

# RF TEST REPORT

For

**BESING TECHNOLOGY (SHENZHEN) CO., LTD**

**Product Name: Wireless Earphones**

**Test Model(s): W30**

**Report Reference No.** : DACE250702019RL001

**FCC ID** : 2ATU8-W30

**Applicant's Name** : BESING TECHNOLOGY (SHENZHEN) CO., LTD

**Address** : 2F, Block 1, Tianxin Resident Group Industrial Park, Shangwu Community, Shiyan Street, Baoan District, Shenzhen, China

**Testing Laboratory** : Shenzhen DACE Testing Technology Co., Ltd.

**Address** : 102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China

**Test Specification Standard** : 47 CFR Part 15.247

**Date of Receipt** : July 2, 2025

**Date of Test** : July 2, 2025 to August 23, 2025

**Data of Issue** : August 23, 2025

**Result** : Pass

Note: This report shall not be reproduced except in full, without the written approval of Shenzhen DACE Testing Technology Co., Ltd. This document may be altered or revised by Shenzhen DACE Testing Technology Co., Ltd. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample

## Apply for company information

|                                       |   |                                                                                                                        |
|---------------------------------------|---|------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant's Name</b>               | : | BESING TECHNOLOGY (SHENZHEN) CO., LTD                                                                                  |
| <b>Address</b>                        | : | 2F, Block 1, Tianxin Resident Group Industrial Park, Shangwu Community, Shiyan Street, Baoan District, Shenzhen, China |
| <b>Product Name</b>                   | : | Wireless Earphones                                                                                                     |
| <b>Test Model(s)</b>                  | : | W30                                                                                                                    |
| <b>Series Model(s)</b>                | : | W31                                                                                                                    |
| <b>Test Specification Standard(s)</b> | : | 47 CFR Part 15.247                                                                                                     |

### NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:

*Keren Huang*

Keren Huang / Test Engineer

August 23, 2025

Supervised by:

*Ben Tang*

Ben Tang / Project Engineer

August 23, 2025

Approved by:

*Machael Mo*

Machael Mo / Manager

August 23, 2025

## Revision History Of Report

| Version | Description | REPORT No.         | Issue Date      |
|---------|-------------|--------------------|-----------------|
| V1.0    | Original    | DACE250702019RL001 | August 23, 2025 |
|         |             |                    |                 |
|         |             |                    |                 |
|         |             |                    |                 |
|         |             |                    |                 |

# CONTENTS

|                                                        |           |
|--------------------------------------------------------|-----------|
| <b>1 TEST SUMMARY .....</b>                            | <b>6</b>  |
| 1.1 TEST STANDARDS .....                               | 6         |
| 1.2 SUMMARY OF TEST RESULT .....                       | 6         |
| <b>2 GENERAL INFORMATION .....</b>                     | <b>7</b>  |
| 2.1 CLIENT INFORMATION .....                           | 7         |
| 2.2 DESCRIPTION OF DEVICE (EUT) .....                  | 7         |
| 2.3 DESCRIPTION OF TEST MODES .....                    | 8         |
| 2.4 DESCRIPTION OF SUPPORT UNITS .....                 | 8         |
| 2.5 EQUIPMENTS USED DURING THE TEST .....              | 9         |
| 2.6 STATEMENT OF THE MEASUREMENT UNCERTAINTY .....     | 11        |
| 2.7 IDENTIFICATION OF TESTING LABORATORY .....         | 11        |
| 2.8 ANNOUNCEMENT .....                                 | 11        |
| <b>3 EVALUATION RESULTS (EVALUATION) .....</b>         | <b>12</b> |
| 3.1 ANTENNA REQUIREMENT .....                          | 12        |
| <b>4 RADIO SPECTRUM MATTER TEST RESULTS (RF) .....</b> | <b>13</b> |
| 4.1 CONDUCTED EMISSION AT AC POWER LINE .....          | 13        |
| 4.1.1 E.U.T. Operation: .....                          | 13        |
| 4.1.2 Test Setup Diagram: .....                        | 13        |
| 4.1.3 Test Data: .....                                 | 14        |
| 4.2 MAXIMUM CONDUCTED OUTPUT POWER .....               | 16        |
| 4.2.1 E.U.T. Operation: .....                          | 16        |
| 4.2.2 Test Setup Diagram: .....                        | 16        |
| 4.2.3 Test Data: .....                                 | 16        |
| 4.3 CHANNEL SEPARATION .....                           | 17        |
| 4.3.1 E.U.T. Operation: .....                          | 17        |
| 4.3.2 Test Setup Diagram: .....                        | 17        |
| 4.3.3 Test Data: .....                                 | 17        |
| 4.4 NUMBER OF HOPPING FREQUENCIES .....                | 18        |
| 4.4.1 E.U.T. Operation: .....                          | 18        |
| 4.4.2 Test Setup Diagram: .....                        | 18        |
| 4.4.3 Test Data: .....                                 | 18        |
| 4.5 DWELL TIME .....                                   | 19        |
| 4.5.1 E.U.T. Operation: .....                          | 20        |
| 4.5.2 Test Setup Diagram: .....                        | 20        |
| 4.5.3 Test Data: .....                                 | 20        |
| 4.6 EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS .....  | 21        |
| 4.6.1 E.U.T. Operation: .....                          | 22        |
| 4.6.2 Test Setup Diagram: .....                        | 22        |
| 4.6.3 Test Data: .....                                 | 22        |
| 4.7 BAND EDGE EMISSIONS (RADIATED) .....               | 23        |
| 4.7.1 E.U.T. Operation: .....                          | 23        |
| 4.7.2 Test Setup Diagram: .....                        | 23        |
| 4.7.3 Test Data: .....                                 | 24        |
| 4.8 EMISSIONS IN FREQUENCY BANDS (BELOW 1GHz) .....    | 28        |
| 4.8.1 E.U.T. Operation: .....                          | 29        |
| 4.8.2 Test Data: .....                                 | 29        |

|                                                      |           |
|------------------------------------------------------|-----------|
| <b>4.9 EMISSIONS IN FREQUENCY BANDS (ABOVE 1GHz)</b> | <b>31</b> |
| 4.9.1 E.U.T. Operation:                              | 32        |
| 4.9.2 Test Data:                                     | 32        |
| <b>5 TEST SETUP PHOTOS</b>                           | <b>38</b> |
| <b>6 PHOTOS OF THE EUT</b>                           | <b>40</b> |
| <b>APPENDIX</b>                                      | <b>54</b> |
| 1. DUTY CYCLE                                        | 55        |
| 2. -20dB BANDWIDTH                                   | 59        |
| 3. 99% OCCUPIED BANDWIDTH                            | 63        |
| 4. PEAK OUTPUT POWER                                 | 67        |
| 5. SPURIOUS EMISSIONS                                | 71        |
| 6. BANDEGE                                           | 77        |
| 7. CARRIER FREQUENCIES SEPARATION (HOPPING)          | 86        |
| 8. NUMBER OF HOPPING CHANNEL (HOPPING)               | 90        |
| 9. DWELL TIME (HOPPING)                              | 94        |

# 1 TEST SUMMARY

## 1.1 Test Standards

The tests were performed according to following standards:

**47 CFR Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

## 1.2 Summary of Test Result

| Item                                        | Standard           | Method                                                                           | Requirement                      | Result |
|---------------------------------------------|--------------------|----------------------------------------------------------------------------------|----------------------------------|--------|
| Antenna requirement                         | 47 CFR Part 15.247 |                                                                                  | 47 CFR 15.203                    | Pass   |
| Conducted Emission at AC power line         | 47 CFR Part 15.247 | ANSI C63.10-2020 section 6.2                                                     | 47 CFR 15.207(a)                 | Pass   |
| Maximum Conducted Output Power              | 47 CFR Part 15.247 | ANSI C63.10-2020, section 7.8.5<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 47 CFR 15.247(b)(1)              | Pass   |
| Channel Separation                          | 47 CFR Part 15.247 | ANSI C63.10-2020, section 7.8.2<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 47 CFR 15.247(a)(1)              | Pass   |
| Number of Hopping Frequencies               | 47 CFR Part 15.247 | ANSI C63.10-2020, section 7.8.3<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 47 CFR 15.247(a)(1)(iii)         | Pass   |
| Dwell Time                                  | 47 CFR Part 15.247 | ANSI C63.10-2020, section 7.8.4<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 47 CFR 15.247(a)(1)(iii)         | Pass   |
| Emissions in non-restricted frequency bands | 47 CFR Part 15.247 | ANSI C63.10-2020 section 7.8.7<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02  | 47 CFR 15.247(d)                 | Pass   |
| Band edge emissions (Radiated)              | 47 CFR Part 15.247 | ANSI C63.10-2020 section 6.10<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02   | 47 CFR 15.247(d), 15.209, 15.205 | Pass   |
| Emissions in frequency bands (below 1GHz)   | 47 CFR Part 15.247 | ANSI C63.10-2020 section 6.6.4<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02  | 47 CFR 15.247(d), 15.209, 15.205 | Pass   |
| Emissions in frequency bands (above 1GHz)   | 47 CFR Part 15.247 | ANSI C63.10-2020 section 6.6.4<br>KDB 558074 D01 15.247<br>Meas Guidance v05r02  | 47 CFR 15.247(d), 15.209, 15.205 | Pass   |

## 2 GENERAL INFORMATION

### 2.1 Client Information

**Applicant's Name** : BESING TECHNOLOGY (SHENZHEN) CO., LTD  
**Address** : 2F, Block 1, Tianxin Resident Group Industrial Park, Shangwu Community, Shiyan Street, Baoan District, Shenzhen, China

**Manufacturer** : BESING TECHNOLOGY (SHENZHEN) CO., LTD  
**Address** : 2F, Block 1, Tianxin Resident Group Industrial Park, Shangwu Community, Shiyan Street, Baoan District, Shenzhen, China

### 2.2 Description of Device (EUT)

|                       |                                                                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:         | Wireless Earphones                                                                                                                                                           |
| Model/Type reference: | W30                                                                                                                                                                          |
| Series Model:         | W31                                                                                                                                                                          |
| Model Difference:     | The product has many models, only the model name,color and shape is different, and the other parts such as the circuit principle, pcb and electrical structure are the same. |
| Trade Mark:           | N/A                                                                                                                                                                          |
| Power Supply:         | DC 5V/1A from adapter Battery:DC3.7V 40mAh                                                                                                                                   |
| Operation Frequency:  | 2402MHz to 2480MHz                                                                                                                                                           |
| Number of Channels:   | 79                                                                                                                                                                           |
| Modulation Type:      | GFSK, $\pi/4$ DQPSK                                                                                                                                                          |
| Antenna Type:         | Internal antenna                                                                                                                                                             |
| Antenna Gain:         | 1.8dBi                                                                                                                                                                       |
| Hardware Version:     | V1.0                                                                                                                                                                         |
| Software Version:     | V1.0                                                                                                                                                                         |

(Remark:The Antenna Gain is supplied by the customer.DACE is not responsible for This data and the related calculations associated with it)

| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                   | 2402MHz   | 21      | 2422MHz   | 41      | 2442MHz   | 61      | 2462MHz   |
| 2                                   | 2403MHz   | 22      | 2423MHz   | 42      | 2443MHz   | 62      | 2463MHz   |
| 3                                   | 2404MHz   | 23      | 2424MHz   | 43      | 2444MHz   | 63      | 2464MHz   |
| 4                                   | 2405MHz   | 24      | 2425MHz   | 44      | 2445MHz   | 64      | 2465MHz   |
| 5                                   | 2406MHz   | 25      | 2426MHz   | 45      | 2446MHz   | 65      | 2466MHz   |
| 6                                   | 2407MHz   | 26      | 2427MHz   | 46      | 2447MHz   | 66      | 2467MHz   |
| 7                                   | 2408MHz   | 27      | 2428MHz   | 47      | 2448MHz   | 67      | 2468MHz   |
| 8                                   | 2409MHz   | 28      | 2429MHz   | 48      | 2449MHz   | 68      | 2469MHz   |
| 9                                   | 2410MHz   | 29      | 2430MHz   | 49      | 2450MHz   | 69      | 2470MHz   |
| 10                                  | 2411MHz   | 30      | 2431MHz   | 50      | 2451MHz   | 70      | 2471MHz   |
| 11                                  | 2412MHz   | 31      | 2432MHz   | 51      | 2452MHz   | 71      | 2472MHz   |
| 12                                  | 2413MHz   | 32      | 2433MHz   | 52      | 2453MHz   | 72      | 2473MHz   |

|    |         |    |         |    |         |    |         |
|----|---------|----|---------|----|---------|----|---------|
| 13 | 2414MHz | 33 | 2434MHz | 53 | 2454MHz | 73 | 2474MHz |
| 14 | 2415MHz | 34 | 2435MHz | 54 | 2455MHz | 74 | 2475MHz |
| 15 | 2416MHz | 35 | 2436MHz | 55 | 2456MHz | 75 | 2476MHz |
| 16 | 2417MHz | 36 | 2437MHz | 56 | 2457MHz | 76 | 2477MHz |
| 17 | 2418MHz | 37 | 2438MHz | 57 | 2458MHz | 77 | 2478MHz |
| 18 | 2419MHz | 38 | 2439MHz | 58 | 2459MHz | 78 | 2479MHz |
| 19 | 2420MHz | 39 | 2440MHz | 59 | 2460MHz | 79 | 2480MHz |
| 20 | 2421MHz | 40 | 2441MHz | 60 | 2461MHz |    |         |

#### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Test channel    | Frequency (MHz) |
|-----------------|-----------------|
|                 | BDR/EDR         |
| Lowest channel  | 2402MHz         |
| Middle channel  | 2441MHz         |
| Highest channel | 2480MHz         |

### 2.3 Description of Test Modes

| No                                                                        | Title                      | Description                                                                             |
|---------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------|
| TM1                                                                       | TX-GFSK (Non-Hopping)      | Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation.      |
| TM2                                                                       | TX-Pi/4DQPSK (Non-Hopping) | Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation. |
| TM3                                                                       | TX-GFSK (Hopping)          | Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.         |
| TM4                                                                       | TX-Pi/4DQPSK (Hopping)     | Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.     |
| Remark: Only the data of the worst mode would be recorded in this report. |                            |                                                                                         |

### 2.4 Description of Support Units

| Title         | Manufacturer | Model No. | Serial No. |
|---------------|--------------|-----------|------------|
| AC-DC adapter | HUAWEI       | P0005     |            |

## 2.5 Equipments Used During The Test

| Conducted Emission at AC power line |                 |                                            |                         |            |              |
|-------------------------------------|-----------------|--------------------------------------------|-------------------------|------------|--------------|
| Equipment                           | Manufacturer    | Model No                                   | Inventory No            | Cal Date   | Cal Due Date |
| Power absorbing clamp               | SCHWARZ BECK    | MESS-ELEKTRONIK                            | /                       | 2025-04-23 | 2026-04-22   |
| Electric Network                    | SCHWARZ BECK    | CAT5 8158                                  | CAT5 8158#207           | 2025-04-18 | 2026-04-17   |
| Cable                               | SCHWARZ BECK    | /                                          | /                       | 2025-04-18 | 2026-04-17   |
| Pulse Limiter                       | SCHWARZ BECK    | VTSD 9561-F Pulse limiter 10dB Attenuation | 561-G071                | 2024-12-06 | 2025-12-05   |
| 50ΩCoaxial Switch                   | Anritsu         | MP59B                                      | M20531                  | /          | /            |
| Test Receiver                       | Rohde & Schwarz | ESPI TEST RECEIVER                         | 1164.6607K03 -102109-MH | 2025-04-25 | 2026-04-24   |
| L.I.S.N                             | R&S             | ESH3-Z5                                    | 831.5518.52             | 2025-04-18 | 2026-04-17   |
| L.I.S.N                             | SCHWARZ BECK    | NSLK 8126                                  | 05055                   | 2025-04-18 | 2026-04-17   |
| Pulse Limiter                       | CYBERTEK        | EM5010A                                    | /                       | 2024-09-27 | 2025-09-26   |
| EMI test software                   | EZ -EMC         | EZ                                         | V1.1.42                 | /          | /            |

### Channel Separation

Number of Hopping Frequencies

Dwell Time

Emissions in non-restricted frequency bands

Maximum Conducted Output Power

| Equipment                           | Manufacturer                                     | Model No | Inventory No | Cal Date   | Cal Due Date |
|-------------------------------------|--------------------------------------------------|----------|--------------|------------|--------------|
| RF Test Software                    | Tachoy Information Technology(she nzhn) Co.,Ltd. | RTS-01   | V1.0.0       | /          | /            |
| Power divider                       | MIDEWEST                                         | PWD-2533 | SMA-79       | 2025-04-18 | 2026-05-10   |
| RF Sensor Unit                      | Tachoy Information Technology(she nzhn) Co.,Ltd. | TR1029-2 | 000001       | /          | /            |
| Wideband radio communication tester | R&S                                              | CMW500   | 113410       | 2025-04-25 | 2026-04-24   |
| Vector Signal Generator             | Keysight                                         | N5181A   | MY50143455   | 2024-12-06 | 2025-12-05   |
| Signal Generator                    | Keysight                                         | N5182A   | MY48180415   | 2024-12-06 | 2025-12-05   |
| Spectrum Analyzer                   | Keysight                                         | N9020A   | MY53420323   | 2024-12-06 | 2025-12-05   |

**Band edge emissions (Radiated)**
**Emissions in frequency bands (below 1GHz)**
**Emissions in frequency bands (above 1GHz)**

| Equipment                           | Manufacturer   | Model No         | Inventory No           | Cal Date   | Cal Due Date |
|-------------------------------------|----------------|------------------|------------------------|------------|--------------|
| EMI Test software                   | Farad          | EZ -EMC          | V1.1.42                | /          | /            |
| Positioning Controller              | MF             | MF-7802          | /                      | /          | /            |
| Amplifier(18-40G)                   | COM-POWER      | AH-1840          | 10100008-1             | 2024-04-26 | 2027-04-25   |
| Horn antenna                        | COM-POWER      | AH-1840 (18-40G) | 10100008               | 2024-04-26 | 2027-04-25   |
| Loop antenna                        | ZHINAN         | ZN30900C         | ZN30900C               | 2025-04-28 | 2026-04-27   |
| Cable(LF)#2                         | Schwarzbeck    | /                | /                      | 2024-12-19 | 2025-12-18   |
| Cable(LF)#1                         | Schwarzbeck    | /                | /                      | 2024-12-19 | 2025-12-18   |
| Cable(HF)#2                         | Schwarzbeck    | AK9515E          | 96250                  | 2025-04-25 | 2026-04-24   |
| Cable(HF)#1                         | Schwarzbeck    | SYV-50-3-1       | /                      | 2025-04-25 | 2026-04-24   |
| Power amplifier(LF)                 | Schwarzbeck    | BBV9743          | 9743-151               | 2025-04-29 | 2026-04-28   |
| Power amplifier(HF)                 | Schwarzbeck    | BBV9718          | 9718-282               | 2025-04-29 | 2026-04-28   |
| Wideband radio communication tester | R&S            | CMW500           | 113410                 | 2025-04-25 | 2026-04-24   |
| Spectrum Analyzer                   | R&S            | FSP30            | 1321.3008K40-101729-jR | 2025-04-18 | 2026-04-17   |
| Test Receiver                       | R&S            | ESCI 3           | 1166.5950K03-101431-Jq | 2025-04-18 | 2026-04-17   |
| Horn Antenna                        | Sunol Sciences | DRH-118          | A091114                | 2025-04-21 | 2026-04-20   |
| Broadband Antenna                   | Sunol Sciences | JB6 Antenna      | A090414                | 2024-09-28 | 2026-09-27   |

## 2.6 Statement Of The Measurement Uncertainty

| Test Item                                                                                                                                         | Measurement Uncertainty |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Conducted Disturbance (0.15~30MHz)                                                                                                                | ±3.41dB                 |
| RF conducted power                                                                                                                                | ±0.733dB                |
| Occupied Bandwidth                                                                                                                                | ±3.63%                  |
| Duty cycle                                                                                                                                        | ±3.1%                   |
| Conducted Spurious emissions                                                                                                                      | ±1.98dB                 |
| Radiated Emission (Above 1GHz)                                                                                                                    | ±5.46dB                 |
| Radiated Emission (Below 1GHz)                                                                                                                    | ±5.79dB                 |
| Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                         |

## 2.7 Identification of Testing Laboratory

|               |                                                                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Company Name: | Shenzhen DACE Testing Technology Co., Ltd.                                                                                                                 |
| Address:      | 102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China |
| Phone Number: | +86-13267178997                                                                                                                                            |
| Fax Number:   | 86-755-29113252                                                                                                                                            |

### Identification of the Responsible Testing Location

|                                |                                                                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Company Name:                  | Shenzhen DACE Testing Technology Co., Ltd.                                                                                                                 |
| Address:                       | 102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China |
| Phone Number:                  | +86-13267178997                                                                                                                                            |
| Fax Number:                    | 86-755-29113252                                                                                                                                            |
| FCC Registration Number:       | 0032847402                                                                                                                                                 |
| Designation Number:            | CN1342                                                                                                                                                     |
| Test Firm Registration Number: | 778666                                                                                                                                                     |
| A2LA Certificate Number:       | 6270.01                                                                                                                                                    |

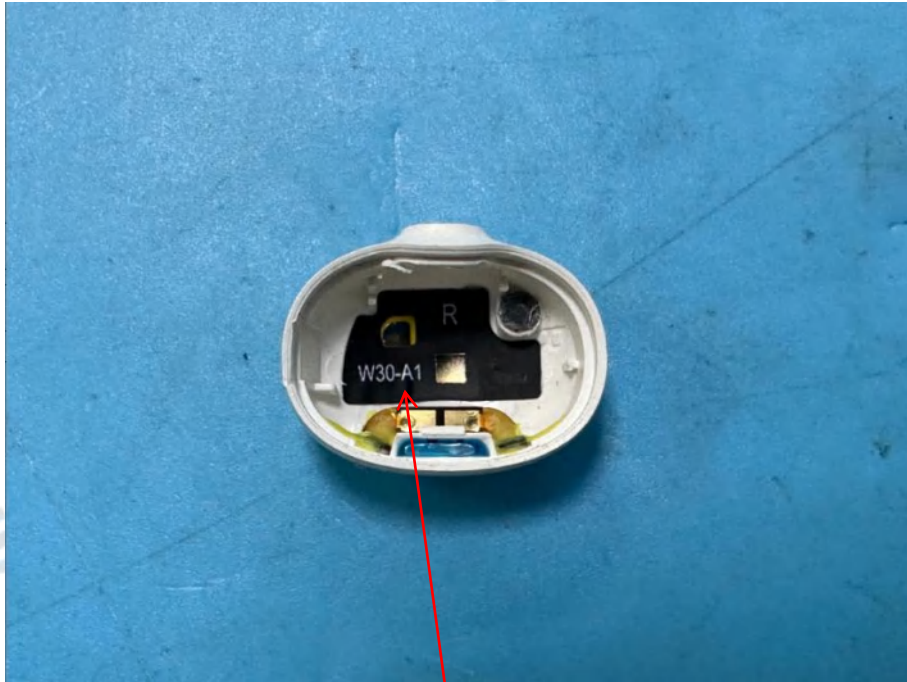
## 2.8 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by DACE and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

### 3 Evaluation Results (Evaluation)

#### 3.1 Antenna requirement

|                   |                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



ANT

#### 4 Radio Spectrum Matter Test Results (RF)

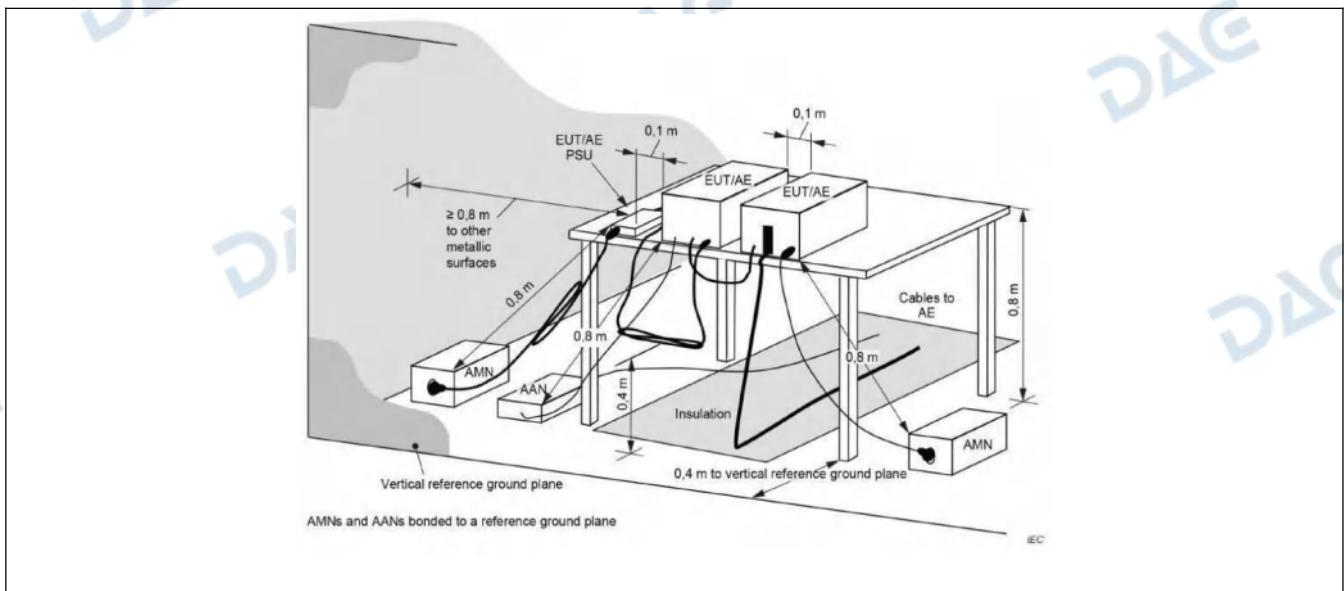
#### 4.1 Conducted Emission at AC power line

