



|                      |                               |
|----------------------|-------------------------------|
| Product Name: Tablet | Report No: FCC2022-06452RF1   |
| Product Model: T20   | Security Classification: Open |
| Version: V1.0        | Total Page: 108               |

## TIRT Testing Report

|              |             |              |  |
|--------------|-------------|--------------|--|
| Prepared By: | Checked By: | Approved By: |  |
| Stone Tang   | Randy Lv    | Daniel Chen  |  |
| Stone Tang   | Randy Lv    | Daniel Chen  |  |

# RF TEST REPORT

**FCC ID: 2AX4YT20**

According to

**47 CFR FCC Part 15, Subpart C(Section 15.247)**

- Equipment : Tablet  
: T20, T20Pro, T20S, T20E
- Model No. : All models are with same schematic, The only differences are model no.  
T20 is main test model, T20Pro, T20S, T20E, is the adding model. No other differences.
- Trademark : DOOGEE
- Product No. : 20221220021902
- Applicant : Shenzhen DOOGEE Hengtong Technology CO.,LTD
- The test result referred exclusively to the presented test model /sample.
  - Without written approval of TIRT Inc. the test report shall not reproduced except in full.
  - Test Date: 2022.12.13-2023.1.8

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen

Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street,  
Pingshan District, Shenzhen, China

TEL: +86-0755-27087573

# Table of Contents

|                                                    |           |
|----------------------------------------------------|-----------|
| <b>1. General Information .....</b>                | <b>6</b>  |
| 1.1 Applicant .....                                | 6         |
| 1.2 Manufacturer .....                             | 6         |
| 1.3 Basic Description of Equipment Under Test..... | 6         |
| 1.4 Antenna Information .....                      | 8         |
| <b>2. Summary of Test Results .....</b>            | <b>9</b>  |
| 2.1 Summary of Test Items .....                    | 9         |
| 2.2 Application of Standard .....                  | 9         |
| 2.3 Test Instruments.....                          | 10        |
| 2.4 Test Mode.....                                 | 11        |
| 2.5 Test Condition .....                           | 12        |
| 2.6 Measurement Uncertainty .....                  | 13        |
| 2.7 Test Location .....                            | 13        |
| 2.8 Deviation from Standards .....                 | 13        |
| 2.9 Abnormalities from Standard Conditions .....   | 13        |
| <b>3. Test Procedure And Results .....</b>         | <b>14</b> |
| 3.1 AC Power Line Conducted Emission.....          | 14        |
| 3.1.1 Limit.....                                   | 14        |
| 3.1.2 Test Procedure .....                         | 14        |
| 3.1.3 Test Setup .....                             | 15        |
| 3.1.4 Test Result .....                            | 16        |
| 3.2 Radiated Emission and Band Edge.....           | 18        |
| 3.2.1 Limit.....                                   | 18        |
| 3.2.2 Test Procedure .....                         | 18        |
| 3.2.3 Test Setup .....                             | 20        |
| 3.2.4 Test Result .....                            | 21        |
| 3.3 Spurious Emission at Antenna Port.....         | 32        |
| 3.3.1 Limit.....                                   | 32        |
| 3.3.2 Test Procedure .....                         | 32        |
| 3.3.3 Test Setup .....                             | 32        |
| 3.3.4 The Result .....                             | 34        |

|                 |                                                |           |
|-----------------|------------------------------------------------|-----------|
| 3.4             | 20dB Occupy Bandwidth .....                    | 35        |
| 3.4.1           | Limit .....                                    | 35        |
| 3.4.2           | Test Procedure .....                           | 35        |
| 3.4.3           | Test Setup .....                               | 36        |
| 3.4.4           | Test Result .....                              | 36        |
| 3.5             | Maximum conducted (average) output power ..... | 37        |
| 3.5.1           | Limit .....                                    | 37        |
| 3.5.2           | Test Procedure .....                           | 37        |
| 3.5.3           | Test Setup .....                               | 37        |
| 3.5.4           | The Result .....                               | 37        |
| 3.6             | Carrier Frequencies Separation .....           | 38        |
| 3.6.1           | Limit .....                                    | 38        |
| 3.6.2           | Test Procedure .....                           | 38        |
| 3.6.3           | Test Setup .....                               | 39        |
| 3.6.4           | The Result .....                               | 40        |
| 3.7             | Hopping Channel Number .....                   | 41        |
| 3.3.5           | Limit .....                                    | 41        |
| 3.3.6           | Test Procedure .....                           | 41        |
| 3.3.7           | Test Setup .....                               | 42        |
| 3.3.8           | The Result .....                               | 43        |
| 3.8             | Dwell Time .....                               | 44        |
| 3.8.1           | Limit .....                                    | 44        |
| 3.8.2           | Test Procedure .....                           | 44        |
| 3.8.3           | Test Setup .....                               | 45        |
| 3.8.4           | The Result .....                               | 45        |
| <b>4.</b>       | <b>Photographs of EUT .....</b>                | <b>46</b> |
| <b>5.</b>       | <b>Photographs of Test Set-up .....</b>        | <b>54</b> |
| <b>Appendix</b> | <b>.....</b>                                   | <b>55</b> |

## History of this test report

Original Report Issue Date: 2023.01.09

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

| Attachment No. | Issue Date | Description |
|----------------|------------|-------------|
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |
|                |            |             |

## 1. General Information

### 1.1 Applicant

Shenzhen DOOGEE Hengtong Technology CO.,LTD

B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District, Shenzhen, China

### 1.2 Manufacturer

Shenzhen DOOGEE Hengtong Technology CO.,LTD

B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No.22, Longhua New District, Shenzhen, China

### 1.3 Basic Description of Equipment Under Test

| Items                       | Description                                                                                         |                |
|-----------------------------|-----------------------------------------------------------------------------------------------------|----------------|
| Equipment Name              | Tablet                                                                                              |                |
| Model Number                | T20                                                                                                 |                |
| Sample ID                   | 20221220021902                                                                                      |                |
| Product Code                | N/A                                                                                                 |                |
| Power Supply                | Input: 100~240V, 50/60Hz                                                                            |                |
| Adapter /Model /Description | Model: HJ-PD20W-US<br>Input: 100-240V~50/60Hz, 0.6A<br>Output: 5V=3A, 9V=2.22A, 12V=1.67A, 20W Max. |                |
| Operate temperature         | 0℃-45℃                                                                                              |                |
| EUT Stage                   | ○ Product Unit                                                                                      | ● Final-Sample |
| Operation Frequency         | 2402~2480MHz                                                                                        |                |
| Channel numbers             | 79                                                                                                  |                |
| Channel separation          | 1MHz                                                                                                |                |
| Modulation technology       | GFSK, $\pi/4$ -DQPSK, 8-DPSK                                                                        |                |
| Antenna Type                | PIFA Antenna                                                                                        |                |
| Antenna gain                | 0.32dBi                                                                                             |                |

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

The test frequencies are below:

| Channel  | Frequency (MHz) |
|----------|-----------------|
| Lowest:  | 2402            |
| Middle:  | 2441            |
| Highest: | 2480            |

**1.4 Antenna Information**

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain     |
|------|-------|------------|--------------|-----------|----------|
| 1    | N/A   | N/A        | PIFA         | N/A       | 0.32 dBi |



## 2. Summary of Test Results

### 2.1 Summary of Test Items

| 47 CFR FCC Part 15, Subpart C (Section 15.247) |                     |         |                                   |
|------------------------------------------------|---------------------|---------|-----------------------------------|
| Test item                                      | FCC Clause          | Results | Remarks                           |
| Antenna Requirement                            | §15.203/§15.247 (c) | Pass    | Meet the requirement of the limit |
| AC Power Line Conducted Emission               | §15.207             | Pass    | Meet the requirement of the limit |
| Conducted Peak Output Power                    | §15.247 (b)(1)      | Pass    | Meet the requirement of the limit |
| 20dB Occupied Bandwidth                        | §15.247 (a)(1)      | Pass    | Meet the requirement of the limit |
| Carrier Frequencies Separation                 | §15.247 (a)(1)      | Pass    | Meet the requirement of the limit |
| Hopping Channel Number                         | §15.247 (a)(1)      | Pass    | Meet the requirement of the limit |
| Dwell Time                                     | §15.247 (a)(1)      | Pass    | Meet the requirement of the limit |
| Radiated Emission                              | §15.205/§15.209     | Pass    | Meet the requirement of the limit |
| Note: NA denotes Not Applicable in this part   |                     |         |                                   |

### 2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 v05r02

ANSI C63.10:2013

## 2.3 Test Instruments

| No.                                                                       | Equipment              | Manufacturer | Type No.        | Serial No. | Calibrated until |
|---------------------------------------------------------------------------|------------------------|--------------|-----------------|------------|------------------|
| RF Output Power Test                                                      |                        |              |                 |            |                  |
| 1                                                                         | Power Collection Unit  | Tonscend     | JS0806-2        | 188060134  | 2023/11/08       |
| 2                                                                         | Tonscend Test System   | Tonscend     | EN300328 V2.2.2 | NA         | NA               |
| 3                                                                         | Temp&Humidity Chamber  | ETOMA        | NTH1100-3 0A    | 16080628   | 2023/11/08       |
| 4                                                                         | Temp&Humidity Recorder | Anymetre     | JR900           | NA         | 2023/11/08       |
| Accumulated Transmit Time, Frequency Occupation and Hopping Sequence Test |                        |              |                 |            |                  |
| 1                                                                         | Spectrum Analyzer      | Agilent      | N9010A          | MY52221119 | 2023/11/08       |
| 2                                                                         | Power Collection Unit  | Tonscend     | JS0806-2        | 188060134  | 2023/11/08       |
| 3                                                                         | Tonscend Test System   | Tonscend     | EN300328 V2.2.2 | NA         | NA               |
| 4                                                                         | Temp&Humidity Recorder | Anymetre     | JR900           | NA         | 2023/11/08       |
| Hopping Frequency Separation Test                                         |                        |              |                 |            |                  |
| 1                                                                         | Spectrum Analyzer      | Agilent      | N9010A          | MY52221119 | 2023/11/08       |
| 2                                                                         | Power Collection Unit  | Tonscend     | JS0806-2        | 188060134  | 2023/11/08       |
| 3                                                                         | Tonscend Test System   | Tonscend     | EN300328 V2.2.2 | NA         | NA               |
| 4                                                                         | Temp&Humidity Recorder | Anymetre     | JR900           | NA         | 2023/11/08       |
| Occupied Channel Bandwidth Test                                           |                        |              |                 |            |                  |
| 1                                                                         | Spectrum Analyzer      | Agilent      | N9010A          | MY52221119 | 2023/11/08       |
| 2                                                                         | Power Collection Unit  | Tonscend     | JS0806-2        | 188060134  | 2023/11/08       |
| 3                                                                         | Tonscend Test System   | Tonscend     | EN300328 V2.2.2 | NA         | NA               |
| 4                                                                         | Temp&Humidity Recorder | Anymetre     | JR900           | NA         | 2023/11/08       |
| Transmitter Unwanted Emissions In The Out of Band Domain                  |                        |              |                 |            |                  |
| 1                                                                         | Spectrum Analyzer      | Agilent      | N9010A          | MY52221119 | 2023/11/08       |
| 2                                                                         | Power Collection Unit  | Tonscend     | JS0806-2        | 188060134  | 2023/11/08       |
| 3                                                                         | Tonscend Test System   | Tonscend     | EN300328 V2.2.2 | NA         | NA               |
| 4                                                                         | Temp&Humidity          | Anymetre     | JR900           | NA         | 2023/11/08       |

|                                          |                        |                 |            |           |            |
|------------------------------------------|------------------------|-----------------|------------|-----------|------------|
|                                          | Recorder               |                 |            |           |            |
| Transmitter Emissions In Spurious Domain |                        |                 |            |           |            |
| 1                                        | Spectrum Analyzer      | Rohde & Schwarz | FSV30      | 103741    | 2023/11/08 |
| 2                                        | Integral antenna       | SCHWARZBECK     | VULB9163   | 9163-868  | 2023/11/08 |
| 3                                        | Broadband Horn Antenna | SCHWARZBECK     | BBHA 9120D | 9120D-123 | 2023/11/08 |
| 4                                        | Broadband amplifier    | SCHWARZBECK     | BBV9745    | 9745#46   | 2023/11/08 |
| 5                                        | Broadband amplifier    | SCHWARZBECK     | BBV9718    | 9718-284  | 2023/11/08 |
| 6                                        | Temp&Humidity Recorder | Anymetre        | JR900      | NA        | 2023/11/08 |

## 2.4 Test Mode

|                        |                  |                                                    |     |
|------------------------|------------------|----------------------------------------------------|-----|
| Test mode:             |                  |                                                    |     |
| Transmitting mode:     |                  | Keep the EUT in transmitting mode with modulation. |     |
| Operating Environment: |                  |                                                    |     |
| Item                   | Normal condition | Extreme condition                                  |     |
|                        |                  | HT                                                 | LT  |
| Temperature            | +15°C to + 35°C  | +45°C                                              | 0°C |
| Humidity               | 20%-95%          |                                                    |     |
| Atmospheric Pressure:  | 100.65 kPa       |                                                    |     |

| Setting                        | Value                                  |
|--------------------------------|----------------------------------------|
| Modulation                     | GFSK, $\pi/4$ -DQPSK, 8-DPSK           |
| Adaptive                       | No                                     |
| Antenna Gain                   | 0.32 dBi                               |
| Nominal Channel Bandwidth      | 0.857MHz(1M),1.179MHz(2M),1.187MHz(3M) |
| DUT Frequency not configurable | No                                     |
| Frequency Low                  | 2402MHz                                |
| Frequency Mid                  | 2441MHz                                |
| Frequency High                 | 2480MHz                                |

**2.5 Test Condition**

| Applicable to                    | Environmental conditions | Input Power | Tested by  |
|----------------------------------|--------------------------|-------------|------------|
| AC Power Line Conducted Emission | 24.6°C, 56 % RH          | 120V AC     | Stone Tang |
| Conducted Peak Output Power      | 24.2°C, 55 % RH          | 120V AC     | Stone Tang |
| 20dB Occupied Bandwidth          | 24.6°C, 56 % RH          | 120V AC     | Stone Tang |
| Carrier Frequencies Separation   | 24.6°C, 56 % RH          | 120V AC     | Stone Tang |
| Hopping Channel Number           | 24.5°C, 56 % RH          | 120V AC     | Stone Tang |
| Dwell Time                       | 24.4°C, 56 % RH          | 120V AC     | Stone Tang |
| Radiated Emission                | 24.4°C, 56 % RH          | 120V AC     | Stone Tang |

The applicant declare the operating environment of EUT as below:

Normal conditions: 120V AC ,15~35°C

## 2.6 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

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

| Uncertainty                               |                           |
|-------------------------------------------|---------------------------|
| Parameter                                 | Uncertainty               |
| Occupied Channel Bandwidth                | $\pm 142.12$ KHz          |
| RF power conducted                        | $\pm 0.74$ dB             |
| RF power radiated                         | $\pm 3.25$ dB             |
| Spurious emissions, conducted             | $\pm 1.78$ dB             |
| Spurious emissions, radiated (9KHz~30MHz) | $\pm 2.56$ dB             |
| Spurious emissions, radiated (30MHz~1GHz) | $\pm 4.6$ dB              |
| Spurious emissions, radiated (Above 1GHz) | $\pm 4.9$ dB              |
| Conduction Emissions(150kHz~30MHz)        | $\pm 3.1$ dB              |
| Humidity                                  | $\pm 4.6\%$               |
| Temperature                               | $\pm 0.7^{\circ}\text{C}$ |
| Time                                      | $\pm 1.25\%$              |

## 2.7 Test Location

|                                |                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Company:                       | Beijing TIRT Technology Service Co.,Ltd Shenzhen                                                                   |
| Address:                       | 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China |
| CNAS Registration Number:      | CNAS L14158                                                                                                        |
| A2LA Registration Number:      | 6049.01                                                                                                            |
| FCC Designation Number:        | CN1309                                                                                                             |
| Test Firm Registration Number: | 825524                                                                                                             |
| Telephone:                     | +86-0755-27087573                                                                                                  |

## 2.8 Deviation from Standards

None

## 2.9 Abnormalities from Standard Conditions

None

### 3. Test Procedure And Results

#### 3.1 AC Power Line Conducted Emission

##### 3.1.1 Limit

| Frequency       | Maximum RF Line Voltage          |                               |
|-----------------|----------------------------------|-------------------------------|
|                 | Quasi-Peak Level<br>dB( $\mu$ V) | Average Level<br>dB( $\mu$ V) |
| 150kHz ~ 500kHz | 66 ~ 56*                         | 56 ~ 46*                      |
| 500kHz ~ 5MHz   | 56                               | 46                            |
| 5MHz ~ 30MHz    | 60                               | 50                            |

Notes: 1. \* Decreasing linearly with logarithm of frequency.

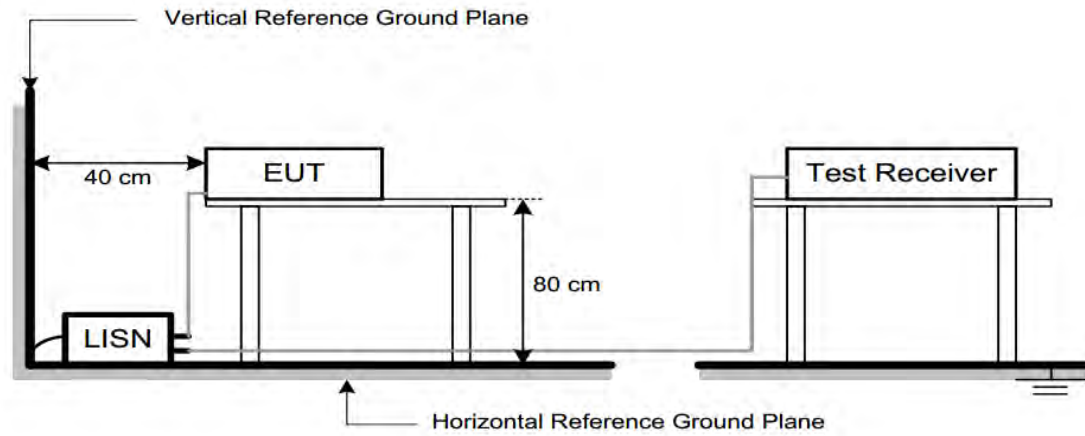
2. The lower limit shall apply at the transition frequencies.

##### 3.1.2 Test Procedure

| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input type="radio"/> Lowest, Middle and Highest Channel                      | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

### 3.1.3 Test Setup



### 3.1.4 Test Result

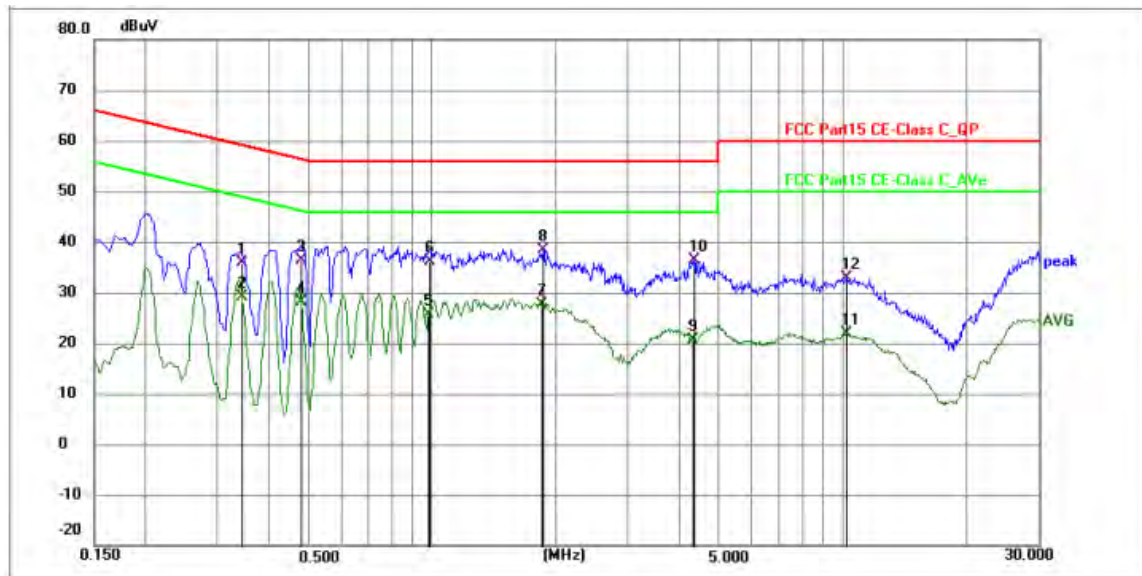
#### Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement - Limit

150kHz~30MHz

Worst Case Operating Mode: Simultaneous transmission

Line



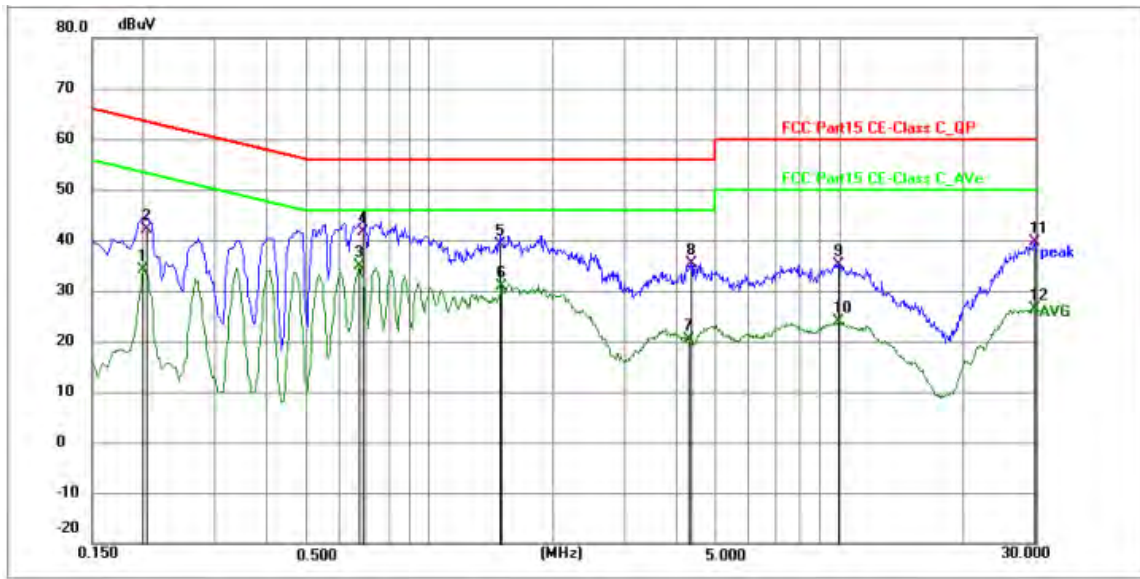
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.3435          | 25.77          | 10.18       | 35.95        | 59.12        | -23.17      | QP       | P   |        |
| 2   | 0.3435          | 19.02          | 10.18       | 29.20        | 49.12        | -19.92      | AVG      | P   |        |
| 3   | 0.4785          | 26.17          | 10.25       | 36.42        | 56.37        | -19.95      | QP       | P   |        |
| 4   | 0.4785          | 17.81          | 10.25       | 28.06        | 46.37        | -18.31      | AVG      | P   |        |
| 5   | 0.9825          | 15.33          | 10.26       | 25.59        | 46.00        | -20.41      | AVG      | P   |        |
| 6   | 0.9870          | 25.78          | 10.26       | 36.04        | 56.00        | -19.96      | QP       | P   |        |
| 7   | 1.8555          | 17.23          | 10.29       | 27.52        | 46.00        | -18.48      | AVG      | P   |        |
| 8 * | 1.8645          | 28.07          | 10.29       | 38.36        | 56.00        | -17.64      | QP       | P   |        |
| 9   | 4.3305          | 10.46          | 10.21       | 20.67        | 46.00        | -25.33      | AVG      | P   |        |
| 10  | 4.3530          | 26.23          | 10.21       | 36.44        | 56.00        | -19.56      | QP       | P   |        |
| 11  | 10.1850         | 11.44          | 10.39       | 21.83        | 50.00        | -28.17      | AVG      | P   |        |
| 12  | 10.2524         | 22.61          | 10.39       | 33.00        | 60.00        | -27.00      | QP       | P   |        |



150kHz~30MHz

Worst Case Operating Mode: Simultaneous transmission

Neutral



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1995          | 23.84          | 10.20       | 34.04        | 53.63        | -19.59      | AVG      | P   |        |
| 2   | 0.2040          | 31.82          | 10.20       | 42.02        | 63.45        | -21.43      | QP       | P   |        |
| 3 * | 0.6720          | 24.57          | 10.25       | 34.82        | 46.00        | -11.18      | AVG      | P   |        |
| 4   | 0.6854          | 31.40          | 10.25       | 41.65        | 56.00        | -14.35      | QP       | P   |        |
| 5   | 1.4910          | 28.96          | 10.28       | 39.24        | 56.00        | -16.76      | QP       | P   |        |
| 6   | 1.4955          | 20.58          | 10.28       | 30.86        | 46.00        | -15.14      | AVG      | P   |        |
| 7   | 4.2765          | 10.08          | 10.21       | 20.29        | 46.00        | -25.71      | AVG      | P   |        |
| 8   | 4.3530          | 25.23          | 10.21       | 35.44        | 56.00        | -20.56      | QP       | P   |        |
| 9   | 9.9642          | 24.82          | 10.41       | 35.23        | 60.00        | -24.77      | QP       | P   |        |
| 10  | 9.9642          | 13.53          | 10.41       | 23.94        | 50.00        | -26.06      | AVG      | P   |        |
| 11  | 29.9940         | 29.84          | 9.87        | 39.71        | 60.00        | -20.29      | QP       | P   |        |
| 12  | 29.9940         | 16.63          | 9.87        | 26.50        | 50.00        | -23.50      | AVG      | P   |        |

## 3.2 Radiated Emission and Band Edge

### 3.2.1 Limit

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| Frequency<br>(MHz) | Distance<br>Meters(m) | Field Strength Limit                                                                              |                                   |
|--------------------|-----------------------|---------------------------------------------------------------------------------------------------|-----------------------------------|
|                    |                       | $\mu\text{V/m}$                                                                                   | $\text{dB}(\mu\text{V})/\text{m}$ |
| 0.009 – 0.49       | 300                   | 2400/F(kHz)                                                                                       | -                                 |
| 0.490 – 1.705      | 30                    | 24000/F(kHz)                                                                                      | -                                 |
| 1.705 – 30         | 30                    | 30                                                                                                | -                                 |
| 30~88              | 3                     | 100                                                                                               | 40.0                              |
| 88~216             | 3                     | 150                                                                                               | 43.5                              |
| 216~960            | 3                     | 200                                                                                               | 46.0                              |
| 960~1000           | 3                     | 500                                                                                               | 54.0                              |
| Above 1000         | 3                     | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) |                                   |

Note: (1) Emission level  $\text{dB}\mu\text{V} = 20 \log$  Emission level  $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

### 3.2.2 Test Procedure

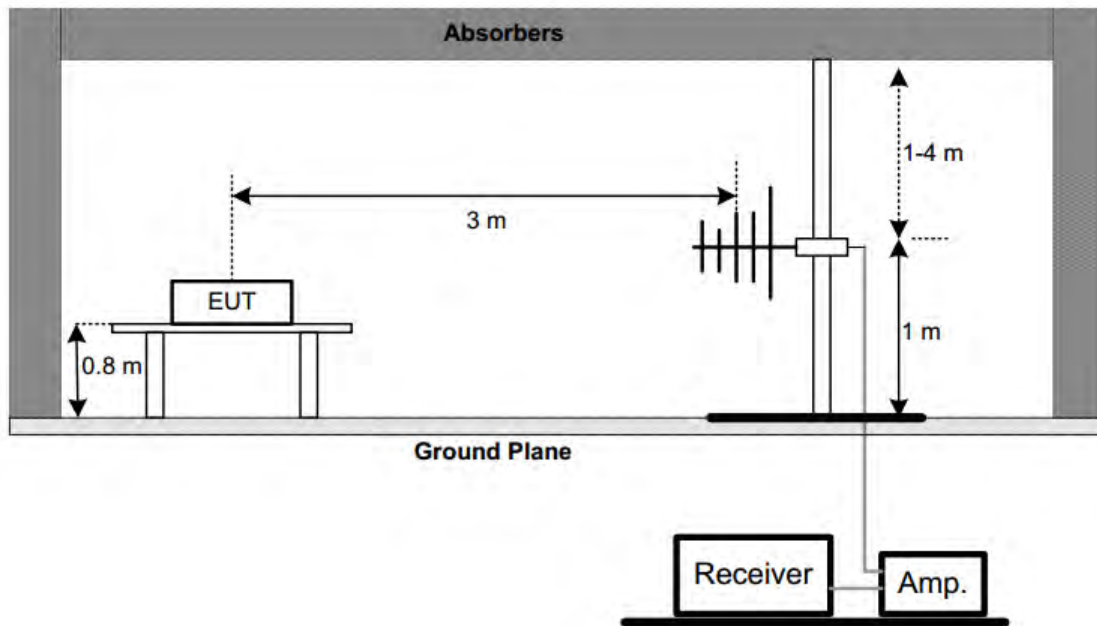
| Test Method                                                                   |                                                       |
|-------------------------------------------------------------------------------|-------------------------------------------------------|
| <input type="radio"/> Conducted Measurement                                   | <input checked="" type="radio"/> Radiated Measurement |
| Test Channels                                                                 |                                                       |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel      |
| Environmental conditions                                                      |                                                       |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme              |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                       |

- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the
- top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The
- table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed
- on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber.
- The table was rotated 360 degrees to determine the position of the highest radiation.(above
- 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of

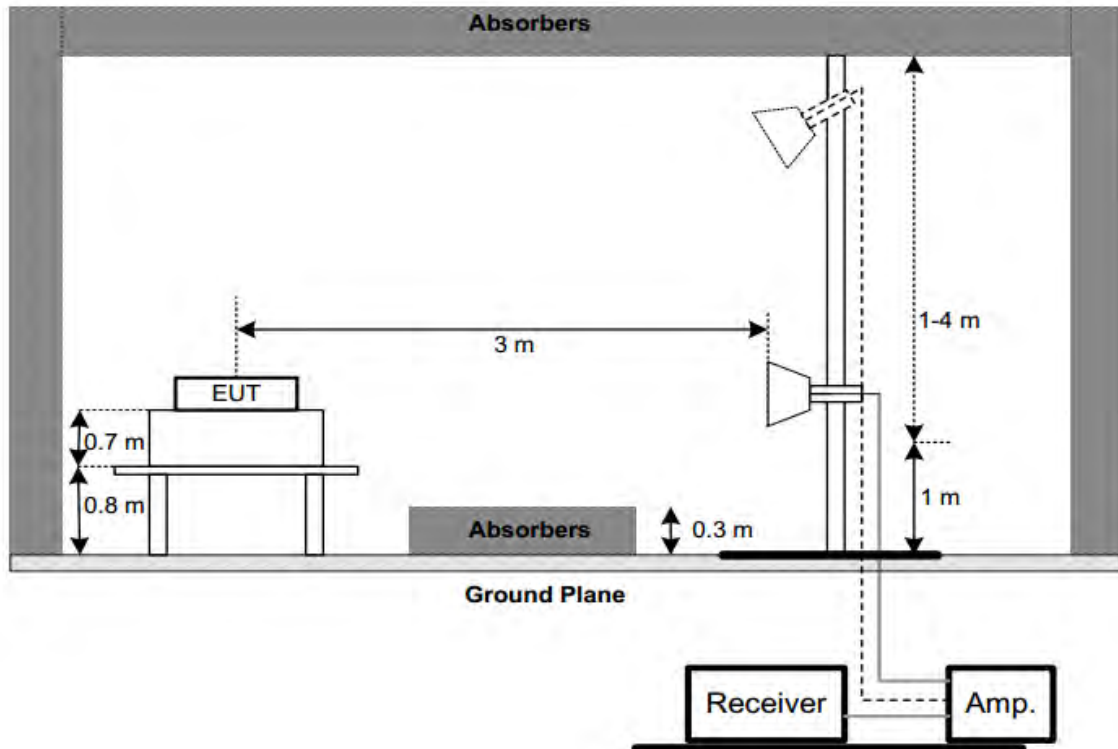
- i) the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of
- j) the antenna are set to make the measurement.
- k) For each suspected emission, the EUT was arranged to its worst case and then the antenna
- l) was tuned to heights find the maximum reading (used Bore sight function).
- m) The receiver system was set to peak and average detect function and specified bandwidth
- n) with maximum hold mode when the test frequency is above 1 GHz.
- o) The initial step in collecting radiated emission data is a receiver peak detector mode
- p) pre-scanning the measurement frequency range. Significant peaks are then marked and then
- q) Quasi Peak detector mode re-measured.
- r) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the
- s) Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- t) (below 1 GHz)
- u) All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak
- v) Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT
- w) shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured,
- x) but AVG Mode didn't perform. (above 1 GHz)
- y) For the actual test configuration, please refer to the related Item -EUT Test Photos.

