# FCC TEST REPORT

## FCC ID: 2BGGZ-T86DVR1026

On Behalf of

Dongguan Kele technology Co., LTD

Vehicle monitoring system

Model No.: T86DVR 10.26, T86DVR 10.36, 10.26, T86PND 10.36, T86PND 10.26, T86PND 9, T86DVR 9, T86DVR 7, T86PND 7, T86PND 6.86, T86DVR 6.86, T86PND 6.25, 6.25, 6.25DVR, T86B 6.25, T86DVR 8.9, T86PND 8.9, T86DVR 9.66, T86PND 9.66

| | | |
|---|---|---|
| Prepared for | : | Dongguan Kele technology Co., LTD |
| Address | : | West Block, 3rd Floor, Building 3, Dewang Industrial Park, No. 12 Huayuan East Street, Hengtang Community, Tangxia Town, Dongguan City |

| | | |
|---|---|---|
| Prepared By | : | Shenzhen PSI Testing Co., Ltd. |
| Address | : | 1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China |

| | | |
|---|---|---|
| Report Number | : | psi2403052-C01-R05 |
| Date of Receipt | : | March 20, 2024 |
| Date of Test | : | March 20, 2024-March 27, 2024 |
| Date of Report | : | March 28, 2024 |
| Version Number | : | V0 |

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# TEST REPORT DECLARATION

| | | |
|---|---|---|
| Applicant | : | Dongguan Kele technology Co., LTD |
| Address | : | West Block, 3rd Floor, Building 3, Dewang Industrial Park, No. 12 Huayuan East Street, Hengtang Community, Tangxia Town, Dongguan City |
| Manufacturer | : | Dongguan Kele technology Co., LTD |
| Address | : | West Block, 3rd Floor, Building 3, Dewang Industrial Park, No. 12 Huayuan East Street, Hengtang Community, Tangxia Town, Dongguan City |
| EUT Description | : | Vehicle monitoring system |
| | (A) Model No. | : T86DVR 10.26, T86DVR 10.36, 10.26, T86PND 10.36, T86PND 10.26, T86PND 9, T86DVR 9, T86DVR 7, T86PND 7, T86PND 6.86, T86DVR 6.86, T86PND 6.25, 6.25, 6.25DVR, T86B 6.25, T86DVR 8.9, T86PND 8.9, T86DVR 9.66, T86PND 9.66 |
| | (B) Trademark | : N/A |

Measurement Standard Used:

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

**ANSI C63.10-2013**

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part 15 requirements.

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

| | | |
|---|---|---|
| Tested by (name + signature).....…..: | Felix Pang<br>Test Engineer | Felix Pang |
| Approved by (name + signature)…....: | Simple Guan<br>Project Manager | Simple Guan |
| Date of issue……..: | March 28, 2024 | |

# Revision History

| Revision | Issue Date | Revisions | Revised By |
|---|---|---|---|
| V0 | March 28, 2024 | Initial released Issue | Felix 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) | P |
| Bandwidth | FCC Part 15:15.247(a)(1) | P |
| Carrier Frequency Separation | FCC Part 15: 15.247(a)(1) | P |
| Number Of Hopping Channel | FCC Part 15: 15.247(a)(1) | P |
| Dwell Time | FCC Part 15: 15.247(a)(1) | P |
| Radiated Spurious Emission | FCC Part 15: 15.209<br>FCC Part 15: 15.205 | P |
| Out-of-band Emissions | FCC Part 15: 15.247(d) | P |
| Radiated Band Edge Emission | FCC Part 15: 15.247(d) | P |
| Power Line Conducted Emissions | FCC Part 15: 15.207 | N/A |
| Antenna requirement | FCC Part 15: 15.203 | P |

Note:
1. P is an abbreviation for Pass.
2. F is an abbreviation for Fail.
3. N/A is an abbreviation for Not Applicable.
4. Conclusion determination rules of this report: Unless there are clear provisions on measurement uncertainty in the standard or customer requirements, decision by actual test data without considering measurement uncertainty.
5. Measurement method usage KDB 558074 D01 15.247 Meas Guidance v05r02.

# 2. General Information

## 2.1. Description of Device (EUT)

| | | |
|---|---|---|
| Description/PMN | : | Vehicle monitoring system |
| Model Number/HVIN(s) | : | T86DVR 10.26, T86DVR 10.36, 10.26, T86PND 10.36, T86PND 10.26, T86PND 9, T86DVR 9, T86DVR 7, T86PND 7, T86PND 6.86, T86DVR 6.86, T86PND 6.25, 6.25, 6.25DVR, T86B 6.25, T86DVR 8.9, T86PND 8.9, T86DVR 9.66, T86PND 9.66 |
| Diff | : | There is no difference except the name of the model. All tests are made with the T86DVR 10.26 model. |
| Test Voltage | : | DC 5V from Car charger with battery DC 12/24V |
| Radio Technology | : | Bluetooth V5.0 EDR |
| Operation frequency | : | 2402-2480MHz |
| Modulation | : | GFSK, π/4-DQPSK, 8DPSK |
| Channel No. | : | 79 |
| Channel Separation | : | 1MHz |
| Antenna Type | : | Internal antenna, Maximum Gain is 1.59dBi. |
| Software version | : | V1.0 |
| Hardware version | : | V1.0 |
| Intend use environment | : | Residential, commercial and light industrial environment |
| Note | : | Antenna information is provided by applicant.<br>Testing lab is not responsible for the accuracy of the information. |

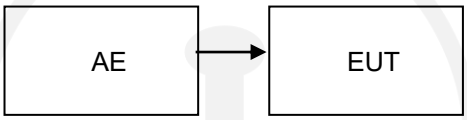
## 2.2. Accessories of Device (EUT)

| | | |
|---|---|---|
| Accessories | : | Car charger |
| Manufacturer | : | Dongguan Kele technology Co., LTD |
| Model | : | N/A |
| Ratings | : | Input: DC 12-24V<br>Output: DC 5.0V/3.0A |

## 2.3. Tested Supporting System Details

| No. | Description | Manufacturer | Model | Serial Number |
|---|---|---|---|---|
| 1 | Battery | Varta | 12V | N/A |
| 2 | Battery | Varta | 12V | N/A |

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




## 2.5. Test Mode Description

The test software 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) |
| GFSK / Pi/4-DQPSK/8DPSK Carrier Tx Mode | CH0 | 2402 |
| | CH39 | 2441 |
| | CH78 | 2480 |
| GFSK / Pi/4-DQPSK/8DPSK hopping on Tx Mode | CH0 to CH78 | 2402 to 2480 |
| GFSK / Pi/4-DQPSK/8DPSK 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 PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission
Registration Number: 916281

## 2.8. Measurement Uncertainty

(95% confidence levels, k=2)

| **Item** | **Uncertainty** |
|---|---|
| Uncertainty for Power point Conducted Emissions Test | 2.17dB |
| Uncertainty for Radiation Emission test in 3m chamber (below 30MHz) | 3.5dB |
| Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz) | 2.74dB(Polarize: V) |
| | 2.76dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz) | 4.29dB(Polarize: V) |
| | 4.82dB(Polarize: H) |
| Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz) | 4.31 dB(Polarize: V) |
| | 4.30 dB(Polarize: H) |
| Uncertainty for radio frequency | 48.24KHz |
| Uncertainty for conducted RF Power | 0.41dB |

## 2.9. Test Equipment List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Firmware Version | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|---|
| 1. | 9*6*6 anechoic chamber | SKET | 9*6*6 | N/A | / | 2022.12.20 | 3 Year |
| 2. | Test Receiver | Rohde&Schwarz | ESCI 7 | 101032/003 | 4.42 SP3 | 2023.12.19 | 1 Year |
| 3. | L.I.S.N.#1 | Rohde&Schwarz | ENV216 | 102282 | / | 2023.12.19 | 1 Year |
| 4. | L.I.S.N.#2 | RFT | NNB111 | 13835240 | / | 2023.12.19 | 1 Year |
| 5. | Loop Antenna | Schwarz beck | FMZB 1519B | 00128 | / | 2023.04.03 | 2 Year |
| 6. | Bilog Antenna | Schwarz beck | VULB 9168 | 01448 | / | 2022.12.26 | 2 Year |
| 7. | Spectrum Analyzer | Rohde&Schwarz | FSV-40N | 101648 | 3.70 | 2023.12.19 | 1 Year |
| 8. | Horn Antenna | Schwarz beck | BBHA 9120 D | 02706 | / | 2022.12.26 | 2 Year |
| 9. | Amplifier | SKET | LAPA_01G18G-45dB | SK2022032901 | / | 2023.12.19 | 1 Yea |
| 10. | Horn Antenna | Schwarz beck | BBHA 9170 | 00946 | / | 2022.12.25 | 2 Year |
| 11. | Amplifier | SKET | LNPA_0118G-45 | SK2020010801 | / | 2023.12.19 | 1 Yea |
| 12 | RF Power Probe | Rohde&Schwarz | NRP-Z11 | 1138.3004.02-1111533-Fz | / | 2023.12.19 | 1 Yea |
| 13 | RF Sensor Unit | Tachoy | TR1029-2 | 20220428P008 | / | 2023.12.19 | 1 Yea |

For Test Software Information

| Item | Software Name | Manufacturer | Version |
|---|---|---|---|
| RE | EZ_EMC | Farad | PSI-3A1 |
| CE | EZ_EMC | Farad | PSI-3A1 |
| RF | RTS | TACHOY | V1.0.0 |

# 3. Maximum Peak Output Power

## 3.1. Limit

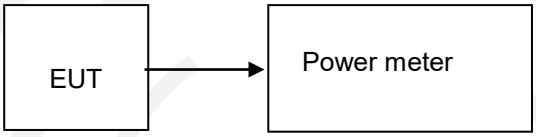
Please refer FCC part 15.247 & RSS-247.

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

| Condition | Antenna | Modulation | Frequency (MHz) | Max. Conducted Power(dBm) | Max. Conducted Power(mW) | Limit(mW) | Result |
|---|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 2402.00 | 5.23 | 3.33 | 1000 | Pass |
| NVNT | ANT1 | 1-DH1 | 2441.00 | **5.94** | **3.93** | 1000 | Pass |
| NVNT | ANT1 | 1-DH1 | 2480.00 | 5.37 | 3.44 | 1000 | Pass |
| NVNT | ANT1 | 2-DH1 | 2402.00 | 2.60 | 1.82 | 125 | Pass |
| NVNT | ANT1 | 2-DH1 | 2441.00 | 4.00 | 2.51 | 125 | Pass |
| NVNT | ANT1 | 2-DH1 | 2480.00 | 4.79 | 3.01 | 125 | Pass |
| NVNT | ANT1 | 3-DH1 | 2402.00 | 5.71 | 3.72 | 125 | Pass |
| NVNT | ANT1 | 3-DH1 | 2441.00 | 5.89 | 3.88 | 125 | Pass |
| NVNT | ANT1 | 3-DH1 | 2480.00 | 5.80 | 3.80 | 125 | 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.

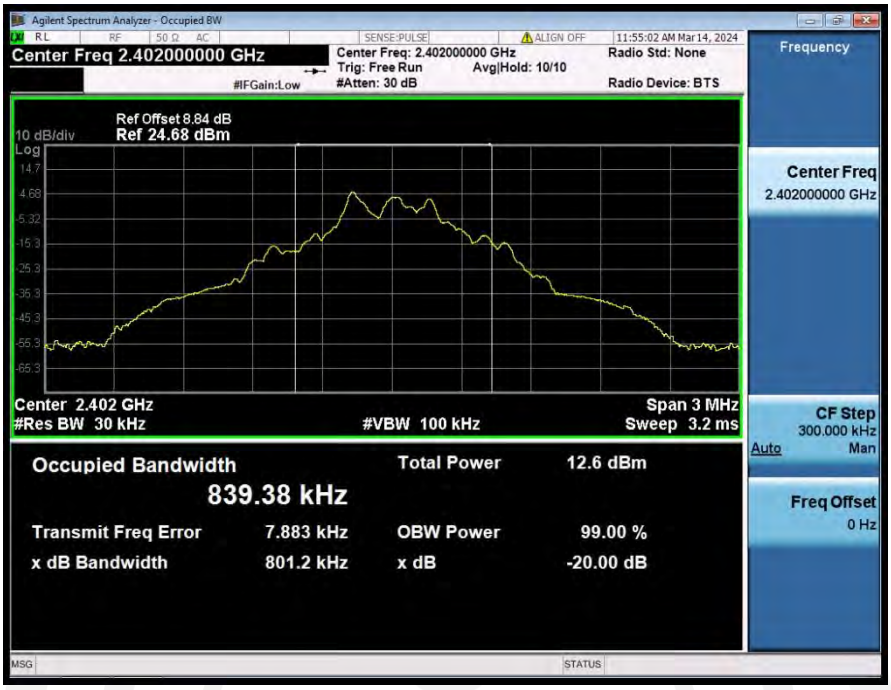
## 4.2. Test Procedure

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.

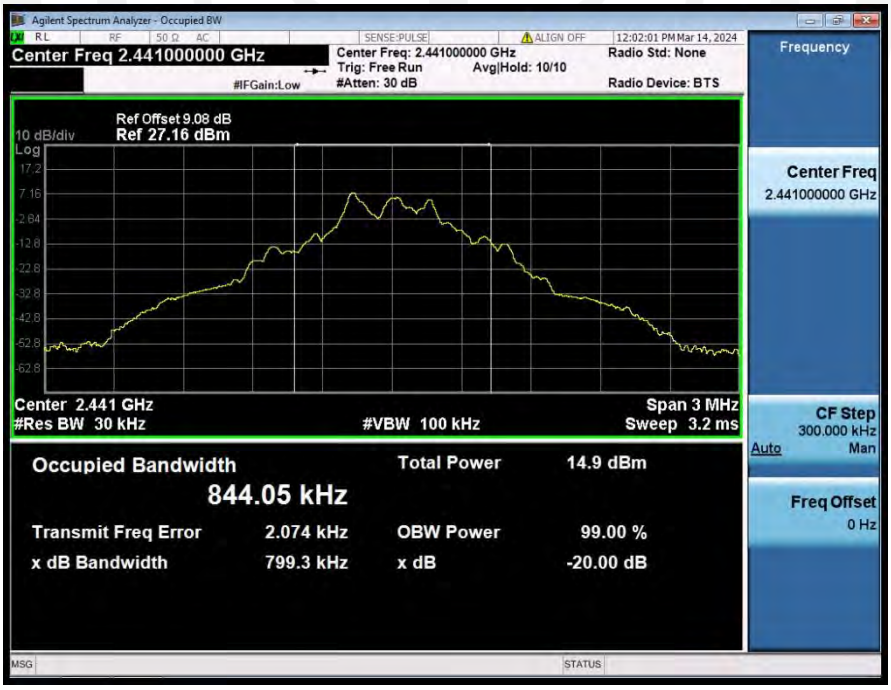
## 4.3. Test Result

| Condition | Antenna | Modulation | Frequency (MHz) | -20dB BW(MHz) | if larger than CFS |
|---|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 2402.00 | 0.801 | No |
| NVNT | ANT1 | 1-DH1 | 2441.00 | 0.799 | No |
| NVNT | ANT1 | 1-DH1 | 2480.00 | 0.800 | No |
| NVNT | ANT1 | 2-DH1 | 2402.00 | 1.261 | Yes |
| NVNT | ANT1 | 2-DH1 | 2441.00 | 1.258 | Yes |
| NVNT | ANT1 | 2-DH1 | 2480.00 | 1.258 | Yes |
| NVNT | ANT1 | 3-DH1 | 2402.00 | 1.168 | Yes |
| NVNT | ANT1 | 3-DH1 | 2441.00 | 1.168 | Yes |
| NVNT | ANT1 | 3-DH1 | 2480.00 | 1.168 | Yes |

**-20dB_Bandwidth_NVNT_ANT1_1-DH1_2402**

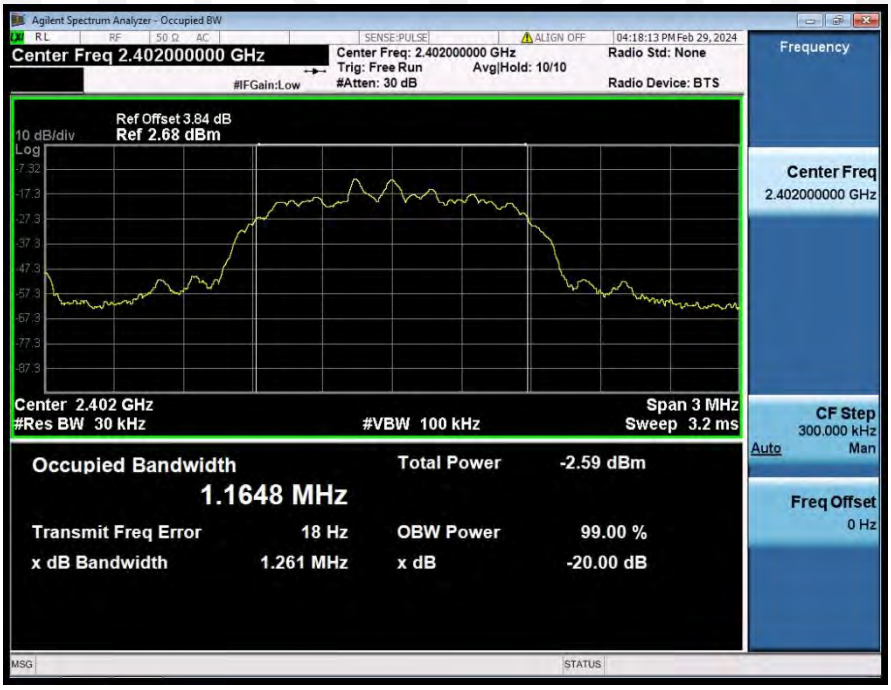



**-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441**

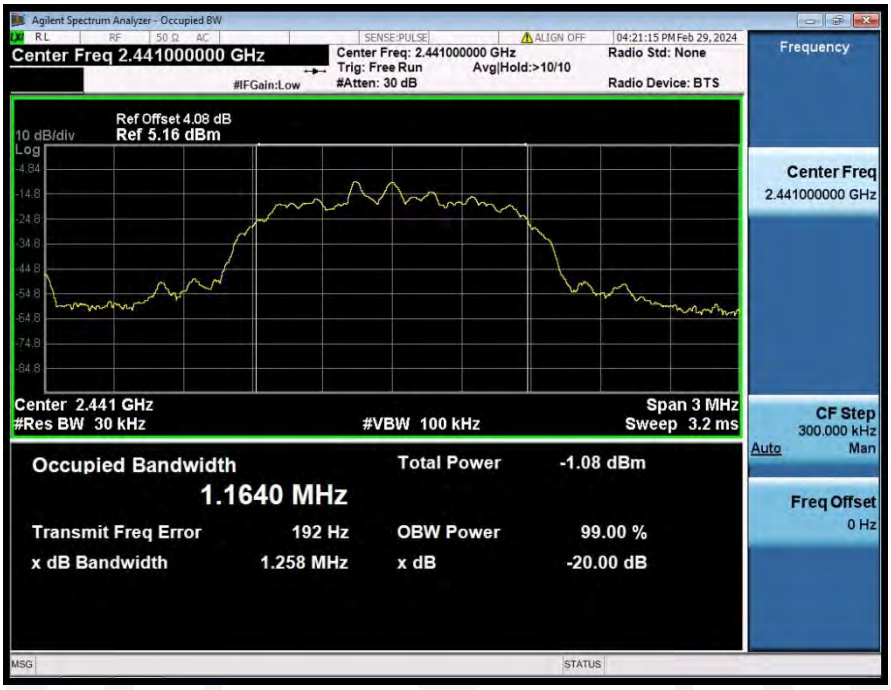


**-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480**

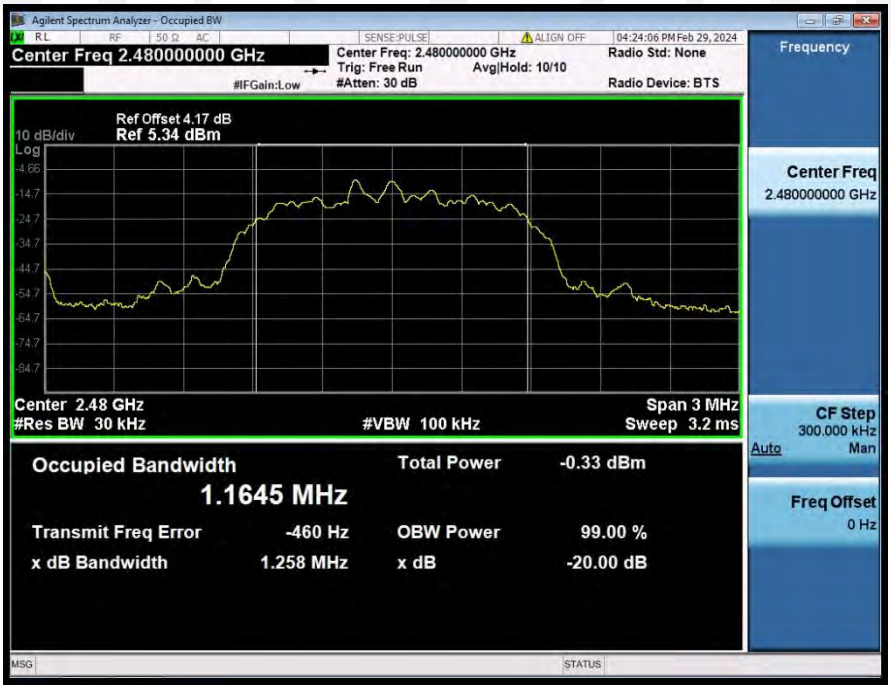
**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2402**



