | 0.4159 | 26.13 | 0.4102 | 0.06 | 3 |
| | N77 27O-H | 100M | 662000 | 3930 | PI/2 BPSK | 26.4 | 0.4365 | 26.31 | 0.4276 | 0.09 | 3 |
| | N78 27O | 100M | 650000 | 3750 | QPSK | 26.31 | 0.4276 | 26.27 | 0.4236 | 0.04 | 3 |
| | N77 27Q | 100M | 633334 | 3500.01 | PI/2 BPSK | 26.3 | 0.4266 | 26.25 | 0.4217 | 0.05 | 3 |
| | N78 27Q | 100M | 633334 | 3500.01 | PI/2 BPSK | 26.28 | 0.4246 | 26.11 | 0.4083 | 0.17 | 3 |

Conclusion:
All test items test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

Based on the spot check test result, the test data from the original model is representative for the variant model. All spot check test data are shown within expected level compliant to limit line.

We are using power and ERP/EIRP measurements from the original parent model reports to list on the grant.

The same detection mechanism/software/antenna gain is used in the variant of DFS. Hence, all test cases refer to parent report.

We confirm that the test data referencing policy of FCC KDB 484596 D01 Referencing Test Data v02r03 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

# 3 List of Measuring Equipment

**For BT/WIFI:**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 11, 2023 | Aug. 28, 2024~ Oct. 16, 2024 | Oct. 10, 2024 | Conducted (TH01-KS) |
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 10, 2024 | | Oct. 09, 2025 | Conducted (TH01-KS) |
| Pulse Power Senor | Anritsu | MA2411B | 0917070 | 300MHz~40GHz | Jan. 02, 2024 | Aug. 28, 2024~ Oct. 16, 2024 | Jan. 01, 2025 | Conducted (TH01-KS) |
| Power Meter | Anritsu | ML2495A | 1005002 | 50MHz Bandwidth | Jan. 02, 2024 | Aug. 28, 2024~ Oct. 16, 2024 | Jan. 01, 2025 | Conducted (TH01-KS) |
| EMI Receiver | R&S | ESCI7 | 100768 | 9kHz~7GHz; | Apr. 18, 2024 | Aug. 28, 2024 | Apr. 17, 2025 | Conduction (CO01-KS) |
| AC LISN (for auxiliary equipment) | MessTec | AN3016 | 060103 | 9kHz~30MHz | Oct. 11, 2023 | Aug. 28, 2024 | Oct. 10, 2024 | Conduction (CO01-KS) |
| AC LISN | MessTec | AN3016 | 060105 | 9kHz~30MHz | Apr. 18, 2024 | Aug. 28, 2024 | Apr. 17, 2025 | Conduction (CO01-KS) |
| AC Power Source | Chroma | 61602 | ABP000000811 | AC 0V~300V, 45Hz~1000Hz | Oct. 11, 2023 | Aug. 28, 2024 | Oct. 10, 2024 | Conduction (CO01-KS) |
| Signal Analyzer | R&S | FSV7 | 101472 | 10Hz~7GHz | Jan. 02, 2024 | Aug, 30, 2024 | Jan. 01, 2025 | Conducted (DFS01-KS) |
| MXG-B RF Vector Signal Genertor | Keysight | 5182B /5182BX07 | MY56200417 /MY59360210 | 9kHz~7.2GHz | Apr 17, 2024 | Aug, 30, 2024 | Apr 16, 2025 | Conducted (DFS01-KS) |
| Combiner | MTJ Cooperation | MTJ7112 | N/A | 0.4-6GHz | NCR | Aug, 30, 2024 | NCR | Conducted (DFS01-KS) |
| EMI Test Receiver | Keysight | N9038A | MY56400004 | 3Hz~8.5GHz;Max 30dBm | Oct. 11, 2023 | Aug, 15, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| EXA Spectrum Analyzer | Keysight | N9010A | MY55370528 | 10Hz-44GHz | Oct. 11, 2023 | Aug, 15, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| Loop Antenna | R&S | HFH2-Z2E | 101125 | 9kHz~30MHz | Sep. 11, 2023 | Aug, 15, 2024 | Sep. 10, 2024 | Radiation (03CH03-KS) |
| Bilog Antenna | TeseQ | CBL6112D | 23182 | 30MHz-1GHz | Dec. 06, 2023 | Aug, 15, 2024 | Dec. 05, 2024 | Radiation (03CH03-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75957 | 1GHz~18GHz | Oct. 23, 2023 | Aug, 15, 2024 | Oct. 22, 2024 | Radiation (03CH03-KS) |
| SHF-EHF Horn | com-power | AH-840 | 101115 | 18GHz~40GHz | Oct. 15, 2023 | Aug, 15, 2024 | Oct. 14, 2024 | Radiation (03CH03-KS) |
| Amplifier | SONOMA | 310N | 413740 | 30MHz ~1000MHz | Jan. 03, 2024 | Aug, 15, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| Amplifier | EM | EM18G40GA | 060851 | 18~40GHz | Jan. 03, 2024 | Aug, 15, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| high gain Amplifier | MITEQ | AMF-7D-0010 1800-30-10P | 2082394 | 1Ghz-18Ghz | Jan. 03, 2024 | Aug, 15, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| Amplifier | Keysight | 83017A | MY53270319 | 1GHz~26.5GHz | Oct. 11, 2023 | Aug, 15, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Aug, 15, 2024 | NCR | Radiation (03CH03-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Aug, 15, 2024 | NCR | Radiation (03CH03-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Aug, 15, 2024 | NCR | Radiation (03CH03-KS) |

NCR: No Calibration Required.

**For WWAN Bands:**

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 11, 2023 | Aug. 28, 2024~ Oct. 16, 2024 | Oct. 10, 2024 | Conducted (TH01-KS) |
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 10, 2024 | | Oct. 09, 2025 | Conducted (TH01-KS) |
| Power divider | STI | STI08-0055 | - | 0.5~40GHz | NCR | Aug. 28, 2024~ Oct. 16, 2024 | NCR | Conducted (TH01-KS) |
| Temperature &humidity chamber | Hongzhan | LP-150U | H2014011440 | -40~+150°C 20%~95%RH | Jul. 04, 2024 | Aug. 28, 2024~ Oct. 16, 2024 | Jul. 03, 2025 | Conducted (TH01-KS) |
| EXA Spectrum Analyzer | Keysight | N9010B | MY57471079 | 10Hz-44G,MAX 30dB | Oct. 11, 2023 | Aug. 22, 2024~ Oct. 15, 2024 | Oct. 10, 2024 | Radiation (03CH04-KS) |
| EXA Spectrum Analyzer | Keysight | N9010B | MY57471079 | 10Hz-44G,MAX 30dB | Oct. 10, 2024 | | Oct. 09, 2025 | Radiation (03CH04-KS) |
| Bilog Antenna | TeseQ | CBL6111D | 59913 | 30MHz-1GHz | Aug. 18, 2024 | Aug. 22, 2024~ Oct. 15, 2024 | Aug. 17, 2025 | Radiation (03CH04-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75957 | 1GHz~18GHz | Oct. 23, 2023 | Aug. 22, 2024~ Oct. 15, 2024 | Oct. 22, 2024 | Radiation (03CH04-KS) |
| SHF-EHF Horn | Com-power | AH-840 | 101070 | 18GHz~40GHz | Jan. 27, 2024 | Aug. 22, 2024~ Oct. 15, 2024 | Jan. 26, 2025 | Radiation (03CH04-KS) |
| Amplifier | SONOMA | 310N | 413740 | 9KHz-1GHz | Jan. 03, 2024 | Aug. 22, 2024~ Oct. 15, 2024 | Jan. 02, 2025 | Radiation (03CH04-KS) |
| Amplifier | EM | EM18G40GA | 060728 | 18~40GHz | Jan. 02, 2024 | Aug. 22, 2024~ Oct. 15, 2024 | Jan. 01, 2025 | Radiation (03CH04-KS) |
| high gain Amplifier | EM | EM01G18GA | 060840 | 1Ghz-18Ghz | Oct. 11, 2023 | Aug. 22, 2024~ Oct. 15, 2024 | Oct. 10, 2024 | Radiation (03CH04-KS) |
| high gain Amplifier | EM | EM01G18GA | 060840 | 1Ghz-18Ghz | Oct. 10, 2024 | | Oct. 09, 2025 | Radiation (03CH04-KS) |
| Amplifier | EM | EM01G18GA | 060892 | 1Ghz-18Ghz | Oct. 11, 2023 | Aug. 22, 2024~ Oct. 15, 2024 | Oct. 10, 2024 | Radiation (03CH04-KS) |
| Amplifier | EM | EM01G18GA | 060892 | 1Ghz-18Ghz | Oct. 10, 2024 | | Oct. 09, 2025 | Radiation (03CH04-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Aug. 22, 2024~ Oct. 15, 2024 | NCR | Radiation (03CH04-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Aug. 22, 2024~ Oct. 15, 2024 | NCR | Radiation (03CH04-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Aug. 22, 2024~ Oct. 15, 2024 | NCR | Radiation (03CH04-KS) |

NCR: No Calibration Required.

# 4 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

**Uncertainty of Conducted Measurement (BT/WIFI2.4G/5G)**

| | |
|---|---|
| **Conducted Spurious Emission & Bandedge** | **±2.22 dB** |
| **Occupied Channel Bandwidth** | **±0.1%** |
| **Conducted Power** | **±0.50 dB** |
| **Conducted Power Spectral Density** | **±0.90 dB** |
| **Frequency** | **±0.4 ppm** |

**Uncertainty of Conducted Measurement (DFS)**

| Test Item | Uncertainty |
|---|---|
| **Conducted Generated signal Levels** | **±0.56 dB** |
| **Conducted Time** | **0.38%** |

**Uncertainty of Conducted Measurement (WWAN)**

| | |
|---|---|
| **Conducted Spurious Emission & Bandedge** | **±2.22 dB** |
| **Occupied Channel Bandwidth** | **±0.1%** |
| **Conducted Power** | **±0.50 dB** |
| **Peak to Average Ratio** | **±0.46 dB** |
| **Frequency Stability** | **±0.4 ppm** |

**Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.84 dB** |

**03CH03-KS(BT/WIF):**

**Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.30dB |

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 6.08dB |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.18dB |

**Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.22dB |

**03CH04-KS(WWAN):**

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.83 dB |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.83 dB |

**Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

| | |
|---|---|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.82 dB |

-THE END-

# Appendix A. Radiated Spurious Emission Test Data

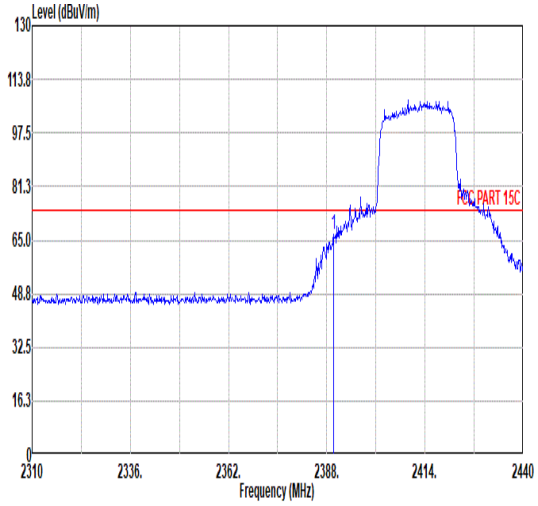
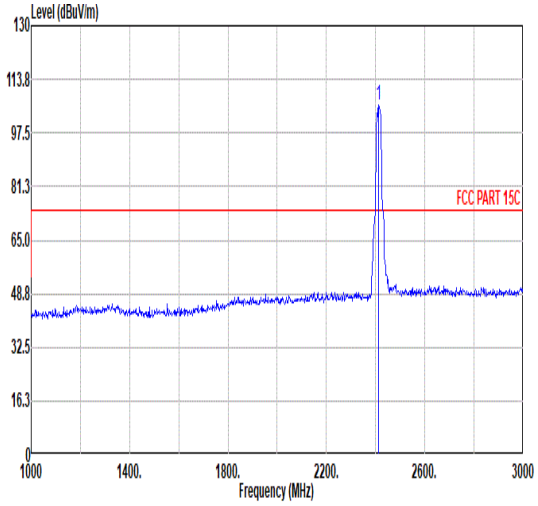
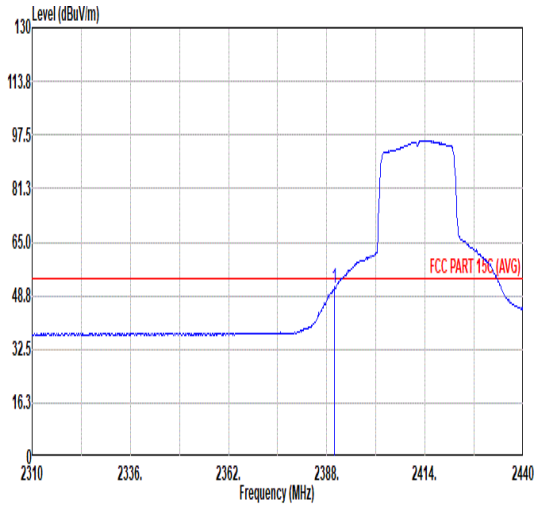
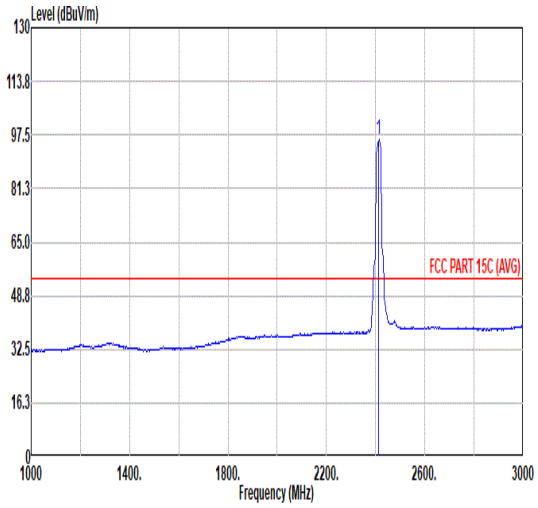
| Test Engineer : | Jake Zhou | Relative Humidity : | 53-58% |
|---|---|---|---|
| | | Temperature : | 23-26℃ |

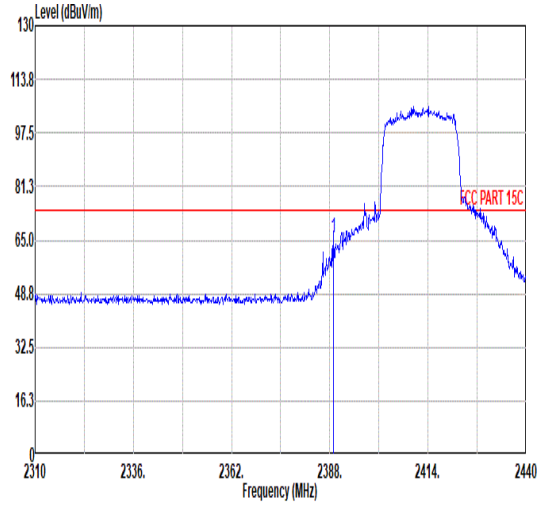
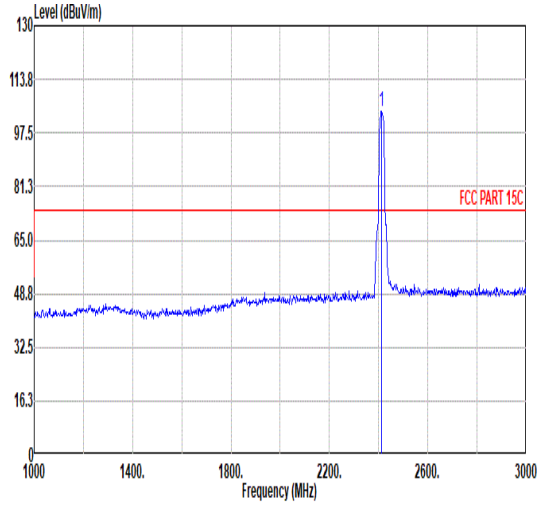
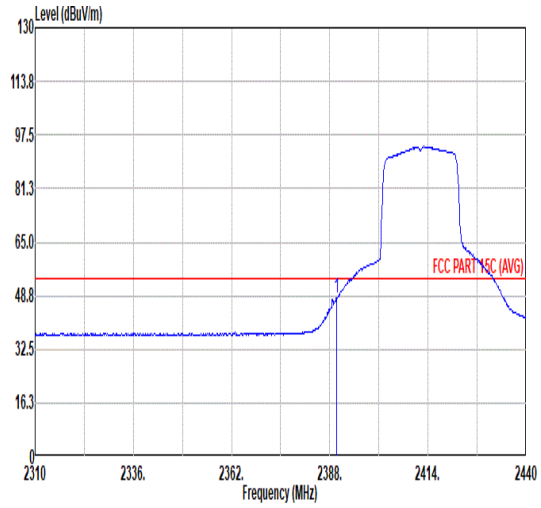
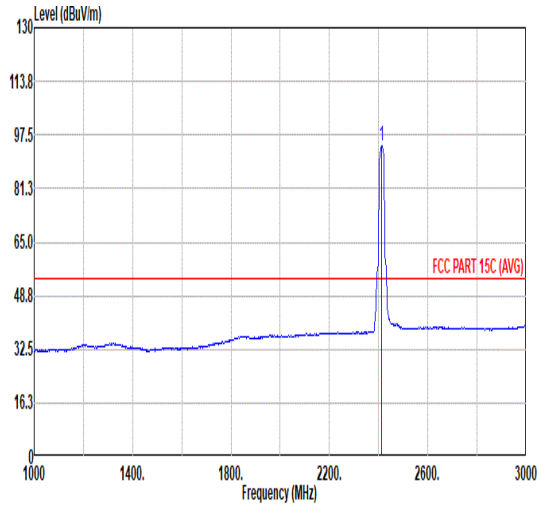
## Radiated Spurious Emission Test Modes for Co-location

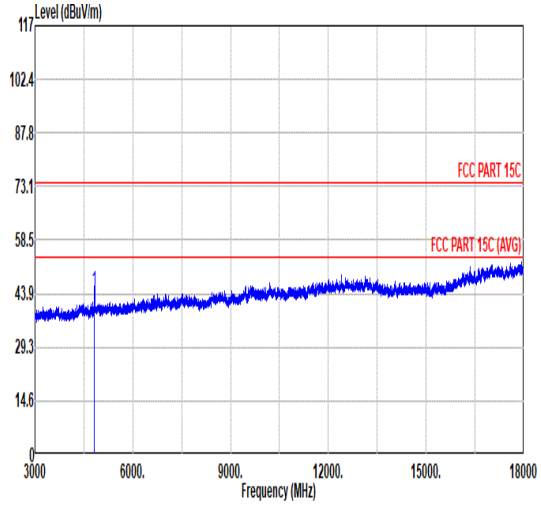
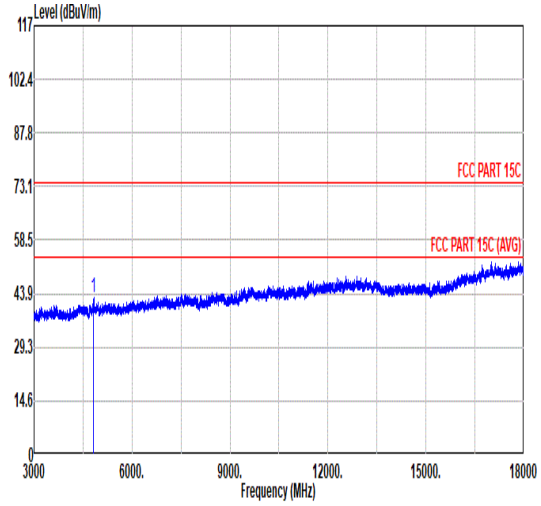
| Mode | Band | Band | Antenna | Modulation | Channel | Frequency | Data Rate | RU | Remark |
|---|---|---|---|---|---|---|---|---|---|
| Mode 1 | Co-location | 2.4G WIFI | 6 | 802.11ax HE20 | 01 | 2412 | MCS0 | Full | - |
| | | WWAN | 3 | Part 96 LTE Band 48 BW=20M | | | | | |
| Mode 2 | Co-location | 5G U-NII-1 | 6 | 802.11ax HE80 | 42 | 5210 | MCS0 | Full | - |
| | | - | 6 | Bluetooth-LE | 38 | 2478 | 2Mbps | Full | - |
| | | WWAN | 3 | Part 96 LTE Band 48 BW=20M | | | | | |

## Summary of each worse mode

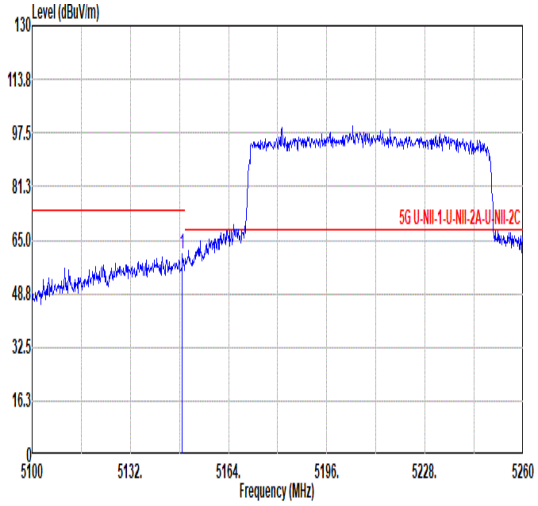
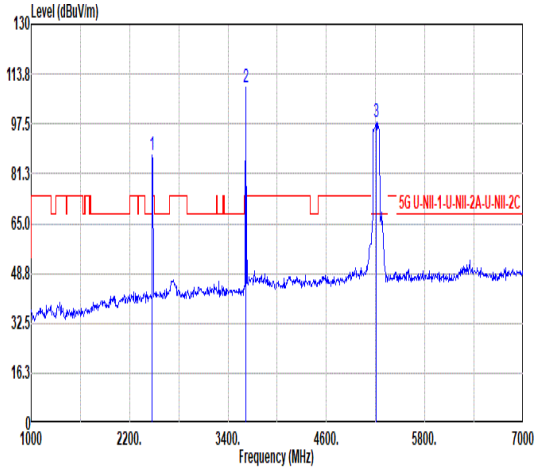
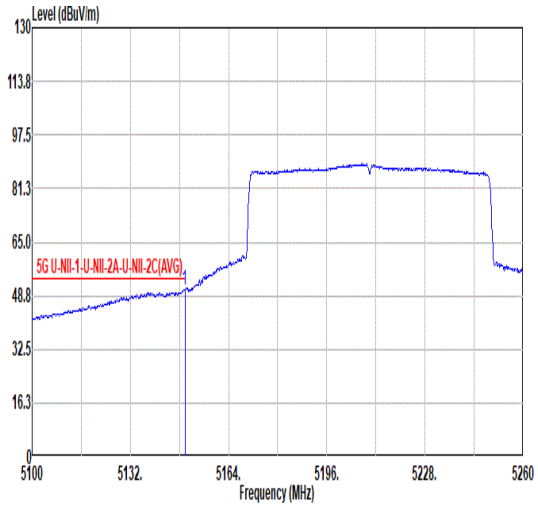
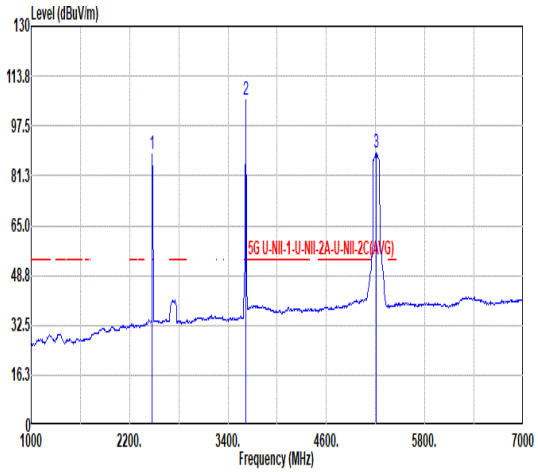
| Mode | Modulation | Ch. | Freq. (MHz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol. | Peak Avg. | Result | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 802.11ax HE20 | 01 | 2389.95 | 50.83 | 54.00 | -3.17 | H | AVERAGE | Pass | Band Edge |
| | 802.11ax HE20 | 01 | 4824.00 | 44.42 | 74.00 | -29.58 | H | PEAK | Pass | Harmonic |
| 2 | 802.11ax HE80 | 42 | 5149.76 | 50.67 | 54.00 | -3.33 | H | AVERAGE | Pass | Band Edge |
| | 802.11ax HE80 | 42 | 10420.00 | 44.50 | 68.20 | -23.70 | V | PEAK | Pass | Harmonic |
| | Bluetooth-LE | 38 | 2485.24 | 40.48 | 54.00 | -13.52 | V | AVERAGE | Pass | Band Edge |
| | Bluetooth-LE | 38 | 4956.00 | 46.87 | 54.00 | -7.13 | H | AVERAGE | Pass | Harmonic |

