# FCC Radio Test Report

## FCC ID: 2AO5W-WOOFITGO

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

| | | |
|---|---|---|
| **Project No.** | : | 1803C020 |
| **Equipment** | : | Bluetooth Speaker |
| **Test Model** | : | WOOFit Go |
| **Series Model** | : | N/A |
| **Applicant** | : | SACKit ApS |
| **Address** | : | Lyngvej 1, 9000 Aalborg, Denmark |

| | | |
|---|---|---|
| **Date of Receipt** | : | Mar. 06, 2018 |
| **Date of Test** | : | Mar. 08, 2018 ~ Mar. 14, 2018 |
| **Issued Date** | : | Mar. 28, 2018 |
| **Tested by** | : | BTL Inc. |

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NVLAP® TESTING NVLAP LAB CODE 200788-0

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# REPORT ISSUED HISTORY

| Issued No. | Description | Issued Date |
|---|---|---|
| BTL-FCCP-2-1803C020 | Original Issue. | Mar. 28, 2018 |

## 1. CERTIFICATION

| | | |
|---|---|---|
| Equipment | : | Bluetooth Speaker |
| Brand Name | : | SACK$^{it}$ |
| Test Model | : | WOOFit Go |
| Series Model | : | N/A |
| Applicant | : | SACKit ApS |
| Manufacturer | : | SACKit ApS |
| Address | : | Lyngvej 1, 9000 Aalborg, Denmark |
| Factory | : | #1 Guangzhou Singulargold Electronics Co.Ltd<br>#2 Dah Dyi Audio Equipment Co., Ltd.<br>#3 Dongguan Sonic Devices Electronics Co.,Ltd |
| Address | : | #1 NO.6 LianhuayanRoad,Sciencepark,guangZhou,China<br>#2 Jin San Jiao Ind. Zone, Shi Bu Village,Liao Bu Town, Dong Guan City, Guang Dong Province, China<br>#3 No.2 Bldg,Zone 2,Dalingshan science and Technology Industrial Park, Dongguan, Guangdong,China |
| Date of Test | : | Mar. 08, 2018 ~ Mar. 14, 2018 |
| Test Sample | : | Engineering Sample NO.: D180301912 |
| Standard(s) | : | FCC Part15, Subpart C (15.247)/ 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-2-1803C020) 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).

**Test results included in this report is only for the LE part.**

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

| Applied Standard(s): FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Standard(s) Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | PASS | |
| 15.247(d) | Antenna conducted Spurious Emission | PASS | |
| 15.247(a)(2) | 6dB Bandwidth | PASS | |
| 15.247(b)(3) | Peak Output Power | PASS | |
| 15.247(e) | Power Spectral Density | PASS | |
| 15.203 | Antenna Requirement | PASS | |
| 15.247(d)/ 15.205/ 15.209 | Transmitter Radiated Emissions | 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=2xUc(y).

The BTL measurement uncertainty as below table:

A. Conducted Measurement:

| Test Site | Method | Measurement Frequency Range | U, (dB) |
|---|---|---|---|
| DG-C02 | CISPR | 150 KHz ~ 30MHz | 2.32 |

B. 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 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| Equipment | Bluetooth Speaker | |
| Brand Name | SACK$^{it}$ | |
| Test Model | WOOFit Go | |
| Series Model | N/A | |
| Model Difference | N/A | |
| Product Description | Operation Frequency | 2402~2480 MHz |
| | Modulation Technology | GFSK(1Mbps) |
| | Bit Rate of Transmitter | |
| | Output Power (Max.) | 2.75 dBm (1Mbps) |
| Power Source | #1 Battery supplied.<br>#2 Suppild from Li-ion Battery | |
| Power Rating | #1 DC 5V 1A<br>#2 DC 3.7V 950mAh | |

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) |
|---|---|---|---|
| 00 | 2402 | 20 | 2442 |
| 01 | 2404 | 21 | 2444 |
| 02 | 2406 | 22 | 2446 |
| 03 | 2408 | 23 | 2448 |
| 04 | 2410 | 24 | 2450 |
| 05 | 2412 | 25 | 2452 |
| 06 | 2414 | 26 | 2454 |
| 07 | 2416 | 27 | 2456 |
| 08 | 2418 | 28 | 2458 |
| 09 | 2420 | 29 | 2460 |
| 10 | 2422 | 30 | 2462 |
| 11 | 2424 | 31 | 2464 |
| 12 | 2426 | 32 | 2466 |
| 13 | 2428 | 33 | 2468 |
| 14 | 2430 | 34 | 2470 |
| 15 | 2432 | 35 | 2472 |
| 16 | 2434 | 36 | 2474 |
| 17 | 2436 | 37 | 2476 |
| 18 | 2438 | 38 | 2478 |
| 19 | 2440 | 39 | 2480 |

3. Table for Filed Antenna:

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|
| 1 | N/A | N/A | Printed | N/A | 2.3 |

## 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 **NOTE (1)** |

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

| **For Conducted Test** | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | TX Mode |

| **For Radiated Test** | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | TX Mode **NOTE (1)** |

Note:

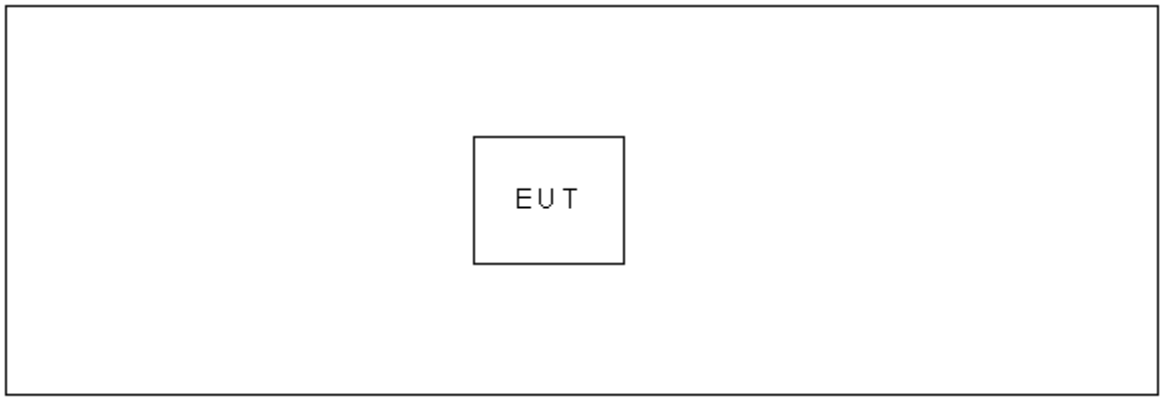
(1) The measurements are performed at the high, middle, low available channels.

## 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of BT LE

| Test Software Version | AB1500 Family LAB Test Tool | | |
|---|---|---|---|
| Frequency (MHz) | 2402 | 2440 | 2480 |
| BT LE | 48 | 46 | 46 |

## 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 |
|---|---|---|---|---|
| - | - | - | - | - |

# 4. EMC EMISSION TEST

## 4.1 CONDUCTED EMISSION MEASUREMENT

### 4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

| Frequency of Emission (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 -0.5 | 66 to 56* | 56 to 46* |
| 0.50 -5.0 | 56 | 46 |
| 5.0 -30.0 | 60 | 50 |

Note:

(1) The limit of " * " decreases with the logarithm of the frequency

(2) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

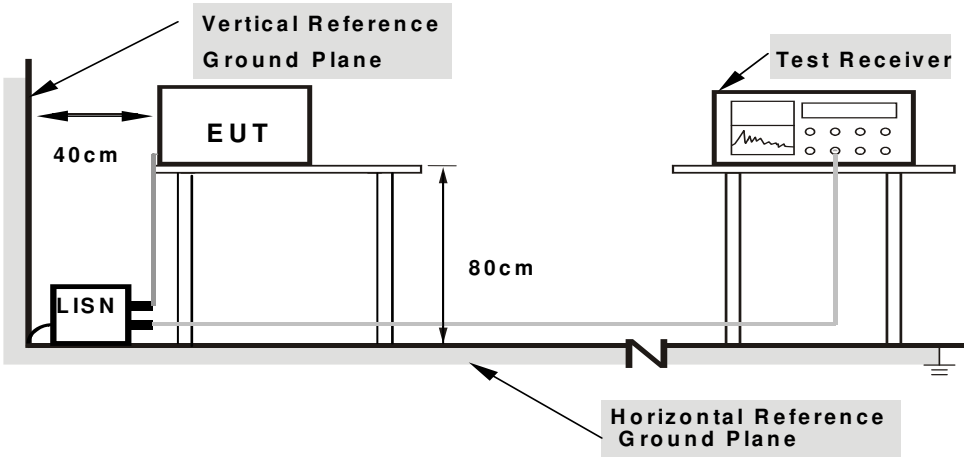
### 4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. 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




Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 4.1.6 EUT TEST CONDITIONS

Temperature: 24°C Relative Humidity: 60% Test Voltage: AC 120V/60Hz

### 4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.
(2) Measuring frequency range from 150KHz to 30MHz.
(3) " N/A" denotes test is not applicable to this device.

## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9KHz-1000MHz)

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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| Frequency (MHz) | (dBuV/m) (at 3 meters) | |
|---|---|---|
| | 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).

(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RBW / VBW<br>(Emission in restricted band) | RBW 1MHz VBW 3MHz peak detector for Pk value<br>RMS detector for AV value |

| 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 |

### 4.2.2 TEST PROCEDURE

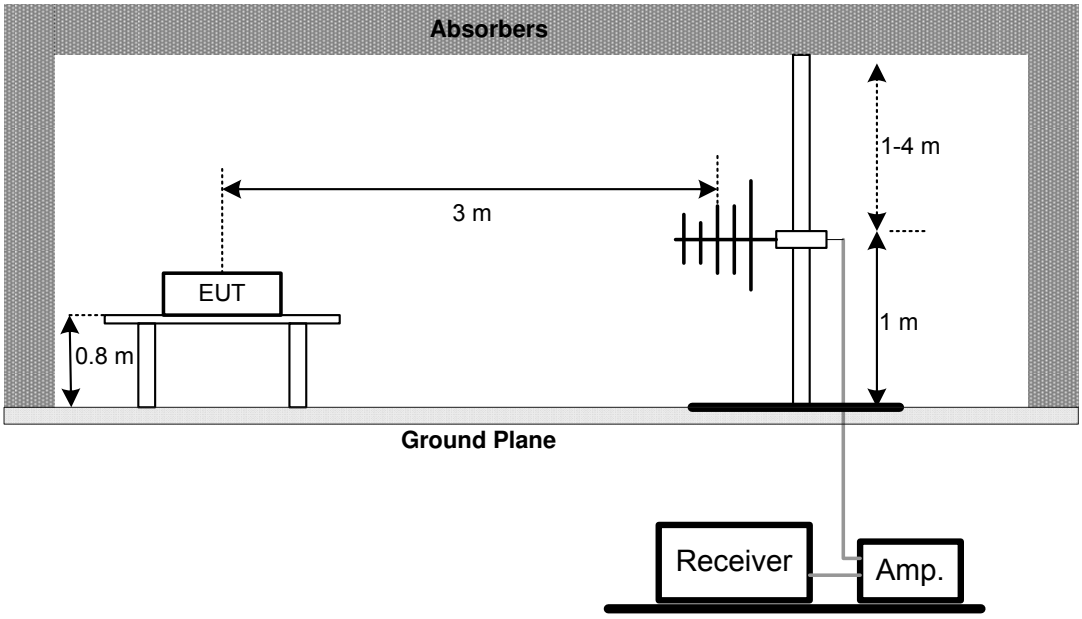
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance 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)
c. The height of the equipment or of the substitution antenna shall be 0.8m 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.
d. 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).
e. 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.
f. 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.
g. 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)
h. 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)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 4.2.3 DEVIATION FROM TEST STANDARD

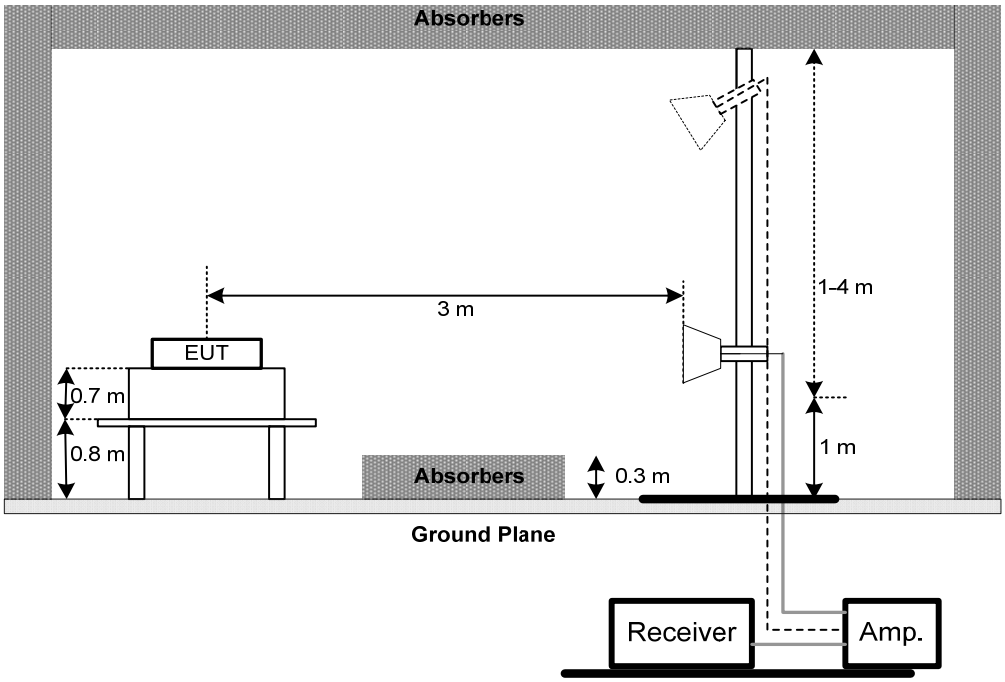
No deviation

### 4.2.4 TEST SETUP

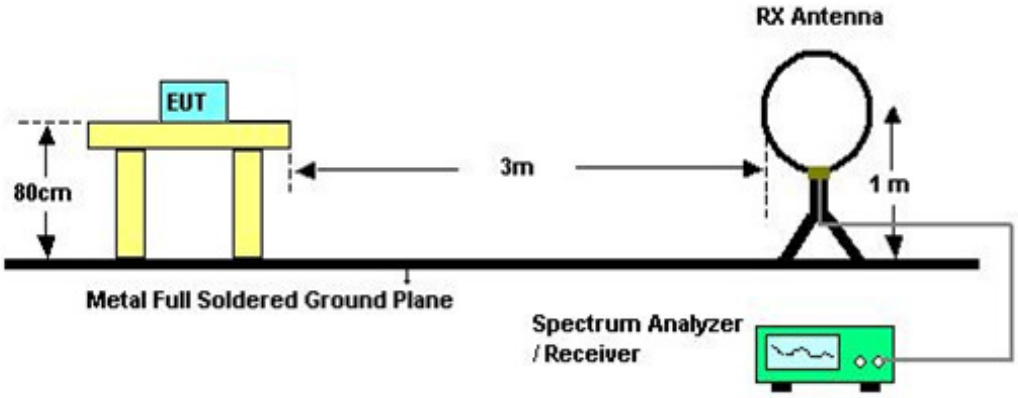
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz




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



(C) For radiated emissions below 30MHz




**4.2.5 EUT OPERATING CONDITIONS**

The EUT was programmed to be in continuously transmitting mode.

**4.2.6 EUT TEST CONDITIONS**

Temperature: 22°C Relative Humidity: 56% Test Voltage: AC 120V/60Hz

**4.2.7TEST RESULTS (9KHZ TO 30MHZ)**

Please refer to the Appendix B

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 (specific distance / test distance) (dB).
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

**4.2.8TEST RESULTS (30MHZ TO 1000MHZ)**

Please refer to the Appendix C.

**4.2.9TEST RESULTS (ABOVE 1000MHZ)**

Please refer to the Appendix D.

Remark:

(1) 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 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(a)(2) | Bandwidth | >= 500KHz (6dB bandwidth) | 2400-2483.5 | PASS |

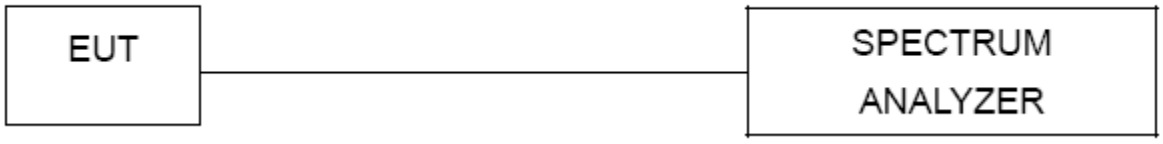
### 5.1.1 TEST PROCEDURE

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=300KHz, Sweep time = 2.5 ms.

### 5.1.2 DEVIATION FROM STANDARD

No deviation.

### 5.1.3 TEST SETUP




### 5.1.4 EUT OPERATION 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.

### 5.1.5 EUT TEST CONDITIONS

Temperature: 24°C  Relative Humidity: 60%  Test Voltage: AC 120V/60Hz

### 5.1.6 TEST RESULTS

Please refer to the Appendix E.

# 6. MAXIMUM OUTPUT POWER TEST

## 6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(b)(3) | Maximum Output Power | 1 watt or 30dBm | 2400-2483.5 | PASS |

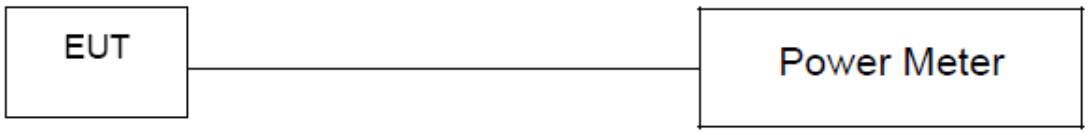
### 6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance.

