Report No.: GTS201902000047F02

FCC REPORT

Applicant:	Shenzhen Arashi Vision Company Limited
Address of Applicant:	6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China
Manufacturer/Factory:	Shenzhen Arashi Vision Company Limited
Address of Manufacturer/Factory:	6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China

Equipment Under Test (EUT)

Product Name:	Insta360 EVO
Model No.:	CINEVOX/A, CINEVOX
Trade Mark:	Insta360
FCC ID:	2AFSH-CINEVOX-A
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	February 20, 2019
Date of Test:	February 20, 2019-March 05, 2019
Date of report issue:	March 06, 2019
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*March 06, 2019*	*Original*

Prepared By: Bill. Yuan ***Date:*** *March 06, 2019*

Project Engineer

Check By: ***Date:*** *March 06, 2019*

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.407(b)(1)	PASS
Frequency Stability	15.407(g)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 40GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. Remark: Test according to ANSI C63.10:2013 and ANSI C63.4:2014			

5 General Information

5.1 General Description of EUT

Product Name:	Insta360 EVO
Model No.:	CINEVOX/A, CINEVOX
Test Model No:	CINEVOX/A
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.	
Serial No.:	IEK5218NWJHEEB
Test sample(s) ID:	GTS201902000047-1
Sample(s) Status:	Engineer sample
Hardware version:	V1.2.1.1
Software version:	V1.0.0
Operation Frequency:	802.11a/802.11n(HT20)/802.11ac(HT20): 5180MHz ~ 5240MHz; 802.11n(HT40)/ 802.11ac(HT40): 5190MHz ~ 5230MHz 802.11ac(HT80): 5210MHz
Channel numbers:	802.11a/802.11n(HT20)/802.11ac(HT20): 4; 802.11n(HT40)/ 802.11ac(HT40): 2 802.11ac(HT80): 1
Channel separation:	802.11a/802.11n(HT20)/802.11ac(HT20): 20MHz; 802.11n(HT40)/ 802.11ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Modulation technology:	OFDM
Antenna Type:	Integral Antenna
Antenna gain:	0dBi(declare by applicant)
Power supply:	DC 3.8V

Operation Frequency each of channel @ 5G Band							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz
38	5190MHz	42	5210MHz	46	5230MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**		
	5G Band		
	802.11 a/n/ac(HT20)	802.11 n/ac(HT40)	802.11ac(HT80)
Lowest channel	5180MHz	5190MHz	
Middle channel	5200MHz		5210MHz
Highest channel	5240MHz	5230MHz	

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation. EUT was test with 99% duty cycle at its maximum power control level.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

5.3 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

● **CNAS (No. CNAS L5775)**

CNAS has accredited Global United Technology Services Co., Ltd., to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 27 2018	June. 26 2019

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

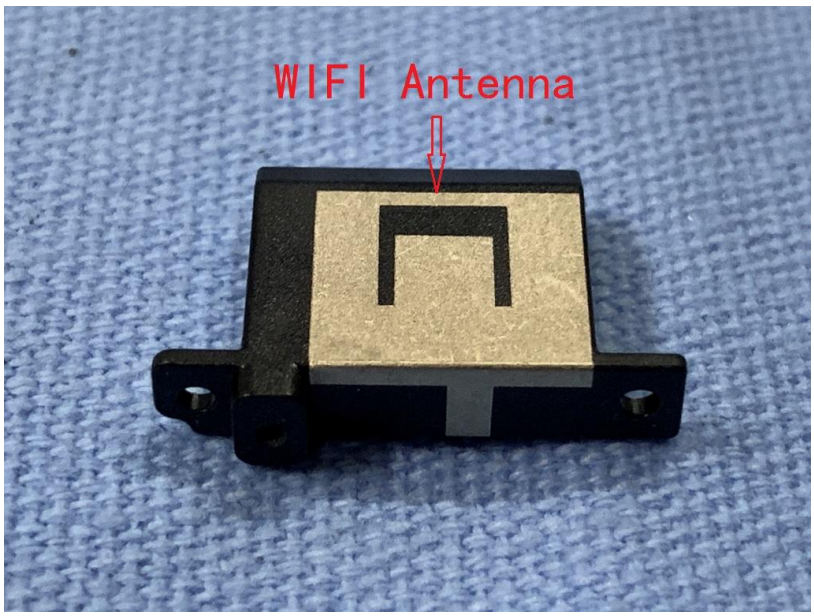
Conducted:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

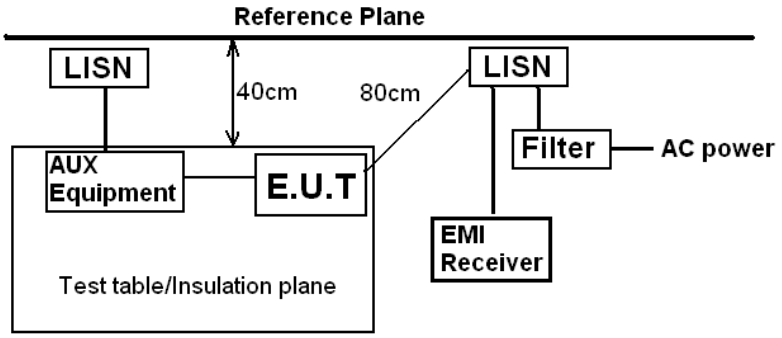
7 Test results and Measurement Data

7.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.*	
E.U.T Antenna:	
The antenna is integral antenna, the best case gain of the main antenna is 0dBi	



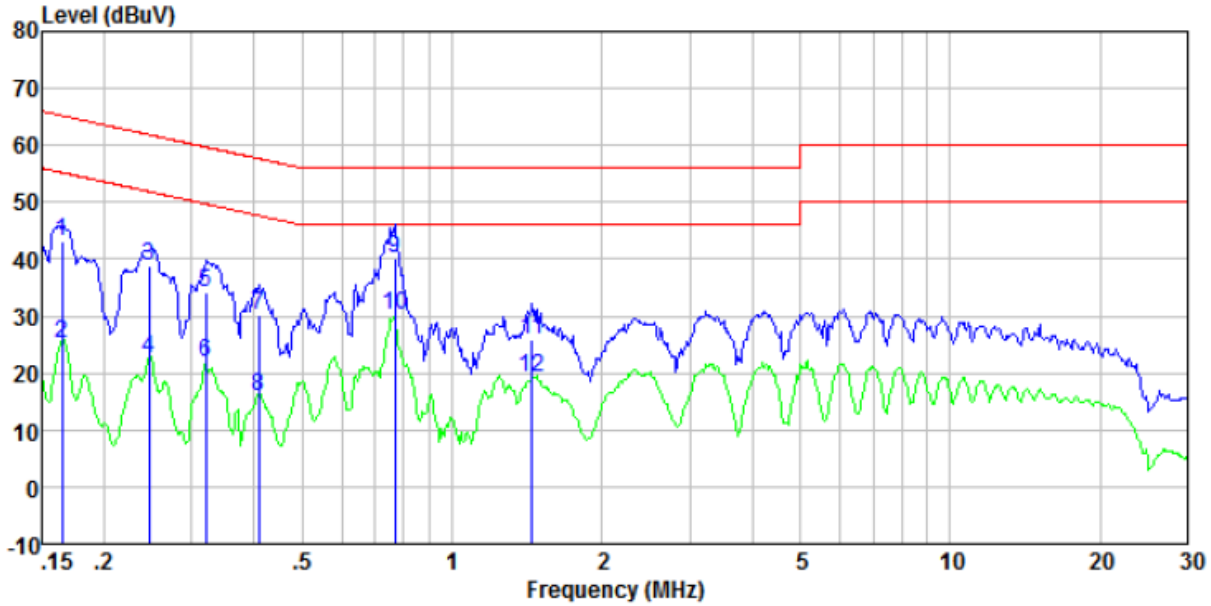
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz
Limit:	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 procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

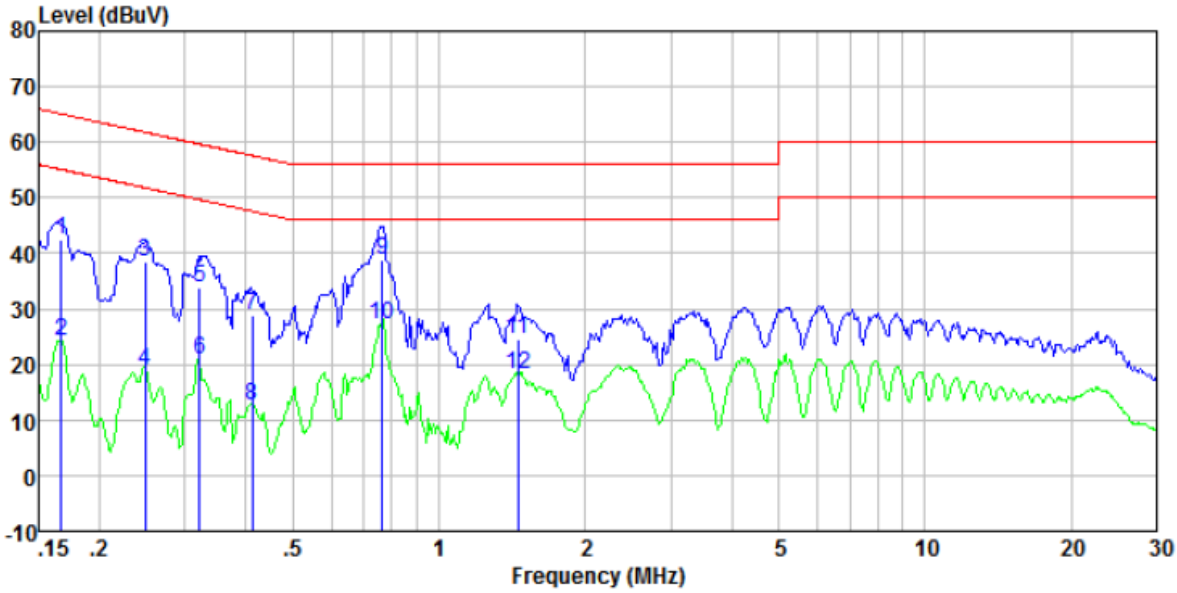
An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Probe:**	**Line**



