



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

## **TEST REPORT**

*For*

**Applicant :** SHENZHEN LI RUI ELECTRONIC CO.,LTD

**Address :** 4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District, Shenzhen, China

**Product Name :** MID

**Model Name :** 7D03, 7D01, 7D02, JP700, JP701

**Brand Name :** N/A

**FCC ID :** Z2Z-7D03

**Report No. :** MOST110902F3

**Date of Issue :** September. 26, 2011

**Issued by :** Most Technology Service Co., Ltd.

**Address :** No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China

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## 1. VERIFICATION OF CONFORMITY

**Equipment Under Test:** MID  
**Brand Name:** N/A  
**Model Number:** 7D03  
**Series Model Number:** 7D01, 7D02, JP700, JP701  
**Model Difference description:** The same PCB but only the model name is different.  
**FCC ID:** Z2Z-7D03  
**Applicant:** SHENZHEN LI RUI ELECTRONIC CO.,LTD  
4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District,  
Shenzhen, China  
**Manufacturer:** SHENZHEN LI RUI ELECTRONIC CO.,LTD  
4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District,  
Shenzhen, China  
**Technical Standards:** 47 CFR Part 15 Subpart C  
**File Number:** MOST110902F3  
**Date of test:** September. 5 - September. 23, 2011  
**Deviation:** None  
**Condition of Test Sample:** Normal  
**Test Result:** PASS

The above equipment was tested by *Most Technology Service 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):



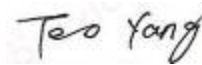
Zhang Ling      September. 26, 2011

Review by (+ signature):



July Wen      September. 26, 2011

Approved by (+ signature):



Terry Yang      September. 26, 2011

## 2. GENERAL INFORMATION

### 2.1 Product Information

Description:	MID
Brand Name	N/A
Model Number	7D03
Series Model Number:	7D01, 7D02, JP700, JP701
Description of Differences:	The same PCB but only the model name is different.
Power Supply:	DC: 3.7V by Li-ion Battery AC Adapter-- Model 1 :SAW-0502000(100V-240V 50/60Hz) AC Adapter-- Model 2 :HWT-15W-050200BU(100V-240V 50/60Hz)
Frequency Range:	802.11b/g/n: 2412MHz - 2462MHz
Number of Channels:	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n Standard-20 MHz Channel mode: 11 Channels
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 Type:	Internal
Antenna Gain:	1.8 dBi
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	2011-09-23
2	15.247(b)(3)	Peak Output Power	PASS	2011-09-23
3	15.247(d)	conducted spurious emission	PASS	2011-09-23
4	15.247(d)	Band Edge	PASS	2011-09-23
5	15.247(e)	Power Spectral Density	PASS	2011-09-23
6	15.207	Conducted Emission	PASS	2011-09-20
7	15.247(d) 15.205 15.209	Radiated Emission	PASS	2011-09-20

*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:	Most Technology Service Co., Ltd.
Location:	No.5, Langshan 2nd Rd, North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, 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 C63.4:2009 and CISPR 16 requirements. The FCC Registration Number is <b>490827</b>.</p> <p>The <b>CNAS</b> Registration Number is <b>CNAS L3573</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. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

#### 3.2 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2009, 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 quasipeak 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 MOST 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.

No.	Equipment	Manufacturer	Model No.	S/N	Calculator due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2012/03/14
2	Spectrum Analyzer	Agilent	E7405A	US44210471	2012/03/14
3	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2012/03/14
4	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2012/03/14
5	Terminator	Hubersuhner	50Ω	No.1	2012/03/14
6	RF Cable	SchwarzBeck	N/A	No.1	2012/03/14
7	Test Receiver	Rohde & Schwarz	ESPI	101202	2012/03/14
8	Bilog Antenna	Sunol	JB3	A121206	2012/03/14
9	Horn Antenna	TRC	N/A	N/A	2012/03/14
10	Cable	Resenberger	N/A	NO.1	2012/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2012/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2012/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2012/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2012/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2012/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2012/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2012/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2012/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2012/03/14
20	Test Analyzer	Kikusui	KHA1000	LM003720	2012/03/14
21	Line Impedence Network	Kikusui	LIN40MA-PCR-L	LM002352	2012/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2012/03/14
23	EMC PRO System	EM Test	UCS-500-M4	V0648102026	2012/03/14
24	Signal Generator	IFR	2032	203002/100	2012/03/14
25	Amplifier	A&R	150W1000	301584	2012/03/14
26	CDN	FCC	FCC-801-M2-25	47	2012/03/14
27	CDN	FCC	FCC-801-M3-25	107	2012/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2012/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2012/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2012/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2012/03/14

**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.

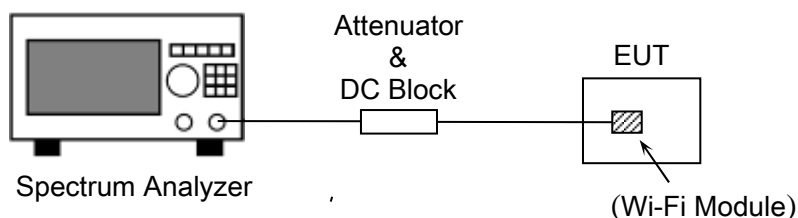


Figure 1: RF Test Setup

#### 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.

##### 802.11b Test Mode

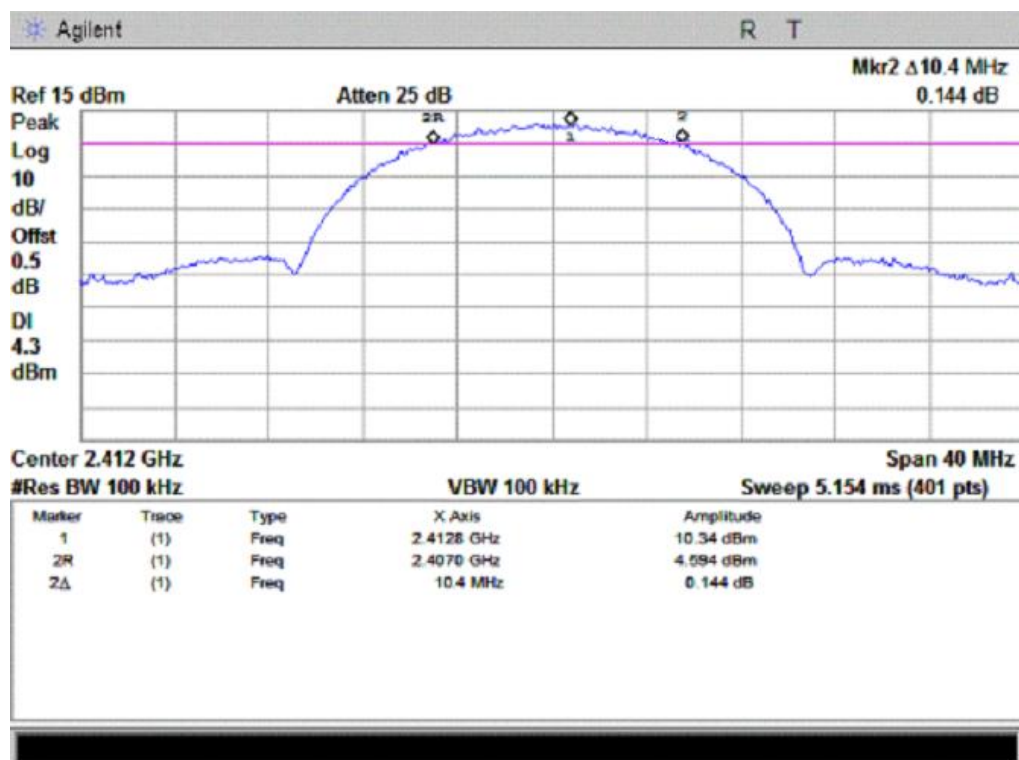
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
Low	2412	10.06	≥500	PASS
Middle	2437	9.94		PASS
High	2462	10.07		PASS

##### 802.11g Test Mode

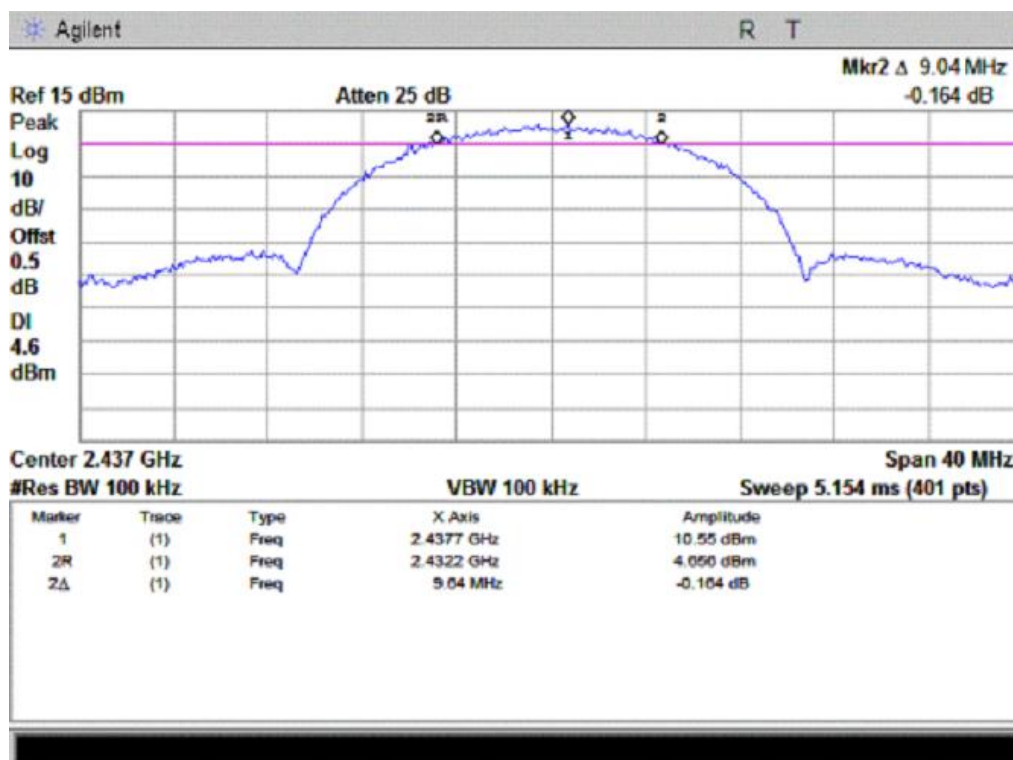
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
Low	2412	15.81	≥500	PASS
Middle	2437	16.15		PASS
High	2462	16.40		PASS

## 802.11n-20MHz Test Mode

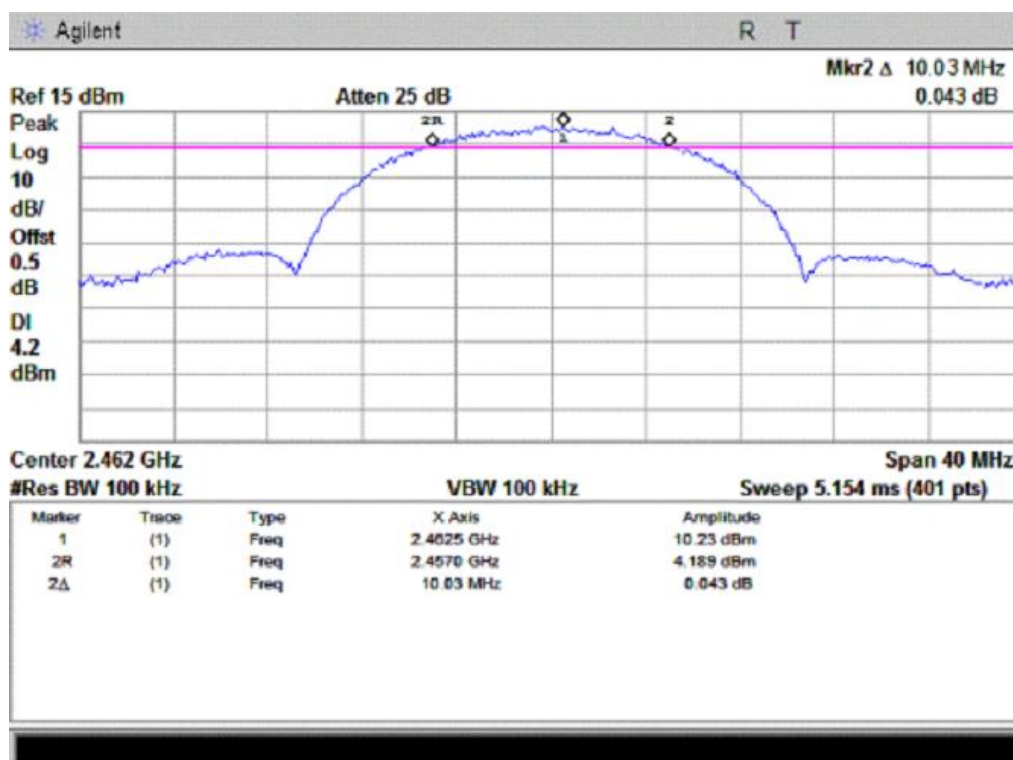
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
Low	2412	16.61	≥500	PASS
Middle	2437	16.54		PASS
High	2462	16.83		PASS



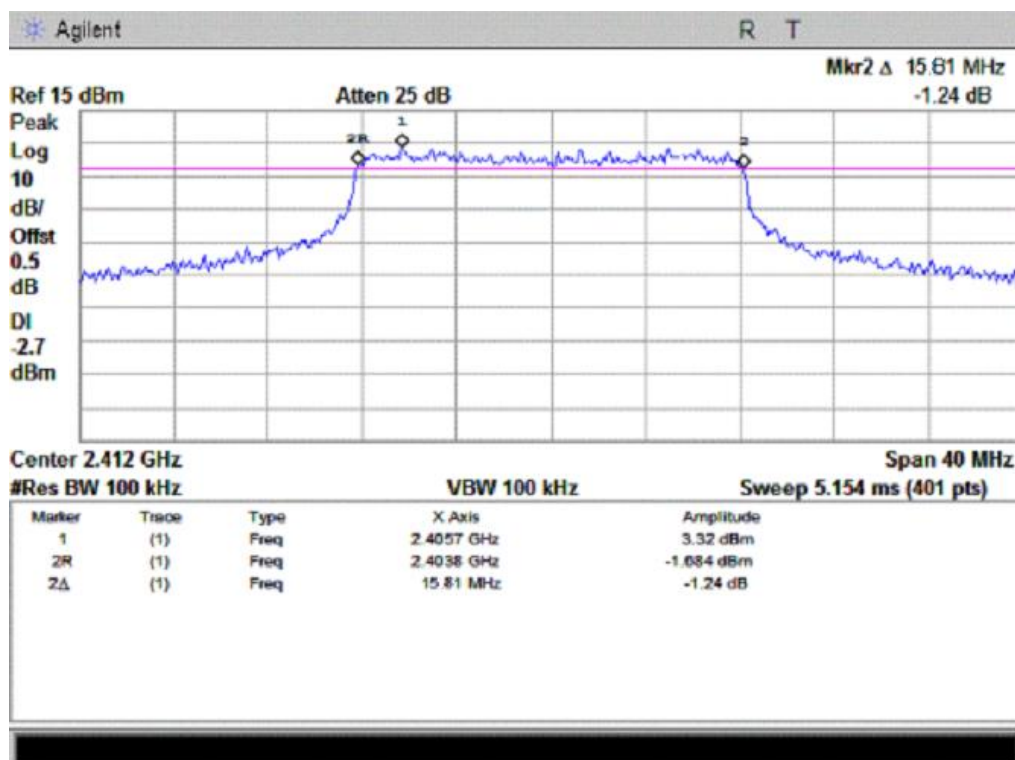
(802.11 b,CH Low)



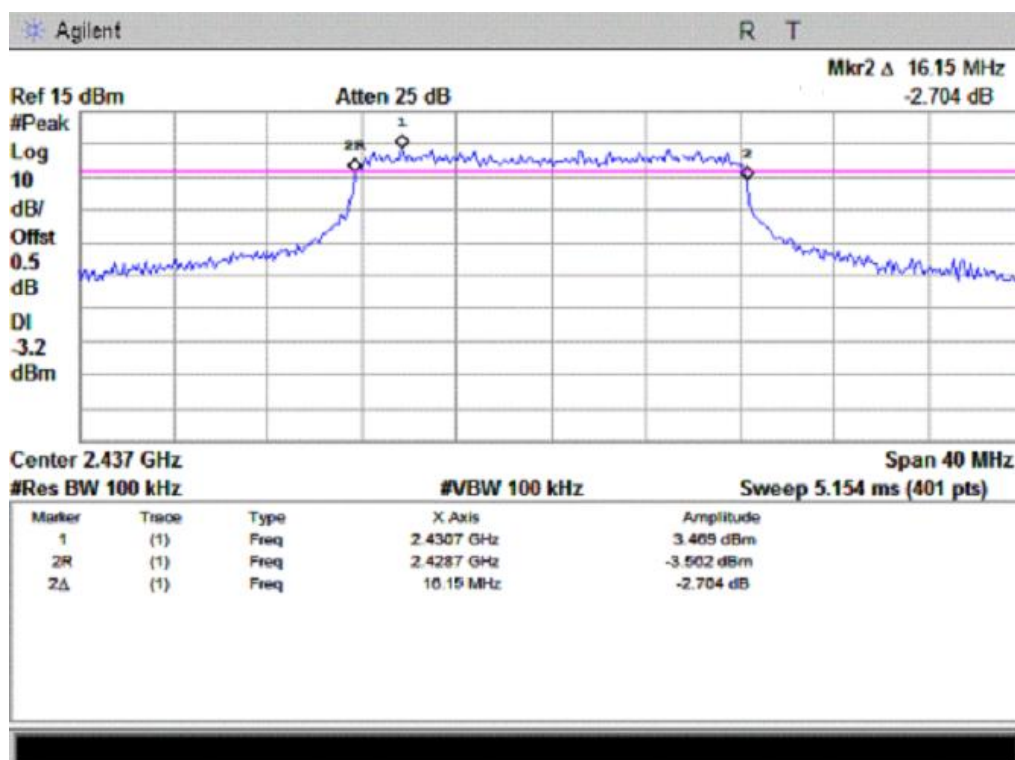
(802.11 b,CH Middle)



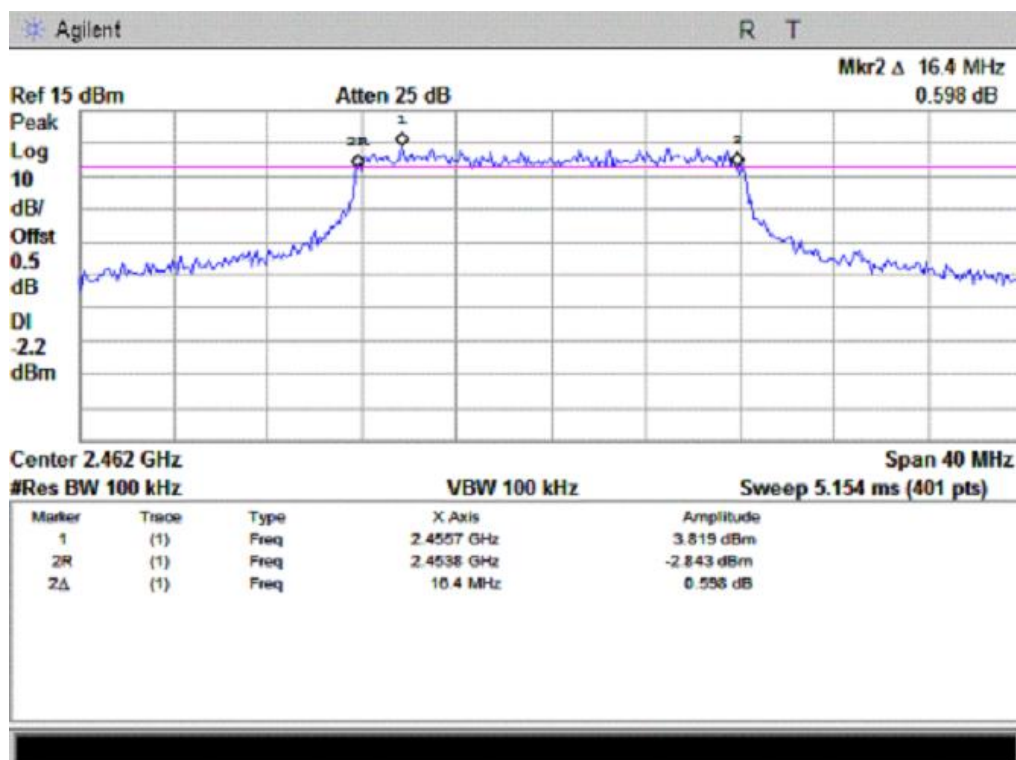
(802.11 b,CH High)



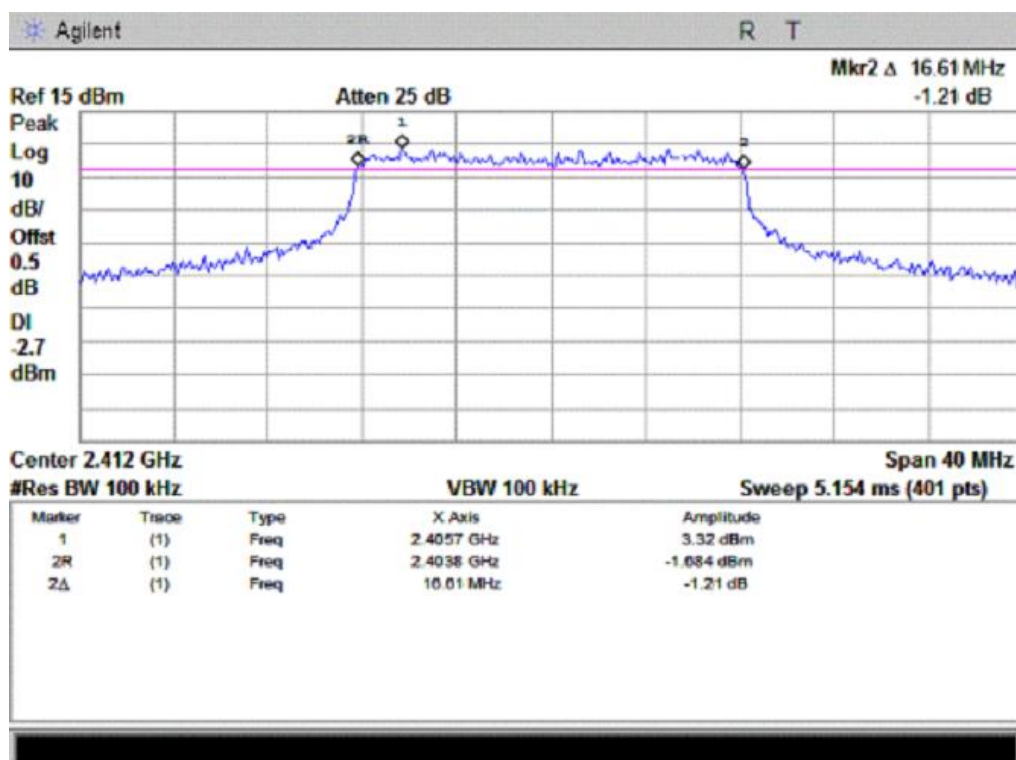
(802.11 g, CH Low)



