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# TEST REPORT

## FCC PART 15.247

Report Reference No. ....: CTL1611308202-WF

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Product Name.....: WLAN 802.11b/g/n module

Model/Type reference .....: WIFI-2-M603USA1

List Model(s).....: See next page

Trade Mark.....: **CHANGHONG 长虹**

FCC ID .....: 2AC49-M603USA1

Applicant's name .....: Sichuan Changhong Electronic Component Co., Ltd.

Address of applicant .....: Luosheng street, Huagai Zhen, Anxian, Mianyang, Sichuan, China

Prepared by .....: Shenzhen CTL Testing Technology Co., Ltd.

Address.....: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Test specification.....:

Standard.....: **FCC Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

TRF Originator .....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF .....: Dated 2011-01

Date of Receipt.....: Nov. 30, 2016

Date of Test Date.....: Nov. 30, 2016–Dec. 14, 2016

Data of Issue.....: Dec. 14, 2016

Result.....: Pass

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# TEST REPORT

<b>Test Report No. :</b> CTL1611308202-WF	Dec. 14, 2016 Date of issue
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Equipment under Test : WLAN 802.11b/g/n module

Model /Type : WIFI-2-M603USA1

Listed Models : WIFI-2-M603, WIFI-2-M603USA2,  
WIFI-2-M603USA3, WIFI-2-M603UWP2,  
WIFI-2-M603UWP3, WIFI-2-M603UWP4, WIFI-6

**Applicant** : **Sichuan Changhong Electronic Component Co., Ltd.**

**Address** : Luosheng street, Huagai Zhen, Anxian, Mianyang, Sichuan, China

**Manufacturer** : **Sichuan Changhong Electronic Component Co., Ltd.**

**Address** : Luosheng street, Huagai Zhen, Anxian, Mianyang, Sichuan, China

<b>Test result</b>	<b>Pass *</b>
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\* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**\*\* Modified History \*\***

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2016-12-14	CTL1611308202-WF	Tracy Qi



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# 1. SUMMARY

## 1.1. TEST STANDARDS

The tests were performed according to following standards:

**FCC Rules Part 15.247:** Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

**ANSI C63.10: 2013:** American National Standard for Testing Unlicensed Wireless Devices

**ANSI C63.4: 2014:** –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz  
Range of 9 kHz to 40GHz

**KDB558074 D01 V03r05:** Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

## 1.2. Test Description

FCC PART 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS



### 1.3. Test Firm

#### 1.3.1 Address of the test laboratory

Shenzhen BALUN Technology Co., Ltd.

Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China

#### 1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

#### FCC-Registration No.:832625

Shenzhen BALUN Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 832625

### 1.4. Statement of the measurement uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Measurement	Value
Occupied Channel Bandwidth	$\pm 4\%$
RF output power, conducted	$\pm 1.4\text{dB}$
Power Spectral Density, conducted	$\pm 2.5\text{dB}$
Unwanted Emissions, conducted	$\pm 2.8\text{dB}$
All emissions, radiated	$\pm 5.4\text{dB}$
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 4\%$

## 2. GENERAL INFORMATION

### 2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

### 2.2. General Description of EUT

Product Name:	WLAN 802.11b/g/n module
Model/Type reference:	WIFI-2-M603USA1
Power supply:	DC 3.3V from host device
<b>WIFI :</b>	
Supported type:	802.11b/802.11g/802.11n(H20)/802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/802.11n(H40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7
Channel separation:	5MHz
Antenna type:	FPC antenna (2*2 MIMO)
Antenna gain:	2dBi

Note: For more details, please refer to the user's manual of the EUT.

### 2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

There are 11 channels provided to the EUT and Channel 01/06/11 were selected for WIFI test.

#### Operation Frequency WIFI :

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

Note: The line display in grey were the channel selected for testing

### 2.4. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Manufacturer	Model No.	Notes
1	Notebook	Apple	MacBook Air	Notebook
2	Adapter	Apple	A1436	Adapter
3	Test jig	Sichuan Changhong	T0	--

**Data Rate Used:**

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

Test Items	Mode	Data Rate	Channel
Maximum Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9kHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
	11n(40MHz)/OFDM	13.5Mbps	3/6/9
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11
	11n(40MHz)/OFDM	13.5Mbps	3/9

**2.5. Equipments Used during the Test**

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	ZFSV-30	103118	2016.07.13	2017.07.12
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	1012	2016.07.13	2017.07.12
Spectrum Analyzer	AGILENT	E4440A4	MY4530443	2016.10.15	2017.10.14
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
LISN	SCHWARZBECK	NSLK	81278127-687	2016.07.05	2017.07.04
Test Antenna-Loop(9kHz-30MHz)	SCHWARZBECK	FMZB	15191519-037	2016.07.22	2017.07.21
Test Antenna-Bi-Log(30MHz-3GHz)	SCHWARZBECK	VULB 9163	9163-624	2016.07.22	2017.07.21
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2016.07.22	2017.07.21
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	BBHA 9170	9170-305	2016.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2016.02.28	2017.02.27
Shielded Enclosure	ChangNing	CN-1307013	13070	--	--
Power Splitter	KMW	DCPD-LDC	1305003215	2016.07.13	2017.07.12
Spectrum Analyzer	Agilent	N9020	US46220290	2016/01/17	2017/01/16
Power Meter	Anritsu	ML2487B	110553	2016/06/02	2017/06/01
Power Sensor	Anritsu	MA2411B	100345	2016/05/21	2017/05/20
RF Cable	Megalon	RF-A303	N/A	2016/06/02	2017/06/01

The calibration interval was one year

**2.6. Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.



## 2.7. Modifications

No modifications were implemented to meet testing criteria.



### 3. TEST CONDITIONS AND RESULTS

#### 3.1. Conducted Emissions Test

##### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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

\* Decreases with the logarithm of the frequency.

##### TEST CONFIGURATION

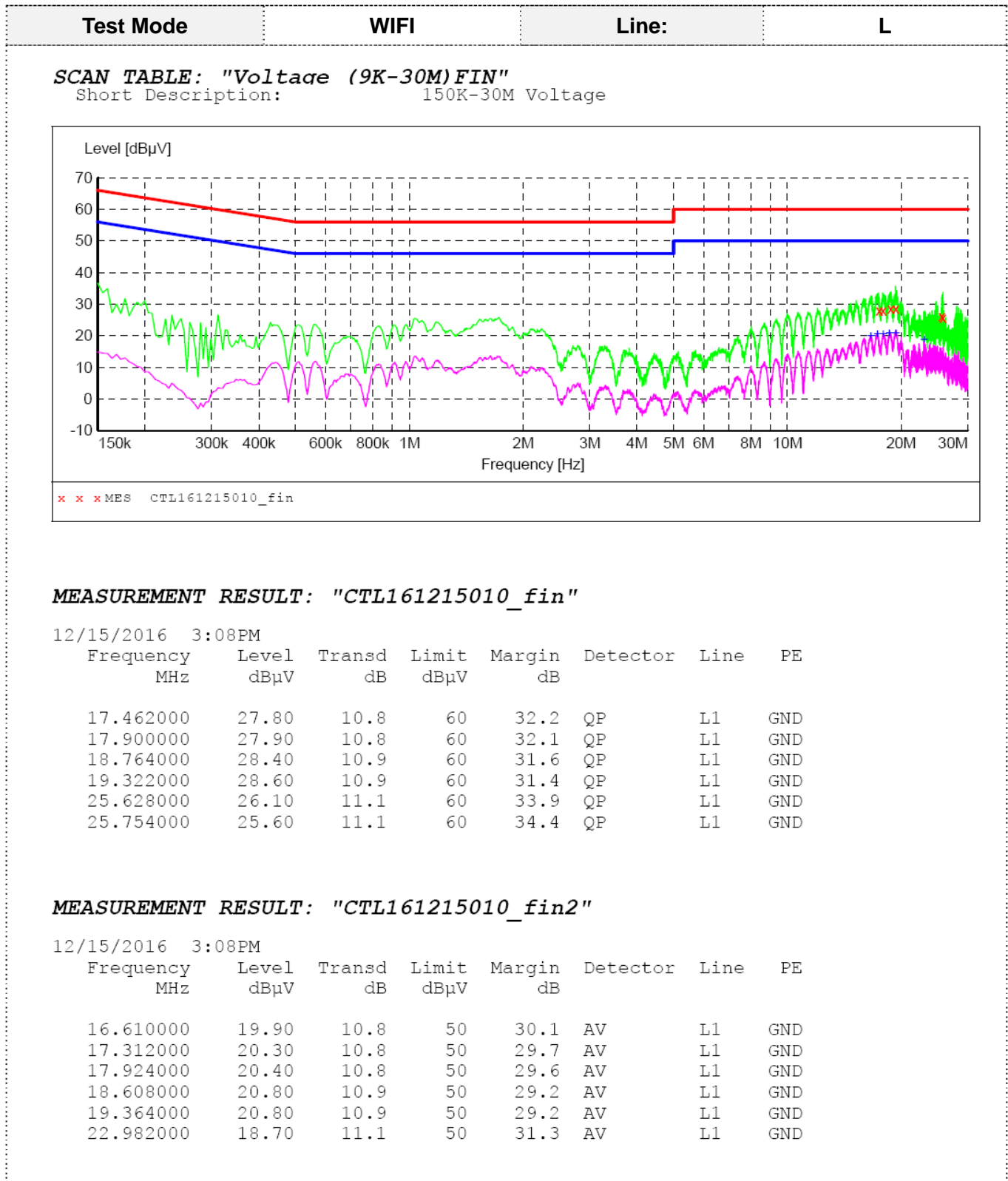


##### TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

**TEST RESULTS**

Remark: 802.11b/802.11g/802.11n(H20)/802.11n(H40) mode all have been tested, only worse case of 802.11b High Channel was reported.