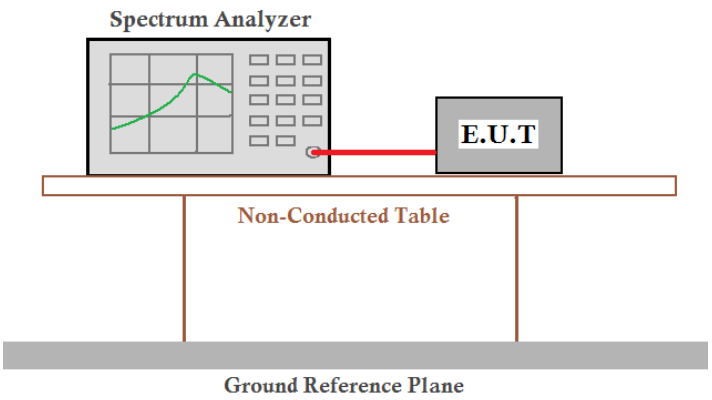
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.17	42.77	0.40	0.08	43.25	65.21	-21.96	QP
0.17	24.84	0.40	0.08	25.32	55.21	-29.89	Average
0.25	38.41	0.40	0.10	38.91	61.86	-22.95	QP
0.25	21.95	0.40	0.10	22.45	51.86	-29.41	Average
0.32	33.55	0.39	0.10	34.04	59.71	-25.67	QP
0.32	21.36	0.39	0.10	21.85	49.71	-27.86	Average
0.41	29.67	0.35	0.11	30.13	57.68	-27.55	QP
0.41	15.37	0.35	0.11	15.83	47.68	-31.85	Average
0.77	39.81	0.24	0.13	40.18	56.00	-15.82	QP
0.77	29.80	0.24	0.13	30.17	46.00	-15.83	Average
1.45	25.52	0.20	0.16	25.88	56.00	-30.12	QP
1.45	18.84	0.20	0.16	19.20	46.00	-26.80	Average

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Probe:**	**Neutral**



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.17	41.84	0.40	0.08	42.32	65.12	-22.80	QP
0.17	23.79	0.40	0.08	24.27	55.12	-30.85	Average
0.25	38.06	0.40	0.10	38.56	61.82	-23.26	QP
0.25	18.39	0.40	0.10	18.89	51.82	-32.93	Average
0.32	33.39	0.39	0.10	33.88	59.66	-25.78	QP
0.32	20.37	0.39	0.10	20.86	49.66	-28.80	Average
0.41	28.40	0.35	0.11	28.86	57.59	-28.73	QP
0.41	12.00	0.35	0.11	12.46	47.59	-35.13	Average
0.76	38.30	0.25	0.13	38.68	56.00	-17.32	QP
0.76	26.83	0.25	0.13	27.21	46.00	-18.79	Average
1.46	24.20	0.20	0.16	24.56	56.00	-31.44	QP
1.46	17.98	0.20	0.16	18.34	46.00	-27.66	Average

7.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

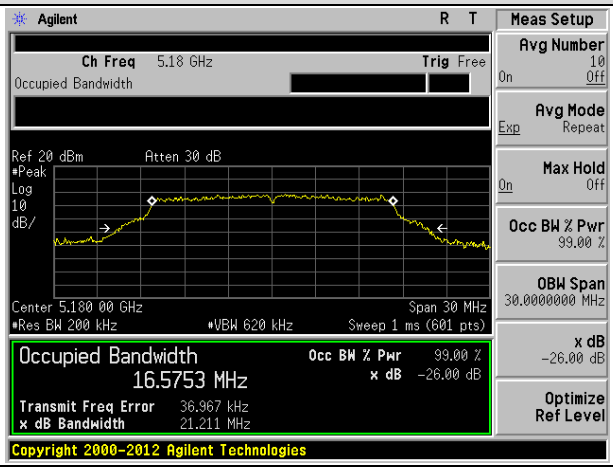
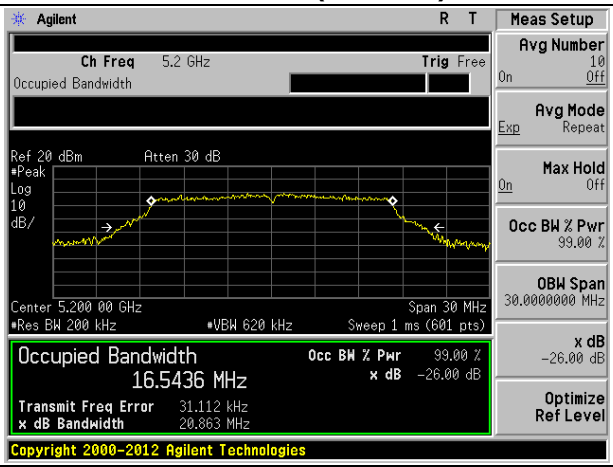
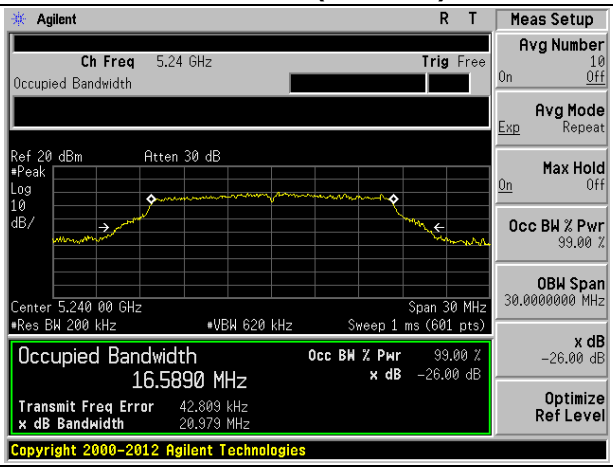
Measurement Data:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT20)	802.11ac(HT20)	802.11a	802.11n(HT20)	802.11ac(HT20)
36	5180.00	16.5753	17.7565	17.7904	21.211	21.525	21.251
40	5200.00	16.5436	17.7075	17.7760	20.863	21.449	21.220
48	5240.00	16.5890	17.6141	17.7362	20.979	20.543	21.313

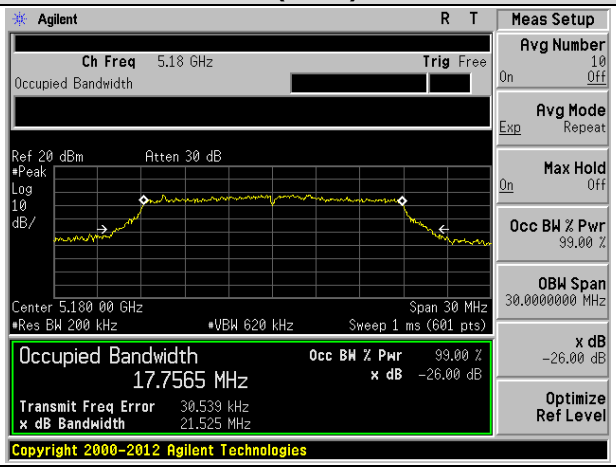
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	36.1298	36.2227	39.528	39.654
46	5230.00	36.3103	36.2084	51.073	39.930

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	75.4250	80.667

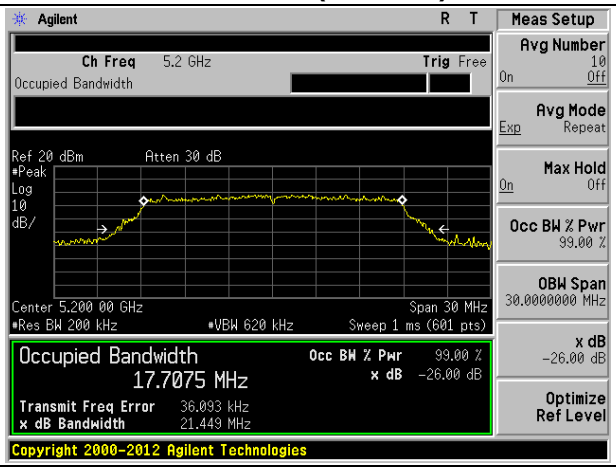
Test plots as followed:

802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

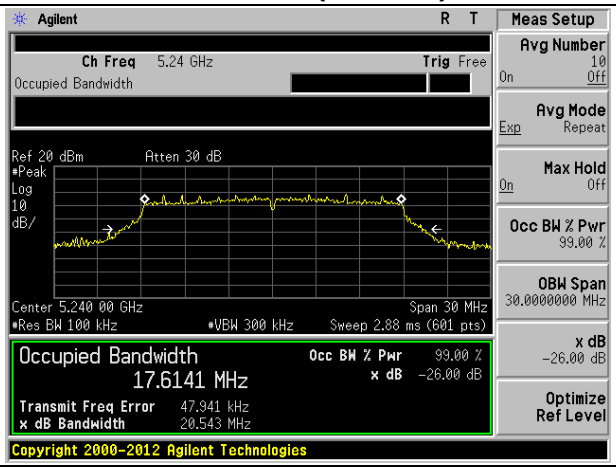
802.11n(HT20) mode



Channel 36 (5180MHz)

