

# FCC 47 CFR PART 15 SUBPART C TEST REPORT

For

Product Name: Wireless Presentation & Collaboration System

Brand Name: DELTA , VIVITEK

Model No.: NP2000

Series Model.: DS200

FCC ID:H79-0120C8

Test Report Number:

C151118R01-RPB

Issued for

Delta Electronic Incorporated.

3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan

Issued by

Compliance Certification Services Inc.

Kun shan Laboratory

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TESTING CERT #2541.01

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## Revision History

Revision	REPORT NO.	Date	Page Revised	Contents
Original	C151118R01-RPB	May 10, 2016	N/A	N/A
01	C151118R01-RPB	June 1, 2016	P11,P54	on page 54 add 9kHz to 30MHz don't test specification

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**1. TEST RESULT CERTIFICATION**

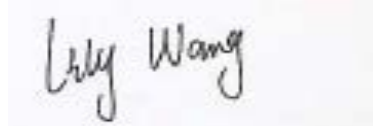
<b>Product Name:</b>	Wireless Presentation & Collaboration System
<b>Trade Name:</b>	DELTA , VIVITEK
<b>Model Name:</b>	NP2000
<b>Series Model:</b>	DS200
<b>Applicant Discrepancy:</b>	Initial
<b>Device Category:</b>	Production unit
<b>Date of Test:</b>	April 9, 2016 ~ April 29, 2016
<b>Applicant:</b>	<b>Delta Electronic Incorporated.</b> 3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan
<b>Manufacturer:</b>	<b>Delta Electronic Incorporated.</b> 3 Tungyung rd., Chungli Industrial Zone, Taoyuan County 32063 Taiwan
<b>Application Type:</b>	Certification

**APPLICABLE STANDARDS**

<b>STANDARD</b>	<b>TEST RESULT</b>
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

**Approved by:****Tested by:**

Jeff.Fang  
RF Manager  
Compliance Certification Services Inc.

Lily.Wang  
Test Engineer  
Compliance Certification Services Inc.

## 2. EUT DESCRIPTION

<b>Product Name:</b>	Wireless Presentation & Collaboration System
<b>Brand Name:</b>	DELTA , VIVITEK
<b>Model Name:</b>	NP2000
<b>Series Model:</b>	DS200
<b>Model Discrepancy:</b>	Only for market segment
<b>Power Adapter:</b>	Power supply and ADP (rating): Model: W12-010N3A Input: 100-240V-50/60Hz 0.3A Output: 5V 2A
<b>Frequency Range :</b>	Bluetooth:2402 ~ 2480 MHz
<b>Transmit Power :</b>	Bluetooth:9.16dBm
<b>Modulation Technique :</b>	Bluetooth: FHSS
<b>Transmit Data Rate :</b>	Bluetooth: GFSK(1 Mbps), $\pi/4$ -DQPSK(2 Mbps),8-DPSK(3 Mbps)
<b>Number of Channels :</b>	Bluetooth: 79 Channels
<b>Antenna Specification:</b>	PCB antenna 0 for 2.4GHz Gain 3.0dBi PCB antenna 1 for 2.4GHz Gain 3.0dBi

**Remark:**

- 1.The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
- 2.This submittal(s) (test report) is intended for **FCC ID:H79-0120C8** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 ,15.247.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EXERCISE EUT**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

#### **3.3 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 C63.10 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

###### **Under 1GHz**

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 3m away from the receiving antenna, which varied from 1m to 4m 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10.

###### **Above 1GHz**

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10.

### 3.4 TEST Mode

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
Peak Output Power	GFSK	1 Mbps	0/39/78	1
	8DPSK	3 Mbps		
Hopping Channel Bandwidth	GFSK	1 Mbps	0/39/78	1
	8DPSK	3 Mbps		
Hopping Channel Separation	GFSK	1 Mbps	38-39	1
	8DPSK	3 Mbps		
Number of Hopping Frequency	GFSK	1 Mbps	0-78	1
	8DPSK	3 Mbps		
Dwell Time	DH1/DH3/DH5	1 Mbps	39	1
	3DH1/3DH3/3DH5	3 Mbps		
Spurious Emission	GFSK	1 Mbps	0/39/78	1
	8DPSK	3 Mbps		
Band Edge Emissions	GFSK	1 Mbps	0/78	1
	8DPSK	3 Mbps		
Radiated Emissions Below 1GHz	GFSK	1 Mbps	78	1
Radiated Emissions Above 1GHz	GFSK	1 Mbps	0/39/78	1
	8DPSK	3 Mbps		
AC Power Conducted Emissions	CTX	-	-	-

Remark: For radiated test cases below 1 GHz, the worst mode data rate channel 78 of 1Mbps was reported only, because this data rate has the highest RF output power at preliminary tests.

**3.5 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
0.0900 - 0.1100	16.420 - 16.423	399.9 - 410.0	4.50 - 5.15
0.4950 - 0.505 <sup>(1)</sup>	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.1250 - 4.1280	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.0 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.2150 - 6.2180	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 121.94	1718.8 - 1722.2	13.25 - 13.40
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.50
8.2910 - 8.2940	149.90 - 150.05	2310 - 2390	15.35 - 16.20
8.3620 - 8.3660	156.52475 - 156.52525	2483.5 - 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.2900 - 12.2930	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345 - 3358	36.43 - 36.5 <sup>(2)</sup>
12.57675 - 12.57725	322.0 - 335.4	3600 - 4400	
13.3600 - 13.4100			

<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.



## **4. INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards. facilities and accreditations

## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILTIES**

All measurement facilities used to collect the measurement data are located at CCS China Kunshan Lab at 10#Weiye Rd, Innovation Park Eco. & Tec. Development Zone Kunshan city JiangSu, (215300), CHINA.

The sites are constructed in conformance with the requirements of ANSI C63.10 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.3 LABORATORY ACCREDITATIONS AND LISTING**

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 200581-0 to perform Electromagnetic Interference tests according to FCC Part 15 or 18 requirements. In addition, the test facilities are listed with Federal Communication Commission, Laboratory Division, 424105 for 10m chamber, 238958 for 3m chamber .

## 5.4 TABLE OF ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

<b>Taiwan</b>	TAF
<b>USA</b>	A2LA

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>Canada</b>	Industry Canada
<b>Japan</b>	VCCI
<b>Taiwan</b>	BSMI
<b>USA</b>	FCC

Copies of granted accreditation certificates are available for downloading from our web site,  
<http://www.ccsrf.com>

**5.5 LIST OF MEASURING EQUIPMENT**

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Data	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-9-11	2016-9-10
Spectrum Analyzer	RS	FSU26	200789	2015-8-10	2016-8-9
OSCILLOSCOPE	Agilent	DSO6104A	MY44002585	2016-3-2	2017-3-1
Power meter	Anritsu	ML2495A	1445010	2016-04-23	2017-04-22
Power sensor	Anritsu	MA2411B	1339220	2016-04-23	2017-04-22
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R	N.C.R
DC Power Supply	AGILENT	E3632A	MY50340053	N.C.R	N.C.R
Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	2016-1-11	2017-1-10
Test Software			EZ-EMC		

977 Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Data	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2015-9-11	2016-9-10
Spectrum Analyzer	RS	FSU26	200789	2015-8-10	2016-8-9
EMI Test Receiver	R&S	ESCI	101378	2016-1-6	2017-1-5
Pre-Amplifier	MINI	ZFL-1000VH2	070306	2016-1-13	2017-1-12
Pre-Amplifier	Miteq	JS41-00101800-32-10P	1675713	2015-8-10	2016-8-9
Bilog Antenna	Sunol	JB1	A062604	2016-3-6	2017-3-5
Bilog Antenna	Sunol	JB1	A110204-1	2016-3-6	2017-3-5
Horn-antenna	SCHWARZBECK	9120D	D:266	2016-3-7	2017-3-5
Horn-antenna	SCHWARZBECK	9120D	D:267	2015-11-10	2016-11-9
Loop Antenna	SCHWARZBECK	HXYZ9170	9170-108	2016-4-7	2017-4-6
Turn Table	CT	CT123	4165	N.C.R	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R	N.C.R
Controller	CT	CT100	95637	N.C.R	N.C.R
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Data	Calibration Due
EMI TEST RECEIVER	R&S	ESCI	100781	2016-3-2	2017-3-1
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	2015-11-2	2016-11-1
LISN (EUT)	FCC	FCC-LISN-50/ 250-50-2-02	05012	2015-9-16	2016-9-15
Pulse LIMITER	R&S	ESH3-Z2	100524	2016-1-6	2017-1-5
Test Software			EZ-EMC		

**Remark:** Each piece of equipment is scheduled for calibration once a year.

## 5.6 SETUP CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

## 5.7 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID

**Remark:**

- 1.All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2.Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 6. FCC PART 15.247 REQUIREMENTS

### 6.1 PEAK POWER

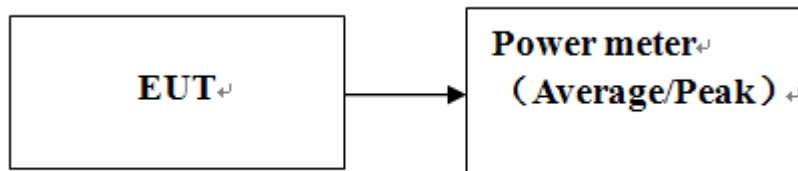
#### Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
2. According to §15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.
3. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
4. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### Test Configuration



#### Test Procedure

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r05.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

**Test Results***No non-compliance noted***Test RESULTS****1M GFSK Modulation mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2402	6.09	4.064	125	PASS
Mid	2441	8.58	7.211		PASS
High	2480	8.98	7.907		PASS

**3M 8-DPSK Modulation mode**

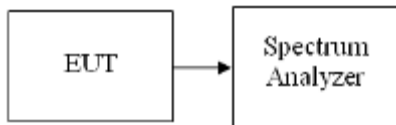
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2402	6.33	4.295	125	PASS
Mid	2441	8.77	7.534		PASS
High	2480	9.16	8.241		PASS

## 6.2 20DB BANDWIDTH

### Limit

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### Test Configuration



### Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 30kHz, VBW = 300kHz, Span = 3MHz, Sweep = auto.
4. Max hold, mark 2 peaks of hopping channel and record the 2 peaks frequency.

**Test Results of Bandwidth***No non-compliance noted*

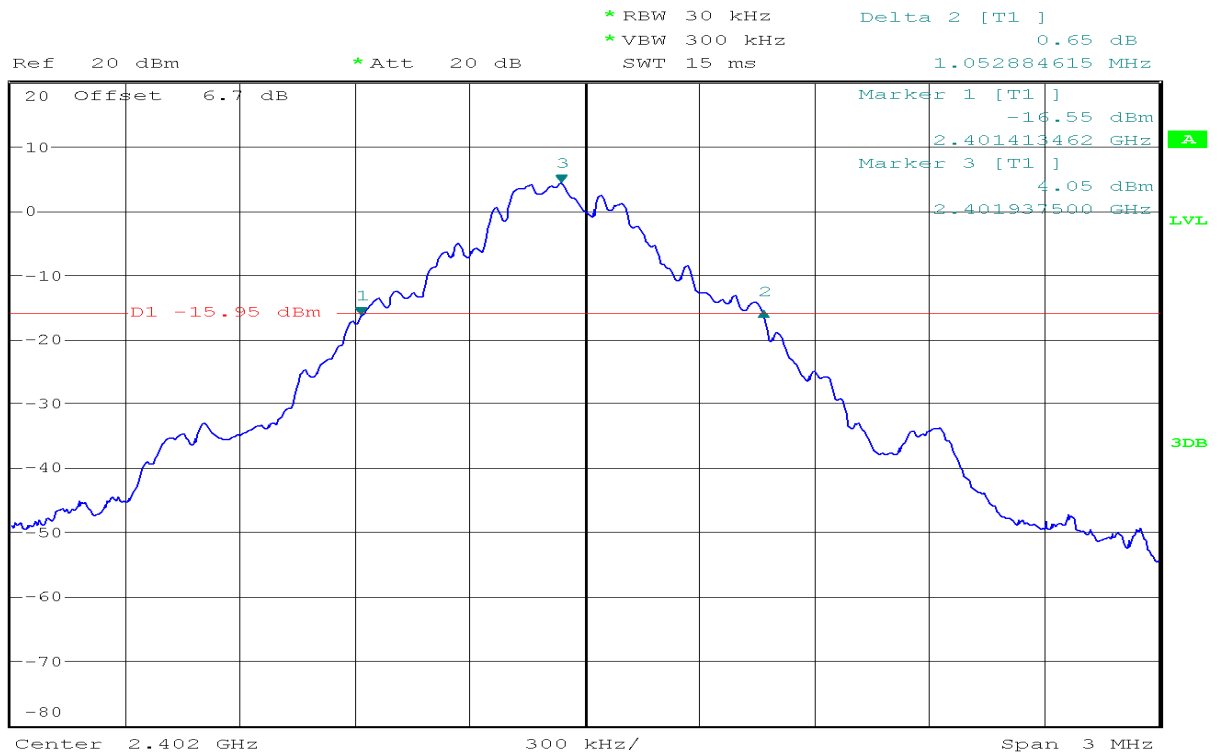
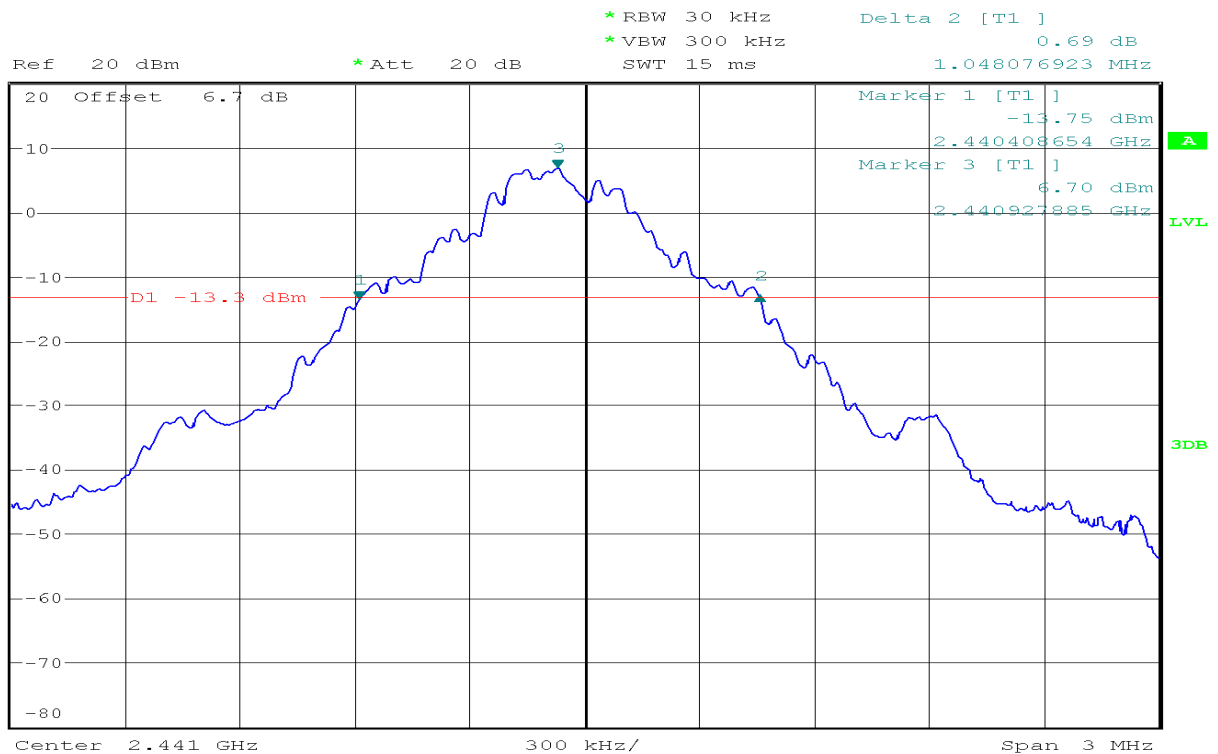
Operation Mode:	1 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

Channel	Frequency (MHz)	20dB Bandwidth (B) (MHz)
00	2402	1.053
39	2441	1.048
78	2480	1.058

Operation Mode:	3 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

Channel	Frequency (MHz)	20dB Bandwidth (B) (MHz)
00	2402	1.346
39	2441	1.341
78	2480	1.341

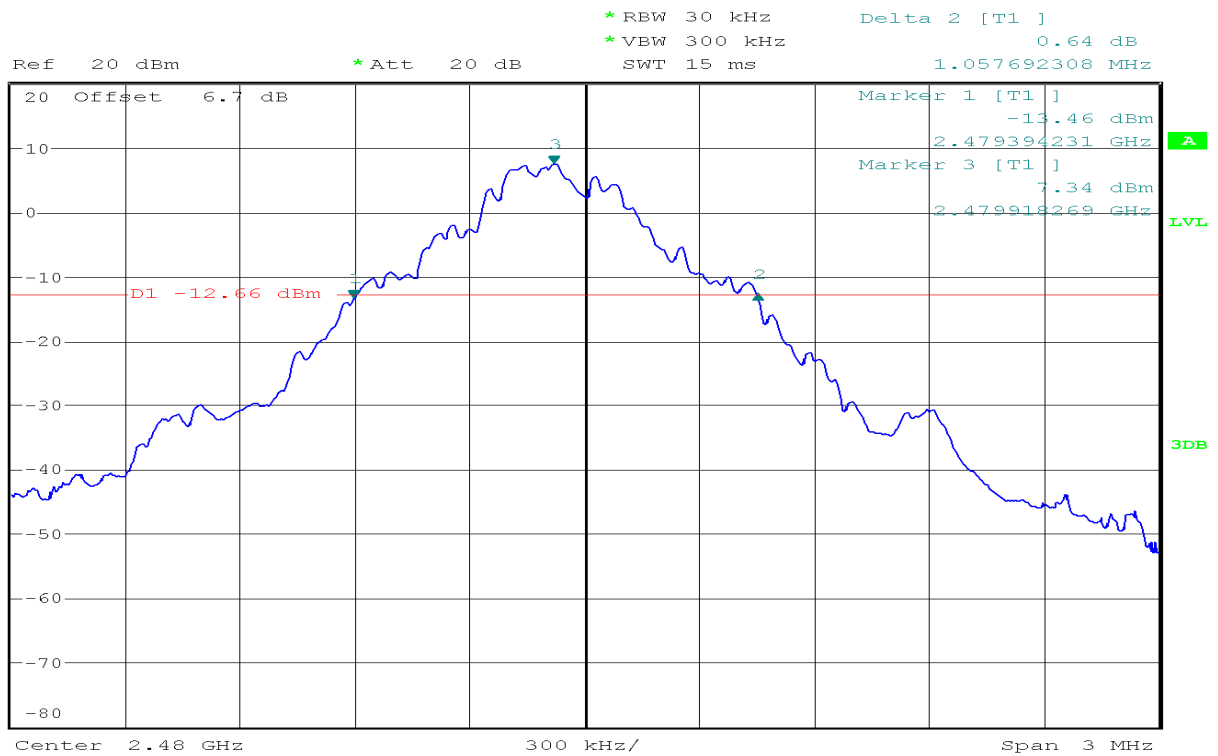


**Test Plot****1M Channel 00****1M Channel 39**

## 1M Channel 78



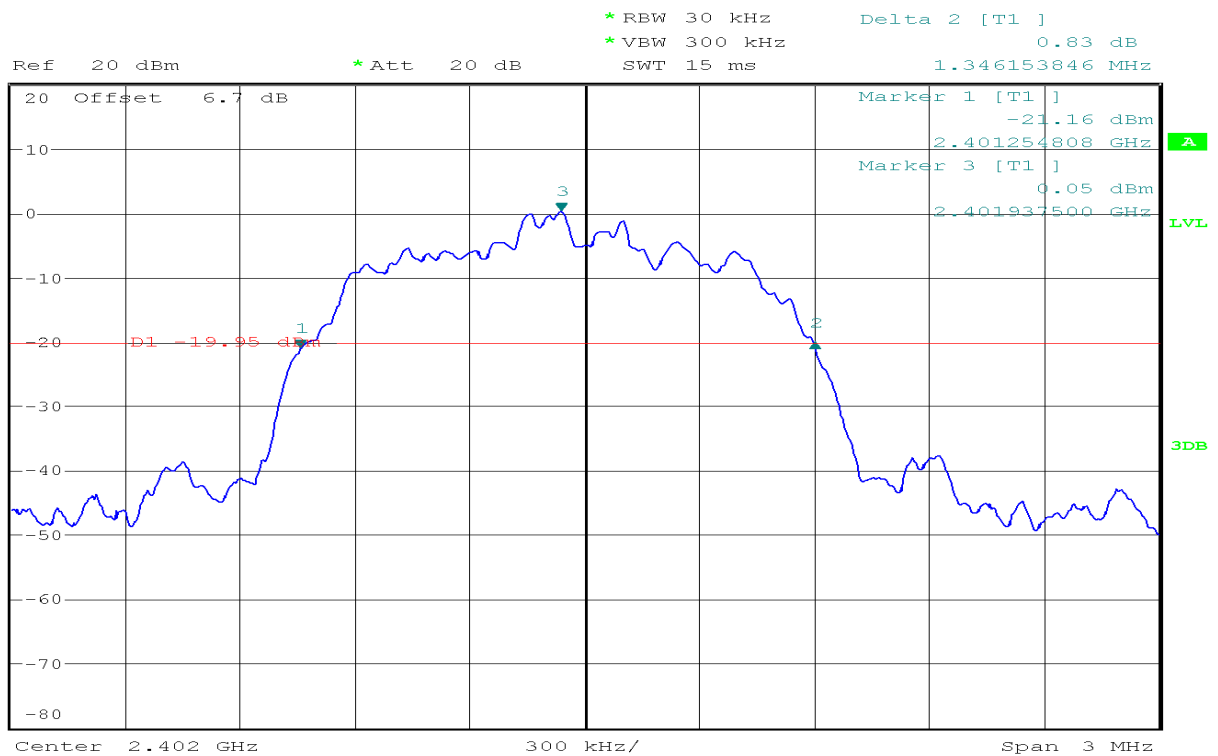
1 PK  
MACH



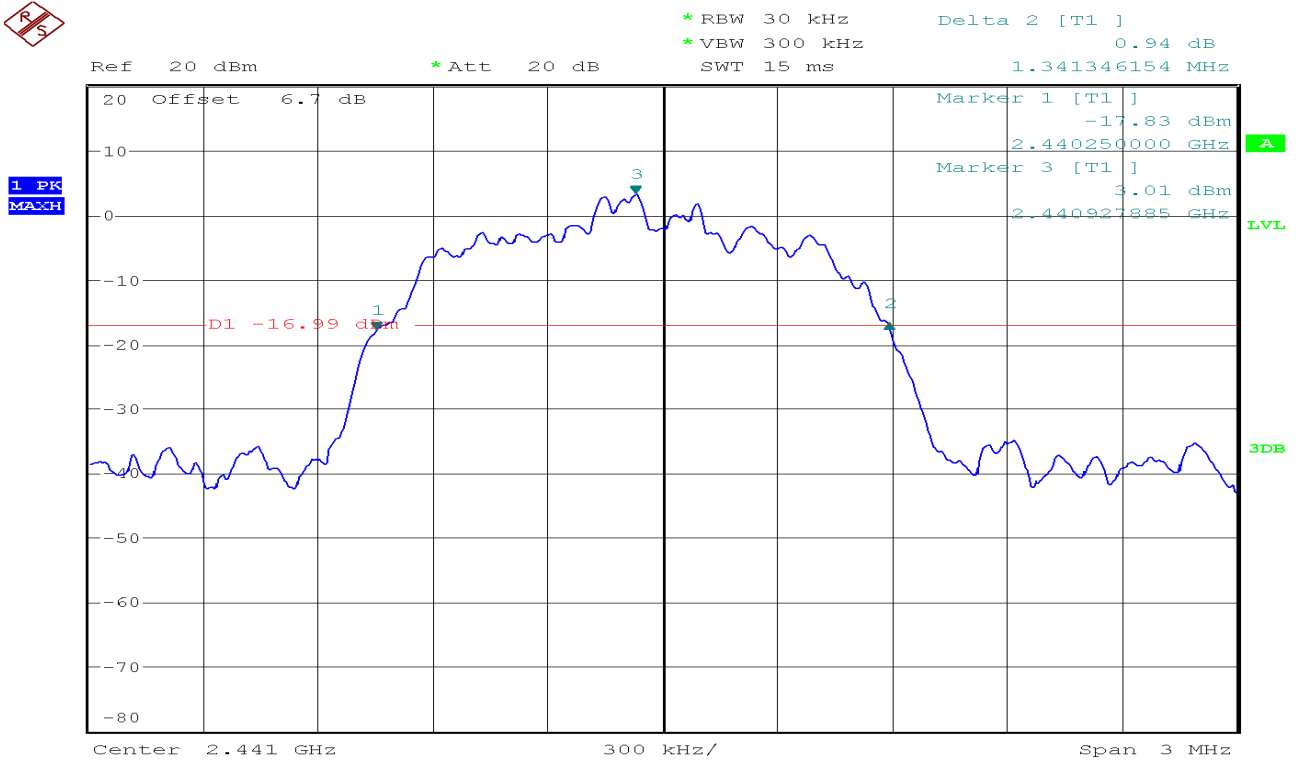
## 3M Channel 00



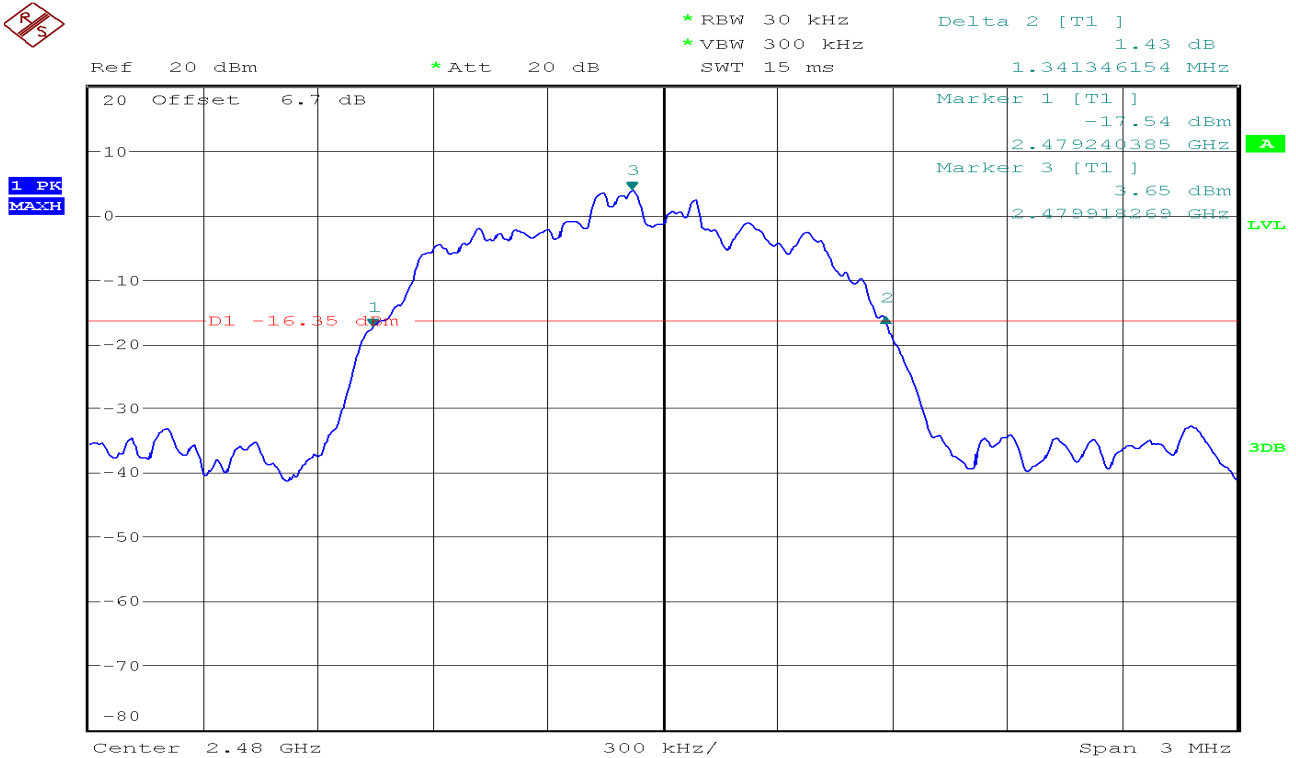
1 PK  
MACH



**3M Channel 39**



**3M Channel 78**

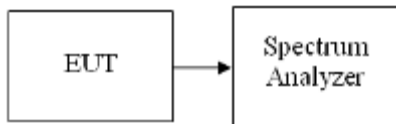


### 6.3 HOPPING CHANNEL SEPARATION

#### LIMIT

According to §15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW = 30kHz, VBW = 100kHz, Span = 3MHz, Sweep = auto.
5. Max hold, mark 2 peaks of hopping channel and record the 2 peaks frequency.