### 6.1.2 DEVIATION FROM STANDARD

No deviation.

### 6.1.3 TEST SETUP




### 6.1.4 EUT OPERATION 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.

### 6.1.5 EUT TEST CONDITIONS

Temperature: 24°C  Relative Humidity: 60%  Test Voltage: AC 120V/60Hz

### 6.1.6 TEST RESULTS

Please refer to the Appendix F.

# 7. ANTENNA CONDUCTED SPURIOUS EMISSION

## 7.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

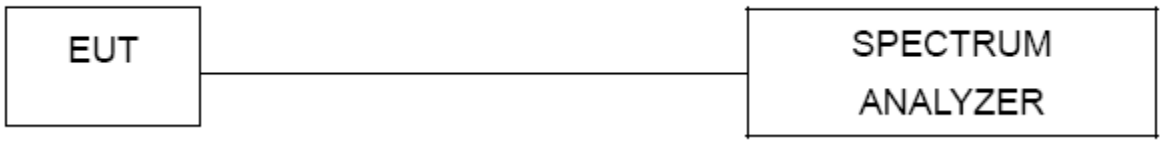
### 7.1.1 TEST PROCEDURE

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=300KHz, Sweep time = 10 ms.
c. Offset=antenna gain+cable loss

### 7.1.2 DEVIATION FROM STANDARD

No deviation.

### 7.1.3 TEST SETUP




### 7.1.4 EUT OPERATION 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.

### 7.1.5 EUT OPERATION CONDITIONS

Temperature: 24°C  Relative Humidity: 60%  Test Voltage: AC 120V/60Hz

### 7.1.6 TEST RESULTS

Please refer to the Appendix G.

# 8. POWER SPECTRAL DENSITY TEST

## 8.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(e) | Power Spectral Density | 8 dBm (in any 3KHz) | 2400-2483.5 | PASS |

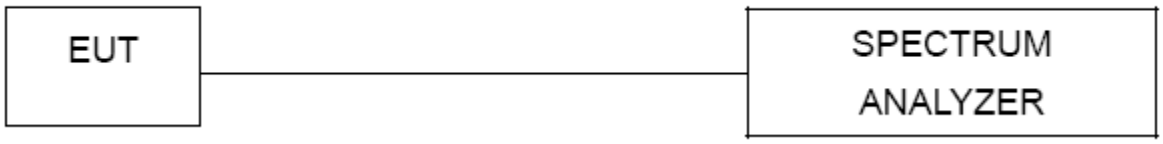
### 8.1.1 TEST PROCEDURE

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=3KHz, VBW=10 KHz, Sweep time = auto.

### 8.1.2 DEVIATION FROM STANDARD

No deviation.

### 8.1.3 TEST SETUP




### 8.1.4 EUT OPERATION 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.

### 8.1.5 EUT TEST CONDITIONS

Temperature: 24°C  Relative Humidity: 60%  Test Voltage: AC 120V/60Hz

### 8.1.6 TEST RESULTS

Please refer to the Appendix H.

## 9. MEASUREMENT INSTRUMENTS LIST

| Conducted Emission Measurement | | | | | |
|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | 50Ω Terminator | SHX | TF2-3G-A | 8122901 | Mar. 11, 2019 |
| 2 | TWO-LINE V-NETWORK | R&S | ENV216 | 100526 | Mar. 11, 2019 |
| 3 | EMI Test Receiver | R&S | ESR3 | 101862 | Aug. 15, 2018 |
| 4 | Artificial-Mains Network | SCHWARZBECK | NSLK 8127 | 8127685 | Aug. 20, 2018 |
| 5 | Cable | N/A | RG400 12m | N/A | Mar. 06, 2019 |
| 6 | Measurement Software | Farad | EZ-EMC Ver.NB-03A1-01 | N/A | N/A |

| Radiated Emission Measurement - 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 | Feb. 07, 2019 |

| Radiated Emission Measurement - 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 | Jun. 08, 2018 |
| 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 | Feb. 07, 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 |

| 6dB Bandwidth Measurement | | | | | |
|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | Spectrum Analyzer | R&S | FSP40 | 100185 | Aug. 20, 2018 |

| Peak Output Power Measurement | | | | | |
|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
| 1 | Power Meter | ANRITSU | ML2495A | 1128009 | Mar. 26, 2018 |
| 2 | Pulse Power Sensor | ANRITSU | MA 2411B | 1027500 | Mar. 26, 2018 |

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

| Power Spectral Density 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.