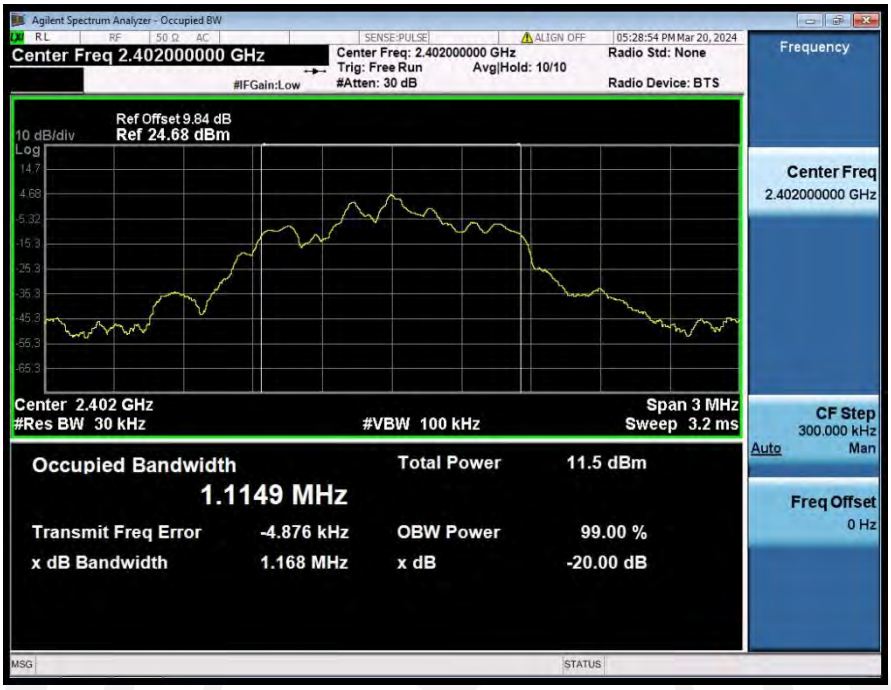
**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2441**




**-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480**



**-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402**




**-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441**

**-20dB_Bandwidth_NVNT_ANT1_3-DH1_2480**

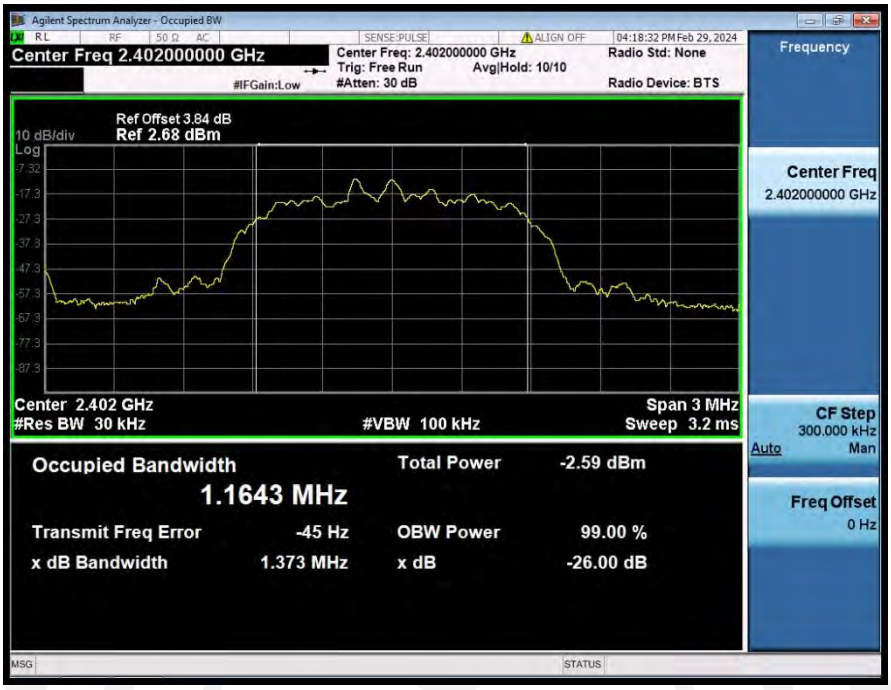
| Condition | Antenna | Modulation | Frequency (MHz) | 99%%BW(MHz) |
|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 2402.00 | 0.840 |
| NVNT | ANT1 | 1-DH1 | 2441.00 | 0.855 |
| NVNT | ANT1 | 1-DH1 | 2480.00 | 0.845 |
| NVNT | ANT1 | 2-DH1 | 2402.00 | 1.164 |
| NVNT | ANT1 | 2-DH1 | 2441.00 | 1.165 |
| NVNT | ANT1 | 2-DH1 | 2480.00 | 1.164 |
| NVNT | ANT1 | 3-DH1 | 2402.00 | 1.115 |
| NVNT | ANT1 | 3-DH1 | 2441.00 | 1.115 |
| NVNT | ANT1 | 3-DH1 | 2480.00 | 1.114 |

**99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2402**

**99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2441**

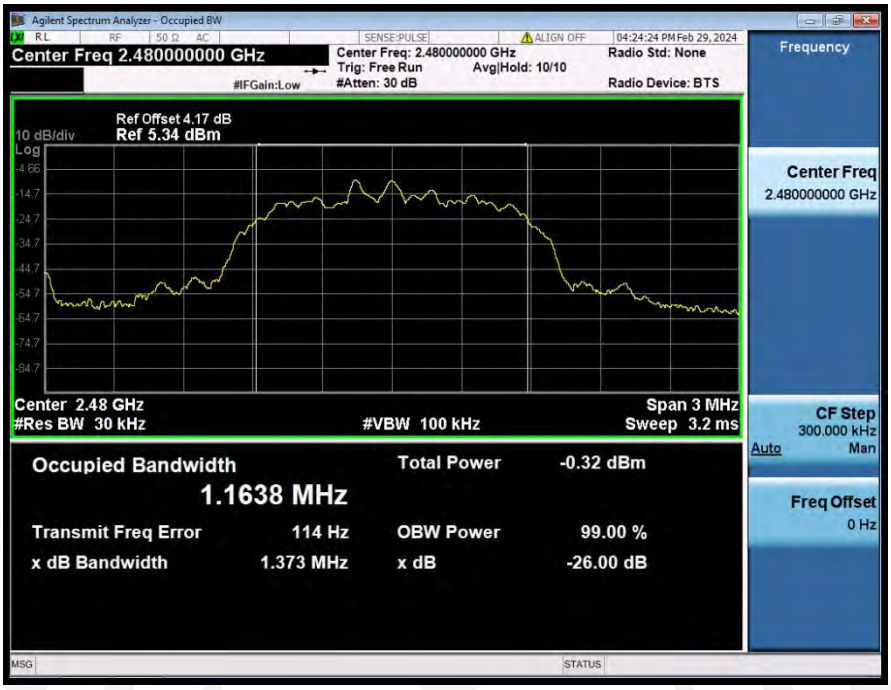
**99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480**

**99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2402**

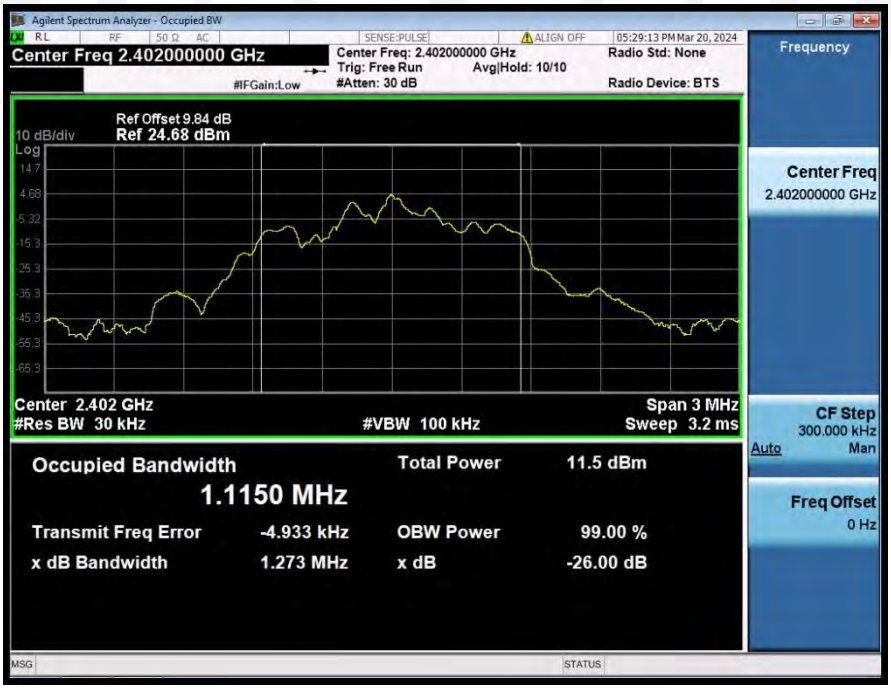



**99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441**

**99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480**




**99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2402**



**99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2441**

**99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2480**

# 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

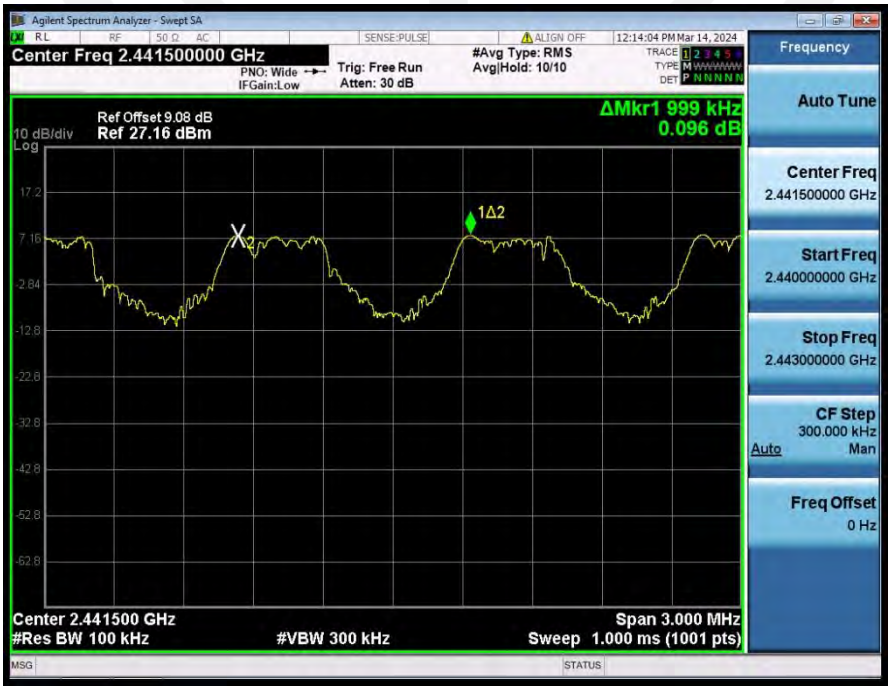
## 5.2. Test Procedure

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 100kHz RBW and 300kHz VBW.

## 5.3. Test Result

| Condition | Antenna | Modulation | Frequency(MHz) | Hopping NO.0 (MHz) | Hopping NO.1 (MHz) | Carrier Frequencies Separation(MHz) | Limit(MHz) | Result |
|---|---|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 2441.00 | 2440.834 | 2441.833 | 1.00 | 0.879 | Pass |
| NVNT | ANT1 | 2-DH1 | 2441.00 | 2440.846 | 2441.845 | 1.00 | 0.839 | Pass |
| NVNT | ANT1 | 3-DH1 | 2441.00 | 2440.831 | 2441.833 | 1.00 | 0.779 | Pass |

**Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping**




**Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping**

**Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping**

# 6. Number Of Hopping Channel

## 6.1. Limit

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

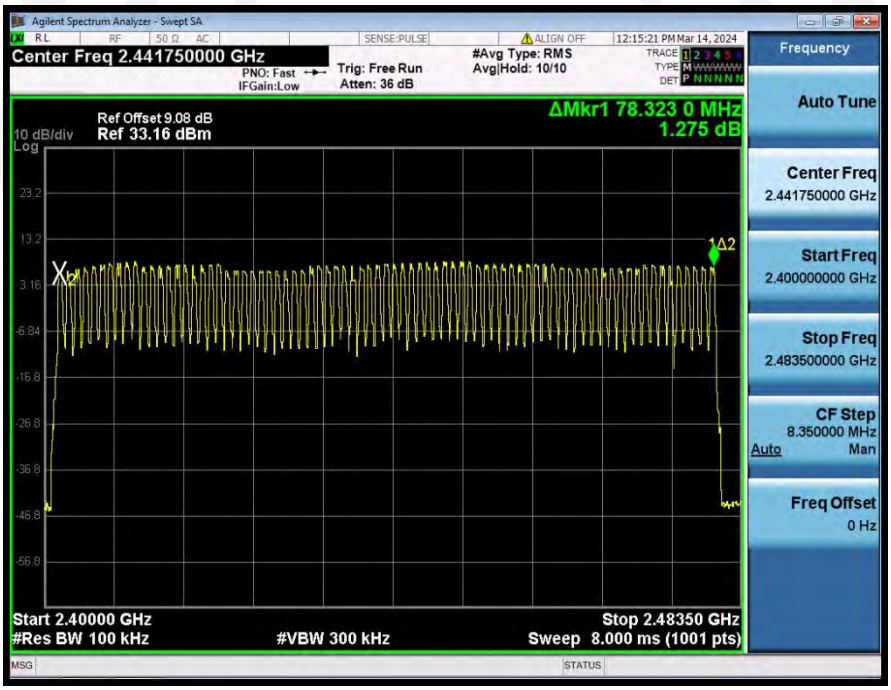
## 6.2. Test Procedure

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.

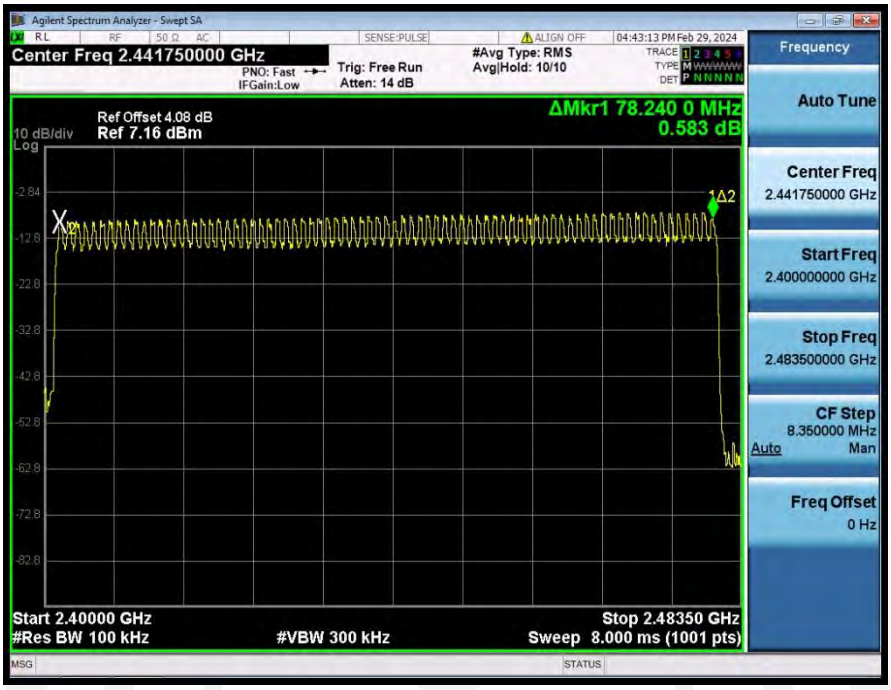
## 6.3. Test Result

| Condition | Antenna | Modulation | Hopping Num | Limit | Result |
|---|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 79 | 15 | Pass |
| NVNT | ANT1 | 2-DH1 | 79 | 15 | Pass |
| NVNT | ANT1 | 3-DH1 | 79 | 15 | Pass |

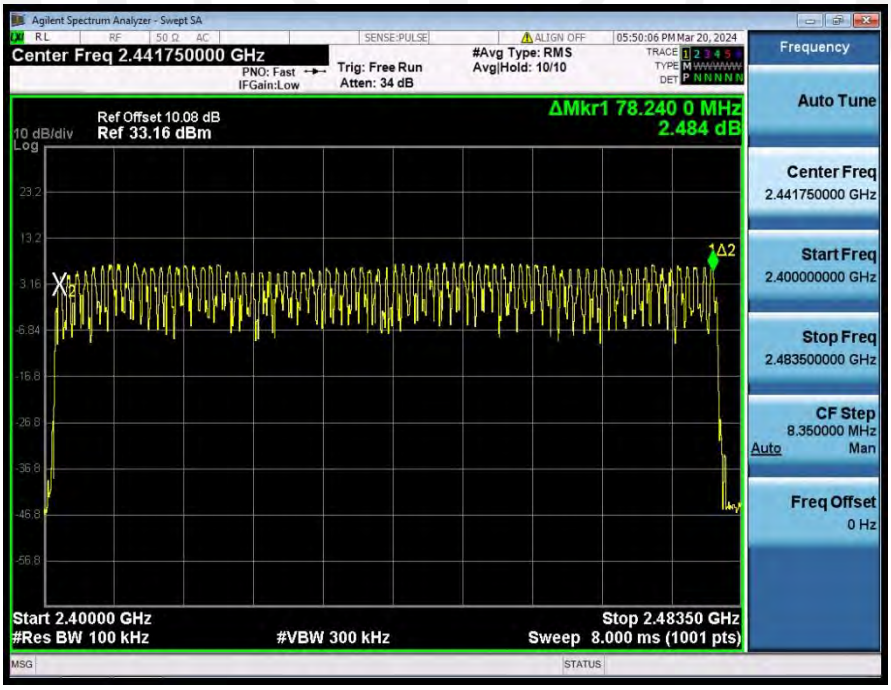
**Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_1-DH1_Hopping**



**Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_2-DH1_Hopping**




**Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH1_Hopping**



# 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 sec- onds 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.

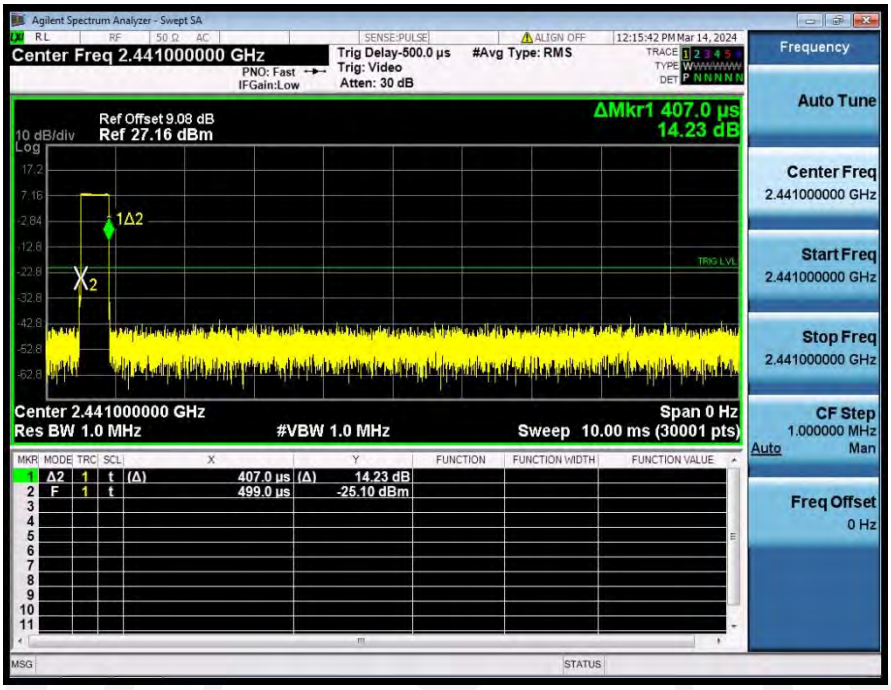
## 7.3. Test Result

Note: 1. The test period: T= 0.4 Second/Channel x 79 Channel = 31.6s

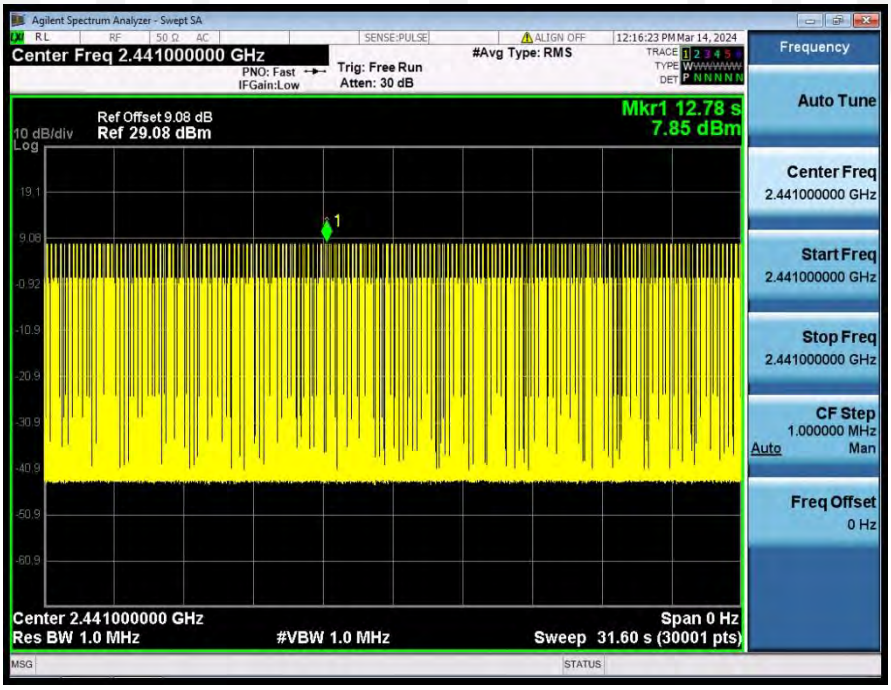
2. Dwell Time=Pulse Time* Hops Number

| Condition | Antenna | Packet Type | Pulse Time(ms) | Hops | Dwell Time(ms) | Limit(s) | Result |
|---|---|---|---|---|---|---|---|
| NVNT | ANT1 | 1-DH1 | 0.407 | 320.00 | 130.240 | 0.40 | Pass |
| NVNT | ANT1 | 2-DH1 | 0.141 | 320.00 | 45.120 | 0.40 | Pass |
| NVNT | ANT1 | 3-DH1 | 0.141 | 316.00 | 44.556 | 0.40 | Pass |
| NVNT | ANT1 | 1-DH3 | 1.663 | 165.00 | 274.395 | 0.40 | Pass |
| NVNT | ANT1 | 1-DH5 | 2.911 | 110.00 | 320.210 | 0.40 | Pass |
| NVNT | ANT1 | 2-DH3 | 0.141 | 160.00 | 22.560 | 0.40 | Pass |
| NVNT | ANT1 | 2-DH5 | 0.141 | 102.00 | 14.382 | 0.40 | Pass |
| NVNT | ANT1 | 3-DH3 | 0.141 | 165.00 | 23.265 | 0.40 | Pass |
| NVNT | ANT1 | 3-DH5 | 0.141 | 100.00 | 14.100 | 0.40 | Pass |

