



## FCC COMPLIANCE TEST REPORT

Technical Statement of Conformity  
in accordance with 47 CFR Part 15 Subpart C

### The product

**Equipment Under Test** : Family book RF remote controller  
**Model Number** : VRF-039A  
**Product Series** : N/A  
**Report Number** : HA140801-RA  
**Issue Date** : 24-Nov-2014  
**Test Result** : Compliance

is produced by

**Cubee Hypermedia Inc.**  
**No. 1-1, Jihu Rd., Neihu Dist., Taipei City 114, Taiwan.**



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SL2-IS-E-0023, SL2-R1-E-0023,  
SL2-R2-E-0023, SL2-L1-E-0023

**FCC Designation No.:** TW1071  
**TAF Accreditation No.:** 1163  
**VCCI Registration No.:** R-2156, C-2329, T-219

# Contents

<b>1 General Description</b>	<b>6</b>
1.1 Description of EUT	6
1.2 Test Instruments	7
1.3 Auxiliary Equipments	8
1.4 EUT SETUP	8
1.5 Identifying the Final Test Mode	8
1.6 Final Test Mode (Worst Case)	9
1.7 Condition of Power Supply	9
1.8 EUT Configuration	9
1.9 Test Methodology	9
1.10 General Test Procedures	9
1.11 Modification	9
1.12 FCC Part 15.205 restricted bands of operations	10
1.13 Qualification of Test Facility	10
<b>2 Power line Conducted Emission Measurement</b>	<b>11</b>
2.1 Test Instruments	11
2.2 Test Arrangement and Procedure	11
2.3 Limit (§ 15.207)	11
2.4 Test Result	11
<b>3 20 dB Bandwidth of the Emission</b>	<b>12</b>
3.1 Test Instruments	12
3.2 Test Arrangement and Procedure	12
3.3 Test Result	12
<b>4 Radiated Emission Test</b>	<b>16</b>
4.1 Test Instruments	16
4.2 Test Arrangement and Procedure	16
4.3 Limit of Field Strength of Fundamental (§ 15.249)	17
4.4 Limit of Spurious Emission (§ 15.209)	17
4.5 Test Result	17
<b>5 Out of Band Emission Test</b>	<b>28</b>
5.1 Test Instruments	28
5.2 Test Arrangement and Procedure	28
5.3 Limit of Field Strength of Fundamental (§ 15.249(d))	28
5.4 Test Result	28



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<b>6</b>	<b>Antenna requirement</b>	<b>33</b>
6.1	Limit (§ 15.203)	33
6.2	Test Result	33
<b>7</b>	<b>Photographs of the Tests</b>	<b>34</b>
7.1	Radiated Disturbances Emission Test (Below 1G)	34
7.2	Radiated Disturbances Emission Test (Above 1G)	35
<b>8</b>	<b>Photographs of the EUT</b>	<b>36</b>

# Test Result Certification

<b>Applicant</b>	: Cubee Hypermedia Inc.
<b>Address of Applicant</b>	: No. 1-1, Jihu Rd., Neihu Dist., Taipei City 114, Taiwan.
<b>Manufacturer</b>	: Vistar Technology Inc.
<b>Address of Manufacturer</b>	: 2F.-5, No. 504, Yuanshan Rd., Zhonghe Dist., New Taipei City 235, Taiwan.
<b>Trade Name</b>	: N/A
<b>Equipment Under Test</b>	: Family book RF remote controller
<b>Model Number</b>	: VRF-039A
<b>Product Series</b>	: N/A
<b>FCC ID</b>	: 2ADJQ-VRF-039A
<b>Filing Type</b>	: Certification
<b>Sample Received Date</b>	: 21-Oct-2014
<b>Test Standard</b>	:

FCC Part 15 Subpart C §15.249

**Deviations from standard test methods & any other specifications : NONE**

**Remark:**

1. This report details the results of the test carried out on one sample.
2. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.203, 15.207, 15.209, 15.249.
3. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd..

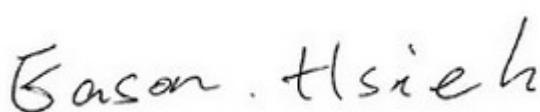


**Documented by:**

Kay Wang/ ADM. Dept Staff

2014-11-24

**Tested by:**



Eason Hsieh / ENG. Dept. Staff

2014-10-28

**Approved by:**



Peter Chin / Section Manager

**Date:**

2014-11-24

## Summary of Test Result

	<b>Test Item</b>	<b>Applicable Standard</b>	<b>Test Result</b>
1	Antenna Requirement	FCC part 15 subpart C §203	Compliance
2	Conducted limits	FCC part 15 subpart C §207	Compliance
3	Radiated emission limits	FCC part 15 subpart C §209	Compliance
4	Field Strength	FCC part 15 subpart C §249(a)	Compliance
5	Band-edge measurement	FCC part 15 subpart C §249(d)	Compliance
6	20dB Bandwidth	FCC part 15 subpart C §215	Compliance

## 1 General Description

### 1.1 Description of EUT

<b>Equipment Under Test</b>	:	Family book RF remote controller
<b>Model Number of EUT</b>	:	VRF-039A
<b>Product Series</b>	:	N/A
<b>Power Supply</b>	:	DC 3V; AAA battery x2
<b>Frequency Range</b>	:	2406~2475 MHz
<b>Number of Channels</b>	:	16 Channels
<b>Carrier Frequency of Each Channel</b>	:	2406 MHz, 2410 MHz, 2414 MHz, 2418 MHz, 2424 MHz, 2428 MHz, 2433 MHz, 2437 MHz, 2443 MHz, 2449 MHz, 2452 MHz, 2457 MHz, 2466 MHz, 2469 MHz, 2472 MHz, 2475 MHz
<b>Antenna Specification</b>	:	Printed Antenna/ Gain: 1.08 dBi
<b>Modulation Technique</b>	:	GFSK
<b>Specification</b>	:	<b>Dimensions</b> : 20.8 cm (L) X 5 cm (W) X 2.2 cm (H) <b>Weight</b> : 120 g <b>Function</b> : The EUT is a wireless remote controller. <b>※For more detail specification, please refer to the User Manual.</b>

## 1.2 Test Instruments

### 1.2.1. Instruments Used for Measurement

HA1

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
RF Amplifier	AR	15S1G3	306578	11-AUG-2014	11-AUG-2015
EMI Receiver	R&S	ESCI	100615	03-MAR-2014	03-MAR-2015
Spectrum Analyzer	R&S	FSL6	100323	11-JUN-2014	11-JUN-2015
Spectrum Analyzer	Advantest	R3172	101202158	24-JUN-2014	24-JUN-2015
Preamplifier	WIRELESS	FPA-6592G	060009	09-JUL-2014	09-JUL-2015
Preamplifier	HD	HD17187	004	04-AUG-2014	04-AUG-2015
Bilog Antenna	TESEQ	CBL6111D	25769	03-MAR-2014	03-MAR-2015
Bilog Antenna	Schaffner	CBL6112B	2860	12-AUG-2014	12-AUG-2015
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	04-MAY-2014	04-MAY-2015
Temp. & Humidity Chamber	Giant Force	GTH-150-20-SP-AR	MMA0907-012	22-JUL-2014	22-JUL-2015
Horn Antenna (18-40GHz)	Com-Power	AH-840	101042	03-Jul-2014	03-Jul-2015
Microwave Preamplifier	Com-Power	PAM-840	461269	02-Jul-2014	02-Jul-2015
L.I.S.N.	Mess Tec	NNB-2/16Z	03/1006	24-Jan-2014	24-Jan-2015
L.I.S.N.	EMCIS	LN2-16	LN04023	01-Aug-2014	01-Aug-2015

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.

### 1.3 Auxiliary Equipments

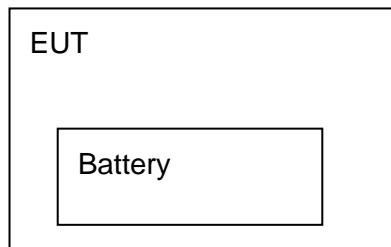
1.3.1. Provided by HongAn Technology Co., Ltd. for Emission Test.

N/A

1.3.2. Provided by the Manufacturer

N/A

### 1.4 EUT SETUP



Note: Main Test Sample: VRF-039A

### 1.5 Identifying the Final Test Mode

1. TX mode 1: set at CH01 (2406MHz), and transmitting. X axis.
2. TX mode 2: set at CH11 (2437MHz), and transmitting. X axis.
3. TX mode 3: set at CH20 (2475MHz), and transmitting. X axis.

Note:

1. During radiated emission pre-test, rotation of the EUT through three orthogonal axes has been evaluated. The worst case X axis was reported. The tests were performed using new batteries.
2. After pre-test, we identified that the TX (X axis) was most likely to cause maximum disturbance and most likely to be susceptible to disturbance. Therefore, the Final Assessment was performed for the worst case.
3. The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.
4. Channel Low (2406MHz), Mid (2437MHz) and High (2475MHz) with highest data rate were chosen for full testing.
5. According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

## 1.6 Final Test Mode (Worst Case)

Conducted Emission: N/A.