## 10. EUT TEST PHOTO

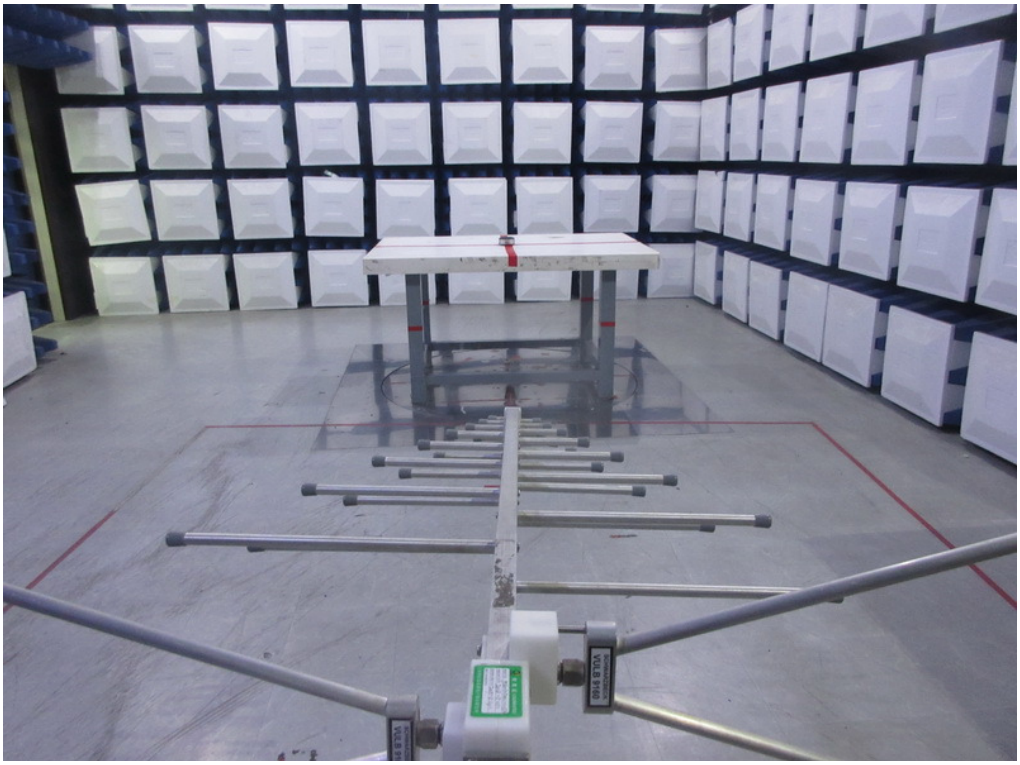
**Conducted Measurement Photos**

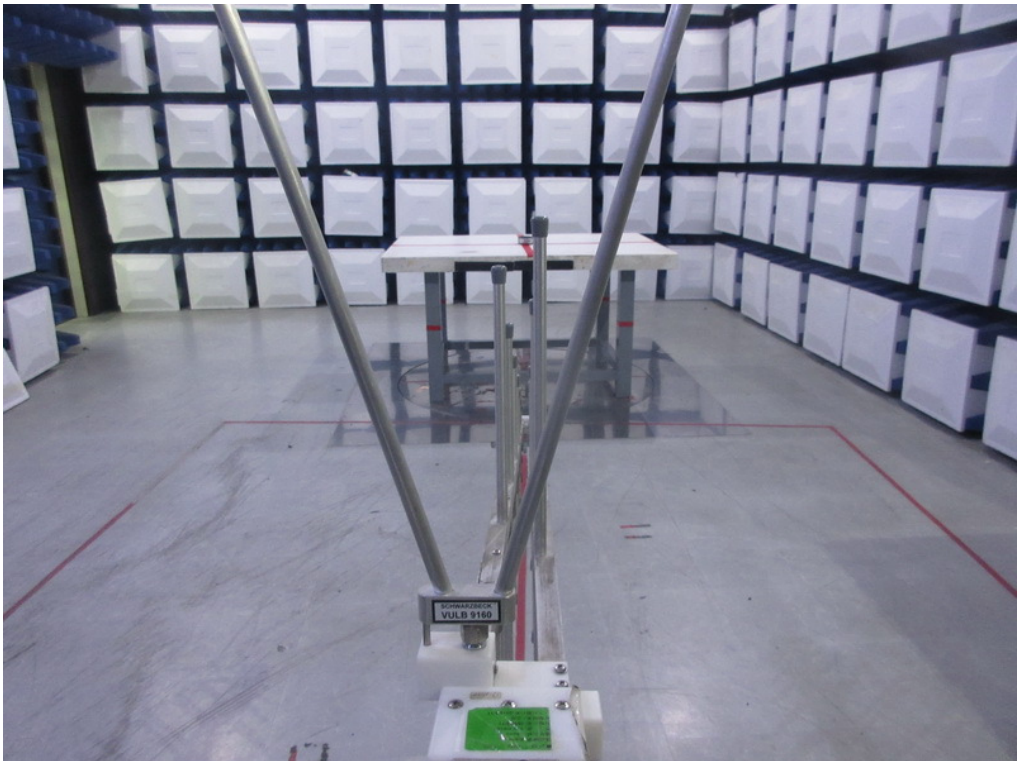
## Radiated Measurement Photos

### 9KHz to 30MHz

## Radiated Measurement Photos

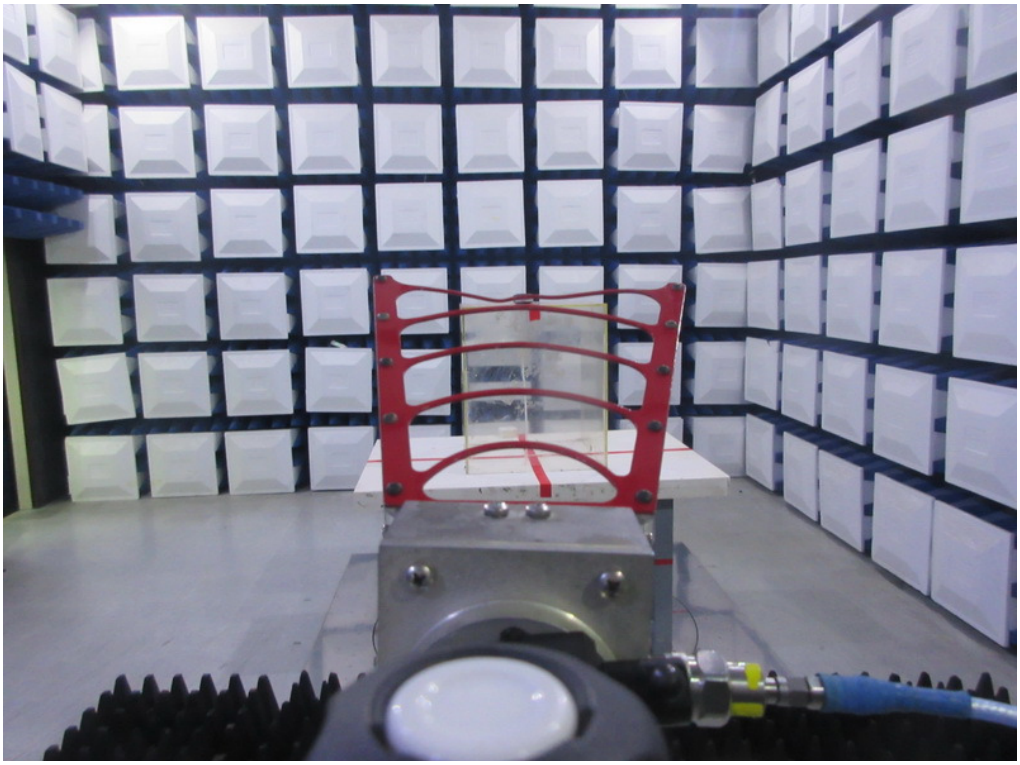
## 30MHz to 1000MHz

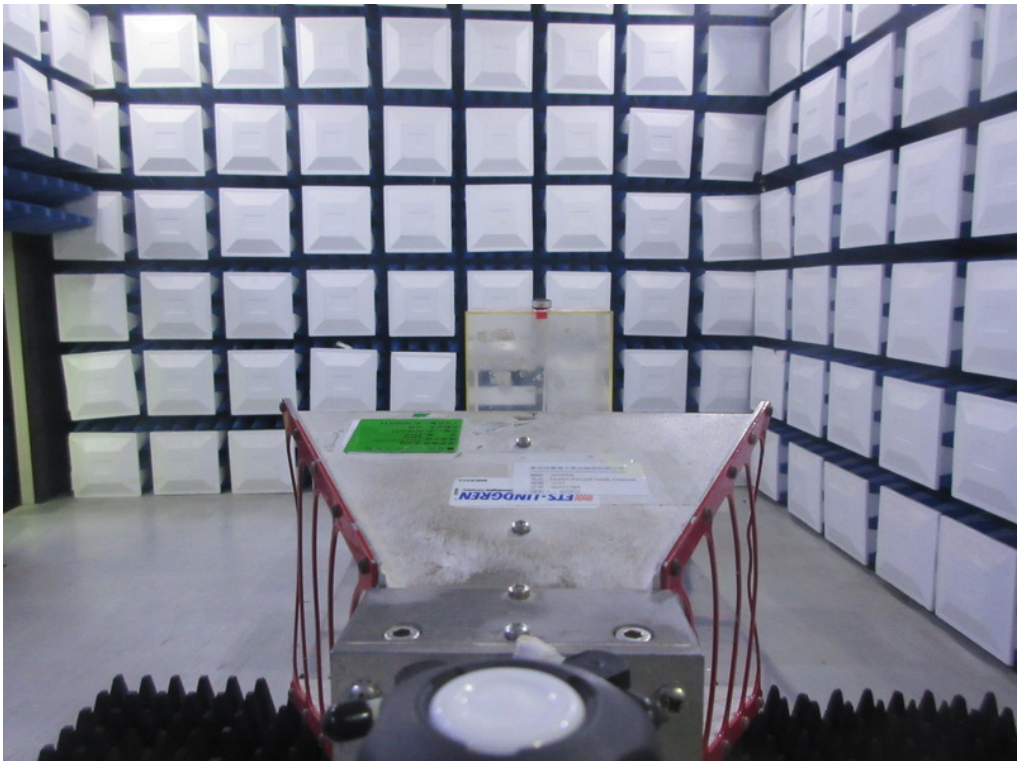




## Radiated Measurement Photos

### Above 1000MHz

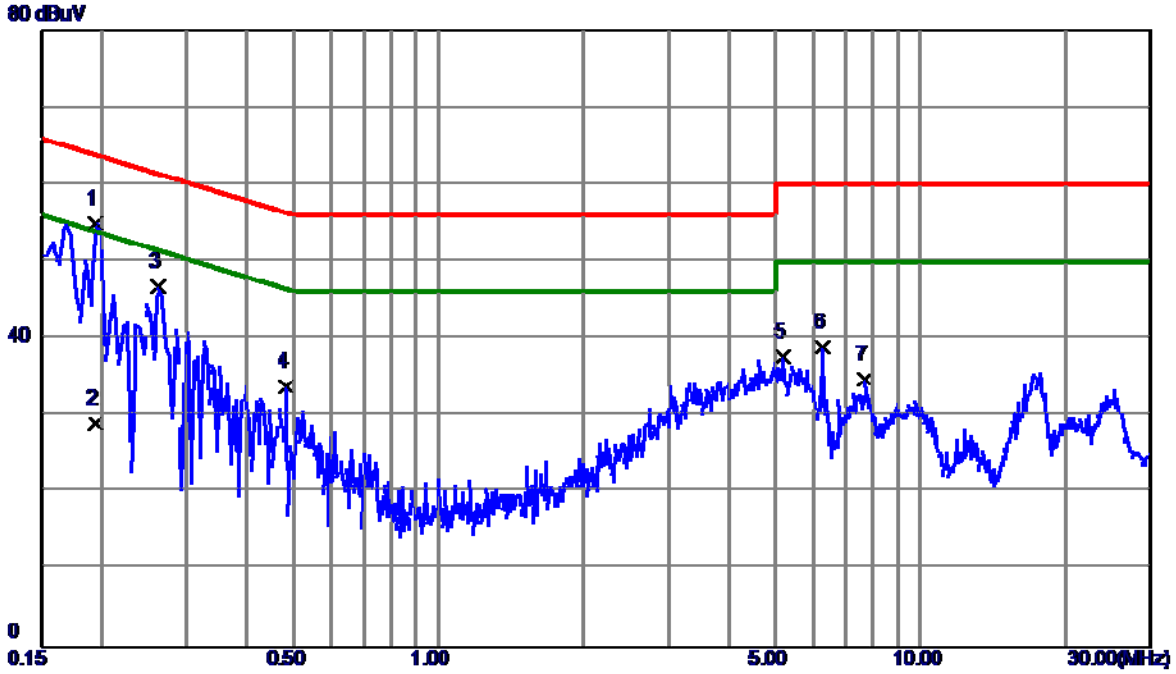




# APPENDIX A - CONDUCTED EMISSION

| Test Mode: | TX Mode |
|---|---|

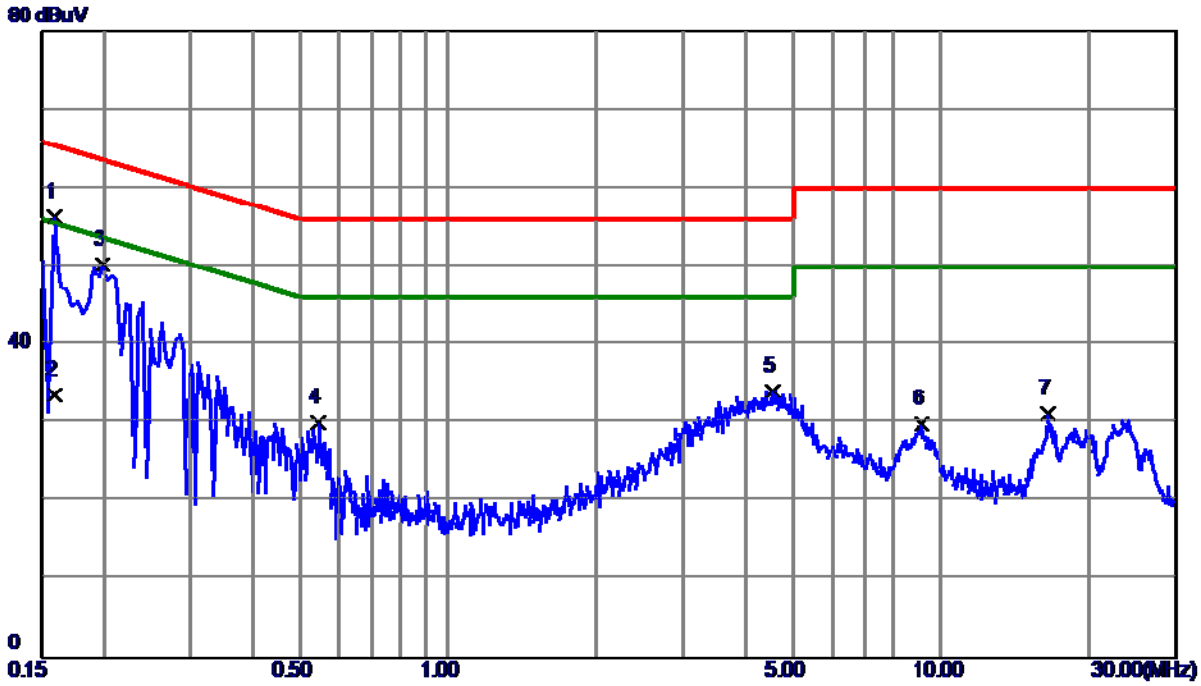
## Line




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 * | 0.1949 | 45.19 | 9.73 | 54.92 | 63.83 | -8.91 | Peak | |
| 2 | 0.1949 | 19.29 | 9.73 | 29.02 | 53.83 | -24.81 | AVG | |
| 3 | 0.2625 | 36.93 | 9.72 | 46.65 | 61.35 | -14.70 | Peak | |
| 4 | 0.4830 | 23.99 | 9.76 | 33.75 | 56.29 | -22.54 | Peak | |
| 5 | 5.1900 | 27.62 | 9.92 | 37.54 | 60.00 | -22.46 | Peak | |
| 6 | 6.2745 | 28.91 | 9.96 | 38.87 | 60.00 | -21.13 | Peak | |
| 7 | 7.6605 | 24.69 | 10.00 | 34.69 | 60.00 | -25.31 | Peak | |

| Test Mode: | TX Mode |
|---|---|

## Neutral

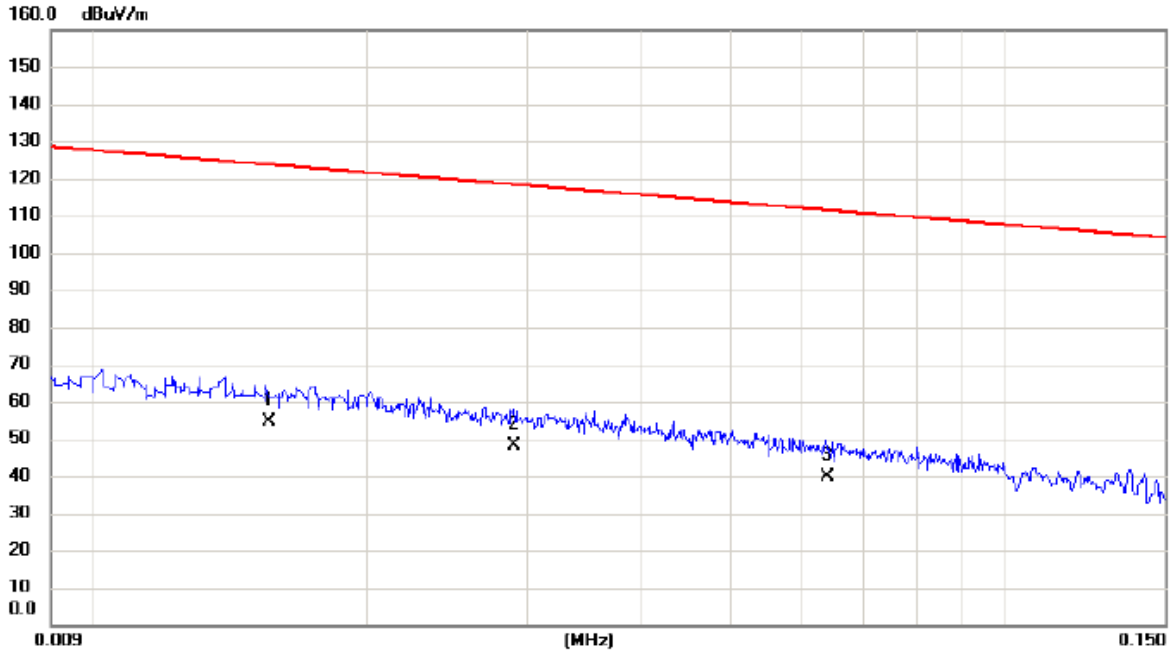



| No. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 * | 0.1590 | 46.66 | 9.64 | 56.30 | 65.52 | -9.22 | Peak | |
| 2 | 0.1590 | 23.90 | 9.64 | 33.54 | 55.52 | -21.98 | AVG | |
| 3 | 0.1995 | 40.64 | 9.65 | 50.29 | 63.63 | -13.34 | Peak | |
| 4 | 0.5460 | 20.35 | 9.66 | 30.01 | 56.00 | -25.99 | Peak | |
| 5 | 4.5555 | 24.29 | 9.83 | 34.12 | 56.00 | -21.88 | Peak | |
| 6 | 9.1230 | 19.99 | 9.99 | 29.98 | 60.00 | -30.02 | Peak | |
| 7 | 16.4760 | 20.86 | 10.36 | 31.22 | 60.00 | -28.78 | Peak | |

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

| Test Mode: | TX Mode |
|---|---|

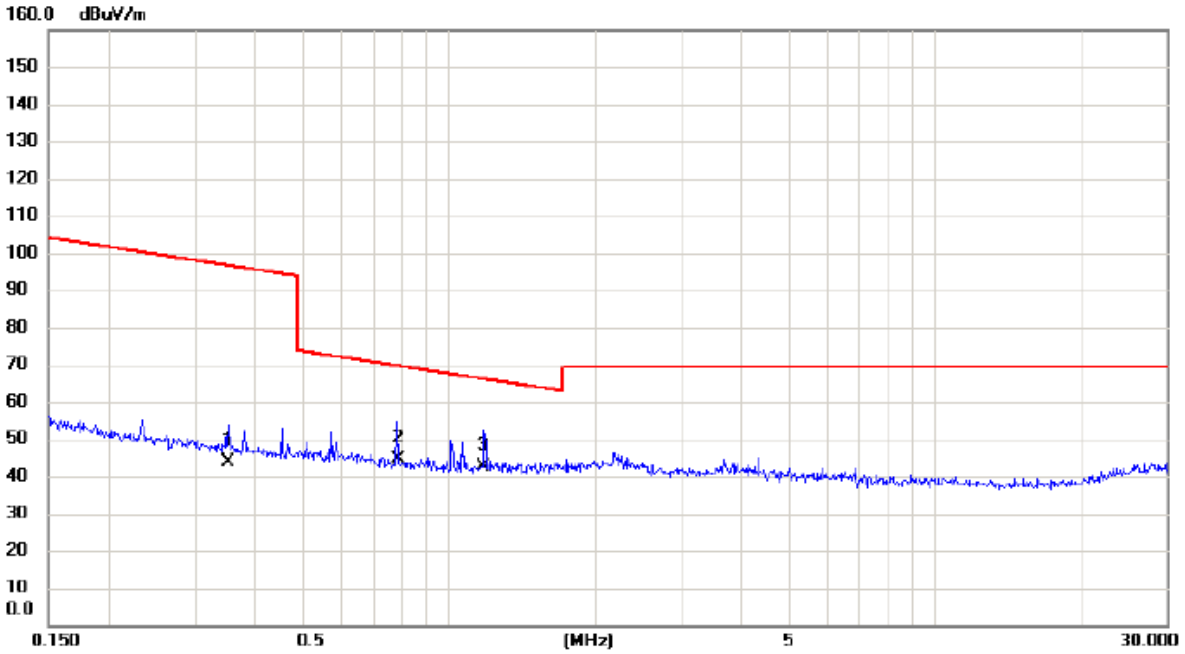
Ant 0°




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 0.0156 | 34.27 | 20.19 | 54.46 | 123.74 | -69.28 | AVG | |
| 2 | | 0.0290 | 28.86 | 19.35 | 48.21 | 118.36 | -70.15 | AVG | |
| 3 | | 0.0638 | 21.33 | 18.45 | 39.78 | 111.51 | -71.73 | AVG | |

| Test Mode: | TX Mode |
|---|---|

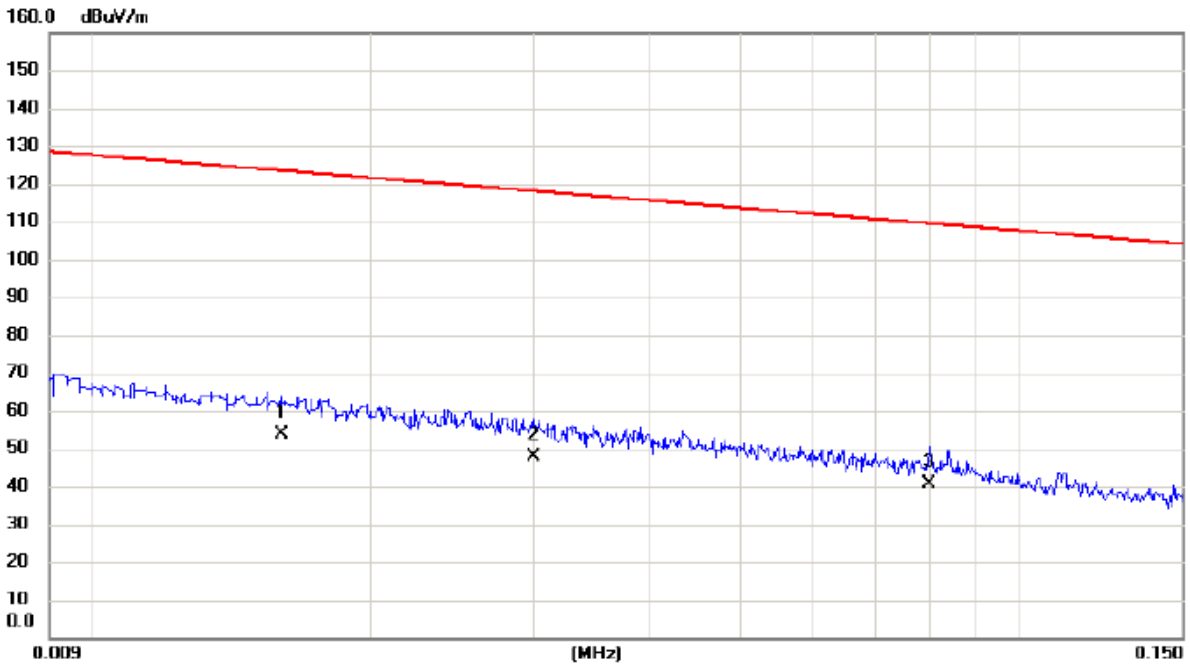
Ant 0°




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 0.3502 | 27.12 | 16.58 | 43.70 | 96.72 | -53.02 | AVG | |
| 2 | | 0.7835 | 28.36 | 16.14 | 44.50 | 69.72 | -25.22 | QP | |
| 3 | * | 1.1781 | 26.87 | 15.82 | 42.69 | 66.18 | -23.49 | QP | |

| Test Mode: | TX Mode |
|---|---|

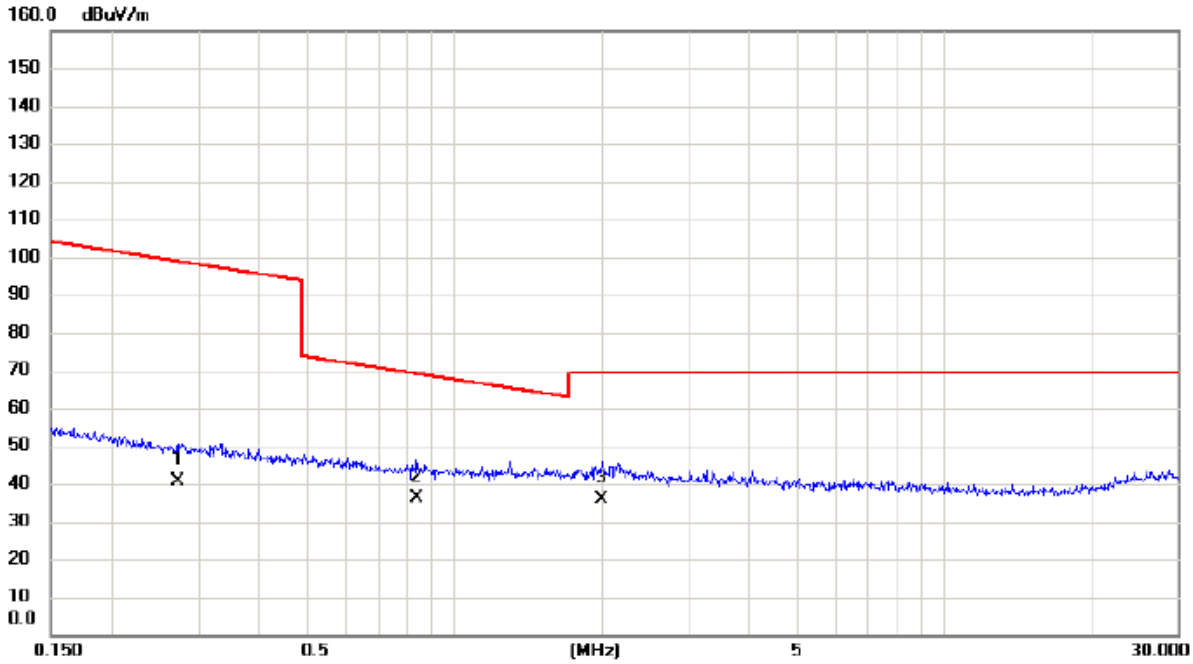
Ant 90°




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 0.0160 | 33.50 | 20.14 | 53.64 | 123.52 | -69.88 | AVG | |
| 2 | | 0.0300 | 28.41 | 19.32 | 47.73 | 118.06 | -70.33 | AVG | |
| 3 | * | 0.0801 | 22.65 | 18.11 | 40.76 | 109.53 | -68.77 | AVG | |

| Test Mode: | TX Mode |
|---|---|

Ant 90°

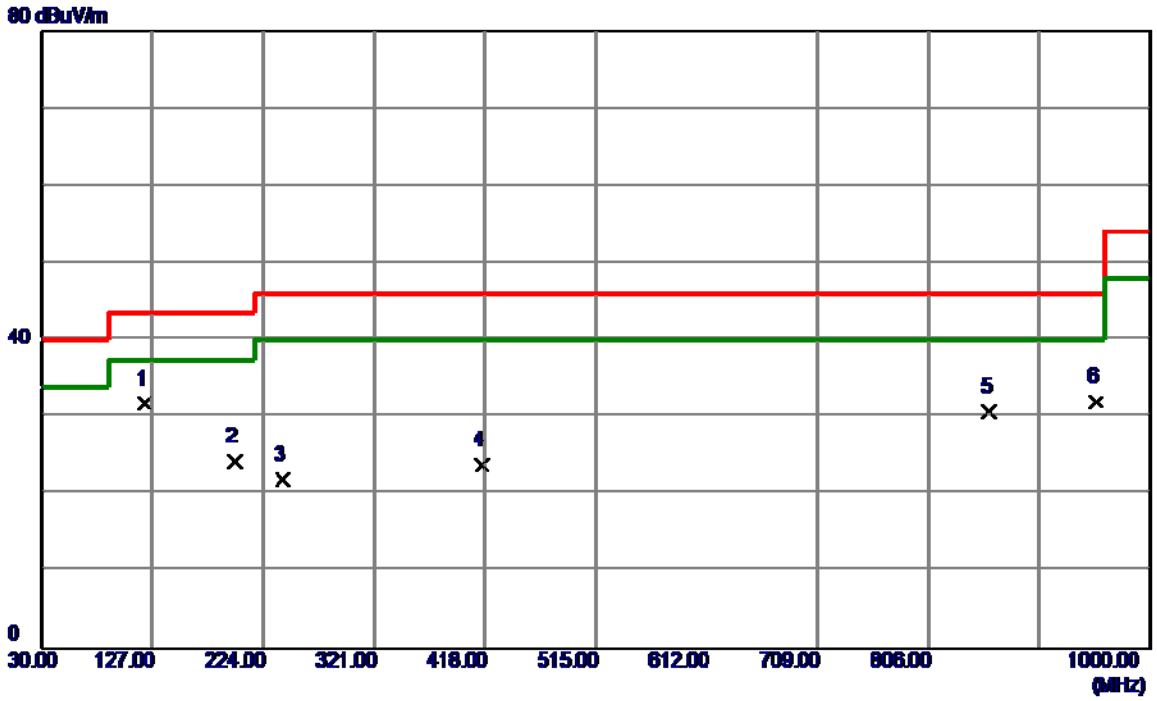



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 0.2730 | 24.13 | 16.64 | 40.77 | 98.88 | -58.11 | AVG | |
| 2 | * | 0.8350 | 20.18 | 16.08 | 36.26 | 69.17 | -32.91 | QP | |
| 3 | | 2.0011 | 20.17 | 15.51 | 35.68 | 69.54 | -33.86 | QP | |