**TEST RESULTS**

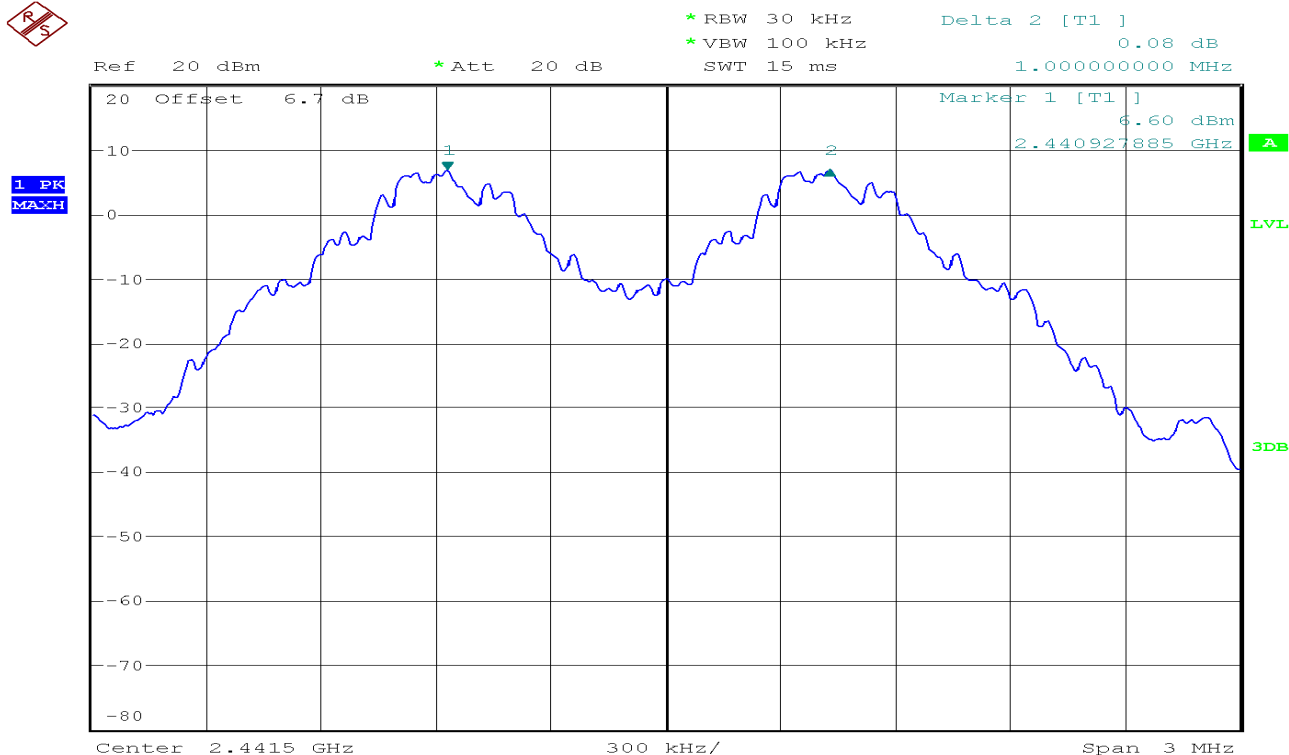
No non-compliance noted

Operation Mode:	1 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

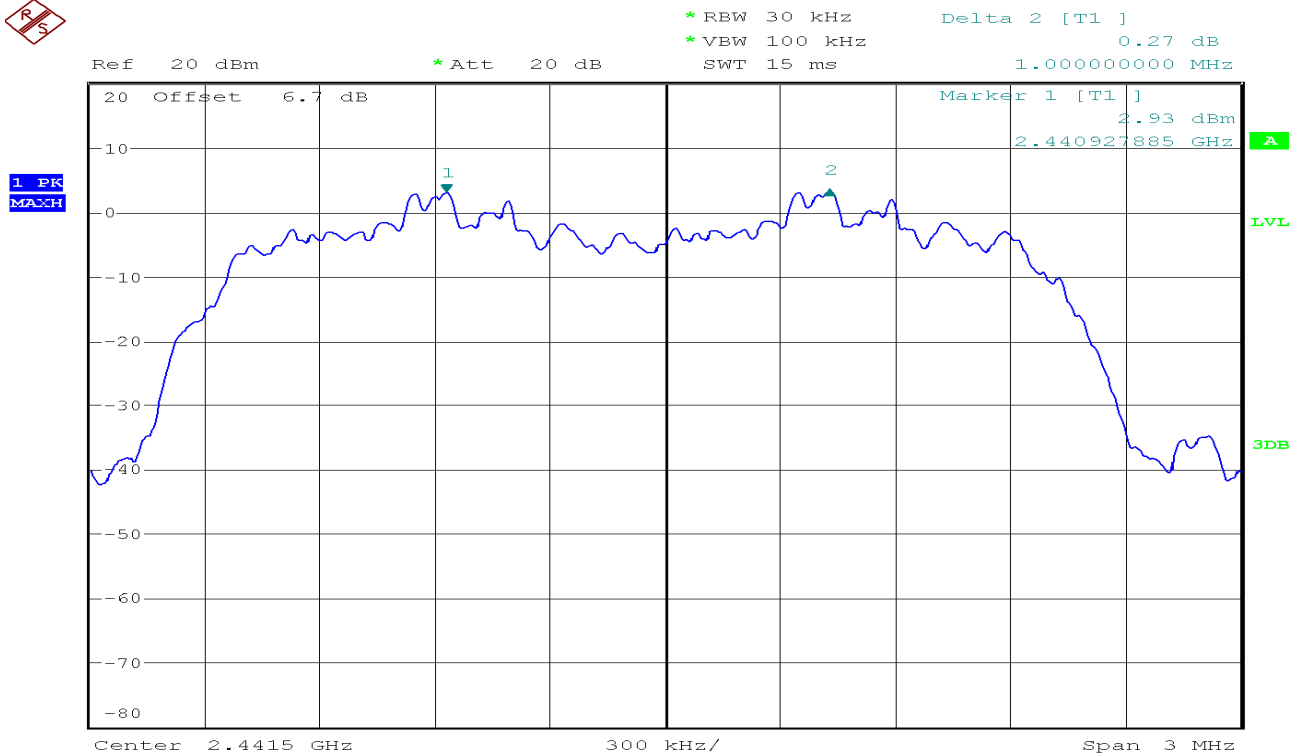
Channel	Frequency	Separation	(2/3 of 20dB BW)	Result
	(MHz)	(MHz)	Limits (MHz)	
39~40	2441~2442	1.000	0.705	Pass

Operation Mode:	3 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

Channel	Frequency	Separation	(2/3 of 20dB BW)	Result
	(MHz)	(MHz)	Limits (MHz)	
39~40	2441~2442	1.000	0.897	Pass

**1M Channel Separation Plot on Channel 39-40**

## 3M Channel Separation Plot on Channel 39-40

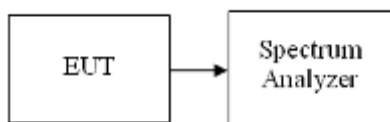


## 6.4 NUMBER OF HOPPING FREQUENCY

### LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

### Test Configuration



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2441.5MHz, Sweep = auto and Start=2441.5MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW, VBW=1MHz.
5. Max hold, view and count how many channel in the band.

### TEST RESULTS

*No non-compliance noted*

### Test Data

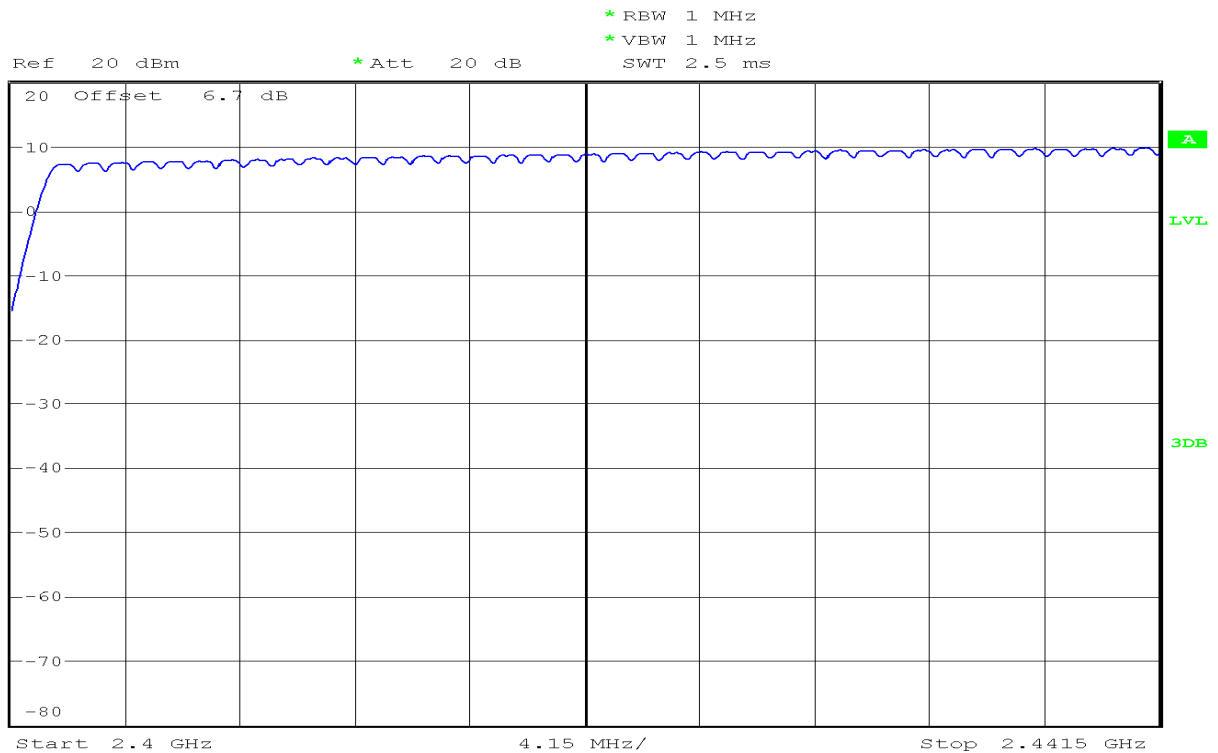
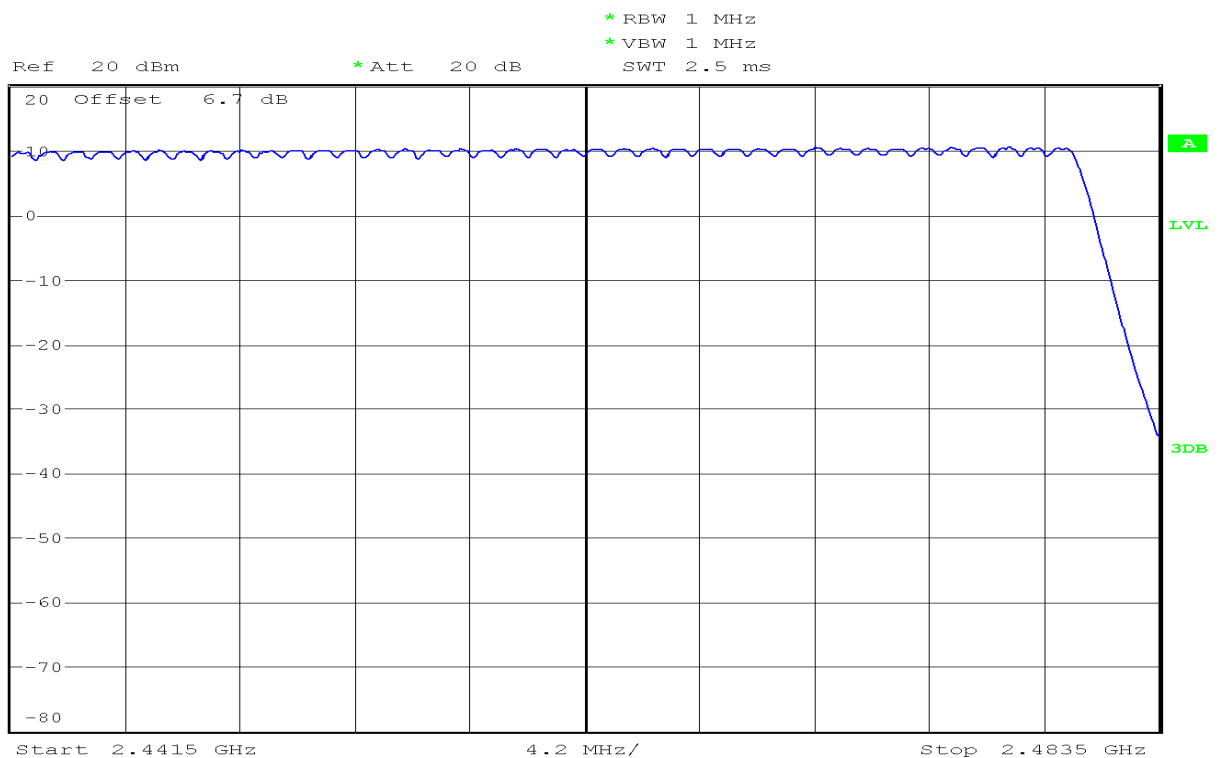
Operation Mode:	1 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

Result (No. of CH)	Limit (No. of CH)	Result
79	>15	PASS

Operation Mode:	3 Mbps	Test Date:	2016-4-26
Temperature:	24°C	Tested by:	Lily.Wang

Result (No. of CH)	Limit (No. of CH)	Result
79	>15	PASS

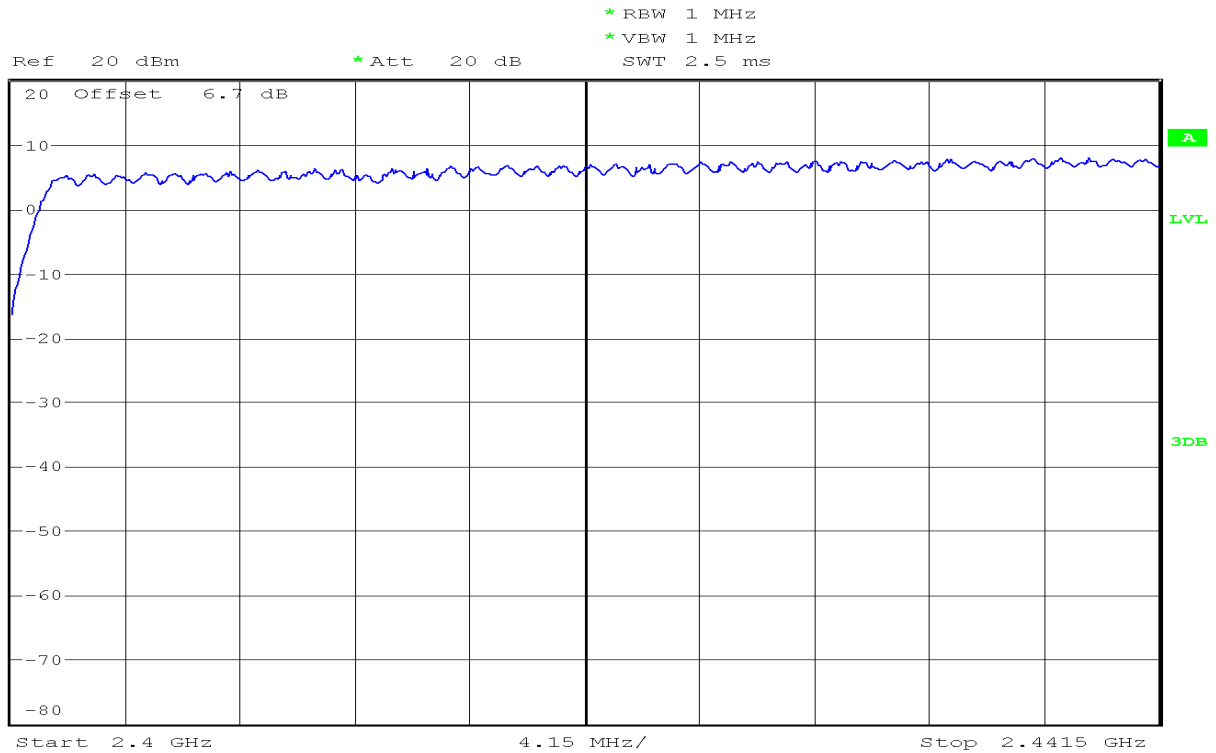
## Test Plot:1M

Channel Number 2.4 GHz – 2.441.5 GHzChannel Number 2.441.5 GHz – 2.4835 GHz

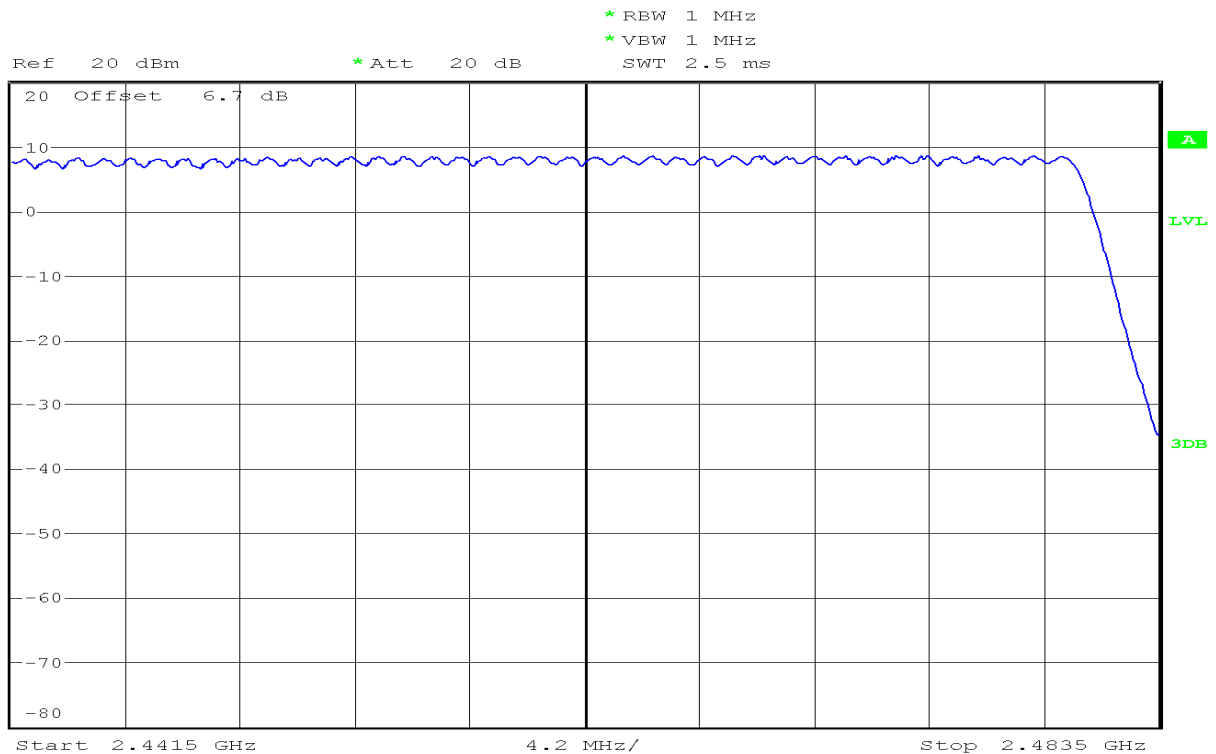


**Test Plot:3M**

**Channel Number 2.4 GHz – 2.441.5 GHz**

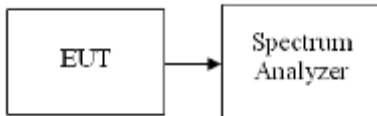


**Channel Number 2.441.5 GHz – 2.4835 GHz**



**6.5 TIME OF OCCUPANCY (DWELL TIME)****LIMIT**

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

**Test Configuration****TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.

**TEST RESULTS**

*No non-compliance noted*

**Test Data**

1M

DH 1

$$0.388 * (1600/2)/79 * 31.6 = 124.16(\text{ms})$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
0.388	124.16	31.60	400	PASS

DH 3

$$1.851 * (1600/4)/79 * 31.6 = 296.16 (\text{ms})$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
1.851	296.16	31.60	400	PASS

DH 5

$$3.187 * (1600/6)/79 * 31.6 = 339.95(\text{ms})$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
3.187	339.95	31.60	400	PASS

3M

DH 1

$$0.442 * (1600/2)/79 * 31.6 = 141.44 \text{ (ms)}$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
0.442	141.44	31.60	400	PASS

