

TEST REPORT

Applicant: Elo Touch Solutions, Inc.

Address of Applicant: 670 N McCarthy Blvd, Suite 100 Milpitas CA 95035, USA

Manufacturer/Factory: Elo Touch Solutions, Inc.

Address of Manufacturer/Factory: 670 N McCarthy Blvd, Suite 100 Milpitas CA 95035, USA

Equipment Under Test (EUT)

Product Name: Touch All-in-One Computer

Model No.: ESY15I1D

Trade Mark: Elo

FCC ID: RBWESY15I1D

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

Date of sample receipt: Mar. 28, 2020

Date of Test: Mar. 28, 2020~Apr. 01, 2021

Date of report issue: Apr. 01, 2021

Test Result : PASS *

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

Authorized Signature:



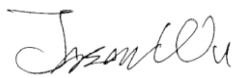
Robinson Lo
Laboratory Manager

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2 Version

Version No.	Date	Description
00	Apr. 01, 2021	Original

Prepared By:

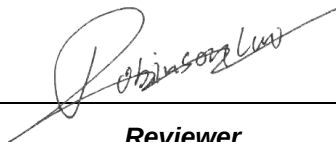


Date:

Apr. 01, 2021

Tested/Project Engineer

Check By:



Reviewer

Date:

Apr. 01, 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
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.407(b)(1)	PASS
Frequency Stability	15.407(g)	PASS

Remark:

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Touch All-in-One Computer			
Model No.:	ESY15I1D			
Serial No.:	N/A			
Hardware Version:	N/A			
Software Version:	N/A			
Test sample(s) ID:	GTSL202103000292-1(Engineer sample) GTSL202103000292-2(Normal 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
Modulation technology:	OFDM			
Antenna Type:	FPCB antenna			
Antenna gain:	Antenna 1:1dBi Antenna 2:1dBi MIMO: 4.01dBi			
Power supply:	DC 19V 3.0A			

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

Channel list for 802.11n(HT40)/ac(HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz				

Channel list for 802.11ac(HT80)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210MHz						

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation..
<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. • 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. 19 2020	Oct. 18 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2020	Oct. 18 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2020	Oct. 18 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
9	Spectrum Analyzer	R&S	FSV40	GTS559	June. 25 2020	June. 24 2021

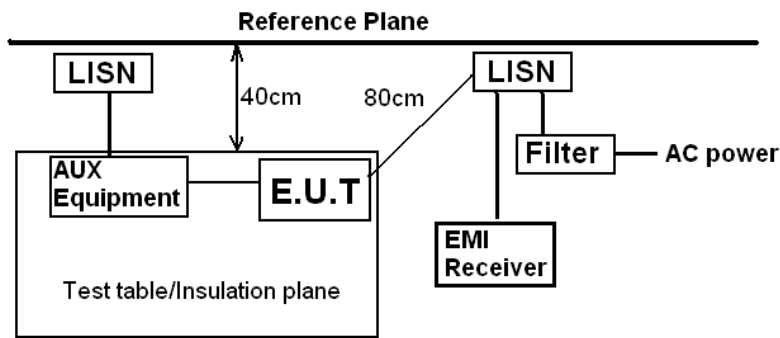
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

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 FPCB antenna, the best case gain of the antennas are 1 dBi, reference to the appendix II for details</i>	

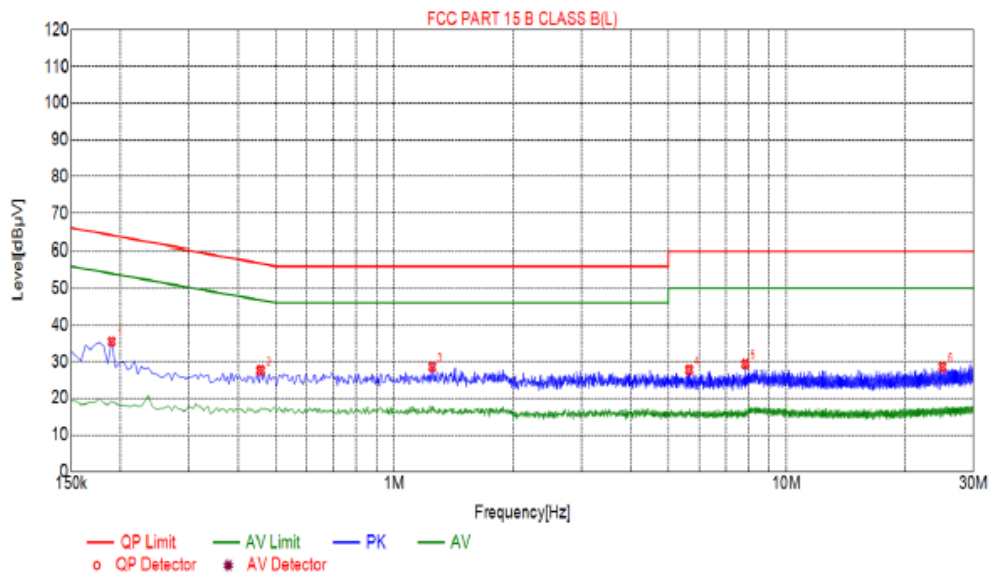
7.2 Conducted Emissions

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:	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:



Suspected List

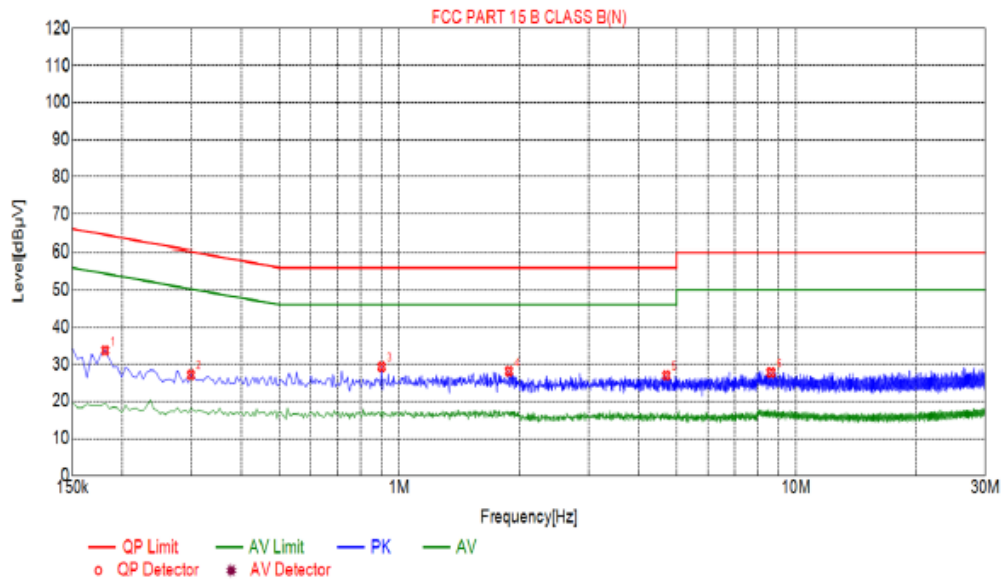
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1905	35.47	10.04	64.01	28.54	25.43	PK	L
2	0.4560	27.65	10.04	56.77	29.12	17.61	PK	L
3	1.2480	28.56	10.09	56.00	27.44	18.47	PK	L
4	5.6445	27.78	10.25	60.00	32.22	17.53	PK	L
5	7.8495	29.33	10.16	60.00	30.67	19.17	PK	L
6	24.9630	28.58	10.24	60.00	31.42	18.34	PK	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

Neutral:



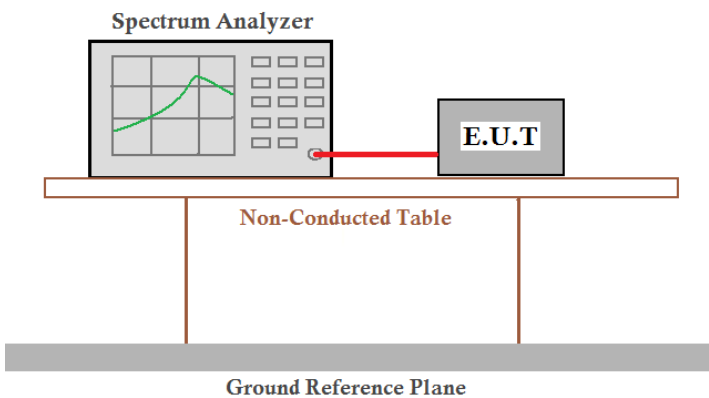
Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1815	33.74	10.06	64.42	30.68	23.68	PK	N
2	0.2985	27.15	10.04	60.28	33.13	17.11	PK	N
3	0.9015	29.30	10.06	56.00	26.70	19.24	PK	N
4	1.8915	28.14	10.14	56.00	27.86	18.00	PK	N
5	4.7040	26.99	10.26	56.00	29.01	16.73	PK	N
6	8.6415	27.77	10.12	60.00	32.23	17.65	PK	N

Remark: $\text{Margin} = \text{Limit} - \text{Level}$

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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 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 environment:	Temp.:	24 °C	Humid.:	53%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
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	16.73	17.83	17.85	24.29	23.63	24.08
44	5220	16.72	17.83	17.86	23.67	24.83	25.00
48	5240	16.67	17.79	17.84	23.19	24.22	23.80

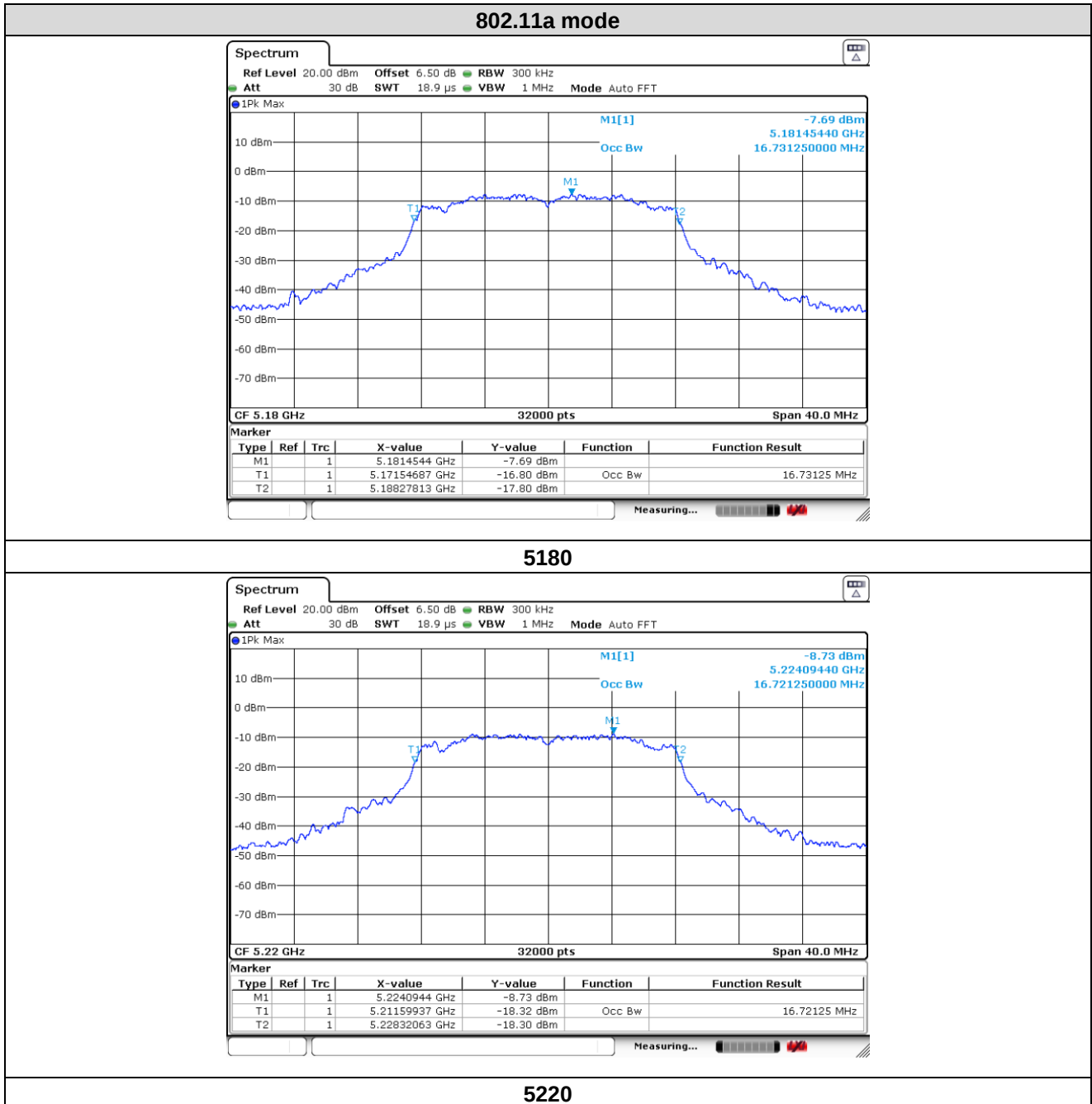
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190	36.29	36.19	44.68	44.93
46	5230	36.33	36.44	44.34	45.04

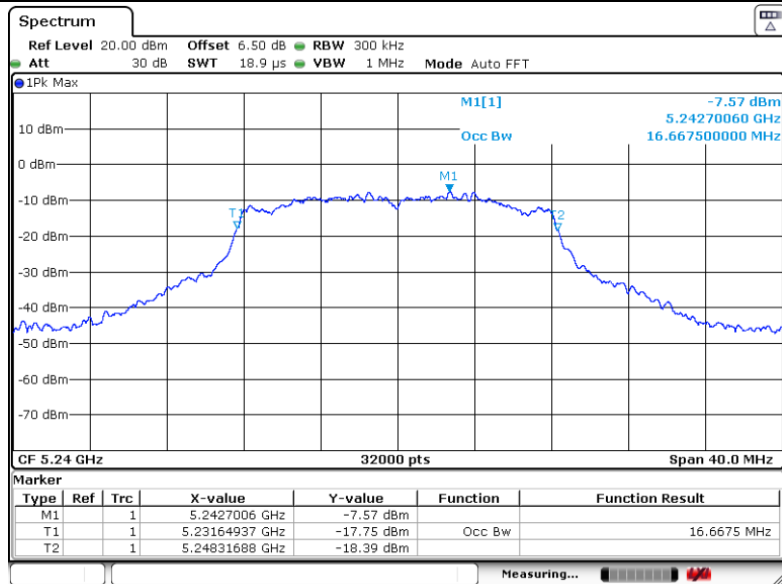
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210	80.82	75.41

Note: The worst data is Antenna 1, only shown Antenna 1 Plot.

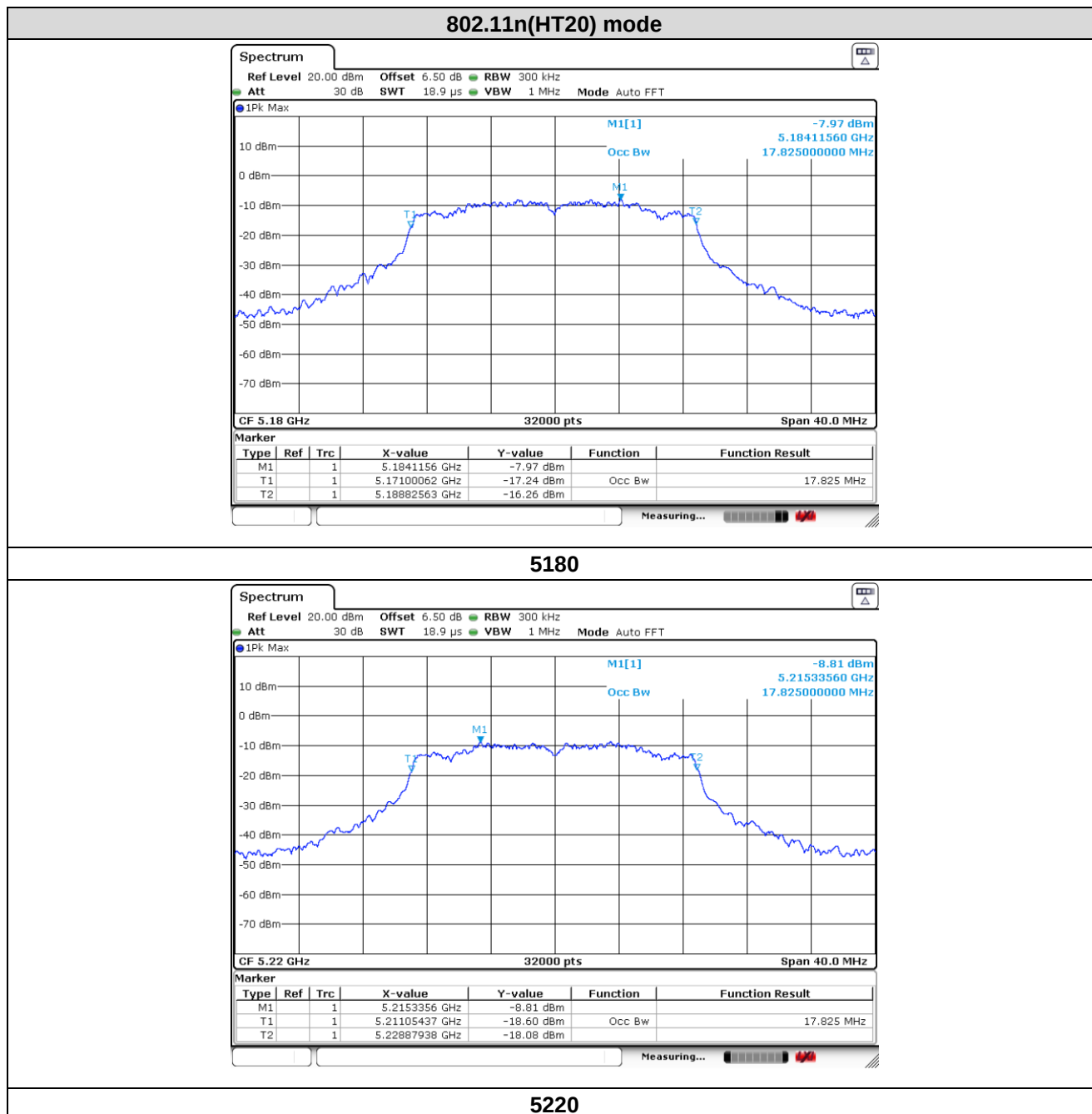
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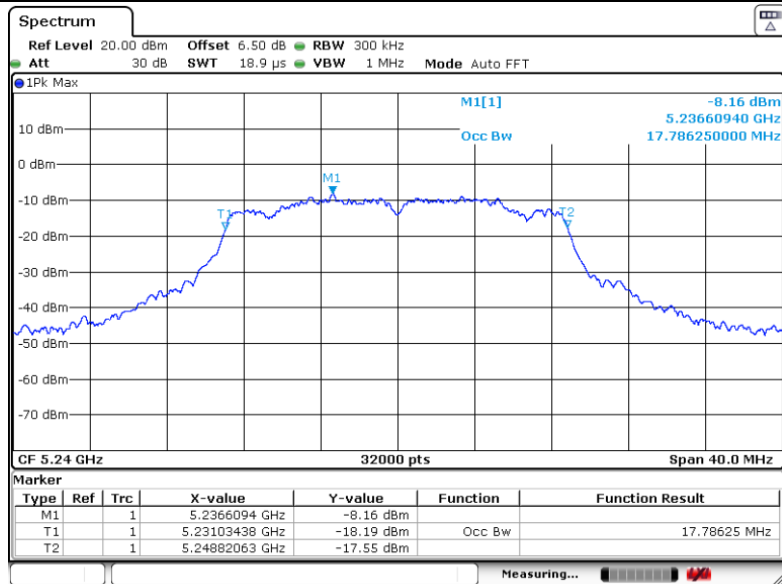
99% Occupied Bandwidth