### 3.2.3 Test Setup

#### (A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



#### (B) Radiated Emission Test Set-Up Frequency Above 1 GHz



#### 3.2.4 Test Result

##### 1) Radiated emission: 9KHz-30MHz

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

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

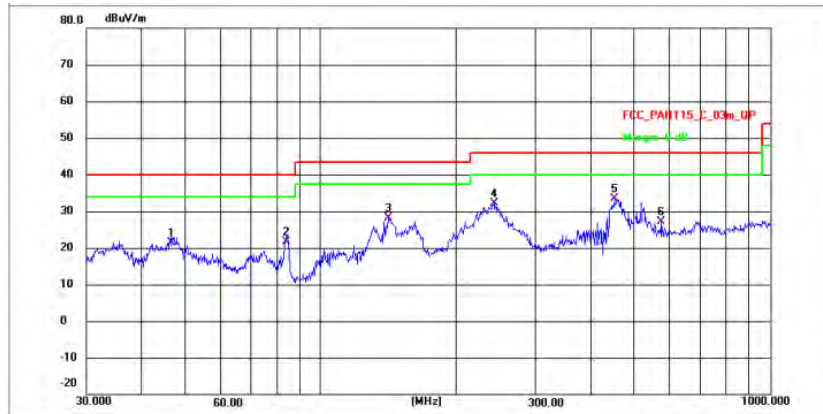
## 2) Radiated emission: 30MHz-1G

### Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

|                       |                 |                |
|-----------------------|-----------------|----------------|
| Below 1G (30MHz~1GHz) | Test mode: GFSK | Test Channel:0 |
|-----------------------|-----------------|----------------|

### VERTICAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 46.5846         | 49.37          | -28.08        | 21.29          | 40.00          | -18.71      | QP       | P   |
| 2   | 83.5220         | 49.49          | -27.86        | 21.63          | 40.00          | -18.37      | QP       | P   |
| 3   | 141.8262        | 55.41          | -27.29        | 28.12          | 43.50          | -15.38      | QP       | P   |
| 4   | 242.9507        | 58.93          | -26.75        | 32.18          | 46.00          | -13.82      | QP       | P   |
| 5 * | 450.3446        | 58.94          | -25.60        | 33.34          | 46.00          | -12.66      | QP       | P   |
| 6   | 573.6191        | 52.33          | -25.22        | 27.11          | 46.00          | -18.89      | QP       | P   |

### HORIZONTAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 38.8196         | 29.46          | -14.21        | 15.25          | 40.00          | -24.75      | QP       | P   |
| 2   | 69.8450         | 43.49          | -27.92        | 15.57          | 40.00          | -24.43      | QP       | P   |
| 3   | 141.8262        | 56.91          | -27.29        | 29.62          | 43.50          | -13.88      | QP       | P   |
| 4 * | 242.9507        | 59.43          | -26.75        | 32.68          | 46.00          | -13.32      | QP       | P   |
| 5   | 464.7837        | 55.10          | -25.56        | 29.54          | 46.00          | -16.46      | QP       | P   |
| 6   | 696.8567        | 50.37          | -24.79        | 25.58          | 46.00          | -20.42      | QP       | P   |

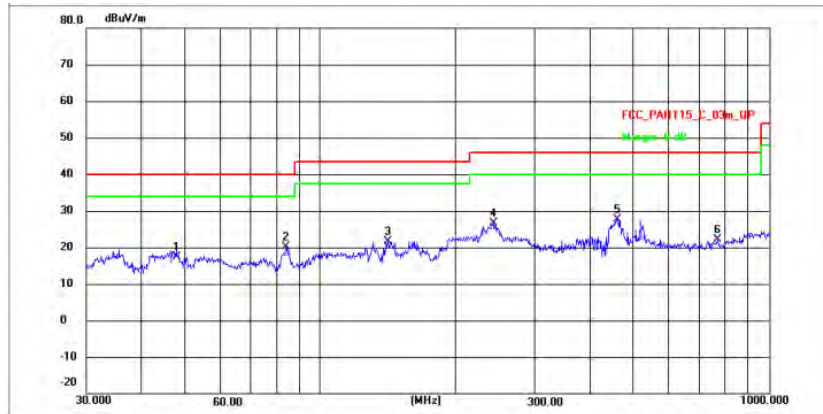


Below 1G (30MHz~1GHz)

Test mode: GFSK

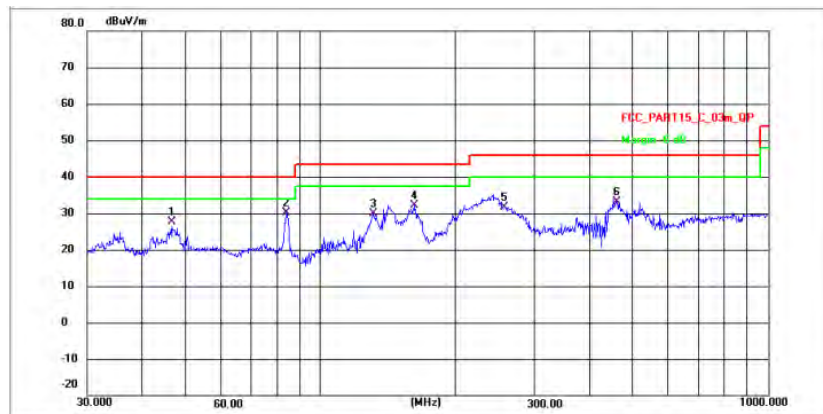
Test Channel:39

### VERTICAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 47.6584         | 45.50          | -28.07        | 17.43          | 40.00          | -22.57      | QP       | P   |
| 2   | 83.5220         | 47.99          | -27.86        | 20.13          | 40.00          | -19.87      | QP       | P   |
| 3   | 141.8262        | 48.91          | -27.29        | 21.62          | 43.50          | -21.88      | QP       | P   |
| 4   | 242.9507        | 53.43          | -26.75        | 26.68          | 46.00          | -19.32      | QP       | P   |
| 5 * | 460.7271        | 53.27          | -25.57        | 27.70          | 46.00          | -18.30      | QP       | P   |
| 6   | 768.7481        | 47.23          | -25.09        | 22.14          | 46.00          | -23.86      | QP       | P   |

### HORIZONTAL



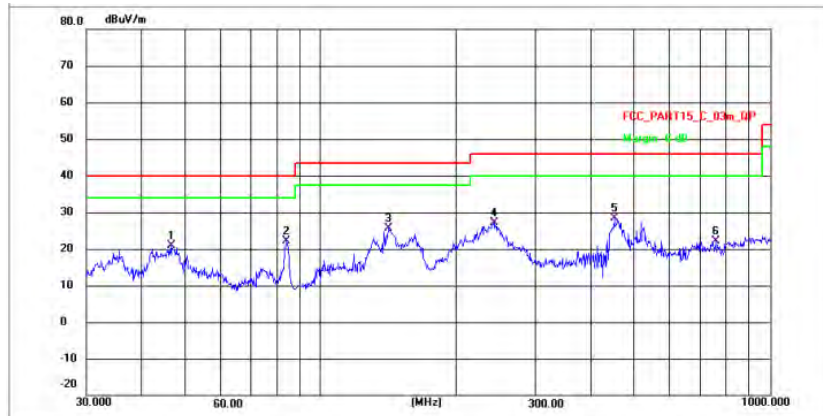
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 46.5846         | 55.77          | -28.08        | 27.69          | 40.00          | -12.31      | QP       | P   |
| 2 * | 83.5220         | 57.99          | -27.86        | 30.13          | 40.00          | -9.87       | QP       | P   |
| 3   | 131.2965        | 57.39          | -27.39        | 30.00          | 43.50          | -13.50      | QP       | P   |
| 4   | 162.3257        | 59.20          | -27.19        | 32.01          | 43.50          | -11.49      | QP       | P   |
| 5   | 258.7795        | 58.25          | -26.65        | 31.60          | 46.00          | -14.40      | QP       | P   |
| 6   | 460.7271        | 58.77          | -25.57        | 33.20          | 46.00          | -12.80      | QP       | P   |

Below 1G (30MHz~1GHz)

Test mode: GFSK

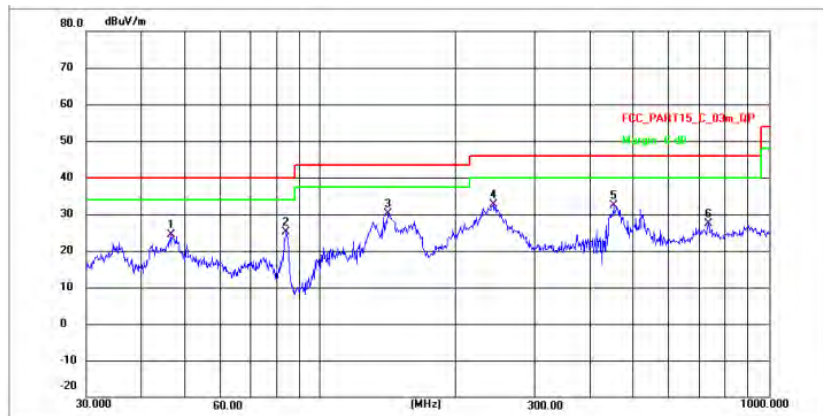
Test Channel:78

### VERTICAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 46.5846         | 48.87          | -28.08        | 20.79          | 40.00          | -19.21      | QP       | P   |
| 2   | 83.5220         | 49.99          | -27.86        | 22.13          | 40.00          | -17.87      | QP       | P   |
| 3   | 141.8262        | 52.91          | -27.29        | 25.62          | 43.50          | -17.88      | QP       | P   |
| 4   | 242.9507        | 53.93          | -26.75        | 27.18          | 46.00          | -18.82      | QP       | P   |
| 5 * | 450.3446        | 53.94          | -25.60        | 28.34          | 46.00          | -17.66      | QP       | P   |
| 6   | 758.0407        | 47.05          | -25.04        | 22.01          | 46.00          | -23.99      | QP       | P   |

### HORIZONTAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 46.5846         | 52.37          | -28.08        | 24.29          | 40.00          | -15.71      | QP       | P   |
| 2   | 83.5220         | 52.99          | -27.86        | 25.13          | 40.00          | -14.87      | QP       | P   |
| 3   | 141.8262        | 57.41          | -27.29        | 30.12          | 43.50          | -13.38      | QP       | P   |
| 4 * | 242.9507        | 59.43          | -26.75        | 32.68          | 46.00          | -13.32      | QP       | P   |
| 5   | 450.3446        | 57.94          | -25.60        | 32.34          | 46.00          | -13.66      | QP       | P   |
| 6   | 731.9202        | 52.26          | -24.93        | 27.33          | 46.00          | -18.67      | QP       | P   |



### 3) Radiated emission: Above 1G

#### Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

|                         |                 |                |
|-------------------------|-----------------|----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: GFSK | Test Channel:0 |
|-------------------------|-----------------|----------------|

#### HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2916.268        | 68.40          | -30.08        | 38.32          | 74.00          | -35.68      | peak     | P   |
| 2   | 3524.096        | 66.11          | -29.93        | 36.18          | 74.00          | -37.82      | peak     | P   |
| 3   | 5076.784        | 64.85          | -28.29        | 36.56          | 74.00          | -37.44      | peak     | P   |
| 4   | 6438.313        | 66.79          | -26.16        | 40.63          | 74.00          | -33.37      | peak     | P   |
| 5   | 7923.200        | 68.18          | -26.15        | 42.03          | 74.00          | -31.97      | peak     | P   |
| 6 * | 11322.095       | 68.01          | -24.56        | 43.45          | 74.00          | -30.55      | peak     | P   |

#### VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2929.786        | 68.24          | -30.06        | 38.18          | 74.00          | -35.82      | peak     | P   |
| 2   | 4869.818        | 65.19          | -28.88        | 36.31          | 74.00          | -37.69      | peak     | P   |
| 3   | 6657.838        | 68.15          | -25.95        | 42.20          | 74.00          | -31.80      | peak     | P   |
| 4   | 9396.405        | 67.05          | -24.67        | 42.38          | 74.00          | -31.62      | peak     | P   |
| 5   | 12386.990       | 70.99          | -22.85        | 48.14          | 74.00          | -25.86      | peak     | P   |
| 6 * | 14830.959       | 72.69          | -21.03        | 51.66          | 74.00          | -22.34      | peak     | P   |

|                         |                 |                 |
|-------------------------|-----------------|-----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: GFSK | Test Channel:39 |
|-------------------------|-----------------|-----------------|

#### HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3550.679        | 64.59          | -29.97        | 34.62          | 74.00          | -39.38      | peak     | P   |
| 2   | 6320.309        | 67.02          | -26.30        | 40.72          | 74.00          | -33.28      | peak     | P   |
| 3   | 8214.697        | 69.93          | -25.98        | 43.95          | 74.00          | -30.05      | peak     | P   |
| 4   | 10062.634       | 69.74          | -24.70        | 45.04          | 74.00          | -28.96      | peak     | P   |
| 5   | 13184.985       | 69.93          | -21.62        | 48.31          | 74.00          | -25.69      | peak     | P   |
| 6 * | 15358.827       | 74.18          | -22.06        | 52.12          | 74.00          | -21.88      | peak     | P   |

#### VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3268.968        | 63.54          | -29.90        | 33.64          | 74.00          | -40.36      | peak     | P   |
| 2   | 3862.246        | 64.58          | -30.38        | 34.20          | 74.00          | -39.80      | peak     | P   |
| 3   | 4920.755        | 63.32          | -28.70        | 34.62          | 74.00          | -39.38      | peak     | P   |
| 4   | 6138.469        | 61.49          | -26.52        | 34.97          | 74.00          | -39.03      | peak     | P   |
| 5   | 7491.148        | 70.28          | -26.28        | 44.00          | 74.00          | -30.00      | peak     | P   |
| 6 * | 11735.245       | 69.70          | -23.89        | 45.81          | 74.00          | -28.19      | peak     | P   |

|                         |                 |                 |
|-------------------------|-----------------|-----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: GFSK | Test Channel:78 |
|-------------------------|-----------------|-----------------|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2916.268        | 65.40          | -30.08        | 35.32          | 74.00          | -38.68      | peak     | P   |
| 2   | 3831.115        | 63.26          | -30.34        | 32.92          | 74.00          | -41.08      | peak     | P   |
| 3   | 4732.445        | 60.82          | -29.37        | 31.45          | 74.00          | -42.55      | peak     | P   |
| 4   | 5487.260        | 62.65          | -27.64        | 35.01          | 74.00          | -38.99      | peak     | P   |
| 5   | 7007.314        | 65.72          | -25.66        | 40.06          | 74.00          | -33.94      | peak     | P   |
| 6 * | 13446.694       | 72.13          | -21.09        | 51.04          | 74.00          | -22.96      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3013.089        | 66.86          | -29.89        | 36.97          | 74.00          | -37.03      | peak     | P   |
| 2   | 3668.564        | 67.96          | -30.12        | 37.84          | 74.00          | -36.16      | peak     | P   |
| 3   | 4287.017        | 68.00          | -30.35        | 37.65          | 74.00          | -36.35      | peak     | P   |
| 4   | 5530.250        | 67.30          | -27.56        | 39.74          | 74.00          | -34.26      | peak     | P   |
| 5   | 7628.806        | 70.61          | -26.25        | 44.36          | 74.00          | -29.64      | peak     | P   |
| 6 * | 10785.449       | 72.26          | -24.84        | 47.42          | 74.00          | -26.58      | peak     | P   |

|                         |                      |                |
|-------------------------|----------------------|----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: Pi/4DQPSK | Test Channel:0 |
|-------------------------|----------------------|----------------|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2929.786        | 67.24          | -30.06        | 37.18          | 74.00          | -36.82      | peak     | P   |
| 2   | 3991.627        | 64.97          | -30.54        | 34.43          | 74.00          | -39.57      | peak     | P   |
| 3   | 4885.326        | 62.51          | -28.82        | 33.69          | 74.00          | -40.31      | peak     | P   |
| 4   | 6600.357        | 65.91          | -25.99        | 39.92          | 74.00          | -34.08      | peak     | P   |
| 5   | 8404.429        | 69.08          | -25.86        | 43.22          | 74.00          | -30.78      | peak     | P   |
| 6 * | 12294.251       | 71.36          | -22.90        | 48.46          | 74.00          | -25.54      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2571.716        | 62.81          | -30.90        | 31.91          | 74.00          | -42.09      | peak     | P   |
| 2   | 3475.541        | 67.22          | -29.89        | 37.33          | 74.00          | -36.67      | peak     | P   |
| 3   | 4353.196        | 65.31          | -30.30        | 35.01          | 74.00          | -38.99      | peak     | P   |
| 4   | 5551.069        | 67.42          | -27.53        | 39.89          | 74.00          | -34.11      | peak     | P   |
| 5   | 7198.228        | 69.99          | -25.90        | 44.09          | 74.00          | -29.91      | peak     | P   |
| 6 * | 10016.206       | 71.20          | -24.63        | 46.57          | 74.00          | -27.43      | peak     | P   |

|                         |                      |                 |
|-------------------------|----------------------|-----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: Pi/4DQPSK | Test Channel:39 |
|-------------------------|----------------------|-----------------|

## HORIZONTAL



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3546.577        | 65.16          | -29.96        | 35.20          | 74.00          | -38.80      | peak     | P   |
| 2   | 4462.760        | 63.69          | -30.22        | 33.47          | 74.00          | -40.53      | peak     | P   |
| 3   | 5461.942        | 64.20          | -27.68        | 36.52          | 74.00          | -37.48      | peak     | P   |
| 4   | 6627.119        | 67.75          | -25.97        | 41.78          | 74.00          | -32.22      | peak     | P   |
| 5   | 8653.393        | 68.79          | -25.65        | 43.14          | 74.00          | -30.86      | peak     | P   |
| 6 * | 11130.654       | 71.16          | -24.46        | 46.70          | 74.00          | -27.30      | peak     | P   |

### VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3567.138        | 62.86          | -29.99        | 32.87          | 74.00          | -41.13      | peak     | P   |
| 2   | 5592.942        | 62.65          | -27.45        | 35.20          | 74.00          | -38.80      | peak     | P   |
| 3   | 6537.700        | 66.51          | -26.05        | 40.46          | 74.00          | -33.54      | peak     | P   |
| 4   | 8167.347        | 69.60          | -26.02        | 43.58          | 74.00          | -30.42      | peak     | P   |
| 5   | 10330.817       | 69.56          | -25.15        | 44.41          | 74.00          | -29.59      | peak     | P   |
| 6 * | 13184.985       | 70.93          | -21.62        | 49.31          | 74.00          | -24.69      | peak     | P   |

Above 1G (1GHz~26.5GHz)

Test mode: Pi/4DQPSK

Test Channel:78

### HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3401.993        | 68.03          | -29.90        | 38.13          | 74.00          | -35.87      | peak     | P   |
| 2   | 4775.039        | 66.06          | -29.21        | 36.85          | 74.00          | -37.15      | peak     | P   |
| 3   | 6156.237        | 65.24          | -26.49        | 38.75          | 74.00          | -35.25      | peak     | P   |
| 4   | 7385.800        | 68.87          | -26.14        | 42.73          | 74.00          | -31.27      | peak     | P   |
| 5   | 8625.924        | 69.71          | -25.68        | 44.03          | 74.00          | -29.97      | peak     | P   |
| 6 * | 11072.895       | 72.36          | -24.44        | 47.92          | 74.00          | -26.08      | peak     | P   |

### VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3550.679        | 65.59          | -29.97        | 35.62          | 74.00          | -38.38      | peak     | P   |
| 2   | 5347.904        | 66.09          | -27.86        | 38.23          | 74.00          | -35.77      | peak     | P   |
| 3   | 7349.598        | 66.45          | -26.10        | 40.35          | 74.00          | -33.65      | peak     | P   |
| 4   | 9307.206        | 67.53          | -24.82        | 42.71          | 74.00          | -31.29      | peak     | P   |
| 5 * | 11072.895       | 72.86          | -24.44        | 48.42          | 74.00          | -25.58      | peak     | P   |
| 6   | 12846.423       | 69.49          | -22.24        | 47.25          | 74.00          | -26.75      | peak     | P   |

|                         |                  |                |
|-------------------------|------------------|----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: 8DPSK | Test Channel:0 |
|-------------------------|------------------|----------------|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3434.597        | 63.84          | -29.90        | 33.94          | 74.00          | -40.06      | peak     | P   |
| 2   | 6336.772        | 63.12          | -26.27        | 36.85          | 74.00          | -37.15      | peak     | P   |
| 3   | 8372.909        | 66.81          | -25.88        | 40.93          | 74.00          | -33.07      | peak     | P   |
| 4   | 10735.686       | 69.48          | -24.95        | 44.53          | 74.00          | -29.47      | peak     | P   |
| 5   | 12386.990       | 71.49          | -22.85        | 48.64          | 74.00          | -25.36      | peak     | P   |
| 6 * | 14947.153       | 72.64          | -20.67        | 51.97          | 74.00          | -22.03      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3627.442        | 65.37          | -30.07        | 35.30          | 74.00          | -38.70      | peak     | P   |
| 2   | 5177.553        | 66.80          | -28.13        | 38.67          | 74.00          | -35.33      | peak     | P   |
| 3   | 6855.064        | 69.09          | -25.78        | 43.31          | 74.00          | -30.69      | peak     | P   |
| 4   | 8551.451        | 71.03          | -25.75        | 45.28          | 74.00          | -28.72      | peak     | P   |
| 5   | 11230.835       | 72.00          | -24.51        | 47.49          | 74.00          | -26.51      | peak     | P   |
| 6 * | 13753.291       | 73.96          | -21.37        | 52.59          | 74.00          | -21.41      | peak     | P   |

|                         |                  |                 |
|-------------------------|------------------|-----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: 8DPSK | Test Channel:39 |
|-------------------------|------------------|-----------------|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3490.642        | 67.03          | -29.90        | 37.13          | 74.00          | -36.87      | peak     | P   |
| 2   | 4438.319        | 66.13          | -30.24        | 35.89          | 74.00          | -38.11      | peak     | P   |
| 3   | 6460.683        | 64.99          | -26.12        | 38.87          | 74.00          | -35.13      | peak     | P   |
| 4   | 7191.989        | 66.63          | -25.90        | 40.73          | 74.00          | -33.27      | peak     | P   |
| 5   | 8723.710        | 68.56          | -25.60        | 42.96          | 74.00          | -31.04      | peak     | P   |
| 6 * | 12044.524       | 70.58          | -23.02        | 47.56          | 74.00          | -26.44      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3351.244        | 65.48          | -29.90        | 35.58          | 74.00          | -38.42      | peak     | P   |
| 2   | 4416.564        | 63.18          | -30.25        | 32.93          | 74.00          | -41.07      | peak     | P   |
| 3   | 5872.924        | 65.35          | -26.92        | 38.43          | 74.00          | -35.57      | peak     | P   |
| 4   | 7054.052        | 68.35          | -25.72        | 42.63          | 74.00          | -31.37      | peak     | P   |
| 5   | 8786.975        | 69.57          | -25.54        | 44.03          | 74.00          | -29.97      | peak     | P   |
| 6 * | 11978.560       | 73.33          | -23.11        | 50.22          | 74.00          | -23.78      | peak     | P   |



|                         |                  |                 |
|-------------------------|------------------|-----------------|
| Above 1G (1GHz~26.5GHz) | Test mode: 8DPSK | Test Channel:78 |
|-------------------------|------------------|-----------------|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3178.590        | 64.01          | -29.89        | 34.12          | 74.00          | -39.88      | peak     | P   |
| 2   | 4462.760        | 62.19          | -30.22        | 31.97          | 74.00          | -42.03      | peak     | P   |
| 3   | 5953.251        | 63.43          | -26.77        | 36.66          | 74.00          | -37.34      | peak     | P   |
| 4   | 7349.598        | 69.45          | -26.10        | 43.35          | 74.00          | -30.65      | peak     | P   |
| 5   | 9250.884        | 68.65          | -24.92        | 43.73          | 74.00          | -30.27      | peak     | P   |
| 6 * | 13135.536       | 71.12          | -21.72        | 49.40          | 74.00          | -24.60      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 3371.647        | 66.24          | -29.90        | 36.34          | 74.00          | -37.66      | peak     | P   |
| 2   | 4653.771        | 64.06          | -29.64        | 34.42          | 74.00          | -39.58      | peak     | P   |
| 3   | 6003.361        | 61.59          | -26.67        | 34.92          | 74.00          | -39.08      | peak     | P   |
| 4   | 7508.489        | 66.67          | -26.29        | 40.38          | 74.00          | -33.62      | peak     | P   |
| 5   | 9307.206        | 67.53          | -24.82        | 42.71          | 74.00          | -31.29      | peak     | P   |
| 6 * | 13269.094       | 71.62          | -21.45        | 50.17          | 74.00          | -23.83      | peak     | P   |

## 4) Band Edge

|            |      |               |   |
|------------|------|---------------|---|
| Test mode: | GFSK | Test Channel: | 0 |
|------------|------|---------------|---|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 66.21          | -31.25        | 34.96          | 74.00          | -39.04      | peak     | P   |
| 2   | 2390.000        | 66.29          | -31.17        | 35.12          | 74.00          | -38.88      | peak     | P   |
| 3 * | 2400.000        | 83.87          | -31.16        | 52.71          | 74.00          | -21.29      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 37.01          | -5.05         | 31.96          | 74.00          | -42.04      | peak     | P   |
| 2   | 2390.000        | 39.09          | -4.97         | 34.12          | 74.00          | -39.88      | peak     | P   |
| 3 * | 2400.000        | 56.67          | -4.96         | 51.71          | 74.00          | -22.29      | peak     | P   |

|            |      |               |    |
|------------|------|---------------|----|
| Test mode: | GFSK | Test Channel: | 78 |
|------------|------|---------------|----|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 54.70          | -4.89         | 49.81          | 74.00          | -24.19      | peak     | P   |
| 2   | 2500.000        | 39.58          | -4.87         | 34.71          | 74.00          | -39.29      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 78.90          | -31.09        | 47.81          | 74.00          | -26.19      | peak     | P   |
| 2   | 2500.000        | 66.28          | -31.07        | 35.21          | 74.00          | -38.79      | peak     | P   |

|            |           |               |   |
|------------|-----------|---------------|---|
| Test mode: | Pi/4DQPSK | Test Channel: | 0 |
|------------|-----------|---------------|---|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 66.91          | -31.25        | 35.66          | 74.00          | -38.34      | peak     | P   |
| 2   | 2390.000        | 67.09          | -31.17        | 35.92          | 74.00          | -38.08      | peak     | P   |
| 3 * | 2400.000        | 83.02          | -31.16        | 51.86          | 74.00          | -22.14      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 37.71          | -5.05         | 32.66          | 74.00          | -41.34      | peak     | P   |
| 2   | 2390.000        | 37.39          | -4.97         | 32.42          | 74.00          | -41.58      | peak     | P   |
| 3 * | 2400.000        | 51.32          | -4.96         | 46.36          | 74.00          | -27.64      | peak     | P   |

|            |           |               |    |
|------------|-----------|---------------|----|
| Test mode: | Pi/4DQPSK | Test Channel: | 78 |
|------------|-----------|---------------|----|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 81.79          | -31.09        | 50.70          | 74.00          | -23.30      | peak     | P   |
| 2   | 2500.000        | 66.91          | -31.07        | 35.84          | 74.00          | -38.16      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 78.79          | -31.09        | 47.70          | 74.00          | -26.30      | peak     | P   |
| 2   | 2500.000        | 64.91          | -31.07        | 33.84          | 74.00          | -40.16      | peak     | P   |

|            |       |               |   |
|------------|-------|---------------|---|
| Test mode: | 8DPSK | Test Channel: | 0 |
|------------|-------|---------------|---|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 66.76          | -31.25        | 35.51          | 74.00          | -38.49      | peak     | P   |
| 2   | 2390.000        | 67.12          | -31.17        | 35.95          | 74.00          | -38.05      | peak     | P   |
| 3 * | 2400.000        | 85.05          | -31.16        | 53.89          | 74.00          | -20.11      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1   | 2310.000        | 38.06          | -5.05         | 33.01          | 74.00          | -40.99      | peak     | P   |
| 2   | 2390.000        | 40.42          | -4.97         | 35.45          | 74.00          | -38.55      | peak     | P   |
| 3 * | 2400.000        | 58.35          | -4.96         | 53.39          | 74.00          | -20.61      | peak     | P   |

|            |       |               |    |
|------------|-------|---------------|----|
| Test mode: | 8DPSK | Test Channel: | 78 |
|------------|-------|---------------|----|

## HORIZONTAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 81.57          | -31.09        | 50.48          | 74.00          | -23.52      | peak     | P   |
| 2   | 2500.000        | 66.77          | -31.07        | 35.70          | 74.00          | -38.30      | peak     | P   |

## VERTICAL

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|
| 1 * | 2483.500        | 79.07          | -31.09        | 47.98          | 74.00          | -26.02      | peak     | P   |
| 2   | 2500.000        | 66.27          | -31.07        | 35.20          | 74.00          | -38.80      | peak     | P   |



### 3.3 Spurious Emission at Antenna Port

#### 3.3.1 Limit

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 Output Power limits. If the transmitter complies with the Output 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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### 3.3.2 Test Procedure

| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in

b) the block diagram below.

c) Spectrum Setting as below:

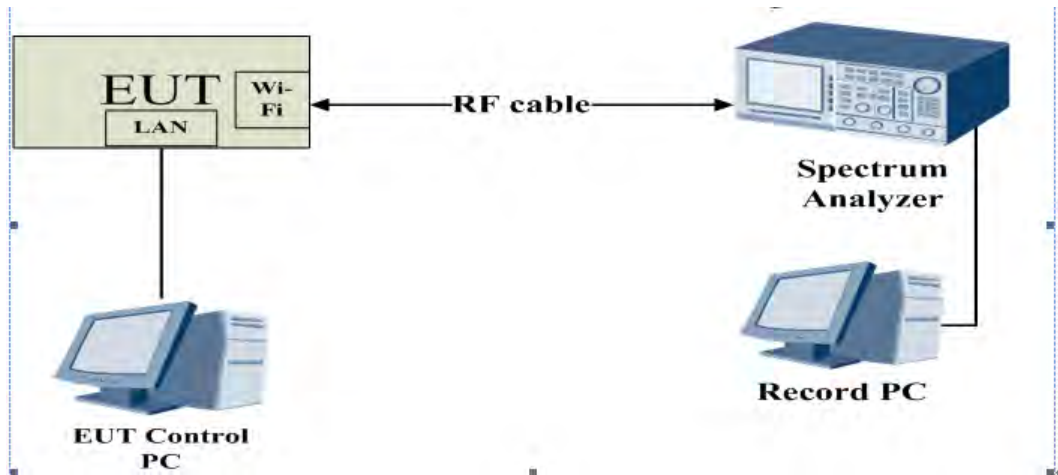
|                  |                                                |
|------------------|------------------------------------------------|
| Centre Frequency | The centre frequency of the channel under test |
| RBW              | 100 kHz                                        |
| VBW              | 300 kHz                                        |
| Frequency span   | 2 x Nominal Channel Bandwidth                  |
| Detector Mode    | Peak                                           |
| Trace Mode       | Max Hold                                       |
| Sweep Time       | Auto Couple                                    |

d) Allow trace to full stabilize.

e) Use the peak marker function to determine the maximum power level in any 100kHz band segment within the fundamental EBW.

#### 3.3.3 Test Setup





### 3.3.4 The Result

#### 3.3.4.1 Conducted Spurious Emission

Please Refer to Appendix for Details.

#### 3.3.4.2 Band edge measurements

Please Refer to Appendix for Details.

### 3.4 20dB Occupy Bandwidth

#### 3.4.1 Limit

N/A

#### 3.4.2 Test Procedure

| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

a) The EUT shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

|                  |                                                |
|------------------|------------------------------------------------|
| Centre Frequency | The centre frequency of the channel under test |
| RBW              | 100kHz                                         |
| VBW              | 300kHz                                         |
| Frequency span   | 2x Nominal Channel Bandwidth                   |
| Detector Mode    | Peak                                           |
| Trace Mode       | Max Hold                                       |
| Sweep Time       | Auto Couple                                    |

b) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

c) Set to the maximum power setting and enable the EUT transmit continuously.

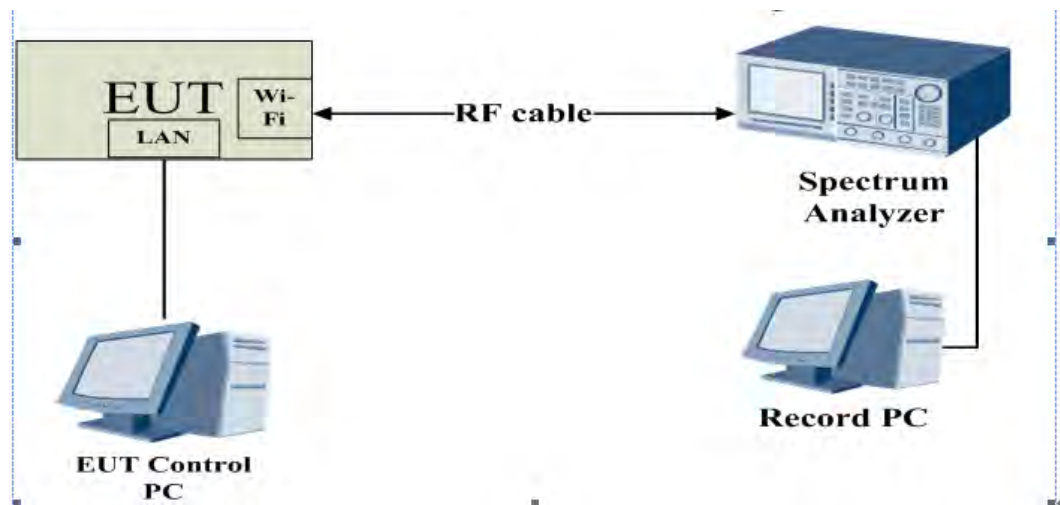
d) Use the following spectrum analyzer settings for 20dB Bandwidth measurement.

Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;  $1\% \leq \text{RBW}$   
 $\leq 5\%$  of the 20 dB bandwidth;  $\text{VBW} \geq 3\text{RBW}$ ;

Sweep = auto; Detector function = peak; Trace = max hold.

e) Measure and record the results in the test report.

### 3.4.3 Test Setup



### 3.4.4 Test Result

Please Refer to Appendix for Details.

### 3.5 Maximum conducted (average) output power

#### 3.5.1 Limit

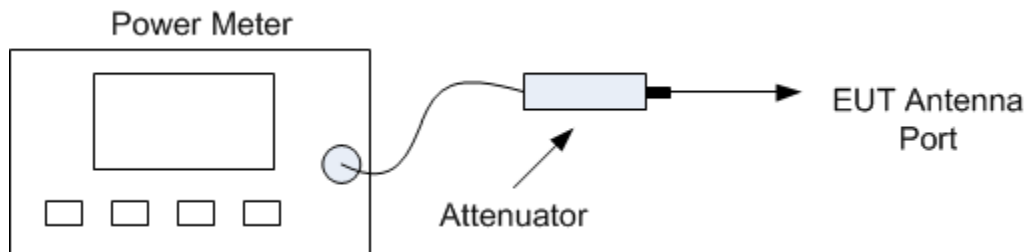
For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

#### 3.5.2 Test Procedure

| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
- The maximum output power was performed in accordance with method 11.9.2.3 of ANSI C63.10.

#### 3.5.3 Test Setup



#### 3.5.4 The Result

Please Refer to Appendix for Details.



### 3.6 Carrier Frequencies Separation

#### 3.6.1 Limit

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. Test Peripherals

#### 3.6.2 Test Procedure

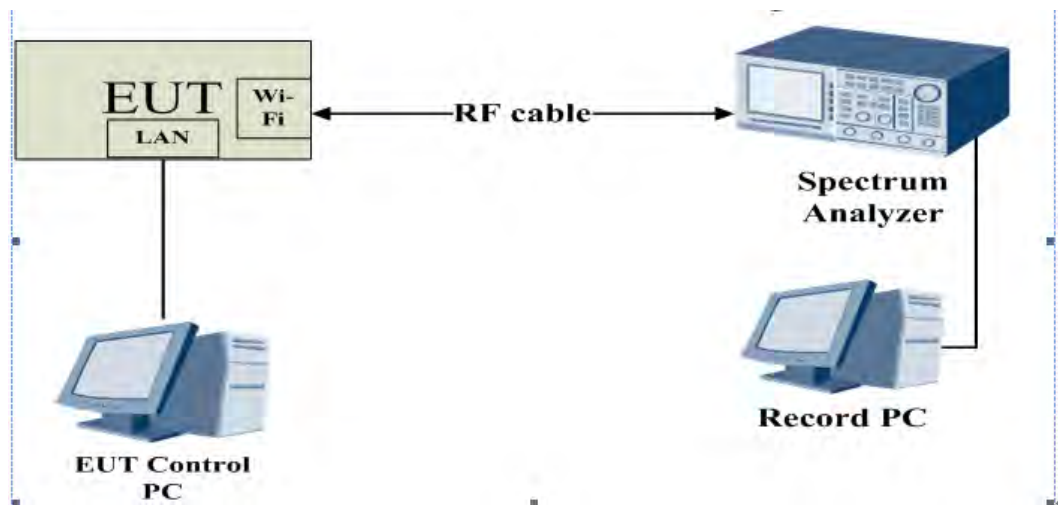
| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in  
b) the block diagram below. Spectrum analyser settings as following:

|               |                          |
|---------------|--------------------------|
| RBW           | 30% of the channel space |
| VBW           | $VBW \geq RBW$           |
| Detector Mode | RMS                      |
| Trace Mode    | Max Hold                 |
| Sweep Time    | Auto                     |

- c) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.  
d) Set to the maximum power setting and enable the EUT transmit continuously.  
e) Enable the EUT hopping function.  
f) Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels; RBW is set to approximately 30% of the channel spacing, adjust as necessary to best identify the center of each individual channel;  $VBW \geq RBW$ ; Sweep = auto;  
Detector function = peak; Trace = max hold.  
g) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Record the value in report.

### 3.6.3 Test Setup



#### 3.6.4 The Result

Please Refer to Appendix for Details.

### 3.7 Hopping Channel Number

#### 3.3.5 Limit

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

#### 3.3.6 Test Procedure

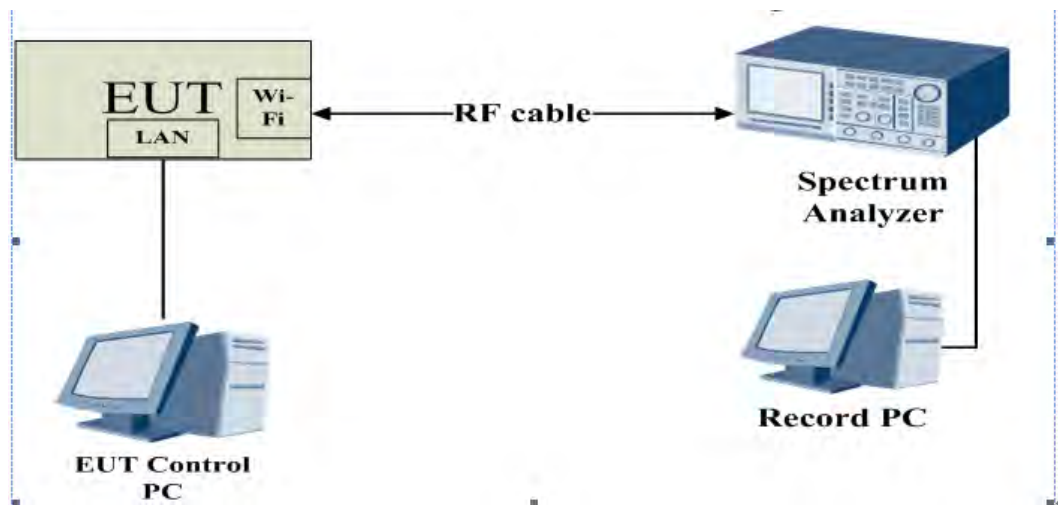
| Test Method                                                                   |                                                  |
|-------------------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement                        | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                                 |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel           | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                                      |                                                  |
| <input checked="" type="radio"/> Normal                                       | <input type="radio"/> Normal and Extreme         |
| Note: <input checked="" type="radio"/> : Test <input type="radio"/> : No Test |                                                  |

- a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in
- b) the block diagram below. Spectrum analyser settings as following:

|               |                          |
|---------------|--------------------------|
| RBW           | 30% of the channel space |
| VBW           | $VBW \geq RBW$           |
| Detector Mode | RMS                      |
| Trace Mode    | Max Hold                 |
| Sweep Time    | Auto                     |

- c) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- d) Set to the maximum power setting and enable the EUT transmit continuously.
- e) Enable the EUT hopping function.
- f) Use the following spectrum analyzer settings: Span = the frequency band of operation; set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold.
- g) The number of hopping frequency used is defined as the number of total channel.
- h) Record the measurement data in report.

### 3.3.7 Test Setup



### 3.3.8 The Result

Please Refer to Appendix for Details.



### 3.8 Dwell Time

#### 3.8.1 Limit

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

#### 3.8.2 Test Procedure

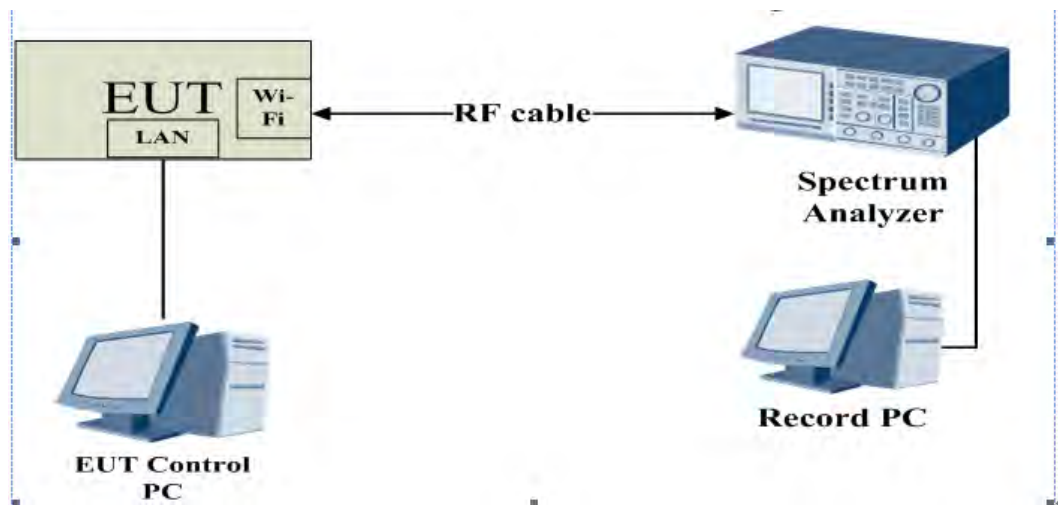
| Test Method                                                         |                                                  |
|---------------------------------------------------------------------|--------------------------------------------------|
| <input checked="" type="radio"/> Conducted Measurement              | <input type="radio"/> Radiated Measurement       |
| Test Channels                                                       |                                                  |
| <input checked="" type="radio"/> Lowest, Middle and Highest Channel | <input type="radio"/> Lowest and Highest Channel |
| Environmental conditions                                            |                                                  |
| <input checked="" type="radio"/> Normal                             | <input type="radio"/> Normal and Extreme         |
| Note: ● : Test    ○ : No Test                                       |                                                  |

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in
- the block diagram below. Spectrum analyser settings as following:

|               |                                                                         |
|---------------|-------------------------------------------------------------------------|
| RBW           | $\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$ |
| VBW           | $VBW \geq RBW$                                                          |
| Detector Mode | RMS                                                                     |
| Trace Mode    | Max Hold                                                                |
| Sweep Time    | Auto                                                                    |

- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously.
- Enable the EUT hopping function.
- Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW shall be  $\leq$  channel spacing and where possible RBW should be set  $\gg 1 / T$ , where T is the expected dwell time per channel;  $VBW \geq RBW$ ; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
- Measure and record the results in the test report.

### 3.8.3 Test Setup



### 3.8.4 The Result

Please Refer to Appendix for Details.

#### 4. Photographs of EUT



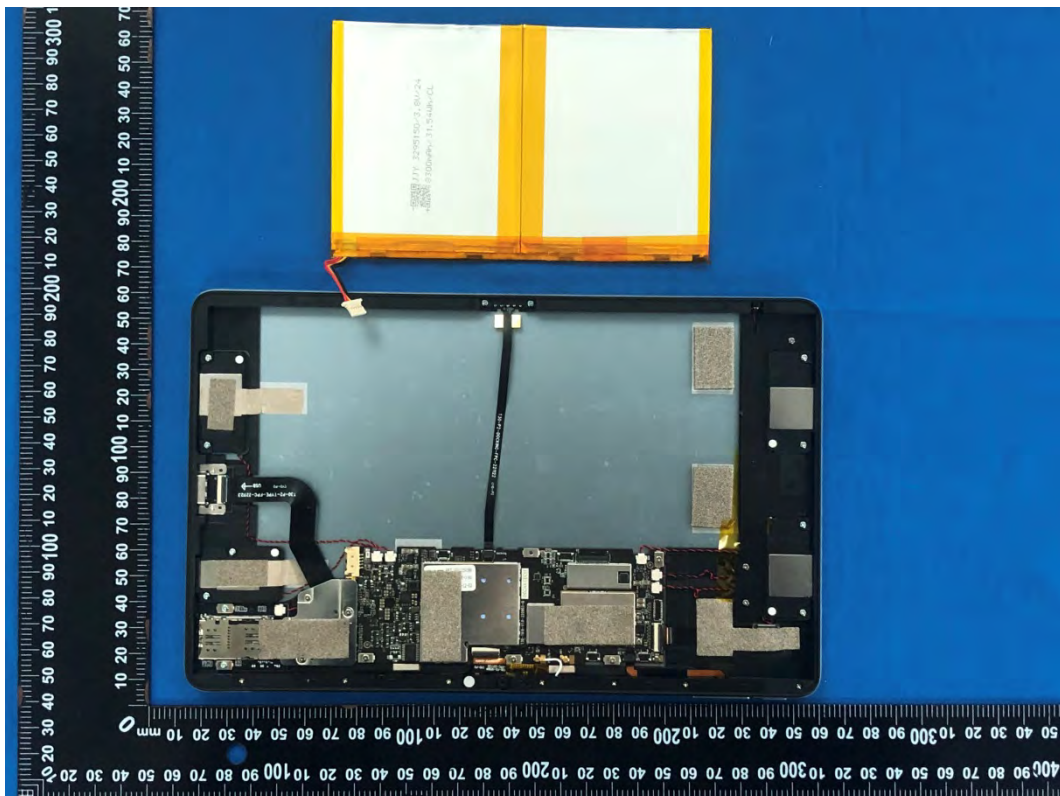
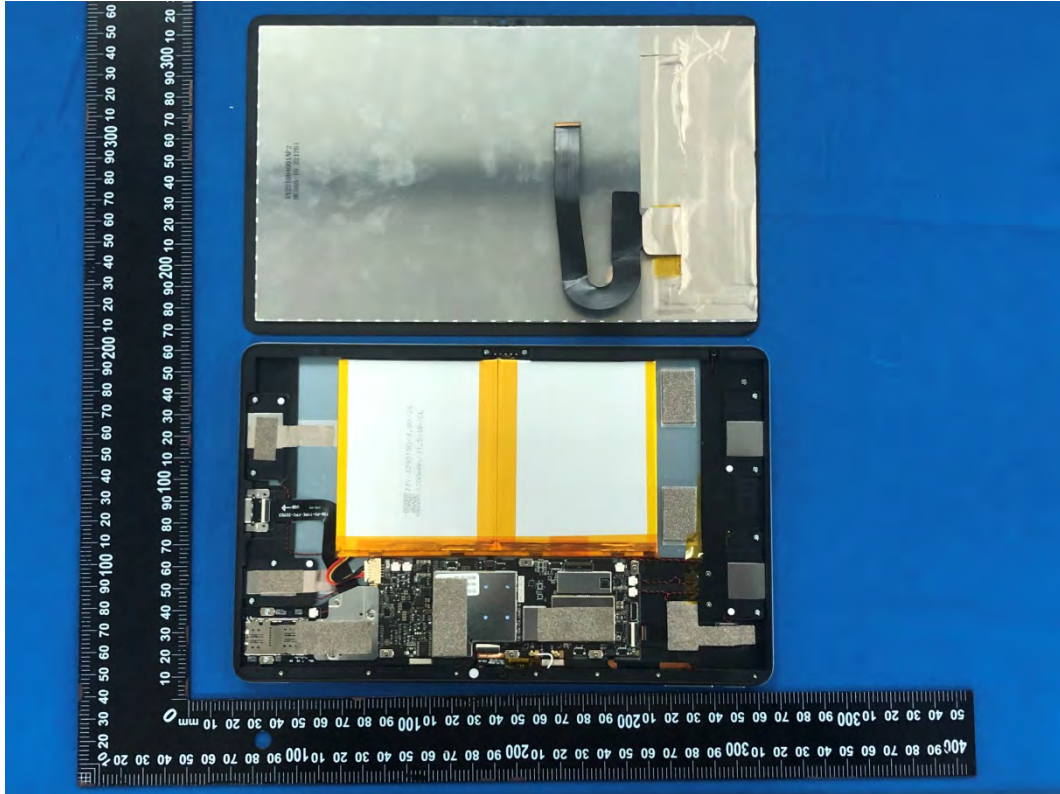


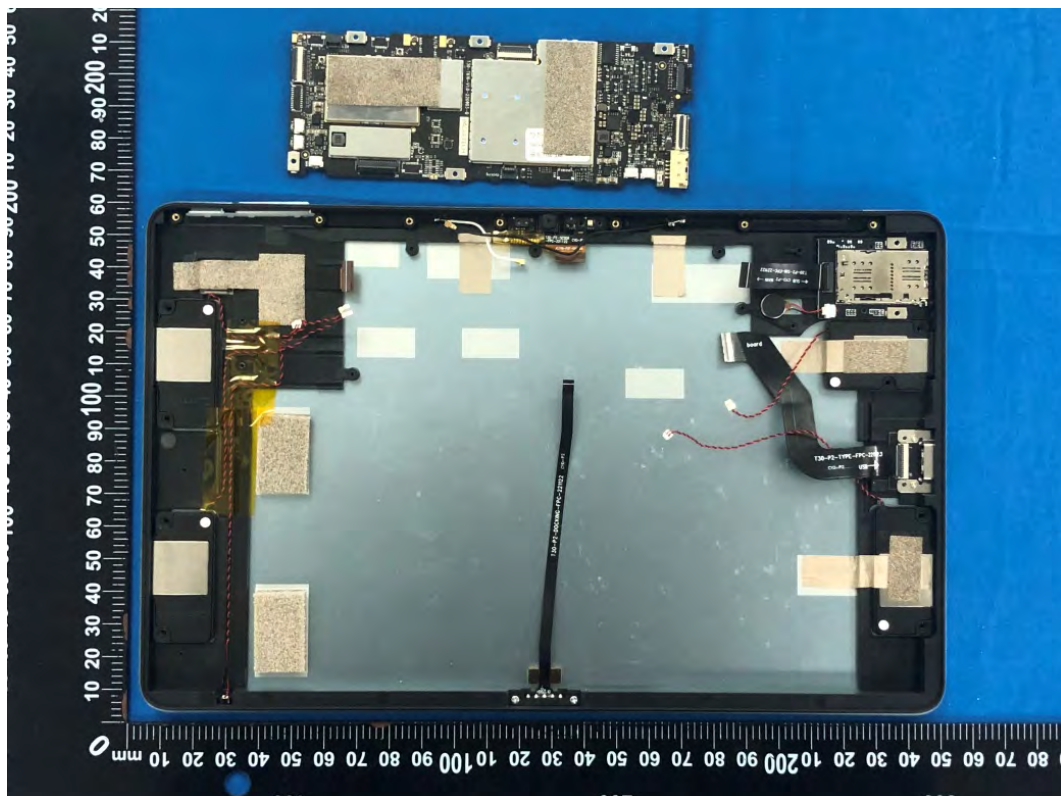
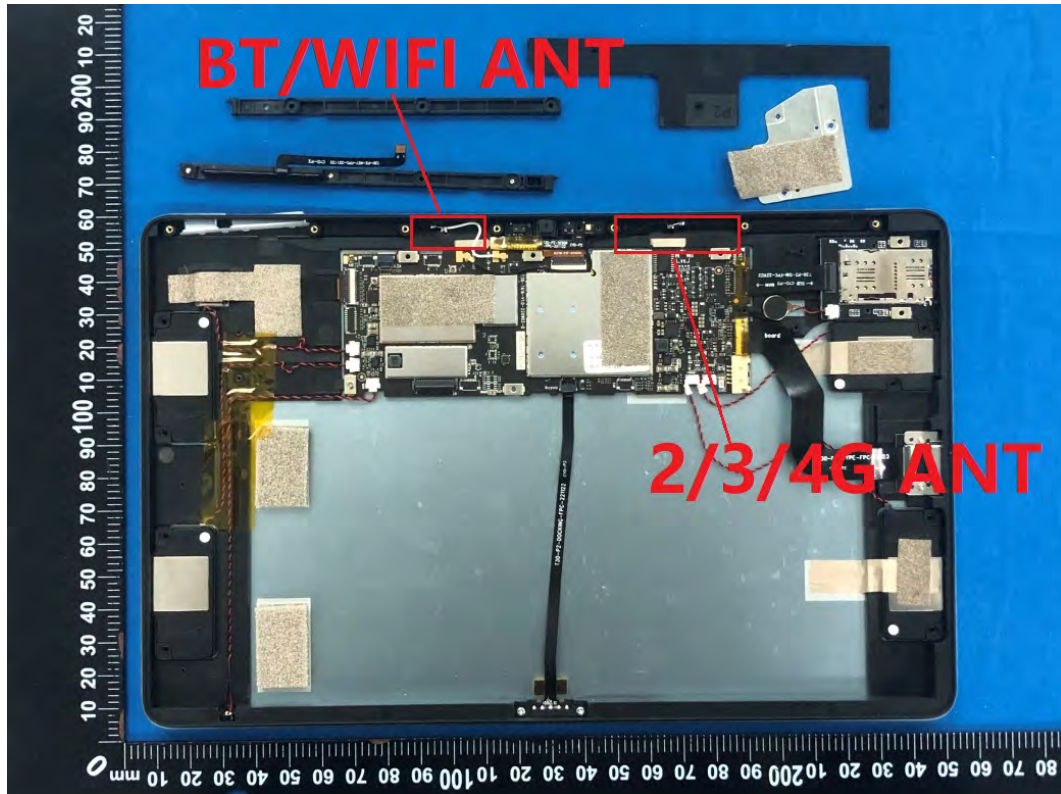




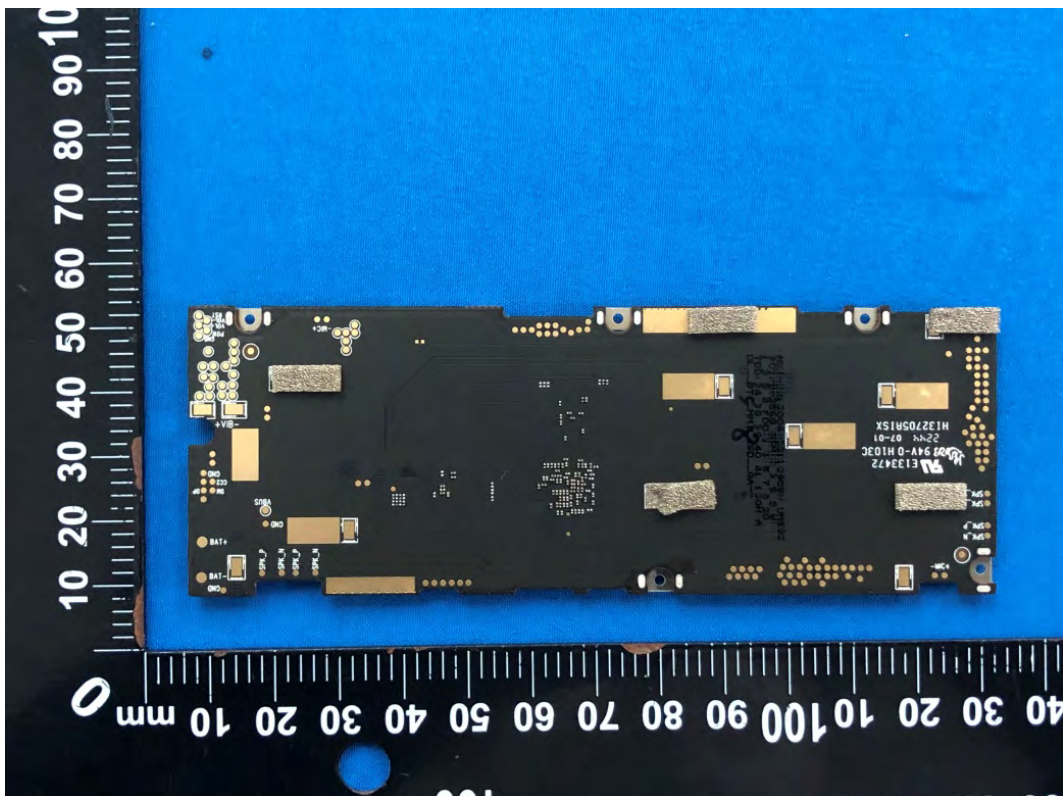
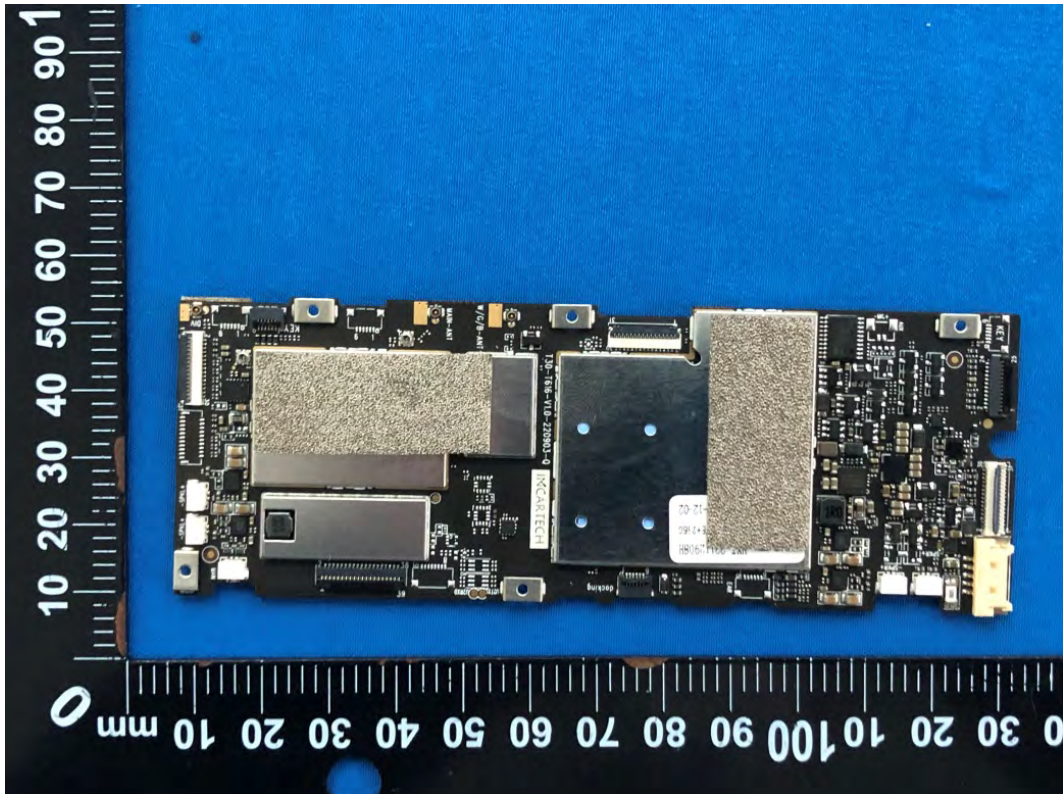