Field Strength: All Mode.

Radiated Emission (30~1000 MHz): Mode 3.

Radiated Emission (1~26.5GHz): All Mode.

## 1.7 Condition of Power Supply

DC 3V

2 AAA sized batteries

Note: The tests were performed using new batteries.

## 1.8 EUT Configuration

1. Setup the EUT as shown in Sec.1.4 Block Diagram.
2. Turn on the power of all equipments.
3. Activate the selected Final Test Mode.

## 1.9 Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.4 (2003) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.203, 15.207, 15.209 and 15.249.

## 1.10 General Test Procedures

### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 (2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C 63.4 (2003).

## 1.11 Modification

N/A

## 1.12 FCC Part 15.205 restricted bands of operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 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
8.37635-8.38675	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	( <sup>2</sup> )
13.36-13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 1.13 Qualification of Test Facility

<b>BSMI Certificate No.</b>	: SL2-IS-E-0023, SL2-IN-E-0023, SL2-R1-E-0023, SL2-R2-E-0023, : SL2-A1-E-0023, SL2-L1-E-0023.
<b>FCC Designation No.</b>	: TW1071
<b>TAF Accreditation No.</b>	: 1163
<b>VCCI Certificate No.</b>	: R-2156, C-2329, T-219

## 2 Power line Conducted Emission Measurement

### 2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 2.2 Test Arrangement and Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 2.3 Limit (§ 15.207)

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency (MHz)	Limits (dBuV)	
	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5.0	56	46
5.0 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### 2.4 Test Result

N/A

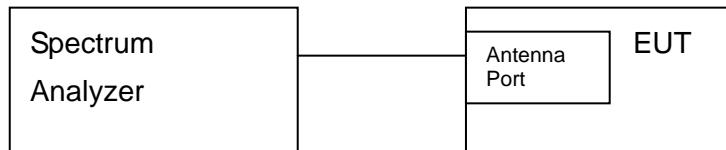
The EUT is a battery powered device.

### 3 20 dB Bandwidth of the Emission

#### 3.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

#### 3.2 Test Arrangement and Procedure



#### 3.3 Test Result

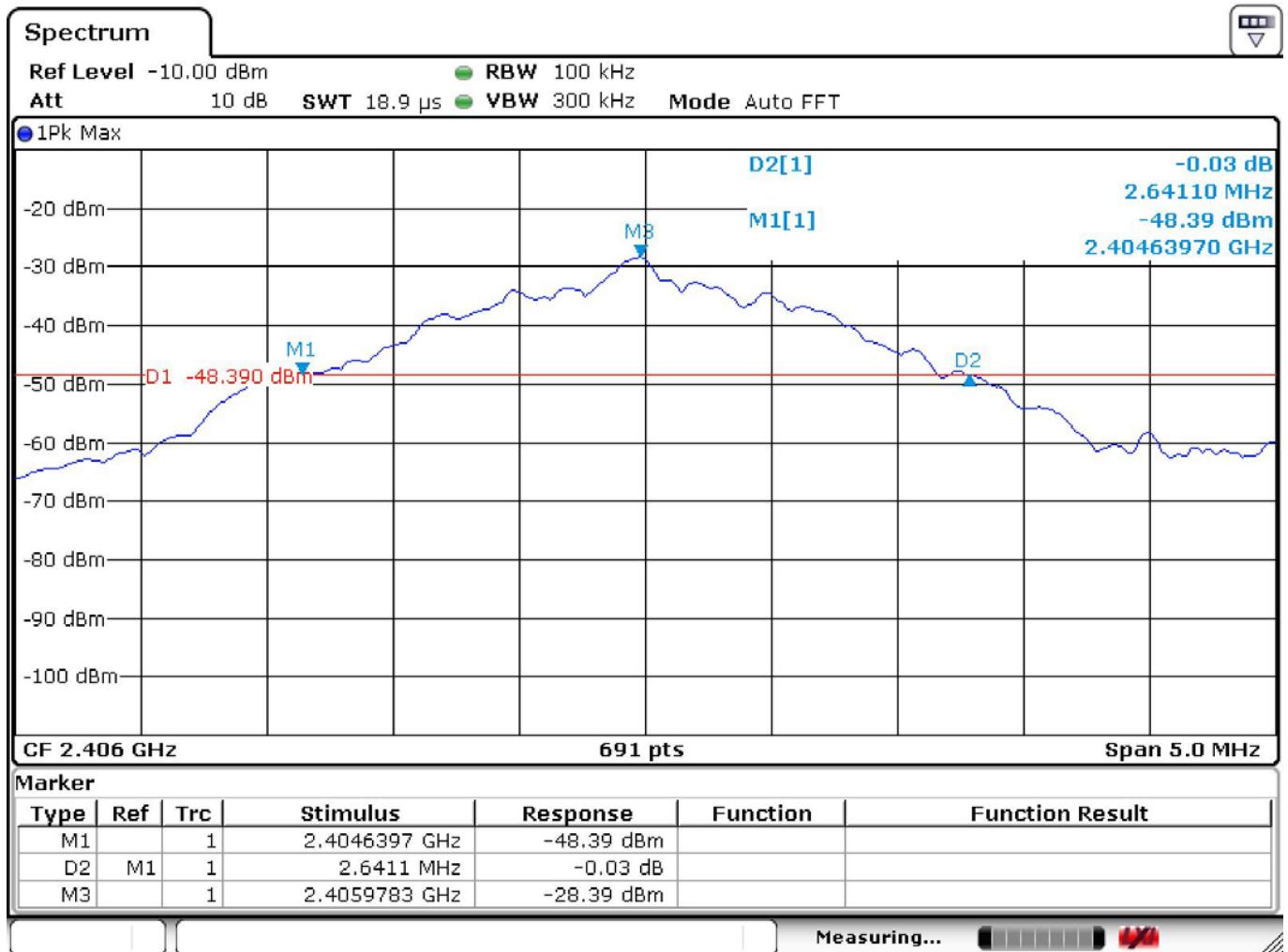
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
01	2406	2.64110
11	2437	2.83650
20	2475	2.81480

Note: 20 dB Bandwidths are measured under following setting: RBW = 100kHz, VBW = 300 kHz.

The final test data are shown on the following page(s).

