

# FCC Radio Test Report

## FCC ID: 2APR6-M712W

This report concerns (check one): ☒ Original Grant ☐ Class II Change

**Project No.** : 1805C013  
**Equipment** : Wireless Optical Mouse  
**Test Model** : M712  
**Series Model** : N/A  
**Applicant** : Shenzhen Doking Technology Co.,Ltd  
**Address** : 21F Jiayu Building Songgang Town Baoan District  
Shenzhen

**Date of Receipt** : May 10, 2018  
**Date of Test** : May 10, 2018 ~ Jun. 11, 2018  
**Issued Date** : Jun. 28, 2018  
**Tested by** : BTL Inc.

**Testing Engineer** : vincent. Tan  
(Vincent Tan)

**Technical Manager** : shawn xiao  
(Shawn Xiao)

**Authorized Signatory** : Steven Lu  
(Steven Lu)

# B T L I N C .

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## Declaration

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL's** reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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**BTL's** laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

## Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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## REPORT ISSUED HISTORY

| Issued No.          | Description     | Issued Date   |
|---------------------|-----------------|---------------|
| BTL-FCCP-1-1805C013 | Original Issue. | Jun. 28, 2018 |

## 1. CERTIFICATION

Equipment : Wireless Optical Mouse  
Brand Name : Doking  
Test Model : M712  
Series Model : N/A  
Applicant : Shenzhen Doking Technology Co.,Ltd  
Manufacturer : Shenzhen Doking Technology Co.,Ltd  
Address : 21F Jiayu Building Songgang Town Baoan District Shenzhen  
Factory Address : Shenzhen Doking Technology Co.,Ltd  
2/F, 3/F, Buliding A&3/F, Buliding B, Dingfeng Hi-Tech Park, Shapuwei Industrial Zone, Songgang -Town, Baoan District Shenzhen, Guangdong, China  
Date of Test : May 10, 2018 ~ Jun. 11, 2018  
Test Sample : Engineering Sample NO.: D180503642  
Standard(s) : FCC Part15, Subpart C (15.249) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1805C013) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

| Applied Standard(s): FCC Part15, Subpart C (15.249) |                             |          |        |
|-----------------------------------------------------|-----------------------------|----------|--------|
| Standard(s) Section                                 | Test Item                   | Judgment | Remark |
| 15.209<br>15.249                                    | Radiated Spurious Emissions | PASS     |        |
| -                                                   | Bandwidth                   | PASS     |        |

NOTE:

(1) "N/A" denotes test is not applicable to this device.

## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's test firm number for FCC: 854385

BTL's designation number for FCC: CN5020

## 2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor)  $k=1.96$  or  $k=2$  (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2 \times U_c(y)$ .

The BTL measurement uncertainty as below table:

### A. Radiated Measurement :

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U, (dB) |
|-----------|--------|-----------------------------|------------|---------|
| DG-CB03   | CISPR  | 9KHz~30MHz                  | V          | 3.79    |
|           |        | 9KHz~30MHz                  | H          | 3.57    |
|           |        | 30MHz ~ 200MHz              | V          | 3.82    |
|           |        | 30MHz ~ 200MHz              | H          | 3.78    |
|           |        | 200MHz ~ 1,000MHz           | V          | 4.10    |
|           |        | 200MHz ~ 1,000MHz           | H          | 4.06    |
|           |        | 1GHz~18GHz                  | V          | 3.12    |
|           |        | 1GHz~18GHz                  | H          | 3.68    |
|           |        | 18GHz~40GHz                 | V          | 4.15    |
|           |        | 18GHz~40GHz                 | H          | 4.14    |

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 3. GENERAL INFORMATION

#### 3.1 DESCRIPTION OF EUT

|                     |                                |                                                   |
|---------------------|--------------------------------|---------------------------------------------------|
| Equipment           | Wireless Optical Mouse         |                                                   |
| Brand Name          | Doking                         |                                                   |
| Test Model          | M712                           |                                                   |
| Series Model        | N/A                            |                                                   |
| Model Difference    | N/A                            |                                                   |
| Product Description | Operation Frequency            | 2410 ~ 2473 MHz                                   |
|                     | Modulation Technology          | GFSK                                              |
|                     | Bit Rate of Transmitter        | 1 Mbps                                            |
|                     | Field Strength                 | 92.71 dBuV/m (Peak Max)<br>76.51 dBuV/m (AVG Max) |
| Power Source        | Supplied from 2*AAA batteries. |                                                   |
| EUT Power Rating    | DC 3V                          |                                                   |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 2. Channel List:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 00      | 2410            | 01      | 2442            | 02      | 2473            |

## 3. Table for Filed Antenna

| Ant. | Brand | P/N | Antenna Type | Connector | Gain (dBi) |
|------|-------|-----|--------------|-----------|------------|
| 1    | N/A   | N/A | PCB          | N/A       | 0          |

## 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1       | TX Mode     |

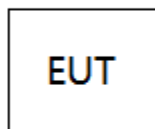
The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

| For Radiated Test |                         |
|-------------------|-------------------------|
| Final Test Mode   | Description             |
| Mode 1            | TX Mode <b>NOTE (1)</b> |

Note:

(1) The measurements are performed at the high, middle, low available channels.

### 3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### 3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID | Series No. |
|------|-----------|-----------|----------------|--------|------------|
| -    | -         | -         | -              | -      | -          |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| -    | -             | -            | -      | -    |

Note:

- (1) The support equipment was authorized by Declaration of Conformity (DOC).

## 4. EMC EMISSION TEST

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 RADIATED EMISSION LIMITS (FCC 15.209)

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009~0.490       | 2400/F(KHz)                       | 300                           |
| 0.490~1.705       | 24000/F(KHz)                      | 30                            |
| 1.705~30.0        | 30                                | 30                            |
| 30~88             | 100                               | 3                             |
| 88~216            | 150                               | 3                             |
| 216~960           | 200                               | 3                             |
| 960~1000          | 500                               | 3                             |

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

#### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209 )

| FREQUENCY (MHz) | (dBuV/m) (at 3m) |         |
|-----------------|------------------|---------|
|                 | PEAK             | AVERAGE |
| Above 1000      | 74               | 54      |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

| FCC Part15 (15.249) , Subpart C                                          |                      |
|--------------------------------------------------------------------------|----------------------|
| Limit                                                                    | Frequency Range(MHz) |
| Field strength of fundamental<br>50000 $\mu$ V/m (94 dB $\mu$ V/m) @ 3 m | 2400-2483.5          |
| Field strength of harmonics<br>500 $\mu$ V/m (54 dB $\mu$ V/m) @ 3 m     | Above 2483.5         |

| Spectrum Parameter | Setting               |
|--------------------|-----------------------|
| Attenuation        | Auto                  |
| Start Frequency    | 1000 MHz              |
| Stop Frequency     | 10th carrier harmonic |

| Receiver Parameter     | Setting                           |
|------------------------|-----------------------------------|
| Attenuation            | Auto                              |
| Start ~ Stop Frequency | 9KHz~90KHz for PK/AVG detector    |
| Start ~ Stop Frequency | 90KHz~110KHz for QP detector      |
| Start ~ Stop Frequency | 110KHz~490KHz for PK/AVG detector |
| Start ~ Stop Frequency | 490KHz~30MHz for QP detector      |
| Start ~ Stop Frequency | 30MHz~1000MHz for QP detector     |

#### 4.1.2 TEST PROCEDURE

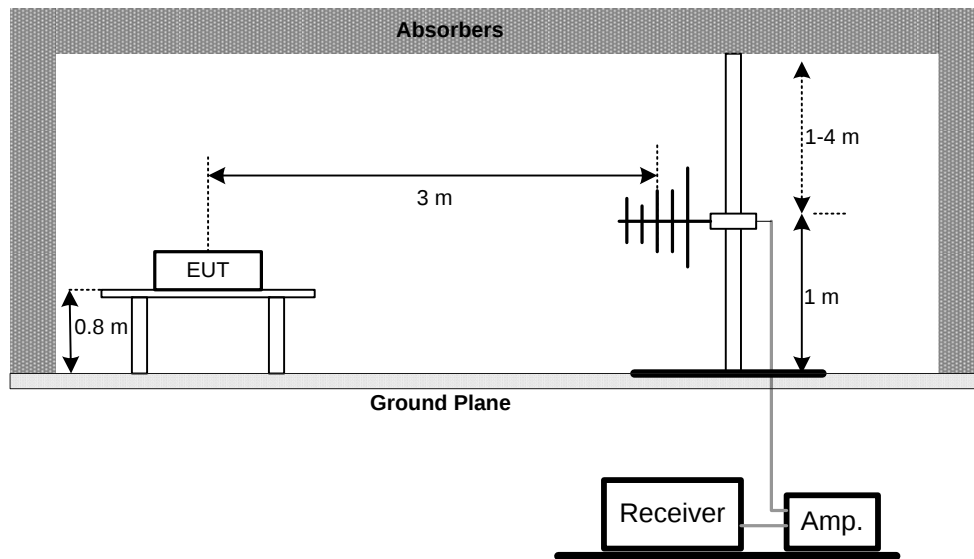
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

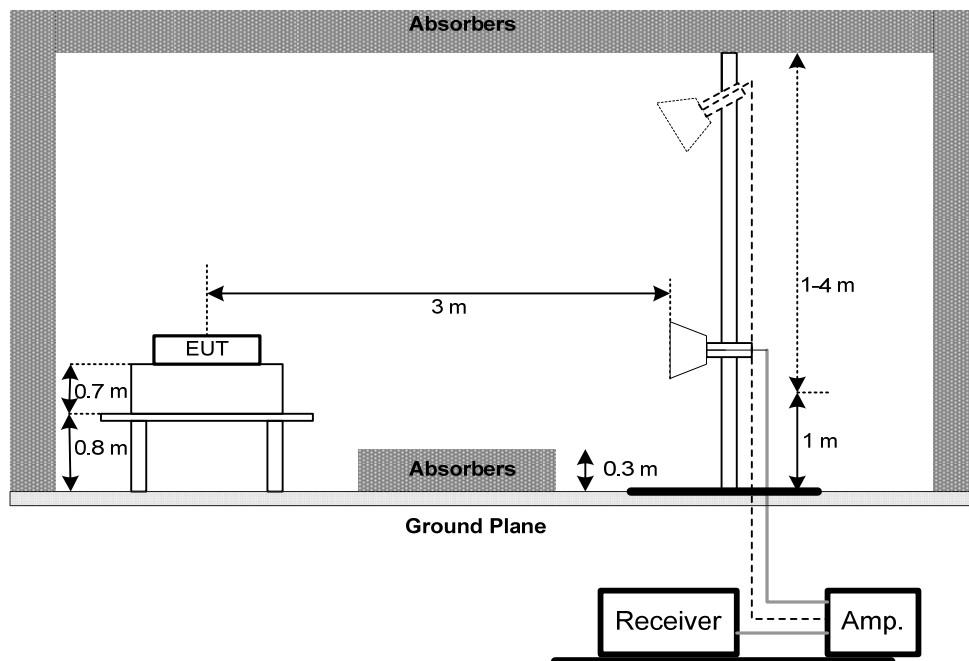
No deviation

#### 4.1.4 TEST SETUP

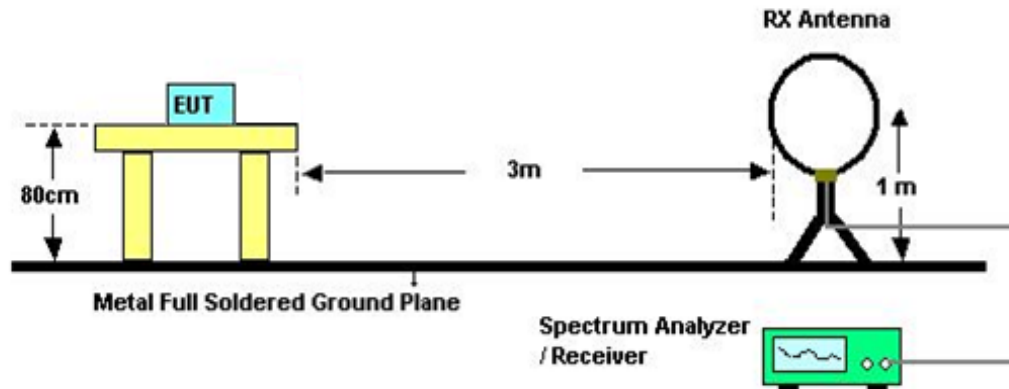
##### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



