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TEST REPORT

FCC PART 15 SUBPART C 15.247

Report Reference No. .....: **CTL1607252810-WF-01**

Compiled by: (position+printed name+signature)	Jacky Chen (File administrators)	Jacky Chen
Tested by: (position+printed name+signature)	Allen Wang (Test Engineer)	Allen Wang
Approved by: (position+printed name+signature)	Tracy Qi (Manager)	Tracy Qi

Product Name.....: WIFI MODULE

Model/Type reference .....: ZK-7662

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

Trade Mark .....: CT-UNITE

FCC ID .....: **2ACWK76X2**

Applicant's name .....: **CT Unite Communication Technology Ltd**

Address of applicant .....: 6C, Jiajiahao Commercial Building, Yiyuan Road, North of Shennan Avenue, Nanshan District, Shenzhen, China

Test Firm .....: **Shenzhen CTL Testing Technology Co., Ltd.**

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

Test specification.....:

Standard.....: **47 CFR FCC Part 15 Subpart C 15.247**

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

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

Date of Receipt.....: Jul. 25, 2016

Date of Test Date.....: Jul. 26, 2016–Aug. 19, 2016

Data of Issue.....: Aug. 20, 2016

Result .....: Pass

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TEST REPORT

Test Report No. :	CTL1607252810-WF-01	Aug. 20, 2016 Date of issue

Equipment under Test	:	WIFI MODULE
Model /Type	:	ZK-7662
Listed Models	:	ZK-7632V, ZK-7632U, ZK-7632-TU, ZK-7632-T, ZK-7632-M, ZK-7632-L, ZK-7632-G, ZK-7662, ZK-7662U, ZK-7662-M , ZK-7662-T, ZK-7662-G, ZK-7662-TU, ZK-7662-V, ZK-7662-L, ZK-7612, ZK-7612-T, ZK-7612-U, ZK-7612-V, ZK-7612-G, ZK-7612-M, ZK-7612-TU, ZK-7610, ZK-7610U, ZK-7610V, ZK-7610-T, ZK-7610-M, ZK-7610-G, ZK-7610-TU, ZK-5572
Applicant	:	**CT Unite Communication Technology Ltd**
Address	:	6C, Jiajiahao Commercial Building, Yiyuan Road, North of Shennan Avenue, Nanshan District, Shenzhen, China
Manufacturer	:	**CT Unite Communication Technology Ltd**
Address	:	6C, Jiajiahao Commercial Building, Yiyuan Road, North of Shennan Avenue, Nanshan District, Shenzhen, China

Test result	**Pass ***

∗ 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	2016-08-20	CTL1607252810-WF-01	Tracy Qi

Table of Contents Page

1. SUMMARY 5

1.1. TEST STANDARDS 5
1.2. TEST DESCRIPTION 5
1.3. TEST FACILITY 6
1.4. STATEMENT OF THE MEASUREMENT UNCERTAINTY 6

2. GENERAL INFORMATION 7

2.1. ENVIRONMENTAL CONDITIONS 7
2.2. GENERAL DESCRIPTION OF EUT 7
2.3. DESCRIPTION OF TEST MODES AND TEST FREQUENCY 7
2.4. EQUIPMENTS USED DURING THE TEST 9
2.5. RELATED SUBMITTAL(S) / GRANT (S) 9
2.6. MODIFICATIONS 9

3. TEST CONDITIONS AND RESULTS 10

3.1. CONDUCTED EMISSIONS TEST 10
3.2. RADIATED EMISSIONS AND BAND EDGE 13
3.3. MAXIMUM CONDUCTED OUTPUT POWER 19
3.4. POWER SPECTRAL DENSITY 20
3.5. 6DB BANDWIDTH 25
3.6. OUT-OF-BAND EMISSIONS 30

4. TEST SETUP PHOTOS OF THE EUT 46

5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT 48

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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

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

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

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

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1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing 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 970318, December 19, 2013.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

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

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:	WIFI MODULE
Model/Type reference:	ZK-7662
Power supply:	DC 3.3V from host device
WIFI	
Supported type:	802.11b SISO /802.11g SISO /802.11n(H20) MIMO /802.11n(H40) MIMO
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:	PIFA Antenna
Antenna gain:	1.0dBi ; antenna number : 2 ; Directional gain for MIMO mode=4dBi

Note: For more details, 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.

All test performed at the low, middle and high of operational frequency range of each mode.

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

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	13.5 Mbps	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	13.5 Mbps	3//9

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2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2016/06/02	2017/06/01
LISN	R&S	ESH2-Z5	860014/010	2016/06/02	2017/06/01
Power Meter	Anritsu	ML2487B	110553	2016/06/02	2017/06/01
Power Sensor	Anritsu	MA2411B	100345	2016/05/21	2017/05/20
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2017/06/01
EMI Test Receiver	R&S	ESCI	103710	2016/06/02	2017/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2016/05/21	2017/05/20
Spectrum Analyzer	Agilent	N9020	US46220290	2016/01/17	2017/01/16
Controller	EM Electronics	Controller EM 1000	N/A	2016/05/21	2017/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2017/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/05/19	2017/05/18
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2016/05/20	2017/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2016/05/20	2017/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
RF Cable	Megalon	RF-A303	N/A	2016/06/02	2017/06/01

The calibration interval was one year

2.5. 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.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

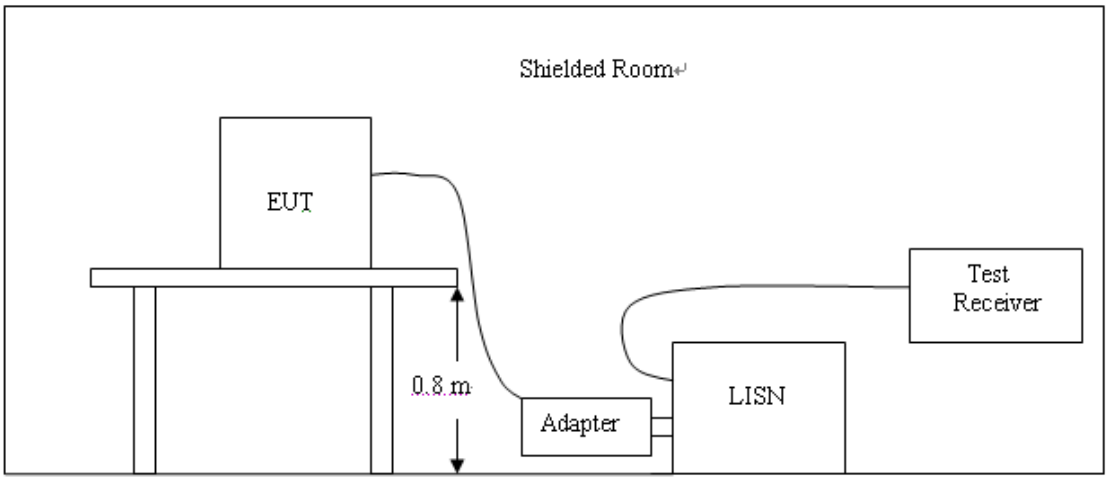
LIMIT

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

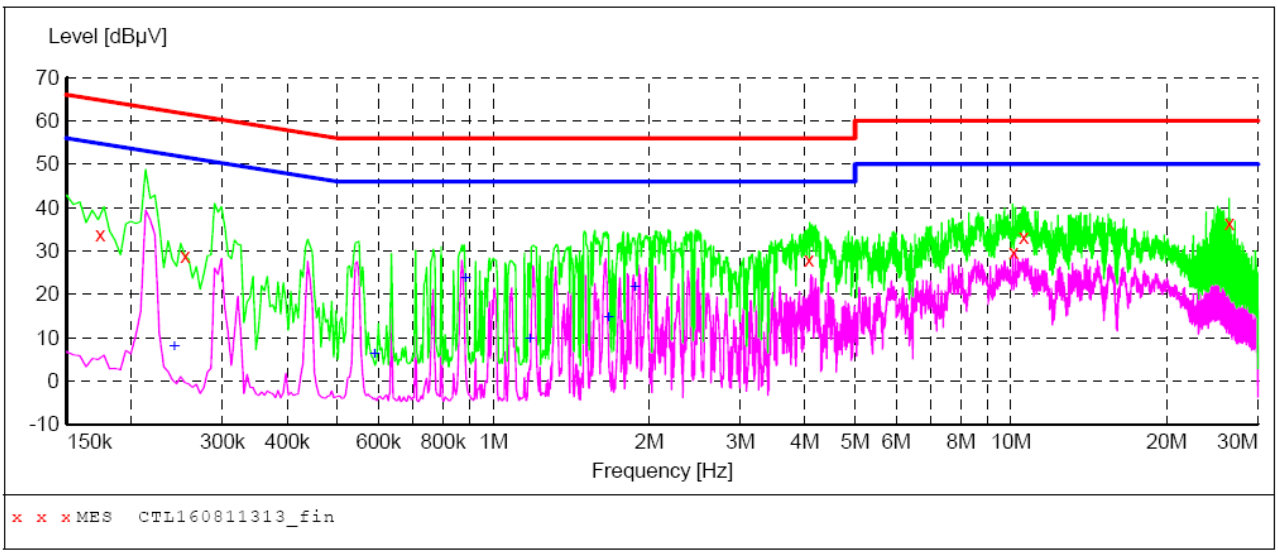
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as 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: All modes 802.11b SISO/802.11g SISO/802.11n (H20) MIMO/802.11n (H40) MIMO MODE ALL have been tested; only worse case is reported.

Line:	L

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160811313_fin"

8/11/2016 5:26PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.174000	33.80	10.2	65	31.0	QP	L1	GND
0.254000	28.90	10.2	62	32.7	QP	L1	GND
4.070000	28.00	10.4	56	28.0	QP	L1	GND
10.112000	29.60	10.6	60	30.4	QP	L1	GND
10.580000	33.10	10.6	60	26.9	QP	L1	GND
26.414000	36.30	11.2	60	23.7	QP	L1	GND

MEASUREMENT RESULT: "CTL160811313_fin2"