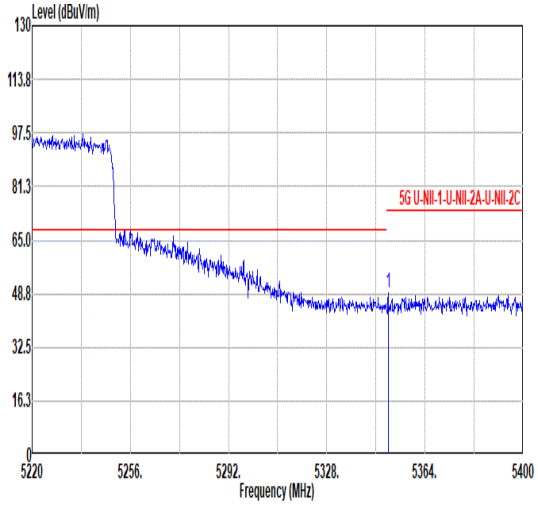
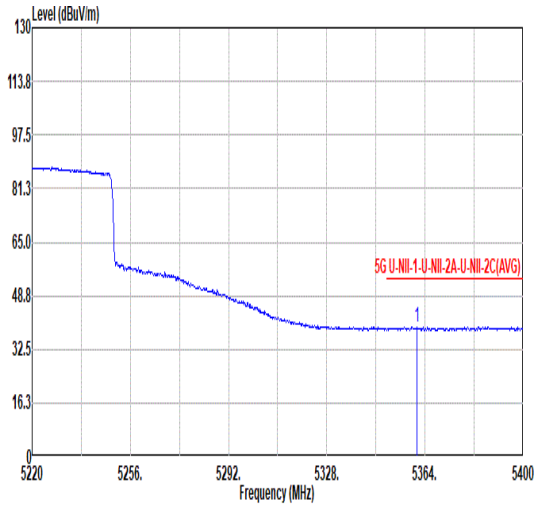
| Mode | 1 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_802.11ax HE20_CH01_Full _2412MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2389.82 66.56 74.00 -7.44 58.32 31.94 7.16 36.86 6.00 206 311 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2412.00 105.97 ------ ------ 97.49 32.14 7.20 36.86 6.00 206 311 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2389.95 50.83 54.00 -3.17 42.59 31.94 7.16 36.86 6.00 206 311 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2412.00 95.94 ------ ------ 87.42 32.17 7.21 36.86 6.00 206 311 AVERAGE |

| Mode | 1 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_802.11ax HE20_CH01_Full _2412MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2388.91 65.71 74.00 -8.29 57.48 31.93 7.16 36.86 6.00 312 52 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2412.00 103.99 ------ ------ 95.51 32.14 7.20 36.86 6.00 312 52 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2389.82 48.00 54.00 -6.00 39.76 31.94 7.16 36.86 6.00 312 52 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2412.00 93.97 ------ ------ 85.49 32.14 7.20 36.86 6.00 312 52 AVERAGE |

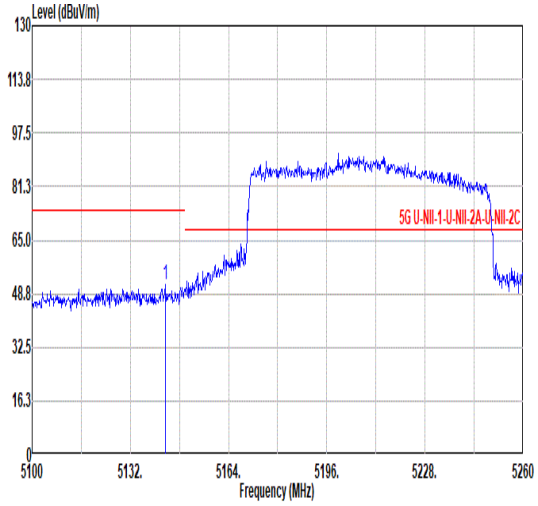
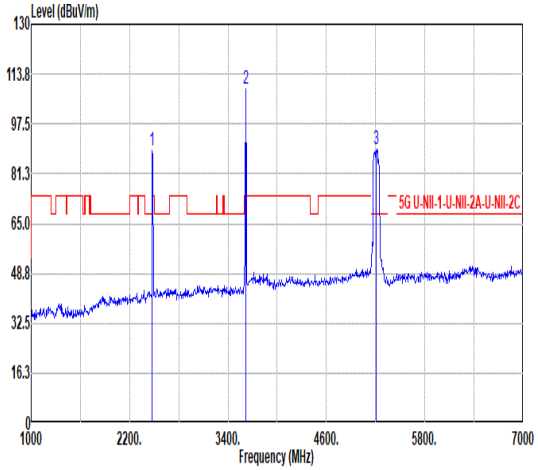
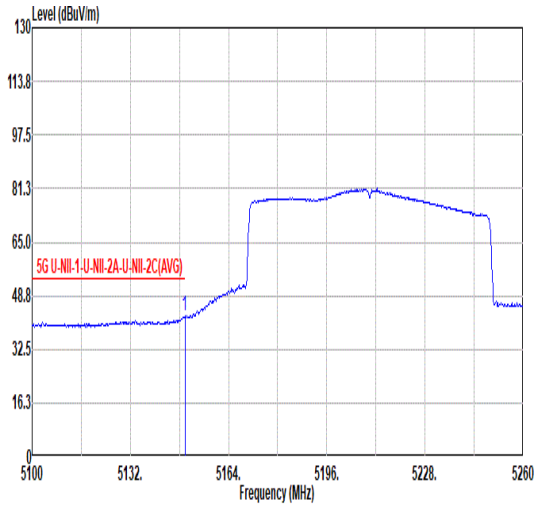
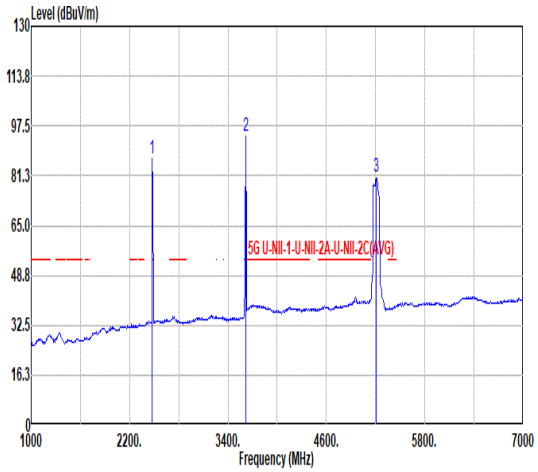
| Mode | 1 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_802.11ax HE20_CH01_Full _2412MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4824.00 44.42 74.00 -29.58 64.97 34.40 10.29 65.24 0.00 -- -- PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4824.00 43.04 74.00 -30.96 63.59 34.40 10.29 65.24 0.00 -- -- PEAK |

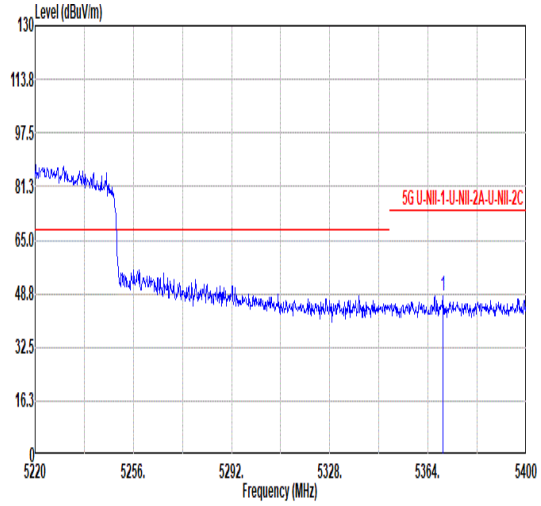
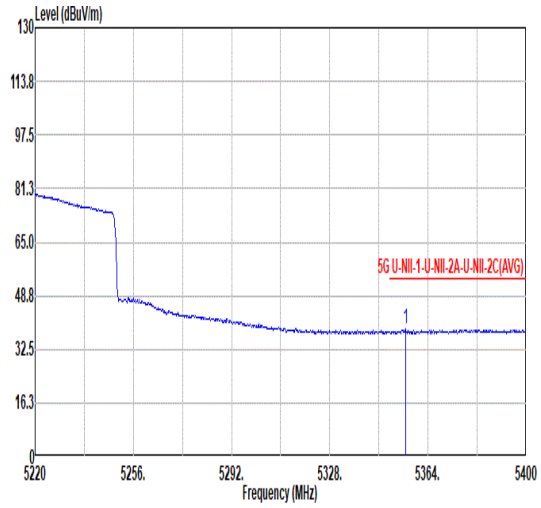
| Mode | 2 |
|---|---|
| | Band Edge - L |
| | U-NII-1_5.15-5.25_802.11ax HE80_CH42_Full_5210MHz |
| ANT | 6 |

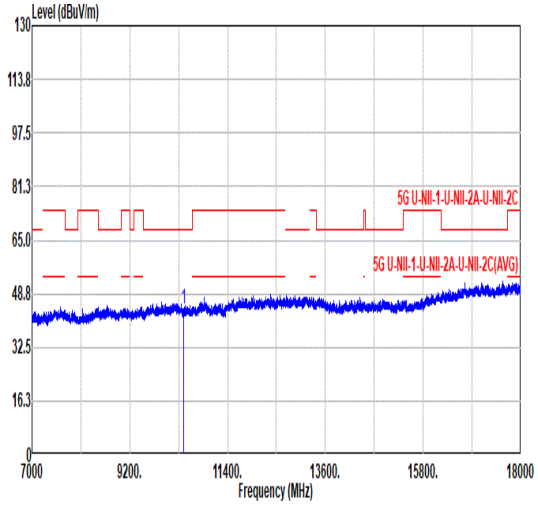
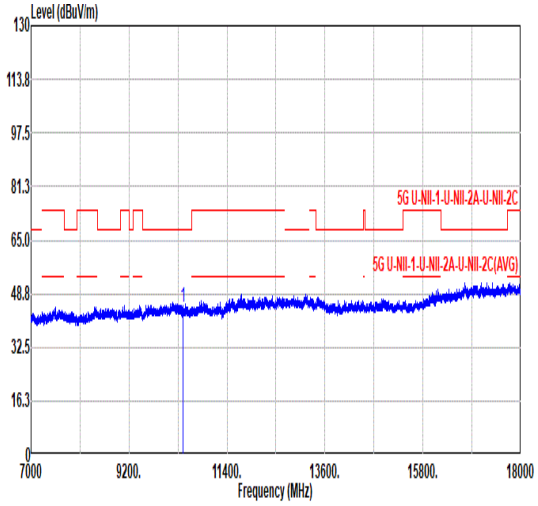
| Pol. | Horizontal | Fundamental |
|---|---|---|
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5148.96 60.84 74.00 -13.16 52.93 34.60 10.65 37.34 0.00 101 236 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2476.00 87.52 ------ ------ 84.45 32.60 7.32 36.85 0.00 101 236 Peak<br>2 3616.00 109.54 ------ ------ 104.37 32.86 8.89 36.58 0.00 101 236 Peak<br>3 5210.00 98.23 ------ ------ 90.15 34.68 10.72 37.32 0.00 101 236 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5149.76 50.67 54.00 -3.33 42.76 34.60 10.65 37.34 0.00 101 236 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2476.00 88.52 ------ ------ 85.45 32.60 7.32 36.85 0.00 101 236 Average<br>2 3616.00 106.02 ------ ------ 100.85 32.86 8.89 36.58 0.00 101 236 Average<br>3 5210.00 88.73 ------ ------ 80.65 34.69 10.71 37.32 0.00 101 236 AVERAGE |

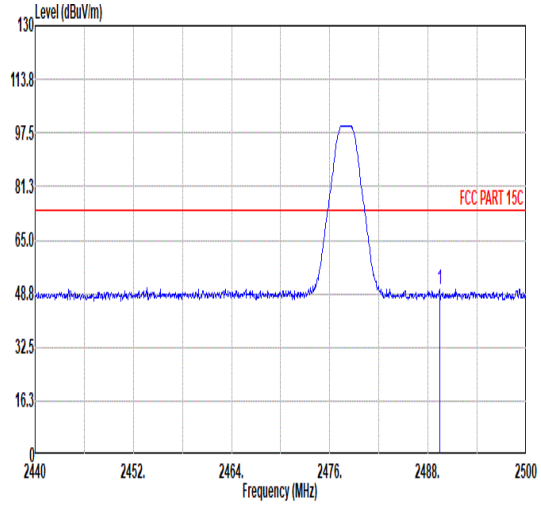
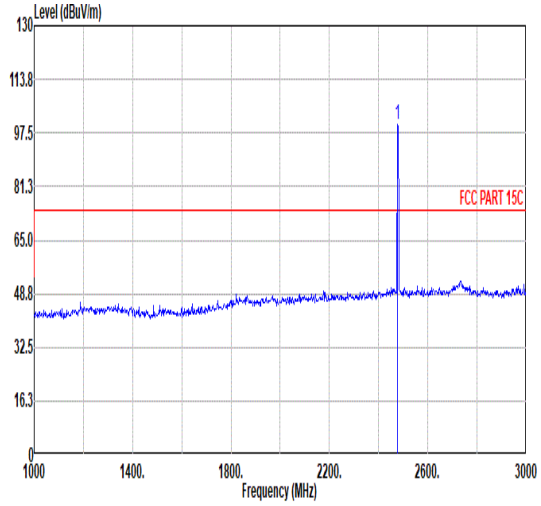
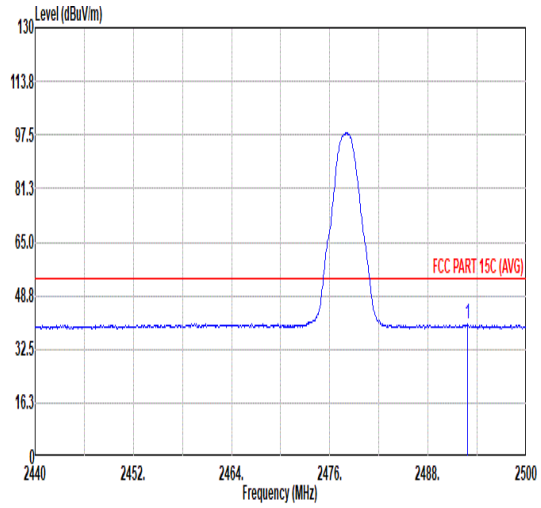
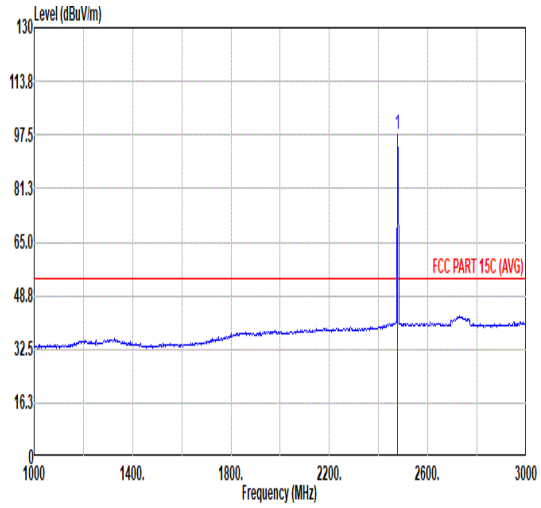
| Mode | 2 | |
|---|---|---|
| | Band Edge - R | |
| | U-NII-1_5.15-5.25_802.11ax HE80_CH42_Full_5210MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5350.50 49.25 74.00 -24.75 40.90 34.80 10.84 37.29 0.00 101 236 PEAK | Blank |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5361.12 39.34 54.00 -14.66 31.02 34.76 10.85 37.29 0.00 101 236 AVERAGE | Blank |

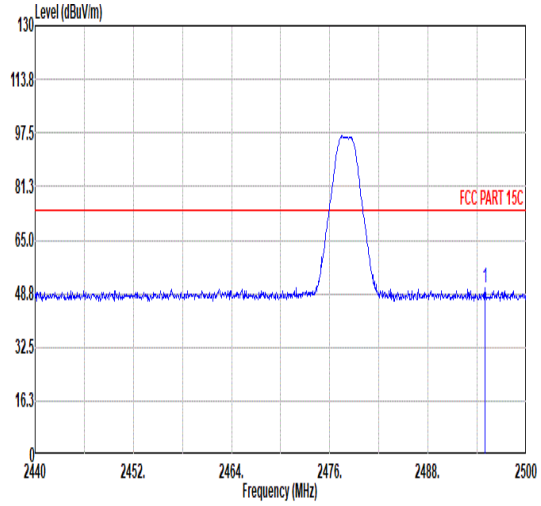
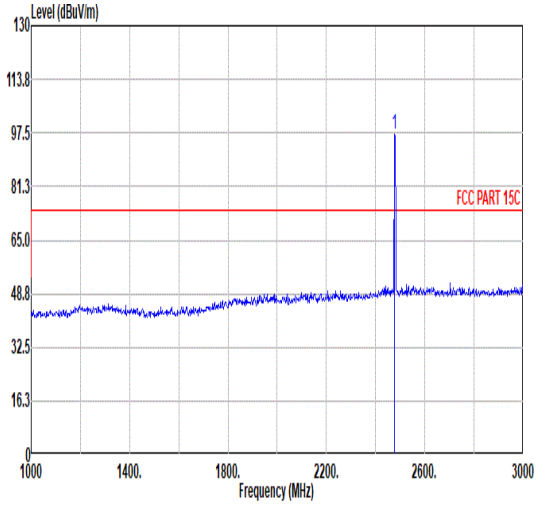
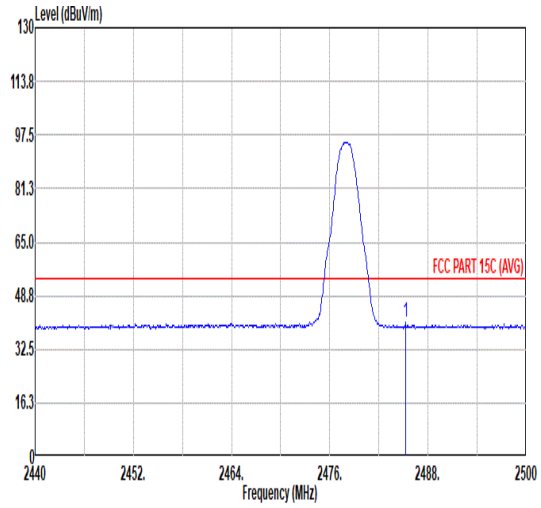
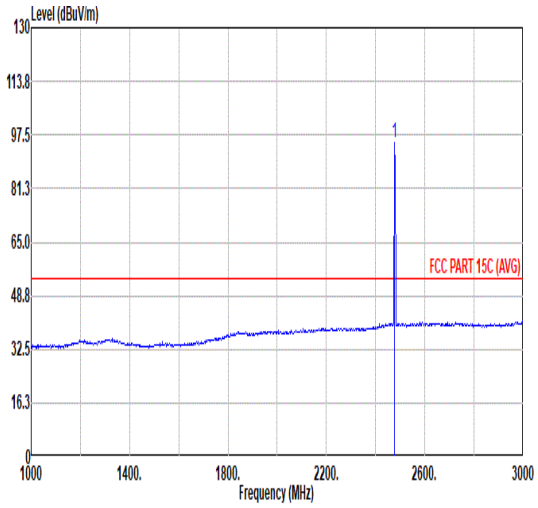
| Mode | 2 |
|---|---|
| | Band Edge - L |
| | U-NII-1_5.15-5.25_802.11ax HE80_CH42_Full_5210MHz |
| ANT | 6 |

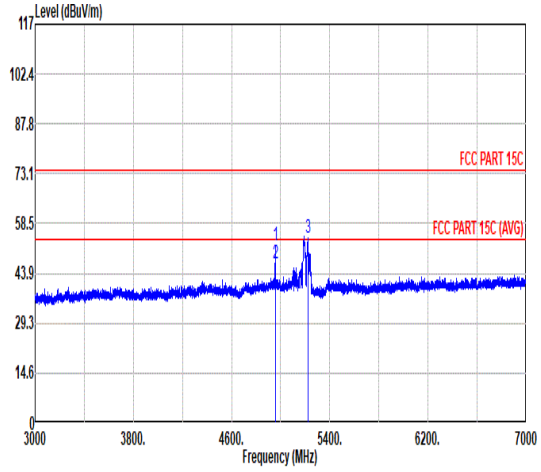
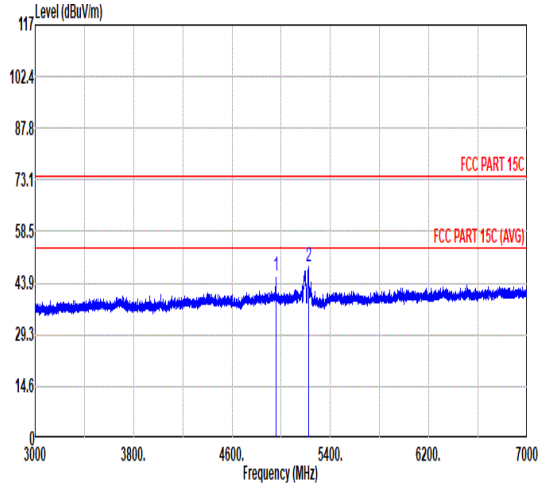
| Pol. | Vertical | Fundamental |
|---|---|---|
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5143.36 51.34 74.00 -22.66 43.40 34.63 10.65 37.34 0.00 376 116 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2476.00 88.86 ------ ------ 85.79 32.60 7.32 36.85 0.00 376 116 Peak<br>2 3616.00 108.67 ------ ------ 103.50 32.86 8.89 36.58 0.00 376 116 Peak<br>3 5210.00 89.32 ------ ------ 81.24 34.68 10.72 37.32 0.00 376 116 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5149.76 42.48 54.00 -11.52 34.57 34.60 10.65 37.34 0.00 376 116 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2476.00 86.75 ------ ------ 83.68 32.60 7.32 36.85 0.00 376 116 Average<br>2 3616.00 94.11 ------ ------ 88.94 32.86 8.89 36.58 0.00 376 116 Average<br>3 5210.00 80.75 ------ ------ 77.68 32.60 7.32 36.85 0.00 376 116 AVERAGE |

| Mode | 2 | |
|---|---|---|
| | Band Edge - R | |
| | U-NII-1_5.15-5.25_802.11ax HE80_CH42_Full_5210MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5369.40 48.08 74.00 -25.92 39.79 34.72 10.86 37.29 0.00 376 116 PEAK | Blank |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 5355.72 38.67 54.00 -15.33 30.33 34.78 10.85 37.29 0.00 376 116 AVERAGE | Blank |

| Mode | 2 | |
|---|---|---|
| | Harmonic | |
| | U-NII-1_5.15-5.25_802.11ax HE80_CH42_Full_5210MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 10420.00 44.20 68.20 -24.00 57.82 37.60 15.33 66.55 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 10420.00 44.50 68.20 -23.70 58.09 37.62 15.34 66.55 0.00 -- -- PEAK |

| Mode | 2 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_2400-2483.5_Bluetooth-LE_CH38_Full_2478MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2489.44 50.27 74.00 -23.73 41.18 32.60 7.34 36.85 6.00 163 301 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 100.04 ------ ------ 90.97 32.60 7.32 36.85 6.00 163 301 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2492.80 40.02 54.00 -13.98 30.92 32.60 7.35 36.85 6.00 163 301 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 97.84 ------ ------ 88.77 32.60 7.32 36.85 6.00 163 301 AVERAGE |

| Mode | 2 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_2400-2483.5_Bluetooth-LE_CH38_Full_2478MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2494.96 50.36 74.00 -23.64 41.26 32.60 7.35 36.85 6.00 303 56 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 97.33 ------ ------ 88.26 32.60 7.32 36.85 6.00 303 56 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2485.24 40.48 54.00 -13.52 31.40 32.60 7.33 36.85 6.00 303 56 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 95.32 ------ ------ 86.25 32.60 7.32 36.85 6.00 303 56 AVERAGE |

| Mode | 2 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_2400-2483.5_Bluetooth-LE_CH38_Full_2478MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4956.00 51.92 74.00 -22.08 72.55 34.56 10.44 65.63 0.00 100 234 PEAK<br>2 4956.00 46.87 54.00 -7.13 67.50 34.56 10.44 65.63 0.00 100 234 AVERAGE<br>3 5222.00 54.27 74.00 -19.73 74.58 34.66 10.73 65.70 0.00 -- -- Peak |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4956.00 46.02 74.00 -27.98 66.65 34.56 10.44 65.63 0.00 -- -- PEAK<br>2 5224.80 48.44 74.00 -25.56 68.76 34.65 10.73 65.70 0.00 -- -- Peak |

Note: For all plots above, the over limit line signals are Fundamental signal which can be ignored.

