



TEST REPORT

FCC PART 15 SUBPART C 15.247 & RSS 247

Report Reference No.: **CTL1901102021-WF**

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Product Name.....: Wifi repeater

Model/Type reference: YNA18008

List Model(s).....: L300# (#=0-9 ,A-Z or Blank)

Brand Name.....: N/A

FCC ID.....: 2ASOD-YNA18008

Applicant's name: **YICHA ELECTRONICS (SHANGHAI) CO., LTD.**

Address of applicant: Shijin Village, Waigang Town, Jiading District, Shanghai, 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 & RSS 247 Issue 2, February 2017**

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

Master TRF: Dated 2011-01

Date of receipt of test item.....: Feb. 20, 2019

Date of sampling.....: Feb. 20, 2019

Date of Test Date.....: Feb. 20, 2019–Mar. 29, 2019

Data of Issue.....: Mar. 30, 2019

Result.....: **Pass**

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TEST REPORT

Test Report No. :	CTL1901102021-WF	Mar. 30, 2019
		Date of issue

Equipment under Test : Wifi repeater

Model /Type : YNA18008

Listed Models : L300# (#=0-9 ,A-Z or Blank)

Applicant : **YICHA ELECTRONICS (SHANGHAI) CO., LTD.**

Address : Shijin Village, Waigang Town, Jiading District,
Shanghai, China

Manufacturer : **YICHA ELECTRONICS (SHANGHAI) CO., LTD.**

Address : Shijin Village, Waigang Town, Jiading District,
Shanghai, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

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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

[RSS-247-Issue 2](#): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

[RSS-Gen Issue 5](#): General Requirements for Compliance of Radio Apparatus

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

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

[KDB 662911](#): D01Emissions Testing of Transmitters with Multiple Outputs in the Same Band

1.2. Test Description

FCC PART 15.247		
FCC Part 15.207 RSS-Gen 8.8	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2) RSS 247 5.2 (1) RSS GEN 6.6	6dB Bandwidth	PASS
FCC Part 15.247(d) RSS 247 5.5	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b) RSS 247 5.4 (4)	Maximum Conducted Output Power	PASS
FCC Part 15.247(e) RSS 247 5.2 (2)	Power Spectral Density	PASS
FCC Part 15.205/ 15.209 RSS-Gen 8.9	Radiated Emissions	PASS
FCC Part 15.247(d) RSS-Gen 8.10	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS

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:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9518B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9518B on Jan. 22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

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 399832, December 08, 2017.

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	±3.53dB	(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 $k=2$.

1.5.Environmental conditions

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

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

1.6.General Description of EUT

Product Name:	Wifi repeater
Model/Type reference:	YNA18008
Power supply:	AC 120V/60Hz
WIFI	
Supported type:	802.11b/802.11g: SISO only; 802.11n(H20)/802.11n(H40): MIMO only
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:	Integral Antenna : 2*TX 2*RX
Antenna gain:	0dBi (Directional gain of MIMO mode: $0+10\log 2=3.01\text{dBi}$)

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

2. 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 802.11b/ 802.11g/ 802.11n(H20) test, Channel 03/06/09 were selected for 802.11n(H40) 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

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

2.1. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.1 2	2018/05/25	2019/05/24
LISN	R&S	ESH2-Z5	860014/010	2018/05/25	2019/05/24
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2018/05/25	2019/05/24
EMI Test Receiver	R&S	ESCI	1166.5950.03	2018/05/25	2019/05/24
Spectrum Analyzer	Agilent	E4407B	MY41440676	2019/01/19	2020/01/18
Spectrum Analyzer	Agilent	N9020	US46220290	2019/01/14	2020/01/13
Controller	EM Electronics	EM 1000	060859	2018/05/21	2019/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2018/05/25	2019/05/24
Active Loop Antenna	Da Ze	ZN30900A	/	2018/05/25	2019/05/24
Amplifier	Agilent	8449B	3008A02306	2018/05/25	2019/05/24
Amplifier	Agilent	8447D	2944A10176	2018/05/25	2019/05/24
Temperature/Humidity Meter	Gangxing	CTH-608	02	2018/05/17	2019/05/16
High-Pass Filter	micro-tranics	HPM50108	G174	2018/05/17	2019/05/16
High-Pass Filter	micro-tranics	HPM50111	G142	2018/05/17	2019/05/16
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2018/05/17	2019/05/16
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2018/05/17	2019/05/16
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2018/05/17	2019/05/16
RF Cable	Megalon	RF-A303	N/A	2018/05/17	2019/05/16

The calibration interval was one year

2.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ASOD-YNA18008 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.3. 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



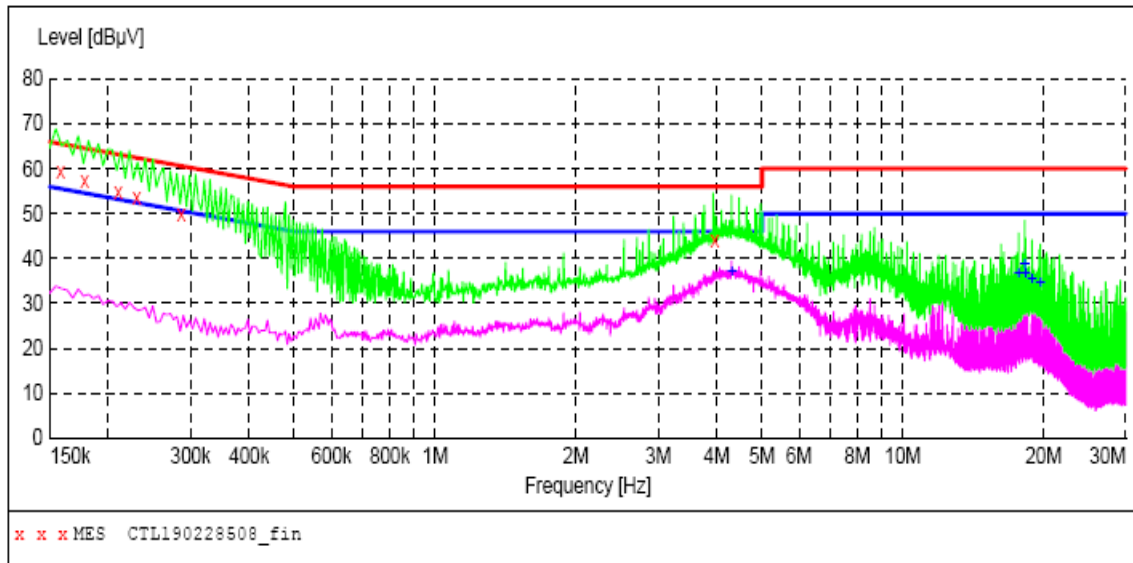
TEST PROCEDURE

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

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL190228508_fin"

2019-3-1 12:01??

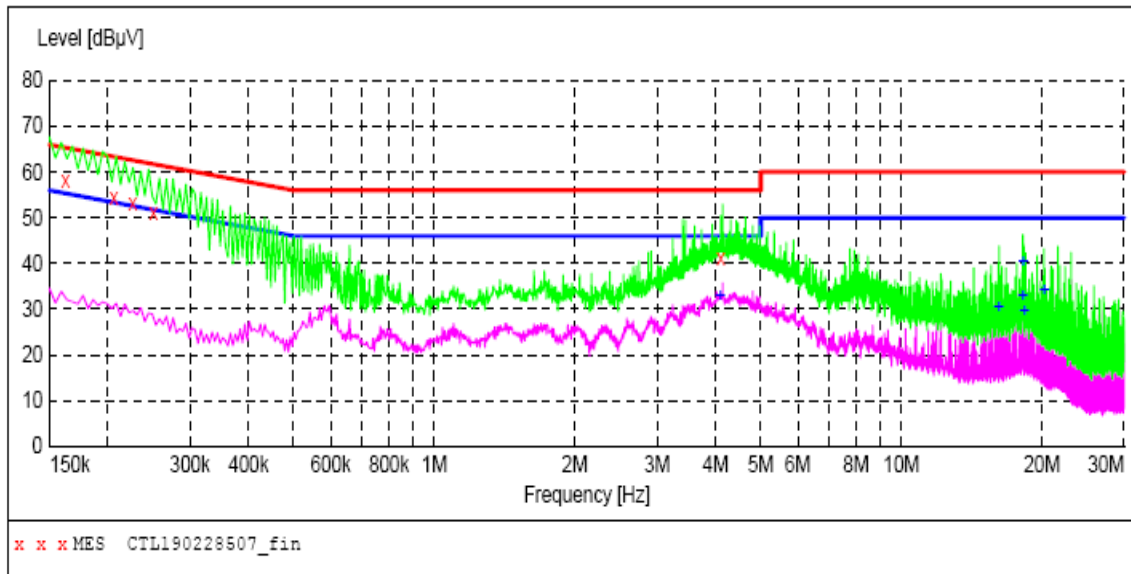
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	59.30	11.2	66	6.3	QP	L1	GND
0.178000	57.50	11.2	65	7.1	QP	L1	GND
0.210000	55.00	11.2	63	8.2	QP	L1	GND
0.230000	53.50	11.2	62	8.9	QP	L1	GND
0.286000	49.70	11.2	61	10.9	QP	L1	GND
3.962000	44.20	11.4	56	11.8	QP	L1	GND

MEASUREMENT RESULT: "CTL190228508_fin2"

2019-3-1 12:01??