#### 4.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 25°C

Relative Humidity: 60%

Test Voltage: DC 3V

#### 4.1.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix A.

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.1.8 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the Appendix B.

Remark:

- (1) Measuring frequency range from 30MHz to 1000MHz.
- (2) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

#### 4.1.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Appendix D.

Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (2) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (3) EUT Orthogonal Axis:  
"X" - denotes Laid on Table, "Y" - denotes Vertical Stand, "Z" - denotes Side Stand
- (4) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (5) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. BANDWIDTH TEST

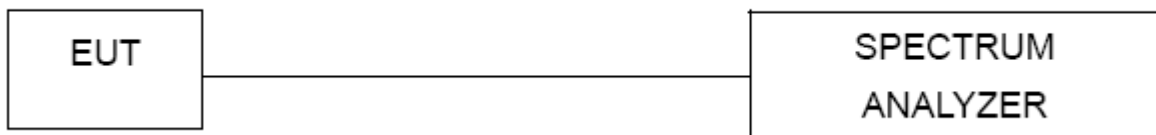
### 5.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

### 5.2 DEVIATION FROM STANDARD

No deviation.

### 5.3 TEST SETUP



### 5.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 5.5 EUT TEST CONDITIONS

Temperature: 25°C  
Relative Humidity: 60%  
Test Voltage: DC 3V

### 5.6 TEST RESULTS

Please refer to the Appendix C.

## 6. MEASUREMENT INSTRUMENTS LIST

| Radiated Emission Below 1GHz |                      |              |                             |             |                  |
|------------------------------|----------------------|--------------|-----------------------------|-------------|------------------|
| Item                         | Kind of Equipment    | Manufacturer | Type No.                    | Serial No.  | Calibrated until |
| 1                            | Antenna              | Schwarbeck   | VULB9160                    | 9160-3232   | Mar. 11, 2019    |
| 2                            | Amplifier            | HP           | 8447D                       | 2944A09673  | Oct. 19, 2018    |
| 3                            | Receiver             | Agilent      | N9038A                      | MY52130039  | Aug. 20, 2018    |
| 4                            | Cable                | emci         | LMR-400(30MHz-1 GHz)(8m+5m) | N/A         | Jun. 26, 2018    |
| 5                            | Controller           | CT           | SC100                       | N/A         | N/A              |
| 6                            | Controller           | MF           | MF-7802                     | MF780208416 | N/A              |
| 7                            | Measurement Software | Farad        | EZ-EMC Ver.NB-03A1-01       | N/A         | N/A              |
| 8                            | Antenna              | EM           | EM-6876-1                   | 230         | Mar. 11, 2019    |

| Radiated Emission Above 1GHz |                                     |                |                          |               |                  |
|------------------------------|-------------------------------------|----------------|--------------------------|---------------|------------------|
| Item                         | Kind of Equipment                   | Manufacturer   | Type No.                 | Serial No.    | Calibrated until |
| 1                            | Double Ridged Guide Antenna         | ETS            | 3115                     | 75789         | Mar. 11, 2019    |
| 2                            | Broad-Band Horn Antenna             | Schwarzbeck    | BBHA 9170                | 9170319       | Mar. 11, 2019    |
| 3                            | Amplifier                           | Agilent        | 8449B                    | 3008A02274    | Mar. 11, 2019    |
| 4                            | Microwave Preamplifier With Adaptor | EMC INSTRUMENT | EMC2654045               | 980039 & HA01 | Mar. 11, 2019    |
| 5                            | Receiver                            | Agilent        | N9038A                   | MY52130039    | Aug. 20, 2018    |
| 6                            | Antenna                             | EM             | EM-6876-1                | 230           | Mar. 11, 2019    |
| 7                            | Controller                          | CT             | SC100                    | N/A           | N/A              |
| 8                            | Controller                          | MF             | MF-7802                  | MF780208416   | N/A              |
| 9                            | Cable                               | emci           | EMC104-SM-SM-1 2000(12m) | N/A           | Jun. 26, 2018    |
| 10                           | Measurement Software                | Farad          | EZ-EMC Ver.NB-03A1-01    | N/A           | N/A              |

| Bandwidth Measurement |                   |              |          |            |                  |
|-----------------------|-------------------|--------------|----------|------------|------------------|
| Item                  | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1                     | Spectrum Analyzer | R&S          | FSP40    | 100185     | Aug. 20, 2018    |

Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

## 7. EUT TEST PHOTO

### Radiated Measurement Photos

9KHz to 30MHz



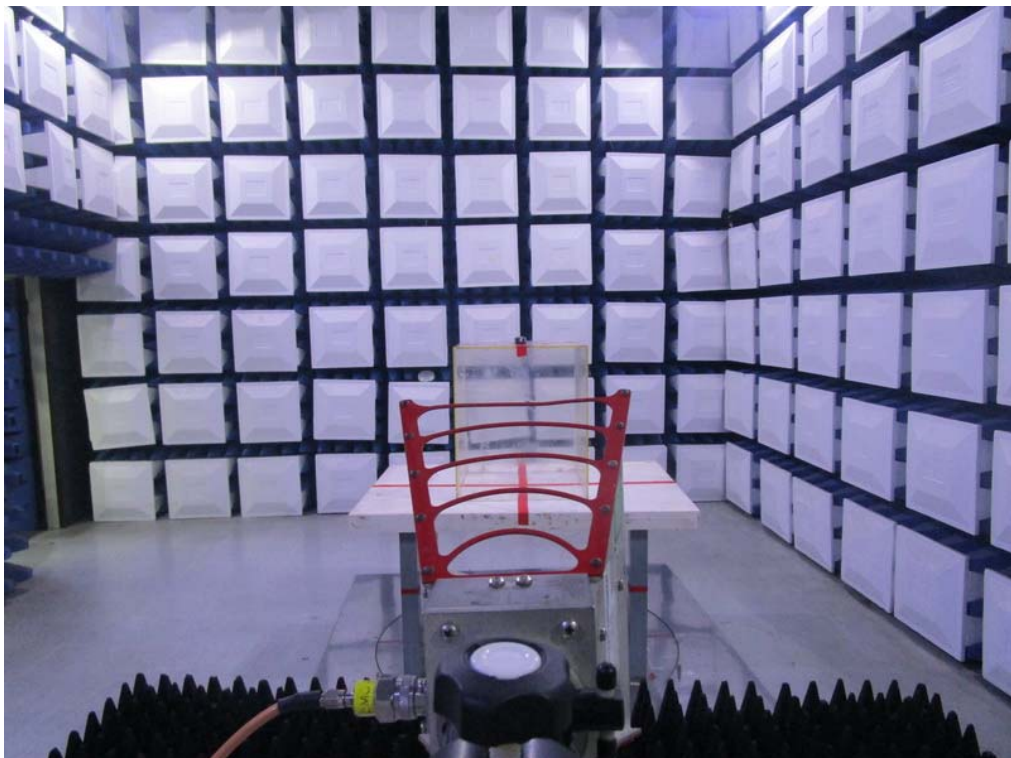
## Radiated Measurement Photos

30MHz to 1000MHz



## Radiated Measurement Photos

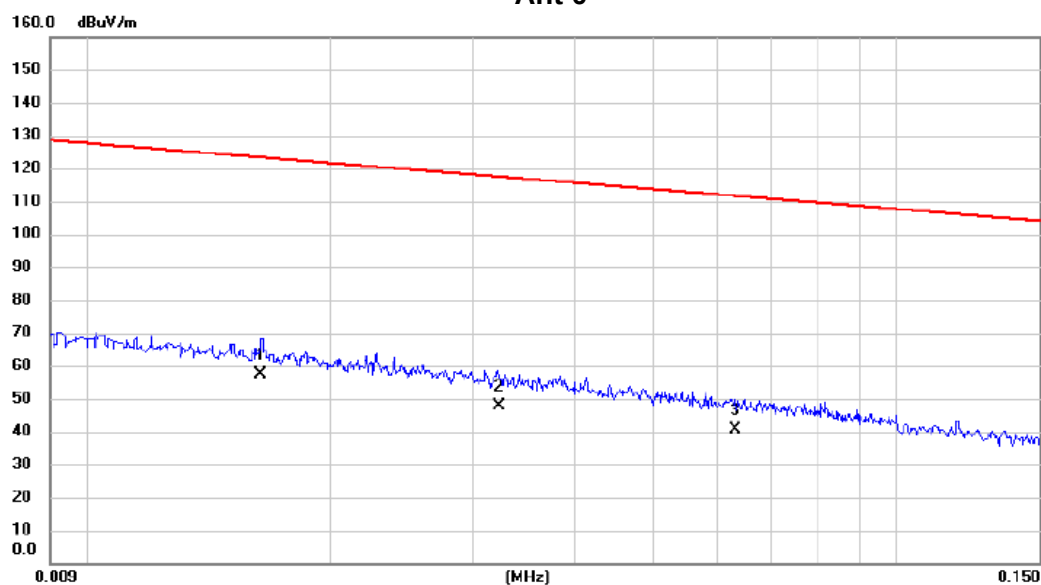
Above 1000MHz



## APPENDIX A - RADIATED EMISSION (9KHZ TO 30MHZ)

Test Mode: TX MODE

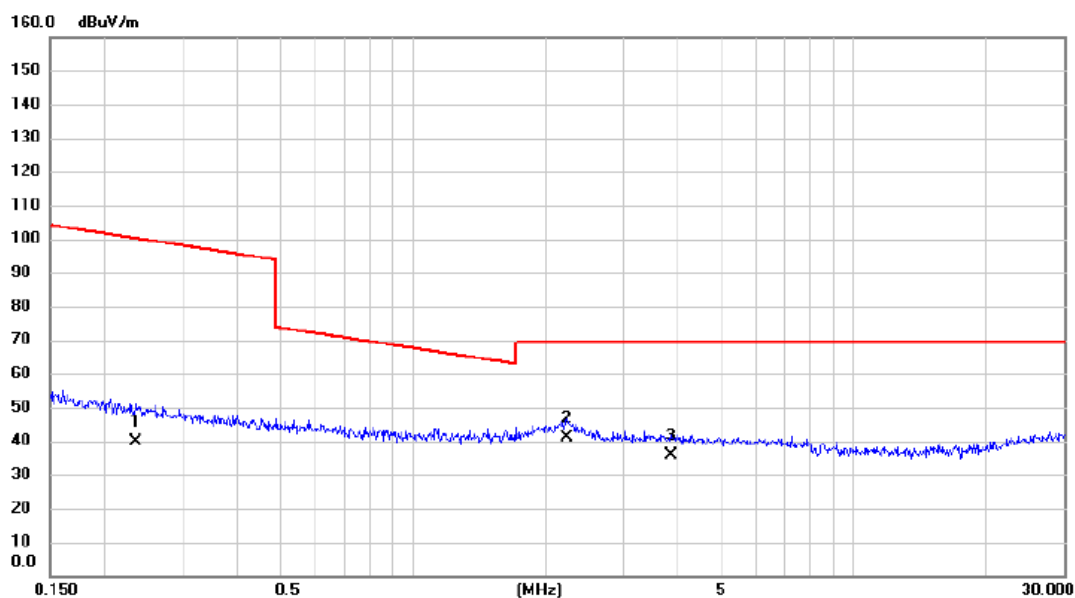
Ant 0°



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV/m | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|----------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 0.016        | 37.20                      | 20.09                   | 57.29                      | 123.31          | -66.02       | AVG      |         |
| 2   |     | 0.032        | 28.60                      | 19.25                   | 47.85                      | 117.42          | -69.57       | AVG      |         |
| 3   |     | 0.063        | 22.10                      | 18.47                   | 40.57                      | 111.59          | -71.02       | AVG      |         |

Test Mode: TX MODE

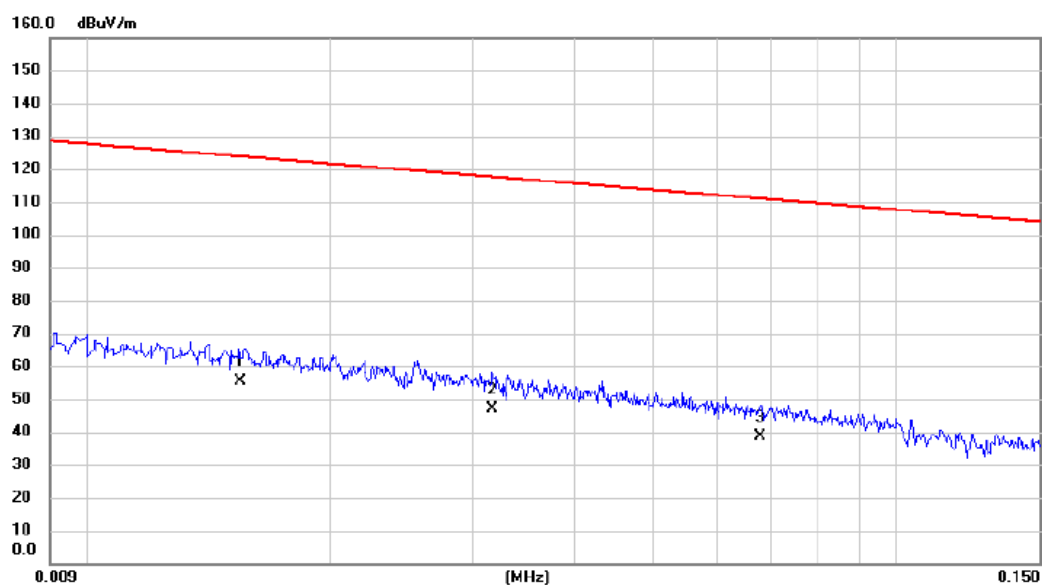
Ant 0°



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV/m | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|----------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 0.235        | 23.20                      | 16.69                   | 39.89                      | 100.17          | -60.28       | AVG      |         |
| 2   | *   | 2.237        | 25.50                      | 15.44                   | 40.94                      | 69.54           | -28.60       | QP       |         |
| 3   |     | 3.840        | 20.70                      | 15.00                   | 35.70                      | 69.54           | -33.84       | QP       |         |

Test Mode: TX MODE

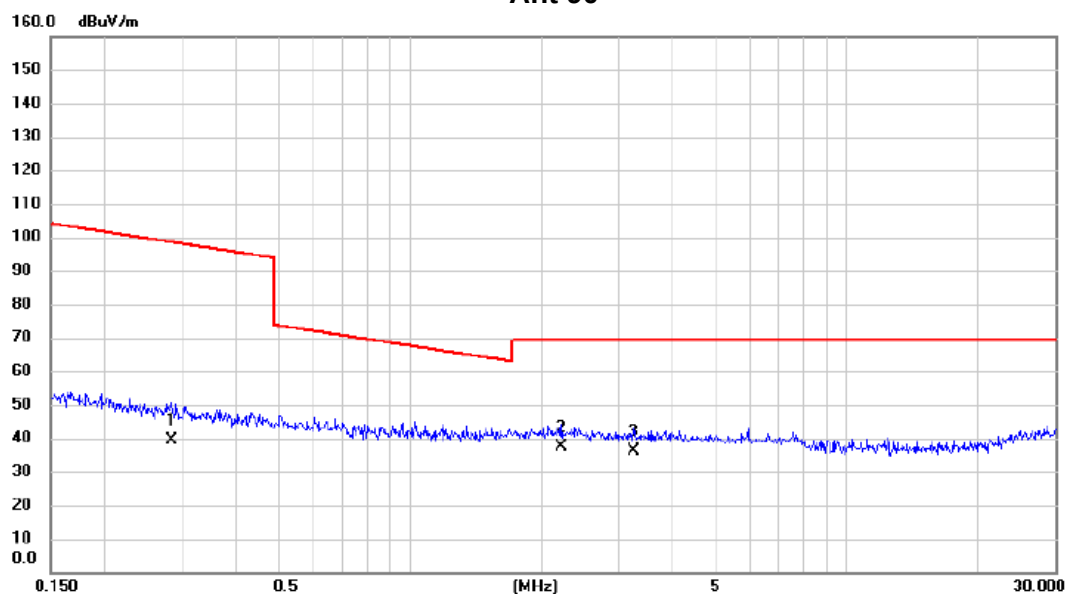
Ant 90°



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit  | Margin |          |         |
|-----|-----|-------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz   | dBuV/m        | dB             | dBuV/m      | dBuV/m | dB     | Detector | Comment |
| 1   | *   | 0.015 | 35.10         | 20.20          | 55.30       | 123.80 | -68.50 | AVG      |         |
| 2   |     | 0.032 | 27.80         | 19.27          | 47.07       | 117.58 | -70.51 | AVG      |         |
| 3   |     | 0.068 | 20.10         | 18.37          | 38.47       | 110.98 | -72.51 | AVG      |         |

Test Mode: TX MODE

Ant 90°

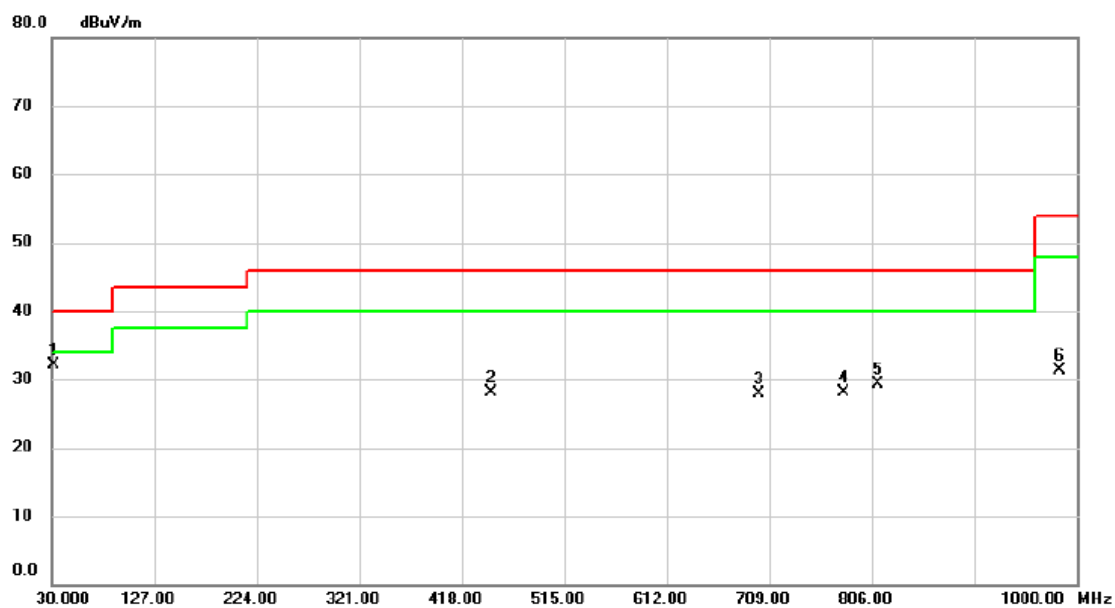


| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV/m | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|----------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 0.285        | 22.70                      | 16.63                   | 39.33                      | 98.52           | -59.19       | AVG      |         |
| 2   | *   | 2.225        | 21.80                      | 15.44                   | 37.24                      | 69.54           | -32.30       | QP       |         |
| 3   |     | 3.258        | 21.10                      | 15.16                   | 36.26                      | 69.54           | -33.28       | QP       |         |

