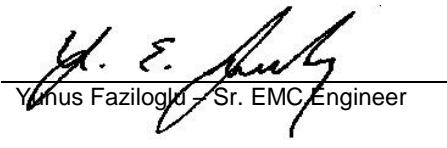




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Test Report

Report No	ER2499-9
Client	Harman International Industries, Incorporated
Address	30001 Cabot Drive Novi, MI 48377
Phone	248-254-7751
Items tested	G31 HIGH
FCC ID	2AHPN-BE2834
IC	6434C-BE2834
FRN	0026894154
Equipment Type	Unlicensed National Information Infrastructure Device
Equipment Code	NII
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2
Test Dates	August 25 - October 12, 2017
Results	As detailed within this report
Prepared by	 _____ Zachary Johnson - Test Engineer
Authorized by	 _____ Yunus Faziloglu - Sr. EMC Engineer
Issue Date	10/28/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 24 of this report.

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Report REV Sep-08-2017 - YF



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Summary

This test report supports an application for certification of a transmitter operating pursuant to:
CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2

The product is the G31 HIGH. This report covers the 5GHz Wifi portion of the device. It is a transmitter that operates in the following bands:

5.15GHz – 5.25GHz

5.725GHz – 5.85GHz

Antenna Type: switching PCB trace antenna

Gain: Maximum 3.2dBi in 5GHz-6GHz frequency band.

We found that the product met the above requirements without modification.

Test samples were received in good condition.



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Test Methodology

All testing was performed according to the following rules/procedures/documents;
CFR Title 47 FCC Part 15.407, RSS-247 Issue 2, RSS-Gen Issue 4, FCC KDB 789033 D02
General UNII Test Procedures New Rules v01r04 and ANSI C63.10-2013.

Radiated emissions were maximized by measuring device in normal operating position,
as well as varying the test antenna's height and polarity.

EUT operating voltage is 11-16V DC

The following bandwidths were used during radiated spurious and AC line conducted emissions testing.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-40GHz	1MHz	3MHz



Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	R2499									
Company:	Harman International Industries, Incorporated									
Company Address:	30001 Cabot Drive Novi, MI, 48377									
Contact:	Mark Bowman									
		MN		PN			SN			
EUT:		G31 HIGH		--			--			
EUT Description:	Car Radio									
EUT Components		MN					SN			
TR8 - High		TR8					--			
Back up camera		--					--			
GPS antenna		--					--			
FM/AM antenna		--					--			
Support Equipment		MN					SN			
CS Supplied Laptop.		--					--			
USB to Ethernet Converter		--					--			
13.5Vdc Power Supply		--					--			
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
DC Power Harness	other	2	2	Power DC	No	No	1.2	in	yes	
Back up cam	other	1	1	other	Yes	No	0.3	in	yes	
USB	USB	3	1	USB	Yes	No	1	in	yes	
FM/AM antenna	-	1	1	Coaxial	Yes	No	0.4	in	yes	
GPS antenna	-	1	1	-	Yes	No	1.3	in	yes	
Audio	-	1	1	-	Yes	No	1.2	in	yes	
XM/Dab RF connector	other	1	1	Coaxial	Yes	No	1	in	yes	
next gen port	-	1	0	-				in	no	
Software Operating Mode Description:										
EUT will be operating in a test mode for Immunity tests, RX for non intentional REMI, and Constant TX internal mode for Spurious.										
Performance Criteria:										
EUT will connect to CMW and preform less than 10% PER during test.BT- EUT will connect to tablet or CMW over bluetooth and stay connected at appropriate distance.										



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Testing Cert. No. 1627-01

Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	EUT employs Switching PCB trace antenna with maximum 3.2dBi gain.
8.10			15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8			15.207	N/A. Unit is powered by a vehicle battery only.

Refer to Appendix A of this report for antenna port conducted measurements.



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Test Results

Radiated Spurious Emissions

LIMITS

[15.407(b)(6)]: Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

[15.407(b)(7)]: The provisions of §15.205 apply to intentional radiators operating under this section.

[15.407(b)(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 e.i.r.p. of -27 dBm/MHz

[15.407(b)(4)(i)]: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge

RSS-247 Issue 2 Section 6.2.1.2: For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p

RSS-247 Issue 2 Section 6.2.4.2: Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;

15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

Device was measured in normal operating position.



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MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company				Work Order - R2499			
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC			
30-1000MHz Horizontal Data				Test Site - CH 2			
Operator: CCH2				Temp; Humid; Pres - 24.2°C; 42%RH; 1012mBar			
802.11n 40MHz Channel 38							
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Test Limit	Results Req 1	Margin Req 1	Worst Margin Req 1
MHz	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(Pass/Fail)	(dB)	
166.596	23.2	-16.5	6.7	43.5	PASS	-36.8	
478.424	22.7	-9.1	13.6	46	PASS	-32.4	
479.179	22.7	-9.1	13.6	46	PASS	-32.4	
481.869	22.5	-9.1	13.3	46	PASS	-32.7	
719.86	23	-5.9	17	46	PASS	-29	-29
960.85	22.4	-2.7	19.7	54	PASS	-34.3	

30-1000MHz Channel 38

Curtis Straus - a Bureau Veritas Company				Work Order - R2499			
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC			
30-1000MHz Vertical Data				Test Site - CH 2			
Operator: CCH2				Temp; Humid; Pres - 25.4°C; 42%RH; 1012mBar			
802.11ac40 CH 151							
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Test Limit	Results Req 1	Margin Req 1	Worst Margin Req 1
MHz	(dB μ V)	(dB/m)	(dB μ V/m)	(dB μ V/m)	(Pass/Fail)	(dB)	
475.91	24.1	-9.6	14.6	46	PASS	-31.5	
478.033	24.5	-9.5	15	46	PASS	-31.1	
479.237	23	-9.5	13.5	46	PASS	-32.5	
482.142	24.7	-9.5	15.2	46	PASS	-30.8	
719.574	22.9	-6.3	16.6	46	PASS	-29.4	-29.4
960.063	23.5	-3	20.5	54	PASS	-33.5	



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Curtis Straus - a Bureau Veritas Company				Work Order - R2499			
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC			
30-1000MHz Horizontal Data				Test Site - CH 2			
Operator: CCH®				Temp; Humid; Pres - 25.4°C; 42%RH; 1012mBar			
802.11ac40 CH 151							
Frequenc y	Raw QP Reading	Correctio n Factor	Amplitud e	Adjusted QP Limit	Test Results Req 1	Margin Req 1	Worst Margin Req 1
MHz	(dBµV)	(dB/m)	(dBµV/m)	(dbµV/m)	(Pass/Fail)	(dB)	
166.238	23.3	-16.7	6.6	43.5	PASS	-36.9	
168.204	23.5	-16.8	6.7	43.5	PASS	-36.8	
479.913	22.6	-9.5	13.1	46	PASS	-32.9	
719.215	23.4	-6.3	17.1	46	PASS	-28.9	
957.332	22.4	-3.1	19.4	46	PASS	-26.6	-26.4
960.176	22.4	-3	19.4	54	PASS	-34.6	

30-1000MHz Channel 151



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Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC											
1-6GHz Horizontal Data				Test Site - CH 2											
Operator: CCH				Temp; Humid; Pres - 24.2°C; 42%RH; 1012mBar											
802.11n 40MHz Channel 38															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Peak Limit:	Peak Margin	Peak Results	Average Limit:	Avg Margin	Avg Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
						FCC_pt15_109_Cla_ssB_Peak			FCC_pt15_109_Cla_ssB_AVG						
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dBμV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	(dB)	
1443.5	36.2	24.4	2.7	38.9	27	74	-35.1	PASS	54	-26.9	PASS	184	275		
1921.9	32.8	25	6.6	39.4	31.6	74	-34.5	PASS	54	-22.3	PASS	295	246		
2400	39.5	32.3	5.9	45.4	38.2	74	-28.6	PASS	54	-15.8	PASS	200	84		
3460	39.7	34.5	10.1	49.8	44.6	74	-24.2	PASS	54	-9.4	PASS	175	103	-24.2	
														-9.4	

1-6GHz Channel 38

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC											
1-6GHz Vertical Data				Test Site - CH 2											
Operator: CCH				Temp; Humid; Pres - 25.4°C; 42%RH; 1012mBar											
802.11ac40 CH 151															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Peak Limit:	Peak Margin	Peak Results	Average Limit:	Avg Margin	Avg Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Avg Margin
						FCC_pt15_109_Cla_ssB_Peak			FCC_pt15_109_Cla_ssB_AVG						
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dBμV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	(dB)	
2417.3	34.7	26.3	12.3	47	38.6	74	-27	PASS	54	-15.4	PASS	215	59		
2463	34.5	25.7	12.4	47	38.1	74	-27	PASS	54	-15.8	PASS	125	89		
3856.5	35.2	27.7	18.8	54	46.5	74	-20	PASS	54	-7.4	PASS	107	312	-7.4	
5179.9	31.3	23.4	21.8	53.1	45.2	74	-20.9	PASS	54	-8.7	PASS	115	27		
5261.6	32.3	22.9	22	54.3	44.8	74	-19.7	PASS	54	-9.1	PASS	223	190	-19.7	

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC											
1-6GHz Horizontal Data				Test Site - CH 2											
Operator: CCH				Temp; Humid; Pres - 25.4°C; 42%RH; 1012mBar											
802.11ac40 CH 151															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Peak Limit:	Peak Margin	Peak Results	Average Limit:	Avg Margin	Avg Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
						FCC_pt15_109_Cla_ssB_Peak			FCC_pt15_109_Cla_ssB_AVG						
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dBμV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	(dB)	
1724.8	32.2	23.5	12.1	44.3	35.6	74	-29.7	PASS	54	-18.4	PASS	102	0		
2414.8	35.8	25.9	12.3	48.1	38.2	74	-25.9	PASS	54	-15.7	PASS	215	108		
2463.2	32.9	25.7	12.4	45.4	38.1	74	-28.6	PASS	54	-15.9	PASS	175	25		
5181.3	33.7	23.4	21.8	55.5	45.2	74	-18.5	PASS	54	-8.8	PASS	111	198	-18.5	
5264.8	32.4	22.9	22	54.4	44.9	74	-19.5	PASS	54	-9.1	PASS	299	141	-8.8	

1-6GHz Channel 151



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Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC											
1-6GHz Vertical Data				Test Site - CH 2											
Operator: CCH®				Temp; Humid; Pres - 24.4°C; 41%RH; 1010mBar											
802.11ac 40MHz CH 159															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Peak Limit: FCC_pt15		Peak Margin	Peak Results	Average Limit: FCC_pt15		Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Avg Margin
						_109_Cla ssB_Peak	Peak Margin			_109_Cla ssB_AVG	Avg Margin				
MHz	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	(dB)	
2416.2	34.8	26.7	12.3	47.1	39.1	74	-26.9	PASS	54	-14.9	PASS	285	208		
2463.1	35.5	26.5	12.4	48	39	74	-26	PASS	54	-15	PASS	225	131		
5180.4	32.6	23.4	21.8	54.3	45.2	74	-19.7	PASS	54	-8.8	PASS	125	111	-8.8	
5251.9	34.4	23	22	56.4	44.9	74	-17.6	PASS	54	-9.1	PASS	105	179		
5262	31.7	22.8	22	53.7	44.8	74	-20.3	PASS	54	-9.2	PASS	203	145	-17.6	

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 13.8V DC											
1-6GHz Horizontal Data				Test Site - CH 2											
Operator: CCH®				Temp; Humid; Pres - 24.4°C; 41%RH; 1010mBar											
802.11ac 40MHz CH 159															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Peak Limit: FCC_pt15		Peak Margin	Peak Results	Average Limit: FCC_pt15		Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Avg Margin
						_109_Cla ssB_Peak	Peak Margin			_109_Cla ssB_AVG	Avg Margin				
MHz	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	(dB)	
2410.6	35.3	26.5	12.3	47.6	38.9	74	-26.4	PASS	54	-15.1	PASS	285	208		
2425.2	35.2	25.3	12.4	47.5	37.6	74	-26.5	PASS	54	-16.4	PASS	225	131		
2460.5	34.1	26.4	12.4	46.6	38.9	74	-27.4	PASS	54	-15.1	PASS	125	111		
5181.6	30.2	23.5	21.8	52	45.3	74	-22	PASS	54	-8.7	PASS	105	179	-8.7	
5263.6	32.3	22.9	22	54.3	44.9	74	-19.7	PASS	54	-9.1	PASS	203	145	-19.7	

1-6GHz Channel 159

Curtis Straus - a Bureau Veritas Company				Work Order - R2499										
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC										
6-18GHz Vertical Data				Test Site - CH1										
Operator: CCH®				Temp; Humid; Pres - 24.1°C; 34%RH; 1010mBar										
5g Wifi Channel 38 802.11n 40MHz														
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Avg Amplitude	Pk Lim: FCC_pt15		Peak Margin	Peak Results	Av Lim: FCC_pt15		Antenna Height	EUT Azimuth	Worst Avg Margin
						_109_Cla ssB_Peak	Worst Peak Margin			_109_Cla ssB_AVG	Avg Margin			
MHz	(dBµV)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)	(cm)	(degrees)	
11787.2	27	18.5	23.5	50.5	83.5	-33	PASS		42.1	63.5	-21.4	PASS	156	132
13436.5	25.8	18.3	27.7	53.5	83.5	-30	PASS		46	63.5	-17.5	PASS	128	136
14051.5	27.4	18.6	29.2	56.5	83.5	-27	PASS		47.8	63.5	-15.7	PASS	188	138
15362.6	29.4	20.9	24.9	54.3	83.5	-29.2	PASS		45.8	63.5	-17.7	PASS	200	335
17006.5	29.2	21.4	30.7	60	83.5	-23.5	PASS		52.2	63.5	-11.3	PASS	100	99
17702.2	29	20.5	37.1	66.1	83.5	-17.4	PASS	-17.4	57.6	63.5	-5.9	PASS	165	157



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Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC											
6-18GHz Horizontal Data				Test Site - CH1											
Operator: CCH				Temp; Humid; Pres - 24.1°C; 34%RH; 1010mBar											
5g Wifi Channel 38 802.11n 40MHz															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak			Pk Lim: FCC_pt15			Adjusted Peak			Av Lim: FCC_pt15		
				Amplitude	ssB_Peak	Peak Margin	Peak Results	Test Peak Margin	Margin	Amplitude	ssB_AVG	Avg Margin	Avg Test Results	Worst Avg Margin	Antenna Height
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
7410.3	25.3	17.2	21.4	46.7	83.5	-36.8	PASS		38.6	63.5	-24.9	PASS		190	312
14117.1	26.7	18.3	29.3	55.9	83.5	-27.6	PASS		47.6	63.5	-15.9	PASS		135	166
16932	30.2	21.3	30.8	60.9	83.5	-22.6	PASS		52.1	63.5	-11.4	PASS		107	159
17680.4	31.1	20.7	36.9	68	83.5	-15.5	PASS	-15.5	57.6	63.5	-5.9	PASS	-5.9	100	227

6-18GHz Channel 38

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC											
6-18GHz Vertical Data				Test Site - CH2											
Operator: CCH				Temp; Humid; Pres - 23.7°C; 38%RH; 1012mBar											
5g Wifi 802.11ac40 ch 151															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak			Pk Lim: FCC_pt15			Adjusted Peak			Av Lim: FCC_pt15		
				Amplitude	ssB_Peak	Peak Margin	Peak Results	Test Peak Margin	Margin	Amplitude	ssB_AVG	Avg Margin	Avg Results	Worst Avg Margin	Antenna Height
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
13618.5	28.4	18.9	28.8	57.2	83.5	-26.3	PASS		47.7	63.5	-15.8	PASS		100	16
15405.1	30.4	20.5	25	55.4	83.5	-28.1	PASS		45.5	63.5	-18	PASS		200	272
16596.9	30.7	21.7	28.1	58.8	83.5	-24.7	PASS		49.9	63.5	-13.6	PASS		131	165
17016.4	29.5	21.3	30.6	60.1	83.5	-23.4	PASS		51.9	63.5	-11.6	PASS		103	148
17661.4	30.6	21	36.7	67.3	83.5	-16.2	PASS	-16.2	57.7	63.5	-5.8	PASS	-5.8	145	95
17977	29.4	20.4	36.5	65.9	83.5	-17.6	PASS		57	63.5	-6.5	PASS		167	168

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC											
6-18GHz Horizontal Data				Test Site - CH2											
Operator: CCH				Temp; Humid; Pres - 23.7°C; 38%RH; 1012mBar											
5g Wifi 802.11ac40 ch 151															
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak			Pk Lim: FCC_pt15			Adjusted Peak			Av Lim: FCC_pt15		
				Amplitude	ssB_Peak	Peak Margin	Peak Results	Test Peak Margin	Margin	Amplitude	ssB_AVG	Avg Margin	Avg Results	Worst Avg Margin	Antenna Height
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
7991.9	26.4	16.7	21.9	48.3	83.5	-35.2	PASS		38.6	63.5	-24.9	PASS		178	239
14113.6	27.3	18.3	29.3	56.6	83.5	-26.9	PASS		47.6	63.5	-15.9	PASS		100	329
17658.6	32.3	21.1	36.7	68.9	83.5	-14.6	PASS	-14.6	57.8	63.5	-5.7	PASS	-5.7	176	74

6-18GHz Channel 151



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Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC											
6-18GHz Vertical Data				Test Site - CH1											
Operator: CCH				Temp; Humid; Pres - 23.8°C; 34%RH; 1010mBar											
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude ssB_Peak	Pk Lim: FCC_pt15 _109_Cla ssB_Peak	Peak Margin	Worst Peak Results Margin	Adjusted Peak Amplitude ssB_AVG	Av Lim: FCC_pt15 _109_Cla ssB_AVG	Avg Margin	Worst Avg Results Margin	Antenna Height	EUT Azimuth		
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
13618.5	28.4	18.9	28.8	57.2	83.5	-26.3	PASS		47.7	63.5	-15.8	PASS		100	16
15405.1	30.4	20.5	25	55.4	83.5	-28.1	PASS		45.5	63.5	-18	PASS		200	272
16596.9	30.7	21.7	28.1	58.8	83.5	-24.7	PASS		49.9	63.5	-13.6	PASS		131	165
17016.4	29.5	21.3	30.6	60.1	83.5	-23.4	PASS		51.9	63.5	-11.6	PASS		103	148
17661.4	30.6	21	36.7	67.3	83.5	-16.2	PASS	-16.2	57.7	63.5	-5.8	PASS	-5.8	145	95
17977	29.4	20.4	36.5	65.9	83.5	-17.6	PASS		57	63.5	-6.5	PASS		167	168

Curtis Straus - a Bureau Veritas Company				Work Order - R2499											
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 13.8V DC											
6-18GHz Horizontal Data				Test Site - CH1											
Operator: CCH				Temp; Humid; Pres - 23.8°C; 34%RH; 1010mBar				802.11ac 40MHz CH 159							
Frequency	Raw Peak Reading	Raw Avg Reading	Correction Factor	Adjusted Peak Amplitude ssB_Peak	Pk Lim: FCC_pt15 _109_Cla ssB_Peak	Peak Margin	Worst Peak Results Margin	Adjusted Peak Amplitude ssB_AVG	Av Lim: FCC_pt15 _109_Cla ssB_AVG	Avg Margin	Worst Avg Results Margin	Antenna Height	EUT Azimuth		
MHz	(dBμV)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
7991.9	26.4	16.7	21.9	48.3	83.5	-35.2	PASS		38.6	63.5	-24.9	PASS		178	239
14113.6	27.3	18.3	29.3	56.6	83.5	-26.9	PASS		47.6	63.5	-15.9	PASS		100	329
17658.6	32.3	21.1	36.7	68.9	83.5	-14.6	PASS	-14.6	57.8	63.5	-5.7	PASS	-5.7	176	74

Rev. 8/21/2017

Spectrum Analyzers / Receivers /Preselectors Rental MXE EMI Receiver(117025)			Range 20Hz-26.5GHz	MN N9038A	Mfr Agilent	SN MY51210151	Asset 117025	Cat I	Calibration Due 12/22/2017	Calibrated on 12/22/2016
Radiated Emissions Sites EMI Chamber 1 EMI Chamber 1			FCC Code 719150 719150	IC Code 2762A-6 2762A-6	VCCI Code A-0015 A-0015	Range 30-1000MHz 1-18GHz	Asset 1685 1685	Cat I I	Calibration Due 12/21/2018 12/21/2018	Calibrated on 12/21/2016 12/21/2016
Preamps /Couplers Attenuators / Filters 2311 PA			Range 1-1000MHz	MN PAM-103	Mfr COM-POWER	SN 441175	Asset 2311	Cat II	Calibration Due 2/4/2018	Calibrated on 2/4/2017
Antennas Red-Black BiLog			Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 2/28/2019	Calibrated on 2/28/2017
Meteorological Meters Weather Clock (Pressure Only) TH A#2084			MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2084	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017	
Cables Asset #1522 Asset #2051 Asset #2054			Range 9kHz - 18GHz 9kHz - 18GHz 9kHz - 18GHz	Mfr Florida RF Florida RF Florida RF			Cat II II II	Calibration Due 2/11/2018 3/5/2018 10/30/2017	Calibrated on 2/11/2017 3/5/2017 10/30/2016	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

6-18GHz Channel 159



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Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
October 28, 2017

Radiated Emissions Table

Date: 17-Oct-17	Company: Harman International Industries, Inc.	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 24.2°C	Humidity: 42%	Pressure: 1010mbar												
Frequency Range: 18-26.5GHz		Measurement Distance: 0.1 m												
Notes: No emissions Found UNII 1		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBμV/m)	Adjusted Avg Reading (dBμV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
No Emissions Found									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
									---	---	---	---	---	---
Table Result:		Pass	by N/A dB						Worst Freq:		N/A MHz			
Test Site: EMI Chamber 2		Cable 1: Asset #2324		Cable 2: ---		Cable 3: ---		Antenna: 18-26.5GHz Horn		Preselector: ---				
Analyzer: Gold		Preamp: 18-26.5GHz												
CSSoft Radiated Emissions Calculator v 1.017.188										Copyright Curtis-Straus LLC 2000				
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Radiated Emissions Table

Date: 17-Oct-17	Company: Harman International Industries, Inc.	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 24.2°C	Humidity: 42%	Pressure: 1010mbar												
Frequency Range: 18-26.5GHz		Measurement Distance: 0.1 m												
Notes: No emissions Found UNII 3		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBμV/m)	Adjusted Avg Reading (dBμV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
No Emissions Found									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
									---	---	---	---	---	---
Table Result:		Pass	by N/A dB				Worst Freq:		N/A MHz					
Test Site: EMI Chamber 2		Cable 1: Asset #2324		Cable 2: ---		Cable 3: ---		Antenna: 18-26.5GHz Horn		Preselector: ---				
Analyzer: Gold		Preamp: 18-26.5GHz								Copyright Curtis-Straus LLC 2000				
CSSoft Radiated Emissions Calculator v 1.017.188														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Rev. 9/20/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/28/2018
Radiated Emissions Sites							
EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz	Asset 1686	Calibration Due 12/21/2018	Calibrated on 12/21/2016
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018
Preamps / Couplers Attenuators / Filters							
HF (Yellow)	Range 18-26.5GHz	MN AFS4-18002650-60-8P-4	Mfr CS	SN 467559	Asset 1266	Calibration Due 10/16/2017	Calibrated on 9/16/2016
Antennas							
HF (White) Horn	18-26.5GHz	MN 801-WLM	Mfr Waveline	SN 758	Asset 758	Calibration Due Verify before Use	Calibrated on date of test
Meteorological Meters							
Weather Clock (Pressure Only)	MN BA928	Mfr Oregon Scientific	SN C3166-1	Asset 831	Calibration Due 4/28/2018	Calibrated on 4/28/2016	
TH A#2084	HTC-1	HDE	2084	II	4/28/2018	3/23/2018	
Cables							
Asset 2324	Range 1-26.5GHz	MN TM26-S1S1-120	Mfr MEGAPHASE	SN 17139101 001	Asset 2324	Calibration Due 8/19/2018	Calibrated on 8/19/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 17-Oct-17	Company: Harman International Industries, Inc.	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 24.2°C	Humidity: 42%	Pressure: 1010mbar												
Frequency Range: 26.5-40GHz		Measurement Distance: 0.1 m												
Notes: No emissions Found UNII 1		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBμV)	Average Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBμV/m)	Adjusted Avg Reading (dBμV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
No Emissions Found									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
									---	---	---	---	---	---
Table Result:		Pass	by N/A dB				Worst Freq:		N/A MHz					
Test Site: EMI Chamber 1		Cable 1: Asset #2323		Cable 2: Asset #2324		Cable 3: ---		Antenna: 40GHz Mixer		Preselector: ---				
Analyzer: Gold		Preamp: 40GHz Mixer								Copyright Curtis-Straus LLC 2000				
CSSoft Radiated Emissions Calculator v 1.017.195														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														



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Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
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Radiated Emissions Table

Date: 17-Oct-17	Company: Harman International Industries, Inc.	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 24.2°C	Humidity: 42%	Pressure: 1010mbar												
Frequency Range: 26.5-40GHz		Measurement Distance: 0.1 m												
Notes: No emissions Found UNII 3		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)
No Emissions Found								---	---	---	---	---	---	

Table Result: Pass by N/A dB **Worst Freq:** N/A MHz

Test Site: EMI Chamber 1	Cable 1: Asset #2323	Cable 2: Asset #2324	Cable 3: ---
Analyzer: Gold	Preamp: 40GHz Mixer	Antenna: 40GHz Mixer	Preselector: ---
CSsoft Radiated Emission Calculator v 1.017.195 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor			

Rev. 10/18/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/28/2018	2/28/2017
Radiated Emissions Sites								
EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 1-18GHz	Asset 1685	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Mixers/Diplexers								
Mixer / Horn	Range 26.5-40 GHz	MN 11970A	Mfr Agilent	SN 3003A10230	Asset 2154	Cat I	Calibration Due 3/12/2019	Calibrated on 3/12/2016
Meteorological Meters/Chambers								
Weather Clock (Pressure Only) TH A#2084	MN BA928 HTC-1	Oregon Scientific	Mfr HDE	SN C3166-1	Asset 831 2084	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables								
Asset 2323	Range 1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	Asset 2323	Cat II	Calibration Due 8/19/2018	Calibrated on 8/19/2017
Asset 2324	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 001	Asset 2324	II	8/19/2018	8/19/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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Radiated Band Edge

Radiated Emissions Table										Work Order: R2499					
Date: 12-Oct-17 Engineer: Chris Hamel Temp: 22.6°C			Company: Harman EUT Desc: G31 HIGH Humidity: 42%			EUT Operating Voltage/Frequency: 13.8V DC Pressure: 1008mBar									
Frequency Range:										Measurement Distance: 3 m					
Notes: 802.11ac80 MCS2 UNII 1 Power Reduced to 60										EUT Max Freq:					
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB _μ V)	Average Reading (dB _μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _μ V/m)	Adjusted Avg Reading (dB _μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
Low V	5150.0	23.8	14.0	0.0	33.7	5.4	62.9	53.1	74.0	-11.1	Pass	54.0 -0.9 Pass			
V	5134.5	25.6	12.7	0.0	33.6	5.4	64.6	51.7	74.0	-9.4	Pass	54.0 -2.3 Pass			
V	5139.4	25.1	12.4	0.0	33.6	5.4	64.1	51.4	74.0	-9.9	Pass	54.0 -2.6 Pass			
V	5128.9	23.6	10.6	0.0	33.6	5.4	62.6	49.6	74.0	-11.4	Pass	54.0 -4.4 Pass			
High V	5350.0	9.7	1.2	0.0	34.0	5.8	49.5	41.0	74.0	-24.5	Pass	54.0 -13.0 Pass			
V	5364.4	12.4	0.7	0.0	34.0	5.8	52.2	40.5	74.0	-21.8	Pass	54.0 -13.5 Pass			

Table Result: Pass by -0.9 dB

Worst Freq: 5150.0 MHz

Test Site: EMI Chamber 1 Analyzer: Rental SA#3 CSsoft Radiated Emissions Calculator v 1.017.193 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor	Cable 1: Asset #2051 Preamp: None	Cable 2: Asset #2054 Antenna: Orange Horn	Cable 3: --- Preselector: ---
---	--------------------------------------	--	----------------------------------