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
4.310000	37.00	11.4	46	9.0	AV	L1	GND
17.696000	36.60	11.3	50	13.4	AV	L1	GND
18.242000	38.80	11.4	50	11.2	AV	L1	GND
18.302000	36.50	11.4	50	13.5	AV	L1	GND
18.914000	35.50	11.4	50	14.5	AV	L1	GND
19.712000	34.60	11.4	50	15.4	AV	L1	GND

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



MEASUREMENT RESULT: "CTL190228507_fin"

2019-2-28 11:58??

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.162000	58.30	11.2	65	7.1	QP	N	GND
0.206000	54.60	11.2	63	8.8	QP	N	GND
0.226000	53.10	11.2	63	9.5	QP	N	GND
0.250000	51.20	11.2	62	10.6	QP	N	GND
4.100000	41.10	11.4	56	14.9	QP	N	GND

MEASUREMENT RESULT: "CTL190228507_fin2"

2019-2-28 11:58??

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
4.100000	33.00	11.4	46	13.0	AV	N	GND
16.166000	30.20	11.2	50	19.8	AV	N	GND
18.182000	32.70	11.4	50	17.3	AV	N	GND
18.242000	40.20	11.4	50	9.8	AV	N	GND
18.368000	29.40	11.4	50	20.6	AV	N	GND
20.258000	34.10	11.5	50	15.9	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.

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

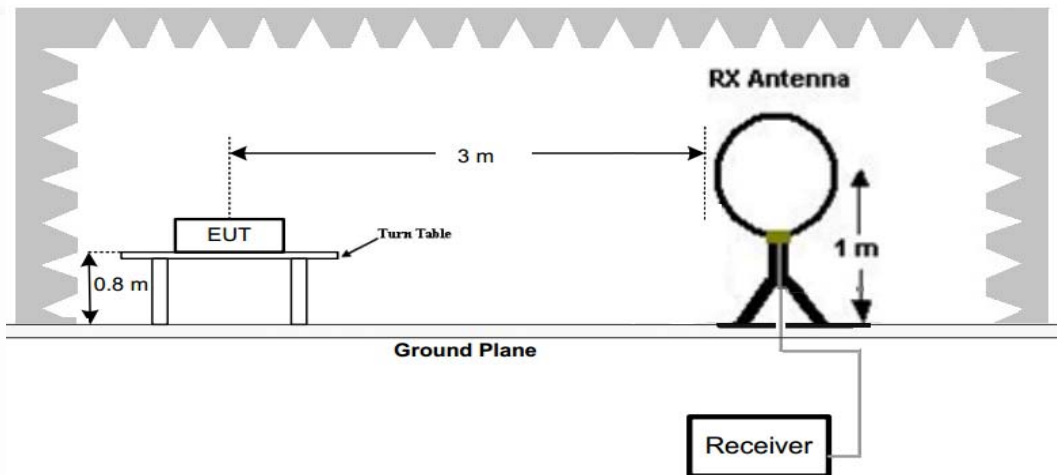
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

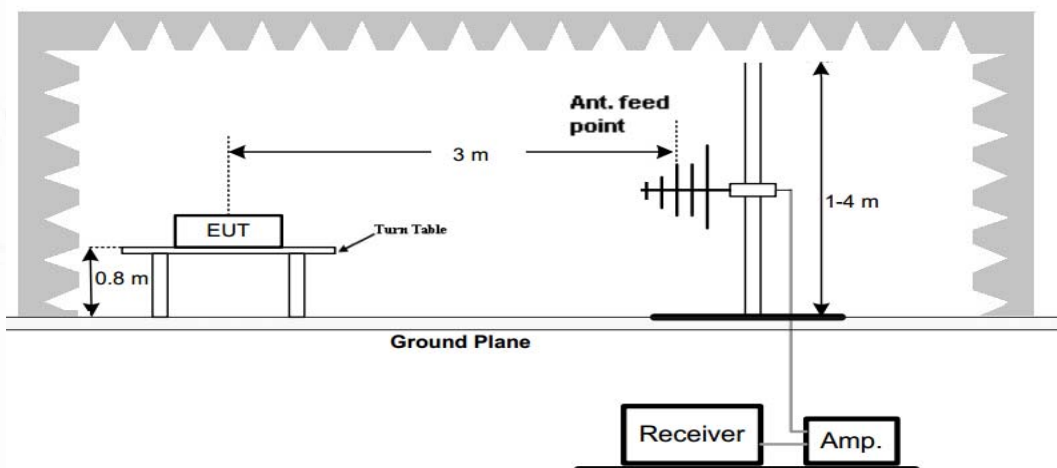
Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+ 40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+ 40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960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

TEST CONFIGURATION

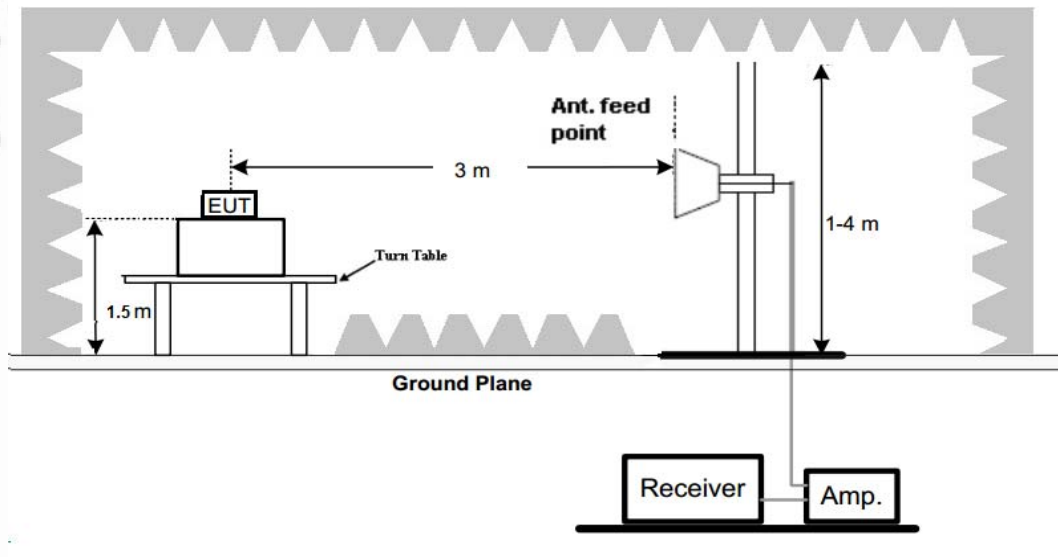
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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. We tested three channels (lowest/middle/highest) of each mode and recorded worst case at 802.11b mode low channel for measurement below 1GHz.
2. We tested three channels (lowest/middle/highest) of each mode and recorded worst case at 802.11b mode above 1GHz.

For 9 KHz-30MHz

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note: The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

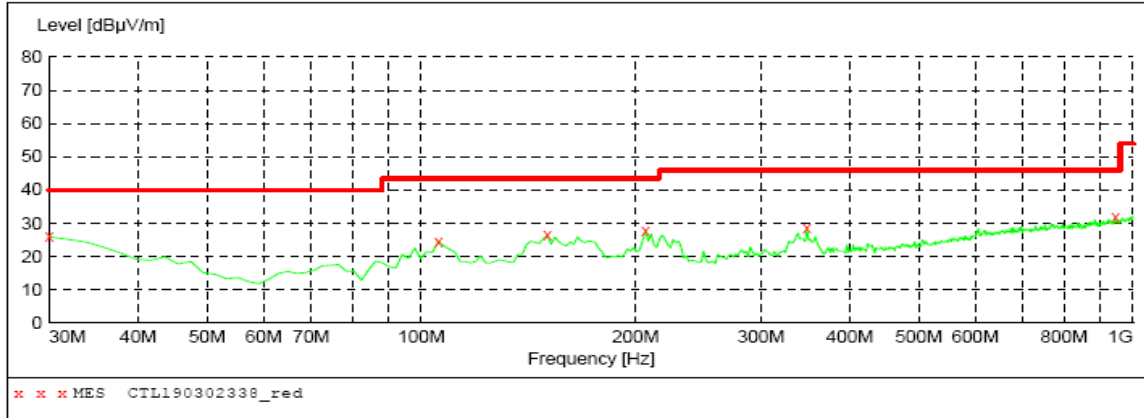
Distance extrapolation factor= $40 \log (\text{specific distance} / \text{test distance})$ (dB);
 Limit line= specific limits (dBuV) + distance extrapolation factor.