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

| Test Mode: | TX 2402MHz _CH00_1Mbps |
|---|---|

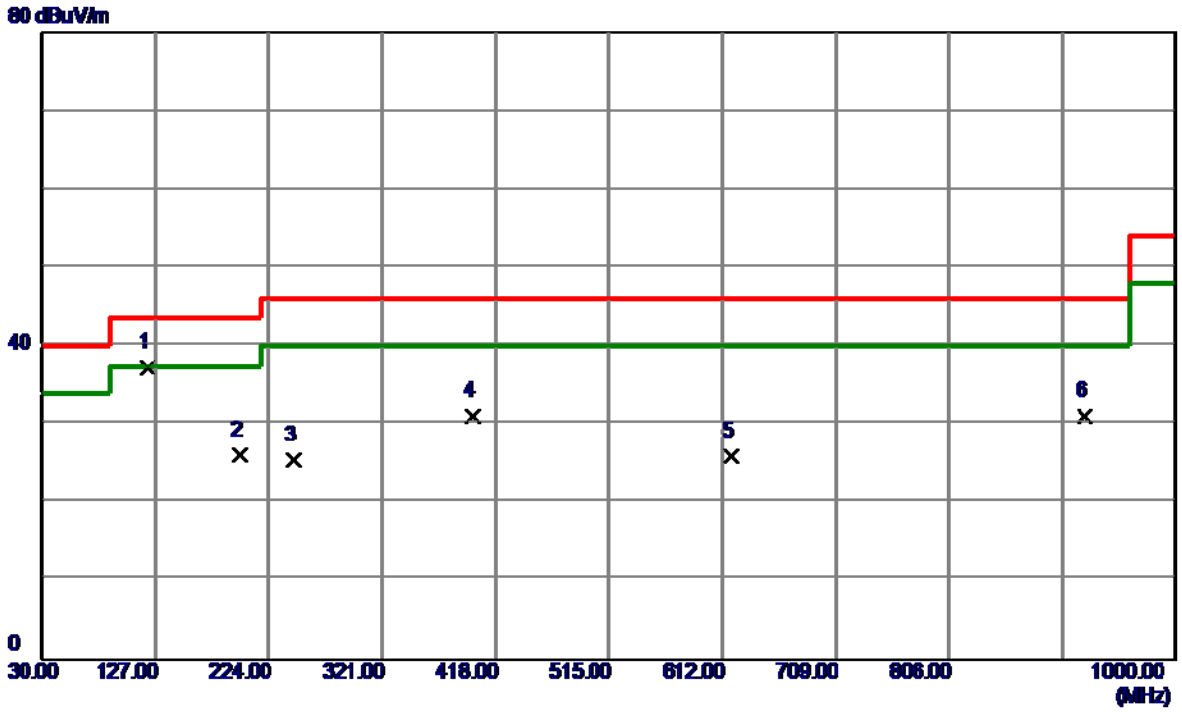
## Vertical




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MIz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 47.14 | -15.38 | 31.76 | 43.50 | -11.74 | Peak | |
| 2 | 198.7800 | 37.89 | -13.64 | 24.25 | 43.50 | -19.25 | Peak | |
| 3 | 241.4600 | 36.39 | -14.44 | 21.95 | 46.00 | -24.05 | Peak | |
| 4 | 416.0600 | 34.67 | -10.90 | 23.77 | 46.00 | -22.23 | Peak | |
| 5 | 859.3500 | 30.46 | 0.19 | 30.65 | 46.00 | -15.35 | Peak | |
| 6 | 952.4700 | 29.95 | 2.04 | 31.99 | 46.00 | -14.01 | Peak | |

| Test Mode: | TX 2402MHz _CH00_1Mbps |
|---|---|

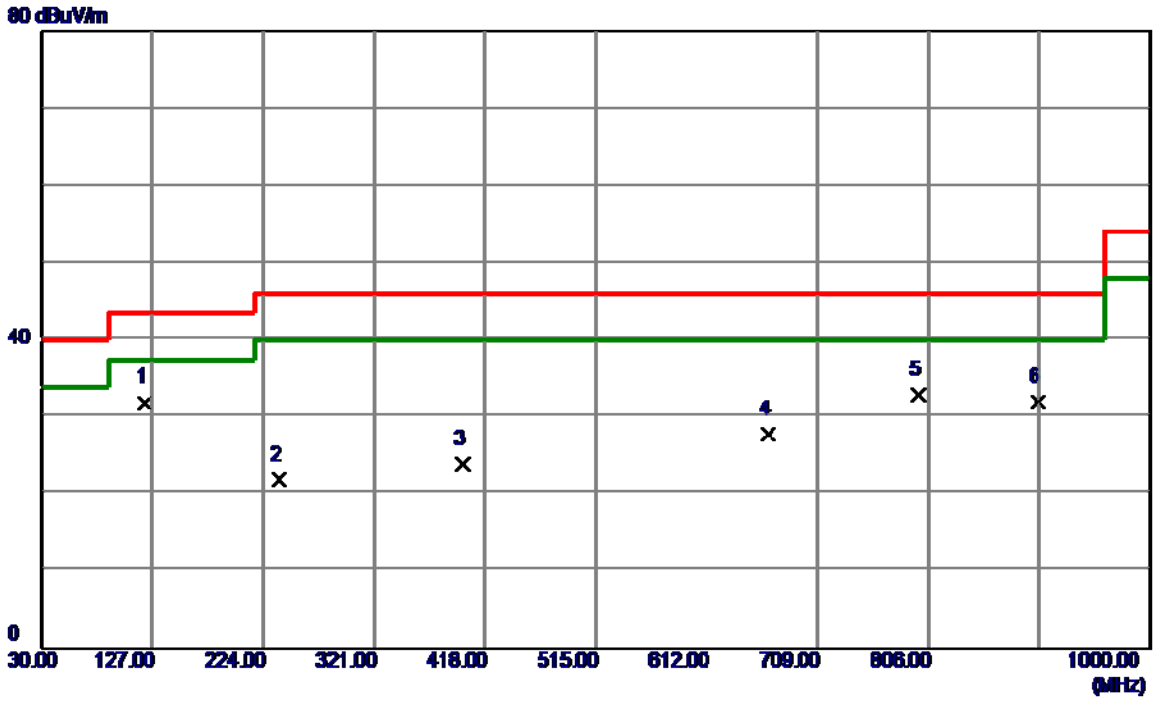
## Horizontal




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 52.60 | -15.38 | 37.22 | 43.50 | -6.28 | Peak | |
| 2 | 198.7800 | 39.77 | -13.64 | 26.13 | 43.50 | -17.37 | Peak | |
| 3 | 245.3400 | 40.11 | -14.64 | 25.47 | 46.00 | -20.53 | Peak | |
| 4 | 398.6000 | 42.35 | -11.38 | 30.97 | 46.00 | -15.03 | Peak | |
| 5 | 619.7600 | 32.04 | -6.05 | 25.99 | 46.00 | -20.01 | Peak | |
| 6 | 922.4000 | 29.61 | 1.46 | 31.07 | 46.00 | -14.93 | Peak | |

| Test Mode: | TX 2440MHz _CH19_1Mbps |
|---|---|

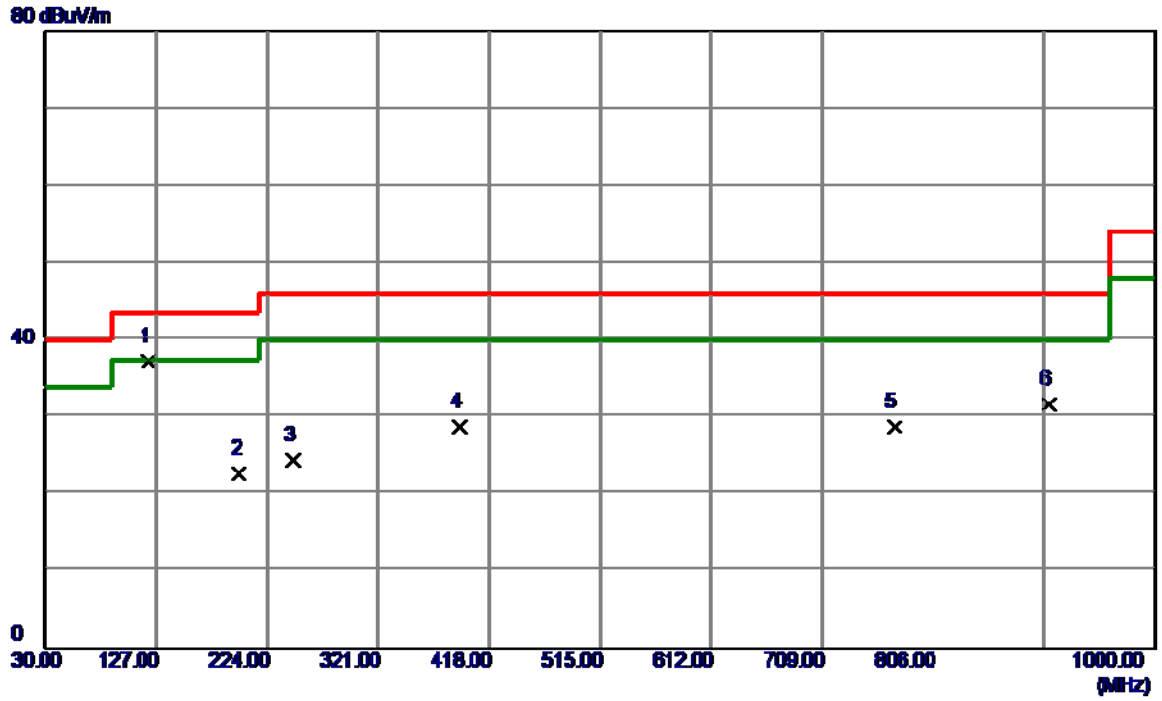
## Vertical




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 47.30 | -15.38 | 31.92 | 43.50 | -11.58 | Peak | |
| 2 | 237.5800 | 36.28 | -14.30 | 21.98 | 46.00 | -24.02 | Peak | |
| 3 | 398.6000 | 35.38 | -11.38 | 24.00 | 46.00 | -22.00 | Peak | |
| 4 | 666.3200 | 32.83 | -4.97 | 27.86 | 46.00 | -18.14 | Peak | |
| 5 | 797.2700 | 34.32 | -1.42 | 32.90 | 46.00 | -13.10 | Peak | |
| 6 | 902.0300 | 30.96 | 1.07 | 32.03 | 46.00 | -13.97 | Peak | |

| Test Mode: | TX 2440MHz _CH19_1Mbps |
|---|---|

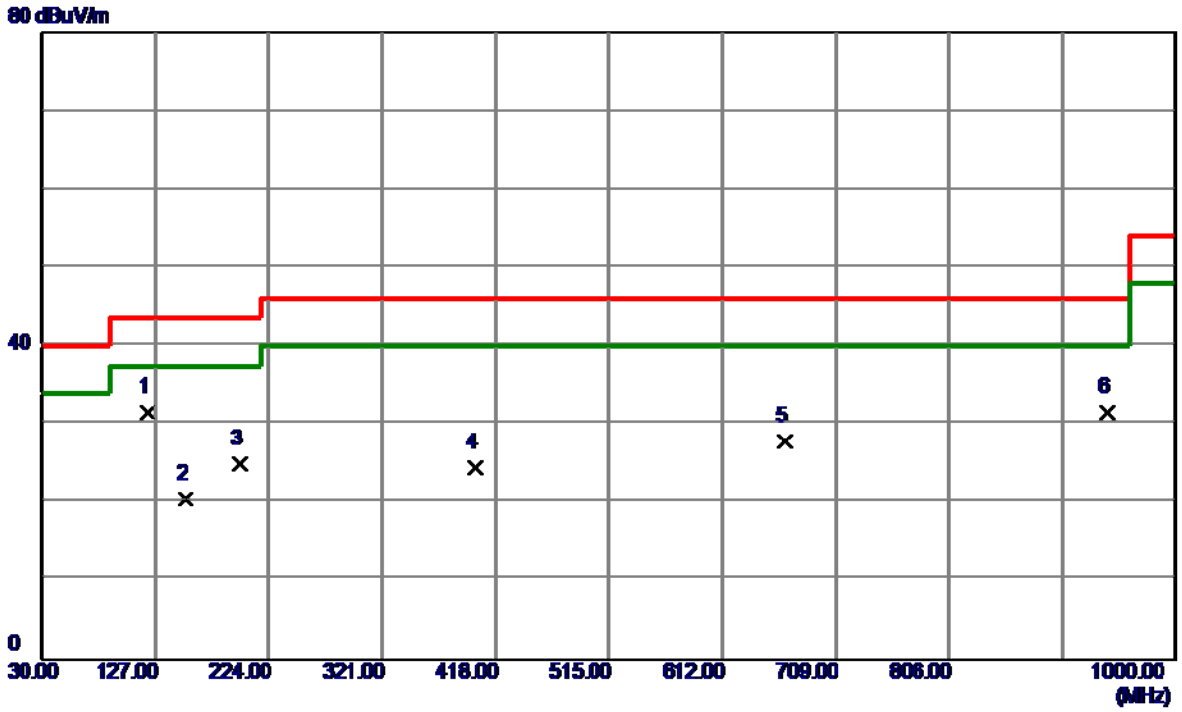
## Horizontal




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 52.70 | -15.38 | 37.32 | 43.50 | -6.18 | Peak | |
| 2 | 199.7500 | 36.43 | -13.73 | 22.70 | 43.50 | -20.80 | Peak | |
| 3 | 246.3100 | 39.17 | -14.69 | 24.48 | 46.00 | -21.52 | Peak | |
| 4 | 391.8100 | 40.21 | -11.46 | 28.75 | 46.00 | -17.25 | Peak | |
| 5 | 772.0500 | 30.80 | -1.97 | 28.83 | 46.00 | -17.17 | Peak | |
| 6 | 906.8800 | 30.52 | 1.16 | 31.68 | 46.00 | -14.32 | Peak | |

| Test Mode: | TX 2480MHz _CH39_1Mbps |
|---|---|

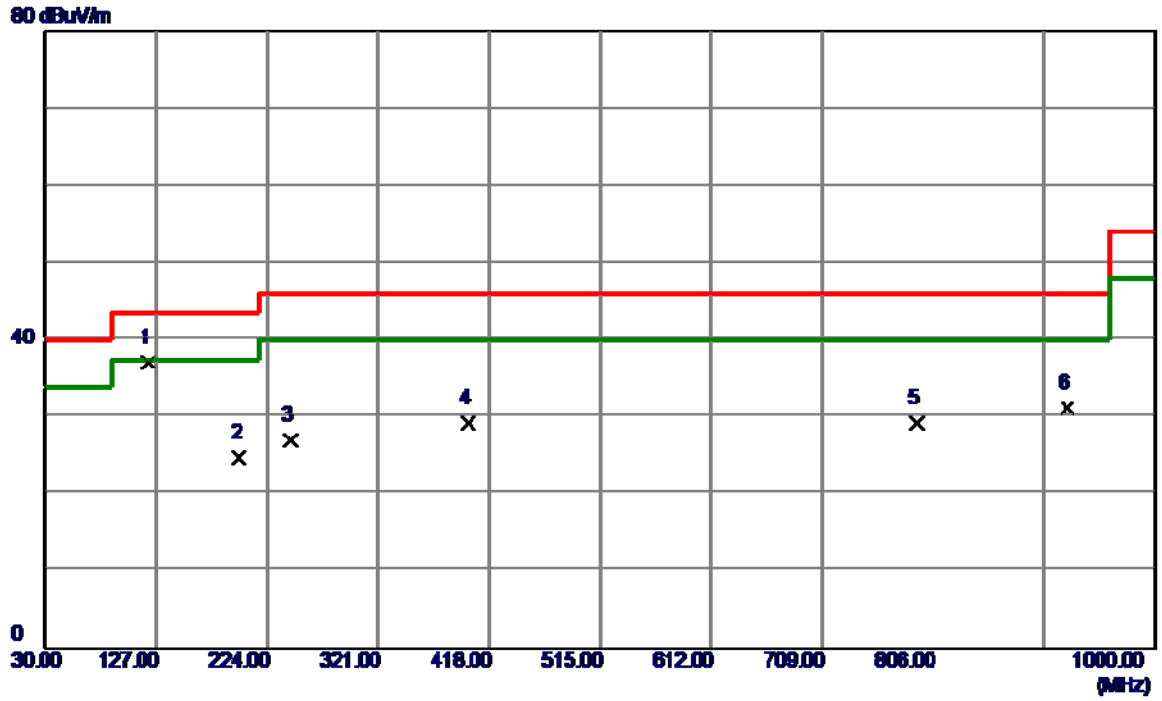
## Vertical




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 46.93 | -15.38 | 31.55 | 43.50 | -11.95 | Peak | |
| 2 | 153.1900 | 33.85 | -13.34 | 20.51 | 43.50 | -22.99 | Peak | |
| 3 | 198.7800 | 38.64 | -13.64 | 25.00 | 43.50 | -18.50 | Peak | |
| 4 | 400.5400 | 35.75 | -11.34 | 24.41 | 46.00 | -21.59 | Peak | |
| 5 | 666.3200 | 32.85 | -4.97 | 27.88 | 46.00 | -18.12 | Peak | |
| 6 | 941.8000 | 29.67 | 1.84 | 31.51 | 46.00 | -14.49 | Peak | |