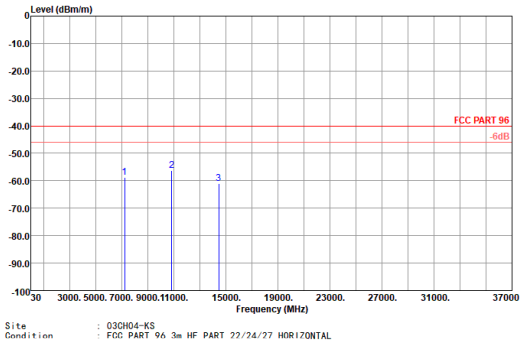
| LTE Band 48 / 20MHz / QPSK / Ant.5 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Channel | Frequency ( MHz ) | EIRP ( dBm ) | Limit ( dBm ) | Over Limit ( dB ) | S.G. Power ( dBm ) | TX Cable loss ( dB ) | TX Antenna Gain (dBi) | Polarization (H/V) |
| Middle | 7231 | -58.82 | -40 | -18.82 | -70.28 | 2.84 | 14.30 | H |
| | 10850 | -56.40 | -40 | -16.40 | -66.34 | 3.49 | 13.43 | H |
| | 14469 | -61.02 | -40 | -21.02 | -71.26 | 3.85 | 14.09 | H |
| | 7231 | -60.93 | -40 | -20.93 | -72.39 | 2.84 | 14.30 | V |
| | 10850 | -49.88 | -40 | -9.88 | -59.82 | 3.49 | 13.43 | V |
| | 14469 | -57.38 | -40 | -17.38 | -67.62 | 3.85 | 14.09 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

**Part 96_ LTE Band 48**

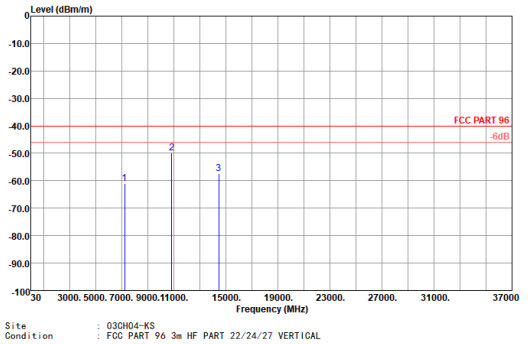
**ANT 5**

**Horizontal**




| | Freq | Level | Over Limit | Limit Line | Read Level | Pol/Phase |
|---|---|---|---|---|---|---|
| | MHz | dBm/m | dB | dBm/m | dBm | |
| 1 | 7231.00 | -58.82 | -18.82 | -40.00 | -53.06 | HORIZONTAL |
| 2 | 10850.00 | -56.40 | -16.40 | -40.00 | -57.88 | HORIZONTAL |
| 3 | 14469.00 | -61.02 | -21.02 | -40.00 | -65.52 | HORIZONTAL |

**Vertical**




| | Freq | Level | Over Limit | Limit Line | Read Level | Pol/Phase |
|---|---|---|---|---|---|---|
| | MHz | dBm/m | dB | dBm/m | dBm | |
| 1 | 7231.00 | -60.93 | -20.93 | -40.00 | -55.14 | VERTICAL |
| 2 | 10850.00 | -49.88 | -9.88 | -40.00 | -51.26 | VERTICAL |
| 3 | 14469.00 | -57.38 | -17.38 | -40.00 | -61.87 | VERTICAL |

# Appendix C. Reference Report

# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | Xiaomi Communications Co., Ltd. |
| EQUIPMENT | : | Mobile Phone |
| BRAND NAME | : | Redmi |
| MODEL NAME | : | 24090RA29G |
| FCC ID | : | 2AFZZRA29G |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |
| TEST DATE(S) | : | Jul. 18, 2024 ~ Jul. 28, 2024 |

**We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.**

**The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.**

Jason Jia

**Approved by: Jason Jia**

ACCREDITED
Cert #5145.02

***Sporton International Inc. (Kunshan)***
***No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China***

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR471506B | Rev. 01 | Initial issue of report | Aug. 19, 2024 |
| | | | |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 3.1 | 15.247(a)(2) | 6dB Bandwidth | ≥ 0.5MHz | Pass | - |
| 3.1 | - | 99% Bandwidth | - | Report only | - |
| 3.2 | 15.247(b)(3) | Peak Output Power | ≤ 30dBm | Pass | - |
| 3.3 | 15.247(e) | Power Spectral Density | ≤ 8dBm/3kHz | Pass | - |
| 3.4 | 15.247(d) | Conducted Band Edges and Spurious Emission | ≤ 20dBc | Pass | - |
| 3.5 | 15.247(d) | Radiated Band Edges and Spurious Emission | 15.209(a) & 15.247(d) | Pass | Under limit 13.80 dB at 2495.32 MHz |
| 3.6 | 15.207 | AC Conducted Emission | 15.207(a) | Pass | Under limit 15.07 dB at 15.146 MHz |
| 3.7 | 15.203 & 15.247(b) | Antenna Requirement | 15.203 & 15.247(b) | Pass | - |

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

# 1 General Description

## 1.1 Applicant

**Xiaomi Communications Co., Ltd.**
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

## 1.2 Manufacturer

**Xiaomi Communications Co., Ltd.**
#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | Mobile Phone |
| **Brand Name** | Redmi |
| **Model Name** | 24090RA29G |
| **FCC ID** | 2AFZZRA29G |
| **IMEI Code** | Conducted: 861793070040843/861793070040850<br>Conduction: 861793070038664/861793070038672<br>Radiation: 861793070038607 |
| **HW Version** | 135300O16 |
| **SW Version** | Xiaomi HyperOS 1.0 |
| **EUT Stage** | Identical Prototype |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | |
|---|---|
| **Tx/Rx Frequency Range** | 2402 MHz ~ 2480 MHz |
| **Number of Channels** | 40 |
| **Carrier Frequency of Each Channel** | 40 Channel (37 hopping + 3 advertising channel) |
| **Maximum Output Power to Antenna** | BLE 1Mbps: 7.33 dBm (0.0054 W)<br>BLE 2Mbps: 7.37 dBm (0.0055 W) |
| **99% Occupied Bandwidth** | BLE 1Mbps: 1.035 MHz<br>BLE 2Mbps: 2.054 MHz |
| **Antenna Type / Gain** | PIFA Antenna type with gain -1.6 dBi |
| **Type of Modulation** | Bluetooth LE : GFSK |

Note: BLE 2M does not support CH00/CH12/CH39.

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

| | | | |
|---|---|---|---|
| **Test Firm** | Sporton International Inc. (Kunshan) | | |
| **Test Site Location** | No. 1098, Pengxi North Road, Kunshan Economic Development Zone<br>Jiangsu Province 215300 People's Republic of China<br>TEL : +86-512-57900158 | | |
| **Test Site No.** | **Sporton Site No.** | **FCC Designation No.** | **FCC Test Firm Registration No.** |
| | CO01-KS<br>03CH03-KS<br>TH01-KS | CN1257 | 314309 |

## 1.7 Test Software

| Item | Site | Manufacturer | Name | Version |
|---|---|---|---|---|
| 1. | TH01-KS | Tonscend | JS1120-3 test system China_210602 | 3.3.10 |
| 2. | 03CH03-KS | AUDIX | E3 | 210616 |
| 3. | CO01-KS | AUDIX | E3 | 6.2009-8-24 |

## 1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

# 2 Test Configuration of Equipment Under Test

## 2.1 Carrier Frequency Channel

| Frequency Band | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---|---|---|---|---|
| 2400-2483.5 MHz | 0 | 2402 | 21 | 2444 |
| | 1 | 2404 | 22 | 2446 |
| | 2 | 2406 | 23 | 2448 |
| | 3 | 2408 | 24 | 2450 |
| | 4 | 2410 | 25 | 2452 |
| | 5 | 2412 | 26 | 2454 |
| | 6 | 2414 | 27 | 2456 |
| | 7 | 2416 | 28 | 2458 |
| | 8 | 2418 | 29 | 2460 |
| | 9 | 2420 | 30 | 2462 |
| | 10 | 2422 | 31 | 2464 |
| | 11 | 2424 | 32 | 2466 |
| | 12 | 2426 | 33 | 2468 |
| | 13 | 2428 | 34 | 2470 |
| | 14 | 2430 | 35 | 2472 |
| | 15 | 2432 | 36 | 2474 |
| | 16 | 2434 | 37 | 2476 |
| | 17 | 2436 | 38 | 2478 |
| | 18 | 2438 | 39 | 2480 |
| | 19 | 2440 | - | - |
| | 20 | 2442 | - | - |

## 2.2 Test Mode

a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

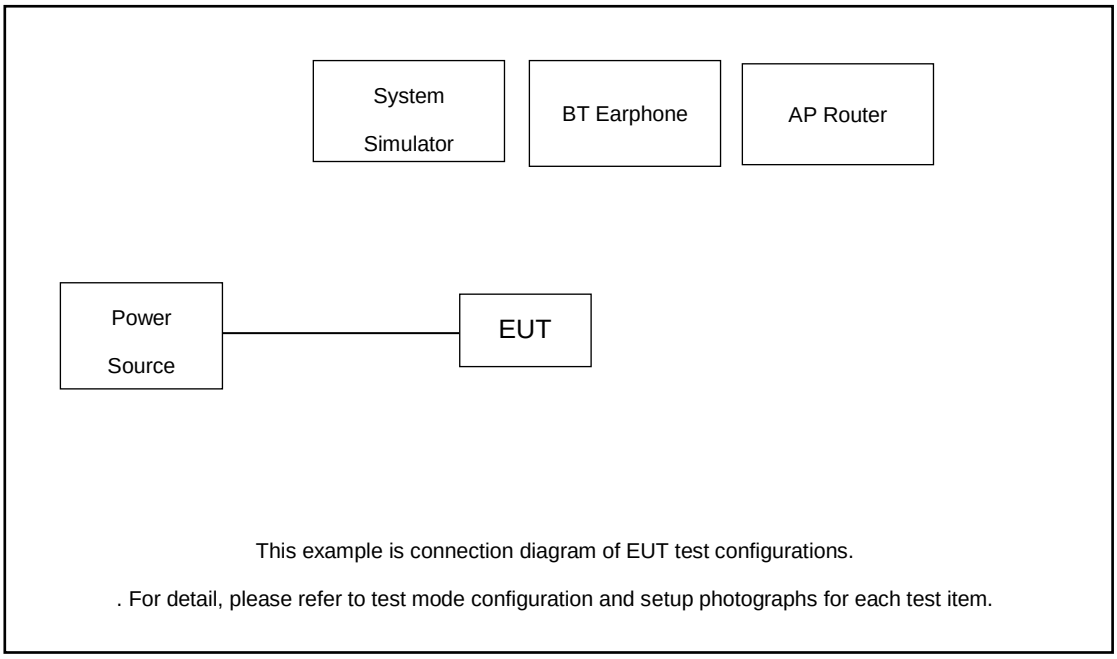
b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

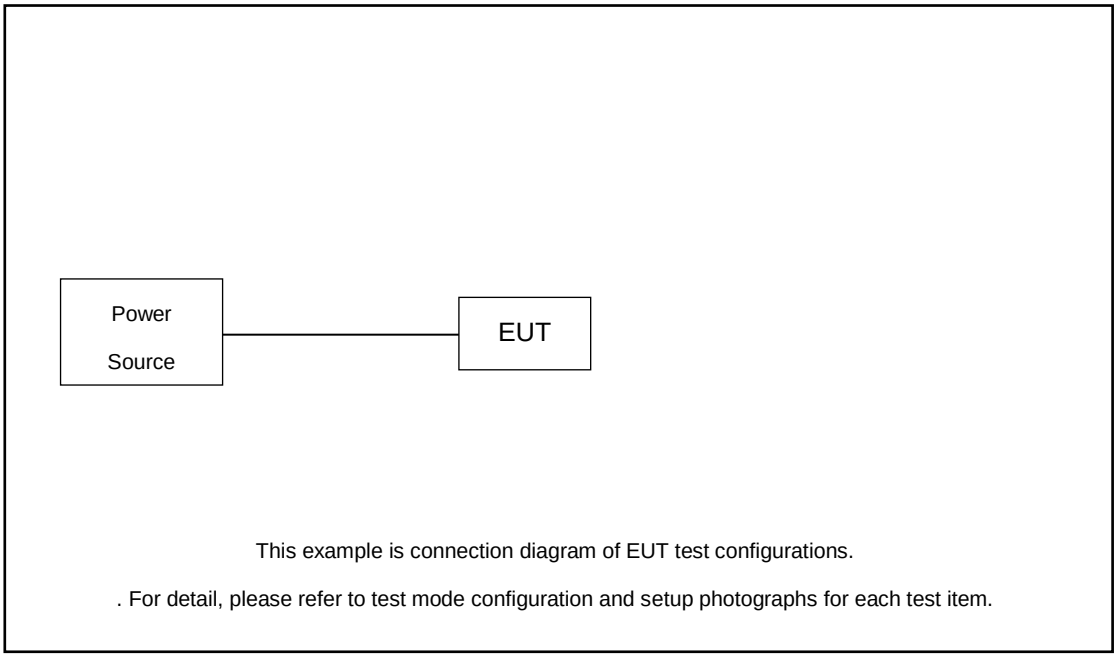
| Summary table of Test Cases | |
|---|---|
| **Test Item** | **Data Rate / Modulation** |
| | **Bluetooth – LE / GFSK** |
| **Conducted TCs** | Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps<br>Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps<br>Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps<br>Mode 4: Bluetooth Tx CH01_2404 MHz_BLE 2Mbps<br>Mode 5: Bluetooth Tx CH19_2440 MHz_BLE 2Mbps<br>Mode 6: Bluetooth Tx CH38_2478 MHz_BLE 2Mbps |
| **Radiated TCs** | Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps<br>Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps<br>Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps<br>Mode 4: Bluetooth Tx CH01_2404 MHz_BLE 2Mbps<br>Mode 5: Bluetooth Tx CH19_2440 MHz_BLE 2Mbps<br>Mode 6: Bluetooth Tx CH38_2478 MHz_BLE 2Mbps |
| **AC Conducted Emission** | Mode 1: GSM 850 Idle + Bluetooth Link + WLAN Link (2.4G) + USB Cable 3 + Adapter 3 |
| **Remark:** For Radiated Test Cases, The tests were performance with Adapter and USB Cable. | |

## 2.3 Connection Diagram of Test System

AC Conducted Emission:




Radiated Emission:



## 2.4 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | Bluetooth Earphone | Lenovo | thinkplus-BH3 | N/A | N/A | N/A |
| 2. | LTE Base Station | Anritus | MT8821C | N/A | N/A | Unshielded,1.8m |
| 3. | Notebook | Lenovo | G480 | QDS-BRCM1050I | N/A | shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m |
| 4. | WLAN AP | D-link | DIR-655 | KA21R655B1 | N/A | Unshielded,1.8m |

## 2.5 EUT Operation Test Setup

For BLE function, the engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

## 2.6 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 12.26 dB and 10dB attenuator.

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*

= 12.26 + 10 = 22.26 (dB)

# 3 Test Result

## 3.1 6dB and 99% Bandwidth Measurement

### 3.1.1 Limit of 6dB and 99% Bandwidth

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

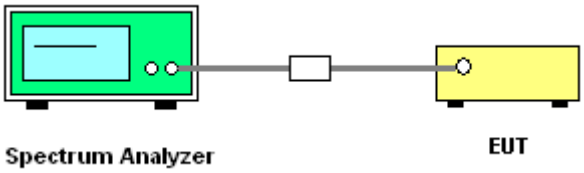
### 3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 11.8
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the 99% OBW and the VBW is set to 3 times of the RBW.
6. Measure and record the results in the test report.

### 3.1.4 Test Setup




### 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Please refer to Appendix A.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

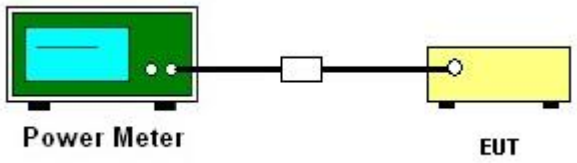
### 3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup




### 3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

### 3.2.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

## 3.3 Power Spectral Density Measurement

### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

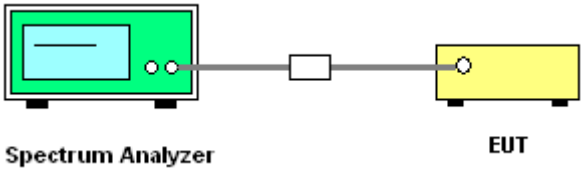
### 3.3.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.
7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

### 3.3.4 Test Setup




### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

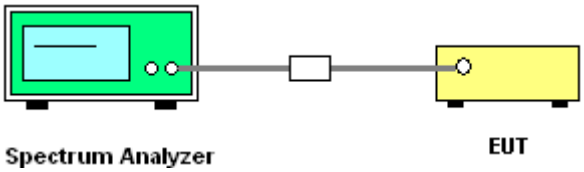
### 3.4.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.4.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 11.13
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions 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 when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 3.4.4 Test Setup




### 3.4.5 Test Result of Conducted Band Edges Plots

Please refer to Appendix A.

### 3.4.6 Test Result of Conducted Spurious Emission Plots

Please refer to Appendix A.

## 3.5 Radiated Band Edges and Spurious Emission Measurement

### 3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 – 88 | 100 | 3 |
| 88 – 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 3.5.2 Measuring Instruments

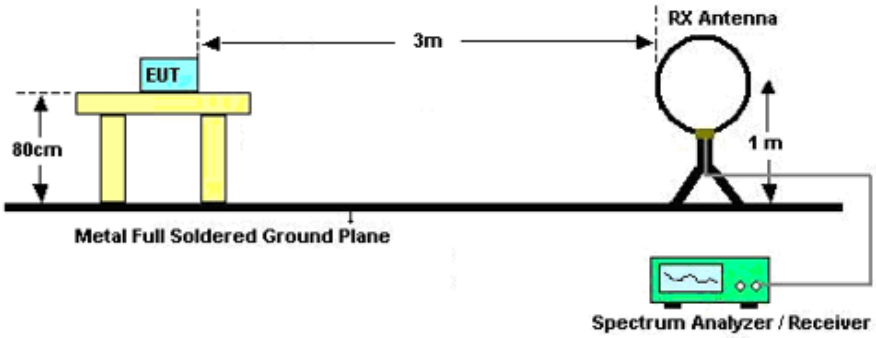
The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.5.3 Test Procedures

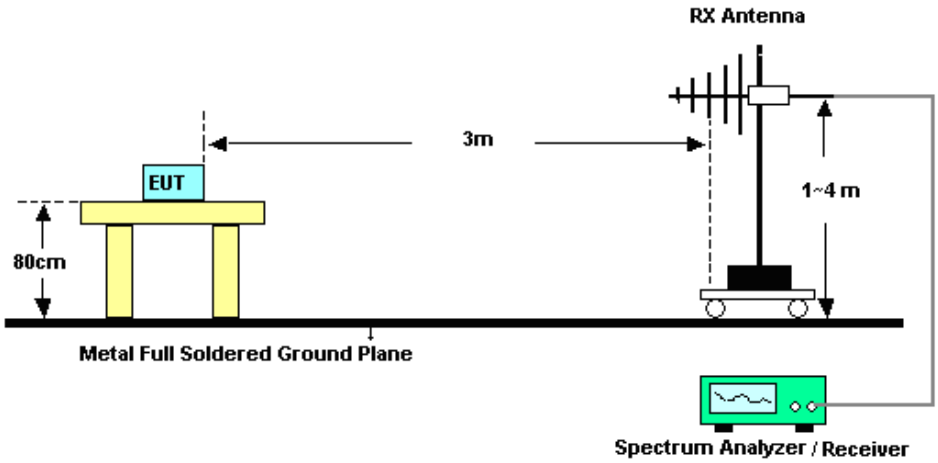
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.5.4 Test Setup

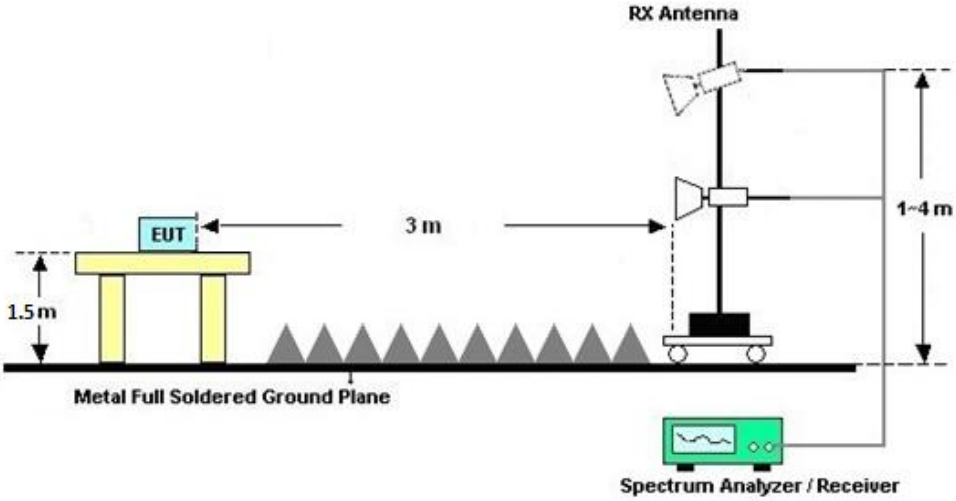
**For radiated emissions below 30MHz**




**For radiated emissions from 30MHz to 1GHz**




**For radiated emissions above 1GHz**



### 3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

### 3.5.7 Duty Cycle

Please refer to Appendix D.

### 3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.

## 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

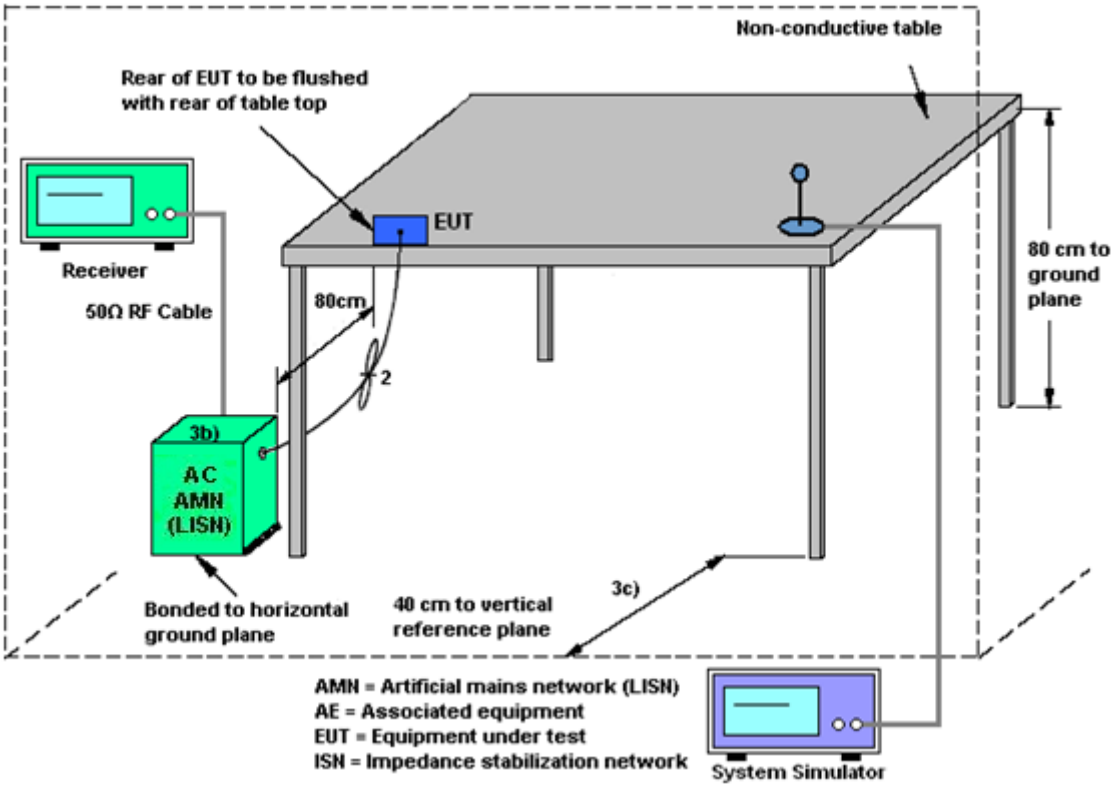
### 3.6.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

### 3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.6.4 Test Setup




### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

## 3.7 Antenna Requirements

### 3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

### 3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

### 3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

# 4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| EMI Test Receiver | Keysight | N9038A | MY56400004 | 3Hz~8.5GHz;Max 30dBm | Oct. 11, 2023 | Jul. 18, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| EXA Spectrum Analyzer | Keysight | N9010A | MY55370528 | 10Hz-44GHz | Oct. 11, 2023 | Jul. 18, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| Loop Antenna | R&S | HFH2-Z2E | 101125 | 9kHz~30MHz | Sep. 11, 2023 | Jul. 18, 2024 | Sep. 10, 2024 | Radiation (03CH03-KS) |
| Bilog Antenna | TeseQ | CBL6112D | 23182 | 30MHz-1GHz | Dec. 06, 2023 | Jul. 18, 2024 | Dec. 05, 2024 | Radiation (03CH03-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75957 | 1GHz~18GHz | Oct. 23, 2023 | Jul. 18, 2024 | Oct. 22, 2024 | Radiation (03CH03-KS) |
| SHF-EHF Horn | com-power | AH-840 | 101115 | 18GHz~40GHz | Oct. 15, 2023 | Jul. 18, 2024 | Oct. 14, 2024 | Radiation (03CH03-KS) |
| Amplifier | SONOMA | 310N | 413740 | 30MHz ~1000MHz | Jan. 03, 2024 | Jul. 18, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| Amplifier | EM | EM18G40GA | 060851 | 18~40GHz | Jan. 03, 2024 | Jul. 18, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| high gain Amplifier | MITEQ | AMF-7D-00101800-30-10P | 2082394 | 1Ghz-18Ghz | Jan. 03, 2024 | Jul. 18, 2024 | Jan. 02, 2025 | Radiation (03CH03-KS) |
| Amplifier | Keysight | 83017A | MY53270319 | 1GHz~26.5GHz | Oct. 11, 2023 | Jul. 18, 2024 | Oct. 10, 2024 | Radiation (03CH03-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Jul. 18, 2024 | NCR | Radiation (03CH03-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Jul. 18, 2024 | NCR | Radiation (03CH03-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Jul. 18, 2024 | NCR | Radiation (03CH03-KS) |
| EMI Receiver | R&S | ESCI7 | 100768 | 9kHz~7GHz; | Apr 18, 2024 | Jul. 28, 2024 | Apr 17, 2025 | Conduction (CO01-KS) |
| AC LISN (for auxiliary equipment) | MessTec | AN3016 | 060103 | 9kHz~30MHz | Oct. 11, 2023 | Jul. 28, 2024 | Oct. 10, 2024 | Conduction (CO01-KS) |
| AC LISN | MessTec | AN3016 | 060105 | 9kHz~30MHz | Apr 18, 2024 | Jul. 28, 2024 | Apr 17, 2025 | Conduction (CO01-KS) |
| AC Power Source | Chroma | 61602 | ABP000000811 | AC 0V~300V, 45Hz~1000Hz | Oct. 11, 2023 | Jul. 28, 2024 | Oct. 10, 2024 | Conduction (CO01-KS) |
| Spectrum Analyzer | R&S | FSV40 | 101040 | 10Hz~40GHz | Oct. 11, 2023 | Jul. 19, 2024 | Oct. 10, 2024 | Conducted (TH01-KS) |
| Pulse Power Senor | Anritsu | MA2411B | 0917070 | 300MHz~40GHz | Jan. 02, 2024 | Jul. 19, 2024 | Jan. 01, 2025 | Conducted (TH01-KS) |
| Power Meter | Anritsu | ML2495A | 1005002 | 50MHz Bandwidth | Jan. 02, 2024 | Jul. 19, 2024 | Jan. 01, 2025 | Conducted (TH01-KS) |

