Certificate #6613.01

# FCC TEST REPORT
# (Part 15, Subpart C)

| | |
|---|---|
| Applicant: | HMD Global Oy |
| Address: | Bertel Jungin aukio 9,02600 Espoo,Finland |

| | |
|---|---|
| Manufacturer or Supplier: | HMD Global Oy |
| Address: | Bertel Jungin aukio 9,02600 Espoo,Finland |
| Product: | Mobile phone |
| Brand Name: | NOKIA |
| Model Name: | TA-1541 |
| FCC ID: | 2AJOTTA-1541 |
| Date of tests: | Jan. 16, 2023 ~ Feb. 23, 2023 |

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

☒ **ANSI C63.10-2013**

**CONCLUSION: The submitted sample was found to <u>COMPLY</u> with the test requirement**

| Prepared by Chao Wu<br>Engineer / Mobile Department | Approved by Peibo Sun<br>Manager / Mobile Department |
|---|---|
| Chao Wu<br>Date: Feb. 23, 2023 | Sun Peibo<br>Date: Feb. 23, 2023 |

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| W7L-P23010004-2RF05 | Original release | Feb. 23, 2023 |

# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15, Subpart C | | | |
|---|---|---|---|
| **STANDARD** | **TEST TYPE AND LIMIT** | **RESULT** | **TEST LAB*** |
| 15.207 | AC Power Conducted Emission | Compliance | A |
| 15.247(a)(1) (iii) | Number of Hopping Frequency Used | Compliance | A |
| 15.247(a)(1) (iii) | Dwell Time on Each Channel | Compliance | A |
| 15.247(a)(1) | 1. Hopping Channel Separation<br>2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | Compliance | A |
| 15.247(b) | Maximum Peak Output Power | Compliance | A |
| 15.247(d)&<br>15.209 | Transmitter Radiated Emissions | Compliance | A |
| 15.247(d) | Out of band Measurement | Compliance | A |
| 15.203 | Antenna Requirement | Compliance | A |

**NOTE:**

1. If the Frequency Hopping System operating in 2400-2483.5MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of hopping channel whichever is greater.
2. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.
3. This report refers to the data of W7L-P23010004-1RF05(model:TA-1536, FCC ID: 2AJOTTA-1536), the difference of TA-1536 and TA-1541 is TA-1541 change model name, TA-1536 is dual card, TA-1541 is single card, and functions are realized through softwareIn. This report verify CE worse case and replaces CE test data, other test data of this report is copied from the report W7L-P23010004-1RF05(model:TA-1536, FCC ID: 2AJOTTA-1536).

***Test Lab Information Reference**

**Lab A:**

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

**Lab Address:**

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

**Accredited Test Lab Cert 6613.01**

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT | UNCERTAINTY |
|---|---|
| AC Power Conducted emissions | ±2.70dB |
| Radiated emissions (30MHz~1GMHz) | ±4.98dB |
| Radiated emissions (1GMHz ~6GMHz) | ±4.70dB |
| Radiated emissions (6GMHz ~18GMHz) | ±4.60dB |
| Radiated emissions (18GMHz ~40GMHz) | ±4.12dB |
| Conducted emissions | ±4.01dB |
| Occupied Channel Bandwidth | ±43.58KHz |
| Conducted Output power | ±2.06dB |
| Power Spectral Density | ±0.85 dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

# 2 GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | Mobile phone |
| **BRAND NAME** | NOKIA |
| **MODEL NAME** | TA-1541 |
| **NOMINAL VOLTAGE** | 3.85Vdc (Li-ion, battery)<br>5.0Vdc (adapter) |
| **MODULATION TECHNOLOGY** | FHSS |
| **MODULATION TYPE** | GFSK, 8DPSK, π/4 DQPSK |
| **OPERATING FREQUENCY** | 2402MHz~2480MHz |
| **NUMBER OF CHANNEL** | 79 |
| **MAX. OUTPUT POWER** | 12.56mW (Max. Measured) |
| **ANTENNA TYPE** | PIFA Antenna with 1.2dBi gain |
| **HW VERSION** | SPR_S63Q0 |
| **SW VERSION** | 00WW_0_090 |
| **I/O PORTS** | Refer to user's manual |
| **CABLE SUPPLIED** | USB cable1: non-shielded cable, with w/o ferrite core, 1 meter<br>USB cable2: non-shielded cable, with w/o ferrite core, 1 meter<br>USB cable3: non-shielded cable, with w/o ferrite core, 1 meter<br>Earphone: non-shielded cable, with w/o ferrite core, 1.2 meter |

**NOTE**:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. The product of TA-1541(FCC ID: 2AJOTTA-1541) have version and components manufacturer from a second supplier. The first version is 090, the second one is 103, only the version changes, and the RF parameters do not change, components manufacturer with following changes as below:

| NO. | Change Description | | specificatons | first supplier | specificatons | second supplier |
|---|---|---|---|---|---|---|
| 1 | PCBA | 64GB EMMC | FEMDNN064G-A3A56 BWCTARV11X64G | Longsys | FEMDNN064G-A3A56 BWCTARV11X64G | Biwin |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | | 2GB LPDDR | FLXC2002G-N2 BWMZEX32H2A-16G-X | Longsys | FLXC2002G-N2 BWMZEX32H2A-16G-X | Biwin |
| 3 | | 3GB LPDDR | FLXC4003G-50 BWMEXX32H2A-24Gb-X | Longsys | FLXC4003G-50 BWMEXX32H2A-24Gb-X | Biwin |
| 4 | | 4GB LPDDR | FLXC2004G-30 BWMZCX32H2A-32G-X | Longsys | FLXC2004G-30 BWMZCX32H2A-32G-X | Biwin |
| 5 | | PCB | / | KINGSHINE | / | WUZHU |
| 6 | LCM | LCD | 6.517 HKC，360min,400typ, 2.5D | TCL | 6.517 BOE（B8），360min,400typ, 2.5D | Lian Chuang |
| 7 | Front camera | Camera | 8M FF COM | Lian Heyingxiang | 8M FF COM | Shijia |
| 8 | Rear camera | Camera | 13M-AF COB | Lian Heyingxiang | 13M-AF COB | Ruicheng |
| 9 | Macro CAM | Camera | 2M FF | Shijia | 2M FF | Lian Heyingxiang |
| 10 | fingerprint | module | Back fingerprint | Hedayuan | Back fingerprint | Sanyingxin |
| 11 | Speaker | | 1712 1W | Dong Sheng | 1712 1W | Xin Rongda |
| 12 | Vibrator | | 1027 FPC | Kai Long | 1027 FPC | Chao Yin |
| 13 | Receiver | | 0809 | Dong Sheng | 0809 | Xin Rongda |
| 14 | FPC | | / | Lante | / | Kaihongxing |
| 15 | Battery | | 5000MAH | Gaoyuan | 5000MAH | Feng Hua |
| 16 | Data cable | | 2A typeC | Yuwei | 2A typeC | Juwei |

4. List of Accessory:

| ACCESSORIES | BRAND | MANUFACTURER | MODEL | SPECIFICATION |
|---|---|---|---|---|
| LCD Panel 1 | HKC | MianYang HKC Optoelectronics Technology Co., Ltd. | QM065HS03-1 | 6.517 |
| LCD Panel 2 | BOE | BOE | BV065WBQ-L1B | 6.517 |
| Battery 1 | Nokia | Guangdong Fenghua New Energy Co.,Ltd. | WT510 | Capacity：3.85 Vdc, 4900mAh |
| Battery 2 | Nokia | HUNAN GAOYUAN BATTERY Co., Ltd. | WT510 | Capacity：3.85 Vdc, 4900mAh |
| AC Adapter | Nokia | SHENZHEN BAIJUNDA ELECTRONICS.,LTD | AD-010U | I/P: 100-240Vac, 0.35A, O/P: 5.0Vdc, 2.0A |
| Earphone | Juwei Electronics Co., LTD | Juwei Electronics Co., LTD | JWEP1252-H21H | Signal Line, 1.2meter |
| USB Cable 1 | Juwei Electronics Co., LTD | Juwei Electronics Co., LTD | JWUB1536-H21H | Signal Line, 1.0meter |
| USB Cable 2 | Yu Wei | Dongguan Yuwei Electronic Technology Co., Ltd. | CH2212TC | Signal Line, 1.0meter |
| USB Cable 3 | Sai bao | Saibao (Jiangxi) Industrial Co., Ltd | SHM1-A003A | Signal Line, 1.0meter |

## 2.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

| CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) |
|---|---|---|---|---|---|---|---|
| 0 | 2402 | 20 | 2422 | 40 | 2442 | 60 | 2462 |
| 1 | 2403 | 21 | 2423 | 41 | 2443 | 61 | 2463 |
| 2 | 2404 | 22 | 2424 | 42 | 2444 | 62 | 2464 |
| 3 | 2405 | 23 | 2425 | 43 | 2445 | 63 | 2465 |
| 4 | 2406 | 24 | 2426 | 44 | 2446 | 64 | 2466 |
| 5 | 2407 | 25 | 2427 | 45 | 2447 | 65 | 2467 |
| 6 | 2408 | 26 | 2428 | 46 | 2448 | 66 | 2468 |
| 7 | 2409 | 27 | 2429 | 47 | 2449 | 67 | 2469 |
| 8 | 2410 | 28 | 2430 | 48 | 2450 | 68 | 2470 |
| 9 | 2411 | 29 | 2431 | 49 | 2451 | 69 | 2471 |
| 10 | 2412 | 30 | 2432 | 50 | 2452 | 70 | 2472 |
| 11 | 2413 | 31 | 2433 | 51 | 2453 | 71 | 2473 |
| 12 | 2414 | 32 | 2434 | 52 | 2454 | 72 | 2474 |
| 13 | 2415 | 33 | 2435 | 53 | 2455 | 73 | 2475 |
| 14 | 2416 | 34 | 2436 | 54 | 2456 | 74 | 2476 |
| 15 | 2417 | 35 | 2437 | 55 | 2457 | 75 | 2477 |
| 16 | 2418 | 36 | 2438 | 56 | 2458 | 76 | 2478 |
| 17 | 2419 | 37 | 2439 | 57 | 2459 | 77 | 2479 |
| 18 | 2420 | 38 | 2440 | 58 | 2460 | 78 | 2480 |
| 19 | 2421 | 39 | 2441 | 59 | 2461 | | |

### 2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photograph of the test configuration for reference.

### 2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
The worst case was found when positioned on X axis for radiated emission.
Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|---|---|---|---|---|---|
| | RE<1G | RE≥1G | PLC | APCM | |
| - | √ | √ | √ | √ | - |

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
**PLC:** Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

**RADIATED EMISSION TEST (BELOW 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|---|---|---|---|---|---|
| - | 0 to 78 | 39 | FHSS | 8DPSK | 3DH5 |

**RADIATED EMISSION TEST (ABOVE 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|---|---|---|---|---|---|
| - | 0 to 78 | 0, 39, 78 | FHSS | 8DPSK | 3DH5 |

## POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|---|---|---|---|---|---|
| - | 0 to 78 | 39 | FHSS | 8DPSK | 3DH5 |

## ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

☒ Following channel(s) was (were) selected for the final test as listed below.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | PACKET TYPE |
|---|---|---|---|---|
| 0 to 78 | 0, 39, 78 | FHSS | GFSK | DH1/DH3/DH5 |
| 0 to 78 | 0, 39, 78 | FHSS | π/4 DQPSK | 2DH1/2DH3/2DH5 |
| 0 to 78 | 0, 39, 78 | FHSS | 8DPSK | 3DH1/3DH3/3DH5 |

## TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | TEST VOLTAGE (SYSTEM) | TESTED BY |
|---|---|---|---|
| RE<1G | 23deg. C, 70%RH | DC 5V By Adapter | Jace Hu |
| RE≥1G | 23deg. C, 70%RH | DC 5V By Adapter | Jace Hu |
| PLC | 25deg. C, 52%RH | DC 5V By Adapter | James Fu |
| APCM | 25deg. C, 60%RH | DC 3.85V By Battery | James Fu |

## 2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C. Section 15.247**
**ANSI C63.10-2013**

**NOTE:**
1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

## 2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | Desktop | Lenovo | M73 SFF | PC04GRQV | N/A |
| 2 | Desktop | Lenovo | M73 SFF | PC06CS27 | N/A |
| 3 | Laptop | Lenovo | Thnikpad L440 | R90FTFKN | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | AC Line: Unshielded, Detachable 1.5m |
| 2 | AC Line: Unshielded, Detachable 1.5m |
| 3 | AC Line: Unshielded, Detachable 1.5m |

# 3 TEST TYPES AND RESULTS

## 3.1 CONDUCTED EMISSION MEASUREMENT

### 3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| 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 |

**NOTE**: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 3.1.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESR3 | 102749 | Feb.25,22 | Feb.24,24 |
| ELEKTRA test software | Rohde&Schwarz | ELEKTRA | NA | N/A | N/A |
| LISN network | Rohde&Schwarz | ENV216 | 102640 | Feb.17,22 | Feb.16,24 |
| CABLE | Rohde&Schwarz | W61.01 | N/A | Oct.31,22 | Apr.29,23 |
| CABLE | Rohde&Schwarz | W601 | N/A | Oct.31,22 | Apr.29,23 |

**NOTE:** 1. The test was performed in CE shielded room.

2. The calibration interval of the above test instruments is 6 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

### 3.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission levels

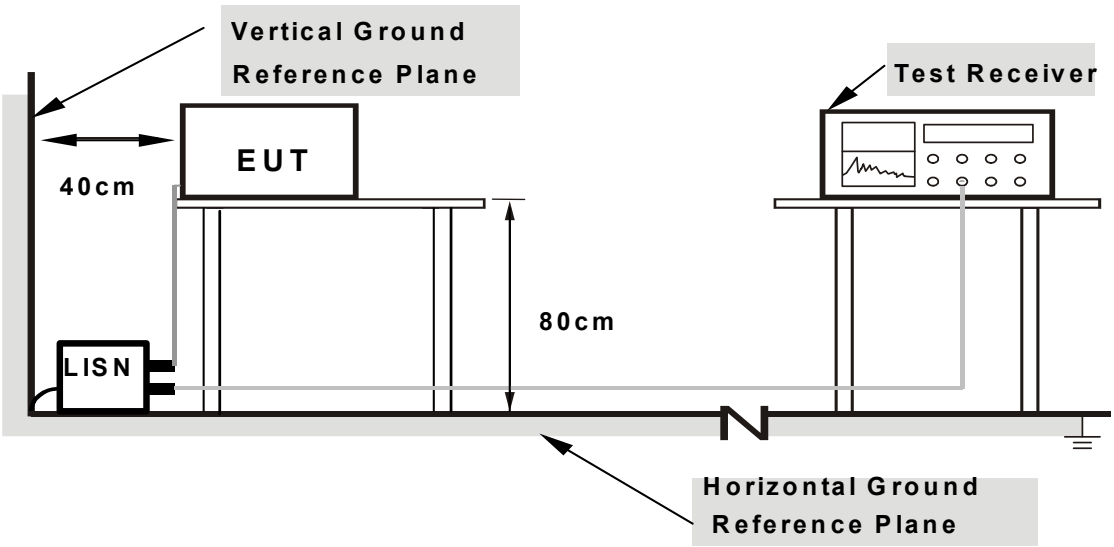
under (Limit - 20dB) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.1.5 TEST SETUP




**Note: 1.Support units were connected to second LISN.**
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.1.6 EUT OPERATING CONDITIONS

a. Turned on the power and connected of all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

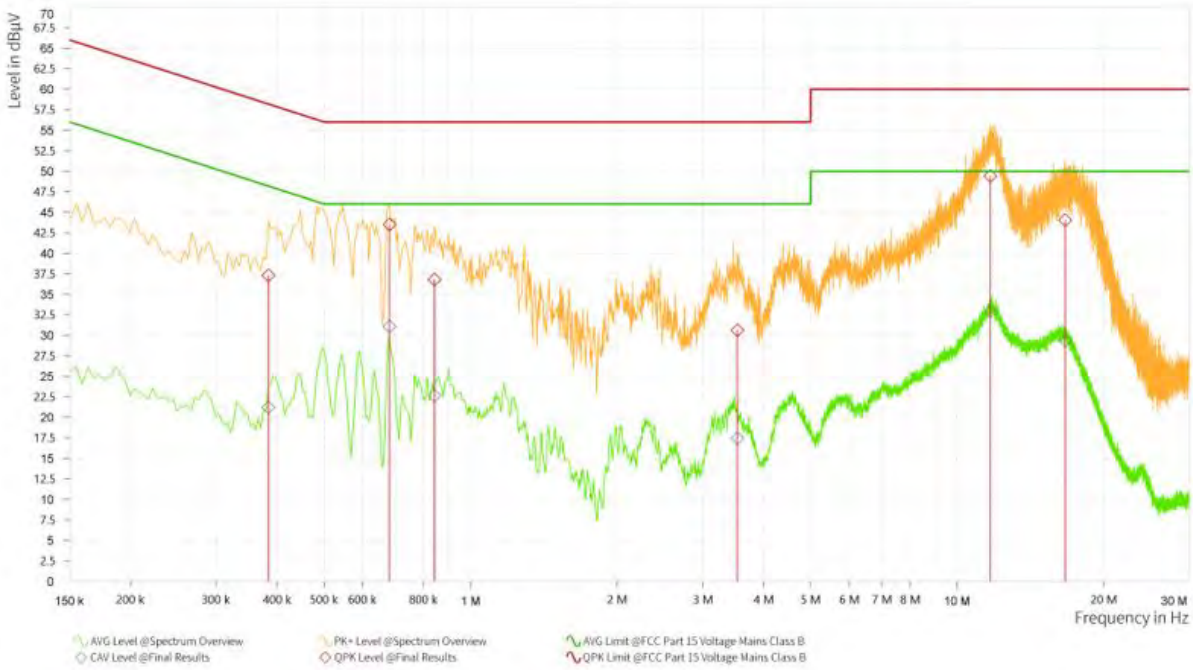
## 3.1.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA:**

| | | | |
|---|---|---|---|
| **Frequency Range** | 150KHz ~ 30MHz | **Detector Function & Resolution Bandwidth** | Quasi-Peak (QP) / Average (AV), 9 kHz |
| **Input Power** | 120Vac, 60Hz | **Environmental Conditions** | 26deg. C, 51%RH |
| **Tested By** | Chao Wu | | |

| Rg | Frequency [MHz] | QPK Level [dBμV] | QPK Limit [dBμV] | QPK Margin [dB] | CAV Level [dBμV] | CAV: AVG Limit [dBμV] | CAV Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.384 | 37.31 | 58.19 | 20.88 | 21.21 | 48.19 | 26.98 | 10.01 | L1 | 9.000 |
| 1 | 0.681 | 43.51 | 56.00 | 12.49 | 31.10 | 46.00 | 14.90 | 9.99 | L1 | 9.000 |
| 1 | 0.843 | 36.81 | 56.00 | 19.19 | 22.65 | 46.00 | 23.35 | 9.92 | L1 | 9.000 |
| 1 | 3.534 | 30.59 | 56.00 | 25.41 | 17.45 | 46.00 | 28.55 | 9.79 | L1 | 9.000 |
| 1 | 11.702 | 49.40 | 60.00 | 10.60 | 32.90 | 50.00 | 17.10 | 9.98 | L1 | 9.000 |
| 1 | 16.692 | 44.05 | 60.00 | 15.95 | 29.33 | 50.00 | 20.67 | 10.08 | L1 | 9.000 |

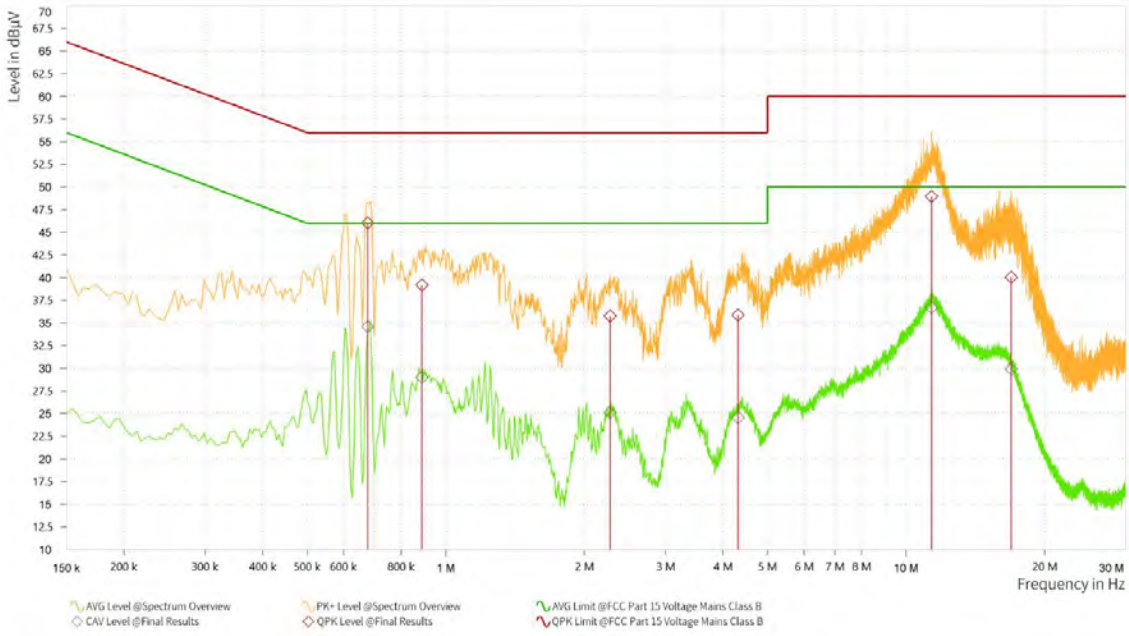
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



| | | | |
|---|---|---|---|
| **Frequency Range** | 150KHz ~ 30MHz | **Detector Function & Resolution Bandwidth** | Quasi-Peak (QP) / Average (AV), 9 kHz |
| **Input Power** | 120Vac, 60Hz | **Environmental Conditions** | 26deg. C, 51%RH |
| **Tested By** | Chao Wu | | |

| Rg | Frequency [MHz] | QPK Level [dBμV] | QPK Limit [dBμV] | QPK Margin [dB] | CAV Level [dBμV] | CAV: AVG Limit [dBμV] | CAV Margin [dB] | Correction [dB] | Line | Meas. BW [kHz] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.677 | 46.04 | 56.00 | 9.96 | 34.60 | 46.00 | 11.40 | 10.00 | N | 9.000 |
| 1 | 0.888 | 39.19 | 56.00 | 16.81 | 28.99 | 46.00 | 17.01 | 9.91 | N | 9.000 |
| 1 | 2.274 | 35.76 | 56.00 | 20.24 | 25.13 | 46.00 | 20.87 | 9.78 | N | 9.000 |
| 1 | 4.313 | 35.86 | 56.00 | 20.14 | 24.56 | 46.00 | 21.44 | 9.81 | N | 9.000 |
| 1 | 11.360 | 48.95 | 60.00 | 11.05 | 36.70 | 50.00 | 13.30 | 10.00 | N | 9.000 |
| 1 | 16.935 | 40.05 | 60.00 | 19.95 | 29.93 | 50.00 | 20.07 | 10.14 | N | 9.000 |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



## 3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

### 3.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

| FREQUENCIES (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 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

### 3.2.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Pre-Amplifier | R&S | SCU18F1 | 100815 | Aug.30,22 | Aug.29,24 |
| Pre-Amplifier | R&S | SCU08F1 | 101028 | Sep.16,22 | Sep.15,24 |
| Signal Generator | R&S | SMB100A | 182185 | Feb.16,22 | Feb.15,24 |
| 3m Fully-anechoic Chamber | TDK | 9m*6m*6m | HRSW-SZ-EMC-01Chamber | Nov.25,22 | Nov.24,25 |
| 3m Semi-anechoic Chamber | TDK | 9m*6m*6m | HRSW-SZ-EMC-02Chamber | Nov.25,22 | Nov.24,25 |
| EMI TEST Receiver | R&S | ESW44 | 101973 | Feb.25,22 | Feb.24,24 |
| Bilog Antenna | SCHWARZBECK | VULB 9163 | 1264 | Feb.28,22 | Feb.27,24 |
| Horn Antenna | ETS-LINDGREN | 3117 | 227836 | Aug.22,22 | Aug.21,24 |
| Horn Antenna (18GHz-40GHz) | Steatite Q-par Antennas | QMS 00880 | 23486 | Feb.23,22 | Feb.22,24 |
| Horn Antenna | Steatite Q-par Antennas | QMS 00208 | 23485 | Aug.22,22 | Aug.21,24 |
| Loop Antenna | SCHWARZ | HFH2-Z2/Z2E | 100976 | Feb.23,22 | Feb.22,24 |
| WIDEBANDRADIO COMMUNICATION TESTER | R&S | CMW500 | 169399 | Jun.27,22 | Jun.26,24 |
| Test Software | ELEKTRA | ELEKTRA4.32 | N/A | N/A | N/A |
| Open Switch and Control Unit | R&S | OSP220 | 101964 | N/A | N/A |
| DC Source | HYELEC | HY3010B | 551016 | Aug.31,22 | Aug.30,24 |
| Hygrothermograph | DELI | 20210528 | SZ014 | Sep.06,22 | Sep.05,24 |
| PC | LENOVO | E14 | HRSW0024 | N/A | N/A |
| TMC-AMI18843A(CABLE) | R&S | HF290-NMNM-7.00M | N/A | N/A | N/A |
| TMC-AMI18843A(CABLE) | R&S | HF290-NMNM-4.00M | N/A | N/A | N/A |
| CABLE | R&S | W13.02 | N/A | Oct.31,22 | Apr.29,23 |
| CABLE | R&S | W12.14 | N/A | Oct.31,22 | Apr.29,23 |

**NOTE:** 1. The calibration interval of the above test instruments is 6 months or 24 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

### 3.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**NOTE:**

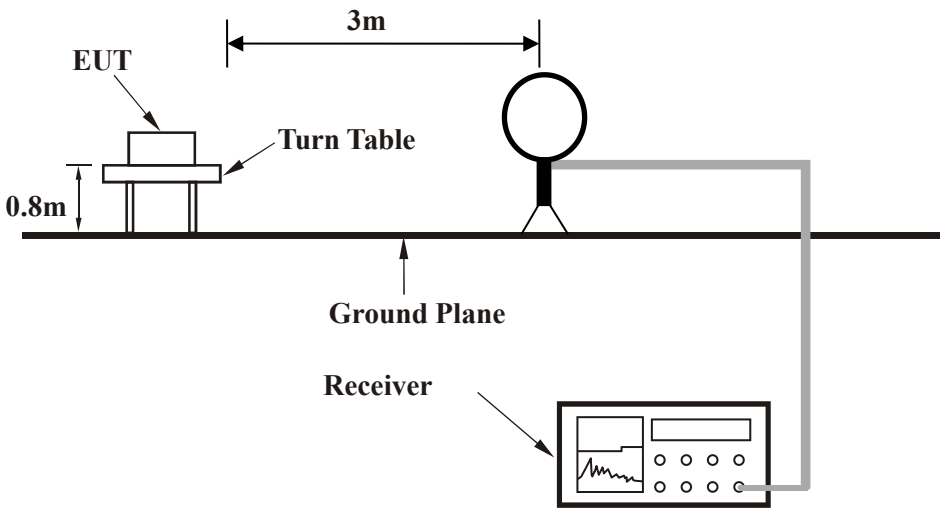
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.
5. All modes of operation were investigated and the worst-case emissions are reported.

