

TEST REPORT

Applicant: DTEN Inc

Address of Applicant: 97 E. Brokaw Road, Suite 180, San Jose, CA 95112, United States

Manufacturer/Factory: DTEN Inc

Address of Manufacturer/Factory: 97 E. Brokaw Road, Suite 180, San Jose, CA 95112, United States

Equipment Under Test (EUT)

Product Name: DTEN Mate

Model No.: DBA13310

Trade Mark: DTEN

FCC ID: 2AQ7Q-DBA13310

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

Date of sample receipt: Dec. 04, 2020

Date of Test: Dec. 04, 2020~Mar. 11, 2021

Date of report issue: Mar. 12, 2021

Test Result : PASS *

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

Authorized Signature:

Robinson Luo

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	Mar. 12, 2021	Original

Prepared By:

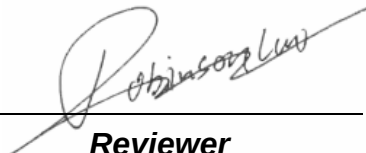


Date:

Mar. 12, 2021

Tested/Project Engineer

Check By:



Reviewer

Date:

Mar. 12, 2021

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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
26dB Bandwidth	15.407(a)	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	0.009MHz-30MHz	3.1dB	(1)
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:	DTEN Mate			
Model No.:	DBA13310			
Serial No.:	N/A			
Hardware Version:	K-MATE-V1.0			
Software Version:	20200930			
Test sample(s) ID:	GTSL202103000144-01			
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			
Antenna Type:	FPCB antenna			
Antenna gain:	1.54dBi			
Power supply:	FJ-SW2120502400U INPUT: 100-240V~ 50/60Hz 0.4A OUTPUT: DC 5V 2.4A			

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..
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
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. Designation Number: CN5029

- **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

None.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 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. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
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
<i>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.</i>	
E.U.T Antenna:	
<i>The antennas are integral antenna, the best case gain of the antennas are 1.54dBi, reference to the appendix II for details</i>	

7.2 Conducted Emissions

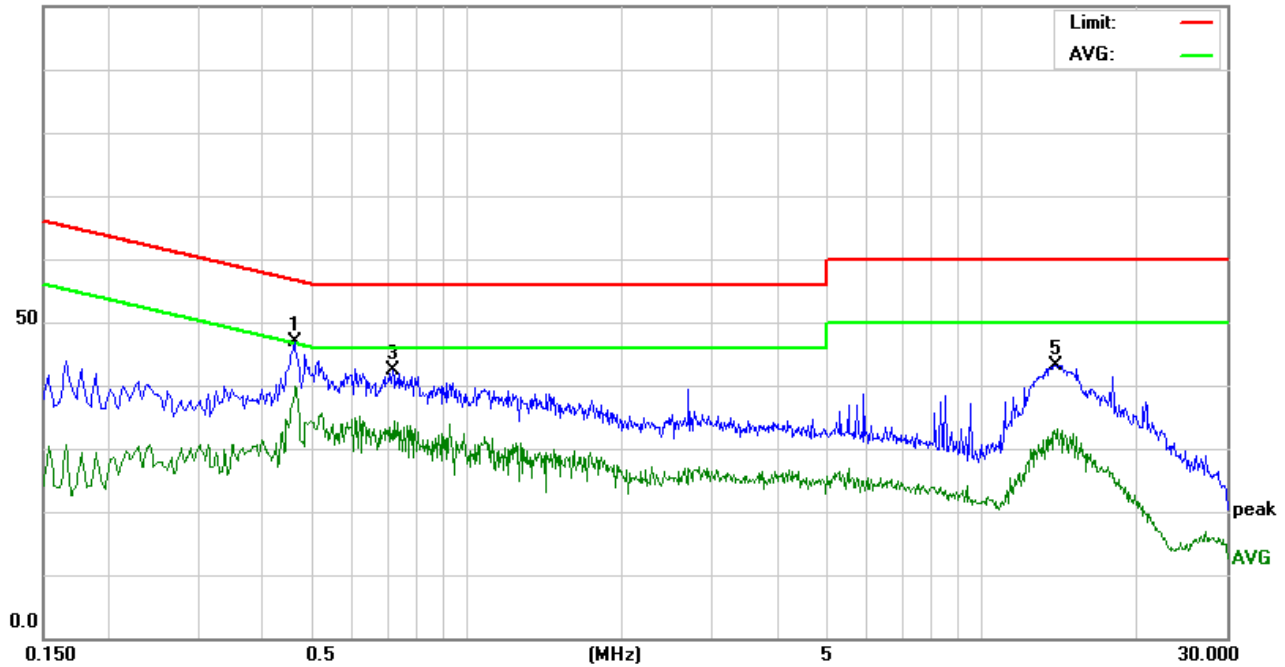
Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	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:	<i>Remark:</i> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>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:

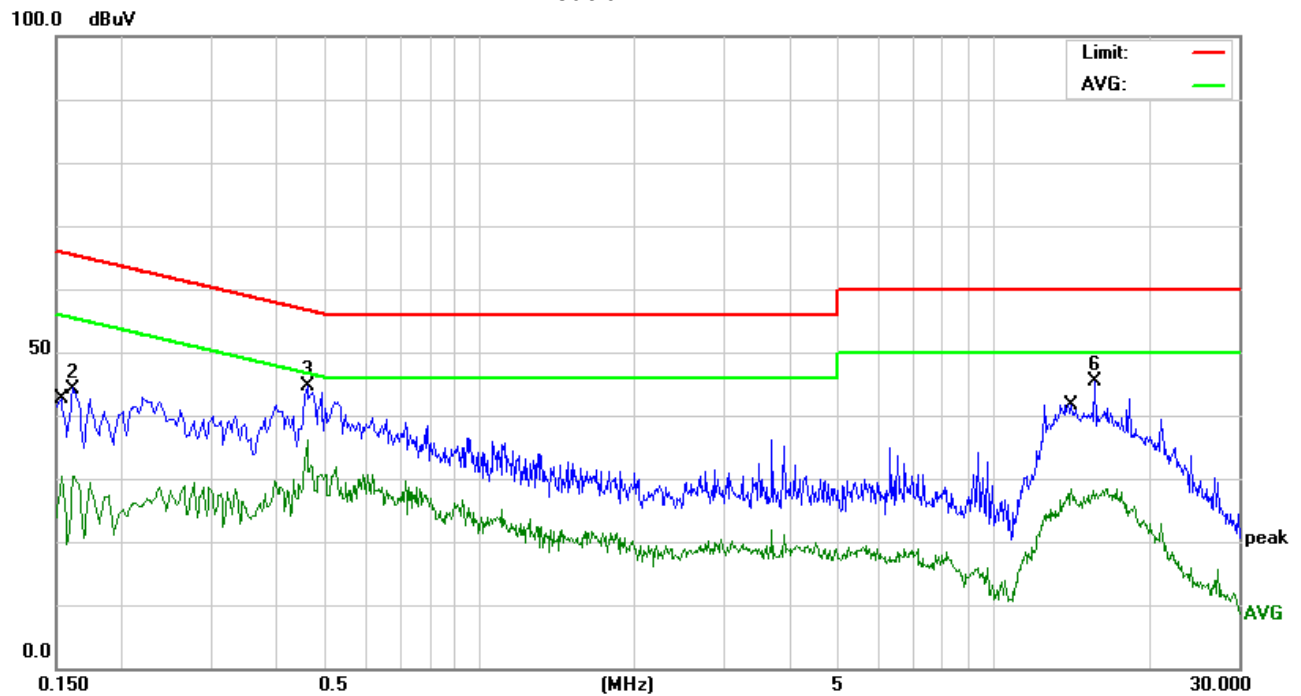
Line:

100.0 dBuV



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.4620	36.73	10.05	46.78	56.66	-9.88	peak
2	*	0.4660	29.77	10.05	39.82	46.58	-6.76	AVG
3		0.7180	32.32	9.98	42.30	56.00	-13.70	peak
4		0.7220	24.31	9.97	34.28	46.00	-11.72	AVG
5		13.9220	32.81	10.38	43.19	60.00	-16.81	peak
6		14.0580	22.66	10.39	33.05	50.00	-16.95	AVG

Neutral:

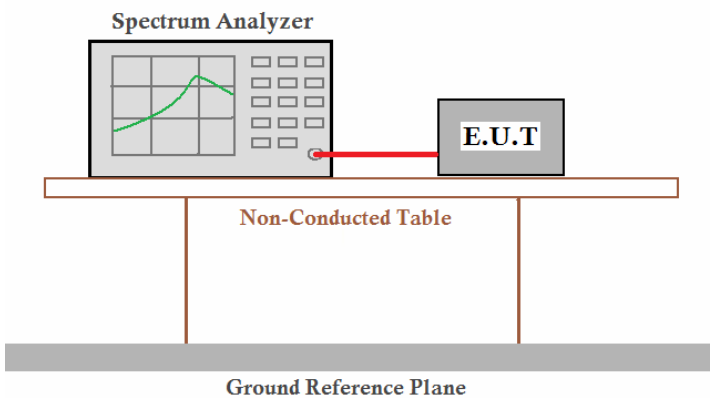


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1539	18.66	11.84	30.50	55.78	-25.28	AVG
2		0.1620	32.57	11.68	44.25	65.36	-21.11	peak
3		0.4620	34.67	10.05	44.72	56.66	-11.94	peak
4	*	0.4620	26.06	10.05	36.11	46.66	-10.55	AVG
5		14.1540	18.06	10.39	28.45	50.00	-21.55	AVG
6		15.7820	34.80	10.53	45.33	60.00	-14.67	peak

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 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 two vertical legs. Below the table is a Ground Reference Plane.
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

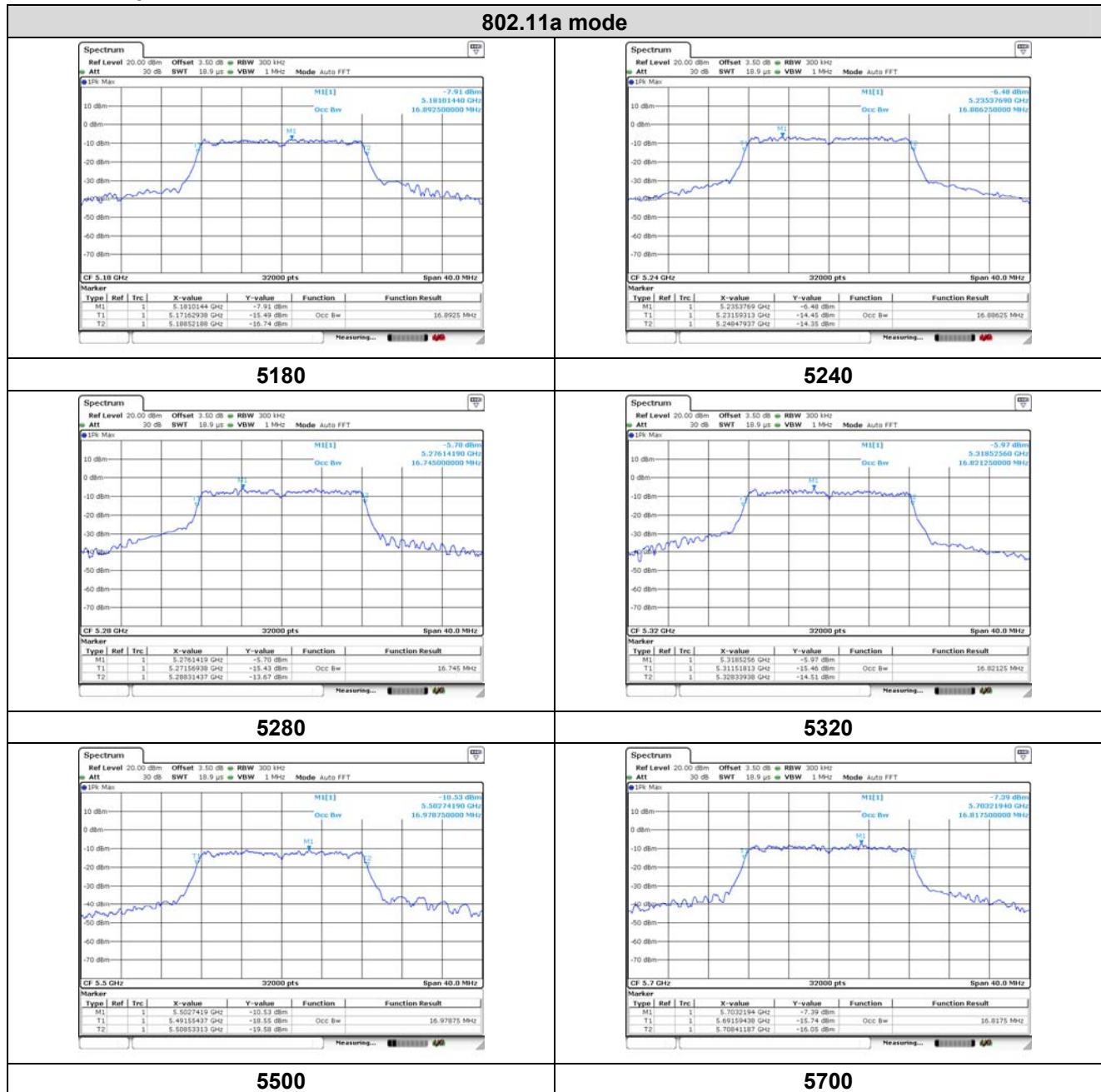
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180	16.7150	17.6350	17.5750	20.2912	20.3300	20.3712
48	5240	16.7575	17.5713	17.5575	20.3000	20.3337	20.3787
56	5280	16.7450	17.8400	17.8138	25.6172	24.1922	26.4922
64	5320	16.8213	17.7463	17.8913	20.175	26.2484	21.6188
100	5500	16.9788	17.8650	18.0088	25.3063	25.7531	28.6000
140	5700	16.8175	17.8938	17.7325	27.3875	23.4172	25.0063