NCR: No Calibration Required

# 5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

**Uncertainty of Conducted Measurement**

| | |
|---|---|
| **Conducted Spurious Emission & Bandedge** | **±2.22 dB** |
| **Occupied Channel Bandwidth** | **±0.1%** |
| **Conducted Power** | **±0.50 dB** |
| **Conducted Power Spectral Density** | **±0.90 dB** |
| **Frequency** | **0.04ppm** |

**Uncertainty of AC Conducted Emission Measurement (0.15 MHz ~ 30 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.84 dB** |

**Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **3.30 dB** |

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **6.08 dB** |

**Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **5.18 dB** |

**Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **5.22 dB** |

**---------- THE END ----------**

# Appendix A. Conducted Test Results

| | |
|---|---|
| **Ambient Condition**: 25 ℃, 45 %RH | |
| **Test Date:** 2024/7/19 | **Test Engineer:** albert shi |

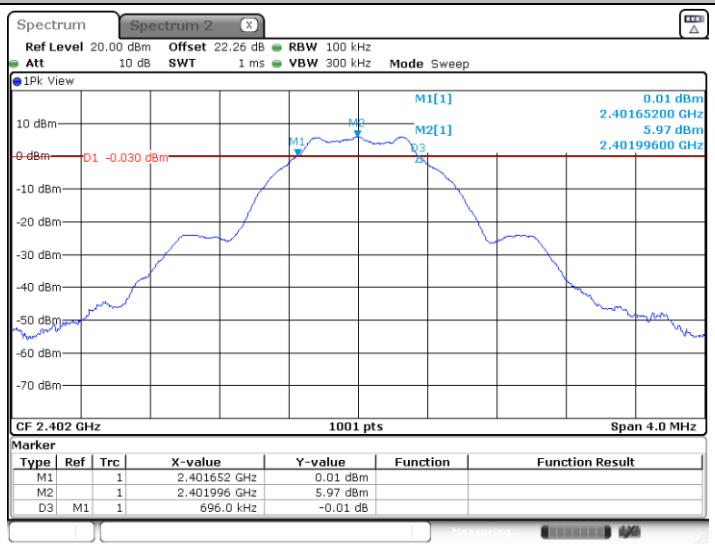
# DTS Bandwidth

## Test Result

| TestMode | Antenna | Freq(MHz) | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant6 | 2402 | 0.70 | 2401.65 | 2402.35 | 0.5 | PASS |
| | | 2440 | 0.69 | 2439.65 | 2440.34 | 0.5 | PASS |
| | | 2480 | 0.69 | 2479.66 | 2480.34 | 0.5 | PASS |
| BLE_2M | Ant6 | 2404 | 1.18 | 2403.42 | 2404.59 | 0.5 | PASS |
| | | 2440 | 1.18 | 2439.41 | 2440.59 | 0.5 | PASS |
| | | 2478 | 1.18 | 2477.42 | 2478.59 | 0.5 | PASS |

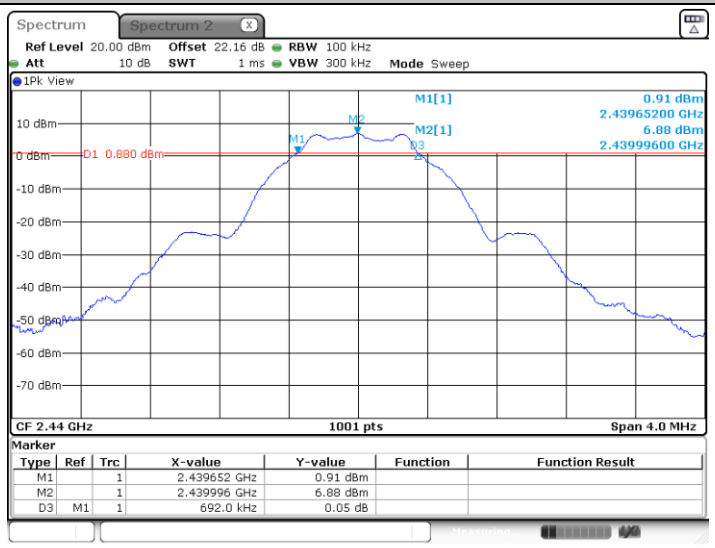
## Test Graphs

BLE_1M_Ant6_2402



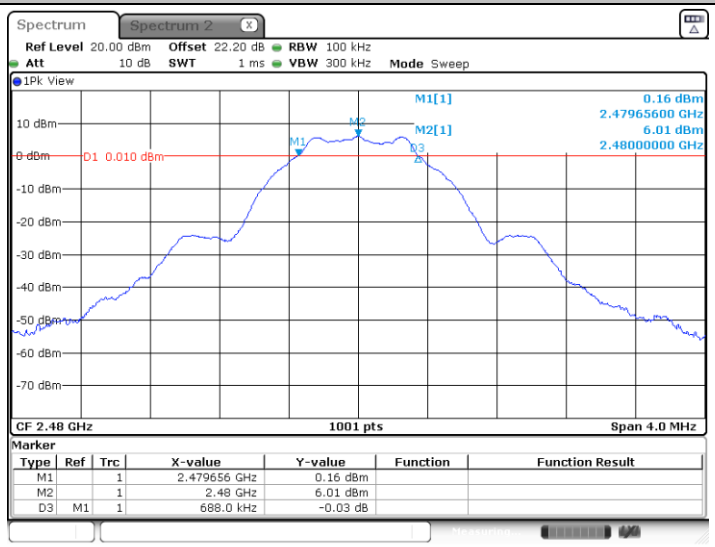

Date: 19.JUL.2024 02:56:21

BLE_1M_Ant6_2440



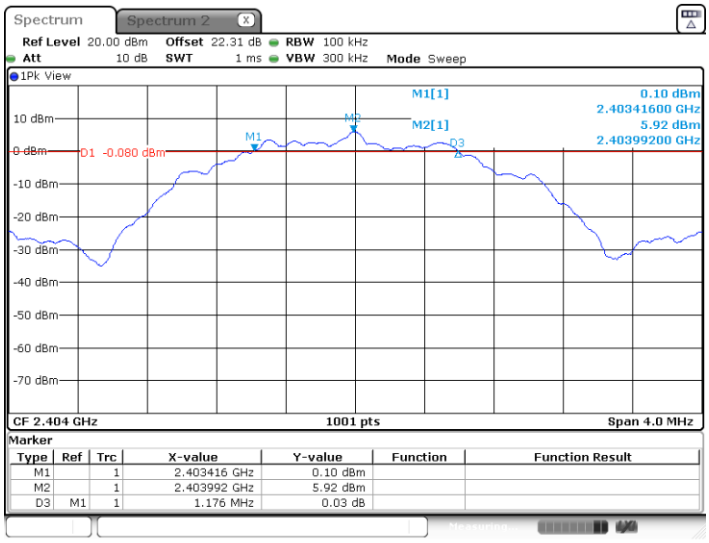

Date: 19.JUL.2024 02:57:50

BLE_1M_Ant6_2480



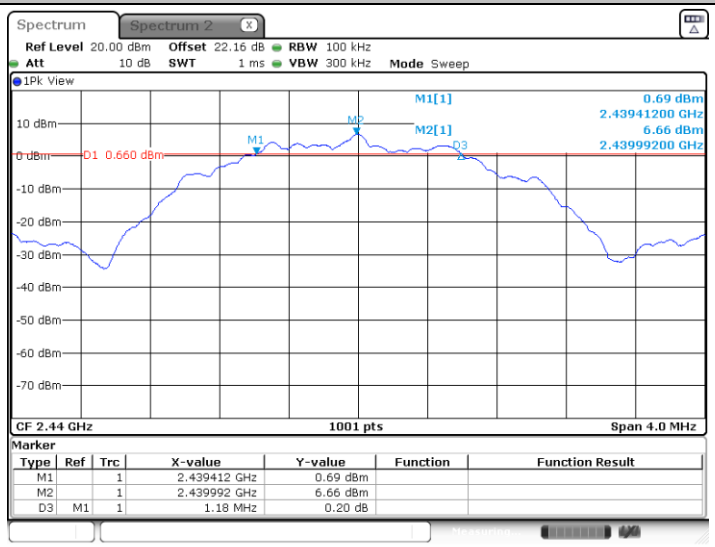

Date: 19.JUL.2024 02:59:01

BLE_2M_Ant6_2404



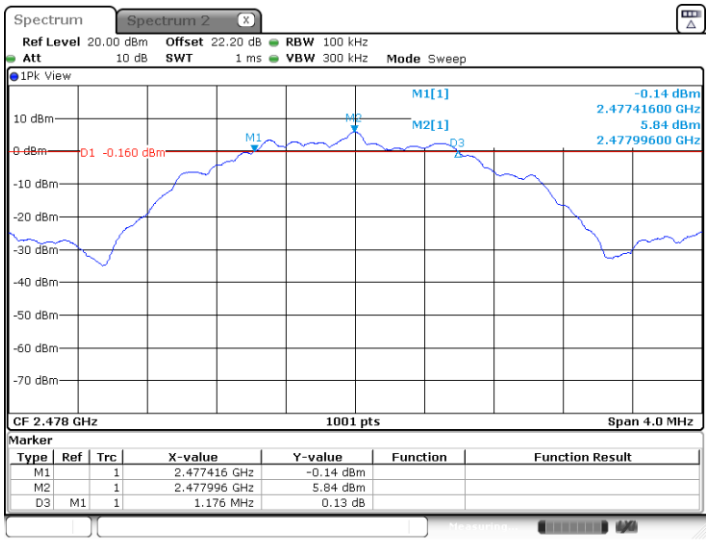

Date: 19.JUL.2024 03:00:34

BLE_2M_Ant6_2440




Date: 19.JUL.2024 03:01:51

BLE_2M_Ant6_2478




Date: 19.JUL.2024 03:02:58

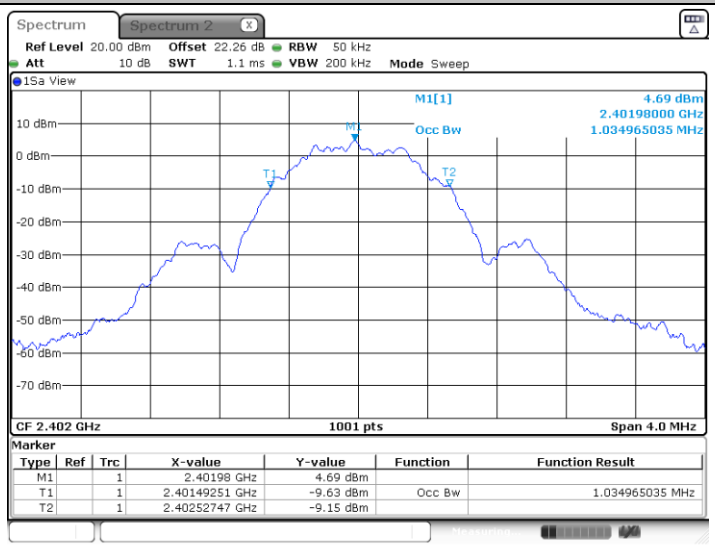
# Occupied Channel Bandwidth

## Test Result

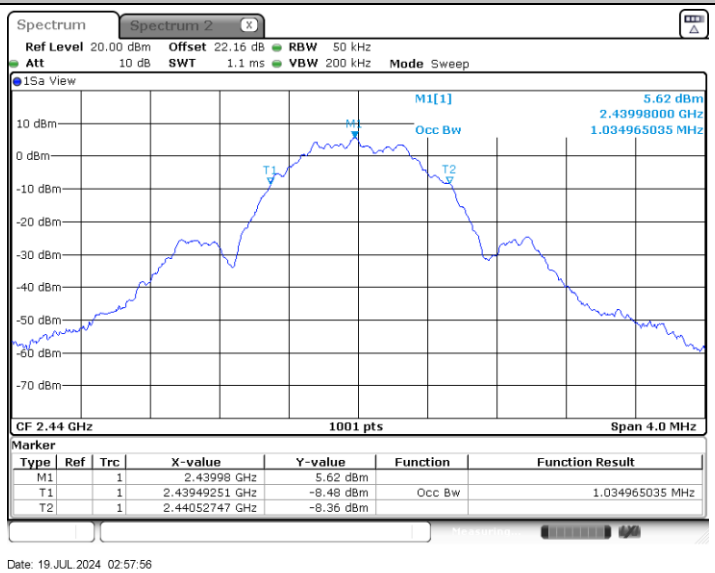
| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz] | FH[MHz] |
|---|---|---|---|---|---|
| BLE_1M | Ant6 | 2402 | 1.035 | 2401.4925 | 2402.5275 |
| | | 2440 | 1.035 | 2439.4925 | 2440.5275 |
| | | 2480 | 1.035 | 2479.4925 | 2480.5275 |
| BLE_2M | Ant6 | 2404 | 2.054 | 2402.9930 | 2405.0470 |
| | | 2440 | 2.054 | 2438.9930 | 2441.0470 |
| | | 2478 | 2.05 | 2476.9970 | 2479.0470 |

## Test Graphs

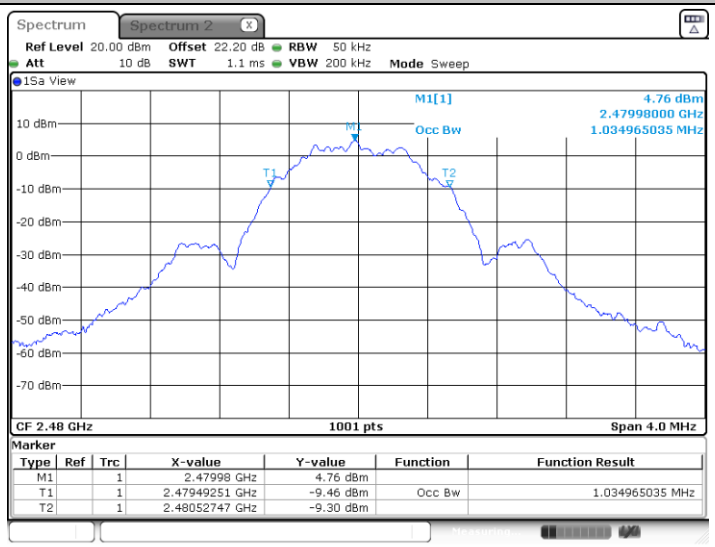
BLE_1M_Ant6_2402




BLE_1M_Ant6_2440

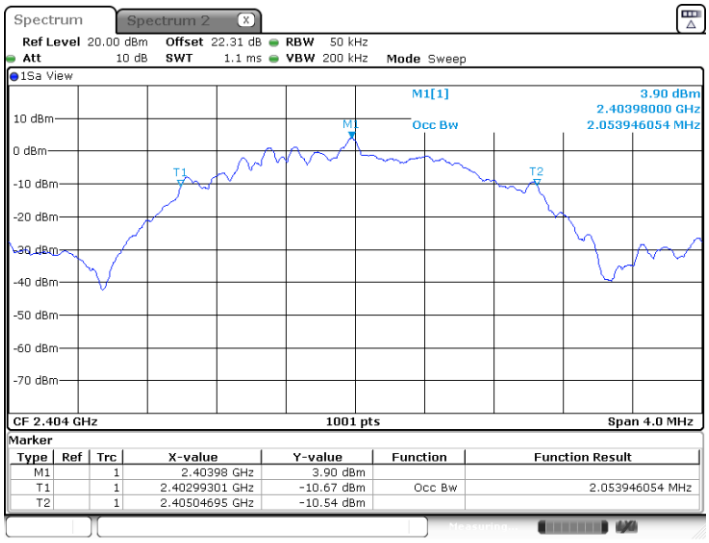


BLE_1M_Ant6_2480



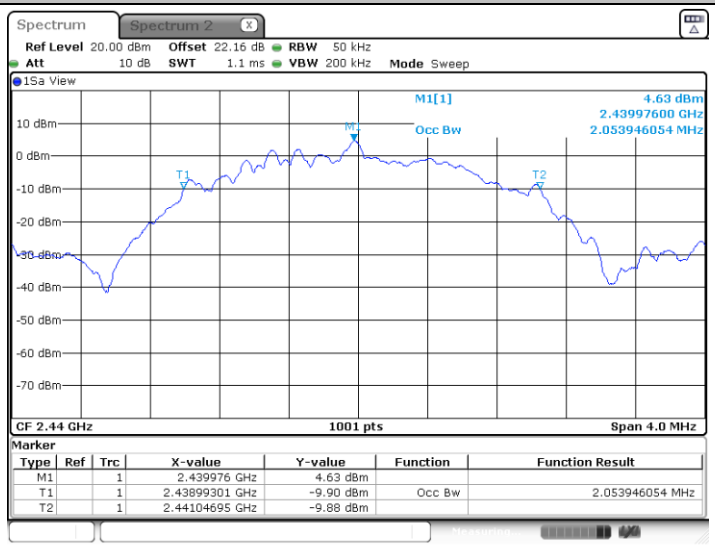

Date: 19.JUL.2024 02:59:07

BLE_2M_Ant6_2404



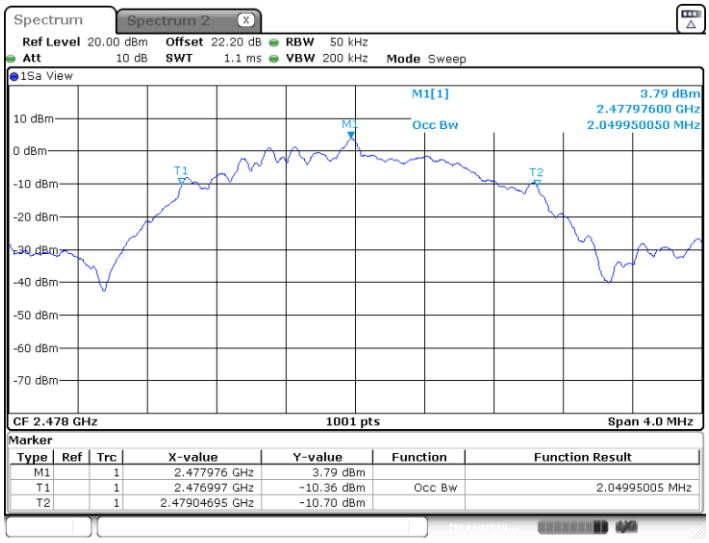

Date: 19.JUL.2024 03:00:40

BLE_2M_Ant6_2440




Date: 19.JUL.2024 03:01:56

BLE_2M_Ant6_2478




Date: 19.JUL.2024 03:03:03

# Maximum conducted output power

## Test Result Peak

| TestMode | Antenna | CH. | Peak Conducted Power (dBm) | Conducted Power Limit | DG (dBi) | EIRP Power (dBm) | EIRP Power Limit | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| BLE1M | Ant6 | 0 | 6.49 | 30.00 | -1.6 | 4.89 | 36.00 | Pass |
| | | 19 | 7.33 | 30.00 | -1.6 | 5.73 | 36.00 | Pass |
| | | 39 | 6.31 | 30.00 | -1.6 | 4.71 | 36.00 | Pass |
| BLE2M | Ant6 | 01 | 6.55 | 30.00 | -1.6 | 4.95 | 36.00 | Pass |
| | | 19 | 7.37 | 30.00 | -1.6 | 5.77 | 36.00 | Pass |
| | | 38 | 6.49 | 30.00 | -1.6 | 4.89 | 36.00 | Pass |

## Test Result Average (Reference only)

| TestMode | Antenna | CH. | Duty Factor (dB) | Average Conducted Power (dBm) |
|---|---|---|---|---|
| BLE1M | Ant6 | 0 | 2.17 | 6.25 |
| | | 19 | 2.17 | 6.91 |
| | | 39 | 2.17 | 6.06 |
| BLE2M | Ant6 | 01 | 5.02 | 6.09 |
| | | 19 | 5.02 | 7.06 |
| | | 38 | 5.02 | 6.04 |

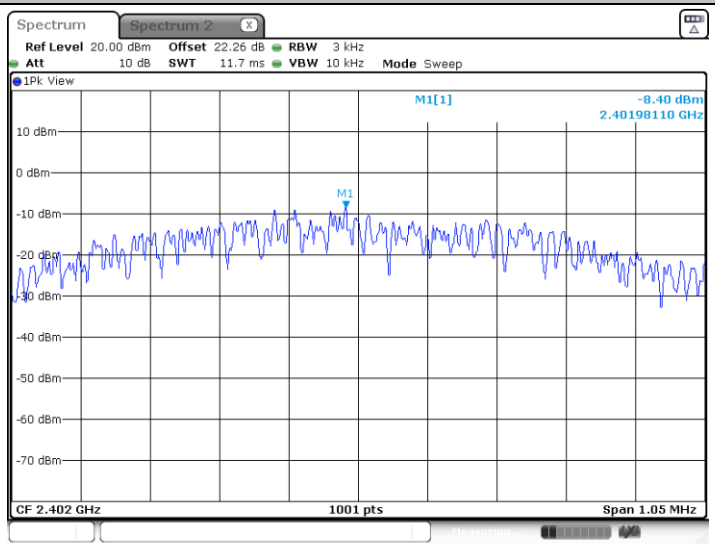
# Maximum power spectral density

## Test Result

| TestMode | Antenna | Freq(MHz) | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| BLE_1M | Ant6 | 2402 | -8.4 | ≤8.00 | PASS |
| | | 2440 | -7.51 | ≤8.00 | PASS |
| | | 2480 | -8.36 | ≤8.00 | PASS |
| BLE_2M | Ant6 | 2404 | -10.39 | ≤8.00 | PASS |
| | | 2440 | -9.66 | ≤8.00 | PASS |
| | | 2478 | -10.51 | ≤8.00 | PASS |