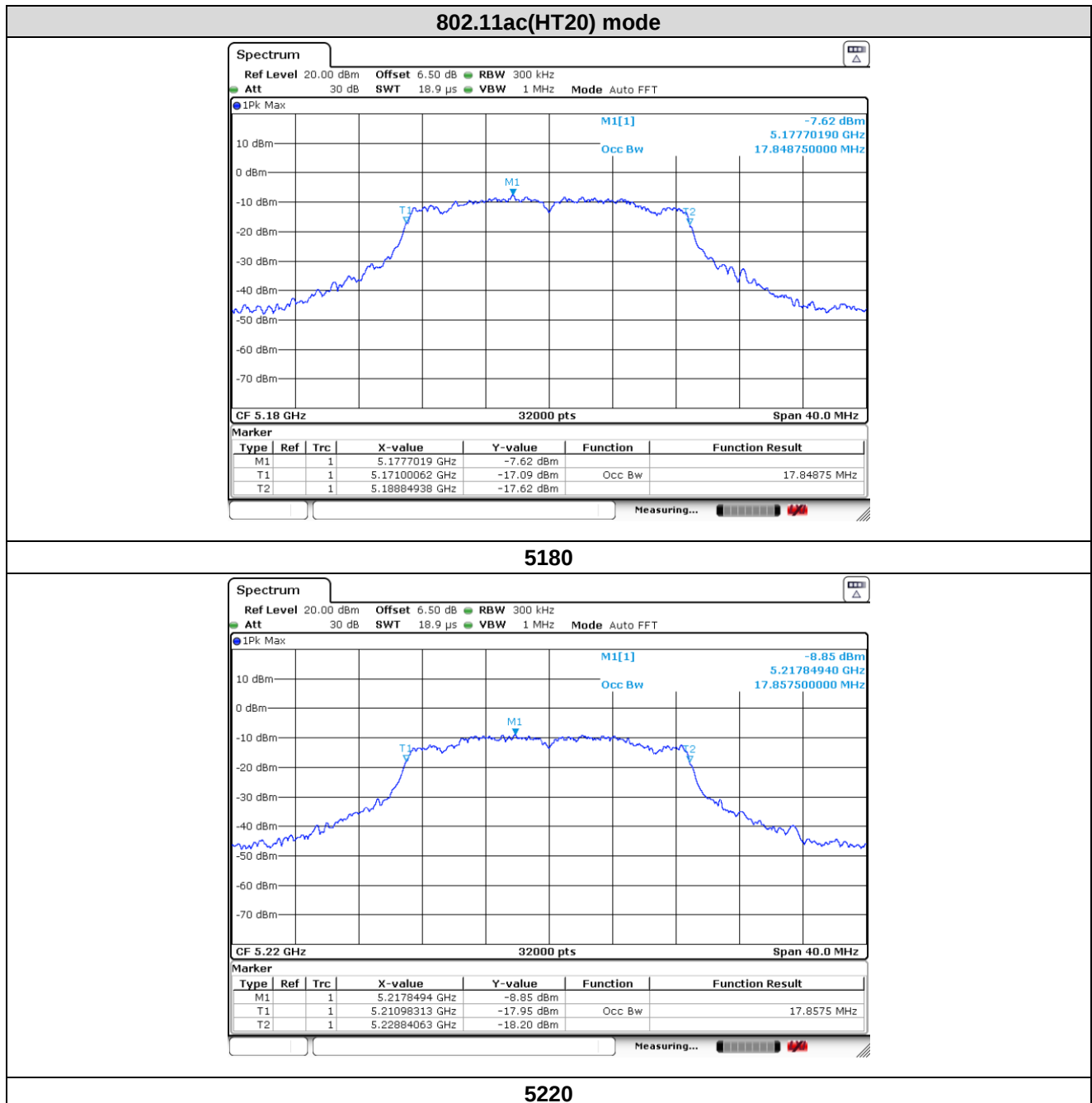


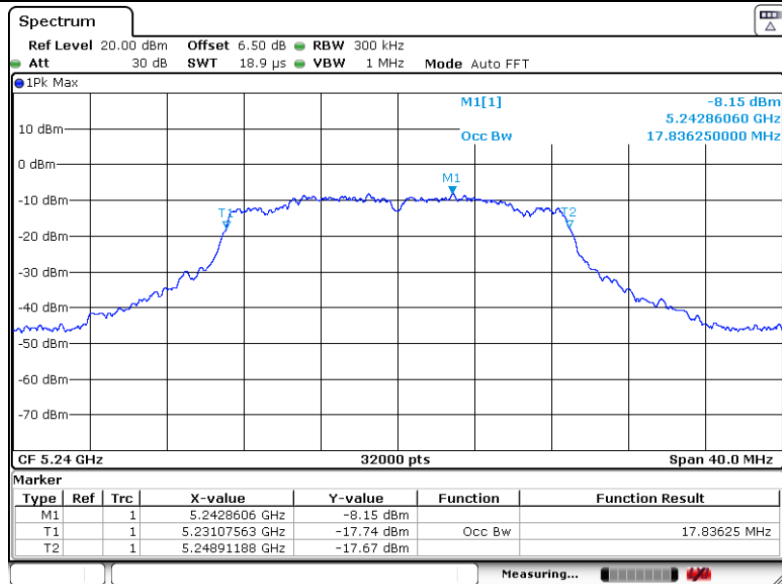
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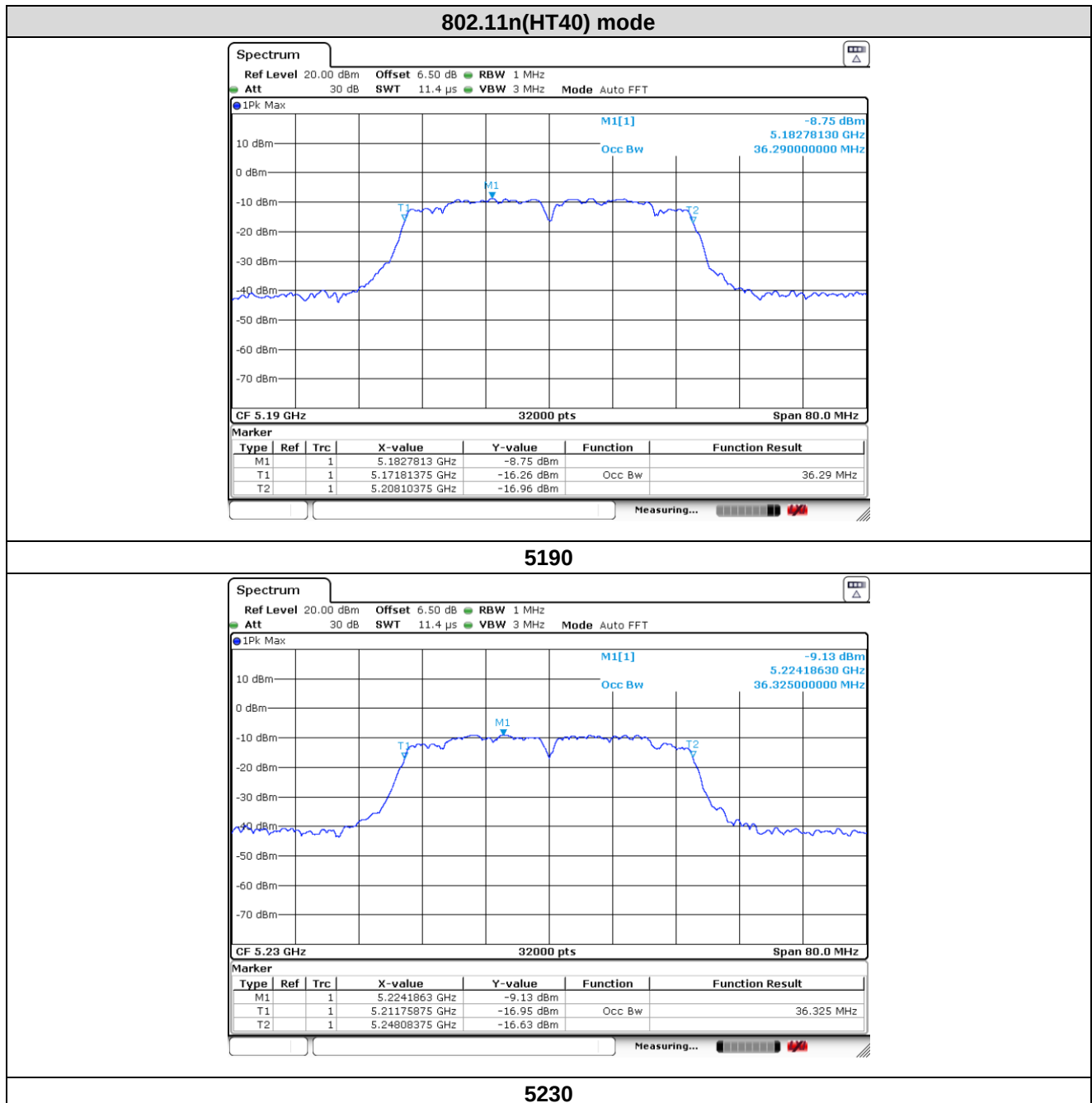


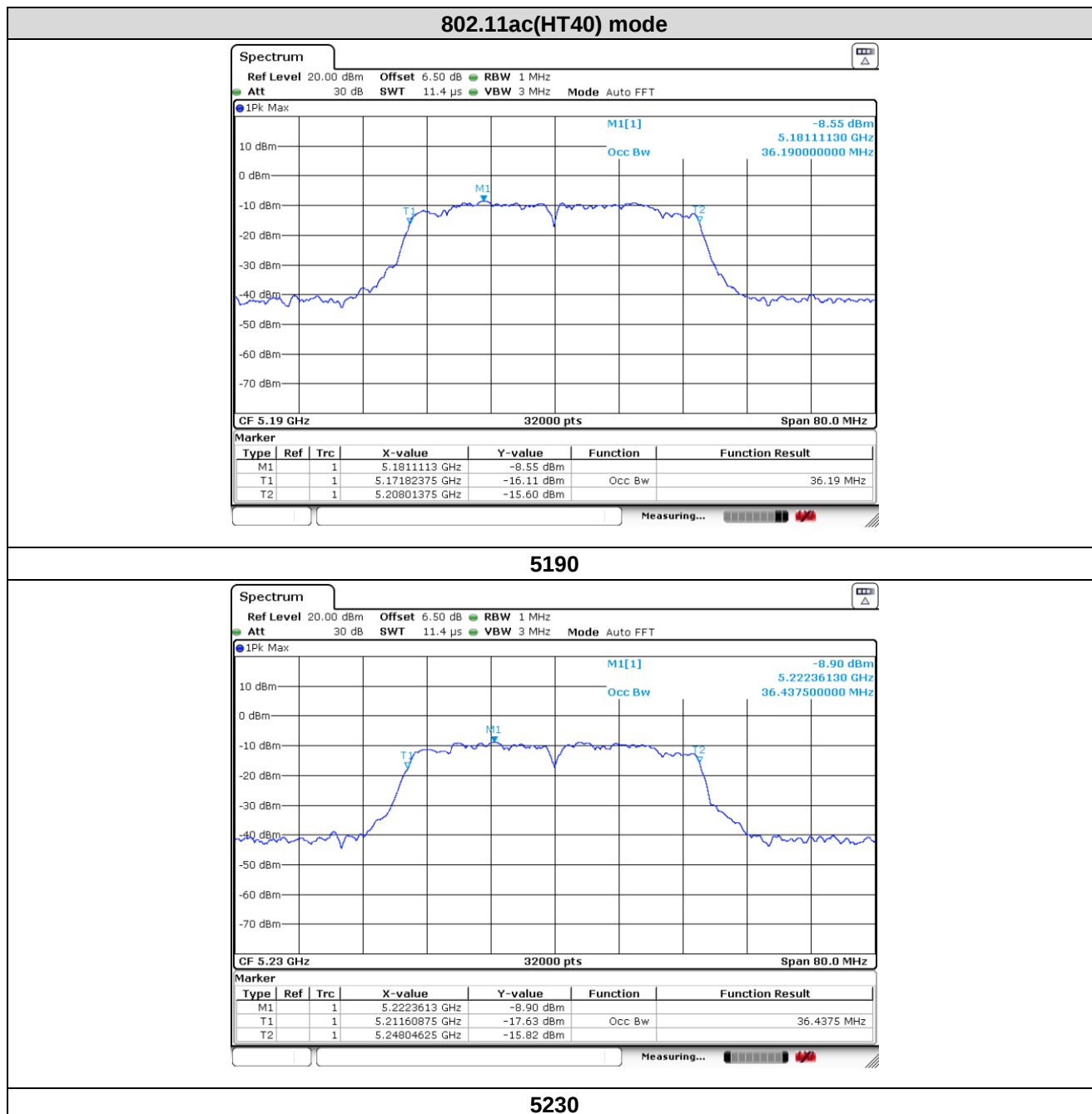
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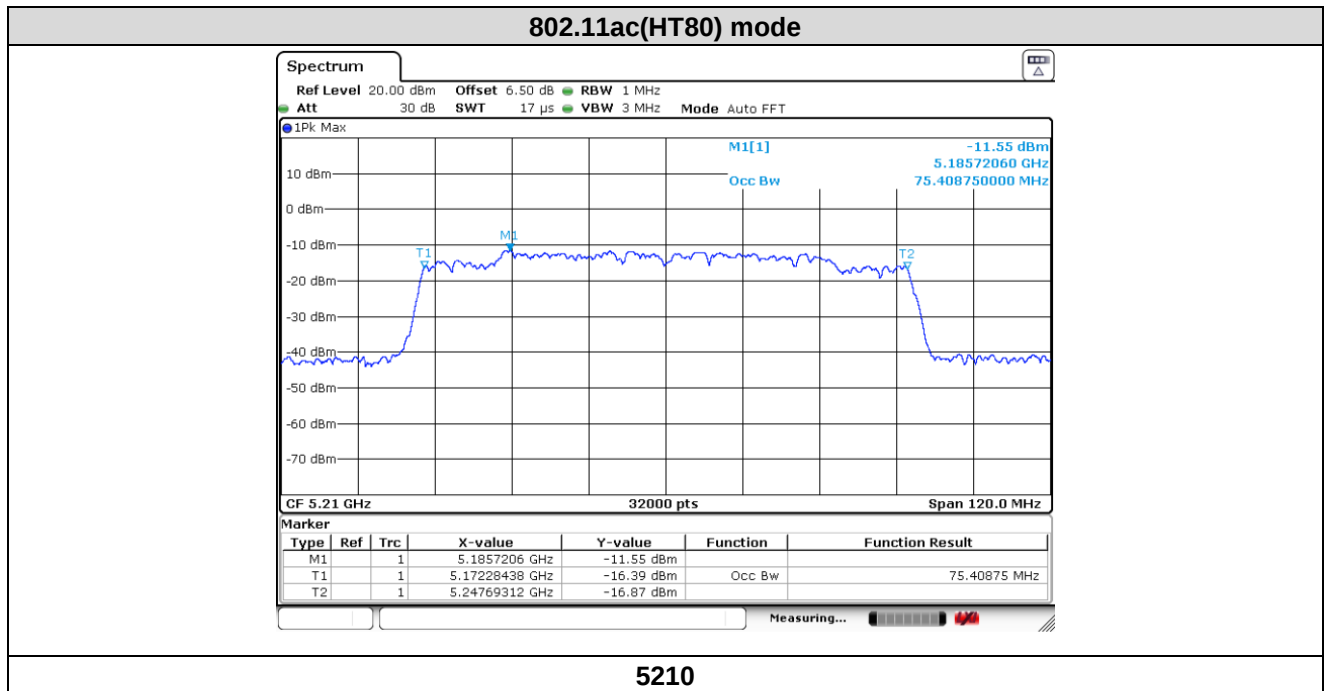




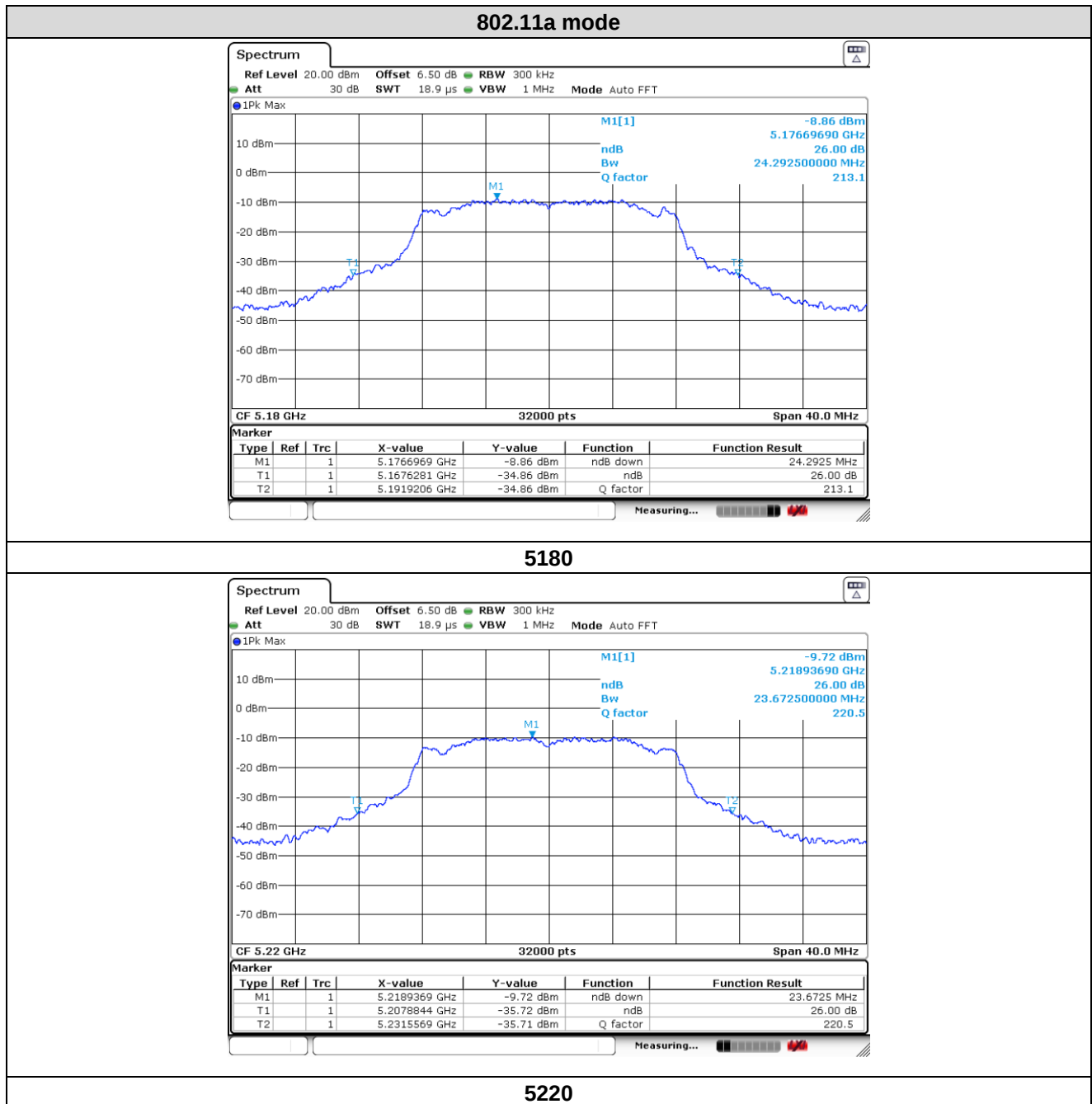
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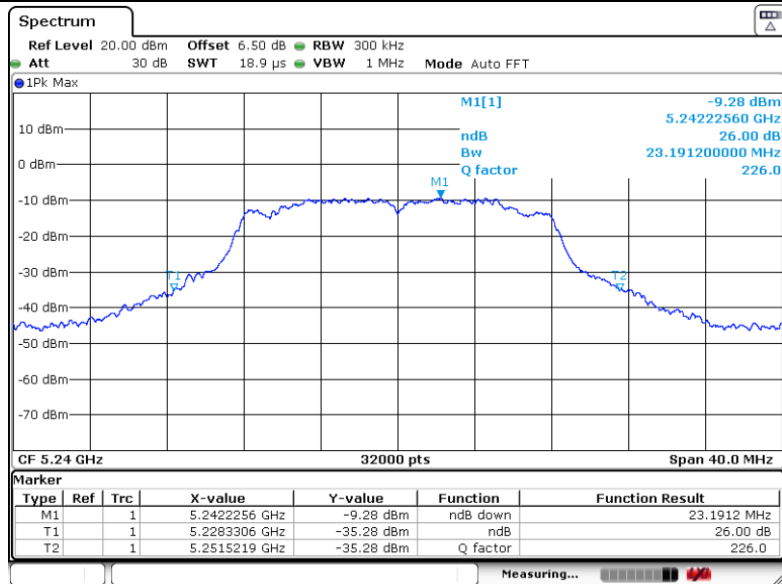