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Radiated Emissions Table										Work Order: R2499					
Date: 12-Oct-17 Engineer: Chris Hamel Temp: 22.6°C			Company: Harman EUT Desc: G31 HIGH Humidity: 42%			EUT Operating Voltage/Frequency: 13.8V DC Pressure: 1008mBar									
Frequency Range:										Measurement Distance: 3 m					
Notes: 802.11ac40 MCS1 UNII 1 Power Reduced to 62										EUT Max Freq:					
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB _μ V)	Average Reading (dB _μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _μ V/m)	Adjusted Avg Reading (dB _μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
Low V	5150.0	21.0	14.5	0.0	33.7	5.4	60.1	53.6	74.0	-13.9	Pass	54.0 -0.4 Pass			
V	5148.2	29.1	14.1	0.0	33.6	5.4	68.1	53.1	74.0	-5.9	Pass	54.0 -0.9 Pass			
V	5146.4	25.9	13.6	0.0	33.6	5.4	64.9	52.6	74.0	-9.1	Pass	54.0 -1.4 Pass			
High H Max	5225.6	57.6	0.0	33.8	5.6	---	---	---	---	---	---	---			
V Max	5238.4	63.2	0.0	33.8	5.6	---	---	---	74.0	---	---	54.0 ---			
V	5350.0	14.2	8.5	0.0	34.0	5.8	54.0	48.3	74.0	-20.0	Pass	54.0 -5.7 Pass			
V	5411.3	20.1	8.4	0.0	34.0	5.9	60.0	48.3	74.0	-14.0	Pass	54.0 -5.7 Pass			

Table Result: Pass by -0.4 dB

Worst Freq: 5150.0 MHz

Test Site: EMI Chamber 1 Analyzer: Rental SA#3 CSsoft Radiated Emissions Calculator v 1.017.193 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor	Cable 1: Asset #2051 Preamp: None	Cable 2: Asset #2054 Antenna: Orange Horn	Cable 3: --- Preselector: ---
---	--------------------------------------	--	----------------------------------

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**Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
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Radiated Emissions Table

Date: 12-Oct-17	Company: Harman	Work Order: R2499													
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC													
Temp: 22.6°C	Humidity: 42%	Pressure: 1008mBar													
Frequency Range:		Measurement Distance: 3 m													
Notes: 802.11ac20 MCS2 UNII 1		EUT Max Freq:													
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	
Low		---		---		---		---		---		---		---	
H Max	5181.8	62.7		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---	---
V Max	5178.3	67.6		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---	---
V	5150.0	20.7	12.6	0.0	33.7	5.4	59.8	51.7	74.0	-14.2	Pass	54.0	-2.3	Pass	
V	5125.6	23.6	12.3	0.0	33.6	5.4	62.6	51.3	74.0	-11.4	Pass	54.0	-2.7	Pass	
V	5076.9	23.6	12.4	0.0	33.5	5.3	62.4	51.2	74.0	-11.6	Pass	54.0	-2.8	Pass	
High		---		---		---		---		---		---		---	
H Max	5237.4	61.6		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---	---
V Max	5235.0	66.1		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---	---
V	5350.0	20.8	12.4	0.0	34.0	5.8	60.6	52.2	74.0	-13.4	Pass	54.0	-1.8	Pass	
V	5420.5	23.9	12.2	0.0	34.0	5.9	63.8	52.1	74.0	-10.2	Pass	54.0	-1.9	Pass	
Table Result:		Pass	by	-1.8 dB									Worst Freq: 5350.0 MHz		
Test Site: EMI Chamber 1	Cable 1: Asset #2051	Cable 2: Asset #2054	Cable 3: ---												
Analyzer: Rental SA#3	Preamp: None	Antenna: Orange Horn	Preselector: ---												
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Adjusted Reading = Reading + Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table

Date: 12-Oct-17	Company: Harman	Work Order: R2499													
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC													
Temp: 22.6°C	Humidity: 42%	Pressure: 1008mBar													
Frequency Range:		Measurement Distance: 3 m													
Notes: 802.11n40 MCS1 UNII 1		EUT Max Freq:													
Power Reduced to 58															
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	
Low		---		---		---		---		---		---		---	
H Max	5188.7	60.1		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---	---
V Max	5192.7	64.7		0.0	33.7	5.6	---	---	74.0	---	---	54.0	---	---	---
V	5150.0	22.1	14.7	0.0	33.7	5.4	61.2	53.8	74.0	-12.8	Pass	54.0	-0.2	Pass	
V	5149.2	28.3	14.8	0.0	33.7	5.4	67.4	53.9	74.0	-6.6	Pass	54.0	-0.1	Pass	
V	5145.3	27.1	14.2	0.0	33.6	5.4	66.1	53.2	74.0	-7.9	Pass	54.0	-0.8	Pass	
V	5133.4	23.3	11.1	0.0	33.6	5.4	62.3	50.1	74.0	-11.7	Pass	54.0	-3.9	Pass	
High		---		---		---		---		---		---		---	
H Max	5222.7	58.2		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---	---
V Max	5225.7	63.1		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---	---
V	5350.0	14.9	8.5	0.0	34.0	5.8	54.7	48.3	74.0	-19.3	Pass	54.0	-5.7	Pass	
V	5372.3	19.7	8.4	0.0	34.0	5.8	59.5	48.2	74.0	-14.5	Pass	54.0	-5.8	Pass	
Table Result:		Pass	by	-0.1 dB									Worst Freq: 5149.2 MHz		
Test Site: EMI Chamber 1	Cable 1: Asset #2051	Cable 2: Asset #2054	Cable 3: ---												
Analyzer: Rental SA#3	Preamp: None	Antenna: Orange Horn	Preselector: ---												
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Adjusted Reading = Reading + Preamp Factor + Antenna Factor + Cable Factor															



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**Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
October 28, 2017**

Radiated Emissions Table

Date: 12-Oct-17	Company: Harman	Work Order: R2499														
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC														
Temp: 22.6°C	Humidity: 42%	Pressure: 1008mBar														
Frequency Range:		Measurement Distance: 3 m														
Notes: 802.11n20 MCS2 UNII 1		EUT Max Freq:														
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average				
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)		
Low		---		---		---		---		---		---				
H Max	5181.6	64.2		0.0	33.7	5.5	---	74.0	---	---	54.0	---	---			
V/Max	5185.0	67.3		0.0	33.7	5.5	---	74.0	---	---	54.0	---	---			
V	5150.0	21.3	14.9	0.0	33.7	5.4	60.4	54.0	74.0	-13.6	Pass	54.0	0.0	Pass		
V	5142.1	26.0	14.2	0.0	33.6	5.4	65.0	53.2	74.0	-9.0	Pass	54.0	-0.8	Pass		
V	5073.1	24.8	12.6	0.0	33.5	5.3	63.6	51.4	74.0	-10.4	Pass	54.0	-2.6	Pass		
V	5104.5	24.8	13.5	0.0	33.6	5.3	63.7	52.4	74.0	-10.3	Pass	54.0	-1.6	Pass		
High		---		---		---		---		---		---		---		
H Max	5243.7	61.1		0.0	33.8	5.6	---	74.0	---	---	54.0	---	---			
V/Max	5244.8	66.3		0.0	33.8	5.6	---	74.0	---	---	54.0	---	---			
V	5350.0	17.8	12.4	0.0	34.0	5.8	57.6	52.2	74.0	-16.4	Pass	54.0	-1.8	Pass		
V	5430.5	23.8	12.2	0.0	34.0	5.9	63.7	52.1	74.0	-10.3	Pass	54.0	-1.9	Pass		
Table Result:		Pass	by	0.0	dB			Worst Freq:		5150.0 MHz						
Test Site: EMI Chamber 1	Cable 1: Asset #2051	Cable 2: Asset #2054	Cable 3: ---													
Analyzer: Rental SA#3	Preamp: None	Antenna: Orange Horn	Preselector: ---													
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																

Radiated Emissions Table

Date: 12-Oct-17	Company: Harman	Work Order: R2499														
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC														
Temp: 22.6°C	Humidity: 42%	Pressure: 1008mBar														
Frequency Range:		Measurement Distance: 3 m														
Notes: 802.11a20 18Mbps UNII 1		EUT Max Freq:														
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average				
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)		
Low		---		---		---		---		---		---		---		
H Max	5182.3	59.1		0.0	33.7	5.5	---	74.0	---	---	54.0	---	---			
V/Max	5178.2	64.0		0.0	33.7	5.5	---	74.0	---	---	54.0	---	---			
V	5150.0	20.0	12.6	0.0	33.7	5.4	59.1	51.7	74.0	-14.9	Pass	54.0	-2.3	Pass		
V	5104.7	24.3	12.9	0.0	33.6	5.3	63.2	51.8	74.0	-10.8	Pass	54.0	-2.2	Pass		
V	5063.9	24.1	12.6	0.0	33.4	5.3	62.8	51.3	74.0	-11.2	Pass	54.0	-2.7	Pass		
High		---		---		---		---		---		---		---		
H Max	5238.5	59.8		0.0	33.8	5.6	---	74.0	---	---	54.0	---	---			
V/Max	5242.6	64.2		0.0	33.8	5.6	---	74.0	---	---	54.0	---	---			
V	5350.0	18.9	12.4	0.0	34.0	5.8	58.7	52.2	74.0	-15.3	Pass	54.0	-1.8	Pass		
V	5420.8	23.7	12.2	0.0	34.0	5.9	63.6	52.1	74.0	-10.4	Pass	54.0	-1.9	Pass		
Table Result:		Pass	by	-1.8	dB			Worst Freq:		5350.0 MHz						
Test Site: EMI Chamber 1	Cable 1: Asset #2051	Cable 2: Asset #2054	Cable 3: ---													
Analyzer: Rental SA#3	Preamp: None	Antenna: Orange Horn	Preselector: ---													
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																

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Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
October 28, 2017

Radiated Emissions Table

Date: 12-Oct-17	Company: Harman	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 22.6°C	Humidity: 42%	Pressure: 1008mBar												
Frequency Range:		Measurement Distance: 3 m												
Notes: 802.11ac80 Power Reduced 59		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)
Table Result: Pass by -0.6 dB												Worst Freq: 5725.0 MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #2051			Cable 2: Asset #2054			Cable 3: ---			Antenna: Orange Horn		
Analyzer: Rental SA#3			Preamp: None			Preselector: ---			Copyright Curtis-Straus LLC 2000			CSsoft Radiated Emissions Calculator v 1.017.193		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Radiated Emissions Table

Date: 13-Oct-17	Company: Harman	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 23.6°C	Humidity: 42%	Pressure: 1024mBar												
Frequency Range:		Measurement Distance: 3 m												
Notes: 802.11ac40 MCS0 Power Reduced 57		EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)
Table Result: Pass by -0.2 dB												Worst Freq: 5723.7 MHz		
Test Site: EMI Chamber 1			Cable 1: Asset #2051			Cable 2: Asset #2054			Cable 3: ---			Antenna: Orange Horn		
Analyzer: Rental SA#3			Preamp: None			Preselector: ---			Copyright Curtis-Straus LLC 2000			CSsoft Radiated Emissions Calculator v 1.017.193		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														



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Testing Cert. No. 1627-01

Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
October 28, 2017

Radiated Emissions Table

Date: 13-Oct-17		Company: Harman		Work Order: R2499																					
Engineer: Chris Hamel		EUT Desc: G31 HIGH		EUT Operating Voltage/Frequency: 13.8V DC																					
Temp: 23.6°C		Humidity: 42%		Pressure: 1024mBar																					
Frequency Range:													Measurement Distance: 3 m												
Notes: 802.11ac20 MCS0 UNII 3													EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBuV)	Average Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Avg Reading (dBuV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average													
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)											
Low									---	---	---	---	---												
H Max	5743.7	47.1		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---												
V/Max	5748.7	53.0		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---												
V	5725.0	8.3	1.3	0.0	33.8	6.2	48.3	41.3	74.0	-25.7	Pass	54.0	-12.7												
V	5724.0	12.7	1.1	0.0	33.8	6.2	52.7	41.1	74.0	-21.3	Pass	54.0	-12.9												
High				---	---	---	---	---	---	---	---	---	---												
H Max	5830.8	50.1		0.0	33.9	6.1	---	---	74.0	---	---	54.0	---												
V/Max	5824.5	55.9		0.0	33.8	6.1	---	---	74.0	---	---	54.0	---												
V	5850.0	6.2	1.5	0.0	33.9	6.0	46.1	41.4	74.0	-27.9	Pass	54.0	-12.6												
V	5931.9	12.0	1.6	0.0	34.1	5.9	52.0	41.6	74.0	-22.0	Pass	54.0	-12.4												
Table Result:		Pass	by	-12.4 dB	Worst Freq: 5931.9 MHz																				
Test Site: EMI Chamber 1		Cable 1: Asset #2051		Cable 2: Asset #2054		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000													
Analyzer: Rental SA#3																									
CSsoft Radiated Emissions Calculator v 1.017.193																									
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																									

Radiated Emissions Table

Date: 13-Oct-17		Company: Harman		Work Order: R2499																					
Engineer: Chris Hamel		EUT Desc: G31 HIGH		EUT Operating Voltage/Frequency: 13.8V DC																					
Temp: 23.6°C		Humidity: 42%		Pressure: 1024mBar																					
Frequency Range:													Measurement Distance: 3 m												
Notes: 802.11n40 MCS0 Power Reduced 58													EUT Max Freq:												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBuV)	Average Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Avg Reading (dBuV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average													
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)											
Low				---	---	---	---	---	---	---	---	---	---												
H Max	5745.0	51.4		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---												
V/Max	5750.1	56.1		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---												
V	5725.0	20.8		12.7	0.0	33.8	6.2	60.8	52.7	74.0	-13.2	Pass	54.0	-1.3											
V	5720.3	29.4	11.1	0.0	33.8	6.2	69.4	51.1	74.0	-4.6	Pass	54.0	-2.9												
V	5724.2	28.1	12.5	0.0	33.8	6.2	68.1	52.5	74.0	-5.9	Pass	54.0	-1.5												
V	5718.5	27.5	10.5	0.0	33.8	6.2	67.5	50.5	74.0	-6.5	Pass	54.0	-3.5												
V	5715.4	26.1	8.6	0.0	33.8	6.2	66.1	48.6	74.0	-7.9	Pass	54.0	-5.4												
High				---	---	---	---	---	---	---	---	---	---												
H Max	5800.2	49.2		0.0	33.8	6.1	---	---	74.0	---	---	54.0	---												
V/Max	5793.2	55.8		0.0	33.8	6.1	---	---	74.0	---	---	54.0	---												
V	5850.0	7.6	1.1	0.0	33.9	6.0	47.5	41.0	74.0	-26.5	Pass	54.0	-13.0												
V	5858.0	12.8	1.2	0.0	33.9	6.0	52.7	41.1	74.0	-21.3	Pass	54.0	-12.9												
Table Result:		Pass	by	-1.3 dB	Worst Freq: 5725.0 MHz																				
Test Site: EMI Chamber 1		Cable 1: Asset #2051		Cable 2: Asset #2054		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000													
Analyzer: Rental SA#3																									
CSsoft Radiated Emissions Calculator v 1.017.193																									
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																									

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Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
October 28, 2017

Radiated Emissions Table

Date: 13-Oct-17	Company: Harman	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 23.6°C	Humidity: 42%	Pressure: 1024mBar												
Frequency Range:		Measurement Distance: 3 m												
Notes: 802.11n20 MCS0 UNII 3		EUT Max Freq:												
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dB _μ V)	Average Reading (dB _μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _μ V/m)	Adjusted Avg Reading (dB _μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB _μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _μ V/m)	Margin (dB)	Result (Pass/Fail)
Low									---	---	---	---	---	---
H Max	5739.9	52.2		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---	---
V Max	5751.3	60.5		0.0	33.8	6.2	---	---	74.0	---	---	54.0	---	---
V	5725.0	20.4	12.8	0.0	33.8	6.2	60.4	52.8	74.0	-13.6	Pass	54.0	-1.2	Pass
V	5723.7	25.0	9.0	0.0	33.8	6.2	65.0	49.0	74.0	-9.0	Pass	54.0	-5.0	Pass
V	5722.4	23.0	9.1	0.0	33.8	6.2	63.0	49.1	74.0	-11.0	Pass	54.0	-4.9	Pass
High									---	---	---	---	---	---
H Max	5826.0	51.7		0.0	33.9	6.1	---	---	74.0	---	---	54.0	---	---
V Max	5821.2	58.2		0.0	33.8	6.1	---	---	74.0	---	---	54.0	---	---
V	5850.0	14.0	5.2	0.0	33.9	6.0	53.9	45.1	74.0	-20.1	Pass	54.0	-8.9	Pass
Table Result:		Pass	by	-1.2 dB									Worst Freq: 5725.0 MHz	
Test Site: EMI Chamber 1		Cable 1: Asset #2051		Cable 2: Asset #2054		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000		
Analyzer: Rental SA#3		Preamp: None												
CSSoft Radiated Emissions Calculator v 1.017.193														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Radiated Emissions Table

Date: 13-Oct-17	Company: Harman	Work Order: R2499												
Engineer: Chris Hamel	EUT Desc: G31 HIGH	EUT Operating Voltage/Frequency: 13.8V DC												
Temp: 23.6°C	Humidity: 42%	Pressure: 1024mBar												
Frequency Range:		Measurement Distance: 3 m												
Notes: Power Reduced to 59 802.11a20MHz		EUT Max Freq:												
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dB _μ V)	Average Reading (dB _μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB _μ V/m)	Adjusted Avg Reading (dB _μ V/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dB _μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB _μ V/m)	Margin (dB)	Result (Pass/Fail)
Low									---	---	---	---	---	---
V	5725.0	24.8	13.8	0.0	33.8	6.2	64.8	53.8	74.0	-9.2	Pass	54.0	-0.2	Pass
V	5724.6	28.8	13.3	0.0	33.8	6.2	68.8	53.3	74.0	-5.2	Pass	54.0	-0.7	Pass
V	5723.2	28.5	11.5	0.0	33.8	6.2	68.5	51.5	74.0	-5.5	Pass	54.0	-2.5	Pass
High									---	---	---	---	---	---
H Max	5818.5	56.6		0.0	33.8	6.1	---	---	74.0	---	---	54.0	---	---
V Max	5827.3	60.1		0.0	33.9	6.1	---	---	74.0	---	---	54.0	---	---
V	5850.0	14.8	7.1	0.0	33.9	6.0	54.7	47.0	74.0	-19.3	Pass	54.0	-7.0	Pass
V	5871.9	18.3	6.8	0.0	33.9	6.0	58.2	46.7	74.0	-15.8	Pass	54.0	-7.3	Pass
Table Result:		Pass	by	-0.2 dB									Worst Freq: 5725.0 MHz	
Test Site: EMI Chamber 1		Cable 1: Asset #2051		Cable 2: Asset #2054		Cable 3: ---		Antenna: Orange Horn		Preselector: ---		Copyright Curtis-Straus LLC 2000		
Analyzer: Rental SA#3		Preamp: None												
CSSoft Radiated Emissions Calculator v 1.017.193														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Rev 10/22/2017													
Spectrum Analyzers / Receivers /Preselectors Rental MXE EMI Receiver(1170725)	Range 20Hz-26.5GHz	MN N6038A	Mfr Agilent	SN MY51210151	Asset 1170725	Cat I	Calibration Due 12/22/2017						
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 1-18GHz	Asset 1685	Cat I	Calibration Due 12/21/2018						
Antennas Orange Horn	Range 1-18GHz	MN 3115	Mfr EMCO	SN 0004-6123	Asset 390	Cat I	Calibration Due 10/13/2018						
Meteorological Meters/Chambers Weather Clock (Pressure Only) THA#2084		MN BA928	Mfr Oregon Scientific	SN C3106-1	Asset 831	Cat I	Calibration Due 4/28/2018						
Cables Asset #2051	Range 9kHz - 18GHz		Mfr Florida RF			Cat II	Calibration Due 3/5/2018						
Asset #2054	Range 9kHz - 18GHz		Mfr Florida RF			Cat II	Calibration Due 10/30/2017						

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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AC Line Conducted Emissions LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dB μ V)	Average limit (dB μ V)
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.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

** Unit is powered by a vehicle battery only.



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Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz)		
NIST	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucispqr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucispqr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.

2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.

3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.

4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.

5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCPs**," "**MTL**," "**ACTS**," "**MTL-ACTS**" and **CURTIS-STRAUS** (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.

6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.

7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.

8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.

9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.

10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.

11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.

12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.

13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.



14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
Rev.160009121(2)_#684340 v14CS



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Appendix A:

ER2499-9 Appendix A

CFR Title 47 FCC Part §15.407 and ISED Canada RSS-247 Issue 2

DUT Information

Model: G31 High
Manufacturer: Harman International Industries, Inc.
Serial Number: 067

U-NII-1

Mode	Channel	Frequency
802.11a 802.11n(HT20) 802.11ac(VHT20)	36	5180
802.11n(HT40) 802.11ac(VHT40)	38	5190
802.11a 802.11n(HT20) 802.11ac(VHT20)	40	5200
802.11ac(VHT80)	42	5210
802.11a 802.11n(HT20) 802.11ac(VHT20)	44	5220
802.11n(HT40) 802.11ac(VHT40)	46	5230
802.11a 802.11n(HT20) 802.11ac(VHT20)	48	5240

U-NII-3

Mode	Channel	Frequency
802.11a 802.11n(HT20) 802.11ac(VHT20)	149	5745
802.11n(HT40) 802.11ac(VHT40)	151	5755
802.11a 802.11n(HT20) 802.11ac(VHT20)	153	5765
802.11ac(VHT80)	155	5775
802.11a 802.11n(HT20) 802.11ac(VHT20)	157	5785
802.11n(HT40) 802.11ac(VHT40)	159	5795
802.11a 802.11n(HT20) 802.11ac(VHT20)	161	5805
802.11a 802.11n(HT20) 802.11ac(VHT20)	165	5825



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Antenna Gain:

Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
5000	-5.17	30.40	2.38
5100	-4.64	34.38	1.53
5200	-5.31	29.44	1.20
5300	-4.23	37.74	3.20
5400	-4.53	35.27	2.78
5500	-6.30	23.46	0.01
5600	-5.00	31.62	2.00
5700	-4.98	31.75	1.19
5800	-4.78	33.30	1.35
5900	-4.66	34.21	0.55
6000	-4.61	34.56	1.57

Number of transmission chains

1

Equipment Type

Unlicensed National Information Infrastructure Device (NII)

Test Equipment Used: R&S TS8997 Test System

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
FSV40 Signal Generator	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	6/30/2018	6/30/2017
<hr/>								
Signal Generators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
SMBV100A Vector Signal Generator	9KHz-6GHz	SMBV100A	ROHDE & SCHWARZ	261919	2201	I	6/26/2018	6/26/2017
SMB100A Signal Generator	100kHz-40GHz	SMB100A	ROHDE & SCHWARZ	179846	2434	I	5/30/2018	5/30/2017
R&S®OSP120 with R&S®OSP-B157	30MHz-18GHz	OSP120	ROHDE & SCHWARZ	101674		I	6/1/2018	6/1/2017
<hr/>								
Cables	Range	Mfr			Cat	Calibration Due	Calibrated on	
Asset #2052	9kHz - 18GHz	Florida RF			II	3/5/2018	3/5/2017	
DUT1	30MHz-26GHz	Micro-Coax			II	6/21/2018	6/21/2017	
<hr/>								
Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
10dB Attenuator-01 Brown	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017
10dB Attenuator-02 Yellow	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017
<hr/>								
Wideband Radio Communication Tester	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
(Rental)CMW500	DC to 6GHz	CMW500	ROHDE & SCHWARZ	155905		I	6/2/2018	6/2/2017



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Testing Cert. No. 1627-01

Test Results Summary

UNII-1

Test	Frequency (MHz)	802.11a	802.11n(HT20)	802.11ac (VHT20)
Average Output Power	5180/5200/5240	PASS	PASS	PASS
Power Spectral Density	5180/5200/5240	PASS	PASS	PASS
DTS Bandwidth (6dB)	5180/5200/5240	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	5180/5200/5240	PASS	PASS	PASS
		802.11n(HT40)	802.11ac(VHT40)	
Average Output Power	5190/5230	PASS	PASS	
Power Spectral Density	5190/5230	PASS	PASS	
DTS Bandwidth (6dB)	5190/5230	PASS	PASS	
Occupied Channel Bandwidth 99%	5190/5230	PASS	PASS	
		802.11ac(VHT80)		
Average Output Power	5210	PASS		
Power Spectral Density	5210	PASS		
DTS Bandwidth (6dB)	5210	PASS		
Occupied Channel Bandwidth 99%	5210	PASS		

UNII-3

Test	Frequency (MHz)	802.11a	802.11n(HT20)	802.11ac (VHT20)
Average Output Power	5745/5785/5825	PASS	PASS	PASS
Power Spectral Density	5745/5785/5825	PASS	PASS	PASS
DTS Bandwidth (6dB)	5745/5785/5825	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	5745/5785/5825	PASS	PASS	PASS
		802.11n(HT40)	802.11ac(VHT40)	
Average Output Power	5755/5795	PASS	PASS	
Peak Power Spectral Density	5755/5795	PASS	PASS	
DTS Bandwidth (6dB)	5755/5795	PASS	PASS	
Occupied Channel Bandwidth 99%	5755/5795	PASS	PASS	
		802.11ac(VHT80)		
Average Output Power	5775	PASS		
Peak Power Spectral Density	5775	PASS		
DTS Bandwidth (6dB)	5775	PASS		
Occupied Channel Bandwidth 99%	5775	PASS		





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Average Output Power (Gated)

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.E.3.b.

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

FCC UNII-1

Limit is 250mW (23.97dBm) for client devices with antenna gains less than 6dBi.

802.11a (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	10.347	10.273	9.66	23.97	93.430
9 Mbps	10.334	10.267	9.676	23.97	90.535
12 Mbps	10.24	10.336	9.732	23.97	87.819
18 Mbps	10.309	10.394	9.8	23.97	83.069
24 Mbps	8.711	8.654	8.026	23.97	78.785
36 Mbps	7.762	7.709	7.12	23.97	71.938
48 Mbps	7.922	7.864	7.042	23.97	66.154
54 Mbps	7.733	7.826	7.021	23.97	64.278

802.11n(HT20) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.333	10.343	9.659	23.97	93.022
MCS1	10.343	10.348	9.533	23.97	87.298
MCS2	10.4	10.422	9.581	23.97	78.387
MCS3	8.707	8.704	7.955	23.97	71.916
MCS4	7.766	7.791	6.99	23.97	66.666
MCS5	7.834	7.839	7.015	23.97	64.818
MCS6	7.856	7.925	7.055	23.97	62.704
MCS7	7.696	7.677	7.071	23.97	62.698

802.11ac(VHT20) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.212	10.383	9.551	23.97	93.048
MCS1	10.358	10.363	9.542	23.97	87.338
MCS2	10.413	10.442	9.953	23.97	82.596
MCS3	8.724	8.721	7.965	23.97	78.612
MCS4	7.773	7.794	7.069	23.97	72.181
MCS5	7.836	7.711	7.019	23.97	67.038
MCS6	7.873	7.671	7.066	23.97	65.252
MCS7	7.668	7.703	7.09	23.97	63.212
MCS8	5.9	5.9	5.3	23.97	60.351

802.11n(HT40) (Power Setting: 58)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.356	10.186	23.97	86.891
MCS1	9.997	10.063	23.97	77.842
MCS2	10.081	10.15	23.97	71.260
MCS3	10.116	10.187	23.97	66.238
MCS4	10.185	10.264	23.97	66.249
MCS5	10.245	10.318	23.97	59.079
MCS6	10.3	10.369	23.97	53.746
MCS7	10.307	10.364	23.97	50.066



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802.11ac(VHT40) (Power Setting: 62)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	8.949	8.99	23.97	86.948
MCS1	8.988	9.059	23.97	78.021
MCS2	9.063	9.134	23.97	71.564
MCS3	9.119	9.194	23.97	66.704
MCS4	9.207	9.21	23.97	59.716
MCS5	9.268	9.35	23.97	54.564
MCS6	9.289	9.374	23.97	52.887
MCS7	9.298	9.386	23.97	51.049
MCS8	9.337	9.406	23.97	49.071
MCS9	9.364	9.447	23.97	46.896

802.11ac(HT80) (Power Setting: 60)

Data Rate	Gated RMS (dBm) 5210 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	8.878	23.97	76.823
MCS1	9.025	23.97	65.282
MCS2	9.050	23.97	58.538
MCS3	9.098	23.97	53.800
MCS4	9.191	23.97	48.014
MCS5	9.235	23.97	44.553
MCS6	9.258	23.97	43.340
MCS7	9.281	23.97	42.010
MCS8	9.301	23.97	40.664
MCS9	9.313	23.97	39.259



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RSS-247 UNII-1

Per RSS-247 Issue 2 Section 6.2.1.1, limit for OEM devices installed in vehicles: Maximum EIRP shall not exceed 30mW or $1.76 + 10^*\log B$, where B is 99% OBW in MHz

Devices must also be capable of reducing power by 3dB

For modulations with less than 20MHz 99% OBW; 802.11a, 802.11n(HT20) and 802.11ac(VHT20), worst case 99% OBW of 16MHz is assumed with resulting conservative limit of 13.8dBm.

