TEST REPORT

Applicant:	Lenovo (Beijing) Limited
Address of Applicant:	201-H2-6, Floor2, Building 2, No. 6 Shangdi West Road, Haidian District, Beijing, China
Manufacturer:	Lenovo (Beijing) Limited
Address of Manufacturer:	201-H2-6, Floor2, Building 2, No. 6 Shangdi West Road, Haidian District, Beijing, China
Factory:	Shenzhen Giec Digital Co., Ltd
Address of Factory:	1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	Wireless LAN / Bluetooth devices
Model No.:	ECB-PR70
FCC ID:	A5M-ECBPR70
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	July 06, 2020
Date of Test:	July 07, 2020-August 06, 2020
Date of report issue:	August 06, 2020
Test Result :	PASS *

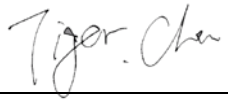
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*August 06, 2020*	*Original*

Prepared By:  ***Date:*** *August 06, 2020*

Project Engineer

Check By:  ***Date:*** *August 06, 2020*

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	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Wireless LAN / Bluetooth devices
Model No.:	ECB-PR70
Serial No.:	JK00001
Hardware Version:	V1.4
Software Version:	chestnut-userdebug 9 PQ2A.20190516.V002 171153 test-keys
Test sample(s) ID:	GTS202007000052-1
Sample(s) Status:	Engineer sample
Operation Frequency:	See table below
Modulation technology:	OFDM
Antenna Type:	FPC Antenna
Antenna gain:	1.3dBi(declare by applicant)
Power supply:	DC 5V, 3A

Band	Mode	Frequency Range (MHz)	Number of channels
U-NII Band I	IEEE 802.11a	5180-5240	4
	IEEE 802.11n 20MHz	5180-5240	4
	IEEE 802.11n 40MHz	5190-5230	2
	IEEE 802.11ac 80MHz	5210	1

Channel list for 802.11a/n(HT20)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

Channel list for 802.11n(HT40)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz				

Channel list for 802.11ac(HT80)

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210MHz						

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation..

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.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate	Mode	Data rate
802.11a/n(HT20)	6/6.5 Mbps	802.11ac(HT80)	29.3 Mbps
802.11n/ac(HT40)	13.5 Mbps		

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.

● **IC —Registration No.: 9079A**

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

● **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

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, 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

Manufacturer	Description	Model	Serial Number
N/A	POWER SUPPLY	S018BAU050030C	N/A

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Additional Instructions

Test Software	RF TEST TOOL
Power level setup	Default

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. 02 2020	July. 01 2025
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. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

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.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
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. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
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. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

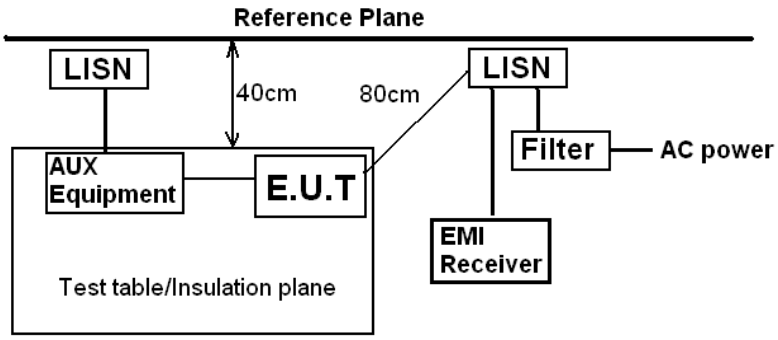
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

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 FPC antenna, the best case gain of the antenna is 1.3dBi, reference to the appendix II for details	

7.2 Conducted Emissions

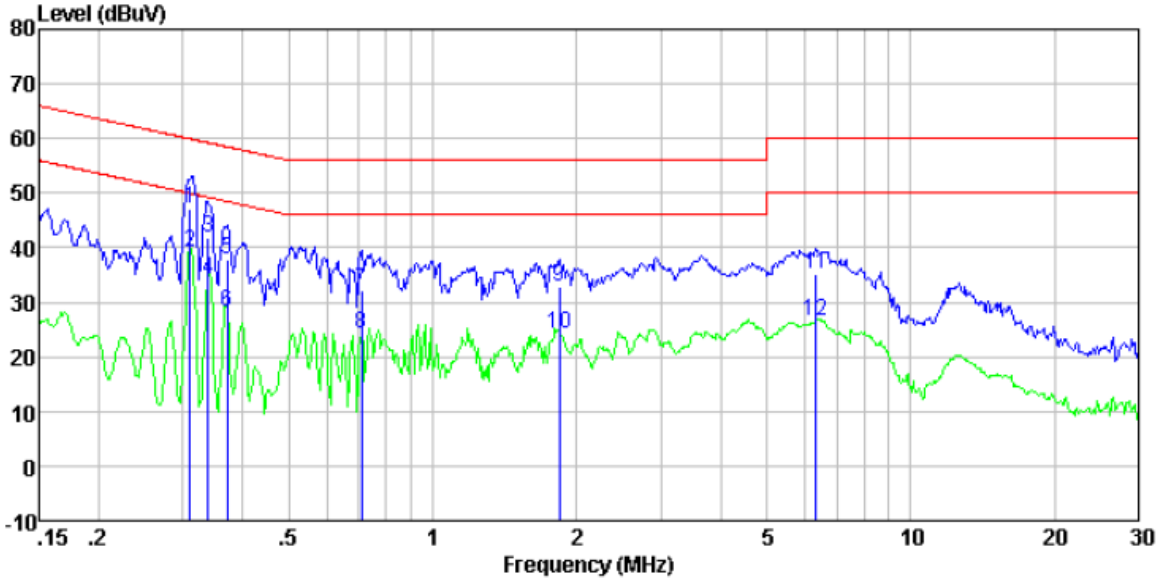
<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="6">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9KHz, VBW=30KHz</td></tr>
<tr><td>Limit:</td><td colspan="6"><table><tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr><tr><td>Quasi-peak</td><td>Average</td></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test procedure</td><td colspan="6">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.</td></tr>
<tr><td>Test setup:</td><td colspan="6"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

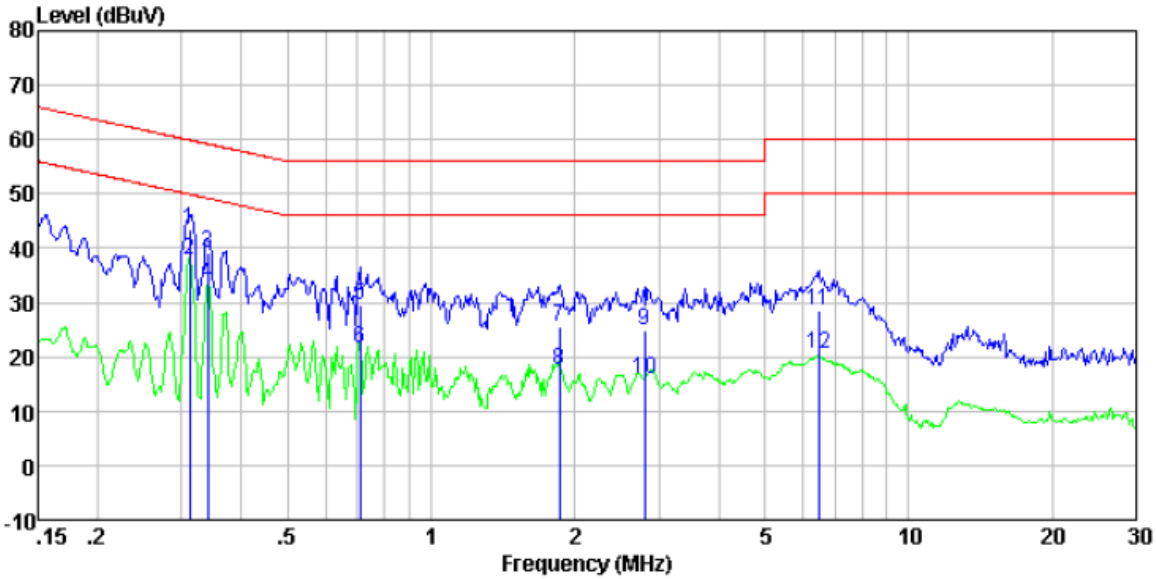
Measurement data:

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.31	26.76	20.39	0.10	47.25	59.97	-12.72	QP
0.31	18.53	20.39	0.10	39.02	49.97	-10.95	Average
0.34	21.48	20.38	0.10	41.96	59.22	-17.26	QP
0.34	13.85	20.38	0.10	34.33	49.22	-14.89	Average
0.37	17.43	20.36	0.10	37.89	58.47	-20.58	QP
0.37	7.86	20.36	0.10	28.32	48.47	-20.15	Average
0.71	11.66	20.26	0.13	32.05	56.00	-23.95	QP
0.71	3.69	20.26	0.13	24.08	46.00	-21.92	Average
1.84	12.34	20.20	0.17	32.71	56.00	-23.29	QP
1.84	3.98	20.20	0.17	24.35	46.00	-21.65	Average
6.35	14.69	20.20	0.18	35.07	60.00	-24.93	QP
6.35	6.15	20.20	0.18	26.53	50.00	-23.47	Average

Neutral:

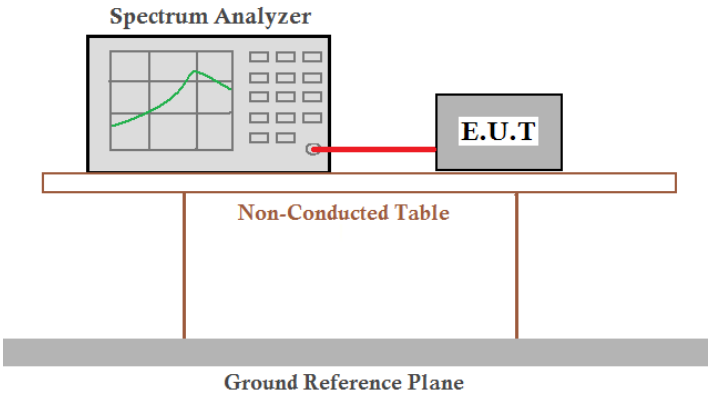


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.31	23.14	20.39	0.10	43.63	59.93	-16.30	QP
0.31	17.21	20.39	0.10	37.70	49.93	-12.23	Average
0.34	18.55	20.38	0.10	39.03	59.18	-20.15	QP
0.34	12.97	20.38	0.10	33.45	49.18	-15.73	Average
0.71	9.14	20.26	0.13	29.53	56.00	-26.47	QP
0.71	1.13	20.26	0.13	21.52	46.00	-24.48	Average
1.86	5.11	20.20	0.17	25.48	56.00	-30.52	QP
1.86	-2.73	20.20	0.17	17.64	46.00	-28.36	Average
2.79	4.32	20.20	0.19	24.71	56.00	-31.29	QP
2.79	-4.44	20.20	0.19	15.95	46.00	-30.05	Average
6.49	8.09	20.20	0.18	28.47	60.00	-31.53	QP
6.49	0.19	20.20	0.18	20.57	50.00	-29.43	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*

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 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

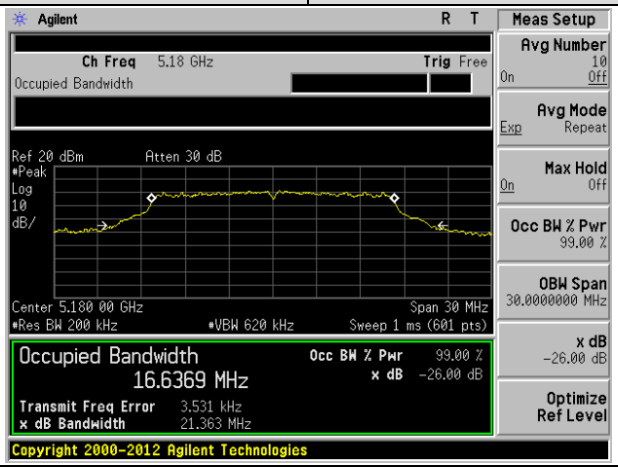
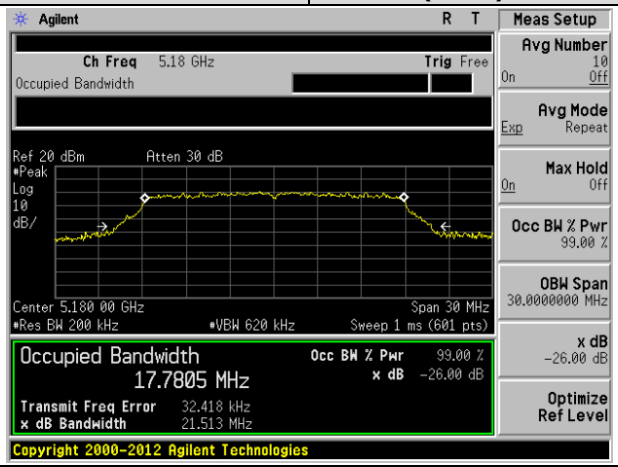
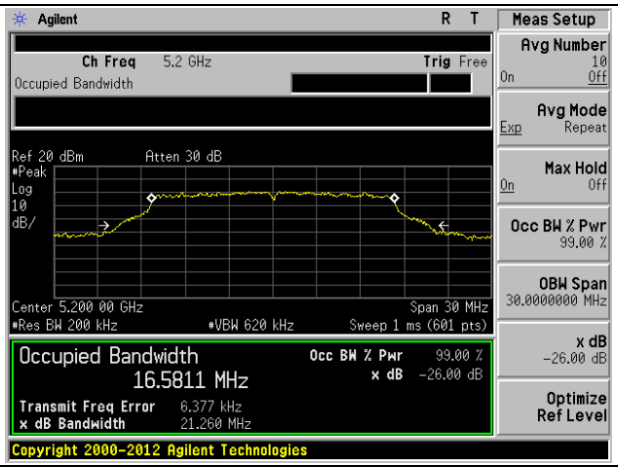
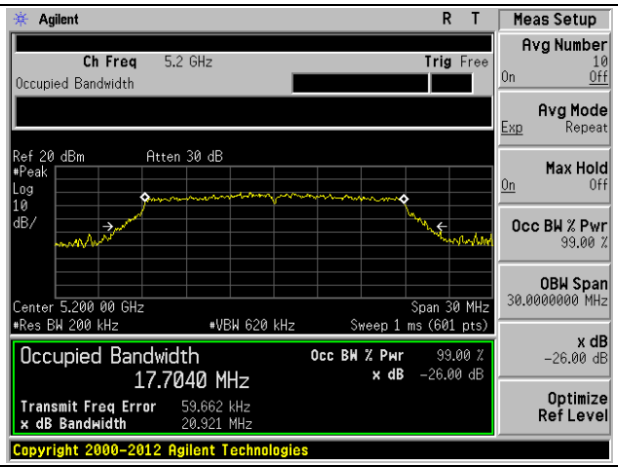
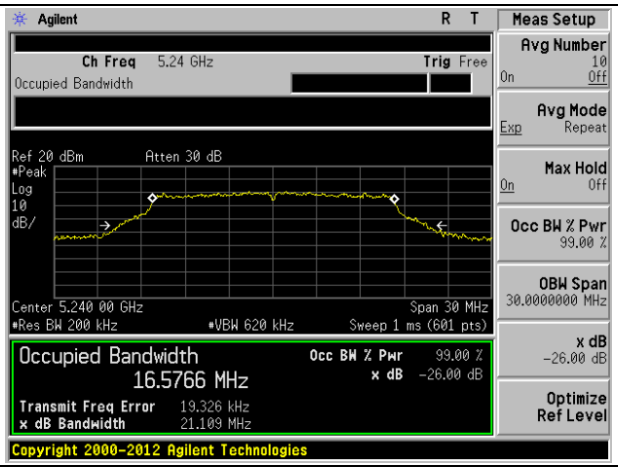
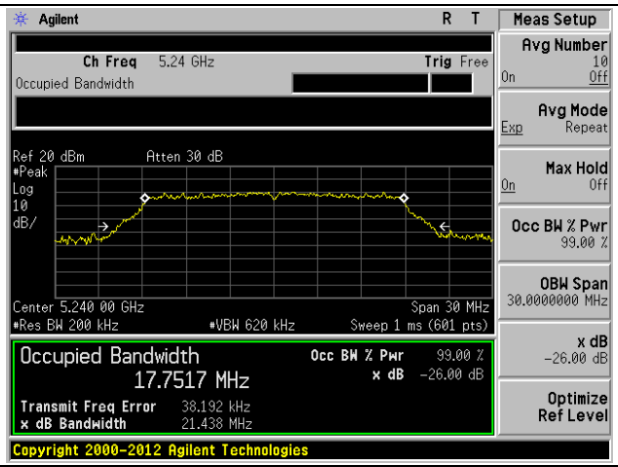
Measurement Data:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(HT20)	802.11a	802.11n(HT 20)	802.11ac(HT20)
36	5180.00	16.6359	17.7805	17.7790	21.363	21.513	21.479
40	5200.00	16.5811	17.7040	17.6812	21.260	20.921	21.241
48	5240.00	16.5766	17.7517	17.7733	21.109	21.438	21.546

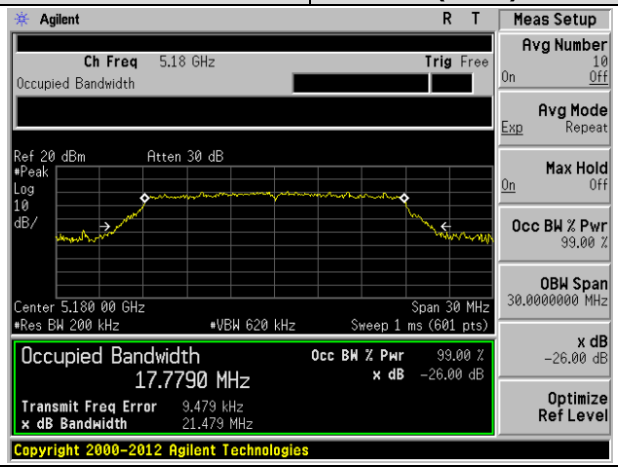
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	36.2003	36.2217	39.876	39.845
46	5230.00	36.1518	36.1676	40.009	40.125

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	75.4240	80.484

Test plots as followed:

Test mode:	802.11a mode	Test mode:	802.11n(HT20) mode
			
5180		5180	
			
5200		5200	
			
5240		5240	

Test mode:	802.11ac(HT20) mode



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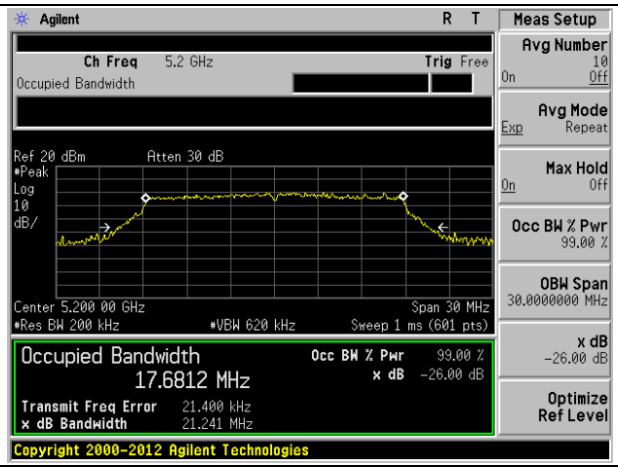

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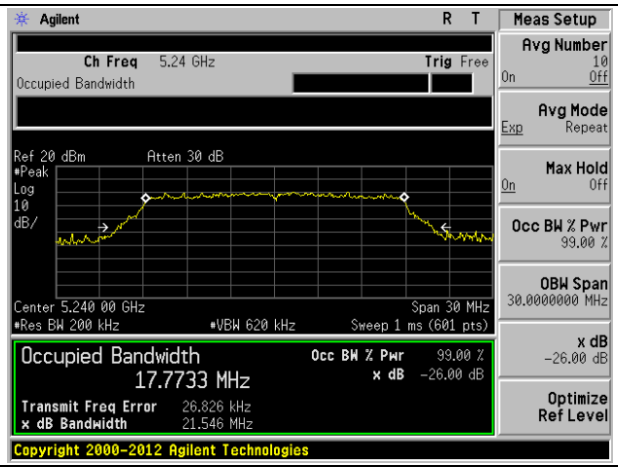
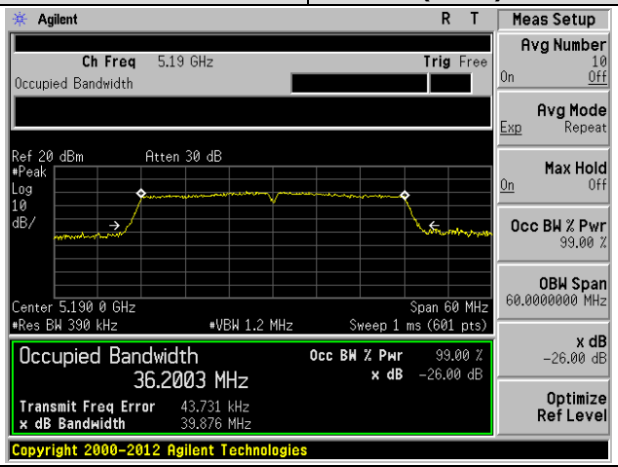
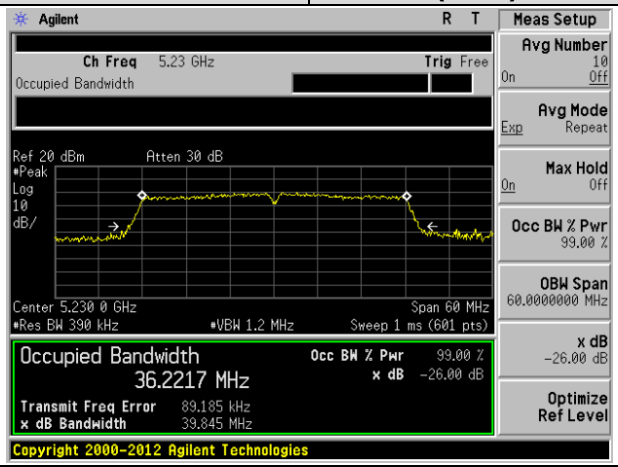
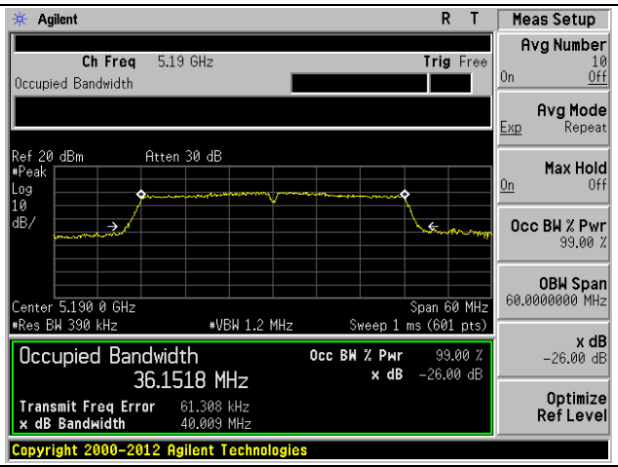
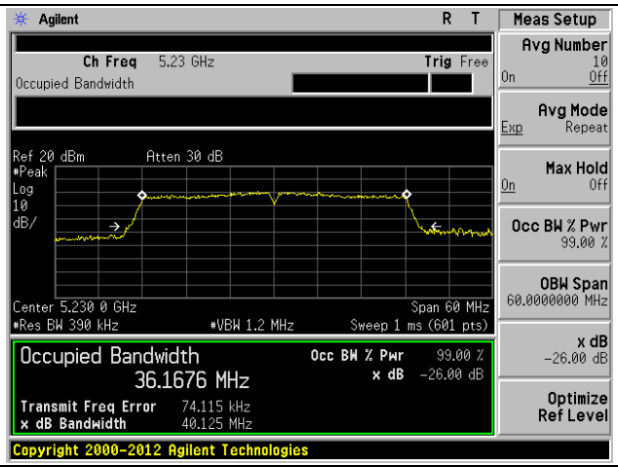
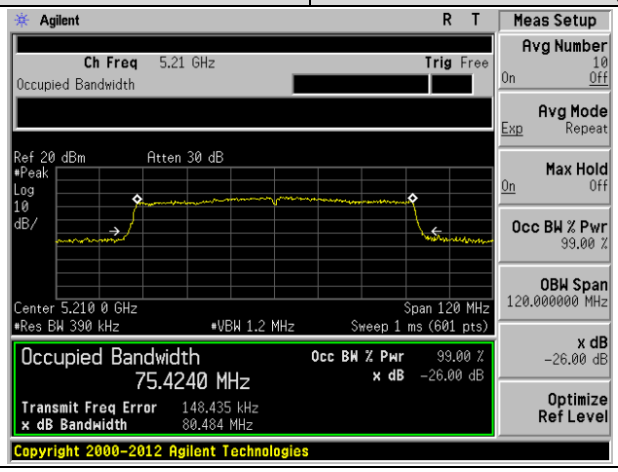
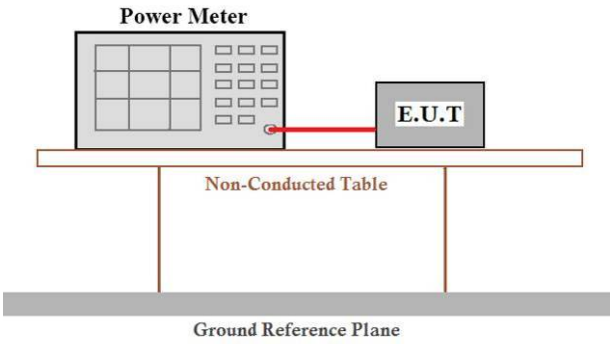


5240

Test mode:	802.11n(HT40) mode	Test mode:	802.11ac(HT40) mode
			
5190		5190	
			
5230		5230	

Test mode:	802.11ac(HT80) mode
	
5210	

7.4 Peak Transmit Power

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407</td></tr>
<tr><td>Test Method:</td><td>KDB 789033 D02 General U-NII Test Procedures New Rules v02r01</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency band (MHz)</th><th>Limit</th></tr>
<tr><td rowspan="2">5150-5250</td><td>≤1W(30dBm) for master device</td></tr>
<tr><td>≤250mW(23.98dBm) for client device</td></tr>
<tr><td>5250-5350</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr>
<tr><td>5470-5725</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr>
<tr><td colspan="2">Remark: *Where B is the 26dB emission bandwidth in MHz.
The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test procedure:</td><td>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).</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

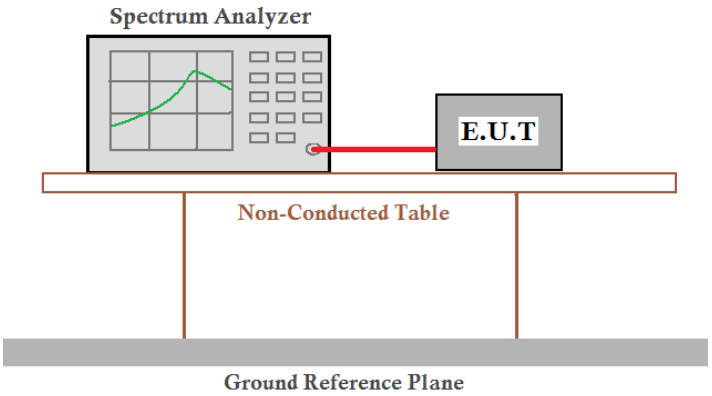
Measurement Data

Modulation	Duty cycle	Duty Factor	Modulation	Duty cycle	Duty Factor
802.11a	95.40%	0.2	802.11ac(HT20)	96.30%	0.16
802.11n(HT20)	95.60%	0.2	802.11ac(HT40)	89.50%	0.48
802.11n(HT40)	89.40%	0.49	802.11ac(HT80)	81.80%	0.87