### 3.2.4 DEVIATION FROM TEST STANDARD

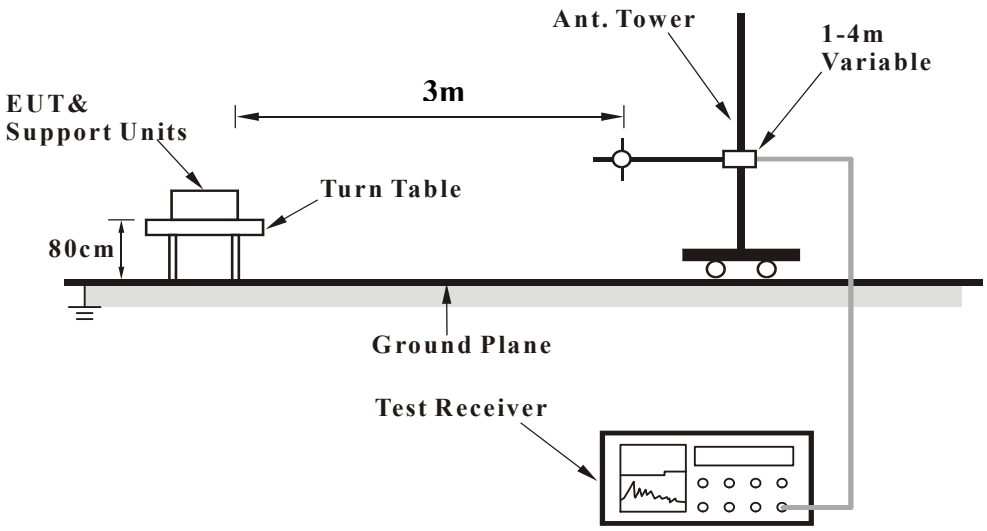
No deviation.

### 3.2.5 TEST SETUP

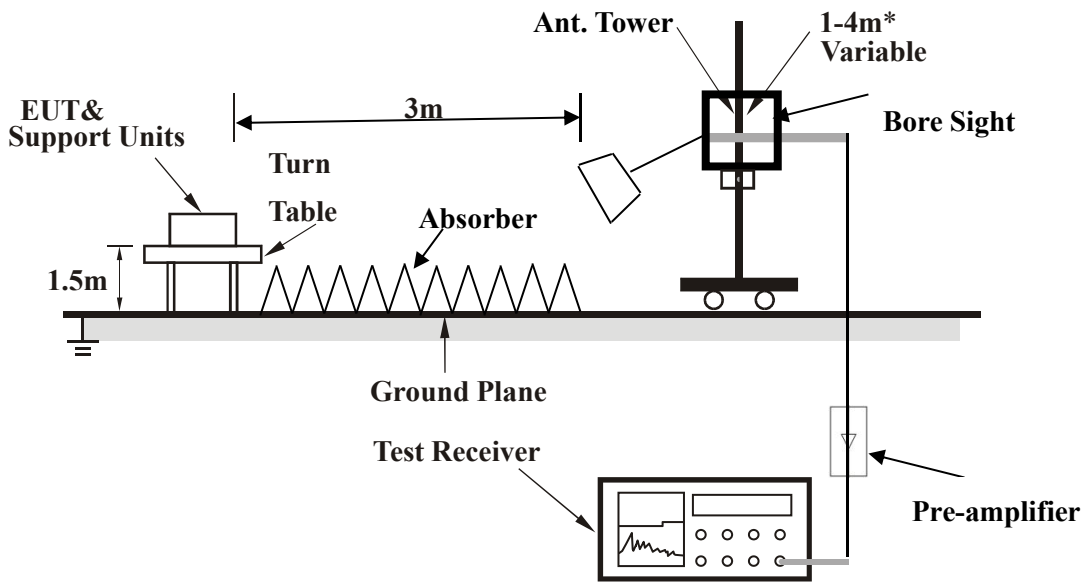
**<Frequency Range 9KHz~30MHz >**




**< Frequency Range 30MHz~1GHz >**



**<Frequency Range above 1GHz>**




**Note**: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.2.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed them on a testing table.
b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the EUT in full functions.

## 3.2.7 TEST RESULTS

**NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.**

**BELOW 1GHz WORST-CASE DATA:**

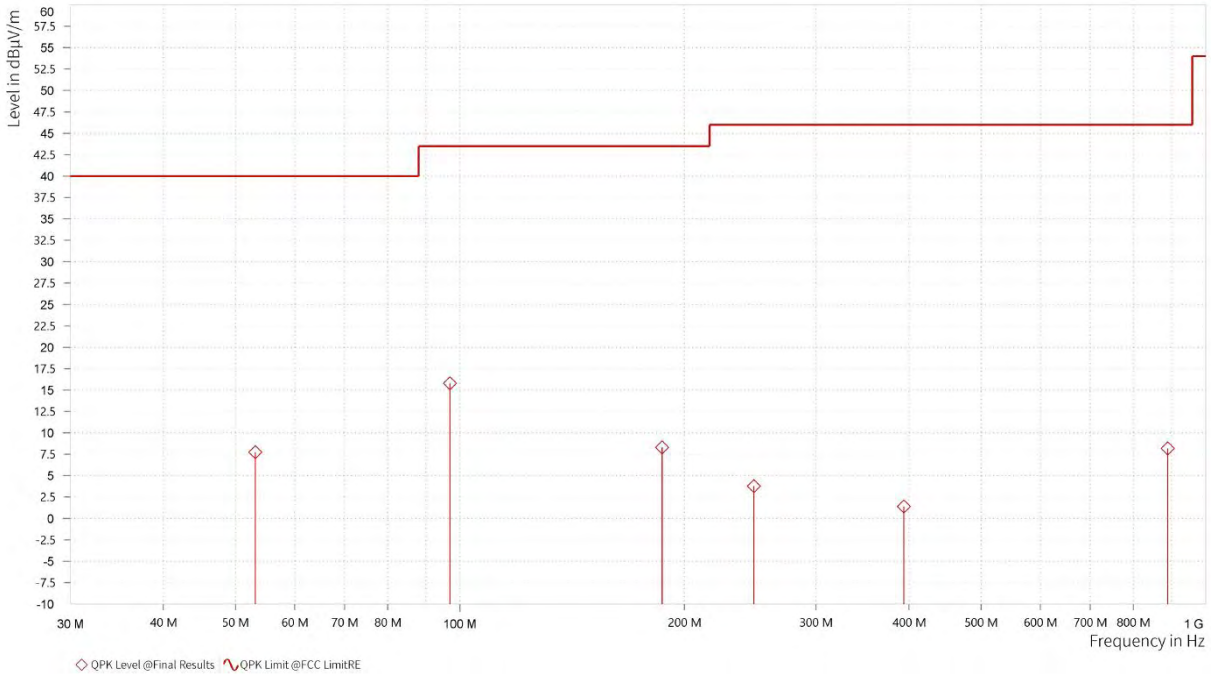
**30 MHz – 1GHz data:**

**BT_8DPSK**

| **CHANNEL** | Channel 39 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
|---|---|---|---|
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | QPK Level [dBμV/m] | QPK Limit [dBμV/m] | QPK Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] | Meas. BW [kHz] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 53.135 | 7.74 | 40.00 | 32.26 | -18.88 | H | 332.3 | 1 | 120.000 |
| 1 | 96.930 | 15.79 | 43.50 | 27.71 | -21.63 | H | 145.1 | 2 | 120.000 |
| 1 | 186.655 | 8.30 | 43.50 | 35.20 | -24.29 | H | 224.8 | 1 | 120.000 |
| 1 | 247.814 | 3.79 | 46.00 | 42.21 | -22.95 | H | 251.7 | 2 | 120.000 |
| 1 | 393.799 | 1.39 | 46.00 | 44.61 | -20.45 | H | 145.1 | 2 | 120.000 |
| 1 | 889.663 | 8.20 | 46.00 | 37.80 | -12.69 | H | 5.7 | 1 | 120.000 |



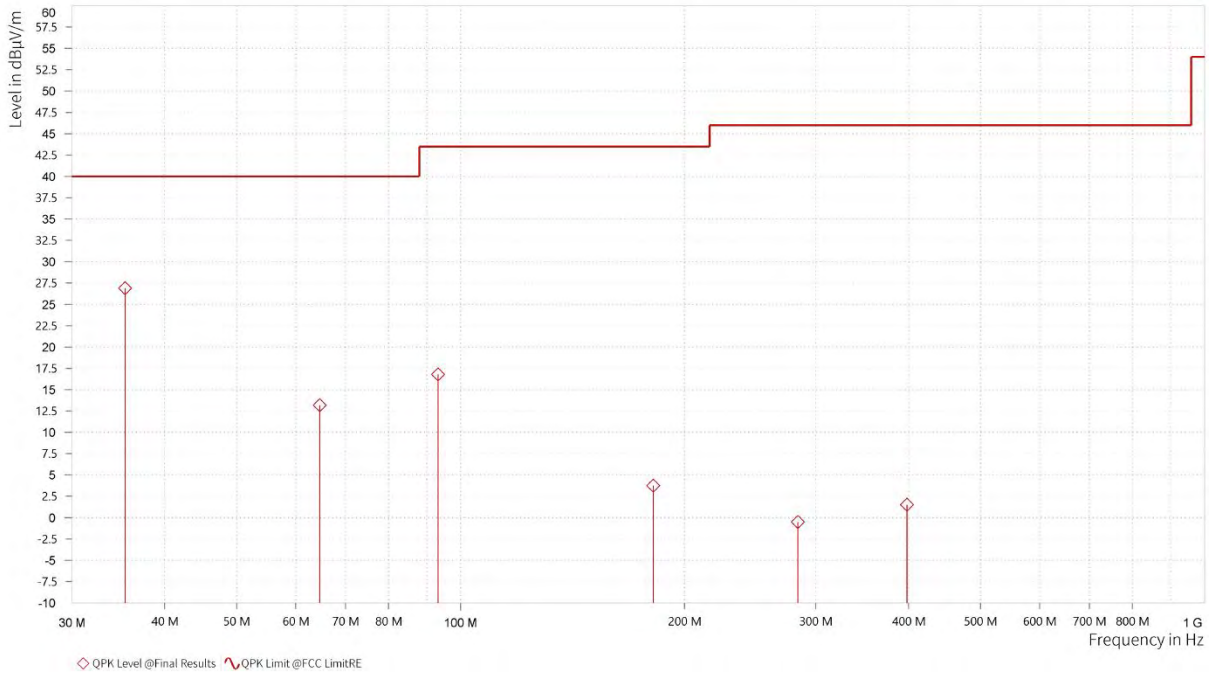
**REMARKS:**

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission level.

| CHANNEL | Channel 39 | DETECTOR FUNCTION | Quasi-Peak (QP) |
|---|---|---|---|
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

| Rg | Frequency [MHz] | QPK Level [dBμV/m] | QPK Limit [dBμV/m] | QPK Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] | Meas. BW [kHz] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 35.384 | 26.89 | 40.00 | 13.11 | -20.00 | V | 214.9 | 1 | 120.000 |
| 1 | 64.629 | 13.17 | 40.00 | 26.83 | -20.23 | V | 323.3 | 1 | 120.000 |
| 1 | 93.244 | 16.79 | 43.50 | 26.71 | -23.00 | V | 214.9 | 1 | 120.000 |
| 1 | 181.563 | 3.75 | 43.50 | 39.75 | -25.47 | V | 323.3 | 1 | 120.000 |
| 1 | 284.043 | -0.53 | 46.00 | 46.53 | -22.42 | V | 214.9 | 1 | 120.000 |
| 1 | 398.164 | 1.50 | 46.00 | 44.50 | -20.39 | V | 5 | 1 | 120.000 |




**REMARKS:**

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission level.

**ABOVE 1GHz WORST-CASE DATA:**

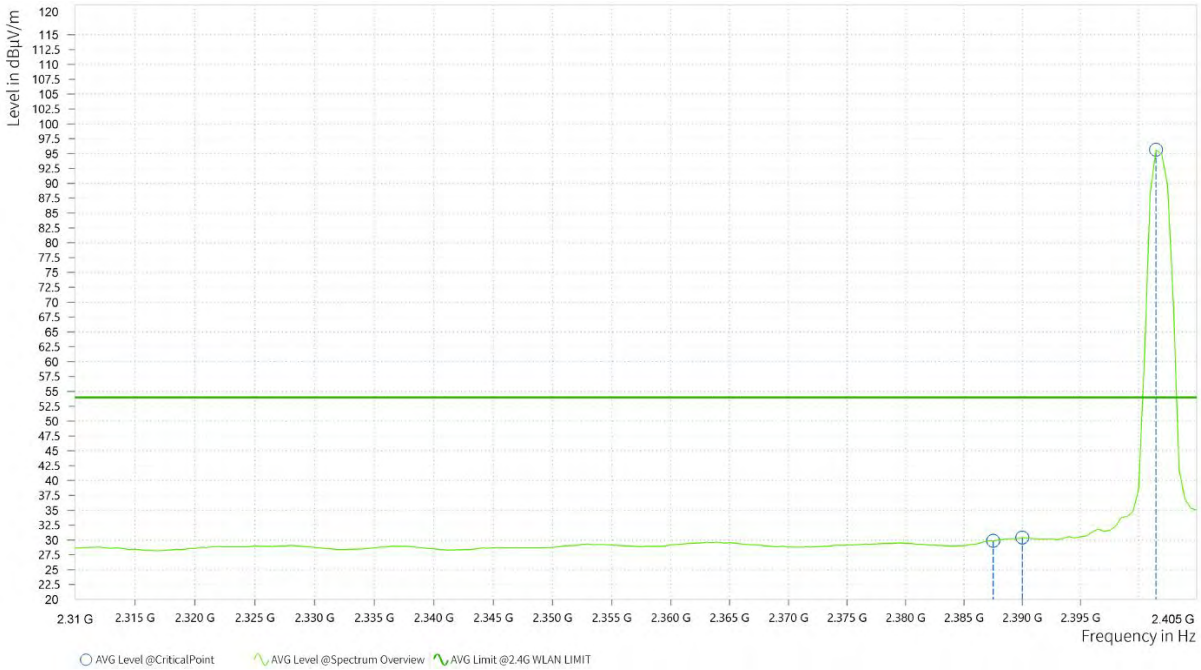
**Note:** 1. For radiated emissions testing ，the full testing range of different modes have been scanned ，only the worst case harmonic data is reported in the sheet.

2. All other emissions that greater than 20dB below the limit were not recorded

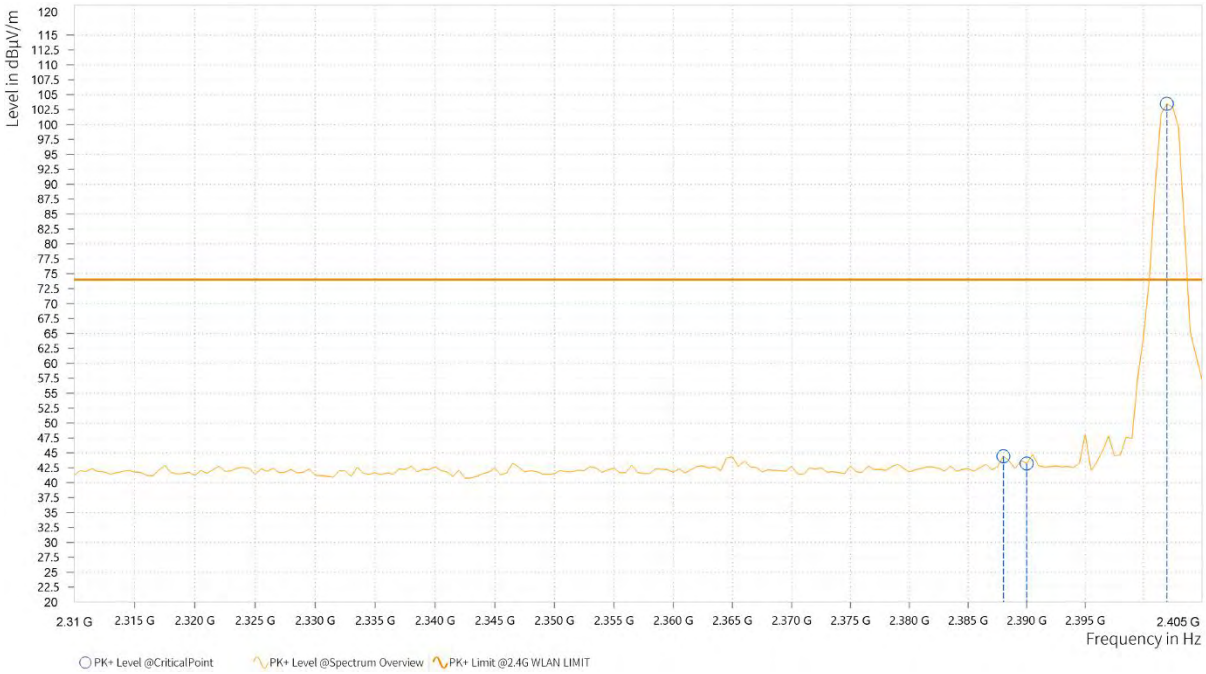
**BT_GFSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 0 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

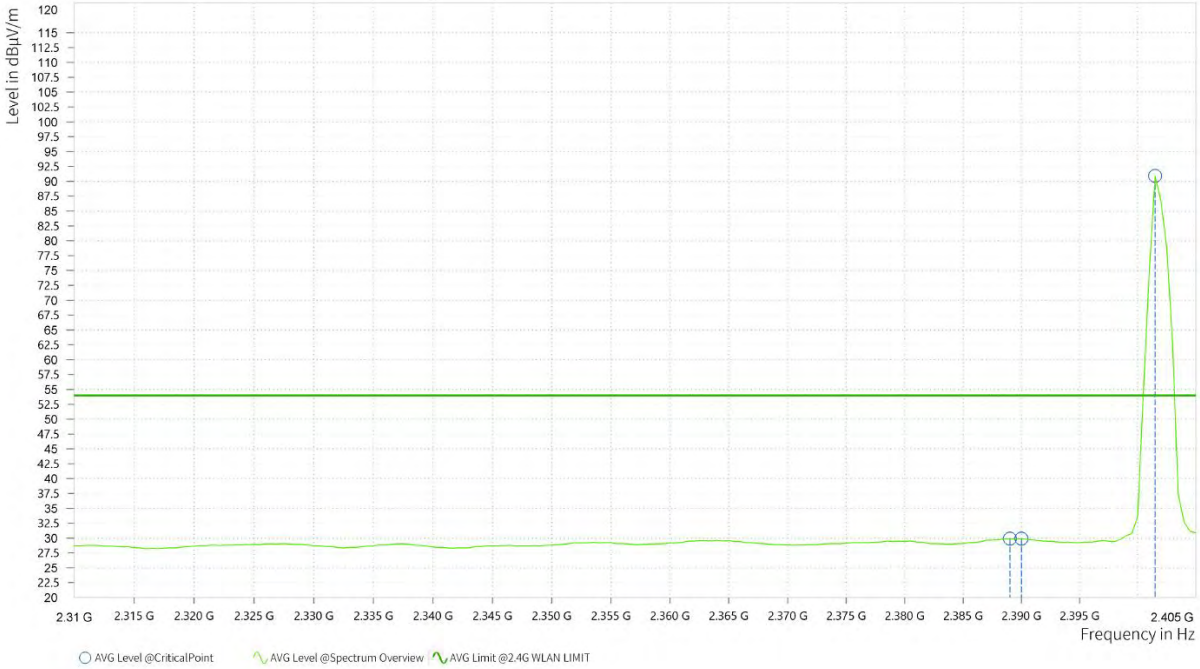
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,387.500 | 29.85 | 54.00 | 24.15 | 9.82 | H | 297 | 2 |
| 1 | 2,390.000 | 30.41 | 54.00 | 23.59 | 9.84 | H | 297 | 2 |
| 1 | 2,401.500 | 95.64 | | | 9.85 | H | 297 | 2 |



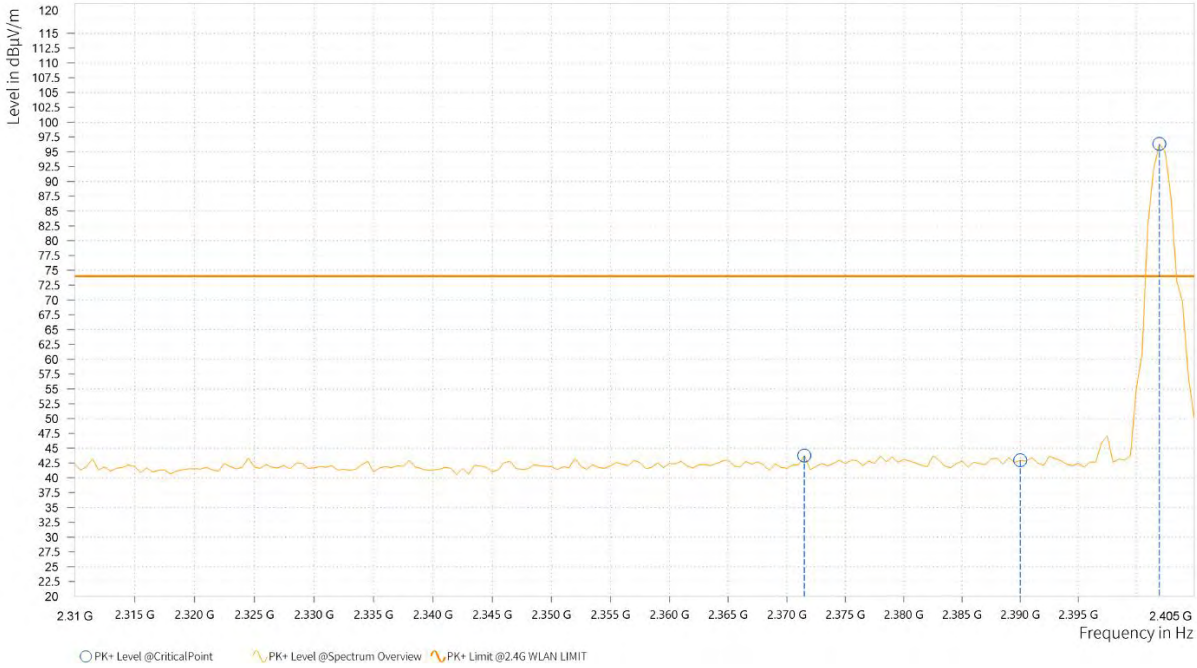
| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,388.000 | 44.44 | 74.00 | 29.56 | 9.82 | H | 218.3 | 1 |
| 1 | 2,390.000 | 43.21 | 74.00 | 30.79 | 9.84 | H | 68.9 | 1 |
| 1 | 2,402.000 | 103.47 | | | 9.85 | H | 262.4 | 2 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,389.000 | 29.89 | 54.00 | 24.11 | 9.83 | V | 303 | 2 |
| 1 | 2,390.000 | 29.92 | 54.00 | 24.08 | 9.84 | V | 128.7 | 1 |
| 1 | 2,401.500 | 90.91 | | | 9.85 | V | 128.7 | 1 |



| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,371.500 | 43.73 | 74.00 | 30.27 | 9.69 | V | 1 | 2 |
| 1 | 2,390.000 | 42.95 | 74.00 | 31.05 | 9.84 | V | 55.8 | 1 |
| 1 | 2,402.000 | 96.33 | | | 9.85 | V | 158.5 | 1 |



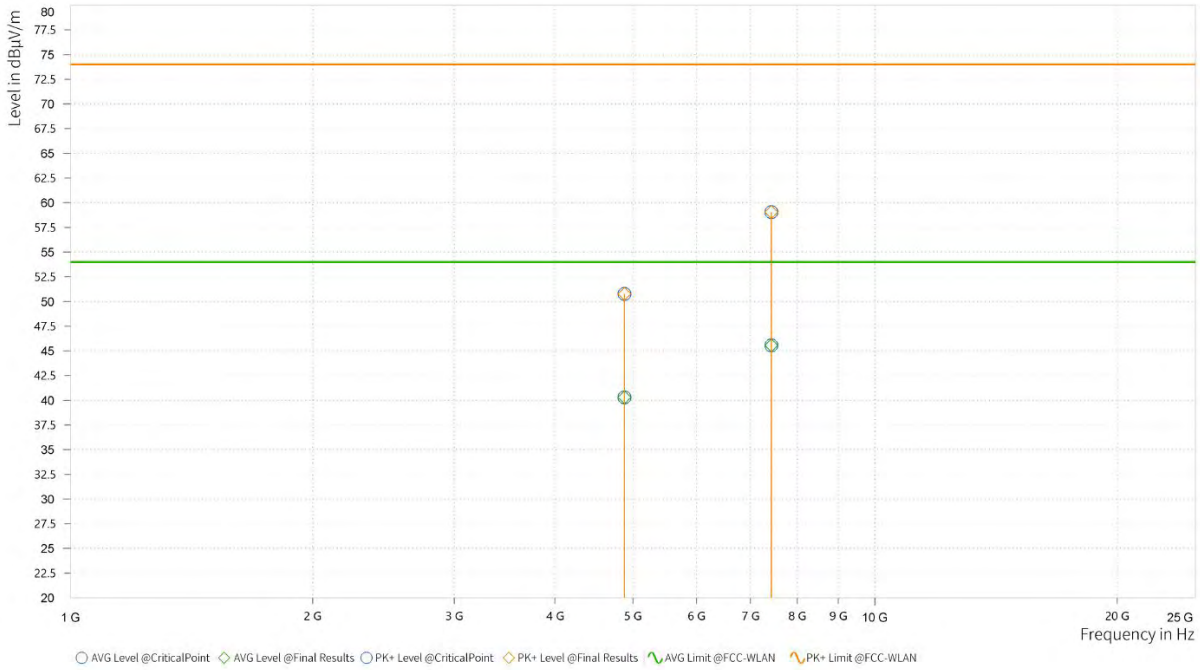

**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2402MHz: Fundamental frequency.

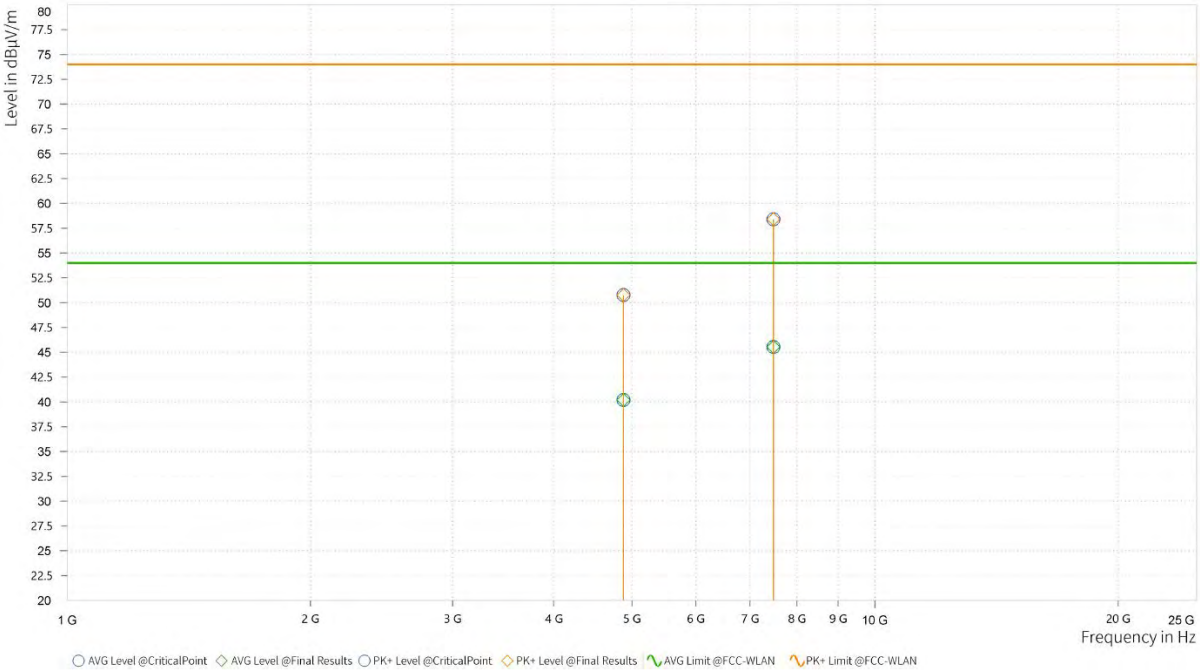
| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4,881.971 | 50.76 | 74.00 | 23.24 | 40.30 | 54.00 | 13.70 | 15.95 | H | 359 | 2 |
| 4 | 7,433.050 | 59.04 | 74.00 | 14.96 | 45.56 | 54.00 | 8.44 | 23.94 | H | 359 | 2 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 3 | 4,881.971 | 50.77 | 74.00 | 23.23 | 40.20 | 54.00 | 13.80 | 15.95 | V | 1 | 2 |
| 4 | 7,483.625 | 58.41 | 74.00 | 15.59 | 45.54 | 54.00 | 8.46 | 23.86 | V | 11.8 | 2 |

