# FCC&IC TEST REPORT

FCC ID: 2AYG9-TR08A

IC: 26800-TR08A

On Behalf of

SHENZHEN YECON TECHNOLOGY CO., LTD

Face recognition intelligent terminal

Model No.: TR08A

| | | |
|---|---|---|
| Prepared for | : | SHENZHEN YECON TECHNOLOGY CO., LTD |
| Address | : | 6 floor, East Second, Cuigang Industrial Park, Huai de community, Fuyong street, Baoan District, Shenzhen |

| | | |
|---|---|---|
| Prepared By | : | Shenzhen Alpha Product Testing Co., Ltd. |
| Address | : | Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China |

| | | |
|---|---|---|
| Report Number | : | A2012054-C01-R08 |
| Date of Receipt | : | December 15, 2020 |
| Date of Test | : | December 15, 2020-January 28, 2021 |
| Date of Report | : | January 28, 2021 |
| Version Number | : | V0 |

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# TEST REPORT DECLARATION

| | | |
|---|---|---|
| Applicant | : | SHENZHEN YECON TECHNOLOGY CO., LTD |
| Address | : | 6 floor, East Second, Cuigang Industrial Park, Huai de community, Fuyong street, Baoan District, Shenzhen |
| Manufacturer | : | SHENZHEN YECON TECHNOLOGY CO., LTD |
| Address | : | 6 floor, East Second, Cuigang Industrial Park, Huai de community, Fuyong street, Baoan District, Shenzhen |
| EUT Description | : | Face recognition intelligent terminal |
| | | (A) Model No. : TR08A |
| | | (B) Trademark : / |

Measurement Standard Used:

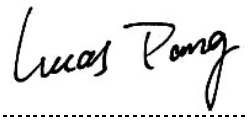
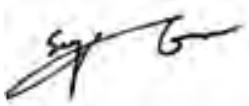
**FCC Rules and Regulations Part 15 Subpart C Section 15.247,**

**RSS-247 Issue 2, RSS-Gen Issue 5, ANSI C63.10:2013, CISPR 16-1-4:2010**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

| | | |
|---|---|---|
| Tested by (name + signature).....…..: | Lucas Pang<br>Project Engineer |  |
| Approved by (name + signature)…....: | Simple Guan<br>Project Manager |  |
| Date of issue…… ……..: | January 28, 2021 | |

**Revision History**

| Revision | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V0 | January 28, 2021 | Initial released Issue | Lucas Pang |

# 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1.Description of Standards and Results

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

| Test Item | Standards Paragraph | Result |
|---|---|---|
| Maximum Peak Output Power | FCC Part 15: 15.247(b)(1)<br>RSS-247(5.4 b)<br>ANSI C63.10 :2013 | P |
| Bandwidth | FCC Part 15: 15.215<br>RSS-247(5.1 a)<br>ANSI C63.10 :2013 | P |
| Carrier Frequency Separation | FCC Part 15: 15.247(a)(1)<br>RSS-247(5.1 b)<br>ANSI C63.10 :2013 | P |
| Number Of Hopping Channel | FCC Part 15: 15.247(a)(1)<br>RSS-247(5.1 d)<br>ANSI C63.10 :2013 | P |
| Dwell Time | FCC Part 15: 15.247(a)(1)<br>RSS-247(5.1 d)<br>ANSI C63.10 :2013 | P |
| Radiated Emission | FCC Part 15: 15.209<br>FCC Part 15: 15.247(d)<br>RSS-Gen(8.9), RSS-247(5.5)<br>ANSI C63.10 :2013 | P |
| Band Edge Compliance | FCC Part 15: 15.247(d)<br>RSS-Gen(8.9), RSS-247(5.5)<br>ANSI C63.10 :2013 | P |
| Power Line Conducted Emissions | FCC Part 15: 15.207<br>RSS-GEN(8.8)<br>ANSI C63.10 :2013 | P |
| Frequency stability | RSS-GEN(6.11) | P |
| Antenna requirement | FCC Part 15: 15.203<br>RSS-GEN(6.8) | P |
| Note: | 1. P is an abbreviation for Pass.<br>2. F is an abbreviation for Fail.<br>3. N/A is an abbreviation for Not Applicable. | |

# 2. GENERAL INFORMATION

## 2.1.Description of Device (EUT)

| | | |
|---|---|---|
| Description/PMN | : | Face recognition intelligent terminal |
| Model Number/HVIN(s) | : | TR08A |
| Diff. | : | / |
| Trademark | : | / |
| Test Voltage | : | DC 12V from adapter |
| Radio Technology | : | Bluetooth(BDR, EDR) |
| Operation frequency | : | 2402-2480MHz |
| Channel No. | : | 79 Channels for Bluetooth V5.0 (BDR/EDR) |
| Channel Separation | : | 1MHz for Bluetooth V5.0 (BDR/EDR) |
| Modulation | : | GFSK, π/4-DQPSK, 8DPSK for Bluetooth V5.0(BDR/EDR) |
| Antenna Type | : | Internal Antenna, max gain 3.24dBi |
| Software version | : | V1.0 |
| Hardware version | : | YT-19-MB-V2.1 |

Remark:

1. The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for Bluetooth V5.0 EDR function, and there is no other transmitter involved.
2. In this report, the main test model is TR08A, and the main test model serial number is YGKJ20207120345.

## 2.2.Accessories of Device (EUT)

| | | |
|---|---|---|
| Accessories1 | : | AC/DC ADAPTER |
| Manufacturer | : | Shenzhen Jiuzhou Power Technology Co., LTD |
| Model | : | JZB024-120180D |
| Ratings | : | Input: 100-240V~ 50/60Hz 0.7A<br>Output: 12.0V⎓1.8A |

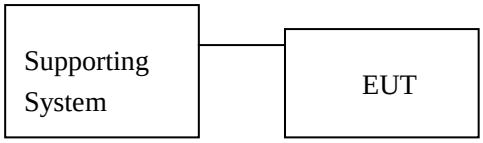
| | | |
|---|---|---|
| Accessories2 | : | AC ADAPTER |
| Manufacturer | : | Dongguan Guanjin Electronics Technology Co., Ltd |
| Model | : | K25V120180E2 |
| Ratings | : | Input: 100-240V~50/60Hz 0.6A<br>Output: 12.0V⎓1.8A 21.6W |

Note: The two power adapters of the product have been tested. This report only reflects the data of the worst power supply (JZB024-120180D).

## 2.3.Tested Supporting System Details

| No. | Description | Manufacturer | Model | Serial Number | Certification or SDOC |
|---|---|---|---|---|---|
| 1. | N/A | N/A | N/A | N/A | N/A |

## 2.4.Block Diagram of connection between EUT and simulators



## 2.5.Test Mode Description

The test software “RFTestTool.app” was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

| Tested mode, channel, and data rate information | | |
|---|---|---|
| Mode | Channel | Frequency (MHz) |
| Carrier Tx Mode | CH0 | 2402 |
| | CH39 | 2441 |
| | CH78 | 2480 |
| GFSK / Pi/4-DQPSK / 8-DPSK hopping on Tx Mode | CH0 to CH78 | 2402 to 2480 |
| GFSK / Pi/4-DQPSK / 8-DPSK hopping off Tx Mode | CH0 | 2402 |
| | CH39 | 2441 |
| | CH78 | 2480 |

## 2.6.Test Conditions

| Items | Required | Actual |
|---|---|---|
| Temperature range: | 15-35℃ | 25℃ |
| Humidity range: | 25-75% | 56% |
| Pressure range: | 86-106kPa | 98kPa |

## 2.7.Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
Designation Number: CN1236
July 15, 2019 Certificated by IC
Registration Number: CN0085

## 2.8.Measurement Uncertainty

(95% confidence levels, k=2)

| **Item** | **Uncertainty** |
|---|---|
| Uncertainty for Power point Conducted Emissions Test | 2.74dB |
| Uncertainty for Radiation Emission test in 3m chamber (below 30MHz) | 2.13 dB(Polarize: V) |
| | 2.57dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 3.77dB(Polarize: V) |
| | 3.80dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz) | 4.16dB(Polarize: H) |
| | 4.13dB(Polarize: V) |
| Uncertainty for radio frequency | 5.4×10-8 |
| Uncertainty for conducted RF Power | 0.37dB |
| Uncertainty for temperature | 0.2℃ |
| Uncertainty for humidity | 1% |
| Uncertainty for DC and low frequency voltages | 0.06% |

## 2.9.Test Equipment List

| Equipment | Manufacture | Model No. | Serial No. | Last cal. | Cal Interval |
|---|---|---|---|---|---|
| 9*6*6 anechoic chamber | CHENYU | 9*6*6 | N/A | 2019.09.06 | 3Year |
| Spectrum analyzer | ROHDE&SCHWARZ | FSV40-N | 102137 | 2020.09.02 | 1Year |
| Spectrum analyzer | Agilent | N9020A | MY499100060 | 2020.09.02 | 1Year |
| Receiver | ROHDE&SCHWARZ | ESR | 1316.3003K03-102082-Wa | 2020.09.02 | 1Year |
| Receiver | R&S | ESCI | 101165 | 2020.09.02 | 1Year |
| Bilog Antenna | Schwarzbeck | VULB 9168 | VULB9168-438 | 2020.04.12 | 2Year |
| Horn Antenna | SCHWARZBECK | BBHA 9120 D | BBHA 9120 D(1201) | 2020.04.12 | 2Year |
| Active Loop Antenna | SCHWARZBECK | FMZB 1519B | 00059 | 2019.09.07 | 2Year |
| Cable | Resenberger | N/A | No.1 | 2020.09.02 | 1Year |
| Cable | Resenberger | N/A | No.2 | 2020.09.02 | 1Year |
| Cable | Resenberger | N/A | No.3 | 2020.09.02 | 1Year |
| Pre-amplifier | HP | HP8347A | 2834A00455 | 2020.09.02 | 1Year |
| Pre-amplifier | Agilent | 8449B | 3008A02664 | 2020.09.02 | 1Year |
| L.I.S.N.#1 | Schwarzbeck | NSLK8126 | 8126466 | 2020.09.02 | 1Year |
| L.I.S.N.#2 | ROHDE&SCHWARZ | ENV216 | 101043 | 2020.09.02 | 1 Year |
| 20db Attenuator | ICPROBING | IATS1 | 82347 | 2020.09.02 | 1 Year |
| Horn Antenna | SCHWARZBECK | BBHA9170 | 00946 | 2019.09.07 | 2 Year |
| Preamplifier | SKET | LNPA_1840-50 | SK2018101801 | 2020.09.02 | 1 Year |
| Power Meter | Agilent | E9300A | MY41496625 | 2020.09.02 | 1 Year |
| Temp. &Humid. Chamber | Weihuang | WHTH-1000-40-880 | 100631 | 2020.09.02 | 1 Year |
| Switching Mode Power Supply | JUNKE | JK12010S | 20140927-6 | 2020.09.02 | 1 Year |

# 3. MAXIMUM PEAK OUTPUT POWER

## 3.1.Limit

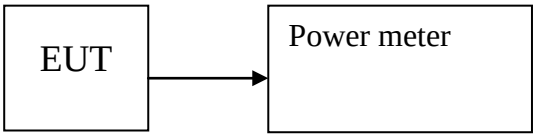
Please refer FCC part 15.247 & RSS-247..

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

## 3.2.Test Procedure

The transmitter output is connected to the RF Power meter. The Power meter is set to the peak power detection.

## 3.3.Test Setup




## 3.4.Test Result

| Mode | Freq (MHz) | PK Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| GFSK | 2402 | 0.898 | 21 | Pass |
| | 2441 | 1.505 | 21 | Pass |
| | 2480 | 0.928 | 21 | Pass |
| π /4 DQPSK | 2402 | -2.31 | 21 | Pass |
| | 2441 | -0.022 | 21 | Pass |
| | 2480 | -1.529 | 21 | Pass |
| 8- DPSK | 2402 | -1.874 | 21 | Pass |
| | 2441 | -0.196 | 21 | Pass |
| | 2480 | -1.492 | 21 | Pass |
| Conclusion: PASS | | | | |

# 4. BANDWIDTH

## 4.1.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in RSS-GEN, FCC Section 15.247(a)(1), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

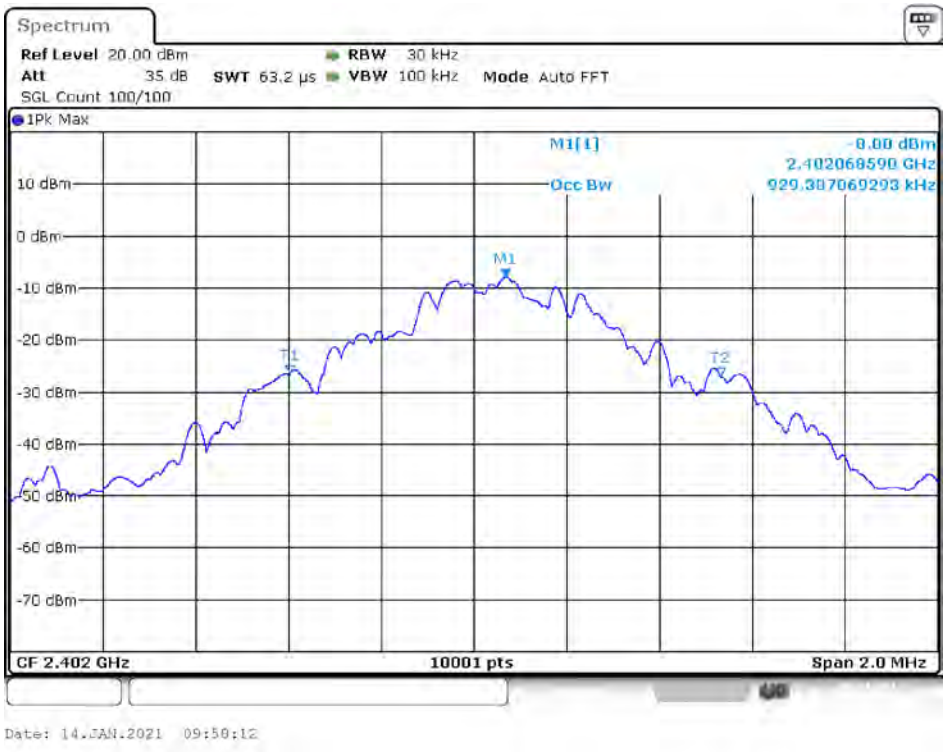
## 4.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

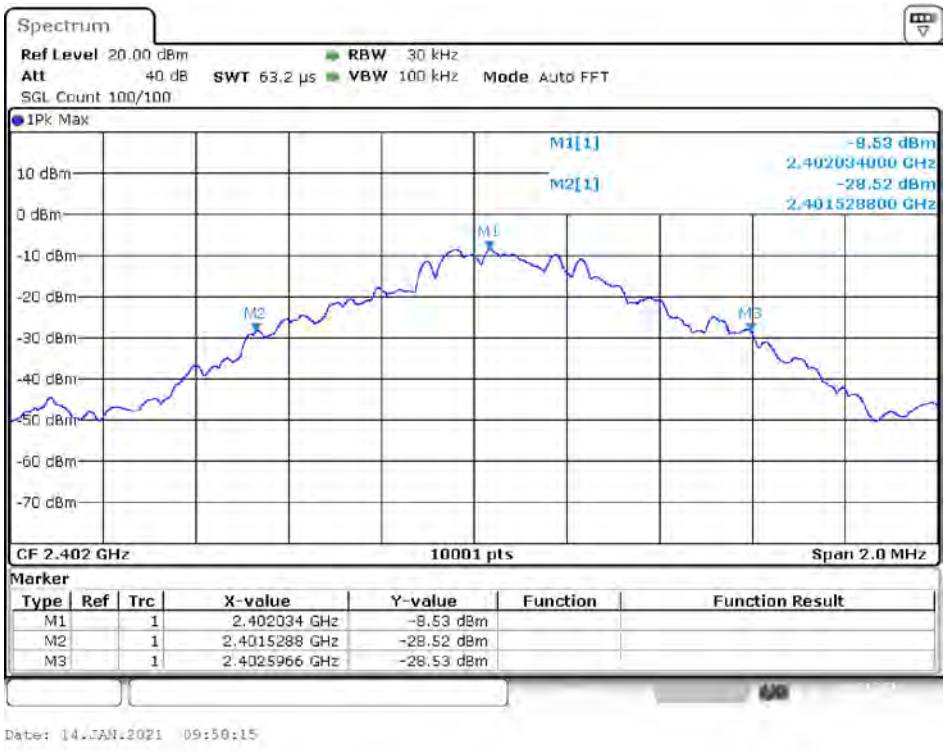
## 4.3.Test Result

| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) | -20 dB Bandwidth (MHz) | Limit -20 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|---|
| NVNT | 1-DH1 | 2402 | Ant 1 | 0.9293 | 1.0678 | / | Pass |
| NVNT | 1-DH1 | 2441 | Ant 1 | 0.9465 | 1.0366 | / | Pass |
| NVNT | 1-DH1 | 2480 | Ant 1 | 0.9231 | 1.0372 | / | Pass |
| NVNT | 2-DH1 | 2402 | Ant 1 | 1.1961 | 1.3222 | / | Pass |
| NVNT | 2-DH1 | 2441 | Ant 1 | 1.1921 | 1.3716 | / | Pass |
| NVNT | 2-DH1 | 2480 | Ant 1 | 1.1931 | 1.349 | / | Pass |
| NVNT | 3-DH1 | 2402 | Ant 1 | 1.1855 | 1.314 | / | Pass |
| NVNT | 3-DH1 | 2441 | Ant 1 | 1.1771 | 1.2742 | / | Pass |
| NVNT | 3-DH1 | 2480 | Ant 1 | 1.1757 | 1.3116 | / | Pass |

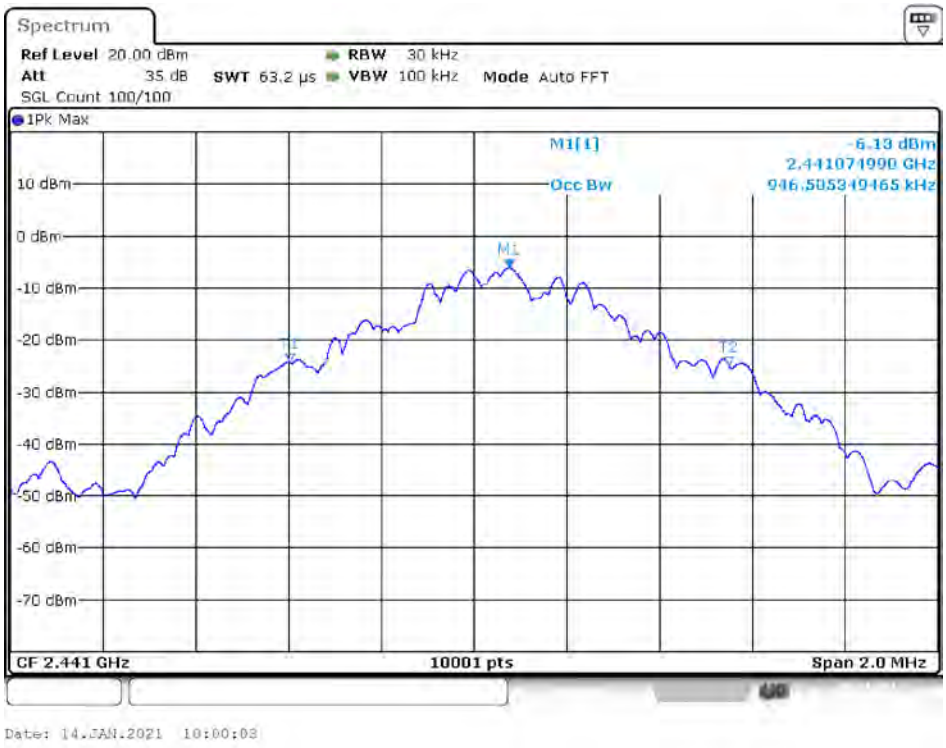
OBW NVNT 1-DH1 2402MHz Ant1



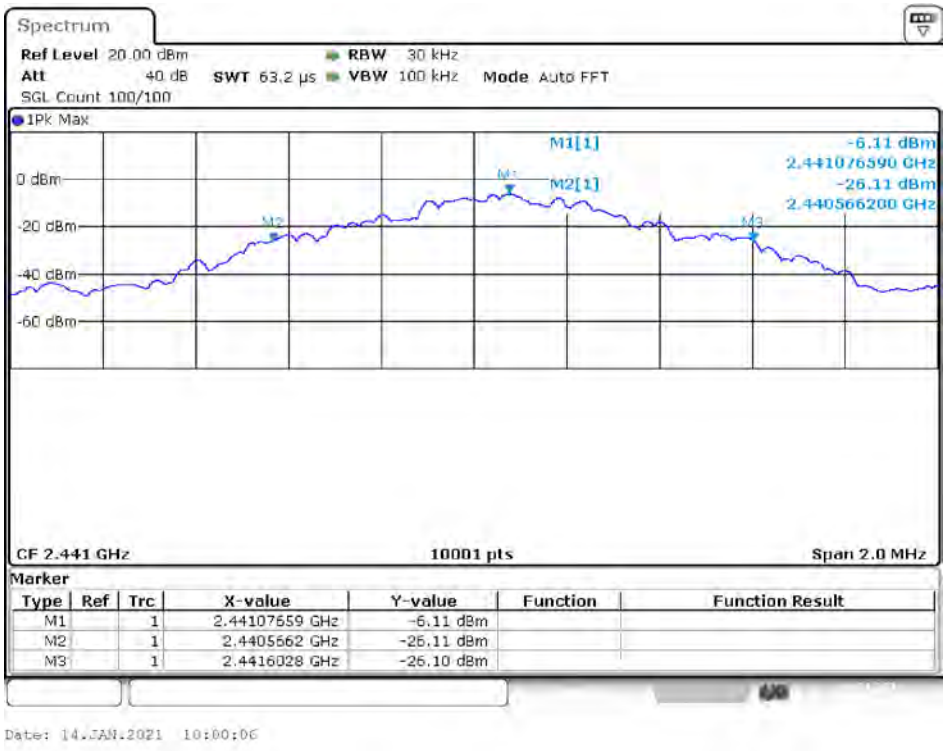

-20 dB BW NVNT 1-DH1 2402MHz Ant1



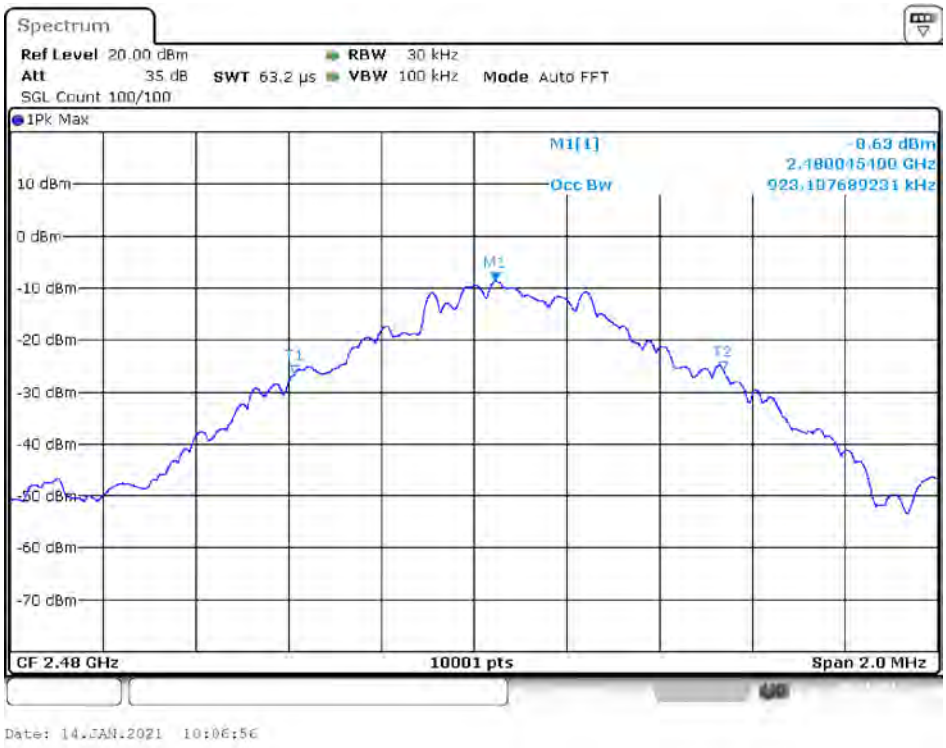
OBW NVNT 1-DH1 2441MHz Ant1




-20 dB BW NVNT 1-DH1 2441MHz Ant1

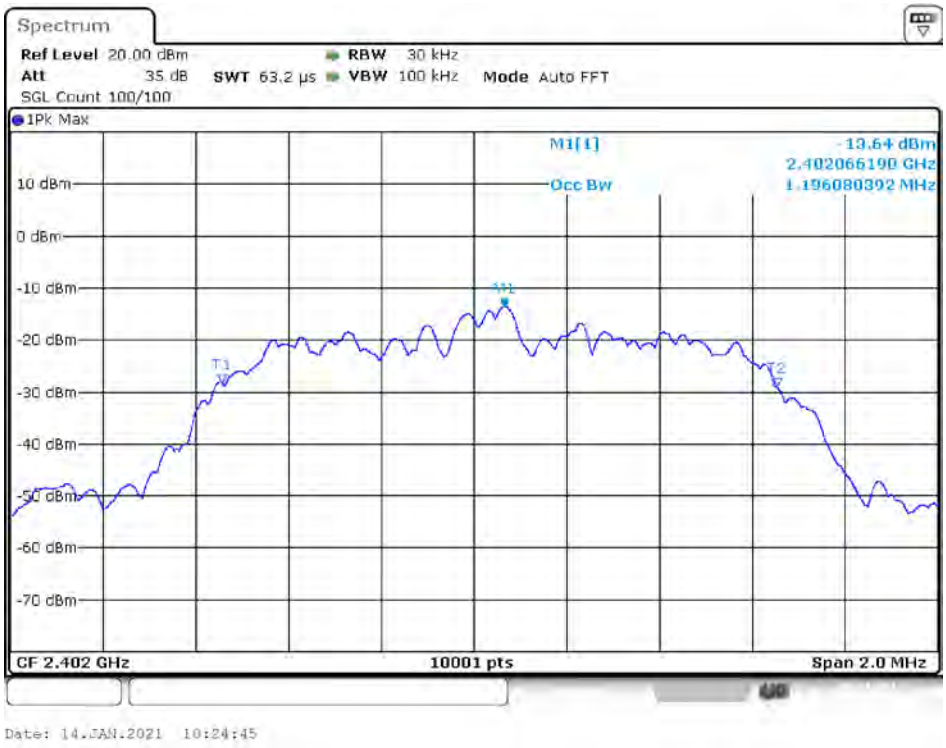


OBW NVNT 1-DH1 2480MHz Ant1




-20 dB BW NVNT 1-DH1 2480MHz Ant1

OBW NVNT 2-DH1 2402MHz Ant1

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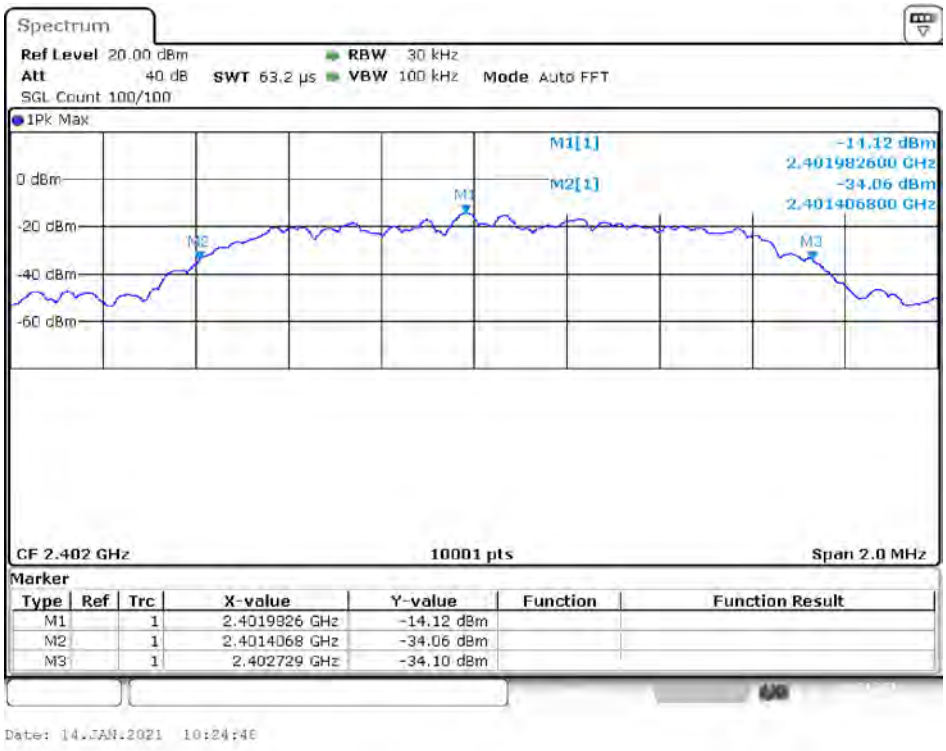
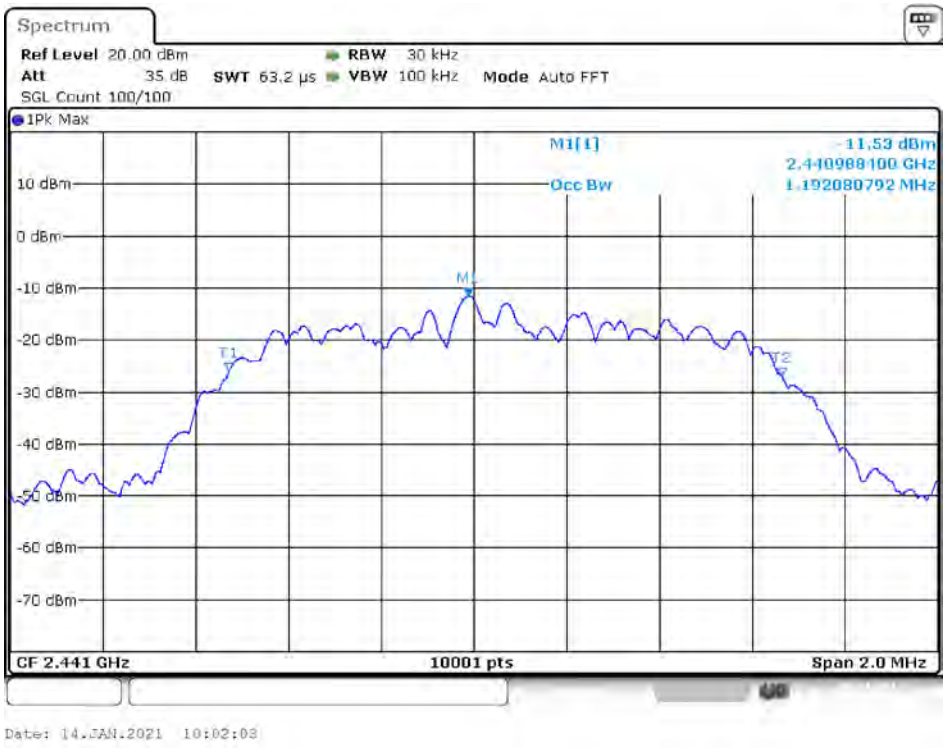
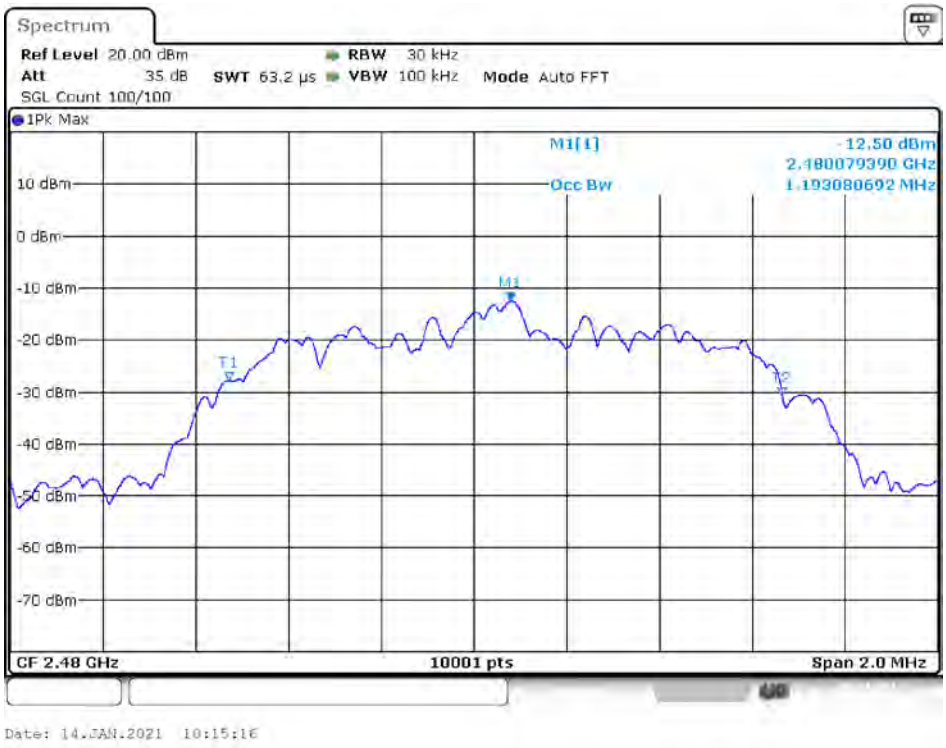


