



**CFR 47 FCC PART 15 SUBPART C  
ISED RSS-247 ISSUE 2**

**CERTIFICATION TEST REPORT**

*For*

**Bluetooth Headset**

**MODEL NUMBER: JR310BT**

**FCC ID: APIJBLJR310BT**

**IC: 6132A-JBLJR310BT**

**REPORT NUMBER: 4789485754-5**

**ISSUE DATE: June 01, 2020**

*Prepared for*

**HARMAN INTERNATIONAL INDUSTRIES INC  
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*Prepared by*

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Revision History

| <u>Rev.</u> | <u>Issue Date</u> | <u>Revisions</u> | <u>Revised By</u> |
|-------------|-------------------|------------------|-------------------|
| V0          | 06/01/2020        | Initial Issue    |                   |



| Summary of Test Results                                                                                                                                                                                                                                                                                      |                                           |                                                                                                               |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------|
| Clause                                                                                                                                                                                                                                                                                                       | Test Items                                | FCC/ISED Rules                                                                                                | Test Results |
| 1                                                                                                                                                                                                                                                                                                            | 20dB Bandwidth and 99% Occupied Bandwidth | FCC 15.247 (a) (1)<br>RSS-247 Clause 5.1 (a)<br>RSS-Gen Clause 6.7                                            | Pass         |
| 2                                                                                                                                                                                                                                                                                                            | Conducted Output Power                    | FCC 15.247 (b) (1)<br>RSS-247 Clause 5.1 (b)                                                                  | Pass         |
| 3                                                                                                                                                                                                                                                                                                            | Carrier Hopping Channel Separation        | FCC 15.247 (a) (1)<br>RSS-247 Clause 5.1 (b)                                                                  | Pass         |
| 4                                                                                                                                                                                                                                                                                                            | Number of Hopping Frequency               | 15.247 (a) (1) III<br>RSS-247 Clause 5.1 (d)                                                                  | Pass         |
| 5                                                                                                                                                                                                                                                                                                            | Time of Occupancy (Dwell Time)            | 15.247 (a) (1) III<br>RSS-247 Clause 5.1 (d)                                                                  | Pass         |
| 6                                                                                                                                                                                                                                                                                                            | Conducted Bandedge                        | FCC 15.247 (d)<br>RSS-247 Clause 5.5                                                                          | Pass         |
| 7                                                                                                                                                                                                                                                                                                            | Radiated Bandedge and Spurious            | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9<br>RSS-GEN Clause 8.10 | Pass         |
| 8                                                                                                                                                                                                                                                                                                            | Conducted Emission Test For AC Power Port | FCC 15.207<br>RSS-GEN Clause 8.8                                                                              | Pass         |
| 9                                                                                                                                                                                                                                                                                                            | Antenna Requirement                       | FCC 15.203<br>RSS-GEN Clause 6.8                                                                              | Pass         |
| <b>Note:</b><br>1.This test report is only published to and used by the applicant, and it is not for evidence purpose in China.<br>2.The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C >< ISED RSS-247 > when <Accuracy Method> decision rule is applied. |                                           |                                                                                                               |              |



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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: HARMAN INTERNATIONAL INDUSTRIES INC  
Address: 8500 Balboa Blvd Nothridge CA 91329, UNITED STATES

### Manufacturer Information

Company Name: HARMAN INTERNATIONAL INDUSTRIES INC  
Address: 8500 Balboa Blvd Nothridge CA 91329, UNITED STATES

### EUT Description

EUT Name: Bluetooth Headset  
Model: JR310BT  
Brand: JBL  
Sample Received Date: May 20, 2020  
Sample Status: Normal  
Sample ID: 3072495  
Date of Tested: May 20~29, 2020

| APPLICABLE STANDARDS         |              |
|------------------------------|--------------|
| STANDARD                     | TEST RESULTS |
| CFR 47 FCC PART 15 SUBPART C | PASS         |
| ISED RSS-247 Issue 2         | PASS         |
| ISED RSS-GEN Issue 5         | PASS         |

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accreditation Certificate | <p><b>A2LA (Certificate No.: 4102.01)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p><b>ISED(Company No.: 21320)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p><b>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.<br/>Facility Name:<br/>Chamber D, the VCCI registration No. is G-20019 and R-20004<br/>Shielding Room B , the VCCI registration No. is C-20012 and T-20011</p> |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note:

1. All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China.
2. The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.
3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.



## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Test Item                                                                                                                                     | Uncertainty          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Conduction emission                                                                                                                           | 3.62dB               |
| Radiation Emission test(include Fundamental emission)<br>(9kHz-30MHz)                                                                         | 2.2dB                |
| Radiation Emission test(include Fundamental emission)<br>(30MHz-1GHz)                                                                         | 4.00dB               |
| Radiation Emission test<br>(1GHz to 26GHz)( include Fundamental emission)                                                                     | 5.78dB (1GHz-18GHz)  |
|                                                                                                                                               | 5.23dB (18GHz-26GHz) |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                      |





## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

|                                    |                     |                     |
|------------------------------------|---------------------|---------------------|
| EUT Name                           | Bluetooth Headset   |                     |
| Model                              | JR310BT             |                     |
| Product Description<br>(Bluetooth) | Operation Frequency | 2402 MHz ~ 2480 MHz |
|                                    | Modulation Type     | Data Rate           |
|                                    | GFSK                | 1Mbps               |
|                                    | π/4-DQPSK           | 2Mbps               |
|                                    | 8DPSK               | 3Mbps               |
| Bluetooth Version                  | V5.0 BR+EDR         |                     |
| Input Rating:                      | 5.0 V DC, 1.0 A     |                     |
| Battery                            | 3.7V, 400mAh        |                     |

### 5.2. MAXIMUM OUTPUT POWER

| Bluetooth Mode | Frequency<br>(MHz) | Channel Number | Max PEAK Output<br>Power<br>(dBm) | EIRP<br>(dBm) |
|----------------|--------------------|----------------|-----------------------------------|---------------|
| GFSK           | 2402-2480          | 0-78[79]       | 0.18                              | 3.50          |
| 8DPSK          | 2402-2480          | 0-78[79]       | 0.21                              | 3.53          |

### 5.3. PACKET TYPE CONFIGURATION

| Bluetooth Mode | Test Mode | Setting(Packet Length) |
|----------------|-----------|------------------------|
| GFSK           | DH1       | 27                     |
|                | DH3       | 183                    |
|                | DH5       | 339                    |
| π/4-DQPSK      | 2-DH1     | 54                     |
|                | 2-DH3     | 367                    |
|                | 2-DH5     | 679                    |
| 8DPSK          | 3-DH1     | 83                     |
|                | 3-DH3     | 552                    |
|                | 3-DH5     | 1021                   |



#### 5.4. CHANNEL LIST

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

#### 5.5. TEST CHANNEL CONFIGURATION

| Modulation Type      | Test Channel                          | Frequency                 |
|----------------------|---------------------------------------|---------------------------|
| GFSK                 | CH0, CH39, CH78/<br>Low, Middle, High | 2402MHz, 2441MHz, 2480MHz |
| GFSK-Hopping mode    | /                                     | 2402~2480MHz              |
| 8DPSK                | CH0, CH39, CH78/<br>Low, Middle, High | 2402MHz, 2441MHz, 2480MHz |
| 8DPSK - Hopping mode | /                                     | 2402~2480MHz              |

**5.6. THE WORSE CASE POWER SETTING PARAMETER**

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                         |                             |       |       |
|--------------------------------------------------------------------|-------------------------|-----------------------------|-------|-------|
| Test Software                                                      |                         | Non Signaling Test Tool     |       |       |
| Modulation Type                                                    | Transmit Antenna Number | Test Software setting value |       |       |
|                                                                    |                         | CH 0                        | CH 39 | CH 78 |
| GFSK                                                               | 1                       | 1                           | 1     | 1     |
| 8DPSK                                                              | 1                       | 1                           | 1     | 1     |



## 5.7. DESCRIPTION OF AVAILABLE ANTENNAS

| Antenna | Frequency (MHz) | Antenna Type | MAX Antenna Gain (dBi) |
|---------|-----------------|--------------|------------------------|
| 1       | 2402-2480       | PCB Antenna  | 3.32                   |

Note: The value of the antenna gain was declared by customer.

## 5.8. WORST-CASE CONFIGURATIONS

| Bluetooth Mode | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|----------------|-----------------------|-----------------|------------------|
| BR             | FHSS                  | GFSK(DH5)       | 1Mbit/s          |
| EDR            | FHSS                  | 8DPSK(3DH5)     | 3Mbit/s          |

Note: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

## 5.9. TEST ENVIRONMENT

| Environment Parameter | Selected Values During Tests |            |
|-----------------------|------------------------------|------------|
| Relative Humidity     | 45 ~ 70%                     |            |
| Atmospheric Pressure: | 101kPa                       |            |
| Temperature           | TN                           | 22 ~ 28 °C |
| Voltage:              | VL                           | N/A        |
|                       | VN                           | DC 3.7V    |
|                       | VH                           | N/A        |

Note: VL= Lower Extreme Test Voltage  
VN= Nominal Voltage.  
VH= Upper Extreme Test Voltage  
TN= Normal Temperature



## 5.10. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Item | Equipment | Brand Name | Model Name | P/N |
|------|-----------|------------|------------|-----|
| 1    | Laptop    | Lenovo     | TP00094A   | /   |
| 2    | UART      | /          | /          | /   |

### I/O CABLES

| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|------|----------------|------------|-----------------|---------|
| 1        | USB  | TYPE C         | /          | 1.0             | /       |

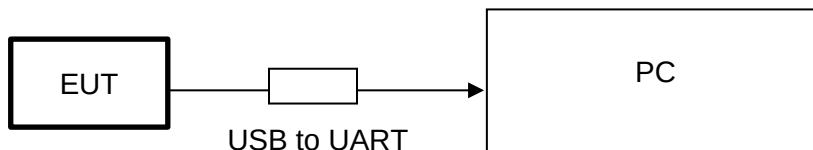
### ACCESSORY

| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| 1    | /         | /          | /          | /           |

### TEST SETUP

The EUT can work in an engineer mode with software through a PC.

### SETUP DIAGRAM FOR TESTS





## 6. MEASURING INSTRUMENT AND SOFTWARE USED

| Conducted Emissions                 |                                         |              |                                     |               |              |              |
|-------------------------------------|-----------------------------------------|--------------|-------------------------------------|---------------|--------------|--------------|
| Instrument                          |                                         |              |                                     |               |              |              |
| Used                                | Equipment                               | Manufacturer | Model No.                           | Serial No.    | Last Cal.    | Next Cal.    |
| <input checked="" type="checkbox"/> | EMI Test Receiver                       | R&S          | ESR3                                | 101961        | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | Two-Line V-Network                      | R&S          | ENV216                              | 101983        | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | Artificial Mains Networks               | Schwarzbeck  | NSLK 8126                           | 8126465       | Dec.05,2019  | Dec.05,2020  |
| Software                            |                                         |              |                                     |               |              |              |
| Used                                | Description                             |              | Manufacturer                        | Name          |              | Version      |
| <input checked="" type="checkbox"/> | Test Software for Conducted disturbance |              | Farad                               | EZ-EMC        |              | Ver. UL-3A1  |
| Radiated Emissions                  |                                         |              |                                     |               |              |              |
| Instrument                          |                                         |              |                                     |               |              |              |
| Used                                | Equipment                               | Manufacturer | Model No.                           | Serial No.    | Last Cal.    | Next Cal.    |
| <input checked="" type="checkbox"/> | MXE EMI Receiver                        | KESIGHT      | N9038A                              | MY56400036    | Dec.06,2019  | Dec.06,2020  |
| <input checked="" type="checkbox"/> | Hybrid Log Periodic Antenna             | TDK          | HLP-3003C                           | 130960        | Sep.17, 2018 | Sep.17, 2021 |
| <input checked="" type="checkbox"/> | Preamplifier                            | HP           | 8447D                               | 2944A09099    | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | EMI Measurement Receiver                | R&S          | ESR26                               | 101377        | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | Horn Antenna                            | TDK          | HRN-0118                            | 130939        | Sep.17, 2018 | Sep.17, 2021 |
| <input checked="" type="checkbox"/> | High Gain Horn Antenna                  | Schwarzbeck  | BBHA-9170                           | 691           | Aug.11, 2018 | Aug.11, 2021 |
| <input checked="" type="checkbox"/> | Preamplifier                            | TDK          | PA-02-0118                          | TRS-305-00066 | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | Preamplifier                            | TDK          | PA-02-2                             | TRS-307-00003 | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | Loop antenna                            | Schwarzbeck  | 1519B                               | 00008         | Jan.07, 2019 | Jan.07, 2022 |
| <input checked="" type="checkbox"/> | Band Reject Filter                      | Wainwright   | WRCJV8-2350-2400-2483.5-2533.5-40SS | 4             | Dec.05,2019  | Dec.05,2020  |
| <input checked="" type="checkbox"/> | High Pass Filter                        | Wi           | WHKX10-2700-3000-18000-40SS         | 23            | Dec.05,2019  | Dec.05,2020  |
| Software                            |                                         |              |                                     |               |              |              |
| Used                                | Description                             |              | Manufacturer                        | Name          |              | Version      |
| <input checked="" type="checkbox"/> | Test Software for Radiated disturbance  |              | Farad                               | EZ-EMC        |              | Ver. UL-3A1  |



| Other instruments                   |                   |              |           |            |             |             |
|-------------------------------------|-------------------|--------------|-----------|------------|-------------|-------------|
| Used                                | Equipment         | Manufacturer | Model No. | Serial No. | Last Cal.   | Next Cal.   |
| <input checked="" type="checkbox"/> | Spectrum Analyzer | Keysight     | N9030A    | MY55410512 | Dec.06,2019 | Dec.06,2020 |
| <input checked="" type="checkbox"/> | Power Meter       | Keysight     | N1911A    | MY55416024 | Dec.06,2019 | Dec.06,2020 |
| <input checked="" type="checkbox"/> | Power Sensor      | Keysight     | U2021XA   | MY5100022  | Dec.06,2019 | Dec.06,2020 |



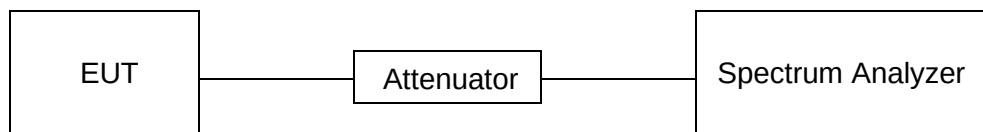
## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only

#### TEST SETUP



#### TEST ENVIRONMENT

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |

#### RESULTS

| Mode  | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T Minimum VBW (kHz) | Final setting For VBW (kHz) |
|-------|----------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|-----------------------------|
| GFSK  | 2.910          | 3.750         | 0.776                 | 77.6%          | 1.10                              | 0.34                  | 0.5                         |
| 8DPSK | 2.910          | 3.750         | 0.776                 | 77.6%          | 1.10                              | 0.34                  | 0.5                         |

Note:

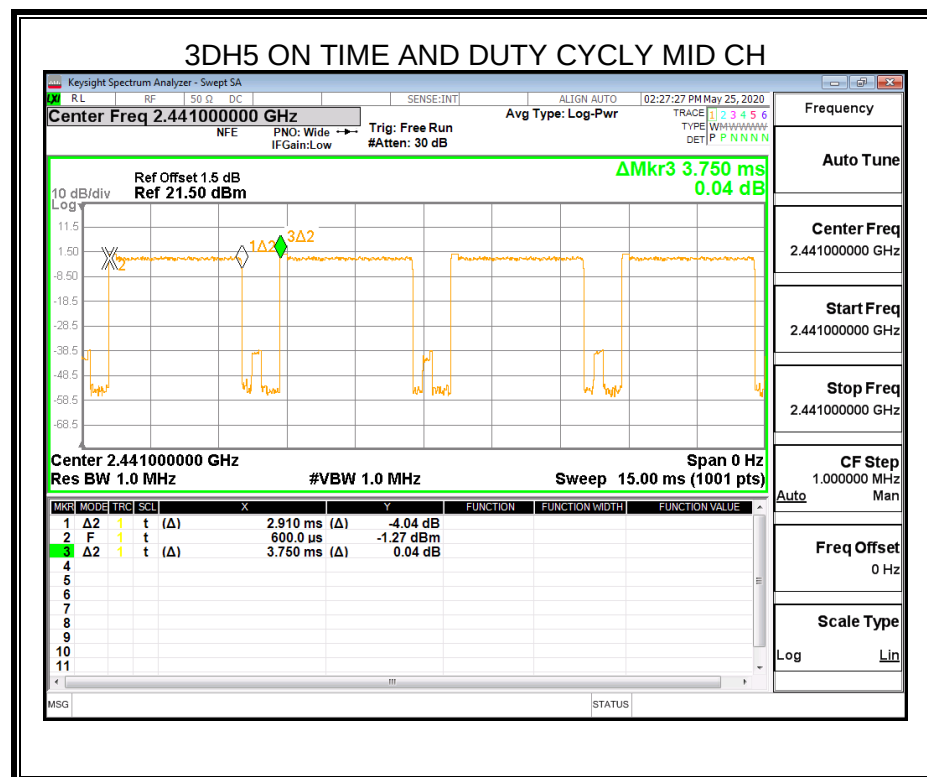
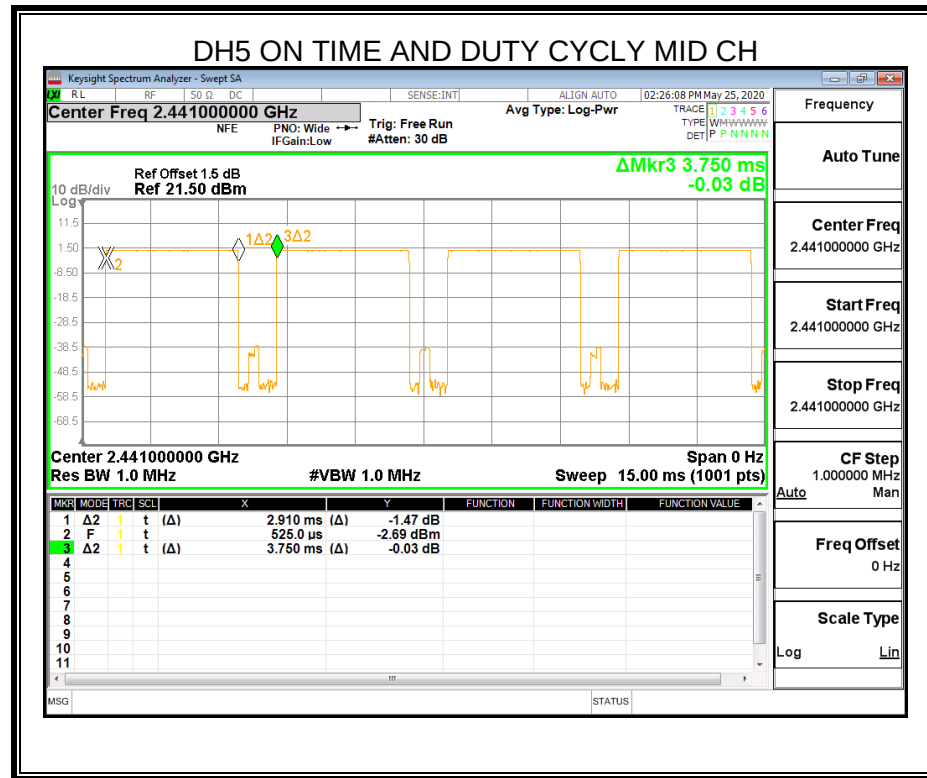
Duty Cycle Correction Factor=10log (1/x).

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.







## 7.2. 20dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

### LIMITS

| CFR 47FCC Part15 (15.247) Subpart C<br>ISED RSS-247 ISSUE 2 |                         |       |                       |
|-------------------------------------------------------------|-------------------------|-------|-----------------------|
| Section                                                     | Test Item               | Limit | Frequency Range (MHz) |
| CFR 47 FCC 15.247 (a) (1)<br>RSS-247 Clause 5.1 (a)         | 20dB Occupied Bandwidth | /     | 2400-2483.5           |
| ISED RSS-Gen Clause 6.7                                     | 99% Occupied Bandwidth  | /     | 2400-2483.5           |

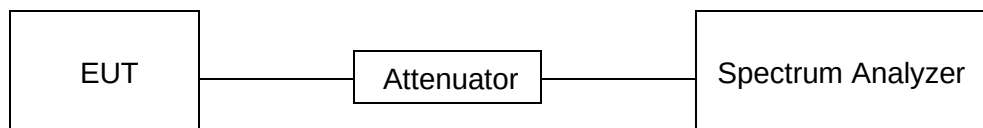
### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

|                  |                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test                                                                                |
| Detector         | Peak                                                                                                                          |
| RBW              | For 20dB:Occupied Bandwidth:1% to 5% of the 20 dB bandwidth<br>For 99%:Occupied Bandwidth: 1% to 5% of the occupied bandwidth |
| VBW              | For 20dB Occupied Bandwidth: approximately 3×RBW<br>For 99% Occupied Bandwidth: ≥ 3×RBW                                       |
| Span             | For 20dB: between 2 times and 5 times the OBW.<br>For 99dB: between 1.5 times and 5.0 times the OBW.                          |
| Trace            | Max hold                                                                                                                      |
| Sweep            | Auto couple                                                                                                                   |

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB and 99% relative to the maximum level measured in the fundamental emission.

### TEST SETUP





#### **TEST ENVIRONMENT**

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |

#### **RESULTS**

Please refer to Appendix A and B.



### 7.3. CONDUCTED OUTPUT POWER

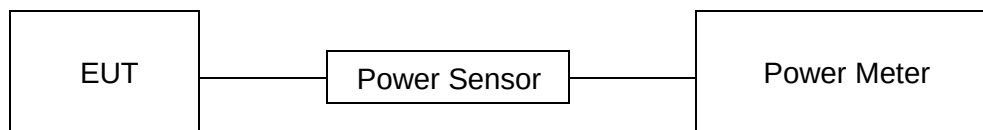
#### LIMITS

| CFR 47 FCC Part15 (15.247) , Subpart C<br>ISED RSS-247 ISSUE 2 |                                   |                                                                                                                                                                                                                                                                                         |                       |
|----------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Section                                                        | Test Item                         | Limit                                                                                                                                                                                                                                                                                   | Frequency Range (MHz) |
| CFR 47 FCC<br>15.247 (b) (1)<br>ISED RSS-247<br>Clause 5.4 (b) | Peak<br>Conducted<br>Output Power | Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel : 1 watt or 30dBm;<br>Hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel : 125 mW or 21dBm | 2400-2483.5           |

#### TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.  
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.  
Measure peak power of each channel.

#### TEST SETUP





**TEST ENVIRONMENT**

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |

**RESULTS**

Please refer to Appendix C.



## 7.4. CARRIER HOPPING CHANNEL SEPARATION

### LIMITS

| CFR 47 FCC Part15 (15.247) , Subpart C<br>ISED RSS-247 ISSUE 2 |                                             |                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
|----------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Section                                                        | Test Item                                   | Limit                                                                                                                                                                                                                                                                                                                                                                                                   | Frequency Range (MHz) |
| CFR 47 FCC<br>15.247 (a) (1)<br>ISED RSS-247<br>Clause 5.1 (b) | Carrier<br>Hopping<br>Channel<br>Separation | Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.<br>Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel. | 2400-2483.5           |

### TEST PROCEDURE

Connect the UUT to the spectrum Analyzer and use the following settings:

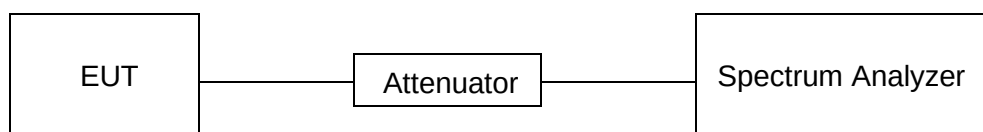
|                  |                                                                                                                                                 |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Center Frequency | The center frequency of the channel under test                                                                                                  |
| Span             | wide enough to capture the peaks of two adjacent channels                                                                                       |
| Detector         | Peak                                                                                                                                            |
| RBW              | Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. |
| VBW              | $\geq$ RBW                                                                                                                                      |
| Trace            | Max hold                                                                                                                                        |
| Sweep time       | Auto couple                                                                                                                                     |

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

Compliance of an EUT with the appropriate regulatory limit shall be determined.

A plot of the data shall be included in the test report.

### TEST SETUP





#### **TEST ENVIRONMENT**

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |

#### **RESULTS**

Please refer to Appendix D.



## 7.5. NUMBER OF HOPPING FREQUENCY

### LIMITS

| CFR 47 FCC Part15 (15.247) , Subpart C<br>ISED RSS-247 ISSUE 2 |                             |                              |
|----------------------------------------------------------------|-----------------------------|------------------------------|
| Section                                                        | Test Item                   | Limit                        |
| CFR 47 15.247 (a) (1) III<br>ISED RSS-247 Clause 5.1 (d)       | Number of Hopping Frequency | at least 15 hopping channels |

### TEST PROCEDURE

Connect the EUT to the spectrum Analyzer and use the following settings:

|            |                                                                                                                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Detector   | Peak                                                                                                                                           |
| RBW        | To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. |
| VBW        | ≥RBW                                                                                                                                           |
| Span       | The frequency band of operation                                                                                                                |
| Trace      | Max hold                                                                                                                                       |
| Sweep time | Auto couple                                                                                                                                    |

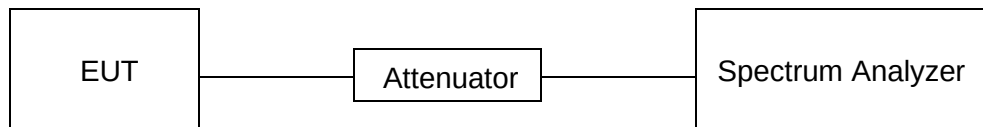
Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.

Count the quantity of peaks to get the number of hopping channels.

FHSS Mode: 79 Channels observed.

AFHSS Mode: 20 Channels declared.

### TEST SETUP



### TEST ENVIRONMENT

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |





## **RESULTS**

Please refer to Appendix F



## 7.6. TIME OF OCCUPANCY (DWELL TIME)

### LIMITS

| CFR 47 FCC Part15 (15.247) , Subpart C<br>ISED RSS-247 ISSUE 2 |                                      |                                                                                                                                                                           |
|----------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section                                                        | Test Item                            | Limit                                                                                                                                                                     |
| CFR 47 15.247 (a) (1) III<br>ISED RSS-247 Clause 5.1 (d)       | Time of<br>Occupancy<br>(Dwell Time) | 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. |

### TEST PROCEDURE

Connect the UUT to the spectrum Analyzer and use the following settings:

|                  |                                                                   |
|------------------|-------------------------------------------------------------------|
| Center Frequency | The center frequency of the channel under test                    |
| Detector         | Average                                                           |
| RBW              | 1MHz                                                              |
| VBW              | ≥RBW                                                              |
| Span             | zero span                                                         |
| Trace            | Clear Write                                                       |
| Sweep time       | As necessary to capture the entire dwell time per hopping channel |

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.  
 $A \text{ Period Time} = (\text{channel number}) \times 0.4$

For FHSS Mode (79 Channel):

DH1 Time Slot: Reading \*  $(1600/2) \times 31.6 / (\text{channel number})$

DH3 Time Slot: Reading \*  $(1600/4) \times 31.6 / (\text{channel number})$

DH5 Time Slot: Reading \*  $(1600/6) \times 31.6 / (\text{channel number})$

For AFHSS Mode (20 Channel):

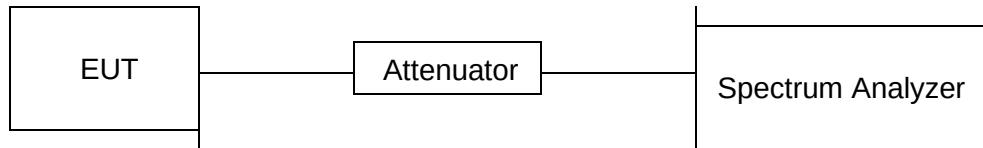
DH1 Time Slot: Reading \*  $(800/2) \times 8 / (\text{channel number})$

DH3 Time Slot: Reading \*  $(800/4) \times 8 / (\text{channel number})$

DH5 Time Slot: Reading \*  $(800/6) \times 8 / (\text{channel number})$



### TEST SETUP



### TEST ENVIRONMENT

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |

### RESULTS

Please refer to Appendix E.



## 7.7. CONDUCTED SPURIOUS EMISSION

### LIMITS

| CFR 47 FCC Part15 (15.247) , Subpart C<br>ISED RSS-247 ISSUE 2 |                                |                                                                                                                               |
|----------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Section                                                        | Test Item                      | Limit                                                                                                                         |
| CFR 47 FCC §15.247 (d)<br>ISED RSS-247 5.5                     | Conducted<br>Spurious Emission | at least 20 dB below that in the 100 kHz<br>bandwidth within the band that contains the<br>highest level of the desired power |

### TEST PROCEDURE

For Bandedge use the following settings:

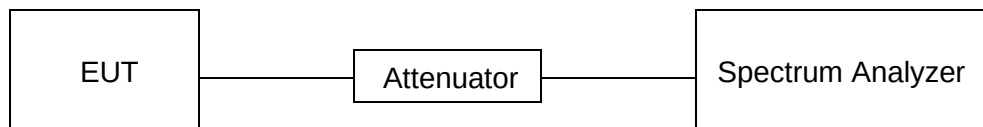
|            |                                                          |
|------------|----------------------------------------------------------|
| Detector   | Peak                                                     |
| RBW        | 100kHz                                                   |
| VBW        | 300kHz                                                   |
| Span       | wide enough to fully capture the emission being measured |
| Trace      | Max hold                                                 |
| Sweep time | Auto couple.                                             |

For Spurious Emission use the following settings:

|            |                                                          |
|------------|----------------------------------------------------------|
| Detector   | Peak                                                     |
| RBW        | 100kHz                                                   |
| VBW        | 300kHz                                                   |
| Span       | wide enough to fully capture the emission being measured |
| Trace      | Max hold                                                 |
| Sweep time | Auto couple.                                             |

Use the peak marker function to determine the maximum amplitude level.

### TEST SETUP



### TEST ENVIRONMENT

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 24.0°C | Relative Humidity | 67.7%   |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |



## **RESULTS**

Please refer to Appendix G & H.



## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Please refer to ISED RSS-GEN Clause 8.9 and Clause 8.10.