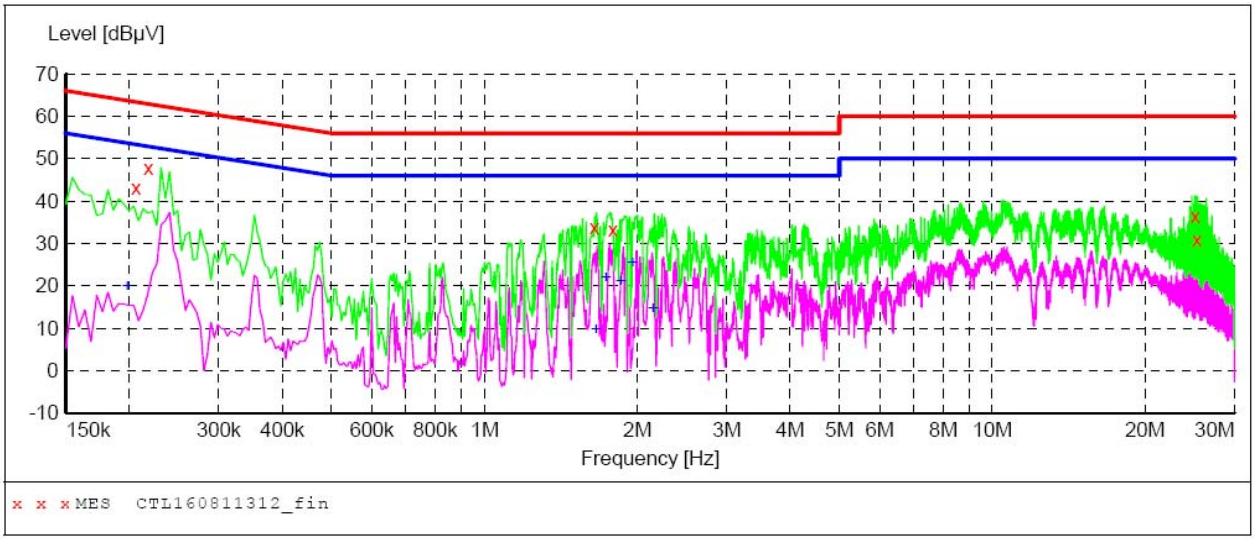
8/11/2016 5:26PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.242000	7.90	10.2	52	44.1	AV	L1	GND
0.590000	6.20	10.2	46	39.8	AV	L1	GND
0.884000	23.60	10.2	46	22.4	AV	L1	GND
1.178000	9.70	10.3	46	36.3	AV	L1	GND
1.670000	14.70	10.3	46	31.3	AV	L1	GND
1.880000	21.50	10.3	46	24.5	AV	L1	GND

Line:	N

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160811312_fin"

8/11/2016 5:23PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.206000	43.10	10.2	63	20.3	QP	N	GND
0.218000	47.80	10.2	63	15.1	QP	N	GND
1.646000	33.90	10.3	56	22.1	QP	N	GND
1.790000	33.10	10.3	56	22.9	QP	N	GND
25.088000	36.40	11.1	60	23.6	QP	N	GND
25.274000	30.90	11.1	60	29.1	QP	N	GND

MEASUREMENT RESULT: "CTL160811312_fin2"

8/11/2016 5:23PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.198000	19.80	10.2	54	33.9	AV	N	GND
1.658000	9.60	10.3	46	36.4	AV	N	GND
1.736000	21.90	10.3	46	24.1	AV	N	GND
1.856000	21.00	10.3	46	25.0	AV	N	GND
1.958000	25.30	10.3	46	20.7	AV	N	GND
2.150000	14.50	10.4	46	31.5	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.

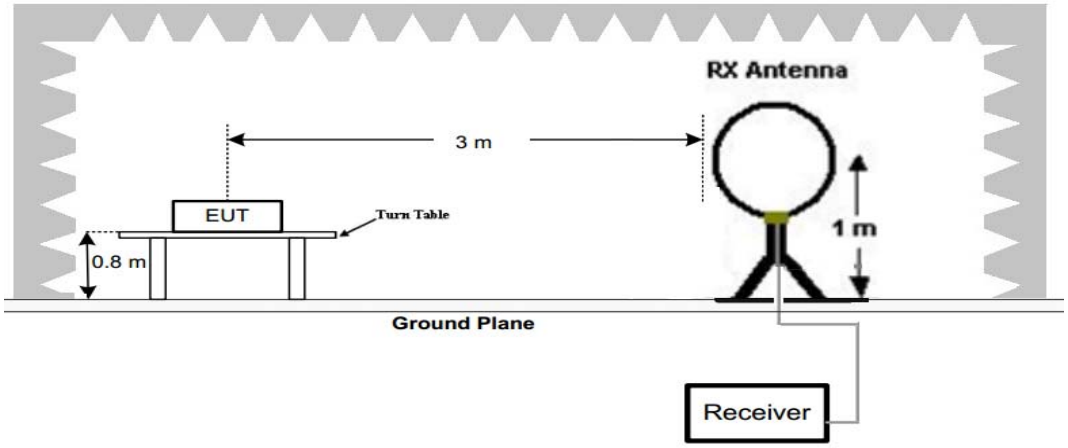
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

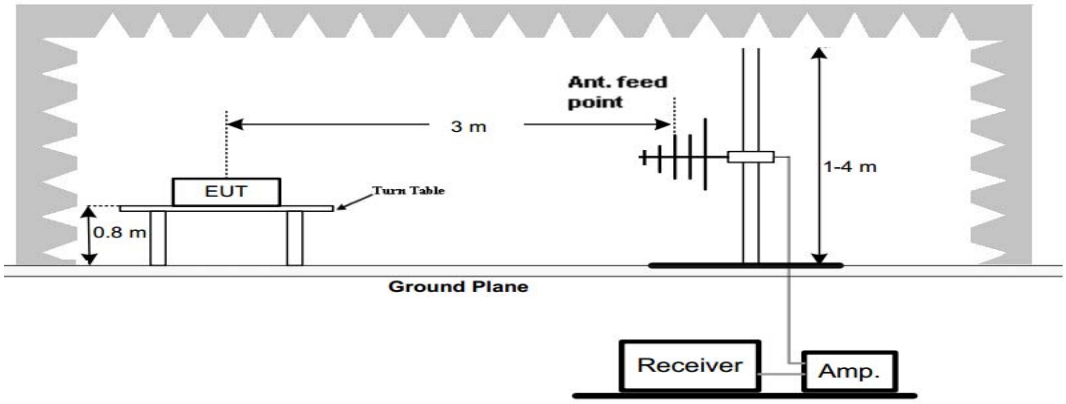
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

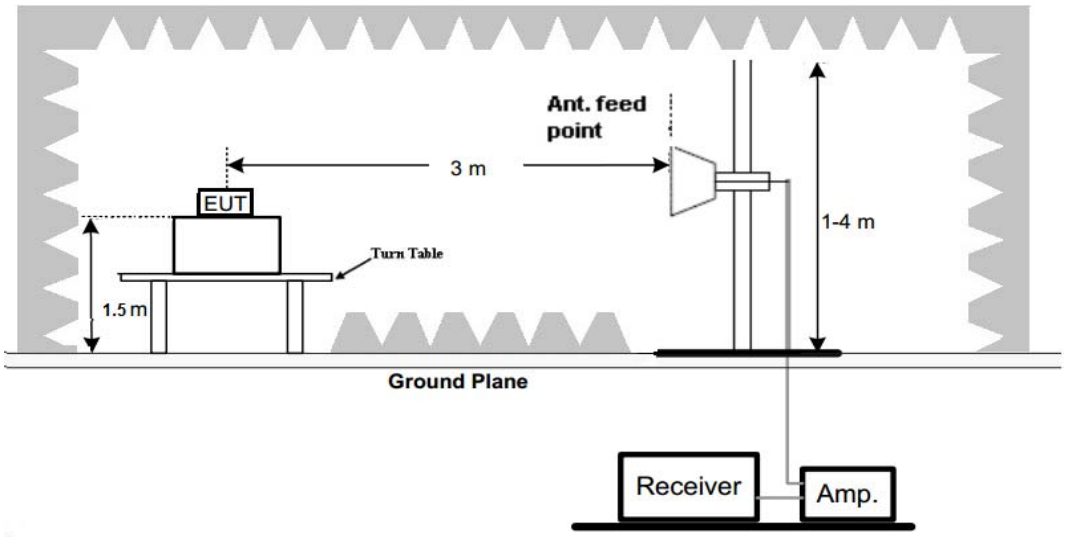
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
4. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.
5. 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
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measurements have been completed.

TEST RESULTS

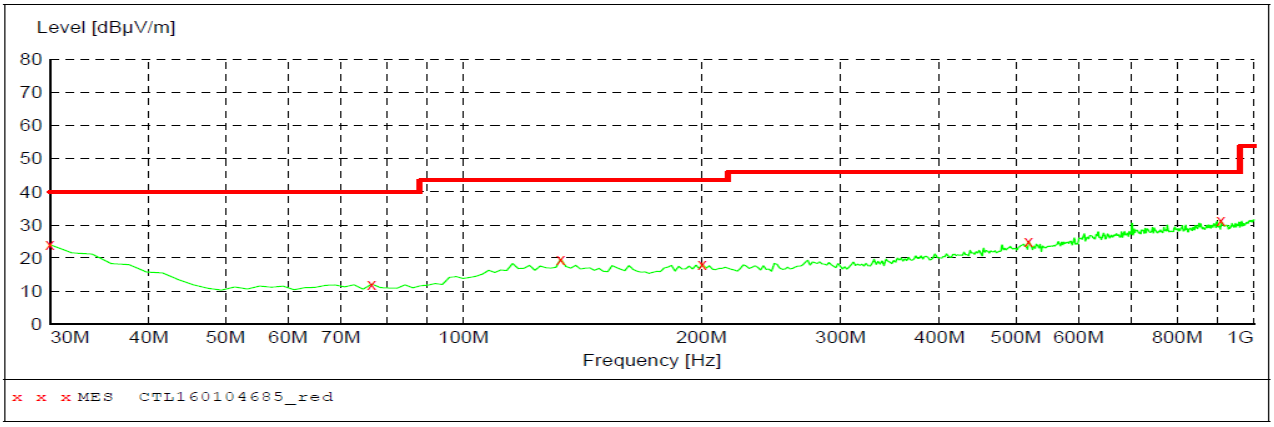
Remark:
1. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9KHz to 30MHz and not recorded in this report.
2. For below 1GHz measurement, all three channels (lowest/middle/highest) of each mode were tested and recorded worst case at 802.11b ant 1 low channel.
3. For above 1GHz measurement, all three channels (lowest/middle/highest) of each mode were tested and recorded worst case at 802.11b mode.

For 30MHz-1GHz

Test mode:	WIFI	Polarization:	Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160104685_red"

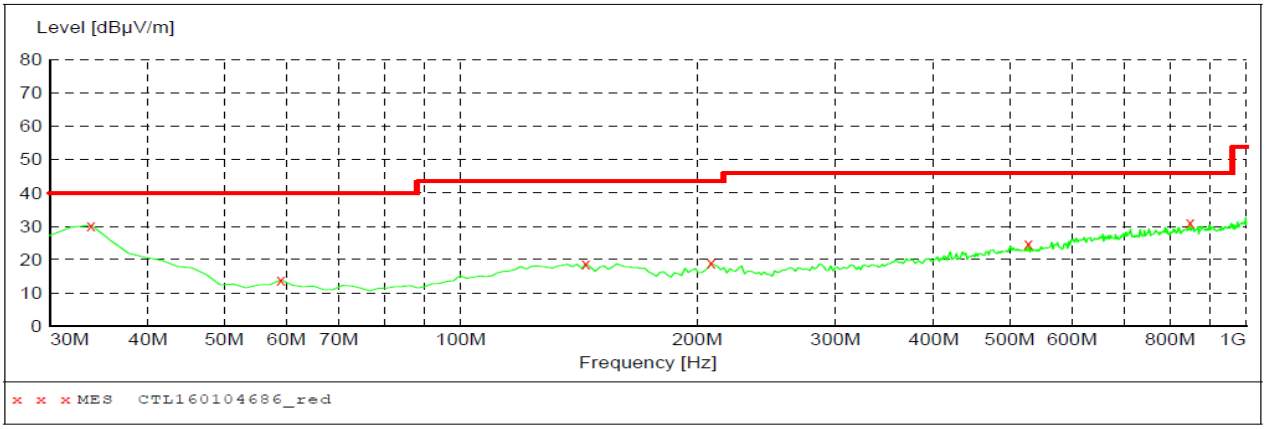
1/5/2016 9:44PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	24.00	20.8	40.0	16.0	---	0.0	0.00	HORIZONTAL
76.560000	12.10	8.3	40.0	27.9	---	0.0	0.00	HORIZONTAL
132.820000	19.70	14.4	43.5	23.8	---	0.0	0.00	HORIZONTAL
200.720000	18.10	14.1	43.5	25.4	---	0.0	0.00	HORIZONTAL
518.880000	25.00	20.3	46.0	21.0	---	0.0	0.00	HORIZONTAL
908.820000	31.40	26.1	46.0	14.6	---	0.0	0.00	HORIZONTAL

Test mode:	WIFI	Polarization:	Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL160104686_red"

1/5/2016 9:45PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	30.30	17.7	40.0	9.7	---	0.0	0.00	VERTICAL
59.100000	13.90	8.0	40.0	26.1	---	0.0	0.00	VERTICAL
144.460000	18.80	14.1	43.5	24.7	---	0.0	0.00	VERTICAL
208.480000	19.00	14.0	43.5	24.5	---	0.0	0.00	VERTICAL
528.580000	24.80	20.4	46.0	21.2	---	0.0	0.00	VERTICAL
848.680000	31.00	25.2	46.0	15.0	---	0.0	0.00	VERTICAL

REMARK :802.11b SISO/802.11g SISO /802.11n (H20) MIMO/802.11n (H40) MIMO all have been tested, only worse case 802.11b SISO MODE ANT 1 is reported.

