



# **FCC 47 CFR PART 15 SUBPART C**

## **TEST REPORT**

*For*

**Applicant : Dreamax Ltd.**

**Address : UNIT 04 7-F BRIGHT WAY TOWER NO.33 MONG KOK ROAD KL,  
HongKong**

**Product Name : MID**

**Model Name : DMX-ST7A,DMX-ST7A-ST7Z**

**Brand Name : N/A**

**FCC ID : 2AA59DREAMAX01**

**Report No. : STS130914F1**

**Date of Issue : October 11,2013**

**Issued by : Shenzhen Super Test Service Technology Co., Ltd.**

**Address : No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan,  
Shenzhen, Guangdong, China**

**Tel : 86-755-2795 8522**

**Fax : 86-755-2795 8022**

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TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY..... 3

2. GENERAL INFORMATION..... 4

2.1 Product Information..... 4

2.2 Objective..... 5

2.3 Test Standards and Results..... 5

2.4 Environmental Conditions..... 5

3. TEST FACILITY..... 6

4. TEST EQUIPMENT LIST..... 8

5. 47 CFR Part 15 C 15.247 Requirements..... 9

5.1 6dB Bandwidth..... 9

5.2 Peak Output Power..... 16

5.3 Conducted Spurious Emission..... 22

5.4 Band Edge..... 25

5.5 Power Spectral Density (PSD)..... 34

5.6 Conducted Emission..... 40

5.7 Radiated Emission..... 43

APPENDIX 1..... 62

PHOTOGRAPHS OF TEST SETUP..... 62

APPENDIX 2..... 65

PHOTOGRAPHS OF EUT..... 65

## 1. VERIFICATION OF CONFORMITY

**Equipment Under Test:** MID  
**Brand Name:** N/A  
**Model Number:** DMX-ST7A  
**Series Model Name:** DMX-ST7A-ST7Z  
**Difference description:** The same PCB, only the model name is different.  
**FCC ID:** **2AA59DREAMAX01**  
**Applicant:** Dreamax Ltd.  
UNIT 04 7-F BRIGHT WAY TOWER NO.33 MONG KOK ROAD KL, HongKong  
**Manufacturer:** Shenzhen John ward technology Co., LTD  
No.201,Building C, Hongshengyuan Industrial Park, No.339  
Bulong Road , Ma An hall community, Bantian Street, Longgang District,  
Shenzhen, Guangdong, China  
**Technical Standards:** 47 CFR Part 15 Subpart C,  
KDB 558074 D01 DTS Meas Guidance v03  
**File Number:** STS130914F1  
**Date of test:** September 25,2013~ October 11,2013  
**Deviation:** None  
**Condition of Test Sample:** Normal  
**Test Result:** PASS

The above equipment was tested by *Shenzhen Super Test Service Technology Co., Ltd.* for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

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

Tested by (+ signature):



Zhang Ling

October 11,2013

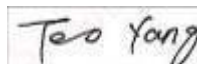
Review by (+ signature):



July Wen

October 11,2013

Approved by (+ signature):



Terry Yang

October 11,2013

## 2. GENERAL INFORMATION

### 2.1 Product Information

EUT- MID	
Description:	MID
Model Name:	DMX-ST7A
Power Supply:	DC 5V by AC/DC adapter 100~240V 50/60Hz DC 3.7V by Lithium-ion Battery
Frequency Range:	IEEE 802.11b/g mode:2412MHz – 2462MHz IEEE 802.11n-20 mode:2412MHz – 2462MHz
Number of Channels:	IEEE 802.11b/g/n mode: 11 Channels
Transmit Power	IEEE 802.11b mode: 9.5+/-2 dBm IEEE 802.11g mode: 9.0+/-2 dBm IEEE 802.11n mode: 9.0+/-2 dBm
Modulation Technique:	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) IEEE 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65.0Mbps)
Antenna Gain:	0dBi
Antenna Type:	Internal Fixed
Temperature Range:	-20°C ~ +50°C

**NOTE:**

1. For a more detailed features description about the EUT, please refer to User's Manual.

## 2.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15(10-1-05 Edition)	Radio Frequency Devices

## 2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.247(a)(2)	6dB Bandwidth	PASS	2013-9-30
2	15.247(b)(3)	Peak Output Power	PASS	2013-9-30
3	15.247(d)	conducted spurious emission	PASS	2013-9-30
4	15.247(d)	Band Edge	PASS	2013-9-30
5	15.247(e)	Power Spectral Density	PASS	2013-9-30
6	15.207	Conducted Emission	PASS	2013-9-28
7	15.247(d) 15.205 15.209	Radiated Emission	PASS	2013-9-28

*Note:* 1. The test result judgment is decided by the limit of measurement standard  
2. The information of measurement uncertainty is available upon the customer's request.

## 2.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

### 3. TEST FACILITY

#### 3.1 TEST FACILITY

Test Site:	Compliance Certification Services Inc. (Kun shan) Laboratory
Location:	No.10 Weiye Rd, Innovation park, Eco&Tec,Development Zone, Kunshan City, Jiangsu, China
Description:	<p>There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 16 requirements.</p> <p>The FCC Registration Number is <b>238958</b>.</p> <p>The <b>CNAS</b> Registration Number is <b>CNAS L4354</b>.</p>
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna.

#### 3.2 GENERAL TEST PROCEDURES

##### EUT Function and Test Mode

The EUT has been tested under normal operating (TX) and standby (RX) condition.

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

### 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 C63.4:2009, 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

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 C63.4:2009.

## 3.3 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
8.37625 - 8.38675	156.7 - 156.9	2655 - 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.

#### 4. TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at CCS for testing. The equipment conforms to the CISPR 16-1/ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2014-5-12
EMI Test Receiver	R&S	ESCI	1166.5950.03	2014-8-13
Pre-Amplifier	Miteq	NSP4000-NF	870629	2014-5-12
Bilog Antenna	Sunol	JB1	A110204-2	2014-5-12
Horn-antenna	SCHWARZBECK	BBHA9120D	D:266	2014-6-7
Horn-antenna	SCHWARZBECK	BBHA9170	D:515	2014-6-7
Loop-antenna	ZHINAN	ZN30900A	N/A	2014-6-7
Turn Table	CT	CT123	4165	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R
Controller	CT	CT100	95637	N.C.R
EMI TEST RECEIVER	R&S	ESCI	100781	2014-3-14
V (V-LISN)	R&S	ENV216	101604	2014-5-21
Pulse Limiter	R&S	ESH3-Z2	100524	2014-9-24
Temperature Chamber	Guangzhou Gongwen	GDS-250	N/A	2014-9-24
Test Software	EZ-EMC			

**NOTE:** Equipments listed above have been calibrated and are in the period of validation.



## 5. 47 CFR Part 15 C 15.247 Requirements

### 5.1 6dB Bandwidth

#### 5.1.1 Definition

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

#### 5.1.2 Test Description

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ohm.

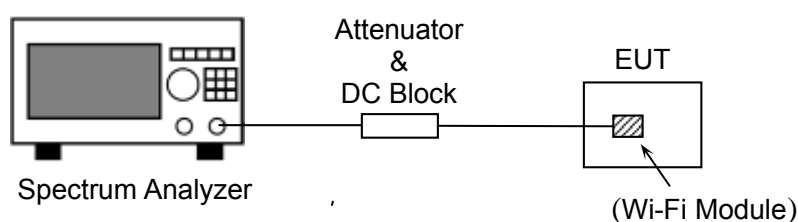


Figure 1: RF Test Setup

#### 5.1.3 Test Result

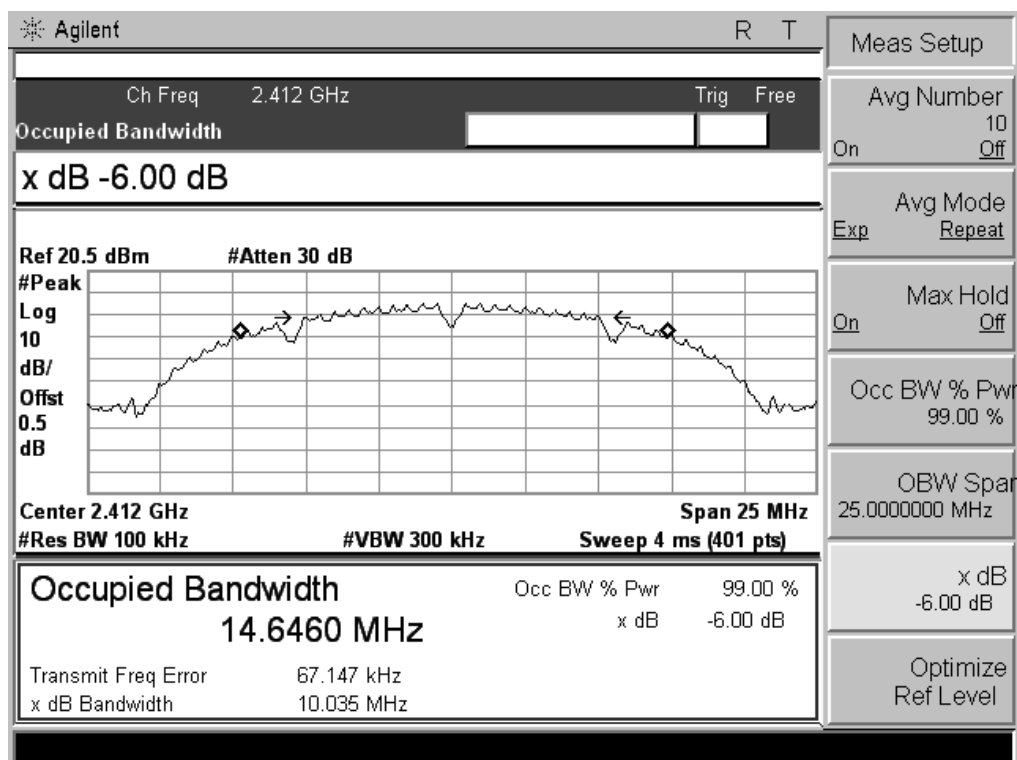
The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

##### 5.1.3.1 802.11b Test Mode

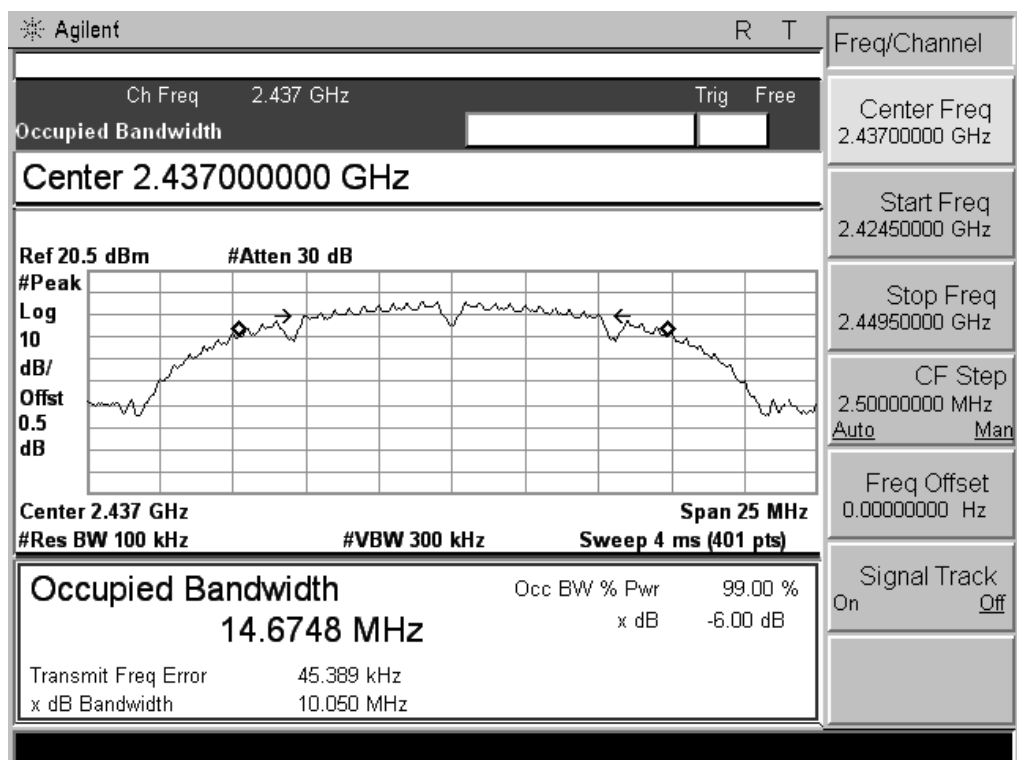
The minimum occupied bandwidth for the fundamental frequency 2412MHz is 10.035MHz. This occupied bandwidth complies with the FCC requirement.

#### A. Test Verdict:

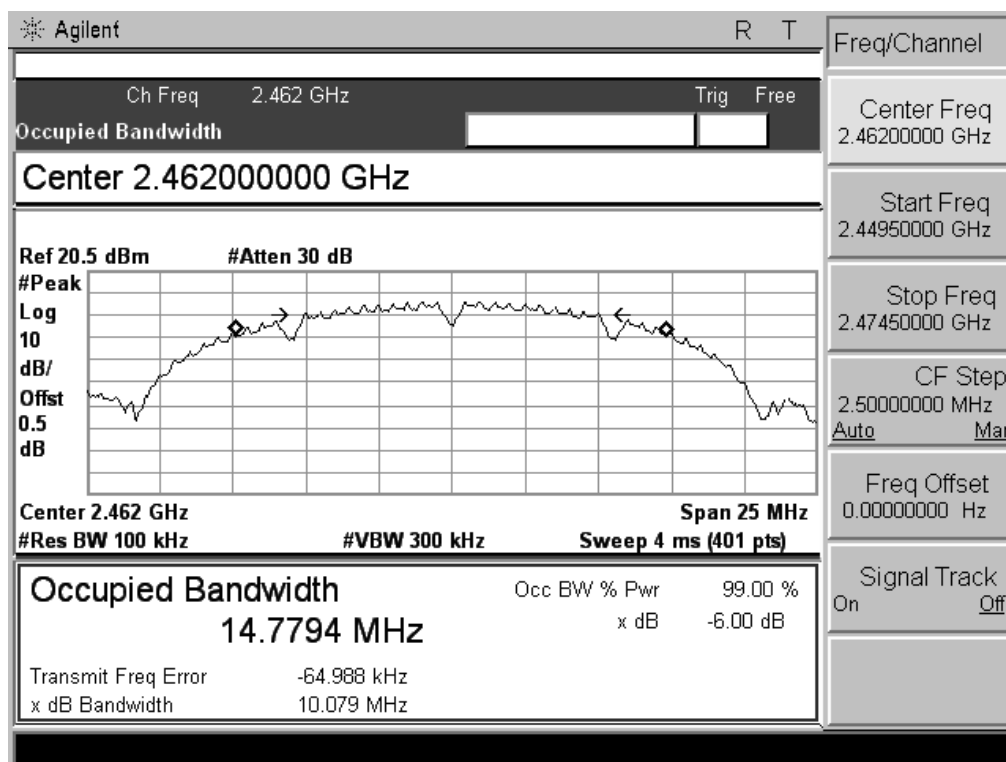
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	10.035	≥500	PASS
6	2437	10.050	≥500	PASS
11	2462	10.079	≥500	PASS

**B. Test Plot:**

(CH Low)



(CH Mid)



(CH High)

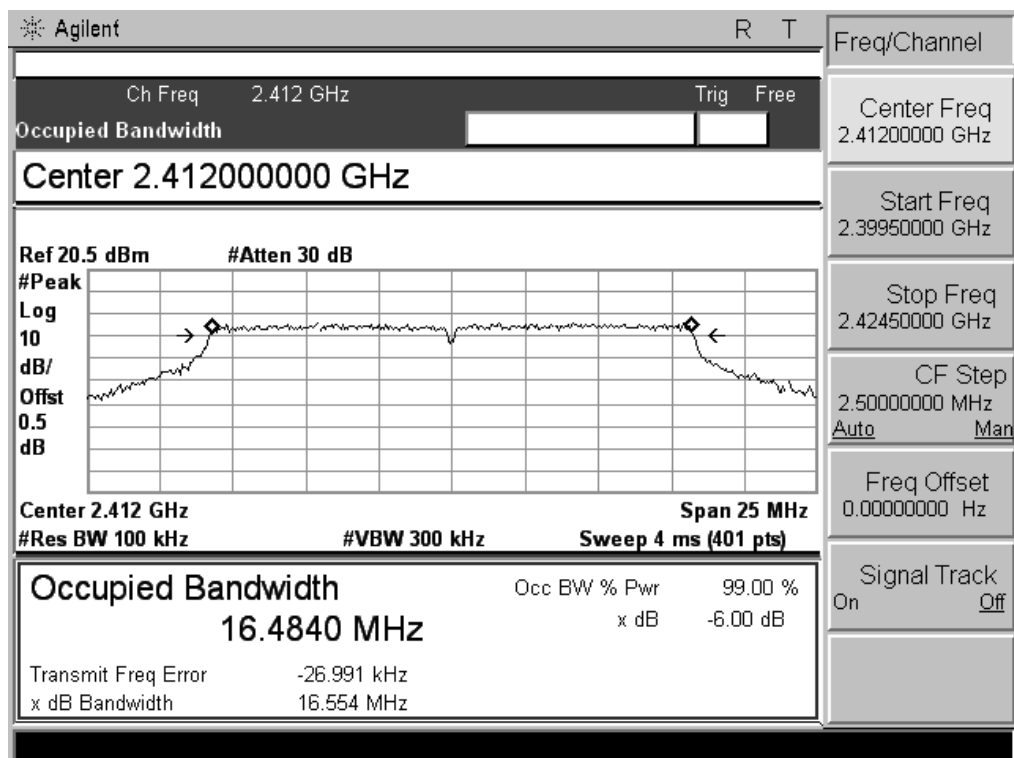
### 5.1.3.2 802.11g Test Mode

The minimum occupied bandwidth for the fundamental frequency 2462MHz is 16.508MHz. This occupied bandwidth complies with the FCC requirement.