For modulations with more than 20MHz 99% OBW; 802.11n(HT40), 802.11ac(VHT40) and 802.11ac(VHT80), the limit is 30mW (14.7dBm)

802.11a

Data Rate	Gated RMS (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
6 Mbps	10.347	1.266	11.61	13.8	6.252	4.095	Default	72
9 Mbps	10.334	1.266	11.60	13.8	6.267	4.067	Default	72
12 Mbps	10.240	1.266	11.51	13.8	6.304	3.936	Default	72
18 Mbps	10.309	1.266	11.58	13.8	6.342	3.967	Default	72
24 Mbps	8.711	1.266	9.98	13.8	5.319	3.392	Default	76
36 Mbps	7.762	1.266	9.03	13.8	3.754	4.008	Default	82
48 Mbps	7.922	1.266	9.19	13.8	3.894	4.028	Default	82
54 Mbps	7.733	1.266	9.00	13.8	3.633	4.100	Default	83
Data Rate	Gated RMS (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
6 Mbps	10.273	1.2	11.47	13.8	6.323	3.95	Default	72
9 Mbps	10.267	1.2	11.47	13.8	6.33	3.937	Default	72
12 Mbps	10.336	1.2	11.54	13.8	6.384	3.952	Default	72
18 Mbps	10.394	1.2	11.59	13.8	6.415	3.979	Default	72
24 Mbps	8.654	1.2	9.85	13.8	5.39	3.264	Default	76
36 Mbps	7.709	1.2	8.91	13.8	3.839	3.87	Default	82
48 Mbps	7.864	1.2	9.06	13.8	3.973	3.891	Default	82
54 Mbps	7.826	1.2	9.03	13.8	3.719	4.107	Default	83
Data Rate	Gated RMS (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
6 Mbps	9.66	2	11.66	13.8	6.395	3.265	Default	72
9 Mbps	9.676	2	11.68	13.8	6.422	3.254	Default	72
12 Mbps	9.732	2	11.73	13.8	6.468	3.264	Default	72
18 Mbps	9.8	2	11.80	13.8	6.522	3.278	Default	72
24 Mbps	8.026	2	10.03	13.8	5.004	3.022	Default	76
36 Mbps	7.12	2	9.12	13.8	3.952	3.168	Default	82
48 Mbps	7.042	2	9.04	13.8	3.991	3.051	Default	82
54 Mbps	7.021	2	9.02	13.8	3.818	3.203	Default	83



802.11n(HT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.333	1.266	11.60	13.8	6.623	3.710	Default	73
MCS1	10.343	1.266	11.61	13.8	6.629	3.714	Default	73
MCS2	10.4	1.266	11.67	13.8	6.535	3.865	Default	73
MCS3	8.707	1.266	9.97	13.8	4.662	4.045	Default	80
MCS4	7.766	1.266	9.03	13.8	3.652	4.114	Default	84
MCS5	7.834	1.266	9.10	13.8	3.657	4.177	Default	84
MCS6	7.856	1.266	9.12	13.8	3.714	4.142	Default	84
MCS7	7.696	1.266	8.96	13.8	3.722	3.974	Default	84
Data Rate	Gated RMS (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.343	1.2	11.54	13.8	6.694	3.649	Default	73
MCS1	10.348	1.2	11.55	13.8	6.542	3.806	Default	73
MCS2	10.422	1.2	11.62	13.8	6.59	3.832	Default	73
MCS3	8.704	1.2	9.90	13.8	4.747	3.957	Default	80
MCS4	7.791	1.2	8.99	13.8	3.717	4.074	Default	84
MCS5	7.839	1.2	9.04	13.8	3.754	4.085	Default	84
MCS6	7.925	1.2	9.13	13.8	3.793	4.132	Default	84
MCS7	7.677	1.2	8.88	13.8	3.813	3.864	Default	84
Data Rate	Gated RMS (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	9.659	2	11.66	13.8	6.582	3.077	Default	73
MCS1	9.533	2	11.53	13.8	6.443	3.090	Default	73
MCS2	9.581	2	11.58	13.8	6.57	3.011	Default	73
MCS3	7.955	2	9.96	13.8	4.853	3.102	Default	80
MCS4	6.99	2	8.99	13.8	3.828	3.162	Default	84
MCS5	7.015	2	9.02	13.8	3.85	3.165	Default	84
MCS6	7.055	2	9.06	13.8	3.893	3.162	Default	84
MCS7	7.071	2	9.07	13.8	3.898	3.173	Default	84



802.11ac(VHT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm)	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.212	1.266	11.48	13.8	6.713	3.499	Default	73
MCS1	10.358	1.266	11.62	13.8	6.252	4.106	Default	74
MCS2	10.413	1.266	11.68	13.8	6.288	4.125	Default	74
MCS3	8.724	1.266	9.99	13.8	4.677	4.047	Default	80
MCS4	7.773	1.266	9.04	13.8	4.227	3.546	Default	83
MCS5	7.836	1.266	9.10	13.8	4.462	3.374	Default	83
MCS6	7.873	1.266	9.14	13.8	3.942	3.931	Default	83
MCS7	7.668	1.266	8.93	13.8	3.746	3.922	Default	84
MCS8	5.9	1.266	7.17	13.8	2.082	3.818	Default	90
Data Rate	Gated RMS (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm)	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.383	1.2	11.58	13.8	6.721	3.662	Default	73
MCS1	10.363	1.2	11.56	13.8	6.308	4.055	Default	74
MCS2	10.442	1.2	11.64	13.8	6.359	4.083	Default	74
MCS3	8.721	1.2	9.92	13.8	4.772	3.949	Default	80
MCS4	7.794	1.2	8.99	13.8	4.207	3.587	Default	83
MCS5	7.711	1.2	8.91	13.8	4.546	3.165	Default	83
MCS6	7.671	1.2	8.87	13.8	4.033	3.638	Default	83
MCS7	7.703	1.2	8.90	13.8	3.826	3.877	Default	84
MCS8	5.9	1.2	7.10	13.8	2.147	3.753	Default	90
Data Rate	Gated RMS (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm)	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	9.551	2	11.55	13.8	6.512	3.039	Default	73
MCS1	9.542	2	11.54	13.8	6.411	3.131	Default	74
MCS2	9.953	2	11.95	13.8	6.458	3.495	Default	74
MCS3	7.965	2	9.97	13.8	4.873	3.092	Default	80
MCS4	7.069	2	9.07	13.8	4.042	3.027	Default	83
MCS5	7.019	2	9.02	13.8	4.011	3.008	Default	83
MCS6	7.066	2	9.07	13.8	4.001	3.065	Default	83
MCS7	7.09	2	9.09	13.8	3.931	3.159	Default	84
MCS8	5.3	2	7.30	13.8	2.234	3.066	Default	90

802.11n(HT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.454	1.233	11.69	14.7	6.548	3.906	Default	72
MCS1	10.524	1.233	11.76	14.7	6.57	3.954	Default	72
MCS2	10.454	1.233	11.69	14.7	6.611	3.843	Default	72
MCS3	8.771	1.233	10.00	14.7	5.167	3.604	Default	78
MCS4	7.823	1.233	9.06	14.7	4.098	3.725	Default	82
MCS5	7.615	1.233	8.85	14.7	4.112	3.503	Default	82
MCS6	7.653	1.233	8.89	14.7	4.159	3.494	Default	82
MCS7	7.635	1.233	8.87	14.7	4.149	3.486	Default	82
Data Rate	Gated RMS (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	9.902	1.8	11.70	14.7	6.62	3.282	Default	72
MCS1	9.97	1.8	11.77	14.7	6.671	3.299	Default	72
MCS2	10.078	1.8	11.88	14.7	6.734	3.344	Default	72
MCS3	8.369	1.8	10.17	14.7	5.293	3.076	Default	78
MCS4	7.207	1.8	9.01	14.7	4.201	3.006	Default	82
MCS5	7.266	1.8	9.07	14.7	4.232	3.034	Default	82



Test Report for Harman International Industries, Incorporated • G31 HIGH• Report No. ER2499-9
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MCS6	7.312	1.8	9.11	14.7	4.284	3.028	Default	82
MCS7	7.035	1.8	8.84	14.7	4.033	3.002	Default	82



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802.11ac(VHT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm)	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.502	1.233	11.74	14.7	6.756	3.746	Default	72
MCS1	10.531	1.233	11.76	14.7	6.641	3.890	Default	72
MCS2	10.454	1.233	11.69	14.7	6.674	3.780	Default	72
MCS3	8.76	1.233	9.99	14.7	5.346	3.414	Default	78
MCS4	7.807	1.233	9.04	14.7	4.506	3.301	Default	82
MCS5	7.614	1.233	8.85	14.7	4.14	3.474	Default	82
MCS6	7.64	1.233	8.87	14.7	4.169	3.471	Default	82
MCS7	7.638	1.233	8.87	14.7	4.152	3.486	Default	82
MCS8	5.651	1.233	6.88	14.7	2.02	3.631	Default	90
MCS9	5.792	1.233	7.03	14.7	2.038	3.754	Default	90
Data Rate	Gated RMS (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.132	1.8	11.93	14.7	6.707	3.425	Default	72
MCS1	9.986	1.8	11.79	14.7	6.76	3.226	Default	72
MCS2	10.051	1.8	11.85	14.7	6.772	3.279	Default	72
MCS3	8.326	1.8	10.13	14.7	5.321	3.005	Default	78
MCS4	7.195	1.8	9.00	14.7	4.125	3.070	Default	82
MCS5	7.252	1.8	9.05	14.7	4.25	3.002	Default	82
MCS6	7.294	1.8	9.09	14.7	4.284	3.010	Default	82
MCS7	7.291	1.8	9.09	14.7	4.288	3.003	Default	82
MCS8	5.053	1.8	6.85	14.7	2.019	3.034	Default	90
MCS9	5.282	1.8	7.08	14.7	2.15	3.132	Default	90

802.11ac(VHT80)

Data Rate	Gated RMS (dBm) 5210 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting Nominal	Power Setting with TPC
MCS0	10.028	1.4	11.43	14.7	6.953	3.075	Default	68
MCS1	9.968	1.4	11.37	14.7	6.857	3.111	Default	69
MCS2	10.029	1.4	11.43	14.7	6.896	3.133	Default	69
MCS3	8.444	1.4	9.84	14.7	5.052	3.392	Default	76
MCS4	7.47	1.4	8.87	14.7	4.447	3.023	Default	79
MCS5	7.517	1.4	8.92	14.7	4.475	3.042	Default	79
MCS6	7.525	1.4	8.93	14.7	4.491	3.034	Default	79
MCS7	7.433	1.4	8.83	14.7	4.394	3.039	Default	79
MCS8	5.328	1.4	6.73	14.7	2.152	3.176	Default	87
MCS9	5.458	1.4	6.86	14.7	2.155	3.303	Default	87

FCC and RSS-247 UNII-3

802.11a (Power Setting: 59)



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Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	10.824	10.541	10.607	30	86.892
9 Mbps	10.815	10.528	10.614	30	90.528
12 Mbps	10.884	10.597	10.664	30	87.819
18 Mbps	10.897	10.615	10.695	30	83.067
24 Mbps	10.904	10.611	10.675	30	78.786
36 Mbps	10.938	10.659	10.726	30	71.924
48 Mbps	11.100	10.795	10.856	30	66.165
54 Mbps	11.063	10.759	10.824	30	64.283

802.11n(HT20) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.258	11.457	11.855	30	93.024
MCS1	11.162	11.493	11.744	30	87.304
MCS2	11.227	11.546	11.817	30	82.510
MCS3	9.871	10.236	10.455	30	78.402
MCS4	9.024	9.03	9.612	30	71.925
MCS5	9.071	9.339	9.66	30	66.686
MCS6	9.09	9.386	9.702	30	64.837
MCS7	9.001	9.405	9.665	30	62.716

802.11ac(VHT20) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.39	11.719	11.938	30	87.337
MCS1	11.403	11.715	11.965	30	87.342
MCS2	11.413	11.721	11.986	30	82.589
MCS3	10.033	10.388	10.626	30	78.612
MCS4	9.244	9.505	9.809	30	72.191
MCS5	9.303	9.574	9.864	30	67.072
MCS6	9.209	9.576	9.853	30	65.260
MCS7	9.162	9.587	9.747	30	63.207
MCS8	7.36	7.673	7.94	30	60.337

802.11n(HT40) (Power Setting: 58)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.068	10.841	30	86.895
MCS1	11.126	10.909	30	77.844
MCS2	11.204	10.96	30	71.265
MCS3	11.226	10.997	30	66.231
MCS4	11.296	11.048	30	59.094
MCS5	11.346	11.112	30	53.759
MCS6	11.392	11.138	30	50.083
MCS7	11.399	11.146	30	50.078

802.11ac(VHT40) (Power Setting: 57)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.356	11.137	30	86.953
MCS1	11.413	11.192	30	78.027
MCS2	11.489	11.249	30	71.573
MCS3	11.522	11.29	30	66.717
MCS4	11.576	11.358	30	59.722
MCS5	11.632	11.393	30	54.585
MCS6	11.65	11.41	30	52.895
MCS7	11.671	11.436	30	51.049
MCS8	11.694	11.449	30	49.063
MCS9	11.708	11.464	30	46.910



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802.11ac(HT80) (Power Setting 59)

Data Rate	Gated RMS (dBm) 5775 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.32	30	76.824
MCS1	10.405	30	65.291
MCS2	10.46	30	58.414
MCS3	10.47	30	53.810
MCS4	10.559	30	48.029
MCS5	10.613	30	44.574
MCS6	10.604	30	43.356
MCS7	10.336	30	42.022
MCS8	10.644	30	40.685
MCS9	10.601	30	39.713



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Power Spectral Density

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.F

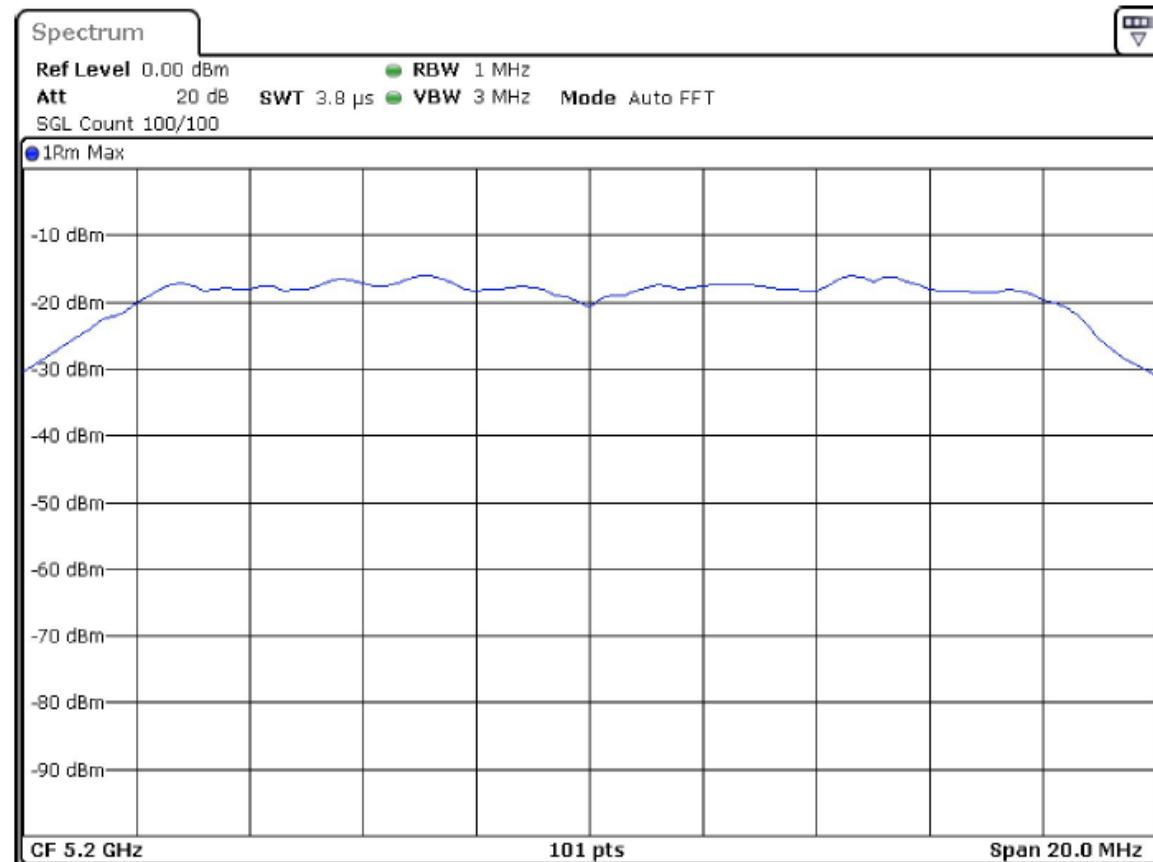
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

FCC UNII-1

802.11a

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
6 Mbps	6.330	6.220	5.622	11
9 Mbps	6.517	6.297	5.996	11
12 Mbps	6.179	7.106	6.424	11
18 Mbps	6.916	7.984	7.323	11
24 Mbps	6.217	6.085	5.427	11
36 Mbps	5.751	5.535	4.946	11
48 Mbps	5.972	6.020	5.122	11
54 Mbps	5.904	5.875	5.077	11

802.11a 18 Mbps 5200MHz



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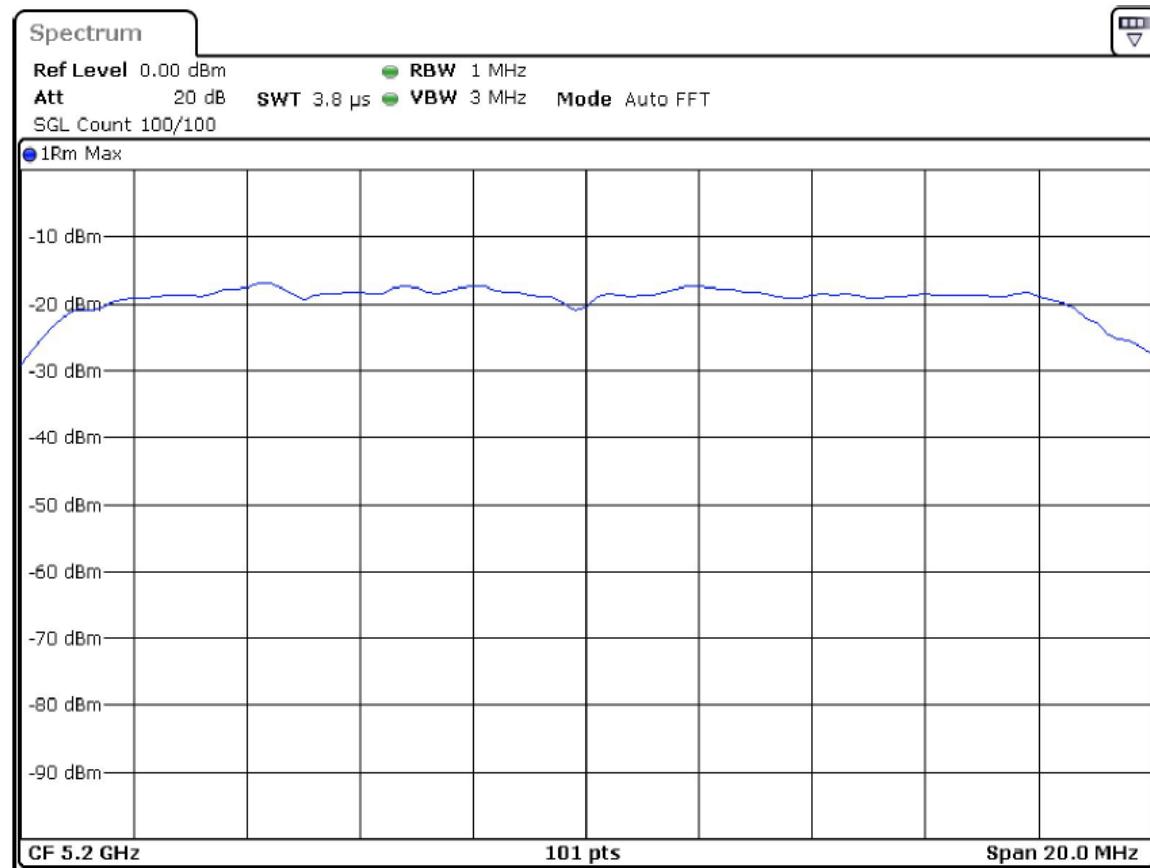
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802.11n(HT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	6.069	6.154	5.201	11
MCS1	6.106	5.931	5.721	11
MCS2	6.573	7.016	5.773	11
MCS3	5.862	6.088	4.570	11
MCS4	4.803	4.720	4.717	11
MCS5	5.803	5.692	4.535	11
MCS6	5.418	4.874	5.146	11
MCS7	6.174	6.684	5.016	11

802.11n(HT20) MCS2 5200MHz



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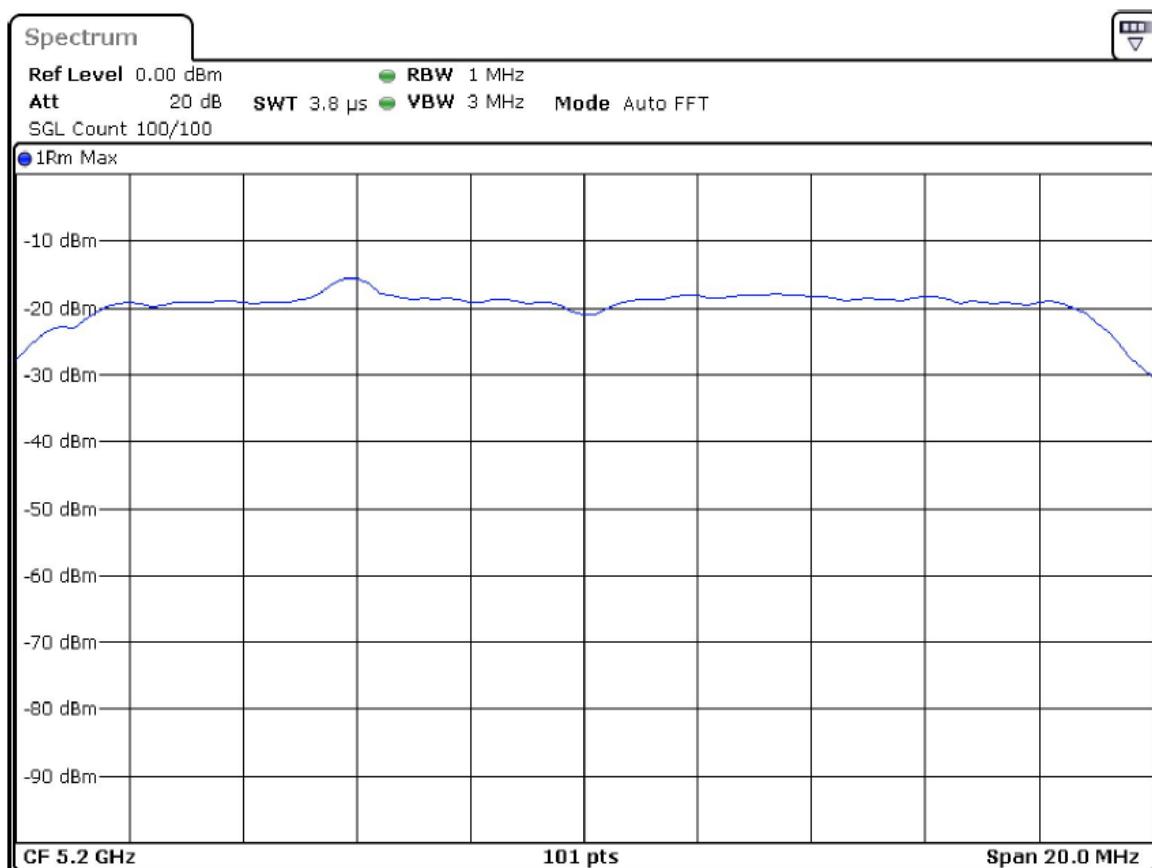
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802.11ac(VHT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	6.082	6.315	5.257	11
MCS1	6.570	6.426	5.778	11
MCS2	7.138	8.416	6.927	11
MCS3	6.191	5.108	5.027	11
MCS4	4.800	5.516	4.283	11
MCS5	6.109	5.975	4.696	11
MCS6	5.917	5.845	4.641	11
MCS7	5.755	5.317	4.436	11
MCS8	5.078	4.398	4.336	11
MCS9	1.931	3.148	2.515	11

802.11ac(VHT20) MCS2 5200MHz



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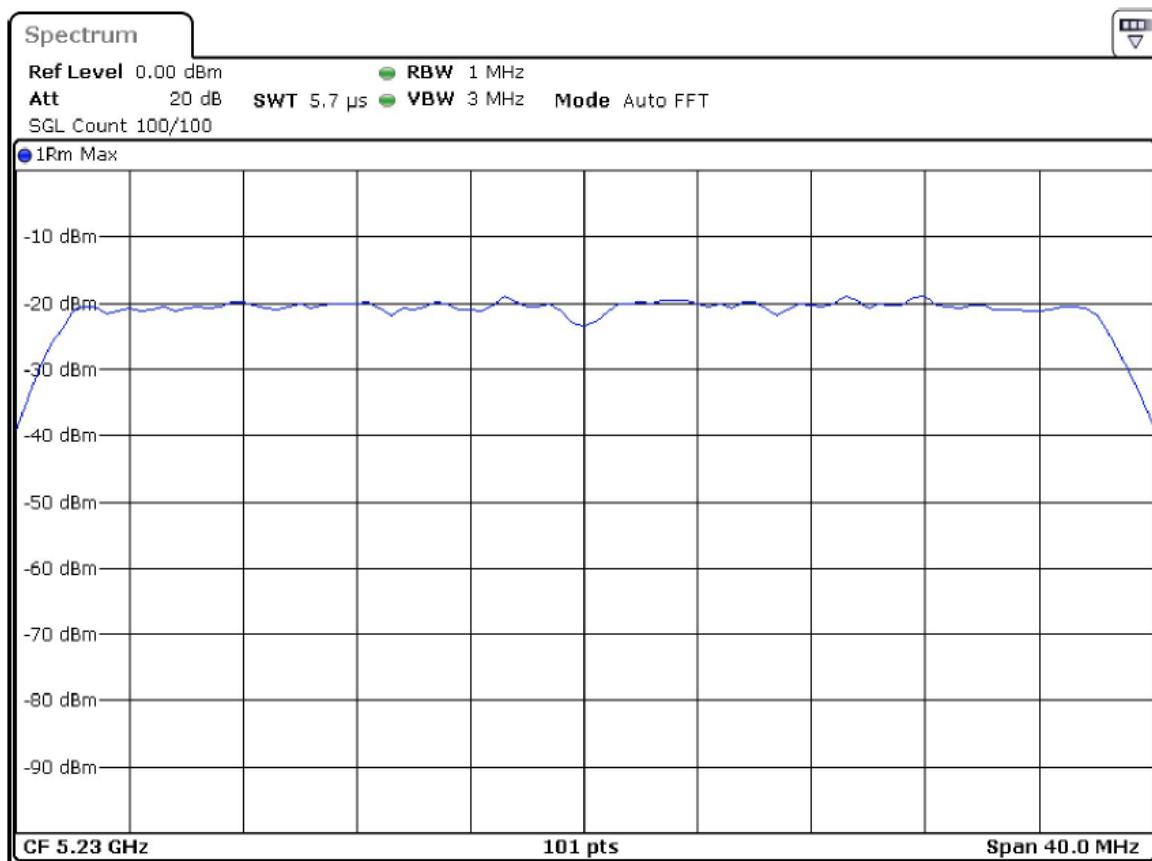
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802.11n(HT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	3.834	3.859	11
MCS1	5.619	4.580	11
MCS2	5.785	5.159	11
MCS3	5.825	6.904	11
MCS4	6.904	6.432	11
MCS5	6.239	6.553	11
MCS6	6.601	6.942	11
MCS7	6.932	6.610	11