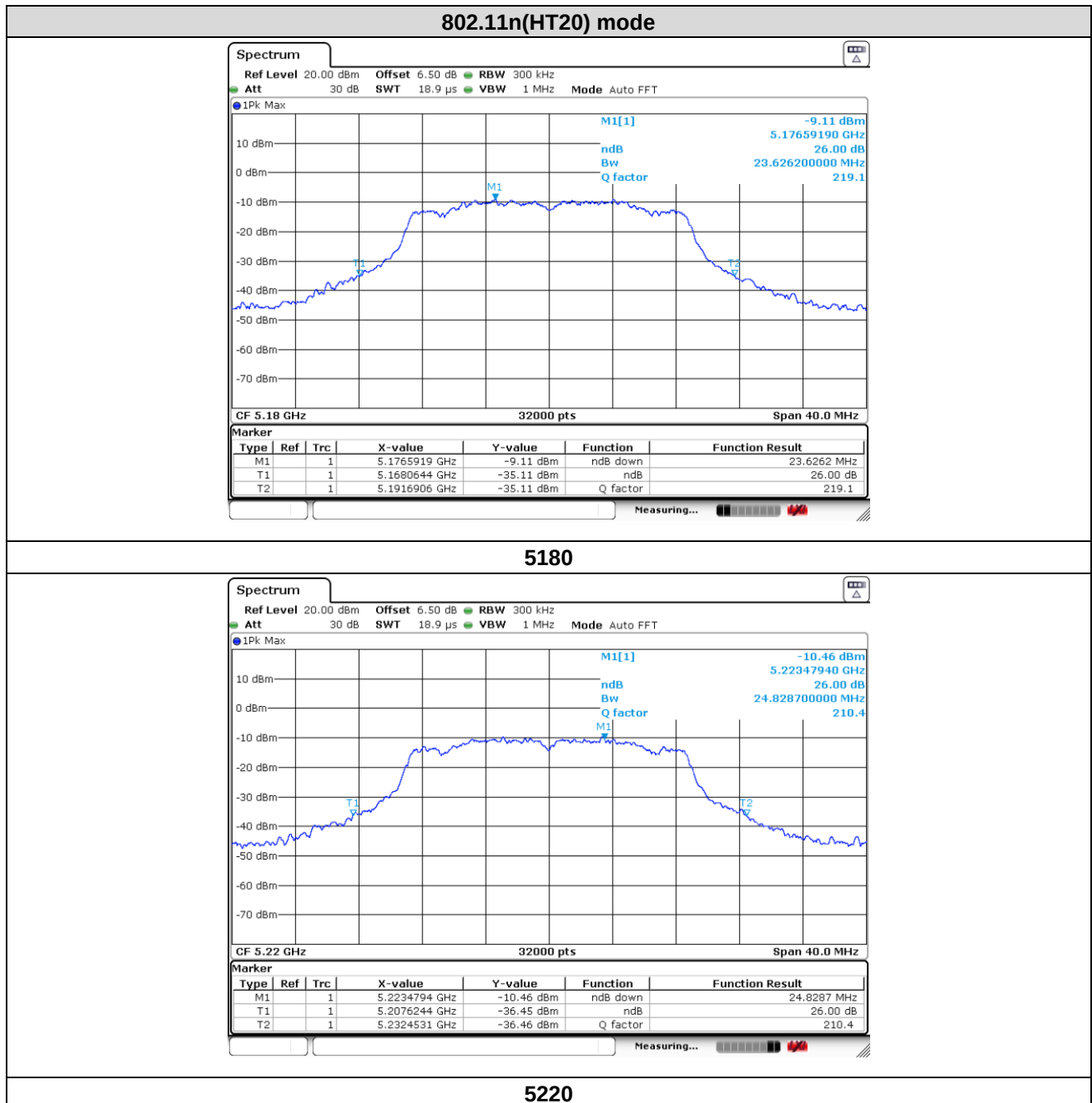


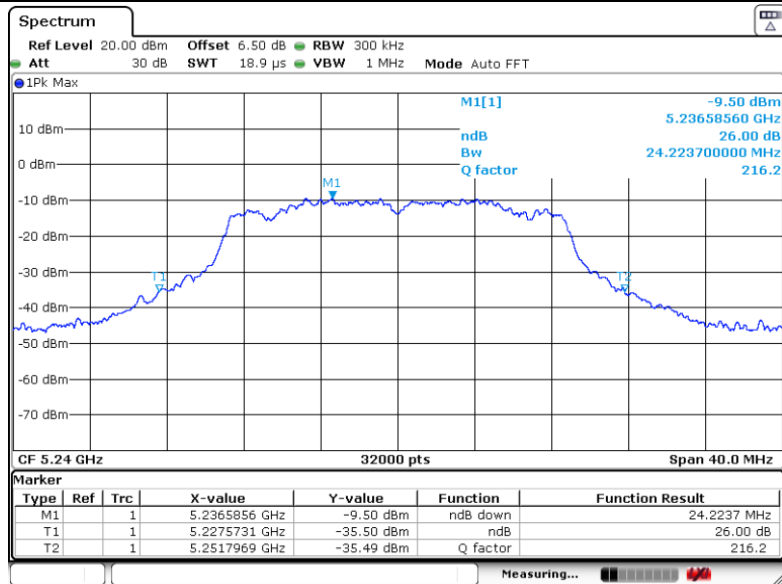
26dB Occupied Bandwidth



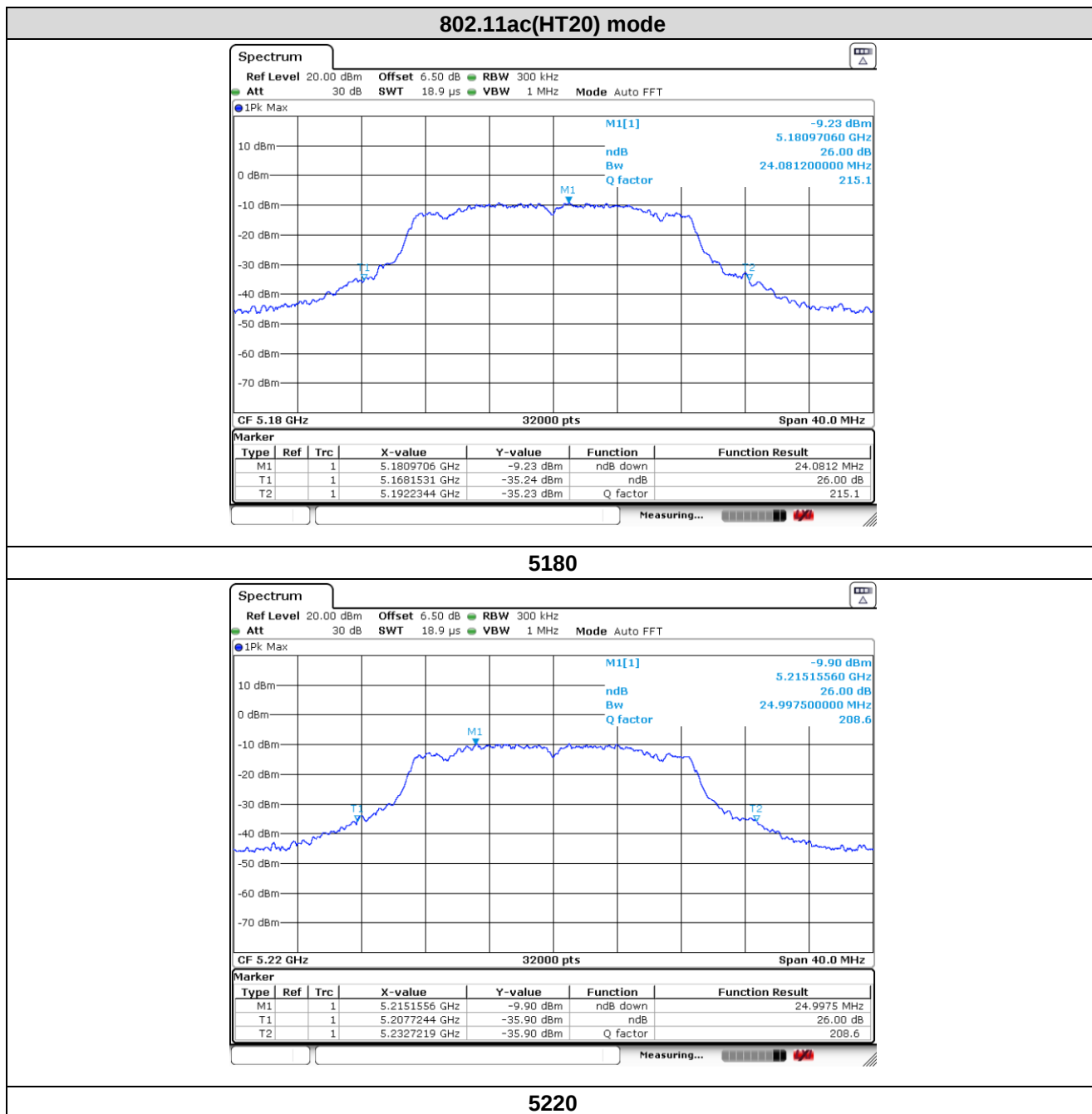


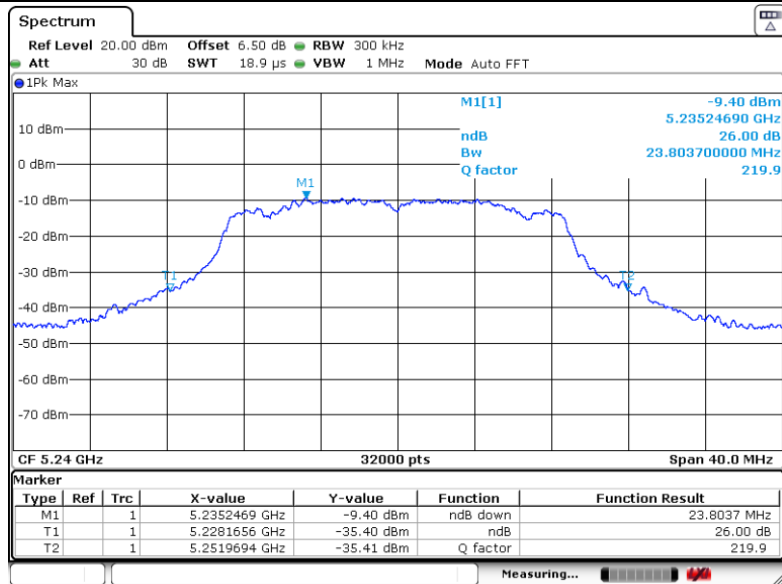
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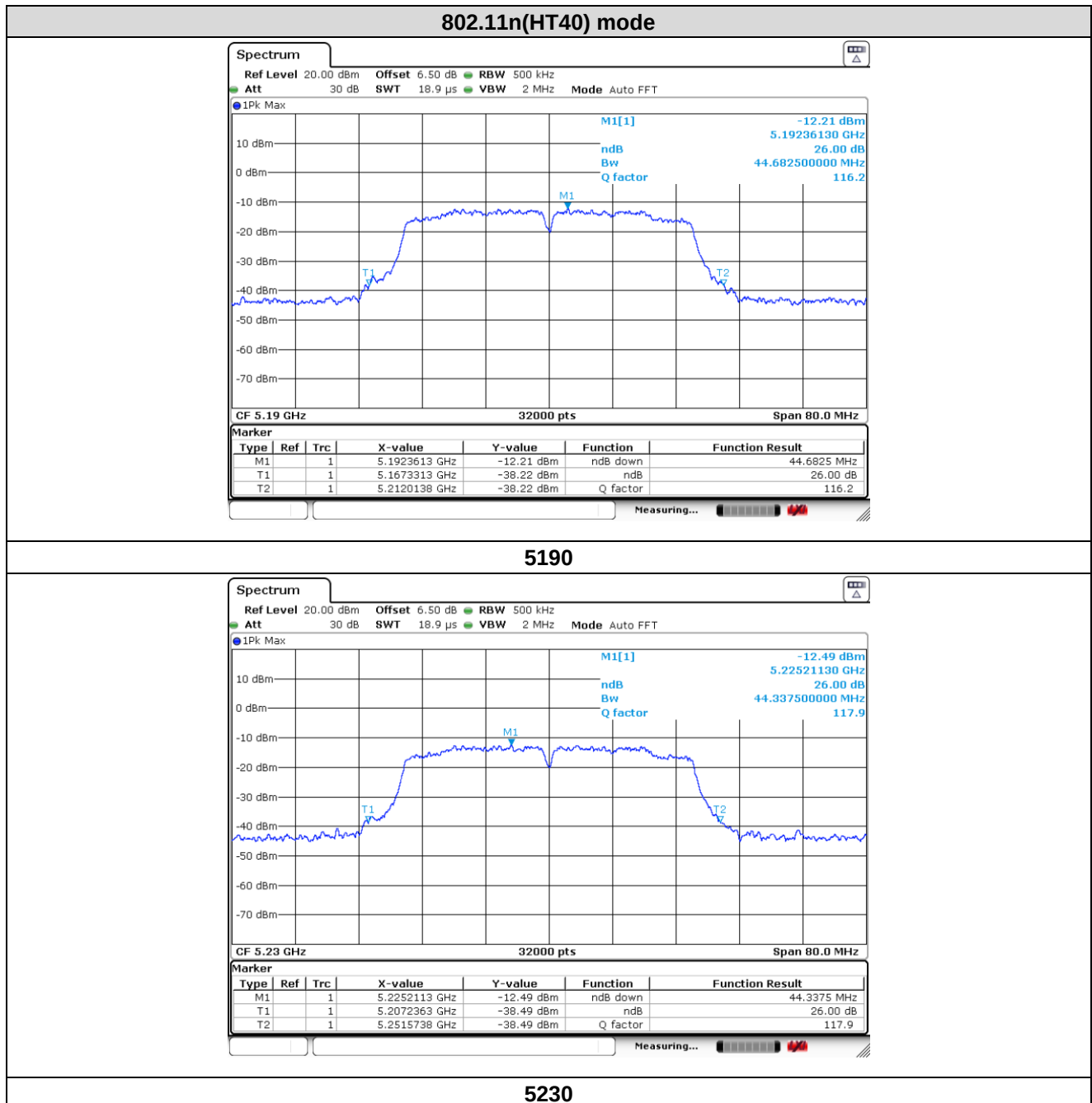


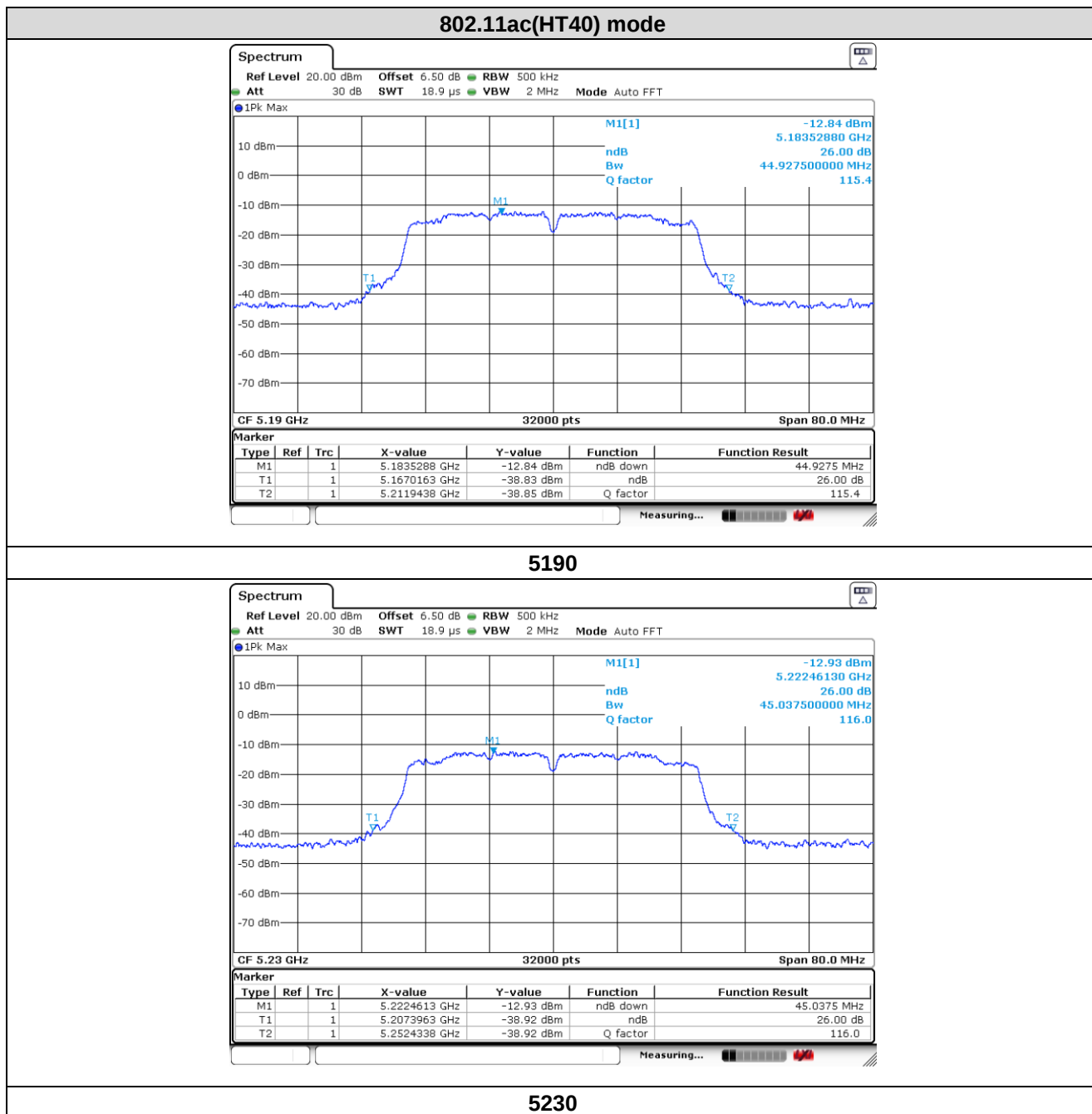
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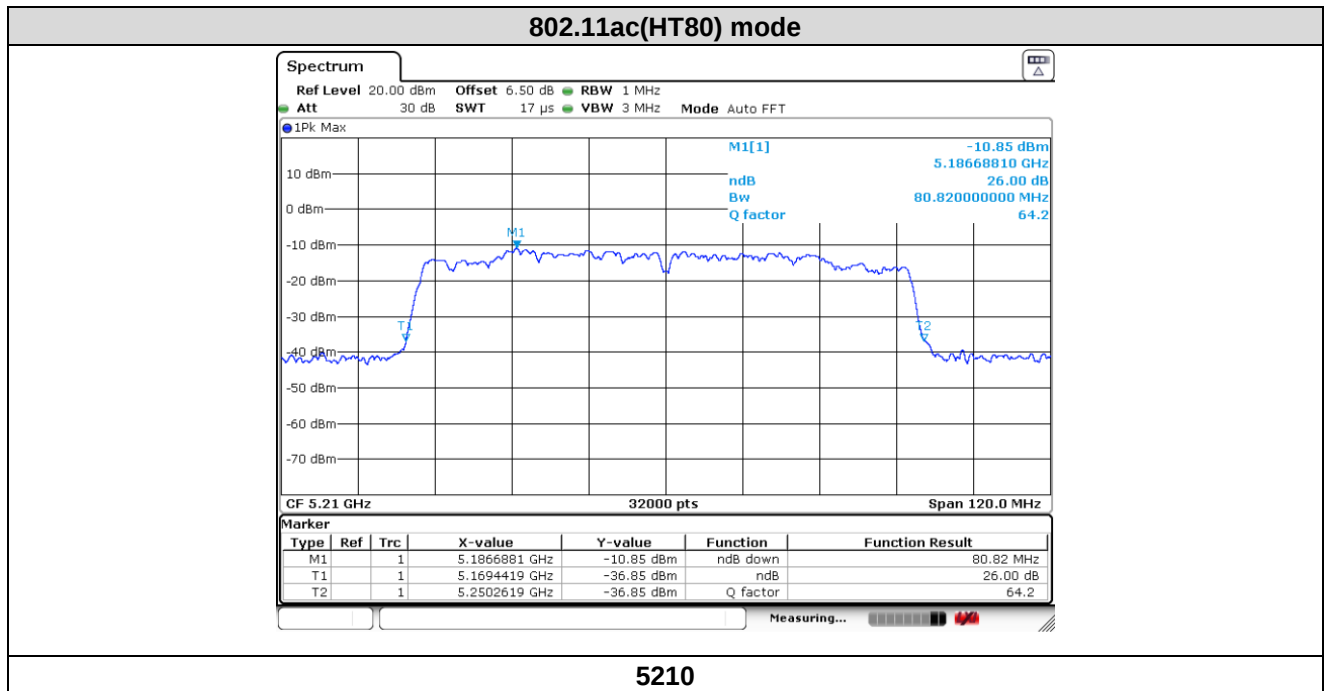