OBW NVNT 2-DH1 2441MHz Ant1

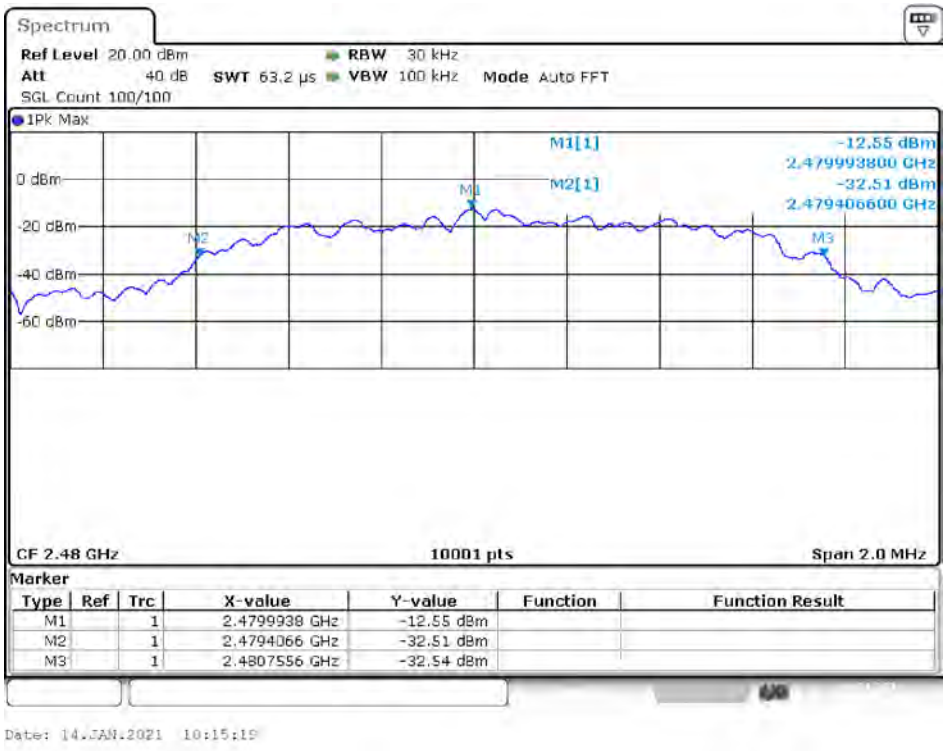



-20 dB BW NVNT 2-DH1 2441MHz Ant1

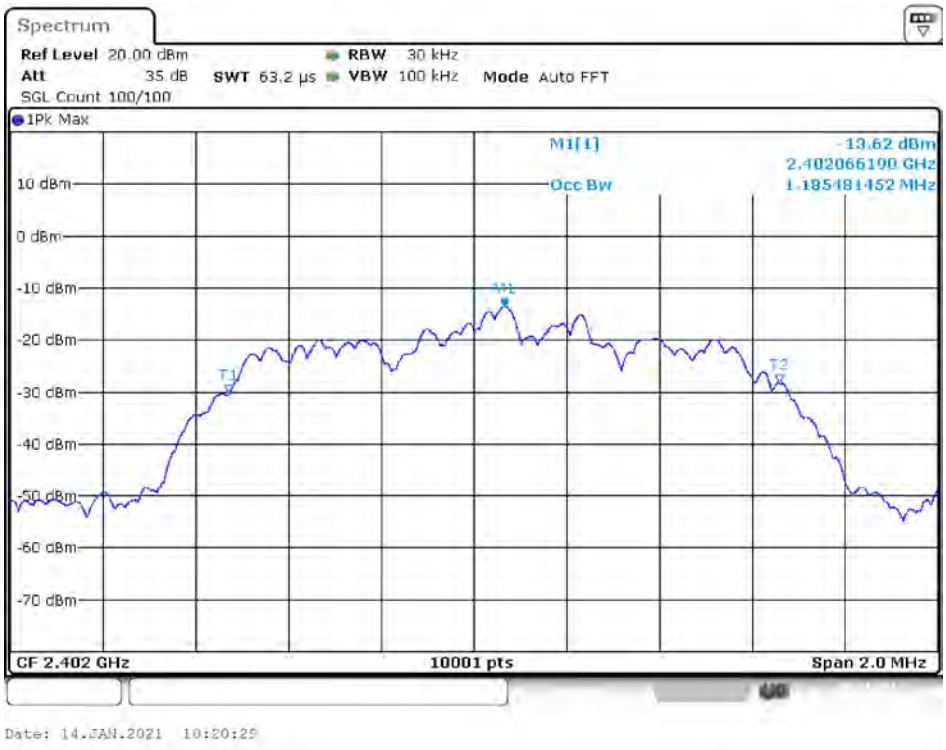
OBW NVNT 2-DH1 2480MHz Ant1



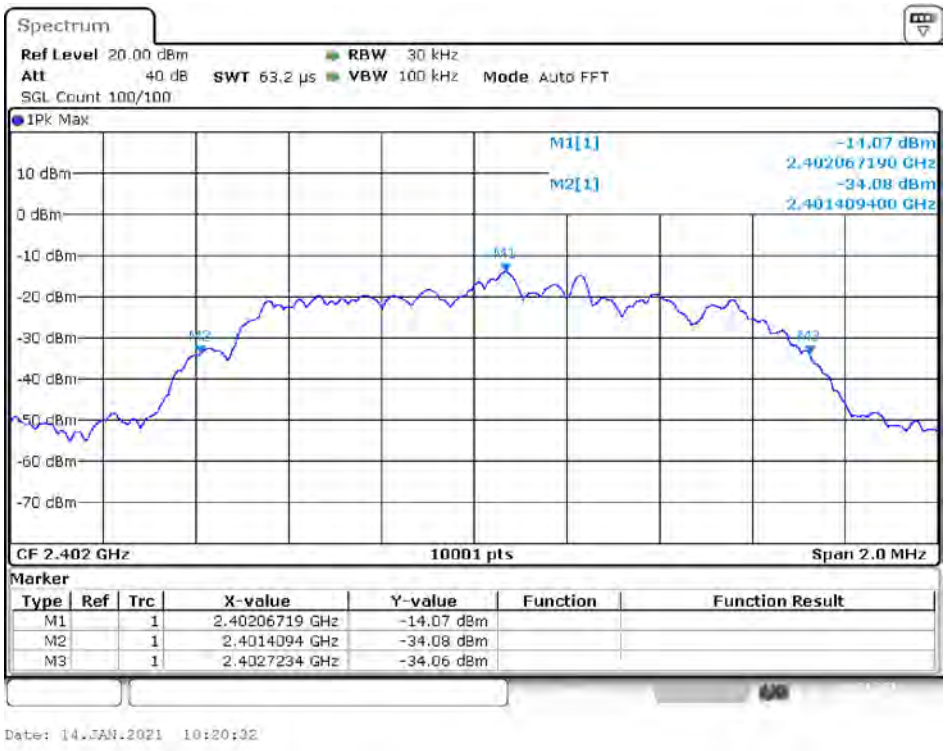

-20 dB BW NVNT 2-DH1 2480MHz Ant1



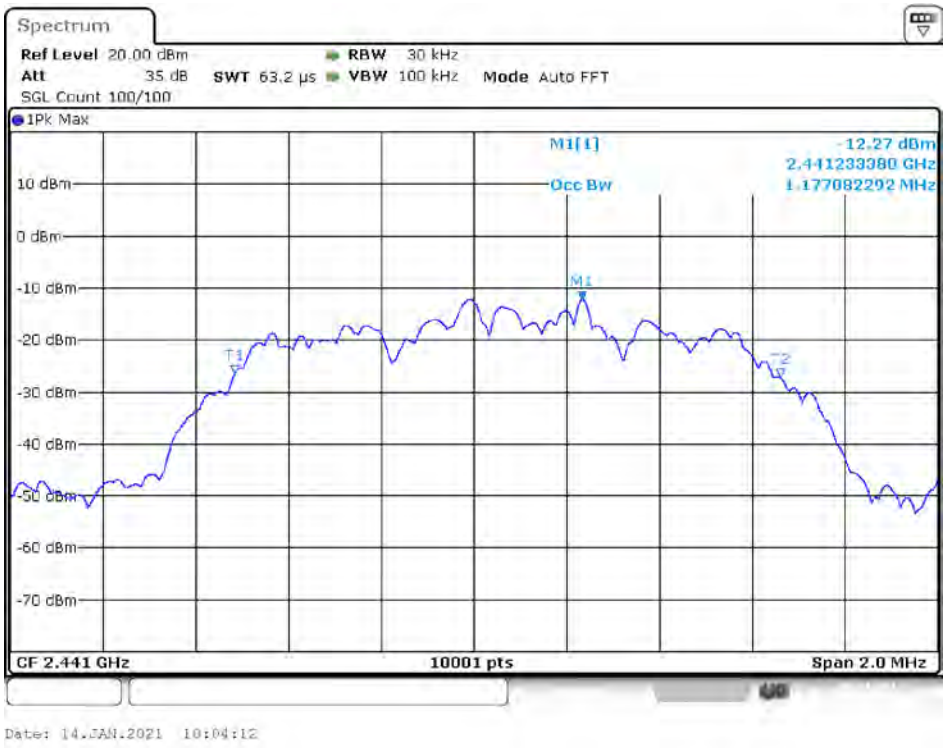
OBW NVNT 3-DH1 2402MHz Ant1



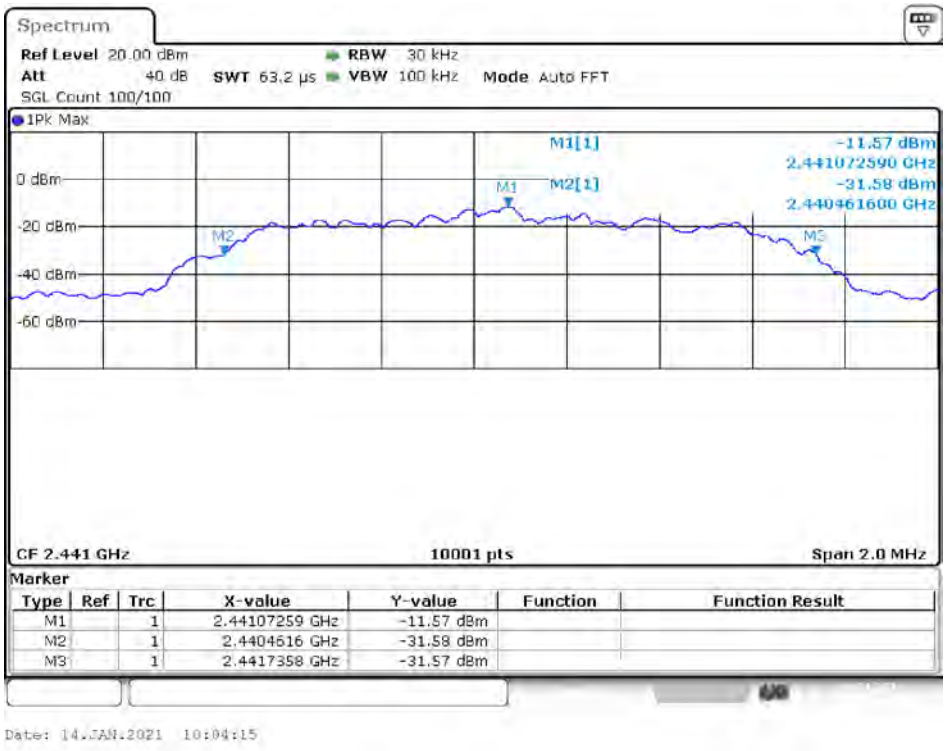

-20 dB BW NVNT 3-DH1 2402MHz Ant1



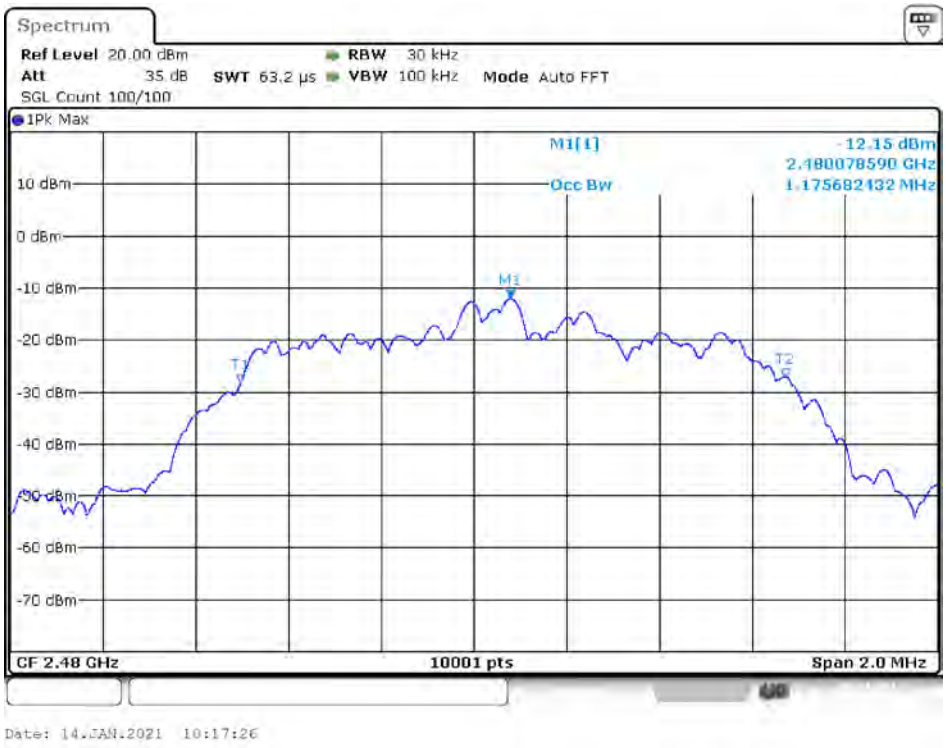
OBW NVNT 3-DH1 2441MHz Ant1



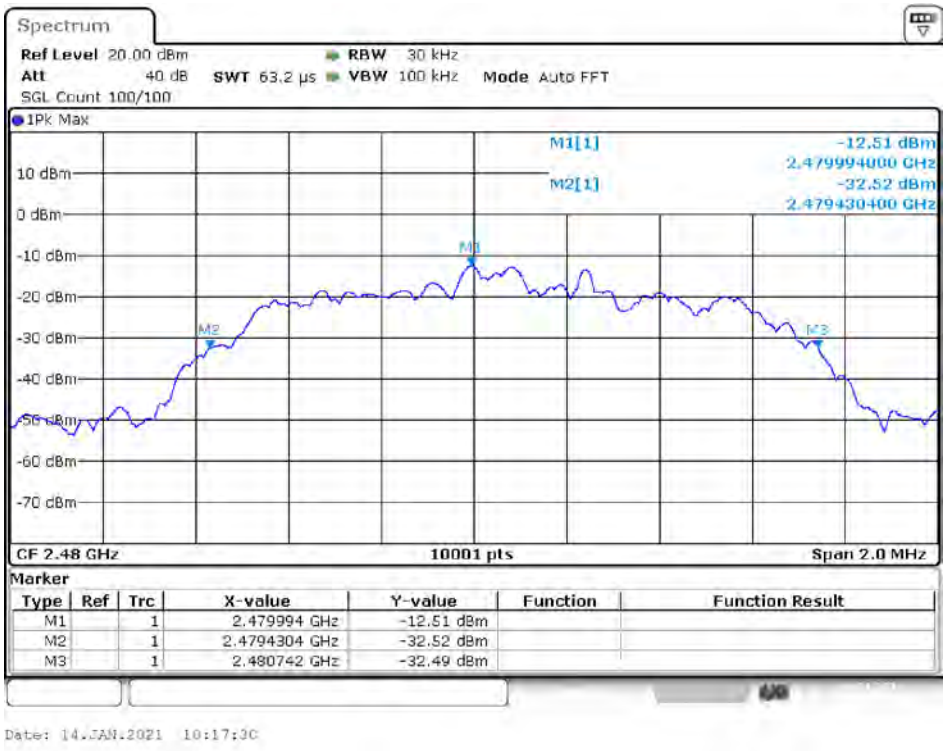

-20 dB BW NVNT 3-DH1 2441MHz Ant1



OBW NVNT 3-DH1 2480MHz Ant1




-20 dB BW NVNT 3-DH1 2480MHz Ant1



# 5. CARRIER FREQUENCY SEPARATION

## 5.1.Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

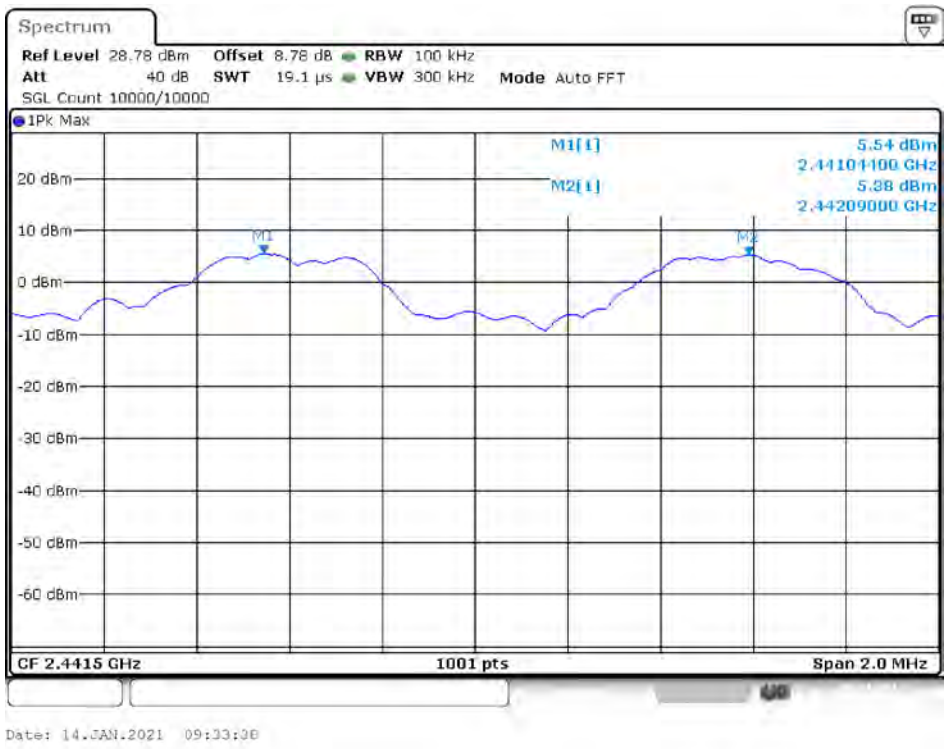
## 5.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW.

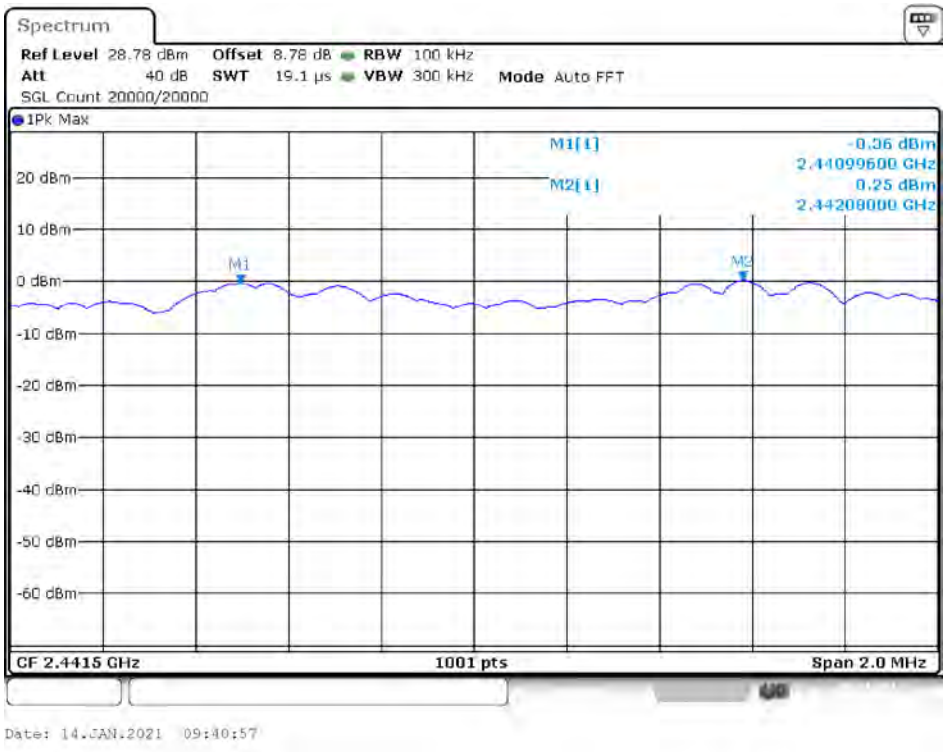
## 5.3.Test Result

| Condition | Mode | Hopping Freq1 (MHz) | Hopping Freq2 (MHz) | HFS (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | 1-DH1 | 2441.044 | 2442.09 | 1.046 | 0.667 | Pass |
| NVNT | 2-DH1 | 2440.996 | 2442.08 | 1.084 | 0.667 | Pass |
| NVNT | 3-DH1 | 2441.076 | 2442.066 | 0.99 | 0.667 | Pass |

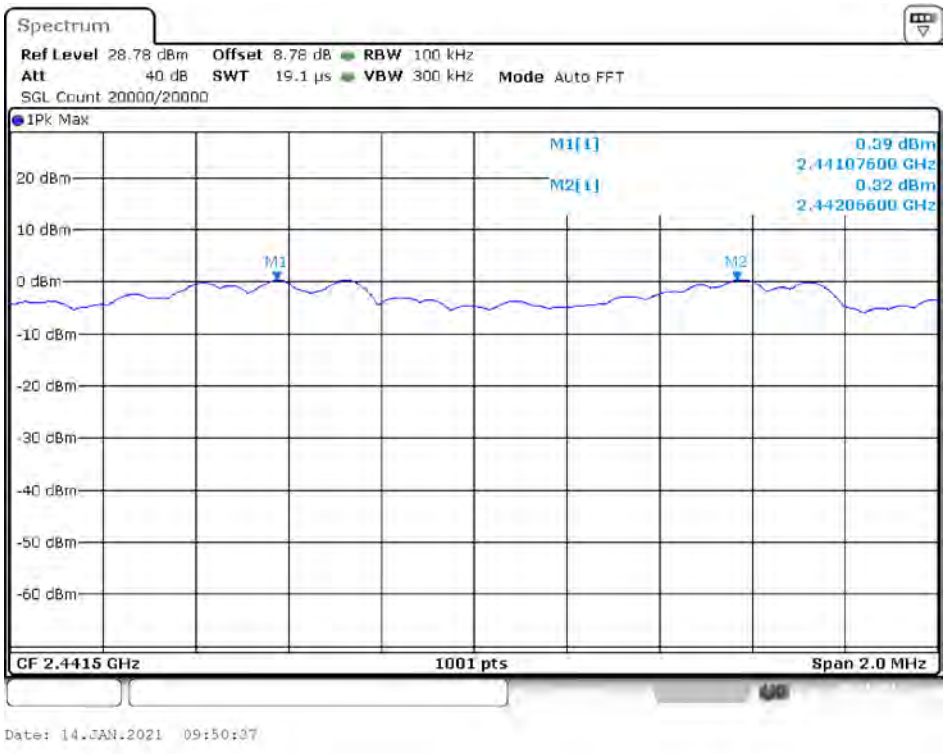
CFS NVNT 1-DH1 2441MHz



CFS NVNT 2-DH1 2441MHz




CFS NVNT 3-DH1 2441MHz



# 6. NUMBER OF HOPPING CHANNEL

## 6.1.Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

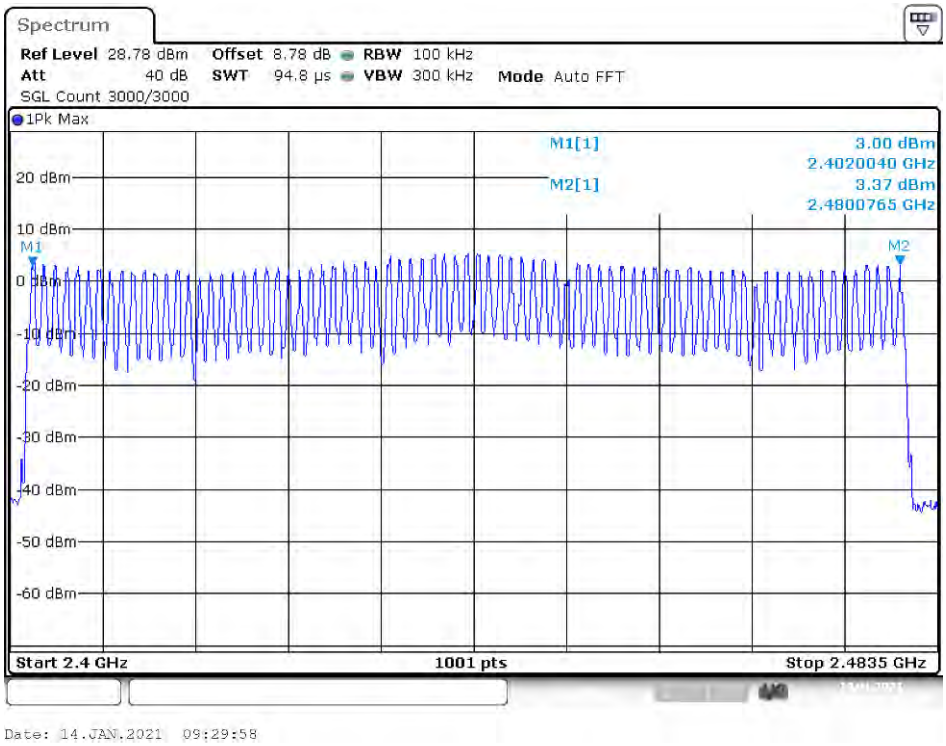
## 6.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

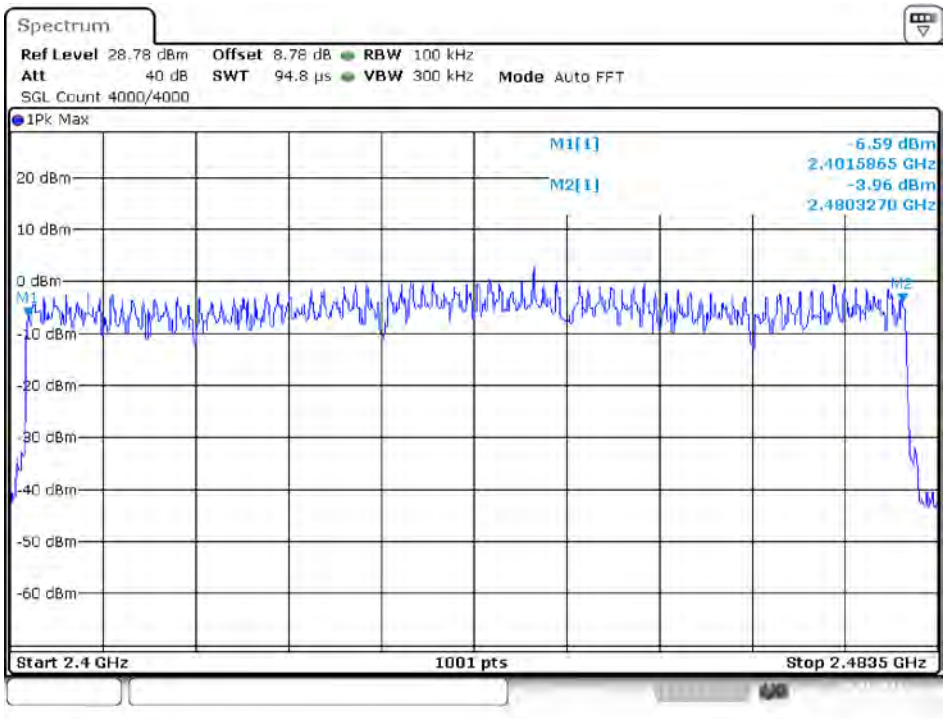
## 6.3.Test Result

| Condition | Mode | Hopping Number | Limit | Verdict |
|---|---|---|---|---|
| NVNT | 1-DH1 | 79 | 15 | Pass |
| NVNT | 2-DH1 | 79 | 15 | Pass |
| NVNT | 3-DH1 | 79 | 15 | Pass |

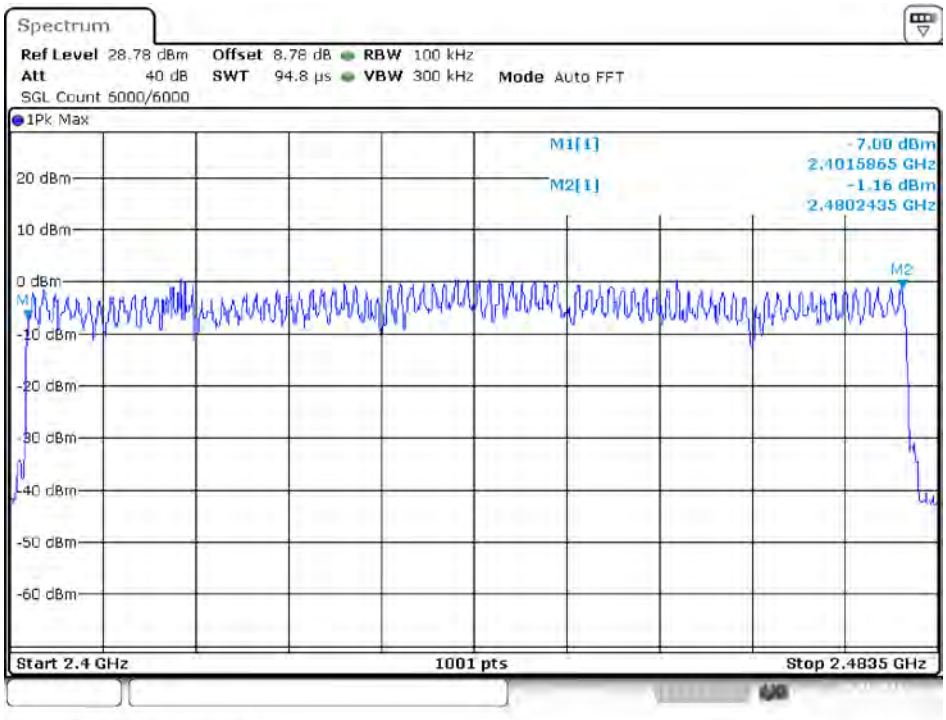
Hopping No. NVNT 1-DH1 2441MHz



Hopping No. NVNT 2-DH1 2441MHz




Hopping No. NVNT 3-DH1 2441MHz



# 7. DWELL TIME

## 7.1.Test limit

Please refer FCC part 15.247 & RSS-247.

Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

## 7.2.Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

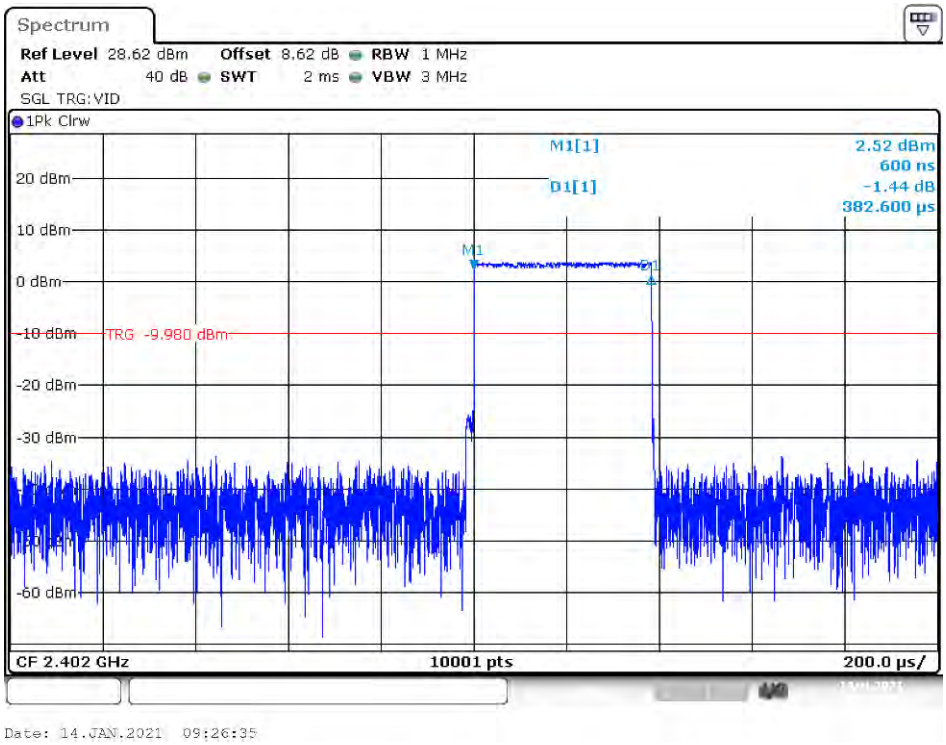
## 7.3.Test Result

PASS.

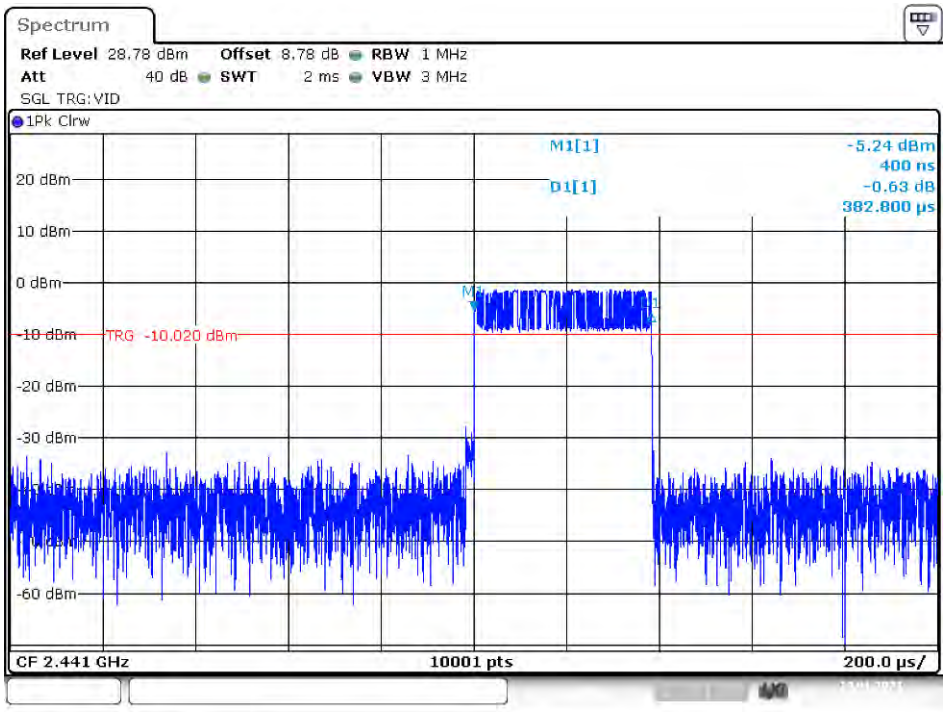
Detailed information please see the following page.

| Condition | Mode | Frequency (MHz) | Pulse Time (ms) | Total Dwell Time (ms) | Period Time (ms) | Limit (ms) | Verdict |
|---|---|---|---|---|---|---|---|
| NVNT | 1-DH1 | 2402 | 0.383 | 120.902 | 31600 | 400 | Pass |
| NVNT | 1-DH1 | 2441 | 0.383 | 120.965 | 31600 | 400 | Pass |
| NVNT | 1-DH1 | 2480 | 0.383 | 120.902 | 31600 | 400 | Pass |
| NVNT | 1-DH3 | 2441 | 1.639 | 258.899 | 31600 | 400 | Pass |
| NVNT | 1-DH5 | 2441 | 2.887 | 273.669 | 31600 | 400 | Pass |
| NVNT | 2-DH1 | 2402 | 0.388 | 122.734 | 31600 | 400 | Pass |
| NVNT | 2-DH1 | 2441 | 0.389 | 122.798 | 31600 | 400 | Pass |
| NVNT | 2-DH1 | 2460 | 0.388 | 122.734 | 31600 | 400 | Pass |
| NVNT | 2-DH3 | 2441 | 1.64 | 259.183 | 31600 | 400 | Pass |
| NVNT | 2-DH5 | 2441 | 2.882 | 273.252 | 31600 | 400 | Pass |
| NVNT | 3-DH1 | 2402 | 0.388 | 122.671 | 31600 | 400 | Pass |
| NVNT | 3-DH1 | 2441 | 0.377 | 119.132 | 31600 | 400 | Pass |
| NVNT | 3-DH1 | 2480 | 0.388 | 122.734 | 31600 | 400 | Pass |
| NVNT | 3-DH3 | 2441 | 1.632 | 257.809 | 31600 | 400 | Pass |
| NVNT | 3-DH5 | 2441 | 2.89 | 274.01 | 31600 | 400 | Pass |

Dwell NVNT 1-DH1 2402MHz

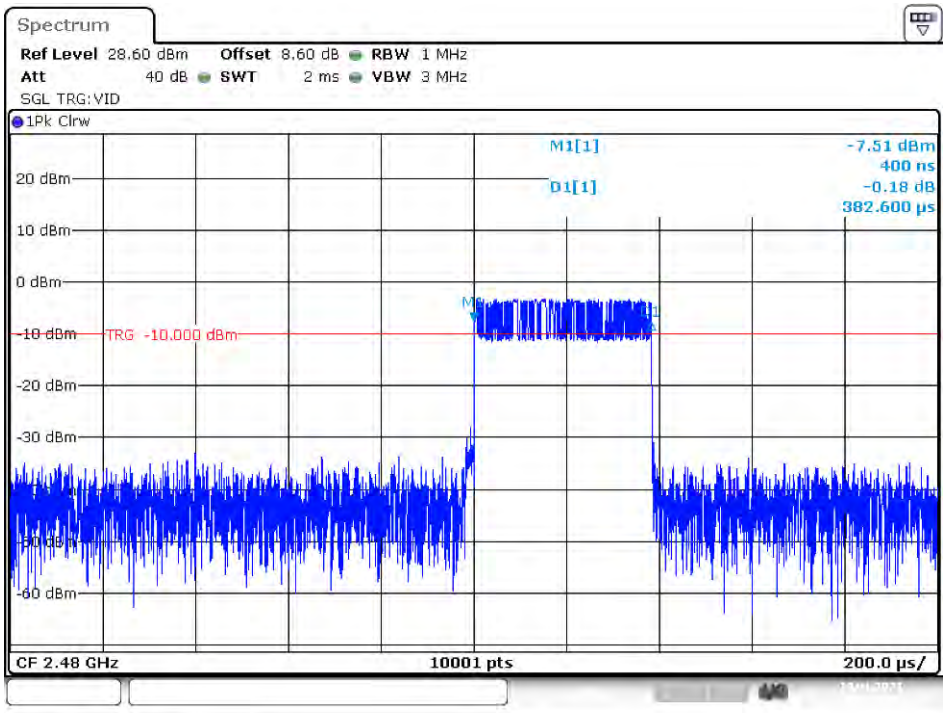


Dwell NVNT 1-DH1 2441MHz



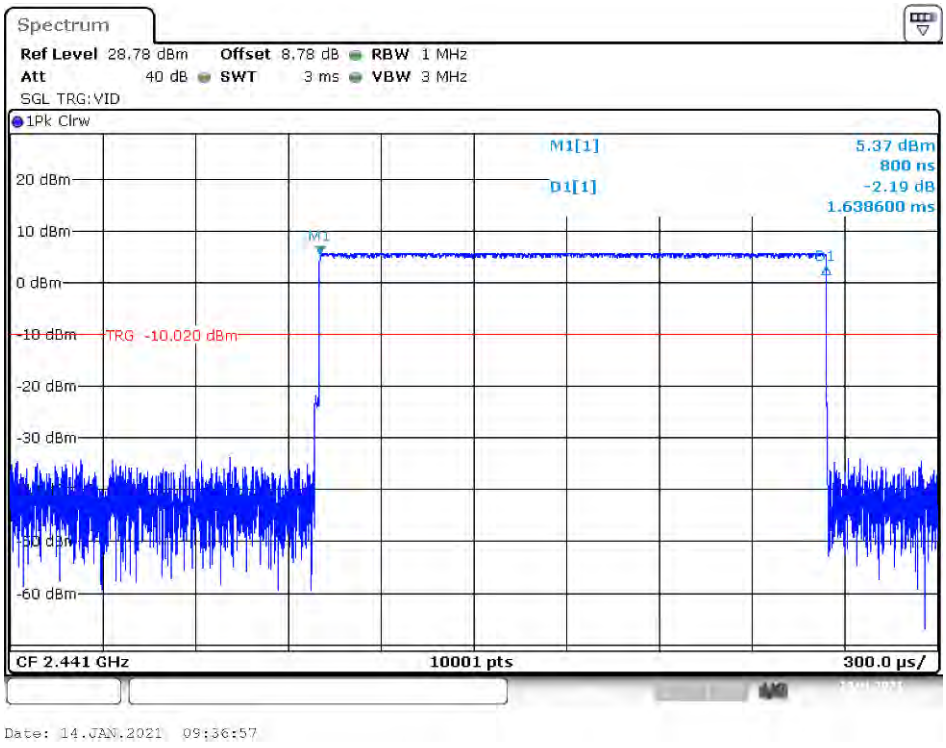

Date: 14.JAN.2021 09:30:05

Dwell NVNT 1-DH1 2480MHz

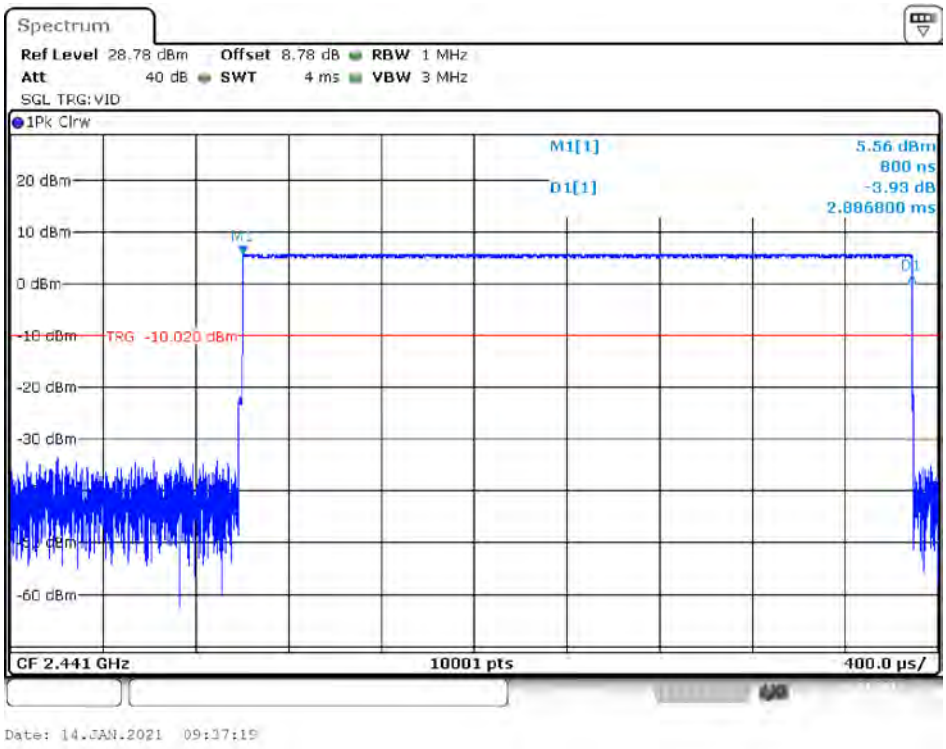



Date: 14.JAN.2021 09:33:54

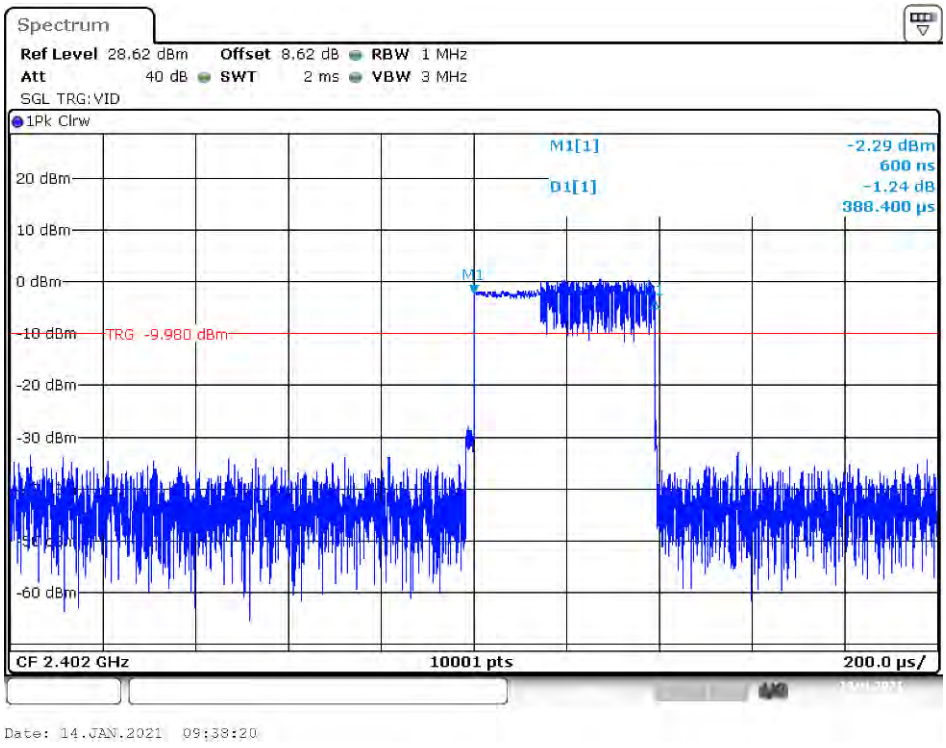
Dwell NVNT 1-DH3 2441MHz




Dwell NVNT 1-DH5 2441MHz

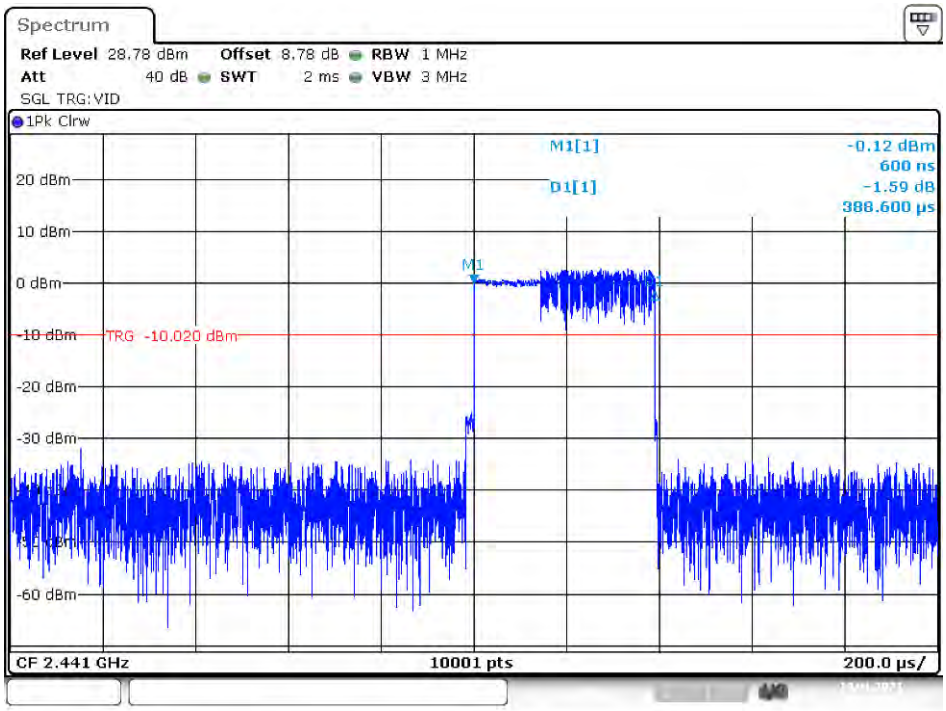


Dwell NVNT 2-DH1 2402MHz



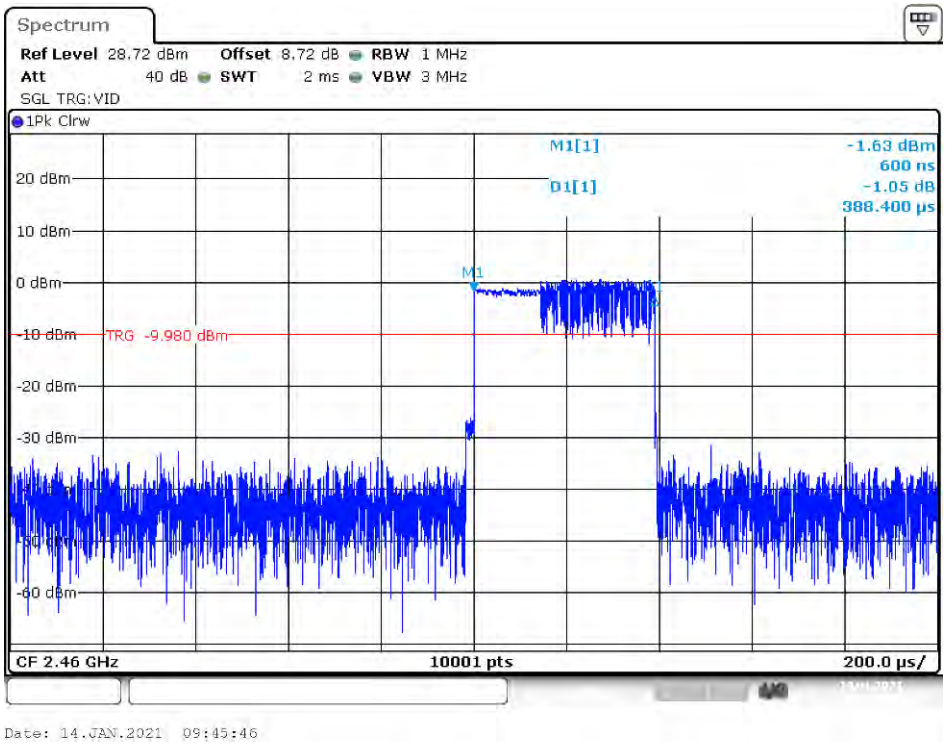

Date: 14.JAN.2021 09:38:20

Dwell NVNT 2-DH1 2441MHz



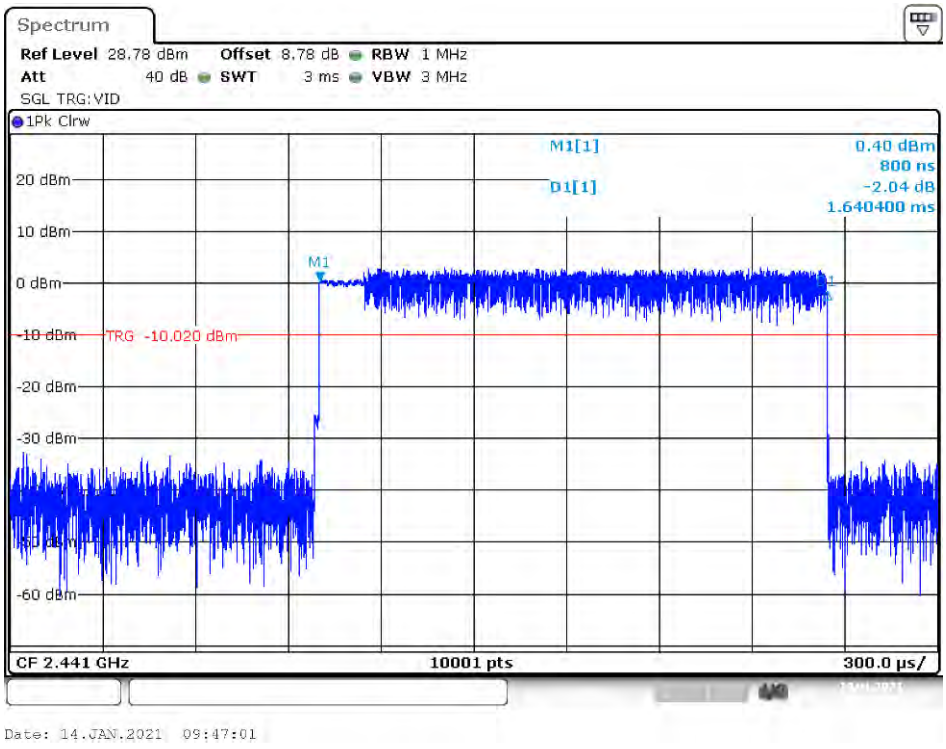

Date: 14.JAN.2021 09:45:11

Dwell NVNT 2-DH1 2460MHz



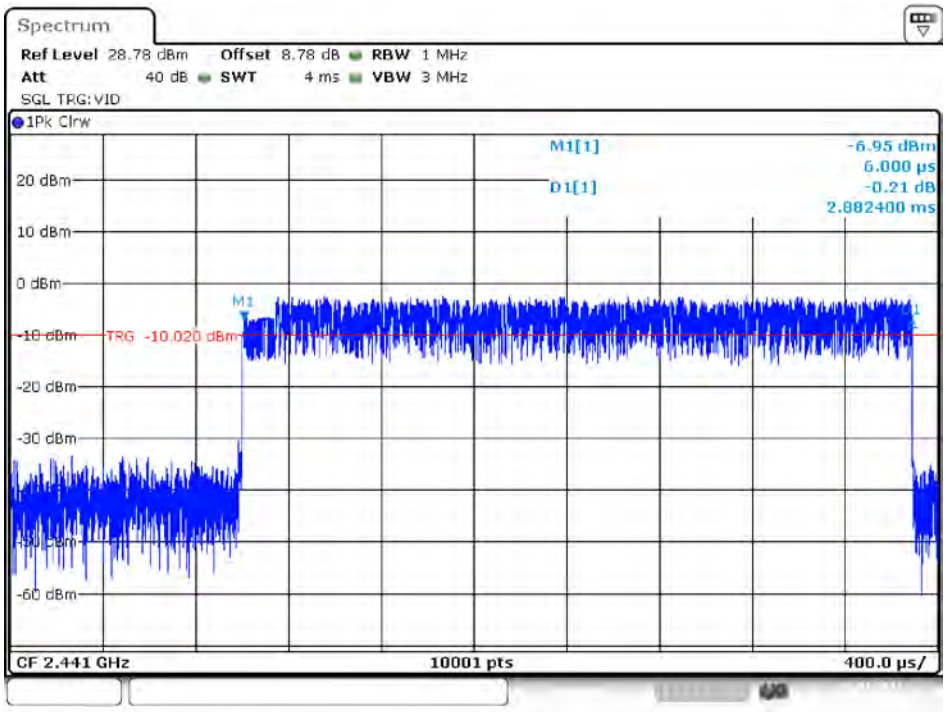

Date: 14.JAN.2021 09:45:46

Dwell NVNT 2-DH3 2441MHz



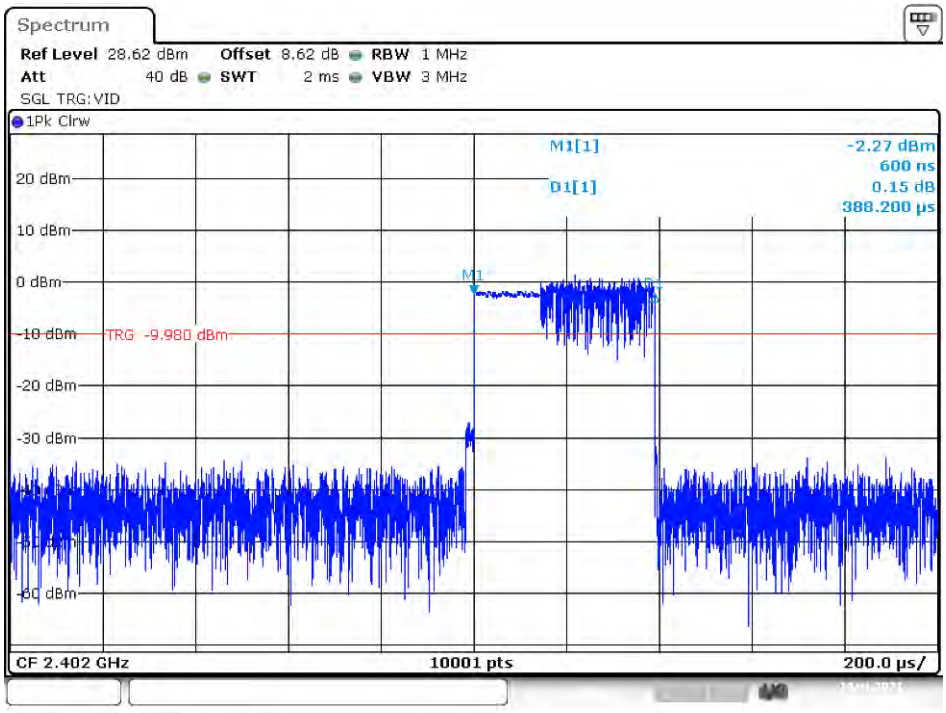

Date: 14.JAN.2021 09:47:01

Dwell NVNT 2-DH5 2441MHz




Date: 14.JAN.2021 09:47:44

Dwell NVNT 3-DH1 2402MHz

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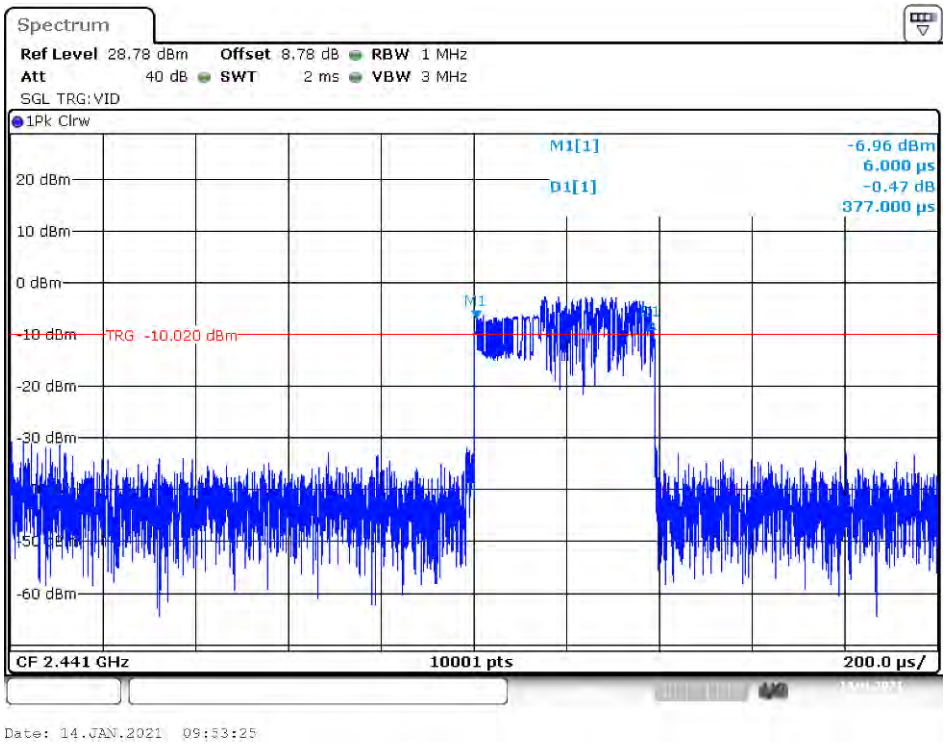
Dwell NVNT 3-DH1 2441MHz