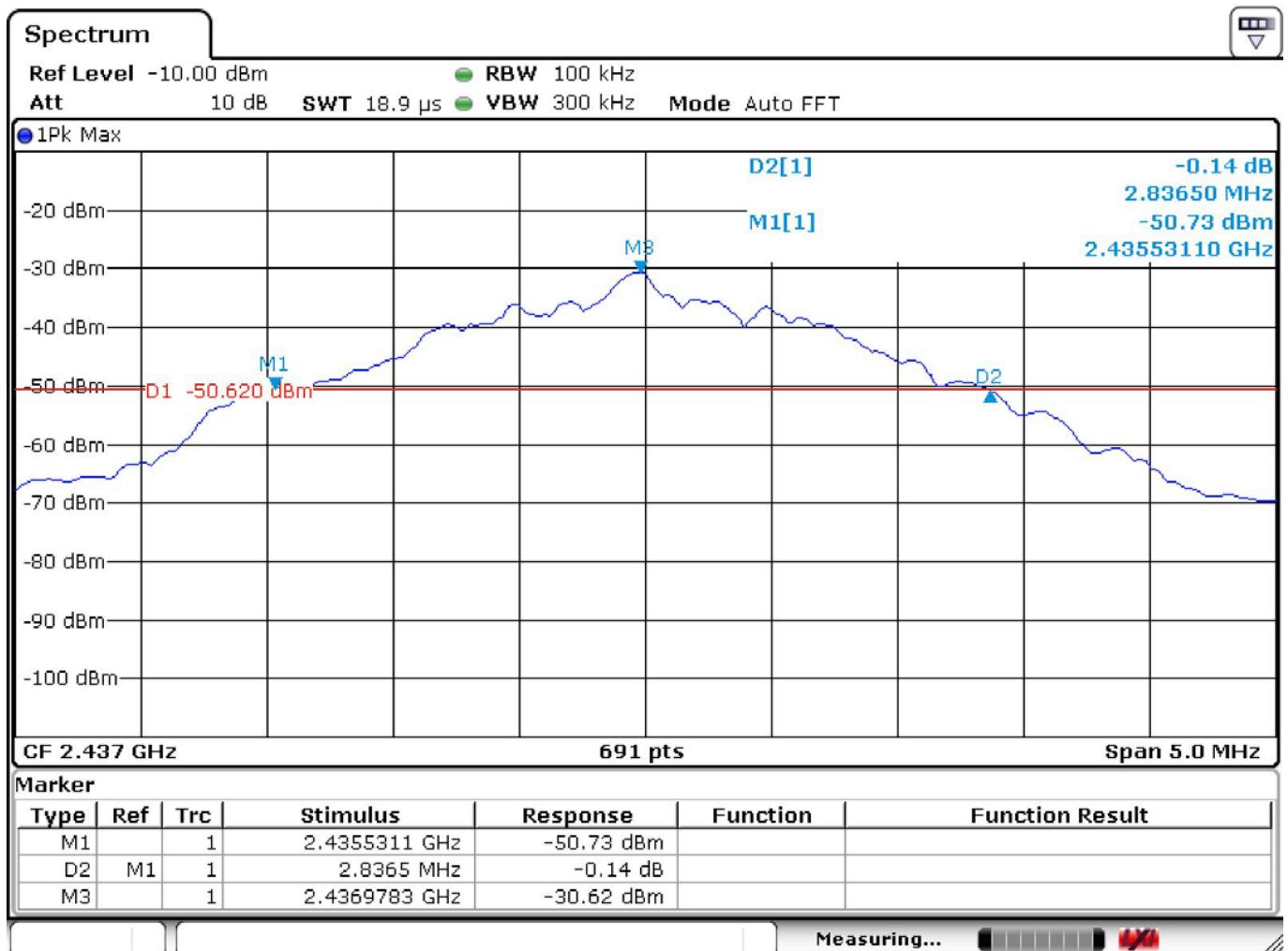


Temperature : 26.7°C      Humidity : 42%  
Test Date : 28-Oct-2014      Tested by : Kidd Liao  
                                    Channel : CH01 (2406MHz)



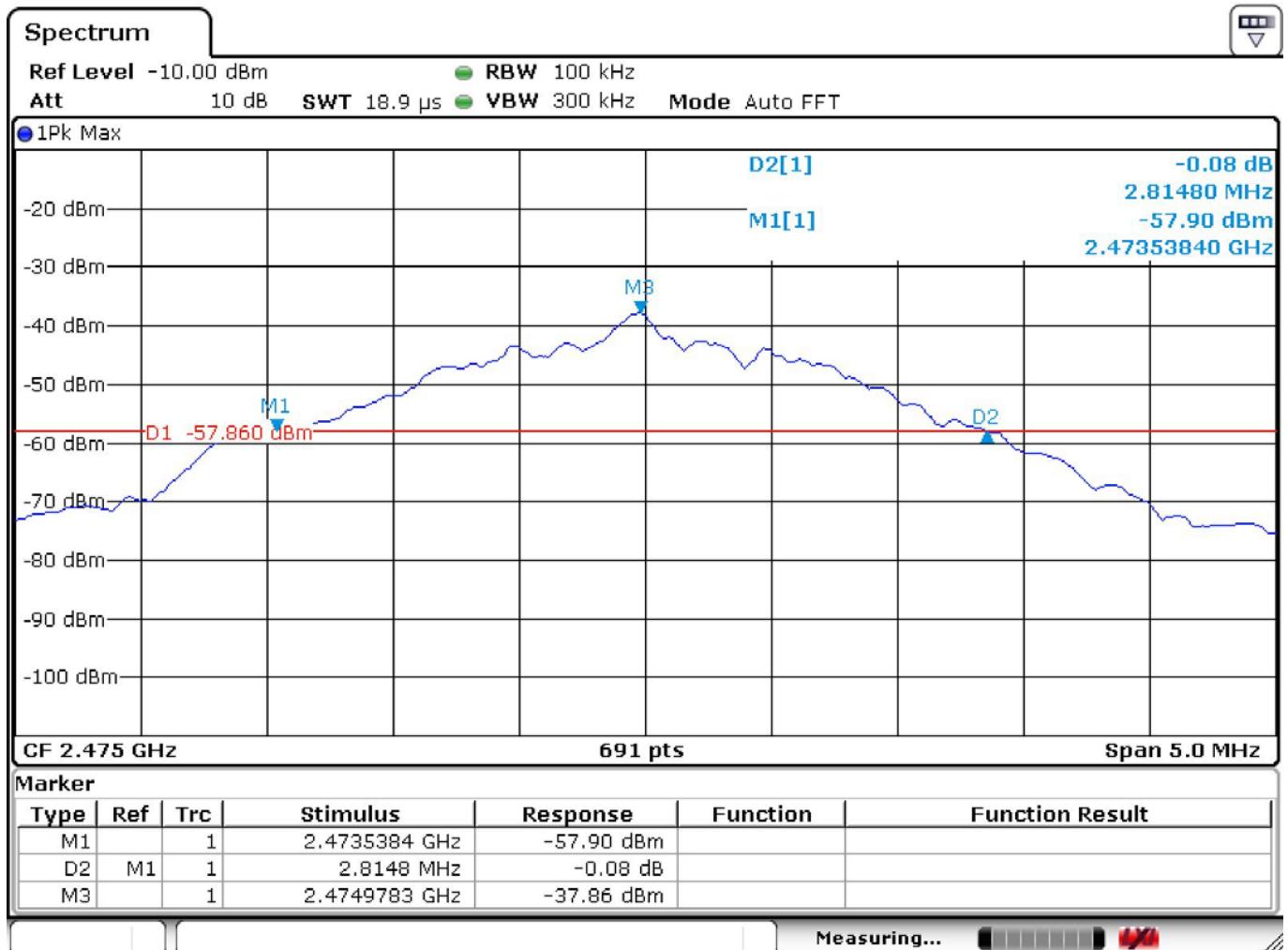


Temperature : 26.7°C      Humidity : 42%  
Test Date : 28-Oct-2014      Tested by : Kidd Liao  
                                    Channel : CH08 (2437MHz)





Temperature : 26.7°C      Humidity : 42%  
Test Date : 28-Oct-2014      Tested by : Kidd Liao  
Channel : CH16 (2475MHz)

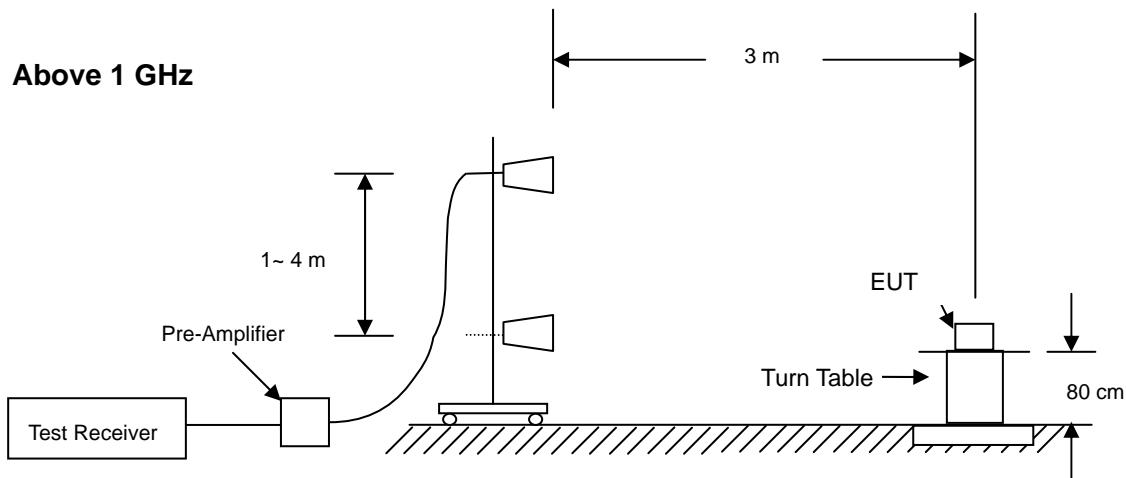
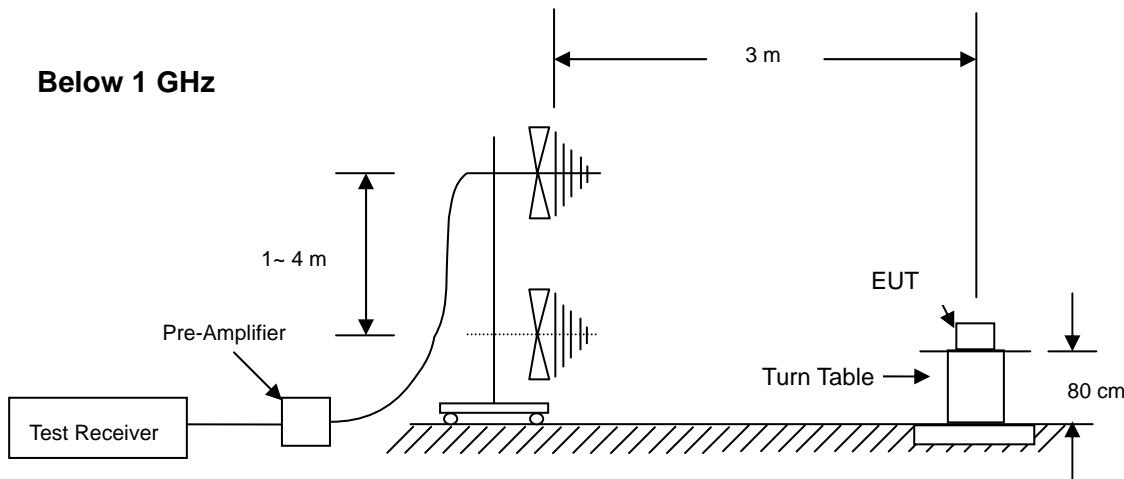


## 4 Radiated Emission Test

### 4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 4.2 Test Arrangement and Procedure



1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
  - (a) Below 1 GHz: RBW =100 kHz/ VBW = 1 MHz/ Sweep = AUTO.
  - (b) Above 1 GHz: Peak: RBW = 3MHz/ VBW = 10MHz/ Sweep = AUTO.