## APPENDIX C - RADIATED EMISSION (30MHZ TO 1000MHZ)

Test Mode: TX 2410MHz

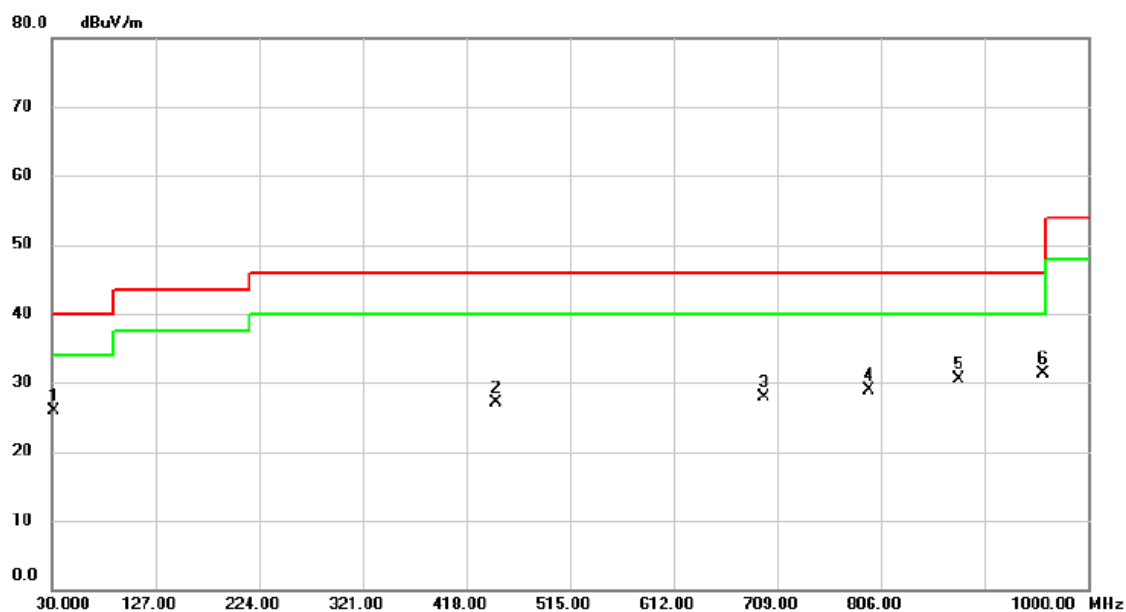
### Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 31.455       | 45.75                    | -13.56                  | 32.19                      | 40.00           | -7.81        | peak     |         |
| 2   |     | 445.160      | 34.56                    | -6.55                   | 28.01                      | 46.00           | -17.99       | peak     |         |
| 3   |     | 699.785      | 28.80                    | -0.93                   | 27.87                      | 46.00           | -18.13       | peak     |         |
| 4   |     | 778.840      | 28.78                    | -0.68                   | 28.10                      | 46.00           | -17.90       | peak     |         |
| 5   |     | 812.305      | 29.04                    | 0.32                    | 29.36                      | 46.00           | -16.64       | peak     |         |
| 6   |     | 983.510      | 29.43                    | 1.89                    | 31.32                      | 54.00           | -22.68       | peak     |         |

Test Mode: TX 2410MHz

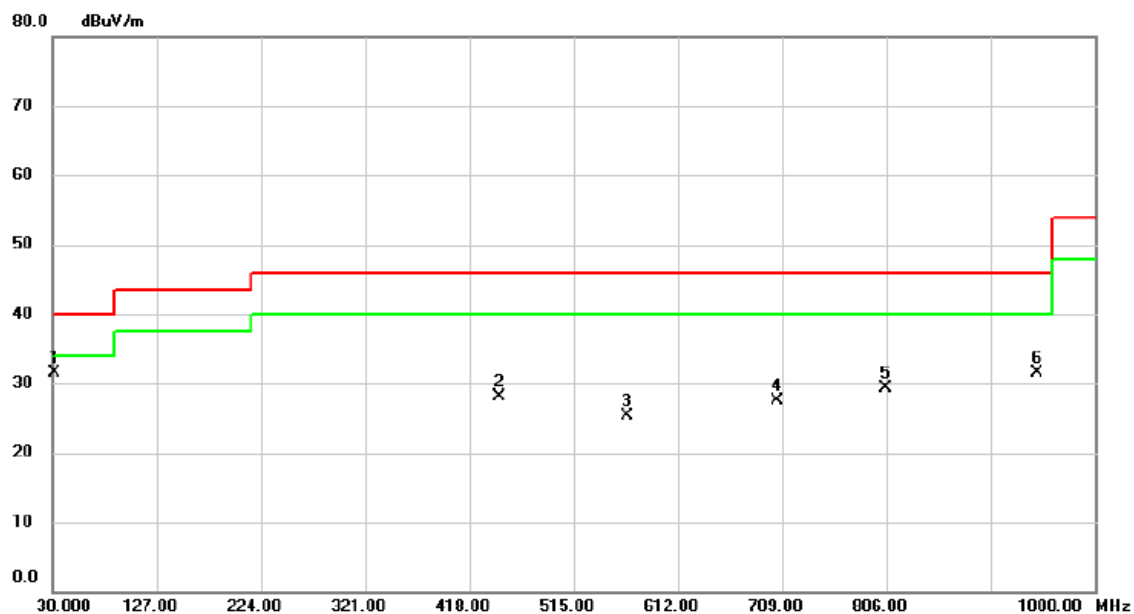
### Horizontal



| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measure-ment | Limit  | Margin |          |         |
|-----|-----|---------|---------------|----------------|--------------|--------|--------|----------|---------|
|     |     | MHz     | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | Detector | Comment |
| 1   | *   | 31.940  | 39.42         | -13.59         | 25.83        | 40.00  | -14.17 | peak     |         |
| 2   |     | 445.645 | 33.70         | -6.53          | 27.17        | 46.00  | -18.83 | peak     |         |
| 3   |     | 696.875 | 28.99         | -1.07          | 27.92        | 46.00  | -18.08 | peak     |         |
| 4   |     | 794.845 | 28.73         | 0.21           | 28.94        | 46.00  | -17.06 | peak     |         |
| 5   |     | 879.235 | 30.31         | 0.21           | 30.52        | 46.00  | -15.48 | peak     |         |
| 6   |     | 958.290 | 28.87         | 2.41           | 31.28        | 46.00  | -14.72 | peak     |         |

Test Mode: TX 2442MHz

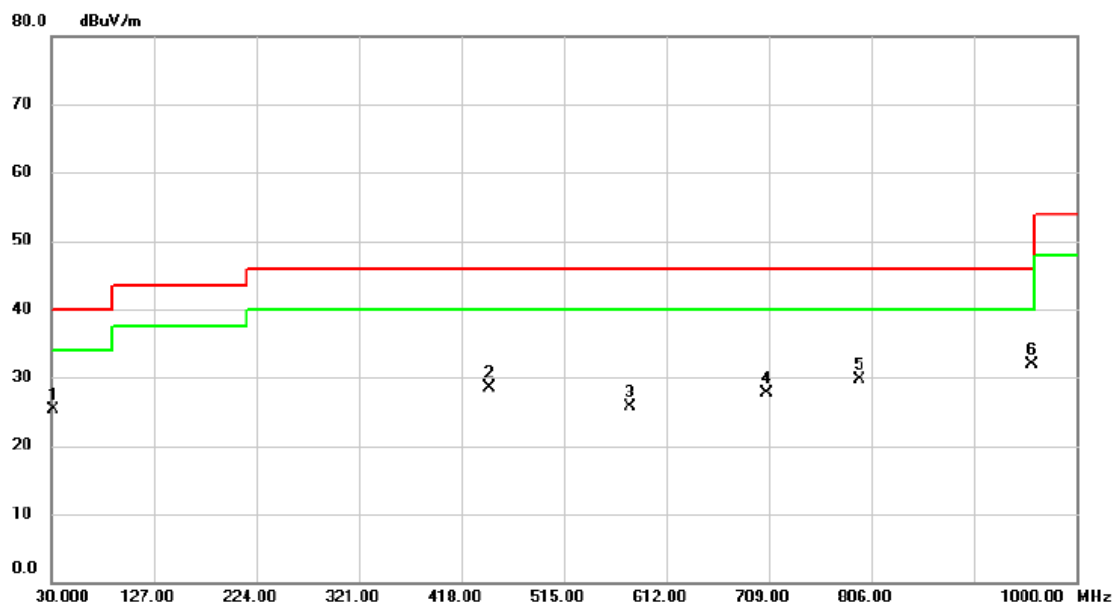
### Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 31.455       | 45.07                    | -13.56                  | 31.51                      | 40.00           | -8.49        | peak     |         |
| 2   |     | 445.160      | 34.62                    | -6.55                   | 28.07                      | 46.00           | -17.93       | peak     |         |
| 3   |     | 564.955      | 29.47                    | -4.21                   | 25.26                      | 46.00           | -20.74       | peak     |         |
| 4   |     | 704.635      | 28.47                    | -1.05                   | 27.42                      | 46.00           | -18.58       | peak     |         |
| 5   |     | 805.515      | 28.94                    | 0.42                    | 29.36                      | 46.00           | -16.64       | peak     |         |
| 6   |     | 946.650      | 29.10                    | 2.44                    | 31.54                      | 46.00           | -14.46       | peak     |         |

Test Mode: TX 2442MHz

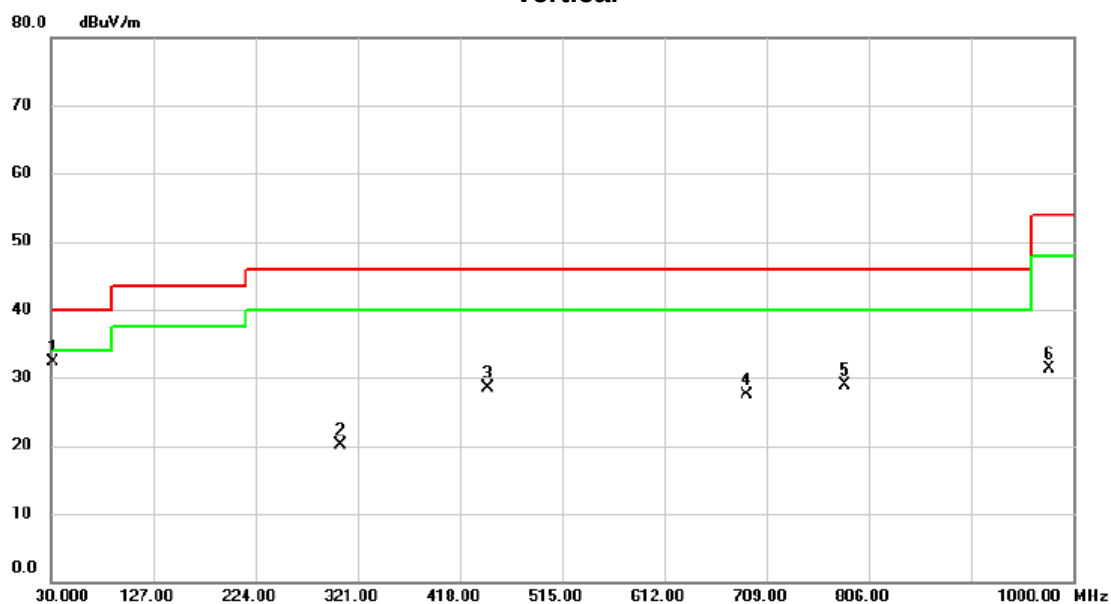
### Horizontal



| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measure-ment | Limit  | Margin |          |         |
|-----|-----|---------|---------------|----------------|--------------|--------|--------|----------|---------|
|     |     | MHz     | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | Detector | Comment |
| 1   |     | 31.940  | 38.83         | -13.59         | 25.24        | 40.00  | -14.76 | peak     |         |
| 2   |     | 444.675 | 35.02         | -6.57          | 28.45        | 46.00  | -17.55 | peak     |         |
| 3   |     | 577.565 | 30.00         | -4.23          | 25.77        | 46.00  | -20.23 | peak     |         |
| 4   |     | 706.575 | 28.81         | -1.10          | 27.71        | 46.00  | -18.29 | peak     |         |
| 5   |     | 794.845 | 29.49         | 0.21           | 29.70        | 46.00  | -16.30 | peak     |         |
| 6   | *   | 958.290 | 29.50         | 2.41           | 31.91        | 46.00  | -14.09 | peak     |         |