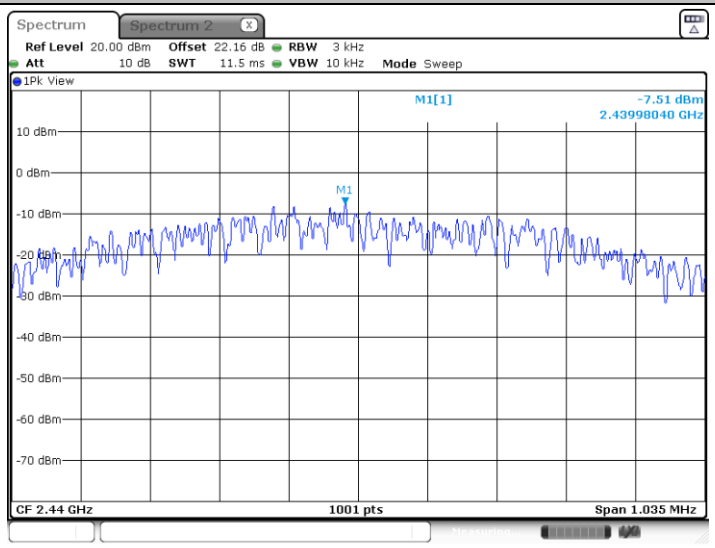
## Test Graphs

BLE_1M_Ant6_2402



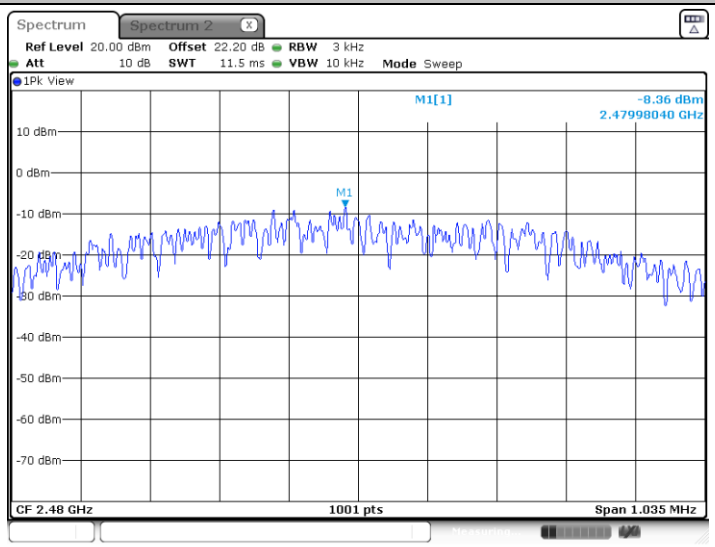

Date: 19.JUL.2024 02:56:38

BLE_1M_Ant6_2440



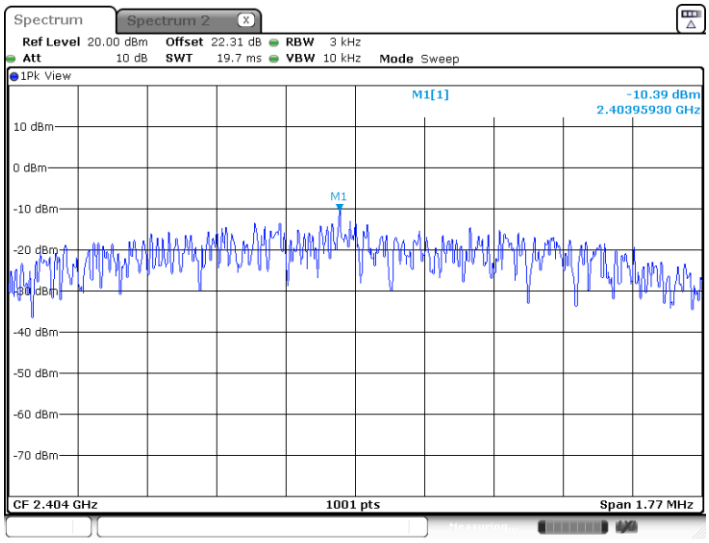

Date: 19.JUL.2024 02:58:07

BLE_1M_Ant6_2480



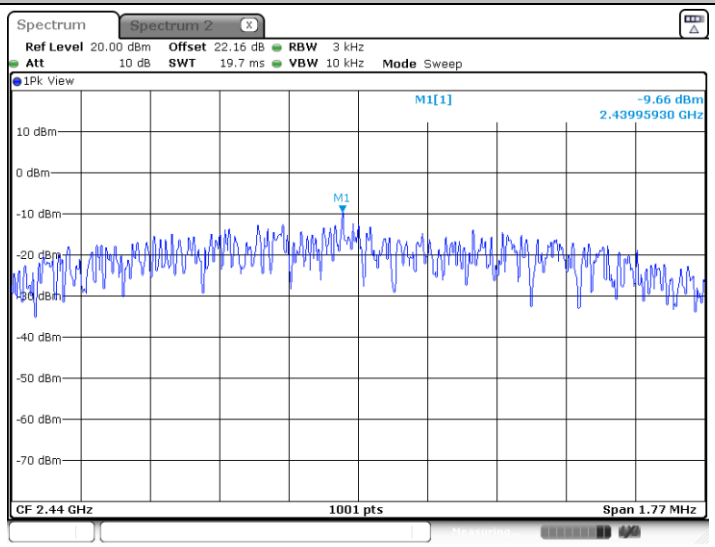

Date: 19.JUL.2024 02:59:18

BLE_2M_Ant6_2404



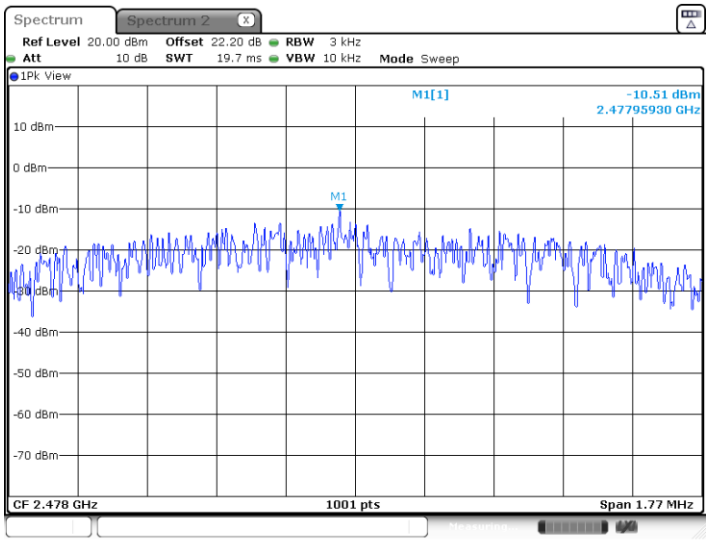

Date: 19.JUL.2024 03:00:50

BLE_2M_Ant6_2440




Date: 19.JUL.2024 03:02:07

BLE_2M_Ant6_2478




Date: 19.JUL.2024 03:03:15

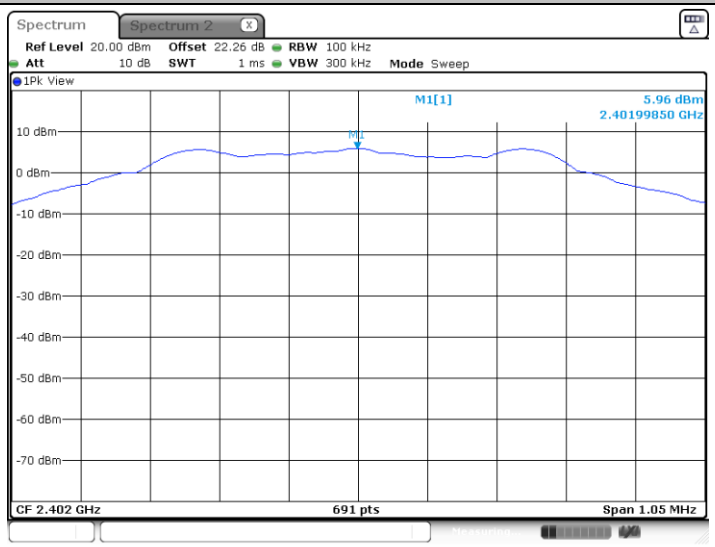
# Reference level measurement

## Test Result

| TestMode | Antenna | Freq(MHz) | Max.Point[MHz] | Result[dBm/100KHz] |
|---|---|---|---|---|
| BLE_1M | Ant6 | 2402 | 2402.00 | 5.96 |
| | | 2440 | 2440.00 | 6.85 |
| | | 2480 | 2480.00 | 5.98 |
| BLE_2M | Ant6 | 2404 | 2403.99 | 5.91 |
| | | 2440 | 2439.99 | 6.64 |
| | | 2478 | 2477.99 | 5.81 |

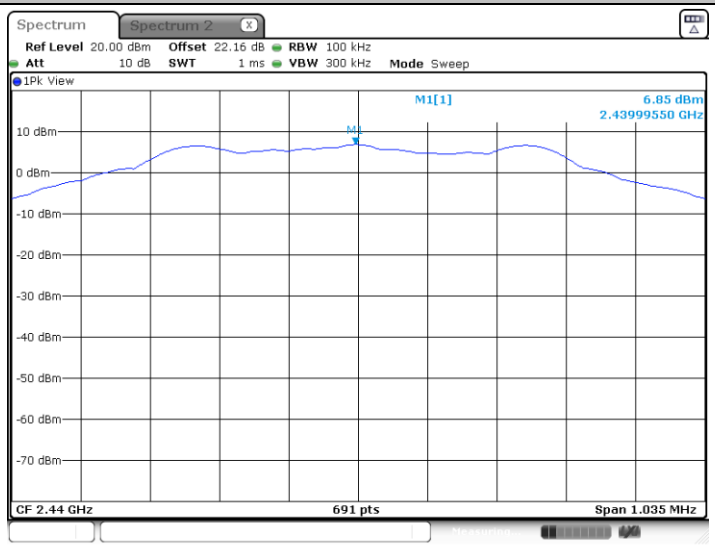
## Test Graphs

BLE_1M_Ant6_2402



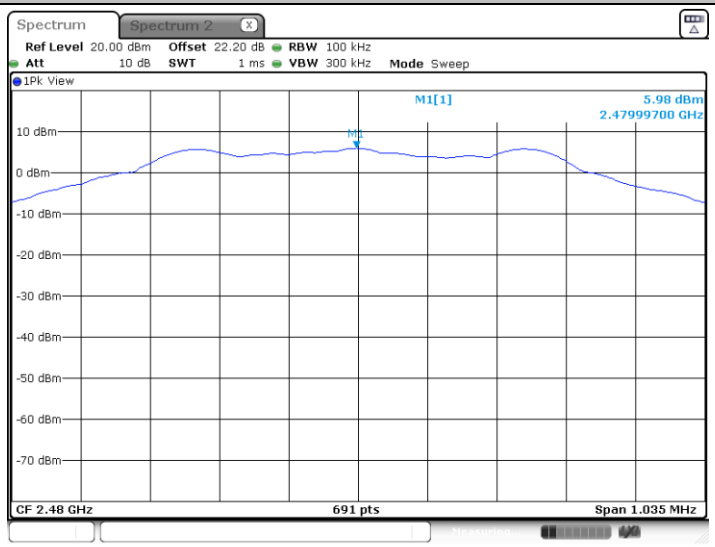

Date: 19.JUL.2024 02:56:45

BLE_1M_Ant6_2440



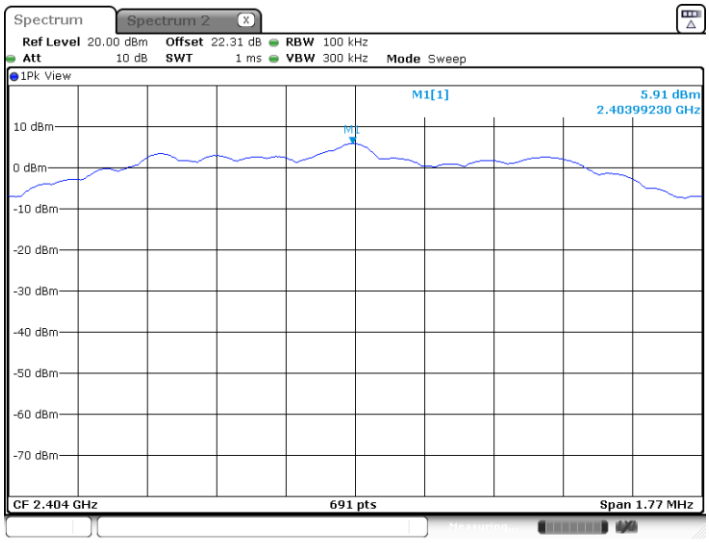

Date: 19.JUL.2024 02:58:15

BLE_1M_Ant6_2480



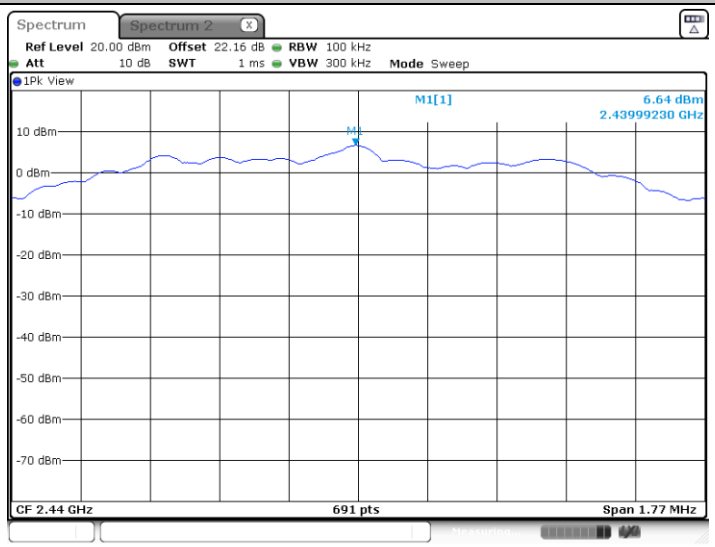

Date: 19.JUL.2024 02:59:25

BLE_2M_Ant6_2404



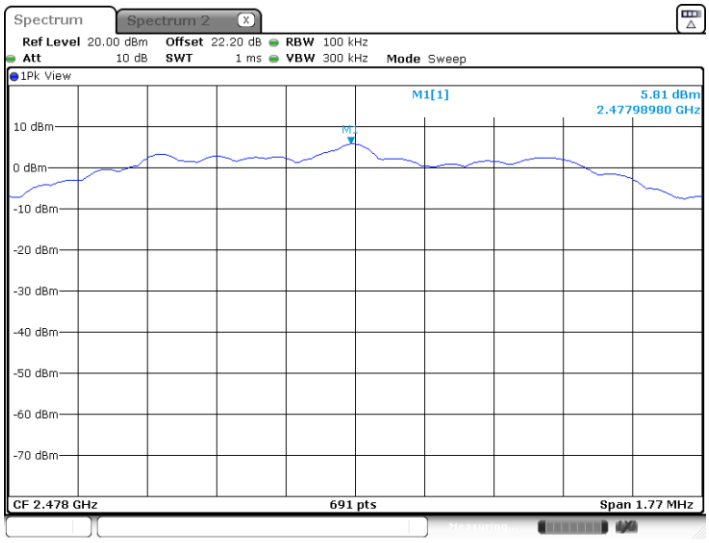

Date: 19.JUL.2024 03:00:58

BLE_2M_Ant6_2440




Date: 19.JUL.2024 03:02:14

BLE_2M_Ant6_2478




Date: 19.JUL.2024 03:03:22

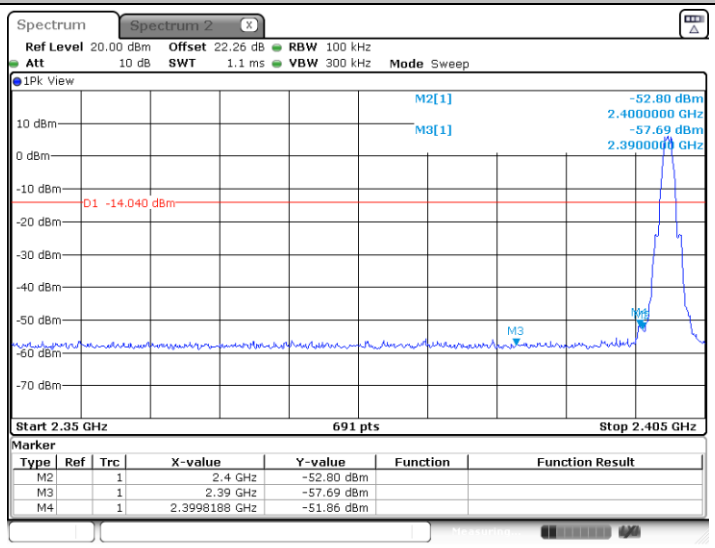
# Band edge measurements

## Test Result

| TestMode | Antenna | ChName | Freq(MHz) | RefLevel [dBm/100KHz] | Result [dBm/100KHz] | Limit [dBm/100KHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant6 | Low | 2402 | 5.96 | -51.86 | ≤-14.04 | PASS |
| | | High | 2480 | 5.98 | -55.31 | ≤-14.02 | PASS |
| BLE_2M | Ant6 | Low | 2404 | 5.91 | -52.4 | ≤-14.09 | PASS |
| | | High | 2478 | 5.81 | -55.76 | ≤-14.19 | PASS |

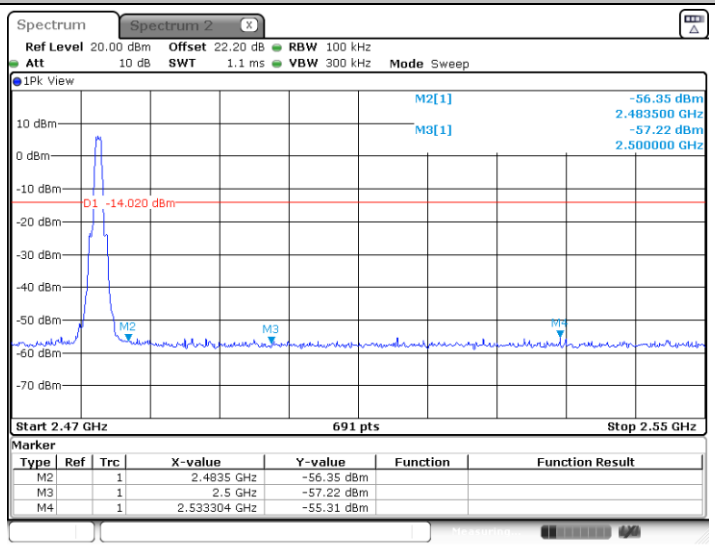
## Test Graphs

BLE_1M_Ant6_Low_2402



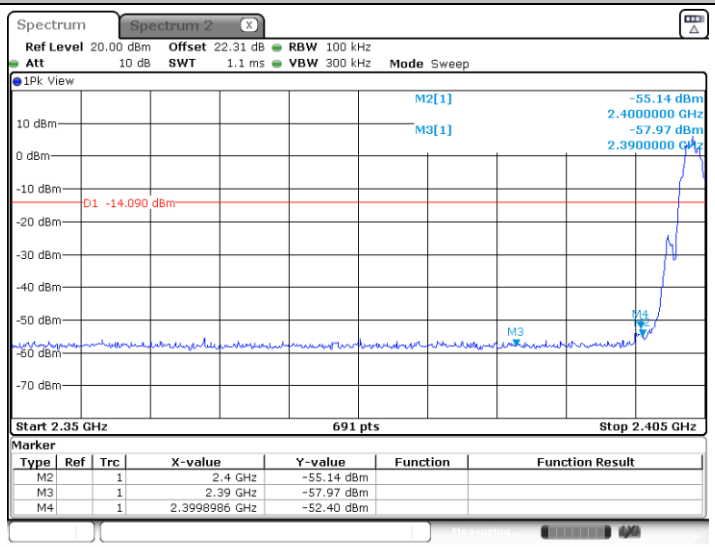

Date: 19.JUL.2024 02:56:59

BLE_1M_Ant6_High_2480



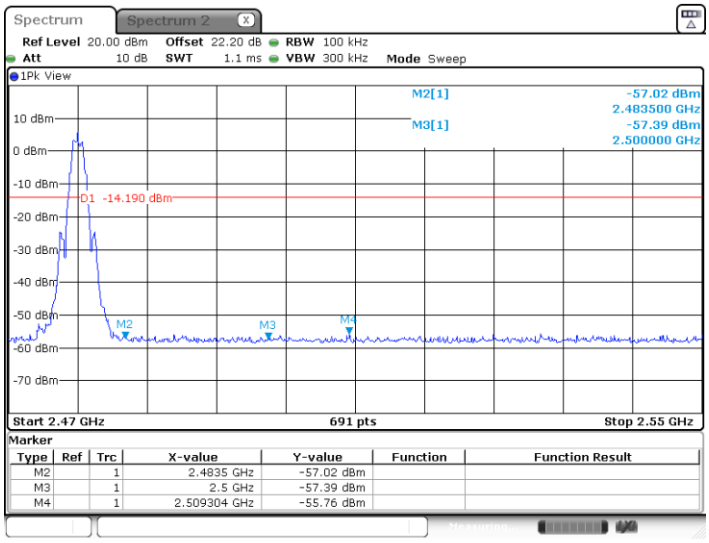

Date: 19.JUL.2024 02:59:39

BLE_2M_Ant6_Low_2404




Date: 19.JUL.2024 03:01:12

BLE_2M_Ant6_High_2478




Date: 19.JUL.2024 03:03:36

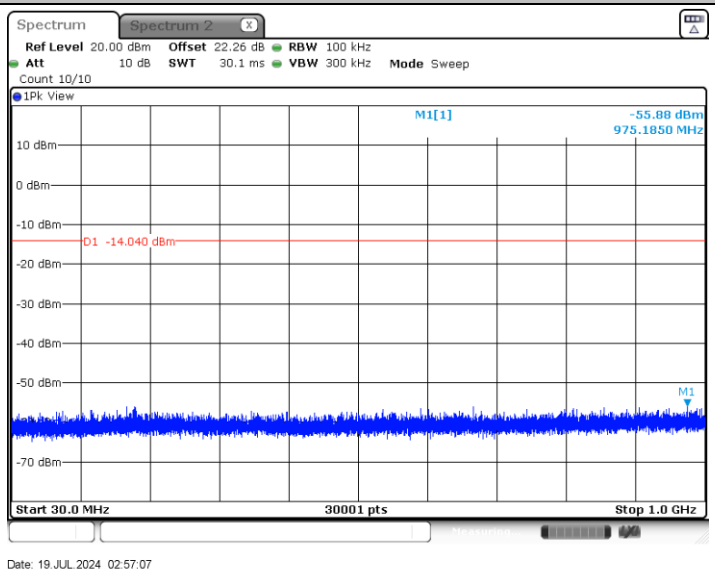
# Conducted Spurious Emission

## Test Result

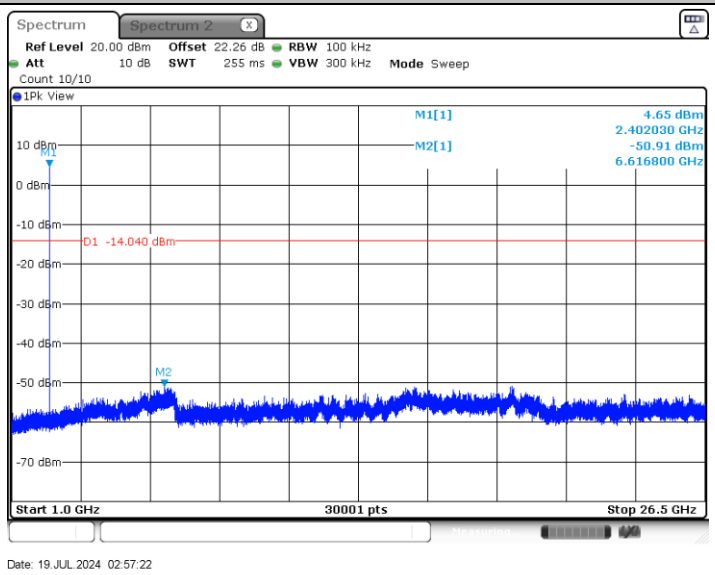
| TestMode | Antenna | Freq(MHz) | FreqRange [MHz] | RefLevel [dBm/100KHz] | Result [dBm/100KHz] | Limit [dBm/100KHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant6 | 2402 | 30~1000 | 5.96 | -55.88 | ≤-14.04 | PASS |
| | | | 1000~26500 | 5.96 | -50.91 | ≤-14.04 | PASS |
| | | 2440 | 30~1000 | 6.85 | -55.2 | ≤-13.15 | PASS |
| | | | 1000~26500 | 6.85 | -49.34 | ≤-13.15 | PASS |
| | | 2480 | 30~1000 | 5.98 | -55.91 | ≤-14.02 | PASS |
| | | | 1000~26500 | 5.98 | -49.05 | ≤-14.02 | PASS |
| BLE_2M | Ant6 | 2404 | 30~1000 | 5.91 | -55.88 | ≤-14.09 | PASS |
| | | | 1000~26500 | 5.91 | -49.51 | ≤-14.09 | PASS |
| | | 2440 | 30~1000 | 6.64 | -56.23 | ≤-13.36 | PASS |
| | | | 1000~26500 | 6.64 | -50.55 | ≤-13.36 | PASS |
| | | 2478 | 30~1000 | 5.81 | -55.78 | ≤-14.19 | PASS |
| | | | 1000~26500 | 5.81 | -50.79 | ≤-14.19 | PASS |