7. Repeat above procedures until the measurements for all frequencies are complete.

#### 4.3 Limit of Field Strength of Fundamental (§ 15.249)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/ meter)	Field strength of harmonics (meters)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Note:

1. Field strength limits are specified at a distance of 3 meters.
2. For frequencies above 1000 MHz, the field strength limits in above table are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

#### 4.4 Limit of Spurious Emission (§ 15.209)

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 § 15.209, whichever is lesser attenuation.

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
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

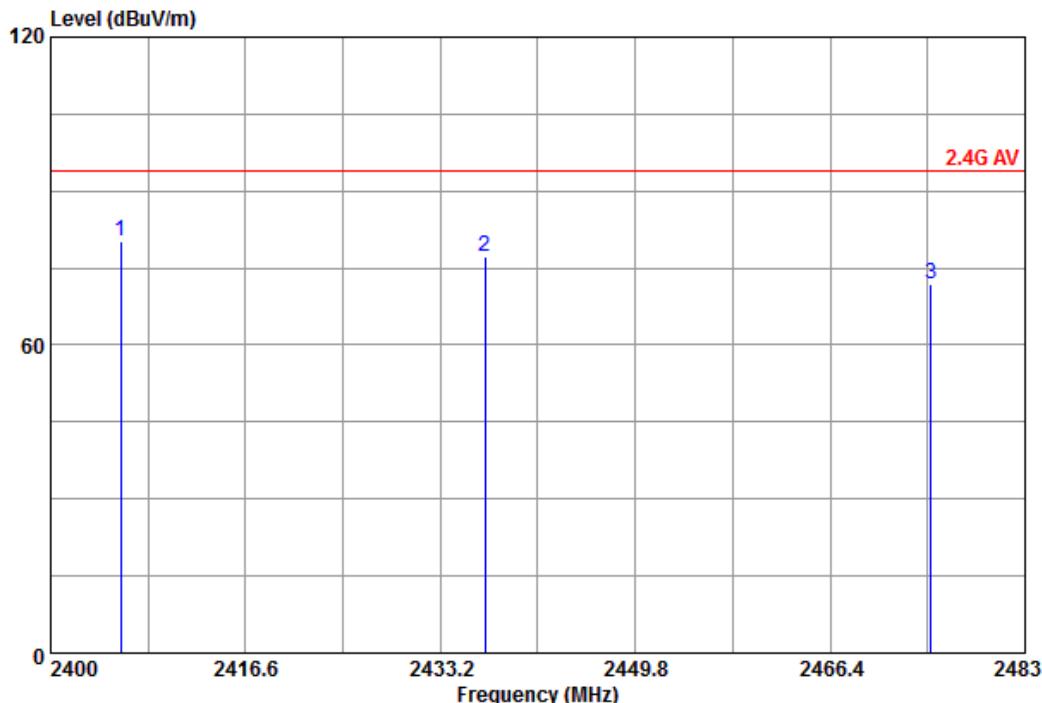
#### 4.5 Test Result

##### Compliance

The final test data are shown on the following page(s).

**Radiated Emission Test Data (Field Strength of Fundamental)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH01 (2406MHz) CH08 (2437MHz)
EUT Position	: Vertical		: CH16 (2475MHz)



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2406.000	87.79	-7.58	80.21	94.00	-13.79	---	---	Peak
2 2437.000	84.80	-7.49	77.31	94.00	-16.69	---	---	Peak
3 2475.000	79.31	-7.39	71.92	94.00	-22.08	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

@ : Maximum Data    x : Over Limit

**Remark :**

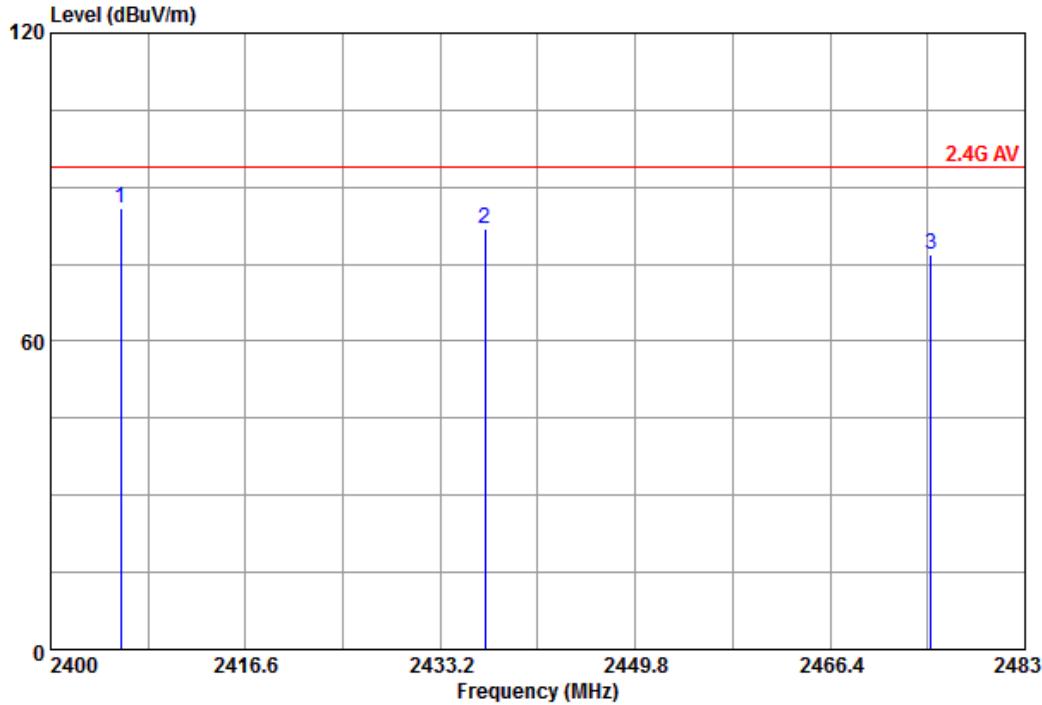
1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:

Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 3MHz, VBW =10MHz, Sweep = AUTO.

Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

**Radiated Emission Test Data (Field Strength of Fundamental)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH01 (2406MHz) CH08 (2437MHz)
EUT Position	: Vertical		CH16 (2475MHz)



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2406.000	93.39	-7.58	85.81	94.00	-8.19	---	---	Peak
2 2437.000	89.27	-7.49	81.78	94.00	-12.22	---	---	Peak
3 2475.000	84.15	-7.39	76.76	94.00	-17.24	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

@ : Maximum Data    x : Over Limit

**Remark :**

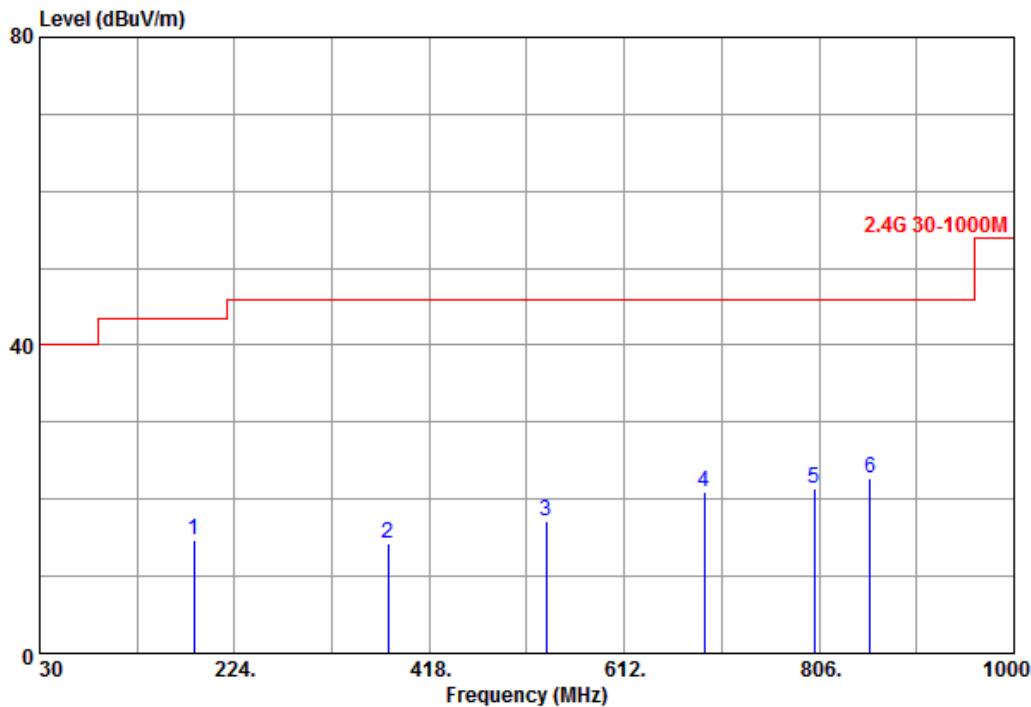
1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:

Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = 3MHz, VBW = 10MHz, Sweep = AUTO.