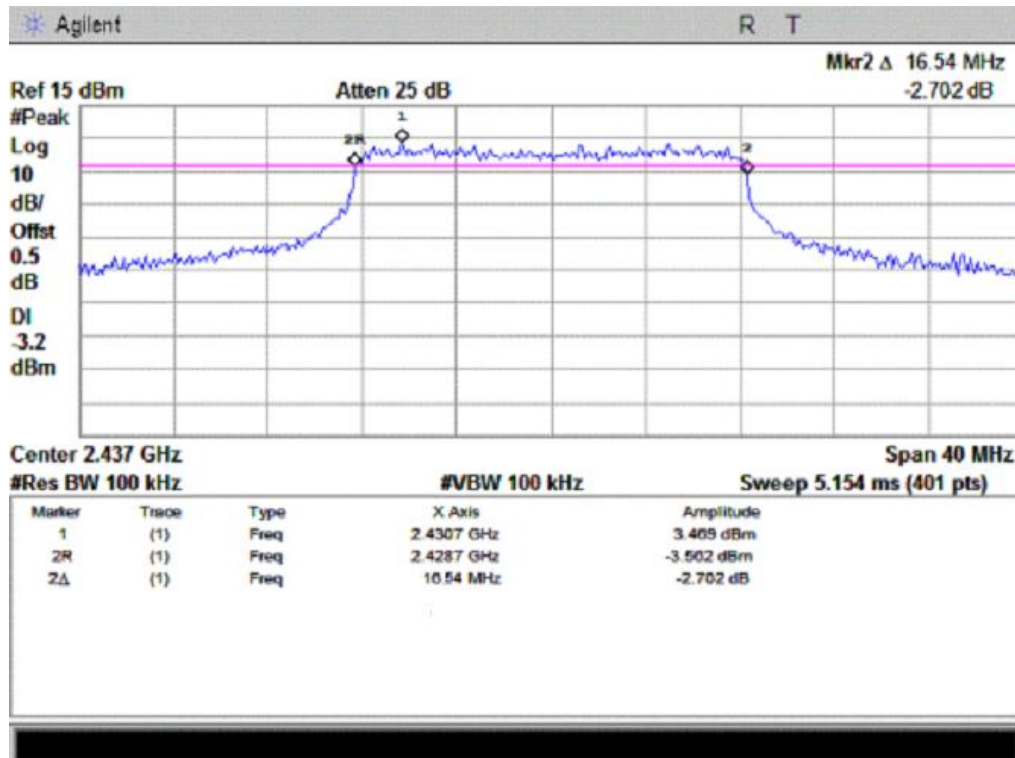
(802.11 g, CH Middle)



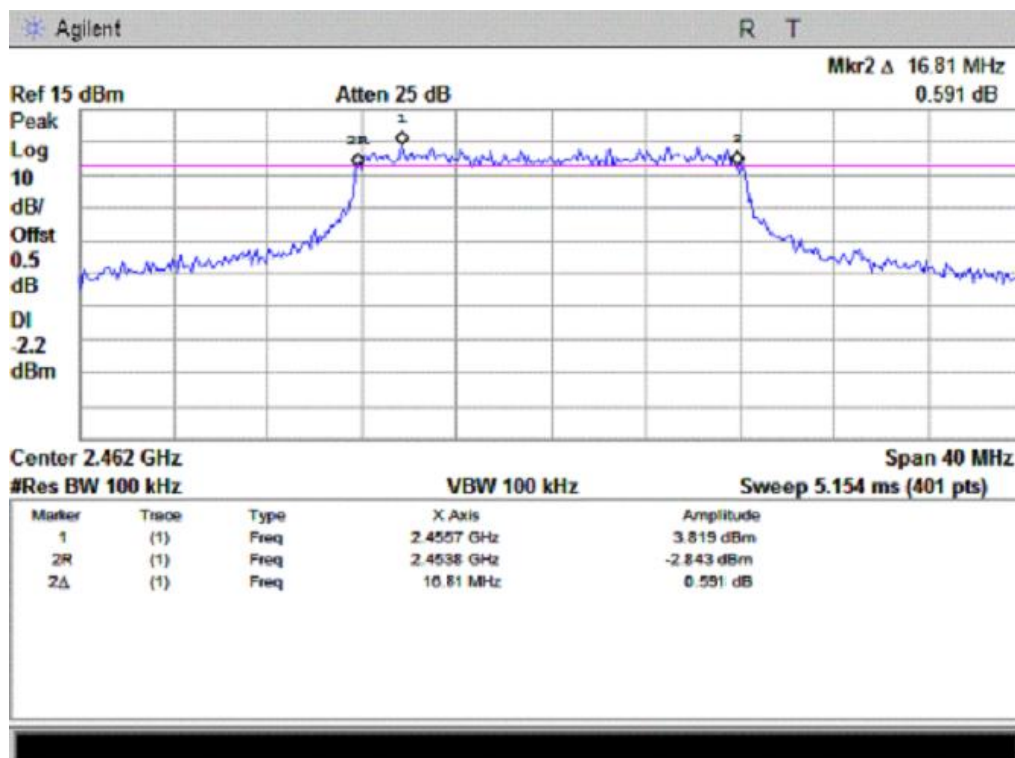
(802.11 g,CH High)



(802.11 n,CH Low)



(802.11 n,CH Middle)



(802.11 n,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.

#### 802.11b Test Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit	Verdict
		dBm	W	W	
Low	2412	11.68	0.0147	0.125	PASS
Middle	2437	11.56	0.0143		PASS
High	2462	11.34	0.0136		PASS

#### 802.11g Test Mode

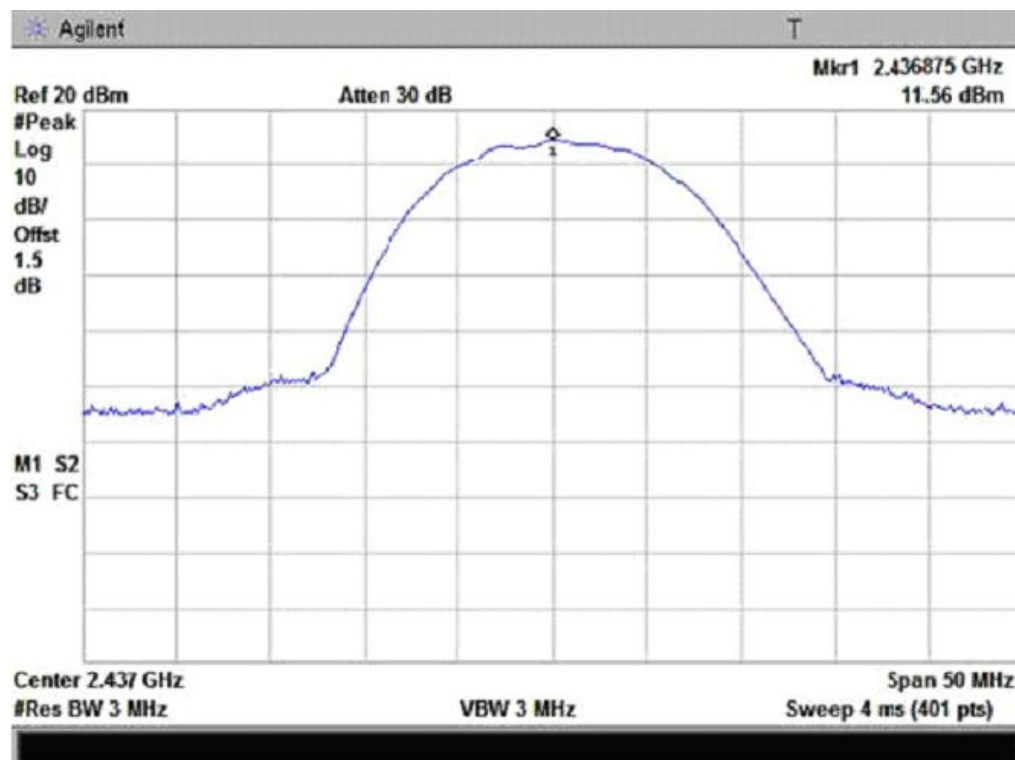
Channel	Frequency (MHz)	Measured Output Peak Power		Limit	Verdict
		dBm	W	W	
Low	2412	11.72	0.0148	0.125	PASS
Middle	2437	11.39	0.0138		PASS
High	2462	11.57	0.0144		PASS

#### 802.11n-20MHz Test Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit	Verdict
		dBm	W	W	
Low	2412	11.55	0.0143	0.125	PASS
Middle	2437	11.70	0.0148		PASS
High	2462	11.09	0.0129		PASS



(802.11 b,CH Low)



(802.11 b,CH Middle)



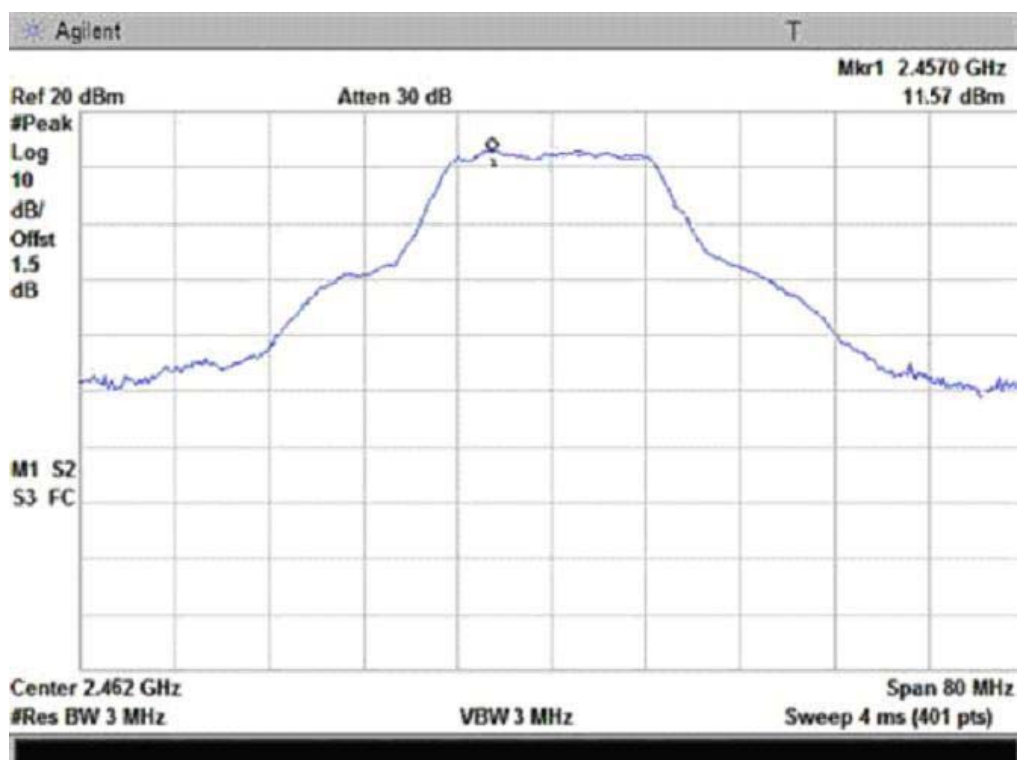
(802.11 b,CH High)



(802.11 g,CH Low)



(802.11 g,CH Middle)



(802.11 g,CH High)



(802.11 n, CH Low)



(802.11 n, CH Middle)



(802.11 n,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

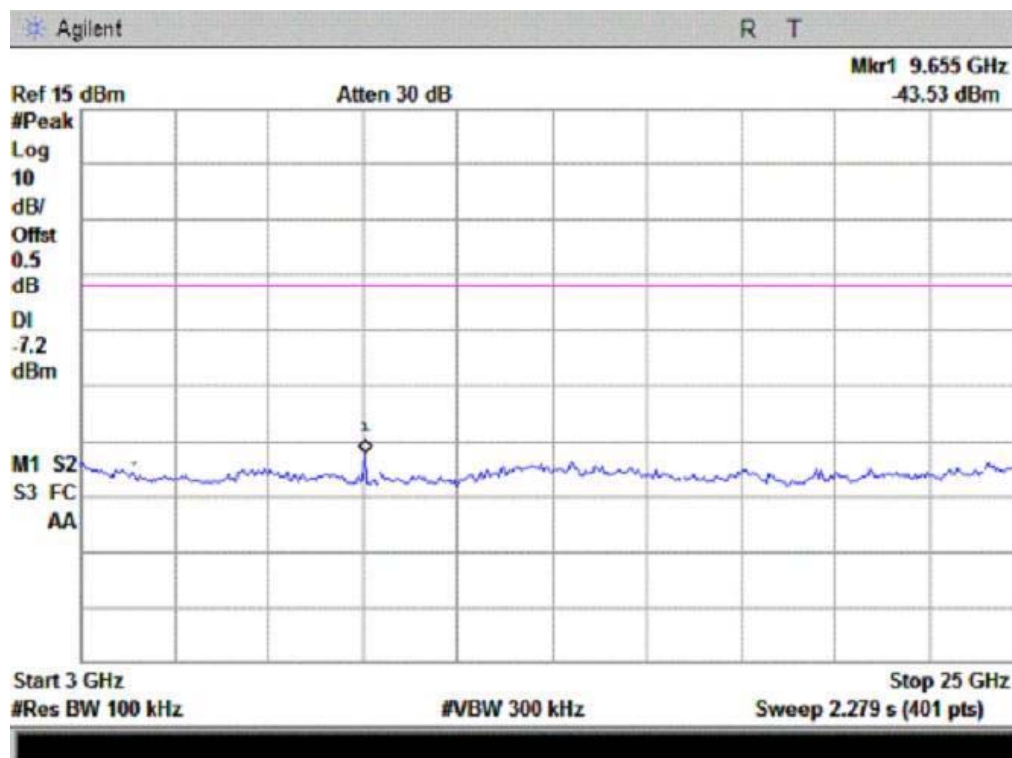
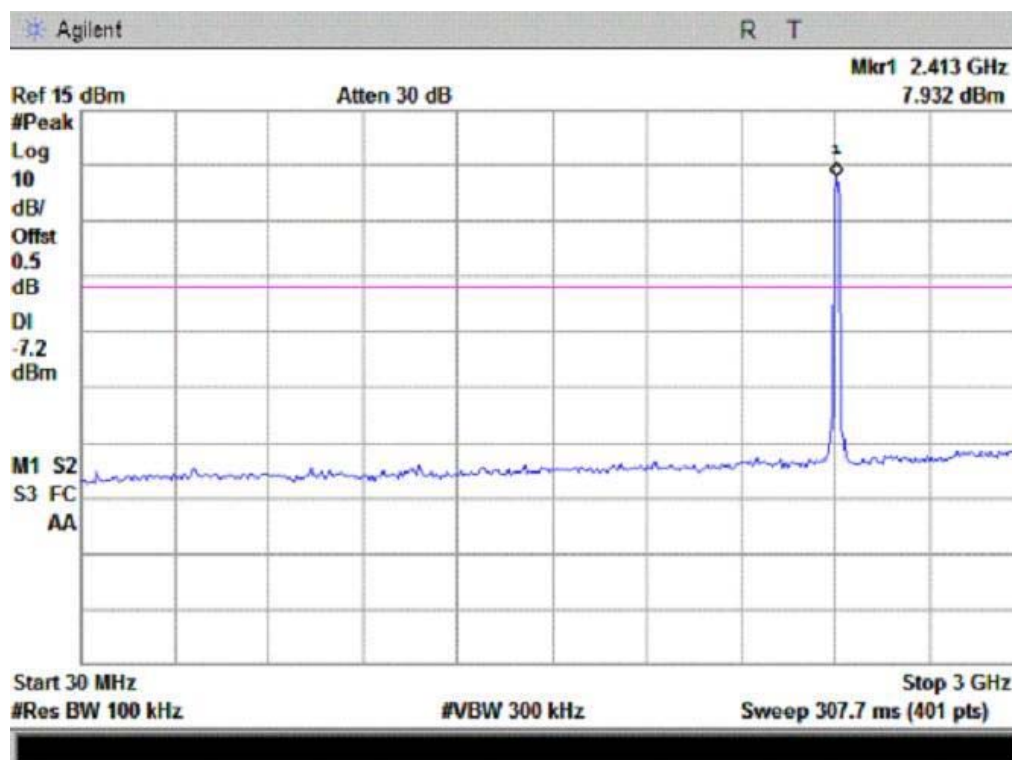
See section 5.1.2 of this report.

#### 5.3.3 Test Result

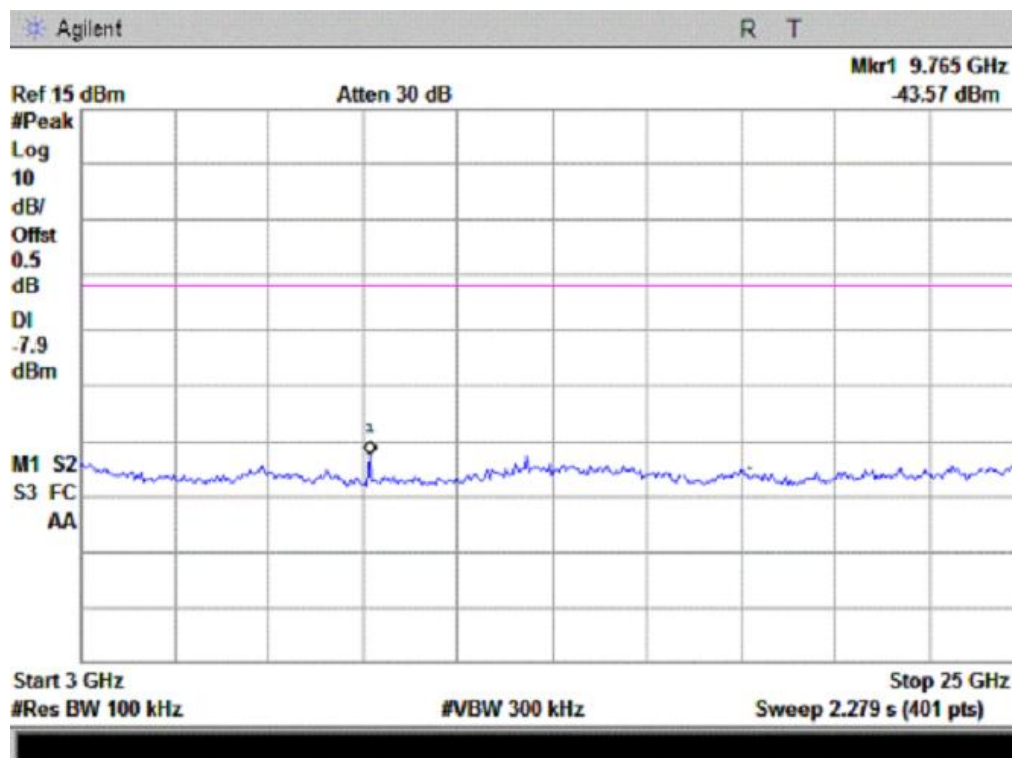
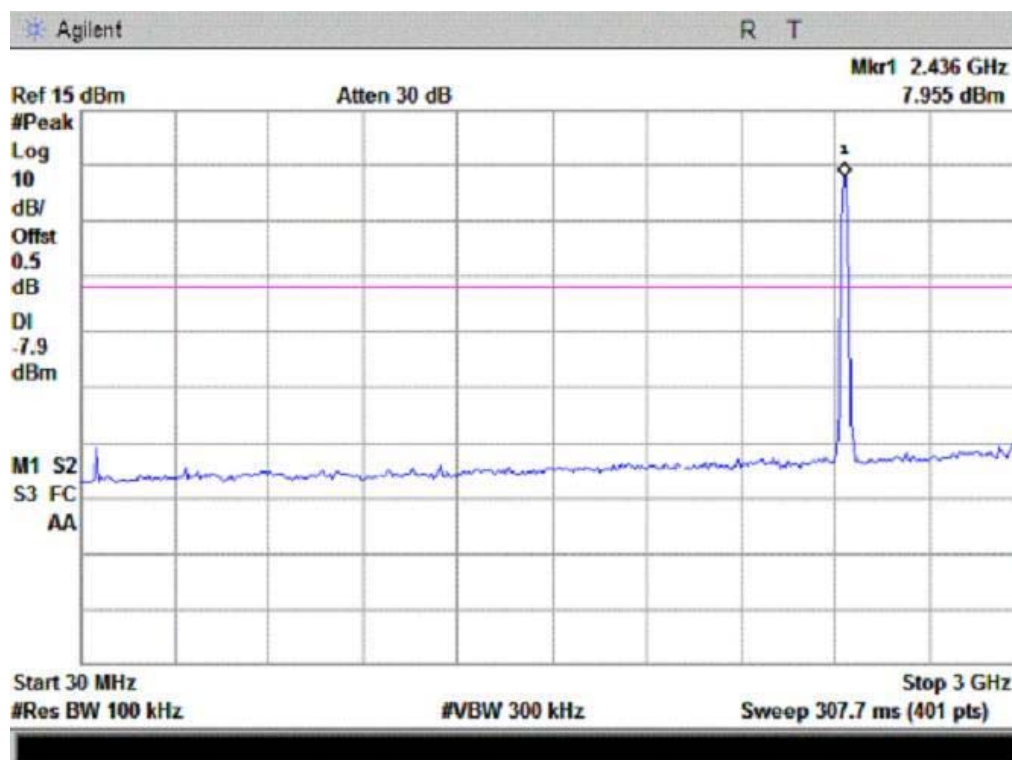
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

Channel	Frequency (MHz)	Fundamental Level (dBm)	Limit (dBm)
802.11b Low	2412	12.76	-7.24
802.11b Mid	2437	12.16	-7.84
802.11b High	2462	12.64	-7.36
802.11g Low	2412	11.45	-8.55
802.11g Mid	2437	11.40	-8.60
802.11g High	2462	11.36	-8.64
802.11 n-20M Low	2412	12.15	-7.85
802.11 n-20M Mid	2437	12.11	-7.89
802.11 n-20M High	2462	12.08	-7.92