## Test Graphs

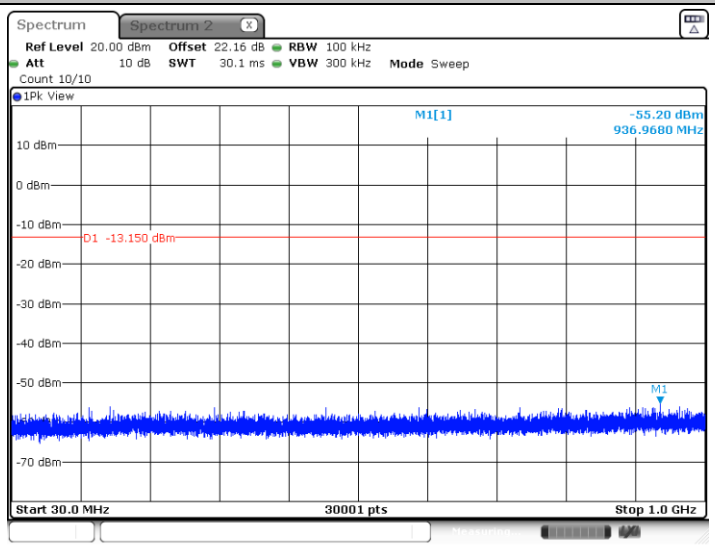
BLE_1M_Ant6_2402_30~1000




BLE_1M_Ant6_2402_1000~26500

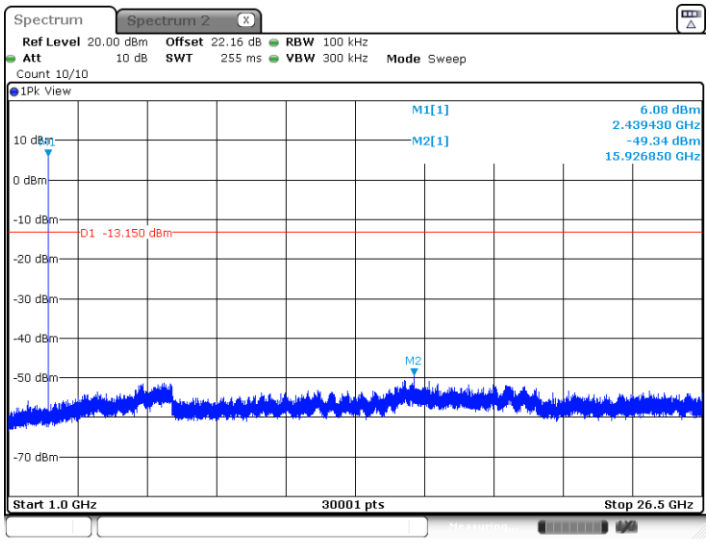


BLE_1M_Ant6_2440_30~1000



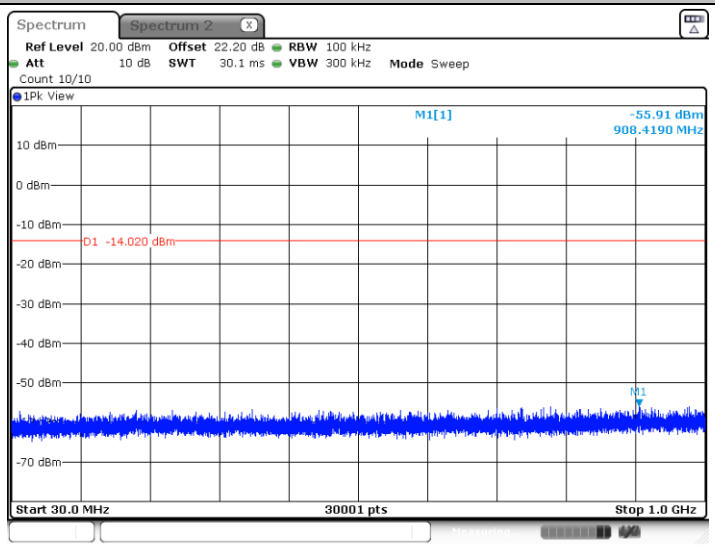

Date: 19.JUL.2024 02:58:21

BLE_1M_Ant6_2440_1000~26500



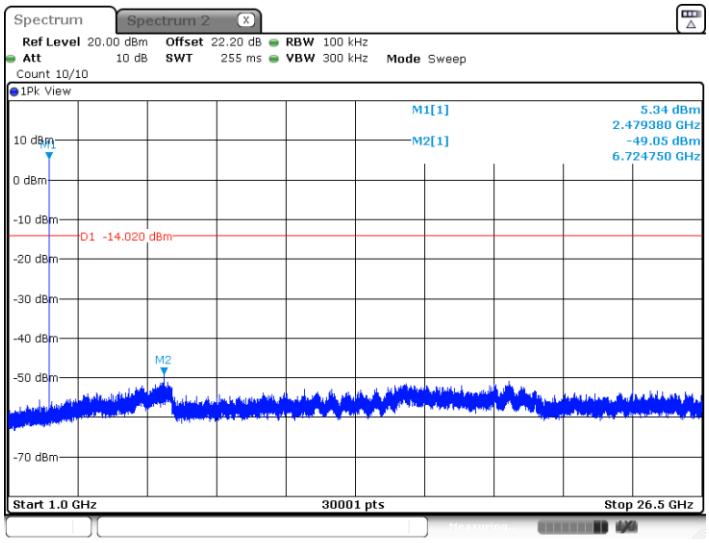

Date: 19.JUL.2024 02:58:37

BLE_1M_Ant6_2480_30~1000



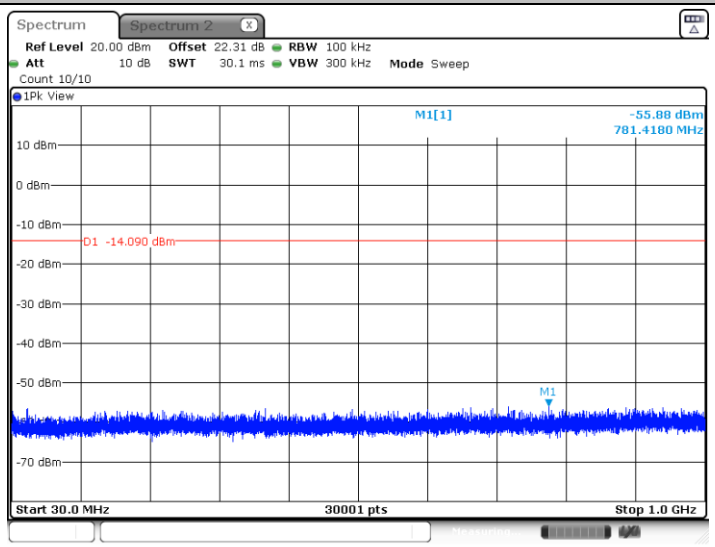

Date: 19.JUL.2024 02:59:46

BLE_1M_Ant6_2480_1000~26500



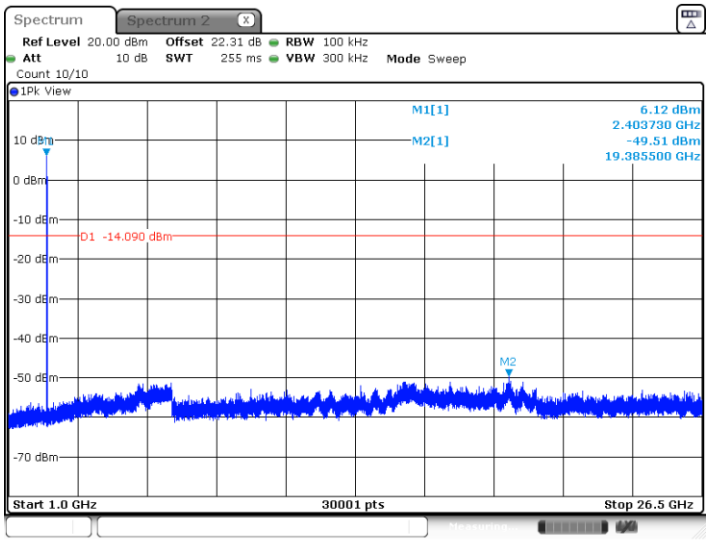

Date: 19.JUL.2024 03:00:01

BLE_2M_Ant6_2404_30~1000



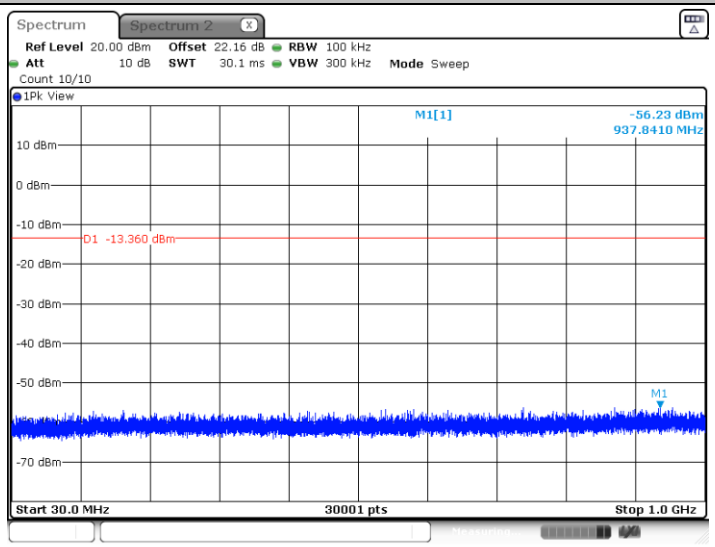

Date: 19.JUL.2024 03:01:18

BLE_2M_Ant6_2404_1000~26500



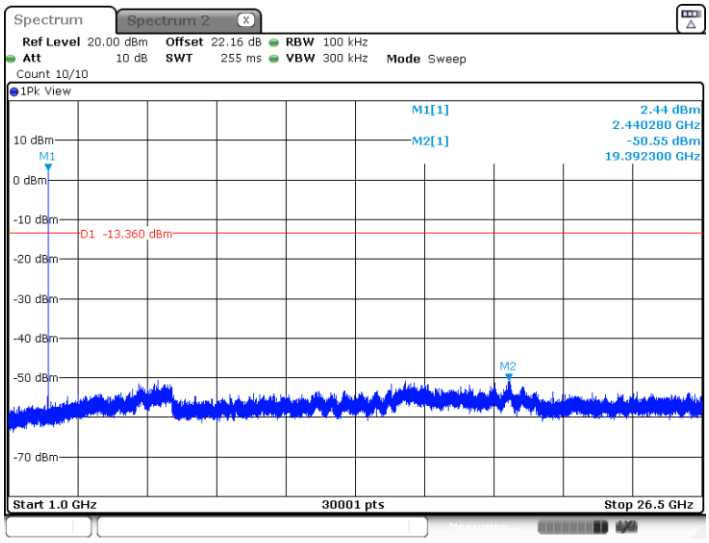

Date: 19.JUL.2024 03:01:34

BLE_2M_Ant6_2440_30~1000



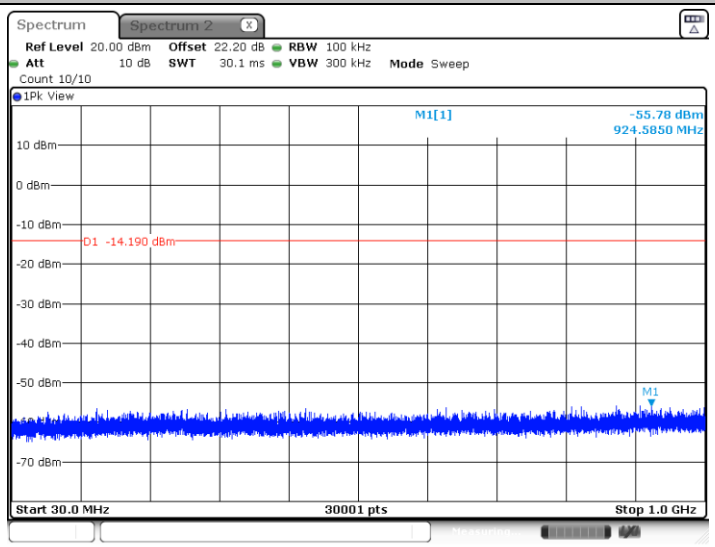

Date: 19.JUL.2024 03:02:20

BLE_2M_Ant6_2440_1000~26500



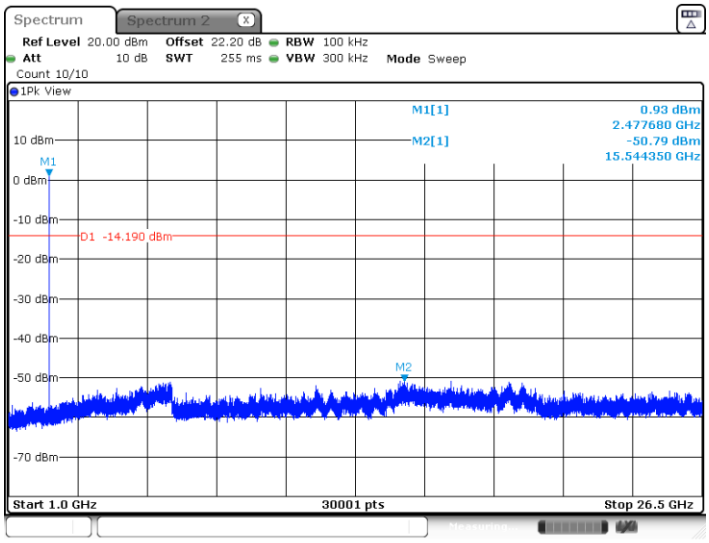

Date: 19.JUL.2024 03:02:35

BLE_2M_Ant6_2478_30~1000




Date: 19.JUL.2024 03:03:43

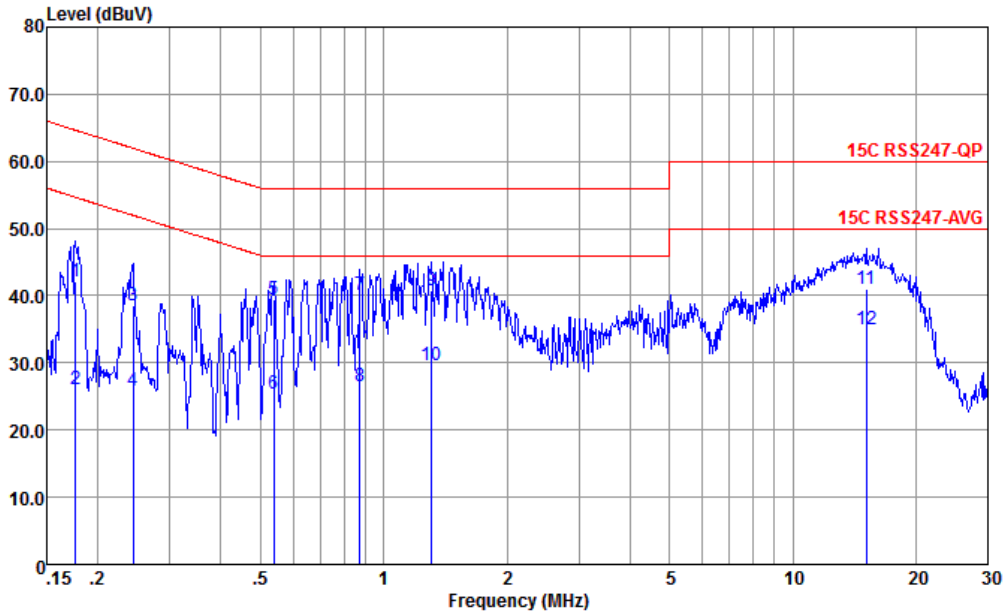
BLE_2M_Ant6_2478_1000~26500




Date: 19.JUL.2024 03:03:58

# Appendix B. AC Conducted Emission Test Results

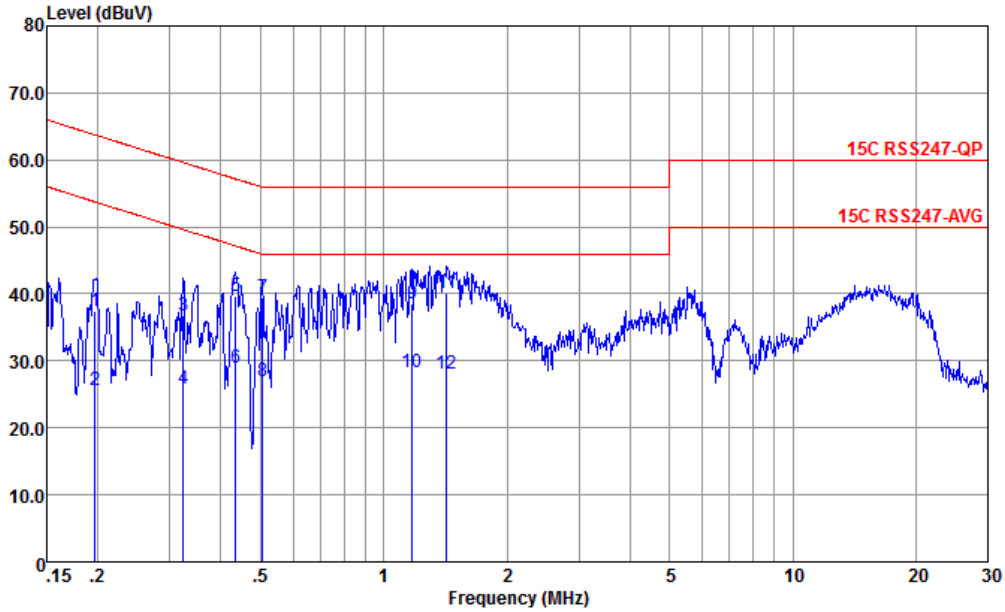
| | | | |
|---|---|---|---|
| **Test Engineer :** | Amos | **Temperature :** | 25.3~26.2℃ |
| | | **Relative Humidity :** | 38~40% |
| **Test Voltage :** | 120Vac / 60Hz | **Phase :** | Line |
| **Remark :** | All emissions not reported here are more than 10 dB below the prescribed limit. | | |




Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-L 2024 LINE

| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.177 | 42.01 | -22.63 | 64.64 | 31.50 | 0.10 | 10.41 | QP |
| 2 | 0.177 | 26.01 | -28.63 | 54.64 | 15.50 | 0.10 | 10.41 | Average |
| 3 | 0.244 | 38.66 | -23.29 | 61.95 | 28.20 | 0.09 | 10.37 | QP |
| 4 | 0.244 | 25.76 | -26.19 | 51.95 | 15.30 | 0.09 | 10.37 | Average |
| 5 | 0.538 | 39.38 | -16.62 | 56.00 | 29.30 | -0.12 | 10.20 | QP |
| 6 | 0.538 | 25.38 | -20.62 | 46.00 | 15.30 | -0.12 | 10.20 | Average |
| 7 | 0.876 | 40.03 | -15.97 | 56.00 | 30.10 | -0.17 | 10.10 | QP |
| 8 | 0.876 | 26.43 | -19.57 | 46.00 | 16.50 | -0.17 | 10.10 | Average |
| 9 | 1.310 | 40.69 | -15.31 | 56.00 | 30.81 | -0.20 | 10.08 | QP |
| 10 | 1.310 | 29.69 | -16.31 | 46.00 | 19.81 | -0.20 | 10.08 | Average |
| 11 | 15.146 | 40.93 | -19.07 | 60.00 | 29.91 | -0.19 | 11.21 | QP |
| 12 * | 15.146 | 34.93 | -15.07 | 50.00 | 23.91 | -0.19 | 11.21 | Average |

| | | | |
|---|---|---|---|
| **Test Engineer :** | Amos | **Temperature :** | 25.3~26.2℃ |
| | | **Relative Humidity :** | 38~40% |
| **Test Voltage :** | 120Vac / 60Hz | **Phase :** | Neutral |
| **Remark :** | All emissions not reported here are more than 10 dB below the prescribed limit. | | |




Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-N 2024 NEUTRAL

| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.197 | 37.34 | -26.42 | 63.76 | 26.80 | 0.13 | 10.41 | QP |
| 2 | 0.197 | 25.64 | -28.12 | 53.76 | 15.10 | 0.13 | 10.41 | Average |
| 3 | 0.323 | 36.79 | -22.83 | 59.62 | 26.59 | -0.12 | 10.32 | QP |
| 4 | 0.323 | 25.79 | -23.83 | 49.62 | 15.59 | -0.12 | 10.32 | Average |
| 5 | 0.435 | 39.72 | -17.43 | 57.15 | 29.60 | -0.14 | 10.26 | QP |
| 6 | 0.435 | 29.02 | -18.13 | 47.15 | 18.90 | -0.14 | 10.26 | Average |
| 7 | 0.505 | 39.47 | -16.53 | 56.00 | 29.40 | -0.15 | 10.22 | QP |
| 8 | 0.505 | 26.87 | -19.13 | 46.00 | 16.80 | -0.15 | 10.22 | Average |
| 9 | 1.172 | 38.60 | -17.40 | 56.00 | 28.69 | -0.18 | 10.09 | QP |
| 10 | 1.172 | 28.20 | -17.80 | 46.00 | 18.29 | -0.18 | 10.09 | Average |
| 11 * | 1.426 | 40.10 | -15.90 | 56.00 | 30.21 | -0.19 | 10.08 | QP |
| 12 | 1.426 | 28.10 | -17.90 | 46.00 | 18.21 | -0.19 | 10.08 | Average |

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

# Appendix C. Radiated Spurious Emission Test Data

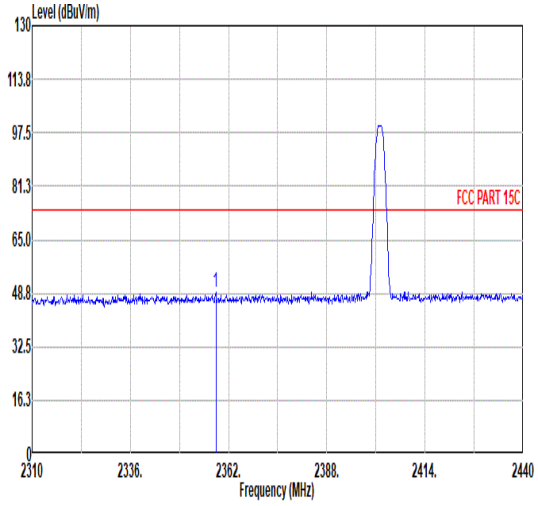
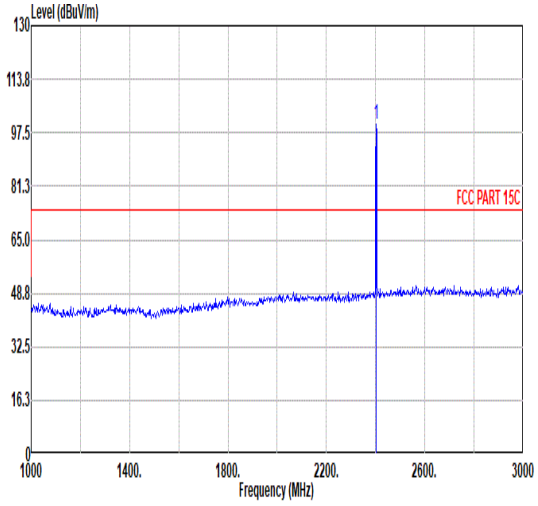
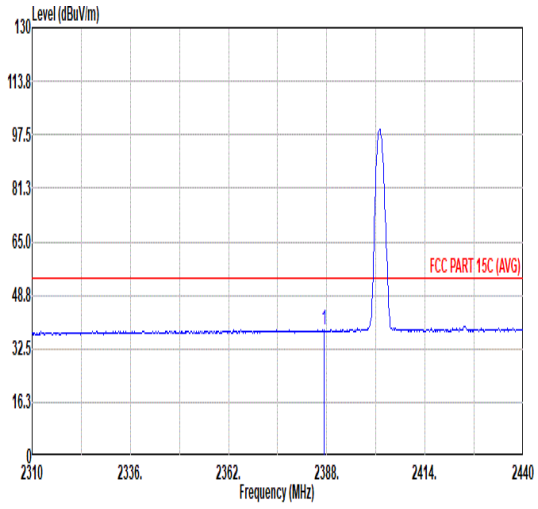
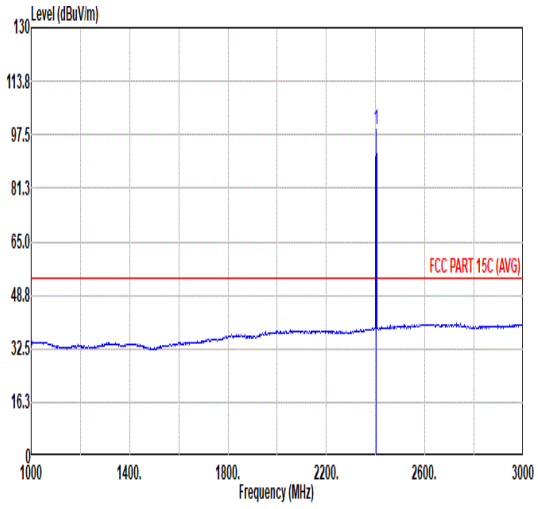
| Test Engineer : | Jake zhou | Relative Humidity : | 52~56% |
|---|---|---|---|
| | | Temperature : | 22~25℃ |

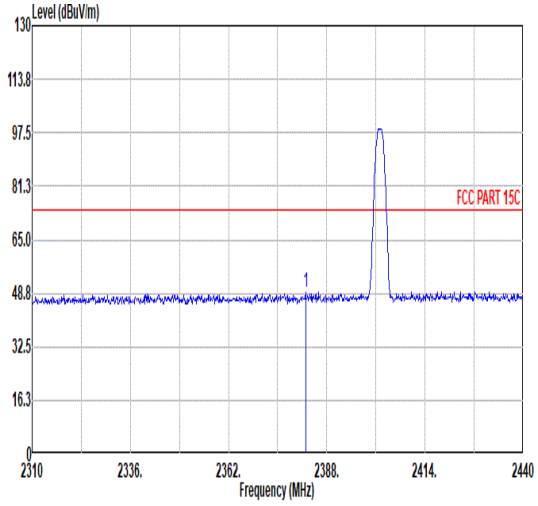
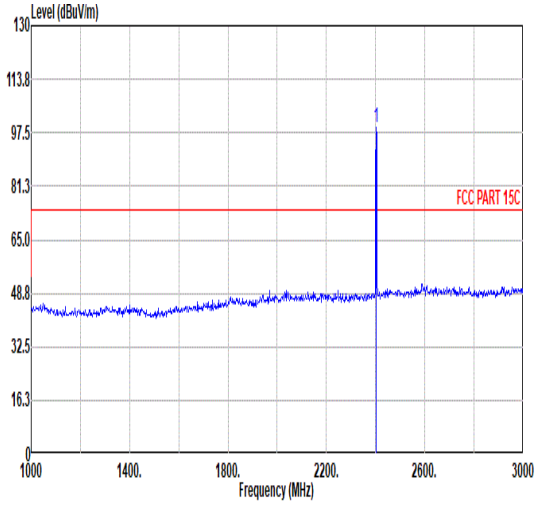
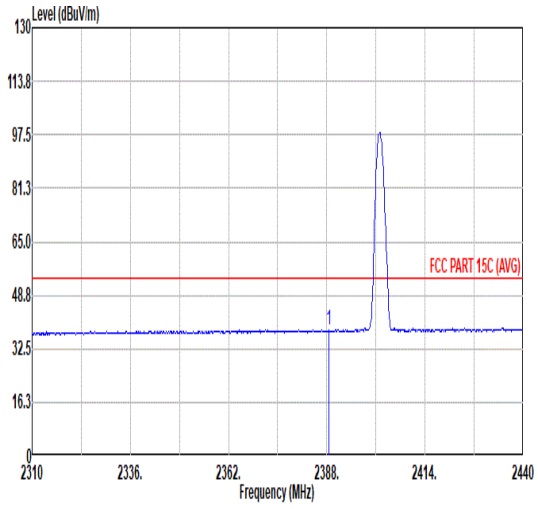
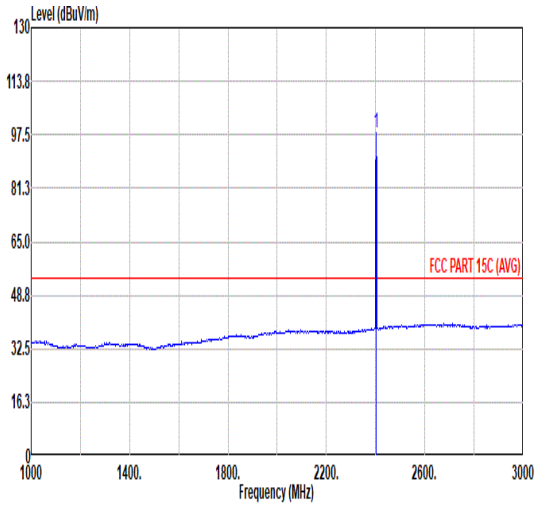
## Radiated Spurious Emission Test Modes

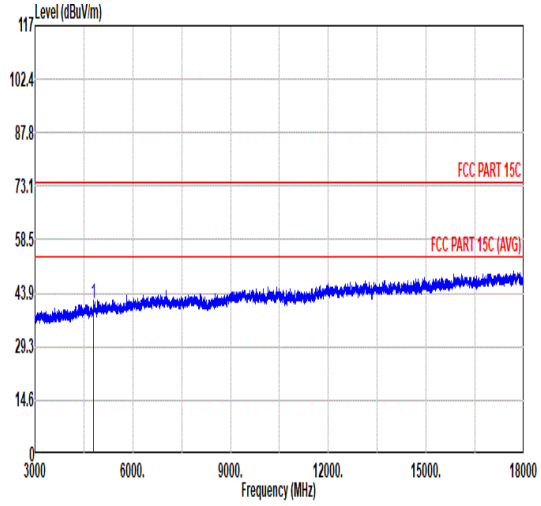
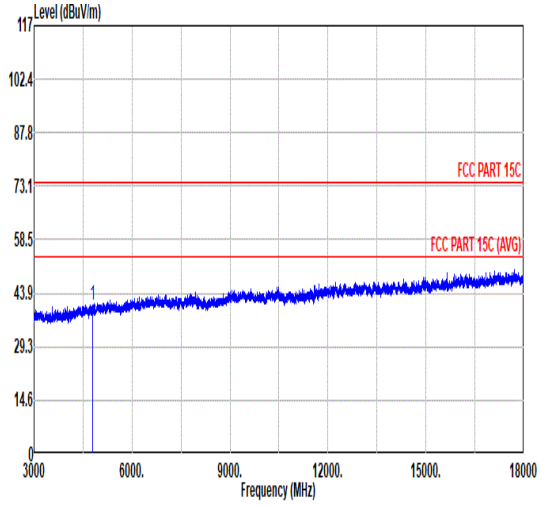
| Mode | Band (MHz) | Antenna | Modulation | Channel | Frequency | Data Rate | RU | Remark |
|---|---|---|---|---|---|---|---|---|
| Mode 1 | 2400-2483.5 | 6 | Bluetooth-LE | 00 | 2402 | 1Mbps | - | - |
| Mode 2 | 2400-2483.5 | 6 | Bluetooth-LE | 19 | 2440 | 1Mbps | - | - |
| Mode 3 | 2400-2483.5 | 6 | Bluetooth-LE | 39 | 2480 | 1Mbps | - | - |
| Mode 4 | 2400-2483.5 | 6 | Bluetooth-LE | 01 | 2404 | 2Mbps | - | - |
| Mode 5 | 2400-2483.5 | 6 | Bluetooth-LE | 19 | 2440 | 2Mbps | - | - |
| Mode 6 | 2400-2483.5 | 6 | Bluetooth-LE | 38 | 2478 | 2Mbps | - | - |

