

# FCC Radio Test Report

## FCC ID: RYK-WNFQ258ACNBT

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

**Project No.** : 1708083  
**Equipment** : 802.11ac/b/g/n WiFi + Bluetooth M.2 Card  
**Test Model** : WNFQ-258ACN(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** : Aug. 21, 2017  
**Date of Test** : Aug. 21, 2017 ~ Oct. 03, 2017  
**Issued Date** : Oct. 11, 2017  
**Tested by** : BTL Inc.

**Testing Engineer** : Kay Wu  
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# **B T L I N C .**

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-3-1708083	Original Issue.	Oct. 11, 2017

## 1. CERTIFICATION

Equipment : 802.11ac/b/g/n WiFi + Bluetooth M.2 Card  
Brand Name : Sparklan  
Test Model : WNFQ-258ACN(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 : Aug. 21, 2017 ~ Oct. 03, 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-3-1708083) 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 WIFI 2.4GHz 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 Emission	PASS	-----
15.247(d) 15.209	Radiated emission	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: RF150107E06Z and model: WNFQ-258ACN(BT)) has been certificated, Conducted and Radiated emission were criticized and reconfirmed in this report.
- (3) Compared with the previous report (RF150107E06Z), Added two new different type (Dipole) 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	802.11ac/b/g/n WiFi + Bluetooth M.2 Card	
Brand Name	Sparklan	
Test Model	WNFQ-258ACN(BT)	
Series Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency	2412~2472 MHz
	Modulation Technology	802.11b:DSSS 802.11g:OFDM 802.11n:OFDM
	Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n up to 300 Mbps
EUT Power Rating	3.3Vdc form host equipment	
Products Covered	N/A	

Note:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- Channel List:

CH01 – CH13 for 802.11b, 802.11g, 802.11n(20MHz) CH03 – CH11 for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	13	2472
02	2417	06	2437	10	2457		
03	2422	07	2442	11	2462		
04	2427	08	2447	12	2467		

#### 3. Table for Filed Antenna:

Ant.	Brand	Model	Type	Connector	Gain (dBi)				
					2.4 GHz	Band 1	Band 2	Band 3	Band 4
1	Wanshin	R3410110203 WSS003	Dipole	RP-SMA	2.02	1.93	1.93	2.03	2.03
2	Long Cheng	FDE_ACBSMA-BGP	Dipole	RP-SMA	3.27	5.436	5.436	5.436	5.96

#### 4.

Operating Mode	TX Mode
	2 TX
IEEE 802.11b	V (ANT 1+ANT 2)
IEEE 802.11g	V (ANT 1+ANT 2)
IEEE 802.11n (20 MHz)	V (ANT 1+ANT 2)
IEEE 802.11n (40 MHz)	V (ANT 1+ANT 2)



### 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 B Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 2	TX G Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 3	TX N-20MHZ Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 4	TX N-40MHZ Mode / CH03, CH06, CH 09, CH 10, CH 11
Mode 5	TX Mode

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 5	TX Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX B Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 2	TX G Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 3	TX N-20MHZ Mode / CH01, CH06, CH 11, CH 12, CH 13
Mode 4	TX N-40MHZ Mode / CH03, CH06, CH 09, CH 10, CH 11

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) 802.11b mode: DBPSK (1Mbps)  
802.11g mode: OFDM (6Mbps)  
802.11n HT20 mode : BPSK (13Mbps)  
802.11n HT40 mode : BPSK (27Mbps)  
For radiated emission tests, the highest output powers were set for final test.
- (3) For radiated emission below 1GHz test, the IEEE 802.11n (40 MHz) is found to be the worst case and recorded.
- (4) The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

### 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.

<p style="text-align: center;"><b>IEEE 802.11b</b></p> <p>Ref 31.5 dBm *Att 30 dB              RBW 10 MHz Delta 3 [T1] 0.00 dB              VBW 10 MHz 12.600000 ms              SWT 30 ms</p> <p>Center 2.412 GHz 3 ms/</p> <p>Date: 30.OCT.2017 17:55:10</p>	<p style="text-align: center;"><b>IEEE 802.11g</b></p> <p>Ref 31.5 dBm *Att 30 dB              RBW 10 MHz Delta 3 [T1] 0.67 dB              VBW 10 MHz 2.210000 ms              SWT 5 ms</p> <p>Center 2.412 GHz 500 <math>\mu</math>s/</p> <p>Date: 30.OCT.2017 17:56:26</p>
<p>Duty cycle = 12.480 ms / 12.600 ms = 99.05 %              Duty Factor = <math>10 * \log(1 / 0.9905) = 0.04</math></p>	<p>Duty cycle = 2.070 ms / 2.210 ms = 93.67 %              Duty Factor = <math>10 * \log(1 / 0.9367) = 0.28</math></p>
<p style="text-align: center;"><b>IEEE 802.11ac (20 MHz)</b></p> <p>Ref 31.5 dBm *Att 30 dB              RBW 10 MHz Delta 3 [T1] 0.95 dB              VBW 10 MHz 2.060000 ms              SWT 5 ms</p> <p>Center 2.412 GHz 500 <math>\mu</math>s/</p> <p>Date: 30.OCT.2017 17:58:27</p>	<p style="text-align: center;"><b>IEEE 802.11ac (40 MHz)</b></p> <p>Ref 31.5 dBm *Att 30 dB              RBW 10 MHz Delta 3 [T1] -0.15 dB              VBW 10 MHz 1.062000 ms              SWT 3 ms</p> <p>Center 2.422 GHz 300 <math>\mu</math>s/</p> <p>Date: 30.OCT.2017 18:00:11</p>
<p>Duty cycle = 1.930 ms / 2.060 ms = 93.69 %              Duty Factor = <math>10 * \log(1 / 0.9369) = 0.28</math></p>	<p>Duty cycle = 0.912 ms / 1.062 ms = 85.88 %              Duty Factor = <math>10 * \log(1 / 0.8588) = 0.66</math></p>

**Note:**

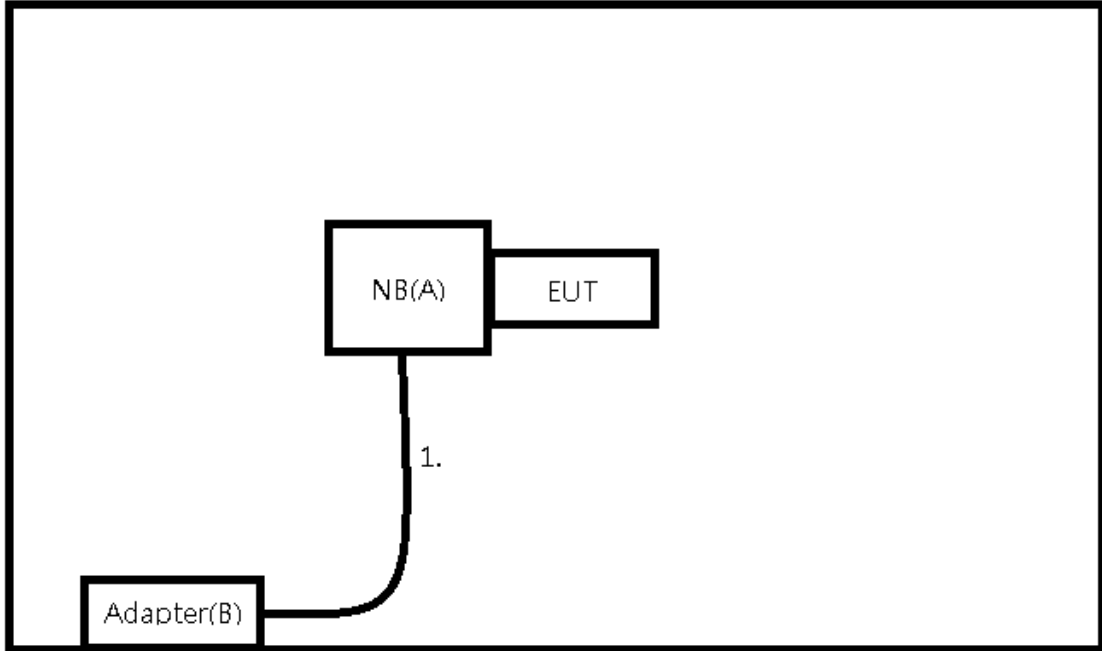
For IEEE 802.11g and IEEE 802.11ac (20 MHz):

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

For IEEE 802.11ac (40 MHz):

For radiated emissions frequency above 1 GHz, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 2 kHz (Duty cycle  $< 98\%$ ).

**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.
A	NB	Lenovo	P50	N/A	N/A
B	Adapter	Lenovo	ADL170NDC2A	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	YES	YES	1.5m	Power 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 (dBμV)	
	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

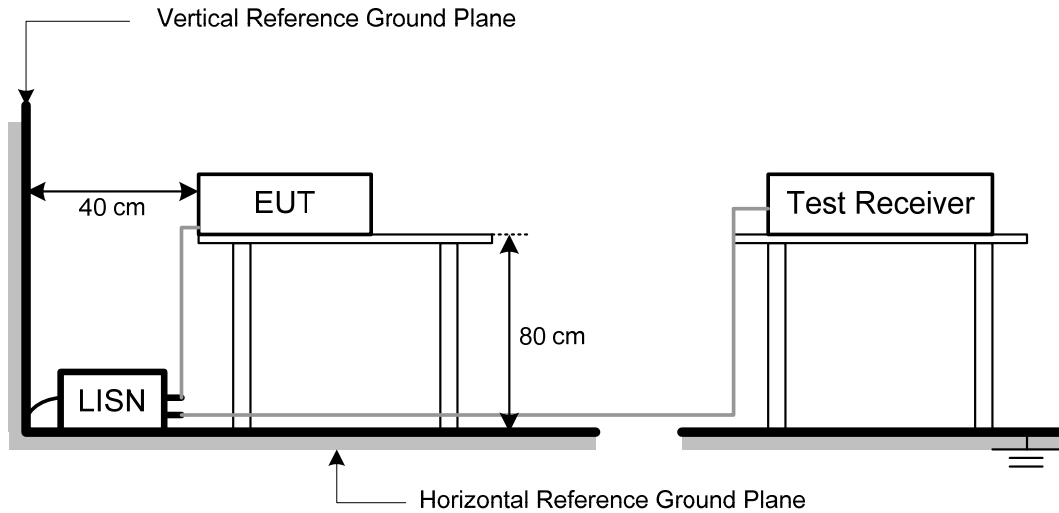
#### 4.1.2 TEST PROCEDURE

- 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)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

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**

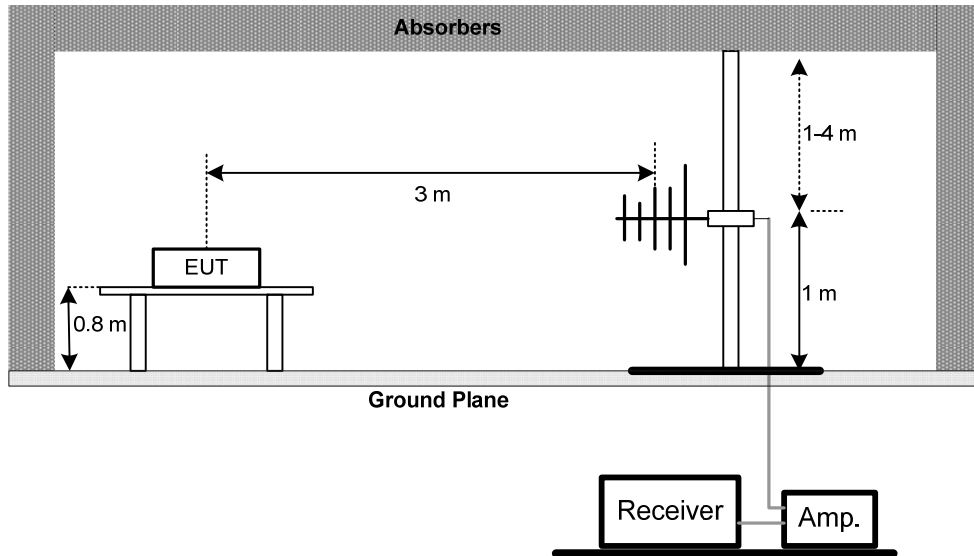
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 m above the ground at a 3 m semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of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

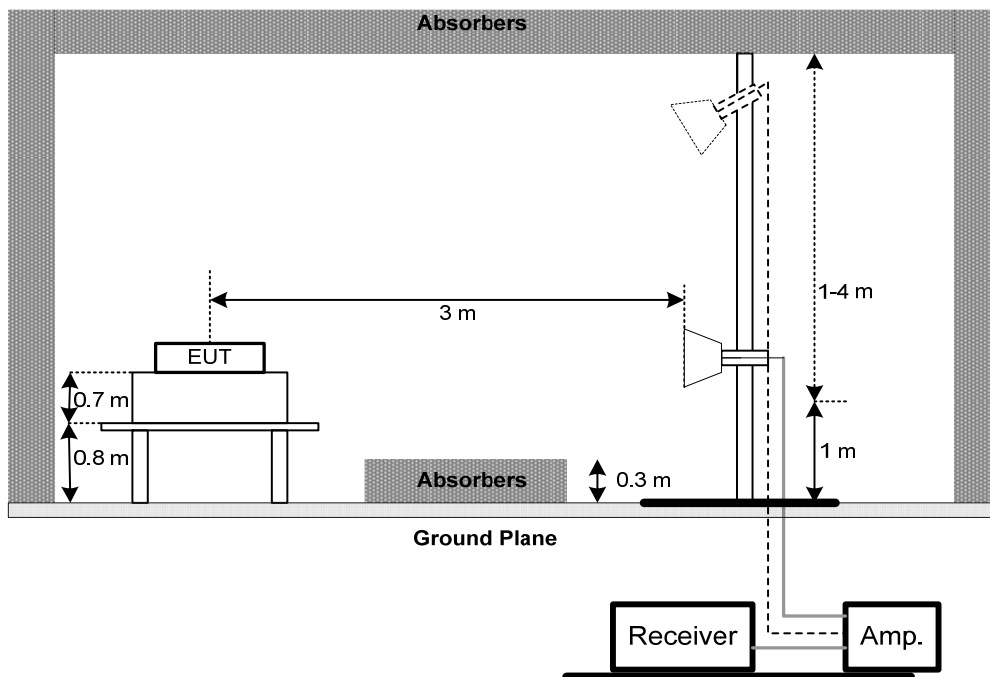
No deviation

**4.2.4 TEST SETUP**

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

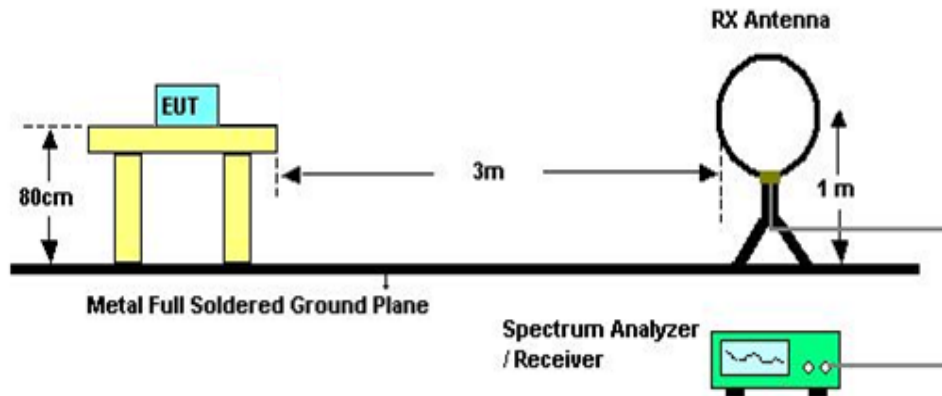


(B) Radiated Emission Test Set-Up Frequency Above 1 GHz





(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: 23°C/25°C Relative Humidity: 70%/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_EMG (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