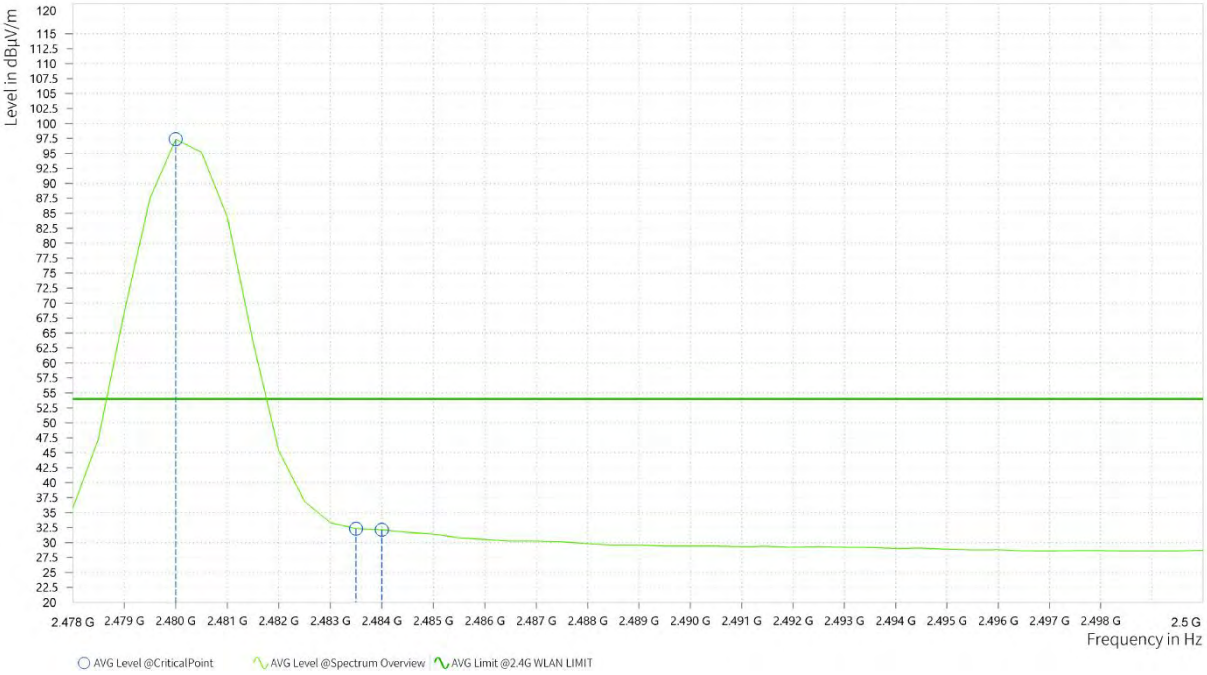



**REMARKS:**

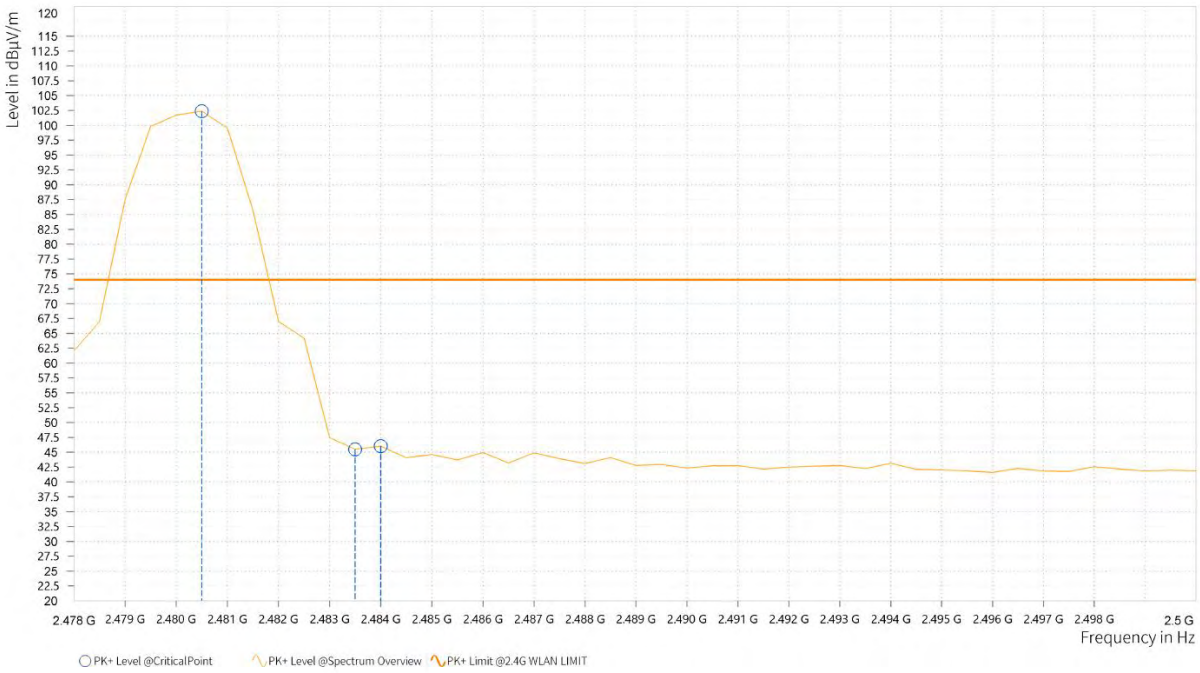
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2441MHz: Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,480.000 | 97.37 | | | 9.89 | H | 225.3 | 2 |
| 1 | 2,483.500 | 32.30 | 54.00 | 21.70 | 9.88 | H | 163.3 | 1 |
| 1 | 2,484.000 | 32.12 | 54.00 | 21.88 | 9.88 | H | 225.3 | 2 |

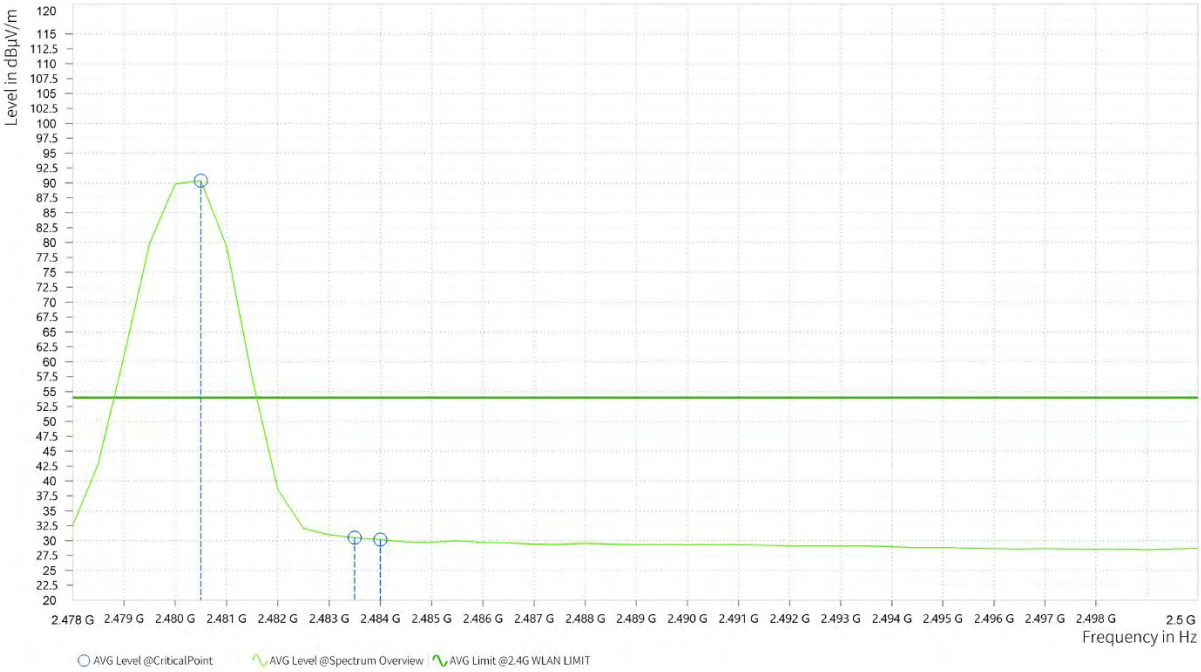


| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.500 | 102.37 | | | 9.89 | H | 236.1 | 2 |
| 1 | 2,483.500 | 45.49 | 74.00 | 28.51 | 9.88 | H | 236.1 | 2 |
| 1 | 2,484.000 | 46.02 | 74.00 | 27.98 | 9.88 | H | 236.1 | 2 |

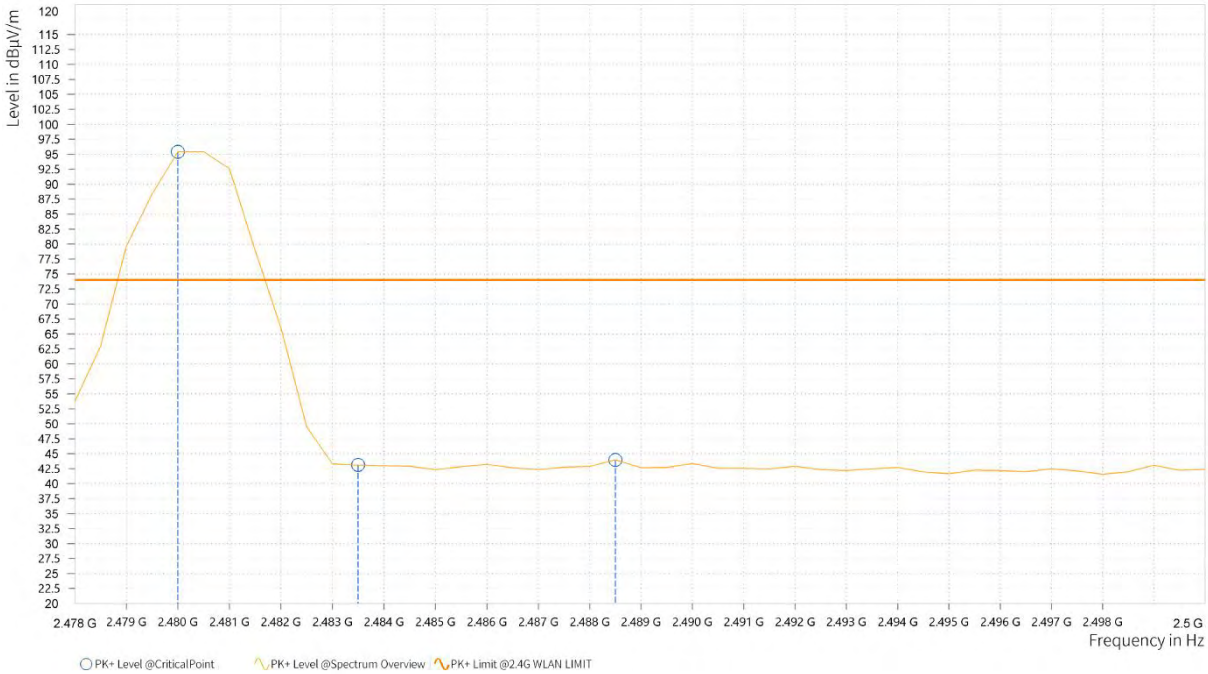


## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | AVG Level [dBµV/m] | AVG Limit [dBµV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.500 | 90.39 | | | 9.89 | V | 168 | 1 |
| 1 | 2,483.500 | 30.48 | 54.00 | 23.52 | 9.88 | V | 168 | 1 |
| 1 | 2,484.000 | 30.16 | 54.00 | 23.84 | 9.88 | V | 196.8 | 1 |



| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.000 | 95.40 | | | 9.89 | V | 147.8 | 1 |
| 1 | 2,483.500 | 43.10 | 74.00 | 30.90 | 9.88 | V | 71.3 | 1 |
| 1 | 2,488.500 | 43.97 | 74.00 | 30.03 | 9.88 | V | 147.8 | 1 |




**REMARKS:**

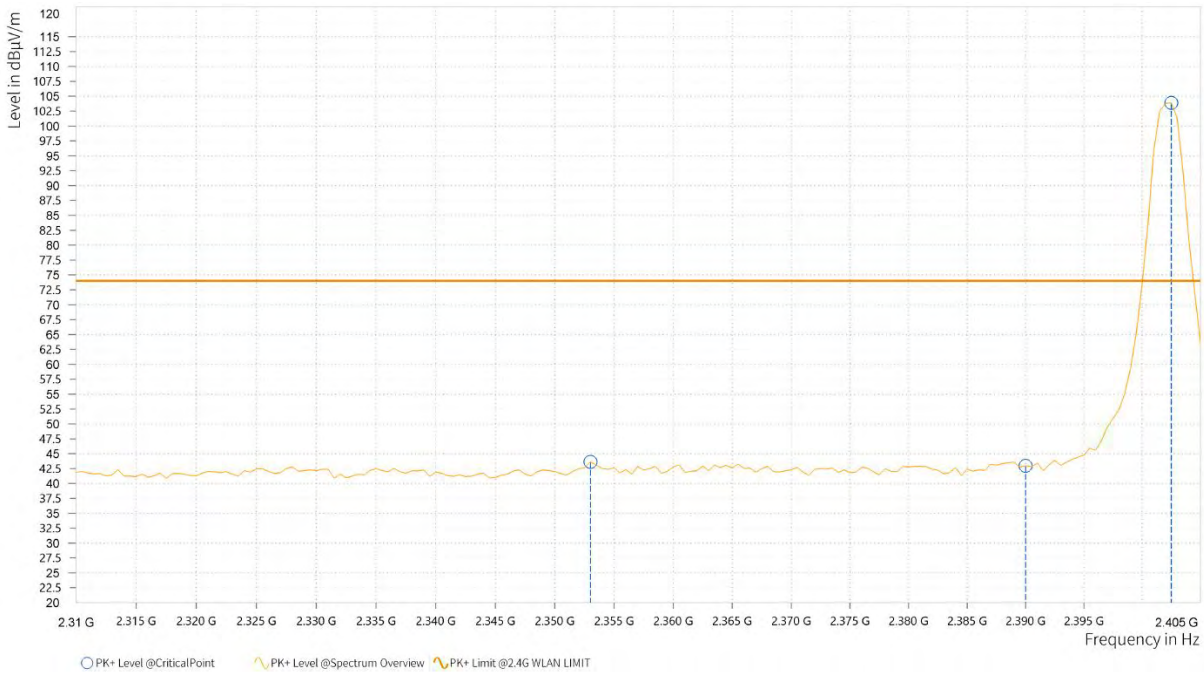
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2480MHz: Fundamental frequency.

**BT_π/4-DQPSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 0 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

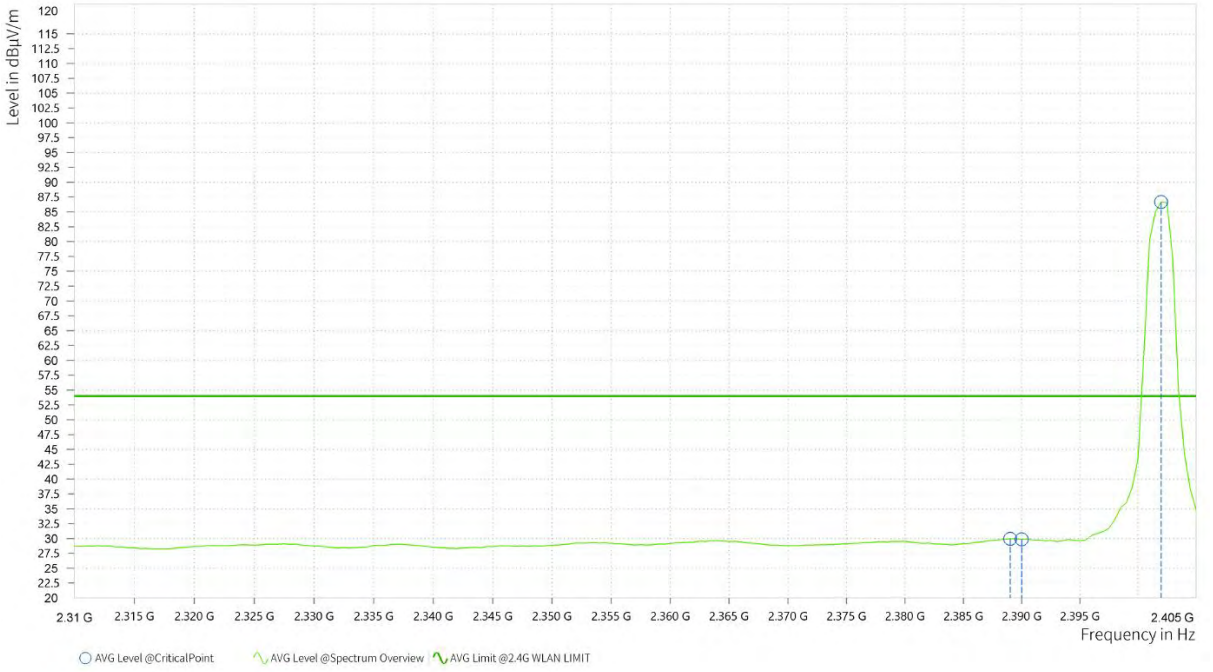
| **ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,389.000 | 30.16 | 54.00 | 23.84 | 9.83 | H | 301.8 | 2 |
| 1 | 2,390.000 | 30.14 | 54.00 | 23.86 | 9.84 | H | 301.8 | 2 |
| 1 | 2,402.000 | 95.49 | | | 9.85 | H | 301.8 | 2 |

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,353.000 | 43.63 | 74.00 | 30.37 | 9.60 | H | 312.5 | 2 |
| 1 | 2,390.000 | 42.97 | 74.00 | 31.03 | 9.84 | H | 225.4 | 1 |
| 1 | 2,402.500 | 103.90 | | | 9.85 | H | 237.2 | 2 |

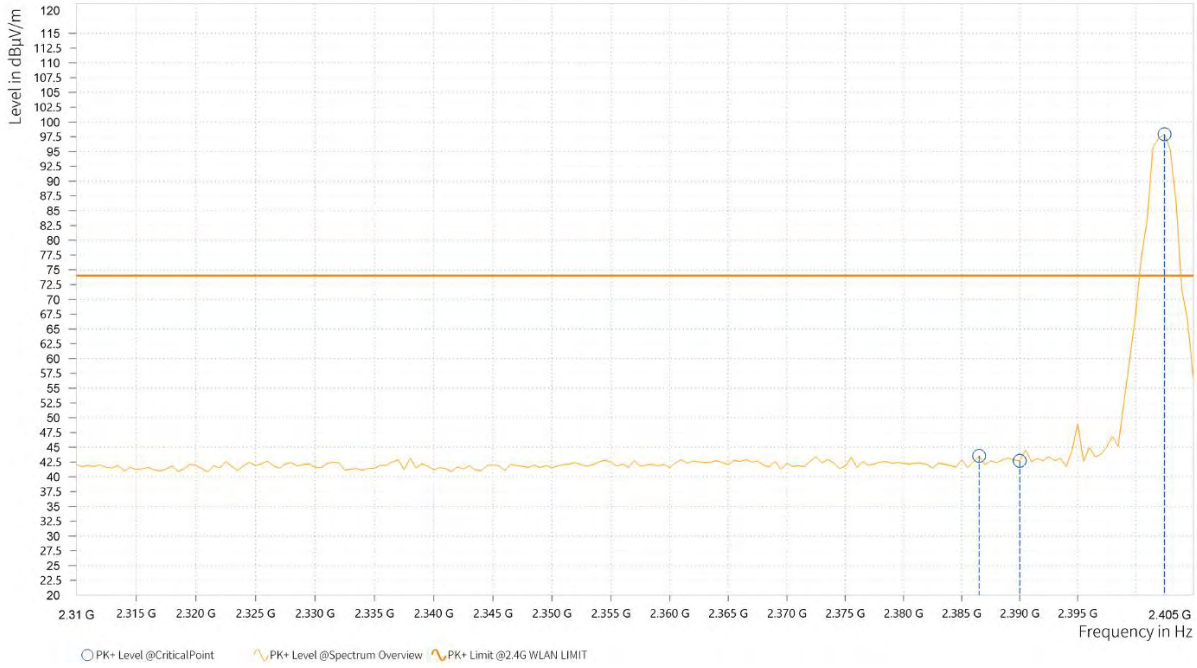


## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | AVG Level [dBµV/m] | AVG Limit [dBµV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,389.000 | 29.95 | 54.00 | 24.05 | 9.83 | V | 120.3 | 1 |
| 1 | 2,390.000 | 29.85 | 54.00 | 24.15 | 9.84 | V | 359 | 2 |
| 1 | 2,402.000 | 86.68 | | | 9.85 | V | 120.3 | 1 |



| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,386.500 | 43.53 | 74.00 | 30.47 | 9.81 | V | 264.8 | 2 |
| 1 | 2,390.000 | 42.72 | 74.00 | 31.28 | 9.84 | V | 248.1 | 1 |
| 1 | 2,402.500 | 97.94 | | | 9.85 | V | 147.8 | 1 |



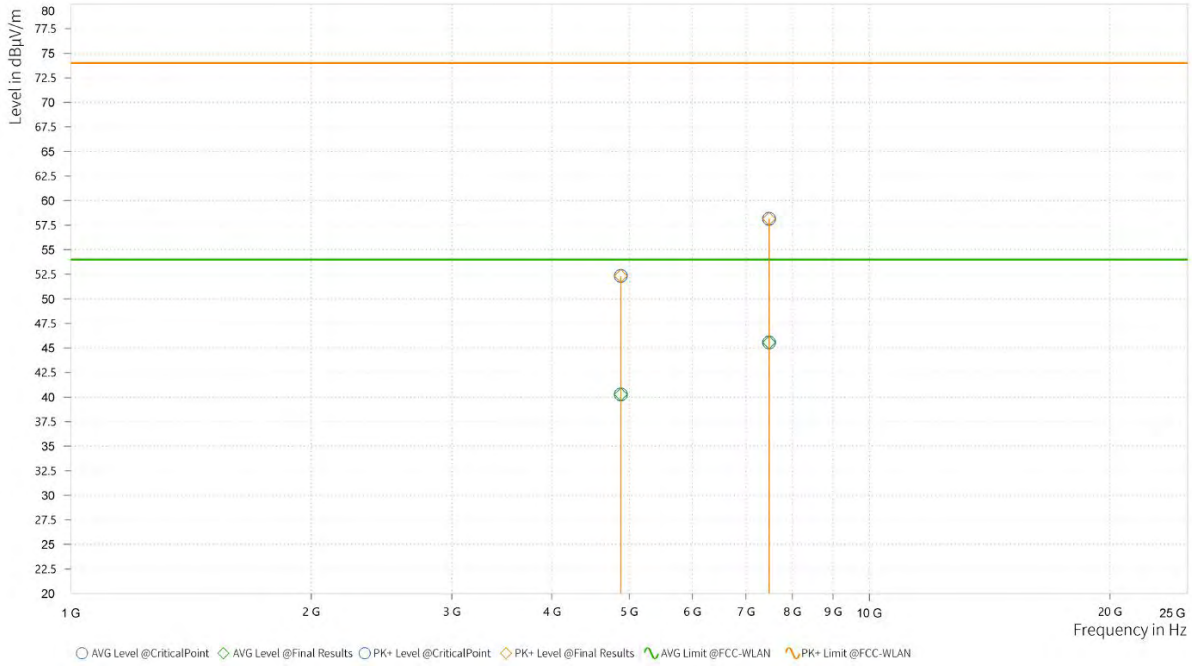

**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2402MHz: Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

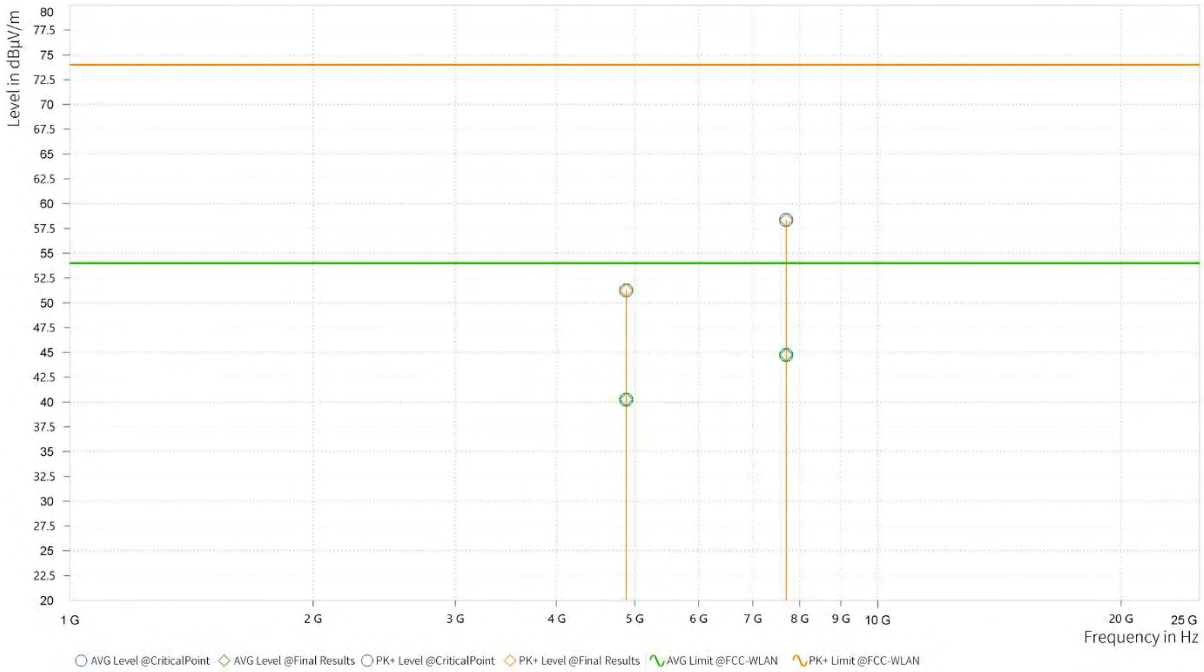
**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4,881.971 | 52.32 | 74.00 | 21.68 | 40.28 | 54.00 | 13.72 | 15.95 | H | 237.4 | 1 |
| 4 | 7,487.875 | 58.16 | 74.00 | 15.84 | 45.56 | 54.00 | 8.44 | 23.87 | H | 10.5 | 2 |



## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4,881.971 | 51.26 | 74.00 | 22.74 | 40.25 | 54.00 | 13.75 | 15.95 | V | 123.8 | 2 |
| 4 | 7,702.925 | 58.34 | 74.00 | 15.66 | 44.75 | 54.00 | 9.25 | 24.33 | V | 1 | 2 |