Radiation Disturbance Test Limit for FCC (Class B) (9kHz-1GHz)

| Emissions radiated outside of the specified frequency bands above 30MHz |                                    |                                      |         |
|-------------------------------------------------------------------------|------------------------------------|--------------------------------------|---------|
| Frequency Range (MHz)                                                   | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |         |
|                                                                         |                                    | Quasi-Peak                           |         |
| 30 - 88                                                                 | 100                                | 40                                   |         |
| 88 - 216                                                                | 150                                | 43.5                                 |         |
| 216 - 960                                                               | 200                                | 46                                   |         |
| Above 960                                                               | 500                                | 54                                   |         |
| Above 1000                                                              | 500                                | Peak                                 | Average |
|                                                                         |                                    | 74                                   | 54      |

| FCC Emissions radiated outside of the specified frequency bands below 30MHz |                                   |                               |
|-----------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| Frequency (MHz)                                                             | Field strength (microvolts/meter) | Measurement distance (meters) |
| 0.009-0.490                                                                 | 2400/F(kHz)                       | 300                           |
| 0.490-1.705                                                                 | 24000/F(kHz)                      | 30                            |
| 1.705-30.0                                                                  | 30                                | 30                            |

ISED General field strength limits at frequencies below 30 MHz

| Table 6 – General field strength limits at frequencies below 30 MHz |                                          |                          |
|---------------------------------------------------------------------|------------------------------------------|--------------------------|
| Frequency                                                           | Magnetic field strength (H-Field) (μA/m) | Measurement distance (m) |
| 9 - 490 kHz <sup>Note 1</sup>                                       | 6.37/F (F in kHz)                        | 300                      |
| 490 - 1705 kHz                                                      | 63.7/F (F in kHz)                        | 30                       |
| 1.705 - 30 MHz                                                      | 0.08                                     | 30                       |

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



ISED Restricted bands please refer to ISED RSS-GEN Clause 8.10

| MHz                 | MHz                   | GHz           |
|---------------------|-----------------------|---------------|
| 0.090 - 0.110       | 149.9 - 150.05        | 9.0 - 9.2     |
| 0.495 - 0.505       | 156.52475 - 156.52525 | 9.3 - 9.5     |
| 2.1735 - 2.1905     | 156.7 - 156.9         | 10.6 - 12.7   |
| 3.020 - 3.026       | 162.0125 - 167.17     | 13.25 - 13.4  |
| 4.125 - 4.128       | 167.72 - 173.2        | 14.47 - 14.5  |
| 4.17725 - 4.17775   | 240 - 285             | 15.35 - 16.2  |
| 4.20725 - 4.20775   | 322 - 335.4           | 17.7 - 21.4   |
| 5.677 - 5.683       | 399.9 - 410           | 22.01 - 23.12 |
| 6.215 - 6.218       | 608 - 614             | 23.6 - 24.0   |
| 6.26775 - 6.26825   | 960 - 1427            | 31.2 - 31.8   |
| 6.31175 - 6.31225   | 1435 - 1626.5         | 36.43 - 36.5  |
| 8.291 - 8.294       | 1645.5 - 1646.5       | Above 38.6    |
| 8.362 - 8.366       | 1660 - 1710           |               |
| 8.37625 - 8.38675   | 1718.8 - 1722.2       |               |
| 8.41425 - 8.41475   | 2200 - 2300           |               |
| 12.29 - 12.293      | 2310 - 2390           |               |
| 12.51975 - 12.52025 | 2483.5 - 2500         |               |
| 12.57675 - 12.57725 | 2690 - 2900           |               |
| 13.36 - 13.41       | 3260 - 3267           |               |
| 16.42 - 16.423      | 3332 - 3339           |               |
| 16.69475 - 16.69525 | 3345.8 - 3358         |               |
| 16.80425 - 16.80475 | 3500 - 4400           |               |
| 25.5 - 25.67        | 4500 - 5150           |               |
| 37.5 - 38.25        | 5350 - 5460           |               |
| 73 - 74.6           | 7250 - 7750           |               |
| 74.8 - 75.2         | 8025 - 8500           |               |
| 108 - 138           |                       |               |

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

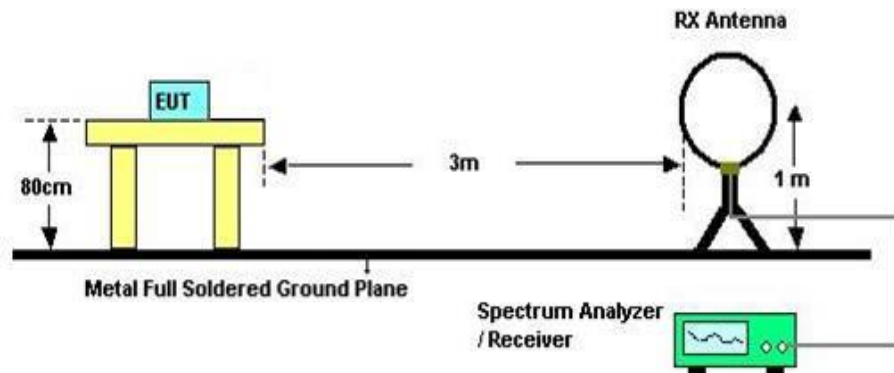
FCC Restricted bands of operation refer to FCC §15.205 (a):

| MHz                      | MHz                 | MHz           | GHz              |
|--------------------------|---------------------|---------------|------------------|
| 0.090-0.110              | 16.42-16.423        | 399.9-410     | 4.5-5.15         |
| <sup>1</sup> 0.495-0.505 | 16.69475-16.69525   | 608-614       | 5.35-5.46        |
| 2.1735-2.1905            | 16.80425-16.80475   | 960-1240      | 7.25-7.75        |
| 4.125-4.128              | 25.5-25.67          | 1300-1427     | 8.025-8.5        |
| 4.17725-4.17775          | 37.5-38.25          | 1435-1626.5   | 9.0-9.2          |
| 4.20725-4.20775          | 73-74.6             | 1645.5-1646.5 | 9.3-9.5          |
| 6.215-6.218              | 74.8-75.2           | 1660-1710     | 10.6-12.7        |
| 6.26775-6.26825          | 108-121.94          | 1718.8-1722.2 | 13.25-13.4       |
| 6.31175-6.31225          | 123-138             | 2200-2300     | 14.47-14.5       |
| 8.291-8.294              | 149.9-150.05        | 2310-2390     | 15.35-16.2       |
| 8.362-8.366              | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4        |
| 8.37625-8.38675          | 156.7-156.9         | 2690-2900     | 22.01-23.12      |
| 8.41425-8.41475          | 162.0125-167.17     | 3260-3267     | 23.6-24.0        |
| 12.29-12.293             | 167.72-173.2        | 3332-3339     | 31.2-31.8        |
| 12.51975-12.52025        | 240-285             | 3345.8-3358   | 36.43-36.5       |
| 12.57675-12.57725        | 322-335.4           | 3600-4400     | ( <sup>2</sup> ) |
| 13.36-13.41              |                     |               |                  |

Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup>Above 38.6c

## TEST SETUP AND PROCEDURE Below 30MHz



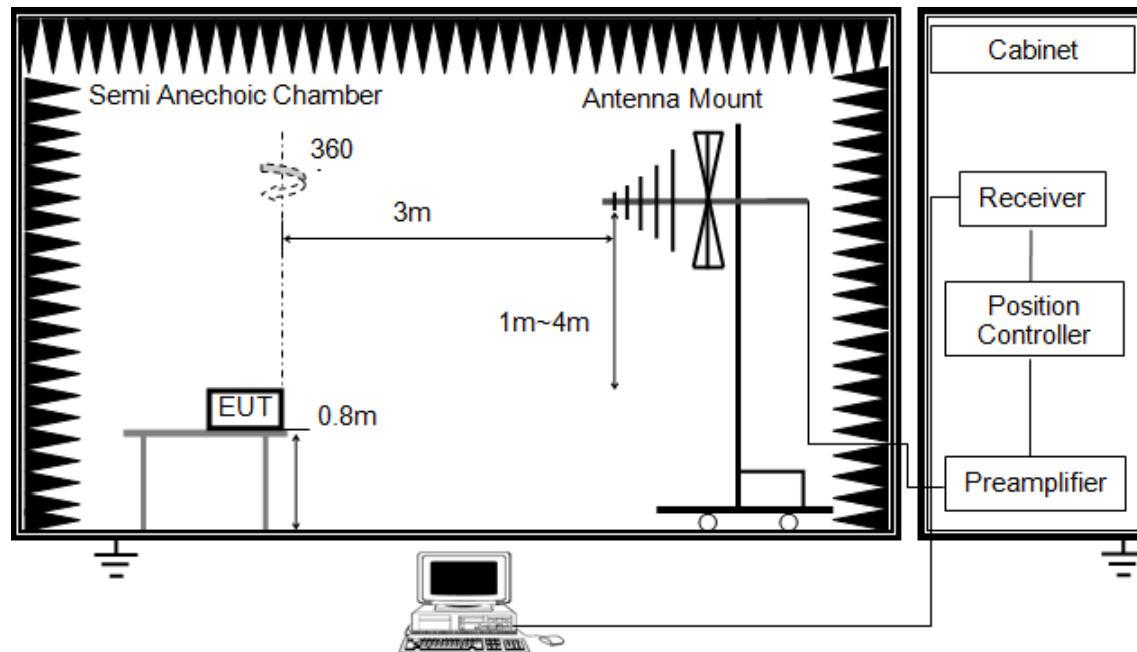
The setting of the spectrum Analyzer

|          |                                                            |
|----------|------------------------------------------------------------|
| RBW      | 200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz) |
| VBW      | 200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz) |
| Sweep    | Auto                                                       |
| Detector | Peak/QP/ Average                                           |
| Trace    | Max hold                                                   |

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m OFS. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.



Below 1G and above 30MHz

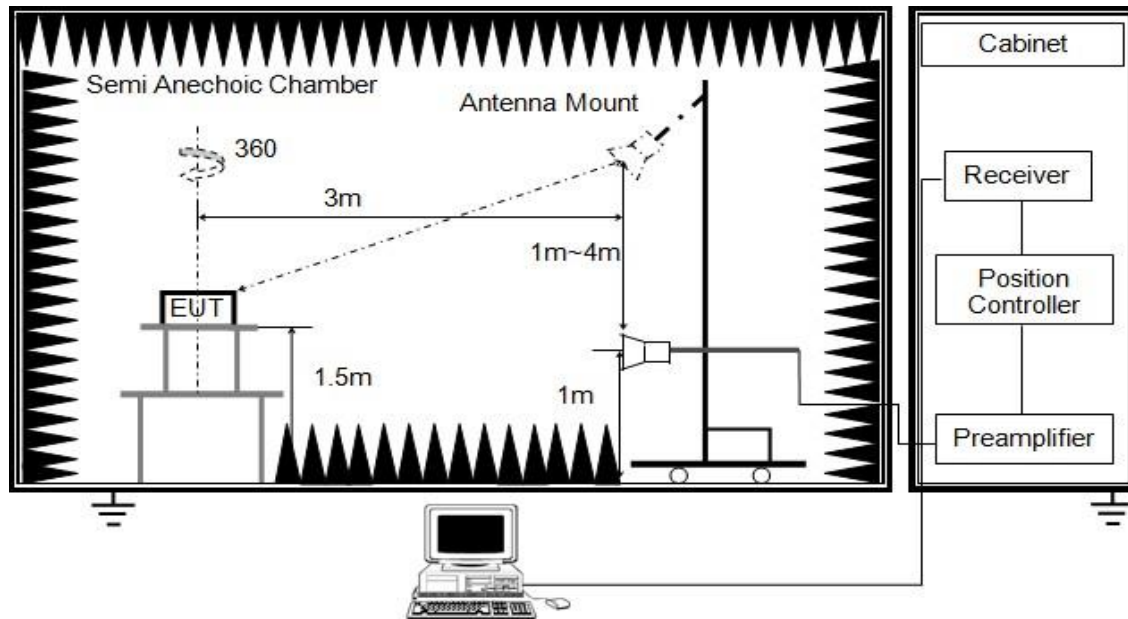


The setting of the spectrum Analyzer

|          |          |
|----------|----------|
| RBW      | 120kHz   |
| VBW      | 300kHz   |
| Sweep    | Auto     |
| Detector | Peak/QP  |
| Trace    | Max hold |

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 80cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peakdetector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

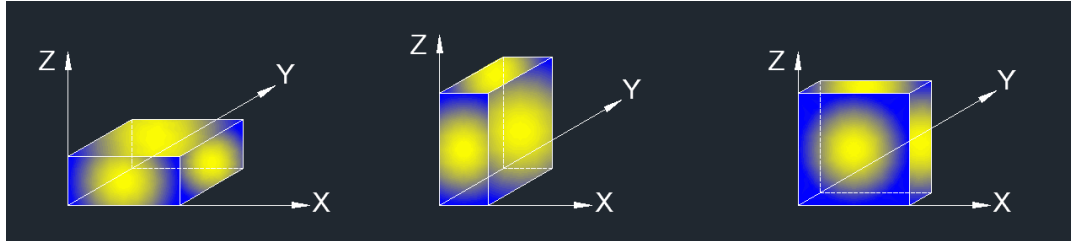
Above 1G



|          |                               |
|----------|-------------------------------|
| RBW      | 1MHz                          |
| VBW      | PEAK: 3MHz<br>AVG: see note 6 |
| Sweep    | Auto                          |
| Detector | Peak                          |
| Trace    | Max hold                      |

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 150cm above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: For radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT does not support simultaneous transmission.

#### TEST ENVIRONMENT

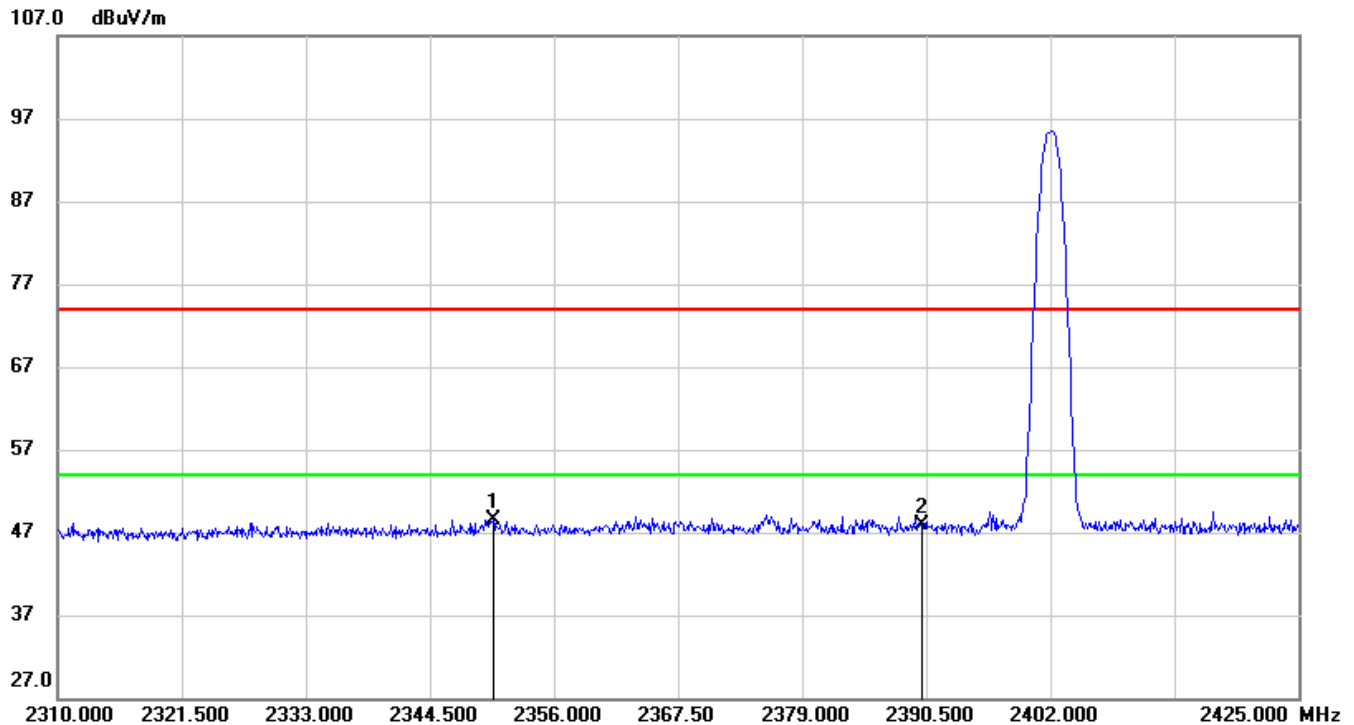
|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 23.5°C | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 3.7V |



## 8.2. RESTRICTED BANDEDGE

### 8.2.1. GFSK MODE

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

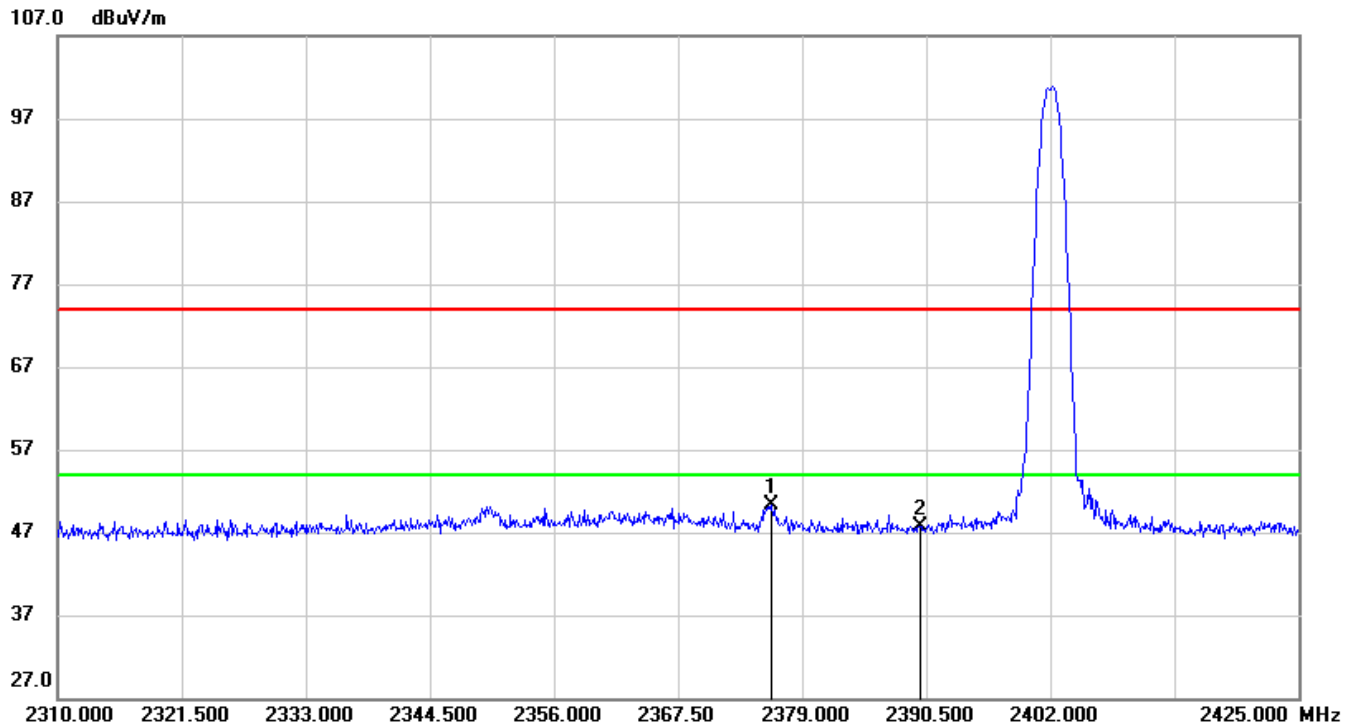


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2350.365           | 15.73             | 32.81             | 48.54              | 74.00             | -25.46         | peak   |
| 2   | 2390.000           | 14.92             | 32.94             | 47.86              | 74.00             | -26.14         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



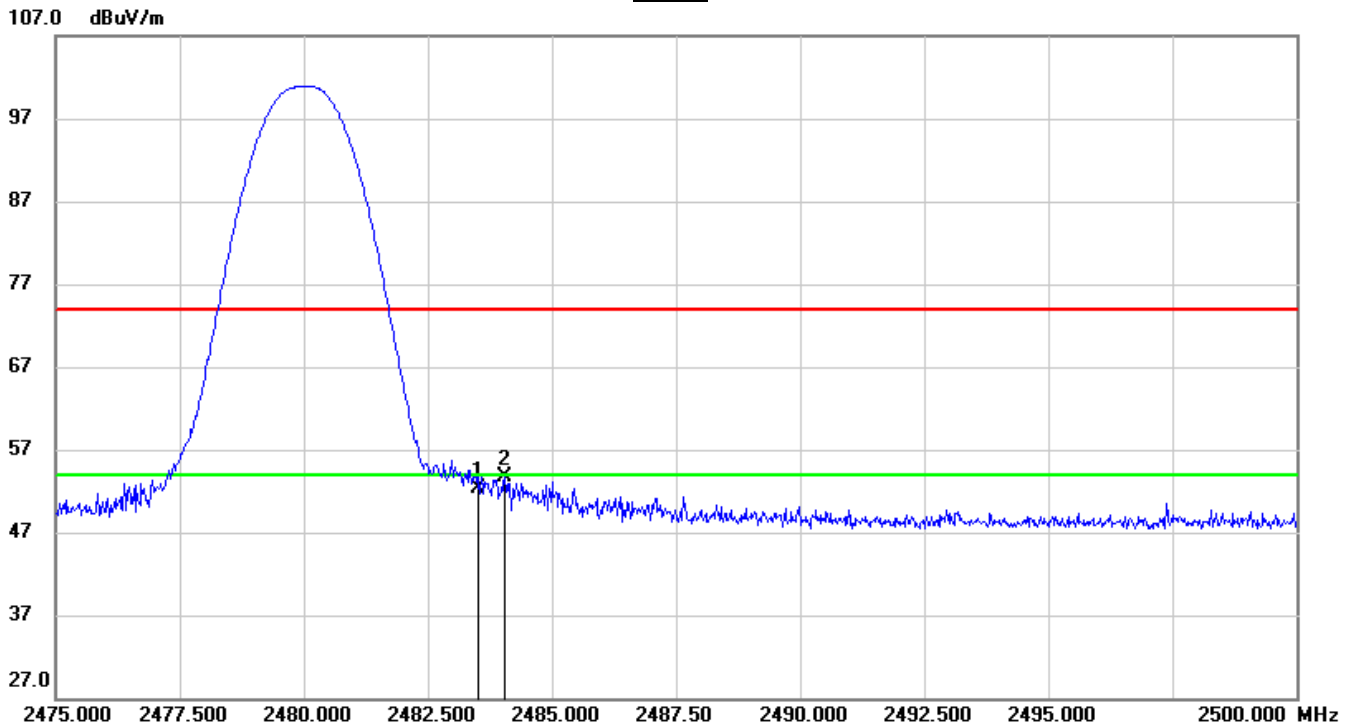
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2376.125           | 17.42             | 32.90             | 50.32              | 74.00             | -23.68         | peak   |
| 2   | 2390.000           | 14.77             | 32.94             | 47.71              | 74.00             | -26.29         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2.If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3.Peak: Peak detector.  
4.Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



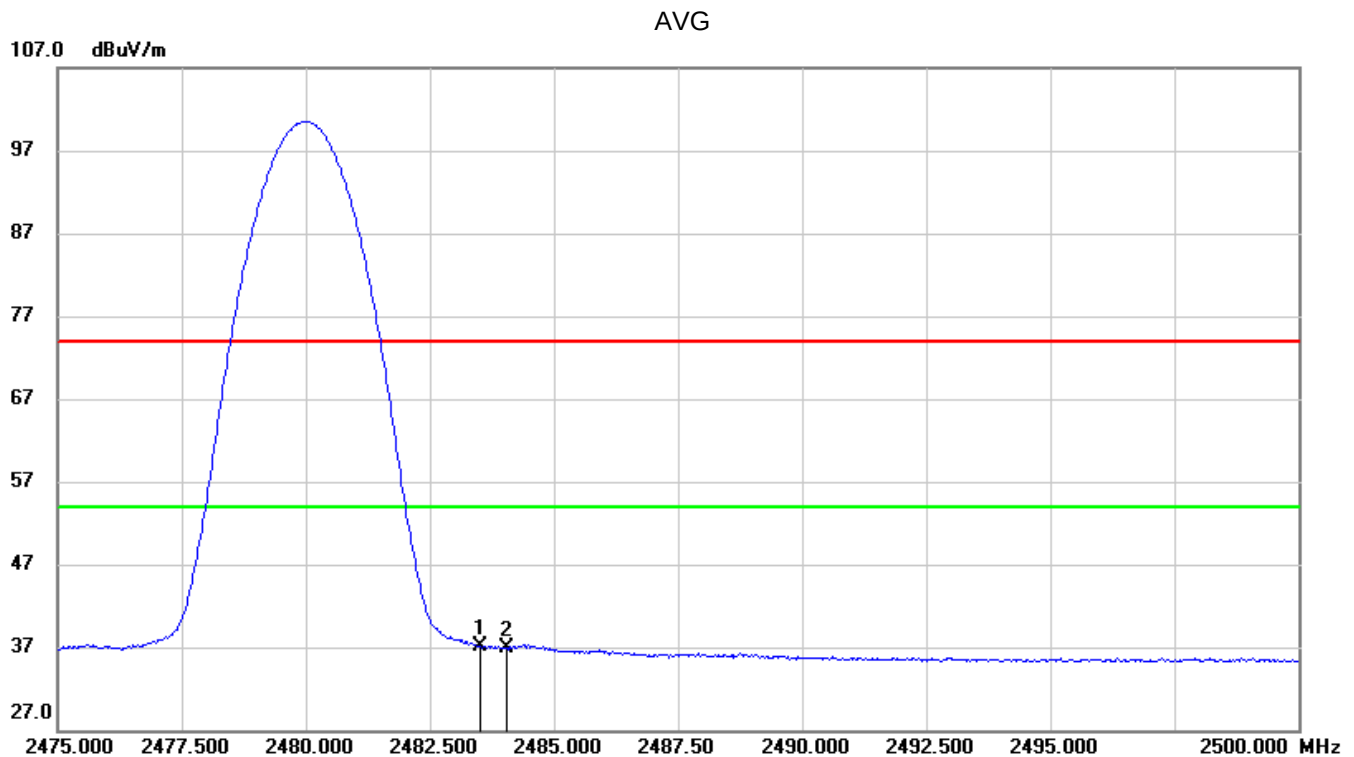
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

**PEAK**



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 18.77             | 33.58             | 52.35              | 74.00             | -21.65         | peak   |
| 2   | 2484.050           | 20.20             | 33.58             | 53.78              | 74.00             | -20.22         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2.If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3.Peak: Peak detector.  
4.Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



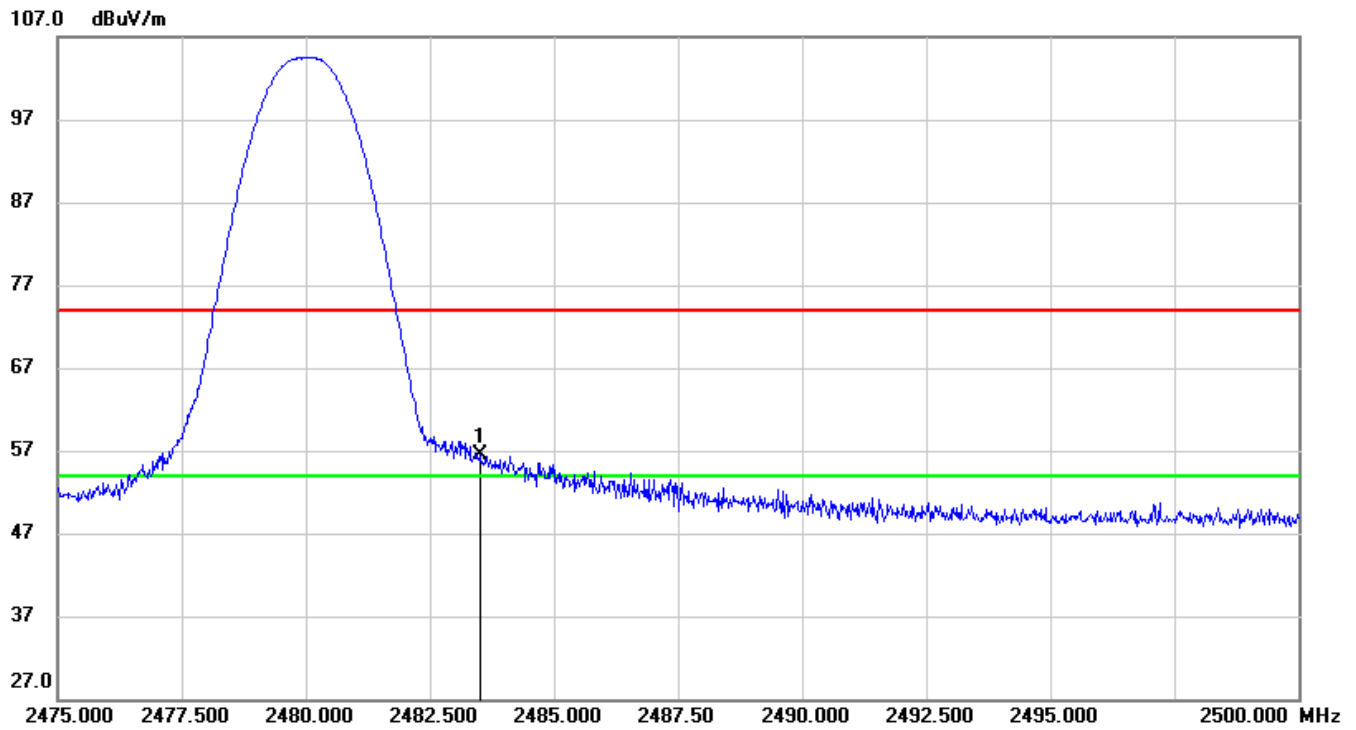
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 3.54              | 33.58             | 37.12              | 54.00             | -16.88         | AVG    |
| 2   | 2484.050           | 3.38              | 33.58             | 36.96              | 54.00             | -17.04         | AVG    |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. AVG:  $VBW=1/Ton$  where: ton is transmit duration.  
4. For transmit duration, please refer to clause 7.1.  
5. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

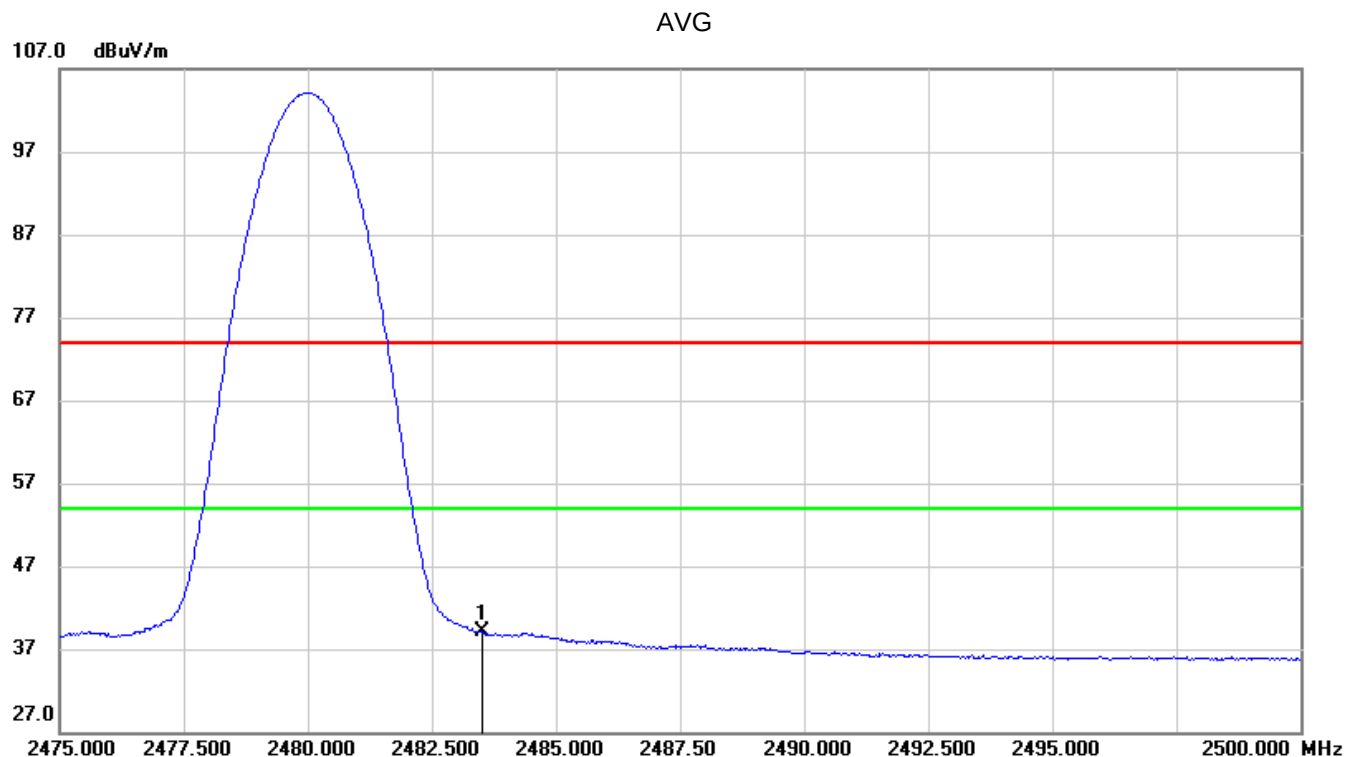
**PEAK**



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 22.89             | 33.58             | 56.47              | 74.00             | -17.53         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2.If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3.Peak: Peak detector.  
4.Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.





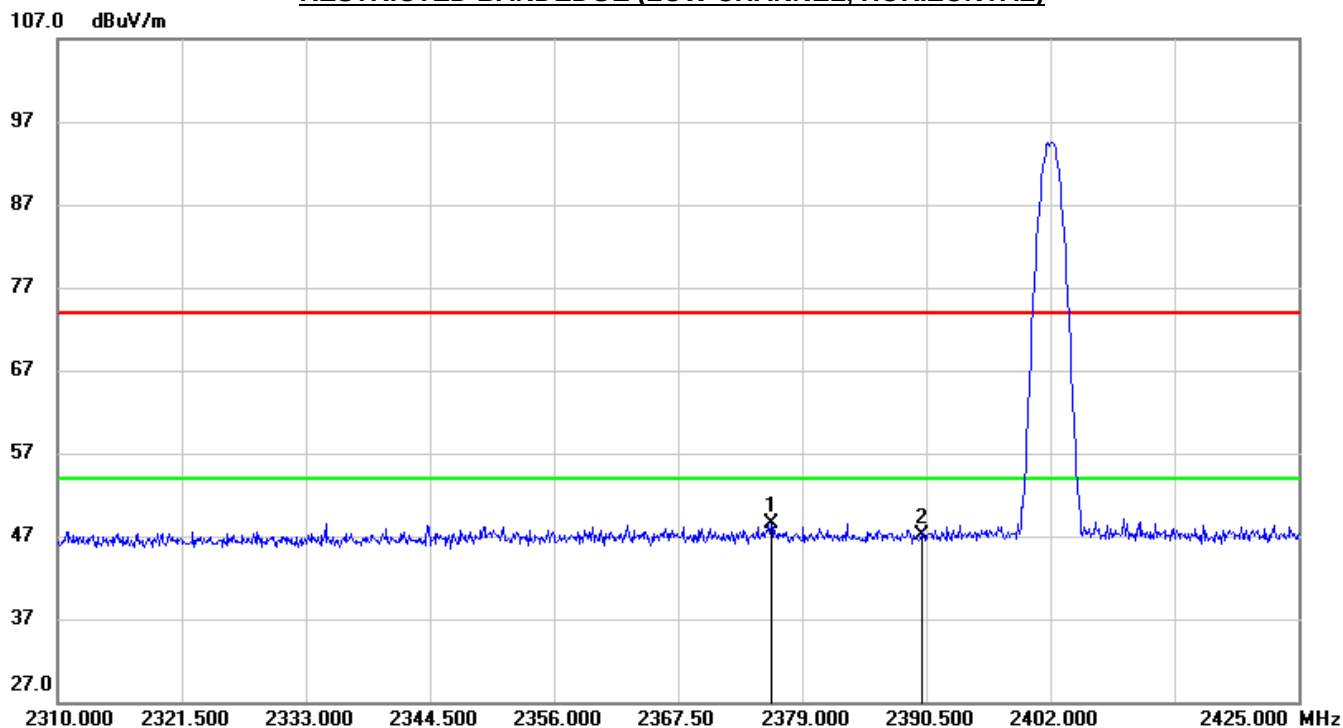
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 5.46              | 33.58             | 39.04              | 54.00             | -14.96         | AVG    |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. AVG:  $VBW=1/Ton$  where: ton is transmit duration.  
4. For transmit duration, please refer to clause 7.1.  
5. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



## 8.2.2. 8DPSK MODE

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

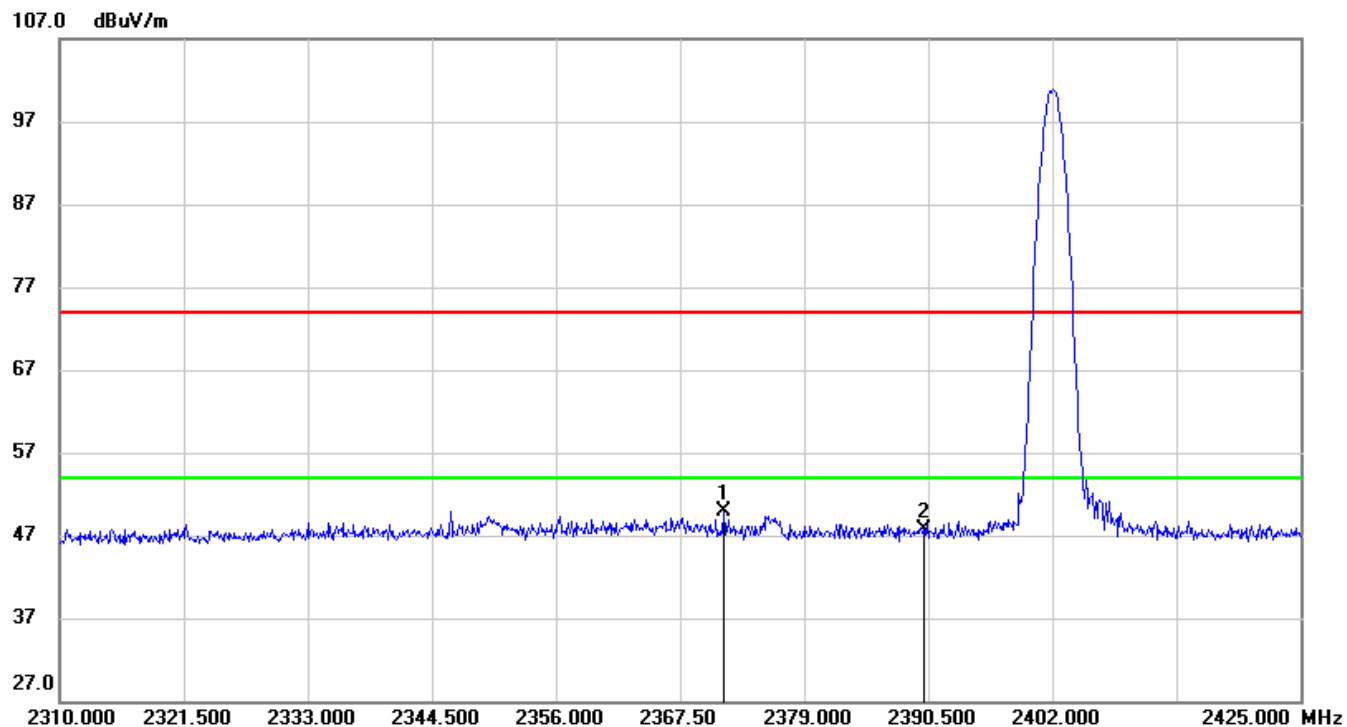


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2376.125           | 15.67             | 32.90             | 48.57              | 74.00             | -25.43         | peak   |
| 2   | 2390.000           | 14.22             | 32.94             | 47.16              | 74.00             | -26.84         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