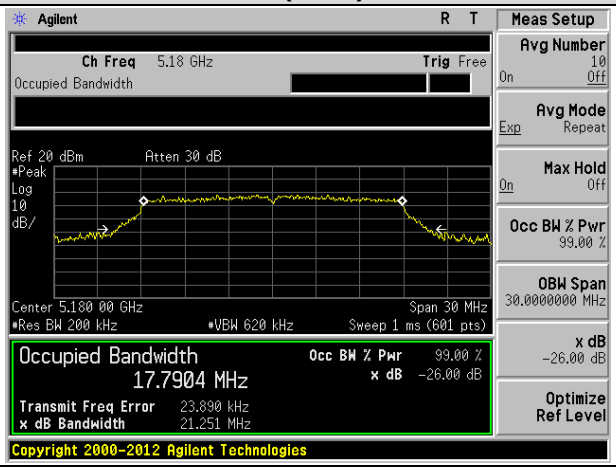


Channel 40 (5200MHz)

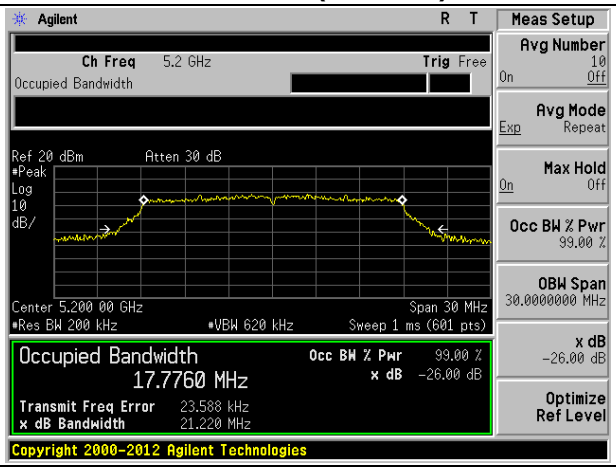


Channel 48 (5240MHz)

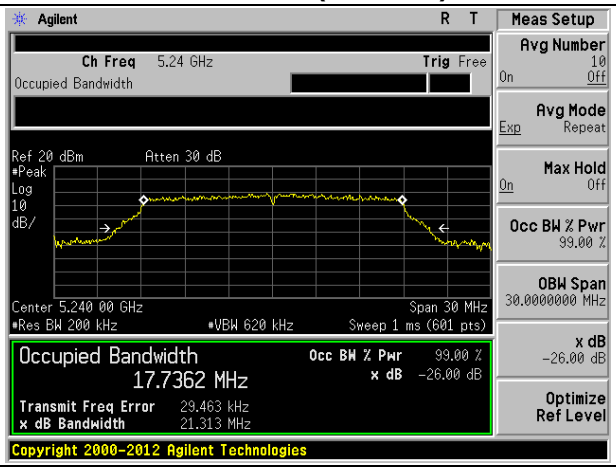
802.11ac(HT20) mode



Channel 36 (5180MHz)

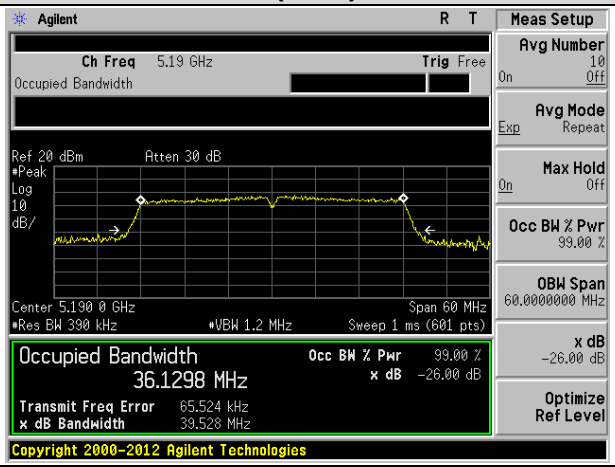


Channel 40 (5200MHz)

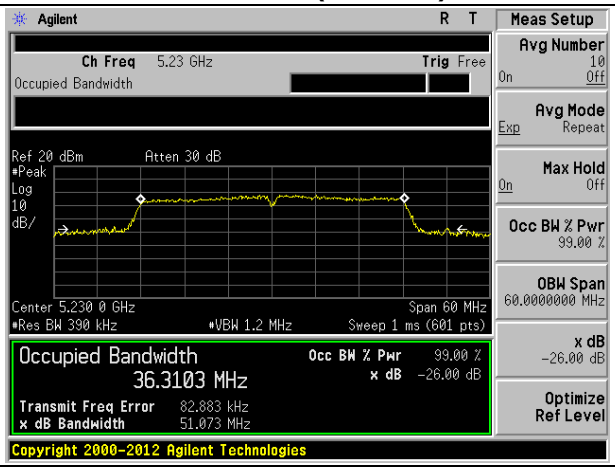


Channel 48 (5240MHz)

802.11n(HT40) mode

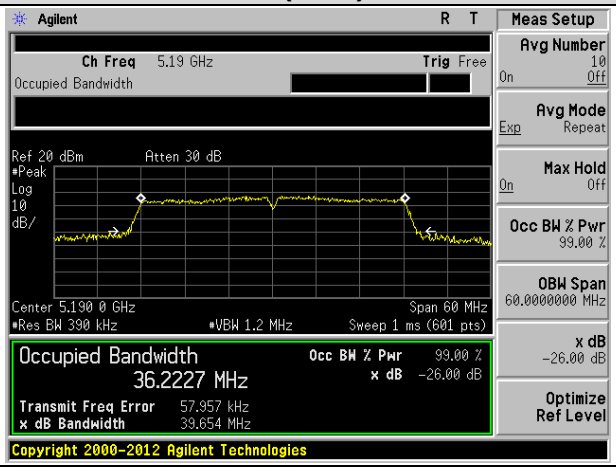


Channel 38 (5190MHz)

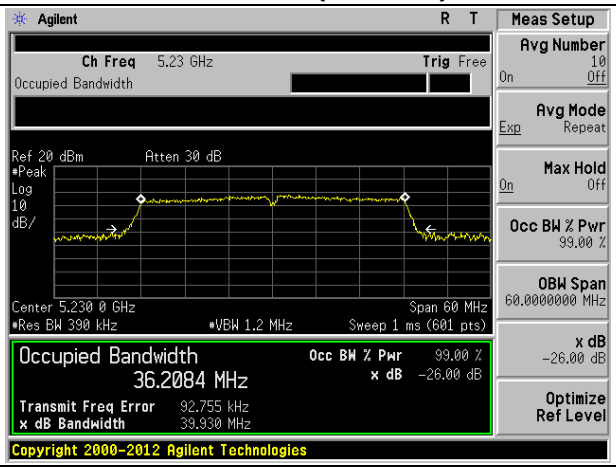


Channel 46 (5230MHz)

802.11ac(HT40) mode

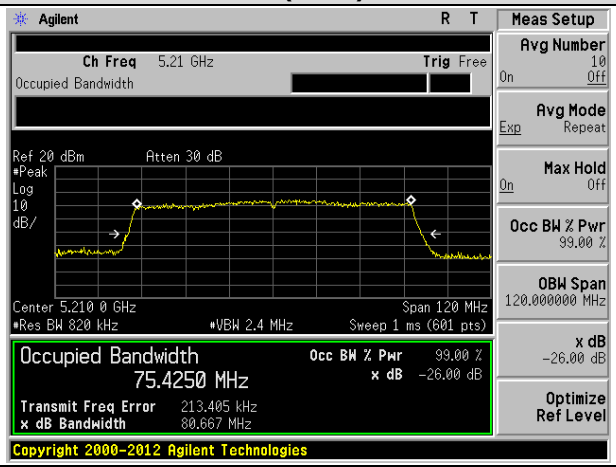


Channel 38 (5190MHz)



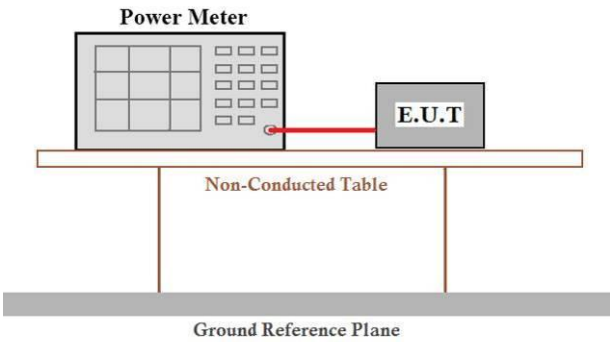
Channel 46 (5230MHz)

802.11ac(HT80) mode



Channel 42 (5210MHz)

7.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW.
Test setup:	
Test procedure:	**Measurement using an RF average power meter** (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	11.16	0.04	11.20	23.98	Pass
40	5200.00	12.77	0.04	12.81	23.98	Pass
48	5240.00	12.74	0.04	12.78	23.98	Pass

802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	12.03	0.04	12.07	23.98	Pass
40	5200.00	11.91	0.04	11.95	23.98	Pass
48	5240.00	11.81	0.04	11.85	23.98	Pass

802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	11.88	0.04	11.92	23.98	Pass
40	5200.00	12.02	0.04	12.06	23.98	Pass
48	5240.00	13.05	0.04	13.09	23.98	Pass

802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	10.54	0.04	10.58	23.98	Pass
46	5230.00	11.39	0.04	11.43	23.98	Pass

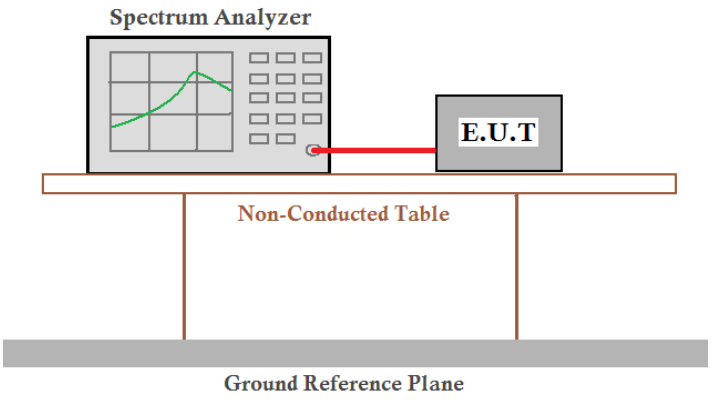
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	10.37	0.04	10.41	23.98	Pass
46	5230.00	13.64	0.04	13.68	23.98	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210.00	4.74	0.04	4.78	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	11dBm/MHz
Test setup:	
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