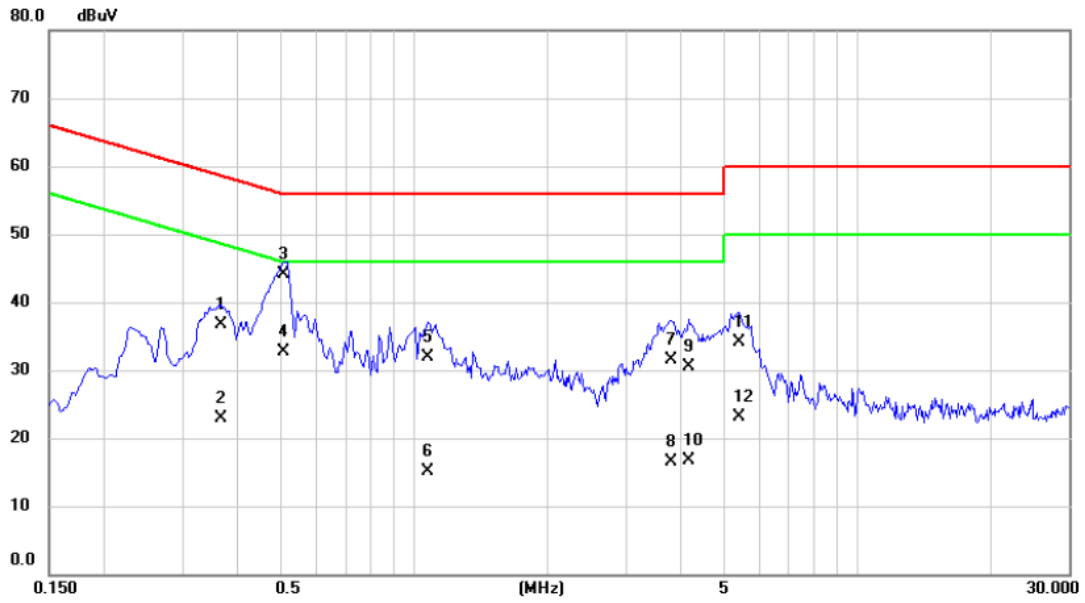
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

## APPENDIX A – CONDUCTED EMISSION

Test Mode: TX Mode

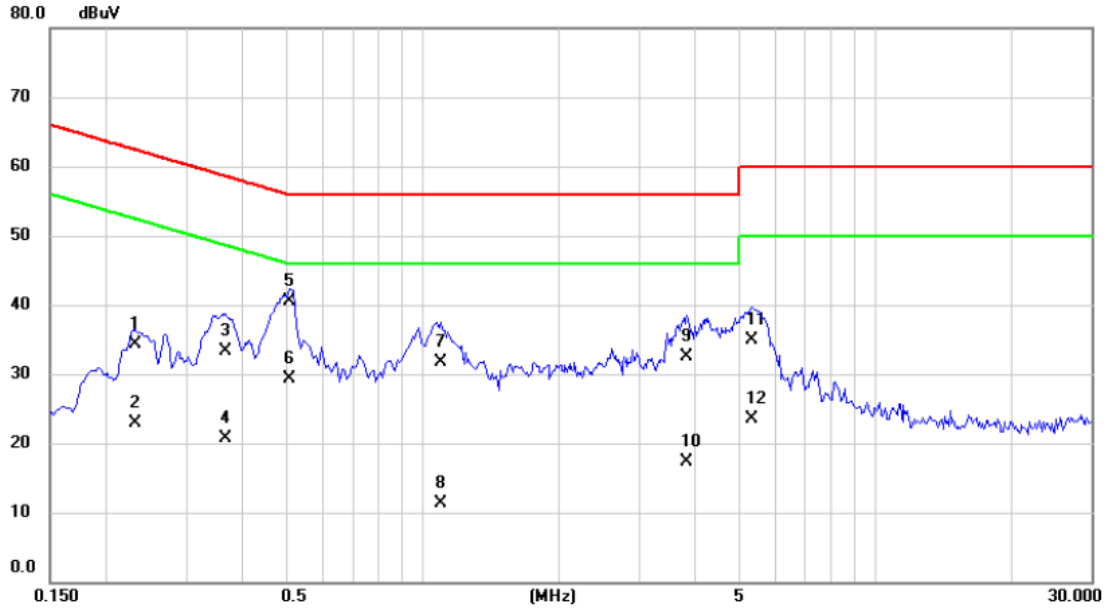
Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3677	26.90	9.73	36.63	58.55	-21.92	QP	
2		0.3677	13.11	9.73	22.84	48.55	-25.71	AVG	
3	*	0.5090	34.40	9.74	44.14	56.00	-11.86	QP	
4		0.5090	23.00	9.74	32.74	46.00	-13.26	AVG	
5		1.0760	22.10	9.74	31.84	56.00	-24.16	QP	
6		1.0760	5.30	9.74	15.04	46.00	-30.96	AVG	
7		3.7940	21.70	9.80	31.50	56.00	-24.50	QP	
8		3.7940	6.80	9.80	16.60	46.00	-29.40	AVG	
9		4.1540	20.60	9.81	30.41	56.00	-25.59	QP	
10		4.1540	6.80	9.81	16.61	46.00	-29.39	AVG	
11		5.4000	24.30	9.84	34.14	60.00	-25.86	QP	
12		5.4000	13.20	9.84	23.04	50.00	-26.96	AVG	

Test Mode: TX Mode

### Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2312	24.60	9.66	34.26	62.41	-28.15	QP	
2		0.2312	13.20	9.66	22.86	52.41	-29.55	AVG	
3		0.3676	23.57	9.67	33.24	58.55	-25.31	QP	
4		0.3676	11.00	9.67	20.67	48.55	-27.88	AVG	
5	*	0.5090	30.90	9.68	40.58	56.00	-15.42	QP	
6		0.5090	19.60	9.68	29.28	46.00	-16.72	AVG	
7		1.0940	22.00	9.69	31.69	56.00	-24.31	QP	
8		1.0940	1.70	9.69	11.39	46.00	-34.61	AVG	
9		3.8390	22.80	9.76	32.56	56.00	-23.44	QP	
10		3.8390	7.50	9.76	17.26	46.00	-28.74	AVG	
11		5.3500	25.10	9.80	34.90	60.00	-25.10	QP	
12		5.3500	13.80	9.80	23.60	50.00	-26.40	AVG	

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

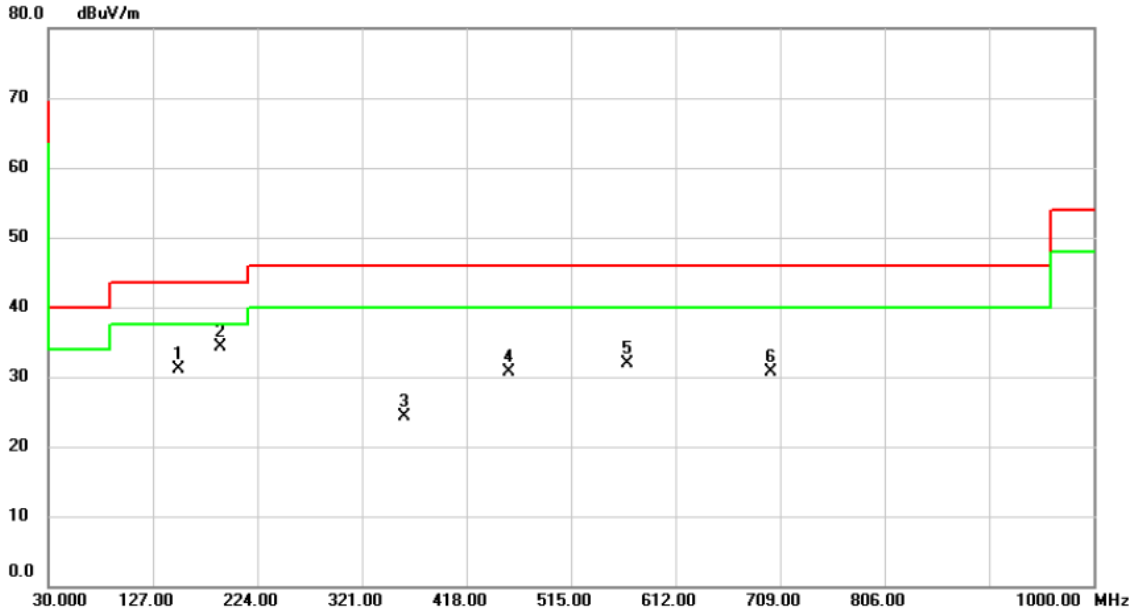
**Test Mode: N/A**

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

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

Test Mode: TX N-40MHZ Mode 2437MHz

Vertical

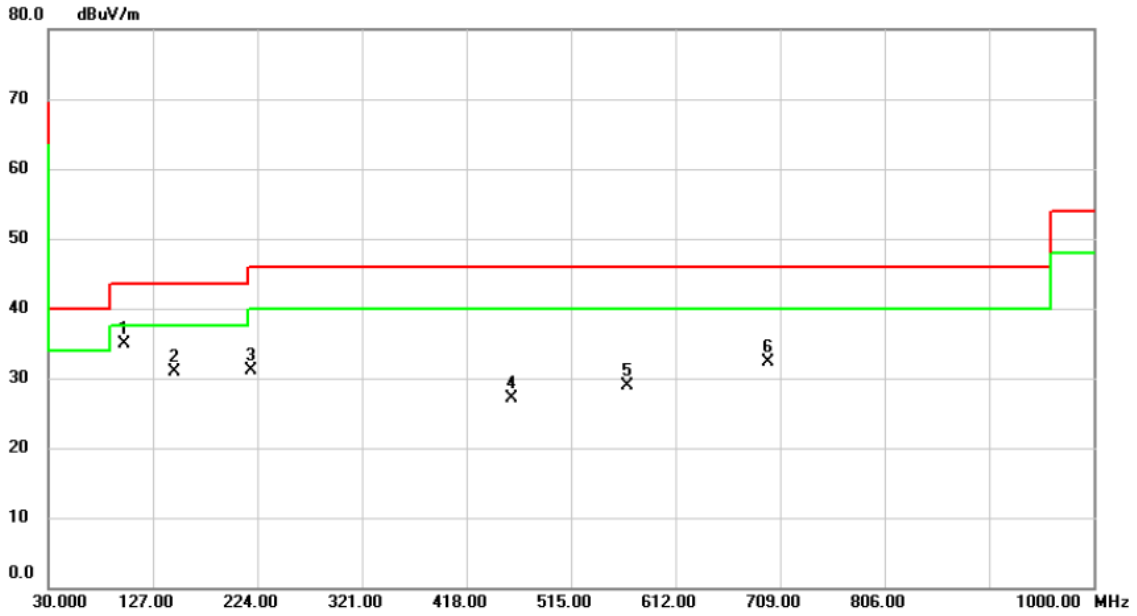


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		150.2800	40.11	-8.95	31.16	43.50	-12.34	peak	
2	*	190.0500	44.67	-10.33	34.34	43.50	-9.16	peak	
3		359.8000	30.30	-5.98	24.32	46.00	-21.68	peak	
4		457.7700	34.21	-3.43	30.78	46.00	-15.22	peak	
5		567.3800	33.25	-1.27	31.98	46.00	-14.02	peak	
6		700.2700	29.82	0.86	30.68	46.00	-15.32	peak	



Test Mode: TX N-40MHZ Mode 2437MHz

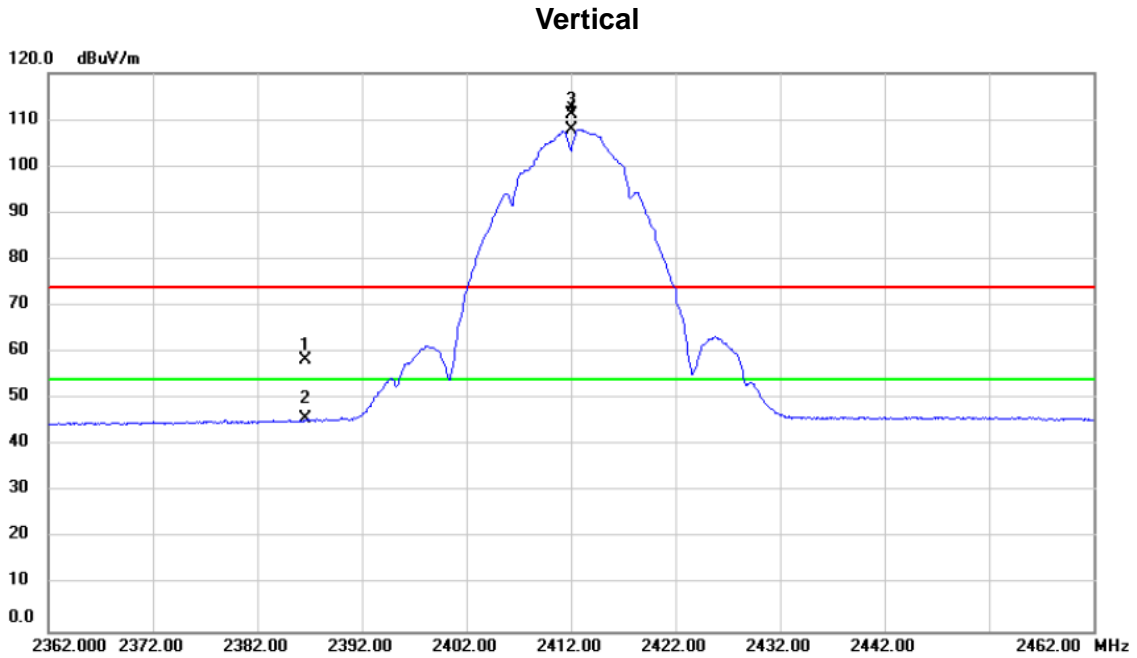
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	99.8400	47.35	-12.39	34.96	43.50	-8.54	peak	
2		146.4000	39.88	-9.04	30.84	43.50	-12.66	peak	
3		218.1800	41.92	-10.85	31.07	46.00	-14.93	peak	
4		459.7100	30.59	-3.39	27.20	46.00	-18.80	peak	
5		567.3800	30.24	-1.27	28.97	46.00	-17.03	peak	
6		697.3600	31.51	0.81	32.32	46.00	-13.68	peak	

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

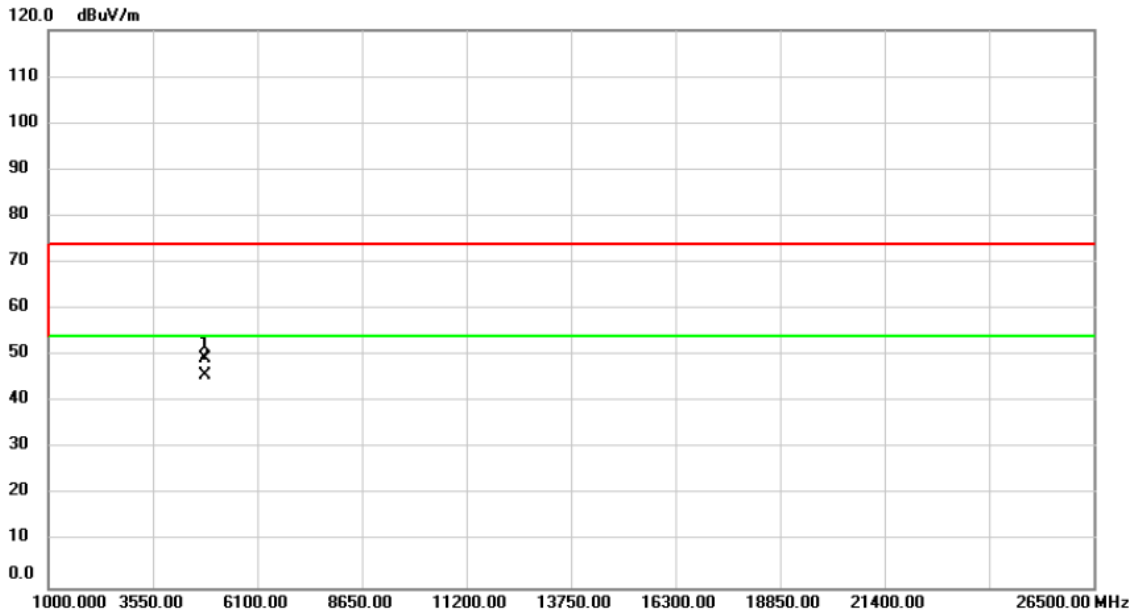
Orthogonal Axis :	X
Test Mode :	TX B Mode 2412MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2386.556	27.33	31.05	58.38	74.00	-15.62	peak	
2		2386.556	14.59	31.05	45.64	54.00	-8.36	AVG	
3	X	2412.000	79.88	31.14	111.02	74.00	37.02	peak	No Limit
4	*	2412.000	76.83	31.14	107.97	54.00	53.97	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B Mode 2412MHz