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------|
| Test Requirement: | Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). |                              |           |
| Test Limit:       | Frequency of emission (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Conducted limit (dB $\mu$ V) |           |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quasi-peak                   | Average   |
|                   | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66 to 56*                    | 56 to 46* |
|                   | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 56                           | 46        |
|                   | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60                           | 50        |
|                   | *Decreases with the logarithm of the frequency.                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |           |
| Test Method:      | ANSI C63.10-2020 section 6.2                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |           |
| Procedure:        | Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices                                                                                                                                                                                                                                                                                                                                            |                              |           |

#### 4.1.1 E.U.T. Operation:

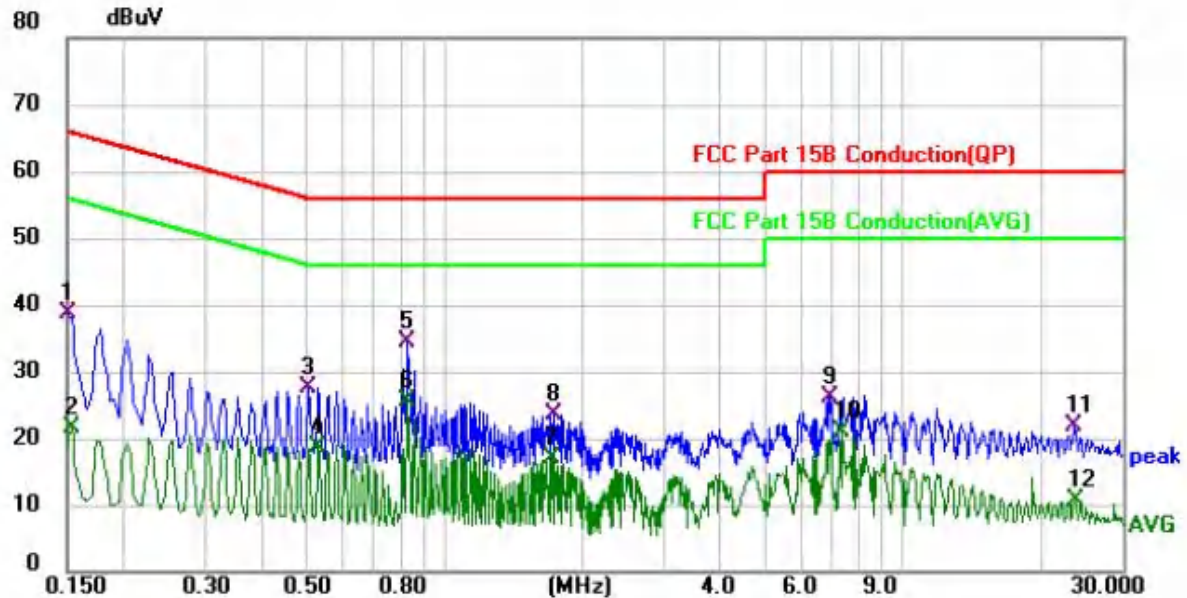
|                        |         |           |      |                       |         |
|------------------------|---------|-----------|------|-----------------------|---------|
| Operating Environment: |         |           |      |                       |         |
| Temperature:           | 22.2 °C | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          |         | TM1, TM2  |      |                       |         |
| Final test mode:       |         | TM1, TM2  |      |                       |         |

#### 4.1.2 Test Setup Diagram:



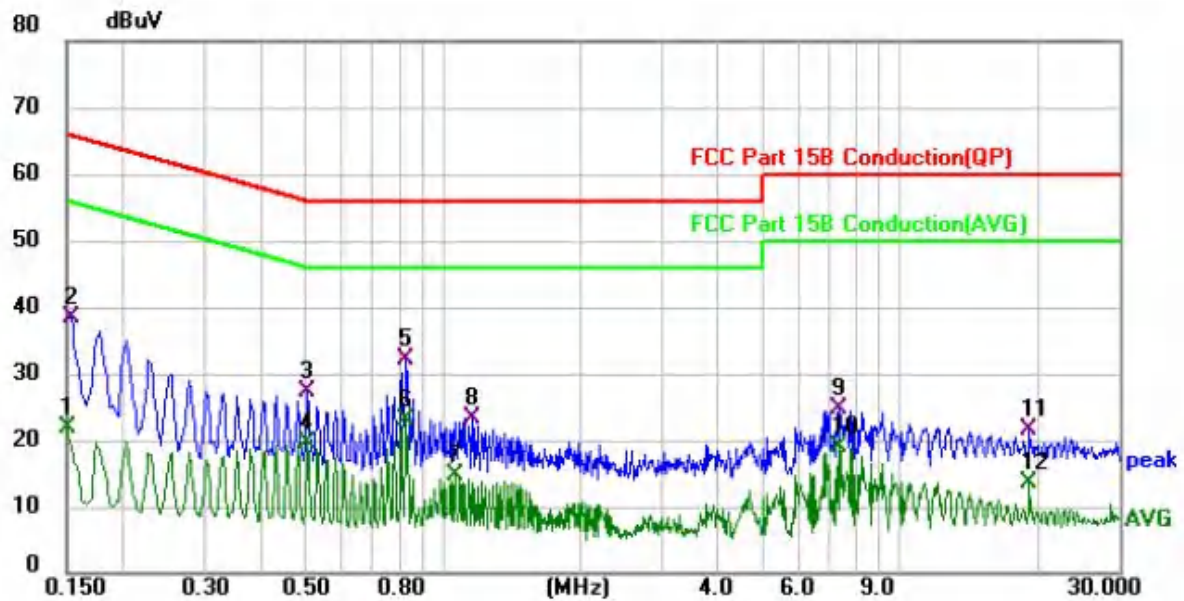
#### 4.1.3 Test Data:

TM1 / Line: Line / Band: 2400-2483.5 MHz / BW: 1 / CH: L



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.1500       | 28.62                    | 10.11                   | 38.73                    | 66.00         | -27.27     | QP       |         |
| 2   |     | 0.1539       | 11.56                    | 10.11                   | 21.67                    | 55.79         | -34.12     | AVG      |         |
| 3   |     | 0.5060       | 17.61                    | 10.10                   | 27.71                    | 56.00         | -28.29     | QP       |         |
| 4   |     | 0.5299       | 8.60                     | 10.10                   | 18.70                    | 46.00         | -27.30     | AVG      |         |
| 5   |     | 0.8340       | 24.29                    | 10.10                   | 34.39                    | 56.00         | -21.61     | QP       |         |
| 6   | *   | 0.8340       | 15.44                    | 10.10                   | 25.54                    | 46.00         | -20.46     | AVG      |         |
| 7   |     | 1.7180       | 7.05                     | 10.03                   | 17.08                    | 46.00         | -28.92     | AVG      |         |
| 8   |     | 1.7420       | 13.68                    | 10.03                   | 23.71                    | 56.00         | -32.29     | QP       |         |
| 9   |     | 6.9500       | 16.06                    | 10.22                   | 26.28                    | 60.00         | -33.72     | QP       |         |
| 10  |     | 7.2940       | 10.69                    | 10.23                   | 20.92                    | 50.00         | -29.08     | AVG      |         |
| 11  |     | 23.5980      | 11.10                    | 10.71                   | 21.81                    | 60.00         | -38.19     | QP       |         |
| 12  |     | 23.6980      | -0.05                    | 10.71                   | 10.66                    | 50.00         | -39.34     | AVG      |         |

TM1 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 1 / CH: L



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.1500       | 11.87                    | 10.08                   | 21.95                    | 56.00         | -34.05     | AVG      |         |
| 2   |     | 0.1539       | 28.23                    | 10.08                   | 38.31                    | 65.79         | -27.48     | QP       |         |
| 3   |     | 0.5060       | 17.21                    | 10.09                   | 27.30                    | 56.00         | -28.70     | QP       |         |
| 4   |     | 0.5060       | 9.50                     | 10.09                   | 19.59                    | 46.00         | -26.41     | AVG      |         |
| 5   |     | 0.8340       | 22.13                    | 10.09                   | 32.22                    | 56.00         | -23.78     | QP       |         |
| 6   | *   | 0.8340       | 12.92                    | 10.09                   | 23.01                    | 46.00         | -22.99     | AVG      |         |
| 7   |     | 1.0620       | 4.52                     | 10.07                   | 14.59                    | 46.00         | -31.41     | AVG      |         |
| 8   |     | 1.1620       | 13.20                    | 10.07                   | 23.27                    | 56.00         | -32.73     | QP       |         |
| 9   |     | 7.2980       | 14.61                    | 10.24                   | 24.85                    | 60.00         | -35.15     | QP       |         |
| 10  |     | 7.2980       | 8.70                     | 10.24                   | 18.94                    | 50.00         | -31.06     | AVG      |         |
| 11  |     | 19.2099      | 10.86                    | 10.59                   | 21.45                    | 60.00         | -38.55     | QP       |         |
| 12  |     | 19.2099      | 2.97                     | 10.59                   | 13.56                    | 50.00         | -36.44     | AVG      |         |

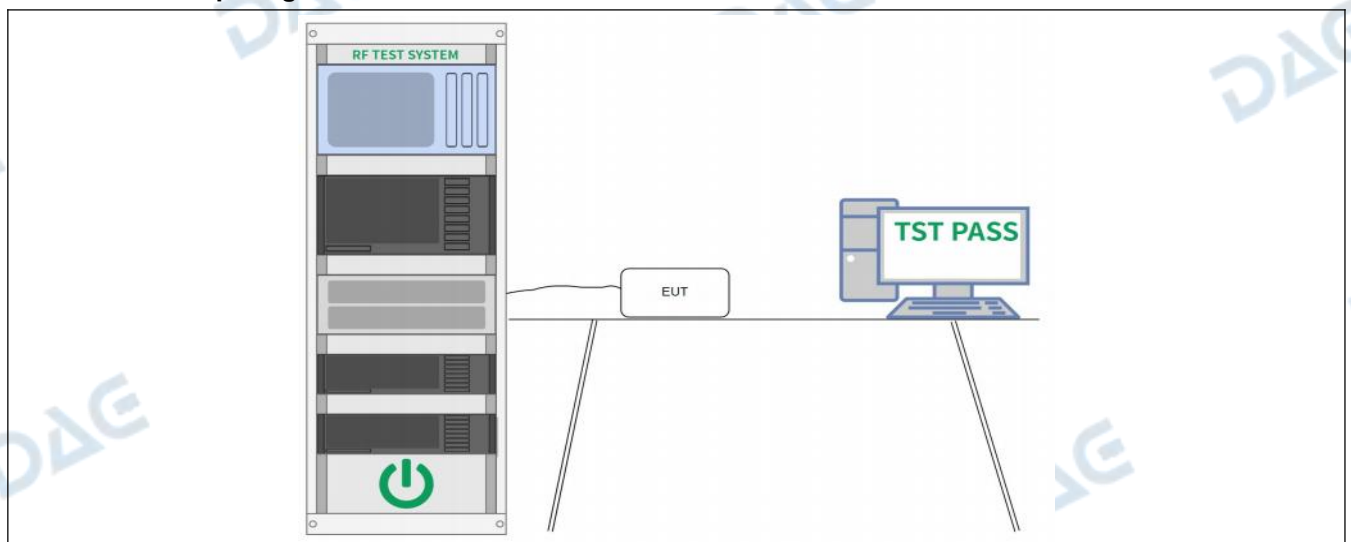
## 4.2 Maximum Conducted Output Power

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR 15.247(b)(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Limit:       | Refer to 47 CFR 15.247(b)(1), 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test Method:      | ANSI C63.10-2020, section 7.8.5<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Procedure:        | <p>This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.</li> <li>b) RBW &gt; 20 dB bandwidth of the emission being measured.</li> <li>c) VBW ≥ RBW.</li> <li>d) Sweep: No faster than coupled (auto) time.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Max-hold.</li> <li>g) Allow trace to stabilize.</li> <li>h) Use the marker-to-peak function to set the marker to the peak of the emission.</li> <li>i) The indicated level is the peak output power, after any corrections for external attenuators and cables.</li> <li>j) A spectral plot of the test results and setup description shall be included in the test report.</li> </ul> <p>NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.</p> |

### 4.2.1 E.U.T. Operation:

|                        |          |           |      |                       |         |
|------------------------|----------|-----------|------|-----------------------|---------|
| Operating Environment: |          |           |      |                       |         |
| Temperature:           | 22.2 °C  | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          | TM1, TM2 |           |      |                       |         |
| Final test mode:       | TM1, TM2 |           |      |                       |         |

### 4.2.2 Test Setup Diagram:



### 4.2.3 Test Data:

Please Refer to Appendix for Details.

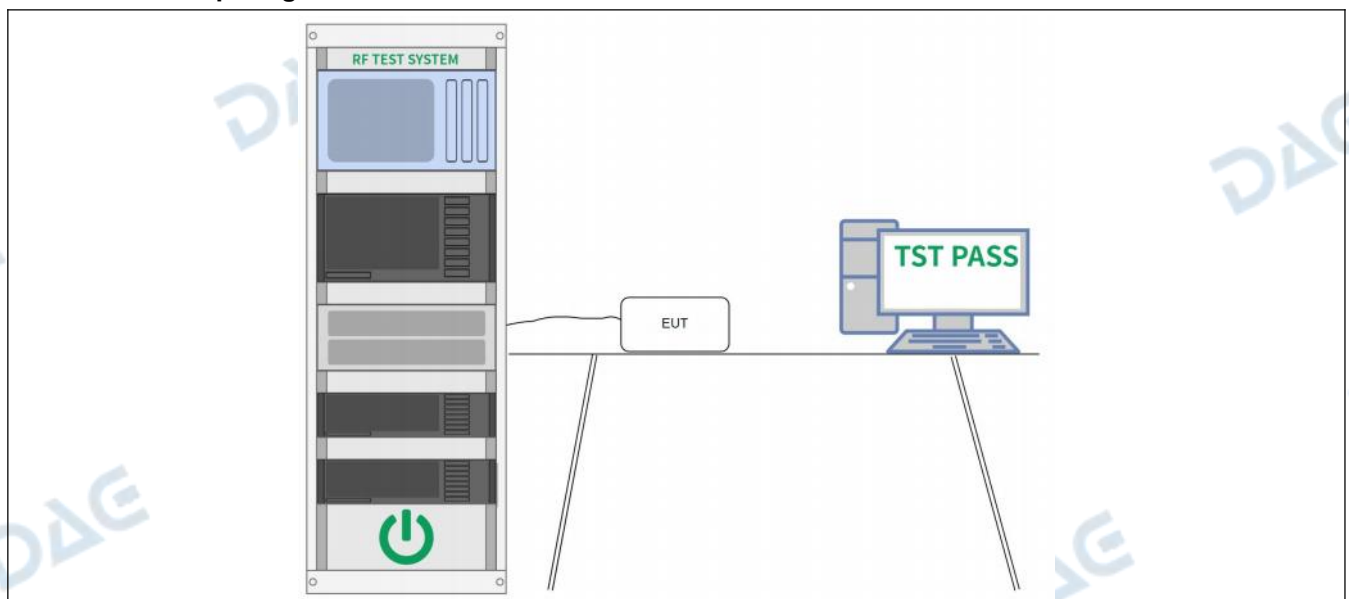
### 4.3 Channel Separation

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR 15.247(a)(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Test Limit:       | Refer to 47 CFR 15.247(a)(1), 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.                                                                                                                                                                                                                                                                                                                                                                   |
| Test Method:      | ANSI C63.10-2020, section 7.8.2<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Procedure:        | <p>The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>a) Span: Wide enough to capture the peaks of two adjacent channels.</li> <li>b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.</li> <li>c) Video (or average) bandwidth (VBW) <math>\geq</math> RBW.</li> <li>d) Sweep: No faster than coupled (auto) time.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Max-hold.</li> <li>g) Allow the trace to stabilize.</li> </ul> <p>Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A spectral plot of the data shall be included in the test report.</p> |

#### 4.3.1 E.U.T. Operation:

|                        |          |           |      |                       |         |
|------------------------|----------|-----------|------|-----------------------|---------|
| Operating Environment: |          |           |      |                       |         |
| Temperature:           | 22.2 °C  | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          | TM3, TM4 |           |      |                       |         |
| Final test mode:       | TM3, TM4 |           |      |                       |         |

#### 4.3.2 Test Setup Diagram:



#### 4.3.3 Test Data:

Please Refer to Appendix for Details.

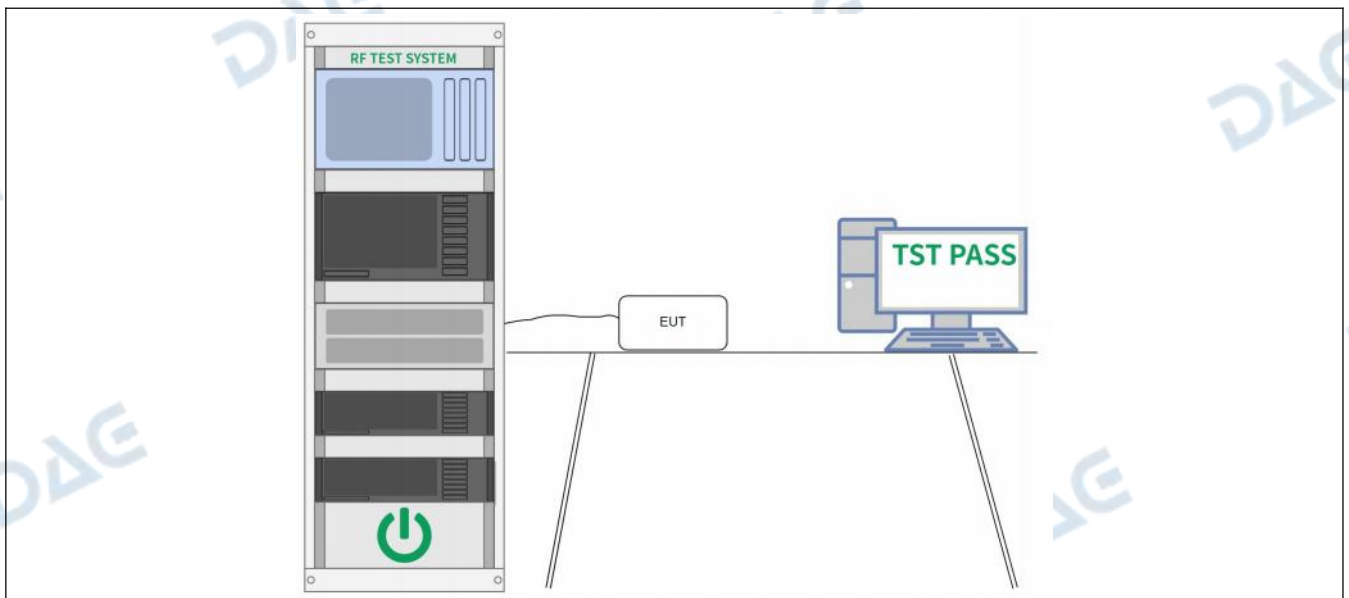
#### 4.4 Number of Hopping Frequencies

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR 15.247(a)(1)(iii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test Limit:       | Refer to 47 CFR 15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Method:      | ANSI C63.10-2020, section 7.8.3<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Procedure:        | <p>The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>a) Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.</li> <li>b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.</li> <li>c) VBW <math>\geq</math> RBW.</li> <li>d) Sweep: No faster than coupled (auto) time.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Max-hold.</li> <li>g) Allow the trace to stabilize.</li> </ul> <p>It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.</p> |

##### 4.4.1 E.U.T. Operation:

|                        |          |           |      |                       |         |
|------------------------|----------|-----------|------|-----------------------|---------|
| Operating Environment: |          |           |      |                       |         |
| Temperature:           | 22.2 °C  | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          | TM3, TM4 |           |      |                       |         |
| Final test mode:       | TM3, TM4 |           |      |                       |         |

##### 4.4.2 Test Setup Diagram:



##### 4.4.3 Test Data:

Please Refer to Appendix for Details.

## 4.5 Dwell Time

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR 15.247(a)(1)(iii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Test Limit:       | Refer to 47 CFR 15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Method:      | ANSI C63.10-2020, section 7.8.4<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Procedure:        | <p>The dwell time per hop on a channel is the time from the start of the first transmission to the end of the last transmission for that hop. If the device has a single transmission per hop then the dwell time is the duration of that transmission. If the device has a multiple transmissions per hop then the dwell time is measured from the start of the first transmission to the end of the last transmission.</p> <p>The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period.</p> <p>The EUT shall have its hopping function enabled. Compliance with the requirements shall be made with the minimum and with the maximum number of channels enabled. If the dwell time per channel does not vary with the number of channels then compliance with the requirements may be based on the minimum number of channels. If the device supports different dwell times per channel (example Bluetooth devices can dwell on a channel for 1, 3 or 5 time slots) then measurements can be limited to the longest dwell time with the minimum number of channels.</p> <p>Use the following spectrum analyzer settings to determine the dwell time per hop:</p> <ul style="list-style-type: none"> <li>a) Span: Zero span, centered on a hopping channel.</li> <li>b) RBW shall be <math>\leq</math> channel spacing and where possible RBW should be set <math>\gg 1/T</math>, where T is the expected transmission time per hop.</li> <li>c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = <math>1/\text{hopping rate}</math>) should achieve this.</li> <li>d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.</li> <li>e) Detector function: Peak.</li> <li>f) Trace: Clear-write, single sweep.</li> <li>g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.</li> </ul> <p>To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time.</p> <p>The average number of hops on the same channel within the regulatory observation</p> |

period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is  $3 / 0.5 \times 10$ , or 60 hops.

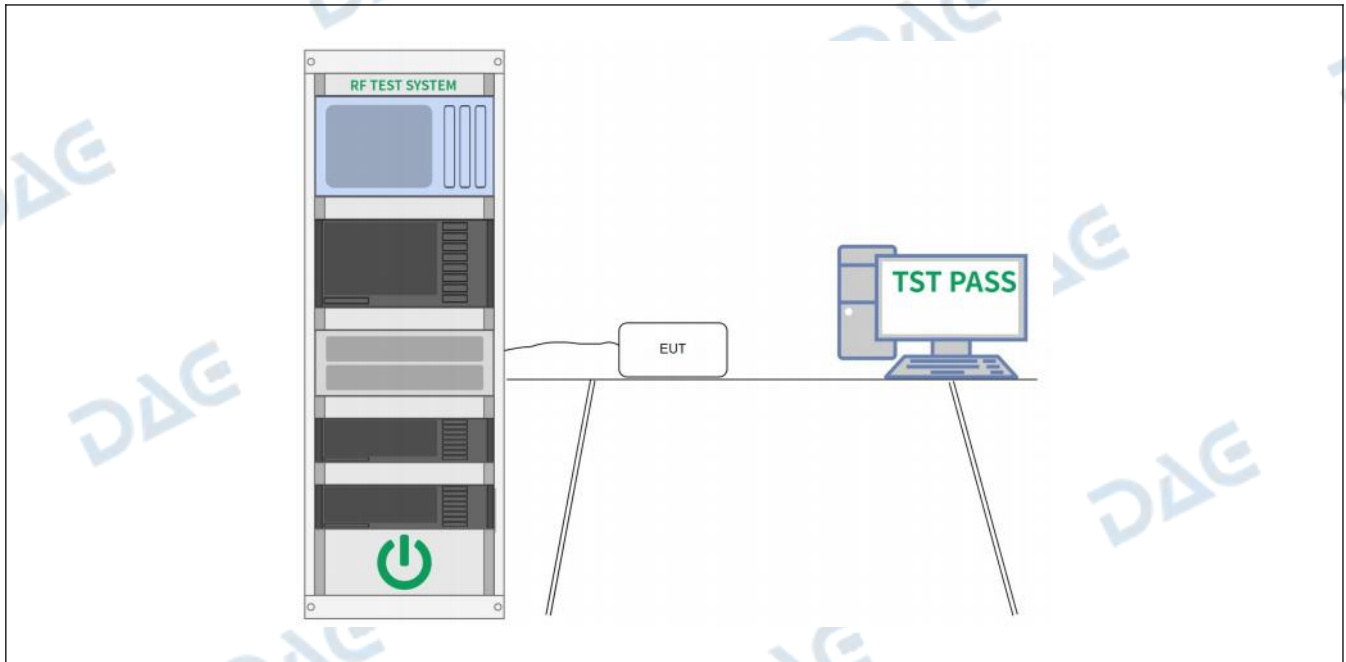
The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

#### 4.5.1 E.U.T. Operation:

Operating Environment:

|                  |          |           |      |                       |         |
|------------------|----------|-----------|------|-----------------------|---------|
| Temperature:     | 22.2 °C  | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:    | TM3, TM4 |           |      |                       |         |
| Final test mode: | TM3, TM4 |           |      |                       |         |

#### 4.5.2 Test Setup Diagram:



#### 4.5.3 Test Data:

Please Refer to Appendix for Details.