For 1GHz to 25GHz

Note: 802.11b SISO/802.11g SISO /802.11n (H20) MIMO/802.11n (H40) MIMO all have been tested, only worse case 802.11b SISO MODE ANT 1 is reported.

802.11b Mode (above 1GHz)

Frequency(MHz):				2412		Polarity:			HORIZONTAL	
No.	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)
1	2412.00	101.87	PK	--	--	68.45	28.80	4.62	0.00	33.42
1	2412.00	91.26	AV	--	--	57.84	28.80	4.62	0.00	33.42
2	2390.00	39.98	PK	74	34.02	6.66	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	51.78	PK	74	22.22	18.39	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	66.29	PK	74	7.71	61.74	33.52	6.92	35.89	4.55
4	4824.00	51.52	AV	54	2.48	46.97	33.52	6.92	35.89	4.55
5	5115.75	41.32	PK	74	32.68	34.13	34.36	7.10	34.27	7.19
5	5115.75	--	AV	54	--	--	--	--	--	--
6	7236.00	50.23	PK	74	23.77	38.96	37.10	9.19	35.02	11.27
6	7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2412		Polarity:			VERTICAL	
No.	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)
1	2412.00	101.69	PK	--	--	68.27	28.80	4.62	0.00	33.42
1	2412.00	91.48	AV	--	--	58.06	28.80	4.62	0.00	33.42
2	2390.00	39.52	PK	74	34.48	6.20	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	50.59	PK	74	23.41	17.20	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	66.78	PK	74	7.22	62.23	33.52	6.92	35.89	4.55
4	4824.00	51.68	AV	54	2.32	47.13	33.52	6.92	35.89	4.55
5	5025.75	42.91	PK	74	31.09	36.03	34.07	7.05	34.24	6.88
5	5025.75	--	AV	54	--	--	--	--	--	--
6	7236.00	50.87	PK	74	23.13	39.60	37.10	9.19	35.02	11.27
6	7236.00	--	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.

Frequency(MHz):				2437		Polarity:			HORIZONTAL	
No.	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)
1	2437.00	102.79	PK	--	--	69.29	28.85	4.65	0.00	33.50
1	2437.00	91.41	AV	--	--	57.91	28.85	4.65	0.00	33.50
2	3875.50	49.75	PK	74	24.25	45.09	33.29	6.26	34.89	4.66
2	3875.50	--	AV	54	--	--	--	--	--	--
3	4874.00	67.54	PK	74	6.46	61.20	33.59	6.95	34.20	6.34
3	4874.00	51.98	AV	54	2.02	45.64	33.59	6.95	34.20	6.34
4	5125.25	41.23	PK	74	32.77	33.90	34.38	7.10	34.16	7.33
4	5125.25	--	AV	54	--	--	--	--	--	--
5	7311.00	48.69	PK	74	25.31	37.03	37.44	9.22	35.00	11.66
5	7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2437		Polarity:			VERTICAL	
No.	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)
1	2437.00	102.84	PK	--	--	69.34	28.85	4.65	0.00	33.50
1	2437.00	91.54	AV	--	--	58.04	28.85	4.65	0.00	33.50
2	3986.75	49.69	PK	74	24.31	44.98	33.14	6.38	34.81	4.71
2	3986.75	--	AV	54	--	--	--	--	--	--
3	4874.00	66.92	PK	74	7.08	60.58	33.59	6.95	34.20	6.34
3	4874.00	51.75	AV	54	2.25	45.41	33.59	6.95	34.20	6.34
4	5215.50	41.59	PK	74	32.41	33.99	34.56	7.15	34.11	7.60
4	5215.50	--	AV	54	--	--	--	--	--	--
5	7311.00	48.73	PK	74	25.27	37.07	37.44	9.22	35.00	11.66
5	7311.00	--	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.

Frequency(MHz):				2462		Polarity:			HORIZONTAL	
No.	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)
1	2462.00	102.14	PK	--	--	68.57	28.89	4.68	0.00	33.57
1	2462.00	91.85	AV	--	--	58.28	28.89	4.68	0.00	33.57
2	2483.50	51.51	PK	74	22.49	17.88	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	40.74	PK	74	33.26	7.06	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	66.98	PK	74	7.02	62.20	33.71	6.98	35.91	4.78
4	4924.00	51.57	AV	54	2.43	46.79	33.71	6.98	35.91	4.78
5	5025.25	43.56	PK	74	30.44	36.69	34.07	7.05	34.24	6.87
5	5025.25	--	AV	54	--	--	--	--	--	--
6	7386.00	50.21	PK	74	23.79	38.33	37.61	9.25	34.98	11.88
6	7386.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2462		Polarity:			VERTICAL	
No.	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)
1	2462.00	102.25	PK	--	--	68.68	28.89	4.68	0.00	33.57
1	2462.00	91.41	AV	--	--	57.84	28.89	4.68	0.00	33.57
2	2483.50	51.59	PK	74	22.41	17.96	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	40.22	PK	74	33.78	6.54	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	66.51	PK	74	7.49	61.73	33.71	6.98	35.91	4.78
4	4924.00	51.69	AV	54	2.31	46.91	33.71	6.98	35.91	4.78
5	5110.75	41.88	PK	74	32.12	34.70	34.35	7.10	34.27	7.18
5	5110.75	--	AV	54	--	--	--	--	--	--
6	7386.00	50.48	PK	74	23.52	38.60	37.61	9.25	34.98	11.88
6	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.

3.3. Maximum Conducted Output Power

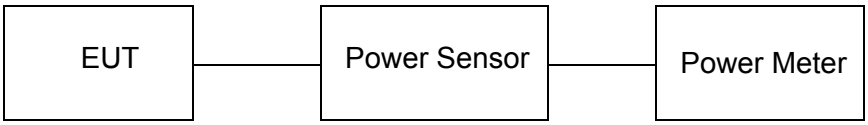
Limit

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

WIFI

Type	Channel	PK Output power Ant1 (dBm)	PK Output power Ant2 (dBm)	Output power Total (dBm)	Limit (dBm)	Result
802.11b SISO	01	19.62	18.75	/	30.00	Pass
	06	19.57	18.92	/		
	11	19.51	19.07	/		
802.11g SISO	01	19.73	18.90	/	30.00	Pass
	06	19.53	18.98	/		
	11	19.16	18.73	/		
802.11n(HT20) MIMO	01	18.68	17.72	21.24	30.00	Pass
	06	18.49	17.69	21.12		
	11	18.17	17.48	20.85		
802.11n(HT40) MIMO	03	18.66	17.78	21.25	30.00	Pass
	06	18.86	17.72	21.34		
	09	18.62	17.30	21.02		

Note: 1.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 ≥ 3 kHz.
3. Set the VBW ≥ 3× 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

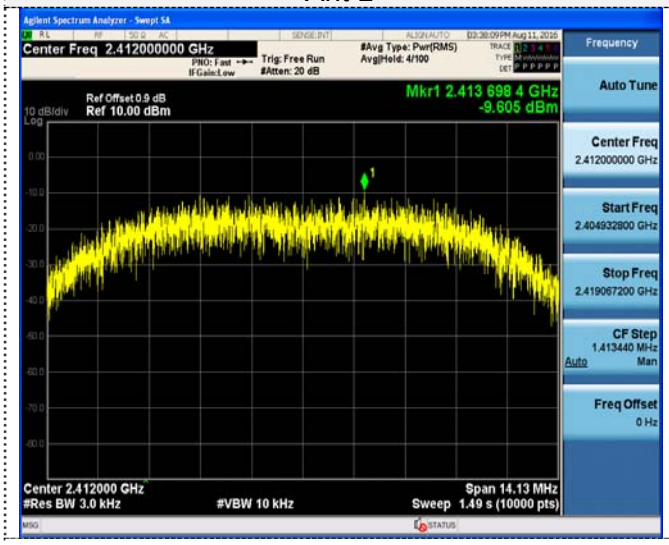
WIFI

Type	Channel	Power Spectral Density Ant1 (dBm/3KHz)	Power Spectral Density Ant2 (dBm/3KHz)	Power Spectral Density Total (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b SISO	01	-9.605	-10.825	/	8.00	Pass
	06	-9.808	-11.396	/		
	11	-6.037	-12.137	/		
802.11g SISO	01	-15.762	-16.695	/	8.00	Pass
	06	-16.498	-16.711	/		
	11	-16.589	-16.113	/		
802.11n(HT20) MIMO	01	-16.161	-17.011	-13.55	8.00	Pass
	06	-16.160	-15.401	-12.75		
	11	-16.463	-16.769	-13.60		
802.11n(HT40) MIMO	03	-19.685	-21.913	-17.65	8.00	Pass
	06	-19.119	-20.964	-16.93		
	09	-19.988	-20.587	-17.27		

Test plot as follows:

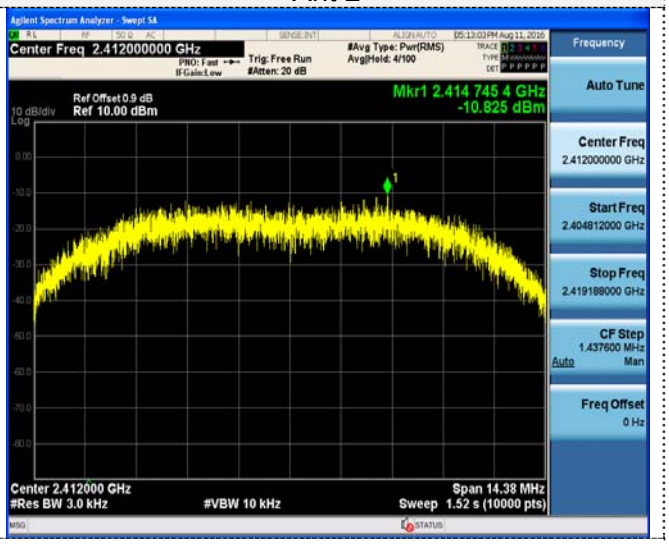
802.11b

Ant 1

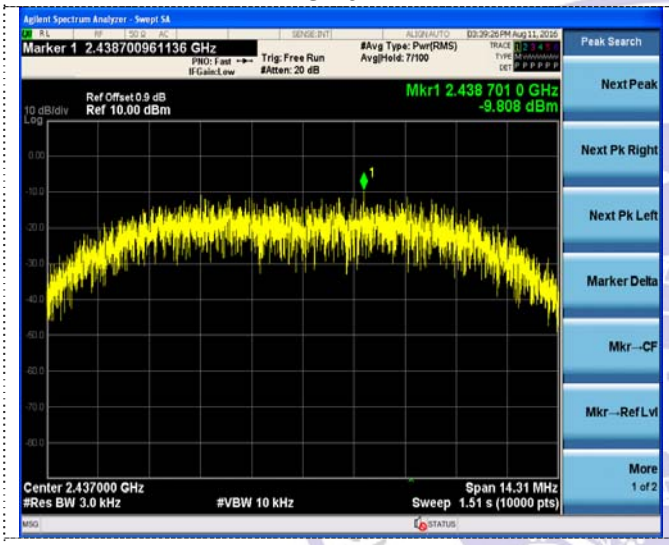


CH01

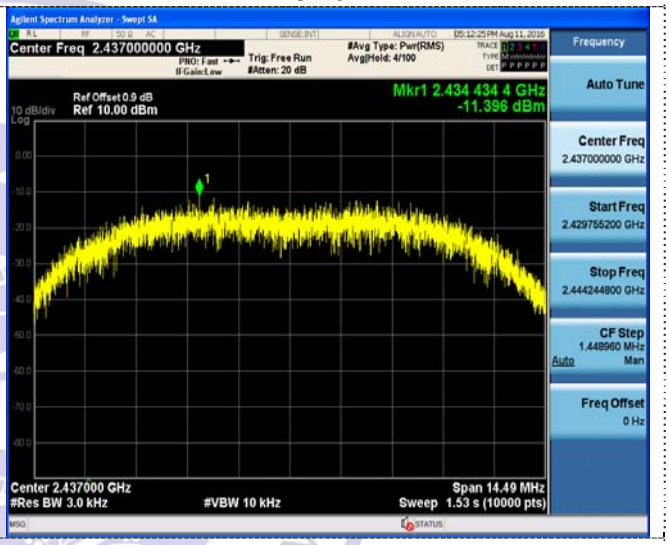
Ant 2



CH01



CH06



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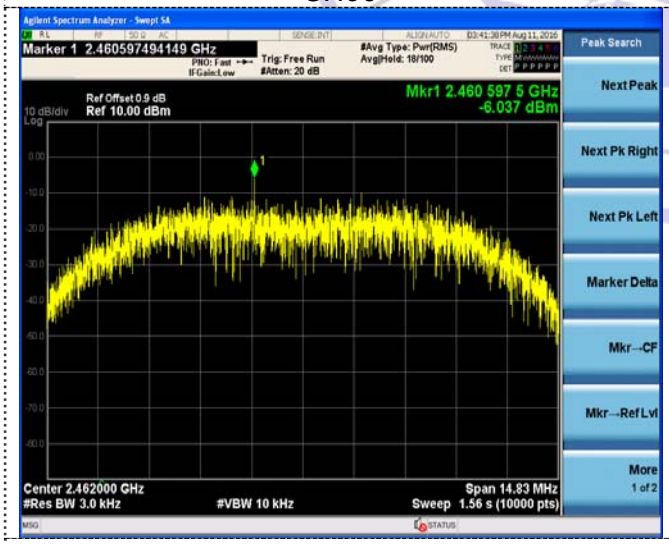

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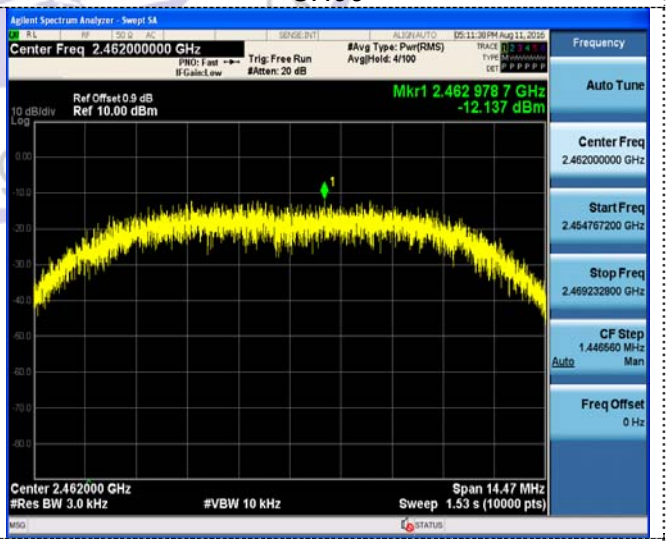
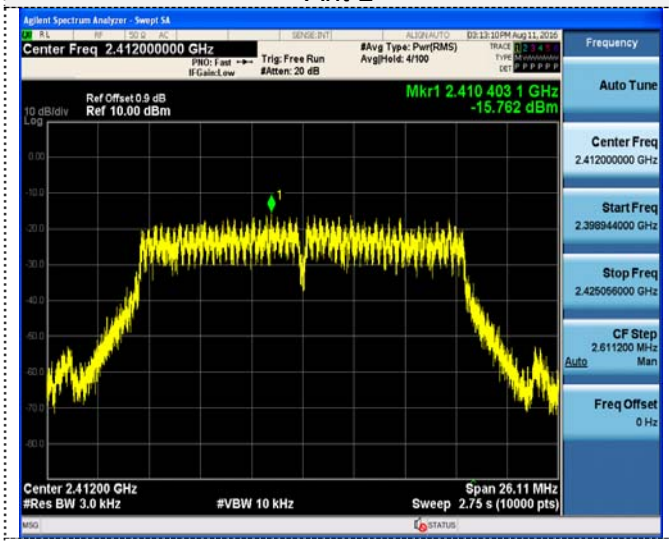


CH11

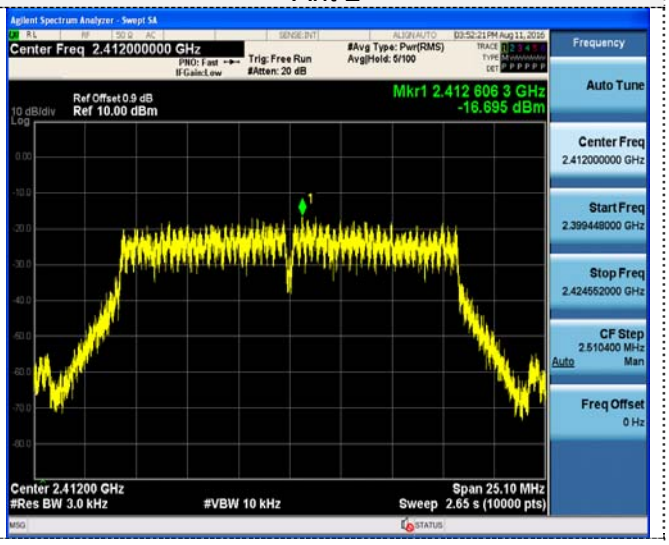
802.11g

Ant 1



CH01

Ant 2



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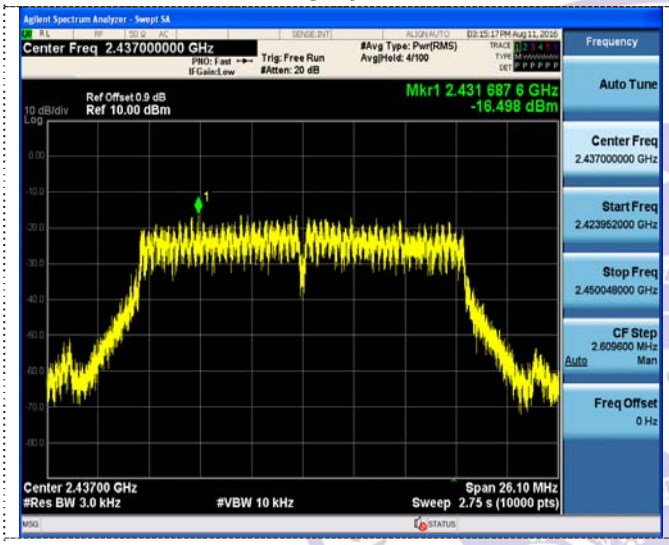

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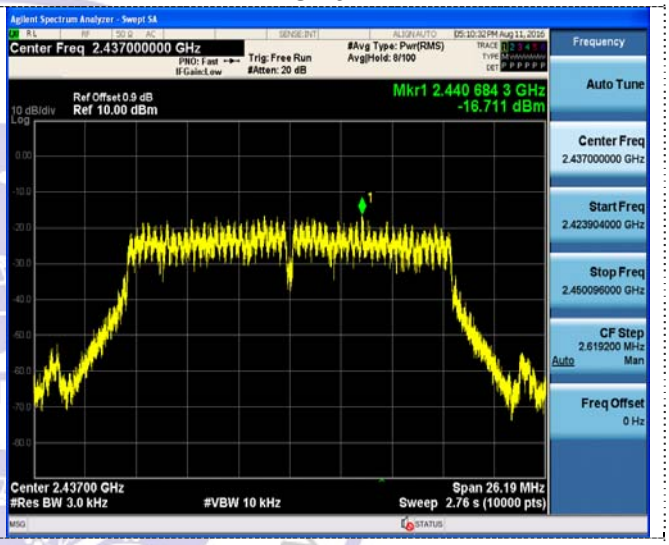

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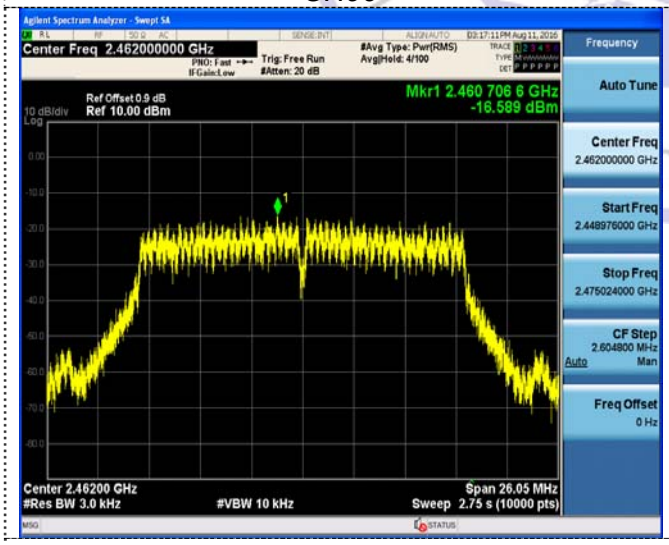