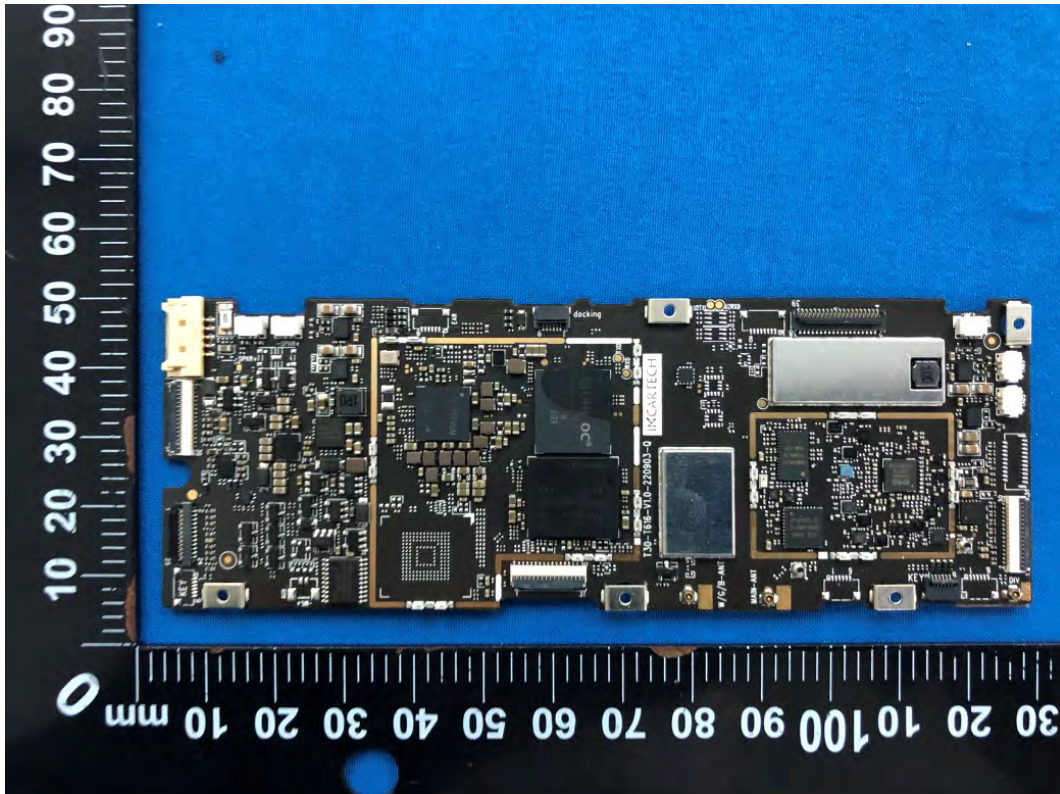






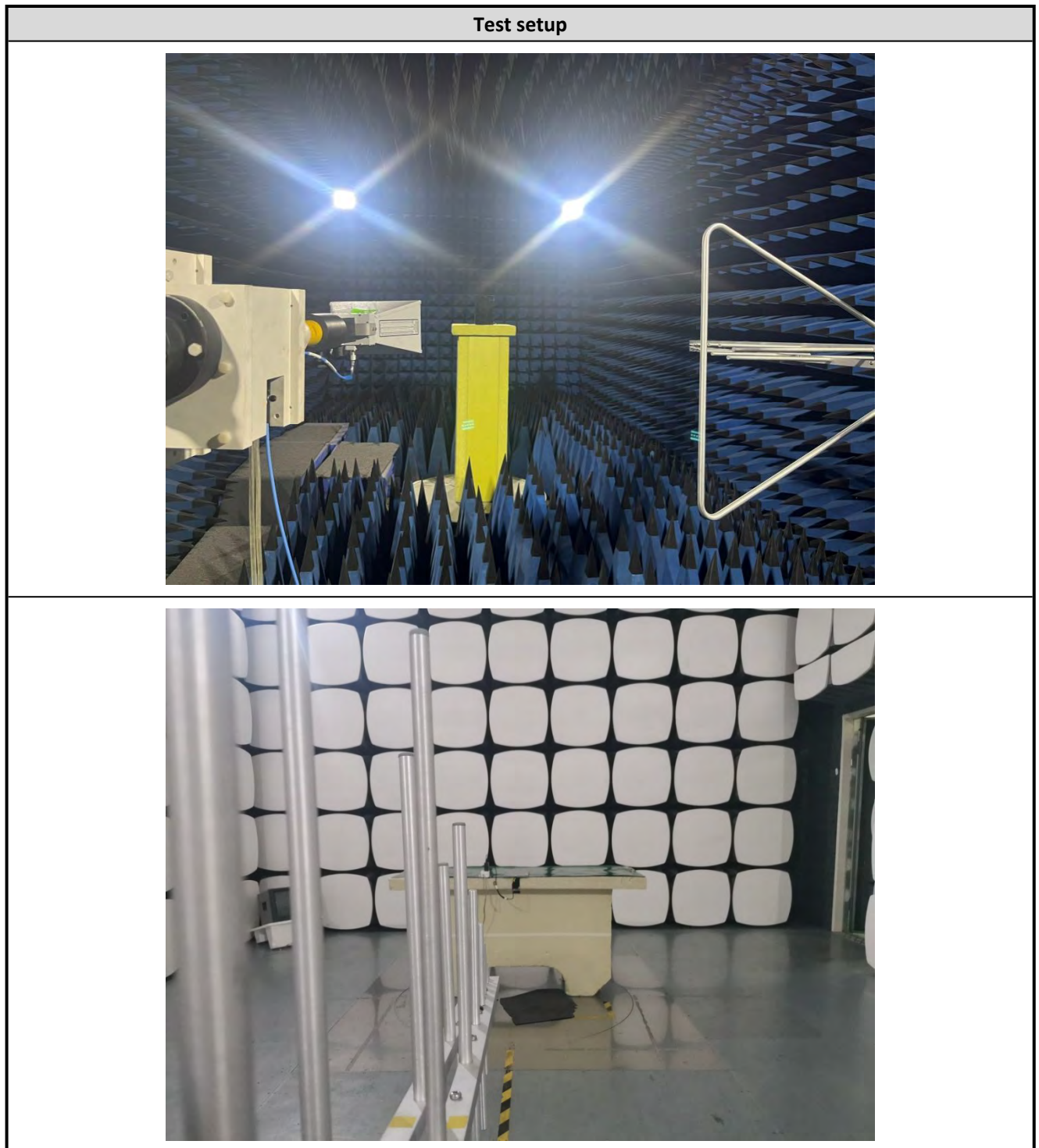




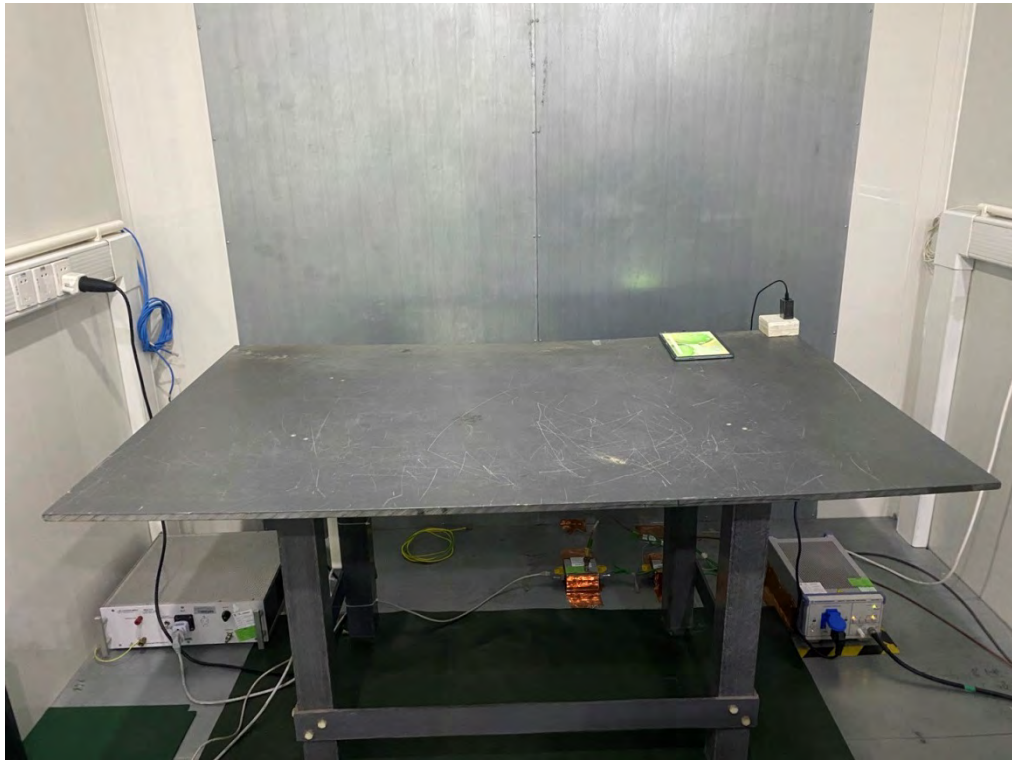




## 5. Photographs of Test Set-up



CE





## Appendix

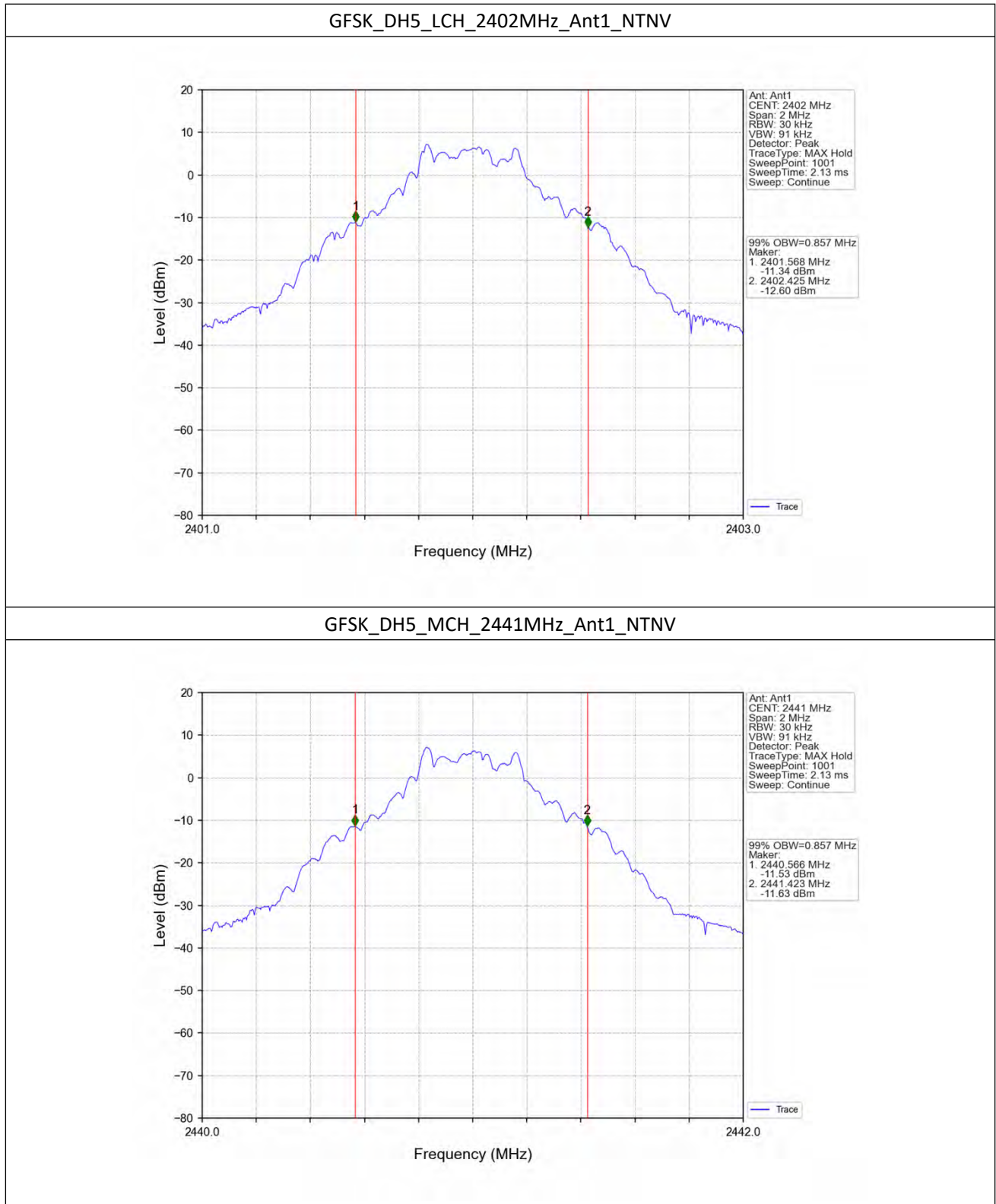
### 1. Bandwidth

#### 1.1 OBW

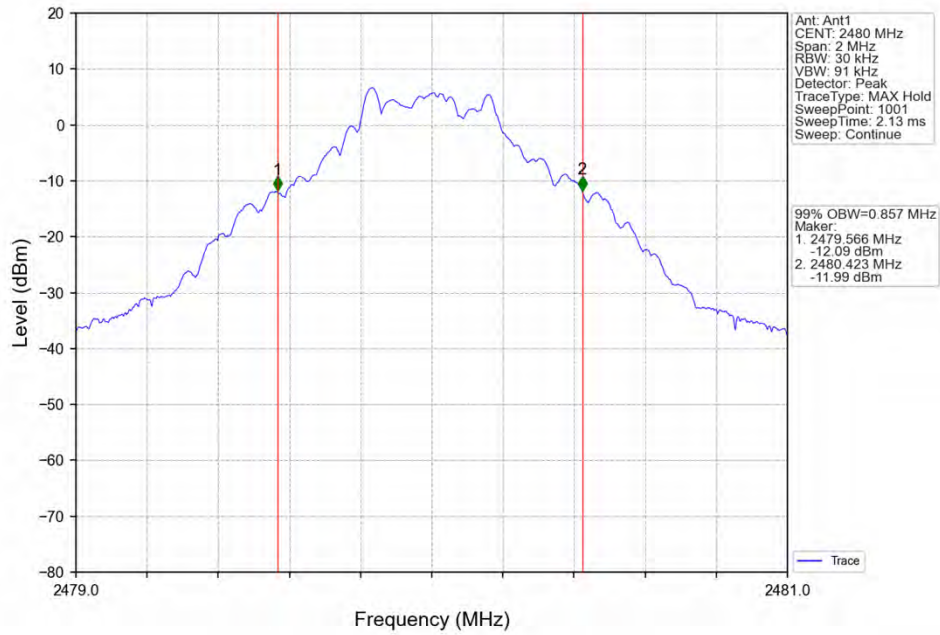
##### 1.1.1 Test Result

| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 99% Occupied Bandwidth (MHz) | Verdict |
|-----------|---------|-----------------|-------------|-----|------------------------------|---------|
|           |         |                 |             |     | Result                       |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 0.857                        | Pass    |
|           |         | 2441            | DH5         | 1   | 0.857                        | Pass    |
|           |         | 2480            | DH5         | 1   | 0.857                        | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.178                        | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.179                        | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.177                        | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 1.183                        | Pass    |
|           |         | 2441            | 3DH5        | 1   | 1.184                        | Pass    |
|           |         | 2480            | 3DH5        | 1   | 1.187                        | Pass    |

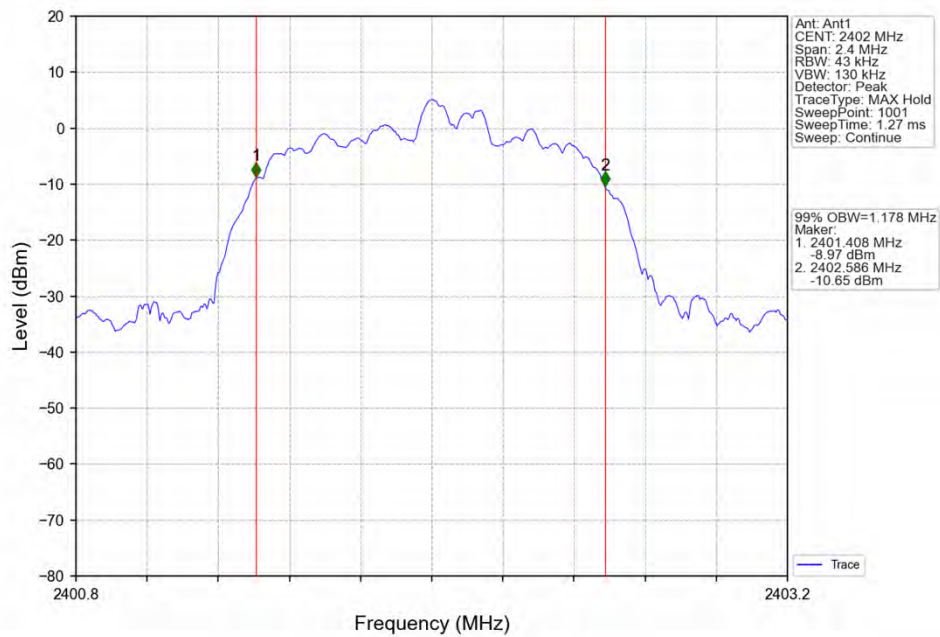
### 1.1.2 Test Graph



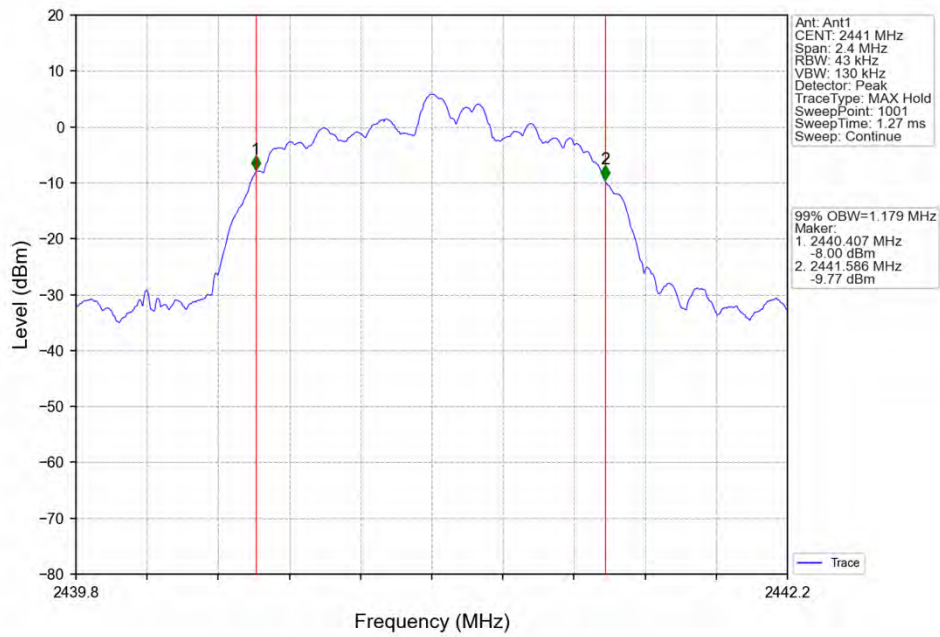
## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



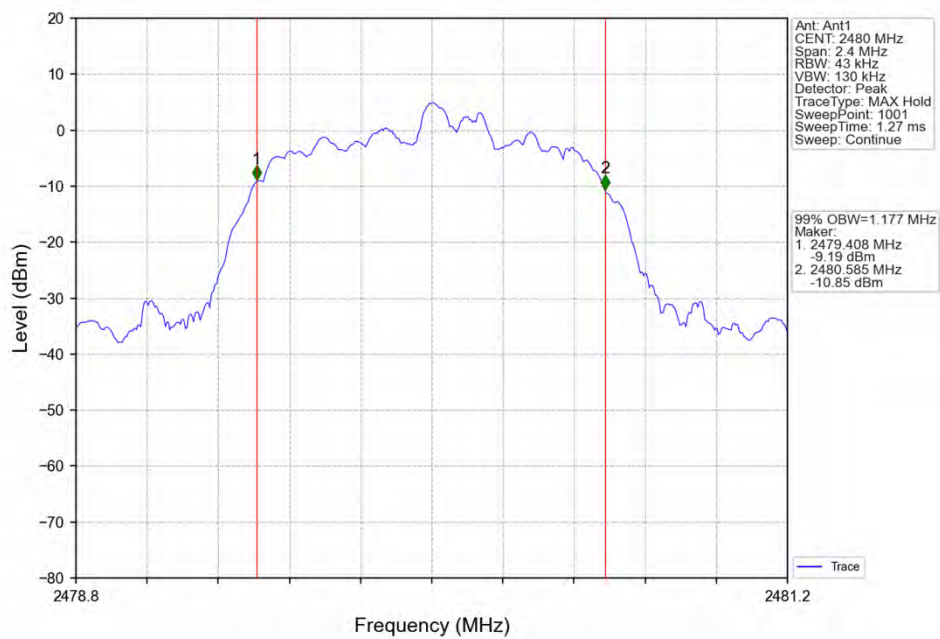
## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



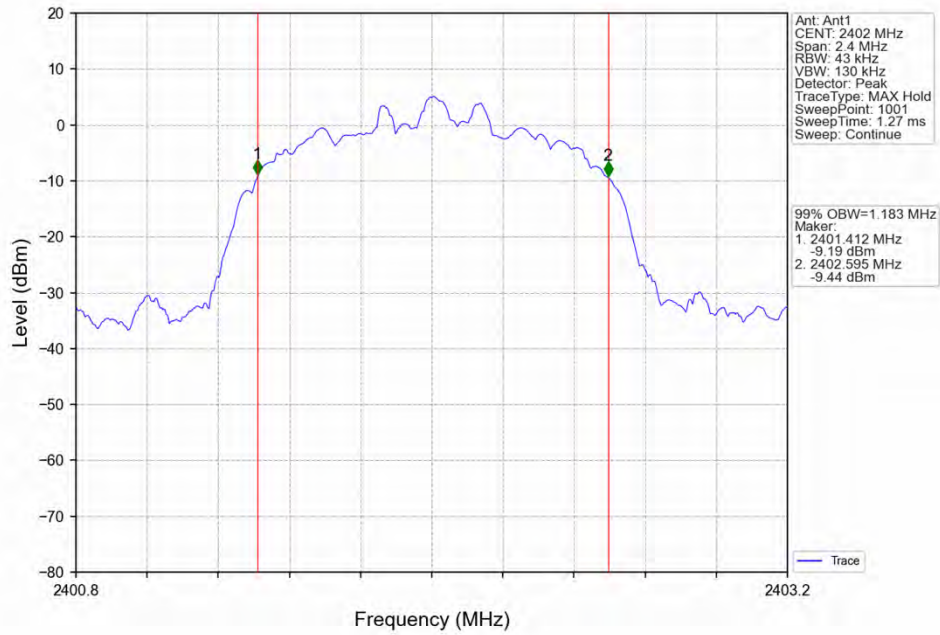
## Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



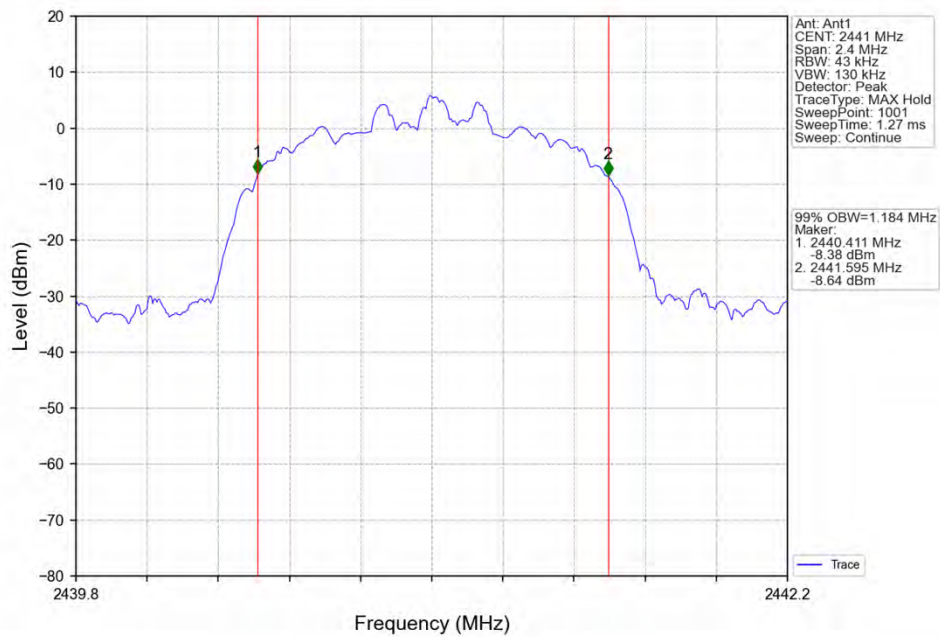
## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV

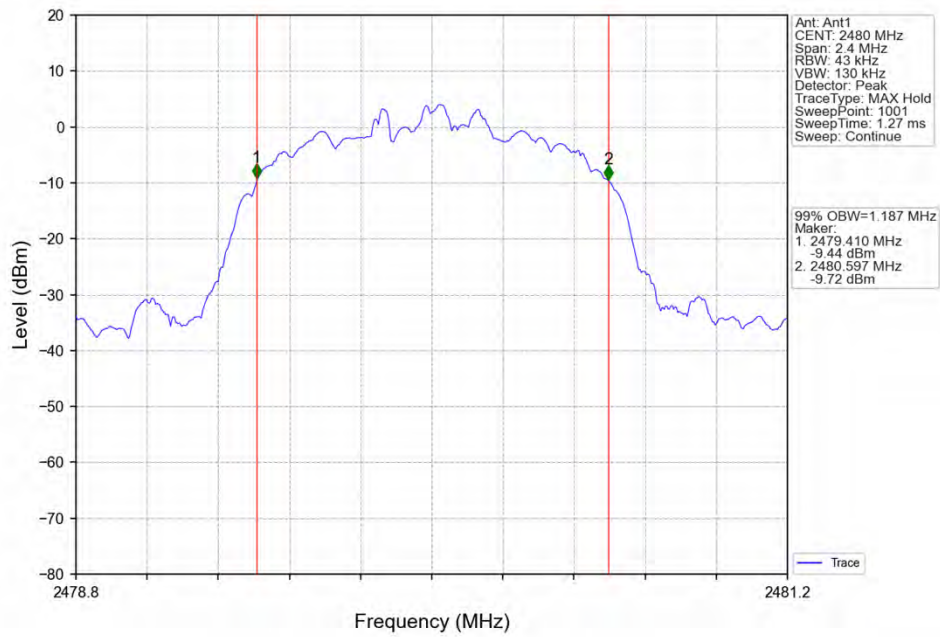


## 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV





## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV

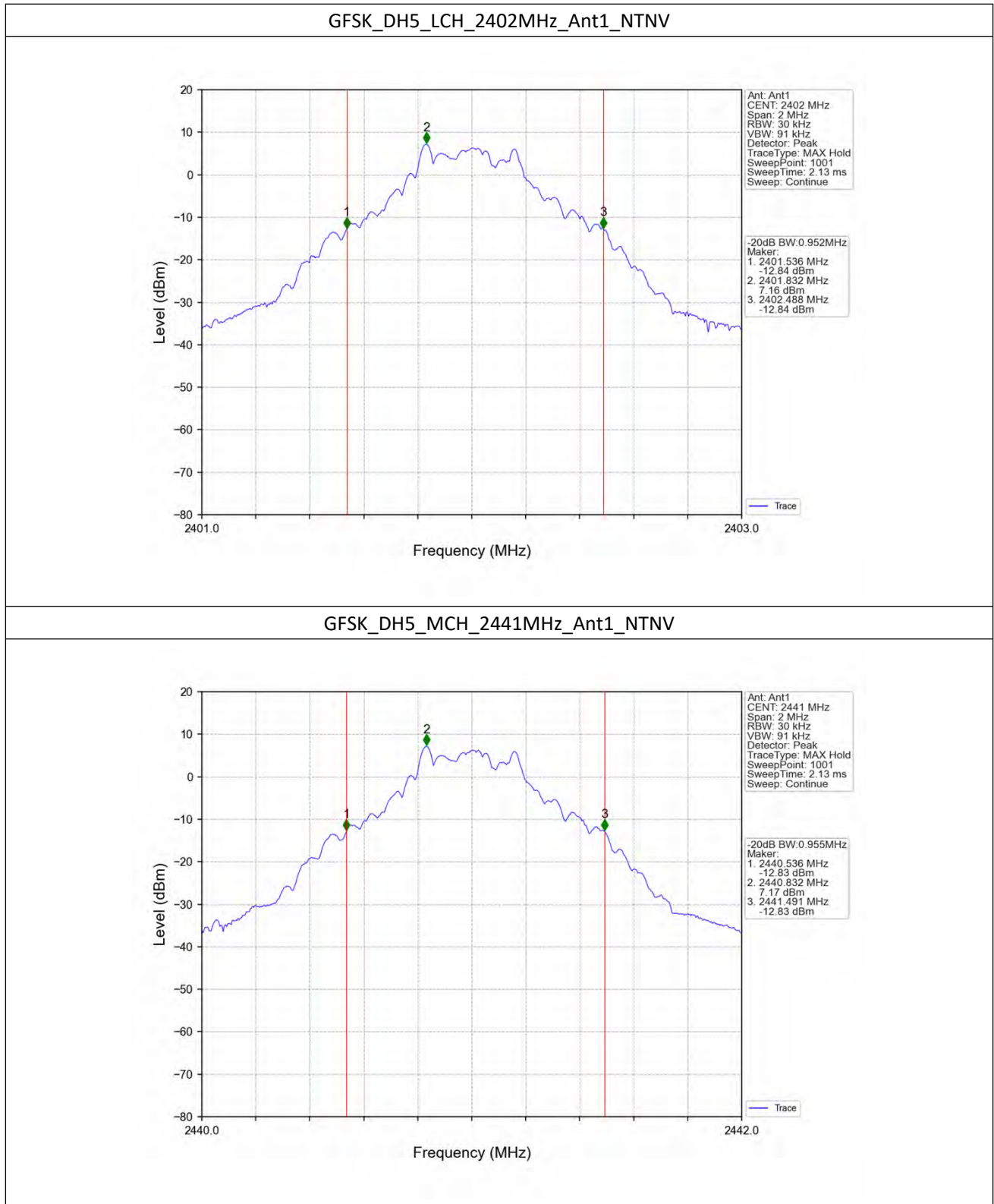


## 1.2 20dB BW

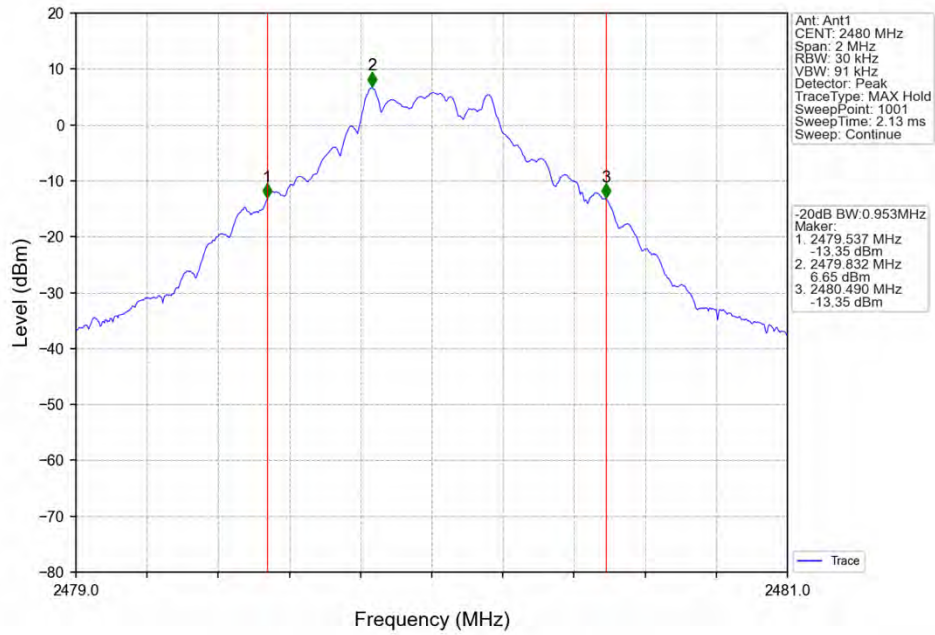
## 1.2.1 Test Result

| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | 20dB Bandwidth (MHz) | Verdict |
|-----------|---------|-----------------|-------------|-----|----------------------|---------|
|           |         |                 |             |     | Result               |         |
| GFSK      | SISO    | 2402            | DH5         | 1   | 0.952                | Pass    |
|           |         | 2441            | DH5         | 1   | 0.955                | Pass    |
|           |         | 2480            | DH5         | 1   | 0.953                | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 1.294                | Pass    |
|           |         | 2441            | 2DH5        | 1   | 1.295                | Pass    |
|           |         | 2480            | 2DH5        | 1   | 1.293                | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 1.309                | Pass    |
|           |         | 2441            | 3DH5        | 1   | 1.309                | Pass    |
|           |         | 2480            | 3DH5        | 1   | 1.309                | Pass    |

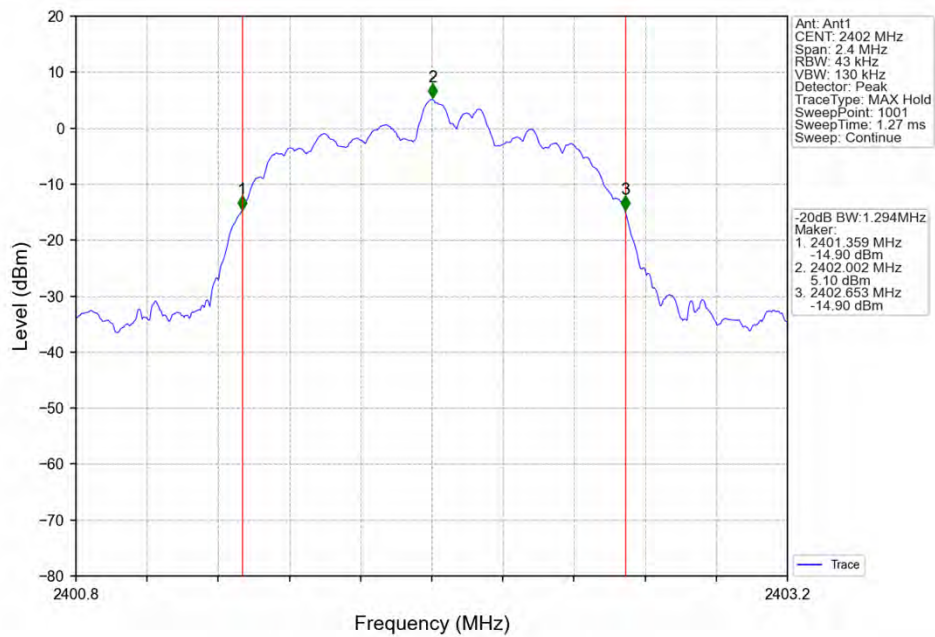
## 1.2.2 Test Graph



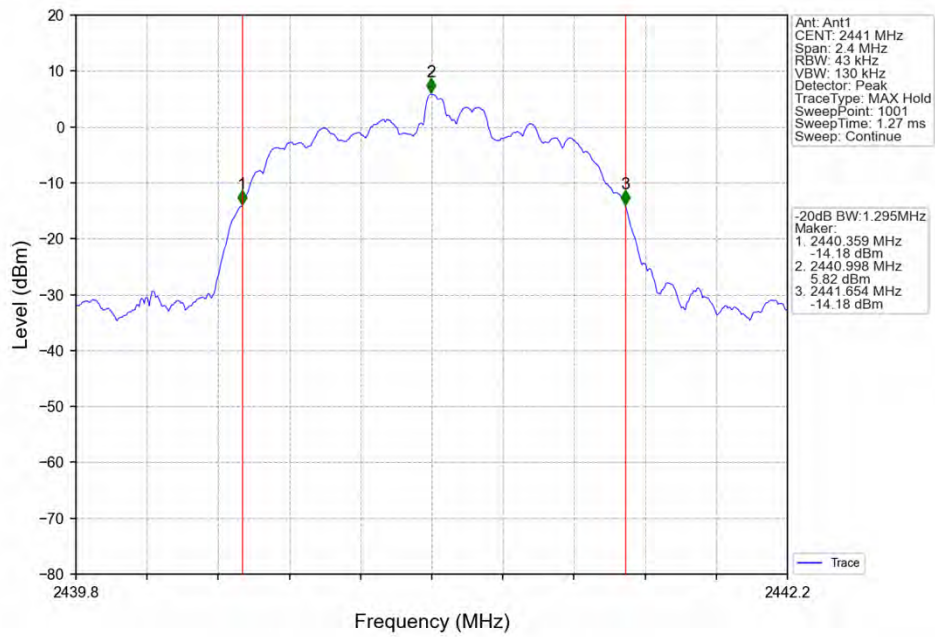
## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



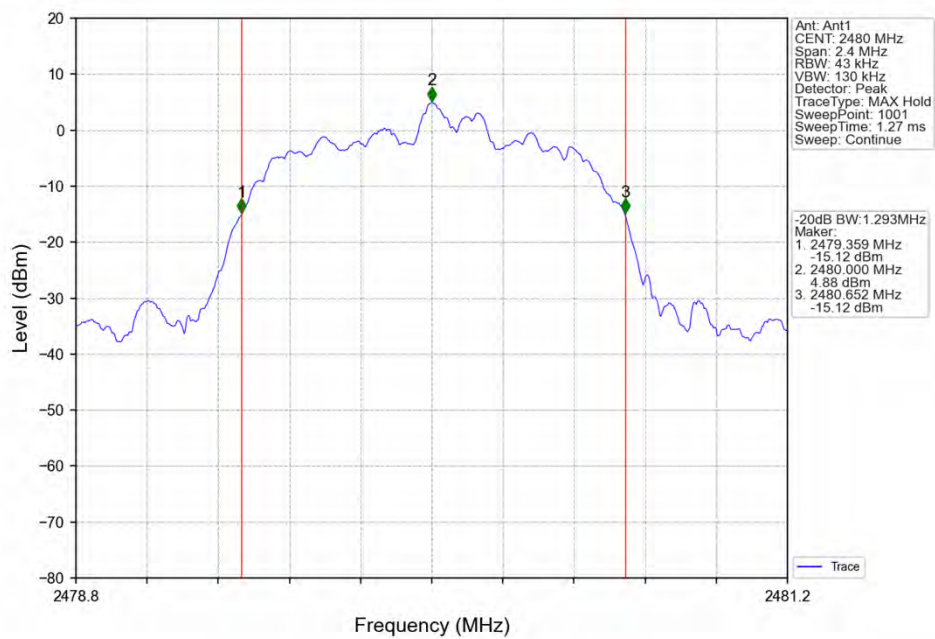
## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



## Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV

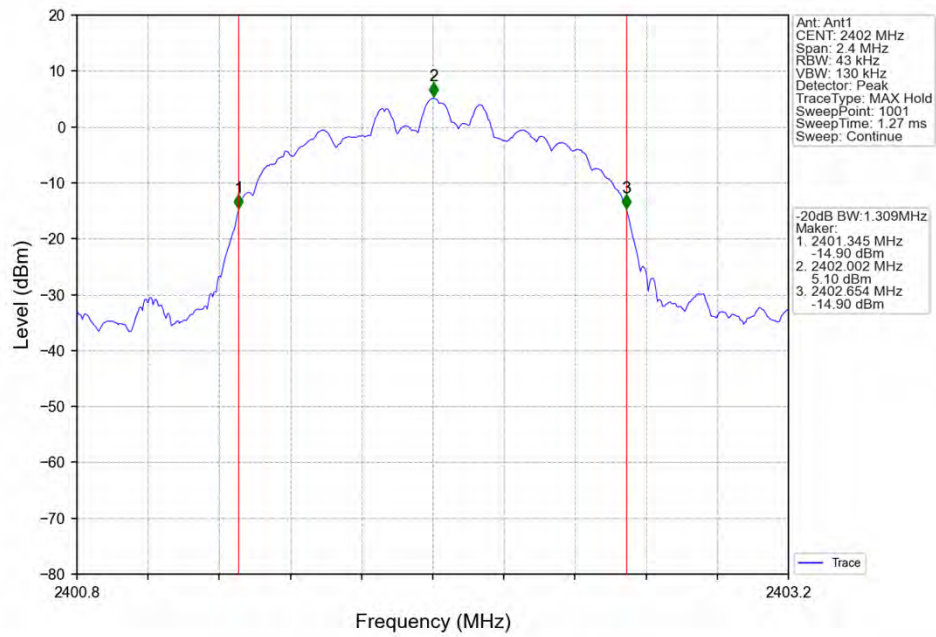


## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV

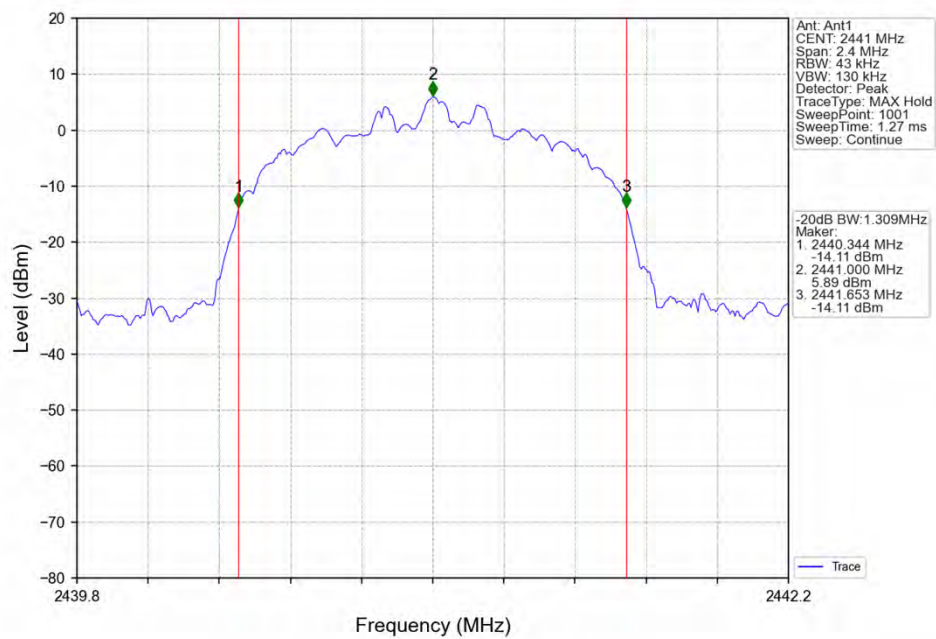




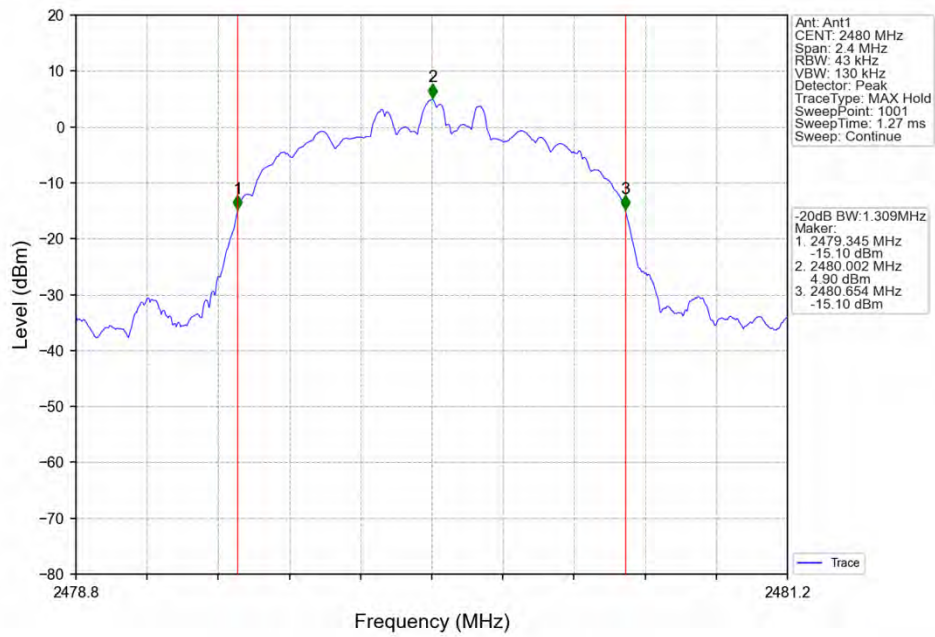
## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



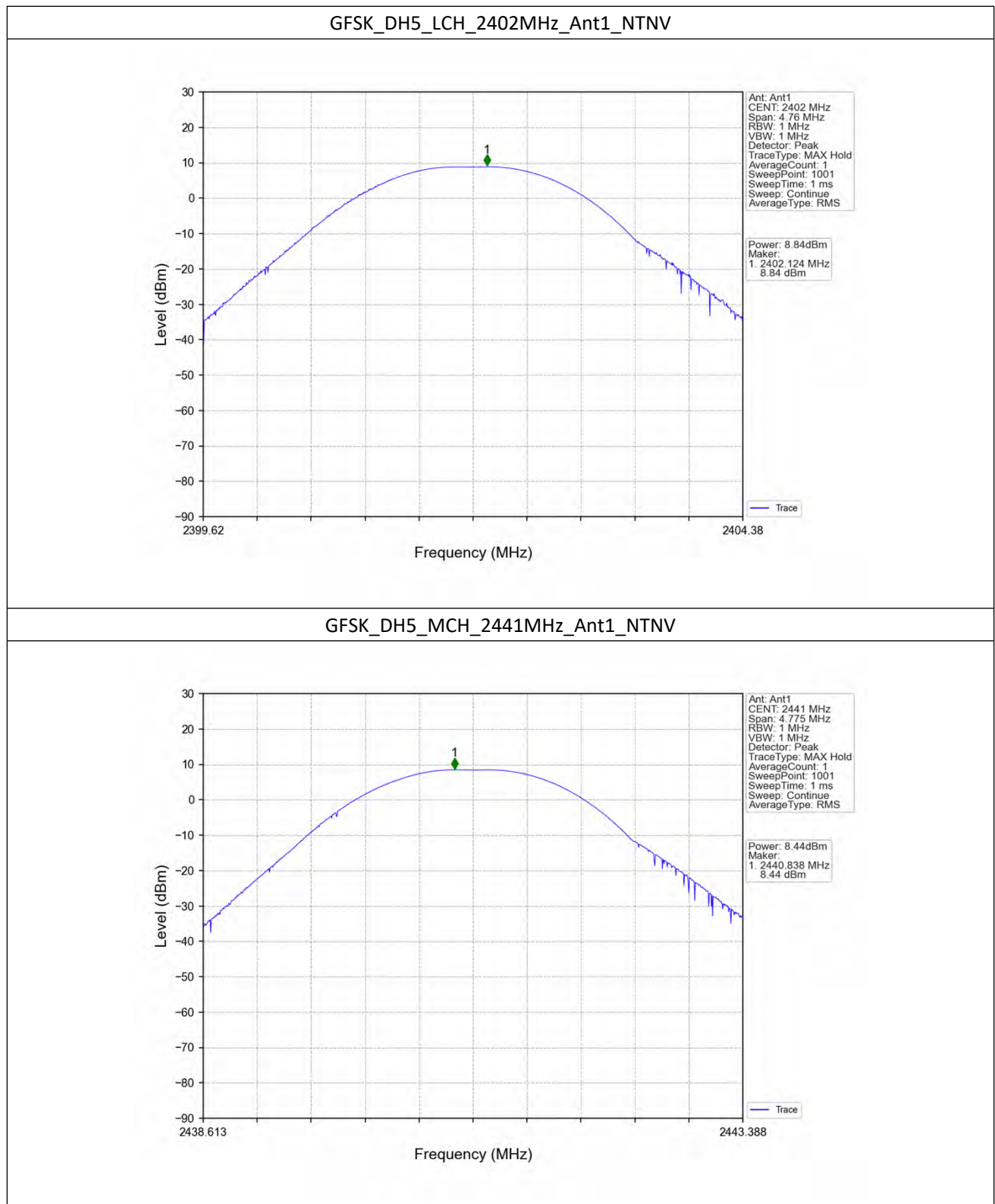
## 2. Maximum Conducted Output Power

### 2.1 Power

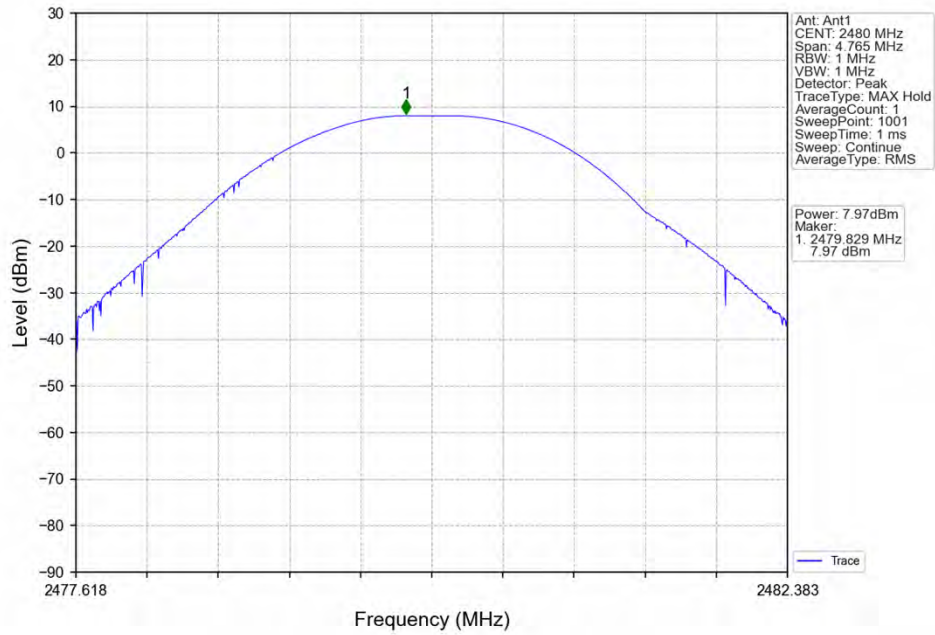
#### 2.1.1 Test Result

| Mode                                | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) |         | Verdict |
|-------------------------------------|---------|-----------------|-------------|-------------------------------------------|---------|---------|
|                                     |         |                 |             | ANT1                                      | Limit   |         |
| GFSK                                | SISO    | 2402            | DH5         | 8.84                                      | <=30    | Pass    |
|                                     |         | 2441            | DH5         | 8.44                                      | <=30    | Pass    |
|                                     |         | 2480            | DH5         | 7.97                                      | <=30    | Pass    |
| Pi/4DQPSK                           | SISO    | 2402            | 2DH5        | 7.11                                      | <=20.97 | Pass    |
|                                     |         | 2441            | 2DH5        | 7.80                                      | <=20.97 | Pass    |
|                                     |         | 2480            | 2DH5        | 6.97                                      | <=20.97 | Pass    |
| 8DPSK                               | SISO    | 2402            | 3DH5        | 7.26                                      | <=20.97 | Pass    |
|                                     |         | 2441            | 3DH5        | 7.96                                      | <=20.97 | Pass    |
|                                     |         | 2480            | 3DH5        | 7.12                                      | <=20.97 | Pass    |
| Note1: Antenna Gain: Ant1: 0.32dBi; |         |                 |             |                                           |         |         |

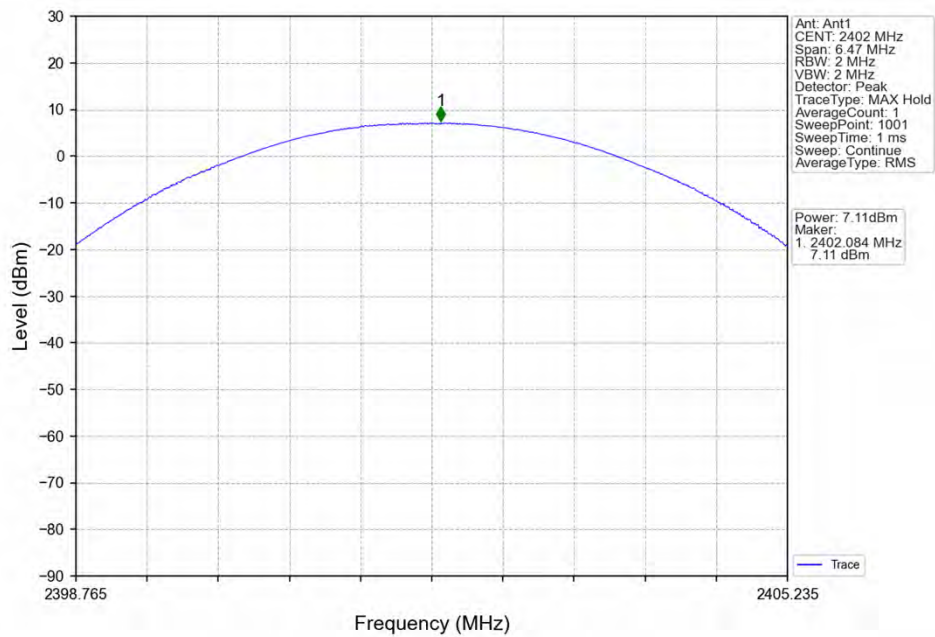
## 2.1.2 Test Graph



## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV

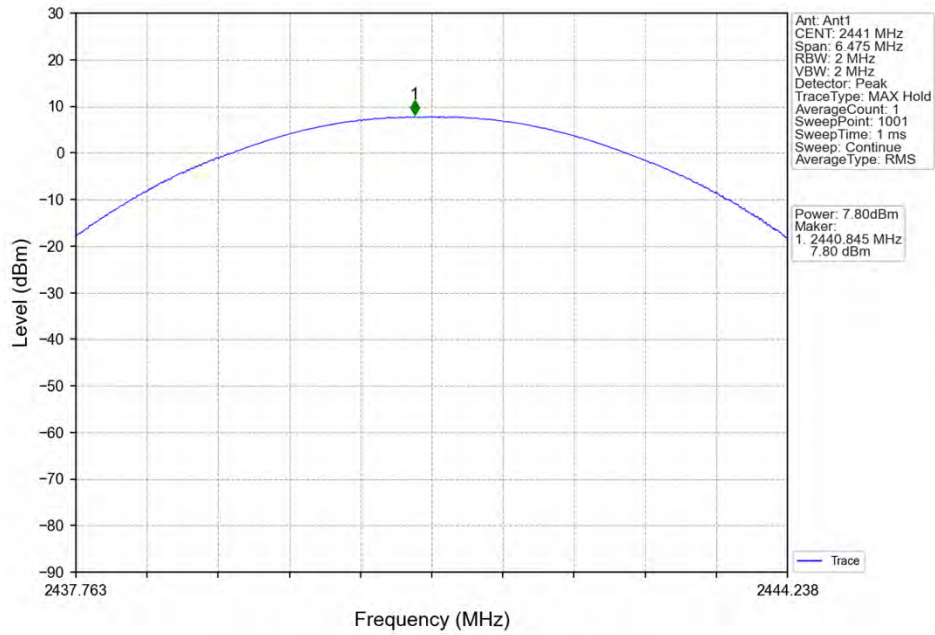


## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

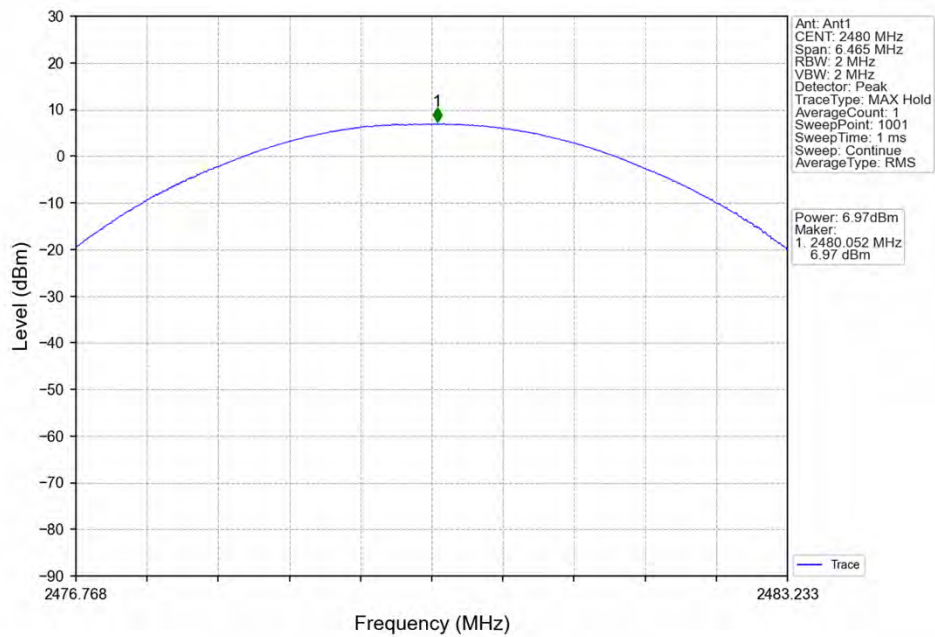




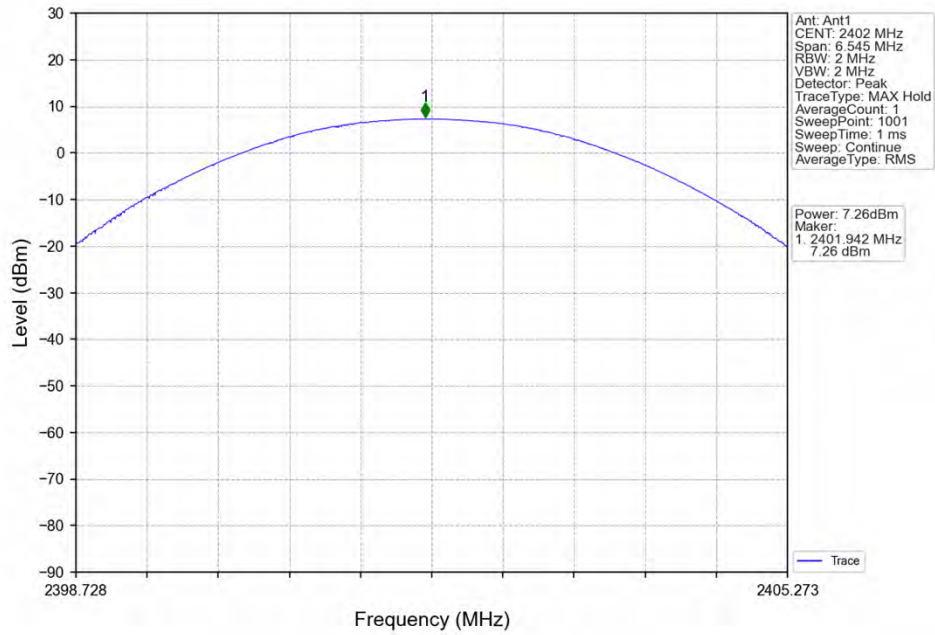
## Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



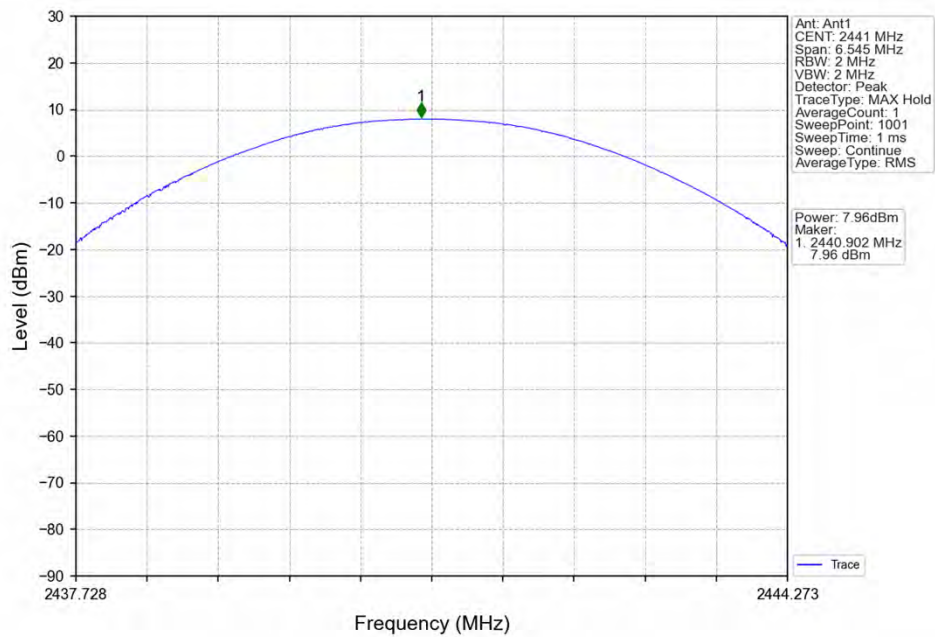
## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



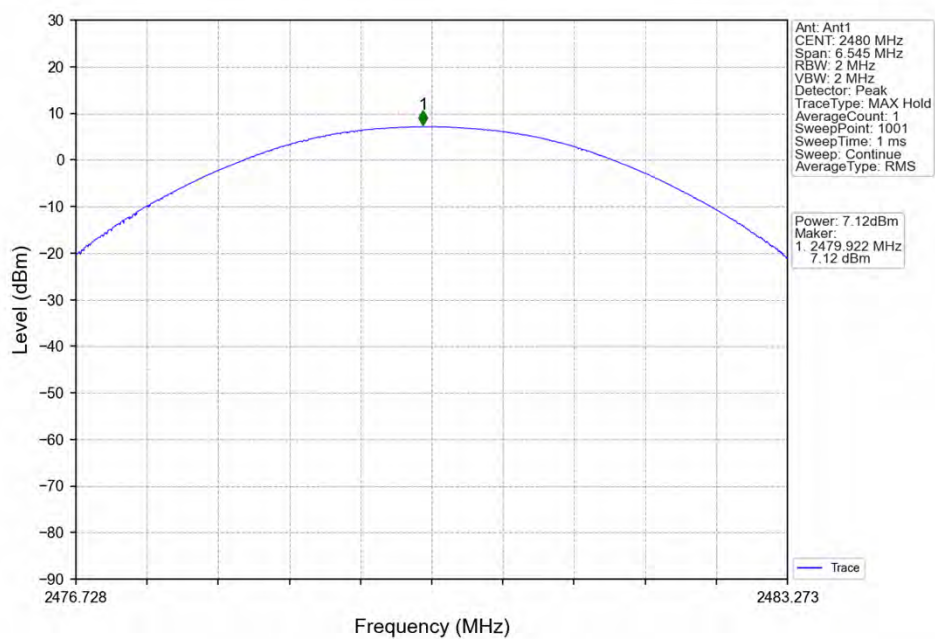
## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



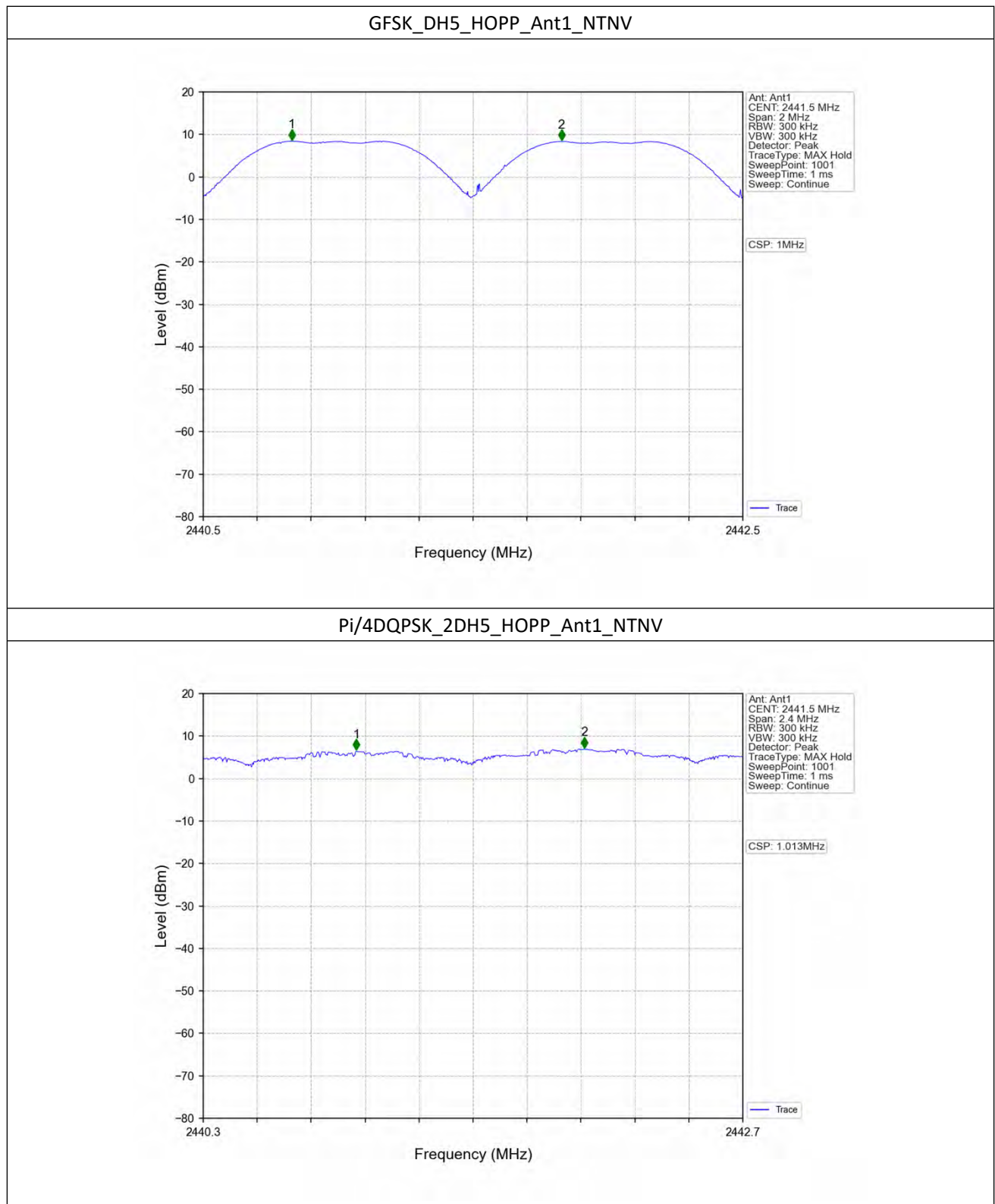
### 3. Carrier Frequency Separation

#### 3.1 Ant1

##### 3.1.1 Test Result

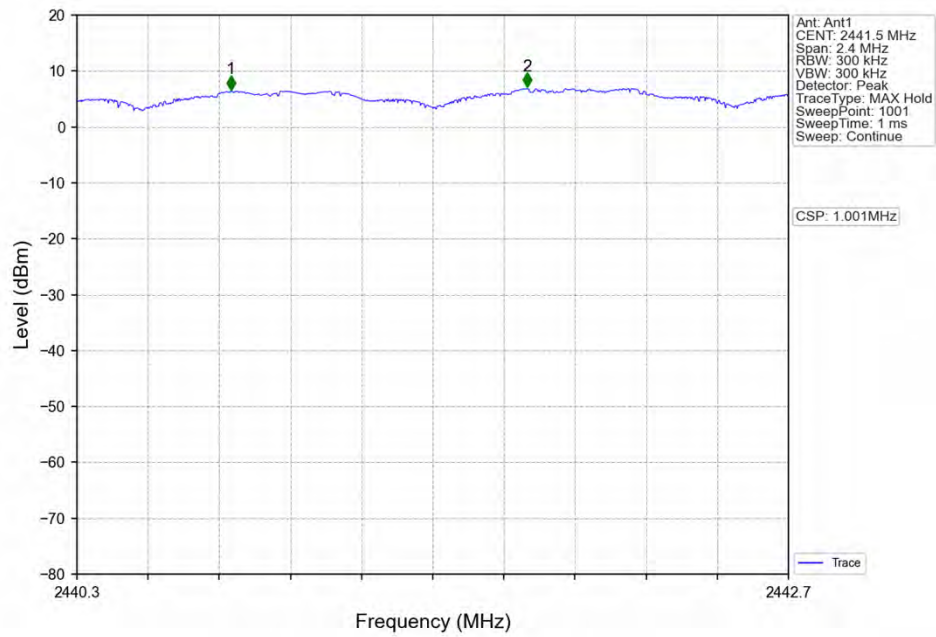
| Ant1      |         |                 |             |                          |                      |              |         |
|-----------|---------|-----------------|-------------|--------------------------|----------------------|--------------|---------|
| Mode      | TX Type | Frequency (MHz) | Packet Type | Channel Separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz)  | Verdict |
| GFSK      | SISO    | HOPP            | DH5         | 1.000                    | 0.955                | $\geq 0.955$ | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH5        | 1.013                    | 1.295                | $\geq 0.863$ | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH5        | 1.001                    | 1.309                | $\geq 0.873$ | Pass    |

### 3.1.2 Test Graph





## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



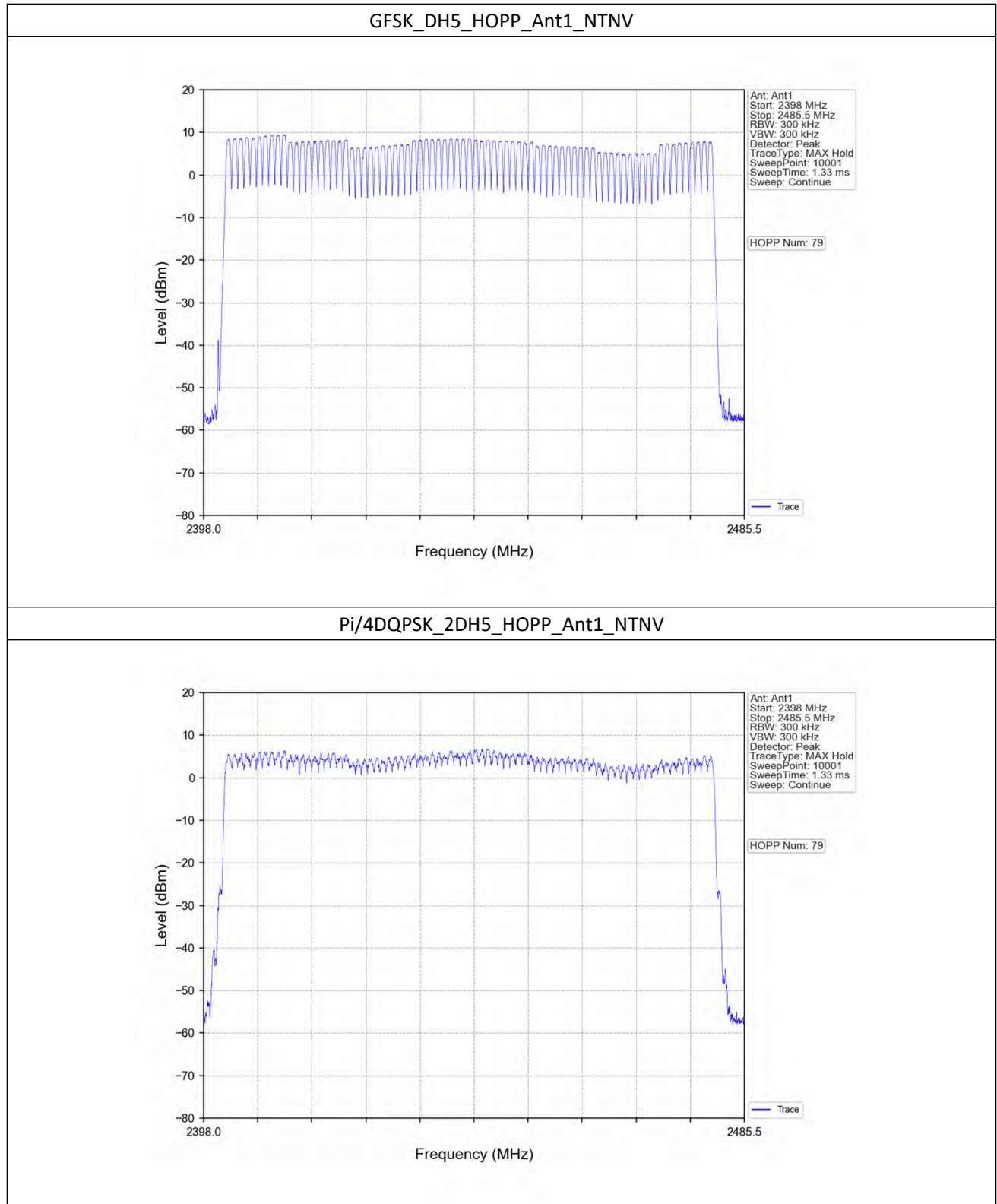
## 4. Number of Hopping Frequencies

### 4.1 HoppNum

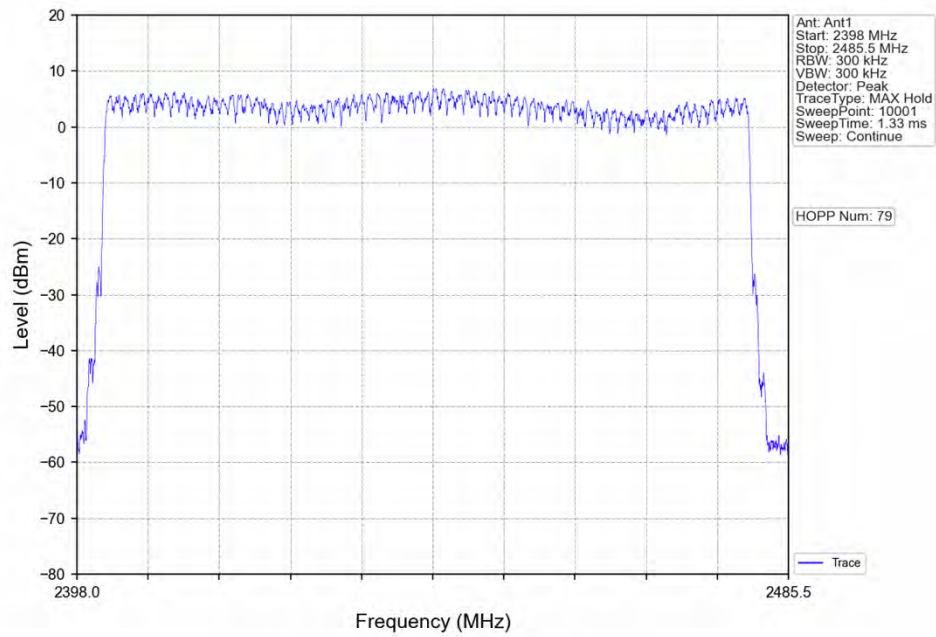
#### 4.1.1 Test Result

| Mode      | TX Type | Frequency (MHz) | Packet Type | Num of Hopping Frequencies |           | Verdict |
|-----------|---------|-----------------|-------------|----------------------------|-----------|---------|
|           |         |                 |             | ANT1                       | Limit     |         |
| GFSK      | SISO    | HOPP            | DH5         | 79                         | $\geq 15$ | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH5        | 79                         | $\geq 15$ | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH5        | 79                         | $\geq 15$ | Pass    |

