FCC Test Report

for

2.4GHz Radio Control System

Trade Name	**:**	**SKYION**
Model Number	**:**	**MOD-3**
FCC ID	**:**	**YUP-2012-MOD3**
Report Number	**:**	**RF- C450-1207-488**
Date of Receipt	**:**	**August 1, 2012**
Date of Report	**:**	**August 23, 2012**

Prepared for

Supercon Co., Ltd.

No. 16, Lane 105, Cheng Fu Rd, Sanhsia District, New Taipei City, Taiwan

Prepared by

Central Research Technology Co.

EMC Test Laboratory

No.11, Lane41, Fushuen St., Jungshan Chiu, Taipei, Taiwan, 104, R.O.C.

NVLAP LAB CODE 200575-0

Verification of Compliance

Equipment under Test	**:** 2.4GHz Radio Control System
Model No.	**:** MOD-3
FCC ID	**:** YUP-2012-MOD3
Applicant	**:** Supercon Co., Ltd.
Address	**:** No. 16, Lane 105, Cheng Fu Rd, Sanhsia District, New Taipei City, Taiwan
Applicable Standards	**: 47 CFR part 15, Subpart C**
Date of Testing	**:** August 1~10, 2012
Deviation	**:** N/A
Condition of Test Sample	**:** Mass Production

We, **Central Research Technology Co**., hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

PREPARED BY : Cathy Chen , **DATE :** Aug. 23, 2012
(Cathy Chen/ Technical Manager)

APPROVED BY : J. Y. Shih , **DATE :** Aug. 23, 2012
(Tsun-Yu Shih/General Manager)

Contents

1 General Description

1.1 General Description of EUT

Equipment under Test	:	2.4GHz Radio Control System
Model No.	:	MOD-3
Power in	:	DC 6V by batteries
Test Voltage	:	6Vdc
Manufacturer	:	Supercon Co., Ltd.
Channel Numbers	:	59
Frequency Range	:	2407~2465MHz
Channel Bandwidth	:	1MHz
Modulation	:	GFSK
Antenna Spec	:	Printed Antenna 3dBi
Function Description	:	

The EUT is used to transmit control command. Please refer to the user's manual for the details.

1.2 Test Methodology

For this EUT, both conducted and radiated emissions were performed according to the procrdures illustrated in ANSI C63.4:2003 and other required measurements were illustrated in separate sections of this test report for detail.

Since the EUT is considered a potable unit, it was pre-tested on the positioned of each 3 axis. There for only the test data of the worse case- X axiz was used for Radiated test.

1.3 Applied standards

(1) Conduction Emission Requirement

For intentional device, according to §15.207(a) line conduction emission limit is as below table.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

(2) Field strength of emissions

According to 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

(3) Radiated Emission Requirement

According to 15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For intentional device, according to §15.209, the general requirement of field strength of radiated emissions from intentional radiator at a distance of 3 meters shall not exceed the below table.

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
960 – 1610	3	500	54.0
above 1610	3	500	54.0

Note 1- The lower limit shall apply at the transition frequency.

(4) Restricted Band

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
[2]1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

1.4 The Support Units

No.	Unit	Model No./ Serial No.	Trade Name	Power Code	Supported by lab.
N/A	*	*	*	*	*

1.5 Layout of Setup

EUT

Connecting Cables :

No.	Cable	Length	Shielded	Core	Shielded Backshell	Supported by lab.	Note
N/A	*	*	*	*	*	*	*

1.6 Test Capability

Test Facility

The test facility used for evaluating the conformance of the EUT with each standard in the present report meets what required in CISPR16-1-4, CISPR16-2-3 and ANSI C63.4:2003.

Test Room	Type of Test Room	Descriptions
TR1	10m semi-anechoic chamber (23m×14m×9m)	Complying with the NSA requirements in documents CISPR 22 and ANSI C63.4:2003. For the radiated emission measurement.
TR11	3m semi-anechoic chamber (9m × 6m × 6m)	
TR13	Test Site	For the RF conducted emission measurement.
TR5	Shielding Room (8m×5m×4m)	For the conducted emission measurement.

Test Laboratory Competence Information

Central Research Technology Co. has been accredited / filed / authorized by the agencies listed in the following table.

Certificate	Nation	Agency	Code	Mark
Accreditation Certificate	USA	NVLAP	200575-0	ISO/IEC 17025
	R.O.C. (Taiwan)	TAF	0905	ISO/IEC 17025
	R.O.C. (Taiwan)	BSMI	SL2-IN-E-0033, SL2-IS-E-0033, SL2-R1/R2-E-0033, SL2-A1-E-0033 SL2-L1-E-0033	ISO/IEC 17025
Site Filing Document	USA	FCC	474046,TW1053	Test facility list & NSA Data
	Canada	IC	4699A-1,-3	Test facility list & NSA Data
	Japan	VCCI	R-1527,C-1609,T-1441,G-10	Test facility list & NSA Data
Authorization Certificate	Germany	TUV	10021687	ISO/IEC 17025
	Norway	Nemko	ELA 212	ISO/IEC 17025

The copy of each certificate can be downloaded from our web site: www.crc-lab.com

1.7 Measurement Uncertainty

The assessed measurement uncertainty with a suitable coverage factor K to ensure 95% confidence level for the normal distribution are shown as below, the values are less than U_{cispr} in table 1 of CISPR 16-4-2.

Test Item	Measurement Uncertainty	
Radiated Emission: (30MHz~200MHz)	Horizontal 3.5dB；Vertical 3.8dB	
Radiated Emission: (200MHz~1GHz)	Horizontal 3.9dB；Vertical 3.9dB	
Radiated Emission: (1GHz~18GHz)	Horizontal 3.5dB；Vertical 3.6dB	
Radiated Emission: (18GHz~26.5GHz)	Horizontal 4.4dB；Vertical 4.5dB	
Line Conducted Emission	ESH2-Z5	3.1dB
	ENV 4200	2.8dB

2 Field Strength of Fundamental Measurement

Result: Pass

2.1 Applied standard

Fundamental Frequency	Peak	Average
☐ 902 – 928 MHz	500mV/m (**114dBuV/m**)	50mV/m (**94dBuV/m**)
☑ 2400 – 2483.5 MHz	500 mV/m (**114dBuV/m**)	50 mV/m (**94dBuV/m**)
☐ 5725 – 5875 MHz	500 mV/m (**114dBuV/m**)	50 mV/m (**94dBuV/m**)
☐ 24.0 – 24.25 GHz	2500 mV/m (**128dBuV/m**)	250 mV/m (**108dBuV/m**)

2.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
Spectrum Analyzer	Agilent	FSP40/ 100031	July 11, 2012	July 11, 2013
Antenna	EMCO	3117/ 00082847	March 1, 2012	March 1, 2013
PRE-AMPLIFIER	MITEQ	JS4-00101800-28-10P/1498979	Dec. 21, 2011	Dec. 21, 2012
PRE-AMPLIFIER	MITEQ	JS4-00101800-28-5A/742309	Dec. 14, 2011	Dec. 14, 2012
Semi - anechoic Chamber	ETS. LINDGREN	TR11/ 906-A	Feb. 12, 2012	Feb. 12, 2013

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR:No Calibration Required.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
1MHz	1MHz	Peak	Maxhold	Peak
1MHz	10Hz	Peak	Maxhold	Average

Climatic Condition

Ambient Temperature：27℃ Relative Humidity : 58%

2.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. A software provided by client enabled the EUT to transmit and receive data at operating frequency.

c. If the EUT is tabletop equipment, it should be placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it should be placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.

d. The EUT is set 3m away from the receiving antenna.

e. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.

f. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine higher emission level and record it.

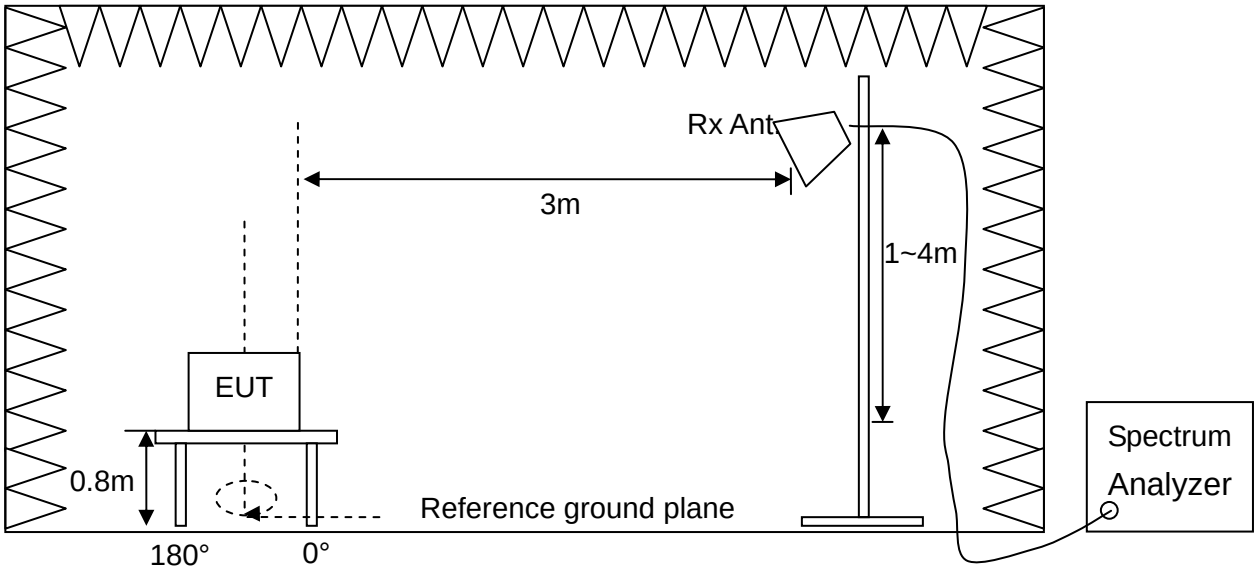
g. Then measure frequency found from step f. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.

h. Set the spectrum detector to be Peak or Average to find out the maximum level occurred.

i. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.

a. Change the receiving antenna to another polarization to measure radiated emission by following step e. to i. again.

2.4 Test configuration



2.5 Test Data

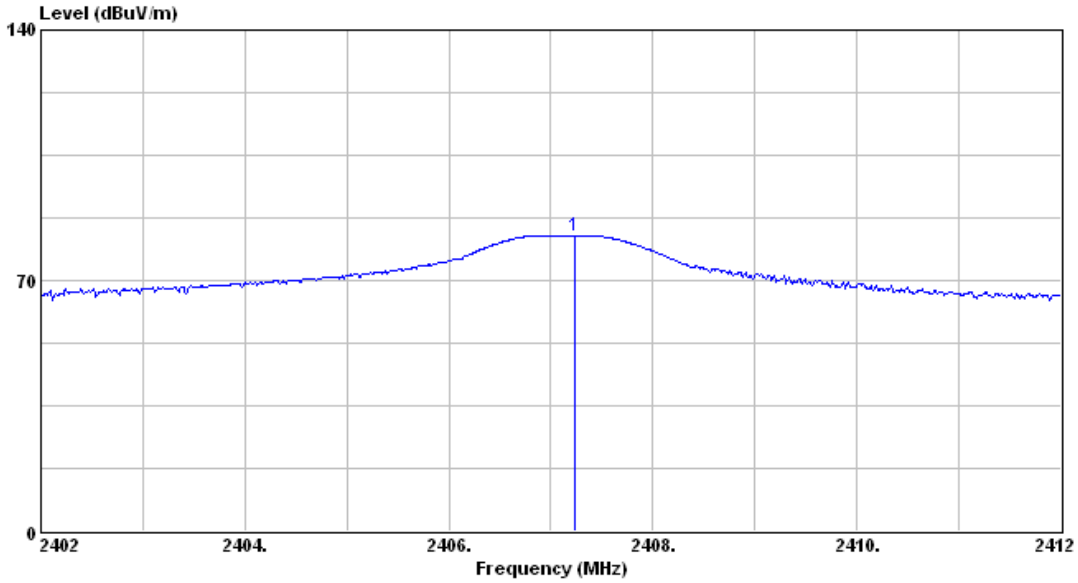
Test Mode : Continuous Transmitting **Tester :** Bill