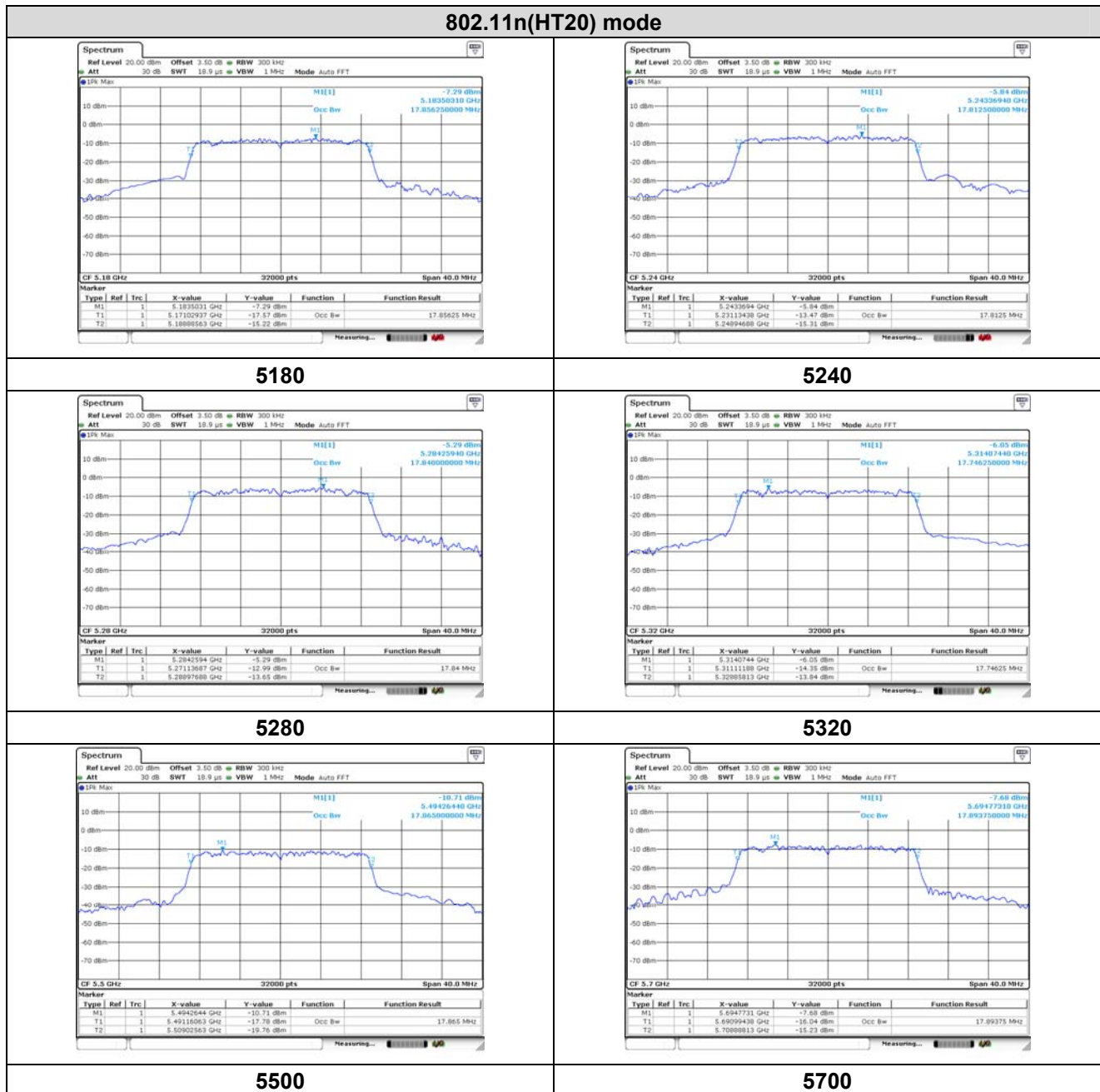
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190	36.1475	36.0075	40.6775	40.4525
62	5310	36.0925	35.9725	39.5425	39.3350
102	5510	36.1075	36.1050	39.6175	40.3500
134	5670	36.2475	36.1325	39.5550	39.4650

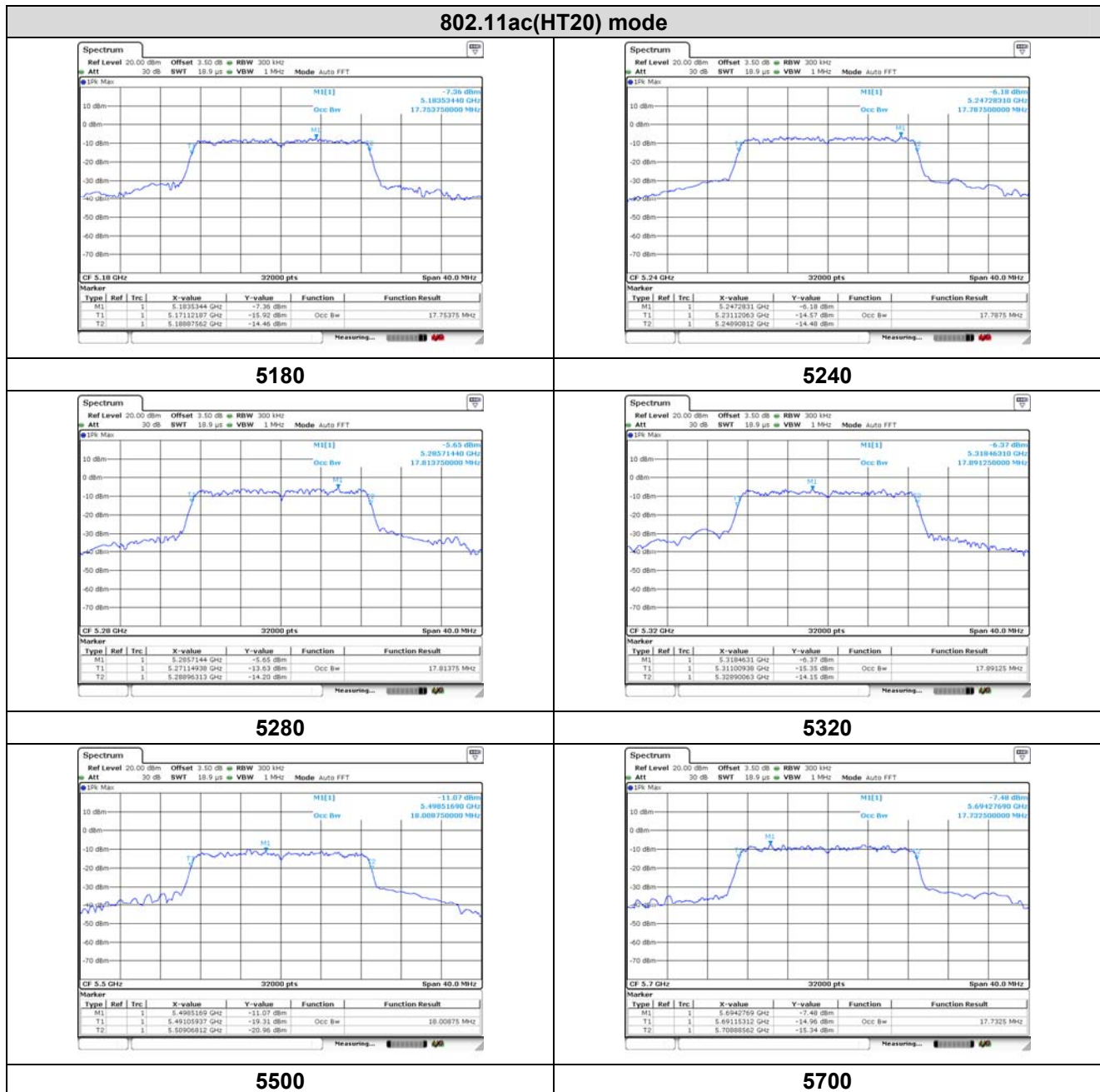
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	75.1163	81.0712
106	5530	75.2250	79.2250
122	5610	75.5950	79.3300

Test plots as followed:

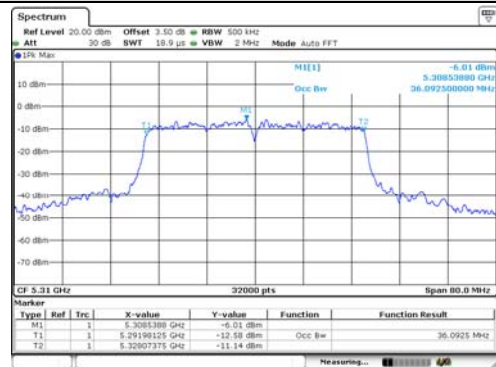
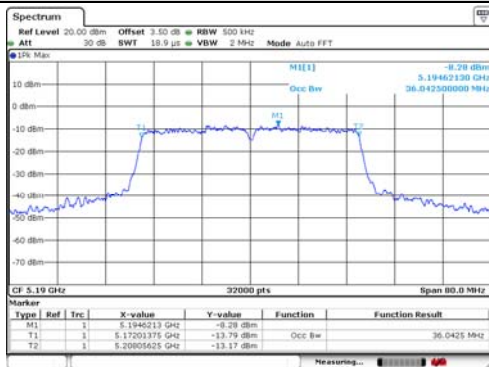
99% Occupied Bandwidth





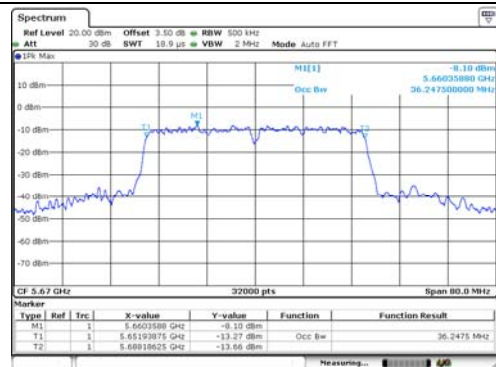
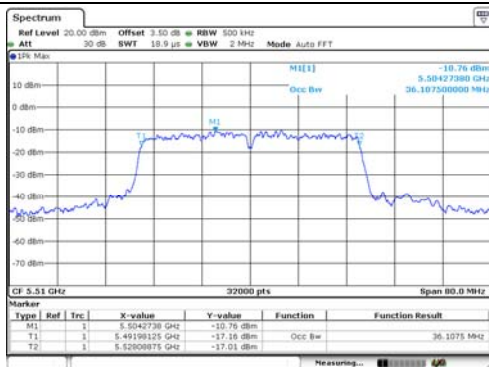


802.11n(HT40) mode



5190

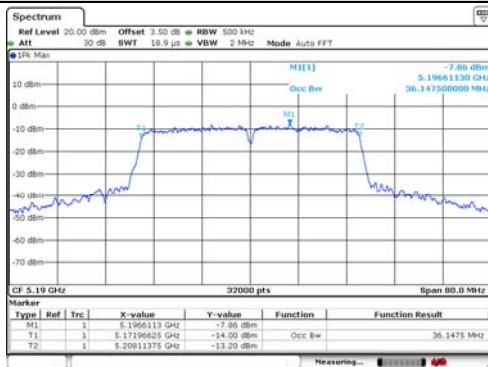
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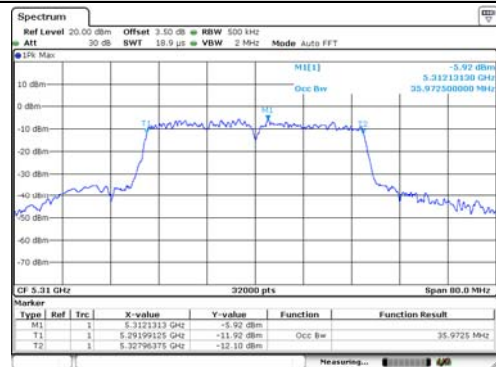
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5670