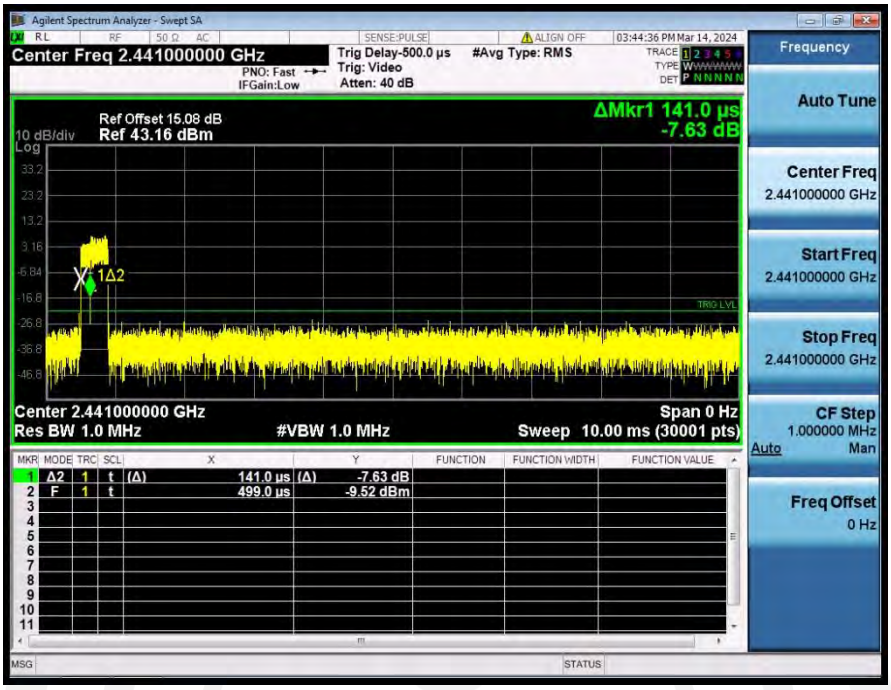
**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_One_Burst_Time**



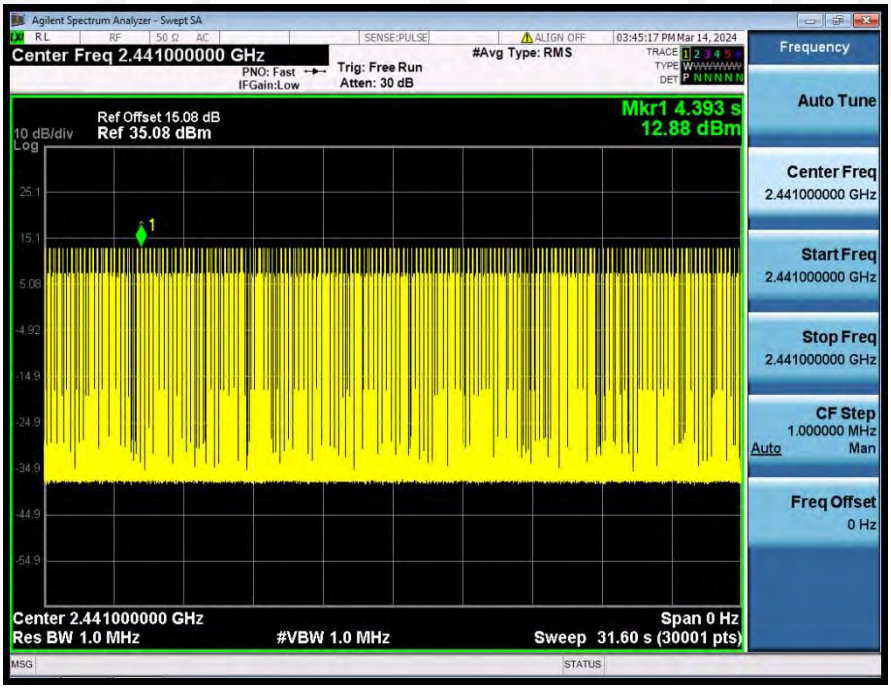

**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_Accumulated**



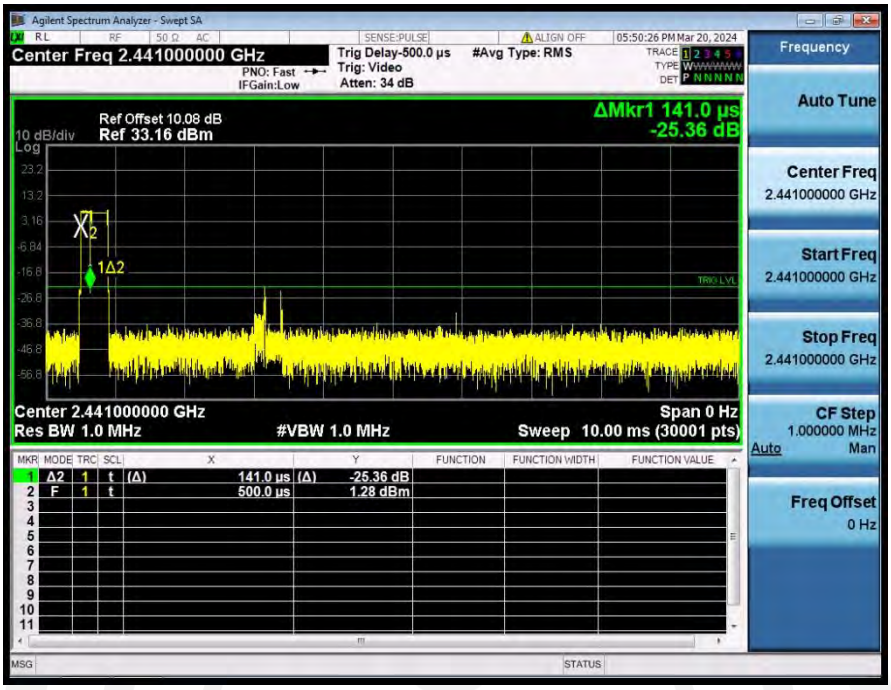
**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_One_Burst_Time**



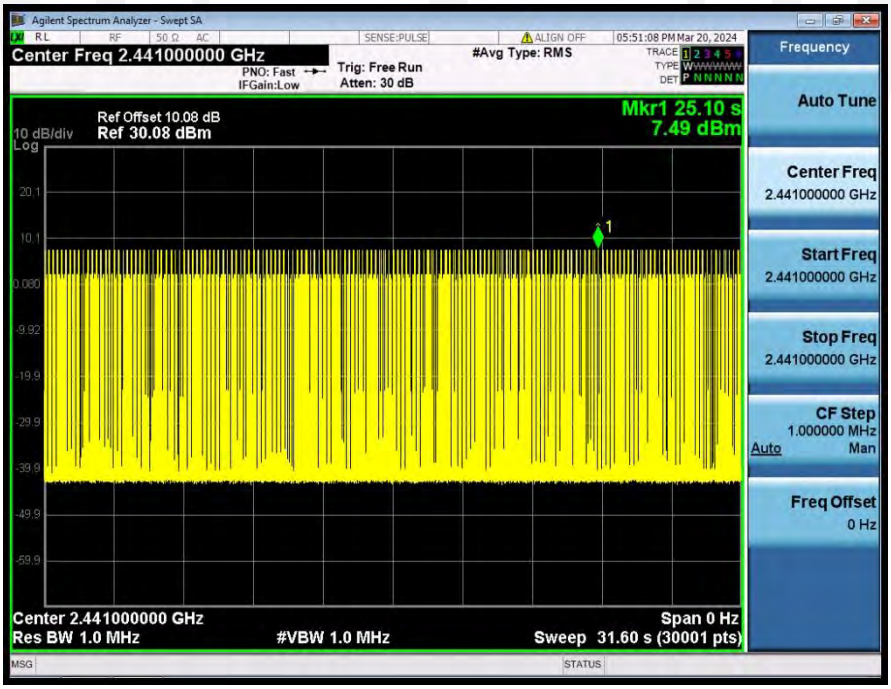

**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_Accumulated**



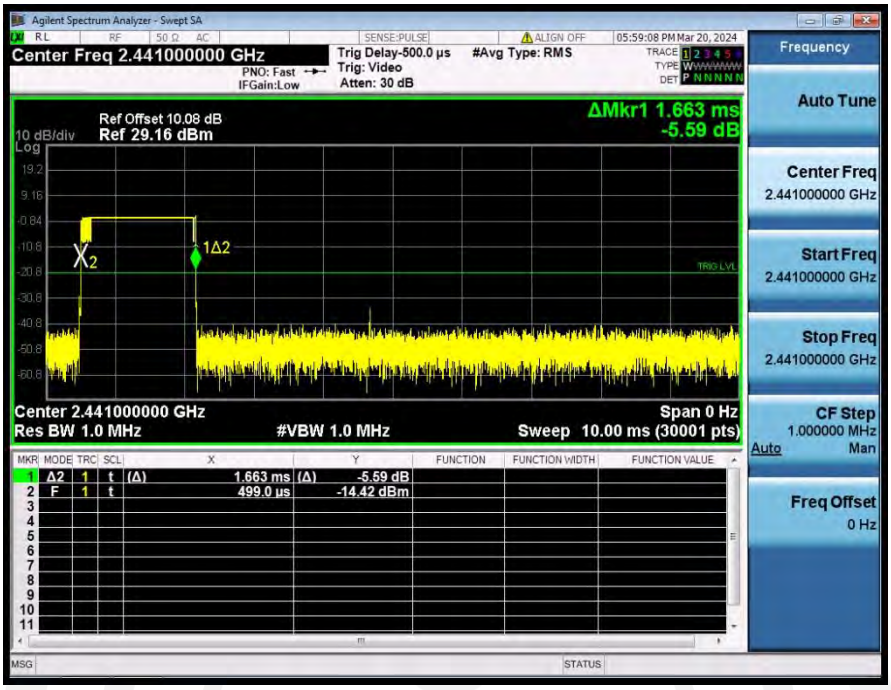
**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_One_Burst_Time**



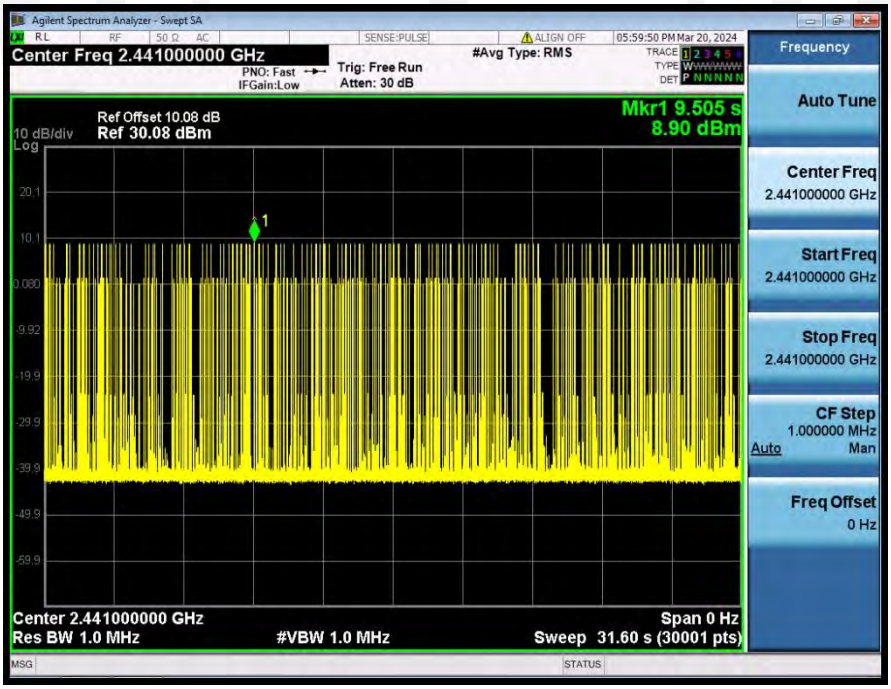

**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_Accumulated**



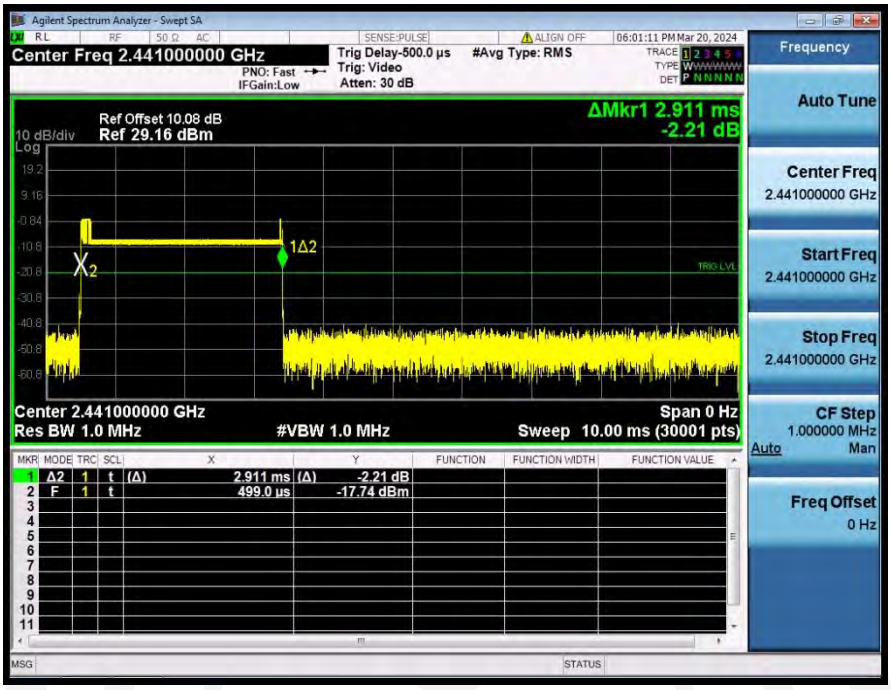
**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_One_Burst_Time**



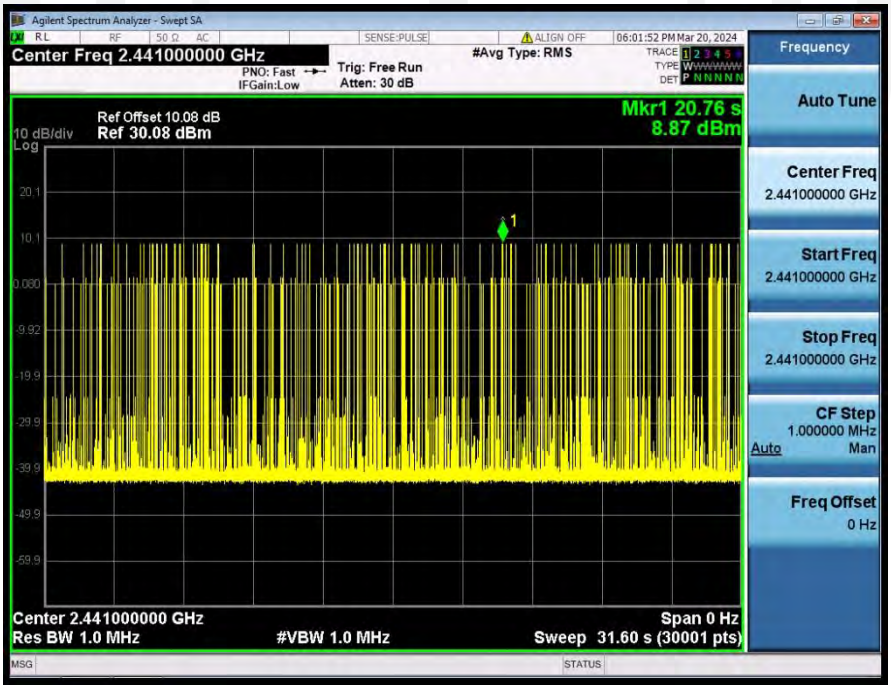

**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_Accumulated**



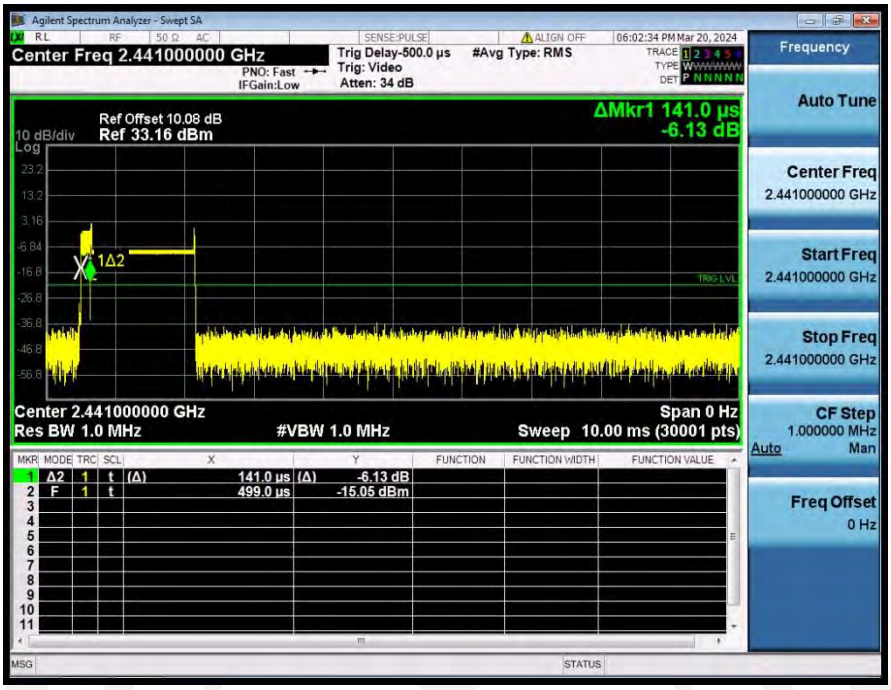
**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_One_Burst_Time**