Frequency (MHz)	Polarization	Reading Data (dBuV)		Correction Factor (dB/m)	Output Field Strength (dBμV/m)		Limit (dBμV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
2407	V	122.07	92.23	-39.45	82.62	52.78	114	94	31.38	41.22
	H	122.06	92.22	-39.45	82.61	52.77	114	94	31.39	41.23
2436	V	121.87	91.81	-39.40	82.47	52.41	114	94	31.53	41.59
	H	121.86	91.93	-39.40	82.46	52.53	114	94	31.54	41.47
2465	V	122.00	91.97	-39.35	82.65	52.62	114	94	31.35	41.38
	H	122.02	91.98	-39.35	82.67	52.63	114	94	31.33	41.37

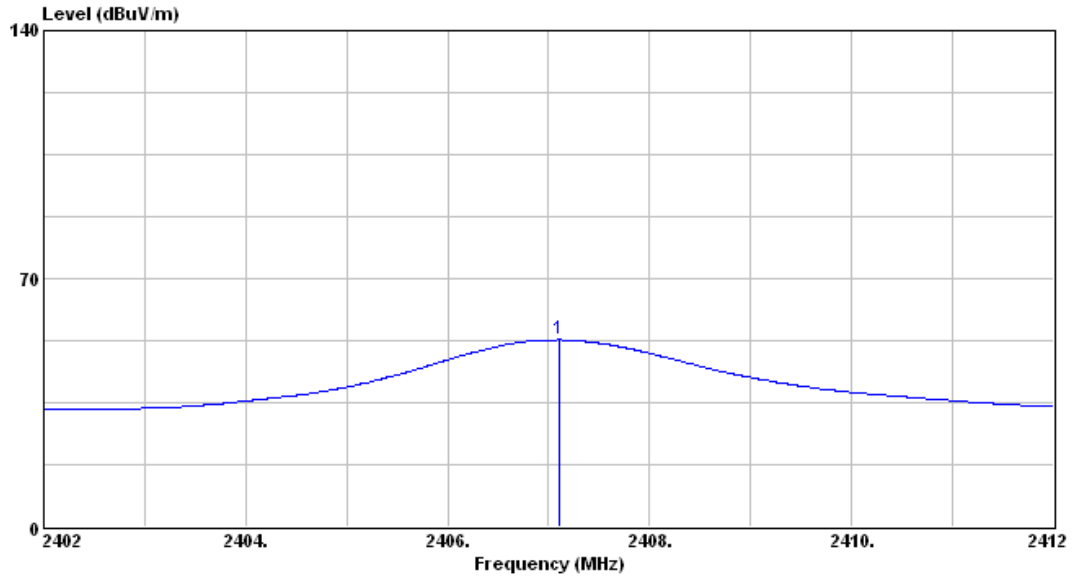
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Output Field Strength (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Output Field Strength

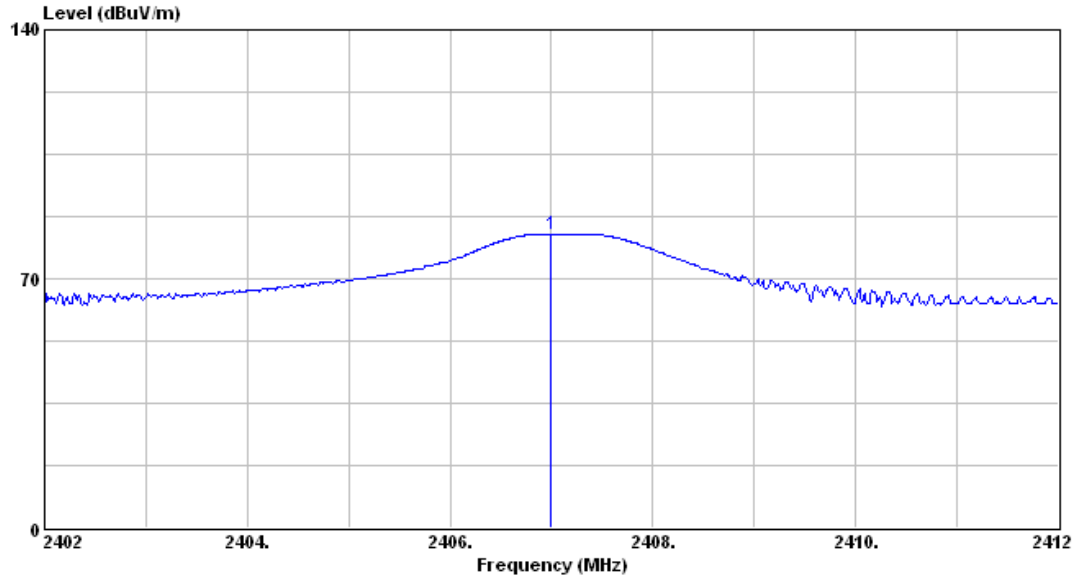
2407MHz, Vertical Polarization - Peak



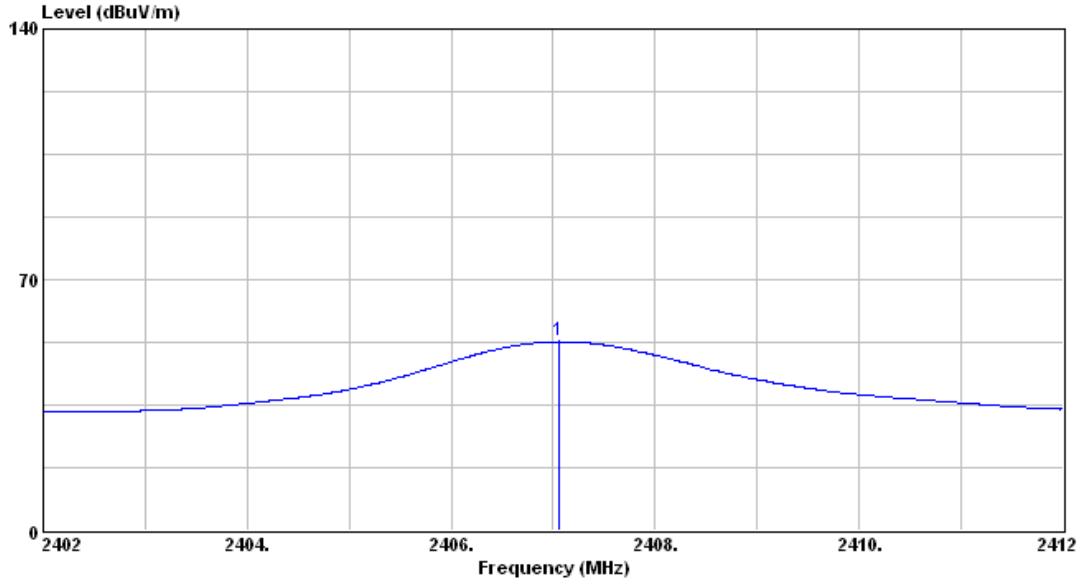
2407MHz, Vertical Polarization - Average



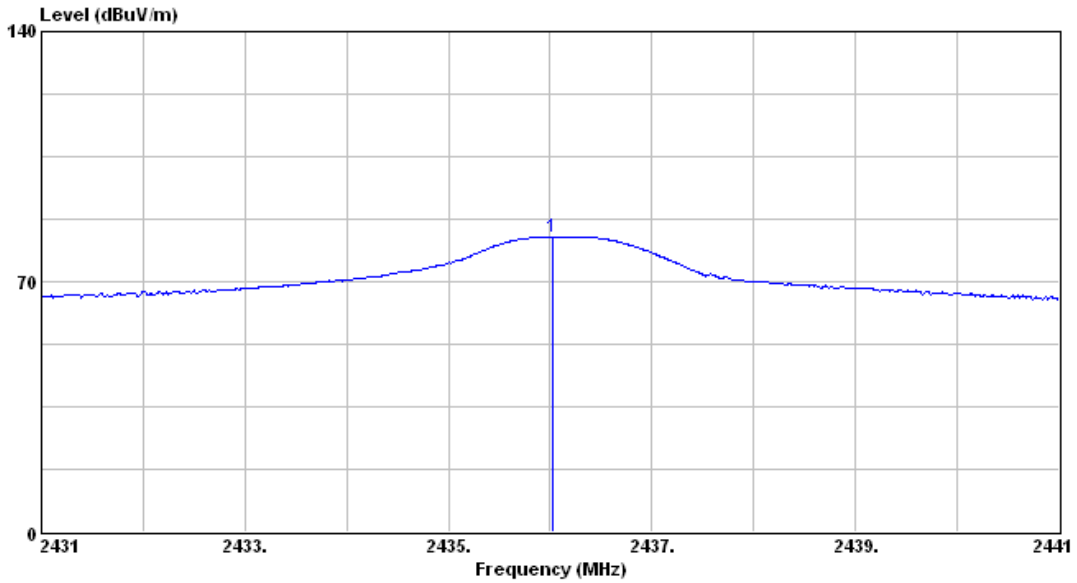
2407MHz, Horizontal Polarization - Peak



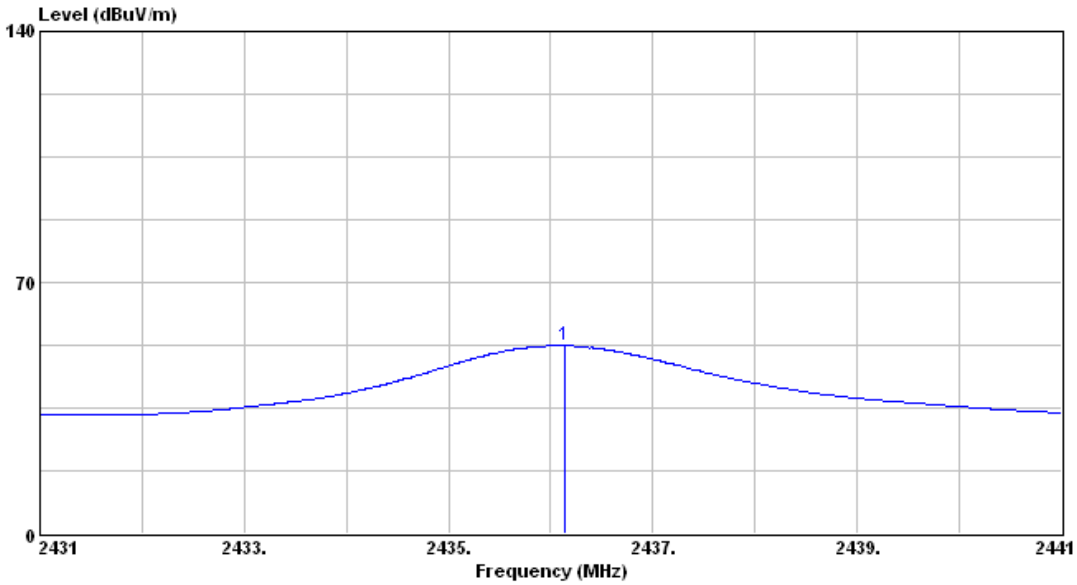
2407MHz, Horizontal Polarization - Average