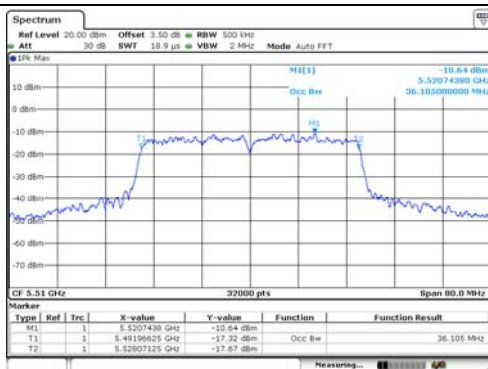
802.11ac(HT40) mode



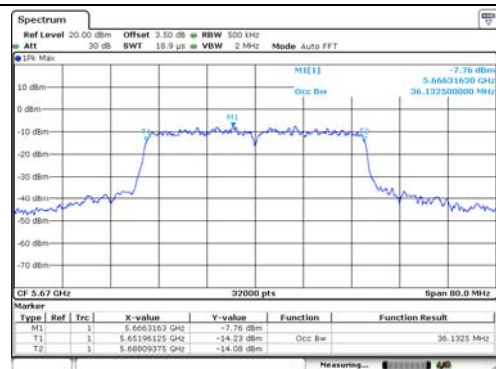
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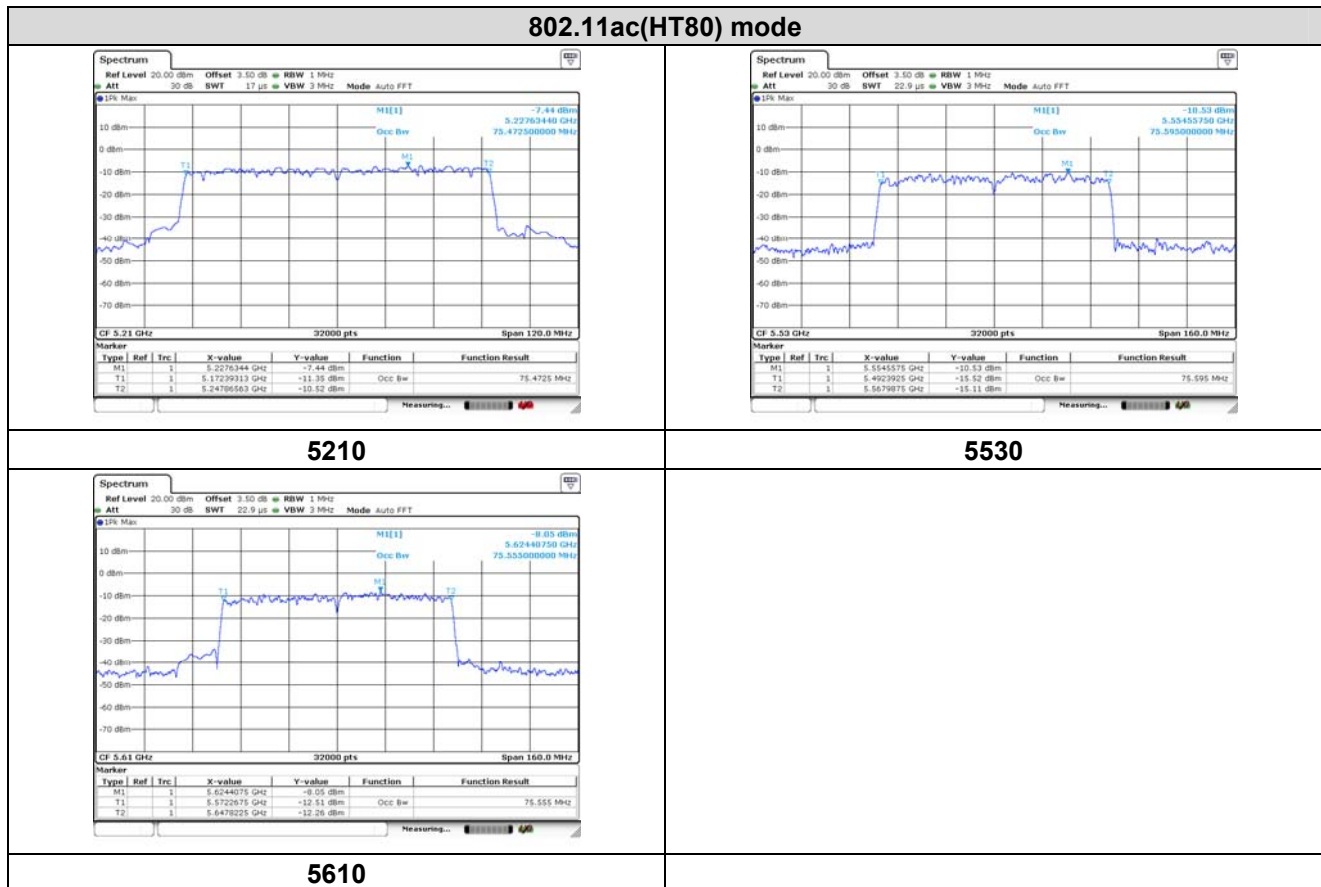
5310



5510

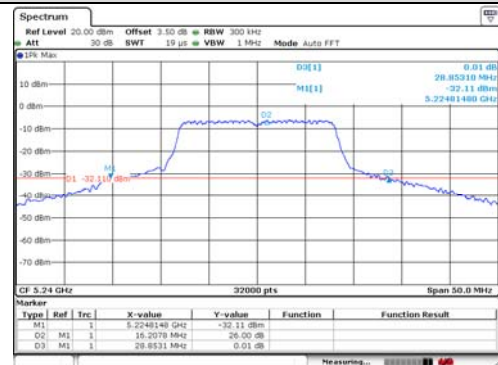
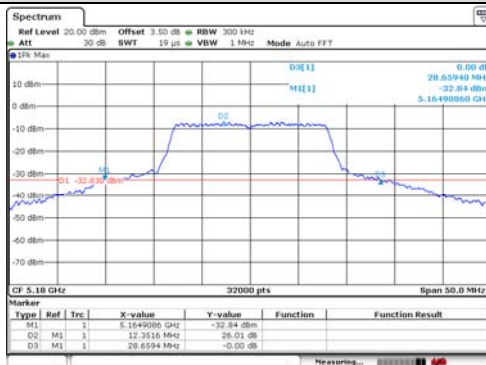


5670

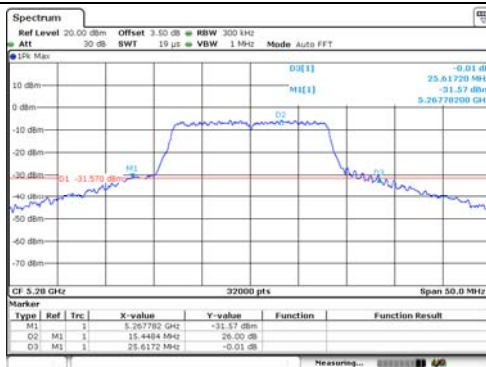


26dB Occupied Bandwidth

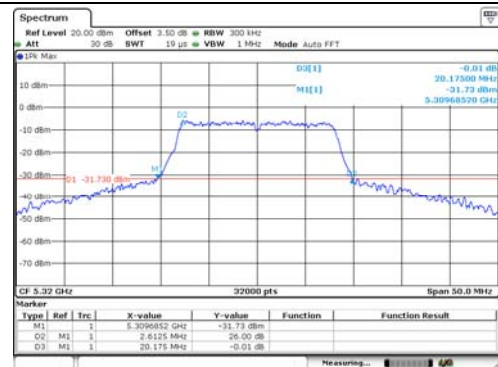
802.11a mode



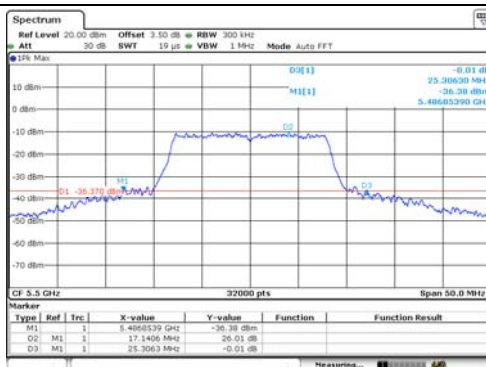
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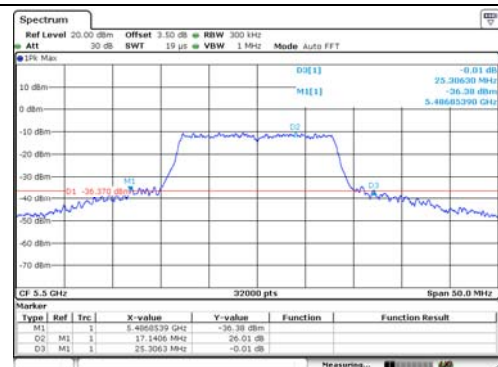
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5280



5320



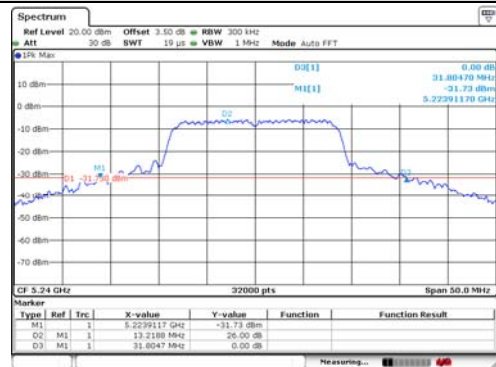
5500



5700

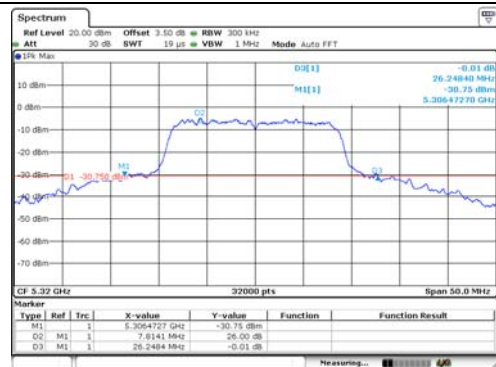
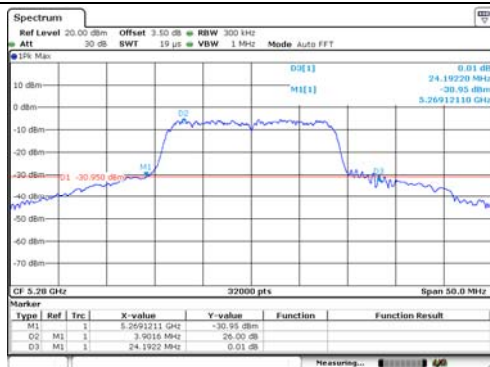


802.11n(HT20) mode



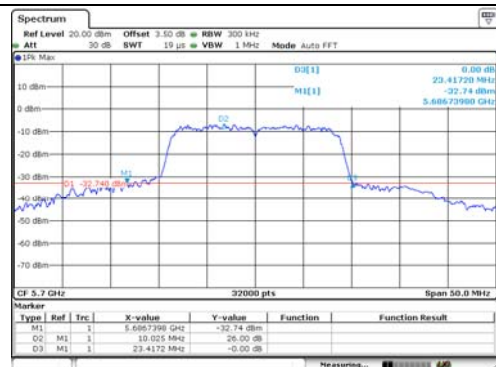
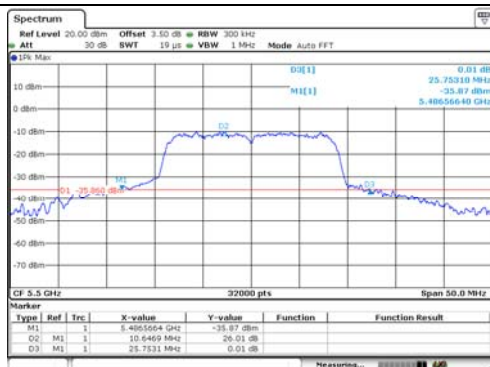
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5240



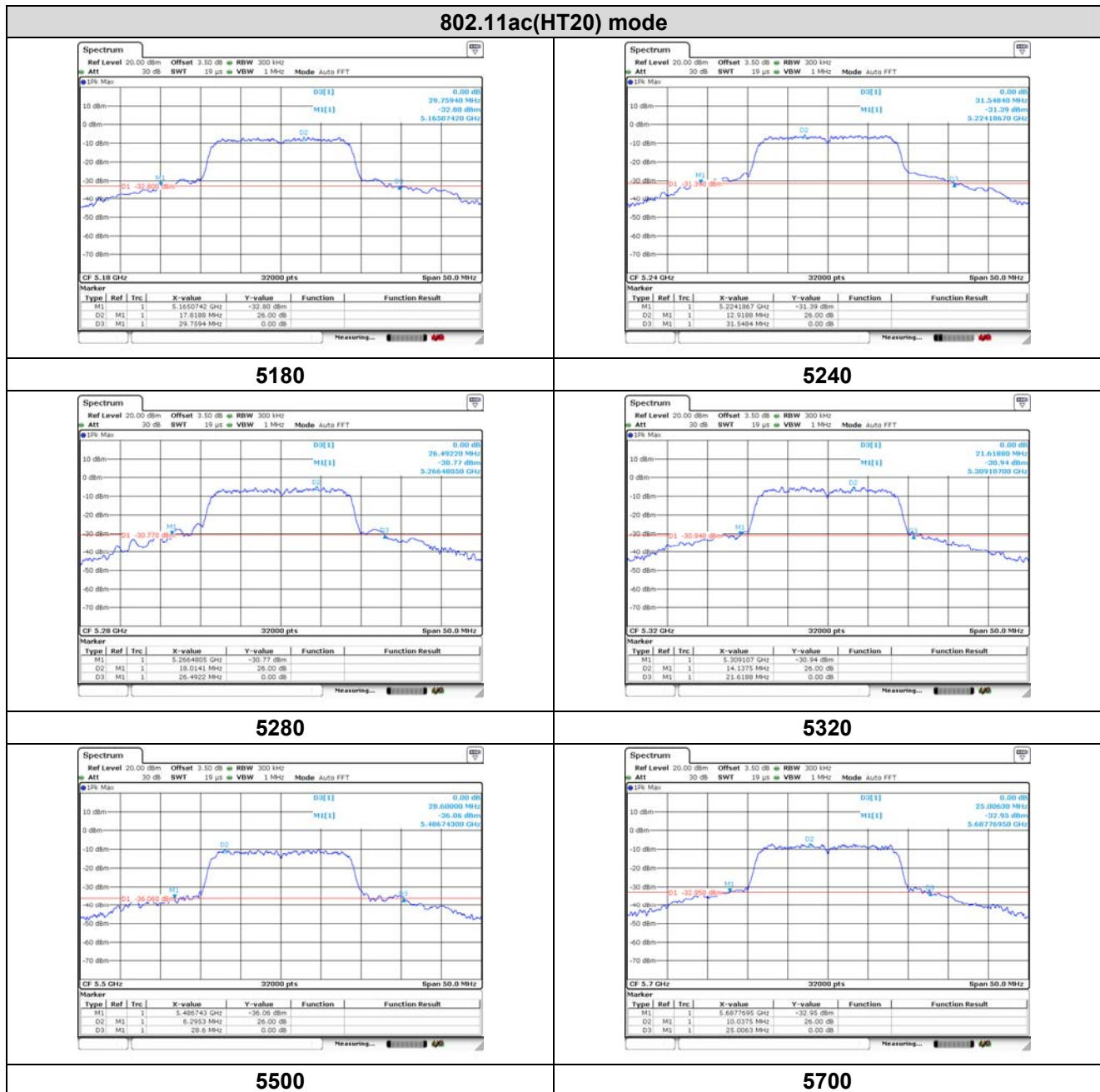
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5320