#### 4.6 Emissions in non-restricted frequency bands

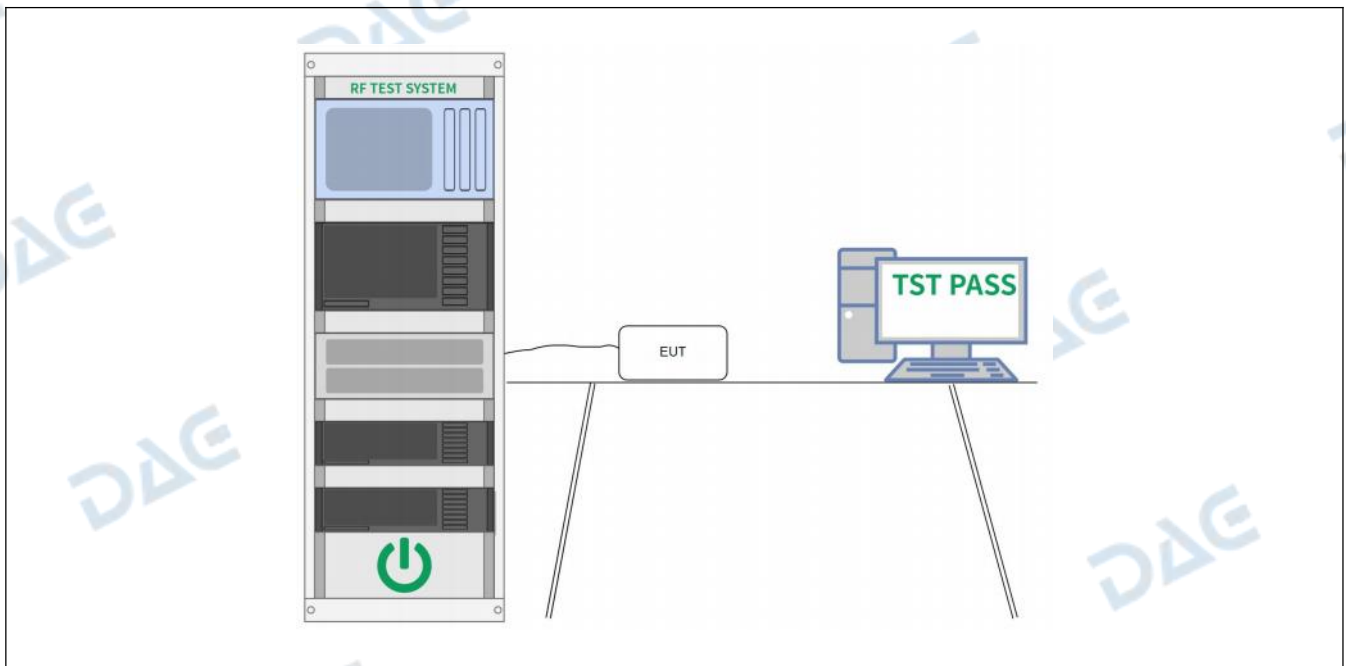
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR 15.247(d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test Limit:       | Refer to 47 CFR 15.247(d), 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 § 15.209(a) is not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Method:      | ANSI C63.10-2020 section 7.8.7<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Procedure:        | <p><b>7.8.7.1 General considerations</b></p> <p>To demonstrate compliance with the relative out-of-band emissions requirements conducted spurious emissions shall be measured for the transmit frequencies, per 5.5 and 5.6, and at the maximum transmit powers. Frequency hopping shall be disabled for this test with the exception of measurements at the allocated band-edges which shall be repeated with hopping enabled.</p> <p>Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The frequency range of testing shall span 30 MHz to 10 times the operating frequency and this may be done in a single sweep or, to aid resolution, across a number of sweeps. The resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector.</p> <p>The limit is based on the highest in-band level across all channels measured using the same instrument settings (resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector). To help clearly demonstrate compliance a display line may be set at the required offset (typically 20 dB) below the highest in-band level. Where the highest in-band level is not clearly identified in the out-of-band measurements a separate spectral plot showing the in-band level shall be provided.</p> <p>When conducted measurements cannot be made (for example a device with integrated, non-removable antenna) radiated measurements shall be used. The reference level for determining the limit shall be established by maximizing the field strength from the highest power channel and measuring using the resolution and video bandwidth settings and peak detector as described above. The field strength limit for spurious emissions outside of restricted-bands shall then be set at the required offset (typically 20 dB) below the highest in-band level. Radiated measurements will follow the standards measurement procedures described in Clause 6 with the exception that the resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. Note that use of wider measurement bandwidths are acceptable for measuring the spurious emissions provided that the peak detector is used and that the measured value of spurious emissions are compared to the highest in-band level measured with the 100 kHz / 300 kHz bandwidth settings to determine compliance.</p> <p><b>7.8.7.2 Band-edges</b></p> <p>Compliance with a relative limit at the band-edges (e.g., -20 dBc) shall be made on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels.</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                              |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge.</p> <p>For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.</p> |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 4.6.1 E.U.T. Operation:

|                        |                    |           |      |                       |         |
|------------------------|--------------------|-----------|------|-----------------------|---------|
| Operating Environment: |                    |           |      |                       |         |
| Temperature:           | 22.2 °C            | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          | TM1, TM2, TM3, TM4 |           |      |                       |         |
| Final test mode:       | TM1, TM2, TM3, TM4 |           |      |                       |         |

#### 4.6.2 Test Setup Diagram:



#### 4.6.3 Test Data:

Please Refer to Appendix for Details.

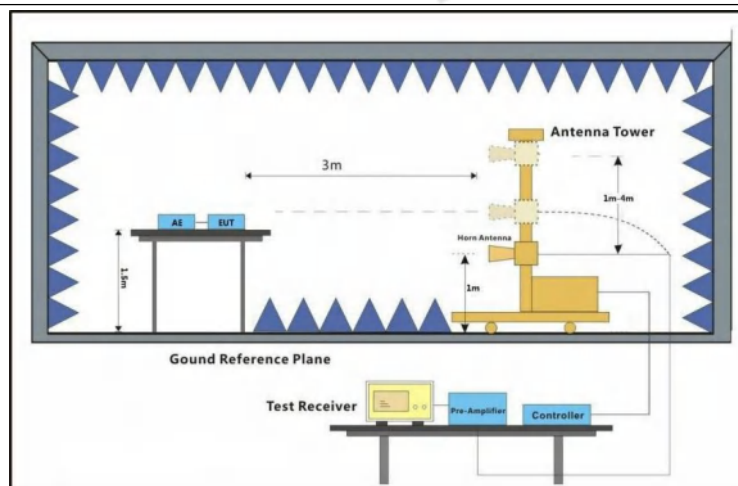
#### 4.7 Band edge emissions (Radiated)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                         |                                   |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| Test Requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Refer to 47 CFR 15.247(d), In addition, 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)). |                                   |                               |
| Test Limit:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Frequency (MHz)                                                                                                                                                                                                         | Field strength (microvolts/meter) | Measurement distance (meters) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.009-0.490                                                                                                                                                                                                             | 2400/F(kHz)                       | 300                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.490-1.705                                                                                                                                                                                                             | 24000/F(kHz)                      | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.705-30.0                                                                                                                                                                                                              | 30                                | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30-88                                                                                                                                                                                                                   | 100 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 88-216                                                                                                                                                                                                                  | 150 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 216-960                                                                                                                                                                                                                 | 200 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Above 960                                                                                                                                                                                                               | 500                               | 3                             |
| <p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges.</p> <p>The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> |                                                                                                                                                                                                                         |                                   |                               |
| Test Method:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ANSI C63.10-2020 section 6.10<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                             |                                   |                               |
| Procedure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ANSI C63.10-2020 section 6.10.5.2                                                                                                                                                                                       |                                   |                               |

##### 4.7.1 E.U.T. Operation:

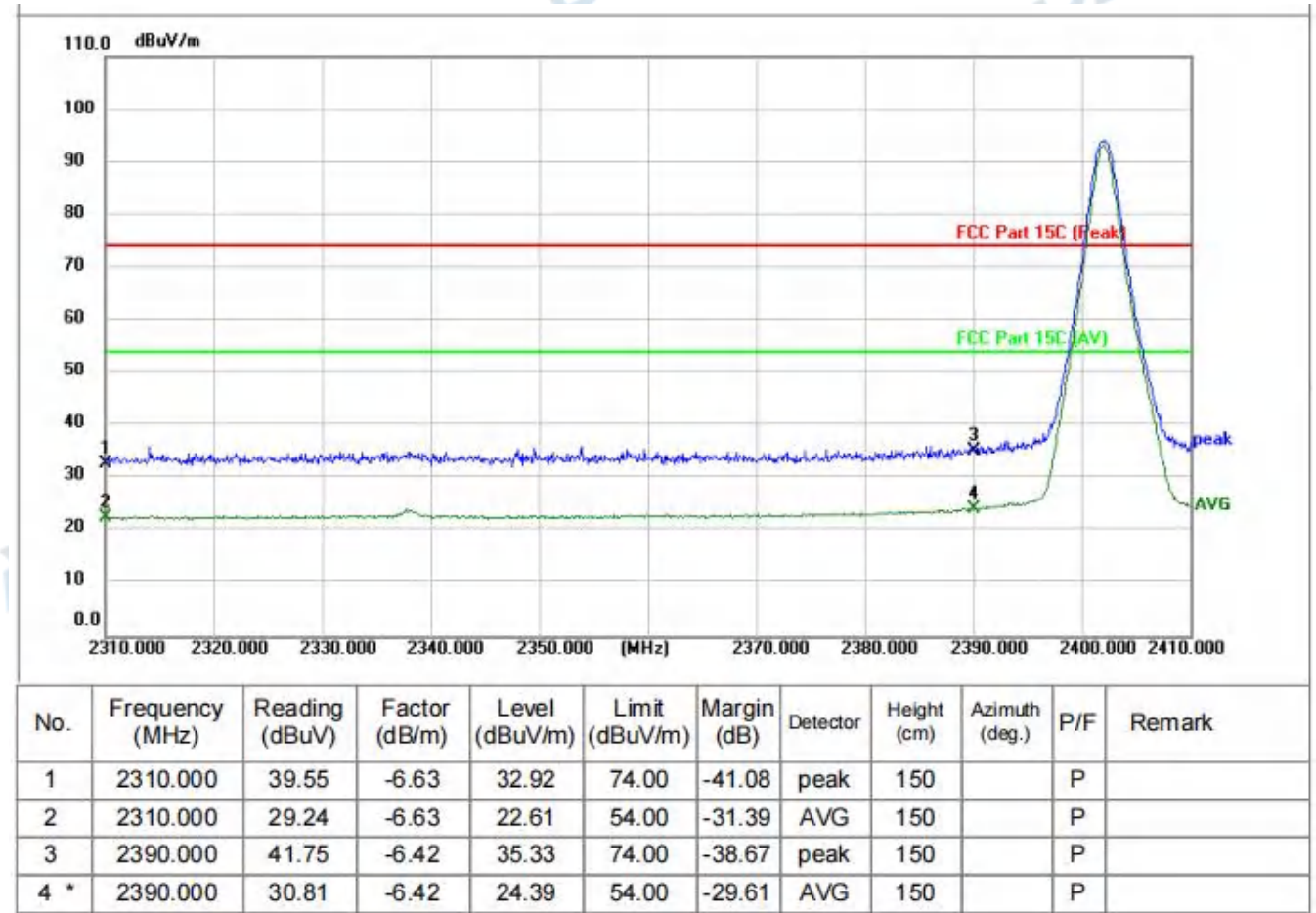
|                        |         |           |      |                       |         |
|------------------------|---------|-----------|------|-----------------------|---------|
| Operating Environment: |         |           |      |                       |         |
| Temperature:           | 22.2 °C | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:          |         | TM1, TM2  |      |                       |         |
| Final test mode:       |         | TM1, TM2  |      |                       |         |

##### 4.7.2 Test Setup Diagram:

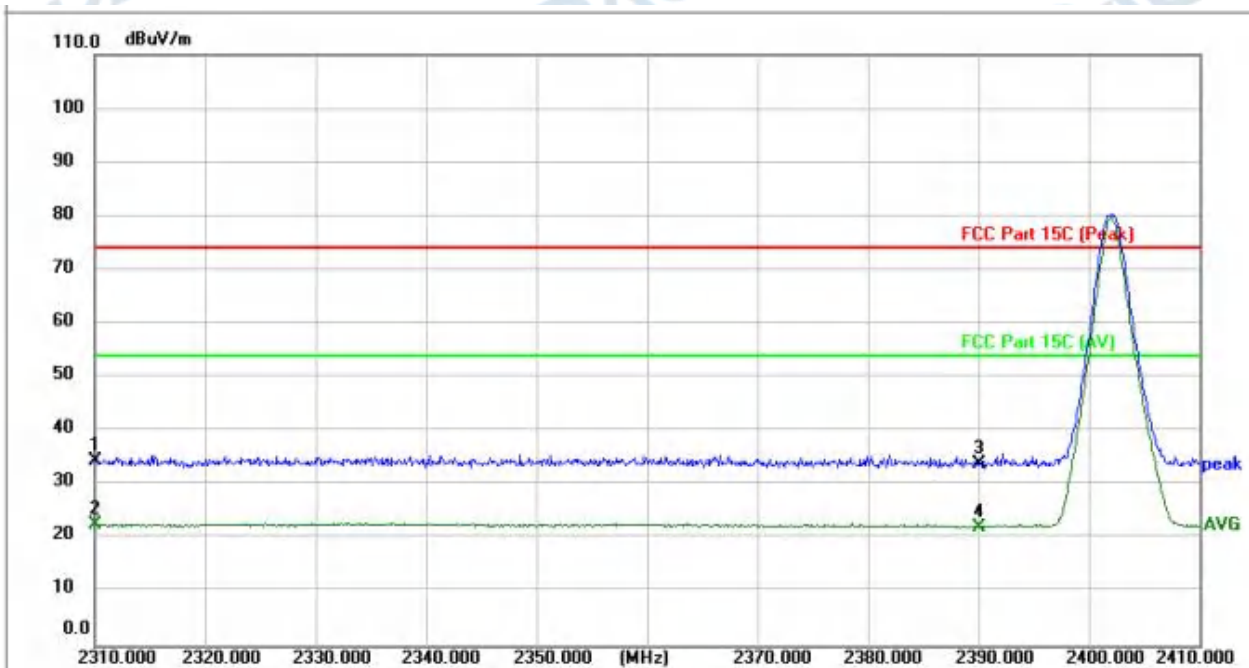


#### 4.7.3 Test Data:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L

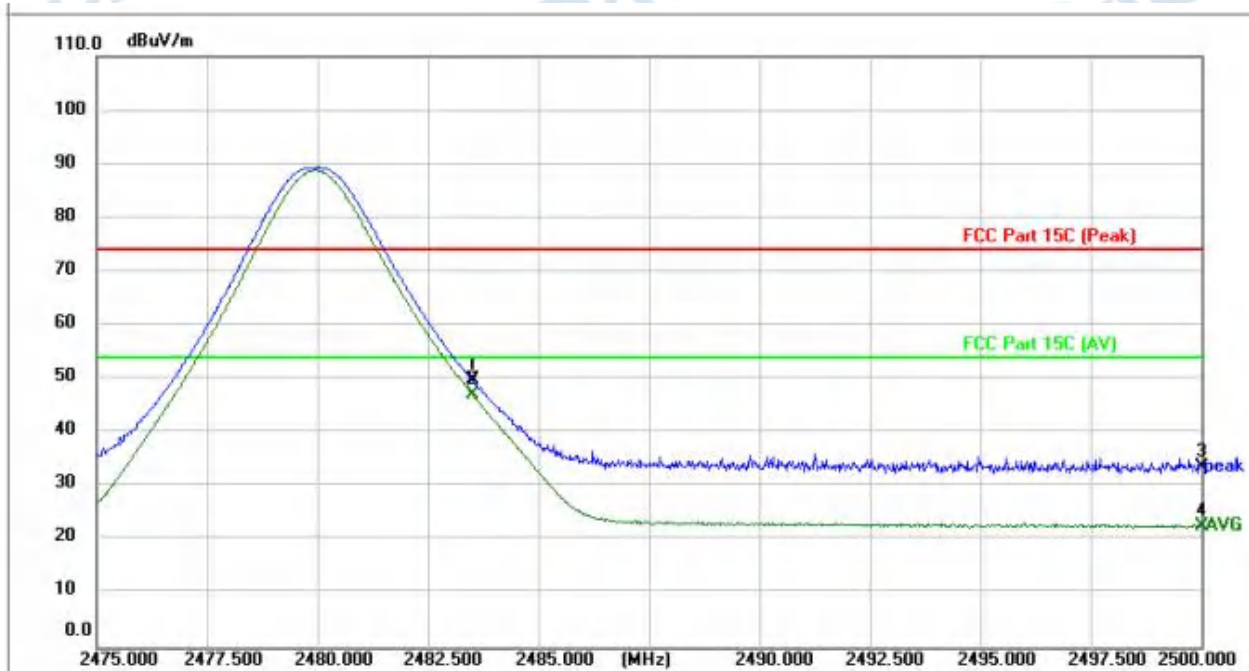


TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



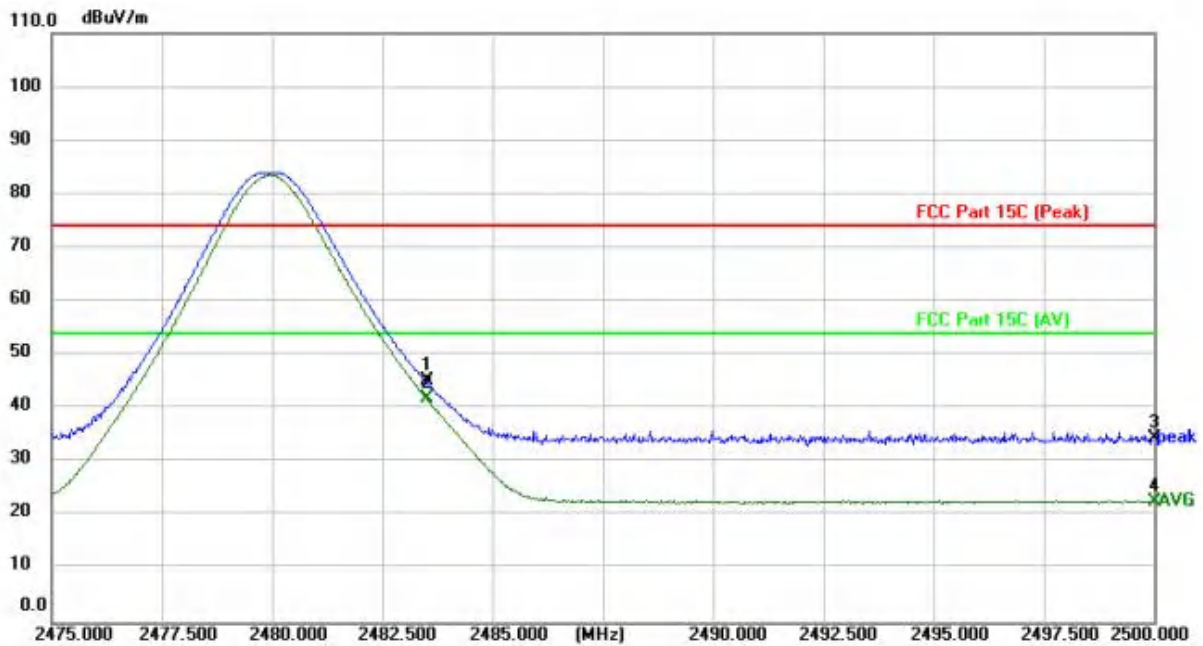
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 2310.000        | 41.07          | -6.63         | 34.44          | 74.00          | -39.56      | peak     | 150         |                | P   |        |
| 2 * | 2310.000        | 29.28          | -6.63         | 22.65          | 54.00          | -31.35      | AVG      | 150         |                | P   |        |
| 3   | 2390.000        | 40.48          | -6.42         | 34.06          | 74.00          | -39.94      | peak     | 150         |                | P   |        |
| 4   | 2390.000        | 28.65          | -6.42         | 22.23          | 54.00          | -31.77      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 2483.500        | 56.00          | -6.17         | 49.83          | 74.00          | -24.17      | peak     | 150         |                | P   |        |
| 2 * | 2483.500        | 53.39          | -6.17         | 47.22          | 54.00          | -6.78       | AVG      | 150         |                | P   |        |
| 3   | 2500.000        | 39.70          | -6.13         | 33.57          | 74.00          | -40.43      | peak     | 150         |                | P   |        |
| 4   | 2500.000        | 28.71          | -6.13         | 22.58          | 54.00          | -31.42      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 2483.500        | 51.36          | -6.17         | 45.19          | 74.00          | -28.81      | peak     | 150         |                | P   |        |
| 2 * | 2483.500        | 48.24          | -6.17         | 42.07          | 54.00          | -11.93      | AVG      | 150         |                | P   |        |
| 3   | 2500.000        | 40.63          | -6.13         | 34.50          | 74.00          | -39.50      | peak     | 150         |                | P   |        |
| 4   | 2500.000        | 28.81          | -6.13         | 22.68          | 54.00          | -31.32      | AVG      | 150         |                | P   |        |

#### 4.8 Emissions in frequency bands (below 1GHz)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| Test Requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Refer to 47 CFR 15.247(d), In addition, 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)).`                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                               |
| Test Limit:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Frequency (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Field strength (microvolts/meter) | Measurement distance (meters) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.009-0.490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2400/F(kHz)                       | 300                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.490-1.705                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24000/F(kHz)                      | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.705-30.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                                | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30-88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 100 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 88-216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 150 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 216-960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 200 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Above 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 500                               | 3                             |
| <p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges.</p> <p>The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                               |
| Test Method:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ANSI C63.10-2020 section 6.6.4<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                               |
| Procedure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>h. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p> <p>Remark:</p> <p>1) For emission below 1GHz, through pre-scan found the worst case is the lowest</p> |                                   |                               |

channel. Only the worst case is recorded in the report.  
 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
 Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Preamplifier Factor  
 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

#### 4.8.1 E.U.T. Operation:

Operating Environment:

Temperature: 22.2 °C Humidity: 54 % Atmospheric Pressure: 102 kPa

Pretest mode: TM1, TM2

Final test mode: TM1, TM2

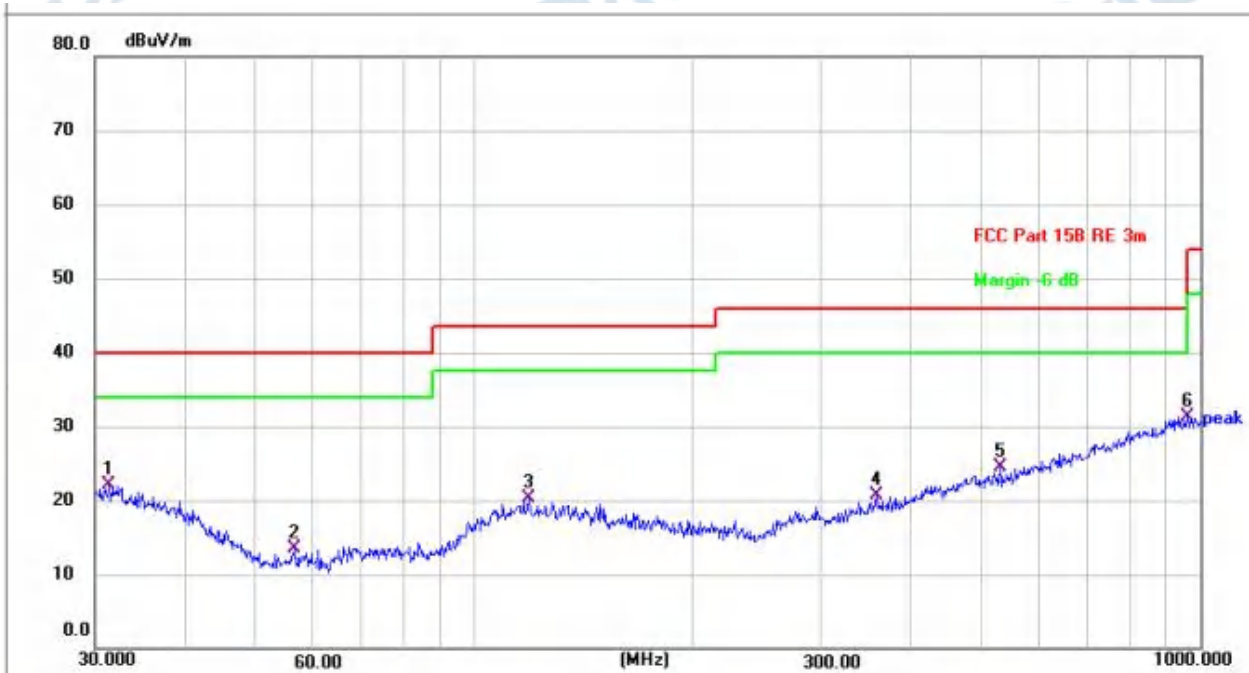
#### 4.8.2 Test Data:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 30.3173         | 27.07          | -4.13         | 22.94          | 40.00          | -17.06      | QP       | 100         |                | P   |        |
| 2   | 80.9275         | 30.04          | -13.06        | 16.98          | 40.00          | -23.02      | QP       | 100         |                | P   |        |
| 3   | 118.1862        | 27.48          | -6.75         | 20.73          | 43.50          | -22.77      | QP       | 100         |                | P   |        |
| 4   | 478.8456        | 27.39          | -3.34         | 24.05          | 46.00          | -21.95      | QP       | 100         |                | P   |        |
| 5   | 590.9737        | 28.46          | -1.78         | 26.68          | 46.00          | -19.32      | QP       | 100         |                | P   |        |
| 6 * | 938.8326        | 27.05          | 4.33          | 31.38          | 46.00          | -14.62      | QP       | 100         |                | P   |        |

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 31.3992         | 24.77          | -2.64         | 22.13          | 40.00          | -17.87      | QP       | 100         |                | P   |        |
| 2   | 56.5929         | 27.49          | -13.91        | 13.58          | 40.00          | -26.42      | QP       | 100         |                | P   |        |
| 3   | 118.6014        | 27.05          | -6.70         | 20.35          | 43.50          | -23.15      | QP       | 100         |                | P   |        |
| 4   | 357.9287        | 27.25          | -6.62         | 20.63          | 46.00          | -25.37      | QP       | 100         |                | P   |        |
| 5   | 530.1014        | 27.58          | -3.06         | 24.52          | 46.00          | -21.48      | QP       | 100         |                | P   |        |
| 6 * | 958.7943        | 26.79          | 4.51          | 31.30          | 46.00          | -14.70      | QP       | 100         |                | P   |        |