DH 3

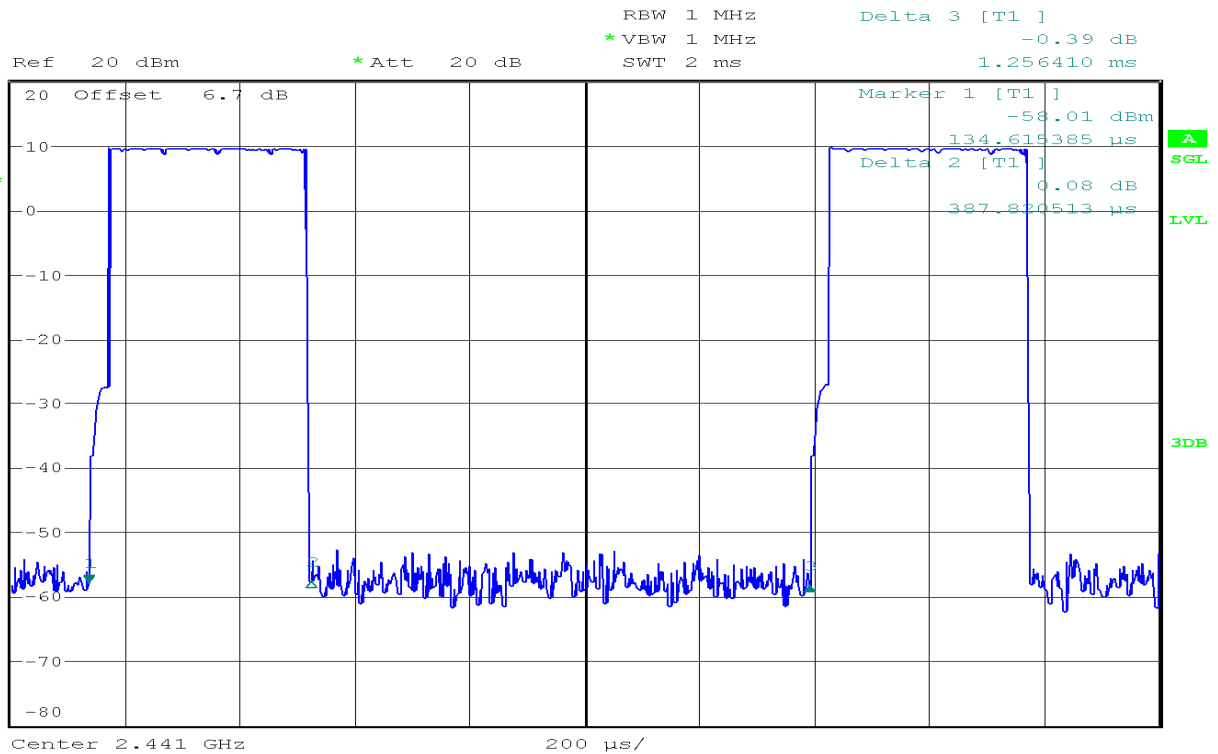
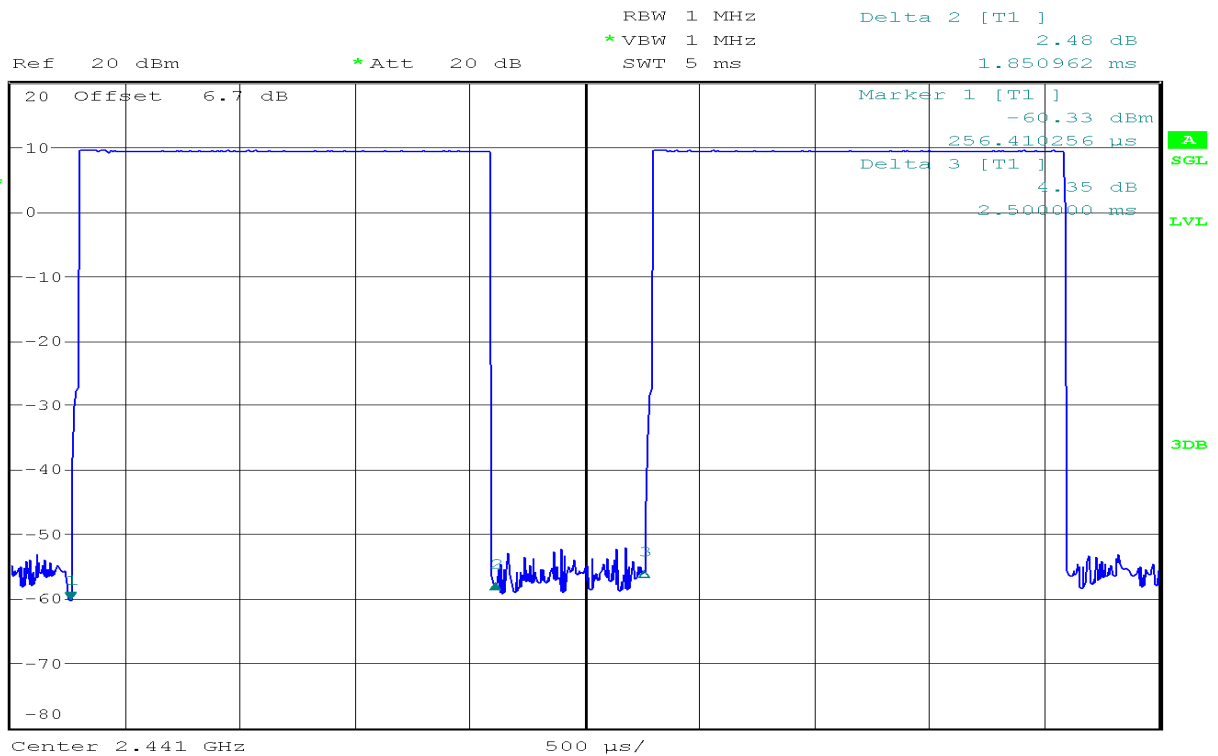
$$1.708 * (1600/4)/79 * 31.6 = 273.28 \text{ (ms)}$$

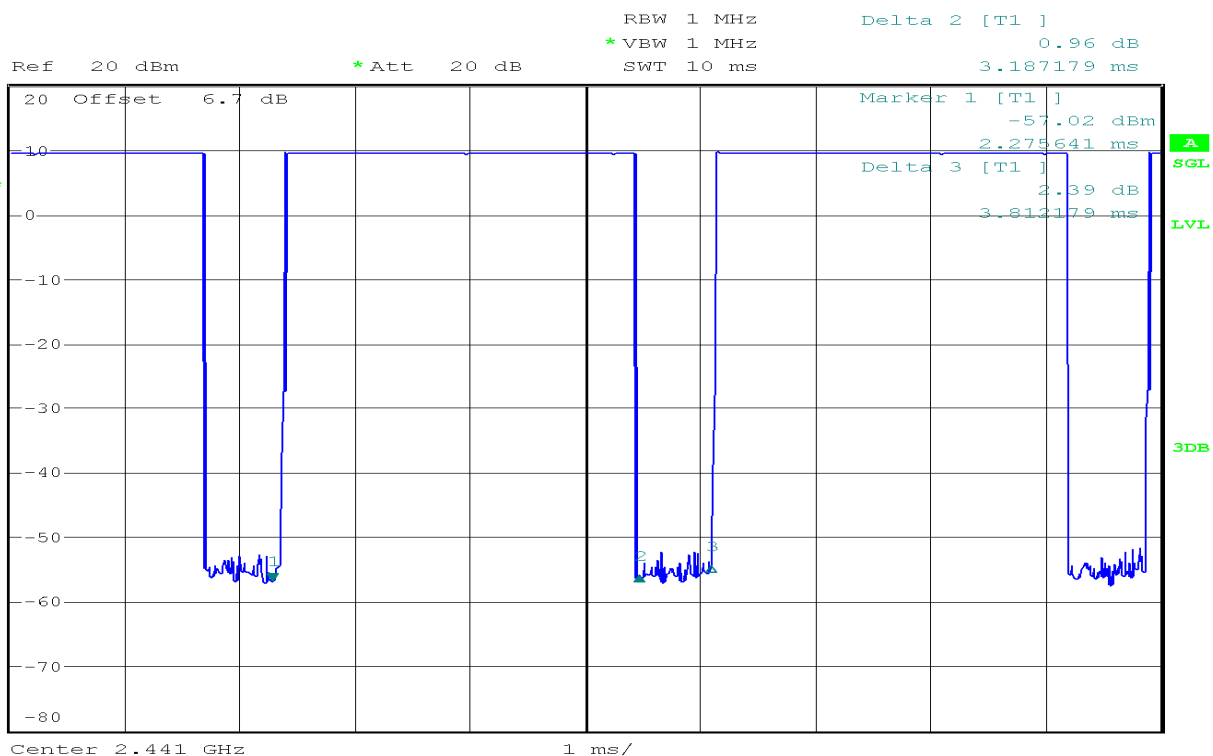
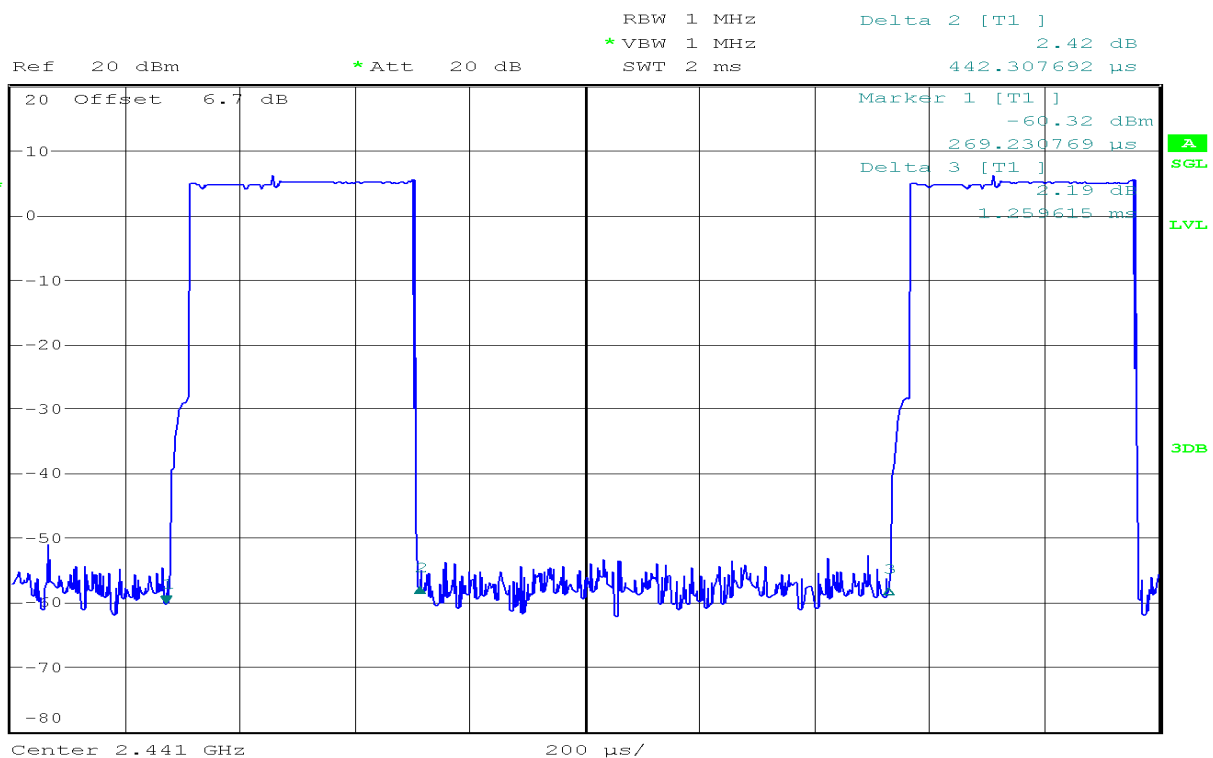
Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
1.708	273.28	31.60	400	PASS

DH 5

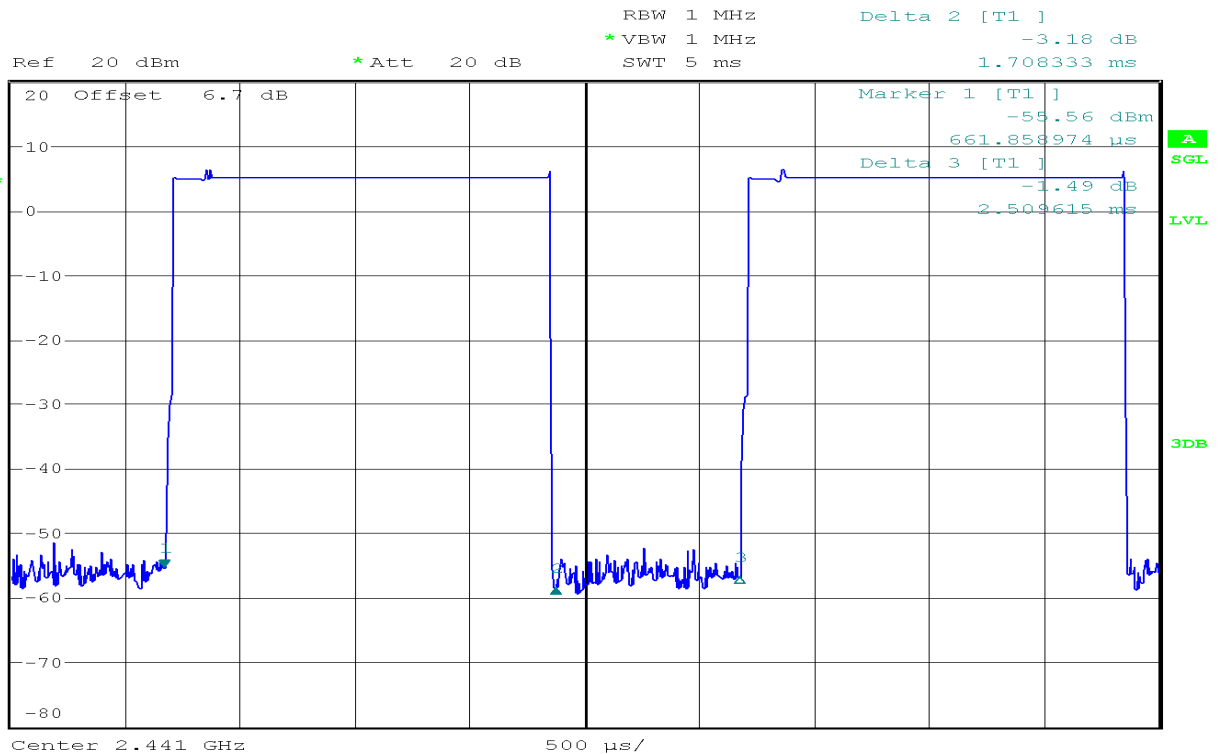
$$2.990 * (1600/6)/79 * 31.6 = 318.93 \text{ (ms)}$$

Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2.990	318.93	31.60	400	PASS

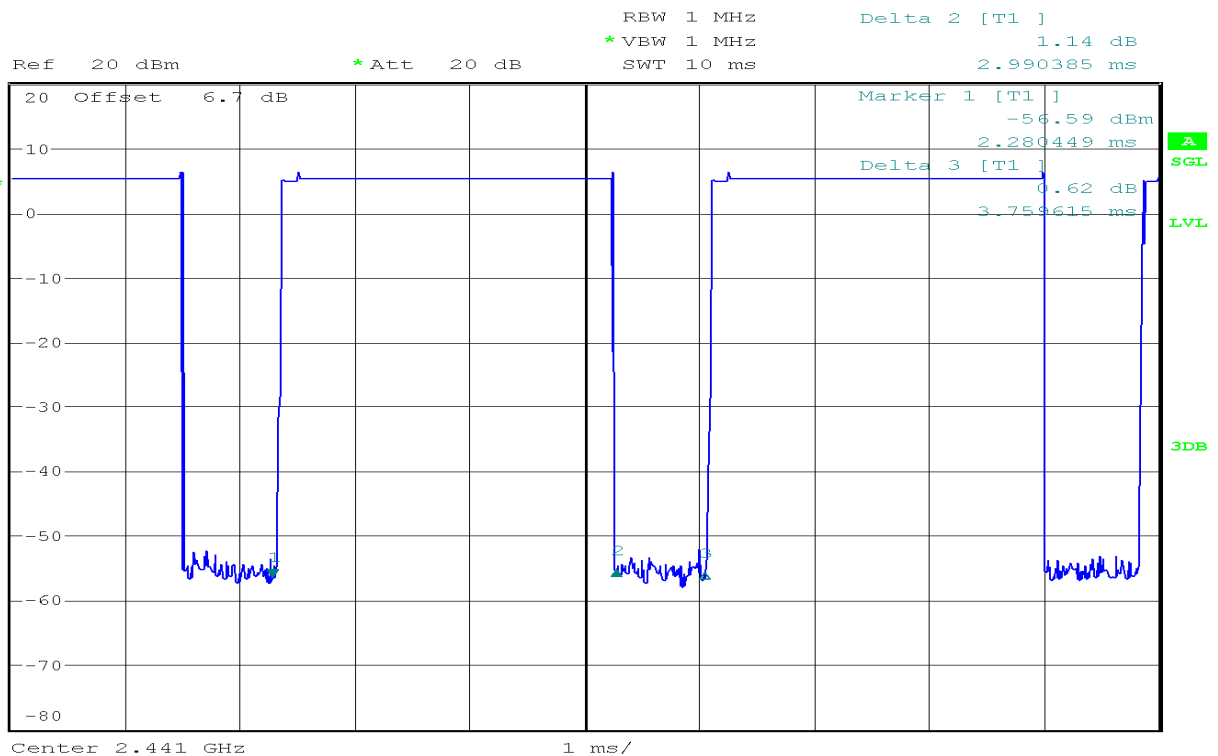
**1M-DH1****1M-DH3**

**1M-DH5****3M-DH1**

## 3M-DH3



## 3M-DH5

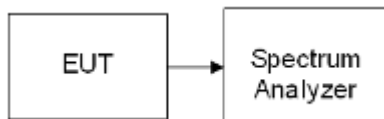


## 6.6 Conducted Band Edges Measurement

### LIMIT

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### Test Configuration



### TEST PROCEDURE

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz ( $\geq 1\%$  span=10MHz), VBW = 300kHz ( $\geq 3$ RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

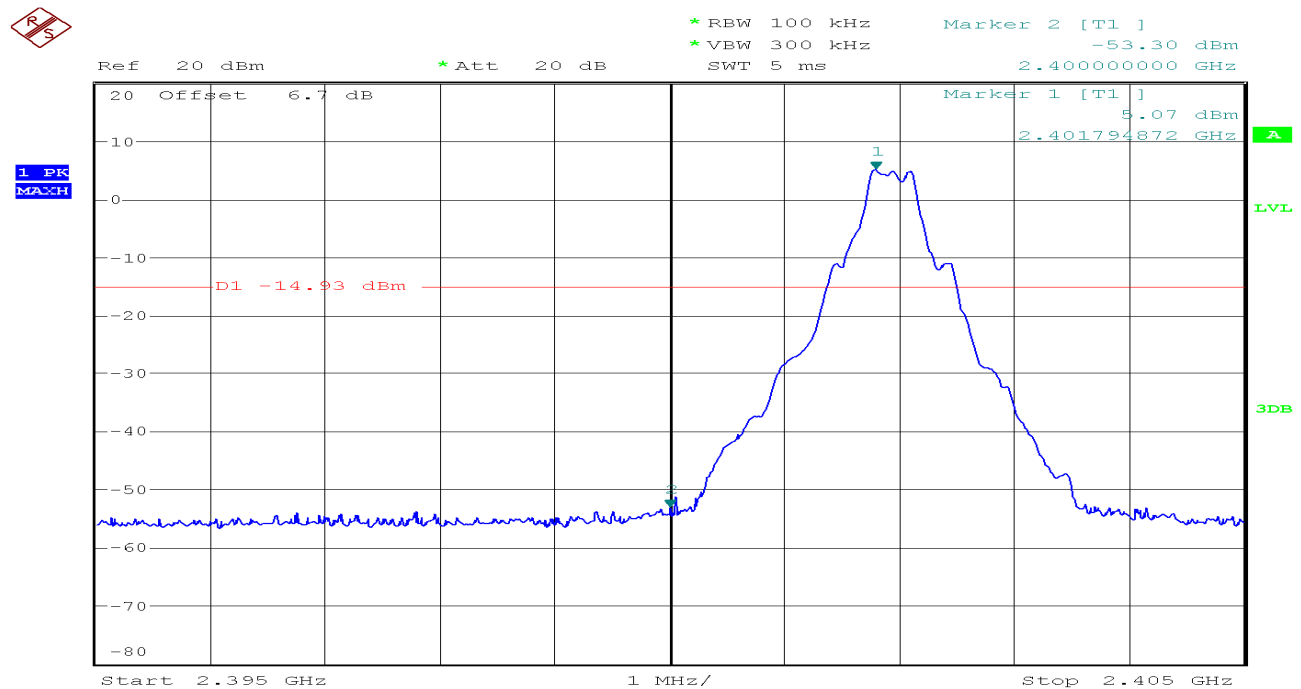
### TEST RESULTS

*No non-compliance noted*

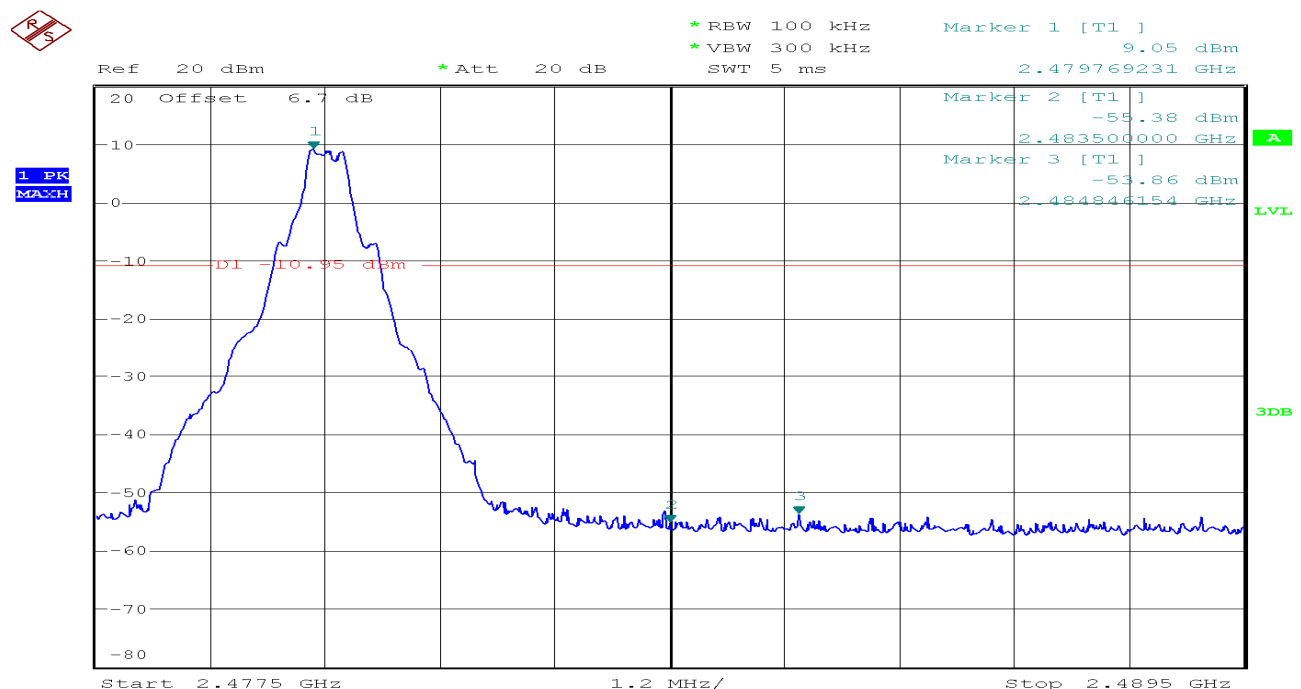
## Test Result of Conducted Band Edges

Operation Mode:	1 Mbps	Test Date:	2016-4-26
Test Channel:	00 and 78	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C