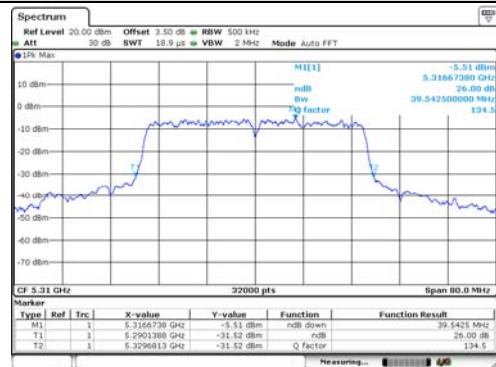
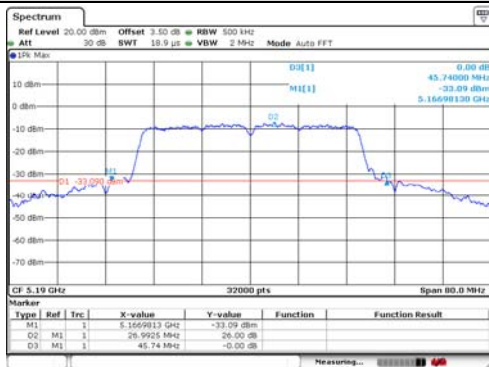


5500

5700

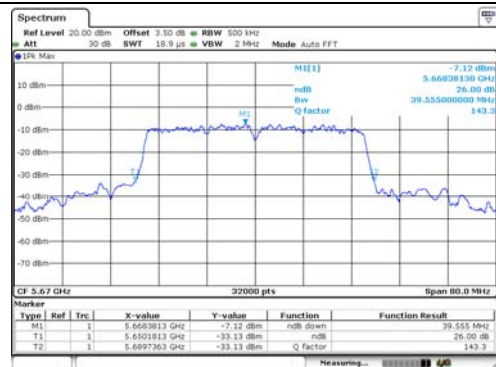
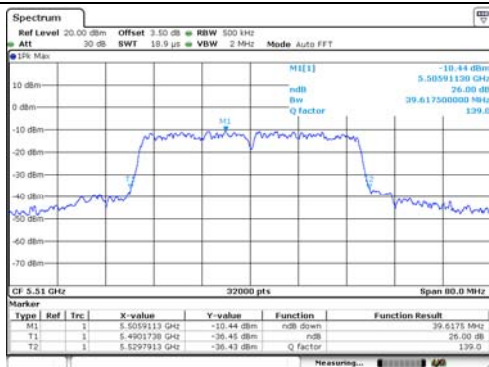


802.11n(HT40) mode



5190

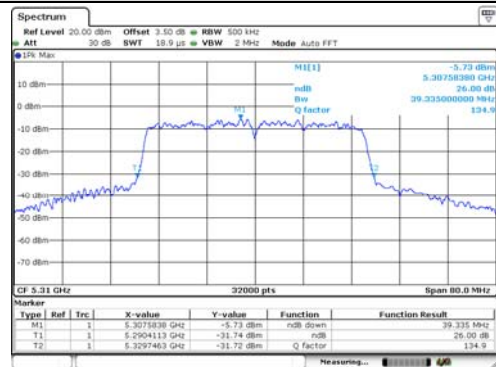
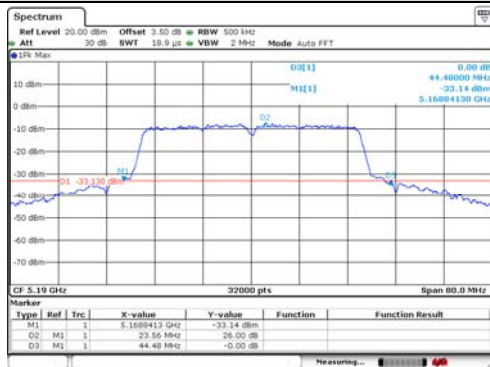
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5510

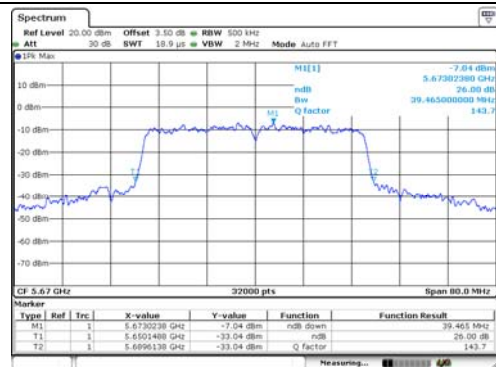
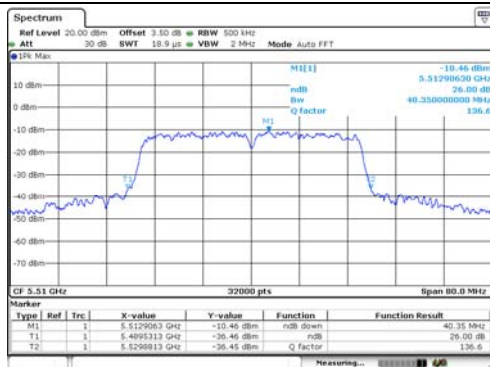
5670

802.11ac(HT40) mode



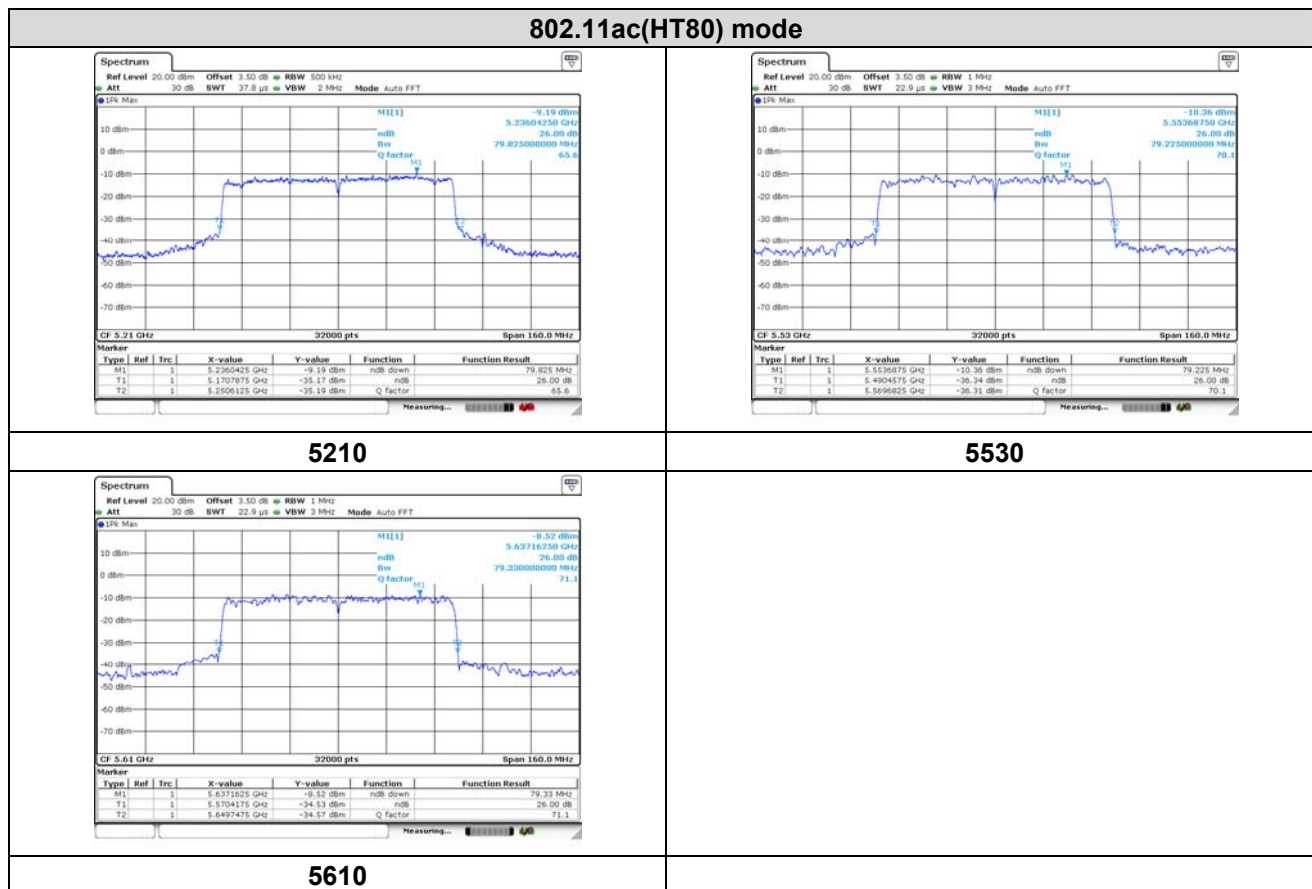
5190

5310

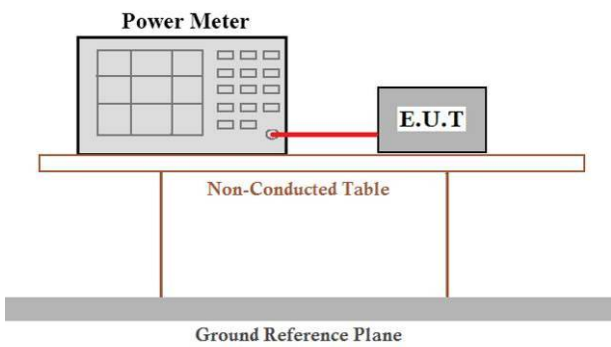


5510

5670



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	91.08%	0.41
802.11n(HT20)	89.67%	0.47
802.11n(HT40)	80.41%	0.95
802.11ac(HT20)	89.68%	0.47
802.11ac(HT40)	80.51%	0.94
802.11ac(HT80)	66.54%	1.77

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	6.01	0.41	6.42	24	Pass
48	5240	6.45	0.41	6.86	24	Pass
56	5280	6.02	0.41	6.43	24	Pass
64	5320	5.87	0.41	3.28	24	Pass
100	5500	3.26	0.41	3.67	24	Pass
140	5700	3.29	0.41	3.7	24	Pass

802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	6.11	0.47	6.58	24	Pass
48	5240	6.43	0.47	6.90	24	Pass
56	5280	6.01	0.47	6.48	24	Pass
64	5320	5.15	0.47	5.62	24	Pass
100	5500	4.06	0.47	4.53	24	Pass
140	5700	3.76	0.47	4.23	24	Pass

802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180	6.02	0.47	6.49	24	Pass
48	5240	6.35	0.47	6.82	24	Pass
56	5280	6.43	0.47	6.90	24	Pass
64	5320	5.12	0.47	5.59	24	Pass
100	5500	4.04	0.47	4.51	24	Pass
140	5700	3.99	0.47	4.46	24	Pass

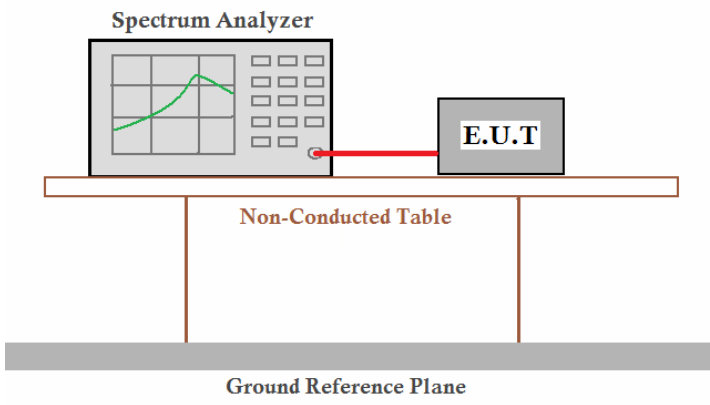
802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190	6.03	0.95	6.98	24	Pass
62	5310	5.94	0.95	6.89	24	Pass
102	5510	3.93	0.95	4.88	24	Pass
134	5670	4.09	0.95	5.04	24	Pass