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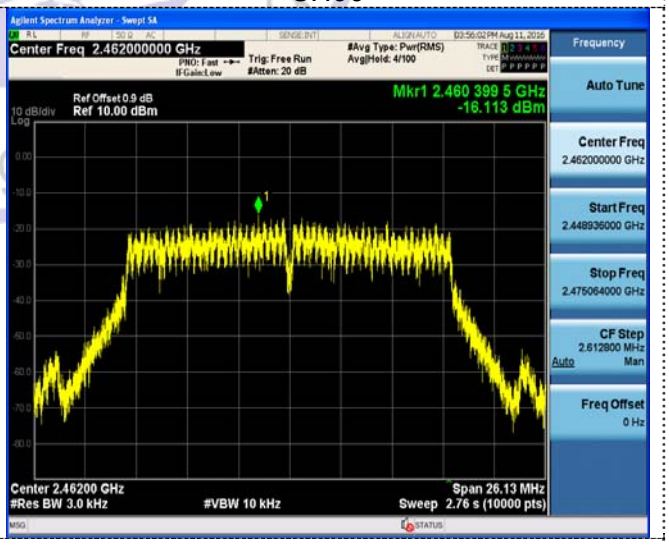
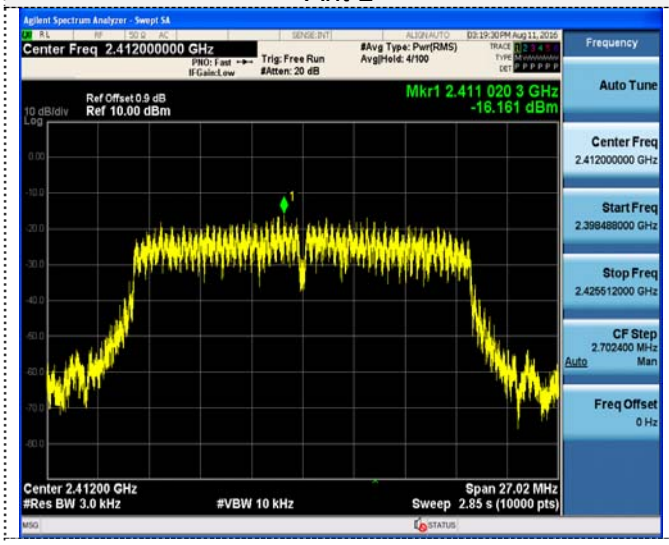


CH11

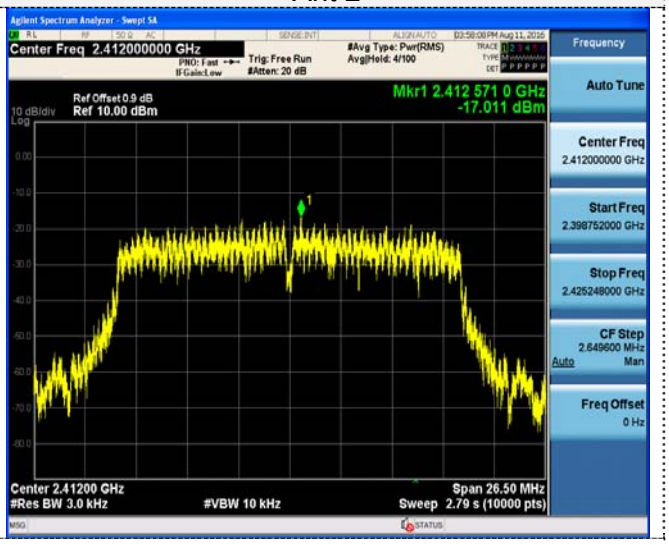
802.11n(HT20)

Ant 1



CH01

Ant 2



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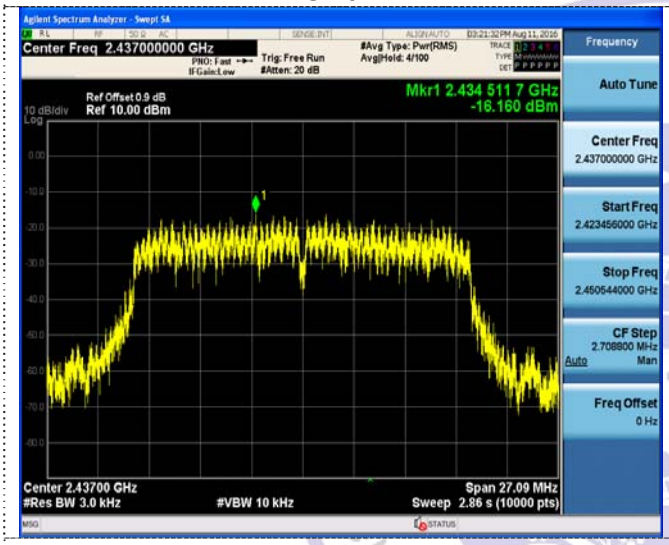

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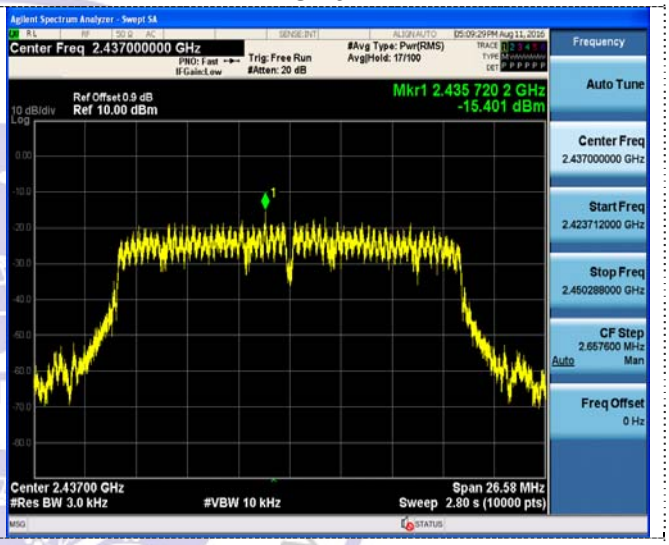

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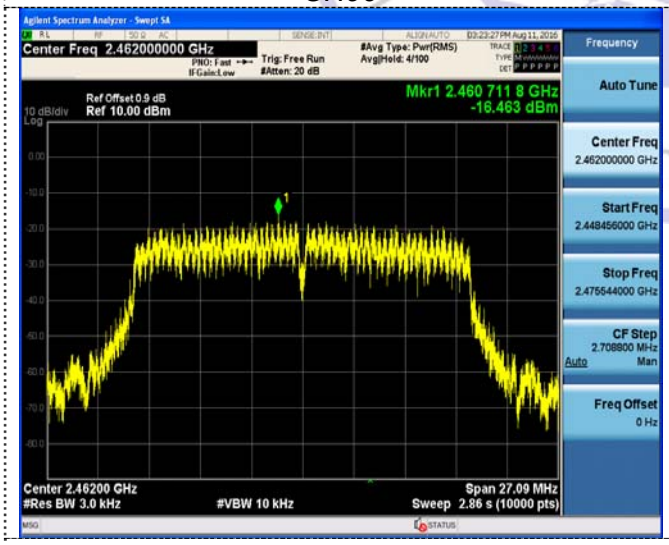

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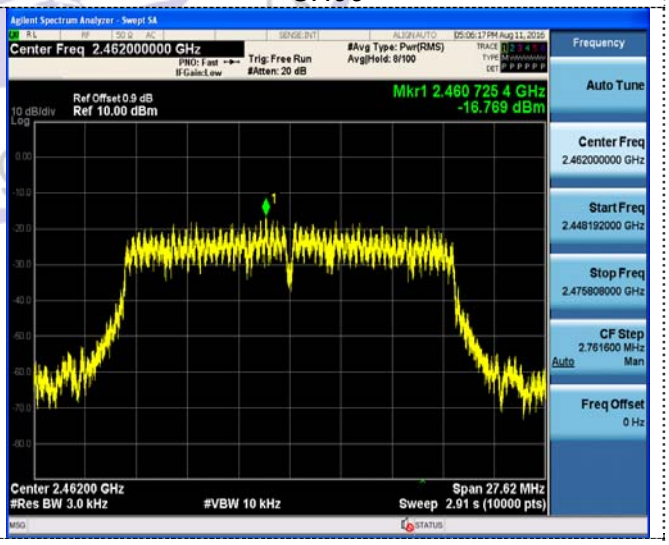
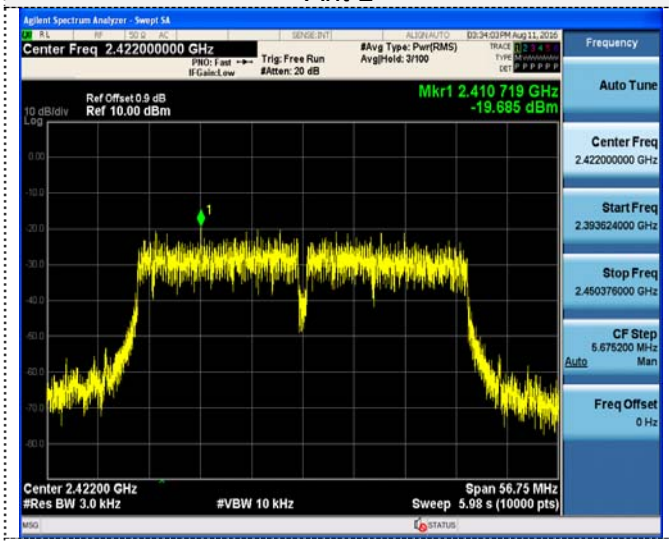


CH11

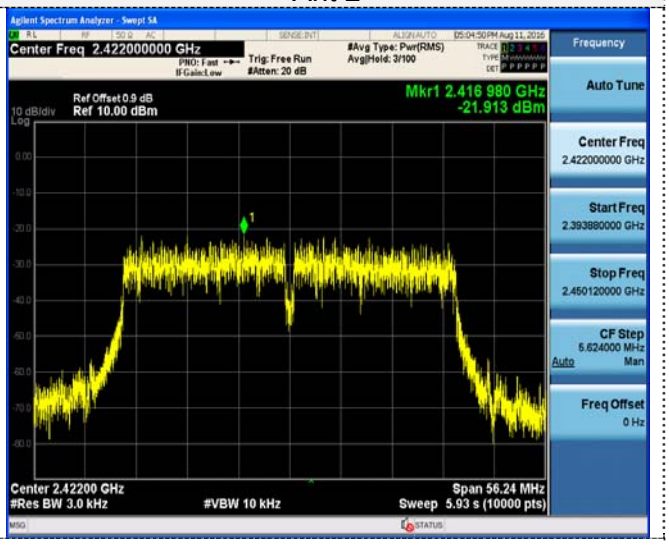
802.11n(HT40)