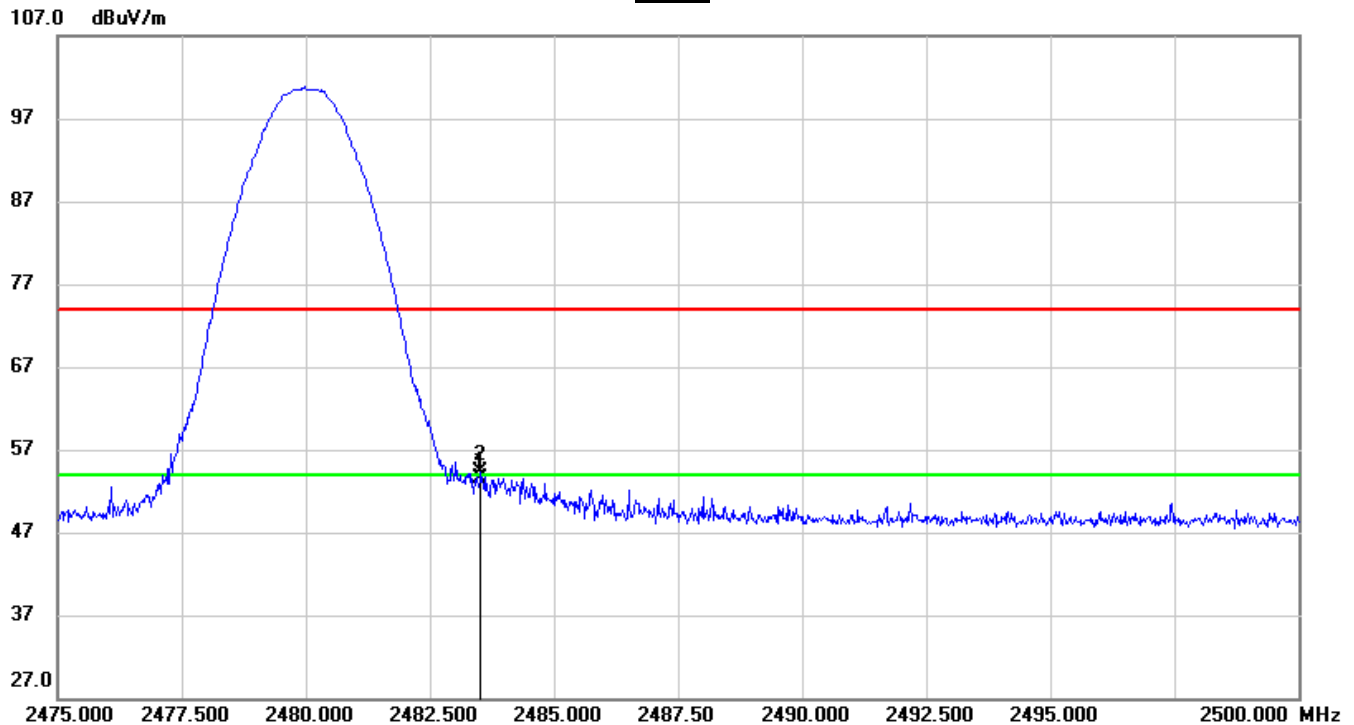
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2371.525           | 17.09             | 32.88             | 49.97              | 74.00             | -24.03         | peak   |
| 2   | 2390.000           | 14.84             | 32.94             | 47.78              | 74.00             | -26.22         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



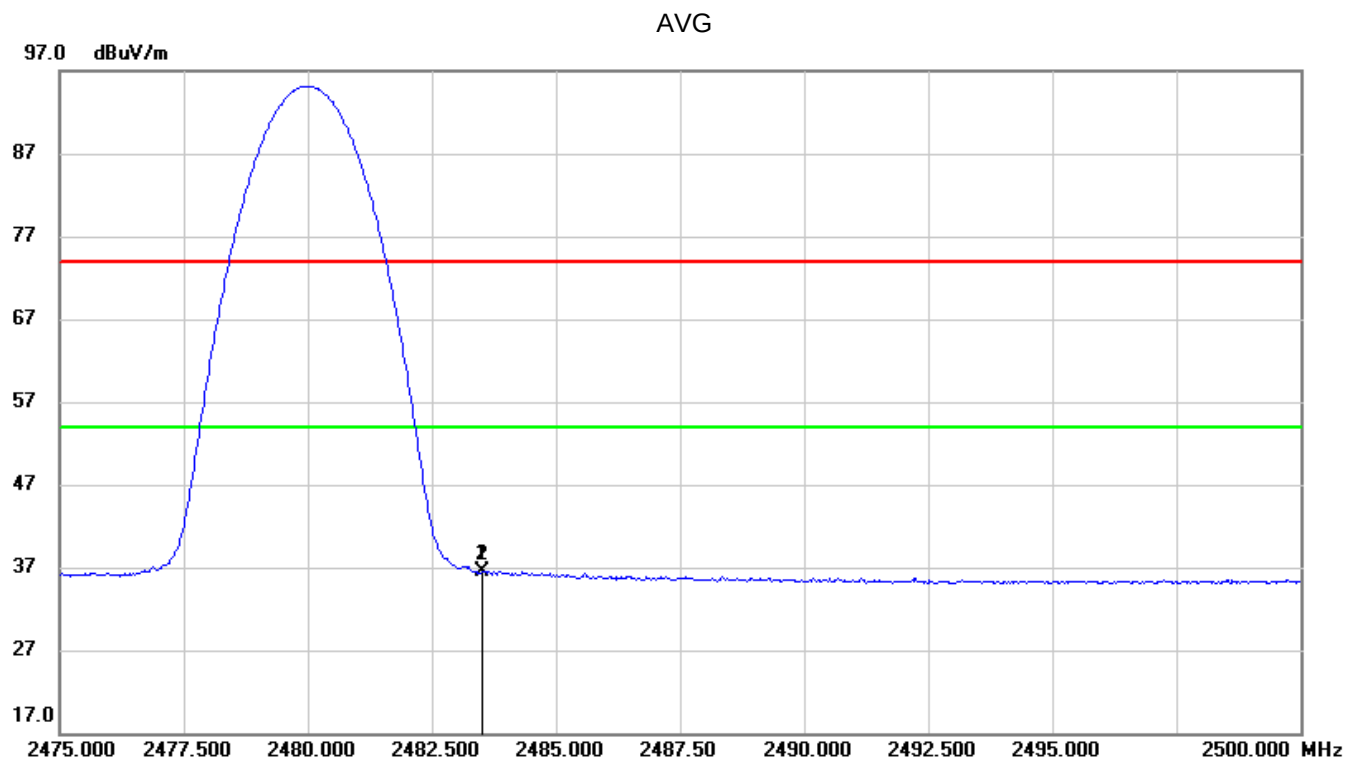
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

**PEAK**



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 19.90             | 33.58             | 53.48              | 74.00             | -20.52         | peak   |
| 2   | 2483.525           | 20.66             | 33.58             | 54.24              | 74.00             | -19.76         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



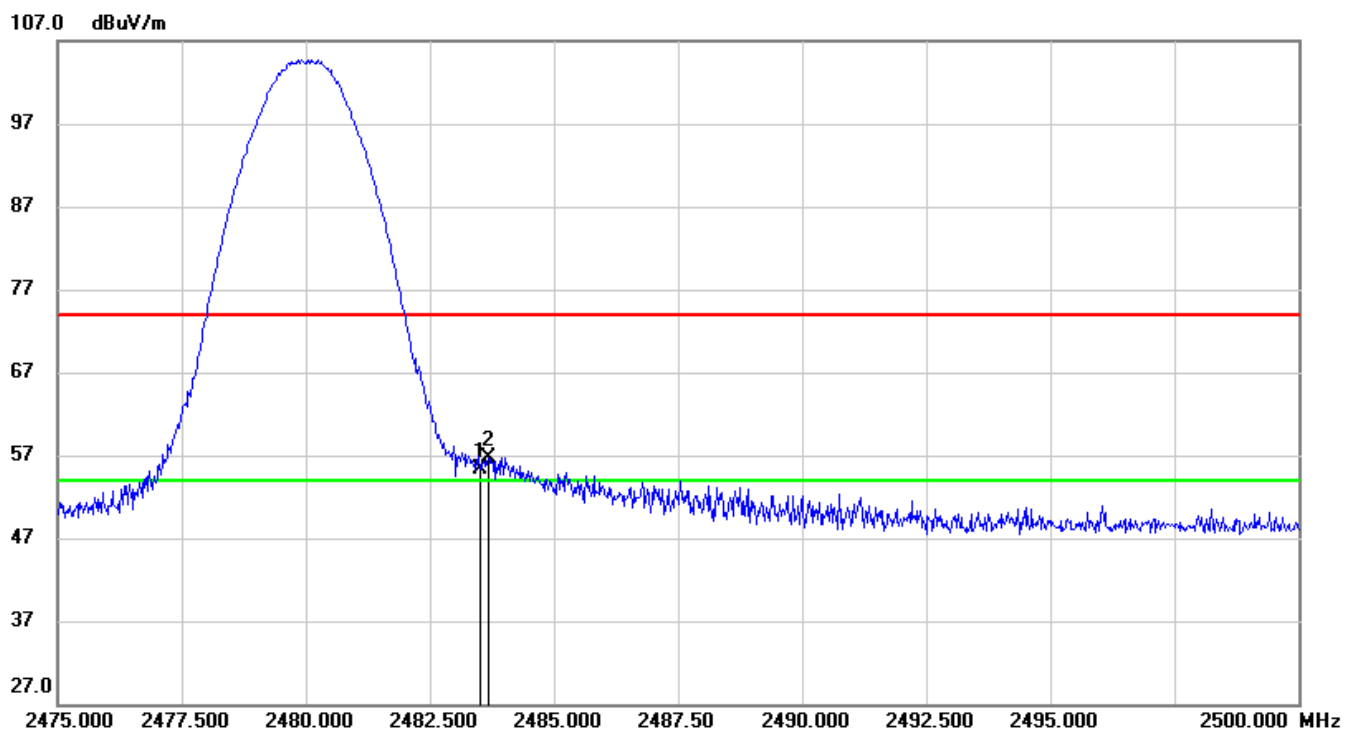
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 2.93              | 33.58             | 36.51              | 54.00             | -17.49         | AVG    |
| 2   | 2483.525           | 2.96              | 33.58             | 36.54              | 54.00             | -17.46         | AVG    |

Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. AVG:  $VBW=1/Ton$  where: ton is transmit duration.  
4. For transmit duration, please refer to clause 7.1.  
5. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

**PEAK**



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 21.67             | 33.58             | 55.25              | 74.00             | -18.75         | peak   |
| 2   | 2483.675           | 23.20             | 33.58             | 56.78              | 74.00             | -17.22         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.

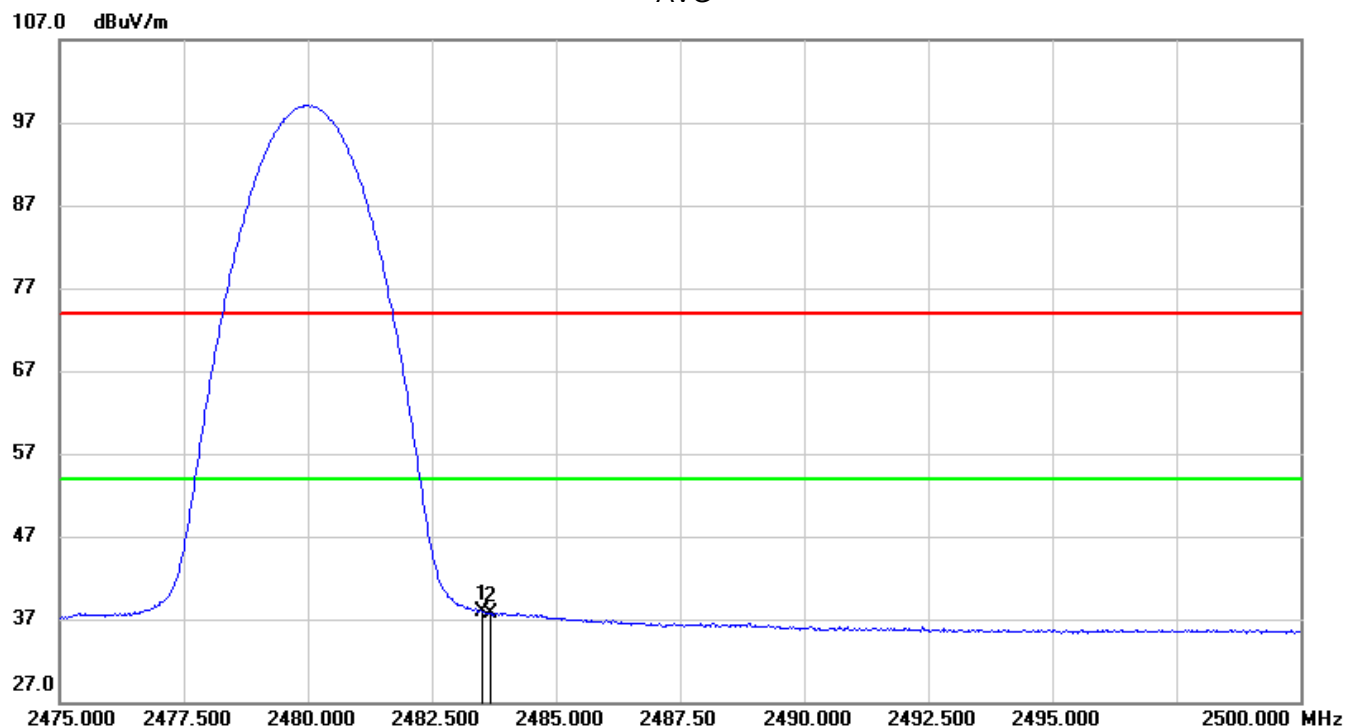
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



AVG



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 2483.500           | 4.25              | 33.58             | 37.83              | 54.00             | -16.17         | AVG    |
| 2   | 2483.675           | 4.05              | 33.58             | 37.63              | 54.00             | -16.37         | AVG    |

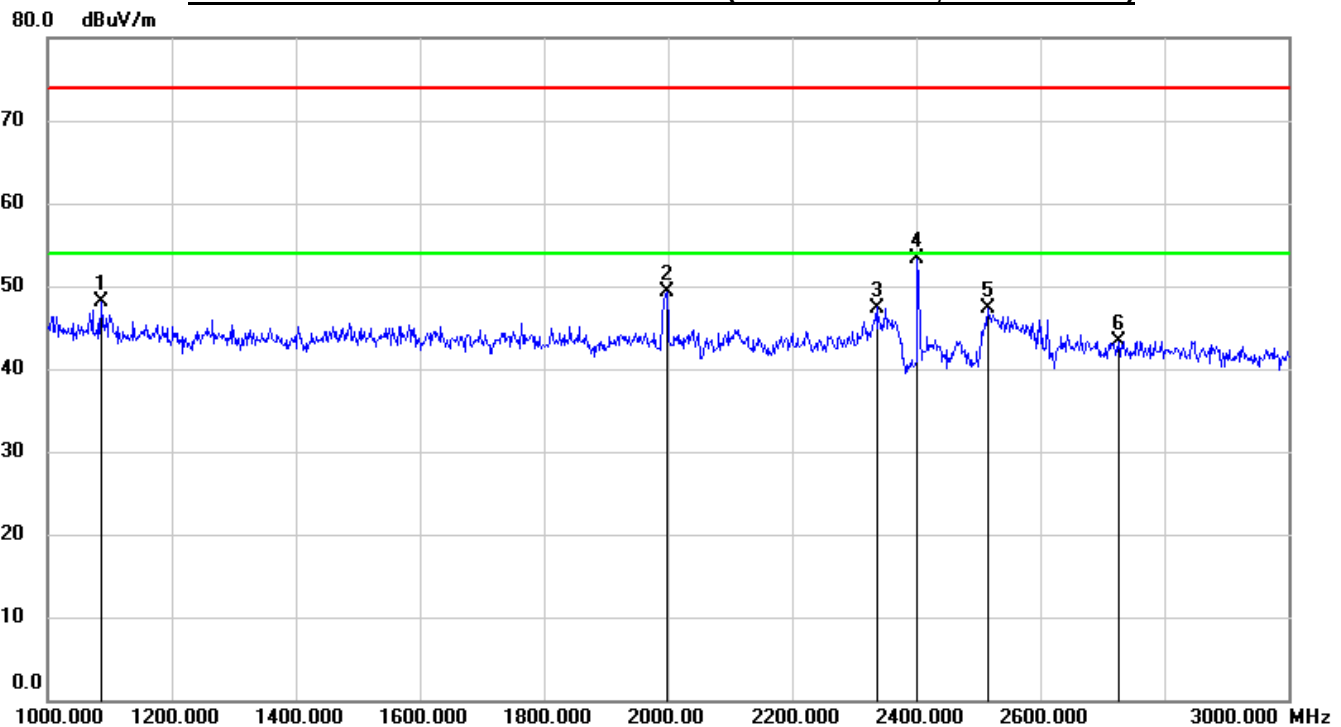
Note: 1. Measurement = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. AVG:  $VBW=1/Ton$  where: ton is transmit duration.  
4. For transmit duration, please refer to clause 7.1.  
5. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



### 8.3. SPURIOUS EMISSIONS (1~3GHz)

#### 8.3.1. GFSK MODE

##### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



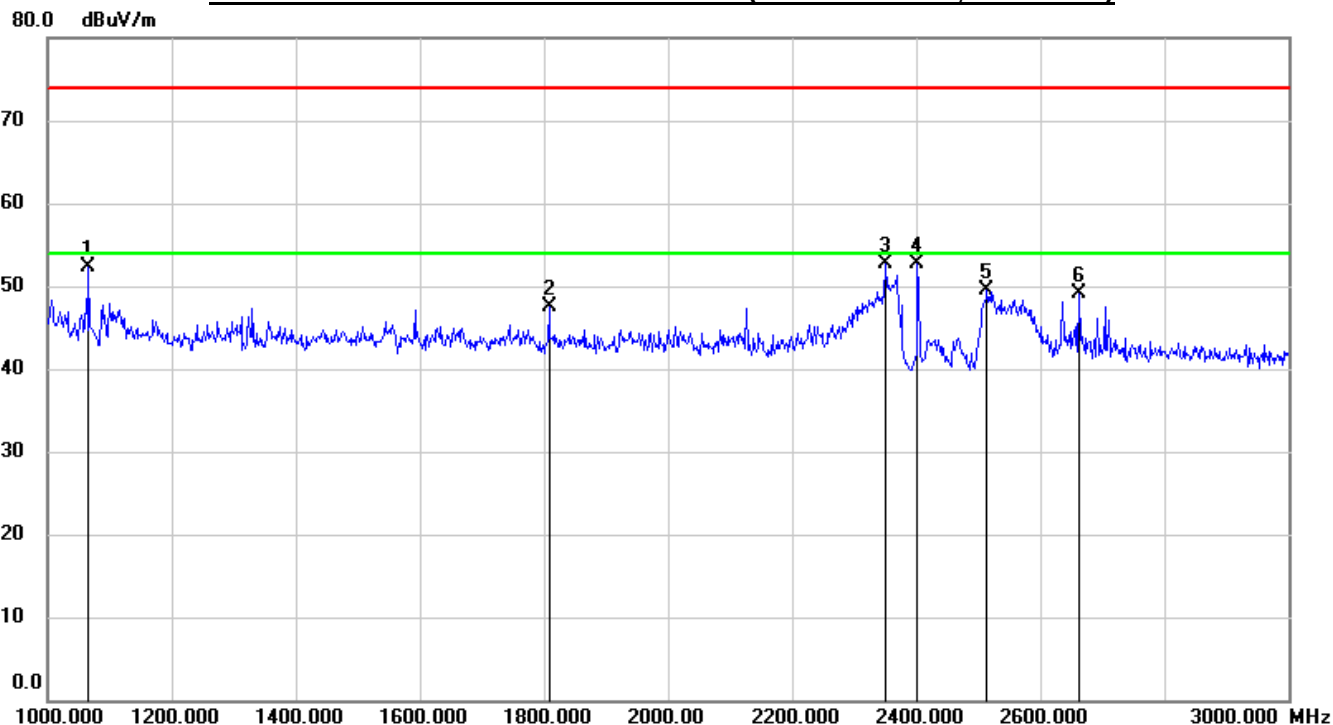
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1086.000           | 65.29             | -17.27            | 48.02              | 74.00             | -25.98         | peak        |
| 2   | 1998.000           | 64.10             | -14.79            | 49.31              | 74.00             | -24.69         | peak        |
| 3   | 2336.000           | 61.40             | -14.00            | 47.40              | 74.00             | -26.60         | peak        |
| 4   | 2402.000           | 67.13             | -13.85            | 53.28              | /                 | /              | fundamental |
| 5   | 2516.000           | 60.78             | -13.55            | 47.23              | 74.00             | -26.77         | peak        |
| 6   | 2726.000           | 56.09             | -12.69            | 43.40              | 74.00             | -30.60         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

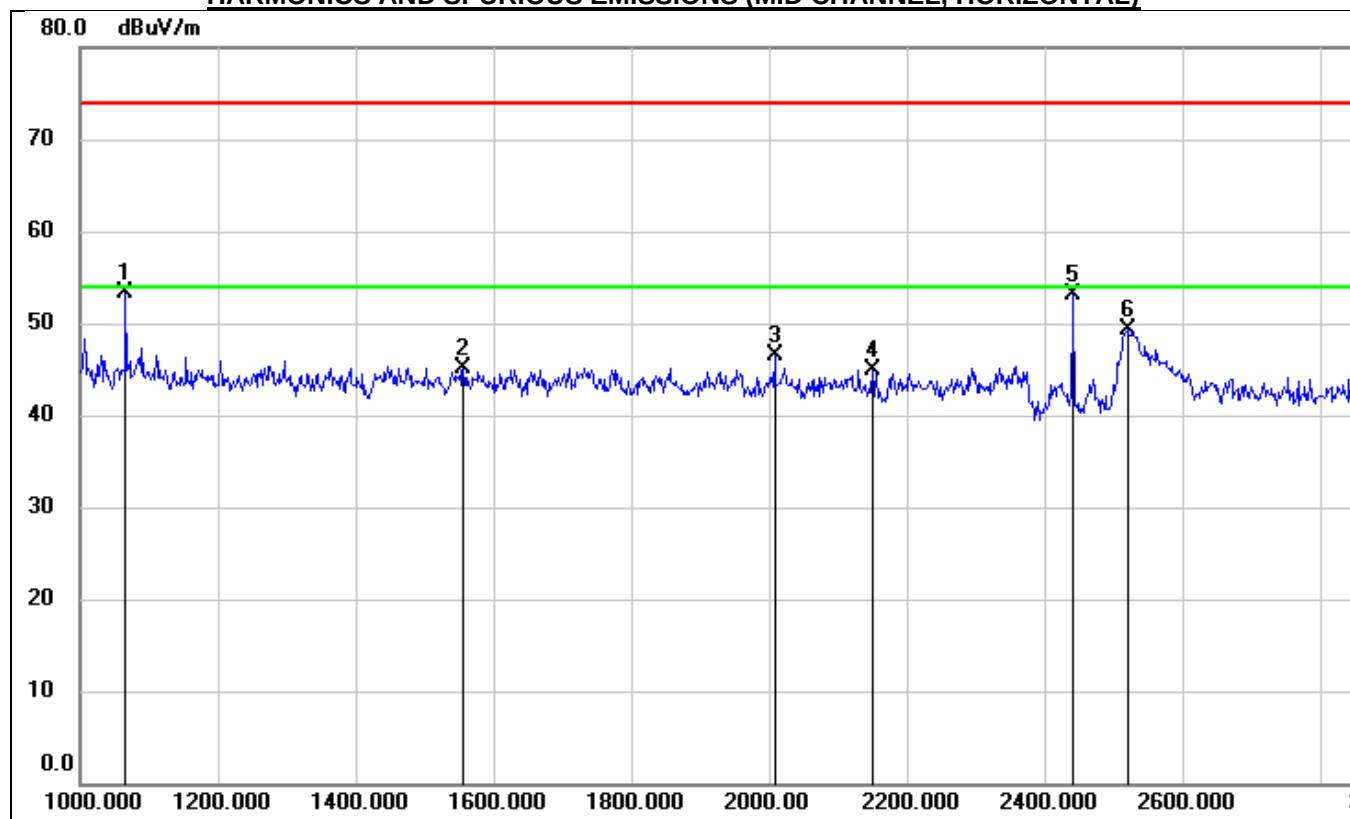


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1066.000           | 69.68             | -17.29            | 52.39              | 74.00             | -21.61         | peak        |
| 2   | 1808.000           | 62.89             | -15.48            | 47.41              | 74.00             | -26.59         | peak        |
| 3   | 2350.000           | 66.64             | -13.96            | 52.68              | 74.00             | -21.32         | peak        |
| 4   | 2402.000           | 66.48             | -13.85            | 52.63              | /                 | /              | fundamental |
| 5   | 2514.000           | 63.03             | -13.56            | 49.47              | 74.00             | -24.53         | peak        |
| 6   | 2662.000           | 62.01             | -12.95            | 49.06              | 74.00             | -24.94         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

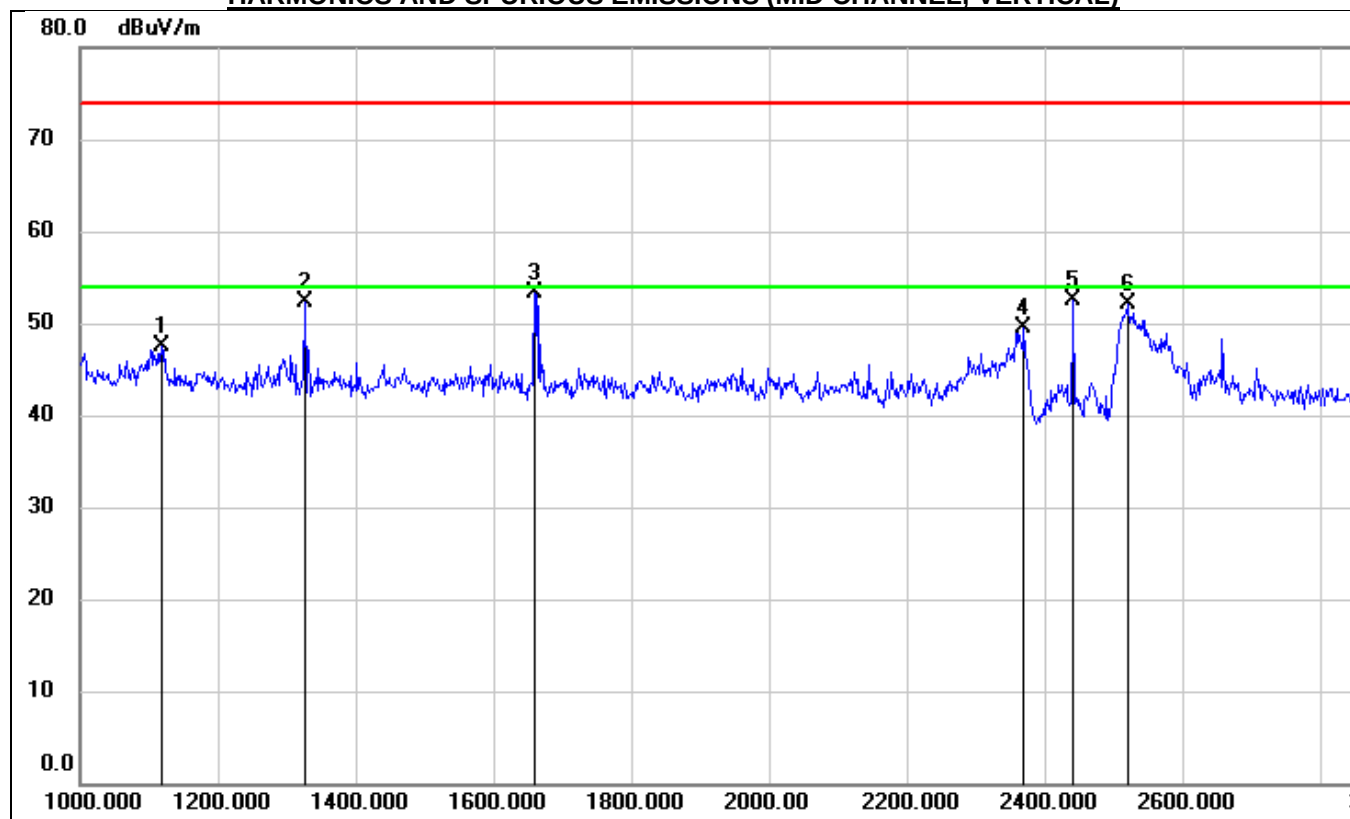


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1066.000           | 70.68             | -17.29            | 53.39              | 74.00             | -20.61         | peak        |
| 2   | 1556.000           | 61.47             | -16.39            | 45.08              | 74.00             | -28.92         | peak        |
| 3   | 2008.000           | 61.34             | -14.77            | 46.57              | 74.00             | -27.43         | peak        |
| 4   | 2150.000           | 59.34             | -14.43            | 44.91              | 74.00             | -29.09         | peak        |
| 5   | 2441.000           | 66.86             | -13.75            | 53.11              | /                 | /              | fundamental |
| 6   | 2520.000           | 62.77             | -13.53            | 49.24              | 74.00             | -24.76         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

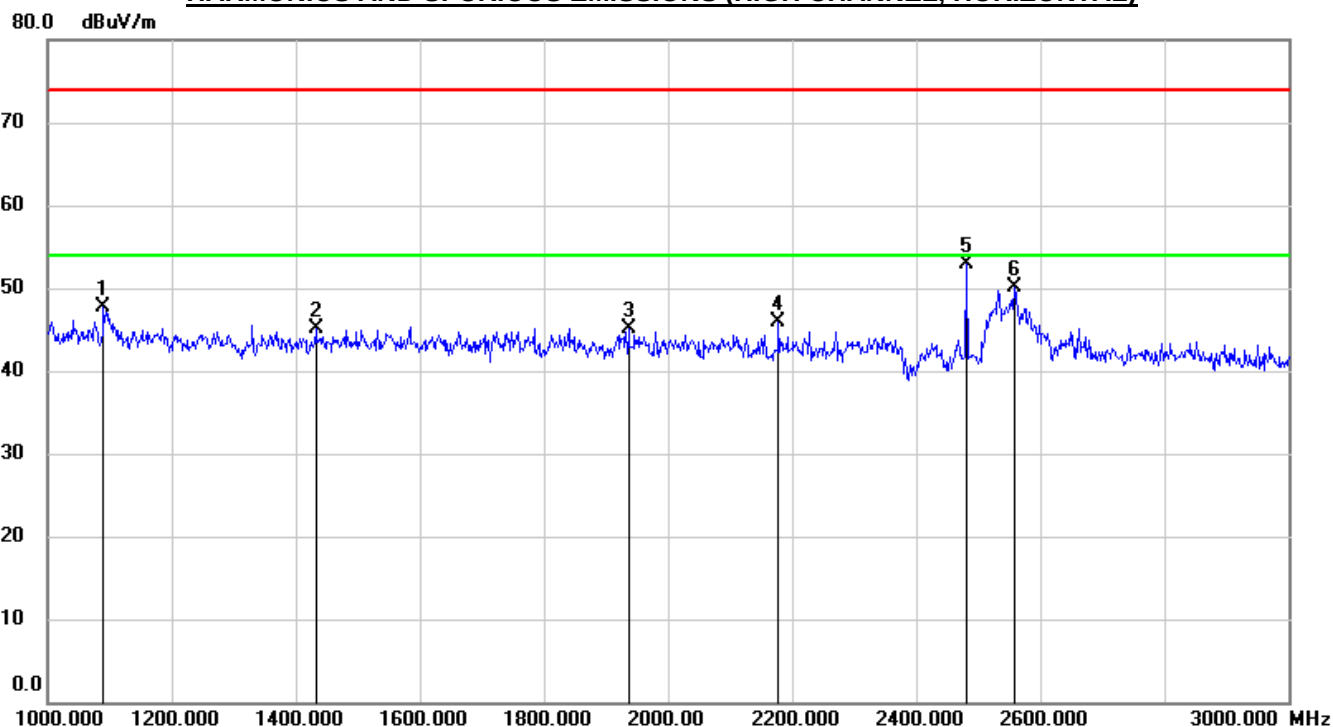


| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark      |
|-----|-----------------|----------------|----------------|-----------------|----------------|-------------|-------------|
| 1   | 1118.000        | 64.71          | -17.21         | 47.50           | 74.00          | -26.50      | peak        |
| 2   | 1326.000        | 69.16          | -16.87         | 52.29           | 74.00          | -21.71      | peak        |
| 3   | 1660.000        | 69.31          | -16.01         | 53.30           | 74.00          | -20.70      | peak        |
| 4   | 2370.000        | 63.50          | -13.91         | 49.59           | 74.00          | -24.41      | peak        |
| 5   | 2441.000        | 66.20          | -13.75         | 52.45           | /              | /           | fundamental |
| 6   | 2520.000        | 65.72          | -13.53         | 52.19           | 74.00          | -21.81      | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

