FCC REPORT

Applicant:	Shenzhen Scope Corporation Limited
Address of Applicant:	12-13F, Block C2, Nanshan Zhiyuan, No 1001, Xueyuan Road, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Scope Corporation Limited
Address of Manufacturer:	12-13F, Block C2, Nanshan Zhiyuan, No 1001, Xueyuan Road, Nanshan District, Shenzhen, China
Factory:	Youke Digital Technology(Hui zhou)Co.,Ltd
Address of Factory:	Queens Village,Zhelong Town, Huiyang District,Huizhou City, China

Equipment Under Test (EUT)

Product Name:	tabletPC
Model No.:	F503V, SP1099, SP1068, SP1068A, SP1068B, SP1228, SP1228A, SP1028BYK1018, YK1019, YK1028, YK1029, YK1058, YK1059, SP1017V, SP1017Z, SP1089, SP1099X, sp1089x, F503X(X=A-Z, Xonly indicate the different client model and color)
Trade Mark:	SCOPE
FCC ID:	2AQNASCOPESP
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	July 16, 2018
Date of Test:	July 17-23, 2018
Date of report issue:	July 24, 2018
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	*July 24, 2018*	*Original*

Prepared By: Bill. Yuan ***Date:*** *July 24, 2018*

Project Engineer

Check By: Andy. wu ***Date:*** *July 24, 2018*

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:	tabletPC
Model No.:	F503V, SP1099, SP1068, SP1068A, SP1068B, SP1228, SP1228A, SP1028BYK1018, YK1019, YK1028, YK1029, YK1058, YK1059, SP1017V, SP1017Z, SP1089, SP1099X, sp1089x, F503X(X=A-Z, Xonly indicate the different client model and color)
Test Model No:	F503V
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are color and model name for commercial purpose.	
Serial No.:	ML5RROKK4G
Test sample(s) ID:	GTS201807000096-1
Sample(s) Status:	Engineer sample
Hardware version:	RK3368H_TABLET_F503V_LPDDR3P132SD4_V20
Software version:	F503V_NOMDM_1.0.0_ZS080_20180416.0932
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:	Internal Antenna
Antenna gain:	2.00dBi(declare by applicant)
Power supply:	Adapter 1: Model:SR-C60502000U1 Input: AC100-240V, 50/60Hz, 0.35A Max Output: DC 5V 2000mA Adapter 2: Model:JHD-AP013U-050200BB-A Input: AC100-240V, 50/60Hz, 0.35A Max Output: DC 5V 2000mA Battery: PL4060103P Model:SR-C60502000U1 DC 3.7V, 6500mAh

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, January 08, 2018.

● **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, August 15, 2016.

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.

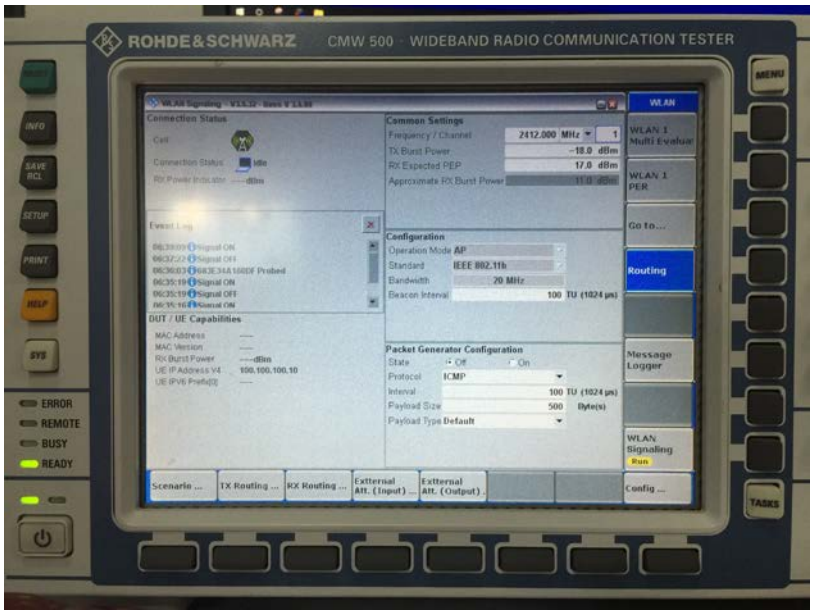
5.6 Deviation from Standards

None.

5.7 Additional Instructions

EUT Fixed Frequency Settings:

Power level setup			
Support Units	Description	Manufacturer	Model
	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500
Mode	Channel	Frequency (MHz)	Level Set
OFDM	CH36	5180	TX level : default
	CH38	5190	
	CH40	5200	
	CH42	5210	
	CH44	5220	
	CH46	5230	
	CH48	5240	



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

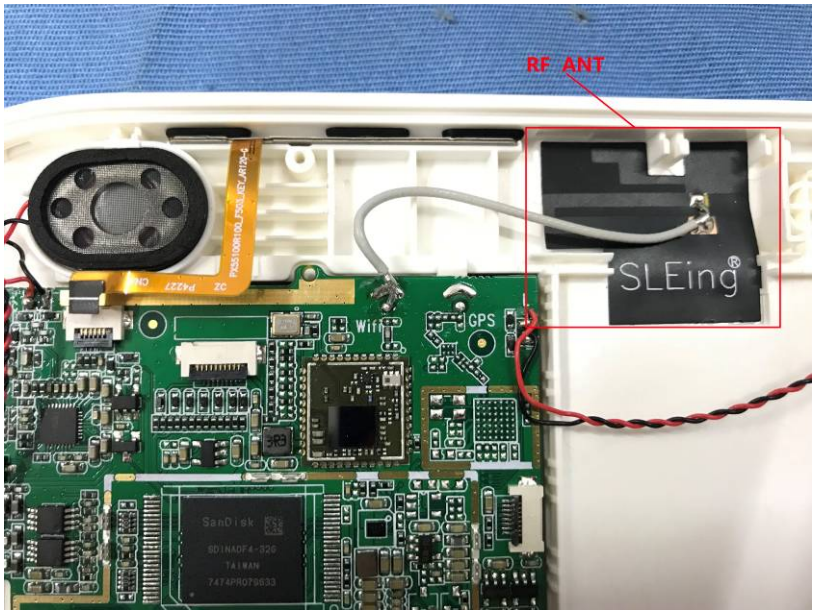
Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
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

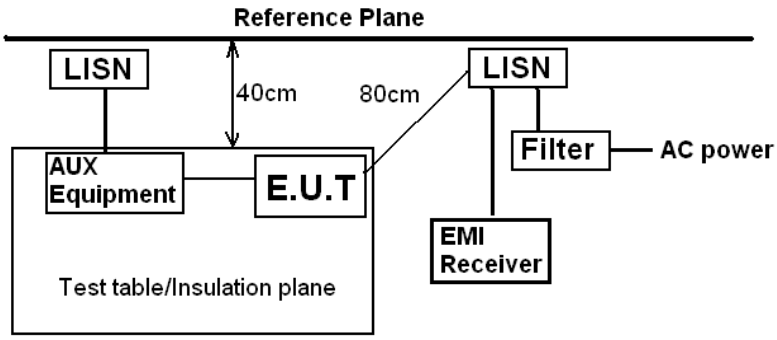
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

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 internal antenna, the best case gain of the main antenna is 2.00dBi  	