For 30MHz-1GHz

Horizontal

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

Short Description:		Field Strength				Transducer
Start	Stop	Detector	Meas. Time	IF Bandw.		
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	JB1	



MEASUREMENT RESULT: "CTL190302338_red"

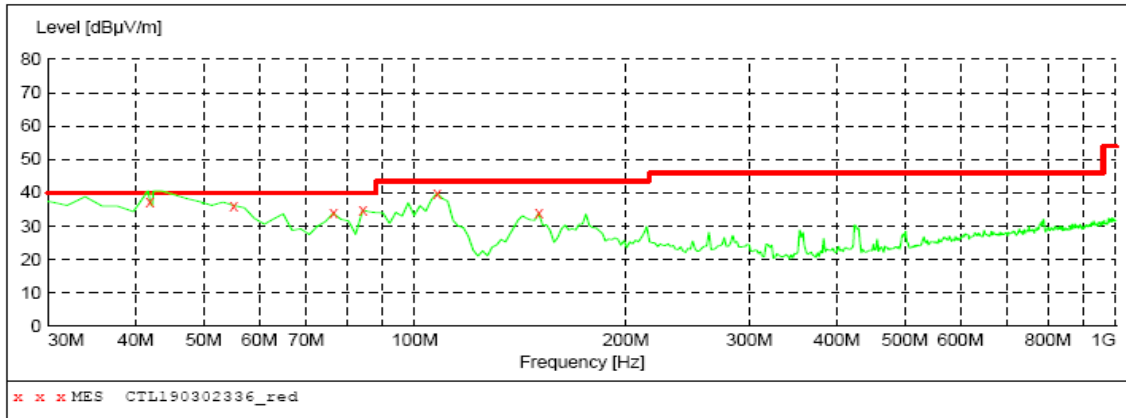
02/03/2019 16:29

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	26.00	22.1	40.0	14.0	---	0.0	0.00	HORIZONTAL
105.660000	24.60	12.5	43.5	18.9	---	0.0	0.00	HORIZONTAL
150.280000	26.50	14.4	43.5	17.0	---	0.0	0.00	HORIZONTAL
206.540000	27.60	14.6	43.5	15.9	---	0.0	0.00	HORIZONTAL
348.160000	28.40	17.2	46.0	17.6	---	0.0	0.00	HORIZONTAL
943.740000	31.70	27.1	46.0	14.3	---	0.0	0.00	HORIZONTAL

Vertical

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

Short Description:		Field Strength				Transducer
Start	Stop	Detector	Meas. Time	IF Bandw.		
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	JB1	



MEASUREMENT RESULT: "CTL190302336_red"

02/03/2019 16:14

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	36.70	13.8	40.0	3.3	QP	0.0	0.00	VERTICAL
55.220000	36.20	8.0	40.0	3.8	PK	0.0	0.00	VERTICAL
76.560000	33.90	9.0	40.0	6.1	PK	0.0	0.00	VERTICAL
84.320000	34.80	8.9	40.0	5.2	PK	0.0	0.00	VERTICAL
107.600000	39.90	12.9	43.5	3.6	PK	0.0	0.00	VERTICAL
150.280000	33.90	14.4	43.5	9.6	PK	0.0	0.00	VERTICAL

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 802.11n (H20) 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	57.11	PK	74	16.89	52.56	33.52	6.92	35.89	4.55
4824.00	52.28	AV	54	1.72	47.73	33.52	6.92	35.89	4.55
5783.12	46.56	PK	74	27.44	39.36	34.38	7.10	34.28	7.20
5783.12	--	AV	54	--	--	--	--	--	--
7236.00	50.07	PK	74	23.93	38.80	37.1	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	56.82	PK	74	17.18	52.27	33.52	6.92	35.89	4.55
4824.00	52.08	AV	54	1.92	47.53	33.52	6.92	35.89	4.55
5296.16	47.34	PK	74	26.66	40.14	34.38	7.10	34.28	7.20
5296.16	--	AV	54	--	--	--	--	--	--
7236.00	48.85	PK	74	25.15	37.58	37.1	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	56.71	PK	74	17.29	50.47	33.59	6.95	34.3	6.24
4874.00	51.18	AV	54	2.82	44.94	33.59	6.95	34.3	6.24
6388.89	46.23	PK	74	27.77	38.63	34.56	7.15	34.11	7.60
6388.89	--	AV	54	--	--	--	--	--	--
7311.00	50.61	PK	74	23.39	38.95	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	56.13	PK	74	17.87	49.79	33.59	6.95	34.2	6.34
4874.00	51.29	AV	54	2.71	44.95	33.59	6.95	34.2	6.34
5152.78	44.60	PK	74	29.40	37.70	34.07	7.05	34.22	6.90
5152.78	--	AV	54	--	--	--	--	--	--
7311.00	48.70	PK	74	25.30	37.04	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	55.79	PK	74	18.21	53.55	33.71	6.98	35.91	4.78
4924.00	50.74	AV	54	3.26	43.73	33.71	6.98	35.91	4.78
5014.25	46.66	PK	74	27.34	41.24	34.34	7.09	34.27	7.17
5014.25	--	AV	54	--	--	--	--	--	--
7386.00	49.38	PK	74	24.62	37.4	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	54.92	PK	74	19.08	50.14	33.71	6.98	35.91	4.78
4924.00	49.69	AV	54	4.31	44.91	33.71	6.98	35.91	4.78
7107.41	45.75	PK	74	28.25	38.58	34.34	7.09	34.27	7.17
7107.41	--	AV	54	--	--	--	--	--	--
7386.00	48.30	PK	74	25.70	36.42	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 SISO /802.11g SISO /802.11n (H20) MIMO/ 802.11n (H40) MIMO all have been tested, only worse case 802.11n (H20) MIMO mode is reported.

802.11n (H20) MIMO Mode (above 1GHz)

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)
2412.00	111.14	PK	--	--	77.75	28.78	4.61	0	33.39
2412.00	105.68	AV	--	--	72.29	28.78	4.61	0	33.39
2376.22	44.29	PK	74	29.71	11.21	28.52	4.56	0	33.08
2376.22	--	AV	54	--	--	--	--	--	--
2390.00	47.07	PK	74	26.93	13.75	28.72	4.60	0	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	59.76	PK	74	14.24	26.37	28.78	4.61	0	33.39
2400.00	52.18	AV	54	1.82	18.79	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	110.46	PK	--	--	77.07	28.78	4.61	0	33.39
2412.00	104.79	AV	--	--	71.4	28.78	4.61	0	33.39
2376.22	45.83	PK	74	28.17	12.75	28.52	4.56	0	33.08
2376.22	--	AV	54	--	--	--	--	--	--
2390.00	46.21	PK	74	27.79	12.89	28.72	4.60	0	33.32
2390.00	--	AV	54	--	--	--	--	--	--
2400.00	58.72	PK	74	15.28	25.33	28.78	4.61	0	33.39
2400.00	51.80	AV	54	2.20	18.41	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	110.15	PK	--	--	76.53	28.92	4.7	0	33.62
2462.00	104.04	AV	--	--	70.42	28.92	4.7	0	33.62
2483.50	45.86	PK	74	28.14	12.23	28.93	4.7	0	33.63
2483.50	--	AV	54	--	--	--	--	--	--
2496.60	44.23	PK	74	29.77	10.59	28.94	4.71	0	33.64
2496.60	--	AV	54	--	--	--	--	--	--
2500.00	42.69	PK	74	31.31	9.01	28.96	4.72	0	33.68
2500.00	--	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)
2462.00	108.51	PK	--	--	74.89	28.92	4.7	0	33.62
2462.00	102.08	AV	--	--	68.46	28.92	4.7	0	33.62
2483.50	47.32	PK	74	26.68	13.69	28.93	4.7	0	33.63
2483.50	--	AV	54	--	--	--	--	--	--
2496.60	45.33	PK	74	28.67	11.69	28.94	4.71	0	33.64
2496.60	--	AV	54	--	--	--	--	--	--
2500.00	42.70	PK	74	31.30	9.02	28.96	4.72	0	33.68
2500.00	--	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

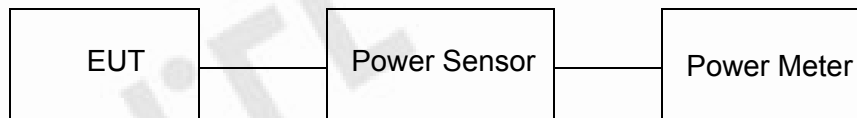
Limit

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	Output power Ant1 (dBm)	Output power Ant2 (dBm)	Output power Total (dBm)	Limit (dBm)	Result
802.11b	01	18.97	18.67	/	30.00	Pass
	06	18.64	18.23	/		
	11	17.96	18.16	/		
802.11g	01	23.27	22.77	/	30.00	Pass
	06	22.75	22.54	/		
	11	22.19	22.45	/		
802.11n(HT20) MIMO	01	22.92	22.61	25.78	30.00	Pass
	06	22.55	22.22	25.40		
	11	21.84	22.25	25.06		
802.11n(HT40) MIMO	03	22.34	21.86	25.12	30.00	Pass
	06	21.98	21.56	24.79		
	09	21.88	21.52	24.71		

Note: 1.The test results including the cable lose.