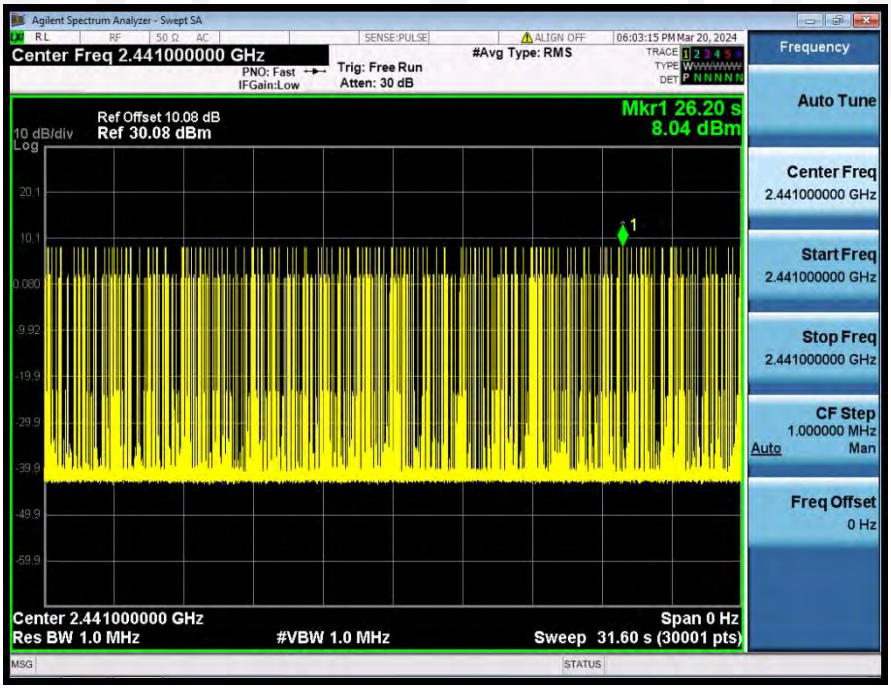

**Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_Accumulated**



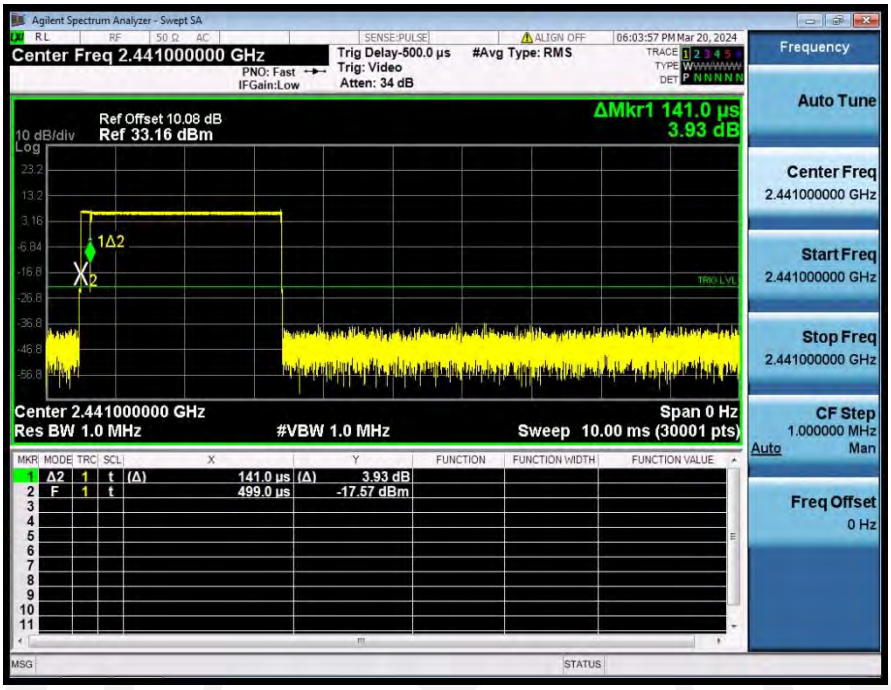
**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_One_Burst_Time**



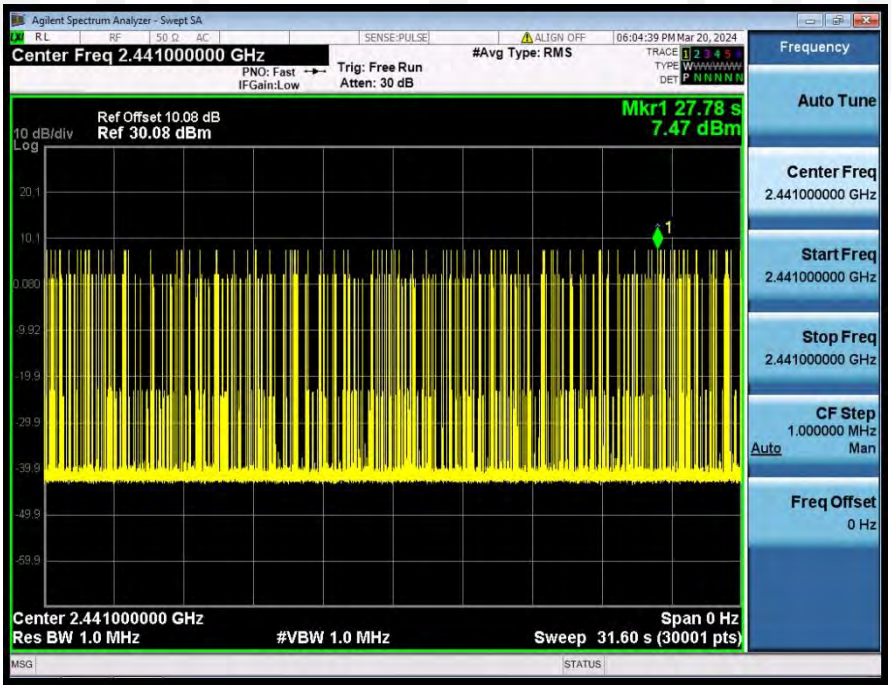

**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_Accumulated**



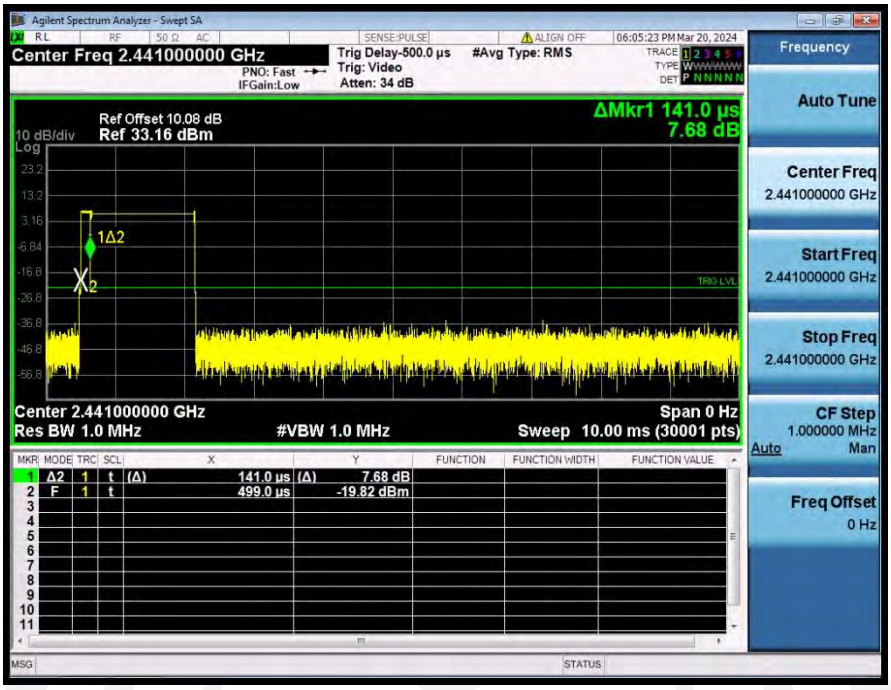
**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_One_Burst_Time**



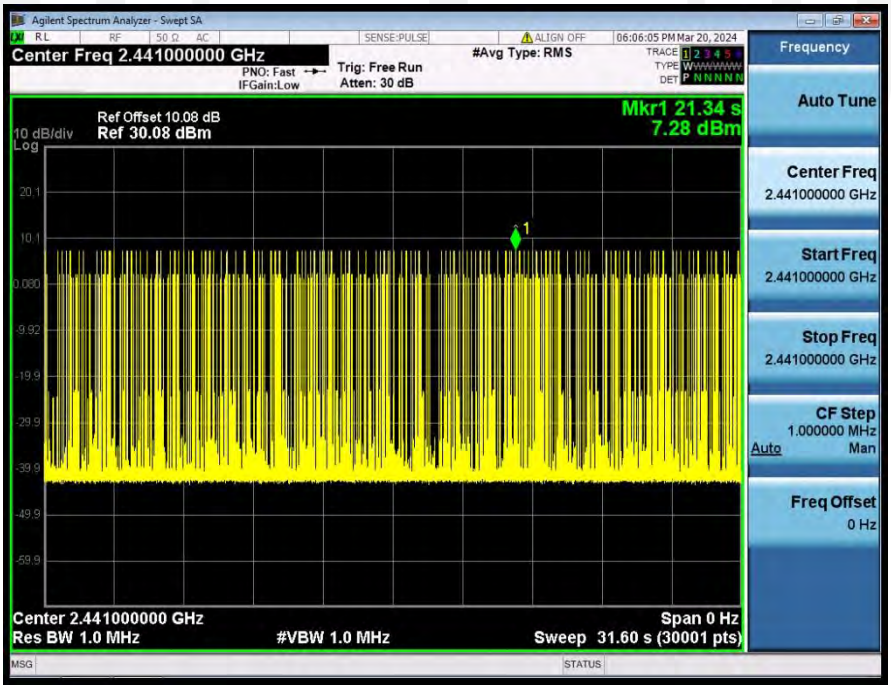

**Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_Accumulated**



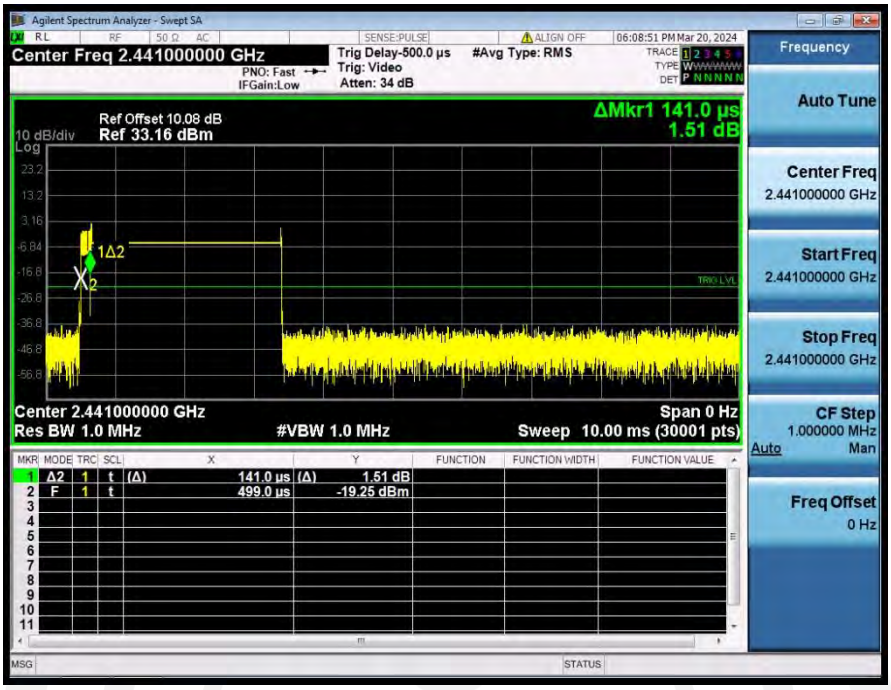
**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_One_Burst_Time**



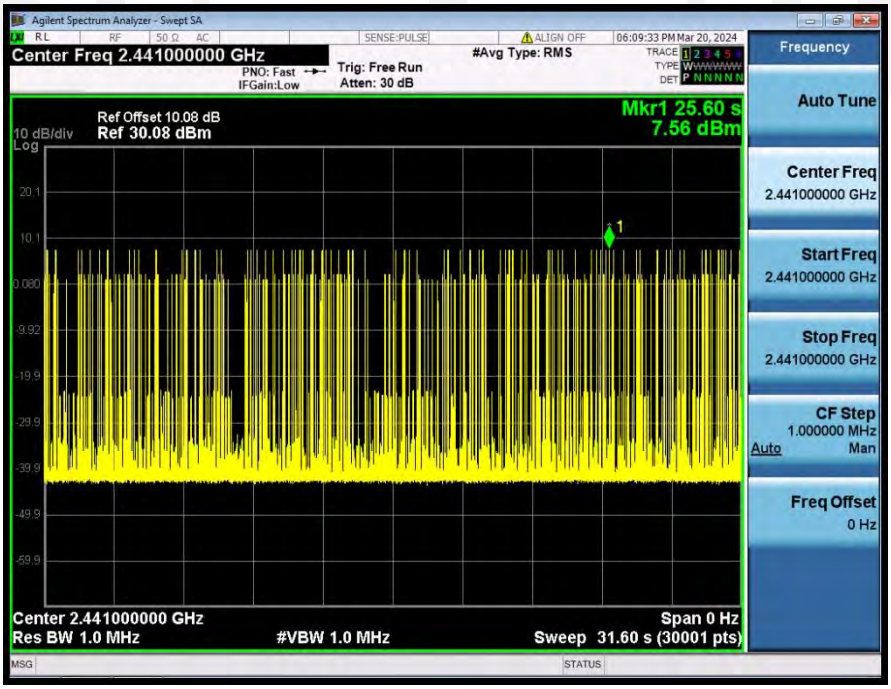

**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_Accumulated**



**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_One_Burst_Time**




**Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_Accumulated**



# 8. Out-of-band Emissions

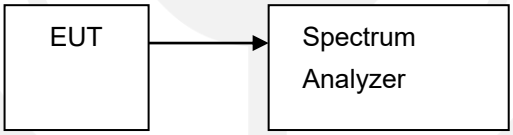
## 8.1. Test Limits

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

## 8.2. Test Procedure

Connect the transmitter ouput to spectrum analvzer using a low loss RF cable, and set the spectrum analvzerto RBW=100 kHz, VBW= 300 kHz, peak detector, and max hold. Measurements utilizing these setting aremade of the in-band reference level, bandedge and out-of-band emissions.

## 8.3. Test Setup



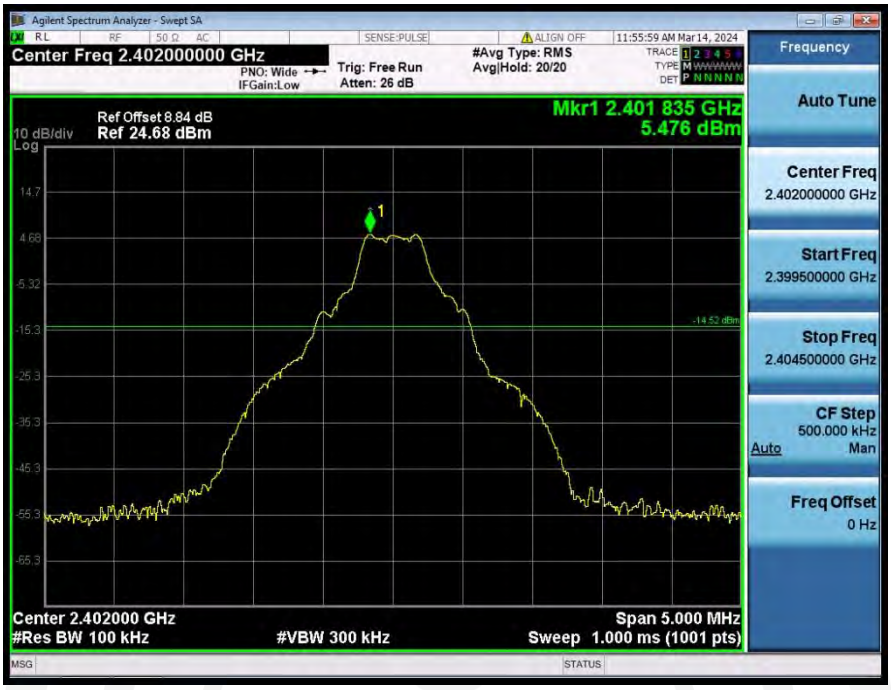

## 8.4. Test Results

PASS.

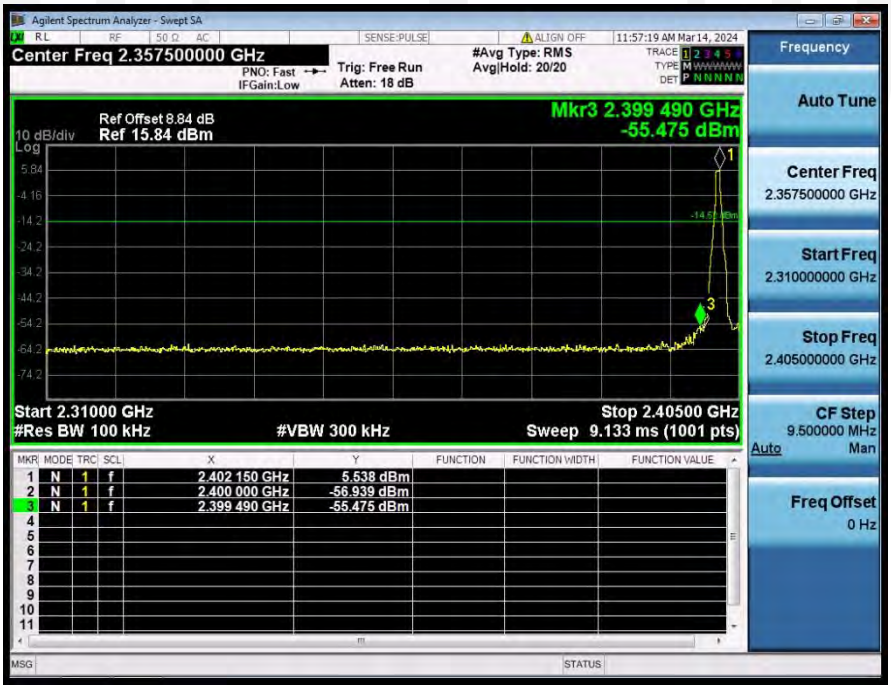
The test results are listed in next pages.

**Band Edge: Pass**

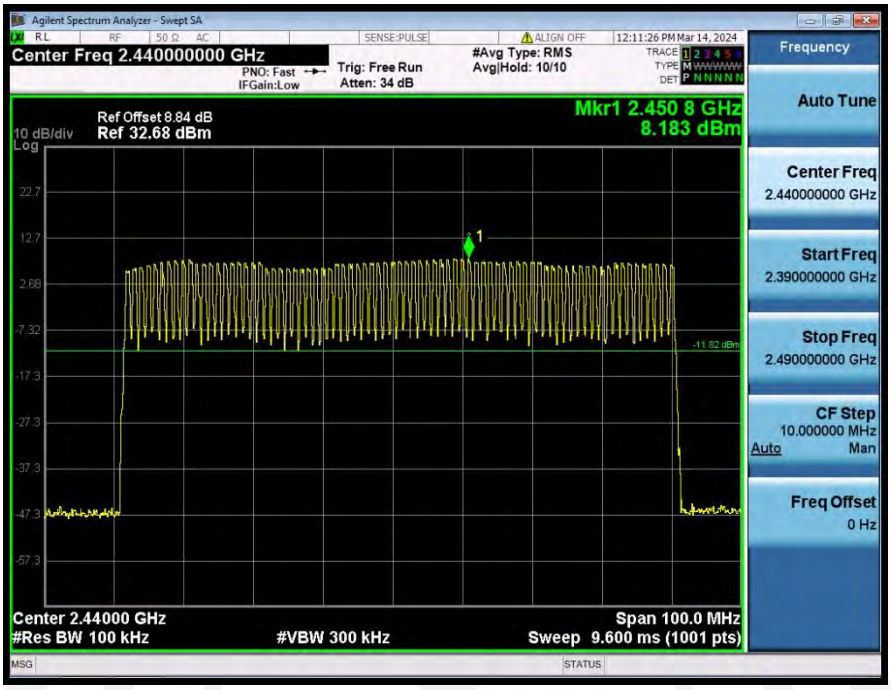
**1_Reference_Level_NVNT_ANT1_1-DH1_2402**