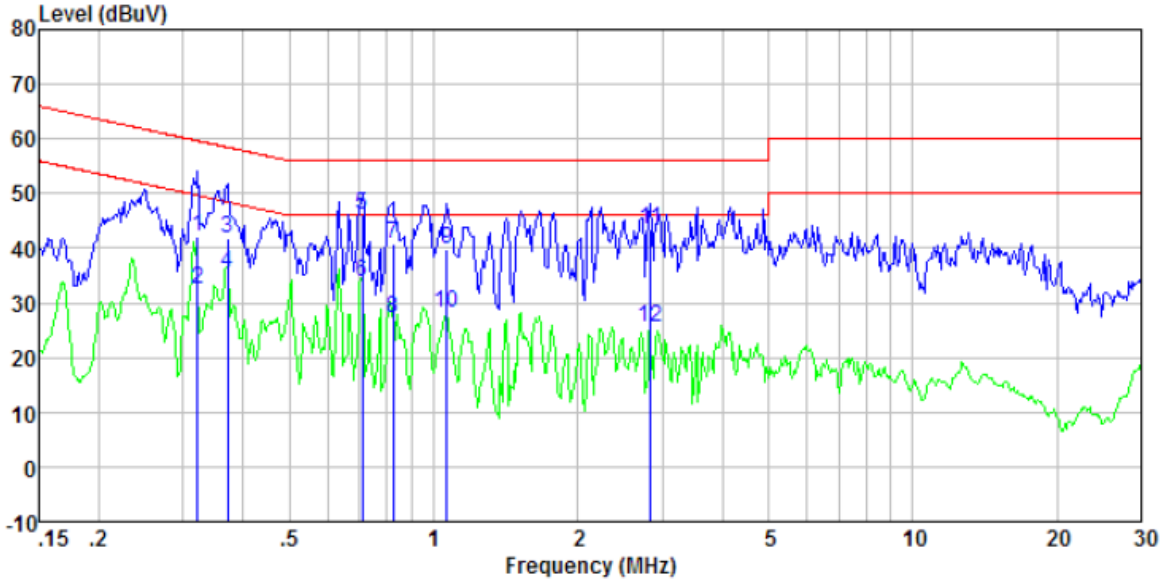
7.2 Conducted Emissions

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

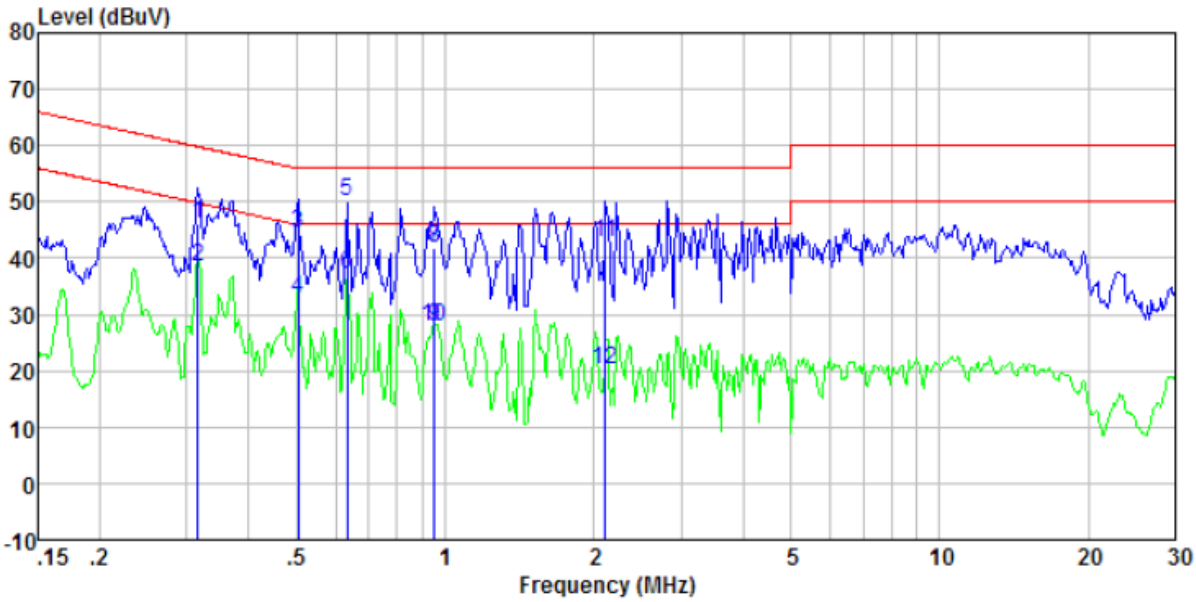
An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

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



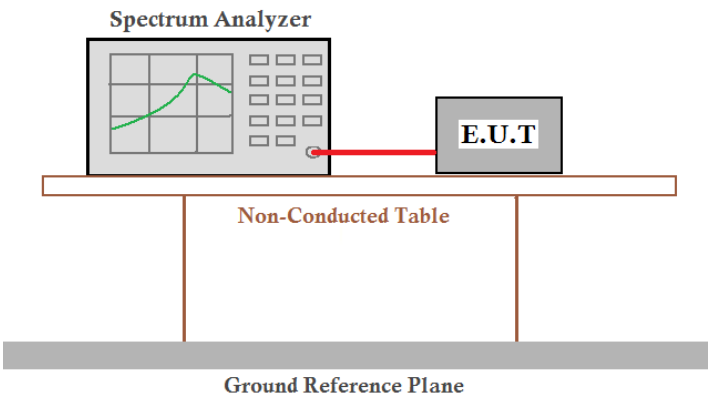
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.32	41.73	0.39	0.10	42.22	59.66	-17.44	QP
0.32	32.09	0.39	0.10	32.58	49.66	-17.08	Average
0.37	41.31	0.36	0.10	41.77	58.47	-16.70	QP
0.37	35.10	0.36	0.10	35.56	48.47	-12.91	Average
0.71	45.73	0.26	0.13	46.12	56.00	-9.88	QP
0.71	33.31	0.26	0.13	33.70	46.00	-12.30	Average
0.82	40.60	0.23	0.14	40.97	56.00	-15.03	QP
0.82	26.76	0.23	0.14	27.13	46.00	-18.87	Average
1.07	39.41	0.20	0.15	39.76	56.00	-16.24	QP
1.07	27.84	0.20	0.15	28.19	46.00	-17.81	Average
2.84	43.03	0.20	0.19	43.42	56.00	-12.58	QP
2.84	25.01	0.20	0.19	25.40	46.00	-20.60	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
0.32	45.60	0.39	0.10	46.09	59.80	-13.71	QP
0.32	37.85	0.39	0.10	38.34	49.80	-11.46	Average
0.50	44.16	0.31	0.11	44.58	56.00	-11.42	QP
0.50	32.49	0.31	0.11	32.91	46.00	-13.09	Average
0.63	49.74	0.28	0.12	50.14	56.00	-5.86	QP
0.63	36.82	0.28	0.12	37.22	46.00	-8.78	Average
0.95	41.51	0.21	0.15	41.87	56.00	-14.13	QP
0.95	41.57	0.21	0.15	41.93	56.00	-14.07	QP
0.95	27.51	0.21	0.15	27.87	46.00	-18.13	Average
0.95	27.56	0.21	0.15	27.92	46.00	-18.08	Average
2.11	42.45	0.20	0.18	42.83	56.00	-13.17	QP
2.11	19.83	0.20	0.18	20.21	46.00	-25.79	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

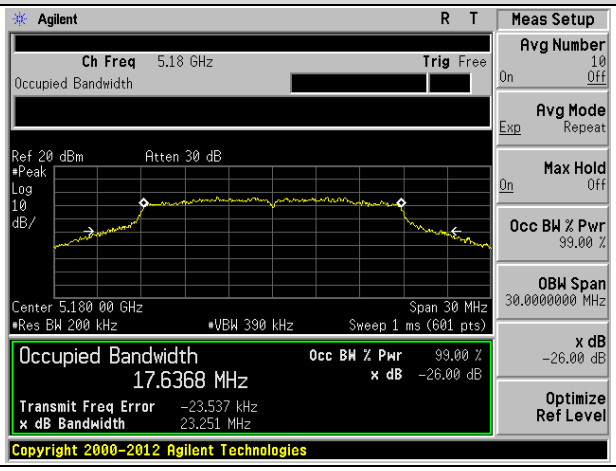
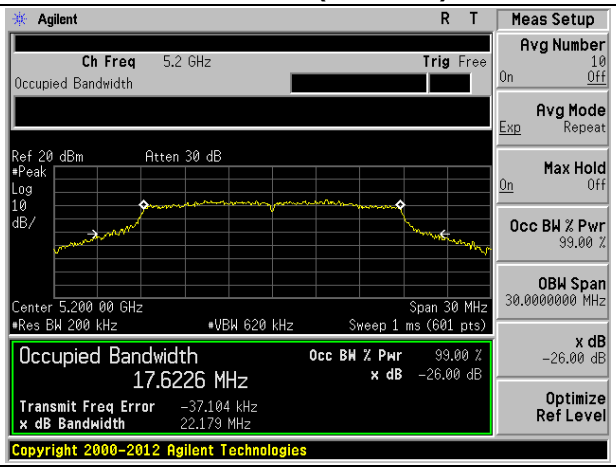
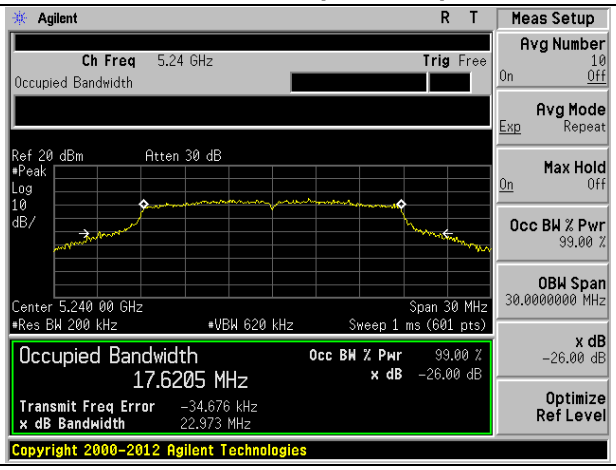
Measurement Data:

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	17.6368	17.6044	17.6009	23.251	21.546	22.202
40	5200.00	17.6226	17.6090	17.6132	22.179	22.527	23.225
48	5240.00	17.6205	17.6010	17.5939	22.973	21.818	22.222

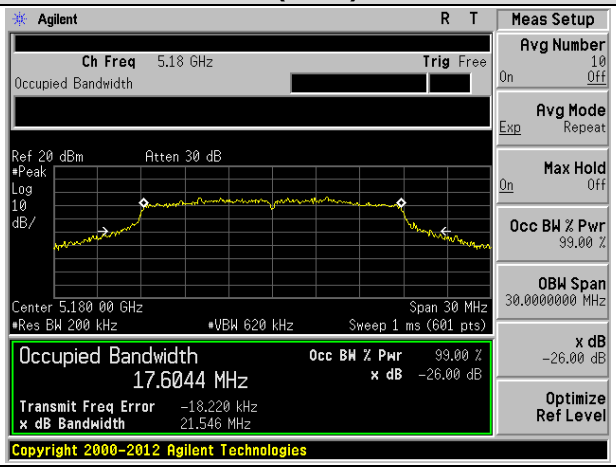
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	35.9972	35.9601	41.717	41.958
46	5230.00	36.0191	35.9617	43.038	41.499

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	74.8774	80.882

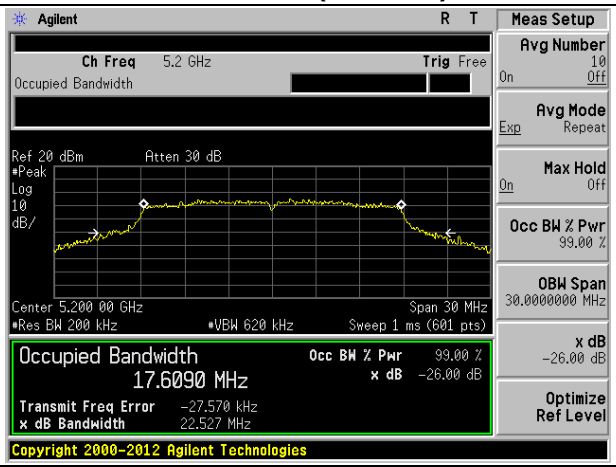
Test plots as followed:

802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

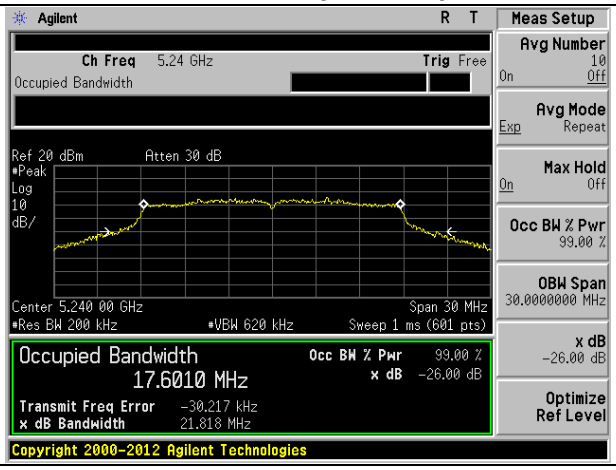
802.11n(HT20) mode



Channel 36 (5180MHz)

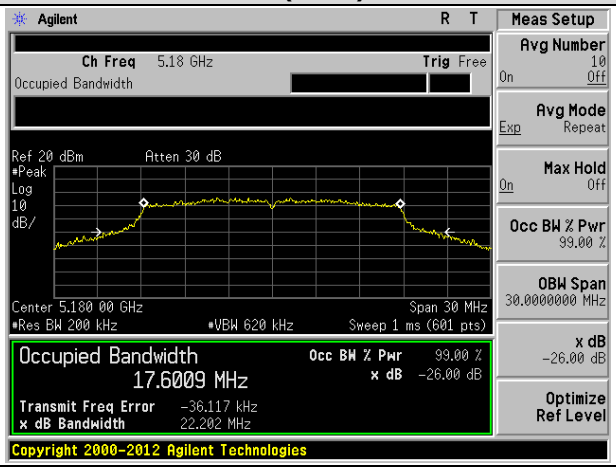


Channel 40 (5200MHz)

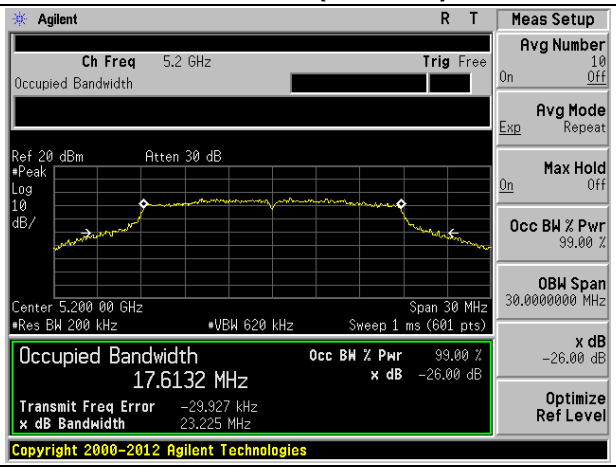


Channel 48 (5240MHz)

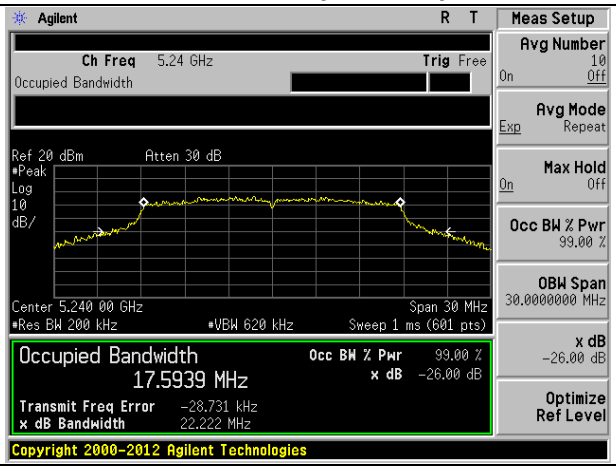
802.11ac(HT20) mode



Channel 36 (5180MHz)

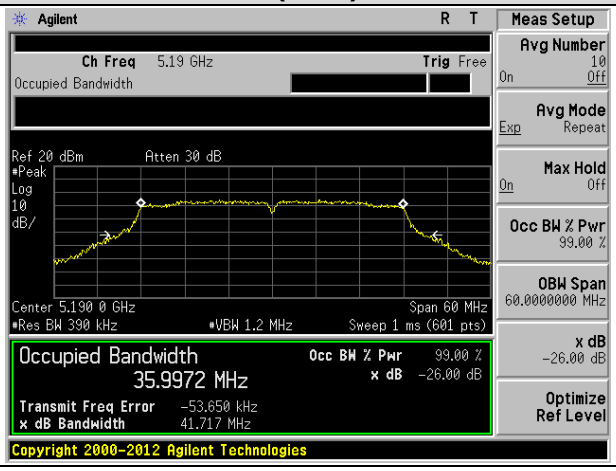


Channel 40 (5200MHz)

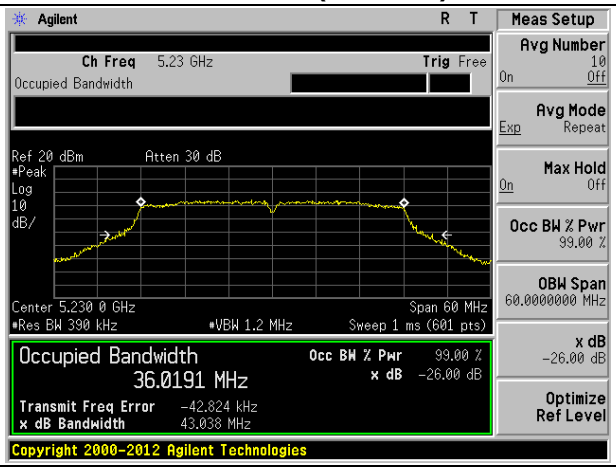


Channel 48 (5240MHz)

802.11n(HT40) mode

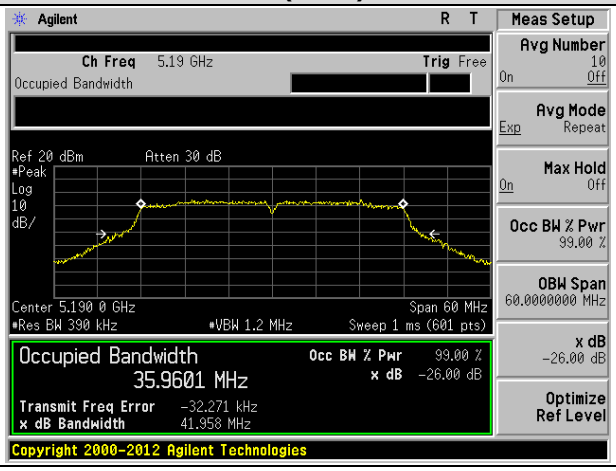


Channel 38 (5190MHz)

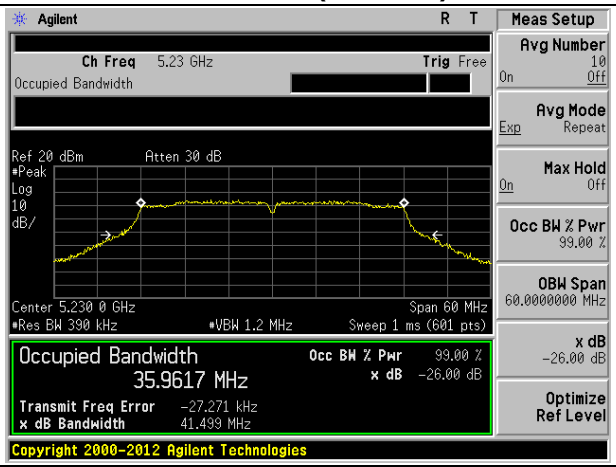


Channel 46 (5230MHz)

802.11ac(HT40) mode

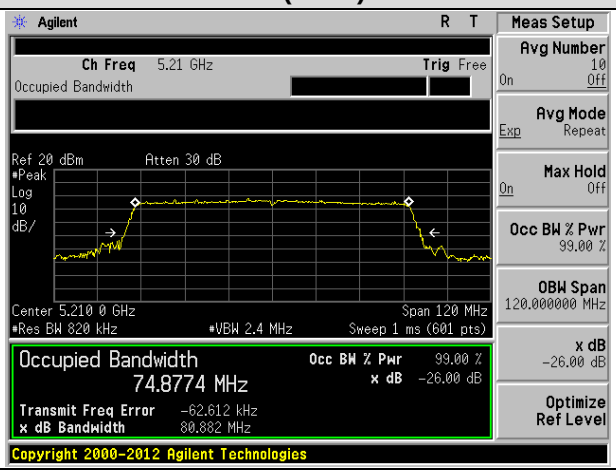


Channel 38 (5190MHz)



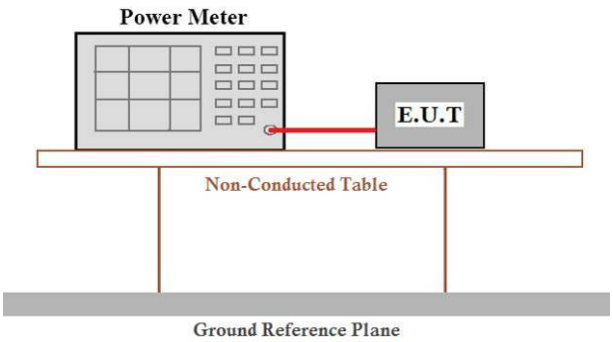
Channel 46 (5230MHz)