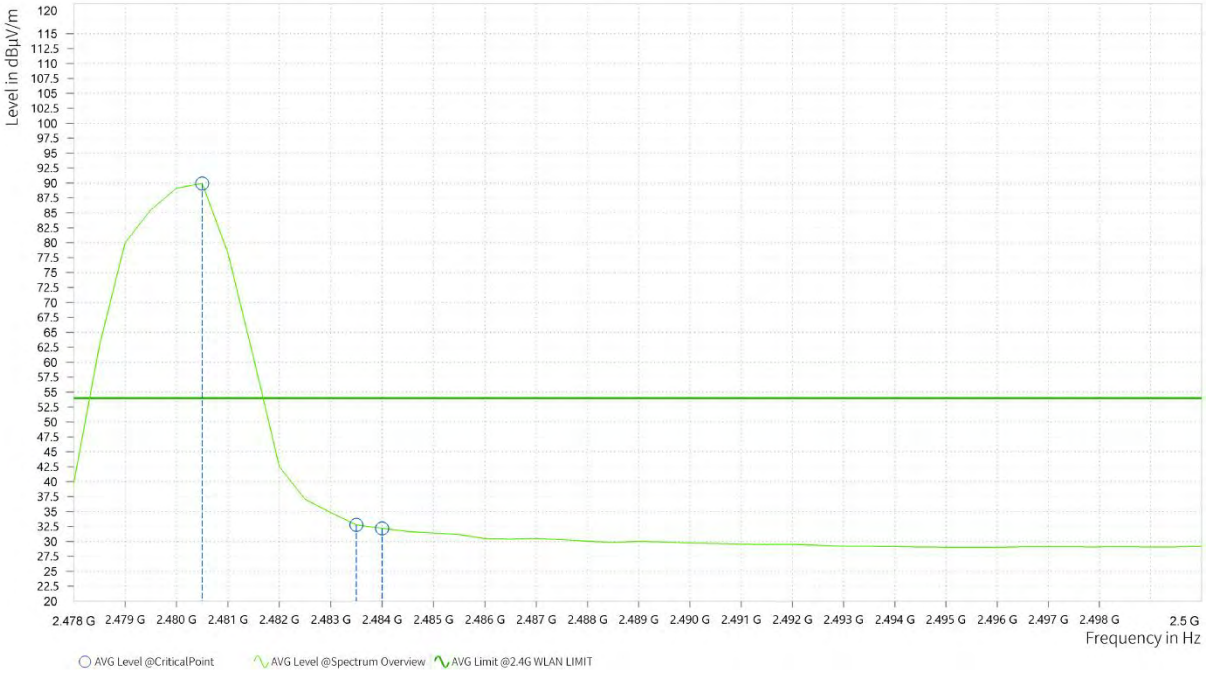

**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2441MHz: Fundamental frequency.

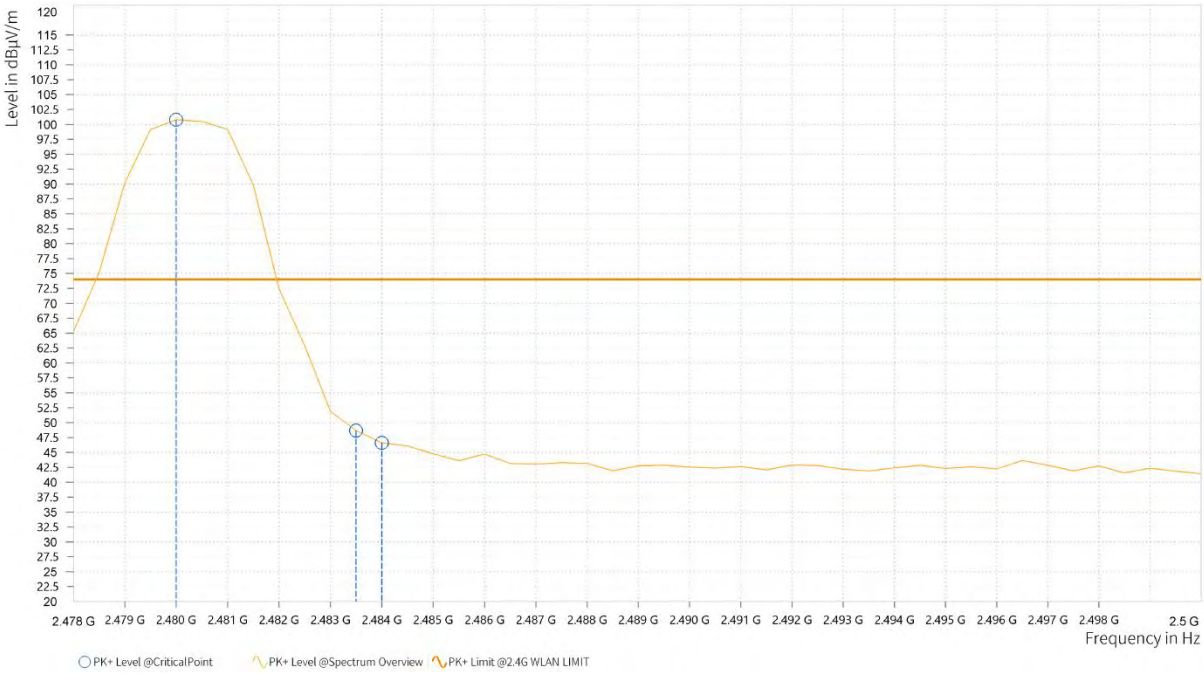
| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.500 | 89.93 | | | 9.89 | H | 175.1 | 2 |
| 1 | 2,483.500 | 32.76 | 54.00 | 21.24 | 9.88 | H | 175.1 | 2 |
| 1 | 2,484.000 | 32.19 | 54.00 | 21.81 | 9.88 | H | 175.1 | 2 |

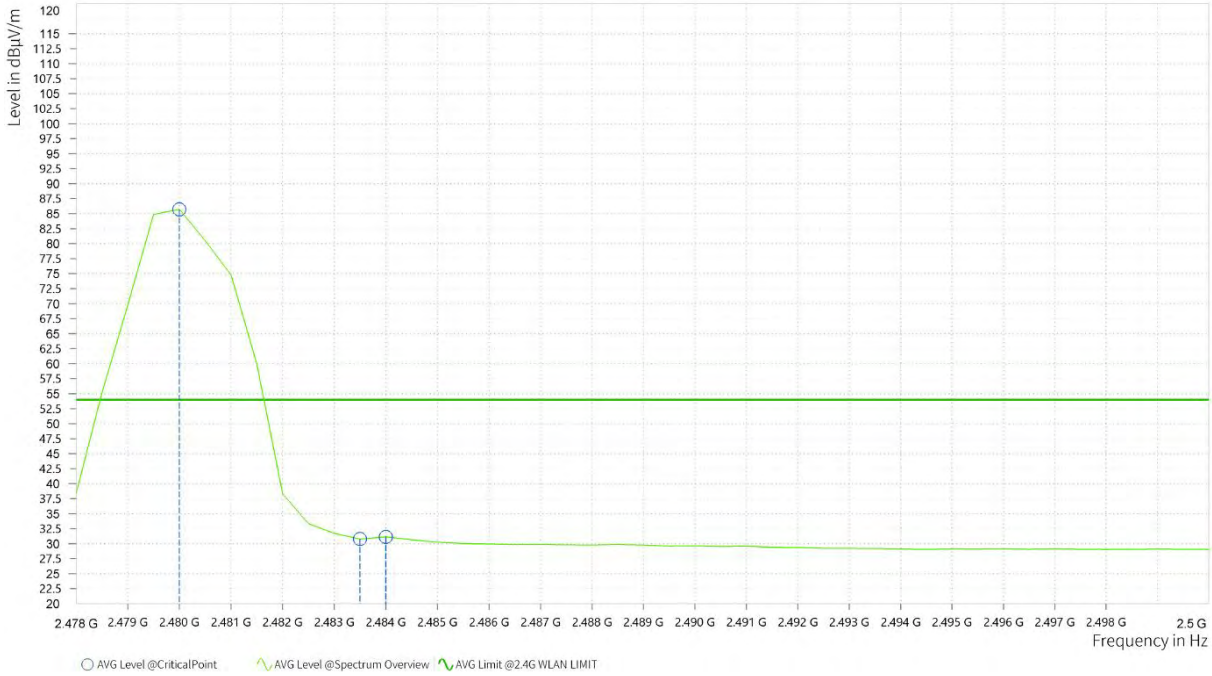


| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.000 | 100.78 | | | 9.89 | H | 72.5 | 1 |
| 1 | 2,483.500 | 48.67 | 74.00 | 25.33 | 9.88 | H | 236.1 | 2 |
| 1 | 2,484.000 | 46.60 | 74.00 | 27.40 | 9.88 | H | 134.6 | 2 |

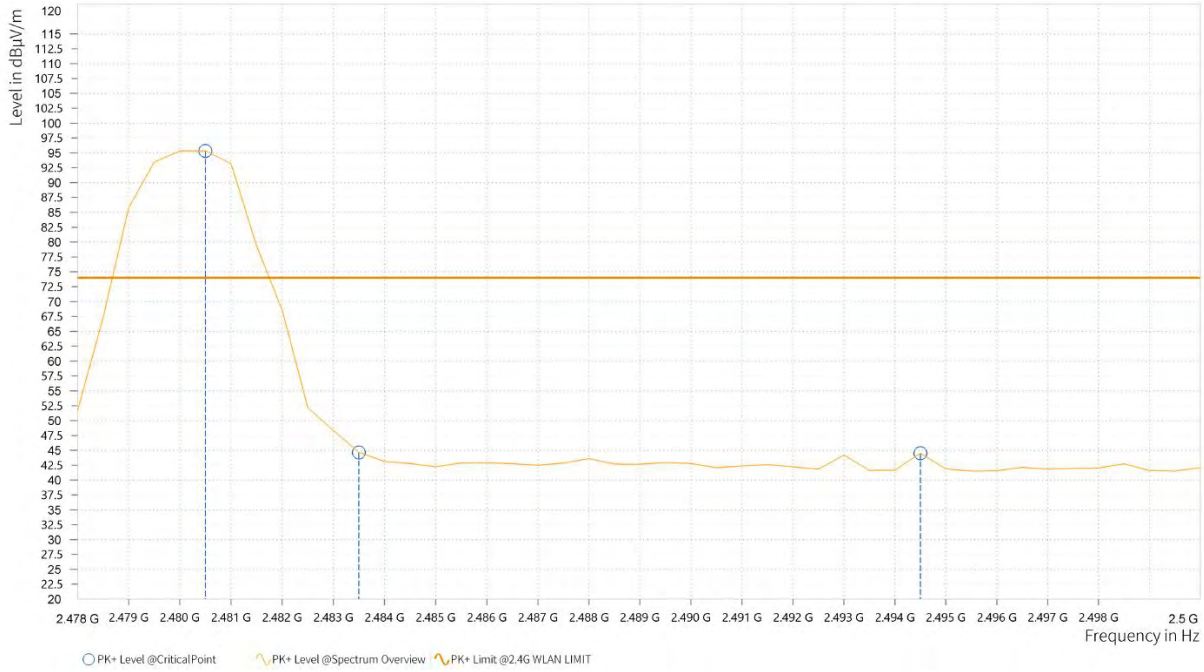


## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.000 | 85.72 | | | 9.89 | V | 5.2 | 1 |
| 1 | 2,483.500 | 30.77 | 54.00 | 23.23 | 9.88 | V | 5.2 | 1 |
| 1 | 2,484.000 | 31.13 | 54.00 | 22.87 | 9.88 | V | 5.2 | 1 |



| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.500 | 95.34 | | | 9.89 | V | 45 | 1 |
| 1 | 2,483.500 | 44.65 | 74.00 | 29.35 | 9.88 | V | 278.2 | 1 |
| 1 | 2,494.500 | 44.51 | 74.00 | 29.49 | 9.88 | V | 350.2 | 1 |




**REMARKS:**

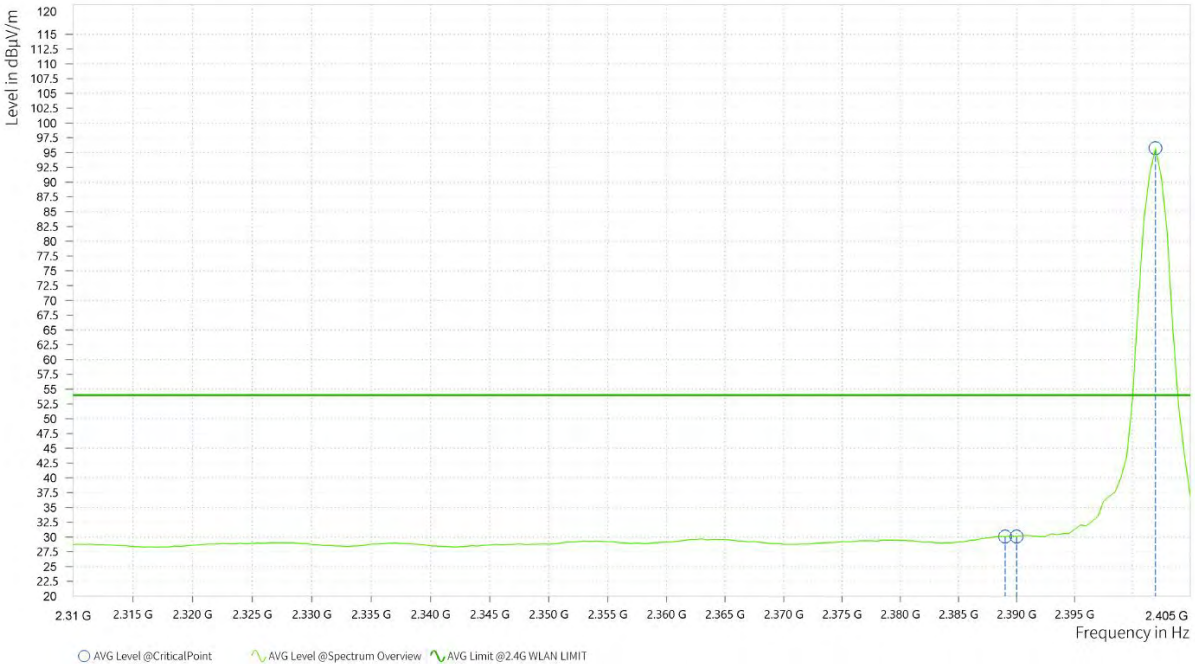
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2480MHz: Fundamental frequency.

**BT_8DPSK**

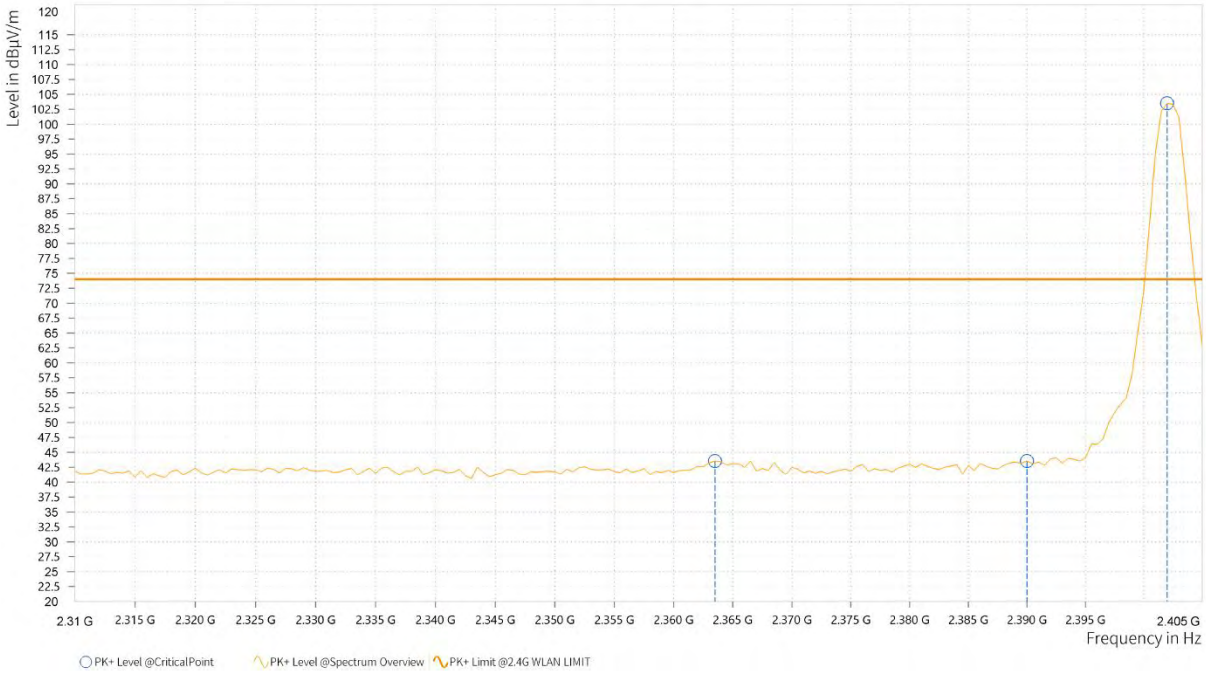
| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 0 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,389.000 | 30.06 | 54.00 | 23.94 | 9.83 | H | 300.6 | 2 |
| 1 | 2,390.000 | 30.08 | 54.00 | 23.92 | 9.84 | H | 238.5 | 2 |
| 1 | 2,402.000 | 95.73 | | | 9.85 | H | 300.6 | 2 |

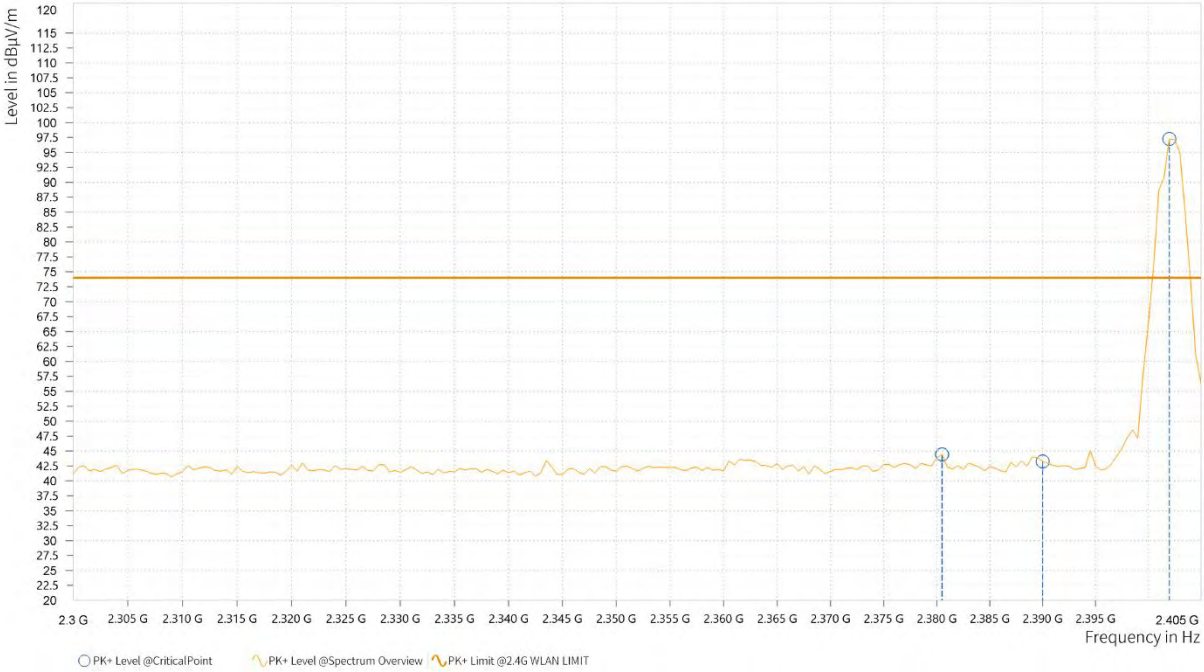


| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,363.500 | 43.54 | 74.00 | 30.46 | 9.64 | H | 245.7 | 1 |
| 1 | 2,390.000 | 43.54 | 74.00 | 30.46 | 9.84 | H | 264.8 | 2 |
| 1 | 2,402.000 | 103.53 | | | 9.85 | H | 169.2 | 1 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,389.000 | 29.92 | 54.00 | 24.08 | 9.83 | V | 0.9 | 2 |
| 1 | 2,390.000 | 29.83 | 54.00 | 24.17 | 9.84 | V | 359.1 | 1 |
| 1 | 2,402.000 | 83.81 | | | 9.85 | V | 52.1 | 2 |

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,380.500 | 44.43 | 74.00 | 29.57 | 9.76 | V | 355.8 | 1 |
| 1 | 2,390.000 | 43.25 | 74.00 | 30.75 | 9.84 | V | 1.4 | 2 |
| 1 | 2,402.000 | 97.25 | | | 9.85 | V | 146.6 | 1 |



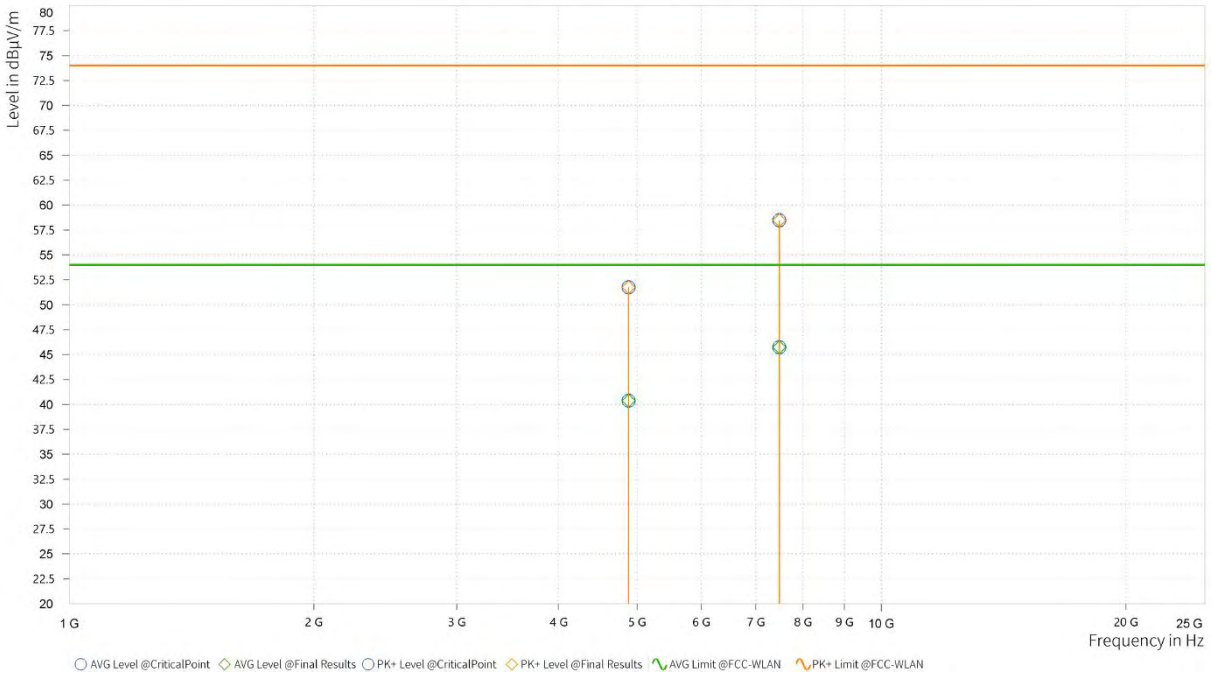

**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2402MHz: Fundamental frequency.

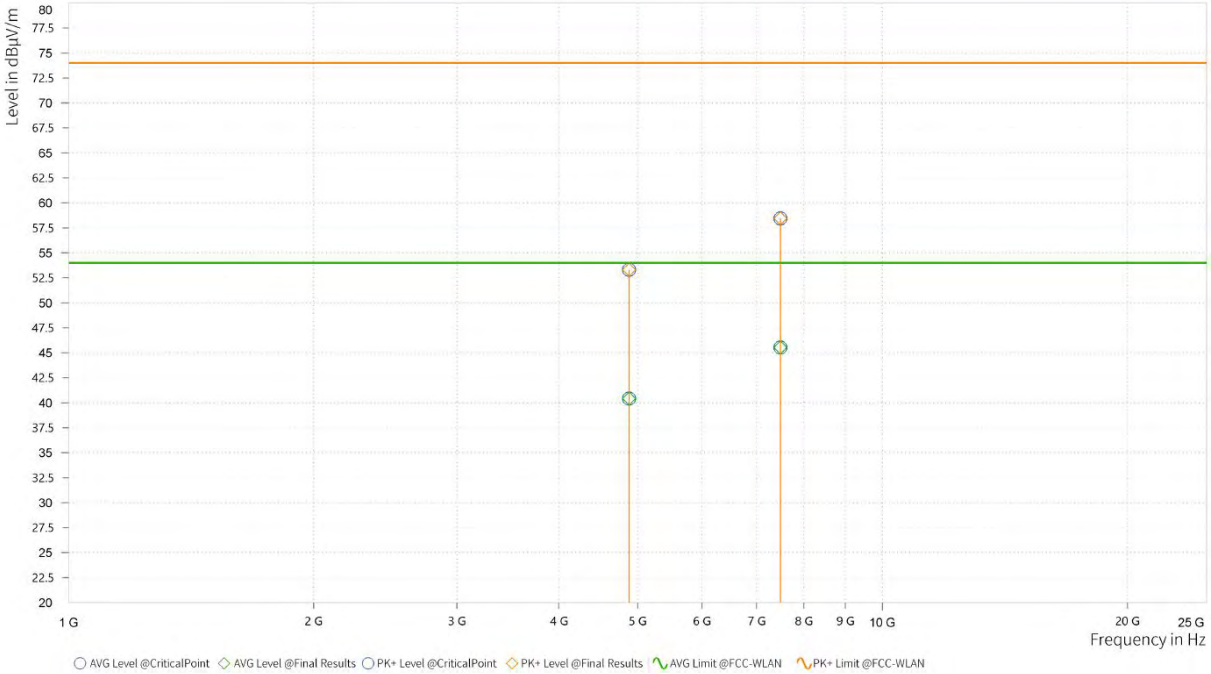
| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 4,882.456 | 51.74 | 74.00 | 22.26 | 40.37 | 54.00 | 13.63 | 15.95 | H | 359 | 1 |
| 4 | 7,484.050 | 58.47 | 74.00 | 15.53 | 45.74 | 54.00 | 8.26 | 23.86 | H | 0.9 | 2 |



| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 3 | 4,881.971 | 53.31 | 74.00 | 20.69 | 40.42 | 54.00 | 13.58 | 15.95 | V | 359 | 2 |
| 4 | 7,490.425 | 58.45 | 74.00 | 15.55 | 45.53 | 54.00 | 8.47 | 23.87 | V | 11.9 | 2 |