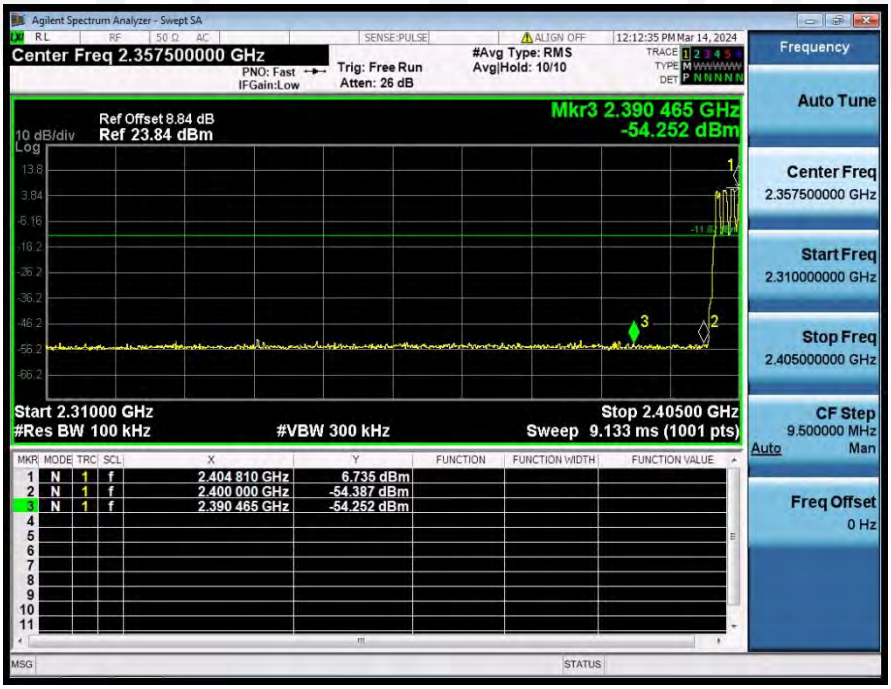

**2_Bandedge_NVNT_ANT1_1-DH1_2402**



**1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping**

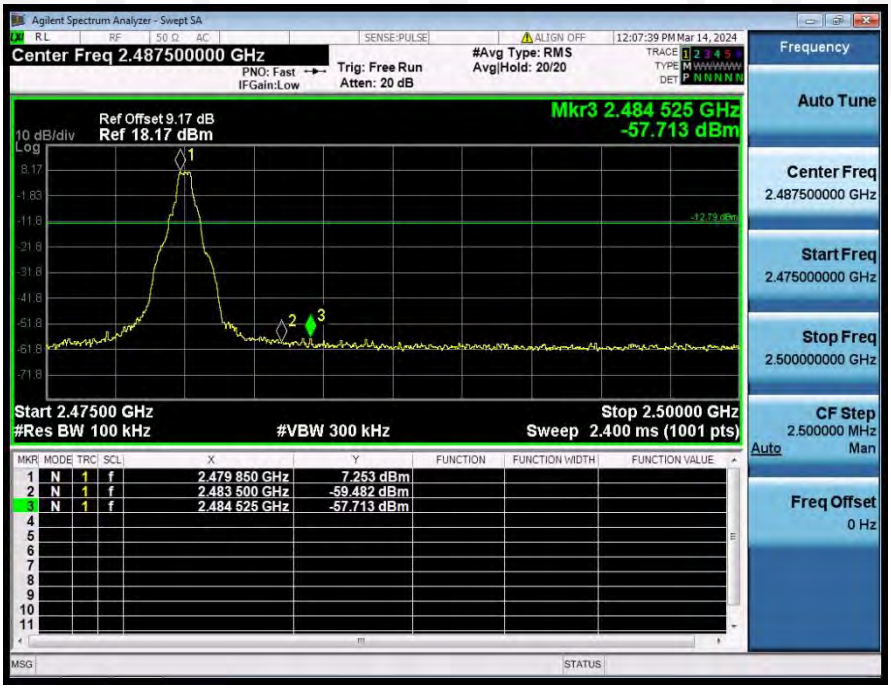



**2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping**

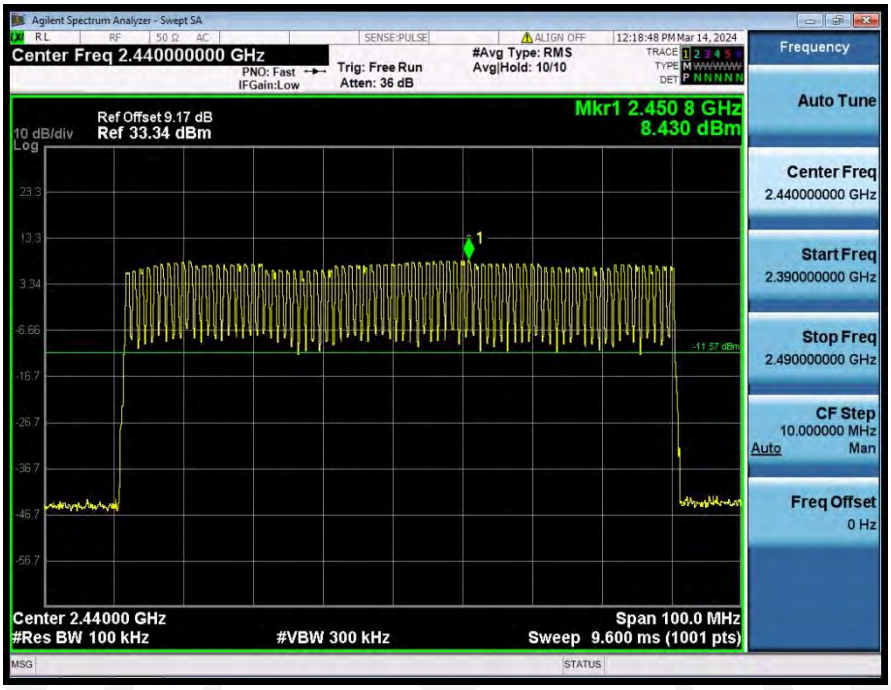


**1_Reference_Level_NVNT_ANT1_1-DH1_2480**

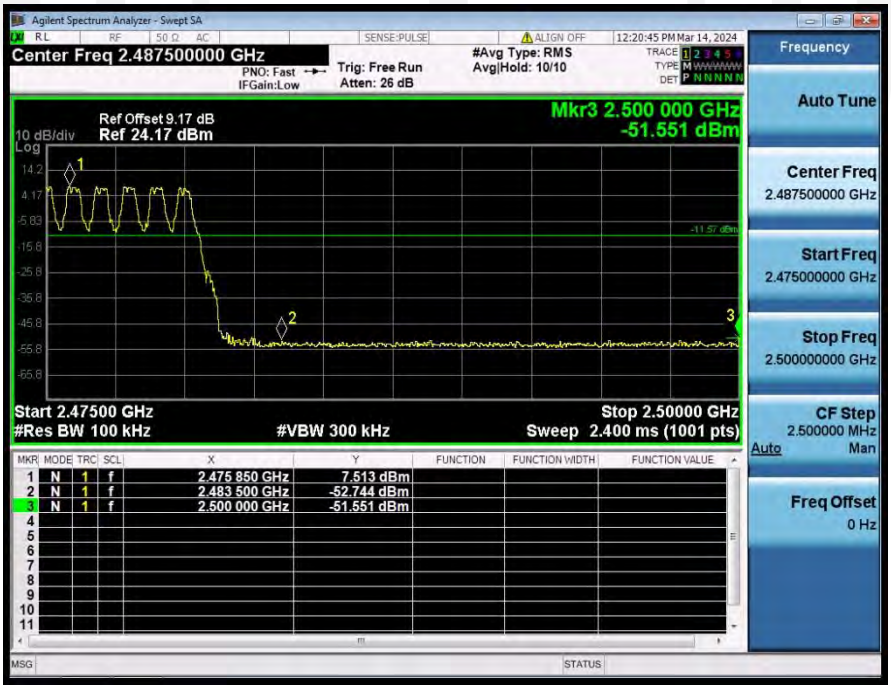
**2_Bandedge_NVNT_ANT1_1-DH1_2480**



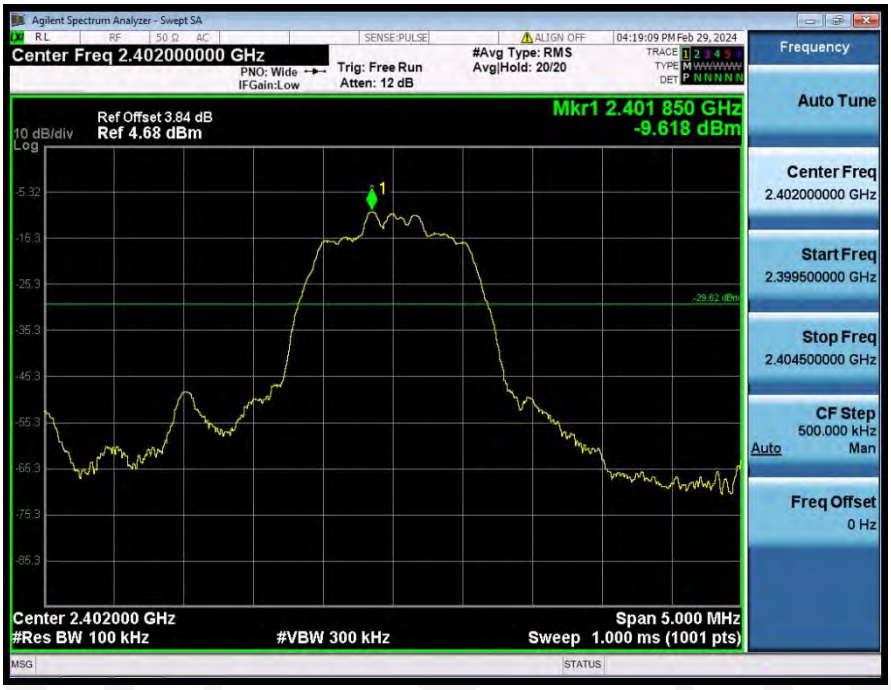
**1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping**



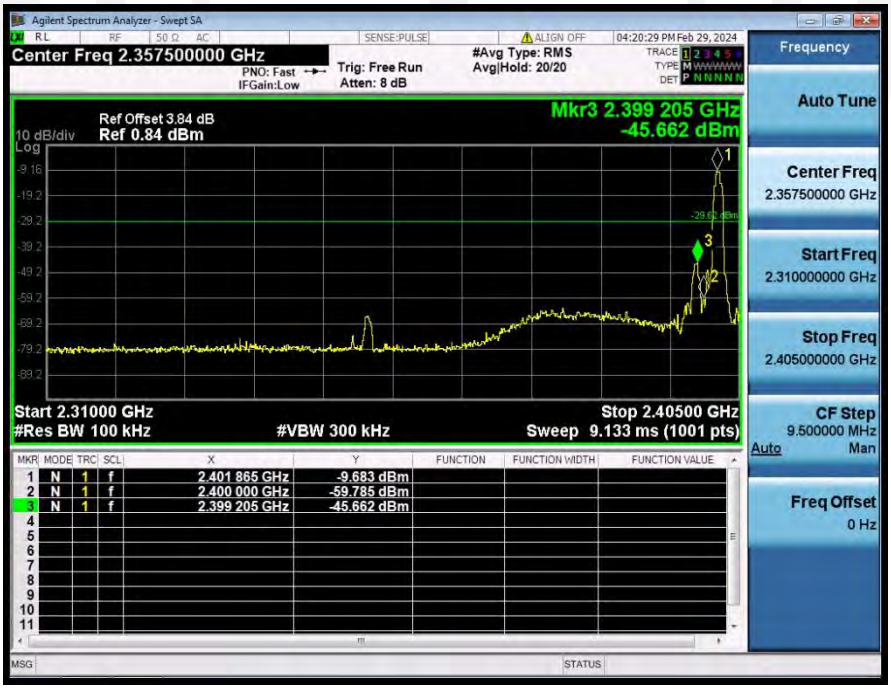

**2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping**



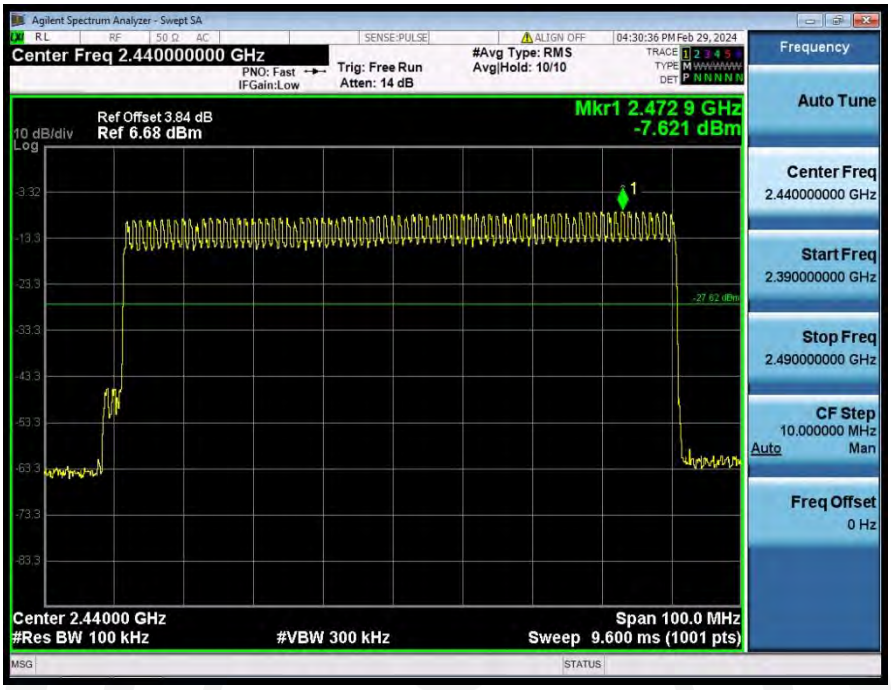
**1_Reference_Level_NVNT_ANT1_2-DH1_2402**



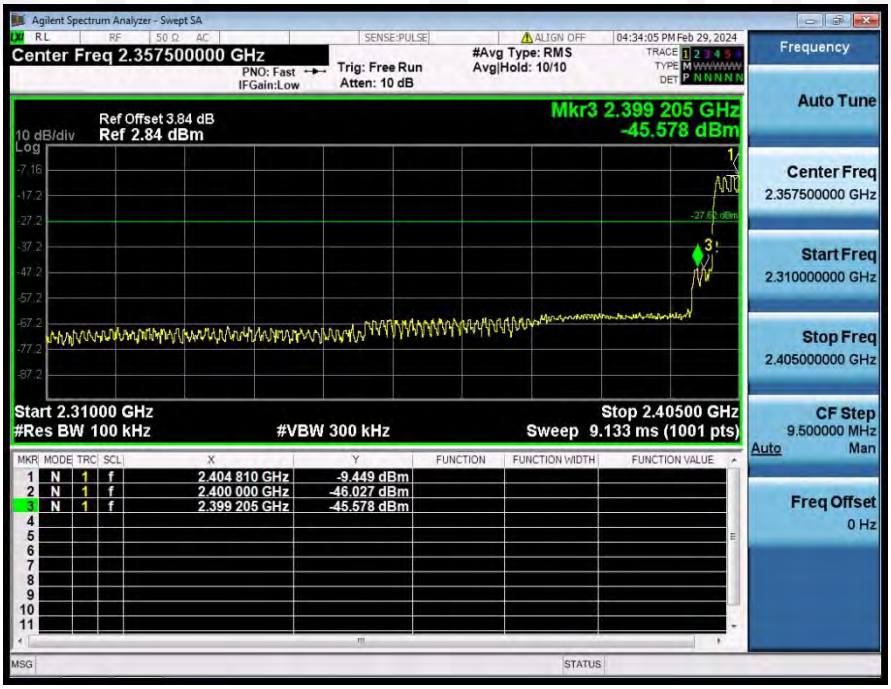

**2_Bandedge_NVNT_ANT1_2-DH1_2402**



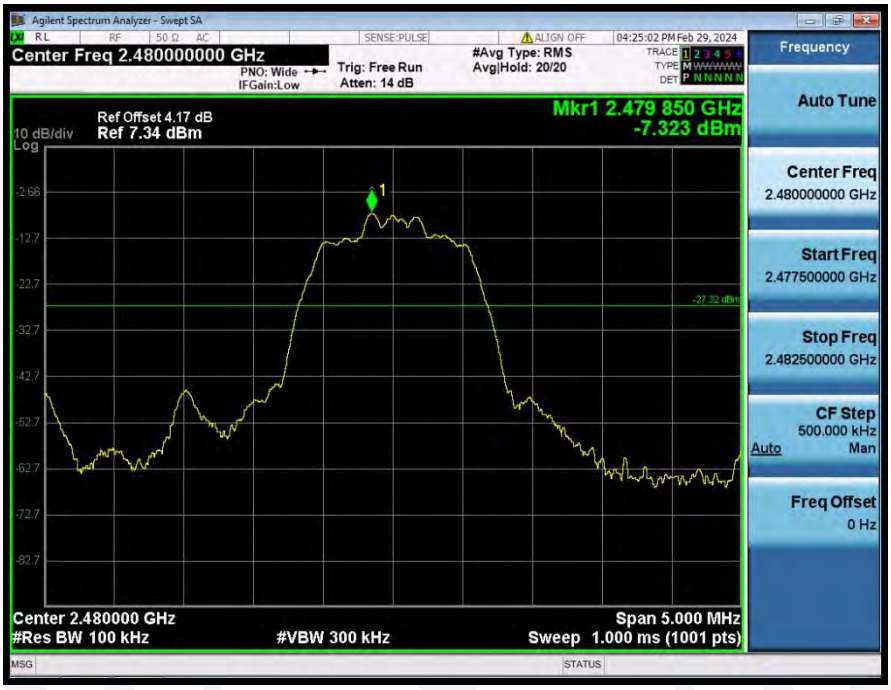
**1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping**



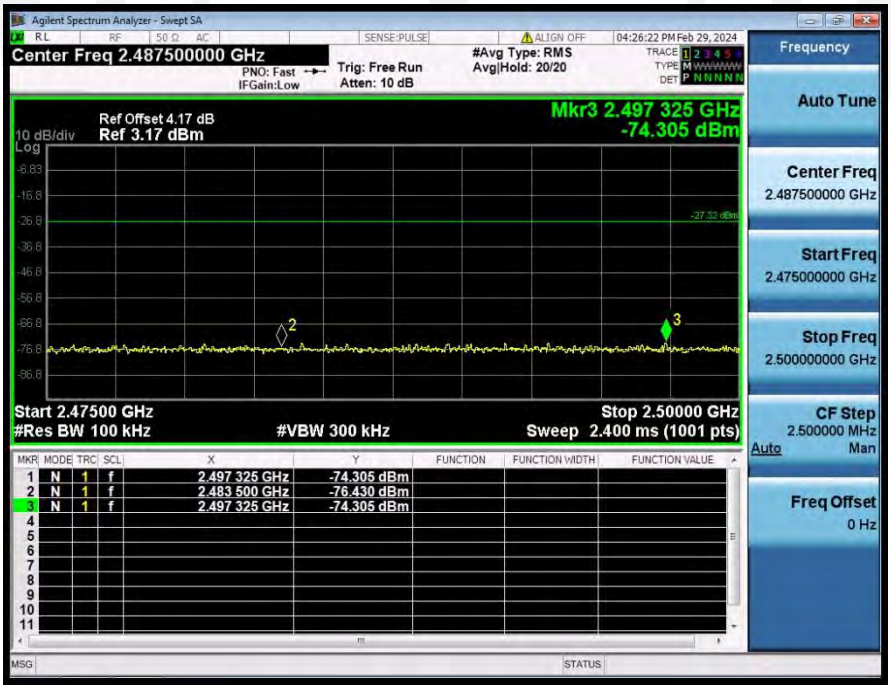

**2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping**



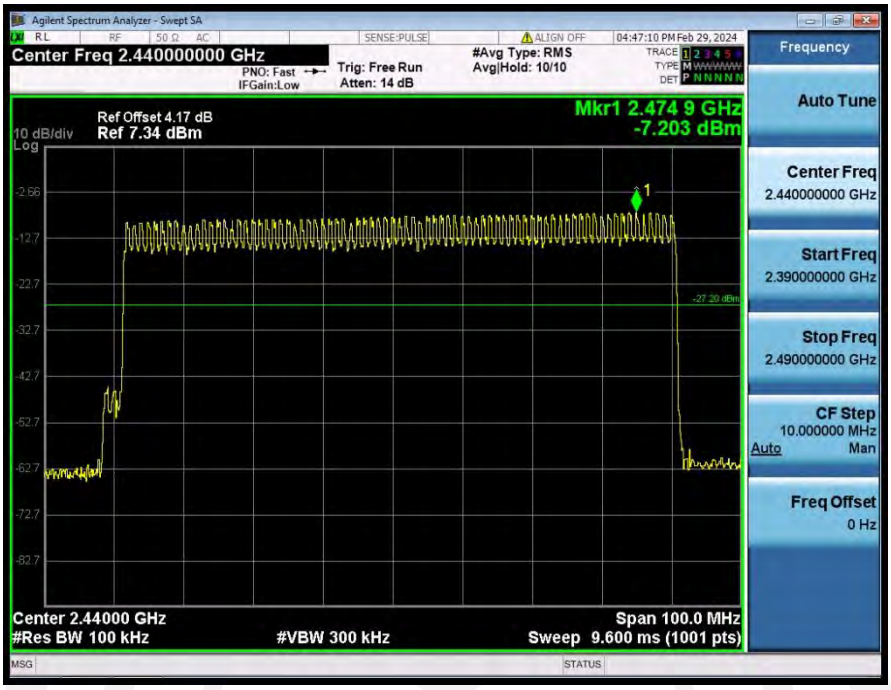
**1_Reference_Level_NVNT_ANT1_2-DH1_2480**