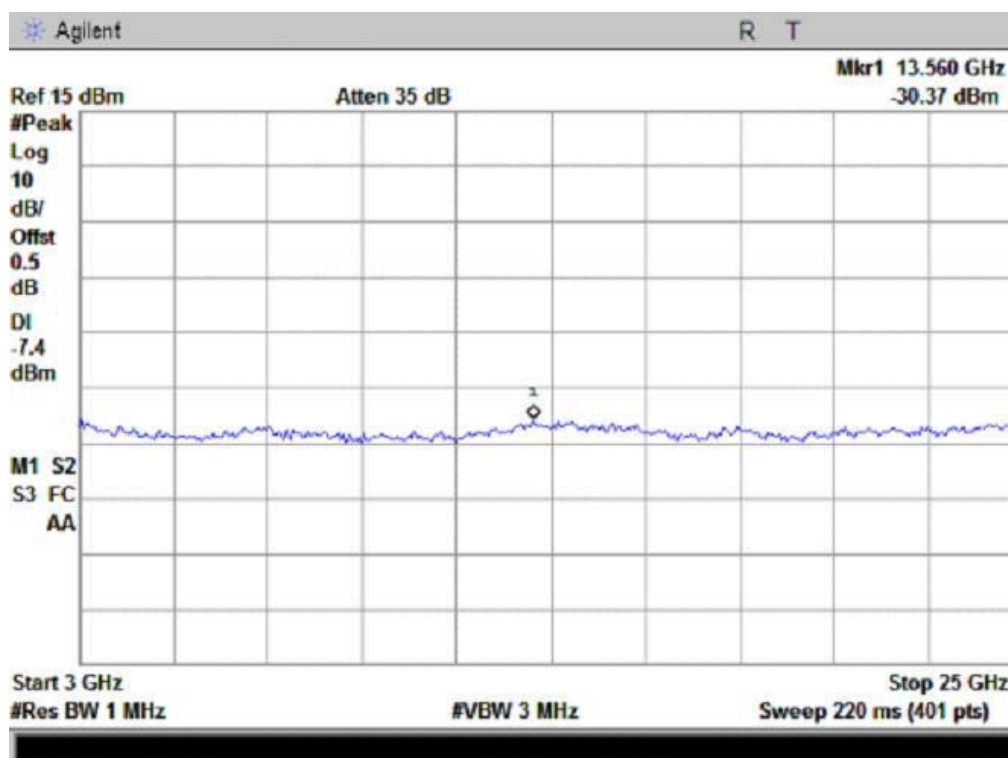
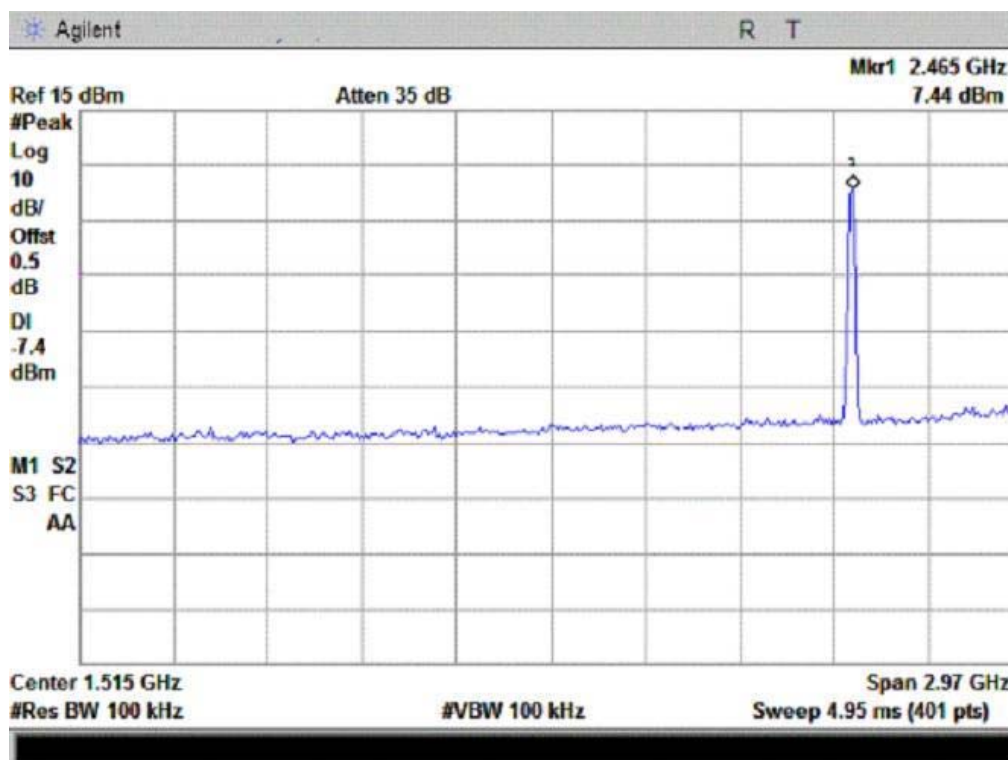
NO.	Frequency	Measurement Bandwidth	Emission Level	Limit	Margin
	MHz	KHz	(dBm)	dBm	dB
<b>TX:802.11 b Low Channel</b>					
1	<1000	100	\	-7.24	>20
2	4824	100	-35.83	-7.24	>20
3	7236	100	\	-7.24	>20
4	9648	100	-43.53	-7.24	>20
5	12060	100	\	-7.24	>20
6	other	100	\	-7.24	>20
<b>TX: 802.11 b Middle Channel</b>					
1	<1000	100	\	-7.84	>20
2	4874	100	-36.14	-7.84	>20
3	7311	100	\	-7.84	>20
4	9748	100	-43.57	-7.84	>20
5	12185	100	\	-7.84	>20
6	other	100	\	-7.84	>20
<b>TX: 802.11 b High Channel</b>					
1	<1000	100	\	-7.36	>20
2	4924	100	-36.63	-7.36	>20
3	7386	100	\	-7.36	>20
4	9848	100	\	-7.36	>20
5	12310	100	\	-7.36	>20
6	other	100	\	-7.36	>20
<b>Measurement uncertainty:±3.2dB</b>					



(802.11b CH Low)

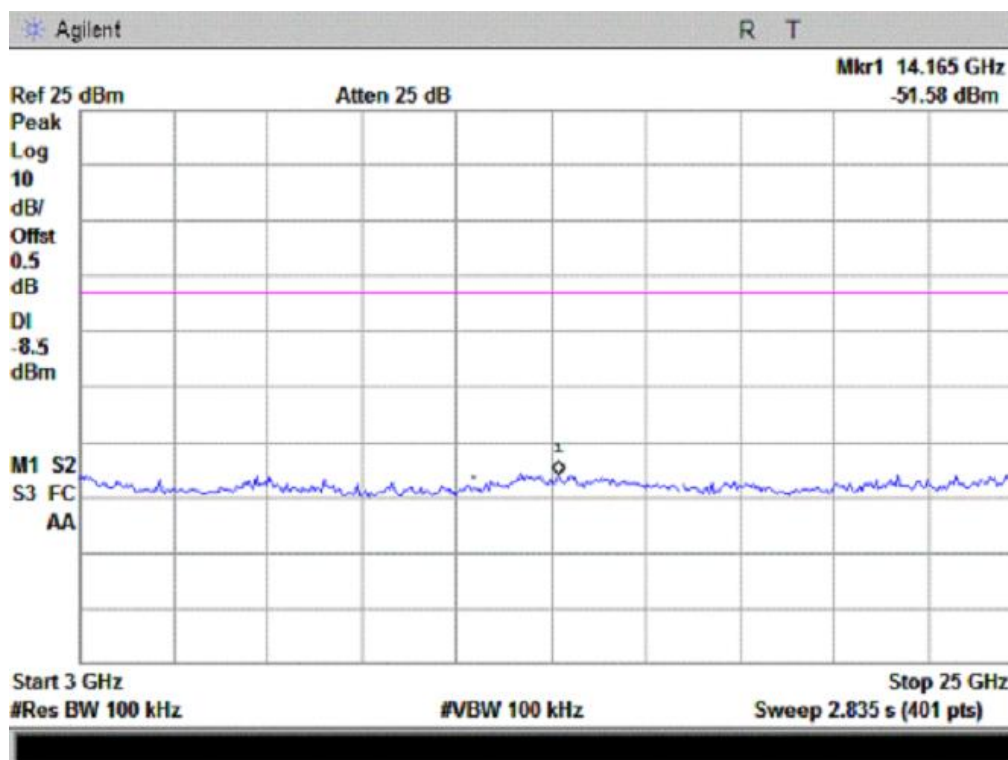
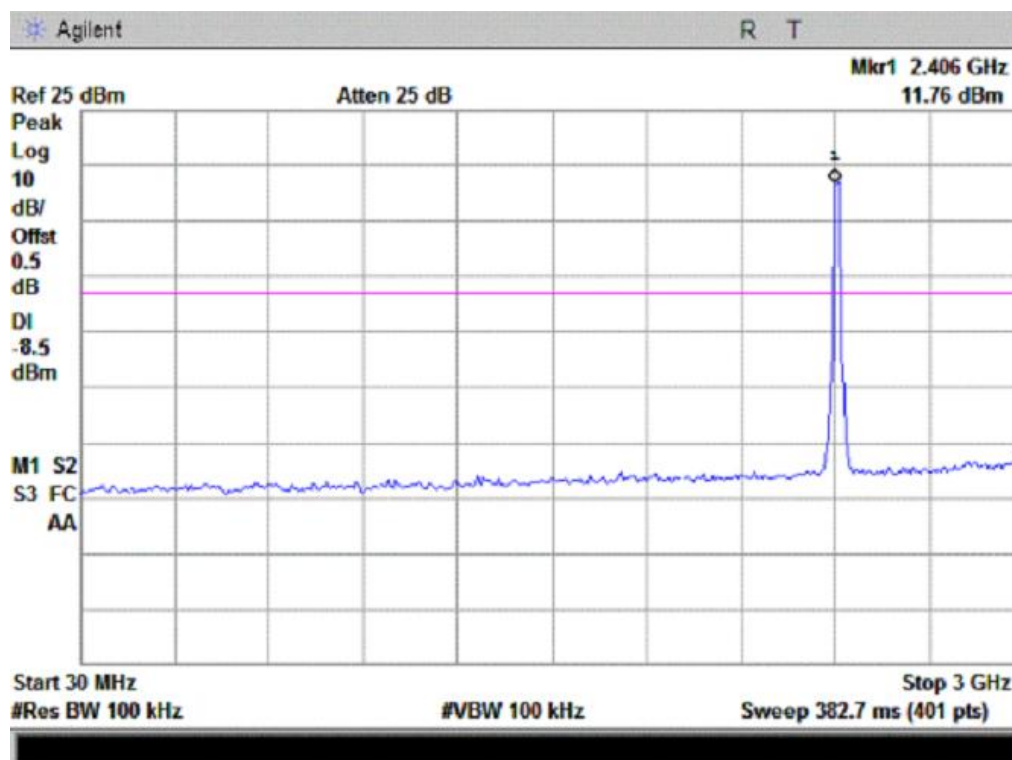


(802.11b CH Middle)

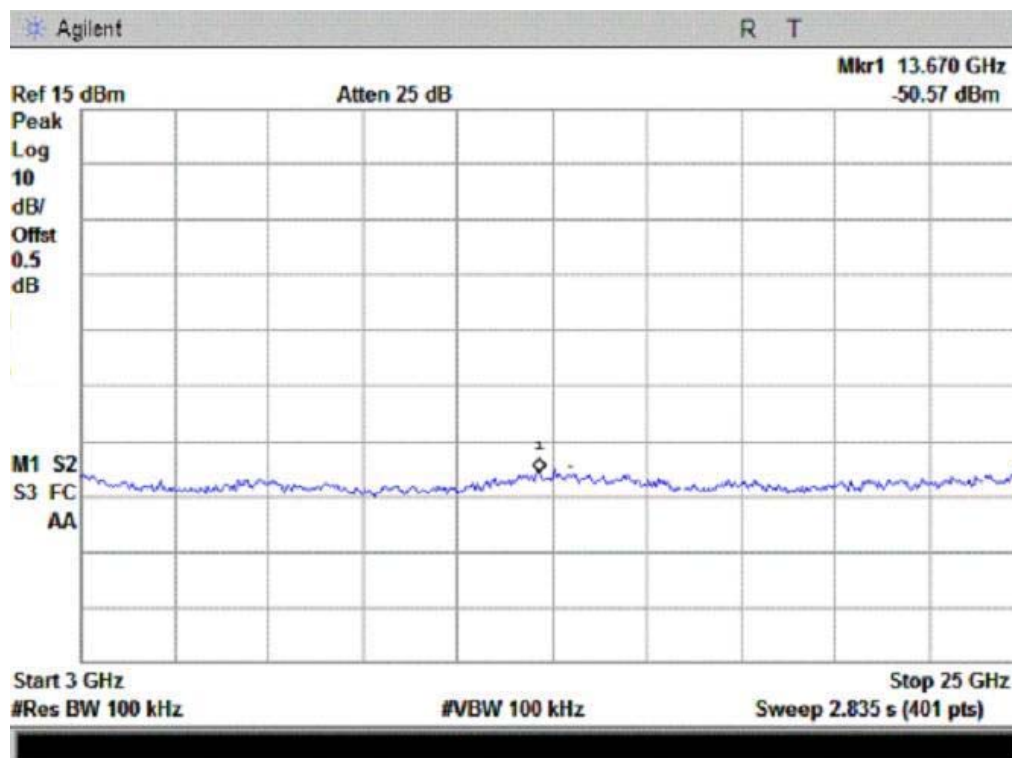
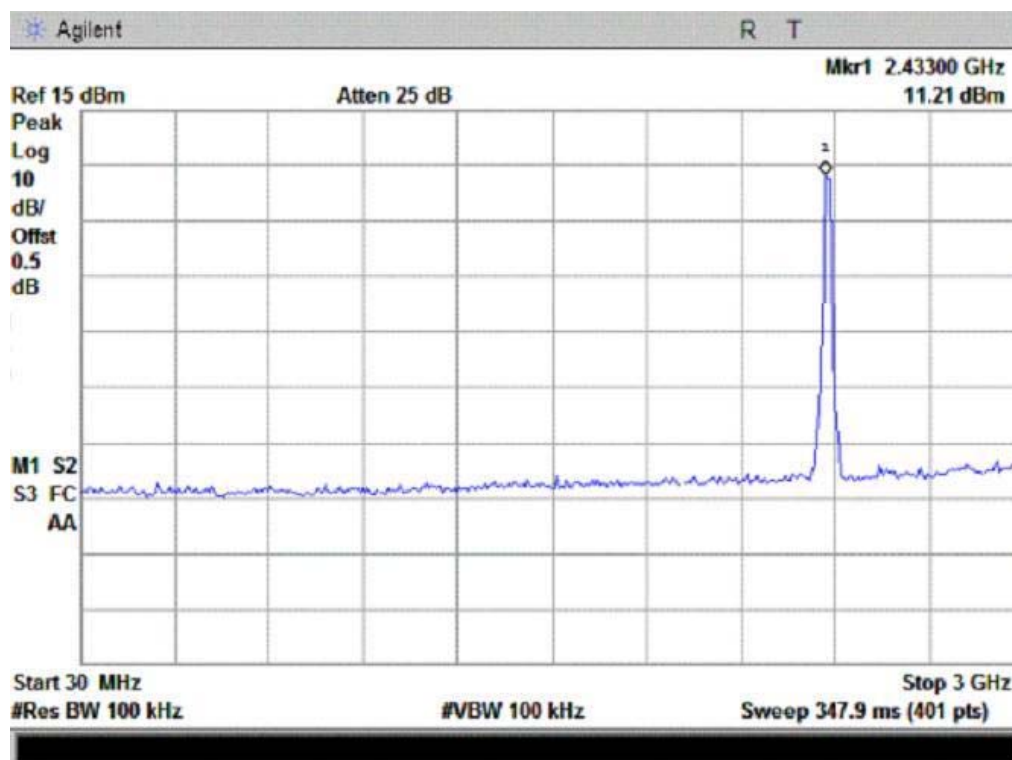


(802.11b CH High)

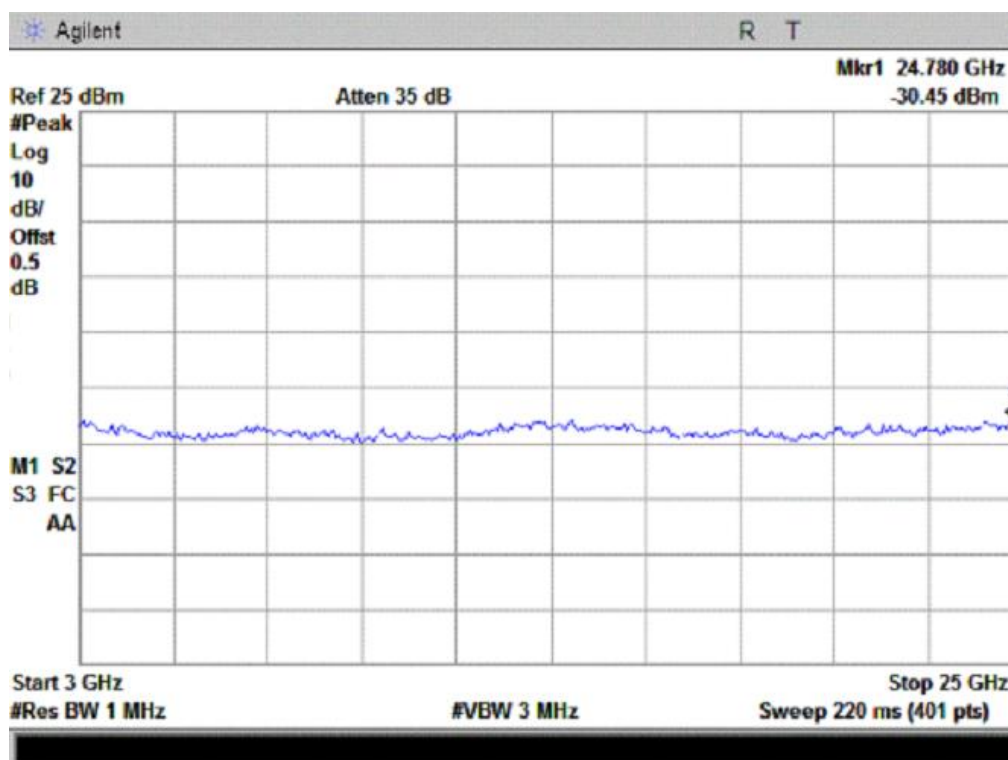
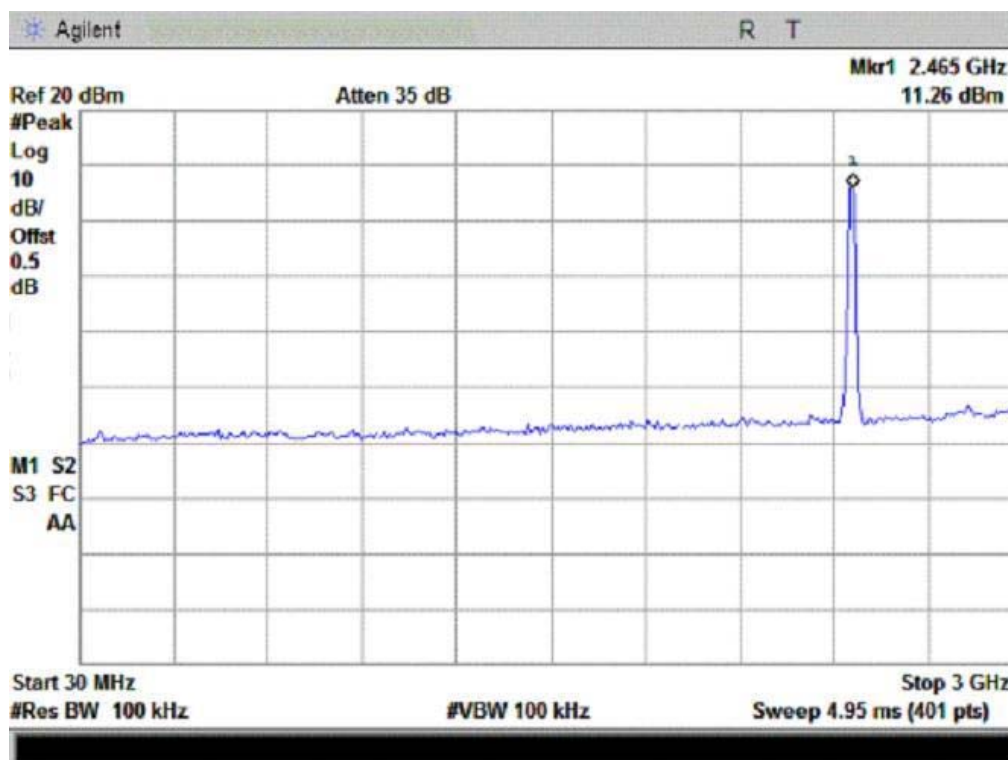
NO.	Frequency	Measurement Bandwidth	Emission Level (dBm)	Limit	Margin
	MHz	KHz	dBm	dBm	dB
<b>TX:802.11 g Low Channel</b>					
1	<1000	100	\	-8.55	>20
2	4824	100	-37.61	-8.55	>20
3	7236	100	\	-8.55	>20
4	9648	100	\	-8.55	>20
5	12060	100	\	-8.55	>20
6	other	100	\	-8.55	>20
<b>TX: 802.11 g Middle Channel</b>					
1	<1000	100	\	-8.60	>20
2	4874	100	-36.17	-8.60	>20
3	7311	100	\	-8.60	>20
4	9748	100	\	-8.60	>20
5	12185	100	\	-8.60	>20
6	other	100	\	-8.60	>20
<b>TX: 802.11 g High Channel</b>					
1	<1000	100	\	-8.64	>20
2	4924	100	-37.53	-8.64	>20
3	7386	100	\	-8.64	>20
4	9848	100	\	-8.64	>20
5	12310	100	\	-8.64	>20
6	other	100	\	-8.64	>20
<b>Measurement uncertainty:±3.2dB</b>					



(802.11g CH Low)

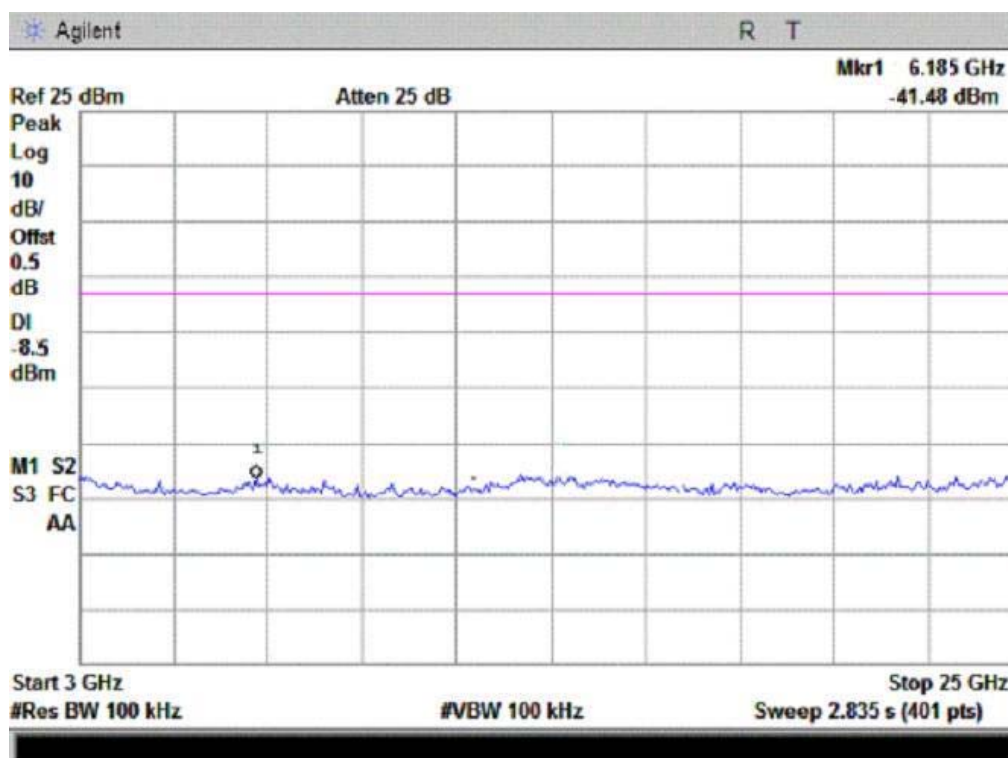
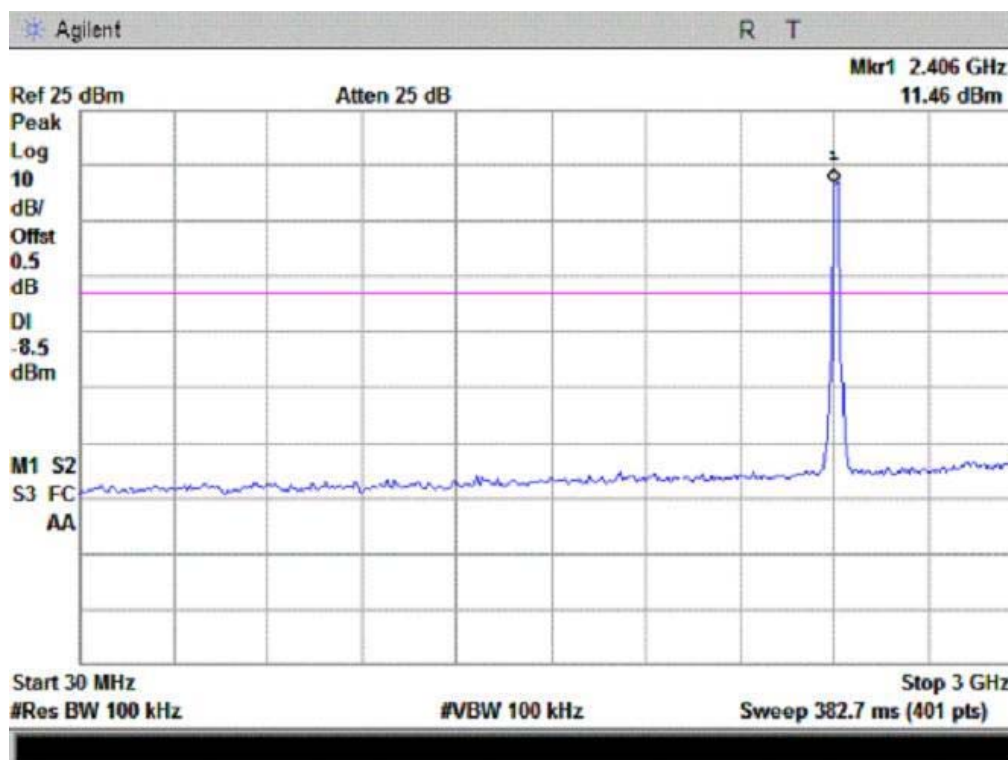