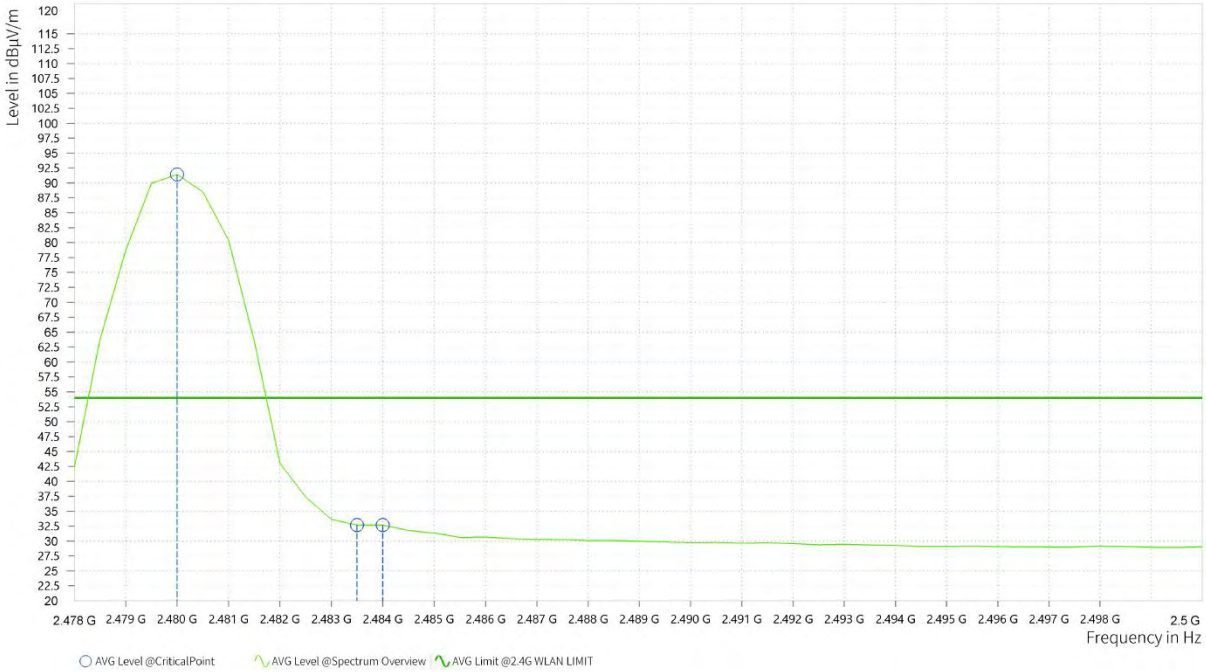



**REMARKS:**

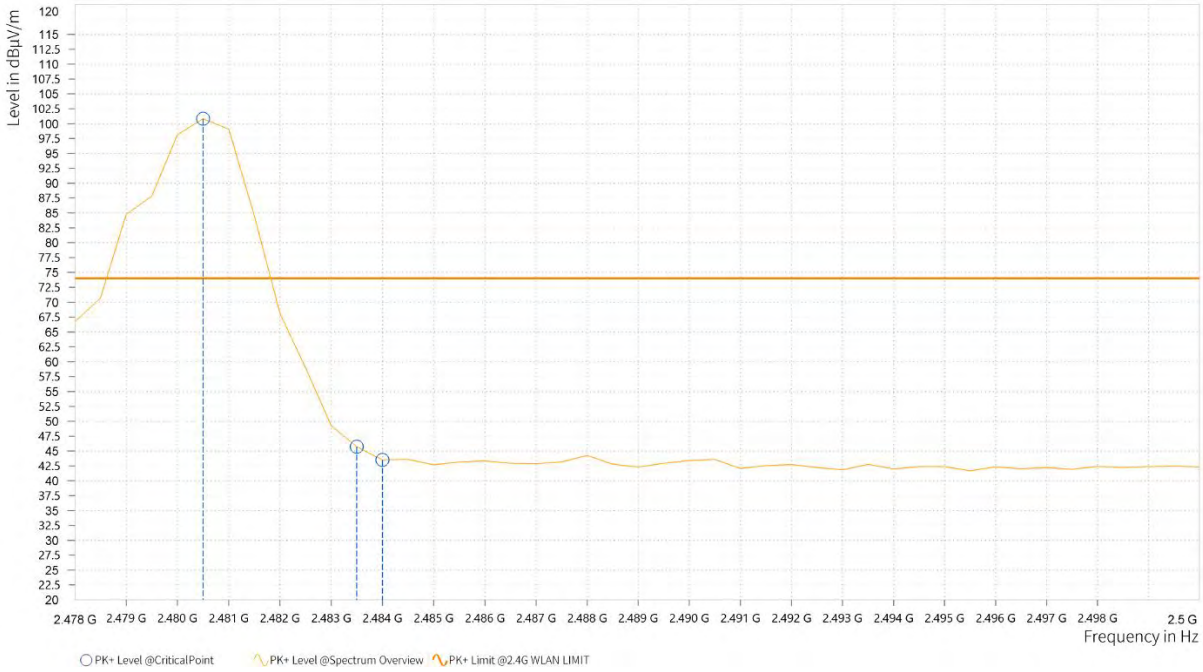
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2441MHz: Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
| 1 | 2,480.000 | 91.41 | | | 9.89 | H | 186 | 1 |
| 1 | 2,483.500 | 32.68 | 54.00 | 21.32 | 9.88 | H | 300.6 | 2 |
| 1 | 2,484.000 | 32.68 | 54.00 | 21.32 | 9.88 | H | 300.6 | 2 |

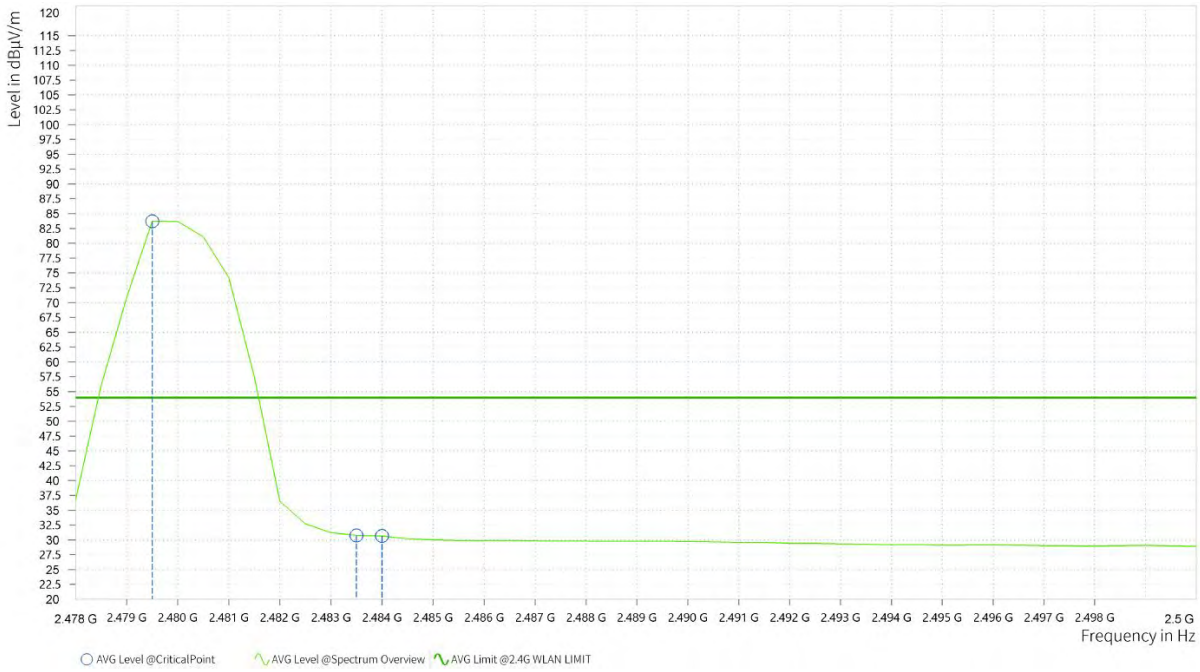


| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,480.500 | 100.83 | | | 9.89 | H | 177.7 | 1 |
| 1 | 2,483.500 | 45.71 | 74.00 | 28.29 | 9.88 | H | 227.7 | 2 |
| 1 | 2,484.000 | 43.51 | 74.00 | 30.49 | 9.88 | H | 310.2 | 2 |

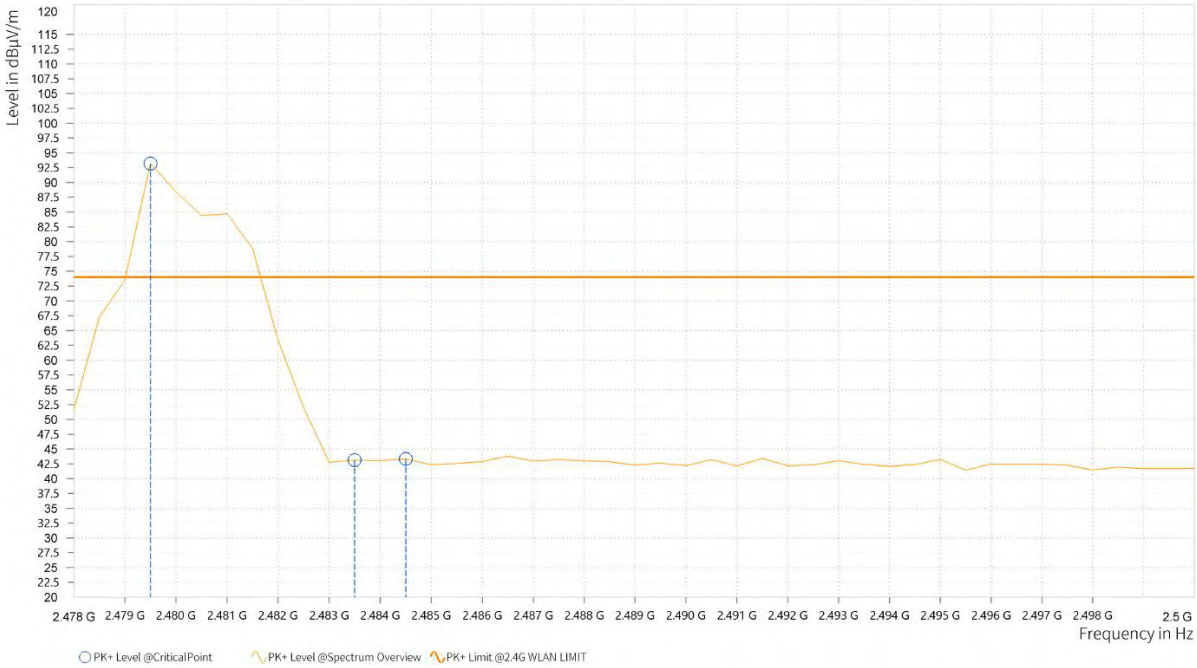


## ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| Rg | Frequency [MHz] | AVG Level [dBμV/m] | AVG Limit [dBμV/m] | AVG Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,479.500 | 83.70 | | | 9.90 | V | 122.7 | 1 |
| 1 | 2,483.500 | 30.75 | 54.00 | 23.25 | 9.88 | V | 122.7 | 1 |
| 1 | 2,484.000 | 30.66 | 54.00 | 23.34 | 9.88 | V | 122.7 | 1 |



| Rg | Frequency [MHz] | PK+ Level [dBμV/m] | PK+ Limit [dBμV/m] | PK+ Margin [dB] | Correction [dB] | Polarization | Azimuth [deg] | Antenna Height [m] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2,479.500 | 93.20 | | | 9.90 | V | 150.2 | 1 |
| 1 | 2,483.500 | 43.14 | 74.00 | 30.86 | 9.88 | V | 285.2 | 2 |
| 1 | 2,484.500 | 43.32 | 74.00 | 30.68 | 9.88 | V | 359.1 | 1 |




**REMARKS:**

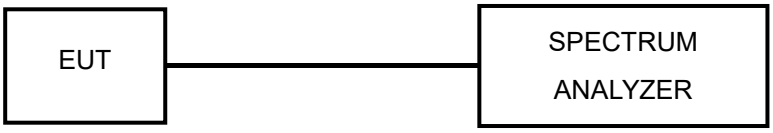
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Limit value – Emission level.
2. 2480MHz: Fundamental frequency.

## 3.3 NUMBER OF HOPPING FREQUENCY USED

### 3.3.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

### 3.3.2 TEST SETUP




### 3.3.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESW 44 | 101973 | Feb.25,22 | Feb.24,24 |
| Open Switch and Control Unit | R&S | OSP-B157W 8 | 100836 | N/A | N/A |
| Vector Signal Generator | R&S | SMBV100B | 102176 | Feb.16,22 | Feb.15,24 |
| Signal Generator | R&S | SMB100A03 | 182185 | Feb.16,22 | Feb.15,24 |
| Wideband Radio Communication | R&S | CMW500 | 169399 | Jun.26,22 | Jun.25,24 |
| Hygrothermograph | DELI | 20210528 | SZ015 | Sep.06,22 | Sep.05,24 |
| PC | LENOVO | E14 | HRSW0024 | N/A | N/A |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-069 | Oct.31,22 | Apr.29,23 |
| CABLE | R&S | J12J103539-00-1 | SEP-03-20-070 | Oct.31,22 | Apr.29,23 |
| Test Software | EMC32 | EMC32 | N/A | N/A | N/A |
| Temperature Chamber | votsch | VT4002 | 58566078100050 | May.31,22 | May.30,24 |

**NOTE:**

1. The calibration interval of the above test instruments is 6 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

### 3.3.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.

d. Set the SA on View mode and then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were completed.

### 3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.3.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

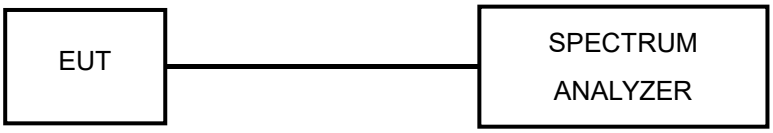
Please Refer to Appendix Of this test report.

## 3.4 DWELL TIME ON EACH CHANNEL

### 3.4.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 3.4.2 TEST SETUP




### 3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.4.4 TEST PROCEDURES

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.

d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

e. Repeat above procedures until all different time-slot modes have been completed.

### 3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4.6 TEST RESULTS

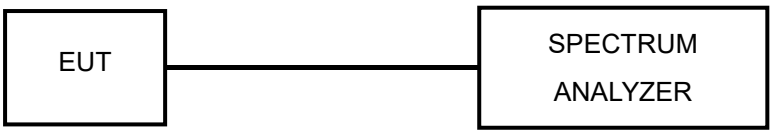
Please Refer to Appendix Of this test report

## 3.5 CHANNEL BANDWIDTH

### 3.5.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dBbandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

### 3.5.2 TEST SETUP




### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.5.4 TEST PROCEDURE

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Repeat above procedures until all frequencies measured were complete.

### 3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.5.7 TEST RESULTS

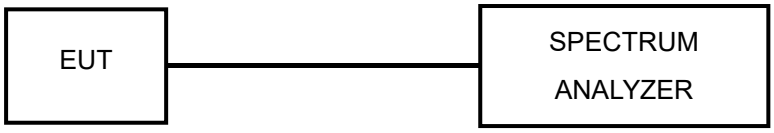
Please Refer to Appendix Of this test report.

## 3.6 HOPPING CHANNEL SEPARATION

### 3.6.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

### 3.6.2 TEST SETUP




### 3.6.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.6.4 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

### 3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.6.6 TEST RESULTS

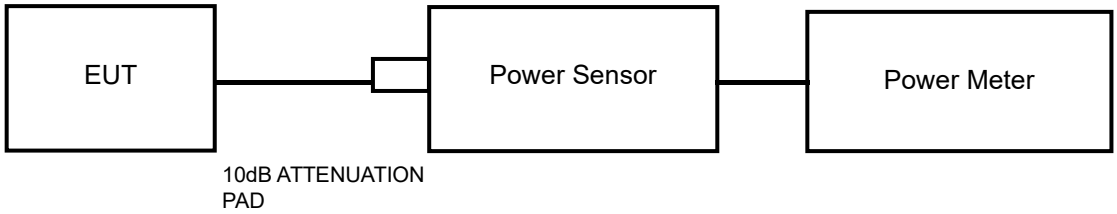
Please Refer to Appendix Of this test report.

## 3.7 MAXIMUM OUTPUT POWER

### 3.7.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

The Maximum Output Power Measurement is 125mW.

### 3.7.2 TEST SETUP




### 3.7.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.7.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

### 3.7.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.7.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 3.7.7 TEST RESULTS

### 3.7.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix Of this test report.

### 3.7.7.2 Average Output Power (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Please Refer to Appendix Of this test report.

## 3.8 OUT OF BAND MEASUREMENT

### 3.8.1 LIMITS OF OUT OF BAND MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz RBW).

### 3.8.2 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Spectrum Analyzer was set RBW to 100 kHz and VBW to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. Detector = PEAK and Trace mode = Max Hold. The band edges was measured and recorded.

### 3.8.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.8.5 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.8.6 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix Of this test report.

# 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

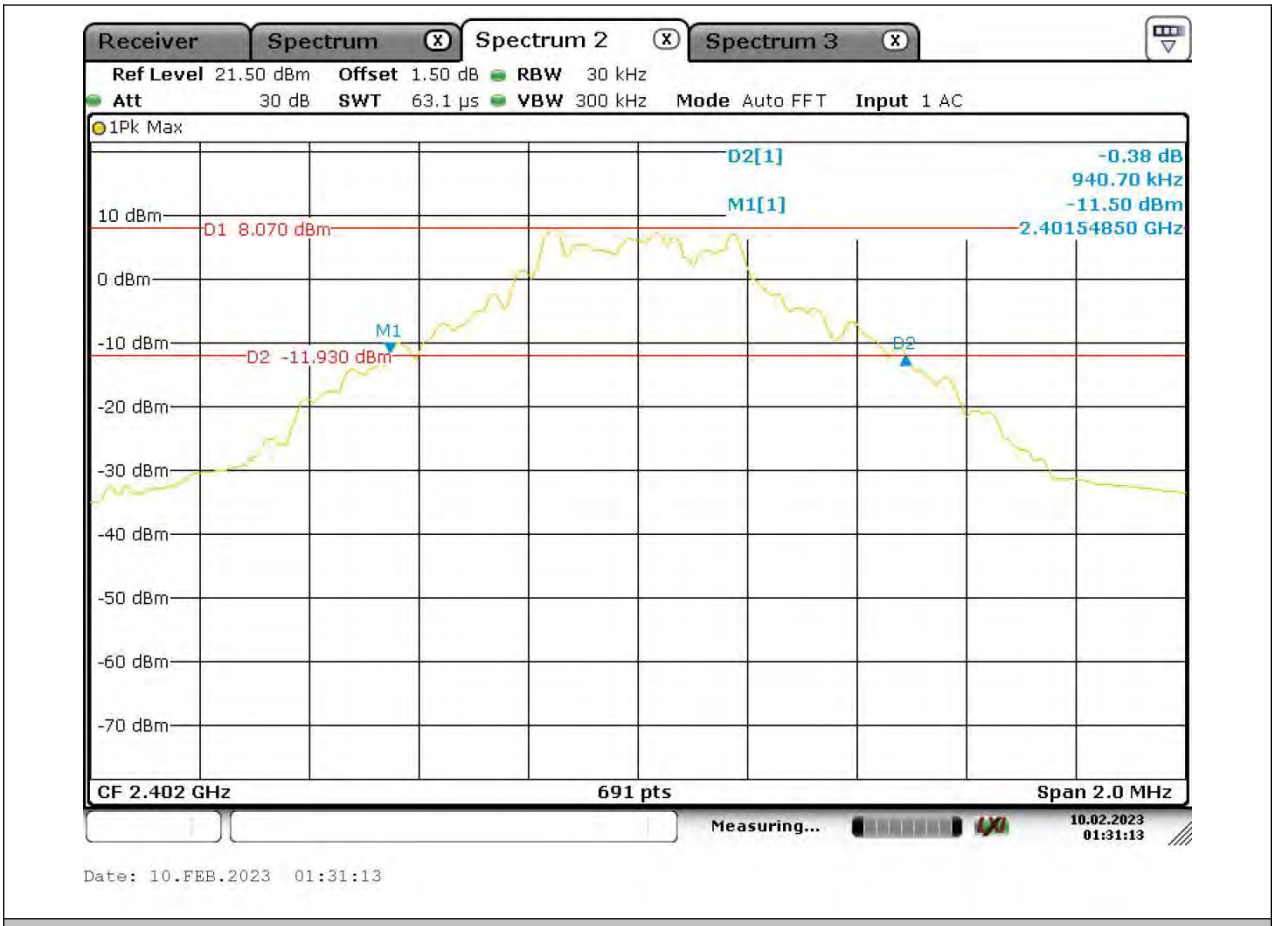
# 6 APPENDIX

## 20DB EMISSION BANDWIDTH

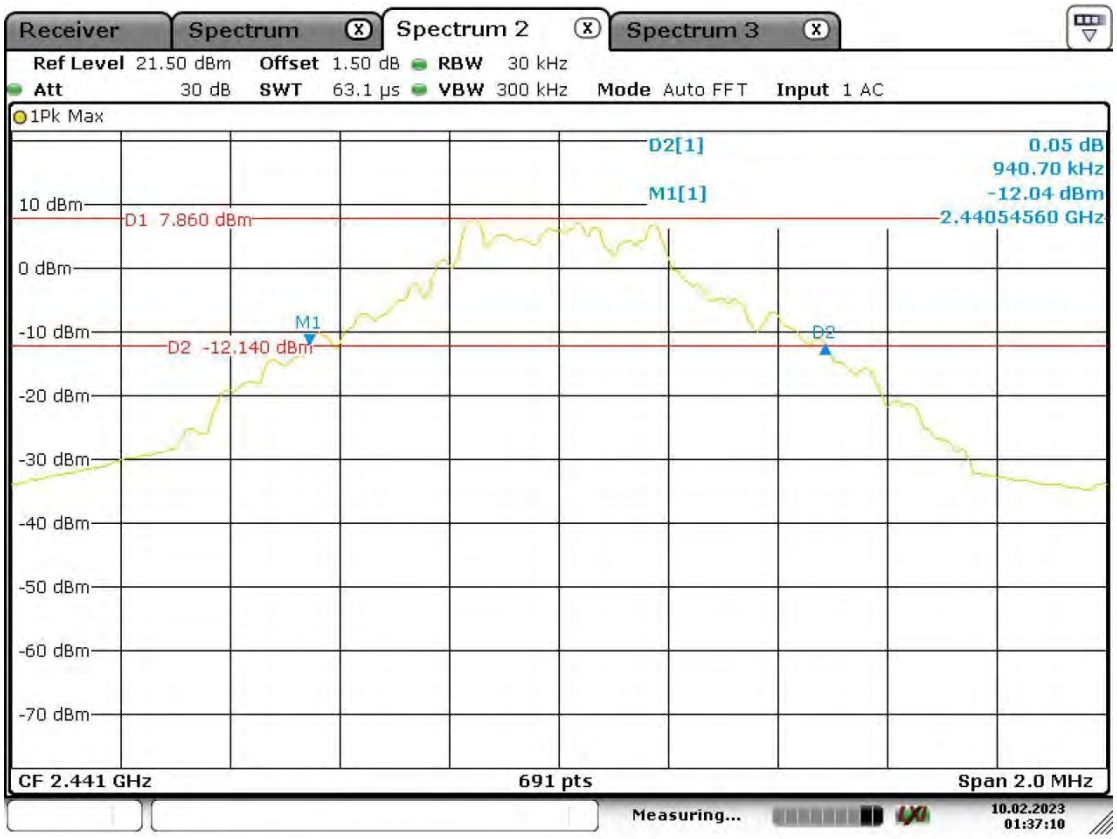
### TEST RESULT

| TestMode | Antenna | Channel | 20db EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 0.9407 | 2401.549 | 2402.490 | --- | PASS |
| | | 2441 | 0.9407 | 2440.546 | 2441.487 | --- | PASS |
| | | 2480 | 0.9407 | 2479.542 | 2480.483 | --- | PASS |
| 2DH5 | Ant1 | 2402 | 1.2851 | 2401.375 | 2402.660 | --- | PASS |
| | | 2441 | 1.2851 | 2440.375 | 2441.660 | --- | PASS |
| | | 2480 | 1.2822 | 2479.375 | 2480.657 | --- | PASS |
| 3DH5 | Ant1 | 2402 | 1.2880 | 2401.360 | 2402.648 | --- | PASS |
| | | 2441 | 1.2880 | 2440.363 | 2441.651 | --- | PASS |
| | | 2480 | 1.2880 | 2479.363 | 2480.651 | --- | PASS |