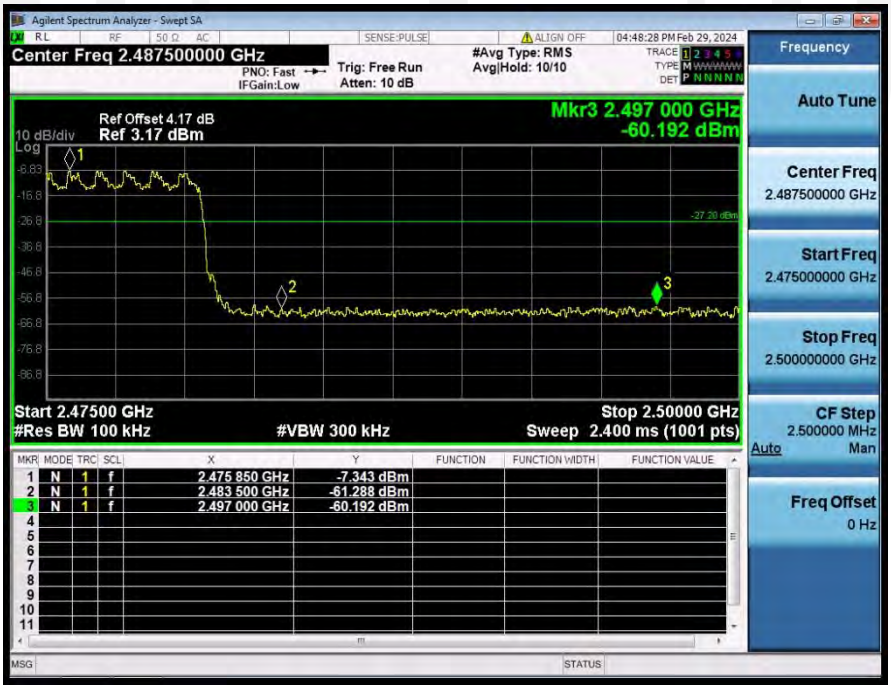

**2_Bandedge_NVNT_ANT1_2-DH1_2480**



**1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping**

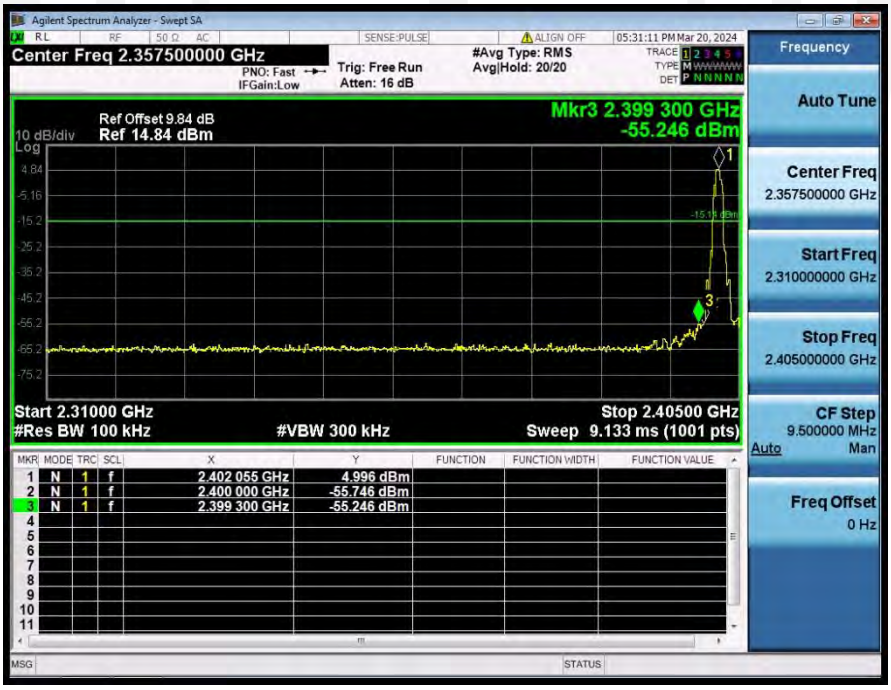



**2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping**

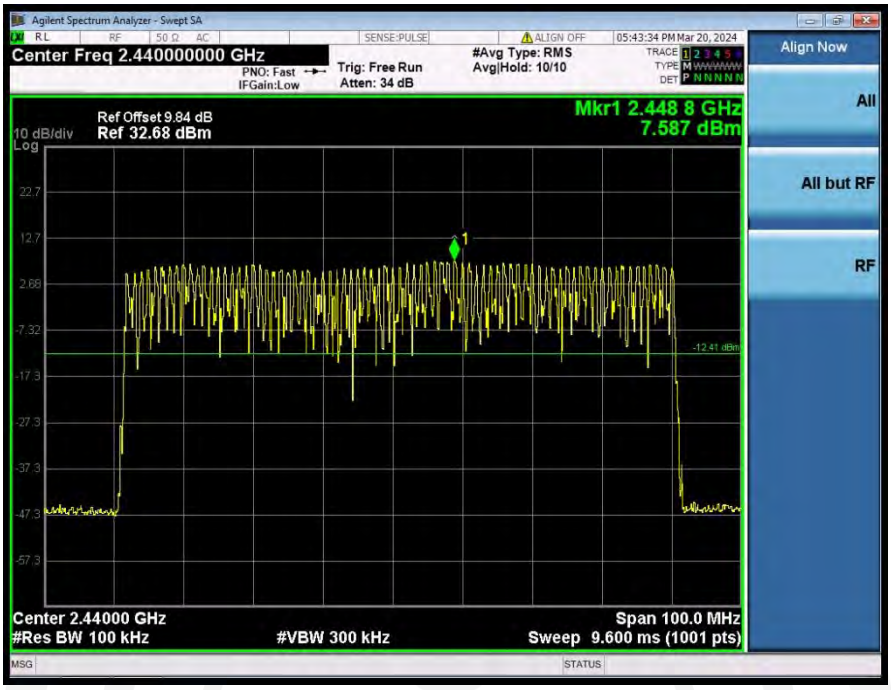


**1_Reference_Level_NVNT_ANT1_3-DH1_2402**

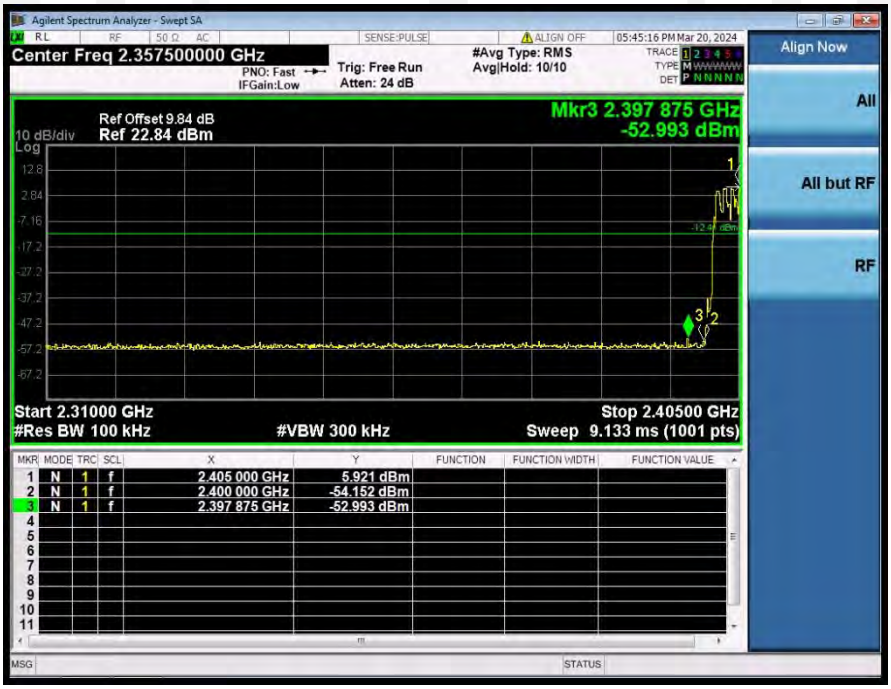
**2_Bandedge_NVNT_ANT1_3-DH1_2402**



**1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping**

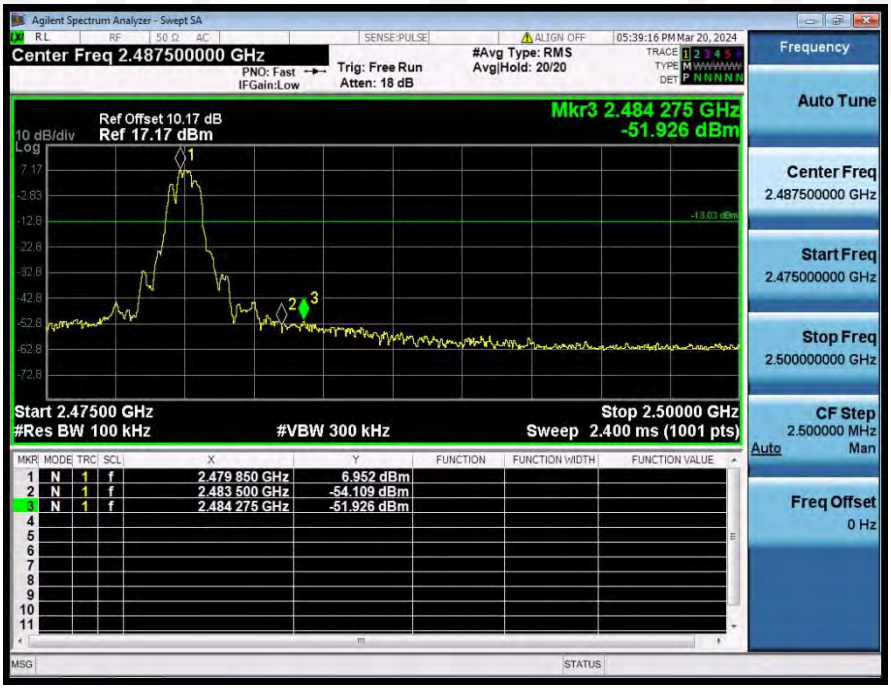



**2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping**



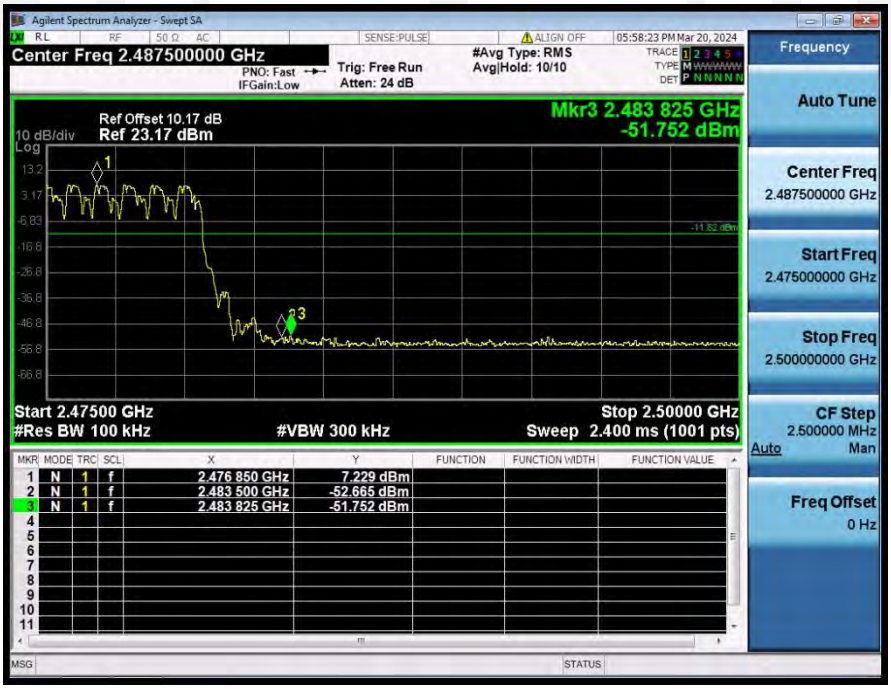
**1_Reference_Level_NVNT_ANT1_3-DH1_2480**

**2_Bandedge_NVNT_ANT1_3-DH1_2480**



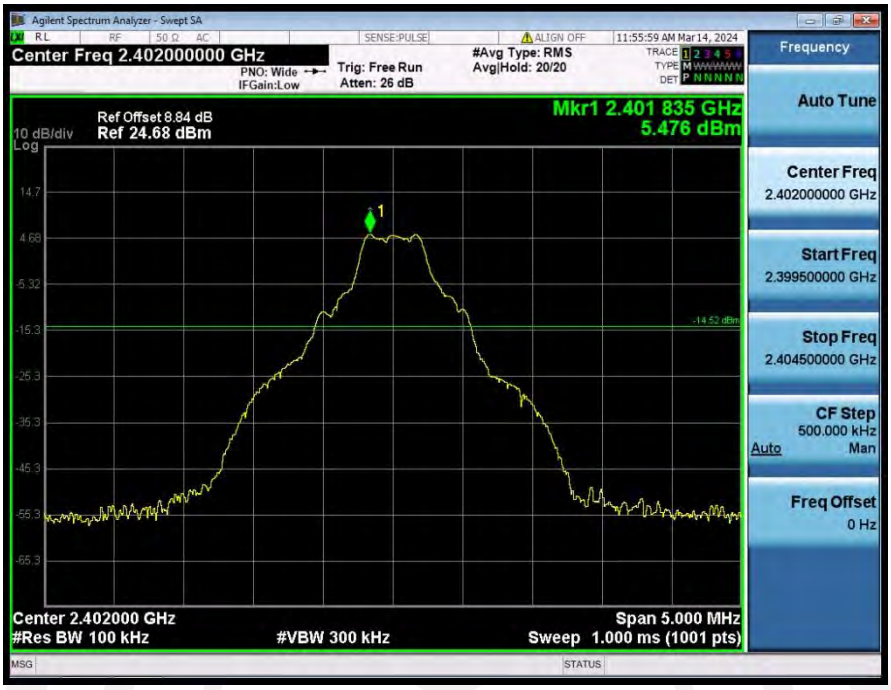
**1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping**

**2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping**

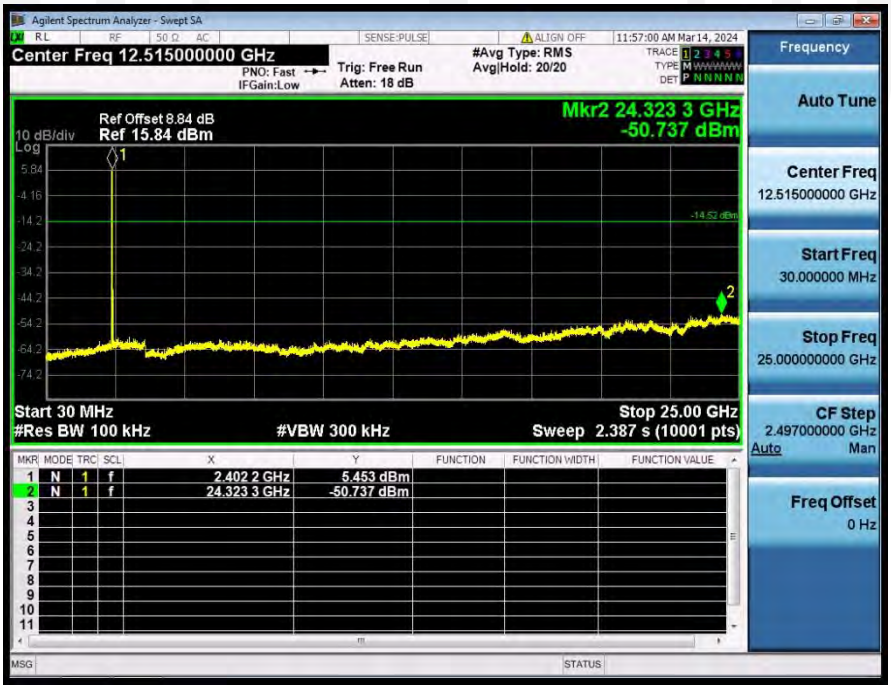


## Conducted spurious emission: Pass

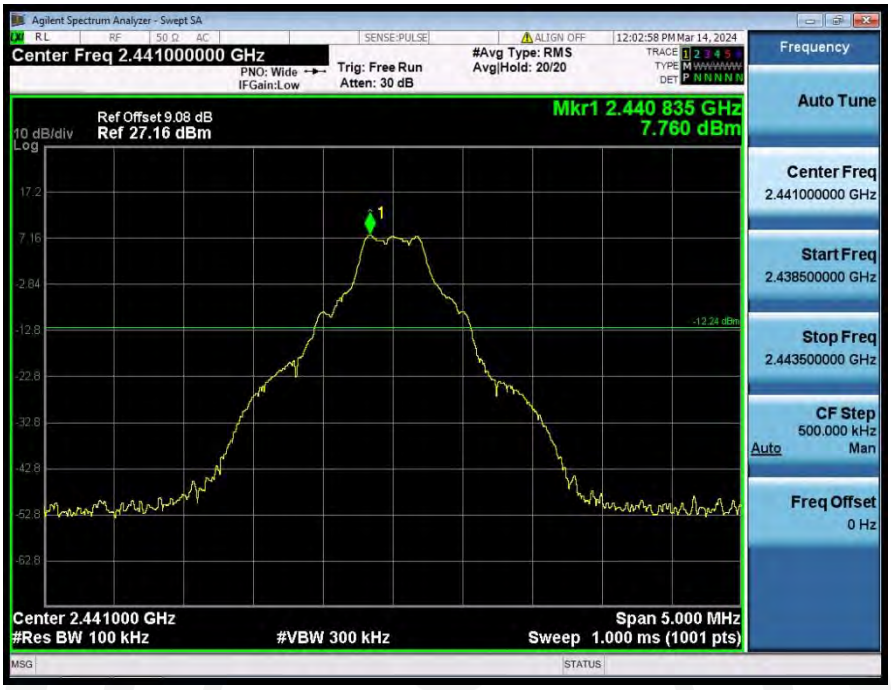
**1_Reference_Level_NVNT_ANT1_1-DH1_2402**