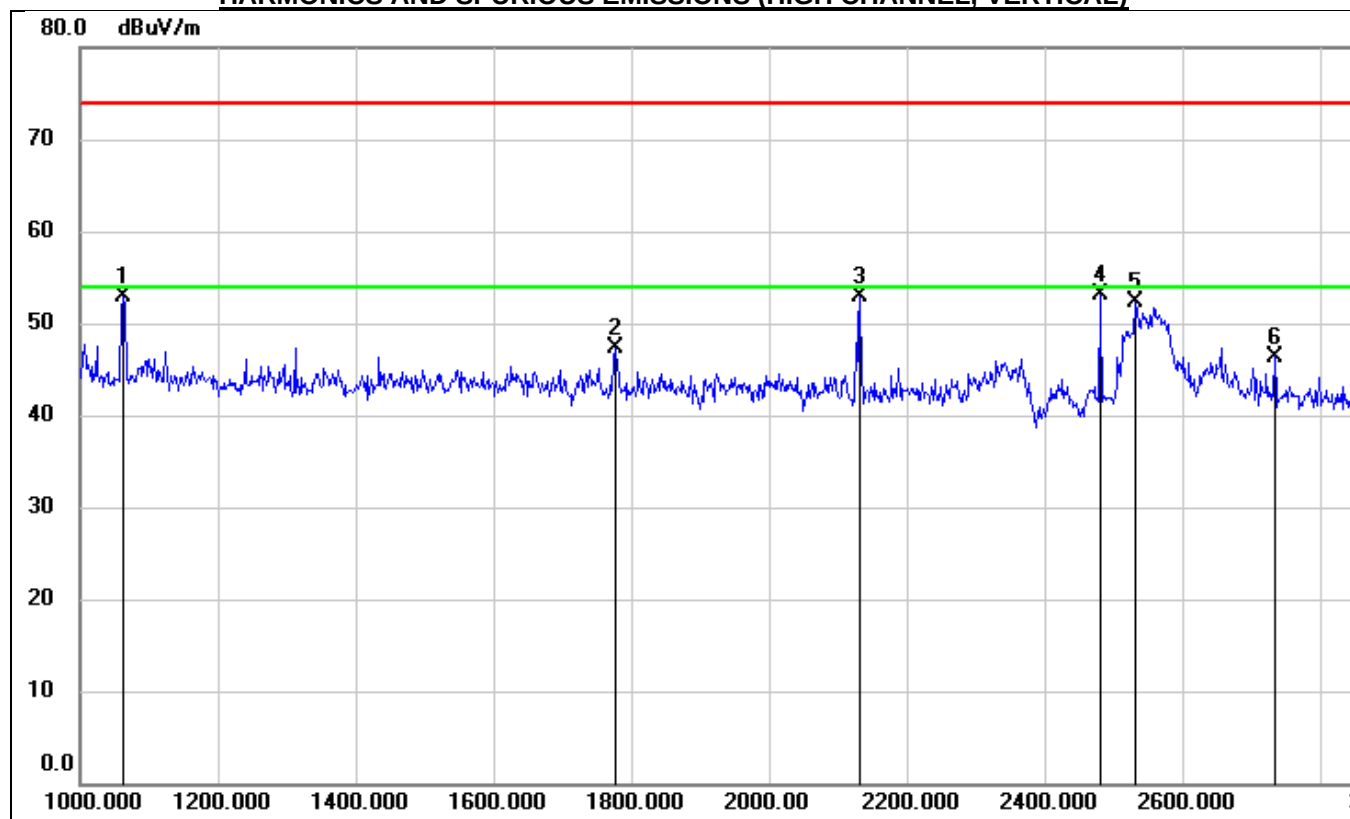


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1090.000           | 64.89             | -17.26            | 47.63              | 74.00             | -26.37         | peak        |
| 2   | 1432.000           | 61.75             | -16.70            | 45.05              | 74.00             | -28.95         | peak        |
| 3   | 1936.000           | 60.12             | -15.01            | 45.11              | 74.00             | -28.89         | peak        |
| 4   | 2178.000           | 60.36             | -14.37            | 45.99              | 74.00             | -28.01         | peak        |
| 5   | 2480.000           | 66.53             | -13.67            | 52.86              | /                 | /              | fundamental |
| 6   | 2558.000           | 63.55             | -13.37            | 50.18              | 74.00             | -23.82         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



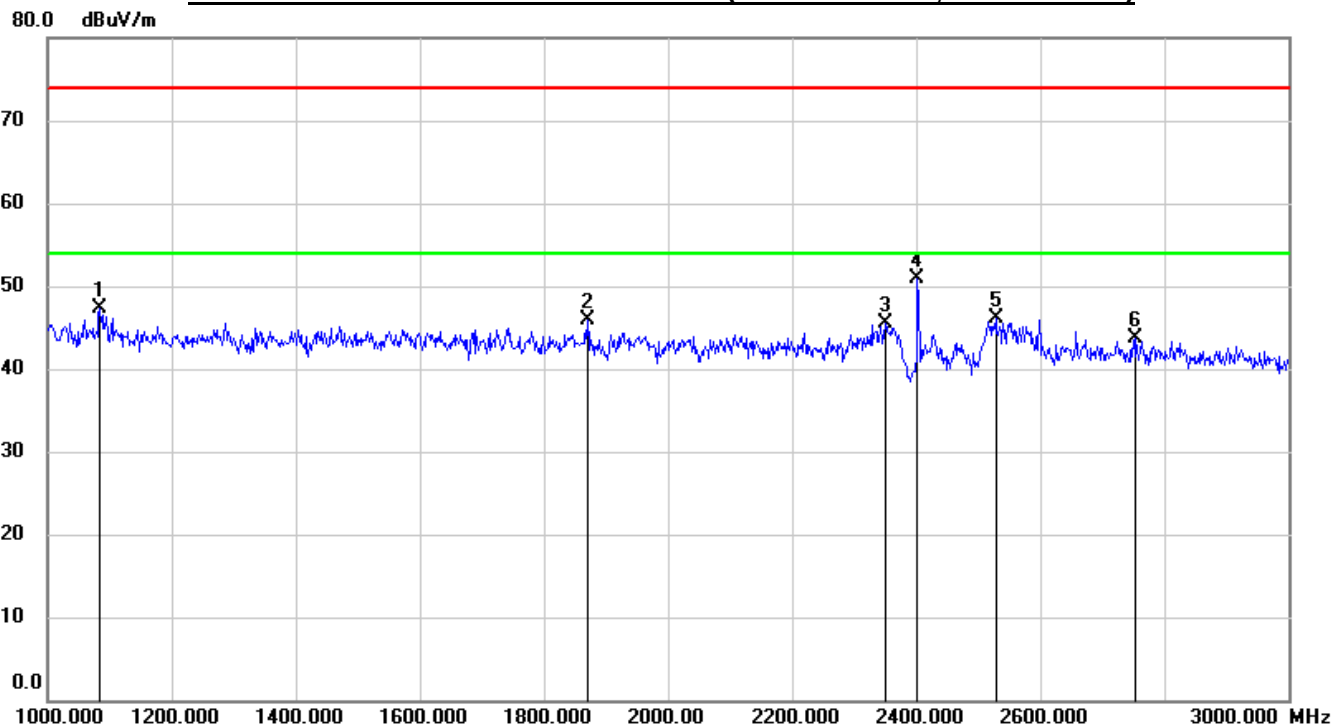
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1062.000           | 70.22             | -17.30            | 52.92              | 74.00             | -21.08         | peak        |
| 2   | 1776.000           | 62.96             | -15.59            | 47.37              | 74.00             | -26.63         | peak        |
| 3   | 2132.000           | 67.28             | -14.47            | 52.81              | 74.00             | -21.19         | peak        |
| 4   | 2480.000           | 66.78             | -13.67            | 53.11              | /                 | /              | fundamental |
| 5   | 2532.000           | 65.77             | -13.48            | 52.29              | 74.00             | -21.71         | peak        |
| 6   | 2734.000           | 59.05             | -12.65            | 46.40              | 74.00             | -27.60         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### 8.3.2. 8DPSK MODE

#### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

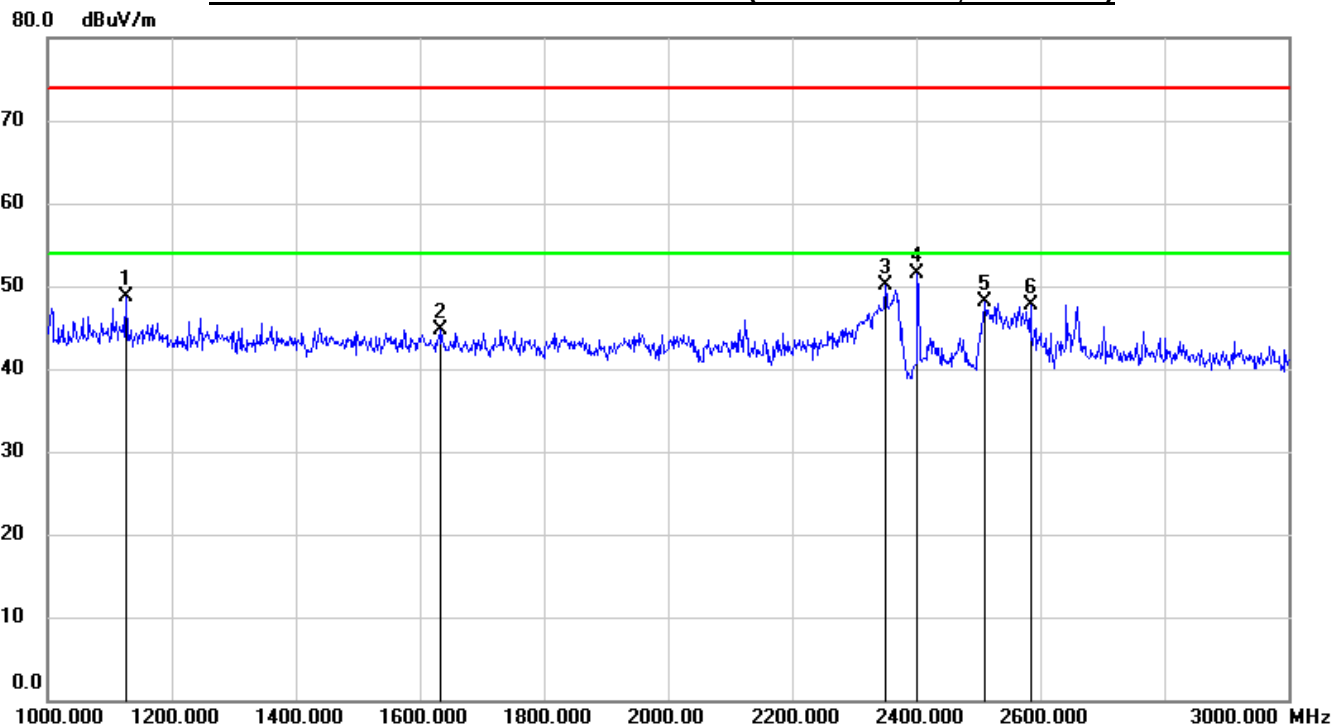


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1084.000           | 64.62             | -17.27            | 47.35              | 74.00             | -26.65         | peak        |
| 2   | 1870.000           | 61.18             | -15.25            | 45.93              | 74.00             | -28.07         | peak        |
| 3   | 2350.000           | 59.48             | -13.96            | 45.52              | 74.00             | -28.48         | peak        |
| 4   | 2402.000           | 64.74             | -13.85            | 50.89              | /                 | /              | fundamental |
| 5   | 2528.000           | 59.59             | -13.50            | 46.09              | 74.00             | -27.91         | peak        |
| 6   | 2754.000           | 56.28             | -12.57            | 43.71              | 74.00             | -30.29         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

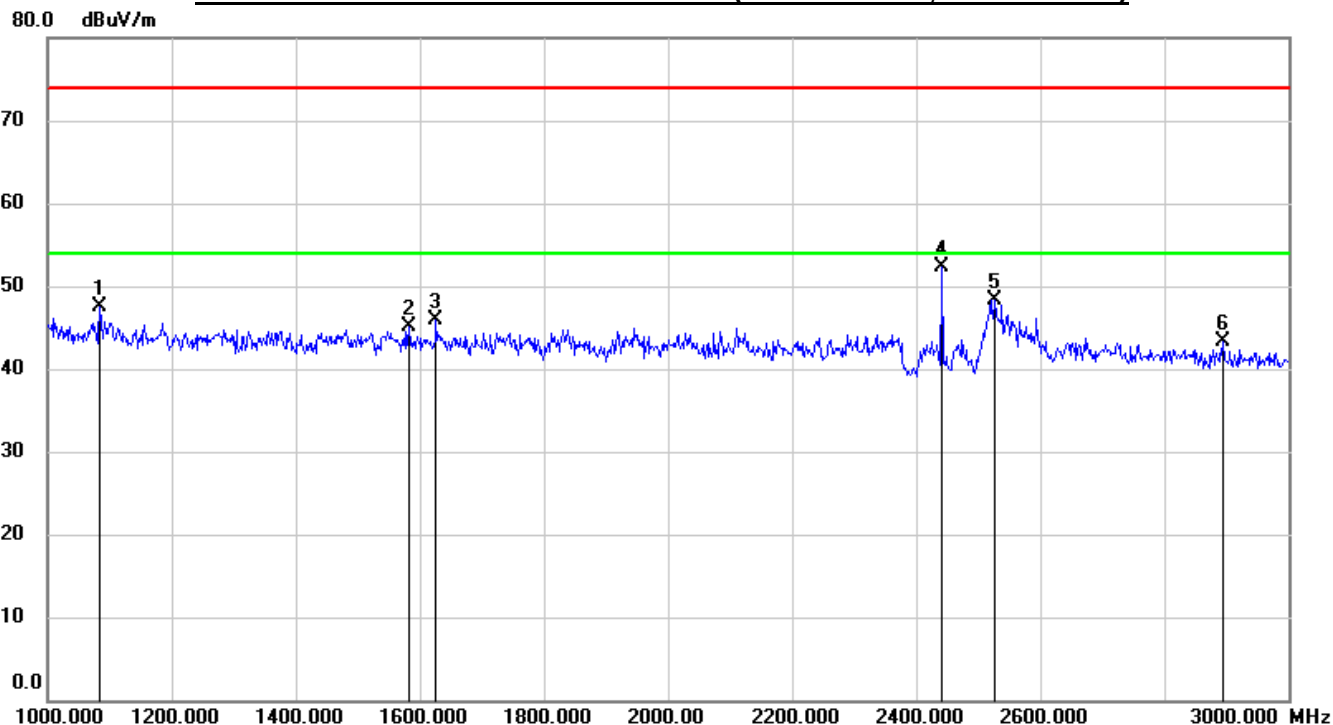


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1126.000           | 65.94             | -17.19            | 48.75              | 74.00             | -25.25         | peak        |
| 2   | 1634.000           | 60.81             | -16.10            | 44.71              | 74.00             | -29.29         | peak        |
| 3   | 2350.000           | 64.00             | -13.96            | 50.04              | 74.00             | -23.96         | peak        |
| 4   | 2402.000           | 65.27             | -13.85            | 51.42              | /                 | /              | fundamental |
| 5   | 2510.000           | 61.67             | -13.57            | 48.10              | 74.00             | -25.90         | peak        |
| 6   | 2584.000           | 60.93             | -13.27            | 47.66              | 74.00             | -26.34         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



**HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)**



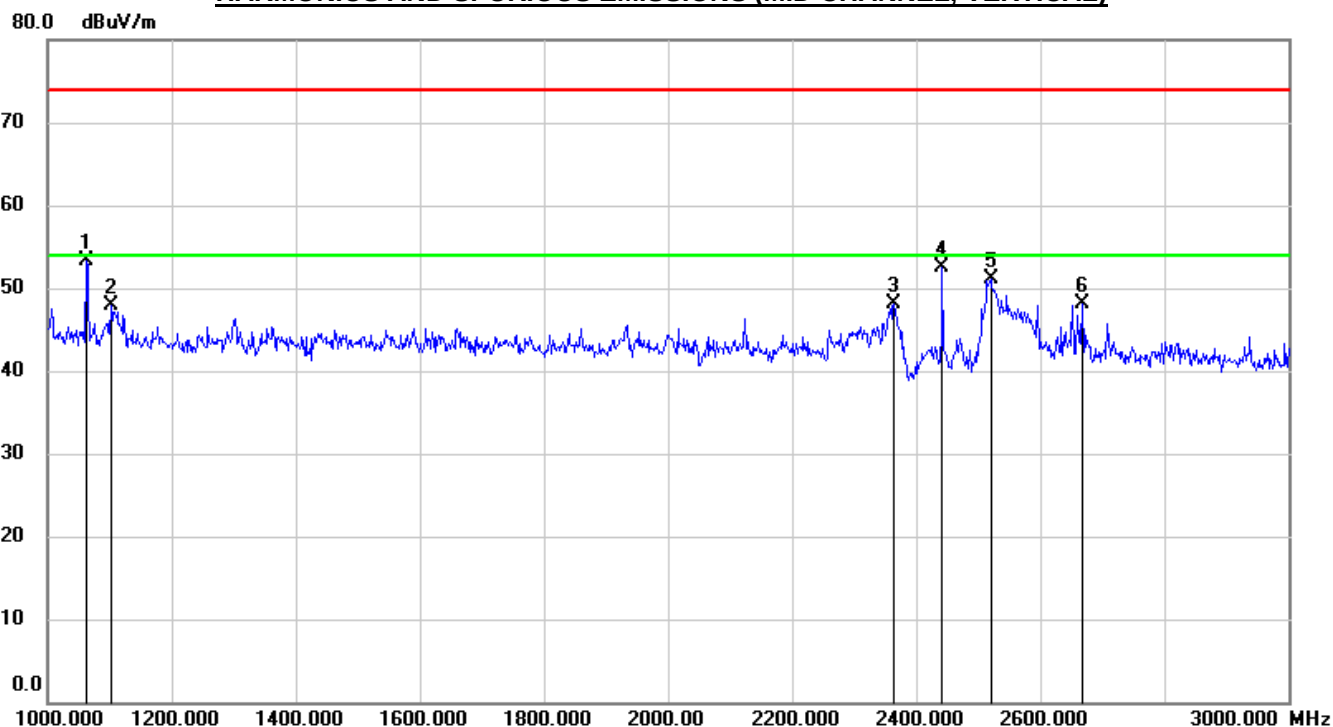
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1084.000           | 64.68             | -17.27            | 47.41              | 74.00             | -26.59         | peak        |
| 2   | 1582.000           | 61.35             | -16.29            | 45.06              | 74.00             | -28.94         | peak        |
| 3   | 1626.000           | 61.98             | -16.13            | 45.85              | 74.00             | -28.15         | peak        |
| 4   | 2441.000           | 66.12             | -13.75            | 52.37              | /                 | /              | fundamental |
| 5   | 2526.000           | 61.86             | -13.51            | 48.35              | 74.00             | -25.65         | peak        |
| 6   | 2894.000           | 55.23             | -11.99            | 43.24              | 74.00             | -30.76         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

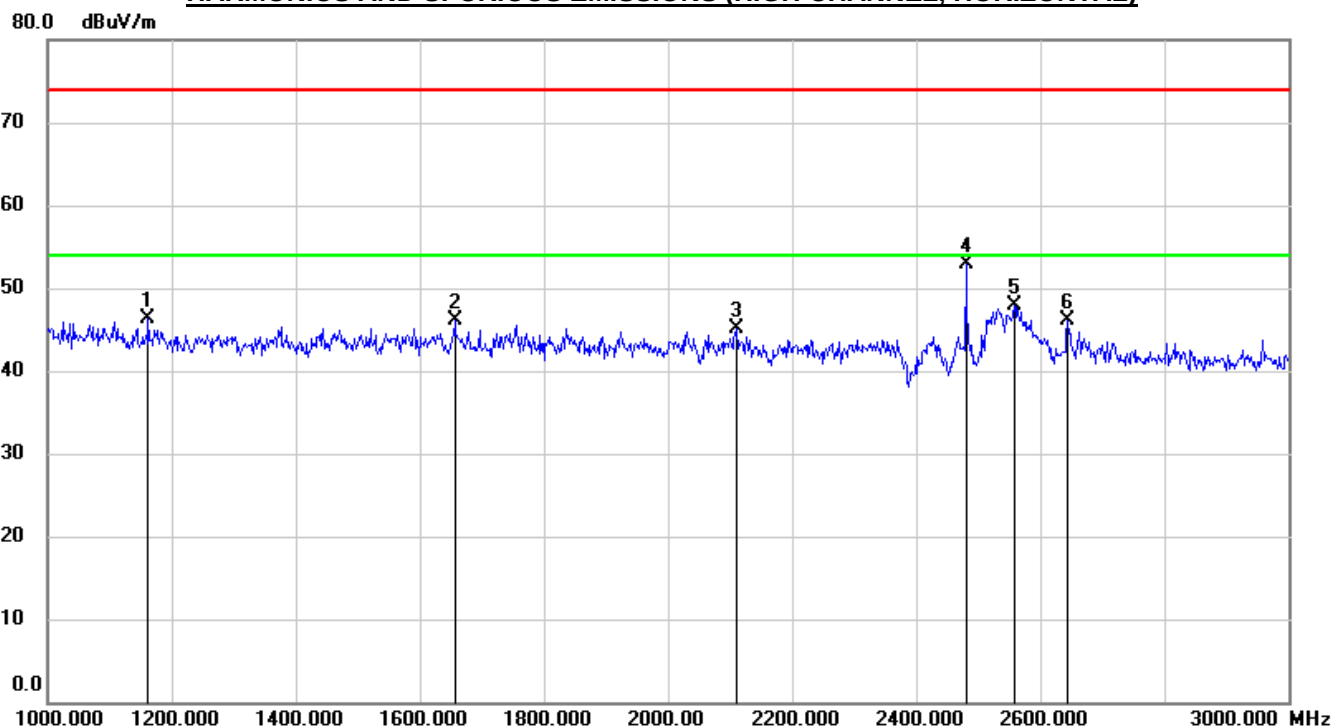


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1062.000           | 70.55             | -17.30            | 53.25              | 74.00             | -20.75         | peak        |
| 2   | 1102.000           | 65.15             | -17.24            | 47.91              | 74.00             | -26.09         | peak        |
| 3   | 2364.000           | 62.10             | -13.93            | 48.17              | 74.00             | -25.83         | peak        |
| 4   | 2441.000           | 66.29             | -13.75            | 52.54              | /                 | /              | fundamental |
| 5   | 2520.000           | 64.65             | -13.53            | 51.12              | 74.00             | -22.88         | peak        |
| 6   | 2668.000           | 60.97             | -12.93            | 48.04              | 74.00             | -25.96         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

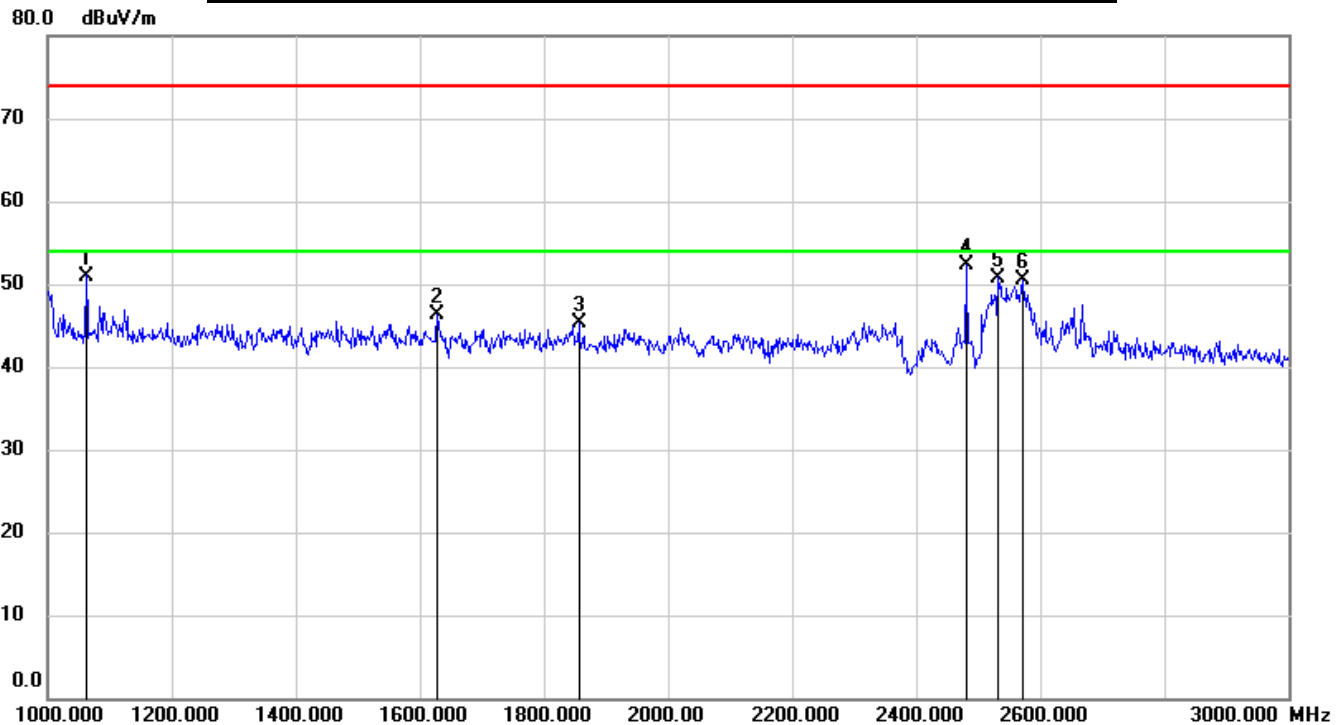


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1162.000           | 63.42             | -17.14            | 46.28              | 74.00             | -27.72         | peak        |
| 2   | 1656.000           | 62.07             | -16.03            | 46.04              | 74.00             | -27.96         | peak        |
| 3   | 2110.000           | 59.60             | -14.52            | 45.08              | 74.00             | -28.92         | peak        |
| 4   | 2480.000           | 66.52             | -13.67            | 52.85              | /                 | /              | fundamental |
| 5   | 2558.000           | 61.26             | -13.37            | 47.89              | 74.00             | -26.11         | peak        |
| 6   | 2644.000           | 59.13             | -13.02            | 46.11              | 74.00             | -27.89         | peak        |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark      |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|-------------|
| 1   | 1062.000           | 68.30             | -17.30            | 51.00              | 74.00             | -23.00         | peak        |
| 2   | 1628.000           | 62.41             | -16.12            | 46.29              | 74.00             | -27.71         | peak        |
| 3   | 1856.000           | 60.52             | -15.30            | 45.22              | 74.00             | -28.78         | peak        |
| 4   | 2480.000           | 65.97             | -13.67            | 52.30              | /                 | /              | fundamental |
| 5   | 2532.000           | 64.28             | -13.48            | 50.80              | 74.00             | -23.20         | peak        |
| 6   | 2572.000           | 63.74             | -13.32            | 50.42              | 74.00             | -23.58         | peak        |

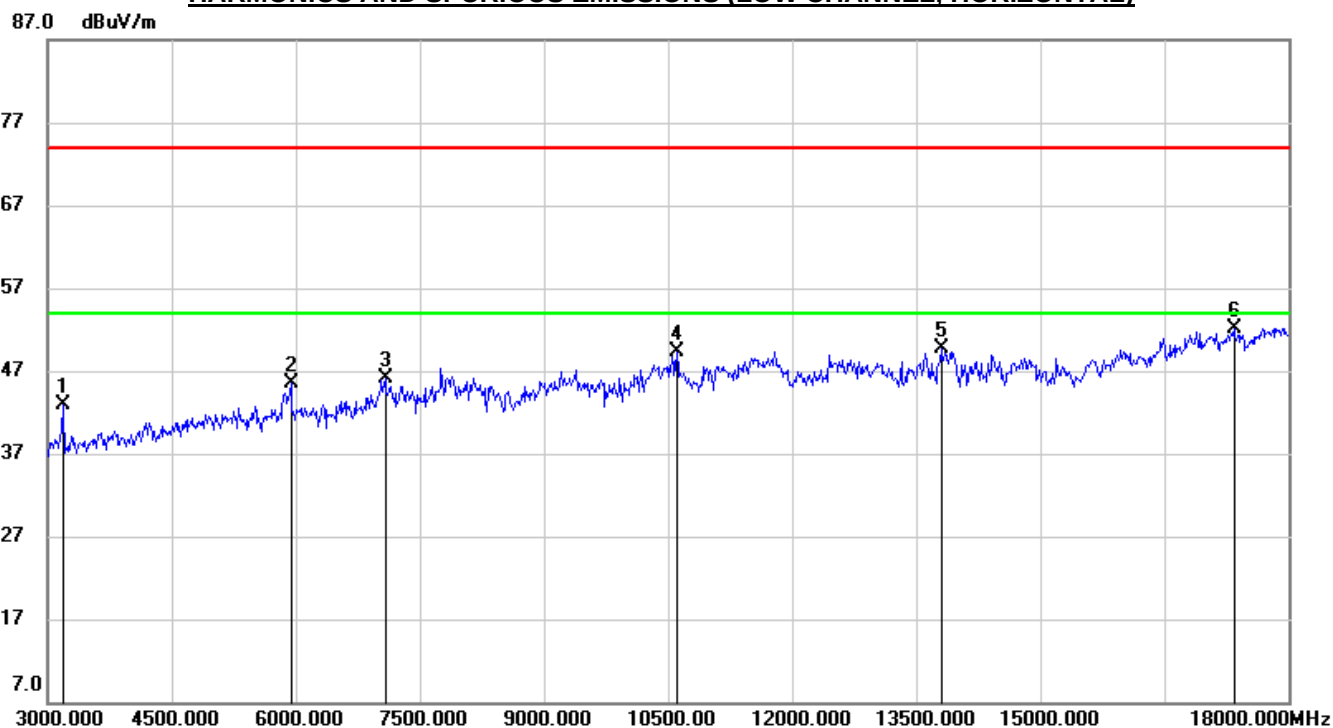
- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



## 8.4. SPURIOUS EMISSIONS (3~18GHz)

### 8.4.1. GFSK MODE

#### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

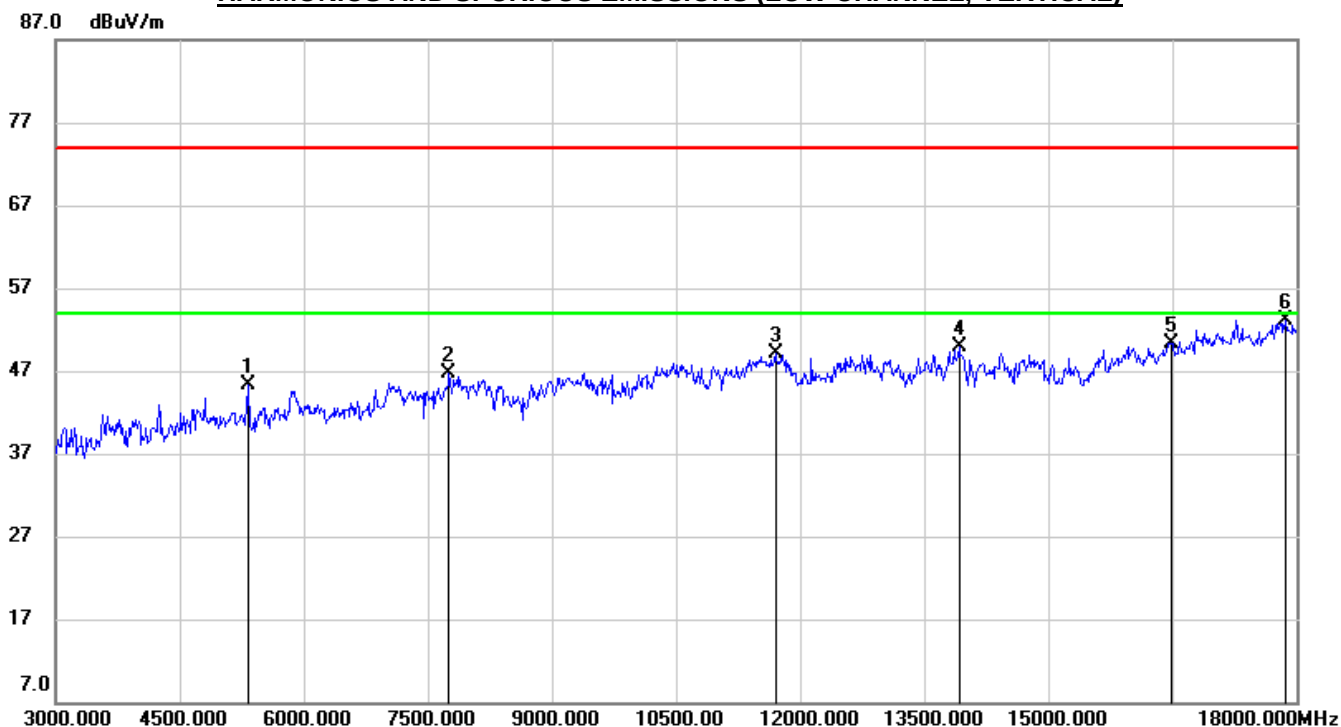


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3180.000           | 47.22             | -4.33             | 42.89              | 74.00             | -31.11         | peak   |
| 2   | 5940.000           | 41.19             | 4.30              | 45.49              | 74.00             | -28.51         | peak   |
| 3   | 7080.000           | 40.14             | 5.89              | 46.03              | 74.00             | -27.97         | peak   |
| 4   | 10605.000          | 37.33             | 11.93             | 49.26              | 74.00             | -24.74         | peak   |
| 5   | 13800.000          | 32.53             | 17.10             | 49.63              | 74.00             | -24.37         | peak   |
| 6   | 17340.000          | 30.45             | 21.61             | 52.06              | 74.00             | -21.94         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

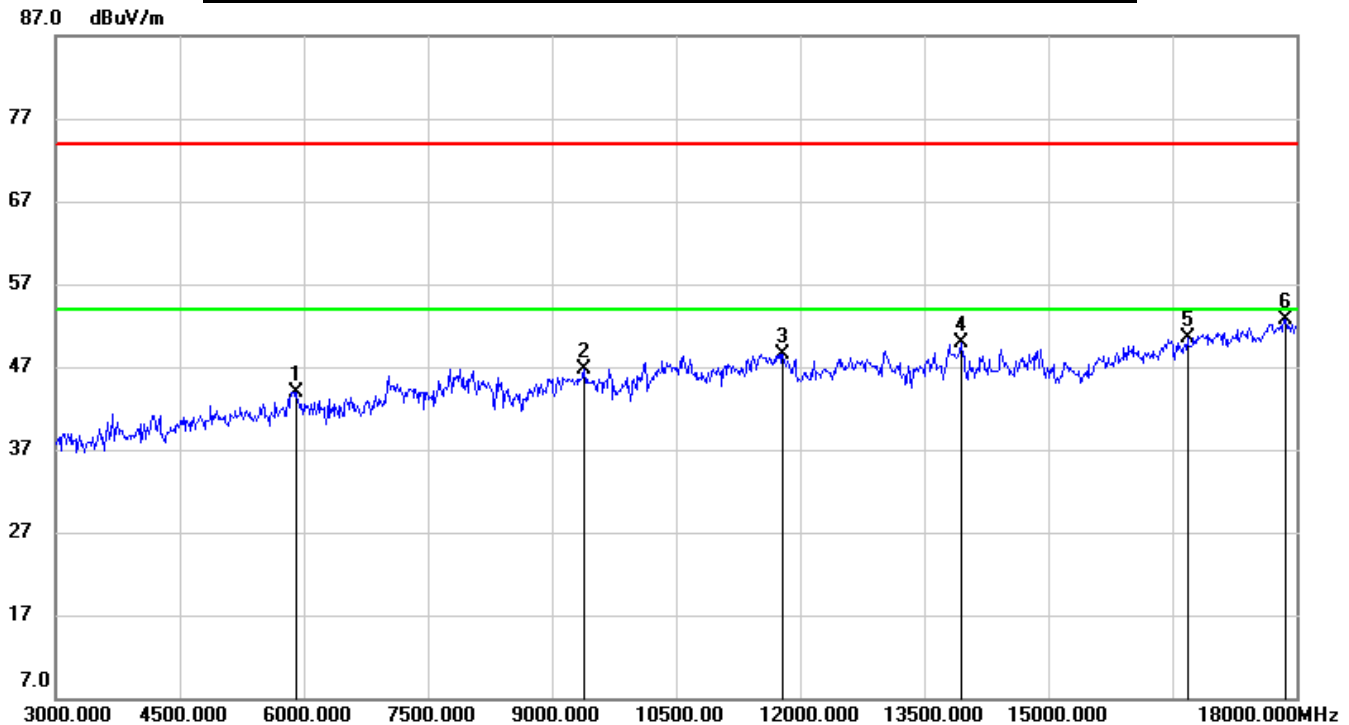


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 5325.000           | 43.27             | 1.99              | 45.26              | 74.00             | -28.74         | peak   |
| 2   | 7755.000           | 39.35             | 7.29              | 46.64              | 74.00             | -27.36         | peak   |
| 3   | 11700.000          | 36.15             | 12.95             | 49.10              | 74.00             | -24.90         | peak   |
| 4   | 13920.000          | 33.67             | 16.17             | 49.84              | 74.00             | -24.16         | peak   |
| 5   | 16485.000          | 31.26             | 19.13             | 50.39              | 74.00             | -23.61         | peak   |
| 6   | 17865.000          | 29.79             | 23.33             | 53.12              | 74.00             | -20.88         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