#### 4.9 Emissions in frequency bands (above 1GHz)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| Test Requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Refer to 47 CFR 15.247(d), in addition, 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)).`                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                               |
| Test Limit:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Frequency (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Field strength (microvolts/meter) | Measurement distance (meters) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.009-0.490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2400/F(kHz)                       | 300                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.490-1.705                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24000/F(kHz)                      | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.705-30.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                                | 30                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30-88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 100 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 88-216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 150 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 216-960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 200 **                            | 3                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Above 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 500                               | 3                             |
| <p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges.</p> <p>The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                               |
| Test Method:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ANSI C63.10-2020 section 6.6.4<br>KDB 558074 D01 15.247 Meas Guidance v05r02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                               |
| Procedure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>h. Test the EUT in the lowest channel, the middle channel, the Highest channel.</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p> <p>Remark:</p> <p>1) For emission below 1GHz, through pre-scan found the worst case is the lowest</p> |                                   |                               |

channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor + Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

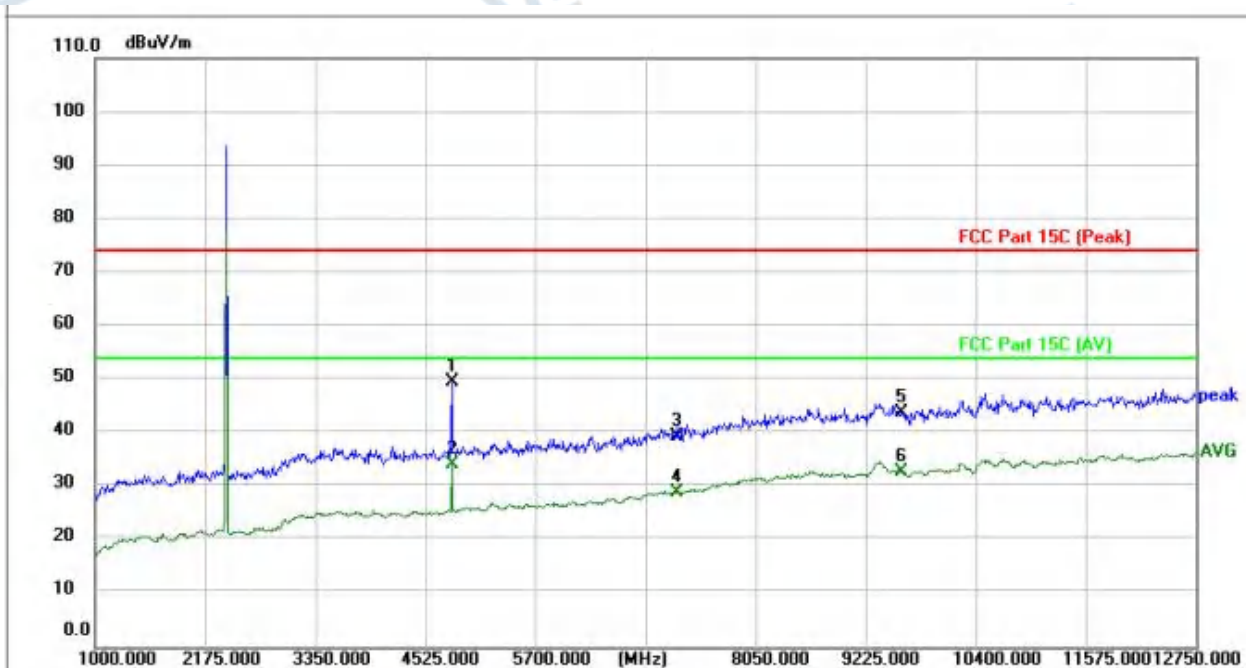
#### 4.9.1 E.U.T. Operation:

Operating Environment:

|                  |          |           |      |                       |         |
|------------------|----------|-----------|------|-----------------------|---------|
| Temperature:     | 22.2 °C  | Humidity: | 54 % | Atmospheric Pressure: | 102 kPa |
| Pretest mode:    | TM1, TM2 |           |      |                       |         |
| Final test mode: | TM1, TM2 |           |      |                       |         |

#### 4.9.2 Test Data:

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4807.000        | 50.30          | -0.69         | 49.61          | 74.00          | -24.39      | peak     | 150         |                | P   |        |
| 2 * | 4807.000        | 34.85          | -0.69         | 34.16          | 54.00          | -19.84      | AVG      | 150         |                | P   |        |
| 3   | 7206.000        | 35.21          | 4.37          | 39.58          | 74.00          | -34.42      | peak     | 150         |                | P   |        |
| 4   | 7206.000        | 24.62          | 4.37          | 28.99          | 54.00          | -25.01      | AVG      | 150         |                | P   |        |
| 5   | 9608.000        | 35.74          | 8.09          | 43.83          | 74.00          | -30.17      | peak     | 150         |                | P   |        |
| 6   | 9608.000        | 24.82          | 8.09          | 32.91          | 54.00          | -21.09      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



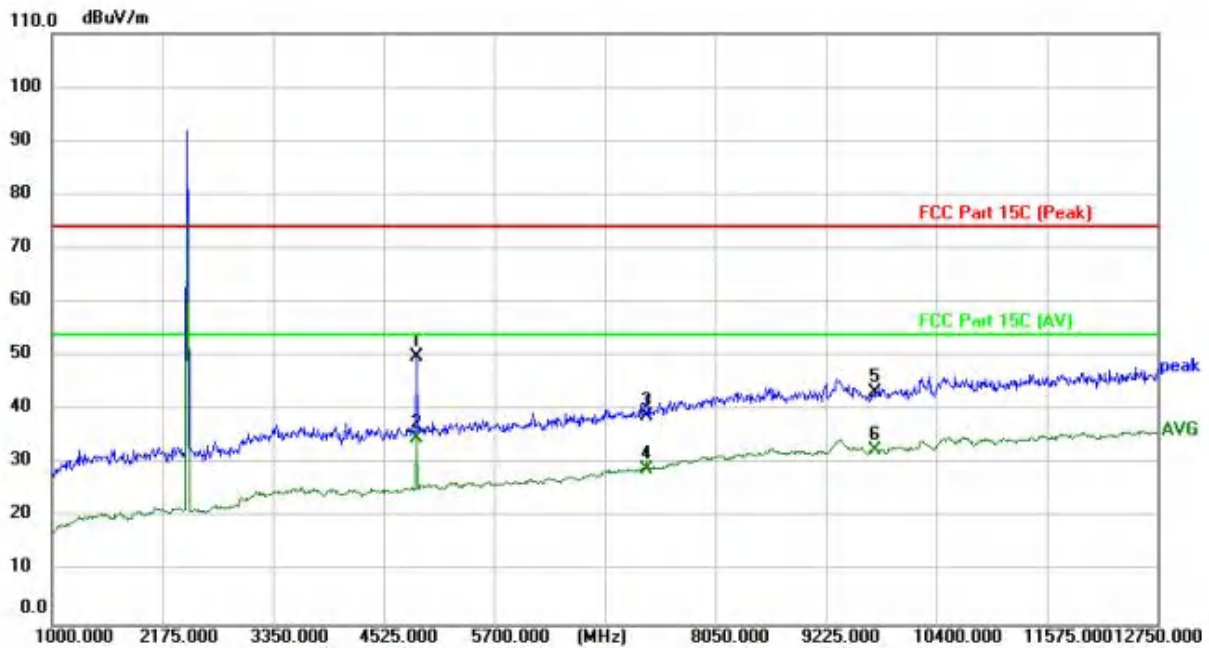
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4804.000        | 38.78          | -0.70         | 38.08          | 74.00          | -35.92      | peak     | 150         |                | P   |        |
| 2   | 4804.000        | 26.51          | -0.70         | 25.81          | 54.00          | -28.19      | AVG      | 150         |                | P   |        |
| 3   | 7206.000        | 36.64          | 4.37          | 41.01          | 74.00          | -32.99      | peak     | 150         |                | P   |        |
| 4   | 7206.000        | 24.74          | 4.37          | 29.11          | 54.00          | -24.89      | AVG      | 150         |                | P   |        |
| 5   | 9608.000        | 37.01          | 8.09          | 45.10          | 74.00          | -28.90      | peak     | 150         |                | P   |        |
| 6 * | 9608.000        | 24.84          | 8.09          | 32.93          | 54.00          | -21.07      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M



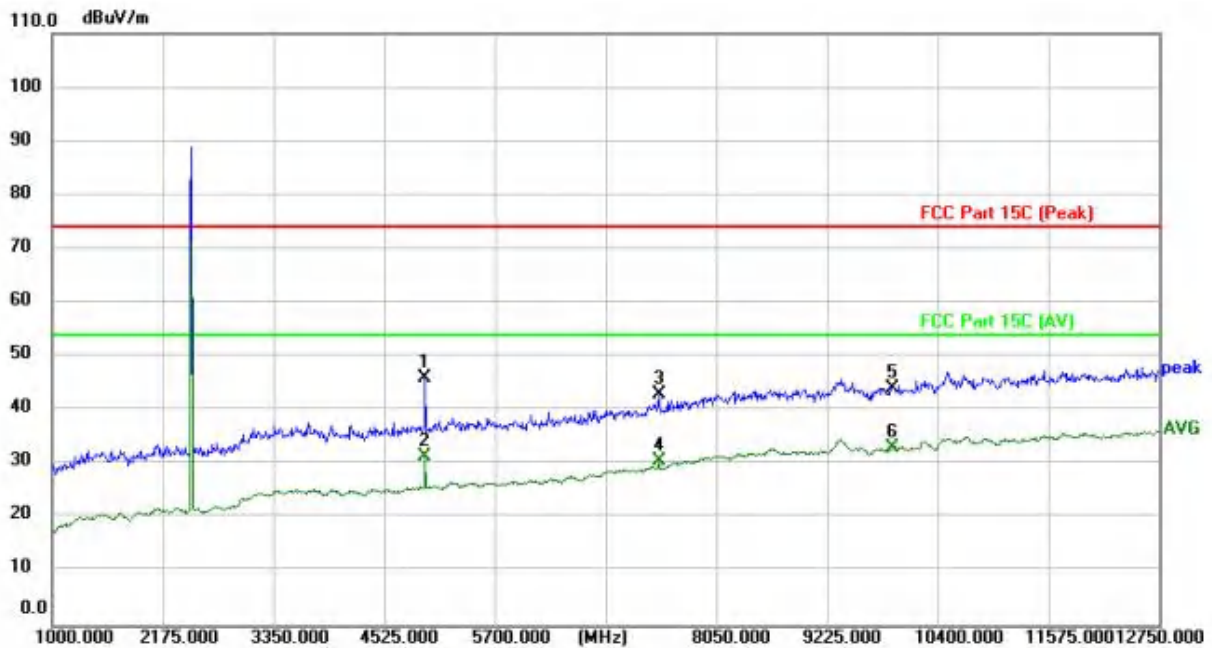
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4882.000        | 37.20          | -0.44         | 36.76          | 74.00          | -37.24      | peak     | 150         |                | P   |        |
| 2   | 4882.000        | 26.43          | -0.44         | 25.99          | 54.00          | -28.01      | AVG      | 150         |                | P   |        |
| 3   | 7323.000        | 35.79          | 4.57          | 40.36          | 74.00          | -33.64      | peak     | 150         |                | P   |        |
| 4   | 7323.000        | 24.76          | 4.57          | 29.33          | 54.00          | -24.67      | AVG      | 150         |                | P   |        |
| 5   | 9764.000        | 36.20          | 8.09          | 44.29          | 74.00          | -29.71      | peak     | 150         |                | P   |        |
| 6 * | 9764.000        | 24.61          | 8.09          | 32.70          | 54.00          | -21.30      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4877.500        | 50.35          | -0.45         | 49.90          | 74.00          | -24.10      | peak     | 150         |                | P   |        |
| 2 * | 4877.500        | 35.28          | -0.45         | 34.83          | 54.00          | -19.17      | AVG      | 150         |                | P   |        |
| 3   | 7323.000        | 34.32          | 4.57          | 38.89          | 74.00          | -35.11      | peak     | 150         |                | P   |        |
| 4   | 7323.000        | 24.57          | 4.57          | 29.14          | 54.00          | -24.86      | AVG      | 150         |                | P   |        |
| 5   | 9764.000        | 35.14          | 8.09          | 43.23          | 74.00          | -30.77      | peak     | 150         |                | P   |        |
| 6   | 9764.000        | 24.43          | 8.09          | 32.52          | 54.00          | -21.48      | AVG      | 150         |                | P   |        |

TM1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4959.750        | 46.26          | -0.17         | 46.09          | 74.00          | -27.91      | peak     | 150         |                | P   |        |
| 2   | 4959.750        | 31.72          | -0.17         | 31.55          | 54.00          | -22.45      | AVG      | 150         |                | P   |        |
| 3   | 7439.000        | 38.30          | 4.78          | 43.08          | 74.00          | -30.92      | peak     | 150         |                | P   |        |
| 4   | 7439.000        | 25.89          | 4.78          | 30.67          | 54.00          | -23.33      | AVG      | 150         |                | P   |        |
| 5   | 9920.000        | 36.07          | 8.08          | 44.15          | 74.00          | -29.85      | peak     | 150         |                | P   |        |
| 6 * | 9920.000        | 24.95          | 8.08          | 33.03          | 54.00          | -20.97      | AVG      | 150         |                | P   |        |

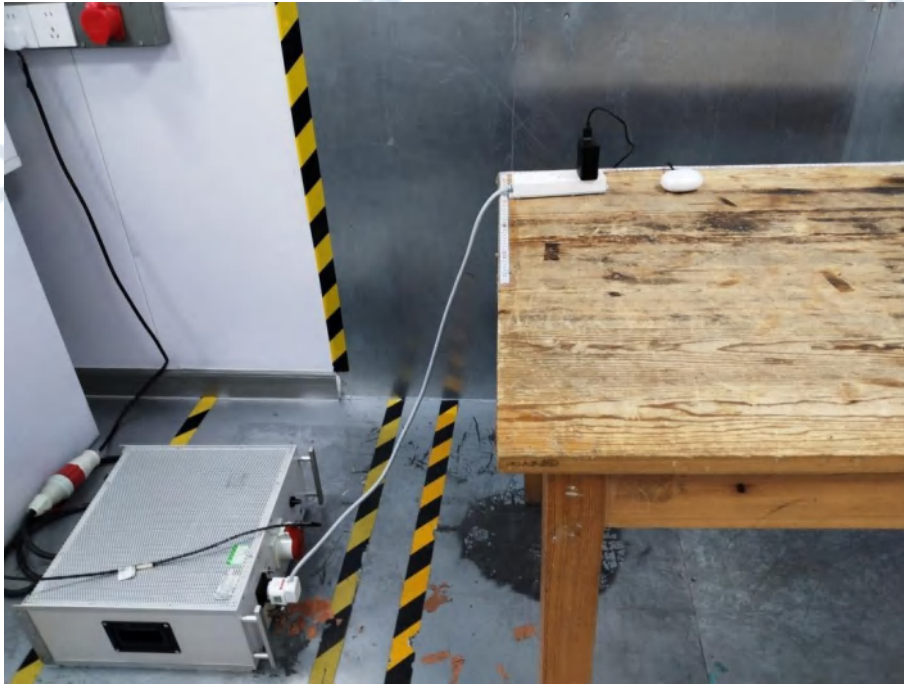
TM1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



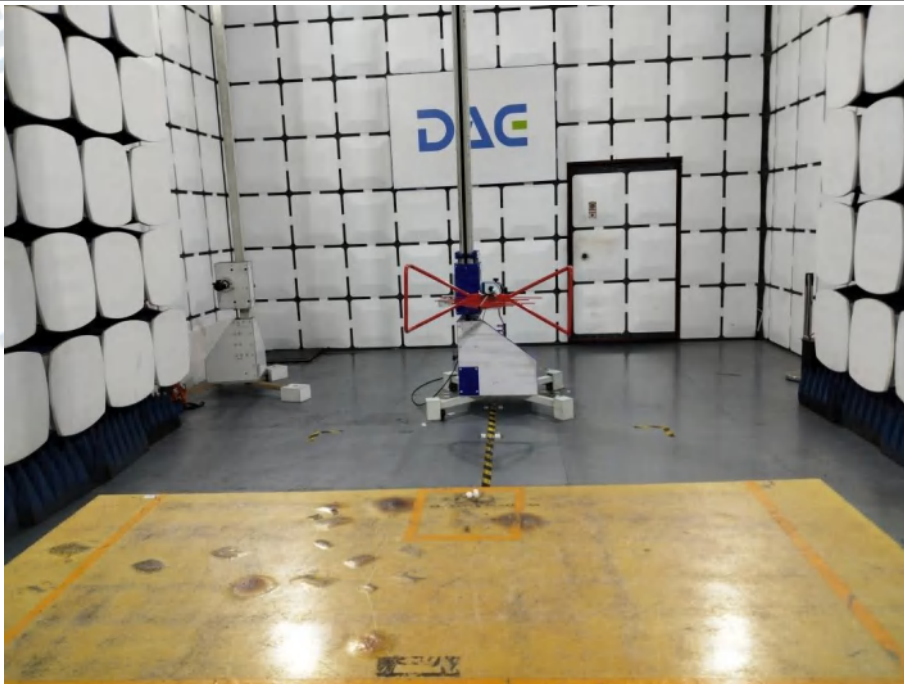
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 4960.000        | 37.46          | -0.17         | 37.29          | 74.00          | -36.71      | peak     | 150         |                | P   |        |
| 2   | 4960.000        | 26.38          | -0.17         | 26.21          | 54.00          | -27.79      | AVG      | 150         |                | P   |        |
| 3   | 7440.000        | 36.55          | 4.78          | 41.33          | 74.00          | -32.67      | peak     | 150         |                | P   |        |
| 4   | 7440.000        | 24.58          | 4.78          | 29.36          | 54.00          | -24.64      | AVG      | 150         |                | P   |        |
| 5   | 9920.000        | 36.23          | 8.08          | 44.31          | 74.00          | -29.69      | peak     | 150         |                | P   |        |
| 6 * | 9920.000        | 24.98          | 8.08          | 33.06          | 54.00          | -20.94      | AVG      | 150         |                | P   |        |

## 5 TEST SETUP PHOTOS

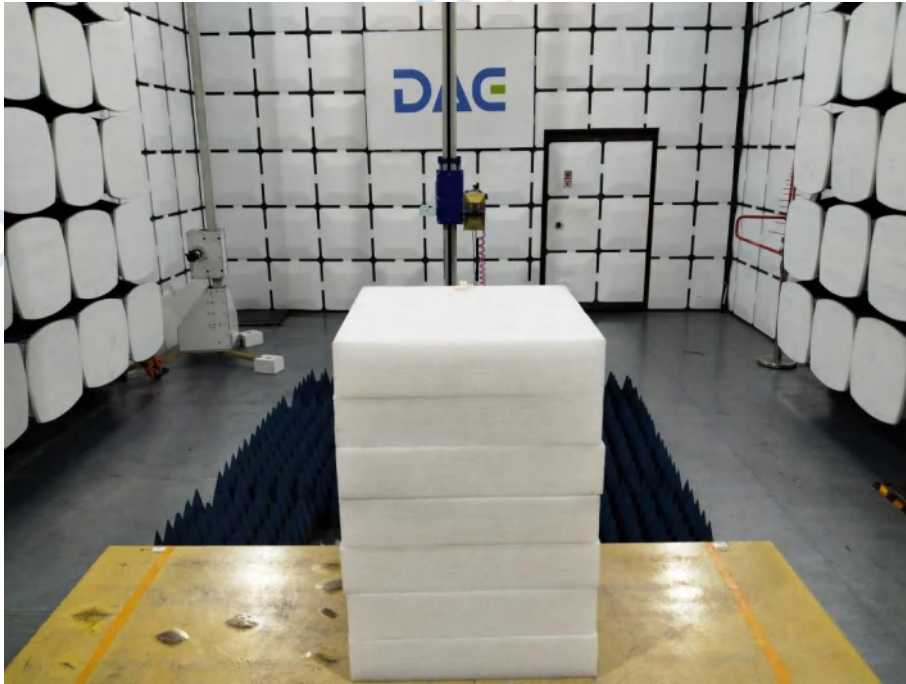
Conducted Emission at AC power line



Emissions in frequency bands (below 1GHz)



**Emissions in frequency bands (above 1GHz)**



## 6 PHOTOS OF THE EUT

External













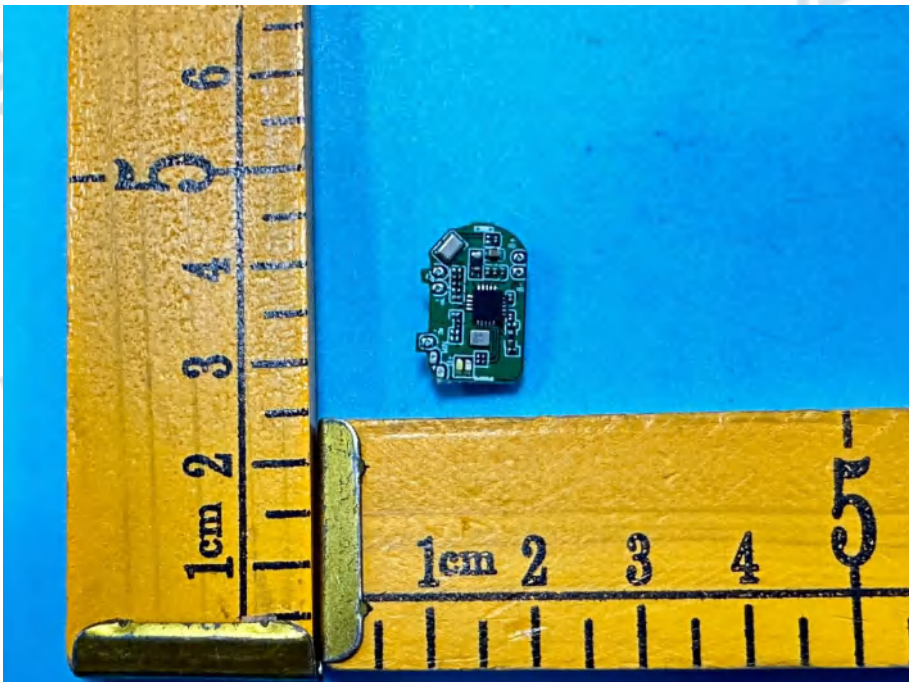
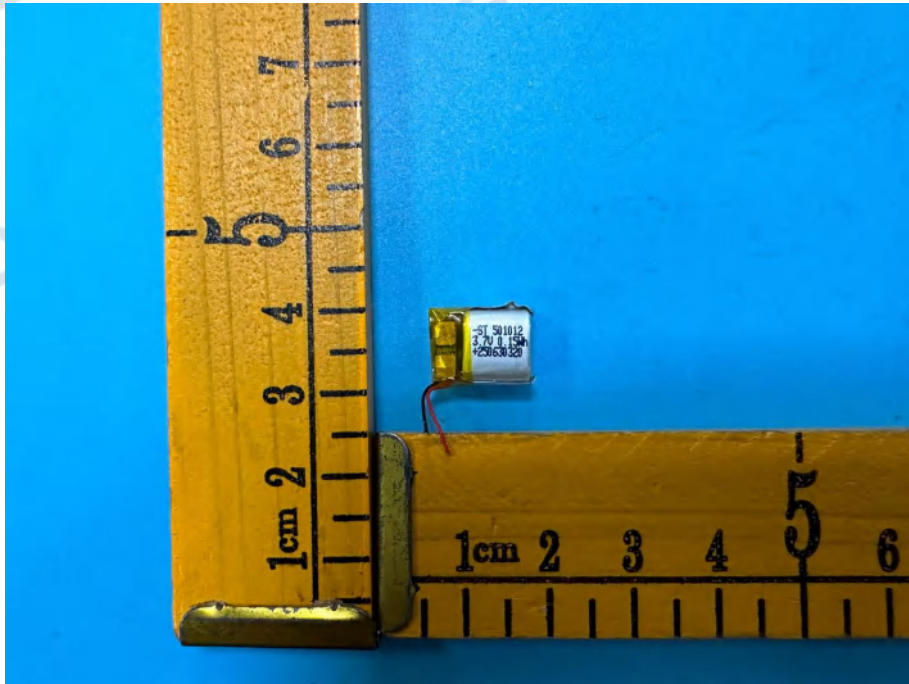