Ant 1



CH03

Ant 2



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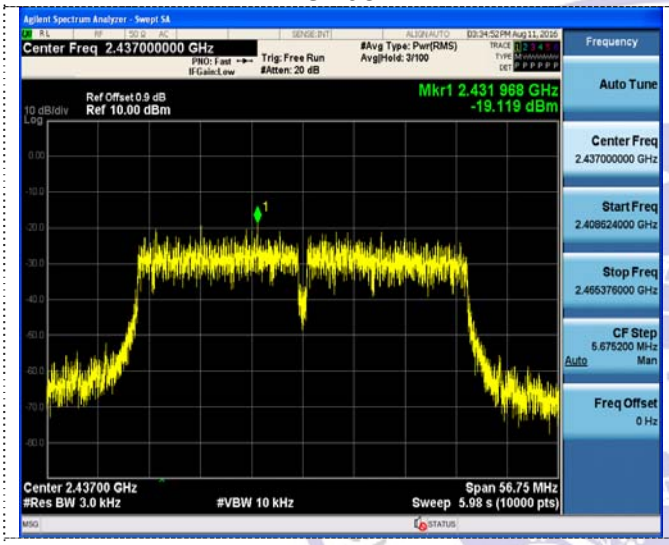

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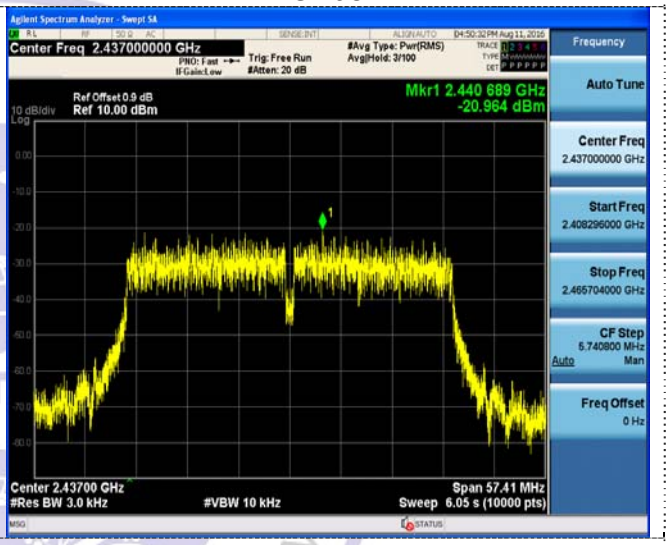

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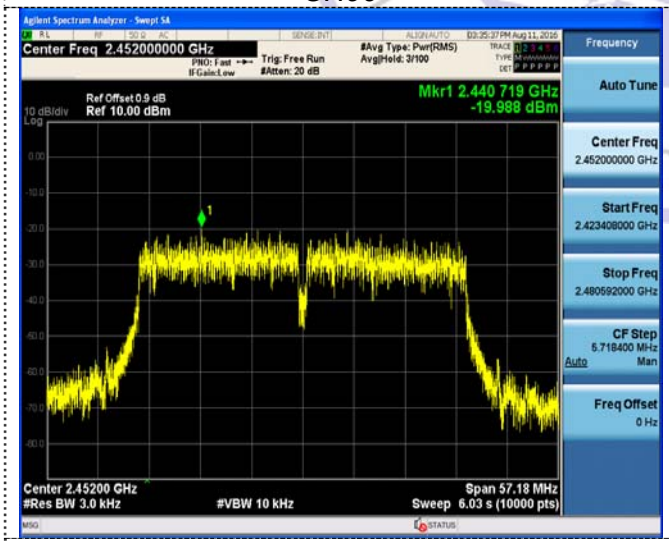
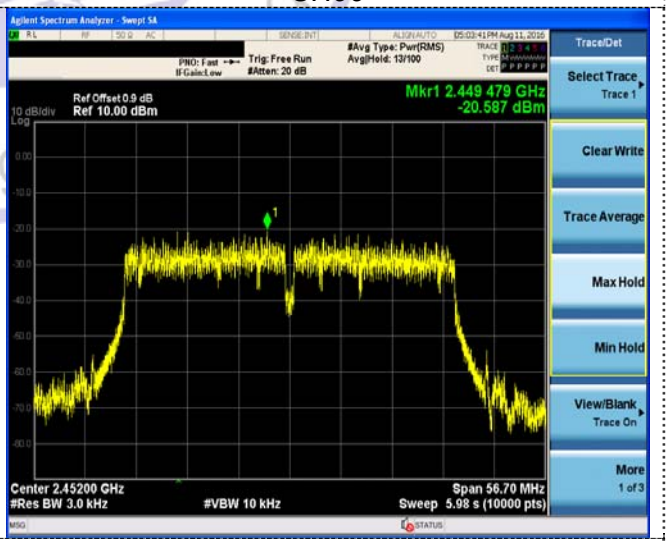


CH09



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

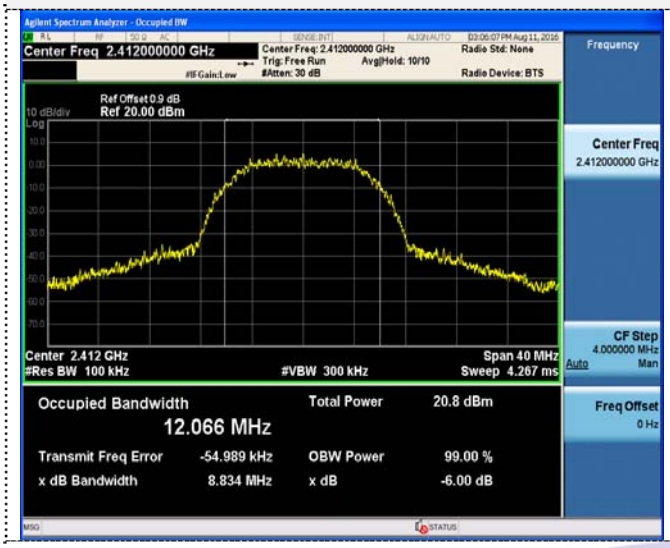
WIFI

Type	Channel	6dB Bandwidth Ant1 (MHz)	6dB Bandwidth Ant2 (MHz)	Limit (KHz)	Result
802.11b	01	8.83	8.99	≥500	Pass
	06	8.94	9.06		
	11	9.27	9.04		
802.11g	01	16.32	15.69	≥500	Pass
	06	16.31	16.37		
	11	16.28	16.33		
802.11n(HT20)	01	16.89	16.56	≥500	Pass
	06	16.93	16.61		
	11	16.93	17.26		
802.11n(HT40)	03	35.47	35.15	≥500	Pass
	06	35.47	35.88		
	09	35.74	35.44		

Test plot as follows:

802.11b

Ant1



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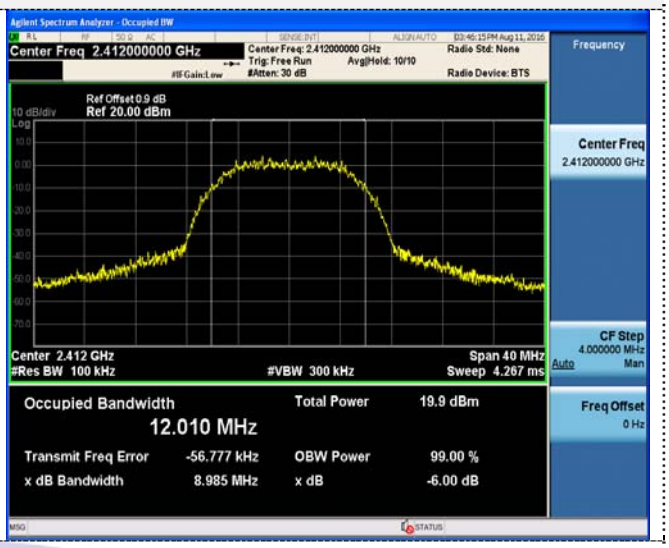

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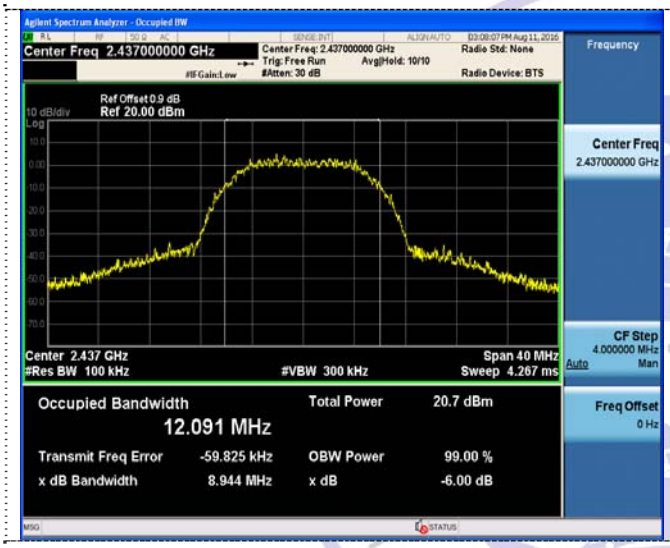

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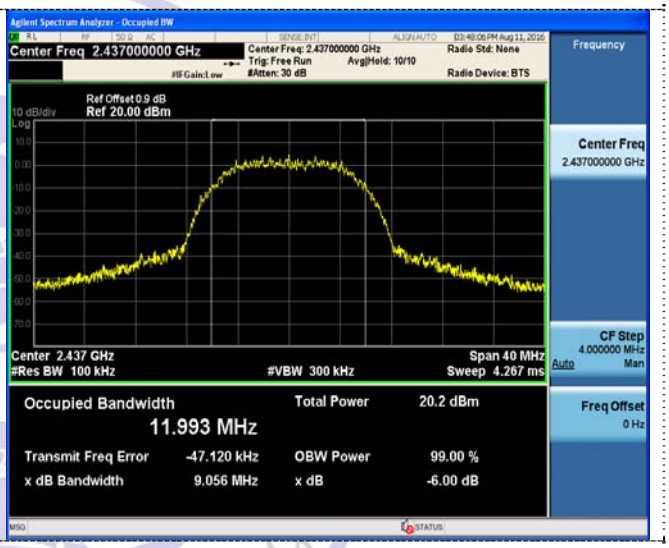

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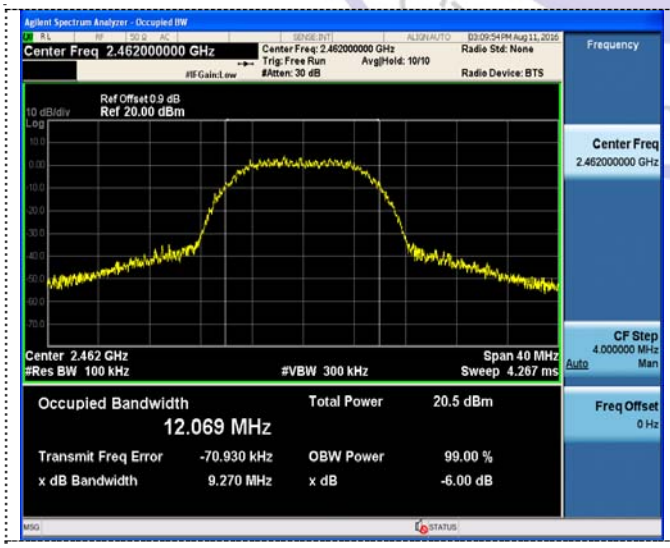