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	13.98	0.20	14.18	23.98	Pass
40	5200	14.84	0.20	15.04	23.98	Pass
48	5240	15.07	0.20	15.27	23.98	Pass
802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	13.93	0.20	14.13	23.98	Pass
40	5200	14.17	0.20	14.37	23.98	Pass
48	5240	14.27	0.20	14.47	23.98	Pass
802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	13.95	0.16	14.11	23.98	Pass
40	5200	14.18	0.16	14.34	23.98	Pass
48	5240	14.19	0.16	14.35	23.98	Pass
802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190	13.45	0.49	13.94	23.98	Pass
46	5230	14.20	0.49	14.69	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	13.68	0.48	14.16	23.98	Pass
46	5230	14.20	0.48	14.68	23.98	Pass
802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210	13.40	0.87	14.27	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

7.5 Power Spectral Density

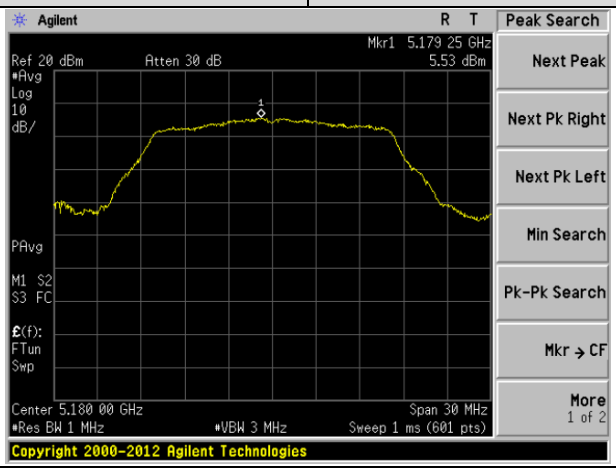
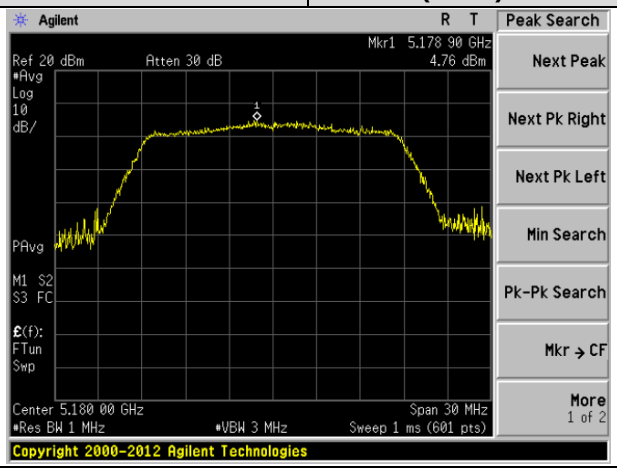
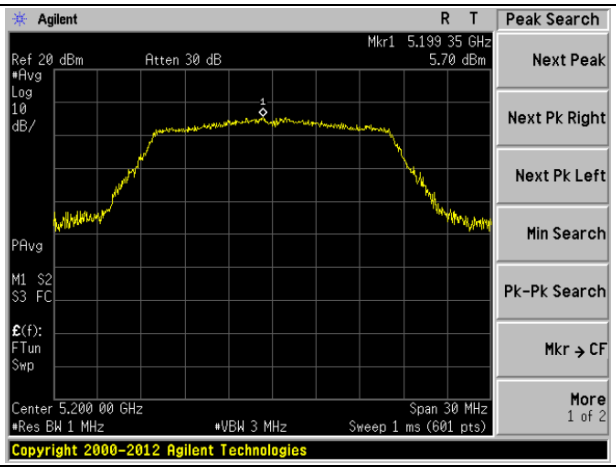
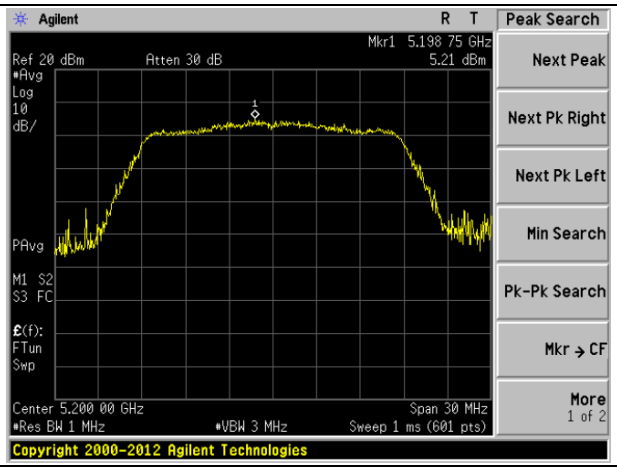
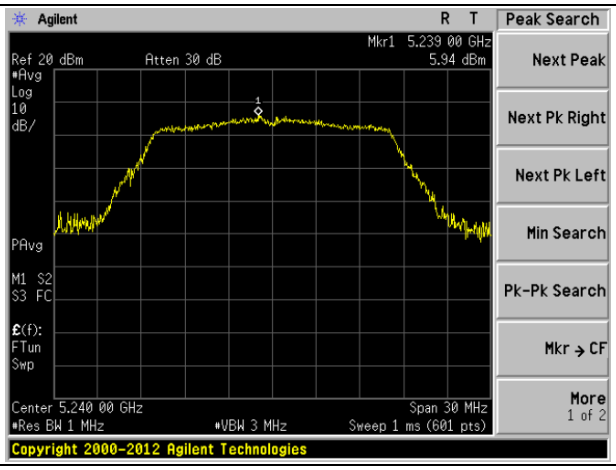
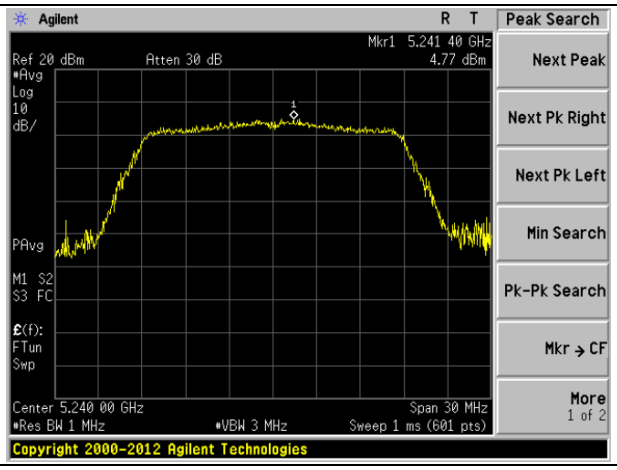
Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	<table><tr><td>Frequency band (MHz)</td><td>Limit</td></tr><tr><td rowspan="2">5150-5250</td><td>≤17dBm in 1MHz for master device</td></tr><tr><td>≤11dBm in 1MHz for client device</td></tr><tr><td>5250-5350</td><td>≤11dBm in 1MHz for client device</td></tr><tr><td>5470-5725</td><td>≤11dBm in 1MHz for client device</td></tr><tr><td colspan="2">Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.</td></tr></table>
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 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

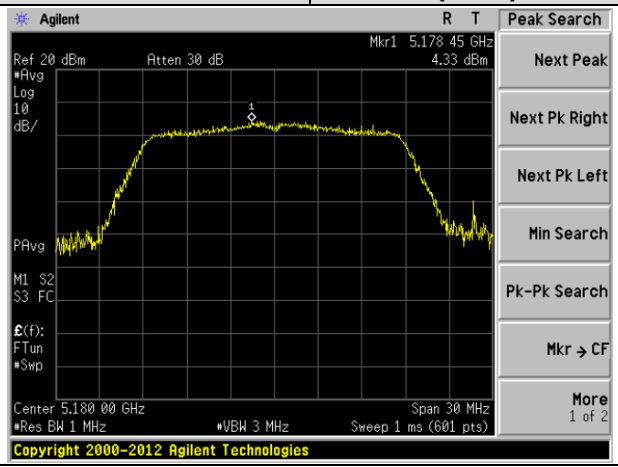
Modulation	Duty cycle	Duty Factor	Modulation	Duty cycle	Duty Factor
802.11a	95.40%	0.2	802.11ac(HT20)	96.30%	0.16
802.11n(HT20)	95.60%	0.2	802.11ac(HT40)	89.50%	0.48
802.11n(HT40)	89.40%	0.49	802.11ac(HT80)	81.80%	0.87