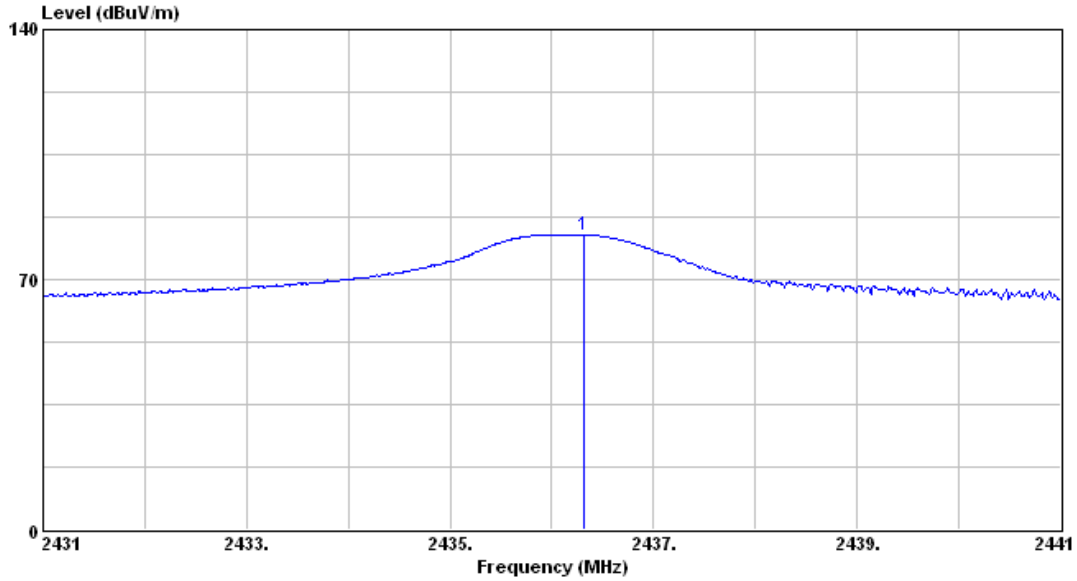
2436MHz, Vertical Polarization - Peak



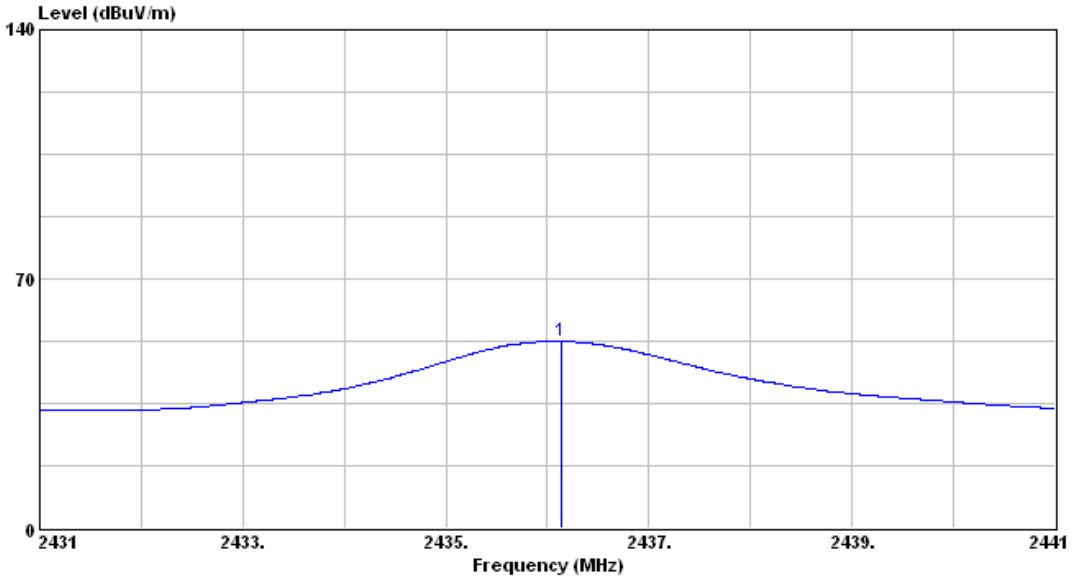
2436MHz, Vertical Polarization - Average



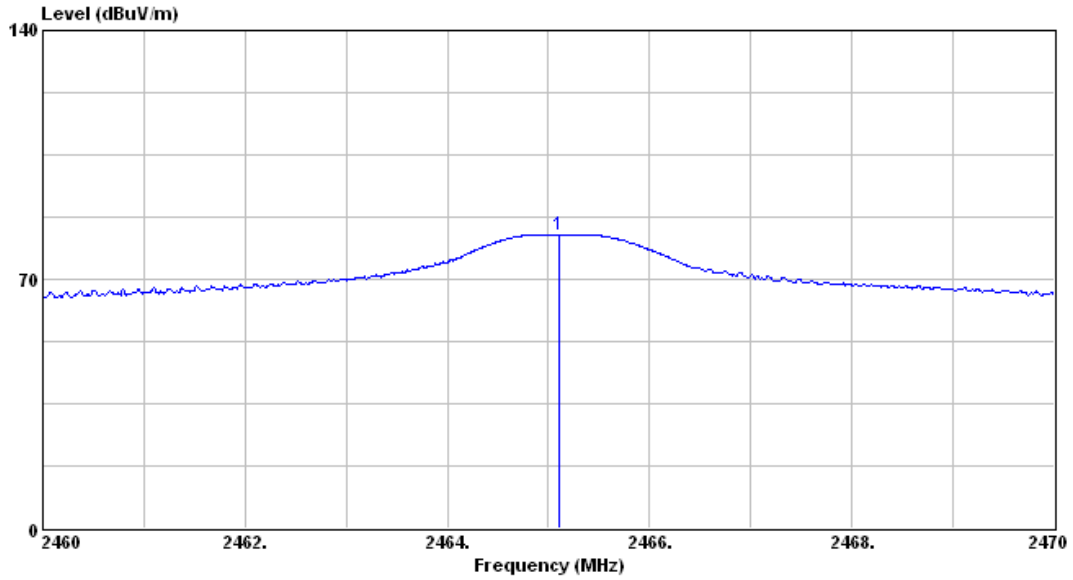
2436MHz, Horizontal Polarization - Peak



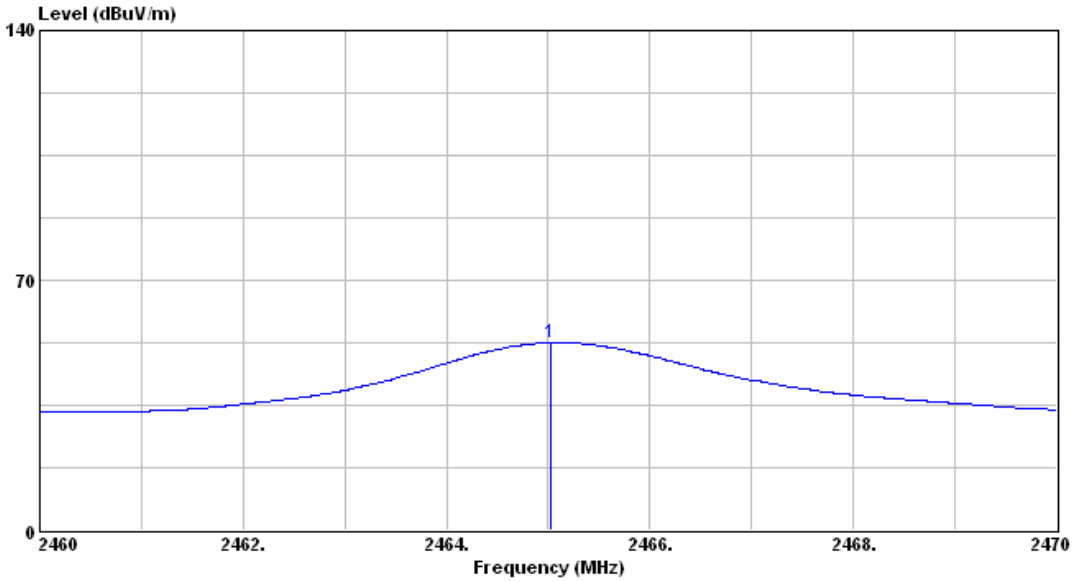
2436MHz, Horizontal Polarization - Average



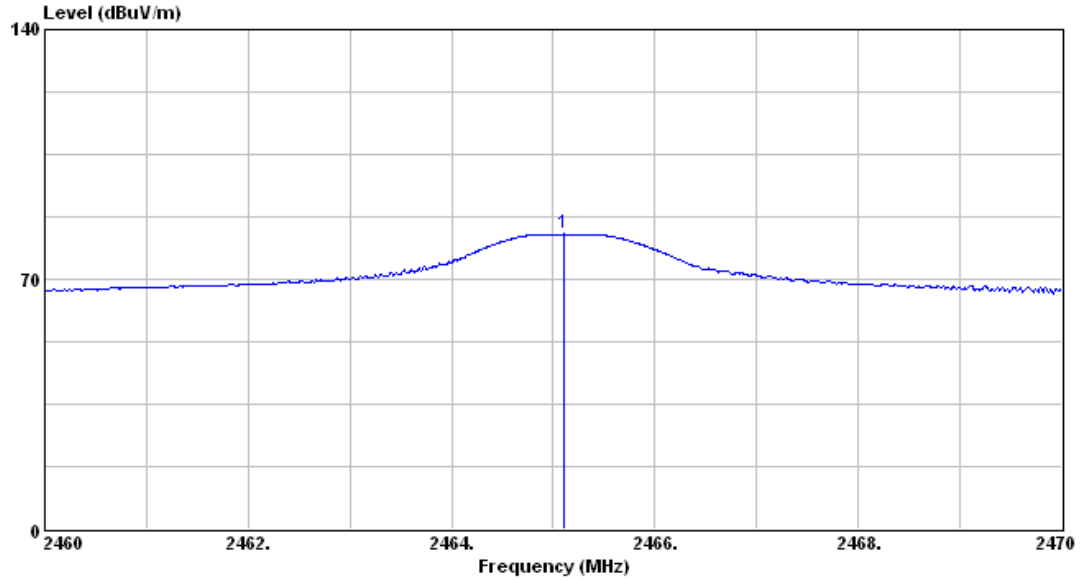
2465MHz, Vertical Polarization - Peak



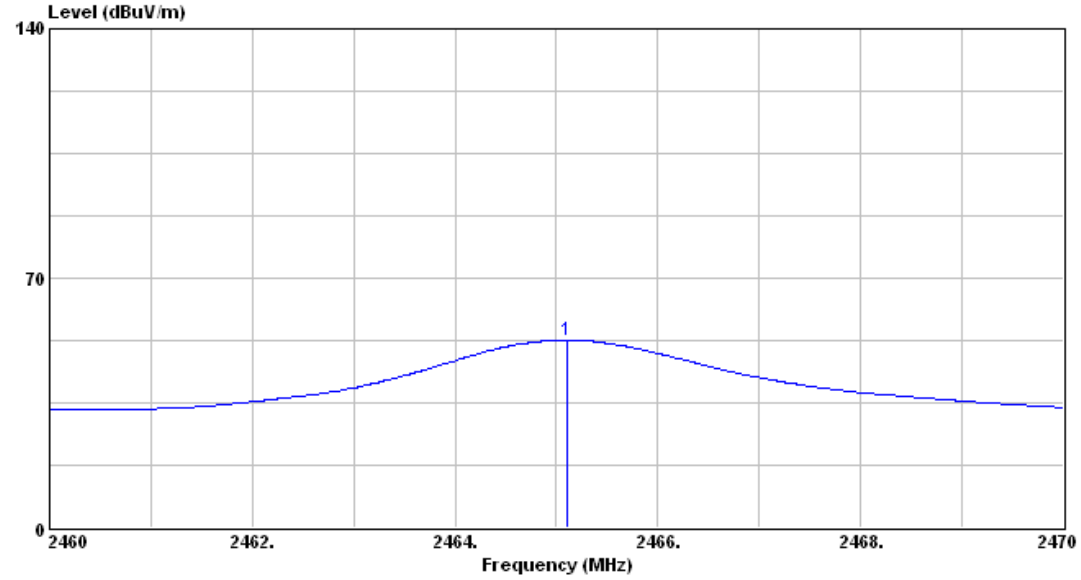
2465MHz, Vertical Polarization - Average



2465MHz, Horizontal Polarization - Peak



2465MHz, Horizontal Polarization - Average



3 Radiated Emission Measurement

Result: Pass

3.1 Applied standard

Limit for Harmonics Radiation Emission Measurement

Fundamental Frequency	Field Strength of Harmonics
☐ 902 – 928 MHz	500 uV/m (54dBuV/m)
☑ 2400 – 2483.5 MHz	500 uV/m (54dBuV/m)
☐ 5725 – 5875 MHz	500 uV/m (54dBuV/m)
☐ 24.0 – 24.25 GHz	2500 uV/m(68dBuV/m)

Limit for Other Emissions except Harmonics

Frequency (MHz)	Quasi-peak (dBμV/m)	
30 to 88	40	
88 to 216	43.5	
216 to 960	46	
960 to 1000	54	
Frequency (MHz)	**Peak (dBμV/m)**	**Average (dBμV/m)**
Above 1000	74	54

Note 1- The lower limit shall apply at the transition frequency.
Note 2- Additional provisions may be required for cases where interference occurs.