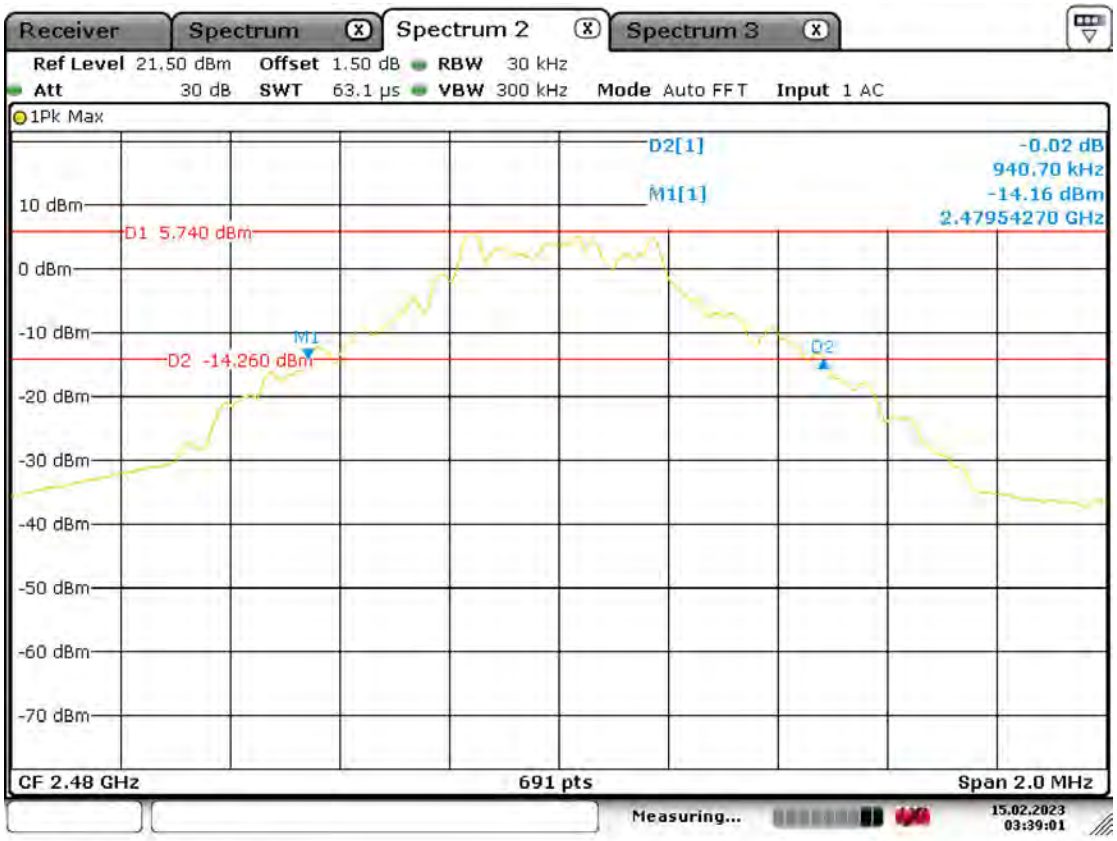
## TEST GRAPHS



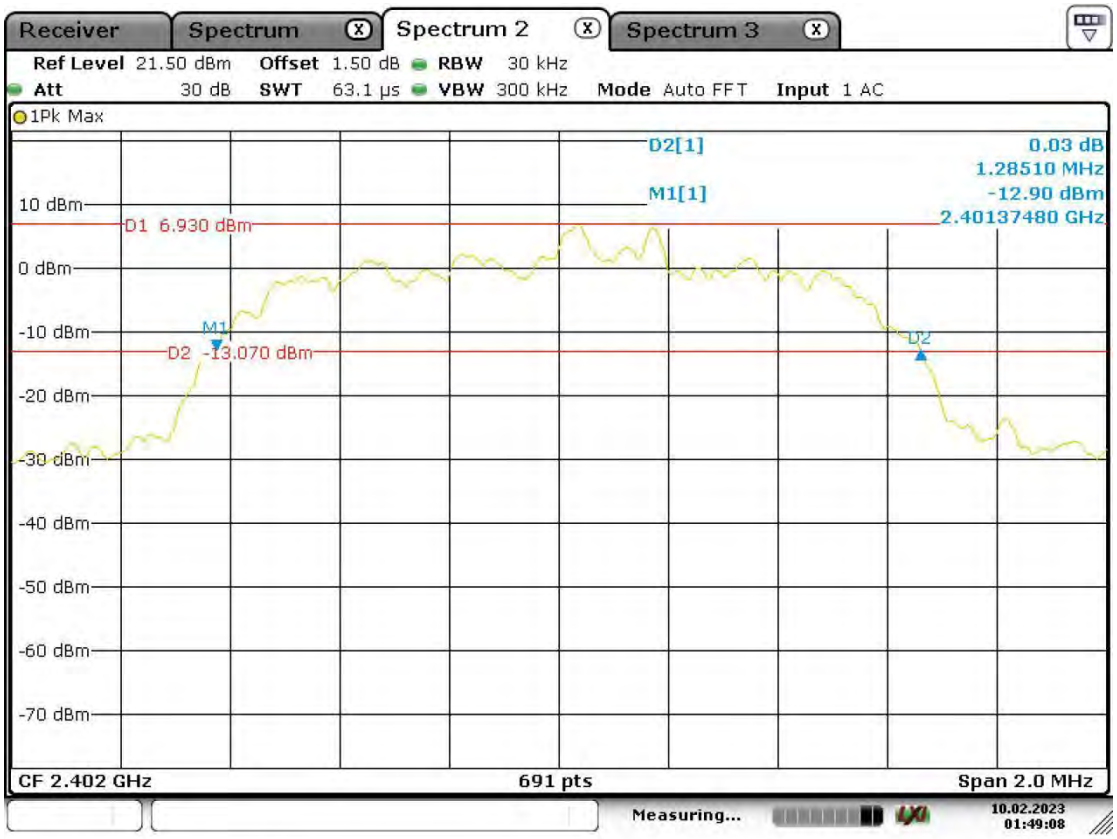

DH5_Ant1_2402



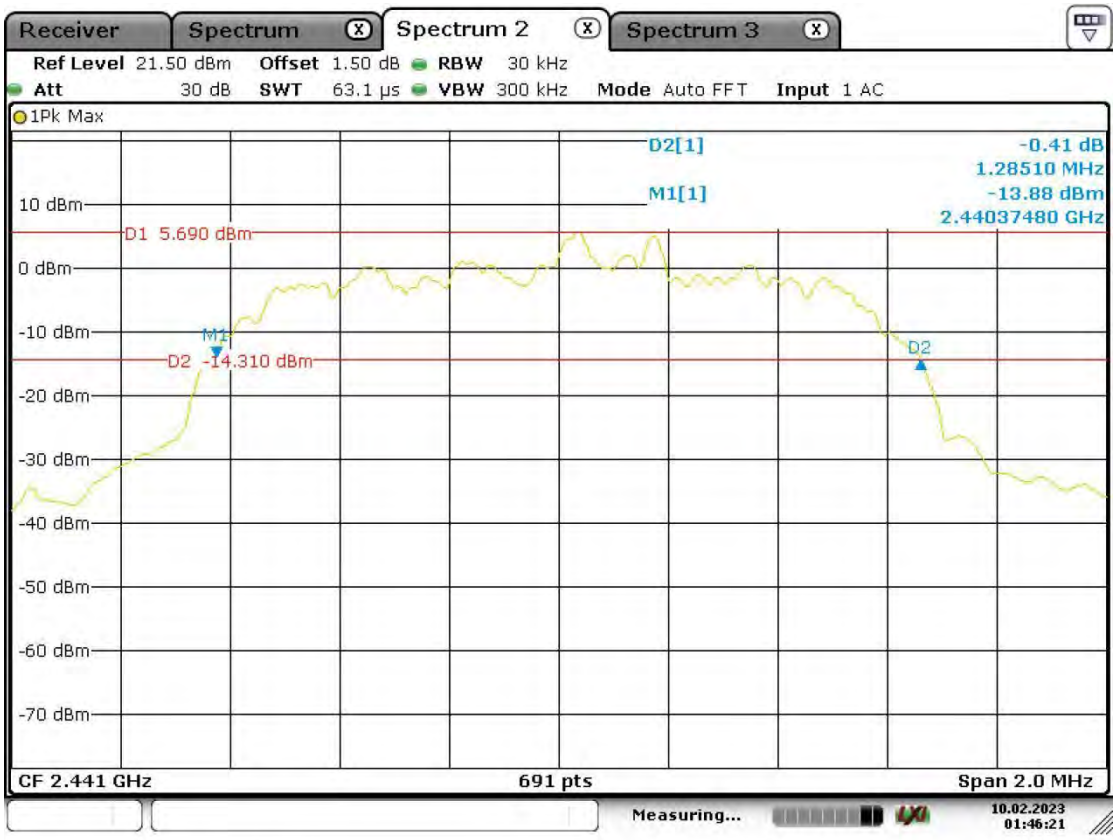

DH5_Ant1_2441



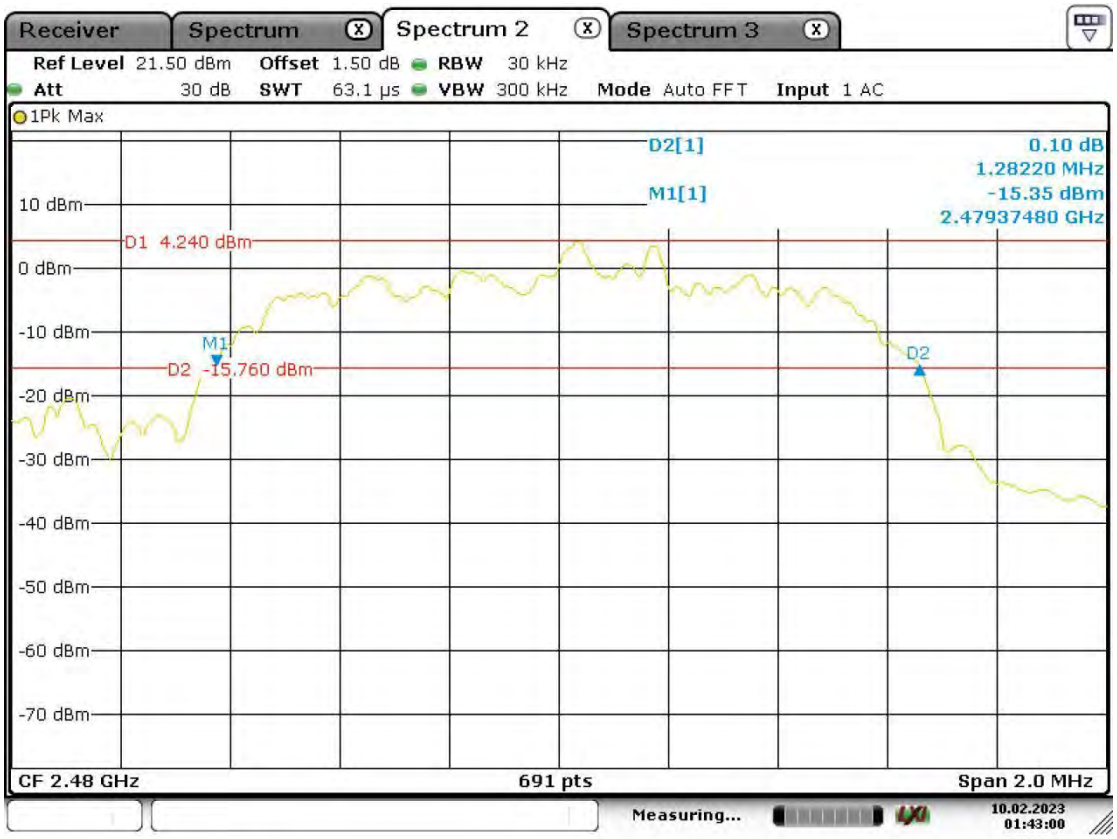

DH5_Ant1_2480



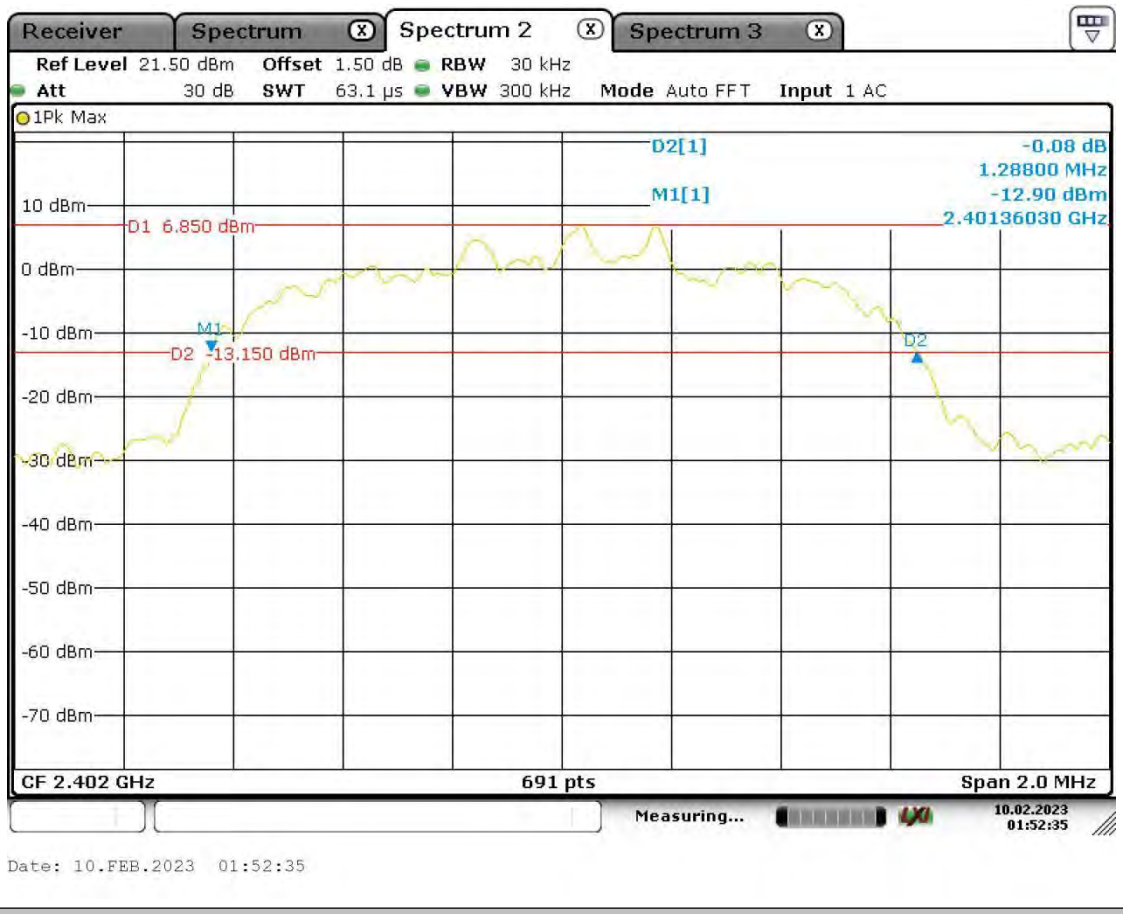

2DH5_Ant1_2402



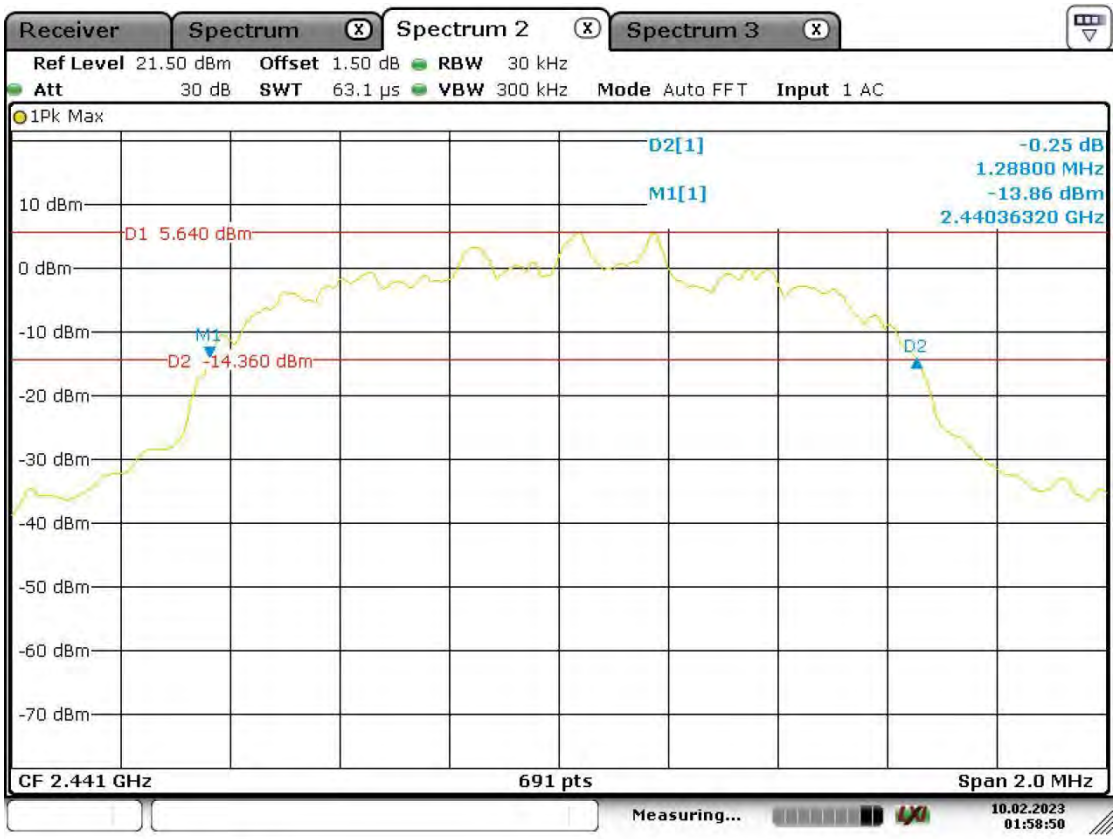

2DH5_Ant1_2441



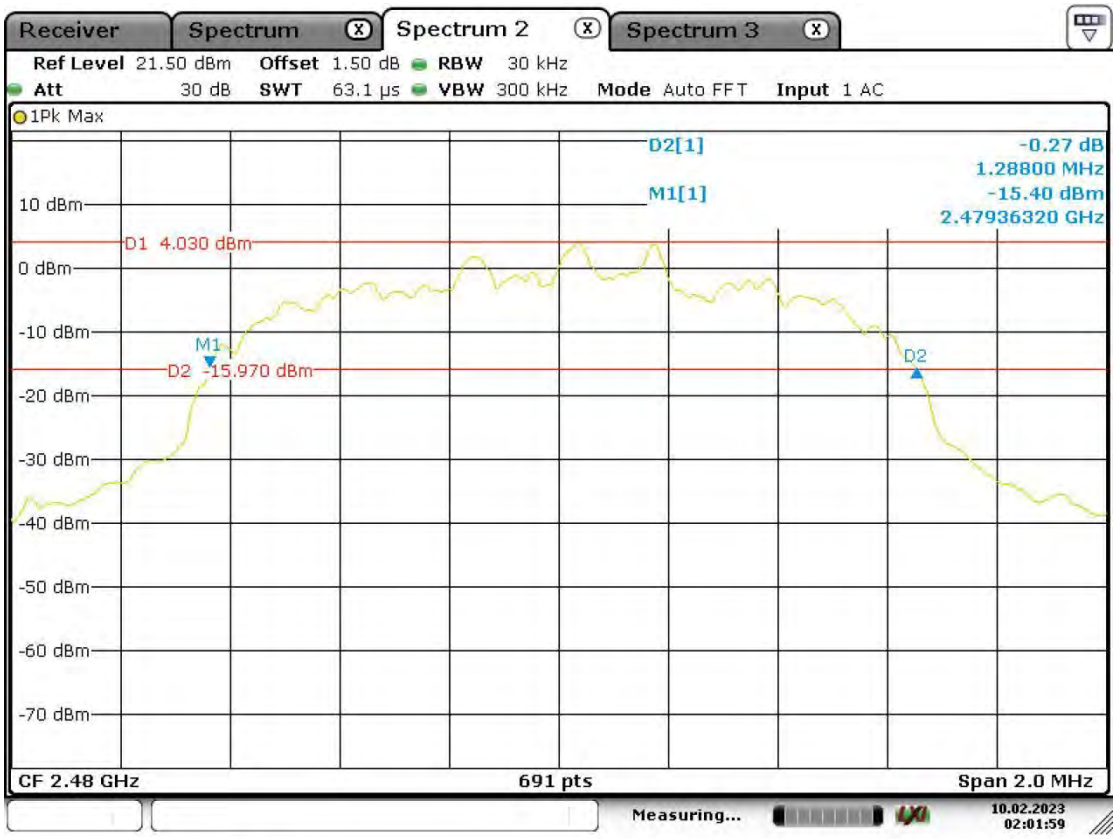

2DH5_Ant1_2480




3DH5_Ant1_2402




3DH5_Ant1_2441



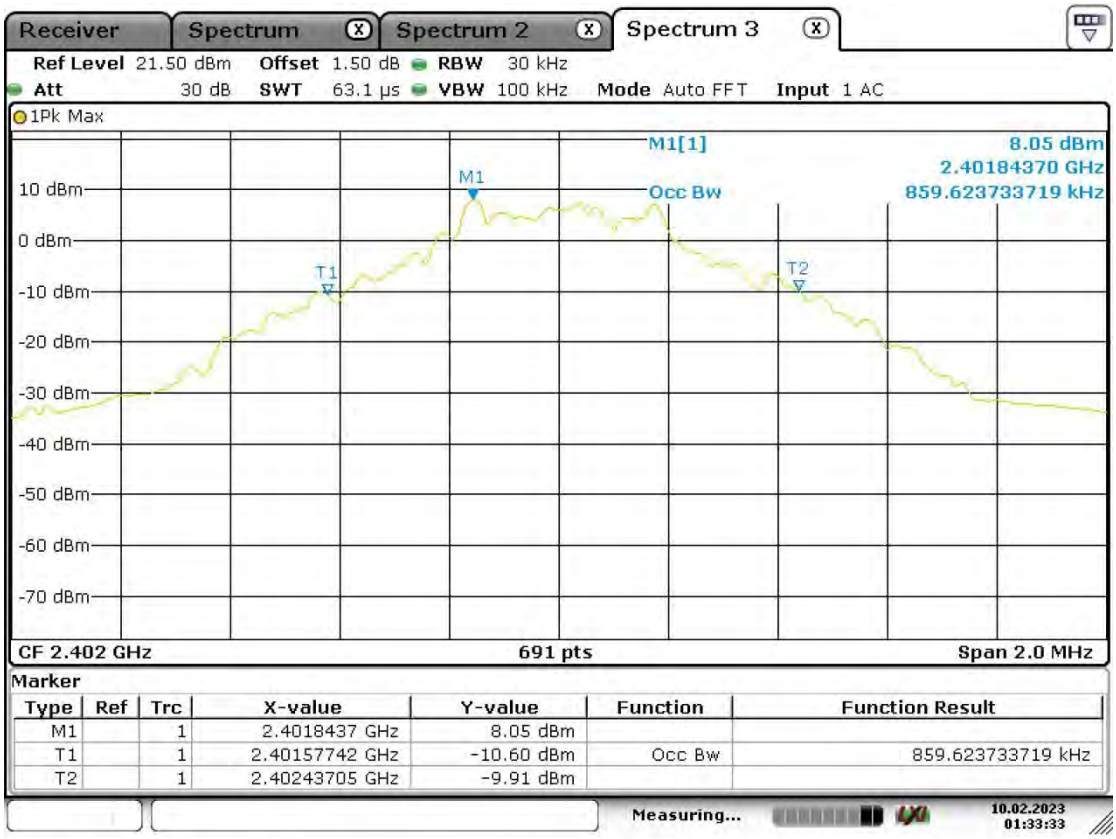

3DH5_Ant1_2480

## OCCUPIED CHANNEL BANDWIDTH

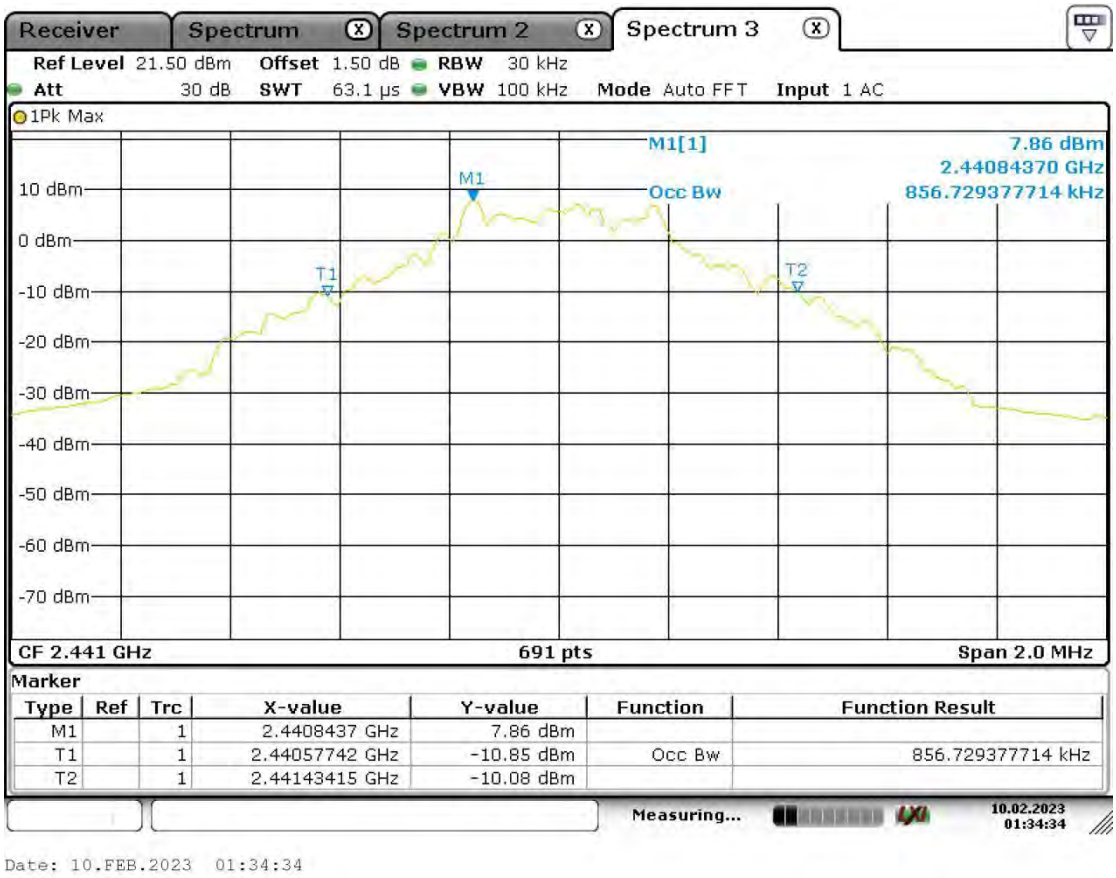
### TEST RESULT

| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 0.8596 | 2401.577 | 2402.437 | --- | PASS |
| | | 2441 | 0.8567 | 2440.577 | 2441.434 | --- | PASS |
| | | 2480 | 0.8567 | 2479.577 | 2480.434 | --- | PASS |
| 2DH5 | Ant1 | 2402 | 1.1867 | 2402.415 | 2403.602 | --- | PASS |
| | | 2441 | 1.1809 | 2440.415 | 2441.596 | --- | PASS |
| | | 2480 | 1.1809 | 2480.415 | 2481.596 | --- | PASS |
| 3DH5 | Ant1 | 2402 | 1.1838 | 2402.415 | 2403.599 | --- | PASS |
| | | 2441 | 1.1809 | 2440.418 | 2441.599 | --- | PASS |
| | | 2480 | 1.1925 | 2480.406 | 2481.599 | --- | PASS |