802.11a mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	5.53	0.2	5.73	11	Pass
40	5200	5.70	0.2	5.90	11	Pass
48	5240	5.94	0.2	6.14	11	Pass
802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	4.76	0.2	4.96	11	Pass
40	5200	5.21	0.2	5.41	11	Pass
48	5240	4.77	0.2	4.97	11	Pass
802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	4.33	0.16	4.49	11	Pass
40	5200	5.05	0.16	5.21	11	Pass
48	5240	5.04	0.16	5.20	11	Pass
802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
38	5190	1.36	0.49	1.85	11	Pass
46	5230	1.48	0.49	1.97	11	Pass
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
38	5190	2.62	0.48	3.10	11	Pass
46	5230	1.84	0.48	2.32	11	Pass
802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
42	5210	-1.28	0.87	-0.41	11	Pass

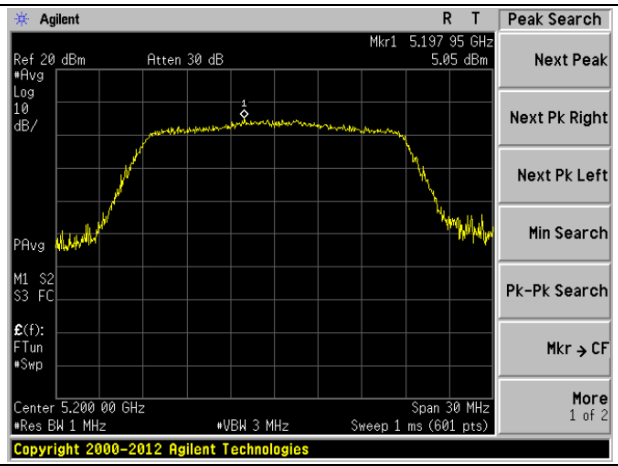
Test plots as followed:

Test mode:	802.11a mode	Test mode:	802.11n(HT20) mode
			
5180		5180	
			
5200		5200	
			
5240		5240	

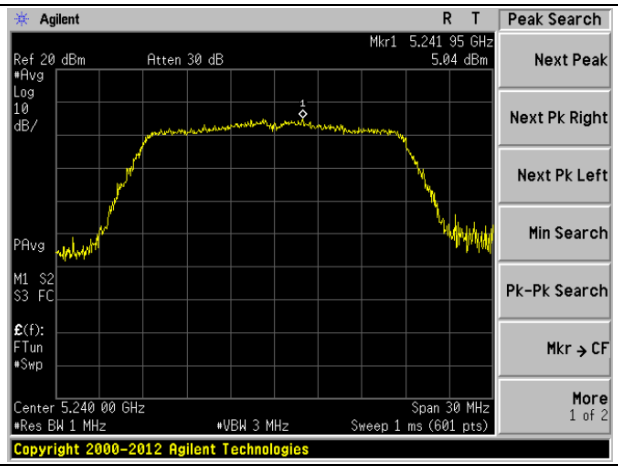
Test mode:	802.11ac(HT20) mode



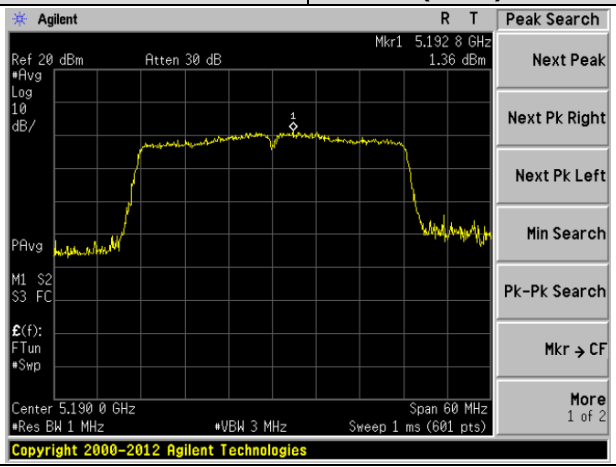
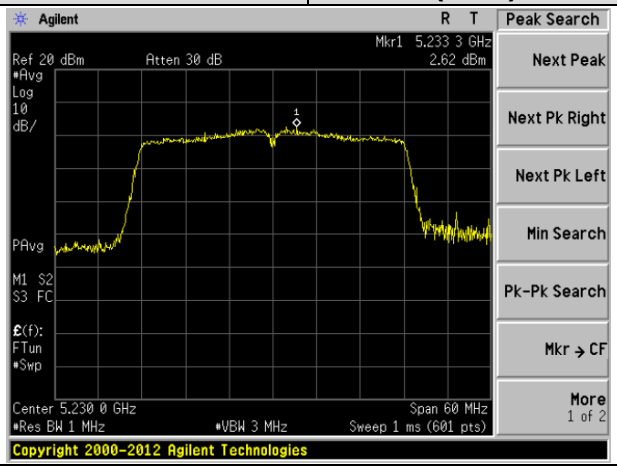
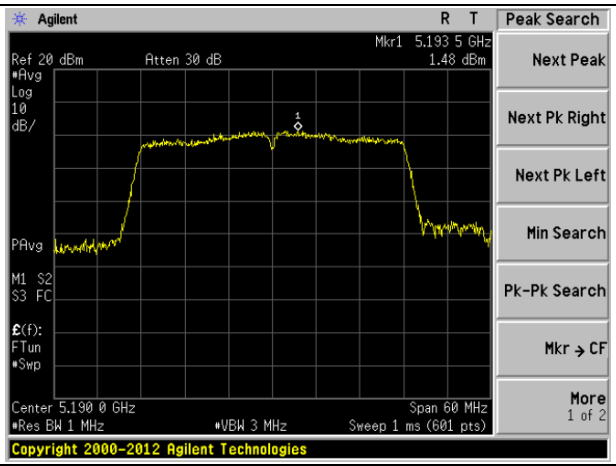
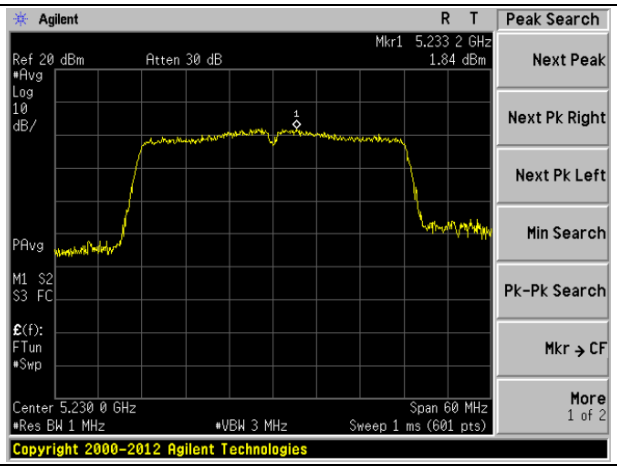
5180

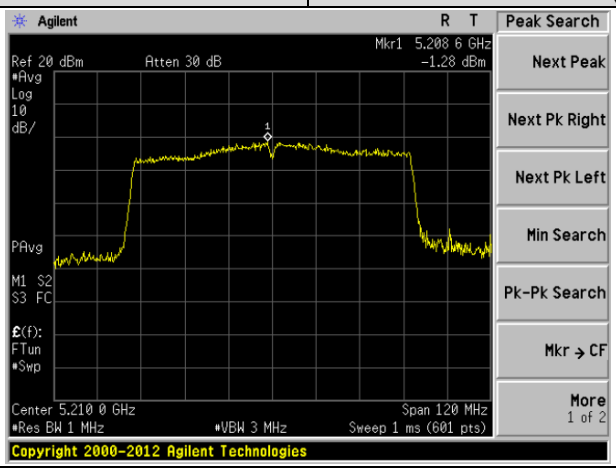


5200



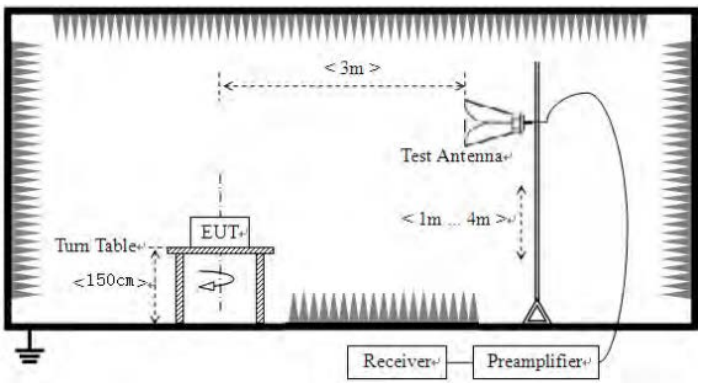
5240

Test mode:	802.11n(HT40) mode	Test mode:	802.11ac(HT40) mode
			
5190		5190	
			
5230		5230	

Test mode:	802.11ac(HT80) mode
	
5210	

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><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></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><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></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:	For radiated emissions above 1GHz 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

1. *Only show the worst case ant 2 test data.*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
5. *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)				PK				
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	44.35	32.07	8.99	37.49	47.92	68.2	-20.28	Horizontal
5350.00	42.17	31.75	9.29	37.2	46.01	68.2	-22.19	Horizontal
5150.00	42.53	32.07	8.99	37.49	46.1	68.2	-22.1	Vertical
5350.00	43.99	31.75	9.29	37.2	47.83	68.2	-20.37	Vertical

802.11a(HT20)				AV				
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	32.83	32.07	8.99	37.49	36.4	54	-17.6	Horizontal
5350.00	33.41	31.75	9.29	37.2	37.25	54	-16.75	Horizontal
5150.00	33.23	32.07	8.99	37.49	36.8	54	-17.2	Vertical
5350.00	34.28	31.75	9.29	37.2	38.12	54	-15.88	Vertical