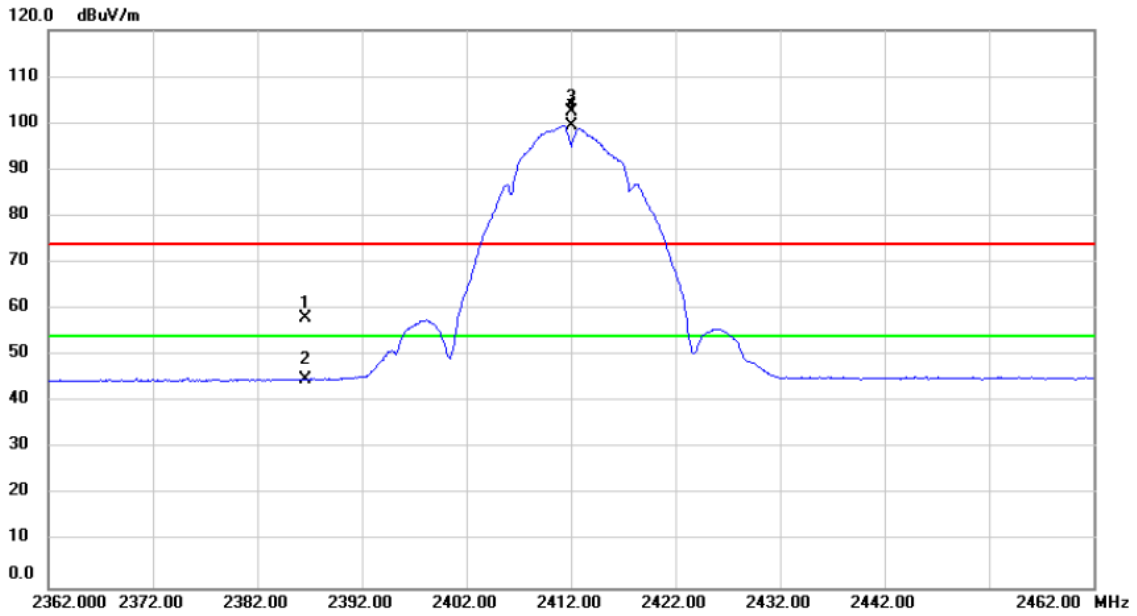
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4824.000	60.82	-11.37	49.45	74.00	-24.55	peak	
2	*	4824.000	57.06	-11.37	45.69	54.00	-8.31	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2412MHz

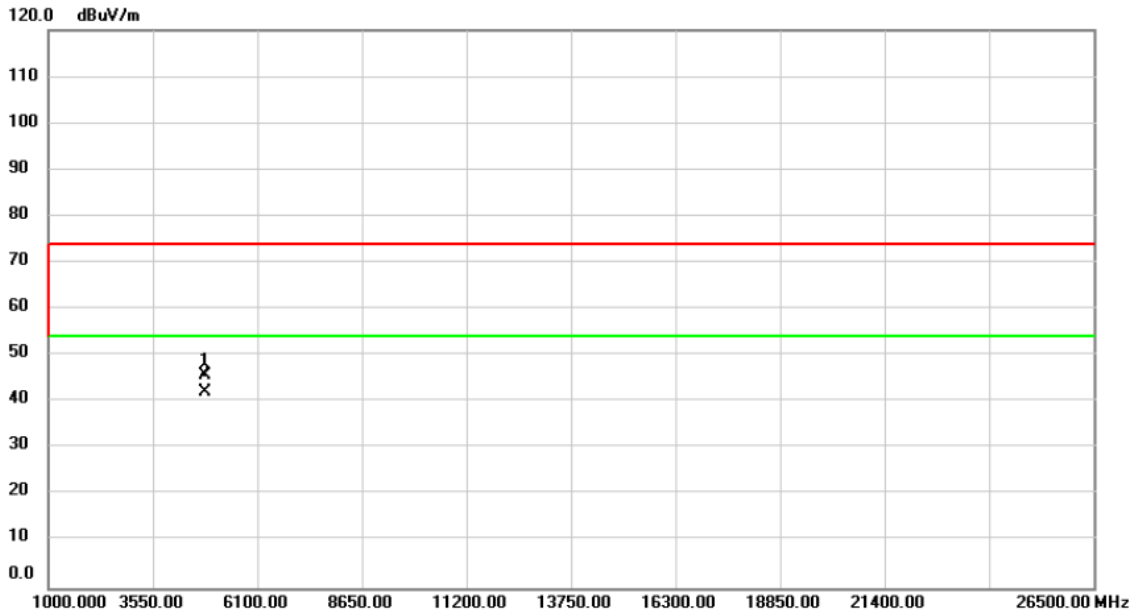
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2386.556	27.10	31.05	58.15	74.00	-15.85	peak	
2		2386.556	13.79	31.05	44.84	54.00	-9.16	AVG	
3	X	2412.000	71.42	31.14	102.56	74.00	28.56	peak	No Limit
4	*	2412.000	68.34	31.14	99.48	54.00	45.48	AVG	No Limit

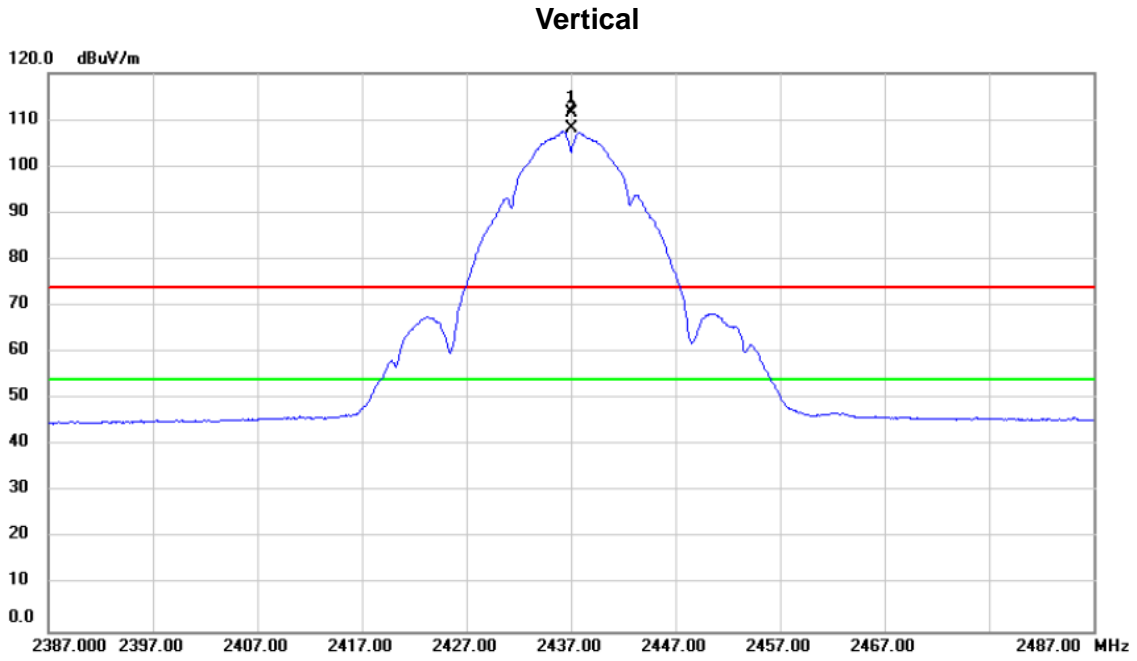
Orthogonal Axis :	X
Test Mode :	TX B Mode 2412MHz

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4824.000	57.18	-11.37	45.81	74.00	-28.19	peak	
2	*	4824.000	53.54	-11.37	42.17	54.00	-11.83	AVG	

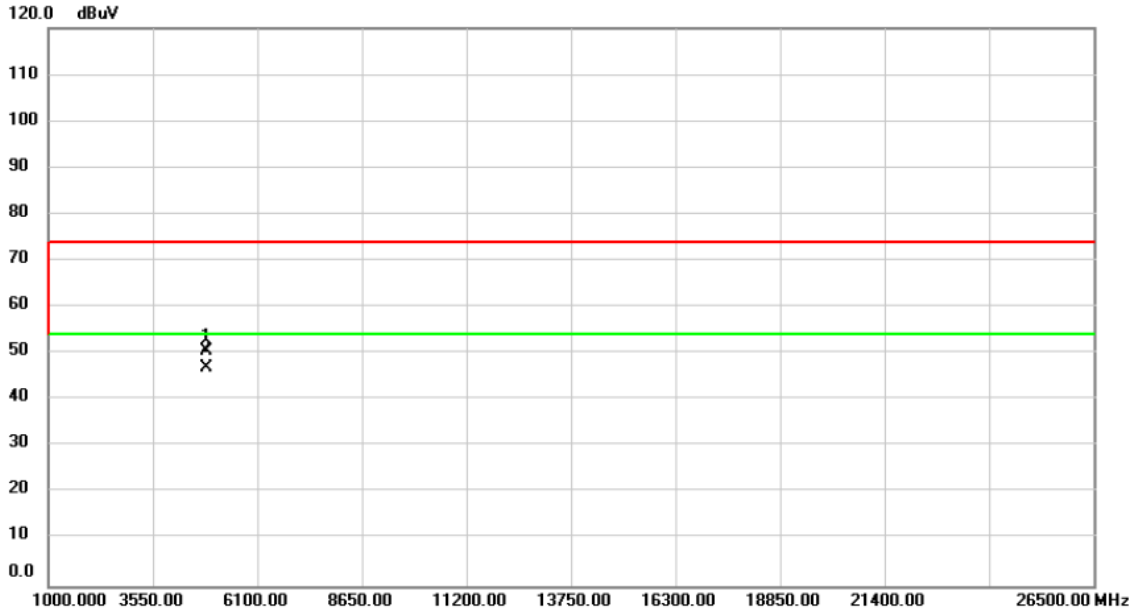
Orthogonal Axis :	X
Test Mode :	TX B Mode 2437MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2437.000	80.16	31.23	111.39	74.00	37.39	peak	No Limit
2	*	2437.000	77.05	31.23	108.28	54.00	54.28	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX B Mode 2437MHz

**Vertical**

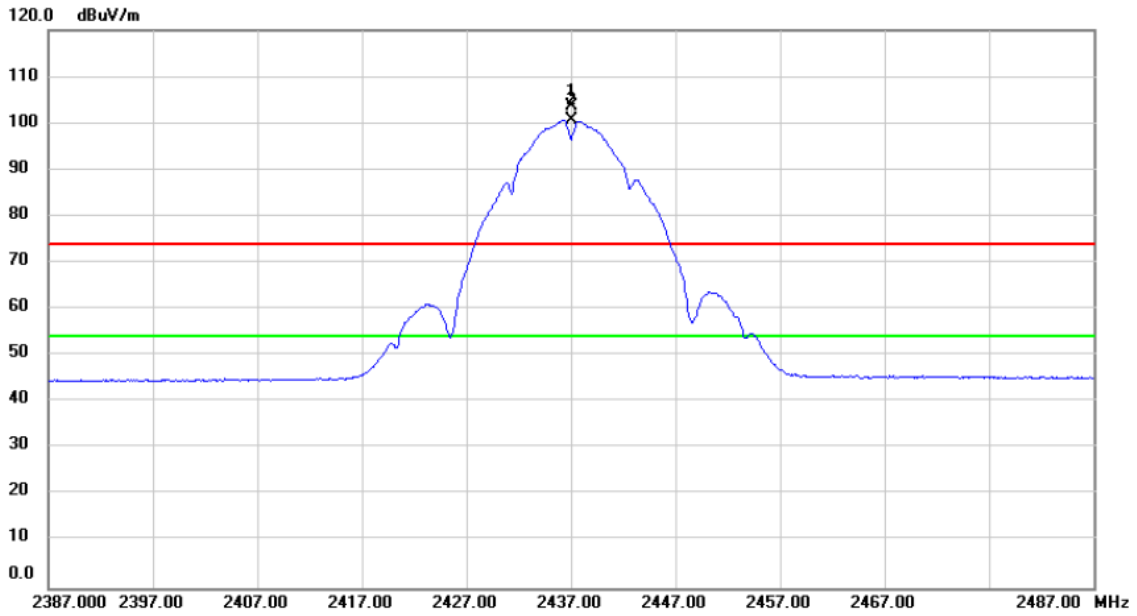


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	4874.000	61.92	-11.29	50.63	74.00	-23.37	peak	
2 *	4874.000	58.36	-11.29	47.07	54.00	-6.93	AVG	



Orthogonal Axis :	X
Test Mode :	TX B Mode 2437MHz

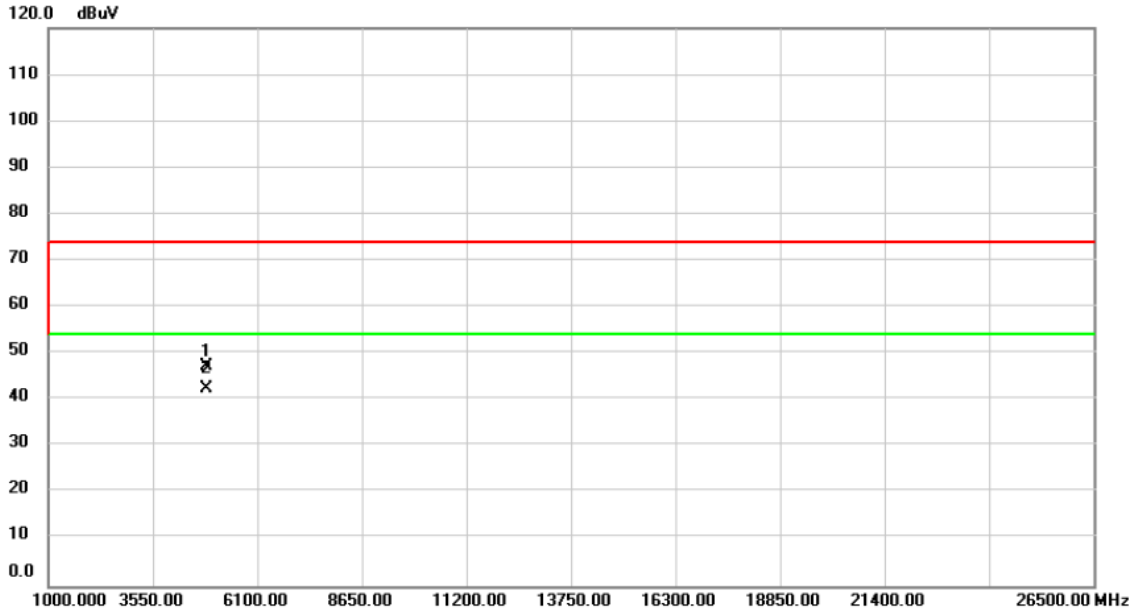
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2437.000	72.54	31.23	103.77	74.00	29.77	peak	No Limit
2	*	2437.000	69.48	31.23	100.71	54.00	46.71	AVG	No Limit

