


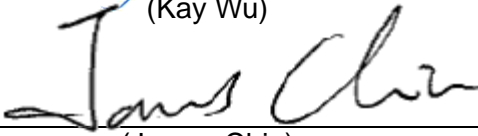
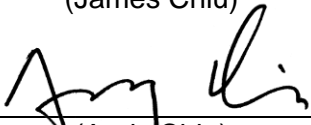
# FCC Radio Test Report

## FCC ID: RYK-WSDB104GNIBT

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

**Project No.** : 1709003  
**Equipment** : 802.11b/g/n WiFi+BT IOT Module  
**Test Model** : WSDB-104GNI(BT)  
**Series Model** : N/A  
**Applicant** : SparkLAN Communications, Inc.  
**Address** : 8F.,No.257,Sec.2,Tiding-Blvd.,Neihu District,Taipei  
City 11493,Taiwan (R.O.C.)

**Date of Receipt** : Sep. 07, 2017  
**Date of Test** : Sep. 07, 2017 ~ Nov. 17, 2017  
**Issued Date** : Nov. 21, 2017  
**Tested by** : BTL Inc.

**Testing Engineer** :   
(Kay Wu)  
**Technical Manager** :   
(James Chiu)  
**Authorized Signatory** :   
(Andy Chiu)

# **B T L I N C .**

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-3-1709003	Original Issue.	Nov. 21, 2017

## 1. CERTIFICATION

Equipment : 802.11b/g/n WiFi+BT IOT Module  
Brand Name : SparkLAN  
Test Model : WSDB-104GNI(BT)  
Series Model : N/A  
Applicant : SparkLAN Communications, Inc.  
Manufacturer : SparkLAN Communications, Inc.  
Address : 8F.,No.257,Sec.2,Tiding-Blvd.,Neihu District,Taipei City 11493,Taiwan  
(R.O.C.)  
Date of Test : Sep. 07, 2017 ~ Nov. 17, 2017  
Test Sample : Engineering Sample  
Standard(s) : FCC Part15, Subpart C (15.247)  
ANSI C63.10-2013

The above equipment has been tested and found in 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-3-1709003) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

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

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.247)			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emissions	PASS	-----
15.247(d) 15.209	Radiated Emissions	PASS	-----
15.203	Antenna Requirement	PASS	-----

Note:

- (1) "N/A" denotes test is not applicable in this test report
- (2) Accord to the EUT((Report Number: STR17068025I-3 and model: WSDB-104GNI(BT)) has been certificated, Conducted and Radiated emission were criticized and reconfirmed in this report.
- (3) Compared with the previous report (STR17068025I-3), Added two new different type (Dipole&PCB) antennas.

## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

### Conducted emission Test:

**C05:** (VCCI RN: C-4742; FCC RN:965108; FCC DN:TW1082)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

### Radiated emission Test (Below 1 GHz):

**CB15:** (FCC RN:674415; FCC DN:TW0659)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

### Radiated emission Test (Above 1 GHz):

**CB15:** (FCC RN:674415; FCC DN:TW0659)

No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

## 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2  $U_{cispr}$  requirement.

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

### A. Conducted emission test:

Test Site	Method	Measurement Frequency Range	U,(dB)
C05	CISPR	150 kHz ~ 30MHz	2.68

### B. Radiated emission test:

Test Site	Method	Measurement Frequency Range	U,(dB)
CB15 (3m)	CISPR	9kHz ~ 150kHz	2.82
		150kHz ~ 30MHz	2.58

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB15 (3m)	CISPR	30MHz ~ 200MHz	V	4.20
		30MHz ~ 200MHz	H	3.64
		200MHz ~ 1,000MHz	V	4.56
		200MHz ~ 1,000MHz	H	3.90

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
CB15 (3m)	CISPR	1GHz ~ 6GHz	V	4.46
		1GHz ~ 6GHz	H	4.40
		6GHz ~ 18GHz	V	3.88
		6GHz ~ 18GHz	H	4.00

Test Site	Method	Measurement Frequency Range	U,(dB)
CB15 (1m)	CISPR	18 ~ 26.5 GHz	4.62
		26.5 ~ 40 GHz	5.12

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	802.11b/g/n WiFi+BT IOT Module	
Brand Name	SparkLAN	
Test Model	WSDB-104GNI(BT)	
Series Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps)
	Bit Rate of Transmitter	
EUT Power Rating	3.3Vdc form host equipment	
Products Covered	N/A	

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:

Group 1:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
0	Long Cheng	FDE_ACBSMA_BGP	Dipole	RP-SMA	3.67

Group 2:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
0	N/A	N/A	PCB	N/A	-5.01

### 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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 Conducted Emissions	
Final Test Mode	Description
Mode 1	TX Mode

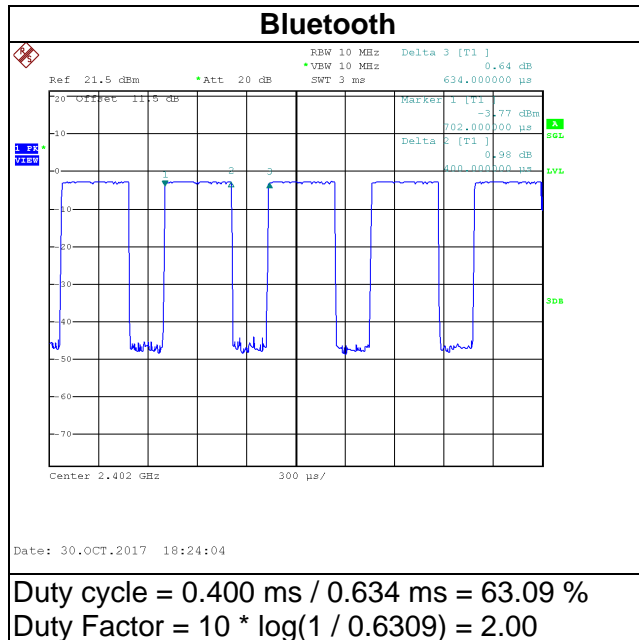
For Radiated Emissions	
Final Test Mode	Description
Mode 1	TX Mode

**Note:**

- (1) The measurements are performed at the high, middle, low available channels.
- (2) Only applies to the Radiated testing above 1 GHz and that only the worst case channel was used in the Radiated 30 MHz - 1 GHz testing and power line conducted emissions.
- (3) For Dipole Antenna, the EUT has pre-tested on positioned of 0° & 90°. The worst case was found positioned on 90°. Therefore only the test data of this 90° was used for radiated emission measurement test.  
For PCB Antenna, the EUT has pre-tested on positioned of each 3 axis. The worst case was found positioned on Z-plane. Therefore only the test data of this Z-plane was used for radiated emission measurement test.

### 3.3 DUTY CYCLE

If duty cycle is  $\geq 98\%$ , duty factor is not required.  
 If duty cycle is  $< 98\%$ , duty factor shall be considered.

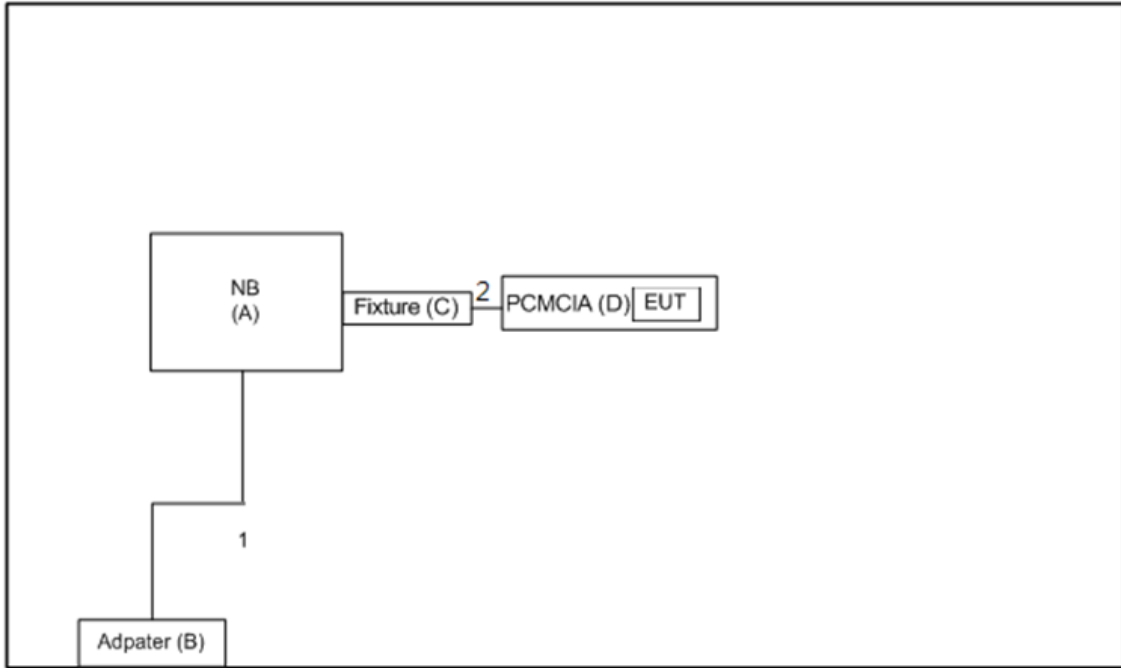


**Note:**

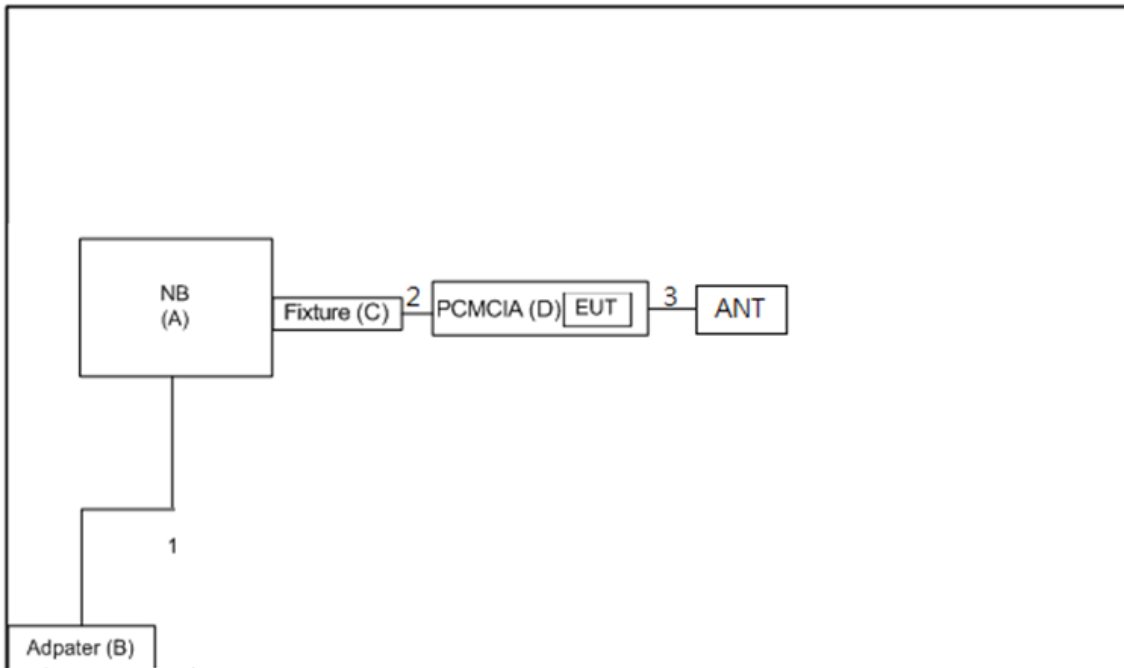
For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 kHz (Duty cycle  $< 98\%$ ).

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

**Antenna Type: PCB**



**Antenna Type: Dipole**



### 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.
A	NB	Lenovo	N/A	N/A	N/A
B	Adapter	Lenovo	ADLX65CLGU2A	N/A	N/A
C	Fixture(Test tool)	N/A	N/A	N/A	N/A
D	PCMCIA(Test tool)	Sparklan	N/A	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	2.0m	Power Cable
2	NO	NO	0.1m	Cable
3	NO	NO	0.1m	Cable

## 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 (dB $\mu$ V)	
	Quasi-peak	Average
0.15 -0.50	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

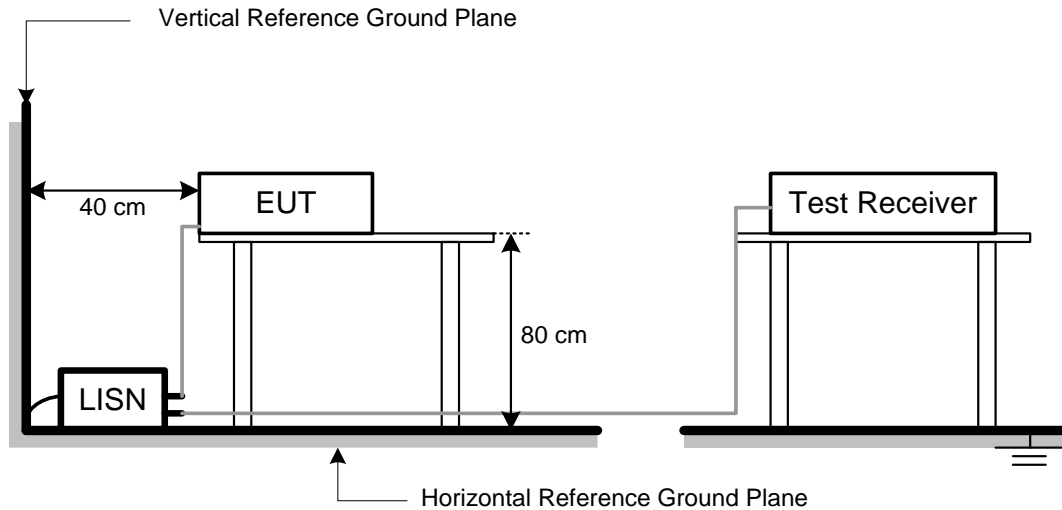
#### 4.1.2 TEST PROCEDURE

- 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



#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 25°C  
 Relative Humidity: 55%  
 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 m)	
	PEAK	AVERAGE
Above 1000	74	54

#### Notes:

- (1) The limit for radiated test was performed according to FCC Part 15, Subpart C.
- (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 (Emission in restricted band)	RBW 1MHz VBW 3MHz peak detector for Pk value 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

