

FCC REPORT

Applicant: Resonian, Inc

Address of Applicant: 15615 Alton PKWY STE 450 Irvine, California 92618, United States

Manufacturer: Shenzhen SDMC Technology Co.,Ltd

Address of Manufacturer: 7/F, W2-A, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, China, 518027

Equipment Under Test (EUT)

Product Name: Android TV Box

Model No.: RSTV-A4K-16

Trade Mark: Kinetic TV

FCC ID: 2ARUM-RSTVA4K166769

Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407

Date of sample receipt: November 20, 2018

Date of Test: November 21, 2018-December 05, 2018

Date of report issue: December 06, 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	December 06, 2018	Original

Prepared By:

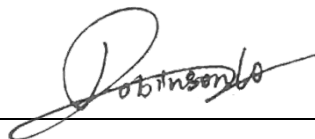


Date:

December 06, 2018

Project Engineer

Check By:



Date:

December 06, 2018

Reviewer

3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY	4
4.1 MEASUREMENT UNCERTAINTY	4
5 GENERAL INFORMATION	5
5.1 GENERAL DESCRIPTION OF EUT	5
5.2 TEST MODE	7
5.3 TEST FACILITY	7
5.4 TEST LOCATION	7
5.5 DESCRIPTION OF SUPPORT UNITS	7
5.6 DEVIATION FROM STANDARDS	7
5.7 ADDITIONAL INSTRUCTIONS	7
6 TEST INSTRUMENTS LIST	8
7 TEST RESULTS AND MEASUREMENT DATA	10
7.1 ANTENNA REQUIREMENT:	10
7.2 CONDUCTED EMISSIONS	11
7.3 EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH	14
7.4 PEAK TRANSMIT POWER	29
7.5 POWER SPECTRAL DENSITY	35
7.6 BAND EDGE	53
7.7 RADIATED EMISSION	61
7.8 FREQUENCY STABILITY	72
8 TEST SETUP PHOTO	76
9 EUT CONSTRUCTIONAL DETAILS	77

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	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 40GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(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:	Android TV Box			
Model No.:	RSTV-A4K-16			
Serial No.:	181100090001-181100099950			
Hardware Version:	V2			
Software Version:	V9.3			
Test sample(s) ID:	GTS201811000126-1			
Sample(s) Status:	Engineer sample			
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	U-NII Band I	IEEE 802.11a	5180-5240	4
		IEEE 802.11n/ac 20MHz	5180-5240	4
		IEEE 802.11n/ac 40MHz	5190-5230	2
		IEEE 802.11ac 80MHz	5210	1
	U-NII Band II-A	IEEE 802.11a	5260-5320	4
		IEEE 802.11n/ac 20MHz	5260-5320	4
		IEEE 802.11n/ac 40MHz	5270-5310	2
		IEEE 802.11ac 80MHz	5290	1
	U-NII Band II-C	IEEE 802.11a	5500-5700	11
		IEEE 802.11n/ac 20MHz	5500-5700	11
		IEEE 802.11n/ac 40MHz	5510-5670	5
		IEEE 802.11ac 80MHz	5530-5610	2
Modulation technology:	OFDM MIMO: 802.11n/ac SISO: 802.11a			
Antenna Type:	Integral Antenna			
Antenna gain:	ANT A: 2.14dBi ANT B: 2.54dBi			
Power supply:	Adapter MODEL:SA12V-050200U INPUT: AC 100-240V, 50/60Hz,0.4A OUTPUT: DC 5V, 2 A			

Channel list for 802.11a/n(HT20)/ac(HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz
52	5260MHz	56	5280MHz	60	5300MHz	64	5320MHz
100	5500MHz	104	5520MHz	108	5540MHz	112	5560MHz
116	5580MHz	120	5600MHz	124	5620MHz	128	5640MHz
132	5660MHz	136	5680MHz	140	5700MHz		

Channel list for 802.11n(HT40)/ac(HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz	54	5270MHz	62	5310MHz
102	5510MHz	110	5550MHz	118	5590MHz	126	5630MHz
134	5670MHz						

Channel list for 802.11ac(HT80)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210MHz	58	5290MHz	106	5530MHz	122	5610MHz

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation..
<i>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.</i>	
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
802.11a/n/ac(HT20)	6/6.5 Mbps
802.11n/ac(HT40)	13.5 Mbps
802.11ac(HT80)	29.3 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, 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

Test Software	Ampark RFTesTool, VER:5.3
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. 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

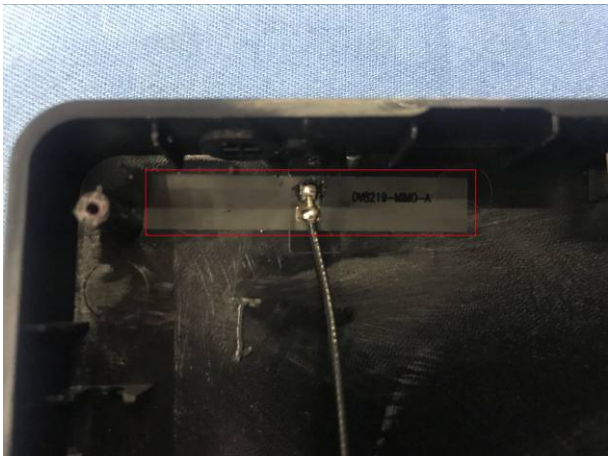
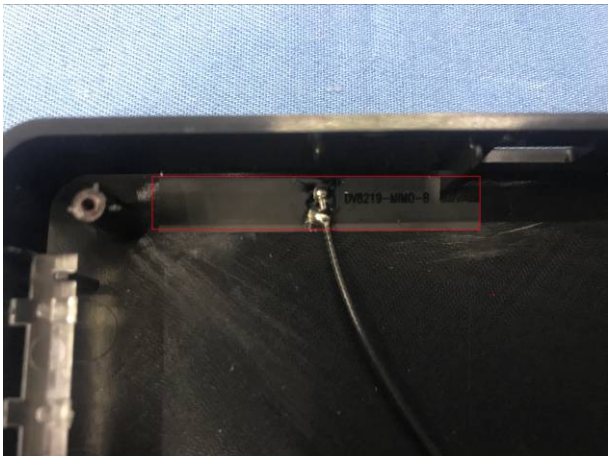
Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU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

RF 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
<i>15.203 requirement:</i> <i>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.</i>	
E.U.T Antenna:	
<i>The antenna is Integral antenna, the best case gain of the ANT A is 2.14dBi and ANT B is 2.54dBi</i>  	

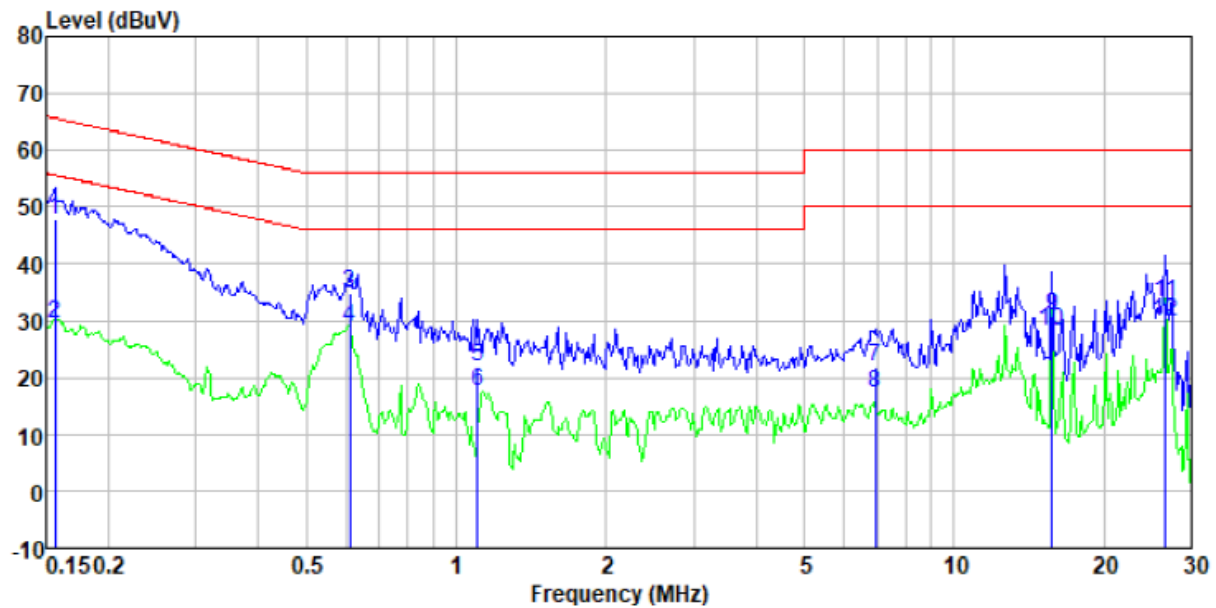
7.2 Conducted Emissions

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

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

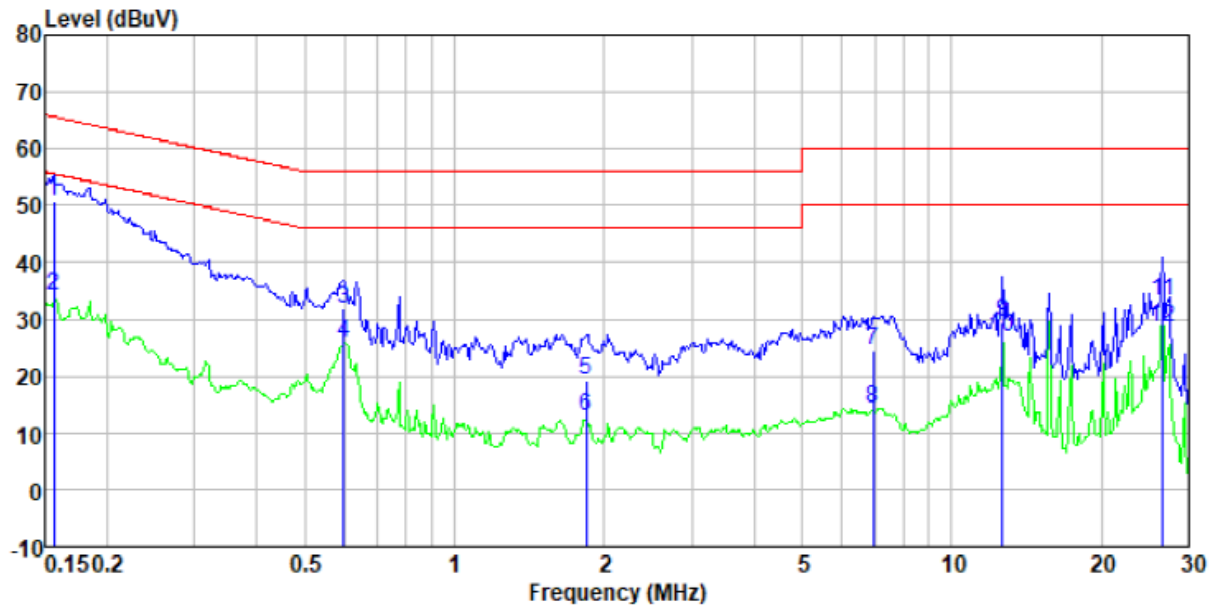
Measurement data:

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	47.19	0.40	0.08	47.67	65.65	-17.98	QP
0.16	28.89	0.40	0.08	29.37	55.65	-26.28	Average
0.61	34.29	0.28	0.12	34.69	56.00	-21.31	QP
0.61	28.37	0.28	0.12	28.77	46.00	-17.23	Average
1.11	21.58	0.20	0.15	21.93	56.00	-34.07	QP
1.11	17.31	0.20	0.15	17.66	46.00	-28.34	Average
6.95	21.34	0.20	0.18	21.72	60.00	-38.28	QP
6.95	16.88	0.20	0.18	17.26	50.00	-32.74	Average
15.72	30.26	0.22	0.21	30.69	60.00	-29.31	QP
15.72	27.82	0.22	0.21	28.25	50.00	-21.75	Average
26.56	32.47	0.37	0.23	33.07	60.00	-26.93	QP
26.56	29.23	0.37	0.23	29.83	50.00	-20.17	Average

Neutral:

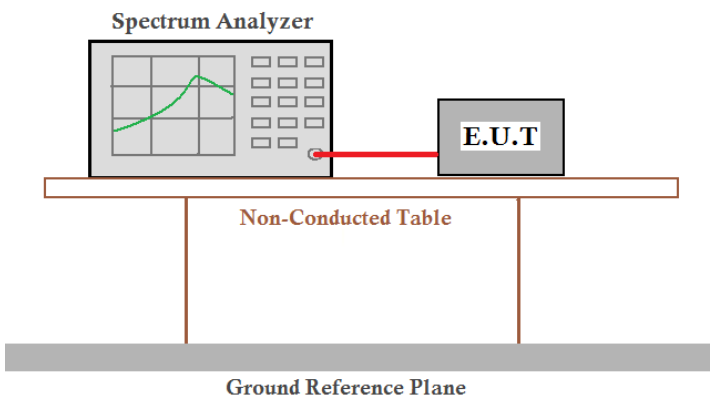


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	50.15	0.40	0.08	50.63	65.65	-15.02	QP
0.16	33.61	0.40	0.08	34.09	55.65	-21.56	Average
0.60	31.30	0.29	0.12	31.71	56.00	-24.29	QP
0.60	25.32	0.29	0.12	25.73	46.00	-20.27	Average
1.84	18.86	0.20	0.17	19.23	56.00	-36.77	QP
1.84	12.41	0.20	0.17	12.78	46.00	-33.22	Average
6.95	24.29	0.20	0.18	24.67	60.00	-35.33	QP
6.95	13.74	0.20	0.18	14.12	50.00	-35.88	Average
12.65	29.04	0.20	0.21	29.45	60.00	-30.55	QP
12.65	26.49	0.20	0.21	26.90	50.00	-23.10	Average
26.56	32.59	0.37	0.23	33.19	60.00	-26.81	QP
26.56	28.03	0.37	0.23	28.63	50.00	-21.37	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:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table, which is supported by two vertical legs. Below the table, a Ground Reference Plane is indicated by a thick grey bar.
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:

ANT A:

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	16.7394	17.9106	17.8882	21.468	21.731	21.707
48	5240	16.7265	17.8630	17.9211	21.217	21.464	21.651
56	5280	16.6948	17.9559	17.8441	21.239	21.340	21.528
64	5320	16.7124	17.8776	17.8429	21.132	21.367	21.356
100	5500	16.7215	17.8334	17.8565	21.485	21.453	21.274
140	5700	16.7164	17.8591	17.8661	21.310	21.418	21.520

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	36.3404	36.2506	40.015	40.135
62	5310	36.3113	36.1498	39.757	39.641
102	5510	36.2468	36.3177	38.835	39.500
134	5670	36.2506	36.3027	39.981	40.183

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	75.7386	82.423
106	5530	75.5405	81.659
122	5610	75.5083	81.257

ANT B:

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180	16.7459	17.8679	17.8701	21.622	21.680	21.679
48	5240	16.6876	17.8681	17.9021	21.300	21.594	21.649
56	5280	16.7253	17.8672	17.8812	21.389	21.699	21.706
64	5320	16.7454	17.8794	17.8762	21.314	21.496	21.524
100	5500	16.6920	17.8922	17.8708	21.251	21.247	21.591
140	5570	16.7436	17.8087	17.8403	21.066	21.377	21.529

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	36.2750	36.3134	40.000	39.916
62	5310	36.4459	36.2540	38.682	39.667
102	5510	36.2174	36.2760	39.939	39.899
134	5670	36.3210	36.2661	40.073	39.940

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	75.7708	81.825
106	5530	75.5178	81.313
122	5610	75.5321	81.530