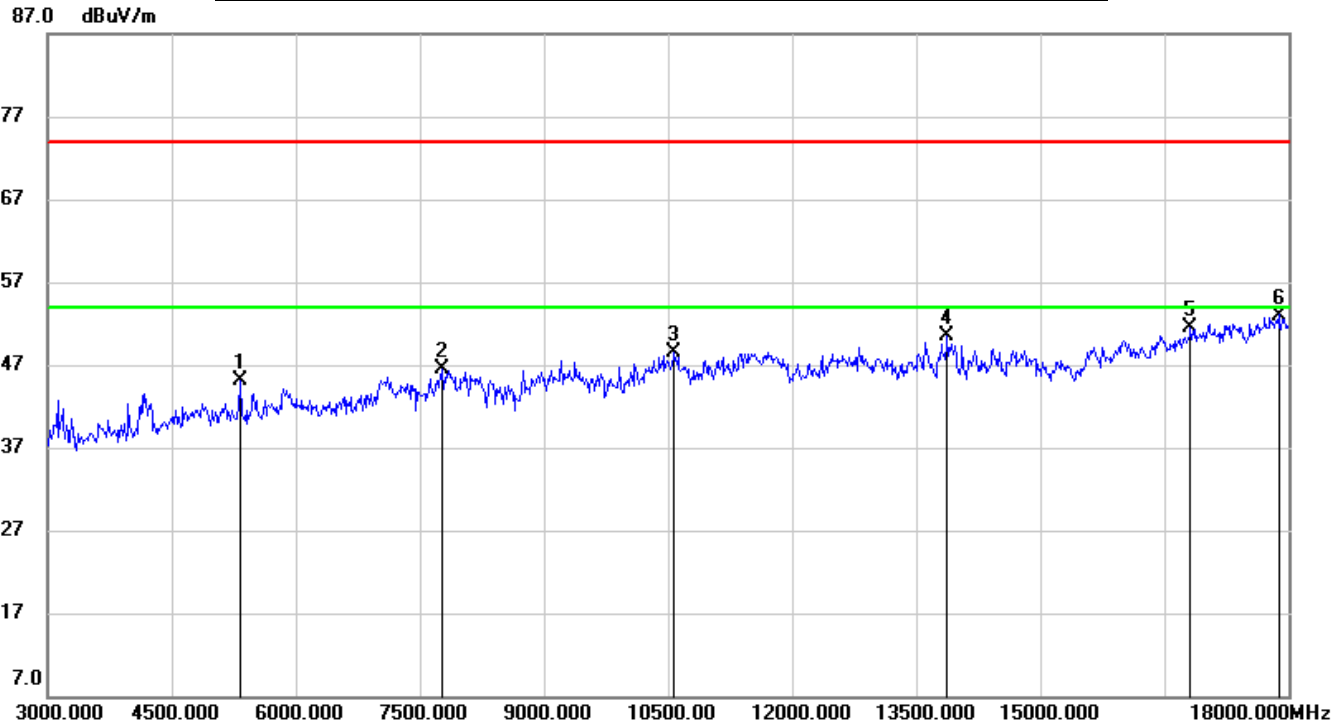


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 5910.000           | 39.08             | 4.79              | 43.87              | 74.00             | -30.13         | peak   |
| 2   | 9390.000           | 37.15             | 9.53              | 46.68              | 74.00             | -27.32         | peak   |
| 3   | 11790.000          | 35.42             | 13.17             | 48.59              | 74.00             | -25.41         | peak   |
| 4   | 13950.000          | 33.87             | 16.11             | 49.98              | 74.00             | -24.02         | peak   |
| 5   | 16680.000          | 30.62             | 19.84             | 50.46              | 74.00             | -23.54         | peak   |
| 6   | 17865.000          | 29.46             | 23.33             | 52.79              | 74.00             | -21.21         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

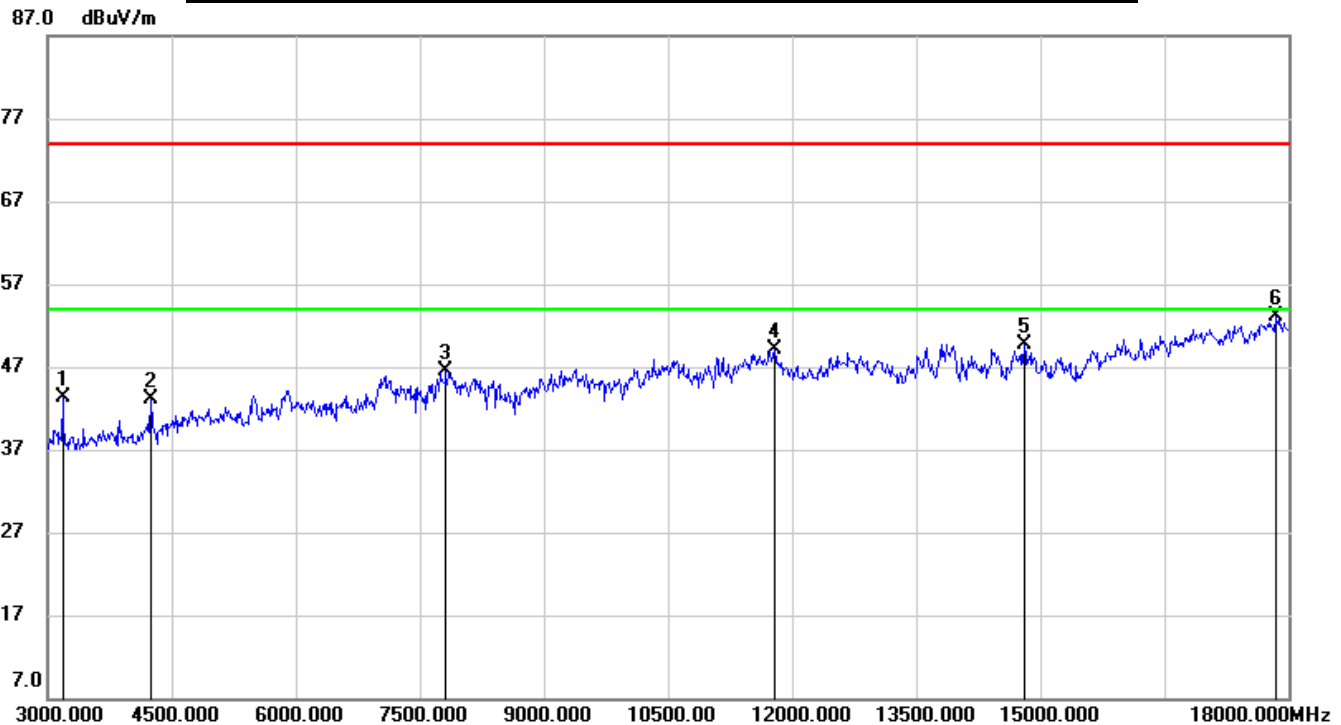


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 5325.000           | 43.11             | 1.99              | 45.10              | 74.00             | -28.90         | peak   |
| 2   | 7770.000           | 39.02             | 7.50              | 46.52              | 74.00             | -27.48         | peak   |
| 3   | 10575.000          | 36.61             | 11.81             | 48.42              | 74.00             | -25.58         | peak   |
| 4   | 13875.000          | 34.02             | 16.44             | 50.46              | 74.00             | -23.54         | peak   |
| 5   | 16815.000          | 31.53             | 19.96             | 51.49              | 74.00             | -22.51         | peak   |
| 6   | 17880.000          | 29.66             | 23.34             | 53.00              | 74.00             | -21.00         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



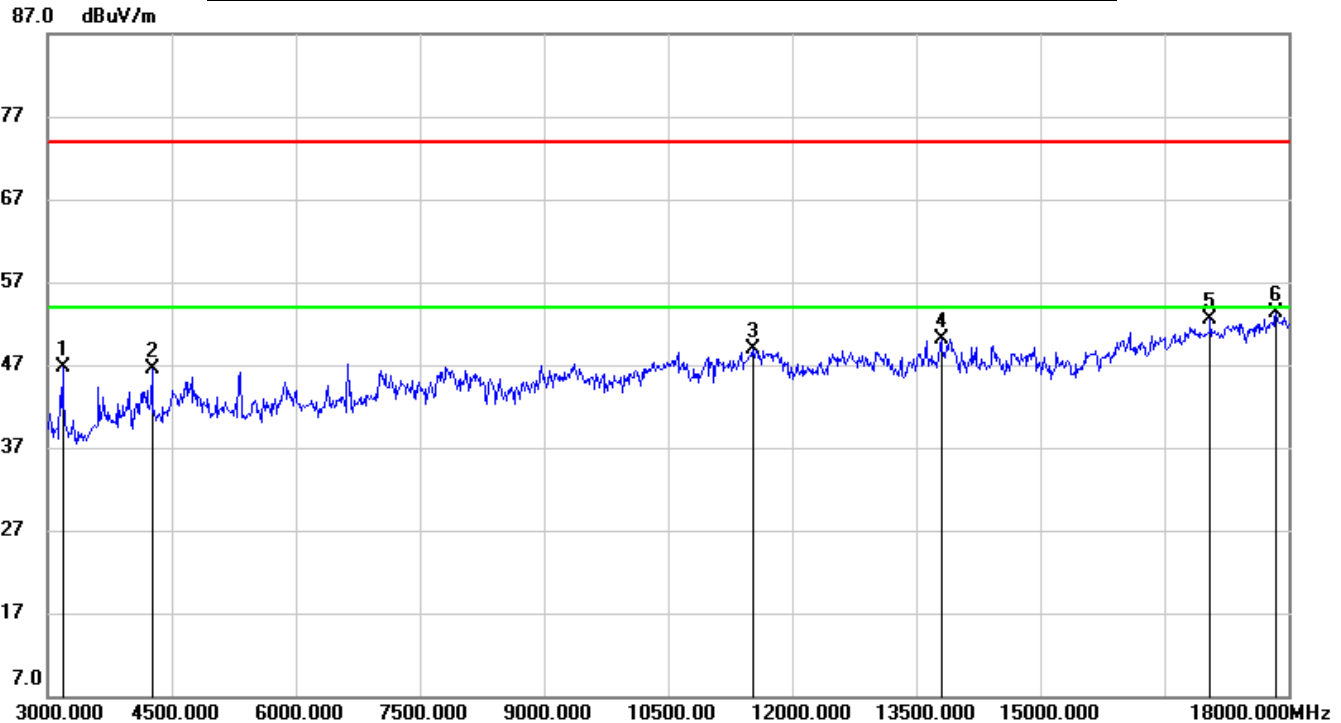
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3180.000           | 47.54             | -4.33             | 43.21              | 74.00             | -30.79         | peak   |
| 2   | 4245.000           | 44.66             | -1.59             | 43.07              | 74.00             | -30.93         | peak   |
| 3   | 7815.000           | 38.60             | 7.83              | 46.43              | 74.00             | -27.57         | peak   |
| 4   | 11790.000          | 35.97             | 13.17             | 49.14              | 74.00             | -24.86         | peak   |
| 5   | 14805.000          | 33.76             | 15.92             | 49.68              | 74.00             | -24.32         | peak   |
| 6   | 17850.000          | 29.71             | 23.32             | 53.03              | 74.00             | -20.97         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



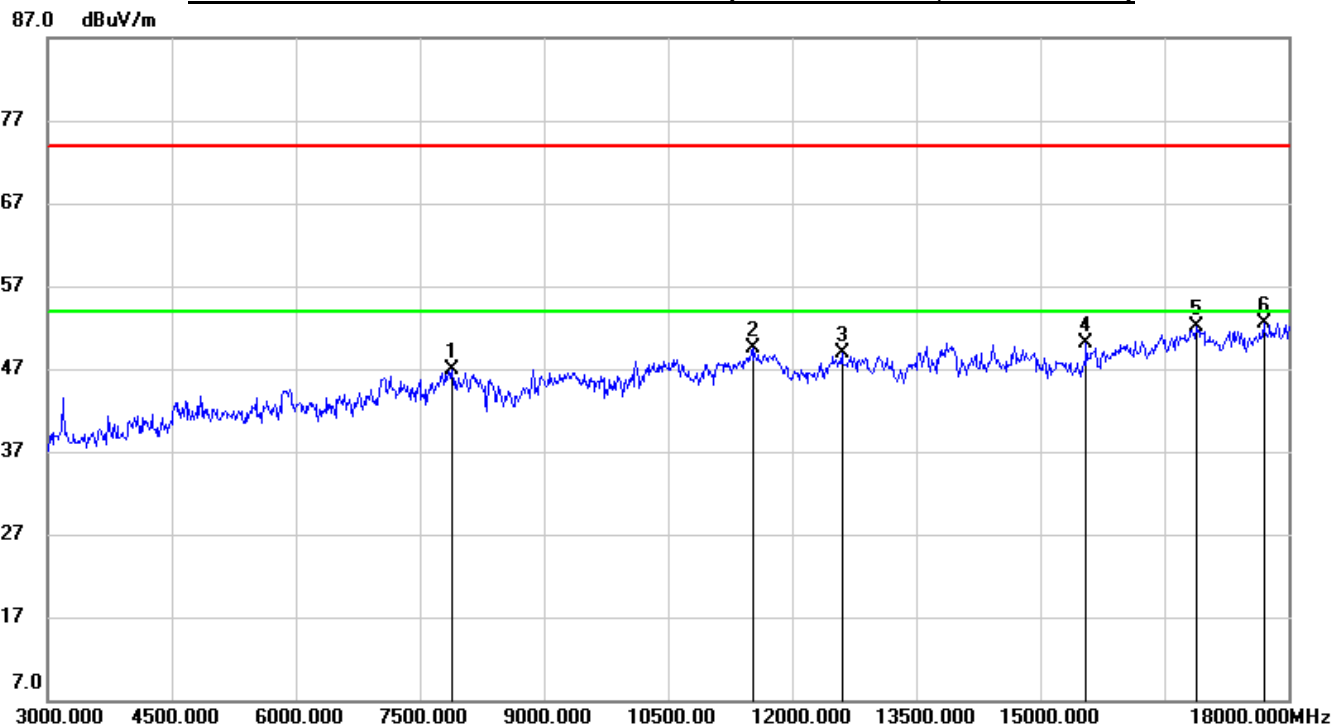
| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3180.000           | 50.96             | -4.33             | 46.63              | 74.00             | -27.37         | peak   |
| 2   | 4260.000           | 48.12             | -1.71             | 46.41              | 74.00             | -27.59         | peak   |
| 3   | 11520.000          | 35.53             | 13.38             | 48.91              | 74.00             | -25.09         | peak   |
| 4   | 13800.000          | 32.92             | 17.10             | 50.02              | 74.00             | -23.98         | peak   |
| 5   | 17055.000          | 31.89             | 20.53             | 52.42              | 74.00             | -21.58         | peak   |
| 6   | 17850.000          | 30.07             | 23.32             | 53.39              | 74.00             | -20.61         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### 8.4.2. 8DPSK MODE

#### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

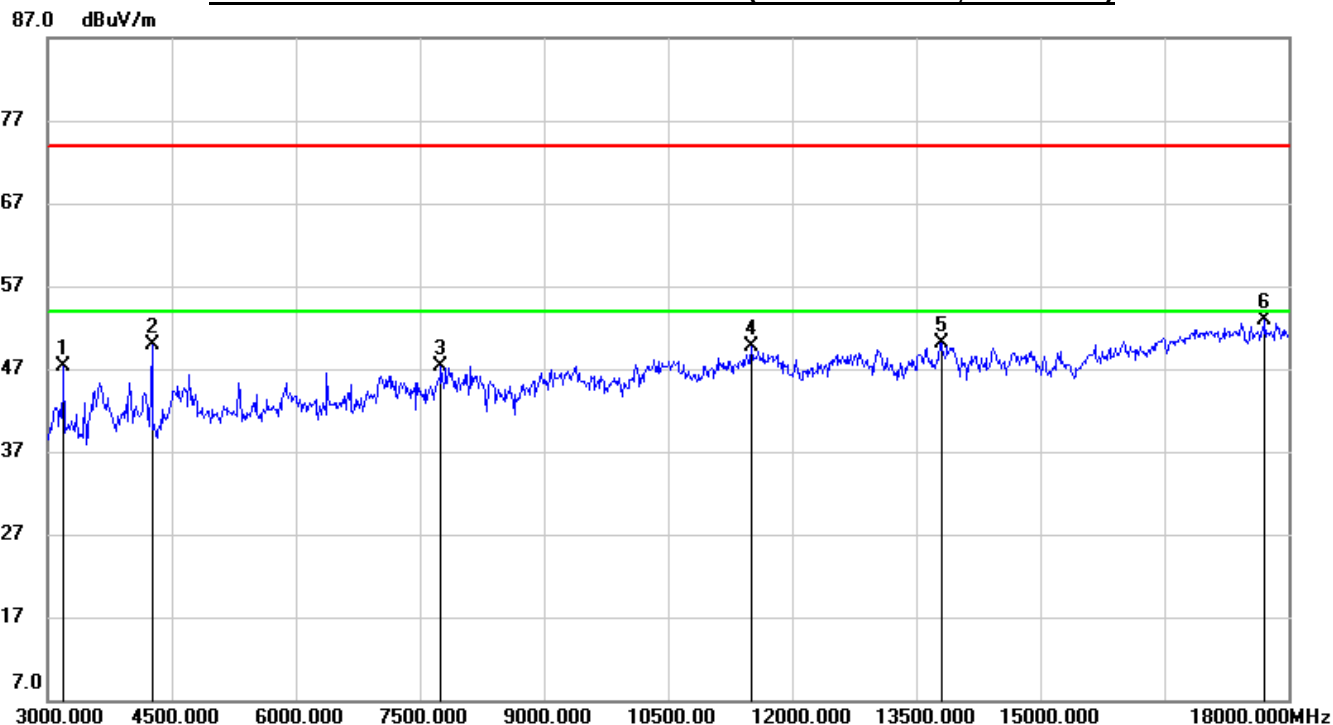


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 7890.000           | 39.55             | 7.30              | 46.85              | 74.00             | -27.15         | peak   |
| 2   | 11520.000          | 36.05             | 13.38             | 49.43              | 74.00             | -24.57         | peak   |
| 3   | 12600.000          | 34.90             | 13.99             | 48.89              | 74.00             | -25.11         | peak   |
| 4   | 15555.000          | 33.36             | 16.66             | 50.02              | 74.00             | -23.98         | peak   |
| 5   | 16890.000          | 32.19             | 19.97             | 52.16              | 74.00             | -21.84         | peak   |
| 6   | 17700.000          | 30.09             | 22.43             | 52.52              | 74.00             | -21.48         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3195.000           | 51.65             | -4.42             | 47.23              | 74.00             | -26.77         | peak   |
| 2   | 4260.000           | 51.53             | -1.71             | 49.82              | 74.00             | -24.18         | peak   |
| 3   | 7755.000           | 40.08             | 7.29              | 47.37              | 74.00             | -26.63         | peak   |
| 4   | 11505.000          | 36.33             | 13.42             | 49.75              | 74.00             | -24.25         | peak   |
| 5   | 13800.000          | 33.03             | 17.10             | 50.13              | 74.00             | -23.87         | peak   |
| 6   | 17715.000          | 30.36             | 22.56             | 52.92              | 74.00             | -21.08         | peak   |

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

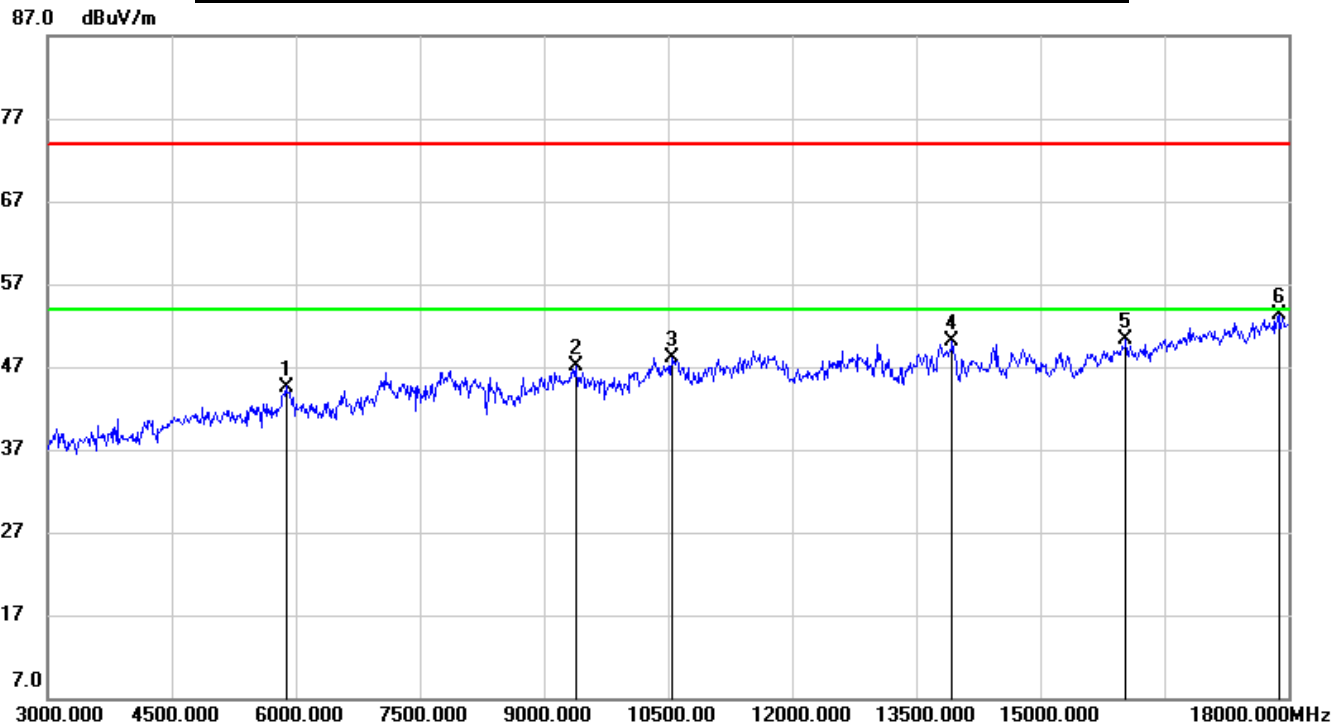
3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

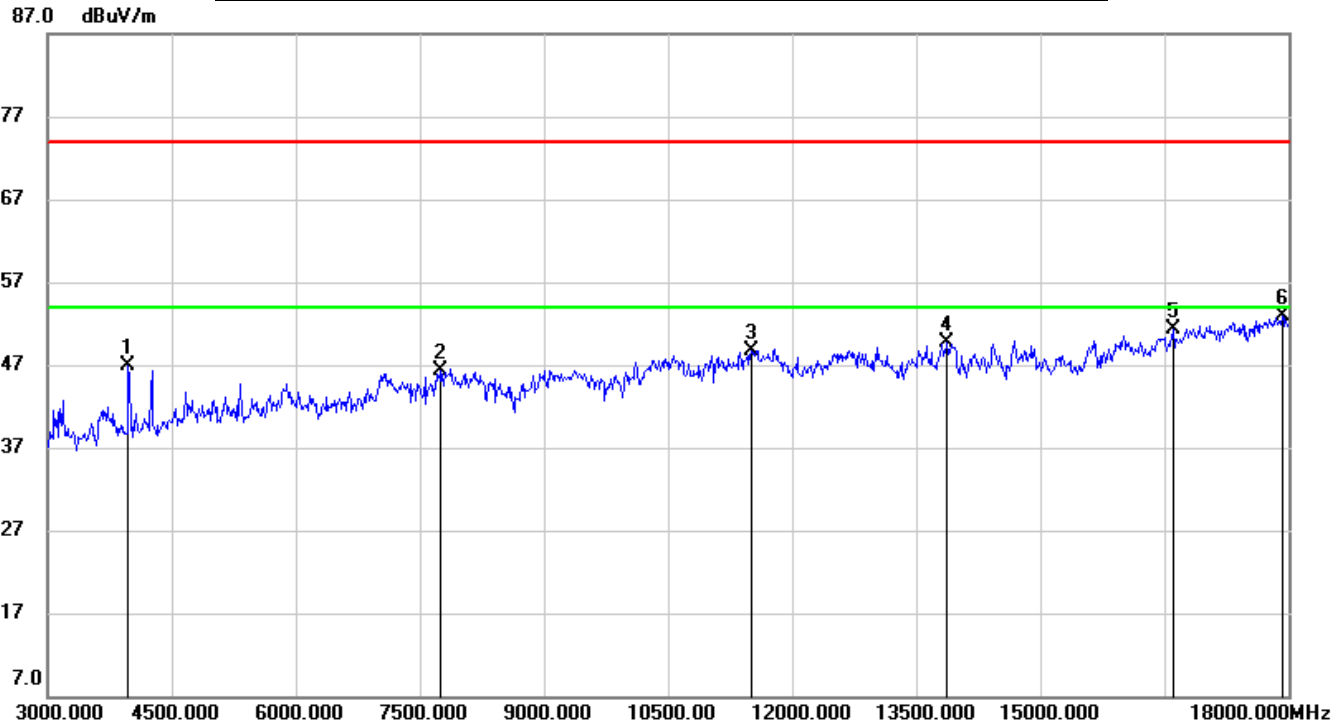


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 5880.000           | 40.01             | 4.59              | 44.60              | 74.00             | -29.40         | peak   |
| 2   | 9390.000           | 37.53             | 9.53              | 47.06              | 74.00             | -26.94         | peak   |
| 3   | 10545.000          | 36.44             | 11.64             | 48.08              | 74.00             | -25.92         | peak   |
| 4   | 13935.000          | 33.87             | 16.15             | 50.02              | 74.00             | -23.98         | peak   |
| 5   | 16035.000          | 32.39             | 17.85             | 50.24              | 74.00             | -23.76         | peak   |
| 6   | 17880.000          | 30.02             | 23.34             | 53.36              | 74.00             | -20.64         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

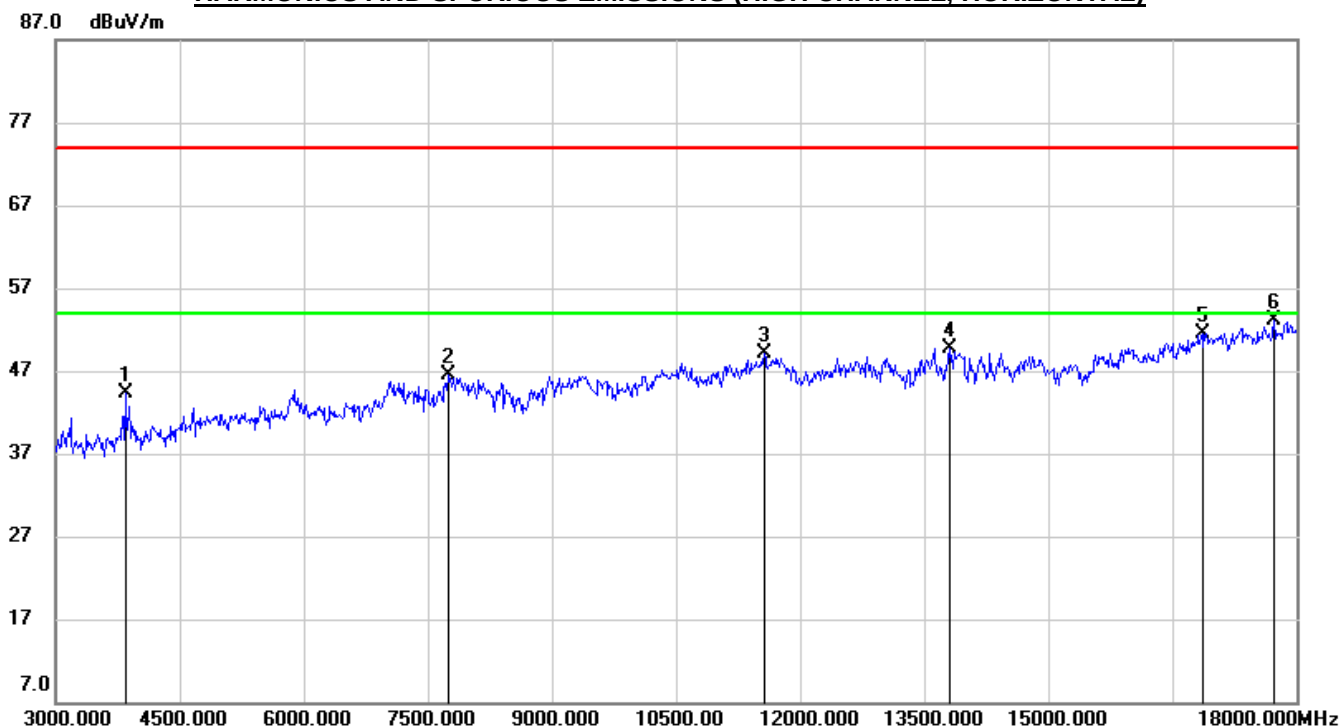


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3975.000           | 49.76             | -2.90             | 46.86              | 74.00             | -27.14         | peak   |
| 2   | 7755.000           | 38.92             | 7.29              | 46.21              | 74.00             | -27.79         | peak   |
| 3   | 11505.000          | 35.31             | 13.42             | 48.73              | 74.00             | -25.27         | peak   |
| 4   | 13875.000          | 33.21             | 16.44             | 49.65              | 74.00             | -24.35         | peak   |
| 5   | 16605.000          | 31.78             | 19.49             | 51.27              | 74.00             | -22.73         | peak   |
| 6   | 17925.000          | 29.56             | 23.37             | 52.93              | 74.00             | -21.07         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

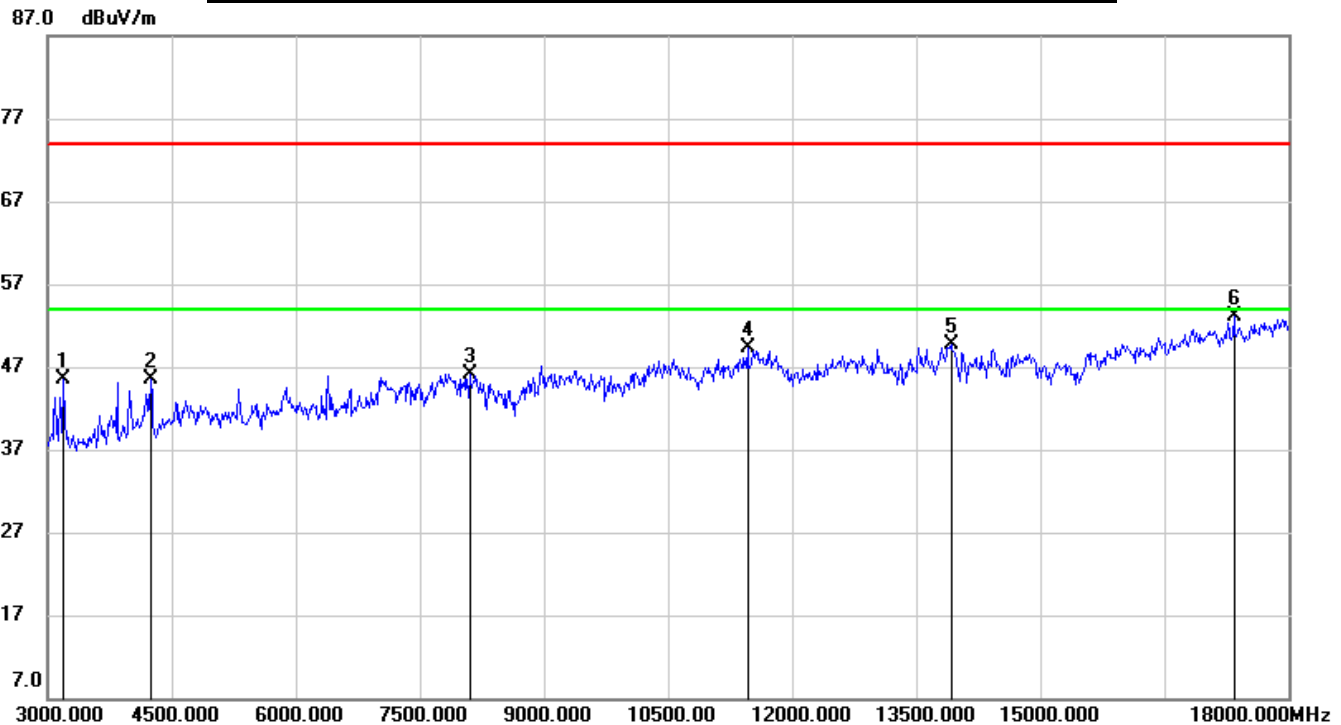


| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3840.000           | 47.21             | -2.84             | 44.37              | 74.00             | -29.63         | peak   |
| 2   | 7740.000           | 39.42             | 7.08              | 46.50              | 74.00             | -27.50         | peak   |
| 3   | 11565.000          | 35.78             | 13.26             | 49.04              | 74.00             | -24.96         | peak   |
| 4   | 13800.000          | 32.56             | 17.10             | 49.66              | 74.00             | -24.34         | peak   |
| 5   | 16860.000          | 31.62             | 19.95             | 51.57              | 74.00             | -22.43         | peak   |
| 6   | 17730.000          | 30.45             | 22.70             | 53.15              | 74.00             | -20.85         | peak   |

- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 3195.000           | 49.94             | -4.42             | 45.52              | 74.00             | -28.48         | peak   |
| 2   | 4245.000           | 47.12             | -1.59             | 45.53              | 74.00             | -28.47         | peak   |
| 3   | 8100.000           | 38.36             | 7.81              | 46.17              | 74.00             | -27.83         | peak   |
| 4   | 11460.000          | 36.19             | 13.11             | 49.30              | 74.00             | -24.70         | peak   |
| 5   | 13920.000          | 33.45             | 16.17             | 49.62              | 74.00             | -24.38         | peak   |
| 6   | 17340.000          | 31.52             | 21.61             | 53.13              | 74.00             | -20.87         | peak   |

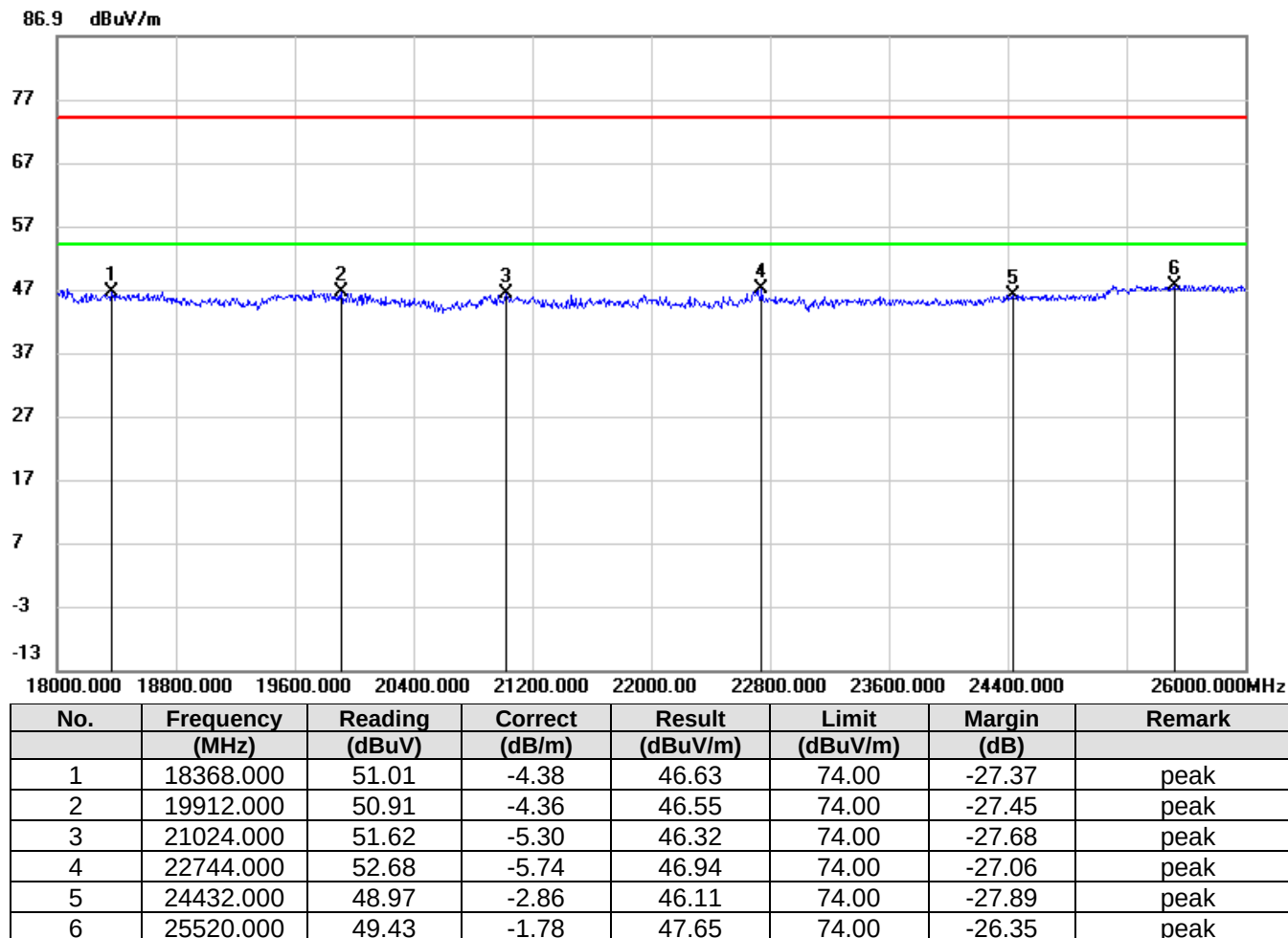
- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.  
4. AVG:  $VBW=1/Ton$  where: ton is transmit duration.  
5. For transmit duration, please refer to clause 7.1.  
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.  
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.