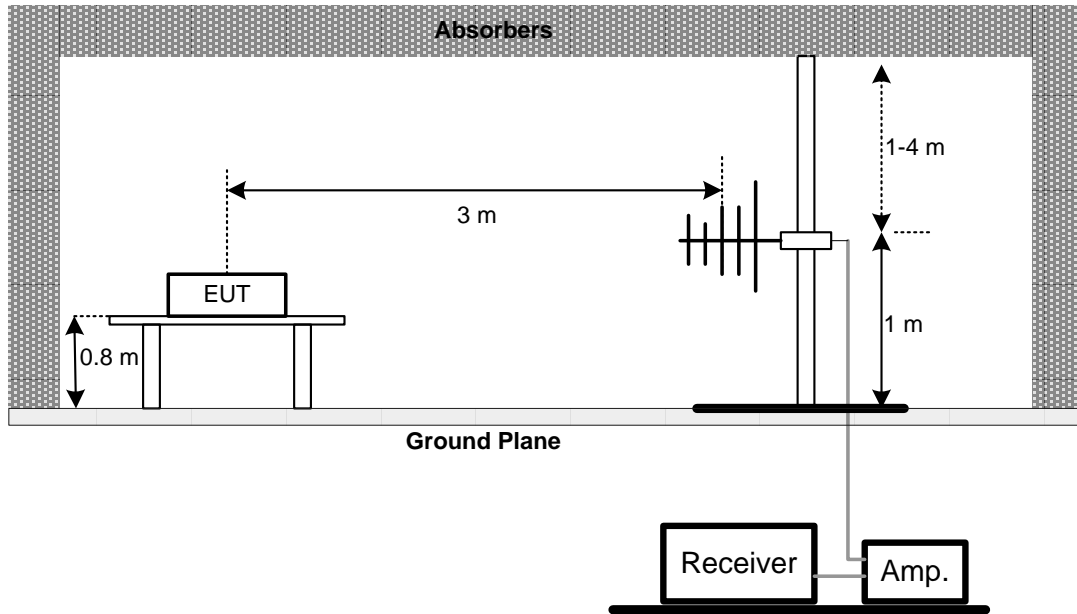
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of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

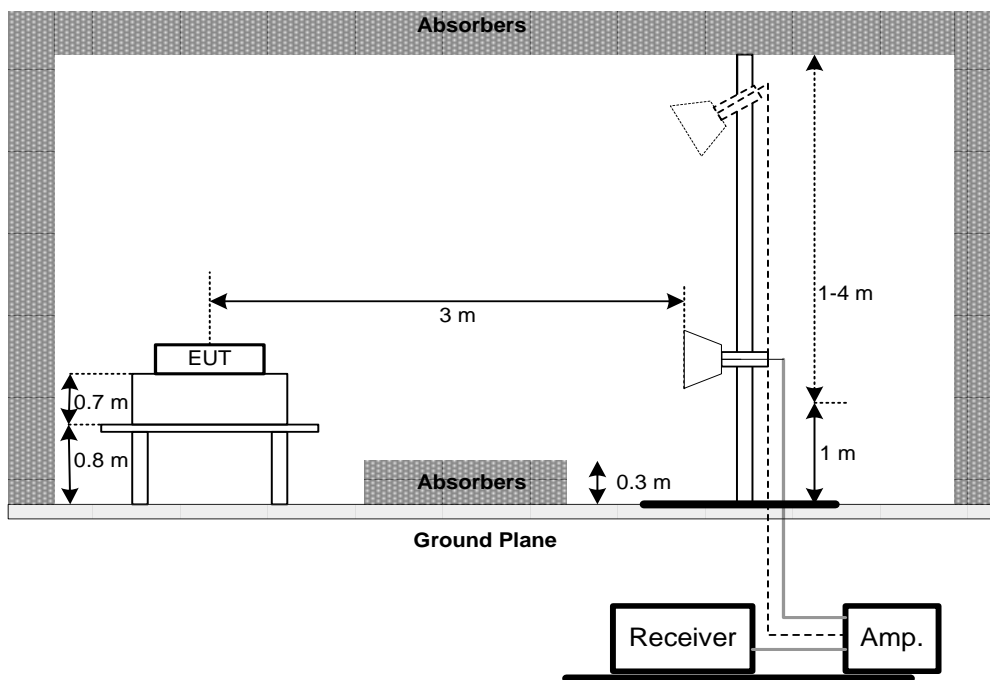
No deviation

**4.2.4 TEST SETUP**

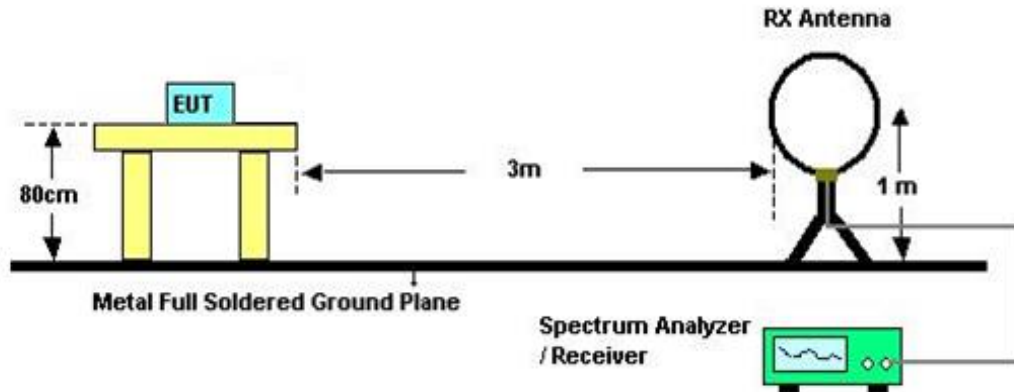
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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: 25°C Relative Humidity: 45% Test Voltage: AC 120V/60Hz

#### 4.2.7 TEST 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 =  $40 \log(\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

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

Please refer to the Appendix C.

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

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. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	101050	Jan. 25, 2018
2	Test Cable	TIMES	CFD300-NL	C02	Jun. 14, 2018
3	EMI Test Receiver	R&S	ESR7	101433	Dec. 09, 2017
4	Measurement Software	EZ	EZ EMC (Version NB-03A)	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Preamplifier	EMCI	012645B	980267	Feb. 28, 2018
2	Preamplifier	EMCI	EMC02325	980217	Dec. 29, 2017
3	Preamplifier	EMCI	EMC2654045	980030	Feb. 14, 2018
4	Test Cable	EMCI	EMC104-SM-S M-8000	8m	Jan. 04, 2018
5	Test Cable	EMCI	EMC104-SM-S M-800	150207	Jan. 04, 2018
6	Test Cable	EMCI	EEMC104-SM-S M-3000	151205	Jan. 04, 2018
7	MXE EMI Receiver	Agilent	N9038A	MY55420127	Jan. 09, 2018
8	Signal Analyzer	Agilent	N9010A	MY52220990	Feb. 22, 2018
9	Loop Ant	EMCO	6502	42960	Nov. 24, 2017
10	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	Feb. 28, 2018
11	Horn Ant	Schwarzbeck	BBHA 9170	187	Dec. 07, 2017
12	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-548	Jan. 16, 2018
13	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0623	Jan. 16, 2018

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

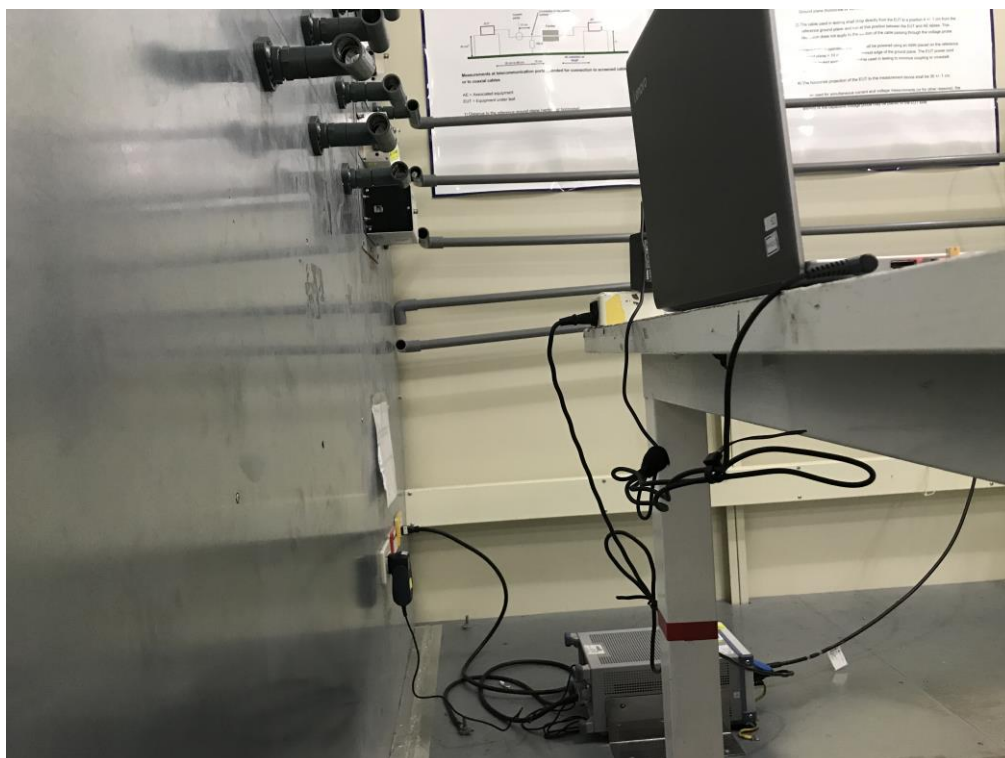
All calibration period of equipment list is one year.

## 6. EUT TEST PHOTO

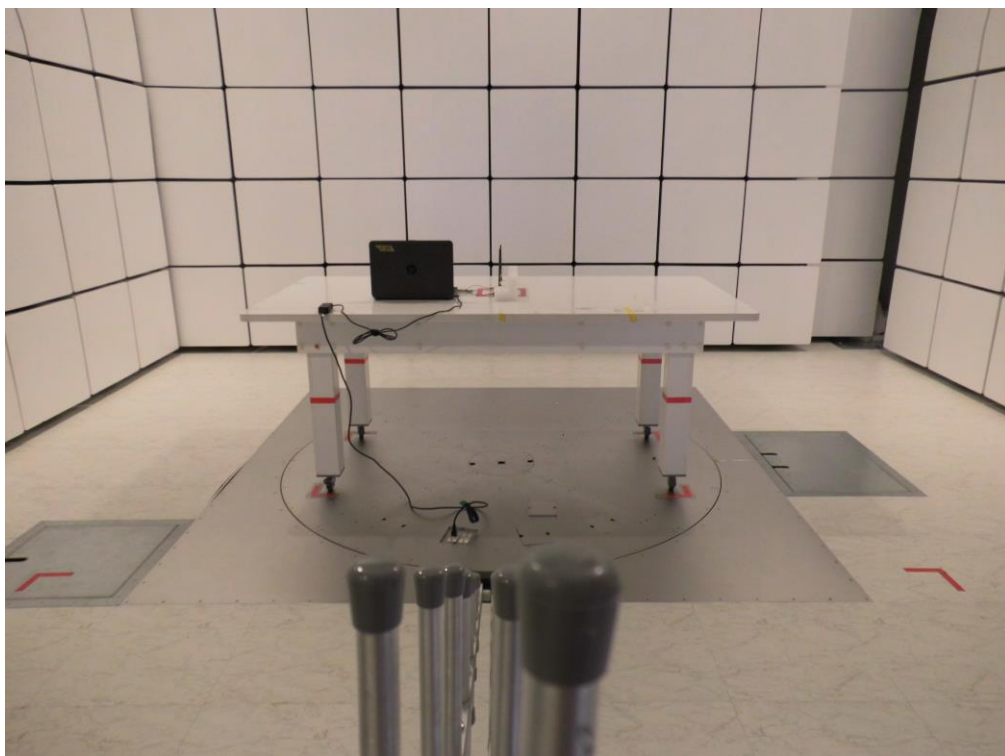
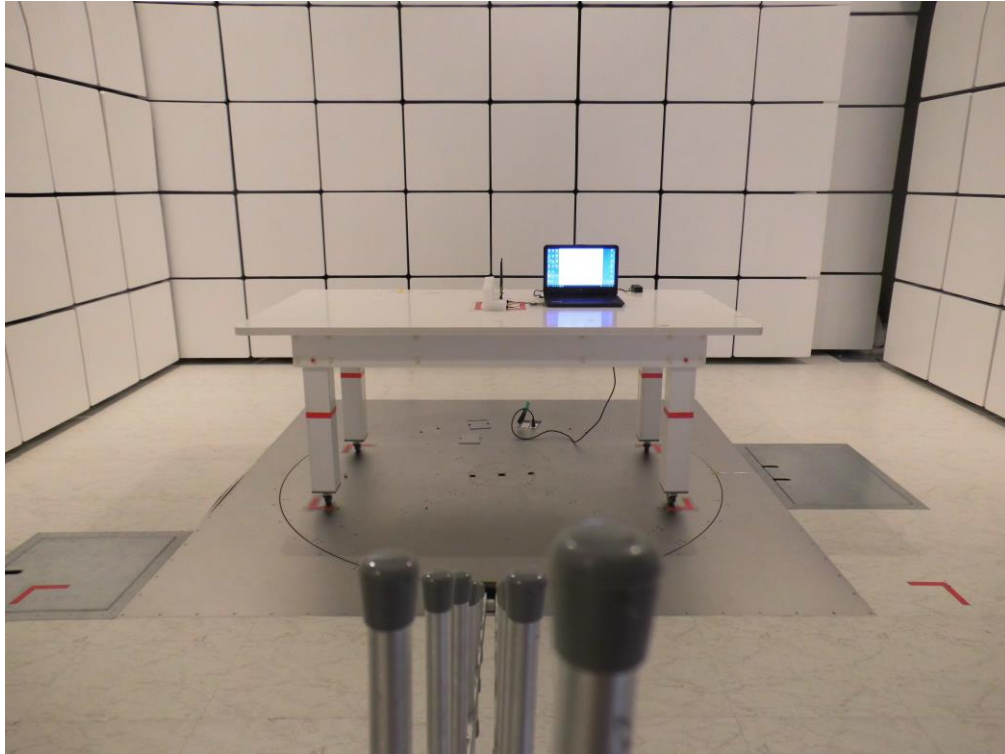
### Conducted Measurement Photos Antenna Type: Dipole