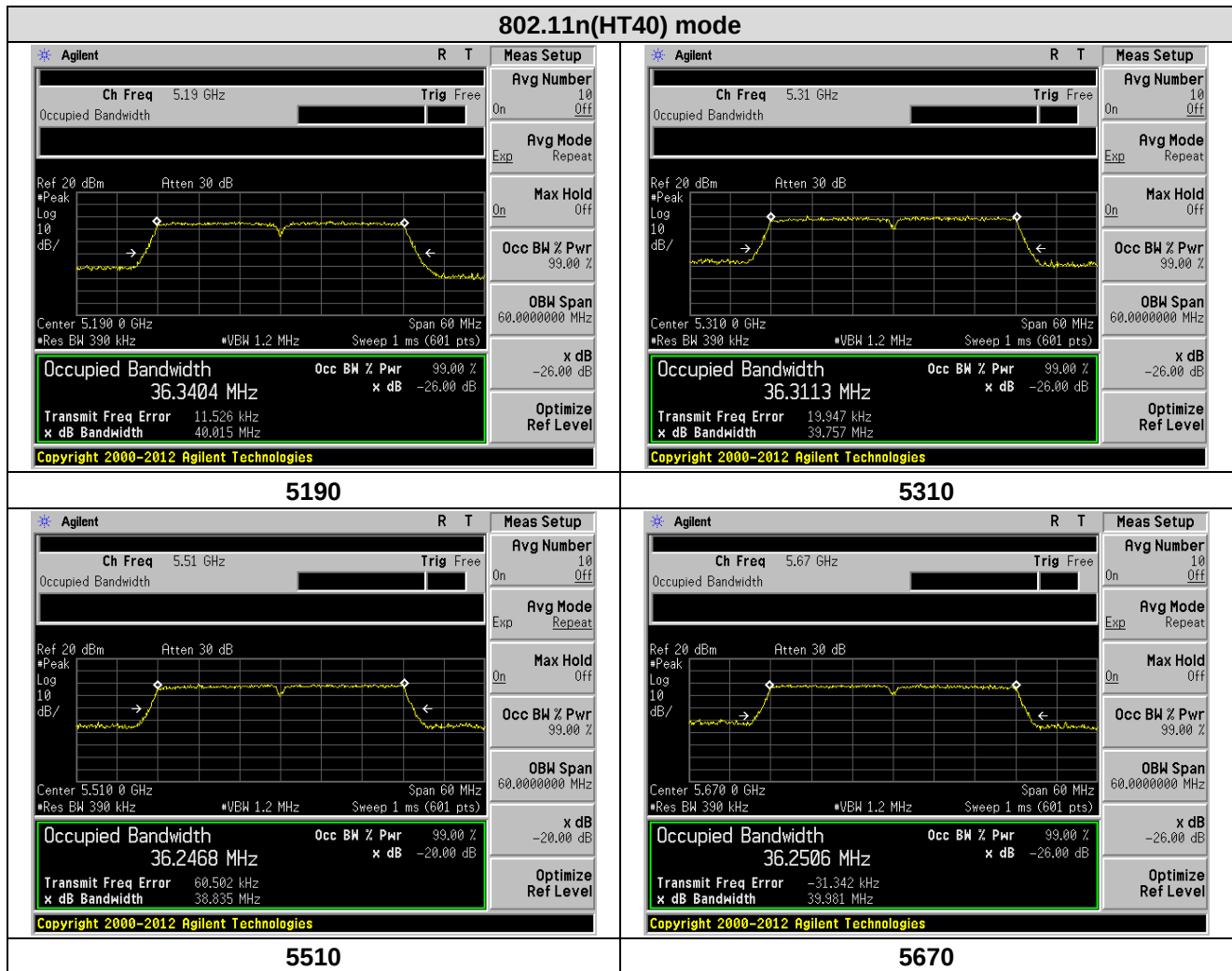
Test plots as followed:

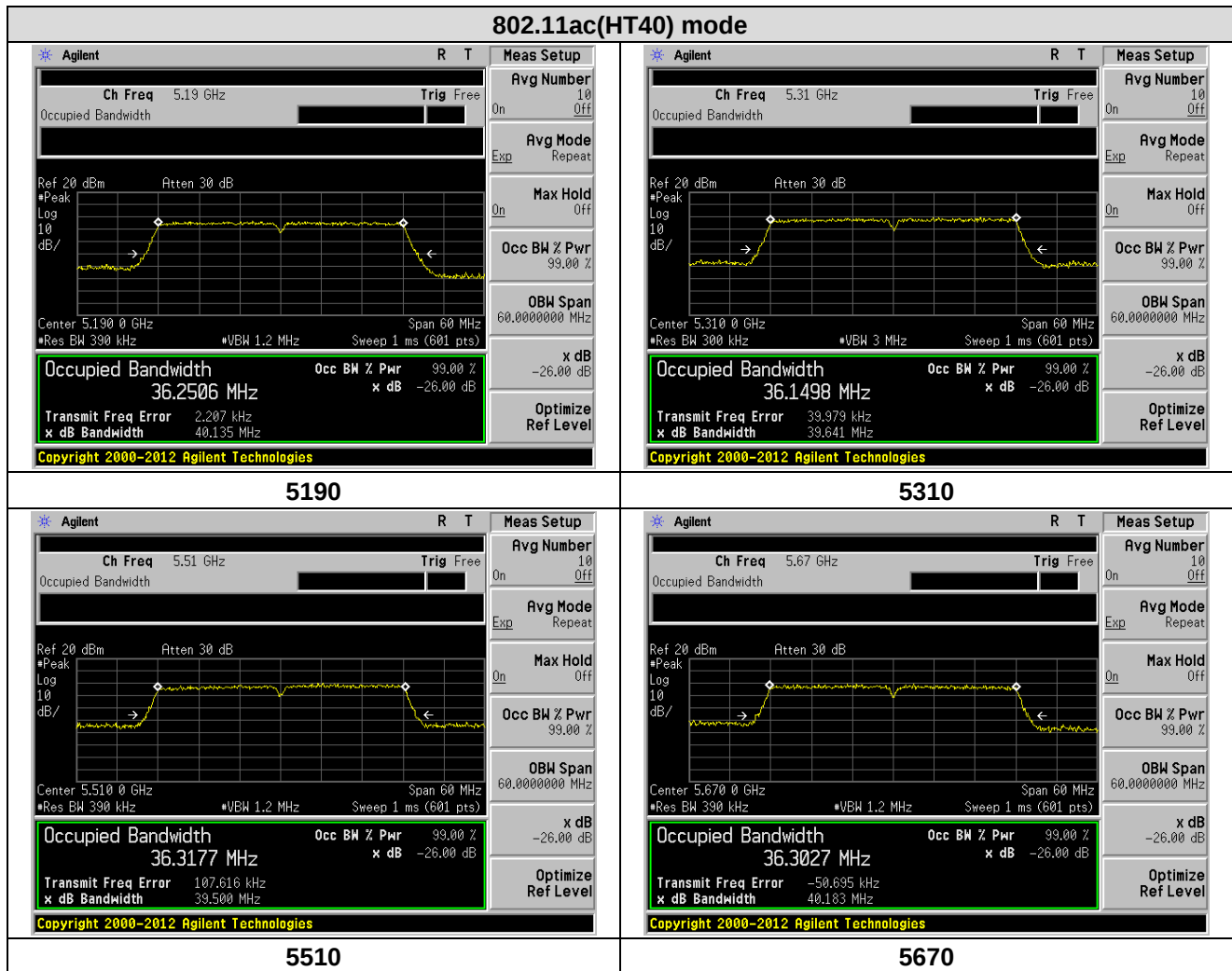
ANT A:

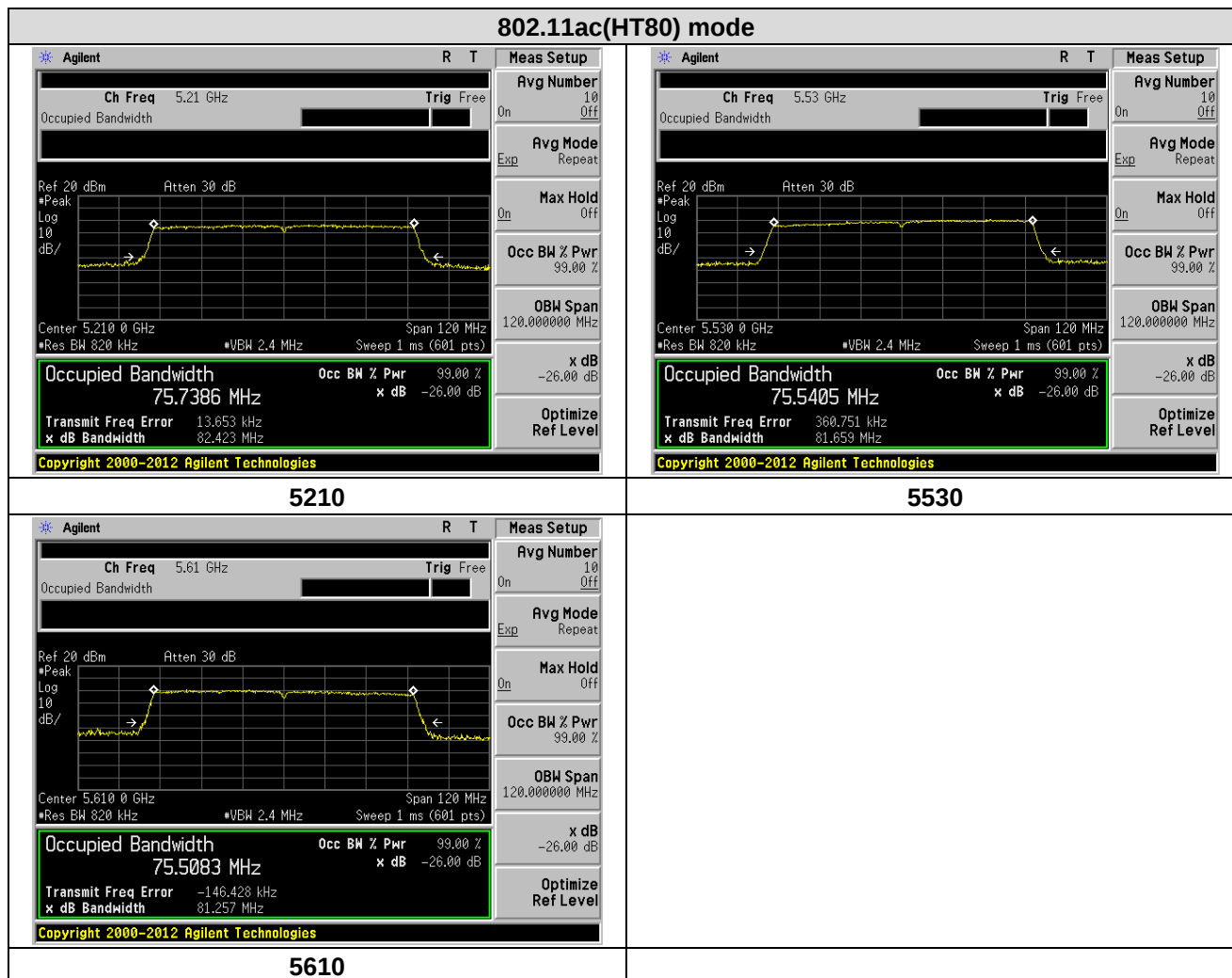










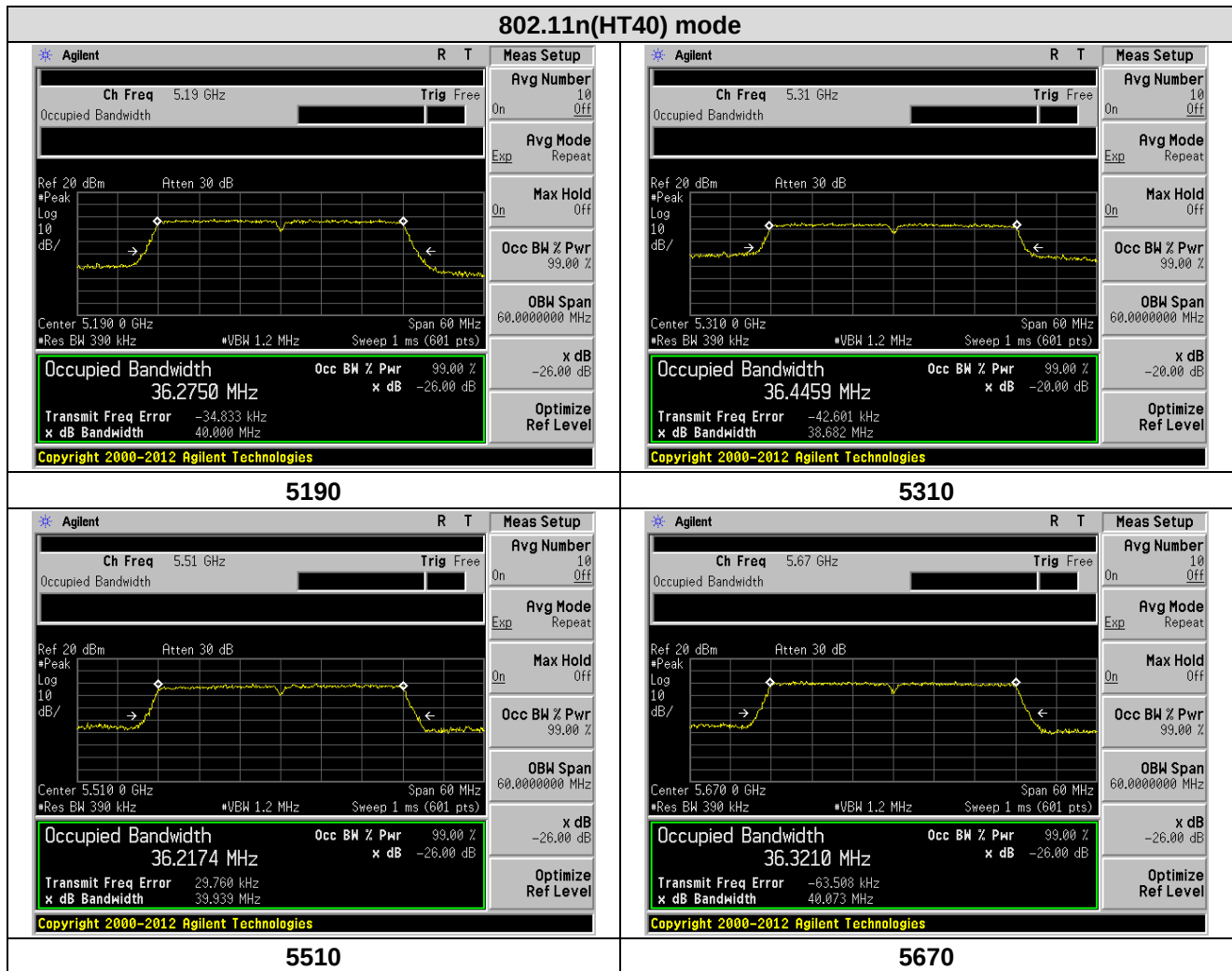


ANT B:

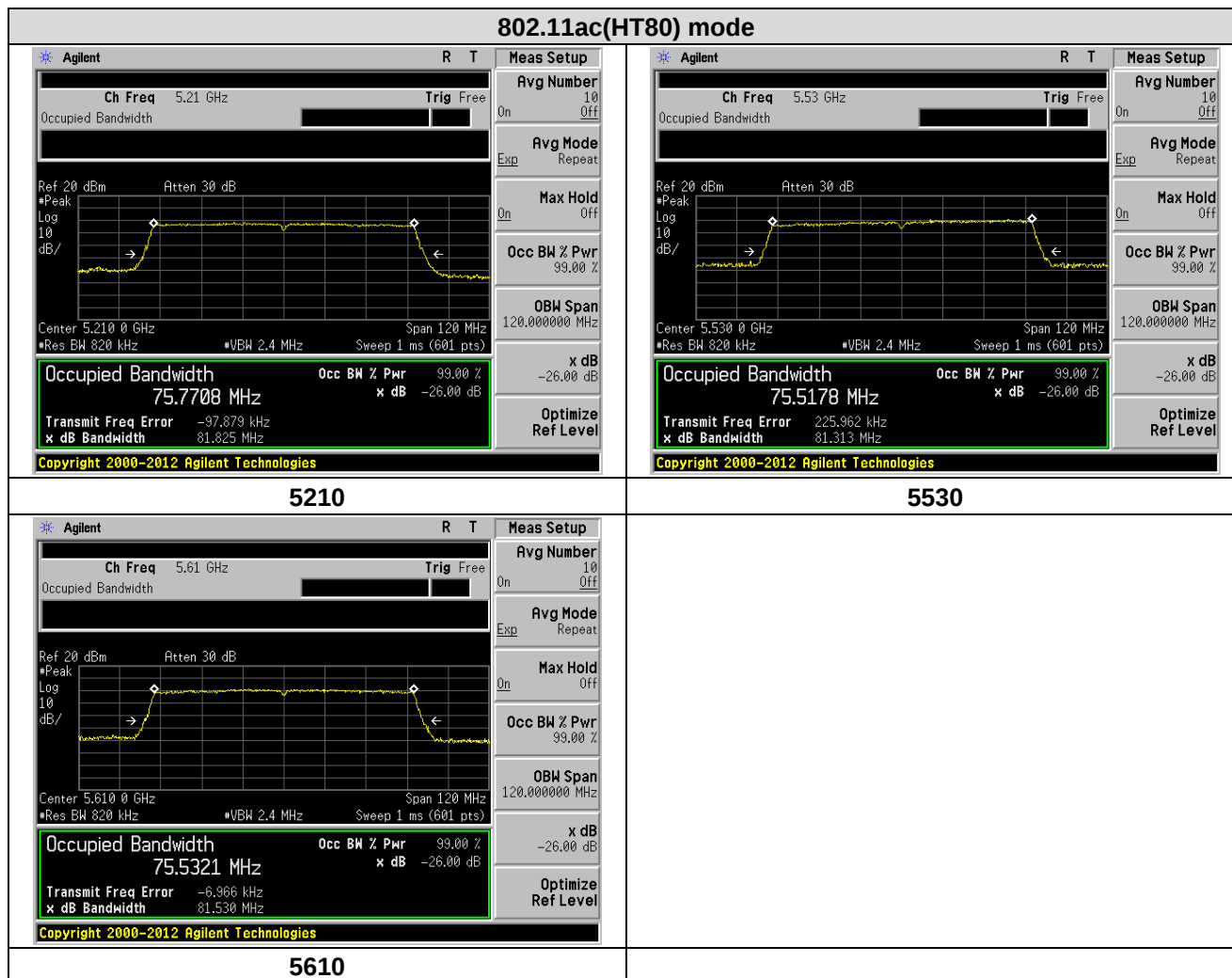




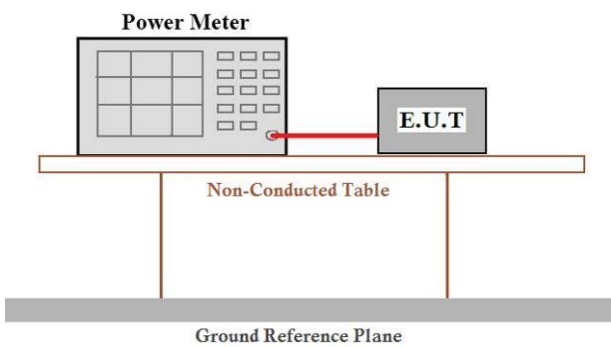








7.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	Frequency band (MHz)	Limit
	5150-5250	$\leq 1\text{W}(30\text{dBm})$ for master device
		$\leq 250\text{mW}(23.98\text{dBm})$ for client device
	5250-5350	$\leq 250\text{mW}(23.98\text{dBm})$ for client device or $11\text{dBm}+10\log B^*$
	5470-5725	$\leq 250\text{mW}(23.98\text{dBm})$ for client device or $11\text{dBm}+10\log B^*$
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.		
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., $10\log(1/0.25)$ 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

Modulation	Duty cycle	Duty Factor
802.11a	98.8%	0.05
802.11n(HT20)	98.8%	0.05
802.11n(HT40)	97.5%	0.11
802.11ac(HT20)	98.9%	0.05
802.11ac(HT40)	97.4%	0.11
802.11ac(HT80)	95.2%	0.21

ANT A:

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	11.89	0.05	11.94	23.98	Pass
48	5240	12.55	0.05	12.60	23.98	Pass
56	5280	13.19	0.05	13.24	23.98	Pass
64	5320	13.87	0.05	13.92	23.98	Pass
100	5500	14.28	0.05	14.33	23.98	Pass
140	5700	13.97	0.05	14.02	23.98	Pass

802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	11.57	0.05	11.62	23.98	Pass
48	5240	12.03	0.05	12.08	23.98	Pass
56	5280	13.04	0.05	13.09	23.98	Pass
64	5320	13.91	0.05	13.96	23.98	Pass
100	5500	14.05	0.05	14.10	23.98	Pass
140	5700	13.24	0.05	13.29	23.98	Pass

802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	11.39	0.05	11.44	23.98	Pass
48	5240	12.39	0.05	12.44	23.98	Pass
56	5280	13.07	0.05	13.12	23.98	Pass
64	5320	13.72	0.05	13.77	23.98	Pass
100	5500	11.78	0.05	11.83	23.98	Pass
140	5700	11.58	0.05	11.63	23.98	Pass

802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190	11.53	0.11	11.64	23.98	Pass
62	5310	14.24	0.11	14.35	23.98	Pass
102	5510	13.47	0.11	13.58	23.98	Pass
134	5670	13.22	0.11	13.33	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	11.45	0.11	11.56	23.98	Pass
62	5310	13.21	0.11	13.32	23.98	Pass
102	5510	13.16	0.11	13.27	23.98	Pass
134	5670	13.08	0.11	13.19	23.98	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210	11.22	0.21	11.43	23.98	Pass
106	5530	13.12	0.21	13.33	23.98	Pass
122	5610	13.70	0.21	13.91	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = $10 \log (1/\text{Duty Cycle})$

ANT B:

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	12.11	0.05	12.16	23.98	Pass
48	5240	13.49	0.05	13.54	23.98	Pass
56	5280	13.95	0.05	14.00	23.98	Pass
64	5320	14.18	0.05	14.23	23.98	Pass
100	5500	12.89	0.05	12.94	23.98	Pass
140	5700	13.34	0.05	13.39	23.98	Pass

802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	12.33	0.05	12.38	23.98	Pass
48	5240	13.50	0.05	13.55	23.98	Pass
56	5280	13.46	0.05	13.51	23.98	Pass
64	5320	14.15	0.05	14.20	23.98	Pass
100	5500	13.08	0.05	13.13	23.98	Pass
140	5700	13.43	0.05	13.48	23.98	Pass

802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	12.07	0.05	12.12	23.98	Pass
48	5240	13.30	0.05	13.35	23.98	Pass
56	5280	13.44	0.05	13.49	23.98	Pass
64	5320	13.07	0.05	13.12	23.98	Pass
100	5500	12.18	0.05	12.23	23.98	Pass
140	5700	12.64	0.05	12.69	23.98	Pass

802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190	11.99	0.11	12.10	23.98	Pass
62	5310	12.57	0.11	12.68	23.98	Pass
102	5510	12.98	0.11	13.09	23.98	Pass
134	5670	13.14	0.11	13.25	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	11.96	0.11	12.07	23.98	Pass
62	5310	13.49	0.11	13.60	23.98	Pass
102	5510	13.24	0.11	13.35	23.98	Pass
134	5670	13.12	0.11	13.23	23.98	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210	11.46	0.21	11.67	23.98	Pass
106	5530	12.69	0.21	12.90	23.98	Pass
122	5610	12.84	0.21	13.05	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

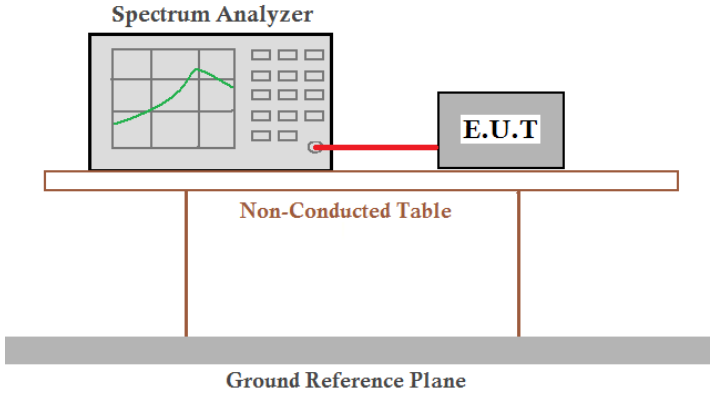
MIMO without beam forming:

Test mode	Frequency (MHz)	ANT A power (dBm)	ANT B power (dBm)	MIMO power (dBm)	Limit (dBm)	Result
802.11n(HT20)	5180	11.62	12.38	15.03	23.98	Pass
	5240	12.08	13.55	15.89		
	5280	13.09	13.51	16.32		
	5320	13.96	14.20	17.09		
	5500	14.10	13.13	16.65		
	5700	13.29	13.48	16.4		
802.11ac(HT20)	5180	11.44	12.12	14.8		
	5240	12.44	13.35	15.93		
	5280	13.12	13.49	16.32		
	5320	13.77	13.12	16.47		
	5500	11.83	12.23	15.04		
	5700	11.63	12.69	15.2		
802.11n(HT40)	5190	11.64	12.10	14.89		
	5310	14.35	12.68	16.61		
	5510	13.58	13.09	16.35		
	5670	13.33	13.25	16.3		
802.11ac(HT40)	5190	11.56	12.07	14.83		
	5310	13.32	13.60	16.47		
	5510	13.27	13.35	16.32		
	5670	13.19	13.23	16.22		
802.11ac(HT80)	5210	11.43	11.67	14.56		
	5530	13.33	12.90	16.13		
	5610	13.91	13.05	16.51		

Note: transmit signals are completely *uncorrelated*,

Directional gain= $10 \times \log [(10^{2.14/10} + 10^{2.54/10})/2]=2.34\text{dBi}$

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:	Frequency band (MHz)	Limit
	5150-5250	≤17dBm in 1MHz for master device
		≤11dBm in 1MHz for client device
	5250-5350	≤11dBm in 1MHz for client device
	5470-5725	≤11dBm in 1MHz for client device
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.		
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.	
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

Modulation	Duty cycle	Duty Factor
802.11a	98.8%	0.05
802.11n(HT20)	98.8%	0.05
802.11n(HT40)	97.5%	0.11
802.11ac(HT20)	98.9%	0.05
802.11ac(HT40)	97.4%	0.11
802.11ac(HT80)	95.2%	0.21

ANT A:

802.11a mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	0.97	0.05	1.02	11	Pass
48	5240	2.54	0.05	2.59	11	Pass
56	5280	3.25	0.05	3.30	11	Pass
64	5320	3.26	0.05	3.31	11	Pass
100	5500	3.46	0.05	3.51	11	Pass
140	5700	4.24	0.05	4.29	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	0.76	0.05	0.81	11	Pass
48	5240	2.09	0.05	2.14	11	Pass
56	5280	2.95	0.05	3.00	11	Pass
64	5320	0.66	0.05	0.71	11	Pass
100	5500	3.88	0.05	3.93	11	Pass
140	5700	1.85	0.05	1.90	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	0.92	0.05	0.97	11	Pass
48	5240	1.75	0.05	1.80	11	Pass
56	5280	1.58	0.05	1.63	11	Pass
64	5320	2.78	0.05	2.83	11	Pass
100	5500	2.11	0.05	2.16	11	Pass
140	5700	1.32	0.05	1.37	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	-3.52	0.11	-3.41	11	Pass
62	5310	1.15	0.11	1.26	11	Pass
102	5510	1.18	0.11	1.29	11	Pass
134	5670	0.71	0.11	0.82	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	-2.72	0.11	-2.61	11	Pass
62	5310	1.33	0.11	1.44	11	Pass
102	5510	0.72	0.11	0.83	11	Pass
134	5670	0.21	0.11	0.32	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	-6.14	0.21	-6.03	11	Pass
106	5530	-2.56	0.21	-2.45	11	Pass
122	5610	-1.78	0.21	-1.67	11	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

ANT B:

802.11a mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	2.69	0.05	2.80	11	Pass
48	5240	3.26	0.05	3.37	11	Pass
56	5280	3.38	0.05	3.49	11	Pass
64	5320	4.72	0.05	4.83	11	Pass
100	5500	2.71	0.05	2.76	11	Pass
140	5700	4.38	0.05	4.43	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	2.48	0.05	2.53	11	Pass
48	5240	2.65	0.05	2.70	11	Pass
56	5280	3.85	0.05	3.90	11	Pass
64	5320	1.62	0.05	1.67	11	Pass
100	5500	3.07	0.05	3.12	11	Pass
140	5700	4.28	0.05	4.33	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	2.71	0.05	2.76	11	Pass
48	5240	3.62	0.05	3.67	11	Pass
56	5280	3.42	0.05	3.47	11	Pass
64	5320	5.12	0.05	5.17	11	Pass
100	5500	2.42	0.05	2.47	11	Pass
140	5700	4.57	0.05	4.62	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	-0.98	0.11	-0.87	11	Pass
62	5310	2.14	0.11	2.25	11	Pass
102	5510	-0.04	0.11	0.07	11	Pass
134	5670	2.26	0.11	2.37	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	-0.69	0.11	-0.58	11	Pass
62	5310	2.17	0.11	2.28	11	Pass
102	5510	0.34	0.11	0.45	11	Pass
134	5670	1.98	0.11	2.09	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	-4.09	0.21	-3.88	11	Pass
106	5530	-3.62	0.21	-3.41	11	Pass
122	5610	-1.11	0.21	-0.90	11	Pass

Note: Output Power = Measured Power + Duty Factor

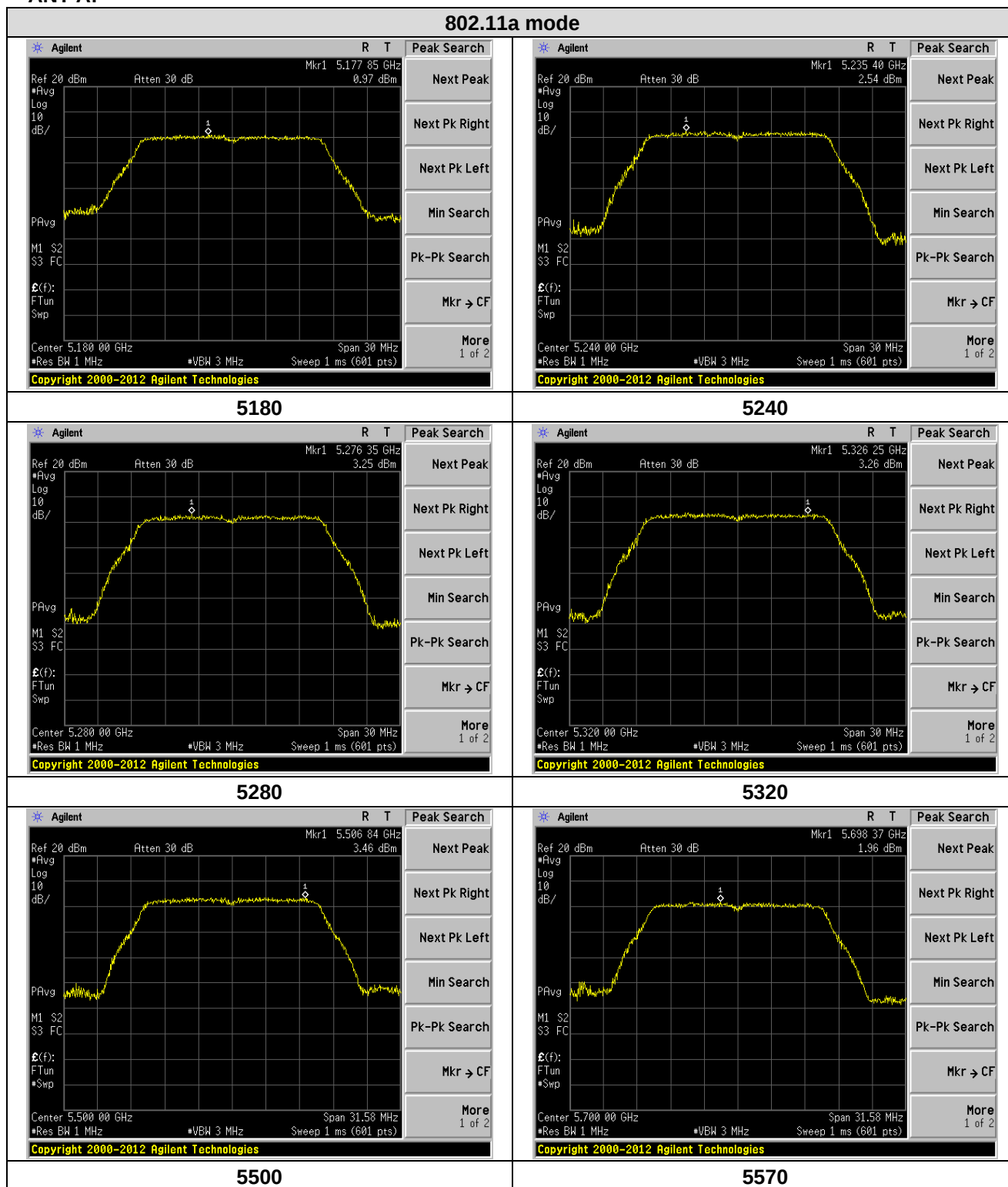
Duty Factor = 10 log (1/Duty Cycle)