(802.11g CH Middle)

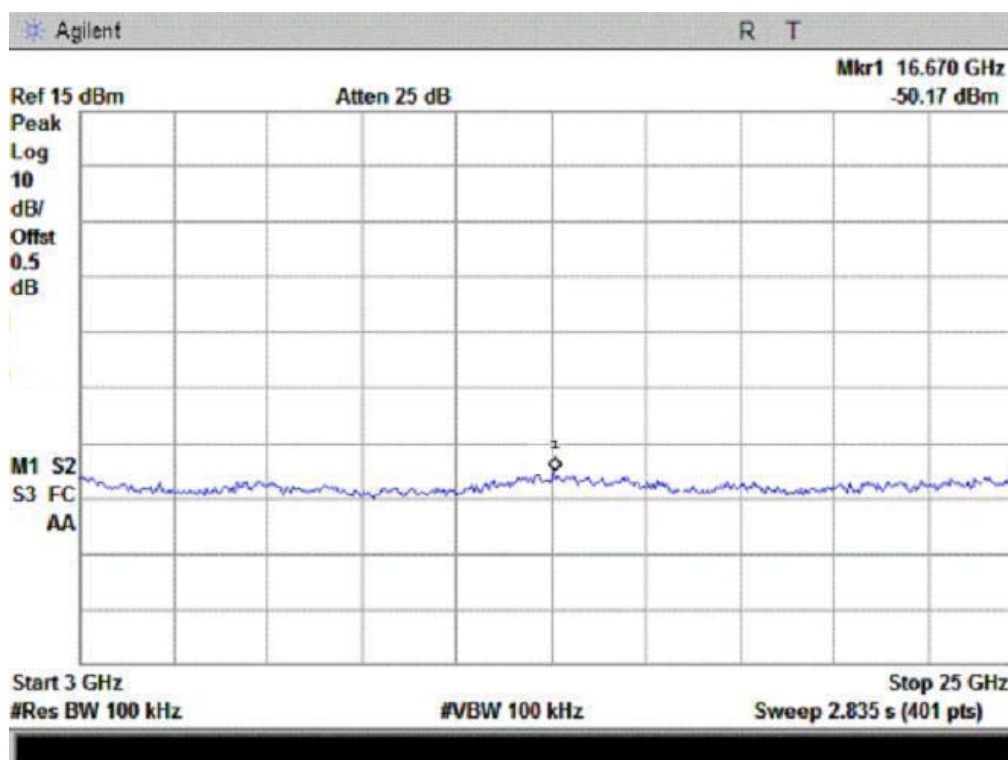
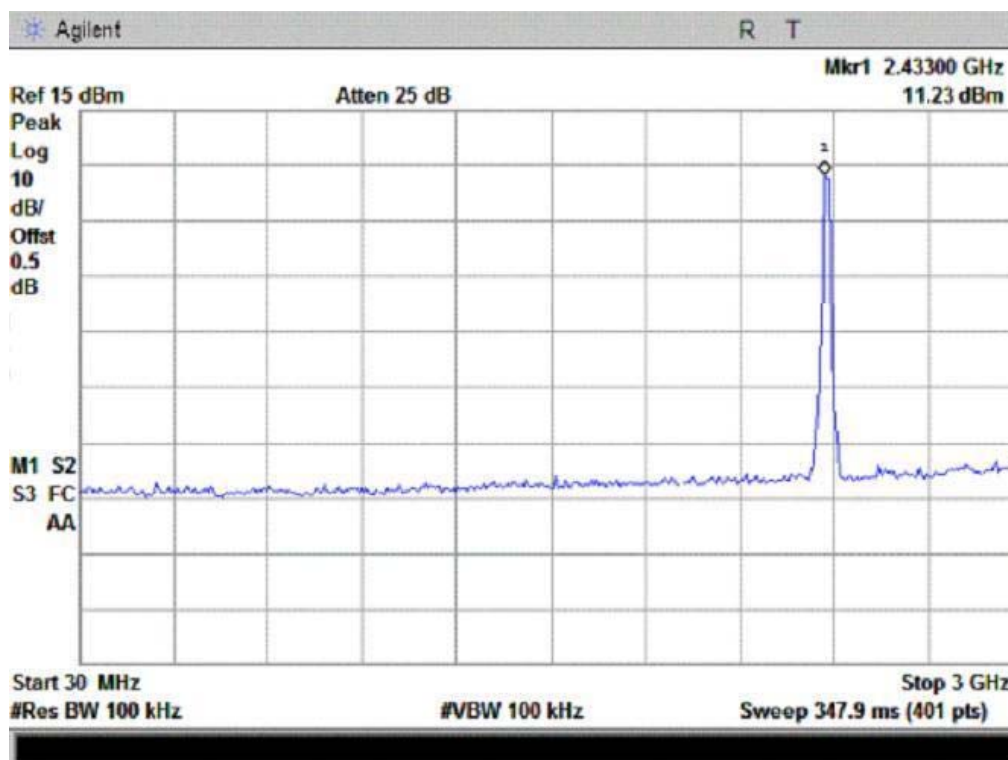


(802.11g CH High)

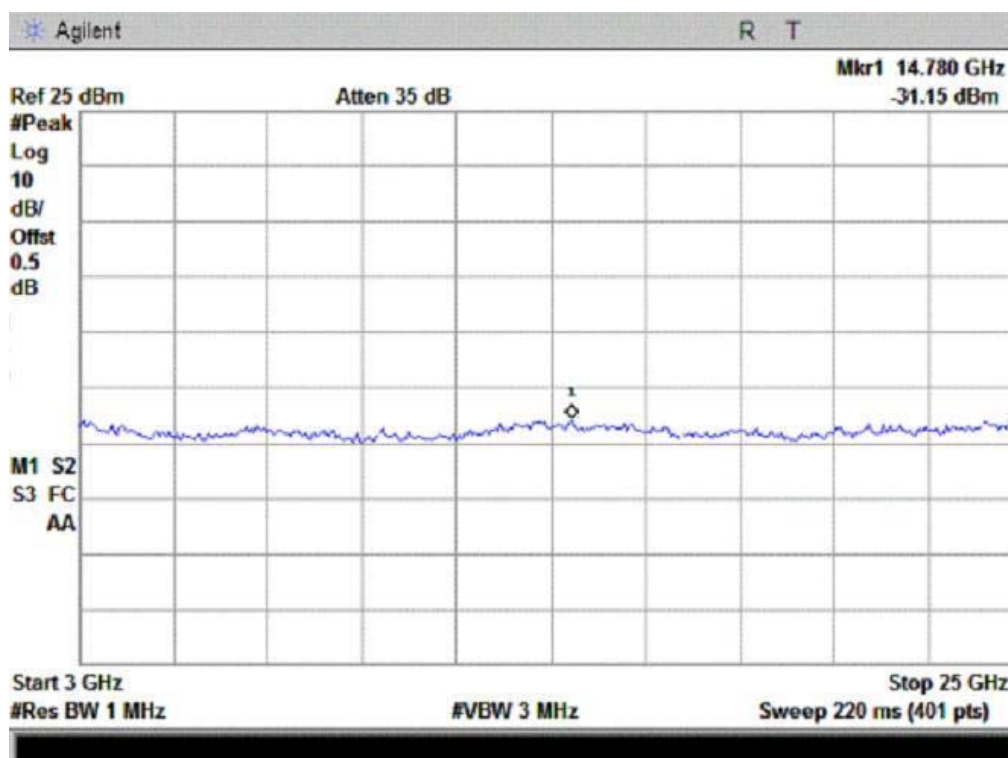
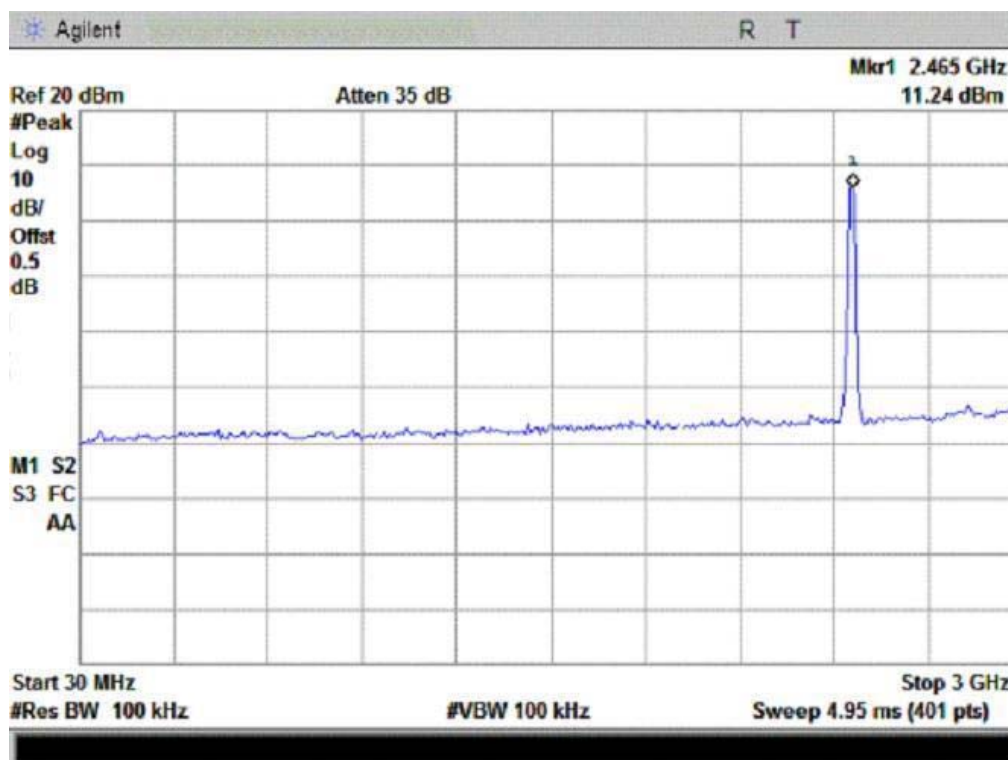
NO.	Frequency	Measurement Bandwidth	Emission Level (dBm)	Limit	Margin
	MHz	KHz	dBm	dBm	dB
<b>TX:802.11 n-20MHz Low Channel</b>					
1	<1000	100	\	-7.85	>20
2	4824	100	-38.73	-7.85	>20
3	7236	100	\	-7.85	>20
4	9648	100	\	-7.85	>20
5	12060	100	\	-7.85	>20
6	other	100	\	-7.85	>20
<b>TX: 802.11 n-20MHz Middle Channel</b>					
1	<1000	100	\	-7.89	>20
2	4874	100	-37.43	-7.89	>20
3	7311	100	\	-7.89	>20
4	9748	100	\	-7.89	>20
5	12185	100	\	-7.89	>20
6	other	100	\	-7.89	>20
<b>TX: 802.11 n-20MHz High Channel</b>					
1	<1000	100	\	-7.92	>20
2	4924	100	-37.12	-7.92	>20
3	7386	100	\	-7.92	>20
4	9848	100	\	-7.92	>20
5	12310	100	\	-7.92	>20
6	other	100	\	-7.92	>20
<b>Measurement uncertainty:±3.2dB</b>					



(802.11n CH Low)



(802.11n CH Middle)



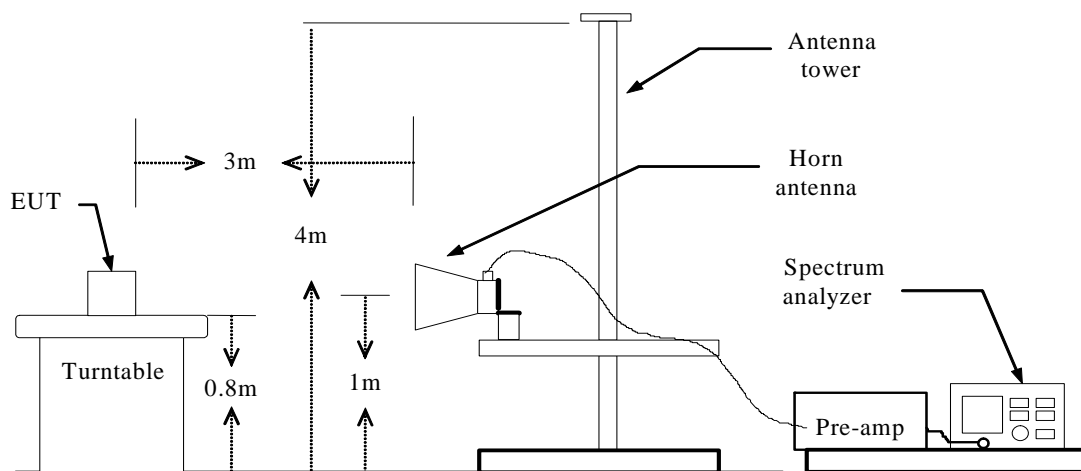
(802.11n CH High)

## 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

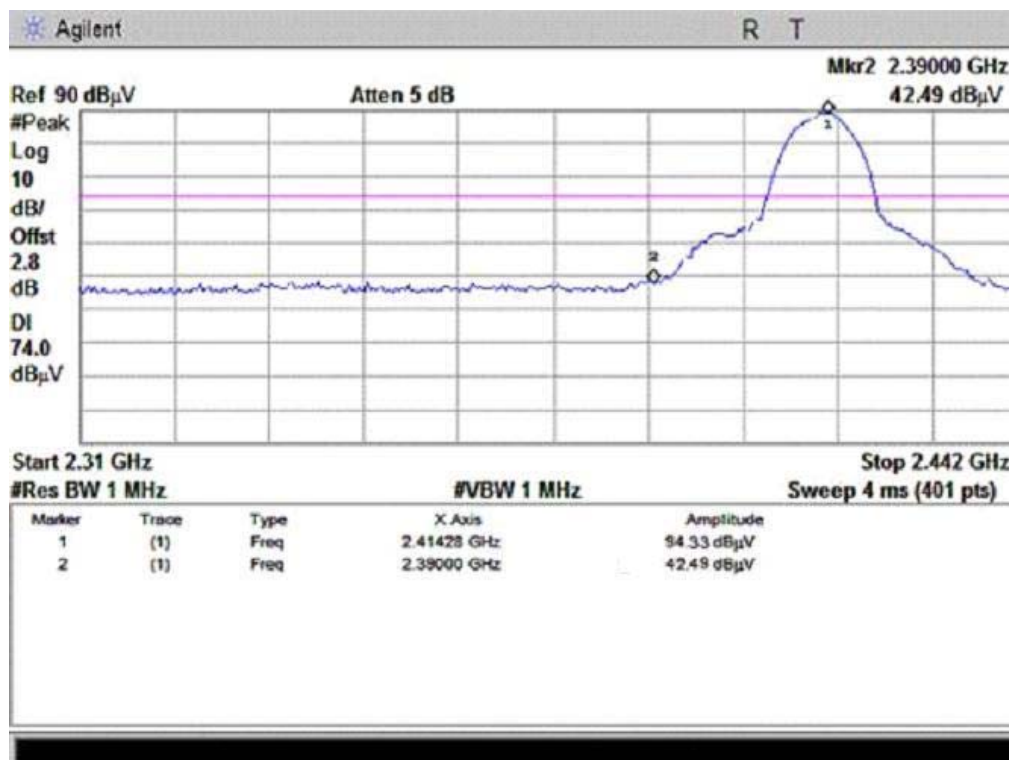


### 5.4.3 Test Result

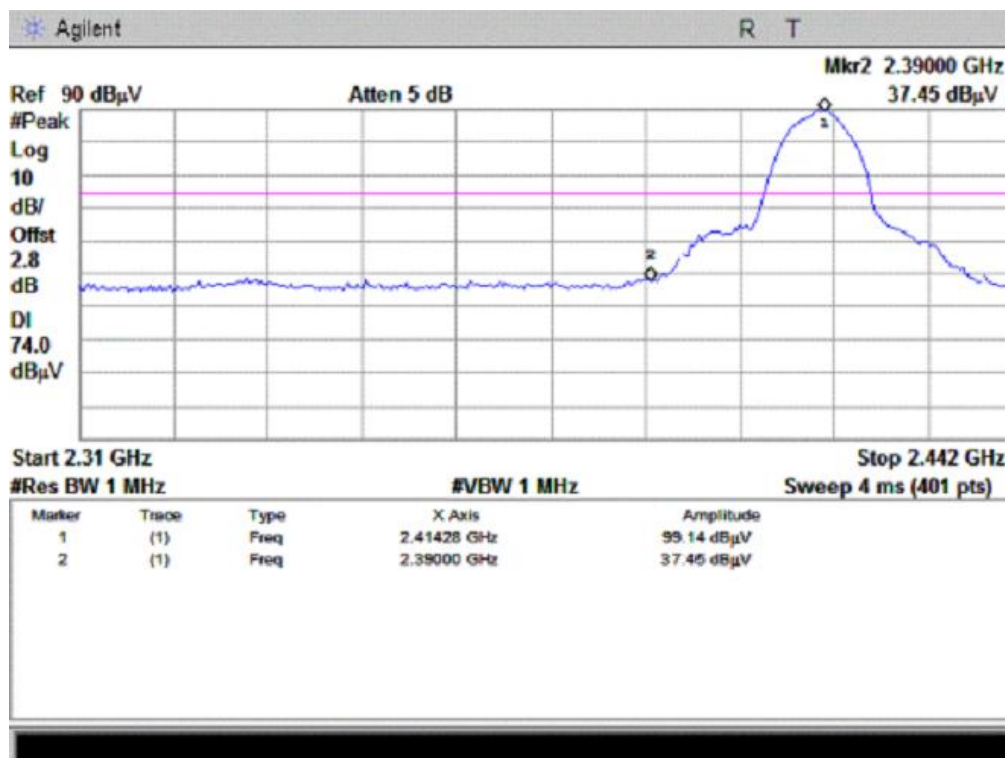
The EUT operates at continuous transmit test mode. The peak and average test data of the lowest and highest channels are tested to verify the band edge emissions.

Test Mode		Channel Marked Frequency	Limit (dBuv/m)	Test Result Highest Emission (dBuv/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
802.11 b	Low Channel	2300MHz	74(Peak) 54(Average)	30.56	20.44	30.78	20.41
		2390MHz		37.45	23.59	42.49	22.52
	High Channel	2483.5MHz		49.97	40.46	45.35	40.49
		2500MHz		31.61	23.34	30.81	23.38
802.11 g	Low Channel	2300MHz		30.48	20.59	30.37	20.34
		2390MHz		43.03	25.01	48.98	24.59
	High Channel	2483.5MHz		47.19	40.48	48.51	40.67
		2500MHz		31.02	22.78	30.86	23.59
802.11 n -20MHz	Low Channel	2300MHz		30.69	20.84	30.57	20.45
		2390MHz		43.93	24.23	48.93	25.07
	High Channel	2483.5MHz		48.40	40.64	47.23	40.62
		2500MHz		31.15	22.81	30.87	23.68

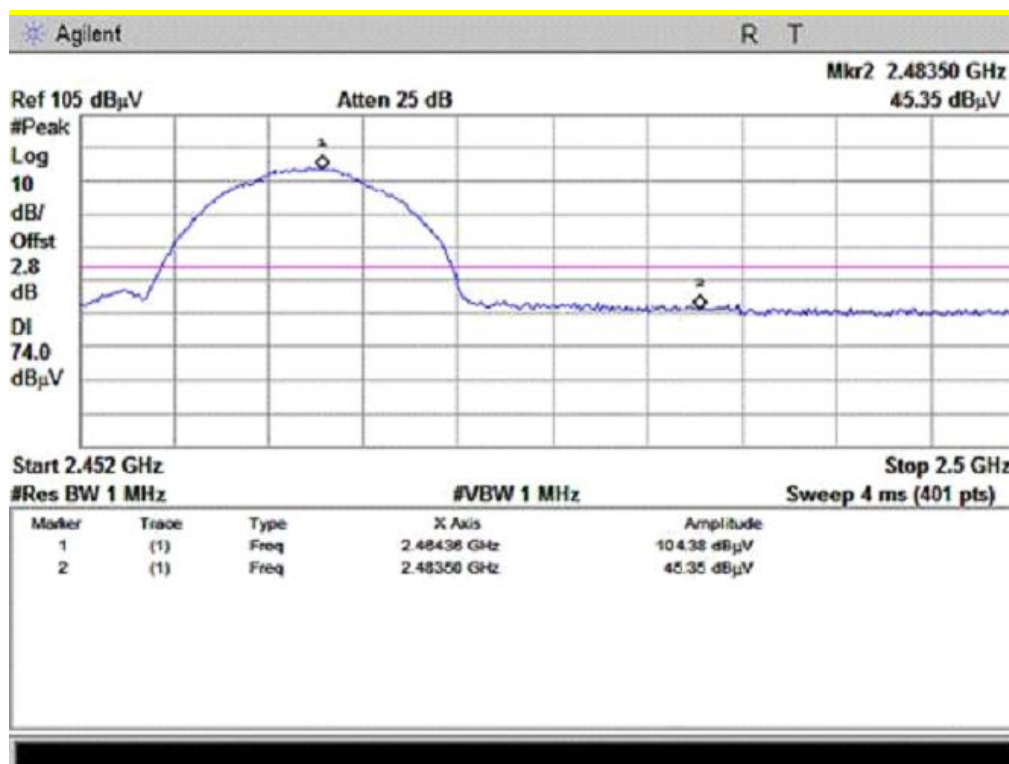
## Test Plot:



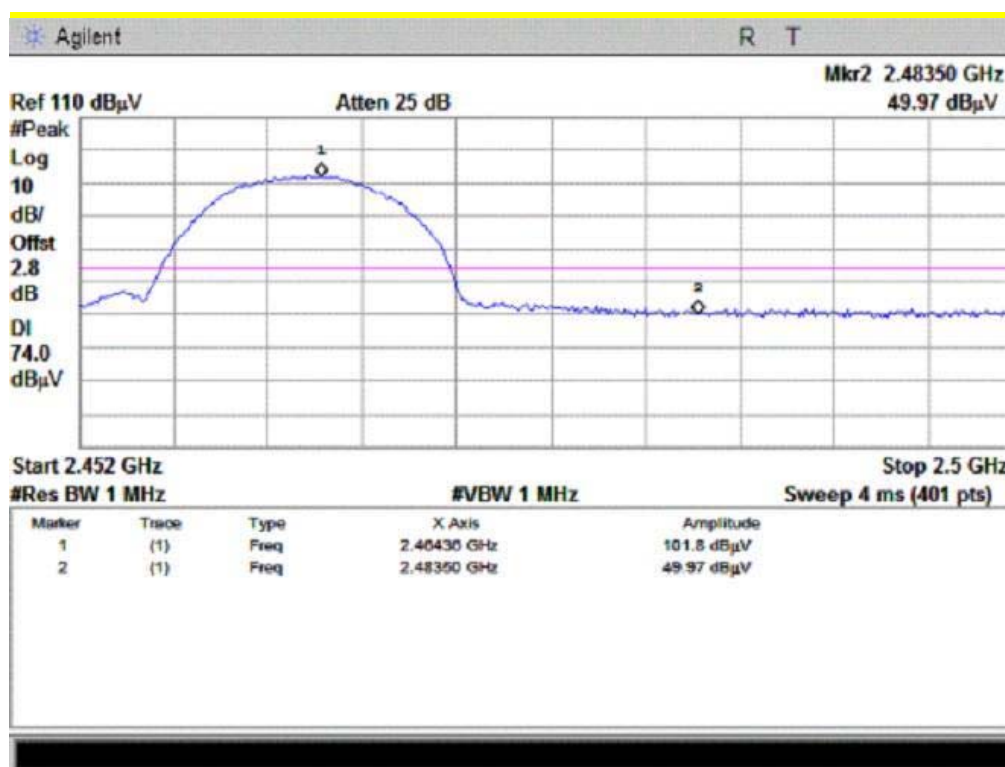
(802.11 b,CH Low, Horizontal, Peak)



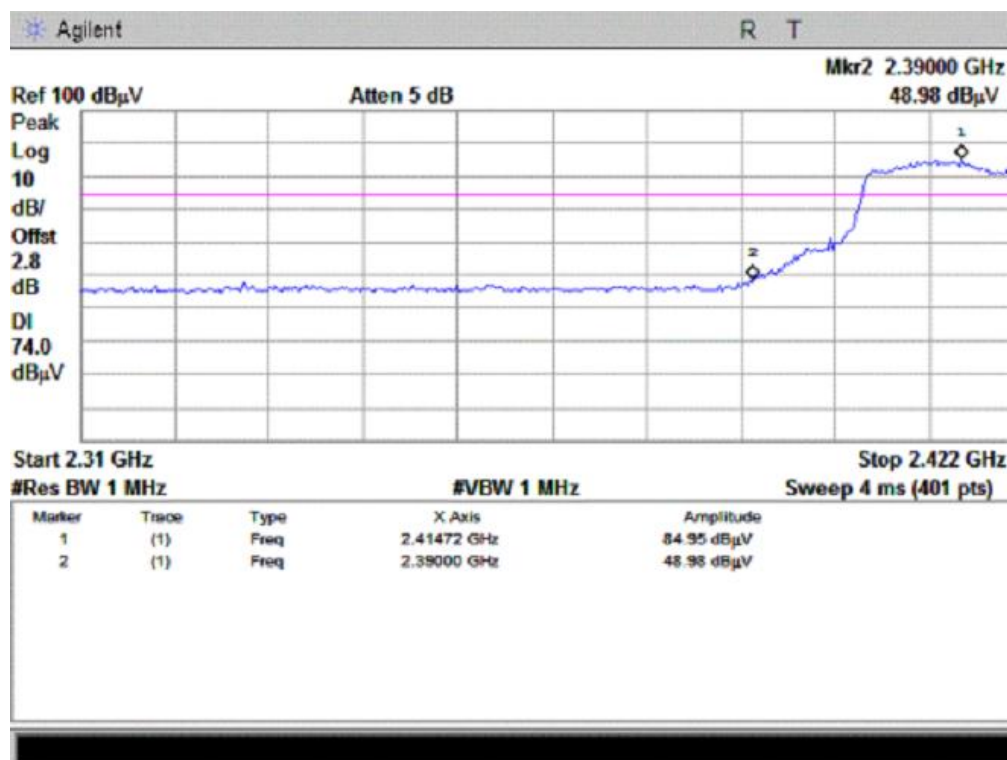
(802.11 b,CH Low, Vertical, Peak)



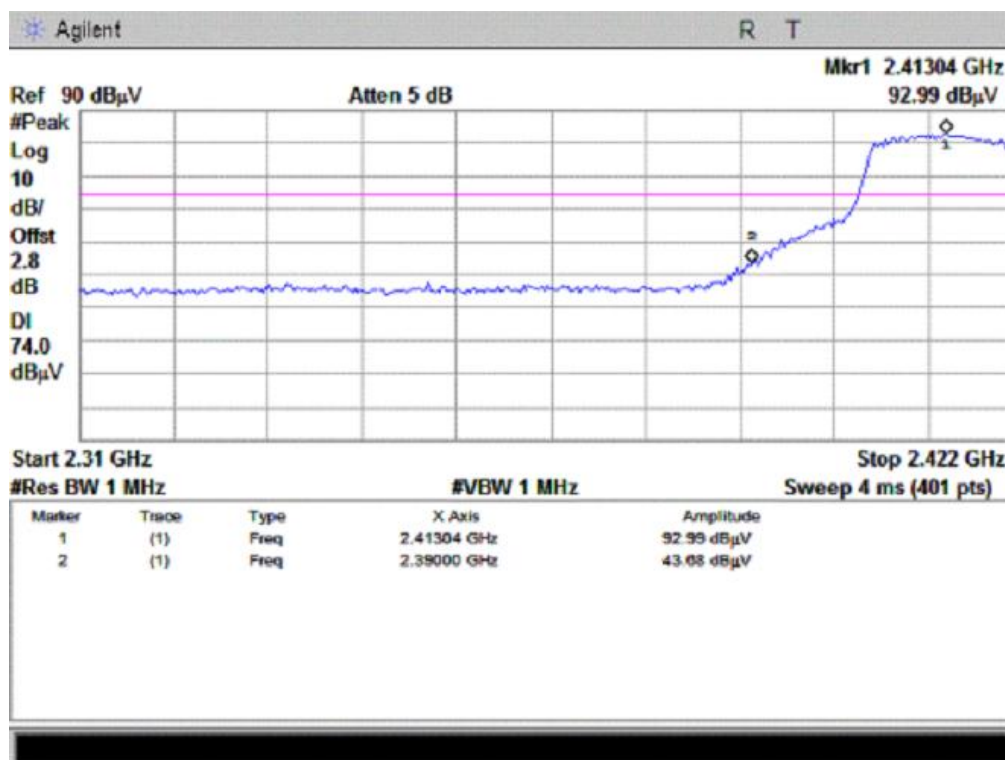
(802.11 b,CH High, Horizontal, Peak)



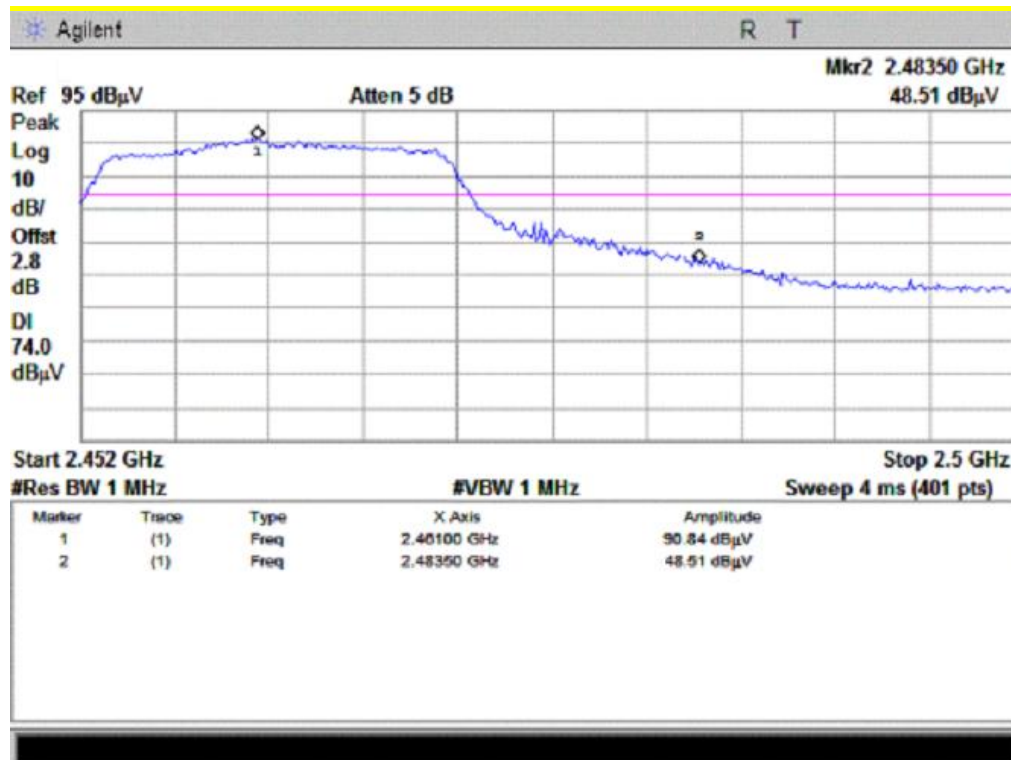
(C802.11 b,CH High, Vertical, Peak)



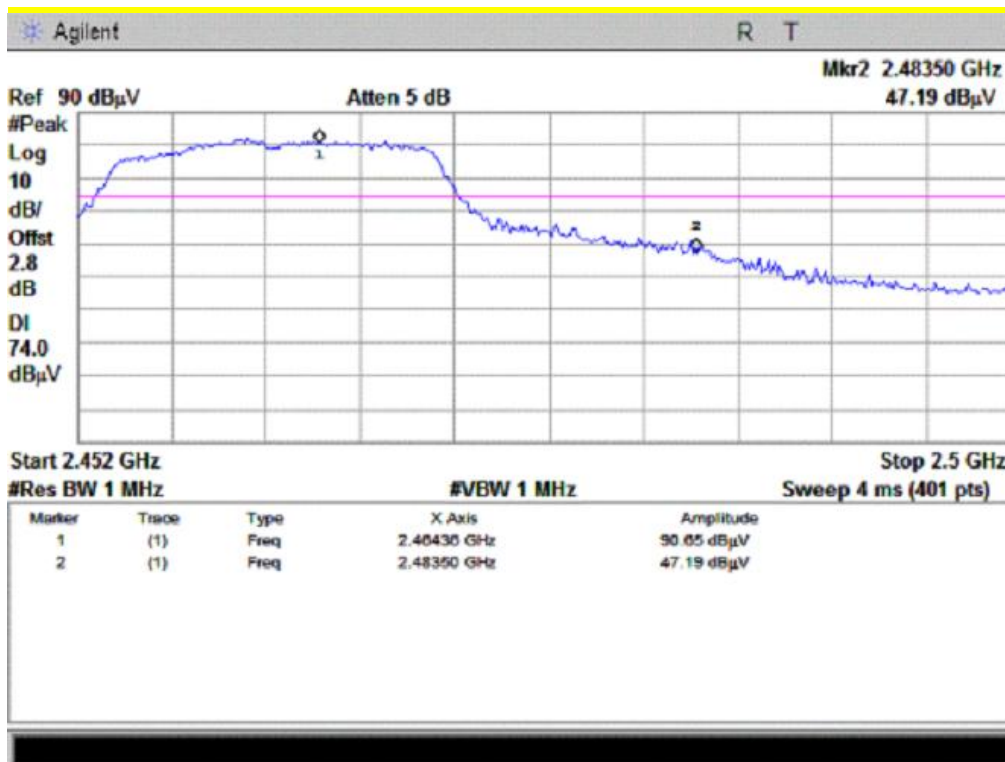
(802.11 g, CH Low, Horizontal, Peak)



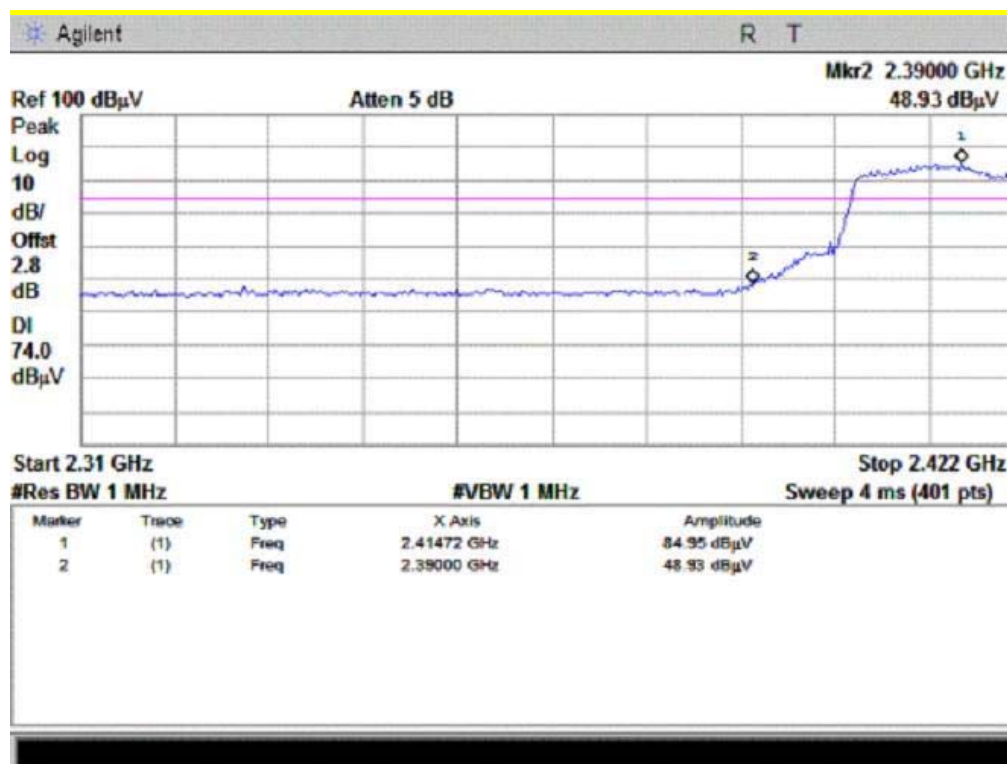
(802.11 g, CH Low, Vertical, Peak)



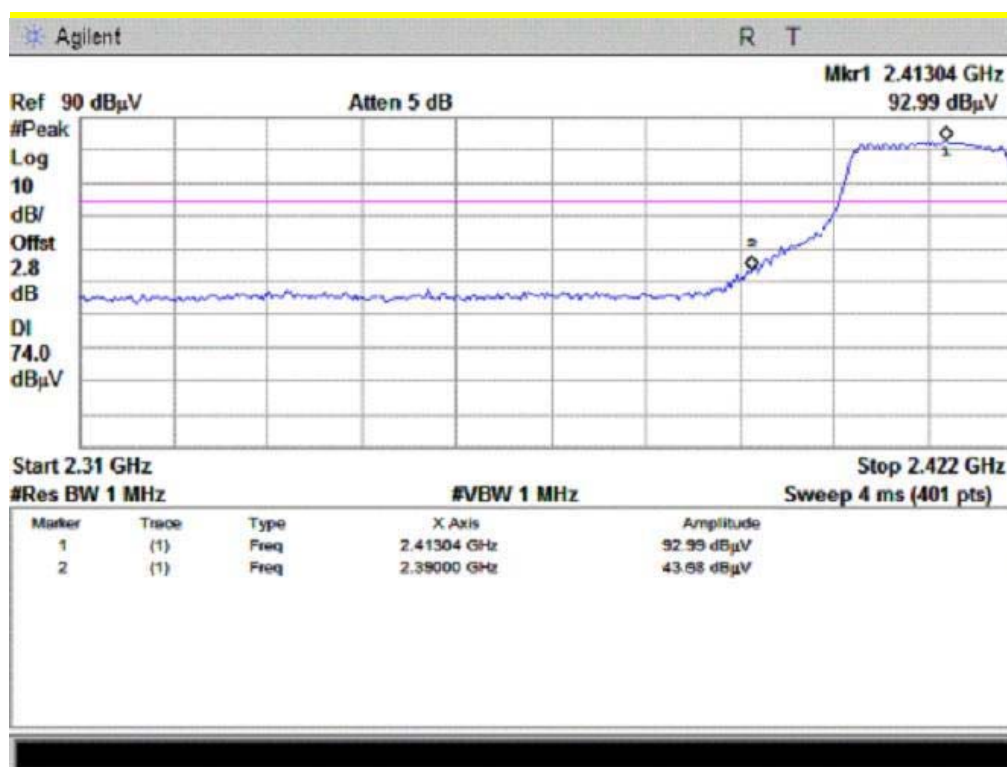
(802.11 g,CH High, Horizontal, Peak)



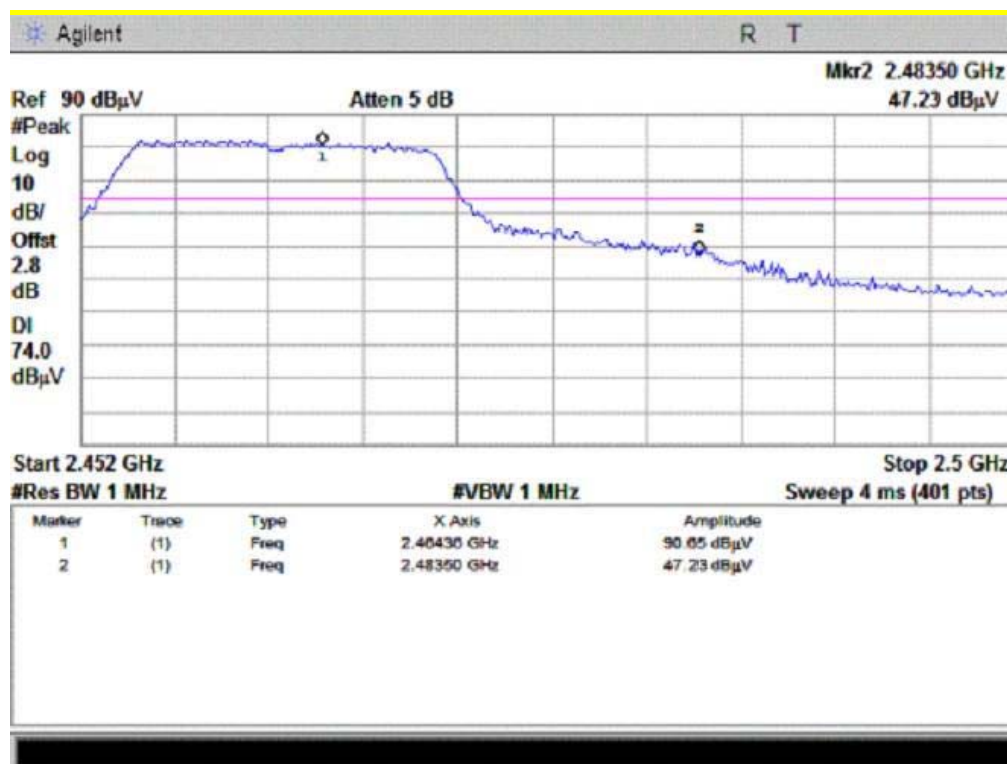
(C802.11 g,CH High, Vertical, Peak)



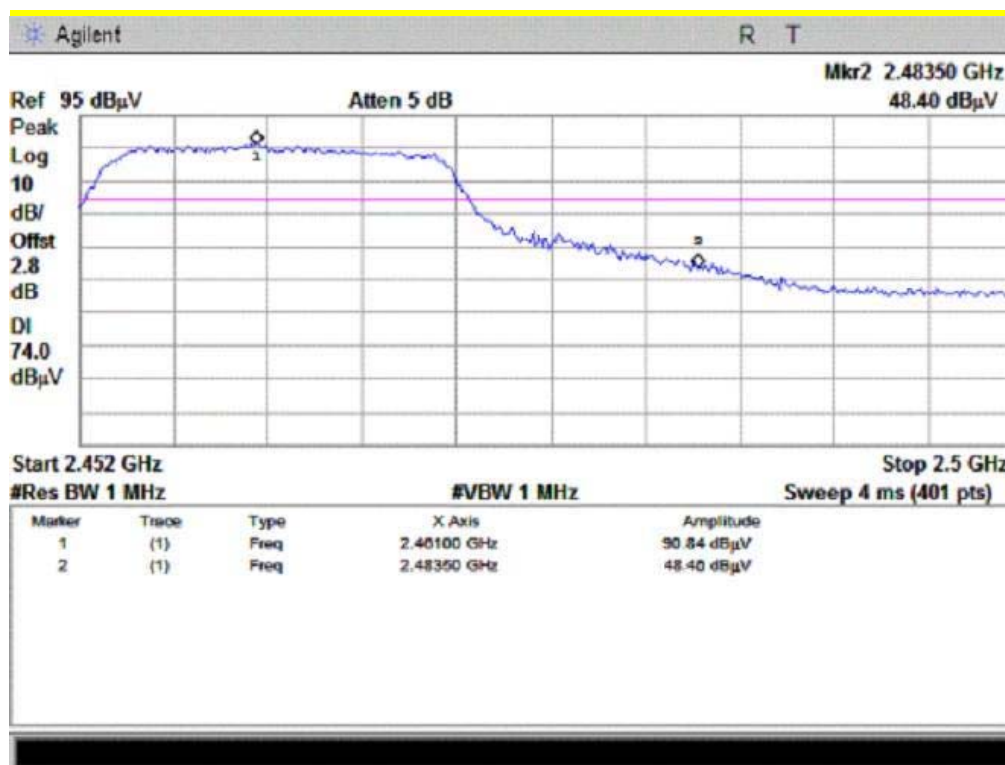
(802.11 n,CH Low, Horizontal, Peak)



(802.11 n,CH Low, Vertical, Peak)



(802.11 n,CH High, Horizontal, Peak)



(C802.11 n,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

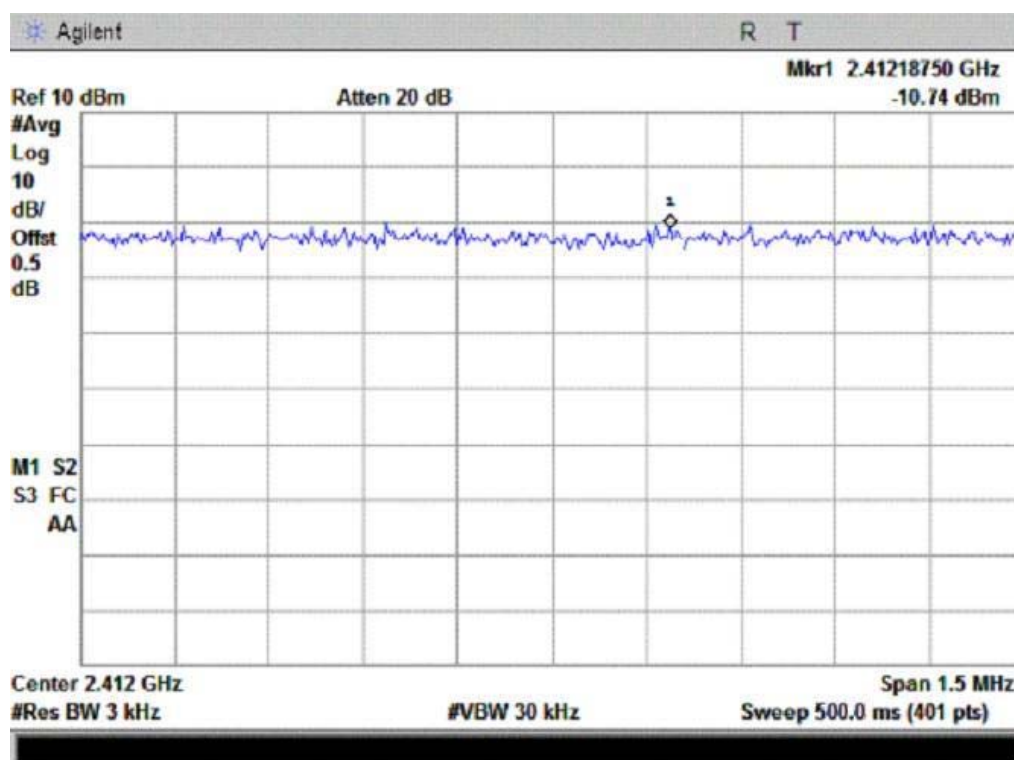
See section 5.1.2 of this report.