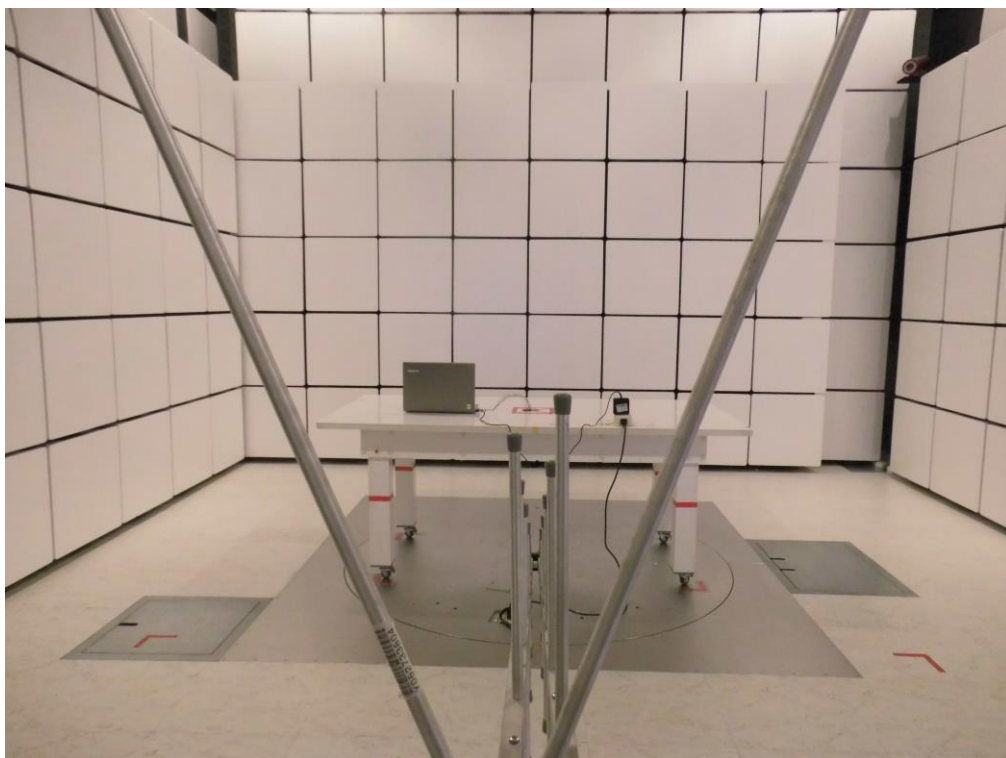
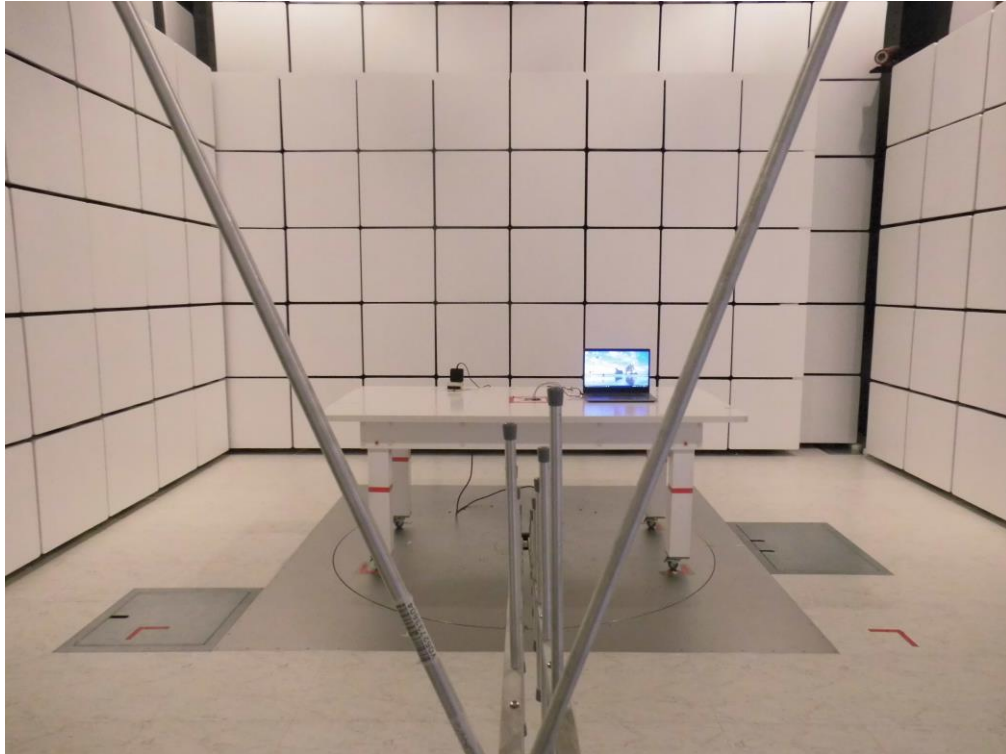
**Conducted Measurement Photos**  
**Antenna Type: PCB**



**Radiated Measurement Photos**  
**30MHz to 1000MHz\_Antenna Type: Dipole**



**Radiated Measurement Photos**  
**30MHz to 1000MHz\_Antenna Type: PCB**

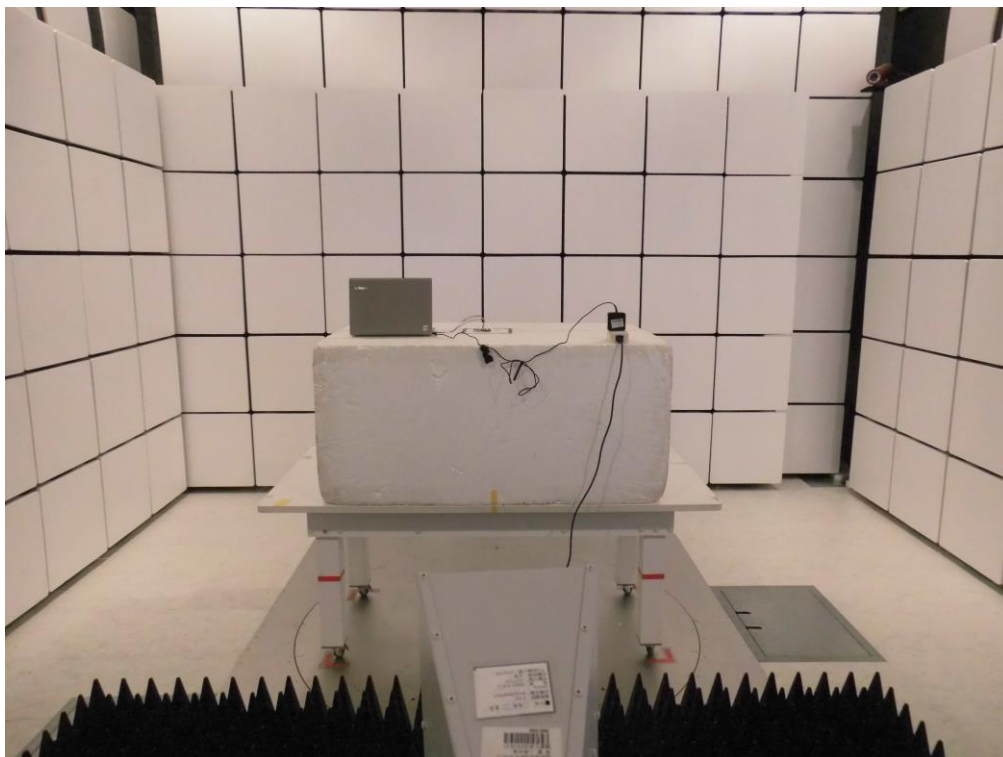




**Radiated Measurement Photos  
Above 1000MHz\_Antenna Type: Dipole**



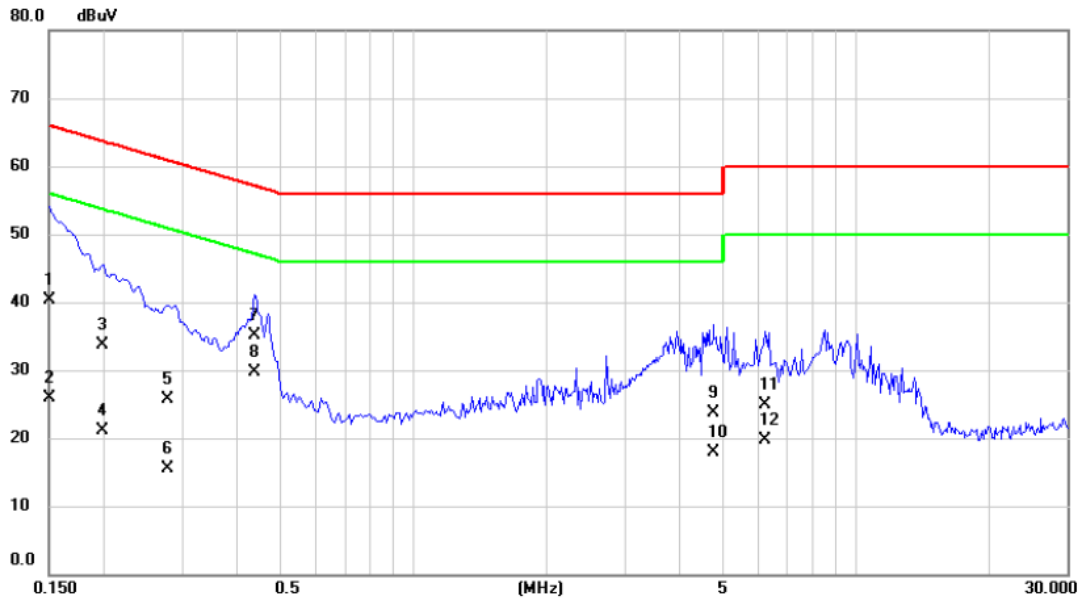
**Radiated Measurement Photos**  
**Above 1000MHz\_Antenna Type: PCB**



## APPENDIX A – CONDUCTED EMISSION

Test Mode: TX Mode\_ Antenna Type: Dipole

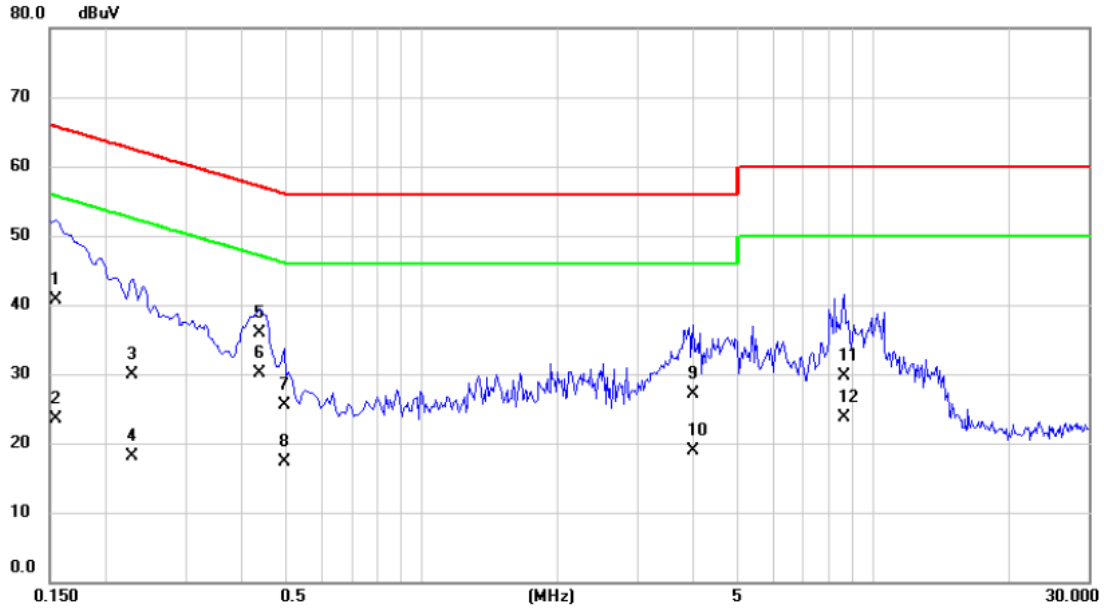
**Line**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	30.50	9.73	40.23	66.00	-25.77	QP	
2		0.1500	16.20	9.73	25.93	56.00	-30.07	AVG	
3		0.1983	23.90	9.71	33.61	63.68	-30.07	QP	
4		0.1983	11.30	9.71	21.01	53.68	-32.67	AVG	
5		0.2781	15.90	9.73	25.63	60.87	-35.24	QP	
6		0.2781	5.80	9.73	15.53	50.87	-35.34	AVG	
7		0.4384	25.40	9.74	35.14	57.09	-21.95	QP	
8	*	0.4384	20.00	9.74	29.74	47.09	-17.35	AVG	
9		4.7660	13.90	9.83	23.73	56.00	-32.27	QP	
10		4.7660	8.00	9.83	17.83	46.00	-28.17	AVG	
11		6.2500	15.10	9.86	24.96	60.00	-35.04	QP	
12		6.2500	9.90	9.86	19.76	50.00	-30.24	AVG	

Test Mode: TX Mode\_ Antenna Type: Dipole

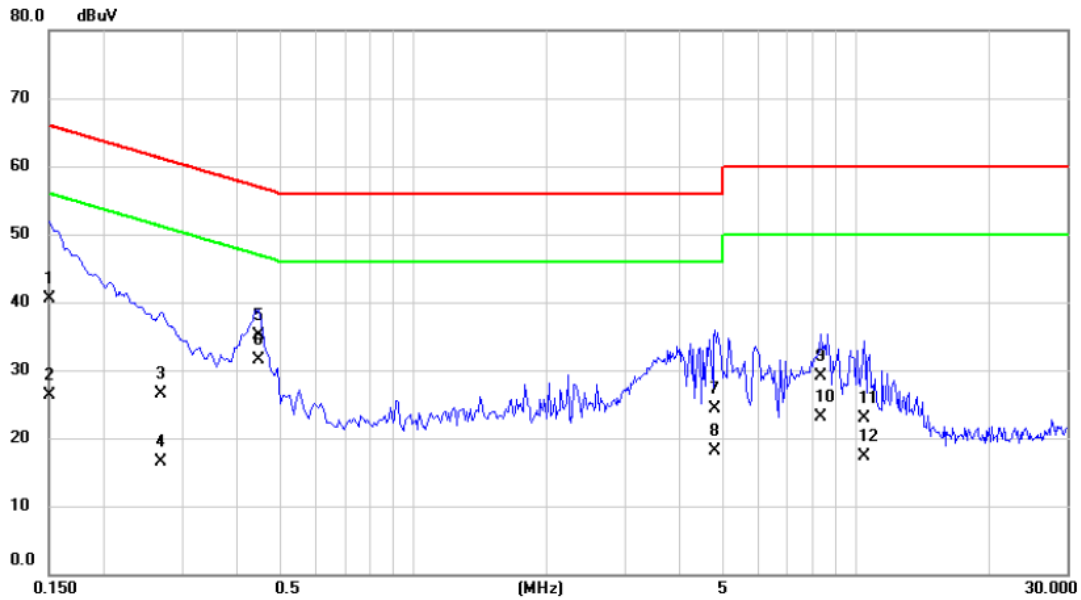
### Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1550	31.10	9.65	40.75	65.73	-24.98	QP	
2		0.1550	13.90	9.65	23.55	55.73	-32.18	AVG	
3		0.2291	20.20	9.66	29.86	62.48	-32.62	QP	
4		0.2291	8.50	9.66	18.16	52.48	-34.32	AVG	
5		0.4384	26.20	9.68	35.88	57.09	-21.21	QP	
6	*	0.4384	20.50	9.68	30.18	47.09	-16.91	AVG	
7		0.4965	15.80	9.68	25.48	56.06	-30.58	QP	
8		0.4965	7.70	9.68	17.38	46.06	-28.68	AVG	
9		3.9920	17.30	9.76	27.06	56.00	-28.94	QP	
10		3.9920	9.20	9.76	18.96	46.00	-27.04	AVG	
11		8.6000	19.80	9.92	29.72	60.00	-30.28	QP	
12		8.6000	13.70	9.92	23.62	50.00	-26.38	AVG	