Test Mode

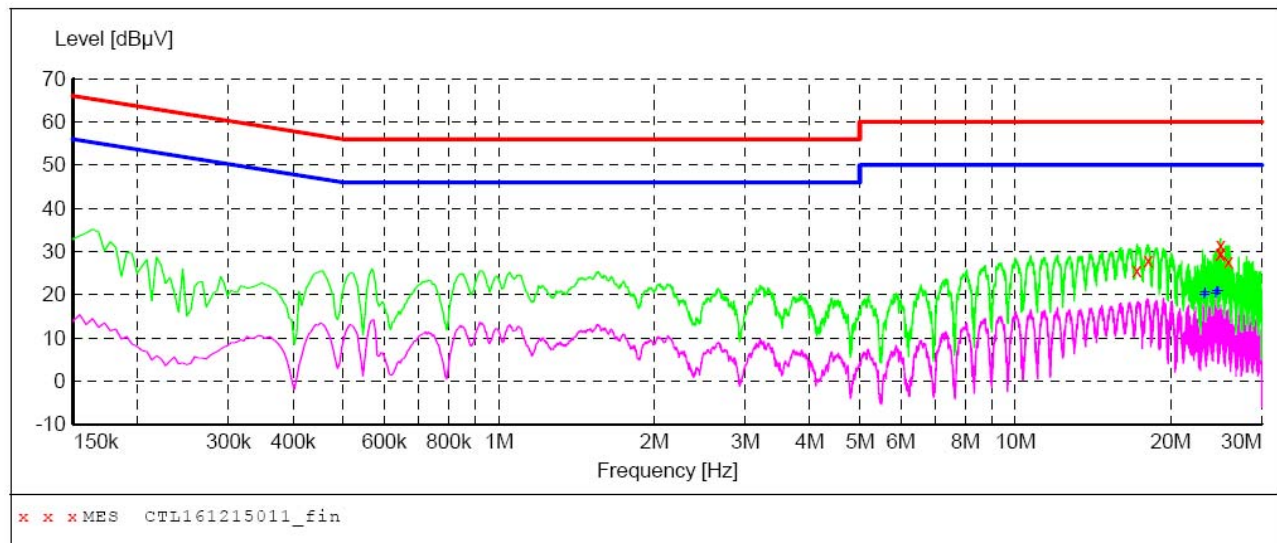
WIFI

Line:

N

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL161215011\_fin"**

12/15/2016 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
17.174000	25.60	10.8	60	34.4	QP	N	GND
18.062000	27.80	10.8	60	32.2	QP	N	GND
24.908000	29.40	11.1	60	30.6	QP	N	GND
24.968000	31.30	11.1	60	28.7	QP	N	GND
25.028000	29.70	11.1	60	30.3	QP	N	GND
25.814000	27.70	11.1	60	32.3	QP	N	GND

**MEASUREMENT RESULT: "CTL161215011\_fin2"**

12/15/2016 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
23.222000	19.90	11.1	50	30.1	AV	N	GND
23.282000	20.30	11.1	50	29.7	AV	N	GND
24.428000	20.10	11.1	50	29.9	AV	N	GND
24.548000	20.80	11.1	50	29.2	AV	N	GND
24.608000	20.70	11.1	50	29.3	AV	N	GND
24.668000	20.80	11.1	50	29.2	AV	N	GND

## 3.2. Radiated Emissions and Band Edge

### Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

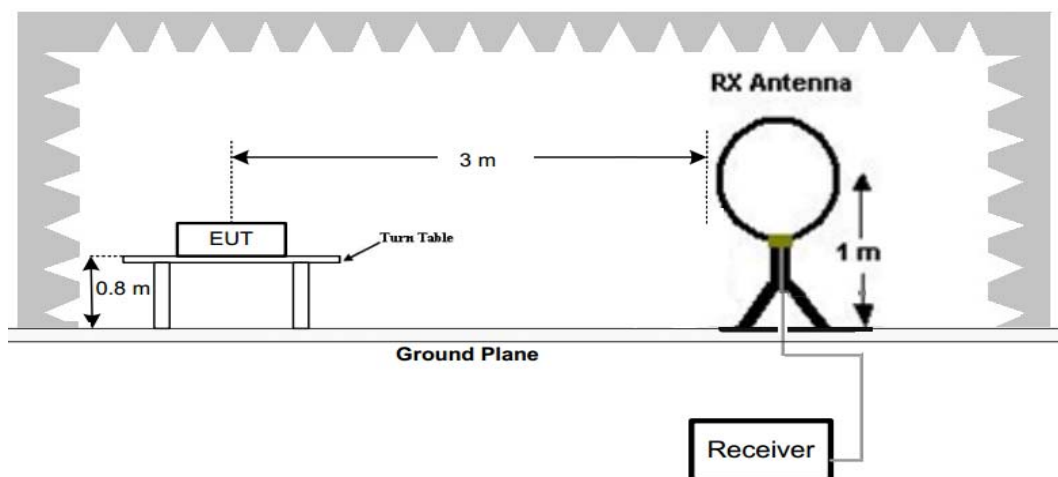
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

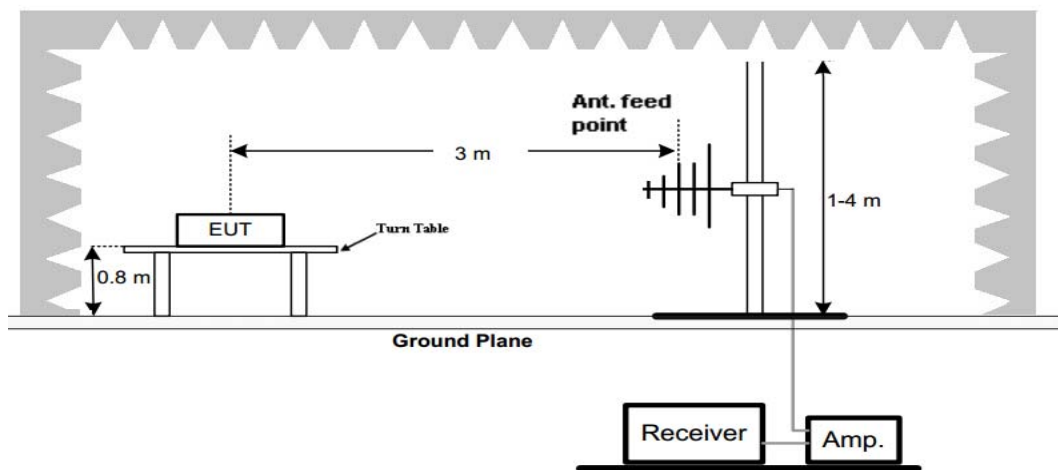
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

### TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

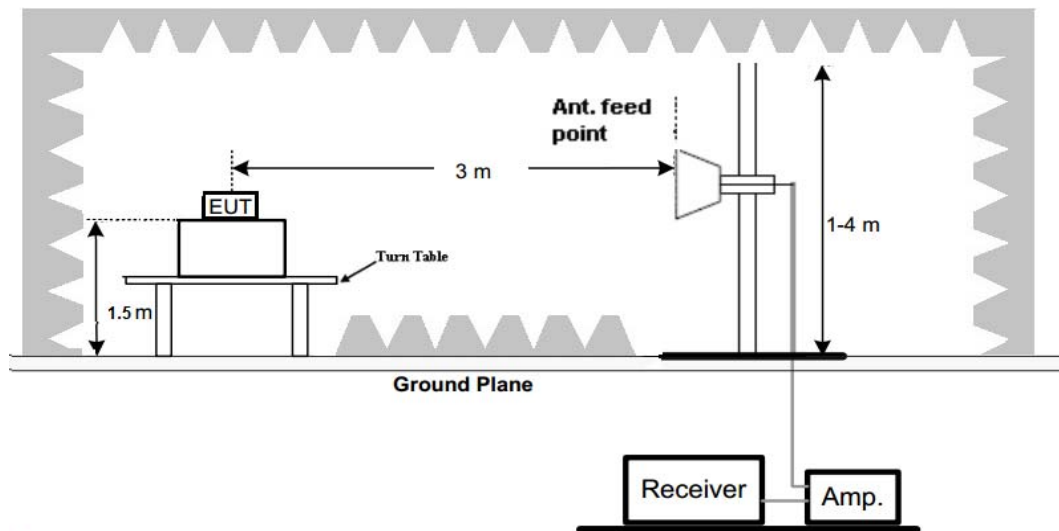


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz





### **Test Procedure**

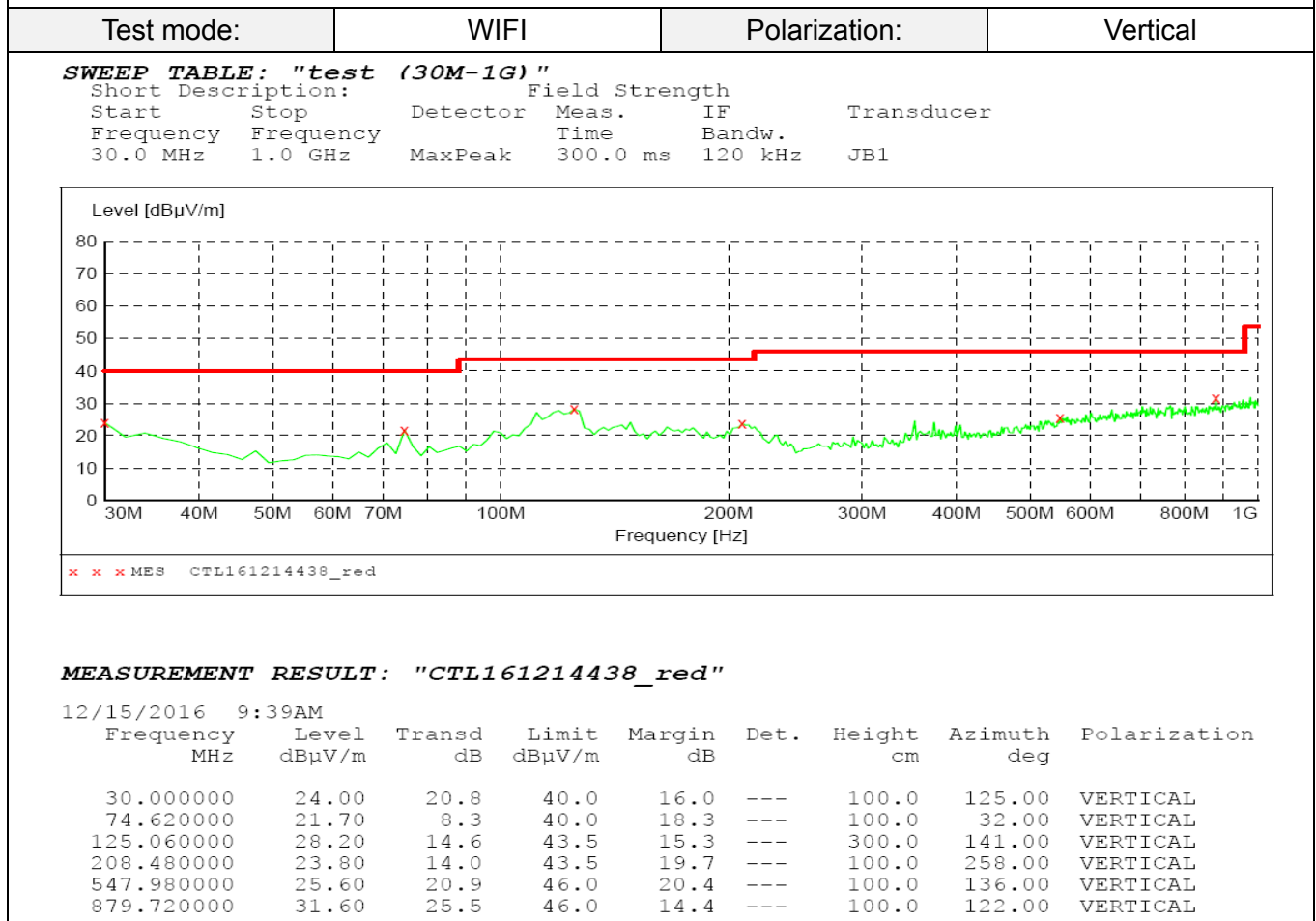
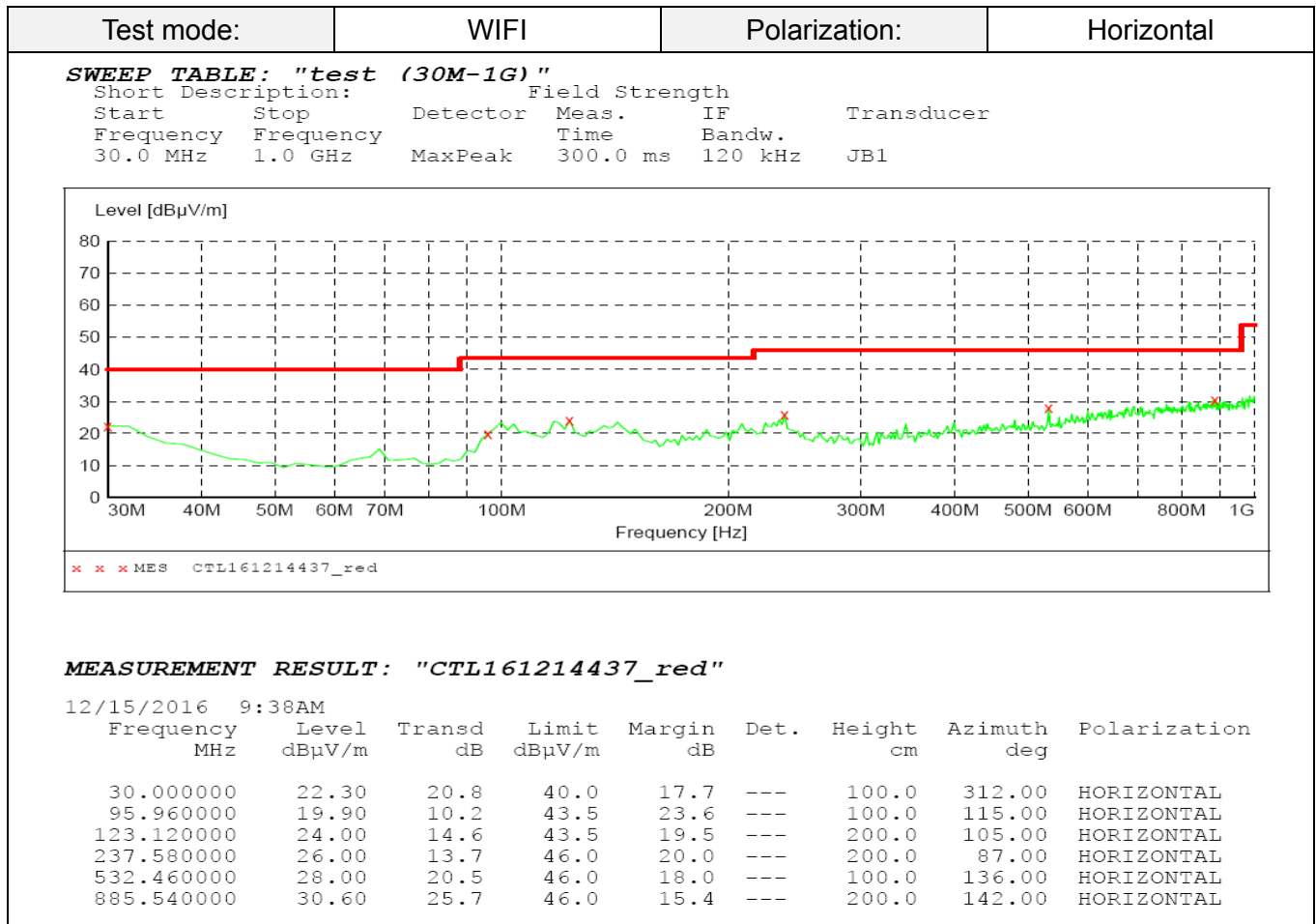
1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

### **TEST RESULTS**

Remark:

1. All three channels (lowest/middle/highest) of each mode were measured below 1GHz and recorded worst case at 802.11b low channel.
2. All three channels (lowest/middle/highest) of each mode were measured above 1GHz and recorded worst case at 802.11n(HT20) 2\*2 mimo mode.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

## For 30MHz-1GHz



**For 1GHz to 25GHz**

Note: 802.11b/802.11g/802.11n (H20)/802.11n (H40) all have been tested, only worse case 802.11n(HT20) 2\*2 mimo mode is reported

Frequency(MHz):			2412		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	60.14	PK	74	13.86	55.59	33.52	6.92	35.89	4.55
4824.00	52.01	AV	54	1.99	47.46	33.52	6.92	35.89	4.55
5125.75	50.38	PK	74	23.62	43.18	34.38	7.10	34.28	7.20
5125.75	--	AV	54	--	--	--	--	--	--
7236.00	48.19	PK	74	25.81	36.92	37.10	9.19	35.02	11.27
7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2412		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	60.37	PK	74	13.63	55.82	33.52	6.92	35.89	4.55
4824.00	51.29	AV	54	2.71	46.74	33.52	6.92	35.89	4.55
5125.75	49.74	PK	74	24.26	42.54	34.38	7.10	34.28	7.20
5125.75	--	AV	54	--	--	--	--	--	--
7236.00	49.68	PK	74	24.32	38.41	37.10	9.19	35.02	11.27
7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2437		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	58.84	PK	74	15.16	52.60	33.59	6.95	34.3	6.24
4874.00	49.05	AV	54	4.95	42.81	33.59	6.95	34.3	6.24
5215.50	51.26	PK	74	22.74	43.66	34.56	7.15	34.11	7.60
5215.50	--	AV	54	--	--	--	--	--	--
7311.00	50.42	PK	74	23.58	38.76	37.44	9.22	35	11.66
7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2437		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	59.17	PK	74	14.83	52.93	33.59	6.95	34.3	6.24
4874.00	50.64	AV	54	3.36	44.40	33.59	6.95	34.3	6.24
5215.50	52.72	PK	74	21.28	45.12	34.56	7.15	34.11	7.60
5215.50	--	AV	54	--	--	--	--	--	--
7311.00	51.38	PK	74	22.62	39.72	37.44	9.22	35	11.66
7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2462		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	57.91	PK	74	16.09	53.13	33.71	6.98	35.91	4.78
4924.00	52.42	AV	54	1.58	47.64	33.71	6.98	35.91	4.78
5105.50	53.27	PK	74	20.73	46.11	34.34	7.09	34.27	7.16
5105.50	--	AV	54	--	--	--	--	--	--
7386.00	49.36	PK	74	24.64	37.48	37.61	9.25	34.98	11.88
7386.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2462		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	58.47	PK	74	15.53	53.69	33.71	6.98	35.91	4.78
4924.00	50.56	AV	54	3.44	45.78	33.71	6.98	35.91	4.78
5105.50	51.64	PK	74	22.36	44.48	34.34	7.09	34.27	7.16
5105.50	--	AV	54	--	--	--	--	--	--
7386.00	50.28	PK	74	23.72	38.40	37.61	9.25	34.98	11.88
7386.00	--	AV	54	--	--	--	--	--	--

## REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

**Results of Band Edges Test (Radiated)**

Note: 802.11b/802.11g/802.11n (H20)/802.11n (H40) all have been tested, only worse case 802.11n(HT20) 2\*2 mimo mode is reported

Frequency(MHz):			2412		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2412.00	112.40	PK	--	--	78.98	28.80	4.62	0	33.42
2412.00	104.55	AV	--	--	71.13	28.80	4.62	0	33.42
2357.25	43.41	PK	74	30.59	10.34	28.51	4.56	0	33.07
2357.25	--	AV	54	--	--	--	--	--	--
2390.00	50.86	PK	74	23.14	17.54	28.72	4.60	0	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	54.62	PK	74	19.38	21.23	28.78	4.61	0	33.39
2400.00	49.25	AV	54	4.75	15.86	28.78	4.61	0	33.39

Frequency(MHz):			2412		Polarity:			VERTICAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2412.00	113.28	PK	--	--	79.86	28.80	4.62	0	33.42
2412.00	102.87	AV	--	--	69.45	28.80	4.62	0	33.42
2357.25	44.02	PK	74	29.98	10.95	28.51	4.56	0	33.07
2357.25	--	AV	54	--	--	--	--	--	--
2390.00	50.61	PK	74	23.39	17.29	28.72	4.60	0	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	53.82	PK	74	20.18	20.43	28.78	4.61	0	33.39
2400.00	48.27	AV	54	5.73	14.88	28.78	4.61	0	33.39

Frequency(MHz):			2462		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2462.00	112.71	PK	--	--	79.14	28.89	4.68	0	33.57
2462.00	105.34	AV	--	--	71.77	28.89	4.68	0	33.57
2483.50	44.64	PK	74	29.36	11.01	28.93	4.70	0	33.63
2483.50	--	AV	54	--	--	28.93	4.70	0	--
2488.75	50.46	PK	74	23.54	16.81	28.94	4.71	0	33.65
2488.75	--	AV	54	--	--	--	--	--	--
2500.00	53.51	PK	74	20.49	19.83	28.96	4.72	0	33.68
2500.00	49.02	AV	54	4.98	--	--	--	--	--

Frequency(MHz):			2462		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2462.00	113.86	PK	--	--	80.29	28.89	4.68	0	33.57
2462.00	104.72	AV	--	--	71.15	28.89	4.68	0	33.57
2483.50	43.62	PK	74	30.38	9.99	28.93	4.70	0	33.63
2483.50	--	AV	54	--	--	28.93	4.70	0	--
2488.75	50.47	PK	74	23.53	16.82	28.94	4.71	0	33.65
2488.75	--	AV	54	--	--	--	--	--	--
2500.00	52.21	PK	74	21.79	18.53	28.96	4.72	0	33.68
2500.00	48.94	AV	54	5.06	--	--	--	--	--

**REMARKS:**

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)



2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value; RMS detector is for AV value.