### Low Band Edge Plot on Channel 00



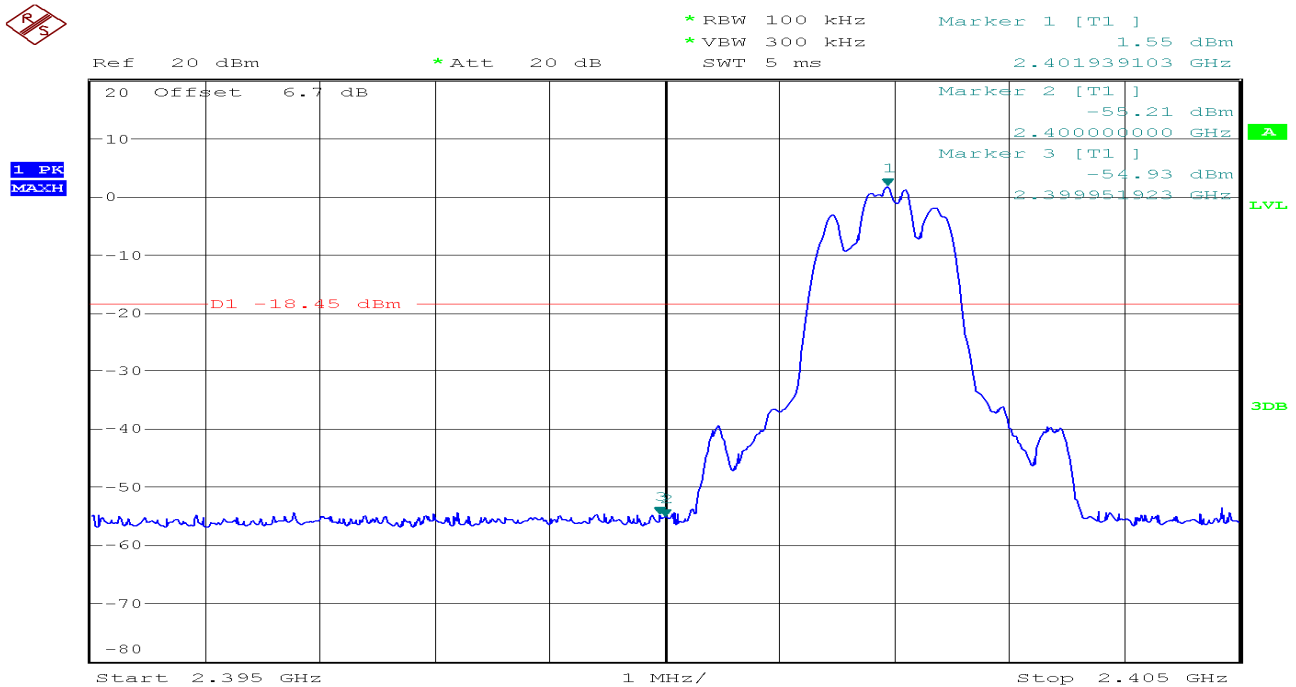
### High Band Edge Plot on Channel 78



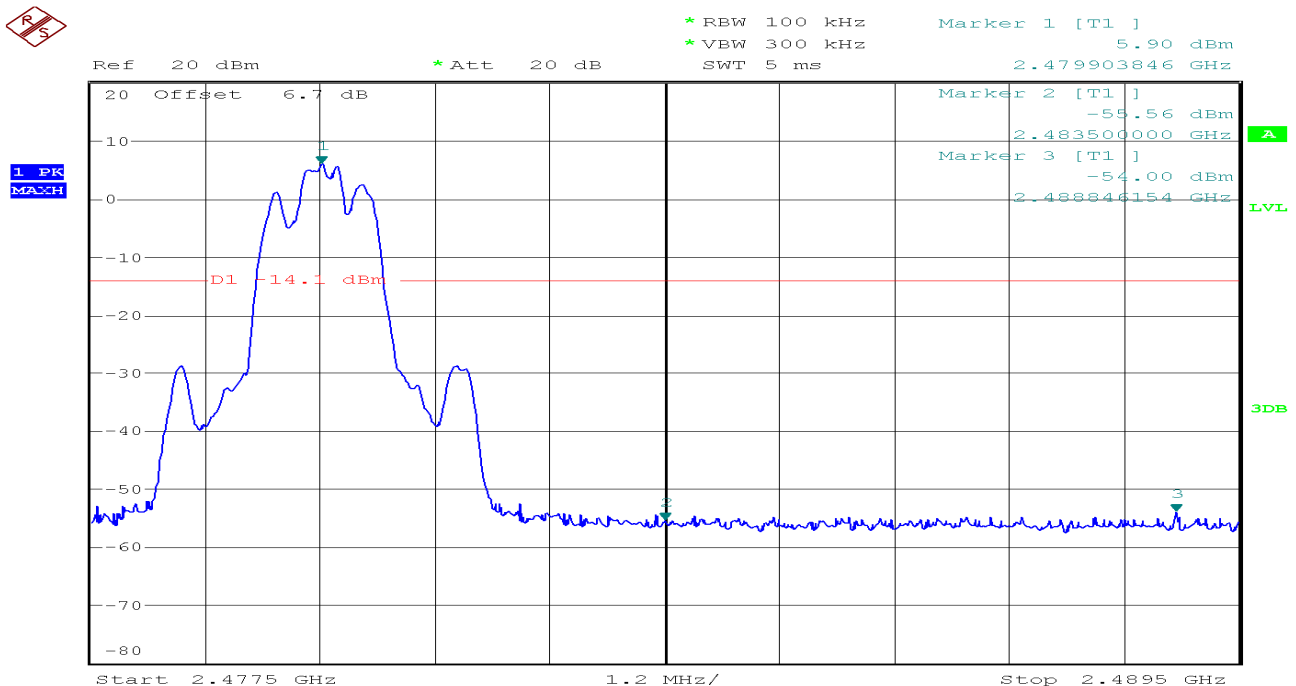


Operation Mode:	3 Mbps	Test Date:	2016-4-26
Test Channel:	00 and 78	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C

## Low Band Edge Plot on Channel 00



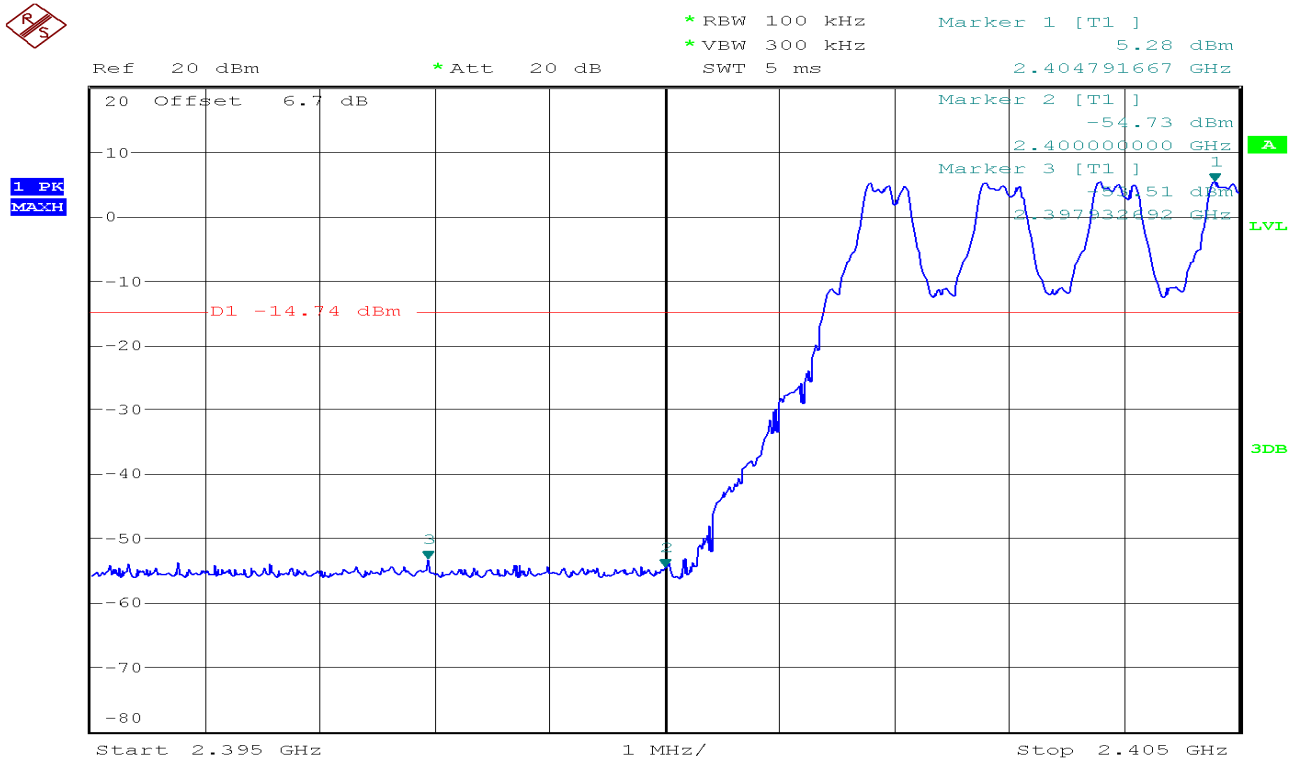
## High Band Edge Plot on Channel 78



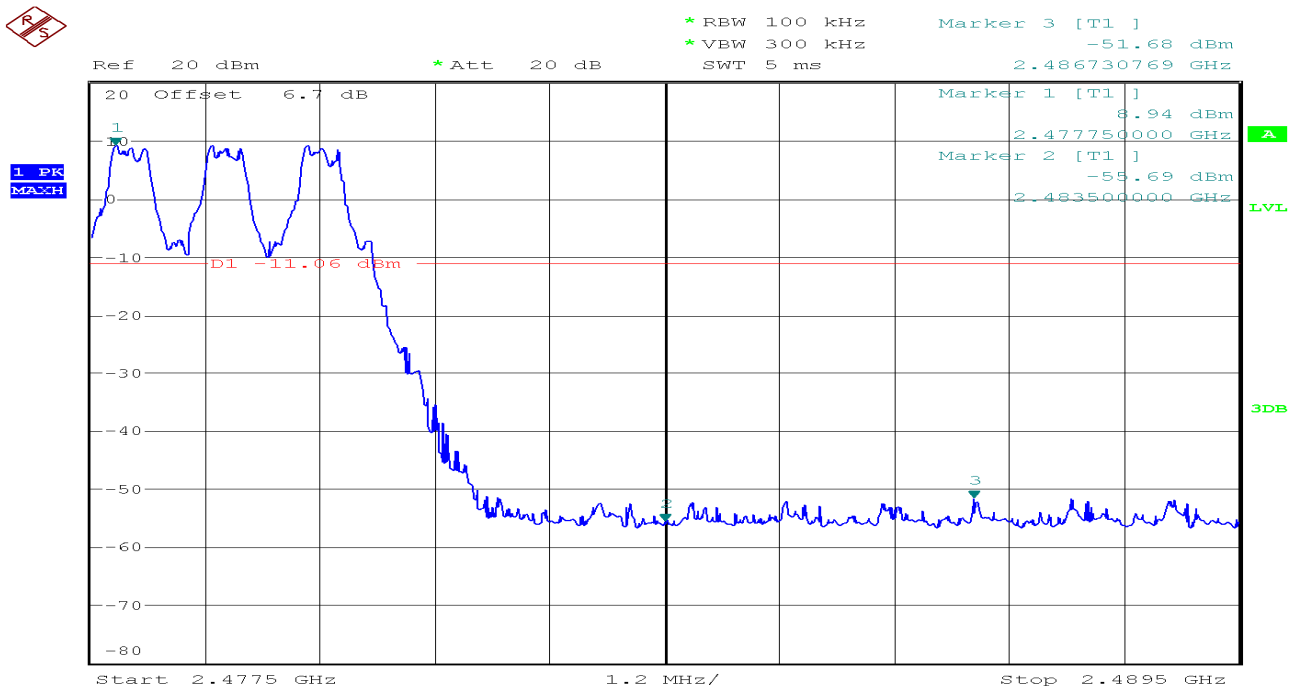
## Test Result of Conducted Hopping Mode Band Edges

Operation Mode:	1 Mbps	Test Date:	2016-4-26
Humidity:	52 % RH	Temperature:	24°C

## 1Mbps Hopping Mode Low Band Edge Plot

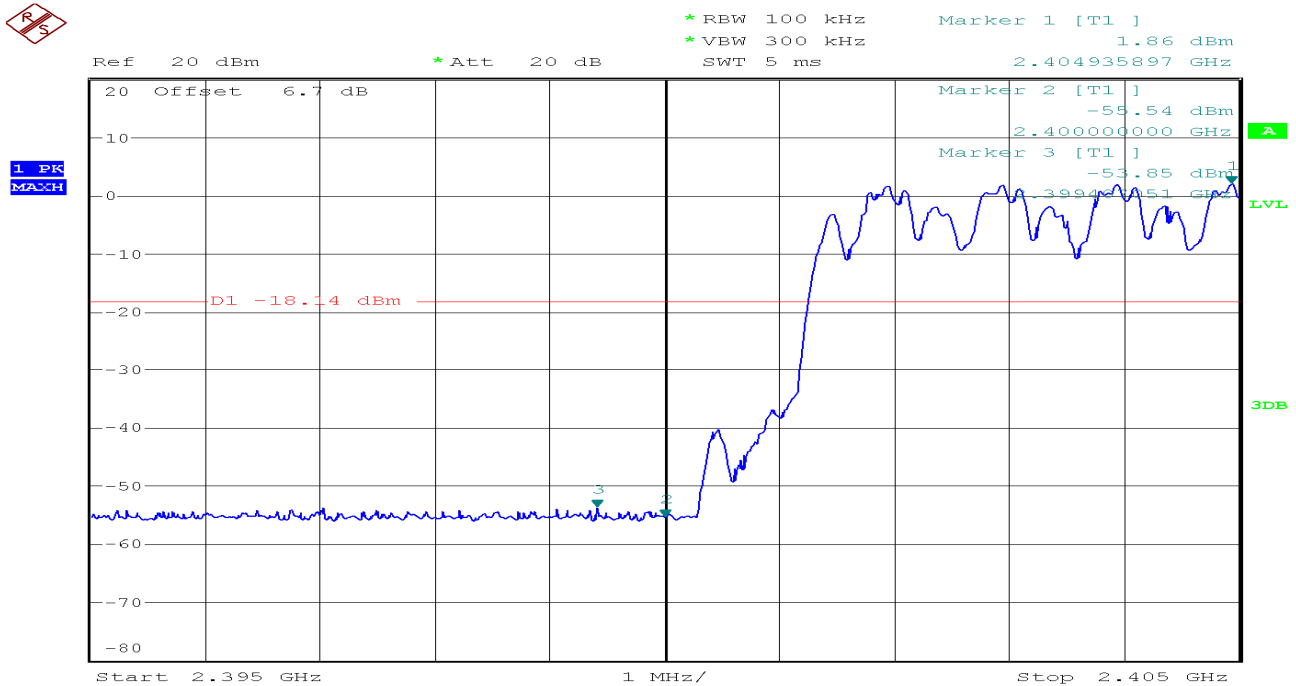


## 1Mbps Hopping Mode High Band Edge Plot

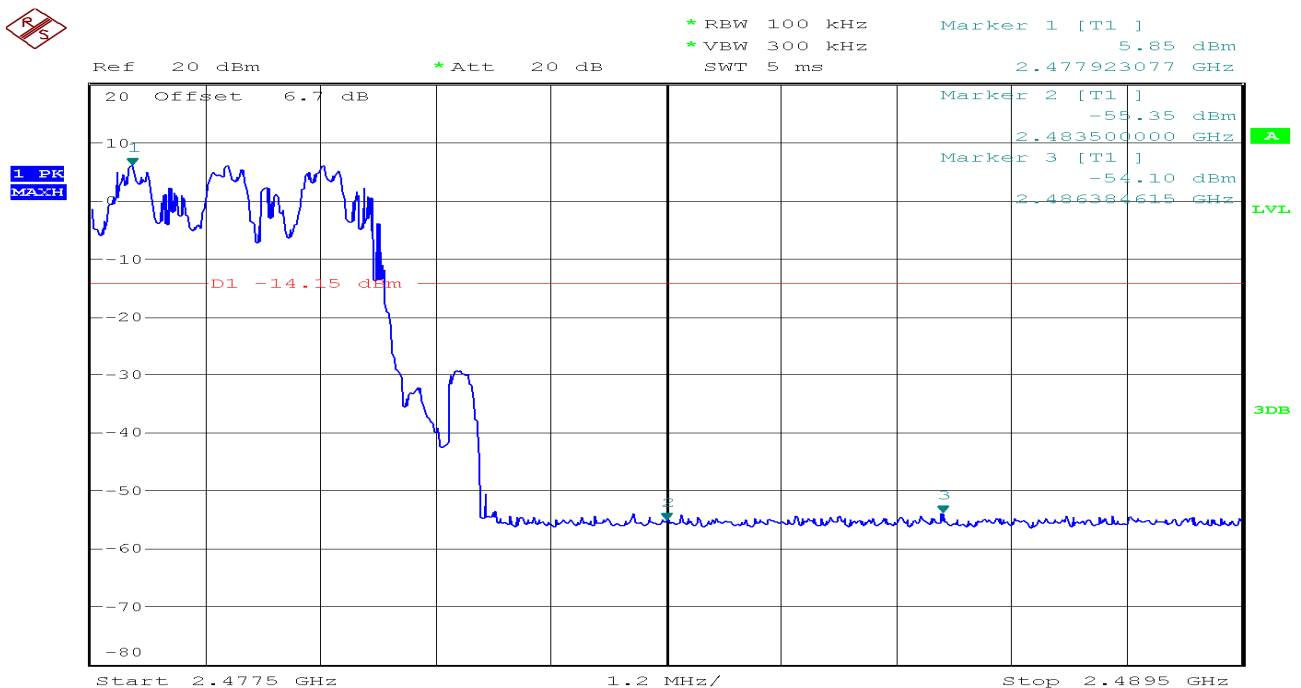


Operation Mode:	3 Mbps	Test Date:	2016-4-26
Humidity:	52 % RH	Temperature:	24°C

## 3Mbps Hopping Mode Low Band Edge Plot



## 3Mbps Hopping Mode High Band Edge Plot

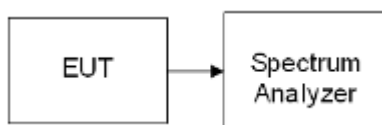


## 6.7 Conducted Spurious Emission Measurement

### LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### Test Configuration



### TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

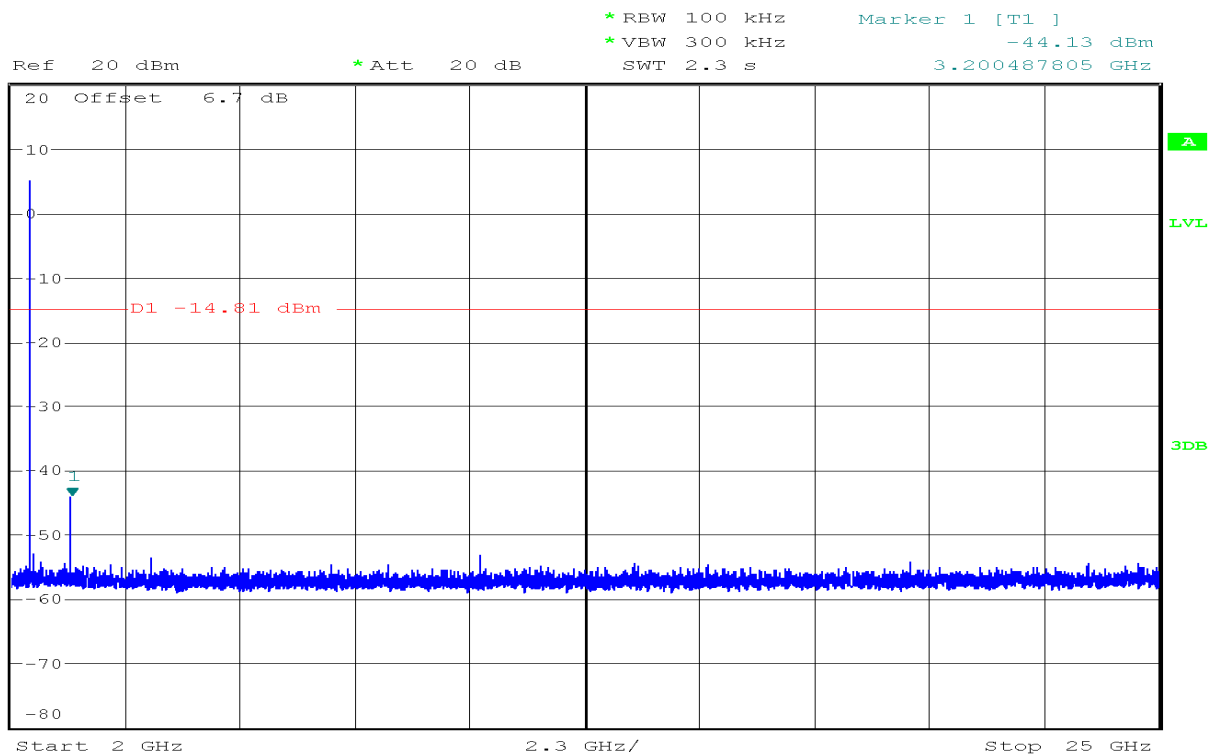
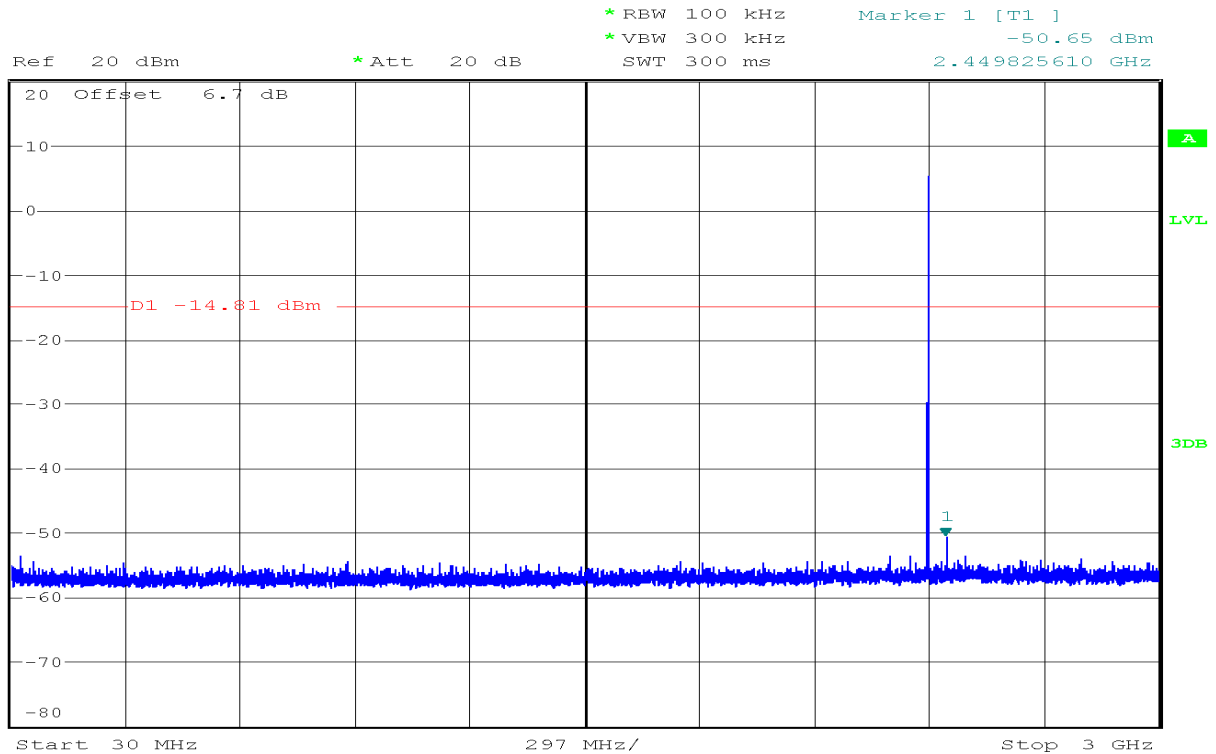
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

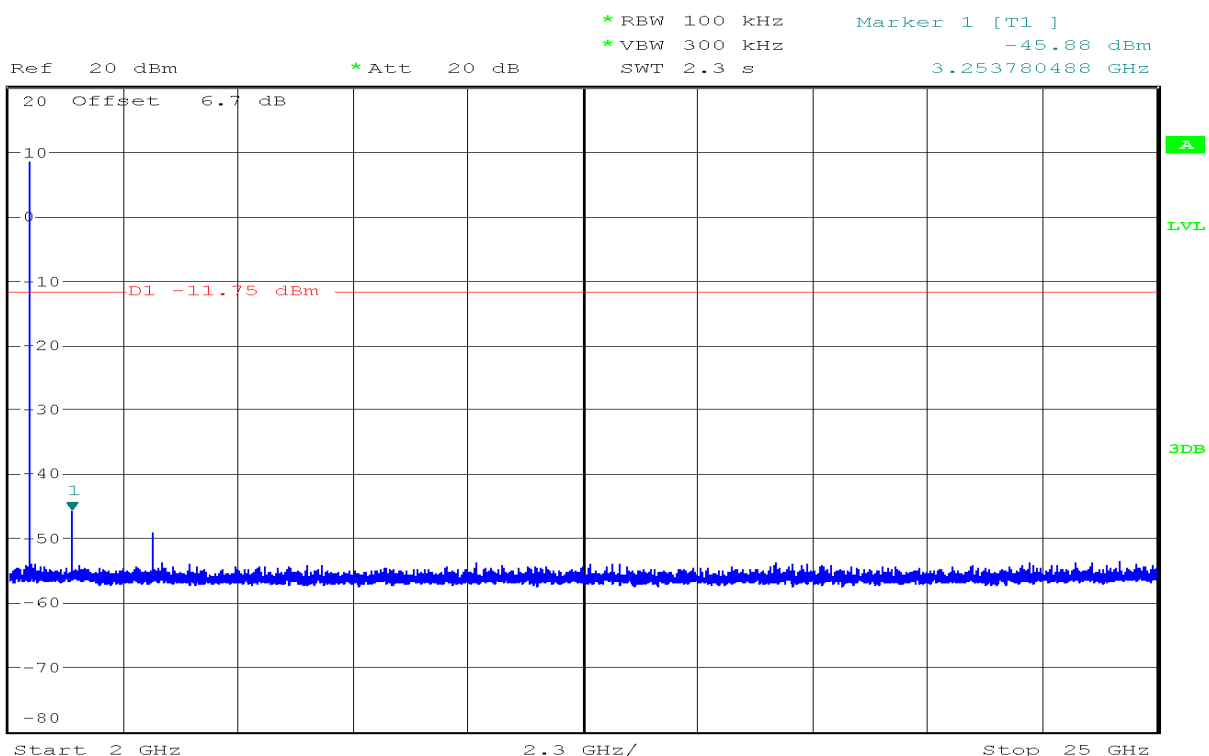
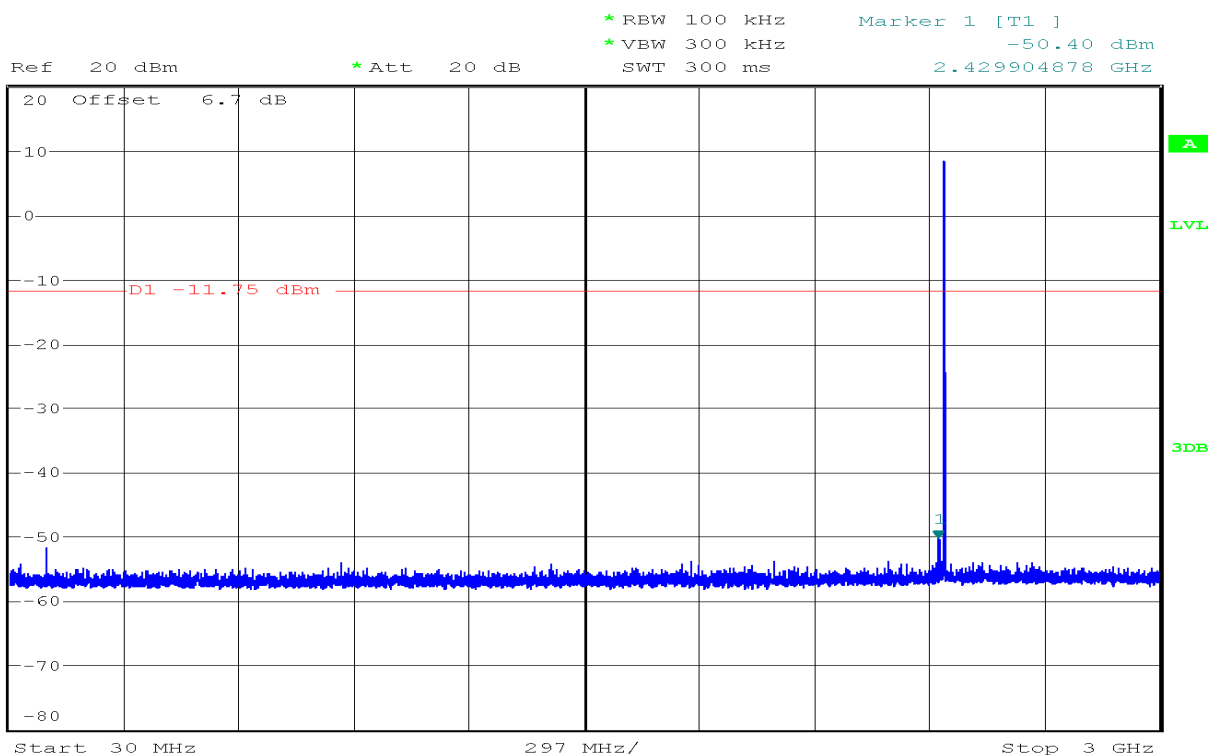
### TEST RESULTS