802.11n(HT40) MCS6 5230MHz



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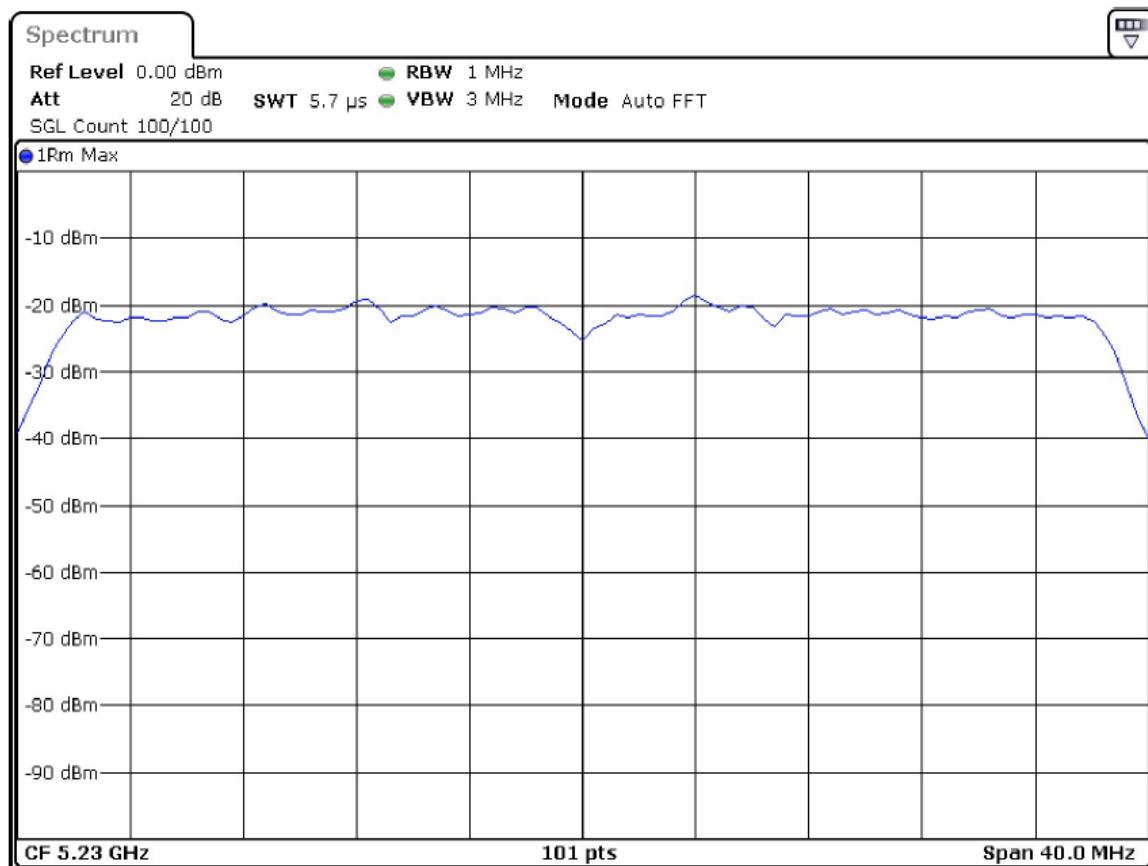
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802.11ac(VHT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	2.054	2.337	11
MCS1	3.386	3.788	11
MCS2	3.522	3.728	11
MCS3	4.603	4.142	11
MCS4	5.476	5.451	11
MCS5	5.719	5.435	11
MCS6	5.690	6.286	11
MCS7	5.610	7.437	11
MCS8	6.150	6.084	11
MCS9	6.377	6.523	11

802.11ac(VHT40) MCS7 5230MHz



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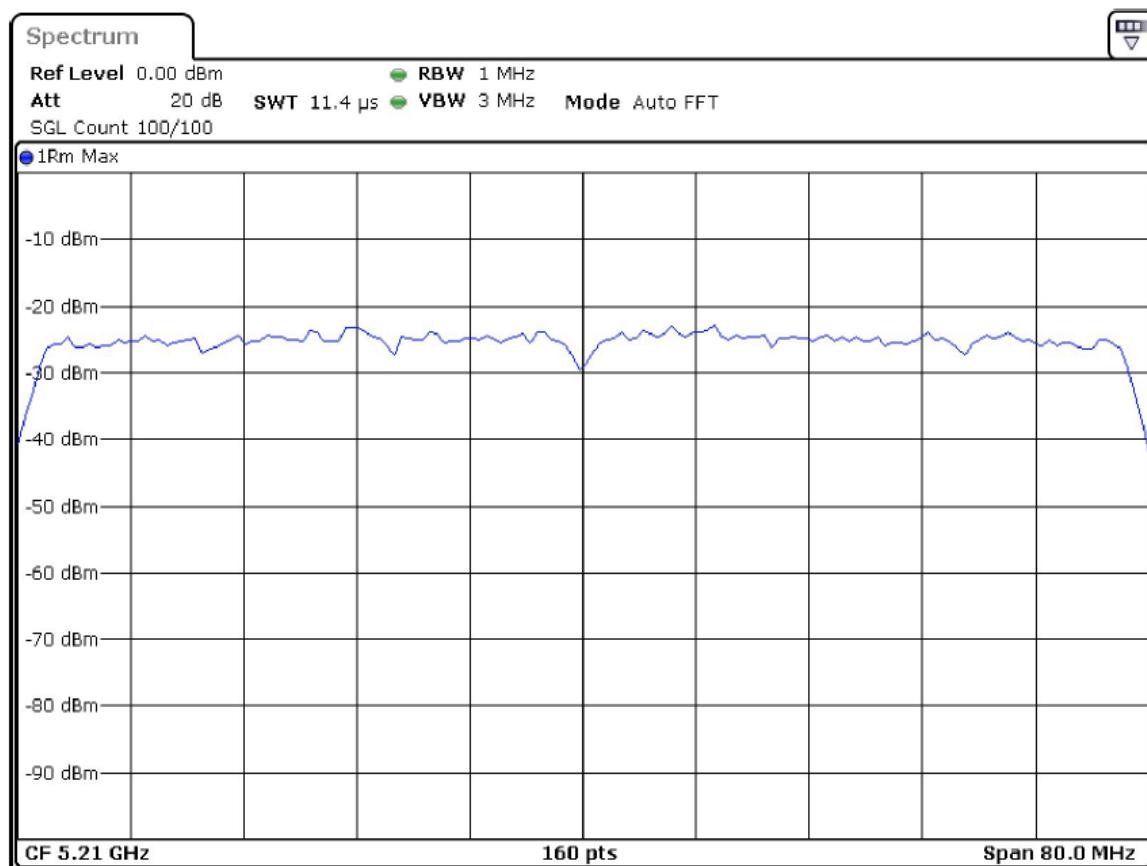
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802.11ac(VHT80)

Data Rate	Peak PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	0.343	11
MCS1	1.809	11
MCS2	2.054	11
MCS3	2.336	11
MCS4	2.606	11
MCS5	3.898	11
MCS6	3.416	11
MCS7	3.153	11
MCS8	3.999	11
MCS9	3.990	11

802.11ac(VHT80) MCS8 5210MHz



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RSS-247 UNII-1

802.11a

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
6 Mbps	6.330	1.266	7.596	10
9 Mbps	6.517	1.266	7.783	10
12 Mbps	6.179	1.266	7.445	10
18 Mbps	6.916	1.266	8.182	10
24 Mbps	6.217	1.266	7.483	10
36 Mbps	5.751	1.266	7.017	10
48 Mbps	5.972	1.266	7.238	10
54 Mbps	5.904	1.266	7.17	10

Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
6 Mbps	6.220	1.2	7.42	10
9 Mbps	6.297	1.2	7.497	10
12 Mbps	7.106	1.2	8.306	10
18 Mbps	7.984	1.2	9.184	10
24 Mbps	6.085	1.2	7.285	10
36 Mbps	5.535	1.2	6.735	10
48 Mbps	6.020	1.2	7.22	10
54 Mbps	5.875	1.2	7.075	10

Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
6 Mbps	5.622	2	7.622	10
9 Mbps	5.996	2	7.996	10
12 Mbps	6.424	2	8.424	10
18 Mbps	7.323	2	9.323	10
24 Mbps	5.427	2	7.427	10
36 Mbps	4.946	2	6.946	10
48 Mbps	5.122	2	7.122	10
54 Mbps	5.077	2	7.077	10

802.11a 18 Mbps 5240MHz

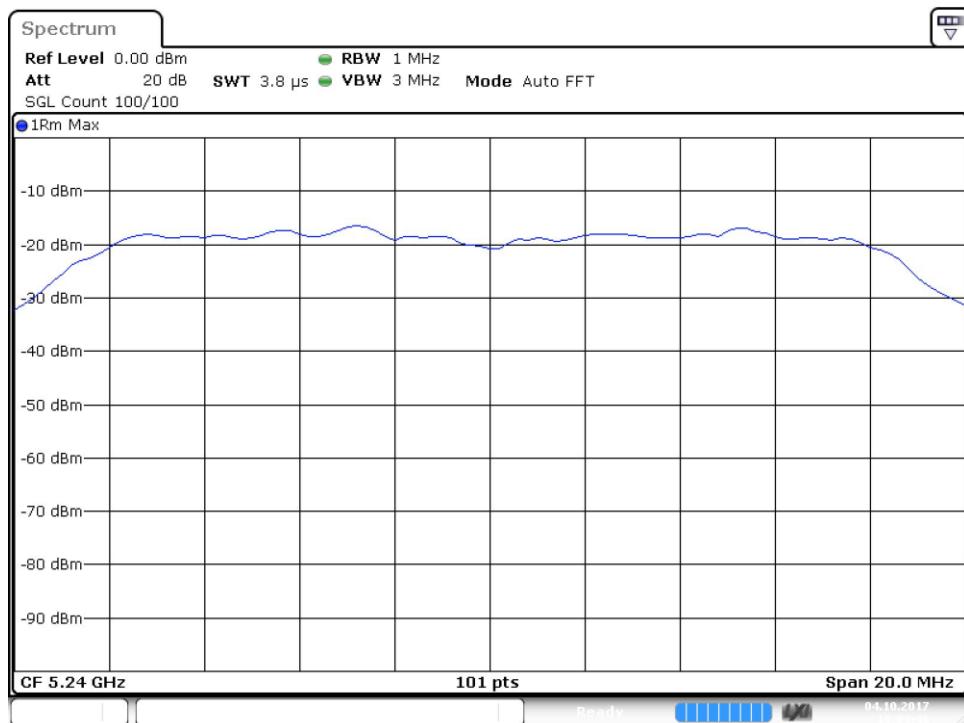


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Testing Cert. No. 1627-01



Date: 4.OCT.2017 19:03:49

802.11n(HT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	6.069	1.266	7.335	10
MCS1	6.106	1.266	7.372	10
MCS2	6.573	1.266	7.839	10
MCS3	5.862	1.266	7.128	10
MCS4	4.803	1.266	6.069	10
MCS5	5.803	1.266	7.069	10
MCS6	5.418	1.266	6.684	10
MCS7	6.174	1.266	7.44	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
MCS0	6.154	1.2	7.354	10
MCS1	5.931	1.2	7.131	10
MCS2	7.016	1.2	8.216	10
MCS3	6.088	1.2	7.288	10
MCS4	4.720	1.2	5.92	10
MCS5	5.692	1.2	6.892	10
MCS6	4.874	1.2	6.074	10
MCS7	6.684	1.2	7.884	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	5.201	2	7.201	10
MCS1	5.721	2	7.721	10
MCS2	5.773	2	7.773	10
MCS3	4.570	2	6.57	10
MCS4	4.717	2	6.717	10
MCS5	4.535	2	6.535	10
MCS6	5.146	2	7.146	10
MCS7	5.016	2	7.016	10

802.11n(HT20) MCS2 5200MHz

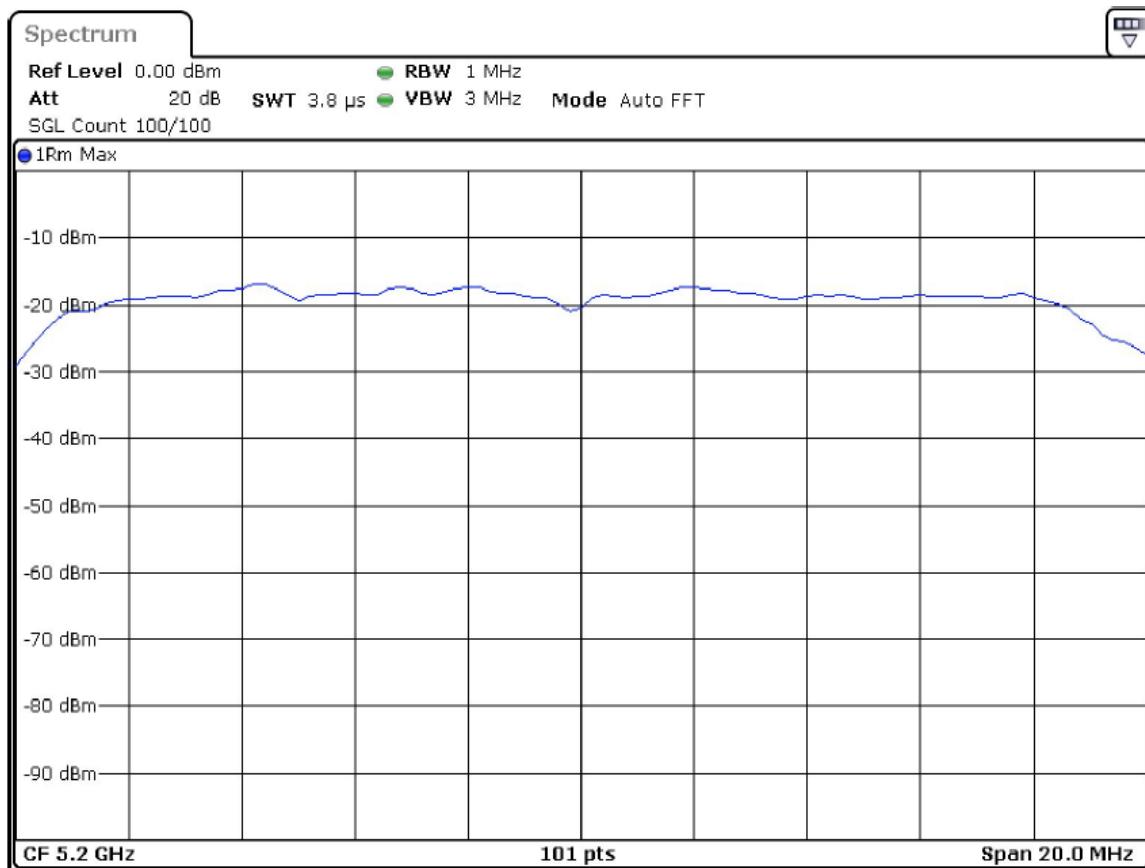


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802.11ac(VHT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	6.082	1.266	7.348	10
MCS1	6.570	1.266	7.836	10
MCS2	7.138	1.266	8.404	10
MCS3	6.191	1.266	7.457	10
MCS4	4.800	1.266	6.066	10
MCS5	6.109	1.266	7.375	10
MCS6	5.917	1.266	7.183	10
MCS7	5.755	1.266	7.021	10
MCS8	5.078	1.266	6.344	10
MCS9	1.931	1.266	3.197	10

Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
MCS0	6.315	1.2	7.515	10
MCS1	6.426	1.2	7.626	10
MCS2	8.416	1.2	9.616	10
MCS3	5.108	1.2	6.308	10
MCS4	5.516	1.2	6.716	10
MCS5	5.975	1.2	7.175	10
MCS6	5.845	1.2	7.045	10
MCS7	5.317	1.2	6.517	10
MCS8	4.398	1.2	5.598	10
MCS9	3.148	1.2	4.348	10



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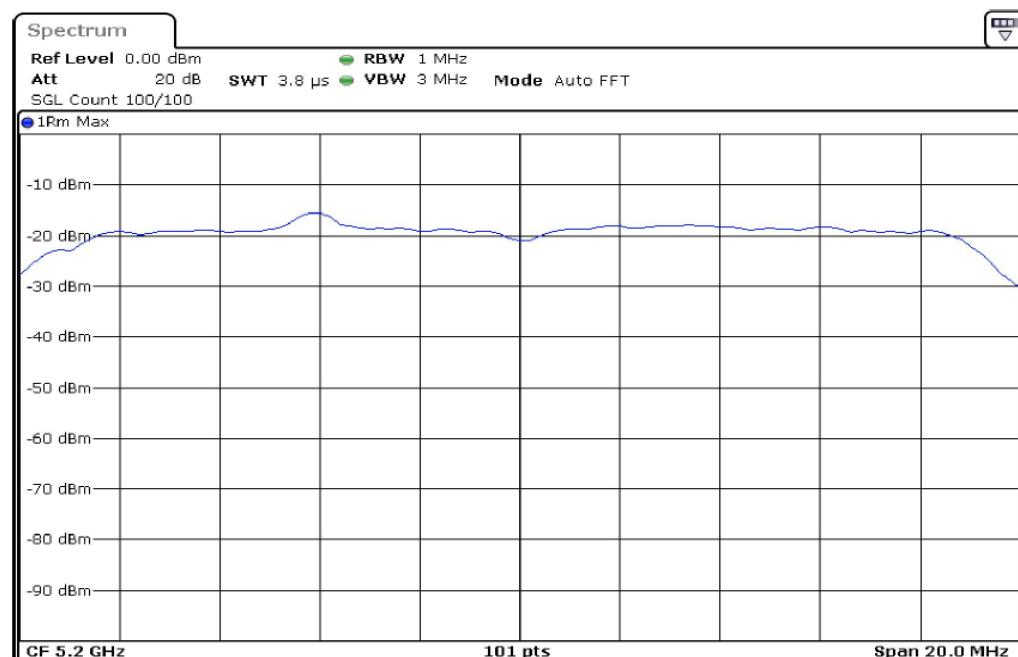
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Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	5.257	2	7.257	10
MCS1	5.778	2	7.778	10
MCS2	6.927	2	8.927	10
MCS3	5.027	2	7.027	10
MCS4	4.283	2	6.283	10
MCS5	4.696	2	6.696	10
MCS6	4.641	2	6.641	10
MCS7	4.436	2	6.436	10
MCS8	4.336	2	6.336	10
MCS9	2.515	2	4.515	10

802.11ac(VHT20) MCS2 5200MHz



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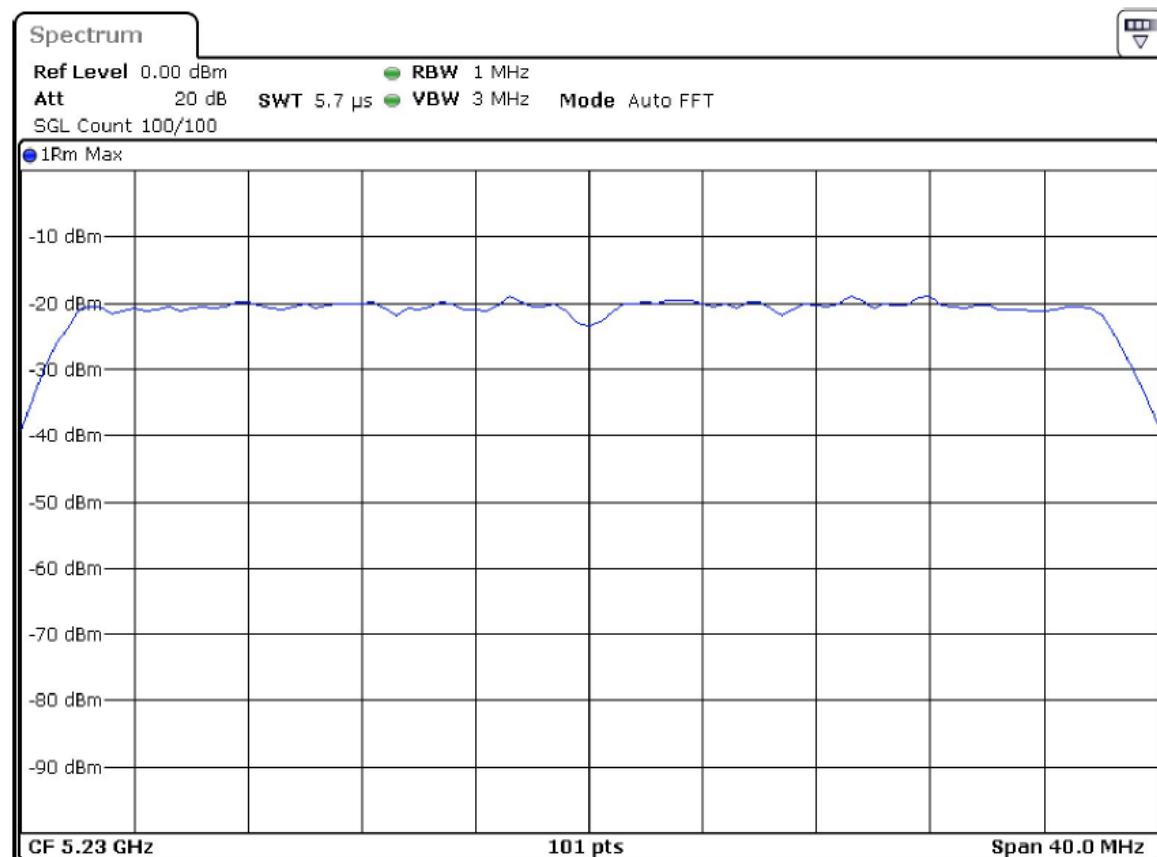


802.11n(HT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	3.834	1.233	5.067	10
MCS1	5.619	1.233	6.852	10
MCS2	5.785	1.233	7.018	10
MCS3	5.825	1.233	7.058	10
MCS4	6.904	1.233	8.137	10
MCS5	6.239	1.233	7.472	10
MCS6	6.601	1.233	7.834	10
MCS7	6.932	1.233	8.165	10

Data Rate	PSD (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	3.859	1.8	5.659	10
MCS1	4.580	1.8	6.38	10
MCS2	5.159	1.8	6.959	10
MCS3	6.904	1.8	8.704	10
MCS4	6.432	1.8	8.232	10
MCS5	6.553	1.8	8.353	10
MCS6	6.942	1.8	8.742	10
MCS7	6.610	1.8	8.41	10

802.11n(HT40) MCS6 5230MHz



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802.11ac(VHT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	2.054	1.233	3.287	10
MCS1	3.386	1.233	4.619	10
MCS2	3.522	1.233	4.755	10
MCS3	4.603	1.233	5.836	10
MCS4	5.476	1.233	6.709	10
MCS5	5.719	1.233	6.952	10
MCS6	5.690	1.233	6.923	10
MCS7	5.610	1.233	6.843	10
MCS8	6.150	1.233	7.383	10
MCS9	6.377	1.233	7.61	10

Data Rate	PSD (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	2.337	1.8	4.137	10
MCS1	3.788	1.8	5.588	10
MCS2	3.728	1.8	5.528	10
MCS3	4.142	1.8	5.942	10
MCS4	5.451	1.8	7.251	10
MCS5	5.435	1.8	7.235	10
MCS6	6.286	1.8	8.086	10
MCS7	7.437	1.8	9.237	10
MCS8	6.084	1.8	7.884	10
MCS9	6.523	1.8	8.323	10

802.11ac(VHT40) MCS7 5230MHz

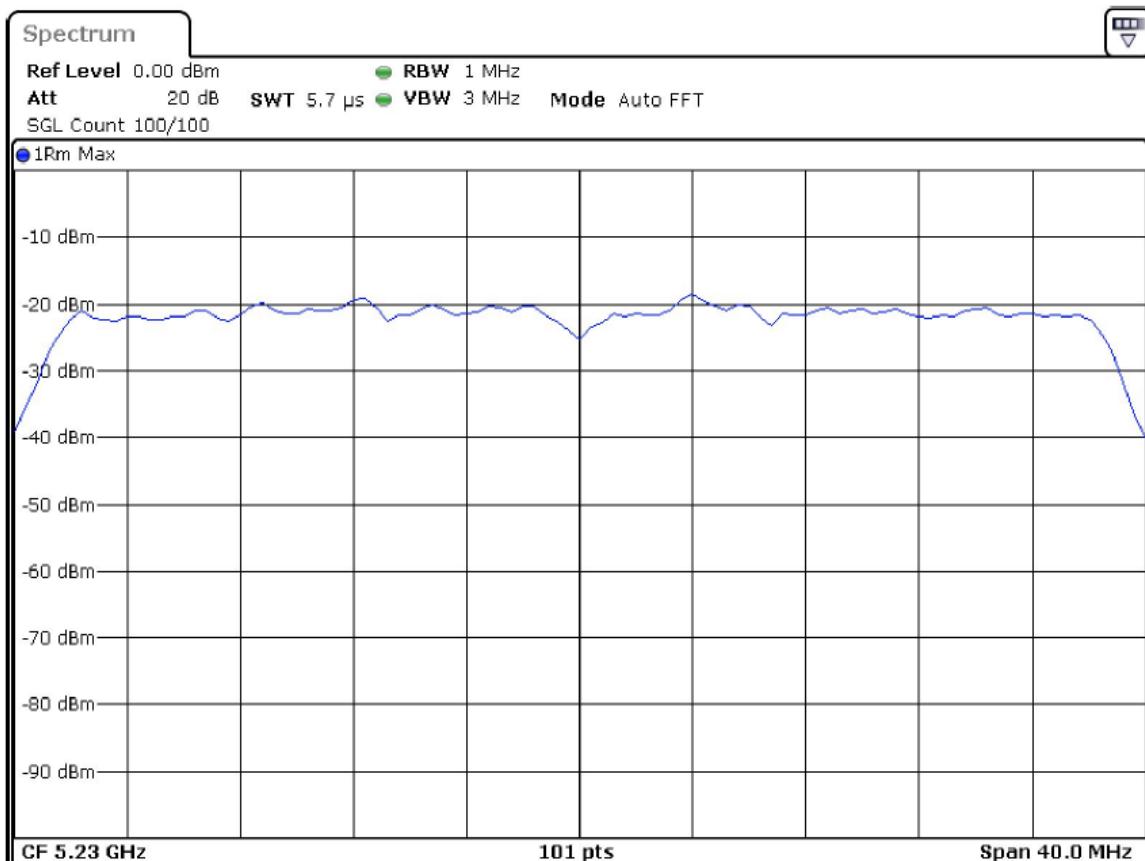


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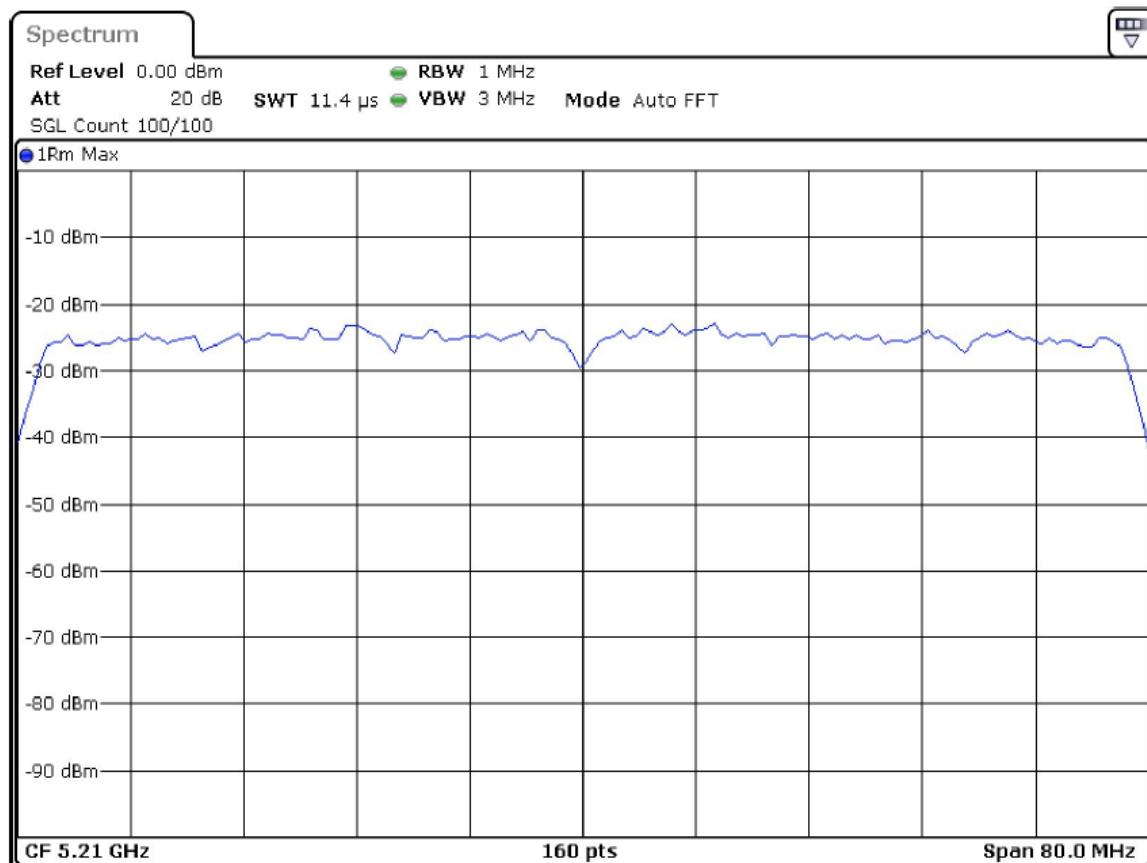
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802.11ac(VHT80)

Data Rate	PSD (dBm) 5210 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	0.343	1.4	1.743	10
MCS1	1.809	1.4	3.209	10
MCS2	2.054	1.4	3.454	10
MCS3	2.336	1.4	3.736	10
MCS4	2.606	1.4	4.006	10
MCS5	3.898	1.4	5.298	10
MCS6	3.416	1.4	4.816	10
MCS7	3.153	1.4	4.553	10
MCS8	3.999	1.4	5.399	10
MCS9	3.990	1.4	5.39	10