3.4. Power Spectral Density

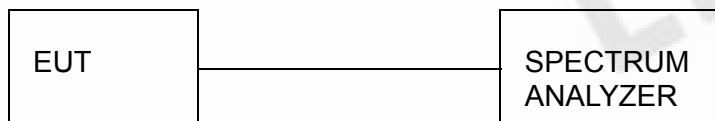
Limit

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 \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

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	01	-8.606	-10.565	/	8.00	Pass
	06	-9.222	-10.162	/		
	11	-9.995	-10.534	/		
802.11g	01	-11.142	-10.331	/	8.00	Pass
	06	-11.619	-12.269	/		
	11	-13.001	-12.468	/		
802.11n(HT20) MIMO	01	-10.729	-12.227	-8.40	8.00	Pass
	06	-11.922	-11.451	-8.67		
	11	-12.622	-11.987	-9.28		
802.11n(HT40) MIMO	03	-14.720	-15.308	-11.99	8.00	Pass
	06	-14.070	-14.744	-11.38		
	09	-15.280	-15.978	-12.60		

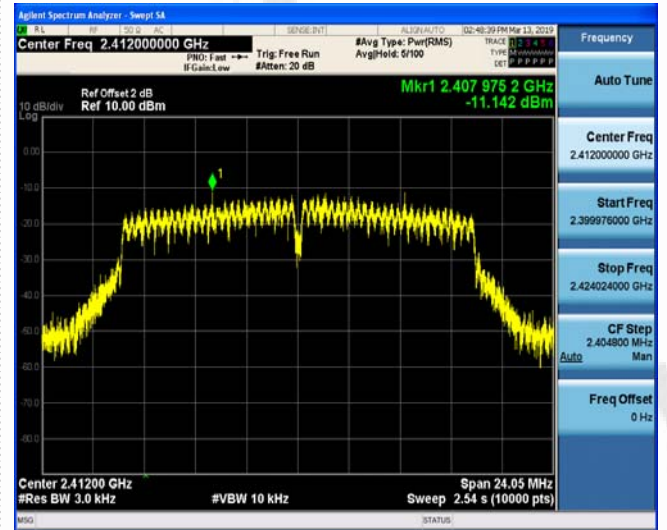
Test plot as follows:

Ant. 1

802.11b

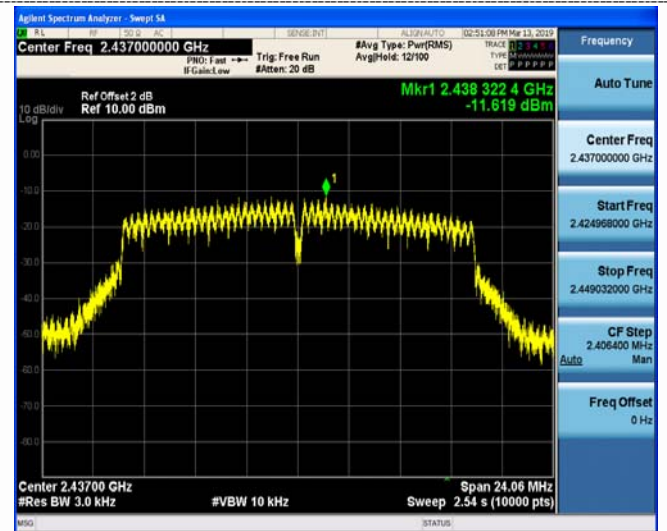
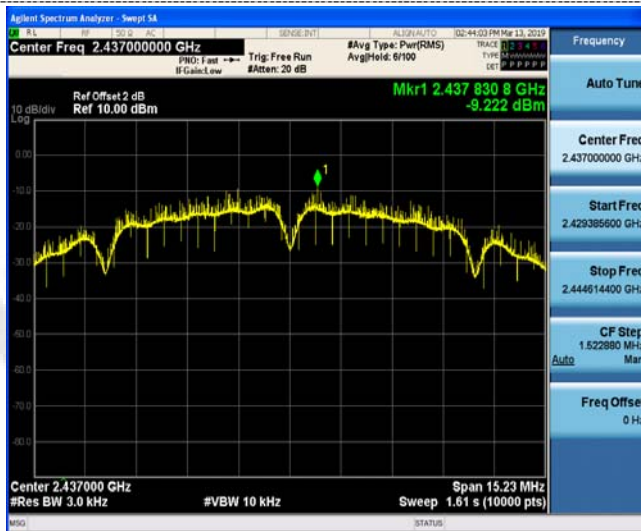


802.11g



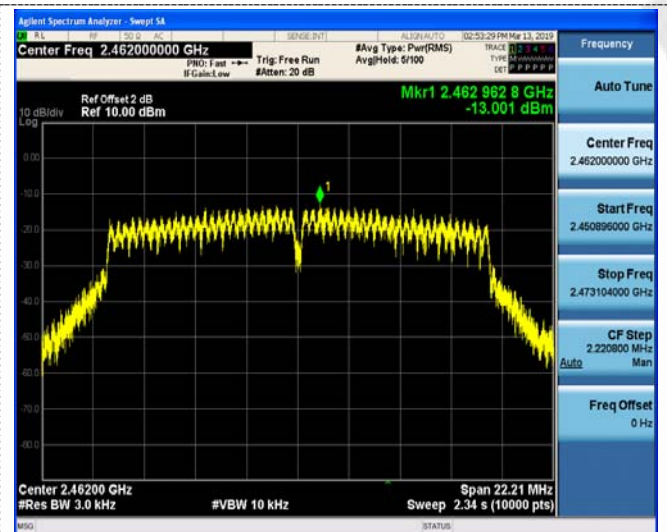
CH01

CH01



CH06

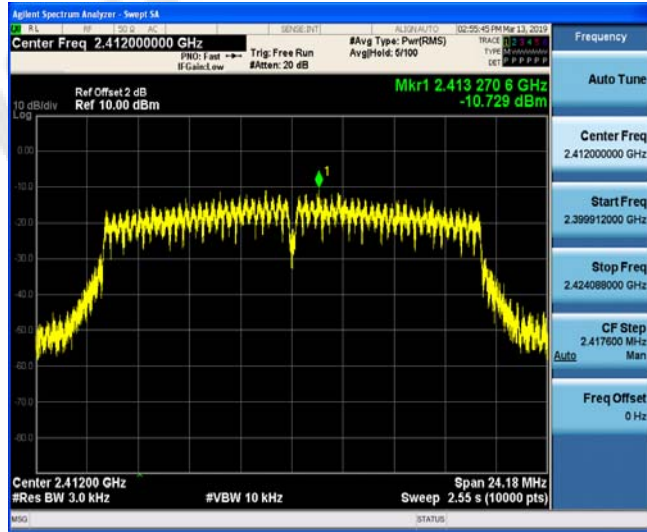
CH06



CH11

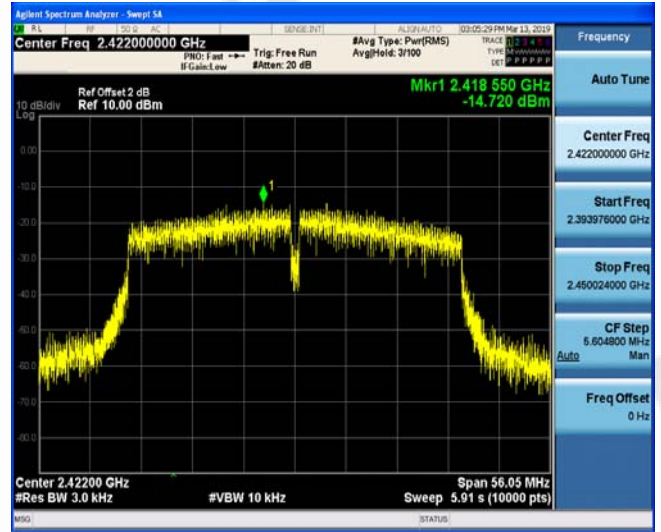
CH11

802.11n(HT20)