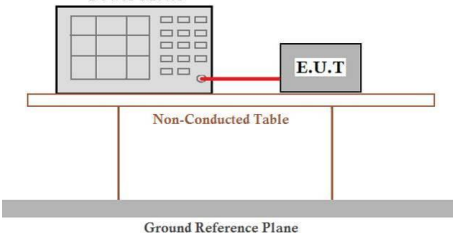
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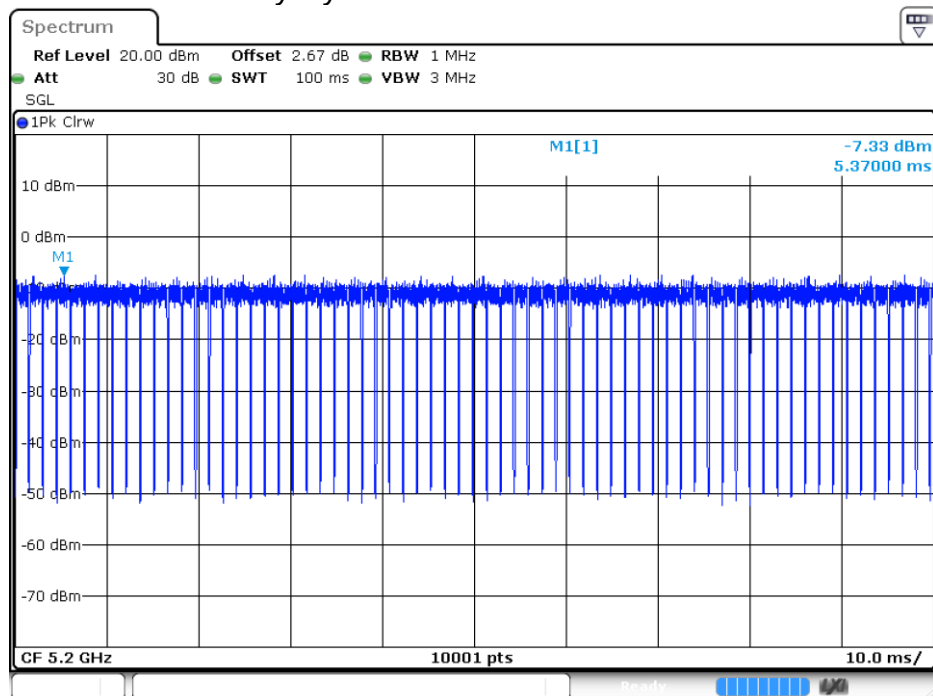
7.4 Peak Transmit Power

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	≤1W(30dBm) for master device				
		≤250mW(23.98dBm) for client device				
	5250-5350	≤250mW(23.98dBm) for client device or 11dBm+10logB*				
	5470-5725	≤250mW(23.98dBm) for client device or 11dBm+10logB*				
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:	Power Meter  Non-Conducted Table Ground Reference Plane					
Test procedure:	Measurement using an RF average power meter (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent).					
Test Instruments:	Refer to section 5.10 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	24 °C	Humid.:	53%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

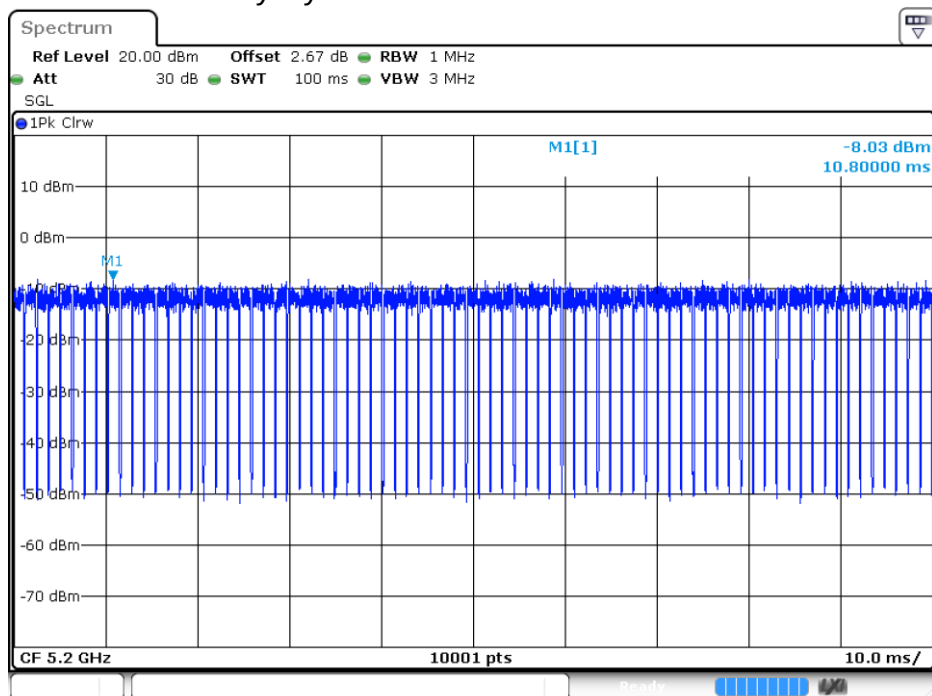
Measurement Data

Modulation	Duty cycle Ant1	Duty cycle Ant2	Duty Factor Ant1	Duty Factor Ant2
802.11a	91.1	91.23	0.4	0.4
802.11n(HT20)	89.39	89.71	0.49	0.47
802.11n(HT40)	81.27	80.55	0.9	0.94
802.11ac(HT20)	89.63	89.7	0.48	0.47
802.11ac(HT40)	81.51	81.51	0.89	0.89
802.11ac(HT80)	69.55	70.04	1.58	1.55