*No non-compliance noted*

Operation Mode:	1 Mbps	Test Date:	2016-4-26
Test Channel:	00	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C



Operation Mode:	1 Mbps	Test Date:	2016-4-26
Test Channel:	39	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C

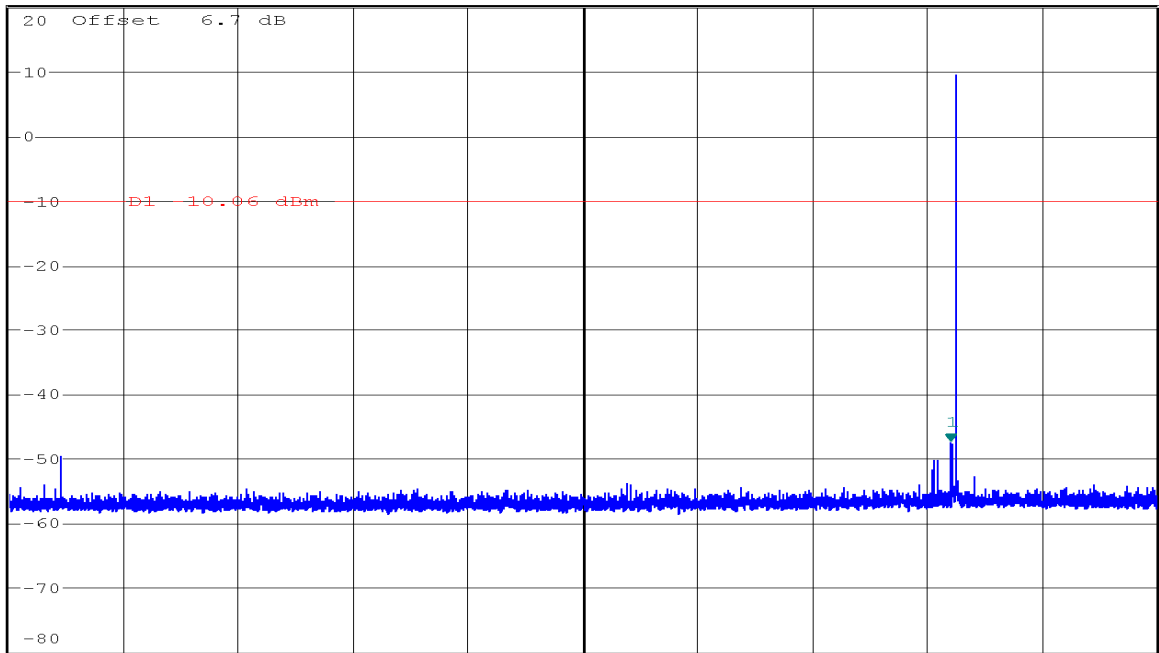


Operation Mode:	1 Mbps	Test Date:	2016-4-26
Test Channel:	78	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C



Ref 20 dBm \* Att 20 dB \* RBW 100 kHz \* VBW 300 kHz SWT 300 ms Marker 1 [T1] -47.53 dBm 2.466486585 GHz

1 PK  
MATCH

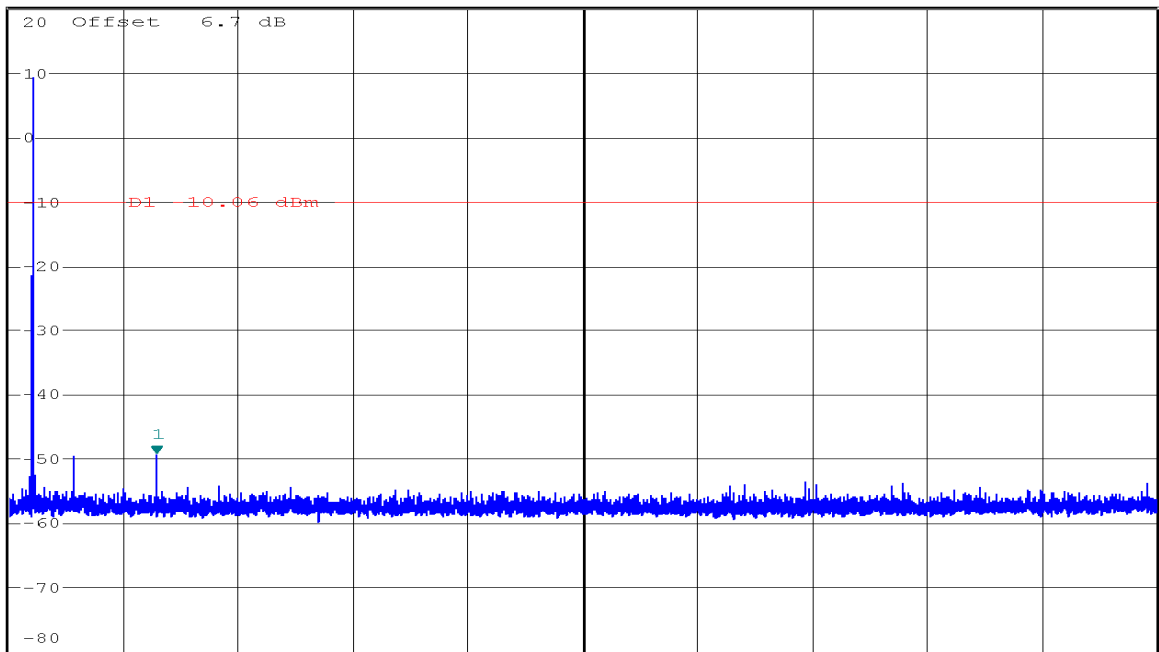


Start 30 MHz 297 MHz/ Stop 3 GHz



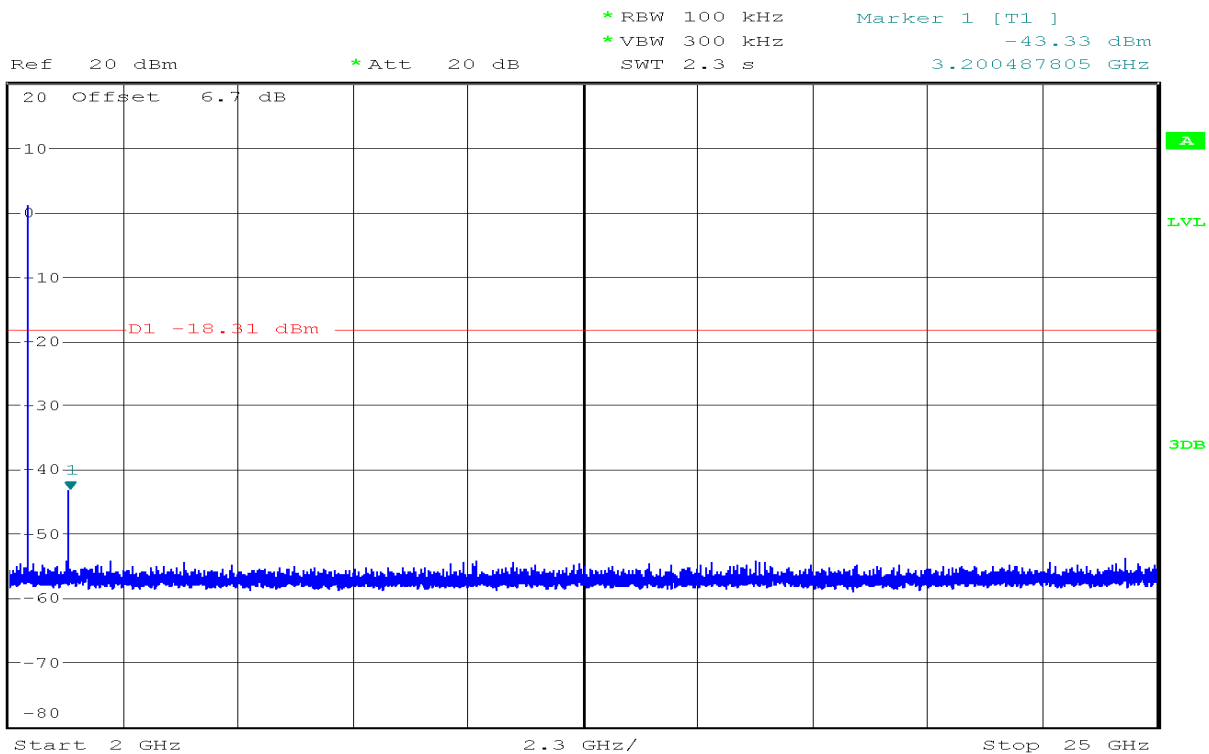
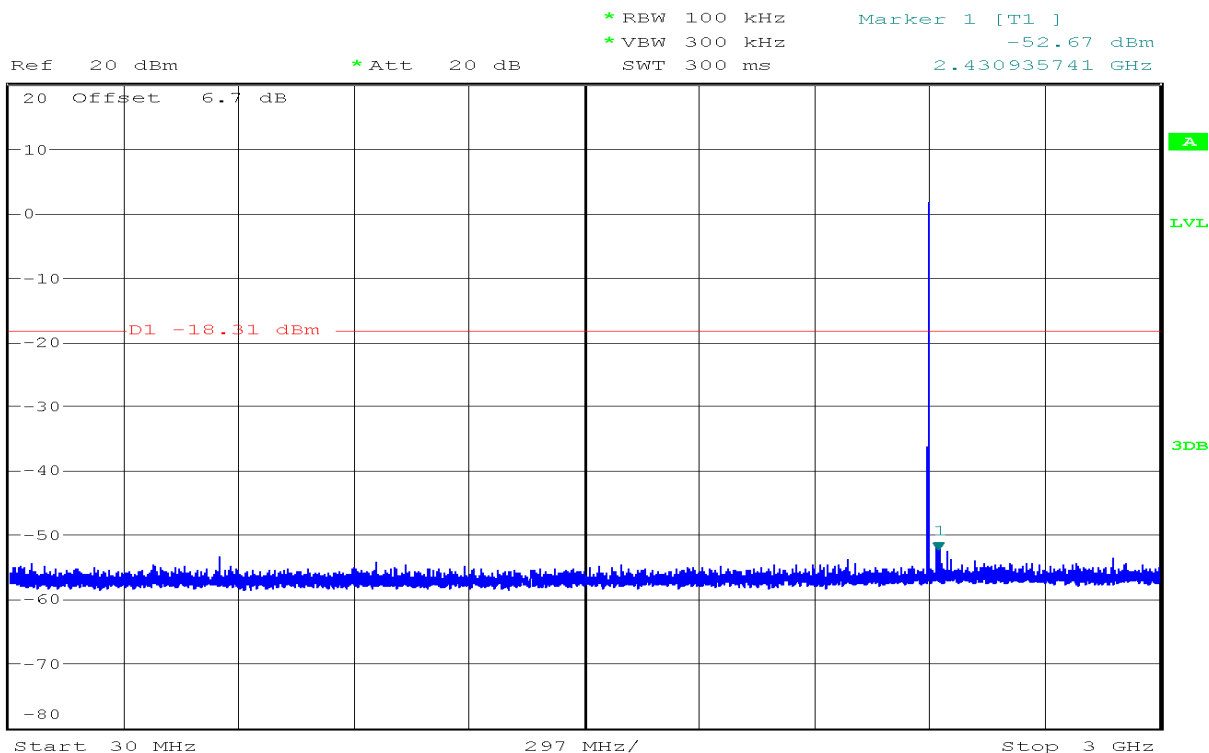
Ref 20 dBm \* Att 20 dB \* RBW 100 kHz \* VBW 300 kHz SWT 2.3 s Marker 1 [T1] -49.43 dBm 4.959146341 GHz

1 PK  
MATCH



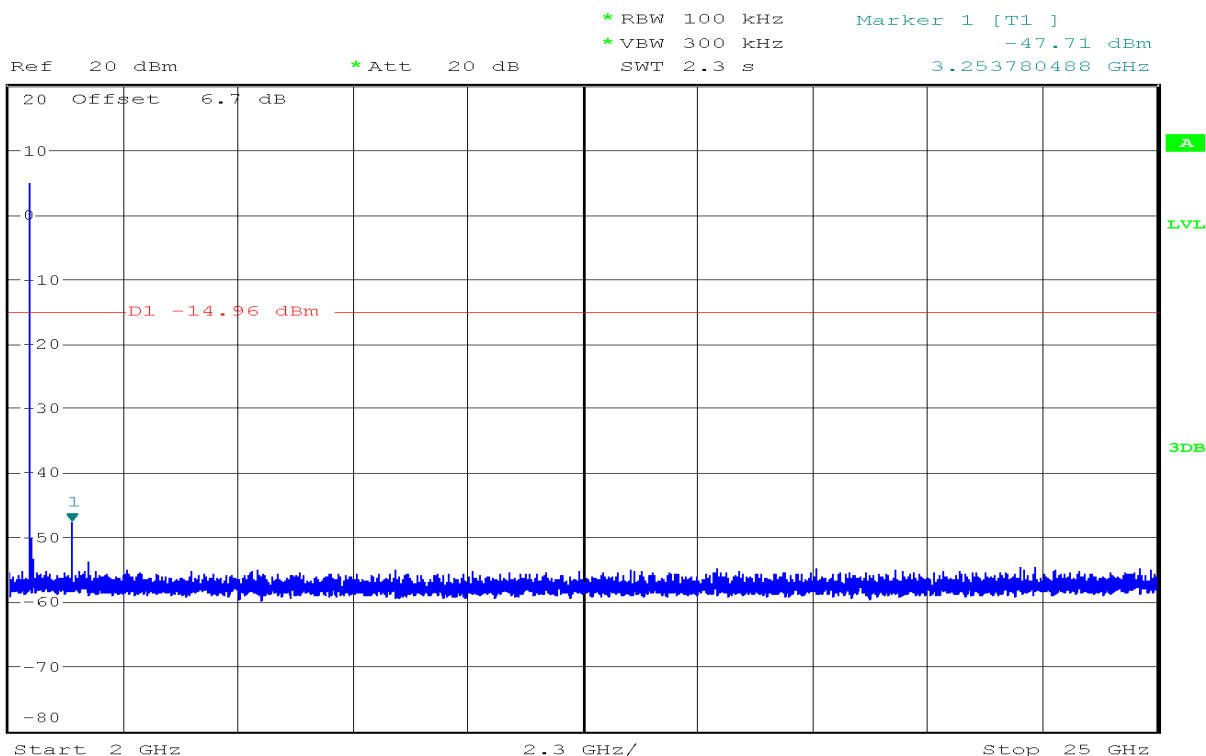
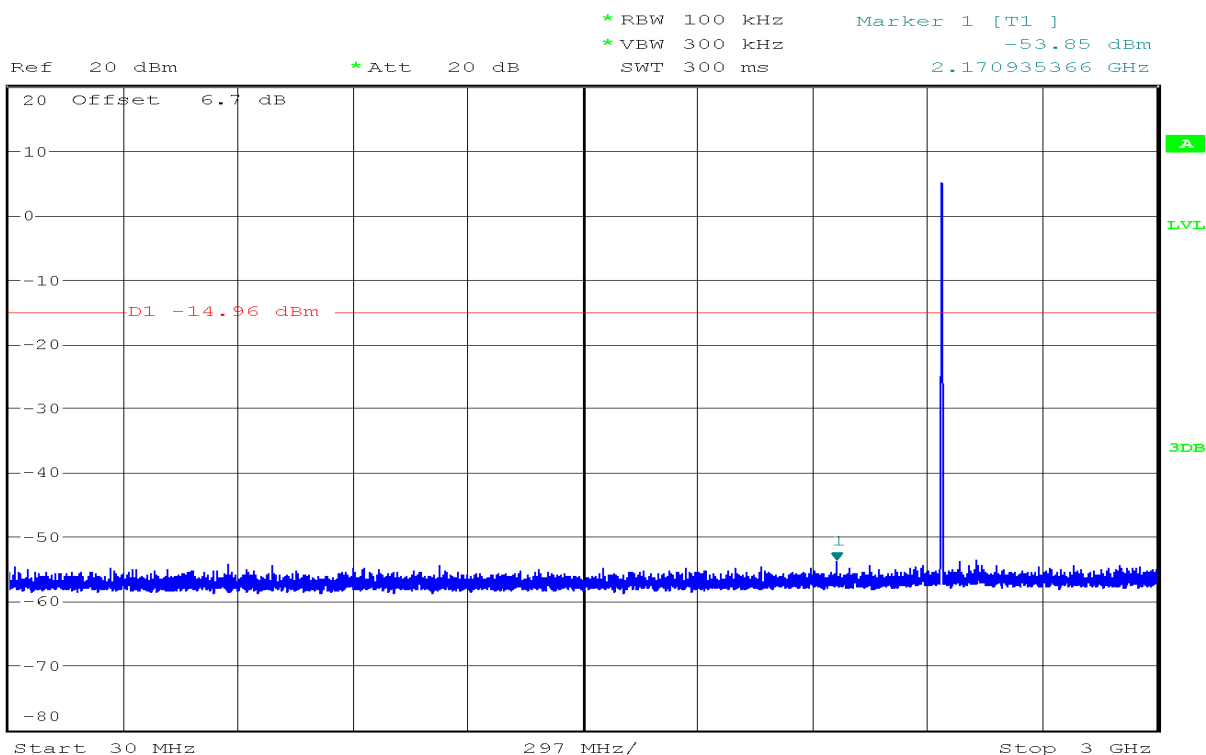
Start 2 GHz 2.3 GHz/ Stop 25 GHz

Operation Mode:	3 Mbps	Test Date:	2016-4-26
Test Channel:	00	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C

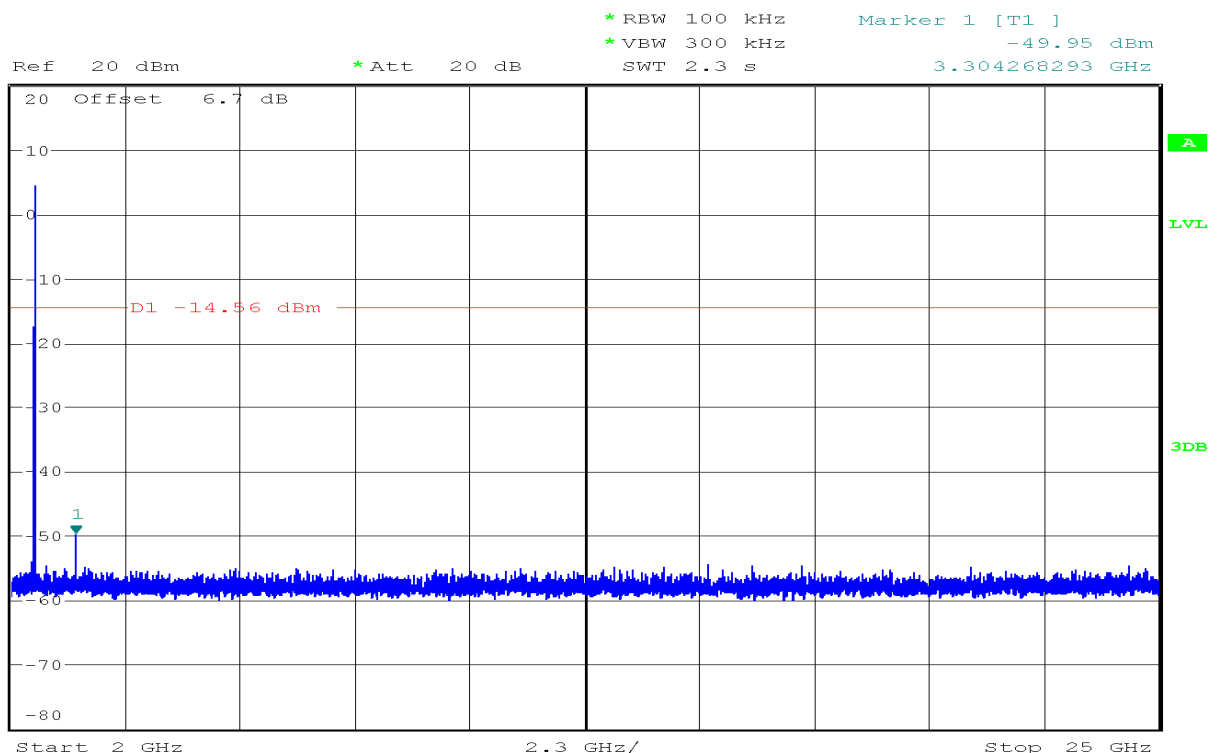
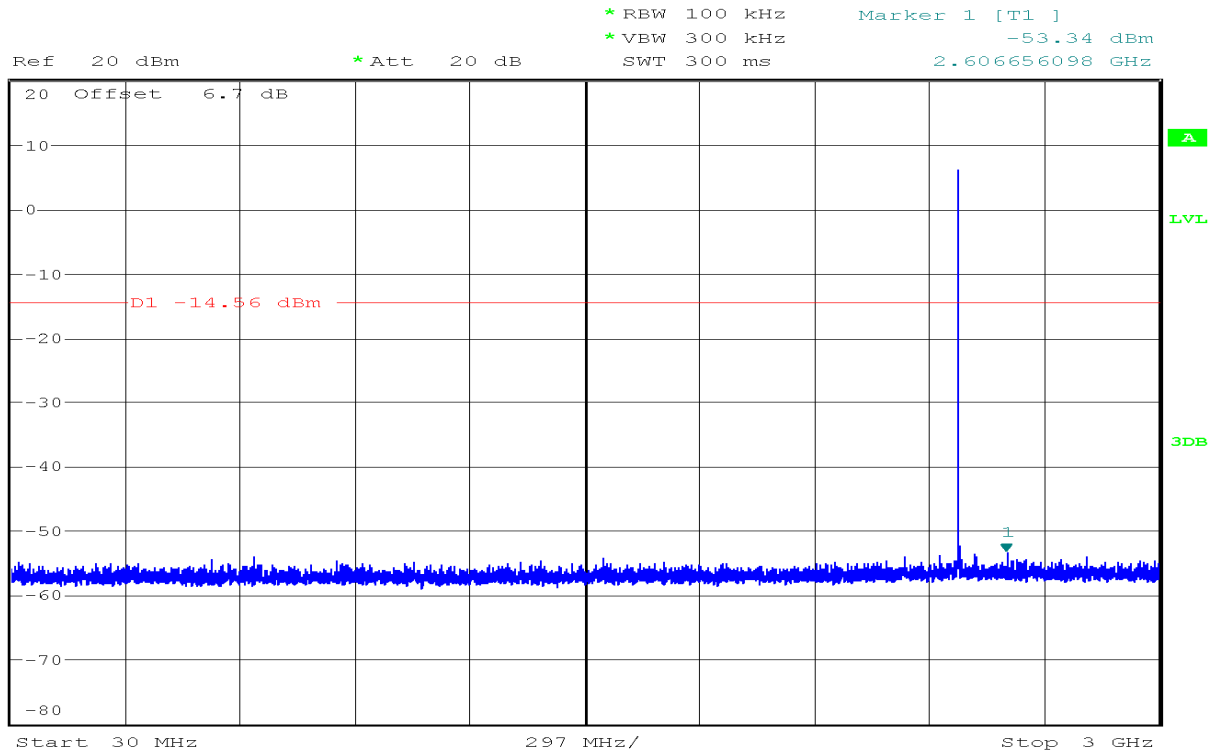




Operation Mode:	3 Mbps	Test Date:	2016-4-26
Test Channel:	39	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C



Operation Mode:	3 Mbps	Test Date:	2016-4-26
Test Channel:	78	Tested by:	Lily.Wang
Humidity:	52 % RH	Temperature:	24°C