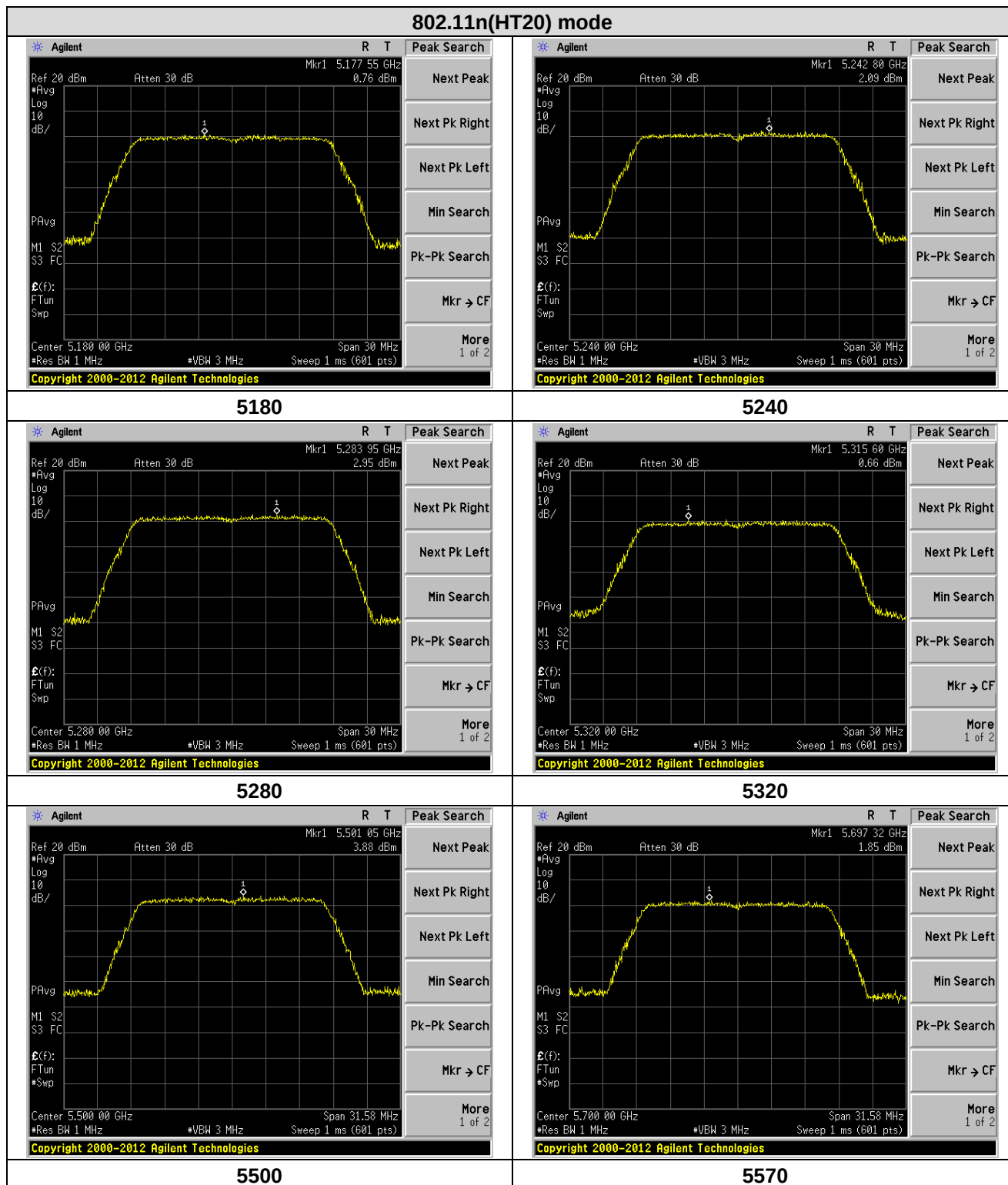
MIMO without beam forming:

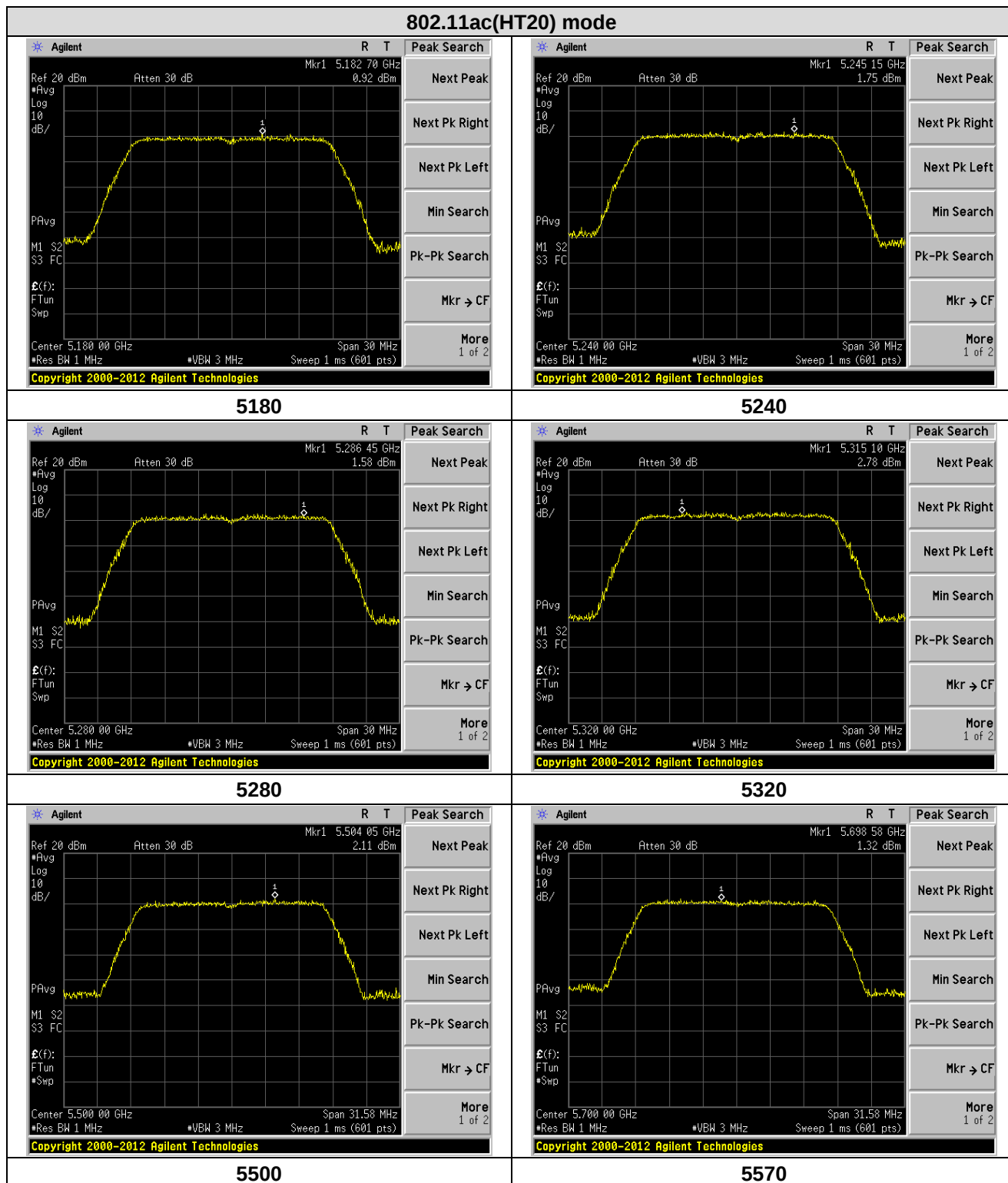
Test mode	Frequency (MHz)	ANT A PSD (dBm/MHz)	ANT B PSD (dBm/MHz)	MIMO (dBm/MHz)	Limit	Result
802.11n(HT20)	5180	0.81	2.53	4.76	11 dBm/M Hz	Pass
	5240	2.14	2.70	5.44		
	5280	3.00	3.90	6.48		
	5320	0.71	1.67	4.23		
	5500	3.93	3.12	6.55		
	5700	1.90	4.33	6.29		
802.11ac(HT20)	5180	0.97	2.76	4.97		
	5240	1.80	3.67	5.85		
	5280	1.63	3.47	5.66		
	5320	2.83	5.17	7.17		
	5500	2.16	2.47	5.33		
	5700	1.37	4.62	6.30		
802.11n(HT40)	5190	-3.41	-0.87	1.05		
	5310	1.26	2.25	4.79		
	5510	1.29	0.07	3.73		
	5670	0.82	2.37	4.67		
802.11ac(HT40)	5190	-2.61	-0.58	1.53		
	5310	1.44	2.28	4.89		
	5510	0.83	0.45	3.65		
	5670	0.32	2.09	4.30		
802.11ac(HT80)	5210	-6.03	-3.88	-1.81		
	5530	-2.45	-3.41	0.11		
	5610	-1.67	-0.90	1.74		

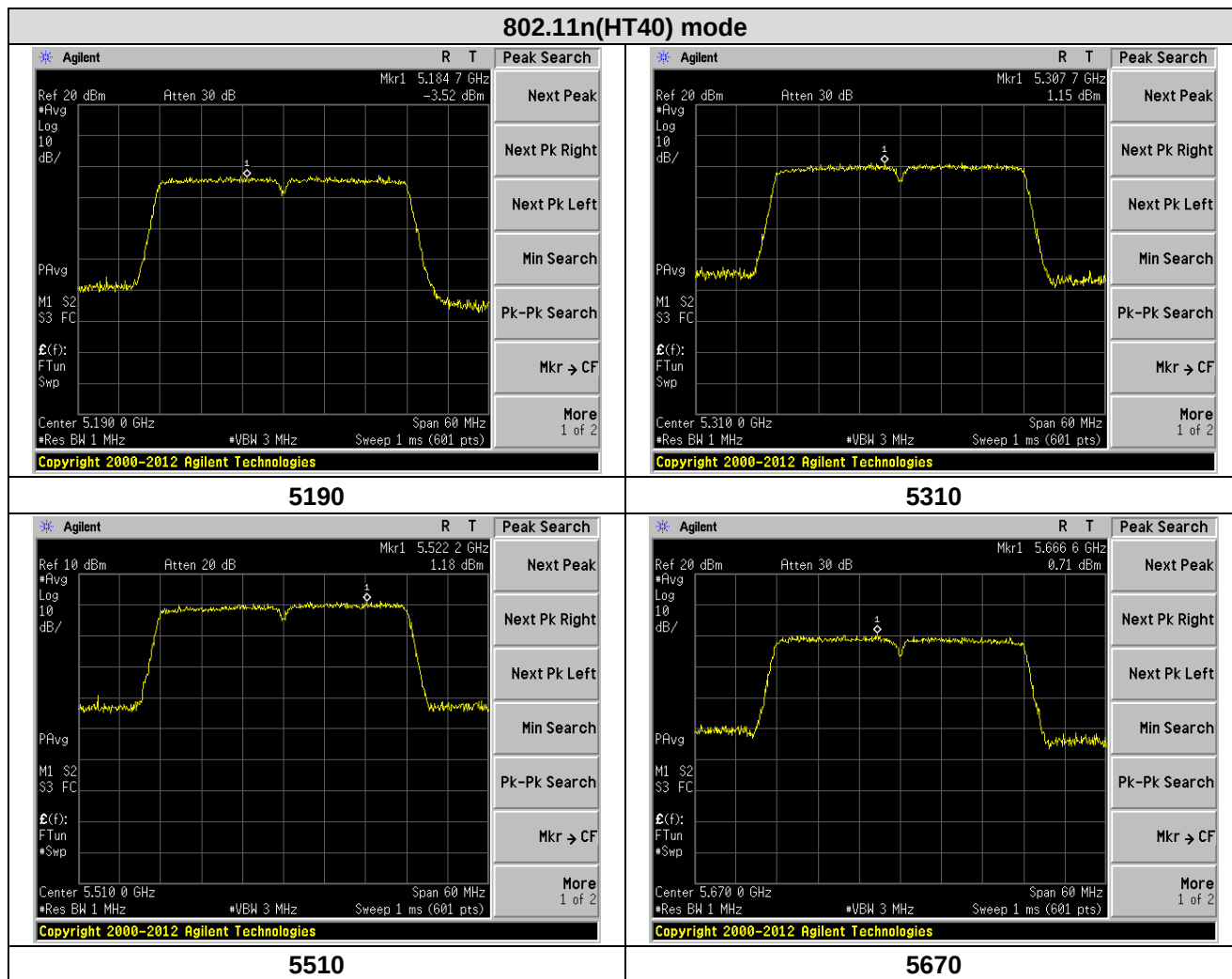
Test plots as followed:

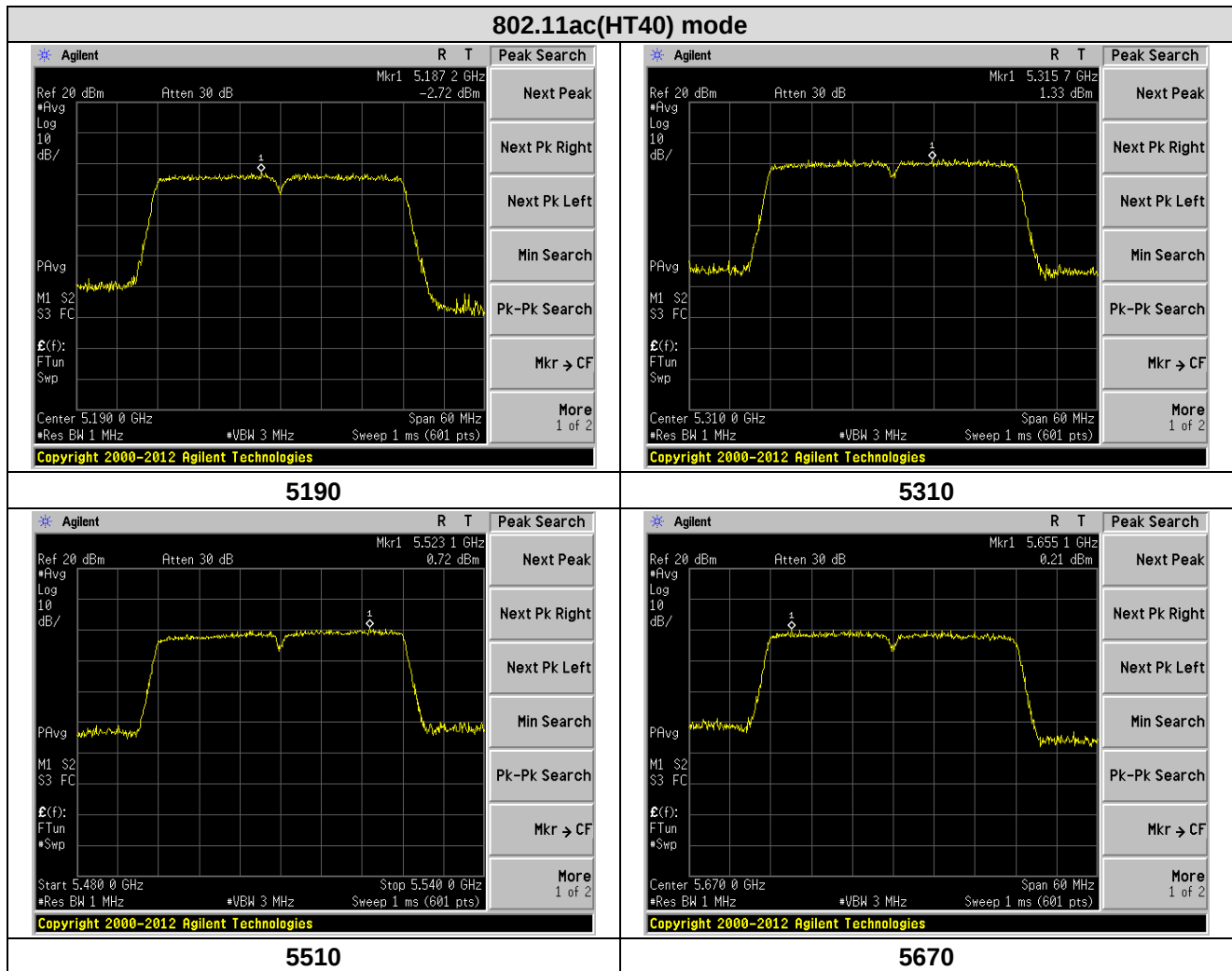
ANT A:

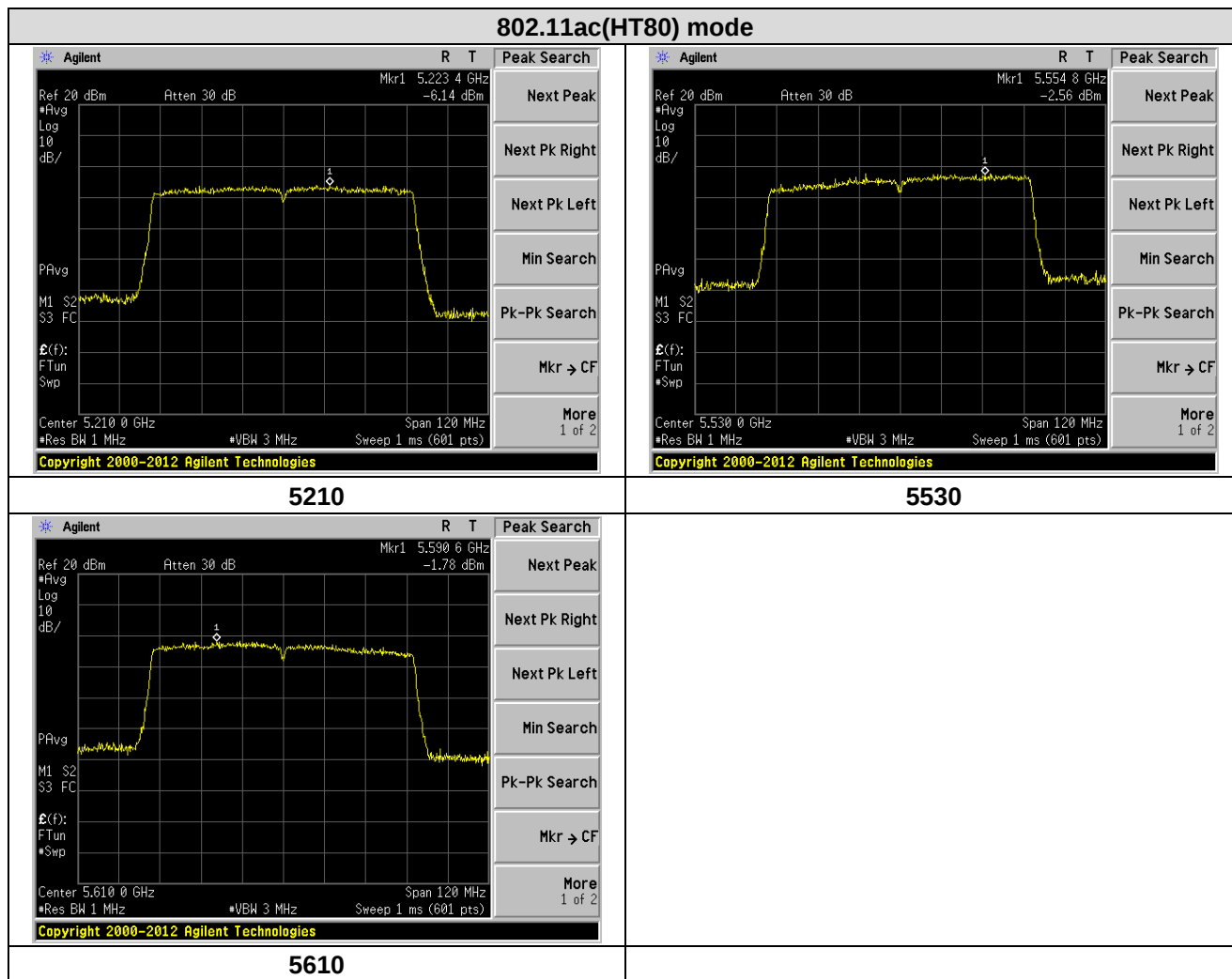




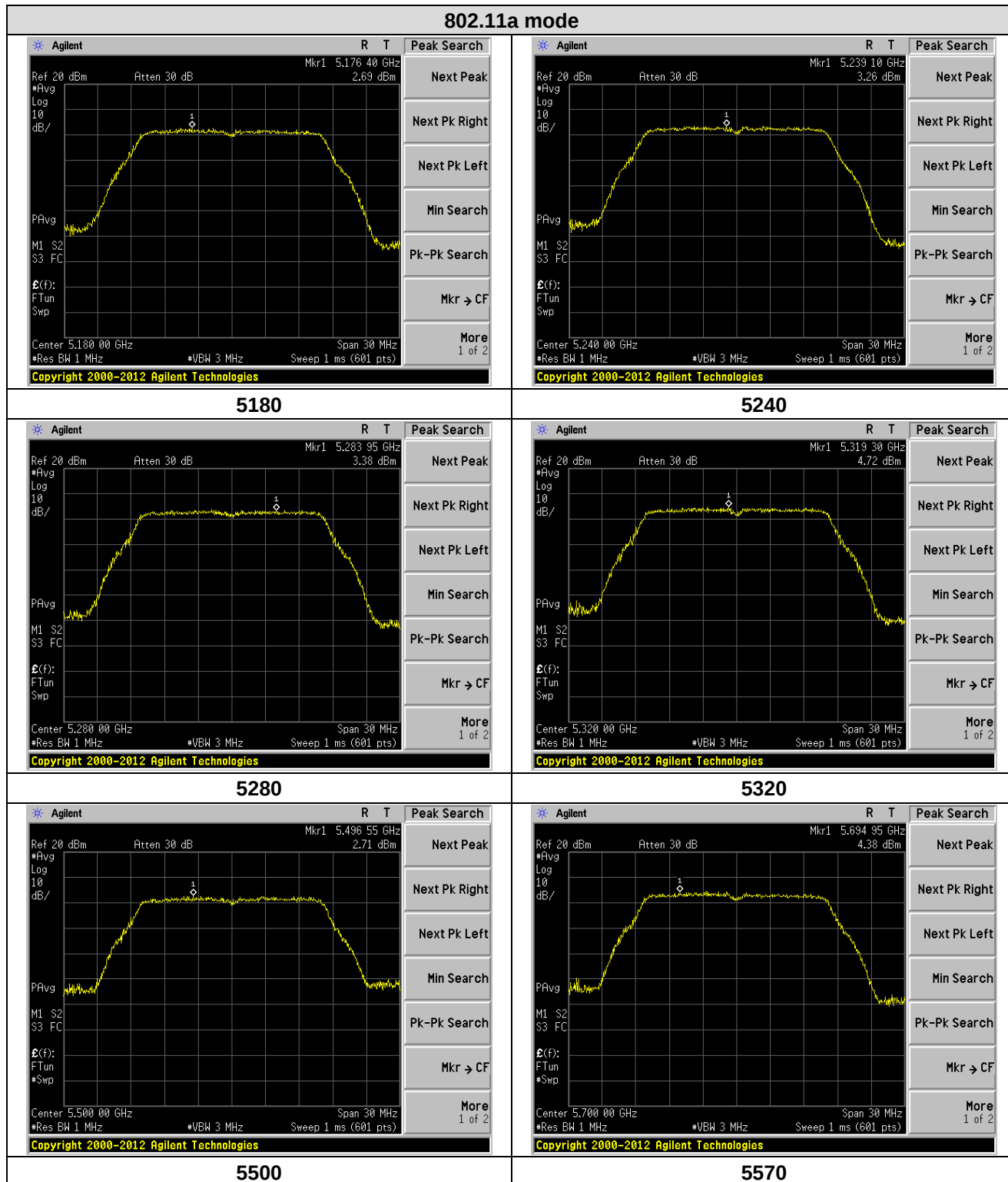


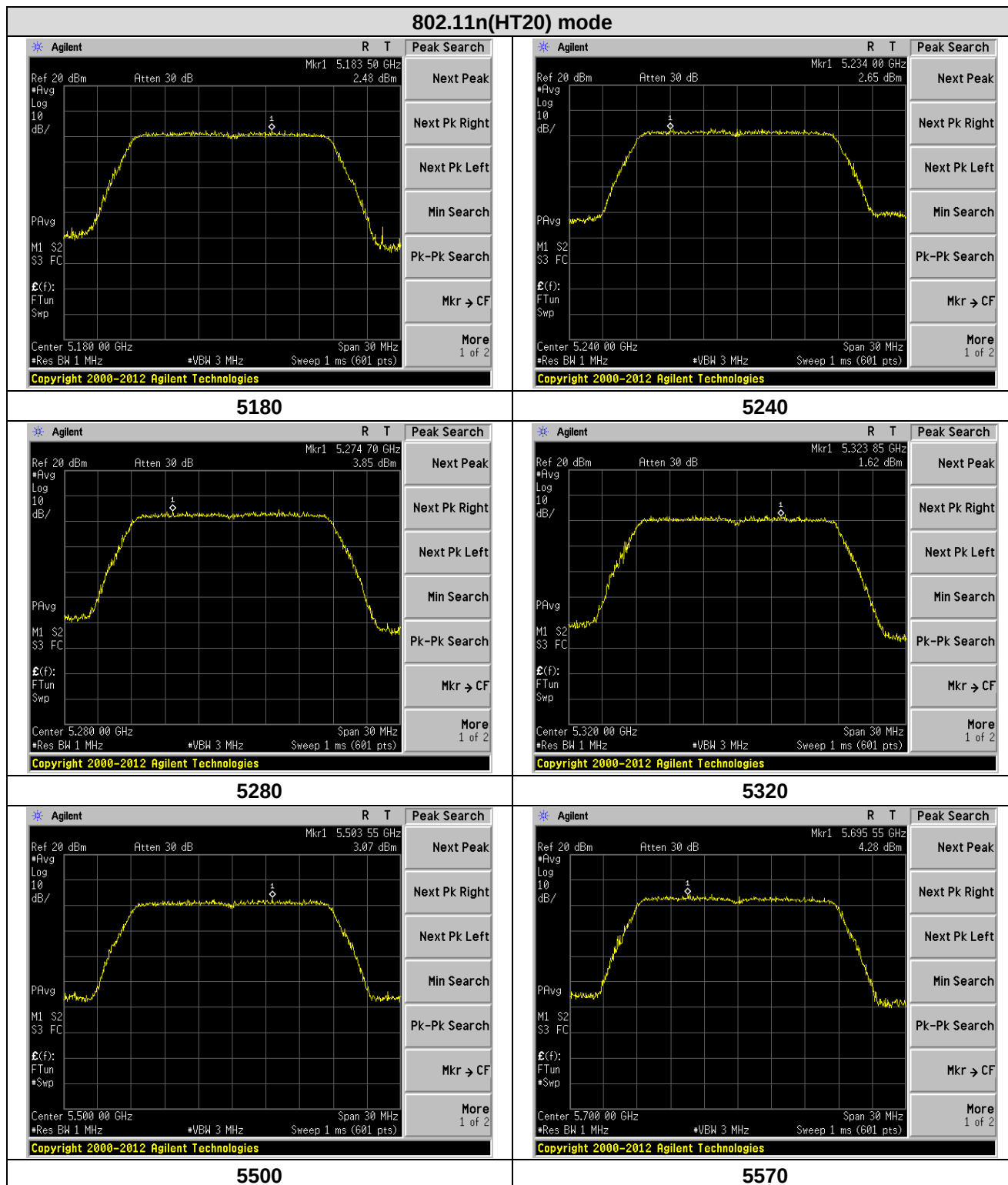


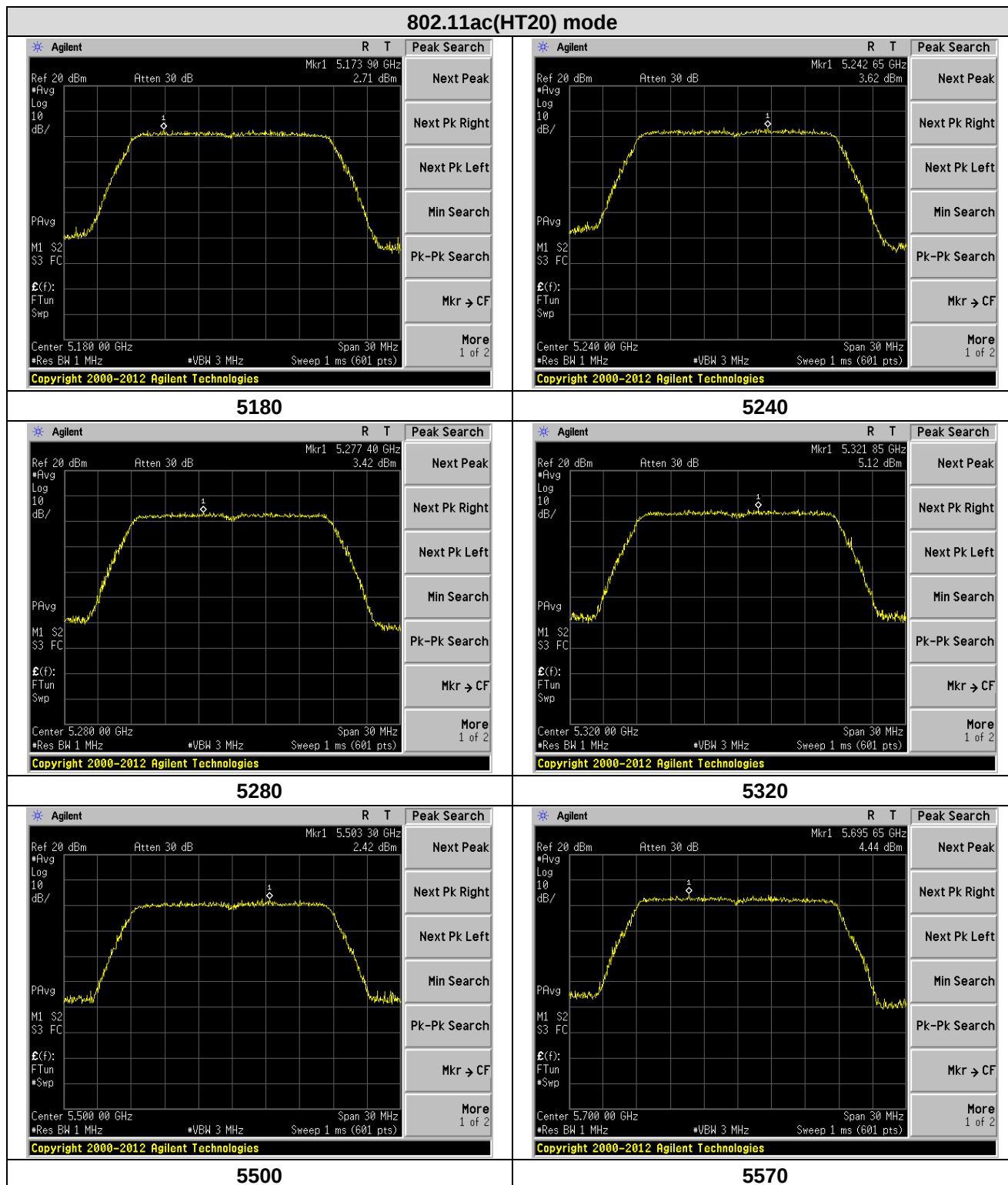


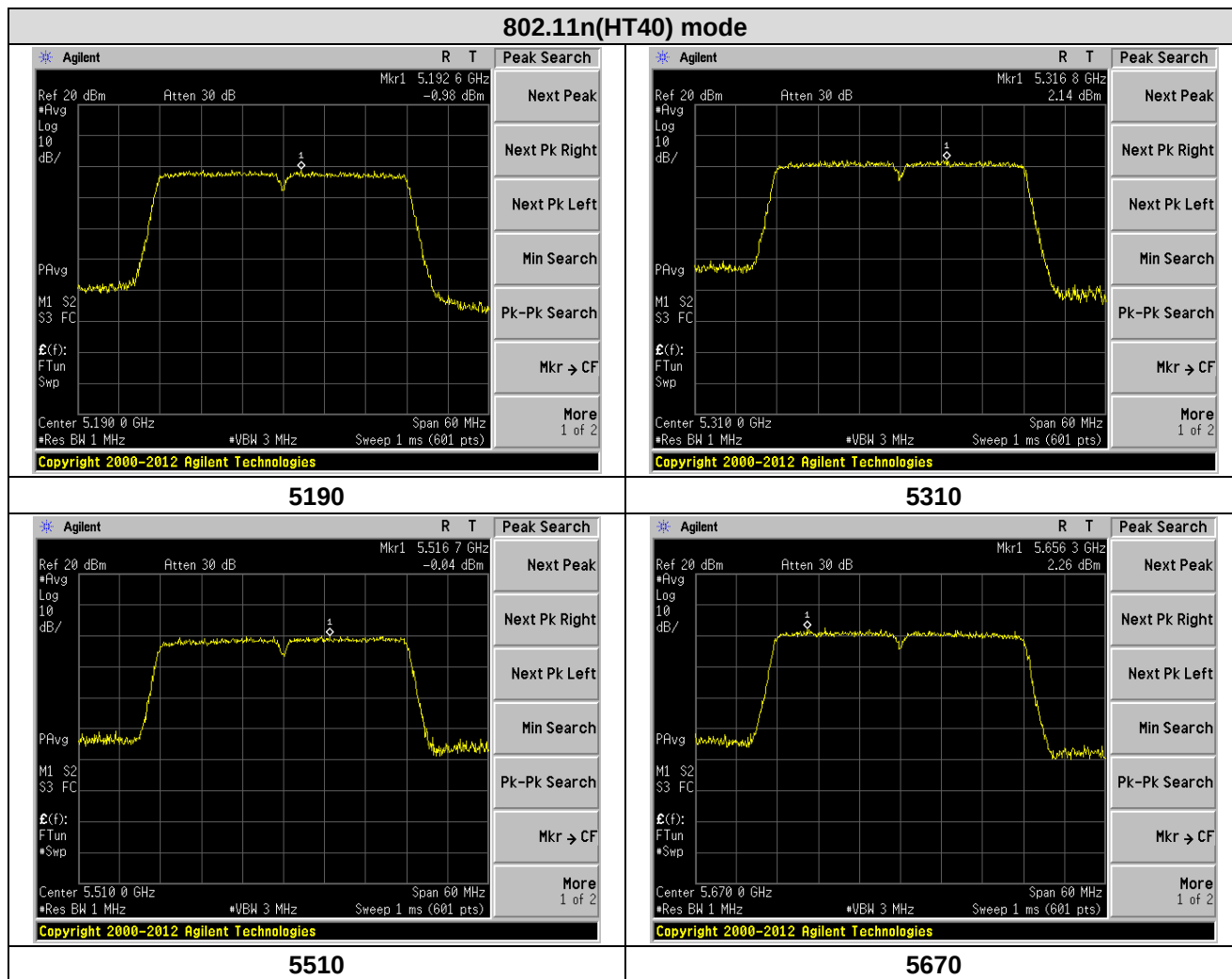


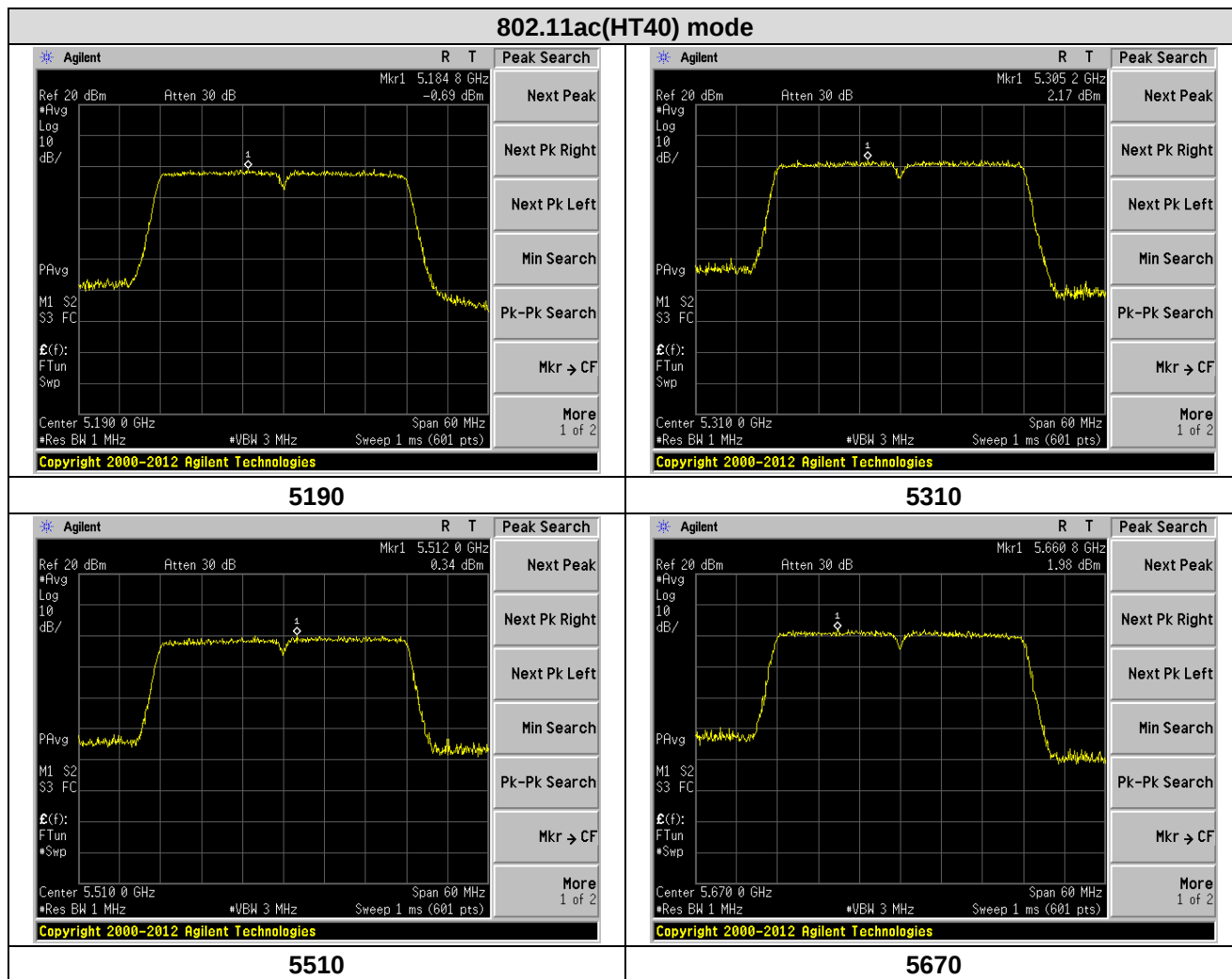
ANT B:

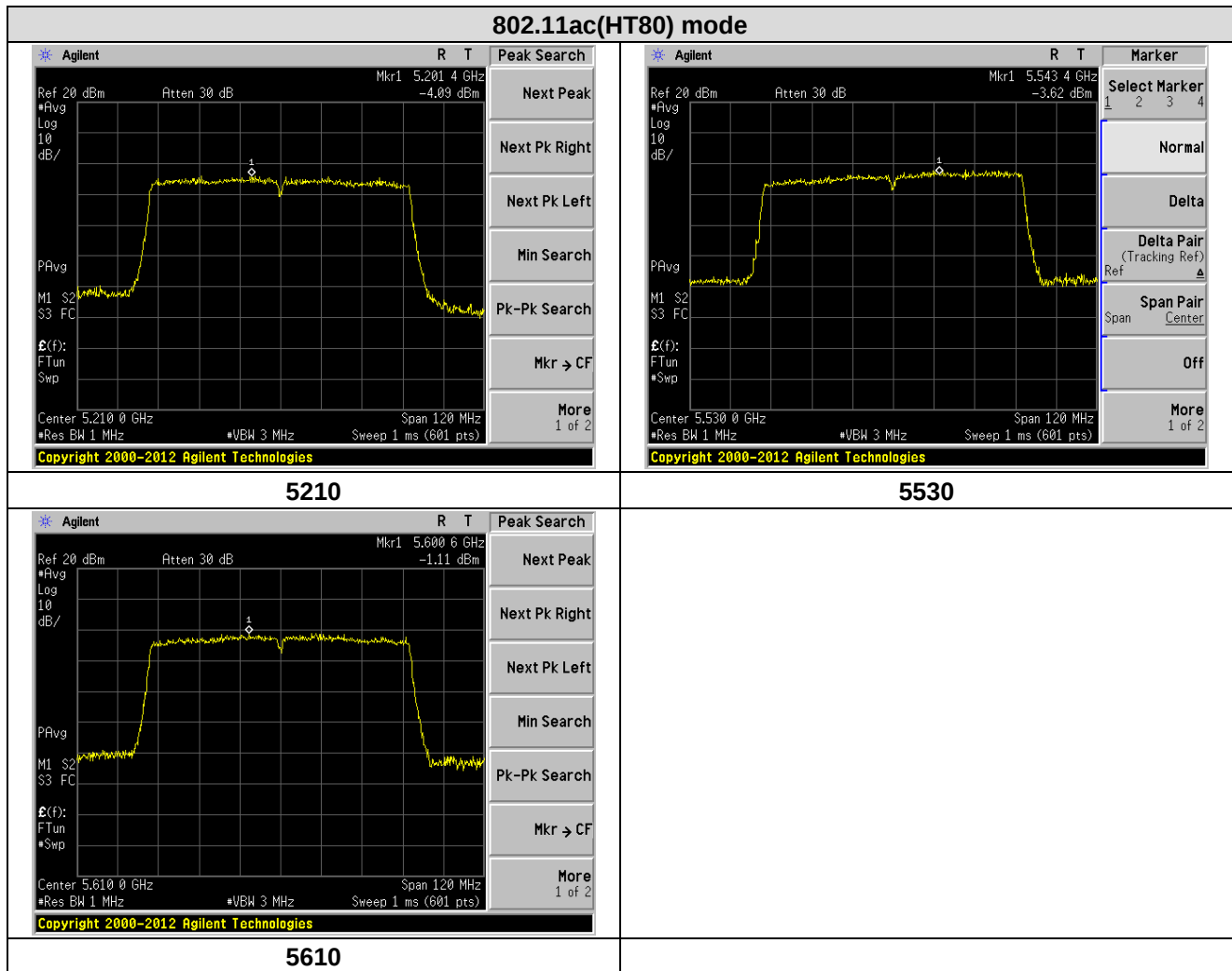






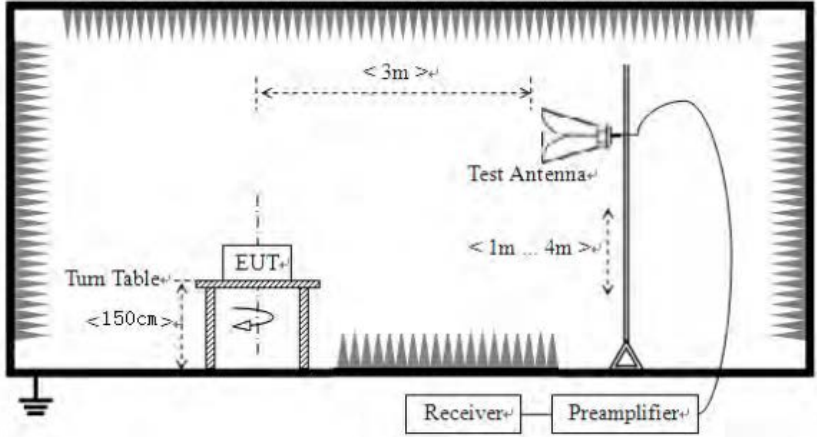






7.6 Band Edge

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 rotatable 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:	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

Remarks:

1. Only the worst case Main Antenna 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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	46.05	32.07	8.99	37.49	49.62	74.00	-24.38	Horizontal
5350.00	47.47	31.75	9.29	37.2	51.31	74.00	-22.69	Horizontal
5460.00	32.29	31.61	9.86	37.08	36.68	74.00	-37.32	Horizontal
5470.00	44.98	31.95	9.56	36.95	49.54	68.20	-18.66	Horizontal
5725.00	45.55	32.53	9.83	35.86	52.05	68.20	-16.15	Horizontal
5150.00	47.70	32.07	8.99	37.49	51.27	74.00	-22.73	Vertical
5350.00	46.19	31.75	9.29	37.2	50.03	74.00	-23.97	Vertical
5460.00	31.28	31.61	9.86	37.08	35.67	74.00	-38.33	Vertical
5470.00	44.57	31.95	9.56	36.95	49.13	68.20	-19.07	Vertical
5725.00	46.86	32.53	9.83	35.86	53.36	68.20	-14.84	Vertical

802.11a(HT20)					AV			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	39.31	32.07	8.99	37.49	42.88	54.00	-11.12	Horizontal
5350.00	36.48	31.75	9.29	37.2	40.32	54.00	-13.68	Horizontal
5460.00	29.41	31.61	9.86	37.08	33.8	54.00	-20.2	Horizontal
5470.00	36.56	31.95	9.56	36.95	41.12	48.20	-7.08	Horizontal
5725.00	37.41	32.53	9.83	35.86	45.91	48.20	-4.29	Horizontal
5150.00	34.57	32.07	8.99	37.49	38.14	54.00	-15.86	Vertical
5350.00	35.97	31.75	9.29	37.2	39.81	54.00	-14.19	Vertical
5460.00	28.12	31.61	9.86	37.08	32.51	54.00	-21.49	Vertical
5470.00	32.07	31.95	9.56	36.95	36.63	48.20	-11.57	Vertical
5725.00	36.31	32.53	9.83	35.86	42.81	48.20	-5.39	Vertical

802.11n(HT20)					PK			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	45.33	32.07	8.99	37.49	48.90	74.00	-25.10	Horizontal
5350.00	47.87	31.75	9.29	37.20	51.71	74.00	-22.29	Horizontal
5460.00	33.54	31.61	9.86	37.08	37.93	74.00	-36.07	Horizontal
5470.00	45.41	31.95	9.56	36.95	49.97	68.20	-18.23	Horizontal
5725.00	47.20	32.53	9.83	35.86	53.70	68.20	-14.50	Horizontal