Test Mode: TX 2473MHz

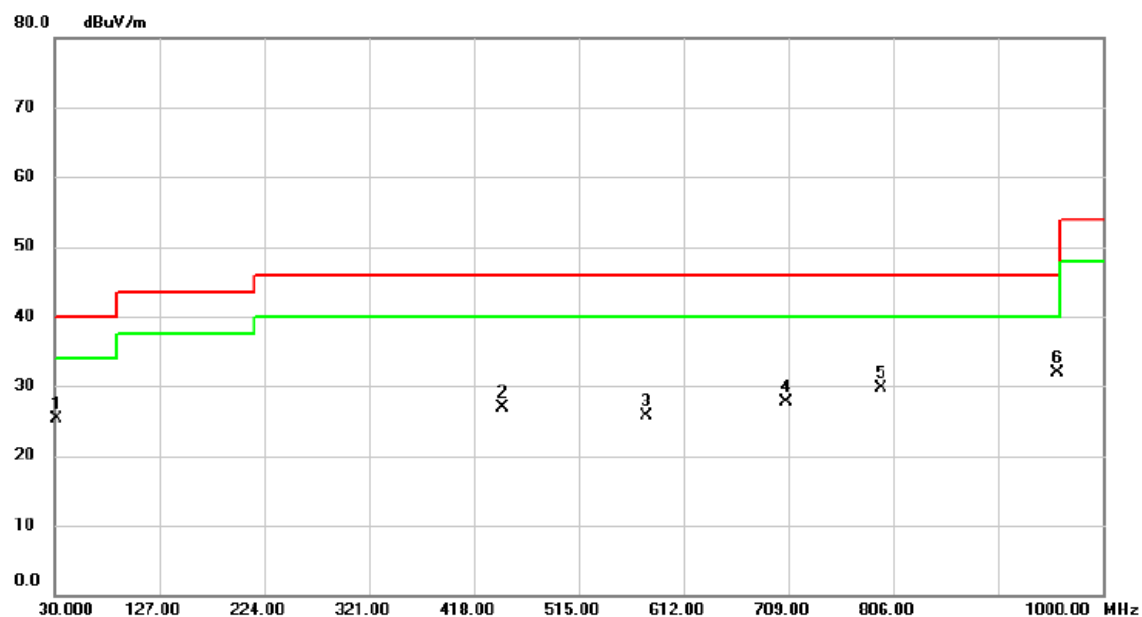
# Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 31.455       | 45.89                    | -13.56                  | 32.33                      | 40.00           | -7.67        | peak     |         |
| 2   |     | 304.995      | 30.70                    | -10.56                  | 20.14                      | 46.00           | -25.86       | peak     |         |
| 3   |     | 444.675      | 35.05                    | -6.57                   | 28.48                      | 46.00           | -17.52       | peak     |         |
| 4   |     | 690.570      | 28.87                    | -1.37                   | 27.50                      | 46.00           | -18.50       | peak     |         |
| 5   |     | 783.690      | 29.40                    | -0.42                   | 28.98                      | 46.00           | -17.02       | peak     |         |
| 6   |     | 976.720      | 29.28                    | 2.03                    | 31.31                      | 54.00           | -22.69       | peak     |         |

Test Mode: TX 2473MHz

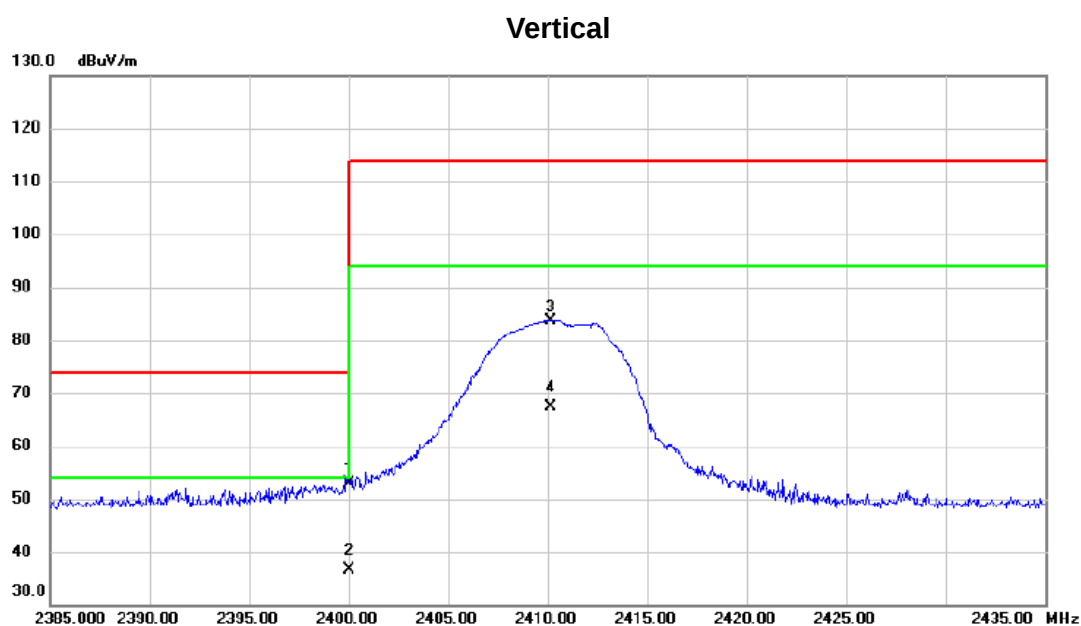
### Horizontal



| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measure-ment | Limit  | Margin |          |         |
|-----|-----|---------|---------------|----------------|--------------|--------|--------|----------|---------|
|     |     | MHz     | dBuV          | dB             | dBuV/m       | dBuV/m | dB     | Detector | Comment |
| 1   |     | 31.940  | 38.83         | -13.59         | 25.24        | 40.00  | -14.76 | peak     |         |
| 2   |     | 444.190 | 33.59         | -6.59          | 27.00        | 46.00  | -19.00 | peak     |         |
| 3   |     | 577.565 | 30.00         | -4.23          | 25.77        | 46.00  | -20.23 | peak     |         |
| 4   |     | 706.575 | 28.81         | -1.10          | 27.71        | 46.00  | -18.29 | peak     |         |
| 5   |     | 794.845 | 29.49         | 0.21           | 29.70        | 46.00  | -16.30 | peak     |         |
| 6   | *   | 958.290 | 29.50         | 2.41           | 31.91        | 46.00  | -14.09 | peak     |         |

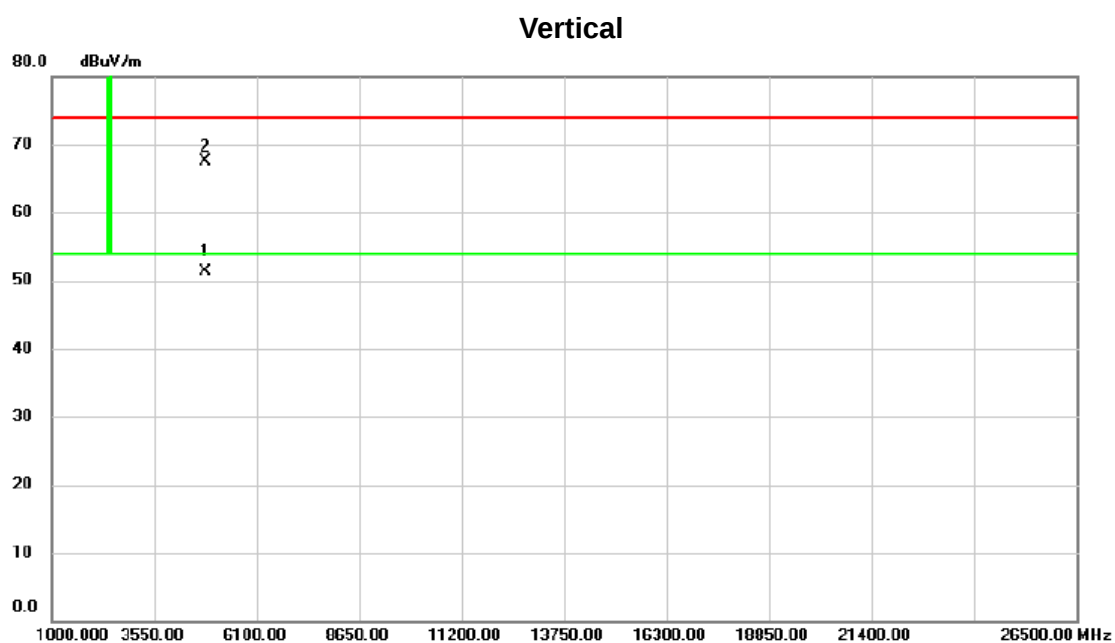
## APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2410 MHz |
|-----------|------------------|



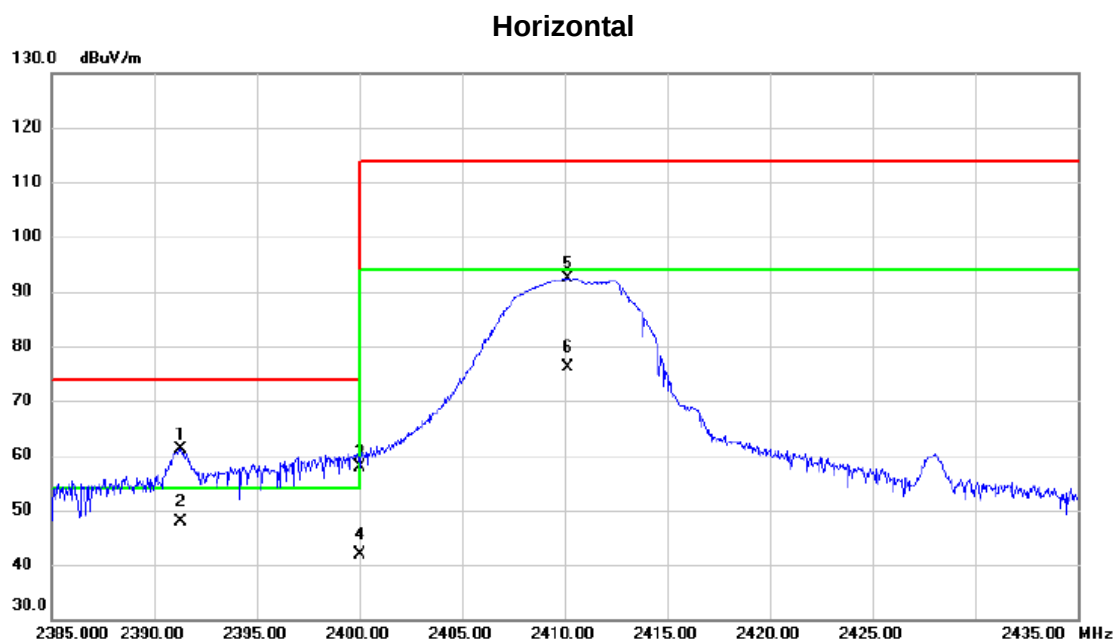
| No. Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|---------|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1       | 2400.000     | 43.88                    | 9.00                    | 52.88                      | 74.00           | -21.12       | peak     |         |
| 2 *     | 2400.000     | 27.68                    | 9.00                    | 36.68                      | 54.00           | -17.32       | AVG      |         |
| 3       | 2410.200     | 74.63                    | 9.00                    | 83.63                      | 114.00          | -30.37       | peak     |         |
| 4       | 2410.200     | 58.43                    | 9.00                    | 67.43                      | 94.00           | -26.57       | AVG      |         |

|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2410 MHz |
|-----------|------------------|