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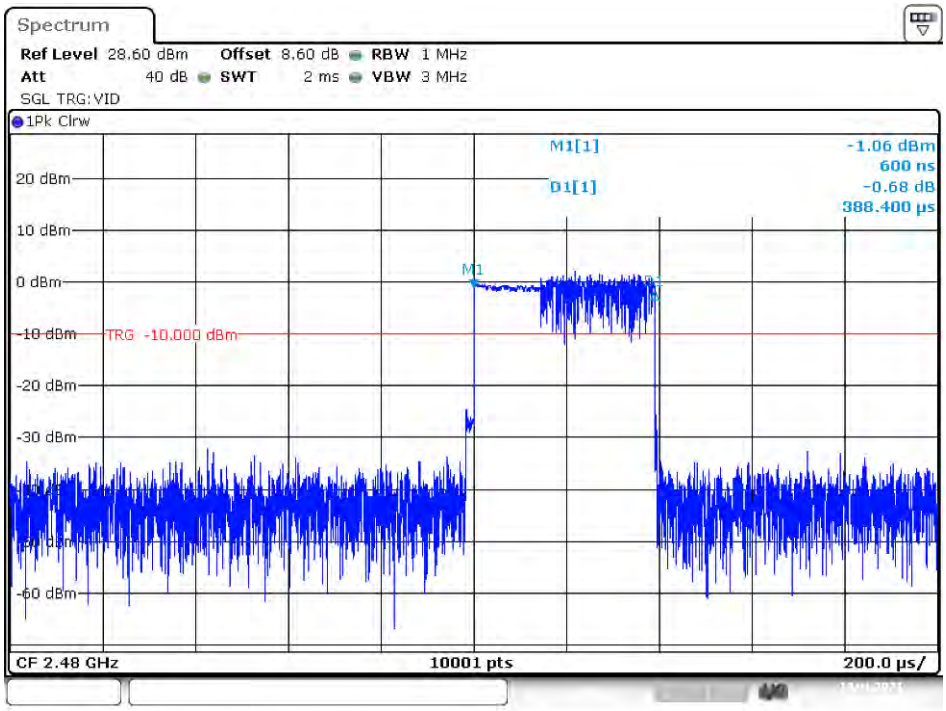
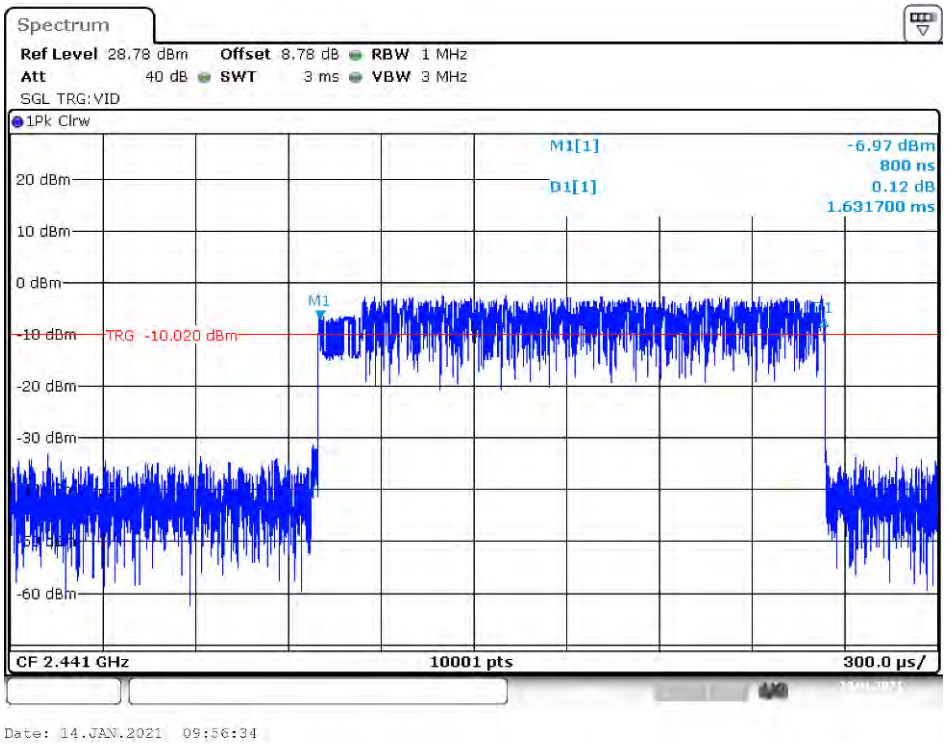
Dwell NVNT 3-DH1 2480MHz

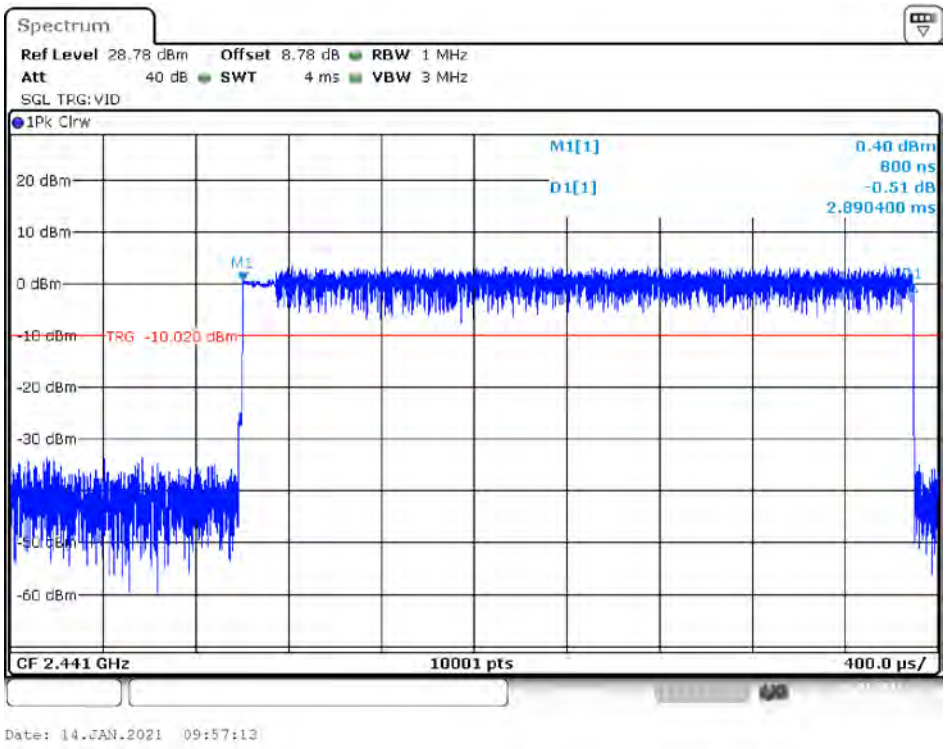



Date: 14.JAN.2021 09:53:38

Dwell NVNT 3-DH3 2441MHz




Dwell NVNT 3-DH5 2441MHz



# 8. RADIATED EMISSIONS

## 8.1.Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |

RSS-GEN Restricted frequency band

**Table 7 – Restricted frequency bands** Note 1

| MHz | MHz | GHz |
|---|---|---|
| 0.090 - 0.110 | 149.9 - 150.05 | 9.0 - 9.2 |
| 0.495 - 0.505 | 156.52475 - 156.52525 | 9.3 - 9.5 |
| 2.1735 - 2.1905 | 156.7 - 156.9 | 10.6 - 12.7 |
| 3.020 - 3.026 | 162.0125 - 167.17 | 13.25 - 13.4 |
| 4.125 - 4.128 | 167.72 - 173.2 | 14.47 - 14.5 |
| 4.17725 - 4.17775 | 240 – 285 | 15.35 - 16.2 |
| 4.20725 - 4.20775 | 322 - 335.4 | 17.7 - 21.4 |

| | | |
|---|---|---|
| 5.677 - 5.683 | 399.9 - 410 | 22.01 - 23.12 |
| 6.215 - 6.218 | 608 - 614 | 23.6 - 24.0 |
| 6.26775 - 6.26825 | 960 - 1427 | 31.2 - 31.8 |
| 6.31175 - 6.31225 | 1435 - 1626.5 | 36.43 - 36.5 |
| 8.291 - 8.294 | 1645.5 - 1646.5 | Above 38.6 |
| 8.362 - 8.366 | 1660 - 1710 | |
| 8.37625 - 8.38675 | 1718.8 - 1722.2 | |
| 8.41425 - 8.41475 | 2200 - 2300 | |
| 12.29 - 12.293 | 2310 - 2390 | |
| 12.51975 - 12.52025 | 2483.5 - 2500 | |
| 12.57675 - 12.57725 | 2655 - 2900 | |
| 13.36 - 13.41 | 3260 – 3267 | |
| 16.42 - 16.423 | 3332 - 3339 | |
| 16.69475 - 16.69525 | 3345.8 - 3358 | |
| 16.80425 - 16.80475 | 3500 - 4400 | |
| 25.5 - 25.67 | 4500 - 5150 | |
| 37.5 - 38.25 | 5350 - 5460 | |
| 73 - 74.6 | 7250 - 7750 | |
| 74.8 - 75.2 | 8025 – 8500 | |
| 108 – 138 | | |

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

15.209 Limit

| FREQUENCY MHz | DISTANCE Meters | FIELD STRENGTHS LIMIT | |
|---|---|---|---|
| | | μV/m | dB(μV)/m |
| 0.009-0.490 | 300 | 2400/F(KHz) | / |
| 0.490-1.705 | 30 | 24000/F(KHz) | / |
| 1.705-30 | 30 | 30 | 29.5 |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0 dB(μV)/m (Peak)<br>54.0 dB(μV)/m (Average) | |

Note: The peak limit is 20 dB higher than the average limit

**Table 5 – General field strength limits at frequencies above 30 MHz**

| Frequency (MHz) | Field strength (μV/m at 3 m) |
|---|---|
| 30 – 88 | 100 |
| 88 – 216 | 150 |
| 216 – 960 | 200 |
| Above 960 | 500 |

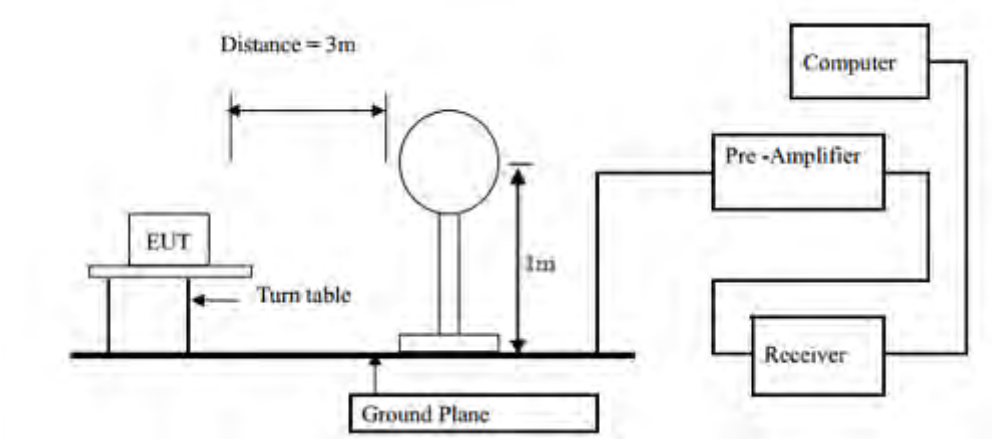
**Table 6 – General field strength limits at frequencies below 30 MHz**

| Frequency | Magnetic field strength (H-Field) (μA/m) | Measurement distance (m) |
|---|---|---|
| 9 - 490 kHz[Note 1] | 6.37/F (F in kHz) | 300 |
| 490 - 1705 kHz | 63.7/F (F in kHz) | 30 |
| 1.705 - 30 MHz | 0.08 | 30 |

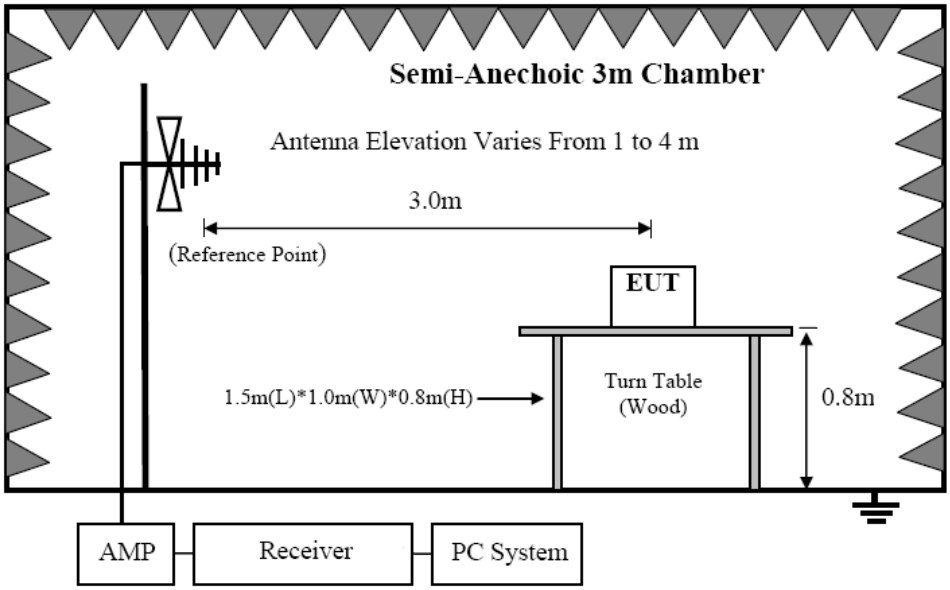
**Note 1:** The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

## 8.2.Block Diagram of Test setup

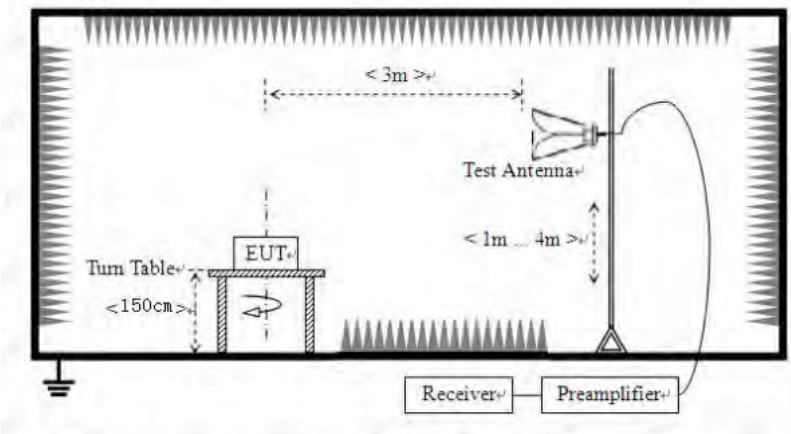
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz




8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz




8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

## 8.3.Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
(2) Setup EUT and simulator
(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
(a) Change work frequency or channel of device if practicable.
(b) Change modulation type of device if practicable.
(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.
(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

## 8.4.Test Result

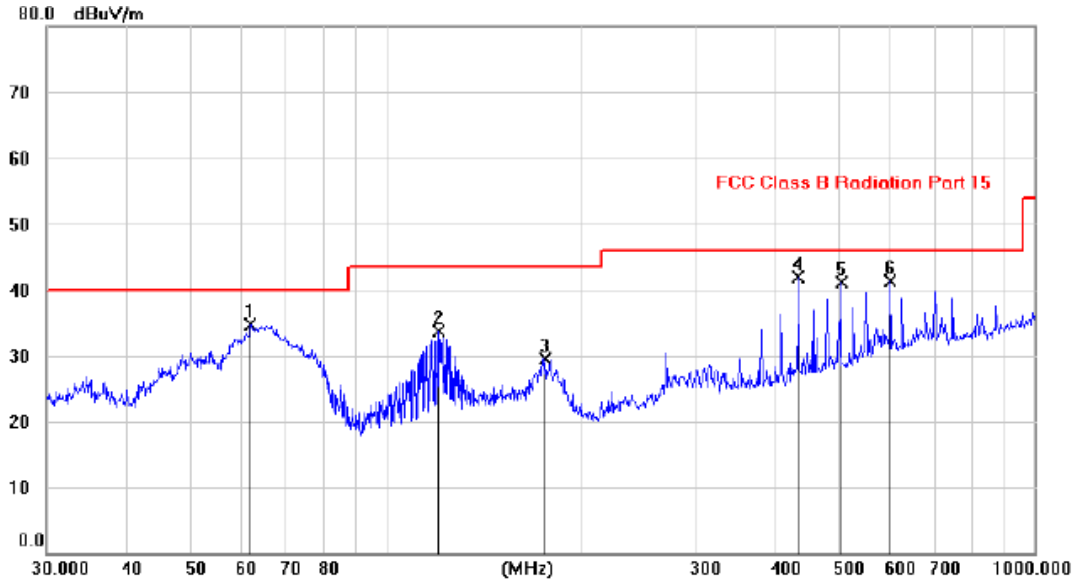
We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS

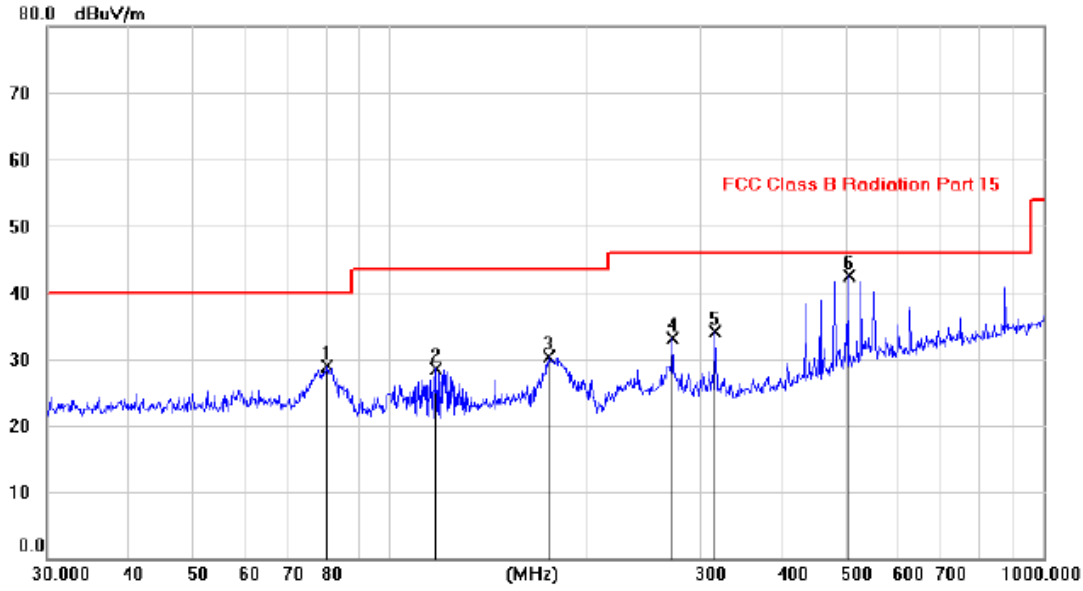
**Vertical:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 61.9371 | 21.87 | 12.88 | 34.75 | 40.00 | -5.25 | peak | | | |
| 2 | | 120.3329 | 20.67 | 13.06 | 33.73 | 43.50 | -9.77 | peak | | | |
| 3 | | 176.4542 | 16.42 | 13.17 | 29.59 | 43.50 | -13.91 | peak | | | |
| 4 | * | 433.9636 | 24.64 | 17.18 | 41.82 | 46.00 | -4.18 | peak | | | |
| 5 | | 504.0577 | 22.73 | 18.28 | 41.01 | 46.00 | -4.99 | peak | | | |
| 6 | | 600.0222 | 20.99 | 20.22 | 41.21 | 46.00 | -4.79 | peak | | | |

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

**Horizontal:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 80.5593 | 19.07 | 9.91 | 28.98 | 40.00 | -11.02 | peak | | | |
| 2 | | 118.0619 | 15.75 | 12.80 | 28.55 | 43.50 | -14.95 | peak | | | |
| 3 | | 175.4464 | 17.00 | 13.31 | 30.31 | 43.50 | -13.19 | peak | | | |
| 4 | | 271.2294 | 19.87 | 13.32 | 33.19 | 46.00 | -12.81 | peak | | | |
| 5 | | 314.8545 | 19.56 | 14.48 | 34.04 | 46.00 | -11.96 | peak | | | |
| 6 | * | 504.0577 | 24.28 | 18.28 | 42.56 | 46.00 | -3.44 | peak | | | |

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2441MHz (AC 120V/ 60Hz) was listed in this report.

From 1G-25GHz

| Test Mode: GFSK TX Low | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Freq (MHz) | Read Level (dBuV/m) | Polar (H/V) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 4804 | 47.04 | V | 33.98 | 10.22 | 34.25 | 56.99 | 74 | 17.01 | PK |
| 4804 | 35.63 | V | 33.98 | 10.22 | 34.25 | 45.58 | 54 | 8.42 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| 4804 | 46.74 | H | 33.98 | 10.22 | 34.25 | 56.69 | 74 | 17.31 | PK |
| 4804 | 34.00 | H | 33.98 | 10.22 | 34.25 | 43.95 | 54 | 10.05 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| Test Mode: GFSK TX Mid | | | | | | | | | |
| 4882 | 46.59 | V | 33.98 | 10.22 | 34.25 | 56.54 | 74 | 17.46 | PK |
| 4882 | 34.90 | V | 33.98 | 10.22 | 34.25 | 44.85 | 54 | 9.15 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| 4882 | 46.85 | H | 33.98 | 10.22 | 34.25 | 56.80 | 74 | 17.20 | PK |
| 4882 | 33.13 | H | 33.98 | 10.22 | 34.25 | 43.08 | 54 | 10.92 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| Test Mode: GFSK TX High | | | | | | | | | |
| 4960 | 46.49 | V | 33.98 | 10.22 | 34.25 | 56.44 | 74 | 17.56 | PK |
| 4960 | 35.19 | V | 33.98 | 10.22 | 34.25 | 45.14 | 54 | 8.86 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |
| 4960 | 46.48 | H | 33.98 | 10.22 | 34.25 | 56.43 | 74 | 17.57 | PK |
| 4960 | 33.46 | H | 33.98 | 10.22 | 34.25 | 43.41 | 54 | 10.59 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

From 1G-25GHz

| Freq (MHz) | Read Level (dBuV/m) | Polar (H/V) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| Test Mode: π/4 DQPSK TX Low | | | | | | | | | |
| 4804 | 47.03 | V | 33.98 | 10.22 | 34.25 | 56.98 | 74 | 17.02 | PK |
| 4804 | 35.51 | V | 33.98 | 10.22 | 34.25 | 45.46 | 54 | 8.54 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| 4804 | 46.46 | H | 33.98 | 10.22 | 34.25 | 56.41 | 74 | 17.59 | PK |
| 4804 | 34.07 | H | 33.98 | 10.22 | 34.25 | 44.02 | 54 | 9.98 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| Test Mode: π/4 DQPSK TX Mid | | | | | | | | | |
| 4882 | 47.23 | V | 33.98 | 10.22 | 34.25 | 57.18 | 74 | 16.82 | PK |
| 4882 | 35.37 | V | 33.98 | 10.22 | 34.25 | 45.32 | 54 | 8.68 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| 4882 | 46.97 | H | 33.98 | 10.22 | 34.25 | 56.92 | 74 | 17.08 | PK |
| 4882 | 33.55 | H | 33.98 | 10.22 | 34.25 | 43.50 | 54 | 10.50 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| Test Mode: π/4 DQPSK TX High | | | | | | | | | |
| 4960 | 46.49 | V | 33.98 | 10.22 | 34.25 | 56.44 | 74 | 17.56 | PK |
| 4960 | 35.68 | V | 33.98 | 10.22 | 34.25 | 45.63 | 54 | 8.37 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |
| 4960 | 46.96 | H | 33.98 | 10.22 | 34.25 | 56.91 | 74 | 17.09 | PK |
| 4960 | 33.22 | H | 33.98 | 10.22 | 34.25 | 43.17 | 54 | 10.83 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

From 1G-25GHz

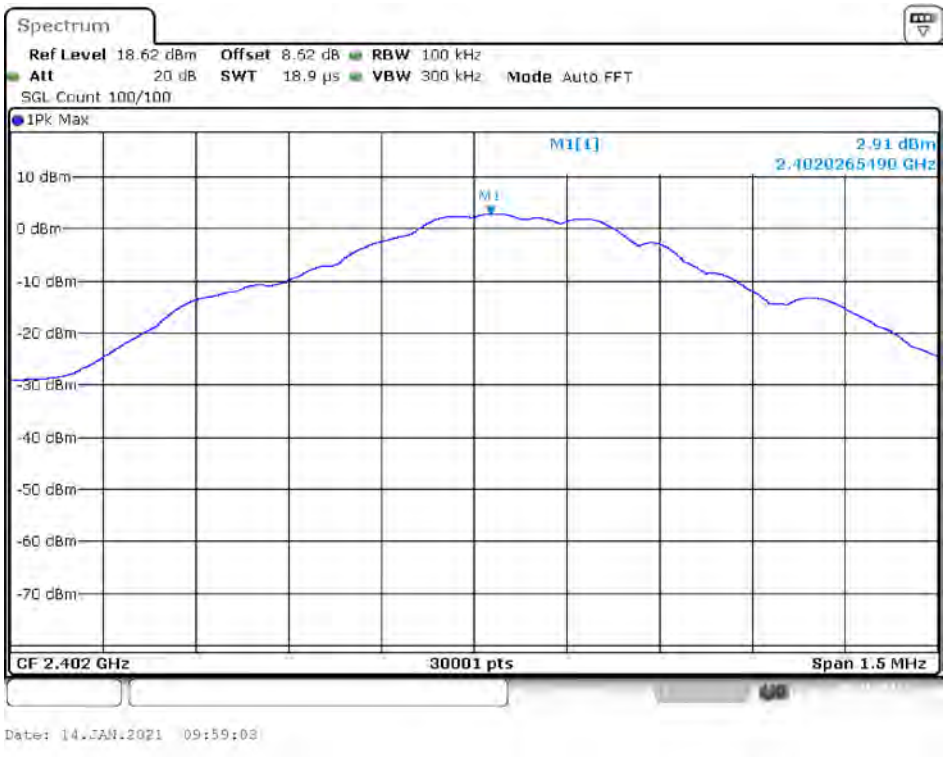
| Test Mode: 8- DQPSK TX Low | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Freq (MHz) | Read Level (dBuV/m) | Polar (H/V) | Antenna Factor (dB/m) | Cable loss(dB) | Amp Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
| 4804 | 46.76 | V | 33.98 | 10.22 | 34.25 | 56.71 | 74 | 17.29 | PK |
| 4804 | 35.32 | V | 33.98 | 10.22 | 34.25 | 45.27 | 54 | 8.73 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| 4804 | 47.04 | H | 33.98 | 10.22 | 34.25 | 56.99 | 74 | 17.01 | PK |
| 4804 | 33.96 | H | 33.98 | 10.22 | 34.25 | 43.91 | 54 | 10.09 | AV |
| 7206 | / | / | / | / | / | / | / | / | / |
| 9608 | / | / | / | / | / | / | / | / | / |
| Test Mode: 8- DQPSK TX Mid | | | | | | | | | |
| 4882 | 47.15 | V | 33.98 | 10.22 | 34.25 | 57.10 | 74 | 16.90 | PK |
| 4882 | 35.47 | V | 33.98 | 10.22 | 34.25 | 45.42 | 54 | 8.58 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| 4882 | 46.53 | H | 33.98 | 10.22 | 34.25 | 56.48 | 74 | 17.52 | PK |
| 4882 | 33.48 | H | 33.98 | 10.22 | 34.25 | 43.43 | 54 | 10.57 | AV |
| 7323 | / | / | / | / | / | / | / | / | / |
| 9764 | / | / | / | / | / | / | / | / | / |
| Test Mode: 8- DQPSK TX High | | | | | | | | | |
| 4960 | 46.89 | V | 33.98 | 10.22 | 34.25 | 56.84 | 74 | 17.16 | PK |
| 4960 | 34.79 | V | 33.98 | 10.22 | 34.25 | 44.74 | 54 | 9.26 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |
| 4960 | 46.35 | H | 33.98 | 10.22 | 34.25 | 56.30 | 74 | 17.70 | PK |
| 4960 | 33.97 | H | 33.98 | 10.22 | 34.25 | 43.92 | 54 | 10.08 | AV |
| 7440 | / | / | / | / | / | / | / | / | / |
| 9920 | / | / | / | / | / | / | / | / | / |