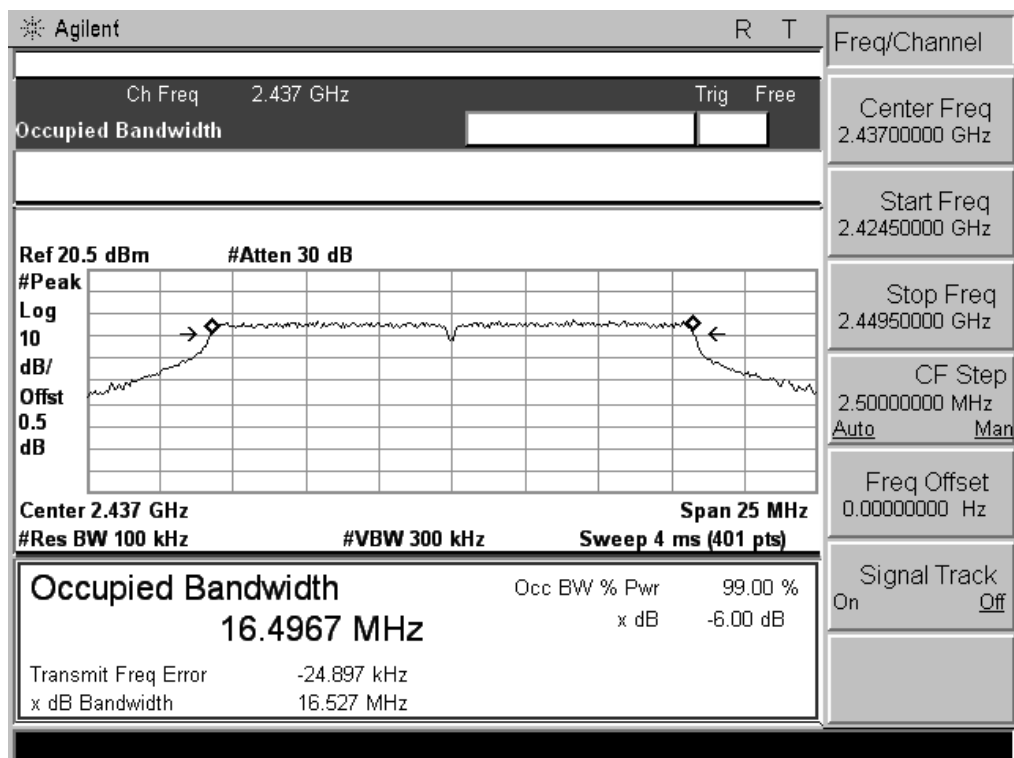
#### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.554	≥500	PASS
6	2437	16.527	≥500	PASS
11	2462	16.508	≥500	PASS

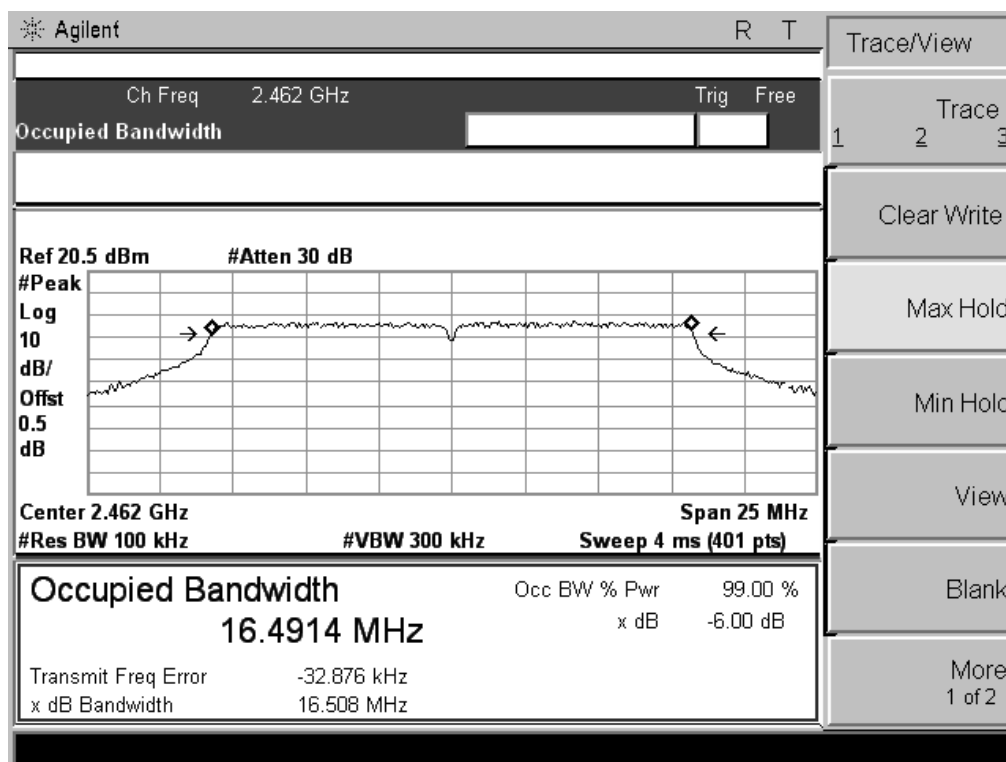
## B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

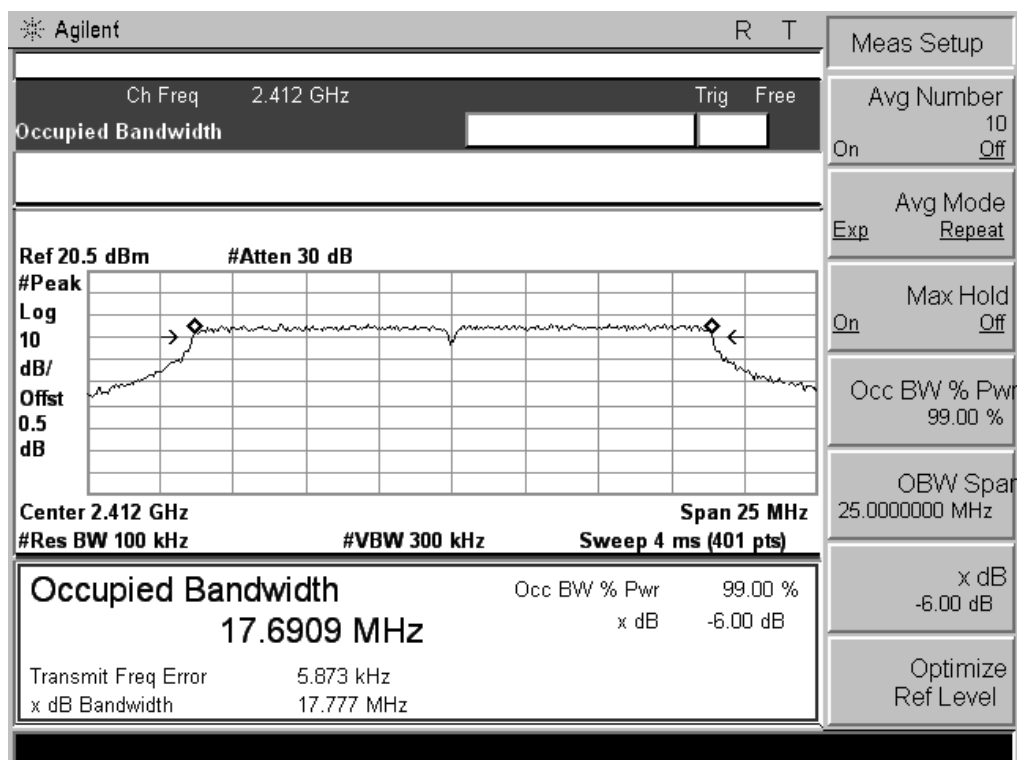
### 5.1.3.3 802.11n Test Mode

The minimum occupied bandwidth for the fundamental frequency 2412MHz is 17.777MHz. This occupied bandwidth complies with the FCC requirement.

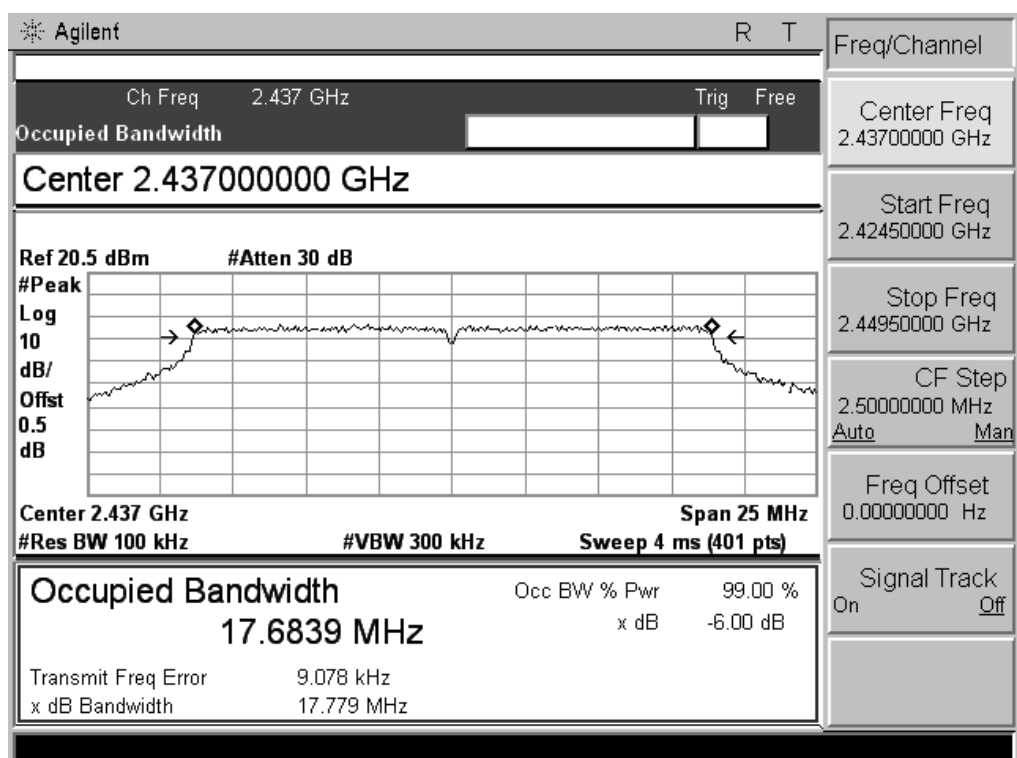
#### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.777	≥500	PASS
6	2437	17.779	≥500	PASS
11	2462	17.800	≥500	PASS

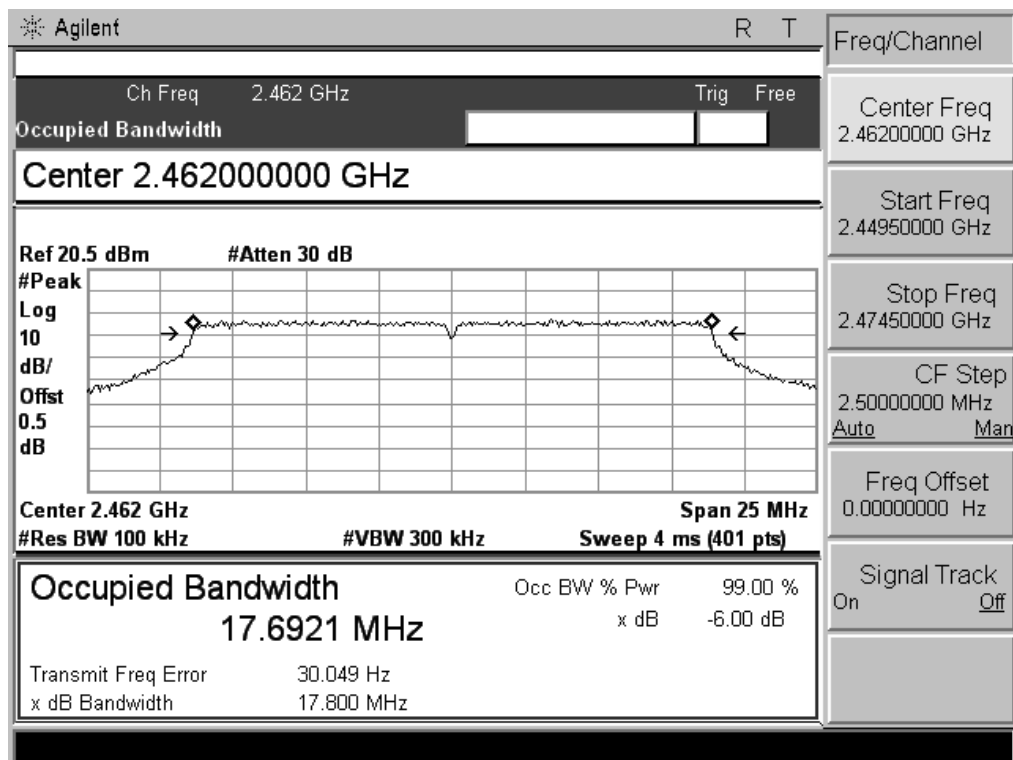
#### B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

## 5.2 Peak Output Power

### 5.2.1 Definition

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

### 5.2.2 Test Description

See section 5.1.2 of this report.

### 5.2.3 Test Result

The EUT operates at maximum output power mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

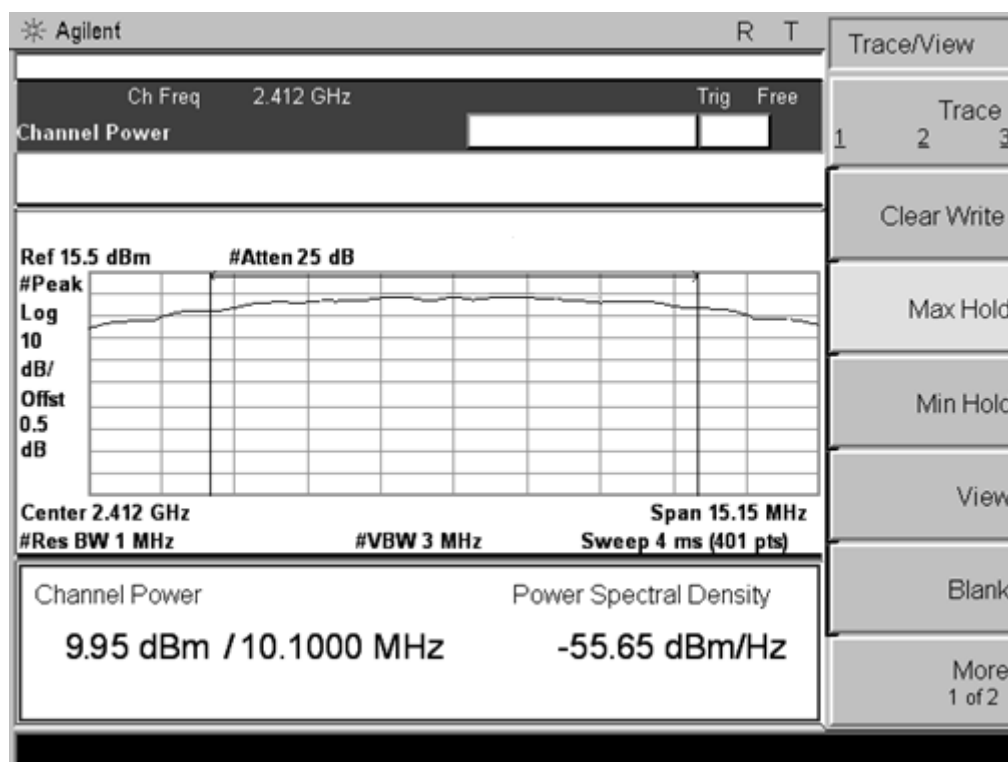
#### 5.2.3.1 802.11b Test Mode

The maximum output power for the fundamental frequency 2462MHz is 9.95dBm. This power complies with the FCC requirement.

#### A. Test Verdict:

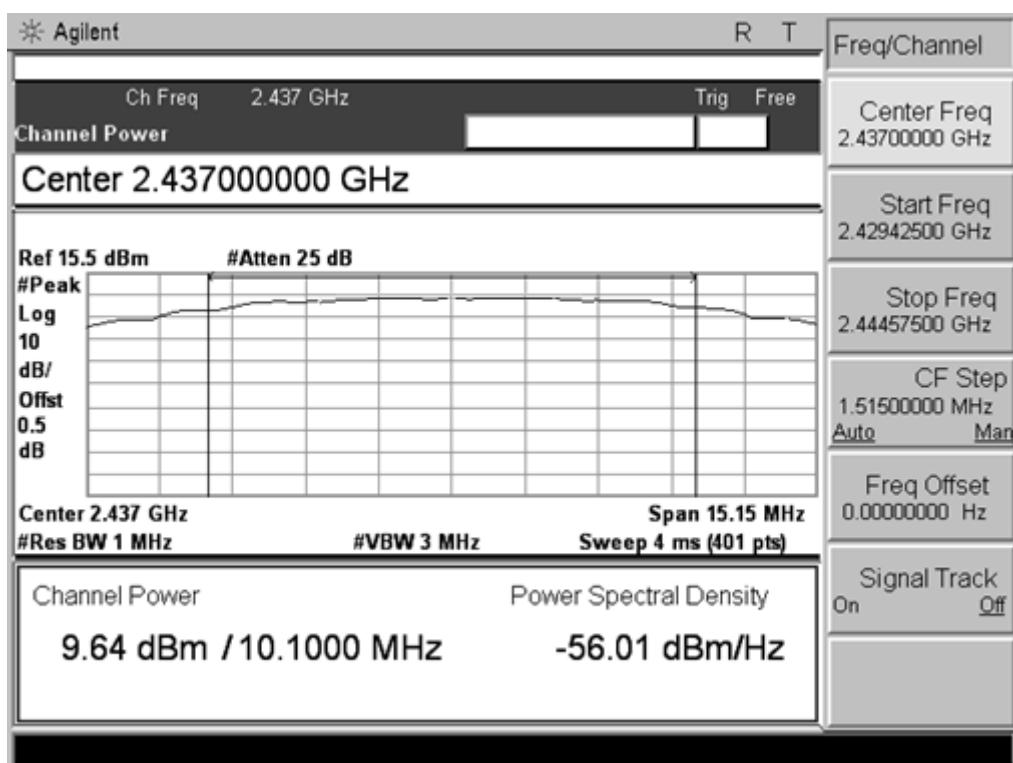
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.62	0.00916	30	1	PASS
6	2437	9.64	0.00920			PASS
11	2462	9.95	0.00989			PASS

#### B. Test Plot:

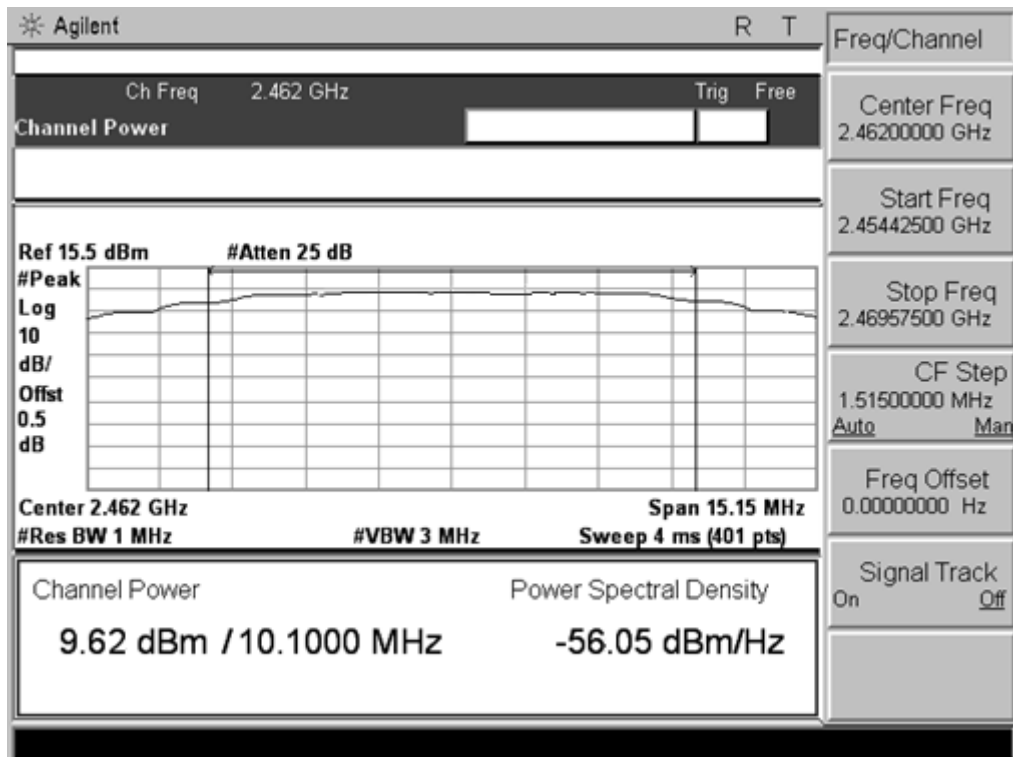


(CH Low)





(CH Mid)



(CH High)

**5.2.3.2 802.11g Test Mode**

The maximum output power for the fundamental frequency 2437 MHz is 11.89dBm. This power complies with the FCC requirement.