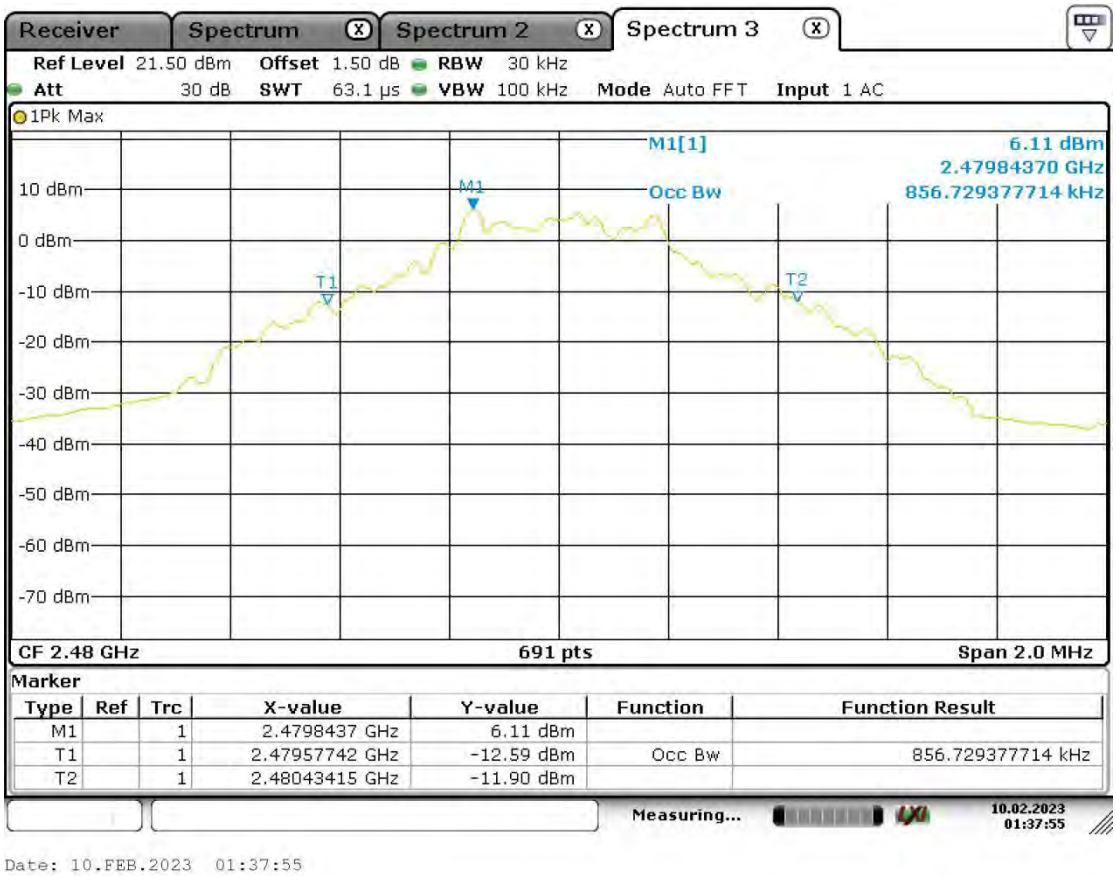
## TEST GRAPHS



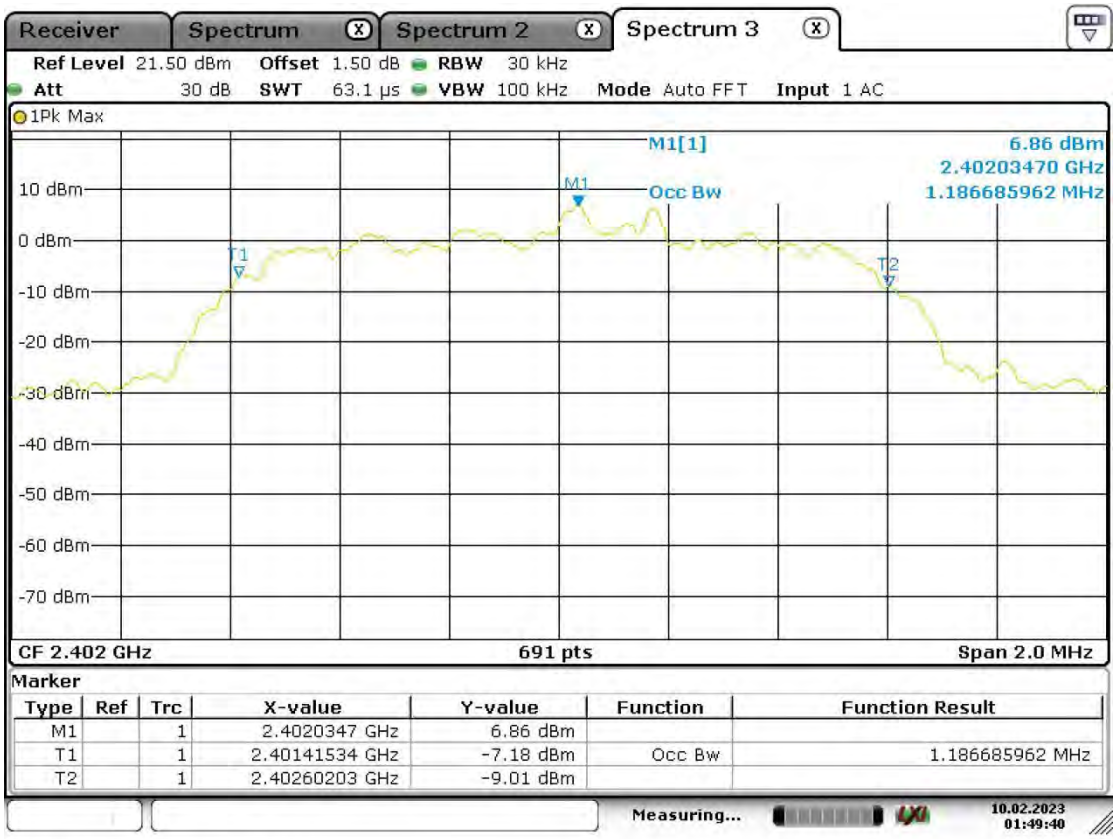

DH5_Ant1_2402




DH5_Ant1_2441



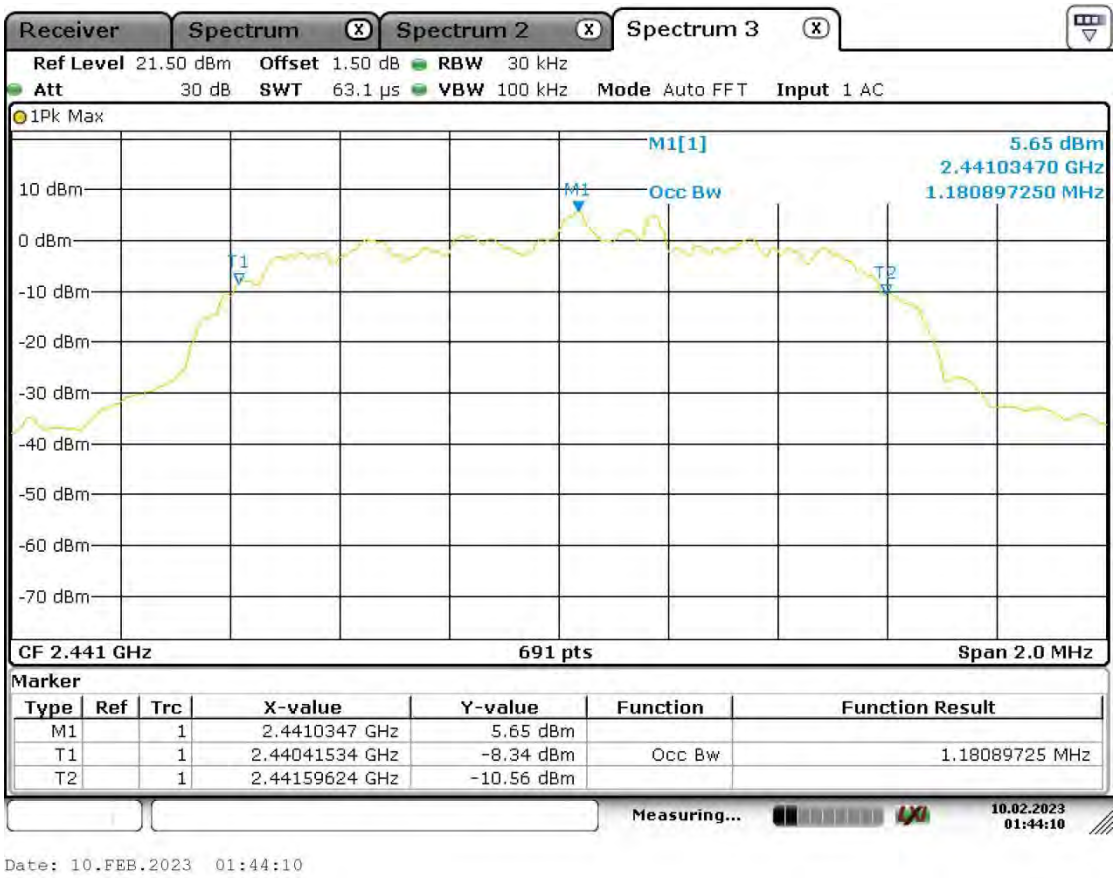

DH5_Ant1_2480



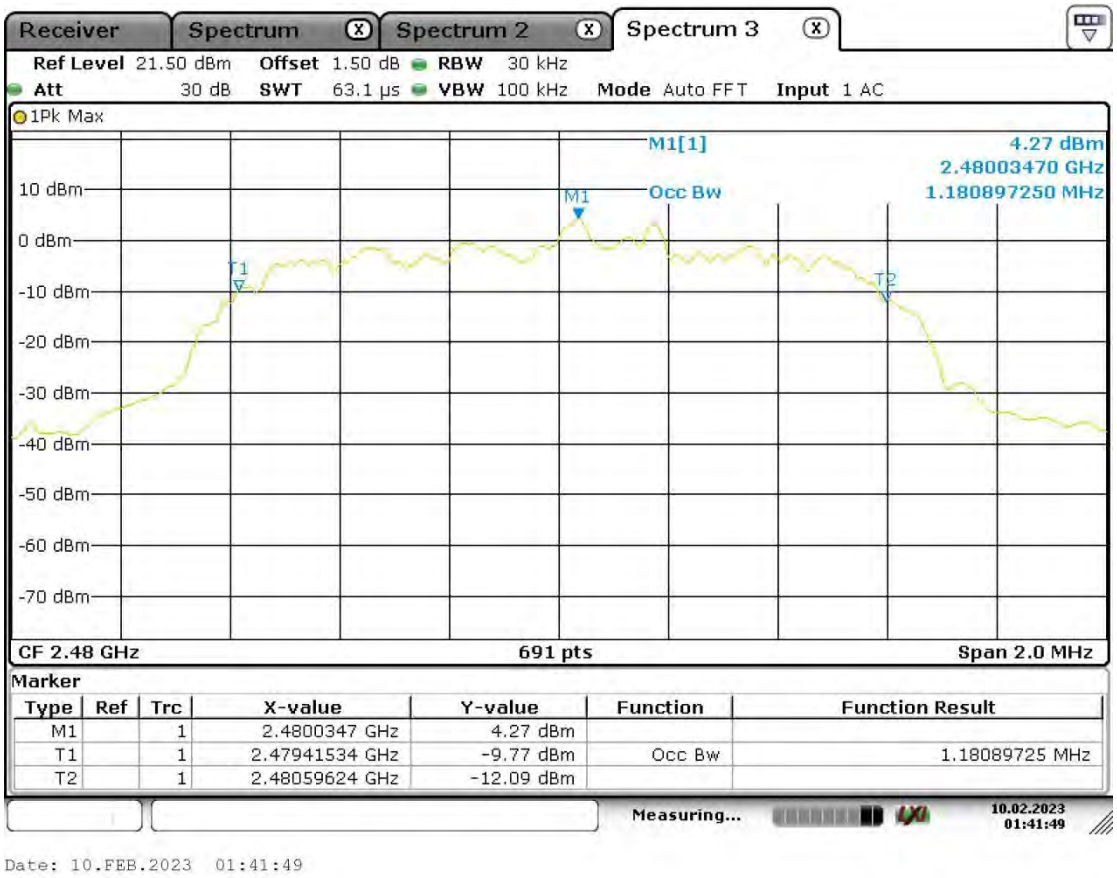

Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.4020347 GHz | 6.86 dBm | | |
| T1 | | 1 | 2.40141534 GHz | -7.18 dBm | Occ Bw | 1.186685962 MHz |
| T2 | | 1 | 2.40260203 GHz | -9.01 dBm | | |

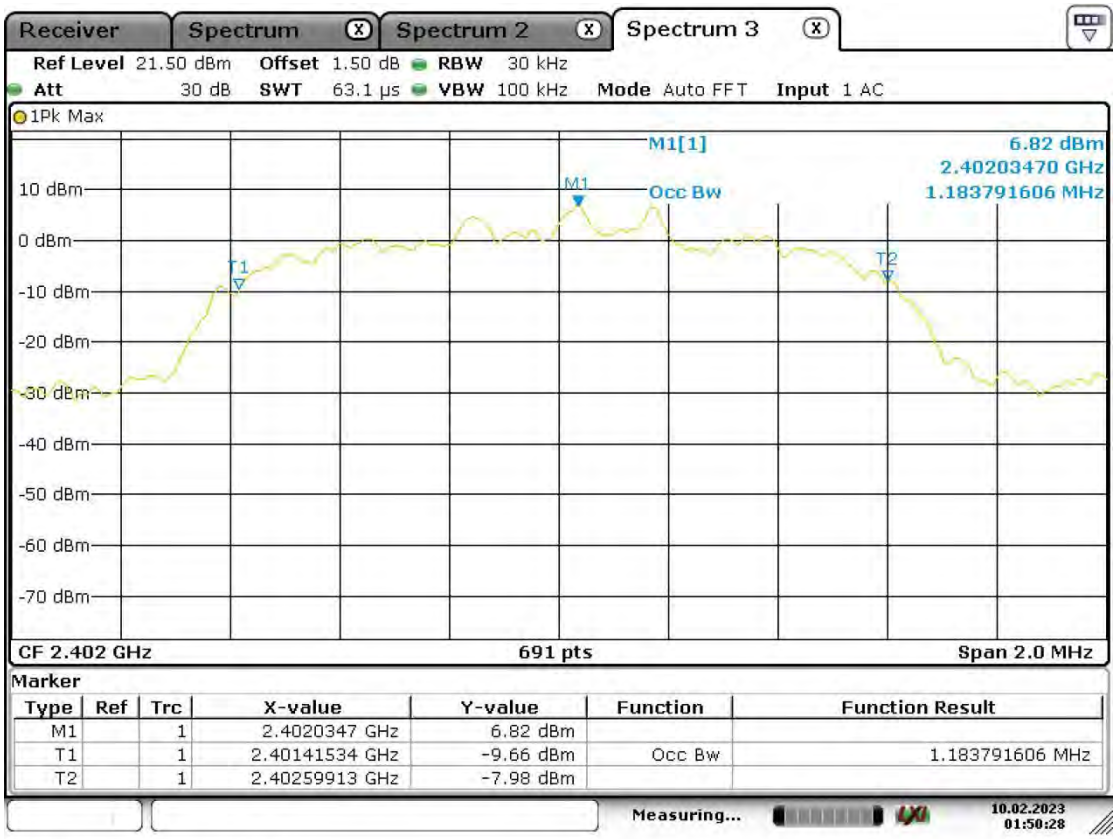
2DH5_Ant1_2402



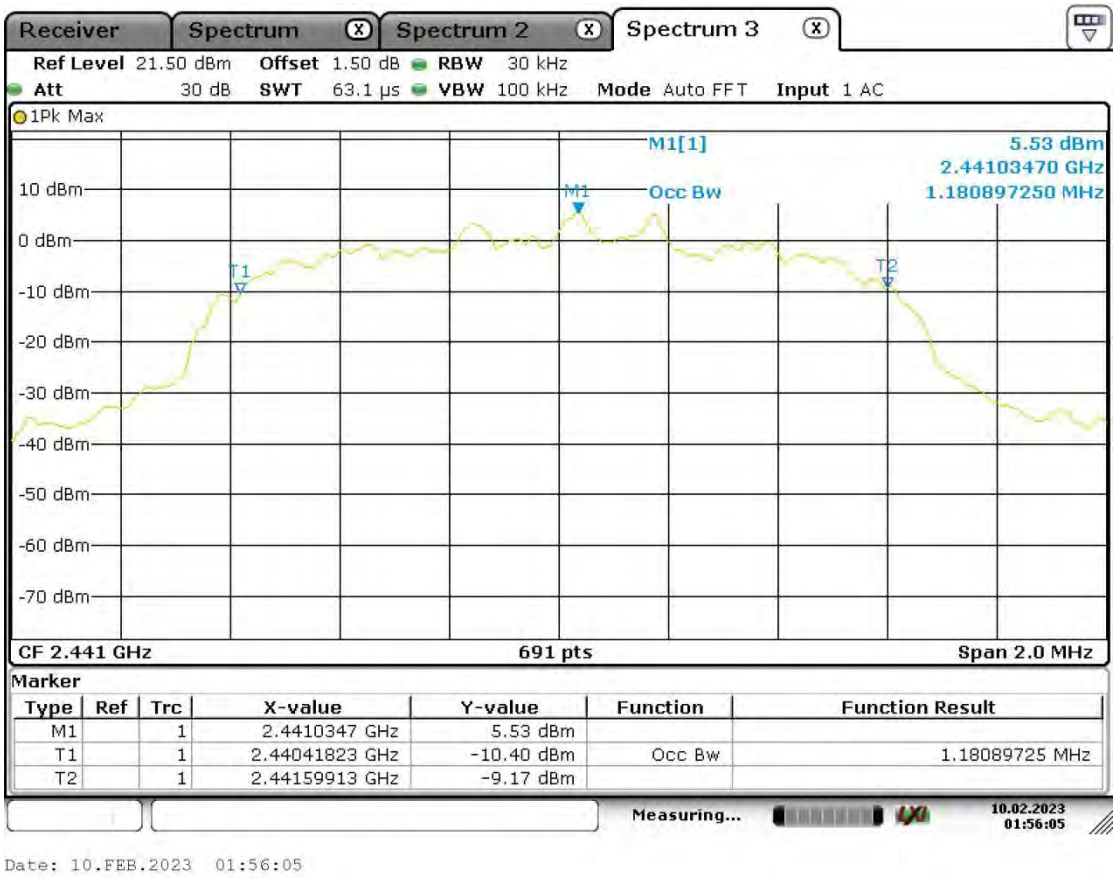

2DH5_Ant1_2441



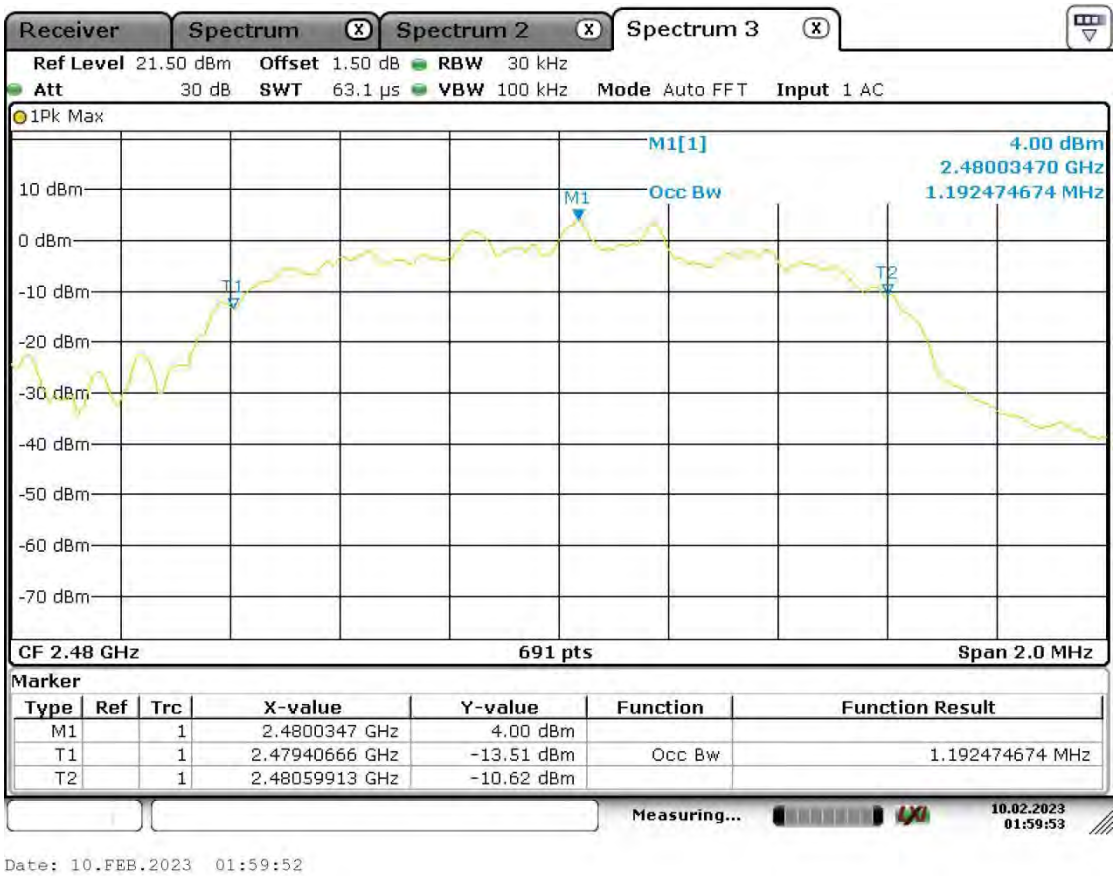

2DH5_Ant1_2480




3DH5_Ant1_2402




3DH5_Ant1_2441




3DH5_Ant1_2480

## MAXIMUM CONDUCTED OUTPUT POWER

### TEST RESULT PEAK

| TestMode | Antenna | Channel | Peak Powert[dBm] | Peak Powert[mw] | Conducted Limit[mw] | Verdict | Power setting |
|---|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 9.45 | 8.81 | ≤125 | PASS | 4 |
| | | 2441 | 9.08 | 8.09 | ≤125 | PASS | 4 |
| | | 2480 | 7.98 | 6.28 | ≤125 | PASS | 4 |
| 2DH5 | Ant1 | 2402 | 10.83 | 12.11 | ≤125 | PASS | 4 |
| | | 2441 | 9.65 | 9.23 | ≤125 | PASS | 4 |
| | | 2480 | 8.74 | 7.48 | ≤125 | PASS | 4 |
| 3DH5 | Ant1 | 2402 | 10.99 | 12.56 | ≤125 | PASS | 4 |
| | | 2441 | 9.92 | 9.82 | ≤125 | PASS | 4 |
| | | 2480 | 9.05 | 8.04 | ≤125 | PASS | 4 |

### TEST RESULT AVERAGE

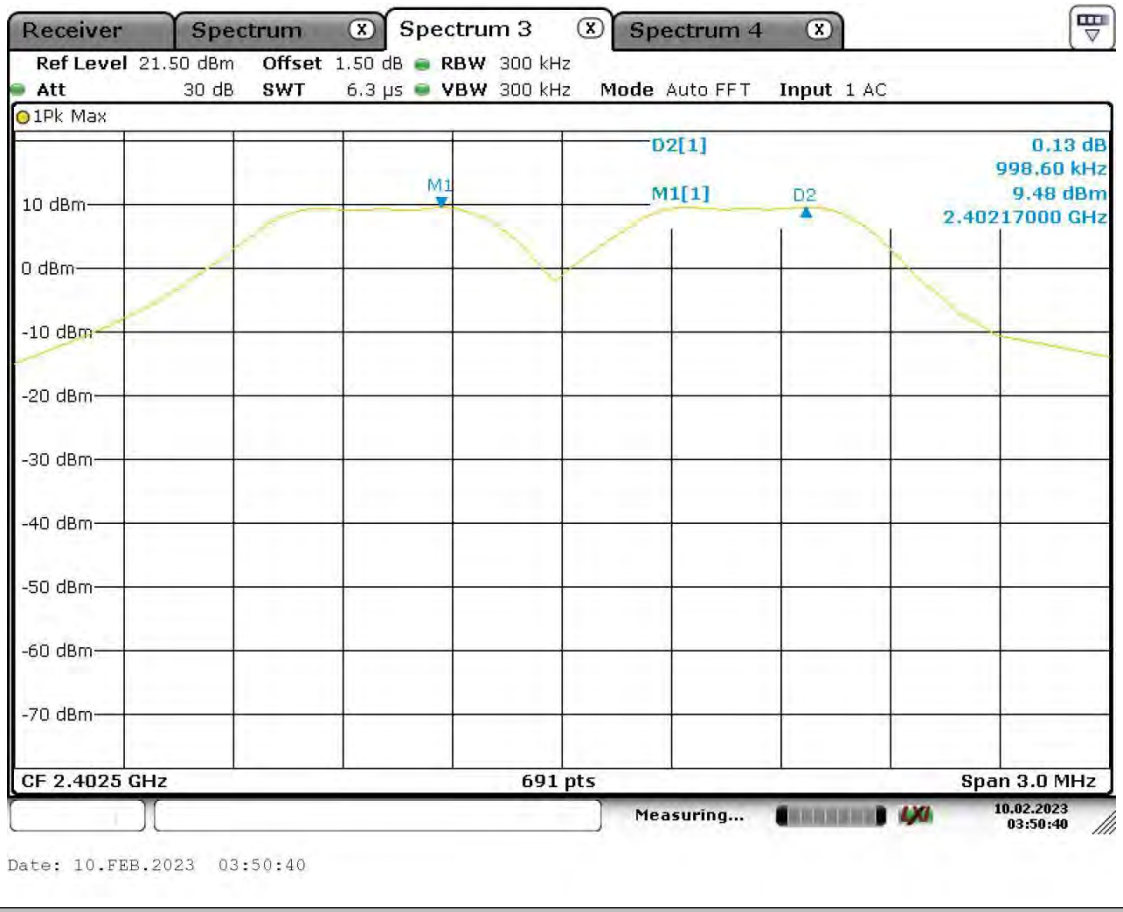
| TestMode | Antenna | Channel | Average Power | Conducted Limit[dBm] | Verdict | Power setting |
|---|---|---|---|---|---|---|
| DH5 | Ant1 | 2402 | 9.39 | / | PASS | 4 |
| | | 2441 | 8.98 | / | PASS | 4 |
| | | 2480 | 7.94 | / | PASS | 4 |
| 2DH5 | Ant1 | 2402 | 8.41 | / | PASS | 4 |
| | | 2441 | 7.01 | / | PASS | 4 |
| | | 2480 | 6.16 | / | PASS | 4 |
| 3DH5 | Ant1 | 2402 | 8.40 | / | PASS | 4 |
| | | 2441 | 6.99 | / | PASS | 4 |
| | | 2480 | 6.11 | / | PASS | 4 |

## CARRIER FREQUENCY SEPARATION

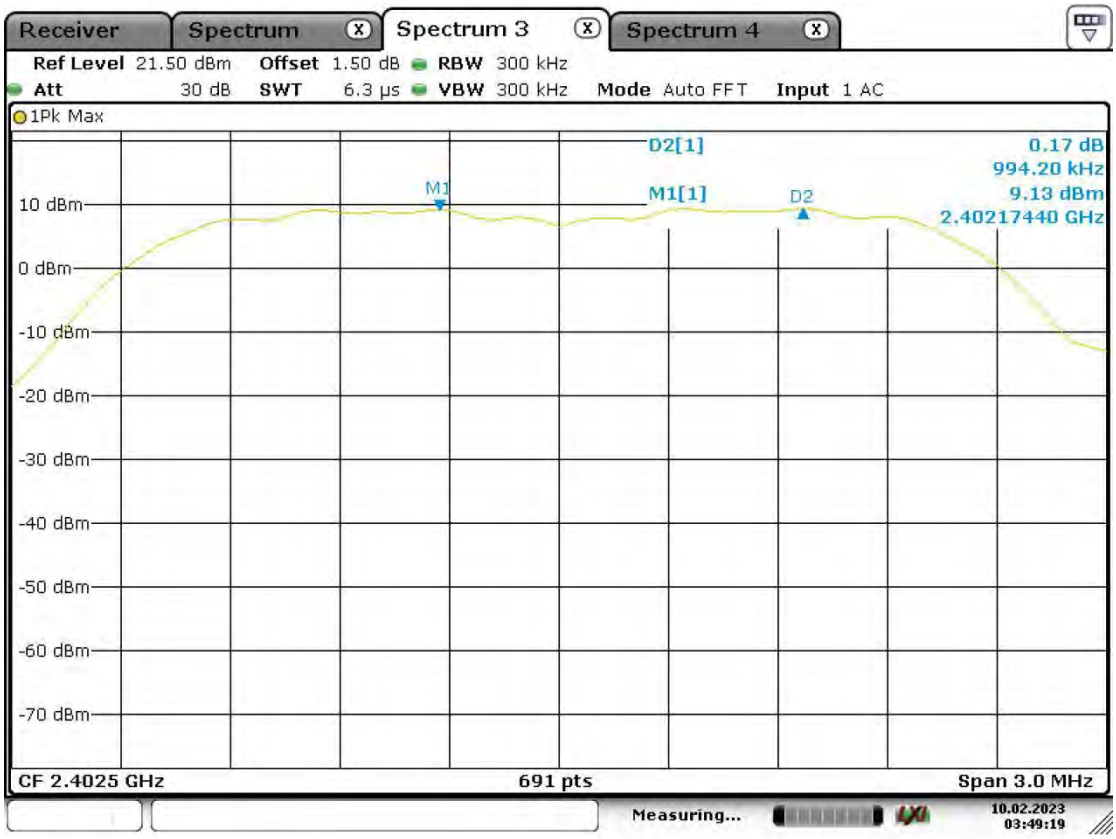
## TEST RESULT

| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5 | Ant1 | Hop | 0.9986 | ≥0.6271 | PASS |
| 2DH5 | Ant1 | Hop | 0.9942 | ≥0.8567 | PASS |
| 3DH5 | Ant1 | Hop | 1.0029 | ≥0.8586 | PASS |