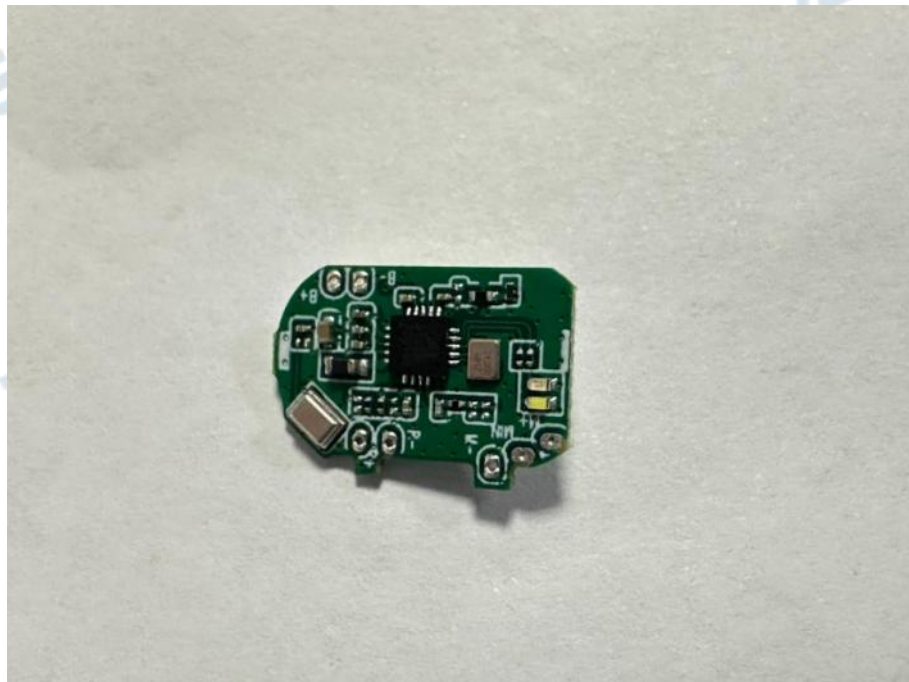
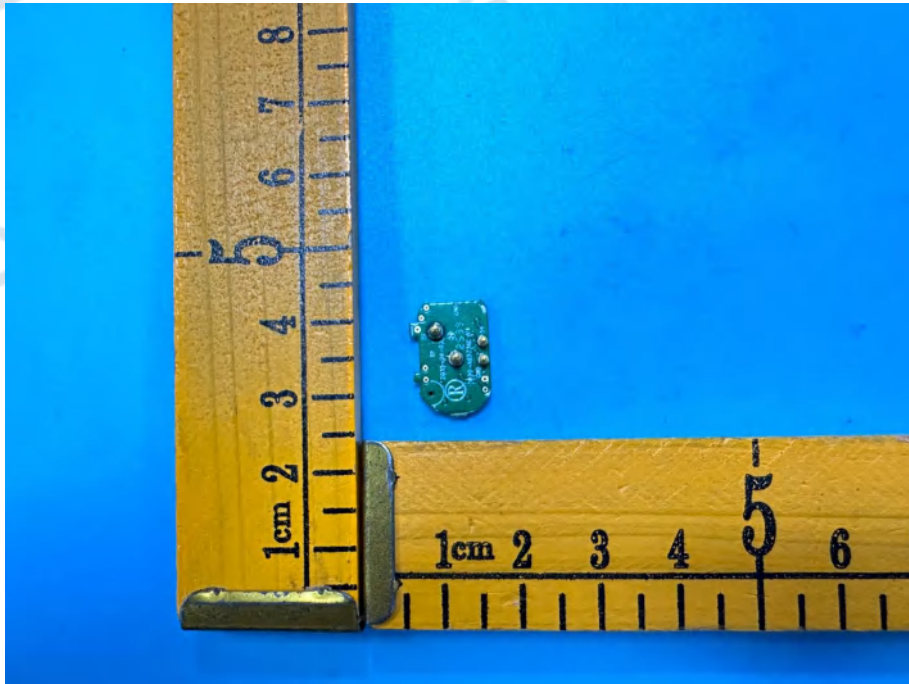


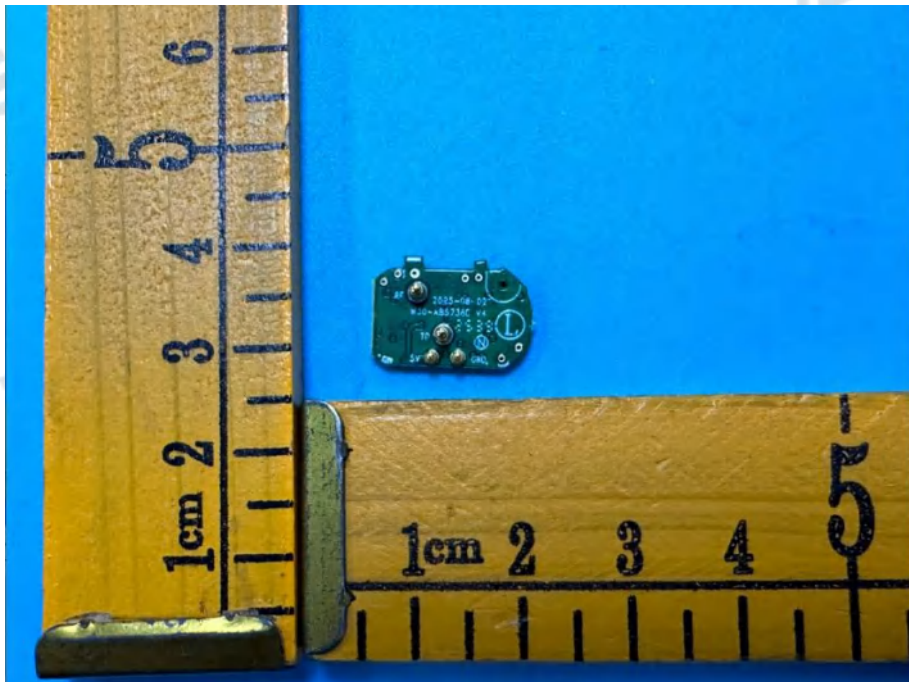
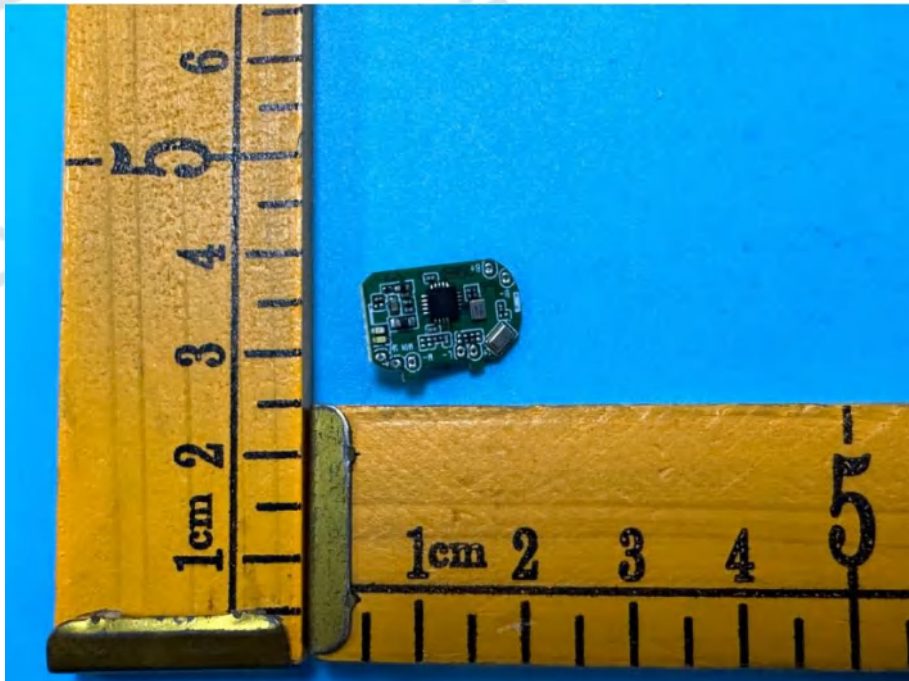


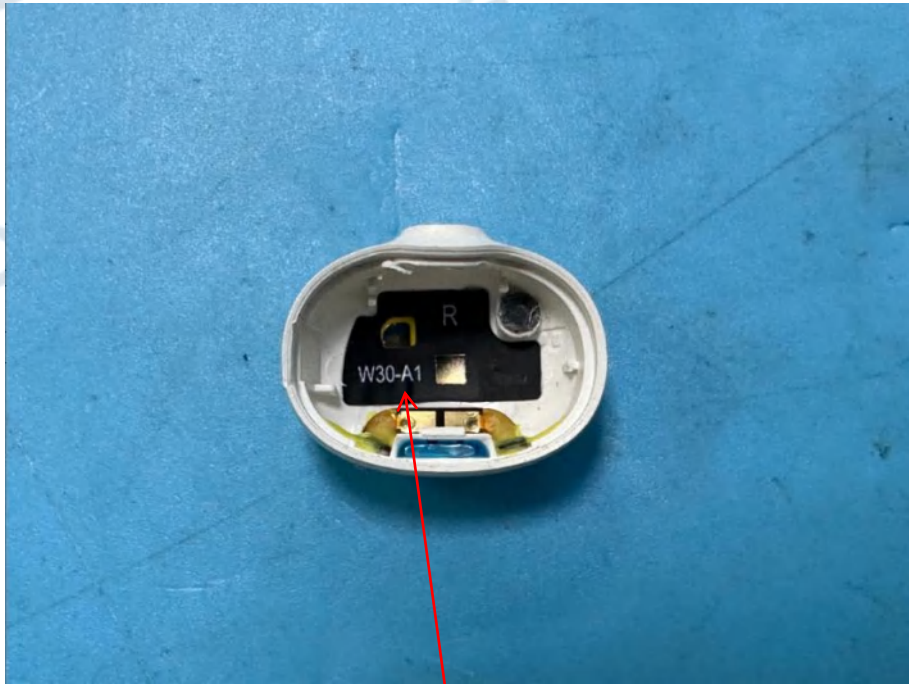
**Internal**











ANT

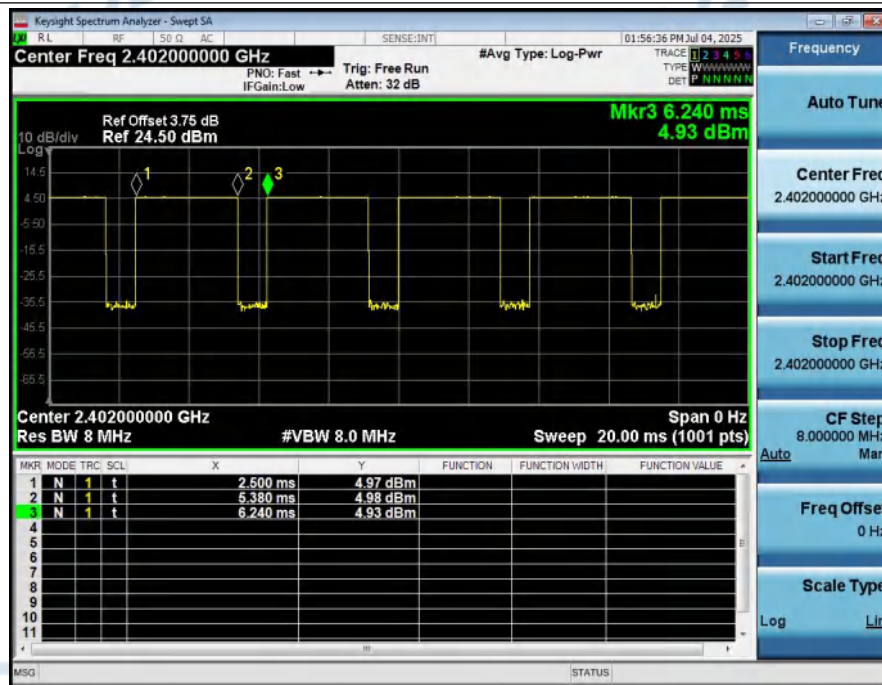
# Appendix

# HT250702008--W30--EDR--FCC FCC\_BT (Part15.247) Test Data

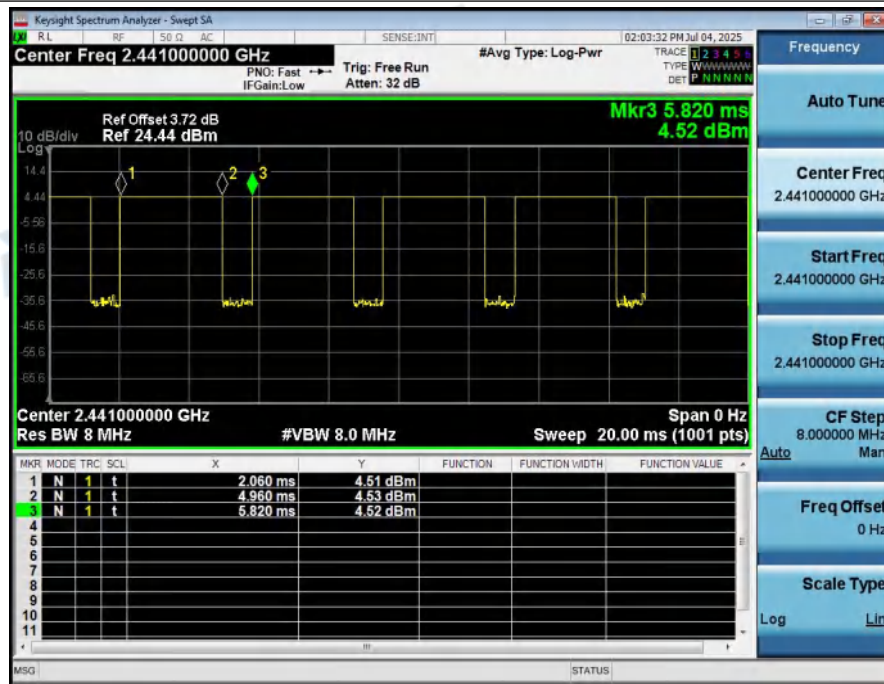
## 1. Duty Cycle

| Condition | Antenna | Rate  | Frequency (MHz) | Dutycycle(%) | Duty_factor |
|-----------|---------|-------|-----------------|--------------|-------------|
| NVNT      | ANT1    | 1-DH5 | 2402.00         | 77.54        | 1.10        |
| NVNT      | ANT1    | 1-DH5 | 2441.00         | 77.66        | 1.10        |
| NVNT      | ANT1    | 1-DH5 | 2480.00         | 77.66        | 1.10        |
| NVNT      | ANT1    | 2-DH5 | 2402.00         | 77.01        | 1.13        |
| NVNT      | ANT1    | 2-DH5 | 2441.00         | 77.01        | 1.13        |
| NVNT      | ANT1    | 2-DH5 | 2480.00         | 77.54        | 1.10        |

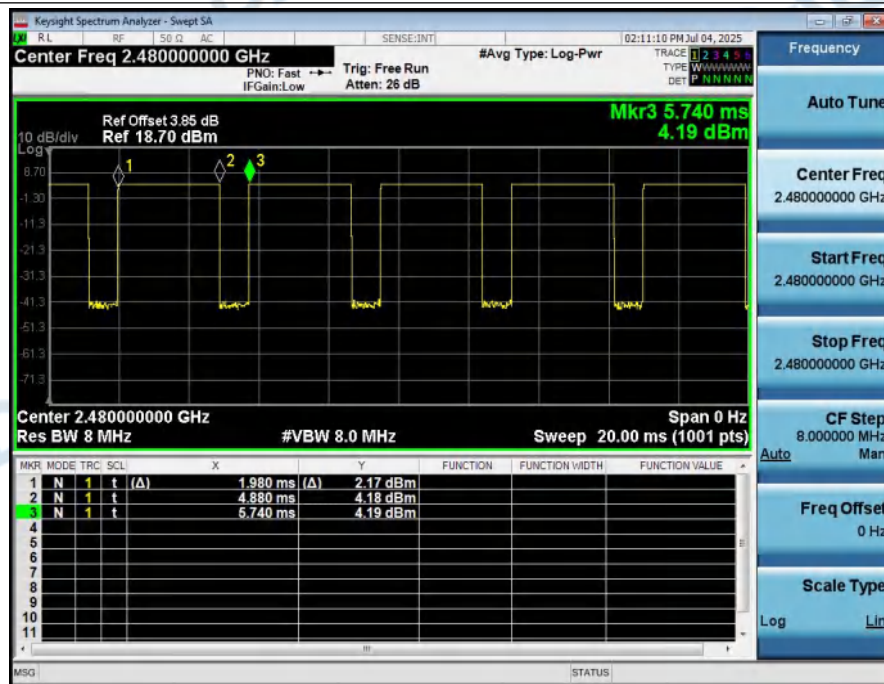
Duty\_Cycle\_NVNT\_ANT1\_1-DH5\_2402



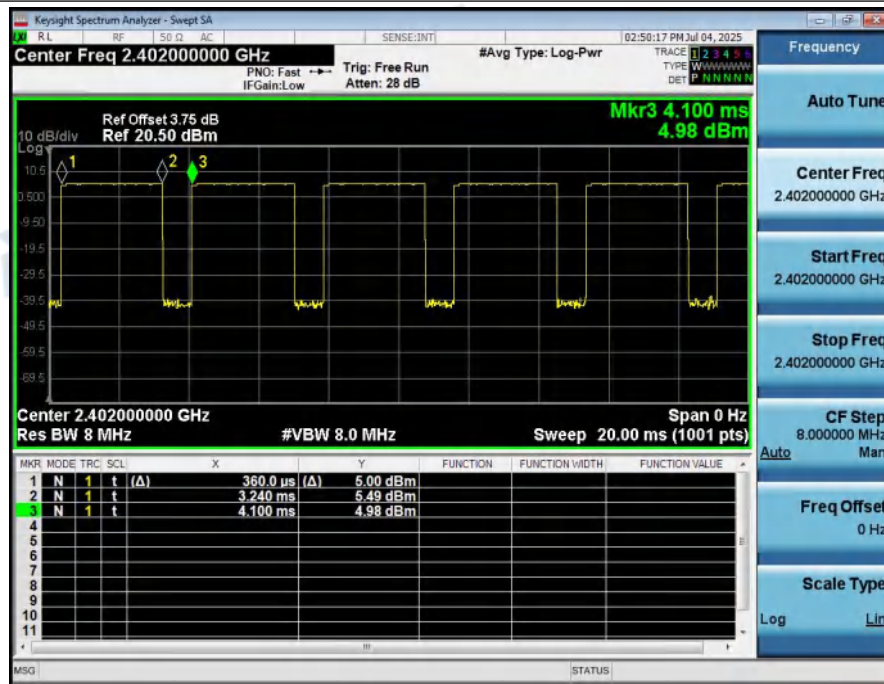
Duty\_Cycle\_NVNT\_ANT1\_1-DH5\_2441



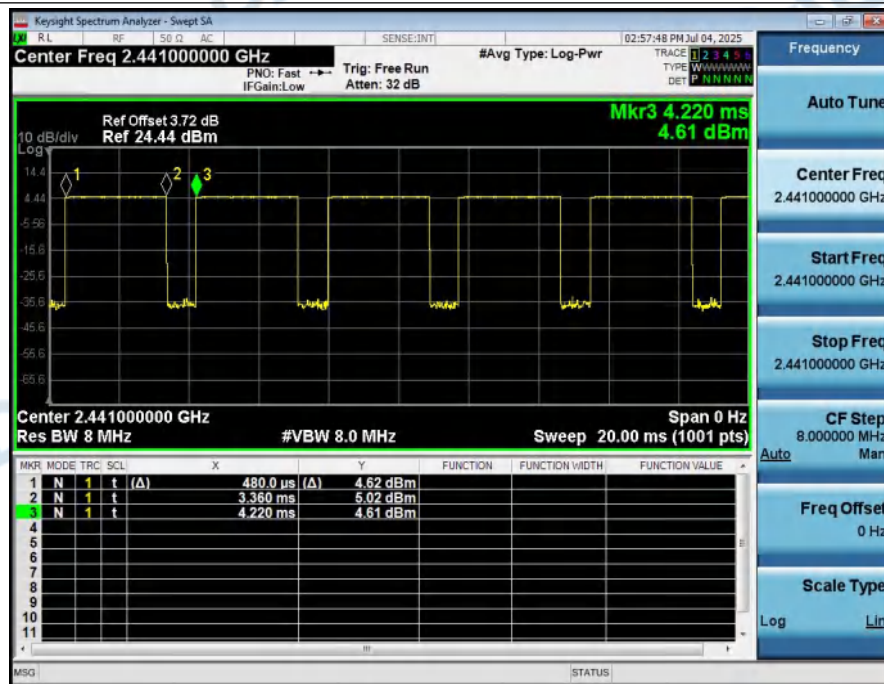
Duty\_Cycle\_NVNT\_ANT1\_1-DH5\_2480



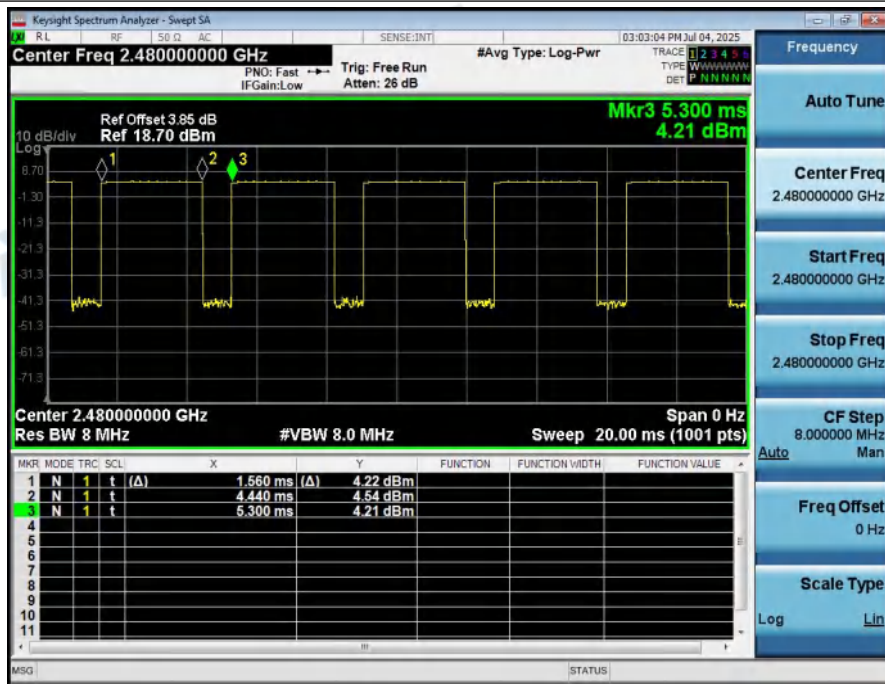
Duty\_Cycle\_NVNT\_ANT1\_2-DH5\_2402



Duty\_Cycle\_NVNT\_ANT1\_2-DH5\_2441



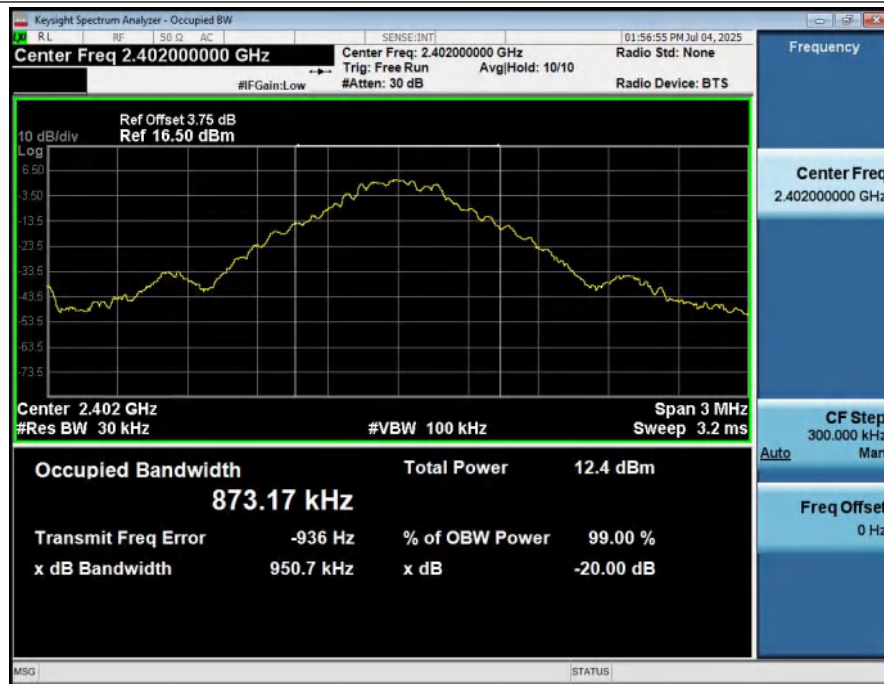
Duty\_Cycle\_NVNT\_ANT1\_2-DH5\_2480



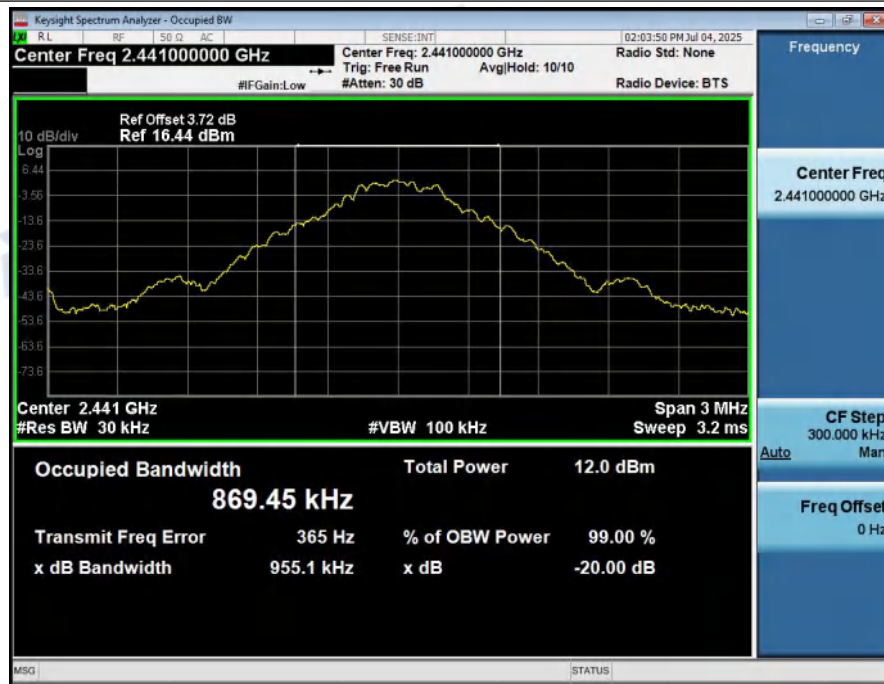
## 2. -20dB Bandwidth

| Condition | Antenna | Modulation | Frequency (MHz) | -20dB BW(MHz) | if larger than CFS |
|-----------|---------|------------|-----------------|---------------|--------------------|
| NVNT      | ANT1    | 1-DH5      | 2402.00         | 0.951         | No                 |
| NVNT      | ANT1    | 1-DH5      | 2441.00         | 0.955         | No                 |
| NVNT      | ANT1    | 1-DH5      | 2480.00         | 0.956         | No                 |
| NVNT      | ANT1    | 2-DH5      | 2402.00         | 1.312         | Yes                |
| NVNT      | ANT1    | 2-DH5      | 2441.00         | 1.318         | Yes                |
| NVNT      | ANT1    | 2-DH5      | 2480.00         | 1.324         | Yes                |