### 5.5.3 Test Result

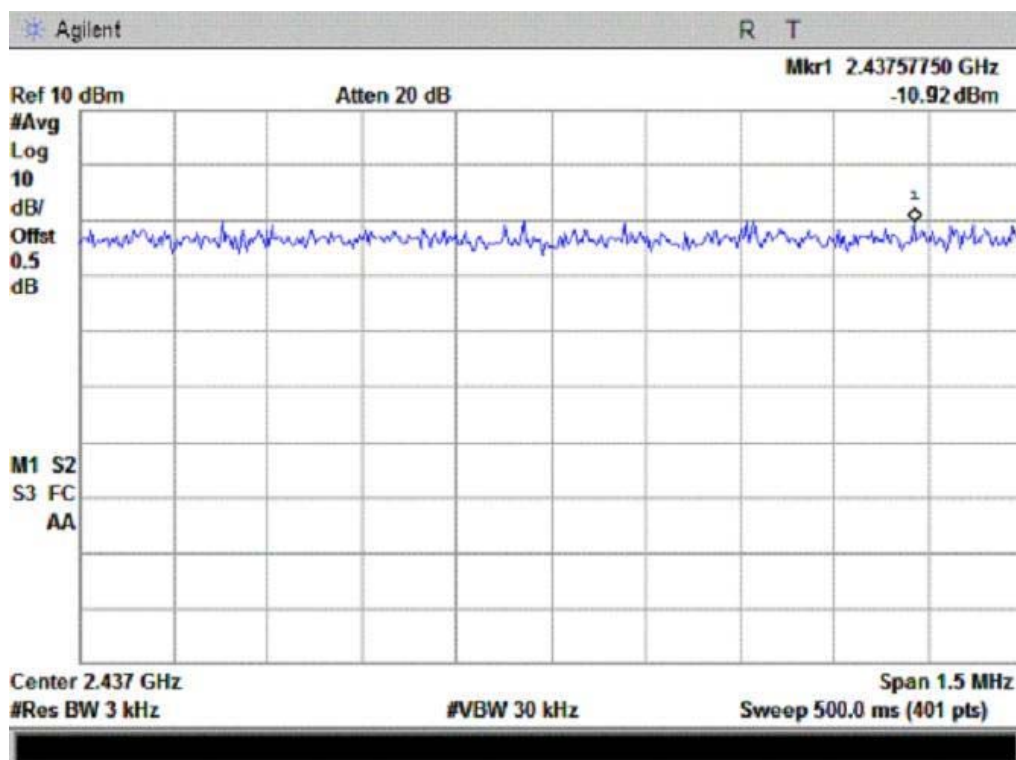
The lowest, middle and highest channels are tested to verify the power spectral density.

#### 802.11b Test Mode

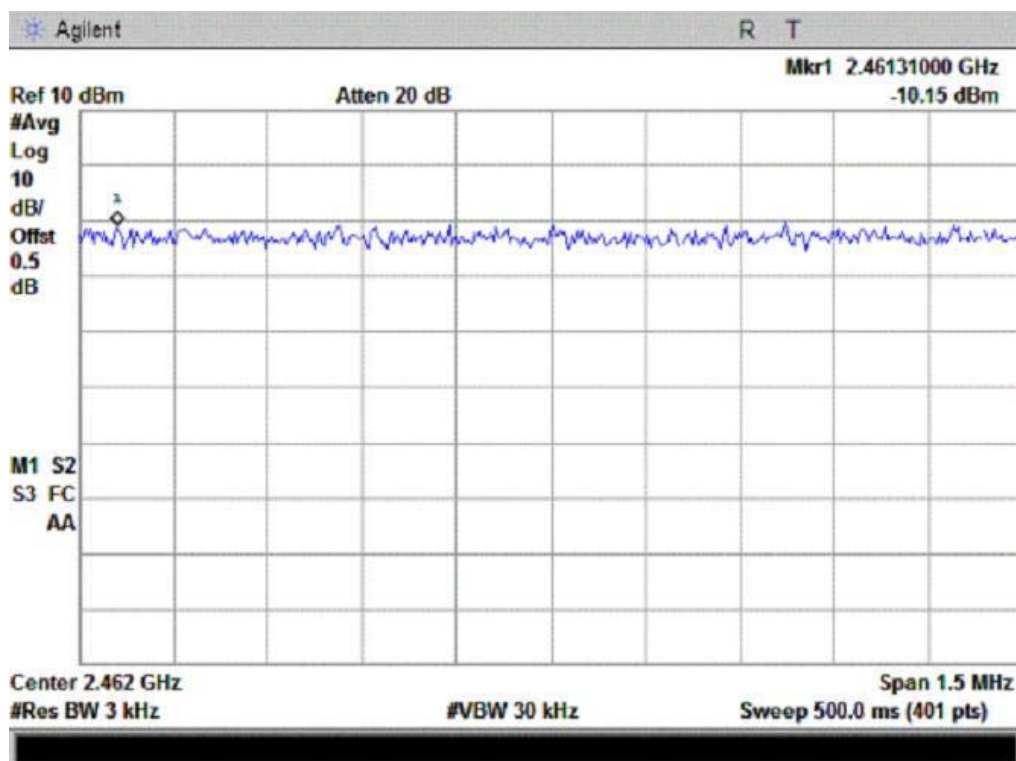
Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
Low	2412	-10.74	≤8	PASS
Middle	2437	-10.92		PASS
High	2462	-10.15		PASS



(Low Channel)



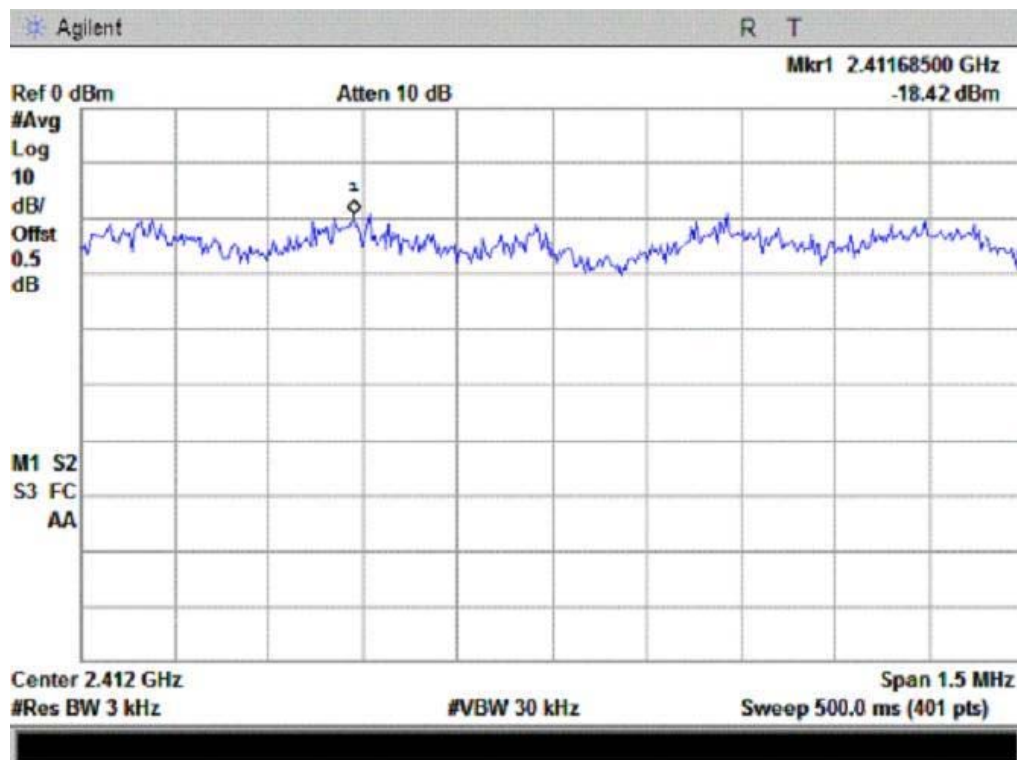
(Middle Channel)



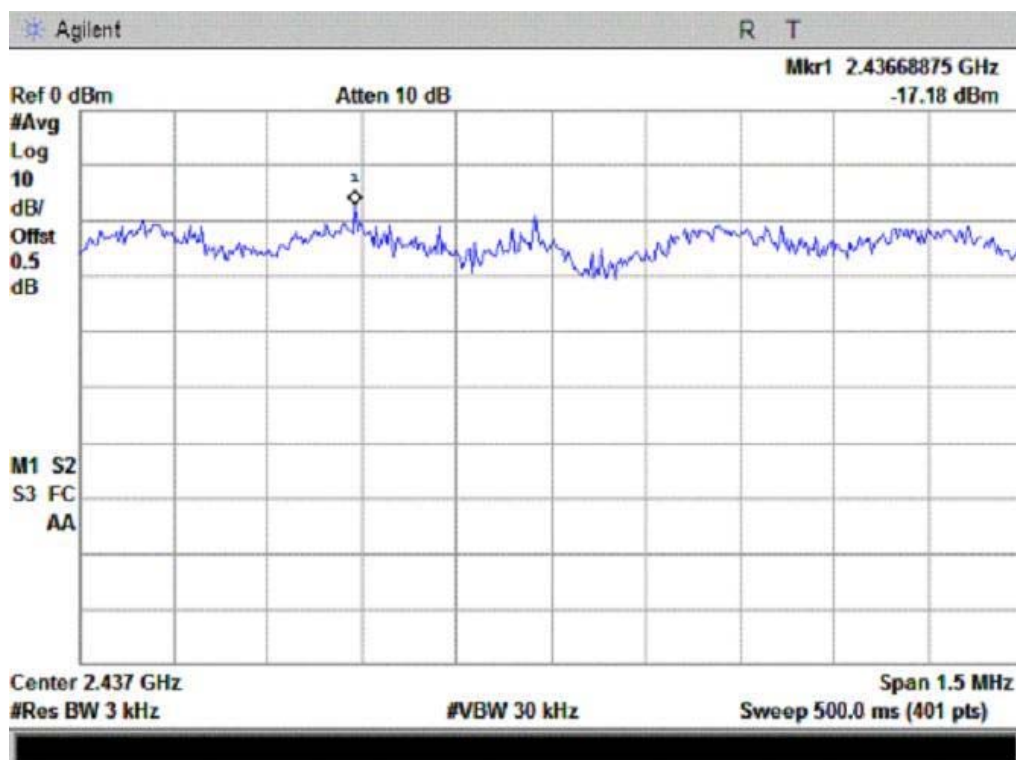
(High Channel)

## 802.11g Test Mode

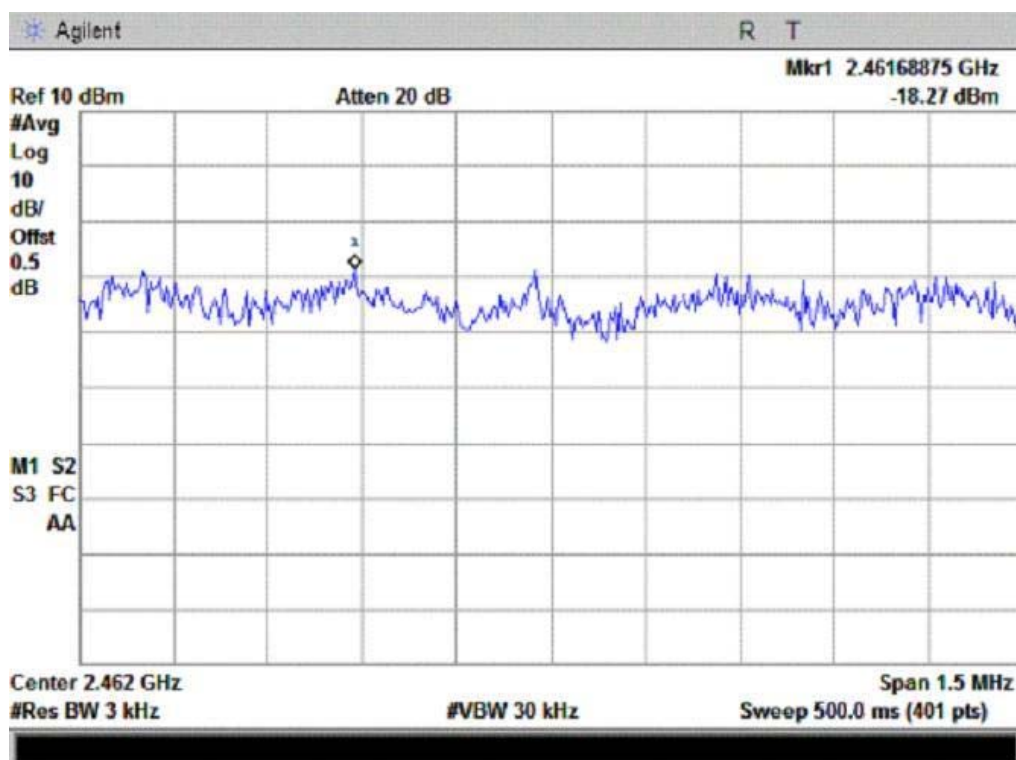
Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
Low	2412	-18.42	≤8	PASS
Middle	2437	-17.18		PASS
High	2462	-18.27		PASS



(Low Channel)



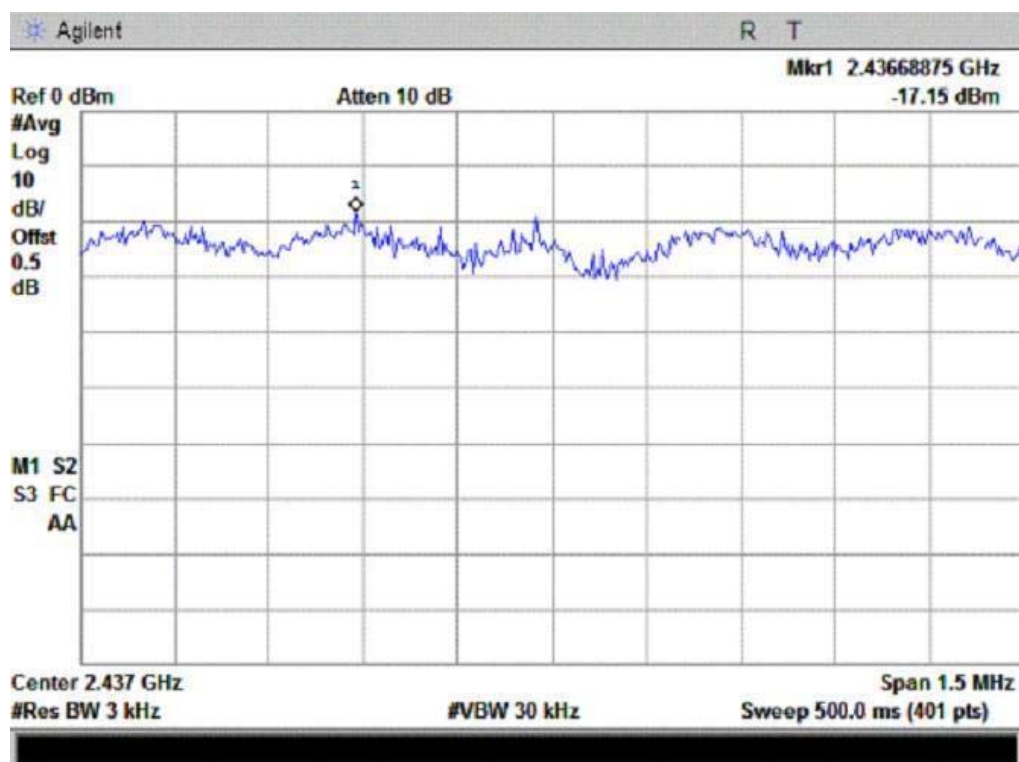
(Middle Channel)



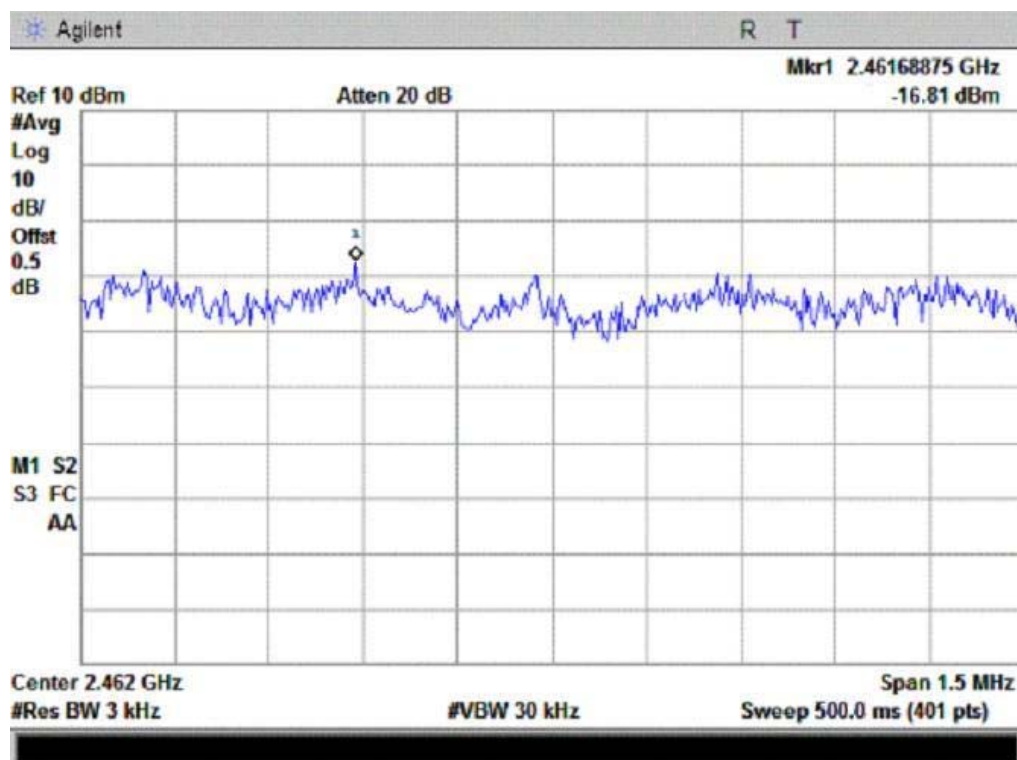
(High Channel)

## 802.11n-20MHz Test Mode

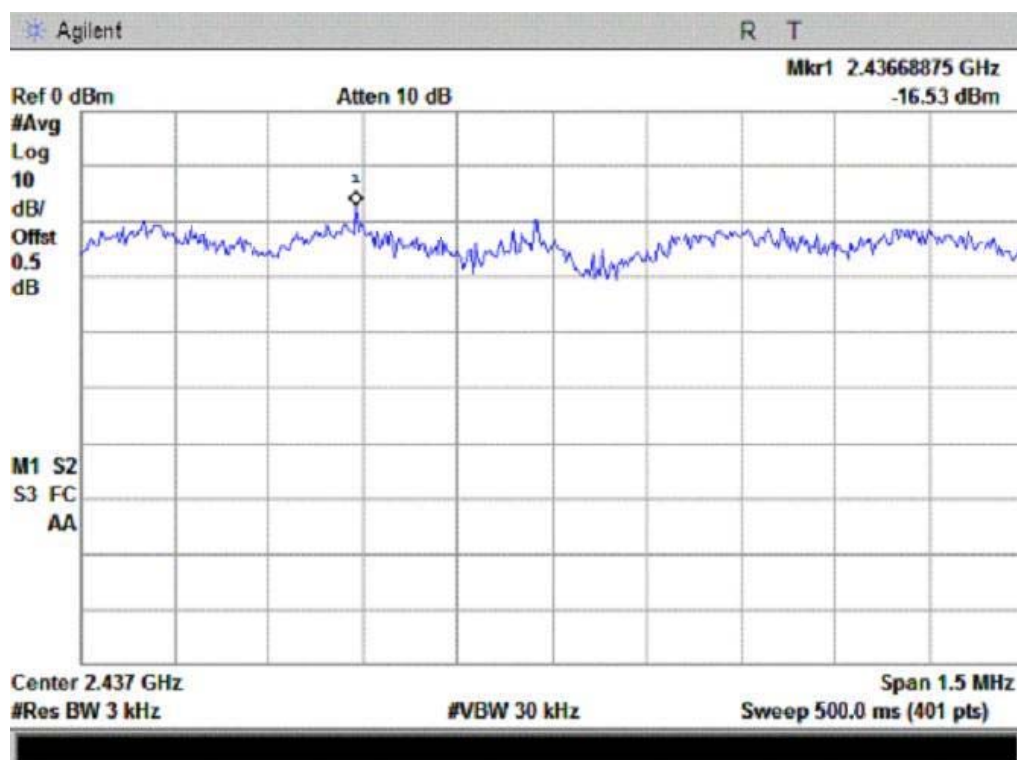
Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
Low	2412	-17.15	≤8	PASS
Middle	2437	-16.81		PASS
High	2462	-16.53		PASS



(Low Channel)



(Middle Channel)



(High Channel)

## 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).

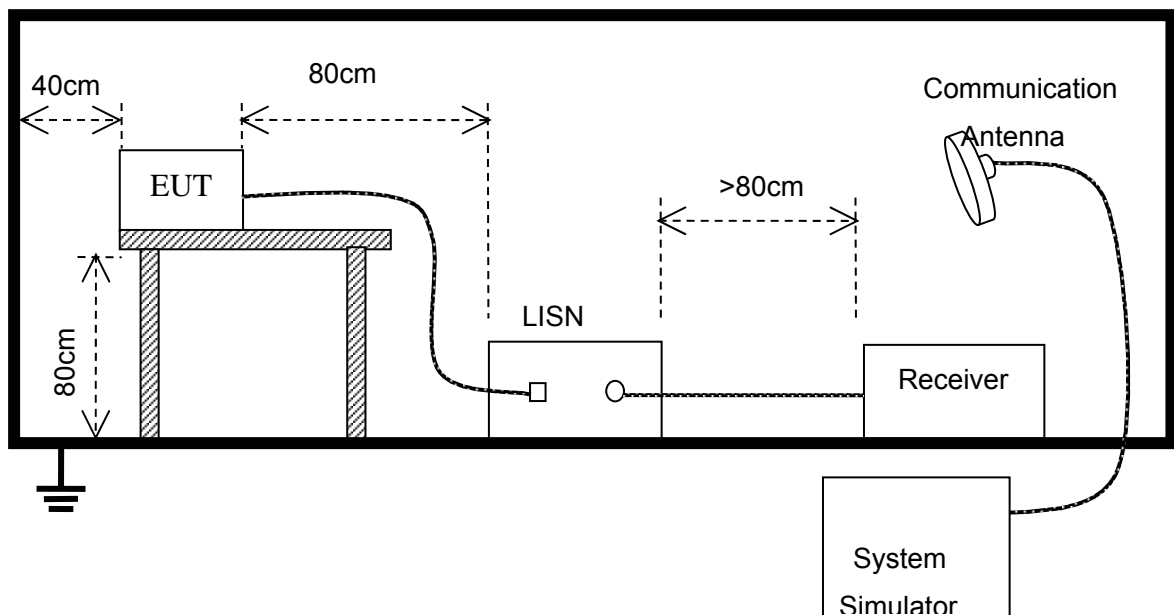
Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**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 Mode:**

Preliminary Radiated Emission Test				
Frequency Range Investigated			9 KHz TO 18000 MHz	
Mode of operation	Date	Report No.	Data#	Worst Mode
Charger Model: HWT-15W-050200	2011-9-20	MOST110902F3	0_(L, N)	
Charger Model: BU SAW-0502000	2011-9-20	MOST110902F3	1_(L, N)	<input checked="" type="checkbox"/>

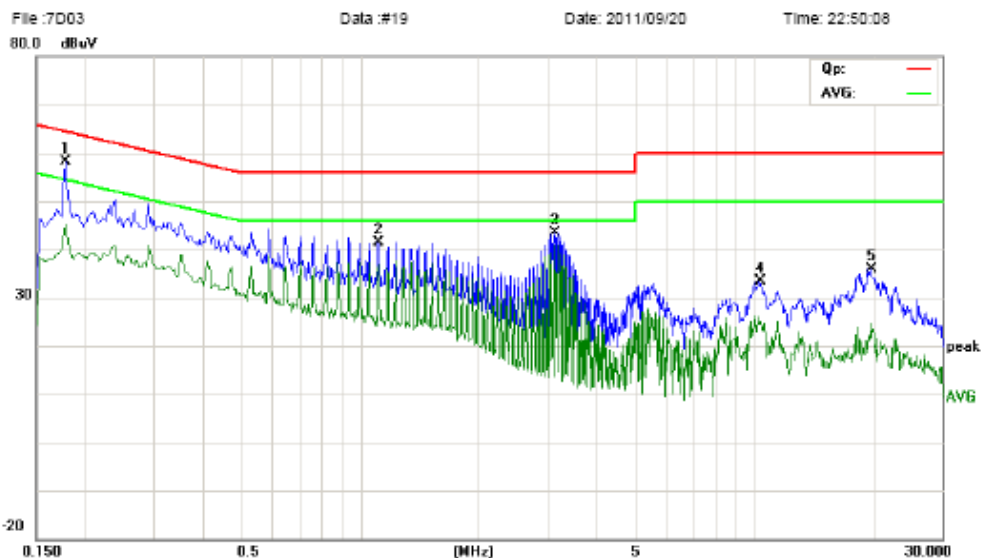
Note: All the test mode were tested during the testing, but only the worst test data of test mode was listed on the following.