802.11n(HT20)				PK				
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	45.67	32.07	8.99	37.49	49.24	68.2	-18.96	Horizontal
5350.00	42.61	31.75	9.29	37.2	46.45	68.2	-21.75	Horizontal
5150.00	45.55	32.07	8.99	37.49	49.12	68.2	-19.08	Vertical
5350.00	42.99	31.75	9.29	37.2	46.83	68.2	-21.37	Vertical

802.11n(HT20)				AV				
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	36.90	32.07	8.99	37.49	40.47	54	-13.53	Horizontal
5350.00	34.39	31.75	9.29	37.2	38.23	54	-15.77	Horizontal
5150.00	32.22	32.07	8.99	37.49	35.79	54	-18.21	Vertical
5350.00	33.15	31.75	9.29	37.2	36.99	54	-17.01	Vertical

802.11ac(HT20)					PK			
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	45.33	32.07	8.99	37.49	48.9	68.2	-19.3	Horizontal
5350.00	43.14	31.75	9.29	37.2	46.98	68.2	-21.22	Horizontal
5150.00	42.25	32.07	8.99	37.49	45.82	68.2	-22.38	Vertical
5350.00	41.57	31.75	9.29	37.2	45.41	68.2	-22.79	Vertical

802.11ac(HT20)					AV			
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	35.83	32.07	8.99	37.49	39.4	54	-14.6	Horizontal
5350.00	36.28	31.75	9.29	37.2	40.12	54	-13.88	Horizontal
5150.00	33.96	32.07	8.99	37.49	37.53	54	-16.47	Vertical
5350.00	34.34	31.75	9.29	37.2	38.18	54	-15.82	Vertical

802.11n(HT40)					PK			
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	43.54	32.07	8.99	37.49	47.11	68.2	-21.09	Horizontal
5350.00	43.90	31.75	9.29	37.2	47.74	68.2	-20.46	Horizontal
5150.00	44.51	32.07	8.99	37.49	48.08	68.2	-20.12	Vertical
5350.00	41.71	31.75	9.29	37.2	45.55	68.2	-22.65	Vertical

802.11n(HT40)					AV			
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	31.19	32.07	8.99	37.49	34.76	54	-19.24	Horizontal
5350.00	35.65	31.75	9.29	37.2	39.49	54	-14.51	Horizontal
5150.00	35.97	32.07	8.99	37.49	39.54	54	-14.46	Vertical
5350.00	32.45	31.75	9.29	37.2	36.29	54	-17.71	Vertical

802.11ac(HT40)				PK				
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	42.64	32.07	8.99	37.49	46.21	68.2	-21.99	Horizontal
5350.00	41.82	31.75	9.29	37.2	45.66	68.2	-22.54	Horizontal
5150.00	42.98	32.07	8.99	37.49	46.55	68.2	-21.65	Vertical
5350.00	45.68	31.75	9.29	37.2	49.52	68.2	-18.68	Vertical

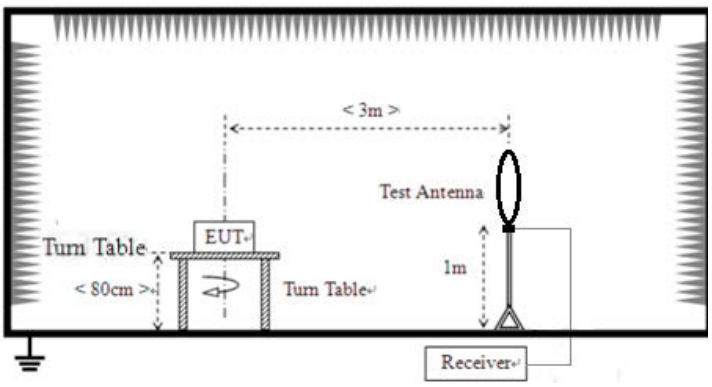
802.11ac(HT40)				AV				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	36.27	32.07	8.99	37.49	39.84	54	-14.16	Horizontal
5350.00	34.50	31.75	9.29	37.2	38.34	54	-15.66	Horizontal
5150.00	31.94	32.07	8.99	37.49	35.51	54	-18.49	Vertical
5350.00	31.83	31.75	9.29	37.2	35.67	54	-18.33	Vertical

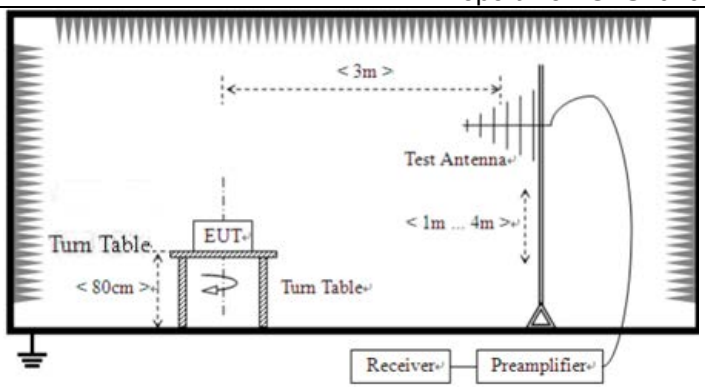
802.11ac(HT80)				PK				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	41.87	32.07	8.99	37.49	45.44	68.2	-22.76	Horizontal
5350.00	45.48	31.75	9.29	37.2	49.32	68.2	-18.88	Horizontal
5150.00	43.33	32.07	8.99	37.49	46.9	68.2	-21.3	Vertical
5350.00	42.95	31.75	9.29	37.2	46.79	68.2	-21.41	Vertical

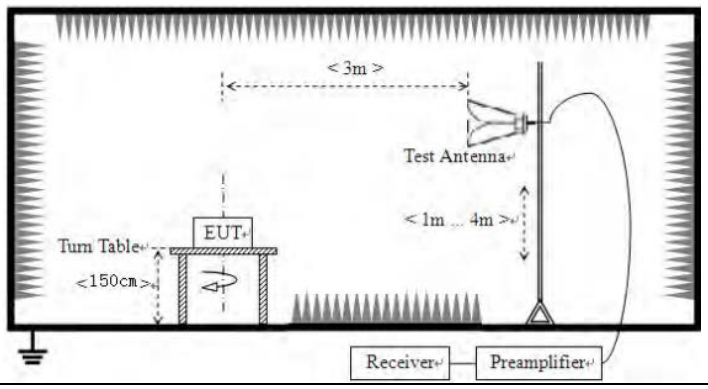
802.11ac(HT80)				AV				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	36.40	32.07	8.99	37.49	39.97	54	-14.03	Horizontal
5350.00	34.25	31.75	9.29	37.2	38.09	54	-15.91	Horizontal
5150.00	32.13	32.07	8.99	37.49	35.7	54	-18.3	Vertical
5350.00	36.73	31.75	9.29	37.2	40.57	54	-13.43	Vertical

7.7 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9kHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</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><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>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:</td></tr>
</table>

	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

<table>
<tr><td></td><td colspan="6"> 

For radiated emissions above 1GHz

</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Remarks:

1. *Only show the worst case ant 2 test data.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

Measurement Data:

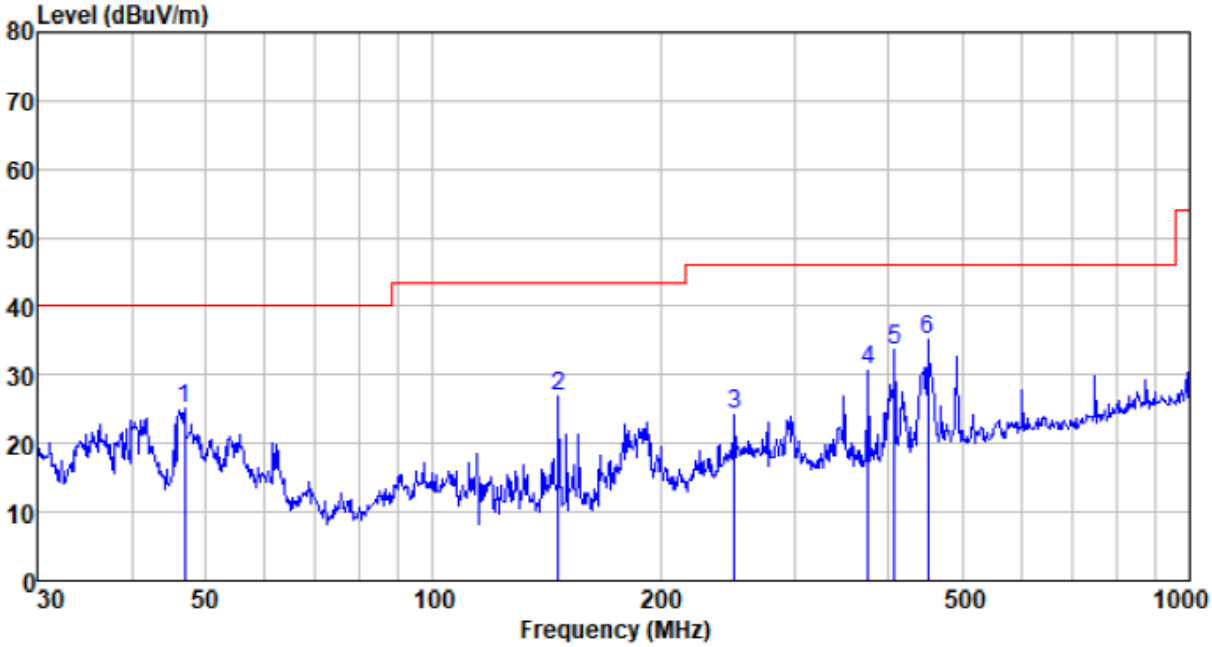
9 kHz ~ 30 MHz

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

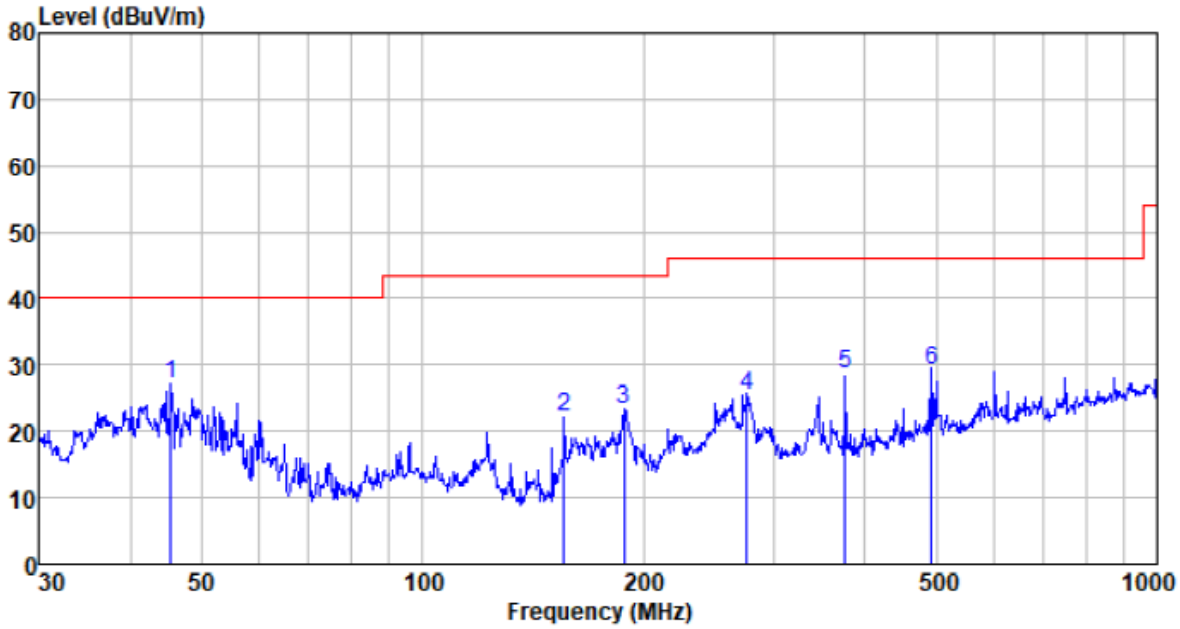
Pre-scan all test modes, found worst case at 802.11a(HT20) 5240MHz, and so only show the test result of 802.11a(HT20) 5240MHz

Horizontal:



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
46.995	48.20	12.27	0.74	36.04	25.17	40.00	-14.83	QP
146.374	54.85	7.53	1.55	37.06	26.87	43.50	-16.63	QP
250.301	47.18	12.18	2.12	37.38	24.10	46.00	-21.90	QP
375.939	50.50	14.94	2.75	37.50	30.69	46.00	-15.31	QP
407.515	52.71	15.50	2.89	37.52	33.58	46.00	-12.42	QP
451.135	53.11	16.40	3.09	37.51	35.09	46.00	-10.91	QP

Vertical:



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
45.375	50.23	12.26	0.72	35.96	27.25	40.00	-12.75	QP
155.910	49.55	8.05	1.60	37.11	22.09	43.50	-21.41	QP
187.753	49.12	9.65	1.78	37.27	23.28	43.50	-20.22	QP
276.124	47.51	12.95	2.25	37.40	25.31	46.00	-20.69	QP
375.939	48.33	14.94	2.75	37.50	28.52	46.00	-17.48	QP
492.469	46.15	17.18	3.27	37.51	29.09	46.00	-16.91	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	35.18	39.67	14.62	32.65	56.82	74	-17.18	Vertical
15540.00	35.04	38.6	17.66	34.46	56.84	74	-17.16	Vertical
10360.00	32.82	39.67	14.62	32.65	54.46	74	-19.54	Horizontal
15540.00	33.47	38.6	17.66	34.46	55.27	74	-18.73	Horizontal

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	23.86	39.67	14.62	32.65	45.5	54	-8.5	Vertical
15540.00	22.52	38.6	17.66	34.46	44.32	54	-9.68	Vertical
10360.00	21.36	39.67	14.62	32.65	43	54	-11	Horizontal
15540.00	21.22	38.6	17.66	34.46	43.02	54	-10.98	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	33.72	39.75	14.63	32.71	55.39	74	-18.61	Vertical
15600.00	35.37	38.33	17.67	34.17	57.2	74	-16.8	Vertical
10400.00	32.99	39.75	14.63	32.71	54.66	74	-19.34	Horizontal
15600.00	32.40	38.33	17.67	34.17	54.23	74	-19.77	Horizontal

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	24.68	39.75	14.63	32.71	46.35	54	-7.65	Vertical
15600.00	22.96	38.33	17.67	34.17	44.79	54	-9.21	Vertical
10400.00	22.48	39.75	14.63	32.71	44.15	54	-9.85	Horizontal
15600.00	22.99	38.33	17.67	34.17	44.82	54	-9.18	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	35.27	39.82	14.68	32.86	56.91	74	-17.09	Vertical
15720.00	34.25	38.09	17.73	33.66	56.41	74	-17.59	Vertical
10480.00	32.74	39.82	14.68	32.86	54.38	74	-19.62	Horizontal
15720.00	36.37	38.09	17.73	33.66	58.53	74	-15.47	Horizontal

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	22.04	39.82	14.68	32.86	43.68	54	-10.32	Vertical
15720.00	23.58	38.09	17.73	33.66	45.74	54	-8.26	Vertical
10480.00	22.74	39.82	14.68	32.86	44.38	54	-9.62	Horizontal
15720.00	24.18	38.09	17.73	33.66	46.34	54	-7.66	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	32.03	39.67	14.62	32.65	53.67	74	-20.33	Vertical
15540.00	34.61	38.6	17.66	34.46	56.41	74	-17.59	Vertical
10360.00	32.75	39.67	14.62	32.65	54.39	74	-19.61	Horizontal
15540.00	32.95	38.6	17.66	34.46	54.75	74	-19.25	Horizontal

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	24.36	39.67	14.62	32.65	46	54	-8	Vertical
15540.00	21.11	38.6	17.66	34.46	42.91	54	-11.09	Vertical
10360.00	23.63	39.67	14.62	32.65	45.27	54	-8.73	Horizontal
15540.00	23.07	38.6	17.66	34.46	44.87	54	-9.13	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	34.57	39.75	14.63	32.71	56.24	74	-17.76	Vertical
15600.00	36.56	38.33	17.67	34.17	58.39	74	-15.61	Vertical
10400.00	32.29	39.75	14.63	32.71	53.96	74	-20.04	Horizontal
15600.00	33.78	38.33	17.67	34.17	55.61	74	-18.39	Horizontal

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	21.24	39.75	14.63	32.71	42.91	54	-11.09	Vertical
15600.00	24.68	38.33	17.67	34.17	46.51	54	-7.49	Vertical
10400.00	23.60	39.75	14.63	32.71	45.27	54	-8.73	Horizontal
15600.00	21.01	38.33	17.67	34.17	42.84	54	-11.16	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	33.93	39.82	14.68	32.86	55.57	74	-18.43	Vertical
15720.00	35.59	38.09	17.73	33.66	57.75	74	-16.25	Vertical
10480.00	36.15	39.82	14.68	32.86	57.79	74	-16.21	Horizontal
15720.00	36.25	38.09	17.73	33.66	58.41	74	-15.59	Horizontal

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	24.05	39.82	14.68	32.86	45.69	54	-8.31	Vertical
15720.00	22.31	38.09	17.73	33.66	44.47	54	-9.53	Vertical
10480.00	23.63	39.82	14.68	32.86	45.27	54	-8.73	Horizontal
15720.00	21.94	38.09	17.73	33.66	44.1	54	-9.9	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	35.02	39.67	14.62	32.65	56.66	74	-17.34	Vertical
15540.00	36.98	38.6	17.66	34.46	58.78	74	-15.22	Vertical
10360.00	35.87	39.67	14.62	32.65	57.51	74	-16.49	Horizontal
15540.00	33.46	38.6	17.66	34.46	55.26	74	-18.74	Horizontal

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	22.30	39.67	14.62	32.65	43.94	54	-10.06	Vertical
15540.00	23.35	38.6	17.66	34.46	45.15	54	-8.85	Vertical
10360.00	21.42	39.67	14.62	32.65	43.06	54	-10.94	Horizontal
15540.00	23.42	38.6	17.66	34.46	45.22	54	-8.78	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	32.48	39.75	14.63	32.71	54.15	74	-19.85	Vertical
15600.00	36.06	38.33	17.67	34.17	57.89	74	-16.11	Vertical
10400.00	34.40	39.75	14.63	32.71	56.07	74	-17.93	Horizontal
15600.00	32.54	38.33	17.67	34.17	54.37	74	-19.63	Horizontal