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.18	0.00828	30	1	PASS
6	2437	9.29	0.00849			PASS
11	2462	9.31	0.00853			PASS

**B. Test Plot:**

(CH Low)

(CH Mid)

(CH High)

**5.2.3.3 802.11n Test Mode**

The maximum output power for the fundamental frequency 2462 MHz is 11.76dBm. This power complies with the FCC requirement.

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.17	0.00826	30	1	PASS
6	2437	9.25	0.00841			PASS
11	2462	9.36	0.00863			PASS

**B. Test Plot:**

(CH Low)

(CH Mid)

(CH High)

### 5.3 Conducted Spurious Emission

#### 5.3.1 Definition

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, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 5.3.2 Test Description

See section 5.1.2 of this report.

#### 5.3.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

##### 5.3.3.1 802.11b Test Mode

1. Table for the Harmonics:

NOTE: “---” in the table following means that the emission power was too small to be measured and was at least 20dB below the limit.

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
	2412.01	10.12	--
1	4824.20	-19.24	-9.88
2	7236.10	---	-9.88
3	9648.30	---	-9.88
4	12060.00	---	-9.88
5	other	---	
Middle Channel			
	2437.02	10.04	--
1	4874.20	-19.68	-9.96
2	7311.10	---	-9.96
3	9748.30	---	-9.96
4	12185.00	---	-9.96
5	other	---	
High Channel			
	2462.01	10.15	--
1	4924.10	-19.04	-9.85
2	7386.20	---	-9.85
3	9848.20	---	-9.85
4	12310.00	---	-9.85
5	other	---	

### 5.3.3.2 802.11g Test Mode

1. Table for the Harmonics:

NOTE: “---” in the table following means that the emission power was too small to be measured and was at least 20dB below the limit.

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
	2412.01	9.18	--
1	4824.20	-20.15	-10.82
2	7236.10	---	-10.82
3	9648.30	---	-10.82
4	12060.00	---	-10.82
5	other	---	
Middle Channel			
	2437.05	9.29	--
1	4874.20	-20.46	-10.71
2	7311.10	---	-10.71
3	9748.30	---	-10.71
4	12185.00	---	-10.71
5	other	---	
High Channel			
	2462.01	9.31	--
1	4924.10	-20.02	-10.69
2	7386.20	---	-10.69
3	9848.20	---	-10.69
4	12310.00	---	-10.69
5	other	---	

**5.3.3.3 802.11n Test Mode**

1. Table for the Harmonics:

NOTE: “---” in the table following means that the emission power was too small to be measured and was at least 20dB below the limit.

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
	2412.02	9.17	--
1	4824.10	-20.86	-10.83
2	7236.10	---	-10.83
3	9648.30	---	-10.83
4	12060.00	---	-10.83
5	other	---	
Middle Channel			
	2437.02	9.25	--
1	4874.04	-20.79	-10.75
2	7311.10	---	-10.75
3	9748.30	---	-10.75
4	12185.00	---	-10.75
5	other	---	
High Channel			
	2462.01	9.36	--
1	4924.10	-20.58	-10.64
2	7386.20	---	-10.64
3	9848.20	---	-10.64
4	12310.00	---	-10.64
5	other	---	

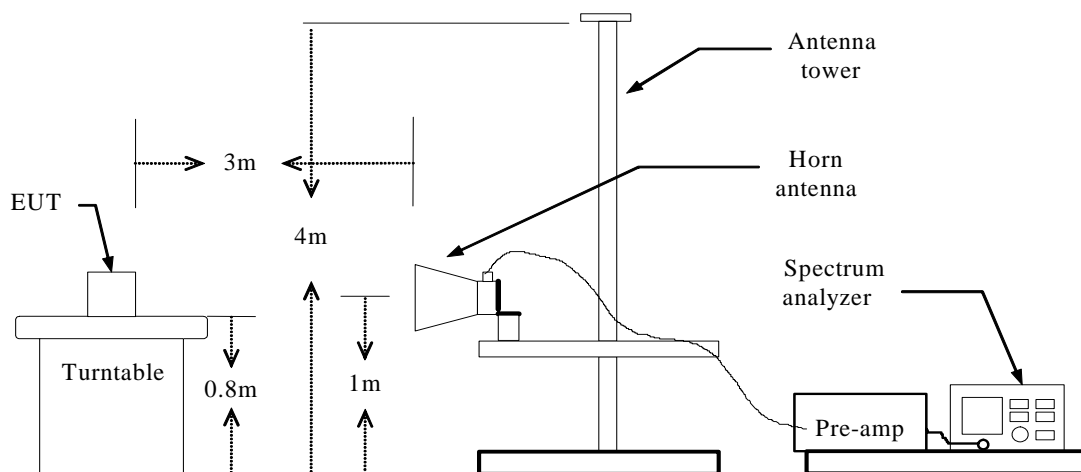


## 5.4 Band Edge

### 5.4.1 Definition

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, provided the transmitter demonstrates compliance with the peak conducted power limits.

### 5.4.2 Test Description



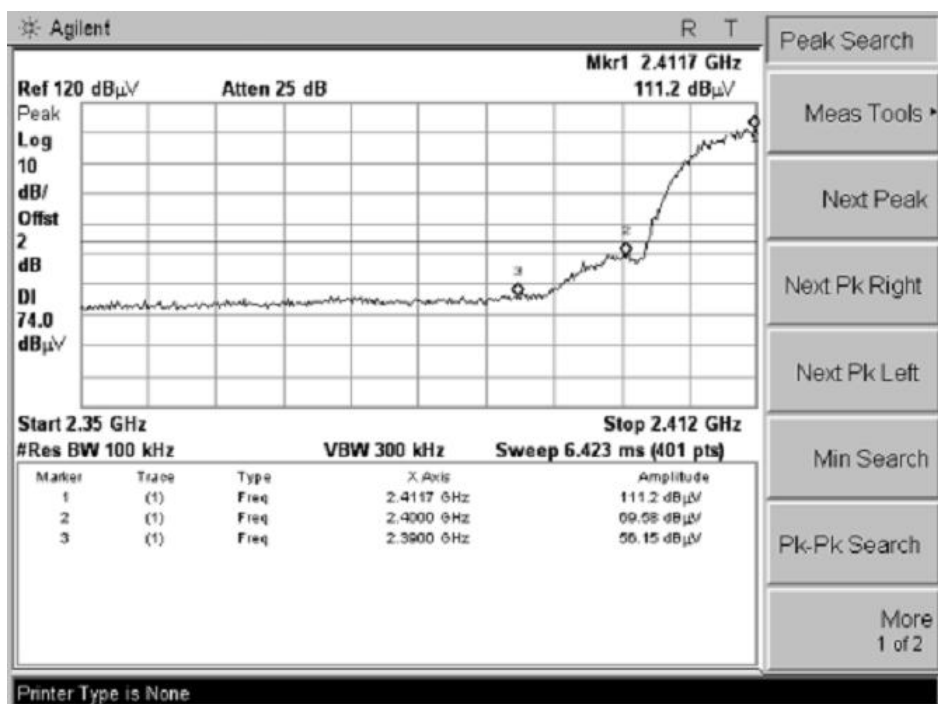
### 5.4.3 Test Result

The EUT operates at continuous transmit test mode. The lowest and highest channels are tested to verify the band edge emissions.

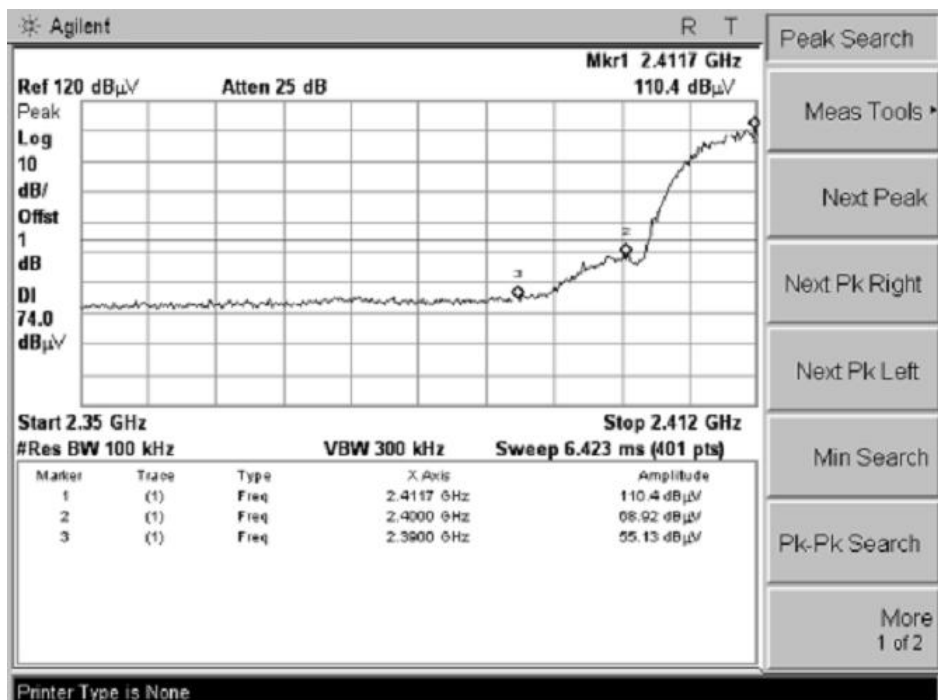
#### 5.4.3.1 802.11b Test Mode

Test Mode		Channel Marked Frequency	Limit (dBuv/m)	Test Result Highest Emission (dBuv/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	56.15	36.78.	55.13	36.13
		2400MHz		69.58	45.59	68.92	45.07
	High Channel	2483.5MHz		54.03	35.37	56.49	37.14
		2500MHz		53.74	33.61	54.73	33.97

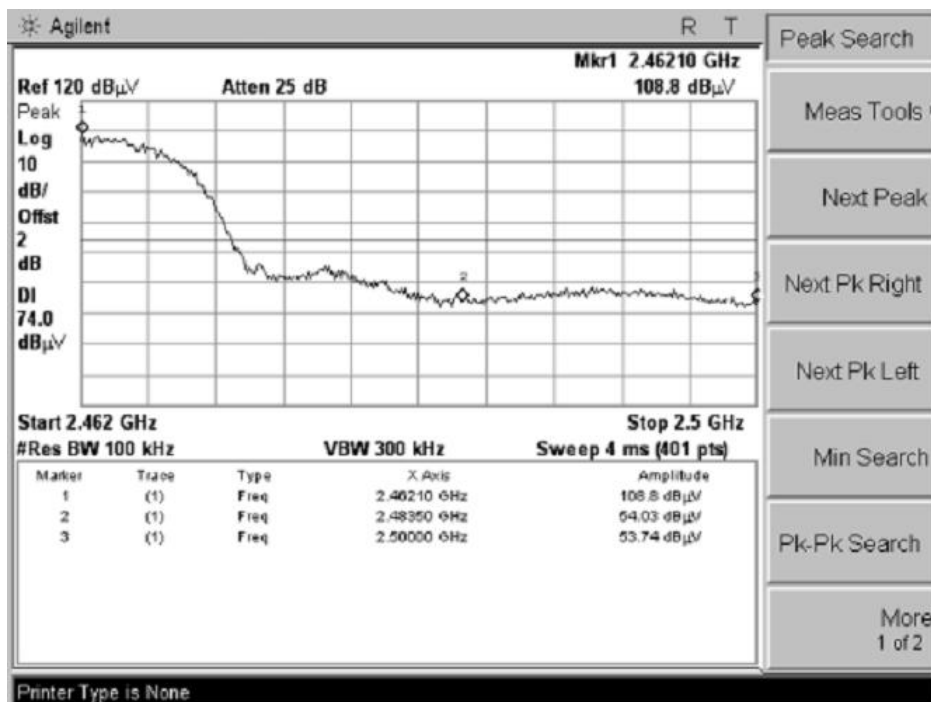
## Test Plot:



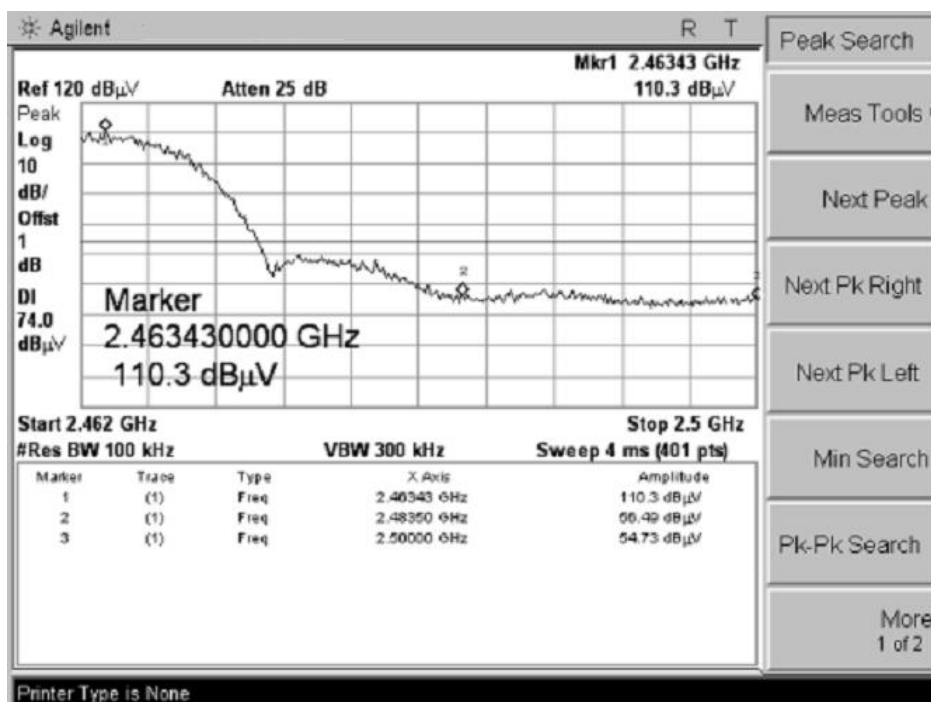
(CH Low, Vertical, Peak)



(CH Low, Horizontal, Peak)



(CH High, Vertical, Peak)

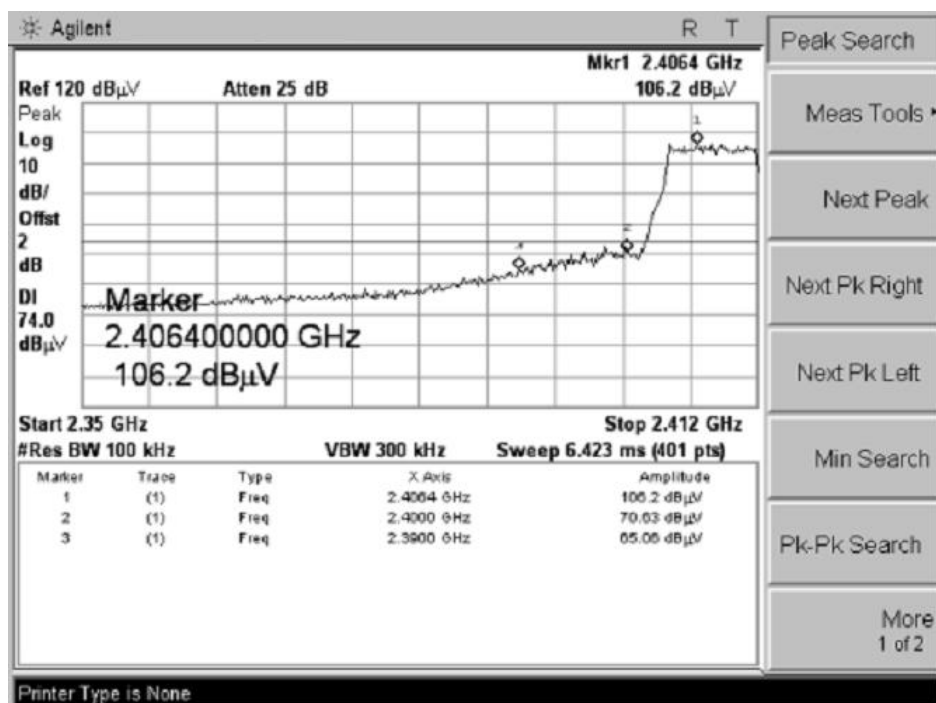


(CH High, Horizontal, Peak)

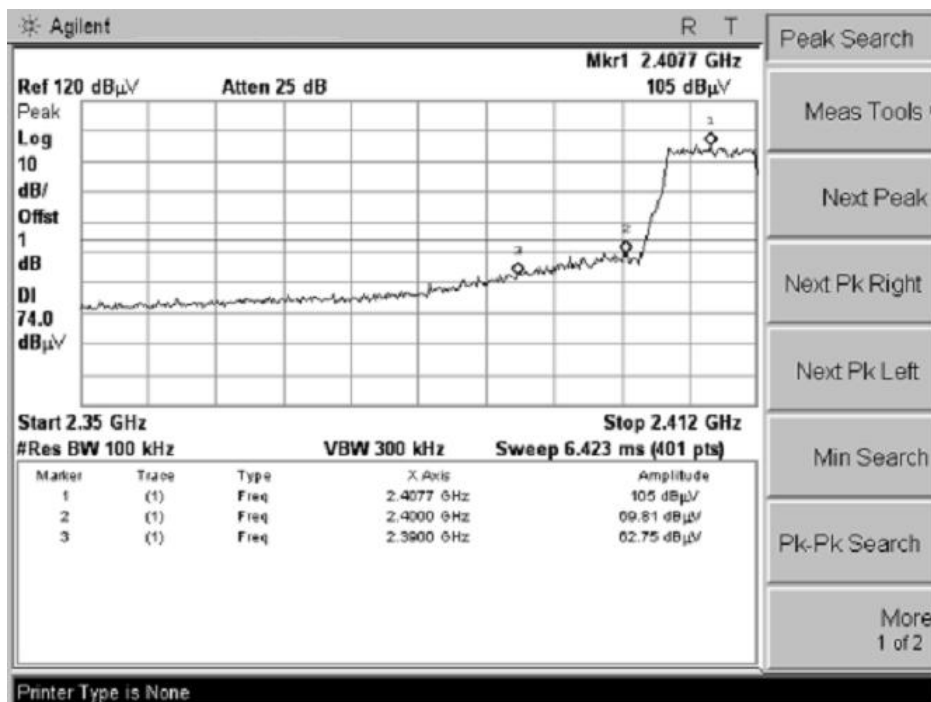
### 5.4.3.2 802.11g Test Mode

Test Mode		Channel Marked Frequency	Limit (dBuV/m)	Test Result Highest Emission (dBuV/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	65.06	43.92	62.75	40.86
		2400MHz		70.63	51.84	69.81	49.63
	High Channel	2483.5MHz		61.29	42.87	60.98	41.54
		2500MHz		54.65	38.77	54.05	39.02