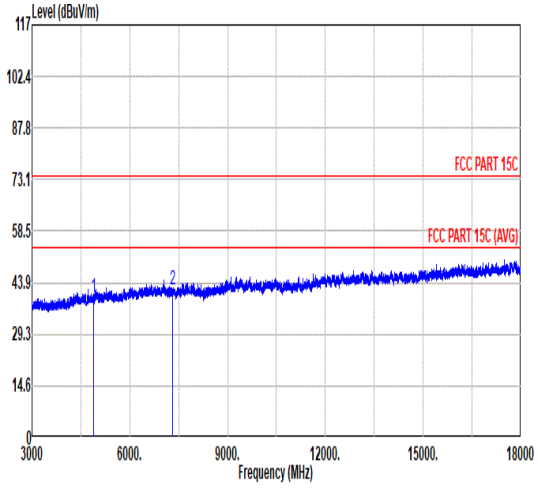
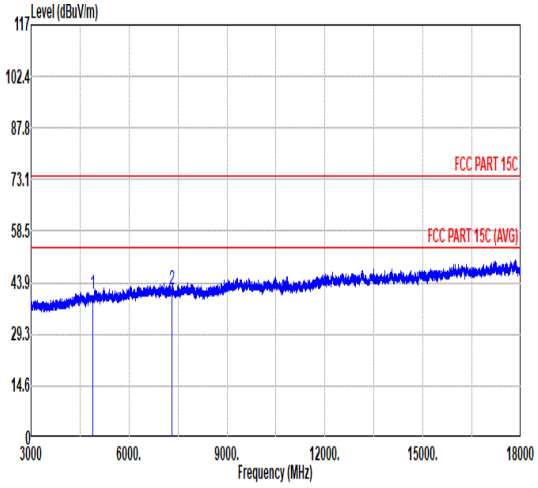
## Summary of each worse mode

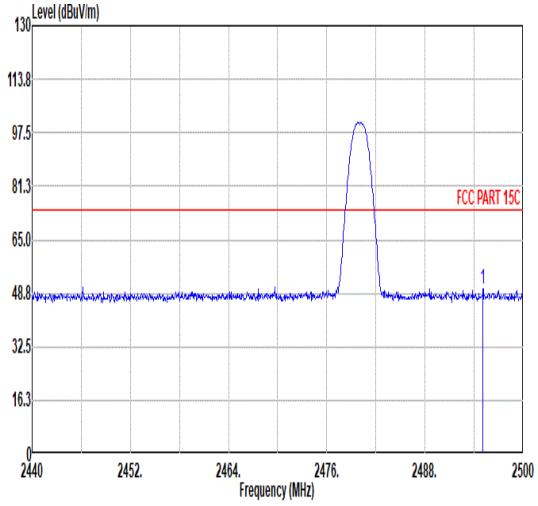
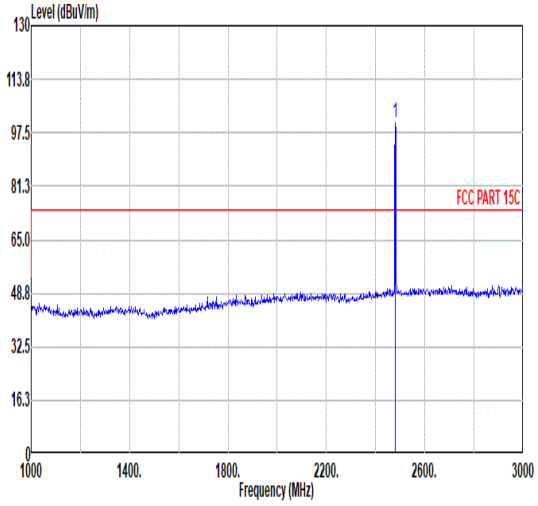
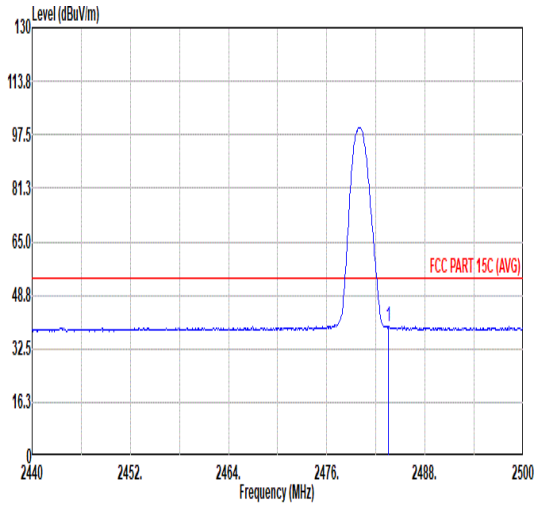
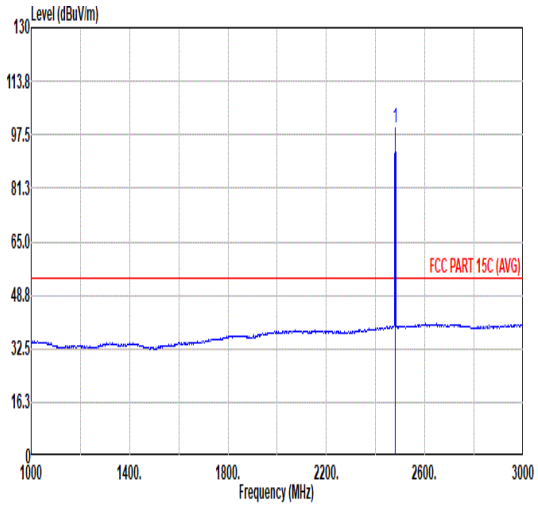
| Mode | Modulation | Ch. | Freq. (MHz) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol. | Peak Avg. | Result | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bluetooth-LE | 00 | 2388.52 | 38.35 | 54.00 | -15.65 | V | AVERAGE | Pass | Band Edge |
| 1 | Bluetooth-LE | 00 | 4804.00 | 41.20 | 74.00 | -32.80 | H | PEAK | Pass | Harmonic |
| 2 | Bluetooth-LE | 19 | - | - | - | - | - | - | - | Band Edge |
| 2 | Bluetooth-LE | 19 | 7320.00 | 41.89 | 74.00 | -32.11 | V | PEAK | Pass | Harmonic |
| 3 | Bluetooth-LE | 39 | 2483.56 | 39.28 | 54.00 | -14.72 | H | AVERAGE | Pass | Band Edge |
| 3 | Bluetooth-LE | 39 | 4960.00 | 42.41 | 74.00 | -31.59 | V | PEAK | Pass | Harmonic |
| 4 | Bluetooth-LE | 01 | 2383.19 | 39.24 | 54.00 | -14.76 | H | AVERAGE | Pass | Band Edge |
| 4 | Bluetooth-LE | 01 | 4808.00 | 41.21 | 74.00 | -32.79 | H | PEAK | Pass | Harmonic |
| 5 | Bluetooth-LE | 19 | - | - | - | - | - | - | - | Band Edge |
| 5 | Bluetooth-LE | 19 | 7320.00 | 42.78 | 74.00 | -31.22 | H | PEAK | Pass | Harmonic |
| 6 | Bluetooth-LE | 38 | 2495.32 | 40.20 | 54.00 | -13.80 | H | AVERAGE | Pass | Band Edge |
| 6 | Bluetooth-LE | 38 | 4956.00 | 42.05 | 74.00 | -31.95 | H | PEAK | Pass | Harmonic |

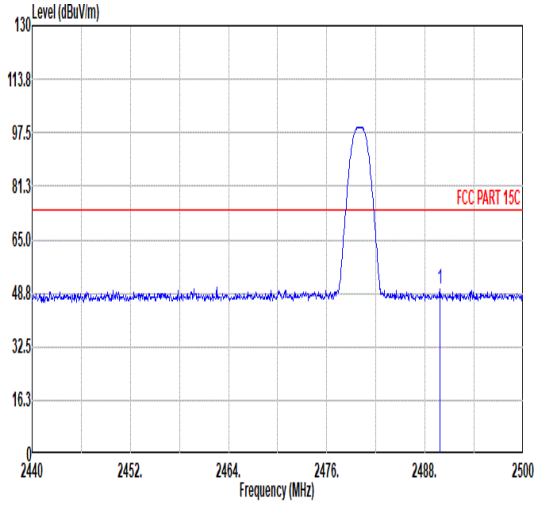
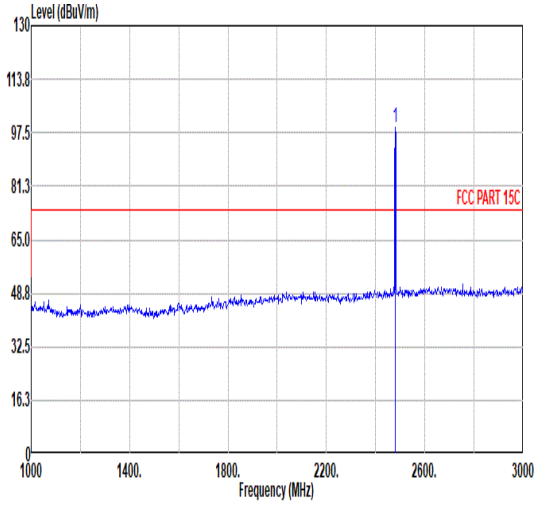
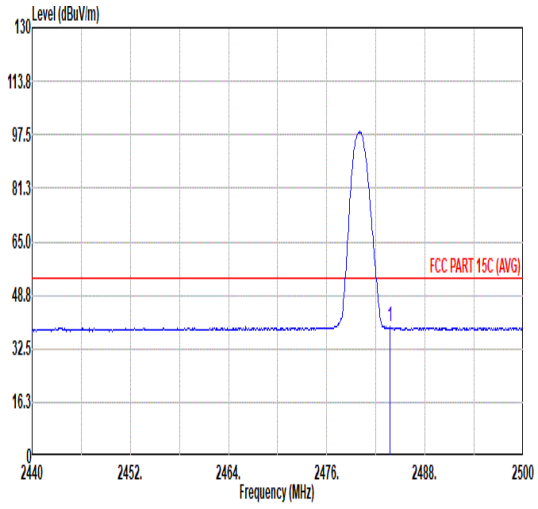
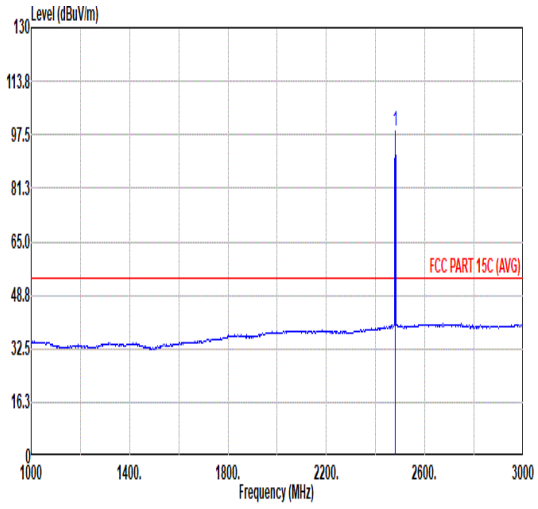
| Mode | 1 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH00_2402MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2358.62 48.95 74.00 -25.05 41.10 31.61 7.11 36.87 6.00 305 300 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2402.00 100.01 ------ ------ 91.78 31.91 7.18 36.86 6.00 305 300 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2387.35 38.19 54.00 -15.81 30.08 31.81 7.16 36.86 6.00 305 300 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2402.00 98.95 ------ ------ 90.72 31.91 7.18 36.86 6.00 305 300 AVERAGE |

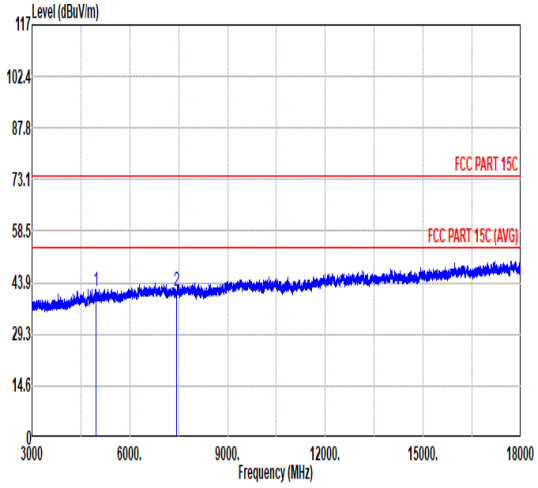
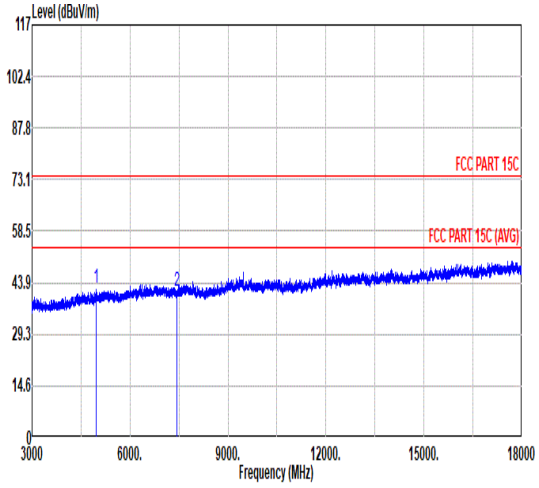
| Mode | 1 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH00_2402MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2382.41 48.89 74.00 -25.11 40.82 31.78 7.15 36.86 6.00 361 48 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2402.00 99.01 ------ ------ 90.78 31.91 7.18 36.86 6.00 361 48 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2388.52 38.35 54.00 -15.65 30.23 31.82 7.16 36.86 6.00 361 48 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2402.00 98.05 ------ ------ 89.82 31.91 7.18 36.86 6.00 361 48 AVERAGE |

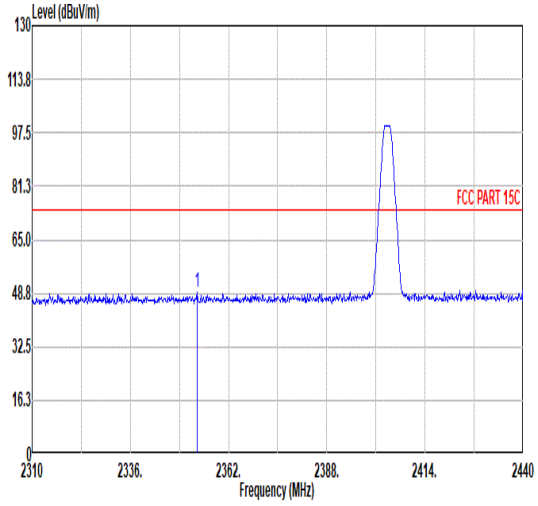
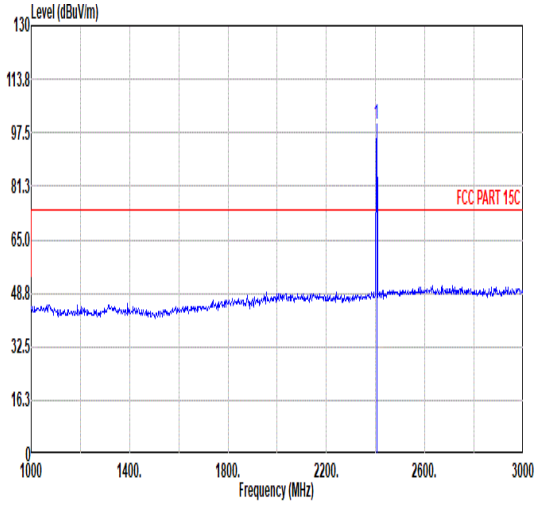
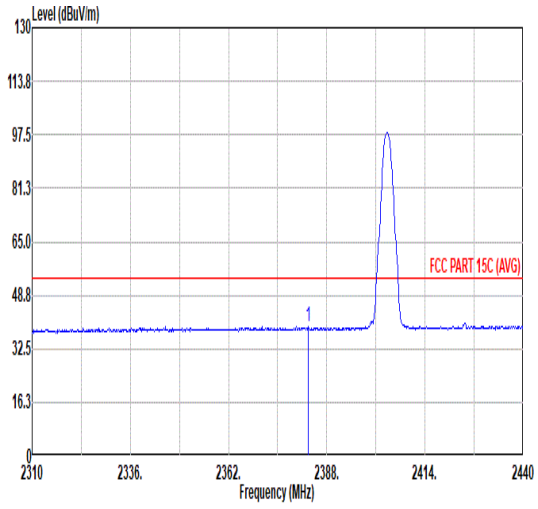
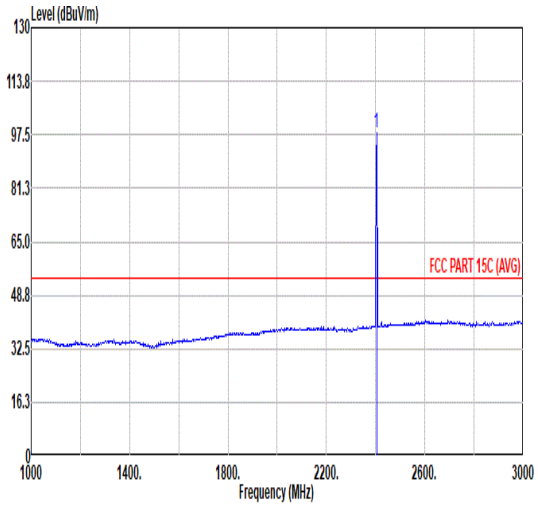
| Mode | 1 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH00_2402MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4804.00 41.20 74.00 -32.80 60.32 34.09 10.27 63.48 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4804.00 40.73 74.00 -33.27 59.85 34.09 10.27 63.48 0.00 -- -- PEAK |

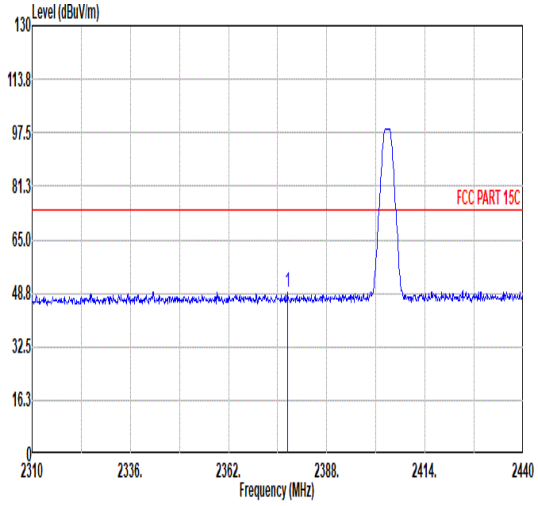
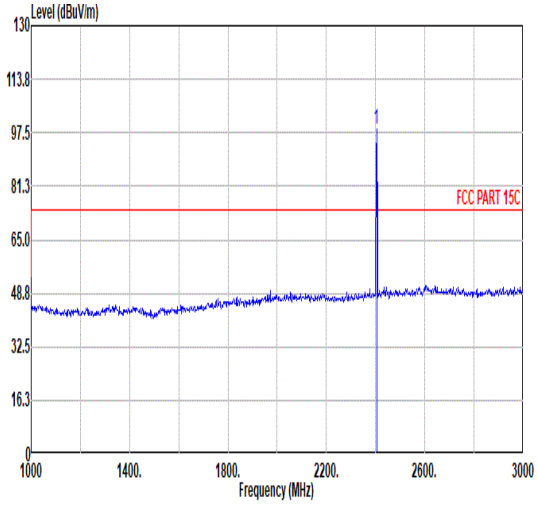
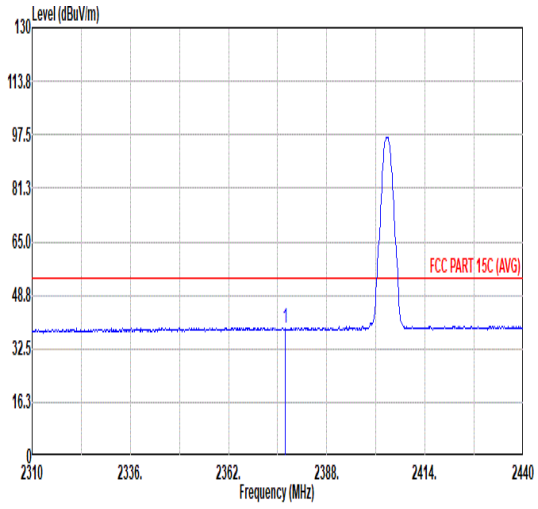
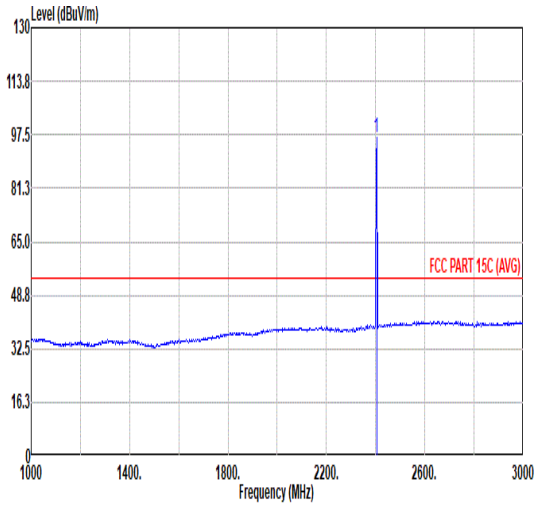
| Mode | 2 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH19_2440MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4880.00 39.72 74.00 -34.28 58.91 33.94 10.35 63.48 0.00 -- -- PEAK<br>2 7320.00 41.84 74.00 -32.16 57.13 35.60 12.79 63.68 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4880.00 40.68 74.00 -33.32 59.87 33.94 10.35 63.48 0.00 -- -- PEAK<br>2 7320.00 41.89 74.00 -32.11 57.18 35.60 12.79 63.68 0.00 -- -- PEAK |

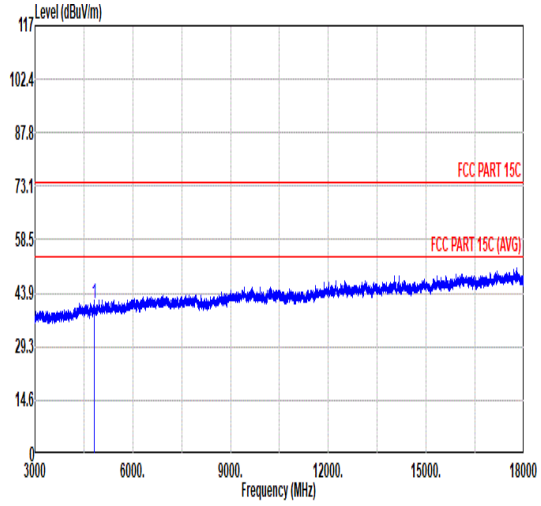
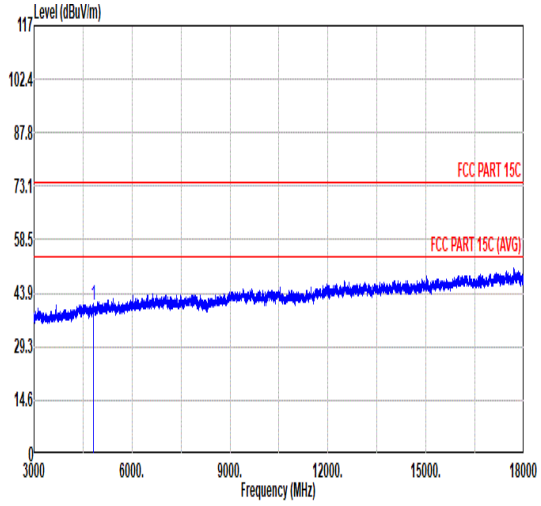
| Mode | 3 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH39_2480MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2495.08 50.05 74.00 -23.95 41.27 32.28 7.35 36.85 6.00 164 300 PEAK |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2480.00 100.64 ------ ------ 91.95 32.22 7.32 36.85 6.00 164 300 PEAK |
| Avg |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2483.56 39.28 54.00 -14.72 30.57 32.23 7.33 36.85 6.00 164 300 AVERAGE |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2480.00 99.59 ------ ------ 90.90 32.22 7.32 36.85 6.00 164 300 AVERAGE |