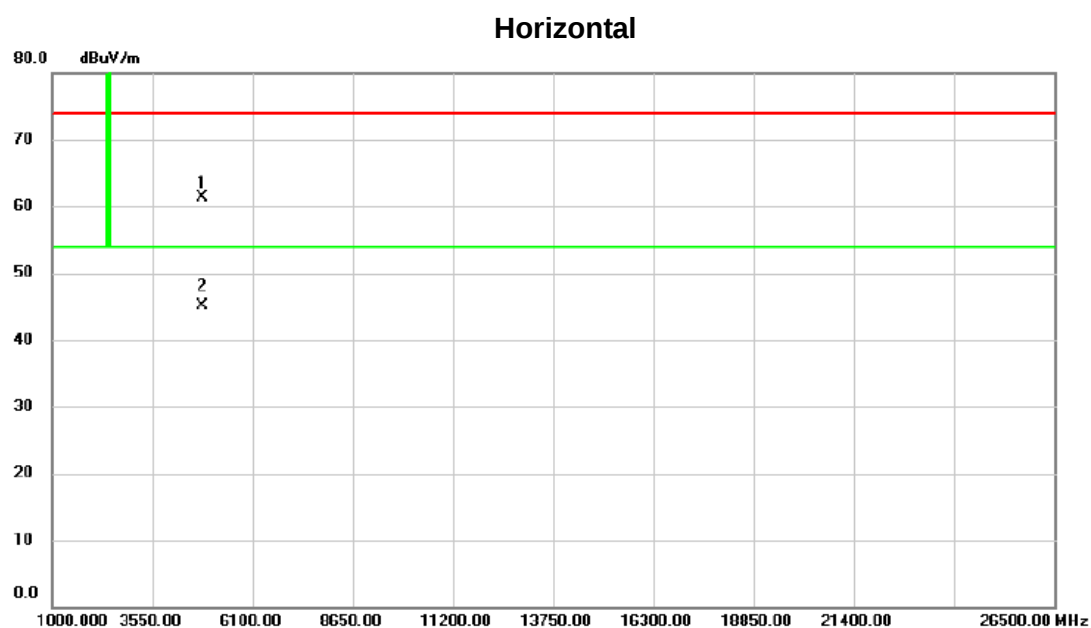
| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 4820.036     | 45.45                    | 5.77                    | 51.22                      | 54.00           | -2.78        | AVG      |         |
| 2   |     | 4820.360     | 61.65                    | 5.77                    | 67.42                      | 74.00           | -6.58        | peak     |         |

Test Mode TX Mode\_2410 MHz



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 2391.300     | 52.07                    | 9.00                    | 61.07                      | 74.00           | -12.93       | peak     |         |
| 2   | *   | 2391.300     | 38.87                    | 9.00                    | 47.87                      | 54.00           | -6.13        | AVG      |         |
| 3   |     | 2400.000     | 49.00                    | 9.00                    | 58.00                      | 74.00           | -16.00       | peak     |         |
| 4   |     | 2400.000     | 32.80                    | 9.00                    | 41.80                      | 54.00           | -12.20       | AVG      |         |
| 5   |     | 2410.200     | 83.35                    | 9.00                    | 92.35                      | 114.00          | -21.65       | peak     |         |
| 6   |     | 2410.200     | 67.15                    | 9.00                    | 76.15                      | 94.00           | -17.85       | AVG      |         |

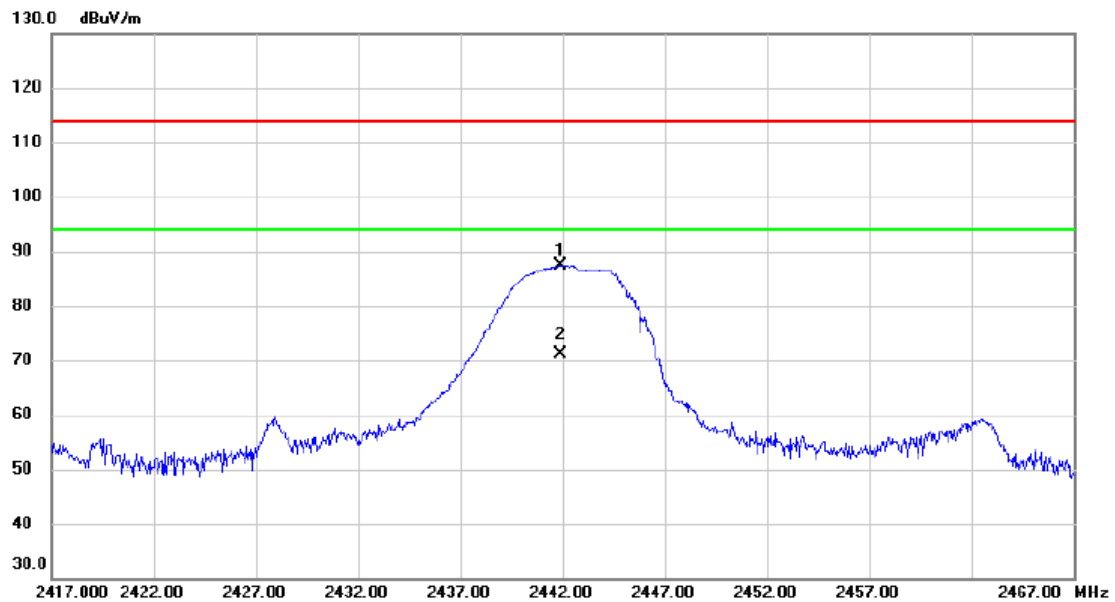
|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2410 MHz |
|-----------|------------------|



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 4820.440     | 55.62                    | 5.77                    | 61.39                      | 74.00           | -12.61       | peak     |         |
| 2   | *   | 4820.463     | 39.42                    | 5.77                    | 45.19                      | 54.00           | -8.81        | AVG      |         |

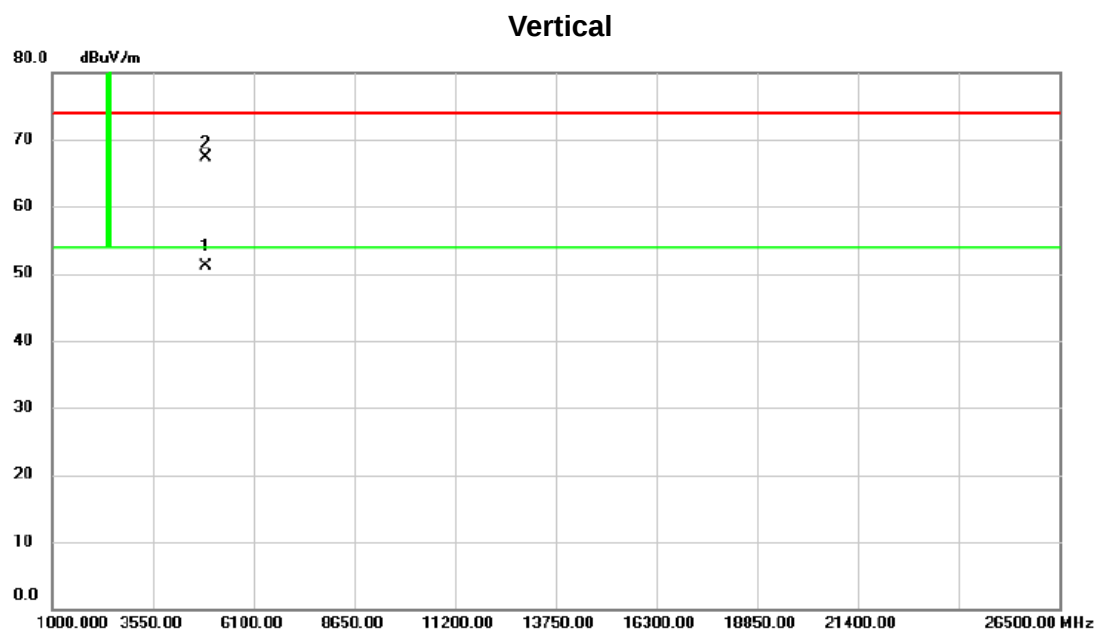
|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2442 MHz |
|-----------|------------------|

### Vertical



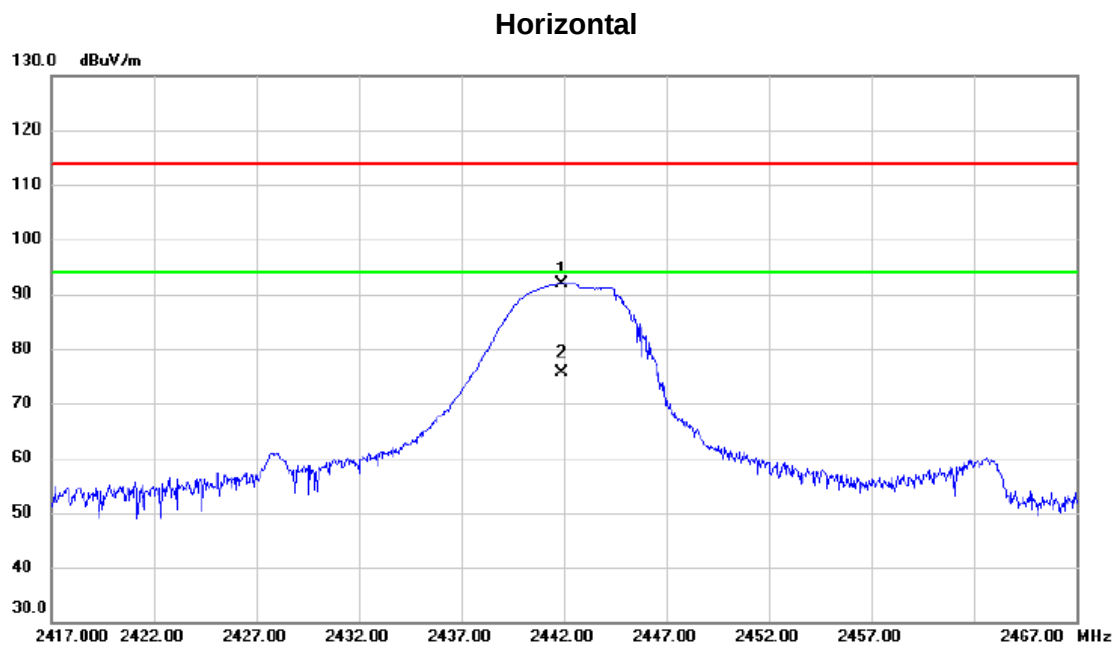
| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Margin |          |         |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV          | dB             | dBuV/m      | dBuV/m | dB     | Detector | Comment |
| 1   |     | 2441.900 | 78.36         | 8.99           | 87.35       | 114.00 | -26.65 | peak     |         |
| 2   | *   | 2441.900 | 62.16         | 8.99           | 71.15       | 94.00  | -22.85 | AVG      |         |

|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2442 MHz |
|-----------|------------------|