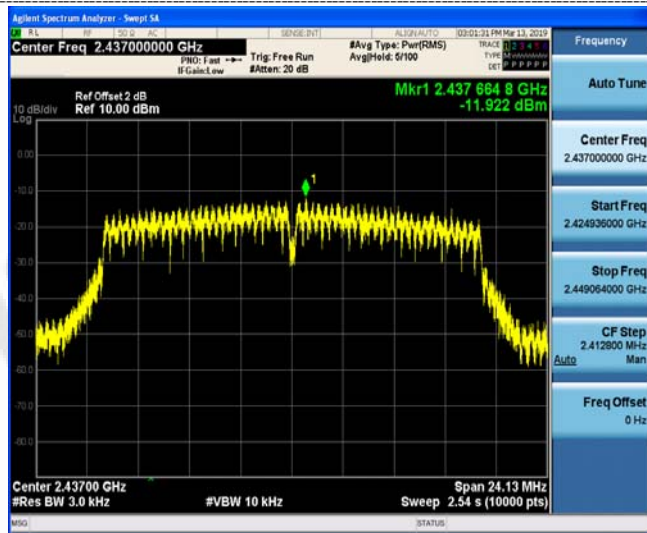


CH01

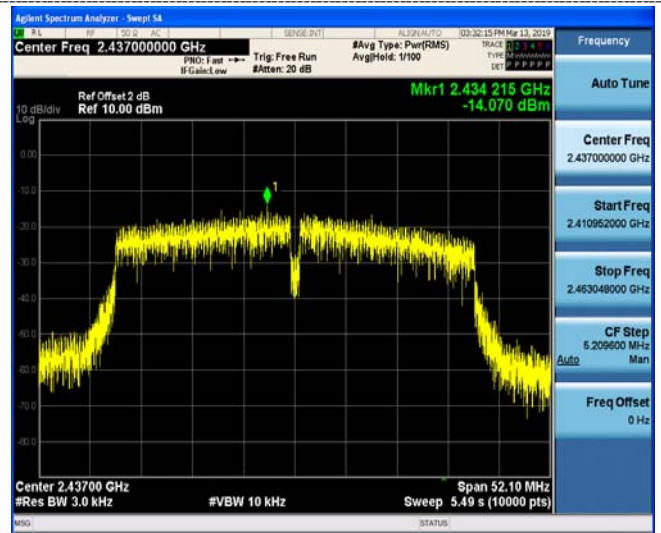
802.11n(HT40)



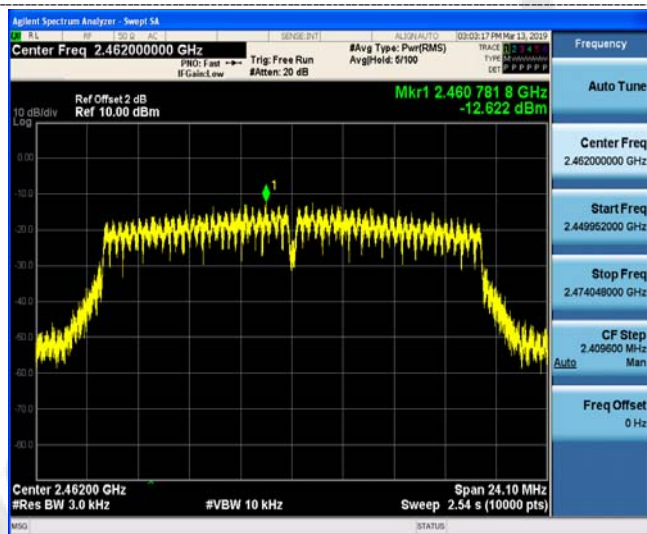
CH03



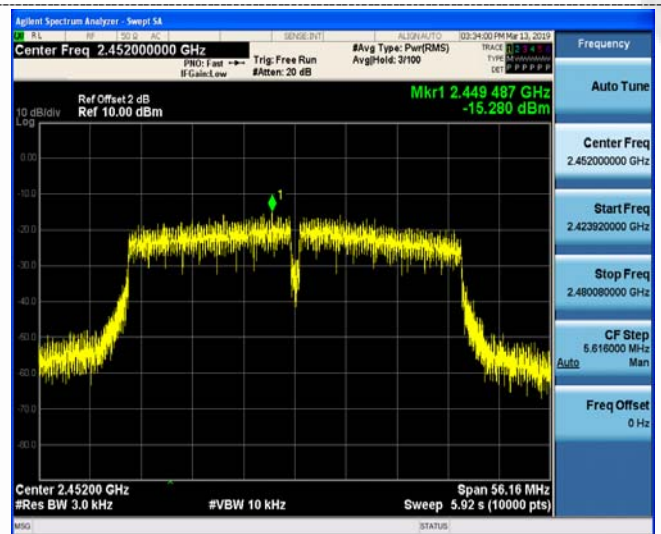
CH06



CH06



CH11



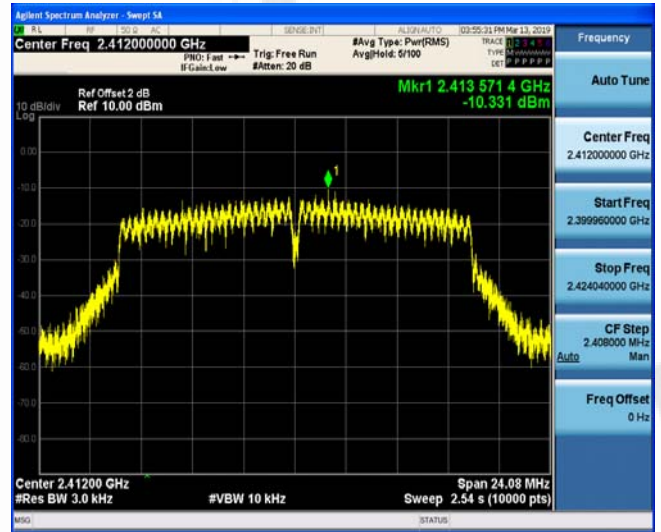
CH09

Ant. 2

802.11b

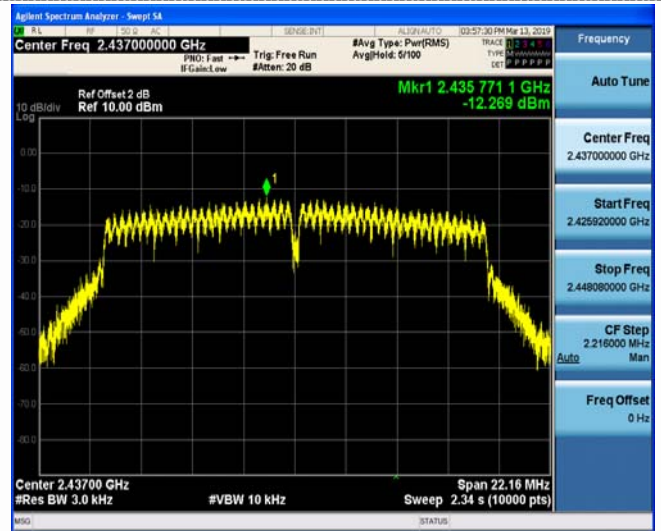


802.11g



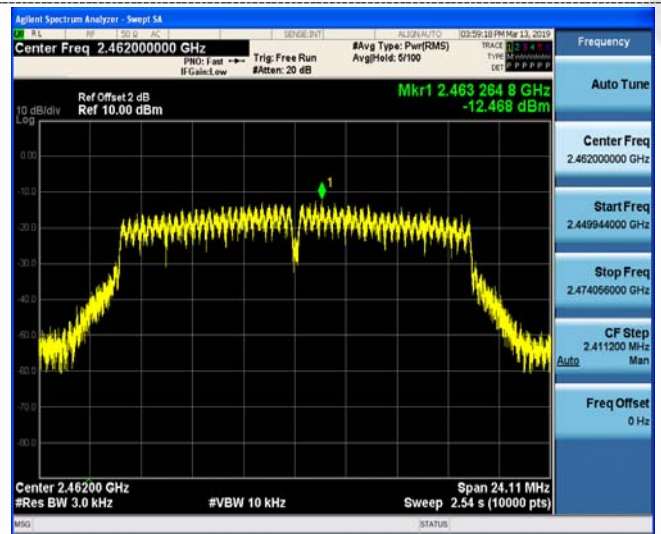
CH01

CH01



CH06

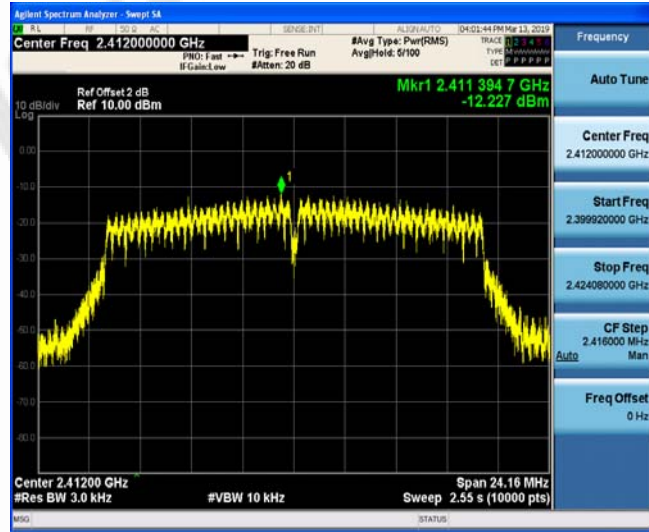
CH06



CH11

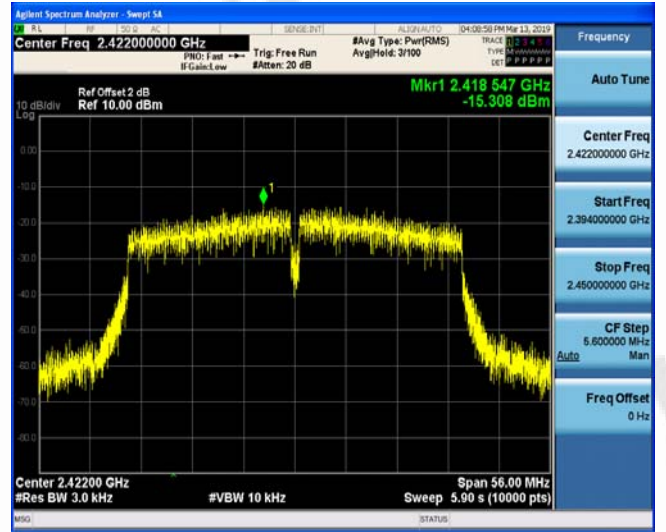
CH11

802.11n(HT20)