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	24.44	39.75	14.63	32.71	46.11	54	-7.89	Vertical
15600.00	23.29	38.33	17.67	34.17	45.12	54	-8.88	Vertical
10400.00	21.45	39.75	14.63	32.71	43.12	54	-10.88	Horizontal
15600.00	21.96	38.33	17.67	34.17	43.79	54	-10.21	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	34.20	39.82	14.68	32.86	55.84	74	-18.16	Vertical
15720.00	35.07	38.09	17.73	33.66	57.23	74	-16.77	Vertical
10480.00	34.30	39.82	14.68	32.86	55.94	74	-18.06	Horizontal
15720.00	35.50	38.09	17.73	33.66	57.66	74	-16.34	Horizontal

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	25.18	39.82	14.68	32.86	46.82	54	-7.18	Vertical
15720.00	23.02	38.09	17.73	33.66	45.18	54	-8.82	Vertical
10480.00	23.04	39.82	14.68	32.86	44.68	54	-9.32	Horizontal
15720.00	24.54	38.09	17.73	33.66	46.7	54	-7.3	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	32.81	39.71	14.63	32.68	54.47	74	-19.53	Vertical
15570.00	32.42	38.46	17.67	34.32	54.23	74	-19.77	Vertical
10380.00	35.84	39.71	14.63	32.68	57.5	74	-16.5	Horizontal
15570.00	36.05	38.46	17.67	34.32	57.86	74	-16.14	Horizontal

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	24.78	39.71	14.63	32.68	46.44	54	-7.56	Vertical
15570.00	22.38	38.46	17.67	34.32	44.19	54	-9.81	Vertical
10380.00	21.88	39.71	14.63	32.68	43.54	54	-10.46	Horizontal
15570.00	23.70	38.46	17.67	34.32	45.51	54	-8.49	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	36.13	39.75	14.65	32.74	57.79	74	-16.21	Vertical
15690.00	34.62	38.33	17.69	34.03	56.61	74	-17.39	Vertical
10460.00	36.60	39.75	14.65	32.74	58.26	74	-15.74	Horizontal
15690.00	32.45	38.33	17.69	34.03	54.44	74	-19.56	Horizontal

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	22.41	39.75	14.65	32.74	44.07	54	-9.93	Vertical
15690.00	22.94	38.33	17.69	34.03	44.93	54	-9.07	Vertical
10460.00	24.77	39.75	14.65	32.74	46.43	54	-7.57	Horizontal
15690.00	21.09	38.33	17.69	34.03	43.08	54	-10.92	Horizontal

802.11acHT40) 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	35.15	39.71	14.63	32.68	56.81	74	-17.19	Vertical
15570.00	32.95	38.46	17.67	34.32	54.76	74	-19.24	Vertical
10380.00	34.62	39.71	14.63	32.68	56.28	74	-17.72	Horizontal
15570.00	35.38	38.46	17.67	34.32	57.19	74	-16.81	Horizontal

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	25.10	39.71	14.63	32.68	46.76	54	-7.24	Vertical
15570.00	22.53	38.46	17.67	34.32	44.34	54	-9.66	Vertical
10380.00	22.90	39.71	14.63	32.68	44.56	54	-9.44	Horizontal
15570.00	24.16	38.46	17.67	34.32	45.97	54	-8.03	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	32.94	39.75	14.65	32.74	54.6	74	-19.4	Vertical
15690.00	34.18	38.33	17.69	34.03	56.17	74	-17.83	Vertical
10460.00	36.09	39.75	14.65	32.74	57.75	74	-16.25	Horizontal
15690.00	34.16	38.33	17.69	34.03	56.15	74	-17.85	Horizontal

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	24.84	39.75	14.65	32.74	46.5	54	-7.5	Vertical
15690.00	21.81	38.33	17.69	34.03	43.8	54	-10.2	Vertical
10460.00	25.02	39.75	14.65	32.74	46.68	54	-7.32	Horizontal
15690.00	22.25	38.33	17.69	34.03	44.24	54	-9.76	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	34.91	39.82	14.66	32.8	56.59	74	-17.41	Vertical
15630.00	34.81	38.09	17.71	33.81	56.8	74	-17.2	Vertical
10420.00	35.27	39.82	14.66	32.8	56.95	74	-17.05	Horizontal
15630.00	36.09	38.09	17.71	33.81	58.08	74	-15.92	Horizontal

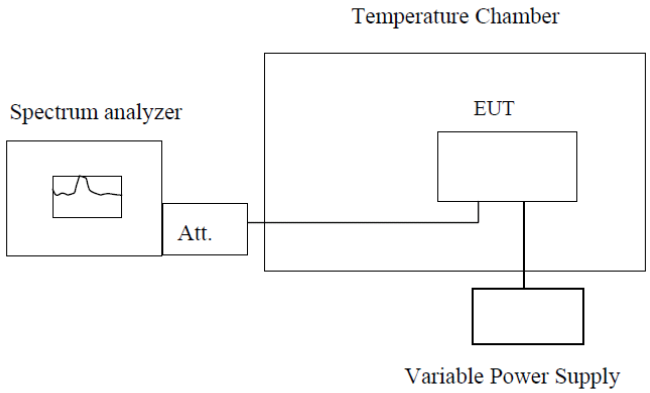
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10420.00	25.65	39.82	14.66	32.8	47.33	54	-6.67	Vertical
15630.00	21.70	38.09	17.71	33.81	43.69	54	-10.31	Vertical
10420.00	22.49	39.82	14.66	32.8	44.17	54	-9.83	Horizontal
15630.00	25.93	38.09	17.71	33.81	47.92	54	-6.08	Horizontal

Notes:

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.

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 6.0 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:

Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (VAC)	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	NV	5180.441	Pass	5180.387	Pass	5180.426	Pass	5180.657	Pass
-20	NV	5180.010	Pass	5180.964	Pass	5180.345	Pass	5180.595	Pass
-10	NV	5180.801	Pass	5180.380	Pass	5180.592	Pass	5180.277	Pass
0	NV	5180.184	Pass	5180.133	Pass	5180.748	Pass	5180.384	Pass
10	NV	5180.111	Pass	5180.322	Pass	5180.357	Pass	5180.438	Pass
20	NV	5180.876	Pass	5180.837	Pass	5180.581	Pass	5180.543	Pass
30	NV	5180.800	Pass	5180.056	Pass	5180.283	Pass	5180.237	Pass
40	NV	5180.912	Pass	5180.916	Pass	5180.815	Pass	5180.701	Pass
50	NV	5180.529	Pass	5180.626	Pass	5180.459	Pass	5180.330	Pass
Frequency stability versus Power Supply.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (VAC)	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	LV	5180.582	Pass	5180.238	Pass	5180.097	Pass	5180.260	Pass
25	HV	5180.548	Pass	5180.771	Pass	5180.928	Pass	5180.937	Pass

Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (VAC)	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	NV	5190.676	Pass	5190.400	Pass	5190.581	Pass	5190.280	Pass
-20	NV	5190.327	Pass	5190.718	Pass	5190.806	Pass	5190.672	Pass
-10	NV	5190.282	Pass	5190.755	Pass	5190.696	Pass	5190.972	Pass
0	NV	5190.176	Pass	5190.391	Pass	5190.697	Pass	5190.700	Pass
10	NV	5190.008	Pass	5190.315	Pass	5190.148	Pass	5190.678	Pass
20	NV	5190.394	Pass	5190.374	Pass	5190.951	Pass	5190.260	Pass
30	NV	5190.717	Pass	5190.152	Pass	5190.017	Pass	5190.192	Pass
40	NV	5190.538	Pass	5190.013	Pass	5190.822	Pass	5190.286	Pass
50	NV	5190.895	Pass	5190.410	Pass	5190.348	Pass	5190.413	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (VAC)	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	LV	5190.076	Pass	5190.203	Pass	5190.199	Pass	5190.113	Pass
25	HV	5190.305	Pass	5190.053	Pass	5190.903	Pass	5190.002	Pass

Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (VAC)	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	NV	5210.962	Pass	5210.017	Pass	5210.970	Pass	5210.303	Pass
-20	NV	5210.271	Pass	5210.300	Pass	5210.904	Pass	5210.942	Pass
-10	NV	5210.815	Pass	5210.205	Pass	5210.760	Pass	5210.345	Pass
0	NV	5210.942	Pass	5210.257	Pass	5210.287	Pass	5210.004	Pass
10	NV	5210.192	Pass	5210.289	Pass	5210.638	Pass	5210.462	Pass
20	NV	5210.197	Pass	5210.374	Pass	5210.058	Pass	5210.434	Pass
30	NV	5210.787	Pass	5210.976	Pass	5210.986	Pass	5210.162	Pass
40	NV	5210.747	Pass	5210.396	Pass	5210.815	Pass	5210.061	Pass
50	NV	5210.305	Pass	5210.670	Pass	5210.468	Pass	5210.584	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (VAC)	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	LV	5210.146	Pass	5210.131	Pass	5210.693	Pass	5210.820	Pass
25	HV	5210.845	Pass	5210.320	Pass	5210.560	Pass	5210.962	Pass

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

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