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

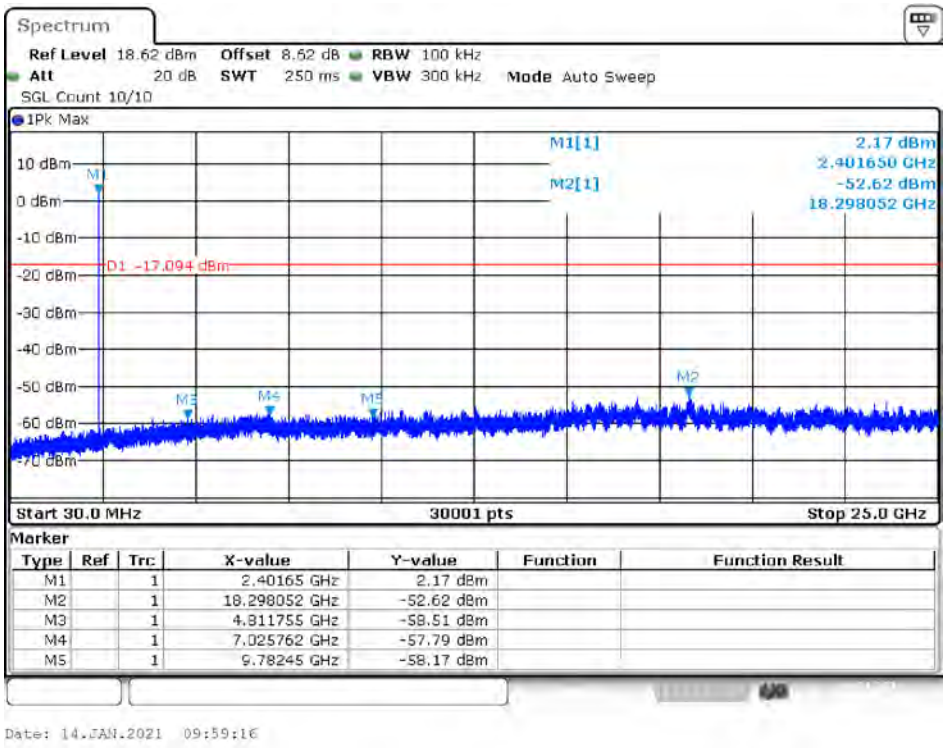
**Conducted RF Spurious Emission**

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | 1-DH1 | 2402 | Ant 1 | -55.52561175346 | -20 | Pass |
| NVNT | 1-DH1 | 2441 | Ant 1 | -58.85722362518 | -20 | Pass |
| NVNT | 1-DH1 | 2480 | Ant 1 | -55.79998541832 | -20 | Pass |
| NVNT | 2-DH1 | 2402 | Ant 1 | -50.37169525146 | -20 | Pass |
| NVNT | 2-DH1 | 2441 | Ant 1 | -53.47562103033 | -20 | Pass |
| NVNT | 2-DH1 | 2480 | Ant 1 | -52.58938466787 | -20 | Pass |
| NVNT | 3-DH1 | 2402 | Ant 1 | -49.95031756401 | -20 | Pass |
| NVNT | 3-DH1 | 2441 | Ant 1 | -53.34849691629 | -20 | Pass |
| NVNT | 3-DH1 | 2480 | Ant 1 | -52.14248153687 | -20 | Pass |

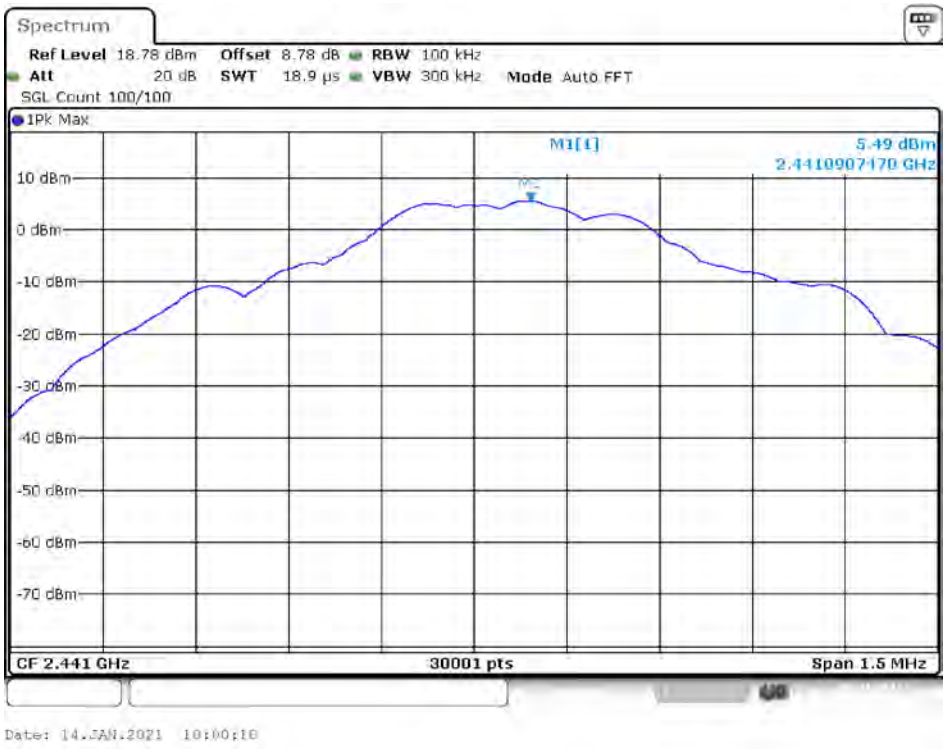
Tx. Spurious NVNT 1-DH1 2402MHz Ant1 Ref



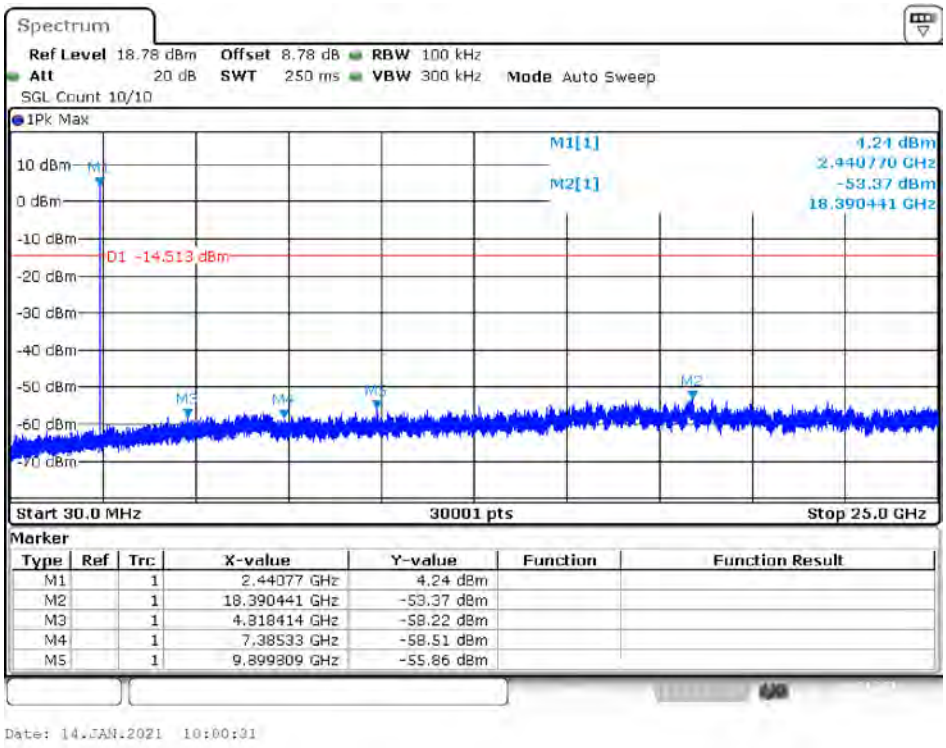
Tx. Spurious NVNT 1-DH1 2402MHz Ant1 Emission




Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Ref

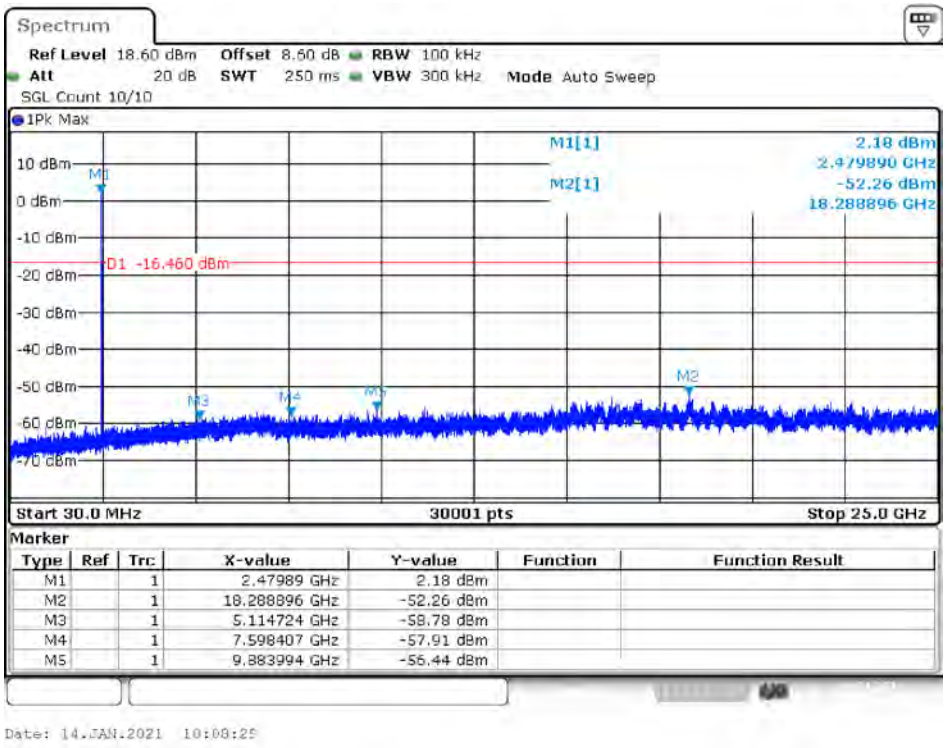


Tx. Spurious NVNT 1-DH1 2441MHz Ant1 Emission

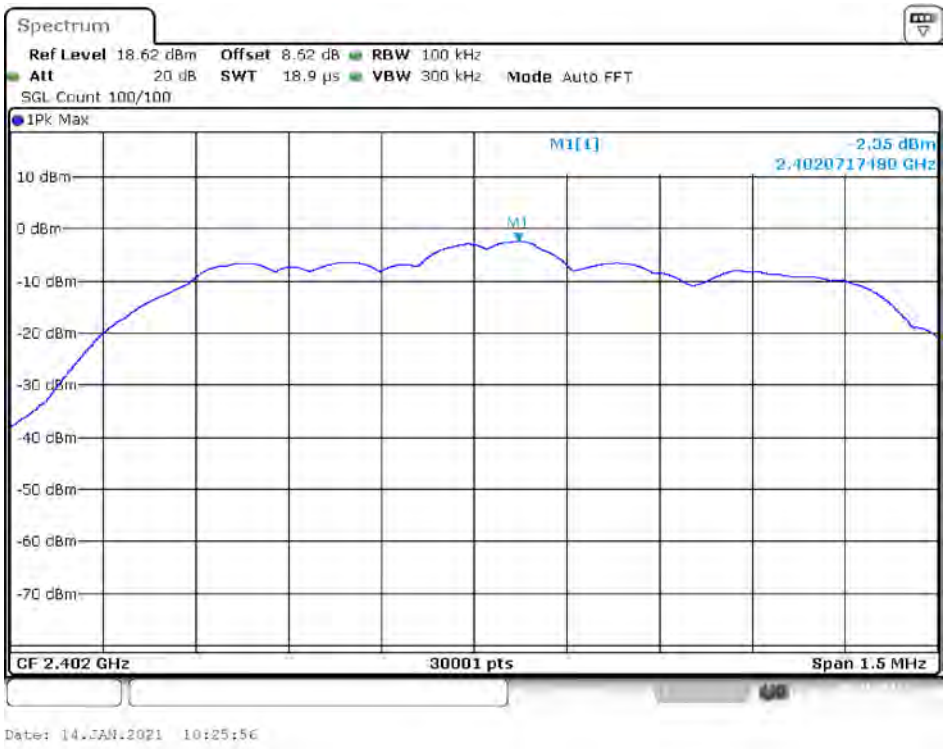



Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Ref

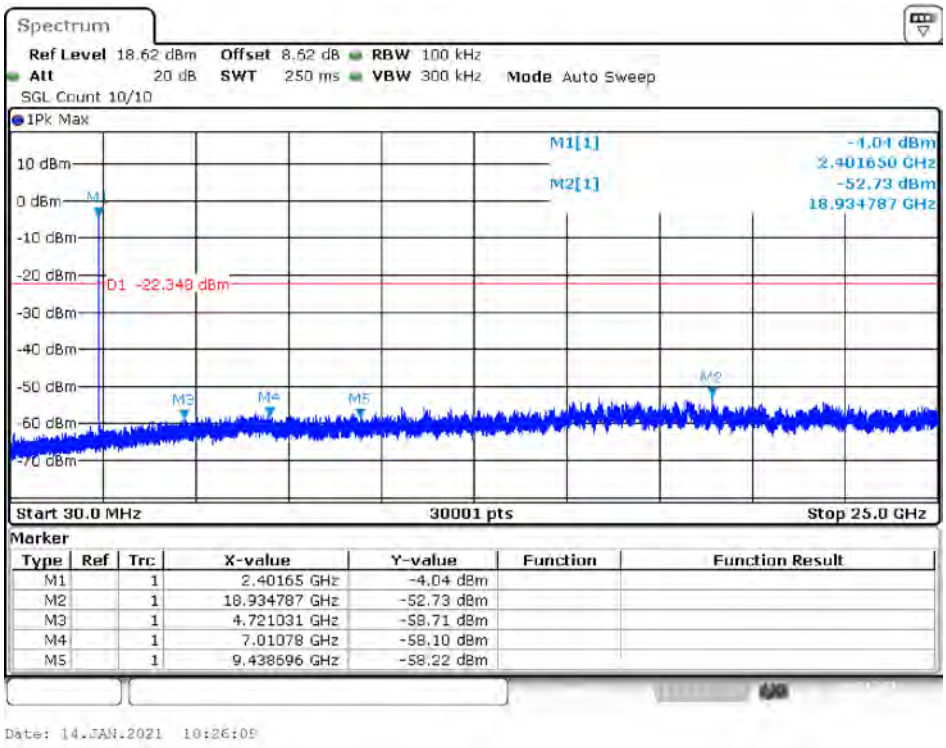
Tx. Spurious NVNT 1-DH1 2480MHz Ant1 Emission



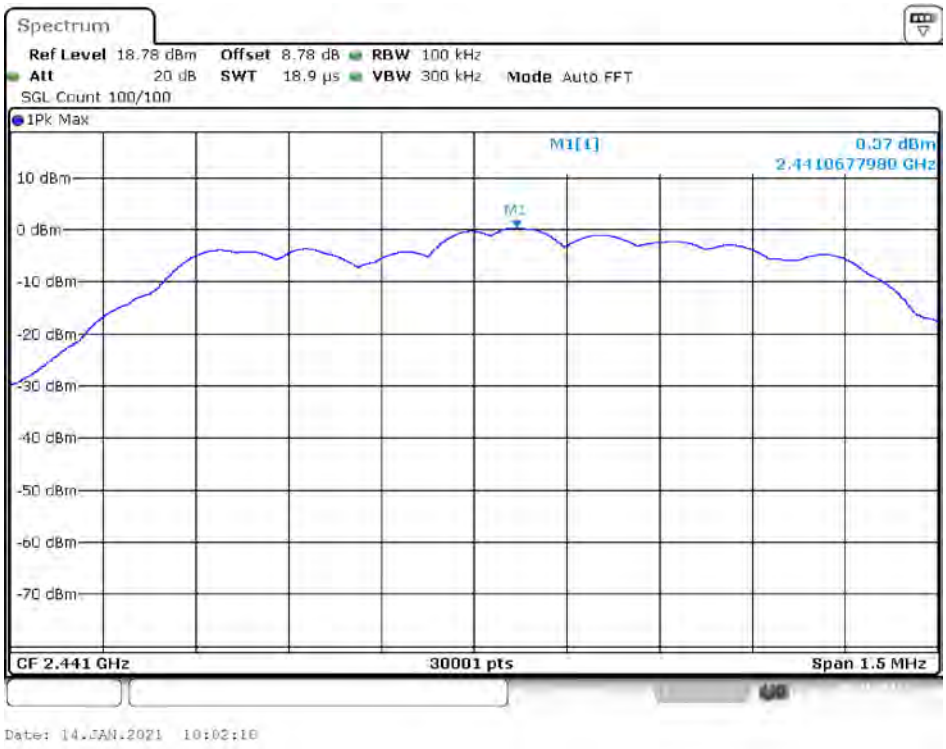

Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Ref



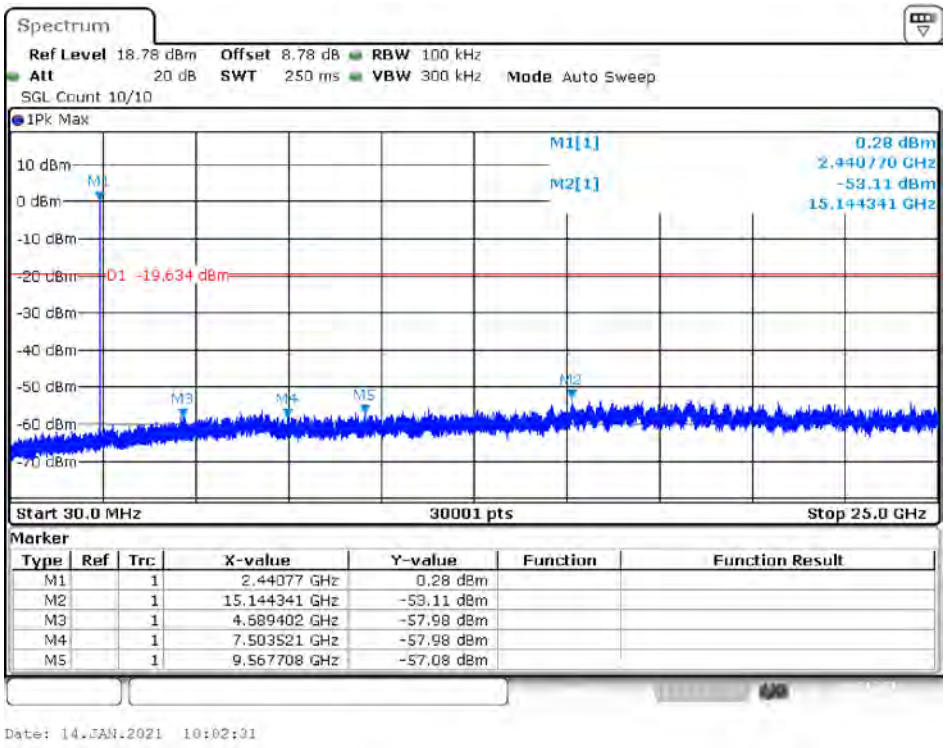
Tx. Spurious NVNT 2-DH1 2402MHz Ant1 Emission



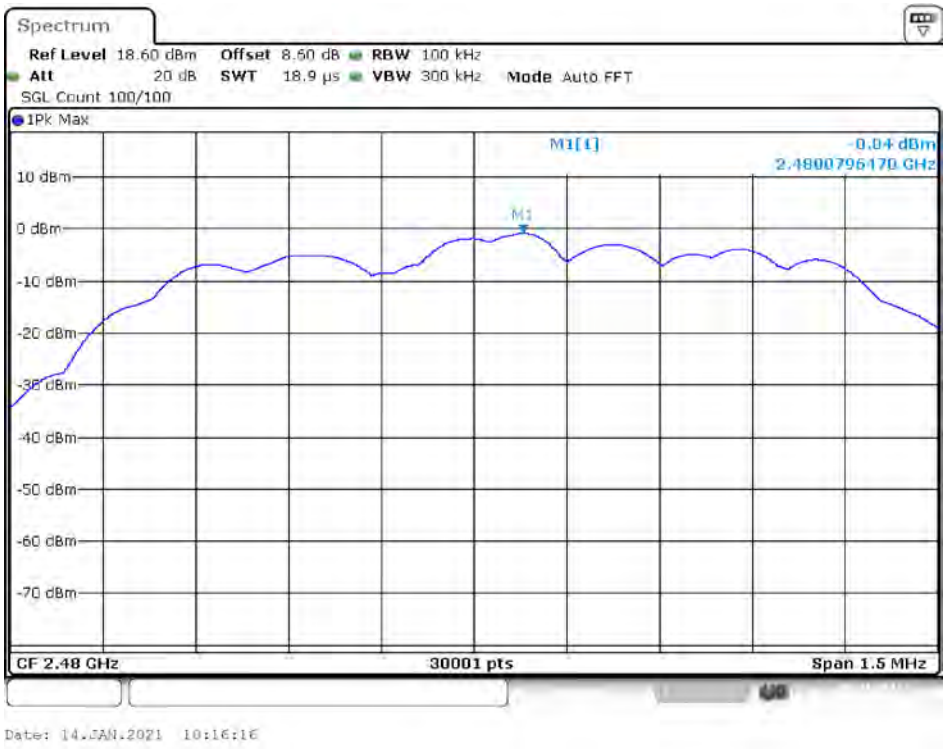

Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Ref



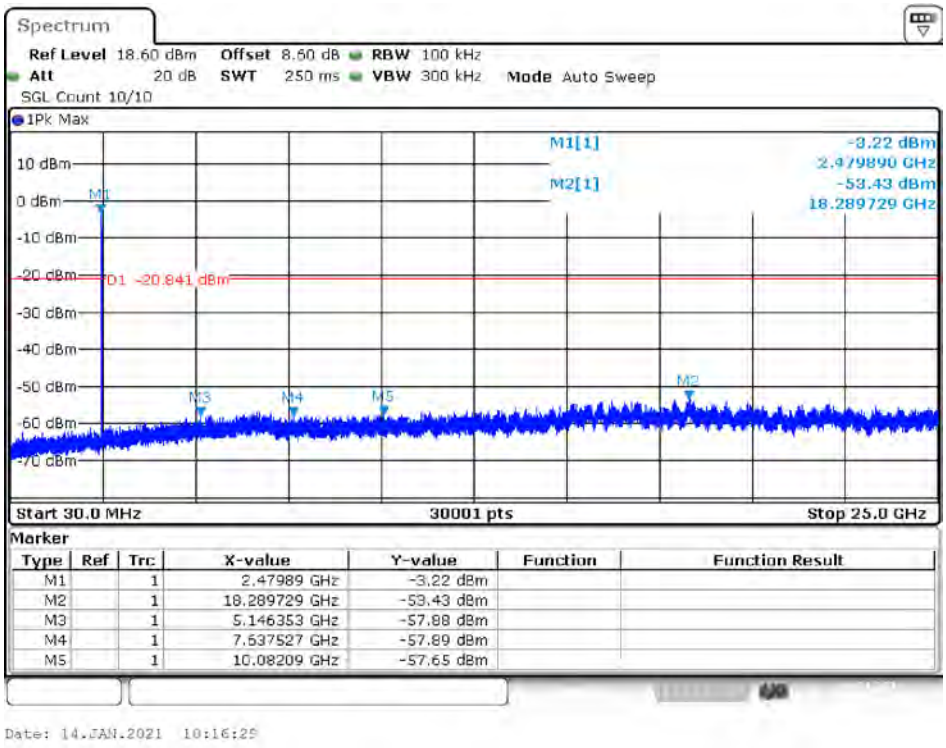
Tx. Spurious NVNT 2-DH1 2441MHz Ant1 Emission




Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Ref



Tx. Spurious NVNT 2-DH1 2480MHz Ant1 Emission

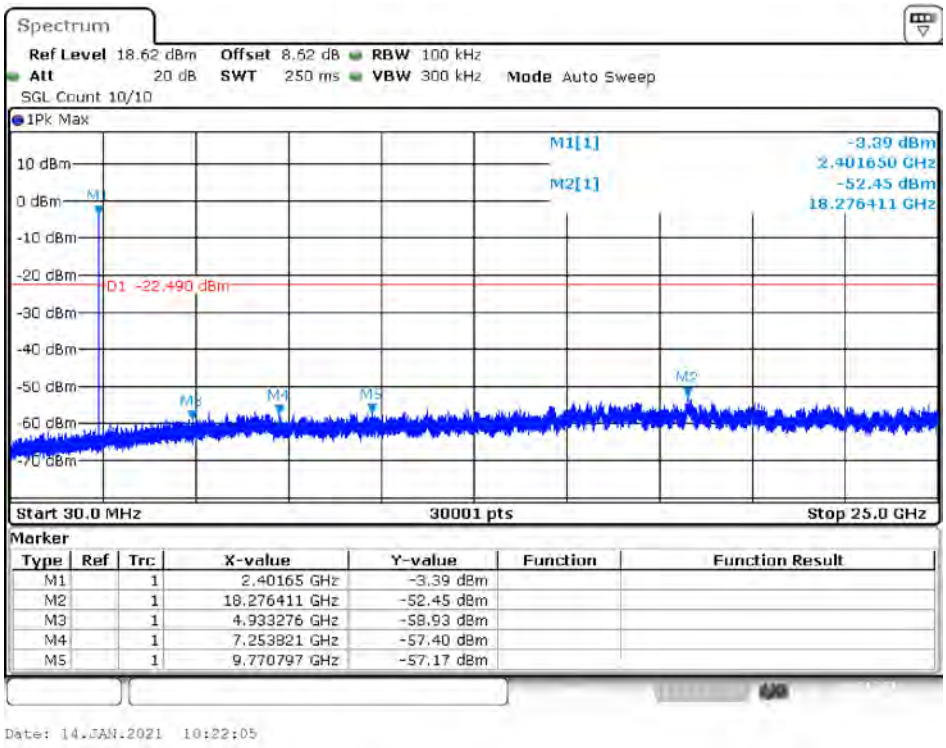



Date: 14.JAN.2021 10:16:25

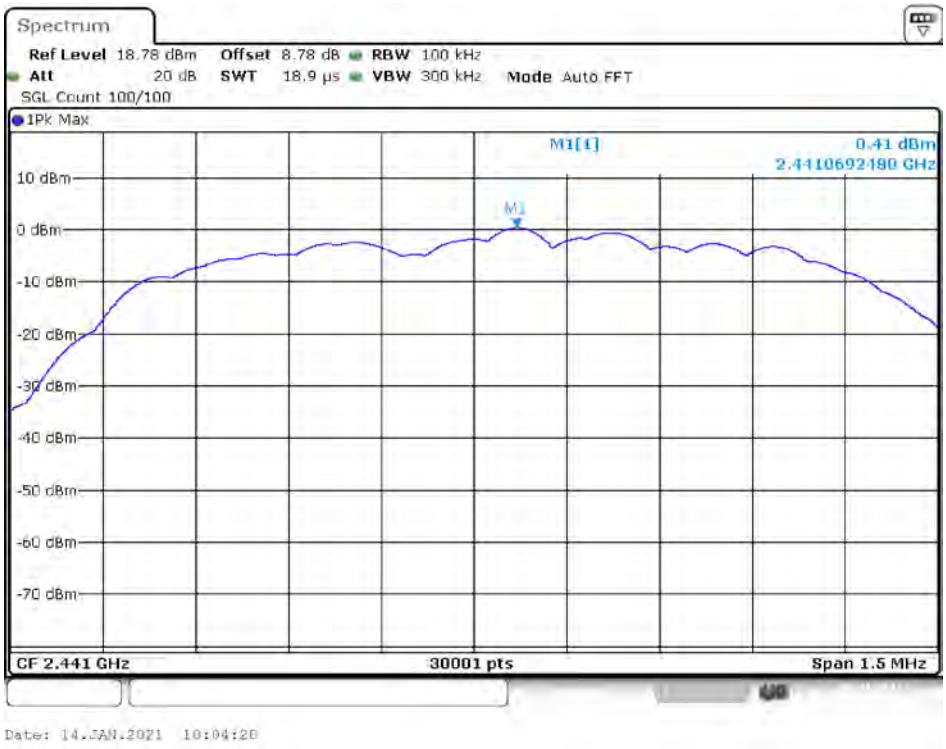
Tx. Spurious NVNT 3-DH1 2402MHz Ant1 Ref