3.2 Test Instruments

Test Site and Equipment	Manufacturer	Model No./ Serial No.	Last Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESCS 30/ 836858/020	Sept. 8, 2011	Sept. 8, 2012
Spectrum Analyzer	Agilent	FSP40/ 100031	July 11, 2012	July 11, 2013
Broadband Antenna	R&S	HL-562/ 830547/010	May 2, 2012	May 2, 2013
Antenna	EMCO	3117/ 00082847	March 1, 2012	March 1, 2013
Pre-Amplifier	Mini Circuit	ZKL-2/ 001	July 16, 2012	Jan.16, 2013
Pre-Amplifier	Mini Circuit	ZKL-2/ 002	July 16, 2012	Jan.16, 2013
PRE-AMPLIFIER	MITEQ	JS4-00101800-28-10P/1498979	Dec. 21, 2011	Dec. 21, 2012
PRE-AMPLIFIER	MITEQ	JS4-00101800-28-5A/742309	Dec. 14, 2011	Dec. 14, 2012
RF Cable	JYEBAO	0214/ C0049	July 16, 2012	Jan.16, 2013
RF Cable	JYEBAO	0214/ C0050	July 16, 2012	Jan.16, 2013
RF Cable	H+S	Sucoflex 104/ C0081	April 16, 2012	Oct. 16, 2012
Semi - anechoic Chamber	ETS. LINDGREN	TR11/ 906-A	Feb. 12, 2012	Feb. 12, 2013

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.
3. The calibration date of the semi-anechoic chamber listed above is the date of NSA measurement.

Instrument Setting

RBW	VBW	Detector	Trace	Comment
120kHz	N/A	Quasi-Peak	Maxhold	Below 1GHz
1MHz	3MHz	Peak	Maxhold	Above 1GHz, Peak
1MHz	10Hz	Peak	Maxhold	Above 1GHz, Average

Climatic Condition

Ambient Temperature：24℃ Relative Humidity :53%

3.3 Measurement Procedure

a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.

b. A software provided by client enabled the EUT to transmit and receive data at operating frequency.(if necessary)

c. If the EUT is tabletop equipment, it should be placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it should be placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.

d. The EUT is set 3m away from the interference receiving antenna.

e. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.

f. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine at least six frequencies associated with higher emission levels and record them.

g. Then measure each frequency found from step f. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.

h. For measurement of frequency below 1000MHz, set the receiver detector to be Quasi-Peak per CISPR 16-1 to find out the maximum level occurred.

i. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any.

j. Record frequency, azimuth angle of the turntable, height, and polarization of the receiving antenna and compare the maximum level with the required limit.

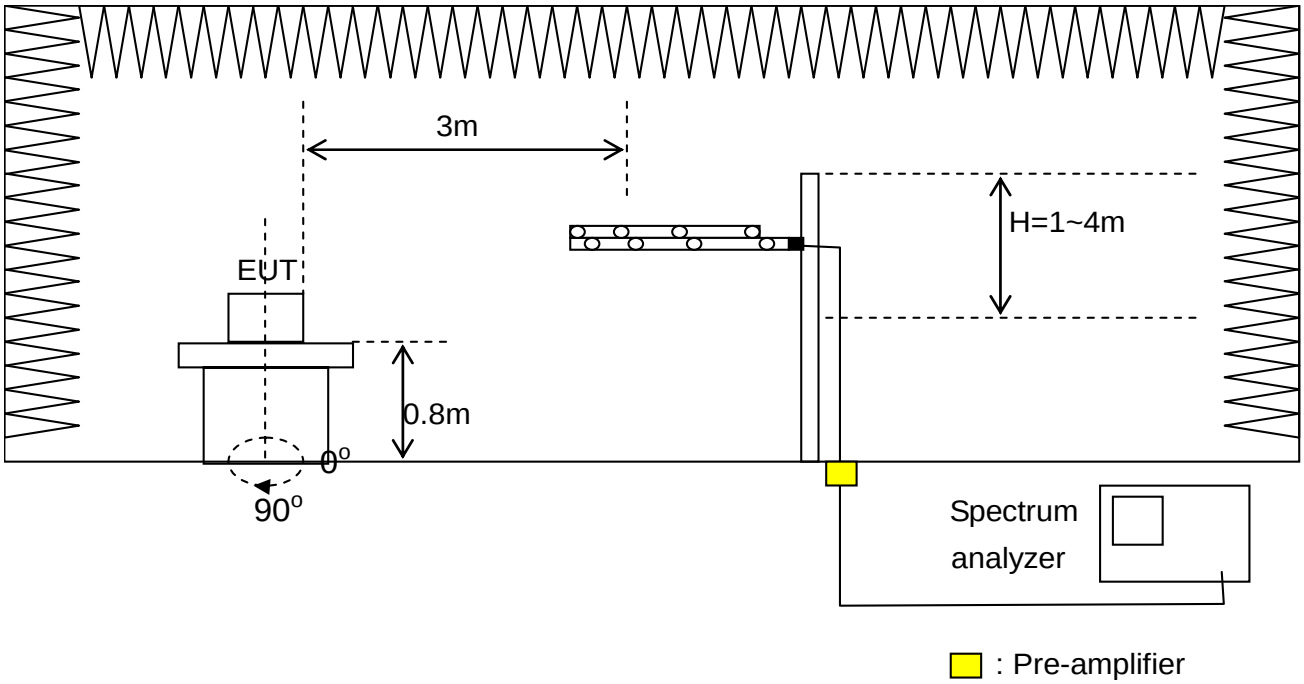
k. Change the receiving antenna to another polarization to measure radiated emission by following step e. to j. again.

l. If the peak emission level below 1000MHz measured from step f. is 4dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

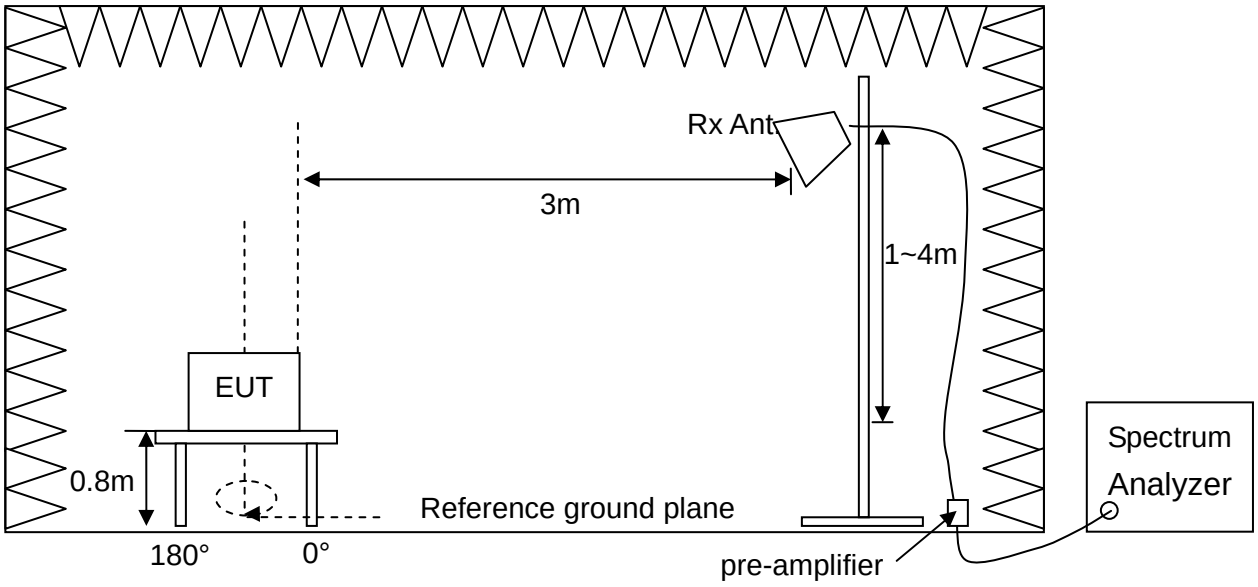
m. If the peak emission level above 1000MHz measured from step f. is 20dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate A.V. value will be measured and presented.

3.4 Test configuration

Below 1GHz



Above 1GHz



3.5 Test Data

Band Edge

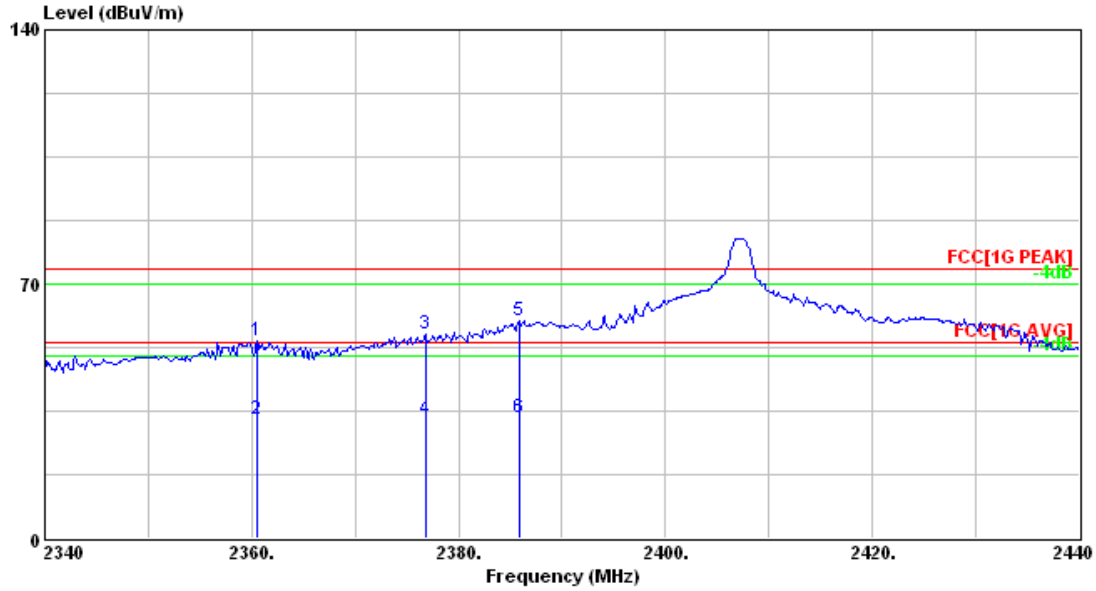
Test Mode : Continuous Transmitting **Tester :** Bill

Operating Frequency (MHz)	Antenna Polarization	Frequency (MHz)	Reading Data (dBuV)		Correction Factor (dB/m)	Emission (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
			PK.	AV.		PK.	AV.	PK.	AV.	PK.	AV.
2407	V	2385.80	99.24	72.67	-39.49	59.75	33.18	74	54	14.25	20.82
2407	H	2385.80	99.01	72.66	-39.49	59.52	33.17	74	54	14.48	20.83
2465	V	2493.65	98.48	72.35	-39.30	59.18	33.05	74	54	14.82	20.95
2465	H	2493.68	101.87	72.36	-39.30	62.57	33.06	74	54	11.43	20.94

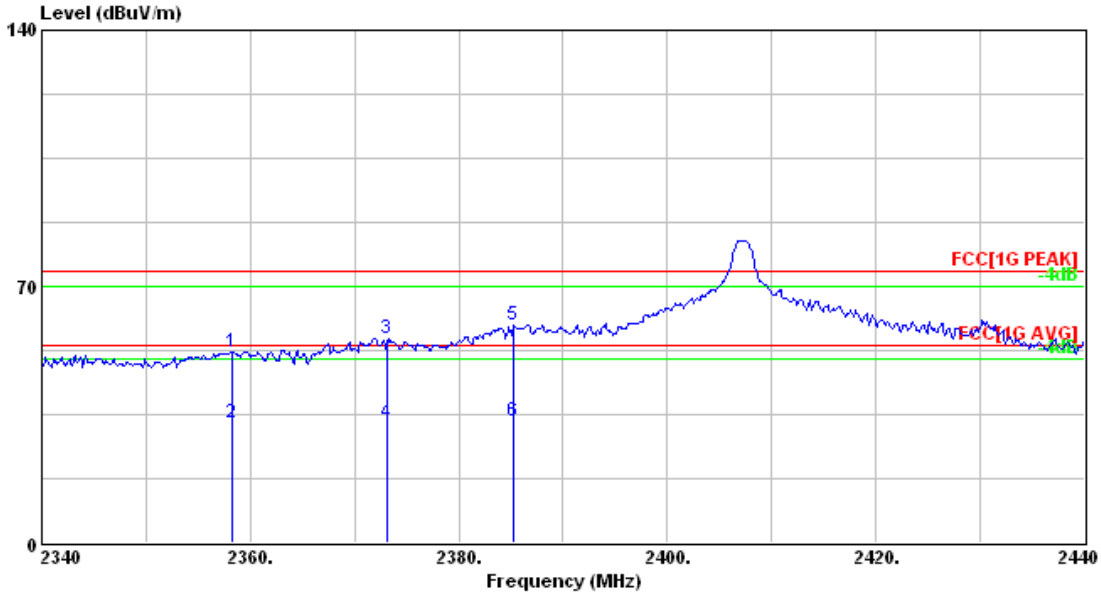
Note:

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Pre-amplifier
2. Emission (dBuV/m) = Reading Data + Correction Factor
3. Margin(dB) = Limit – Emission

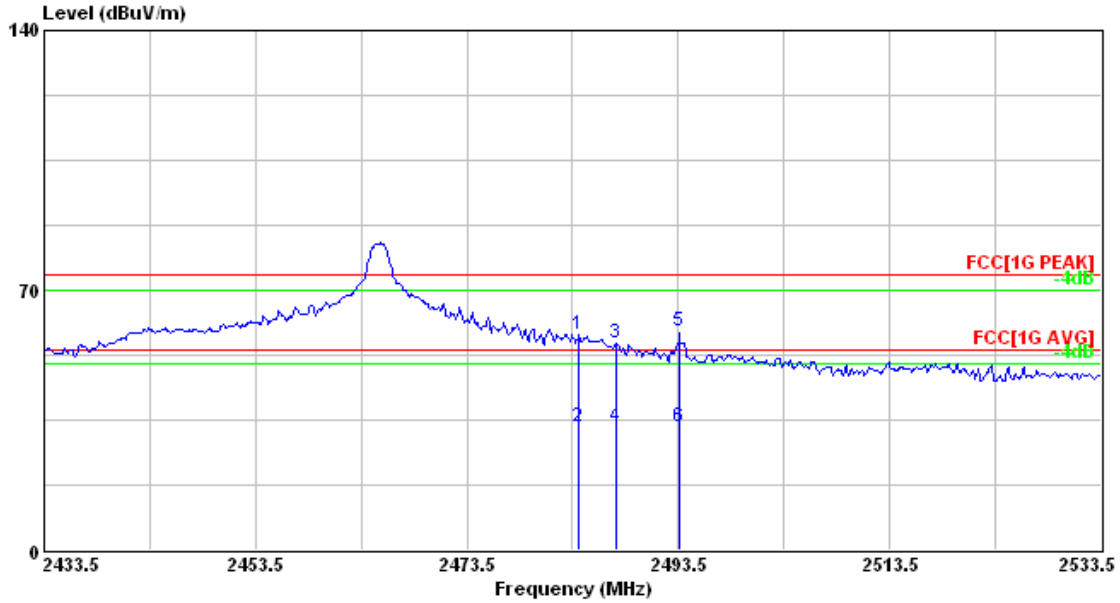
Low Channel (2407MHz), V Polarization



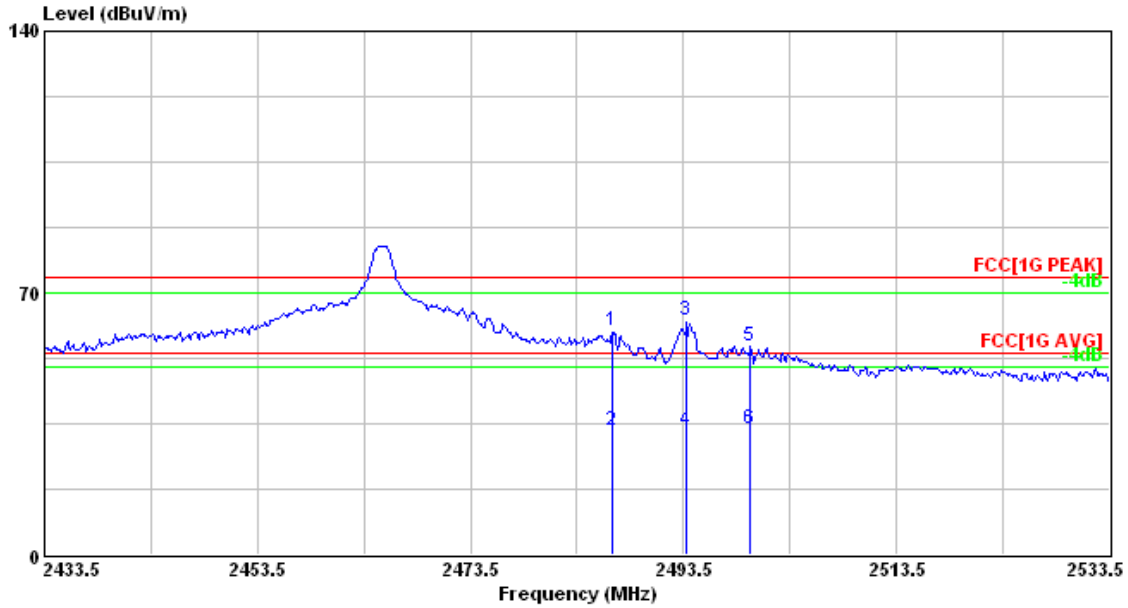
Low Channel (2407MHz), H Polarization



High Channel (2465MHz), V Polarization



High Channel (2465MHz), H Polarization

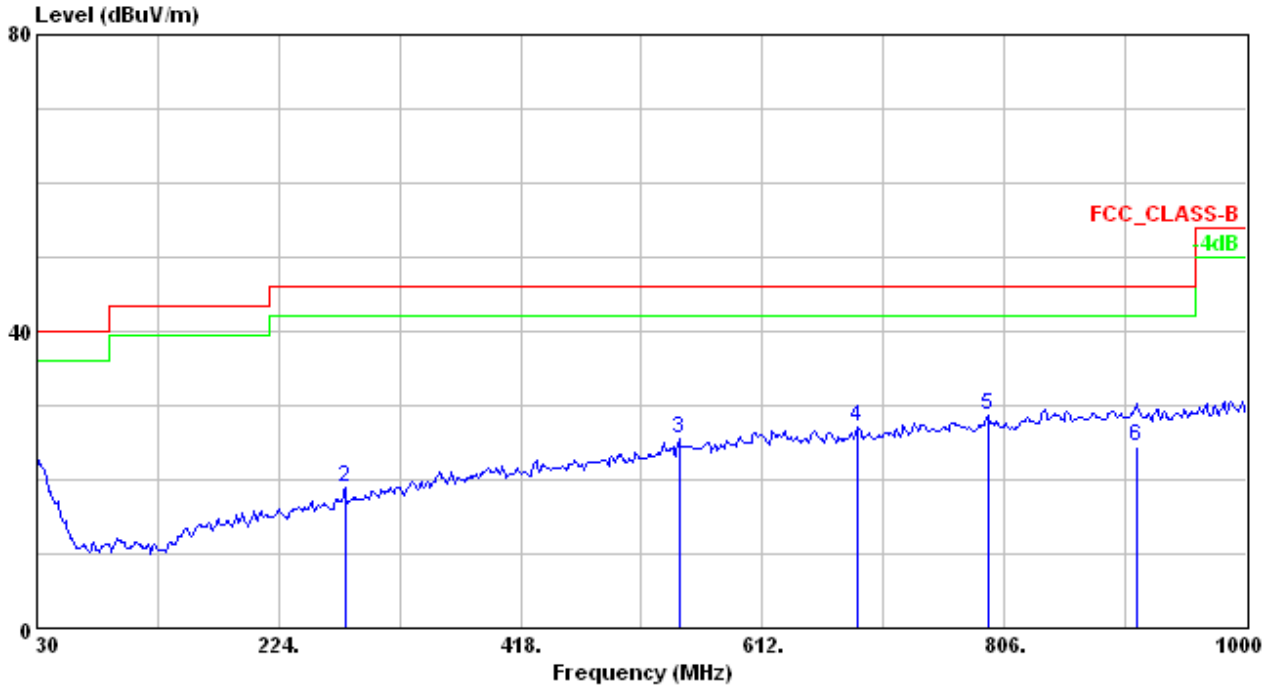


Radiated Emission Measurement below 1000MHz

Test Mode : **2407MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Polarization : Vertical **Frequency Range** : 30MHz~1000MHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	30.000	23.25	31.69	-8.44	40.00	-16.75	---	---	VERTICAL	Peak
2	277.350	18.97	31.94	-12.97	46.00	-27.03	---	---	VERTICAL	Peak
3	545.070	25.56	31.50	-5.94	46.00	-20.44	---	---	VERTICAL	Peak
4	687.660	26.99	30.63	-3.64	46.00	-19.01	---	---	VERTICAL	Peak
5 @	792.420	28.56	31.02	-2.46	46.00	-17.44	---	---	VERTICAL	Peak
6	911.730	24.35	24.92	-0.57	46.00	-21.65	100	60	VERTICAL	QP

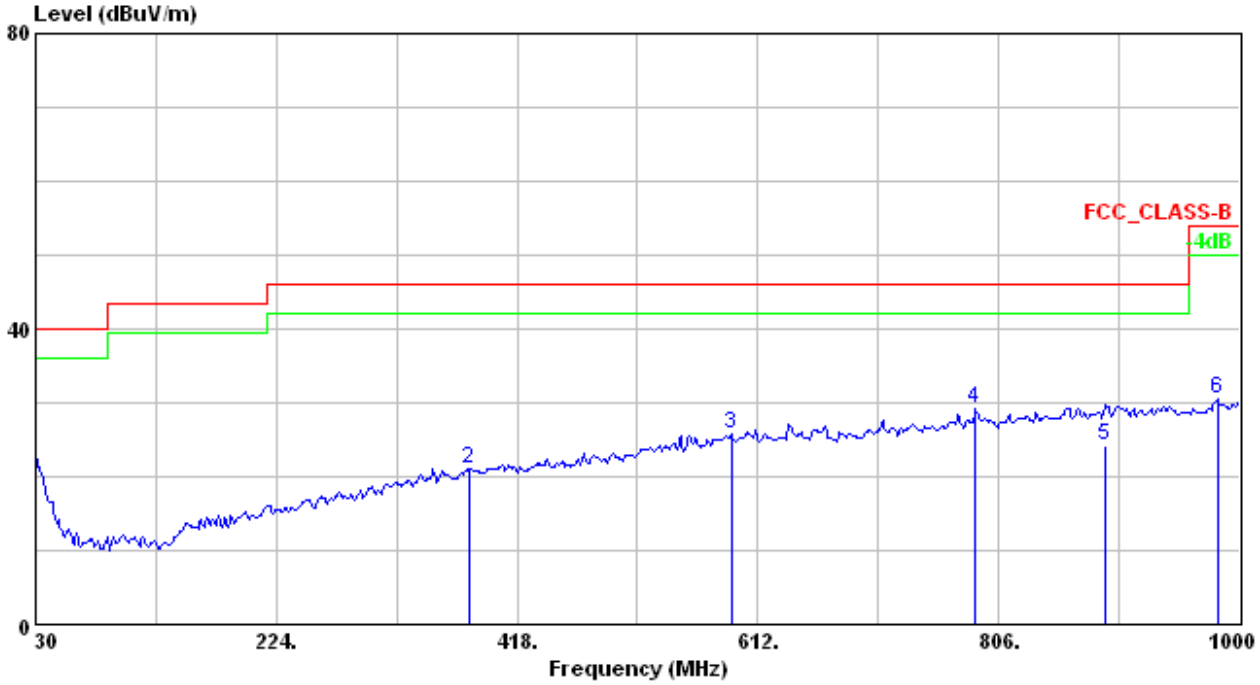
Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode : **2407MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Polarization : Horizontal **Frequency Range** : 30MHz~1000MHz