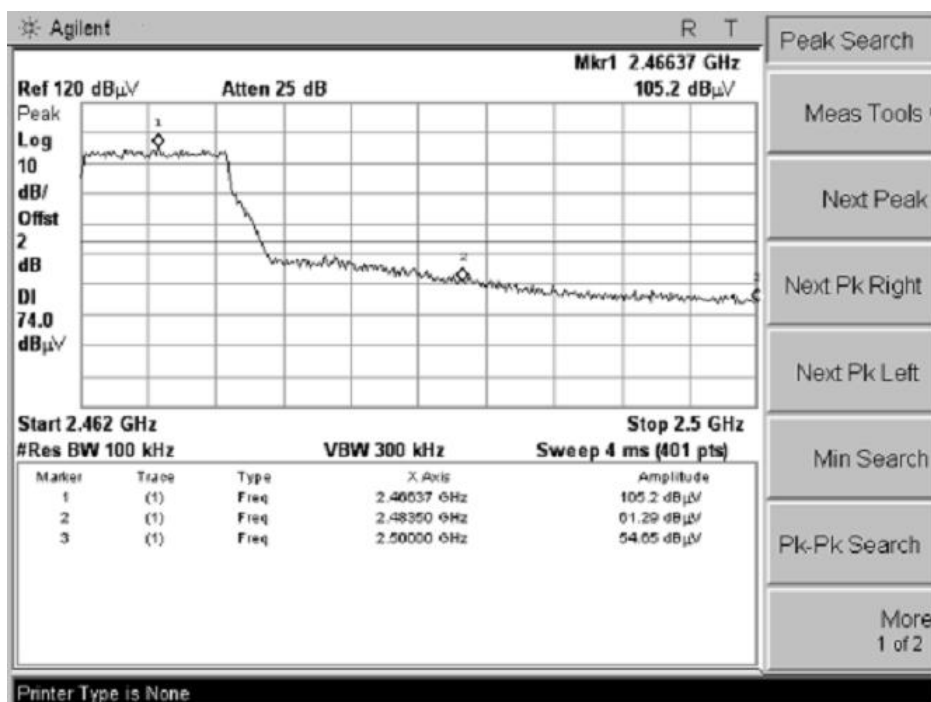
Test Plot:



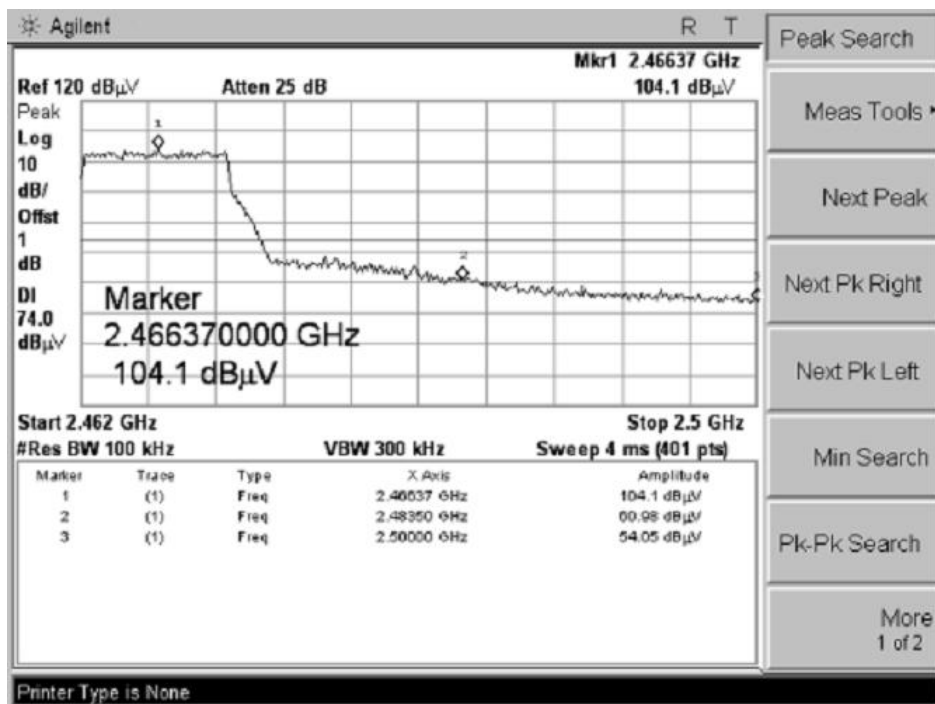
(CH Low, Vertical, Peak )



(CH Low, Horizontal, Peak)



(CH High, Vertical, Peak)

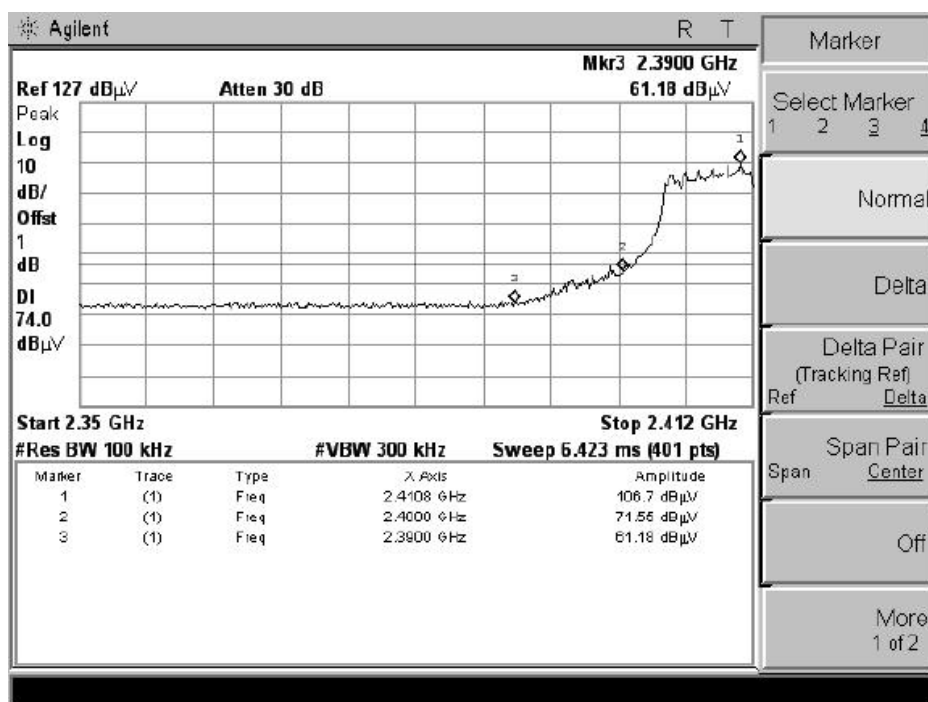


(CH High, Horizontal, Peak)

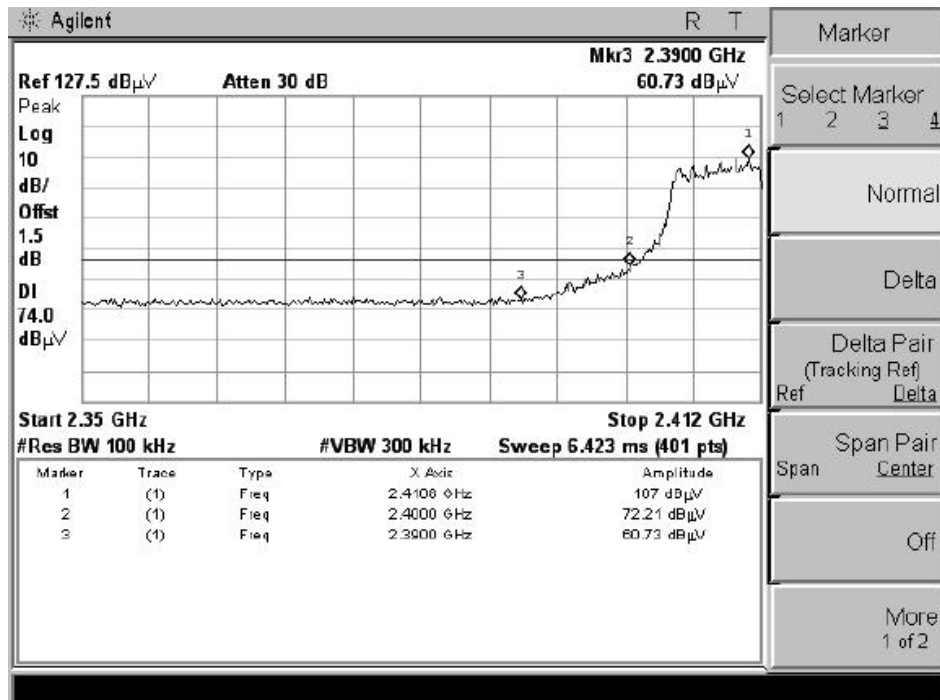
### 5.4.3.3 802.11n Test Mode

Test Mode		Channel Marked Frequency	Limit (dBuV/m)	Test Result Highest Emission (dBuV/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	60.73	36.57	61.18	37.17
		2400MHz		72.21	50.25	71.55	50.53
	High Channel	2483.5MHz		72.79	49.08	71.16	48.38
		2500MHz		60.27	39.73	59.77	38.14

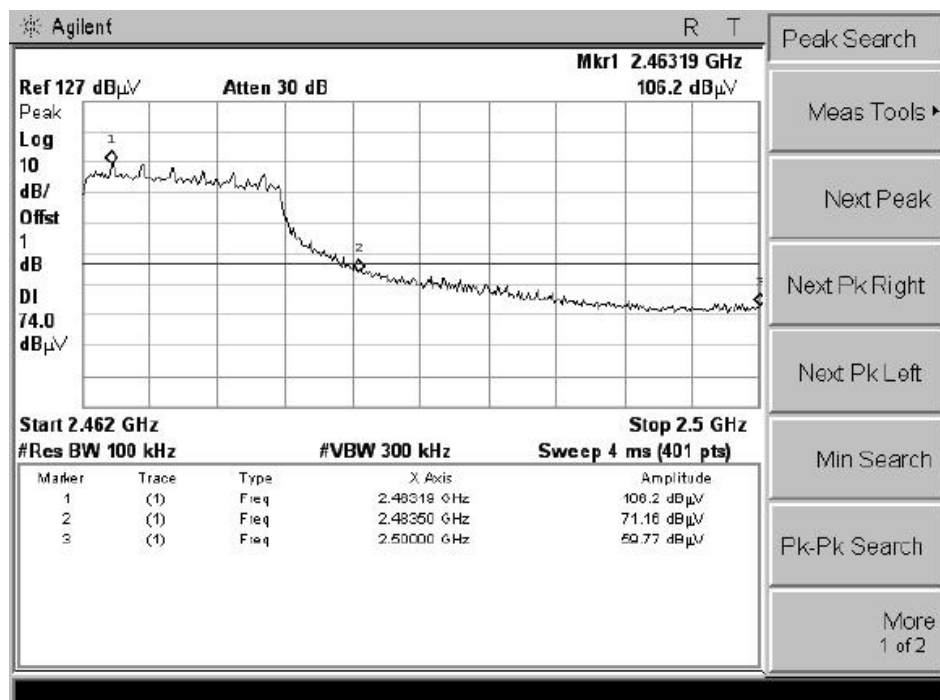
Test Plot:



(CH Low, Horizontal, Peak )

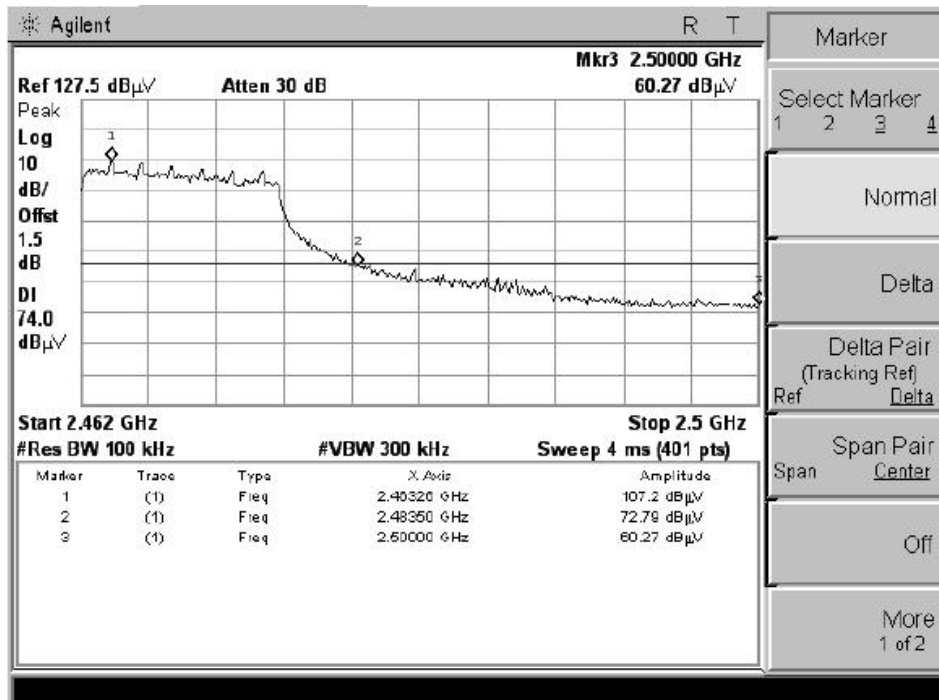


(CH Low, Vertical, Peak)



(CH High, Horizontal, Peak)





(CH High, Vertical, Peak)

## 5.5 Power Spectral Density (PSD)

### 5.5.1 Definition

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 5.5.2 Test Description

See section 5.1.2 of this report.

### 5.5.3 Test Result

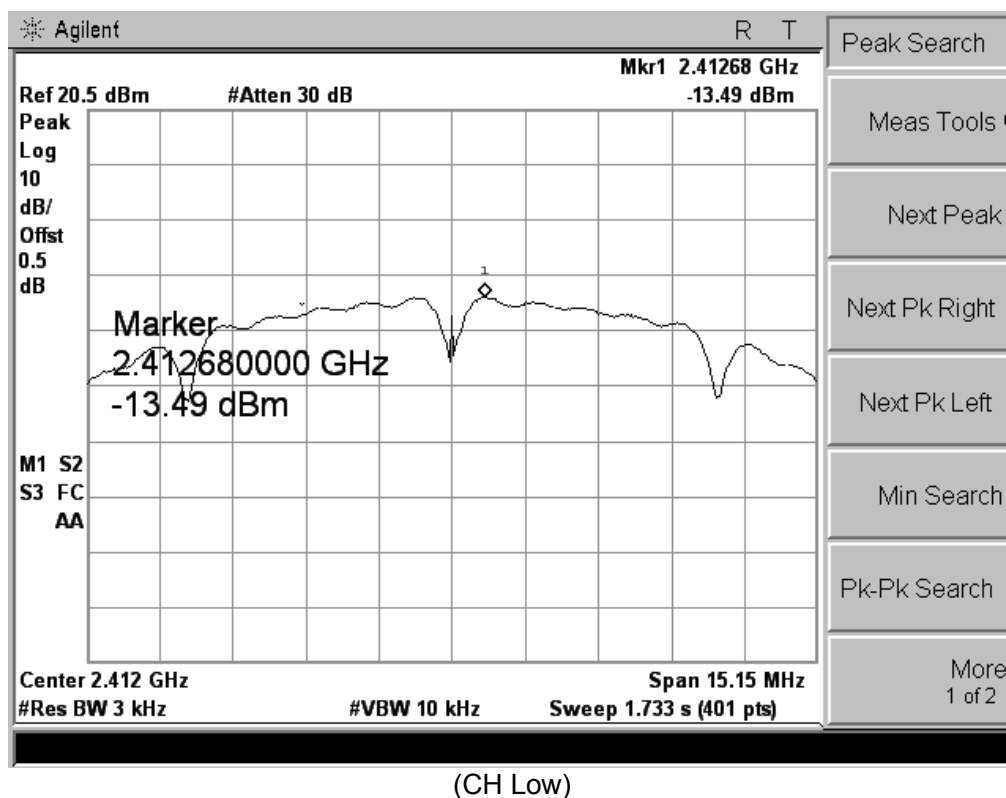
The lowest, middle and highest channels are tested to verify the power spectral density.

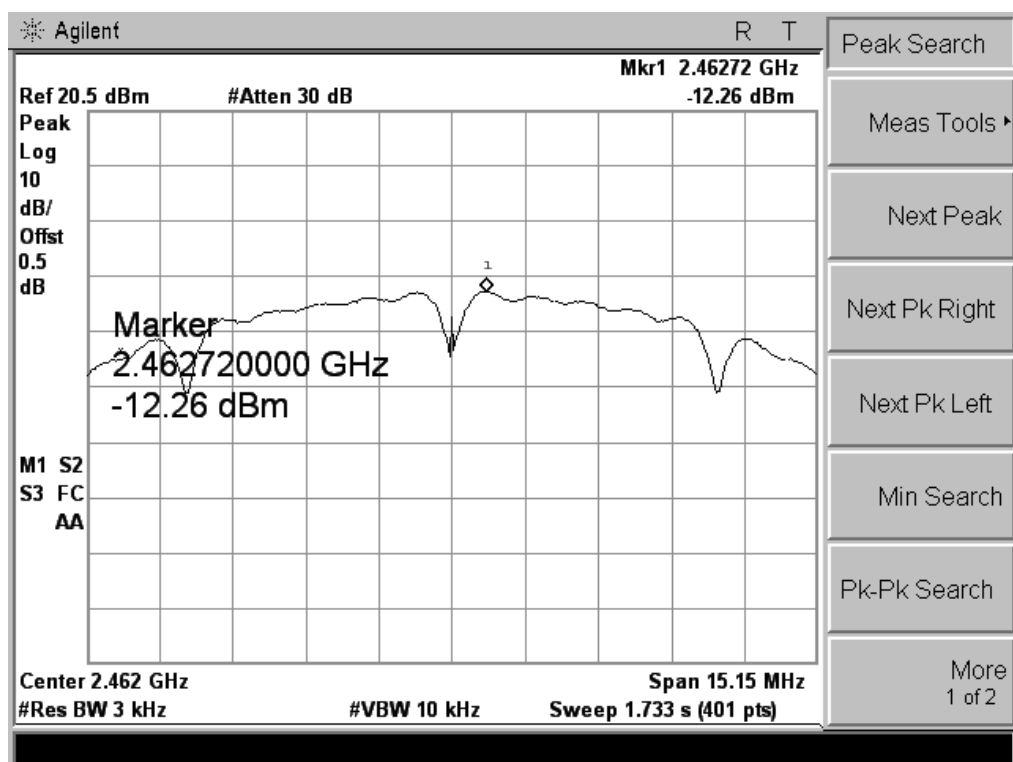
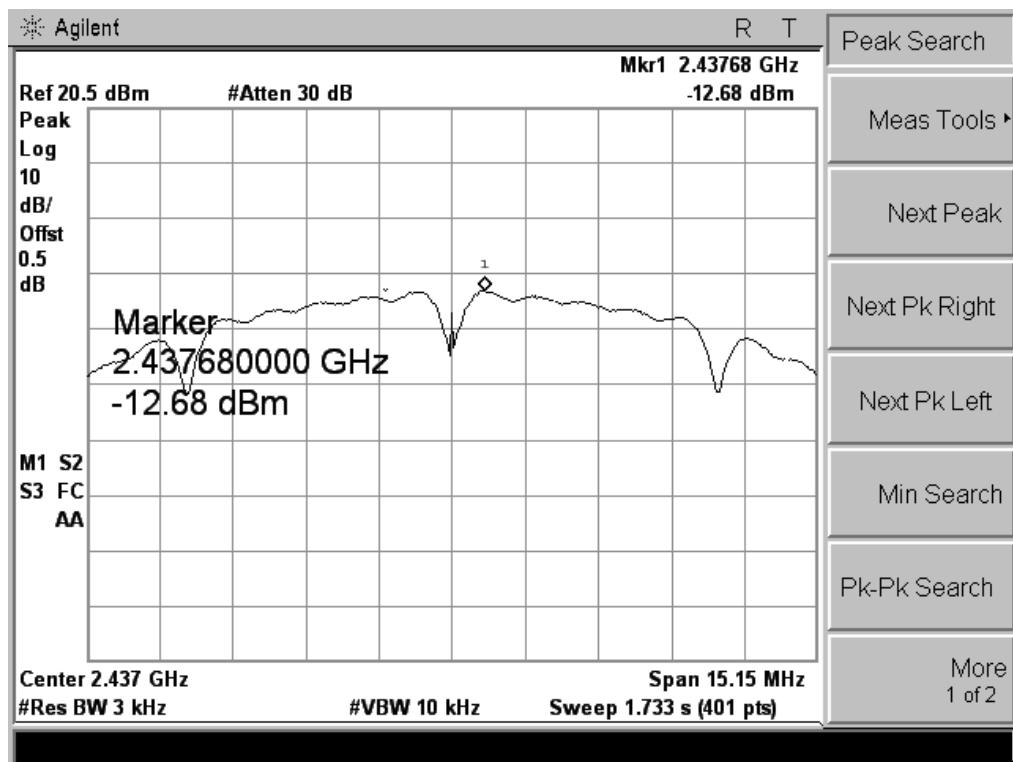
#### 5.5.3.1 802.11b Test Mode