-20dB\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2402\_00



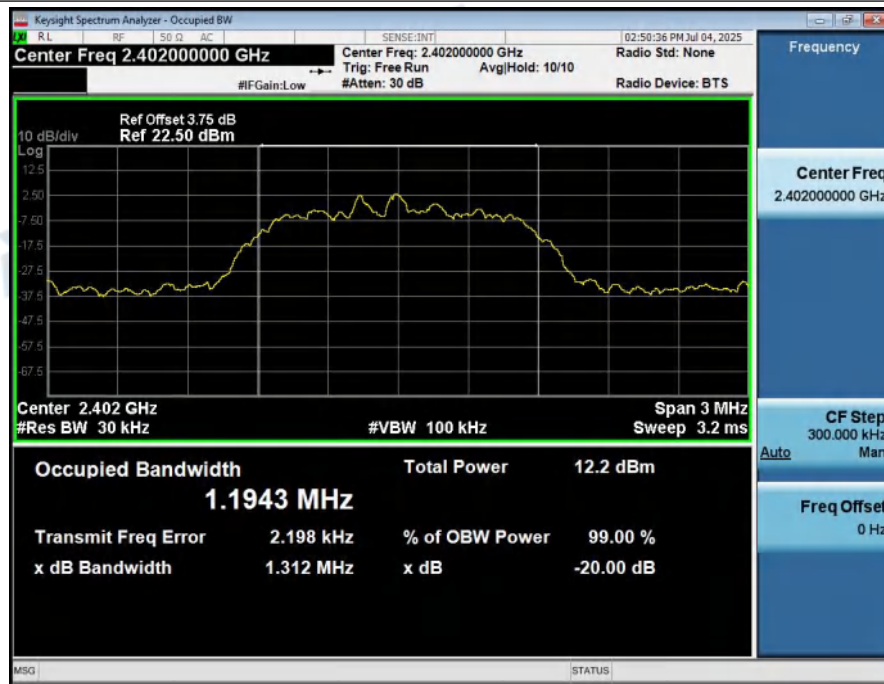
-20dB\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2441\_00



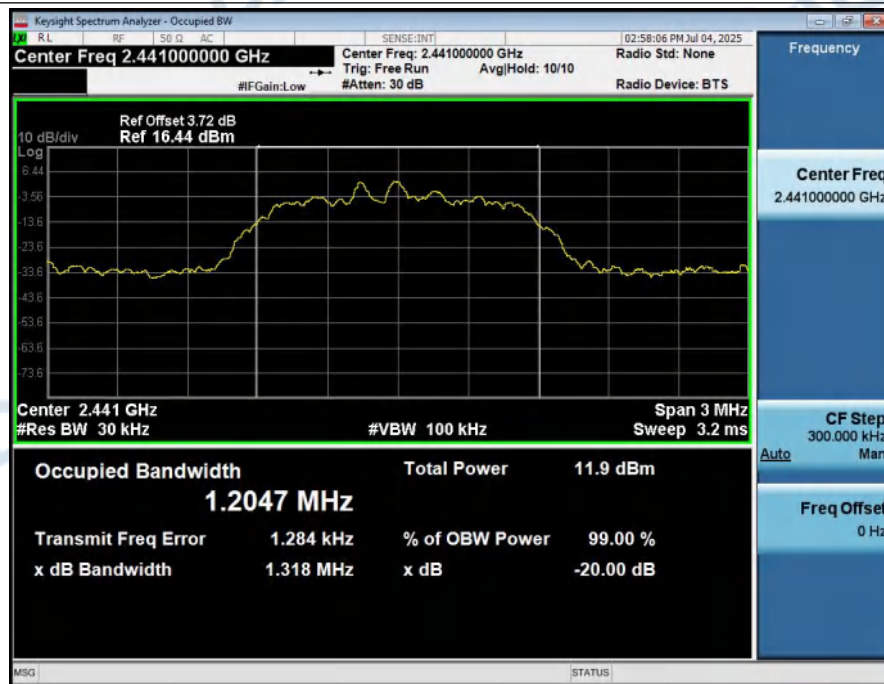
-20dB\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2480\_00



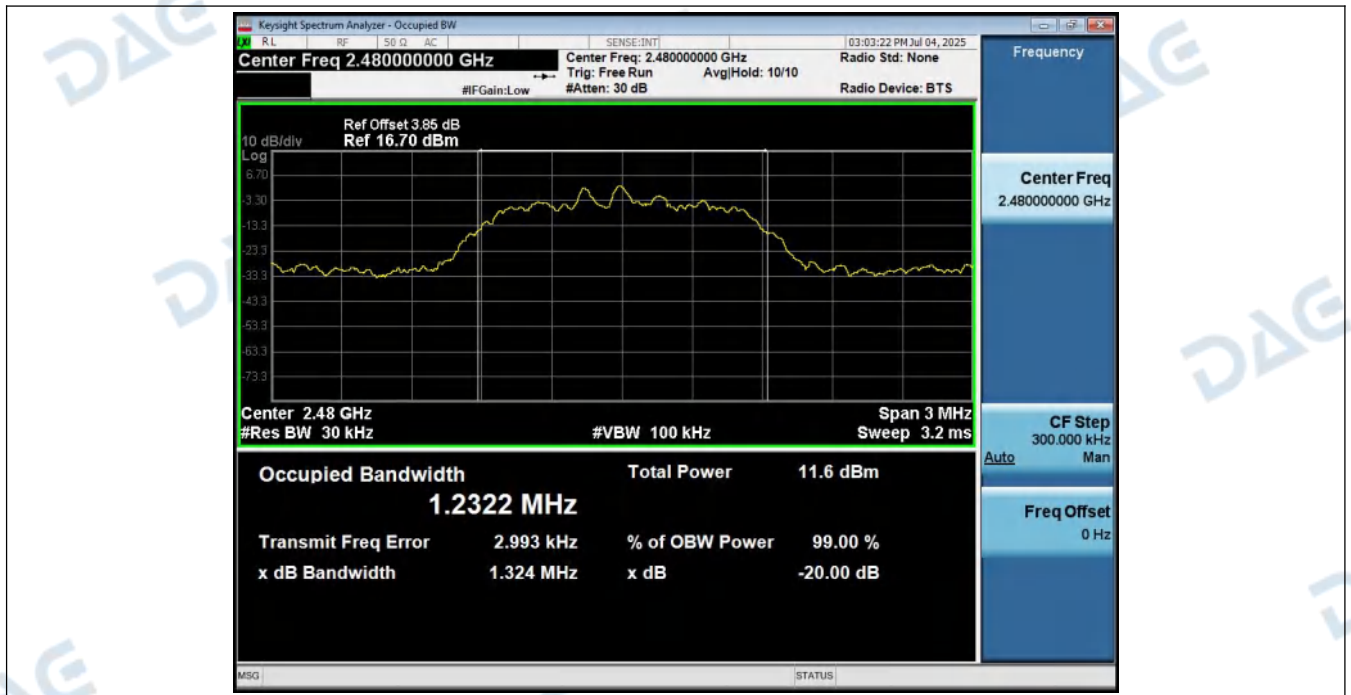
-20dB\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2402\_00



-20dB\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2441\_00



-20dB\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2480\_00



### 3. 99% Occupied Bandwidth

| Condition | Antenna | Modulation | Frequency (MHz) | 99% BW(MHz) |
|-----------|---------|------------|-----------------|-------------|
| NVNT      | ANT1    | 1-DH5      | 2402.00         | 0.871       |
| NVNT      | ANT1    | 1-DH5      | 2441.00         | 0.872       |
| NVNT      | ANT1    | 1-DH5      | 2480.00         | 0.873       |
| NVNT      | ANT1    | 2-DH5      | 2402.00         | 1.194       |
| NVNT      | ANT1    | 2-DH5      | 2441.00         | 1.204       |
| NVNT      | ANT1    | 2-DH5      | 2480.00         | 1.234       |

99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2402\_00



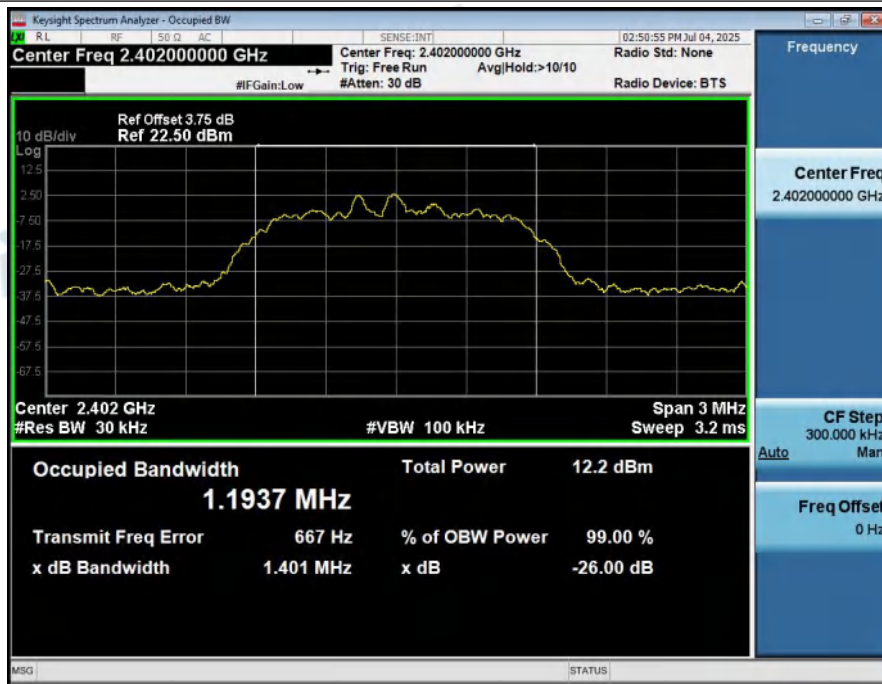
99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2441\_00



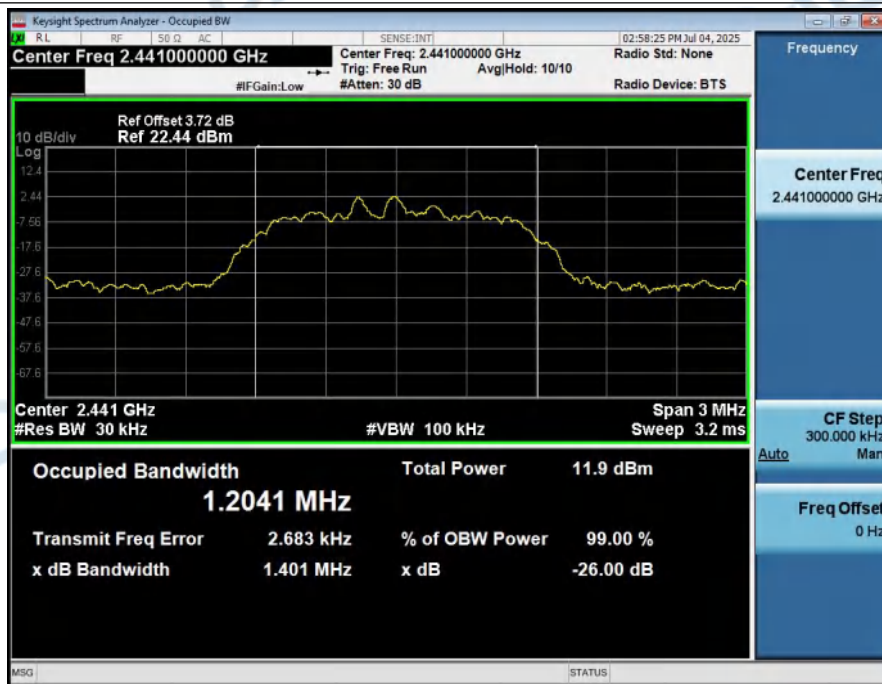
99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_1-DH5\_2480\_00



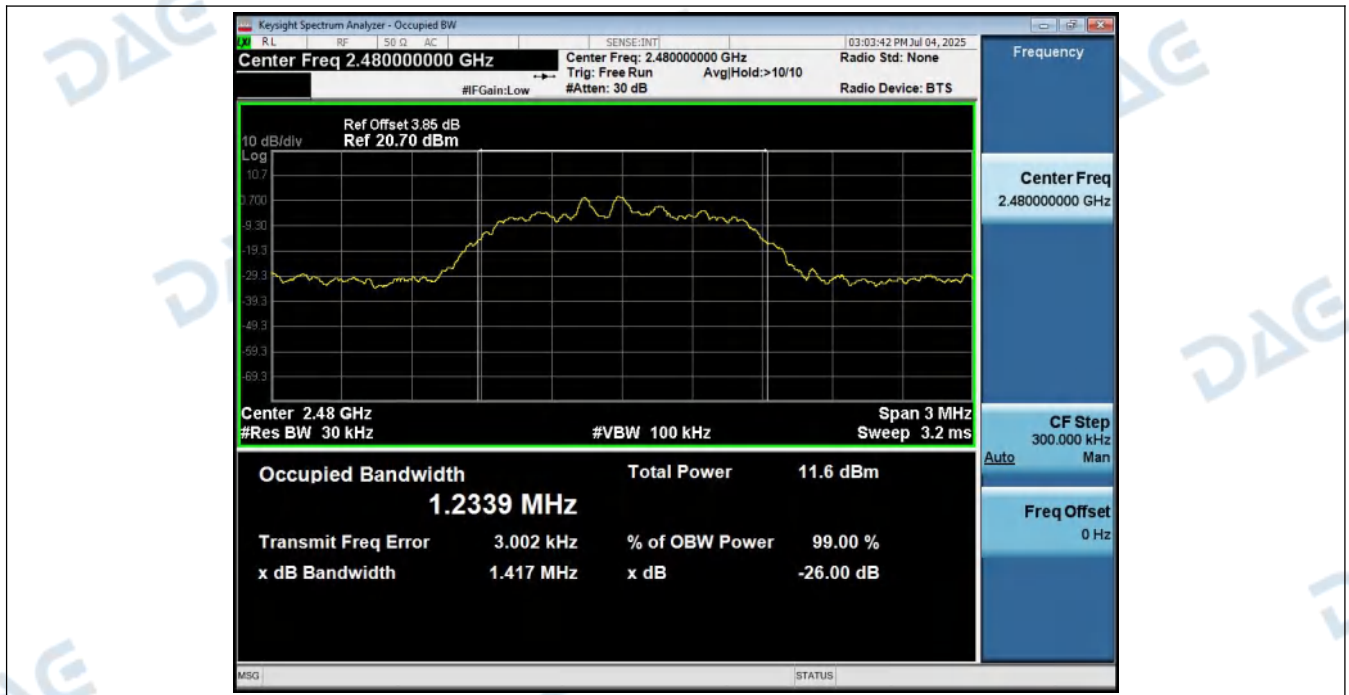
99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2402\_00



99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2441\_00



99%\_Occupied\_Bandwidth\_NVNT\_ANT1\_2-DH5\_2480\_00



#### 4. Peak Output Power

| Condition | Antenna | Modulation | Frequency (MHz) | Max. Conducted Power(dBm) | Max. Conducted Power(mW) | Limit(mW) | Result |
|-----------|---------|------------|-----------------|---------------------------|--------------------------|-----------|--------|
| NVNT      | ANT1    | 1-DH5      | 2402.00         | 4.94                      | 3.12                     | 1000      | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2441.00         | 4.47                      | 2.80                     | 1000      | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2480.00         | 4.17                      | 2.61                     | 1000      | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2402.00         | 5.62                      | 3.64                     | 125       | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2441.00         | 5.13                      | 3.26                     | 125       | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2480.00         | 4.62                      | 2.90                     | 125       | Pass   |

Peak\_Output\_Power\_NVNT\_ANT1\_1-DH5\_2402\_00



Peak\_Output\_Power\_NVNT\_ANT1\_1-DH5\_2441\_00



Peak\_Output\_Power\_NVNT\_ANT1\_1-DH5\_2480\_00



Peak\_Output\_Power\_NVNT\_ANT1\_2-DH5\_2402\_00



Peak\_Output\_Power\_NVNT\_ANT1\_2-DH5\_2441\_00



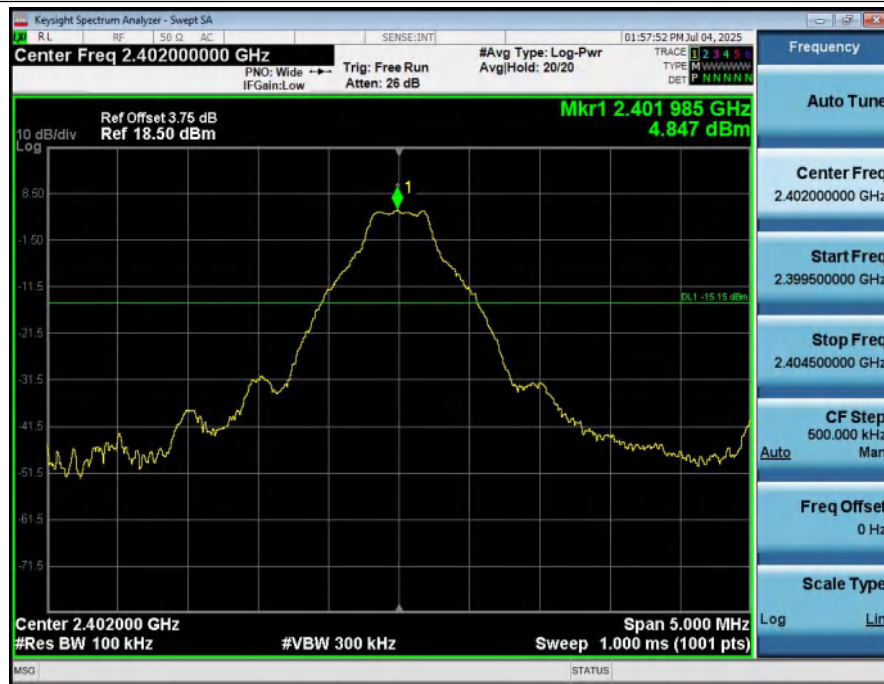
Peak\_Output\_Power\_NVNT\_ANT1\_2-DH5\_2480\_00



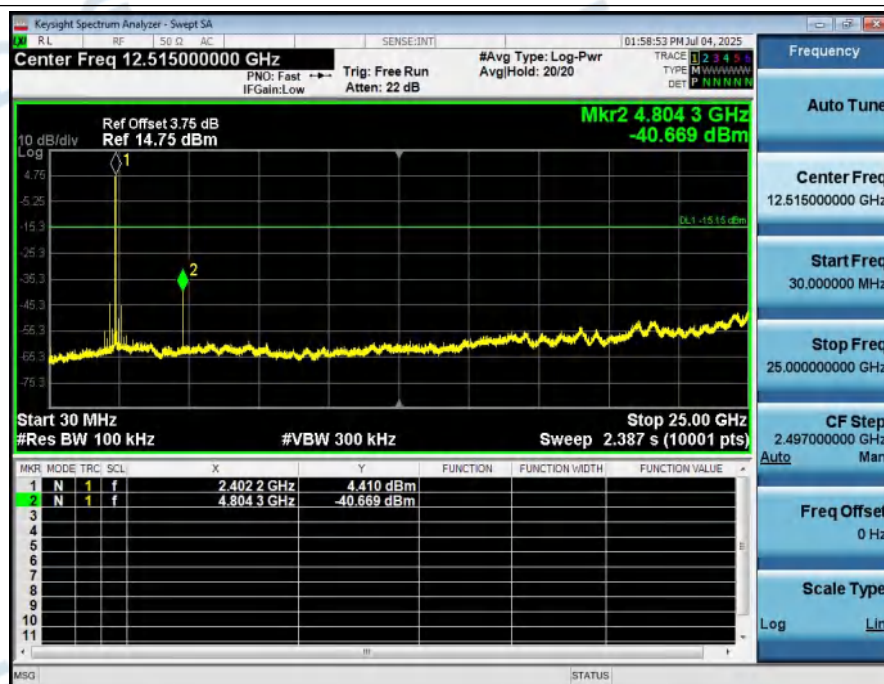
## 5. Spurious Emissions

| Condition | Antenna | Modulation | TX Mode | Ref_level(dBm) | Spurious<br>MAX.Value(dBm) | Limit   | Result |
|-----------|---------|------------|---------|----------------|----------------------------|---------|--------|
| NVNT      | ANT1    | 1-DH5      | 2402.00 | 4.847          | -40.669                    | -15.153 | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2441.00 | 4.329          | -40.849                    | -15.671 | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2480.00 | 3.978          | -39.284                    | -16.022 | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2402.00 | 4.899          | -40.117                    | -15.101 | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2441.00 | 4.567          | -44.006                    | -15.433 | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2480.00 | 4.193          | -43.041                    | -15.807 | Pass   |

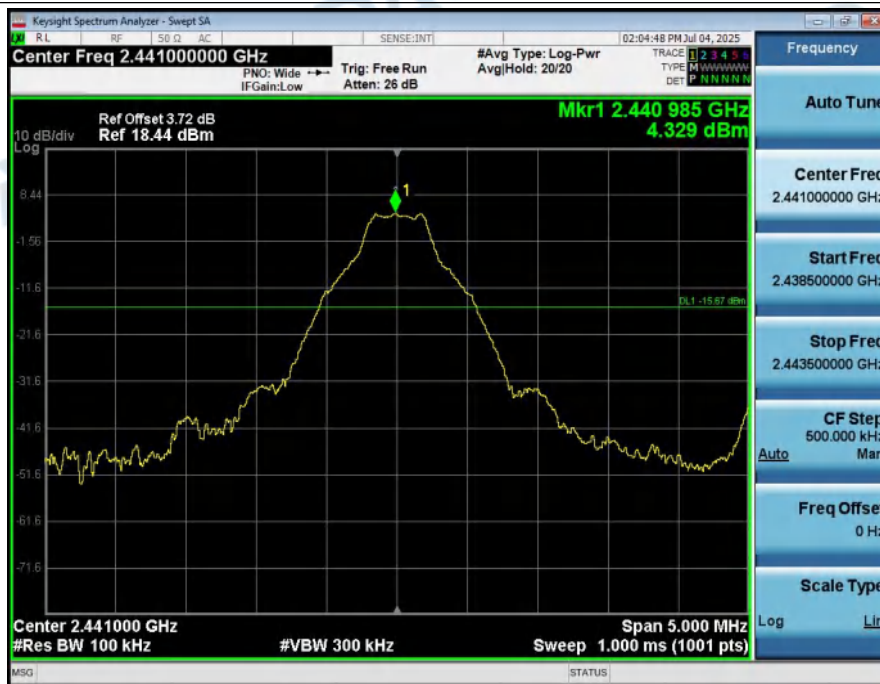
1\_Reference\_Level\_NVNT\_ANT1\_1-DH5\_2402\_00



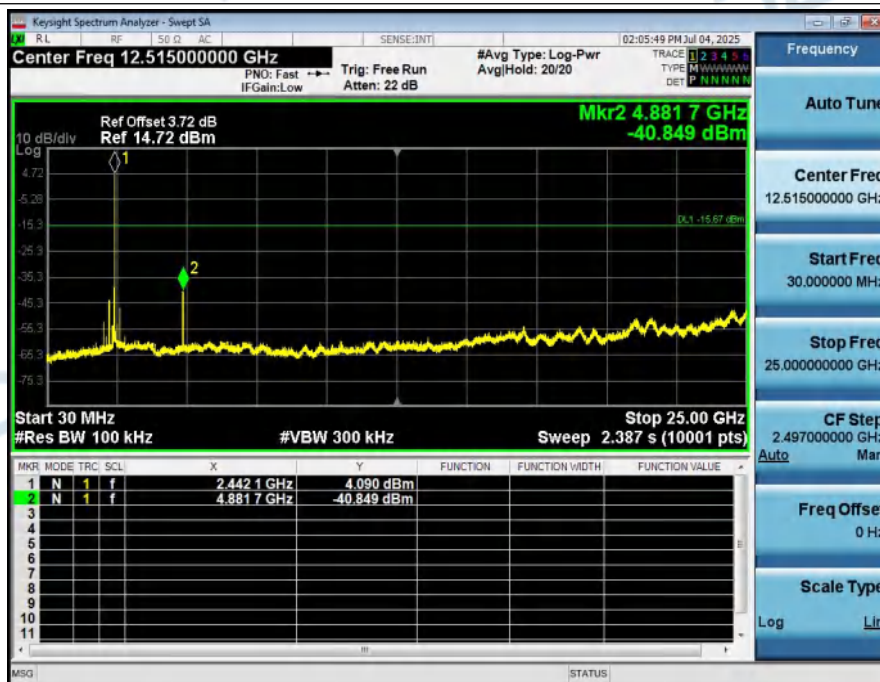
2\_Spurious\_Emissions\_NVNT\_ANT1\_1-DH5\_2402\_00



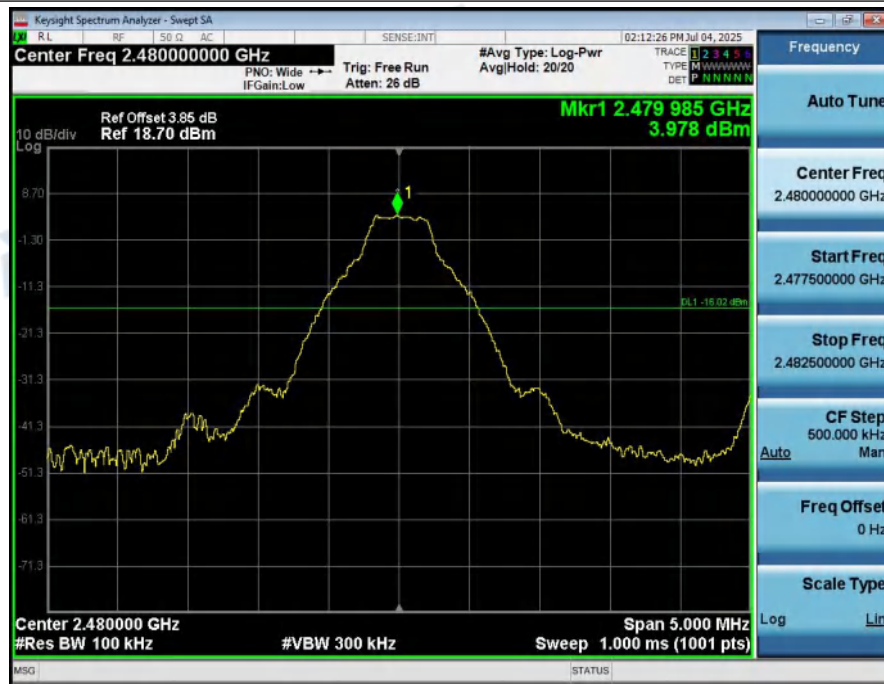
### 1\_Reference\_Level\_NVNT\_ANT1\_1-DH5\_2441\_00