### 4.1.2 Test Graph



## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 5. Time of Occupancy (Dwell Time)

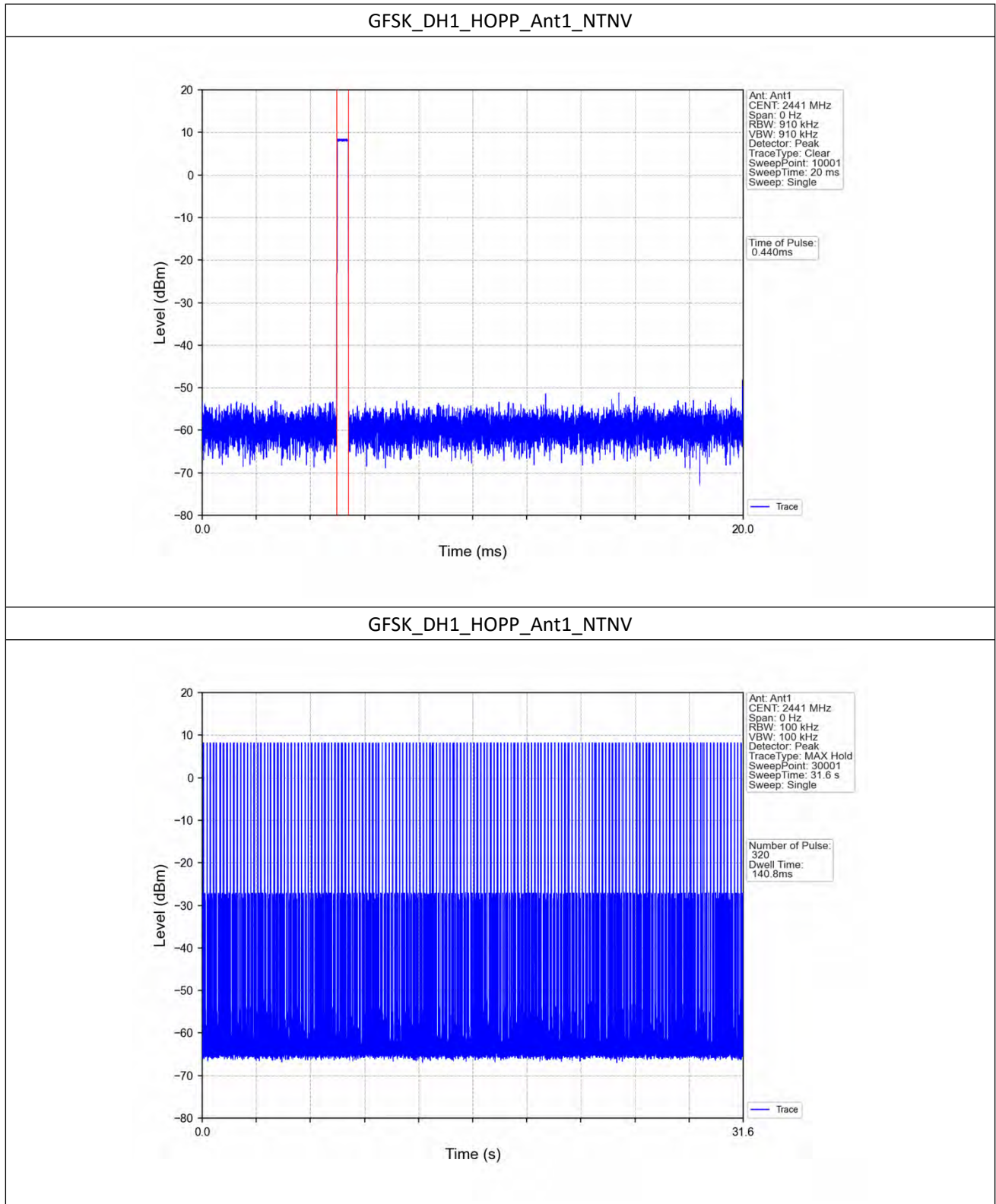
### 5.1 Ant1

#### 5.1.1 Test Result

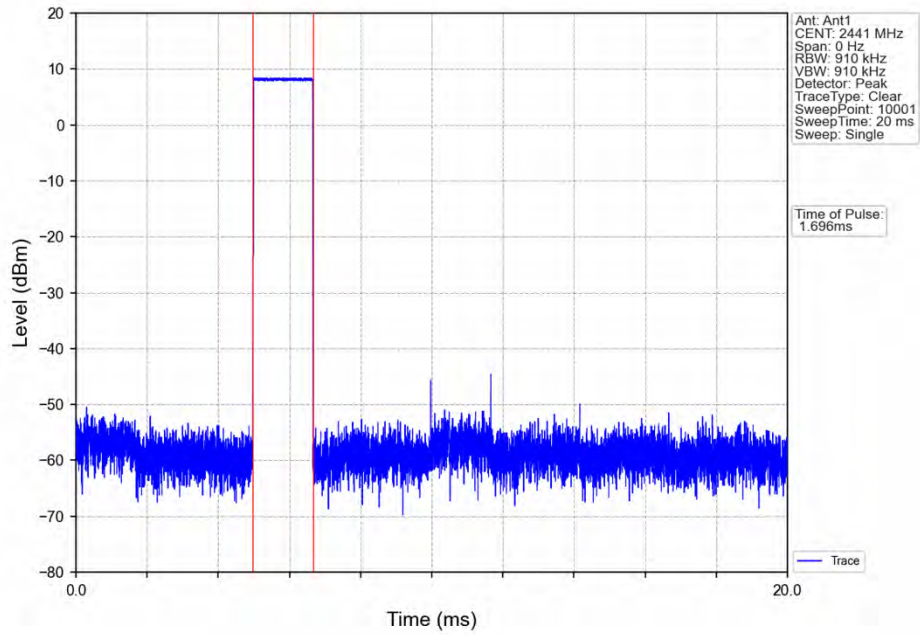
| Ant1      |         |                 |             |                               |                        |                                    |                 |            |         |
|-----------|---------|-----------------|-------------|-------------------------------|------------------------|------------------------------------|-----------------|------------|---------|
| Mode      | Tx Type | Frequency (MHz) | Packet Type | Duration of Single Pulse (ms) | Observation Period (s) | Num of Pulse in Observation Period | Dwell Time (ms) | Limit (ms) | Verdict |
| GFSK      | SISO    | HOPP            | DH1         | 0.440                         | 31.600                 | 320                                | 140.800         | <=400      | Pass    |
|           |         |                 | DH3         | 1.696                         | 31.600                 | 162                                | 274.752         | <=400      | Pass    |
|           |         |                 | DH5         | 2.938                         | 31.600                 | 98                                 | 287.924         | <=400      | Pass    |
| Pi/4DQPSK | SISO    | HOPP            | 2DH1        | 0.402                         | 31.600                 | 320                                | 128.640         | <=400      | Pass    |
|           |         |                 | 2DH3        | 1.684                         | 31.600                 | 155                                | 261.020         | <=400      | Pass    |
|           |         |                 | 2DH5        | 2.934                         | 31.600                 | 94                                 | 275.796         | <=400      | Pass    |
| 8DPSK     | SISO    | HOPP            | 3DH1        | 0.400                         | 31.600                 | 319                                | 127.600         | <=400      | Pass    |
|           |         |                 | 3DH3        | 1.680                         | 31.600                 | 152                                | 255.360         | <=400      | Pass    |
|           |         |                 | 3DH5        | 2.932                         | 31.600                 | 108                                | 316.656         | <=400      | Pass    |



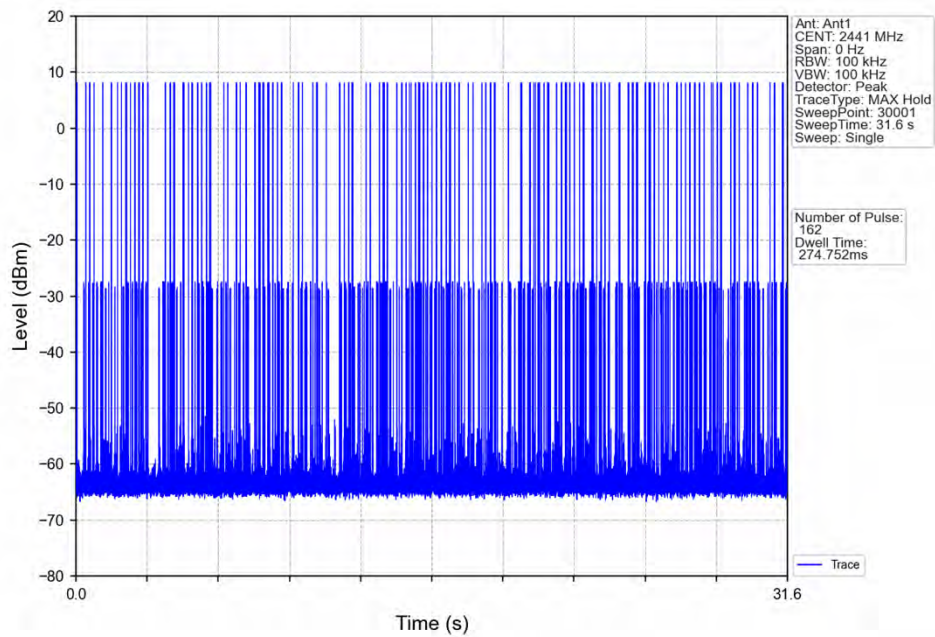
### 5.1.2 Test Graph



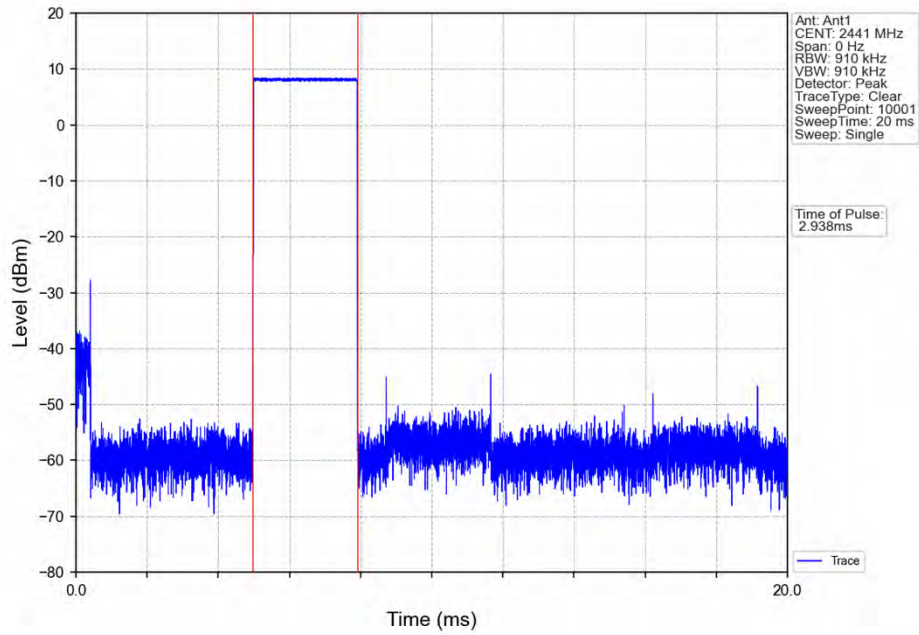
GFSK\_DH3\_HOPP\_Ant1\_NTNV



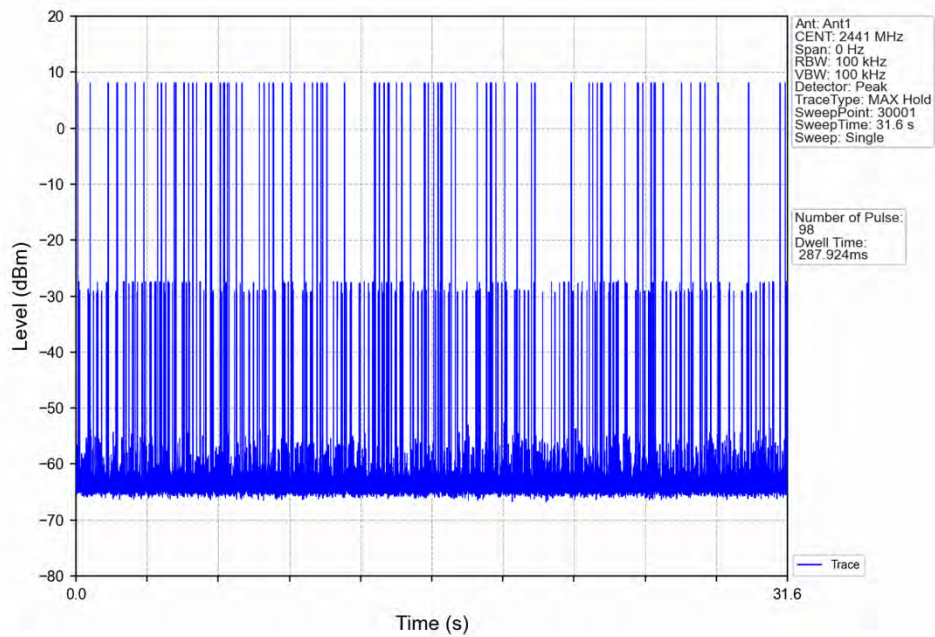
GFSK\_DH3\_HOPP\_Ant1\_NTNV



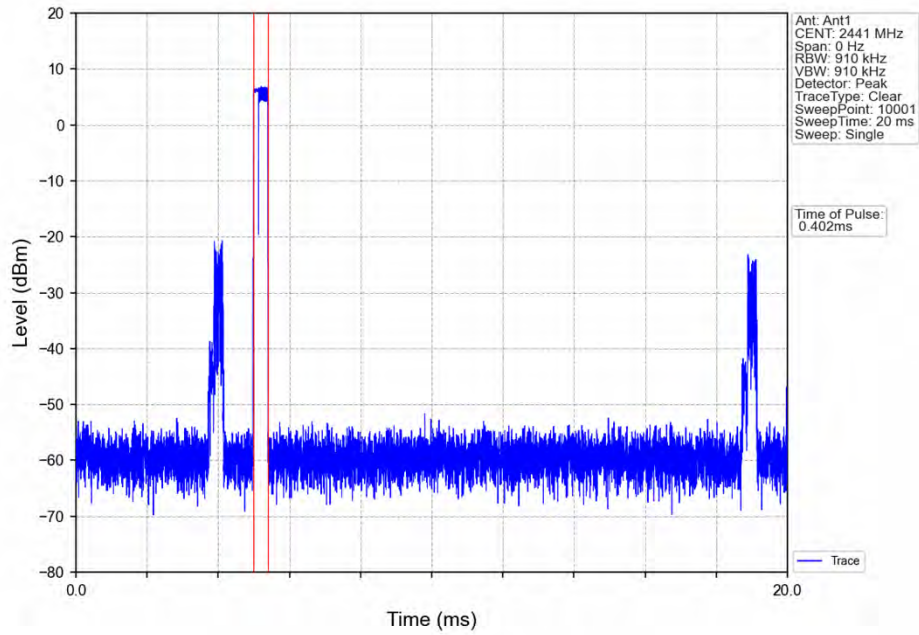
## GFSK\_DH5\_HOPP\_Ant1\_NTNV



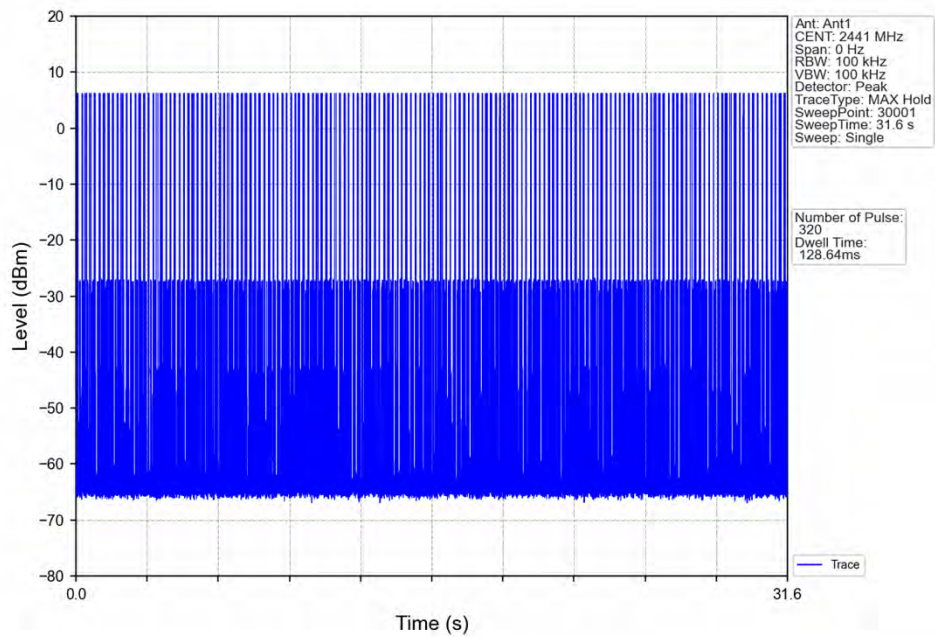
## GFSK\_DH5\_HOPP\_Ant1\_NTNV



## Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV

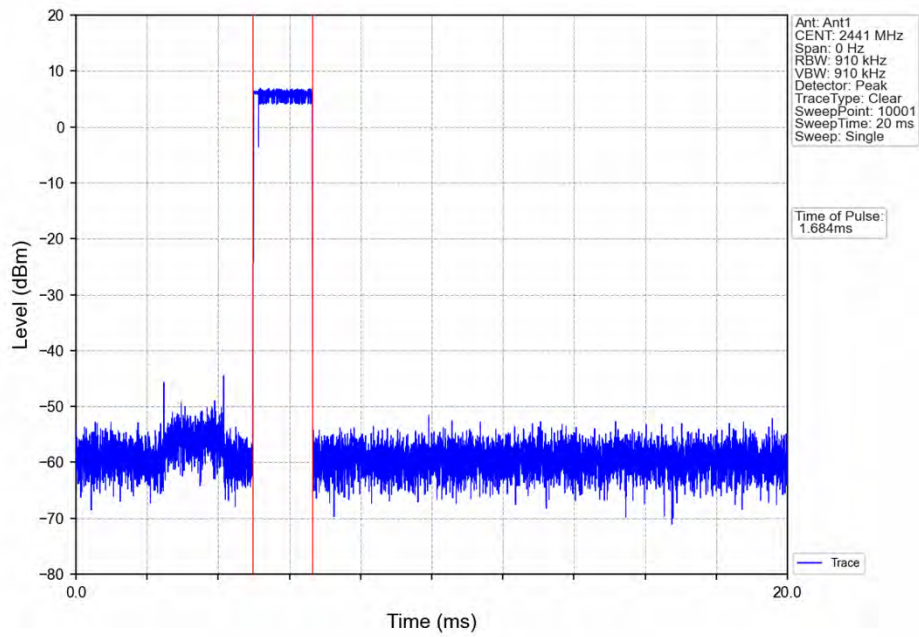


## Pi/4DQPSK\_2DH1\_HOPP\_Ant1\_NTNV

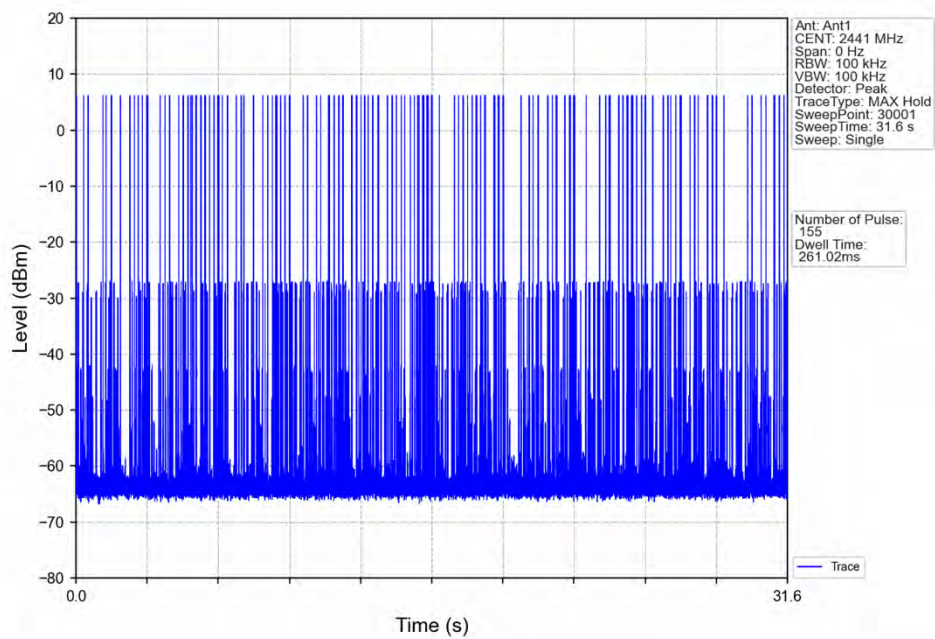




## Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV

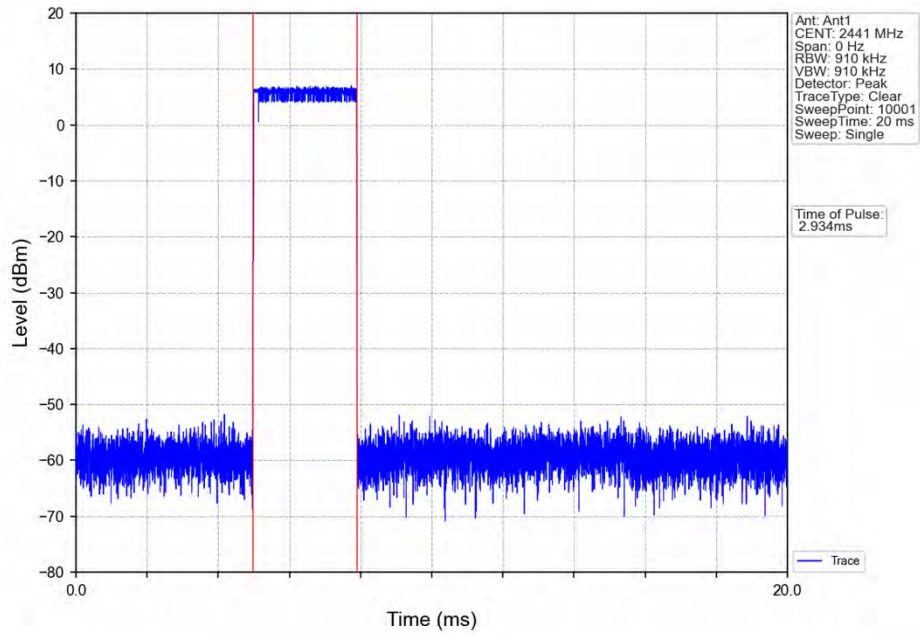


## Pi/4DQPSK\_2DH3\_HOPP\_Ant1\_NTNV

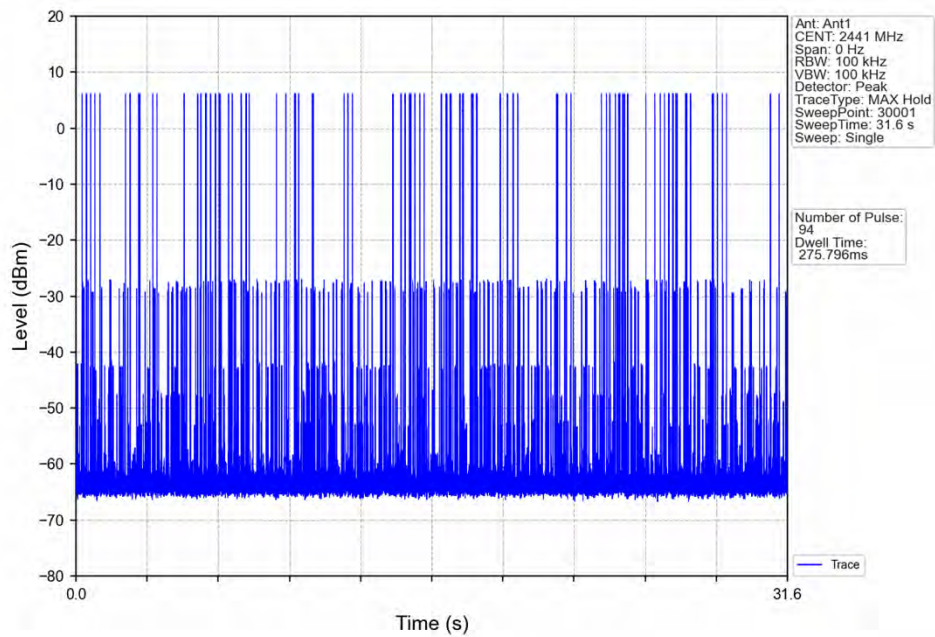




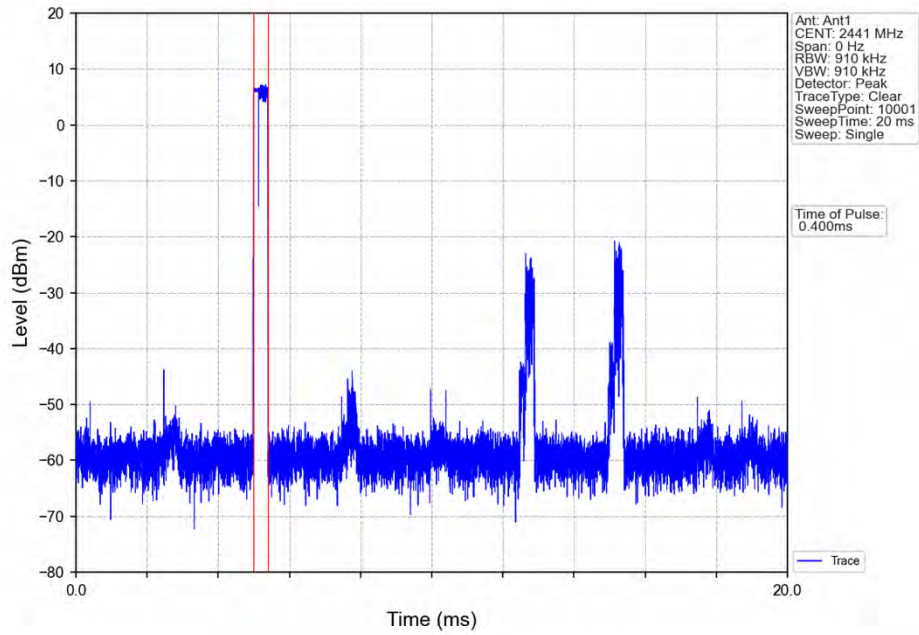
## Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



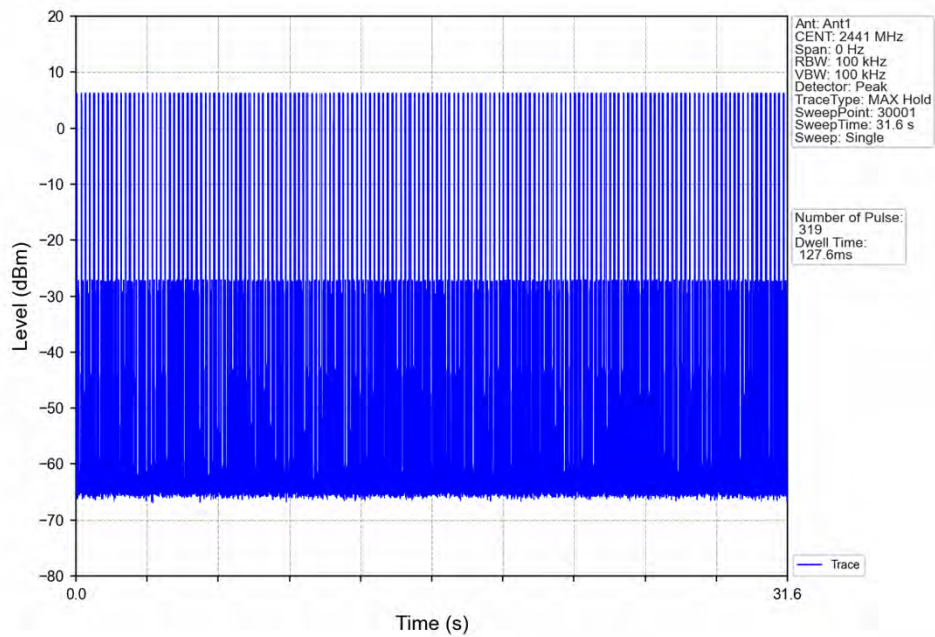
## Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



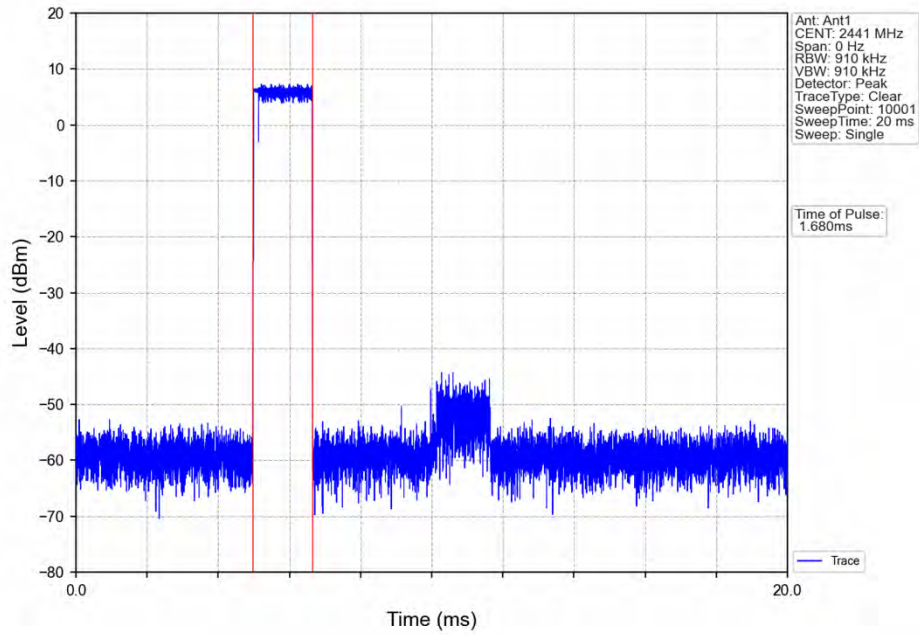
## 8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