## 8.5. SPURIOUS EMISSIONS 18G ~ 26GHz

### 8.5.1. GFSK MODE

#### SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



Note: 1. Peak Result = Reading Level + Correct Factor.

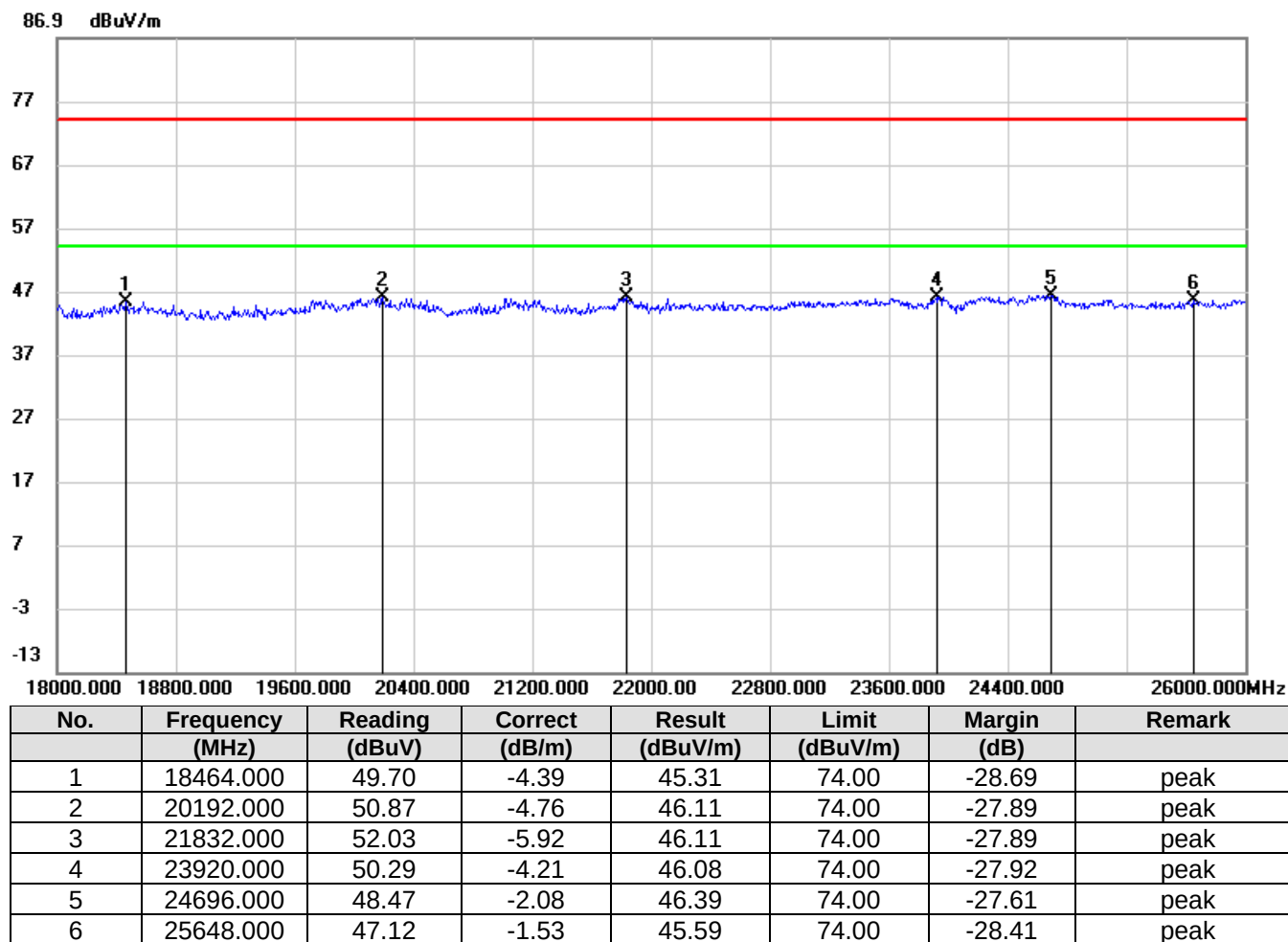
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.





**SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)**



- Note: 1. Peak Result = Reading Level + Correct Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Peak: Peak detector.

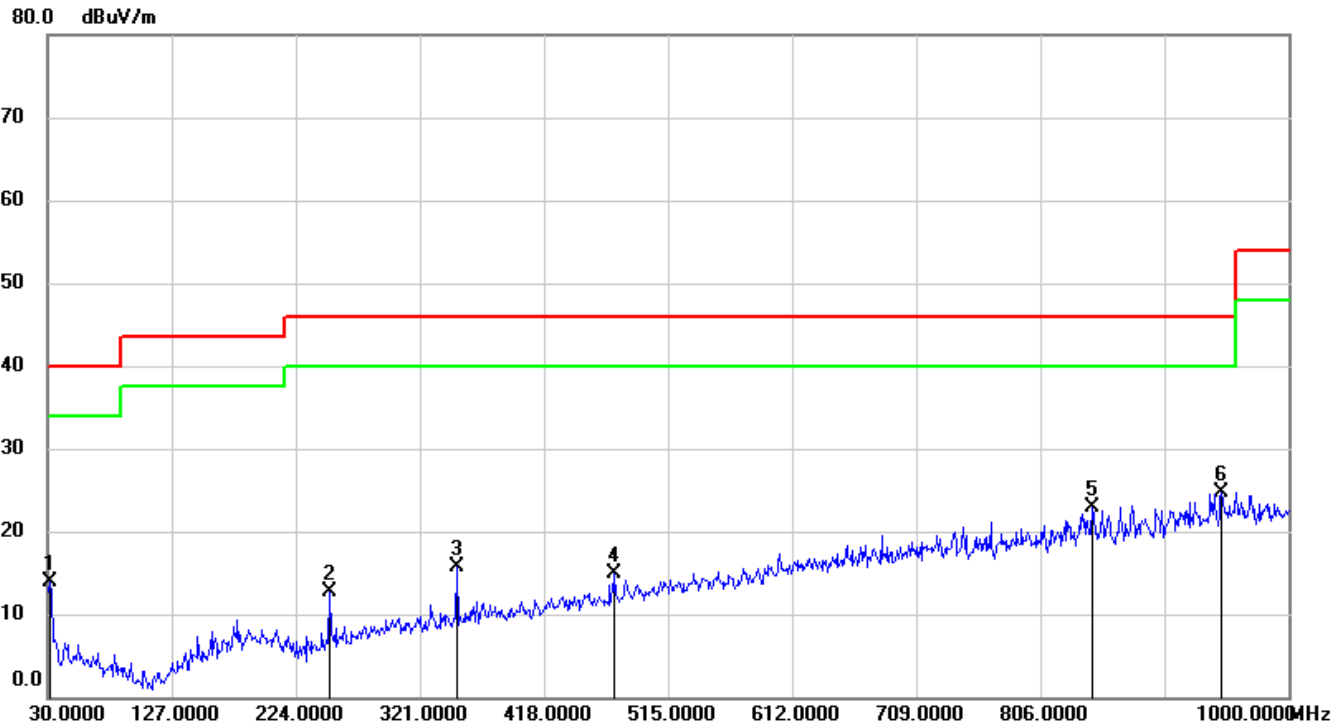
Note: All test modes have been tested, only the worst data record in the report.



## 8.6. SPURIOUS EMISSIONS 30M ~ 1 GHz

### 8.6.1. GFSK MODE

#### SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------|--------------------|-------------------|----------------|--------|
| 1   | 31.9400            | 30.97             | -17.05            | 13.92              | 40.00             | -26.08         | QP     |
| 2   | 250.1900           | 29.09             | -16.34            | 12.75              | 46.00             | -33.25         | QP     |
| 3   | 350.1000           | 29.15             | -13.52            | 15.63              | 46.00             | -30.37         | QP     |
| 4   | 473.2900           | 26.18             | -11.35            | 14.83              | 46.00             | -31.17         | QP     |
| 5   | 846.7400           | 27.76             | -4.80             | 22.96              | 46.00             | -23.04         | QP     |
| 6   | 947.6200           | 28.25             | -3.47             | 24.78              | 46.00             | -21.22         | QP     |

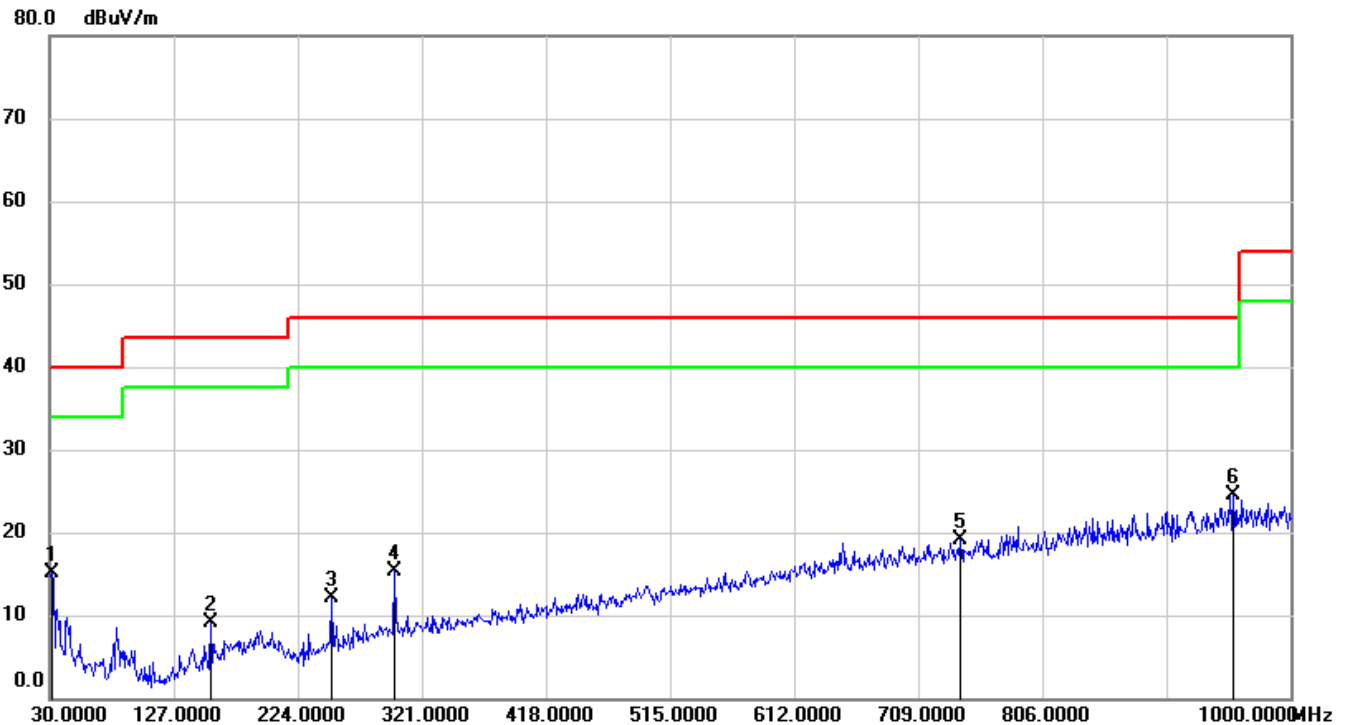
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



**SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)**



- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.  
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.  
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

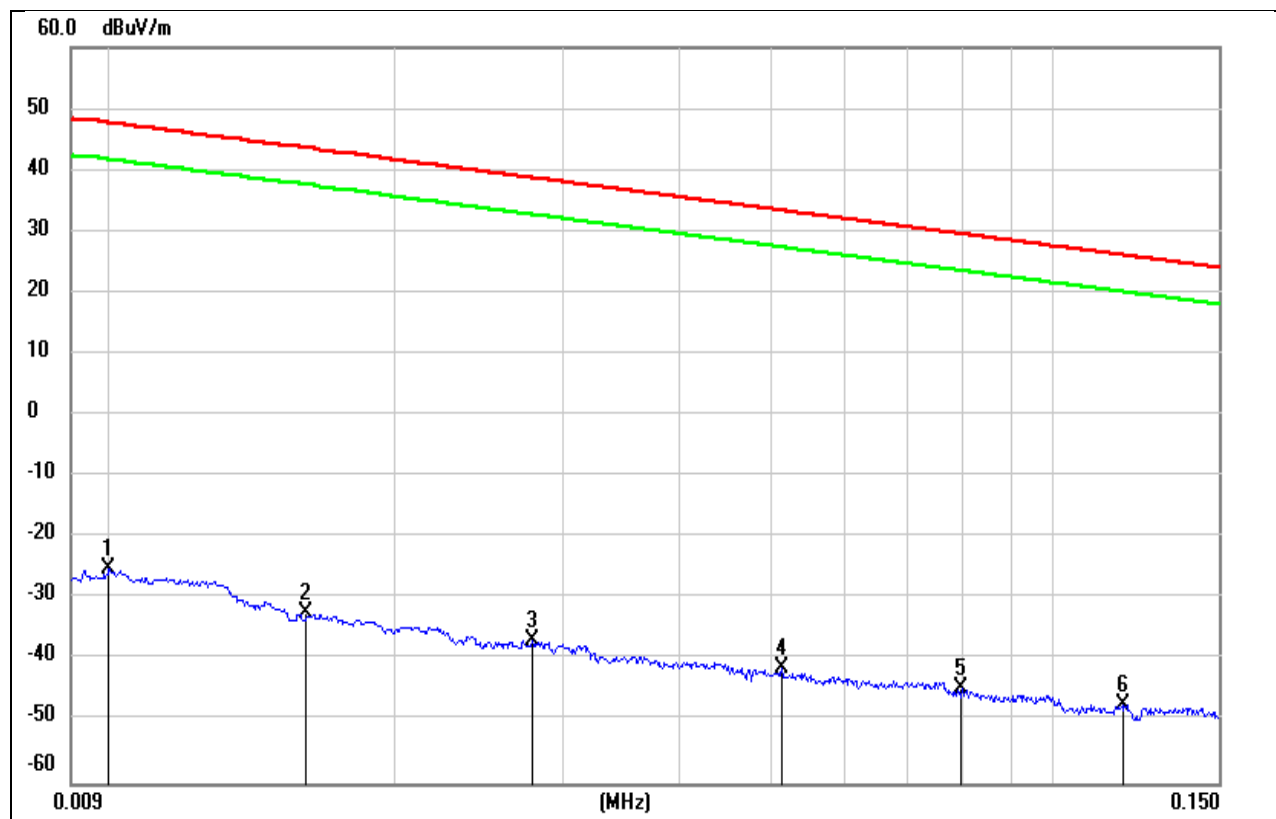
Note: All test modes have been tested, only the worst data record in the report.



## 8.7. SPURIOUS EMISSIONS BELOW 30M

### 8.7.1. GFSK MODE

SPURIOUS EMISSIONS (MID CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)  
9kHz~ 150kHz



| No. | Frequency | Reading | Correct | Result   | Limit    | ISED Result | ISED Limit | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|-------------|------------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dBuA/m)    | (dBuA/m)   | (dB)   |        |
| 1   | 0.0100    | 76.22   | -101.40 | -25.18   | 47.60    | -76.68      | -3.90      | -72.78 | peak   |
| 2   | 0.0160    | 68.97   | -101.37 | -32.40   | 43.52    | -83.90      | -7.98      | -75.92 | peak   |
| 3   | 0.0279    | 64.67   | -101.38 | -36.71   | 38.69    | -88.21      | -12.81     | -75.40 | peak   |
| 4   | 0.0514    | 60.18   | -101.48 | -41.30   | 33.38    | -92.8       | -18.12     | -74.68 | peak   |
| 5   | 0.0796    | 57.03   | -101.63 | -44.60   | 29.58    | -96.10      | -21.92     | -74.18 | peak   |
| 6   | 0.1184    | 54.52   | -101.74 | -47.22   | 26.14    | -98.72      | -25.36     | -73.36 | peak   |

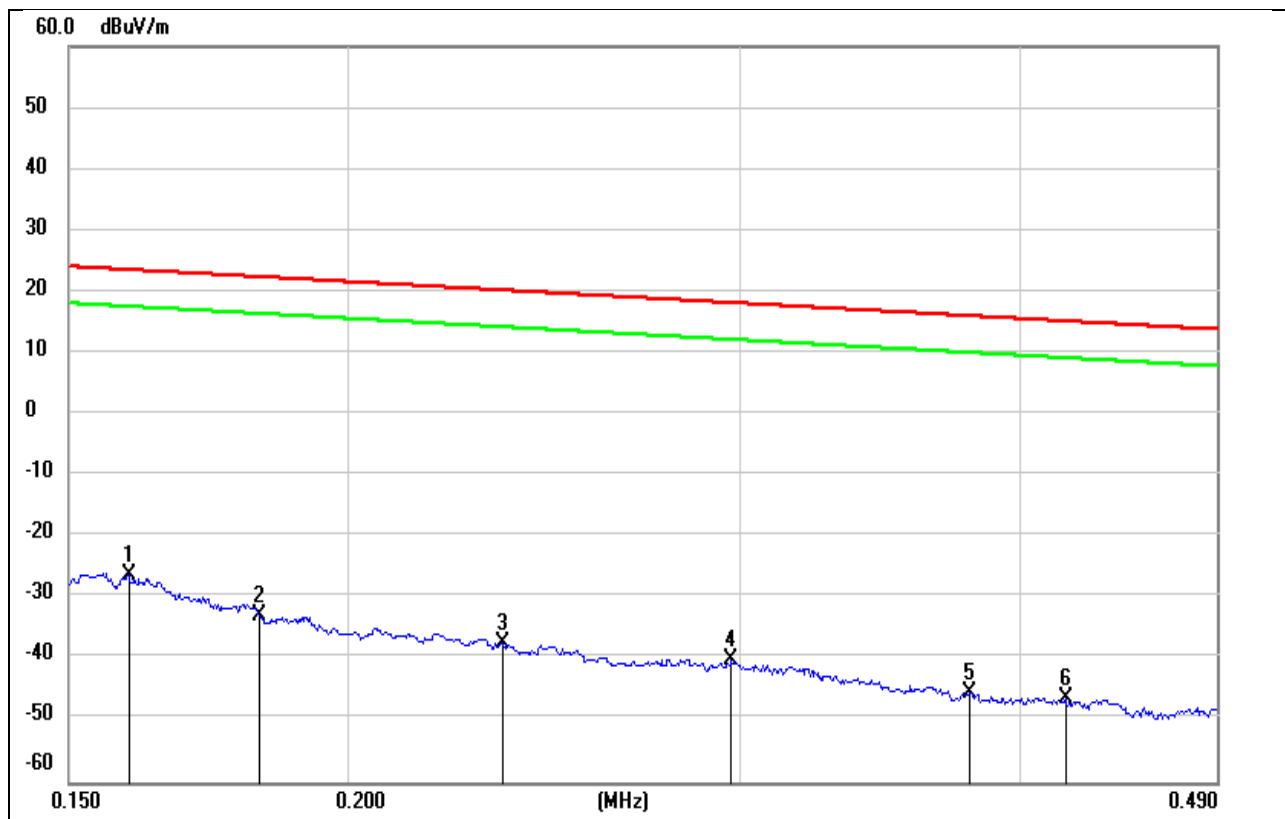
Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120 $\pi$ ] = dBuV/m- 51.5).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.



150kHz ~ 490kHz



| No. | Frequency | Reading | Correct | Result   | Limit    | ISED Result | ISED Limit | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|-------------|------------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dBuA/m)    | (dBuA/m)   | (dB)   |        |
| 1   | 0.1595    | 75.36   | -101.65 | -26.29   | 23.55    | -77.79      | -27.95     | -49.84 | peak   |
| 2   | 0.1826    | 68.76   | -101.69 | -32.93   | 22.38    | -84.43      | -29.12     | -55.31 | peak   |
| 3   | 0.2346    | 64.35   | -101.77 | -37.42   | 20.19    | -88.92      | -31.31     | -57.61 | peak   |
| 4   | 0.2972    | 61.66   | -101.85 | -40.19   | 18.14    | -91.69      | -33.36     | -58.33 | peak   |
| 5   | 0.3800    | 56.52   | -101.94 | -45.42   | 16.01    | -96.92      | -35.49     | -61.43 | peak   |
| 6   | 0.4193    | 55.68   | -101.98 | -46.30   | 15.15    | -97.80      | -36.35     | -61.45 | peak   |

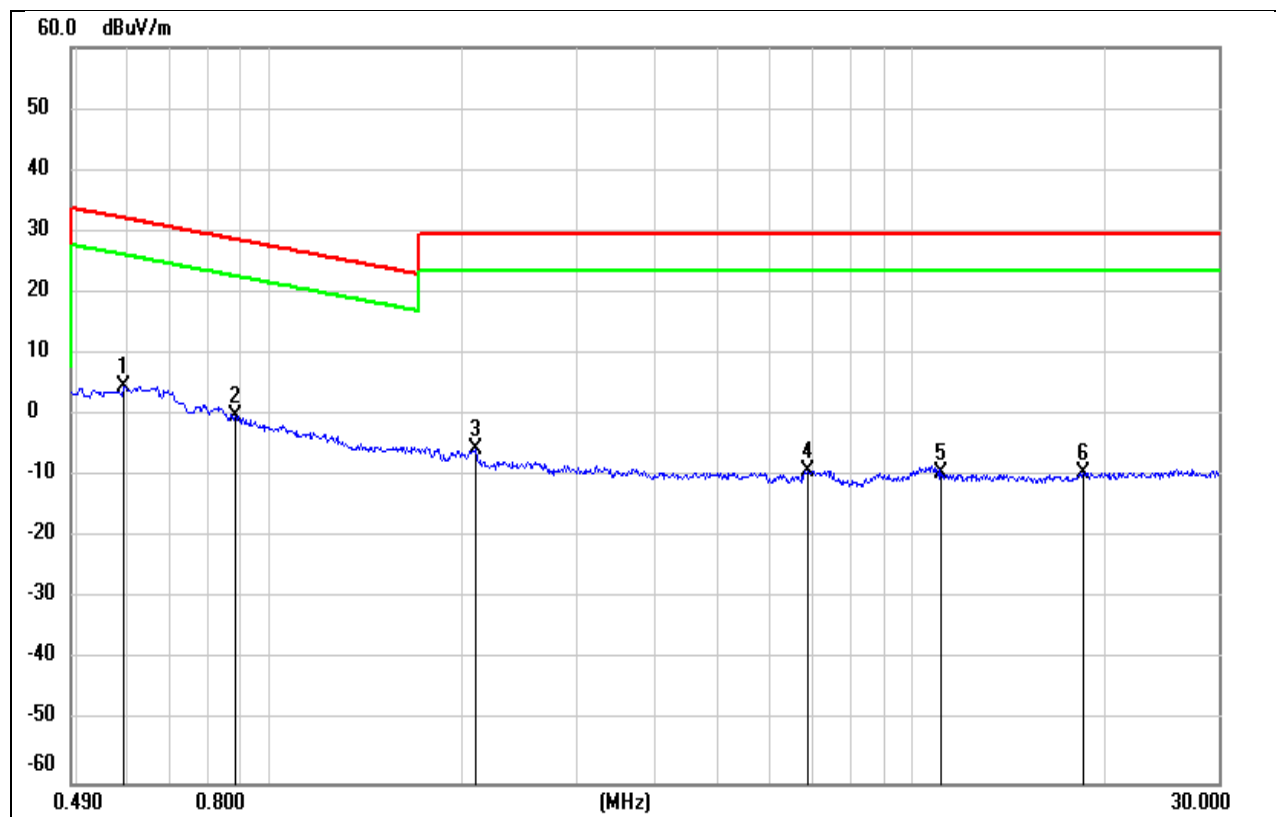
Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120 $\pi$ ] = dBuV/m- 51.5).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.



490kHz ~ 30MHz



| No. | Frequency | Reading | Correct | Result   | Limit    | ISED Result | ISED Limit | Margin | Remark |
|-----|-----------|---------|---------|----------|----------|-------------|------------|--------|--------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV/m) | (dBuV/m) | (dBuA/m)    | (dBuA/m)   | (dB)   |        |
| 1   | 0.5917    | 66.74   | -62.08  | 4.66     | 32.16    | -46.84      | -19.34     | -27.50 | peak   |
| 2   | 0.8820    | 62.18   | -62.19  | -0.01    | 28.69    | -51.51      | -22.81     | -28.70 | peak   |
| 3   | 2.0939    | 56.39   | -61.79  | -5.40    | 29.54    | -56.90      | -21.96     | -34.94 | peak   |
| 4   | 6.8936    | 52.09   | -61.22  | -9.13    | 29.54    | -60.63      | -21.96     | -38.67 | peak   |
| 5   | 11.0838   | 51.28   | -60.84  | -9.56    | 29.54    | -61.06      | -21.96     | -39.10 | peak   |
| 6   | 18.4908   | 51.55   | -60.89  | -9.34    | 29.54    | -60.84      | -21.96     | -38.88 | peak   |

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120 $\pi$ ] = dBuV/m- 51.5).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Note: All test modes have been tested, only the worst data record in the report.

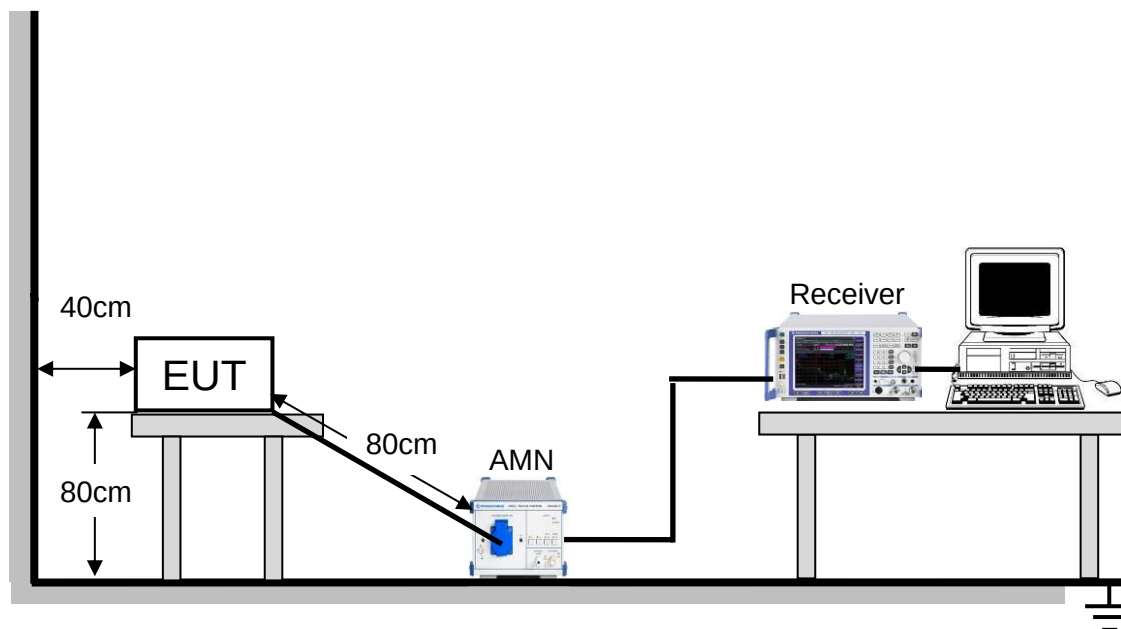
## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8.

| FREQUENCY (MHz) | Quasi-peak | Average   |
|-----------------|------------|-----------|
| 0.15 -0.5       | 66 - 56 *  | 56 - 46 * |
| 0.50 -5.0       | 56.00      | 46.00     |
| 5.0 -30.0       | 60.00      | 50.00     |

### TEST SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

### TEST ENVIRONMENT

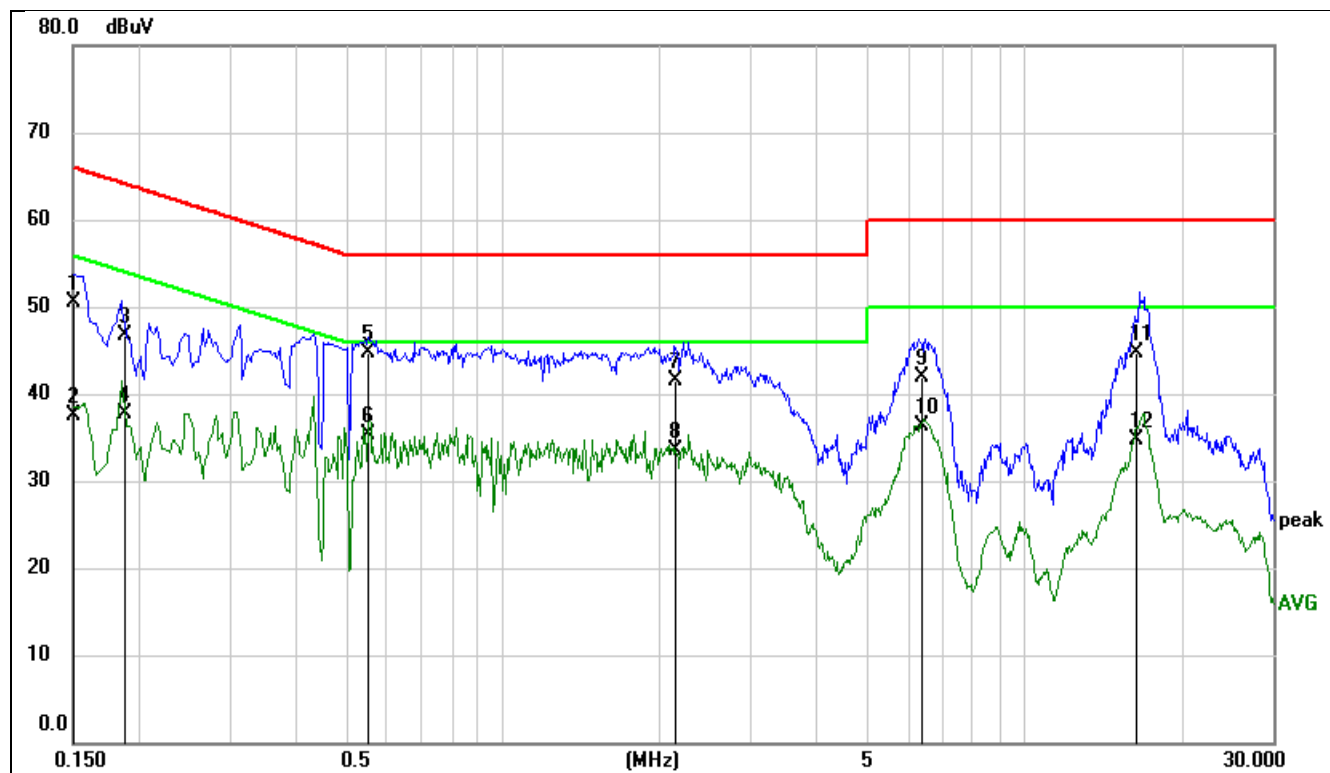
|                     |        |                   |             |
|---------------------|--------|-------------------|-------------|
| Temperature         | 22.0°C | Relative Humidity | 68.3%       |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC120V 60Hz |



## 9.1. 8DPSK MODE

### TEST RESULTS (HIGH CHANNEL, WORST-CASE CONFIGURATION)

#### LINE N RESULTS



| No. | Frequency (MHz) | Reading (dBuV) | Correct (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|-----|-----------------|----------------|--------------|---------------|--------------|-------------|--------|
| 1   | 0.1511          | 40.86          | 9.60         | 50.46         | 65.94        | -15.48      | QP     |
| 2   | 0.1511          | 27.83          | 9.60         | 37.43         | 55.94        | -18.51      | AVG    |
| 3   | 0.1887          | 37.10          | 9.60         | 46.70         | 64.09        | -17.39      | QP     |
| 4   | 0.1887          | 28.17          | 9.60         | 37.77         | 54.09        | -16.32      | AVG    |
| 5   | 0.5577          | 35.19          | 9.60         | 44.79         | 56.00        | -11.21      | QP     |
| 6   | 0.5577          | 25.78          | 9.60         | 35.38         | 46.00        | -10.62      | AVG    |
| 7   | 2.1547          | 31.96          | 9.63         | 41.59         | 56.00        | -14.41      | QP     |
| 8   | 2.1547          | 23.84          | 9.63         | 33.47         | 46.00        | -12.53      | AVG    |
| 9   | 6.3794          | 32.19          | 9.71         | 41.90         | 60.00        | -18.10      | QP     |
| 10  | 6.3794          | 26.52          | 9.71         | 36.23         | 50.00        | -13.77      | AVG    |
| 11  | 16.5497         | 34.66          | 10.00        | 44.66         | 60.00        | -15.34      | QP     |
| 12  | 16.5497         | 24.67          | 10.00        | 34.67         | 50.00        | -15.33      | AVG    |

Note: 1. Result = Reading +Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

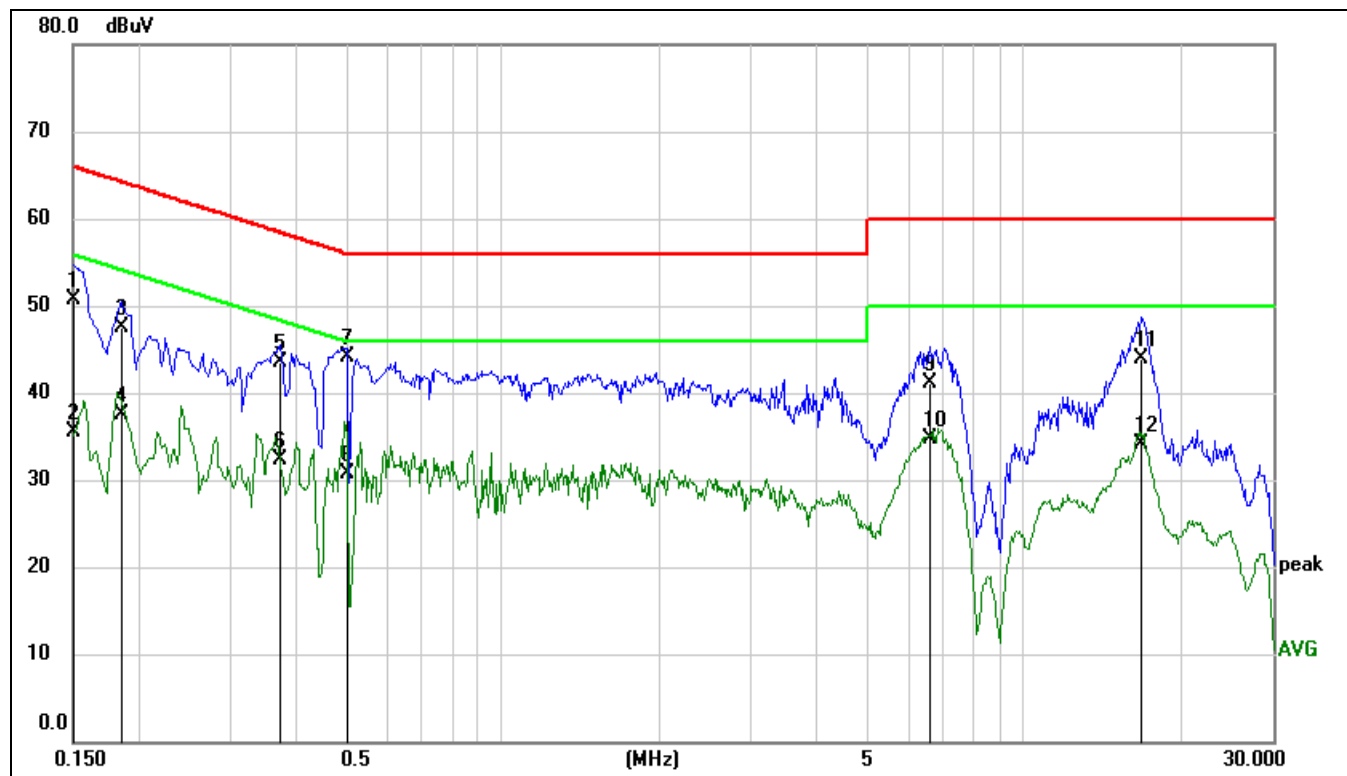
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).