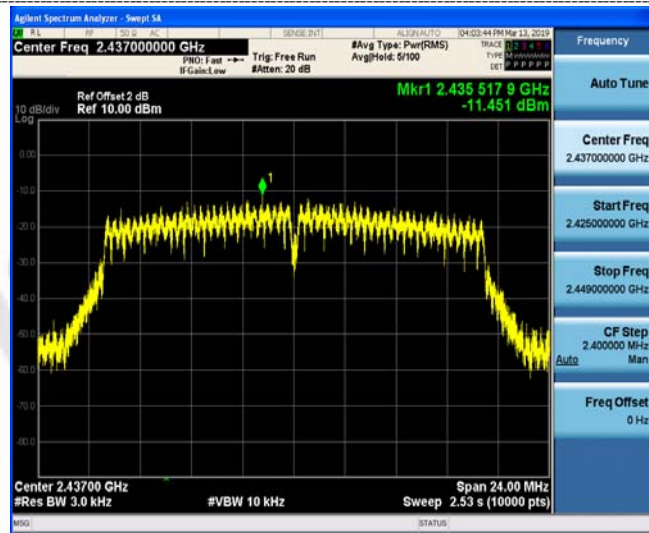


CH01

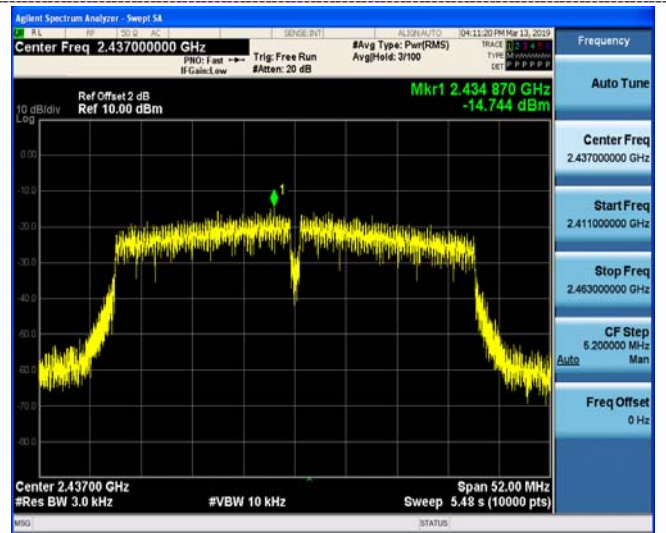
802.11n(HT40)



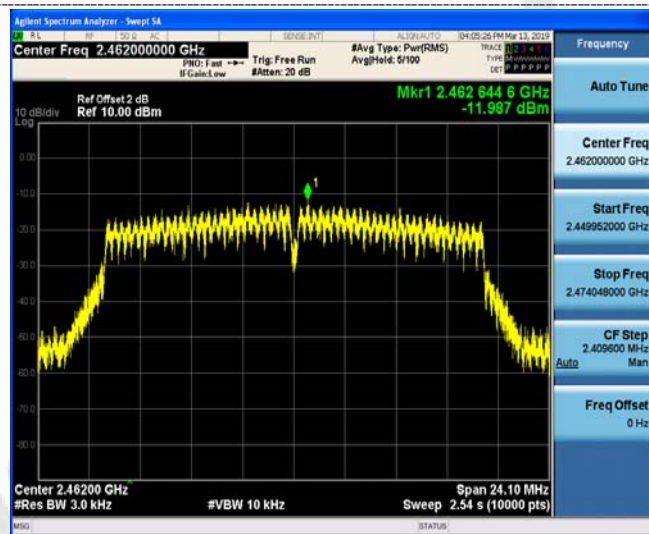
CH03



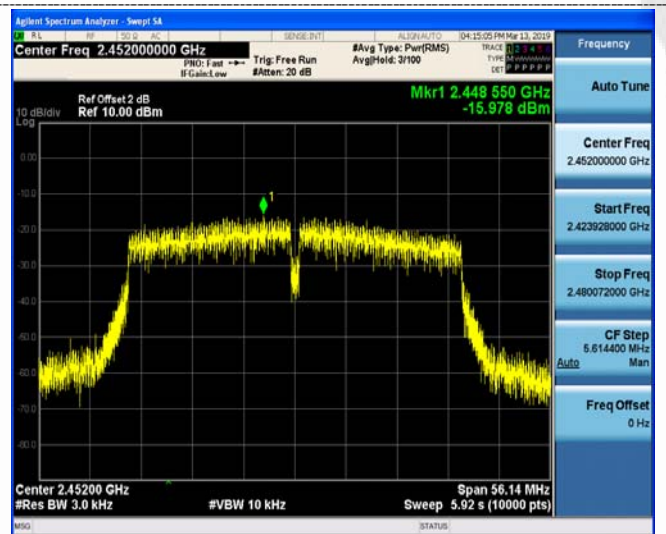
CH06



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

WIFI

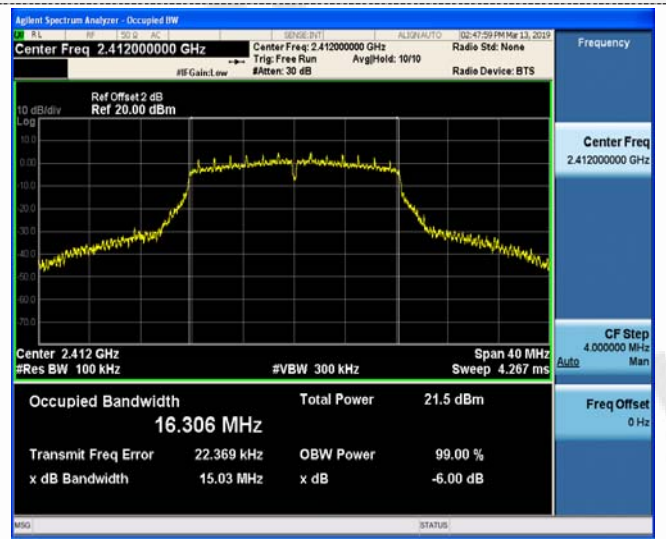
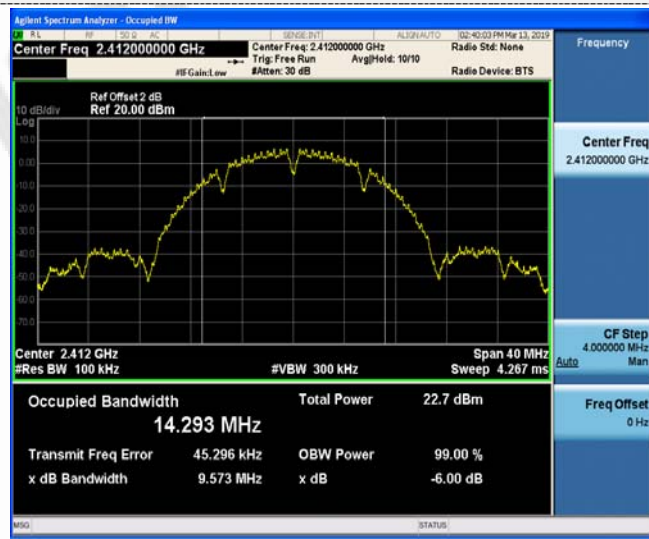
Type	Channel	6dB Bandwidth Ant1 (MHz)	6dB Bandwidth Ant2 (MHz)	Limit (KHz)	Result
802.11b	01	9.573	9.566	≥500	Pass
	06	9.518	9.565		
	11	10.04	9.539		
802.11g	01	15.03	15.05	≥500	Pass
	06	15.04	13.85		
	11	13.88	15.07		
802.11n(HT20)	01	15.11	15.10	≥500	Pass
	06	15.08	15.00		
	11	15.06	15.06		
802.11n(HT40)	03	35.03	35.00	≥500	Pass
	06	32.56	32.50		
	09	35.10	35.09		

Test plot as follows:

Ant.1

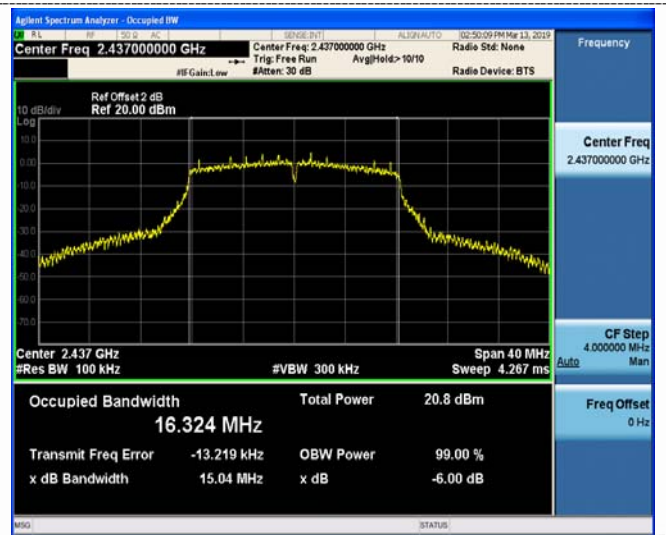
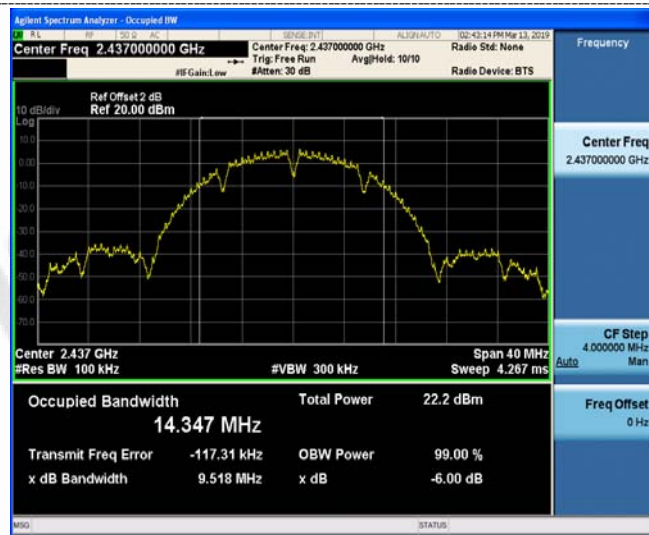
802.11b

802.11g



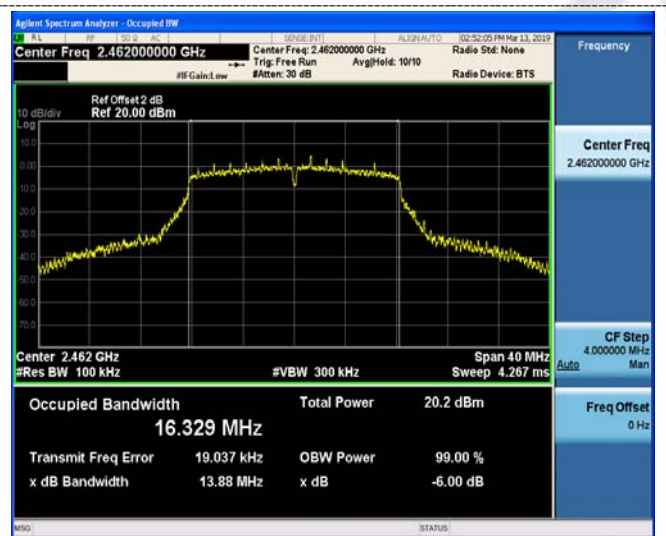
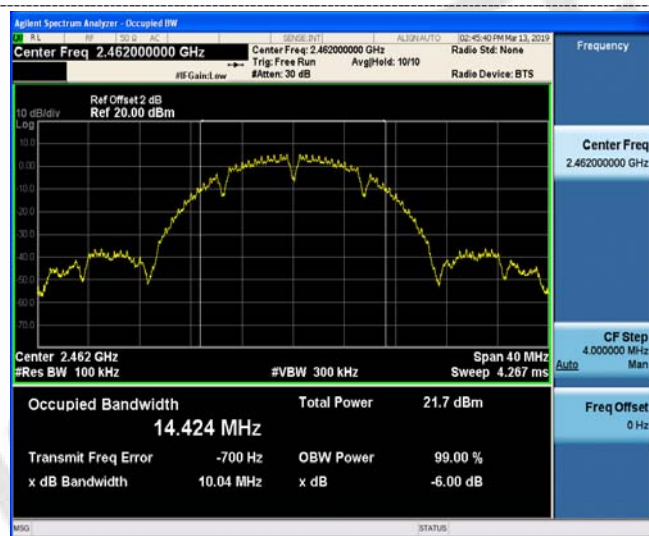
CH01

CH01



CH06

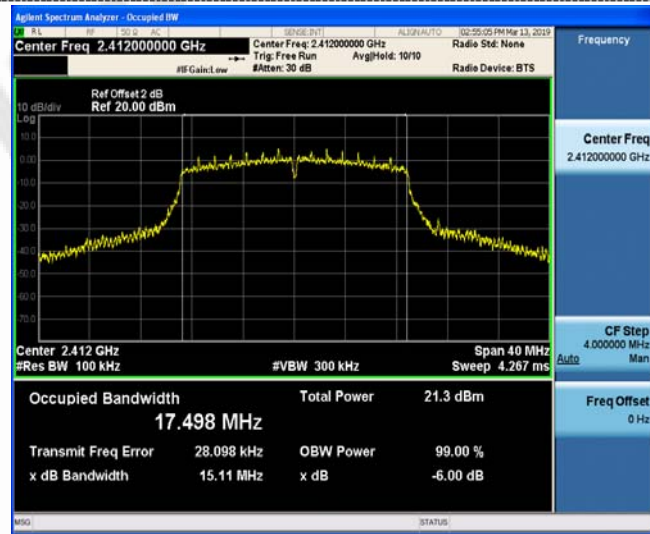
CH06



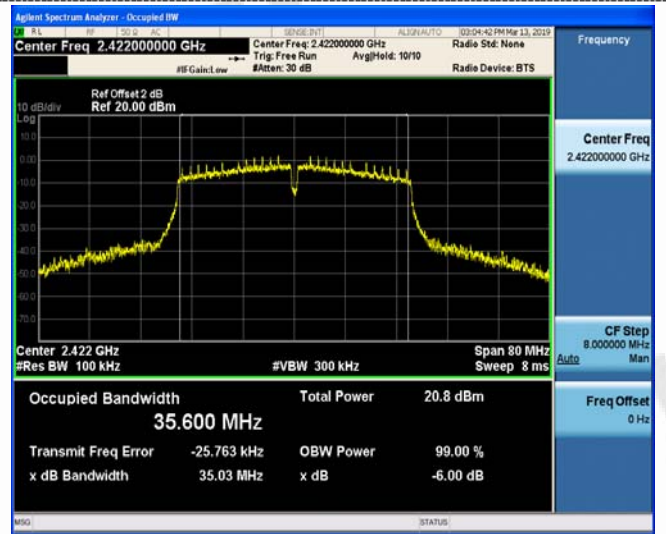
CH11

CH11

802.11n(HT20)

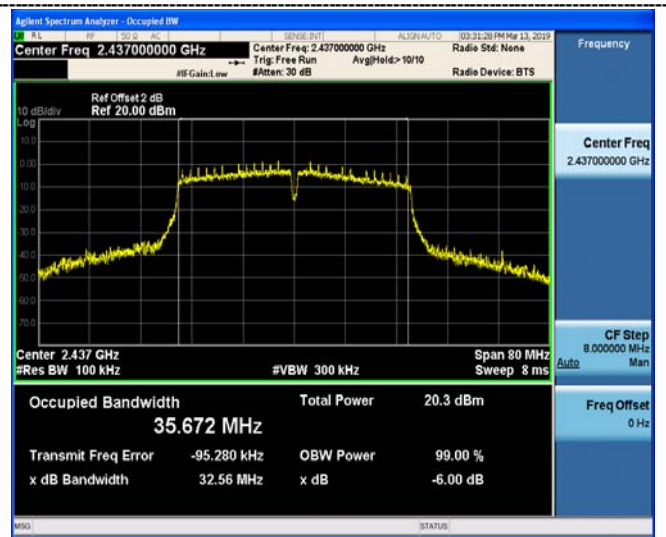
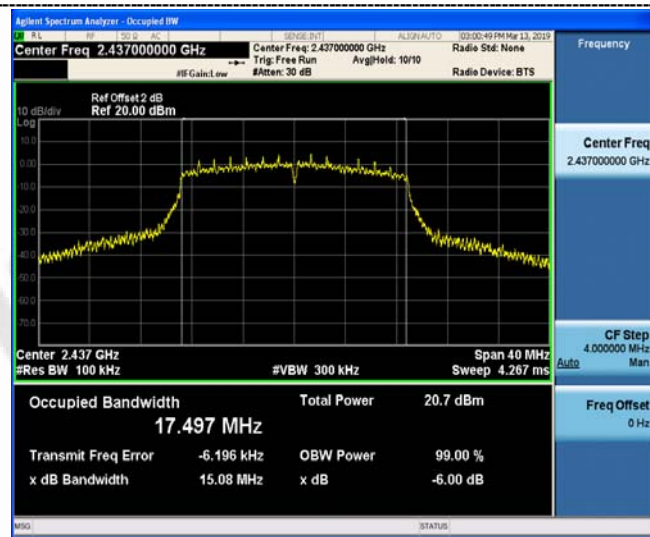