| Test Mode: | TX 2480MHz _CH39_1Mbps |
|---|---|

## Horizontal

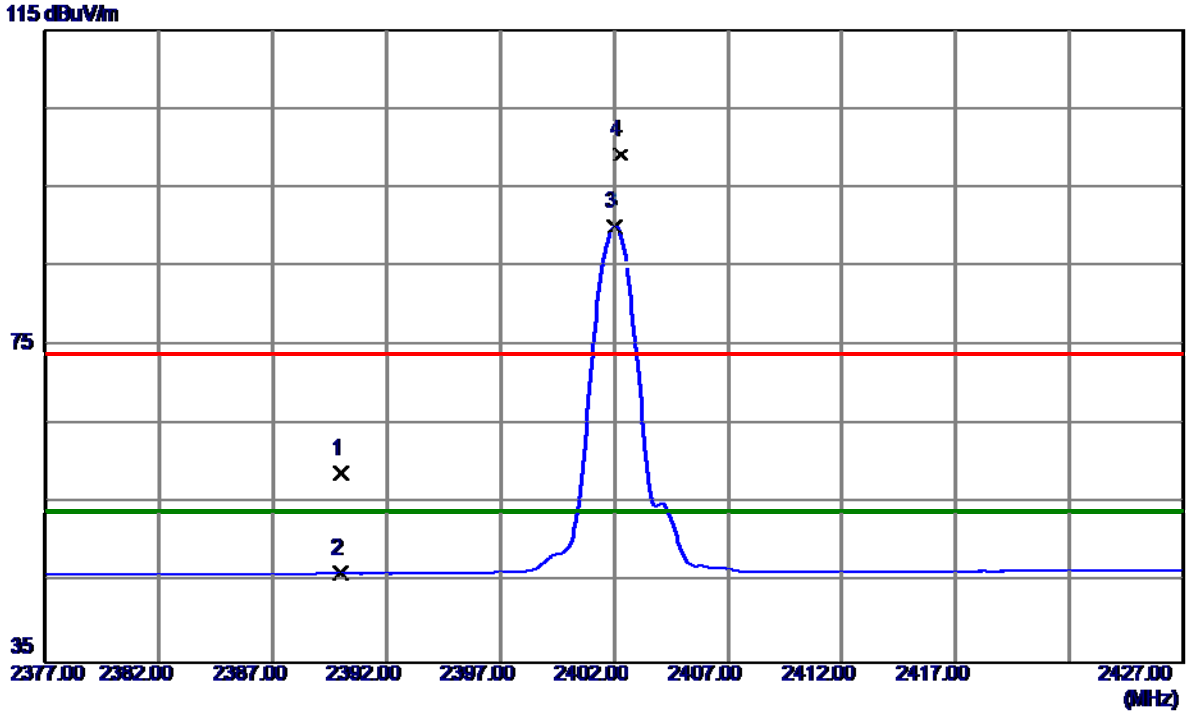



| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 120.2100 | 52.53 | -15.38 | 37.15 | 43.50 | -6.35 | Peak | |
| 2 | 199.7500 | 38.53 | -13.73 | 24.80 | 43.50 | -18.70 | Peak | |
| 3 | 244.3700 | 41.63 | -14.59 | 27.04 | 46.00 | -18.96 | Peak | |
| 4 | 399.5700 | 40.71 | -11.37 | 29.34 | 46.00 | -16.66 | Peak | |
| 5 | 791.4500 | 30.85 | -1.55 | 29.30 | 46.00 | -16.70 | Peak | |
| 6 | 923.3700 | 29.74 | 1.48 | 31.22 | 46.00 | -14.78 | Peak | |

# APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

| Test Mode : | TX 2402MHz _CH00_1Mbps |
|---|---|

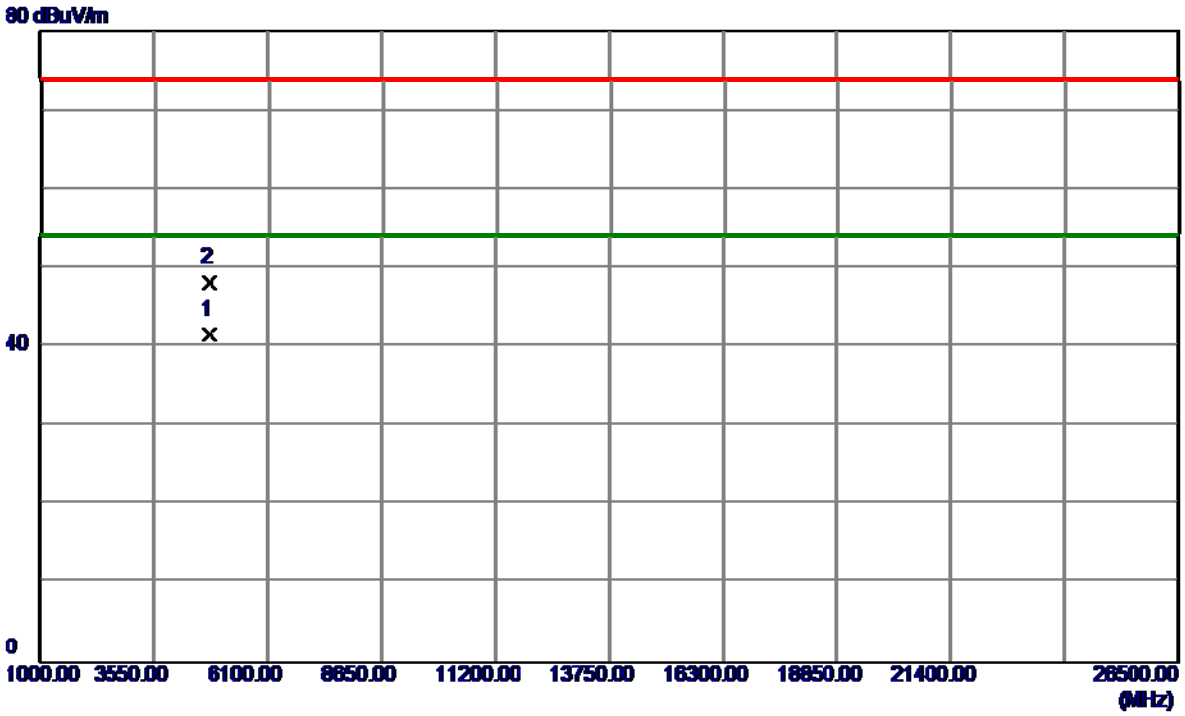
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | 2390.0000 | 25.75 | 33.06 | 58.81 | 74.00 | -15.19 | Peak | |
| 2 | 2390.0000 | 13.08 | 33.06 | 46.14 | 54.00 | -7.86 | AVG | |
| 3 * | 2402.0000 | 57.00 | 33.10 | 90.10 | 54.00 | 36.10 | AVG | No Limit |
| 4 | 2402.2500 | 66.09 | 33.10 | 99.19 | 74.00 | 25.19 | Peak | No Limit |

| Test Mode : | TX 2402MHz _CH00_1Mbps |
|---|---|

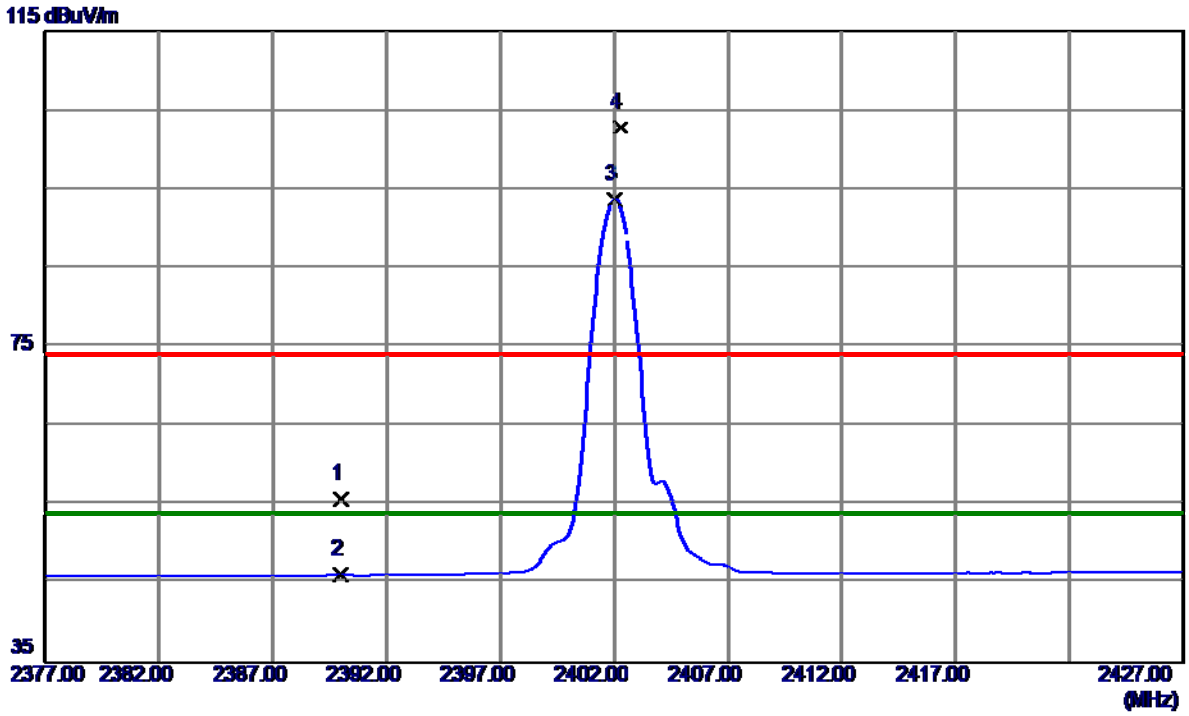
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 4803.7599 | 35.04 | 6.59 | 41.63 | 54.00 | -12.37 | AVG | |
| 2 | 4804.2200 | 41.62 | 6.59 | 48.21 | 74.00 | -25.79 | Peak | |

| Test Mode : | TX 2402MHz _CH00_1Mbps |
|---|---|

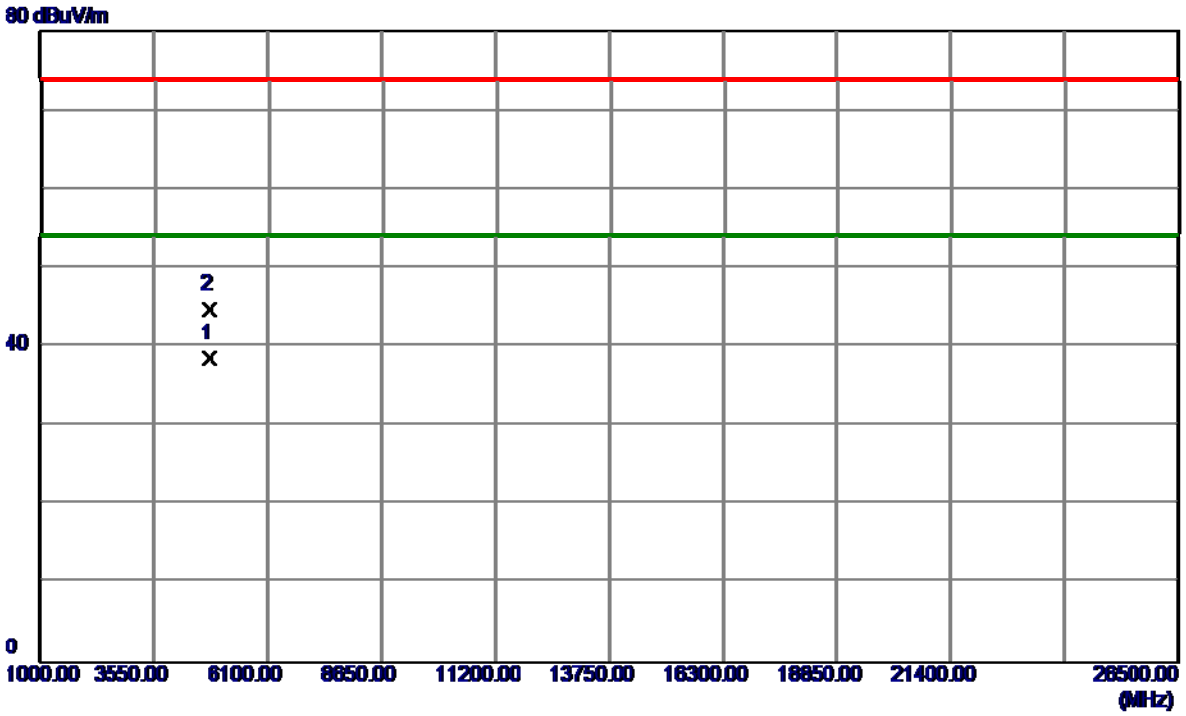
**Horizontal**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | 2390.0000 | 22.72 | 33.06 | 55.78 | 74.00 | -18.22 | Peak | |
| 2 | 2390.0000 | 13.10 | 33.06 | 46.16 | 54.00 | -7.84 | AVG | |
| 3 * | 2402.0000 | 60.70 | 33.10 | 93.80 | 54.00 | 39.80 | AVG | No Limit |
| 4 | 2402.2500 | 69.78 | 33.10 | 102.88 | 74.00 | 28.88 | Peak | No Limit |

| Test Mode : | TX 2402MHz _CH00_1Mbps |
|---|---|

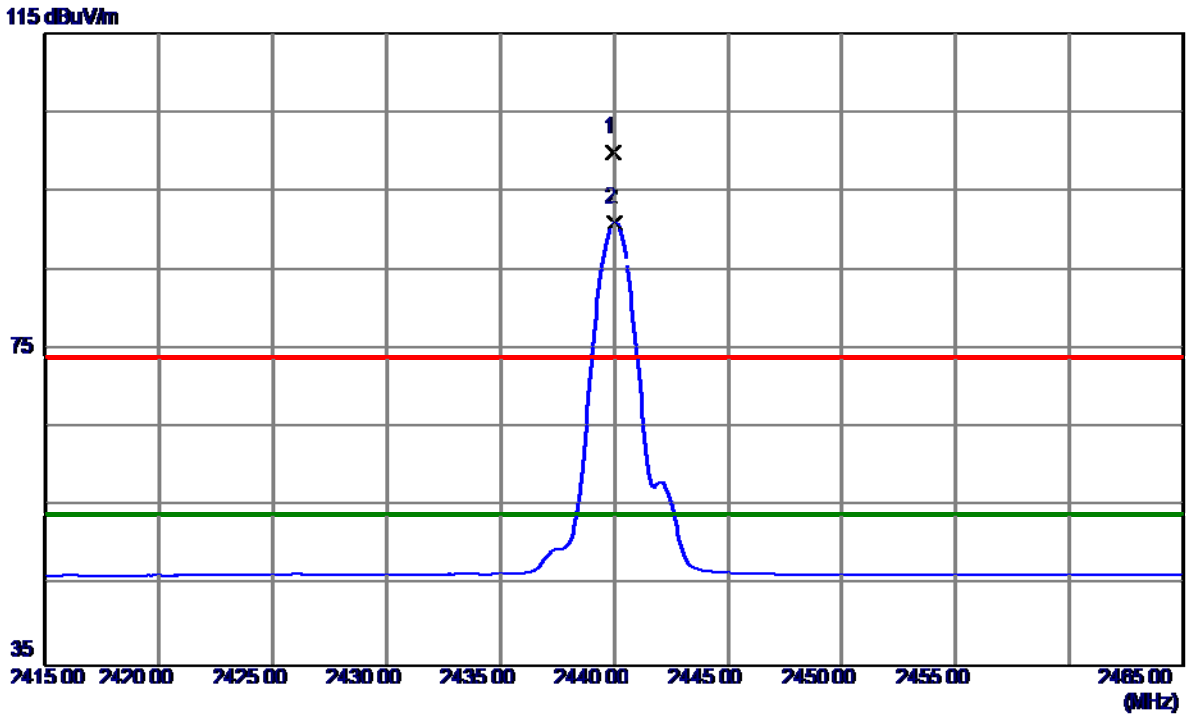
**Horizontal**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 4805.9800 | 31.95 | 6.59 | 38.54 | 54.00 | -15.46 | AVG | |
| 2 | 4806.1400 | 38.14 | 6.59 | 44.73 | 74.00 | -29.27 | Peak | |