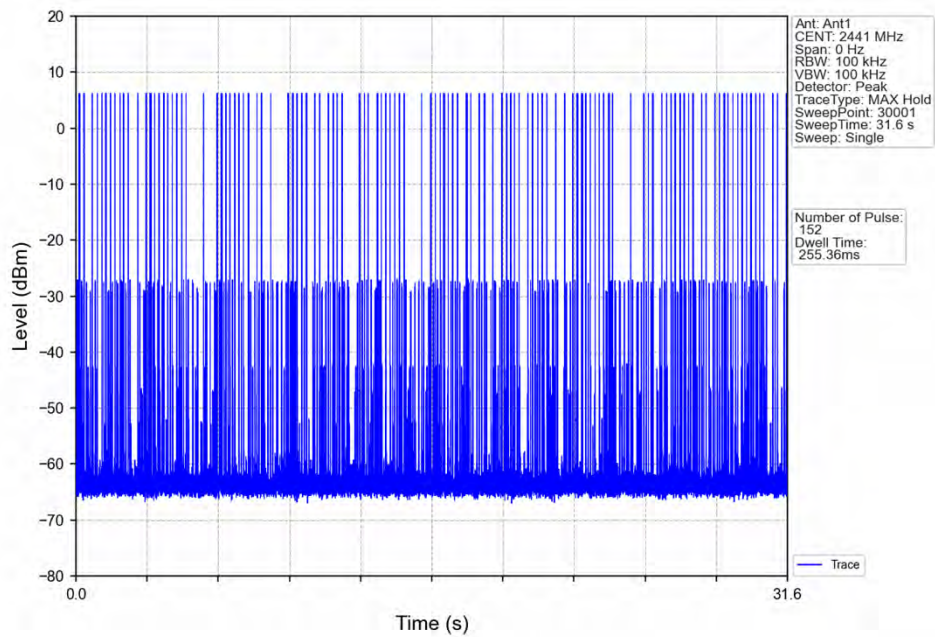
## 8DPSK\_3DH1\_HOPP\_Ant1\_NTNV



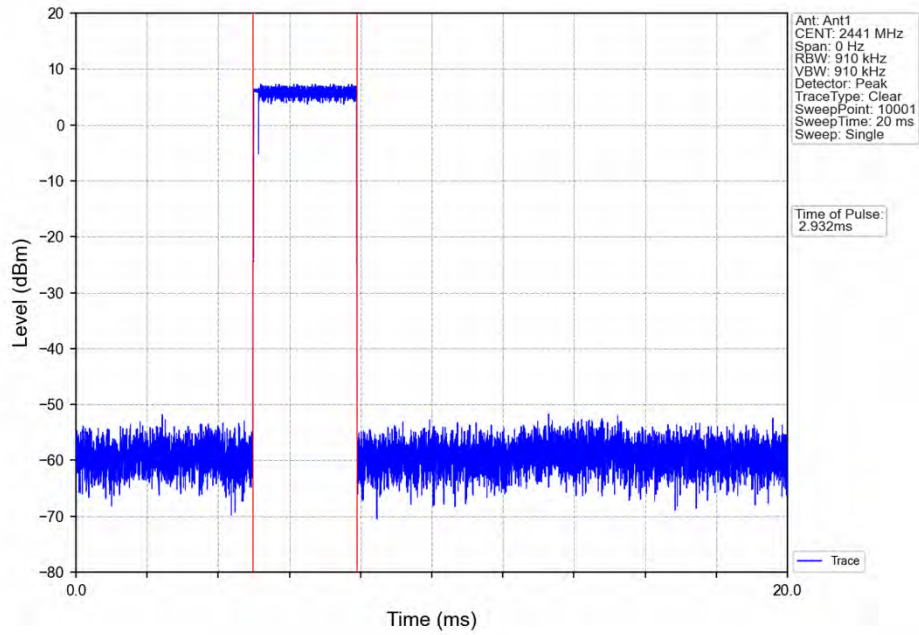
## 8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



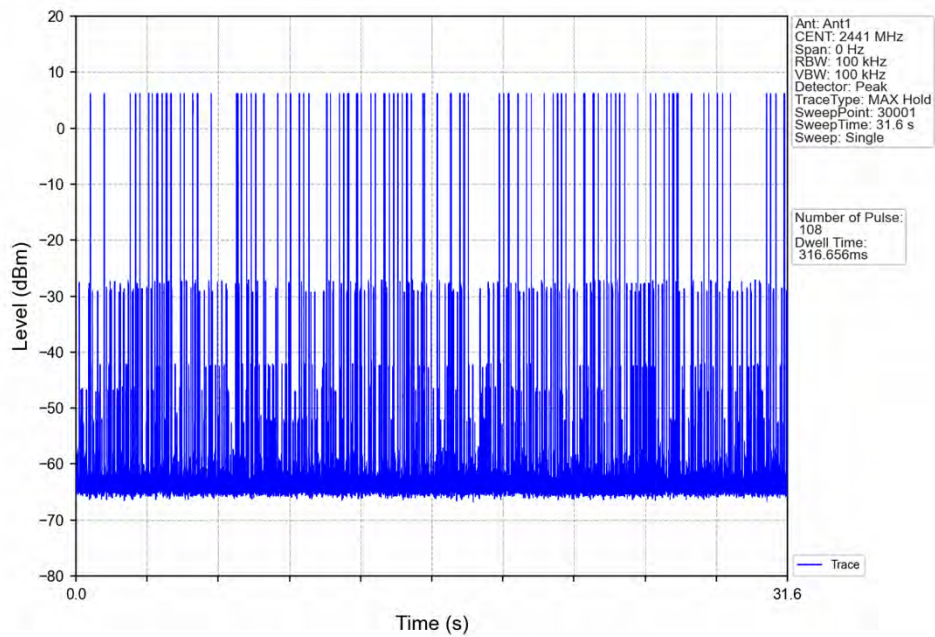
## 8DPSK\_3DH3\_HOPP\_Ant1\_NTNV



## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 6. Unwanted Emissions In Non-restricted Frequency Bands

### 6.1 Ref

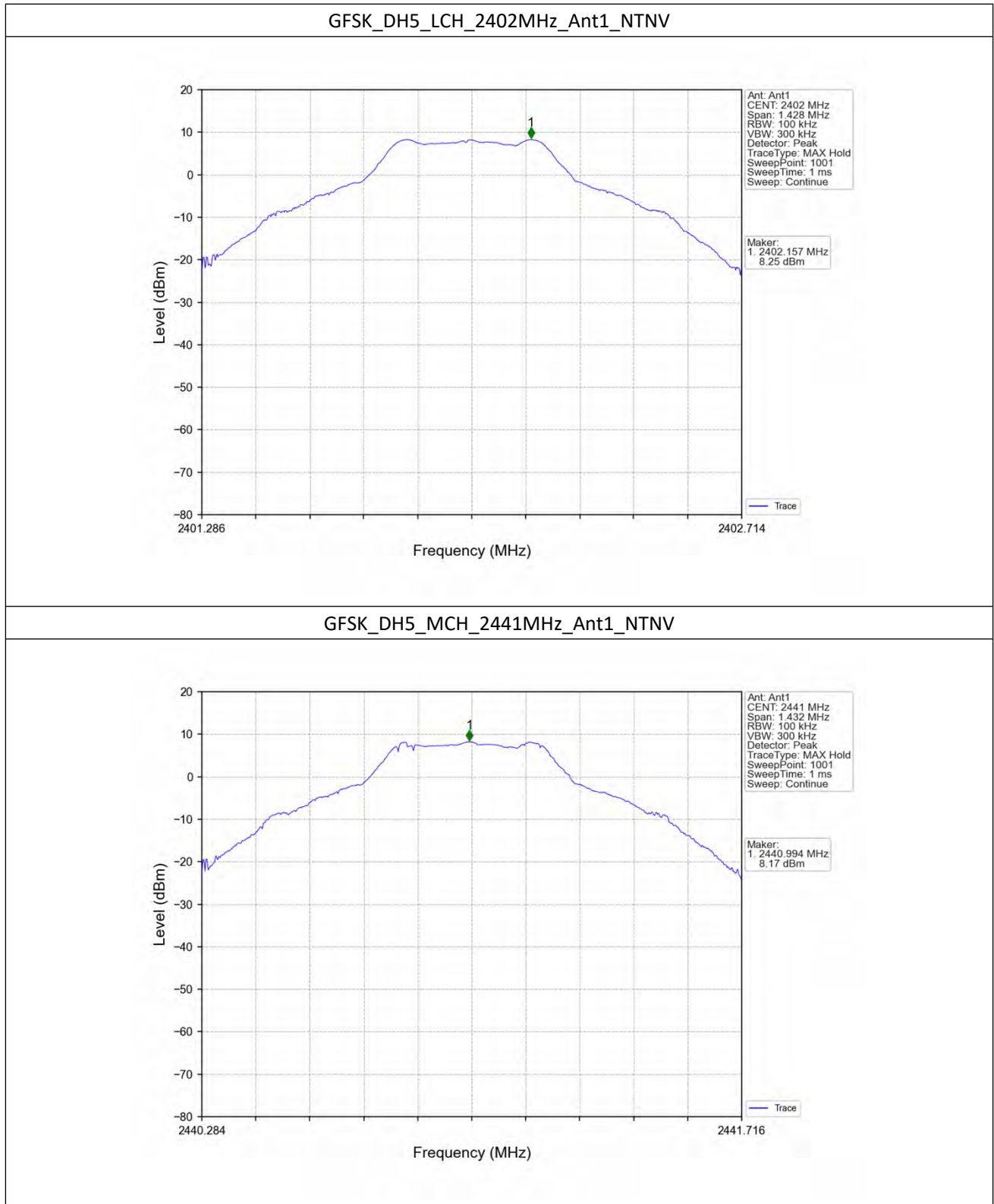
#### 6.1.1 Test Result

| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) |
|-----------|---------|-----------------|-------------|-----|--------------------------|
| GFSK      | SISO    | 2402            | DH5         | 1   | 8.25                     |
|           |         | 2441            | DH5         | 1   | 8.17                     |
|           |         | 2480            | DH5         | 1   | 7.68                     |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 5.09                     |
|           |         | 2441            | 2DH5        | 1   | 6.00                     |
|           |         | 2480            | 2DH5        | 1   | 5.27                     |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 5.49                     |
|           |         | 2441            | 3DH5        | 1   | 6.26                     |
|           |         | 2480            | 3DH5        | 1   | 5.29                     |

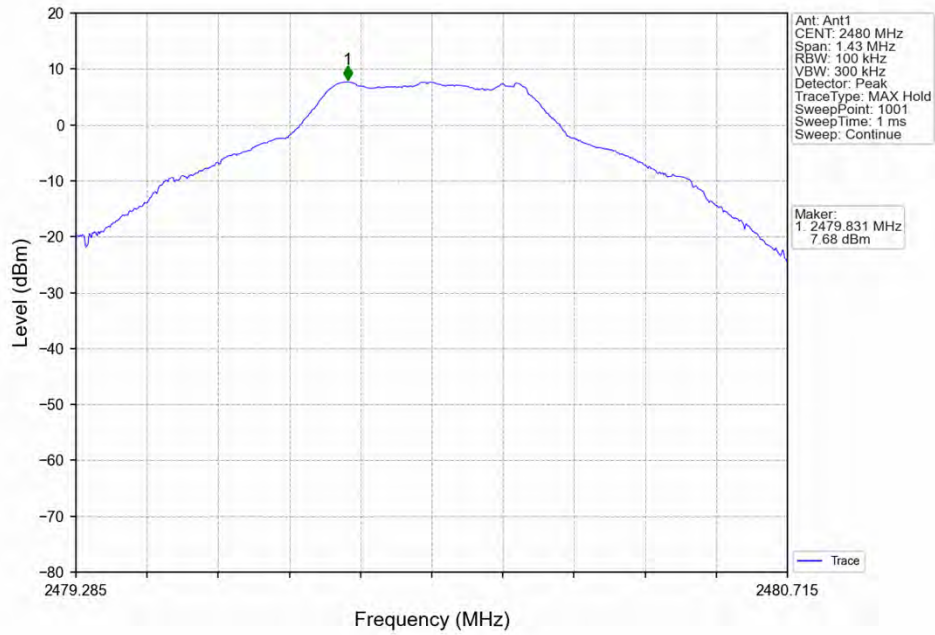
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



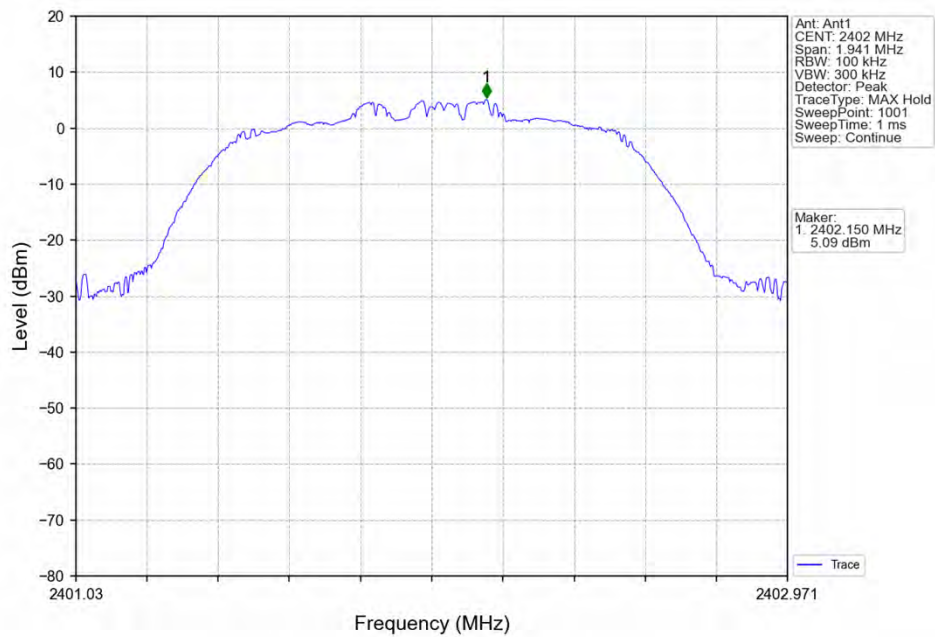
## 6.1.2 Test Graph



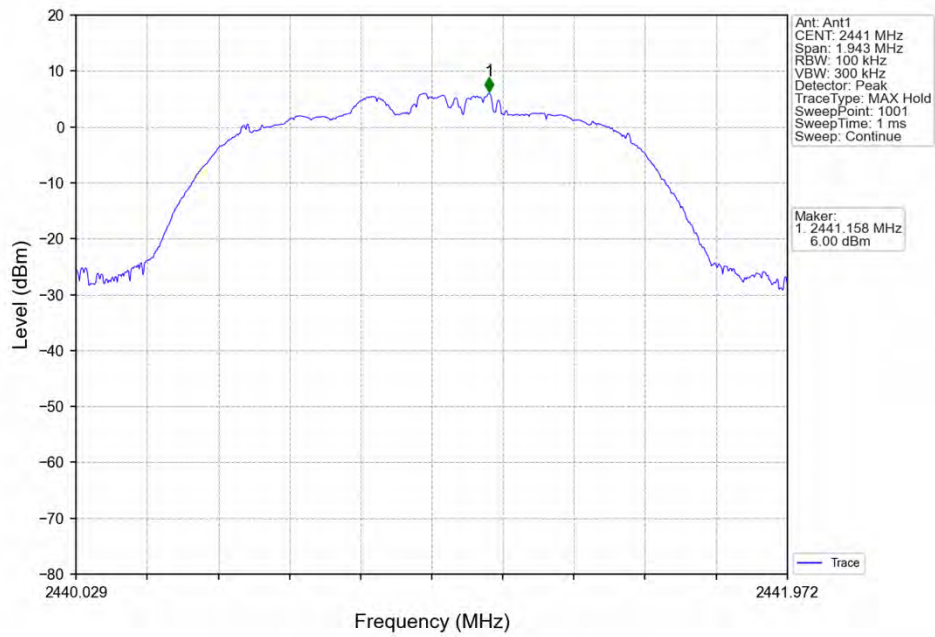
## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



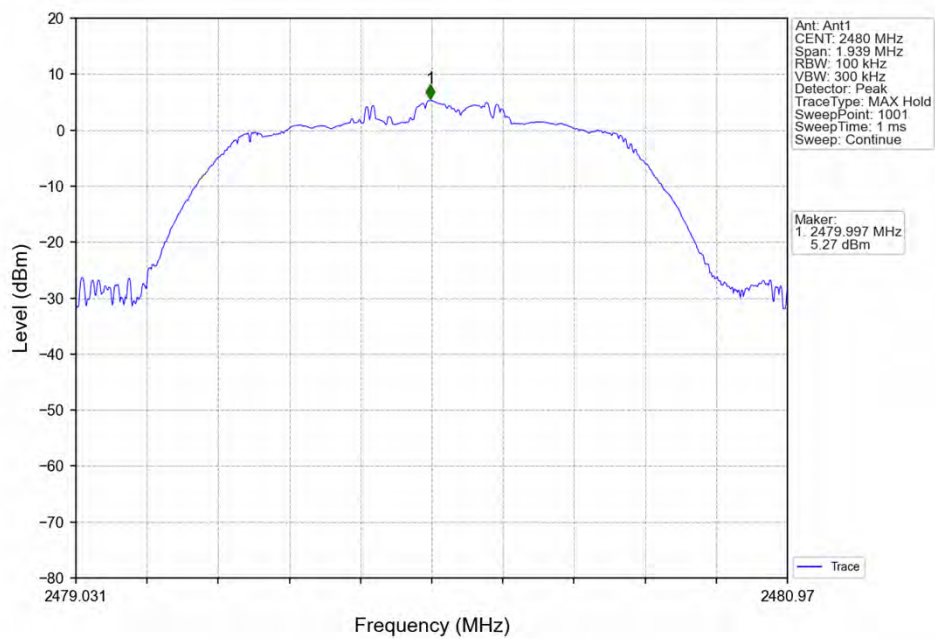
## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



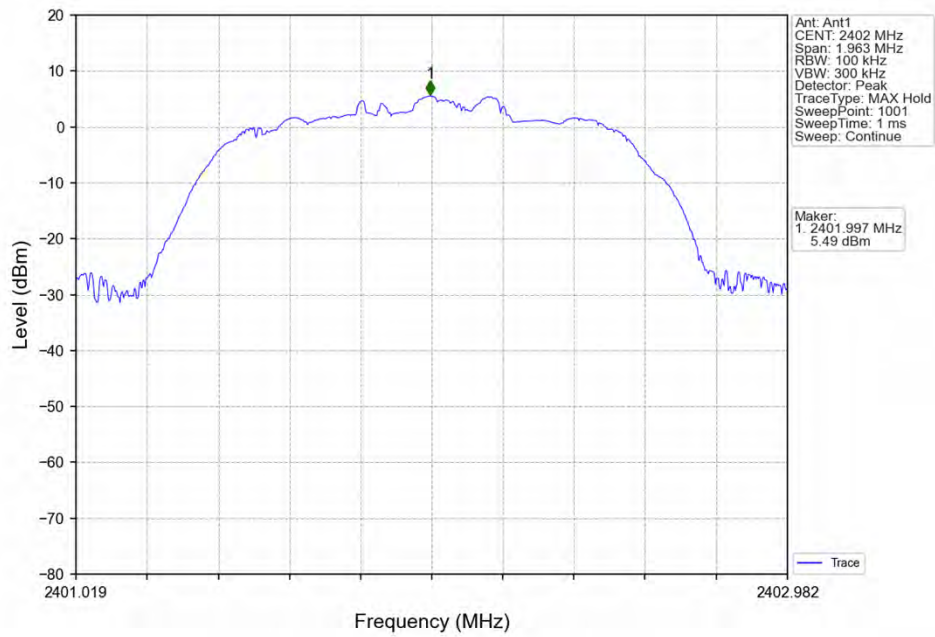
## Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



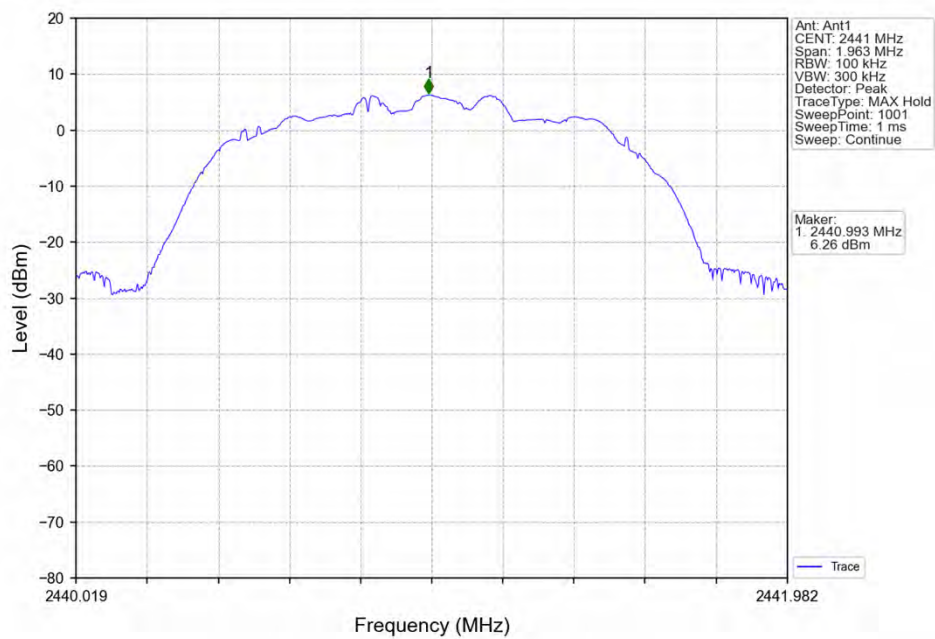
## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



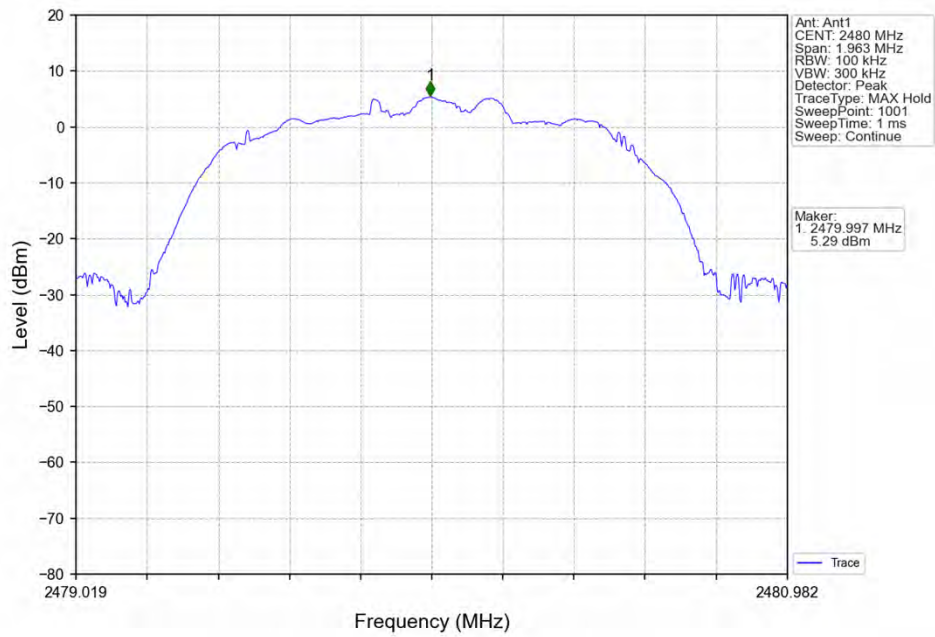
## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV





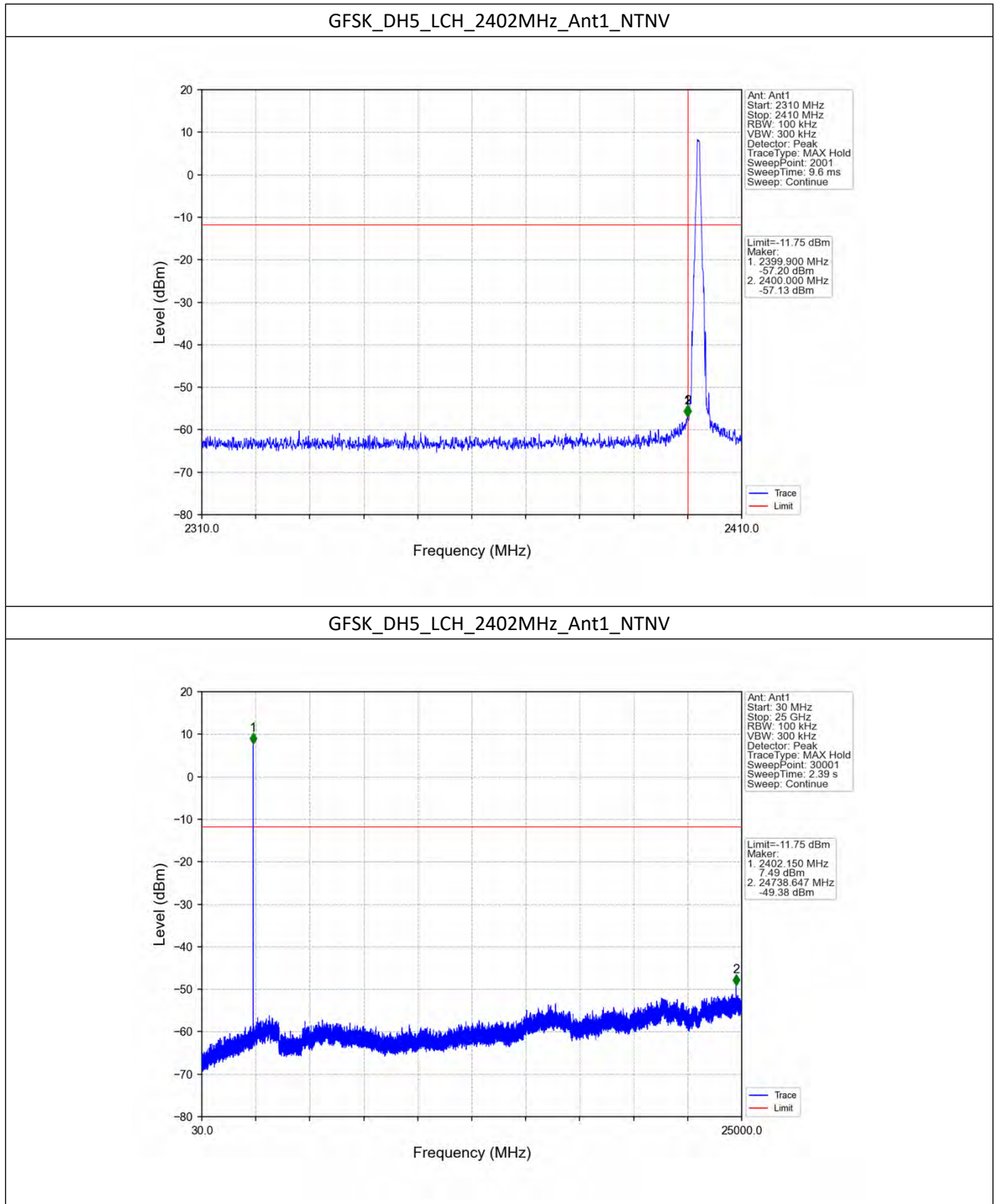
## 6.2 CSE

### 6.2.1 Test Result

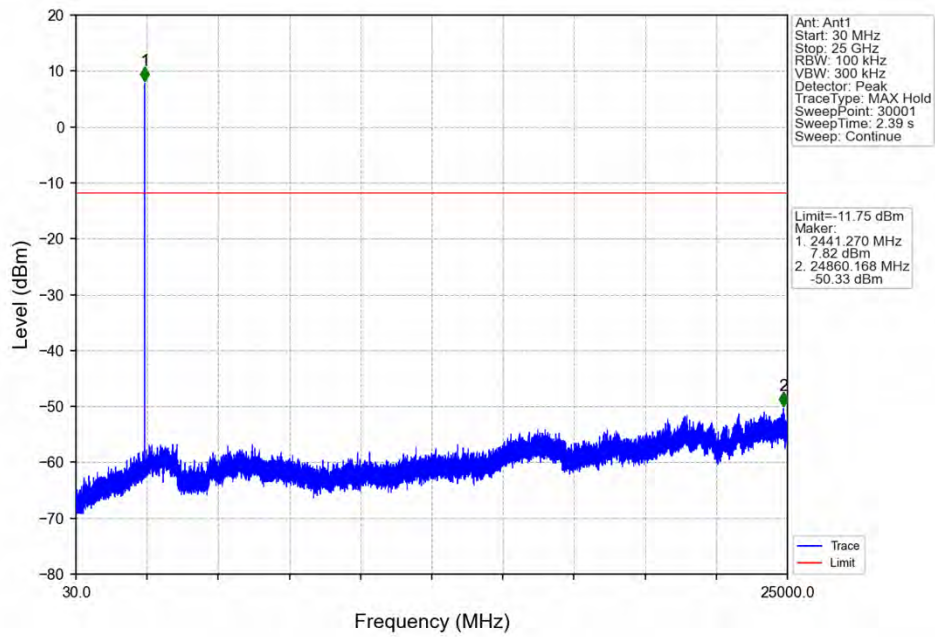
| Mode      | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|-----------|---------|-----------------|-------------|-----|--------------------------|-------------|---------|
| GFSK      | SISO    | 2402            | DH5         | 1   | 8.25                     | -11.75      | Pass    |
|           |         | 2441            | DH5         | 1   | 8.25                     | -11.75      | Pass    |
|           |         | 2480            | DH5         | 1   | 8.25                     | -11.75      | Pass    |
|           |         | HOPP            | DH5         | 1   | 8.25                     | -11.75      | Pass    |
| Pi/4DQPSK | SISO    | 2402            | 2DH5        | 1   | 6.00                     | -14.00      | Pass    |
|           |         | 2441            | 2DH5        | 1   | 6.00                     | -14.00      | Pass    |
|           |         | 2480            | 2DH5        | 1   | 6.00                     | -14.00      | Pass    |
|           |         | HOPP            | 2DH5        | 1   | 6.00                     | -14.00      | Pass    |
| 8DPSK     | SISO    | 2402            | 3DH5        | 1   | 6.26                     | -13.74      | Pass    |
|           |         | 2441            | 3DH5        | 1   | 6.26                     | -13.74      | Pass    |
|           |         | 2480            | 3DH5        | 1   | 6.26                     | -13.74      | Pass    |
|           |         | HOPP            | 3DH5        | 1   | 6.26                     | -13.74      | Pass    |