802.11a mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.76	0.04	2.80	11	Pass
40	5200.00	3.56	0.04	3.60	11	Pass
48	5240.00	3.44	0.04	3.48	11	Pass

802.11n(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.84	0.04	2.88	11	Pass
40	5200.00	2.77	0.04	2.81	11	Pass
48	5240.00	3.37	0.04	3.41	11	Pass

802.11ac(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.20	0.04	2.24	11	Pass
40	5200.00	2.33	0.04	2.37	11	Pass
48	5240.00	3.23	0.04	3.27	11	Pass

802.11n(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-1.43	0.04	-1.39	11	Pass
46	5230.00	-0.61	0.04	-0.57	11	Pass

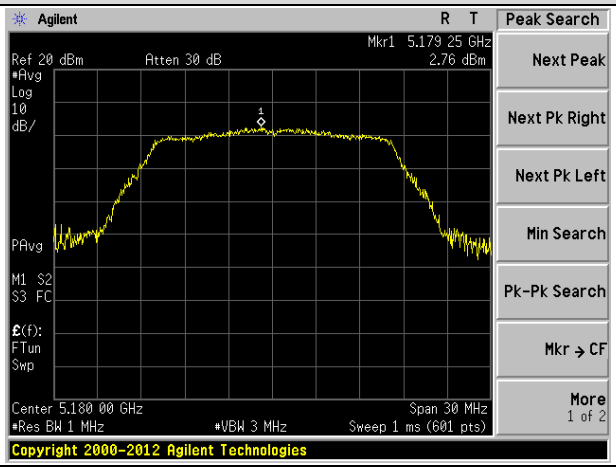
802.11ac(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-1.40	0.04	-1.36	11	Pass
46	5230.00	-0.58	0.04	-0.54	11	Pass

802.11ac(HT80) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
42	5210.00	-7.82	0.04	-7.78	11	Pass

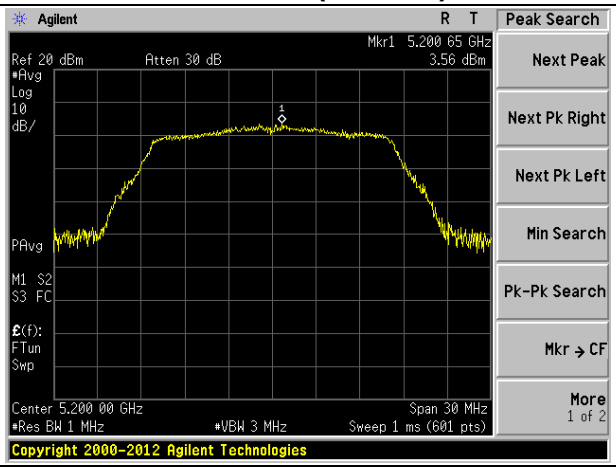
Note: Total PSD = Measured PSD + Duty Factor
Duty Factor = 10 log (1/Duty Cycle)

Test plots as followed:

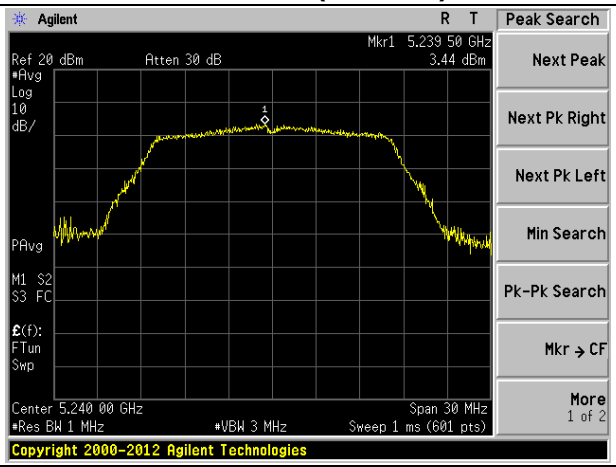
802.11a mode



Channel 36 (5180MHz)

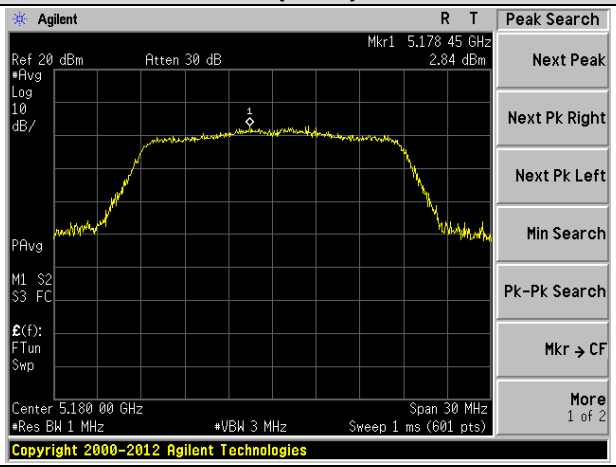


Channel 40 (5200MHz)

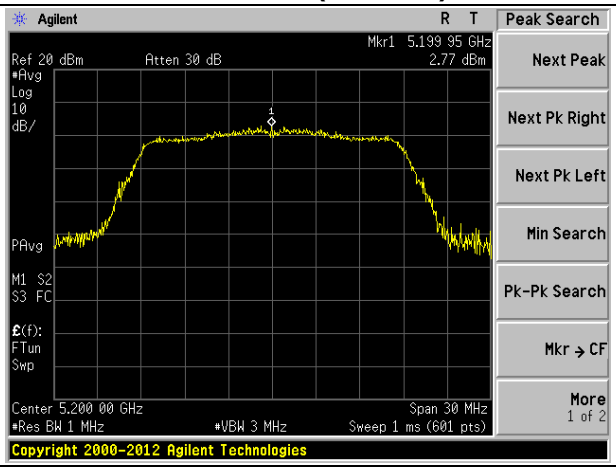


Channel 48 (5240MHz)

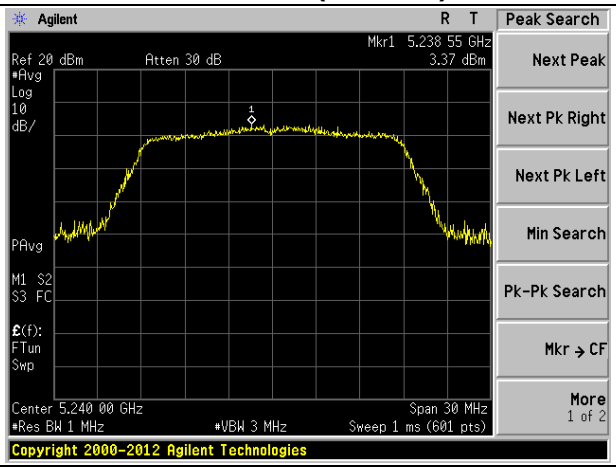
802.11n(HT20) mode



Channel 36 (5180MHz)

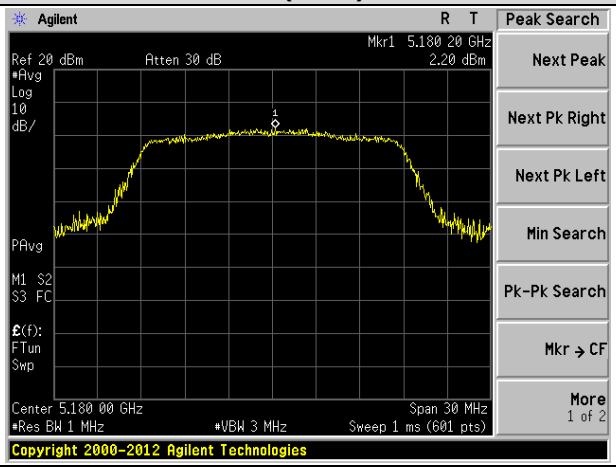


Channel 40 (5200MHz)

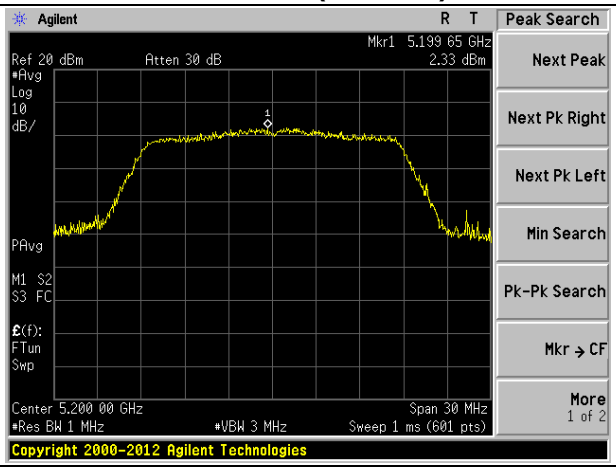


Channel 48 (5240MHz)

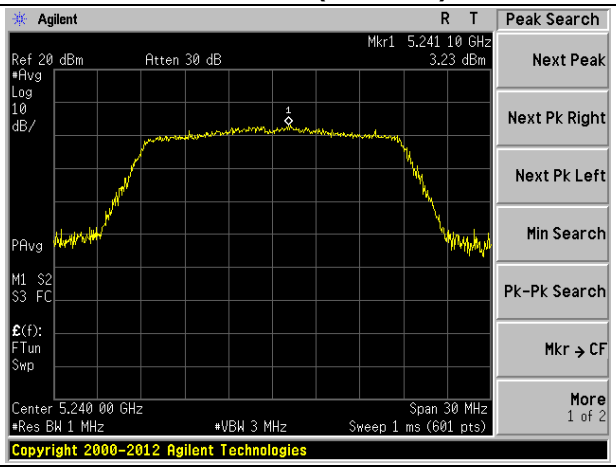
802.11ac(HT20) mode



Channel 36 (5180MHz)