802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190	6.03	0.94	6.97	24	Pass
62	5310	6.01	0.94	6.95	24	Pass
102	5510	3.94	0.94	4.88	24	Pass
134	5670	3.82	0.94	4.76	24	Pass

802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210	5.16	1.77	6.93	24	Pass
106	5530	4.12	1.77	5.89	24	Pass
122	5610	3.58	1.77	5.35	24	Pass

Note: Output Power = Measured Power + Duty Factor
Duty Factor = 10 log (1/Duty Cycle)

7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407	
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Limit:	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	91.08%	0.41
802.11n(HT20)	89.67%	0.47
802.11n(HT40)	80.41%	0.95
802.11ac(HT20)	89.68%	0.47
802.11ac(HT40)	80.51%	0.94
802.11ac(HT80)	66.54%	1.77

802.11a mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
36	5180	-0.55	0.41	3.97	11	Pass
48	5240	0.07	0.41	4.1	11	Pass
56	5280	-0.41	0.41	4.82	11	Pass
64	5320	-0.44	0.41	5.01	11	Pass
100	5500	-5.30	0.41	4.26	11	Pass
140	5700	-2.32	0.41	4.21	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	-0.81	0.47	-0.34	11	Pass
48	5240	-0.11	0.47	0.36	11	Pass
56	5280	0.34	0.47	0.81	11	Pass
64	5320	0.18	0.47	0.65	11	Pass
100	5500	-3.94	0.47	-3.47	11	Pass
140	5700	-0.96	0.47	-0.49	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	-0.97	0.47	-0.50	11	Pass
48	5240	-0.37	0.47	0.10	11	Pass
56	5280	0.23	0.47	0.70	11	Pass
64	5320	0.21	0.47	0.68	11	Pass
100	5500	-4.44	0.47	-3.97	11	Pass
140	5700	-1.41	0.47	-0.94	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	-4.43	0.95	-3.48	11	Pass
62	5310	-2.77	0.95	-1.82	11	Pass
102	5510	-7.53	0.95	-6.58	11	Pass
134	5670	-4.79	0.95	-3.84	11	Pass

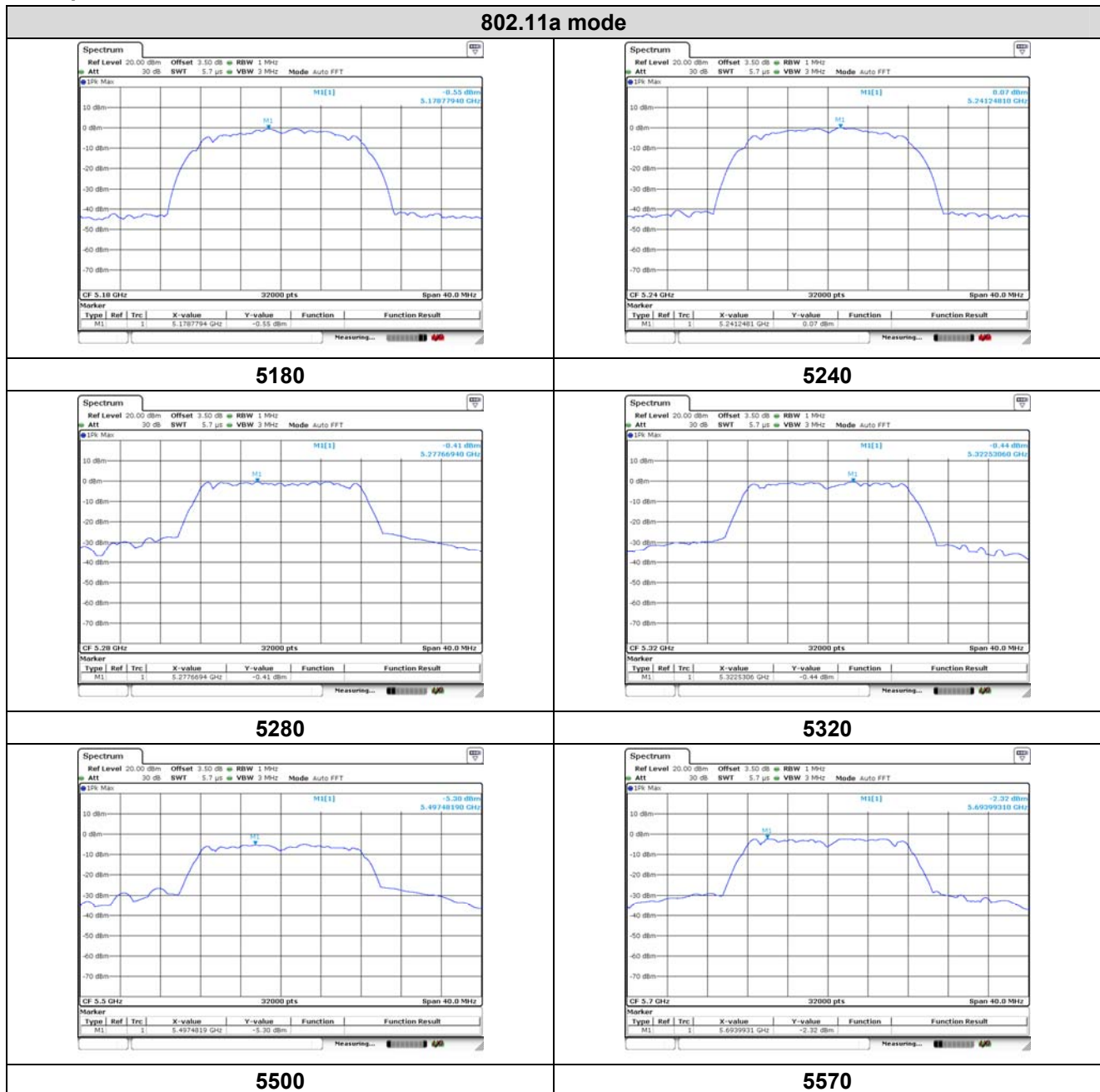
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD Power(dBm/MHz)	Limit (dBm/MHz)	Result
38	5190	-4.56	0.94	-3.62	11	Pass
62	5310	-3.17	0.94	-2.23	11	Pass
102	5510	-8.19	0.94	-7.25	11	Pass
134	5670	-4.35	0.94	-3.41	11	Pass

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	-13.02	1.77	-11.25	11	Pass
106	5530	-10.4	1.77	-8.63	11	Pass
122	5610	-8.1	1.77	-6.33	11	Pass

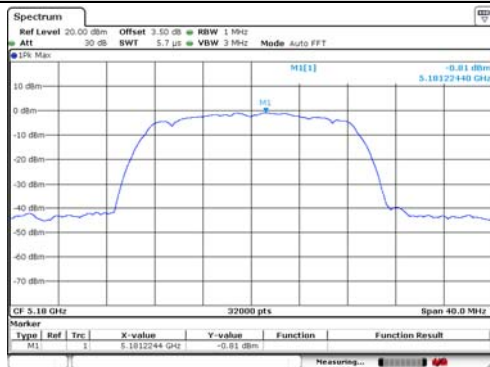
Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

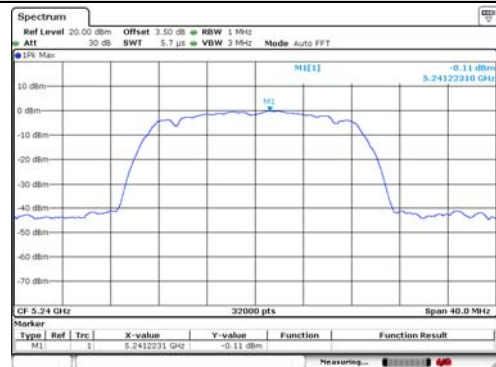
Test plots as followed:



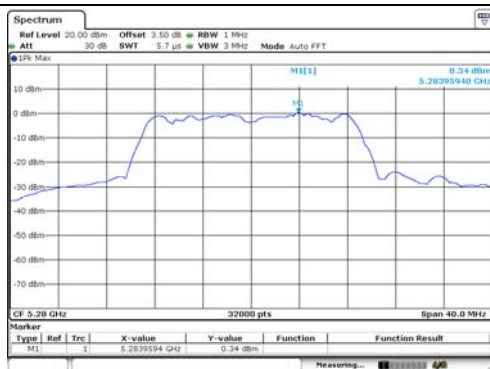
802.11n(HT20) mode



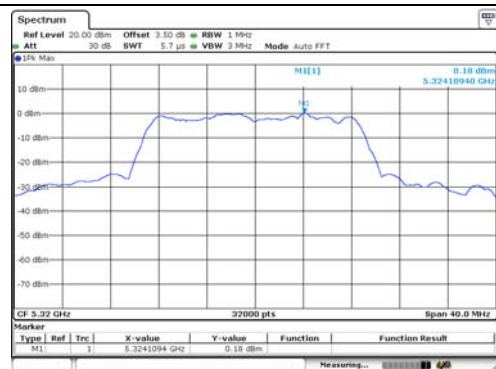
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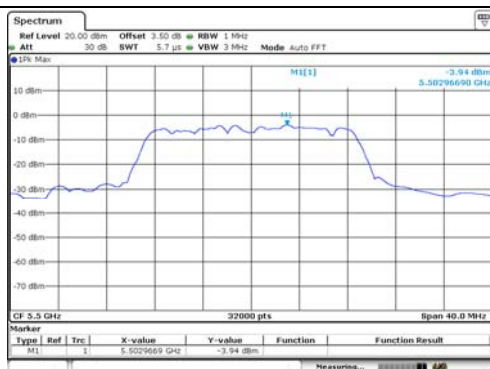
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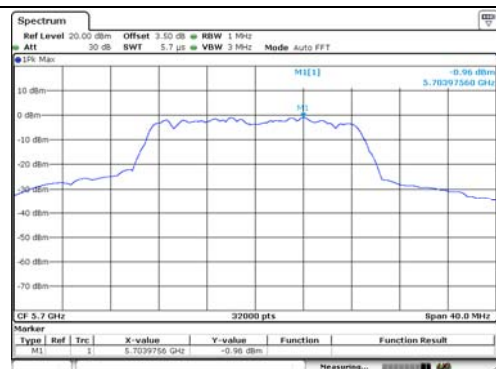
5280



5320

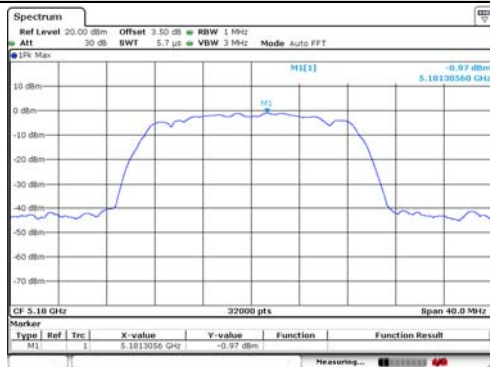


5500

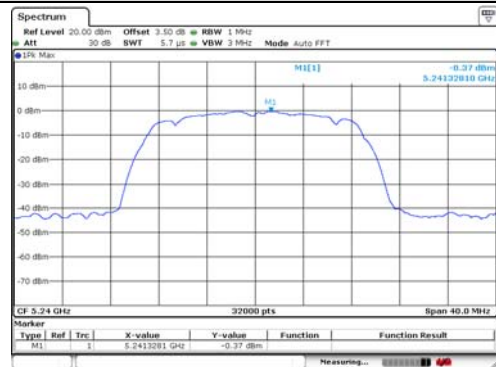


5570

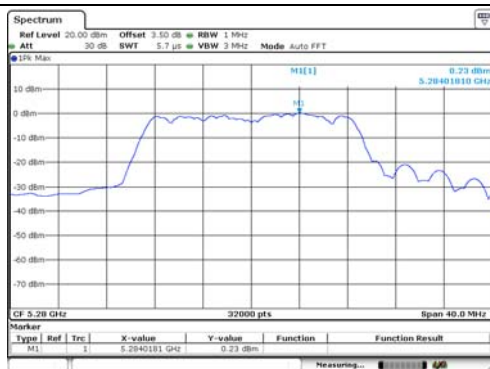
802.11ac(HT20) mode



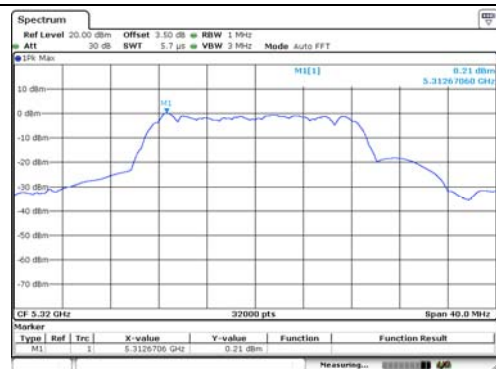
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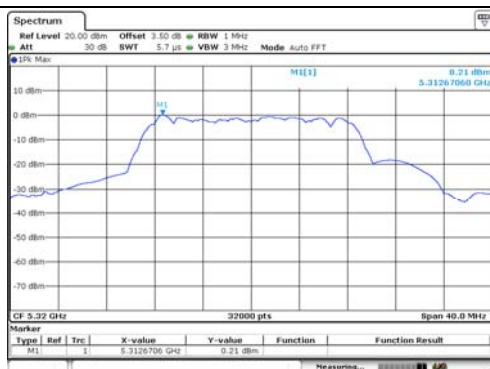
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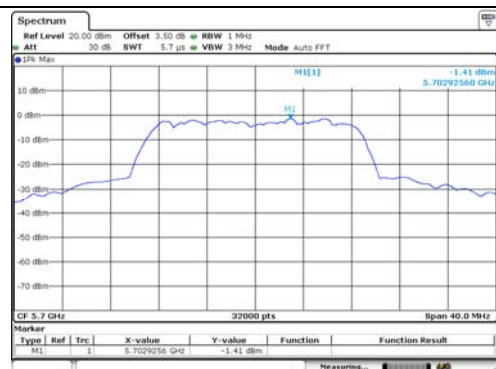
5280