### 3.3. Maximum Conducted Output Power

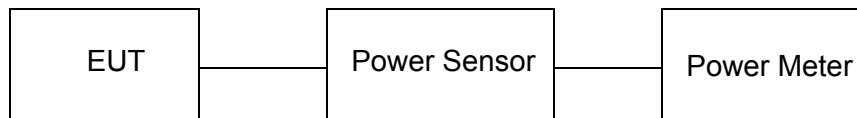
#### Limit

The Maximum Peak Output Power Measurement is 30dBm.

#### Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

#### Test Configuration



#### Test Results

Mode	Channel/ Frequency (MHz)	Peak Power Output (dBm)			Peak Power Limit (dBm)	Result
		Ant1	Ant 2	MIMO		
802.11b	1/2412	15.17	15.42	N/A	30	PASS
	6/2437	15.80	15.11	N/A	30	PASS
	11/2462	15.26	15.48	N/A	30	PASS
802.11g	1/2412	13.12	13.07	N/A	30	PASS
	6/2437	13.28	13.34	N/A	30	PASS
	11/2462	13.20	13.47	N/A	30	PASS
802.11n(HT20)	1/2412	13.27	13.06	16.78	30	PASS
	6/2437	13.19	13.42	16.12	30	PASS
	11/2462	13.20	13.14	16.24	30	PASS
802.11n(HT40)	3/2422	11.27	11.23	14.26	30	PASS
	6/2437	11.35	11.08	14.07	30	PASS
	9/2452	11.18	11.22	14.04	30	PASS

Note: The test results including the cable lose.

### 3.4. Power Spectral Density

#### Limit

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.

#### Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW  $\geq 3$  kHz.
3. Set the VBW  $\geq 3 \times$  RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

#### Test Configuration



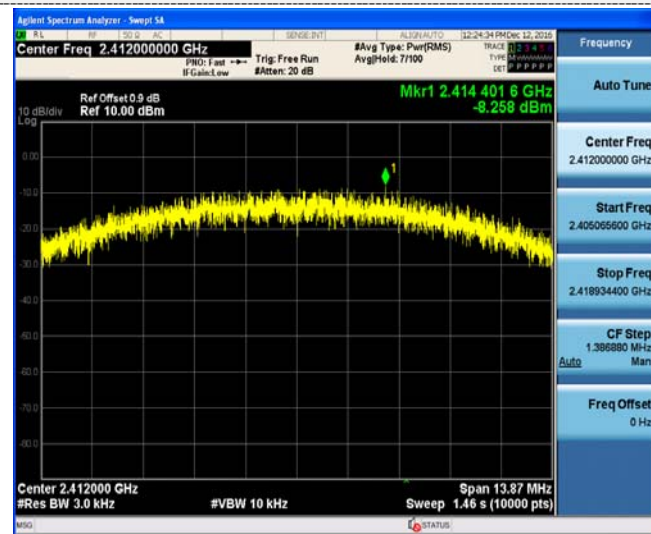
#### Test Results

Mode	Channel Frequency (MHz)	PSD (dBm/3KHz)			Limit (dBm/3KHz)	Result
		Ant1	Ant2	MIMO		
802.11b	1/2412	-8.258	-3.597	N/A	8	PASS
	6/2437	-6.983	-6.411	N/A	8	PASS
	11/2462	-7.937	-8.080	N/A	8	PASS
802.11g	1/2412	-13.004	-11.798	N/A	8	PASS
	6/2437	-12.455	-12.068	N/A	8	PASS
	11/2462	-11.913	-12.990	N/A	8	PASS
802.11n(HT20)	1/2412	-13.209	-11.513	-9.268	8	PASS
	6/2437	-13.605	-11.833	-9.619	8	PASS
	11/2462	-12.087	-13.323	-9.651	8	PASS
802.11n(HT40)	3/2422	-17.353	-17.370	-14.351	8	PASS
	6/2437	-16.952	-17.932	-14.404	8	PASS
	9/2452	-17.535	-18.114	-14.805	8	PASS

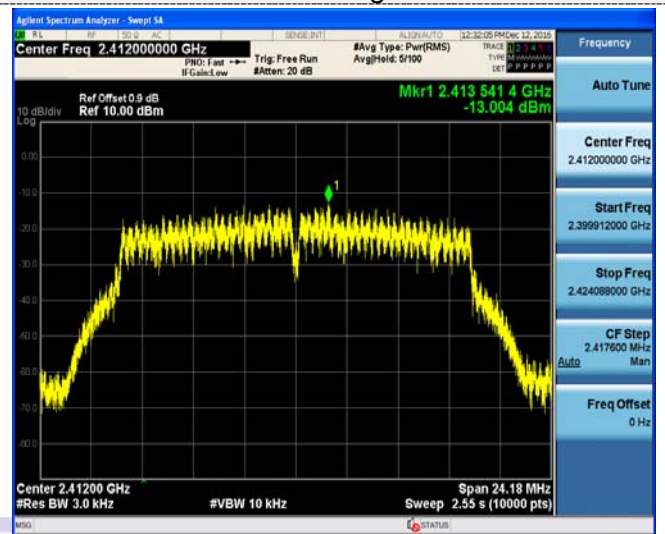
Test plot as follows:

Ant1:

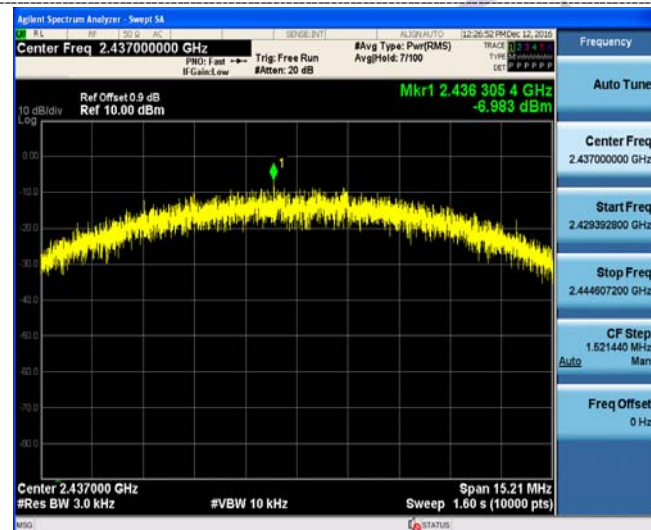
802.11b



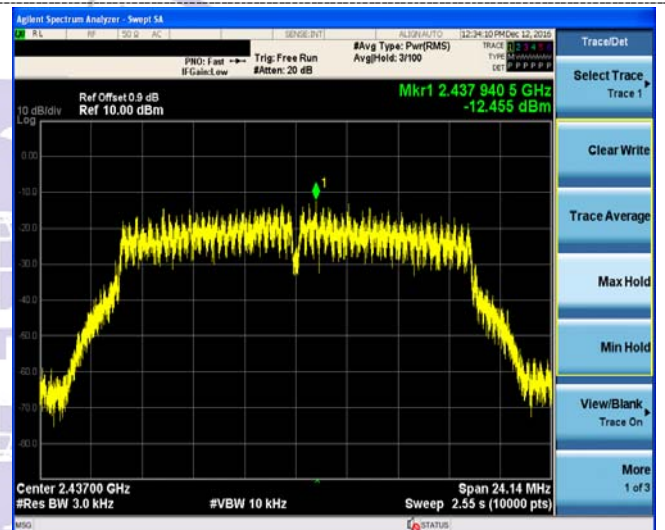
802.11g



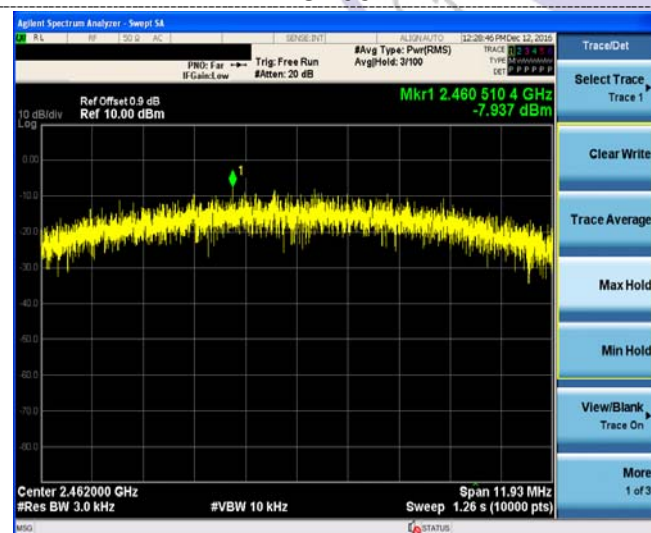
CH01



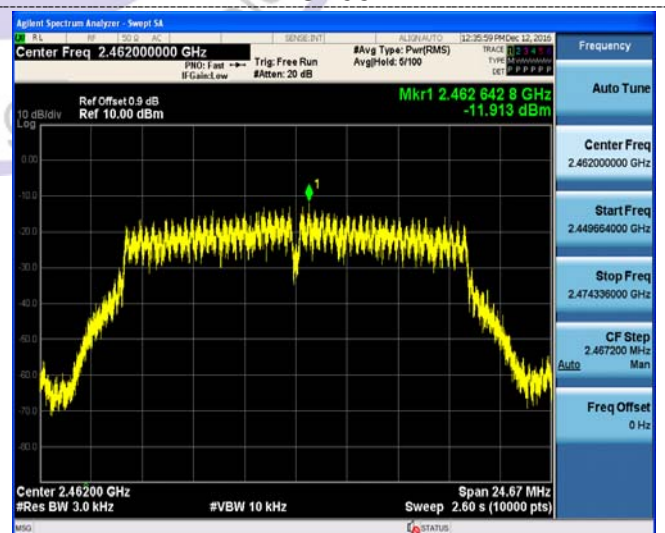
CH01



CH06



CH06

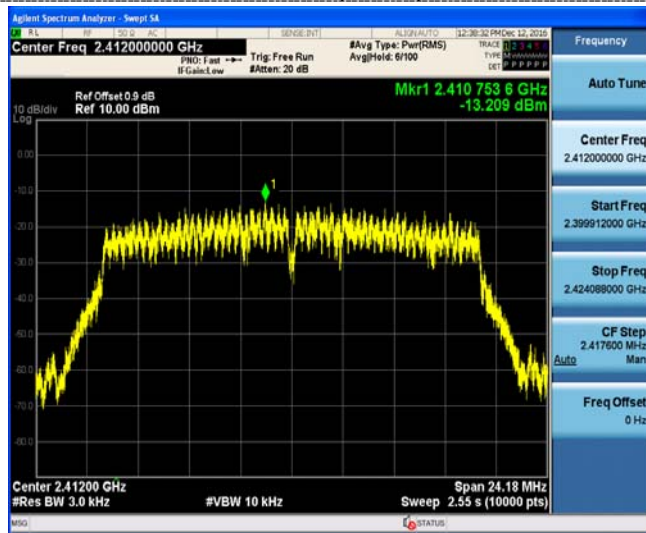


CH11

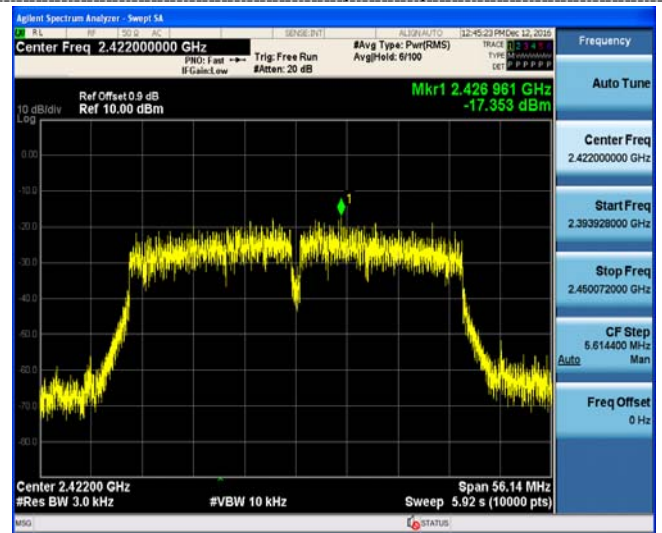
CH11



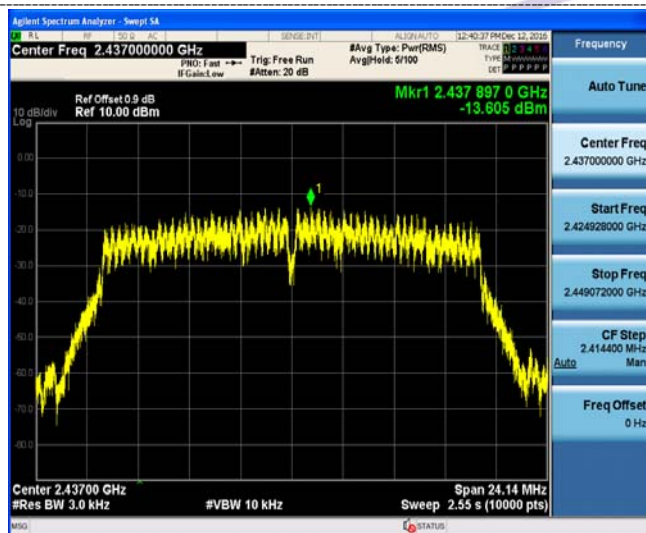
802.11n(HT20)



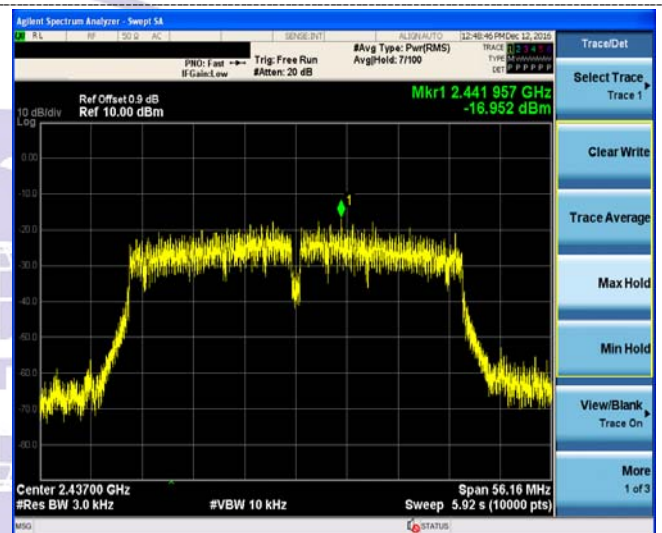
802.11n(HT40)



CH01



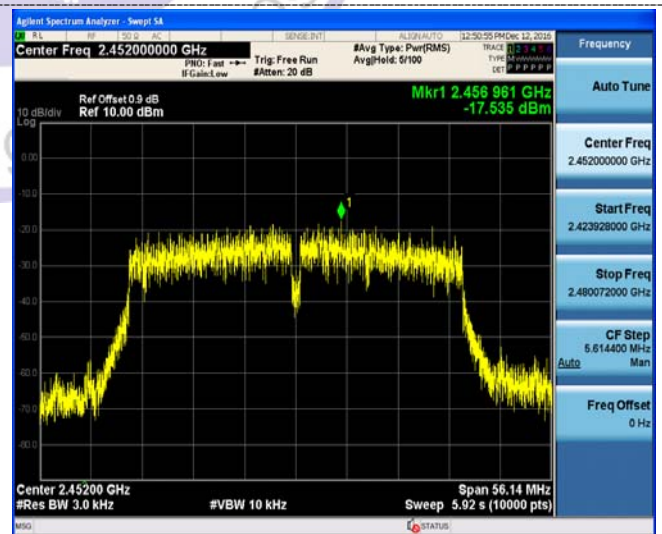
CH03



CH06



CH06



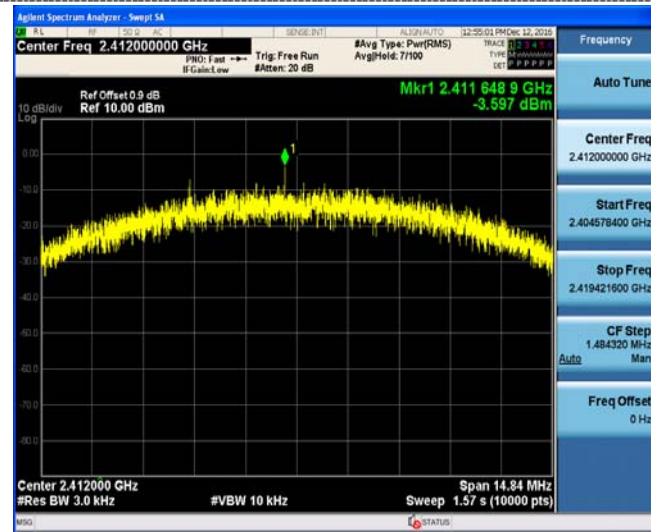
CH11

CH09

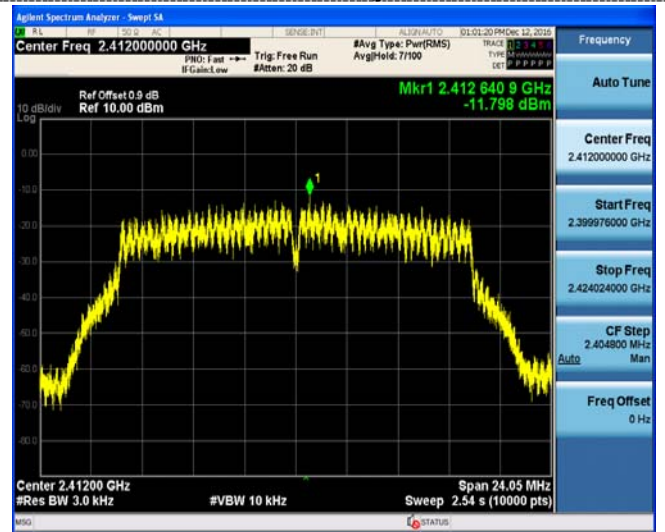


Ant 2:

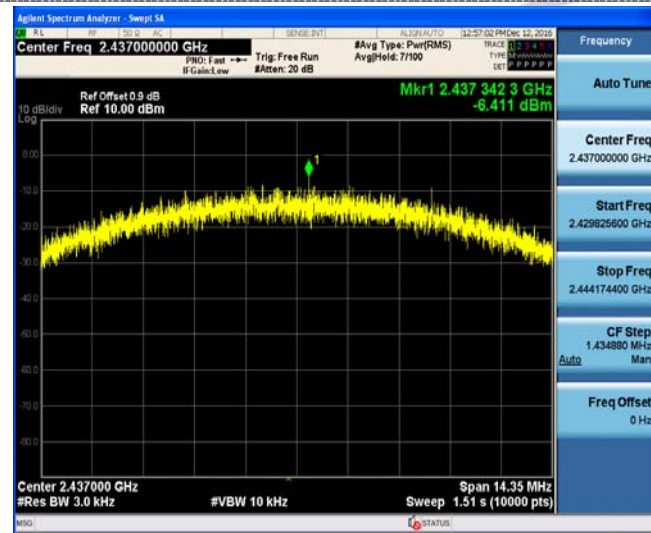
802.11b



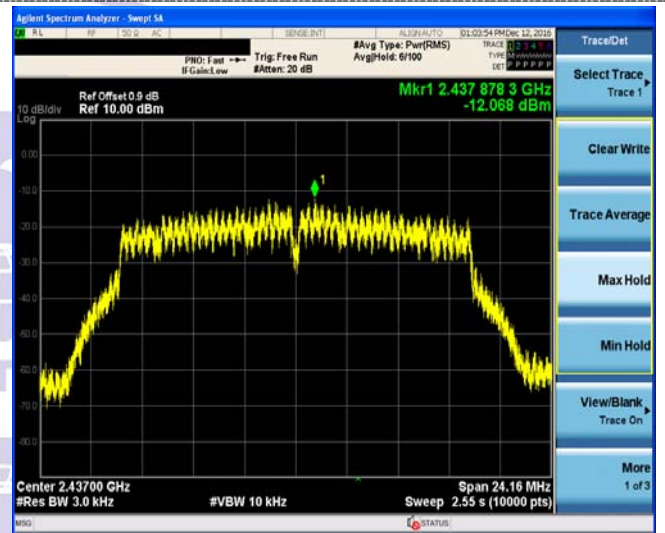
802.11g



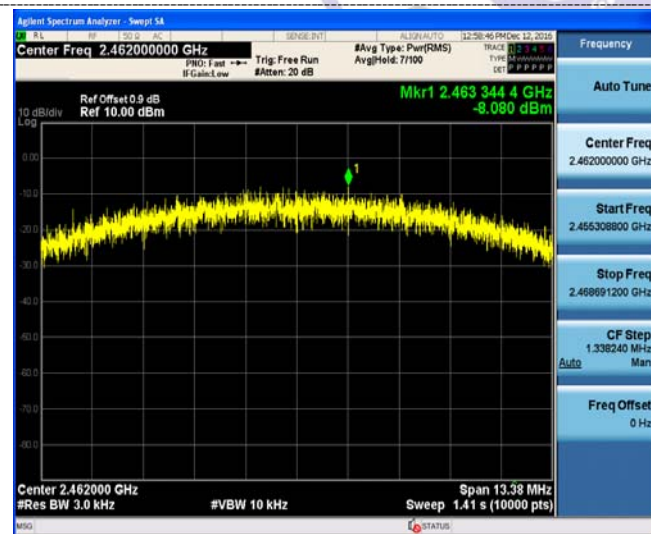
CH01



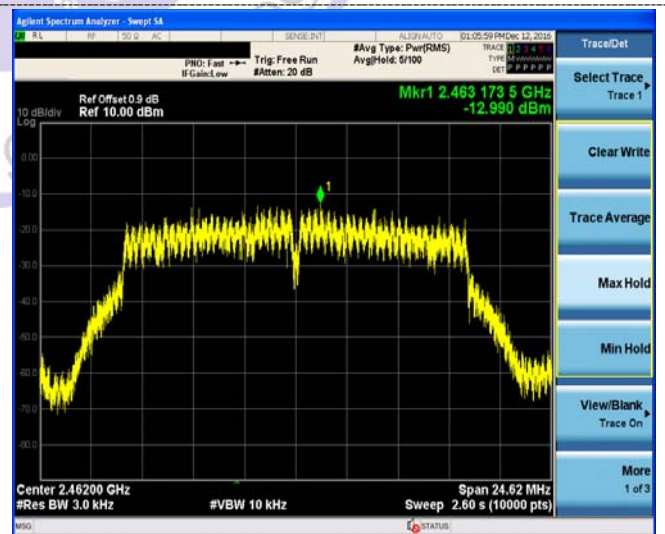
CH01



CH06



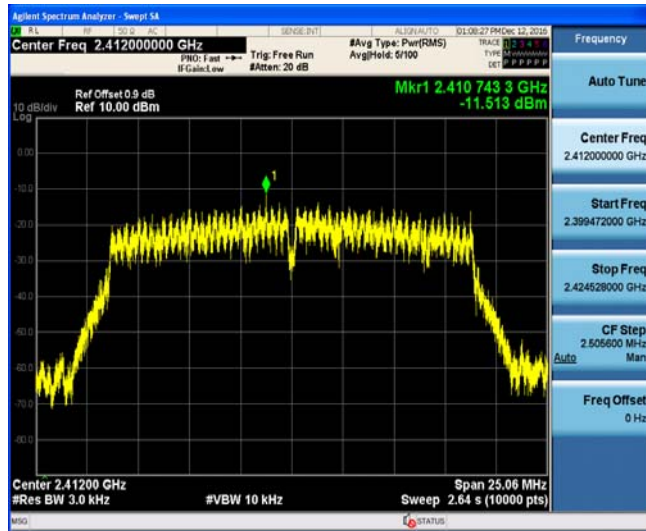
CH06



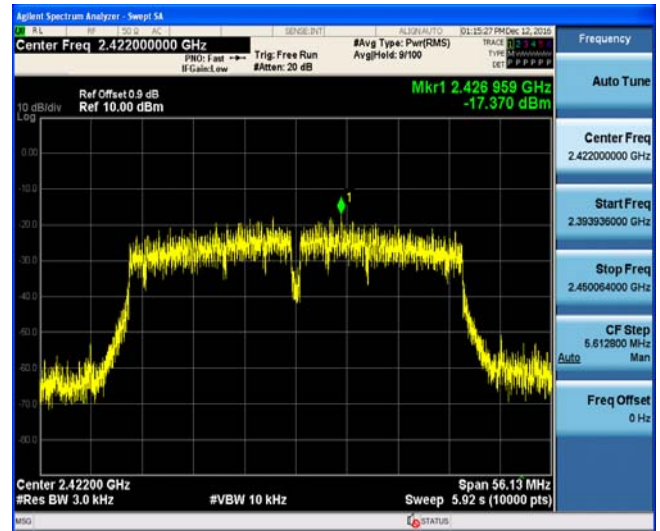
CH11

CH11

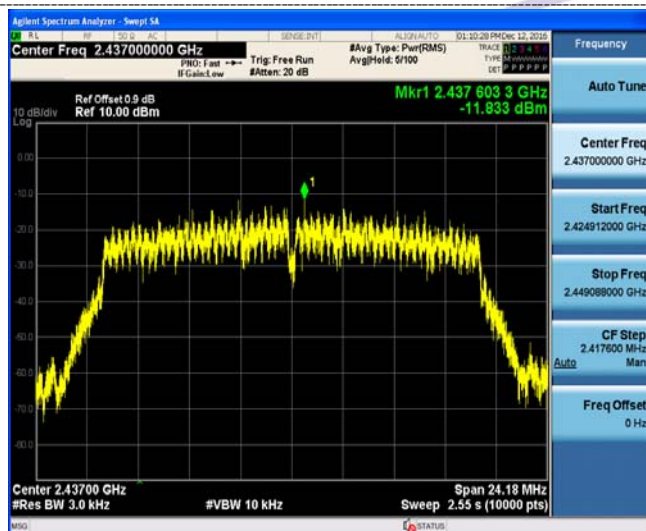
802.11n(HT20)



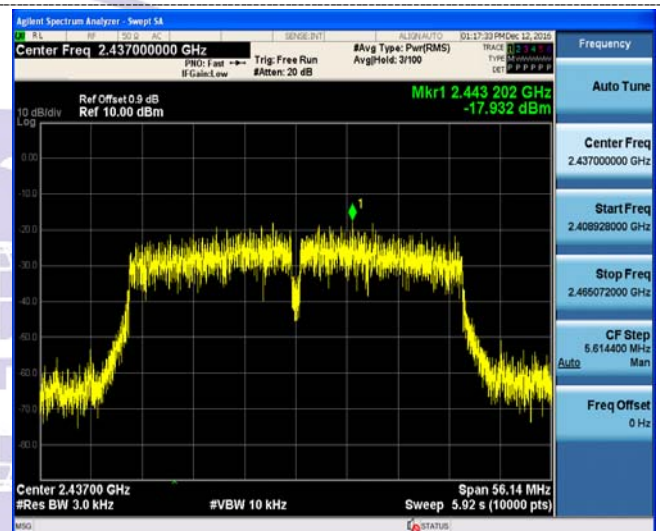
802.11n(HT40)



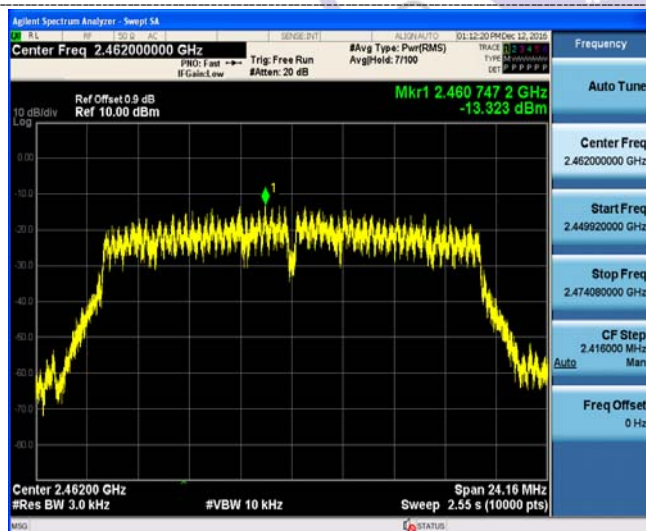
CH01



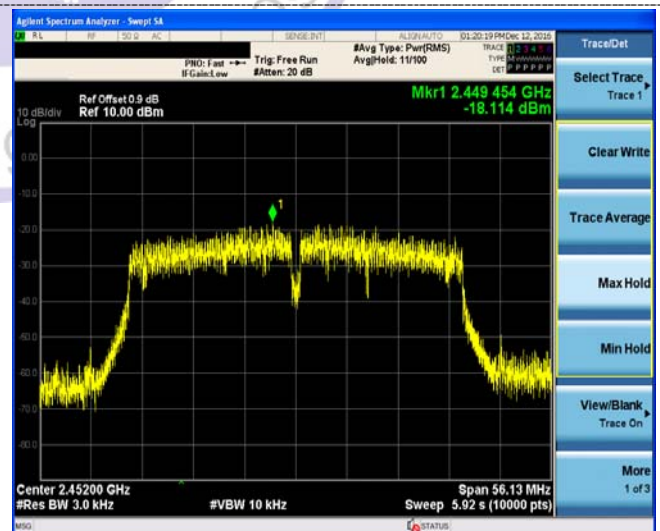
CH03



CH06



CH06



CH11

CH09

### 3.5. 6dB Bandwidth

#### Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

#### Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

#### Test Configuration



#### Test Results

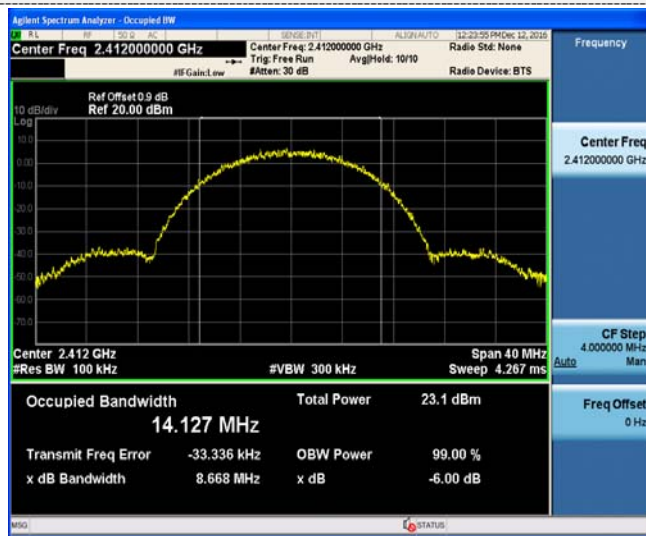
Ant1					
Type	Channel	6dB Bandwidth Ant1 (MHz)	6dB Bandwidth Ant2 (MHz)	Limit (KHz)	Result
802.11b	01	8.668	9.277	≥500	Pass
	06	9.509	8.968		
	11	7.456	8.364		
802.11g	01	15.11	15.03	≥500	Pass
	06	15.09	15.10		
	11	15.42	15.39		
802.11n(HT20)	01	15.11	15.66	≥500	Pass
	06	15.09	15.11		
	11	15.42	15.10		
802.11n(HT40)	03	35.09	35.08	≥500	Pass
	06	35.10	35.09		
	09	35.09	35.08		

Test plot as follows:

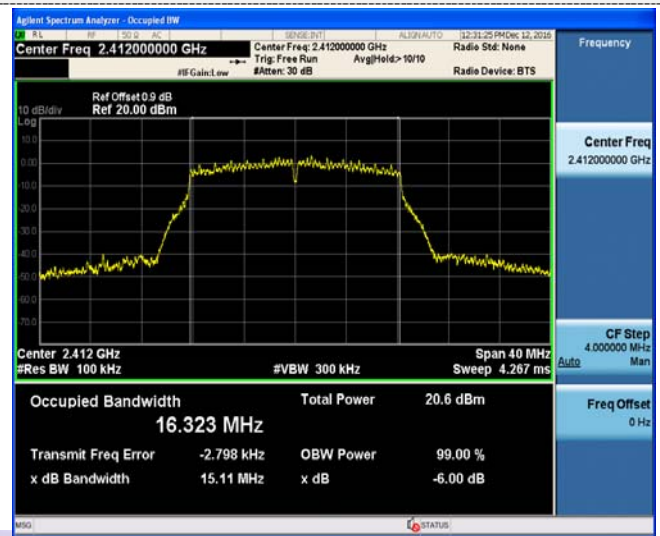


Ant1:

802.11b

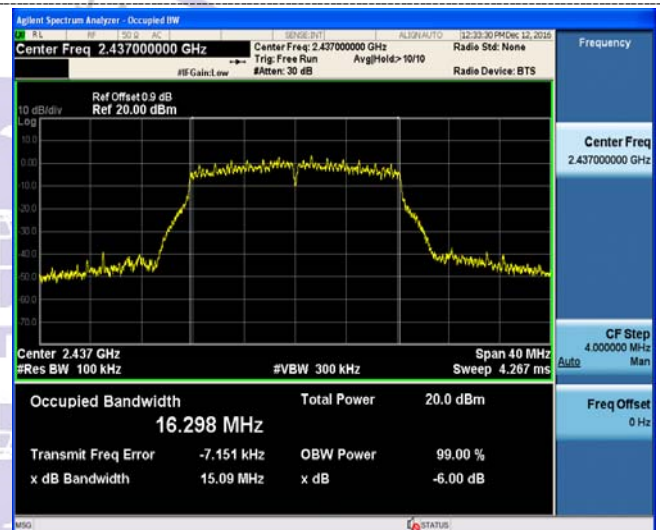


802.11g



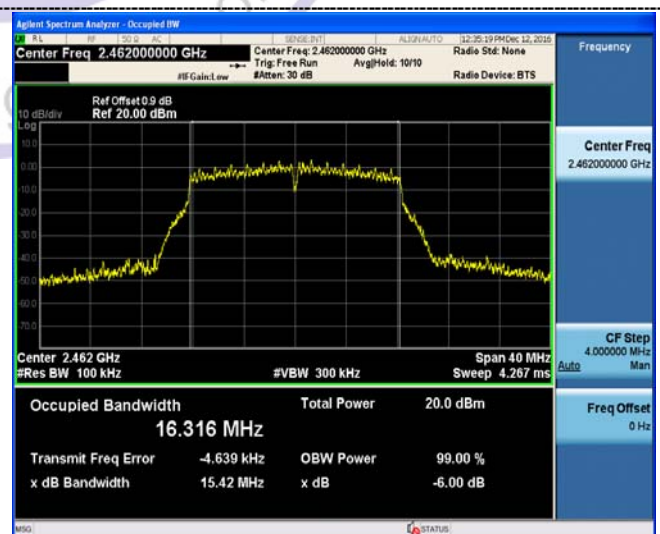
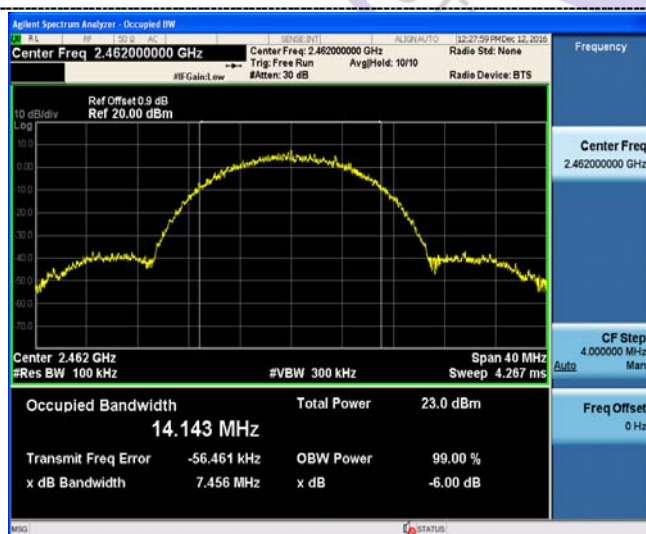
CH01

CH01



CH06

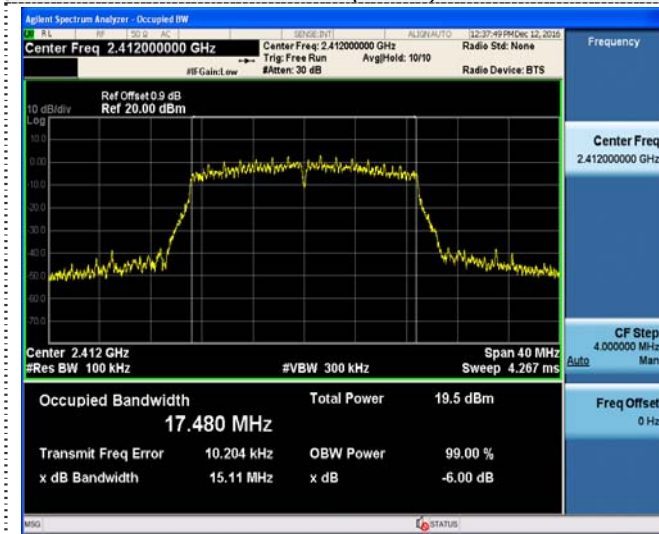
CH06



CH11

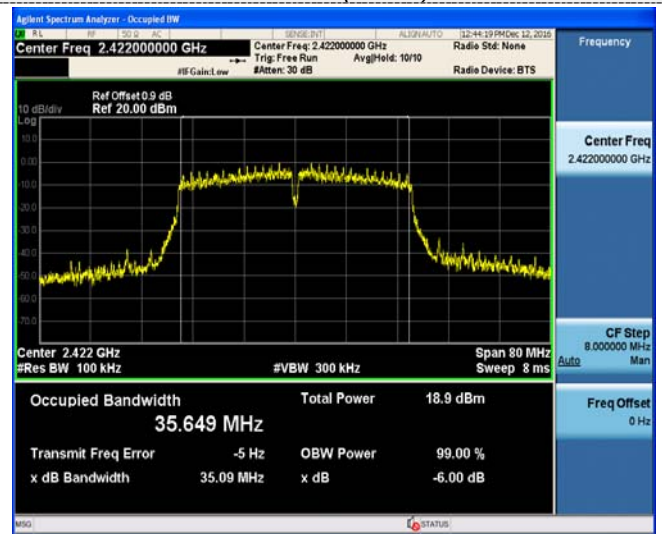
CH11

802.11n(HT20)

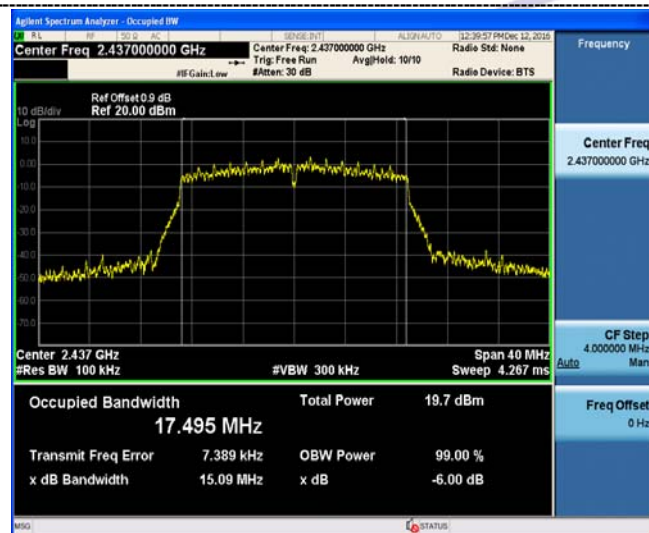


CH01

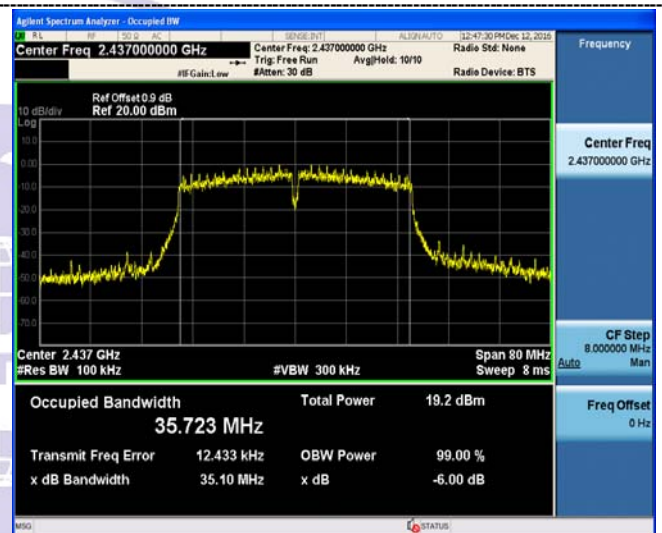
802.11n(HT40)