Note: Because the 20 dB Bandwidth is over 1MHz, the RBW setting of measuring Field strength of Fundamental should be 3MHz, and VBW should be at 10 MHz.

**Radiated Emission Test Data (Below 1 GHz)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 183.260	32.04	-17.38	14.66	43.50	-28.84	---	---	
2 377.260	28.44	-14.16	14.28	46.00	-31.72	---	---	
3 534.400	27.81	-10.59	17.22	46.00	-28.78	---	---	
4 691.540	28.19	-7.26	20.93	46.00	-25.07	---	---	
5 801.150	26.88	-5.50	21.38	46.00	-24.62	---	---	
6 @ 856.440	27.51	-4.73	22.78	46.00	-23.22	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

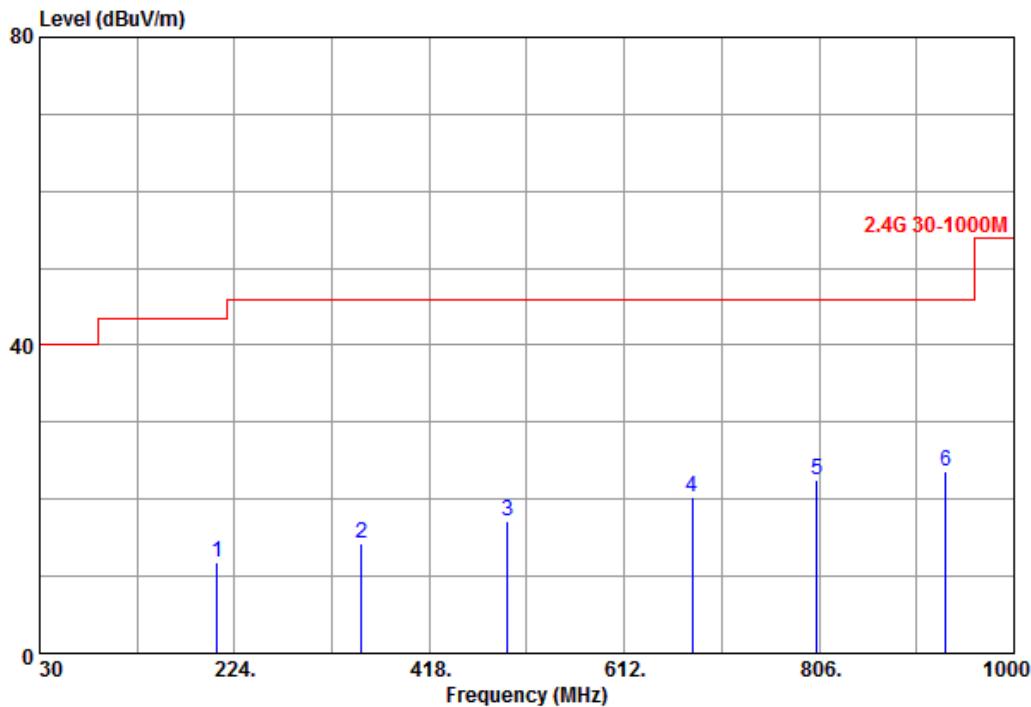
@ : Maximum Data x : Over Limit

**Remark :**

1. Measuring frequencies from 30 MHz to 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
4. All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

**Radiated Emission Test Data (Below 1 GHz)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dB <sub>UV</sub>	dB	dB <sub>UV</sub> /m	dB <sub>UV</sub> /m	dB			
1 206.540	30.44	-18.56	11.88	43.50	-31.62	---	---	
2 350.100	30.82	-16.50	14.32	46.00	-31.68	---	---	
3 495.600	30.96	-13.89	17.07	46.00	-28.93	---	---	
4 679.900	30.48	-10.14	20.34	46.00	-25.66	---	---	
5 804.060	30.95	-8.38	22.57	46.00	-23.43	---	---	
6 @ 932.100	30.51	-6.99	23.52	46.00	-22.48	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

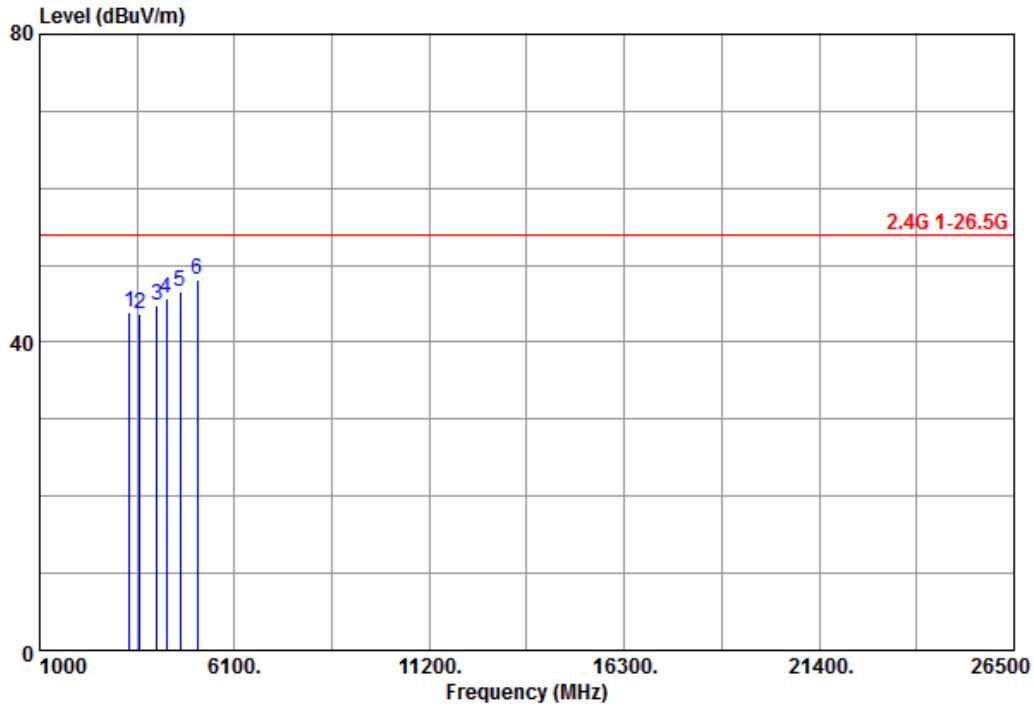
@ : Maximum Data x : Over Limit

**Remark :**

1. Measuring frequencies from 30 MHz to 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
4. All readings are Peak values. None of the peak value reading exceeds the Q.P. limit. Hence, Q.P. reading was not measured.
5. The IF bandwidth of SPA between 30 MHz to 1 GHz was 100 kHz.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH01 (2406MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3346.000	48.73	-4.85	43.88	54.00	-10.12	---	---	
2 3626.500	47.75	-4.07	43.68	54.00	-10.32	---	---	
3 4060.000	47.39	-2.70	44.69	54.00	-9.31	---	---	
4 4315.000	47.20	-1.61	45.59	54.00	-8.41	---	---	
5 4672.000	46.68	-0.08	46.60	54.00	-7.40	---	---	
6 @5131.000	46.46	1.65	48.11	54.00	-5.89	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