##### A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-13.49	$\leq 8$	PASS
6	2437	-12.68	$\leq 8$	PASS
11	2462	-12.26	$\leq 8$	PASS

##### B. Test Plot:



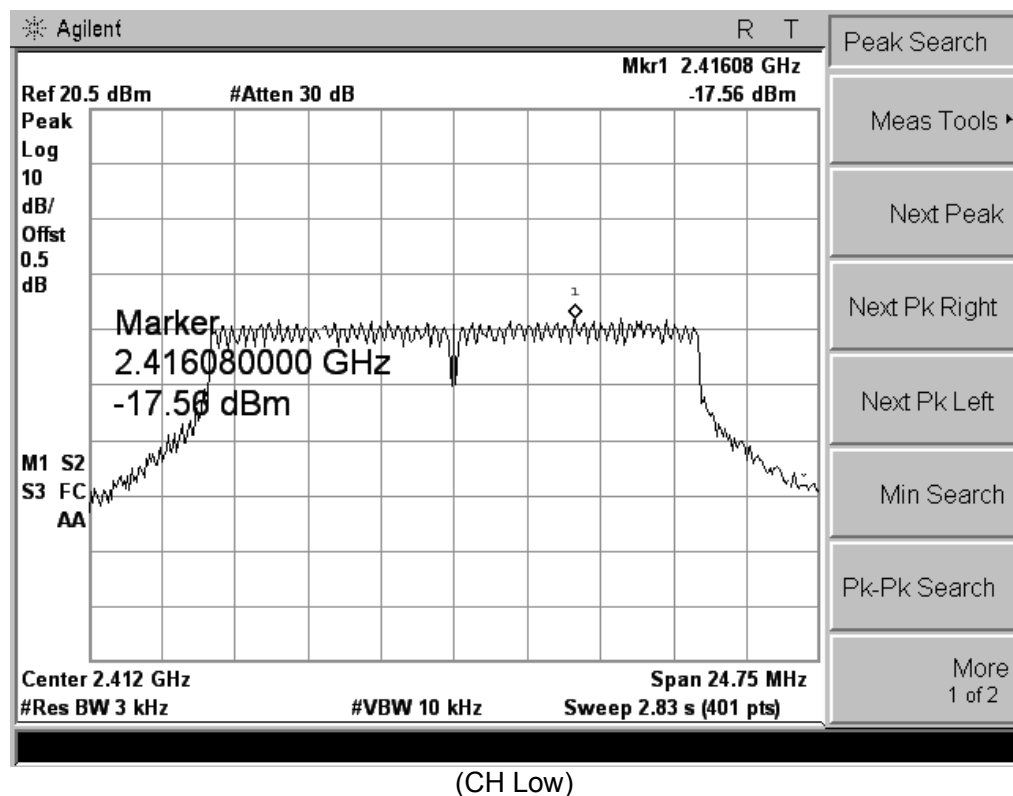


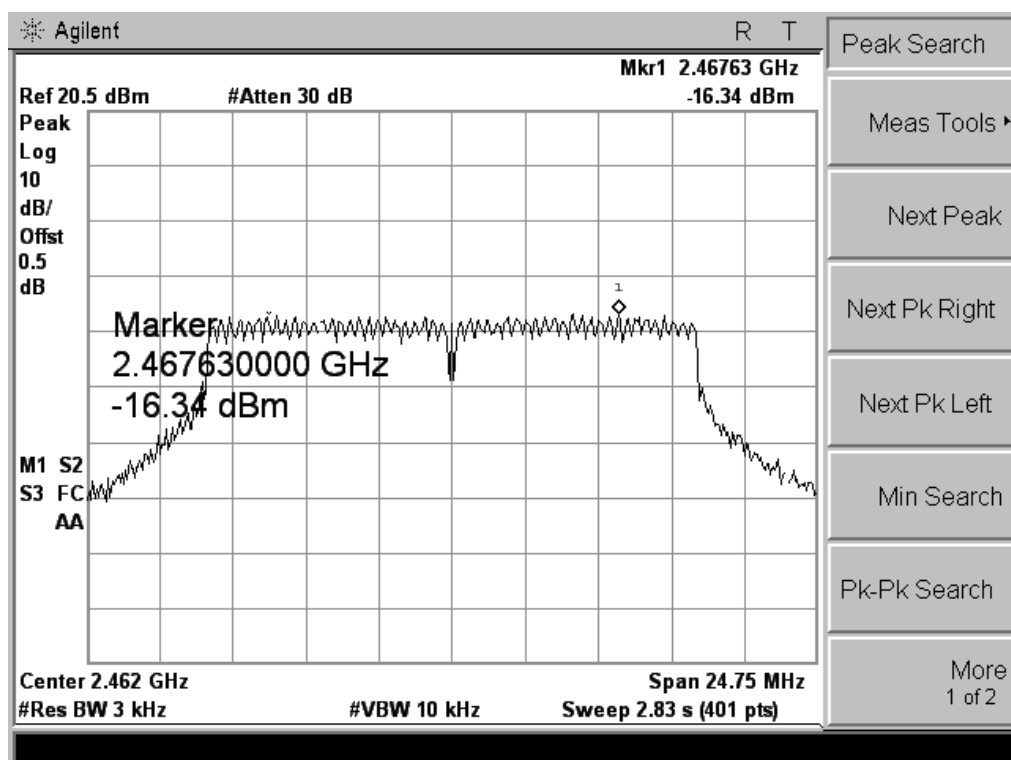
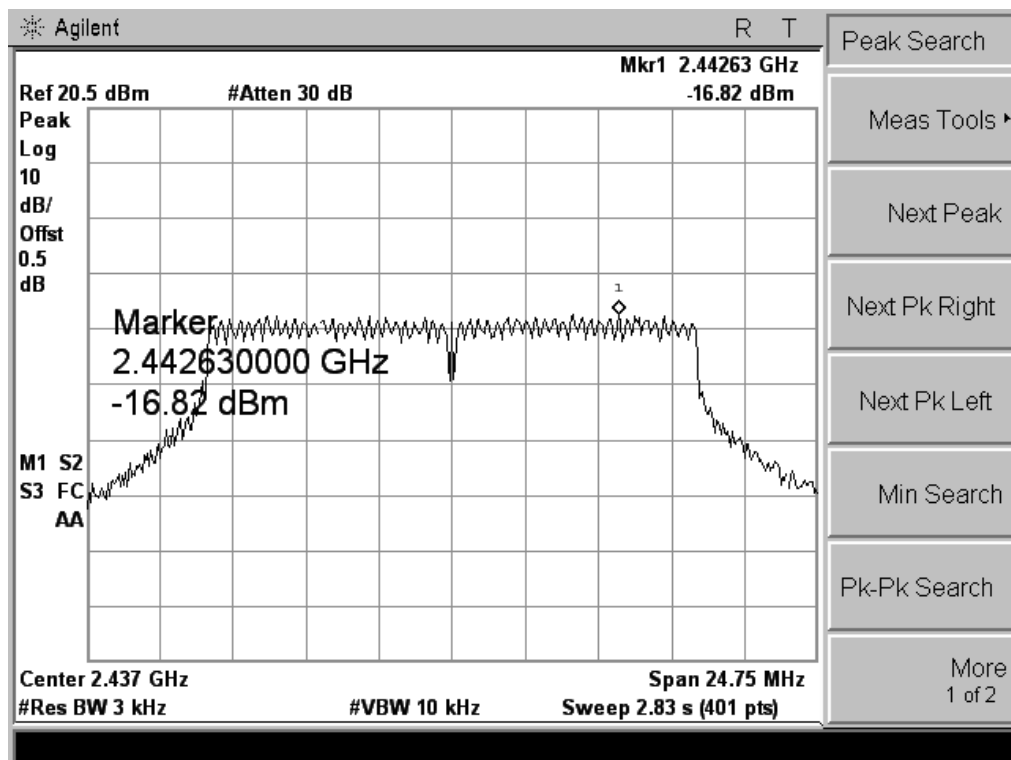
### 5.5.3.2 802.11g Test Mode

#### A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-17.56	$\leq 8$	PASS
6	2437	-16.82	$\leq 8$	PASS
11	2462	-16.34	$\leq 8$	PASS

#### B. Test Plot:



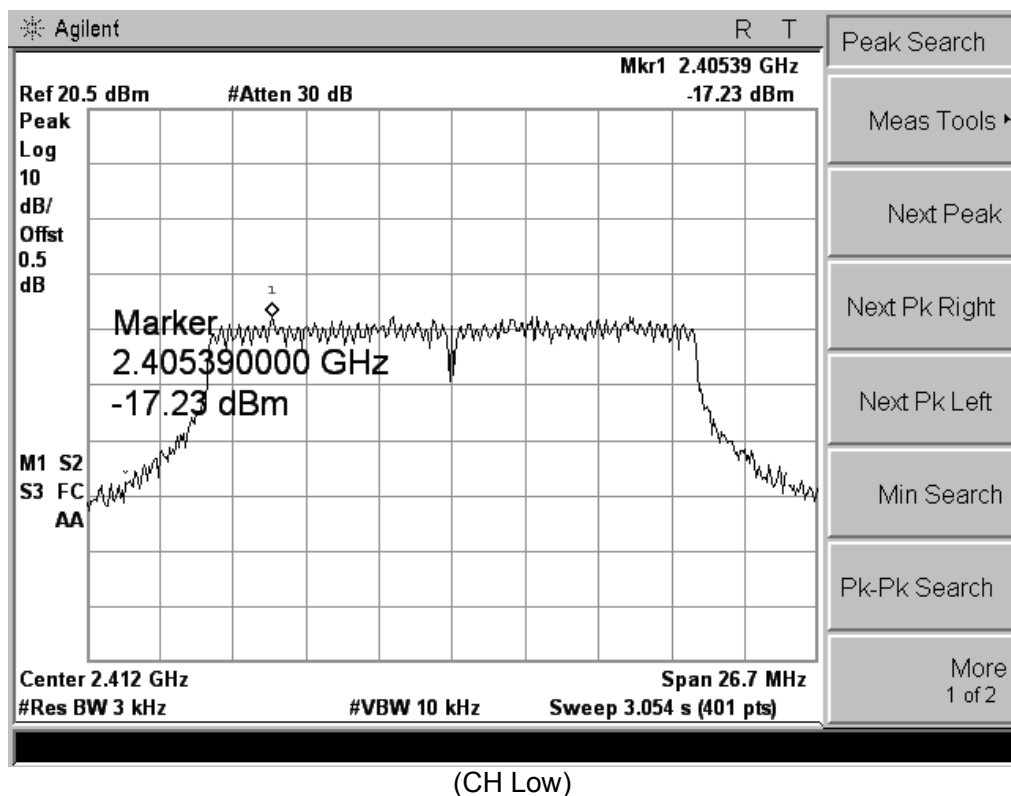


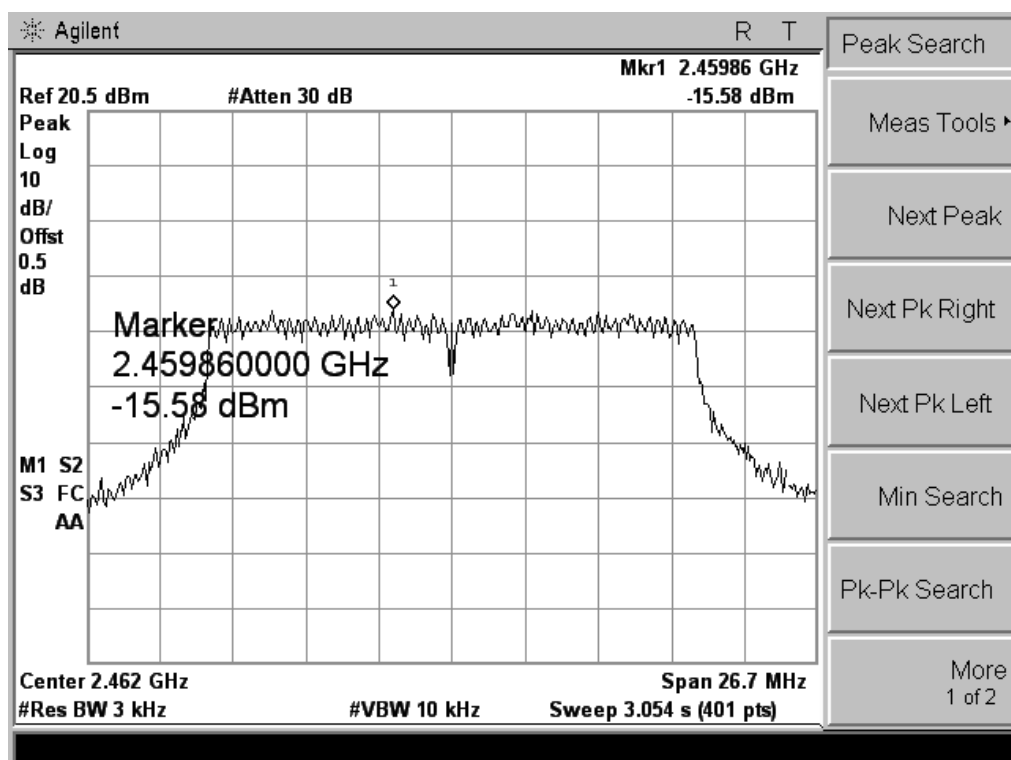
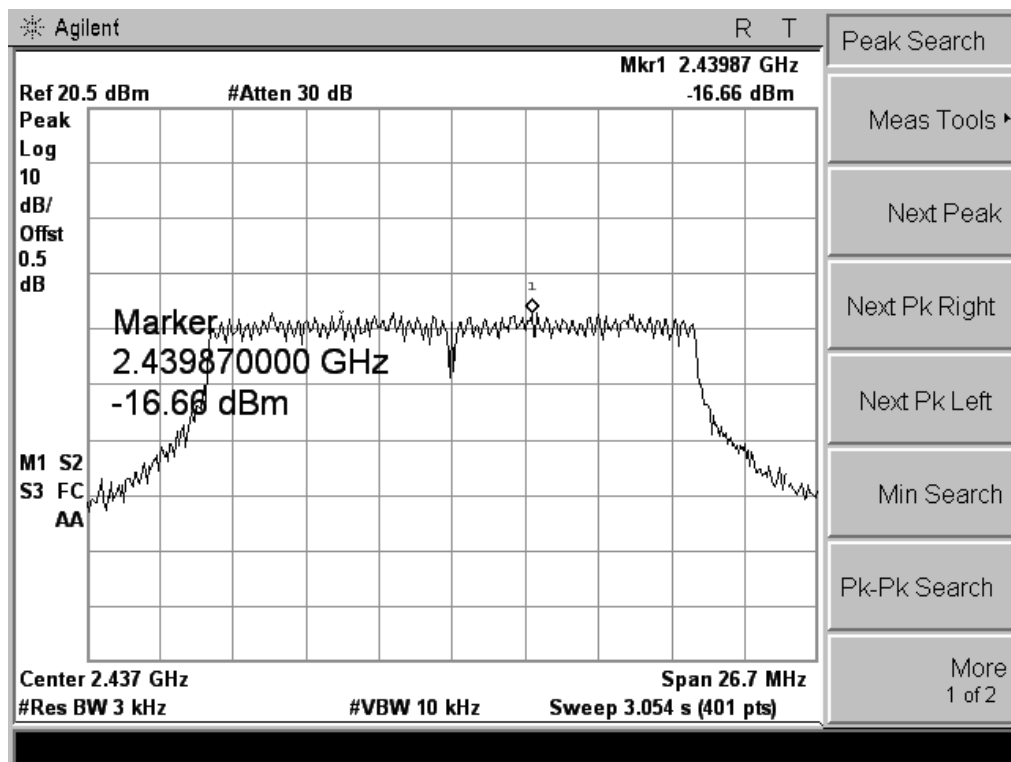
### 5.5.3.3 802.11n Test Mode

#### A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-17.23	$\leq 8$	PASS
6	2437	-16.66	$\leq 8$	PASS
11	2462	-15.58	$\leq 8$	PASS

#### B. Test Plot:





## 5.6 Conducted Emission

### 5.6.1 Definition

According to FCC section 15.207, for an intentional radiator that 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 the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

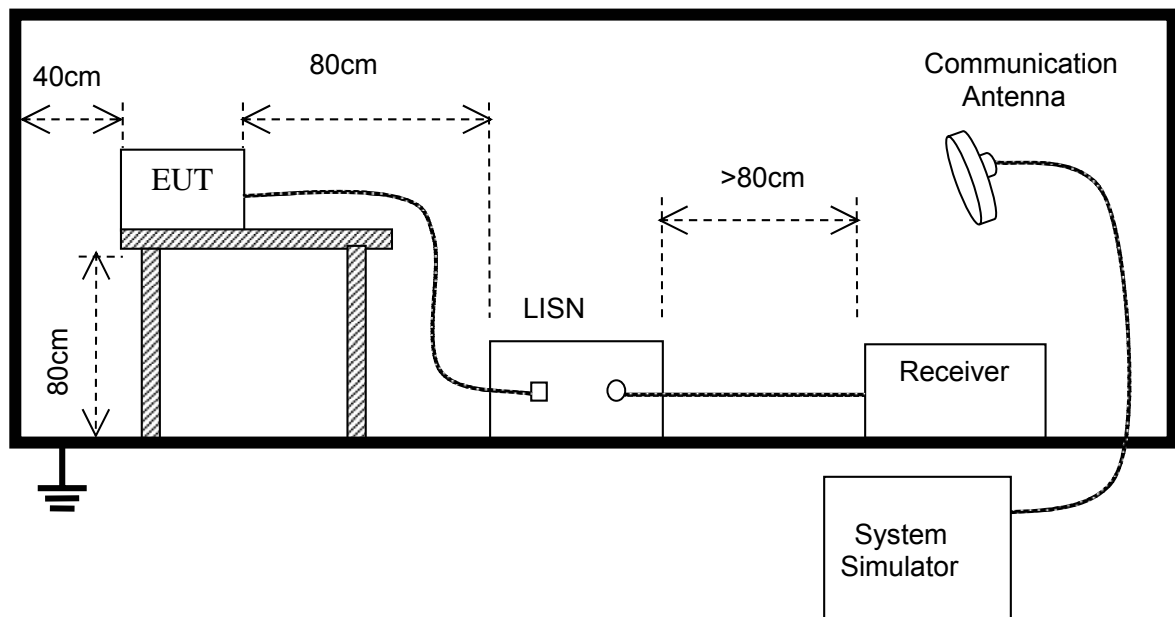
Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**Note:**

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

### 5.6.2 Test Description

The EUT is powered by the Battery charged with the AC Adapter which is powered by 120V, 60Hz AC mains supply. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power.