## 6.8 Radiated Band Edge and Spurious Emission Measurement

### LIMIT

- Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

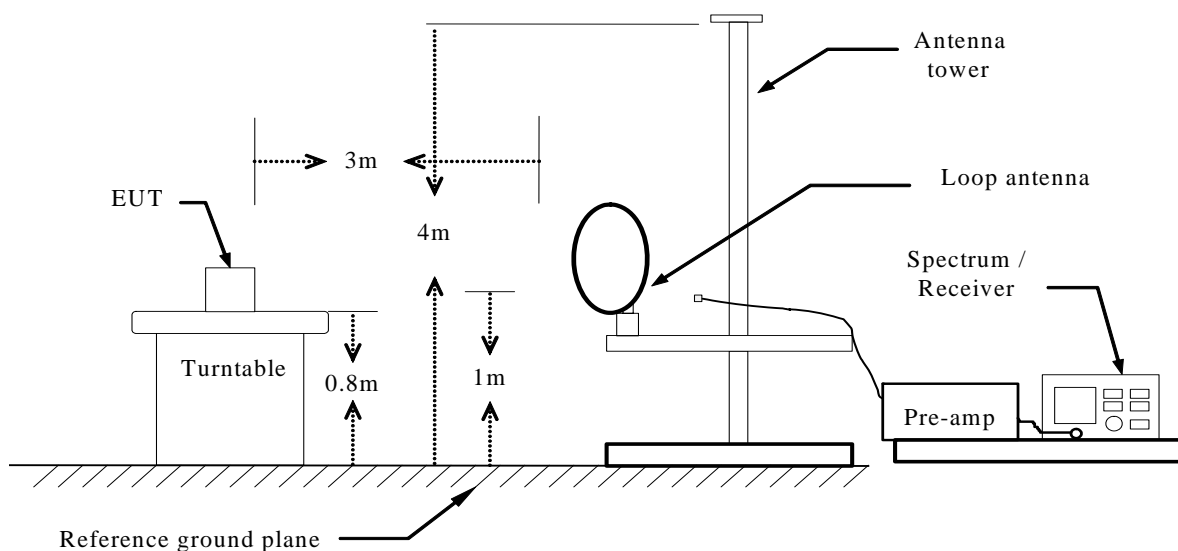
**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

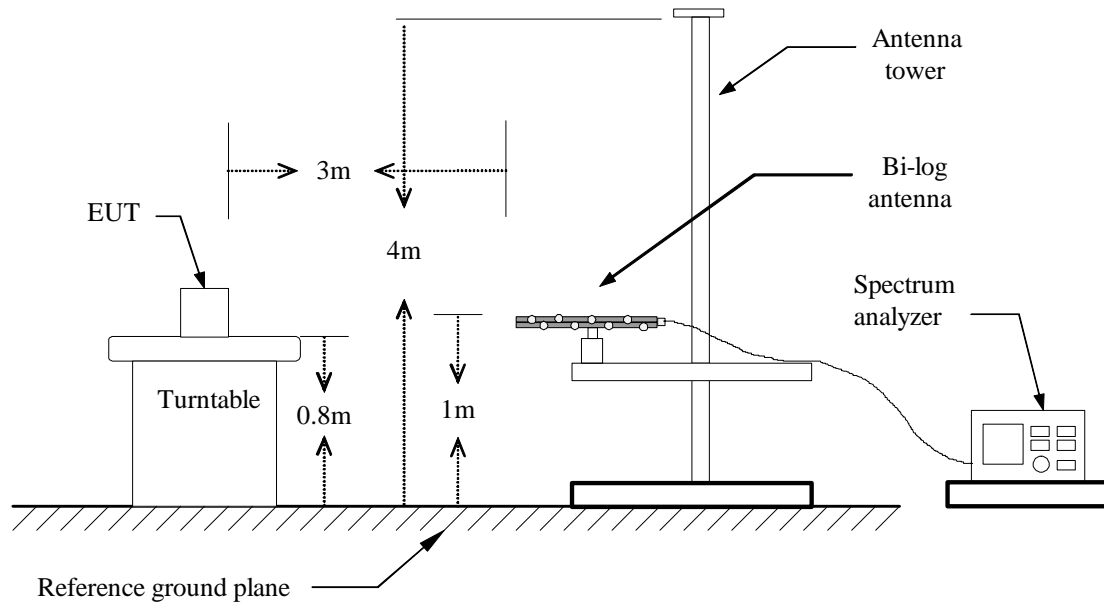
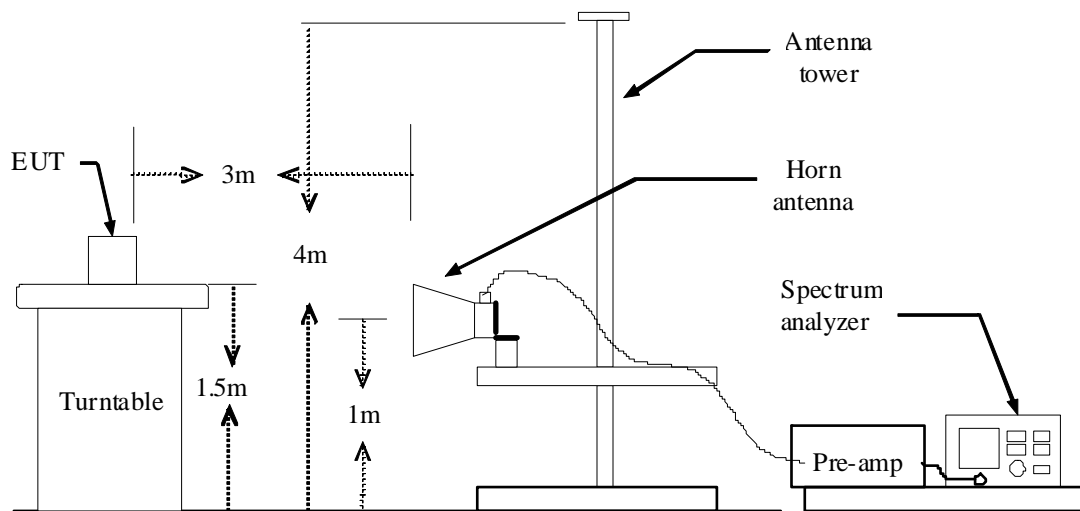
- In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength ( $\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

### Test Configuration

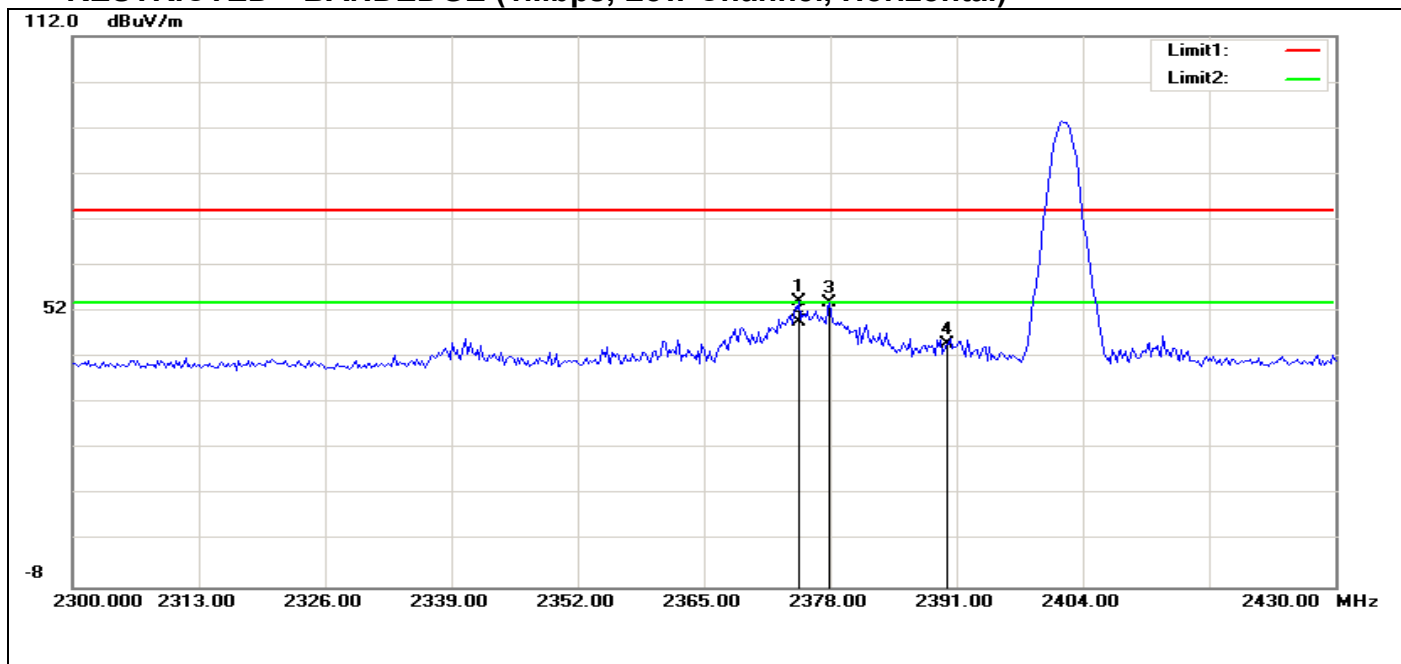
#### Below 30MHz



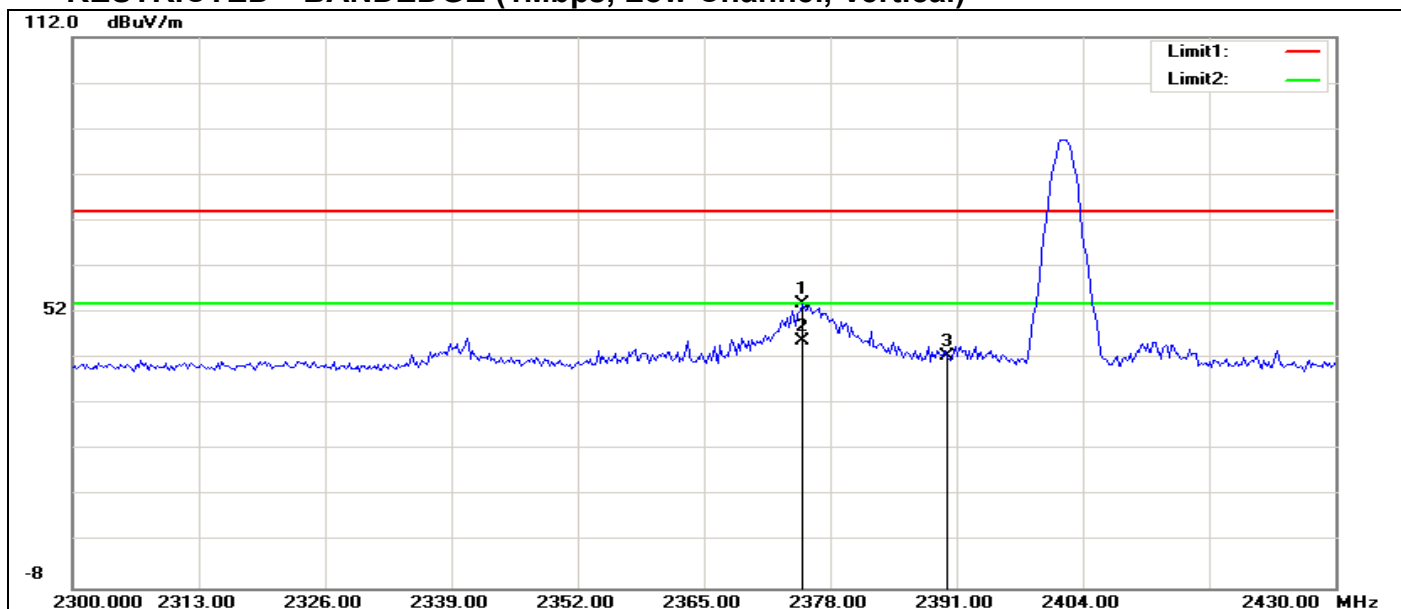
**Below 1 GHz****Above 1 GHz**

**TEST PROCEDURE**

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m 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:  
Below 1GHz:  
RBW=100kHz / VBW=300kHz / Sweep=AUTO  
Above 1GHz:  
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

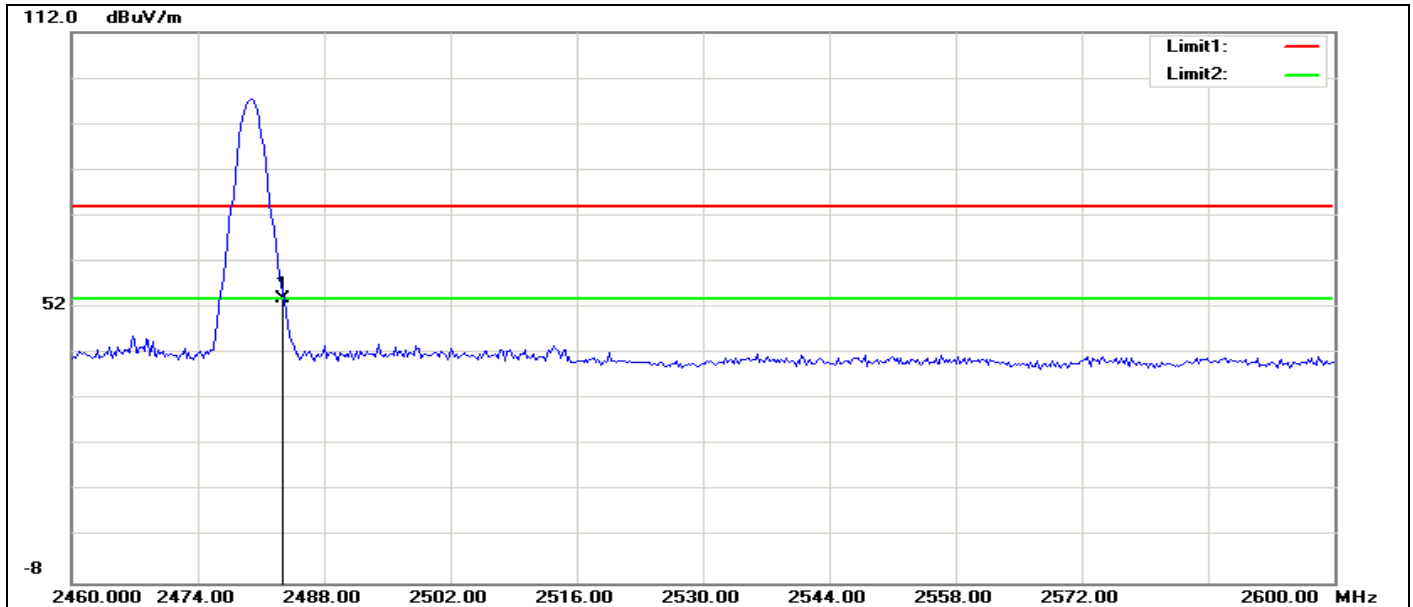
**RESTRICTED BANDEDGE (1Mbps, Low Channel, Horizontal)**

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2374.792	62.83	-8.50	54.33	74.00	-19.67	100	199	peak
2	2374.792	58.13	-8.50	49.63	54.00	-4.37	100	199	AVG
3	2377.917	62.44	-8.50	53.94	74.00	-20.06	100	199	peak
4	2390.000	53.44	-8.47	44.97	74.00	-29.03	100	199	peak

**RESTRICTED BANDEDGE (1Mbps, Low Channel, Vertical)**

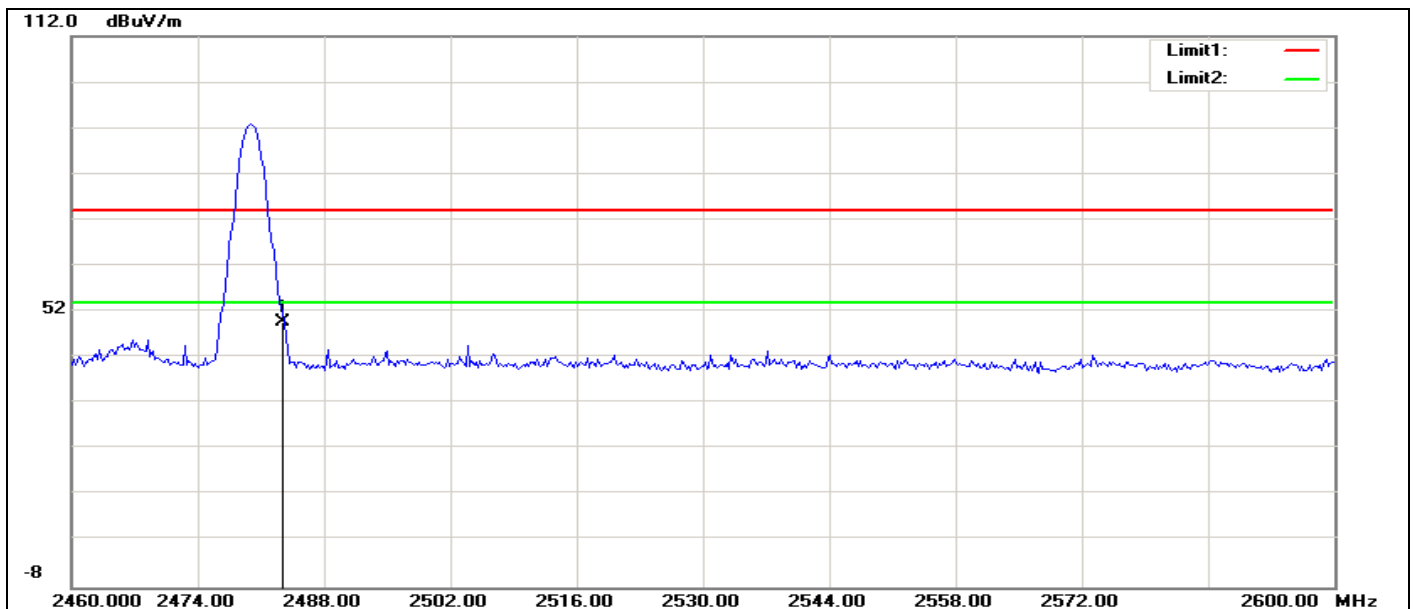
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.208	62.55	-8.50	54.05	74.00	-19.95	100	134	peak
2	2375.208	54.37	-8.50	45.87	54.00	-8.13	100	134	AVG
3	2390.000	51.10	-8.47	42.63	74.00	-31.37	100	248	peak

## RESTRICTED BANDEDGE (1Mbps Mode, High Channel, Horizontal)



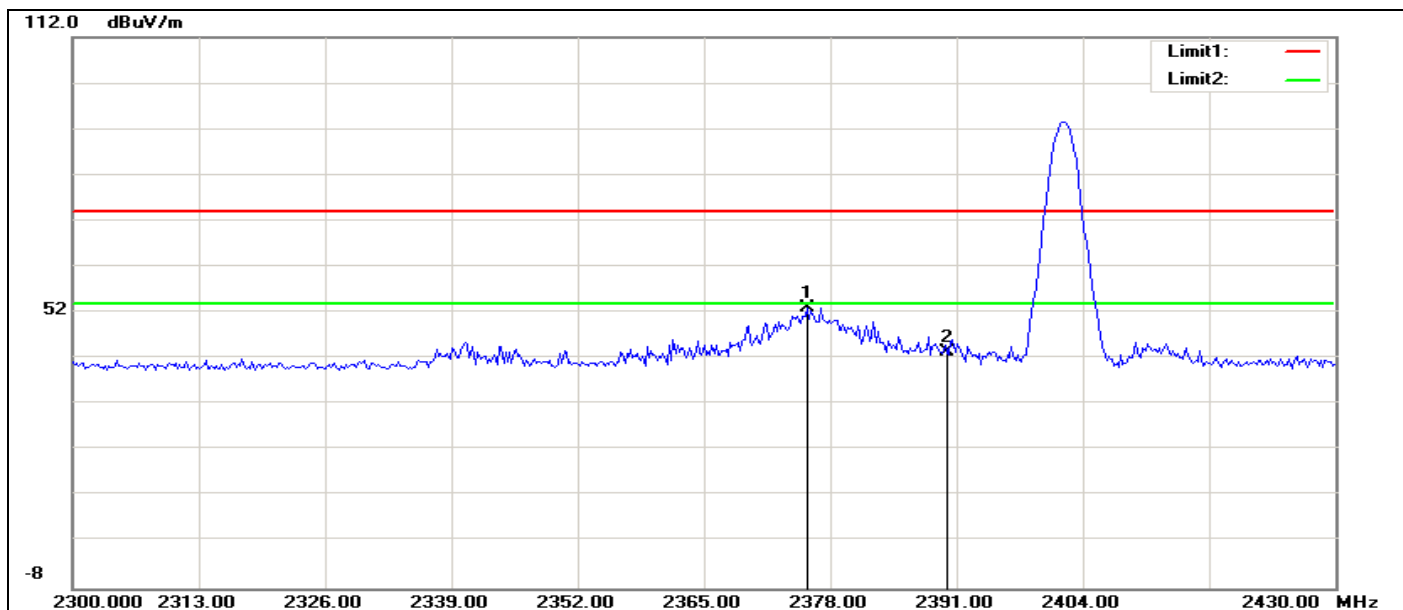
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	62.13	-8.26	53.87	74.00	-20.13	100	137	peak

## RESTRICTED BANDEDGE (1Mbps, High Channel, Vertical)



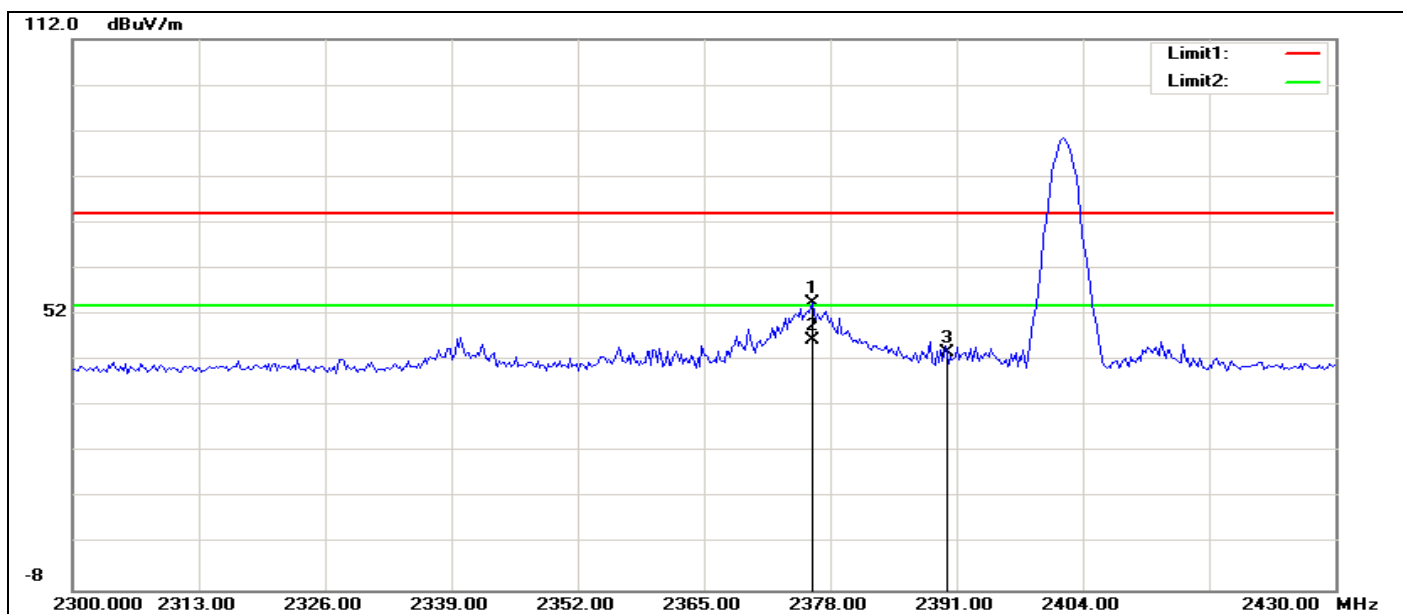
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	57.92	-8.26	49.66	74.00	-24.34	100	119	peak

## RESTRICTED BANDEDGE (3Mbps, Low Channel, Horizontal)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.625	61.45	-8.50	52.95	74.00	-21.05	100	44	peak
2	2390.000	51.85	-8.47	43.38	74.00	-30.62	100	210	peak