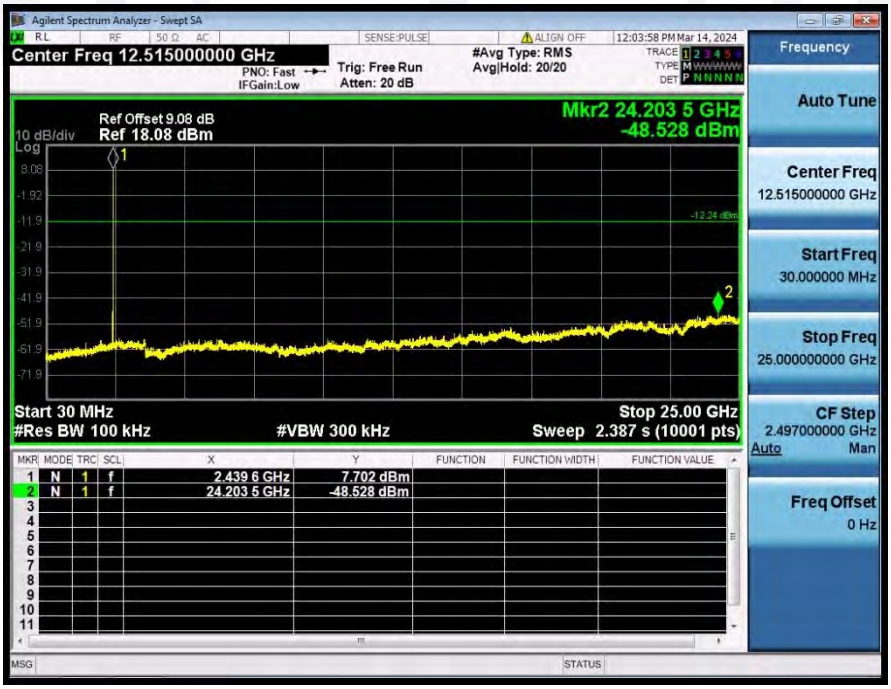

**2_Spurious_Emissions_NVNT_ANT1_1-DH1_2402**



**1_Reference_Level_NVNT_ANT1_1-DH1_2441**

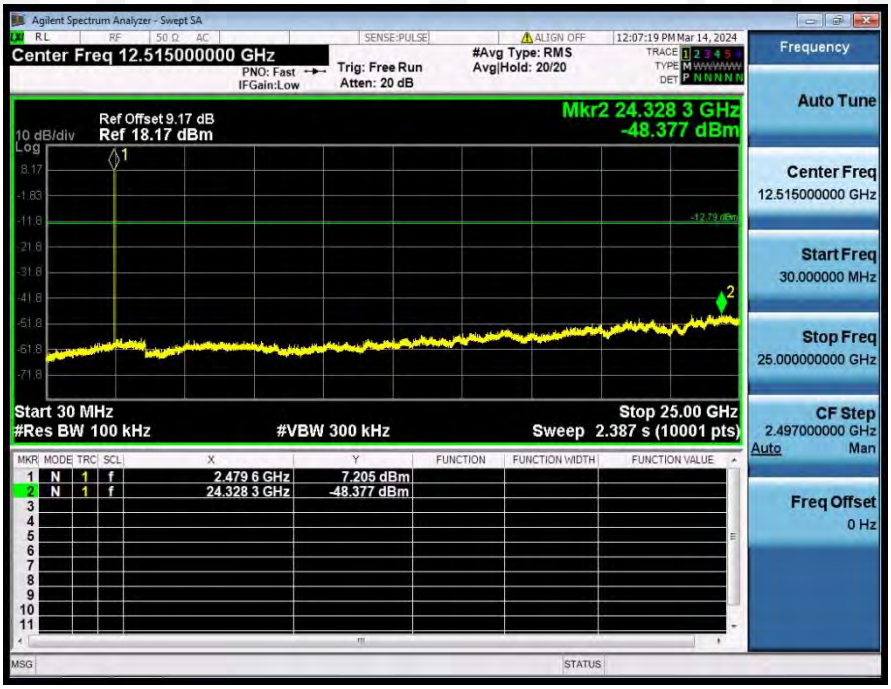



**2_Spurious_Emissions_NVNT_ANT1_1-DH1_2441**

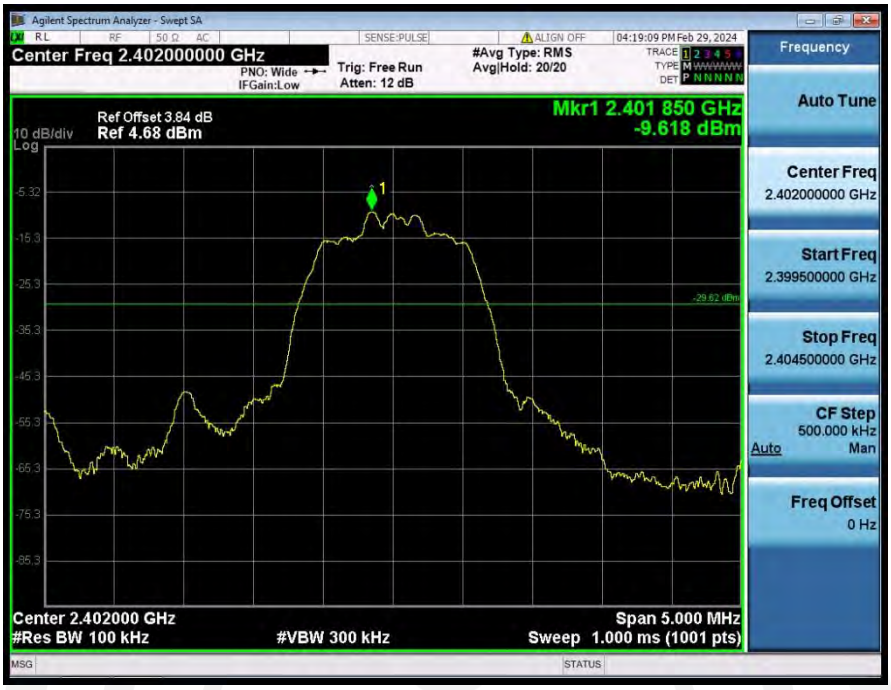


**1_Reference_Level_NVNT_ANT1_1-DH1_2480**

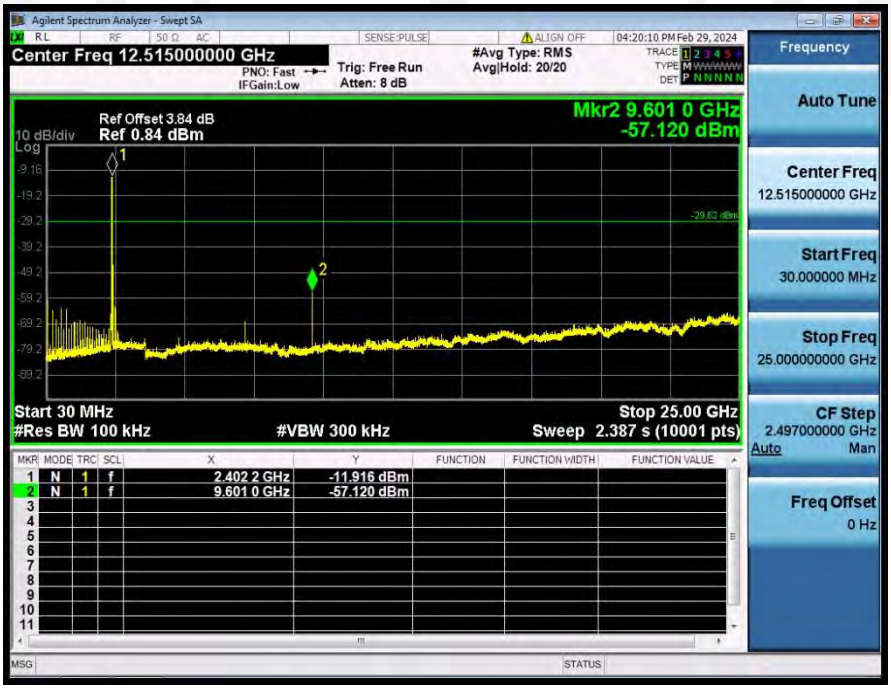
**2_Spurious_Emissions_NVNT_ANT1_1-DH1_2480**



**1_Reference_Level_NVNT_ANT1_2-DH1_2402**

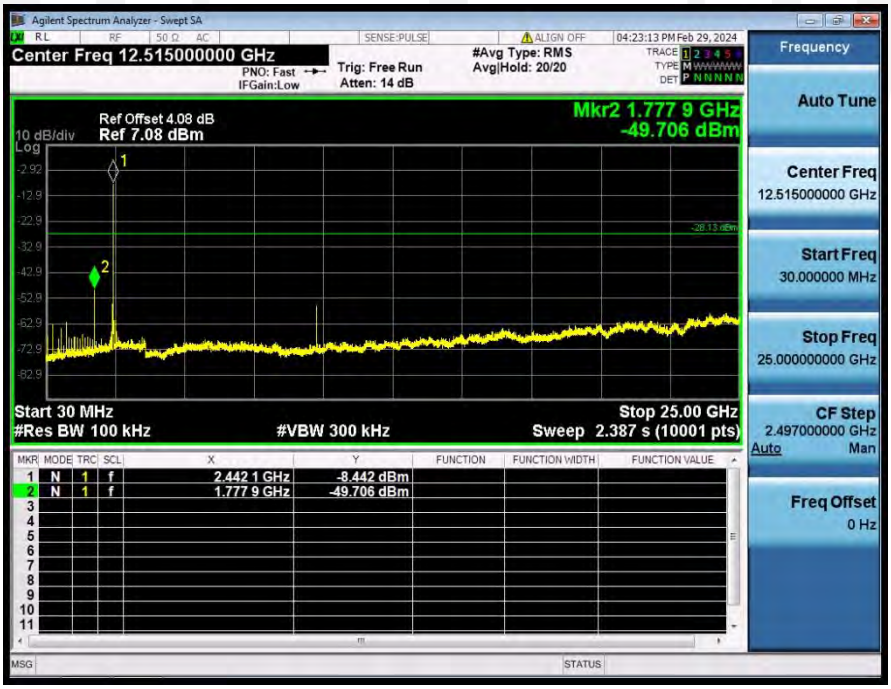



**2_Spurious_Emissions_NVNT_ANT1_2-DH1_2402**

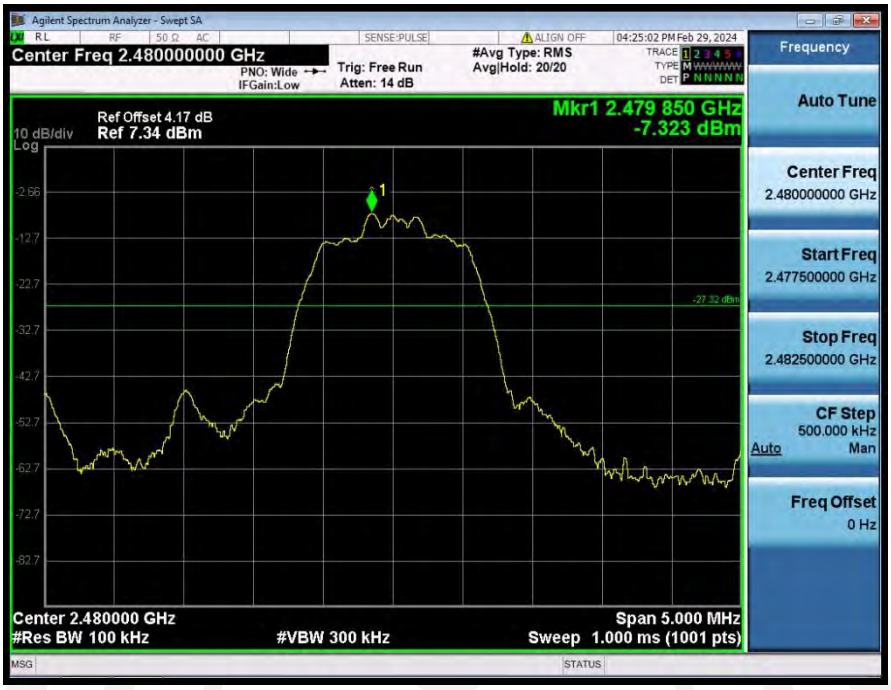


**1_Reference_Level_NVNT_ANT1_2-DH1_2441**

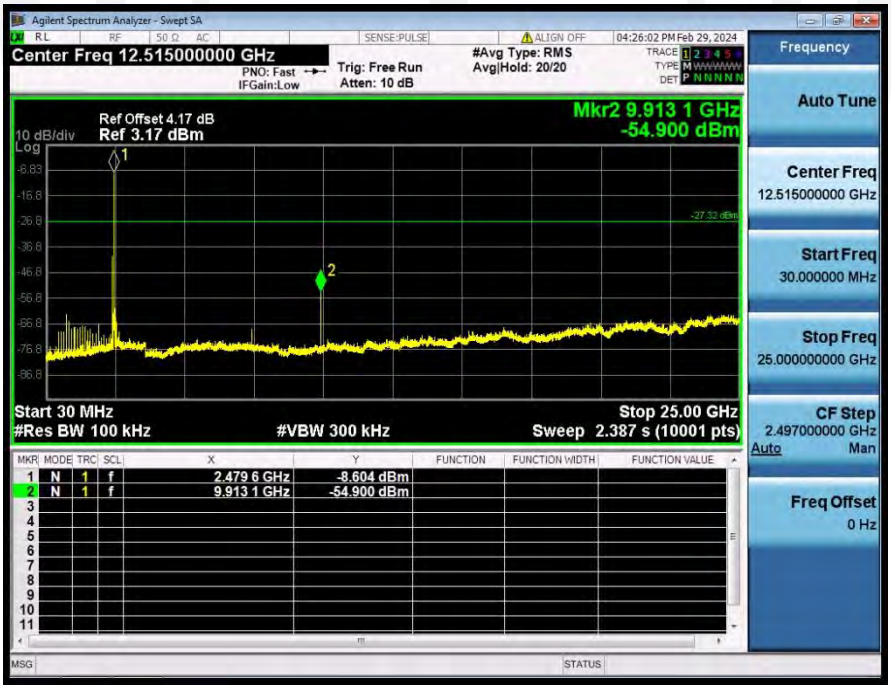
**2_Spurious_Emissions_NVNT_ANT1_2-DH1_2441**



**1_Reference_Level_NVNT_ANT1_2-DH1_2480**

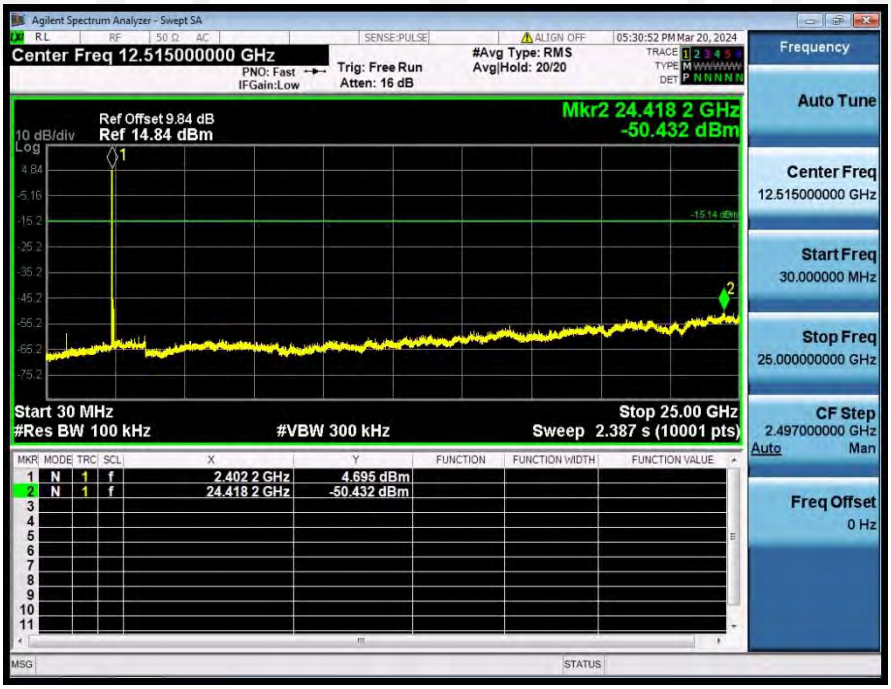



**2_Spurious_Emissions_NVNT_ANT1_2-DH1_2480**



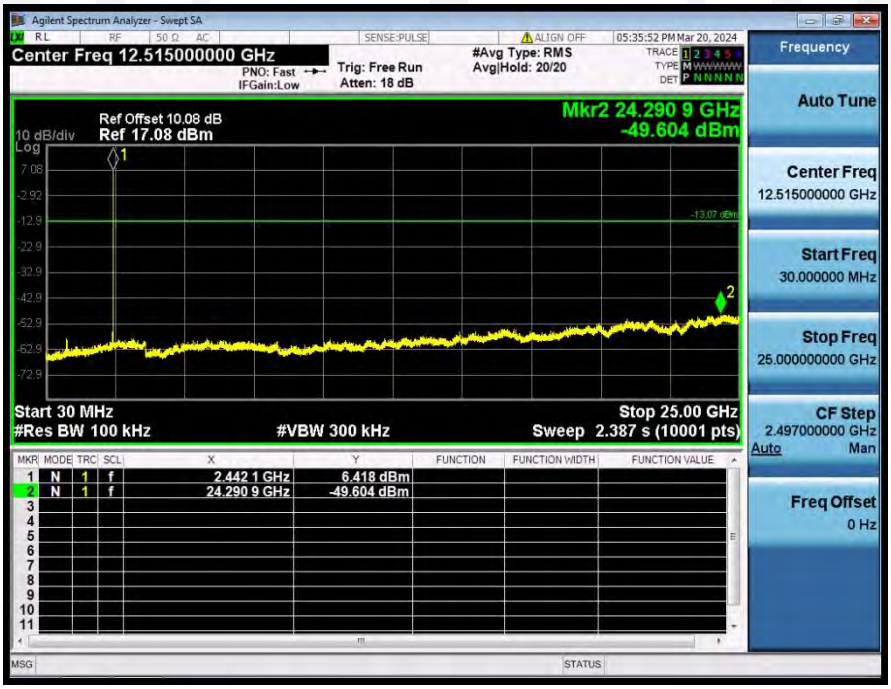
**1_Reference_Level_NVNT_ANT1_3-DH1_2402**

**2_Spurious_Emissions_NVNT_ANT1_3-DH1_2402**



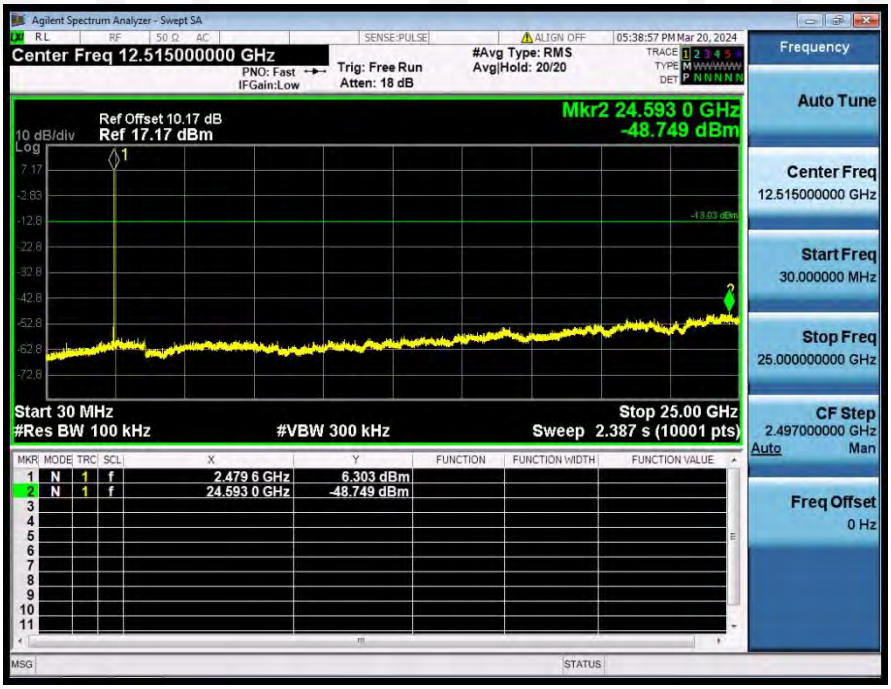
**1_Reference_Level_NVNT_ANT1_3-DH1_2441**

**2_Spurious_Emissions_NVNT_ANT1_3-DH1_2441**



**1_Reference_Level_NVNT_ANT1_3-DH1_2480**

**2_Spurious_Emissions_NVNT_ANT1_3-DH1_2480**



# 9. Radiated Emissions

## 9.1. 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]) |

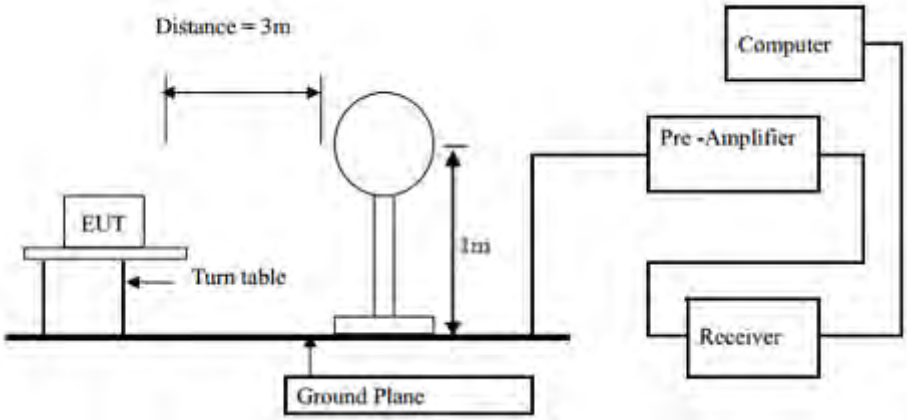
15.209 Limit

| 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) | |

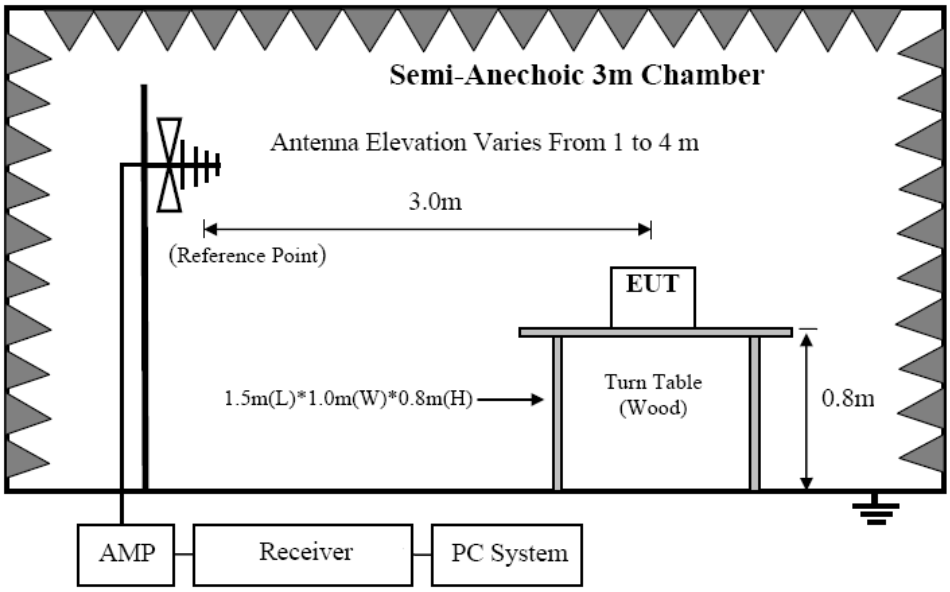
Note: The peak limit is 20 dB higher than the average limit

## 9.2. Block Diagram of Test setup

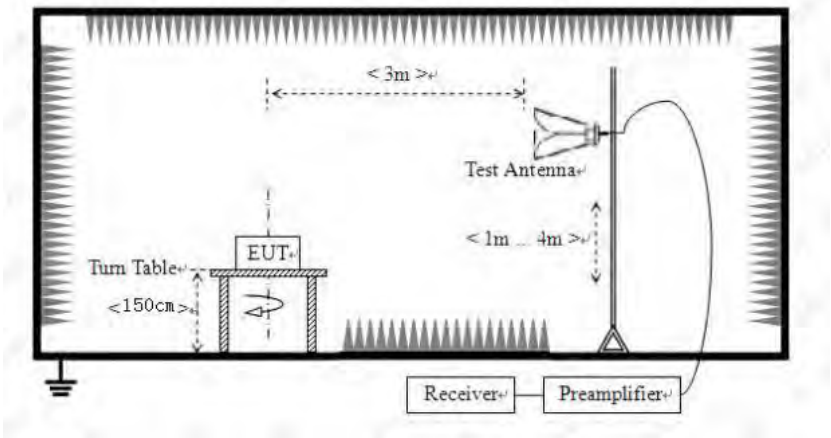
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz




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.