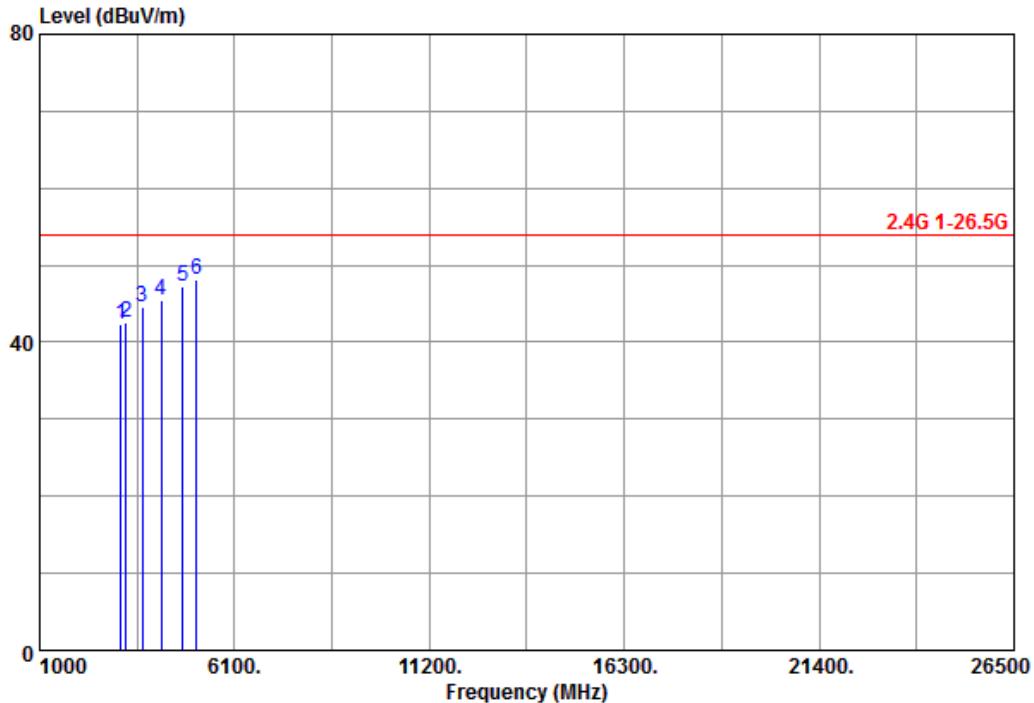
@ : Maximum Data    x : Over Limit

**Remark :**

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH01 (2406MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3116.500	47.97	-5.54	42.43	54.00	-11.57	---	---	
2 3269.500	47.60	-5.06	42.54	54.00	-11.46	---	---	
3 3677.500	48.35	-3.87	44.48	54.00	-9.52	---	---	
4 4187.500	47.66	-2.12	45.54	54.00	-8.46	---	---	
5 4748.500	47.04	0.21	47.25	54.00	-6.75	---	---	
6 50105.500	46.46	1.61	48.07	54.00	-5.93	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

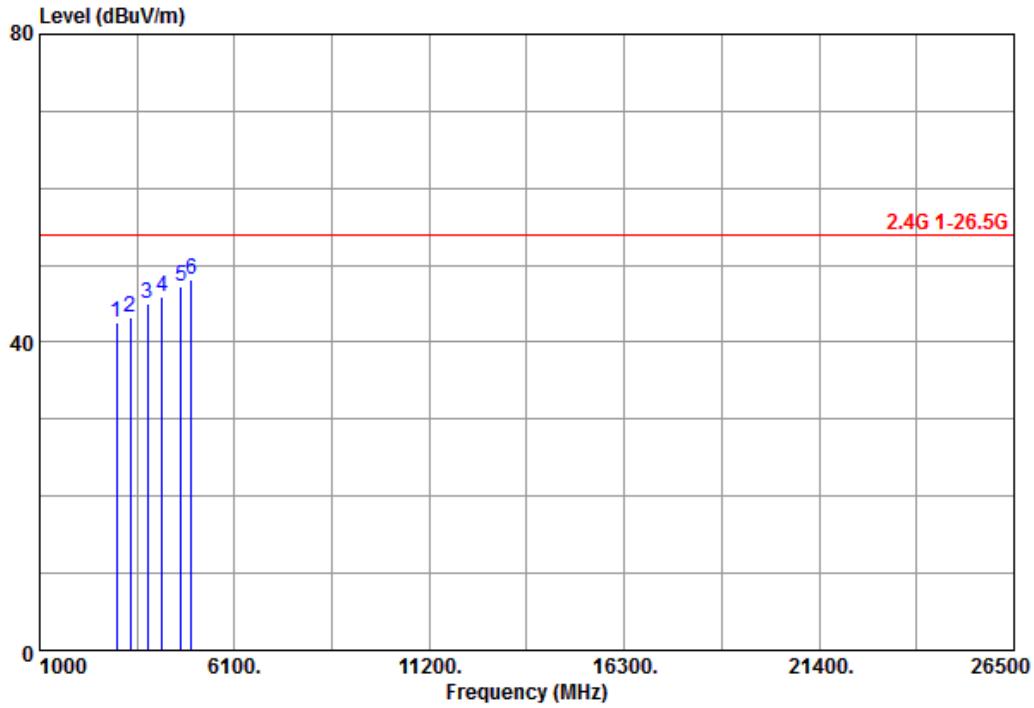
@ : Maximum Data      x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH08 (2437MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3014.500	48.42	-5.84	42.58	54.00	-11.42	---	---	
2 3371.500	47.96	-4.76	43.20	54.00	-10.80	---	---	
3 3830.500	48.41	-3.48	44.93	54.00	-9.07	---	---	
4 4213.000	47.93	-2.04	45.89	54.00	-8.11	---	---	
5 4697.500	47.26	0.07	47.33	54.00	-6.67	---	---	
6 04978.000	46.84	1.22	48.06	54.00	-5.94	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

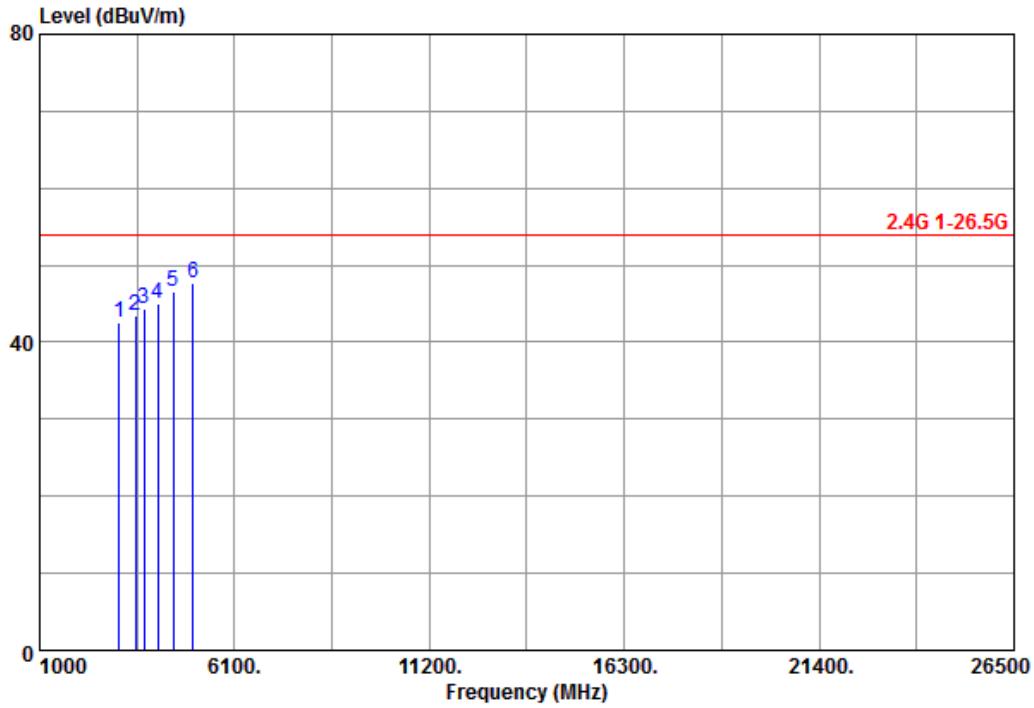
@ : Maximum Data      x : Over Limit

**Remark :**

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH08 (2437MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3091.000	48.11	-5.59	42.52	54.00	-11.48	---	---	
2 3499.000	47.90	-4.40	43.50	54.00	-10.50	---	---	
3 3728.500	48.11	-3.77	44.34	54.00	-9.66	---	---	
4 4085.500	47.50	-2.55	44.95	54.00	-9.05	---	---	
5 4493.500	47.28	-0.81	46.47	54.00	-7.53	---	---	
6 @50003.500	46.38	1.34	47.72	54.00	-6.28	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