## 5.6.4 Test Result



Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

## Conducted Emission Measurement



Site: site #1

Phase: L1

Temperature: 26

Limit: FCC Part15 B Class B QP

Power: AC 120V/60Hz

Humidity: 60 %

EUT: MID

M/N: 7D03

Mode: WIFI

Note:

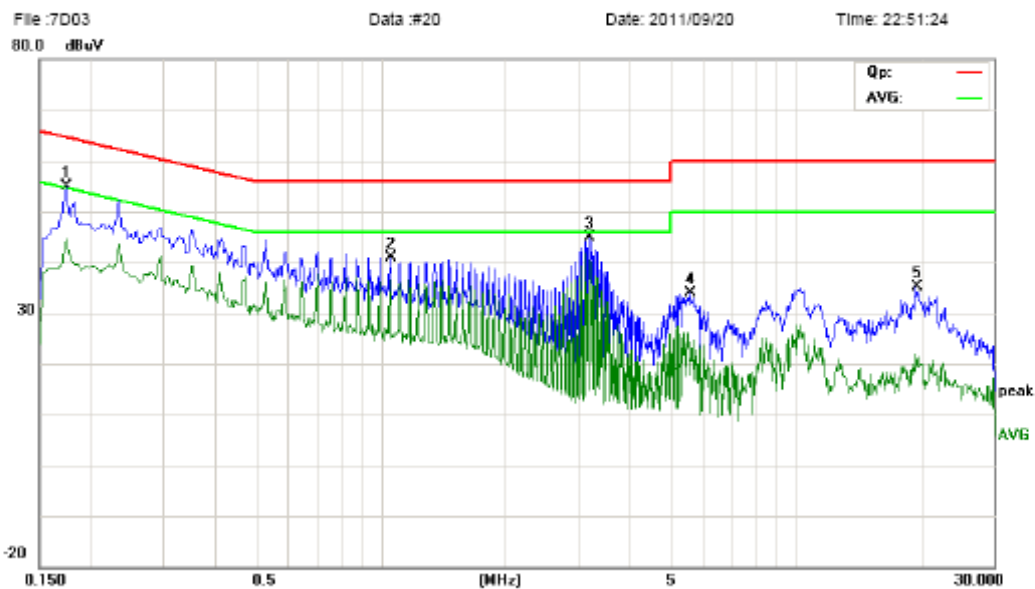
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1	*	0.1780	47.44	10.68	58.12	64.58	-6.46	peak	
2		1.1100	31.42	9.89	41.31	56.00	-14.69	peak	
3		3.1020	33.28	10.10	43.38	56.00	-12.62	peak	
4		10.2980	24.28	9.00	33.28	60.00	-26.72	peak	
5		19.7820	26.94	9.00	35.94	60.00	-24.06	peak	

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



Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Conducted Emission Measurement



Site site #1

Phase: **N**

Temperature: 26

Limit: FCC Part15 B Class B QP

Power: AC 120V/60Hz

Humidity: 60 %

EUT: MID

M/N: 7D03

Mode: WIFI

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1740	44.39	10.44	54.83	64.77	-9.94	peak	
2		1.0540	30.84	9.95	40.79	56.00	-15.21	peak	
3		3.1620	34.77	10.16	44.93	56.00	-11.07	peak	
4		5.5620	22.22	11.66	33.88	60.00	-26.12	peak	
5		19.4900	26.05	9.00	35.05	60.00	-24.95	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)).

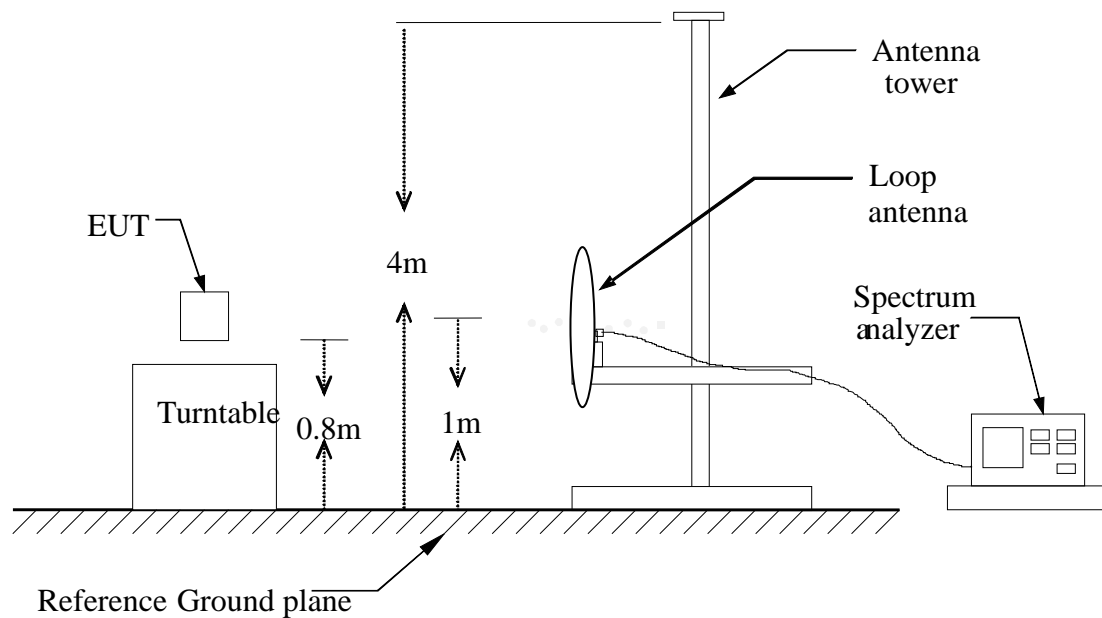
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

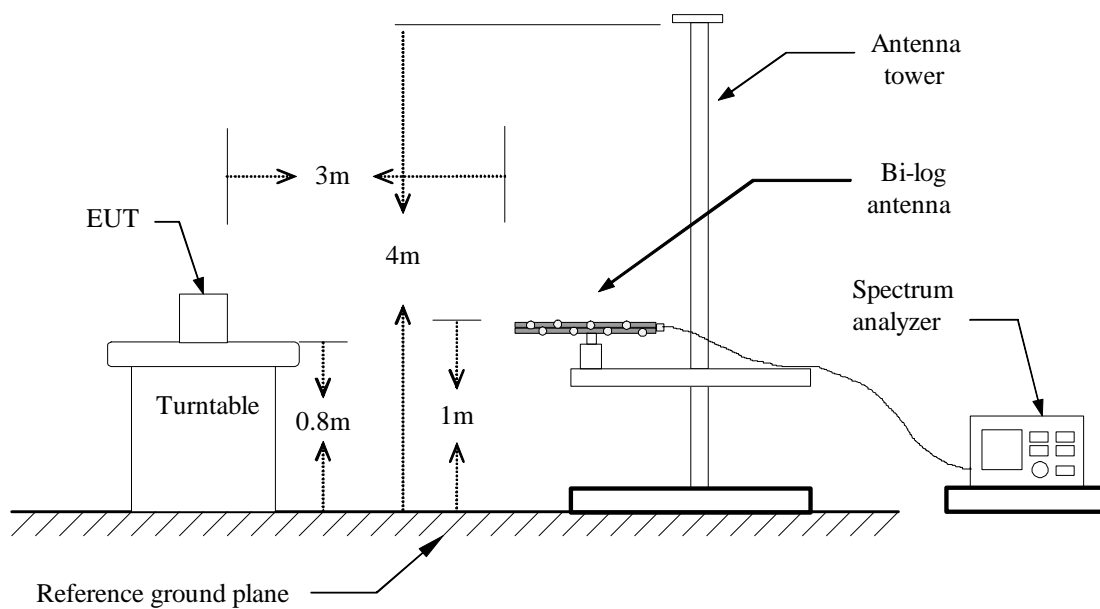
As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured 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.

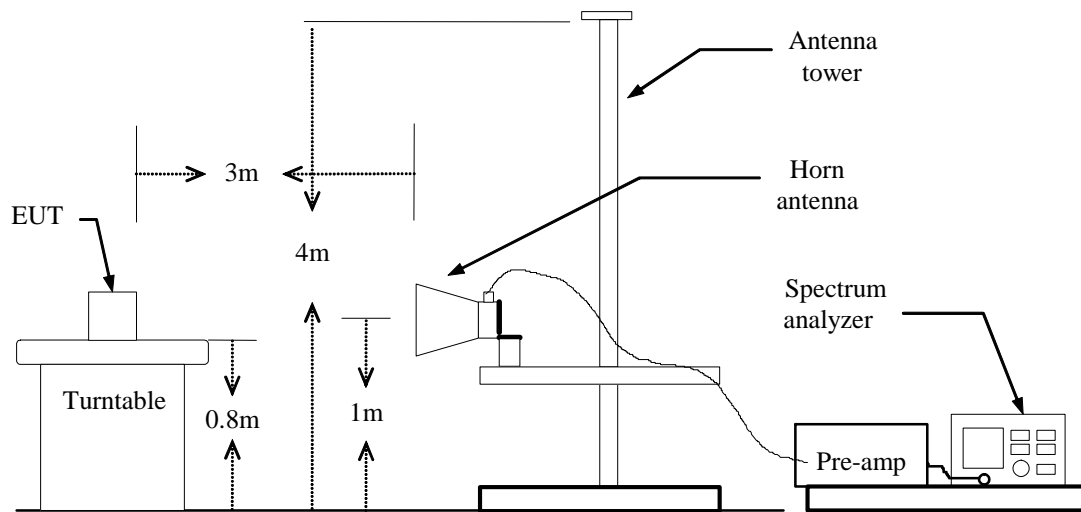
## 5.7.2 Test Description

### 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 Mode:**

Preliminary Radiated Emission Test				
Frequency Range Investigated			9 KHz TO 18000 MHz	
Mode of operation	Date	Report No.	Data#	Worst Mode
802.11b Mode	2011-9-20	MOST110902F3	0_(H, V)	
802.11g Mode	2011-9-20	MOST110902F3	1_(H, V)	<input checked="" type="checkbox"/>
802.11n Mode	2011-9-20	MOST110902F3	2_(H, V)	

Note: All the test mode were tested during the testing, but only the worst test data of test mode was listed on the following.

**5.7.4 Test Result****Below 1 GHz****Form 9KHz to 30MHz:**

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)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
N/A	H								>20
N/A	V								>20

-No detected in below 30MHz.



Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Radiated Emission Measurement

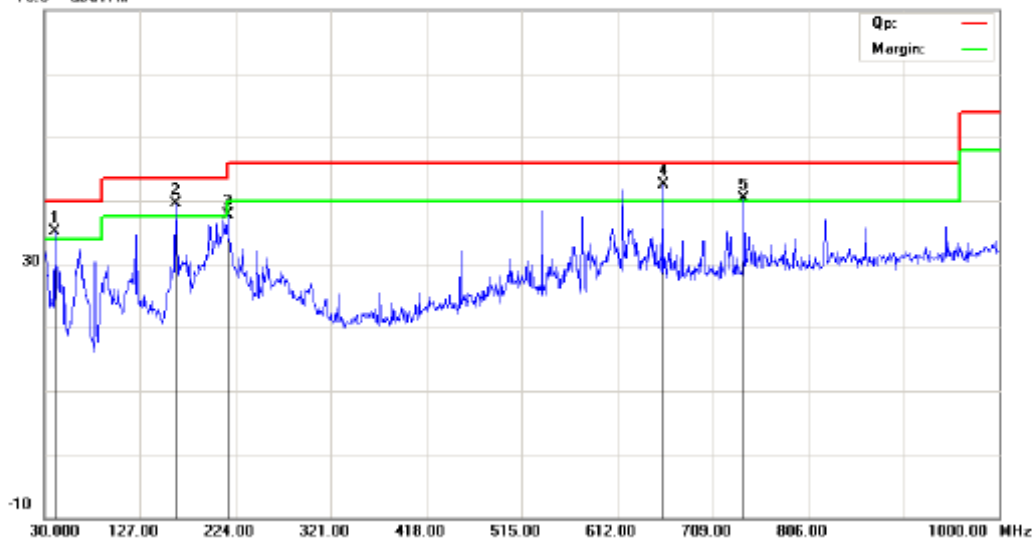
File: 7D03

Data: #17

Date: 2011-9-20

Time: 20:30:50

70.0 dBuV/m



Site site #1

Polarization: *Vertical*

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: AC 120V/60Hz

Humidity: 61 %

EUT: MID

Distance: 3m

M/N: 7D03

Mode: WIFI

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	40.6700	18.67	16.37	35.04	40.00	-4.96	peak	0	
2	!	163.8600	22.19	17.23	39.42	43.50	-4.08	peak	0	
3		216.2400	21.60	16.14	37.74	46.00	-8.26	peak	0	
4	*	658.5600	18.38	24.20	42.58	46.00	-3.42	peak	0	
5	!	741.0100	14.76	25.56	40.32	46.00	-5.68	peak	0	

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



Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Radiated Emission Measurement

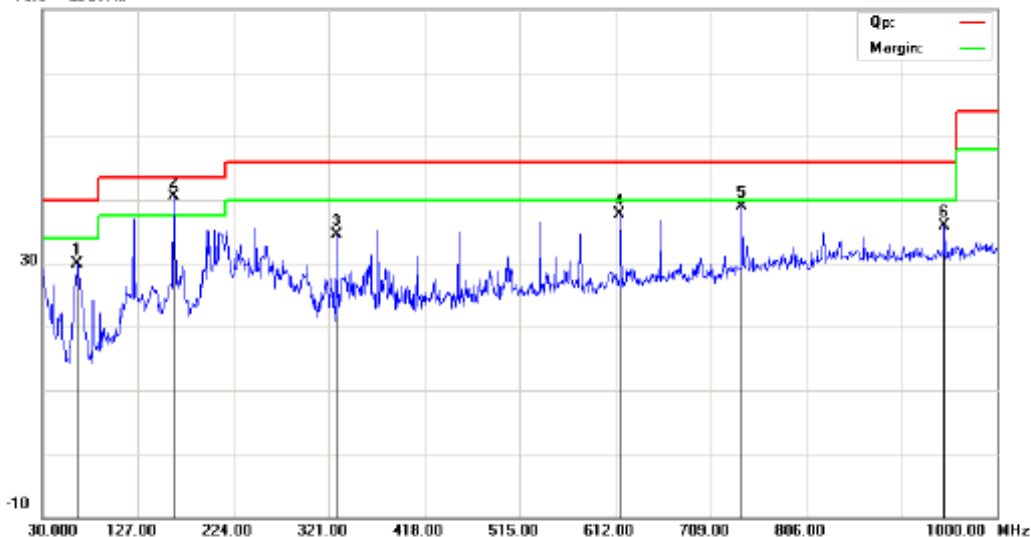
File: 7D03

Data: #18

Date: 2011-9-20

Time: 20:32:25

70.0 dBuV/m



Site site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: AC 120V/60Hz

Humidity: 61 %

EUT: MID

Distance: 3m

M/N: 7D03

Mode: WIFI

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		65.8900	18.47	11.37	29.84	40.00	-10.16	peak	0	
2	*	163.8600	23.18	17.23	40.41	43.50	-3.09	peak	0	
3		328.7600	17.47	17.00	34.47	46.00	-11.53	peak	0	
4		616.8500	14.24	23.41	37.65	46.00	-8.35	peak	0	
5		741.0100	13.28	25.56	38.84	46.00	-7.16	peak	0	
6		946.6500	8.21	27.77	35.98	46.00	-10.02	peak	0	

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

**Above 1 GHz**

**Operation Mode:** 802.11g Low Channel TX Mode    **Test Date:** 2011-09-20  
**Temperature:** 20°C    **Tested by:** Petter Ping  
**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)
2412.01	H	88.34	75.67	10.14	98.48	85.81	114	94	-8.19
4824.5	H	46.96	28.48	17.76	64.72	46.24	74	54	-7.76
NA	H								
2412.01	V	87.22	75.09	10.14	97.36	85.23	114	94	-8.77
4824.5	V	46.52	28.03	17.76	64.28	45.79	74	54	-8.21
NA	V								

**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:** 802.11g CH Mid  
**Temperature:** 20°C  
**Humidity:** 70 % RH

**Test Date:** 2011-08-30  
**Tested by:** Petter Ping  
**Polarity:** Ver. / Hor.

Freq (MHz)	Ant. Pol HV	Peak	AV	Ant. / CL	Actual Fs		Peak	AV	AV
		Reading	Reading	CF			Limit	Limit	Margin
		(dBμV)	(dBμV)	(dB)	Peak	AV	(dBμV/m)	(dBμV/m)	(dB)
					(dBμV/m)	(dBμV/m)			
2437.02	H	89.43	79.14	10.23	99.66	89.37	114	94	-4.63
4874.05	H	49.65	26.53	19.16	68.81	45.69	74	54	-8.31
NA	H								
2437.02	V	88.83	78.75	10.23	99.06	88.98	114	94	-5.02
4874.05	V	48.46	25.71	19.16	67.62	44.87	74	54	-9.13
NA	V								

**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).
7. Only the worse test data was been recorded in the report.

**Operation Mode:** 802.11g CH High**Test Date:** 2011-08-30**Temperature:** 20°C**Tested by:** Petter Ping**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	
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
2462.01	H	86.45	77.93	10.28	96.73	88.21	114	94	-5.79
4923.15	H	47.23	23.88	23.49	70.72	47.37	74	54	-6.63
NA	H								
2462.01	V	86.11	77.48	10.28	96.39	87.76	114	94	-6.24
4923.15	V	46.85	23.74	23.49	70.34	47.23	74	54	-6.77
NA	V								