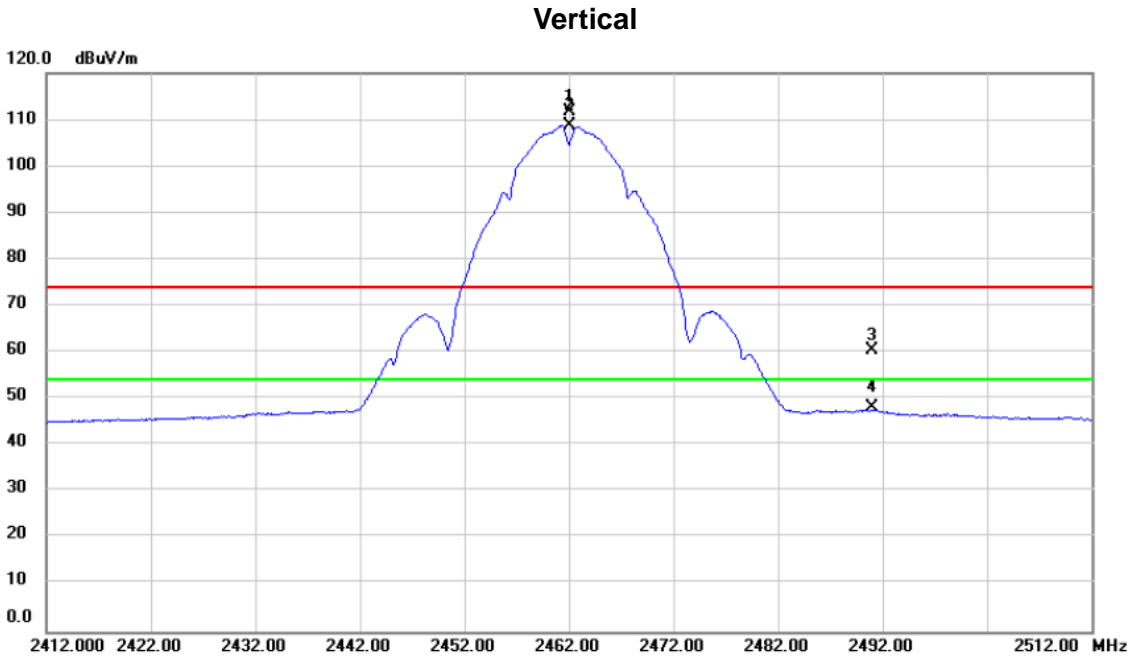
Orthogonal Axis :	X
Test Mode :	TX B Mode 2437MHz

**Horizontal**



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	4874.000	58.66	-11.29	47.37	74.00	-26.63	peak	
2 *	4874.000	53.69	-11.29	42.40	54.00	-11.60	AVG	

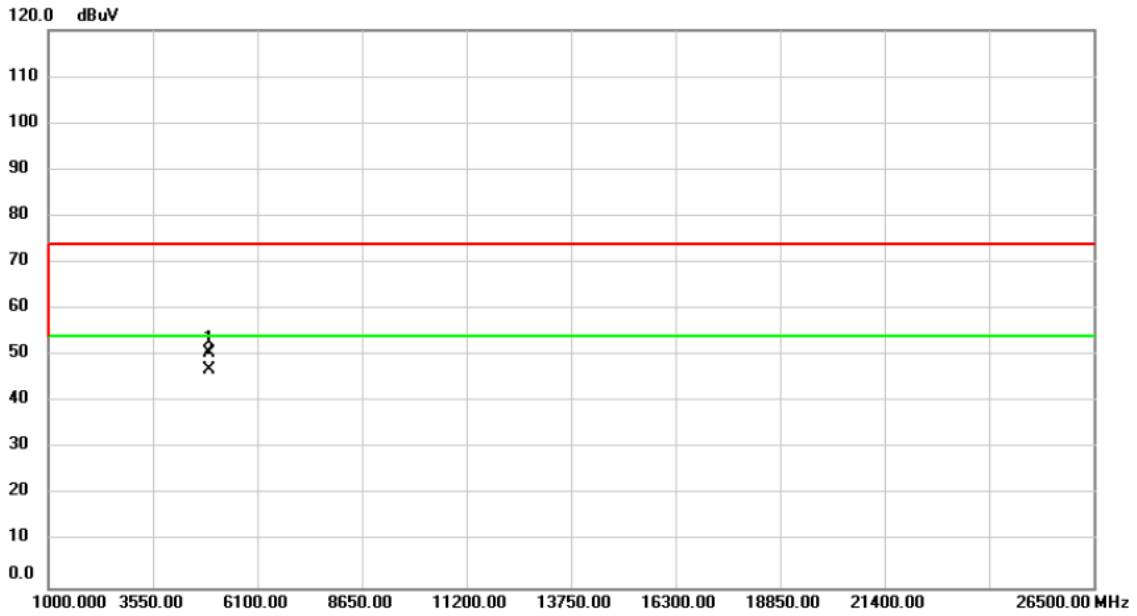
Orthogonal Axis :	X
Test Mode :	TX B Mode 2462MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2462.000	80.40	31.33	111.73	74.00	37.73	peak	No Limit
2	*	2462.000	77.33	31.33	108.66	54.00	54.66	AVG	No Limit
3		2490.991	29.10	31.43	60.53	74.00	-13.47	peak	
4		2490.991	16.81	31.43	48.24	54.00	-5.76	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2462MHz

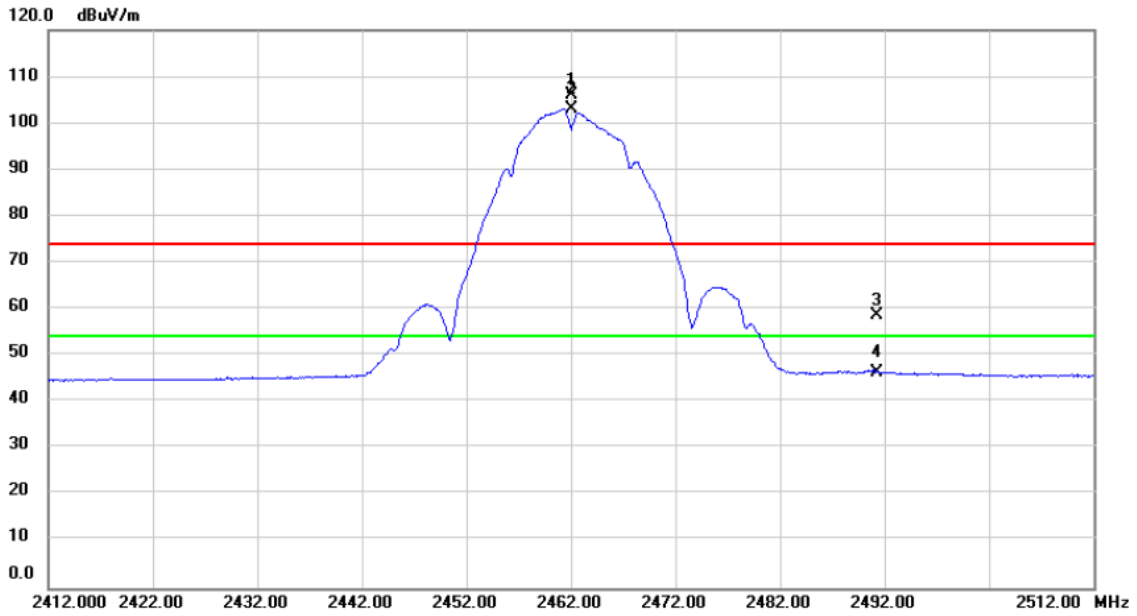
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		4924.000	61.82	-11.22	50.60	74.00	-23.40	peak	
2	*	4924.000	58.23	-11.22	47.01	54.00	-6.99	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2462MHz

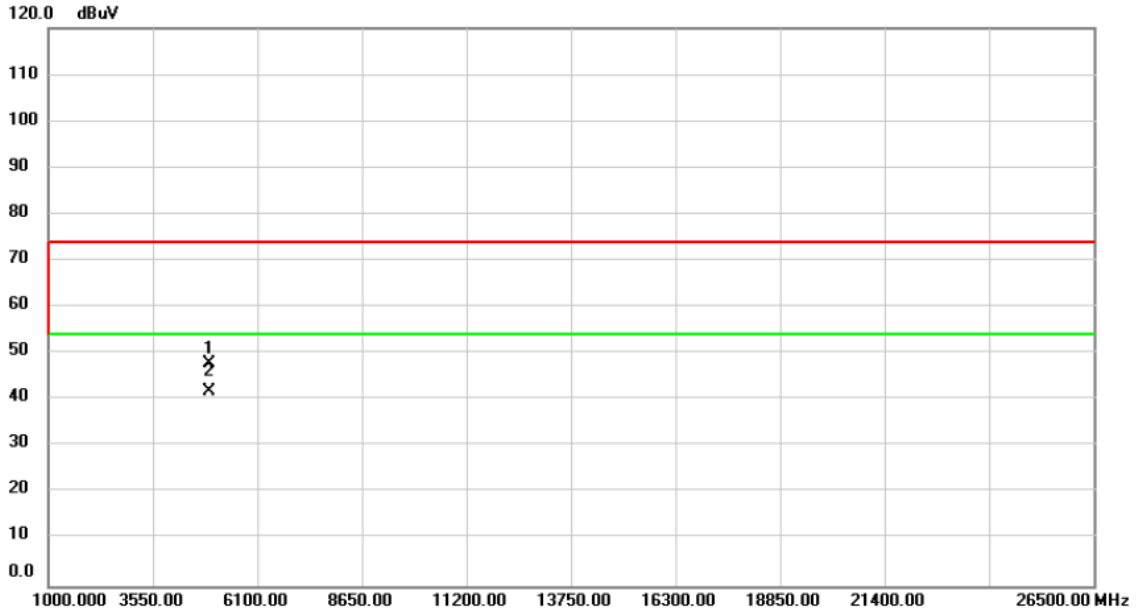
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2462.000	74.82	31.33	106.15	74.00	32.15	peak	No Limit
2	*	2462.000	71.73	31.33	103.06	54.00	49.06	AVG	No Limit
3		2491.321	27.33	31.44	58.77	74.00	-15.23	peak	
4		2491.321	14.83	31.44	46.27	54.00	-7.73	AVG	

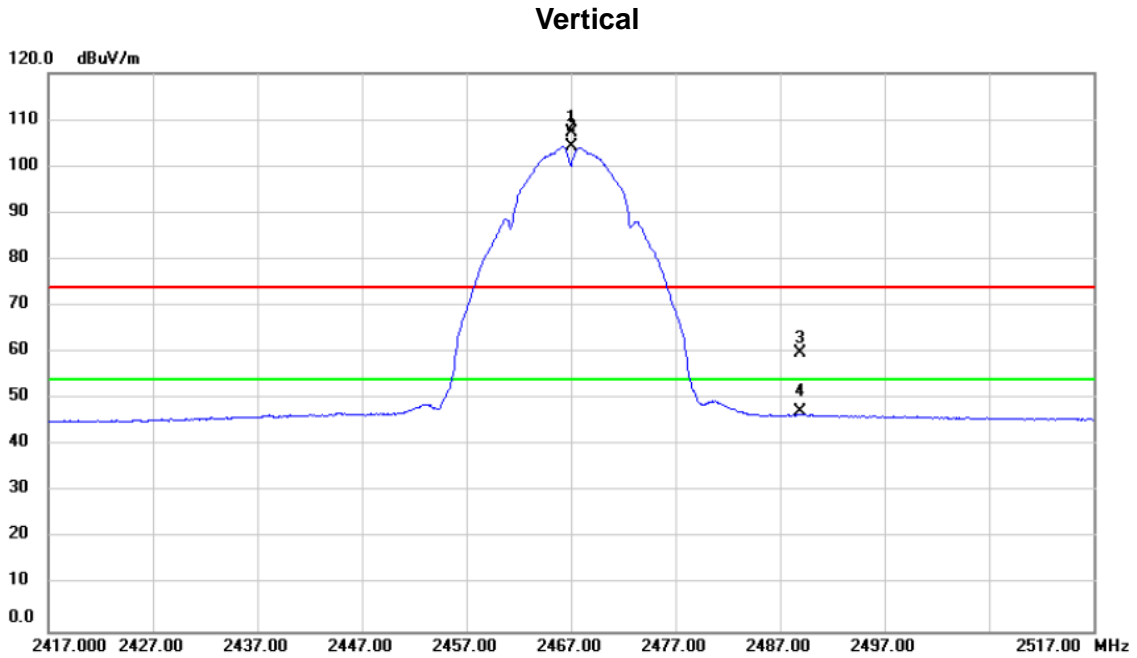
Orthogonal Axis :	X
Test Mode :	TX B Mode 2462MHz

**Horizontal**



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	4924.000	59.13	-11.22	47.91	74.00	-26.09	peak	
2 *	4924.000	53.08	-11.22	41.86	54.00	-12.14	AVG	

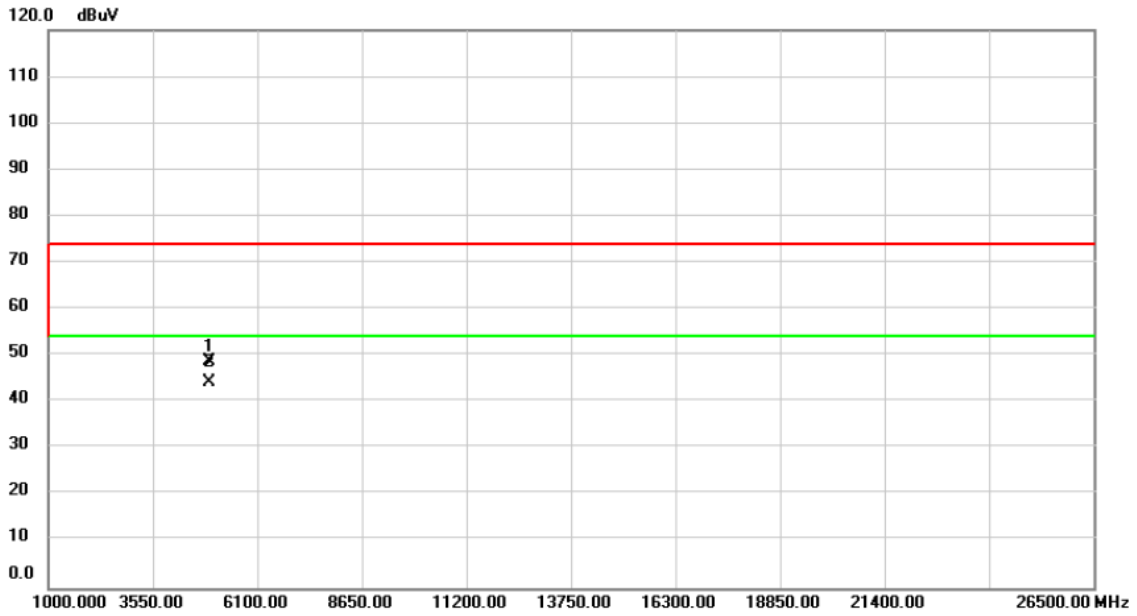
Orthogonal Axis :	X
Test Mode :	TX B Mode 2467MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2467.000	75.94	31.35	107.29	74.00	33.29	peak	No Limit
2	*	2467.000	72.85	31.35	104.20	54.00	50.20	AVG	No Limit
3		2488.994	28.37	31.43	59.80	74.00	-14.20	peak	
4		2488.994	15.75	31.43	47.18	54.00	-6.82	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2467MHz