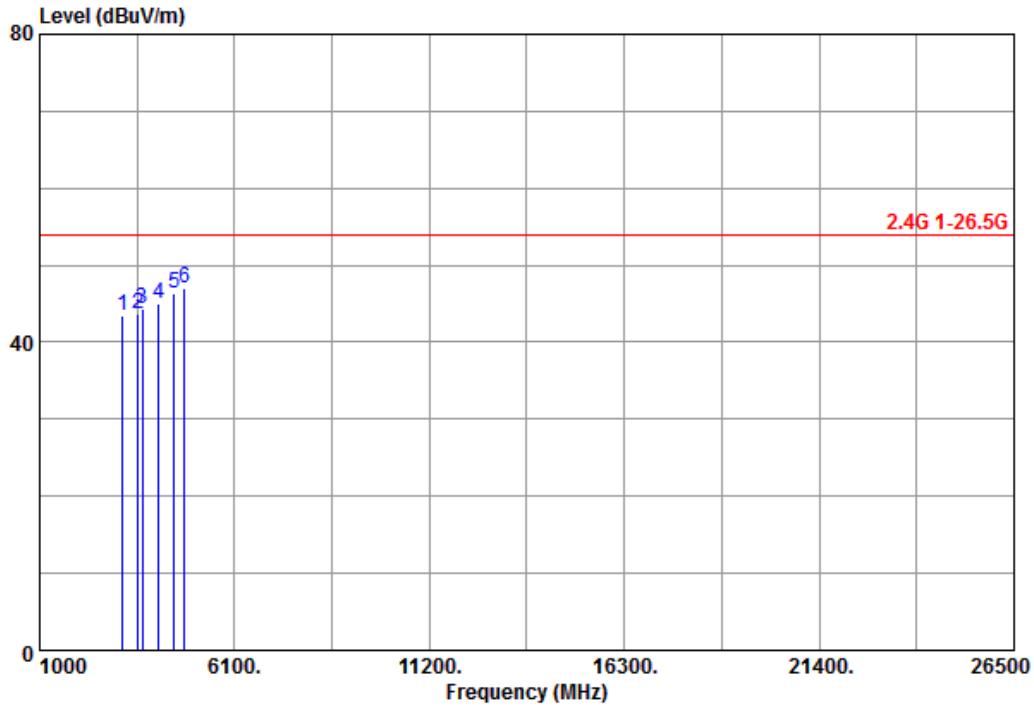
@ : Maximum Data    x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3167.500	48.76	-5.35	43.41	54.00	-10.59	---	---	
2 3575.500	47.80	-4.17	43.63	54.00	-10.37	---	---	
3 3677.500	48.19	-3.87	44.32	54.00	-9.68	---	---	
4 4111.000	47.51	-2.48	45.03	54.00	-8.97	---	---	
5 4519.000	46.99	-0.74	46.25	54.00	-7.75	---	---	
6 4799.500	46.43	0.49	46.92	54.00	-7.08	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

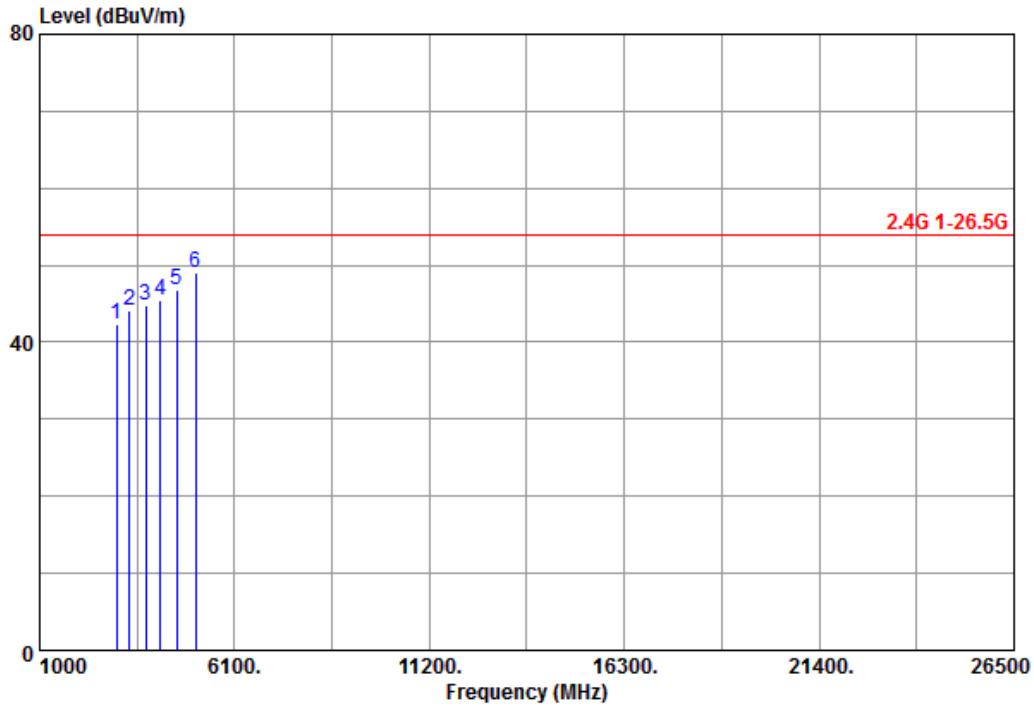
@ : Maximum Data      x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Radiated Emission Test Data (Above 1G and Field Strength to 10th Harmonic)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 3014.500	48.11	-5.84	42.27	54.00	-11.73	---	---	
2 3346.000	49.00	-4.85	44.15	54.00	-9.85	---	---	
3 3779.500	48.31	-3.58	44.73	54.00	-9.27	---	---	
4 4162.000	47.74	-2.26	45.48	54.00	-8.52	---	---	
5 4595.500	47.26	-0.38	46.88	54.00	-7.12	---	---	
6 @5080.000	47.40	1.52	48.92	54.00	-5.08	---	---	

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

@ : Maximum Data    x : Over Limit

Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

## 5 Out of Band Emission Test

### 5.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 5.2 Test Arrangement and Procedure

Refer to Sec. 3.2.

### 5.3 Limit of Field Strength of Fundamental (§ 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 § 15.209, whichever is the lesser attenuation.

### 5.4 Test Result

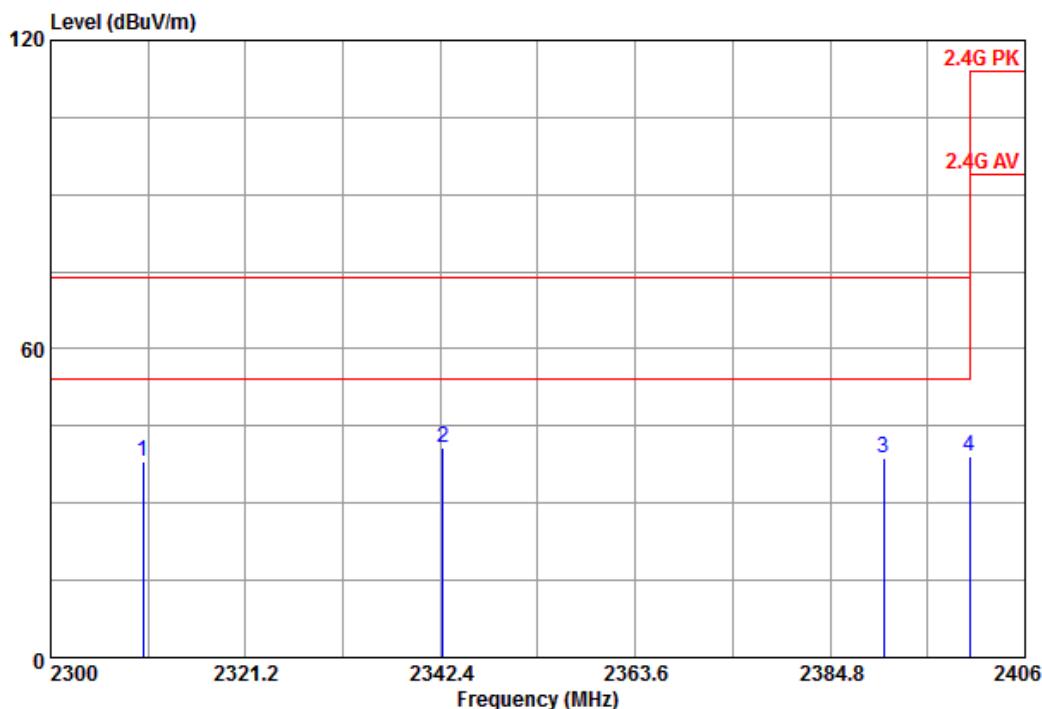
#### Compliance

The final test data are shown on the following page(s).

## Band-Edge Test Data (Lower Edge)

Temperature : 26.7°C  
Test Date : 28-Oct-2014  
Polarization : Vertical  
EUT Position : Vertical

Humidity : 42%  
Tested by : Eason Hsieh  
Channel : CH01 (2406MHz)



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2310.090	45.94	-7.88	38.06	54.00	-15.94	---	---	Peak
2 2342.670	48.63	-7.79	40.84	54.00	-13.16	---	---	Peak
3 2390.640	46.43	-7.63	38.80	54.00	-15.20	---	---	Peak
4 2400.000	46.61	-7.63	38.98	54.00	-15.02	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