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

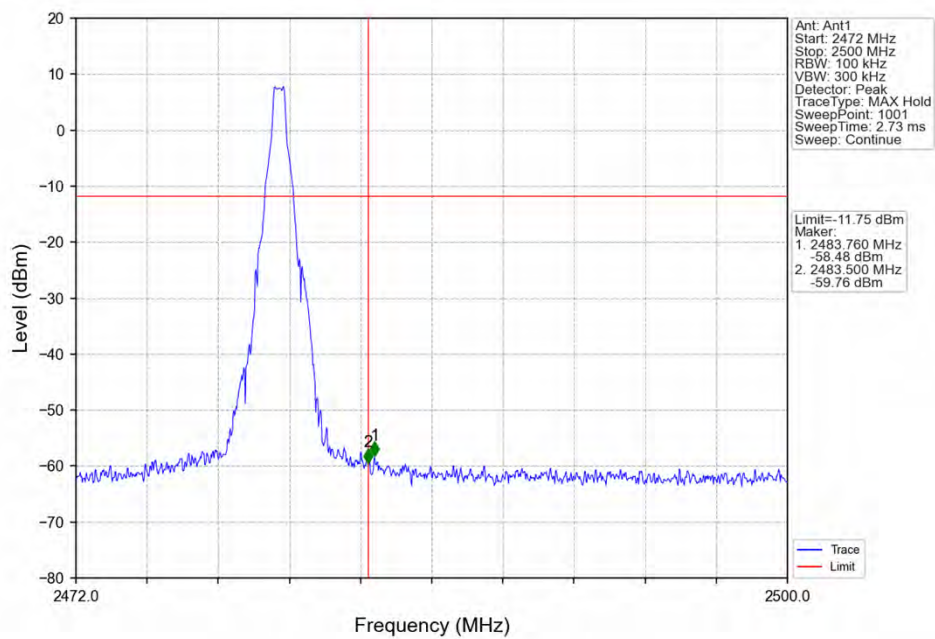
## 6.2.2 Test Graph



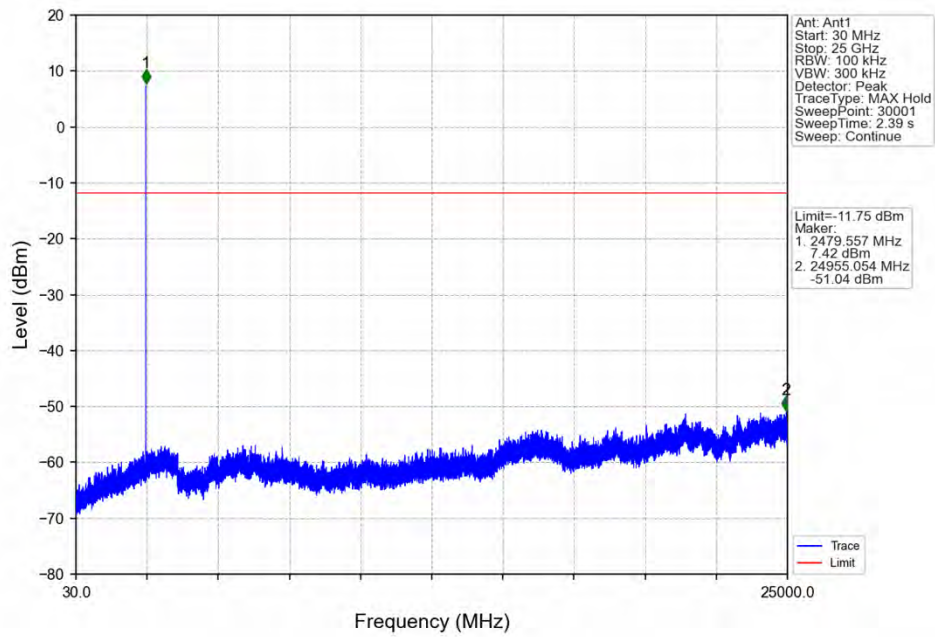
## GFSK\_DH5\_MCH\_2441MHz\_Ant1\_NTNV



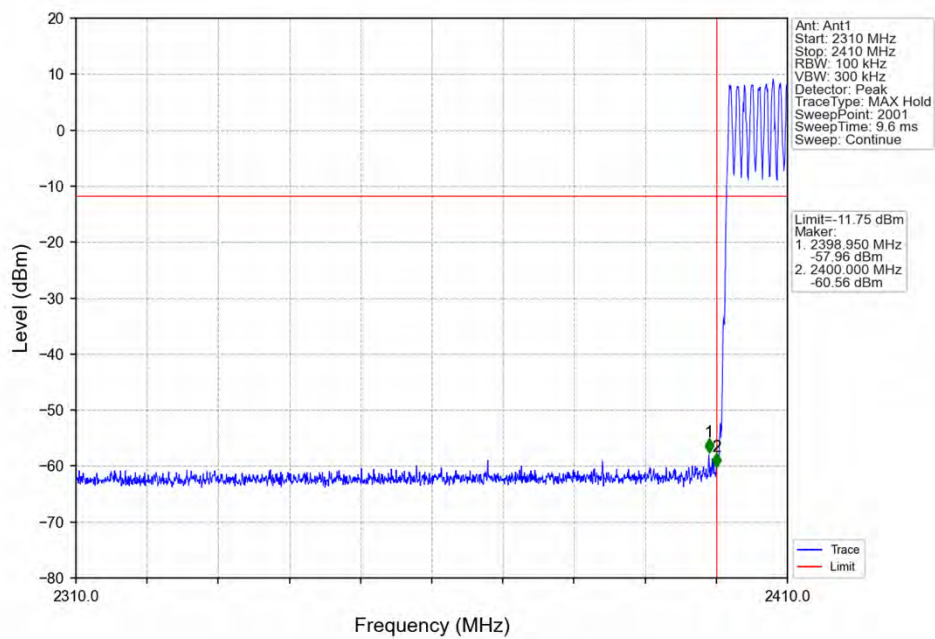
## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



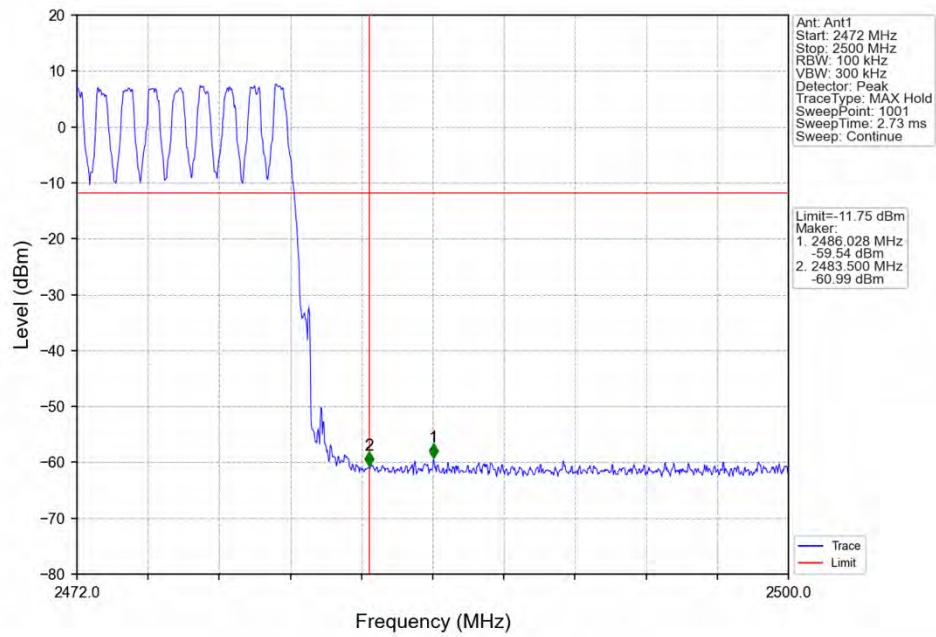
## GFSK\_DH5\_HCH\_2480MHz\_Ant1\_NTNV



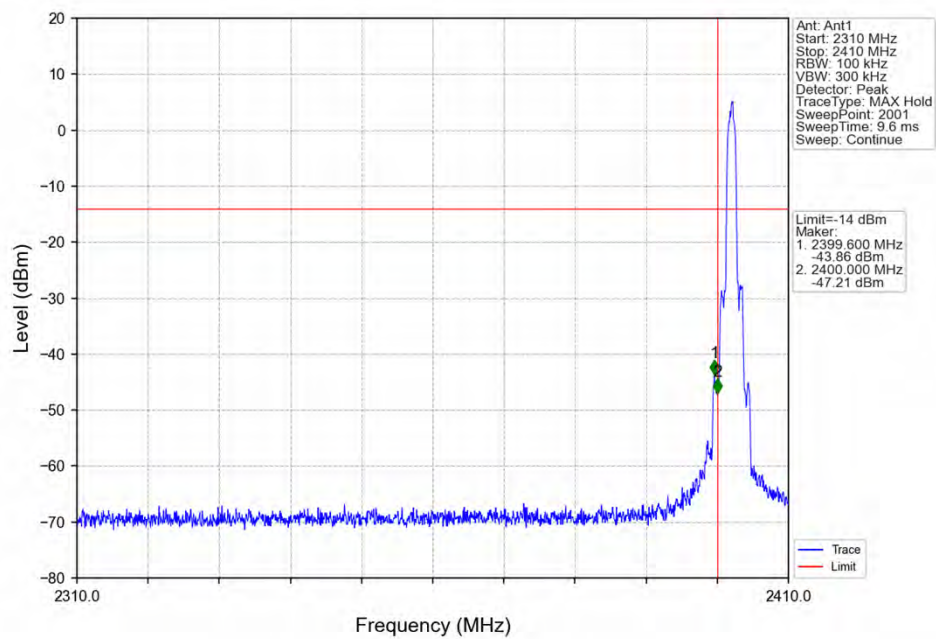
## GFSK\_DH5\_HOPP\_2410MHz\_Ant1\_NTNV



## GFSK\_DH5\_HOPP\_Ant1\_NTNV

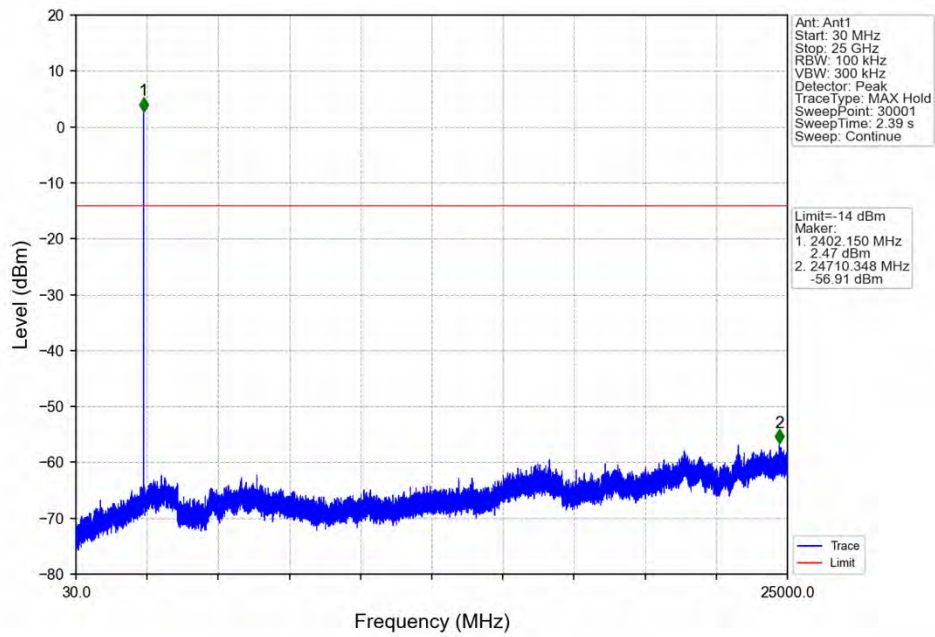


## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV

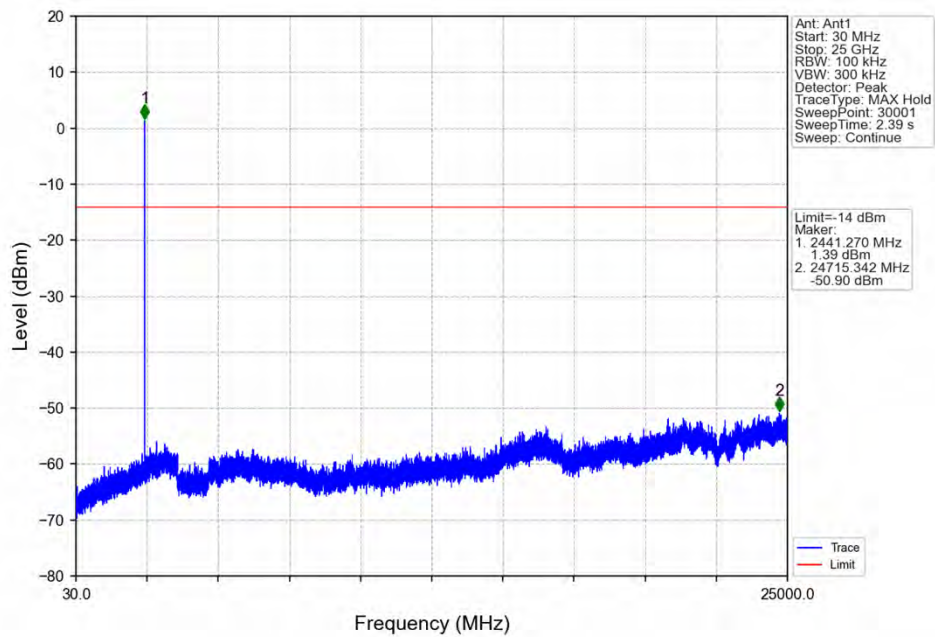




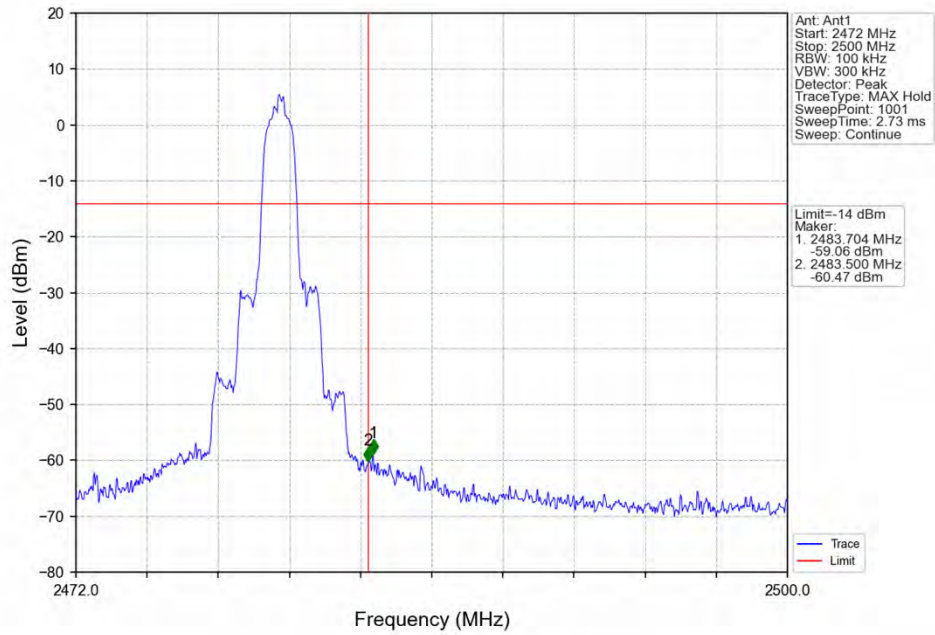
## Pi/4DQPSK\_2DH5\_LCH\_2402MHz\_Ant1\_NTNV



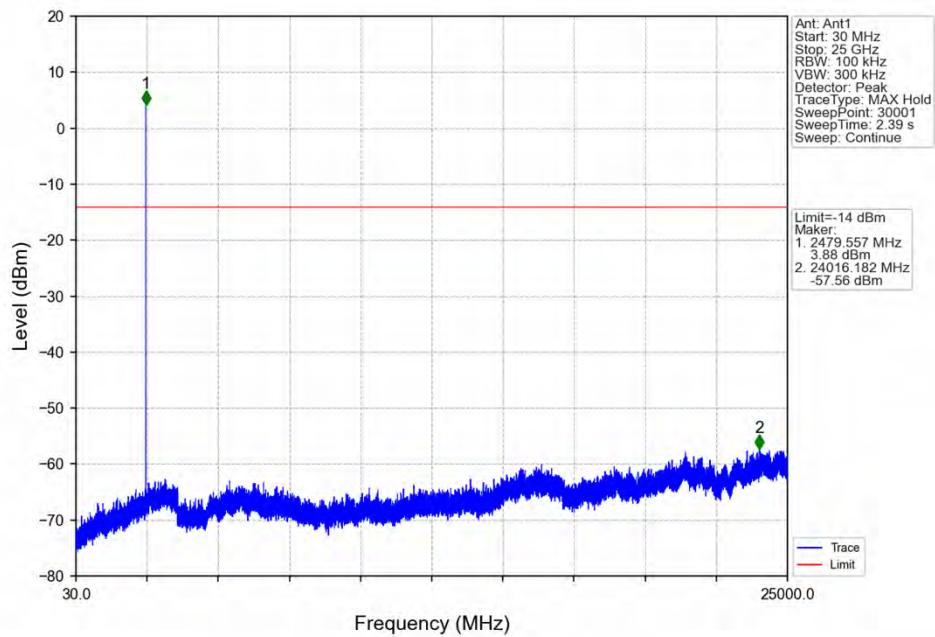
## Pi/4DQPSK\_2DH5\_MCH\_2441MHz\_Ant1\_NTNV



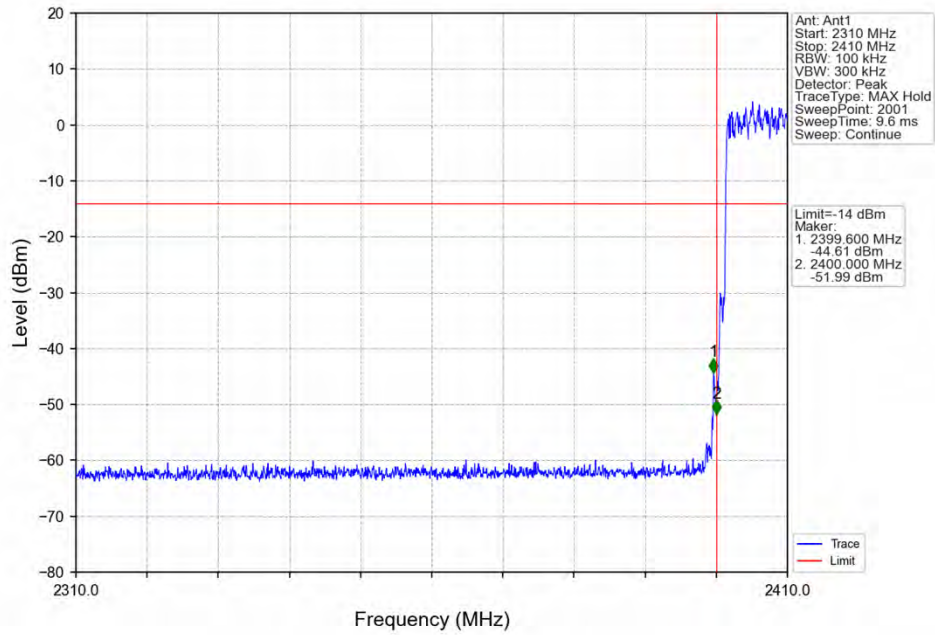
## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



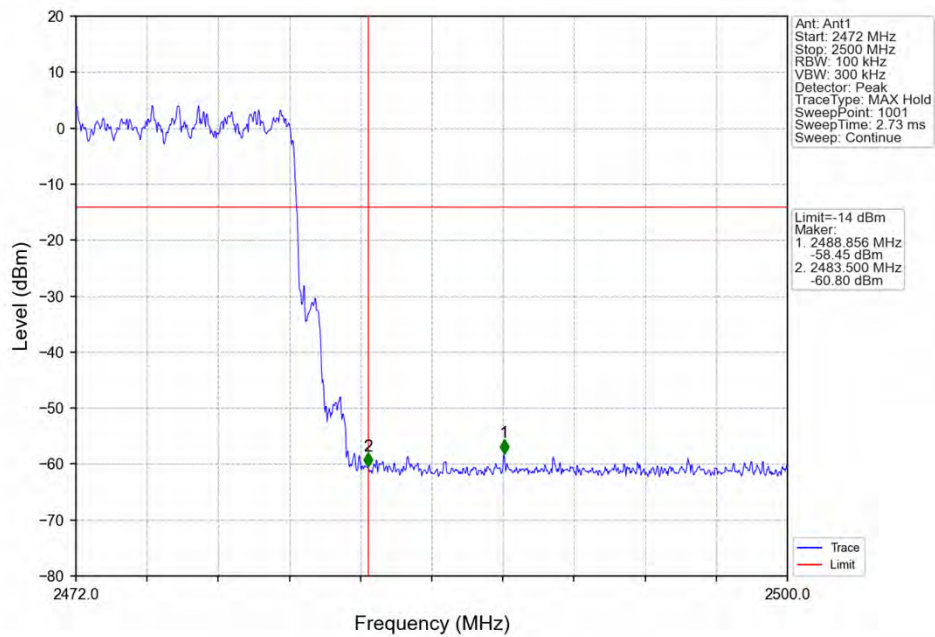
## Pi/4DQPSK\_2DH5\_HCH\_2480MHz\_Ant1\_NTNV



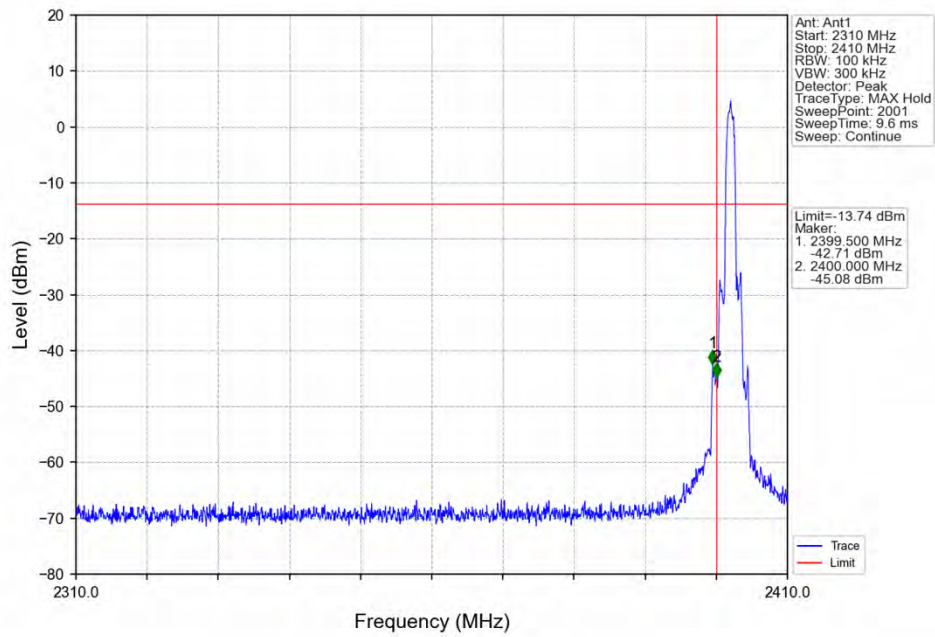
## Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



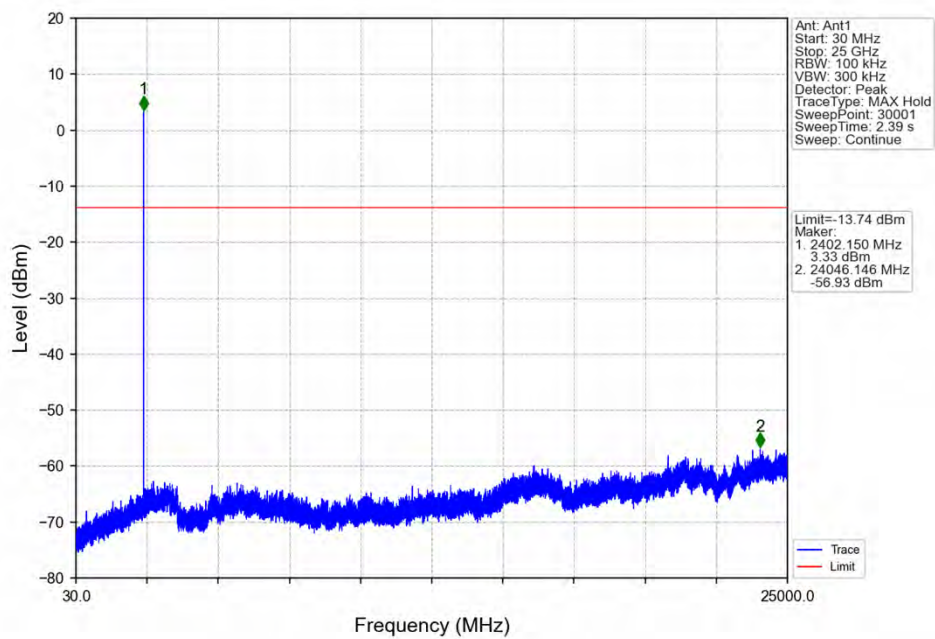
## Pi/4DQPSK\_2DH5\_HOPP\_Ant1\_NTNV



## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV

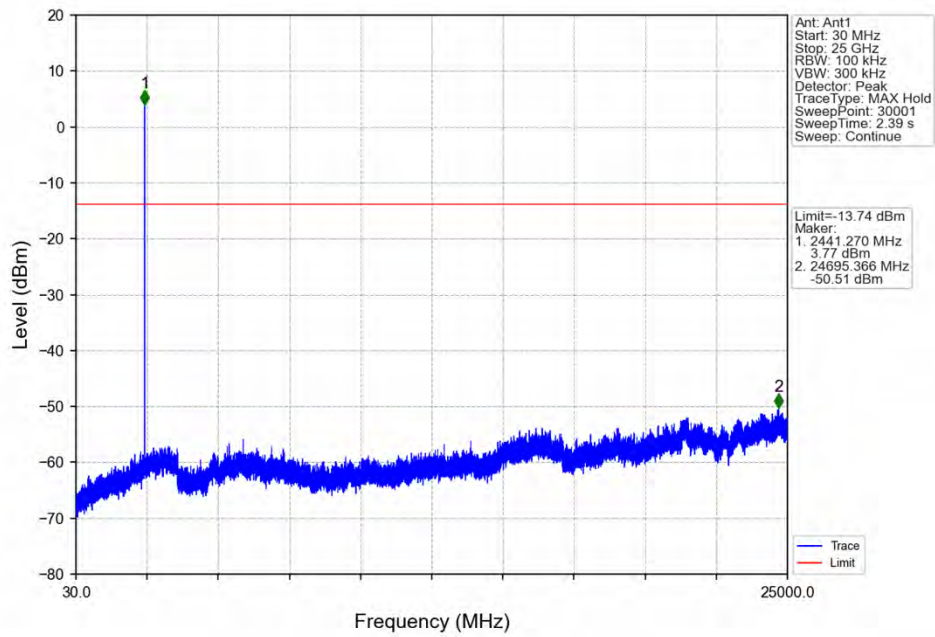


## 8DPSK\_3DH5\_LCH\_2402MHz\_Ant1\_NTNV

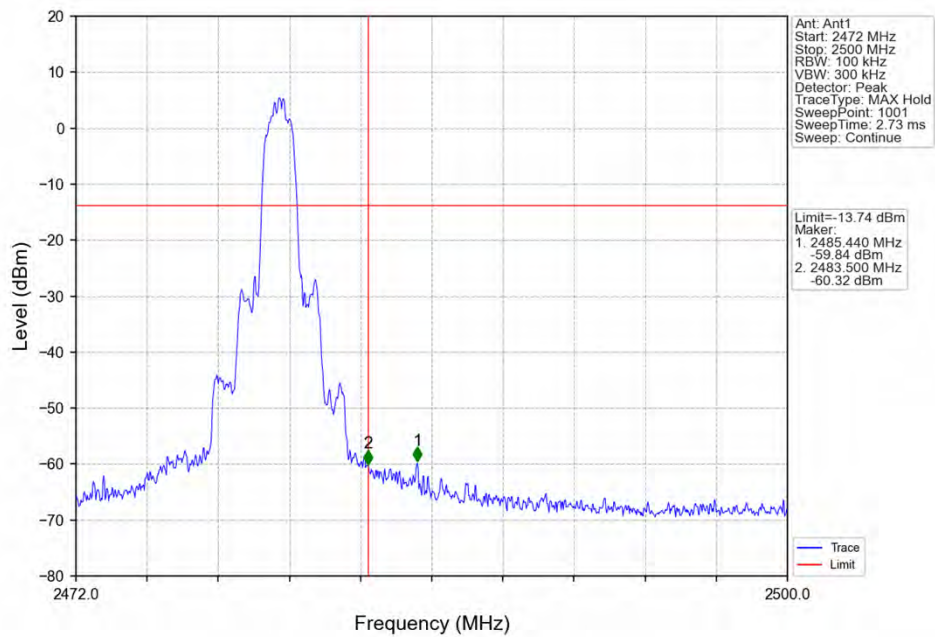




## 8DPSK\_3DH5\_MCH\_2441MHz\_Ant1\_NTNV

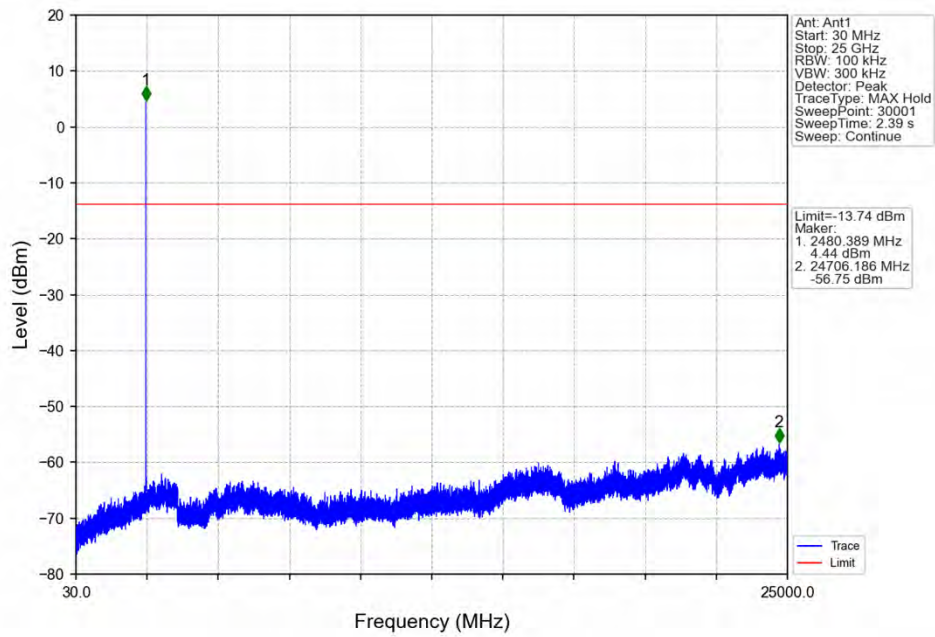


## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV

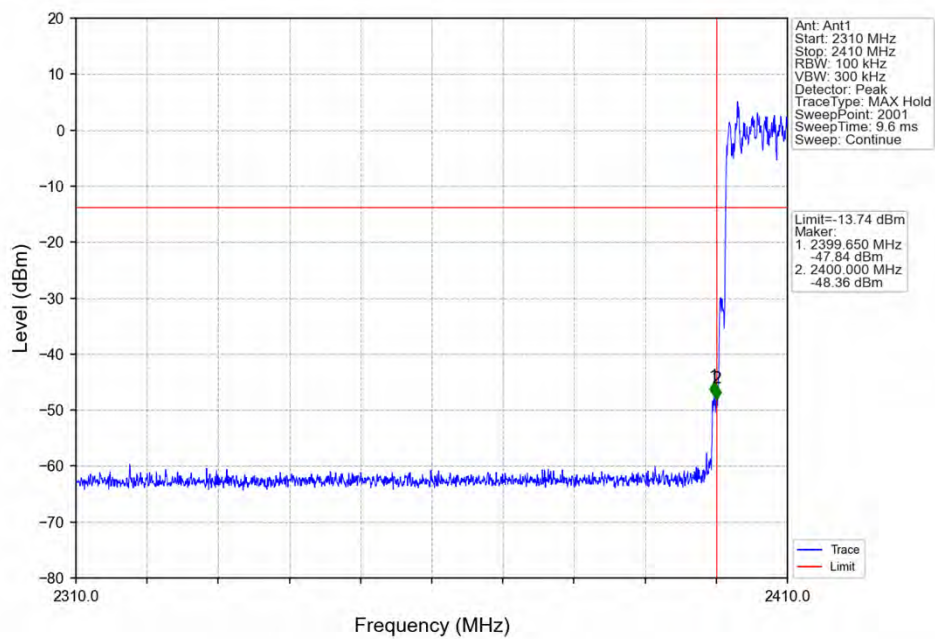




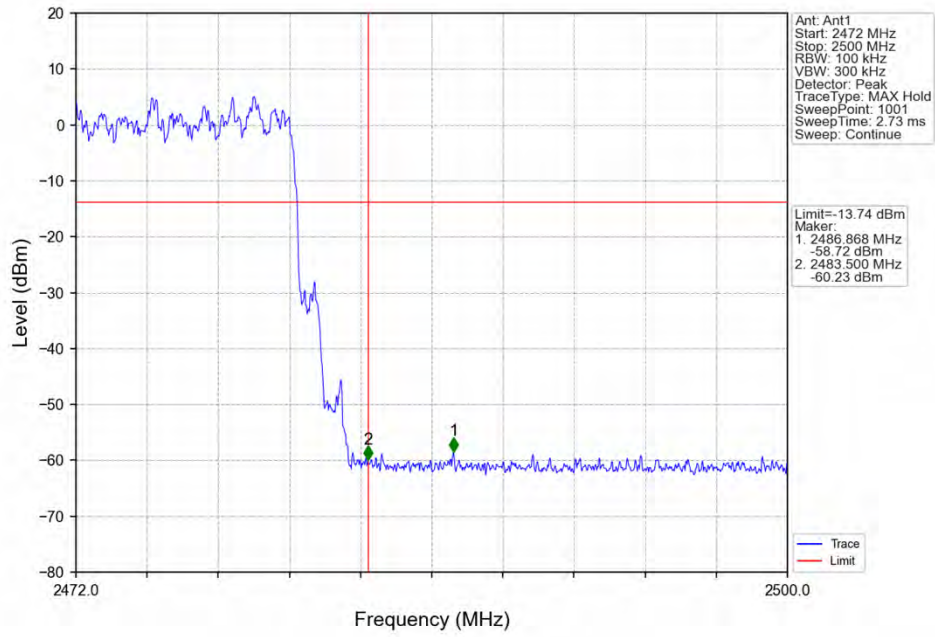
## 8DPSK\_3DH5\_HCH\_2480MHz\_Ant1\_NTNV



## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 8DPSK\_3DH5\_HOPP\_Ant1\_NTNV



## 7. Form731

### 7.1 Form731

#### 7.1.1 Test Result

| Lower Freq (MHz) | High Freq (MHz) | MAX Power (W) | MAX Power (dBm) |
|------------------|-----------------|---------------|-----------------|
| 2402             | 2480            | 0.0077        | 8.84            |

---

(END OF REPORT)