### 5.6.3 Test Result

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.



## Conducted Emission Measurement

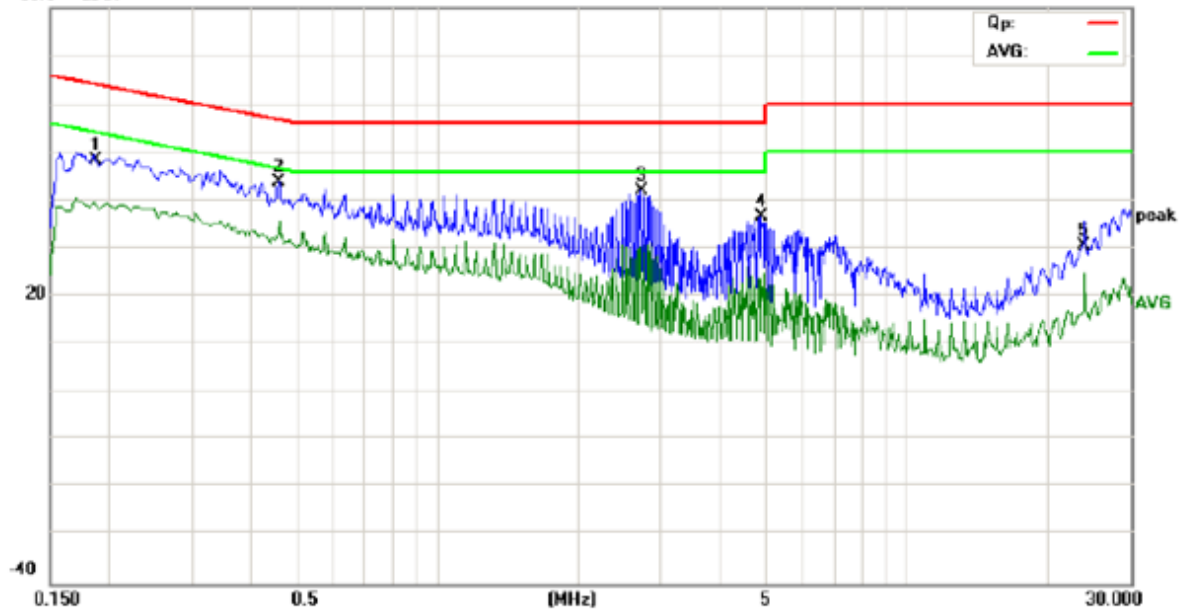
File :9028

Data :#31

Date: 2013/09/28

Time: 17:33:15

90.0 dBuV



Site #1

Phase: L1

Temperature: 26

Limit: FCC Part 15 Class B QP

Power: AC 120V/60Hz

Humidity: 60 %

EUT: TabletPC

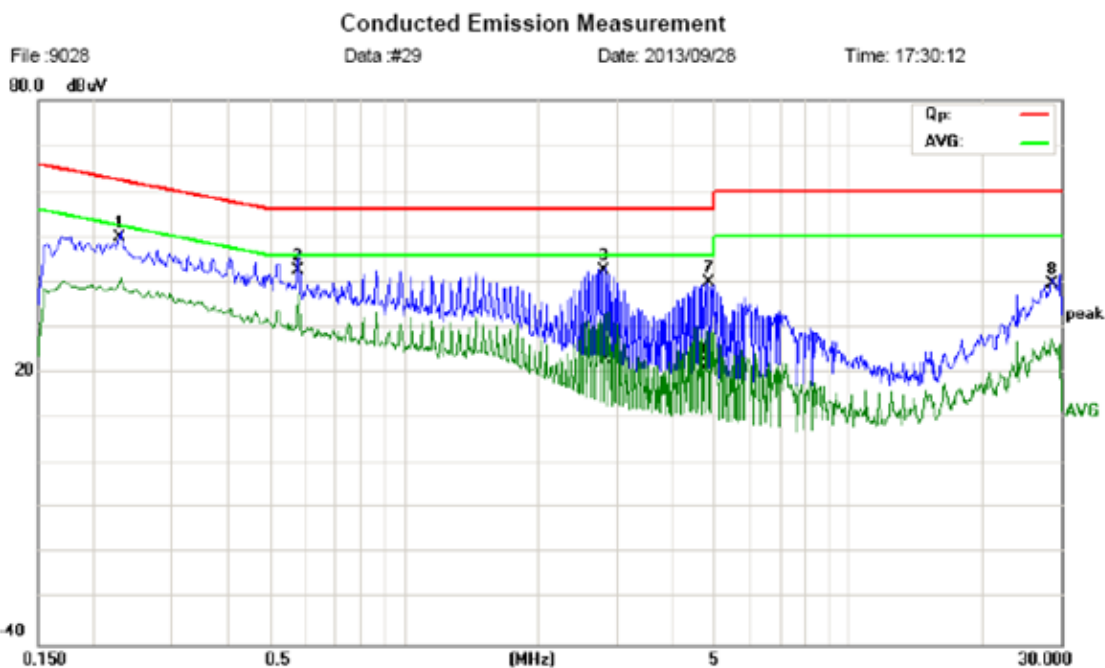
M/N: DMX-ST7A

Mode: WIFI

Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1874	37.02	11.24	48.26	64.15	-15.89	peak	
2 *	0.4580	33.47	10.28	43.75	56.73	-12.98	peak	
3	2.7100	32.36	9.71	42.07	56.00	-13.93	peak	
4	4.8980	24.82	11.90	36.72	56.00	-19.28	peak	
5	23.7100	21.61	9.00	30.61	60.00	-29.39	peak	

\*:Maximum data    x:Over limit    !:over margin



Site #1

Phase: **L1**

Temperature: 26

Limit: FCC Part 15 Class B QP

Power: AC 120V/60Hz

Humidity: 60 %

EUT: TabletPC

M/N: DMX-ST7A

Mode: WIFI

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.2280	38.18	11.81	49.99	62.52	-12.53	peak	
2		0.5740	32.62	10.00	42.62	56.00	-13.38	peak	
3		2.7820	32.83	9.78	42.61	56.00	-13.39	peak	
4		2.8100	13.34	9.81	23.15	56.00	-32.85	peak	
5		4.7820	10.23	11.78	22.01	56.00	-33.99	peak	
6		4.7820	10.23	11.78	22.01	56.00	-33.99	peak	
7		4.8020	28.18	11.80	39.98	56.00	-16.02	peak	
8		28.5220	30.69	9.00	39.69	60.00	-20.31	peak	

\*:Maximum data    x:Over limit    !:over margin

## 5.7 Radiated Emission

### 5.7.1 Definition

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

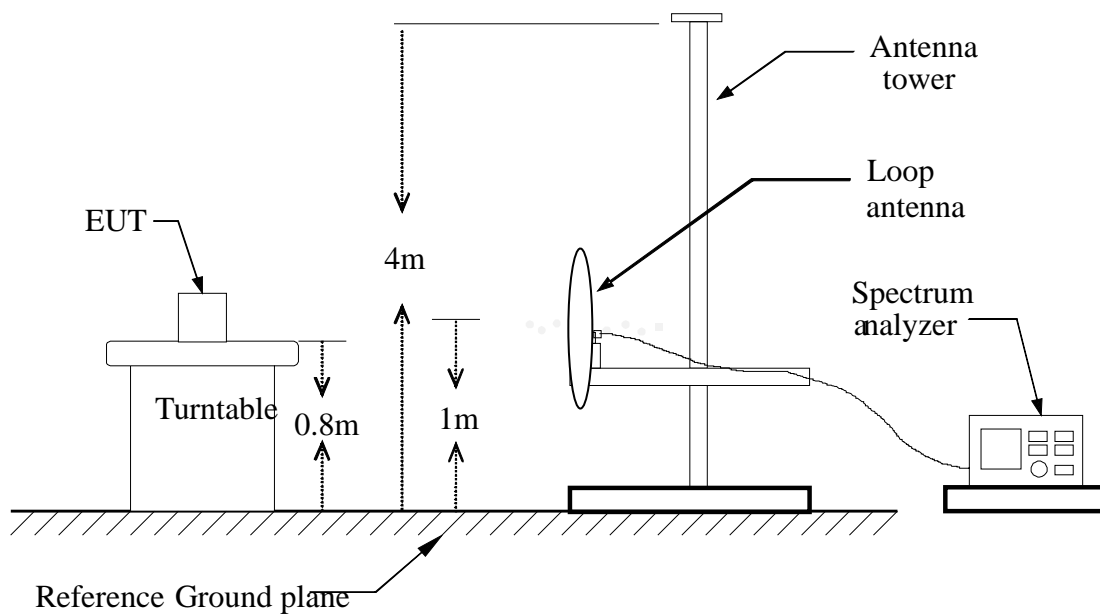
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

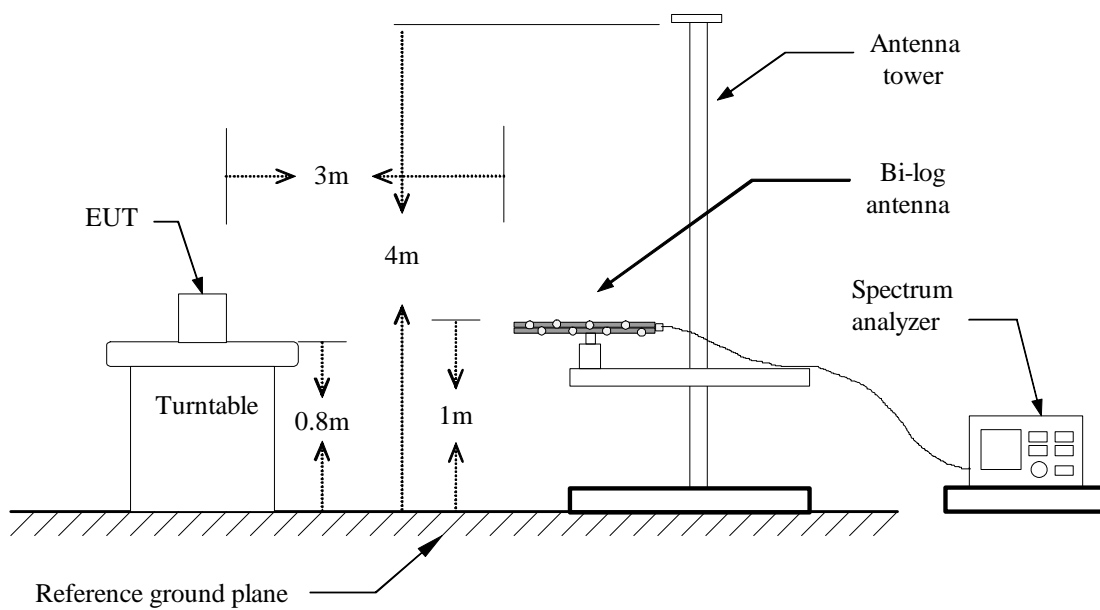
As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

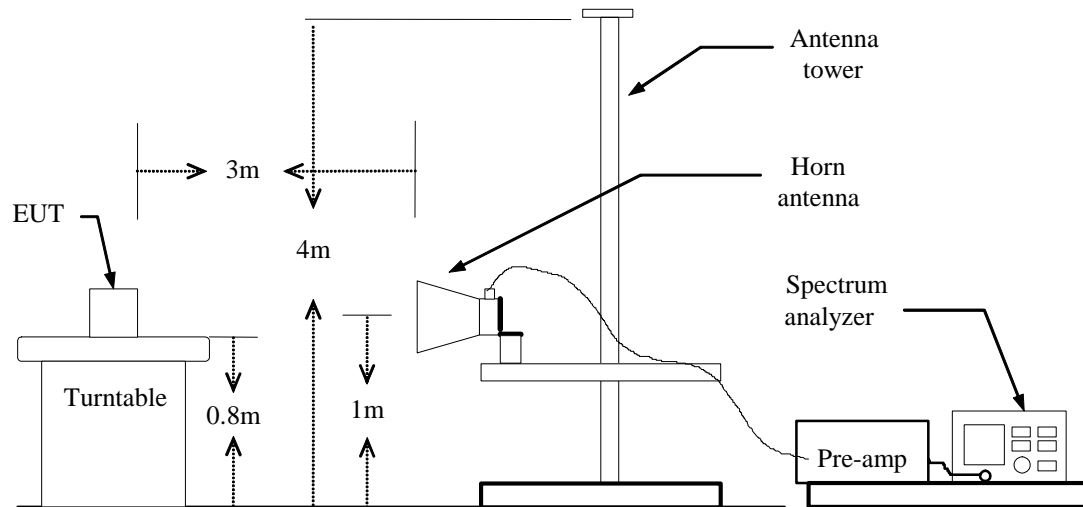
## 5.7.2 Test Description

### A. Test Setup:



### Blow 1GHz:



**Above 1GHz:****B. Test procedures**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
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=100 kHz / VBW=300 kHz / 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.

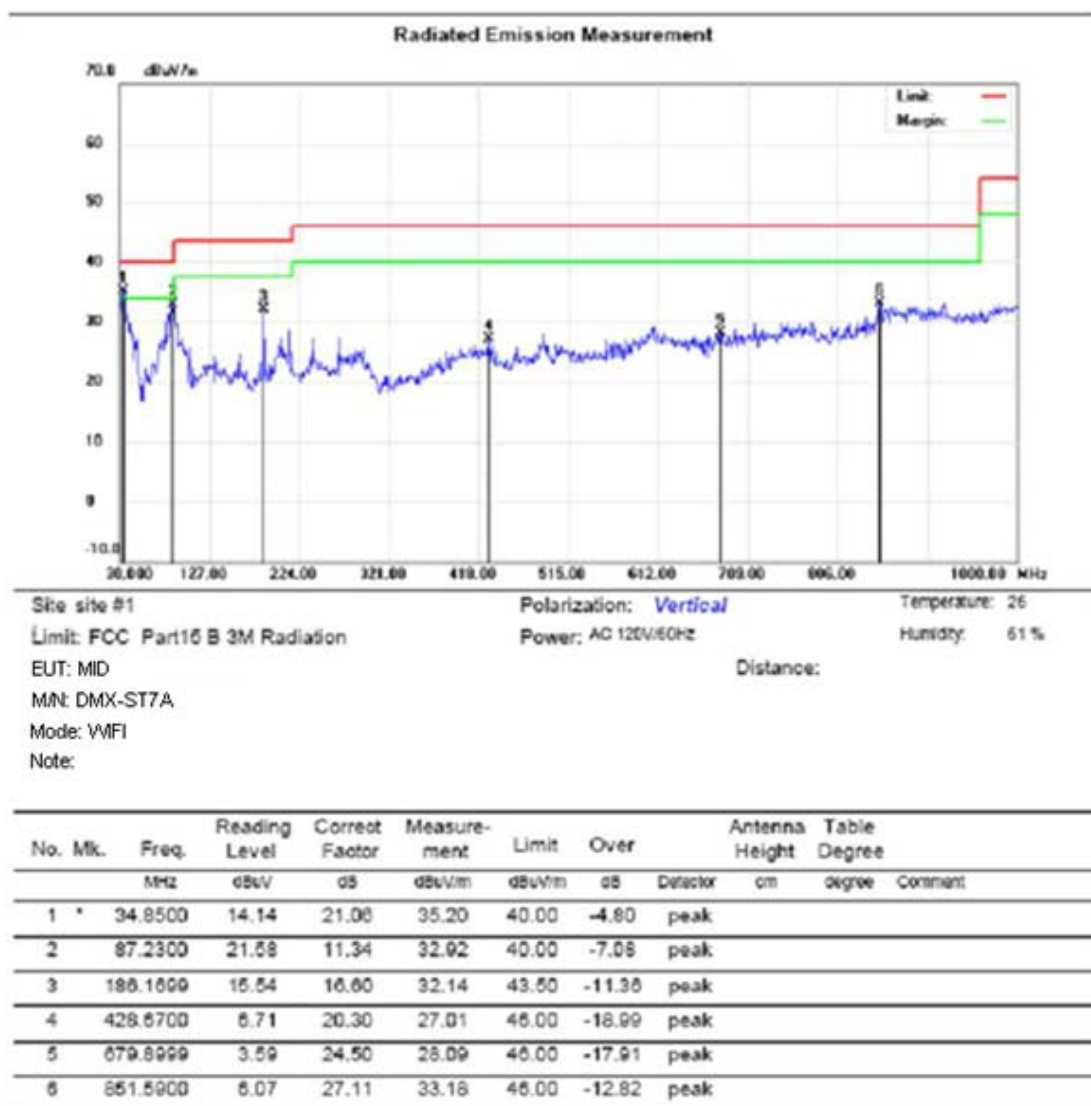
### **5.7.3 Test Result**

#### **Form 9 KHz to 30MHz:**

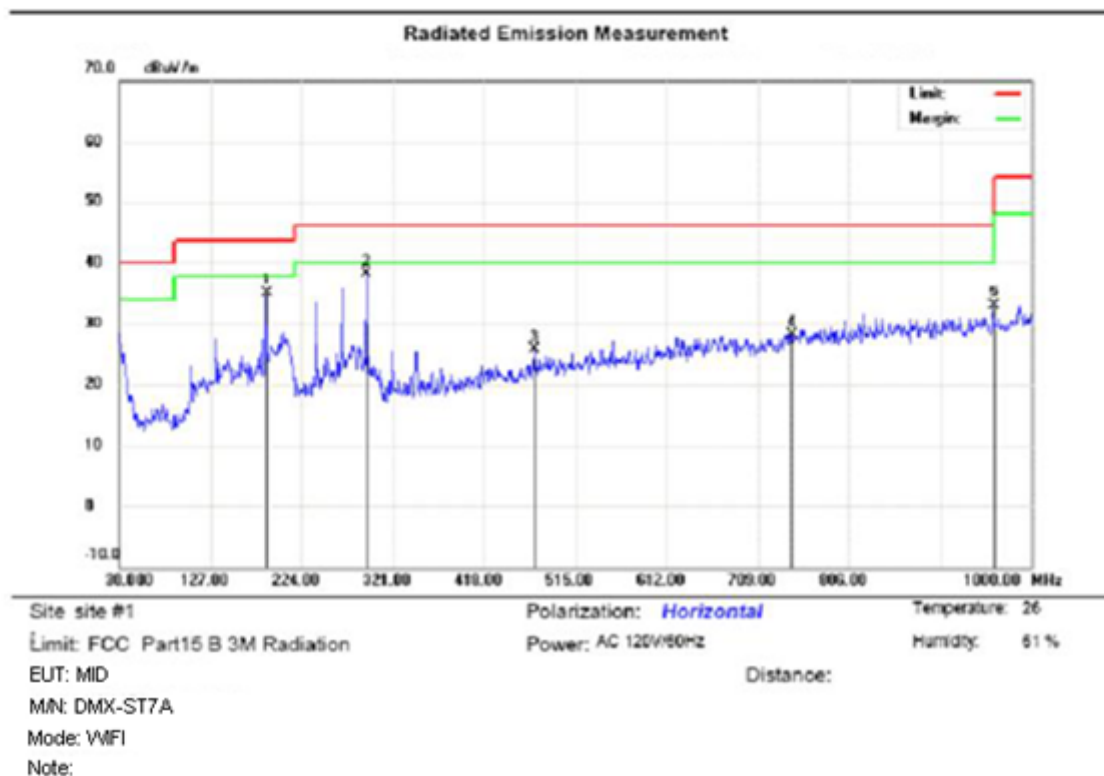
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