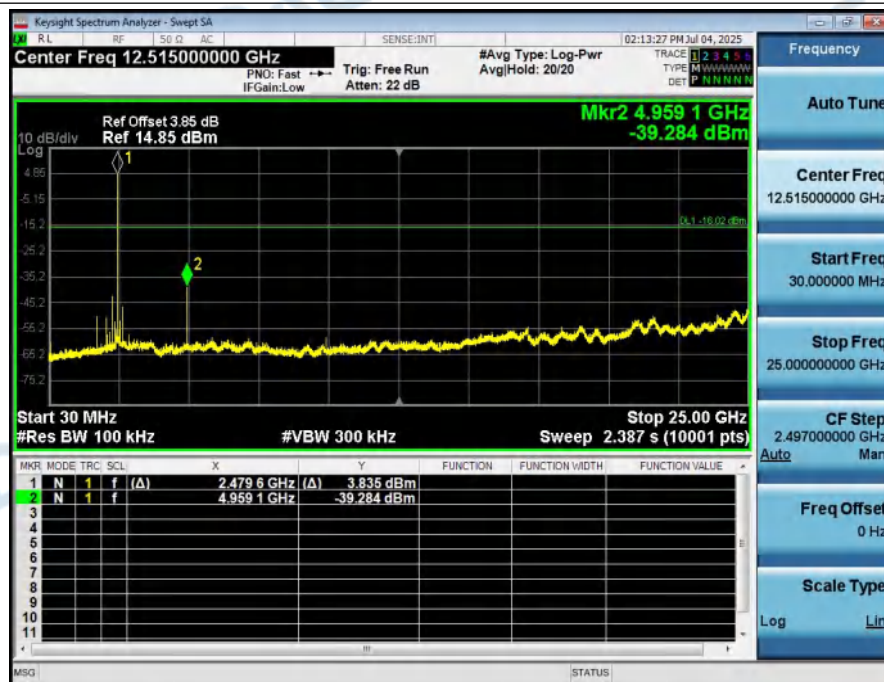
### 2\_Spurious\_Emissions\_NVNT\_ANT1\_1-DH5\_2441\_00



### 1\_Reference\_Level\_NVNT\_ANT1\_1-DH5\_2480\_00



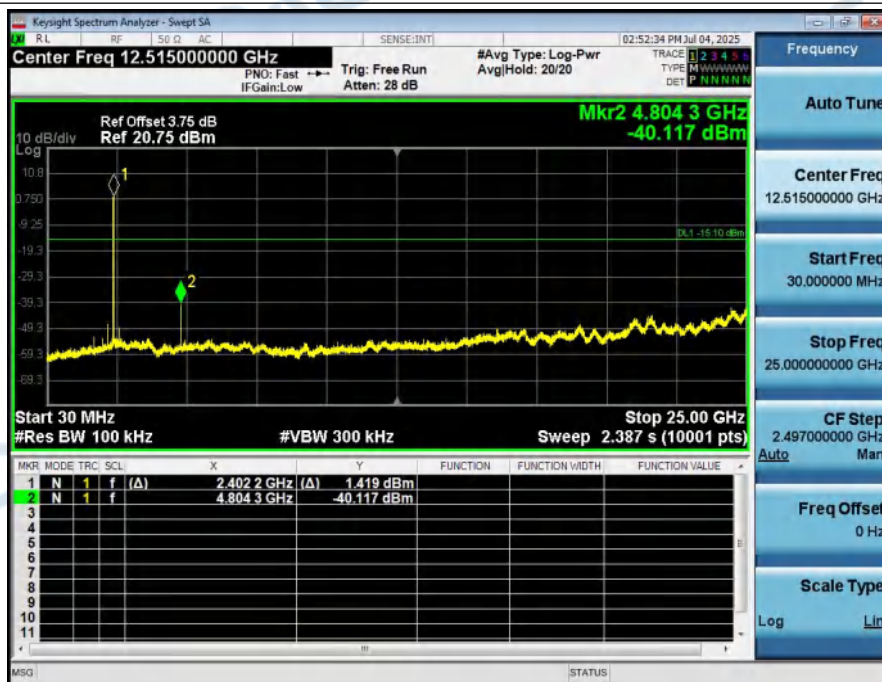
2\_Spurious\_Emissions\_NVNT\_ANT1\_1-DH5\_2480\_00



1\_Reference\_Level\_NVNT\_ANT1\_2-DH5\_2402\_00



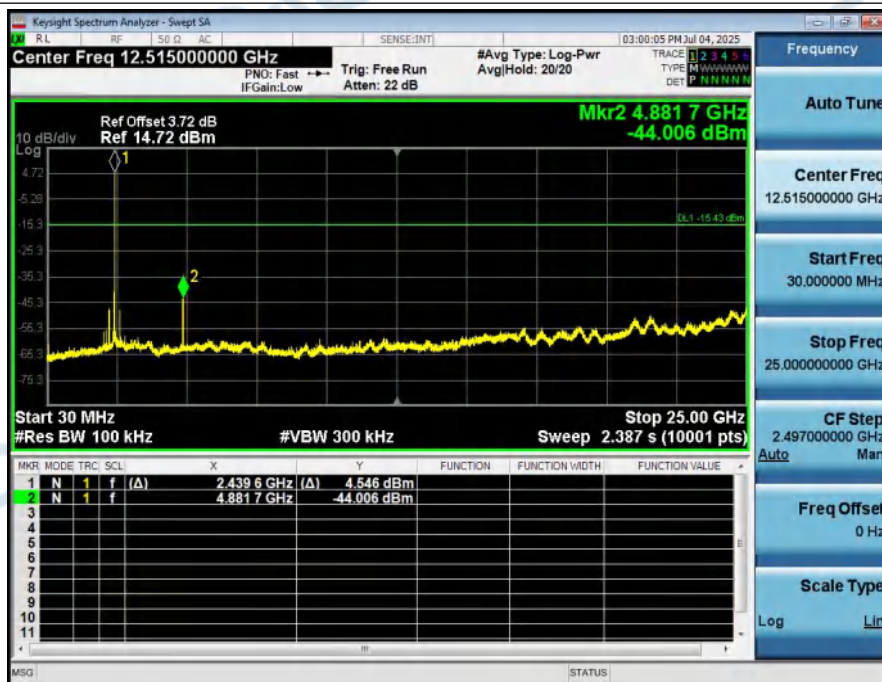
2\_Spurious\_Emissions\_NVNT\_ANT1\_2-DH5\_2402\_00



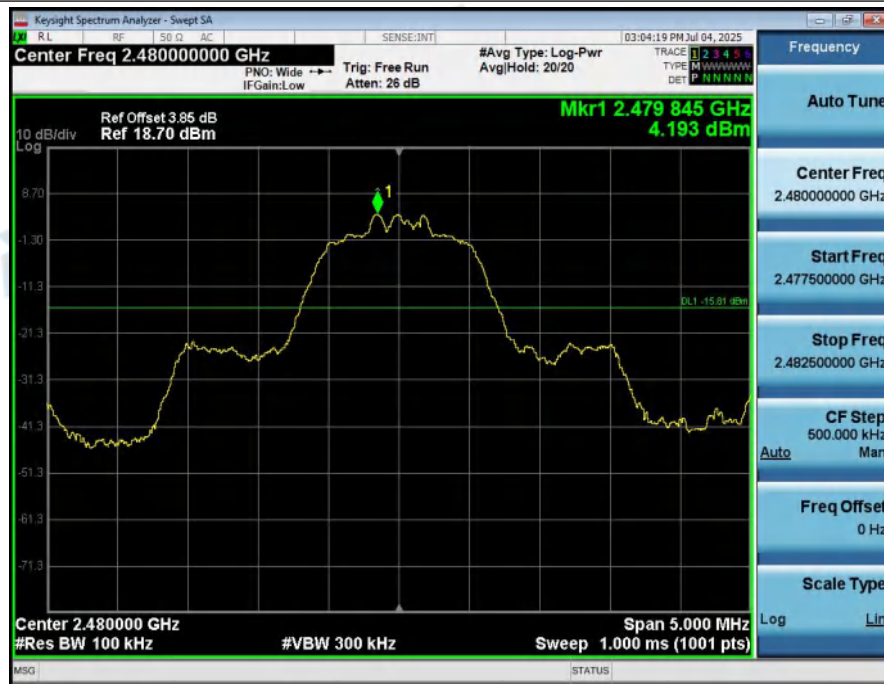
1\_Reference\_Level\_NVNT\_ANT1\_2-DH5\_2441\_00



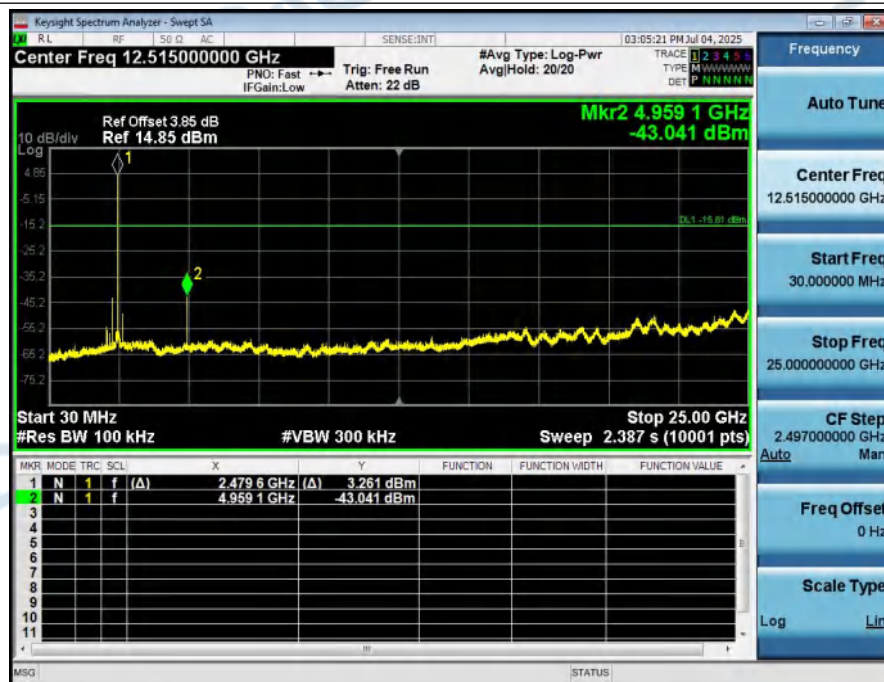
2\_Spurious\_Emissions\_NVNT\_ANT1\_2-DH5\_2441\_00



1\_Reference\_Level\_NVNT\_ANT1\_2-DH5\_2480\_00



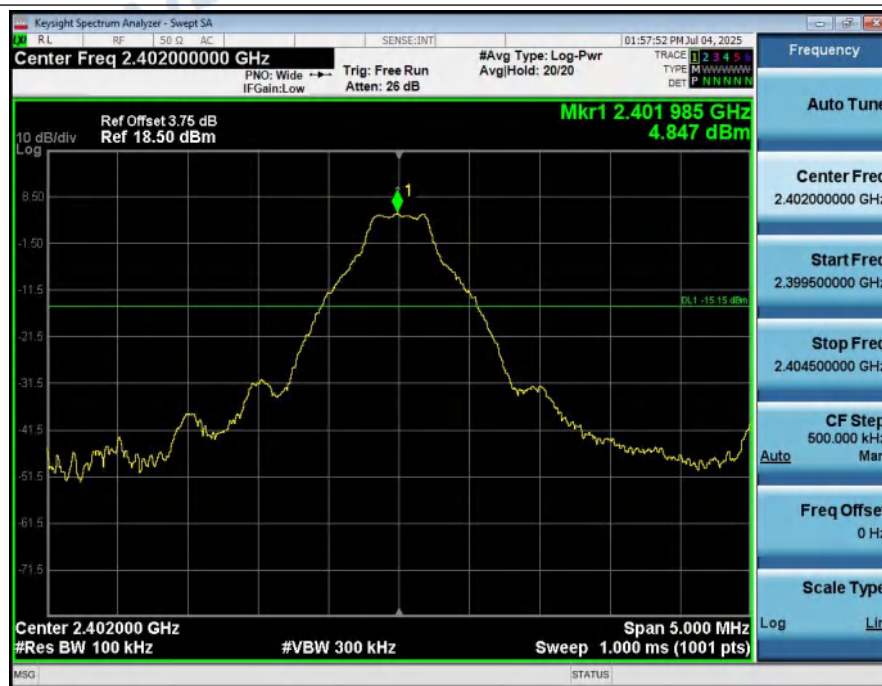
2\_Spurious\_Emissions\_NVNT\_ANT1\_2-DH5\_2480\_00



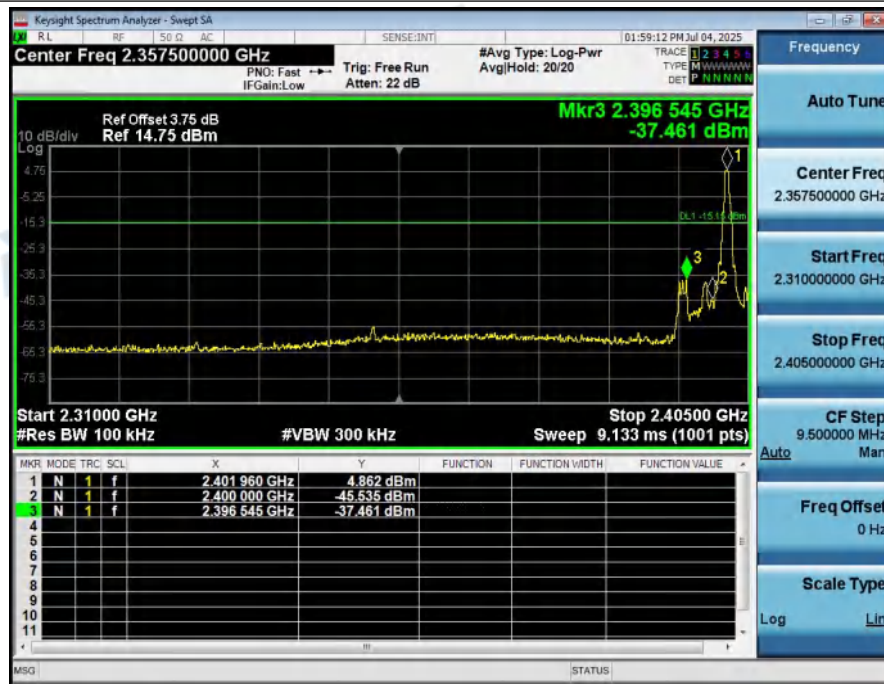
## 6. Bandedge

| Condition | Antenna | Modulation | TX Mode     | Ref_level(dBm) | Bandedge MAX.Value | Limit   | Result |
|-----------|---------|------------|-------------|----------------|--------------------|---------|--------|
| NVNT      | ANT1    | 1-DH5      | 2402.00     | 4.847          | -37.461            | -15.153 | Pass   |
| NVNT      | ANT1    | 1-DH5      | Hopping_LCH | 4.737          | -38.438            | -15.263 | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2480.00     | 3.978          | -37.580            | -16.022 | Pass   |
| NVNT      | ANT1    | 1-DH5      | Hopping_HCH | 5.098          | -38.232            | -14.902 | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2402.00     | 4.899          | -36.856            | -15.101 | Pass   |
| NVNT      | ANT1    | 2-DH5      | Hopping_LCH | 4.749          | -37.402            | -15.251 | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2480.00     | 4.193          | -38.092            | -15.807 | Pass   |
| NVNT      | ANT1    | 2-DH5      | Hopping_HCH | 4.802          | -45.533            | -15.198 | Pass   |

1\_Reference\_Level\_NVNT\_ANT1\_1-DH5\_2402\_00



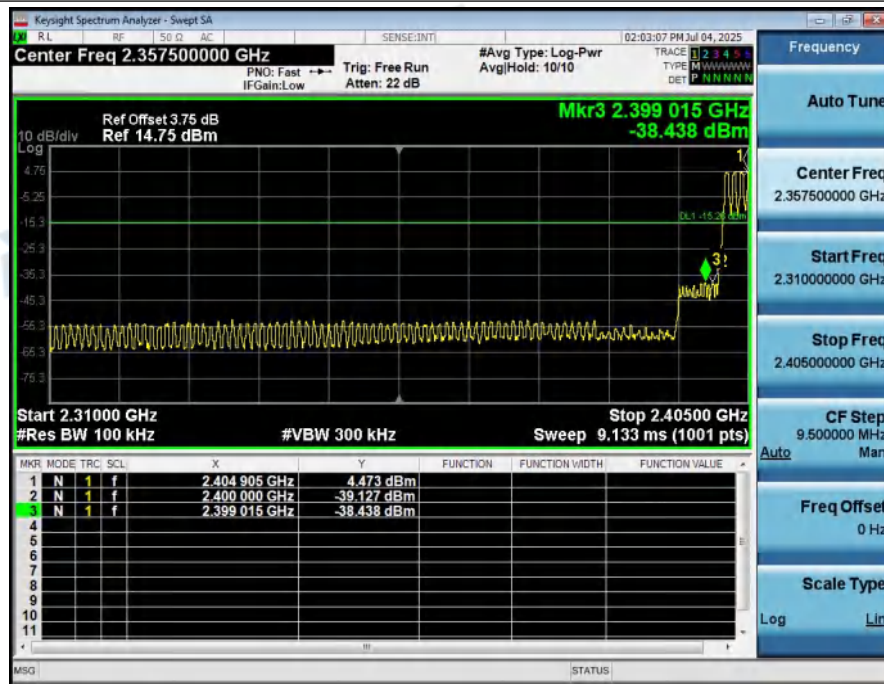
2\_Bandedge\_NVNT\_ANT1\_1-DH5\_2402\_00



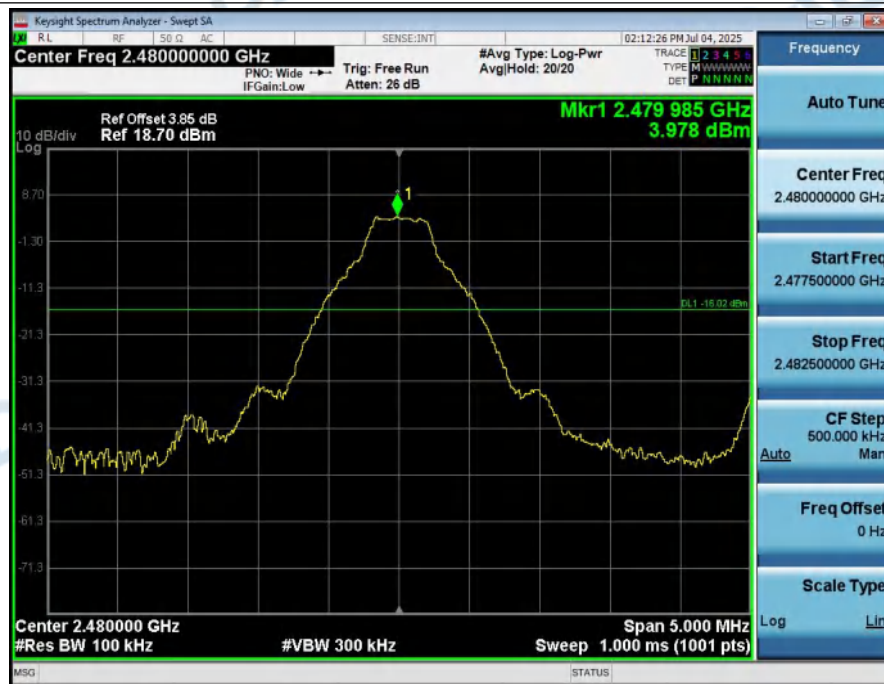
### 1\_Reference\_Level\_Hopping\_NVNT\_ANT1\_1-DH5\_Hopping



### 2\_Band\_Edge\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



1\_Reference\_Level\_NVNT\_ANT1\_1-DH5\_2480\_00



2\_Bandedge\_NVNT\_ANT1\_1-DH5\_2480\_00



### 1\_Reference\_Level\_Hopping\_NVNT\_ANT1\_1-DH5\_Hopping



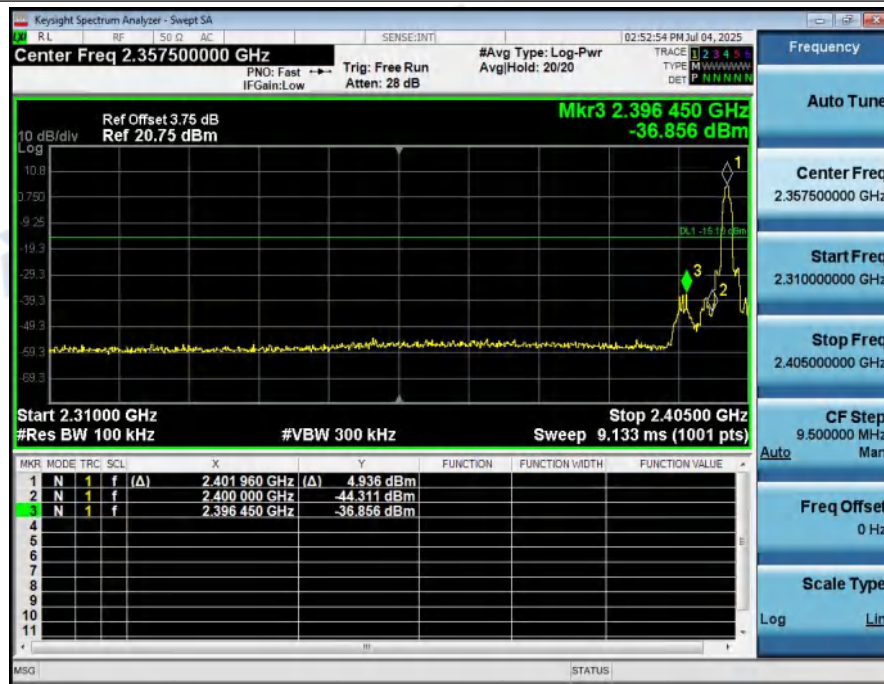
### 2\_Band\_Edge\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



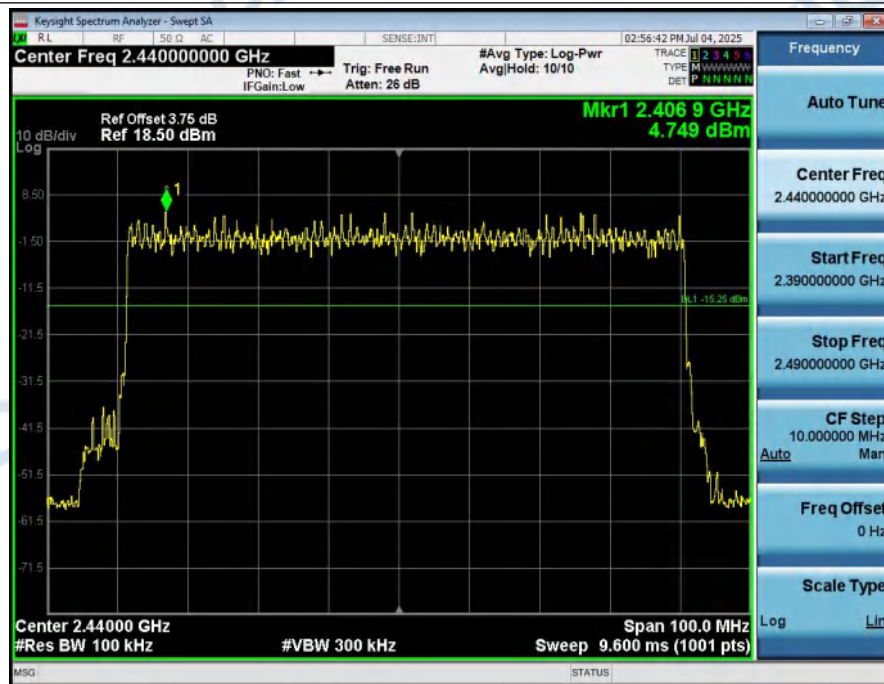
### 1\_Reference\_Level\_NVNT\_ANT1\_2-DH5\_2402\_00



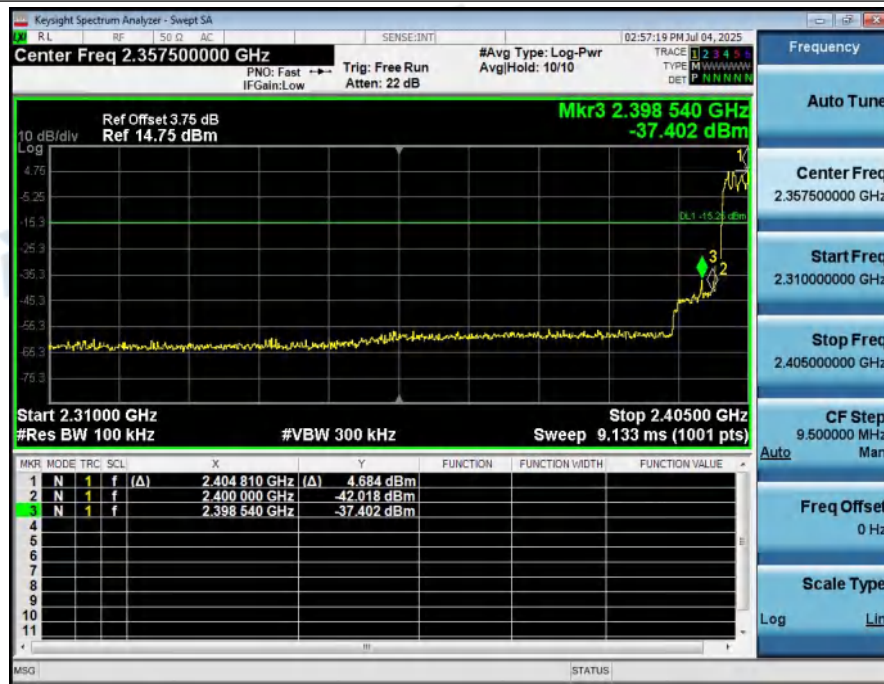
### 2\_Bandedge\_NVNT\_ANT1\_2-DH5\_2402\_00