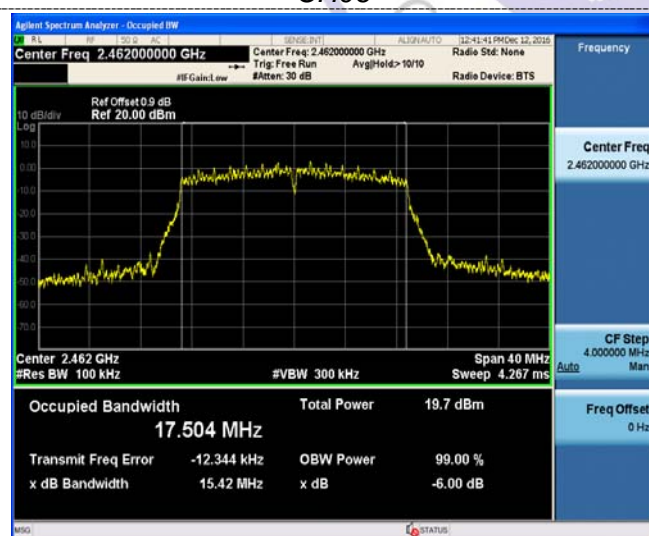
CH03



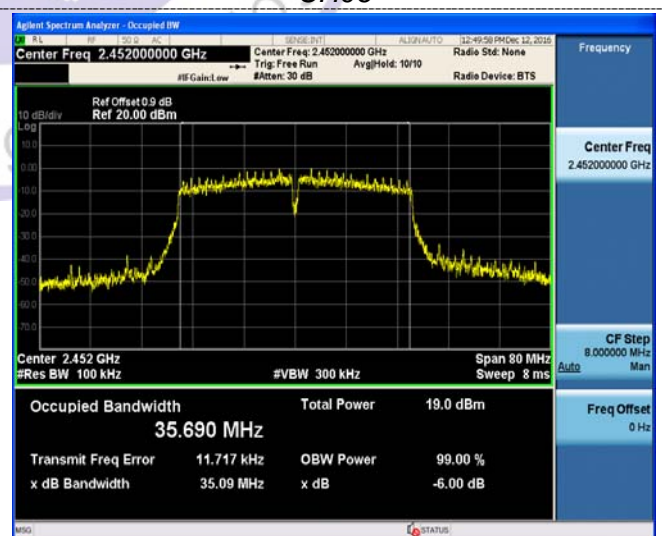
CH06



CH06



CH11



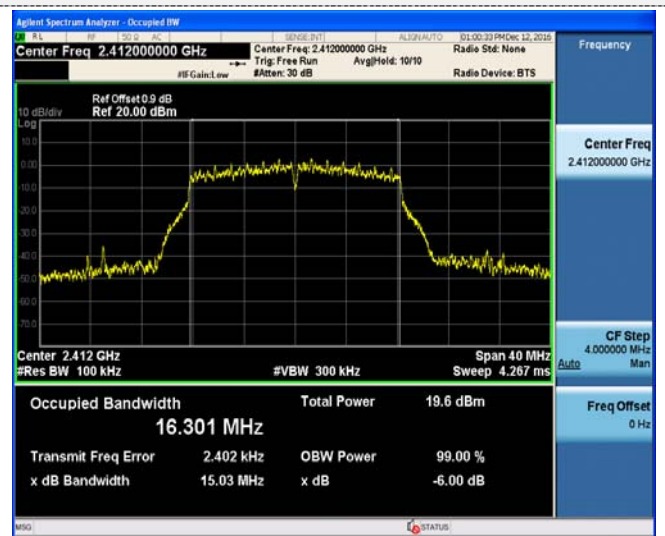
CH09



Ant2:

802.11b

802.11g



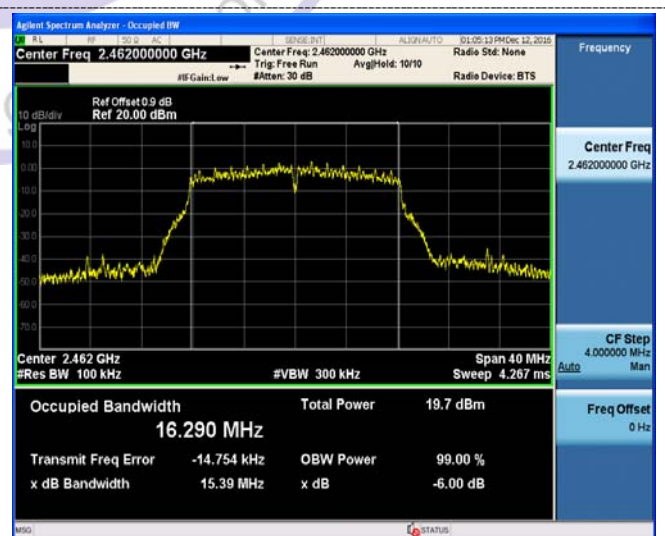
CH01

CH01



CH06

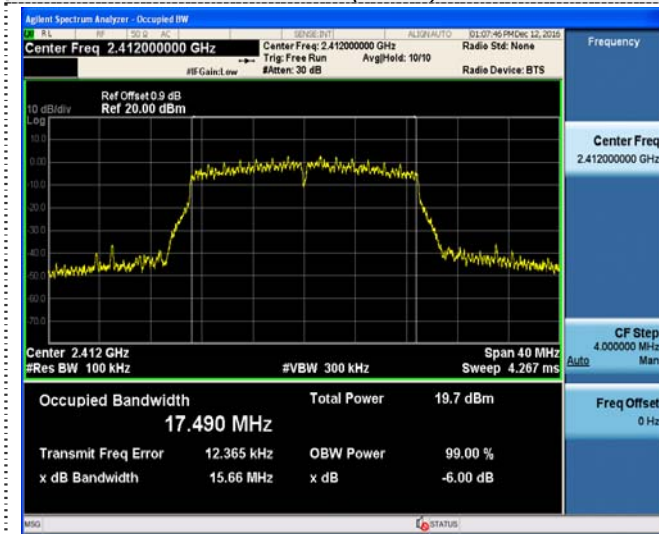
CH06



CH11

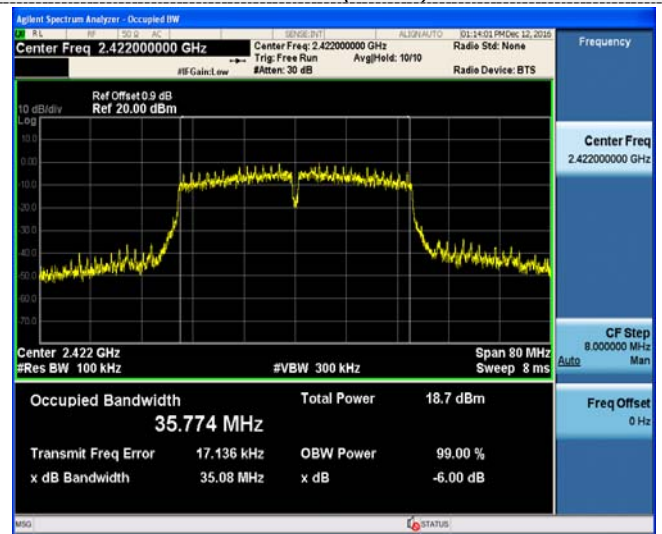
CH11

802.11n(HT20)

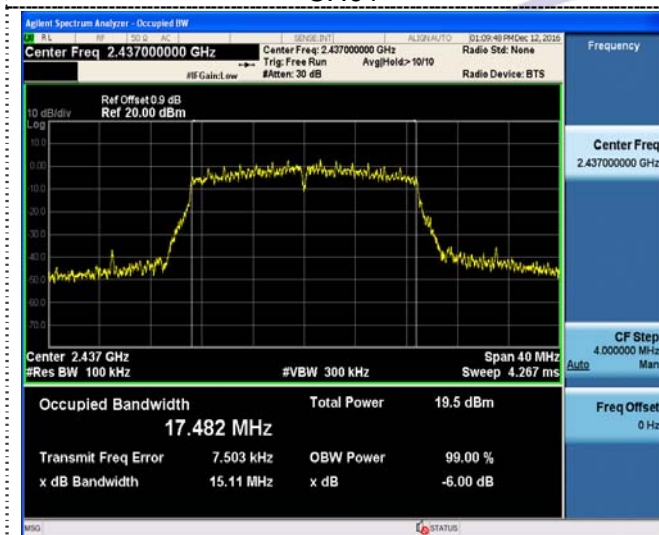


CH01

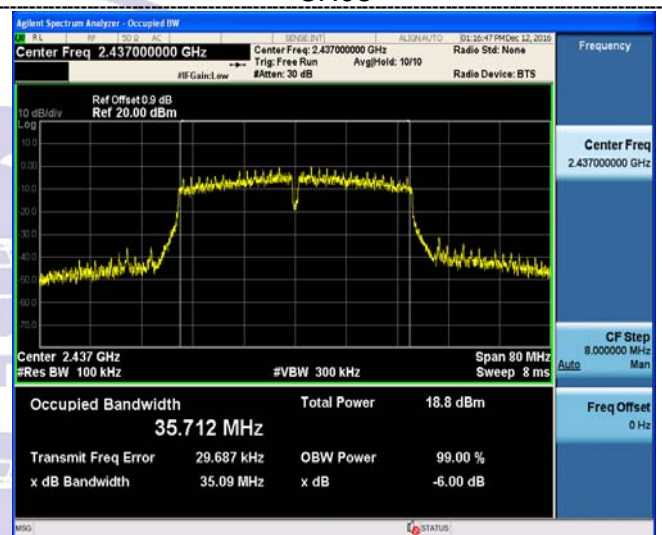
802.11n(HT40)



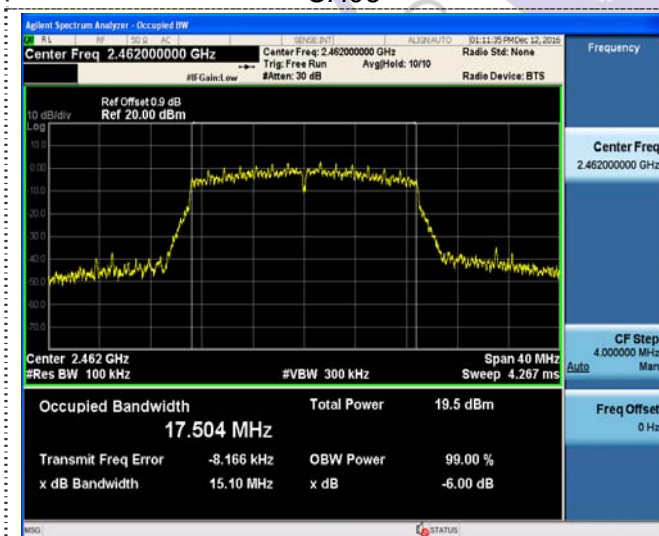
CH03



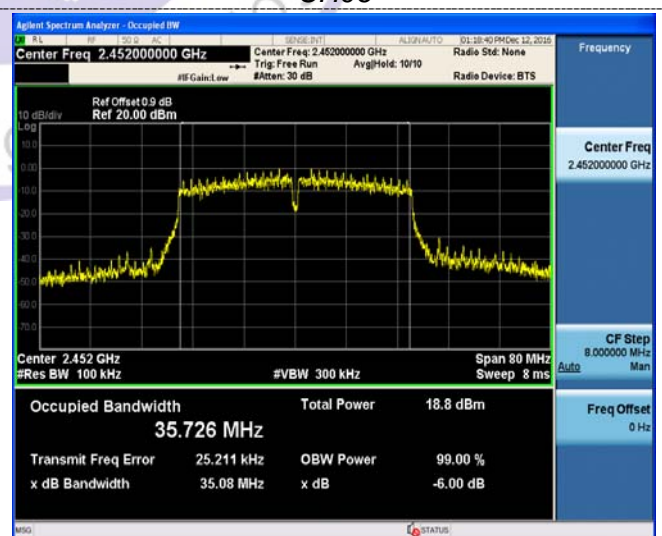
CH06



CH06



CH11



CH09