**Form 30MHz to 1000MHz:**

Mode1: IEEE 802.11b/CH Low



\*:Maximum data    x:Over limit    !:over margin

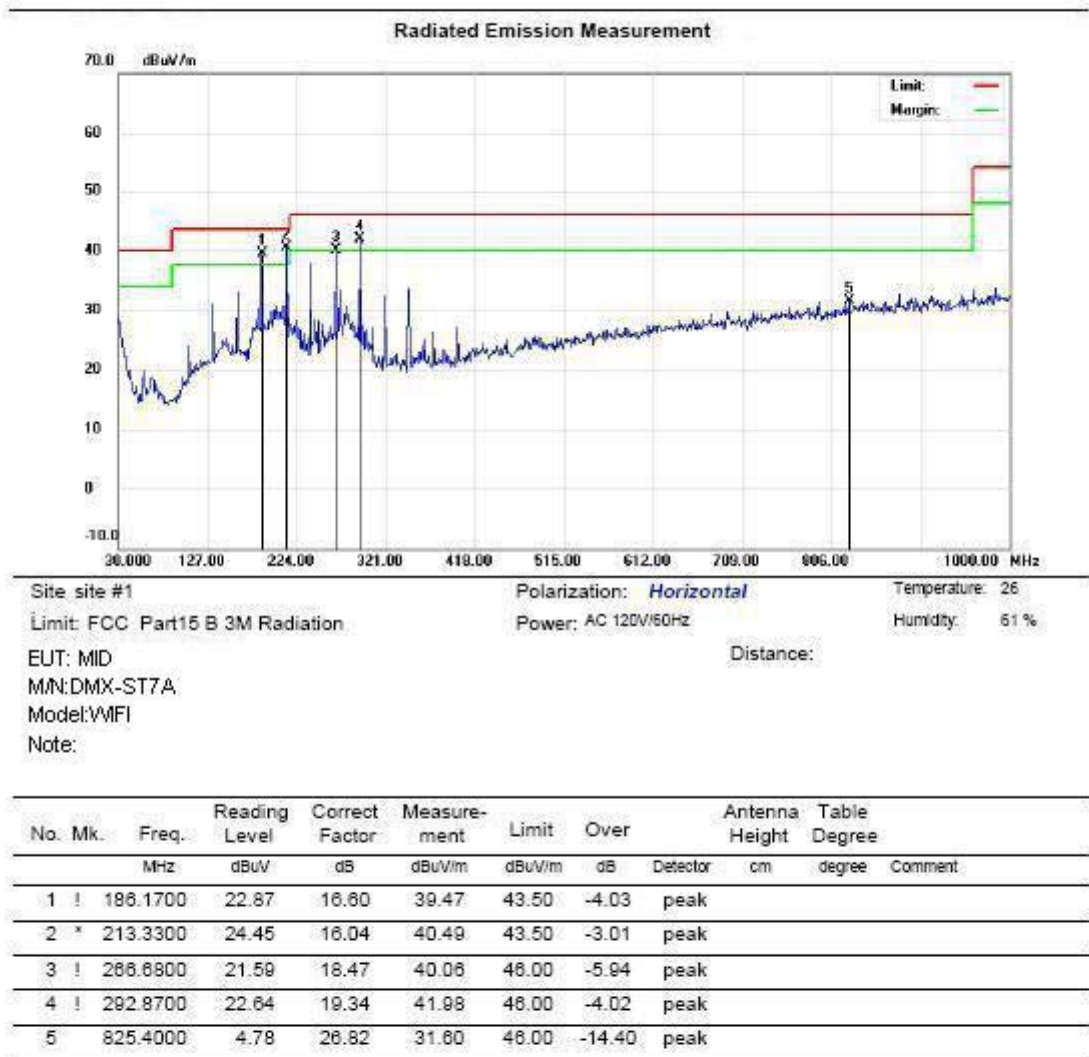


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		186.1700	18.35	16.00	34.95	43.00	-8.55	peak			
2	*	292.8700	18.68	19.34	38.02	46.00	-7.98	peak			
3		471.3500	4.44	21.25	25.69	46.00	-20.31	peak			
4		744.8900	2.28	26.79	28.07	46.00	-17.93	peak			
5		959.2600	4.83	28.00	32.83	46.00	-13.17	peak			

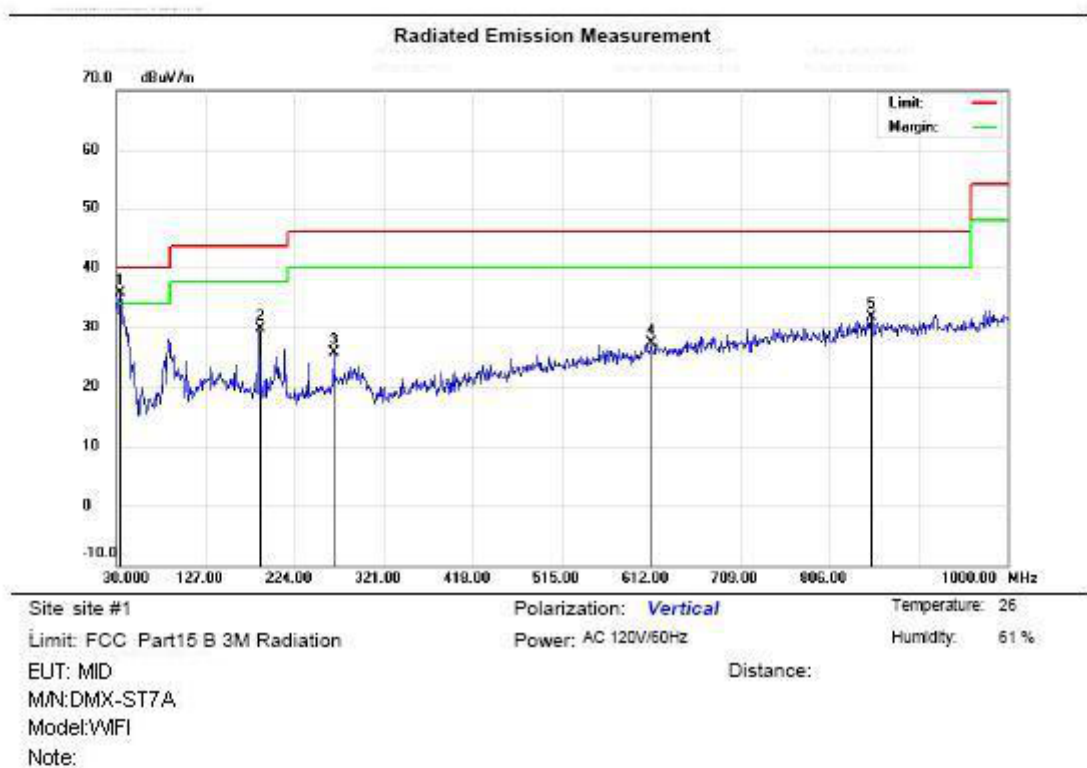
\*:Maximum data    x:Over limit    !:over margin



Mode2: IEEE 802.11b/CH Mid



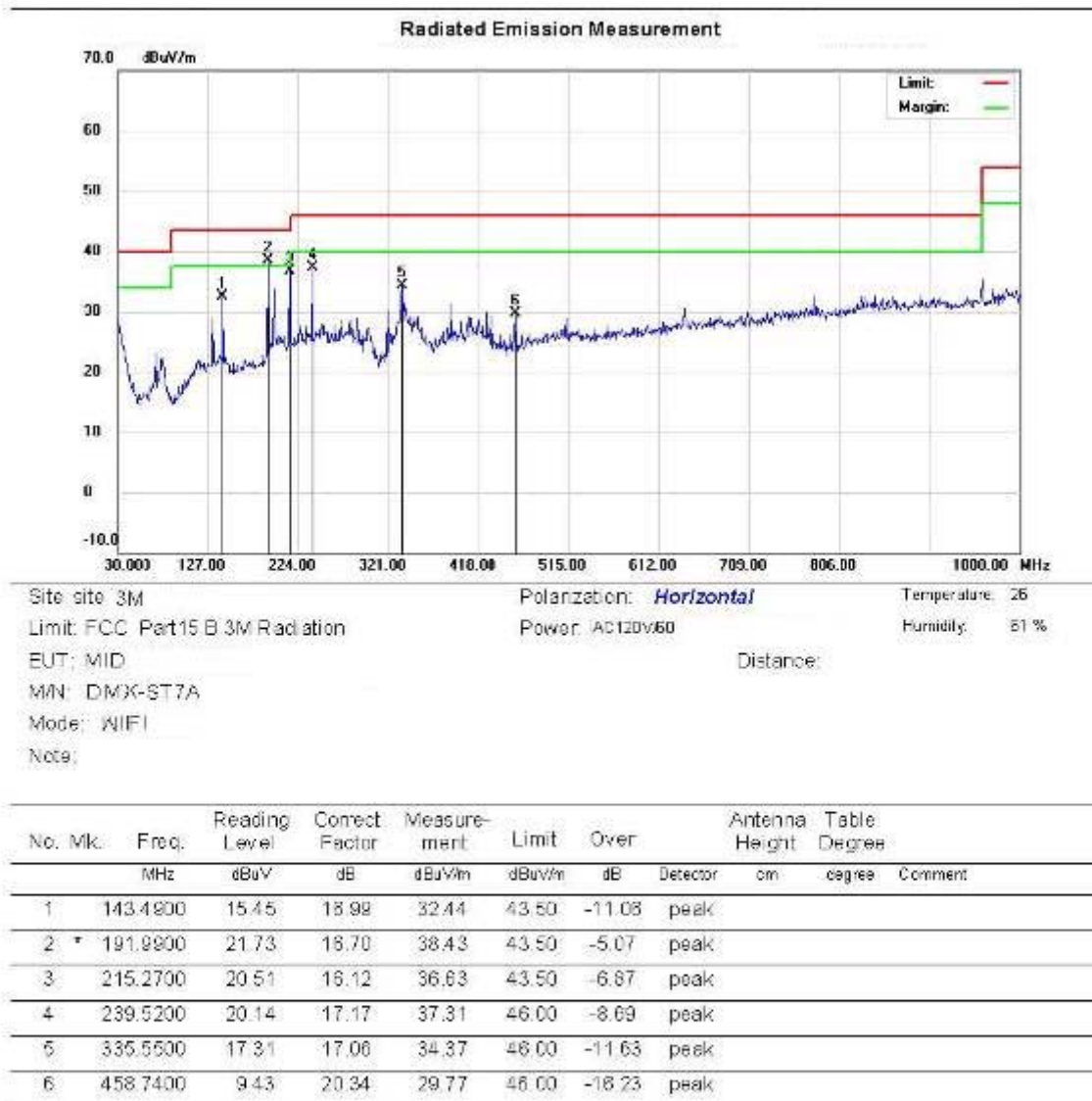
\*:Maximum data    x:Over limit    !:over margin



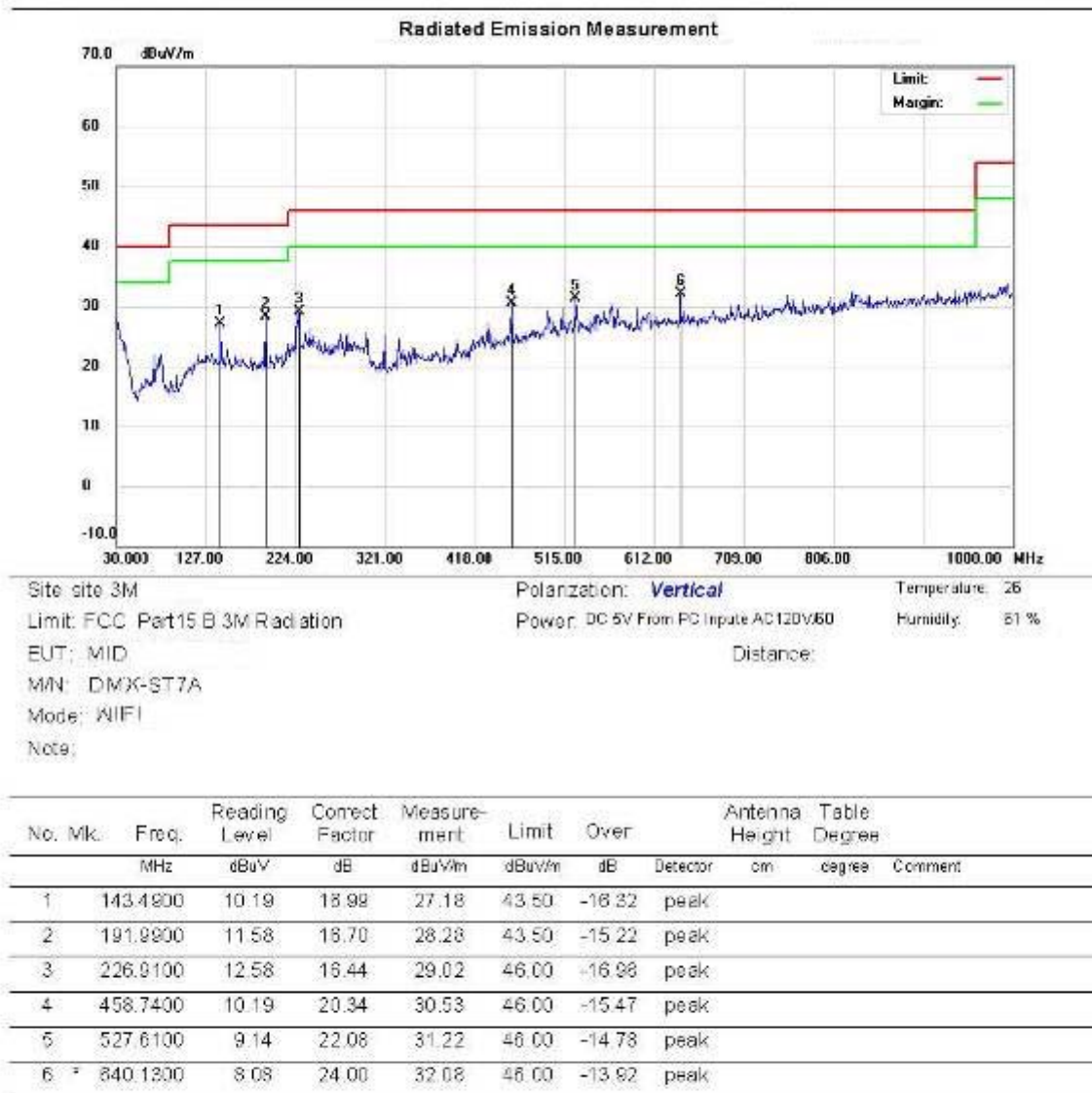
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	*	34.8500	14.64	21.06	35.70	40.00	-4.30	peak		
2		186.1700	13.04	16.60	29.64	43.50	-13.86	peak		
3		266.6800	7.31	18.47	25.78	46.00	-20.22	peak		
4		612.0000	3.98	23.26	27.24	46.00	-18.76	peak		
5		851.5900	4.57	27.11	31.68	46.00	-14.32	peak		

\*:Maximum data    x:Over limit    !:over margin

Mode3: IEEE 802.11b/CH High



\*Maximum data x:Over limit l:over margin



\*Maximum data x:Over limit l:over margin

**Form 1 GHz to 25GHz:**

**Operation Mode:** TX/ IEEE 802.11b/CH Low      **Test Date:** September28,2013  
**Temperature:** 20°C      **Tested by:** Habby Guo  
**Humidity:** 70 % RH      **Polarity:** Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF	Peak	AV	Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4824.5	V	44.98	25.69	23.05	68.03	48.74	74.00	54.00	-5.26
N/A	V								
4824.5	H	45.37	26.38	23.05	68.42	49.43	74.00	54.00	-4.57
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11b/CH Mid**Test Date:** September28,2013**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV Margin
		Reading (dBuV)	Reading (dBuV)	CF (dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4874.5	V	43.52	23.83	23.31	66.83	47.14	74.00	54.00	-6.86
N/A	V								
4874.5	H	44.60	24.42	23.31	67.91	47.73	74.00	54.00	-6.27
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11b/CH High  
**Temperature:** 20°C  
**Humidity:** 70 % RH

**Test Date:** September28,2013  
**Tested by:** Habby Guo  
**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
		Reading	Reading	CF			Limit	Limit	
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	Margin
					(dBuV/m)	(dBuV/m)			(dB)
4924.5	V	46.08	25.19	23.53	69.61	48.72	74.00	54.00	-5.28
N/A	V								
4924.5	H	45.65	24.08	23.53	69.18	47.61	74.00	54.00	-6.39
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11g/CH Low**Test Date:** September28,2013**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
		Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4824.5	V	43.71	23.61	23.05	66.76	46.66	74.00	54.00	-7.34
N/A	V								
4824.5	H	44.97	25.08	23.05	68.02	48.13	74.00	54.00	-5.87
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



**Operation Mode:** TX/ IEEE 802.11g/CH Mid**Test Date:** September28,2013**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq.	Ant. Pol	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	Margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4874.5	V	45.84	24.23	23.31	69.15	47.54	74.00	54.00	-6.46
N/A	V								
4874.5	H	44.17	25.79	23.31	67.48	49.10	74.00	54.00	-4.90
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11g/CH High  
**Temperature:** 20°C  
**Humidity:** 70 % RH

**Test Date:** September28,2013  
**Tested by:** Habby Guo  
**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	Margin
		Reading (dBuV)	Reading (dBuV)	CF (dB)			Limit (dBuV/m)	Limit (dBuV/m)	
					Peak (dBuV/m)	AV (dBuV/m)			
4924.5	V	46.29	25.34	23.53	69.82	48.87	74.00	54.00	-5.13
N/A	V								
4924.5	H	44.35	24.20	23.53	67.88	47.73	74.00	54.00	-6.27
N/A	H								

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11n/CH Low      **Test Date:** September28,2013  
**Temperature:** 20°C      **Tested by:** Habby Guo  
**Humidity:** 70 % RH      **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Peak Margin (dB)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
4824.05	H	41.42	21.36	23.05	64.47	44.41	74.00	54.00	-9.53	-9.59
N/A										>20
4824.06	V	42.01	22.82	23.05	65.06	45.87	74.00	54.00	-8.94	-8.13
N/A										>20

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11n/CH Mid**Test Date:** September28,2013**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Peak Margin (dB)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
4874.15	H	42.63	22.45	23.31	65.94	45.76	74.00	54.00	-8.06	-8.24
N/A										>20
4874.15	V	42.89	22.96	23.31	66.20	46.27	74.00	54.00	-7.80	-7.73
N/A										>20

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX/ IEEE 802.11n/CH High**Test Date:** September28,2013**Temperature:** 20°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