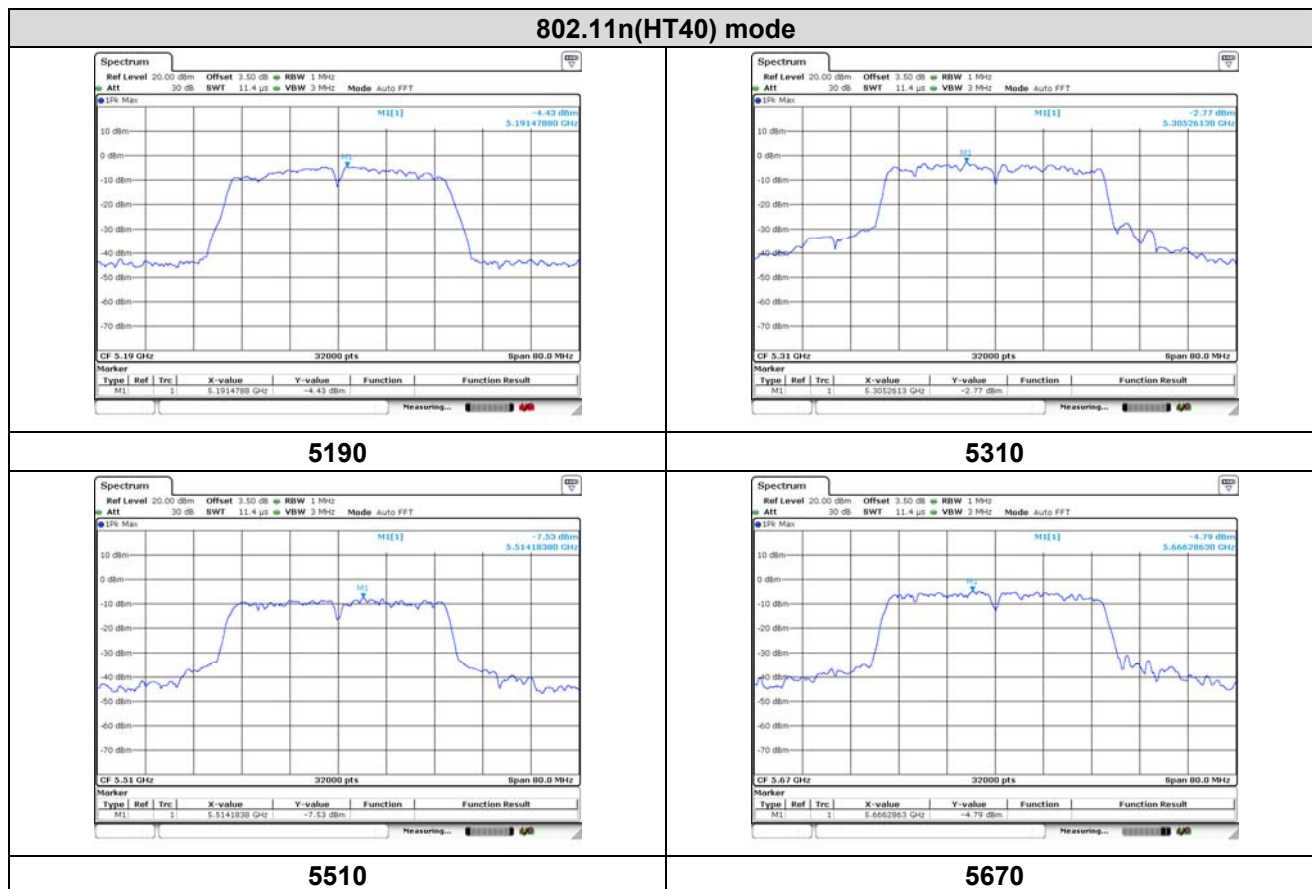
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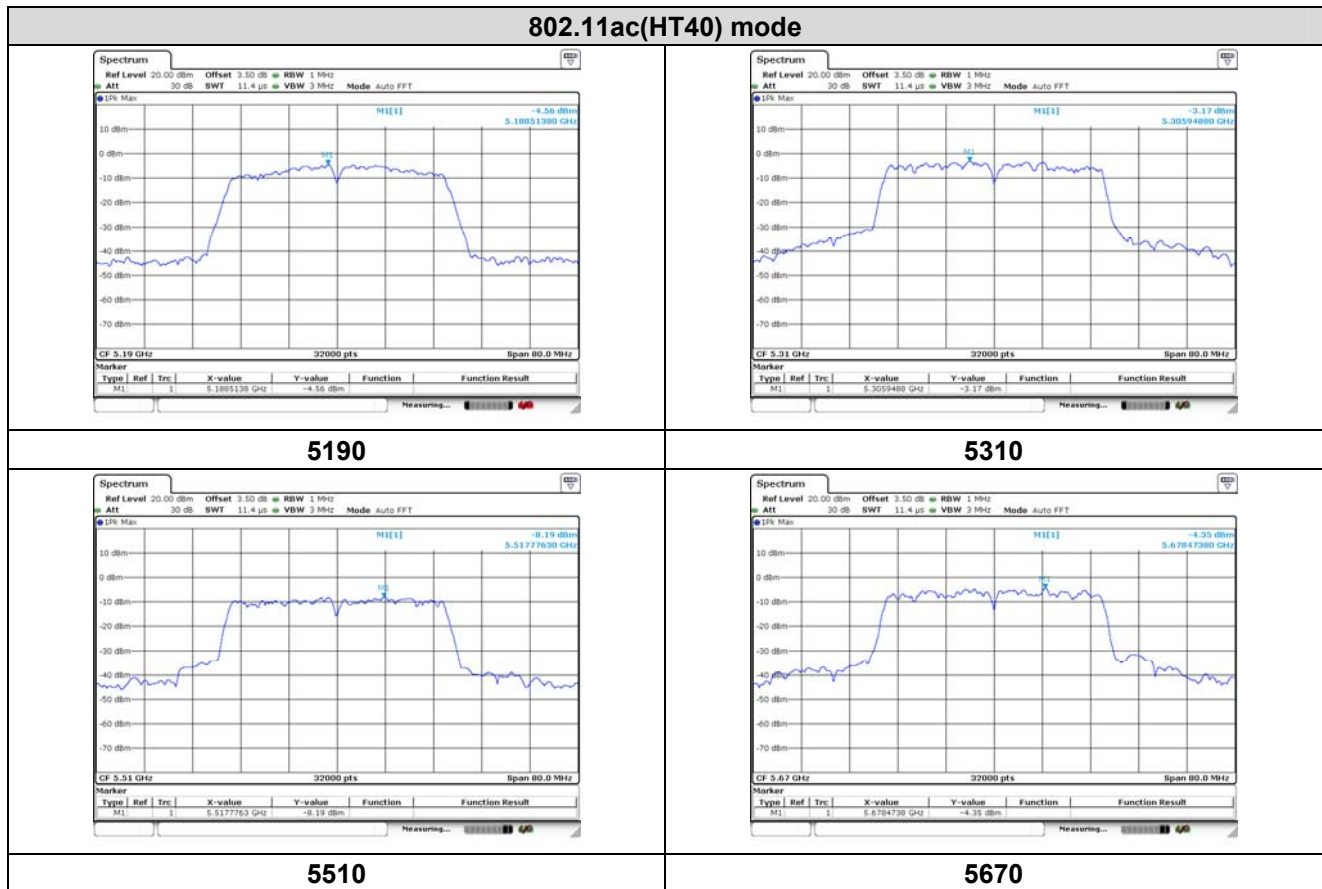


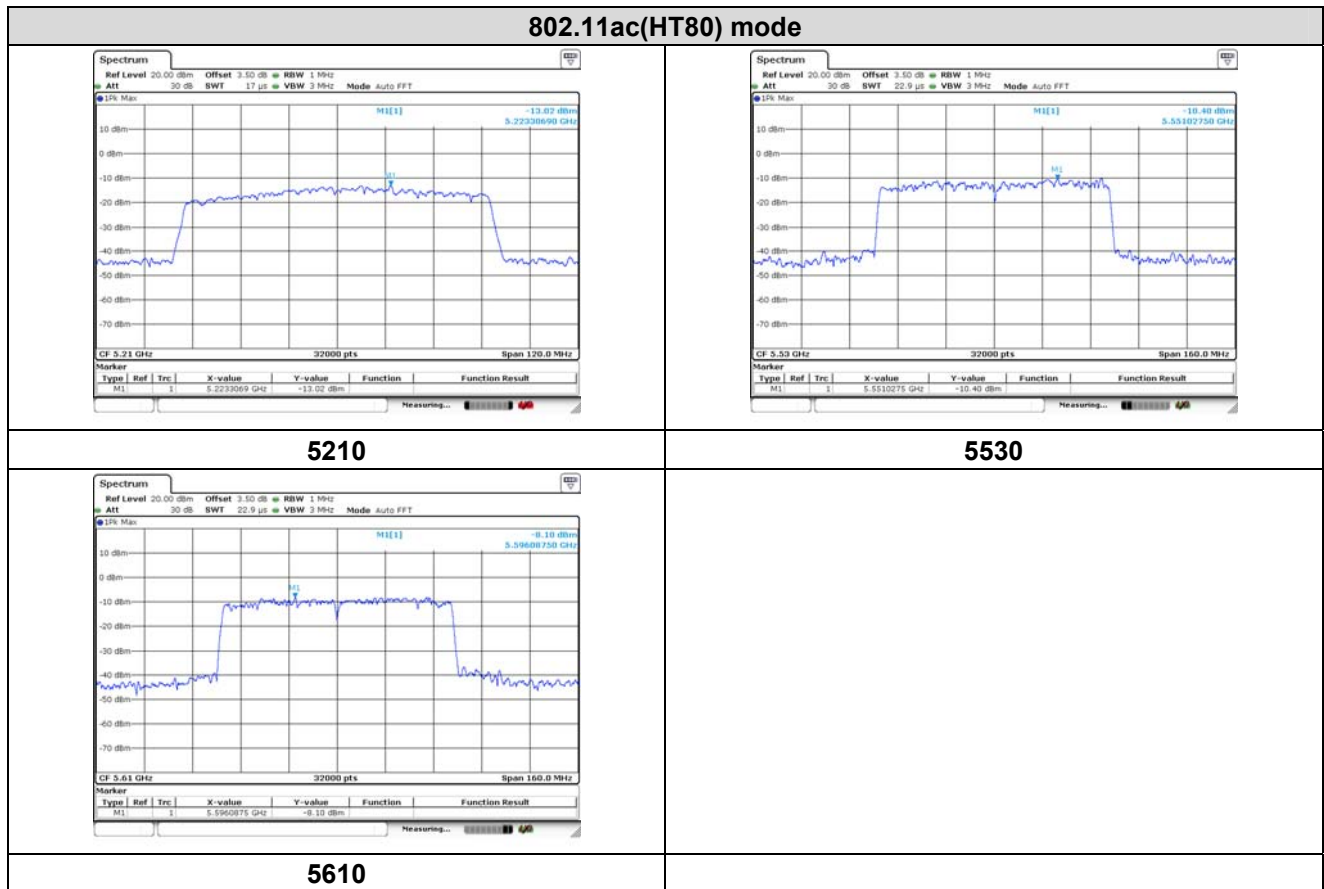
5500



5570

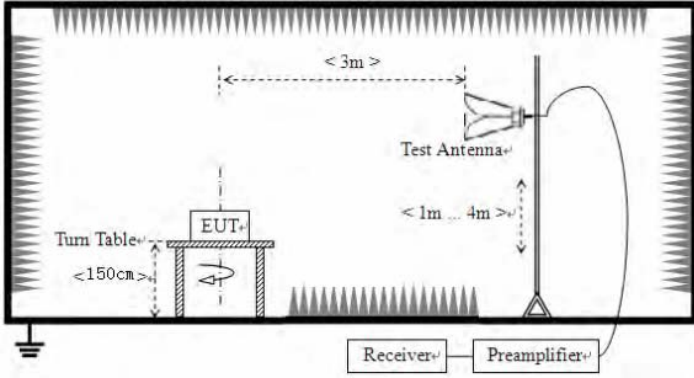






7.6 Band Edge

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:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>					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	
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:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>68.2</td><td>Peak Value</td></tr></table> Undesirable emission limits: (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band. (3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.					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
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																							
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:
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$
For example, if $\text{EIRP} = -27\text{dBm}$
 $E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$

Measurement Data:

Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11a mode.)