**Vertical**

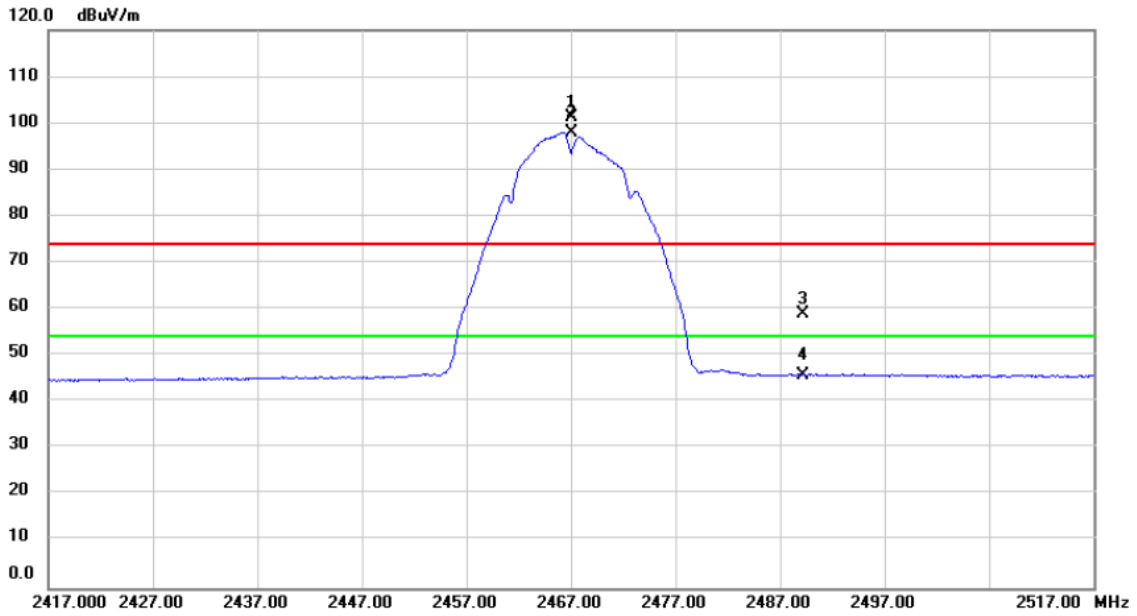


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		4934.000	59.92	-11.21	48.71	74.00	-25.29	peak	
2	*	4934.000	55.46	-11.21	44.25	54.00	-9.75	AVG	



Orthogonal Axis :	X
Test Mode :	TX B Mode 2467MHz

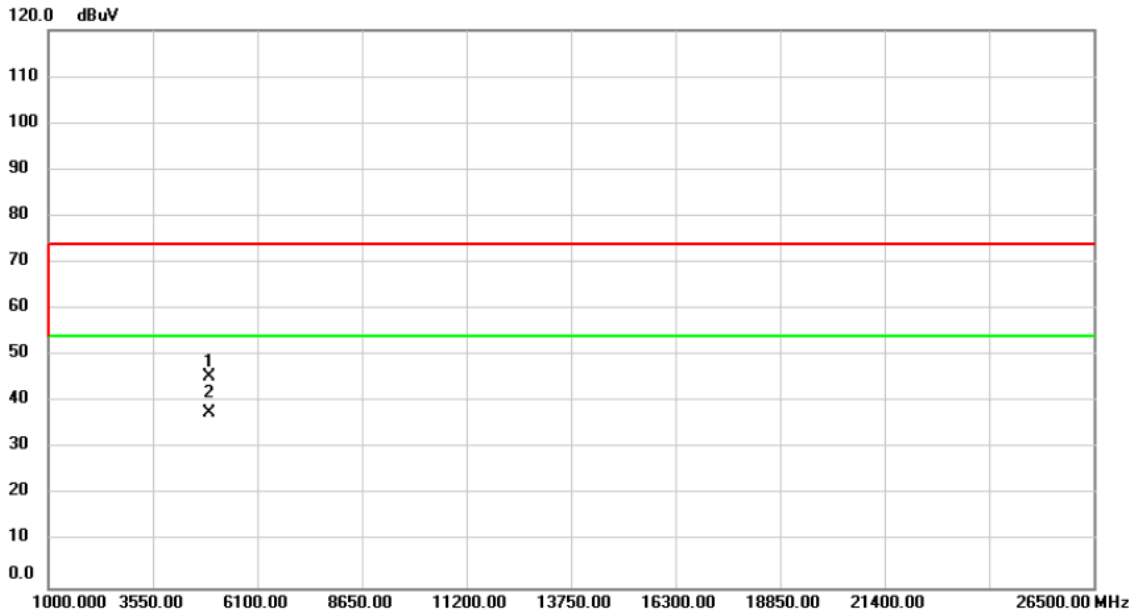
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2467.000	69.77	31.35	101.12	74.00	27.12	peak	No Limit
2	*	2467.000	66.65	31.35	98.00	54.00	44.00	AVG	No Limit
3		2489.228	27.46	31.43	58.89	74.00	-15.11	peak	
4		2489.228	14.22	31.43	45.65	54.00	-8.35	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2467MHz

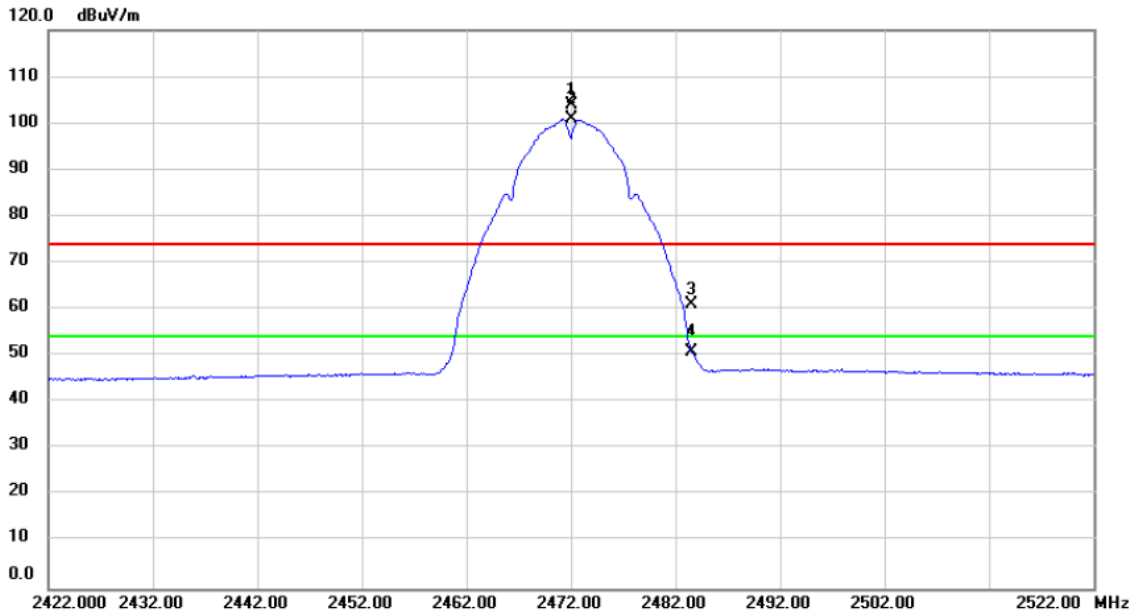
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		4934.000	56.62	-11.21	45.41	74.00	-28.59	peak	
2	*	4934.000	48.89	-11.21	37.68	54.00	-16.32	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2472MHz

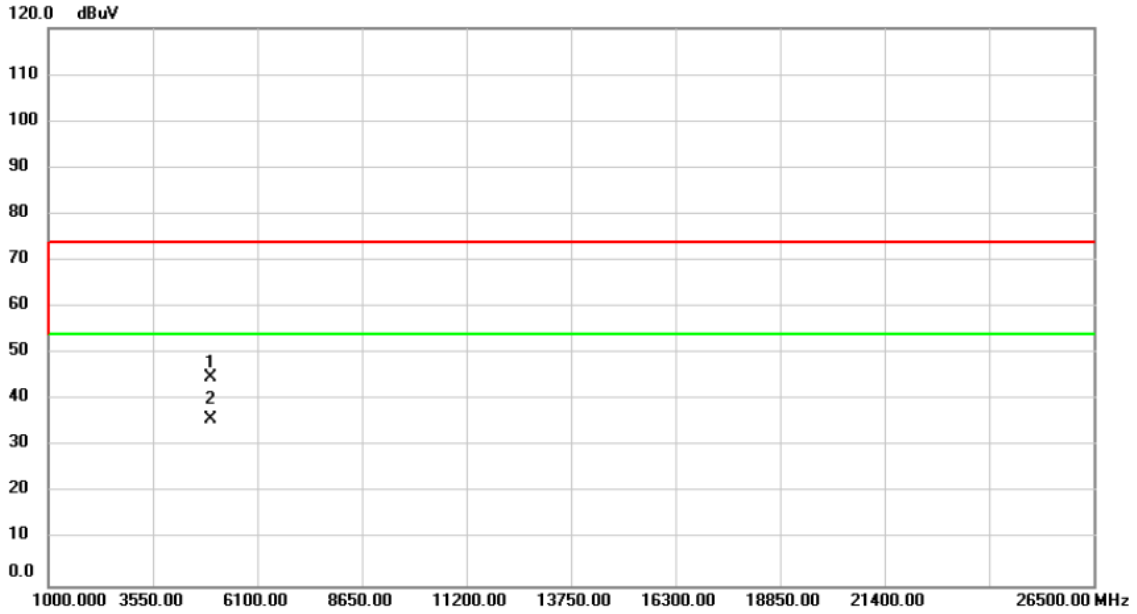
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2472.000	72.64	31.37	104.01	74.00	30.01	peak	No Limit
2	*	2472.000	69.49	31.37	100.86	54.00	46.86	AVG	No Limit
3		2483.500	29.76	31.41	61.17	74.00	-12.83	peak	
4		2483.500	19.52	31.41	50.93	54.00	-3.07	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2472MHz

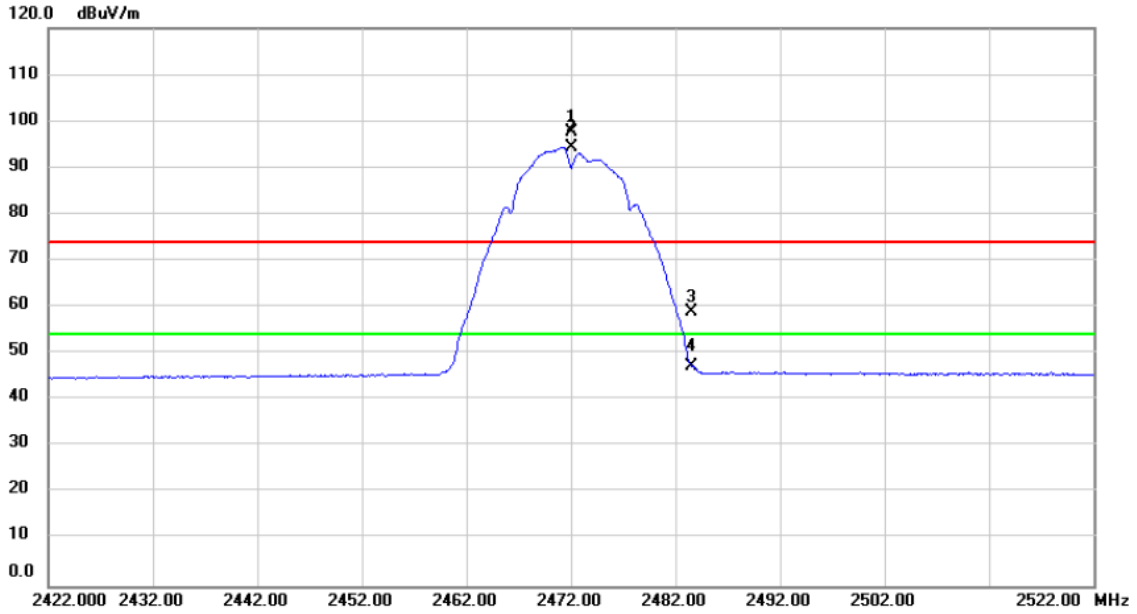
**Vertical**



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	4944.000	55.94	-11.19	44.75	74.00	-29.25	peak	
2 *	4944.000	47.03	-11.19	35.84	54.00	-18.16	AVG	

Orthogonal Axis :	X
Test Mode :	TX B Mode 2472MHz

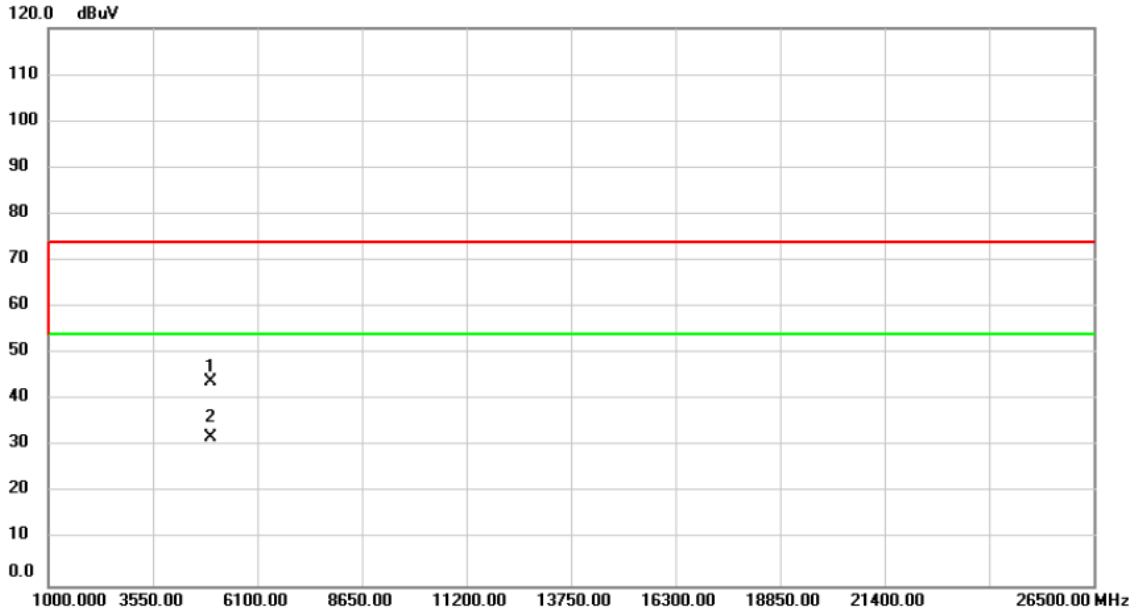
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2472.000	66.23	31.37	97.60	74.00	23.60	peak	No Limit
2	*	2472.000	63.01	31.37	94.38	54.00	40.38	AVG	No Limit
3		2483.500	27.54	31.41	58.95	74.00	-15.05	peak	
4		2483.500	15.71	31.41	47.12	54.00	-6.88	AVG	

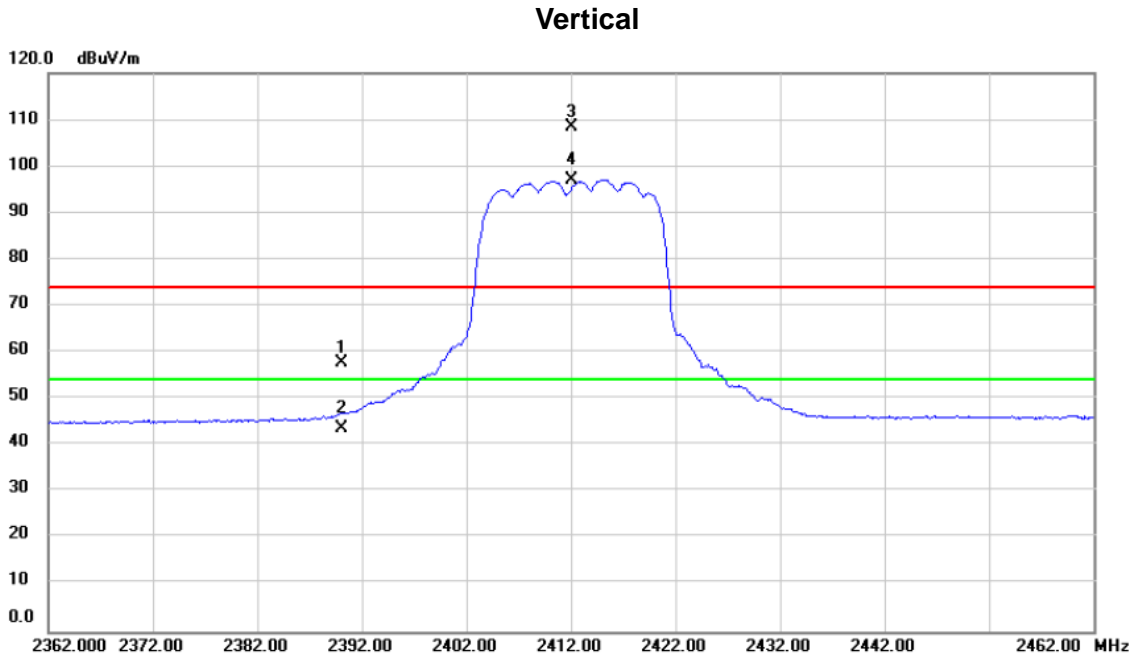
Orthogonal Axis :	X
Test Mode :	TX B Mode 2472MHz