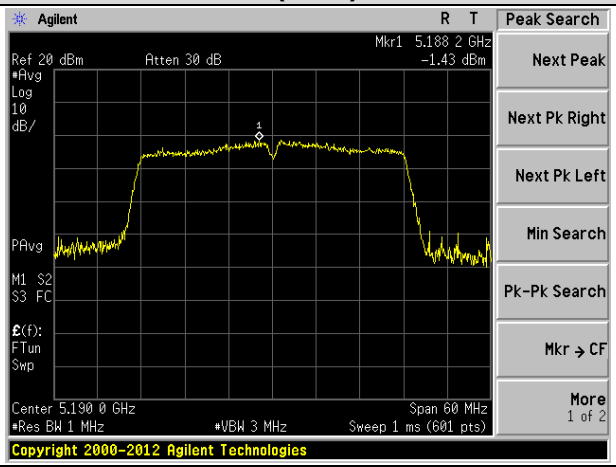


Channel 40 (5200MHz)

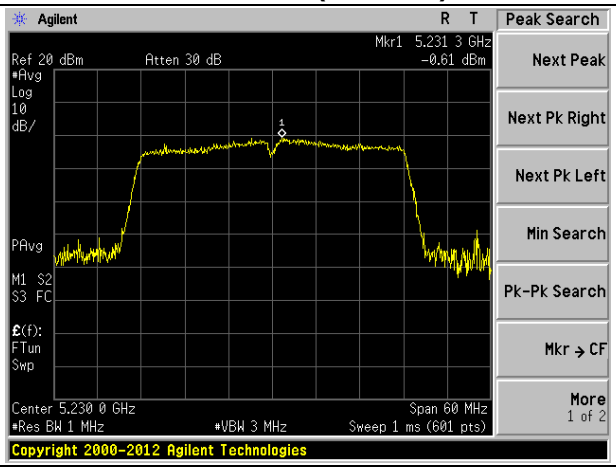


Channel 48 (5240MHz)

802.11n(HT40) mode

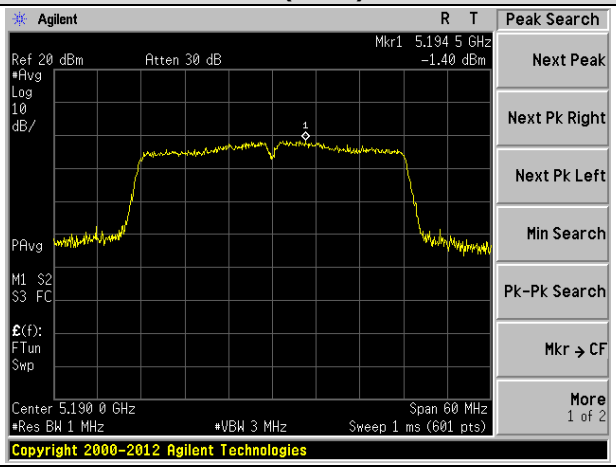


Channel 38 (5190MHz)

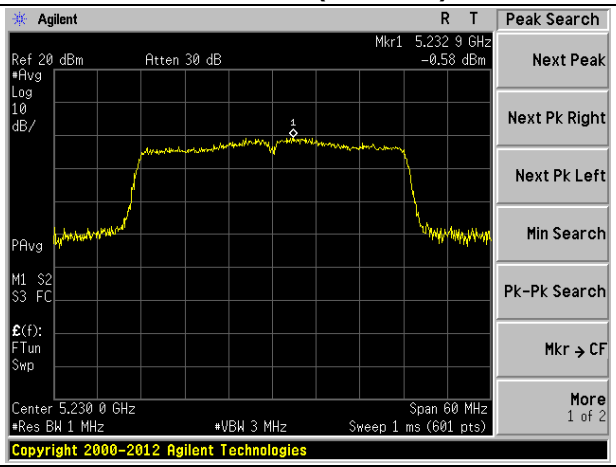


Channel 46 (5230MHz)

802.11ac(HT40) mode

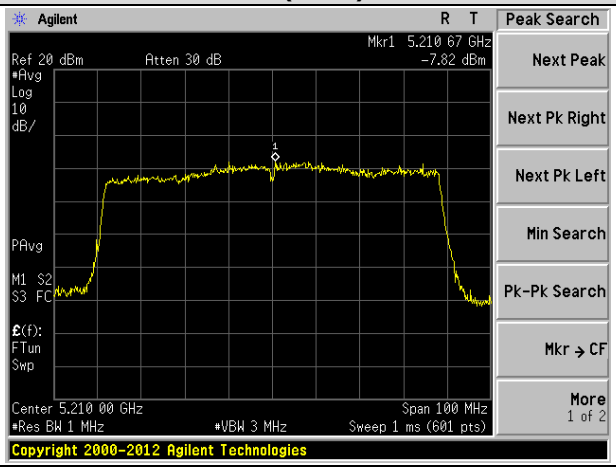


Channel 38 (5190MHz)



Channel 46 (5230MHz)

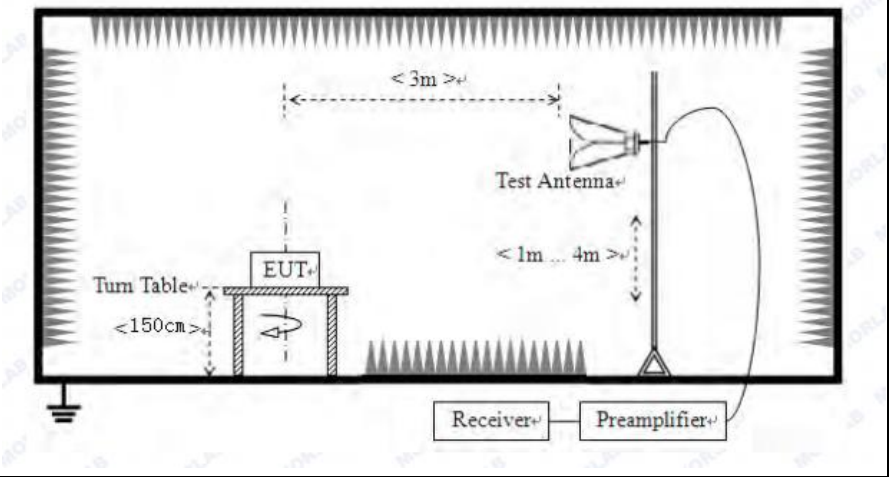
802.11ac(HT80) mode



Channel 42 (5210MHz)

7.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>68.2</td><td>Peak Value</td></tr>
</table>
Undesirable emission limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not
</td></tr>
</table>

	have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:

E[dBuV/m] = EIRP[dBm] + 95.2;

For example, if EIRP = -27dBm

E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

Measurement Data:

802.11a(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	44.77	32.07	8.99	37.49	48.34	68.20	-19.86	Vertical
5150.00	40.00	32.07	8.99	37.49	43.57	54.00	-10.43	Vertical
5150.00	46.04	32.07	8.99	37.49	49.61	68.20	-18.59	Horizontal
5150.00	42.84	32.07	8.99	37.49	46.41	54.00	-7.59	Horizontal

802.11a(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	47.26	31.75	9.29	37.20	51.10	68.20	-17.10	Vertical
5350.00	40.56	31.75	9.29	37.20	44.40	54.00	-9.60	Vertical
5350.00	44.81	31.75	9.29	37.20	48.65	68.20	-19.55	Horizontal
5350.00	41.79	31.75	9.29	37.20	45.63	54.00	-8.37	Horizontal

802.11n(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	44.86	32.07	8.99	37.49	48.43	68.20	-19.77	Vertical
5150.00	38.48	32.07	8.99	37.49	42.05	54.00	-11.95	Vertical
5150.00	44.02	32.07	8.99	37.49	47.59	68.20	-20.61	Horizontal
5150.00	40.36	32.07	8.99	37.49	43.93	54.00	-10.07	Horizontal

802.11n(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.82	31.75	9.29	37.20	48.66	68.20	-19.54	Vertical
5350.00	41.10	31.75	9.29	37.20	44.94	54.00	-9.06	Vertical
5350.00	45.41	31.75	9.29	37.20	49.25	68.20	-18.95	Horizontal
5350.00	37.15	31.75	9.29	37.20	40.99	54.00	-13.01	Horizontal

802.11ac(HT20)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	46.13	32.07	8.99	37.49	49.70	68.20	-18.50	Vertical
5150.00	42.24	32.07	8.99	37.49	45.81	54.00	-8.19	Vertical
5150.00	44.57	32.07	8.99	37.49	48.14	68.20	-20.06	Horizontal
5150.00	42.02	32.07	8.99	37.49	45.59	54.00	-8.41	Horizontal

802.11ac(HT20)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.85	31.75	9.29	37.20	48.69	68.20	-19.51	Vertical
5350.00	39.23	31.75	9.29	37.20	43.07	54.00	-10.93	Vertical
5350.00	45.15	31.75	9.29	37.20	48.99	68.20	-19.21	Horizontal
5350.00	37.23	31.75	9.29	37.20	41.07	54.00	-12.93	Horizontal

802.11n(HT40)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	44.14	32.07	8.99	37.49	47.71	68.20	-20.49	Vertical
5150.00	39.63	32.07	8.99	37.49	43.20	54.00	-10.80	Vertical
5150.00	47.17	32.07	8.99	37.49	50.74	68.20	-17.46	Horizontal
5150.00	40.45	32.07	8.99	37.49	44.02	54.00	-9.98	Horizontal

802.11n(HT40)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	44.03	31.75	9.29	37.20	47.87	68.20	-20.33	Vertical
5350.00	40.28	31.75	9.29	37.20	44.12	54.00	-9.88	Vertical
5350.00	46.75	31.75	9.29	37.20	50.59	68.20	-17.61	Horizontal
5350.00	37.73	31.75	9.29	37.20	41.57	54.00	-12.43	Horizontal