## 9.3. 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.

## 9.4. Test Results

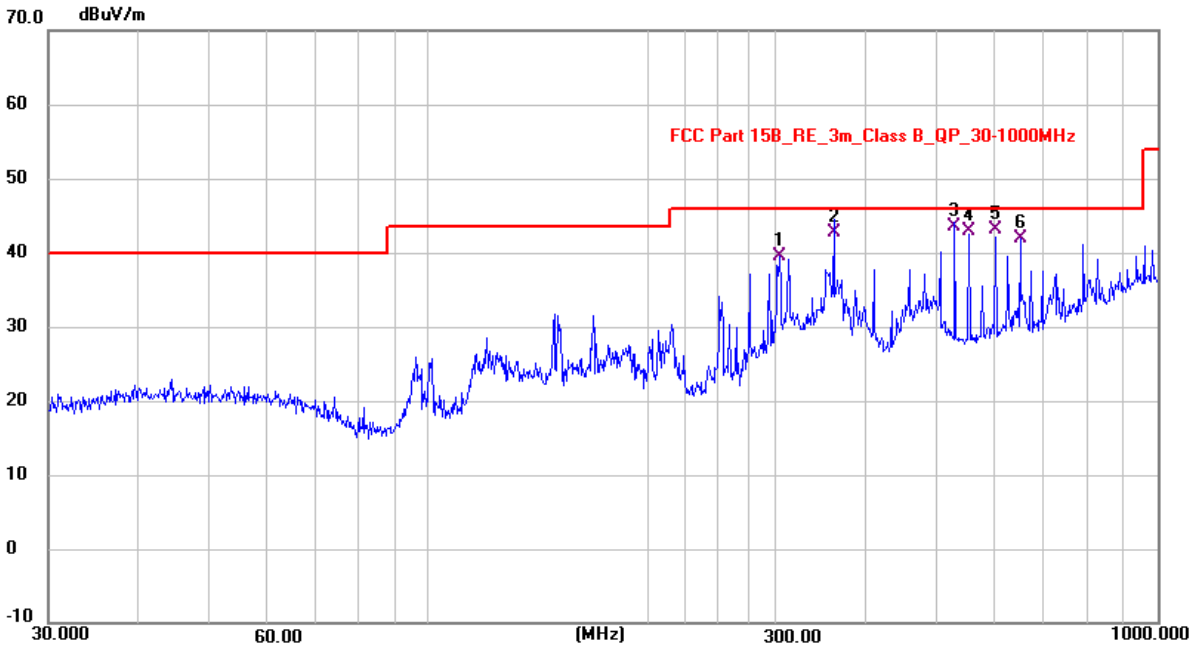
We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.

Detailed information please see the following page.

| From 9KHz to 30MHz: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2024.03.25 | Temperature | : | 26℃ |
| Test Engineer | : | Felix Pang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **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: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2024.03.25 | Temperature | : | 26℃ |
| Test Engineer | : | Felix Pang | Humidity | : | 54% |
| Test Mode | : | GFSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | 1. The test results are listed in next pages.<br>2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.<br>3. All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz (AC 120V/ 60Hz) was listed in this report. | | | | |

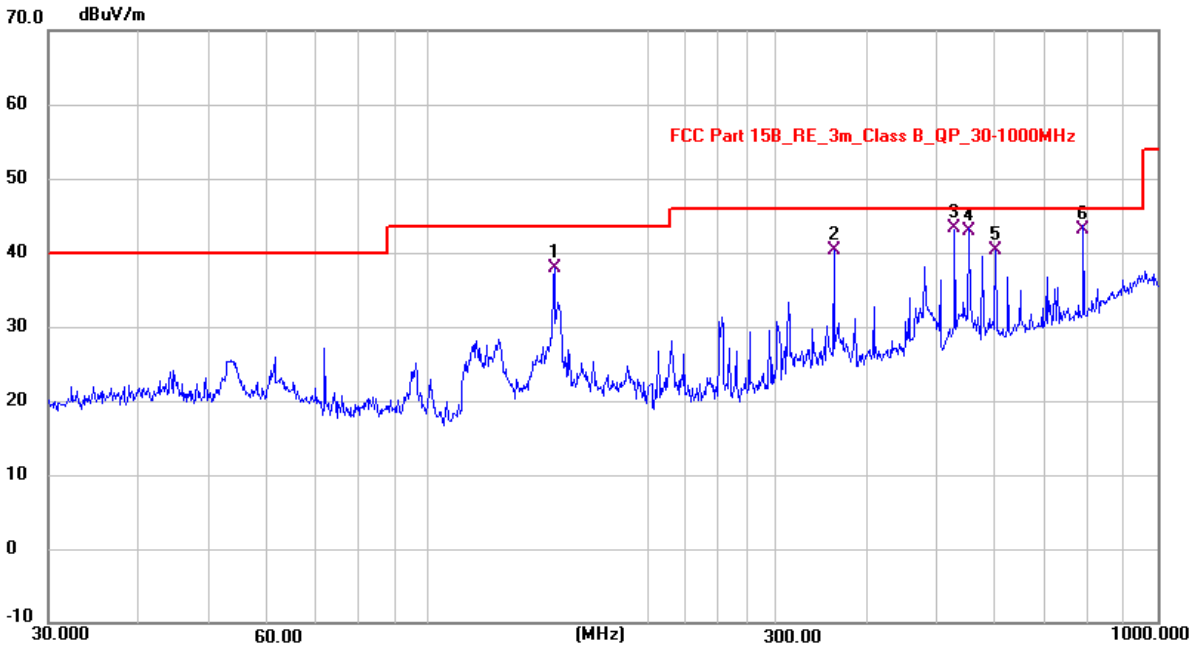
**Polarization: Vertical**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 303.1448 | 25.67 | 13.74 | 39.41 | 46.00 | -6.59 | QP |
| 2 | 360.1319 | 27.50 | 15.18 | 42.68 | 46.00 | -3.32 | QP |
| 3 * | 528.0143 | 24.60 | 18.96 | 43.56 | 46.00 | -2.44 | QP |
| 4 | 552.1568 | 23.35 | 19.54 | 42.89 | 46.00 | -3.11 | QP |
| 5 | 600.1099 | 22.38 | 20.69 | 43.07 | 46.00 | -2.93 | QP |
| 6 | 648.2374 | 20.51 | 21.31 | 41.82 | 46.00 | -4.18 | QP |

Note: Level = Reading + Factor Margin = Level - Limit

**Polarization: Horizontal**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 148.5061 | 24.84 | 13.01 | 37.85 | 43.50 | -5.65 | QP |
| 2 | 360.1319 | 25.09 | 15.18 | 40.27 | 46.00 | -5.73 | QP |
| 3 * | 528.0143 | 24.30 | 18.96 | 43.26 | 46.00 | -2.74 | QP |
| 4 | 552.1568 | 23.32 | 19.54 | 42.86 | 46.00 | -3.14 | QP |
| 5 | 600.1099 | 19.61 | 20.69 | 40.30 | 46.00 | -5.70 | QP |
| 6 | 792.3534 | 19.74 | 23.34 | 43.08 | 46.00 | -2.92 | QP |

Note: Level = Reading + Factor Margin = Level - Limit

| From 1GHz to 25GHz: | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2024.03.25 | Temperature | : | 26℃ |
| Test Engineer | : | Felix Pang | Humidity | : | 54% |
| Test Mode | : | GFSK, π/4 DQPSK, 8DPSK mode | | | |
| Test Results | : | **PASS** | | | |
| Note: | 1. The test results are listed in next pages.<br>2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.<br>3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out. | | | | |

| Test Mode : GFSK TX Low | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 4804 | V | 84.39 | -27.27 | 57.12 | 74.00 | -16.88 | Peak |
| 2 | 4804 | V | 66.10 | -27.27 | 38.83 | 54.00 | -15.17 | Avg |
| 3 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4804 | H | 79.99 | -27.27 | 52.72 | 74.00 | -21.28 | Peak |
| 6 | 4804 | H | 74.94 | -27.27 | 47.67 | 54.00 | -6.33 | Avg |
| 7 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : GFSK TX Mid | | | | | | | | |
| 1 | 4882 | V | 84.85 | -27.79 | 57.06 | 74.00 | -16.94 | Peak |
| 2 | 4882 | V | 64.14 | -27.79 | 36.35 | 54.00 | -17.65 | Avg |
| 3 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4882 | H | 84.30 | -27.79 | 56.51 | 74.00 | -17.49 | Peak |
| 6 | 4882 | H | 71.16 | -27.79 | 43.37 | 54.00 | -10.63 | Avg |
| 7 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : GFSK TX High | | | | | | | | |
| 1 | 4960 | V | 85.97 | -28.30 | 57.67 | 74.00 | -16.33 | Peak |
| 2 | 4960 | V | 69.45 | -28.30 | 41.15 | 54.00 | -12.85 | Avg |
| 3 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9920 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4960 | H | 80.98 | -28.30 | 52.68 | 74.00 | -21.32 | Peak |
| 6 | 4960 | H | 71.39 | -28.30 | 43.09 | 54.00 | -10.91 | Avg |
| 7 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9920 | -- | -- | -- | -- | -- | -- | -- |

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.

| Test Mode : π/4 DQPSK TX Low |
|---|

| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 4804 | V | 86.14 | -27.27 | 58.87 | 74.00 | -15.13 | Peak |
| 2 | 4804 | V | 66.31 | -27.27 | 39.04 | 54.00 | -14.96 | Avg |
| 3 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4804 | H | 80.50 | -27.27 | 53.23 | 74.00 | -20.77 | Peak |
| 6 | 4804 | H | 71.21 | -27.27 | 43.94 | 54.00 | -10.06 | Avg |
| 7 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : π/4 DQPSK TX Mid | | | | | | | | |
| 1 | 4882 | V | 86.21 | -27.79 | 58.42 | 74.00 | -15.58 | Peak |
| 2 | 4882 | V | 64.01 | -27.79 | 36.22 | 54.00 | -17.78 | Avg |
| 3 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4882 | H | 83.09 | -27.79 | 55.30 | 74.00 | -18.70 | Peak |
| 6 | 4882 | H | 70.22 | -27.79 | 42.43 | 54.00 | -11.57 | Avg |
| 7 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : π/4 DQPSK TX High | | | | | | | | |
| 1 | 4960 | V | 84.65 | -28.30 | 56.35 | 74.00 | -17.65 | Peak |
| 2 | 4960 | V | 69.85 | -28.30 | 41.55 | 54.00 | -12.45 | Avg |
| 3 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9920 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4960 | H | 83.45 | -28.30 | 55.15 | 74.00 | -18.85 | Peak |
| 6 | 4960 | H | 72.62 | -28.30 | 44.32 | 54.00 | -9.68 | Avg |
| 7 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9920 | -- | -- | -- | -- | -- | -- | -- |

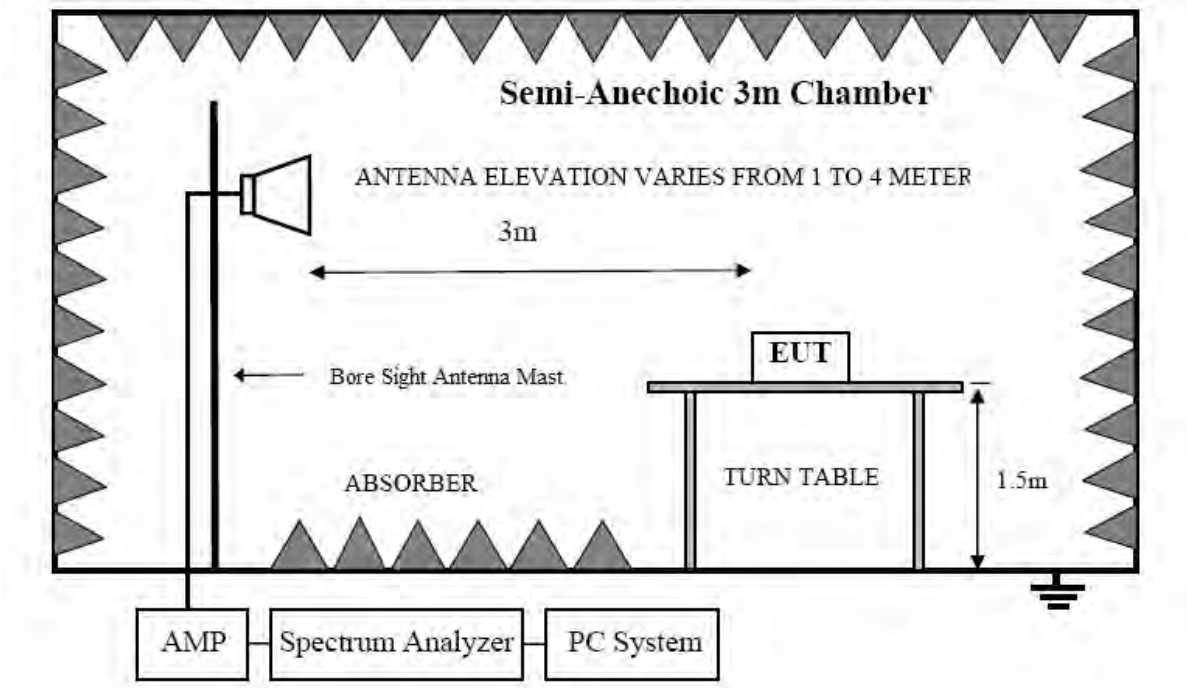
Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.

| Test Mode : 8DPSK TX Low | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 4804 | V | 82.87 | -27.27 | 55.60 | 74.00 | -18.40 | Peak |
| 2 | 4804 | V | 65.55 | -27.27 | 38.28 | 54.00 | -15.72 | Avg |
| 3 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4804 | H | 80.56 | -27.27 | 53.29 | 74.00 | -20.71 | Peak |
| 6 | 4804 | H | 71.52 | -27.27 | 44.25 | 54.00 | -9.75 | Avg |
| 7 | 7206 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9608 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : 8DPSK TX Mid | | | | | | | | |
| 1 | 4882 | V | 86.47 | -27.79 | 58.68 | 74.00 | -15.32 | Peak |
| 2 | 4882 | V | 65.06 | -27.79 | 37.27 | 54.00 | -16.73 | Avg |
| 3 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4882 | H | 81.45 | -27.79 | 53.66 | 74.00 | -20.34 | Peak |
| 6 | 4882 | H | 72.17 | -27.79 | 44.38 | 54.00 | -9.62 | Avg |
| 7 | 7323 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9764 | -- | -- | -- | -- | -- | -- | -- |
| Test Mode : 8DPSK TX High | | | | | | | | |
| 1 | 4960 | V | 83.19 | -28.30 | 54.89 | 74.00 | -19.11 | Peak |
| 2 | 4960 | V | 68.58 | -28.30 | 40.28 | 54.00 | -13.72 | Avg |
| 3 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 4 | 9920 | -- | -- | -- | -- | -- | -- | -- |
| 5 | 4960 | H | 80.09 | -28.30 | 51.79 | 74.00 | -22.21 | Peak |
| 6 | 4960 | H | 71.13 | -28.30 | 42.83 | 54.00 | -11.17 | Avg |
| 7 | 7440 | -- | -- | -- | -- | -- | -- | -- |
| 8 | 9920 | -- | -- | -- | -- | -- | -- | -- |

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.

# 10.Band Edge Test

## 10.1.Block Diagram of Test Setup




## 10.2.Test Limit

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

## 10.3.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.

## 10.4.Test Results

| | | | | | |
|---|---|---|---|---|---|
| Test Date | : | 2024.03.25 | Temperature | : | 24℃ |
| Test Engineer | : | Felix Pang | Humidity | : | 56% |
| Test Results | : | **PASS** | | | |

| Frequency Range : **2310MHz~2410MHz** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Test Mode : GFSK TX 2402MHz | | | | | | | | |
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 2390 | H | 71.79 | -21.62 | 50.17 | 74.00 | -23.83 | Peak |
| 2 | 2390 | H | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | H | 78.12 | -26.08 | 52.04 | 74.00 | -21.96 | Peak |
| 4 | 2400 | H | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2390 | V | 69.10 | -21.62 | 47.48 | 74.00 | -26.52 | Peak |
| 2 | 2390 | V | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | V | 76.80 | -26.08 | 50.72 | 74.00 | -23.28 | Peak |
| 4 | 2400 | V | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| Frequency Range : **2450MHz~2550MHz** | | | | | | | | |
| Test Mode : GFSK TX 2480MHz | | | | | | | | |
| 1 | 2483.5 | H | 74.50 | -25.84 | 48.66 | 74.00 | -25.34 | Peak |
| 2 | 2483.5 | H | -- | -25.84 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2483.5 | V | 74.06 | -25.84 | 48.22 | 74.00 | -25.78 | Peak |
| 2 | 2483.5 | V | -- | -25.84 | -- | 54.00 | -- | Avg |

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
5. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

| Frequency Range : **2310MHz~2410MHz** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Test Mode : π/4 DQPSK TX 2402MHz | | | | | | | | |
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 2390 | H | 70.69 | -21.62 | 49.07 | 74.00 | -24.93 | Peak |
| 2 | 2390 | H | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | H | 78.75 | -26.08 | 52.67 | 74.00 | -21.33 | Peak |
| 4 | 2400 | H | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2390 | V | 70.09 | -21.62 | 48.47 | 74.00 | -25.53 | Peak |
| 2 | 2390 | V | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | V | 78.54 | -26.08 | 52.46 | 74.00 | -21.54 | Peak |
| 4 | 2400 | V | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| Frequency Range : **2450MHz~2550MHz** | | | | | | | | |
| Test Mode : π/4 DQPSK TX 2480MHz | | | | | | | | |
| 1 | 2483.5 | H | 74.11 | -25.84 | 48.27 | 74.00 | -25.73 | Peak |
| 2 | 2483.5 | H | -- | -25.84 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2483.5 | V | 72.22 | -25.84 | 46.38 | 74.00 | -27.62 | Peak |
| 2 | 2483.5 | V | -- | -25.84 | -- | 54.00 | -- | Avg |

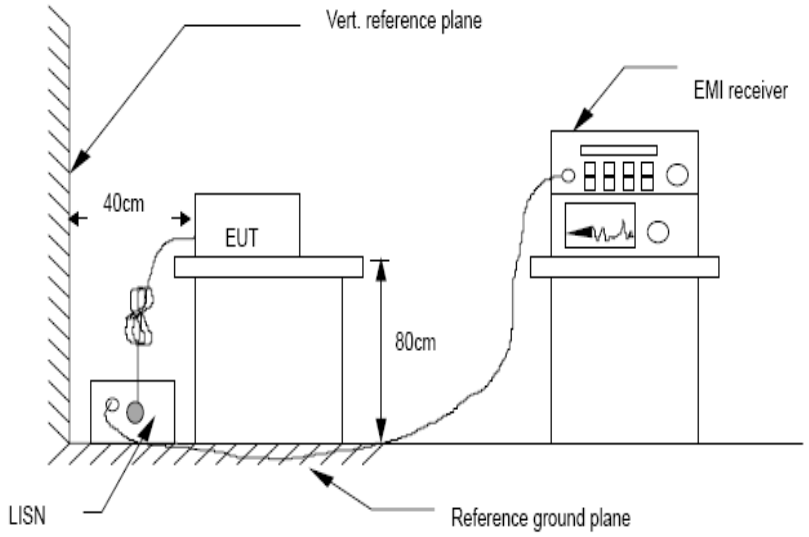
Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

| Frequency Range : **2310MHz~2410MHz** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Test Mode : 8DPSK TX 2402MHz | | | | | | | | |
| No. | Freq MHz | Polarity | Reading (dBuV/m) | Correct Factor | Result (dBuV/m) | Limit (dBuV/m) | Margin | Remark |
| 1 | 2390 | H | 72.82 | -21.62 | 51.20 | 74.00 | -22.80 | Peak |
| 2 | 2390 | H | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | H | 76.43 | -26.08 | 50.35 | 74.00 | -23.65 | Peak |
| 4 | 2400 | H | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2390 | V | 66.77 | -21.62 | 45.15 | 74.00 | -28.85 | Peak |
| 2 | 2390 | V | -- | -21.62 | -- | 54.00 | -- | Avg |
| 3 | 2400 | V | 77.99 | -26.08 | 51.91 | 74.00 | -22.09 | Peak |
| 4 | 2400 | V | -- | -26.08 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| Frequency Range : **2450MHz~2550MHz** | | | | | | | | |
| Test Mode : 8DPSK TX 2480MHz | | | | | | | | |
| 1 | 2483.5 | H | 73.93 | -25.84 | 48.09 | 74.00 | -25.91 | Peak |
| 2 | 2483.5 | H | -- | -25.84 | -- | 54.00 | -- | Avg |
| | | | | | | | | |
| 1 | 2483.5 | V | 73.63 | -25.84 | 47.79 | 74.00 | -26.21 | Peak |
| 2 | 2483.5 | V | -- | -25.84 | -- | 54.00 | -- | Avg |

Note:
1. Means other frequency and mode comply with standard requirements and at least have 20dB margin.
2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain.
Result=Reading + Correct Factor.
Margin= Result-Limit.
5. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

# 11. Power Line Conducted Emissions

## 11.1.Block Diagram of Test Setup




## 11.2.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.

## 11.3.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.

## 11.4.Test Results

| | | | |
|---|---|---|---|
| Test Date | : N/A | Temperature | : N/A |
| Test Engineer | : N/A | Humidity | : N/A |
| Test Mode | : N/A | | |
| Test Results | : N/A | | |
| Note: | Not applicable, the product is powered by batteries. | | |

# 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.Photos of test setup

Reference to the **appendix I Test Setup Photo** for details.

# 14. Photos of EUT

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

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