Test Mode: TX Mode\_ Antenna Type: PCB

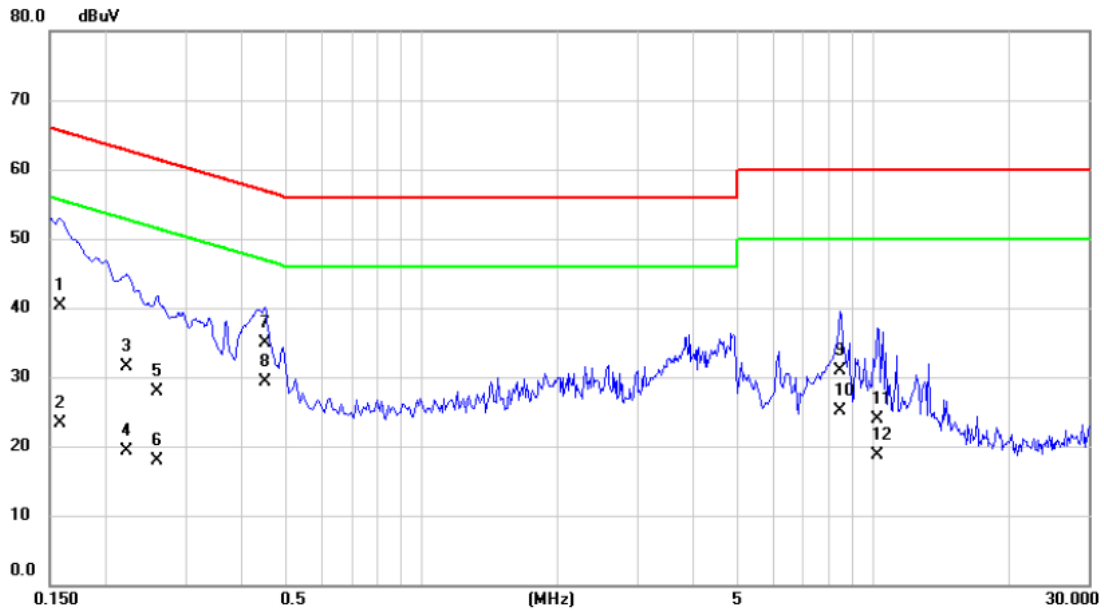
### Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	30.70	9.73	40.43	66.00	-25.57	QP	
2		0.1500	16.50	9.73	26.23	56.00	-29.77	AVG	
3		0.2690	16.80	9.73	26.53	61.15	-34.62	QP	
4		0.2690	6.80	9.73	16.53	51.15	-34.62	AVG	
5		0.4461	25.30	9.74	35.04	56.95	-21.91	QP	
6	*	0.4461	21.70	9.74	31.44	46.95	-15.51	AVG	
7		4.8110	14.50	9.83	24.33	56.00	-31.67	QP	
8		4.8110	8.20	9.83	18.03	46.00	-27.97	AVG	
9		8.3500	19.20	9.93	29.13	60.00	-30.87	QP	
10		8.3500	13.20	9.93	23.13	50.00	-26.87	AVG	
11		10.4500	13.00	9.98	22.98	60.00	-37.02	QP	
12		10.4500	7.40	9.98	17.38	50.00	-32.62	AVG	

Test Mode: TX Mode\_ Antenna Type: PCB

### Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1577	30.60	9.65	40.25	65.58	-25.33	QP	
2		0.1577	13.60	9.65	23.25	55.58	-32.33	AVG	
3		0.2221	21.80	9.66	31.46	62.74	-31.28	QP	
4		0.2221	9.60	9.66	19.26	52.74	-33.48	AVG	
5		0.2600	18.20	9.67	27.87	61.43	-33.56	QP	
6		0.2600	8.30	9.67	17.97	51.43	-33.46	AVG	
7		0.4496	25.30	9.68	34.98	56.88	-21.90	QP	
8	*	0.4496	19.60	9.68	29.28	46.88	-17.60	AVG	
9		8.4500	21.00	9.90	30.90	60.00	-29.10	QP	
10		8.4500	15.30	9.90	25.20	50.00	-24.80	AVG	
11		10.2500	14.00	9.96	23.96	60.00	-36.04	QP	
12		10.2500	8.80	9.96	18.76	50.00	-31.24	AVG	

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

**Test Mode: N/A**

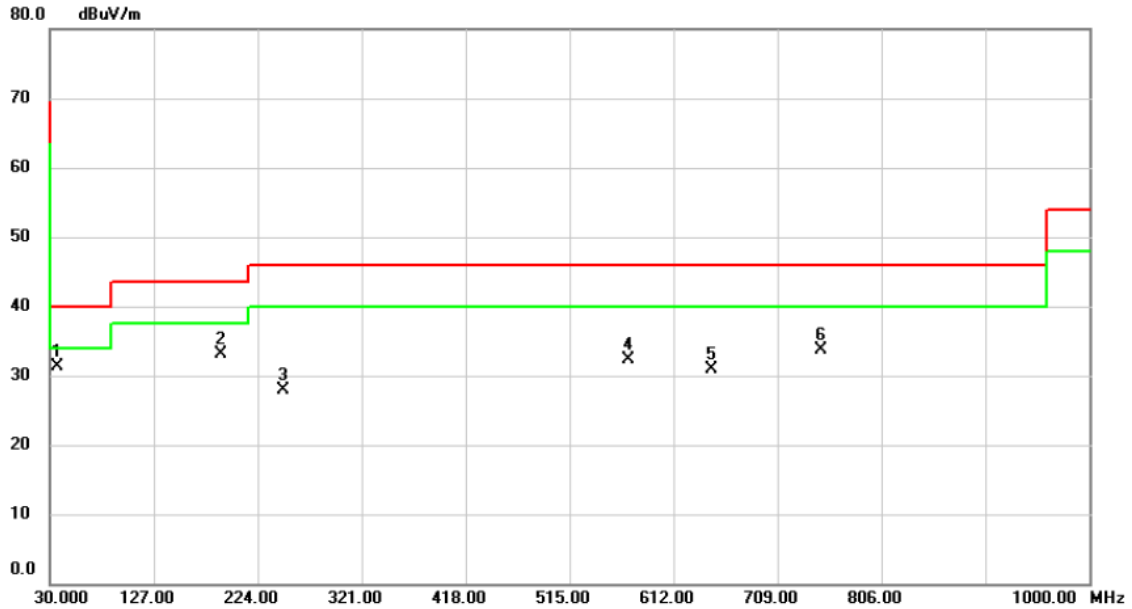
Note: "N/A" denotes test is not applicable to this device.



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

Test Mode: TX 2480MHz \_CH39\_ 1Mbps\_ Antenna Type: Dipole

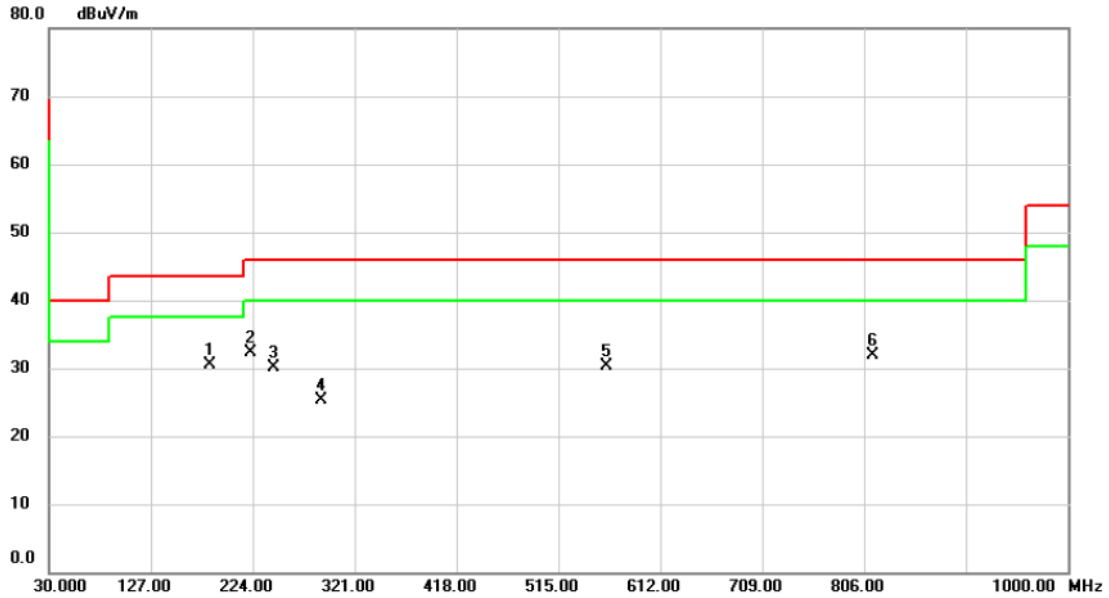
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	36.7900	40.06	-8.69	31.37	40.00	-8.63	peak	
2		190.0500	43.49	-10.33	33.16	43.50	-10.34	peak	
3		247.2800	37.15	-9.17	27.98	46.00	-18.02	peak	
4		569.3200	33.59	-1.22	32.37	46.00	-13.63	peak	
5		647.8900	30.95	-0.04	30.91	46.00	-15.09	peak	
6		749.7400	31.73	1.88	33.61	46.00	-12.39	peak	

Test Mode: TX 2480MHz \_CH39\_ 1Mbps\_ Antenna Type: Dipole

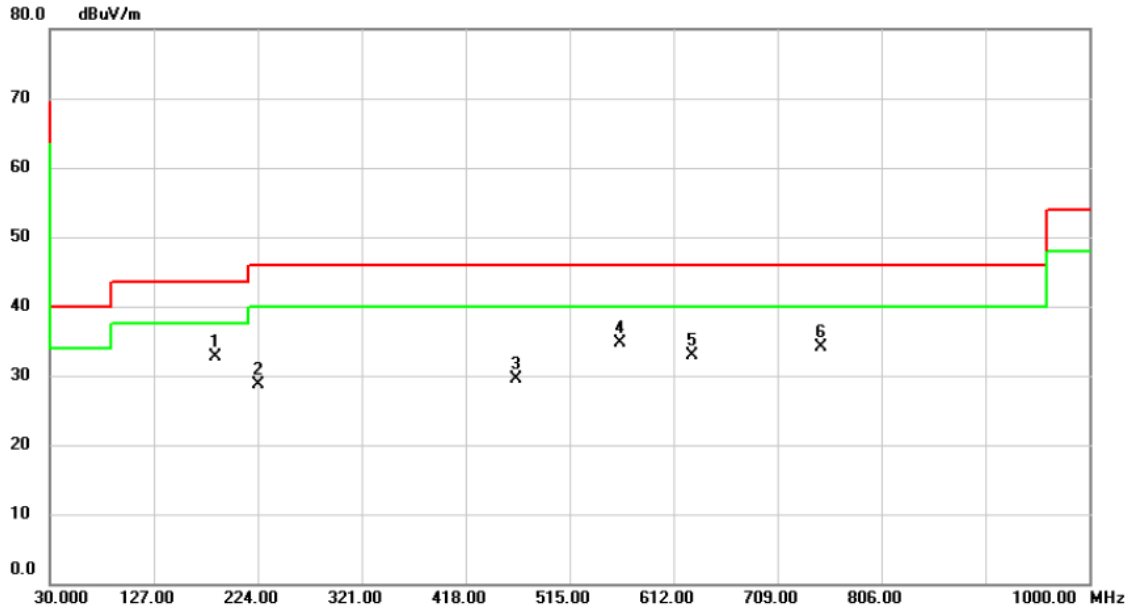
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	183.2600	40.45	-9.85	30.60	43.50	-12.90	peak	
2		222.0600	42.96	-10.68	32.28	46.00	-13.72	peak	
3		244.3700	39.39	-9.26	30.13	46.00	-15.87	peak	
4		289.9600	33.02	-7.71	25.31	46.00	-20.69	peak	
5		560.5900	31.71	-1.45	30.26	46.00	-15.74	peak	
6		813.7600	29.06	2.79	31.85	46.00	-14.15	peak	

Test Mode: TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: PCB

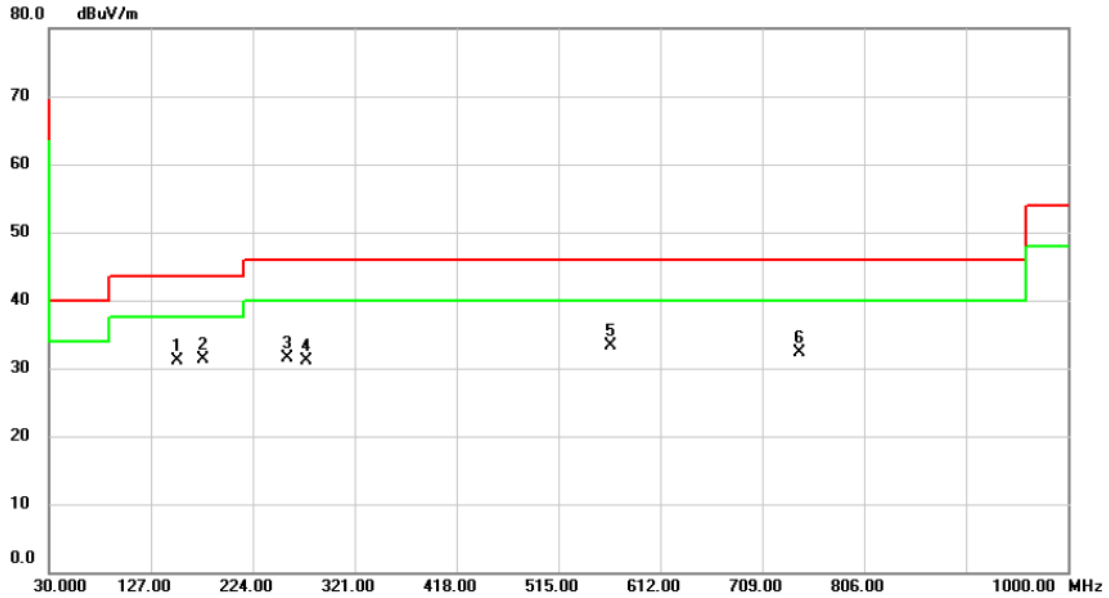
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	184.2300	42.70	-9.92	32.78	43.50	-10.72	peak	
2		224.9700	39.26	-10.47	28.79	46.00	-17.21	peak	
3		464.5600	32.81	-3.32	29.49	46.00	-16.51	peak	
4		562.5300	36.06	-1.39	34.67	46.00	-11.33	peak	
5		629.4600	33.16	-0.19	32.97	46.00	-13.03	peak	
6		749.7400	32.15	1.88	34.03	46.00	-11.97	peak	