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		4944.000	55.23	-11.19	44.04	74.00	-29.96	peak	
2	*	4944.000	43.27	-11.19	32.08	54.00	-21.92	AVG	

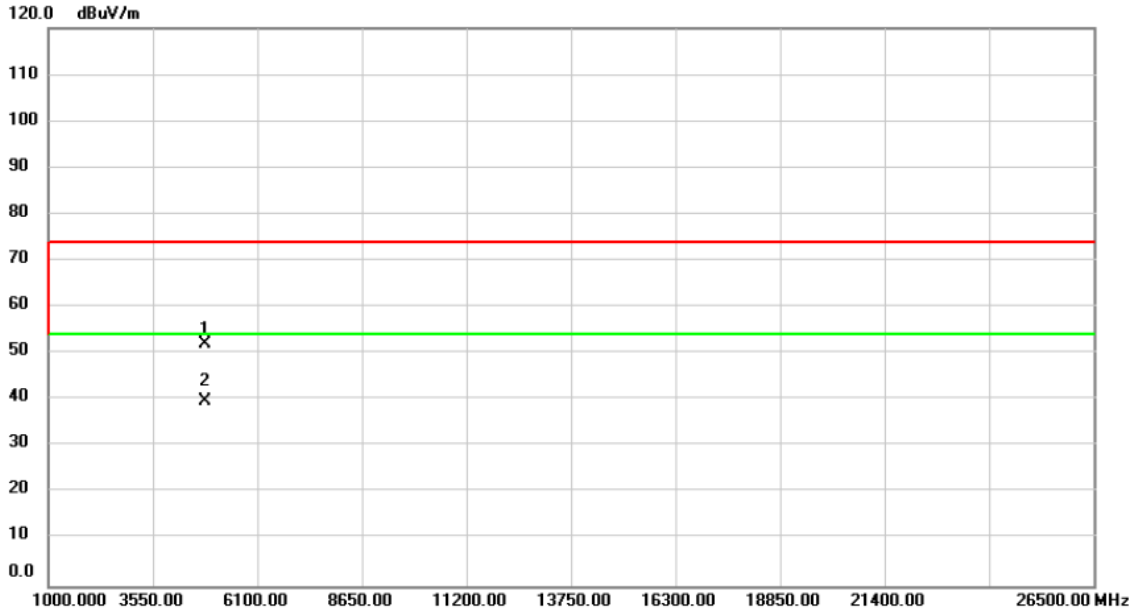
Orthogonal Axis :	X
Test Mode :	TX G Mode 2412MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	26.56	31.06	57.62	74.00	-16.38	peak	
2		2390.000	12.66	31.06	43.72	54.00	-10.28	AVG	
3	X	2412.000	77.20	31.14	108.34	74.00	34.34	peak	No Limit
4	*	2412.000	65.93	31.14	97.07	54.00	43.07	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G Mode 2412MHz

**Vertical**

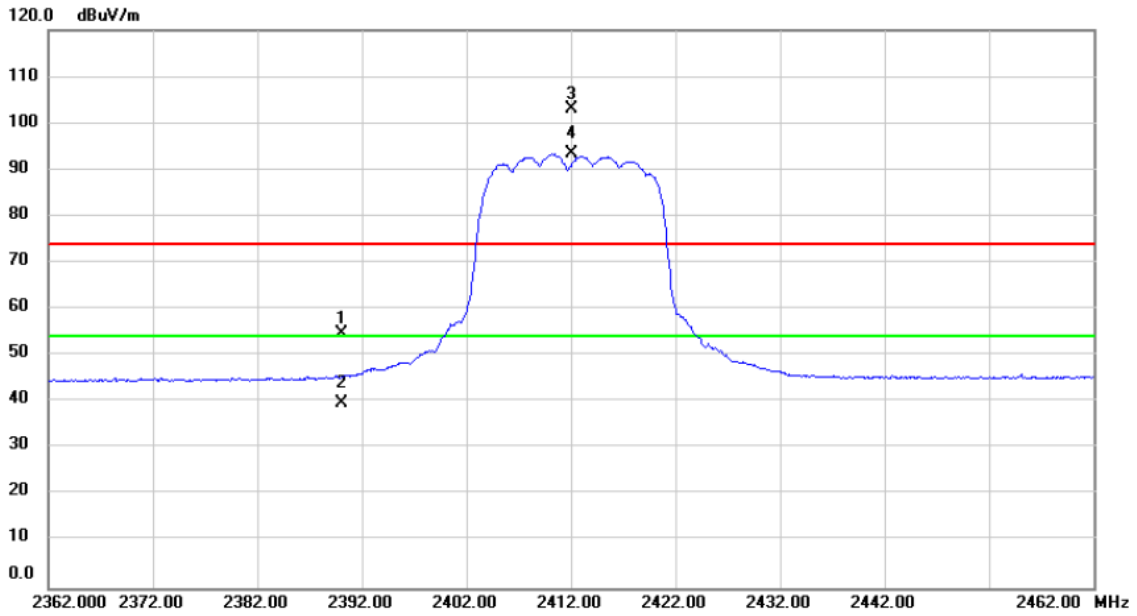


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4824.000	63.40	-11.37	52.03	74.00	-21.97	peak	
2	*	4824.000	51.09	-11.37	39.72	54.00	-14.28	AVG	



Orthogonal Axis :	X
Test Mode :	TX G Mode 2412MHz

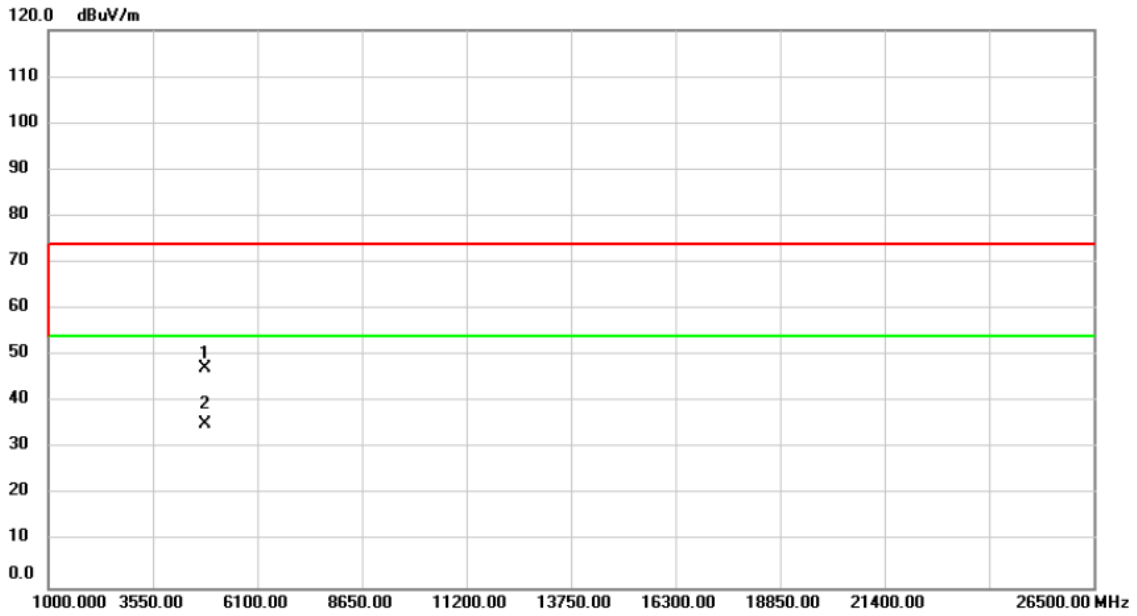
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.63	31.06	54.69	74.00	-19.31	peak	
2		2390.000	8.61	31.06	39.67	54.00	-14.33	AVG	
3	X	2412.000	71.86	31.14	103.00	74.00	29.00	peak	No Limit
4	*	2412.000	62.19	31.14	93.33	54.00	39.33	AVG	No Limit

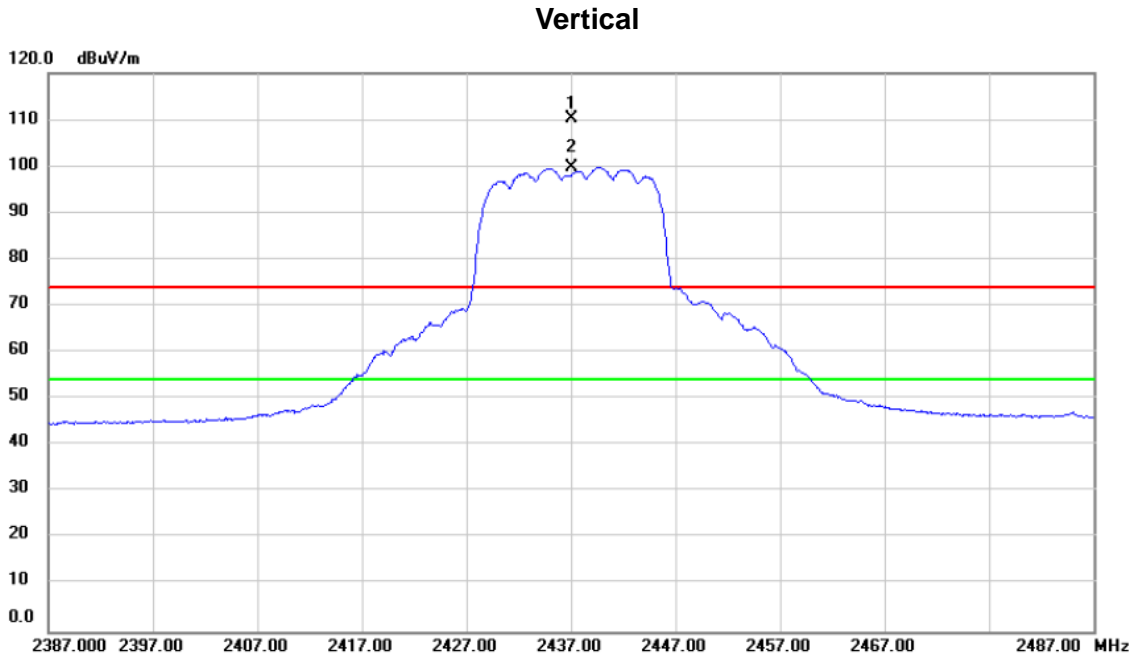
Orthogonal Axis :	X
Test Mode :	TX G Mode 2412MHz

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4824.000	58.65	-11.37	47.28	74.00	-26.72	peak	
2	*	4824.000	46.77	-11.37	35.40	54.00	-18.60	AVG	

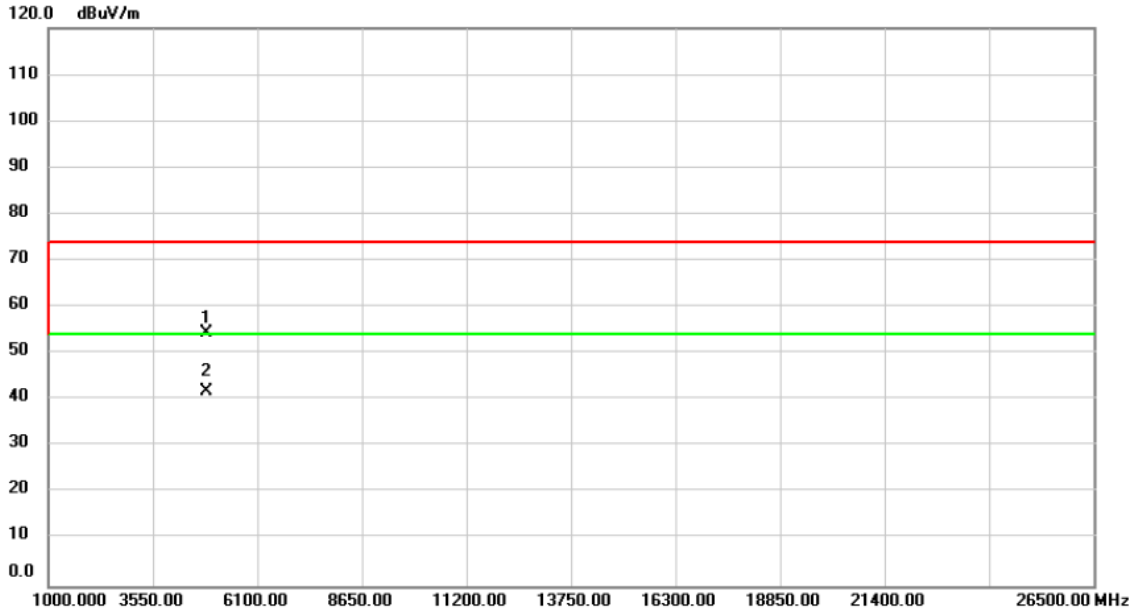
Orthogonal Axis :	X
Test Mode :	TX G Mode 2437MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2437.000	78.97	31.23	110.20	74.00	36.20	peak	No Limit
2	*	2437.000	68.64	31.23	99.87	54.00	45.87	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G Mode 2437MHz

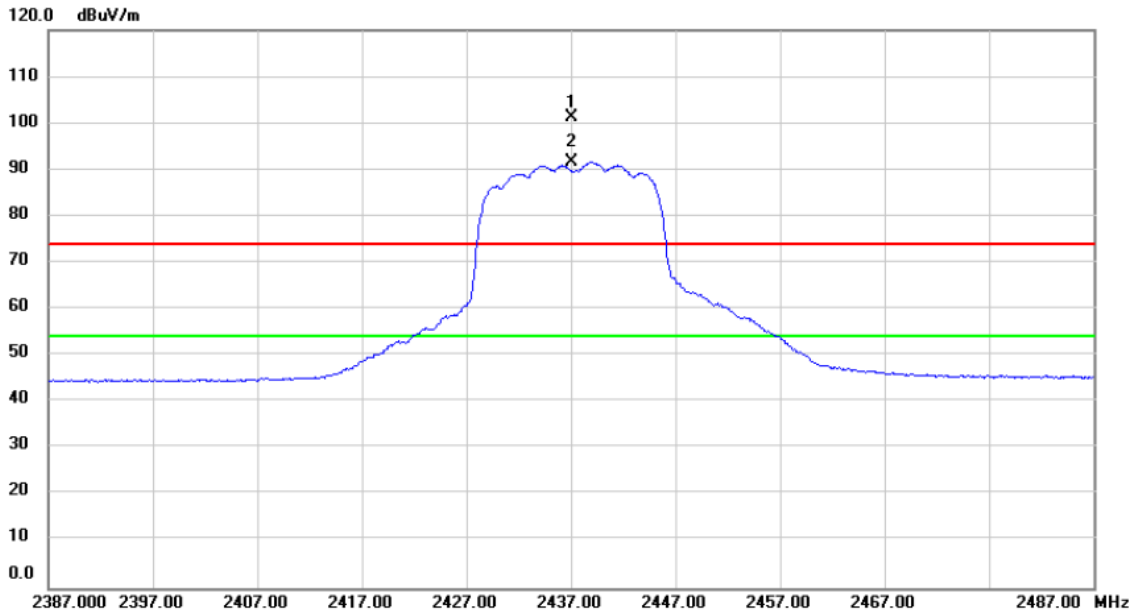
**Vertical**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4874.000	65.62	-11.29	54.33	74.00	-19.67	peak	
2	*	4874.000	53.20	-11.29	41.91	54.00	-12.09	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2437MHz