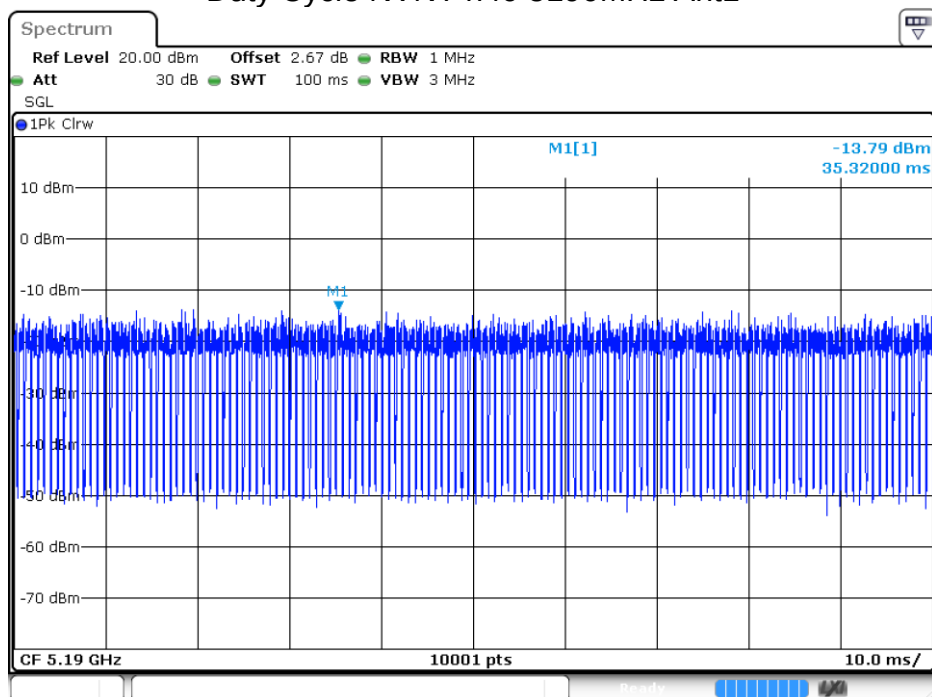
Duty Cycle NVNT a 5200MHz Ant1



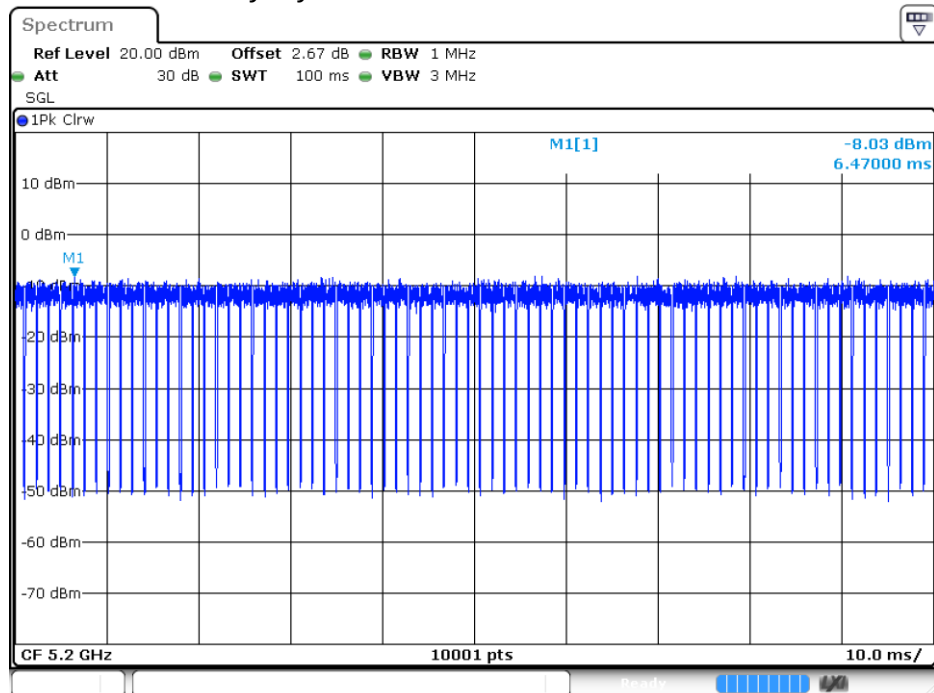
Duty Cycle NVNT n20 5200MHz Ant1



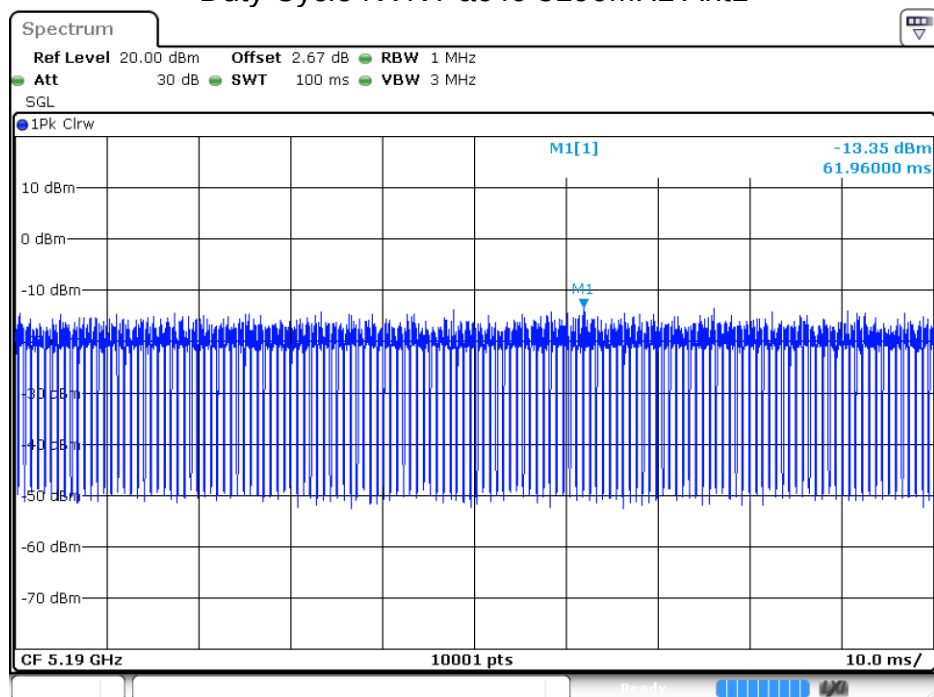
Duty Cycle NVNT n40 5190MHz Ant1



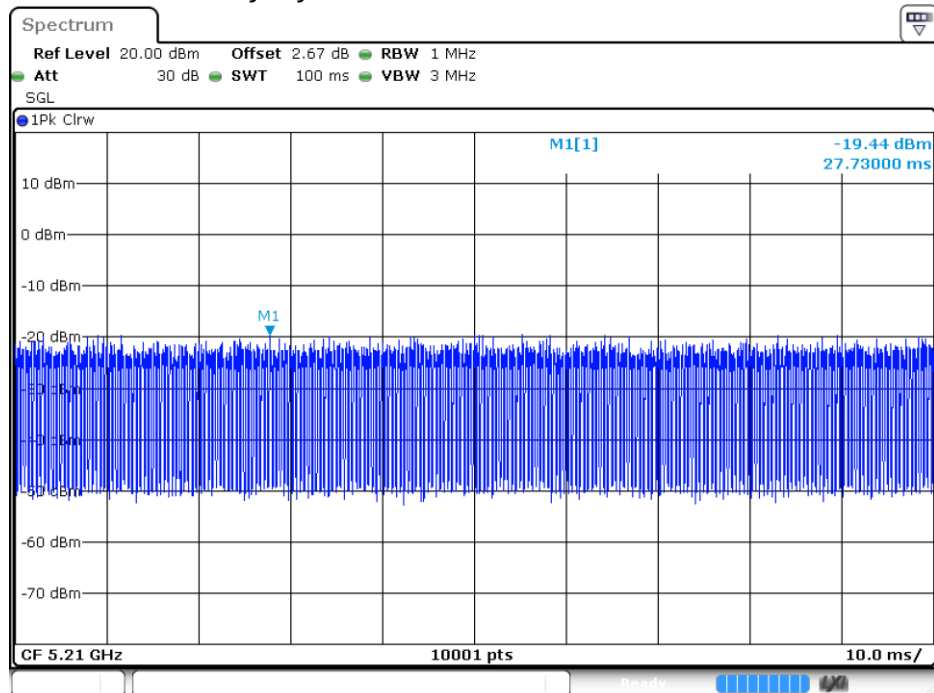
Duty Cycle NVNT ac20 5200MHz Ant1



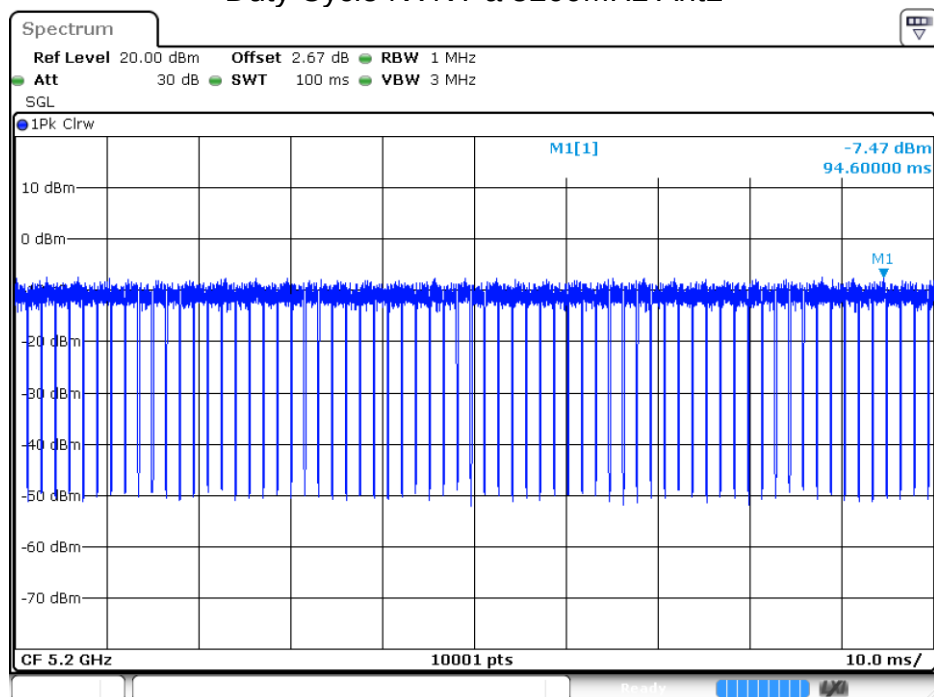
Duty Cycle NVNT ac40 5190MHz Ant1



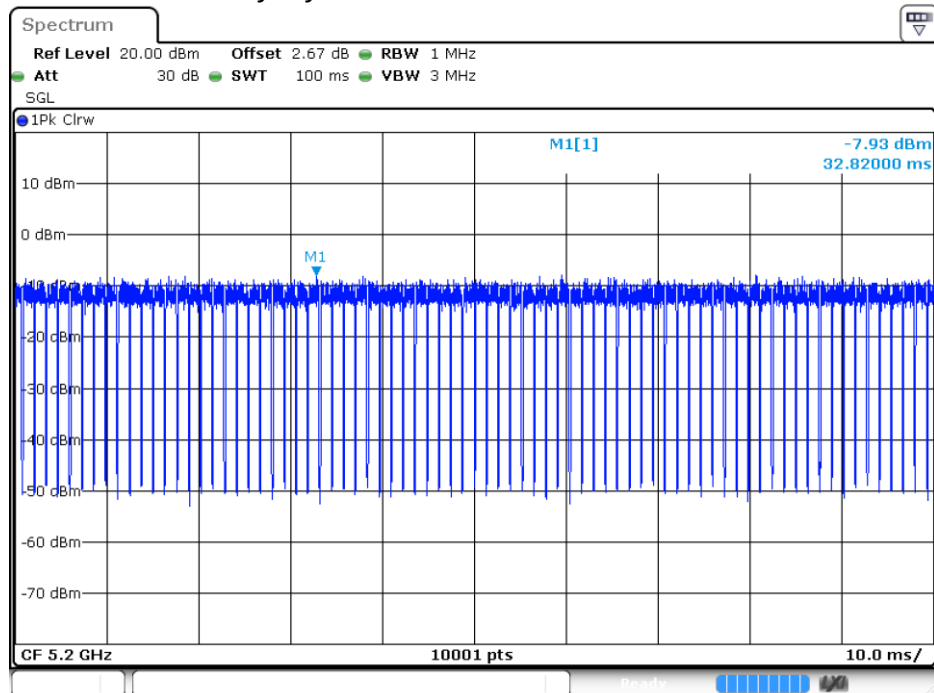
Duty Cycle NVNT ac80 5210MHz Ant1



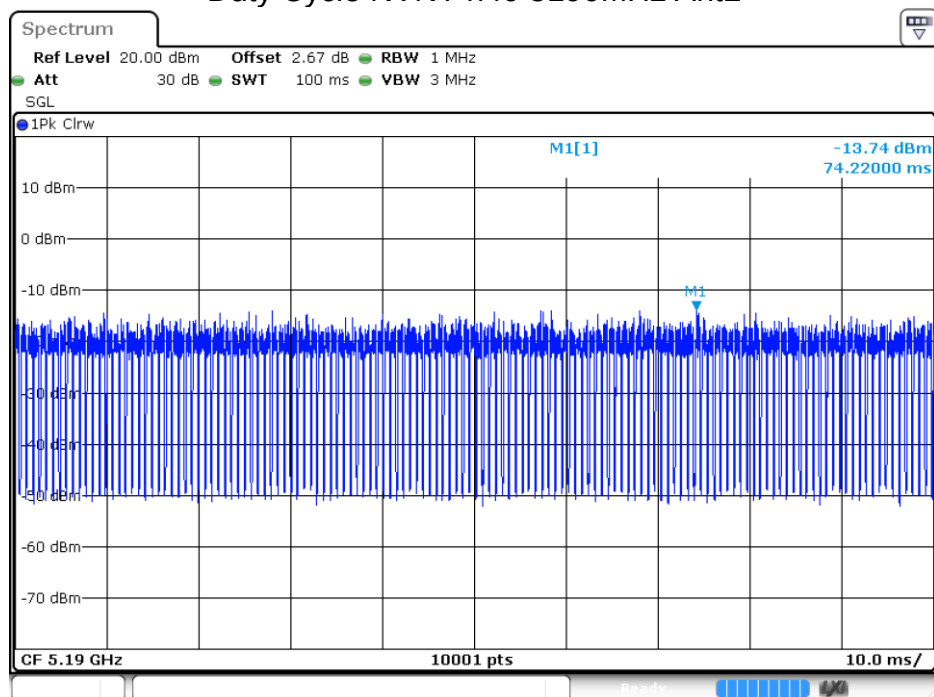
Duty Cycle NVNT a 5200MHz Ant2



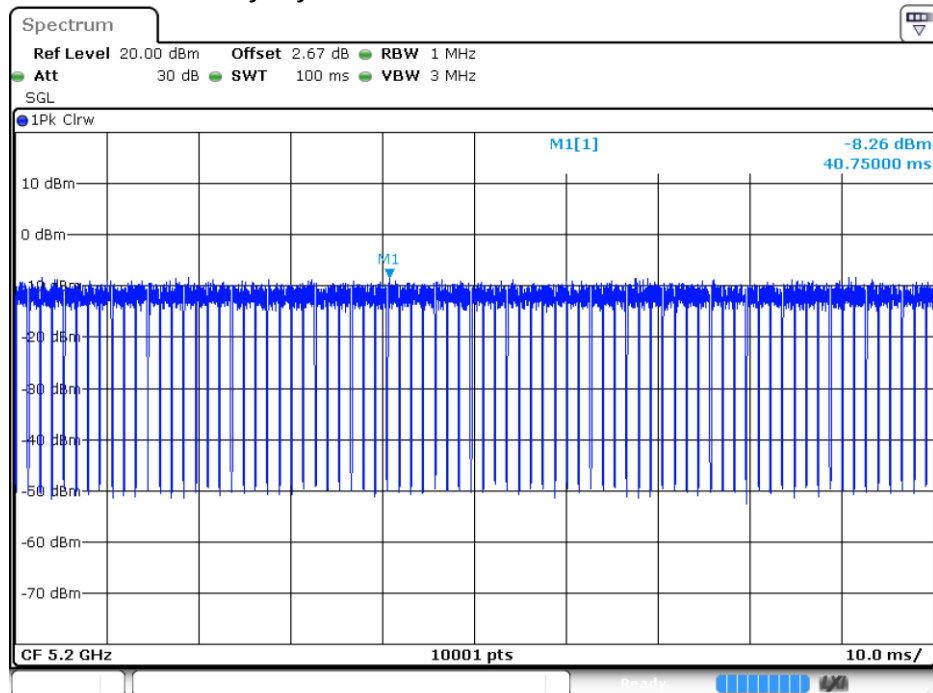
Duty Cycle NVNT n20 5200MHz Ant2



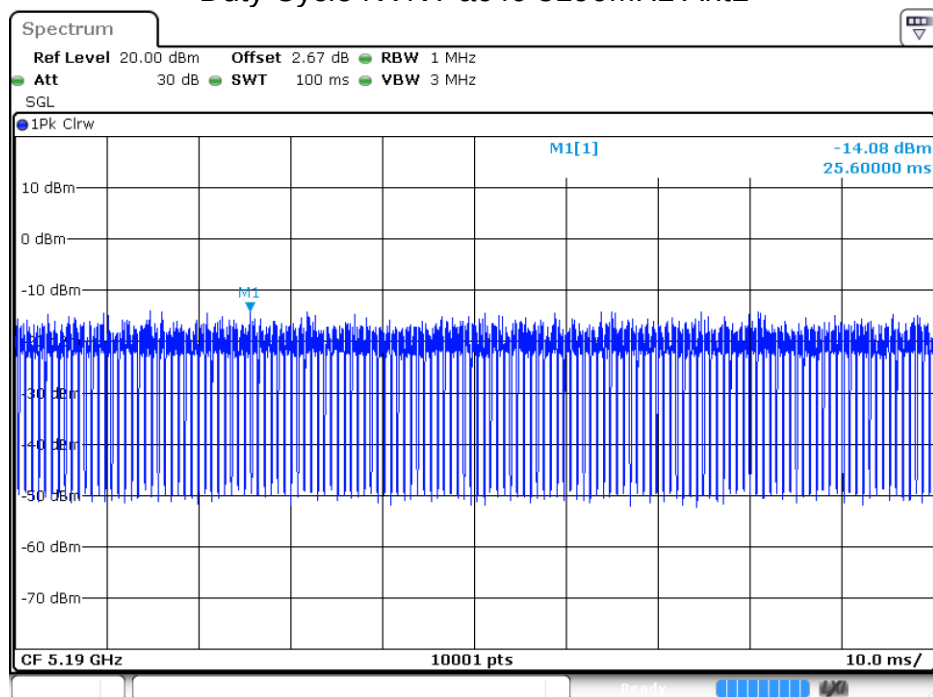
Duty Cycle NVNT n40 5190MHz Ant2



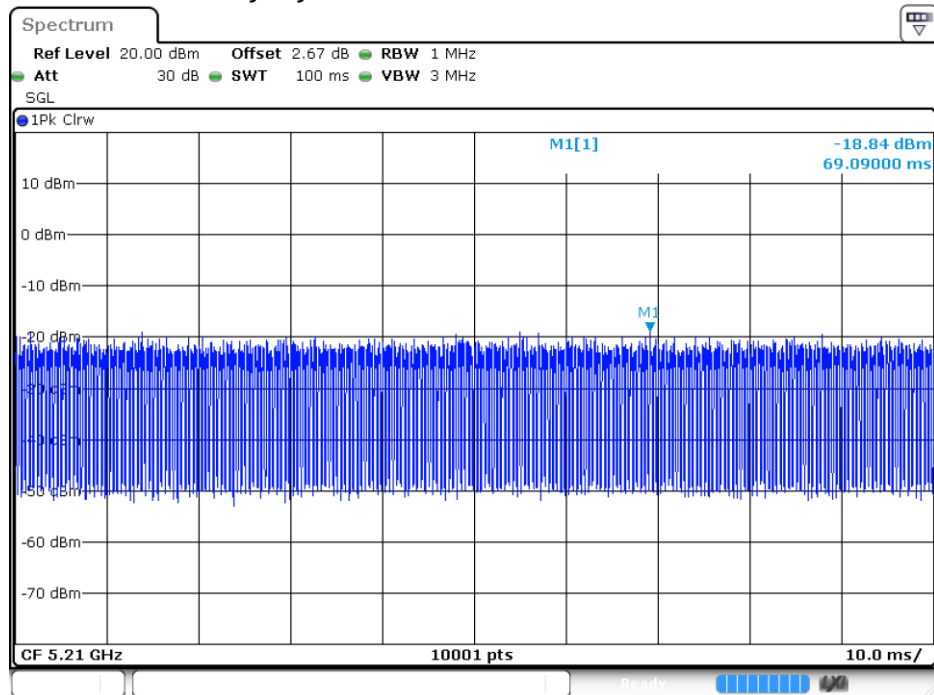
Duty Cycle NVNT ac20 5200MHz Ant2



Duty Cycle NVNT ac40 5190MHz Ant2



Duty Cycle NVNT ac80 5210MHz Ant2



802.11a mode								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1 (dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
36	5180	0.4	2.42	0.4	2.41	/	24	Pass
40	5200	0.4	2.52	0.4	2.44	/	24	Pass
48	5240	0.4	2.36	0.4	2.36	/	24	Pass

802.11n(HT20) mode								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1 (dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
36	5180	0.49	1.56	0.47	1.46	4.52	24	Pass
40	5200	0.49	1.37	0.47	1.24	4.32	24	Pass
48	5240	0.49	1.18	0.47	1.03	4.12	24	Pass

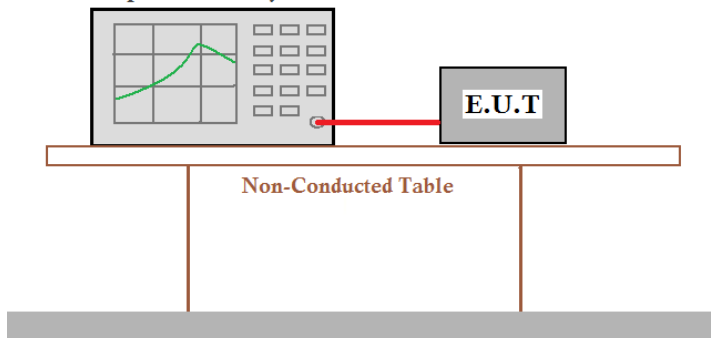
802.11ac(HT20) mode								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1 (dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
36	5180	0.48	1.45	0.47	1.31	4.39	24	Pass
40	5200	0.48	1.33	0.47	1.00	4.18	24	Pass
48	5240	0.48	1.08	0.47	0.93	4.02	24	Pass

802.11n(HT40) mode								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1 (dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
38	5190	0.9	-0.42	0.94	-0.41	2.60	24	Pass
46	5230	0.9	-0.76	0.94	-0.78	2.24	24	Pass

802.11ac(HT40) mode								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1 (dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
38	5190	0.89	-0.45	0.89	-0.41	2.58	24	Pass
46	5230	0.89	-0.80	0.89	-0.86	2.18	24	Pass

802.11 ac(HT80)								
CH No.	Frequency (MHz)	Duty Factor	Total Output Power Ant1(dBm)	Duty Factor	Total Output Power Ant2 (dBm)	Mimo	Limit (dBm)	Result
42	5210	1.58	-2.05	1.55	-2.13	0.92	24	Pass

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:	Spectrum Analyzer  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 environment:	Temp.:	24 °C	Humid.:	53%	Press.:	1012mbar	
Test voltage:	AC 120V, 60Hz						
Test results:	Pass						

Measurement Data

Modulation	Duty cycle Ant1	Duty cycle Ant2	Duty Factor Ant1	Duty Factor Ant2
802.11a	91.1	91.23	0.4	0.4
802.11n(HT20)	89.39	89.71	0.49	0.47
802.11n(HT40)	81.27	80.55	0.9	0.94
802.11ac(HT20)	89.63	89.7	0.48	0.47
802.11ac(HT40)	81.51	81.51	0.89	0.89
802.11ac(HT80)	69.55	70.04	1.58	1.55

802.11a mode								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
36	5180	0.4	-7.62	0.4	-7.56	/	11	Pass
40	5200	0.4	-7.32	0.4	-7.23	/	11	Pass
48	5240	0.4	-7.86	0.4	-7.95	/	11	Pass

802.11n(HT20) mode								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
36	5180	0.49	-8.46	0.47	-8.13	-4.80	11	Pass
40	5200	0.49	-7.74	0.47	-7.57	-4.16	11	Pass
48	5240	0.49	-8.5	0.47	-8.21	-4.86	11	Pass

802.11ac(HT20) mode								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
36	5180	0.48	-7.71	0.47	-8.05	-4.39	11	Pass
40	5200	0.48	-8.22	0.47	-7.94	-4.59	11	Pass
48	5240	0.48	-8.16	0.47	-8.04	-4.61	11	Pass

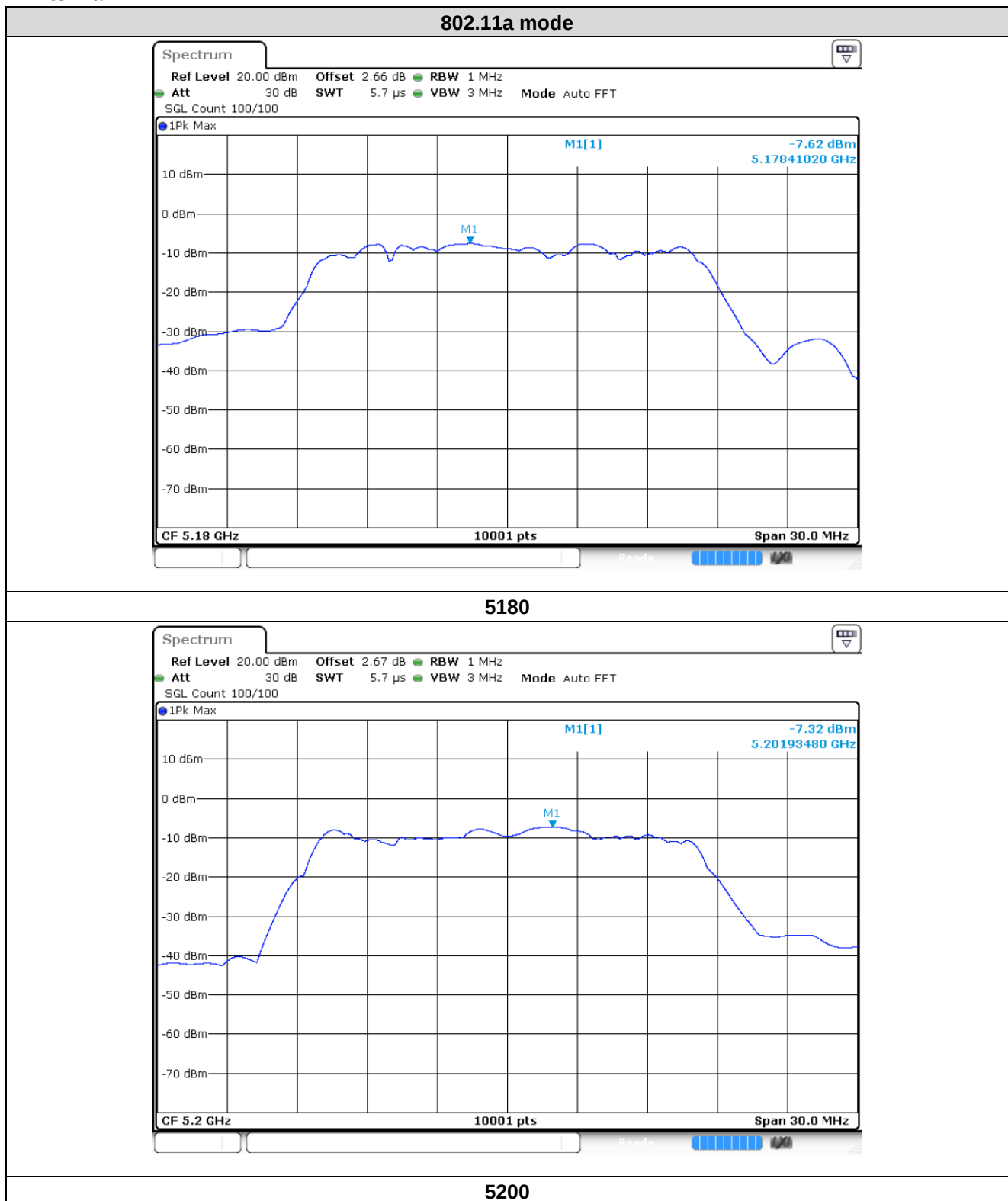
802.11n(HT40) mode								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
38	5190	0.9	-13.09	0.94	-13.38	-9.30	11	Pass
46	5230	0.9	-13.37	0.94	-12.74	-9.11	11	Pass

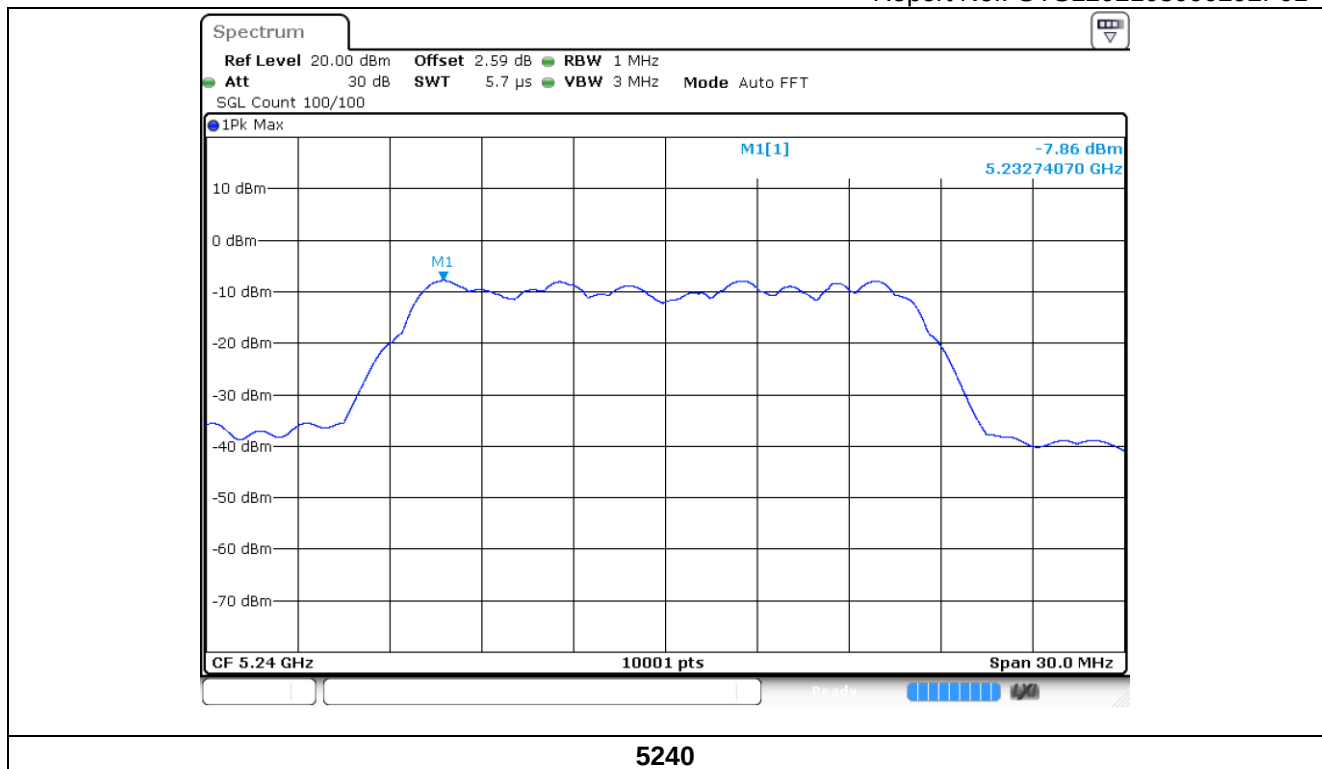
802.11ac(HT40) mode								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
38	5190	0.89	-12.34	0.89	-13.41	-8.94	11	Pass
46	5230	0.89	-13.72	0.89	-13.98	-9.95	11	Pass