802.11 a/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500	39.22	35.58	29.04	8.28	54.04	68.2	-14.16	Peak	Horizontal
4500	32.56	35.58	29.04	8.28	47.38	54	-6.62	AV	Horizontal
5150	43.25	35.58	29.04	8.28	58.07	68.2	-10.13	Peak	Horizontal
5150	31.01	35.58	29.04	8.28	45.83	54	-8.17	AV	Horizontal

802.11 a/ Channel 36 :5180 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500	36.52	35.58	29.04	8.28	51.34	68.2	-16.86	Peak	Vertical
4500	30.89	35.58	29.04	8.28	45.71	54	-8.29	AV	Vertical
5150	39.12	35.58	29.04	8.28	53.94	68.2	-14.26	Peak	Vertical
5150	30.7	35.58	29.04	8.28	45.52	54	-8.48	AV	Vertical

802.11 a/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350	42.5	35.42	29.06	8.39	57.25	68.2	-10.95	Peak	Horizontal
5350	33.65	35.42	29.06	8.39	48.4	54	-5.6	AV	Horizontal
5460	40.12	35.42	29.06	8.39	54.87	68.2	-13.33	Peak	Horizontal
5460	32.01	35.42	29.06	8.39	46.76	54	-7.24	AV	Horizontal

802.11 a/ Channel 48 :5240 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350	35.89	35.42	29.06	8.39	50.64	68.2	-17.56	Peak	Vertical
5350	30.26	35.42	29.06	8.39	45.01	54	-8.99	AV	Vertical
5460	38.89	35.42	29.06	8.39	53.64	68.2	-14.56	Peak	Vertical
5460	29.56	35.42	29.06	8.39	44.31	54	-9.69	AV	Vertical

802.11 a/ Channel 52 :5260 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500	39.21	35.58	29.04	8.28	54.03	68.2	-14.17	Peak	Horizontal
4500	32.01	35.58	29.04	8.28	46.83	54	-7.17	AV	Horizontal
5150	41.26	35.58	29.04	8.28	56.08	68.2	-12.12	Peak	Horizontal
5150	30.21	35.58	29.04	8.28	45.03	54	-8.97	AV	Horizontal

802.11 a/ Channel 52 :5260 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
4500	35.22	35.58	29.04	8.28	50.04	68.2	-18.16	Peak	Vertical
4500	29.56	35.58	29.04	8.28	44.38	54	-9.62	AV	Vertical
5150	38.81	35.58	29.04	8.28	53.63	68.2	-14.57	Peak	Vertical
5150	30.4	35.58	29.04	8.28	45.22	54	-8.78	AV	Vertical

802.11 a/ Channel 64 :5320 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350	42.5	35.42	29.06	8.39	57.25	68.2	-10.95	Peak	Horizontal
5350	33.15	35.42	29.06	8.39	47.9	54	-6.1	AV	Horizontal
5460	40.99	35.42	29.06	8.39	55.74	68.2	-12.46	Peak	Horizontal
5460	30.55	35.42	29.06	8.39	45.3	54	-8.7	AV	Horizontal

802.11 a/ Channel 64 :5320 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5350	35.26	35.42	29.06	8.39	50.01	68.2	-18.19	Peak	Vertical
5350	30.21	35.42	29.06	8.39	44.96	54	-9.04	AV	Vertical
5460	39.55	35.42	29.06	8.39	54.3	68.2	-13.9	Peak	Vertical
5460	30.22	35.42	29.06	8.39	44.97	54	-9.03	AV	Vertical

802.11 a/ Channel 100 :5500 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5460	39.45	35.35	29.07	8.43	54.16	68.2	-14.04	Peak	Horizontal
5460	32.22	35.35	29.07	8.43	46.93	54	-7.07	AV	Horizontal
5470	41.25	35.35	29.07	8.43	55.96	68.2	-12.24	Peak	Horizontal
5470	30.12	35.35	29.07	8.43	44.83	54	-9.17	AV	Horizontal

802.11 a/ Channel 100 :5500 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5460	36.01	35.35	29.07	8.43	50.72	68.2	-17.48	Peak	Vertical
5460	30.11	35.35	29.07	8.43	44.82	68.2	-23.38	AV	Vertical
5470	38.99	35.35	29.07	8.43	53.7	68.2	-14.5	Peak	Vertical
5470	29.45	35.35	29.07	8.43	44.16	68.2	-24.04	AV	Vertical

802.11 a/ Channel 140 :5700 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5725	43.01	35.3	29.11	8.51	57.71	68.2	-10.49	Peak	Horizontal
5725	34.01	35.3	29.11	8.51	48.71	54	-5.29	AV	Horizontal
5735	41.56	35.3	29.11	8.51	56.26	68.2	-11.94	Peak	Horizontal
5735	29.54	35.3	29.11	8.51	44.24	54	-9.76	AV	Horizontal

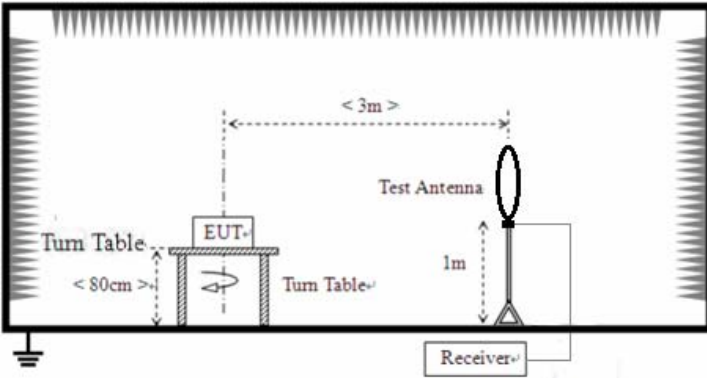
802.11 a/ Channel 140 :5700 MHz									
Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector	Polarization
5725	36.01	35.3	29.11	8.51	50.71	68.2	-17.49	Peak	Vertical
5725	30.11	35.3	29.11	8.51	44.81	68.2	-23.39	AV	Vertical
5735	40.1	35.3	29.11	8.51	54.8	68.2	-13.4	Peak	Vertical
5735	29.65	35.3	29.11	8.51	44.35	68.2	-23.85	AV	Vertical

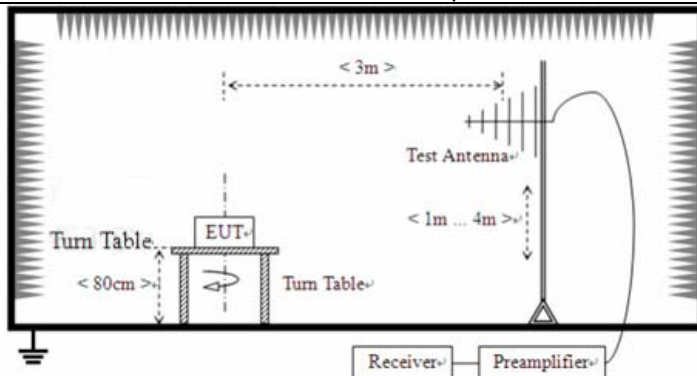
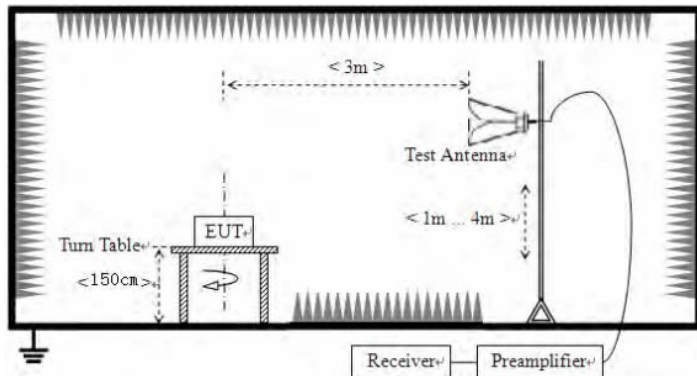
REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=1/T/Sweep time=Auto/Detector=Peak;

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

	
For radiated emissions above 1GHz	
	
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:

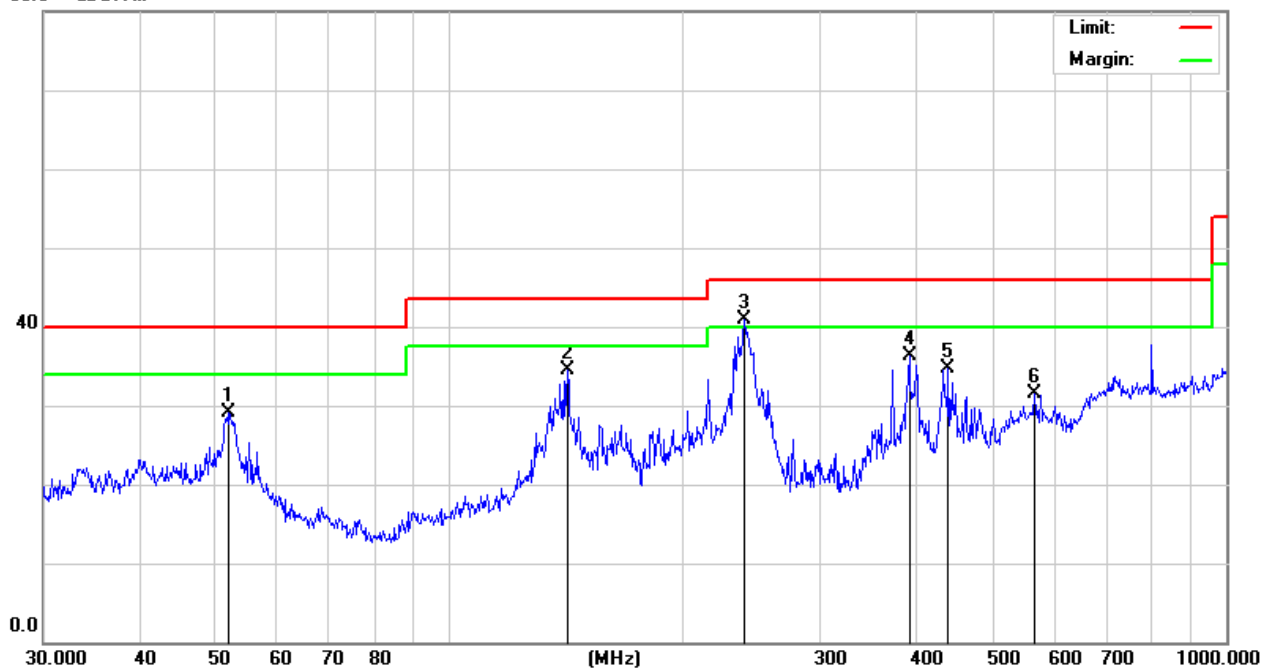
9 kHz ~ 30 MHz

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:

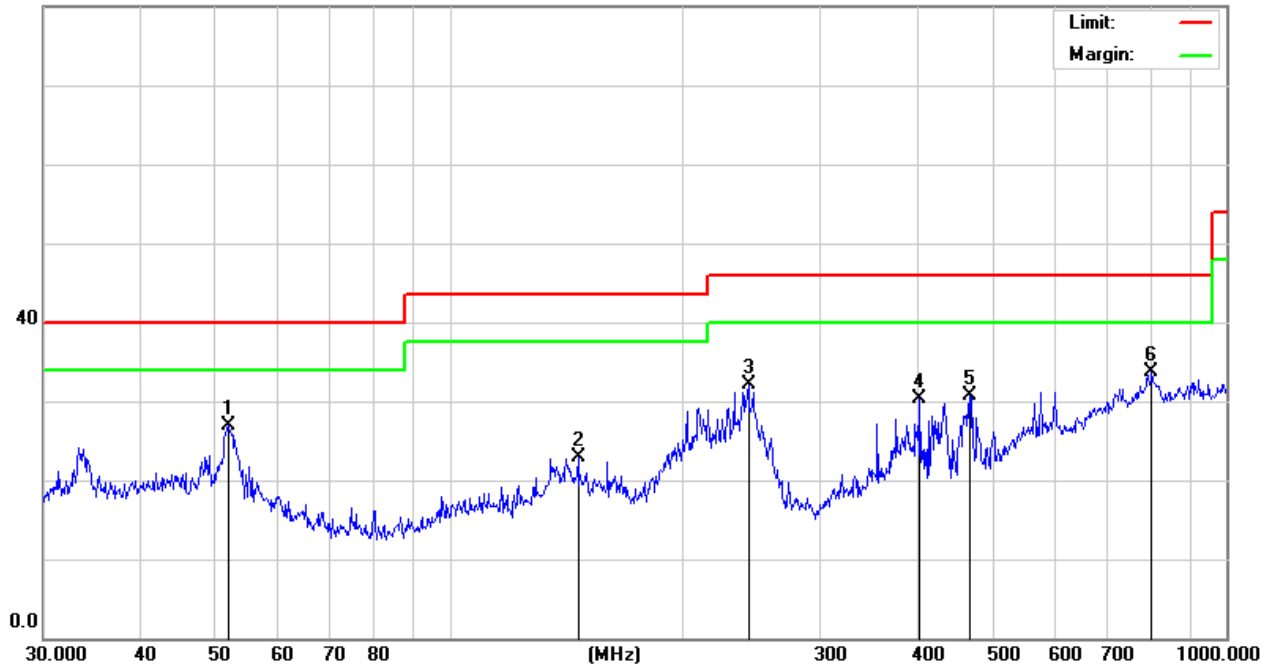
80.0 dBuV/m



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		52.0251	32.79	-3.69	29.10	40.00	-10.90	peak
2		141.8262	41.42	-6.92	34.50	43.50	-9.00	peak
3	*	239.1473	47.55	-6.60	40.95	46.00	-5.05	peak
4		390.7226	39.79	-3.50	36.29	46.00	-9.71	peak
5		438.6554	35.42	-0.75	34.67	46.00	-11.33	peak
6		566.6223	27.12	4.33	31.45	46.00	-14.55	peak