Date: 14.JAN.2021 10:21:52

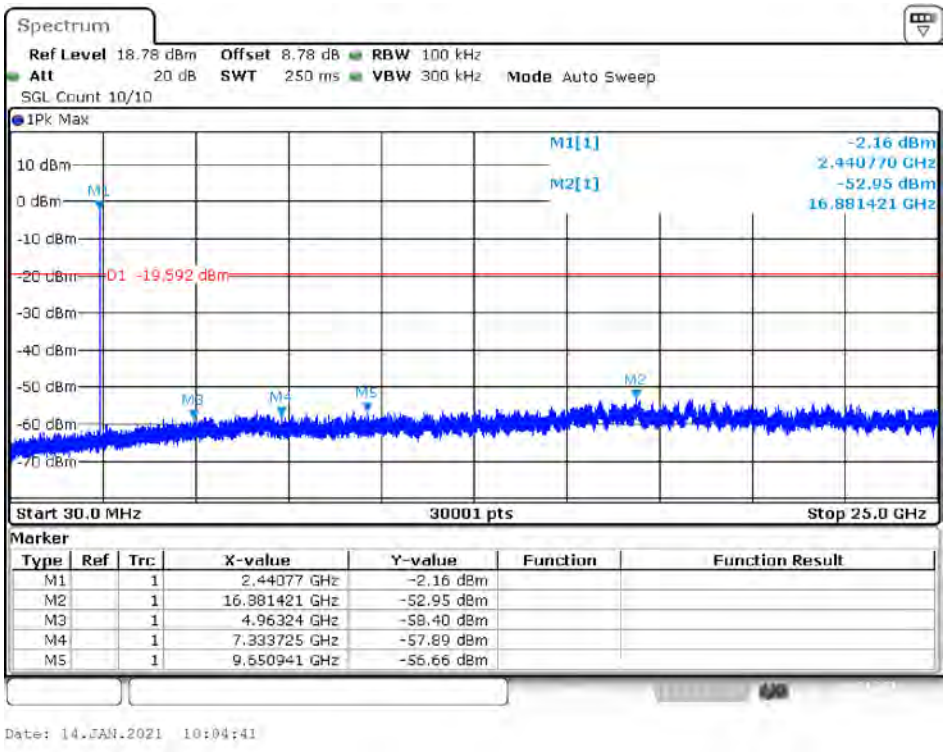
Tx. Spurious NVNT 3-DH1 2402MHz Ant1 Emission




Tx. Spurious NVNT 3-DH1 2441MHz Ant1 Ref

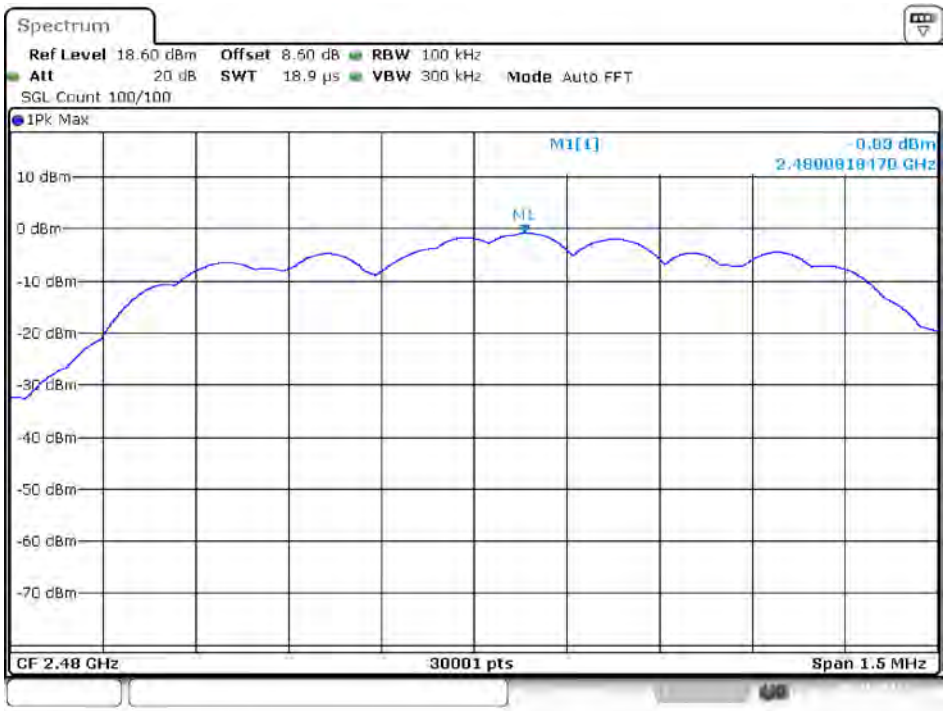


Tx. Spurious NVNT 3-DH1 2441MHz Ant1 Emission



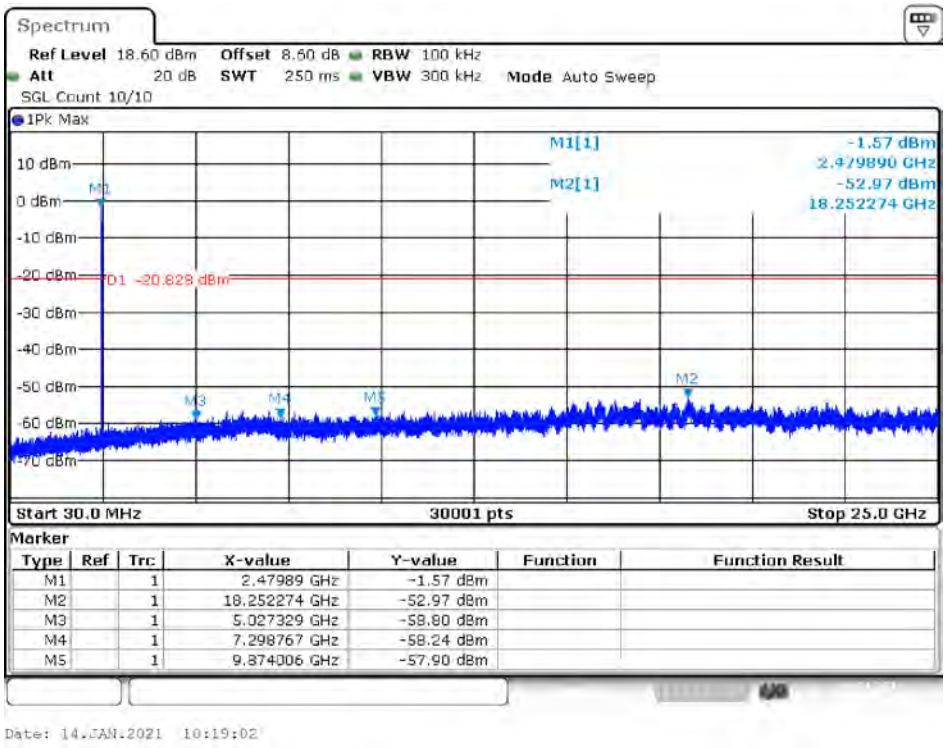

Date: 14.JAN.2021 10:04:41

Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Ref



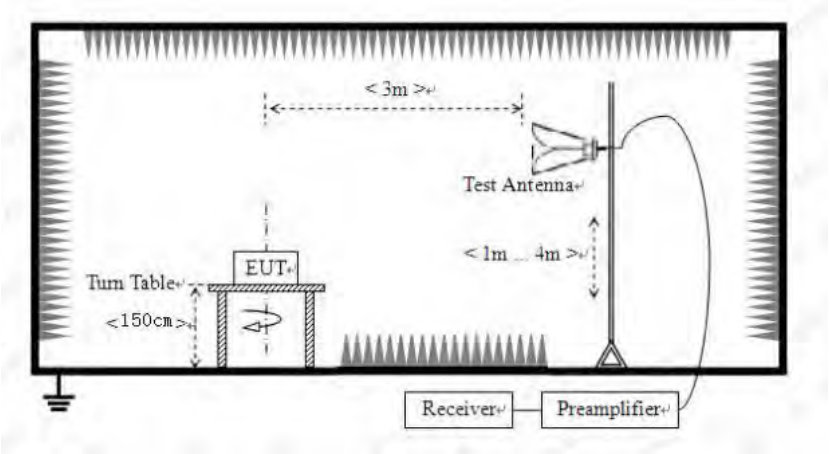

Date: 14.JAN.2021 10:10:49

Tx. Spurious NVNT 3-DH1 2480MHz Ant1 Emission



# 9. BAND EDGE COMPLIANCE

## 9.1.Block Diagram of Test Setup




## 9.2.Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in FCC part 15.209 and RSS-GEN, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with FCC part 15.209 and RSS-GEN limits.

## 9.3.Test Procedure

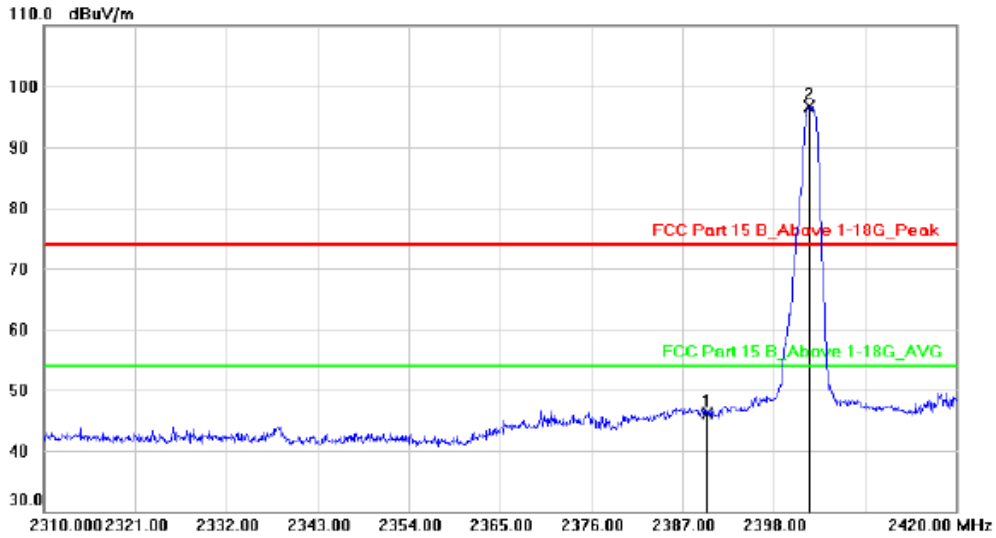
Refer to ANSI C 63.10, Clause 6.10.
All restriction band and non- restriction band have been tested, only worse case is reported.

## 9.4.Test Result

PASS. (See below detailed test data)

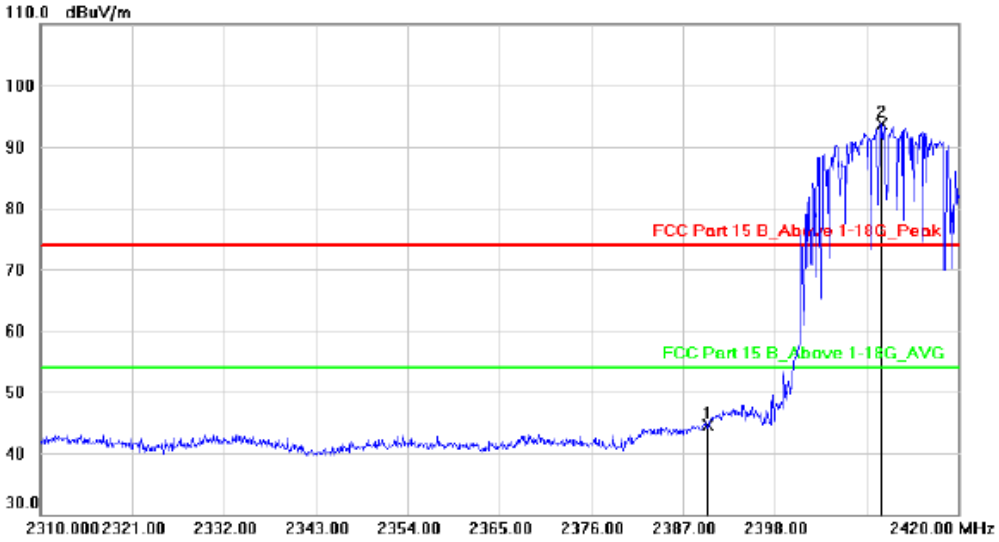
Radiated Method:

Polarization: Vertical Test Mode: GFSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 49.51 | -3.40 | 46.11 | 74.00 | -27.89 | peak | | | |
| 2 | * | 2402.290 | 100.09 | -3.41 | 96.68 | 74.00 | 22.68 | peak | | | |

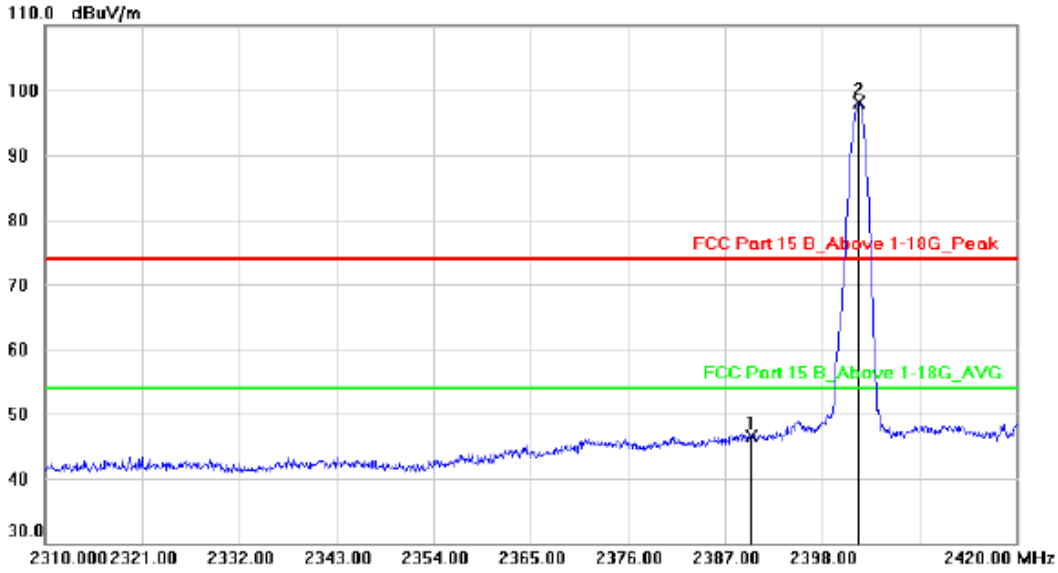
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 47.97 | -3.40 | 44.57 | 74.00 | -29.43 | peak | | | |
| 2 | * | 2410.760 | 97.10 | -3.40 | 93.70 | 74.00 | 19.70 | peak | | | |

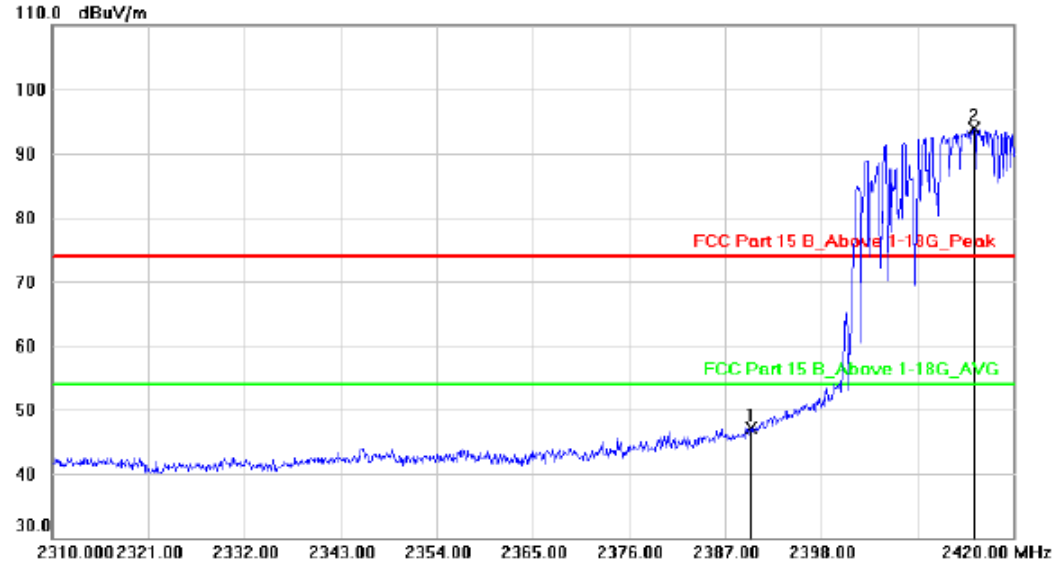
hopping-on

Polarization: Horizontal: Test Mode: GFSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 49.95 | -3.40 | 46.55 | 74.00 | -27.45 | peak | | | |
| 2 | * | 2402.180 | 101.43 | -3.41 | 98.02 | 74.00 | 24.02 | peak | | | |

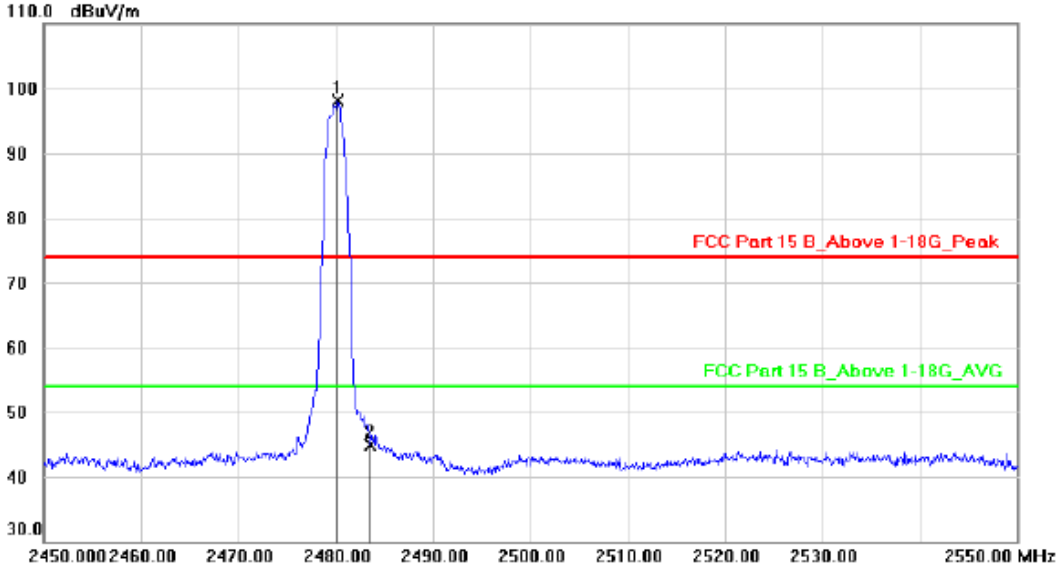
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 50.46 | -3.40 | 47.06 | 74.00 | -26.94 | peak | | | |
| 2 | * | 2415.490 | 97.29 | -3.41 | 93.88 | 74.00 | 19.88 | peak | | | |

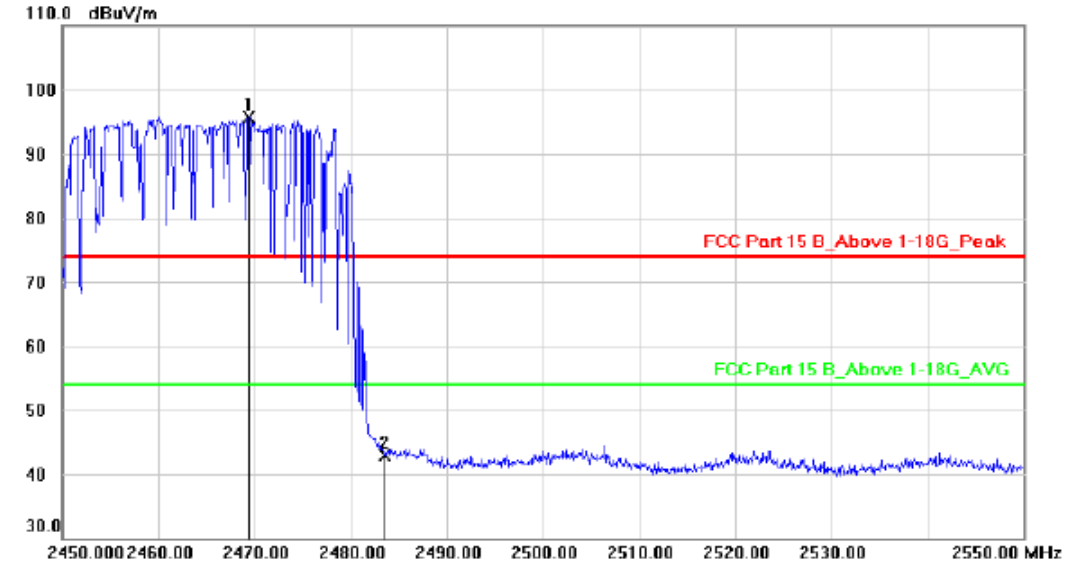
hopping-on

Polarization: Vertical Test Mode: GFSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2480.200 | 101.40 | -3.38 | 98.02 | 74.00 | 24.02 | peak | | | |
| 2 | | 2483.500 | 48.36 | -3.38 | 44.98 | 74.00 | -29.02 | peak | | | |

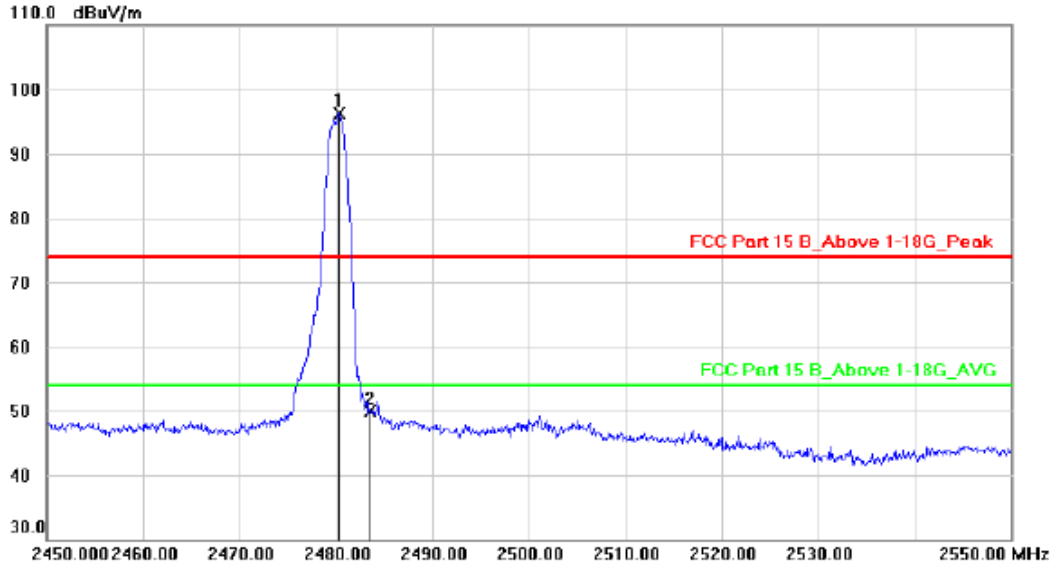
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2469.400 | 99.13 | -3.39 | 95.74 | 74.00 | 21.74 | peak | | | |
| 2 | | 2483.500 | 46.26 | -3.38 | 42.88 | 74.00 | -31.12 | peak | | | |

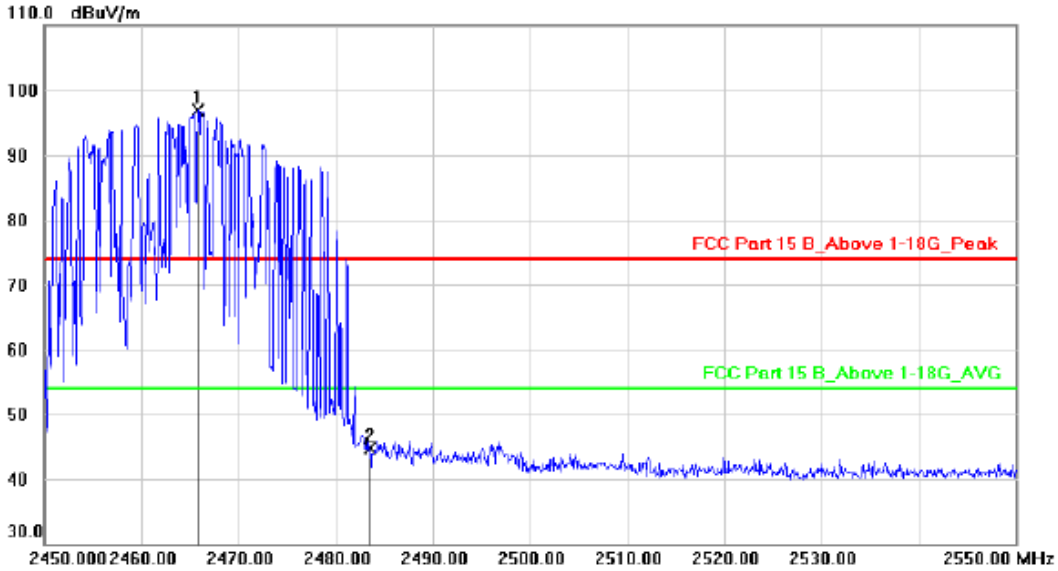
hopping-on

Polarization: Horizontal Test Mode: GFSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2480.300 | 99.60 | -3.38 | 96.22 | 74.00 | 22.22 | peak | | | |
| 2 | | 2483.500 | 53.32 | -3.38 | 49.94 | 74.00 | -24.06 | peak | | | |

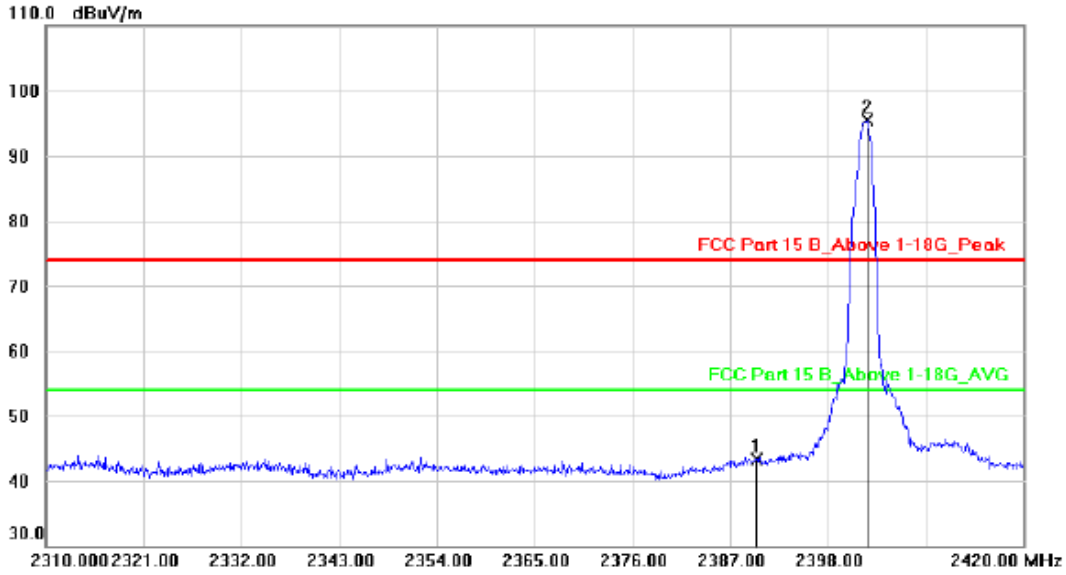
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2465.800 | 100.31 | -3.39 | 96.92 | 74.00 | 22.92 | peak | | | |
| 2 | | 2483.500 | 48.17 | -3.38 | 44.79 | 74.00 | -29.21 | peak | | | |

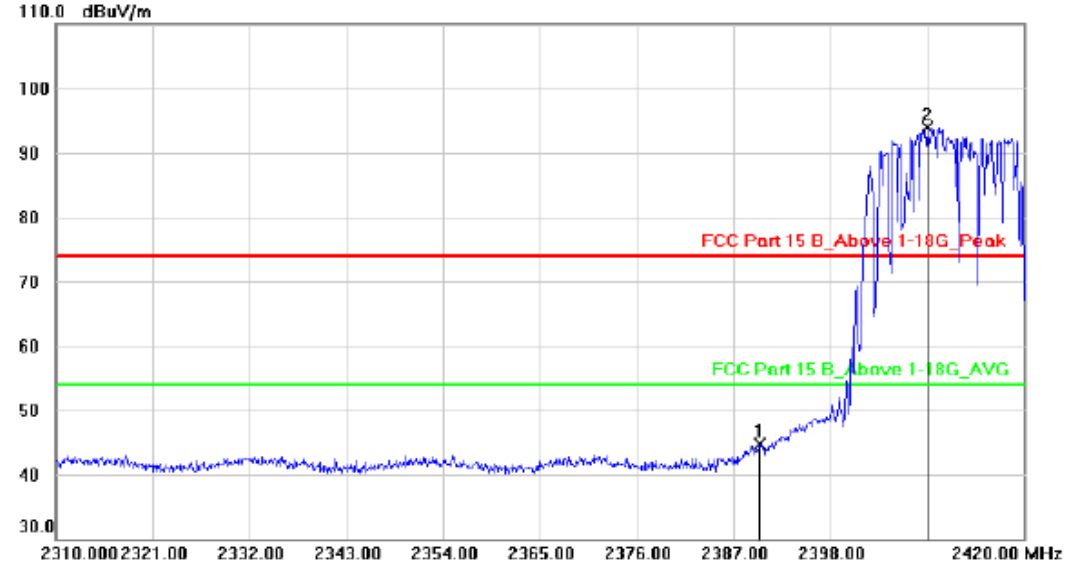
hopping-on

Polarization: Vertical Test Mode: π /4 DQPSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 46.61 | -3.40 | 43.21 | 74.00 | -30.79 | peak | | | |
| 2 | * | 2402.400 | 98.87 | -3.41 | 95.46 | 74.00 | 21.46 | peak | | | |