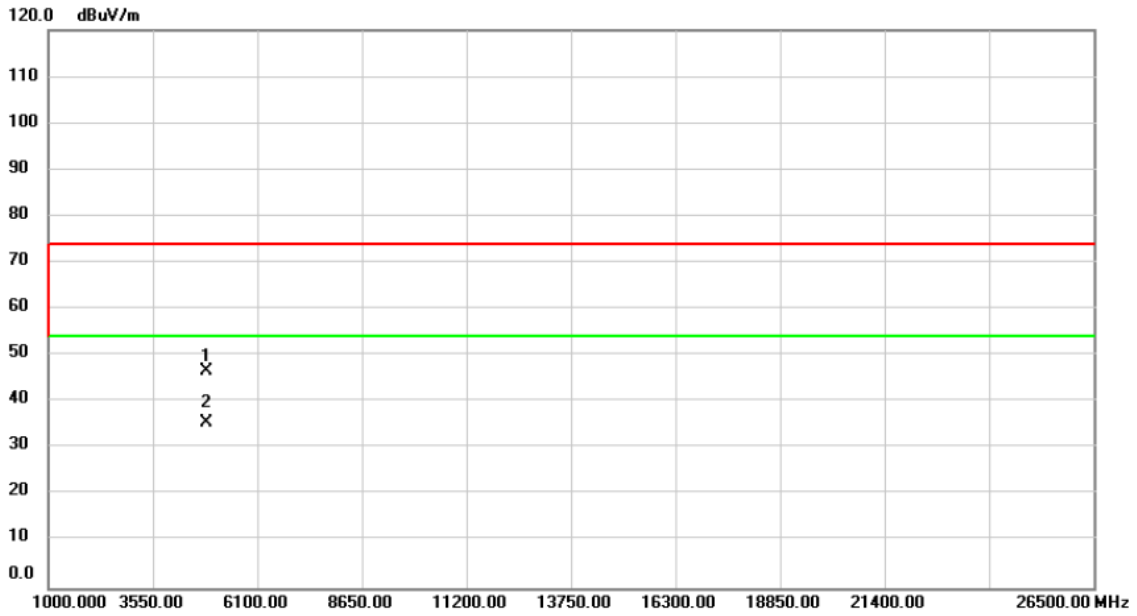
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2437.000	69.97	31.23	101.20	74.00	27.20	peak	No Limit
2	*	2437.000	60.46	31.23	91.69	54.00	37.69	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX G Mode 2437MHz

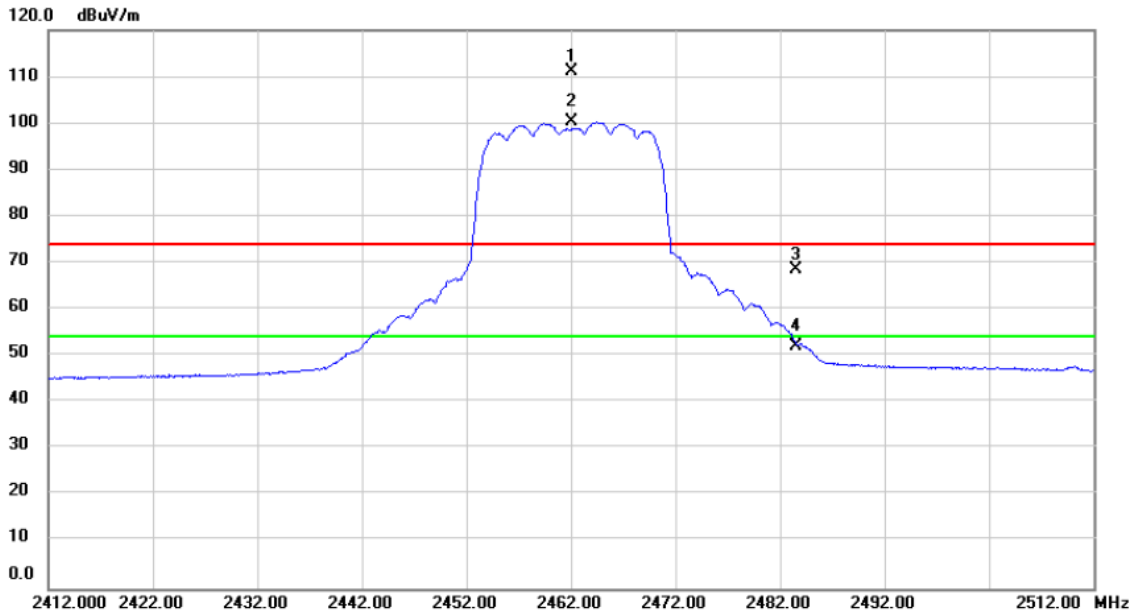
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4874.000	58.04	-11.29	46.75	74.00	-27.25	peak	
2	*	4874.000	46.79	-11.29	35.50	54.00	-18.50	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2462MHz

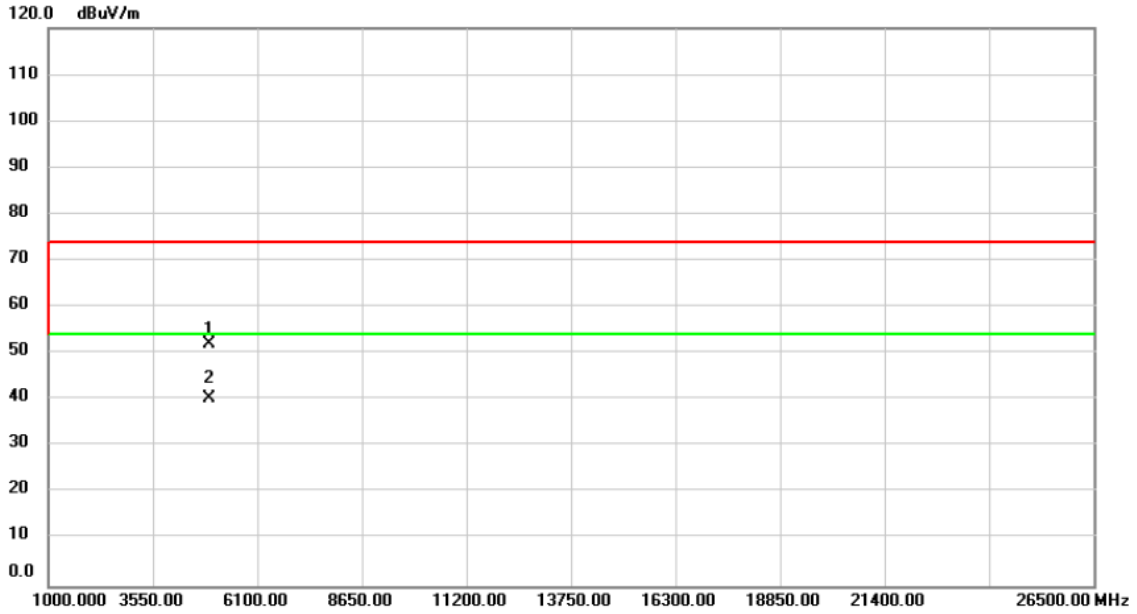
**Vertical**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2462.000	79.85	31.33	111.18	74.00	37.18	peak	No Limit
2	*	2462.000	69.01	31.33	100.34	54.00	46.34	AVG	No Limit
3		2483.500	37.17	31.41	68.58	74.00	-5.42	peak	
4		2483.500	20.63	31.41	52.04	54.00	-1.96	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2462MHz

**Vertical**

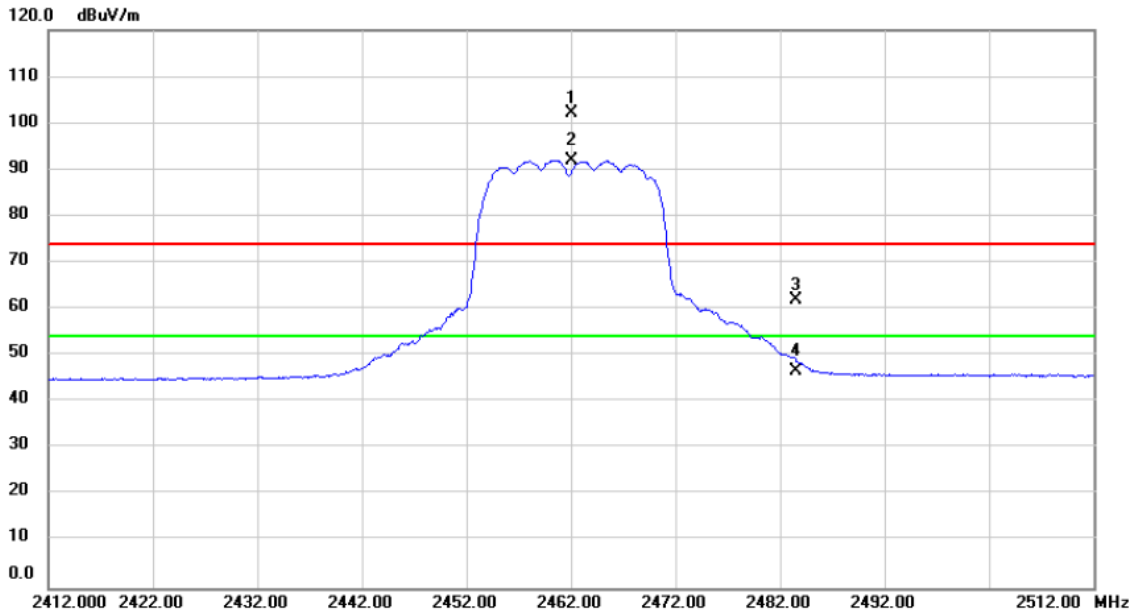


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	4924.000	63.40	-11.22	52.18	74.00	-21.82	peak	
2 *	4924.000	51.44	-11.22	40.22	54.00	-13.78	AVG	



Orthogonal Axis :	X
Test Mode :	TX G Mode 2462MHz

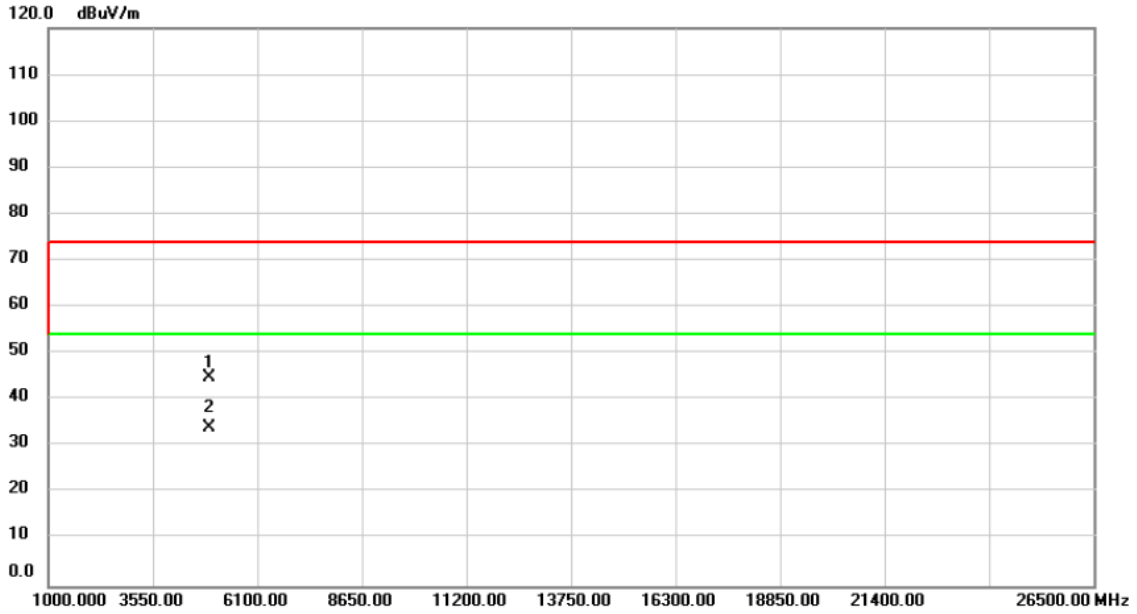
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2462.000	70.83	31.33	102.16	74.00	28.16	peak	No Limit
2	*	2462.000	60.73	31.33	92.06	54.00	38.06	AVG	No Limit
3		2483.500	30.57	31.41	61.98	74.00	-12.02	peak	
4		2483.500	15.36	31.41	46.77	54.00	-7.23	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2462MHz

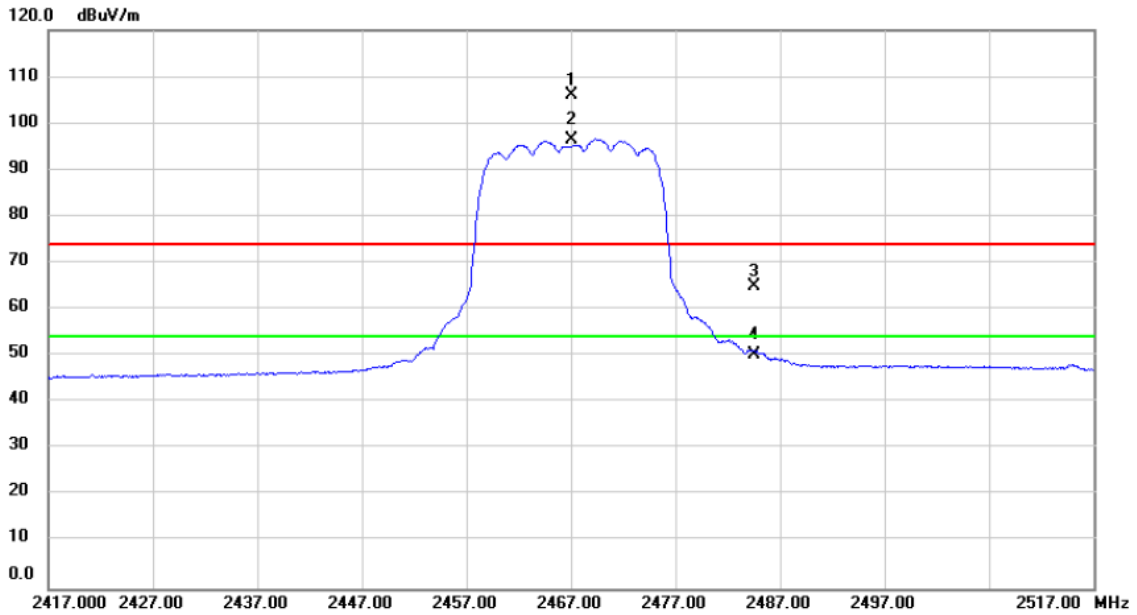
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4924.000	55.96	-11.22	44.74	74.00	-29.26	peak	
2	*	4924.000	45.23	-11.22	34.01	54.00	-19.99	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2467MHz

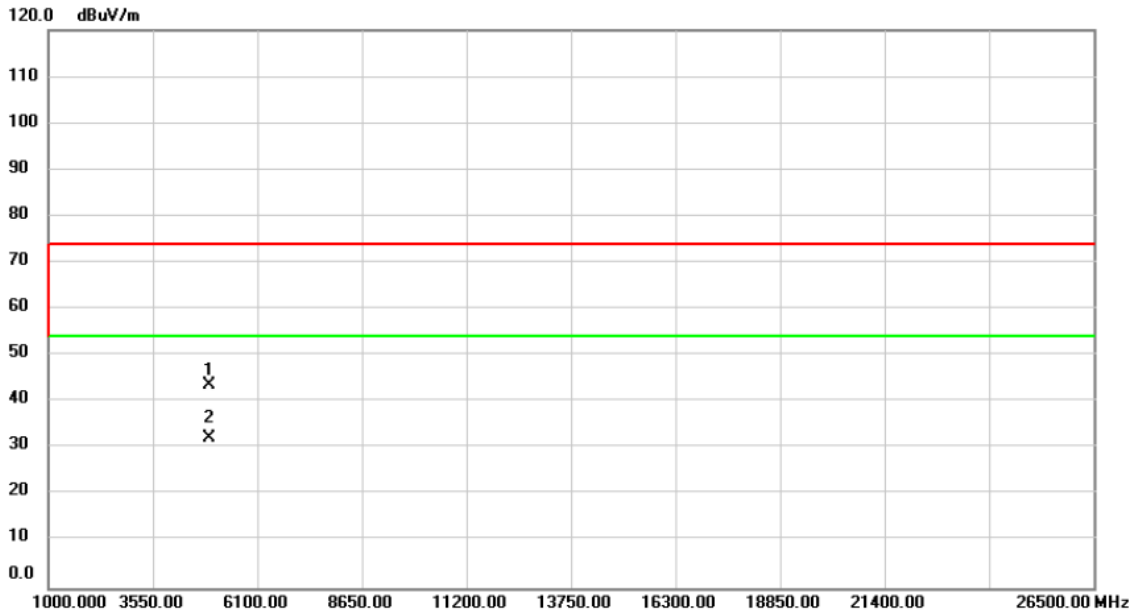
**Vertical**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2467.000	74.80	31.35	106.15	74.00	32.15	peak	No Limit
2	*	2467.000	65.25	31.35	96.60	54.00	42.60	AVG	No Limit
3		2484.490	33.43	31.42	64.85	74.00	-9.15	peak	
4		2484.490	18.88	31.42	50.30	54.00	-3.70	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2467MHz