### 1\_Reference\_Level\_Hopping\_NVNT\_ANT1\_2-DH5\_Hopping



### 2\_Band\_Edge\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



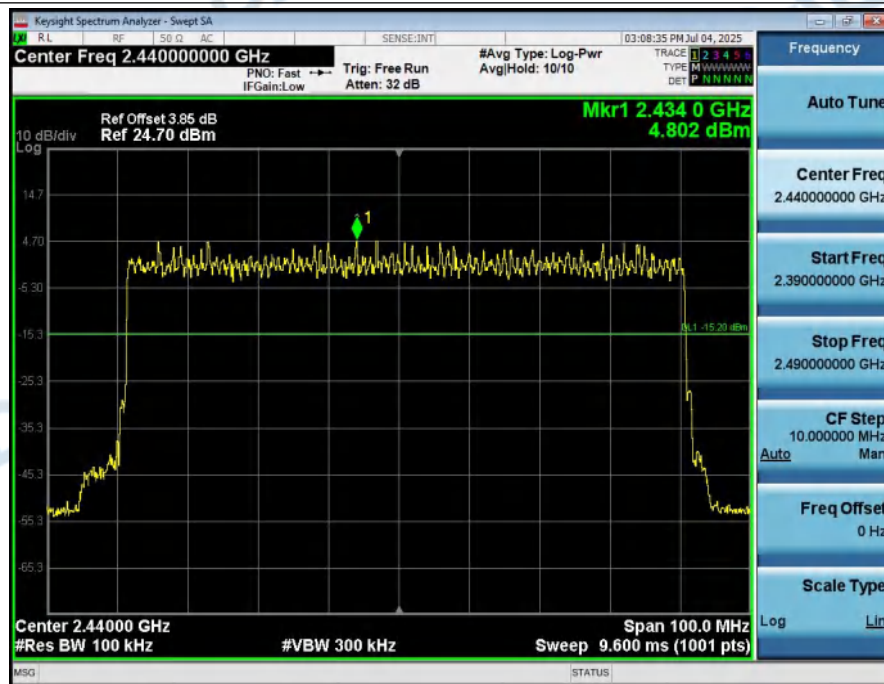
### 1\_Reference\_Level\_NVNT\_ANT1\_2-DH5\_2480\_00



### 2\_Bandedge\_NVNT\_ANT1\_2-DH5\_2480\_00



### 1\_Reference\_Level\_Hopping\_NVNT\_ANT1\_2-DH5\_Hopping



### 2\_Band\_Edge\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



## 7. Carrier Frequencies Separation (Hopping)

| Condition | Antenna | Modulation | Frequency(MHz) | Hopping NO.0 (MHz) | Hopping NO.1 (MHz) | Carrier Frequencies Separation(MHz) | Limit(MHz) | Result |
|-----------|---------|------------|----------------|--------------------|--------------------|-------------------------------------|------------|--------|
| NVNT      | ANT1    | 1-DH5      | 2402.00        | 2401.846           | 2402.839           | 0.99                                | 0.951      | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2441.00        | 2440.846           | 2441.827           | 0.98                                | 0.955      | Pass   |
| NVNT      | ANT1    | 1-DH5      | 2480.00        | 2478.846           | 2479.839           | 0.99                                | 0.956      | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2402.00        | 2401.843           | 2402.836           | 0.99                                | 0.875      | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2441.00        | 2440.861           | 2441.836           | 0.97                                | 0.879      | Pass   |
| NVNT      | ANT1    | 2-DH5      | 2480.00        | 2478.831           | 2479.848           | 1.02                                | 0.883      | Pass   |

Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



#### Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



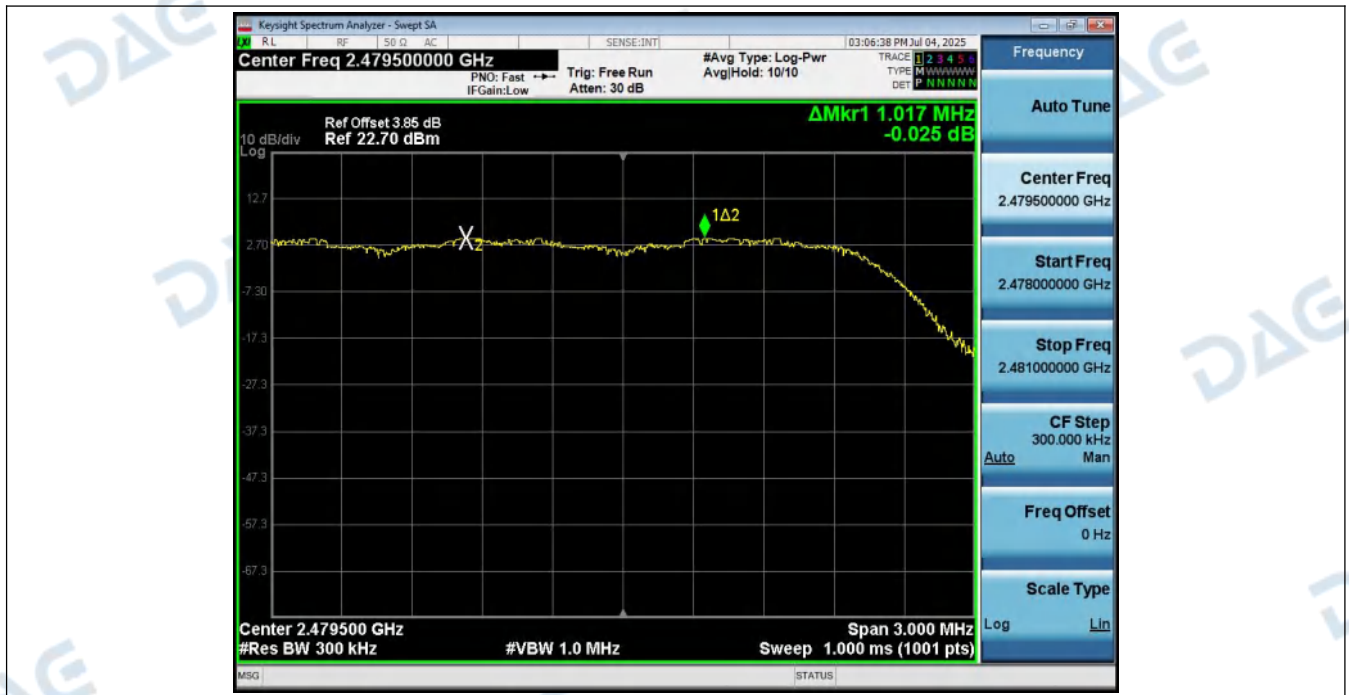
#### Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



#### Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



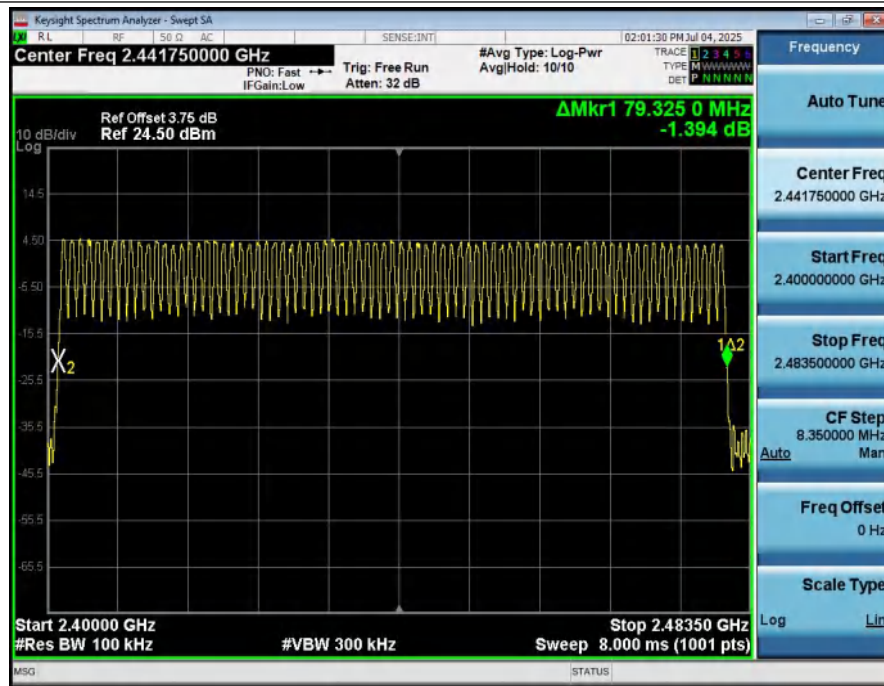
#### Carrier\_Frequencies\_Separation\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



## 8. Number of Hopping Channel (Hopping)

| Condition | Antenna | Modulation | Hopping Num | Limit | Result |
|-----------|---------|------------|-------------|-------|--------|
| NVNT      | ANT1    | 1-DH5      | 79          | 15    | Pass   |
| NVNT      | ANT1    | 1-DH5      | 79          | 15    | Pass   |
| NVNT      | ANT1    | 1-DH5      | 79          | 15    | Pass   |
| NVNT      | ANT1    | 2-DH5      | 79          | 15    | Pass   |
| NVNT      | ANT1    | 2-DH5      | 79          | 15    | Pass   |
| NVNT      | ANT1    | 2-DH5      | 79          | 15    | Pass   |

Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



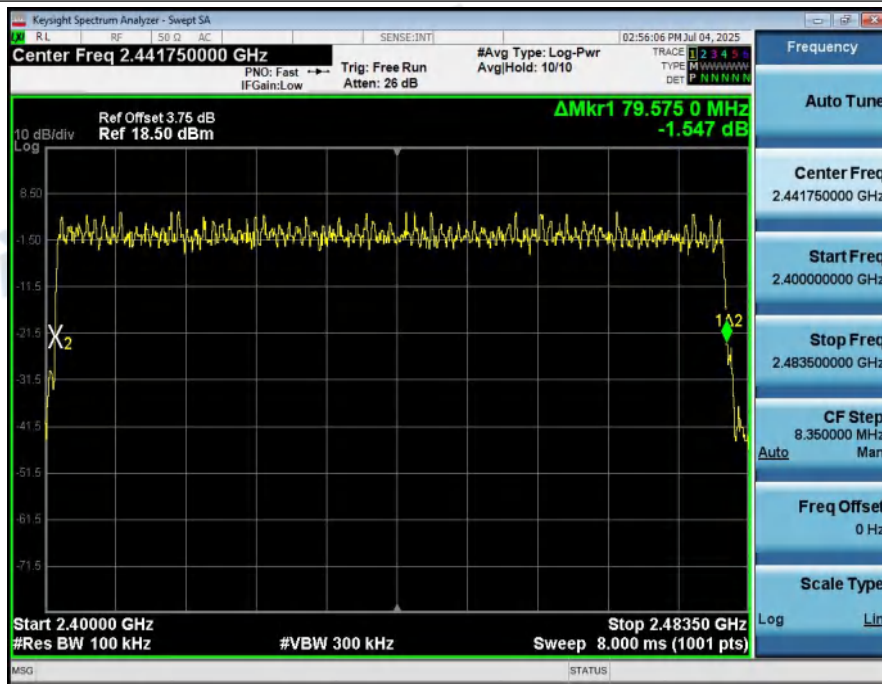
Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



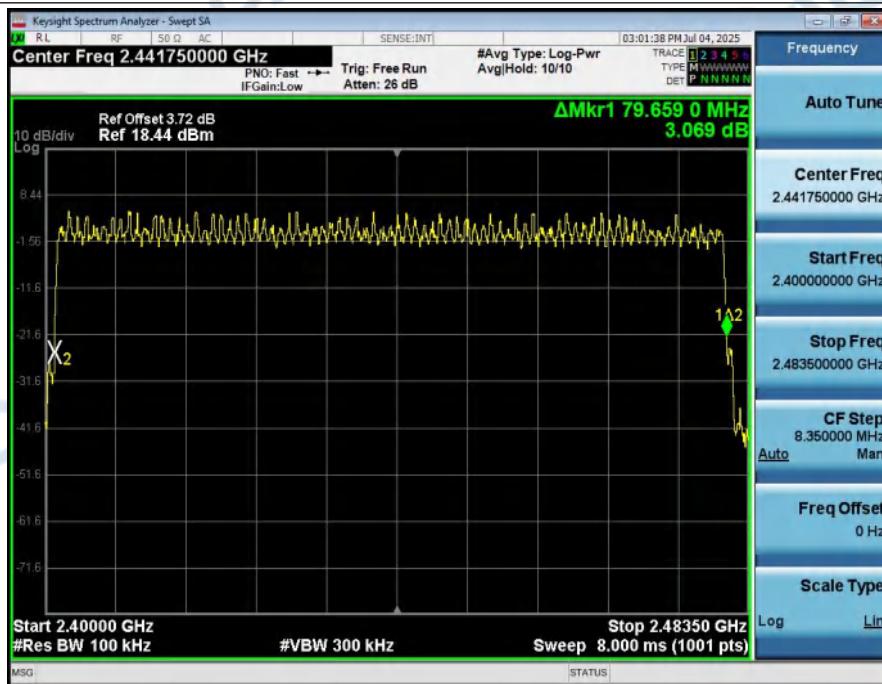
Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_1-DH5\_Hopping



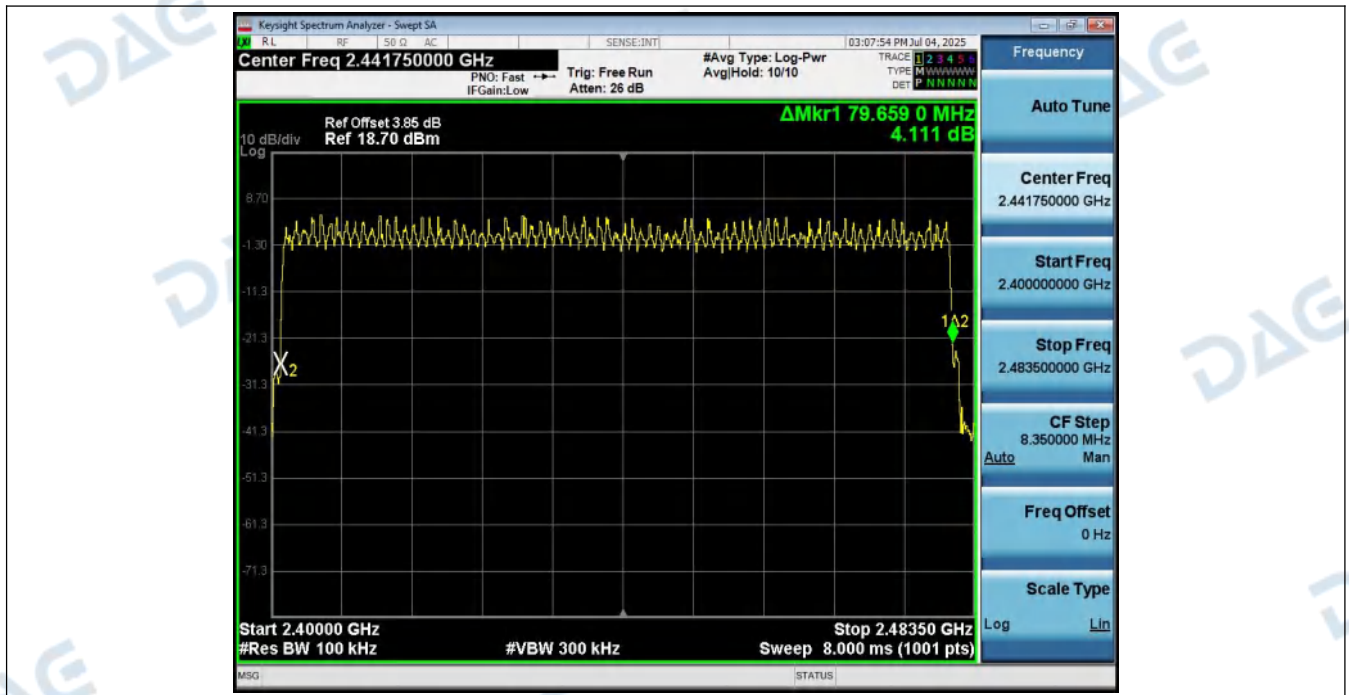
Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



#### Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



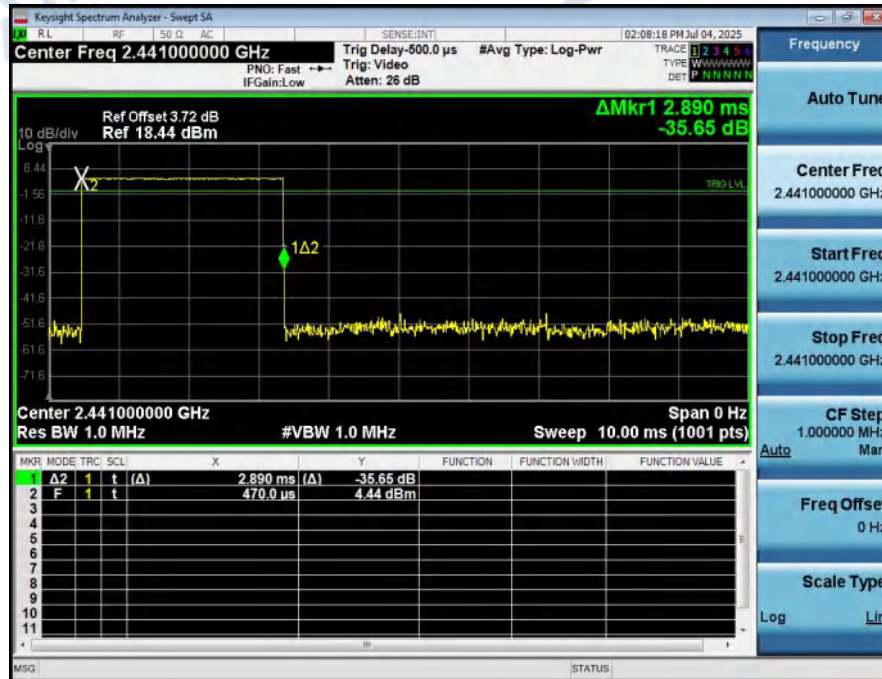
#### Number\_of\_Hopping\_Channel\_(Hopping)\_NVNT\_ANT1\_2-DH5\_Hopping



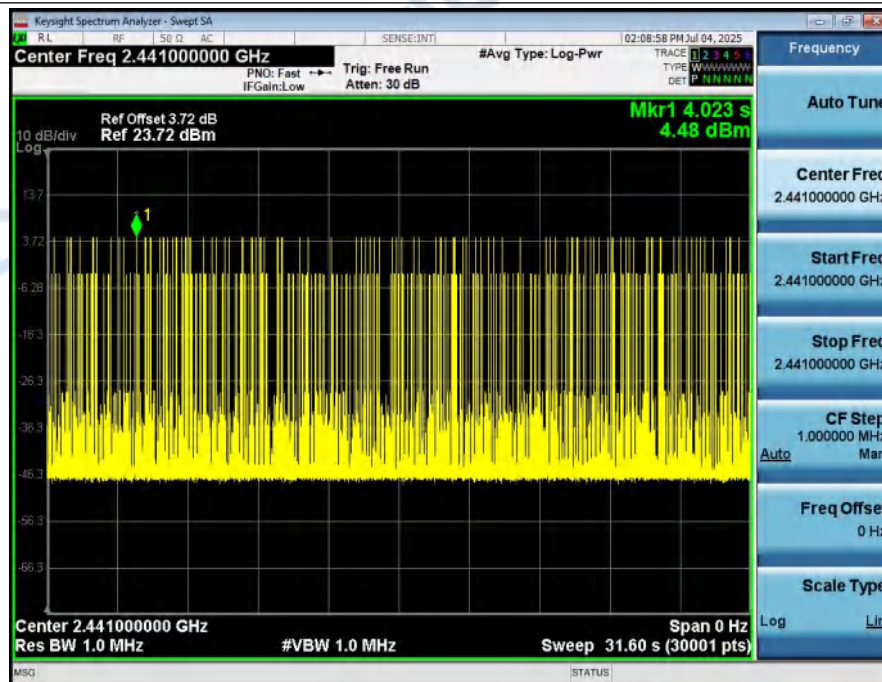
## 9. Dwell Time (Hopping)

| Condition | Antenna | Packet Type | Pulse Time(ms) | Hops   | Dwell Time(ms) | Limit(s) | Result |
|-----------|---------|-------------|----------------|--------|----------------|----------|--------|
| NVNT      | ANT1    | 1-DH5       | 2.890          | 112.00 | 323.680        | 0.40     | Pass   |
| NVNT      | ANT1    | 2-DH5       | 2.900          | 107.00 | 310.300        | 0.40     | Pass   |

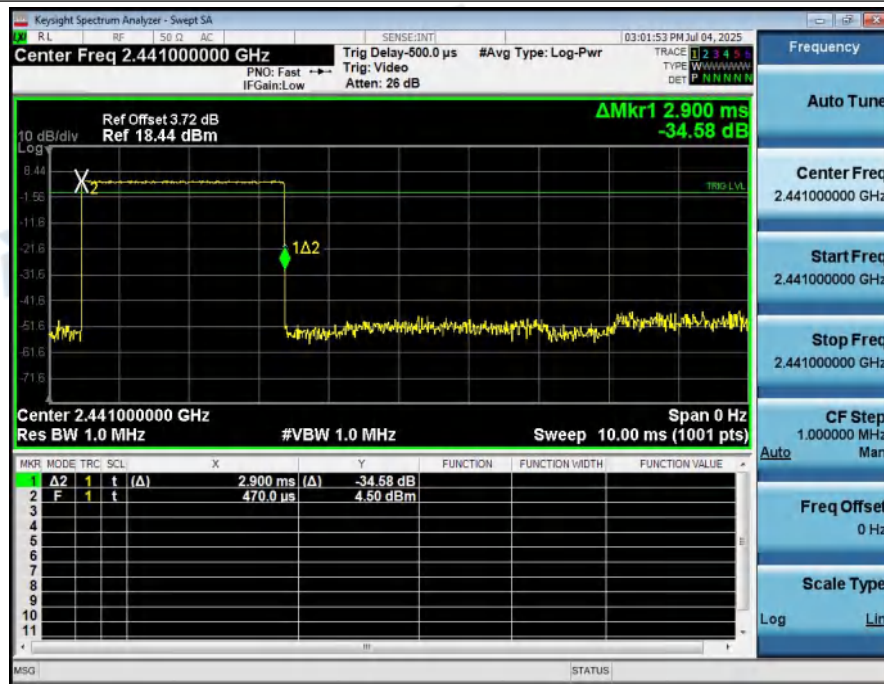
Dwell\_Time\_(Hopping)\_NVNT\_ANT1\_1-DH5\_2441\_00\_One\_Burst\_Time



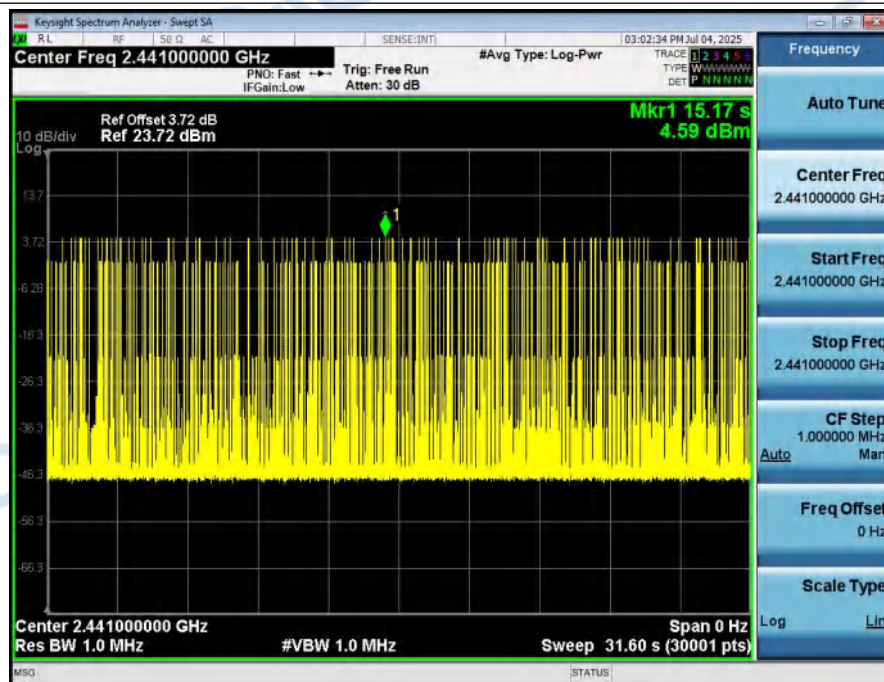
Dwell\_Time\_(Hopping)\_NVNT\_ANT1\_1-DH5\_2441\_00\_Accumulated



Dwell\_Time\_(Hopping)\_NVNT\_ANT1\_2-DH5\_2441\_00\_One\_Burst\_Time



Dwell\_Time\_(Hopping)\_NVNT\_ANT1\_2-DH5\_2441\_00\_Accumulated



\*\*\*\*\* End of Report \*\*\*\*\*