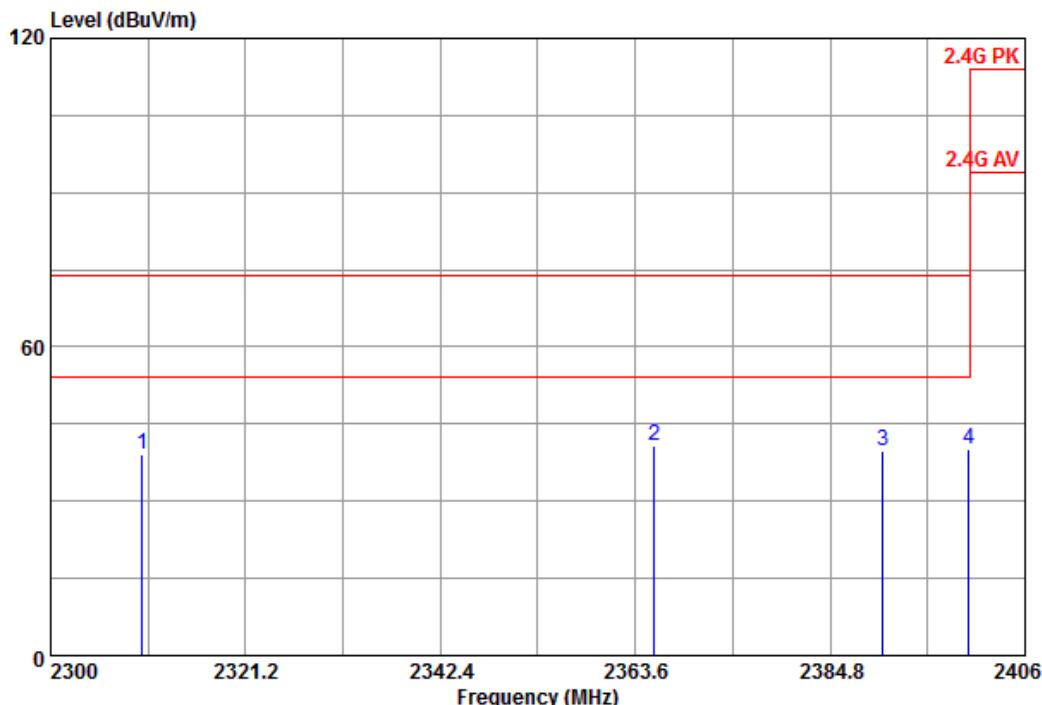
@ : Maximum Data    x : Over Limit

## Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

## Band-Edge Test Data (Lower Edge)

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH01 (2406MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2310.000	47.02	-7.88	39.14	54.00	-14.86	---	---	Peak
2 @2365.620	48.68	-7.74	40.94	54.00	-13.06	---	---	Peak
3 2390.550	47.49	-7.63	39.86	54.00	-14.14	---	---	Peak
4 2399.910	47.58	-7.63	39.95	54.00	-14.05	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

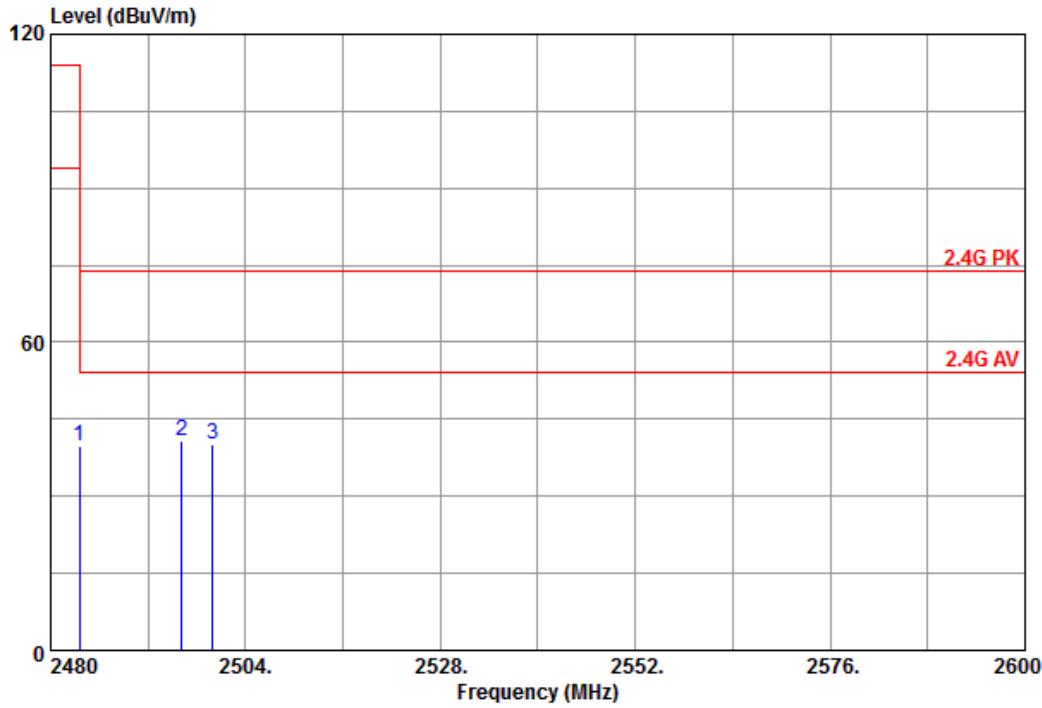
@ : Maximum Data      x : Over Limit

## Remark :

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Band-Edge Test Data (Upper Edge)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Vertical	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2483.500	47.15	-7.39	39.76	54.00	-14.24	---	---	Peak
2 2496.123	48.12	-7.33	40.79	54.00	-13.21	---	---	Peak
3 2500.000	47.58	-7.33	40.25	54.00	-13.75	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

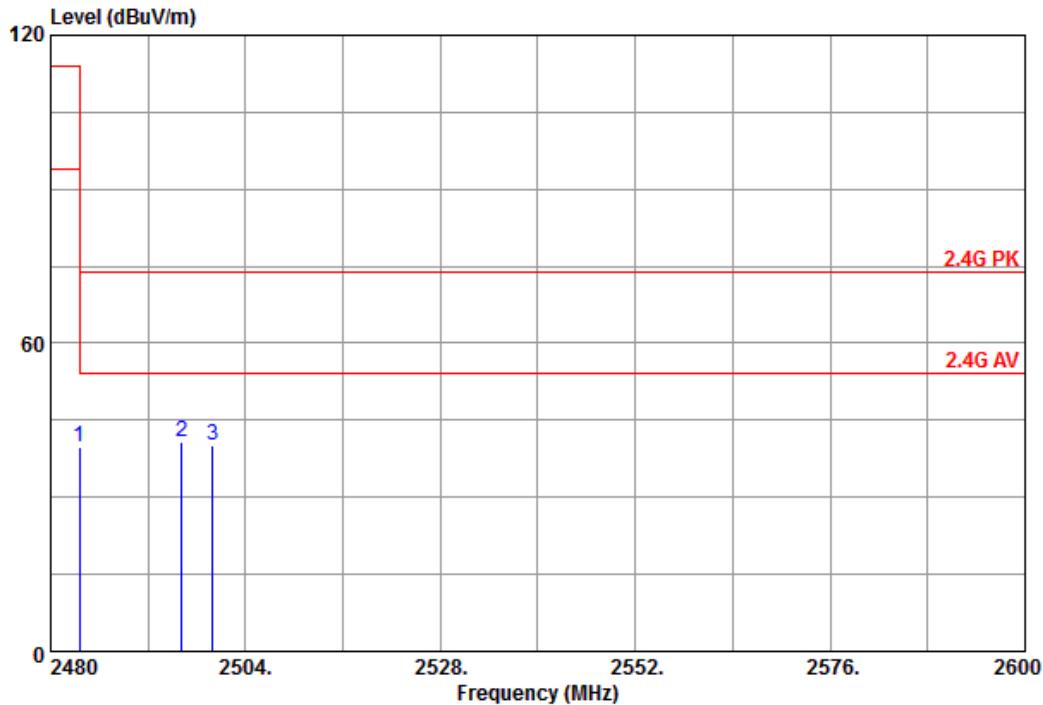
@ :Maximum Data x :Over Limit

**Remark :**

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

**Band-Edge Test Data (Upper Edge)**

Temperature	: 26.7°C	Humidity	: 42%
Test Date	: 28-Oct-2014	Tested by	: Eason Hsieh
Polarization	: Horizontal	Channel	: CH16 (2475MHz)
EUT Position	: Vertical		



Freq	Reading	C.F	Result	Limit	Margin	A/pos	T/pos	Remark
MHz	dBuV	dB	dBuV/m	dBuV/m	dB			
1 2483.500	47.15	-7.39	39.76	54.00	-14.24	---	---	Peak
2 @2496.123	48.12	-7.33	40.79	54.00	-13.21	---	---	Peak
3 2500.000	47.58	-7.33	40.25	54.00	-13.75	---	---	Peak

C.F = Antenna Factor + Cable Loss - Preamp gain  
Result = Reading + C.F ; Margin = Result - Limit

@ : Maximum Data    x : Over Limit

**Remark :**

1. Measuring frequencies from 1 GHz to the 10<sup>th</sup> harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode.
4. All readings are Peak values. None of the peak value reading exceeds the A.V. limit. Hence, A.V. reading was not measured.
5. Spectrum setting:
  - (a) Peak Setting 1GHz to 10<sup>th</sup> harmonics of fundamental, RBW = VBW = 1MHz, Sweep = AUTO.

## 6 Antenna requirement

### 6.1 Limit (§ 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 § 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 § 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.

### 6.2 Test Result

**Compliance.**

**The EUT applies a printed PCB antenna.**