4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.





### LINE L RESULTS



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-----------------|------------------|-----------------|----------------|--------|
| 1   | 0.1511             | 41.17             | 9.61            | 50.78            | 65.94           | -15.16         | QP     |
| 2   | 0.1511             | 25.82             | 9.61            | 35.43            | 55.94           | -20.51         | AVG    |
| 3   | 0.1855             | 37.92             | 9.60            | 47.52            | 64.24           | -16.72         | QP     |
| 4   | 0.1855             | 27.95             | 9.60            | 37.55            | 54.24           | -16.69         | AVG    |
| 5   | 0.3764             | 33.88             | 9.60            | 43.48            | 58.36           | -14.88         | QP     |
| 6   | 0.3764             | 22.65             | 9.60            | 32.25            | 48.36           | -16.11         | AVG    |
| 7   | 0.5001             | 34.42             | 9.60            | 44.02            | 56.00           | -11.98         | QP     |
| 8   | 0.5001             | 21.13             | 9.60            | 30.73            | 46.00           | -15.27         | AVG    |
| 9   | 6.6373             | 31.39             | 9.70            | 41.09            | 60.00           | -18.91         | QP     |
| 10  | 6.6373             | 24.95             | 9.70            | 34.65            | 50.00           | -15.35         | AVG    |
| 11  | 16.7912            | 34.00             | 9.94            | 43.94            | 60.00           | -16.06         | QP     |
| 12  | 16.7912            | 24.07             | 9.94            | 34.01            | 50.00           | -15.99         | AVG    |

Note: 1. Result = Reading +Correct Factor.  
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).  
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

Note: All the modes and channels had been tested, but only the worst data recorded in the report.



## 10. ANTENNA REQUIREMENTS

### **APPLICABLE REQUIREMENTS**

Please refer to FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **RESULTS**

Complies



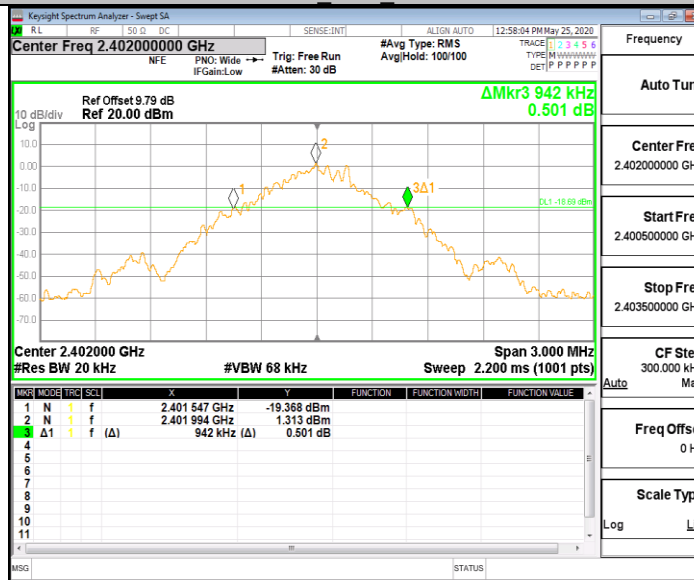
## Appendix A: 20dB Emission Bandwidth Test Result

| Test Mode | Antenna | Channel | 20db EBW[MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|-----------|---------|---------|---------------|----------|----------|------------|---------|
| DH5       | Ant1    | 2402    | 0.942         | 2401.547 | 2402.489 | ---        | PASS    |
|           |         | 2441    | 1.017         | 2440.481 | 2441.498 | ---        | PASS    |
|           |         | 2480    | 0.930         | 2479.499 | 2480.429 | ---        | PASS    |
| 3DH5      | Ant1    | 2402    | 1.275         | 2401.352 | 2402.627 | ---        | PASS    |
|           |         | 2441    | 1.179         | 2440.421 | 2441.600 | ---        | PASS    |
|           |         | 2480    | 1.155         | 2479.427 | 2480.582 | ---        | PASS    |

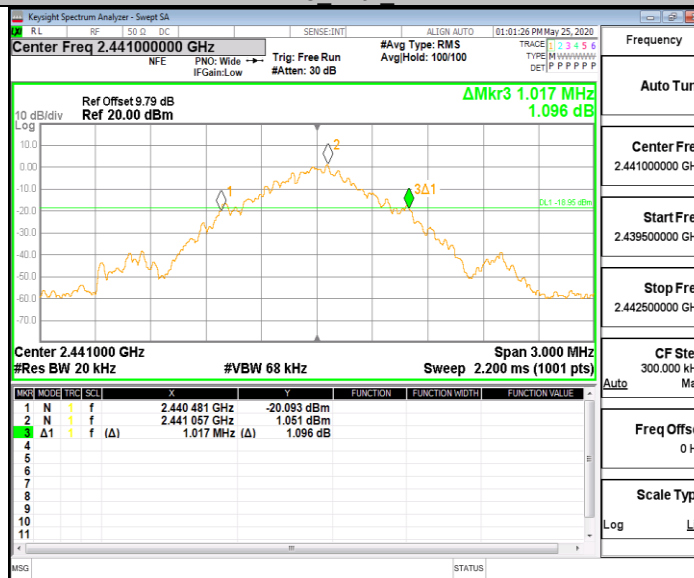


## Test Graphs

DH5 Ant1 2402



DH5 Ant1 2441

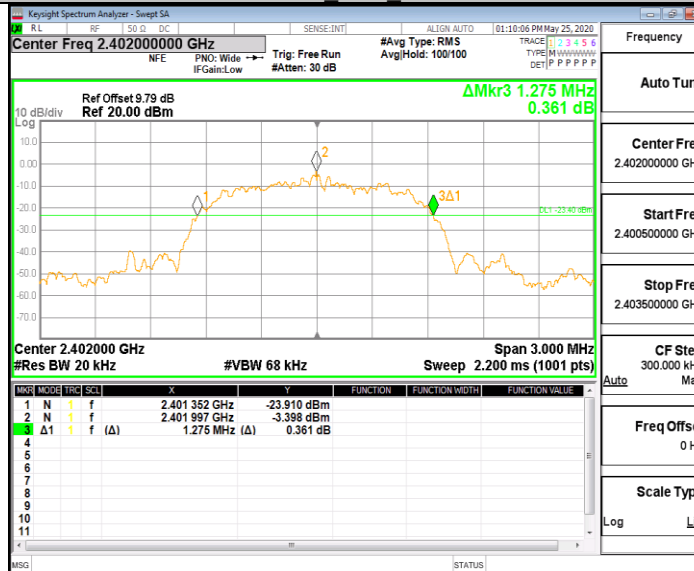




DH5 Ant1 2480

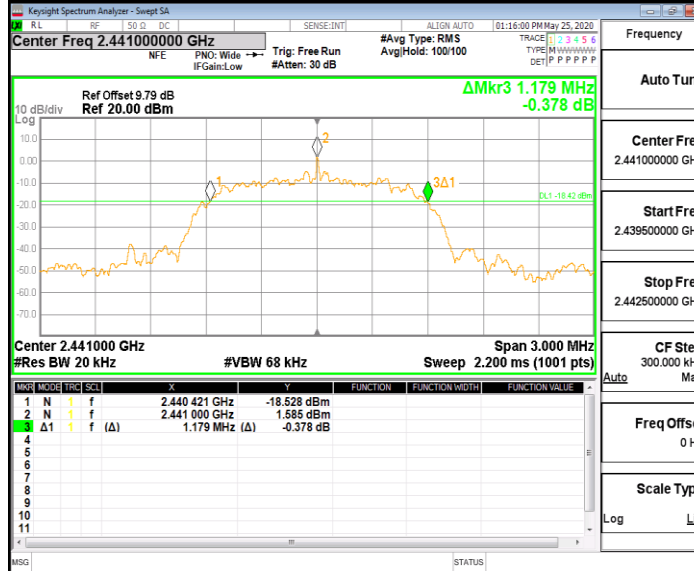


3DH5 Ant1 2402

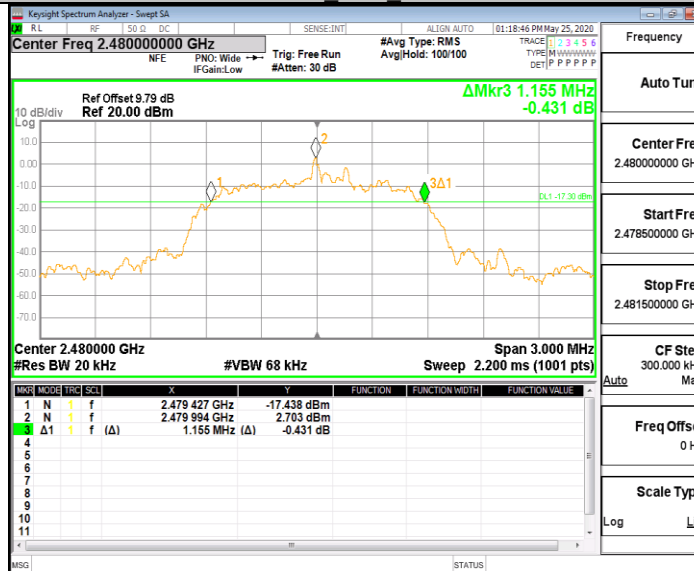




3DH5 Ant1 2441



3DH5 Ant1 2480





## Appendix B: Occupied Channel Bandwidth Test Result

| Test Mode | Antenna | Channel | OCB [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|-----------|---------|---------|-----------|----------|----------|------------|---------|
| DH5       | Ant1    | 2402    | 0.84233   | 2401.583 | 2402.426 | ---        | PASS    |
|           |         | 2441    | 0.85929   | 2440.567 | 2441.426 | ---        | PASS    |
|           |         | 2480    | 0.87450   | 2479.554 | 2480.428 | ---        | PASS    |
| 3DH5      | Ant1    | 2402    | 1.1514    | 2401.420 | 2402.572 | ---        | PASS    |
|           |         | 2441    | 1.1431    | 2440.426 | 2441.569 | ---        | PASS    |
|           |         | 2480    | 1.1630    | 2479.416 | 2480.579 | ---        | PASS    |



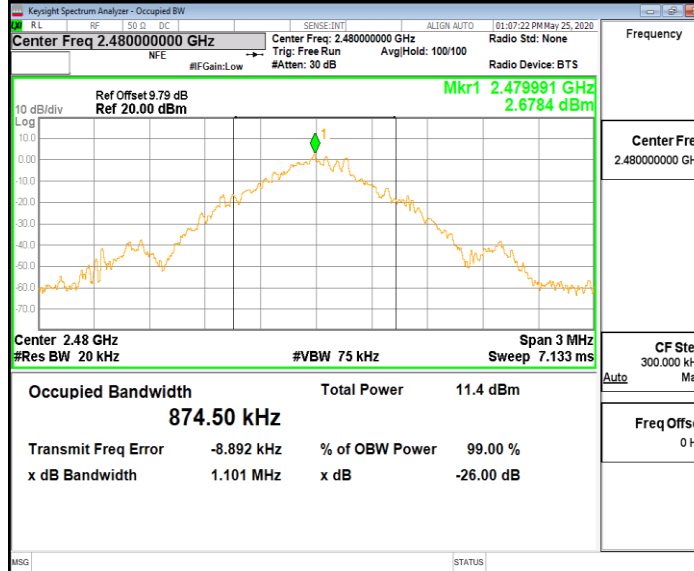
## Test Graphs



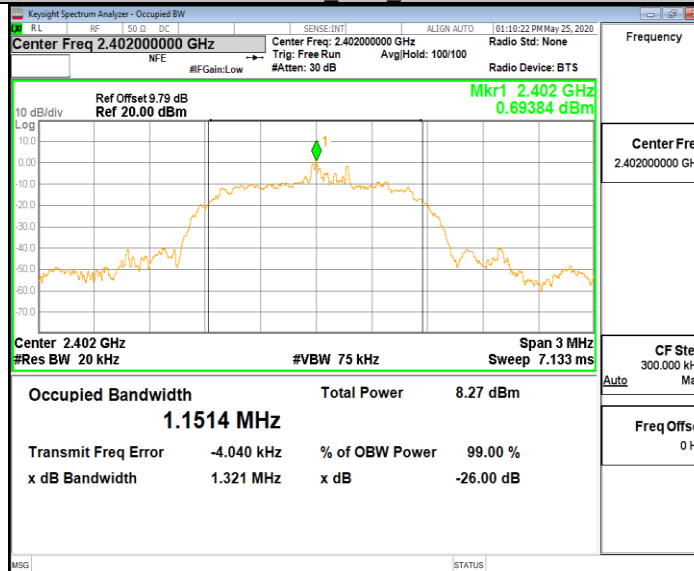




DH5 Ant1 2480

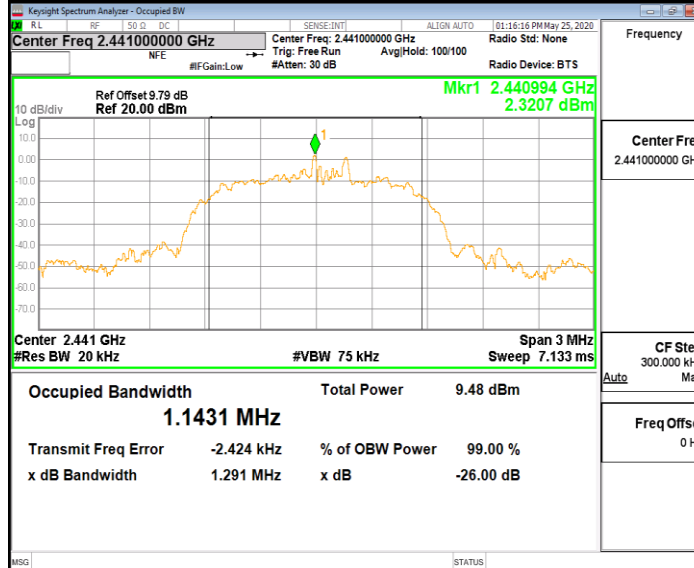


3DH5 Ant1 2402

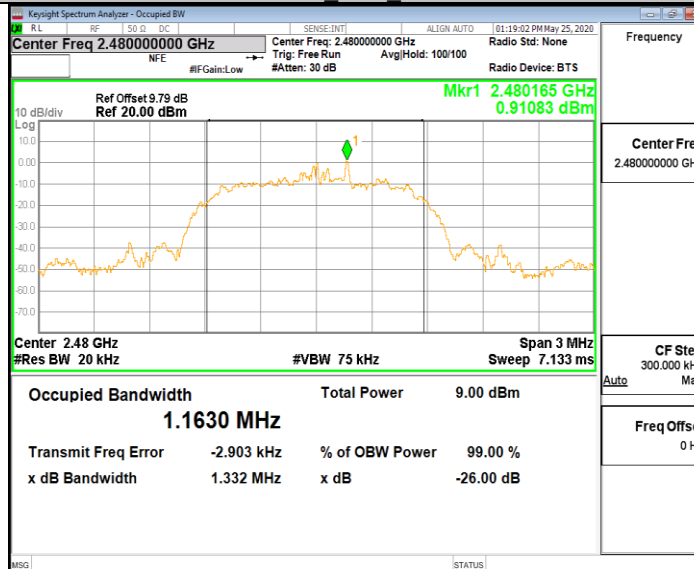




## 3DH5 Ant1 2441



## 3DH5 Ant1 2480





## Appendix C: Maximum Peak conducted output power Test Result

| Test Mode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|---------|-------------|------------|---------|
| DH5       | Ant1    | 2402    | 0.18        | <=21       | PASS    |
|           |         | 2441    | -0.80       | <=21       | PASS    |
|           |         | 2480    | -0.90       | <=21       | PASS    |
| 3DH5      | Ant1    | 2402    | 0.21        | <=21       | PASS    |
|           |         | 2441    | -0.83       | <=21       | PASS    |
|           |         | 2480    | -0.87       | <=21       | PASS    |



## Appendix D: Carrier frequency separation Test Result

| Test Mode | Antenna | Channel | Result[MHz] | Limit[MHz]   | Verdict |
|-----------|---------|---------|-------------|--------------|---------|
| DH5       | Ant1    | Hop     | 1.008       | $\geq 0.678$ | PASS    |
| 3DH5      | Ant1    | Hop     | 1.008       | $\geq 0.850$ | PASS    |



## Test Graphs





## Appendix E: Time of occupancy Test Result

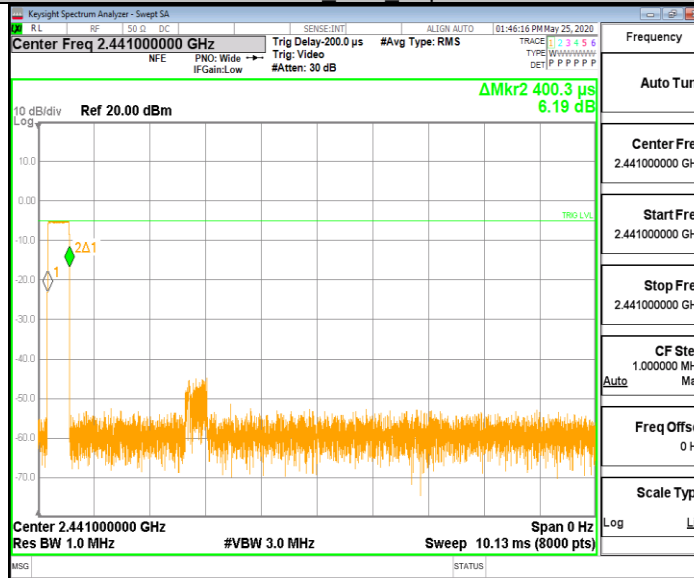
| FHSS Mode |         |         |                    |           |            |         |
|-----------|---------|---------|--------------------|-----------|------------|---------|
| Test Mode | Antenna | Channel | BurstWidth<br>[ms] | Result[s] | Limit[s]   | Verdict |
| DH1       | Ant1    | Hop     | 0.40               | 0.128     | $\leq 0.4$ | PASS    |
| DH3       | Ant1    | Hop     | 1.66               | 0.266     | $\leq 0.4$ | PASS    |
| DH5       | Ant1    | Hop     | 2.90               | 0.309     | $\leq 0.4$ | PASS    |
| 3DH1      | Ant1    | Hop     | 0.41               | 0.131     | $\leq 0.4$ | PASS    |
| 3DH3      | Ant1    | Hop     | 1.66               | 0.266     | $\leq 0.4$ | PASS    |
| 3DH5      | Ant1    | Hop     | 2.91               | 0.310     | $\leq 0.4$ | PASS    |

| AFHSS Mode |         |         |                    |           |            |         |
|------------|---------|---------|--------------------|-----------|------------|---------|
| Test Mode  | Antenna | Channel | BurstWidth<br>[ms] | Result[s] | Limit[s]   | Verdict |
| DH1        | Ant1    | Hop     | 0.40               | 0.064     | $\leq 0.4$ | PASS    |
| DH3        | Ant1    | Hop     | 1.66               | 0.133     | $\leq 0.4$ | PASS    |
| DH5        | Ant1    | Hop     | 2.90               | 0.155     | $\leq 0.4$ | PASS    |
| 3DH1       | Ant1    | Hop     | 0.41               | 0.066     | $\leq 0.4$ | PASS    |
| 3DH3       | Ant1    | Hop     | 1.66               | 0.133     | $\leq 0.4$ | PASS    |
| 3DH5       | Ant1    | Hop     | 2.91               | 0.155     | $\leq 0.4$ | PASS    |

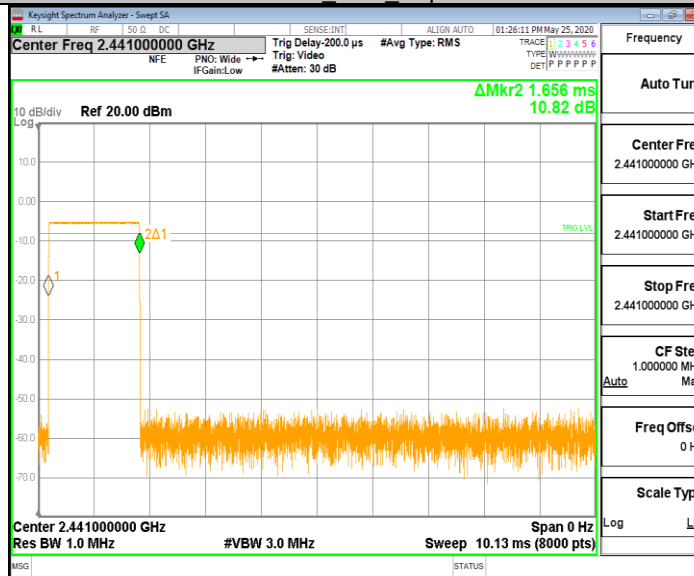


## Test Graphs

DH1\_Ant1\_Hop

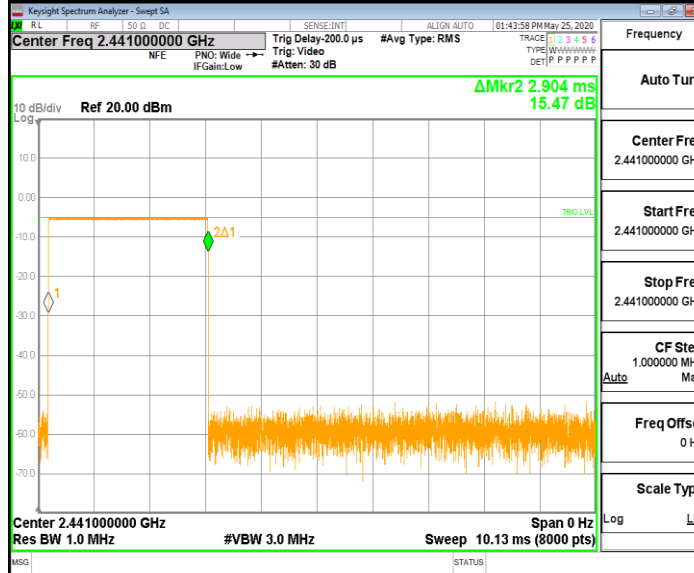


DH3\_Ant1\_Hop

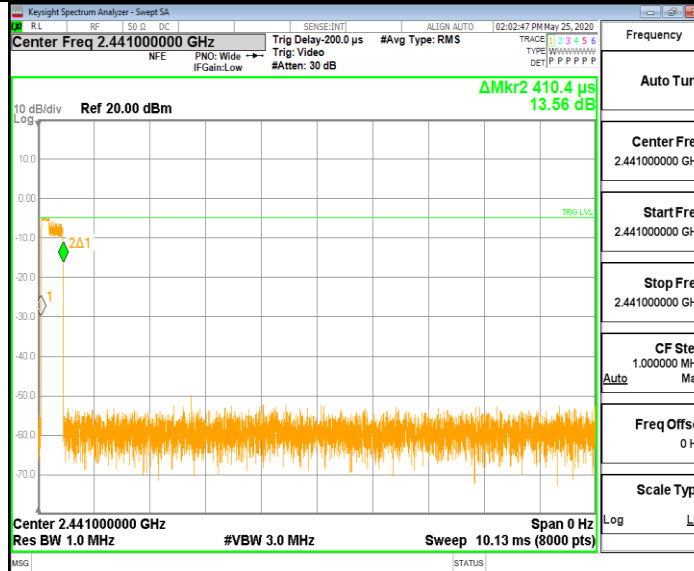




DH5 Ant1 Hop



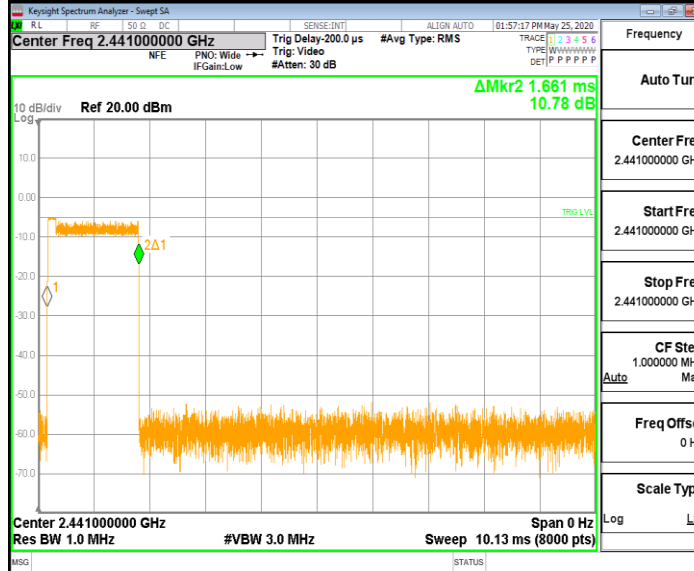
3DH1 Ant1 Hop



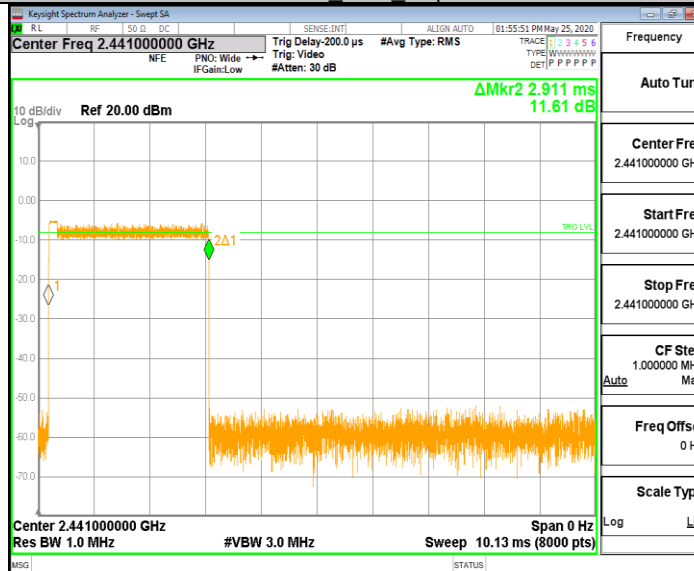




### 3DH3 Ant1 Hop



### 3DH5 Ant1 Hop





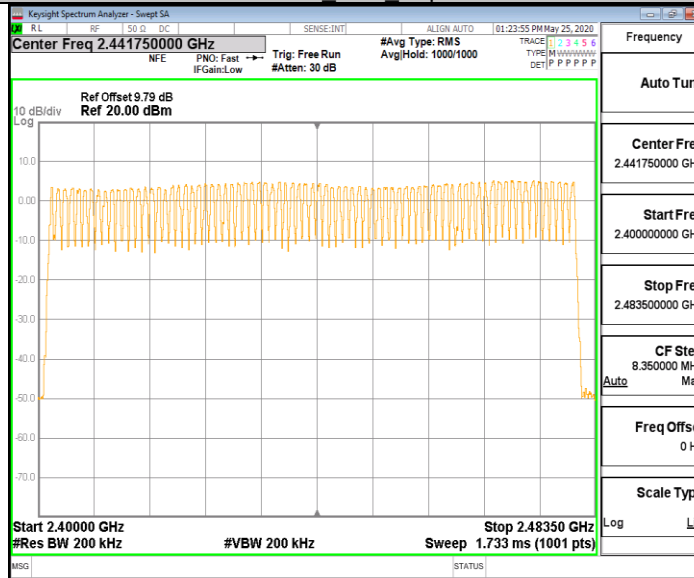
## Appendix F: Number of hopping channels Test Result

| Test Mode | Antenna | Channel | Result[Num] | Limit[Num] | Verdict |
|-----------|---------|---------|-------------|------------|---------|
| DH5       | Ant1    | Hop     | 79          | $\geq 15$  | PASS    |
| 3DH5      | Ant1    | Hop     | 79          | $\geq 15$  | PASS    |

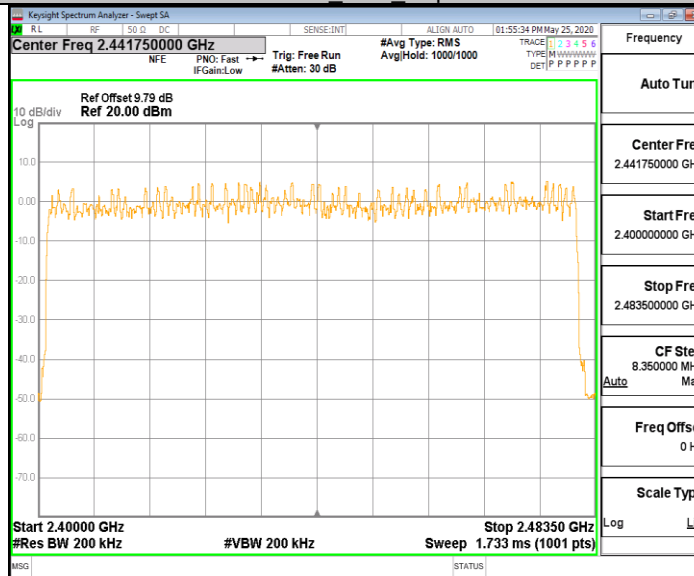


## Test Graphs

DH5\_Ant1\_Hop



3DH5\_Ant1\_Hop





## Appendix G: Band edge measurements

### Test Result

| Test Mode | Antenna | ChName | Channel  | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|-----------|---------|--------|----------|-------------------|-----------------|----------------|---------|
| DH5       | Ant1    | Low    | 2402     | 3.47              | -50.09          | <=-16.54       | PASS    |
|           |         | High   | 2480     | 4.88              | -49.57          | <=-15.12       | PASS    |
|           |         | Low    | Hop_2402 | 3.07              | -48.9           | -16.93         | PASS    |
|           |         | High   | Hop_2480 | 5.09              | -49.84          | -14.91         | PASS    |
| 3DH5      | Ant1    | Low    | 2402     | 3.51              | -50.75          | <=-16.49       | PASS    |
|           |         | High   | 2480     | 4.74              | -50.04          | <=-15.26       | PASS    |
|           |         | Low    | Hop_2402 | 0.55              | -50.92          | -19.45         | PASS    |
|           |         | High   | Hop_2480 | 5.10              | -50.24          | -14.9          | PASS    |