Test Mode: TX 2480MHz \_CH39\_ 1Mbps\_ Antenna Type: PCB

**Horizontal**

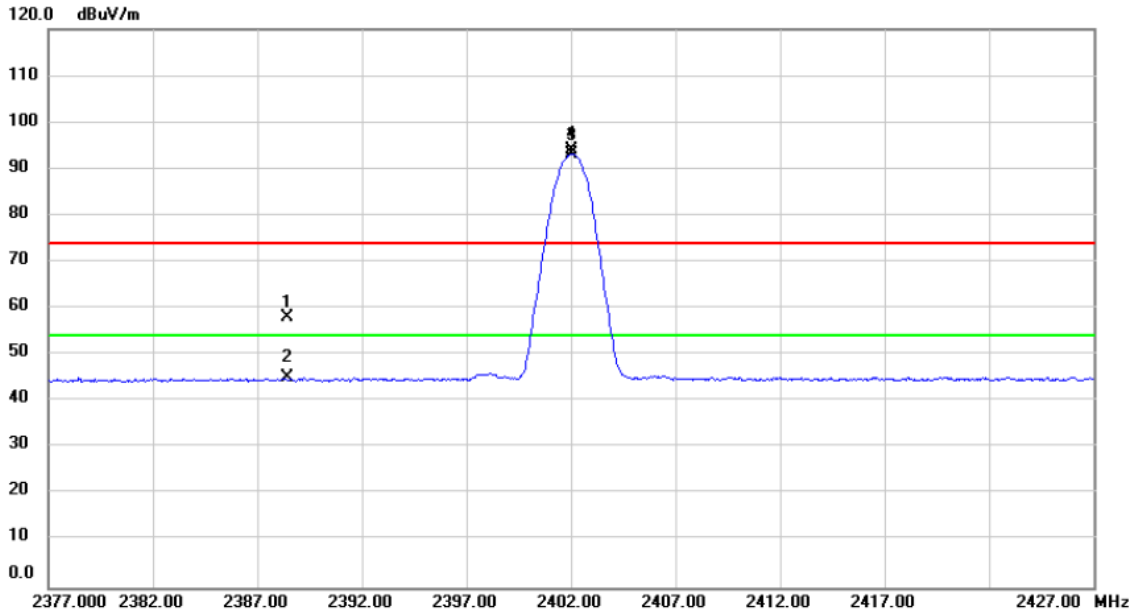


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		152.2200	39.95	-8.87	31.08	43.50	-12.42	peak	
2	*	176.4700	40.52	-9.25	31.27	43.50	-12.23	peak	
3		256.9800	40.43	-8.86	31.57	46.00	-14.43	peak	
4		275.4100	39.33	-8.22	31.11	46.00	-14.89	peak	
5		564.4700	34.65	-1.34	33.31	46.00	-12.69	peak	
6		743.9200	30.57	1.76	32.33	46.00	-13.67	peak	

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

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: Dipole

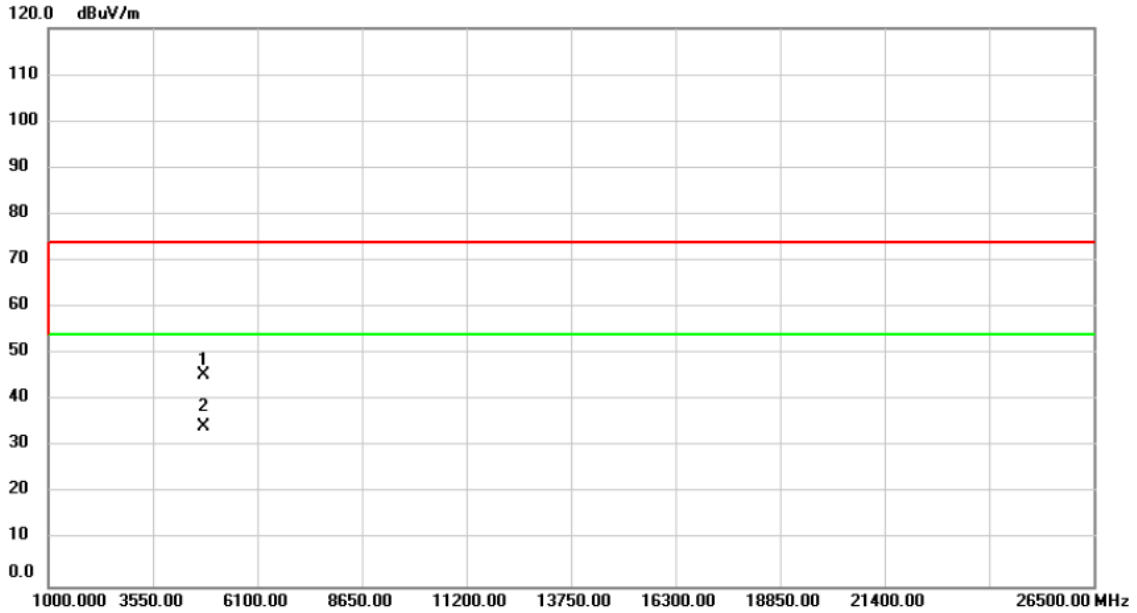
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2388.450	27.10	31.06	58.16	74.00	-15.84	peak	
2		2388.450	13.97	31.06	45.03	54.00	-8.97	AVG	
3	X	2402.000	62.79	31.11	93.90	74.00	19.90	peak	No Limit
4	*	2402.000	62.09	31.11	93.20	54.00	39.20	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: Dipole

**Vertical**

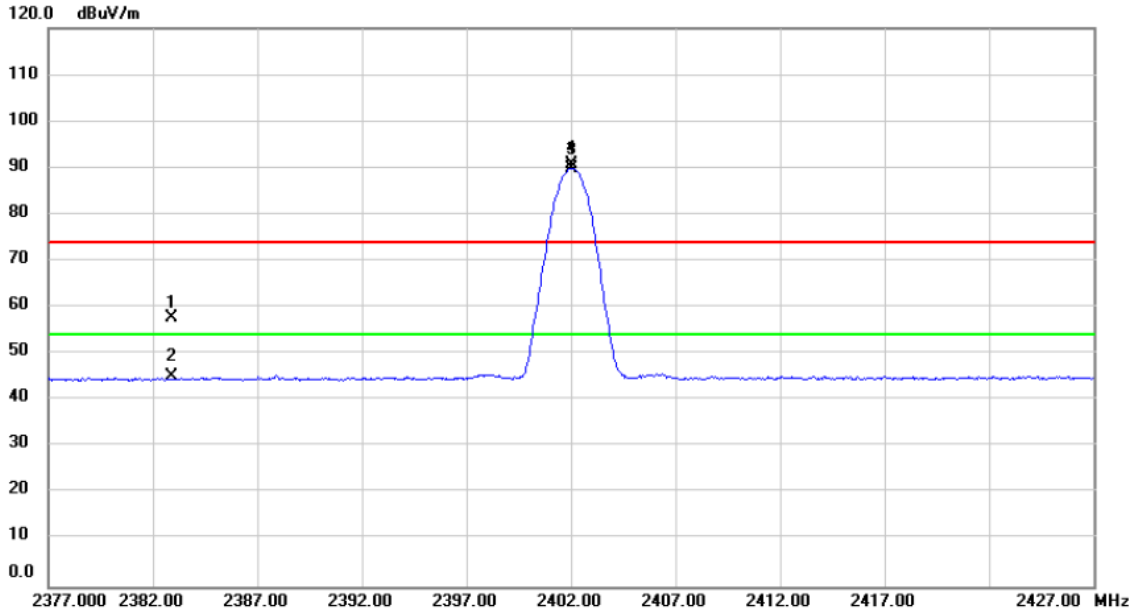


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.000	56.99	-11.40	45.59	74.00	-28.41	peak	
2	*	4804.000	45.80	-11.40	34.40	54.00	-19.60	AVG	



Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: Dipole

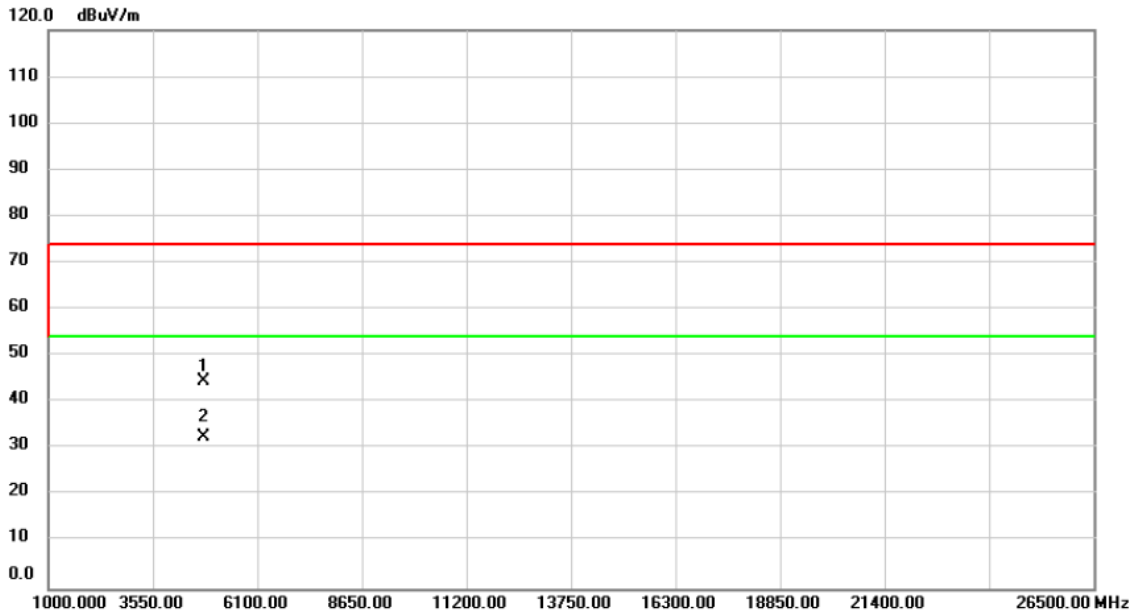
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2382.876	26.77	31.04	57.81	74.00	-16.19	peak	
2		2382.876	13.99	31.04	45.03	54.00	-8.97	AVG	
3	X	2402.000	59.57	31.11	90.68	74.00	16.68	peak	No Limit
4	*	2402.000	58.84	31.11	89.95	54.00	35.95	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: Dipole

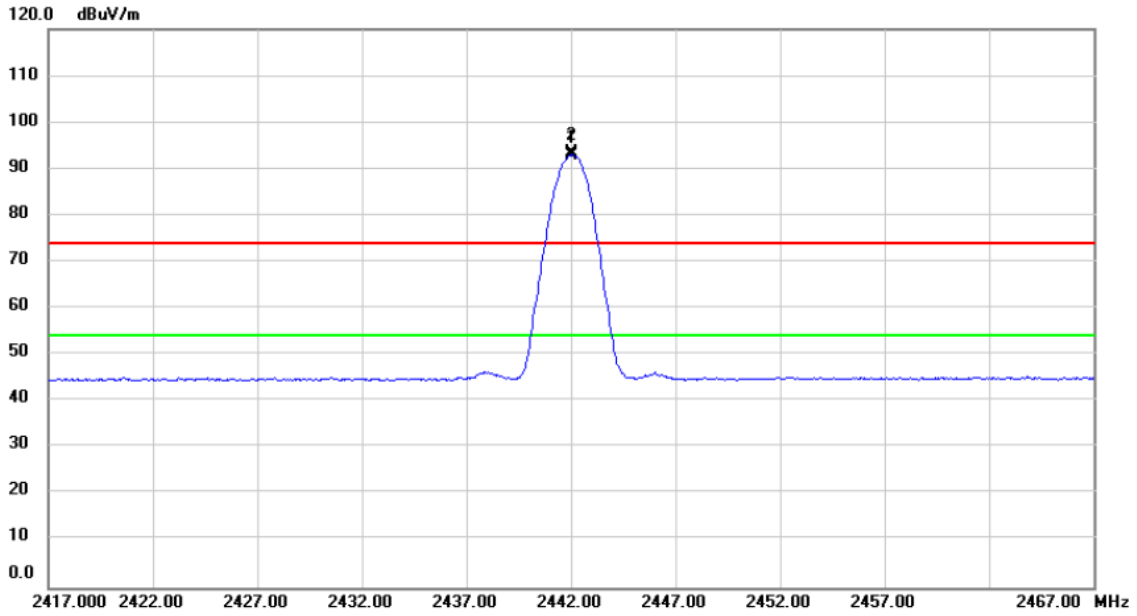
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.000	55.81	-11.40	44.41	74.00	-29.59	peak	
2	*	4804.000	43.99	-11.40	32.59	54.00	-21.41	AVG	

Test Mode : TX 2440MHz \_CH19\_ 1Mbps\_ Antenna Type: Dipole

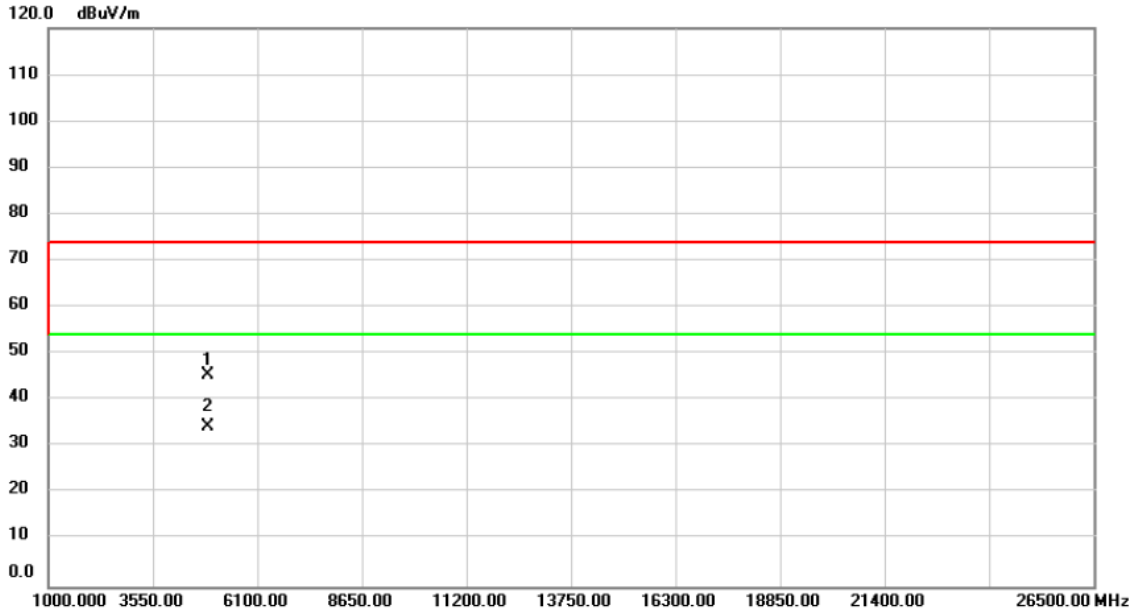
**Vertical**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2442.000	62.32	31.26	93.58	74.00	19.58	peak	No Limit
2	*	2442.000	61.74	31.26	93.00	54.00	39.00	AVG	No Limit

Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: Dipole

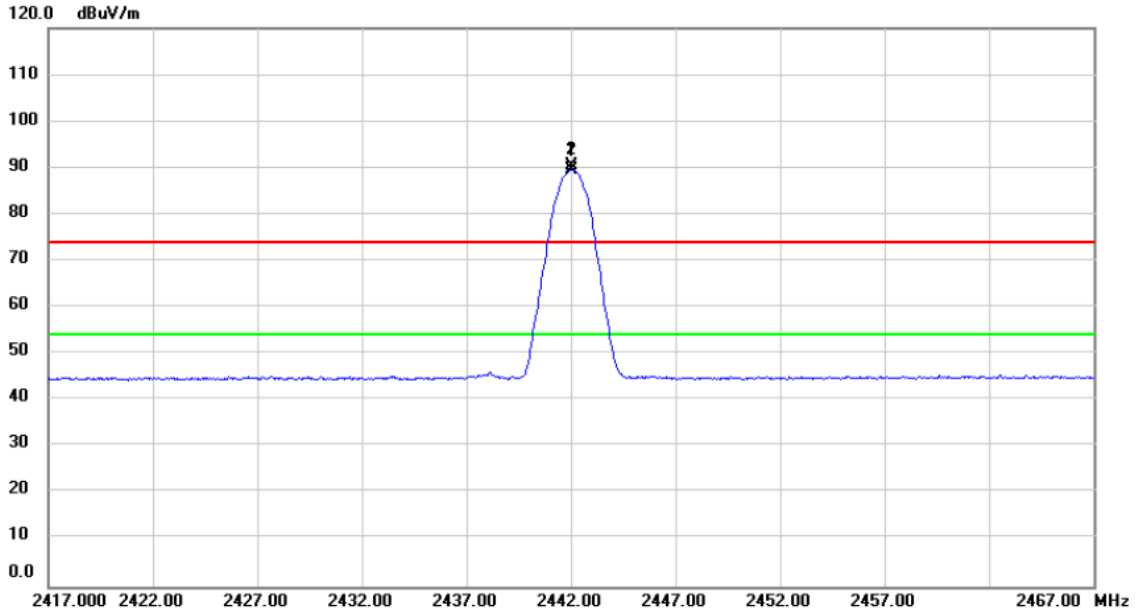
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4884.000	56.65	-11.28	45.37	74.00	-28.63	peak	
2	*	4884.000	45.67	-11.28	34.39	54.00	-19.61	AVG	

Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: Dipole

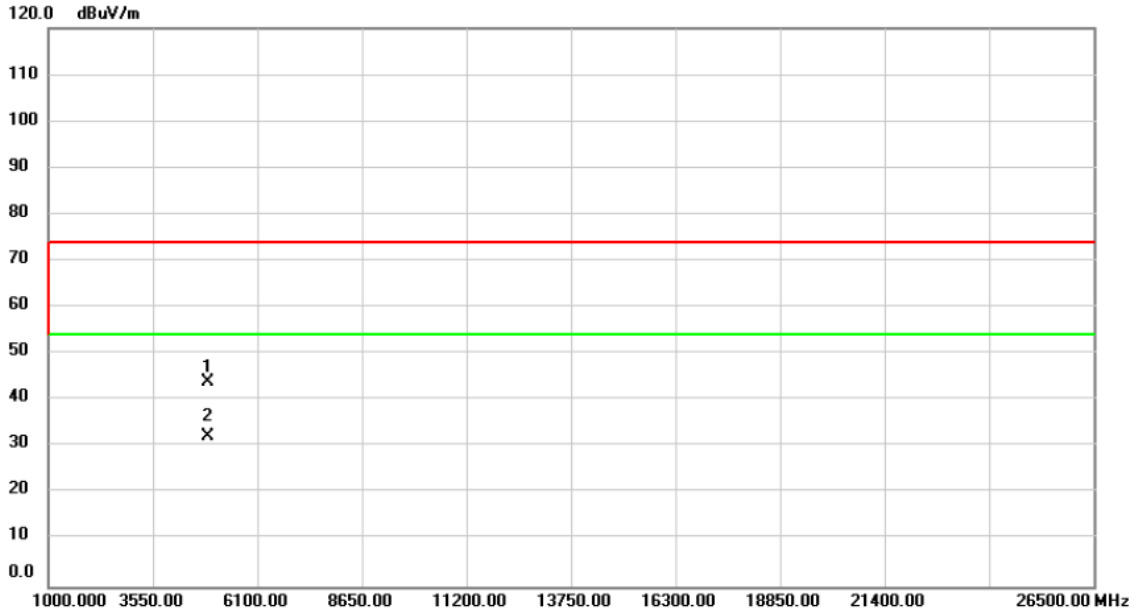
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2442.000	59.11	31.26	90.37	74.00	16.37	peak	No Limit
2	*	2442.000	58.35	31.26	89.61	54.00	35.61	AVG	No Limit

Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: Dipole

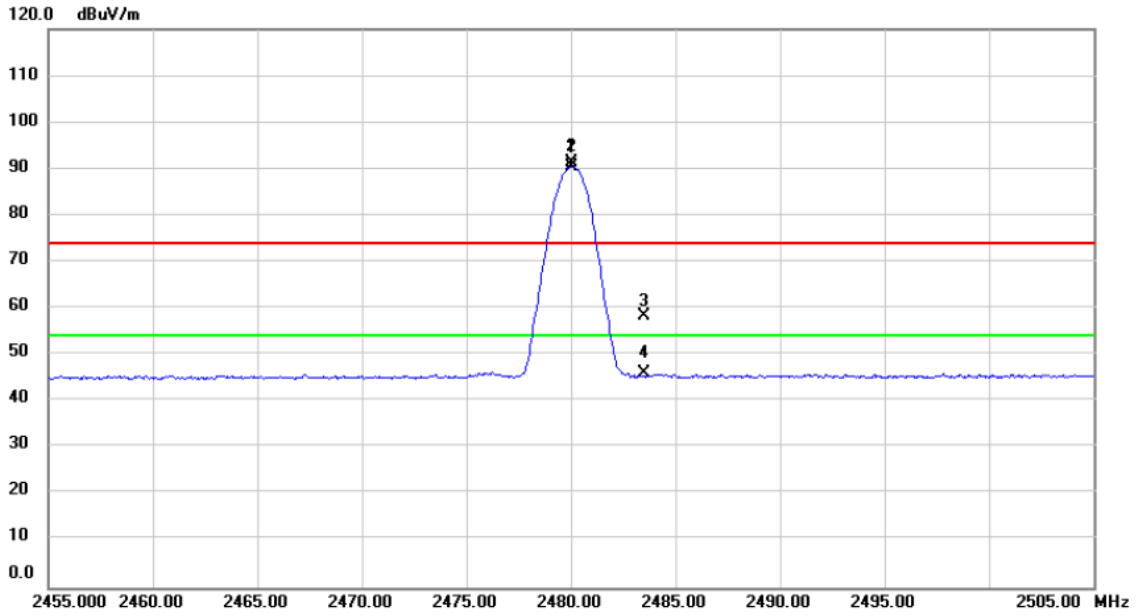
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4884.000	55.36	-11.28	44.08	74.00	-29.92	peak	
2	*	4884.000	43.58	-11.28	32.30	54.00	-21.70	AVG	

Test Mode : TX 2480MHz \_CH39\_ 1Mbps\_ Antenna Type: Dipole

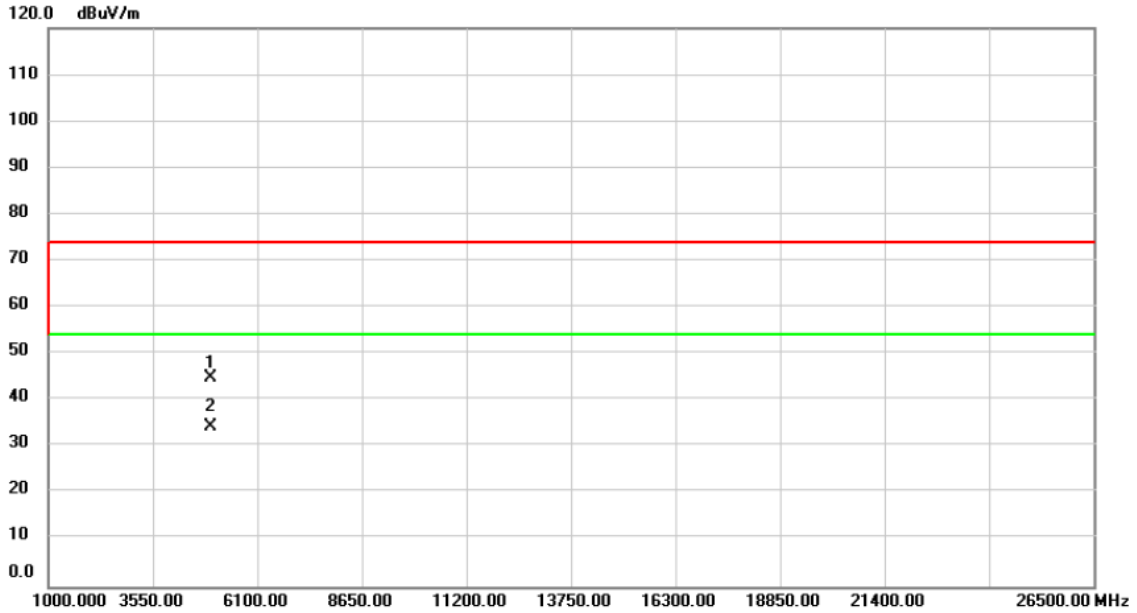
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	60.07	31.39	91.46	74.00	17.46	peak	No Limit
2	*	2480.000	59.17	31.39	90.56	54.00	36.56	AVG	No Limit
3		2483.500	26.88	31.41	58.29	74.00	-15.71	peak	
4		2483.500	14.51	31.41	45.92	54.00	-8.08	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: Dipole

**Vertical**

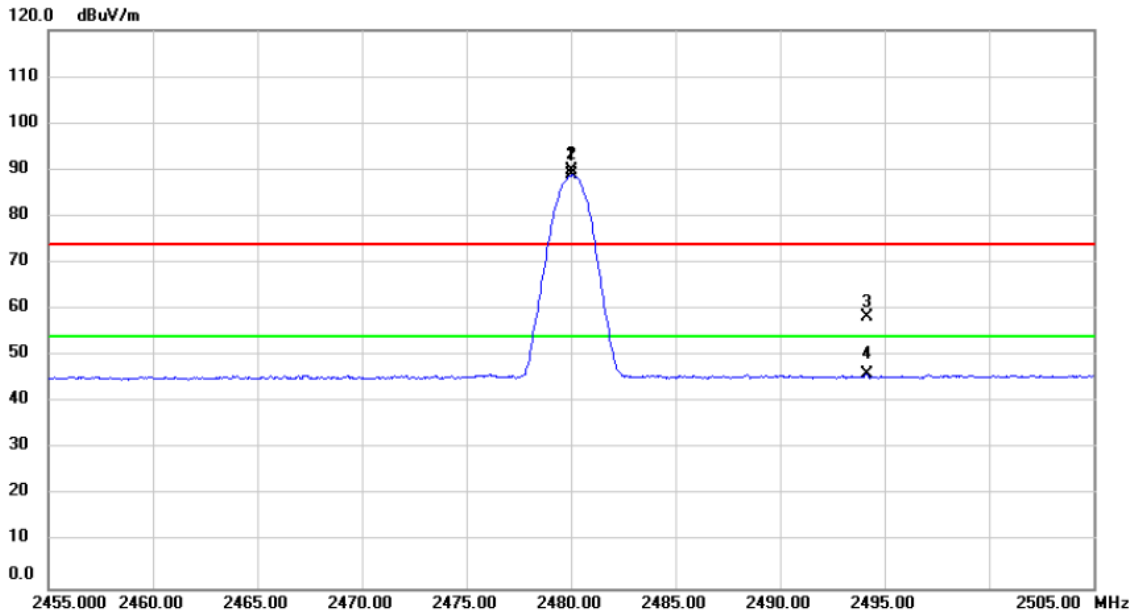


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.000	56.15	-11.15	45.00	74.00	-29.00	peak	
2	*	4960.000	45.56	-11.15	34.41	54.00	-19.59	AVG	



Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: Dipole

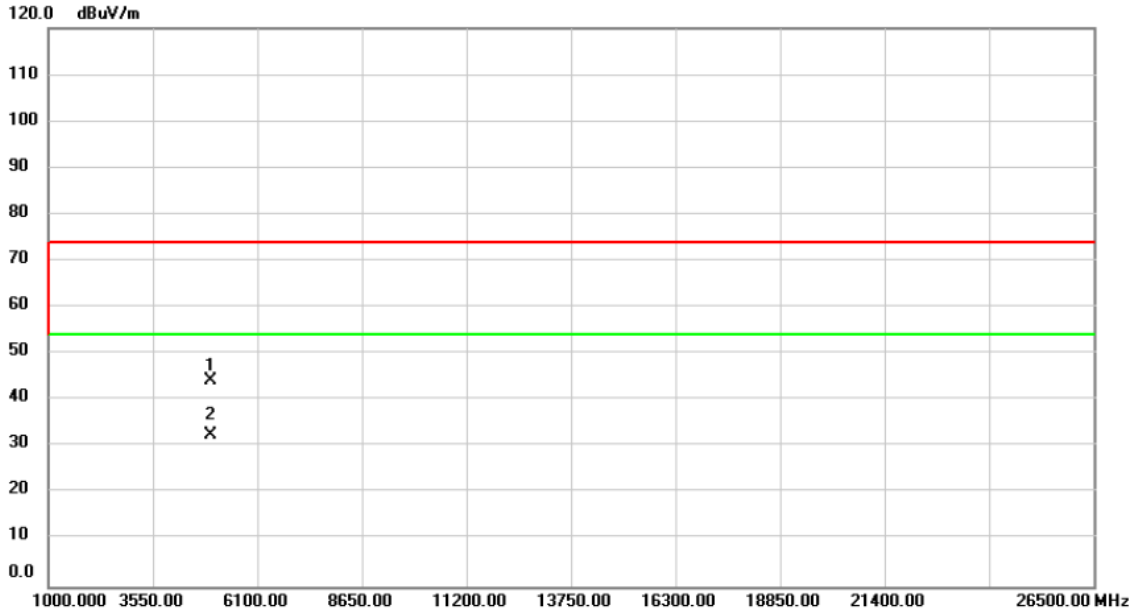
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	58.33	31.39	89.72	74.00	15.72	peak	No Limit
2	*	2480.000	57.45	31.39	88.84	54.00	34.84	AVG	No Limit
3		2494.150	26.91	31.44	58.35	74.00	-15.65	peak	
4		2494.150	14.66	31.44	46.10	54.00	-7.90	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: Dipole