802.11n(HT40)



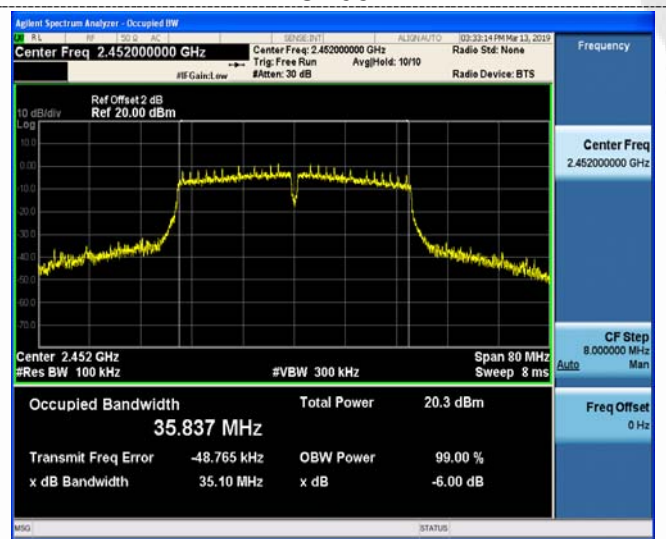
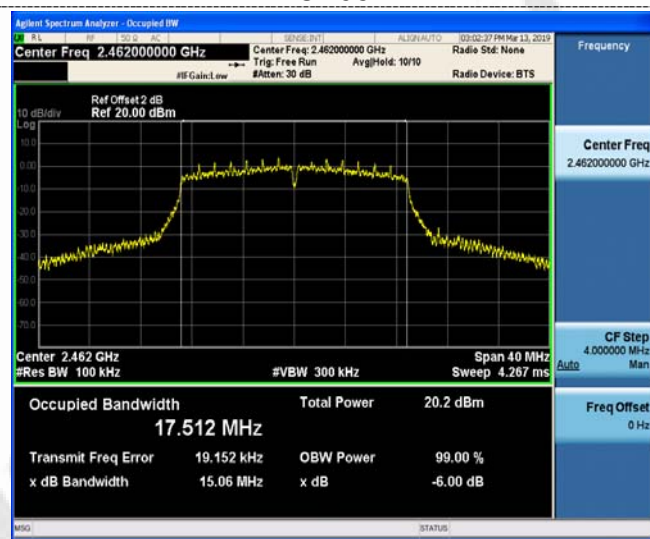
CH01

CH03



CH06

CH06



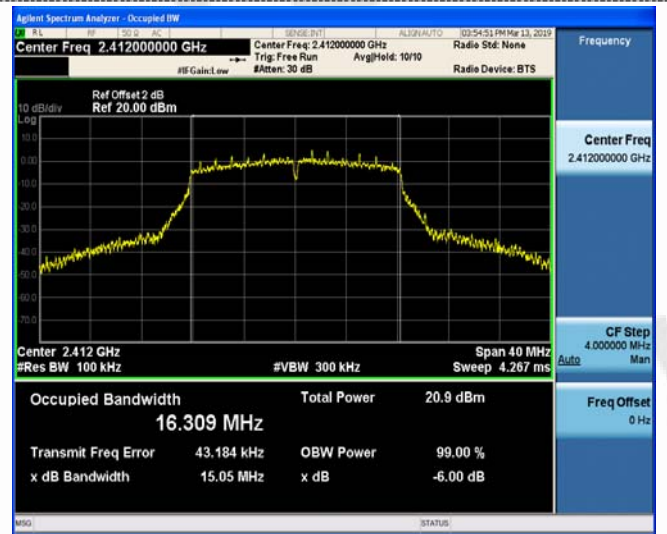
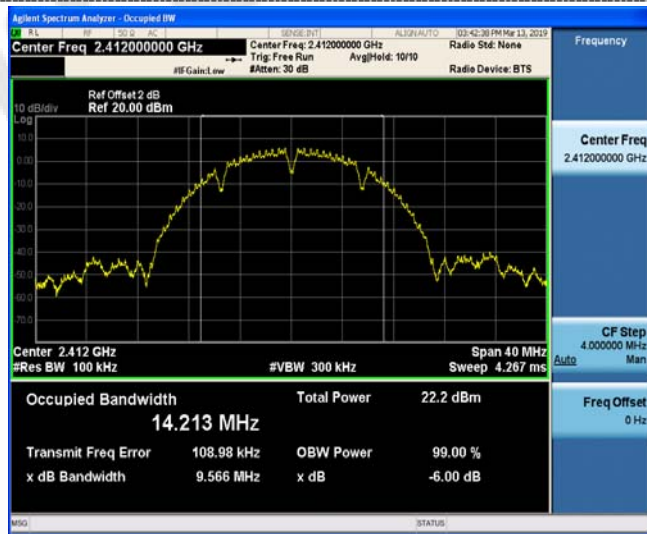
CH11

CH09

Ant.2

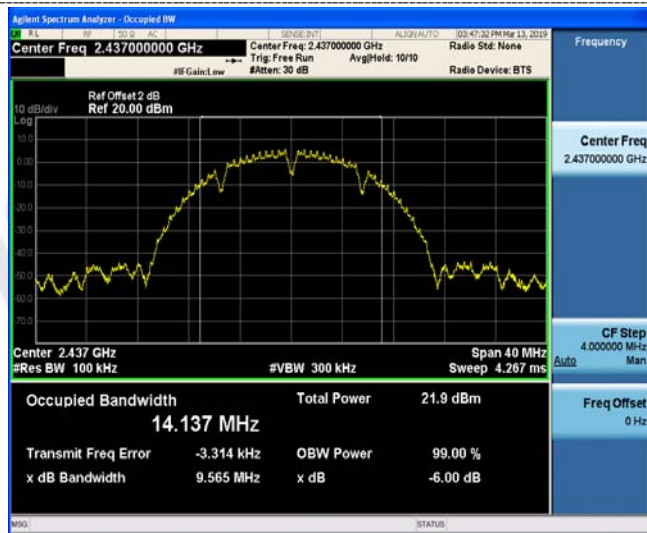
802.11b

802.11g



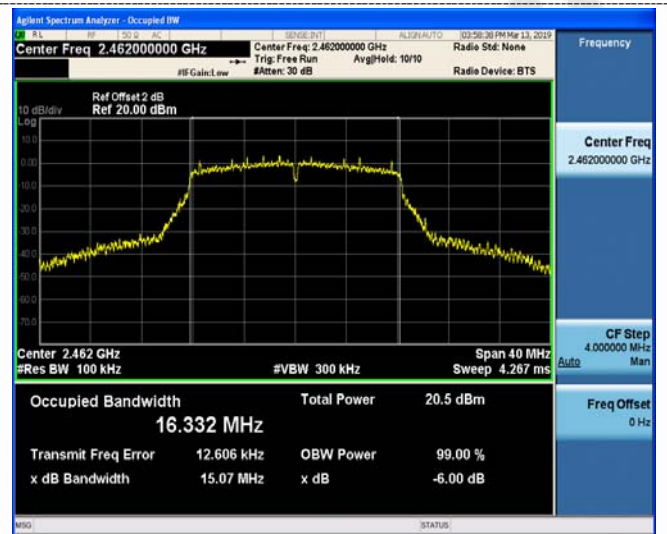
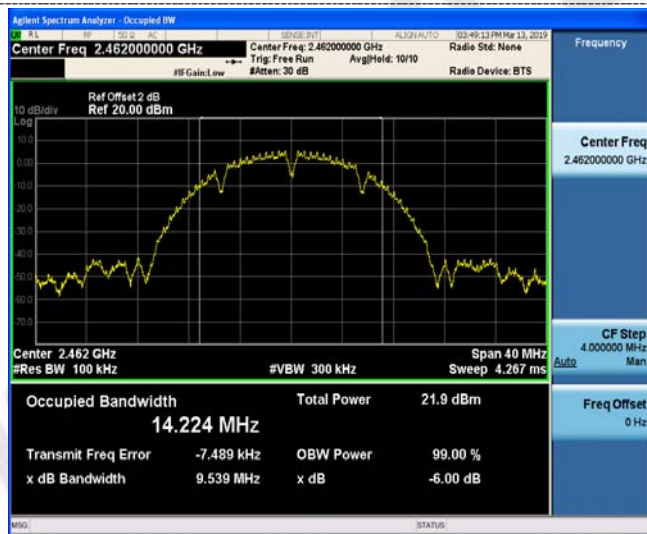
CH01

CH01



CH06

CH06



CH11

CH11