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	7.28	0.04	7.32	23.98	Pass
40	5200.00	7.21	0.04	7.25	23.98	Pass
48	5240.00	7.13	0.04	7.17	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	7.61	0.04	7.65	23.98	Pass
40	5200.00	7.25	0.04	7.29	23.98	Pass
48	5240.00	7.15	0.04	7.19	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	7.38	0.04	7.42	23.98	Pass
40	5200.00	7.60	0.04	7.64	23.98	Pass
48	5240.00	7.11	0.04	7.15	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	6.61	0.04	6.65	23.98	Pass
46	5230.00	6.47	0.04	6.51	23.98	Pass

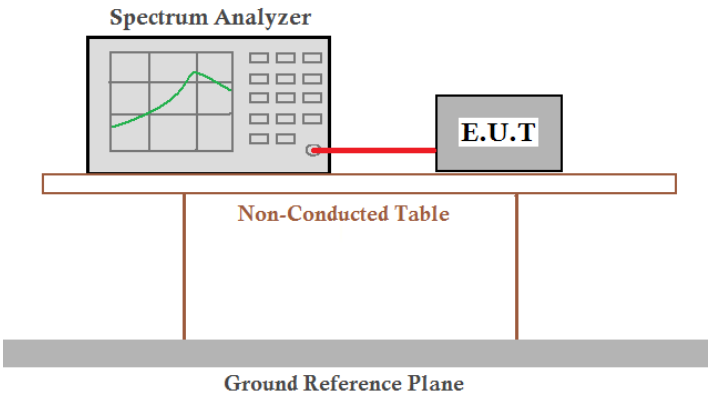
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	6.68	0.04	6.72	23.98	Pass
46	5230.00	6.41	0.04	6.45	23.98	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210.00	5.88	0.04	5.92	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	-1.13	0.04	-1.09	11	Pass
40	5200.00	-2.27	0.04	-2.23	11	Pass
48	5240.00	-1.82	0.04	-1.78	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	-0.65	0.04	-0.61	11	Pass
40	5200.00	-0.69	0.04	-0.65	11	Pass
48	5240.00	-1.14	0.04	-1.10	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	-1.04	0.04	-1.00	11	Pass
40	5200.00	-0.62	0.04	-0.58	11	Pass
48	5240.00	-1.11	0.04	-1.07	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	-4.93	0.04	-4.89	11	Pass
46	5230.00	-5.37	0.04	-5.33	11	Pass

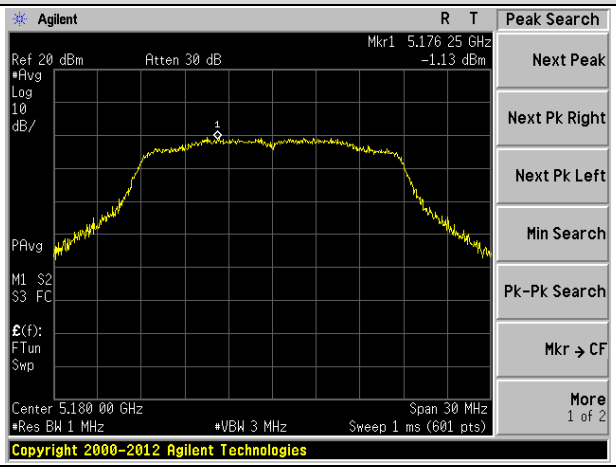
802.11ac(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-4.31	0.04	-4.27	11	Pass
46	5230.00	-5.34	0.04	-5.30	11	Pass

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	-15.02	0.04	-14.98	11	Pass

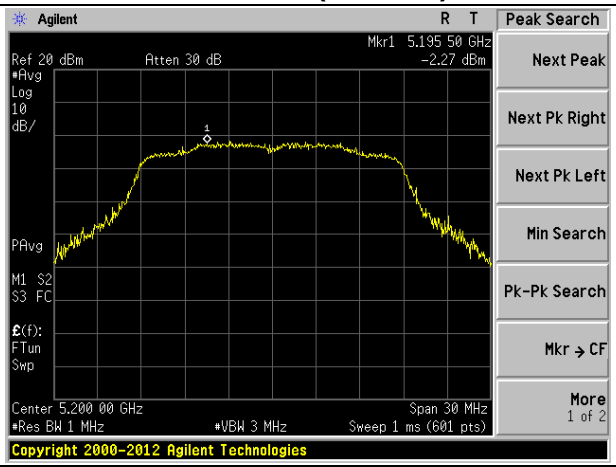
Note: Total PSD = Measured PSD + Duty Factor
Duty Factor = 10 log (1/Duty Cycle)

Test plots as followed:

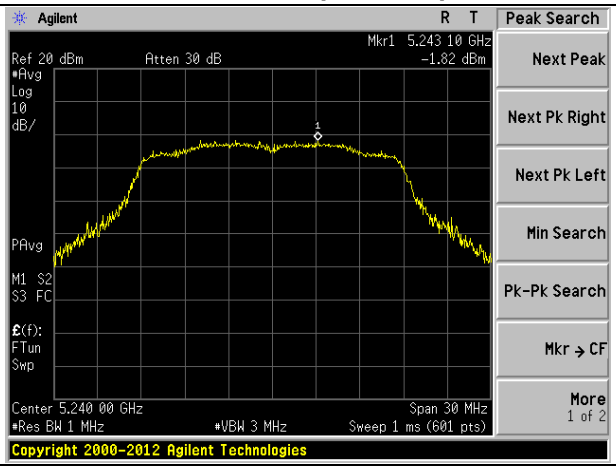
802.11a mode



Channel 36 (5180MHz)

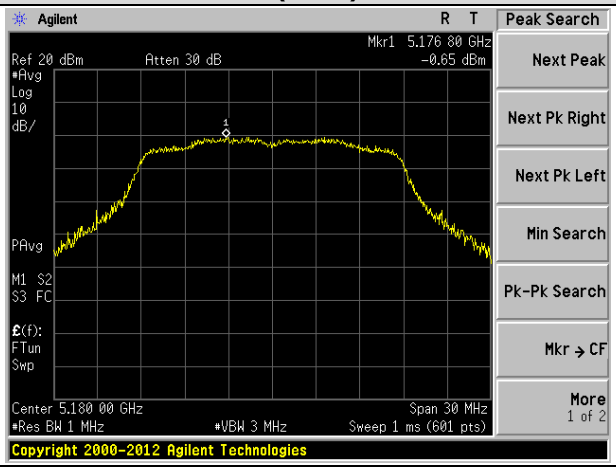


Channel 40 (5200MHz)

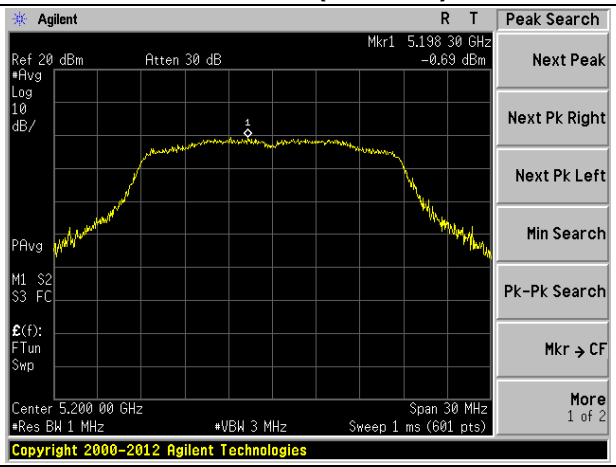


Channel 48 (5240MHz)

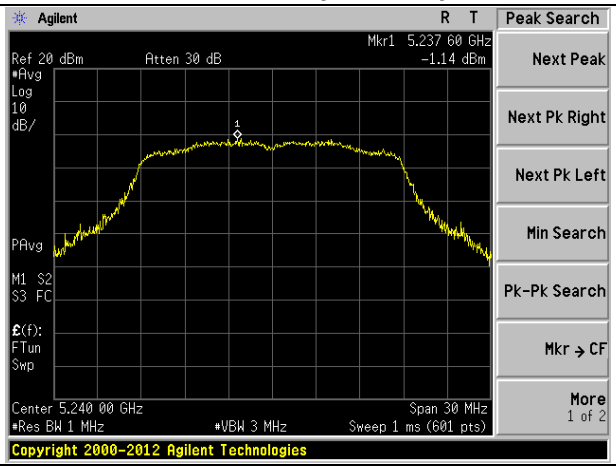
802.11n(HT20) mode



Channel 36 (5180MHz)

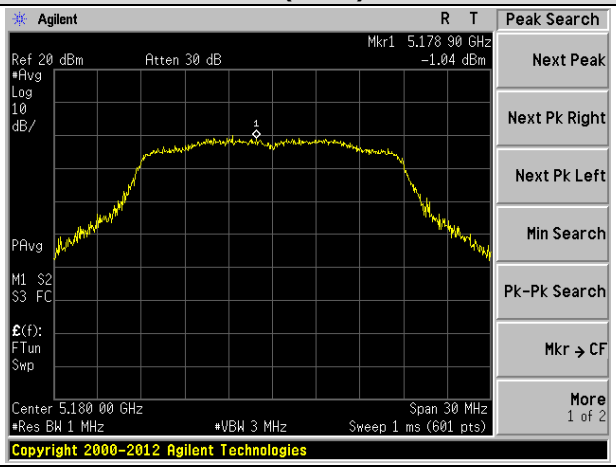


Channel 40 (5200MHz)