802.11ac(HT40)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	46.43	32.07	8.99	37.49	50.00	68.20	-18.20	Vertical
5150.00	39.87	32.07	8.99	37.49	43.44	54.00	-10.56	Vertical
5150.00	46.39	32.07	8.99	37.49	49.96	68.20	-18.24	Horizontal
5150.00	41.66	32.07	8.99	37.49	45.23	54.00	-8.77	Horizontal

802.11ac(HT40)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	46.81	31.75	9.29	37.20	50.65	68.20	-17.55	Vertical
5350.00	39.25	31.75	9.29	37.20	43.09	54.00	-10.91	Vertical
5350.00	46.71	31.75	9.29	37.20	50.55	68.20	-17.65	Horizontal
5350.00	39.99	31.75	9.29	37.20	43.83	54.00	-10.17	Horizontal

802.11ac(HT80)					Lowest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	45.02	32.07	8.99	37.49	48.59	68.20	-19.61	Vertical
5150.00	38.06	32.07	8.99	37.49	41.63	54.00	-12.37	Vertical
5150.00	44.78	32.07	8.99	37.49	48.35	68.20	-19.85	Horizontal
5150.00	41.61	32.07	8.99	37.49	45.18	54.00	-8.82	Horizontal

802.11ac(HT80)					Highest			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5350.00	47.17	31.75	9.29	37.20	51.01	68.20	-17.19	Vertical
5350.00	40.04	31.75	9.29	37.20	43.88	54.00	-10.12	Vertical
5350.00	46.38	31.75	9.29	37.20	50.22	68.20	-17.98	Horizontal
5350.00	40.46	31.75	9.29	37.20	44.30	54.00	-9.70	Horizontal

7.7 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

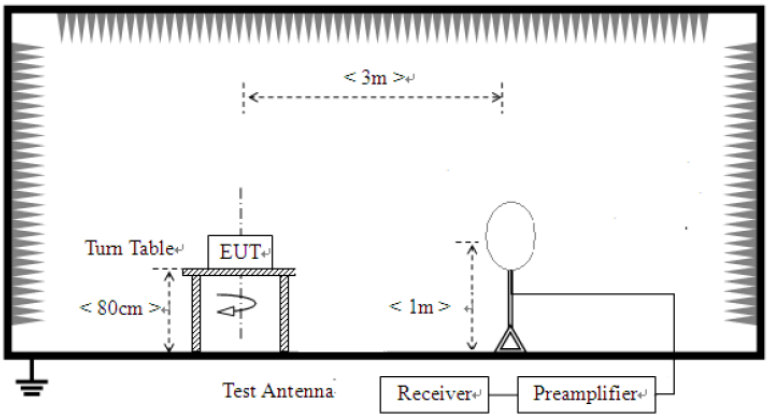
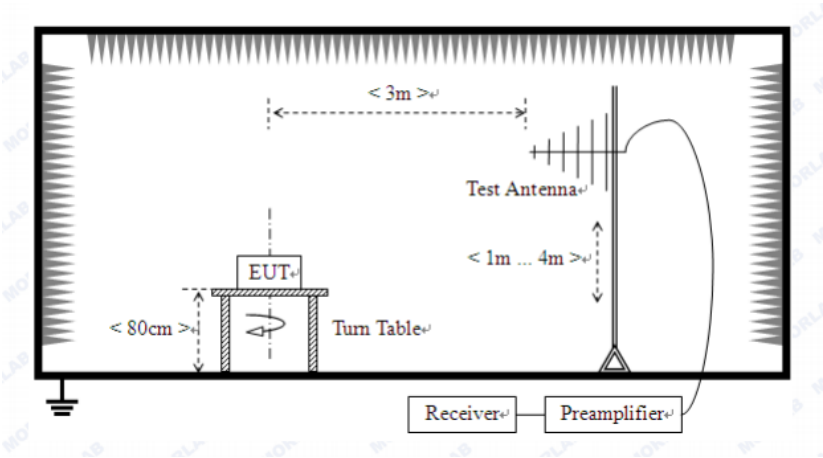
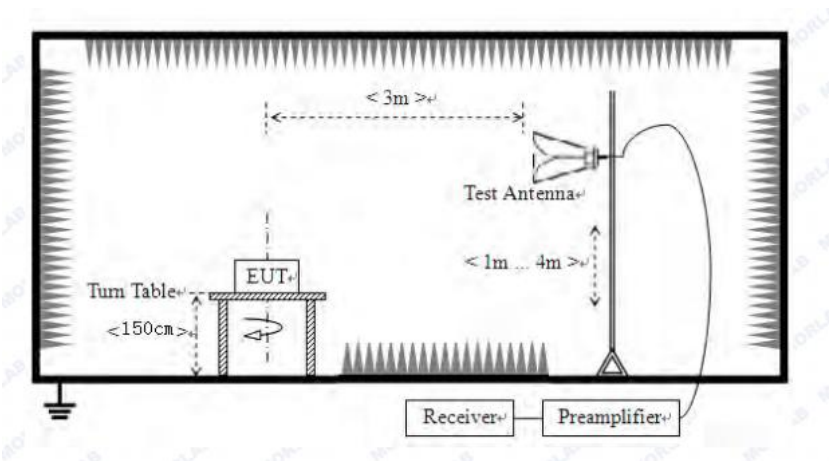
Test Procedure:

Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:

1>.Below 1GHz test procedure:

1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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 antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that

	did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 2>.Above 1GHz test procedure: 1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.

Test setup:	For radiated emissions from 9kHz to 30MHz  For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

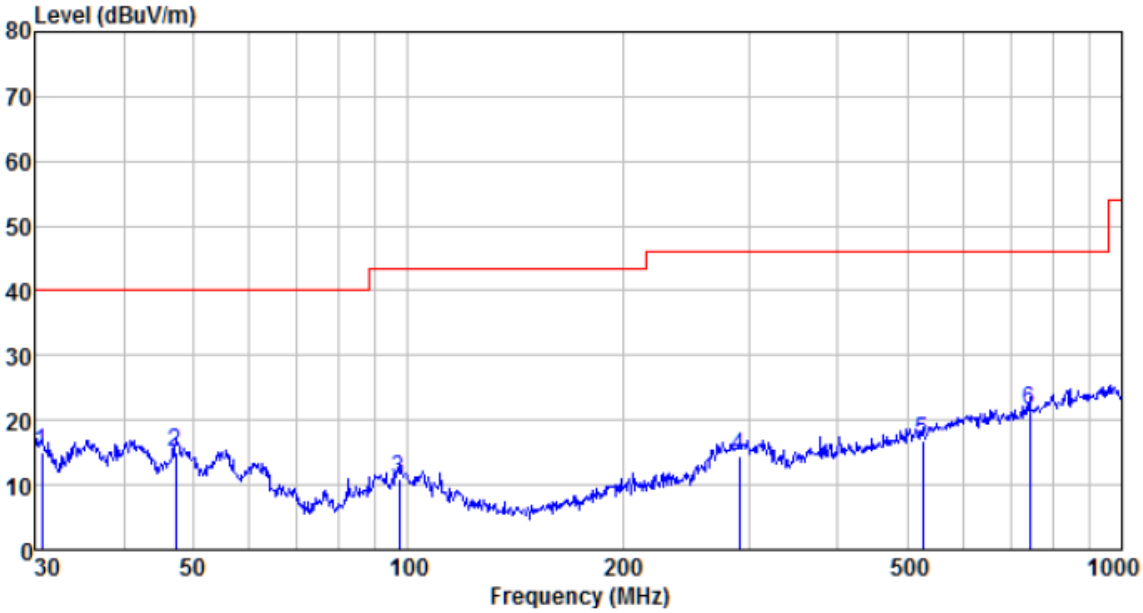
Measurement Data:

9 kHz ~ 30 MHz

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

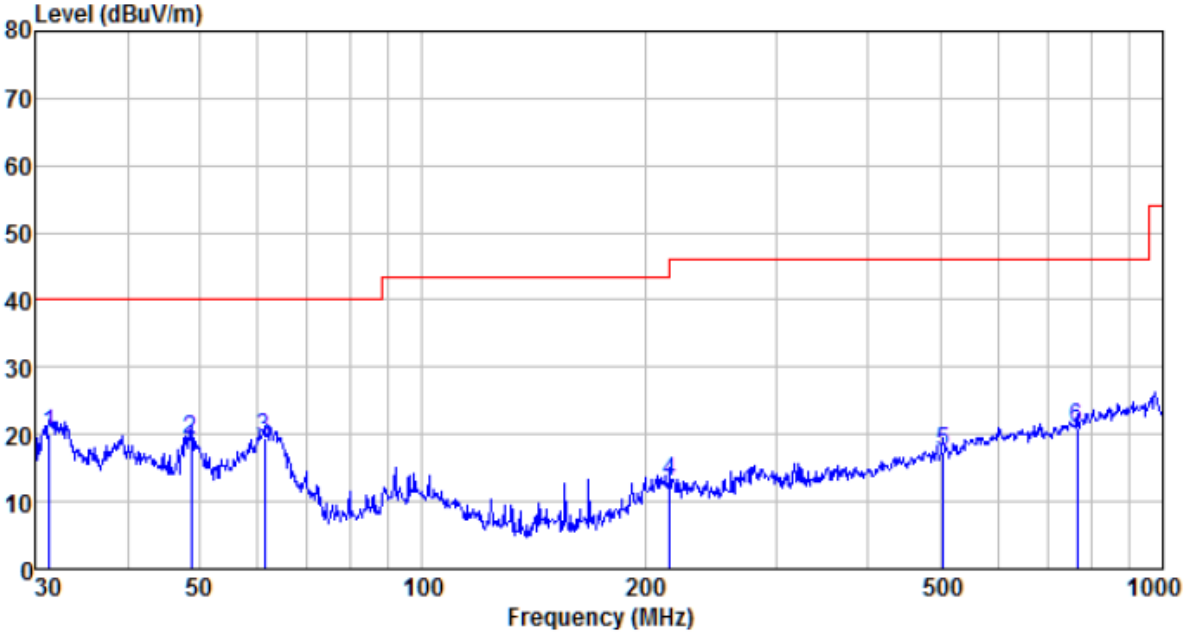
30MHz~ 1GHz

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
30.745	38.33	11.22	0.56	35.06	15.05	40.00	-24.95	QP
47.326	38.01	12.28	0.74	36.05	14.98	40.00	-25.02	QP
97.115	34.72	11.79	1.17	36.70	10.98	43.50	-32.52	QP
291.036	36.32	13.35	2.32	37.41	14.58	46.00	-31.42	QP
526.397	32.96	17.90	3.43	37.52	16.77	46.00	-29.23	QP
742.259	34.47	20.41	4.24	37.63	21.49	46.00	-24.51	QP