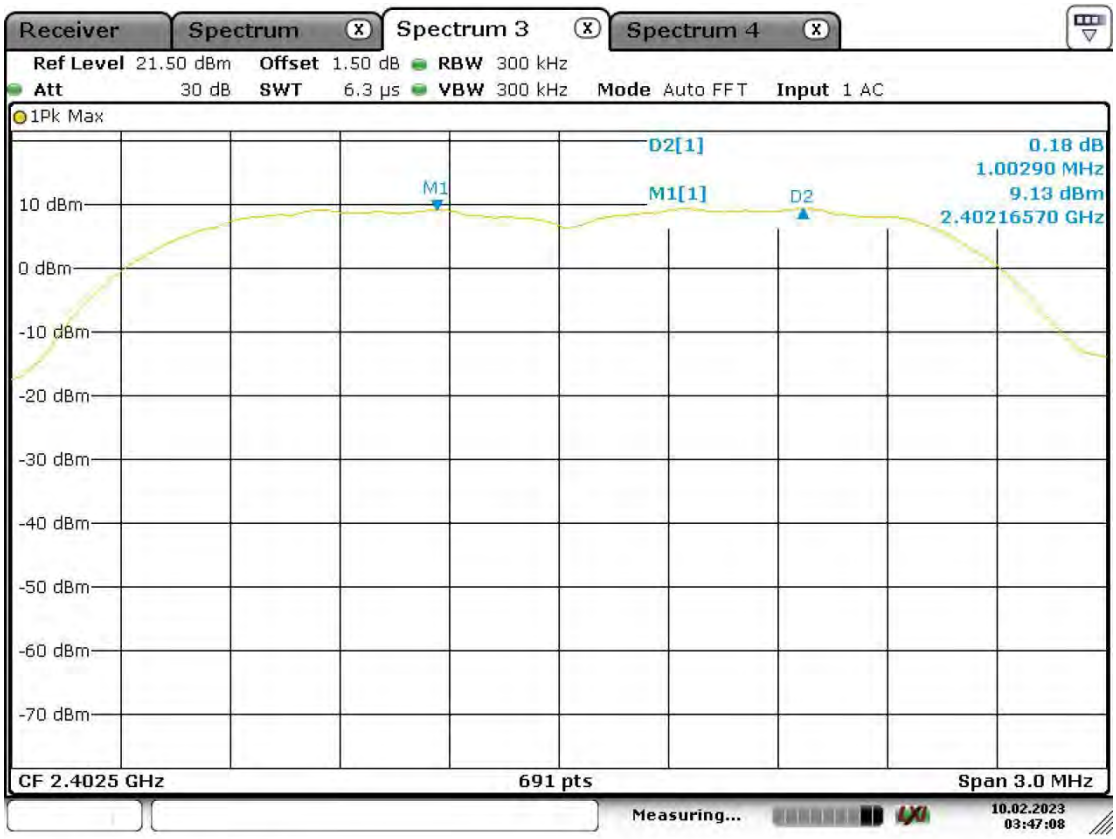
## TEST GRAPHS




DH5_Ant1_Hop




2DH5_Ant1_Hop



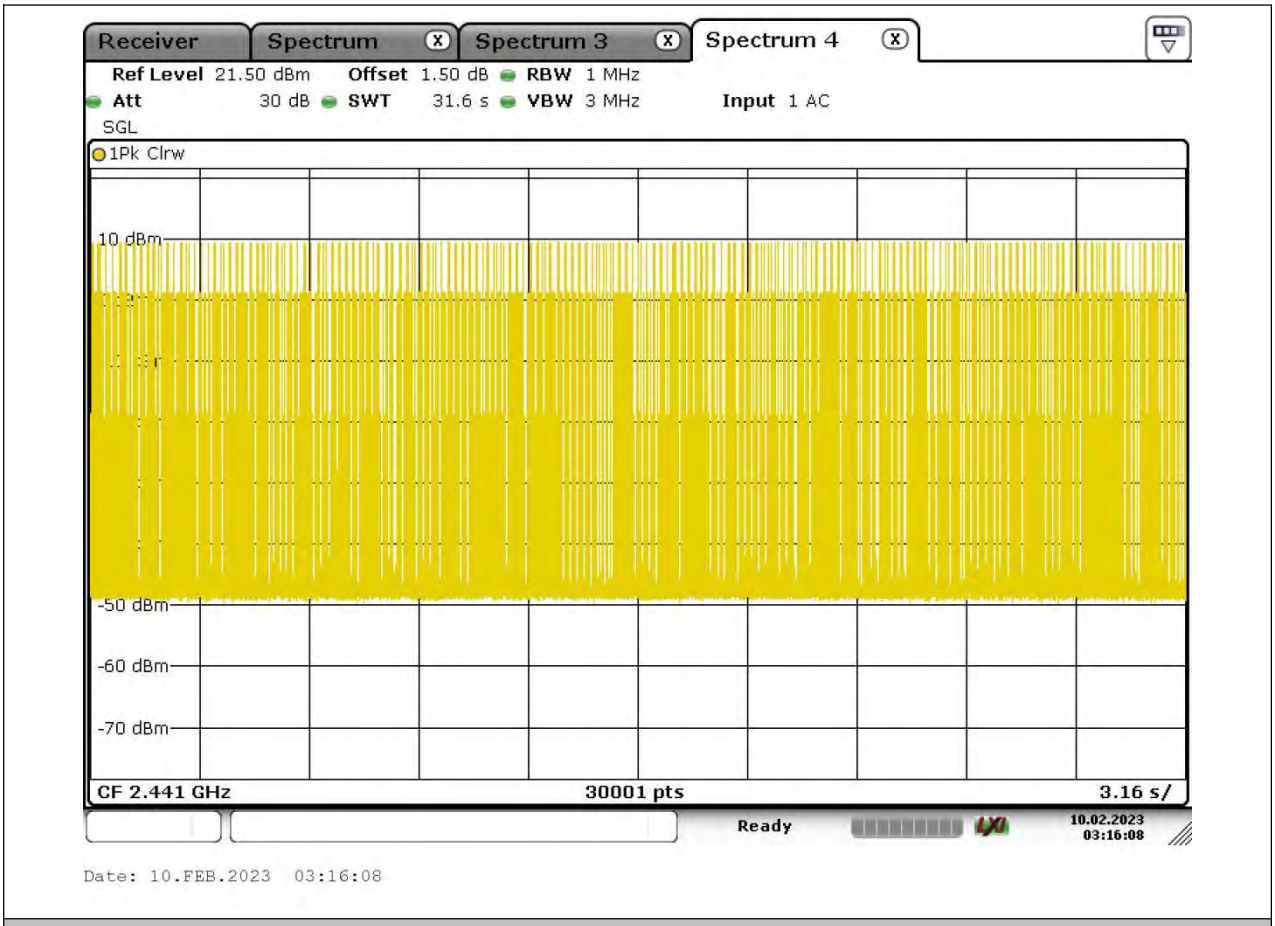

3DH5_Ant1_Hop

## TIME OF OCCUPANCY

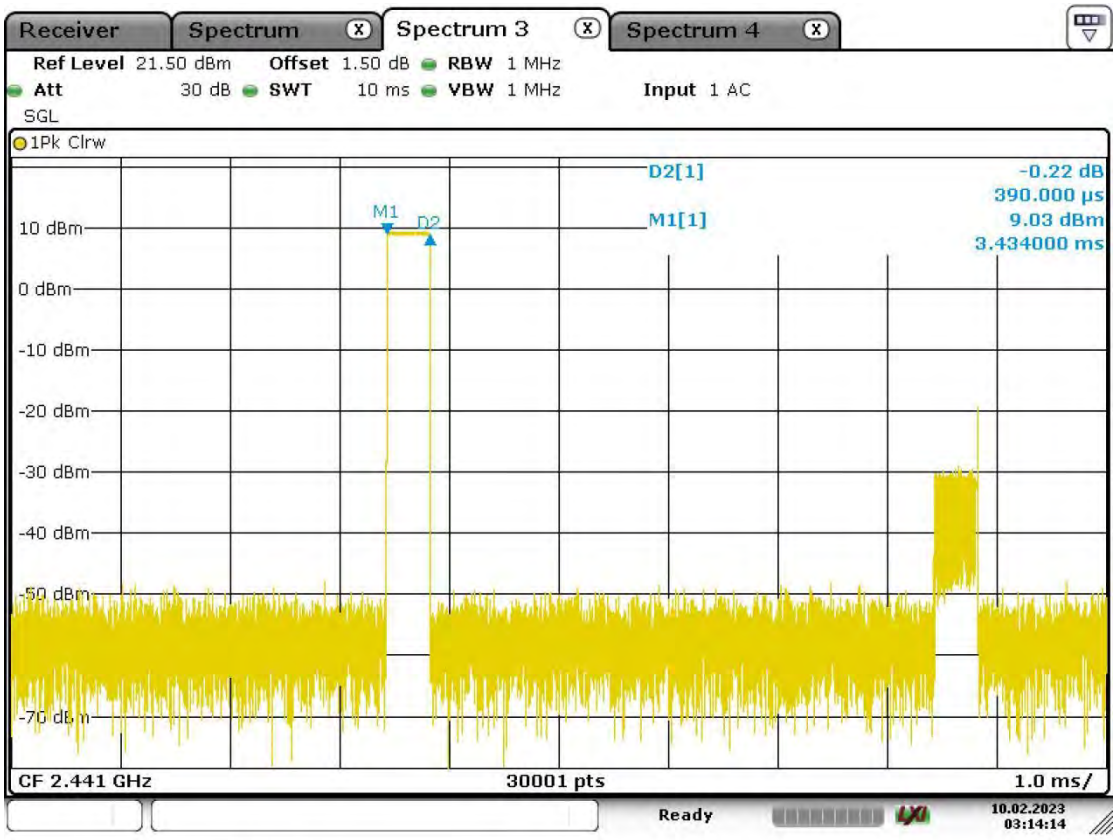
## TEST RESULT

| TestMode | Antenna | Channel | BurstWidth [ms] | TotalHops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1 | Ant1 | Hop | 0.390 | 294 | 0.115 | ≤0.4 | PASS |
| DH3 | Ant1 | Hop | 1.646 | 152 | 0.250 | ≤0.4 | PASS |
| DH5 | Ant1 | Hop | 2.894 | 114 | 0.330 | ≤0.4 | PASS |
| 2DH1 | Ant1 | Hop | 0.383 | 287 | 0.110 | ≤0.4 | PASS |
| 2DH3 | Ant1 | Hop | 1.634 | 159 | 0.260 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.882 | 102 | 0.294 | ≤0.4 | PASS |
| 3DH1 | Ant1 | Hop | 0.380 | 222 | 0.084 | ≤0.4 | PASS |
| 3DH3 | Ant1 | Hop | 1.630 | 181 | 0.295 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 2.882 | 103 | 0.296 | ≤0.4 | PASS |

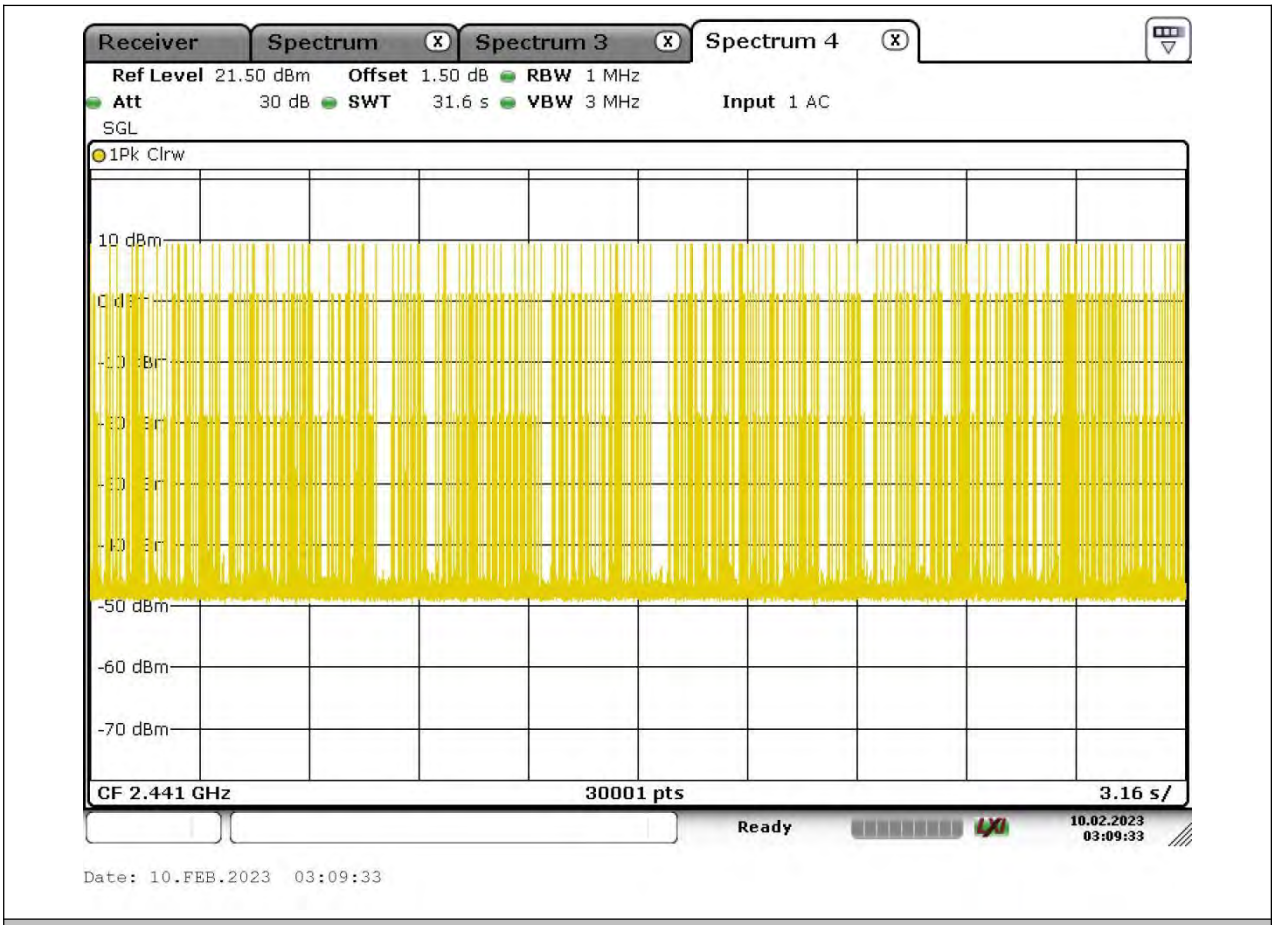
## TEST GRAPHS



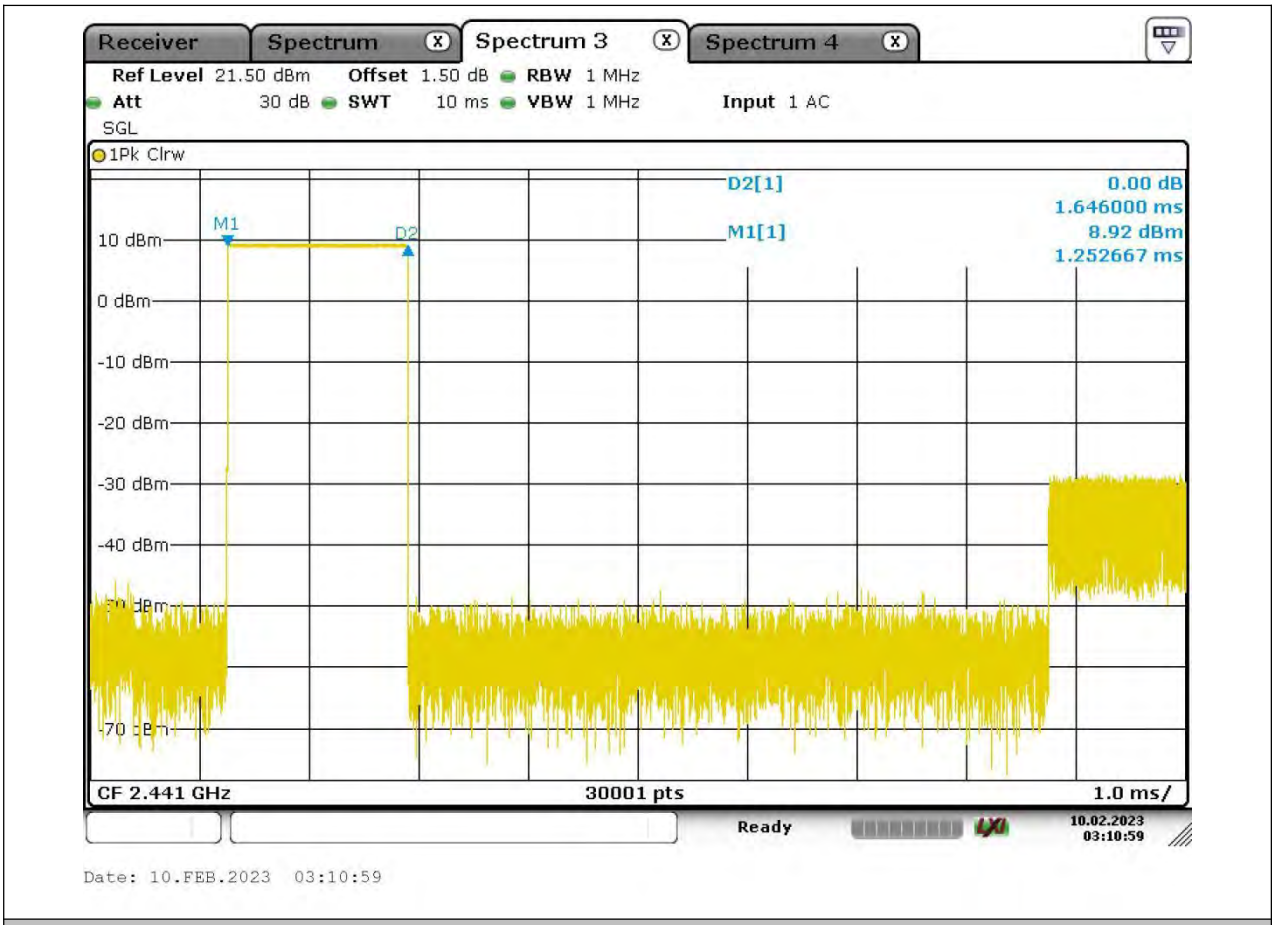

DH1_Ant1_Hop


Receiver
Spectrum
Spectrum 3
Spectrum 4
Ref Level 21.50 dBm Offset 1.50 dB RBW 1 MHz
Att 30 dB SWT 10 ms VBW 1 MHz Input 1 AC
SGL
1Pk Clrw
D2[1]
-0.22 dB
390.000 µs
M1[1]
9.03 dBm
3.434000 ms
M1
D2
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
CF 2.441 GHz
30001 pts
1.0 ms/
Ready
10.02.2023
03:14:14
Date: 10.FEB.2023 03:14:14

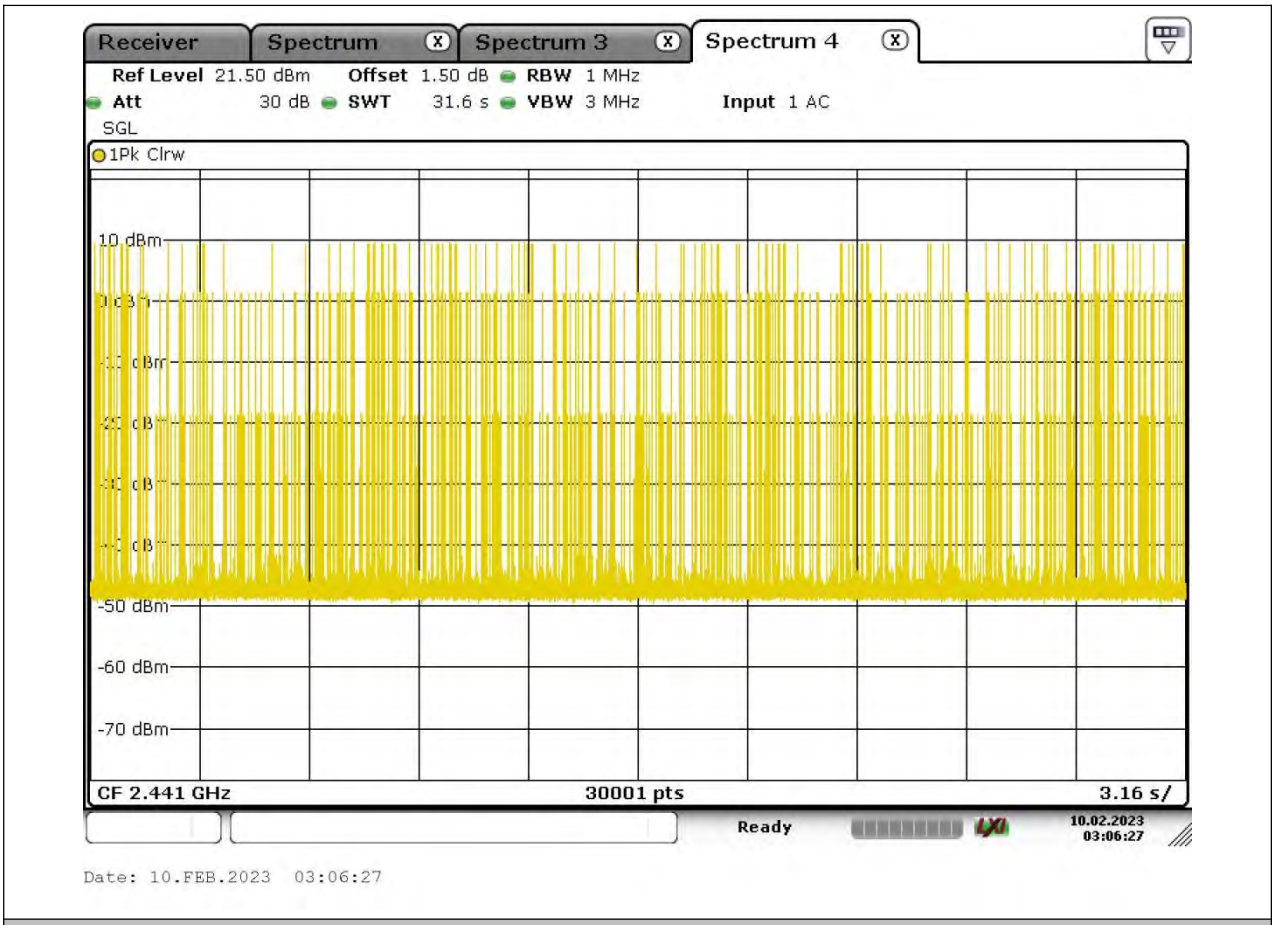
DH1_Ant1_Hop


Receiver
Spectrum
Spectrum 3
Spectrum 4
Ref Level 21.50 dBm Offset 1.50 dB RBW 1 MHz
Att 30 dB SWT 31.6 s VBW 3 MHz Input 1 AC
SGL
1Pk Clrw
10 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.441 GHz
30001 pts
3.16 s/
Ready
10.02.2023
03:09:33
Date: 10.FEB.2023 03:09:33

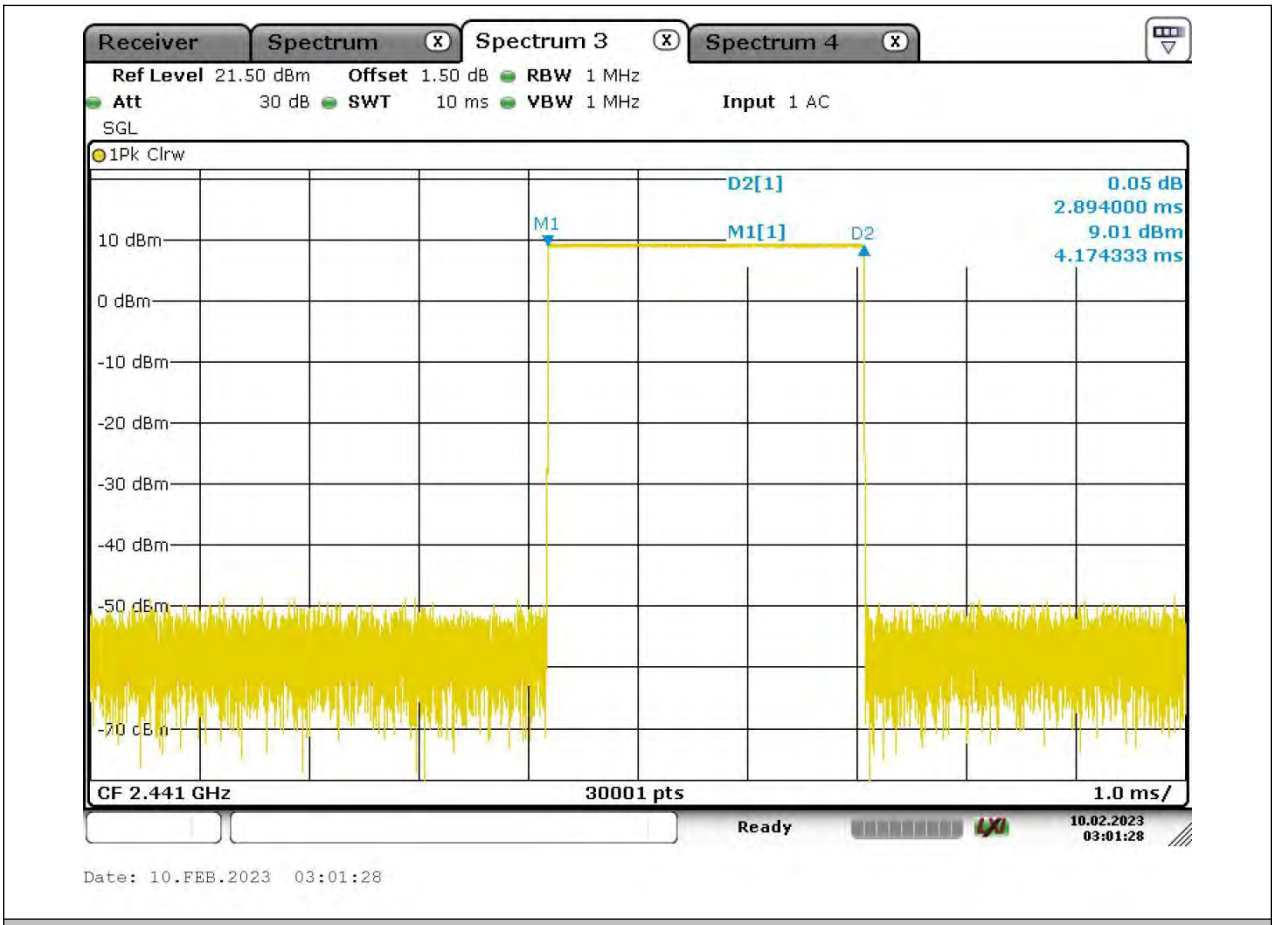
DH3_Ant1_Hop


Receiver
Spectrum
Spectrum 3
Spectrum 4
Ref Level 21.50 dBm Offset 1.50 dB RBW 1 MHz
Att 30 dB SWT 10 ms VBW 1 MHz Input 1 AC
SGL
1Pk Clrw
D2[1]
0.00 dB
1.646000 ms
M1[1]
8.92 dBm
1.252667 ms
M1
D2
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
CF 2.441 GHz
30001 pts
1.0 ms/
Ready
10.02.2023
03:10:59
Date: 10.FEB.2023 03:10:59

DH3_Ant1_Hop


Receiver
Spectrum
Spectrum 3
Spectrum 4
Ref Level 21.50 dBm Offset 1.50 dB RBW 1 MHz
Att 30 dB SWT 31.6 s VBW 3 MHz Input 1 AC
SGL
1Pk Clrw
10 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.441 GHz
30001 pts
3.16 s/
Ready
10.02.2023
03:06:27
Date: 10.FEB.2023 03:06:27

DH5_Ant1_Hop


Receiver
Spectrum
Spectrum 3
Spectrum 4
Ref Level 21.50 dBm Offset 1.50 dB RBW 1 MHz
Att 30 dB SWT 10 ms VBW 1 MHz Input 1 AC
SGL
1Pk Clrw
D2[1]
0.05 dB
2.894000 ms
M1
M1[1]
D2
9.01 dBm
4.174333 ms
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-70 dBm
CF 2.441 GHz
30001 pts
1.0 ms/
Ready
10.02.2023
03:01:28
Date: 10.FEB.2023 03:01:28

DH5_Ant1_Hop