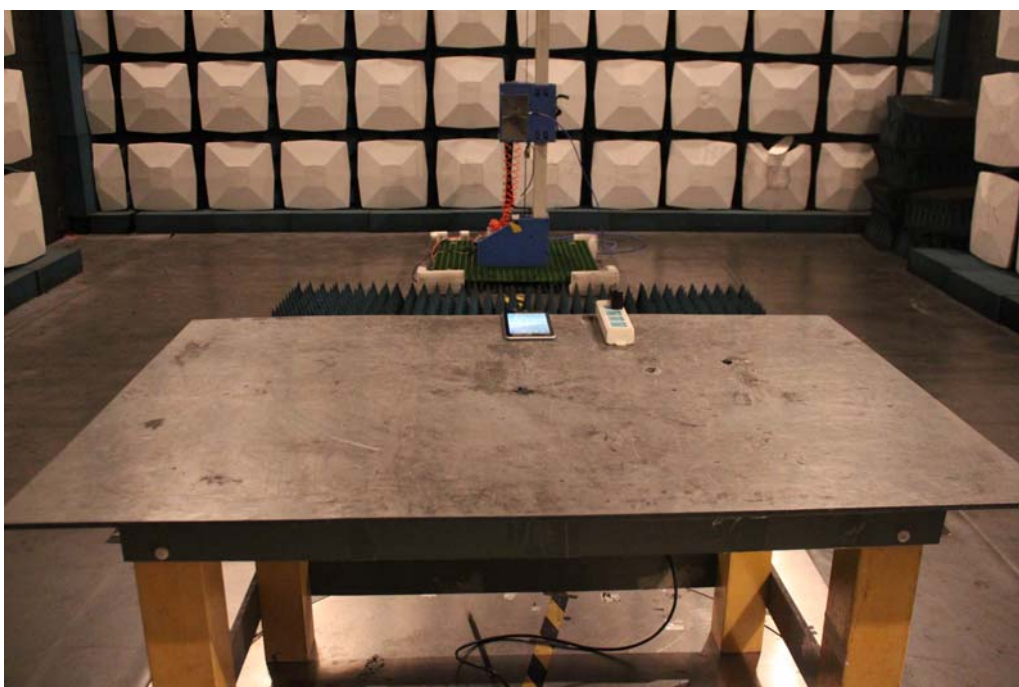
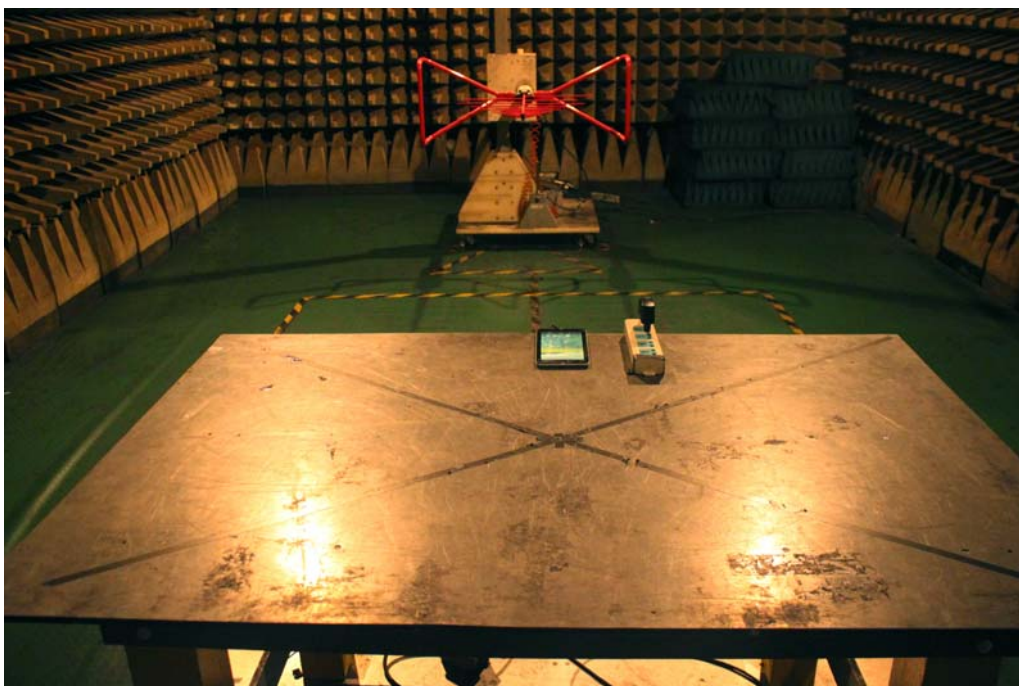
Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Peak Margin (dB)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
4924.05	H	43.59	23.02	23.53	67.12	46.55	74.00	54.00	-6.88	-7.45
N/A										>20
4924.05	V	43.76	23.14	23.53	67.29	46.67	74.00	54.00	-6.71	-7.33
N/A										>20

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**APPENDIX 1**

**PHOTOGRAPHS OF TEST SETUP**

RE TEST SETUP



CE TEST SETUP





## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

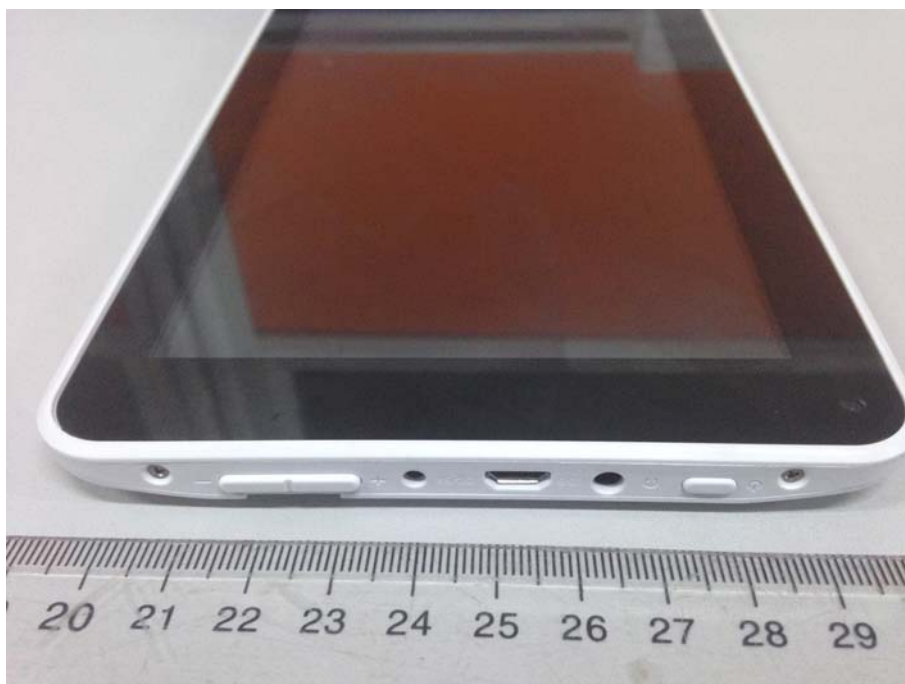
FRONT VIEW OF SAMPLE



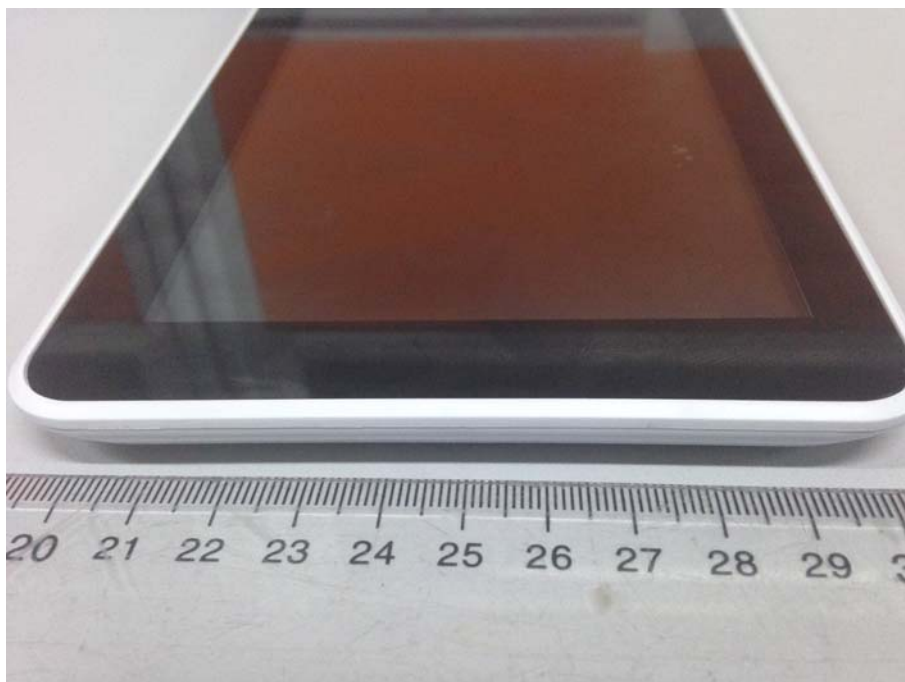
BACK VIEW OF SAMPLE



LEFT VIEW OF SAMPLE



RIGHT VIEW OF SAMPLE



TOP VIEW OF SAMPLE



BOTTOM VIEW OF SAMPLE

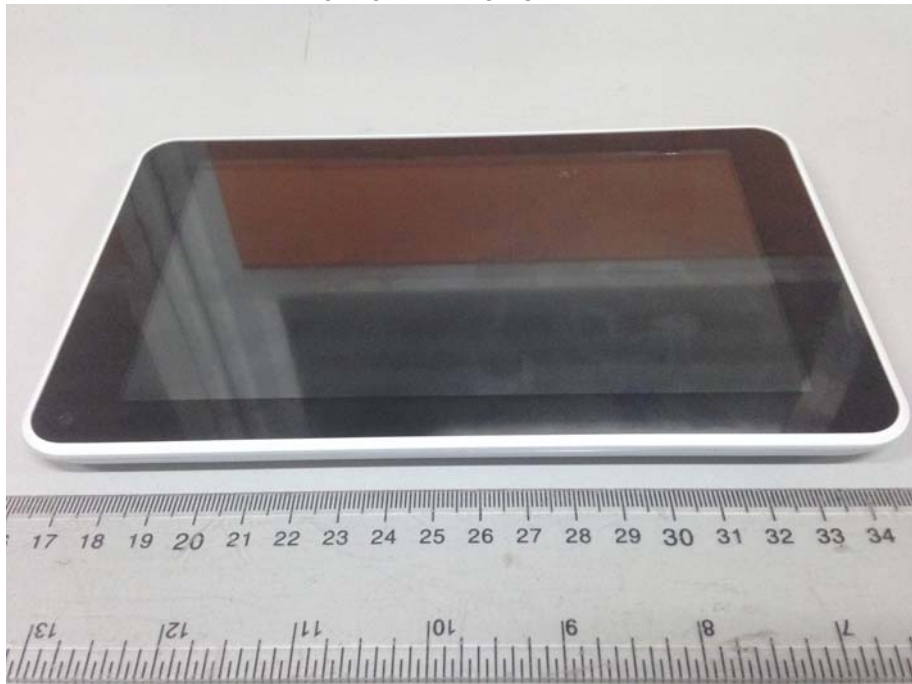


PHOTO OF POWER SUPPLY

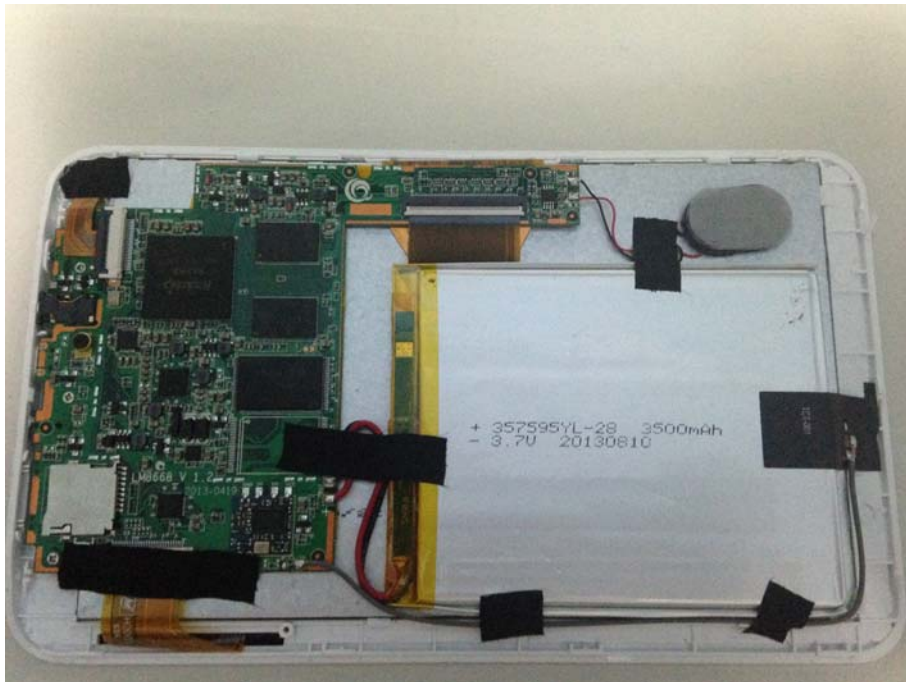


PHOTO OF USB





INTERNAL PHOTO OF SAMPLE – 1



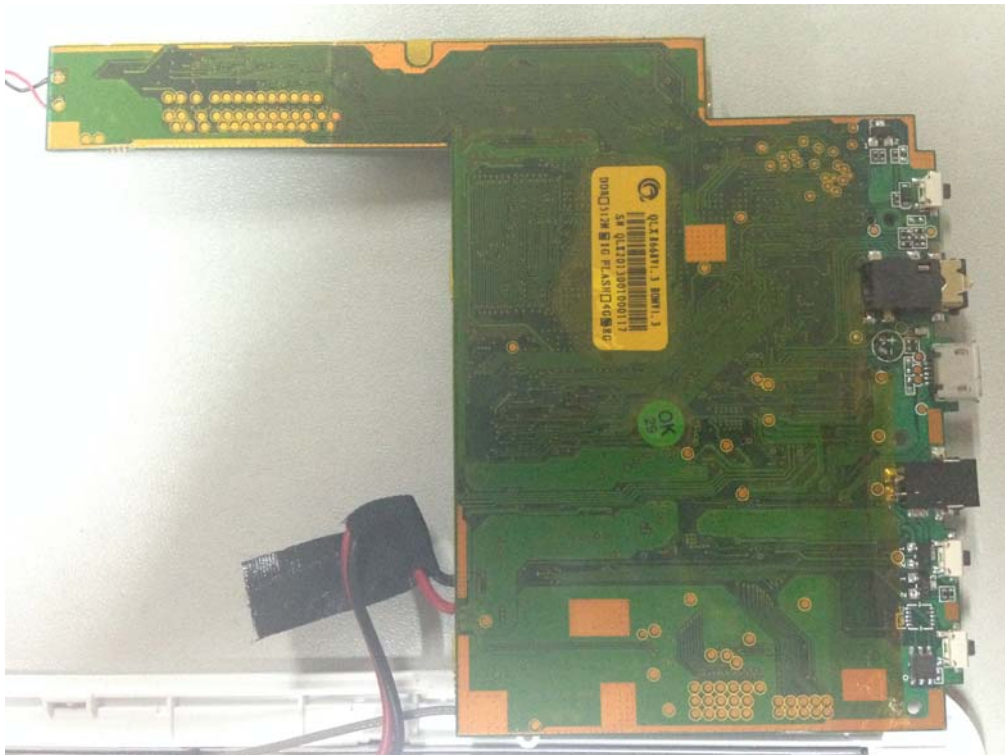
INTERNAL PHOTO OF SAMPLE -2



INTERNAL PHOTO OF SAMPLE – 3

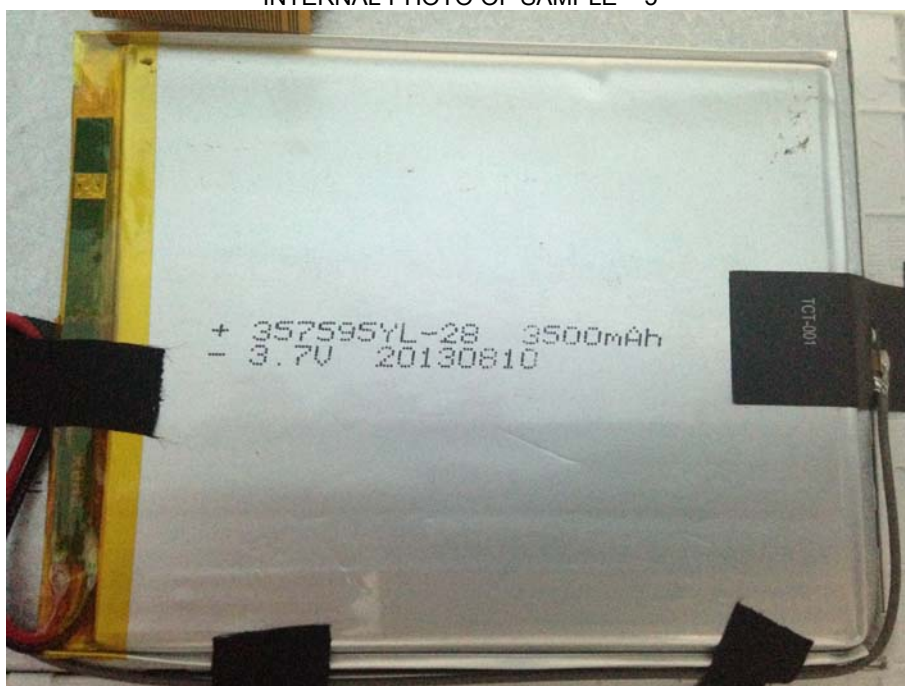


INTERNAL PHOTO OF SAMPLE – 4





INTERNAL PHOTO OF SAMPLE – 5



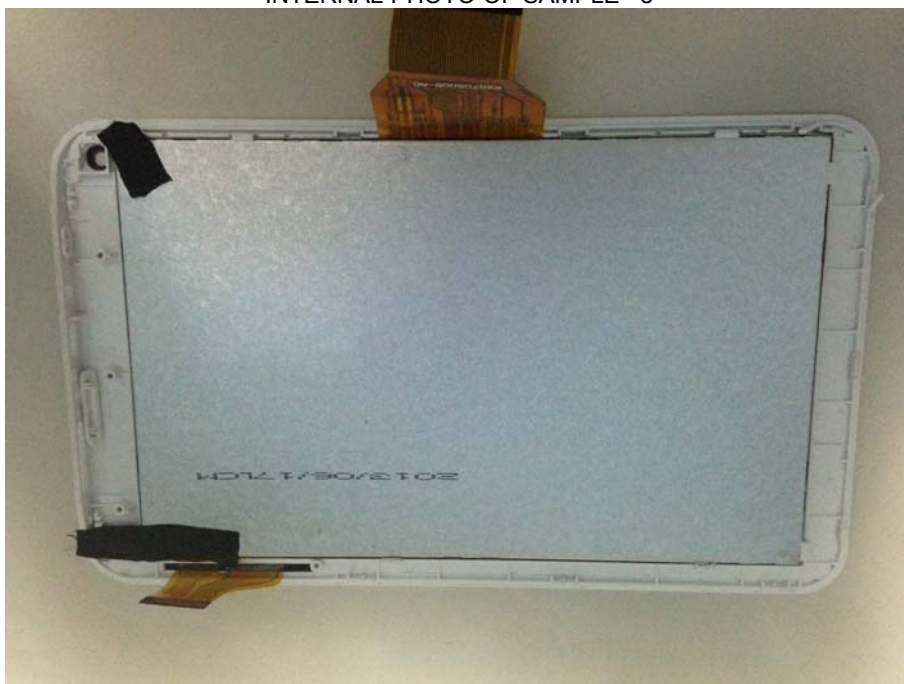
INTERNAL PHOTO OF SAMPLE –6



INTERNAL PHOTO OF SAMPLE -7



INTERNAL PHOTO OF SAMPLE -8



INTERNAL PHOTO OF ADAPTER -1



INTERNAL PHOTO OF ADAPTER -2



-----END OF REPORT-----