5150.00	44.84	32.07	8.99	37.49	48.41	74.00	-25.59	Vertical
5350.00	44.15	31.75	9.29	37.20	47.99	74.00	-26.01	Vertical
5460.00	32.58	31.61	9.86	37.08	36.97	74.00	-37.03	Vertical
5470.00	45.47	31.95	9.56	36.95	50.03	68.20	-18.17	Vertical
5725.00	47.23	32.53	9.83	35.86	53.73	68.20	-14.47	Vertical

802.11n(HT20)					AV			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	34.22	32.07	8.99	37.49	37.79	54.00	-16.21	Horizontal
5350.00	39.75	31.75	9.29	37.20	43.59	54.00	-10.41	Horizontal
5460.00	29.58	31.61	9.86	37.08	33.97	54.00	-20.03	Horizontal
5470.00	34.73	31.95	9.56	36.95	39.29	48.20	-8.91	Horizontal
5725.00	33.97	32.53	9.83	35.86	40.47	48.20	-7.73	Horizontal
5150.00	33.00	32.07	8.99	37.49	36.57	54.00	-17.43	Vertical
5350.00	34.79	31.75	9.29	37.20	38.63	54.00	-15.37	Vertical
5460.00	28.66	31.61	9.86	37.08	33.05	54.00	-20.95	Vertical
5470.00	35.53	31.95	9.56	36.95	40.09	48.20	-8.11	Vertical
5725.00	36.25	32.53	9.83	35.86	42.75	48.20	-5.45	Vertical

802.11ac(HT20)					PK			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	43.29	32.07	8.99	37.49	46.86	74.00	-27.14	Horizontal
5350.00	44.78	31.75	9.29	37.20	48.62	74.00	-25.38	Horizontal
5460.00	33.96	31.61	9.86	37.08	38.35	74.00	-35.65	Horizontal
5470.00	43.25	31.95	9.56	36.95	47.81	68.20	-20.39	Horizontal
5725.00	45.76	32.53	9.83	35.86	52.26	68.20	-15.94	Horizontal
5150.00	44.64	32.07	8.99	37.49	48.21	74.00	-25.79	Vertical
5350.00	43.40	31.75	9.29	37.20	47.24	74.00	-26.76	Vertical
5460.00	33.73	31.61	9.86	37.08	38.12	74.00	-35.88	Vertical
5470.00	43.08	31.95	9.56	36.95	47.64	68.20	-20.56	Vertical
5725.00	43.75	32.53	9.83	35.86	50.25	68.20	-17.95	Vertical

802.11ac(HT20)					AV			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	34.39	32.07	8.99	37.49	37.96	54.00	-16.04	Horizontal
5350.00	33.92	31.75	9.29	37.20	37.76	54.00	-16.24	Horizontal
5460.00	28.23	31.61	9.86	37.08	32.62	54.00	-21.38	Horizontal
5470.00	35.16	31.95	9.56	36.95	39.72	48.20	-8.48	Horizontal
5725.00	33.67	32.53	9.83	35.86	40.17	48.20	-8.03	Horizontal
5150.00	34.08	32.07	8.99	37.49	37.65	54.00	-16.35	Vertical
5350.00	34.91	31.75	9.29	37.20	38.75	54.00	-15.25	Vertical
5460.00	27.48	31.61	9.86	37.08	31.87	54.00	-22.13	Vertical
5470.00	35.24	31.95	9.56	36.95	39.80	48.20	-8.40	Vertical
5725.00	34.65	32.53	9.83	35.86	41.15	48.20	-7.05	Vertical