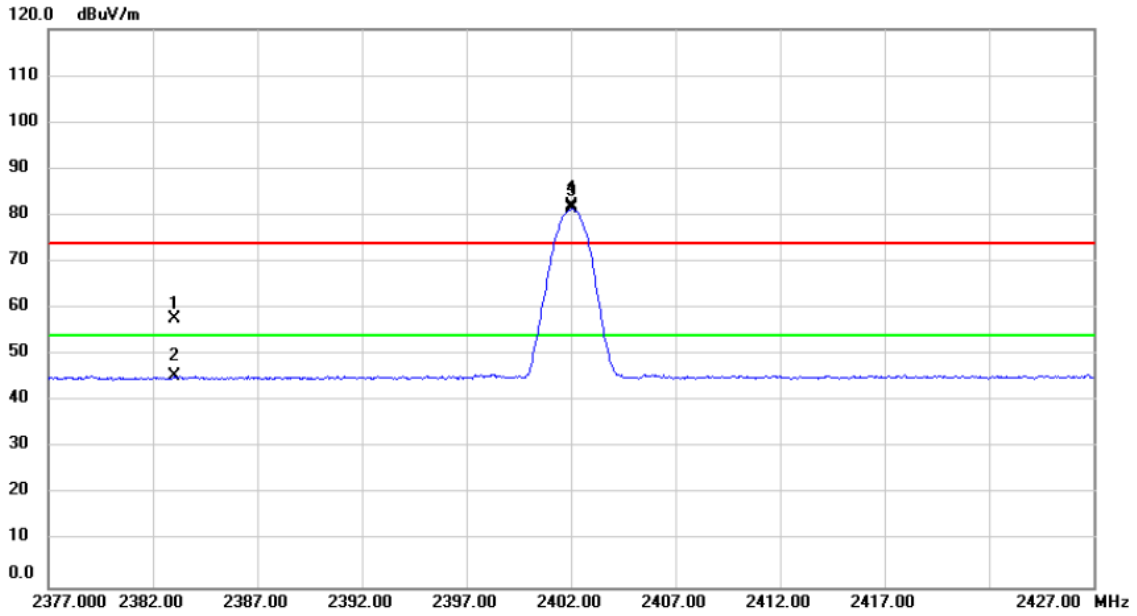
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.000	55.47	-11.15	44.32	74.00	-29.68	peak	
2	*	4960.000	43.70	-11.15	32.55	54.00	-21.45	AVG	

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: PCB

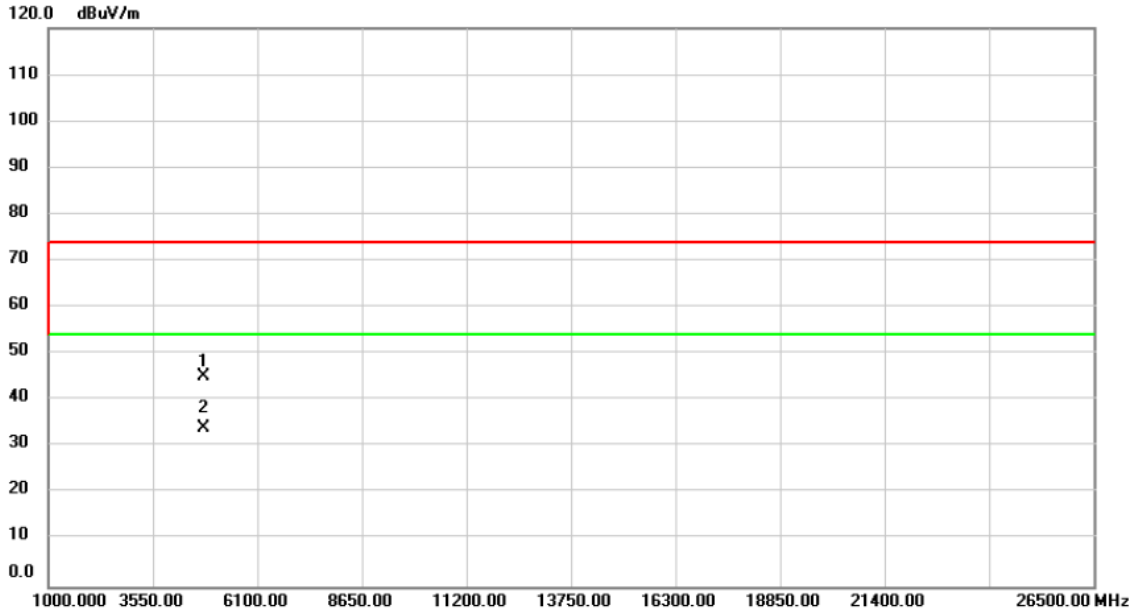
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2383.000	26.68	31.04	57.72	74.00	-16.28	peak	
2		2383.000	14.39	31.04	45.43	54.00	-8.57	AVG	
3	X	2402.000	51.06	31.11	82.17	74.00	8.17	peak	No Limit
4	*	2402.000	50.26	31.11	81.37	54.00	27.37	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: PCB

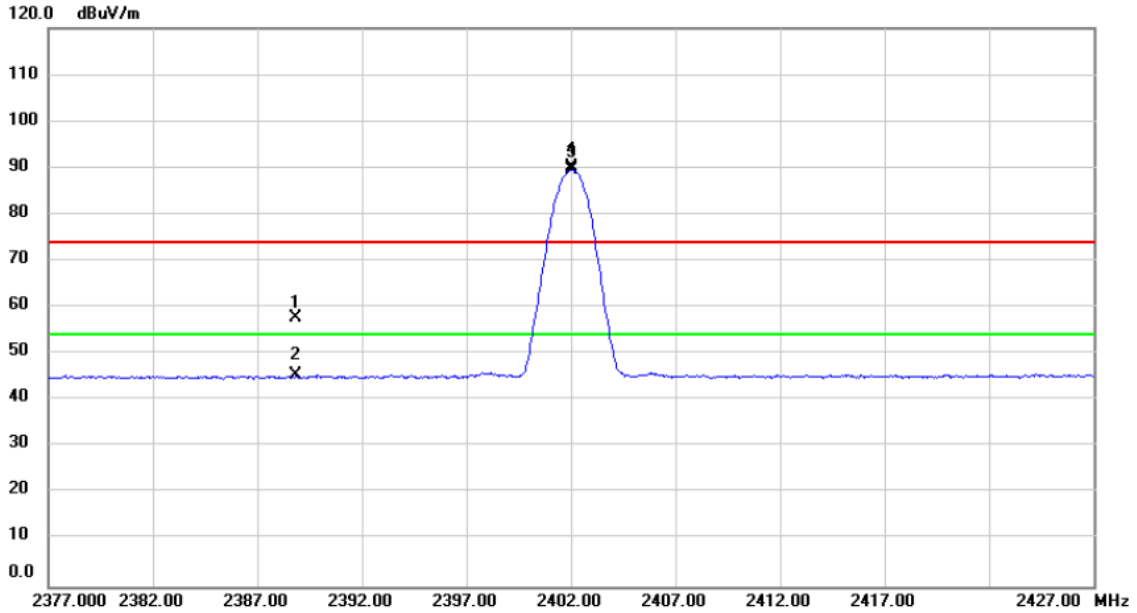
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.000	56.48	-11.40	45.08	74.00	-28.92	peak	
2	*	4804.000	45.45	-11.40	34.05	54.00	-19.95	AVG	

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: PCB

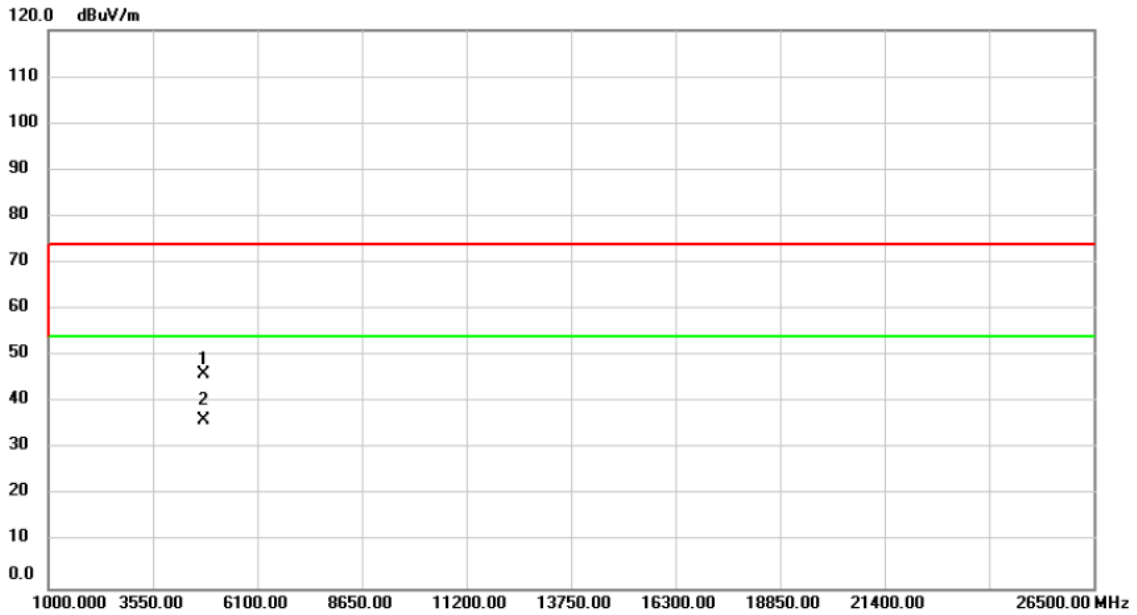
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2388.850	26.70	31.06	57.76	74.00	-16.24	peak	
2		2388.850	14.33	31.06	45.39	54.00	-8.61	AVG	
3	X	2402.000	59.08	31.11	90.19	74.00	16.19	peak	No Limit
4	*	2402.000	58.44	31.11	89.55	54.00	35.55	AVG	No Limit

Test Mode : TX 2402MHz \_CH00\_1Mbps\_ Antenna Type: PCB

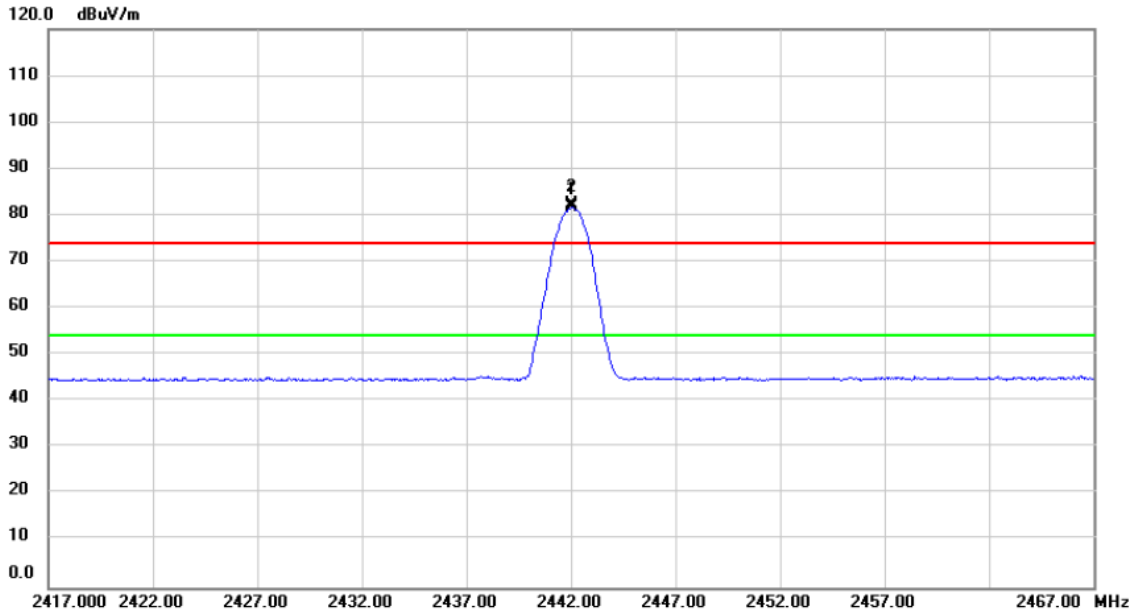
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4804.000	57.41	-11.40	46.01	74.00	-27.99	peak	
2	*	4804.000	47.67	-11.40	36.27	54.00	-17.73	AVG	

Test Mode : TX 2440MHz \_CH19\_ 1Mbps\_ Antenna Type: PCB

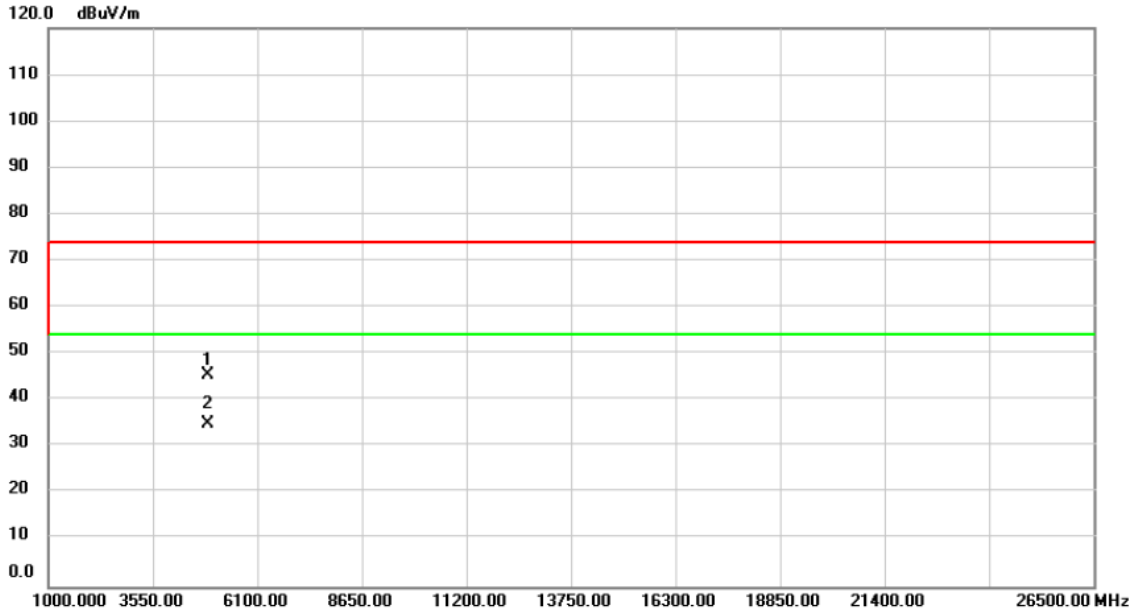
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2442.000	51.13	31.26	82.39	74.00	8.39	peak	No Limit
2	*	2442.000	50.37	31.26	81.63	54.00	27.63	AVG	No Limit

Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: PCB

**Vertical**

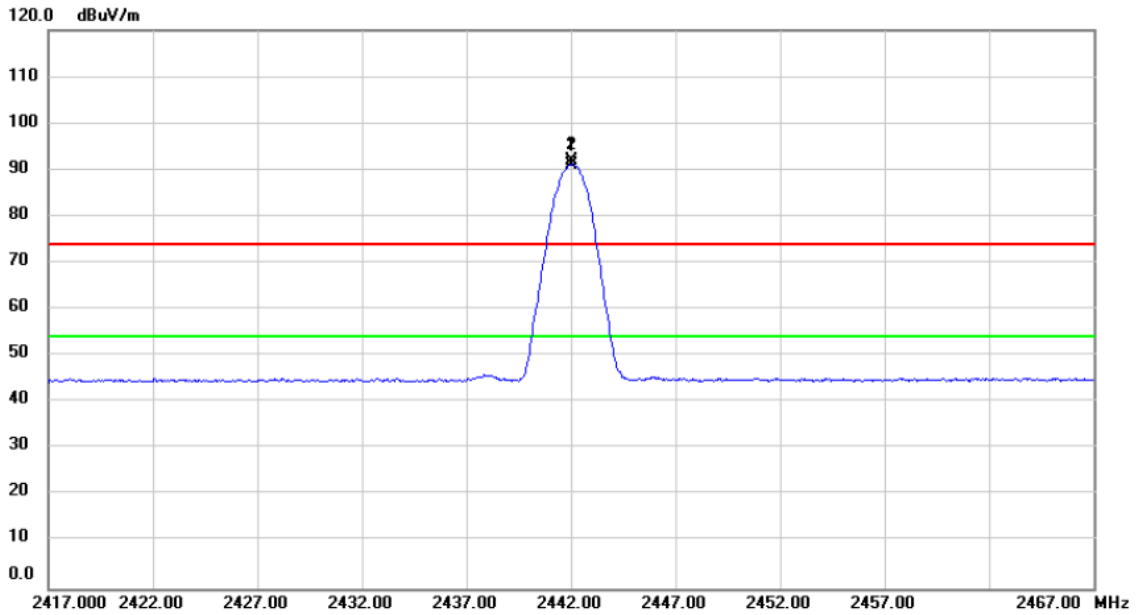


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4884.000	56.62	-11.28	45.34	74.00	-28.66	peak	
2	*	4884.000	46.30	-11.28	35.02	54.00	-18.98	AVG	



Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: PCB

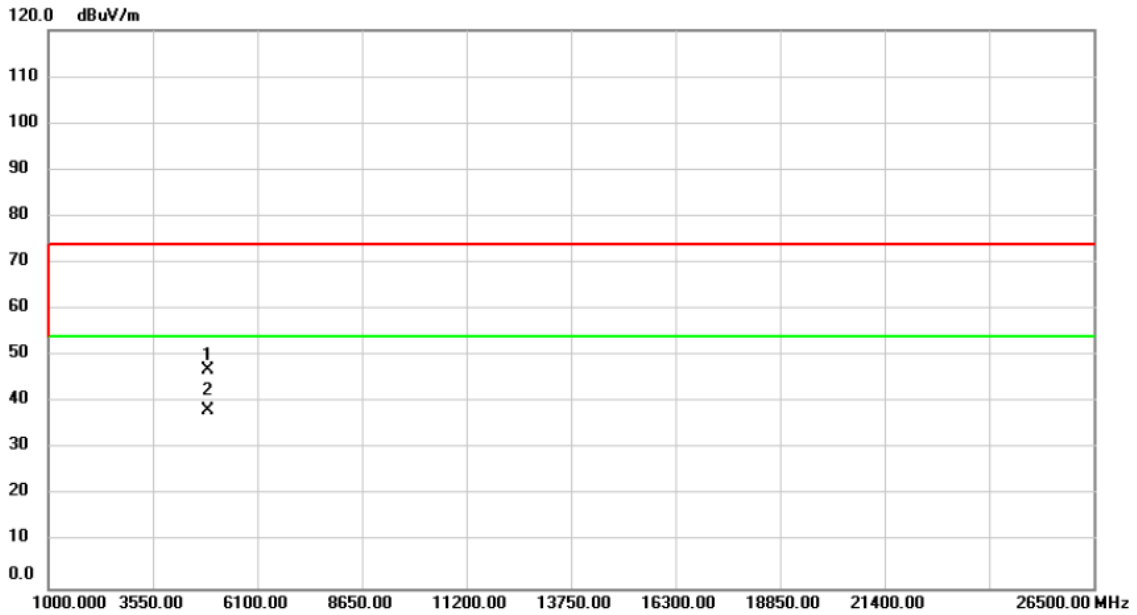
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2442.000	60.69	31.26	91.95	74.00	17.95	peak	No Limit
2	*	2442.000	59.94	31.26	91.20	54.00	37.20	AVG	No Limit

Test Mode : TX 2440MHz \_CH19\_1Mbps\_ Antenna Type: PCB

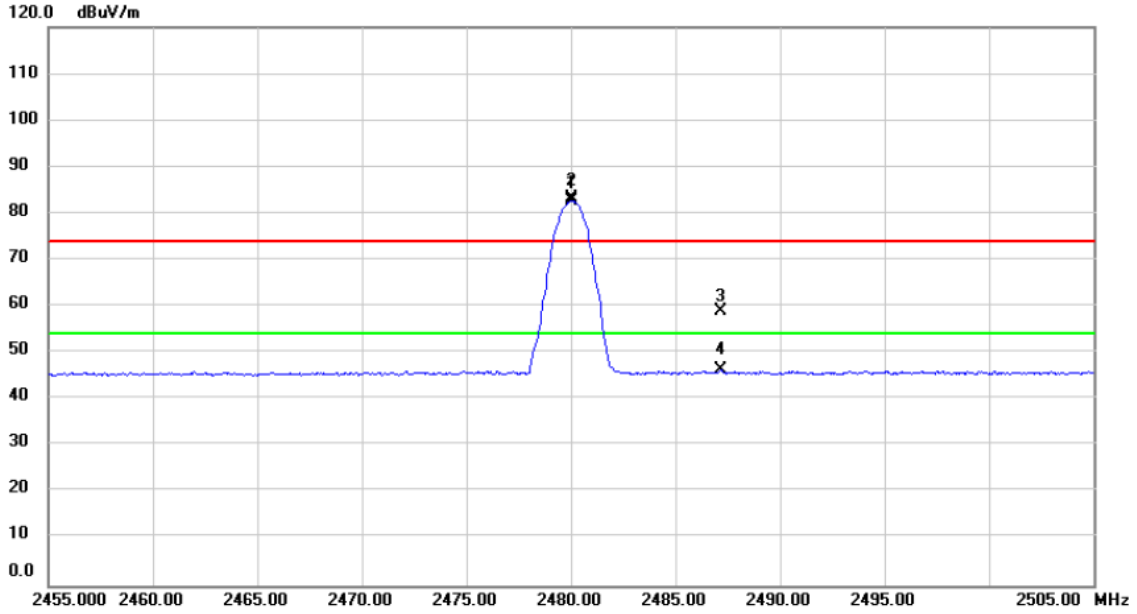
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4884.000	58.23	-11.28	46.95	74.00	-27.05	peak	
2	*	4884.000	49.68	-11.28	38.40	54.00	-15.60	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: PCB

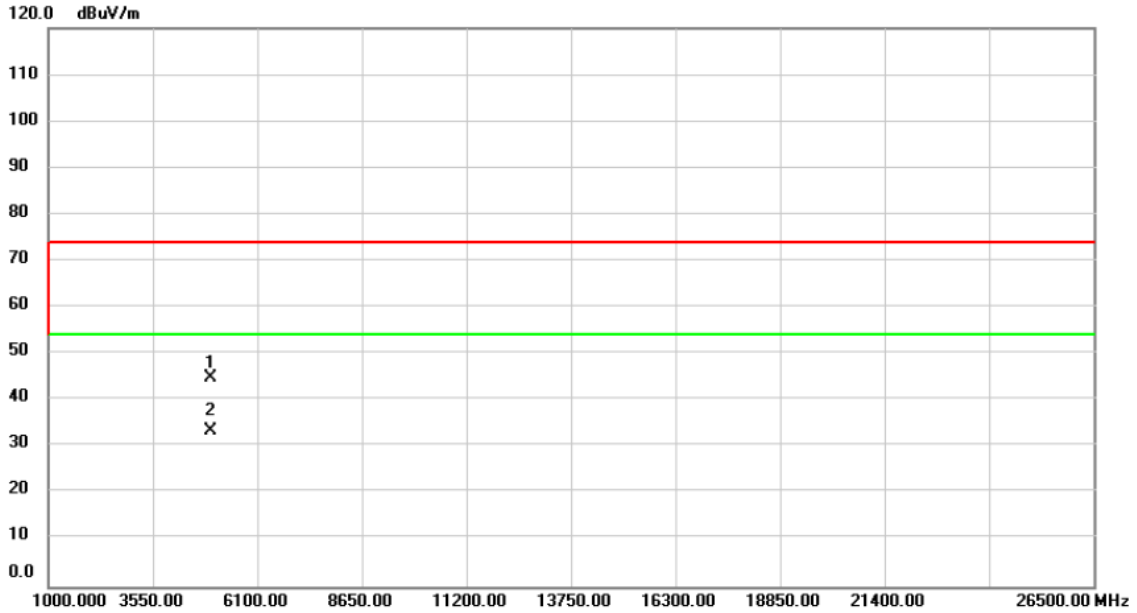
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	51.73	31.39	83.12	74.00	9.12	peak	No Limit
2	*	2480.050	51.29	31.39	82.68	54.00	28.68	AVG	No Limit
3		2487.150	27.41	31.42	58.83	74.00	-15.17	peak	
4		2487.150	14.82	31.42	46.24	54.00	-7.76	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: PCB

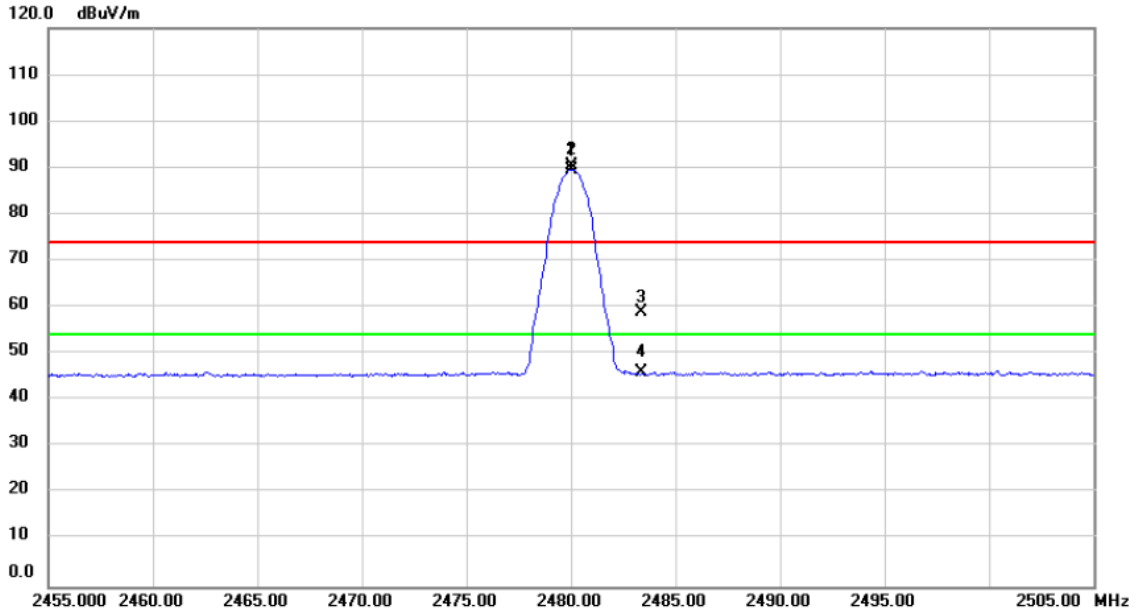
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.000	56.01	-11.15	44.86	74.00	-29.14	peak	
2	*	4960.000	44.69	-11.15	33.54	54.00	-20.46	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: PCB

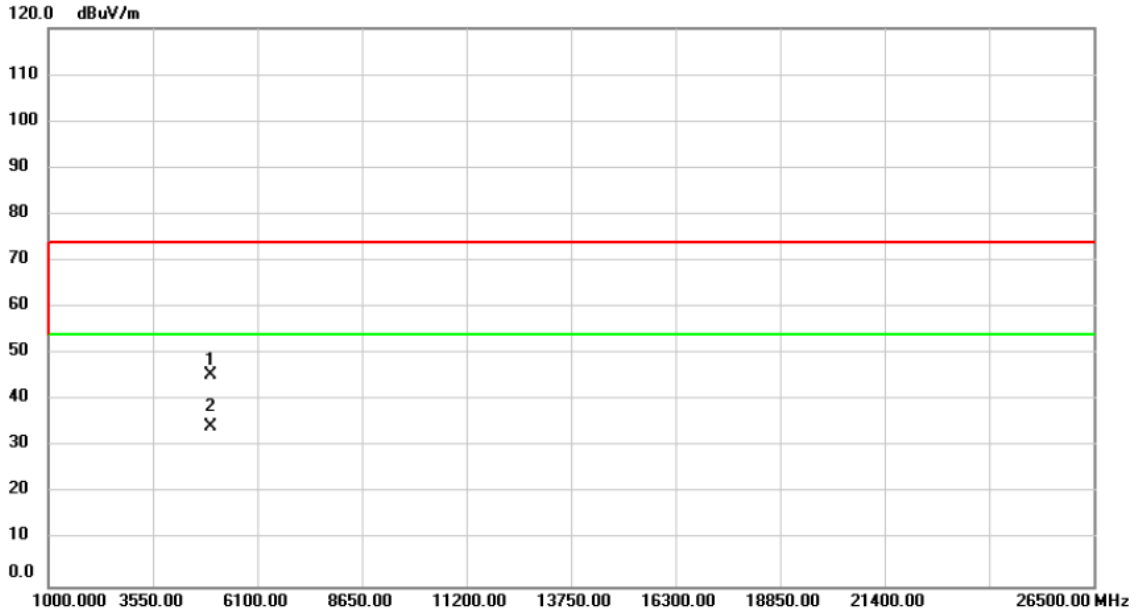
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	58.97	31.39	90.36	74.00	16.36	peak	No Limit
2	*	2480.000	58.24	31.39	89.63	54.00	35.63	AVG	No Limit
3		2483.394	27.51	31.41	58.92	74.00	-15.08	peak	
4		2483.394	14.72	31.41	46.13	54.00	-7.87	AVG	

Test Mode : TX 2480MHz \_CH39\_1Mbps\_ Antenna Type: PCB

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4960.000	56.47	-11.15	45.32	74.00	-28.68	peak	
2	*	4960.000	45.57	-11.15	34.42	54.00	-19.58	AVG	