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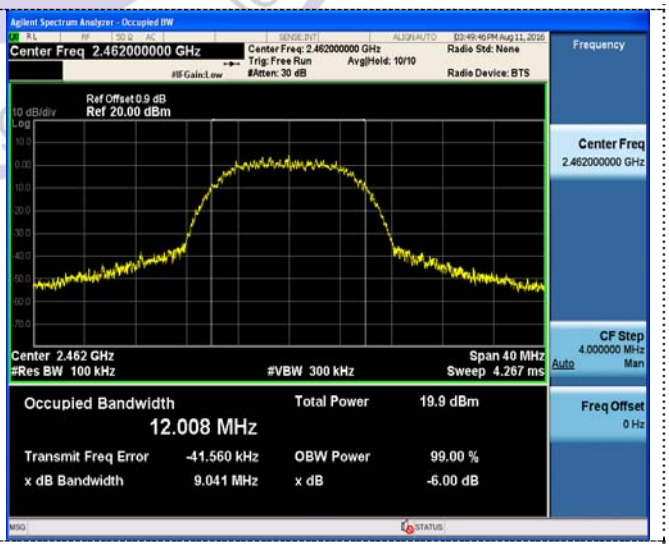
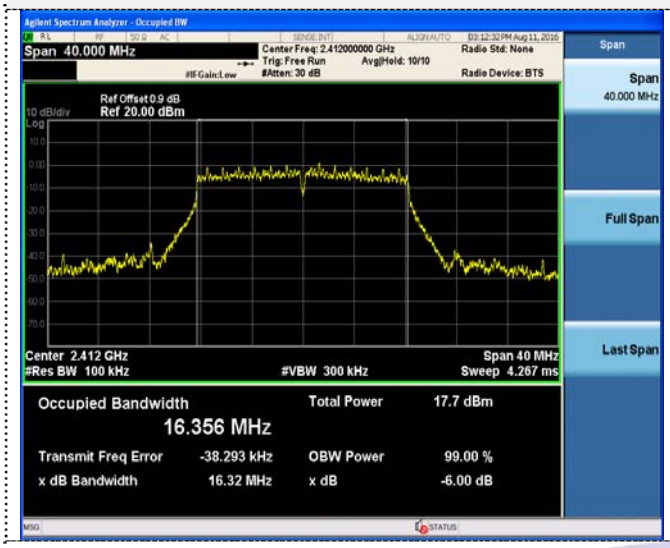


CH11

CH11

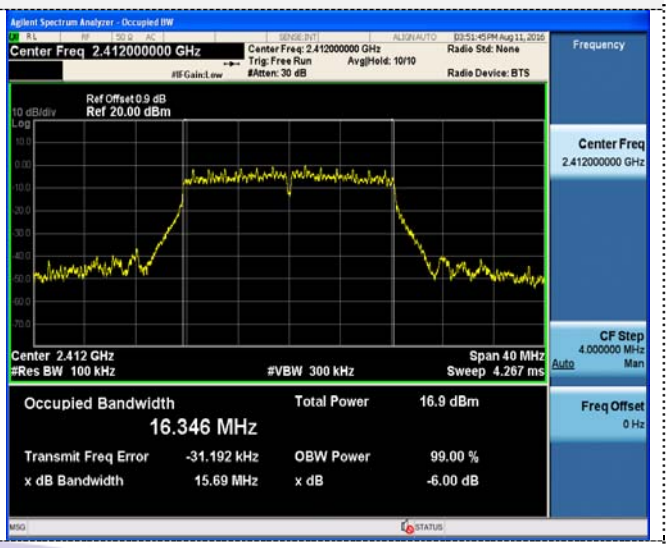
802.11g

Ant1



CH01

Ant2



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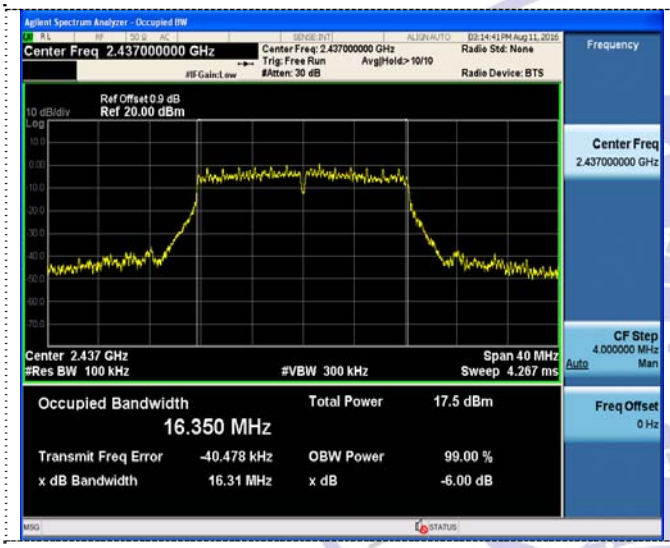

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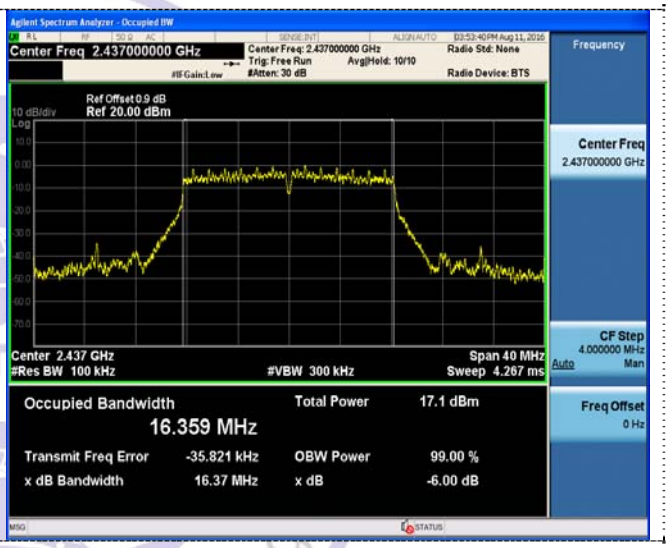

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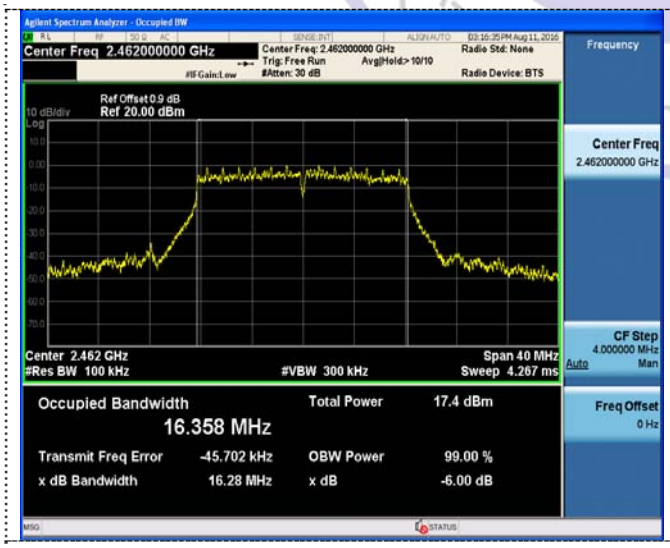

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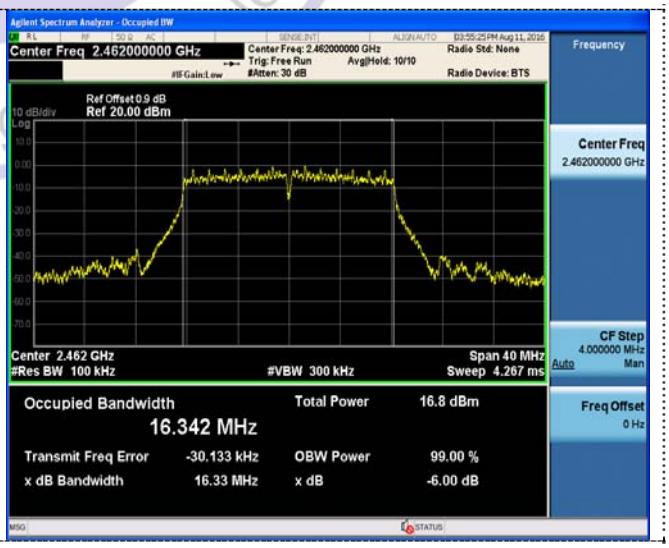
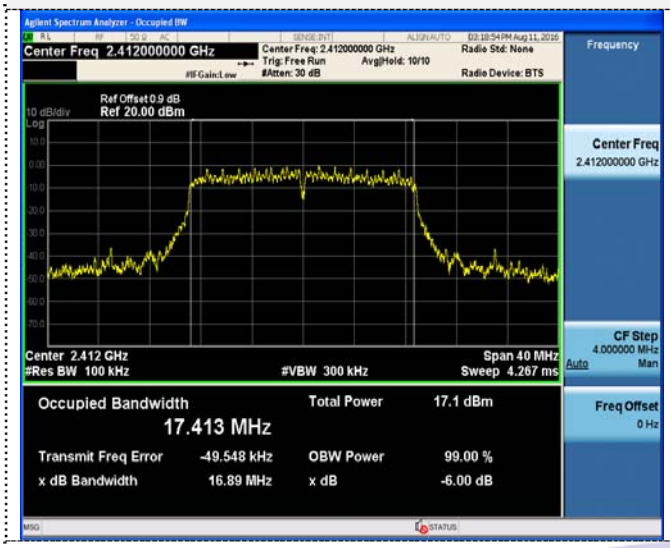


CH11

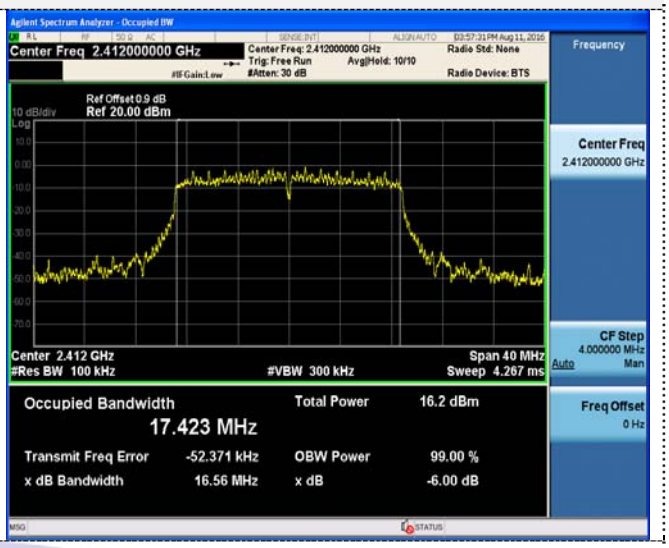
802.11n(HT20)

Ant1



CH01

Ant2



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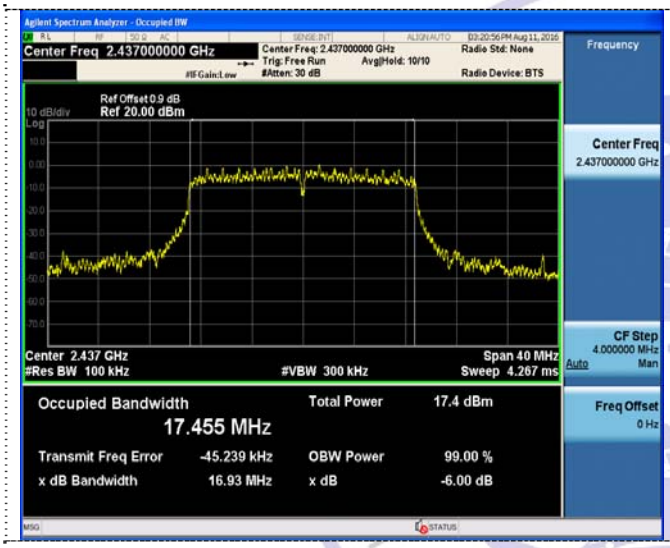