802.11ac(VHT80) MCS8 5210MHz



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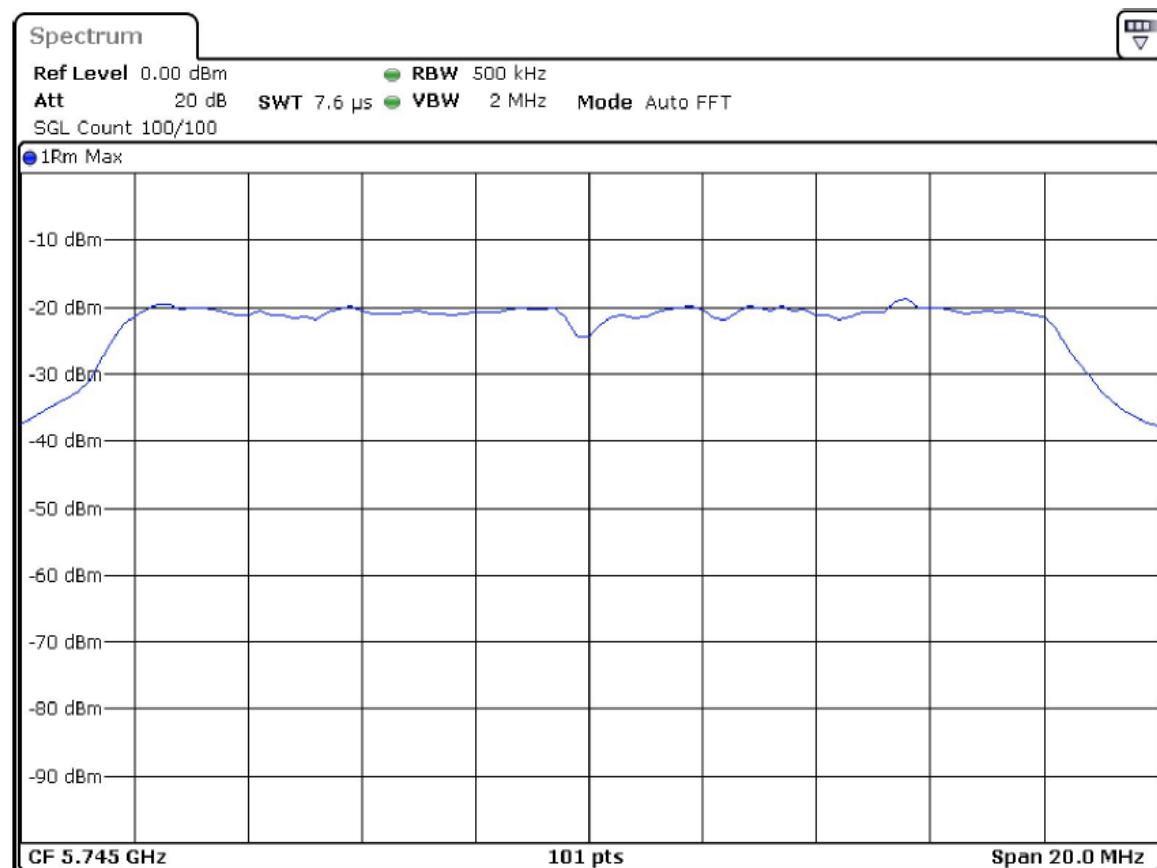
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FCC and RSS-247 UNII-3

802.11a

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
6 Mbps	3.881	4.040	4.585	30.0
9 Mbps	5.094	4.657	4.609	30.0
12 Mbps	5.220	4.110	4.132	30.0
18 Mbps	5.649	5.137	5.283	30.0
24 Mbps	5.381	5.054	5.083	30.0
36 Mbps	6.250	5.939	6.060	30.0
48 Mbps	6.143	5.847	6.014	30.0
54 Mbps	6.297	5.561	5.881	30.0

802.11a 54 Mbps 5745MHz



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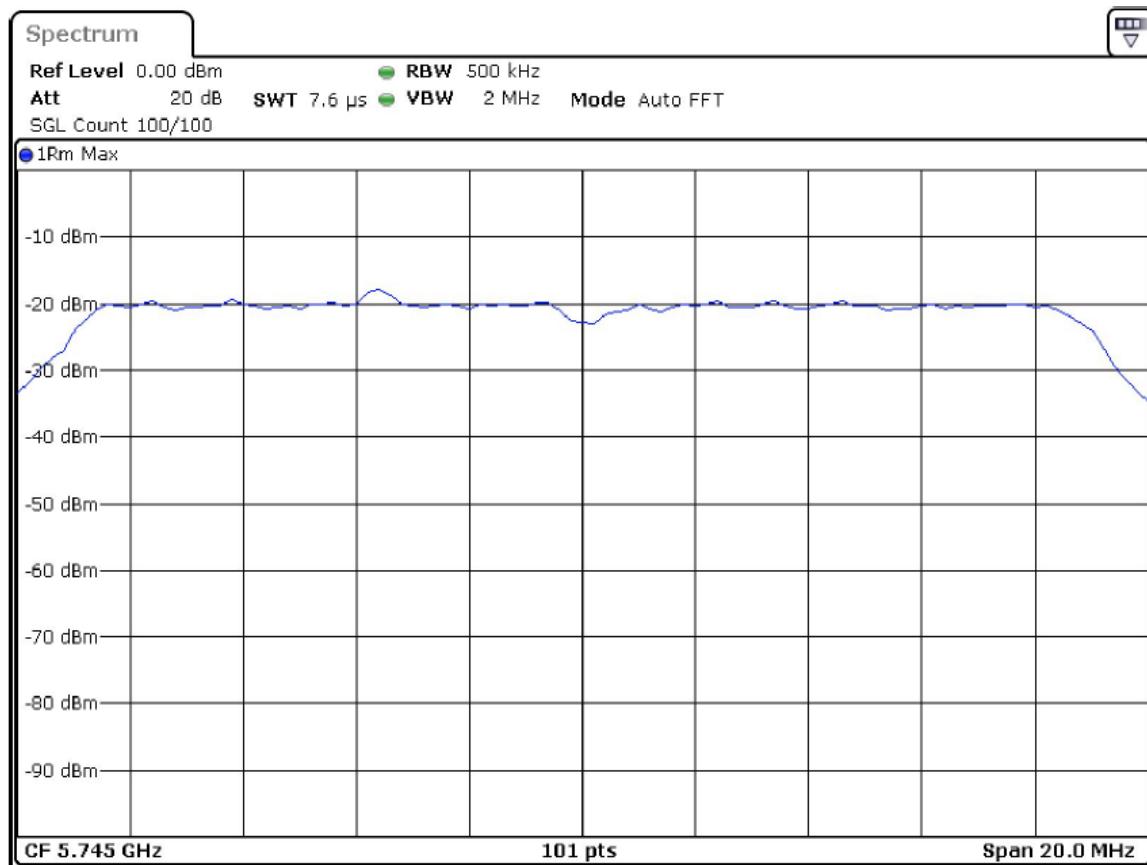
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802.11n(HT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	3.995	3.842	4.195	30
MCS1	6.088	5.315	4.729	30
MCS2	5.153	4.952	5.451	30
MCS3	4.673	3.818	4.7	30
MCS4	4.267	4.356	3.038	30
MCS5	4.821	4.481	4.821	30
MCS6	4.234	4.576	4.799	30
MCS7	4.557	4.656	5.259	30

802.11n(HT20) MCS1 5745MHz



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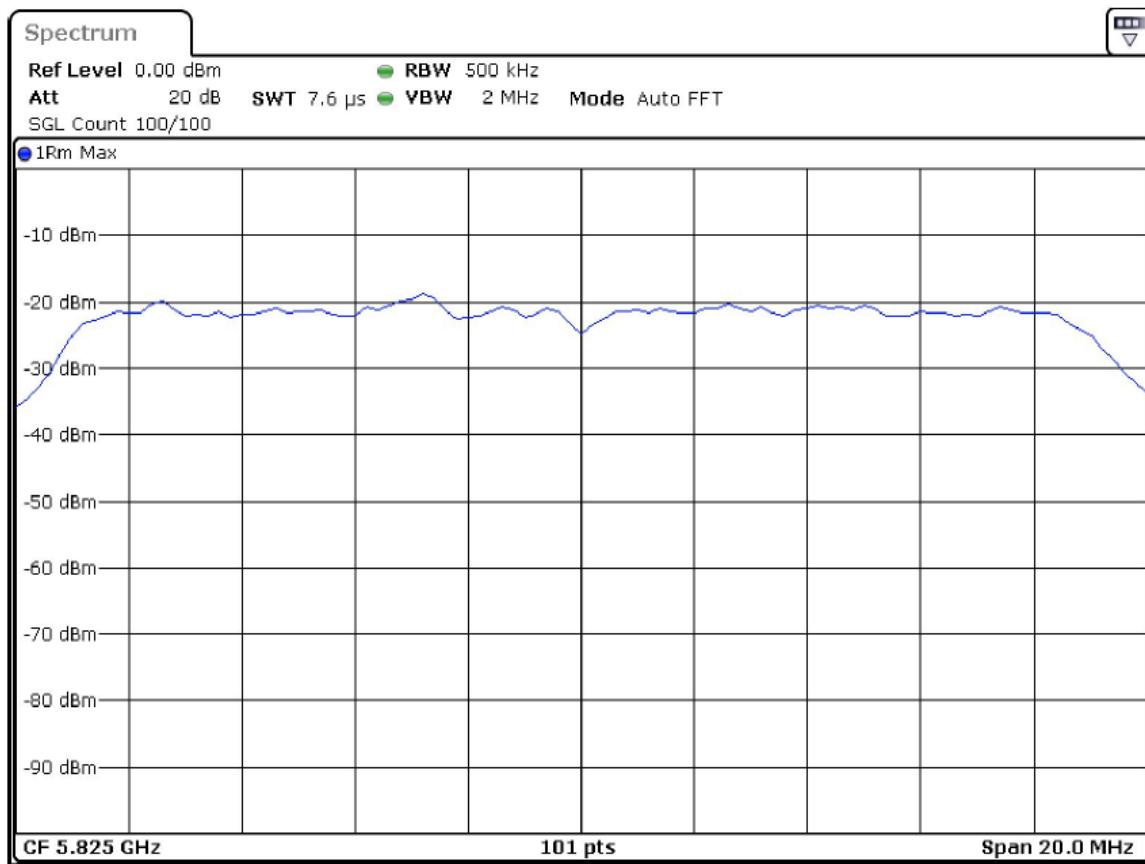
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802.11ac(VHT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	3.918	5.283	4.021	30
MCS1	5.321	4.535	6.039	30
MCS2	5.655	5.712	5.872	30
MCS3	4.541	4.806	4.916	30
MCS4	4.781	4.076	4.416	30
MCS5	5.110	4.319	5.493	30
MCS6	4.265	5.418	5.931	30
MCS7	4.663	5.155	6.375	30
MCS8	3.129	3.255	3.312	30

802.11ac(VHT20) MCS7 5825MHz



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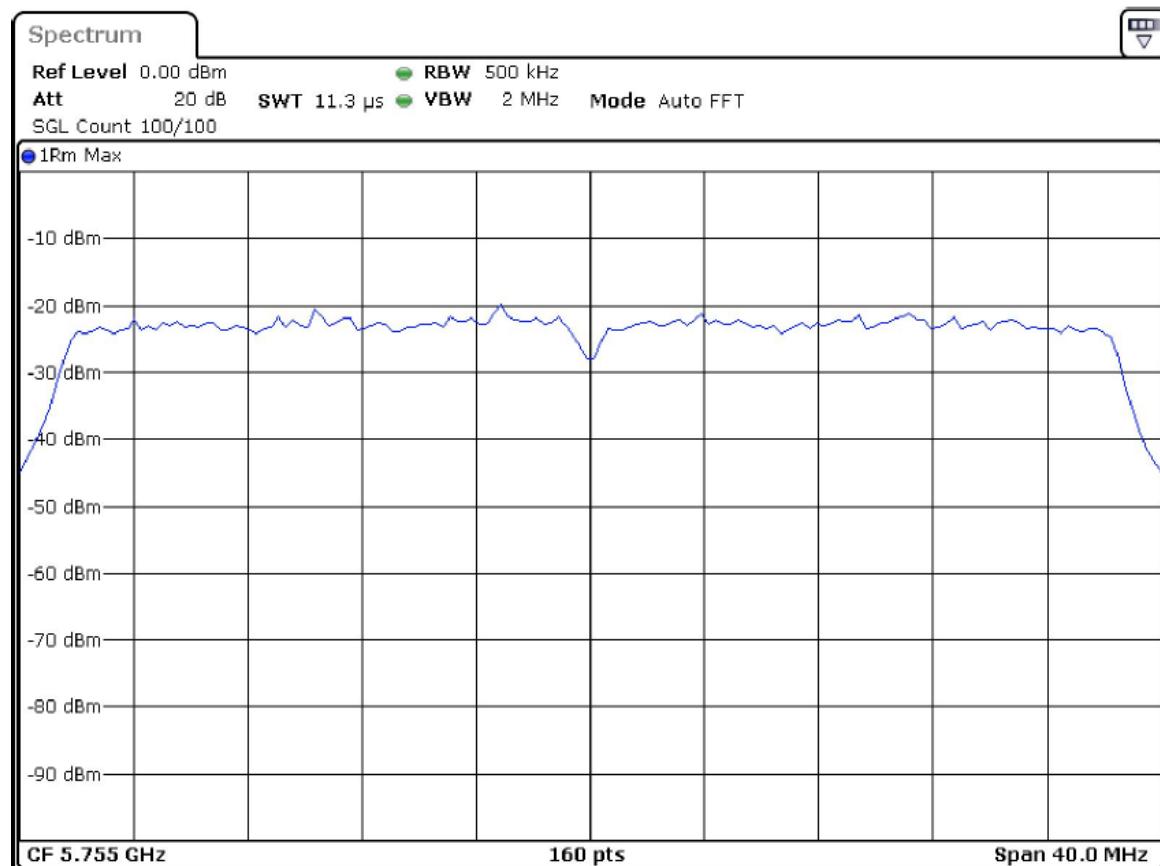
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802.11n(HT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	1.908	0.952	30
MCS1	4.018	2.930	30
MCS2	3.588	2.741	30
MCS3	4.433	3.821	30
MCS4	4.434	4.540	30
MCS5	4.673	5.869	30
MCS6	6.151	5.029	30
MCS7	4.375	4.843	30

802.11n(HT40) MCS6 5755MHz



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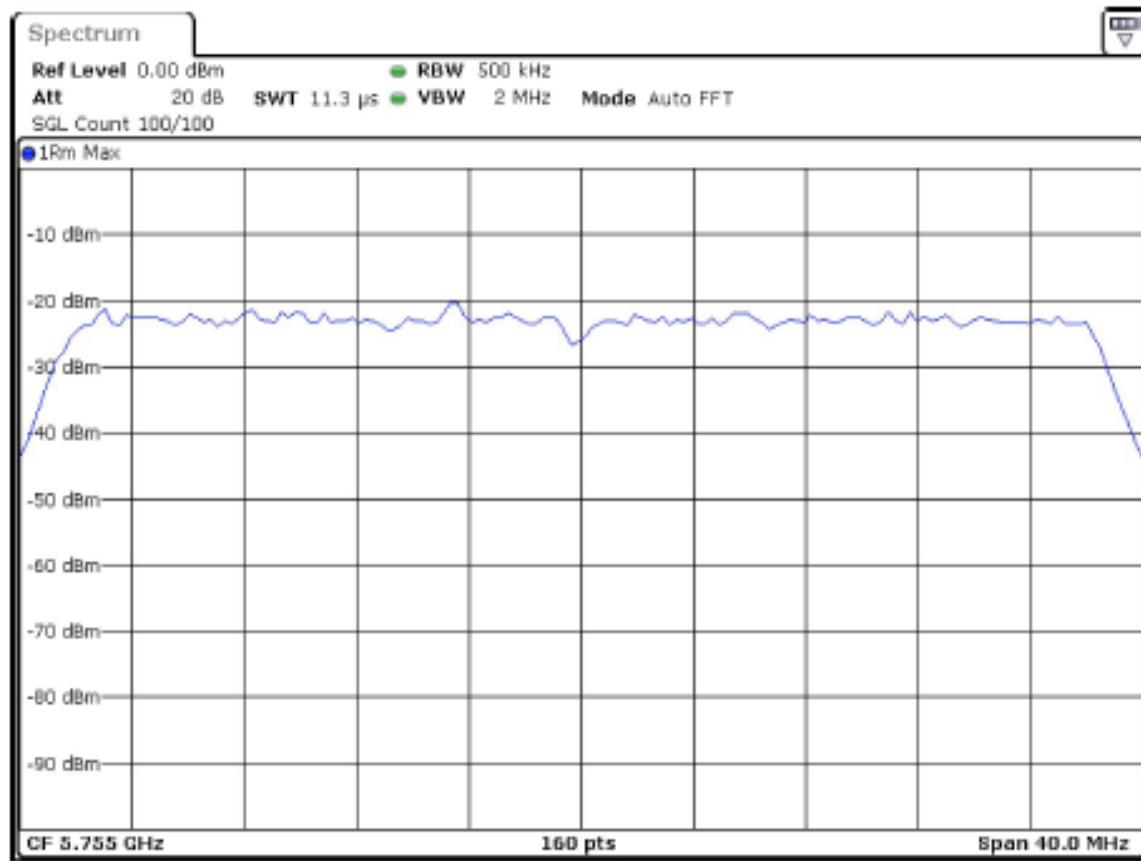
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802.11ac(VHT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	1.623	2.032	30
MCS1	3.222	3.056	30
MCS2	3.652	3.097	30
MCS3	4.014	3.736	30
MCS4	4.291	5.132	30
MCS5	5.1	4.718	30
MCS6	4.876	4.748	30
MCS7	5.639	4.918	30
MCS8	5.644	4.713	30
MCS9	6.078	5.675	30

802.11ac(VHT40) MCS9 5755MHz



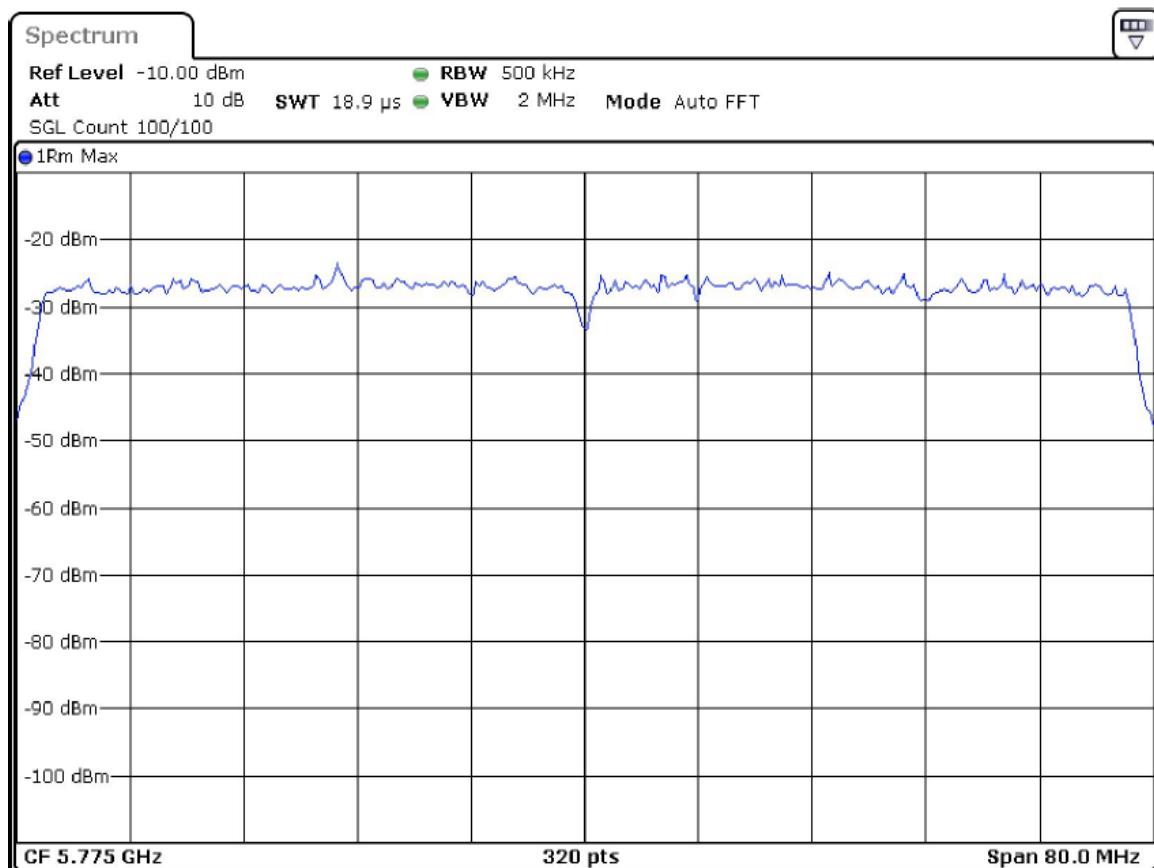
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802.11ac(VHT80)

Data Rate	Peak PSD (dBm) 5775 MHz	Limit (dBm)
MCS0	-1.666	30
MCS1	0.451	30
MCS2	1.145	30
MCS3	1.392	30
MCS4	1.545	30
MCS5	2.016	30
MCS6	3.219	30
MCS7	2.253	30
MCS8	1.785	30
MCS9	3.199	30

802.11ac(VHT80) MCS6 5775MHz



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DTS Bandwidth (6dB)

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.C.2.
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%
FCC/RSS-247 UNII-1

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 18 Mbps	5180.000	16.458853	0.5	5171.720698	5188.179551
802.11n(HT20) MSC2	5180.000	17.855361	0.5	5171.022444	5188.877805
802.11ac(VHT20) MCS2	5180.000	17.855361	0.5	5171.022444	5188.877805
802.11n(HT40) MSC6	5190.000	36.654183	0.5	5171.622971	5208.277154
802.11ac(VHT40) MCS9	5190.000	36.654183	0.5	5171.622971	5208.277154
802.11a 18 Mbps	5200.000	16.458853	0.5	5191.720698	5208.179551
802.11n(HT20) MSC2	5200.000	17.855361	0.5	5191.022444	5208.877805
802.11ac(VHT20) MCS2	5200.000	17.855361	0.5	5191.022444	5208.877805
802.11ac(VHT80) MSC9	5210.000	76.552154	0.5	5171.723923	5248.276077
802.11n(HT40) MCS6	5230.000	36.654183	0.5	5211.622971	5248.277154
802.11ac(VHT40) MCS9	5230.000	36.654183	0.5	5211.622971	5248.277154
802.11a 18 Mb/s	5240.000	16.558603	0.5	5231.620948	5248.179551
802.11n(HT20) MSC2	5240.000	17.855361	0.5	5231.022444	5248.877805
802.11ac(VHT20) MCS2	5240.000	17.855361	0.5	5231.022444	5248.877805





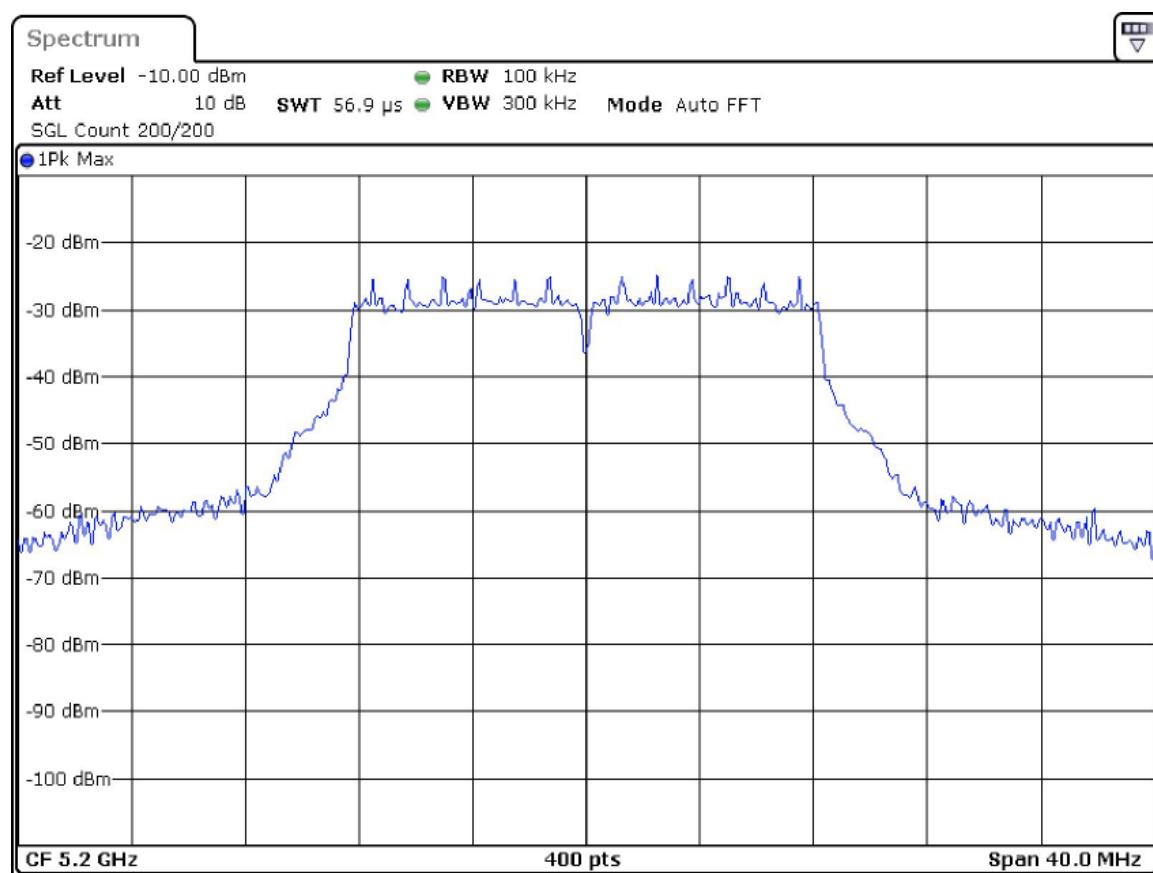
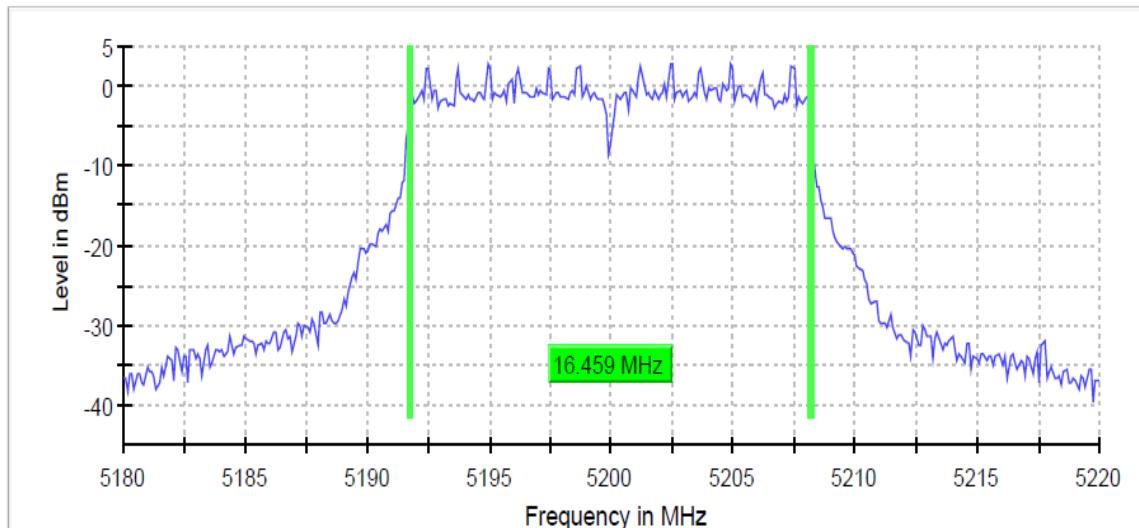
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802.11a 18 Mbps 5200MHz