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 4884.340     | 45.22                    | 5.93                    | 51.15                      | 54.00           | -2.85        | AVG      |         |
| 2   |     | 4884.400     | 61.42                    | 5.93                    | 67.35                      | 74.00           | -6.65        | peak     |         |

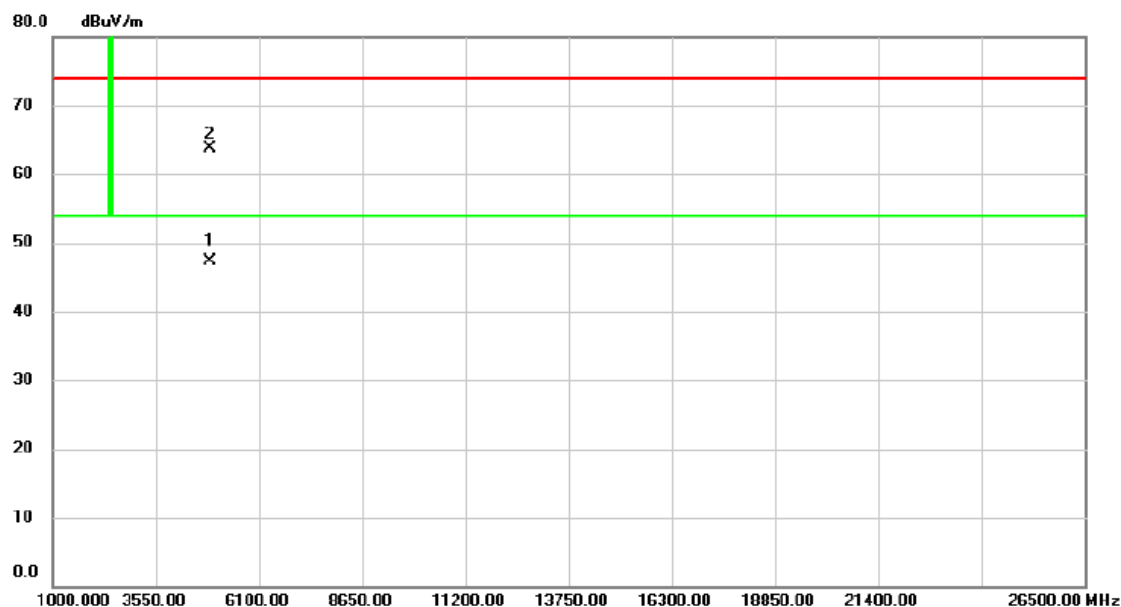
|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2442 MHz |
|-----------|------------------|



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 2441.900     | 82.91                    | 8.99                    | 91.90                      | 114.00          | -22.10       | peak     |         |
| 2   | *   | 2441.900     | 66.67                    | 8.99                    | 75.66                      | 94.00           | -18.34       | AVG      |         |

|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2442 MHz |
|-----------|------------------|

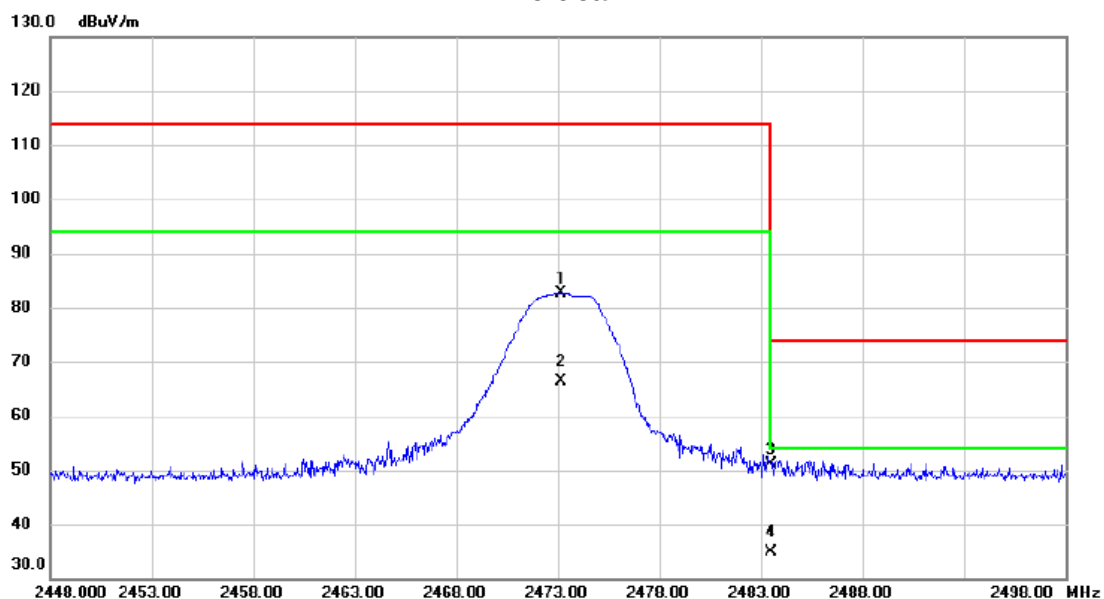
### Horizontal



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 4884.328     | 41.43                    | 5.93                    | 47.36                      | 54.00           | -6.64        | AVG      |         |
| 2   |     | 4884.412     | 57.76                    | 5.93                    | 63.69                      | 74.00           | -10.31       | peak     |         |

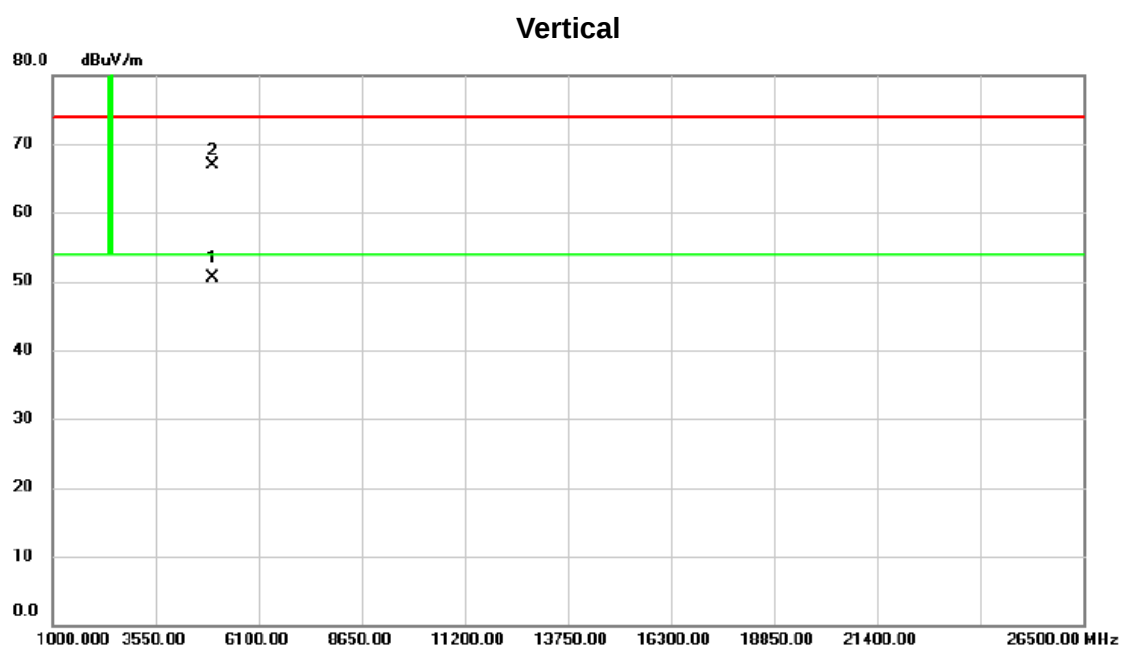
Test Mode TX Mode\_2473 MHz

# Vertical



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 2473.200     | 73.66                    | 8.97                    | 82.63                      | 114.00          | -31.37       | peak     |         |
| 2   |     | 2473.200     | 57.46                    | 8.97                    | 66.43                      | 94.00           | -27.57       | AVG      |         |
| 3   |     | 2483.500     | 42.15                    | 8.96                    | 51.11                      | 74.00           | -22.89       | peak     |         |
| 4   | *   | 2483.500     | 25.95                    | 8.96                    | 34.91                      | 54.00           | -19.09       | AVG      |         |

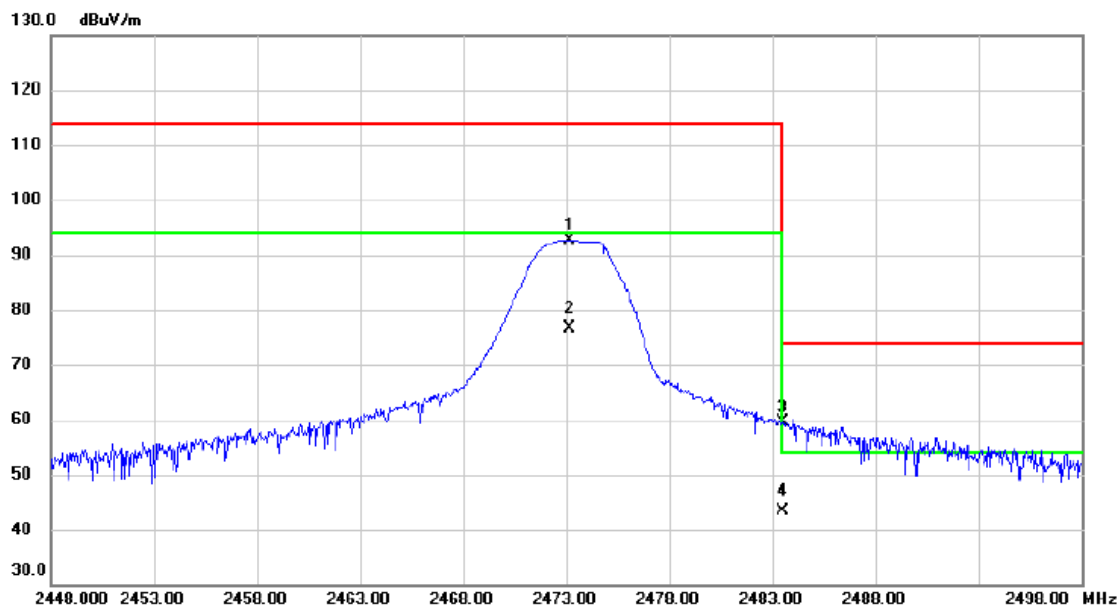
|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2473 MHz |
|-----------|------------------|