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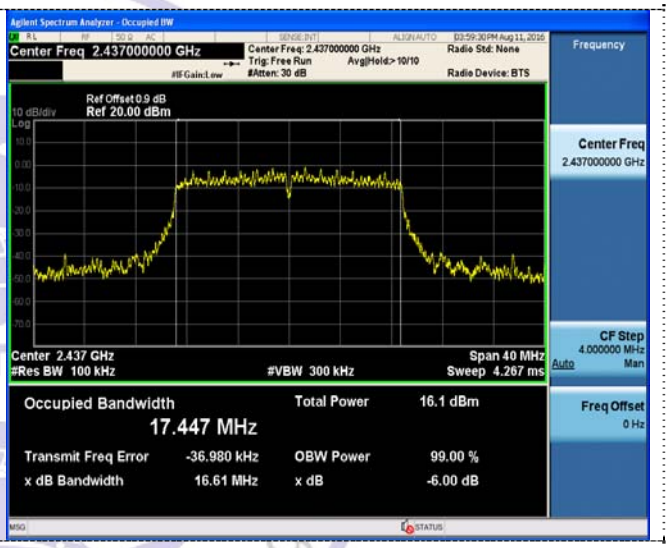

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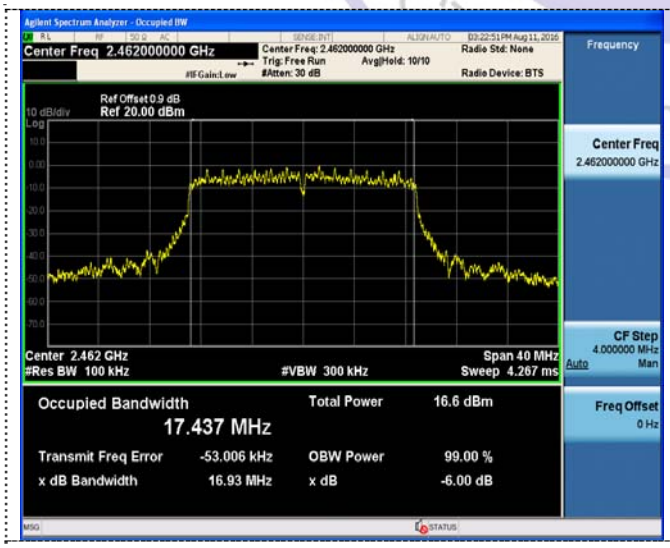

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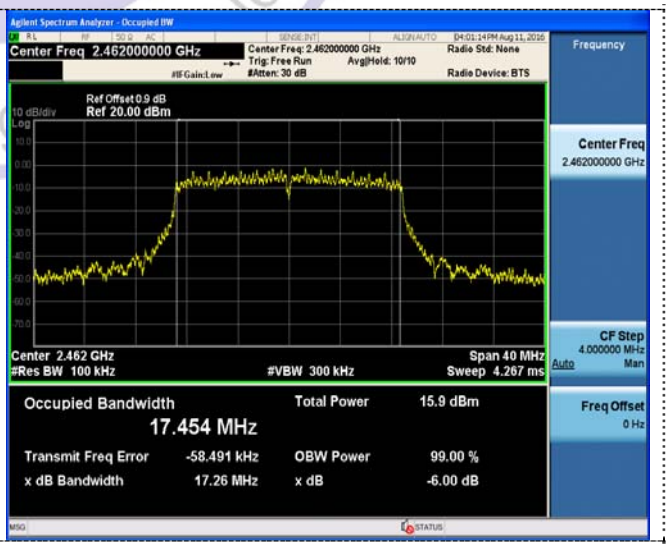
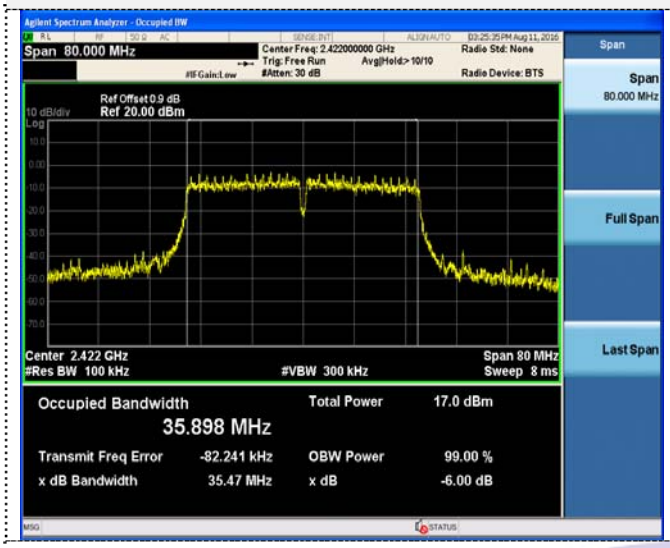


CH11

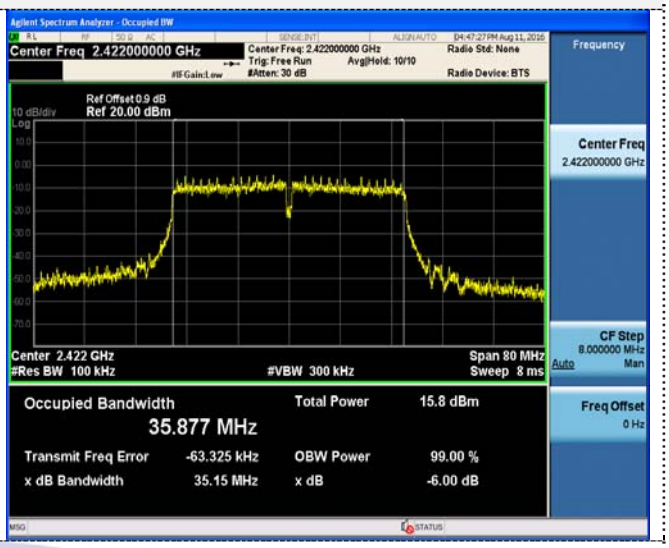
802.11n(HT40)

Ant1



CH01

Ant2



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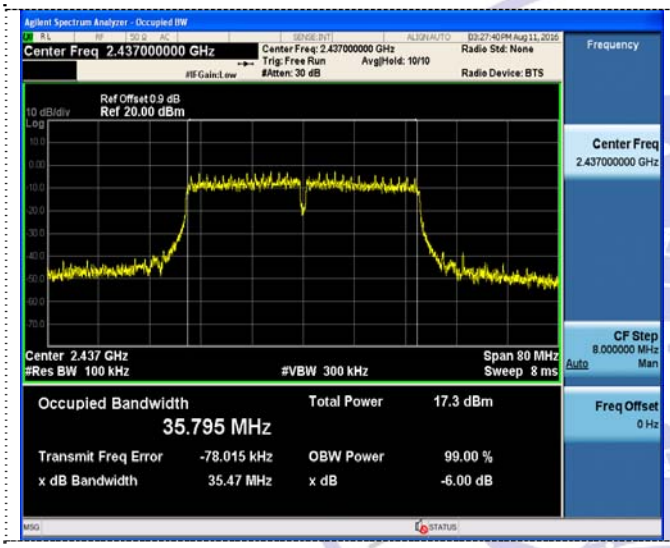

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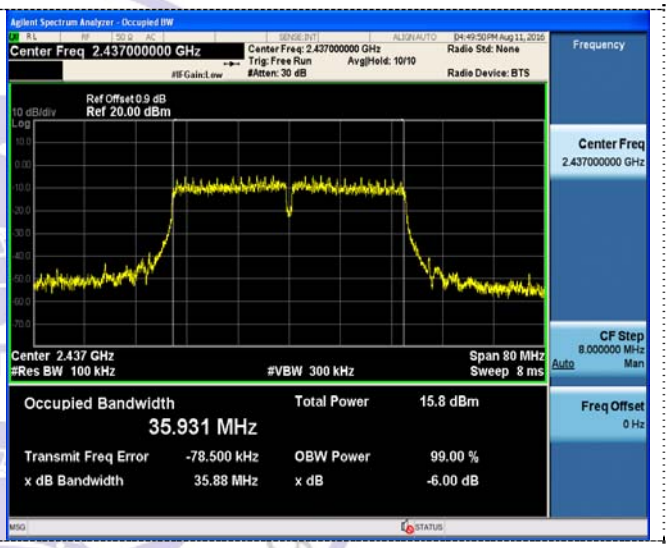

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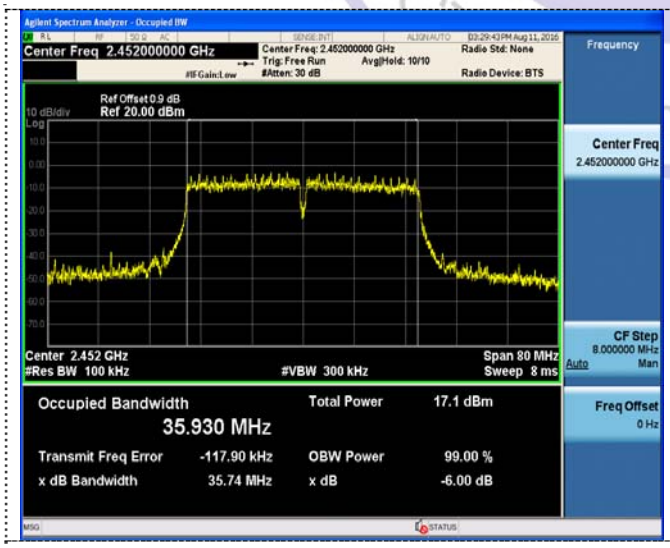

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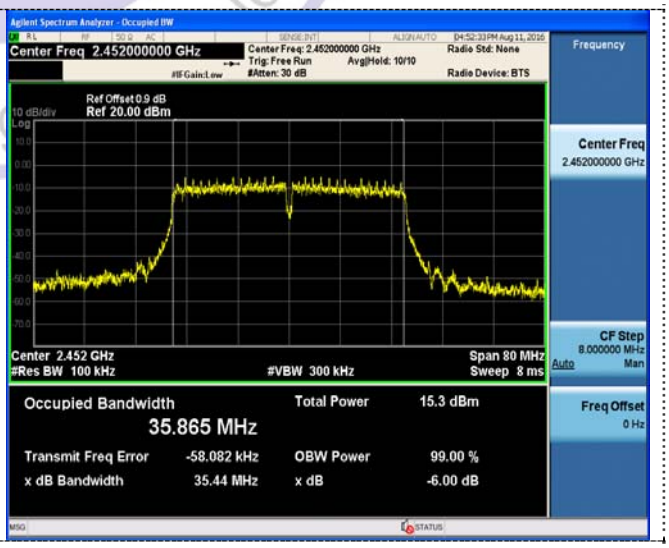

CH11