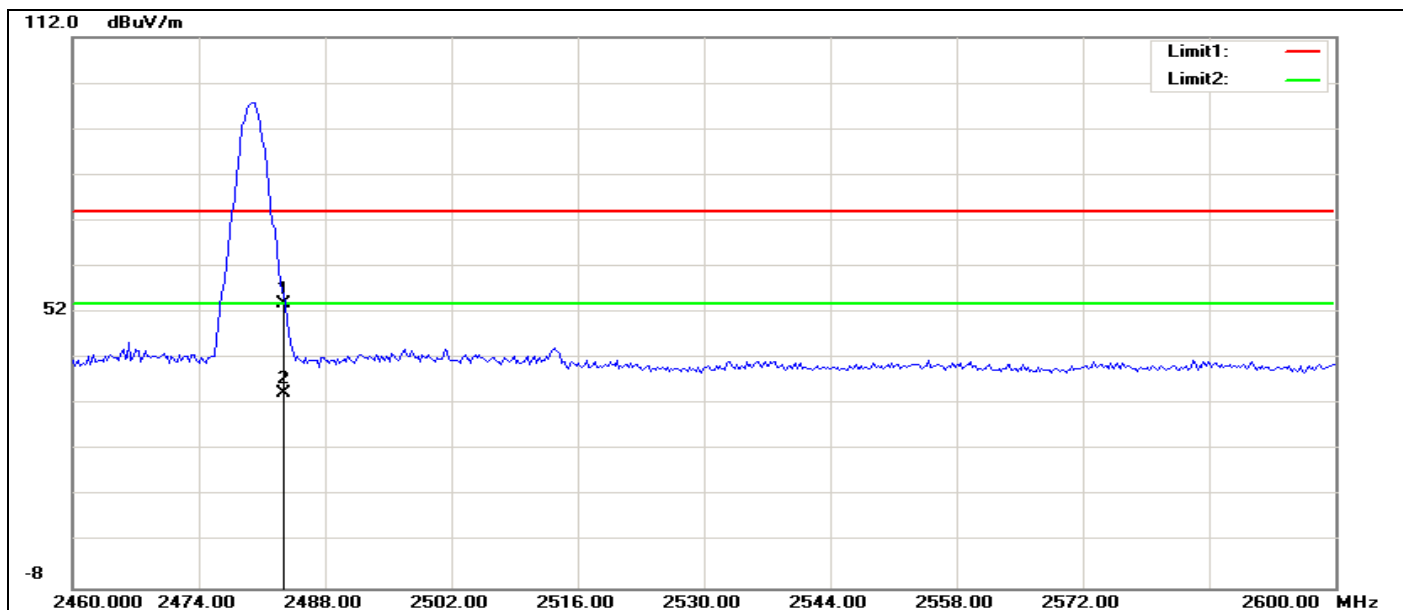
## RESTRICTED BANDEDGE (3Mbps, Low Channel, Vertical)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2376.250	62.92	-8.50	54.42	74.00	-19.58	100	231	peak
2	2376.250	54.88	-8.50	46.38	54.00	-7.62	100	231	AVG
3	2390.000	52.19	-8.47	43.72	74.00	-30.28	100	235	peak

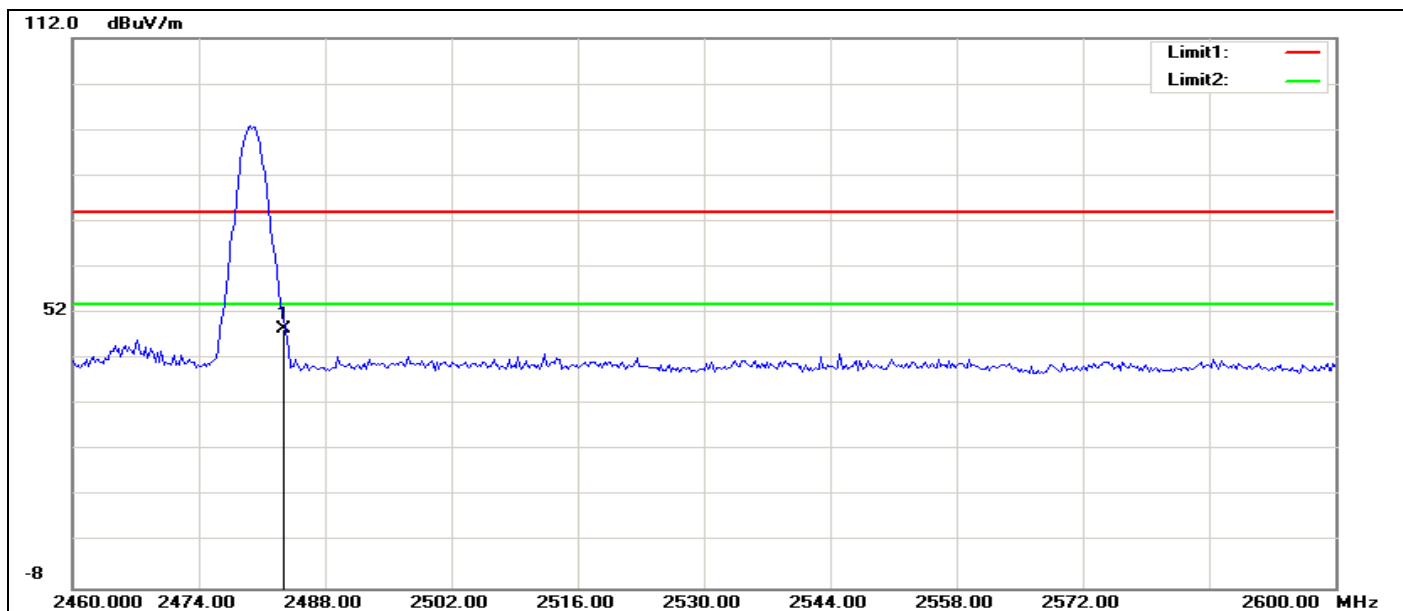


## RESTRICTED BANDEDGE (3Mbps, High Channel, Horizontal)

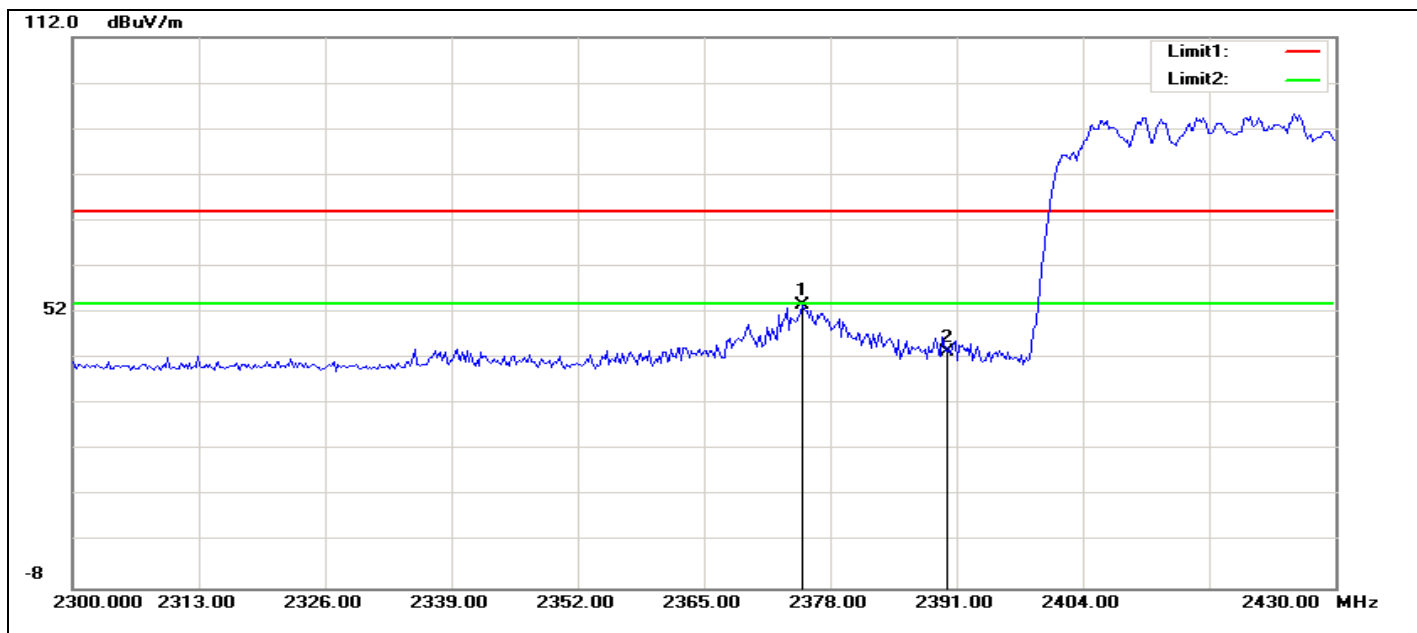


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	62.29	-8.26	54.03	74.00	-19.97	100	134	peak
2	2483.500	42.66	-8.26	34.40	54.00	-19.60	100	134	AVG

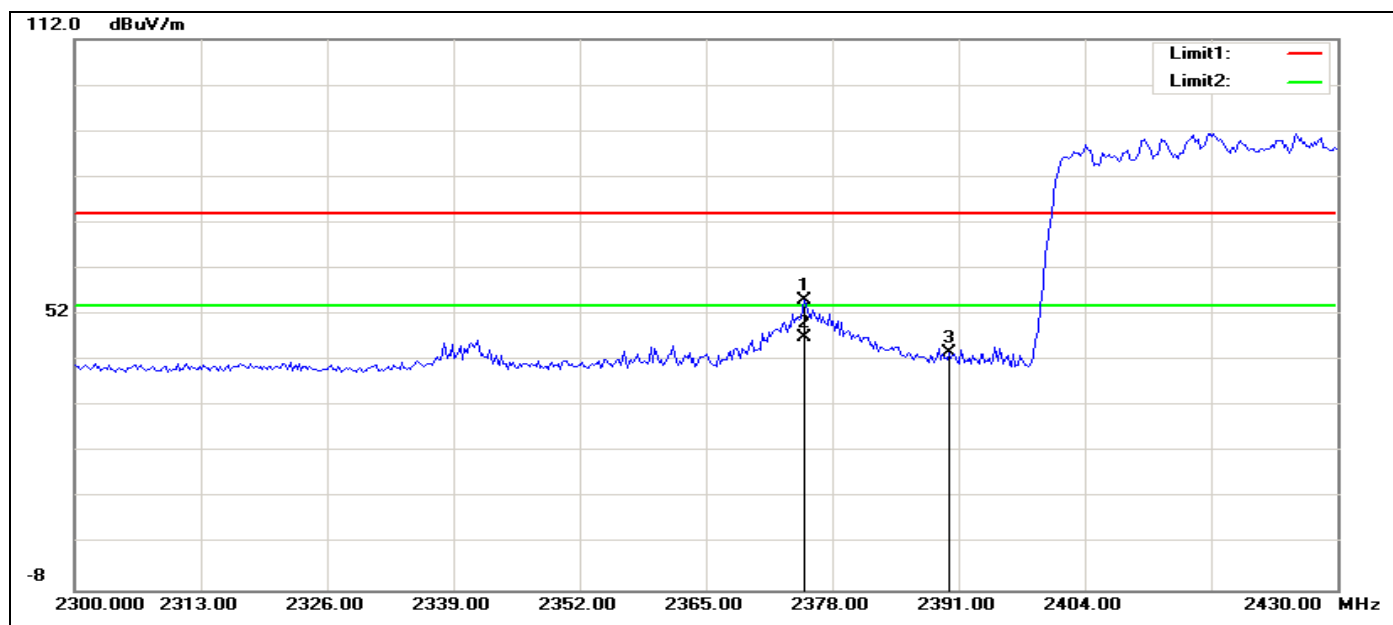
## RESTRICTED BANDEDGE (3Mbps, High Channel, Vertical)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	56.87	-8.26	48.61	74.00	-25.39	100	124	peak

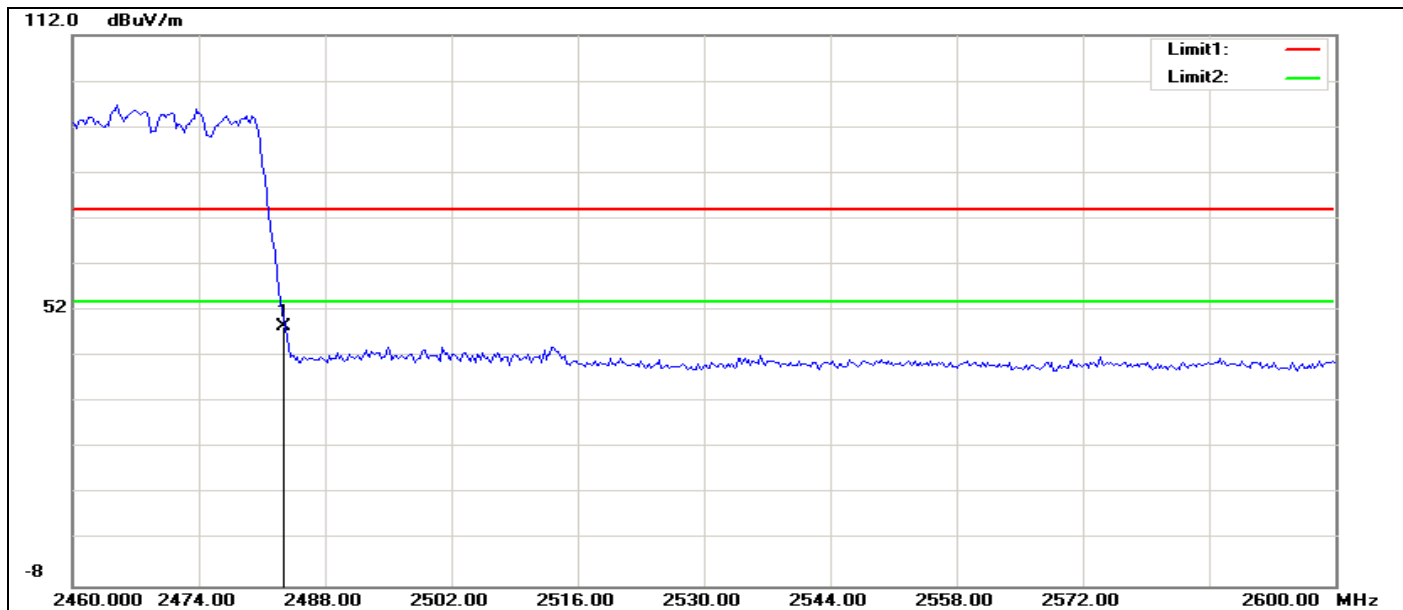
**RESTRICTED BANDEDGE (1Mbps, Low Channel, Horizontal,hopping)**

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.208	62.11	-8.50	53.61	74.00	-20.39	100	129	peak
2	2390.000	51.95	-8.47	43.48	74.00	-30.52	100	201	peak

**RESTRICTED BANDEDGE (1Mbps, Low Channel, Vertical,hopping)**

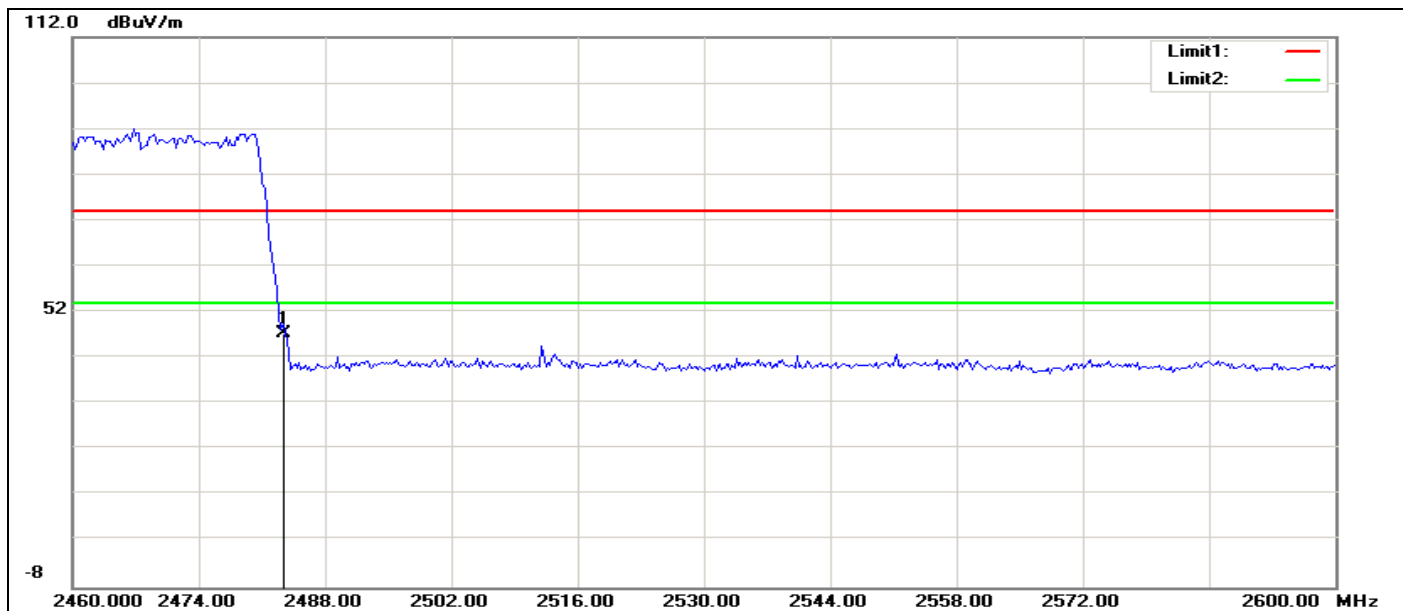
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.208	63.74	-8.50	55.24	74.00	-18.76	100	138	peak
2	2375.208	55.68	-8.50	47.18	54.00	-6.82	100	138	AVG
3	2390.000	52.29	-8.47	43.82	74.00	-30.18	100	242	peak

## RESTRICTED BANDEDGE (1Mbps Mode, High Channel, Horizontal,hopping)



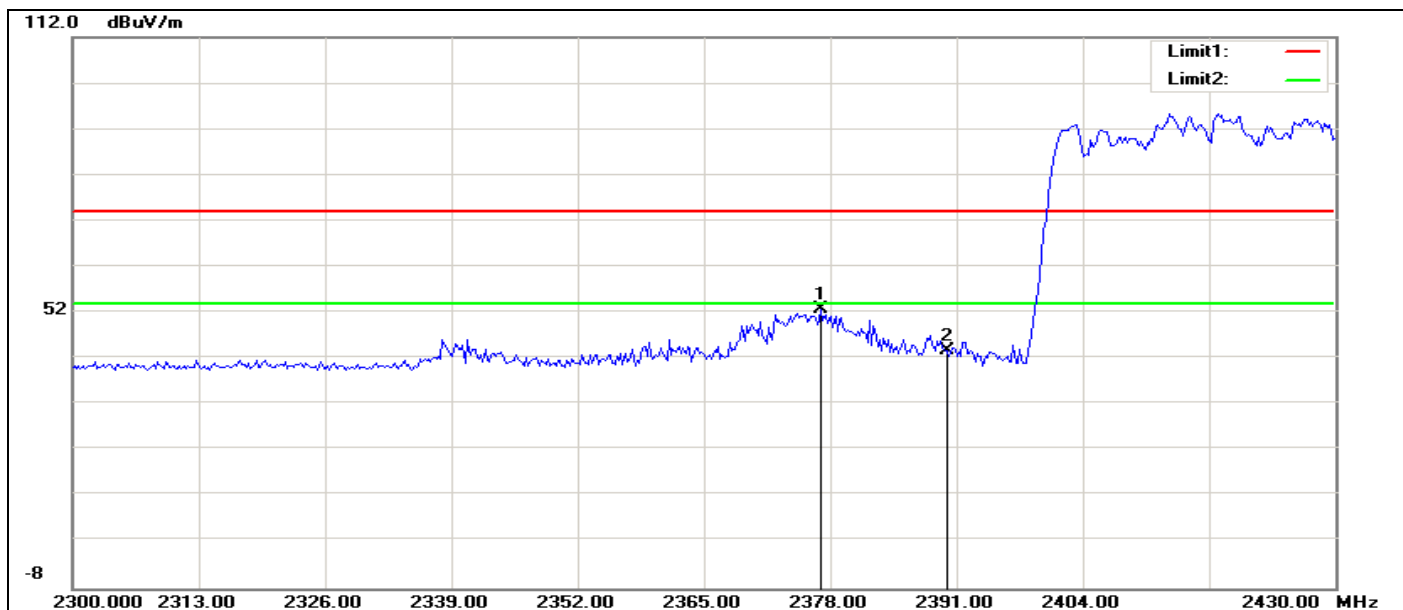
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	56.95	-8.26	48.69	74.00	-25.31	100	126	peak

## RESTRICTED BANDEDGE (1Mbps, High Channel, Vertical,hopping)



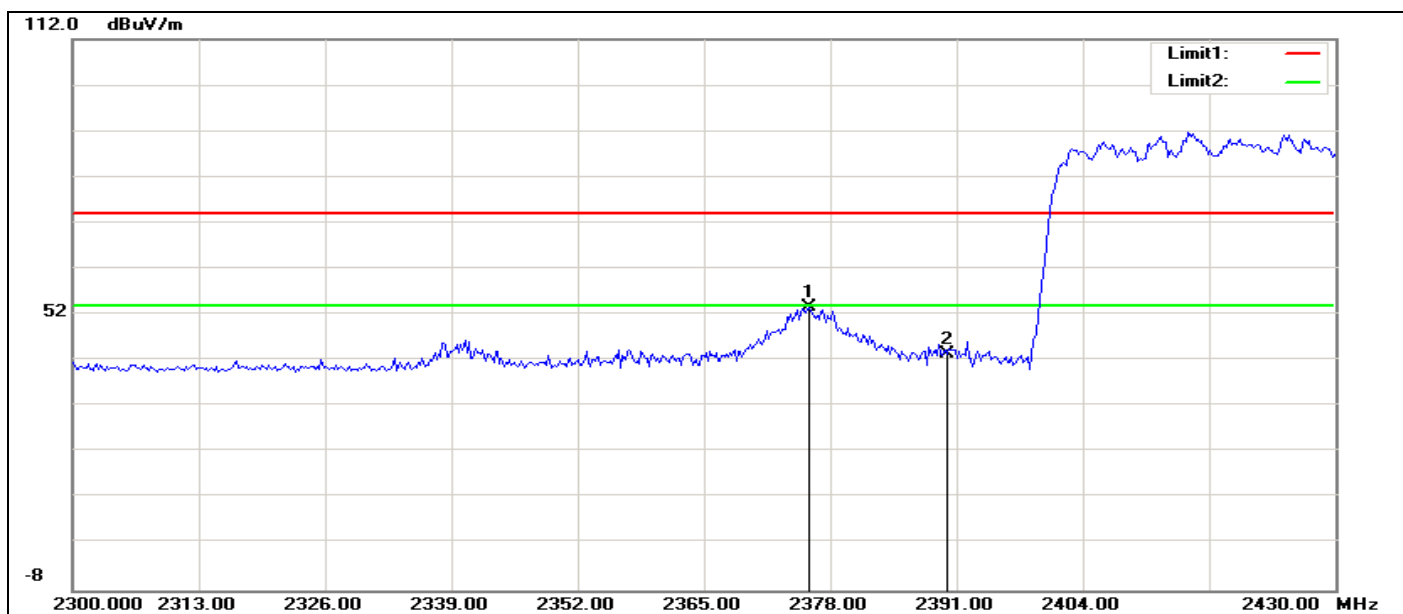
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.67	-8.26	47.41	74.00	-26.59	100	118	peak

## RESTRICTED BANDEDGE (3Mbps, Low Channel, Horizontal,hopping)

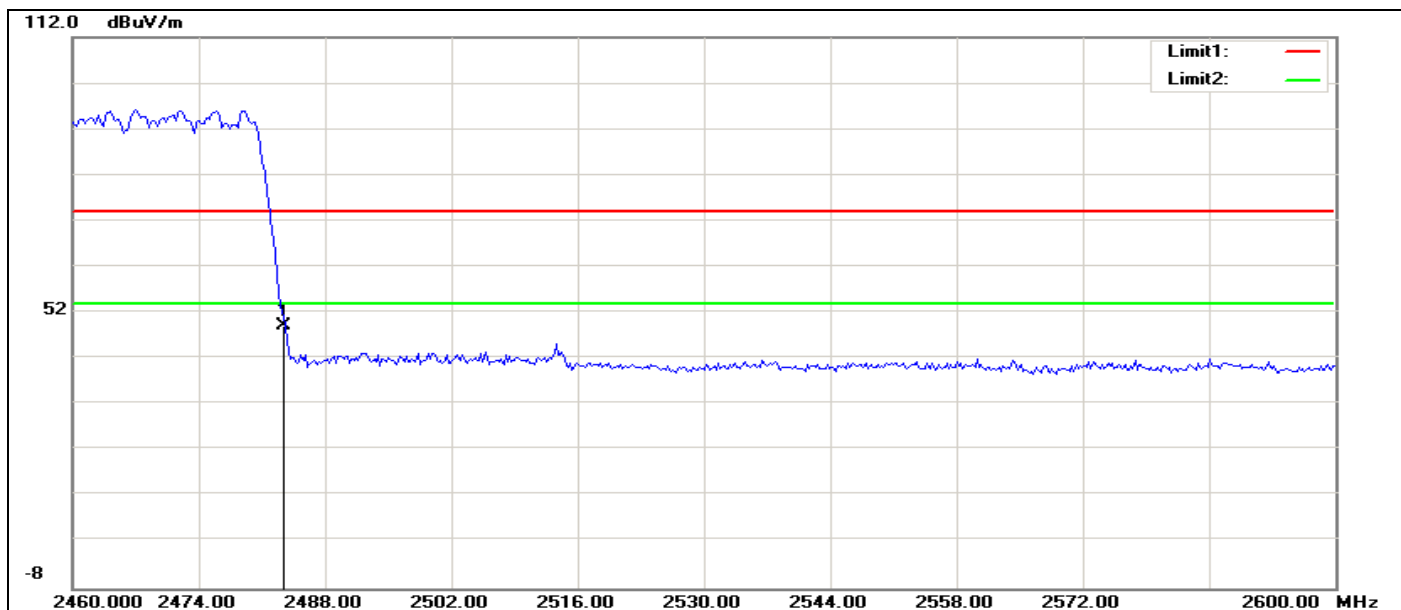
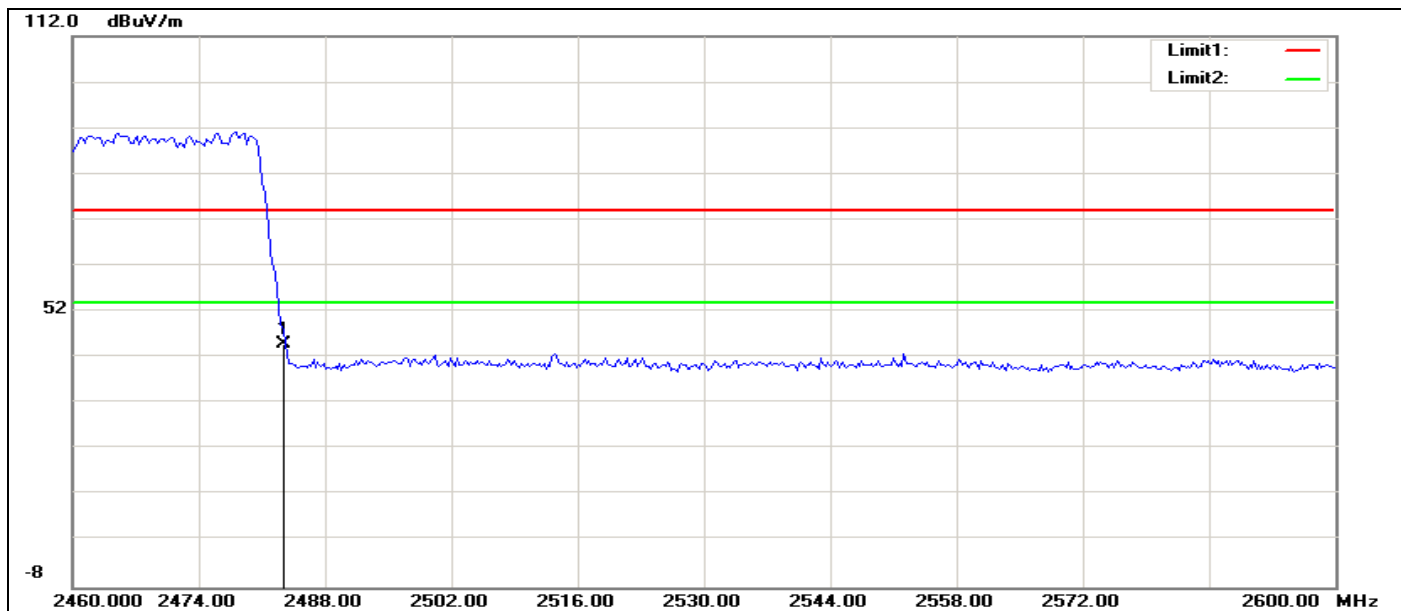


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2377.083	61.21	-8.50	52.71	74.00	-21.29	100	208	peak
2	2390.000	52.11	-8.47	43.64	74.00	-30.36	100	123	peak

## RESTRICTED BANDEDGE (3Mbps, Low Channel, Vertical,hopping)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2375.833	62.10	-8.50	53.60	74.00	-20.40	100	250	peak
2	2390.000	52.03	-8.47	43.56	74.00	-30.44	100	114	peak

**RESTRICTED BANDEDGE (3Mbps, High Channel, Horizontal,hopping)****RESTRICTED BANDEDGE (3Mbps, High Channel, Vertical)**

**TEST RESULT OF RADIATED EMISSION****Below 30MHz**

The interference of the frequency value is lower than the limit below 20 db, measured as the background noise values and will not be recorded.