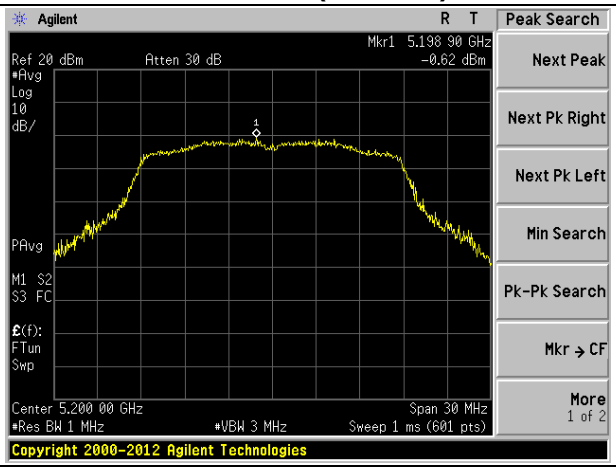


Channel 48 (5240MHz)

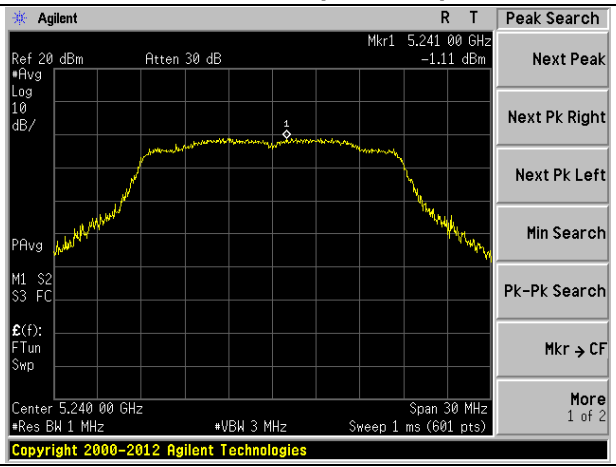
802.11ac(HT20) mode



Channel 36 (5180MHz)

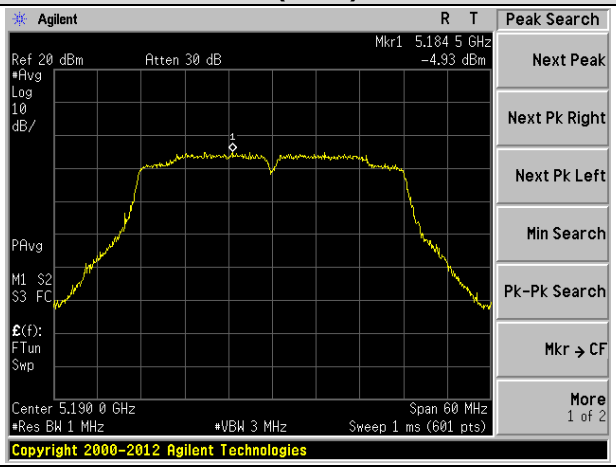


Channel 40 (5200MHz)

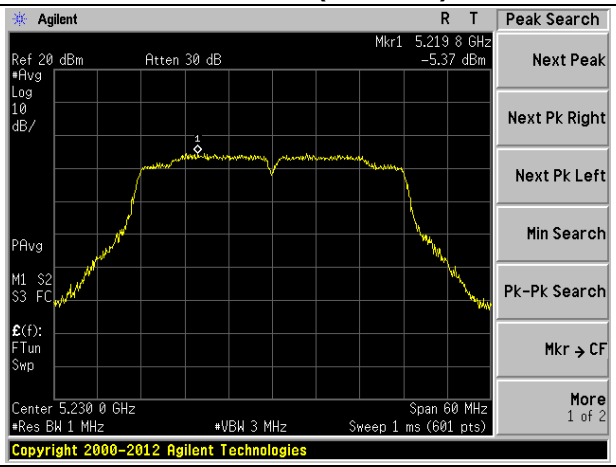


Channel 48 (5240MHz)

802.11n(HT40) mode

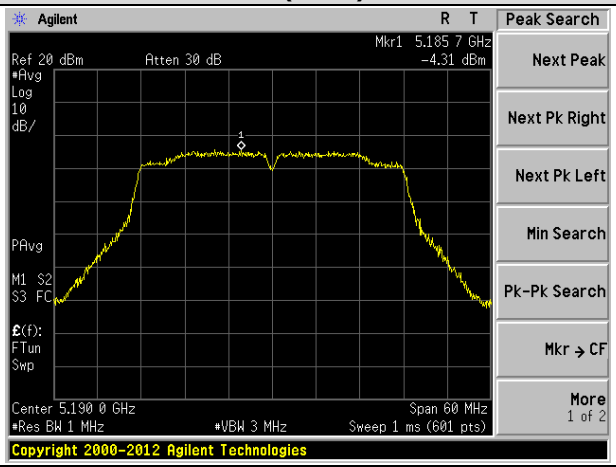


Channel 38 (5190MHz)

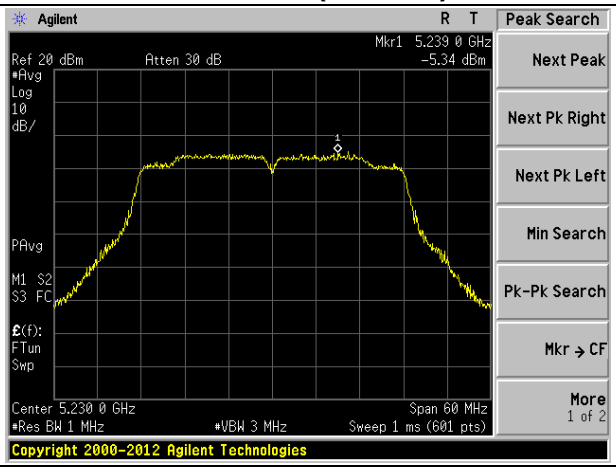


Channel 46 (5230MHz)

802.11ac(HT40) mode

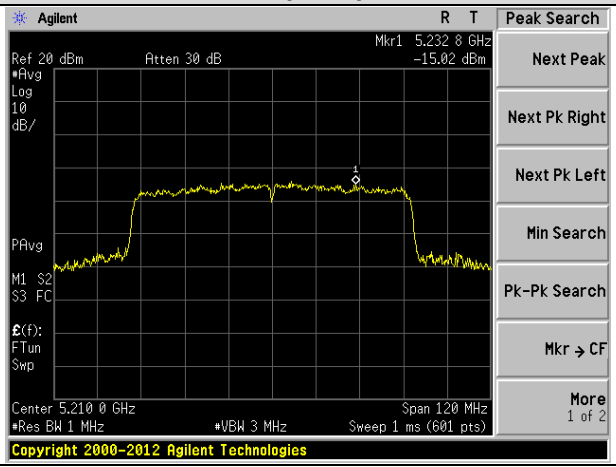


Channel 38 (5190MHz)



Channel 46 (5230MHz)

802.11ac(HT80) mode



Channel 42 (5210MHz)

7.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 and 5.205
Test Method:	ANSI C63.10:2013
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	68.2	Peak Value

Undesirable emission limits:

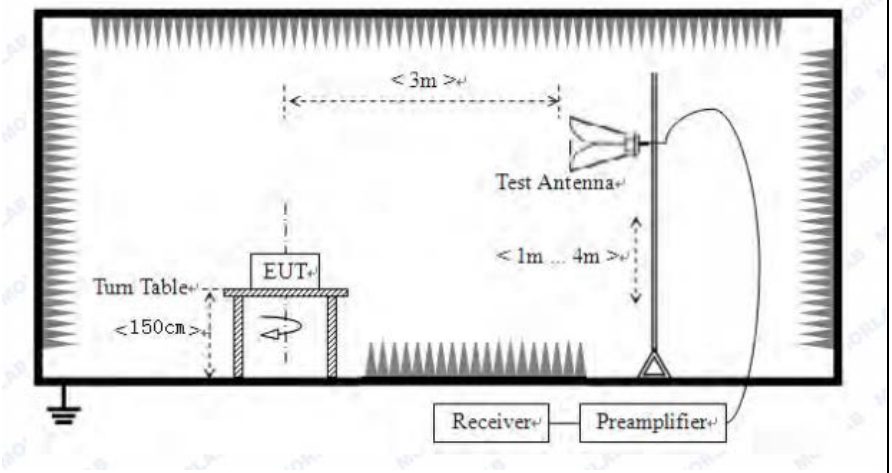
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(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.

Test Procedure:

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

	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	45.11	32.07	8.99	37.49	48.68	68.20	-19.52	Vertical
5150.00	37.57	32.07	8.99	37.49	41.14	54.00	-12.86	Vertical
5150.00	46.36	32.07	8.99	37.49	49.93	68.20	-18.27	Horizontal
5150.00	41.36	32.07	8.99	37.49	44.93	54.00	-9.07	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	44.86	31.75	9.29	37.20	48.70	68.20	-19.50	Vertical
5350.00	42.74	31.75	9.29	37.20	46.58	54.00	-7.42	Vertical
5350.00	44.46	31.75	9.29	37.20	48.30	68.20	-19.90	Horizontal
5350.00	42.89	31.75	9.29	37.20	46.73	54.00	-7.27	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	44.89	32.07	8.99	37.49	48.46	68.20	-19.74	Vertical
5150.00	39.90	32.07	8.99	37.49	43.47	54.00	-10.53	Vertical
5150.00	46.79	32.07	8.99	37.49	50.36	68.20	-17.84	Horizontal
5150.00	39.65	32.07	8.99	37.49	43.22	54.00	-10.78	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	47.33	31.75	9.29	37.20	51.17	68.20	-17.03	Vertical
5350.00	37.56	31.75	9.29	37.20	41.40	54.00	-12.60	Vertical
5350.00	46.34	31.75	9.29	37.20	50.18	68.20	-18.02	Horizontal
5350.00	38.04	31.75	9.29	37.20	41.88	54.00	-12.12	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	45.31	32.07	8.99	37.49	48.88	68.20	-19.32	Vertical
5150.00	38.35	32.07	8.99	37.49	41.92	54.00	-12.08	Vertical
5150.00	45.46	32.07	8.99	37.49	49.03	68.20	-19.17	Horizontal
5150.00	38.21	32.07	8.99	37.49	41.78	54.00	-12.22	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	44.18	31.75	9.29	37.20	48.02	68.20	-20.18	Vertical
5350.00	38.61	31.75	9.29	37.20	42.45	54.00	-11.55	Vertical
5350.00	46.51	31.75	9.29	37.20	50.35	68.20	-17.85	Horizontal
5350.00	42.87	31.75	9.29	37.20	46.71	54.00	-7.29	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	46.08	32.07	8.99	37.49	49.65	68.20	-18.55	Vertical
5150.00	37.77	32.07	8.99	37.49	41.34	54.00	-12.66	Vertical
5150.00	45.50	32.07	8.99	37.49	49.07	68.20	-19.13	Horizontal
5150.00	37.70	32.07	8.99	37.49	41.27	54.00	-12.73	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	44.99	31.75	9.29	37.20	48.83	68.20	-19.37	Vertical
5350.00	42.99	31.75	9.29	37.20	46.83	54.00	-7.17	Vertical
5350.00	47.63	31.75	9.29	37.20	51.47	68.20	-16.73	Horizontal
5350.00	39.95	31.75	9.29	37.20	43.79	54.00	-10.21	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	45.25	32.07	8.99	37.49	48.82	68.20	-19.38	Vertical
5150.00	39.91	32.07	8.99	37.49	43.48	54.00	-10.52	Vertical
5150.00	46.46	32.07	8.99	37.49	50.03	68.20	-18.17	Horizontal
5150.00	37.33	32.07	8.99	37.49	40.90	54.00	-13.10	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	47.45	31.75	9.29	37.20	51.29	68.20	-16.91	Vertical
5350.00	41.58	31.75	9.29	37.20	45.42	54.00	-8.58	Vertical
5350.00	45.07	31.75	9.29	37.20	48.91	68.20	-19.29	Horizontal
5350.00	39.23	31.75	9.29	37.20	43.07	54.00	-10.93	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	47.05	32.07	8.99	37.49	50.62	68.20	-17.58	Vertical
5150.00	41.19	32.07	8.99	37.49	44.76	54.00	-9.24	Vertical
5150.00	45.84	32.07	8.99	37.49	49.41	68.20	-18.79	Horizontal
5150.00	40.49	32.07	8.99	37.49	44.06	54.00	-9.94	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	47.74	31.75	9.29	37.20	51.58	68.20	-16.62	Vertical
5350.00	39.85	31.75	9.29	37.20	43.69	54.00	-10.31	Vertical
5350.00	44.00	31.75	9.29	37.20	47.84	68.20	-20.36	Horizontal
5350.00	41.90	31.75	9.29	37.20	45.74	54.00	-8.26	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	

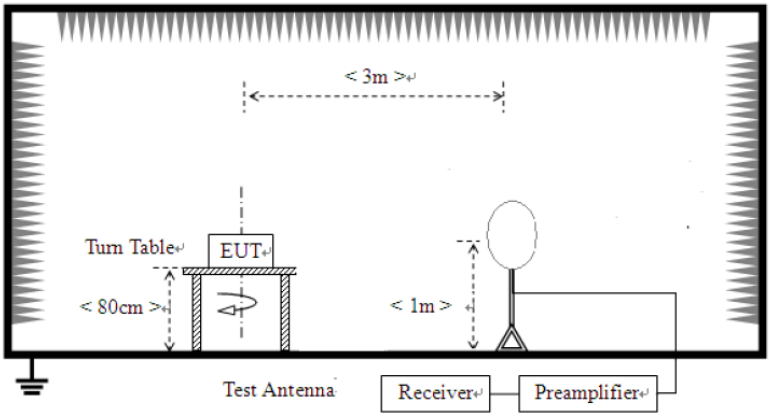
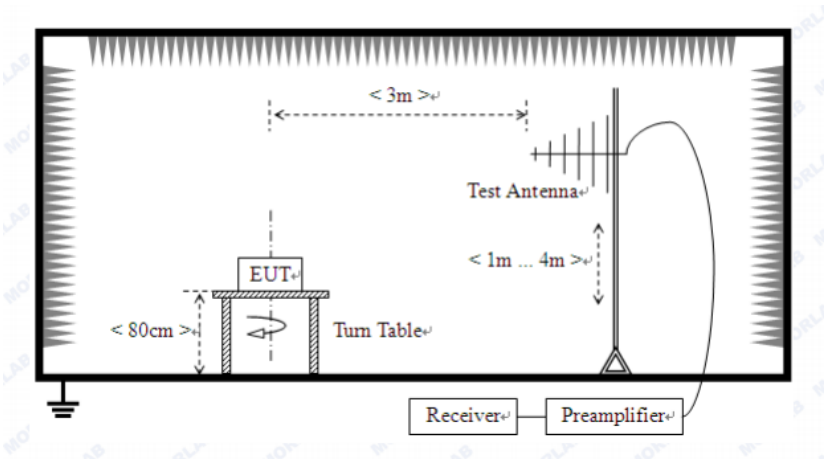
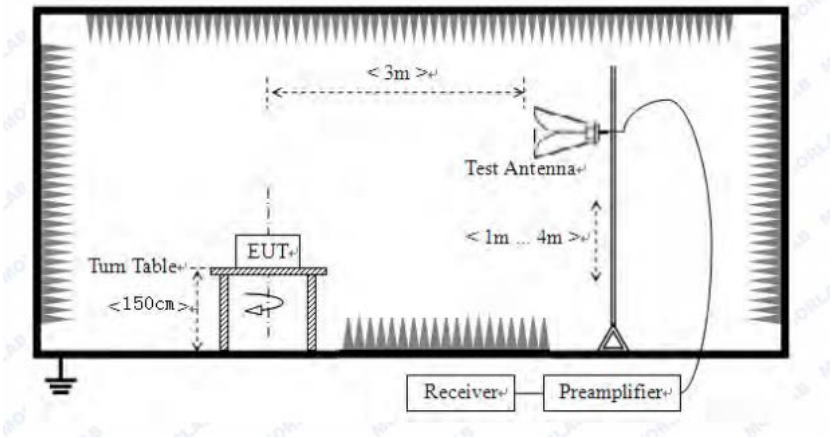
Test Procedure:

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

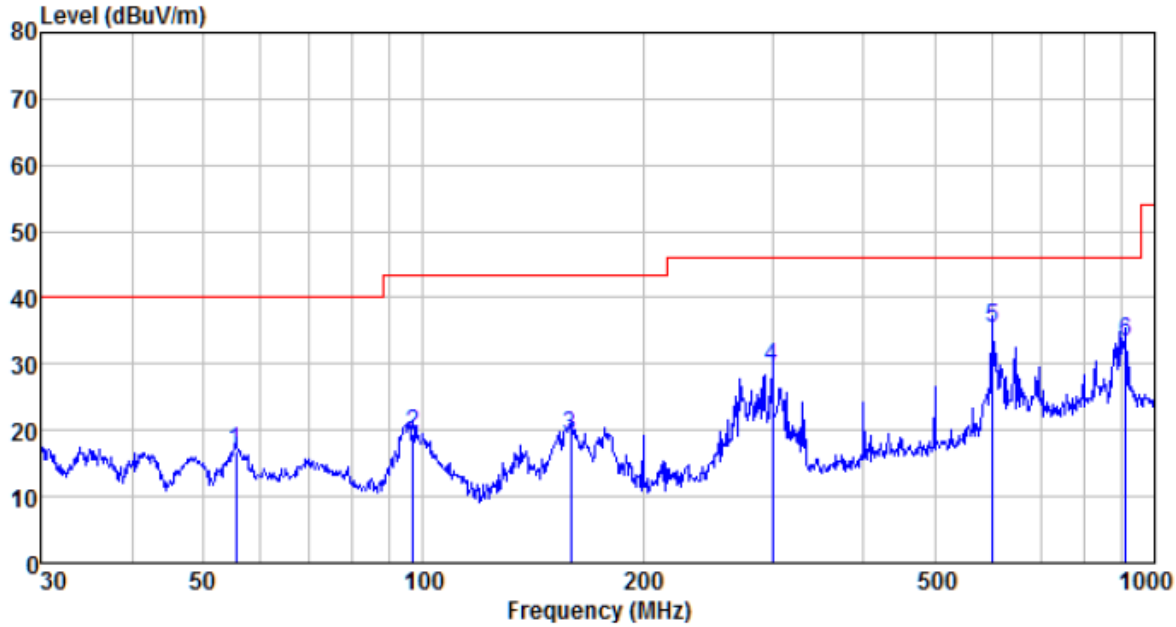
Measurement Data:

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.