| Test Mode : | TX 2440MHz _CH19_1Mbps |
|---|---|

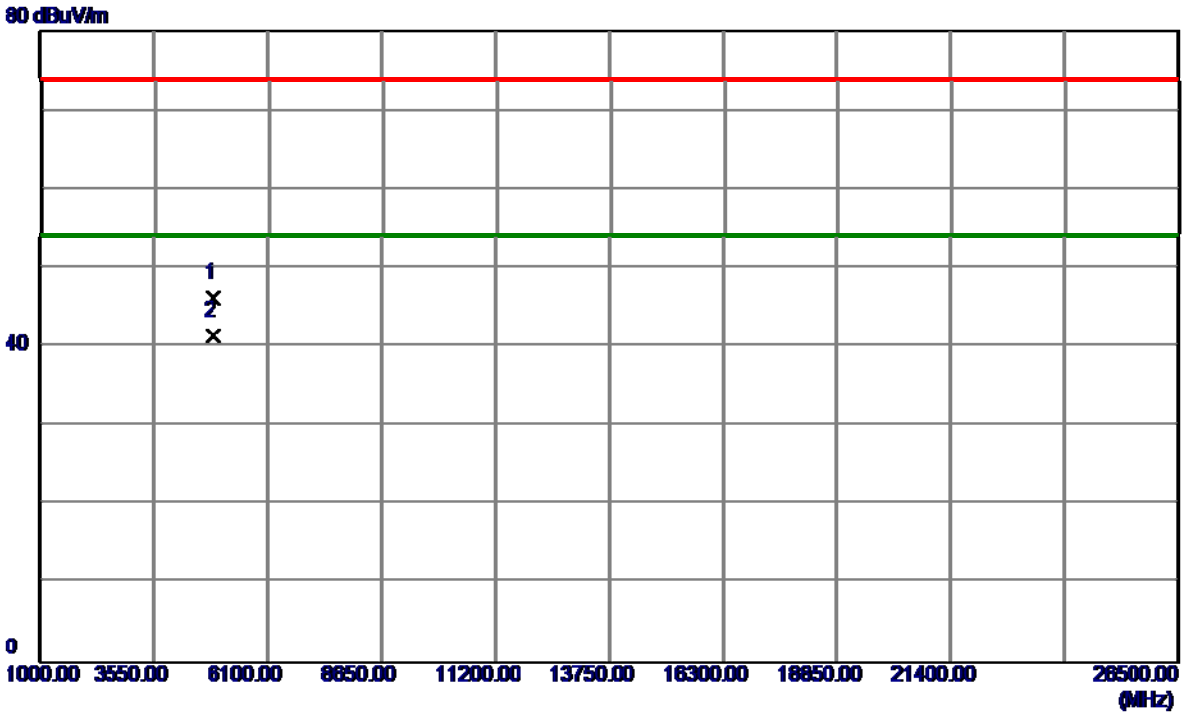
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | 2439.9500 | 66.68 | 33.24 | 99.92 | 74.00 | 25.92 | Peak | No Limit |
| 2 * | 2440.0000 | 57.75 | 33.24 | 90.99 | 54.00 | 36.99 | AVG | No Limit |

| Test Mode : | TX 2440MHz _CH19_1Mbps |
|---|---|

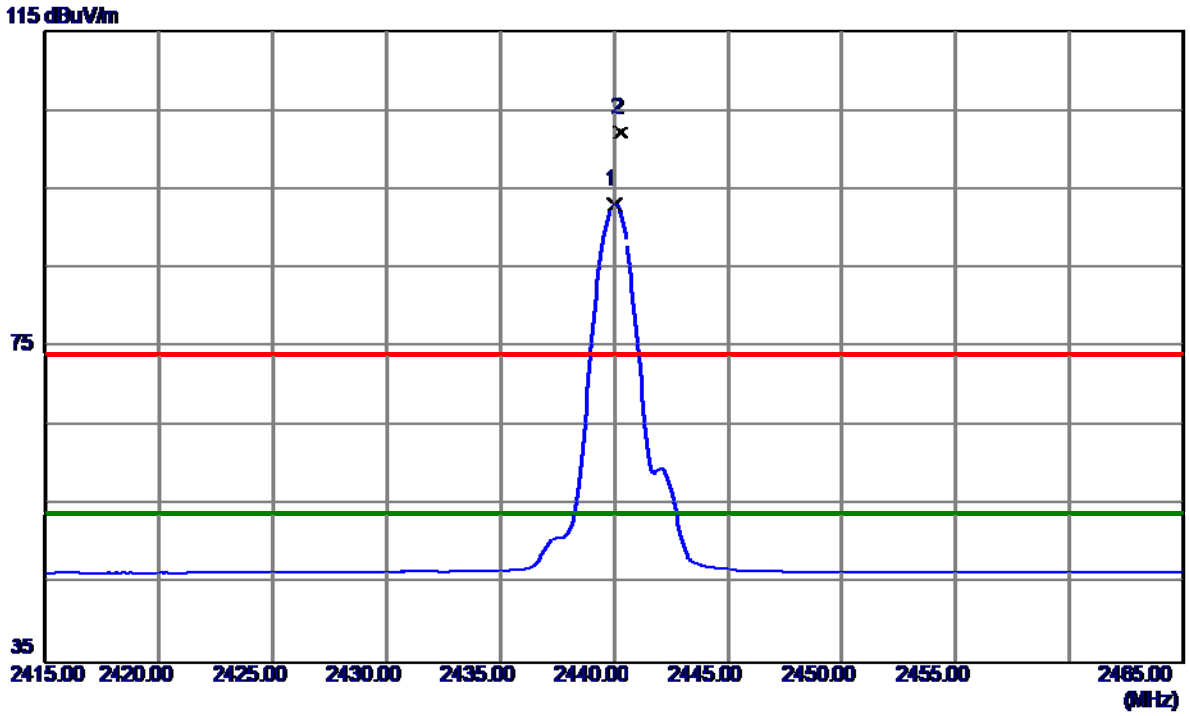
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | 4881.9400 | 39.38 | 6.87 | 46.25 | 74.00 | -27.75 | Peak | |
| 2 * | 4881.9600 | 34.61 | 6.87 | 41.48 | 54.00 | -12.52 | AVG | |

| Test Mode : | TX 2440MHz _CH19_1Mbps |
|---|---|

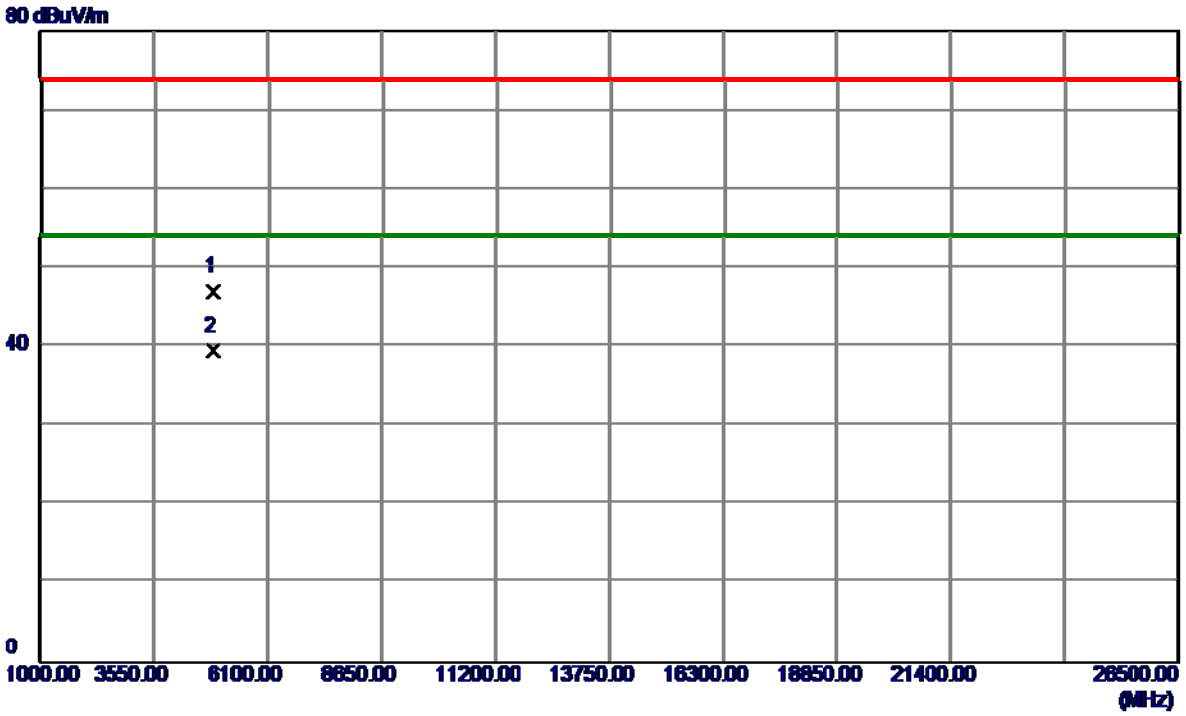
**Horizontal**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 2440.0000 | 59.88 | 33.24 | 93.12 | 54.00 | 39.12 | AVG | No Limit |
| 2 | 2440.3000 | 68.98 | 33.25 | 102.23 | 74.00 | 28.23 | Peak | No Limit |

| Test Mode : | TX 2440MHz _CH19_1Mbps |
|---|---|

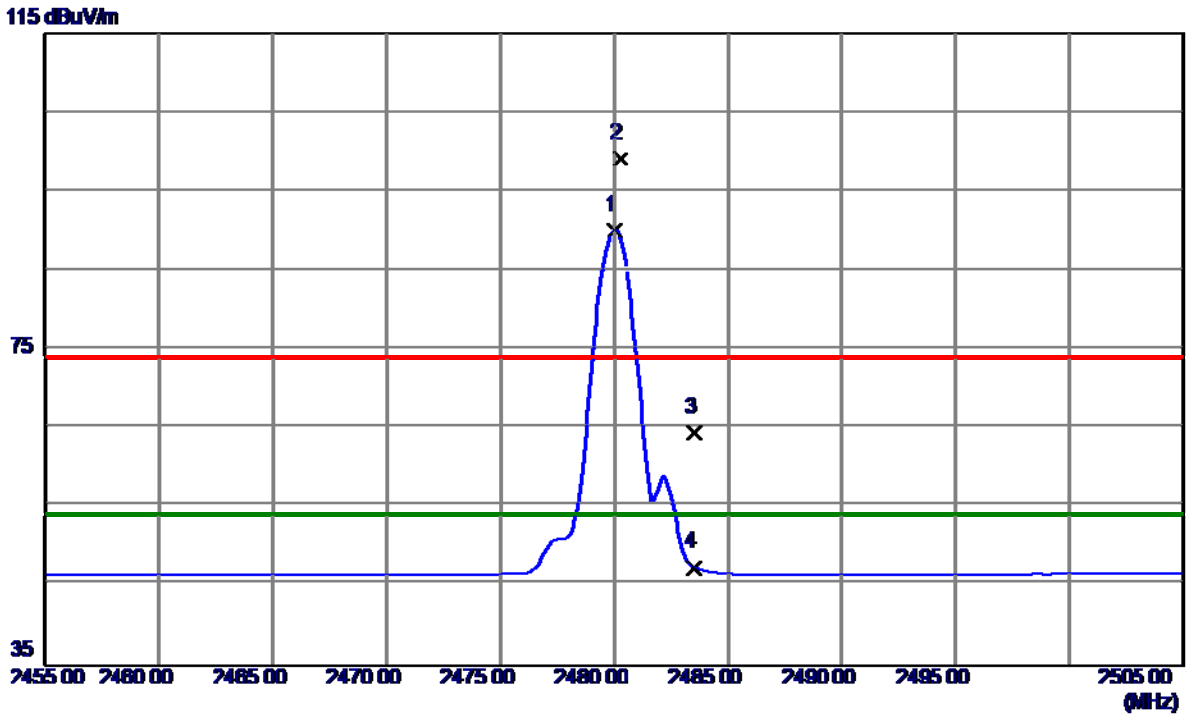
**Horizontal**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | 4879.5600 | 40.23 | 6.86 | 47.09 | 74.00 | -26.91 | Peak | |
| 2 * | 4879.8400 | 32.64 | 6.86 | 39.50 | 54.00 | -14.50 | AVG | |

| Test Mode : | TX 2480MHz _CH39_1Mbps |
|---|---|

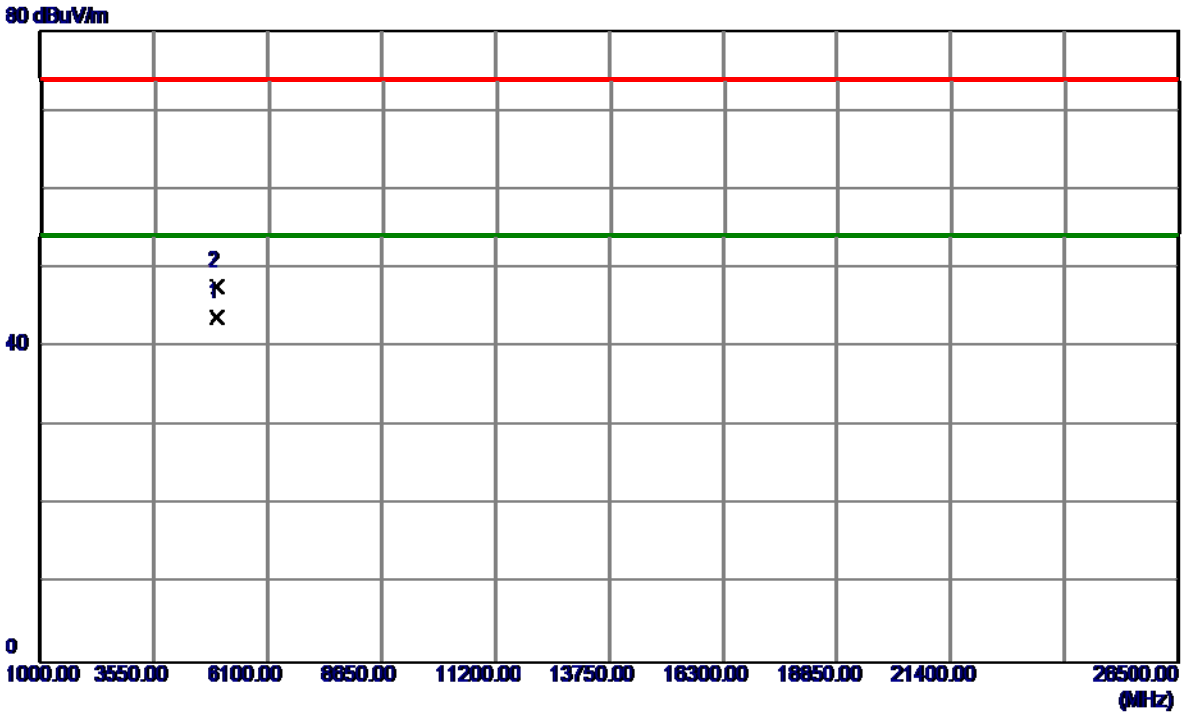
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 2480.0000 | 56.68 | 33.39 | 90.07 | 54.00 | 36.07 | AVG | No Limit |
| 2 | 2480.2500 | 65.78 | 33.40 | 99.18 | 74.00 | 25.18 | Peak | No Limit |
| 3 | 2483.5000 | 30.99 | 33.41 | 64.40 | 74.00 | -9.60 | Peak | |
| 4 | 2483.5000 | 13.99 | 33.41 | 47.40 | 54.00 | -6.60 | AVG | |

| Test Mode : | TX 2480MHz _CH39_1Mbps |
|---|---|

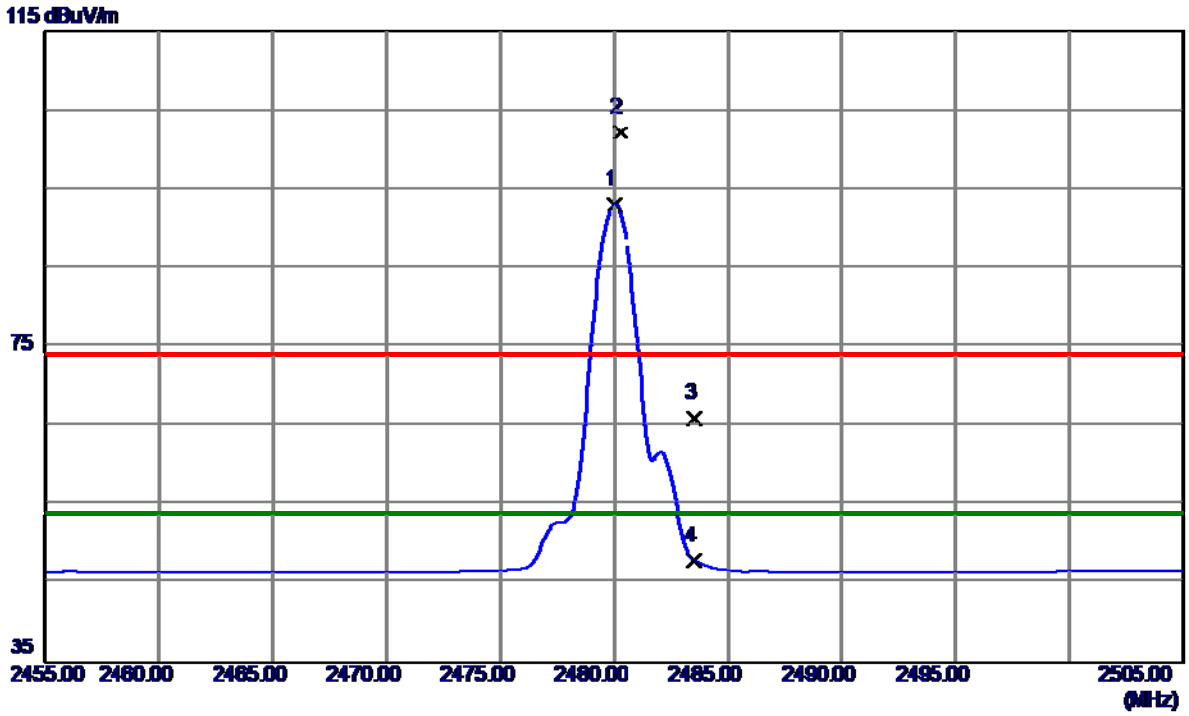
**Vertical**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 4962.0000 | 36.63 | 7.15 | 43.78 | 54.00 | -10.22 | AVG | |
| 2 | 4962.0400 | 40.48 | 7.15 | 47.63 | 74.00 | -26.37 | Peak | |