6 dB Bandwidth

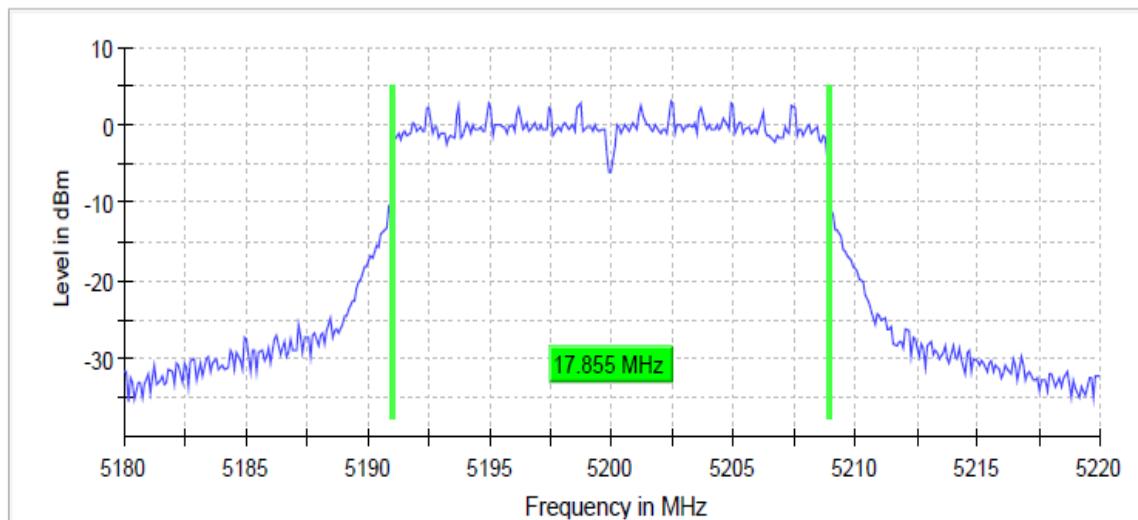


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802.11n(HT20) MCS2 5200MHz

6 dB Bandwidth

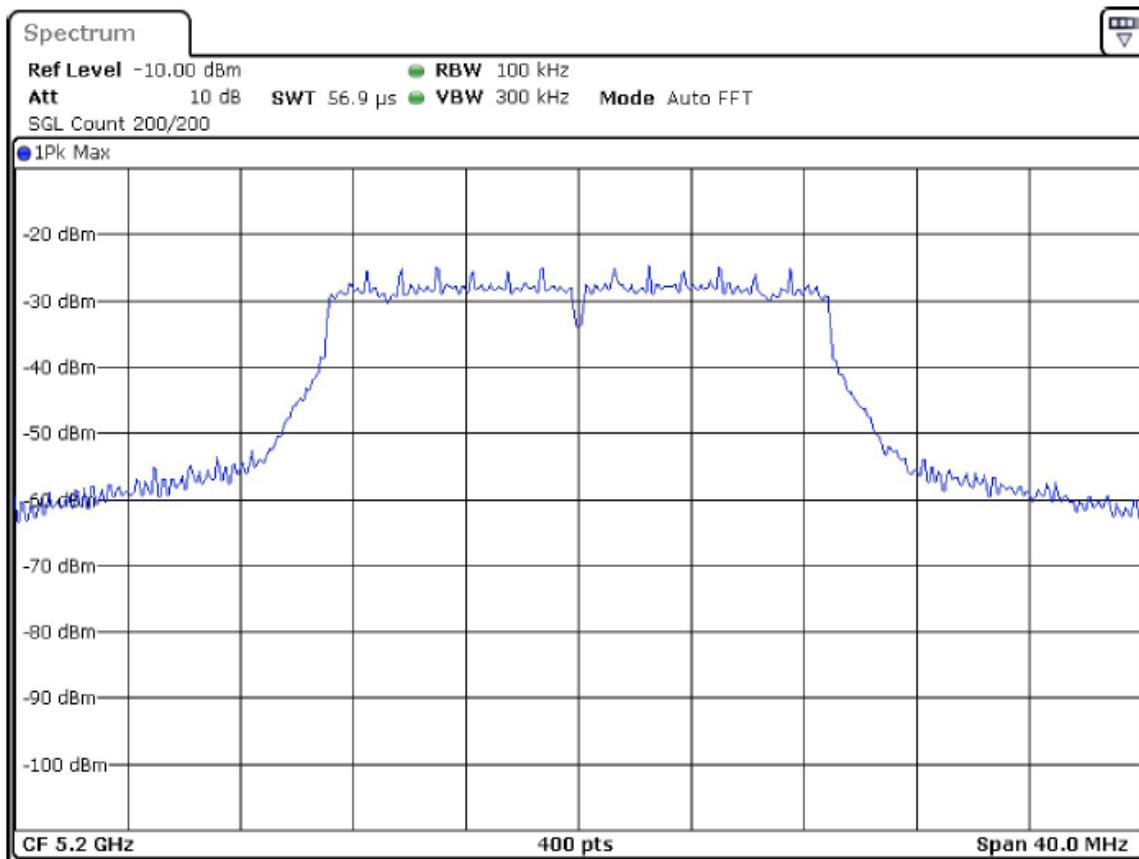


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Testing Cert. No. 1627-01



802.11ac(VHT20) MCS2 5200MHz

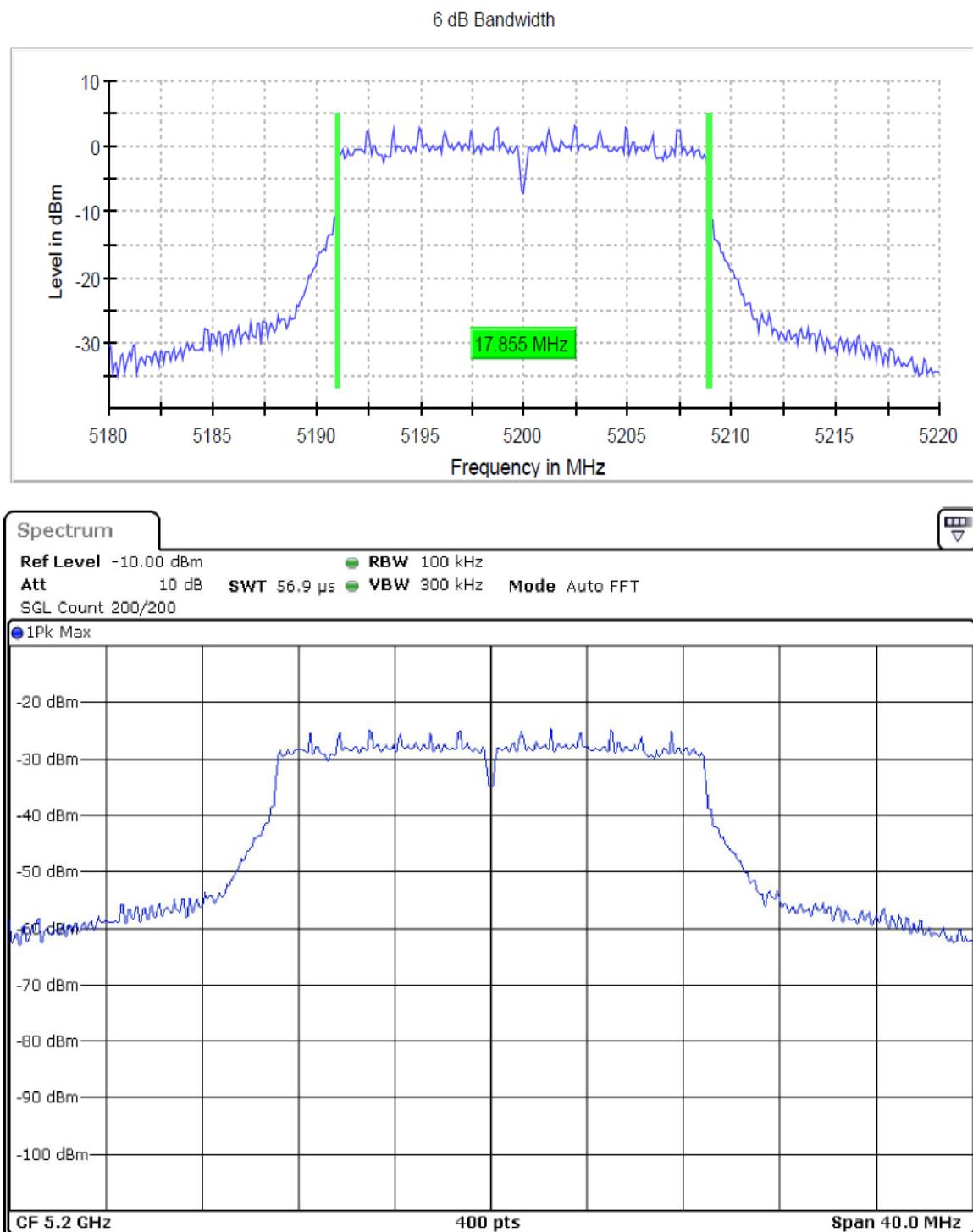


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Testing Cert. No. 1627-01



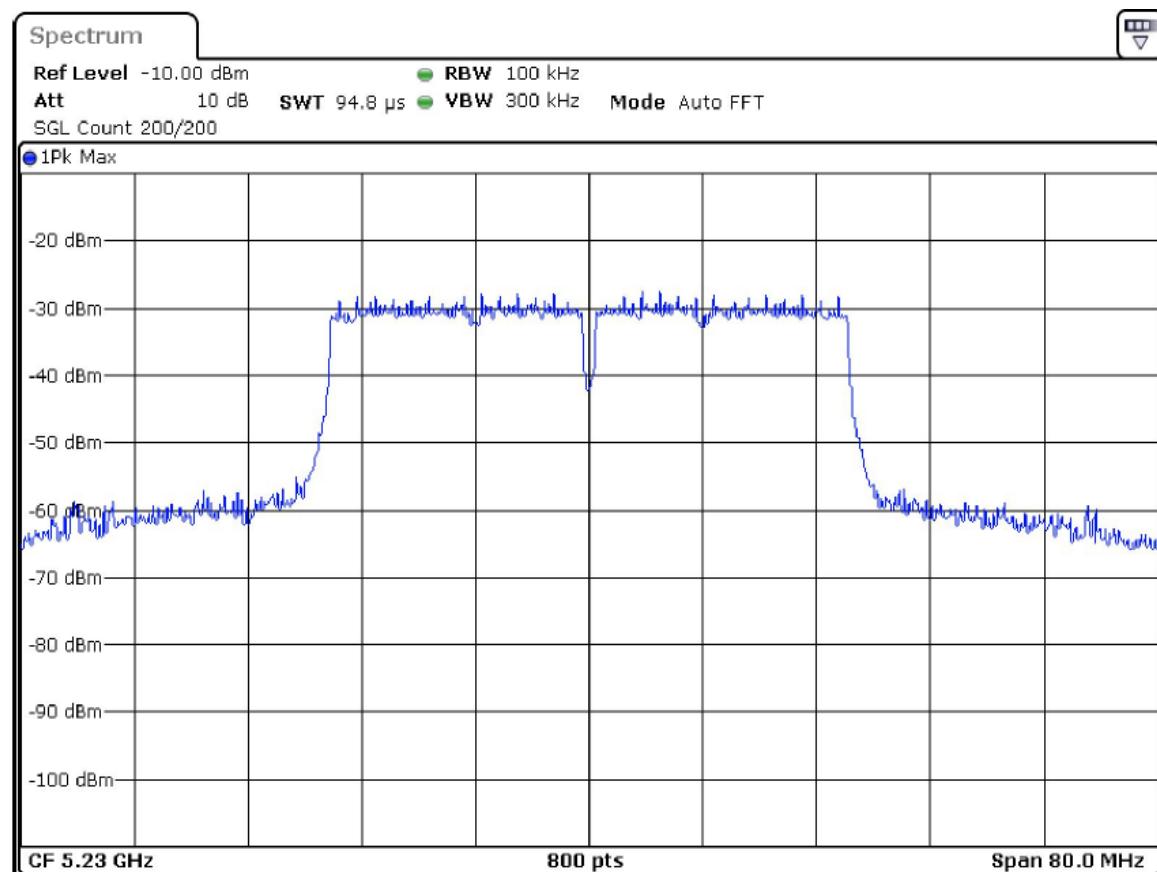
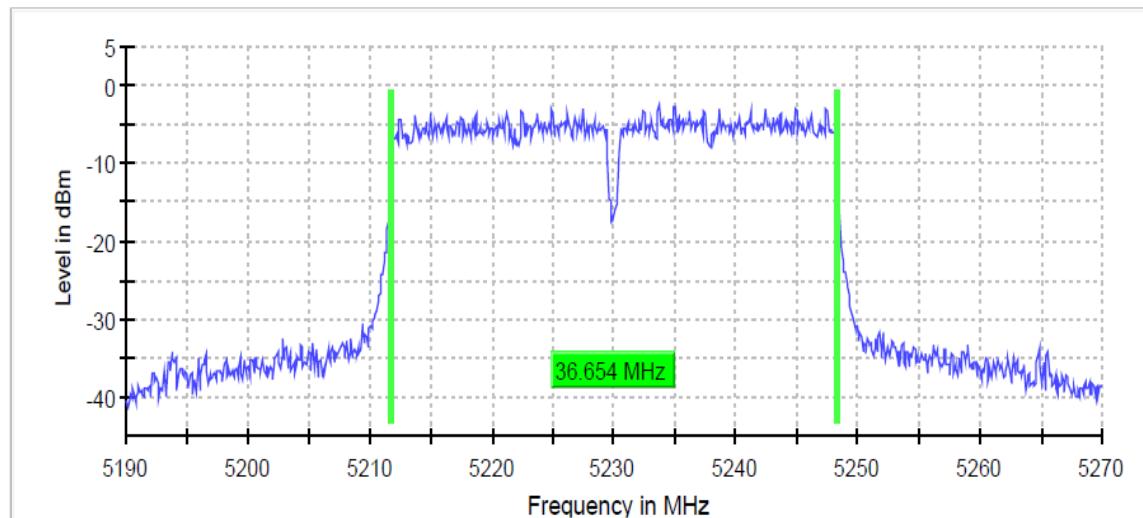
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802.11n(HT40) MCS6 5230 MHz

6 dB Bandwidth



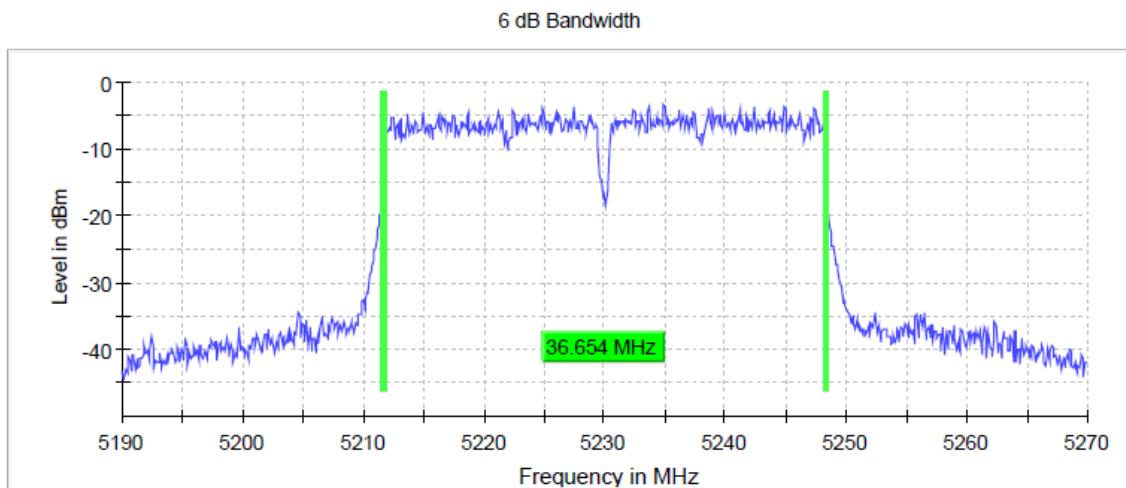
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Testing Cert. No. 1627-01

802.11ac(VHT40) MCS9 5230MHz

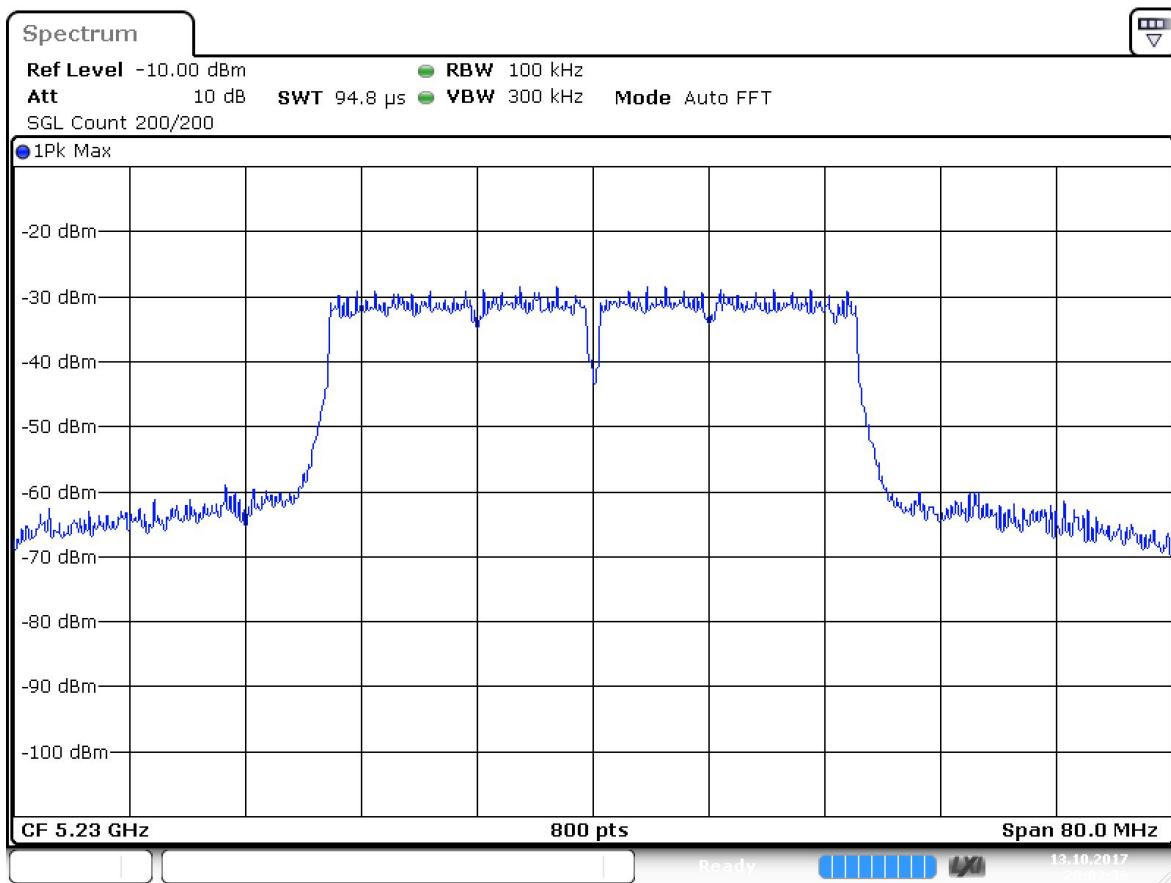


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Date: 13.OCT.2017 20:03:36

802.11ac(VHT80) MCS9 5210MHZ

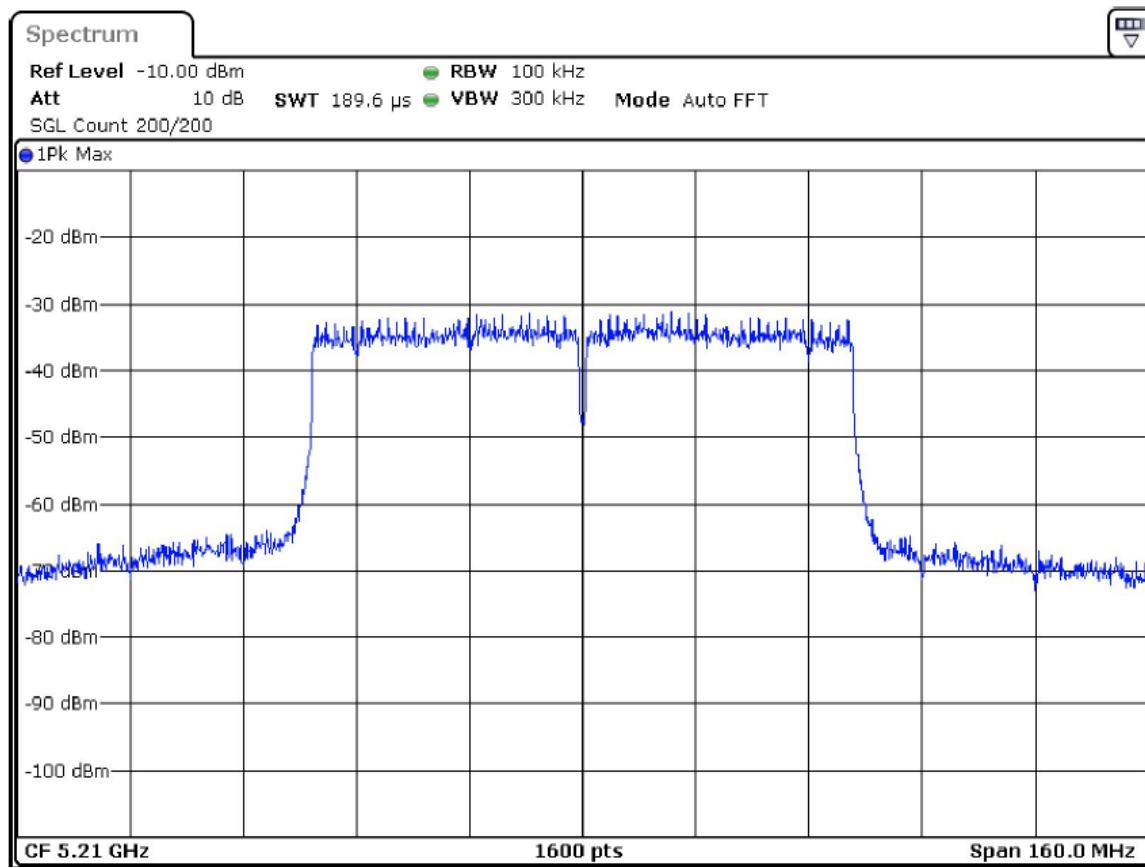
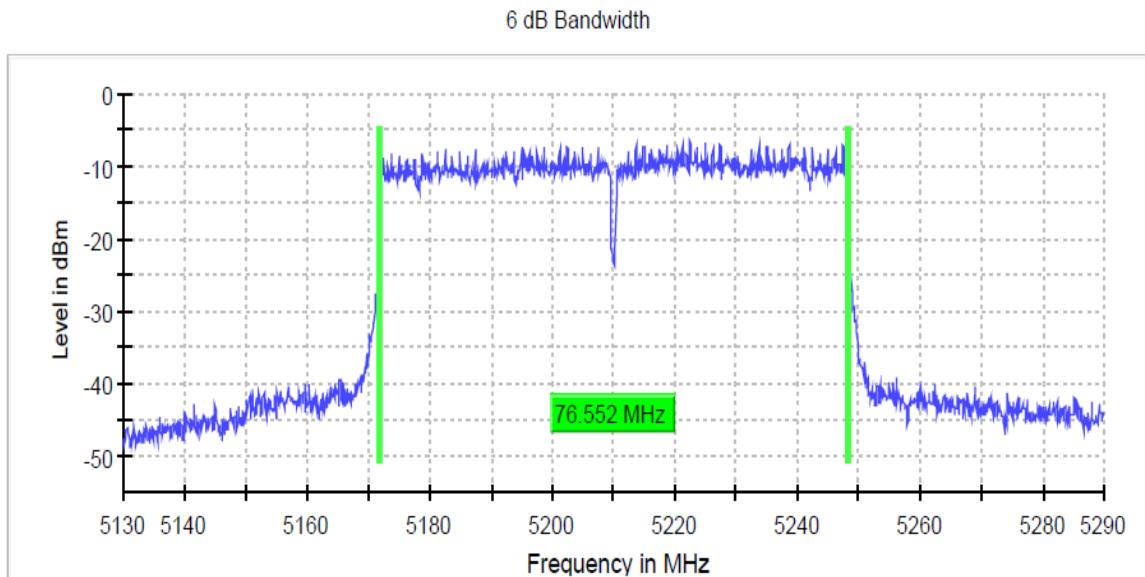


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FCC/RSS-247 UNII-3

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 48 Mbps	5745.00	16.458853	0.5	5736.72069	5753.17955
802.11n(HT20) MSC0	5745.00	17.655860	0.5	5736.12219	5753.77805
802.11ac(VHT20) MCS2	5745.00	17.855361	0.5	5736.02244	5753.87780
802.11n(HT40) MSC7	5755.00	36.654183	0.5	5736.62297	5773.27715
802.11ac(VHT40) MCS9	5755.00	36.654183	0.5	5736.62297	5773.27715
802.11ac(VHT80) MCS8	5775.00	76.652092	0.5	5736.62398	5813.27607
802.11a 48 Mbps	5785.00	16.658354	0.5	5776.62094	5793.27930
802.11n(HT20) MSC0	5785.00	17.755611	0.5	5776.02244	5793.77805
802.11ac(VHT20) MCS2	5785.00	17.855361	0.5	5776.02244	5793.87780
802.11n(HT40) MSC7	5795.00	36.654183	0.5	5776.62297	5813.27715
802.11ac(VHT40) MCS9	5795.00	36.654183	0.5	5776.62297	5813.27715
802.11a 48 Mbps	5825.00	16.458853	0.5	5816.72069	5833.17955
802.11n(HT20) MSC0	5825.00	17.755611	0.5	5816.02244	5833.77805
802.11ac(VHT20) MCS2	5825.00	17.855361	0.5	5816.02244	5833.87780



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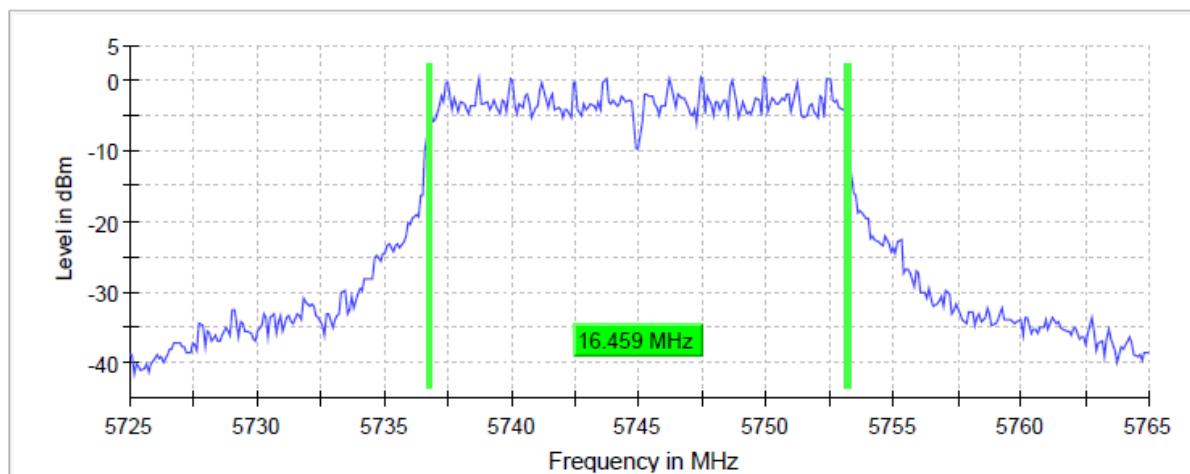