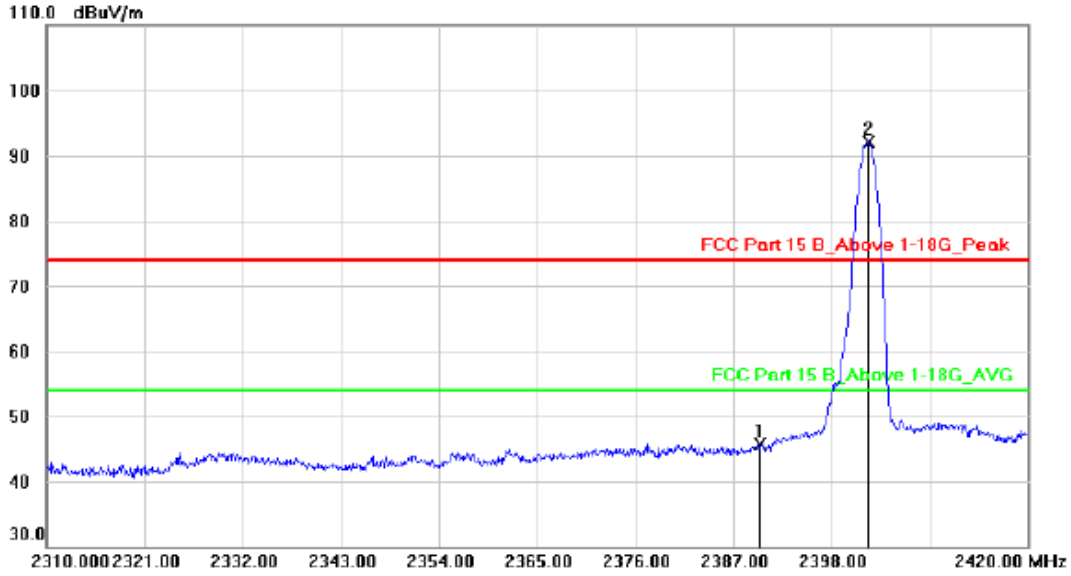
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 48.07 | -3.40 | 44.67 | 74.00 | -29.33 | peak | | | |
| 2 | * | 2409.110 | 97.40 | -3.40 | 94.00 | 74.00 | 20.00 | peak | | | |

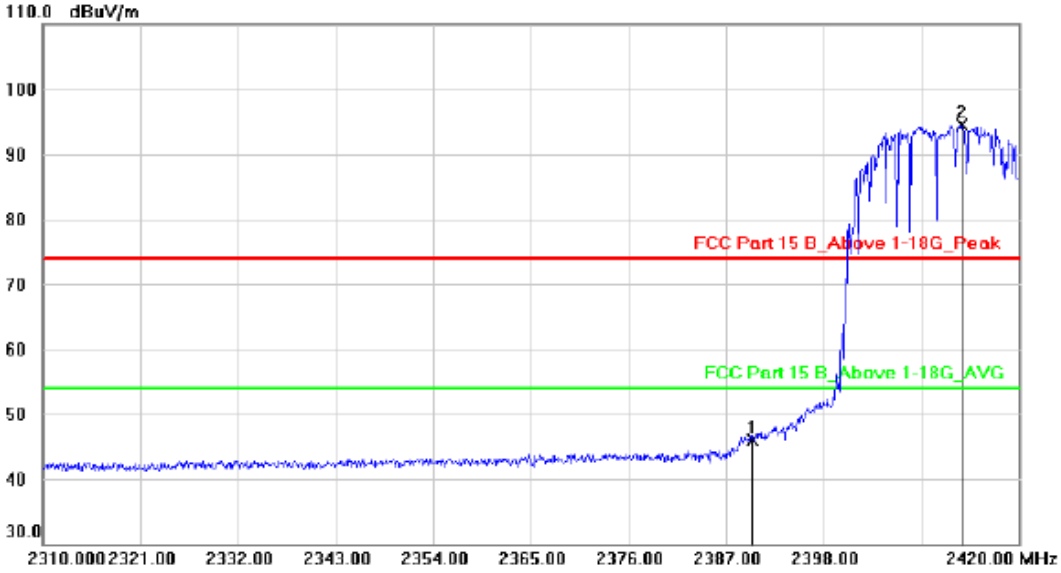
hopping-on

Polarization: Horizontal Test Mode: π /4 DQPSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 49.18 | -3.40 | 45.78 | 74.00 | -28.22 | peak | | | |
| 2 | * | 2402.180 | 95.42 | -3.41 | 92.01 | 74.00 | 18.01 | peak | | | |

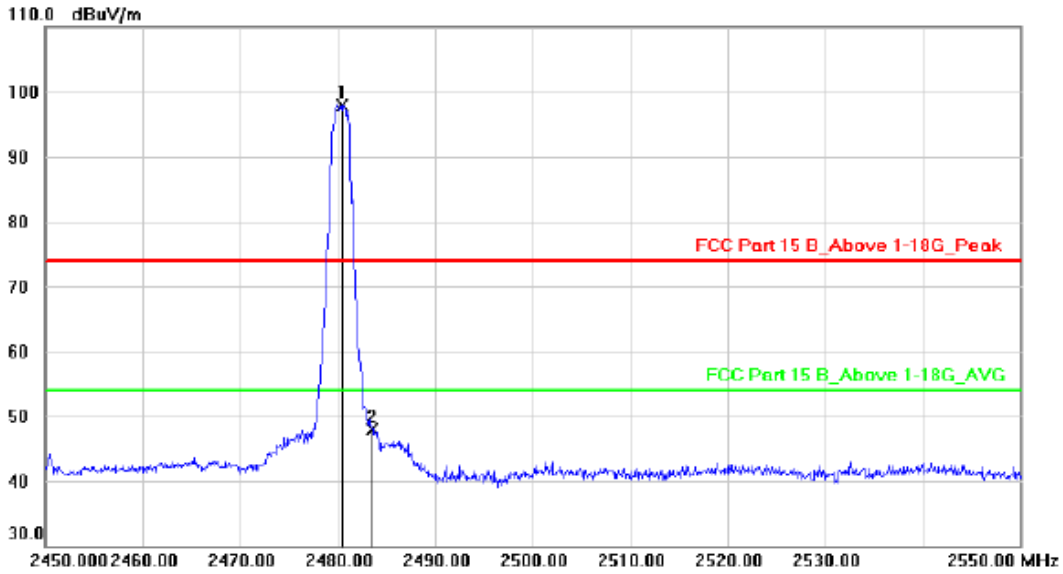
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 49.29 | -3.40 | 45.89 | 74.00 | -28.11 | peak | | | |
| 2 | * | 2413.620 | 97.95 | -3.41 | 94.54 | 74.00 | 20.54 | peak | | | |

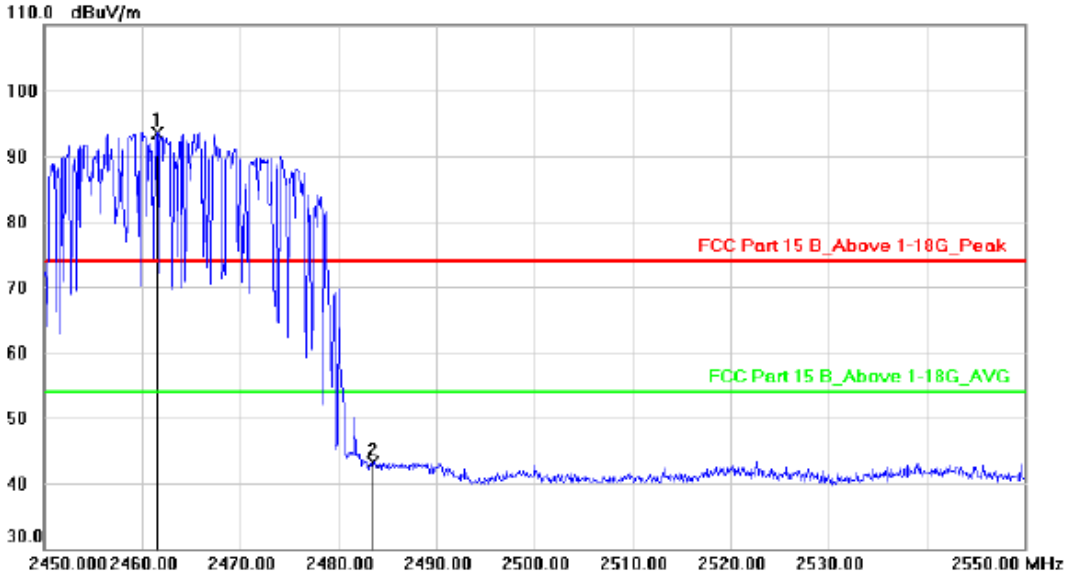
hopping-on

Polarization: Vertical Test Mode: π /4 DQPSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2480.500 | 101.25 | -3.38 | 97.87 | 74.00 | 23.87 | peak | | | |
| 2 | | 2483.500 | 51.21 | -3.38 | 47.83 | 74.00 | -26.17 | peak | | | |

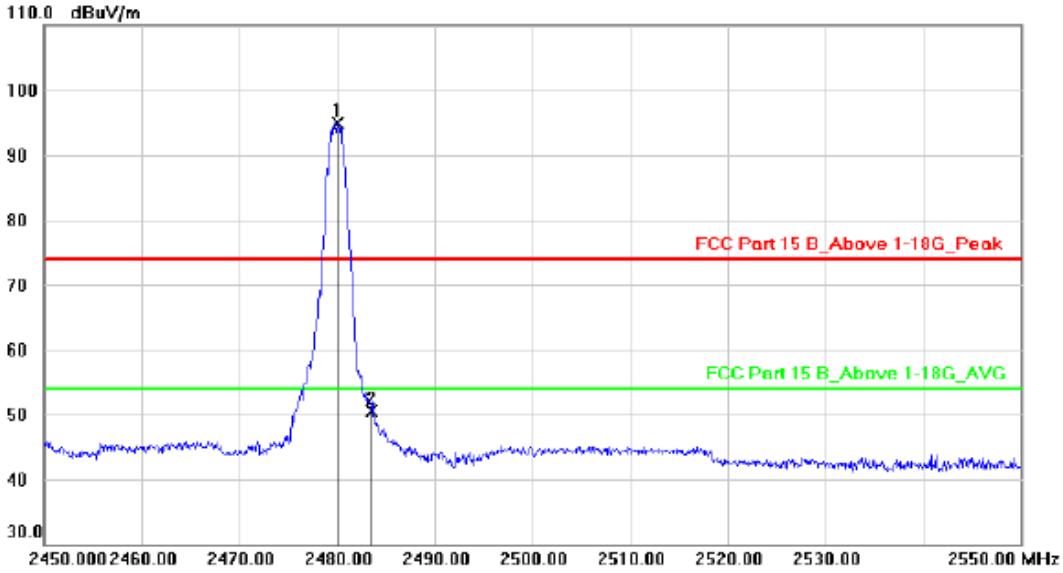
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2461.500 | 96.99 | -3.40 | 93.59 | 74.00 | 19.59 | peak | | | |
| 2 | | 2483.500 | 46.42 | -3.38 | 43.04 | 74.00 | -30.96 | peak | | | |

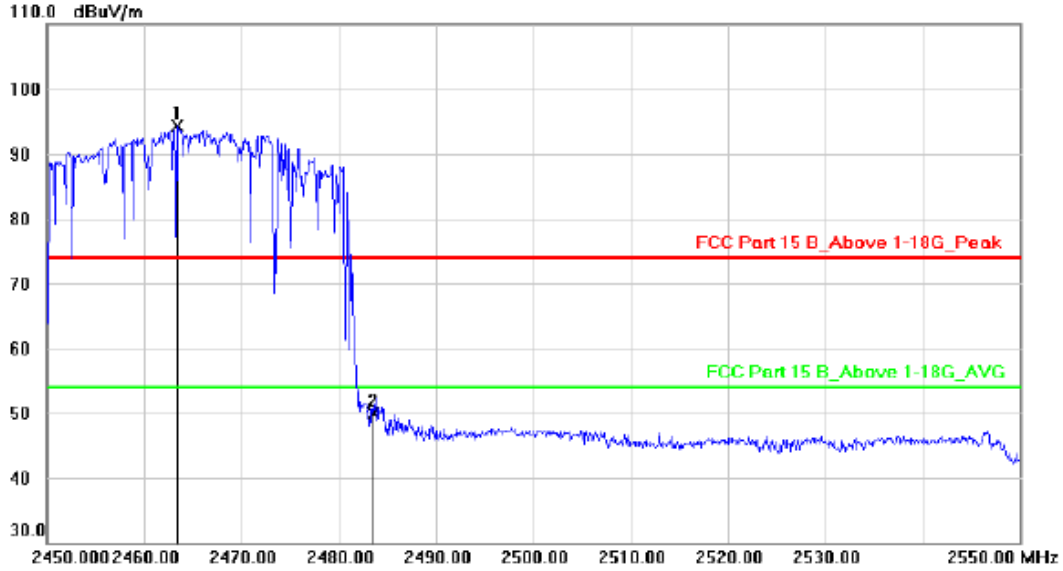
hopping-on

Polarization: Horizontal Test Mode: π /4 DQPSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2480.000 | 98.32 | -3.38 | 94.94 | 74.00 | 20.94 | peak | | | |
| 2 | | 2483.500 | 53.86 | -3.38 | 50.48 | 74.00 | -23.52 | peak | | | |

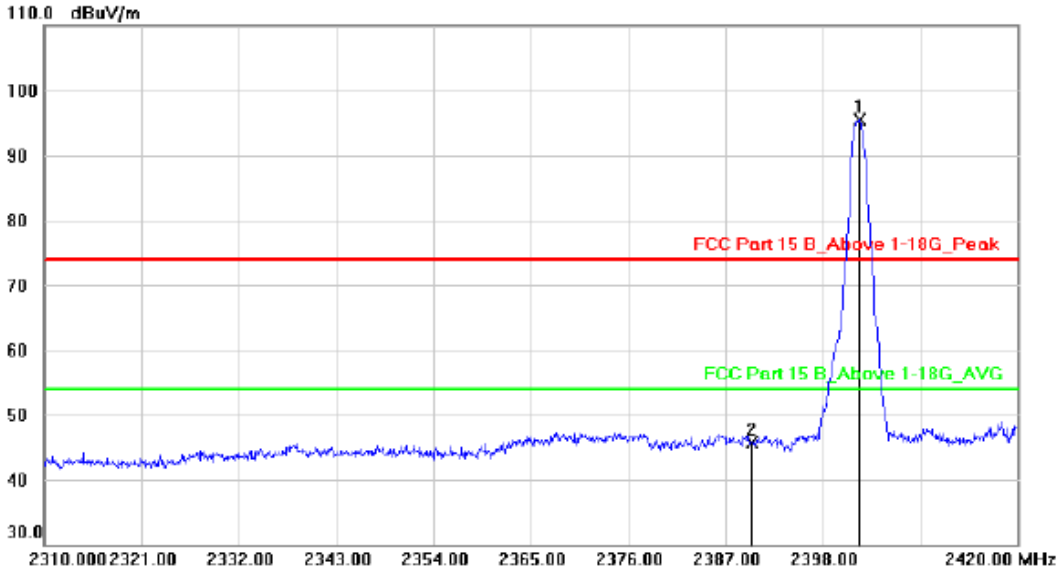
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2463.400 | 97.62 | -3.40 | 94.22 | 74.00 | 20.22 | peak | | | |
| 2 | | 2483.500 | 53.24 | -3.38 | 49.86 | 74.00 | -24.14 | peak | | | |

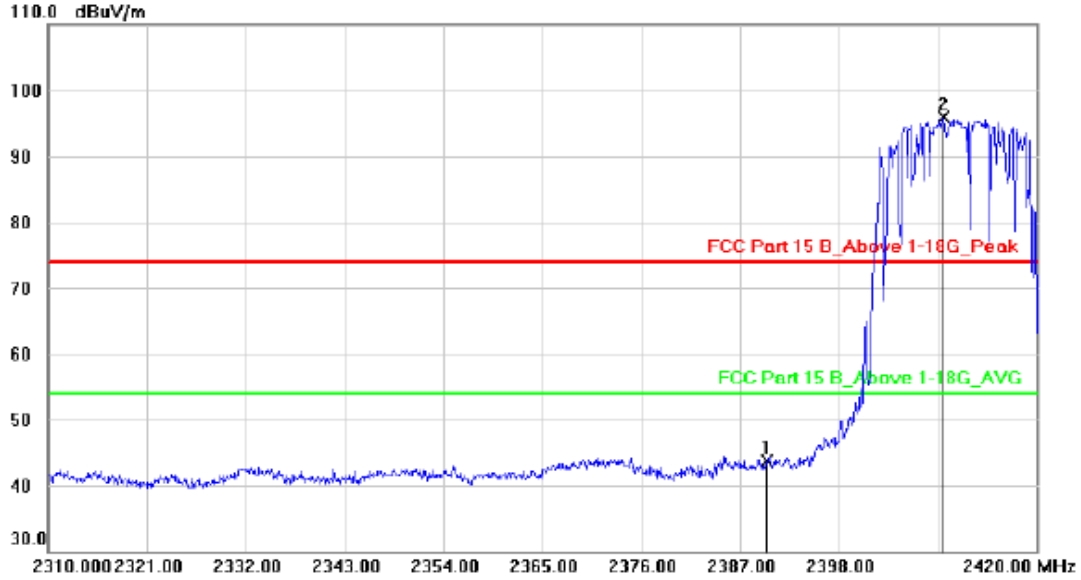
hopping-on

Polarization: Vertical Test Mode: 8DPSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2402.180 | 99.01 | -3.41 | 95.60 | 74.00 | 21.60 | peak | | | |
| 2 | | 2390.000 | 49.01 | -3.40 | 45.61 | 74.00 | -28.39 | peak | | | |

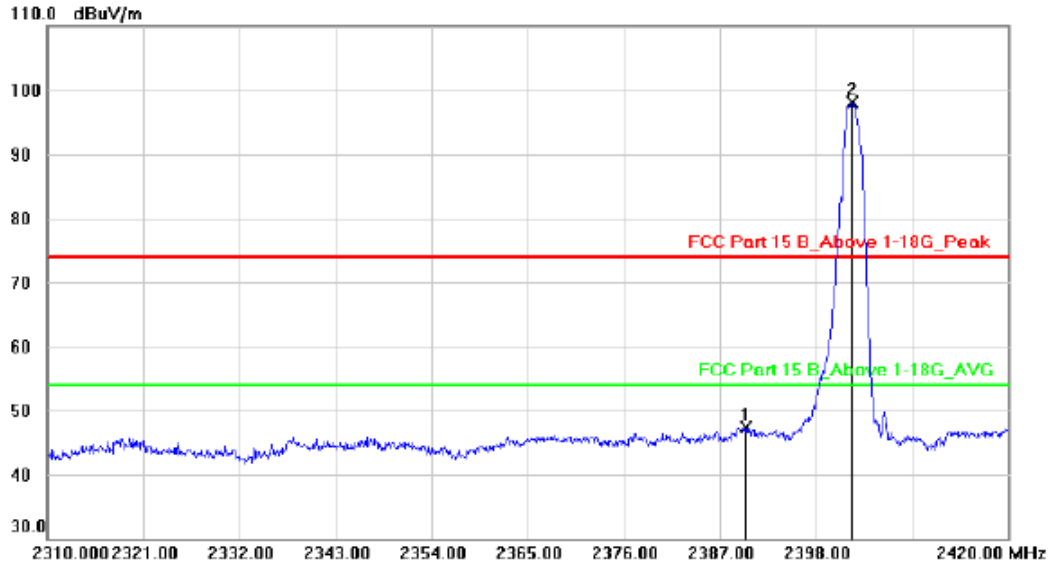
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 47.07 | -3.40 | 43.67 | 74.00 | -30.33 | peak | | | |
| 2 | * | 2409.660 | 99.23 | -3.40 | 95.83 | 74.00 | 21.83 | peak | | | |

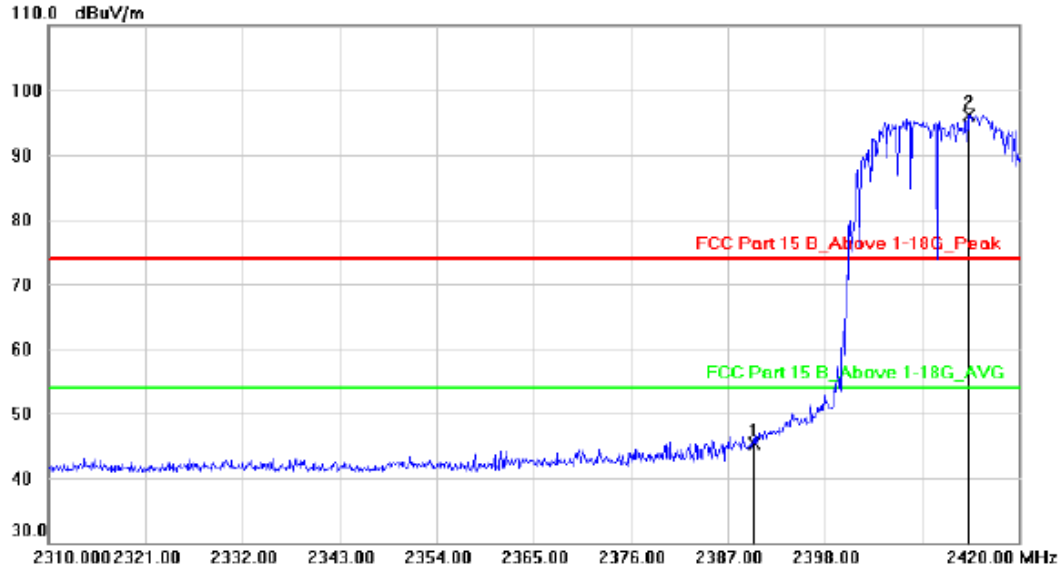
hopping-on

Polarization: Horizontal Test Mode: 8DPSK-Low




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 50.68 | -3.40 | 47.28 | 74.00 | -26.72 | peak | | | |
| 2 | * | 2402.180 | 101.42 | -3.41 | 98.01 | 74.00 | 24.01 | peak | | | |

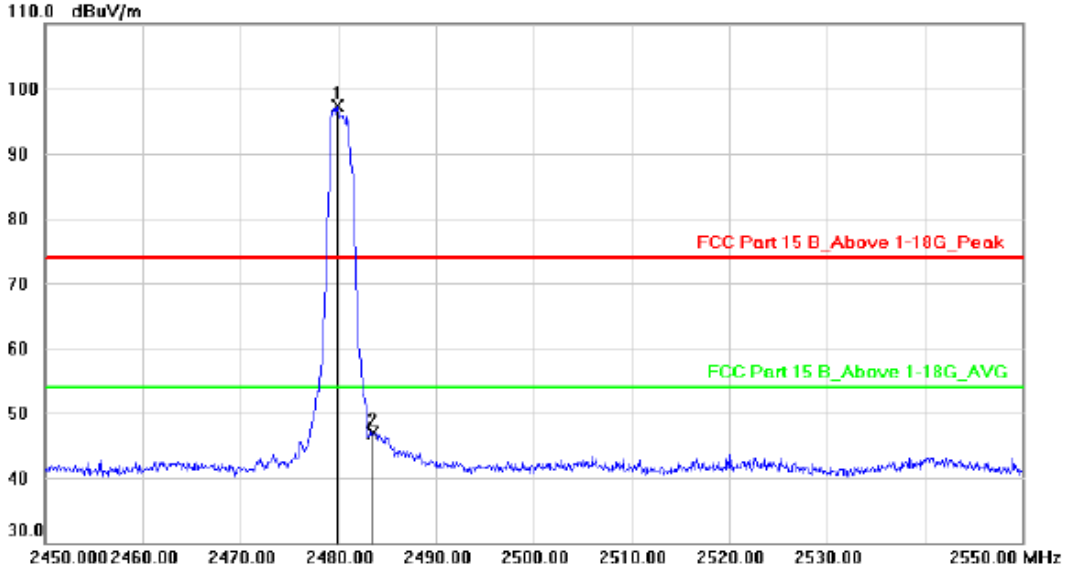
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 2390.000 | 48.79 | -3.40 | 45.39 | 74.00 | -28.61 | peak | | | |
| 2 | * | 2414.390 | 99.46 | -3.41 | 96.05 | 74.00 | 22.05 | peak | | | |

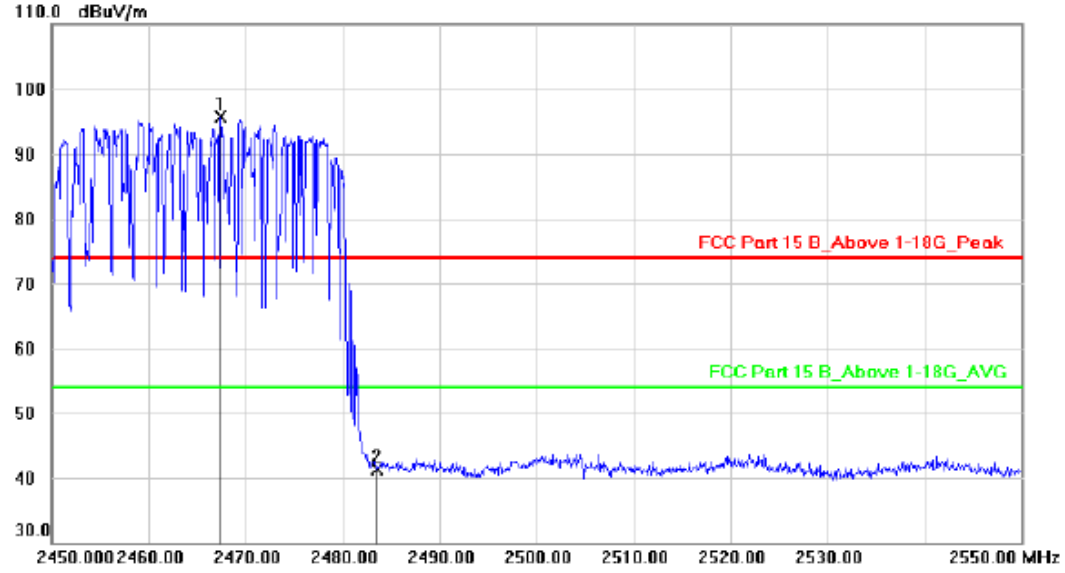
hopping-on

Polarization: Vertical Test Mode: 8DPSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2479.900 | 100.60 | -3.38 | 97.22 | 74.00 | 23.22 | peak | | | |
| 2 | | 2483.500 | 50.36 | -3.38 | 46.98 | 74.00 | -27.02 | peak | | | |

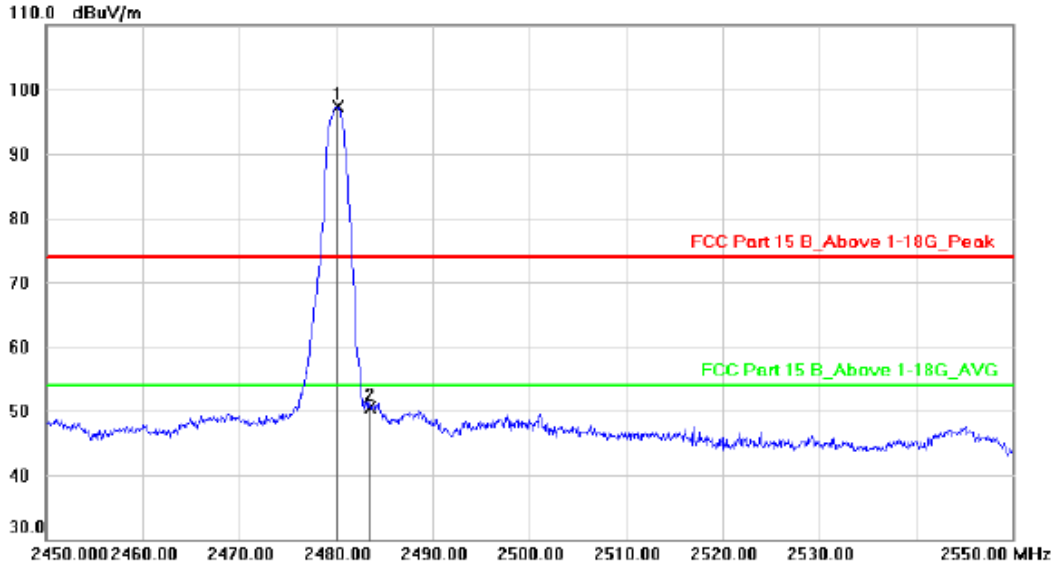
hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2467.400 | 99.09 | -3.39 | 95.70 | 74.00 | 21.70 | peak | | | |
| 2 | | 2483.500 | 44.76 | -3.38 | 41.38 | 74.00 | -32.62 | peak | | | |