Vertical:

80.0 dBuV/m



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		51.8430	33.09	-6.26	26.83	40.00	-13.17	peak
2		146.3735	30.23	-7.31	22.92	43.50	-20.58	peak
3		242.5253	38.53	-6.50	32.03	46.00	-13.97	peak
4		403.2500	34.57	-4.18	30.39	46.00	-15.61	peak
5		467.2349	33.47	-2.82	30.65	46.00	-15.35	peak
6	*	801.7863	25.95	7.67	33.62	46.00	-12.38	peak

Above 1GHz:

802.11a(HT20) 5180MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10360	33.92	12.56	46.48	74.00	-27.52	PK
V	15540	36.09	16.45	52.54	74.00	-21.46	PK
H	10360	35.62	12.56	48.18	74.00	-25.82	PK
H	15540	36.89	16.45	53.34	74.00	-20.66	PK

802.11a(HT20) 5240MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10480	33.24	12.68	45.92	74.00	-28.08	PK
V	15720	34.84	16.54	51.38	74.00	-22.62	PK
H	10480	36.04	12.68	48.72	74.00	-25.28	PK
H	15720	34.48	16.54	51.02	74.00	-22.98	PK

802.11a 5320MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10640	35.92	13.81	49.73	74.00	-24.27	PK
V	15960	35.88	16.46	52.34	74.00	-21.66	PK
H	10640	37.54	13.81	51.35	74.00	-22.65	PK
H	15960	34.89	16.46	51.35	74.00	-22.65	PK

802.11a 5500MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11000	33.5	16.8	50.30	74.00	-23.70	PK
V	16500	34.8	15.82	50.62	74.00	-23.38	PK
H	11000	36.21	16.8	53.01	74.00	-20.99	PK
H	16500	34.28	15.82	50.10	74.00	-23.90	PK

802.11a 5700MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11400	32.38	17.04	49.42	74.00	-24.58	PK
V	17100	29.82	21.31	51.13	74.00	-22.87	PK
H	11400	30.89	17.04	47.93	74.00	-26.07	PK
H	17100	29.58	21.31	50.89	74.00	-23.11	PK

802.11n(HT20) 5180MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10360	32.85	12.56	45.41	74.00	-28.59	PK
V	15540	35.19	16.45	51.64	74.00	-22.36	PK
H	10360	35.19	12.56	47.75	74.00	-26.25	PK
H	15540	35.69	16.45	52.14	74.00	-21.86	PK

802.11n(HT20) 5240MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10480	35.30	12.68	47.98	74.00	-26.02	PK
V	15720	32.52	16.54	49.06	74.00	-24.94	PK
H	10480	34.37	12.68	47.05	74.00	-26.95	PK
H	15720	33.42	16.54	49.96	74.00	-24.04	PK

802.11n(HT20) 5320MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10640	35.7	13.81	49.51	74.00	-24.49	PK
V	15960	35.54	16.46	52.00	74.00	-22.00	PK
H	10640	36.78	13.81	50.59	74.00	-23.41	PK
H	15960	35.41	16.46	51.87	74.00	-22.13	PK

802.11n(HT20) 5500MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11000	33.26	16.8	50.06	74.00	-23.94	PK
V	16500	34.43	15.82	50.25	74.00	-23.75	PK
H	11000	35.79	16.8	52.59	74.00	-21.41	PK
H	16500	34.36	15.82	50.18	74.00	-23.82	PK

802.11n(HT20) 5700MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11400	32.47	17.04	49.51	74.00	-24.49	PK
V	17100	29.51	21.31	50.82	74.00	-23.18	PK
H	11400	30.9	17.04	47.94	74.00	-26.06	PK
H	17100	29.38	21.31	50.69	74.00	-23.31	PK

802.11ac(HT20) 5180MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10360	34.63	12.56	47.19	74.00	-26.81	PK
V	15540	33.57	16.45	50.02	74.00	-23.98	PK
H	10360	33.52	12.56	46.08	74.00	-27.92	PK
H	15540	34.86	16.45	51.31	74.00	-22.69	PK

802.11ac(HT20) 5240MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10480	34.12	12.68	46.80	74.00	-27.20	PK
V	15720	32.24	16.54	48.78	74.00	-25.22	PK
H	10480	32.43	12.68	45.11	74.00	-28.89	PK
H	15720	34.08	16.54	50.62	74.00	-23.38	PK

802.11ac(HT20) 5320MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10640	33.5	16.8	50.30	74.00	-23.70	PK
V	15960	34.81	15.82	50.63	74.00	-23.37	PK
H	10640	35.7	16.8	52.50	74.00	-21.50	PK
H	15960	34.52	15.82	50.34	74.00	-23.66	PK

802.11ac(HT20) 5500MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11000	33.5	16.8	50.30	74.00	-23.70	PK
V	16500	34.81	15.82	50.63	74.00	-23.37	PK
H	11000	35.7	16.8	52.50	74.00	-21.50	PK
H	16500	34.52	15.82	50.34	74.00	-23.66	PK

802.11ac(HT20) 5700MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11400	32.91	17.04	49.95	74.00	-24.05	PK
V	17100	29.87	21.31	51.18	74.00	-22.82	PK
H	11400	31.39	17.04	48.43	74.00	-25.57	PK
H	17100	29.87	21.31	51.18	74.00	-22.82	PK

802.11n(HT40) 5190MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10380	33.16	12.58	45.74	74.00	-28.26	PK
V	15570	34.32	16.48	50.80	74.00	-23.20	PK
H	10380	34.65	12.58	47.23	74.00	-26.77	PK
H	15570	32.44	16.48	48.92	74.00	-25.08	PK

802.11n(HT40) 5310MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10620	31.55	13.65	45.20	74.00	-28.80	PK
V	15930	28.04	16.53	44.57	74.00	-29.43	PK
H	10620	30.48	13.65	44.13	74.00	-29.87	PK
H	15930	28.04	16.53	44.57	74.00	-29.43	PK

802.11n(HT40) 5510MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11020	34.27	16.83	51.10	74.00	-22.90	PK
V	16530	26.82	16.1	42.92	74.00	-31.08	PK
H	11020	32.85	16.83	49.68	74.00	-24.32	PK
H	16530	28.88	16.1	44.98	74.00	-29.02	PK

802.11n(HT40) 5670MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11340	33.19	17.03	50.22	74.00	-23.78	PK
V	17010	34.97	20.57	55.54	74.00	-18.46	PK
H	11340	35.61	17.03	52.64	74.00	-21.36	PK
H	17010	35.89	20.57	56.46	74.00	-17.54	PK

802.11ac(HT40) 5190MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10380	32.88	12.58	45.46	74.00	-28.54	PK
V	15570	34.43	16.48	50.91	74.00	-23.09	PK
H	10380	34.62	12.58	47.20	74.00	-26.80	PK
H	15570	32.75	16.48	49.23	74.00	-24.77	PK

802.11ac(HT40) 5310MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10620	33.84	13.65	47.49	74.00	-26.51	PK
V	15930	34.27	16.53	50.80	74.00	-23.20	PK
H	10620	35.71	13.65	49.36	74.00	-24.64	PK
H	15930	33.93	16.53	50.46	74.00	-23.54	PK

802.11ac(HT40) 5510MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11020	33.15	16.83	49.98	74.00	-24.02	PK
V	16530	29.79	16.1	45.89	74.00	-28.11	PK
H	11020	31.58	16.83	48.41	74.00	-25.59	PK
H	16530	29.41	16.10	45.51	74.00	-28.49	PK

802.11ac(HT40) 5670MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11340	31.54	17.03	48.57	74.00	-25.43	PK
V	17010	27.79	20.57	48.36	74.00	-25.64	PK
H	11340	30.37	17.03	47.40	74.00	-26.60	PK
H	17010	28.39	20.57	48.96	74.00	-25.04	PK

802.11ac(HT80) 5210MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10420	33.51	12.62	46.13	74.00	-27.87	PK
V	15630	32.87	16.52	49.39	74.00	-24.61	PK
H	10420	33.38	12.62	46.00	74.00	-28.00	PK
H	15630	31.90	16.52	48.42	74.00	-25.58	PK

802.11ac(HT80) 5530MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11060	34.31	16.89	51.20	74.00	-22.80	PK
V	16590	27.26	16.67	43.93	74.00	-30.07	PK
H	11060	32.17	16.89	49.06	74.00	-24.94	PK
H	16590	29.13	16.67	45.80	74.00	-28.20	PK

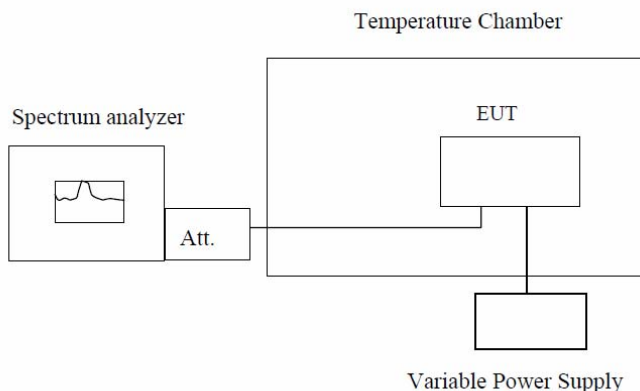
802.11ac(HT80) 5610MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11220	33.25	16.99	50.24	74.00	-23.76	PK
V	16830	35.14	18.92	54.06	74.00	-19.94	PK
H	11220	35.67	16.99	52.66	74.00	-21.34	PK
H	16830	35.44	18.92	54.36	74.00	-19.64	PK

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	5180.1793	Pass	5179.8933	Pass	5180.0781	Pass	5179.9513	Pass
-20	120	5180.0222	Pass	5179.9429	Pass	5179.9942	Pass	5179.9369	Pass
-10	120	5179.9291	Pass	5179.9822	Pass	5179.9971	Pass	5180.0566	Pass
0	120	5180.0037	Pass	5180.1049	Pass	5179.8980	Pass	5179.9840	Pass
10	120	5180.0595	Pass	5180.0012	Pass	5180.0513	Pass	5180.1278	Pass
20	120	5179.8903	Pass	5179.9115	Pass	5179.9565	Pass	5179.9272	Pass
30	120	5180.0879	Pass	5180.0164	Pass	5179.9644	Pass	5180.0273	Pass
40	120	5179.9852	Pass	5179.8660	Pass	5179.9485	Pass	5180.0833	Pass
50	120	5180.0158	Pass	5179.9312	Pass	5179.8938	Pass	5179.8193	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	5179.9718	Pass	5180.0646	Pass	5179.9597	Pass	5180.0440	Pass
25	120	5180.0674	Pass	5180.0431	Pass	5180.1206	Pass	5180.0080	Pass
25	132	5179.9137	Pass	5180.0294	Pass	5180.1069	Pass	5180.1377	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	5190.1111	Pass	5190.0819	Pass	5189.8689	Pass	5190.0186	Pass
-20	120	5190.0329	Pass	5189.9972	Pass	5189.9889	Pass	5190.0119	Pass
-10	120	5190.0472	Pass	5189.9731	Pass	5189.8998	Pass	5190.0758	Pass
0	120	5190.1792	Pass	5189.9419	Pass	5189.9624	Pass	5190.0854	Pass
10	120	5190.0967	Pass	5189.9708	Pass	5189.9217	Pass	5190.0135	Pass
20	120	5190.0517	Pass	5190.0025	Pass	5190.0018	Pass	5190.1427	Pass
30	120	5190.1362	Pass	5189.9726	Pass	5190.1578	Pass	5190.0776	Pass
40	120	5189.9637	Pass	5189.9568	Pass	5189.9896	Pass	5190.0483	Pass
50	120	5189.9120	Pass	5189.9117	Pass	5189.9354	Pass	5190.0283	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	5190.1296	Pass	5189.9744	Pass	5189.9230	Pass	5190.1068	Pass
25	120	5189.9794	Pass	5190.1443	Pass	5189.9450	Pass	5189.8842	Pass
25	132	5190.0188	Pass	5190.1055	Pass	5189.8861	Pass	5190.0334	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	5210.0782	Pass	5210.0139	Pass	5210.1539	Pass	5210.0507	Pass
-20	120	5210.1301	Pass	5210.0468	Pass	5210.0443	Pass	5210.0629	Pass
-10	120	5209.9606	Pass	5210.2076	Pass	5210.0010	Pass	5210.1085	Pass
0	120	5210.0026	Pass	5209.8946	Pass	5210.0951	Pass	5210.0282	Pass
10	120	5210.0546	Pass	5209.9022	Pass	5210.0624	Pass	5210.0465	Pass
20	120	5209.9584	Pass	5209.9297	Pass	5210.0659	Pass	5209.9153	Pass
30	120	5210.0730	Pass	5209.9673	Pass	5210.0524	Pass	5210.0107	Pass
40	120	5210.0433	Pass	5209.7970	Pass	5210.1374	Pass	5209.9572	Pass
50	120	5210.1471	Pass	5210.0139	Pass	5210.1102	Pass	5210.1350	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	5210.1292	Pass	5209.9934	Pass	5209.9824	Pass	5210.2361	Pass
25	120	5209.9423	Pass	5210.0362	Pass	5209.9274	Pass	5210.0539	Pass
25	132	5210.1481	Pass	5210.0084	Pass	5210.0119	Pass	5209.9604	Pass

8 Test Setup Photo

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

9 EUT Constructional Details

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

---END---