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   | *   | 4946.398     | 44.47                    | 6.08                    | 50.55                      | 54.00           | -3.45        | AVG      |         |
| 2   |     | 4946.844     | 60.76                    | 6.08                    | 66.84                      | 74.00           | -7.16        | peak     |         |

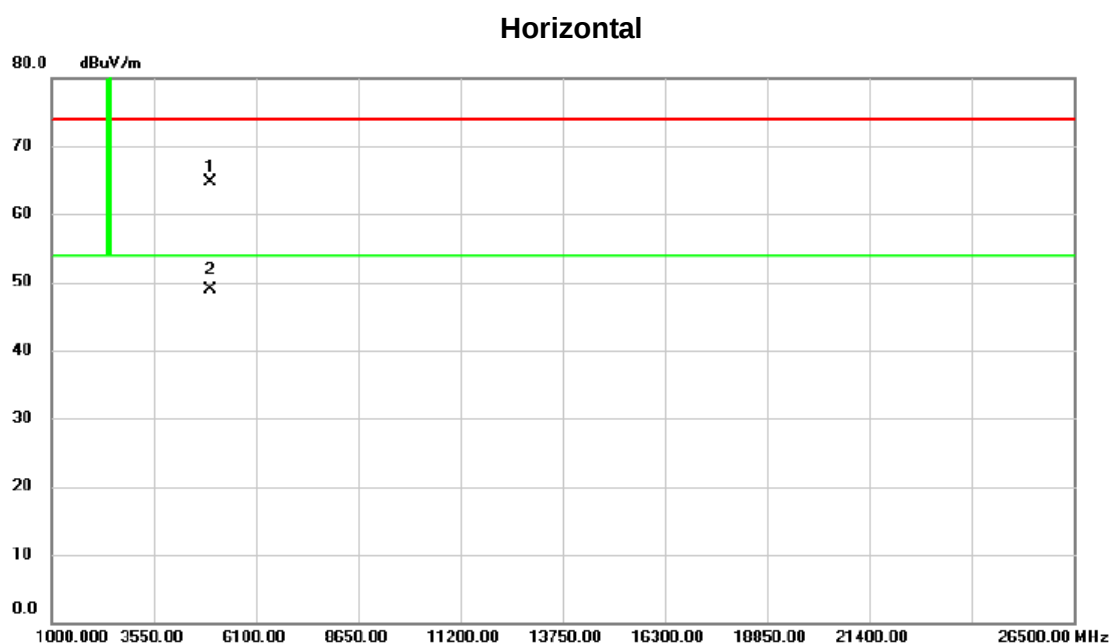
Test Mode TX Mode\_2473 MHz

# Horizontal



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 2473.200     | 83.74                    | 8.97                    | 92.71                      | 114.00          | -21.29       | peak     |         |
| 2   |     | 2473.200     | 67.54                    | 8.97                    | 76.51                      | 94.00           | -17.49       | AVG      |         |
| 3   |     | 2483.500     | 50.61                    | 8.96                    | 59.57                      | 74.00           | -14.43       | peak     |         |
| 4   | *   | 2483.500     | 34.41                    | 8.96                    | 43.37                      | 54.00           | -10.63       | AVG      |         |

|           |                  |
|-----------|------------------|
| Test Mode | TX Mode_2473 MHz |
|-----------|------------------|

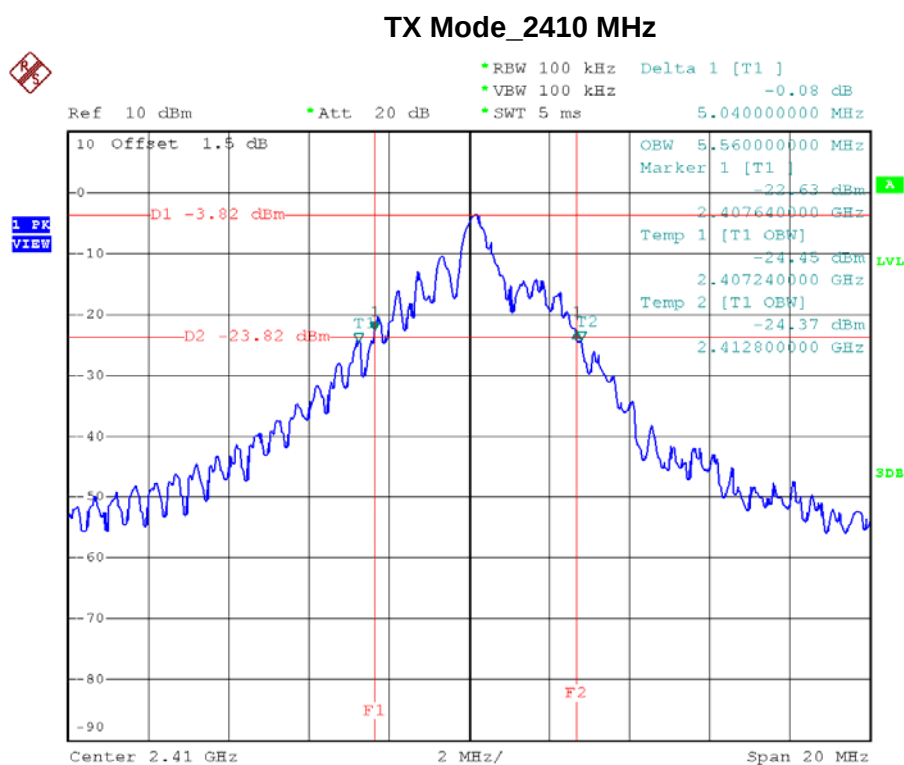


| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|--------------|----------|---------|
| 1   |     | 4946.412     | 58.60                    | 6.08                    | 64.68                      | 74.00           | -9.32        | peak     |         |
| 2   | *   | 4946.438     | 42.76                    | 6.08                    | 48.84                      | 54.00           | -5.16        | AVG      |         |

## APPENDIX E - BANDWIDTH

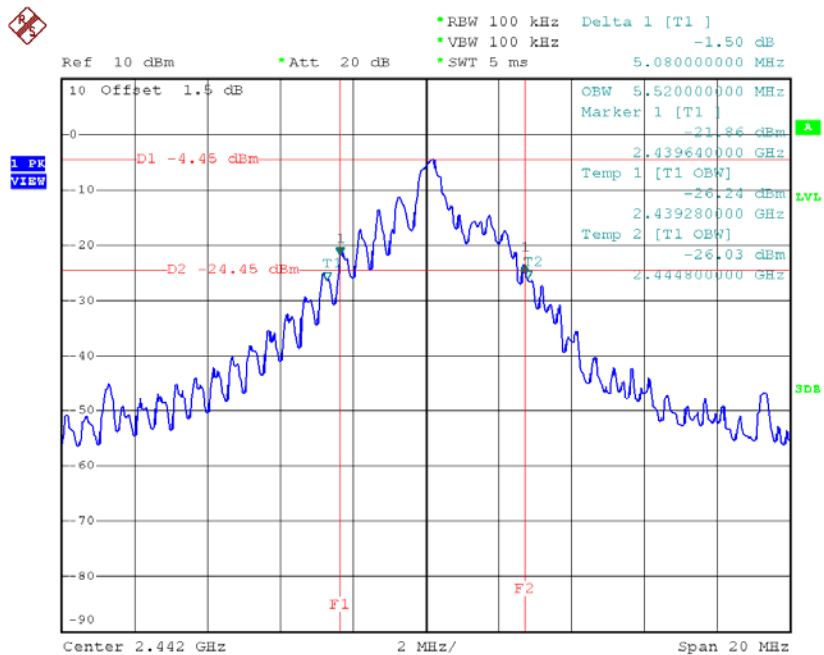
|            |                                    |
|------------|------------------------------------|
| Test Mode: | TX Mode_2410 MHz/2442 MHz/2473 MHz |
|------------|------------------------------------|

| Frequency (MHz) | 20dB Bandwidth (MHz) | 99% Occupied BW (MHz) |
|-----------------|----------------------|-----------------------|
| 2410            | 5.04                 | 5.56                  |
| 2442            | 5.08                 | 5.52                  |
| 2473            | 4.00                 | 4.44                  |



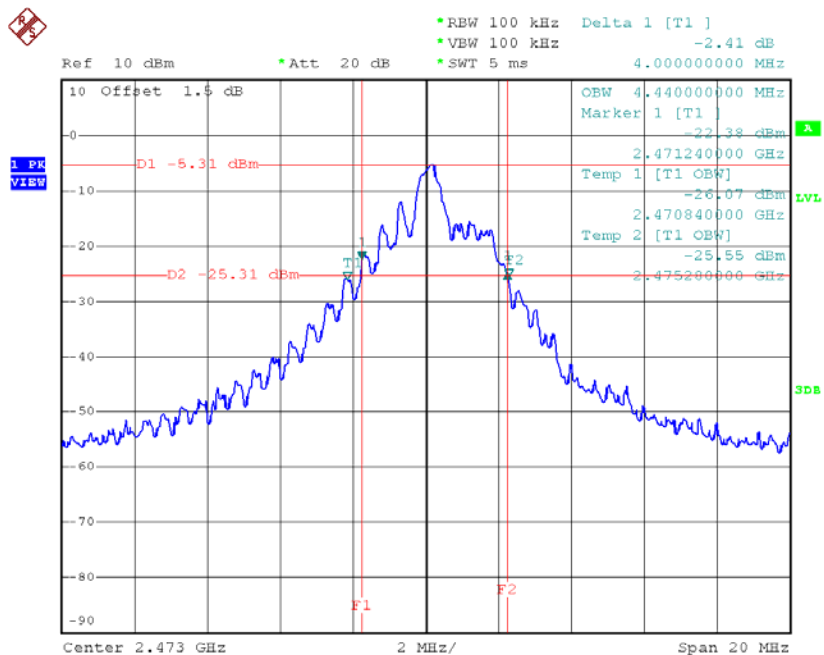
Date: 11.JUN.2018 14:56:06

### TX Mode\_2442 MHz



Date: 11.JUN.2018 15:02:29

### TX Mode\_2473 MHz



Date: 11.JUN.2018 15:44:07