**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).
7. Only the worse test data was been recorded in the report.

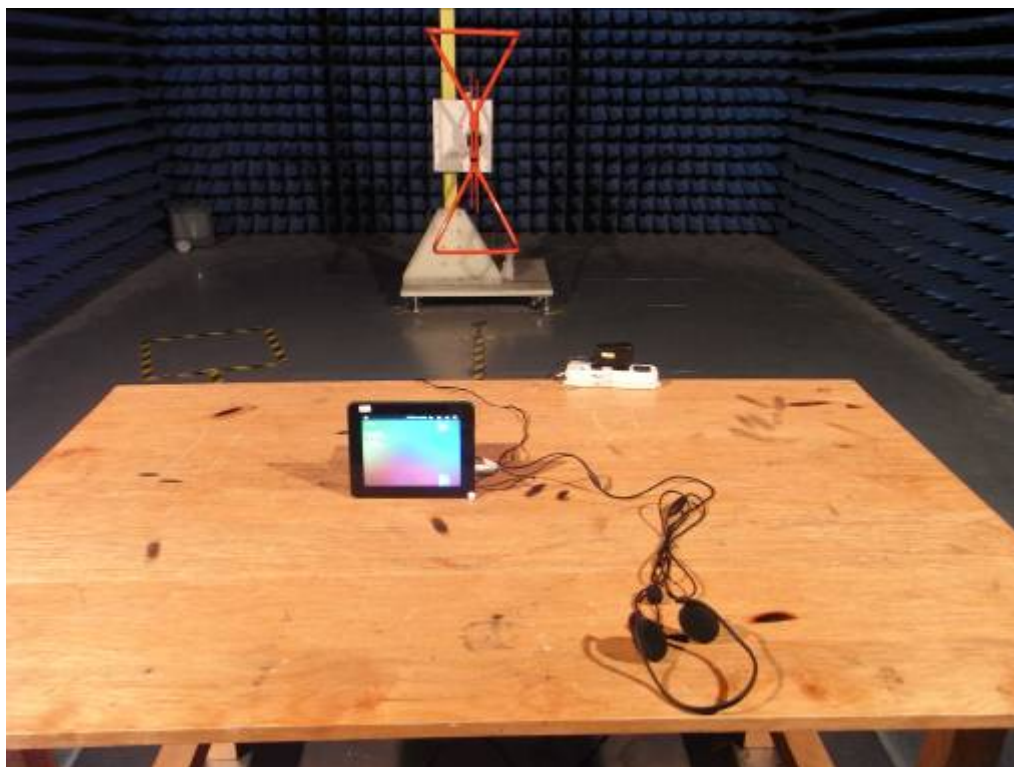
## **APPENDIX 1**

### **PHOTOGRAPHS OF TEST SETUP**

CE TEST SETUP



RE 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 -MODEL 1



PHOTO OF POWER SUPPLY -MODEL 2



PHOTO OF THE ENTIRE SAMPLE

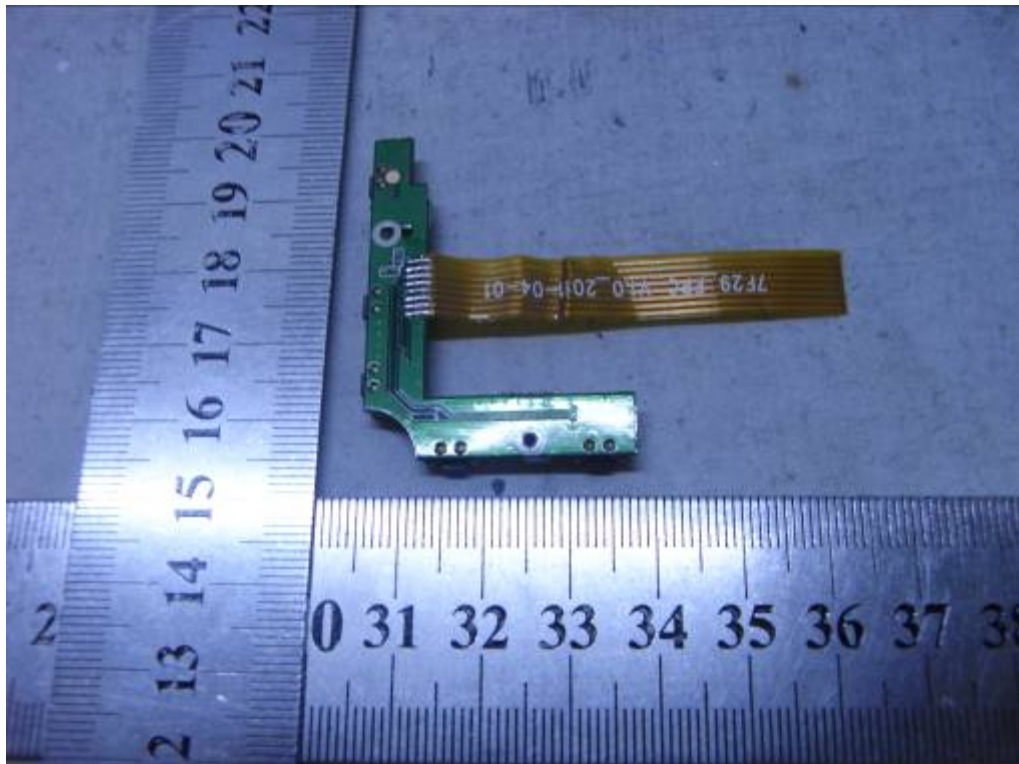


PHOTO OF BATTERY





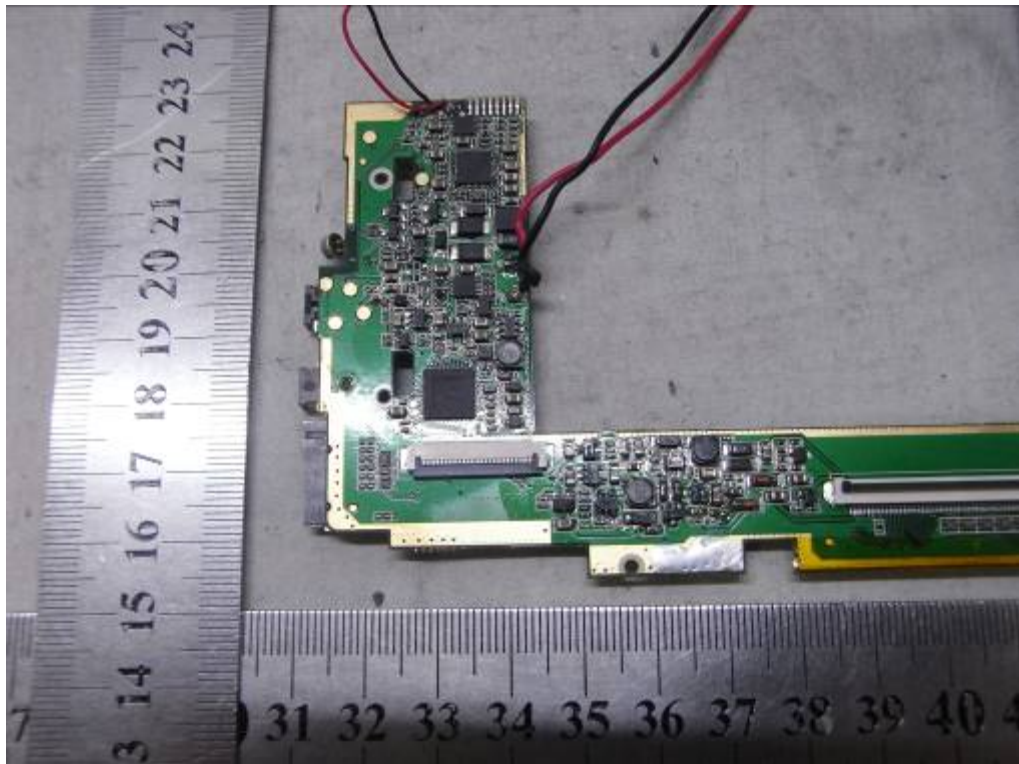
INTERNAL PHOTO OF SAMPLE -3



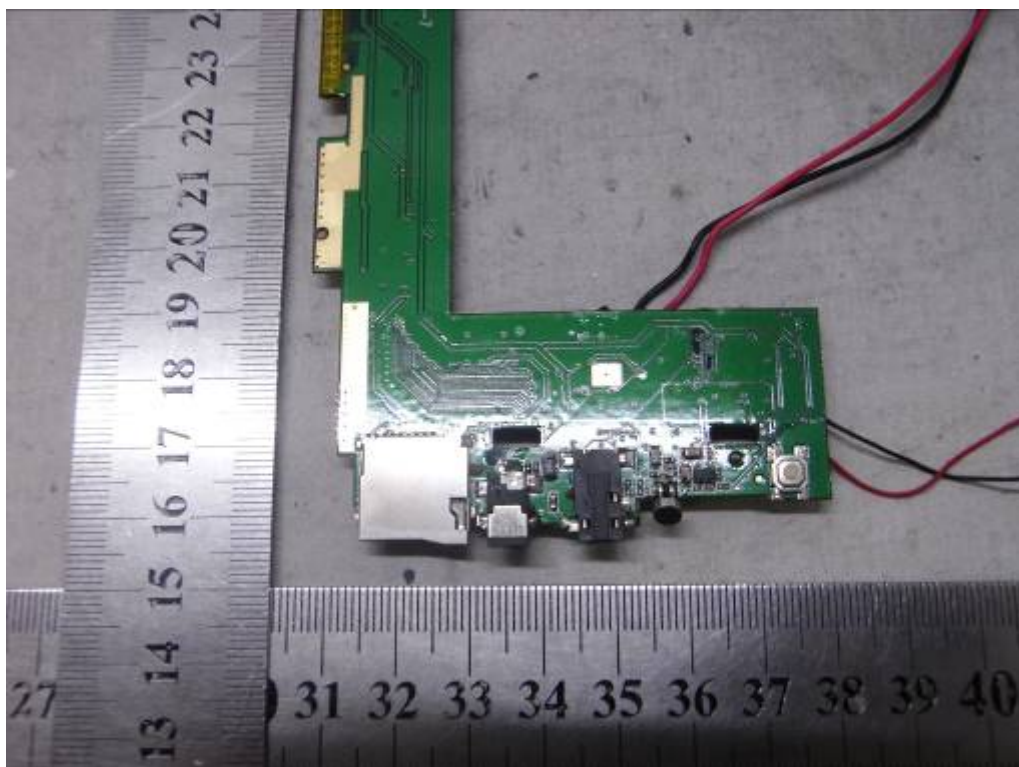
INTERNAL PHOTO OF SAMPLE -4



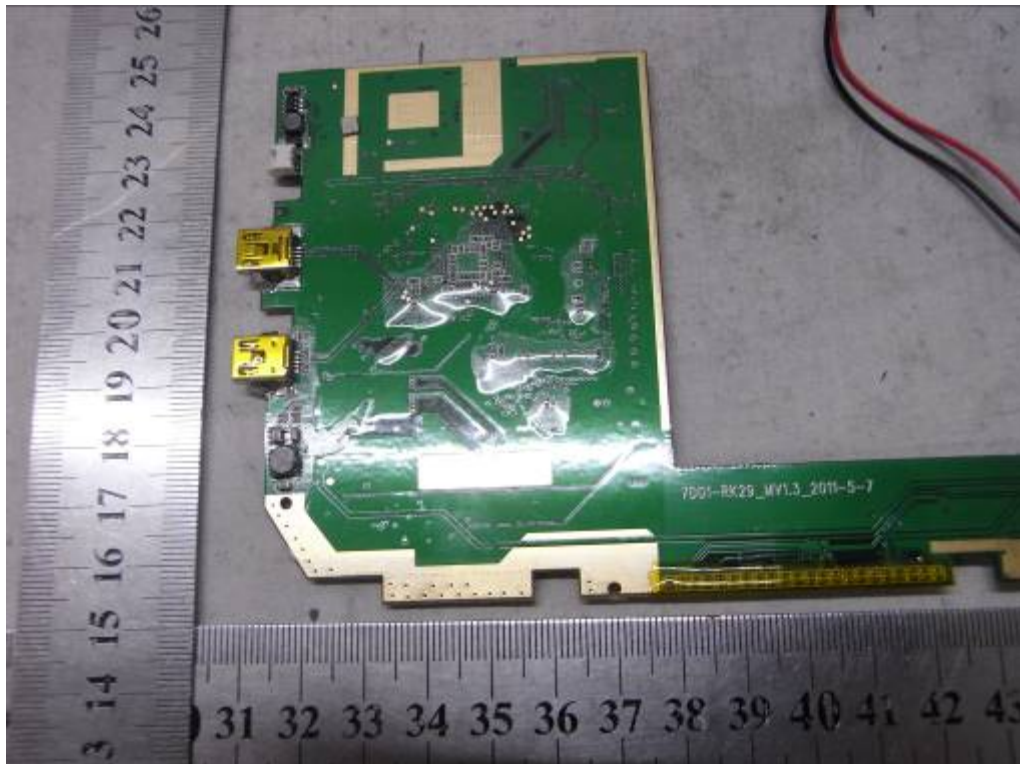
INTERNAL PHOTO OF SAMPLE -5



INTERNAL PHOTO OF SAMPLE -6



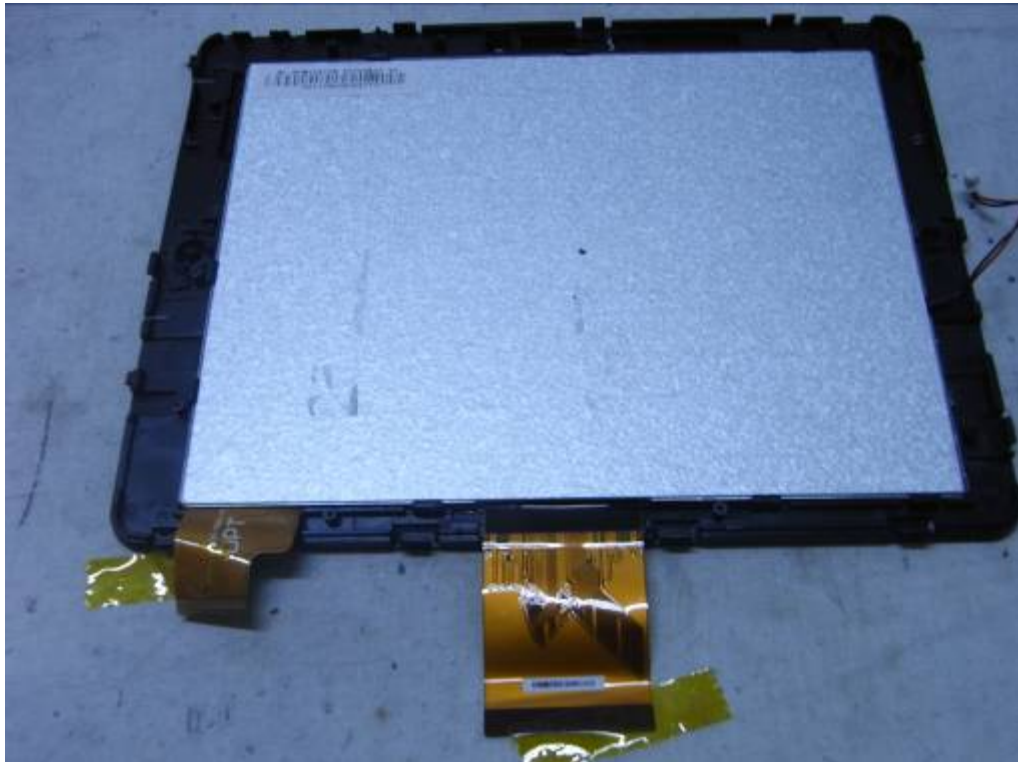
INTERNAL PHOTO OF SAMPLE -7



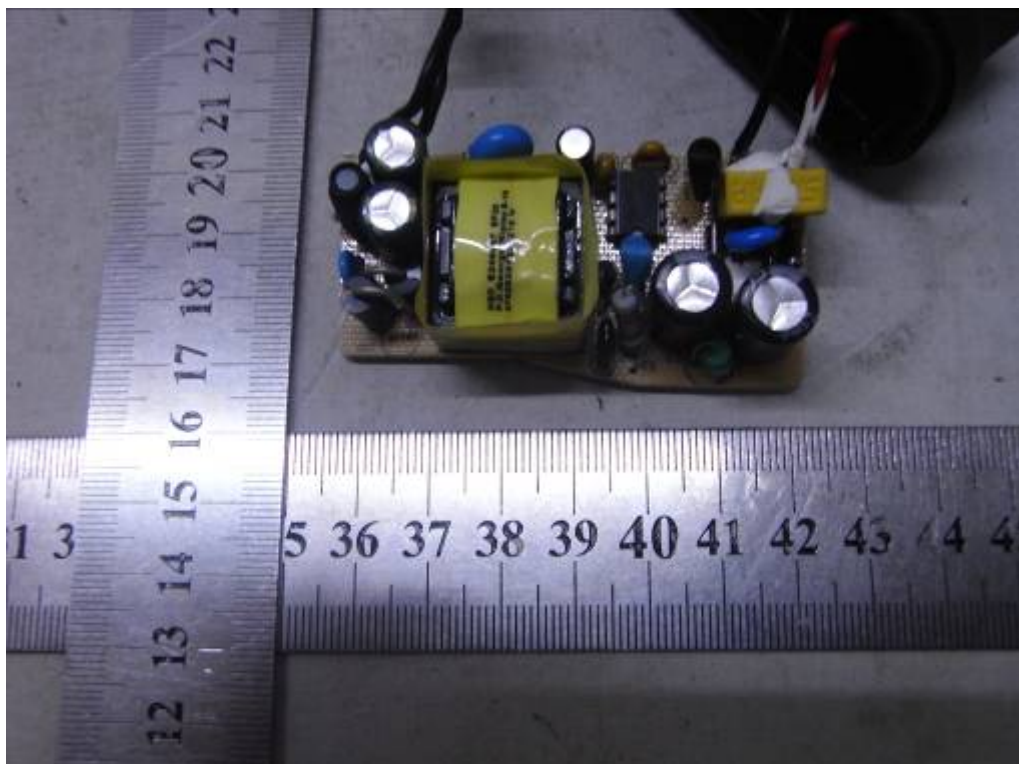
INTERNAL PHOTO OF SAMPLE -8

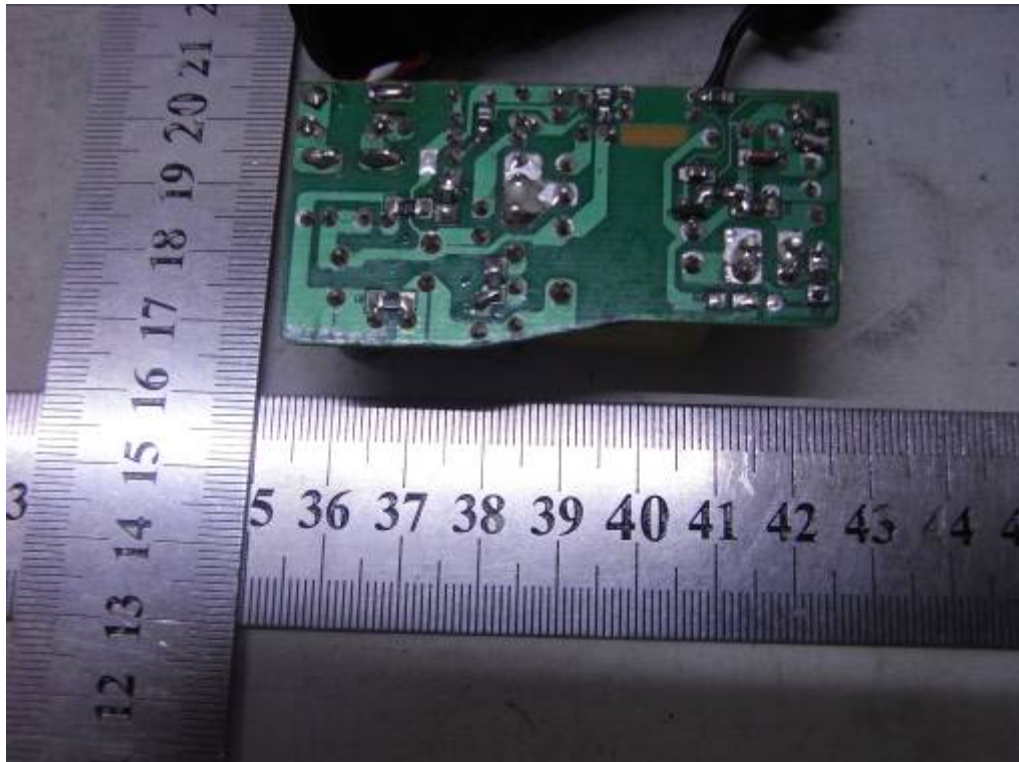


INTERNAL PHOTO OF SAMPLE -9

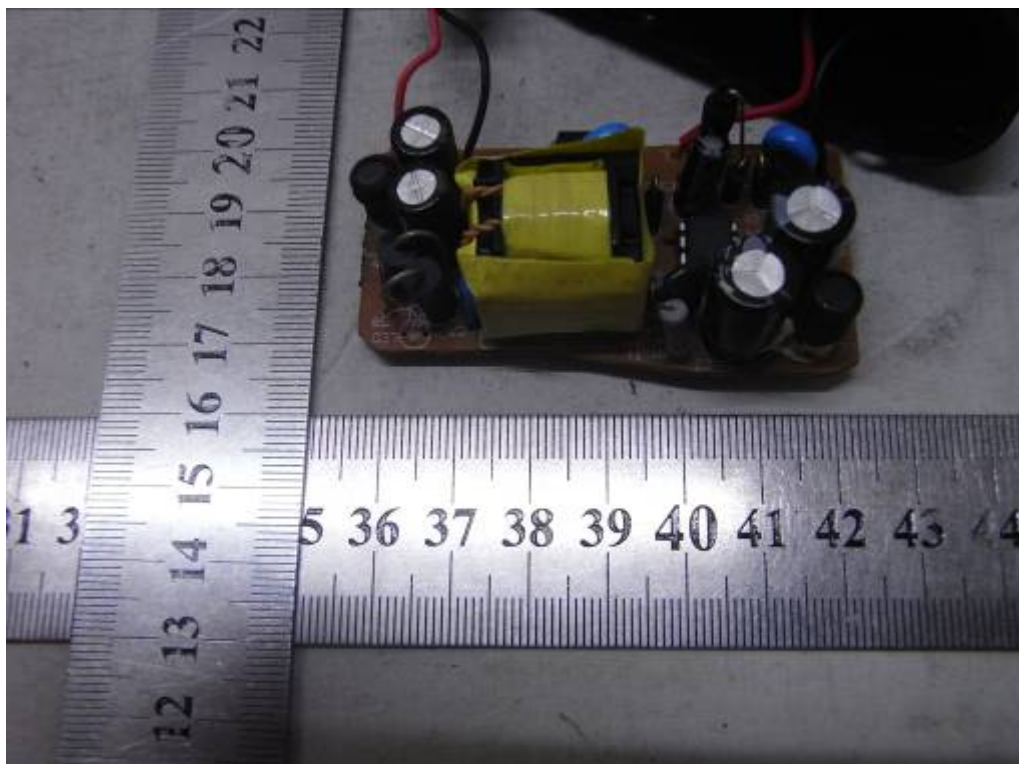


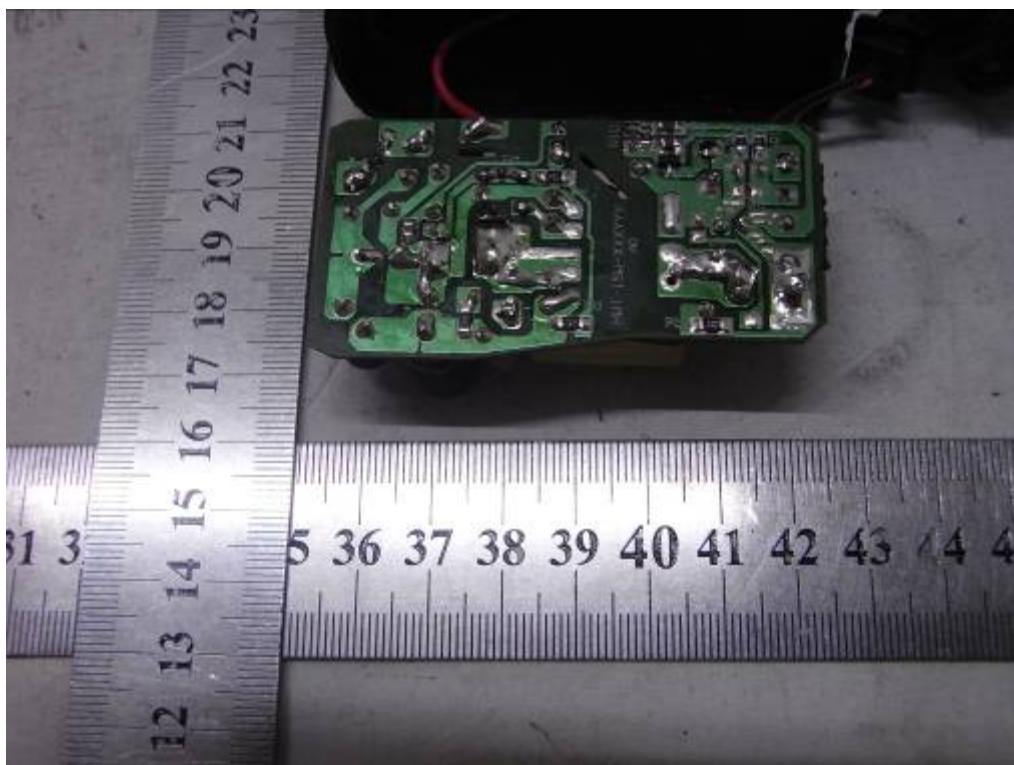
INTERNAL PHOTO OF POWER SUPPLY-1





INTERNAL PHOTO OF POWER SUPPLY-2





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