**Below 1 GHz**

<b>Operation Mode:</b>	Normal Link	<b>Test Date:</b>	2016-4-12
<b>Temperature:</b>	25°C	<b>Tested by:</b>	Lily.Wang
<b>Humidity:</b>	48% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
32.9100	V	16.32	19.19	35.51	40.00	-4.49	peak
95.9600	V	24.35	9.55	33.90	40.00	-6.10	peak
114.3900	V	22.61	10.30	32.91	40.00	-7.09	peak
197.8100	V	23.48	12.24	35.72	40.00	-4.28	peak
701.2400	V	21.72	21.54	43.26	47.00	-3.74	QP
793.3900	V	23.96	22.78	46.74	47.00	-0.26	QP
31.9400	H	14.55	19.70	34.25	40.00	-5.75	peak
70.7400	H	25.48	8.66	34.14	40.00	-5.86	peak
116.3300	H	23.49	10.35	33.84	40.00	-6.16	peak
149.3100	H	18.57	11.11	29.68	40.00	-10.32	peak
701.2400	H	23.32	21.54	44.86	47.00	-2.14	peak
792.4200	H	20.05	22.77	42.82	47.00	-4.18	peak

**Notes:**

1. Measurements above show only up to maximum emissions noted, 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.
2. Radiated emissions measured in frequency range from 9 KHz to 1000MHz 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 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



# Compliance Certification Services Inc.

Date of Issue : June 1, 2016

Report No: C151118R01-RPB

FCC ID:H79-0120C8

## Above 1 GHz

Operation Mode: 1 Mbps

Test Date: 2016-4-9

Test Channel: CH00

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	46.40	-3.45	42.95	74.00	-31.05	100	303	peak
2	7293.269	43.59	1.18	44.77	74.00	-29.23	100	2	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4868.590	45.31	-3.26	42.05	74.00	-31.95	100	0	peak
2	7592.949	42.59	2.58	45.17	74.00	-28.83	100	68	peak
N/A									

Operation Mode: 1 Mbps

Test Date: 2016-4-9

Test Channel: CH39

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4977.564	44.86	-3.00	41.86	74.00	-32.14	100	62	peak
2	7974.359	42.64	4.37	47.01	74.00	-26.99	100	246	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	44.61	-3.45	41.16	74.00	-32.84	100	206	peak
2	7674.680	42.89	2.96	45.85	74.00	-28.15	100	0	peak



# Compliance Certification Services Inc.

Date of Issue :June 1, 2016

Report No: C151118R01-RPB

FCC ID:H79-0120C8

N/A									

Operation Mode: 1 Mbps

Test Date: 2016-4-9

Test Channel: CH78

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4786.859	44.72	-3.45	41.27	74.00	-32.73	100	193	peak
2	7538.462	43.04	2.33	45.37	74.00	-28.63	100	34	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4977.564	45.41	-3.00	42.41	74.00	-31.59	100	64	peak
2	7701.923	43.41	3.09	46.50	74.00	-27.50	100	355	peak
N/A									

Operation Mode: 3 Mbps

Test Date: 2016-4-9

Test Channel: CH00

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4759.615	45.09	-3.51	41.58	74.00	-32.42	100	296	peak
2	7538.462	43.06	2.33	45.39	74.00	-28.61	100	132	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
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# Compliance Certification Services Inc.

Date of Issue : June 1, 2016

Report No: C151118R01-RPB

FCC ID:H79-0120C8

1	4786.859	45.56	-3.45	42.11	74.00	-31.89	100	304	peak
2	7729.167	43.73	3.22	46.95	74.00	-27.05	100	318	peak
N/A									

Operation Mode: 3 Mbps

Test Date: 2016-4-9

Test Channel: CH39

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4895.833	44.93	-3.19	41.74	74.00	-32.26	100	359	peak
2	7701.923	43.04	3.09	46.13	74.00	-27.87	100	78	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4705.128	45.28	-3.64	41.64	74.00	-32.36	100	237	peak
2	7729.167	42.74	3.22	45.96	74.00	-28.04	100	167	peak
N/A									

Operation Mode: 3 Mbps

Test Date: 2016-4-9

Test Channel: CH78

Tested by: Lily.Wang

Temperature: 25°C

Polarity: Ver. / Hor.

## Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4814.103	45.00	-3.38	41.62	74.00	-32.38	100	78	peak
2	7674.680	43.49	2.96	46.45	74.00	-27.55	100	312	peak
N/A									

## Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	4868.590	46.07	-3.26	42.81	74.00	-31.19	100	282	peak
2	7511.218	42.89	2.20	45.09	74.00	-28.91	100	160	peak
N/A									


**Remark:**

1. *Measuring frequencies from 1 GHz to the 10th 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 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*
4. *Spectrum setting:*
  - a. *Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 1MHz, Sweep time = Auto.*
  - b. *AV Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep time = Auto.*

## 6.9 POWERLINE CONDUCTED EMISSIONS

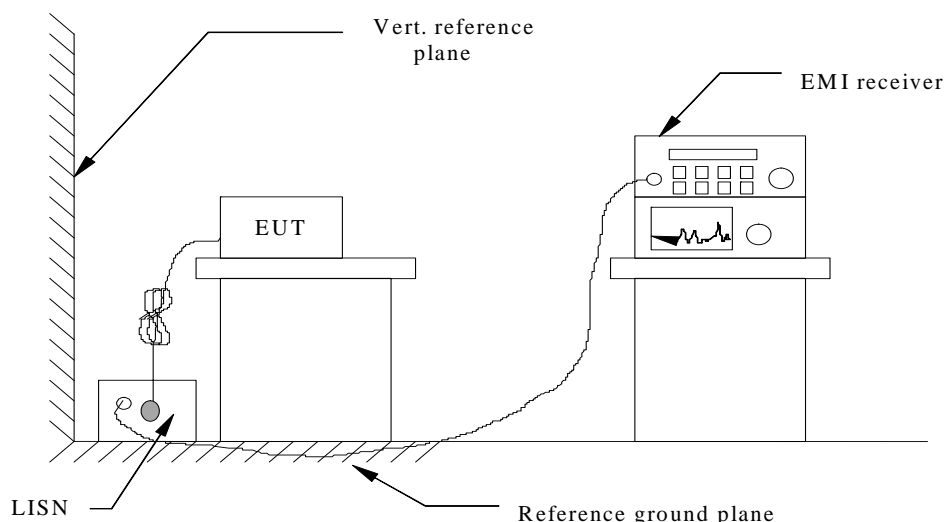
### LIMIT

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 Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 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.

### Test Configuration



See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### TEST PROCEDURE

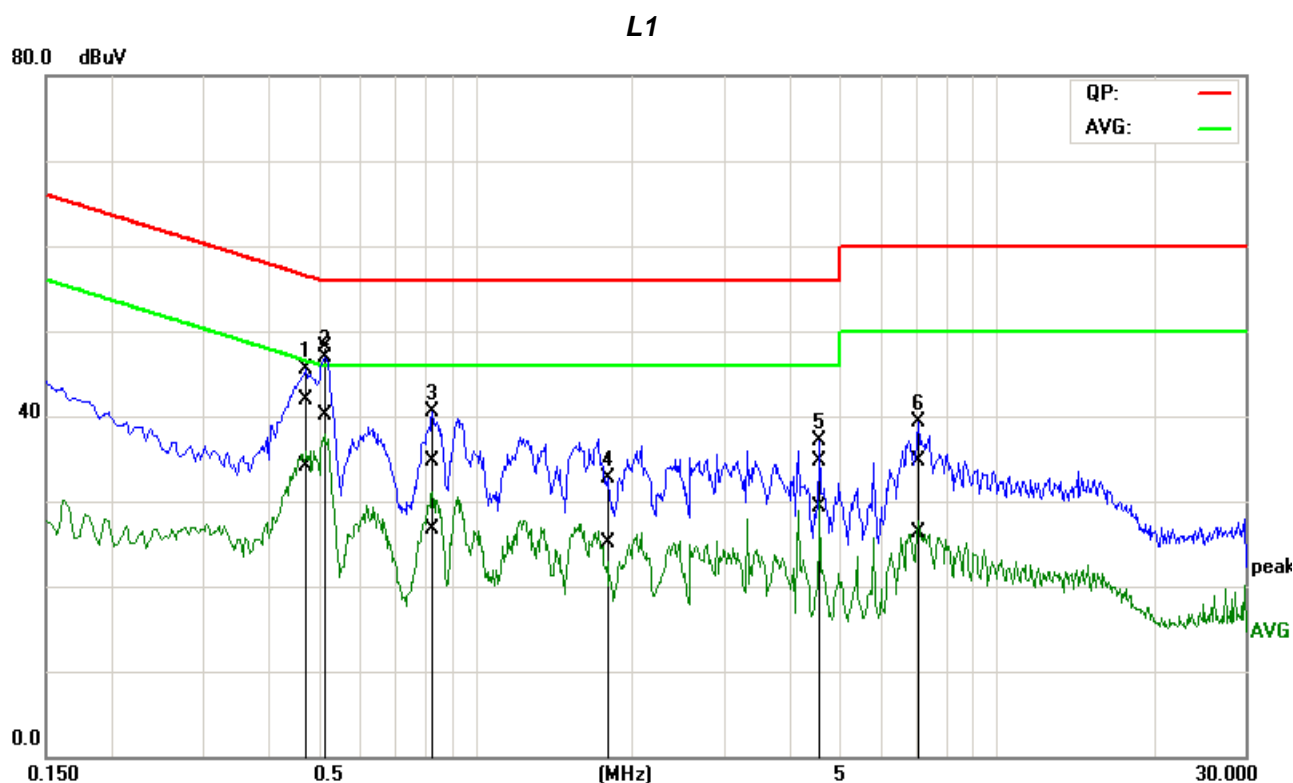
1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

**Test Data**

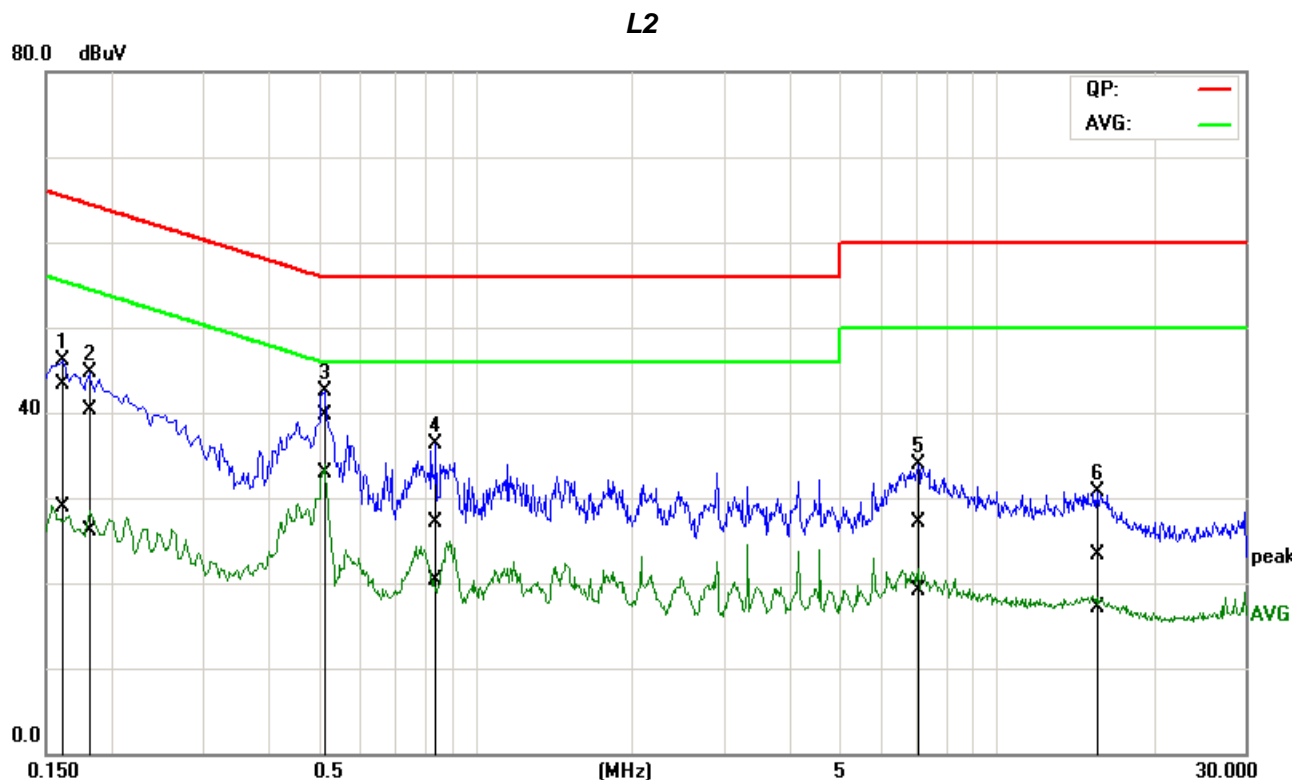
Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:17:53
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.4716	22.03	14.24	19.81	41.84	34.05	56.49	46.49	-14.65	-12.44	Pass
2*	0.5112	28.33	20.33	19.81	48.14	40.14	56.00	46.00	-7.86	-5.86	Pass
3	0.8183	14.85	6.84	19.80	34.65	26.64	56.00	46.00	-21.35	-19.36	Pass
4	1.7989	12.84	5.25	19.83	32.67	25.08	56.00	46.00	-23.33	-20.92	Pass
5	4.5777	14.79	9.46	19.92	34.71	29.38	56.00	46.00	-21.29	-16.62	Pass
6	7.0742	14.81	6.34	19.92	34.73	26.26	60.00	50.00	-25.27	-23.74	Pass

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

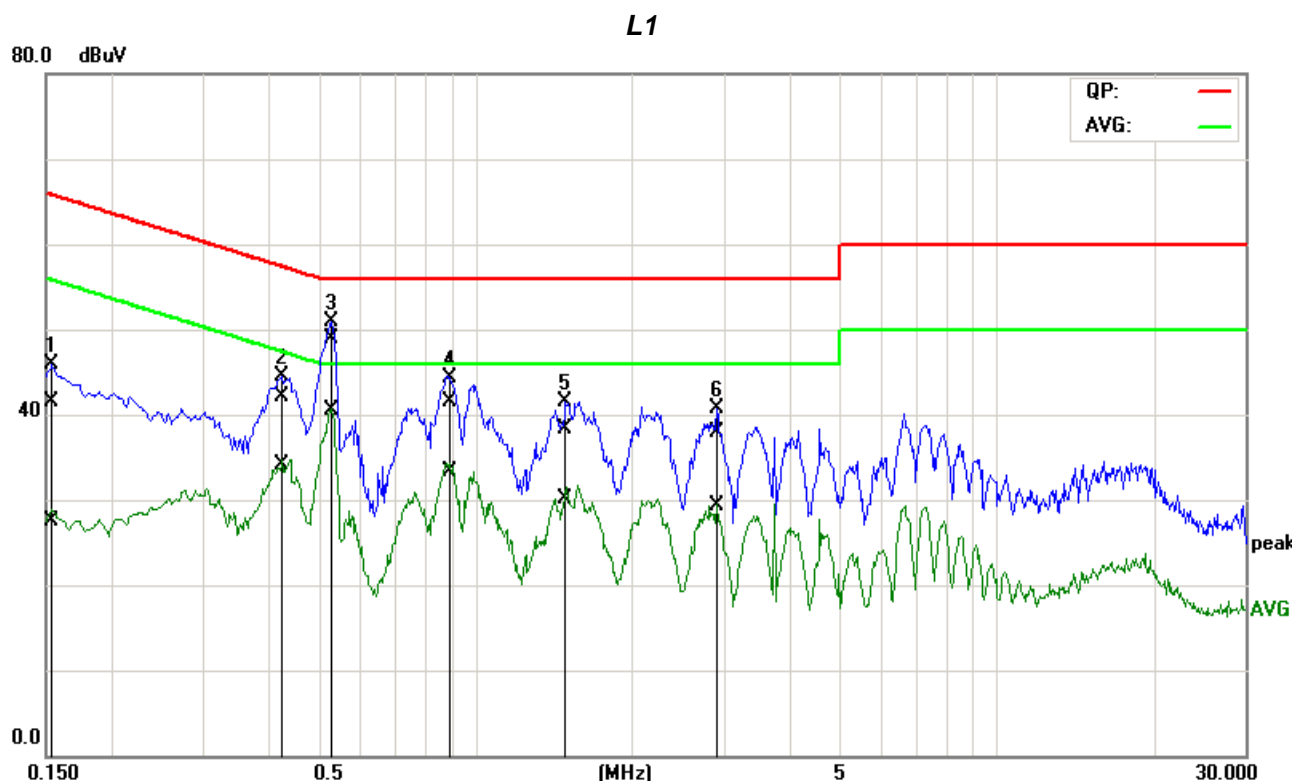
Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:22:45
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1598	23.55	9.13	19.74	43.29	28.87	65.47	55.47	-22.18	-26.60	Pass
2	0.1810	20.60	6.28	19.74	40.34	26.02	64.43	54.44	-24.09	-28.42	Pass
3*	0.5148	19.98	13.16	19.75	39.73	32.91	56.00	46.00	-16.27	-13.09	Pass
4	0.8329	7.41	0.52	19.74	27.15	20.26	56.00	46.00	-28.85	-25.74	Pass
5	7.0894	7.15	-0.82	19.89	27.04	19.07	60.00	50.00	-32.96	-30.93	Pass
6	15.5751	2.89	-3.20	20.33	23.22	17.13	60.00	50.00	-36.78	-32.87	Pass

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

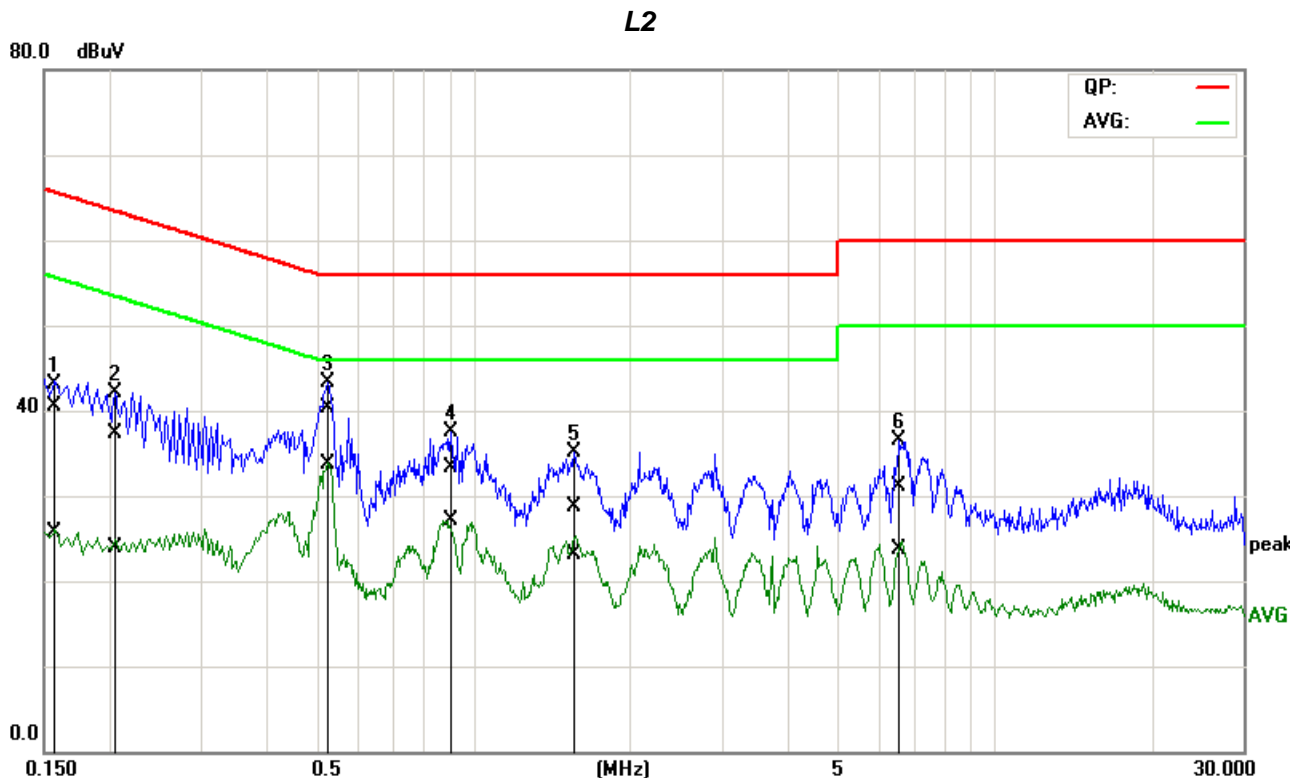
Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:28:21
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 240V/60Hz
Model:		Description:	



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1522	21.77	7.65	19.79	41.56	27.44	65.87	55.88	-24.31	-28.44	Pass
2	0.4271	22.26	14.37	19.81	42.07	34.18	57.31	47.31	-15.24	-13.13	Pass
3*	0.5276	29.15	20.64	19.81	48.96	40.45	56.00	46.00	-7.04	-5.55	Pass
4	0.8989	21.78	13.49	19.79	41.57	33.28	56.00	46.00	-14.43	-12.72	Pass
5	1.4976	18.43	10.29	19.81	38.24	30.10	56.00	46.00	-17.76	-15.90	Pass
6	2.9113	18.09	9.32	19.89	37.98	29.21	56.00	46.00	-18.02	-16.79	Pass

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C151118R01	Date:	2016-4-29
Model No.:	NP2000	Time:	AM 09:33:33
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 240V/60Hz
Model:		Description:	



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1544	20.77	6.00	19.74	40.51	25.74	65.75	55.76	-25.24	-30.02	Pass
2	0.2034	17.47	4.10	19.74	37.21	23.84	63.47	53.47	-26.26	-29.63	Pass
3*	0.5226	20.60	13.97	19.75	40.35	33.72	56.00	46.00	-15.65	-12.28	Pass
4	0.8916	13.54	7.34	19.74	33.28	27.08	56.00	46.00	-22.72	-18.92	Pass
5	1.5386	8.93	3.42	19.75	28.68	23.17	56.00	46.00	-27.32	-22.83	Pass
6	6.5813	11.28	3.82	19.87	31.15	23.69	60.00	50.00	-28.85	-26.31	Pass

**Note:** 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Remark:

- 1.The measuring frequencies range between 0.15 MHz and 30 MHz.
- 2.The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
- 3.“—” denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
- 4.The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.

**END OF REPORT**