| Test Mode : | TX 2480MHz _CH39_1Mbps |
|---|---|

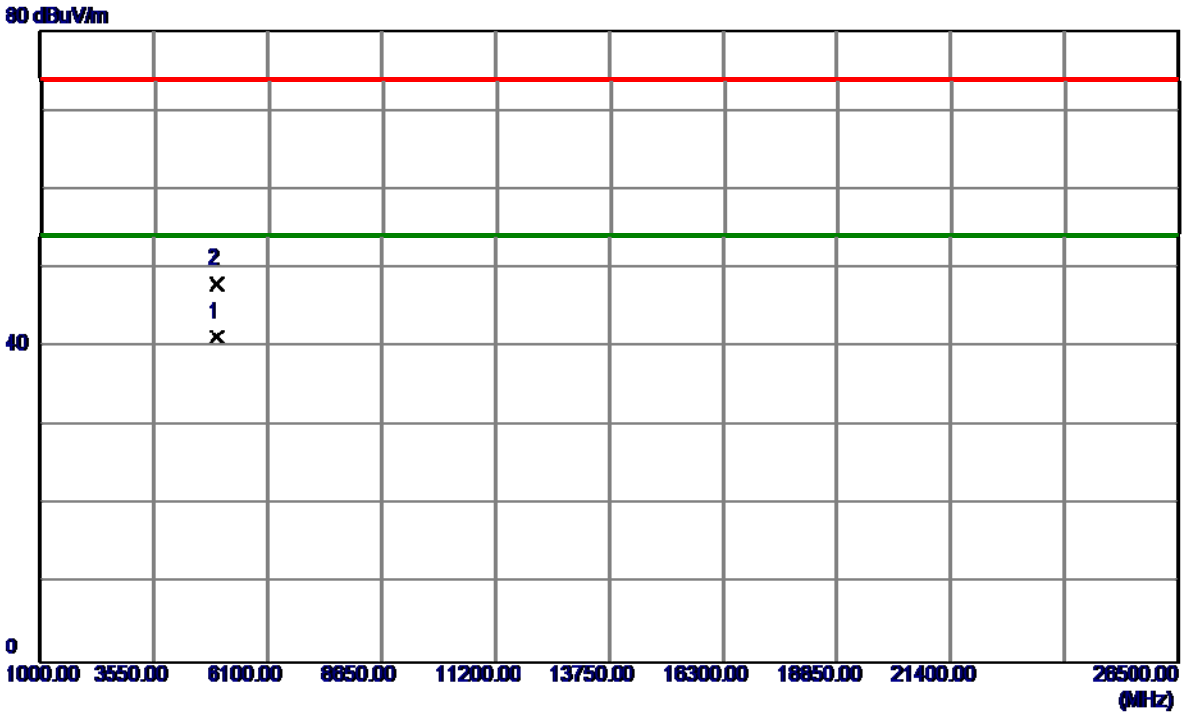
**Horizontal**




| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 2480.0000 | 59.77 | 33.39 | 93.16 | 54.00 | 39.16 | AVG | No Limit |
| 2 | 2480.2500 | 68.80 | 33.40 | 102.20 | 74.00 | 28.20 | Peak | No Limit |
| 3 | 2483.5000 | 32.61 | 33.41 | 66.02 | 74.00 | -7.98 | Peak | |
| 4 | 2483.5000 | 14.55 | 33.41 | 47.96 | 54.00 | -6.04 | AVG | |

| Test Mode : | TX 2480MHz _CH39_1Mbps |
|---|---|

**Horizontal**



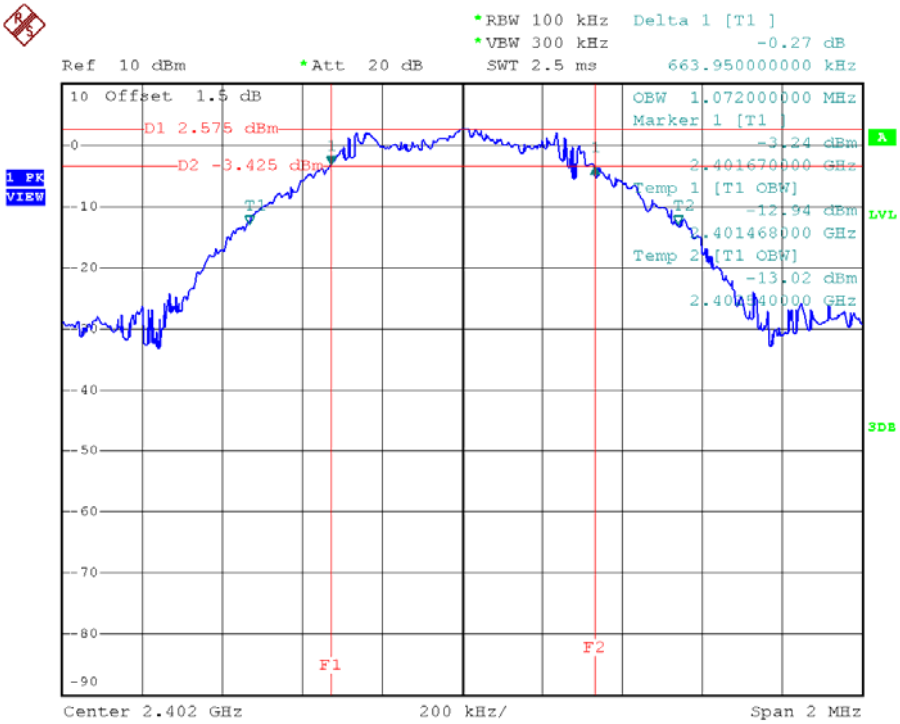

| No. | Freq. | Reading Level | Correct Factor | Measure ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 * | 4960.0200 | 34.13 | 7.15 | 41.28 | 54.00 | -12.72 | AVG | |
| 2 | 4960.3200 | 40.91 | 7.15 | 48.06 | 74.00 | -25.94 | Peak | |

# APPENDIX E - BANDWIDTH

| Test Mode: | TX Mode |
|---|---|

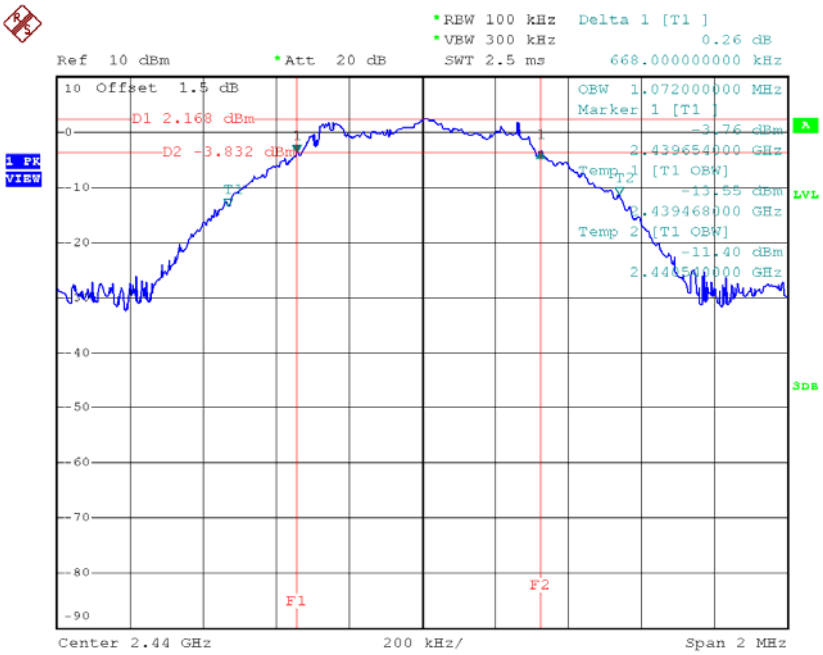
| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Min. Limit (kHz) | Test Result |
|---|---|---|---|---|
| 2402 | 0.664 | 1.072 | 500 | Pass |
| 2440 | 0.668 | 1.072 | 500 | Pass |
| 2480 | 0.659 | 1.076 | 500 | Pass |

**TX CH00**



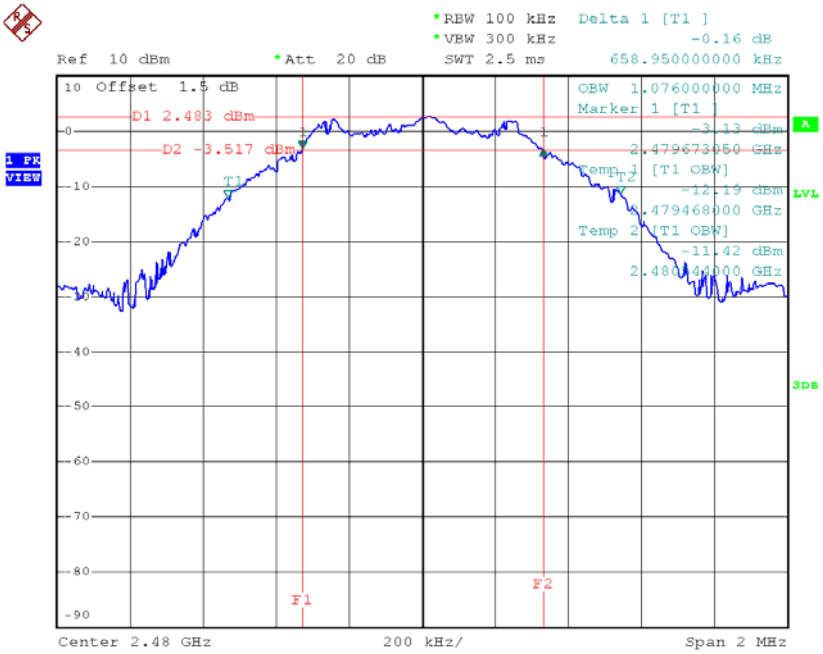

Date: 14.MAR.2018 15:22:13

## TX CH19




Date: 14.MAR.2018 15:30:19

## TX CH39




Date: 14.MAR.2018 15:32:15

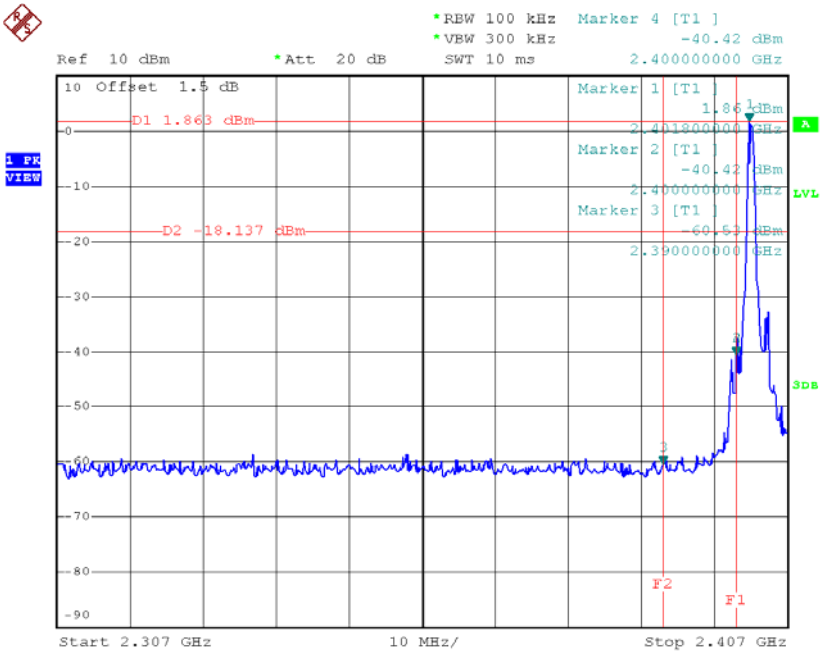
# APPENDIX F - MAXIMUM OUTPUT POWER TEST

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Max. Limit (dBm) | Max. Limit (W) | Test Result |
|---|---|---|---|---|---|
| 2402 | 2.74 | 0.0019 | 30.00 | 1.00 | Pass |
| 2440 | 2.38 | 0.0017 | 30.00 | 1.00 | Pass |
| 2480 | 2.75 | 0.0019 | 30.00 | 1.00 | Pass |

# APPENDIX G - ANTENNA CONDUCTED SPURIOUS EMISSION

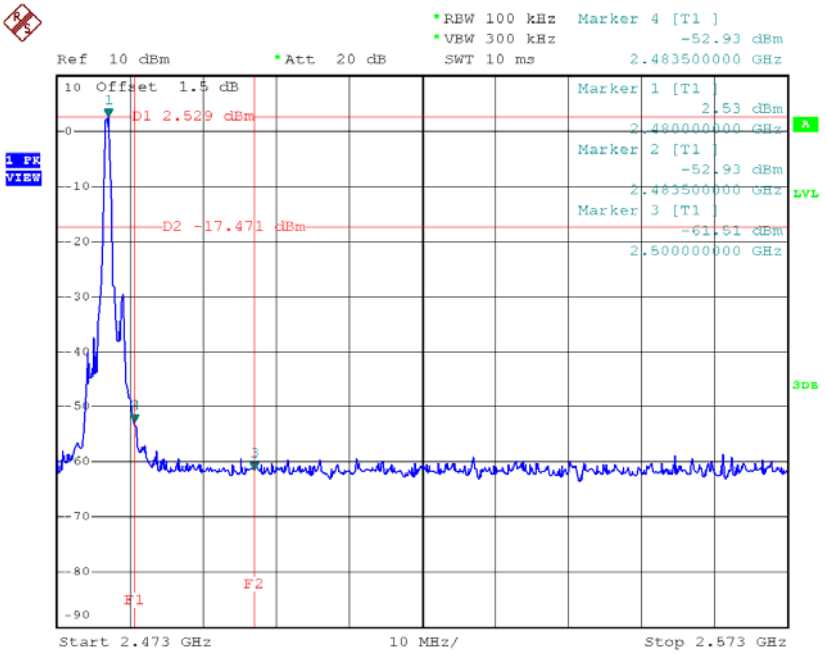
| Test Mode : | CH00, CH19 , CH39 - 1Mbps |
|---|---|