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Testing Cert. No. 1627-01

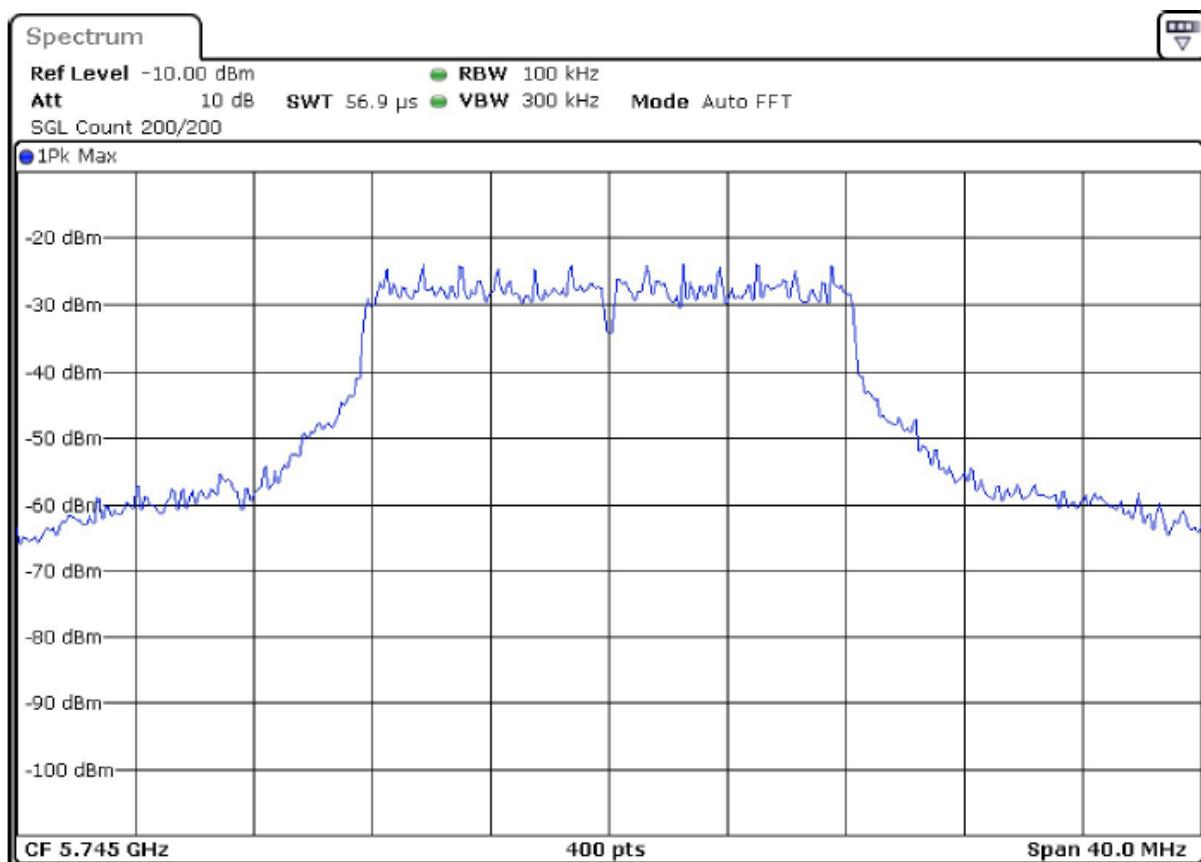
802.11a 48 Mbps 5745MHz

6 dB Bandwidth



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802.11n(HT20) MCS0 5825MHz

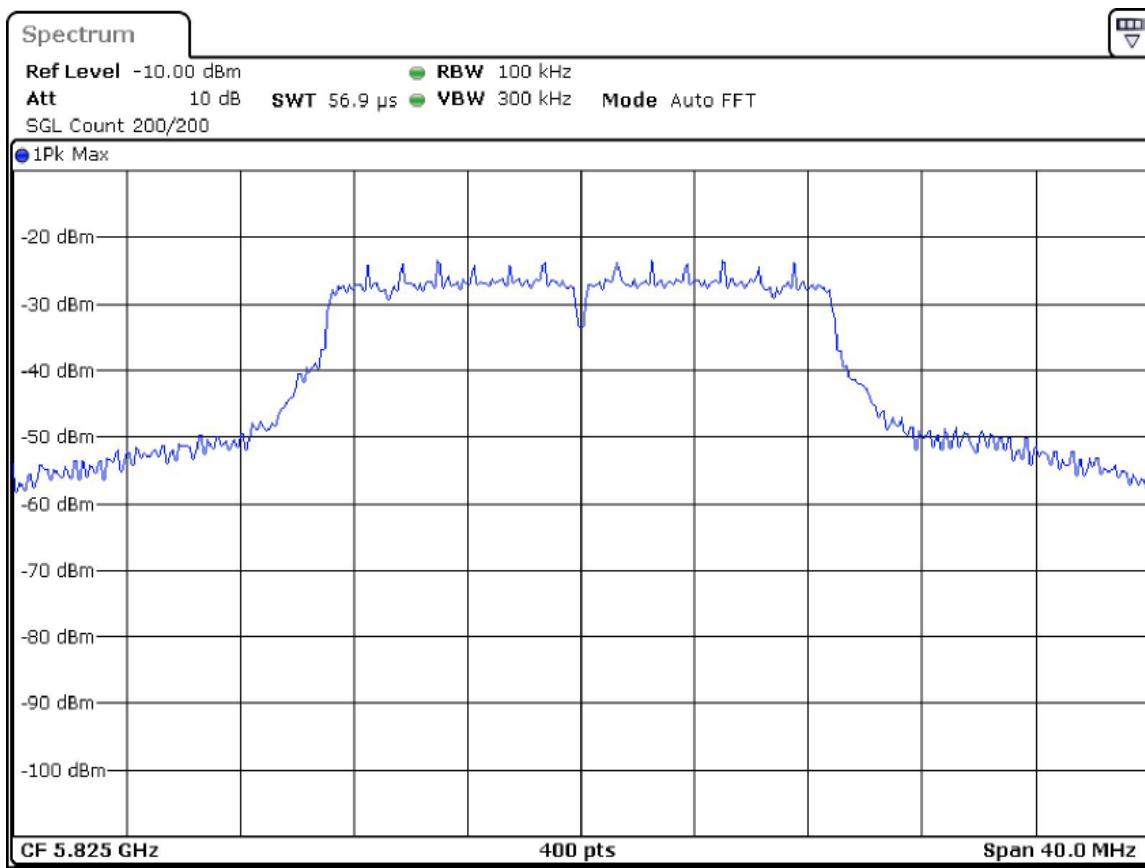
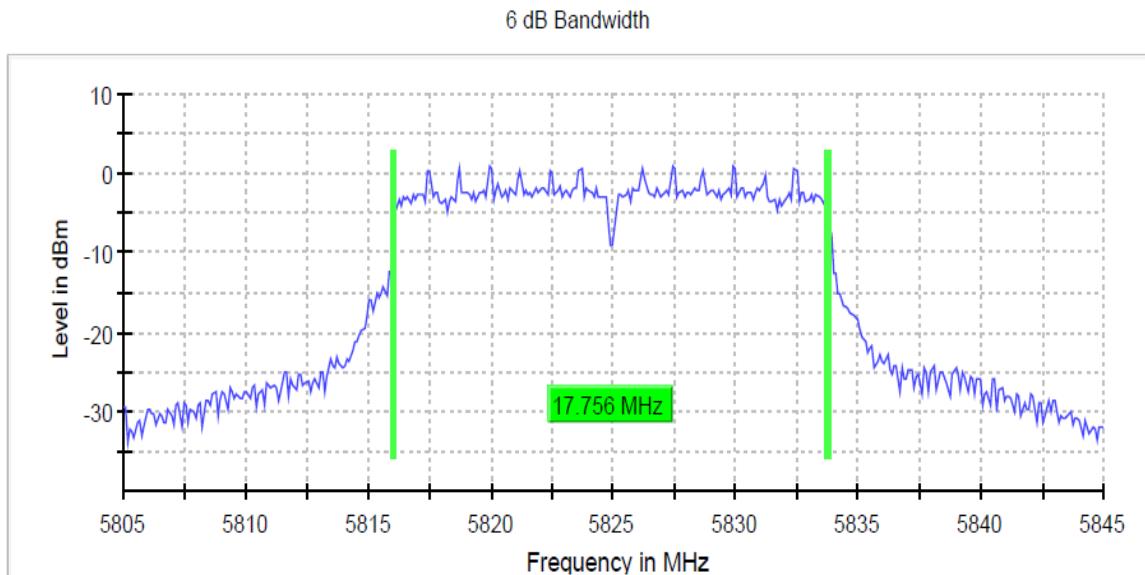


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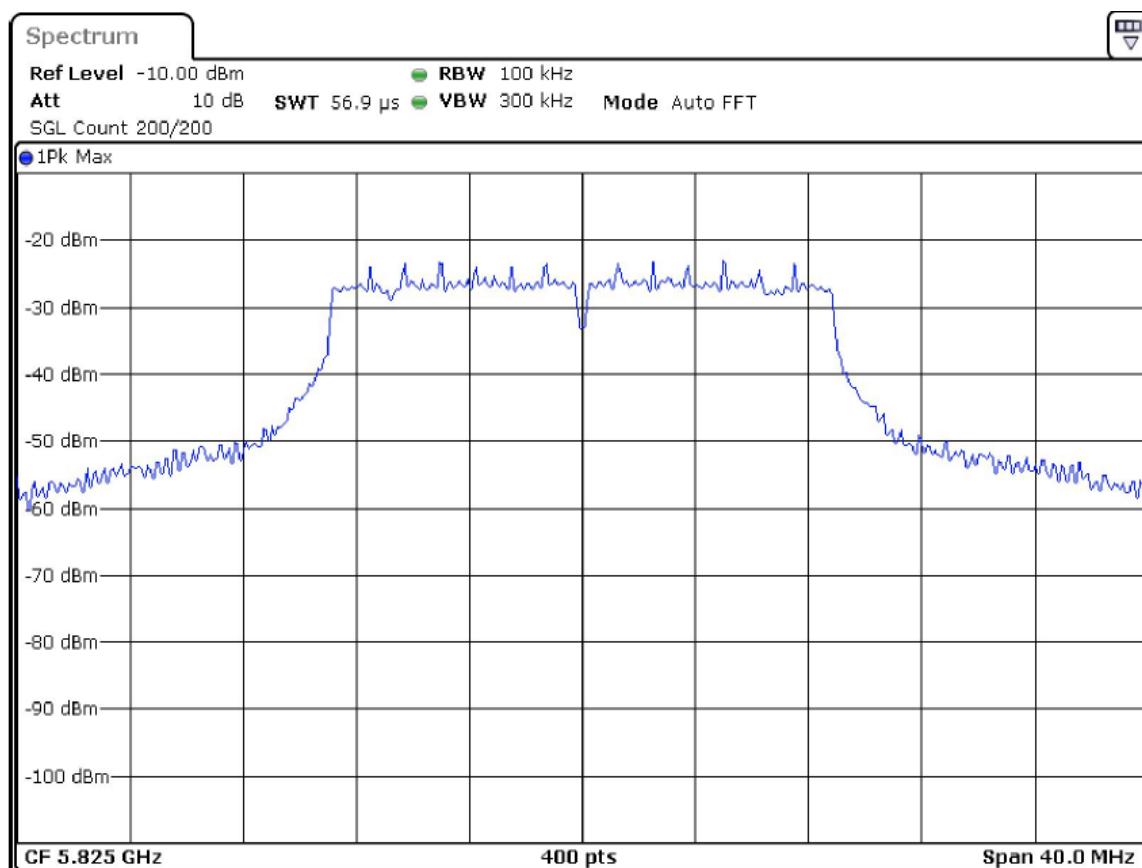
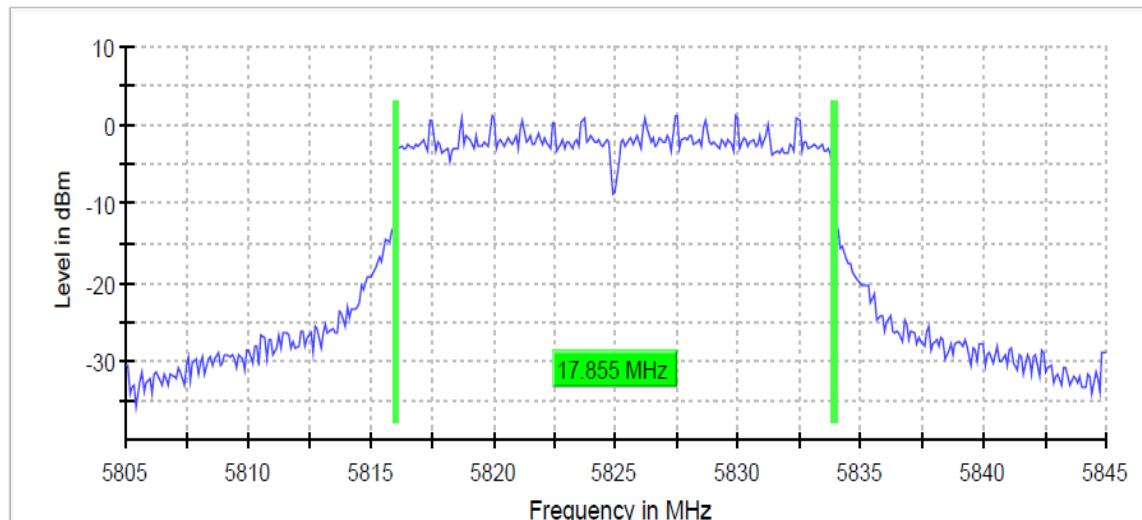
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802.11ac(VHT20) MCS2 5825MHz

6 dB Bandwidth



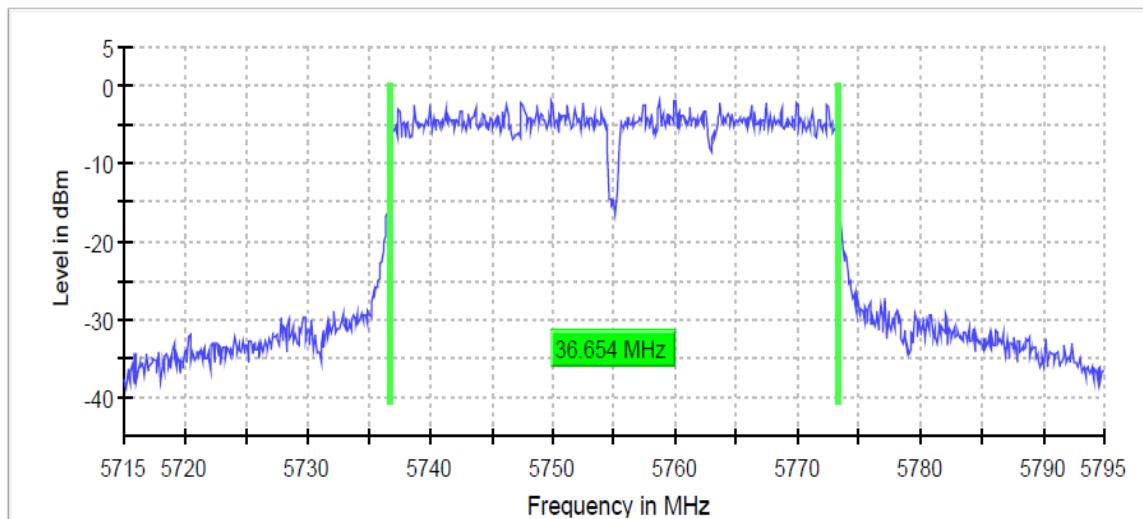
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802.11n(HT40) MCS7 5755MHz

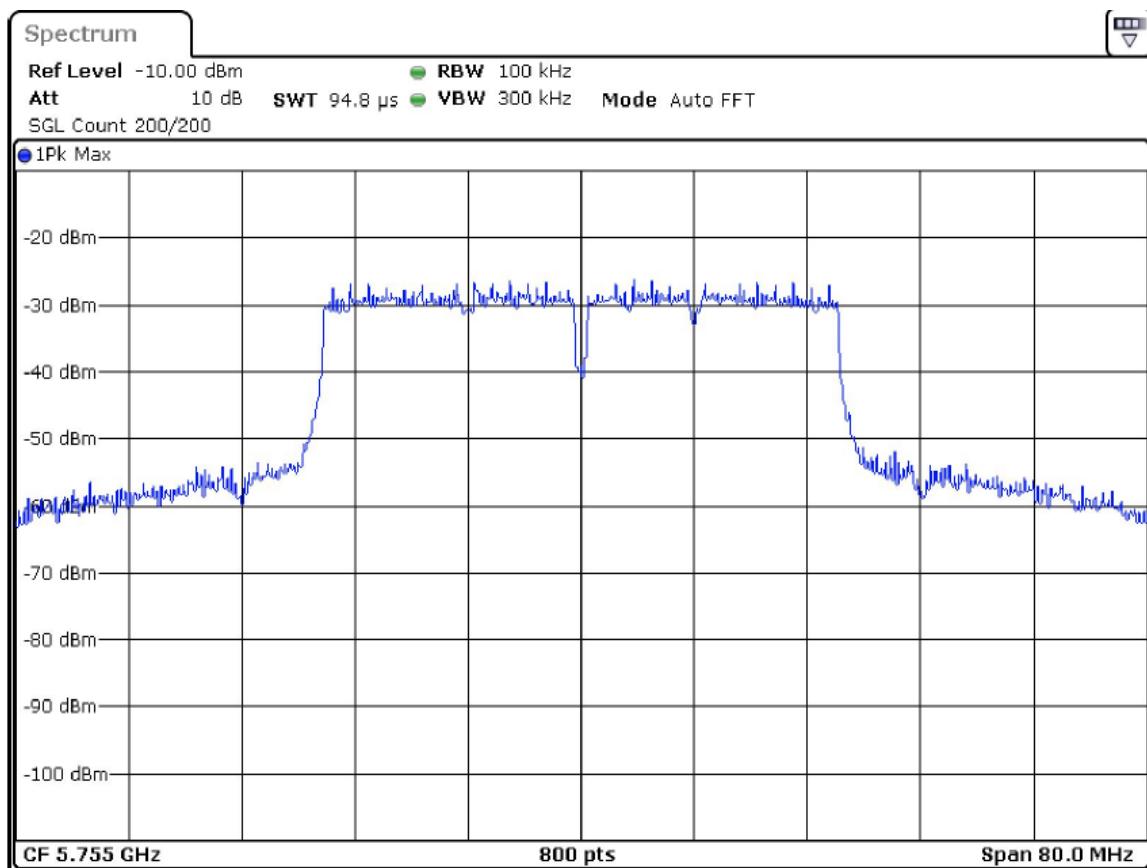
6 dB Bandwidth



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802.11ac(VHT40) MCS9 5755MHz

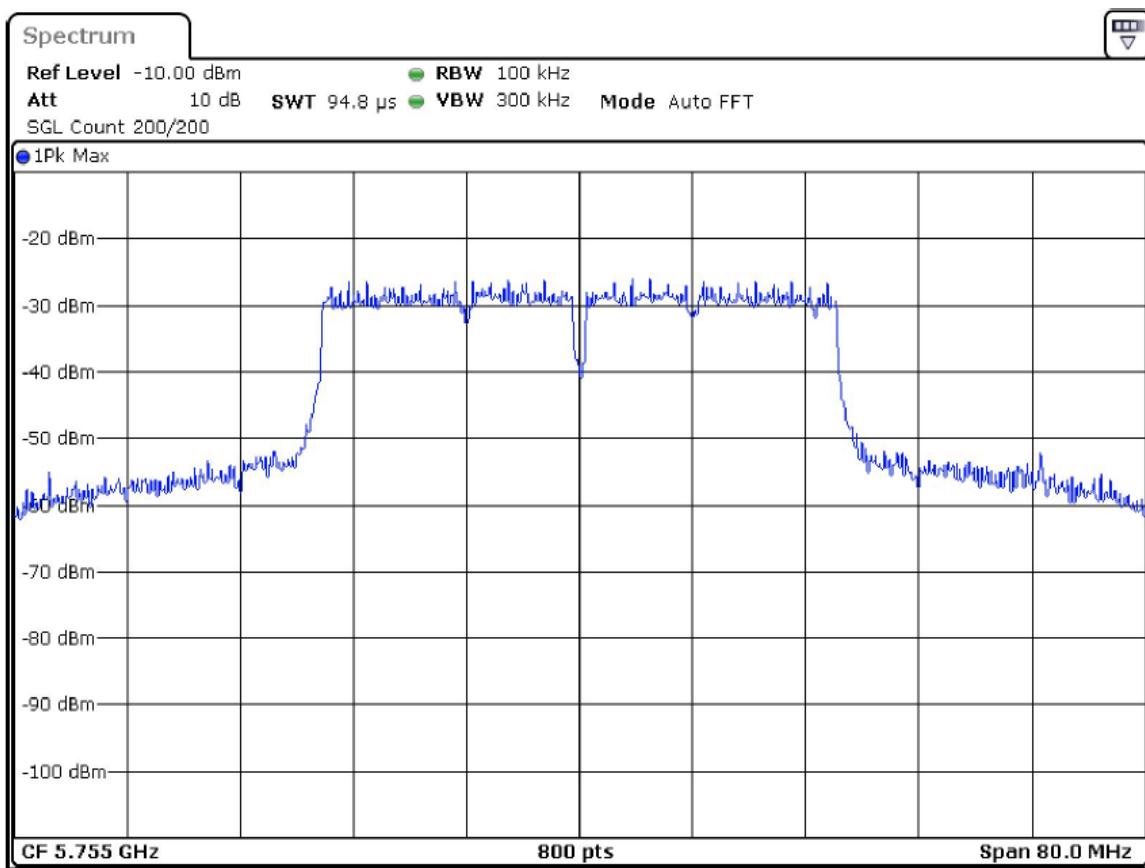
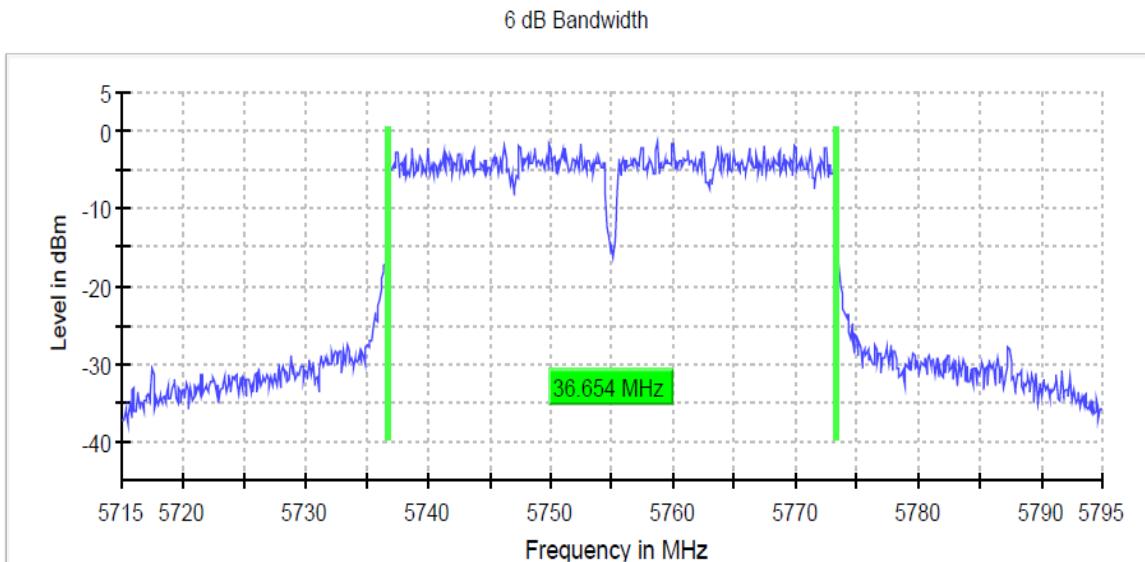


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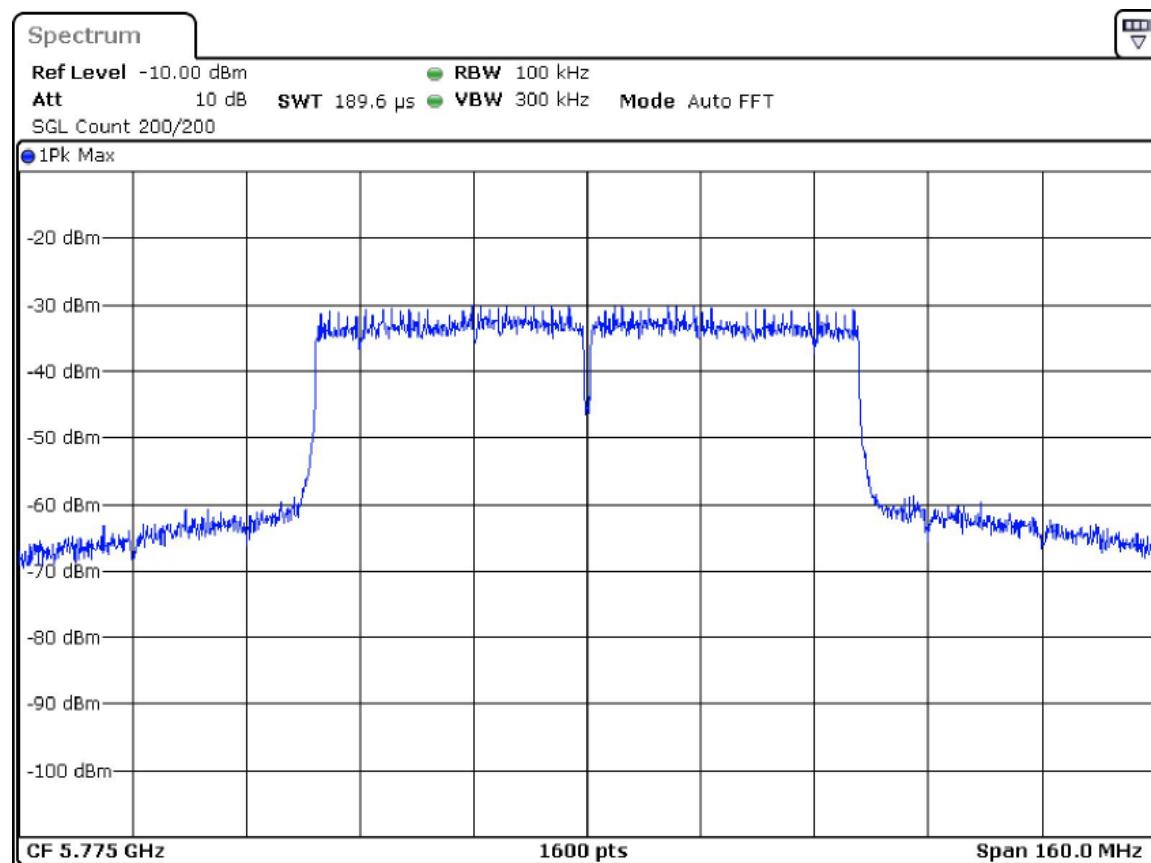
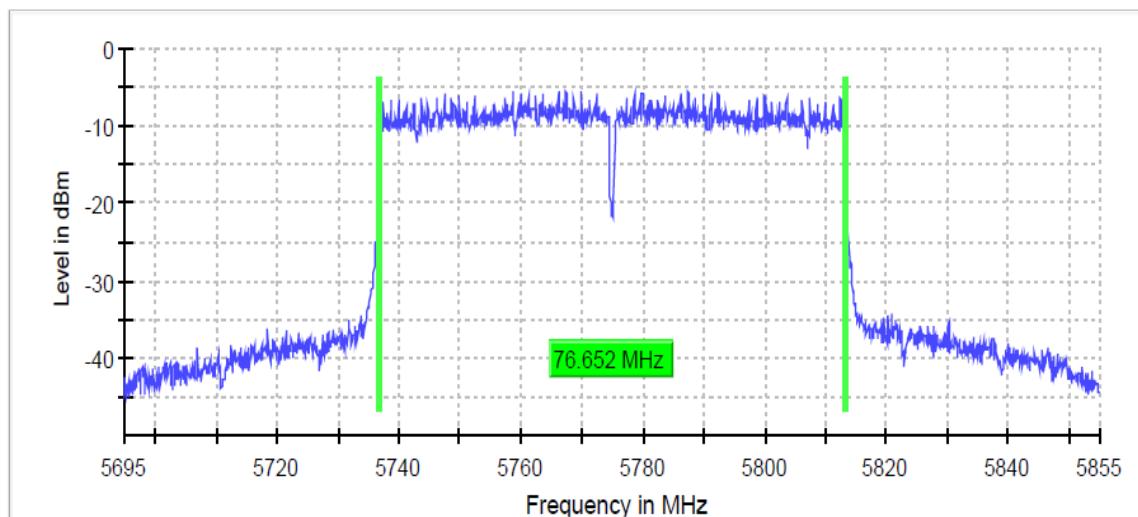
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802.11ac(VHT80) MCS8 5775MHz

6 dB Bandwidth



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Occupied Channel Bandwidth 99%

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.D.