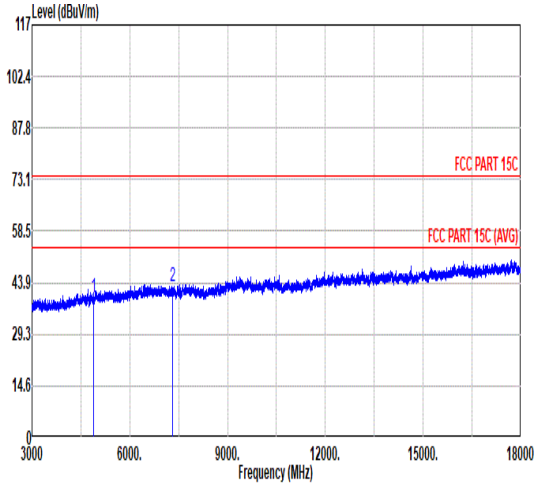
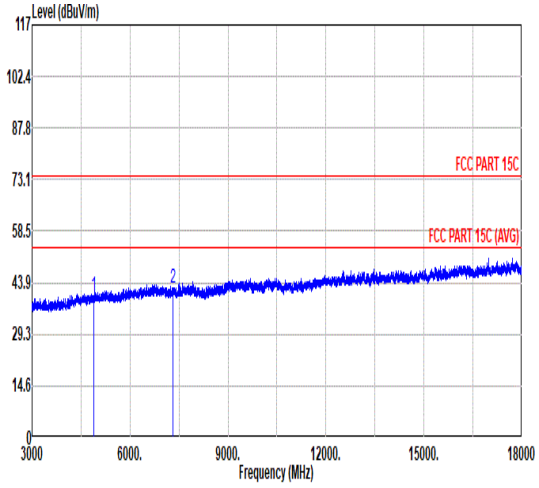
| Mode | 3 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH39_2480MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2489.80 50.10 74.00 -23.90 41.35 32.26 7.34 36.85 6.00 379 47 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2480.00 99.29 ------ ------ 90.60 32.22 7.32 36.85 6.00 379 47 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2483.68 39.05 54.00 -14.95 30.34 32.23 7.33 36.85 6.00 379 47 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2480.00 98.39 ------ ------ 89.70 32.22 7.32 36.85 6.00 379 47 AVERAGE |

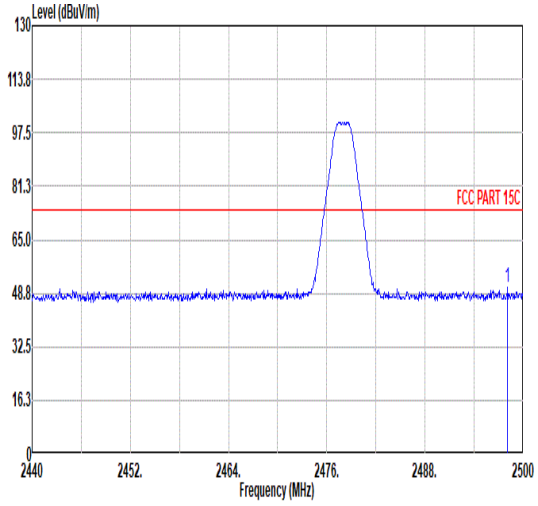
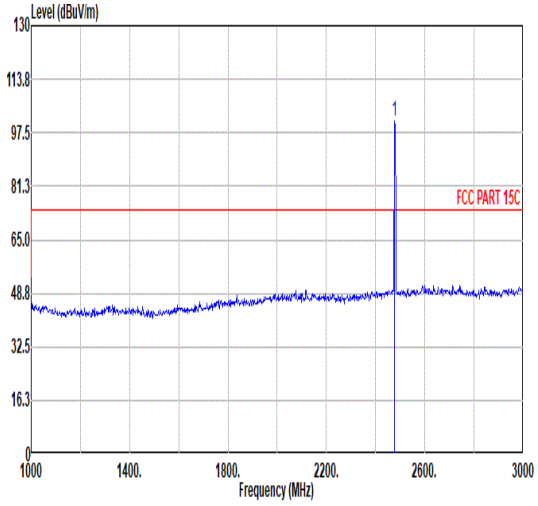
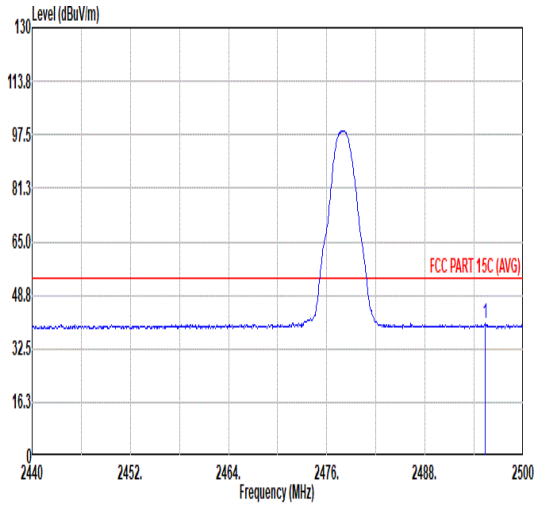
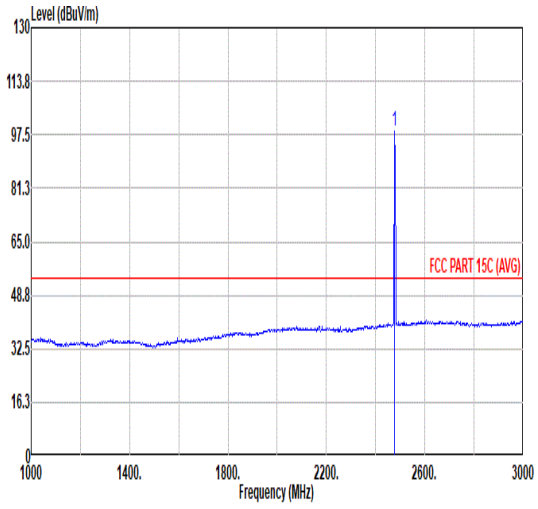
| Mode | 3 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH39_2480MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4960.00 41.62 74.00 -32.38 60.70 33.96 10.44 63.48 0.00 -- -- PEAK<br>2 7440.00 41.53 74.00 -32.47 56.71 35.64 12.93 63.75 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4960.00 42.41 74.00 -31.59 61.49 33.96 10.44 63.48 0.00 -- -- PEAK<br>2 7440.00 41.49 74.00 -32.51 56.67 35.64 12.93 63.75 0.00 -- -- PEAK |

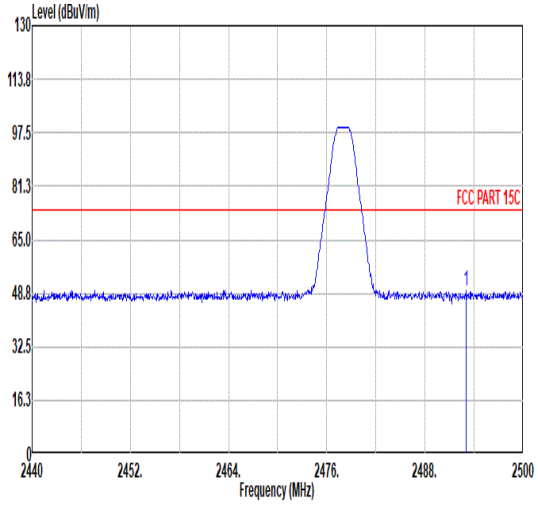
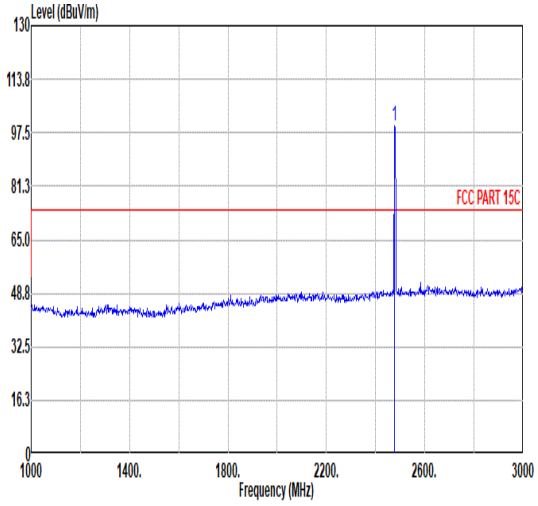
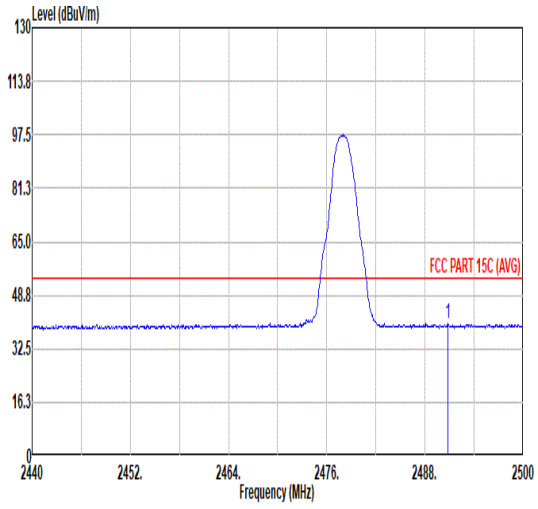
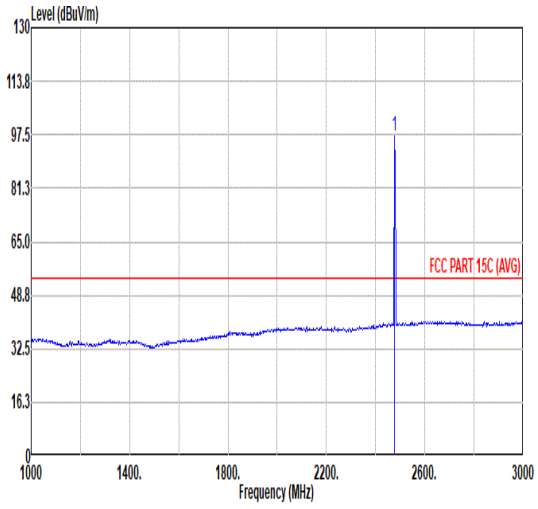
| Mode | 4 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH01_2404MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2353.68 49.26 74.00 -24.74 41.44 31.58 7.11 36.87 6.00 304 297 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2404.00 100.20 ------ ------ 91.95 31.92 7.19 36.86 6.00 304 297 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2383.19 39.24 54.00 -14.76 31.17 31.78 7.15 36.86 6.00 304 297 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2404.00 97.91 ------ ------ 89.66 31.92 7.19 36.86 6.00 304 297 AVERAGE |

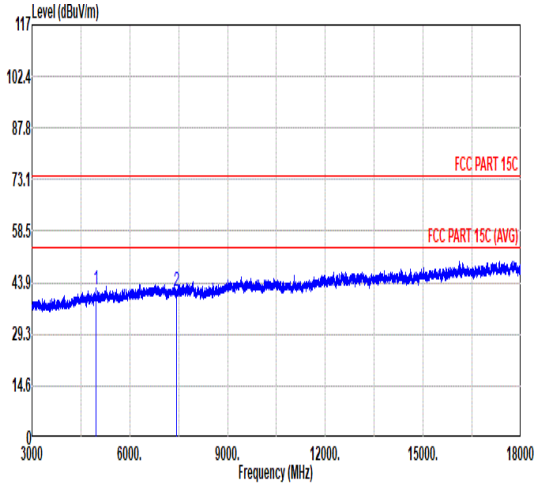
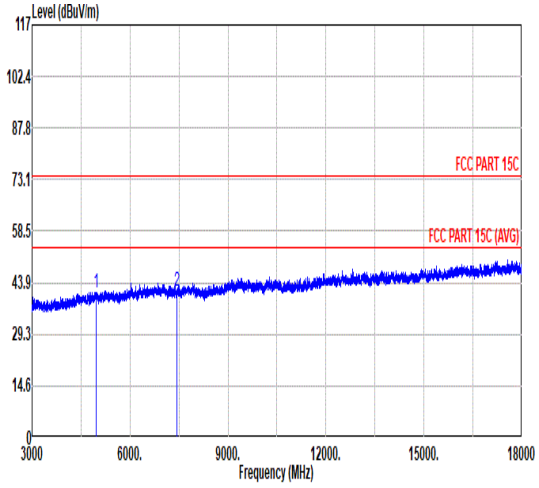
| Mode | 4 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH01_2404MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2377.60 49.22 74.00 -24.78 41.20 31.74 7.14 36.86 6.00 361 49 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2404.00 98.73 ------ ------ 90.48 31.92 7.19 36.86 6.00 361 49 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2376.95 38.94 54.00 -15.06 30.92 31.74 7.14 36.86 6.00 361 49 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2404.00 96.71 ------ ------ 88.46 31.92 7.19 36.86 6.00 361 49 AVERAGE |

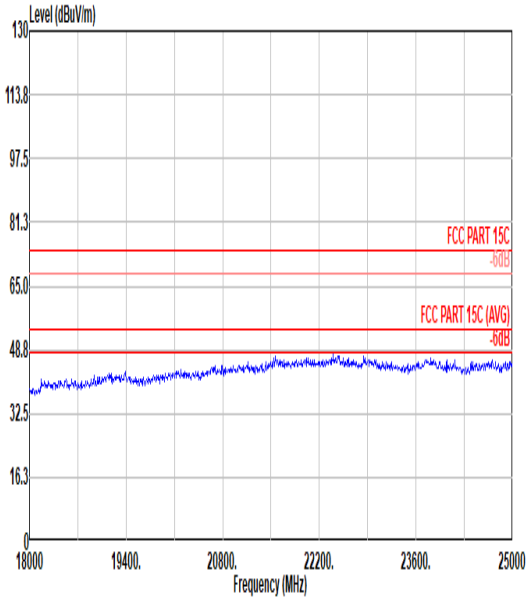
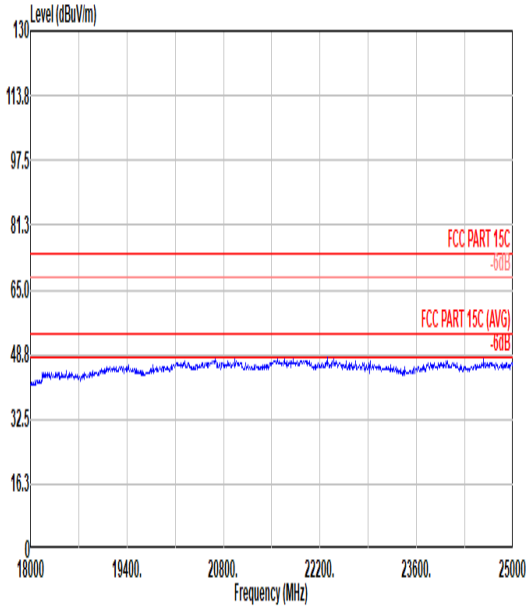
| Mode | 4 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH01_2404MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4808.00 41.21 74.00 -32.79 60.33 34.08 10.28 63.48 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4808.00 40.62 74.00 -33.38 59.74 34.08 10.28 63.48 0.00 -- -- PEAK |

| Mode | 5 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH19_2440MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4880.00 39.93 74.00 -34.07 59.12 33.94 10.35 63.48 0.00 -- -- PEAK<br>2 7320.00 42.78 74.00 -31.22 58.07 35.60 12.79 63.68 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4880.00 39.96 74.00 -34.04 59.15 33.94 10.35 63.48 0.00 -- -- PEAK<br>2 7320.00 42.27 74.00 -31.73 57.56 35.60 12.79 63.68 0.00 -- -- PEAK |

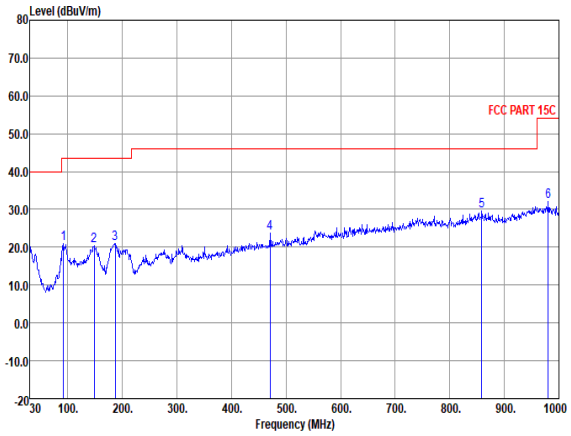
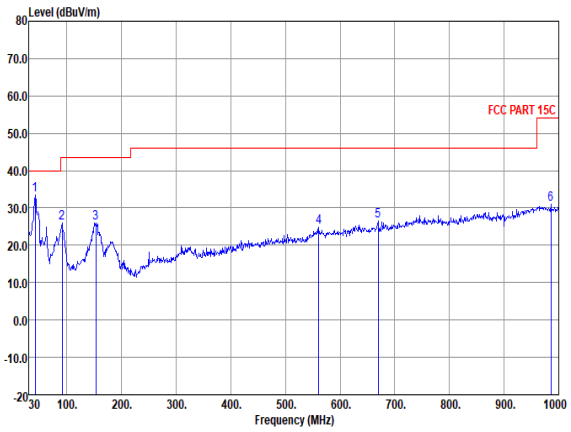
| Mode | 6 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH38_2478MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Fundamental |
| Peak |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2498.08 50.55 74.00 -23.45 41.75 32.29 7.36 36.85 6.00 163 300 PEAK |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 100.88 ------ ------ 92.20 32.21 7.32 36.85 6.00 163 300 PEAK |
| Avg |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2495.32 40.20 54.00 -13.80 31.42 32.28 7.35 36.85 6.00 163 300 AVERAGE |  <br>Limit Read Ant Cable Preamp Aux APos TPos<br>Freq Level Line Margin Level Factor Loss Factor Factor Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 98.65 ------ ------ 89.97 32.21 7.32 36.85 6.00 163 300 AVERAGE |

| Mode | 6 | |
|---|---|---|
| | Band Edge | |
| | 2400-2483.5_Bluetooth-LE _CH38_2478MHz | |
| ANT | 6 | |
| Pol. | Vertical | Fundamental |
| Peak |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2492.98 49.50 74.00 -24.50 40.73 32.27 7.35 36.85 6.00 380 48 PEAK |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 99.61 ------ ------ 90.93 32.21 7.32 36.85 6.00 380 48 PEAK |
| Avg |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2490.76 40.00 54.00 -14.00 31.25 32.26 7.34 36.85 6.00 380 48 AVERAGE |  <br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 2478.00 97.29 ------ ------ 88.61 32.21 7.32 36.85 6.00 380 48 AVERAGE |

| Mode | 6 | |
|---|---|---|
| | Harmonic | |
| | 2400-2483.5_Bluetooth-LE _CH38_2478MHz | |
| ANT | 6 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4956.00 42.05 74.00 -31.95 61.13 33.96 10.44 63.48 0.00 -- -- PEAK<br>2 7434.00 41.36 74.00 -32.64 56.55 35.63 12.93 63.75 0.00 -- -- PEAK |  <br><br>Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor Aux Factor APos TPos Remark<br>MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg<br>1 4956.00 41.07 74.00 -32.93 60.15 33.96 10.44 63.48 0.00 -- -- PEAK<br>2 7434.00 41.55 74.00 -32.45 56.74 35.63 12.93 63.75 0.00 -- -- PEAK |

| | | |
|---|---|---|
| Mode | 6 | |
| | 18G-25G | |
| | 2400-2483.5_Bluetooth-LE_GSFK _CH38_2478MHz | |
| ANT | 1 | |
| Pol. | Horizontal | Vertical |
| Peak<br>Avg |  |  |

| Mode | 6 |
|---|---|
| | LF |
| | 2400-2483.5_Bluetooth-LE_GSFK _CH38_2478MHz |
| ANT | 1 |

| Pol. | Horizontal | Vertical |
|---|---|---|
| QP |  |  |



| | | Freq MHz | Level dBuV/m | Over Limit dB | Limit Line dBuV/m | ReadLevel dBuV | Antenna Factor dB/m | Cable Loss dB | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 92.08 | 20.89 | -22.61 | 43.50 | 37.34 | 14.88 | 1.35 | 32.68 | --- | --- | Peak |
| 2 | | 148.34 | 20.46 | -23.04 | 43.50 | 34.22 | 17.16 | 1.79 | 32.71 | --- | --- | Peak |
| 3 | | 187.14 | 21.02 | -22.48 | 43.50 | 37.11 | 14.65 | 2.01 | 32.75 | --- | --- | Peak |
| 4 | | 470.38 | 23.72 | -22.28 | 46.00 | 30.41 | 23.27 | 3.14 | 33.10 | --- | --- | Peak |
| 5 | p | 858.38 | 29.64 | -16.36 | 46.00 | 28.41 | 29.47 | 4.30 | 32.54 | --- | --- | Peak |
| 6 | | 980.60 | 32.07 | -21.93 | 54.00 | 27.95 | 30.81 | 4.65 | 31.34 | --- | --- | Peak |

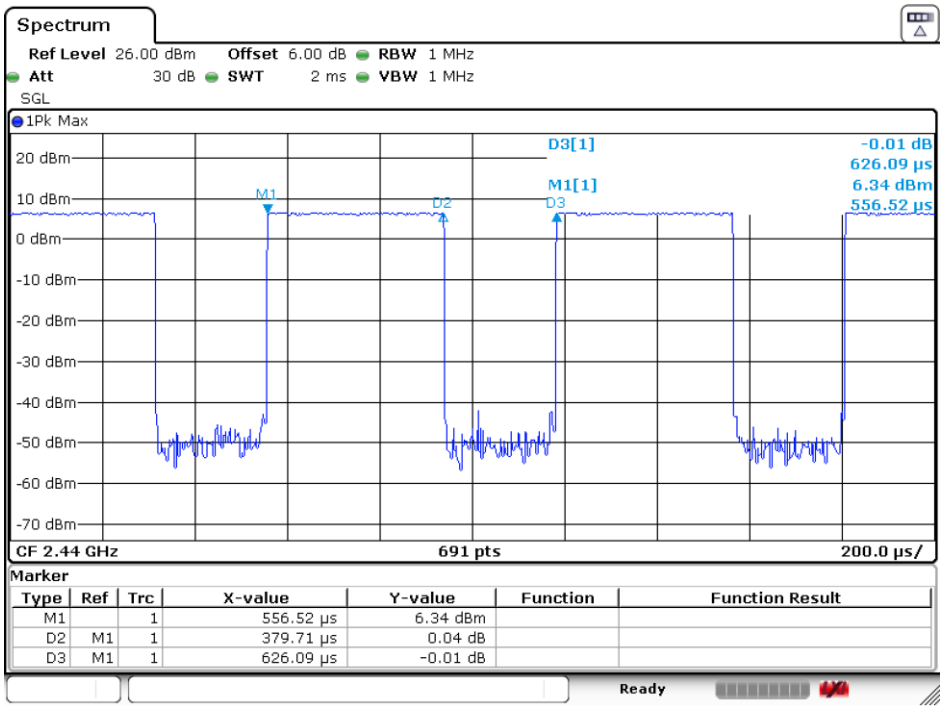


| | | Freq MHz | Level dBuV/m | Over Limit dB | Limit Line dBuV/m | ReadLevel dBuV | Antenna Factor dB/m | Cable Loss dB | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | p | 41.64 | 33.60 | -6.40 | 40.00 | 47.04 | 18.49 | 0.90 | 32.83 | --- | --- | Peak |
| 2 | | 91.11 | 25.94 | -17.56 | 43.50 | 42.53 | 14.75 | 1.35 | 32.69 | --- | --- | Peak |
| 3 | | 153.19 | 26.07 | -17.43 | 43.50 | 40.12 | 16.85 | 1.81 | 32.71 | --- | --- | Peak |
| 4 | | 560.59 | 24.72 | -21.28 | 46.00 | 28.57 | 26.10 | 3.29 | 33.24 | --- | --- | Peak |
| 5 | | 669.23 | 26.65 | -19.35 | 46.00 | 29.91 | 26.17 | 3.82 | 33.25 | --- | --- | Peak |
| 6 | | 985.45 | 31.04 | -22.96 | 54.00 | 26.96 | 30.71 | 4.66 | 31.29 | --- | --- | Peak |

# Appendix D. Duty Cycle Plots

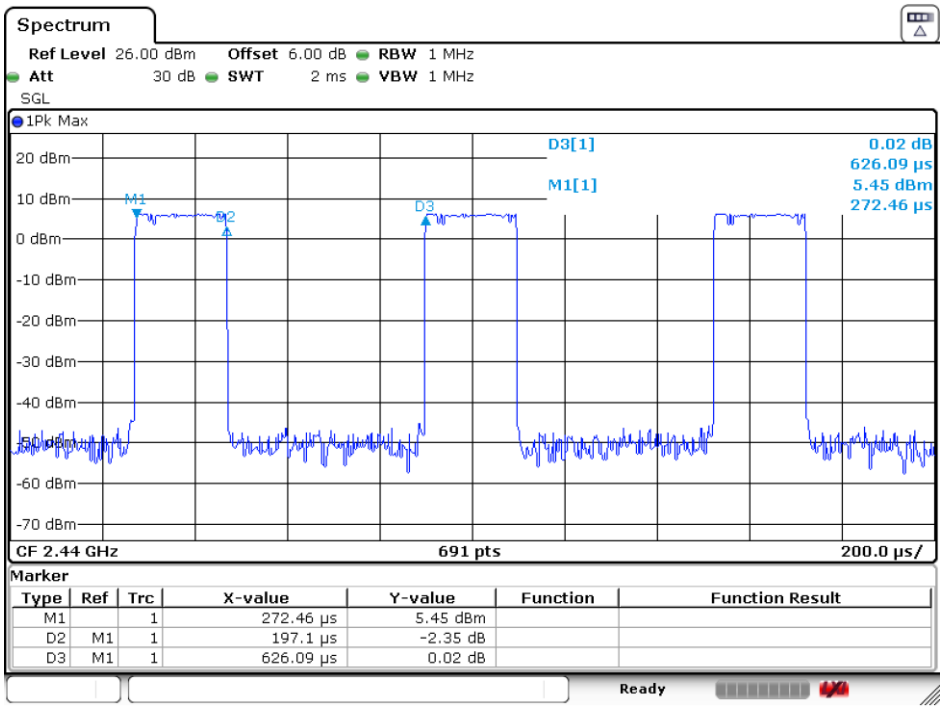
| Band | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|---|---|---|---|---|
| Bluetooth LE 1Mbps | 60.65 | 0.380 | 2.634 | 2.7KHz |
| Bluetooth LE 2Mbps | 31.48 | 0.197 | 5.074 | 5.1KHz |

**Bluetooth LE 1Mbps**




Date: 18.JUL.2024 04:26:19

## Bluetooth LE 2Mbps




Date: 18.JUL.2024 04:27:00