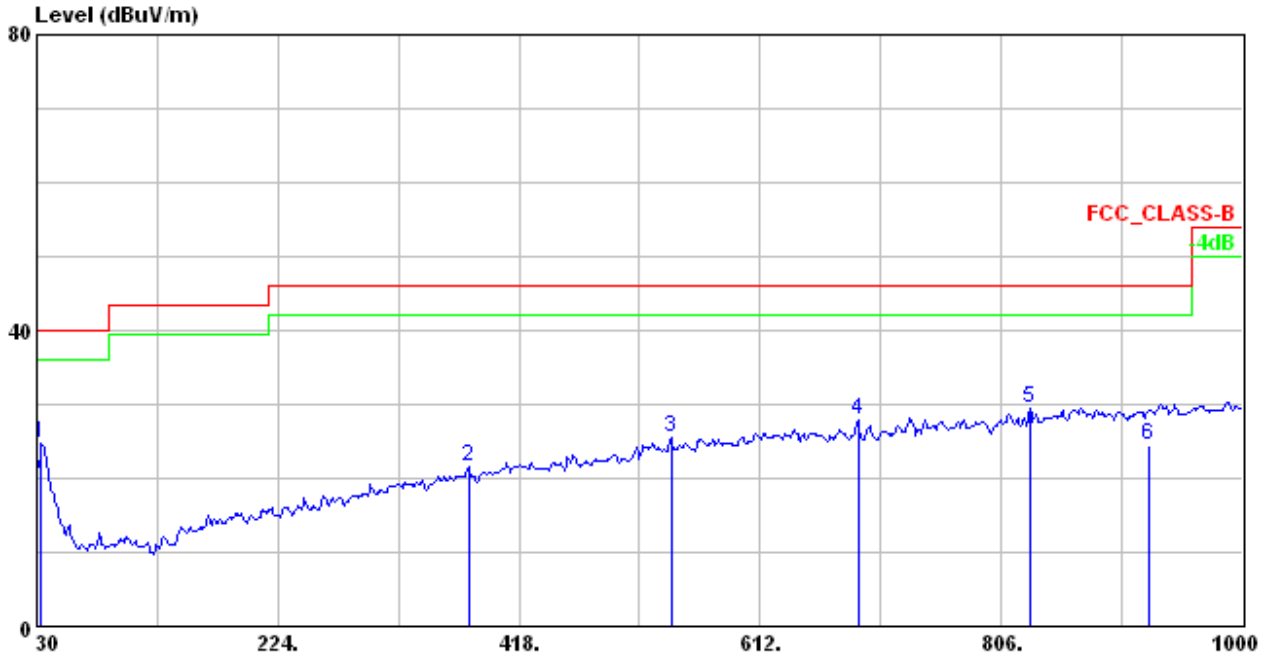


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	30.000	22.78	31.22	-8.44	40.00	-17.22	---	---	HORIZONTAL	Peak
2	379.200	21.16	30.75	-9.59	46.00	-24.84	---	---	HORIZONTAL	Peak
3	590.660	25.85	30.72	-4.87	46.00	-20.15	---	---	HORIZONTAL	Peak
4 @	787.570	29.21	31.70	-2.49	46.00	-16.79	---	---	HORIZONTAL	Peak
5	892.330	24.27	25.02	-0.75	46.00	-21.73	100	359	HORIZONTAL	QP
6	982.540	30.49	30.56	-0.07	54.00	-23.51	---	---	HORIZONTAL	Peak

Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode	**: 2436MHz, Continuous Transmitting**		
Test Distance	**:** 3m	**Tester**	**:** Bill
Polarization	**:** Vertical	**Frequency Range**	**:** 30MHz~1000MHz

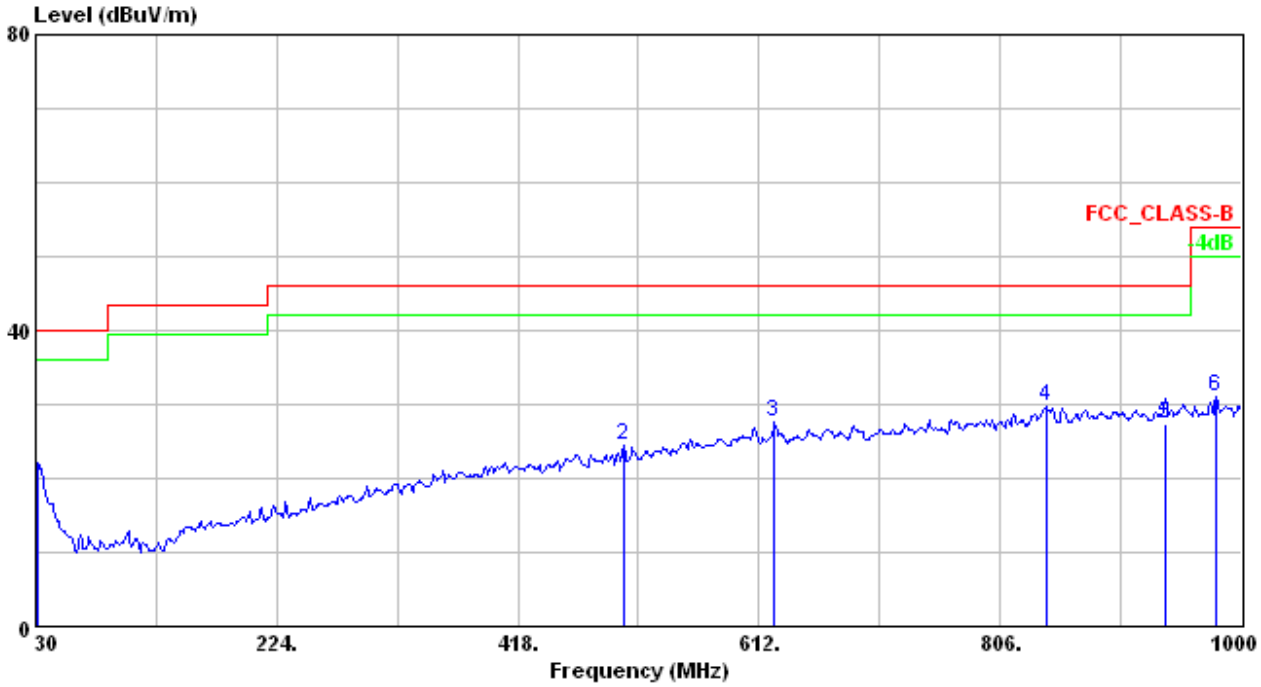


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	33.880	24.84	35.42	-10.58	40.00	-15.16	---	---	VERTICAL	Peak
2	377.260	21.53	31.17	-9.64	46.00	-24.47	---	---	VERTICAL	Peak
3	540.220	25.49	31.54	-6.05	46.00	-20.51	---	---	VERTICAL	Peak
4	690.570	27.90	31.49	-3.59	46.00	-18.10	---	---	VERTICAL	Peak
5 @	829.280	29.40	31.22	-1.82	46.00	-16.60	---	---	VERTICAL	Peak
6	924.452	24.34	24.87	-0.53	46.00	-21.66	101	54	VERTICAL	QP

Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Mode	**: 2436MHz, Continuous Transmitting**		
Test Distance	**:** 3m	**Tester**	**:** Bill
Polarization	**:** Horizontal	**Frequency Range**	**:** 30MHz~1000MHz

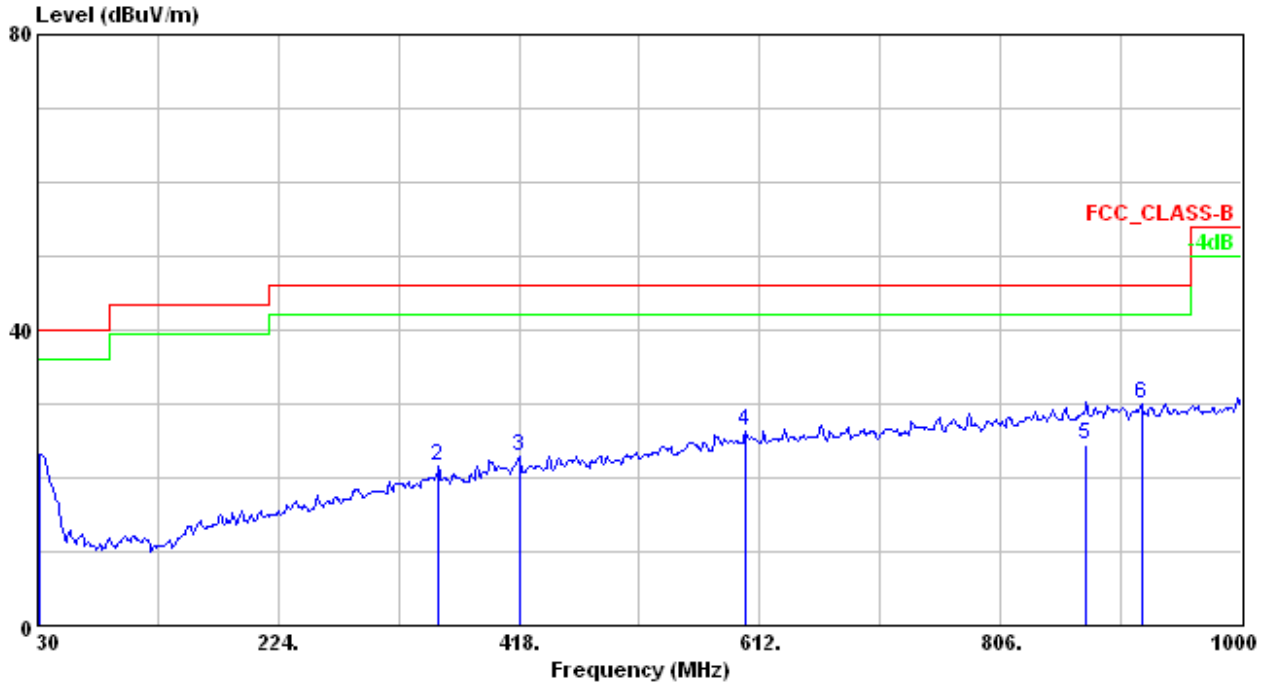


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	30.970	22.21	31.18	-8.97	40.00	-17.79	---	---	HORIZONTAL	Peak
2	503.360	24.52	31.35	-6.83	46.00	-21.48	---	---	HORIZONTAL	Peak
3	624.610	27.51	31.90	-4.39	46.00	-18.49	---	---	HORIZONTAL	Peak
4 @	843.830	29.68	31.20	-1.52	46.00	-16.32	---	---	HORIZONTAL	Peak
5	938.890	27.39	27.87	-0.48	46.00	-18.61	100	131	HORIZONTAL	QP
6	979.630	31.10	31.20	-0.10	54.00	-22.90	---	---	HORIZONTAL	Peak

Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Model	**: 2465MHz, Continuous Transmitting**		
Test Distance	**:** 3m	**Tester**	**:** Bill
Polarization	**:** Vertical	**Frequency Range**	**:** 30MHz~1000MHz

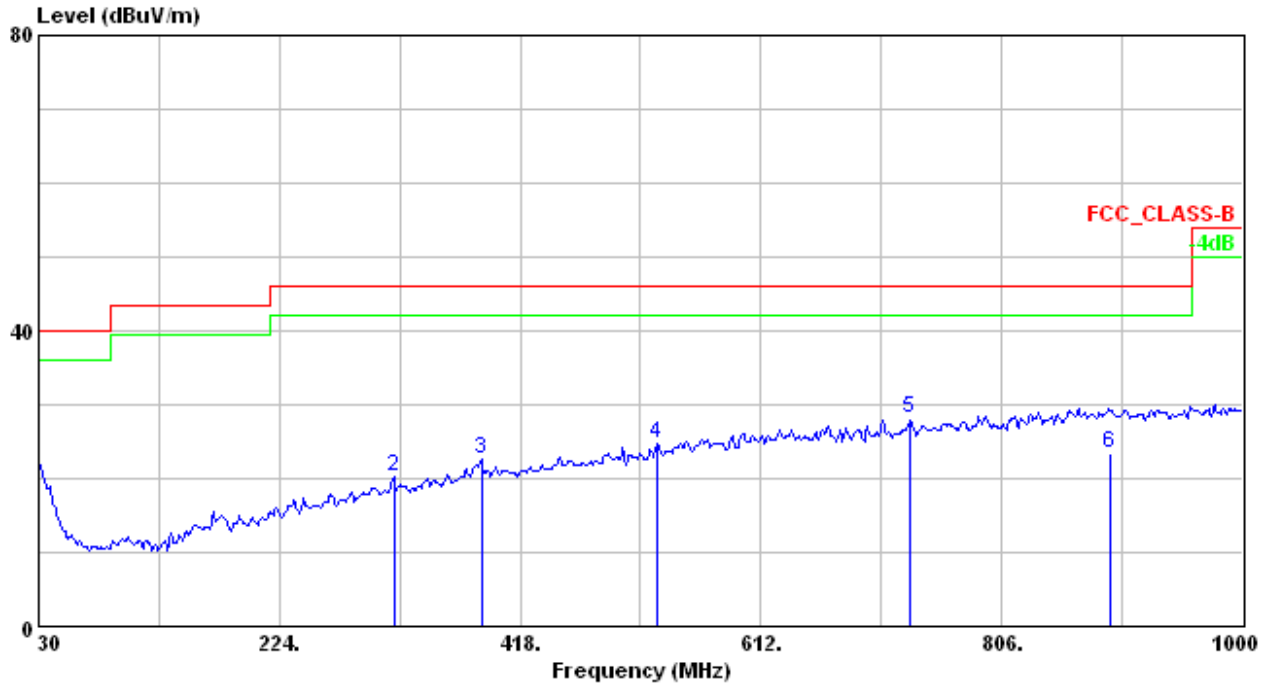


	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	31.940	23.20	32.71	-9.51	40.00	-16.80	---	---	VERTICAL	Peak
2	353.010	21.68	31.95	-10.27	46.00	-24.32	---	---	VERTICAL	Peak
3	418.000	22.94	31.63	-8.69	46.00	-23.06	---	---	VERTICAL	Peak
4	600.360	26.19	30.84	-4.65	46.00	-19.81	---	---	VERTICAL	Peak
5	874.870	24.38	25.39	-1.01	46.00	-21.62	100	154	VERTICAL	QP
6 @	919.490	29.97	30.52	-0.55	46.00	-16.03	---	---	VERTICAL	Peak