802.11n(HT40)					PK			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	45.12	32.07	8.99	37.49	48.69	74.00	-25.31	Horizontal
5350.00	45.15	31.75	9.29	37.20	48.99	74.00	-25.01	Horizontal
5460.00	34.47	31.61	9.86	37.08	38.86	74.00	-35.14	Horizontal
5470.00	44.89	31.95	9.56	36.95	49.45	68.20	-18.75	Horizontal
5725.00	43.32	32.53	9.83	35.86	49.82	68.20	-18.38	Horizontal
5150.00	43.68	32.07	8.99	37.49	47.25	74.00	-26.75	Vertical
5350.00	45.49	31.75	9.29	37.20	49.33	74.00	-24.67	Vertical
5460.00	34.81	31.61	9.86	37.08	39.20	74.00	-34.80	Vertical
5470.00	45.11	31.95	9.56	36.95	49.67	68.20	-18.53	Vertical
5725.00	44.59	32.53	9.83	35.86	51.09	68.20	-17.11	Vertical

802.11n(HT40)					AV			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	33.90	32.07	8.99	37.49	37.47	54.00	-16.53	Horizontal
5350.00	34.89	31.75	9.29	37.20	38.73	54.00	-15.27	Horizontal
5460.00	28.95	31.61	9.86	37.08	33.34	54.00	-20.66	Horizontal
5470.00	33.54	31.95	9.56	36.95	38.10	48.20	-10.10	Horizontal
5725.00	35.98	32.53	9.83	35.86	42.48	48.20	-5.72	Horizontal
5150.00	35.69	32.07	8.99	37.49	39.26	54.00	-14.74	Vertical
5350.00	35.14	31.75	9.29	37.20	38.98	54.00	-15.02	Vertical
5460.00	27.46	31.61	9.86	37.08	31.85	54.00	-22.15	Vertical
5470.00	35.60	31.95	9.56	36.95	40.16	48.20	-8.04	Vertical
5725.00	34.70	32.53	9.83	35.86	41.20	48.20	-7.00	Vertical

802.11ac(HT40)					PK			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	43.77	32.07	8.99	37.49	47.34	74.00	-26.66	Horizontal
5350.00	43.55	31.75	9.29	37.20	47.39	74.00	-26.61	Horizontal
5460.00	34.50	31.61	9.86	37.08	38.89	74.00	-35.11	Horizontal
5470.00	43.31	31.95	9.56	36.95	47.87	68.20	-20.33	Horizontal
5725.00	45.81	32.53	9.83	35.86	52.31	68.20	-15.89	Horizontal
5150.00	44.53	32.07	8.99	37.49	48.10	74.00	-25.90	Vertical
5350.00	44.23	31.75	9.29	37.20	48.07	74.00	-25.93	Vertical
5460.00	34.41	31.61	9.86	37.08	38.80	74.00	-35.20	Vertical
5470.00	43.56	31.95	9.56	36.95	48.12	68.20	-20.08	Vertical
5725.00	45.04	32.53	9.83	35.86	51.54	68.20	-16.66	Vertical

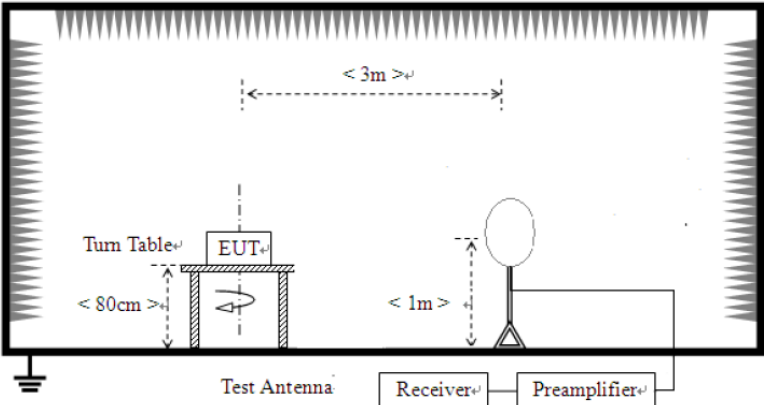
802.11ac(HT40)					AV			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
5150.00	34.57	32.07	8.99	37.49	38.14	54.00	-15.86	Horizontal
5350.00	33.29	31.75	9.29	37.20	37.13	54.00	-16.87	Horizontal
5460.00	28.51	31.61	9.86	37.08	32.90	54.00	-21.10	Horizontal
5470.00	34.34	31.95	9.56	36.95	38.90	48.20	-9.30	Horizontal
5725.00	33.60	32.53	9.83	35.86	40.10	48.20	-8.10	Horizontal
5150.00	35.60	32.07	8.99	37.49	39.17	54.00	-14.83	Vertical
5350.00	33.45	31.75	9.29	37.20	37.29	54.00	-16.71	Vertical
5460.00	28.76	31.61	9.86	37.08	33.15	54.00	-20.85	Vertical
5470.00	35.08	31.95	9.56	36.95	39.64	48.20	-8.56	Vertical
5725.00	35.48	32.53	9.83	35.86	41.98	48.20	-6.22	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	43.67	32.07	8.99	37.49	47.24	74.00	-26.76	Horizontal
5350.00	45.32	31.75	9.29	37.20	49.16	74.00	-24.84	Horizontal
5460.00	35.25	31.61	9.86	37.08	39.64	74.00	-34.36	Horizontal
5470.00	43.52	31.95	9.56	36.95	48.08	68.20	-20.12	Horizontal
5725.00	43.27	32.53	9.83	35.86	49.77	68.20	-18.43	Horizontal
5150.00	43.36	32.07	8.99	37.49	46.93	74.00	-27.07	Vertical
5350.00	44.73	31.75	9.29	37.20	48.57	74.00	-25.43	Vertical
5460.00	35.35	31.61	9.86	37.08	39.74	74.00	-34.26	Vertical
5470.00	45.14	31.95	9.56	36.95	49.70	68.20	-18.50	Vertical
5725.00	44.46	32.53	9.83	35.86	50.96	68.20	-17.24	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	34.39	32.07	8.99	37.49	37.96	54.00	-16.04	Horizontal
5350.00	33.94	31.75	9.29	37.20	37.78	54.00	-16.22	Horizontal
5460.00	28.44	31.61	9.86	37.08	32.83	54.00	-21.17	Horizontal
5470.00	35.85	31.95	9.56	36.95	40.41	48.20	-7.79	Horizontal
5725.00	33.32	32.53	9.83	35.86	39.82	48.20	-8.38	Horizontal
5150.00	34.91	32.07	8.99	37.49	38.48	54.00	-15.52	Vertical
5350.00	33.11	31.75	9.29	37.20	36.95	54.00	-17.05	Vertical
5460.00	27.05	31.61	9.86	37.08	31.44	54.00	-22.56	Vertical
5470.00	34.84	31.95	9.56	36.95	39.40	48.20	-8.80	Vertical
5725.00	35.66	32.53	9.83	35.86	42.16	48.20	-6.04	Vertical

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 rotatable 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: $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ 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 to 1GHz

Report No: 0702010110001207

Diagram illustrating the setup for radiated emissions testing above 1GHz. The EUT is placed on a Turn Table at a height of < 80cm. The Test Antenna is positioned at a distance of < 3m from the EUT and at a height of < 1m ... 4m. The antenna is connected to a Receiver and a Preamplifier.

For radiated emissions above 1GHz

Diagram illustrating the setup for radiated emissions testing below 1GHz. The EUT is placed on a Turn Table at a height of < 150cm. The Test Antenna is positioned at a distance of < 3m from the EUT and at a height of < 1m ... 4m. The antenna is connected to a Receiver and a Preamplifier.

Test Instruments:

Refer to section 5.10 for details

Test mode:

Refer to section 5.2 for details

Test environment:

Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
--------	-------	---------	-----	---------	----------

Test voltage:

AC 120V, 60Hz

Test results:

Pass

Remarks:

1. Only the worst case Main Antenna 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.

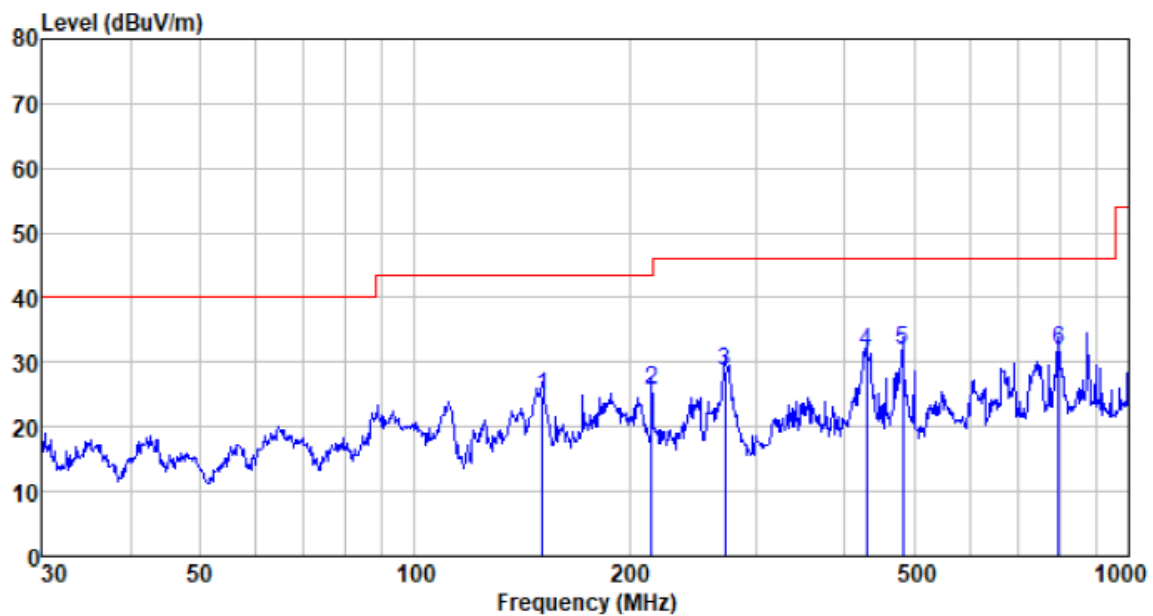
Measurement Data:

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.

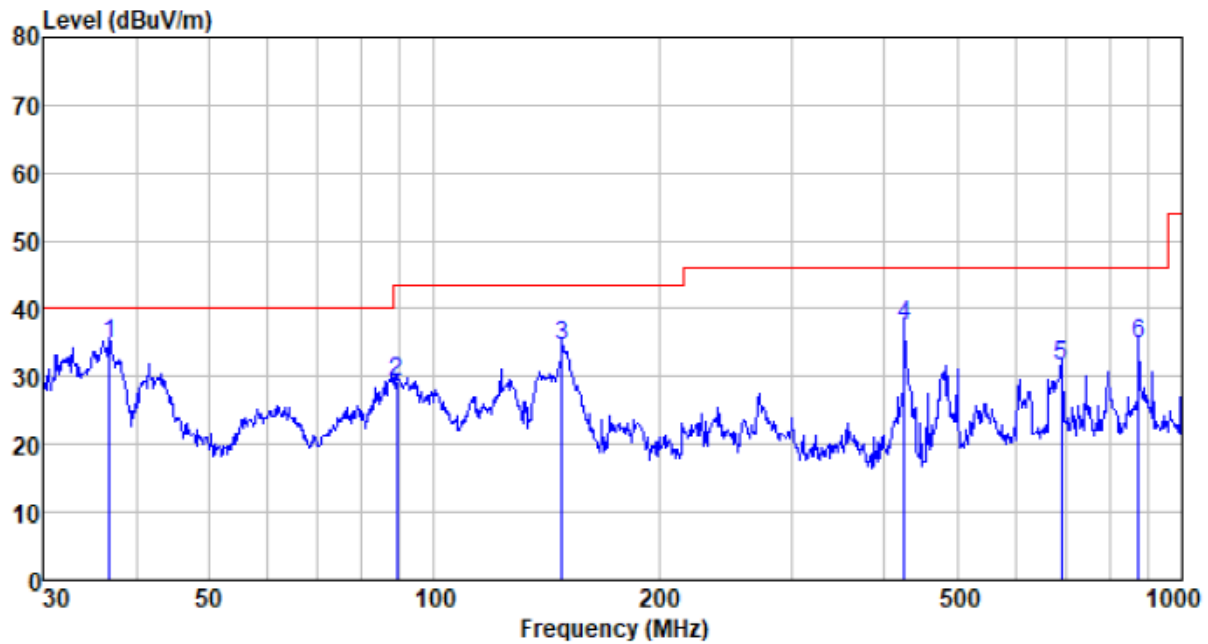
30MHz~ 1GHz

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
151.067	53.17	7.70	1.09	37.08	24.88	43.50	-18.62	QP
214.514	50.71	10.95	1.28	37.35	25.59	43.50	-17.91	QP
272.278	51.86	12.84	1.47	37.40	28.77	46.00	-17.23	QP
429.523	51.13	15.95	1.88	37.52	31.44	46.00	-14.56	QP
482.216	50.32	16.97	2.05	37.51	31.83	46.00	-14.17	QP
796.183	45.30	21.34	2.82	37.62	31.84	46.00	-14.16	QP

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
36.766	58.39	11.64	0.14	35.47	34.70	40.00	-5.30	QP
89.276	54.85	10.45	0.67	36.63	29.34	43.50	-14.16	QP
148.441	63.07	7.57	1.08	37.07	34.65	43.50	-8.85	QP
425.028	57.34	15.87	1.87	37.52	37.56	46.00	-8.44	QP
689.565	46.84	19.59	2.66	37.62	31.47	46.00	-14.53	QP
875.247	47.30	22.09	2.96	37.60	34.75	46.00	-11.25	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	29.29	39.67	14.62	32.65	50.93	74	-23.07	Vertical
15540.00	32.95	38.6	17.66	34.46	54.75	74	-19.25	Vertical
10360.00	30.37	39.67	14.62	32.65	52.01	74	-21.99	Horizontal
15540.00	31.33	38.6	17.66	34.46	53.13	74	-20.87	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	32.94	39.75	14.63	32.71	54.61	74	-19.39	Vertical
15600.00	32.54	38.33	17.67	34.17	54.37	74	-19.63	Vertical
10400.00	31.61	39.75	14.63	32.71	53.28	74	-20.72	Horizontal
15600.00	31.71	38.33	17.67	34.17	53.54	74	-20.46	Horizontal

802.11a(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.9	39.82	14.68	32.86	53.54	74	-20.46	Vertical
15720.00	29.83	38.09	17.73	33.66	51.99	74	-22.01	Vertical
10480.00	31.91	39.82	14.68	32.86	53.55	74	-20.45	Horizontal
15720.00	32.35	38.09	17.73	33.66	54.51	74	-19.49	Horizontal

802.11a 5320MHz

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
10640.00	29.58	40.06	14.8	33.22	51.22	74	-22.78	Vertical
15960.00	29.16	37.97	17.85	33.3	51.68	74	-22.32	Vertical
10640.00	32.33	40.06	14.8	33.22	53.97	74	-20.03	Horizontal
15960.00	30.46	37.97	17.85	33.3	52.98	74	-21.02	Horizontal

802.11a 5500MHz

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
11000.00	30.05	40.1	14.82	33.28	51.69	74	-22.31	Vertical
16500.00	31.94	37.95	17.87	33.24	54.52	74	-19.48	Vertical
11000.00	31.04	40.1	14.82	33.28	52.68	74	-21.32	Horizontal
16500.00	30.81	37.95	17.87	33.24	53.39	74	-20.61	Horizontal

802.11a 5700MHz

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
11400.00	28.78	40.38	14.96	33.7	50.42	74	-23.58	Vertical
17100.00	29.52	37.81	18.01	32.82	52.52	74	-21.48	Vertical
11400.00	28.67	40.38	14.96	33.7	50.31	74	-23.69	Horizontal
17100.00	28.52	37.81	18.01	32.82	51.52	74	-22.48	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	29.77	39.67	14.62	32.65	51.41	74	-22.59	Vertical
15540.00	32.55	38.6	17.66	34.46	54.35	74	-19.65	Vertical
10360.00	32.93	39.67	14.62	32.65	54.57	74	-19.43	Horizontal
15540.00	30.10	38.6	17.66	34.46	51.9	74	-22.1	Horizontal