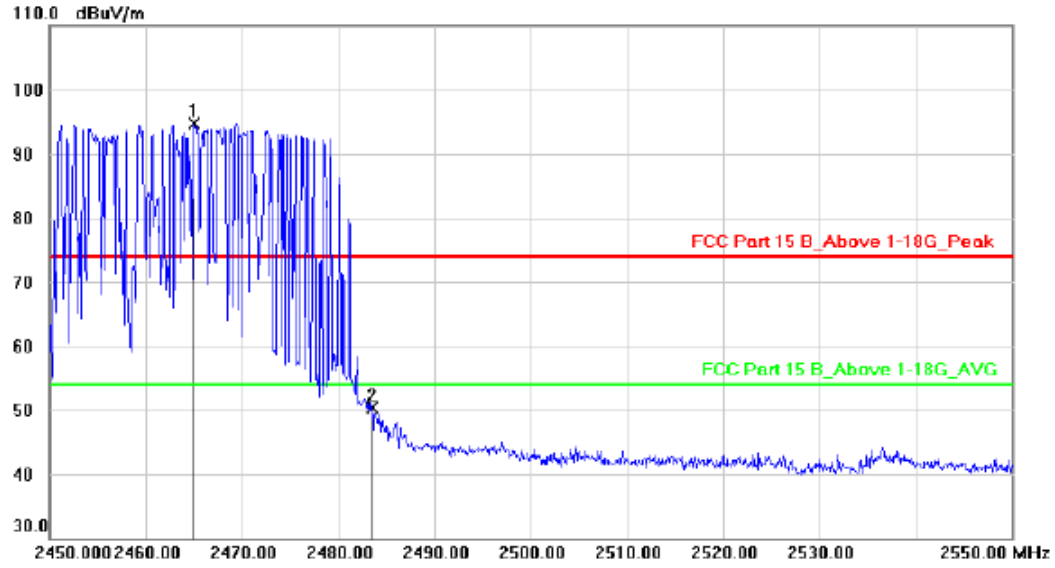
hopping-on

Polarization: Horizontal Test Mode: 8DPSK-High




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2480.200 | 100.75 | -3.38 | 97.37 | 74.00 | 23.37 | peak | | | |
| 2 | | 2483.500 | 53.82 | -3.38 | 50.44 | 74.00 | -23.56 | peak | | | |

hopping-off




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 2465.000 | 98.04 | -3.39 | 94.65 | 74.00 | 20.65 | peak | | | |
| 2 | | 2483.500 | 53.67 | -3.38 | 50.29 | 74.00 | -23.71 | peak | | | |

hopping-on

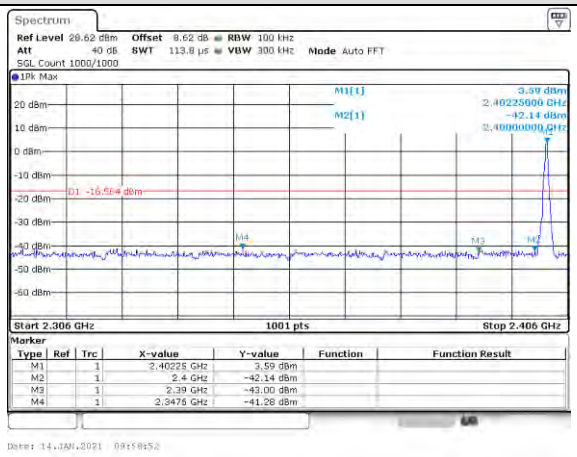
Note: 1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

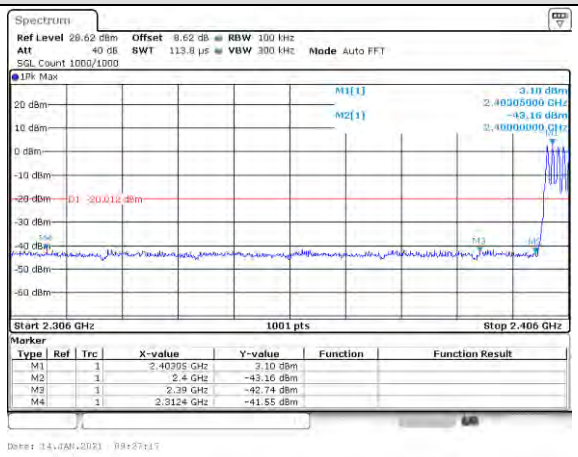
Conducted Method

**GFSK Mode:**

| Test channel: | Lowest channel |
|---|---|

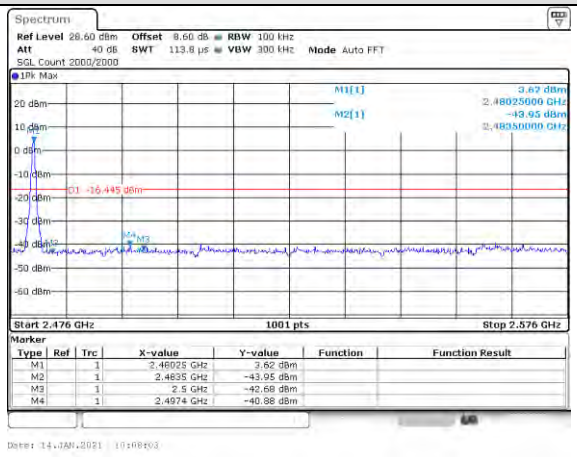



No-hopping mode

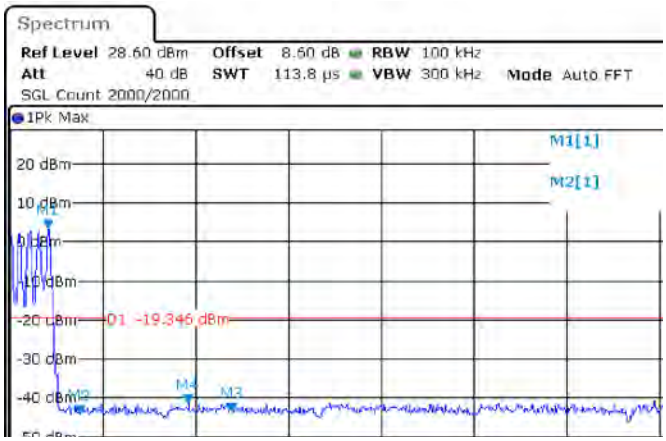



Hopping mode

| Test channel: | Highest channel |
|---|---|




No-hopping mode

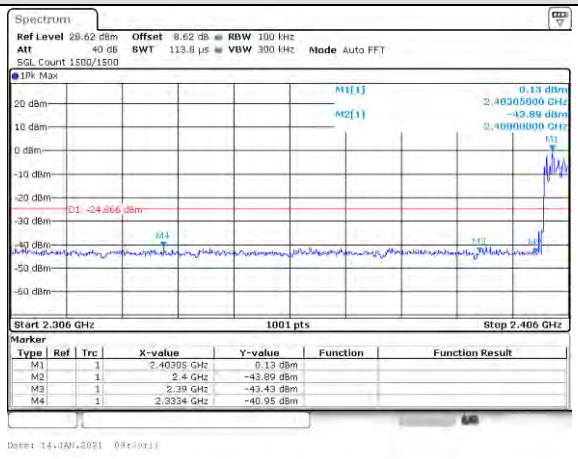



Hopping mode

**Pi/4QPSK Mode:**

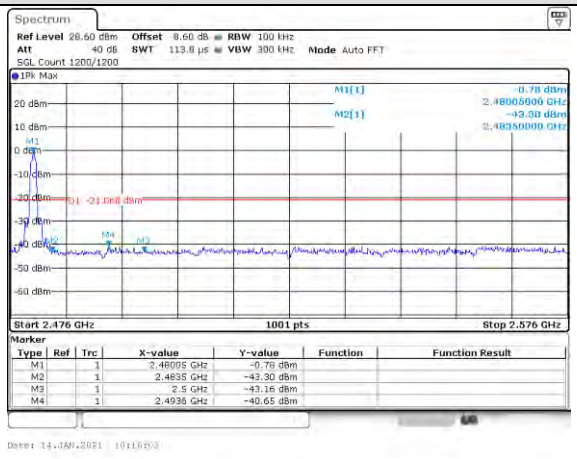
| Test channel: | Lowest channel |
|---|---|


No-hopping mode

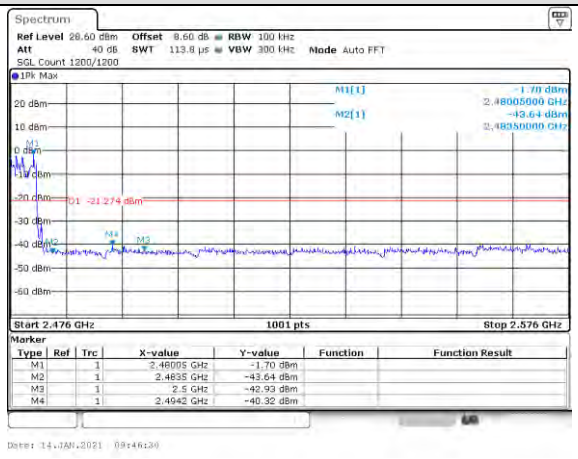



Hopping mode

| Test channel: | Highest channel |
|---|---|



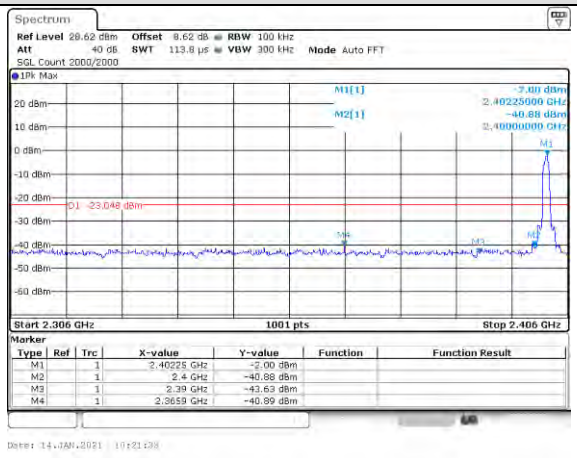

No-hopping mode



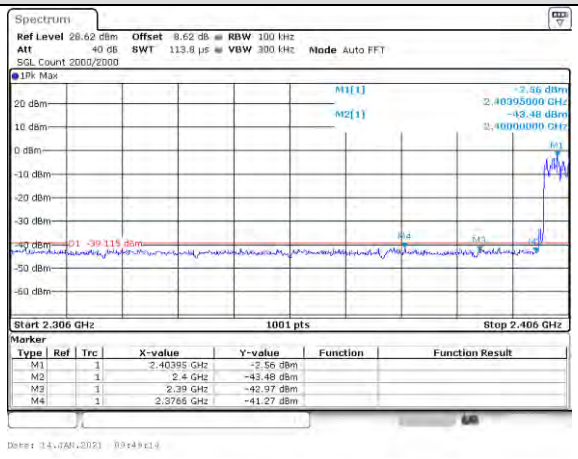

Hopping mode

**8DPSK Mode:**

| Test channel: | Lowest channel |
|---|---|

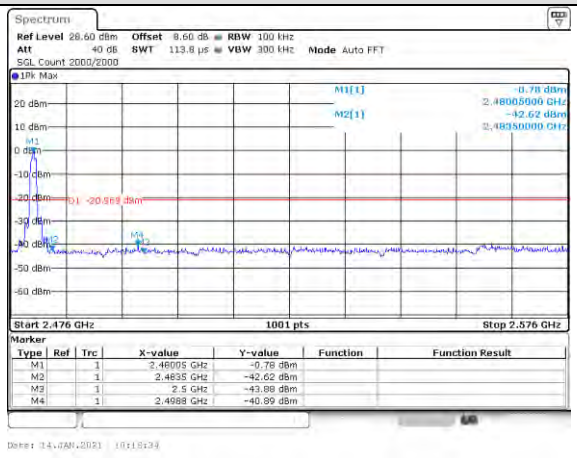



No-hopping mode

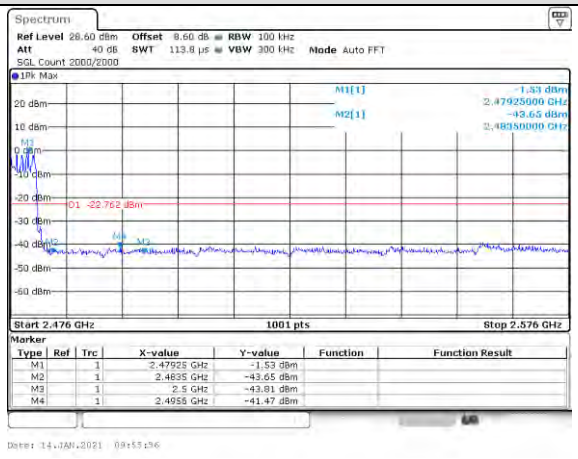



Hopping mode

| Test channel: | Highest channel |
|---|---|



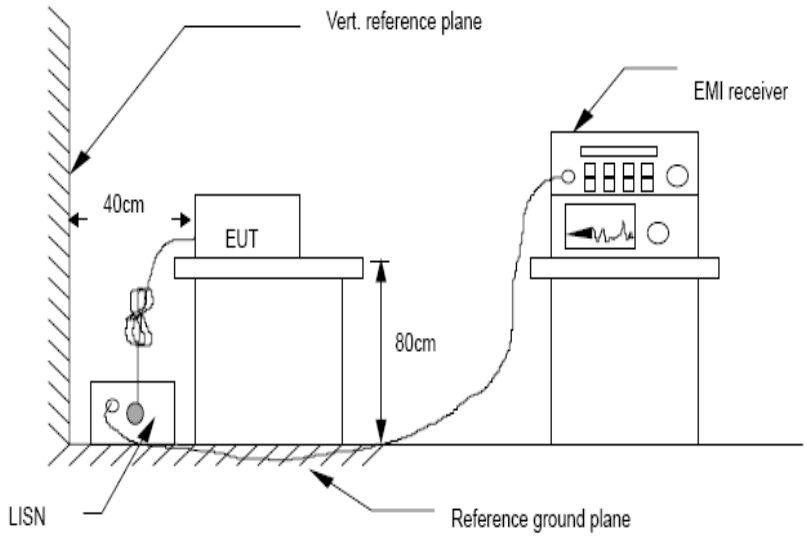

No-hopping mode




Hopping mode

# 10.POWER LINE CONDUCTED EMISSIONS

## 10.1.Block Diagram of Test Setup




## 10.2.Limit

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 150kHz ~ 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz ~ 5MHz | 56 | 46 |
| 5MHz ~ 30MHz | 60 | 50 |

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

## 10.3.Test Procedure

(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on conducted Emission test.
(4) The bandwidth of test receiver is set at 10KHz.

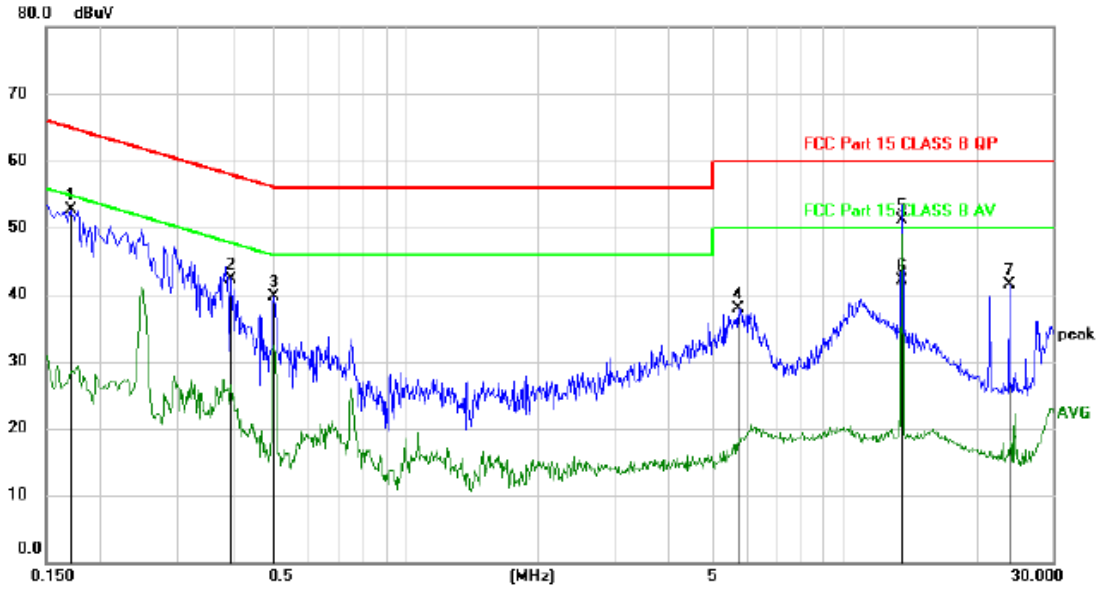
(5) The frequency range from 150 KHz to 30MHz is checked.

## 10.4.Test Result

PASS. (See below detailed test data)

Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

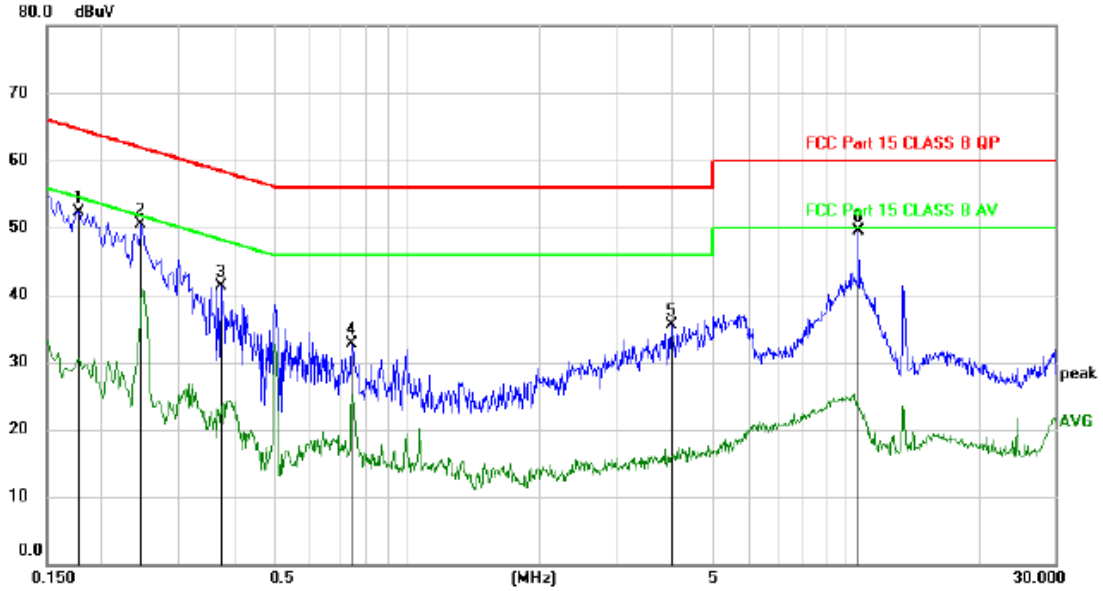
**Line:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1710 | 42.77 | 9.93 | 52.70 | 64.91 | -12.21 | peak | |
| 2 | | 0.3960 | 32.46 | 9.94 | 42.40 | 57.94 | -15.54 | peak | |
| 3 | | 0.4980 | 29.66 | 9.96 | 39.62 | 56.03 | -16.41 | peak | |
| 4 | | 5.7420 | 27.74 | 10.07 | 37.81 | 60.00 | -22.19 | peak | |
| 5 | | 13.5630 | 40.85 | 10.30 | 51.15 | 60.00 | -8.85 | QP | |
| 6 | * | 13.5630 | 31.76 | 10.30 | 42.06 | 50.00 | -7.94 | AVG | |
| 7 | | 23.8560 | 31.10 | 10.44 | 41.54 | 60.00 | -18.46 | peak | |

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

**Neutral:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1770 | 42.35 | 9.93 | 52.28 | 64.63 | -12.35 | peak | |
| 2 | | 0.2460 | 40.47 | 9.97 | 50.44 | 61.89 | -11.45 | peak | |
| 3 | | 0.3750 | 31.33 | 9.94 | 41.27 | 58.39 | -17.12 | peak | |
| 4 | | 0.7440 | 22.81 | 9.93 | 32.74 | 56.00 | -23.26 | peak | |
| 5 | | 3.9900 | 25.56 | 9.97 | 35.53 | 56.00 | -20.47 | peak | |
| 6 | * | 10.6920 | 39.20 | 10.23 | 49.43 | 60.00 | -10.57 | peak | |

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2441MHz (AC 120V/ 60Hz) was listed in this report.

# 11.FREQUENCY STABILITY

## 11.1.Test limit

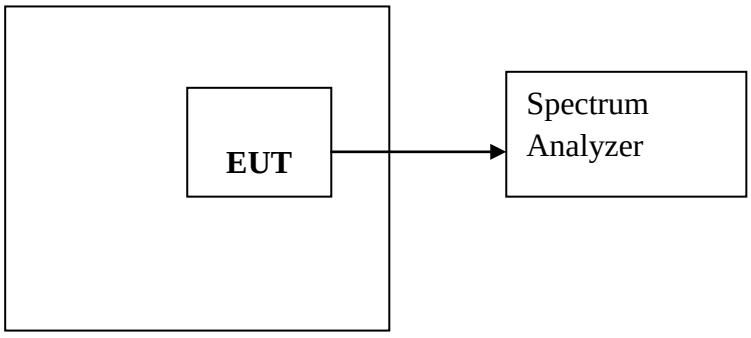
Please refer section RSS-Gen.

Regulation RSS-Gen If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

## 11.2.Test Procedure

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 11.3.Test Setup




Temperature controller

## 11.4.Test Results

**PASS.**

Detailed information please see the following page.

| Assigned Frequency(MHz): 2402MHz(GFSK) | | | | |
|---|---|---|---|---|
| Voltage | Temperature | Measured Frequency (MHz) | Frequency stability(MHz) | Limit(MHz) |
| Low DC 10.8V | +20℃ | 2402.005 | 0.005 | ±0.020 |
| Normal DC 12V | -10℃ | 2402.004 | 0.004 | ±0.020 |
| | -5℃ | 2402.006 | 0.006 | ±0.020 |
| | 0℃ | 2402.001 | 0.001 | ±0.020 |
| | +10℃ | 2402.005 | 0.005 | ±0.020 |
| | +20℃ | 2402.001 | 0.001 | ±0.020 |
| | +30℃ | 2402.004 | 0.004 | ±0.020 |
| | +40℃ | 2402.005 | 0.005 | ±0.020 |
| | +50℃ | 2402.003 | 0.003 | ±0.020 |
| | +60℃ | 2402.002 | 0.002 | ±0.020 |
| High DC 13.2V | +20℃ | 2402.004 | 0.004 | ±0.020 |

# 12. ANTENNA REQUIREMENTS

## 12.1. Limit

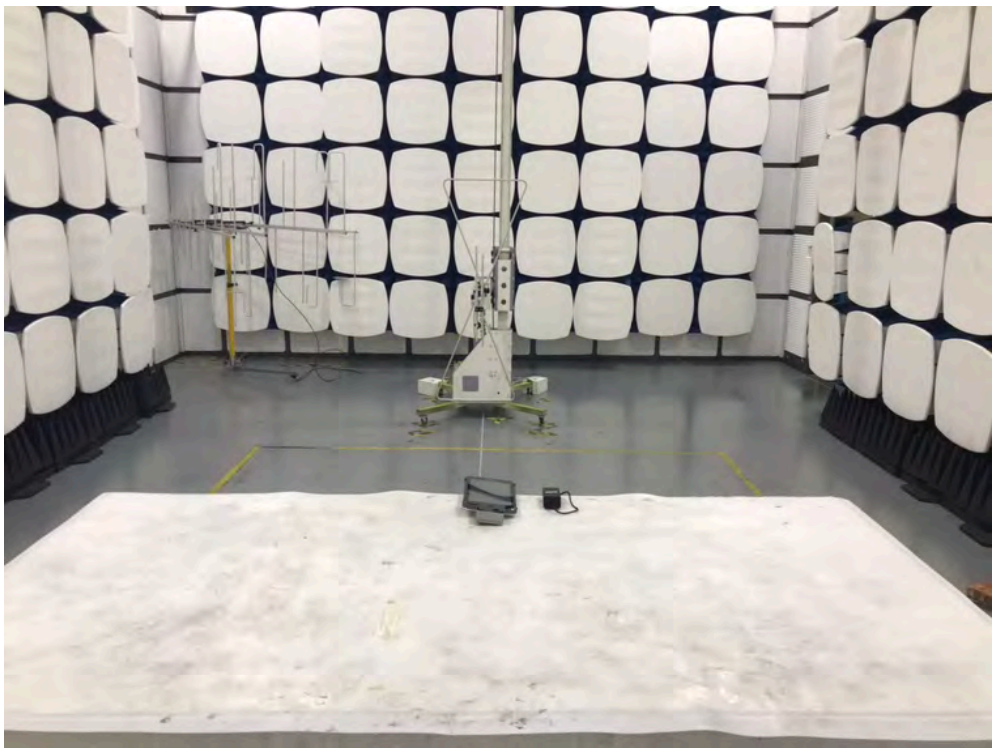
For intentional device, according to FCC 47 CFR Section 15.203 and RSS-GEN, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

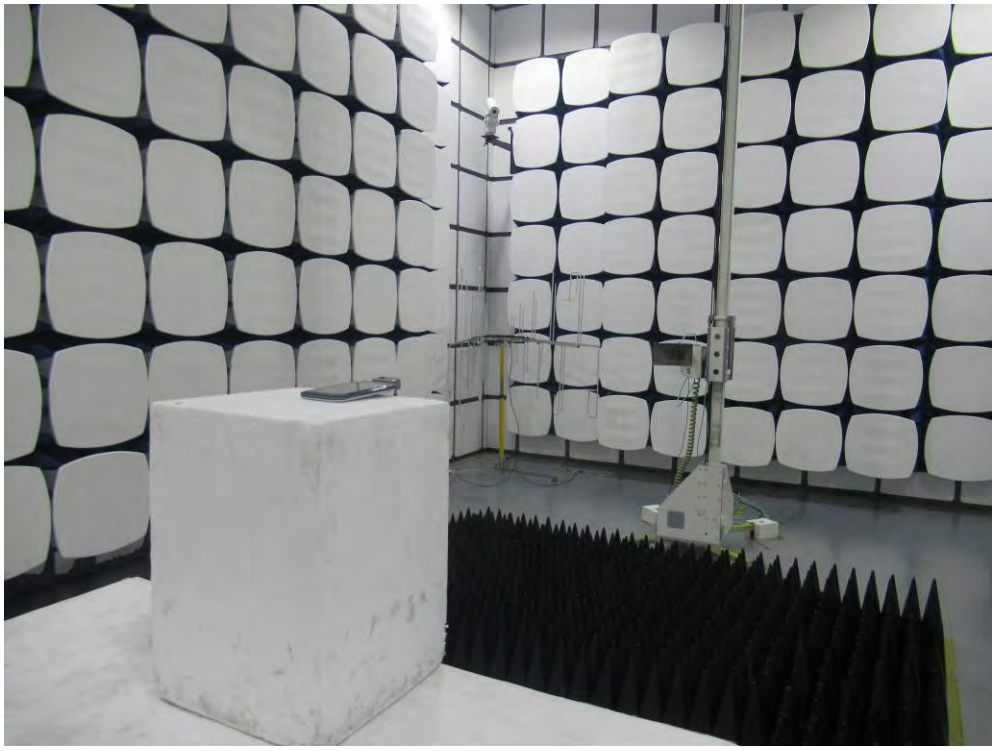
## 12.2. Result

The EUT antenna is internal antenna. It complies with the standard requirement.

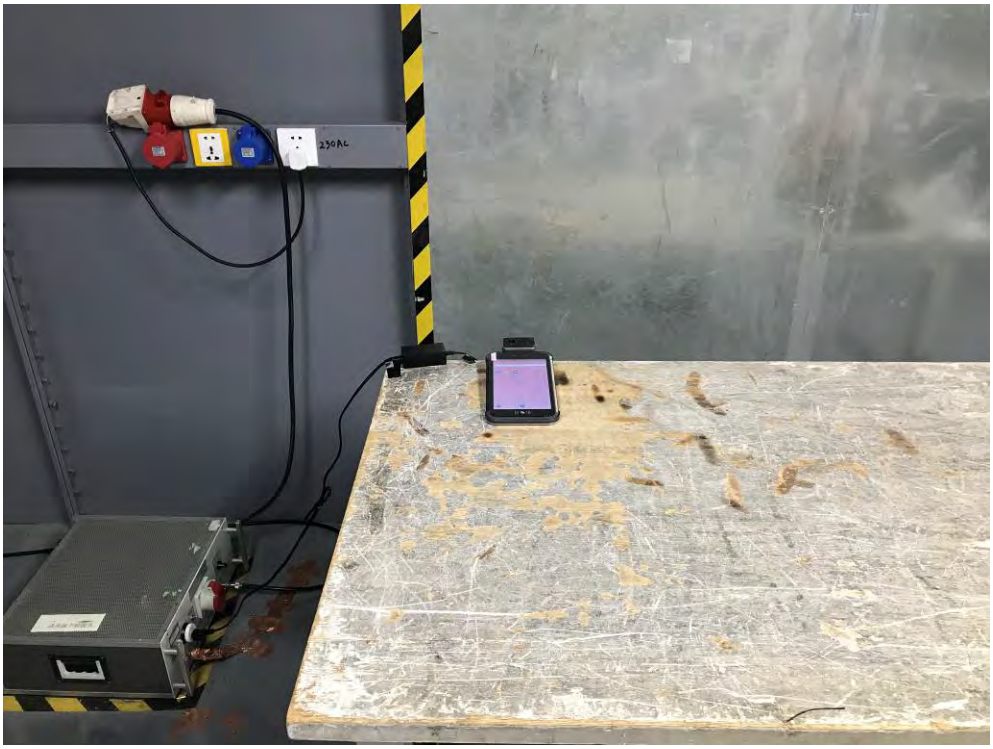
# 13. Test Setup Photo

## 13.1. Photos of Radiated emission





## 13.2.Photos of Conducted Emission test



# 14. EUT PHOTO

Please refer to: External Photographs and Internal Photographs.

**---------THE END OF REPORT-------**