Note：

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Test Model	**: 2465MHz, Continuous Transmitting**		
Test Distance	**:** 3m	**Tester**	**:** Bill
Polarization	**:** Horizontal	**Frequency Range**	**:** 30MHz~1000MHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	30.000	22.13	30.57	-8.44	40.00	-17.87	---	---	HORIZONTAL	Peak
2	316.150	20.19	31.62	-11.43	46.00	-25.81	---	---	HORIZONTAL	Peak
3	386.960	22.62	32.01	-9.39	46.00	-23.38	---	---	HORIZONTAL	Peak
4	527.610	24.85	31.16	-6.31	46.00	-21.15	---	---	HORIZONTAL	Peak
5	732.280	28.03	31.04	-3.01	46.00	-17.97	---	---	HORIZONTAL	Peak
6	893.458	23.30	24.02	-0.72	46.00	-22.70	100	95	HORIZONTAL	QP

Note：

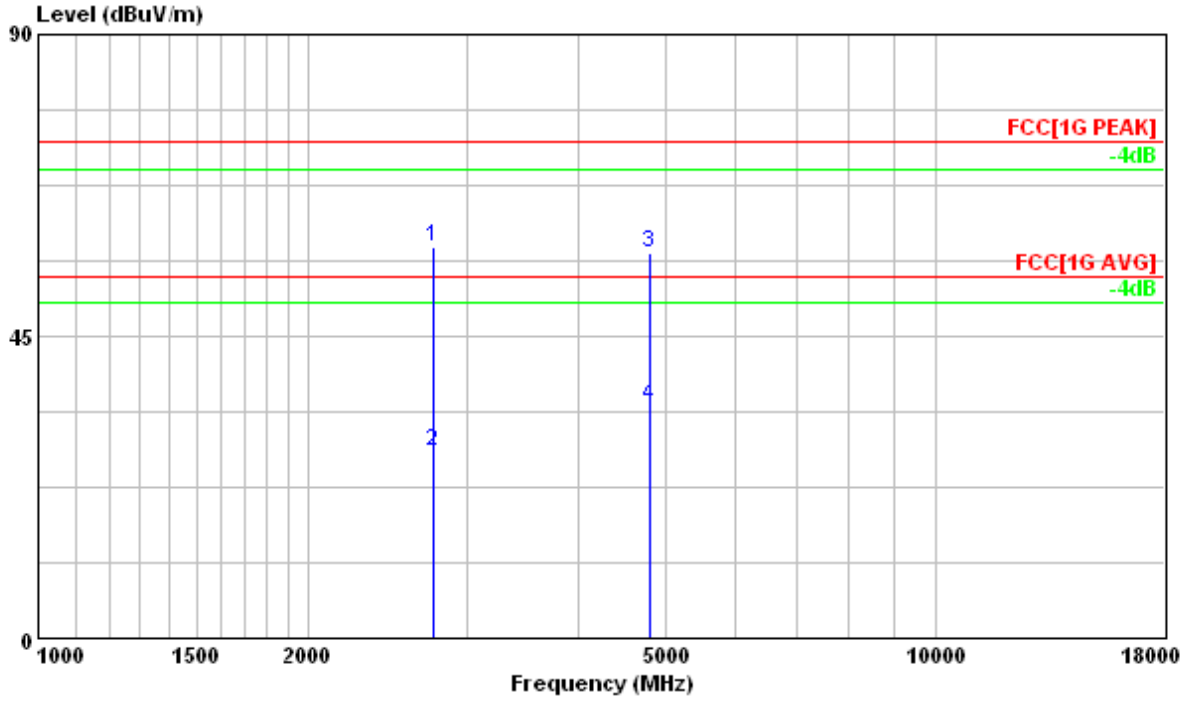
1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor

Radiated Emission Measurement above 1000MHz

Test Model : **2407MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Vertical **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	2753.233	58.20	96.95	-38.75	74.00	-15.80	100	270	VERTICAL	Peak
2	2753.233	27.81	66.56	-38.75	54.00	-26.19	100	270	VERTICAL	Average
3	4813.925	57.39	93.03	-35.64	74.00	-16.61	125	242	VERTICAL	Peak
4	4813.925	34.70	70.34	-35.64	54.00	-19.30	125	242	VERTICAL	Average

Note:

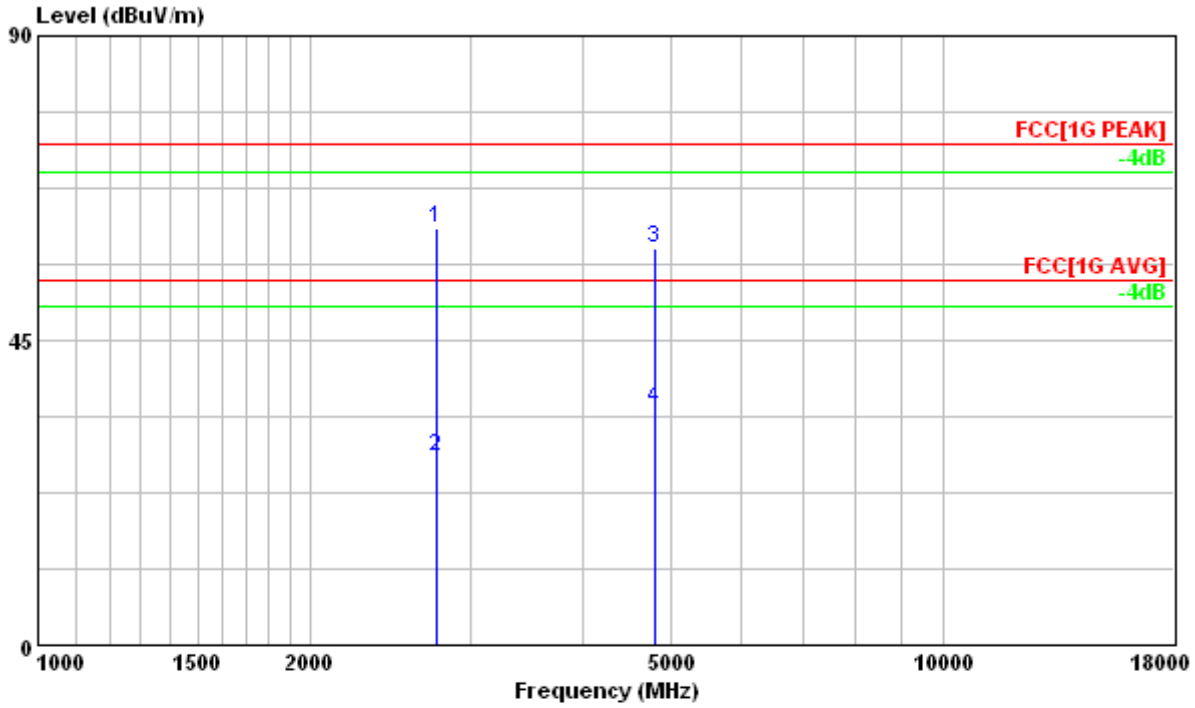
1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

Test Model : **2407MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Horizontal **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1 @	2753.455	61.68	100.43	-38.75	74.00	-12.32	100	157	HORIZONTAL	Peak
2	2753.455	27.96	66.71	-38.75	54.00	-26.04	100	157	HORIZONTAL	Average
3 @	4813.800	58.61	94.25	-35.64	74.00	-15.39	105	298	HORIZONTAL	Peak
4	4813.800	34.79	70.43	-35.64	54.00	-19.21	105	298	HORIZONTAL	Average

Note:

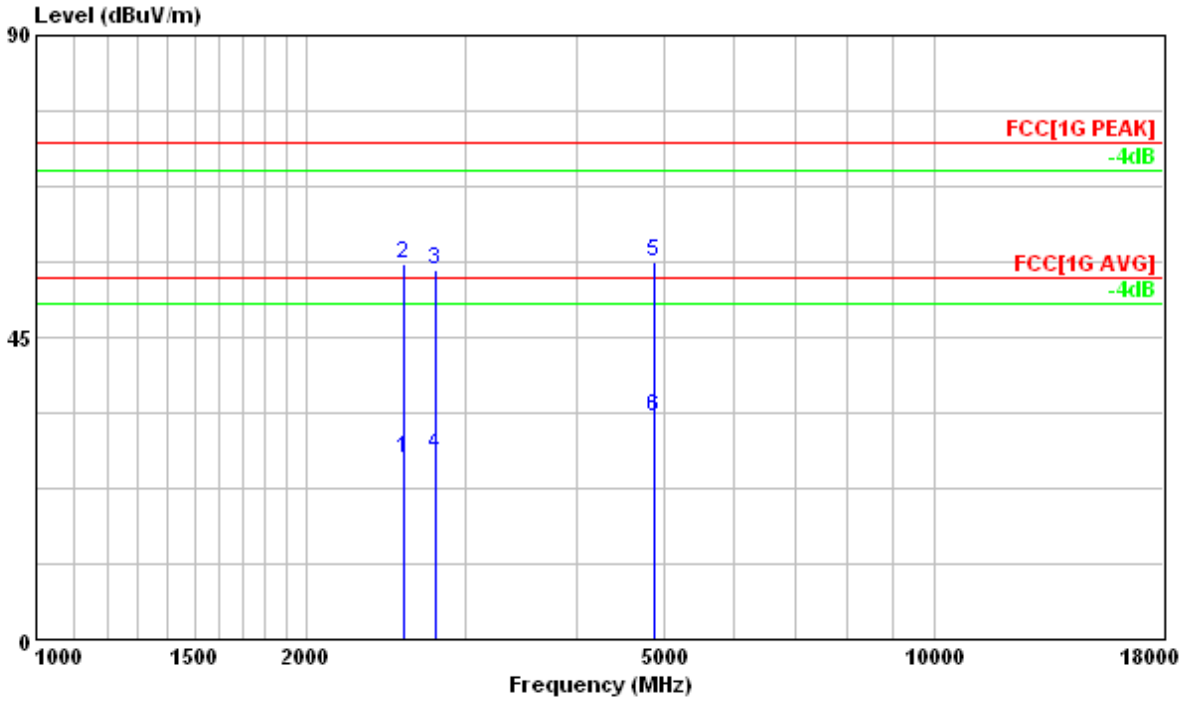
1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

Test Model : **2436MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Vertical **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2563.671	27.07	66.23	-39.16	54.00	-26.93	225	212	VERTICAL	Average
2	2563.671	56.09	95.25	-39.16	74.00	-17.91	225	212	VERTICAL	Peak
3	2786.359	54.99	93.68	-38.69	74.00	-19.01	100	196	VERTICAL	Peak
4	2786.359	27.63	66.32	-38.69	54.00	-26.37	100	196	VERTICAL	Average
5	4871.837	56.25	91.87	-35.62	74.00	-17.75	130	182	VERTICAL	Peak
6	4871.837	33.22	68.84	-35.62	54.00	-20.78	130	182	VERTICAL	Average

Note:

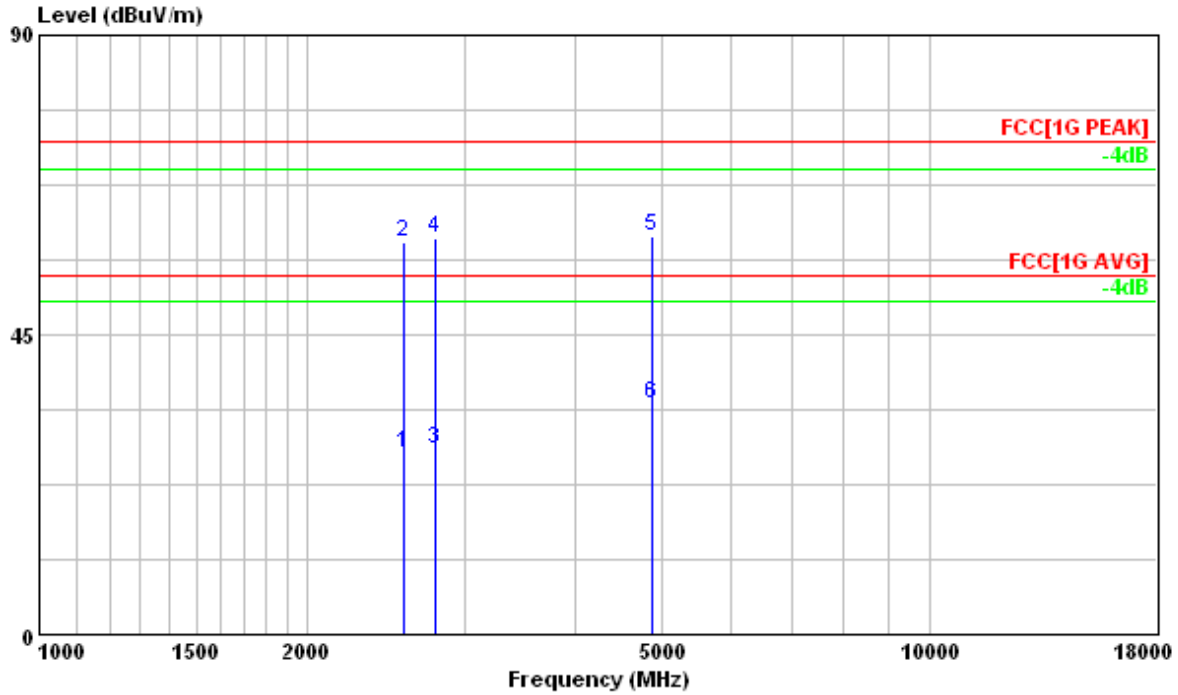
1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

Test Model : **2436MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Horizontal **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2563.847	27.14	66.30	-39.16	54.00	-26.86	123	20	HORIZONTAL	Average
2 @	2563.847	58.83	97.99	-39.16	74.00	-15.17	123	20	HORIZONTAL	Peak
3	2786.470	27.69	66.38	-38.69	54.00	-26.31	100	360	HORIZONTAL	Average
4 @	2786.470	59.37	98.06	-38.69	74.00	-14.63	100	360	HORIZONTAL	Peak
5 @	4872.600	59.68	95.30	-35.62	74.00	-14.32	141	305	HORIZONTAL	Peak
6	4872.600	34.51	70.13	-35.62	54.00	-19.49	141	305	HORIZONTAL	Average

Note:

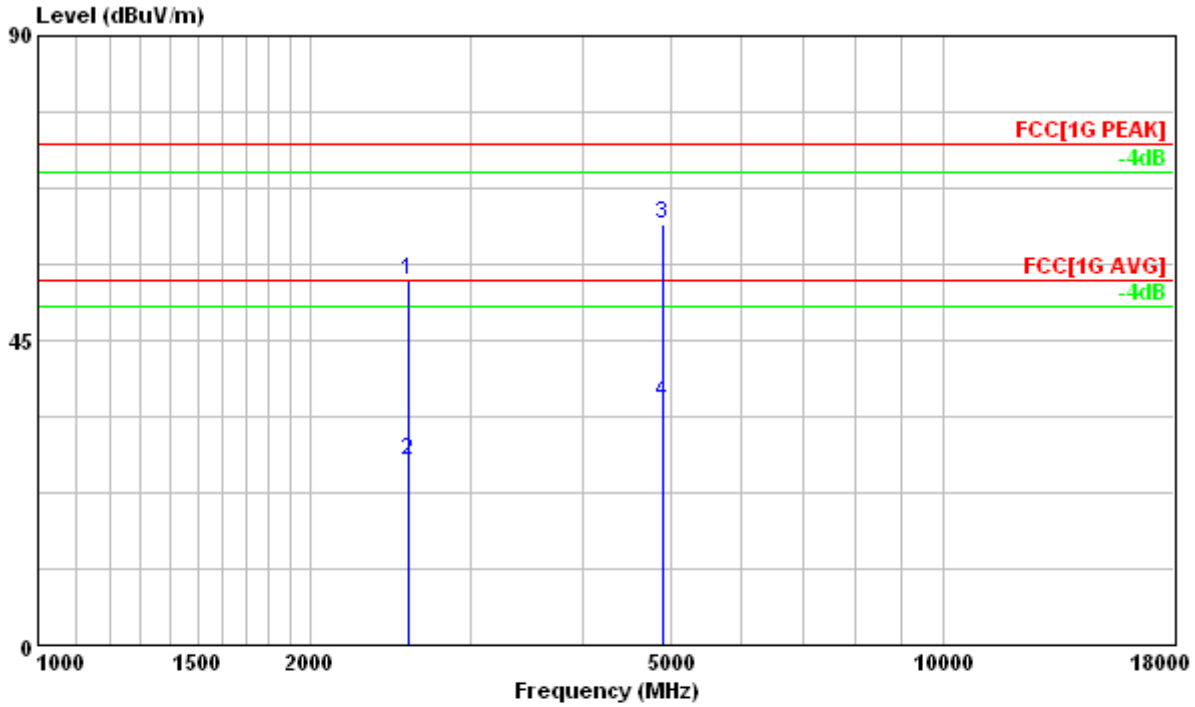
1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

Test Model : **2465MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Vertical **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2563.798	53.96	93.12	-39.16	74.00	-20.04	143	227	VERTICAL	Peak
2	2563.798	27.11	66.27	-39.16	54.00	-26.89	143	227	VERTICAL	Average
3 @	4912.259	62.20	97.77	-35.57	74.00	-11.80	165	245	VERTICAL	Peak
4	4912.259	35.91	71.48	-35.57	54.00	-18.09	165	245	VERTICAL	Average

Note:

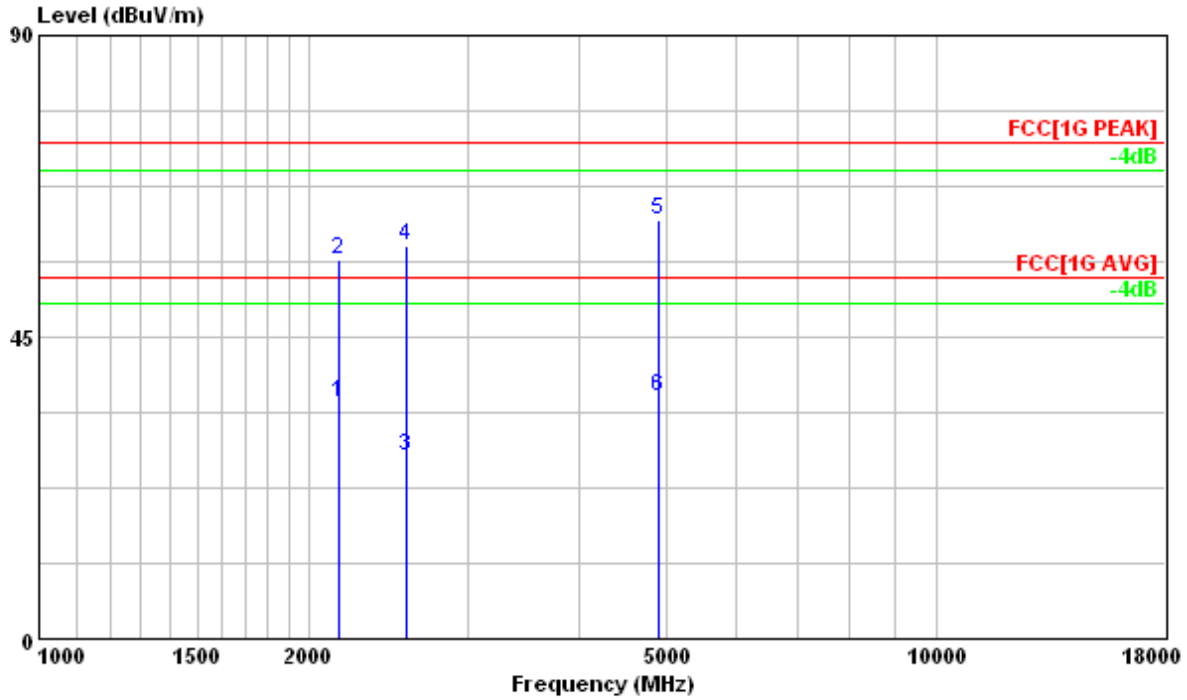
1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

Test Model : **2465MHz, Continuous Transmitting**

Test Distance : 3m **Tester** : Bill

Antenna Polarization : Horizontal **Frequency Range** :1GHz~25GHz



	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Ant Pos	Table Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2157.227	35.22	75.21	-39.99	54.00	-18.78	101	7	HORIZONTAL	Average
2	2157.227	56.48	96.47	-39.99	74.00	-17.52	101	7	HORIZONTAL	Peak
3	2563.935	27.18	66.34	-39.16	74.00	-46.82	101	334	HORIZONTAL	QP
4 @	2563.935	58.67	97.83	-39.16	74.00	-15.33	101	334	HORIZONTAL	Peak
5 @	4912.180	62.42	97.99	-35.57	74.00	-11.58	105	111	HORIZONTAL	Peak
6	4912.180	36.12	71.69	-35.57	54.00	-17.88	105	111	HORIZONTAL	Average

Note:

1. Emission Level (dBuV/m) = Reading Value + Correction Factor.
2. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier.
3. PK. and AV. are abbreviation of peak and average respectively.

No signal can be detected from 18GHz to 25GHz, so the graphs are omitted above 18GHz.

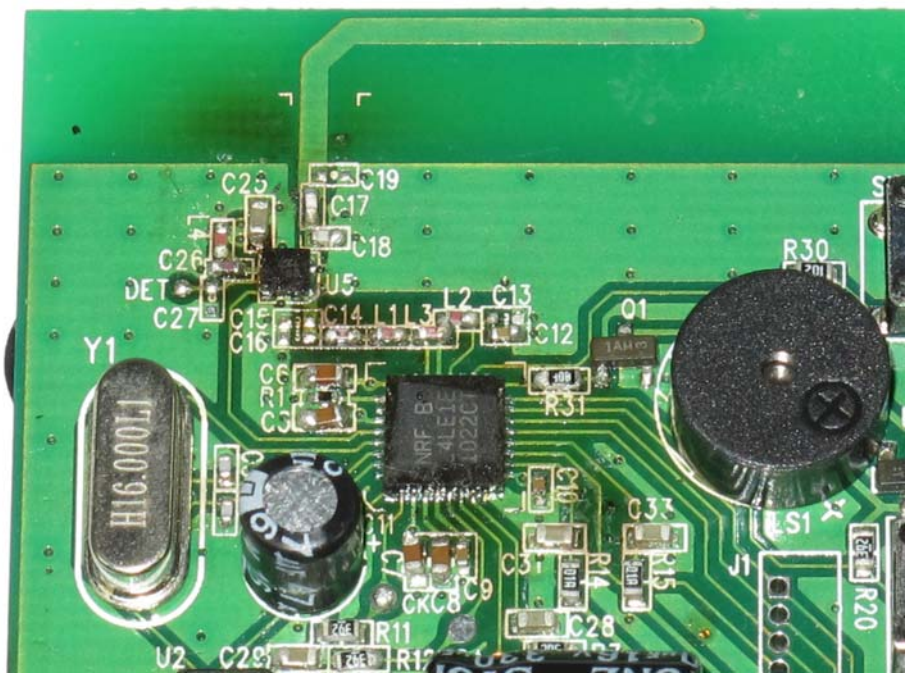
4 Antenna Requirement

4.1 Applied standard

According to 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.2 Antenna Information

This antenna is a permanently attached antenna



4.3 Result

Comply the standard