Mode:	**Transmitting mode**	**Test by:**	**Bill**
Temp./Hum.(%H):	**26℃/56%RH**	**Polarziation:**	**Vertical**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
31.399	43.53	11.23	0.57	35.11	20.22	40.00	-19.78	QP
48.672	42.33	12.29	0.76	36.12	19.26	40.00	-20.74	QP
61.132	43.97	10.84	0.87	36.34	19.34	40.00	-20.66	QP
216.024	37.48	11.02	1.93	37.35	13.08	46.00	-32.92	QP
504.706	34.31	17.41	3.33	37.51	17.54	46.00	-28.46	QP
766.057	33.46	20.84	4.33	37.62	21.01	46.00	-24.99	QP

Above 1GHz:

802.11a(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	28.42	39.67	14.62	32.65	50.06	74.00	-23.94	Vertical
15540.00	29.75	38.60	17.66	34.46	50.22	74.00	-23.78	Vertical
10360.00	29.73	39.67	14.62	32.65	50.06	74.00	-23.94	Horizontal
15540.00	30.53	38.60	17.66	34.46	50.22	74.00	-23.78	Horizontal

802.11a(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	31.03	39.75	14.63	32.71	50.09	74.00	-23.91	Vertical
15600.00	32.93	38.33	17.67	34.17	50.25	74.00	-23.75	Vertical
10400.00	31.12	39.75	14.63	32.71	50.09	74.00	-23.91	Horizontal
15600.00	29.68	38.33	17.67	34.17	50.25	74.00	-23.75	Horizontal

802.11a(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.78	39.82	14.68	32.86	50.06	74.00	-23.94	Vertical
15720.00	29.81	38.09	17.73	33.66	50.58	74.00	-23.42	Vertical
10480.00	28.37	39.82	14.68	32.86	50.06	74.00	-23.94	Horizontal
15720.00	28.77	38.09	17.73	33.66	50.58	74.00	-23.42	Horizontal

802.11n(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	32.43	39.67	14.62	32.65	50.06	74.00	-23.94	Vertical
15540.00	30.05	38.60	17.66	34.46	50.22	74.00	-23.78	Vertical
10360.00	30.93	39.67	14.62	32.65	50.06	74.00	-23.94	Horizontal
15540.00	32.61	38.60	17.66	34.46	50.22	74.00	-23.78	Horizontal

802.11n(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	30.70	39.75	14.63	32.71	50.09	74.00	-23.91	Vertical
15600.00	30.36	38.33	17.67	34.17	50.25	74.00	-23.75	Vertical
10400.00	32.38	39.75	14.63	32.71	50.09	74.00	-23.91	Horizontal
15600.00	28.05	38.33	17.67	34.17	50.25	74.00	-23.75	Horizontal

802.11n(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.36	39.82	14.68	32.86	50.06	74.00	-23.94	Vertical
15720.00	28.08	38.09	17.73	33.66	50.58	74.00	-23.42	Vertical
10480.00	30.85	39.82	14.68	32.86	50.06	74.00	-23.94	Horizontal
15720.00	28.77	38.09	17.73	33.66	50.58	74.00	-23.42	Horizontal

802.11ac(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	30.58	39.71	14.63	32.68	50.08	74.00	-23.92	Vertical
15540.00	31.38	38.46	17.67	34.32	50.23	74.00	-23.77	Vertical
10360.00	31.46	39.71	14.63	32.68	50.08	74.00	-23.92	Horizontal
15540.00	30.10	38.46	17.67	34.32	50.23	74.00	-23.77	Horizontal

802.11ac(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.82	39.75	14.63	32.71	50.09	74.00	-23.91	Vertical
15600.00	30.67	38.33	17.67	34.17	50.25	74.00	-23.75	Vertical
10400.00	30.78	39.75	14.63	32.71	50.09	74.00	-23.91	Horizontal
15600.00	30.14	38.33	17.67	34.17	50.25	74.00	-23.75	Horizontal

802.11ac(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	29.25	39.82	14.68	32.86	50.06	74.00	-23.94	Vertical
15720.00	30.25	38.09	17.73	33.66	50.58	74.00	-23.42	Vertical
10480.00	32.62	39.82	14.68	32.86	50.06	74.00	-23.94	Horizontal
15720.00	28.16	38.09	17.73	33.66	50.58	74.00	-23.42	Horizontal

802.11nHT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	31.69	39.71	14.63	32.68	50.08	74.00	-23.92	Vertical
15570.00	30.19	38.46	17.67	34.32	50.23	74.00	-23.77	Vertical
10380.00	30.58	39.71	14.63	32.68	50.08	74.00	-23.92	Horizontal
15570.00	32.79	38.46	17.67	34.32	50.23	74.00	-23.77	Horizontal

802.11n(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	30.59	39.82	14.66	32.80	50.10	74.00	-23.90	Vertical
15690.00	28.41	38.09	17.71	33.81	50.41	74.00	-23.59	Vertical
10460.00	28.95	39.82	14.66	32.80	50.10	74.00	-23.90	Horizontal
15690.00	28.08	38.09	17.71	33.81	50.41	74.00	-23.59	Horizontal

802.11ac(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	30.49	39.71	14.63	32.68	50.08	74.00	-23.92	Vertical
15570.00	32.36	38.46	17.67	34.32	50.23	74.00	-23.77	Vertical
10380.00	32.16	39.71	14.63	32.68	50.08	74.00	-23.92	Horizontal
15570.00	31.92	38.46	17.67	34.32	50.23	74.00	-23.77	Horizontal

802.11ac(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	28.02	39.75	14.65	32.74	50.08	74.00	-23.92	Vertical
15690.00	30.60	38.33	17.69	34.03	50.41	74.00	-23.59	Vertical
10460.00	28.44	39.75	14.65	32.74	50.08	74.00	-23.92	Horizontal
15690.00	31.88	38.33	17.69	34.03	50.41	74.00	-23.59	Horizontal

802.11ac(HT80) 5210MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.00	30.37	39.82	14.66	32.80	50.10	74.00	-23.90	Vertical
15630.00	28.25	38.09	17.71	33.81	50.41	74.00	-23.59	Vertical
10420.00	30.23	39.82	14.66	32.80	50.10	74.00	-23.90	Horizontal
15630.00	31.66	38.09	17.71	33.81	50.41	74.00	-23.59	Horizontal

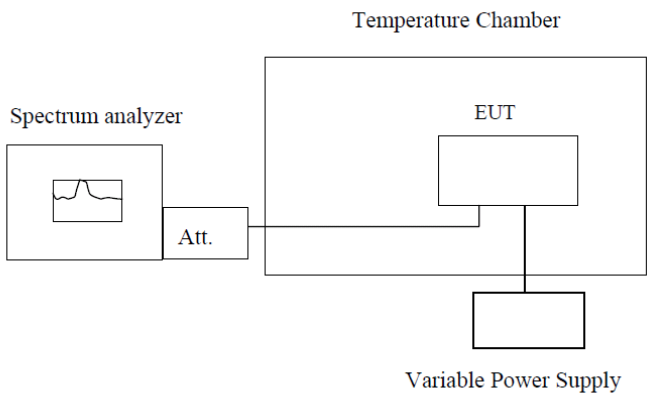
Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

802.11a									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5179.8800	Pass	5180.1083	Pass	5180.3034	Pass	5179.9285	Pass
-20	3.8	5179.6331	Pass	5180.0704	Pass	5180.4392	Pass	5179.6572	Pass
-10	3.8	5179.6505	Pass	5180.2946	Pass	5180.8952	Pass	5179.5841	Pass
0	3.8	5179.7259	Pass	5180.3474	Pass	5180.1162	Pass	5179.1170	Pass
10	3.8	5179.8577	Pass	5180.5782	Pass	5180.9003	Pass	5179.7802	Pass
20	3.8	5179.5971	Pass	5180.9232	Pass	5180.7929	Pass	5179.3097	Pass
30	3.8	5179.4152	Pass	5180.7759	Pass	5180.1496	Pass	5179.4698	Pass
40	3.8	5179.1093	Pass	5180.4744	Pass	5180.1381	Pass	5179.0831	Pass
50	3.8	5179.6151	Pass	5180.5790	Pass	5180.0139	Pass	5179.8538	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5179.9537	Pass	5180.5162	Pass	5180.9038	Pass	5179.7735	Pass
25	3.8	5179.2174	Pass	5180.5207	Pass	5180.1829	Pass	5179.1988	Pass
25	4.2	5179.7552	Pass	5180.2478	Pass	5180.6822	Pass	5179.7367	Pass