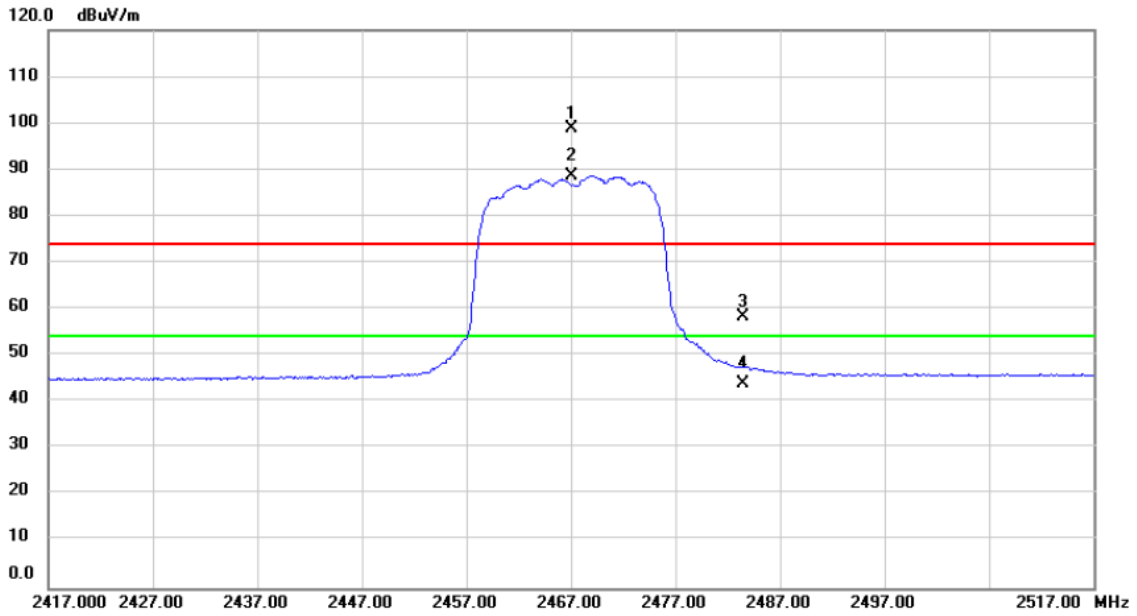
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4934.000	54.95	-11.21	43.74	74.00	-30.26	peak	
2	*	4934.000	43.44	-11.21	32.23	54.00	-21.77	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2467MHz

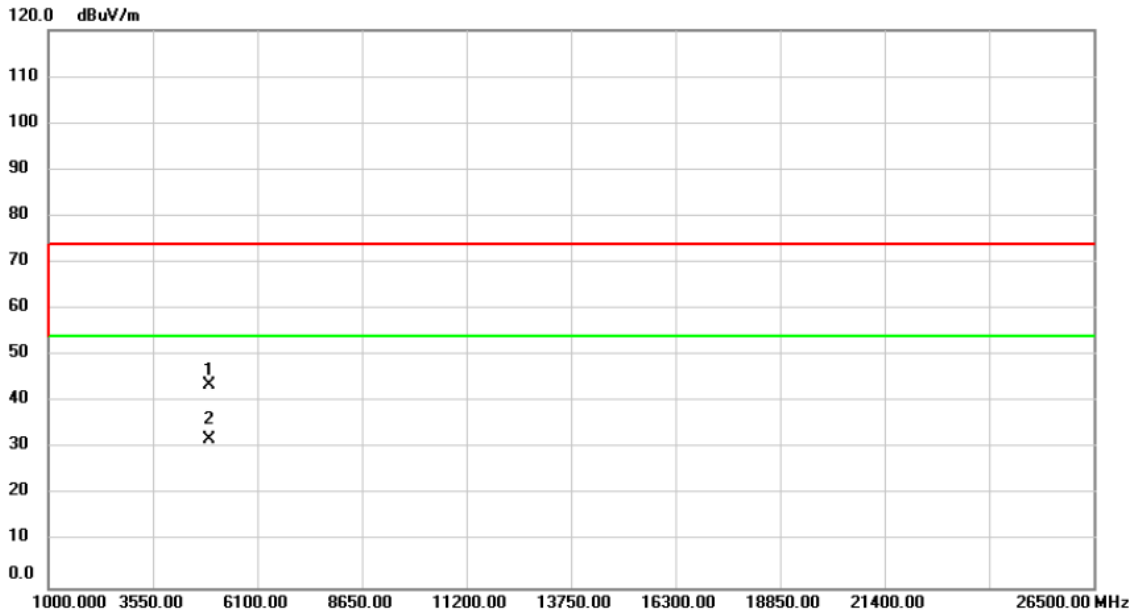
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2467.000	67.52	31.35	98.87	74.00	24.87	peak	No Limit
2	*	2467.000	57.45	31.35	88.80	54.00	34.80	AVG	No Limit
3		2483.500	27.03	31.41	58.44	74.00	-15.56	peak	
4		2483.500	12.56	31.41	43.97	54.00	-10.03	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2467MHz

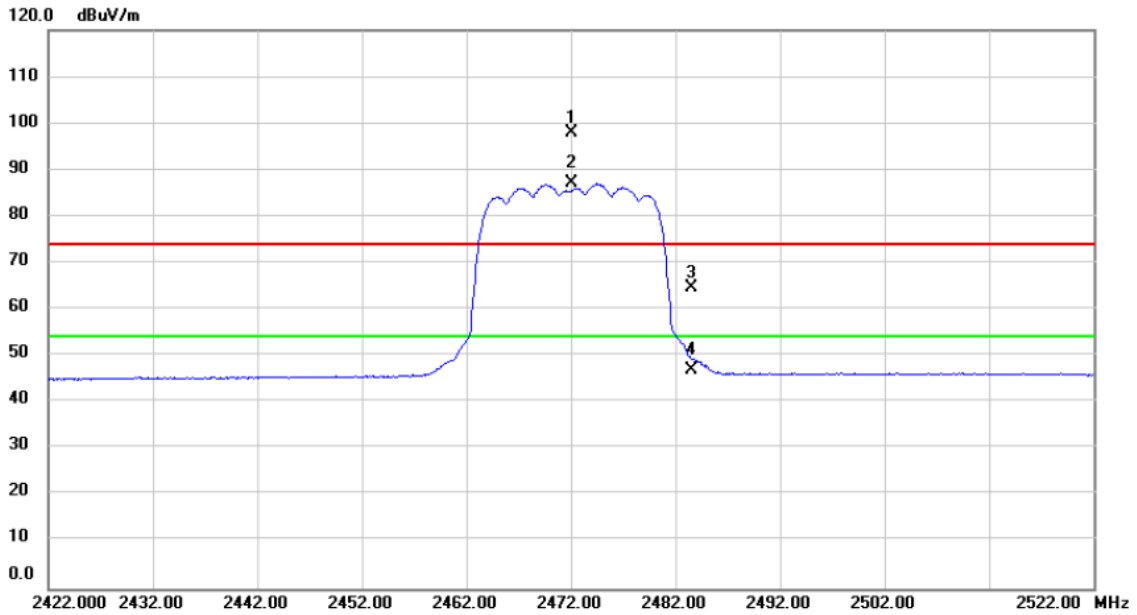
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4934.000	55.00	-11.21	43.79	74.00	-30.21	peak	
2	*	4934.000	43.27	-11.21	32.06	54.00	-21.94	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2472MHz

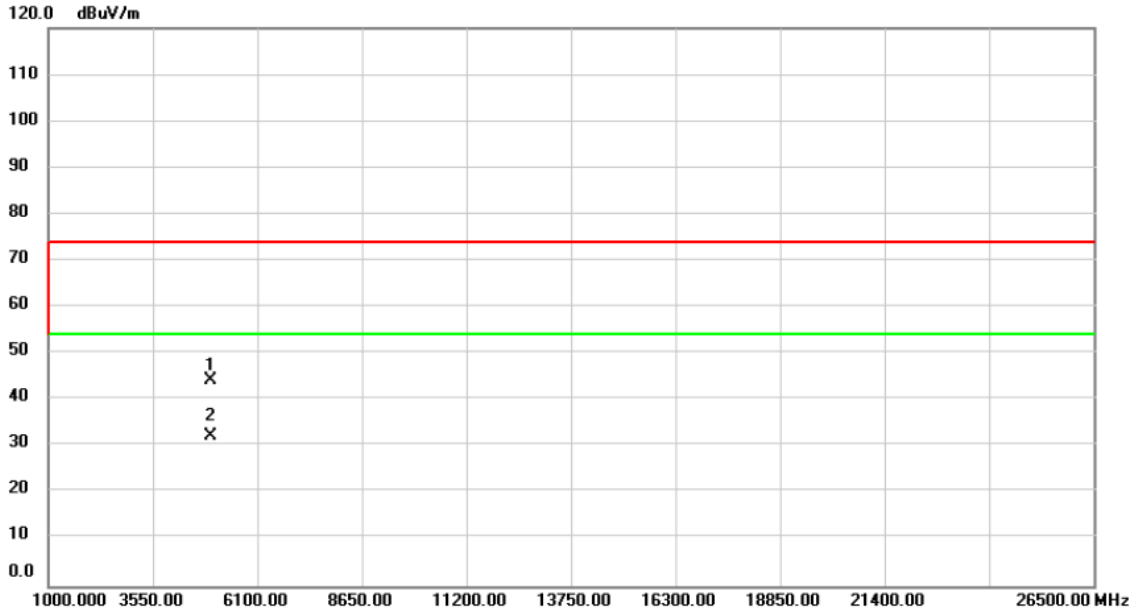
**Vertical**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	X	2472.000	66.52	31.37	97.89	74.00	23.89	peak	No Limit
2	*	2472.000	55.66	31.37	87.03	54.00	33.03	AVG	No Limit
3		2483.500	33.19	31.41	64.60	74.00	-9.40	peak	
4		2483.500	15.69	31.41	47.10	54.00	-6.90	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2472MHz

**Vertical**

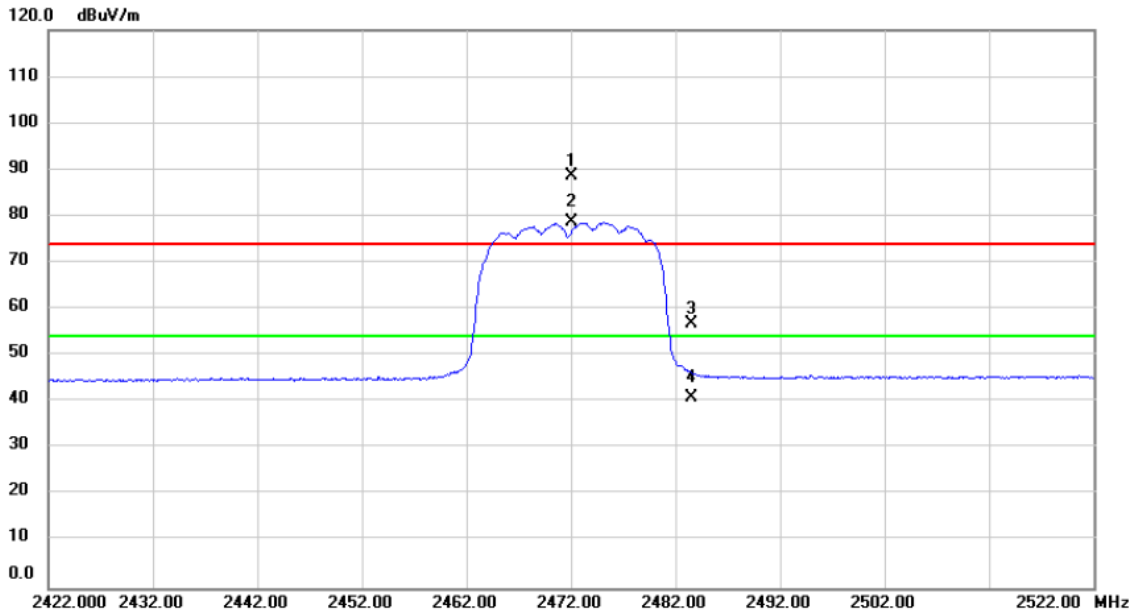


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4944.000	55.30	-11.19	44.11	74.00	-29.89	peak	
2	*	4944.000	43.36	-11.19	32.17	54.00	-21.83	AVG	



Orthogonal Axis :	X
Test Mode :	TX G Mode 2472MHz

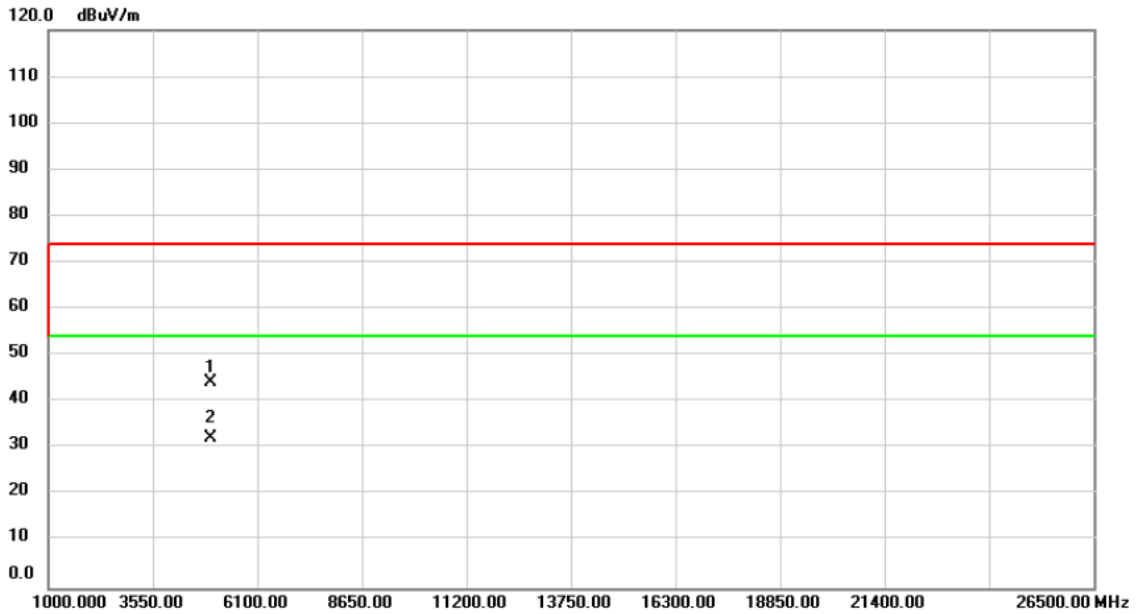
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2472.000	57.38	31.37	88.75	74.00	14.75	peak	No Limit
2	*	2472.000	47.26	31.37	78.63	54.00	24.63	AVG	No Limit
3		2483.500	25.37	31.41	56.78	74.00	-17.22	peak	
4		2483.500	9.65	31.41	41.06	54.00	-12.94	AVG	

Orthogonal Axis :	X
Test Mode :	TX G Mode 2472MHz

**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4944.000	55.42	-11.19	44.23	74.00	-29.77	peak	
2	*	4944.000	43.43	-11.19	32.24	54.00	-21.76	AVG	