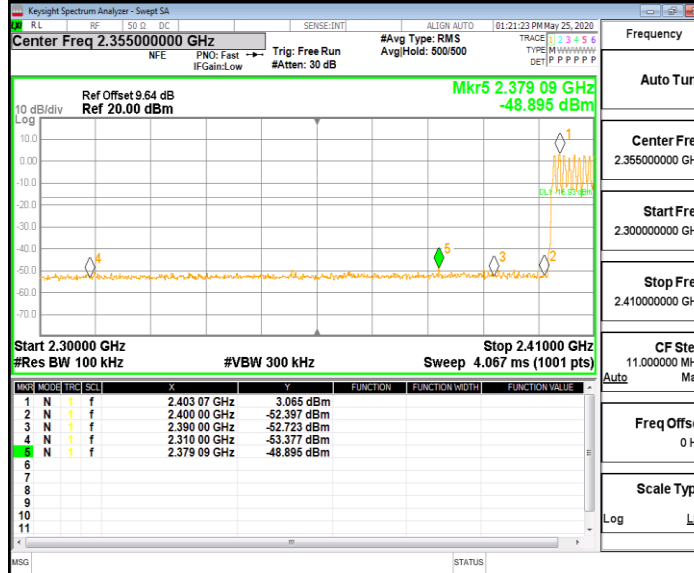


## Test Graphs

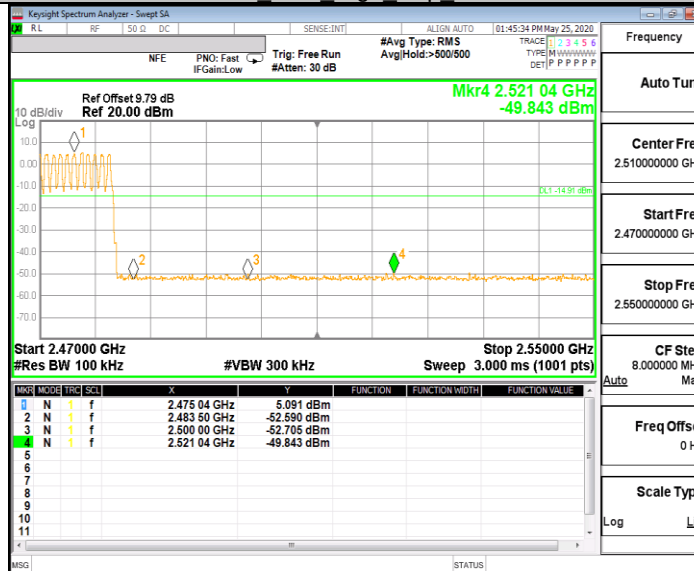




DH5 Ant1 Low Hop 2402

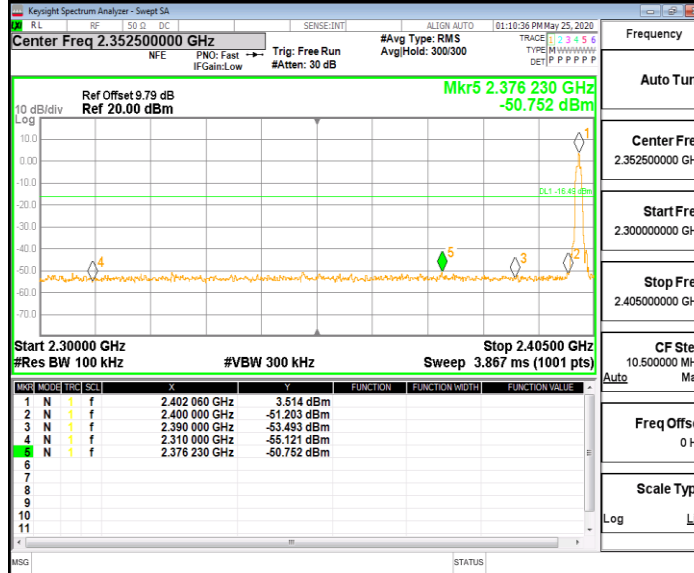


DH5 Ant1 High Hop 2480

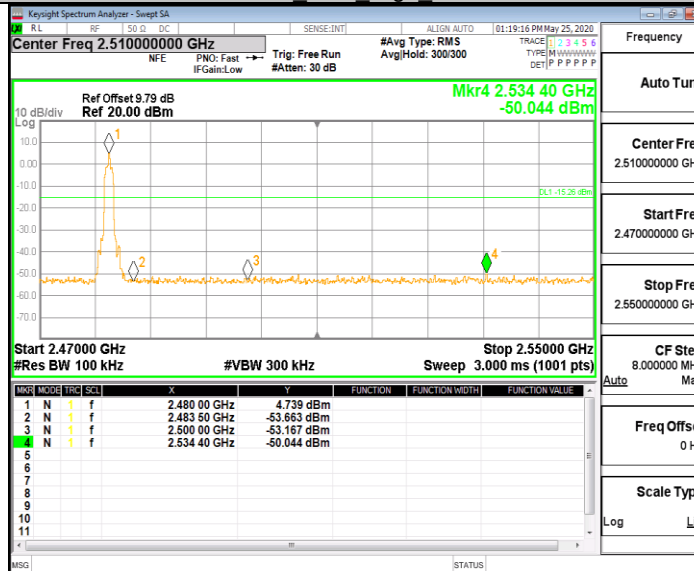




3DH5 Ant1 Low 2402

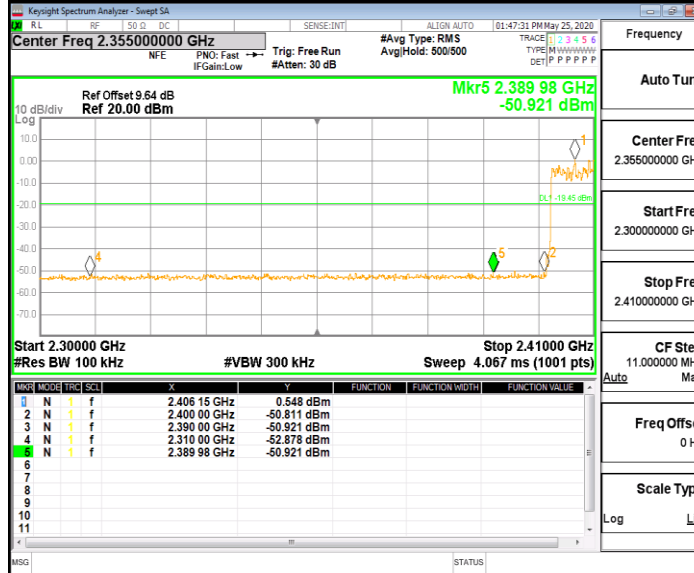


3DH5 Ant1 High 2480

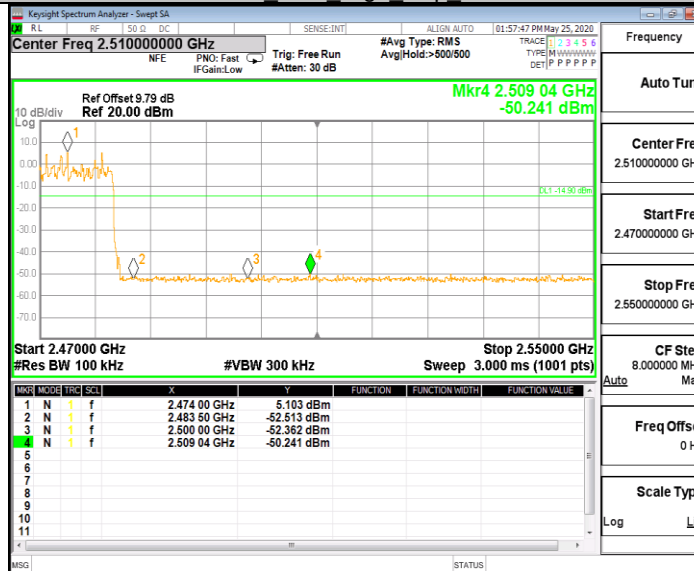




3DH5 Ant1 Low Hop 2402



3DH5 Ant1 High Hop 2480





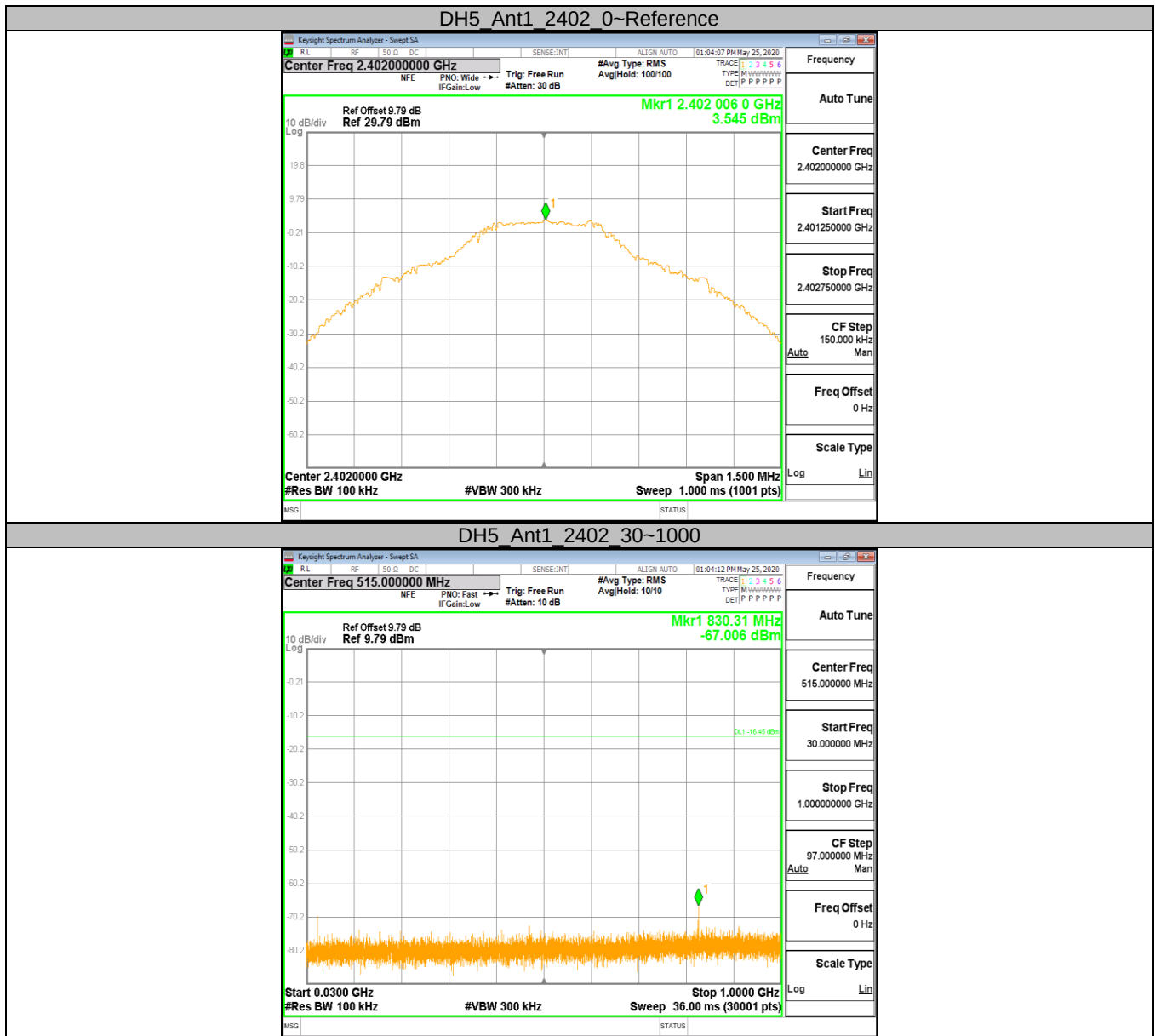


## Appendix H: Conducted Spurious Emission Test Result

| Test Mode | Antenna | Channel | FreqRange<br>[MHz] | RefLevel<br>[dBm] | Result<br>[dBm] | Limit<br>[dBm] | Verdict |
|-----------|---------|---------|--------------------|-------------------|-----------------|----------------|---------|
| DH5       | Ant1    | 2402    | Reference          | 3.55              | 3.55            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -67.006         | <=-16.455      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -54.859         | <=-16.455      | PASS    |
|           |         | 2441    | Reference          | 4.33              | 4.33            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -61.15          | <=-15.669      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -56.582         | <=-15.669      | PASS    |
|           |         | 2480    | Reference          | 4.78              | 4.78            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -69.211         | <=-15.223      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -55.976         | <=-15.223      | PASS    |
| 3DH5      | Ant1    | 2402    | Reference          | 2.75              | 2.75            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -71.229         | <=-17.253      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -57.419         | <=-17.253      | PASS    |
|           |         | 2441    | Reference          | 4.23              | 4.23            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -72.587         | <=-15.771      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -57.324         | <=-15.771      | PASS    |
|           |         | 2480    | Reference          | 2.65              | 2.65            | ---            | PASS    |
|           |         |         | 30~1000            | 30~1000           | -69.635         | <=-17.355      | PASS    |
|           |         |         | 1000~26500         | 1000~26500        | -60.274         | <=-17.355      | PASS    |

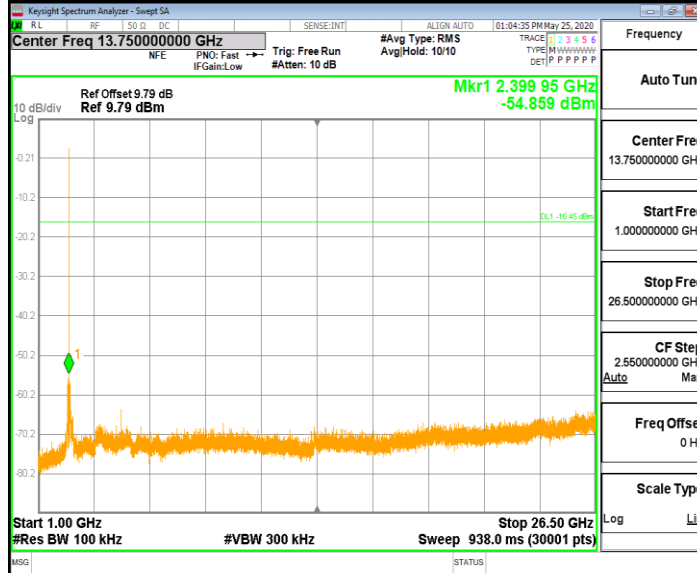


## Test Graphs

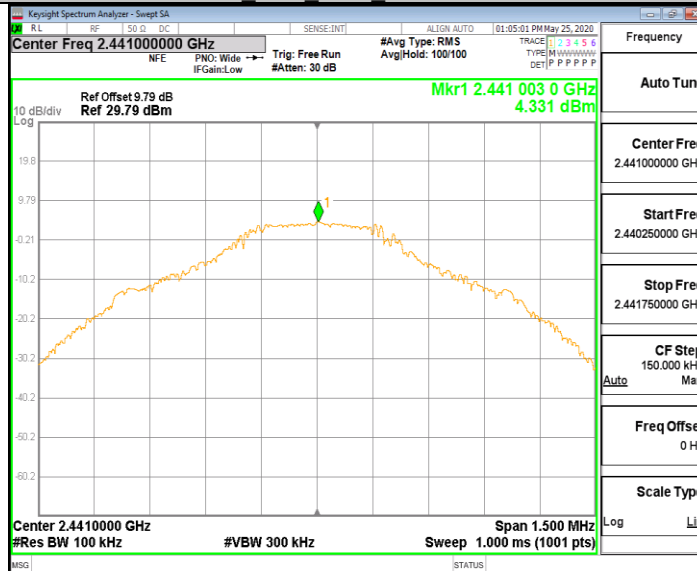




DH5\_Ant1\_2402\_1000~26500

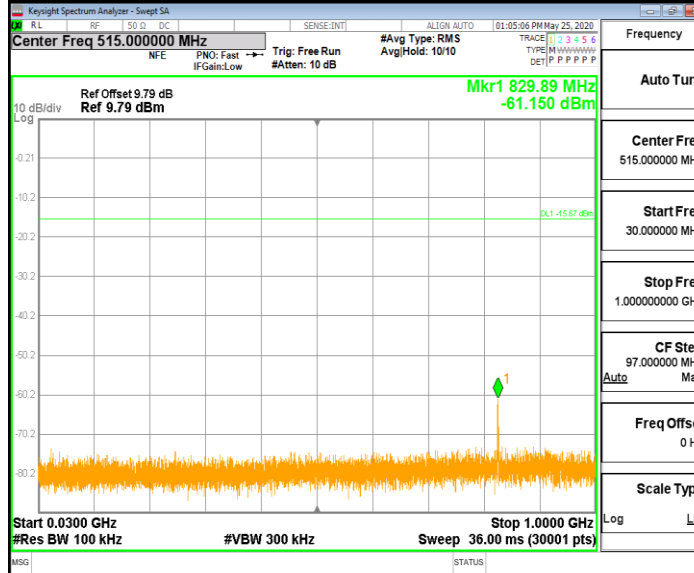


DH5\_Ant1\_2441\_0~Reference

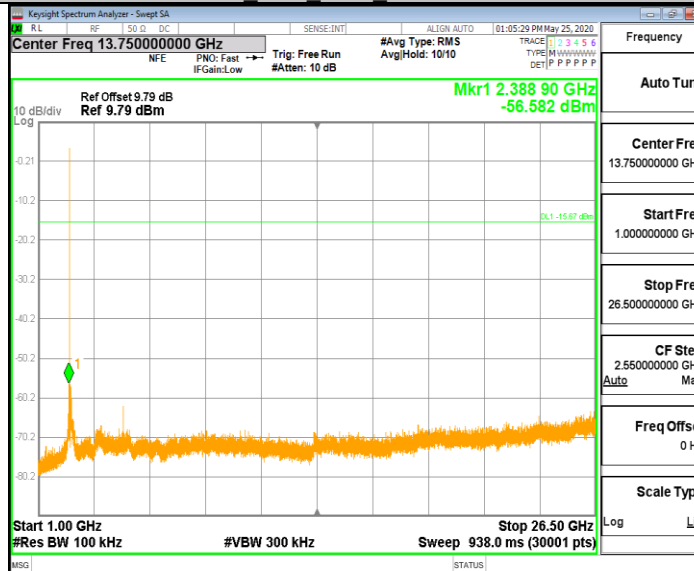




DH5 Ant1 2441 30~1000

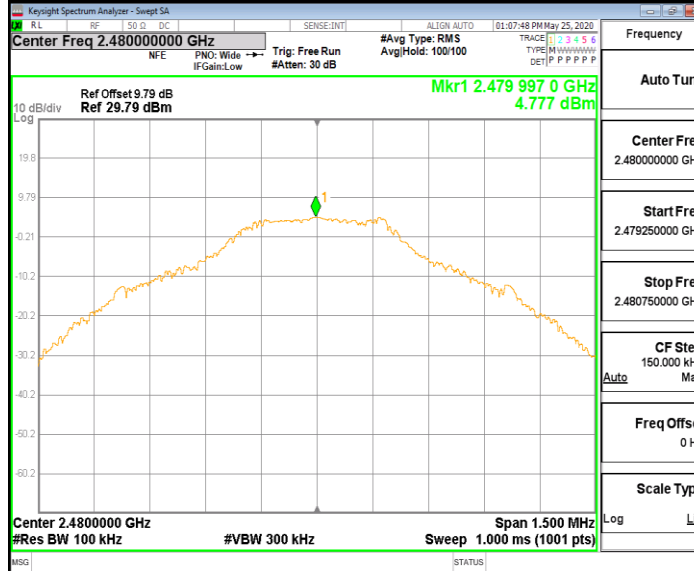


DH5 Ant1 2441 1000~26500

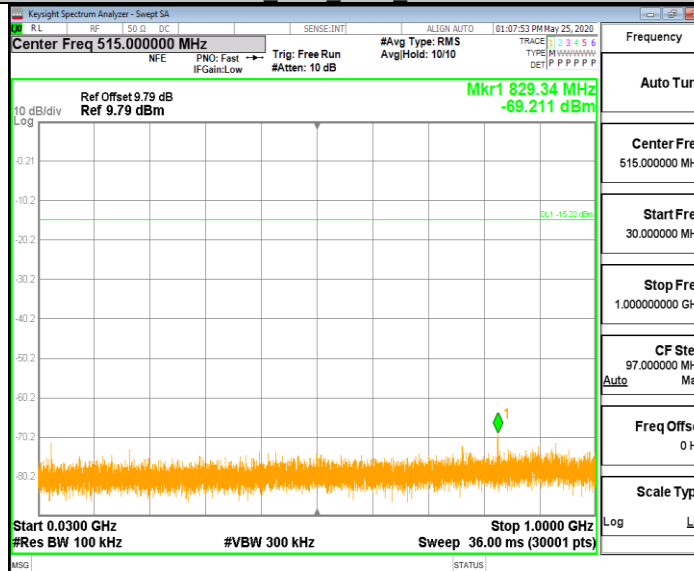




DH5 Ant1 2480 0~Reference

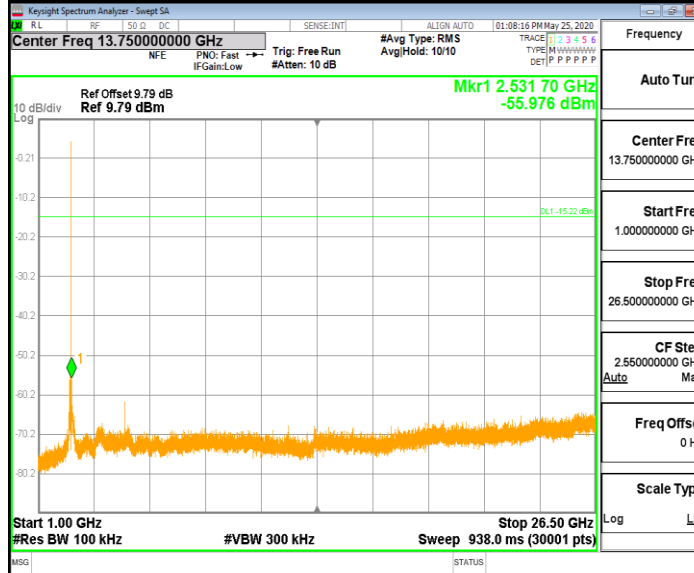


DH5 Ant1 2480 30~1000

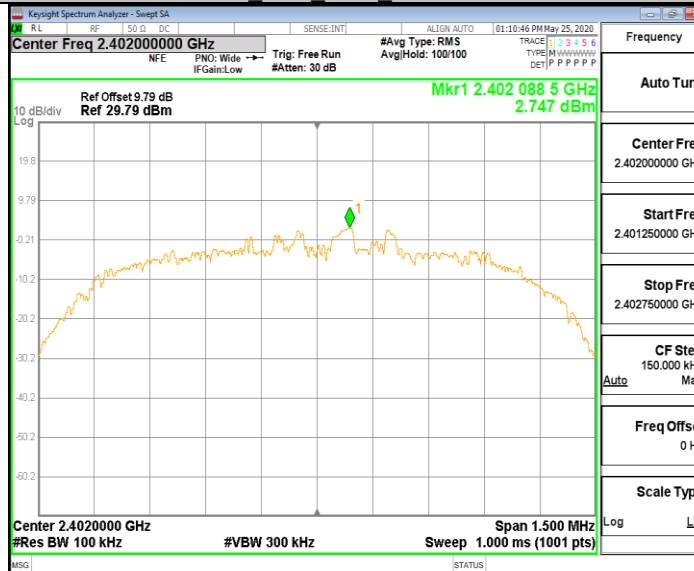


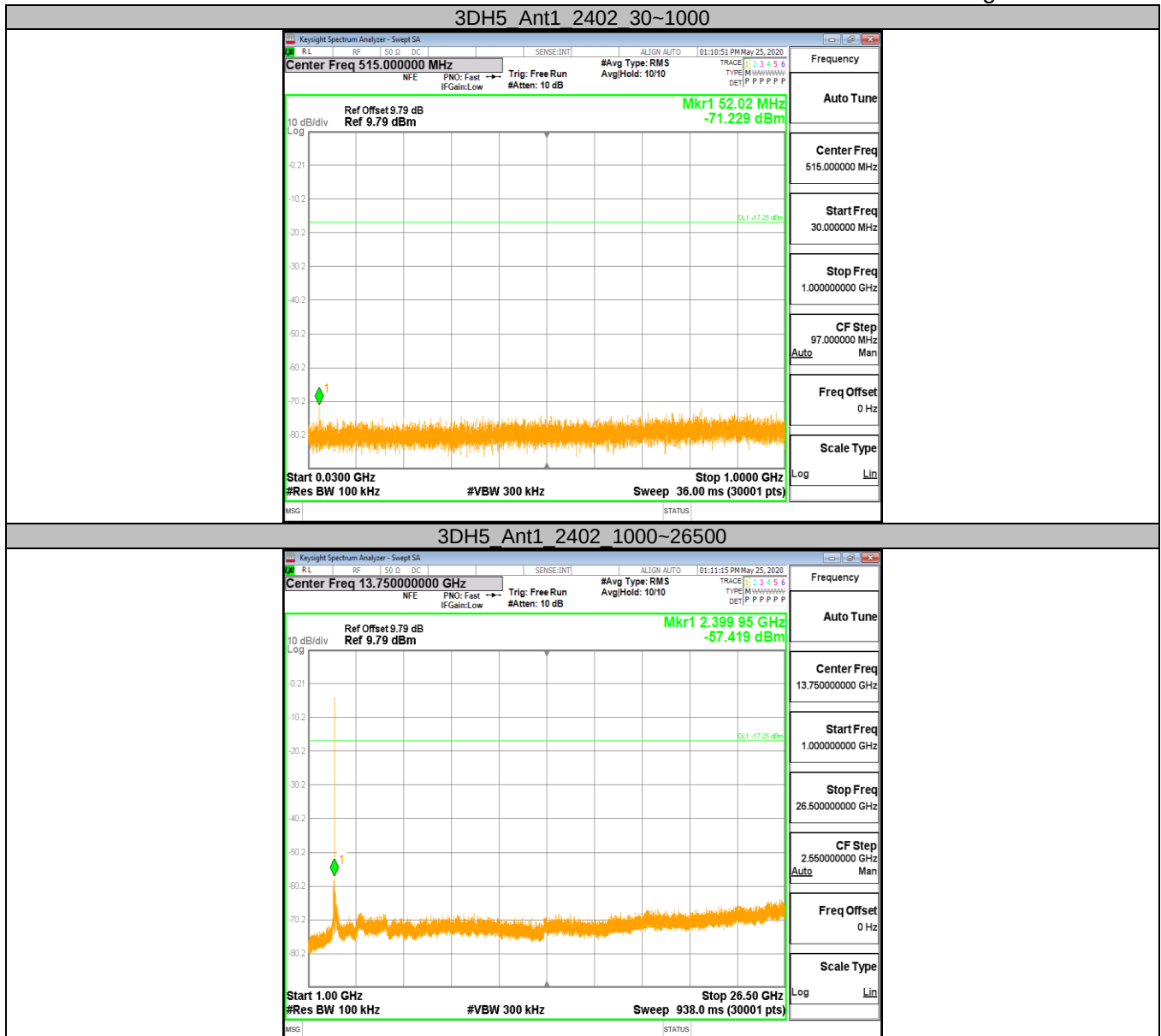
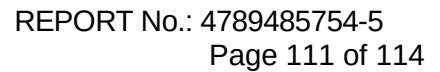


DH5 Ant1 2480 1000~26500



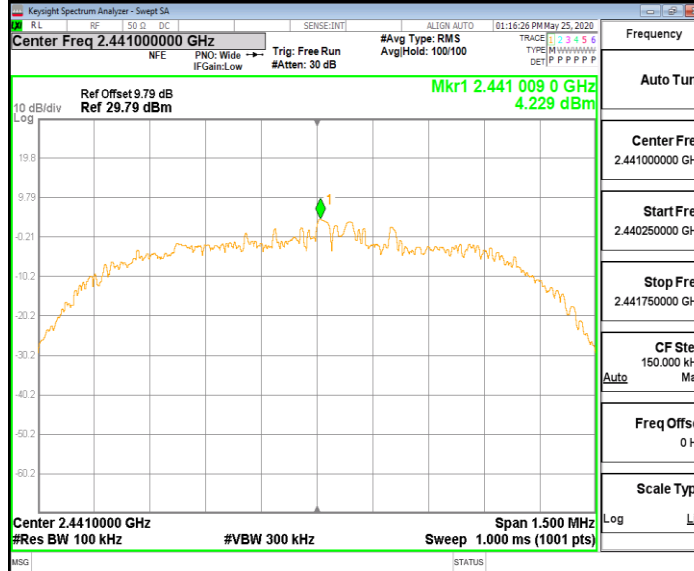
3DH5 Ant1 2402 0~Reference



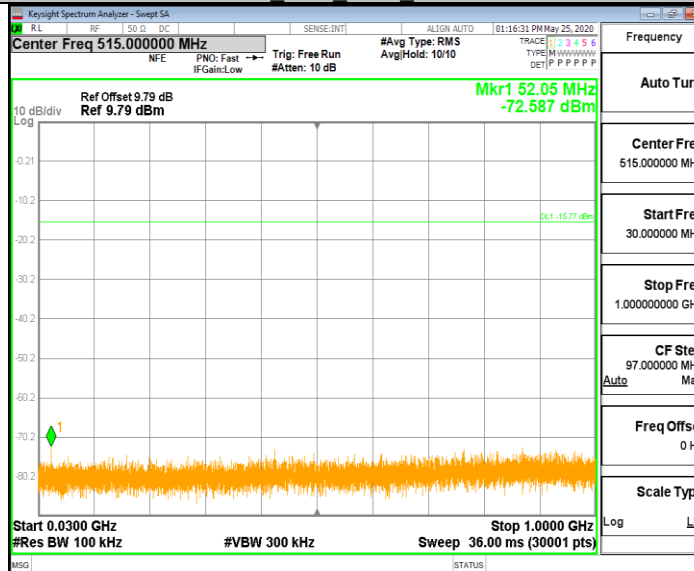




3DH5 Ant1 2441 0~Reference



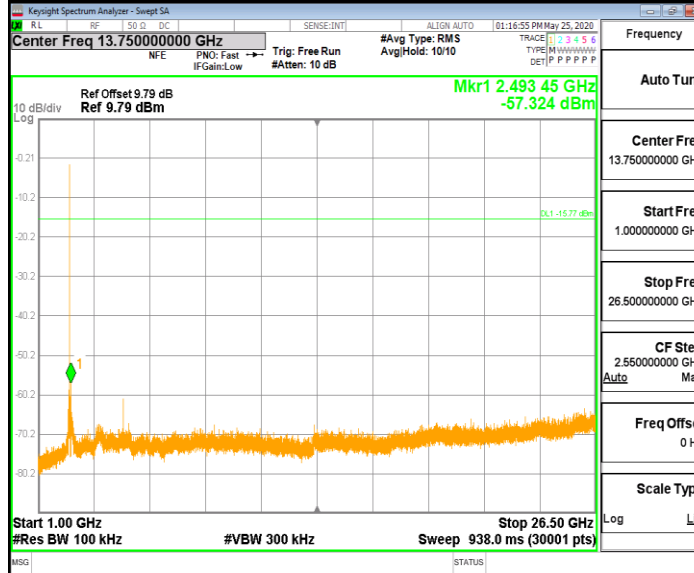
3DH5 Ant1 2441 30~1000



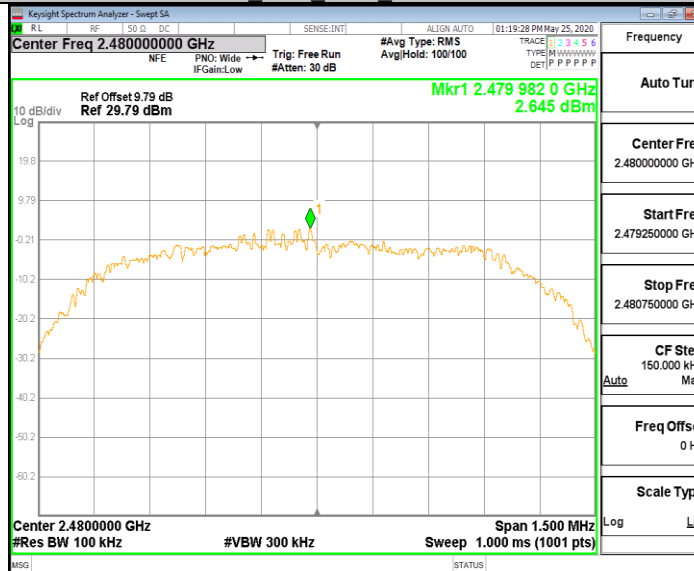




3DH5 Ant1 2441 1000~26500

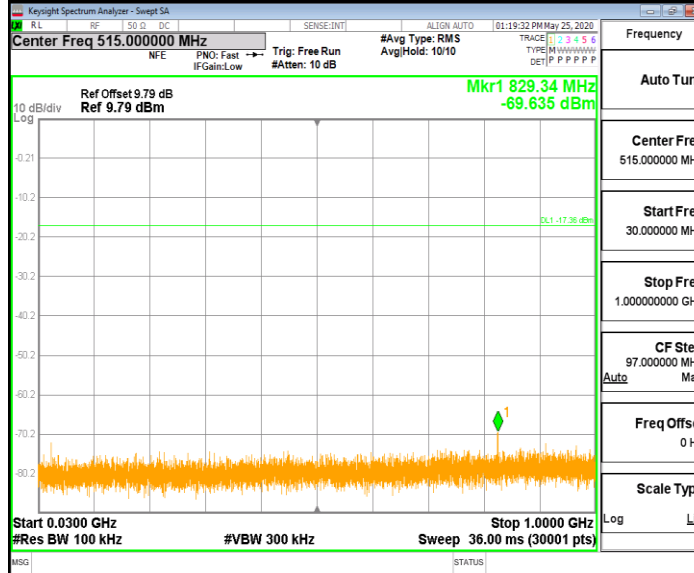


3DH5 Ant1 2480 0~Reference

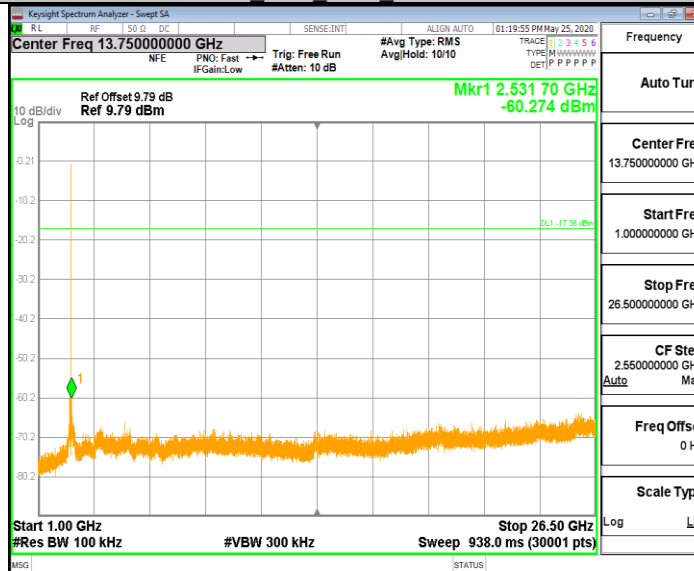




3DH5 Ant1 2480 30~1000



3DH5 Ant1 2480 1000~26500



End of Report