802.11n(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	30.74	39.75	14.63	32.71	52.41	74	-21.59	Vertical
15600.00	31.80	38.33	17.67	34.17	53.63	74	-20.37	Vertical
10400.00	28.67	39.75	14.63	32.71	50.34	74	-23.66	Horizontal
15600.00	31.14	38.33	17.67	34.17	52.97	74	-21.03	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	30.19	39.82	14.68	32.86	51.83	74	-22.17	Vertical
15720.00	32.56	38.09	17.73	33.66	54.72	74	-19.28	Vertical
10480.00	28.58	39.82	14.68	32.86	50.22	74	-23.78	Horizontal
15720.00	30.75	38.09	17.73	33.66	52.91	74	-21.09	Horizontal

802.11n(HT20) 5320MHz

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
10640.00	31.51	40.06	14.8	33.22	53.15	74	-20.85	Vertical
15960.00	31.41	37.97	17.85	33.3	53.93	74	-20.07	Vertical
10640.00	28.41	40.06	14.8	33.22	50.05	74	-23.95	Horizontal
15960.00	28.28	37.97	17.85	33.3	50.8	74	-23.2	Horizontal

802.11n(HT20) 5500MHz

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
11000.00	30.41	40.1	14.82	33.28	52.05	74	-21.95	Vertical
16500.00	32.61	37.95	17.87	33.24	55.19	74	-18.81	Vertical
11000.00	31.78	40.1	14.82	33.28	53.42	74	-20.58	Horizontal
16500.00	28.16	37.95	17.87	33.24	50.74	74	-23.26	Horizontal

802.11n(HT20) 5700MHz

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
11400.00	31.05	40.38	14.96	33.7	52.69	74	-21.31	Vertical
17100.00	29.02	37.81	18.01	32.82	52.02	74	-21.98	Vertical
11400.00	28.35	40.38	14.96	33.7	49.99	74	-24.01	Horizontal
17100.00	29.12	37.81	18.01	32.82	52.12	74	-21.88	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	28.12	39.67	14.62	32.65	49.76	74	-24.24	Vertical
15540.00	31.30	38.6	17.66	34.46	53.1	74	-20.9	Vertical
10360.00	29.92	39.67	14.62	32.65	51.56	74	-22.44	Horizontal
15540.00	32.33	38.6	17.66	34.46	54.13	74	-19.87	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	28.30	39.75	14.63	32.71	49.97	74	-24.03	Vertical
15600.00	31.93	38.33	17.67	34.17	53.76	74	-20.24	Vertical
10400.00	28.04	39.75	14.63	32.71	49.71	74	-24.29	Horizontal
15600.00	31.63	38.33	17.67	34.17	53.46	74	-20.54	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	31.77	39.82	14.68	32.86	53.41	74	-20.59	Vertical
15720.00	29.11	38.09	17.73	33.66	51.27	74	-22.73	Vertical
10480.00	32.92	39.82	14.68	32.86	54.56	74	-19.44	Horizontal
15720.00	31.91	38.09	17.73	33.66	54.07	74	-19.93	Horizontal

802.11ac(HT20) 5320MHz

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
10640.00	31.48	40.06	14.8	33.22	53.12	74	-20.88	Vertical
15960.00	31.49	37.97	17.85	33.3	54.01	74	-19.99	Vertical
10640.00	29.64	40.06	14.8	33.22	51.28	74	-22.72	Horizontal
15960.00	30.94	37.97	17.85	33.3	53.46	74	-20.54	Horizontal

802.11ac(HT20) 5500MHz

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
11000.00	31.13	40.1	14.82	33.28	52.77	74	-21.23	Vertical
16500.00	31.99	37.95	17.87	33.24	54.57	74	-19.43	Vertical
11000.00	29.77	40.1	14.82	33.28	51.41	74	-22.59	Horizontal
16500.00	28.79	37.95	17.87	33.24	51.37	74	-22.63	Horizontal

802.11ac(HT20) 5700MHz

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
11400.00	32.58	40.38	14.96	33.7	54.22	74	-19.78	Vertical
17100.00	29.3	37.81	18.01	32.82	52.3	74	-21.7	Vertical
11400.00	29.01	40.38	14.96	33.7	50.65	74	-23.35	Horizontal
17100.00	28.09	37.81	18.01	32.82	51.09	74	-22.91	Horizontal

802.11n(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	28.99	39.71	14.63	32.68	50.65	74	-23.35	Vertical
15570.00	28.67	38.46	17.67	34.32	50.48	74	-23.52	Vertical
10380.00	28.26	39.71	14.63	32.68	49.92	74	-24.08	Horizontal
15570.00	28.01	38.46	17.67	34.32	49.82	74	-24.18	Horizontal

802.11n(HT40) 5310MHz

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
10620.00	30.51	40.02	14.78	33.16	52.15	74	-21.85	Vertical
15930.00	32.31	37.99	17.83	33.36	54.77	74	-19.23	Vertical
10620.00	30.90	40.02	14.78	33.16	52.54	74	-21.46	Horizontal
15930.00	30.68	37.99	17.83	33.36	53.14	74	-20.86	Horizontal

802.11n(HT40) 5510MHz

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
11020.00	30.31	40.14	14.84	33.34	51.95	74	-22.05	Vertical
16530.00	31.72	37.93	17.89	33.18	54.36	74	-19.64	Vertical
11020.00	29.95	40.14	14.84	33.34	51.59	74	-22.41	Horizontal
16530.00	30.13	37.93	17.89	33.18	52.77	74	-21.23	Horizontal

802.11n(HT40) 5670MHz

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
11340.00	30.8	40.34	14.94	33.64	52.44	74	-21.56	Vertical
17010.00	30.37	37.83	17.99	32.88	53.31	74	-20.69	Vertical
11340.00	30.88	40.34	14.94	33.64	52.52	74	-21.48	Horizontal
17010.00	28.2	37.83	17.99	32.88	51.14	74	-22.86	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	31.23	39.71	14.63	32.68	52.89	74	-21.11	Vertical
15570.00	30.02	38.46	17.67	34.32	51.83	74	-22.17	Vertical
10380.00	28.58	39.71	14.63	32.68	50.24	74	-23.76	Horizontal
15570.00	29.64	38.46	17.67	34.32	51.45	74	-22.55	Horizontal

802.11ac(HT40) 5310MHz

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
10620.00	29.60	40.02	14.78	33.16	51.24	74	-22.76	Vertical
15930.00	30.24	37.99	17.83	33.36	52.7	74	-21.3	Vertical
10620.00	28.25	40.02	14.78	33.16	49.89	74	-24.11	Horizontal
15930.00	31.54	37.99	17.83	33.36	54	74	-20	Horizontal

802.11ac(HT40) 5510MHz

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
11020.00	31.41	40.14	14.84	33.34	53.05	74	-20.95	Vertical
16530.00	32.92	37.93	17.89	33.18	55.56	74	-18.44	Vertical
11020.00	29.1	40.14	14.84	33.34	50.74	74	-23.26	Horizontal
16530.00	28.8	37.93	17.89	33.18	51.44	74	-22.56	Horizontal

802.11ac(HT40) 5670MHz

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
11340.00	29.24	40.34	14.94	33.64	50.88	74	-23.12	Vertical
17010.00	32.53	37.83	17.99	32.88	55.47	74	-18.53	Vertical
11340.00	31.36	40.34	14.94	33.64	53	74	-21	Horizontal
17010.00	29.6	37.83	17.99	32.88	52.54	74	-21.46	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	29.10	39.82	14.66	32.8	50.78	74	-23.22	Vertical
15630.00	31.39	38.09	17.71	33.81	53.38	74	-20.62	Vertical
10420.00	32.10	39.82	14.66	32.8	53.78	74	-20.22	Horizontal
15630.00	32.57	38.09	17.71	33.81	54.56	74	-19.44	Horizontal

802.11ac(HT80) 5530MHz

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
11060.00	32.78	40.18	14.86	33.4	54.42	74	-19.58	Vertical
16590.00	31.94	37.91	17.91	33.12	54.64	74	-19.36	Vertical
11060.00	32.93	40.18	14.86	33.4	54.57	74	-19.43	Horizontal
16590.00	31.55	37.91	17.91	33.12	54.25	74	-19.75	Horizontal

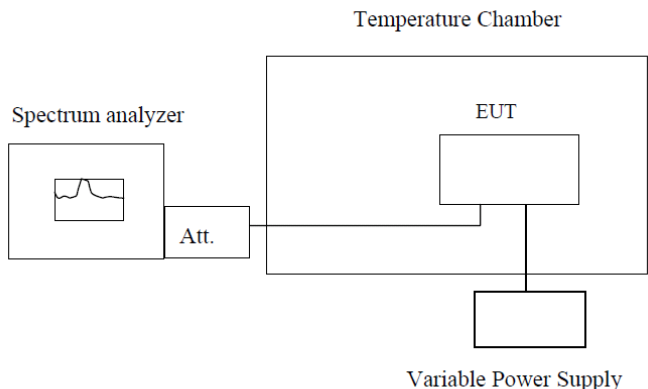
802.11ac(HT80) 5610MHz

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
11220.00	30.14	40.3	14.92	33.58	51.78	74	-22.22	Vertical
16830.00	29.93	37.85	17.97	32.94	52.81	74	-21.19	Vertical
11220.00	31.46	40.3	14.92	33.58	53.1	74	-20.9	Horizontal
16830.00	30.22	37.85	17.97	32.94	53.1	74	-20.9	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.
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:

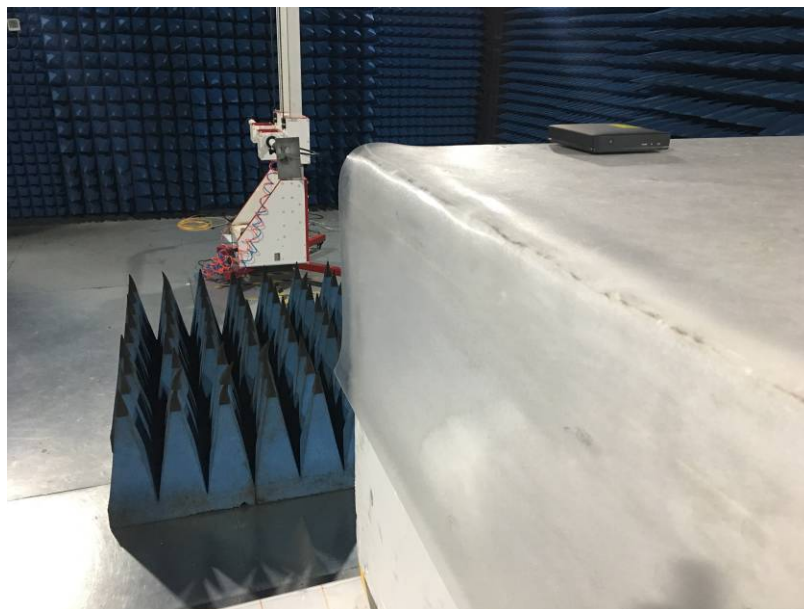
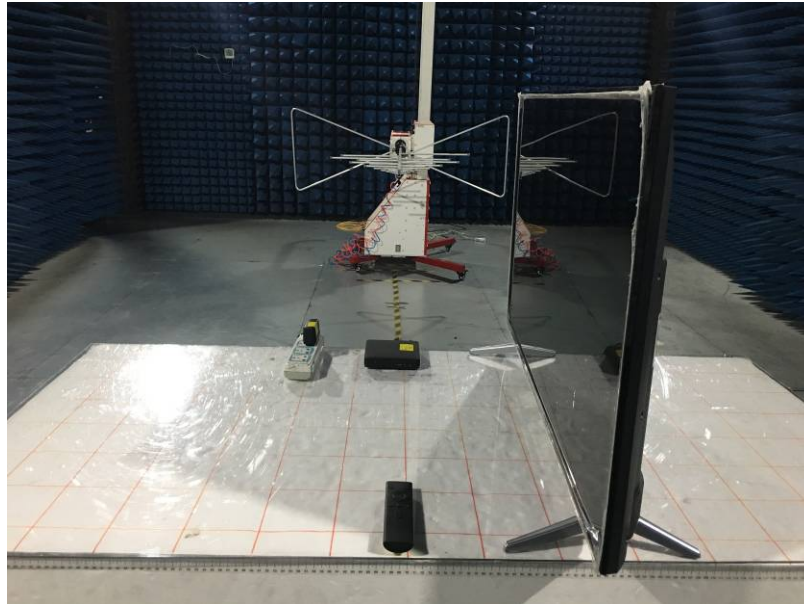
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (VAC)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5179.7797	Pass	5180.0673	Pass	5180.2934	Pass	5179.9774	Pass
-20	120	5179.3441	Pass	5180.7984	Pass	5180.4911	Pass	5179.6756	Pass
-10	120	5179.3032	Pass	5180.4548	Pass	5180.0045	Pass	5179.0632	Pass
0	120	5179.0184	Pass	5180.0024	Pass	5180.4195	Pass	5179.3145	Pass
10	120	5179.0976	Pass	5180.7975	Pass	5180.7293	Pass	5179.9387	Pass
20	120	5179.8661	Pass	5180.4314	Pass	5180.3684	Pass	5179.6318	Pass
30	120	5179.2395	Pass	5180.2178	Pass	5180.4728	Pass	5179.4514	Pass
40	120	5179.5189	Pass	5180.5854	Pass	5180.8453	Pass	5179.5087	Pass
50	120	5179.4691	Pass	5180.5656	Pass	5180.1689	Pass	5179.3851	Pass
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
25	108	5179.7276	Pass	5180.2079	Pass	5180.4941	Pass	5179.9746	Pass
25	120	5179.2358	Pass	5180.5321	Pass	5180.4631	Pass	5179.9616	Pass
25	132	5179.4914	Pass	5180.6996	Pass	5180.1919	Pass	5179.3046	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	120	5189.4977	Pass	5190.2609	Pass	5190.8635	Pass	5189.9214	Pass
-20	120	5189.5197	Pass	5190.1810	Pass	5190.0777	Pass	5189.9053	Pass
-10	120	5189.0592	Pass	5190.7286	Pass	5190.4380	Pass	5189.1032	Pass
0	120	5189.8882	Pass	5190.1469	Pass	5190.8754	Pass	5189.2494	Pass
10	120	5189.7527	Pass	5190.0988	Pass	5190.3096	Pass	5189.8695	Pass
20	120	5189.5507	Pass	5190.3997	Pass	5190.8544	Pass	5189.7288	Pass
30	120	5189.4867	Pass	5190.6365	Pass	5190.5159	Pass	5189.3846	Pass
40	120	5189.2947	Pass	5190.4751	Pass	5190.9359	Pass	5189.1411	Pass
50	120	5189.9849	Pass	5190.8767	Pass	5190.4110	Pass	5189.7780	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	108	5189.9719	Pass	5190.4645	Pass	5190.6146	Pass	5189.2189	Pass
25	120	5189.8145	Pass	5190.1777	Pass	5190.6683	Pass	5189.0427	Pass
25	132	5189.1239	Pass	5190.9723	Pass	5190.6912	Pass	5189.7551	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	120	5209.0452	Pass	5210.0183	Pass	5209.9245	Pass	5210.4632	Pass
-20	120	5209.2184	Pass	5210.1253	Pass	5209.1406	Pass	5210.0777	Pass
-10	120	5209.1546	Pass	5210.3142	Pass	5209.1024	Pass	5210.8647	Pass
0	120	5209.3385	Pass	5210.5436	Pass	5209.2115	Pass	5210.6110	Pass
10	120	5209.0569	Pass	5210.9138	Pass	5209.3415	Pass	5210.4088	Pass
20	120	5209.4075	Pass	5210.1343	Pass	5209.8780	Pass	5210.8181	Pass
30	120	5209.5881	Pass	5210.1163	Pass	5209.8282	Pass	5210.6165	Pass
40	120	5209.9908	Pass	5210.9878	Pass	5209.5771	Pass	5210.4201	Pass
50	120	5209.2274	Pass	5210.5683	Pass	5209.4775	Pass	5210.3214	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	108	5210.7919	Pass	5209.0948	Pass	5209.3987	Pass	5210.4984	Pass
25	120	5210.6885	Pass	5209.5414	Pass	5209.2554	Pass	5210.9346	Pass
25	132	5210.2857	Pass	5209.0289	Pass	5209.4905	Pass	5210.4345	Pass

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201811000126F01

---END---