802.11 ac(HT80)								
CH No.	Frequency (MHz)	Duty Factor	Total PSD Power Ant1(dBm/MHz)	Duty Factor	Total PSD Power Ant2(dBm/MHz)	Mimo	Limit (dBm/MHz)	Result
42	5210	1.58	-17.49	1.55	-16.98	-12.65	11	Pass

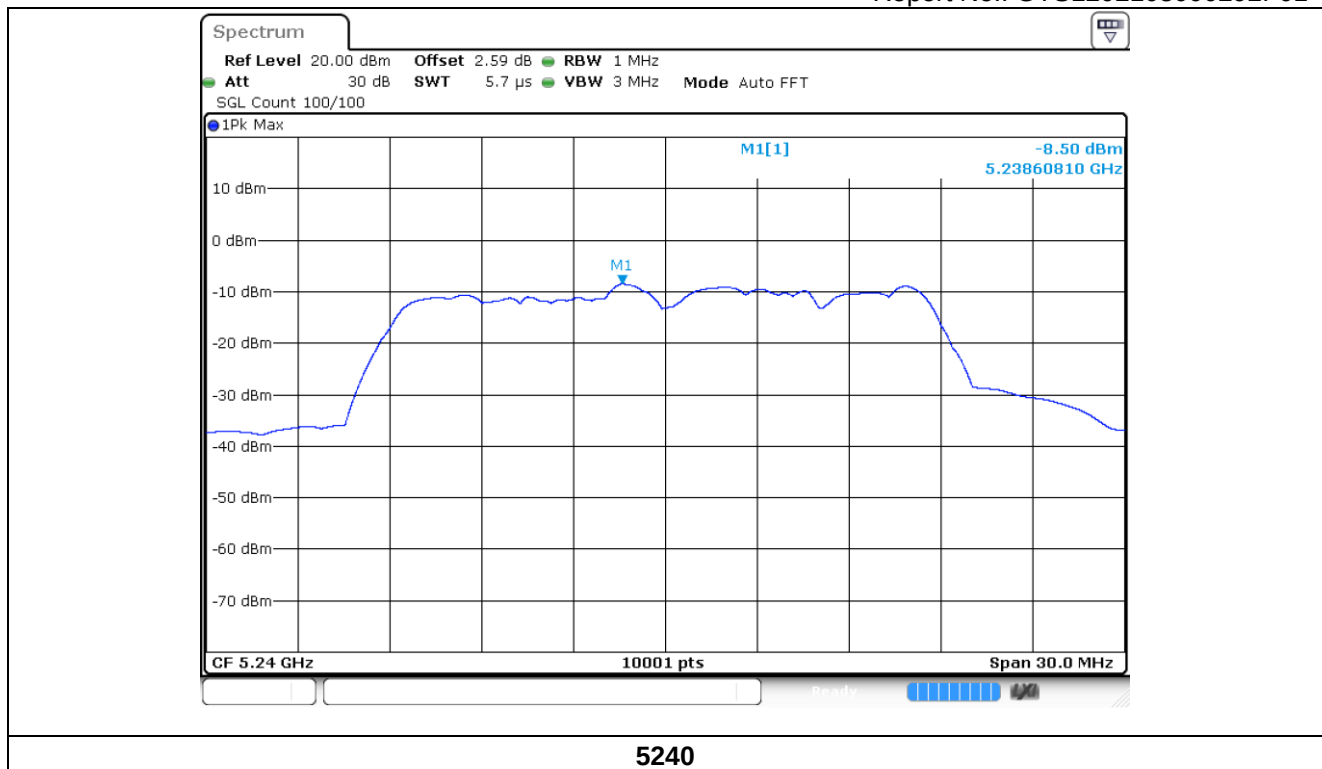
Test plots as followed:

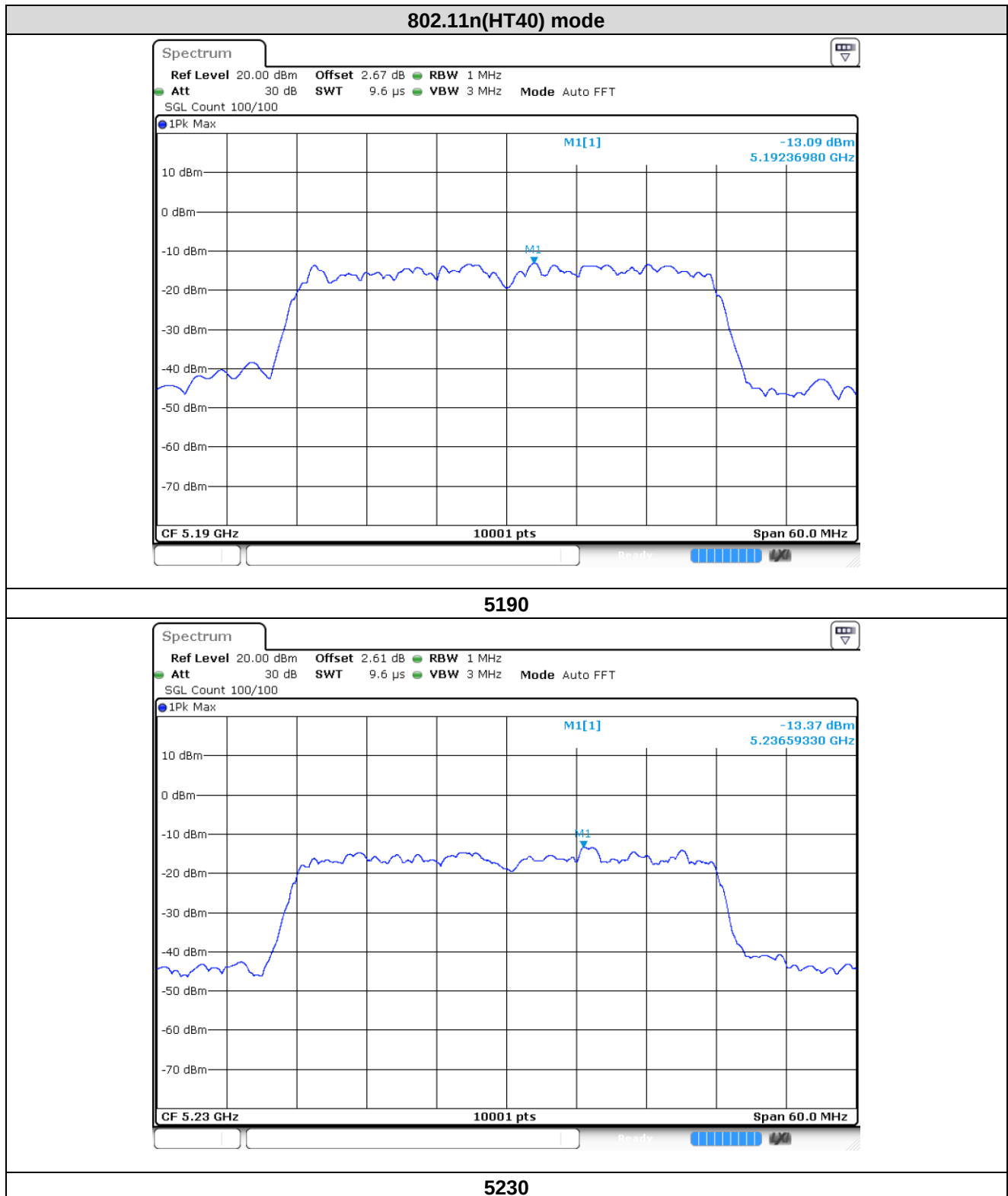
Antenna 1:

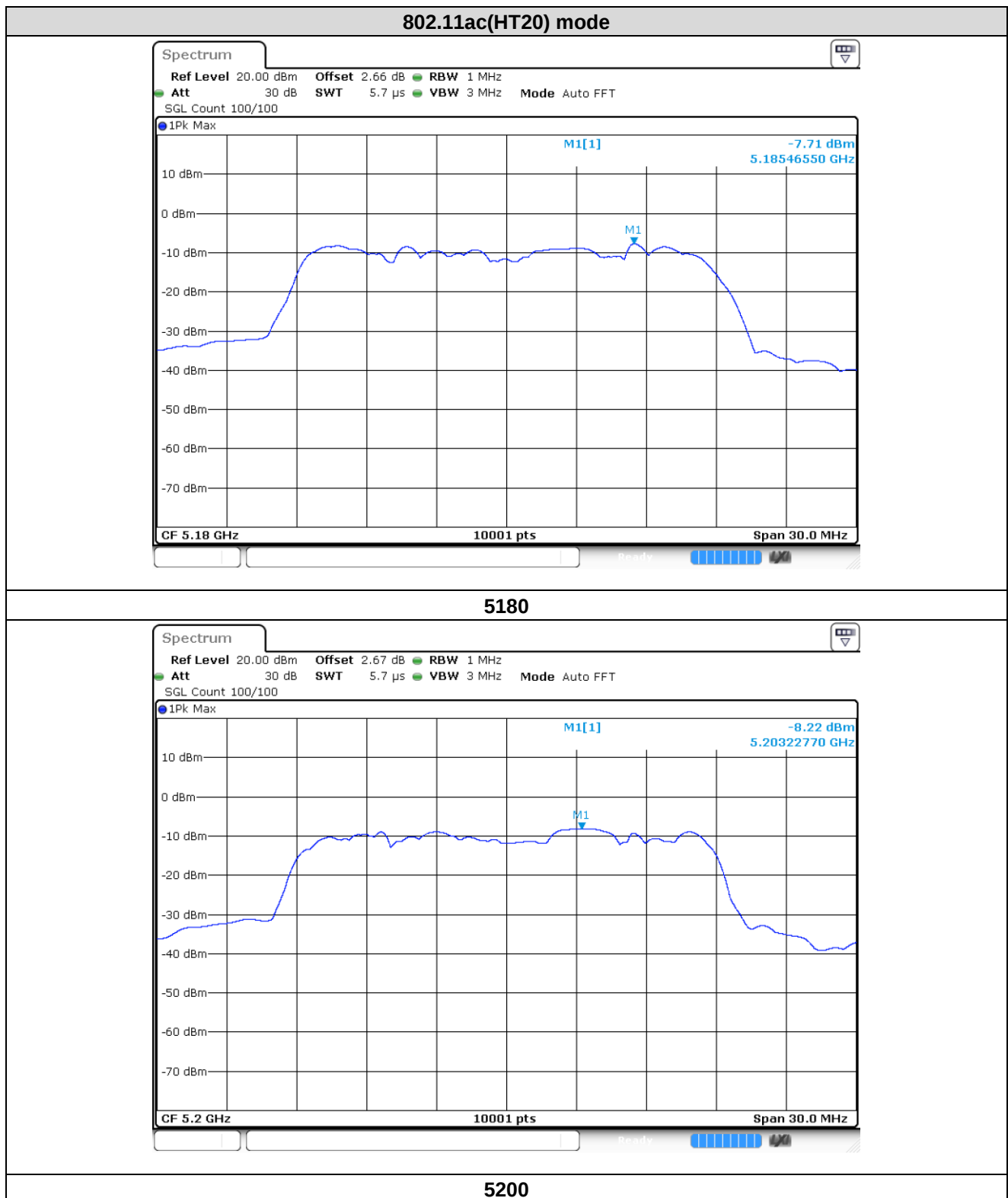


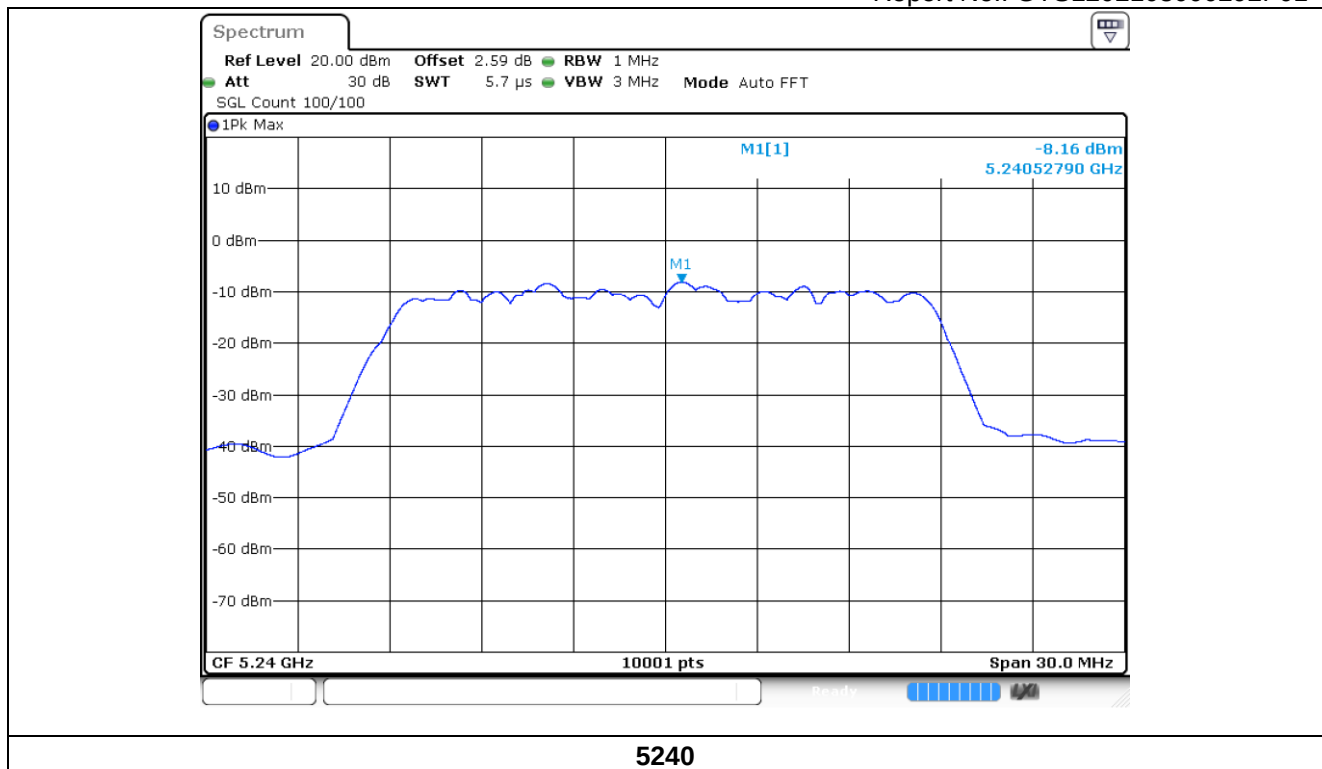




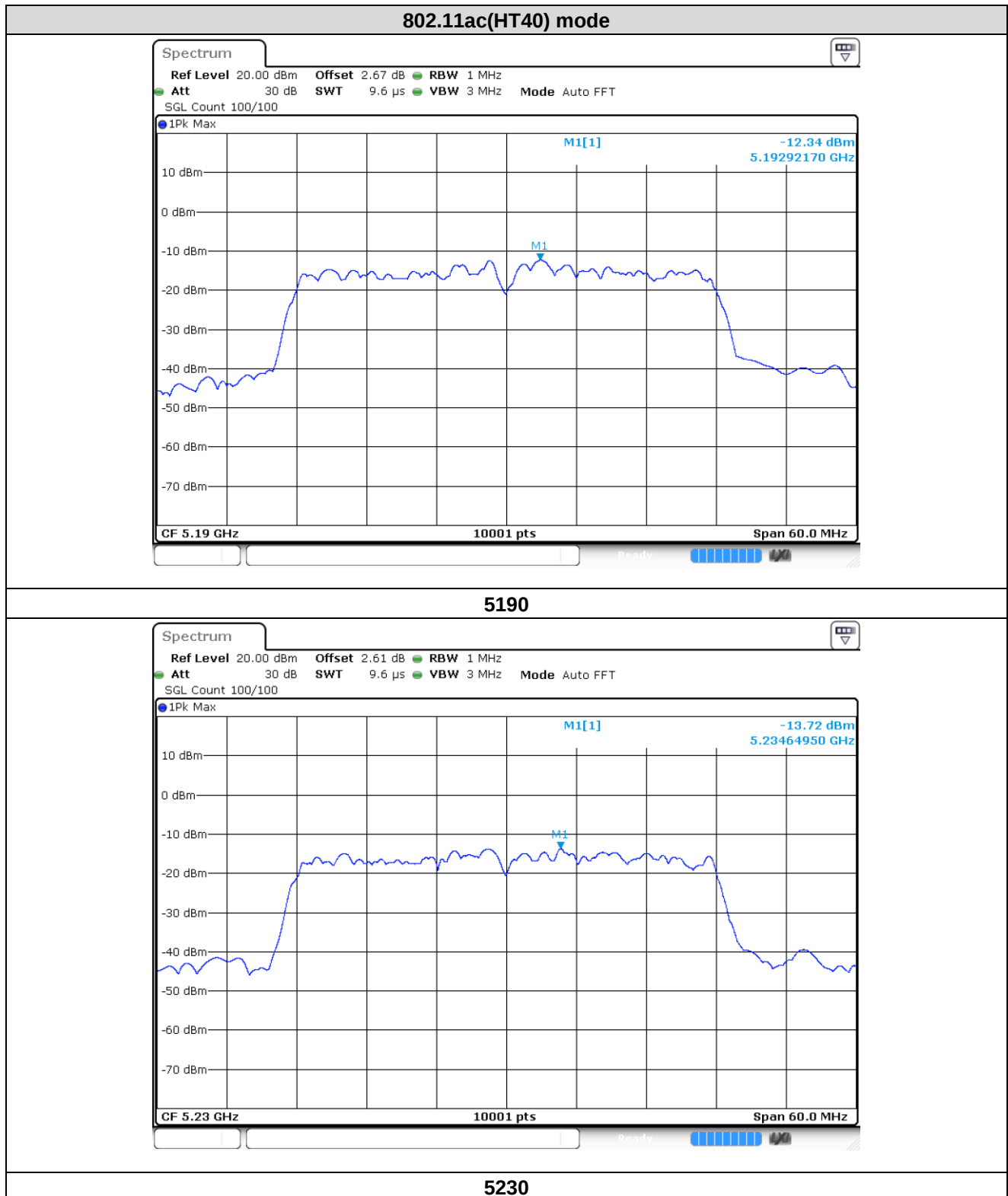


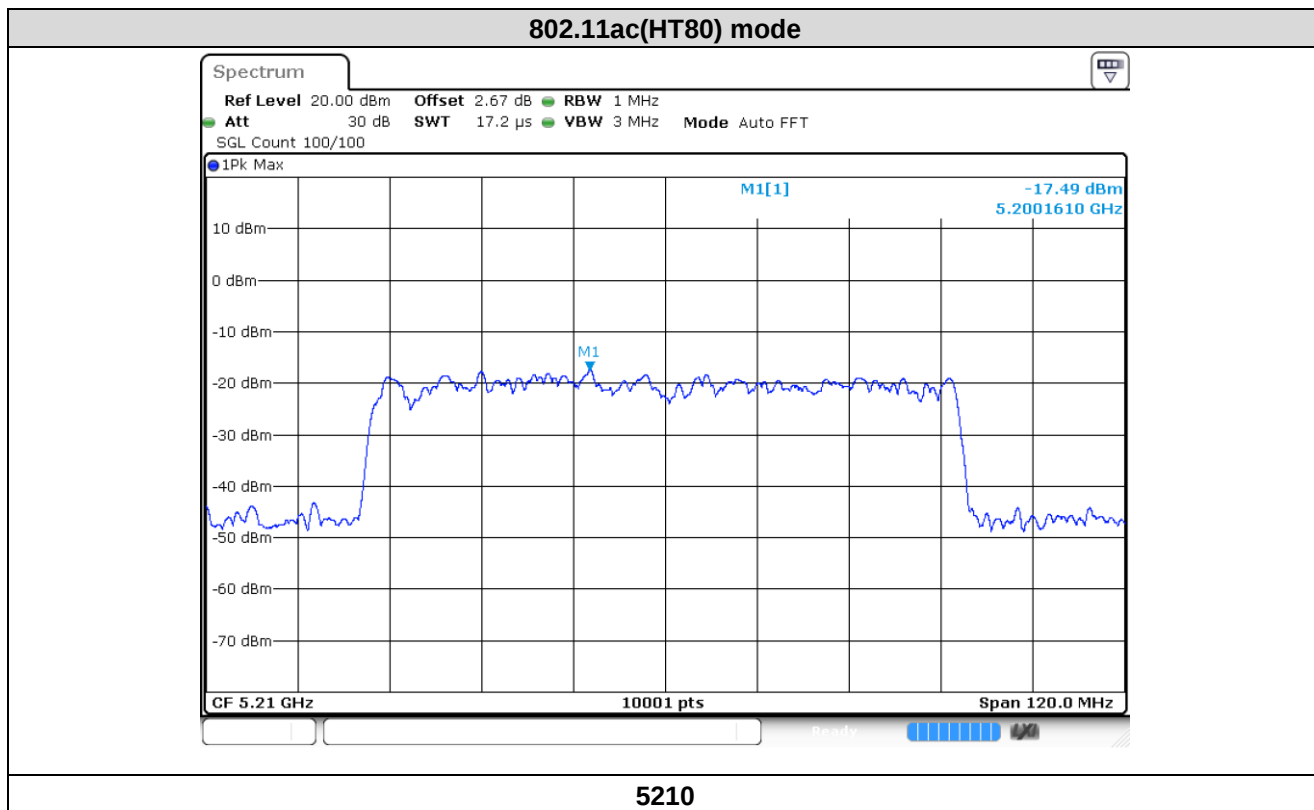




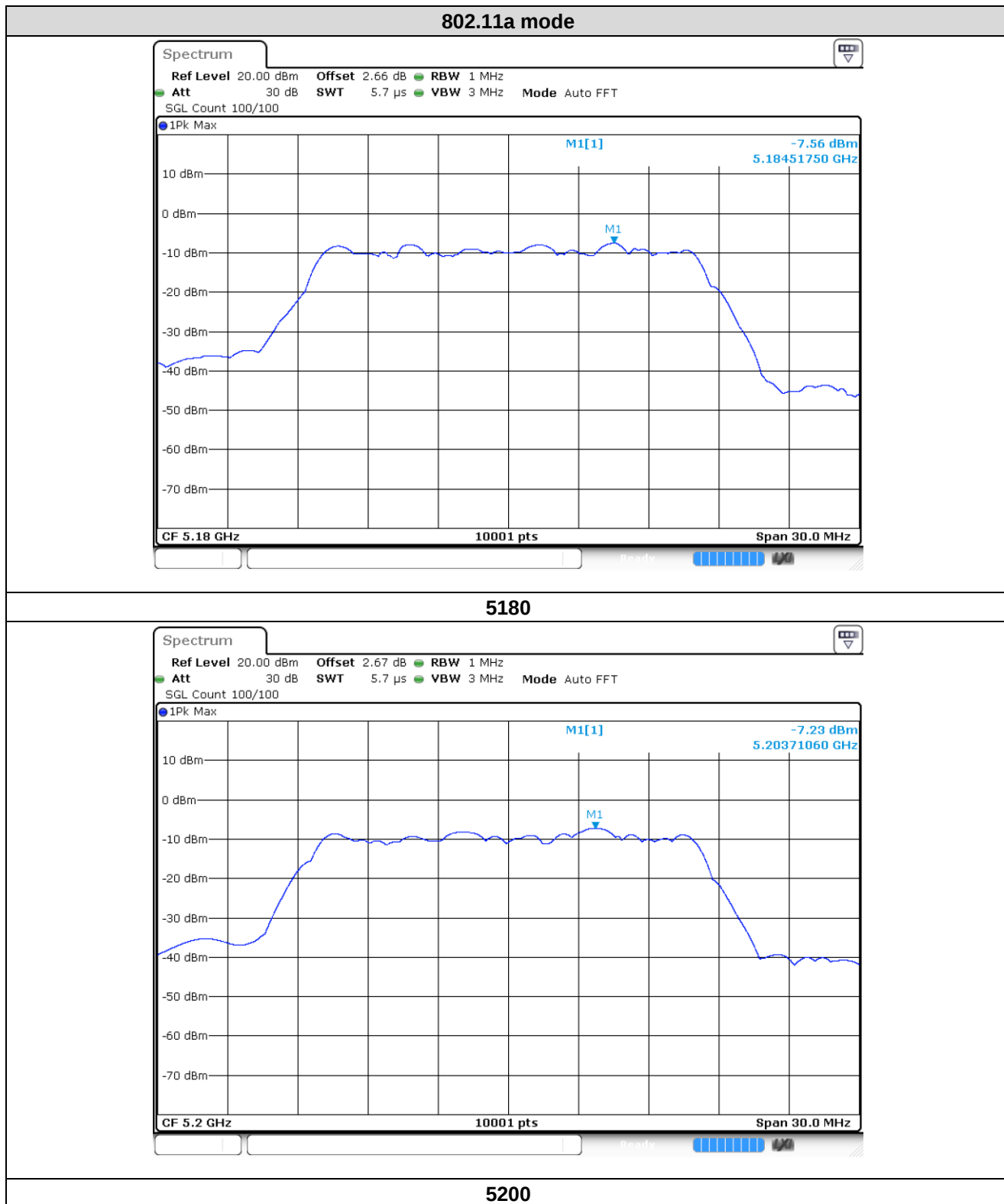


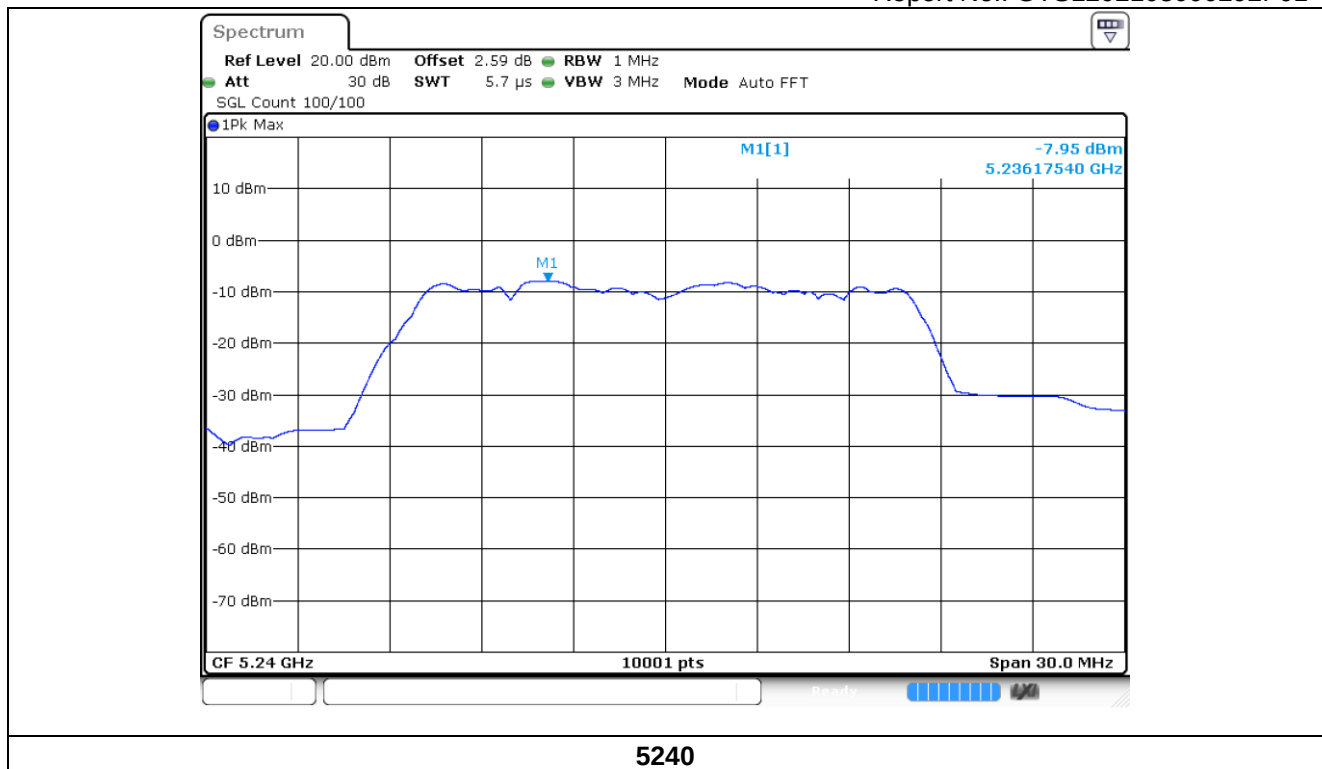
5240



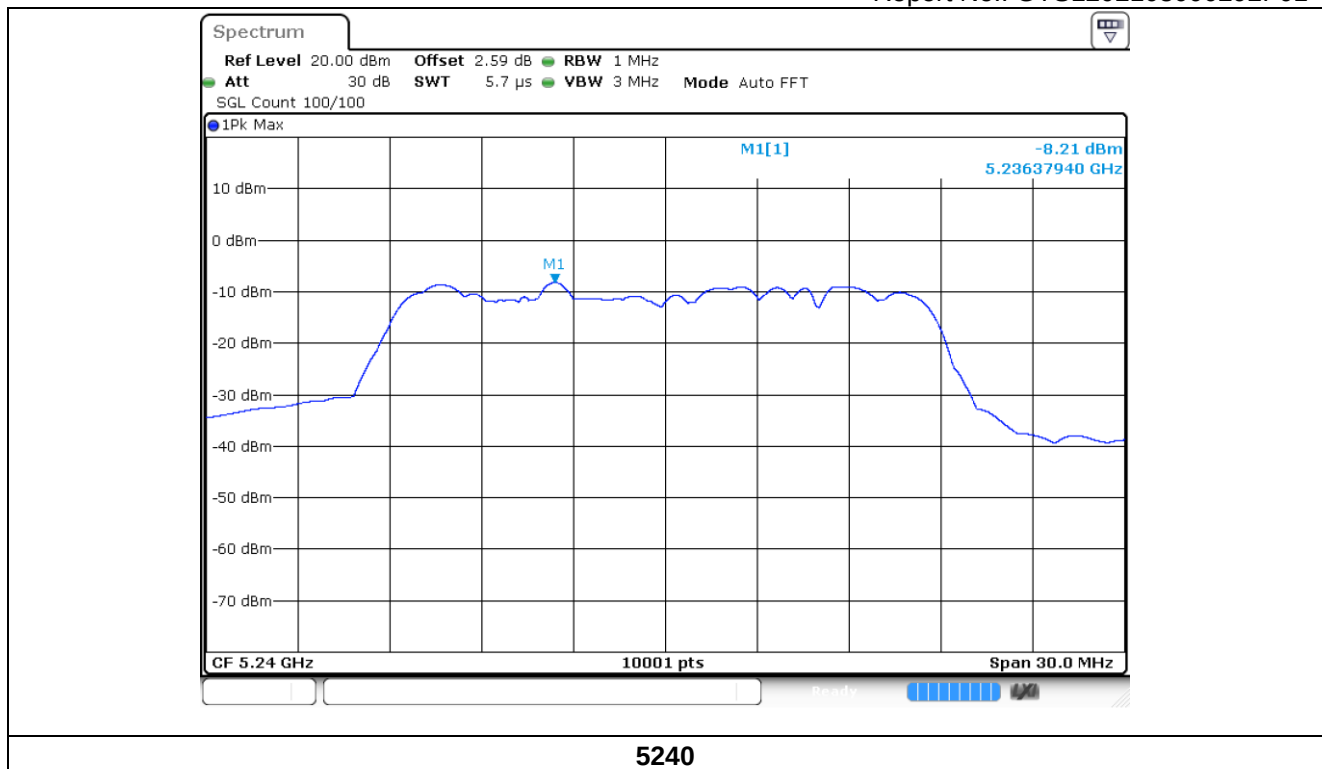


Antenna 2:

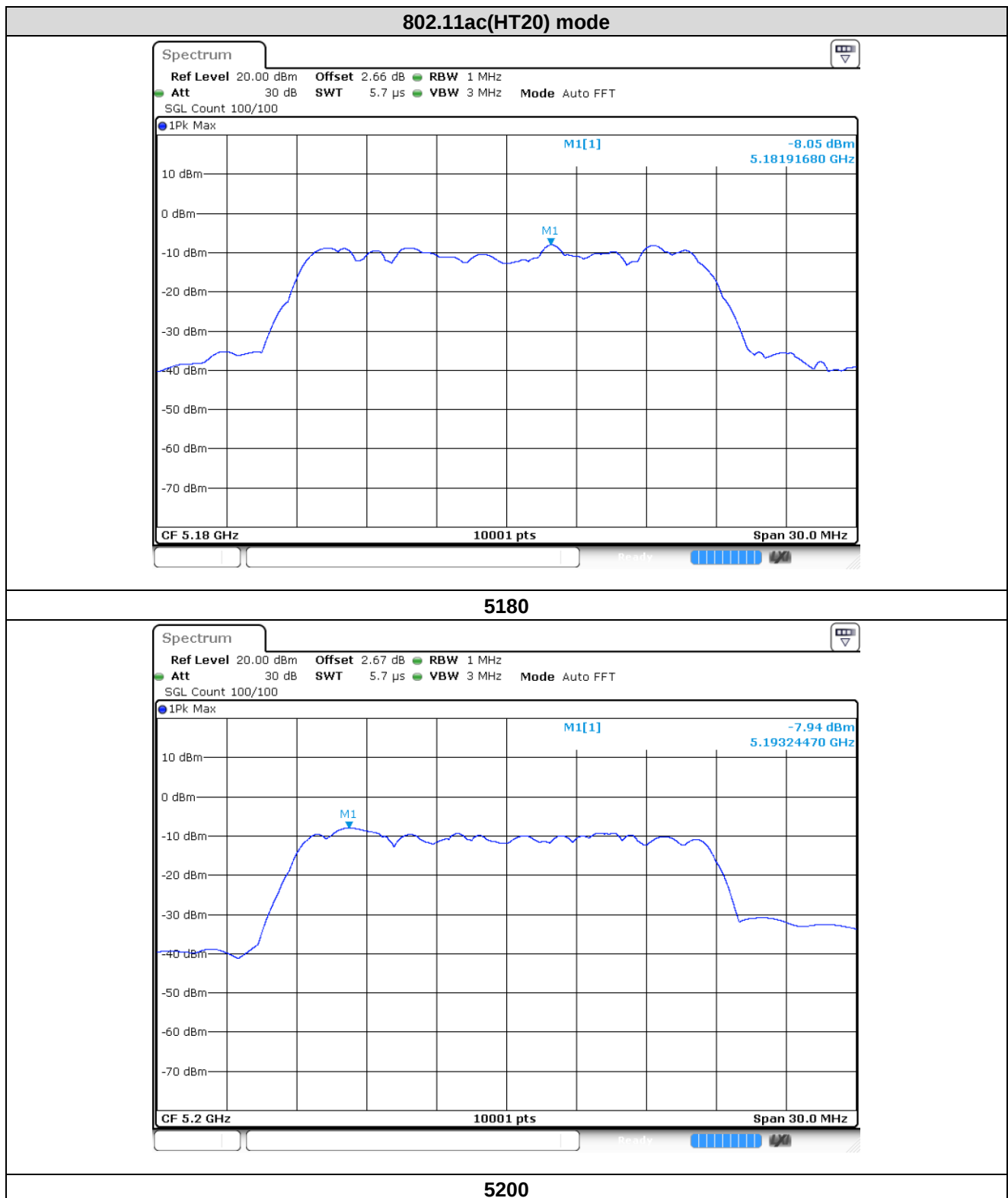


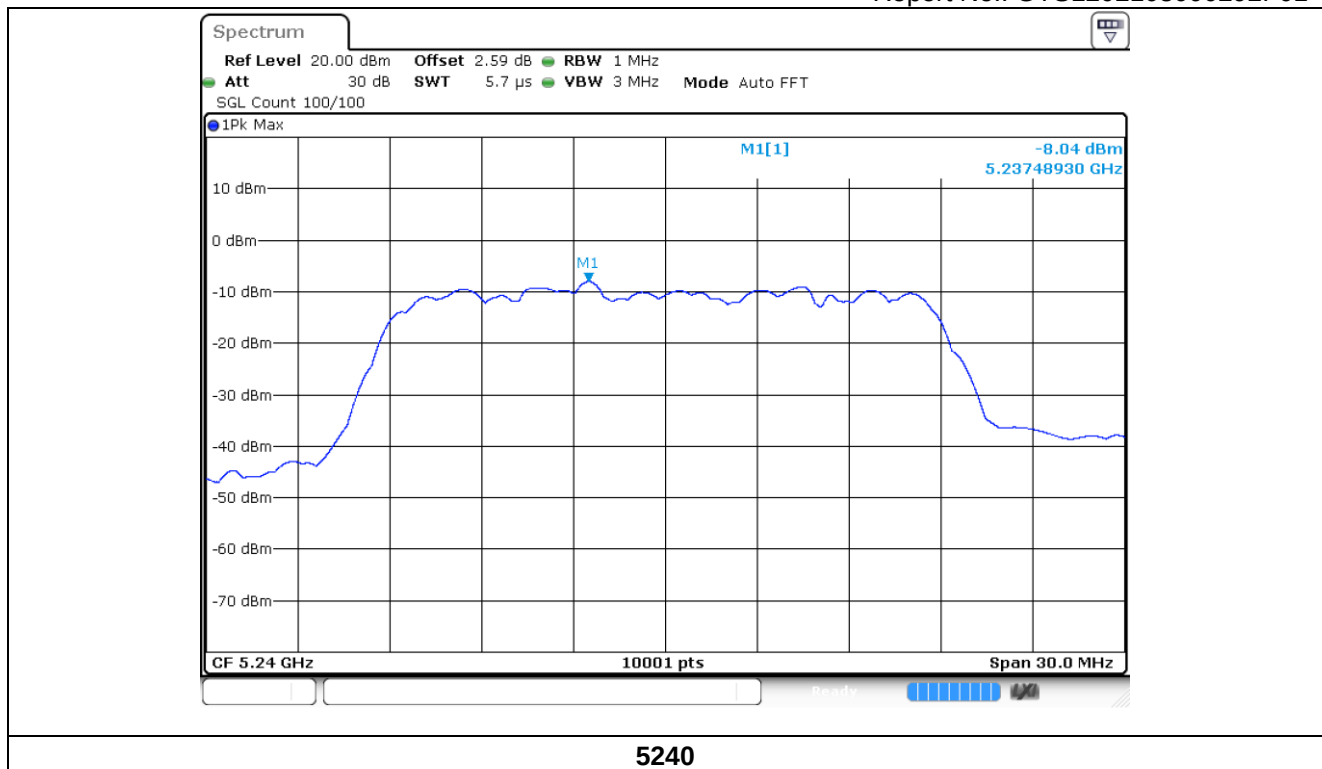




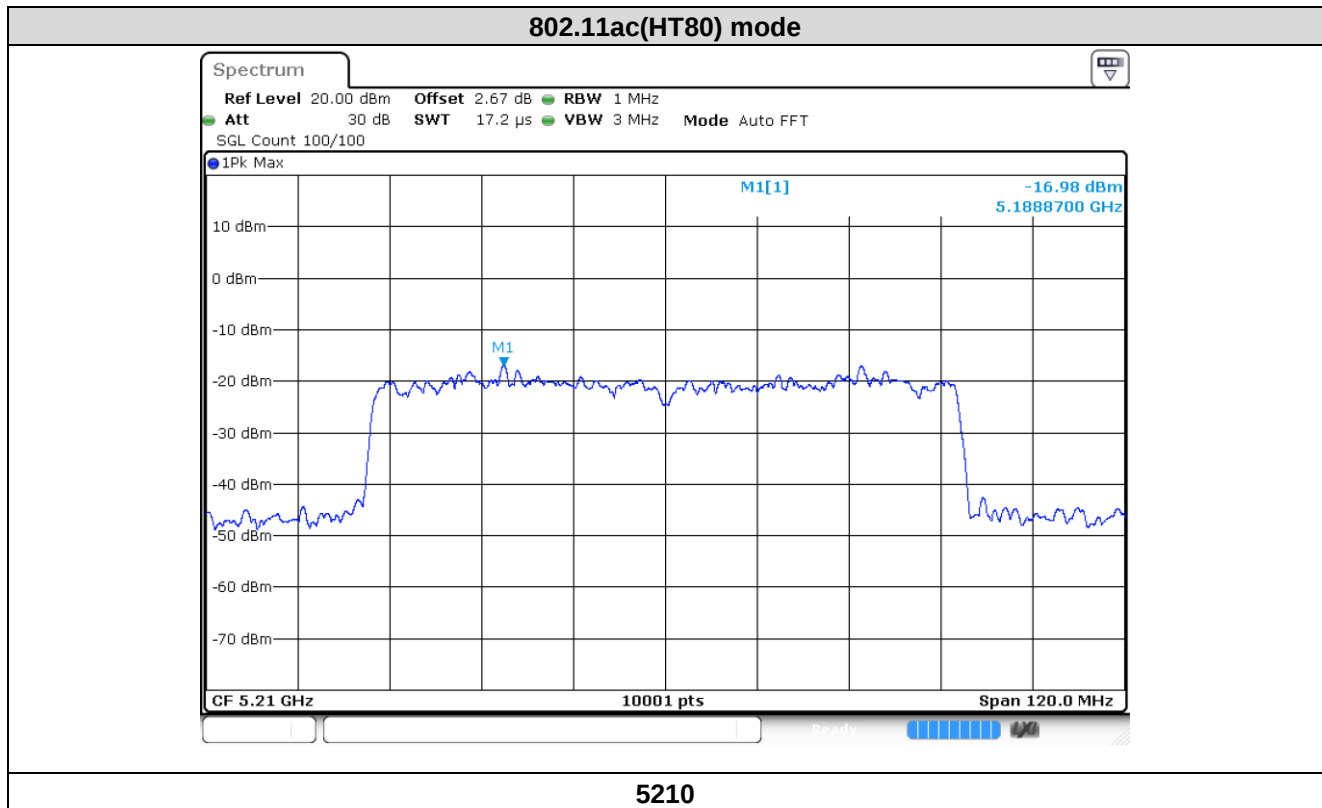






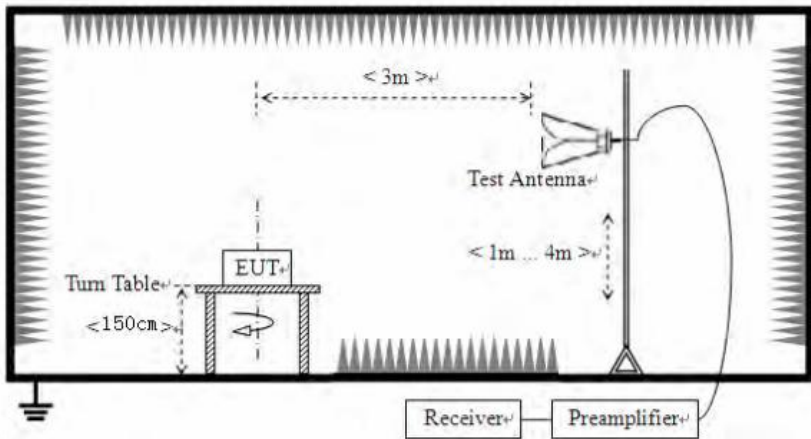






7.6 Band Edge

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 environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:

- Only the worst case Main Antenna test data.
- Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.
- 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 EIRP = -27dBm
 $E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$

Measurement Data:

802.11a						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	46.49	4.78	51.27	68.20	CH36
5150.000	H	49.68	4.78	54.46	68.20	CH36
5350.000	V	39.33	4.30	43.63	68.20	CH48
5350.000	H	40.56	4.30	44.86	68.20	CH48
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	35.23	4.78	40.01	54.00	CH36
5150.000	H	37.52	4.78	42.30	54.00	CH36

802.11n(HT20)						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	47.16	4.78	51.94	68.20	CH36
5150.000	H	48.47	4.78	53.25	68.20	CH36
5350.000	V	38.08	4.30	43.82	68.20	CH48
5350.000	H	39.26	4.30	45.77	68.20	CH48
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	35.01	4.78	39.79	54.00	CH36
5150.000	H	36.82	4.78	41.60	54.00	CH36

802.11ac(HT20)						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	48.06	4.78	52.84	68.20	CH36
5150.000	H	49.89	4.78	54.67	68.20	CH36
5350.000	V	38.32	4.30	42.43	68.20	CH48
5350.000	H	40.51	4.30	43.82	68.20	CH48
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	36.72	4.78	41.50	54.00	CH36
5150.000	H	38.25	4.78	43.03	54.00	CH36

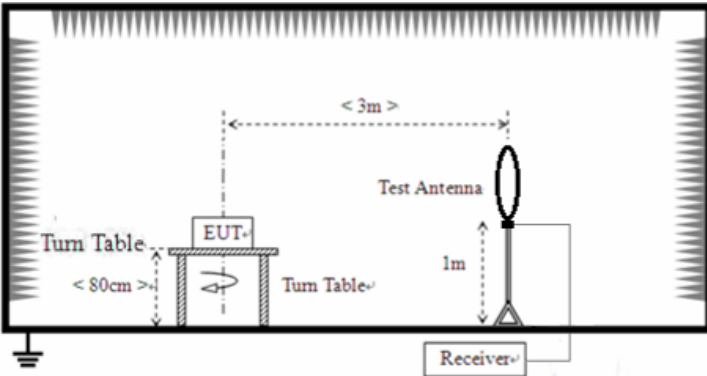
802.11n(HT40)						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	50.38	4.78	55.16	55.94	CH38
5150.000	H	52.25	4.78	57.03	57.78	CH38
5350.000	V	39.24	4.30	43.54	40.16	CH48
5350.000	H	41.36	4.30	45.66	42.85	CH48
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	41.11	4.78	45.89	54.00	CH38
5150.000	H	42.51	4.78	47.29	54.00	CH38

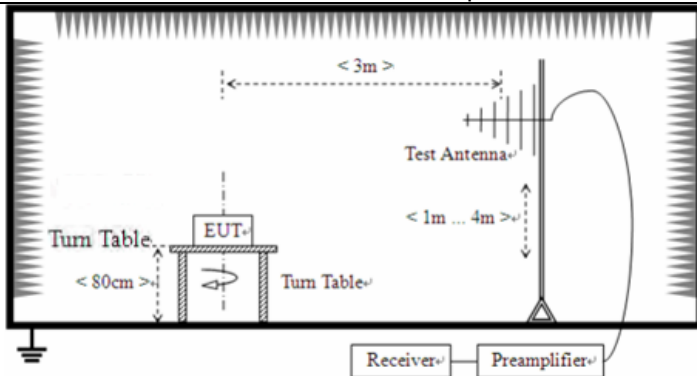
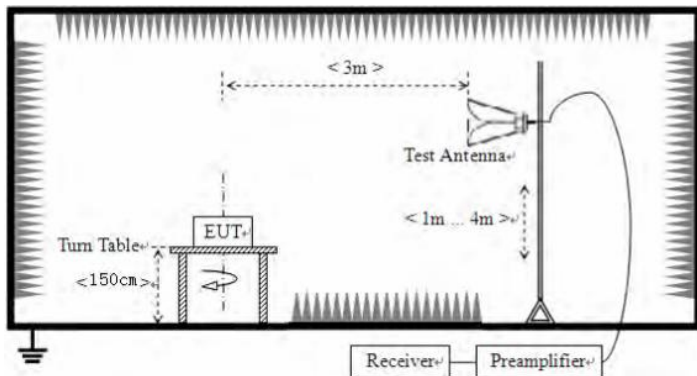
802.11ac(HT40)						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	50.79	4.78	55.57	68.20	CH38
5150.000	H	51.63	4.78	56.41	68.20	CH38
5350.000	V	40.44	4.30	44.74	68.20	CH48
5350.000	H	42.58	4.30	46.88	68.20	CH48
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	39.08	4.78	43.86	54.00	CH38
5150.000	H	41.47	4.78	46.25	54.00	CH38

802.11ac(HT80)						
Freq. (MHz)(Peak)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Peak(dBuv)	Peak(dB)	Peak(dBuv/m)	Peak(dBuv/m)	
5150.000	V	48.42	4.78	53.20	68.20	CH42
5350.000	V	37.17	4.78	41.95	68.20	CH42
5150.000	H	50.98	4.30	55.28	68.20	CH42
5350.000	H	43.85	4.30	48.15	68.20	CH42
Freq.(MHz) (Avg)	Ant.Pol. H/V	Reading	Ant/CF	Act	Limit	Note
		Avg(dBuv)	Avg(dB)	Avg(dBuv/m)	Avg(dBuv/m)	
5150.000	V	39.01	4.78	43.79	54.00	CH42
5150.000	H	41.75	4.78	46.53	54.00	CH42

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

Frequency (MHz)	Ant. Pol.(H/V)	Reading(dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit(dBuV/m)	Margin (dB)	Remark
43.91	V	15.63	14.48	30.11	40.00	-9.89	peak
349.55	V	11.47	18.50	29.97	46.00	-16.03	peak
426.63	V	10.62	20.94	31.56	46.00	-14.44	peak
567.35	V	9.81	22.66	32.47	46.00	-13.53	peak
708.36	V	8.45	25.39	33.84	46.00	-12.16	peak
851.82	V	9.36	25.93	35.29	46.00	-10.71	peak
216.61	H	14.34	16.40	30.74	46.00	-9.26	peak
249.37	H	16.66	16.44	33.1	46.00	-12.9	peak
340.73	H	19.27	18.15	37.42	46.00	-8.58	peak
344.96	H	19.35	18.30	37.65	46.00	-8.35	peak
350.52	H	19.78	18.50	38.28	46.00	-7.72	peak
375.54	H	15.19	19.51	34.7	46.00	-11.3	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	34.54	12.56	47.1	68.2	-21.1	PK
V	15540	35.37	16.45	51.82	68.2	-16.38	PK
H	10360	35.22	12.56	47.78	68.2	-20.42	PK
H	15540	36.71	16.45	53.16	68.2	-15.04	PK

802.11a(HT20) 5220MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10400	36.13	12.64	48.77	68.2	-19.43	PK
V	15600	35.61	16.53	52.14	68.2	-16.06	PK
H	10400	37.09	12.64	49.73	68.2	-18.47	PK
H	15600	35.13	16.53	51.66	68.2	-16.54	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	33.75	12.68	46.43	68.2	-21.77	PK
V	15720	34.73	16.54	51.27	68.2	-16.93	PK
H	10480	36.07	12.68	48.75	68.2	-19.45	PK
H	15720	34.68	16.54	51.22	68.2	-16.98	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	32.74	12.56	45.3	68.2	-22.9	PK
V	15540	34.77	16.45	51.22	68.2	-16.98	PK
H	10360	35.20	12.56	47.76	68.2	-20.44	PK
H	15540	36.03	16.45	52.48	68.2	-15.72	PK

802.11n(HT20) 5220MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10400	34.33	12.64	46.97	68.2	-21.23	PK
V	15600	33.53	16.53	50.06	68.2	-18.14	PK
H	10400	35.92	12.64	48.56	68.2	-19.64	PK
H	15600	36.05	16.53	52.58	68.2	-15.62	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	35.11	12.68	47.79	68.2	-20.41	PK
V	15720	31.75	16.54	48.29	68.2	-19.91	PK
H	10480	34.05	12.68	46.73	68.2	-21.47	PK
H	15720	33.72	16.54	50.26	68.2	-17.94	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	33.80	12.56	46.36	68.2	-21.84	PK
V	15540	34.18	16.45	50.63	68.2	-17.57	PK
H	10360	33.94	12.56	46.5	68.2	-21.7	PK
H	15540	35.04	16.45	51.49	68.2	-16.71	PK

802.11ac(HT20) 5220MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10400	34.24	12.64	46.88	68.2	-21.32	PK
V	15600	31.30	16.53	47.83	68.2	-20.37	PK
H	10400	32.60	12.64	45.24	68.2	-22.96	PK
H	15600	31.82	16.53	48.35	68.2	-19.85	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	34.22	12.68	46.9	68.2	-21.3	PK
V	15720	32.36	16.54	48.9	68.2	-19.3	PK
H	10480	32.69	12.68	45.37	68.2	-22.83	PK
H	15720	34.33	16.54	50.87	68.2	-17.33	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	35.64	12.58	48.22	68.2	-19.98	PK
V	15570	34.15	16.48	50.63	68.2	-17.57	PK
H	10380	37.02	12.58	49.6	68.2	-18.6	PK
H	15570	33.20	16.48	49.68	68.2	-18.52	PK

802.11n(HT40) 5230MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10460	36.76	12.66	49.42	68.2	-18.78	PK
V	15690	34.80	16.53	51.33	68.2	-16.87	PK
H	10460	35.45	12.66	48.11	68.2	-20.09	PK
H	15690	33.66	16.53	50.19	68.2	-18.01	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	32.98	12.58	45.56	68.2	-22.64	PK
V	15570	34.29	16.48	50.77	68.2	-17.43	PK
H	10380	34.79	12.58	47.37	68.2	-20.83	PK
H	15570	32.56	16.48	49.04	68.2	-19.16	PK

802.11ac(HT40) 5230MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10460	34.08	12.66	46.74	68.2	-21.46	PK
V	15690	31.28	16.53	47.81	68.2	-20.39	PK
H	10460	34.38	12.66	47.04	68.2	-21.16	PK
H	15690	32.43	16.53	48.96	68.2	-19.24	PK

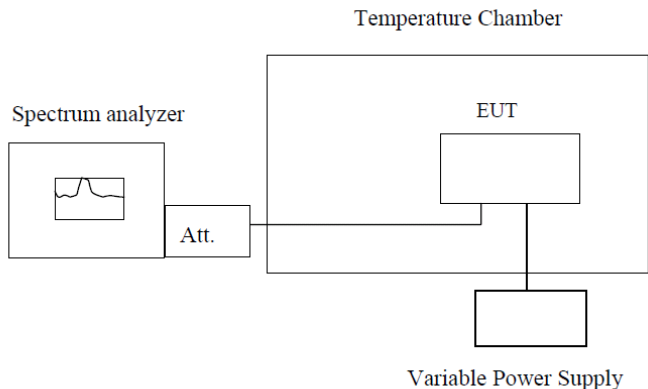
802.11ac(HT80) 5210MHz

Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	10420	32.93	12.62	45.55	68.2	-22.65	PK
V	15630	32.66	16.52	49.18	68.2	-19.02	PK
H	10420	33.73	12.62	46.35	68.2	-21.85	PK
H	15630	32.13	16.52	48.65	68.2	-19.55	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 environment:	Temp.:	24 °C	Humid.:	53%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
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	5180.2048	Pass	5179.8830	Pass	5180.1824	Pass	5179.9669	Pass
-20	120	5180.0016	Pass	5179.9271	Pass	5180.0435	Pass	5179.9124	Pass
-10	120	5179.9914	Pass	5179.9294	Pass	5179.9601	Pass	5180.0893	Pass
0	120	5180.0801	Pass	5180.0304	Pass	5179.8836	Pass	5179.9272	Pass
10	120	5180.0209	Pass	5180.0242	Pass	5179.9921	Pass	5180.1306	Pass
20	120	5179.9654	Pass	5179.9187	Pass	5180.0536	Pass	5179.8324	Pass
30	120	5180.0559	Pass	5179.9242	Pass	5179.8841	Pass	5179.9391	Pass
40	120	5180.0210	Pass	5179.9113	Pass	5180.0162	Pass	5180.1830	Pass
50	120	5179.9549	Pass	5179.8806	Pass	5179.9207	Pass	5179.8178	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	5179.9406	Pass	5180.1286	Pass	5179.9460	Pass	5180.0583	Pass
25	120	5180.1438	Pass	5180.1292	Pass	5180.2081	Pass	5179.9368	Pass
25	132	5179.8569	Pass	5180.0705	Pass	5180.0954	Pass	5180.1460	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	5190.0361	Pass	5190.0473	Pass	5189.9376	Pass	5190.0524	Pass
-20	120	5190.1090	Pass	5190.0189	Pass	5189.8901	Pass	5190.0206	Pass
-10	120	5190.0004	Pass	5189.9950	Pass	5189.9831	Pass	5190.0218	Pass
0	120	5190.2134	Pass	5189.8689	Pass	5189.9274	Pass	5190.1679	Pass
10	120	5190.0370	Pass	5189.9661	Pass	5189.9138	Pass	5190.0891	Pass
20	120	5189.9893	Pass	5190.0001	Pass	5190.0740	Pass	5190.0700	Pass
30	120	5190.1328	Pass	5190.0533	Pass	5190.1795	Pass	5190.0339	Pass
40	120	5190.0365	Pass	5190.0383	Pass	5189.9799	Pass	5190.0546	Pass
50	120	5190.0122	Pass	5189.8157	Pass	5190.0041	Pass	5190.1159	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	5190.1513	Pass	5190.0574	Pass	5189.9005	Pass	5190.0716	Pass
25	120	5190.0379	Pass	5190.1400	Pass	5190.0342	Pass	5189.7990	Pass
25	132	5189.9781	Pass	5190.0341	Pass	5189.9775	Pass	5189.9847	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	5210.1765	Pass	5210.0126	Pass	5210.1184	Pass	5210.1514	Pass
-20	120	5210.1153	Pass	5210.1468	Pass	5209.9866	Pass	5210.1611	Pass
-10	120	5209.8890	Pass	5210.3151	Pass	5209.9952	Pass	5210.0308	Pass
0	120	5209.9651	Pass	5209.8850	Pass	5210.1044	Pass	5210.1245	Pass
10	120	5210.0277	Pass	5209.8769	Pass	5210.0945	Pass	5210.0293	Pass
20	120	5209.9816	Pass	5209.8850	Pass	5210.0980	Pass	5209.9544	Pass
30	120	5210.0958	Pass	5210.0310	Pass	5210.0506	Pass	5210.0349	Pass
40	120	5210.1098	Pass	5209.8275	Pass	5210.1200	Pass	5209.9455	Pass
50	120	5210.0559	Pass	5210.1053	Pass	5210.1097	Pass	5210.1500	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	5210.2293	Pass	5210.0398	Pass	5210.0004	Pass	5210.1637	Pass
25	120	5210.0316	Pass	5210.1008	Pass	5209.8920	Pass	5210.0567	Pass
25	132	5210.2221	Pass	5210.1221	Pass	5210.1039	Pass	5210.0083	Pass

8 Test Setup Photo

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

9 EUT Constructional Details

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

---END---