802.11n(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5179.1449	Pass	5180.7607	Pass	5180.4279	Pass	5179.4307	Pass
-20	3.8	5179.6532	Pass	5180.5357	Pass	5180.9414	Pass	5179.8257	Pass
-10	3.8	5179.0108	Pass	5180.9106	Pass	5180.0444	Pass	5179.5238	Pass
0	3.8	5179.1015	Pass	5180.0607	Pass	5180.0291	Pass	5179.8893	Pass
10	3.8	5179.1834	Pass	5180.4822	Pass	5180.7875	Pass	5179.0834	Pass
20	3.8	5179.0188	Pass	5180.8450	Pass	5180.3002	Pass	5179.6569	Pass
30	3.8	5179.9355	Pass	5180.8934	Pass	5180.4113	Pass	5179.7364	Pass
40	3.8	5179.0902	Pass	5180.7364	Pass	5180.3461	Pass	5179.2565	Pass
50	3.8	5179.3378	Pass	5180.0551	Pass	5180.5418	Pass	5179.9564	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5179.9684	Pass	5180.9252	Pass	5180.4380	Pass	5179.9731	Pass
25	3.8	5179.6555	Pass	5180.3410	Pass	5180.6392	Pass	5179.3445	Pass
25	4.2	5179.4399	Pass	5180.5454	Pass	5180.3757	Pass	5179.3331	Pass

802.11ac(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5179.7940	Pass	5180.9330	Pass	5180.2408	Pass	5179.0040	Pass
-20	3.8	5179.5808	Pass	5180.5471	Pass	5180.4095	Pass	5179.1710	Pass
-10	3.8	5179.4444	Pass	5180.0218	Pass	5180.9470	Pass	5179.1361	Pass
0	3.8	5179.0186	Pass	5180.0326	Pass	5180.5084	Pass	5179.8646	Pass
10	3.8	5179.5731	Pass	5180.0695	Pass	5180.5225	Pass	5179.1999	Pass
20	3.8	5179.8480	Pass	5180.2612	Pass	5180.5747	Pass	5179.4228	Pass
30	3.8	5179.2727	Pass	5180.0307	Pass	5180.8334	Pass	5179.1196	Pass
40	3.8	5179.1187	Pass	5180.5823	Pass	5180.2562	Pass	5179.3386	Pass
50	3.8	5179.9924	Pass	5180.6210	Pass	5180.2836	Pass	5179.9051	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5179.9171	Pass	5180.4455	Pass	5180.6981	Pass	5179.5107	Pass
25	3.8	5179.6429	Pass	5180.3915	Pass	5180.3861	Pass	5179.9358	Pass
25	4.2	5179.5839	Pass	5180.0760	Pass	5180.3666	Pass	5179.8439	Pass

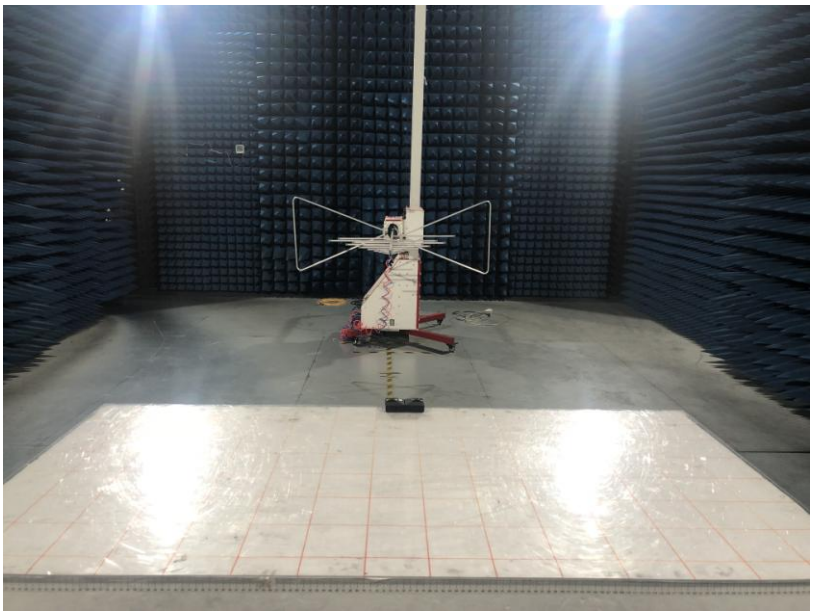
802.11n(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5189.9214	Pass	5190.8635	Pass	5190.2609	Pass	5189.4977	Pass
-20	3.8	5189.9053	Pass	5190.0777	Pass	5190.1810	Pass	5189.5197	Pass
-10	3.8	5189.1032	Pass	5190.4380	Pass	5190.7286	Pass	5189.0592	Pass
0	3.8	5189.2494	Pass	5190.8754	Pass	5190.1469	Pass	5189.8882	Pass
10	3.8	5189.8695	Pass	5190.3096	Pass	5190.0988	Pass	5189.7527	Pass
20	3.8	5189.7288	Pass	5190.8544	Pass	5190.3997	Pass	5189.5507	Pass
30	3.8	5189.3846	Pass	5190.5159	Pass	5190.6365	Pass	5189.4867	Pass
40	3.8	5189.1411	Pass	5190.9359	Pass	5190.4751	Pass	5189.2947	Pass
50	3.8	5189.7780	Pass	5190.4110	Pass	5190.8767	Pass	5189.9849	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5189.9775	Pass	5190.4674	Pass	5190.6184	Pass	5189.2176	Pass
25	3.8	5189.8133	Pass	5190.1765	Pass	5190.6611	Pass	5189.0435	Pass
25	4.2	5189.1274	Pass	5190.9780	Pass	5190.6933	Pass	5189.7554	Pass

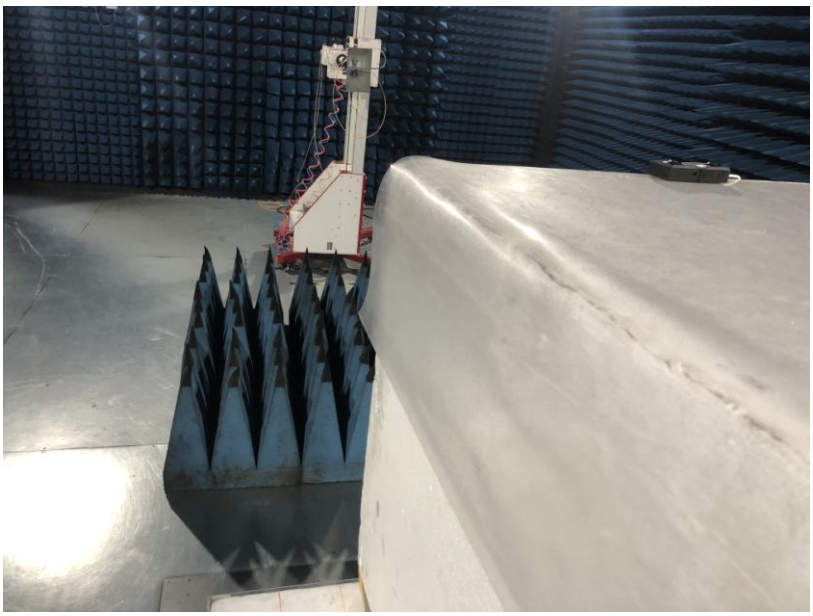
802.11ac(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5189.4005	Pass	5190.2801	Pass	5190.8031	Pass	5189.8111	Pass
-20	3.8	5189.4932	Pass	5190.7828	Pass	5190.8978	Pass	5189.2099	Pass
-10	3.8	5189.4870	Pass	5190.4514	Pass	5190.1672	Pass	5189.0299	Pass
0	3.8	5189.7504	Pass	5190.2056	Pass	5190.6900	Pass	5189.5019	Pass
10	3.8	5189.3584	Pass	5190.3258	Pass	5190.8115	Pass	5189.5017	Pass
20	3.8	5189.7570	Pass	5190.8808	Pass	5190.7042	Pass	5189.7836	Pass
30	3.8	5189.6996	Pass	5190.2463	Pass	5190.6442	Pass	5189.7227	Pass
40	3.8	5189.6633	Pass	5190.5999	Pass	5190.6356	Pass	5189.7018	Pass
50	3.8	5189.4026	Pass	5190.7683	Pass	5190.3715	Pass	5189.4603	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5189.2979	Pass	5190.1622	Pass	5190.8271	Pass	5189.0109	Pass
25	3.8	5189.8509	Pass	5190.2739	Pass	5190.3941	Pass	5189.7812	Pass
25	4.2	5189.0706	Pass	5190.8693	Pass	5190.9035	Pass	5189.8876	Pass

802.11ac(HT80)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.8	5209.9212	Pass	5210.4621	Pass	5210.0249	Pass	5209.0278	Pass
-20	3.8	5209.1406	Pass	5210.0777	Pass	5210.1253	Pass	5209.2184	Pass
-10	3.8	5209.1024	Pass	5210.8647	Pass	5210.3142	Pass	5209.1546	Pass
0	3.8	5209.2115	Pass	5210.6110	Pass	5210.5436	Pass	5209.3385	Pass
10	3.8	5209.3415	Pass	5210.4088	Pass	5210.9138	Pass	5209.0569	Pass
20	3.8	5209.8780	Pass	5210.8181	Pass	5210.1343	Pass	5209.4075	Pass
30	3.8	5209.8282	Pass	5210.6165	Pass	5210.1163	Pass	5209.5881	Pass
40	3.8	5209.5771	Pass	5210.4201	Pass	5210.9878	Pass	5209.9908	Pass
50	3.8	5209.4778	Pass	5210.3293	Pass	5210.5612	Pass	5209.2291	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	3.3	5209.3975	Pass	5210.7916	Pass	5210.4989	Pass	5209.0943	Pass
25	3.8	5209.2554	Pass	5210.6885	Pass	5210.9346	Pass	5209.5414	Pass
25	4.2	5209.4908	Pass	5210.2854	Pass	5210.4367	Pass	5209.0285	Pass

8 Test Setup Photo

Radiated Emission





Conducted Emission

9 EUT Constructional Details

Reference to the test report No.: GTS201902000047F01

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