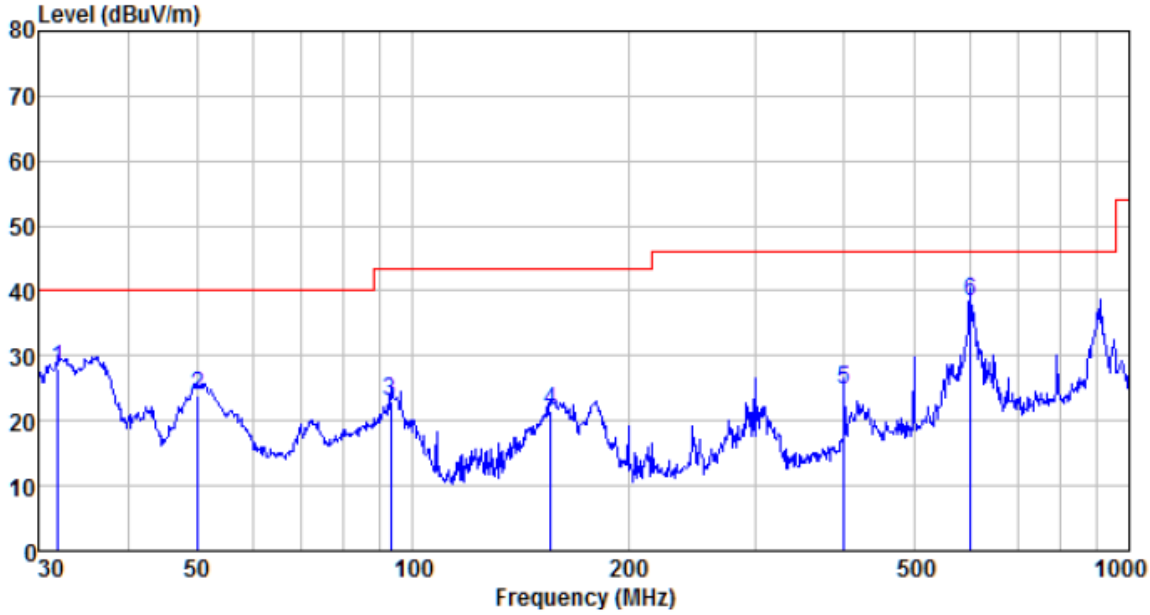
30MHz~ 1GHz

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
55.415	40.67	11.67	0.82	36.26	16.90	40.00	-23.10	QP
96.775	43.63	11.35	1.17	36.69	19.46	43.50	-24.04	QP
159.225	46.60	8.20	1.62	37.13	19.29	43.50	-24.21	QP
300.367	50.97	13.50	2.36	37.42	29.41	46.00	-16.59	QP
601.427	49.79	19.30	3.73	37.54	35.28	46.00	-10.72	QP
912.862	43.71	22.27	4.90	37.59	33.29	46.00	-12.71	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
31.955	51.34	11.25	0.57	35.15	28.01	40.00	-11.99	QP
50.057	47.07	12.20	0.77	36.18	23.86	40.00	-16.14	QP
93.113	47.50	10.98	1.14	36.66	22.96	43.50	-20.54	QP
155.910	49.12	7.85	1.60	37.11	21.46	43.50	-22.04	QP
400.432	43.82	15.50	2.85	37.52	24.65	46.00	-21.35	QP
601.427	52.95	19.30	3.73	37.54	38.44	46.00	-7.56	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	30.23	39.67	14.62	32.65	51.87	74.00	-22.13	Vertical
15540.00	28.17	38.60	17.66	34.46	52.03	74.00	-21.97	Vertical
10360.00	28.86	39.67	14.62	32.65	51.87	74.00	-22.13	Horizontal
15540.00	32.73	38.60	17.66	34.46	52.03	74.00	-21.97	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	30.86	39.75	14.63	32.71	51.90	74.00	-22.10	Vertical
15600.00	32.78	38.33	17.67	34.17	52.06	74.00	-21.94	Vertical
10400.00	28.02	39.75	14.63	32.71	51.90	74.00	-22.10	Horizontal
15600.00	28.65	38.33	17.67	34.17	52.06	74.00	-21.94	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	29.01	39.82	14.68	32.86	51.87	74.00	-22.13	Vertical
15720.00	31.64	38.09	17.73	33.66	52.39	74.00	-21.61	Vertical
10480.00	31.24	39.82	14.68	32.86	51.87	74.00	-22.13	Horizontal
15720.00	32.54	38.09	17.73	33.66	52.39	74.00	-21.61	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	28.08	39.67	14.62	32.65	51.87	74.00	-22.13	Vertical
15540.00	28.11	38.60	17.66	34.46	52.03	74.00	-21.97	Vertical
10360.00	31.45	39.67	14.62	32.65	51.87	74.00	-22.13	Horizontal
15540.00	32.35	38.60	17.66	34.46	52.03	74.00	-21.97	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	28.20	39.75	14.63	32.71	51.90	74.00	-22.10	Vertical
15600.00	32.52	38.33	17.67	34.17	52.06	74.00	-21.94	Vertical
10400.00	32.72	39.75	14.63	32.71	51.90	74.00	-22.10	Horizontal
15600.00	28.60	38.33	17.67	34.17	52.06	74.00	-21.94	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	30.85	39.82	14.68	32.86	51.87	74.00	-22.13	Vertical
15720.00	31.61	38.09	17.73	33.66	52.39	74.00	-21.61	Vertical
10480.00	32.61	39.82	14.68	32.86	51.87	74.00	-22.13	Horizontal
15720.00	29.56	38.09	17.73	33.66	52.39	74.00	-21.61	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	31.43	39.71	14.63	32.68	51.89	74.00	-22.11	Vertical
15540.00	29.56	38.46	17.67	34.32	52.04	74.00	-21.96	Vertical
10360.00	30.59	39.71	14.63	32.68	51.89	74.00	-22.11	Horizontal
15540.00	29.20	38.46	17.67	34.32	52.04	74.00	-21.96	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	29.68	39.75	14.63	32.71	51.90	74.00	-22.10	Vertical
15600.00	32.14	38.33	17.67	34.17	52.06	74.00	-21.94	Vertical
10400.00	28.01	39.75	14.63	32.71	51.90	74.00	-22.10	Horizontal
15600.00	28.56	38.33	17.67	34.17	52.06	74.00	-21.94	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	29.43	39.82	14.68	32.86	51.87	74.00	-22.13	Vertical
15720.00	30.11	38.09	17.73	33.66	52.39	74.00	-21.61	Vertical
10480.00	29.64	39.82	14.68	32.86	51.87	74.00	-22.13	Horizontal
15720.00	28.09	38.09	17.73	33.66	52.39	74.00	-21.61	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	31.28	39.71	14.63	32.68	51.89	74.00	-22.11	Vertical
15570.00	28.91	38.46	17.67	34.32	52.04	74.00	-21.96	Vertical
10380.00	29.90	39.71	14.63	32.68	51.89	74.00	-22.11	Horizontal
15570.00	28.75	38.46	17.67	34.32	52.04	74.00	-21.96	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	29.02	39.82	14.66	32.80	51.91	74.00	-22.09	Vertical
15690.00	32.99	38.09	17.71	33.81	52.22	74.00	-21.78	Vertical
10460.00	29.46	39.82	14.66	32.80	51.91	74.00	-22.09	Horizontal
15690.00	28.77	38.09	17.71	33.81	52.22	74.00	-21.78	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	29.07	39.71	14.63	32.68	51.89	74.00	-22.11	Vertical
15570.00	31.73	38.46	17.67	34.32	52.04	74.00	-21.96	Vertical
10380.00	32.80	39.71	14.63	32.68	51.89	74.00	-22.11	Horizontal
15570.00	32.48	38.46	17.67	34.32	52.04	74.00	-21.96	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	32.84	39.75	14.65	32.74	51.89	74.00	-22.11	Vertical
15690.00	30.85	38.33	17.69	34.03	52.22	74.00	-21.78	Vertical
10460.00	32.43	39.75	14.65	32.74	51.89	74.00	-22.11	Horizontal
15690.00	28.47	38.33	17.69	34.03	52.22	74.00	-21.78	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	29.90	39.82	14.66	32.80	51.91	74.00	-22.09	Vertical
15630.00	30.24	38.09	17.71	33.81	52.22	74.00	-21.78	Vertical
10420.00	28.46	39.82	14.66	32.80	51.91	74.00	-22.09	Horizontal
15630.00	32.32	38.09	17.71	33.81	52.22	74.00	-21.78	Horizontal

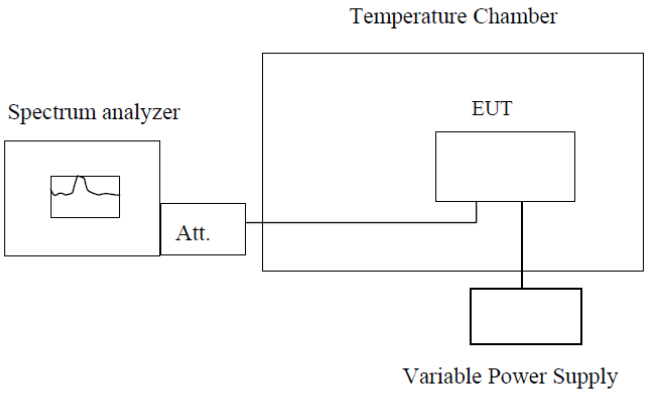
Note:

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	3.7	5178.0429	Pass	5181.6367	Pass	5182.7720	Pass	5178.7977	Pass
-20	3.7	5178.0578	Pass	5180.3342	Pass	5180.6705	Pass	5179.0909	Pass
-10	3.7	5178.7329	Pass	5180.5413	Pass	5181.3208	Pass	5178.1911	Pass
0	3.7	5178.7023	Pass	5180.5700	Pass	5181.4842	Pass	5179.3704	Pass
10	3.7	5178.2651	Pass	5181.1633	Pass	5180.1431	Pass	5178.6680	Pass
20	3.7	5179.7846	Pass	5180.6397	Pass	5180.2643	Pass	5179.7902	Pass
30	3.7	5179.5779	Pass	5180.7816	Pass	5180.3958	Pass	5179.4748	Pass
40	3.7	5179.6337	Pass	5180.9643	Pass	5180.0211	Pass	5179.7844	Pass
50	3.7	5179.1231	Pass	5180.7093	Pass	5180.2438	Pass	5179.4862	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	5179.0472	Pass	5180.4633	Pass	5180.9950	Pass	5179.6032	Pass
25	3.7	5179.4159	Pass	5180.9515	Pass	5180.4287	Pass	5179.6571	Pass
25	4.2	5179.5419	Pass	5180.1288	Pass	5180.9950	Pass	5179.6657	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	3.7	5179.2923	Pass	5180.8689	Pass	5181.6973	Pass	5179.3358	Pass
-20	3.7	5179.9872	Pass	5180.2576	Pass	5180.7393	Pass	5179.9582	Pass
-10	3.7	5179.7703	Pass	5180.2168	Pass	5180.5656	Pass	5179.8888	Pass
0	3.7	5179.4056	Pass	5180.4231	Pass	5180.2934	Pass	5179.0928	Pass
10	3.7	5179.4717	Pass	5180.7684	Pass	5180.1969	Pass	5179.6651	Pass
20	3.7	5179.3181	Pass	5180.4751	Pass	5180.4525	Pass	5179.4199	Pass
30	3.7	5179.1673	Pass	5180.4813	Pass	5180.4799	Pass	5179.3230	Pass
40	3.7	5179.8616	Pass	5180.0903	Pass	5180.4557	Pass	5179.3629	Pass
50	3.7	5179.7637	Pass	5180.0524	Pass	5180.2184	Pass	5179.7888	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	5179.2717	Pass	5180.9968	Pass	5180.0276	Pass	5179.8745	Pass
25	3.7	5179.3657	Pass	5180.2813	Pass	5180.0255	Pass	5179.2602	Pass
25	4.2	5179.7564	Pass	5180.1064	Pass	5180.2674	Pass	5179.2647	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	3.7	5179.1546	Pass	5182.0595	Pass	5181.0685	Pass	5179.1260	Pass
-20	3.7	5179.7771	Pass	5180.5142	Pass	5180.2721	Pass	5179.3916	Pass
-10	3.7	5179.4238	Pass	5180.6219	Pass	5180.6542	Pass	5179.4992	Pass
0	3.7	5179.8325	Pass	5180.3600	Pass	5180.6221	Pass	5179.4774	Pass
10	3.7	5179.8162	Pass	5180.7807	Pass	5180.5827	Pass	5179.4936	Pass
20	3.7	5179.2580	Pass	5180.4983	Pass	5180.5694	Pass	5179.4443	Pass
30	3.7	5179.8126	Pass	5180.4382	Pass	5180.2586	Pass	5179.8496	Pass
40	3.7	5179.8758	Pass	5180.1014	Pass	5180.7133	Pass	5179.1620	Pass
50	3.7	5179.2810	Pass	5180.9117	Pass	5180.8115	Pass	5179.3511	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	5179.7585	Pass	5180.0763	Pass	5180.6338	Pass	5179.3185	Pass
25	3.7	5179.1383	Pass	5180.0225	Pass	5180.5289	Pass	5179.0322	Pass
25	4.2	5179.2219	Pass	5180.1392	Pass	5180.6837	Pass	5179.1609	Pass

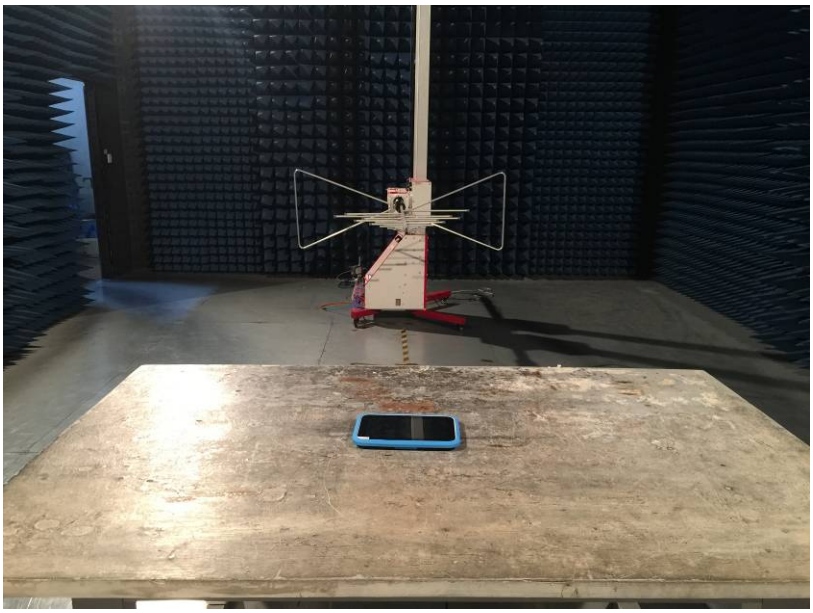
802.11n(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.7	5189.5759	Pass	5192.4825	Pass	5193.7910	Pass	5186.8298	Pass
-20	3.7	5189.3768	Pass	5190.7846	Pass	5190.9002	Pass	5189.1470	Pass
-10	3.7	5189.2649	Pass	5190.3078	Pass	5190.8189	Pass	5189.1865	Pass
0	3.7	5189.6553	Pass	5190.7898	Pass	5190.9821	Pass	5189.6499	Pass
10	3.7	5189.7940	Pass	5190.4089	Pass	5190.9037	Pass	5189.9332	Pass
20	3.7	5189.9227	Pass	5190.8983	Pass	5190.8149	Pass	5189.8285	Pass
30	3.7	5189.9444	Pass	5190.7677	Pass	5190.4348	Pass	5189.2188	Pass
40	3.7	5189.5521	Pass	5190.8407	Pass	5190.8138	Pass	5189.5631	Pass
50	3.7	5189.2854	Pass	5190.5303	Pass	5190.0075	Pass	5189.8550	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	5189.2327	Pass	5190.3853	Pass	5190.7116	Pass	5189.6681	Pass
25	3.7	5189.8891	Pass	5190.4590	Pass	5190.6290	Pass	5189.6927	Pass
25	4.2	5189.2851	Pass	5190.3335	Pass	5190.5976	Pass	5189.4818	Pass

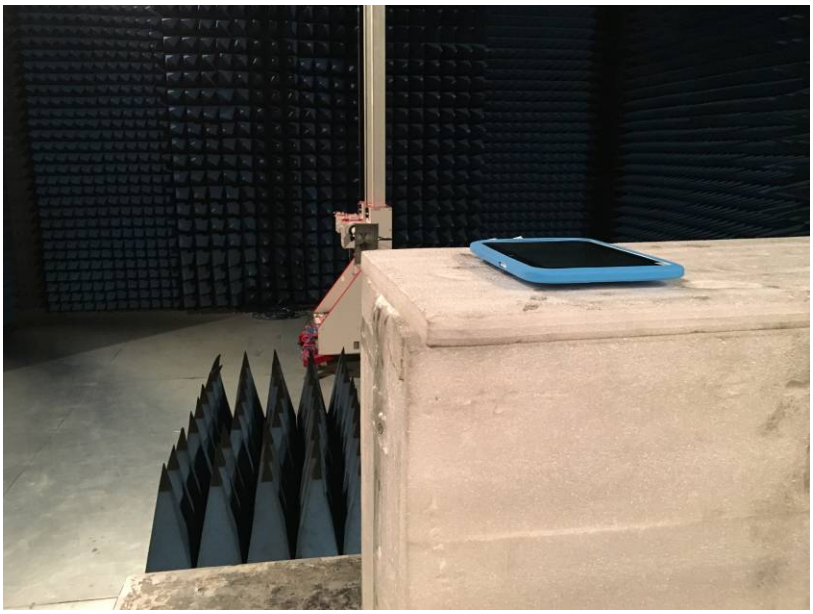
802.11ac(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	3.7	5188.6227	Pass	5191.8009	Pass	5194.9246	Pass	5187.9167	Pass
-20	3.7	5189.8999	Pass	5190.8565	Pass	5190.5449	Pass	5189.0766	Pass
-10	3.7	5189.4922	Pass	5190.8272	Pass	5190.8733	Pass	5189.5281	Pass
0	3.7	5189.3582	Pass	5190.9773	Pass	5190.8257	Pass	5189.2744	Pass
10	3.7	5189.7510	Pass	5190.6748	Pass	5190.2639	Pass	5189.3025	Pass
20	3.7	5189.9567	Pass	5190.2793	Pass	5190.4945	Pass	5189.1745	Pass
30	3.7	5189.3683	Pass	5190.2823	Pass	5190.0718	Pass	5189.4742	Pass
40	3.7	5189.3136	Pass	5190.7547	Pass	5190.7136	Pass	5189.8031	Pass
50	3.7	5189.1560	Pass	5190.7230	Pass	5190.9444	Pass	5189.0011	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	5189.4805	Pass	5190.2069	Pass	5190.8272	Pass	5189.4619	Pass
25	3.7	5189.0311	Pass	5190.0451	Pass	5190.4456	Pass	5189.7322	Pass
25	4.2	5189.8249	Pass	5190.0692	Pass	5190.7981	Pass	5189.3134	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	3.7	5209.8688	Pass	5210.5407	Pass	5210.4852	Pass	5209.2542	Pass
-20	3.7	5209.1335	Pass	5210.5294	Pass	5210.8249	Pass	5209.9430	Pass
-10	3.7	5209.8416	Pass	5210.5568	Pass	5210.6877	Pass	5209.5835	Pass
0	3.7	5209.5809	Pass	5210.8933	Pass	5210.4090	Pass	5209.4572	Pass
10	3.7	5209.5177	Pass	5210.7655	Pass	5210.9285	Pass	5209.7995	Pass
20	3.7	5209.5442	Pass	5210.1589	Pass	5210.1271	Pass	5209.7343	Pass
30	3.7	5209.9416	Pass	5210.3242	Pass	5210.7880	Pass	5209.4951	Pass
40	3.7	5209.6366	Pass	5210.9185	Pass	5210.1329	Pass	5209.6983	Pass
50	3.7	5209.4555	Pass	5210.5703	Pass	5210.7357	Pass	5209.0451	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	5209.0482	Pass	5210.6984	Pass	5210.4914	Pass	5209.8213	Pass
25	3.7	5209.7737	Pass	5210.5018	Pass	5210.7660	Pass	5209.0684	Pass
25	4.2	5209.3763	Pass	5210.4211	Pass	5210.1069	Pass	5209.1709	Pass

8 Test Setup Photo

Radiated Emission





Conducted Emission

9 EUT Constructional Details

Reference to the test report No. GTS201807000096F01

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