**CH00 (Lower) - 1Mbps**



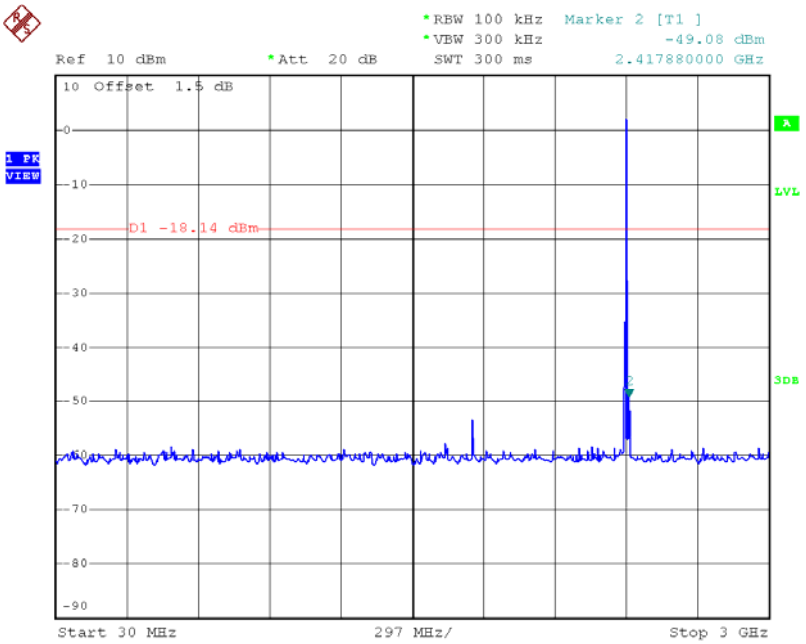

Date: 14.MAR.2018 15:22:22

**CH39 (upper) - 1Mbps**



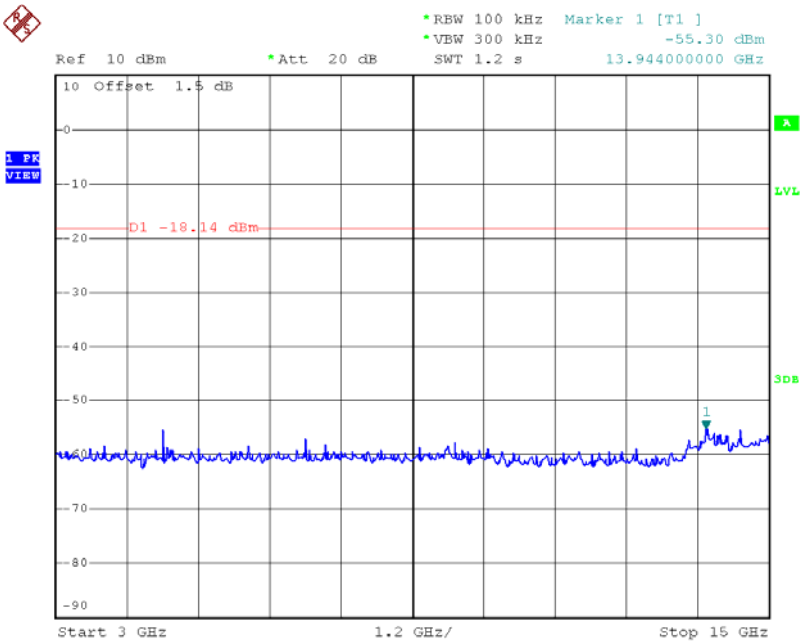

Date: 14.MAR.2018 15:32:24

## CH00 (10 Harmonic of the frequency) 1



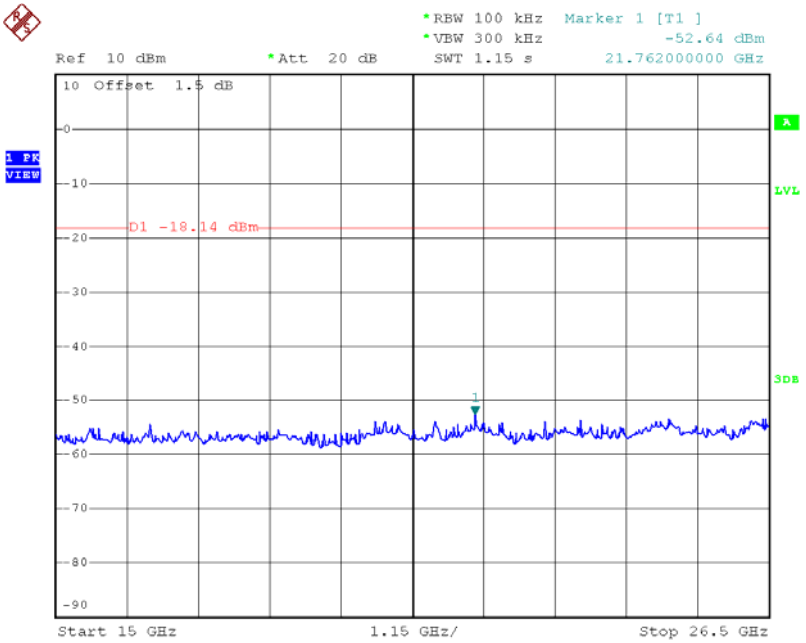

Date: 14.MAR.2018 15:22:36

## CH00 (10 Harmonic of the frequency) 2



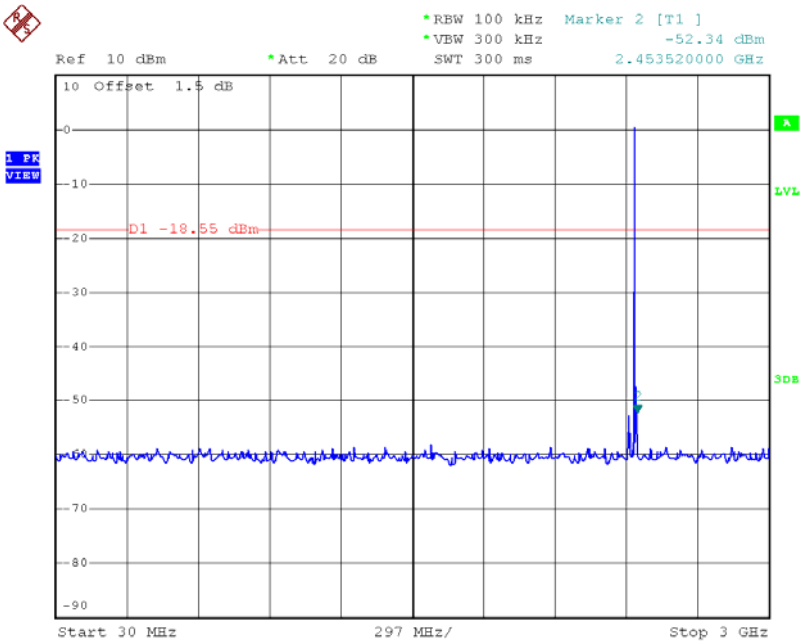

Date: 14.MAR.2018 15:22:46

## CH00 (10 Harmonic of the frequency) 3



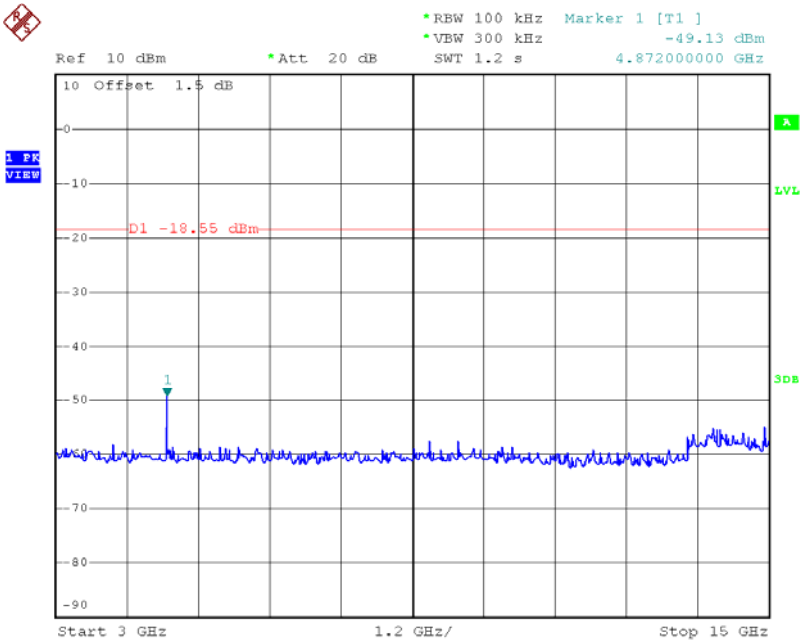

Date: 14.MAR.2018 15:22:55

## CH19 (10 Harmonic of the frequency) 1



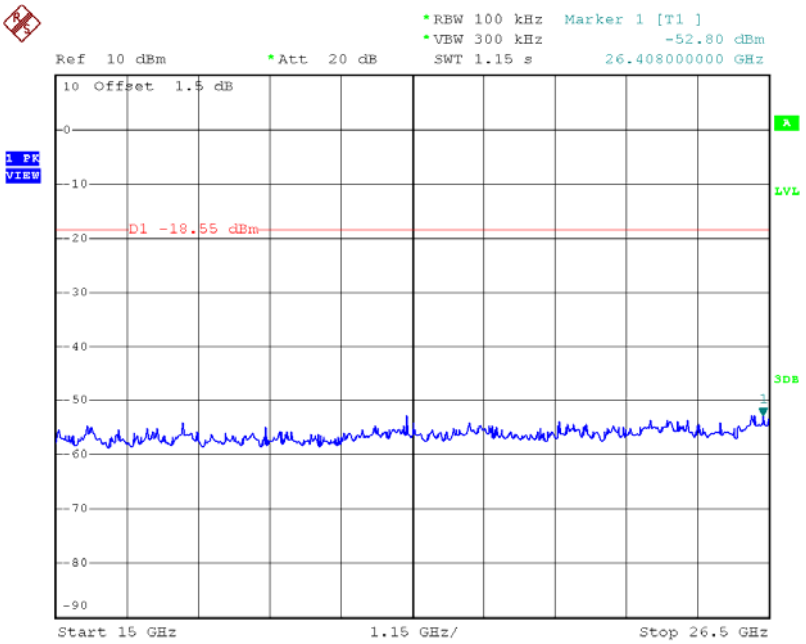

Date: 14.MAR.2018 15:30:43

## CH19 (10 Harmonic of the frequency) 2



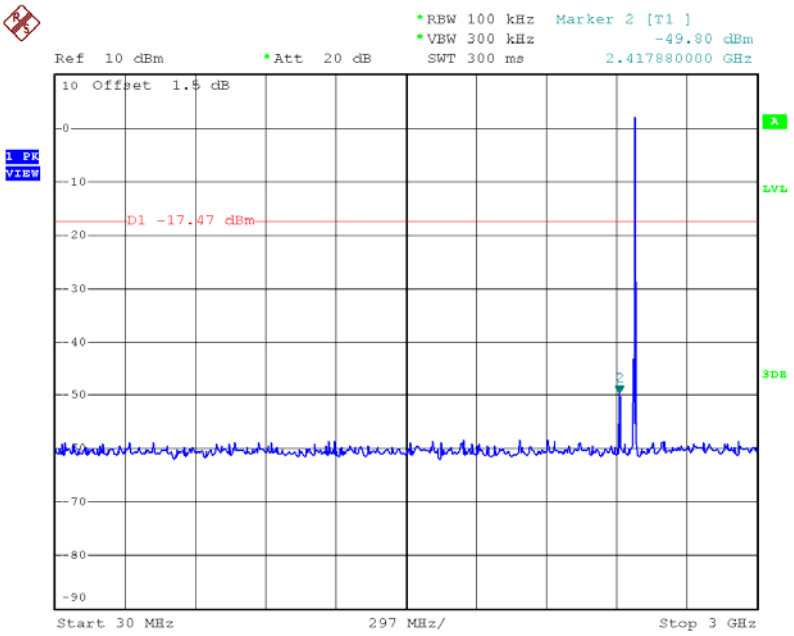

Date: 14.MAR.2018 15:30:52

## CH19 (10 Harmonic of the frequency) 3



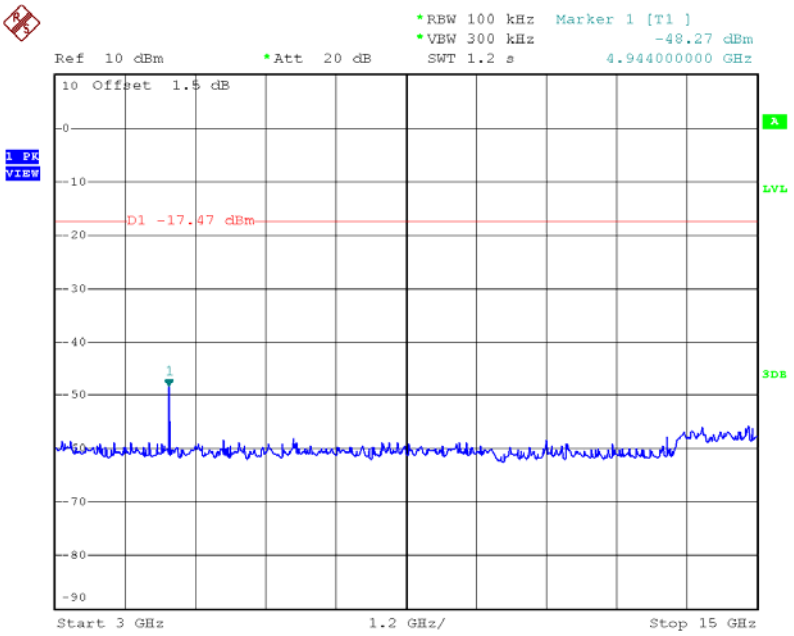

Date: 14.MAR.2018 15:31:01

## CH39 (10 Harmonic of the frequency) 1



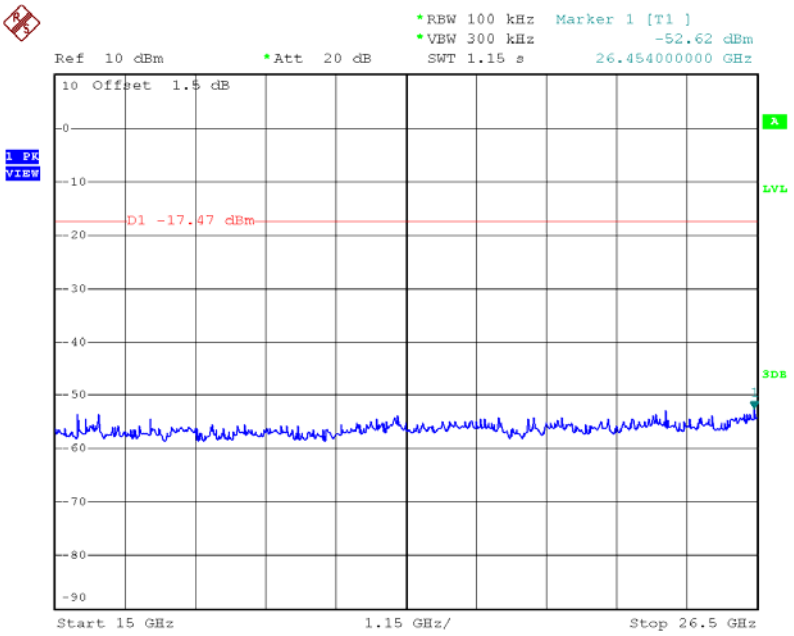

Date: 14.MAR.2018 15:32:39

## CH39 (10 Harmonic of the frequency) 2




Date: 14.MAR.2018 15:32:49

## CH39 (10 Harmonic of the frequency) 3



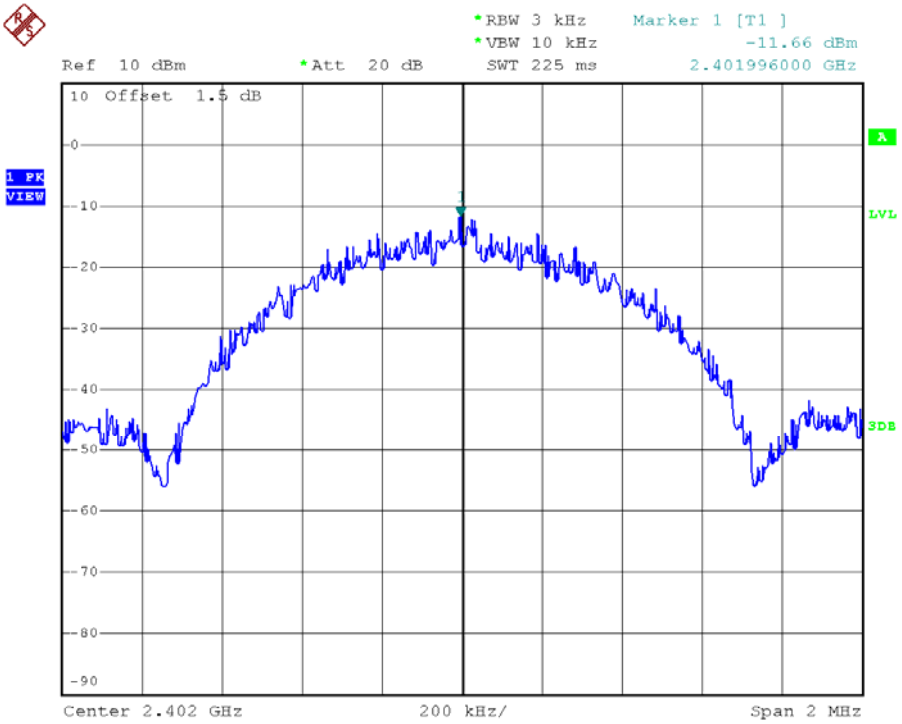

Date: 14.MAR.2018 15:32:58

# APPENDIX H - POWER SPECTRAL DENSITY TEST

| Test Mode: | CH00, CH19 , CH39 - 1Mbps |
|---|---|

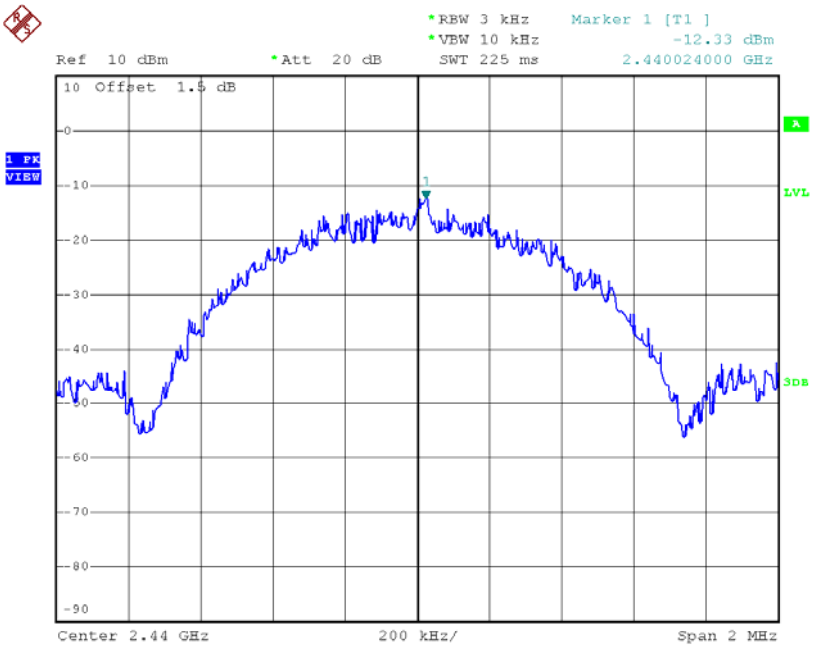
| Frequency (MHz) | Power Density (dBm/3kHz) | Power Density (mW/3kHz) | Max. Limit (dBm/3kHz) | Test Result |
|---|---|---|---|---|
| 2402 | -11.66 | 0.068 | 8.00 | Pass |
| 2440 | -12.33 | 0.058 | 8.00 | Pass |
| 2480 | -12.18 | 0.061 | 8.00 | Pass |

**TX CH00**



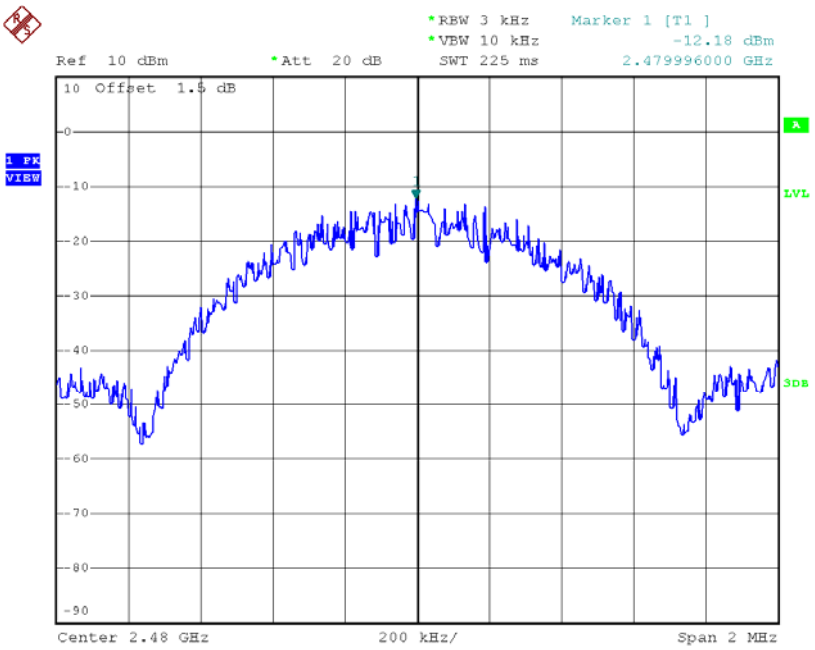

Date: 14.MAR.2018 15:23:02

## TX CH19




Date: 14.MAR.2018 15:31:08

## TX CH39




Date: 14.MAR.2018 15:33:05