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

FCC/RSS-247 UNII-1

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 18 Mbps	5180.000	17.014925	5171.194030	5188.208955	5150-5250
802.11n(HT20) MSC2	5180.000	18.208955	5170.597015	5188.805970	5150-5250
802.11ac(VHT20) MCS2	5180.000	18.208955	5170.597015	5188.805970	5150-5250
802.11n(HT40) MSC6	5190.000	36.273292	5171.614907	5207.888199	5150-5250
802.11ac(VHT40) MCS9	5190.000	36.273292	5171.614907	5207.888199	5150-5250
802.11a 18 Mbps	5200.000	17.014925	5191.194030	5208.208955	5150-5250
802.11n(HT20) MSC2	5200.000	18.208955	5190.597015	5208.805970	5150-5250
802.11ac(VHT20) MCS2	5200.000	18.507463	5190.597015	5209.104478	5150-5250
802.11ac(VHT80) MSC9	5210.000	76.521739	5171.242236	5247.763975	5150-5250
802.11n(HT40) MCS6	5230.000	36.273292	5211.614907	5247.888199	5150-5250
802.11ac(VHT40) MCS9	5230.000	36.273292	5211.614907	5247.888199	5150-5250
802.11a 18 Mbps	5240.000	17.014925	5231.194030	5248.208955	5150-5250
802.11n(HT20) MSC2	5240.000	18.507463	5230.597015	5249.104478	5150-5250
802.11ac(VHT20) MCS2	5240.000	17.910448	5230.895522	5248.805970	5150-5250



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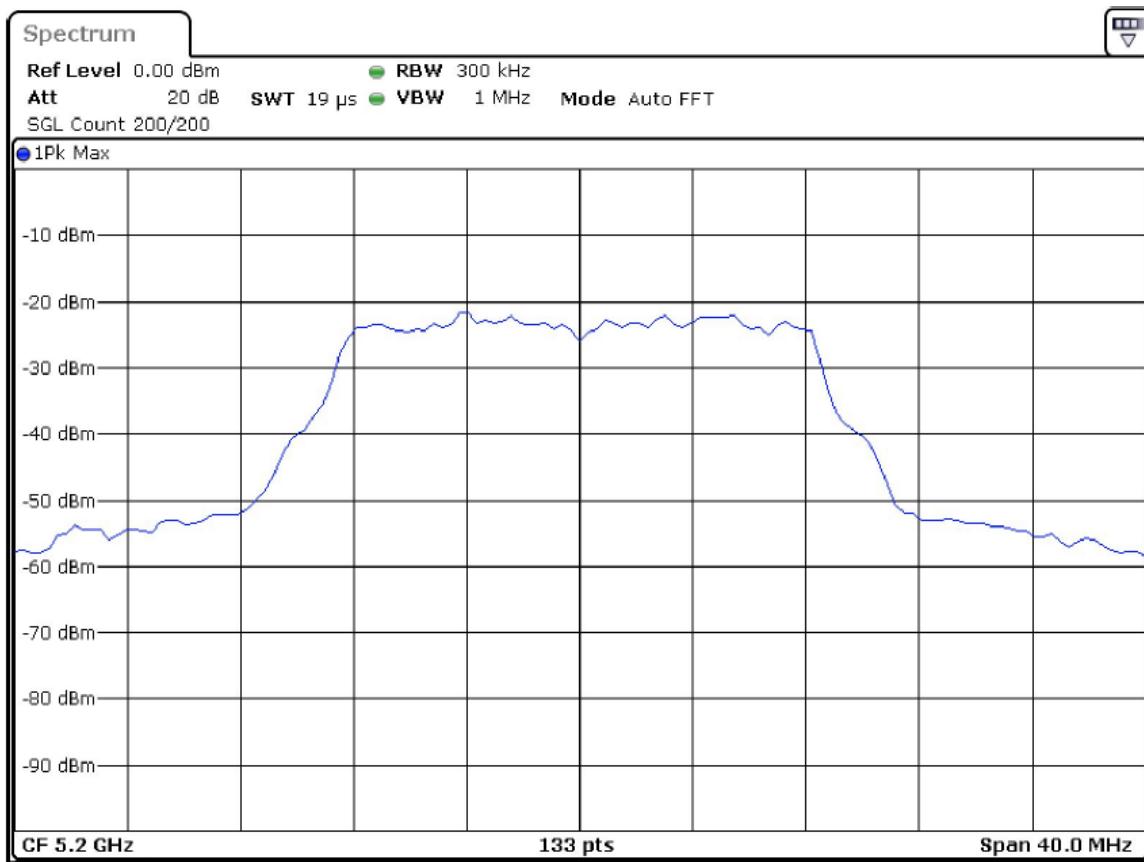
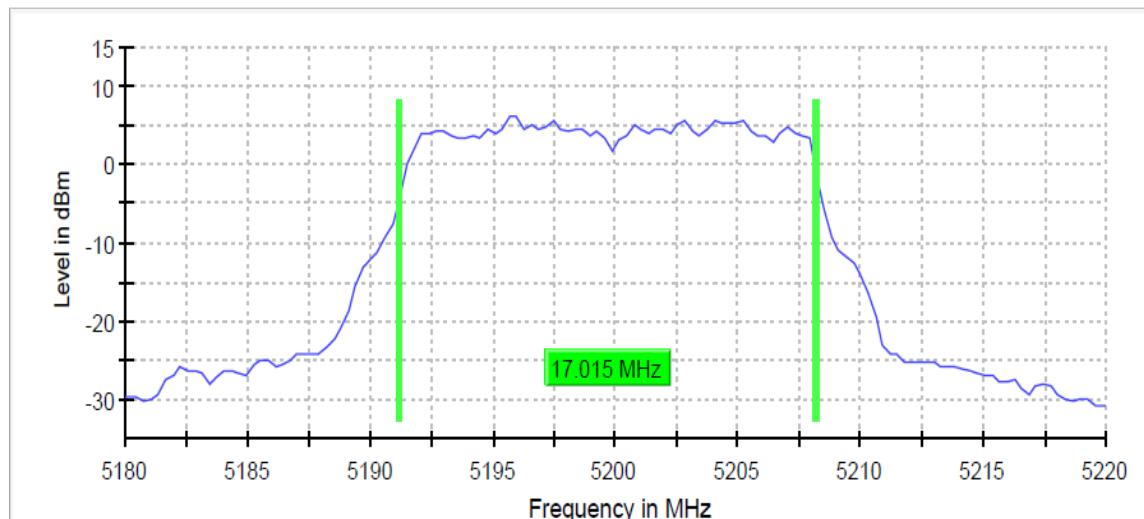


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802.11a 18 Mbps 5200MHz

99 % Bandwidth



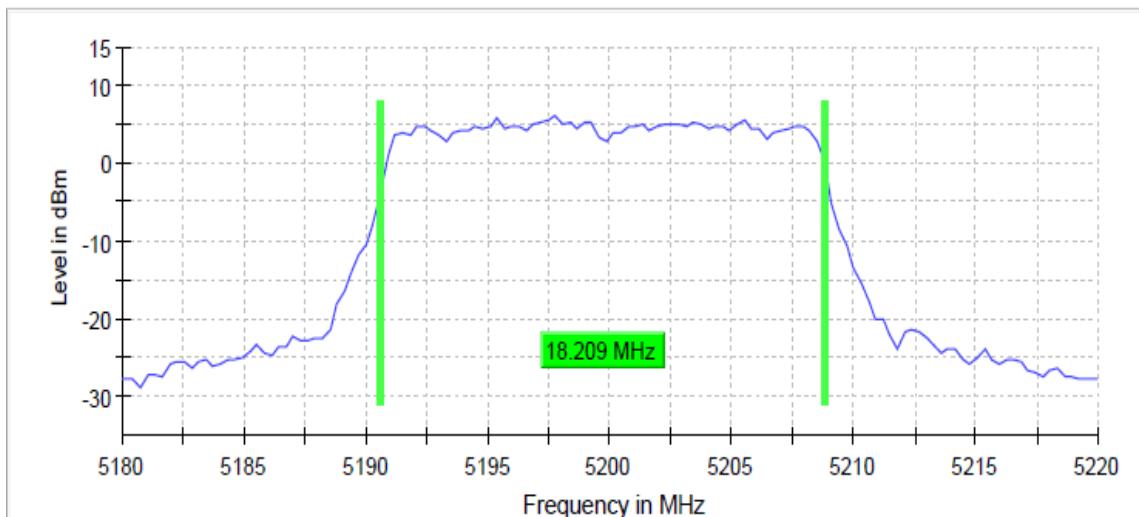
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802.11n(HT20) MCS2 5200MHz

99 % Bandwidth

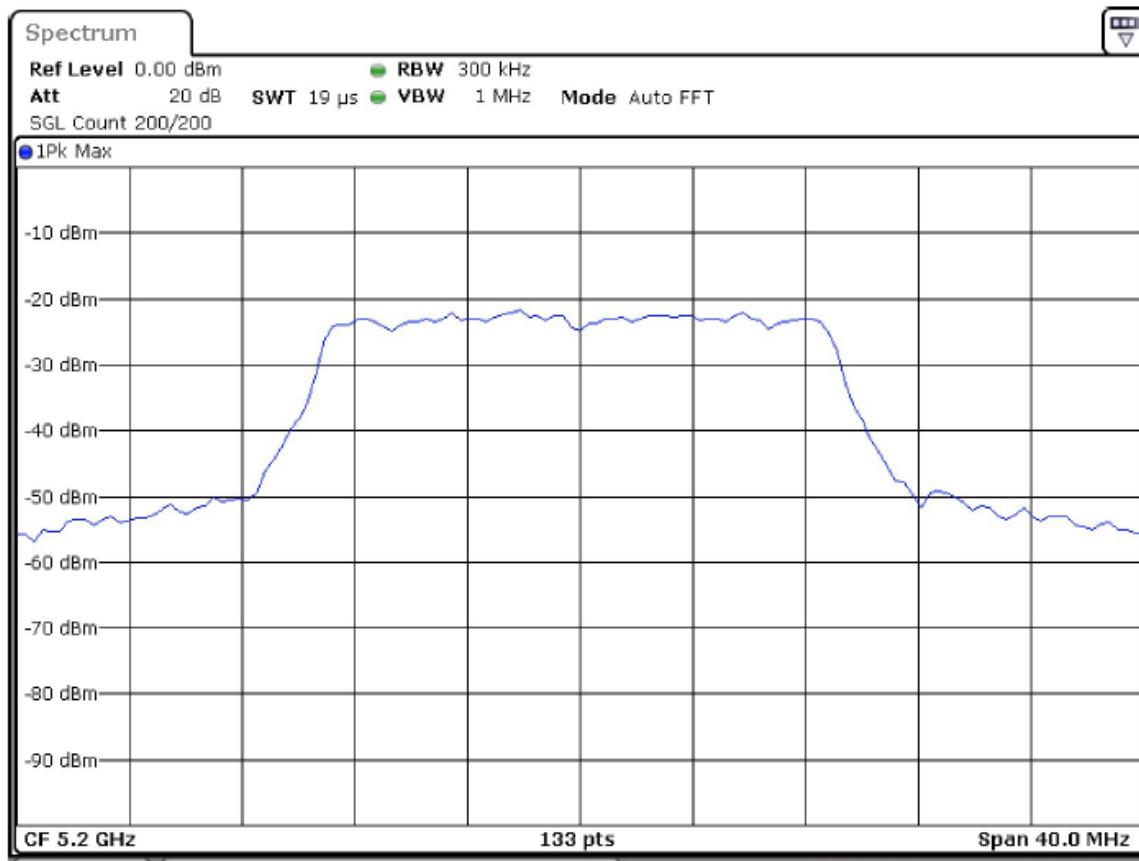


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802.11ac(VHT20) MCS2 5200MHz

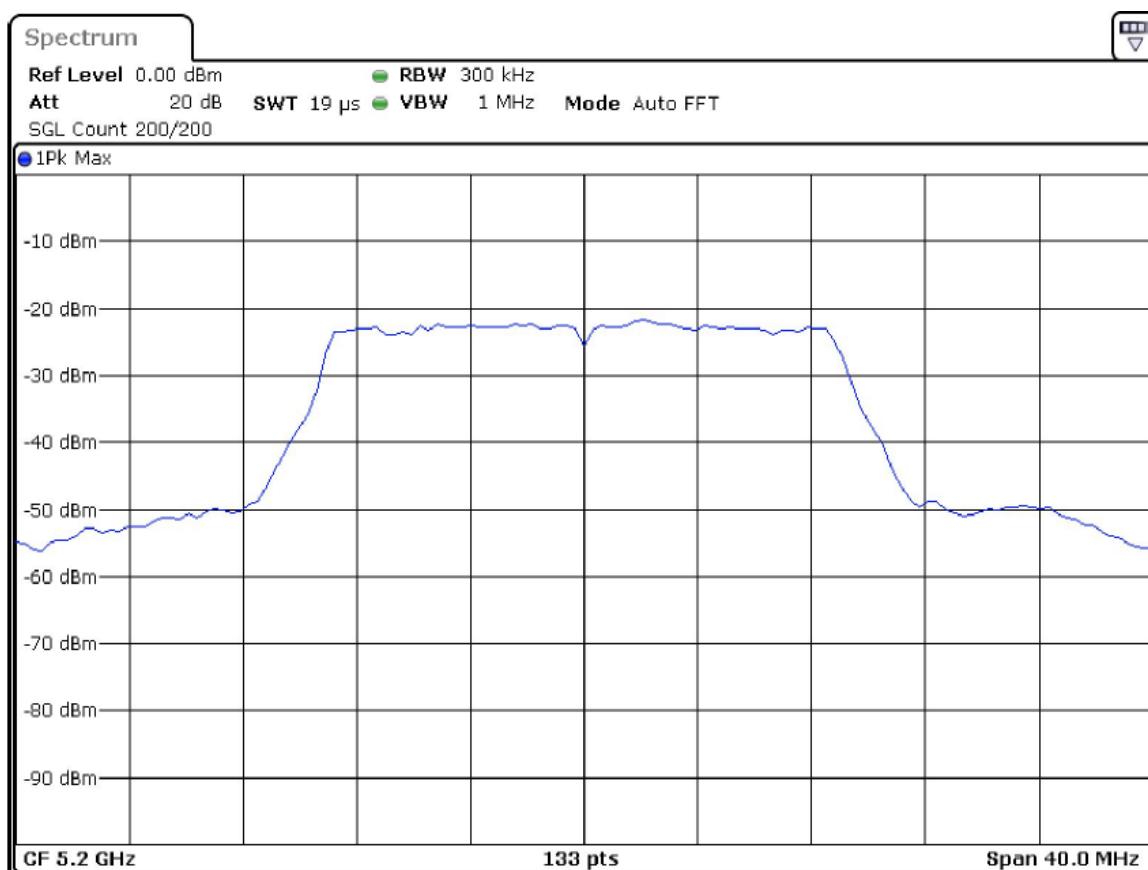
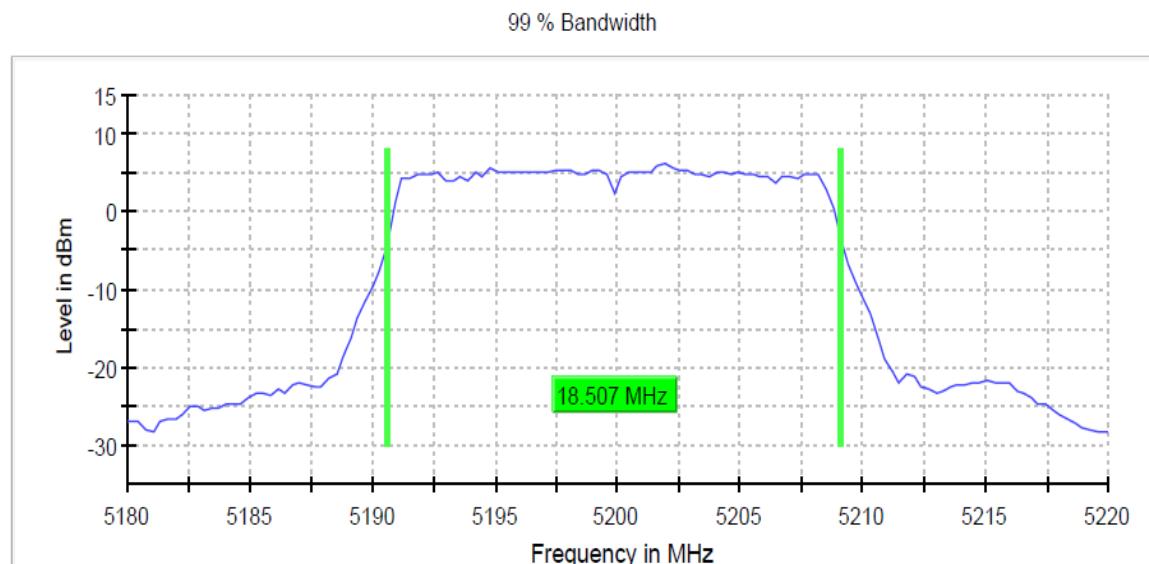


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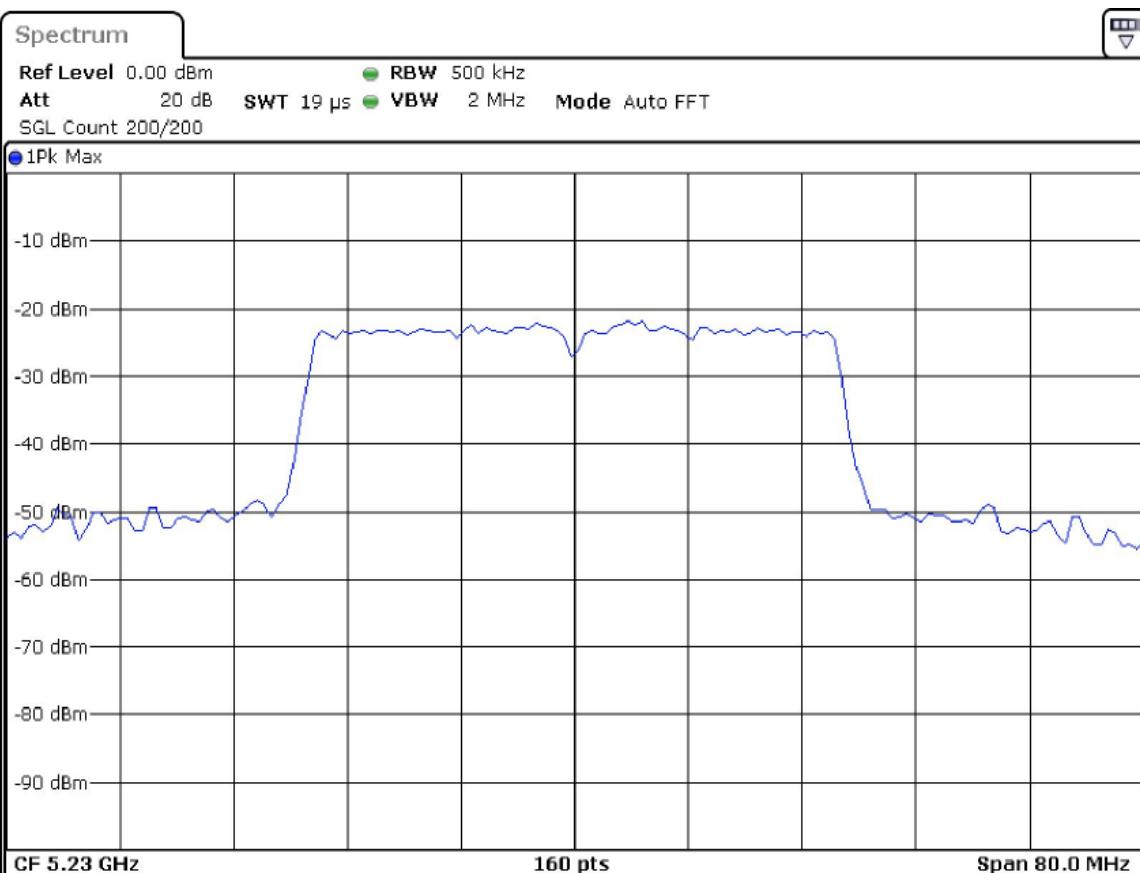
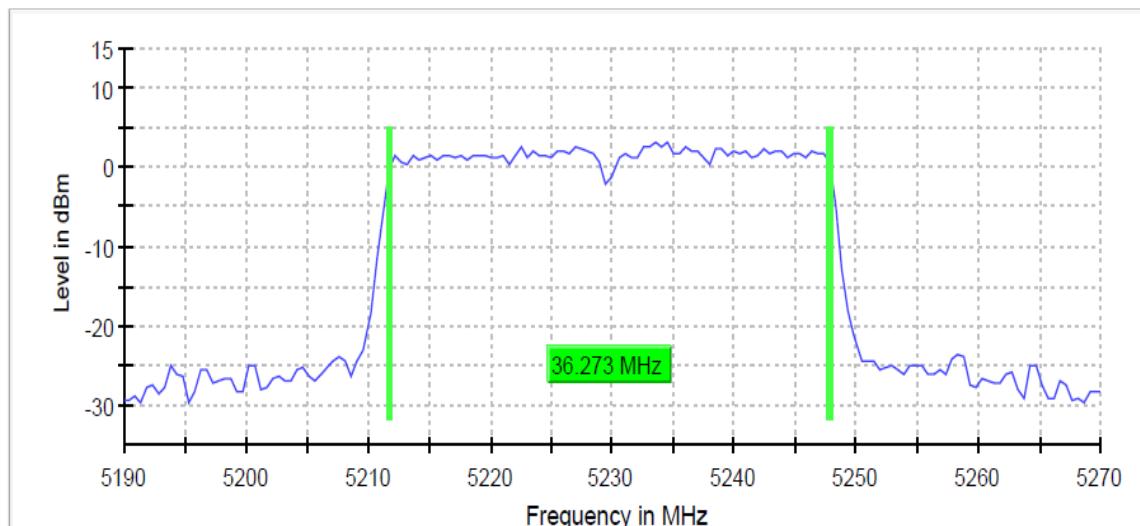
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802.11n(HT40) MCS6 5230MHz

99 % Bandwidth



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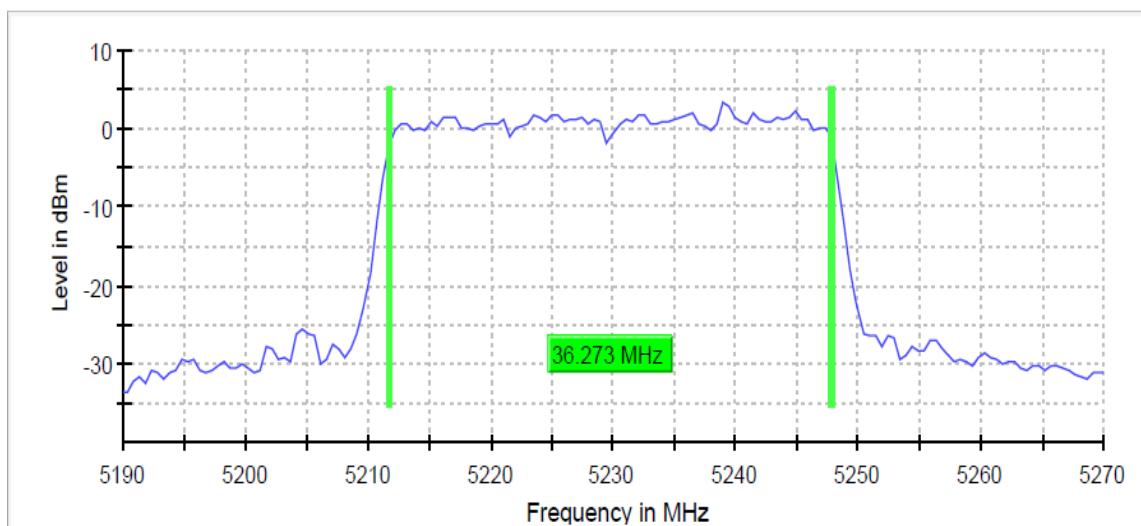


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Testing Cert. No. 1627-01

802.11ac(VHT40) MCS9 5230MHz

99 % Bandwidth



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Testing Cert. No. 1627-01



802.11ac(VHT80) MCS9 5210MHz

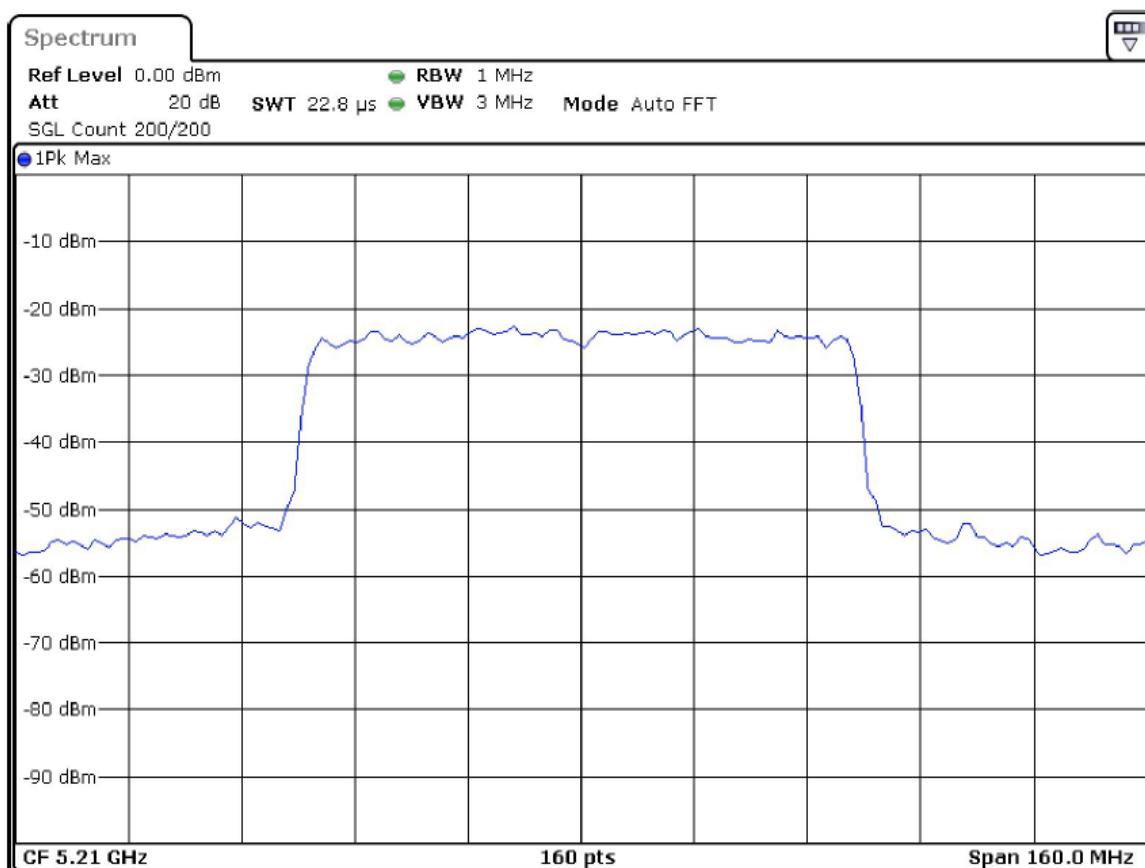
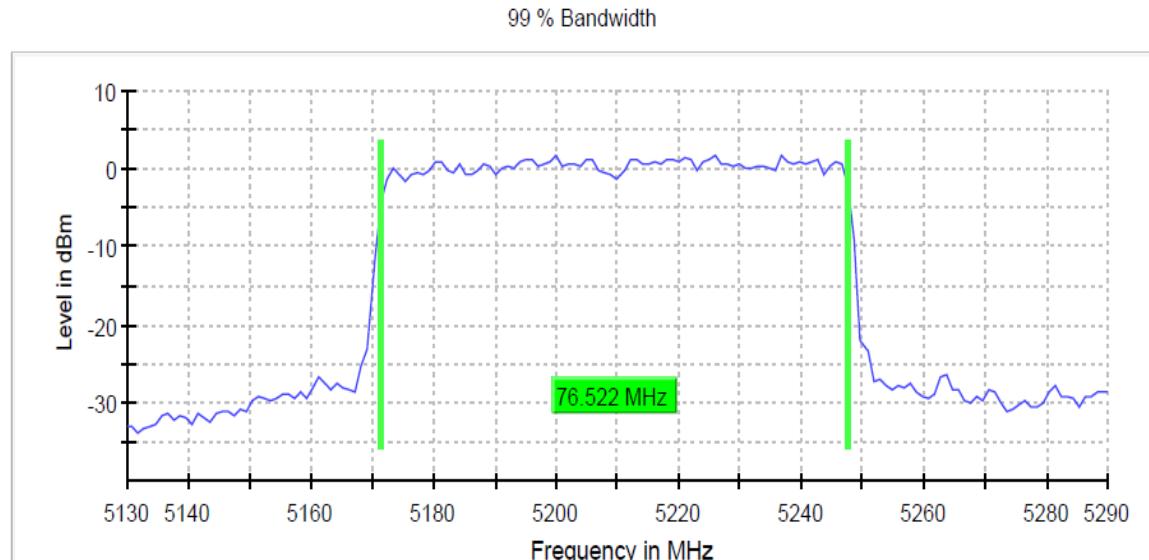


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FCC/RSS-247 UNII-3

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 48 Mbps	5745.00	16.716418	5736.492537	5753.208955	5725-5850
802.11n(HT20) MSC0	5745.00	18.507463	5735.597015	5754.104478	5725-5850
802.11ac(VHT20) MCS2	5745.00	18.507463	5735.597015	5754.104478	5725-5850
802.11n(HT40) MSC7	5755.00	36.273292	5736.614907	5772.888199	5725-5850
802.11ac(VHT40) MCS9	5755.00	36.654183	5736.622971	5773.277154	5725-5850
802.11ac(VHT80) MCS8	5775.00	76.521739	5736.242236	5812.763975	5725-5850
802.11a 48 Mbps	5785.00	17.014925	5776.194030	5793.208955	5725-5850
802.11n(HT20) MSC0	5785.00	18.507463	5775.597015	5794.104478	5725-5850
802.11ac(VHT20) MCS2	5785.00	18.507463	5775.597015	5794.104478	5725-5850
802.11n(HT40) MSC7	5795.00	36.273292	5776.614907	5812.888199	5725-5850
802.11ac(VHT40) MCS9	5795.00	36.770187	5776.118012	5812.888199	5725-5850
802.11a 48 Mbps	5825.00	16.716418	5816.492537	5833.208955	5725-5850
802.11n(HT20) MSC0	5825.00	18.507463	5815.597015	5834.104478	5725-5850
802.11ac(VHT20) MCS2	5825.00	18.507463	5815.597015	5834.104478	5725-5850



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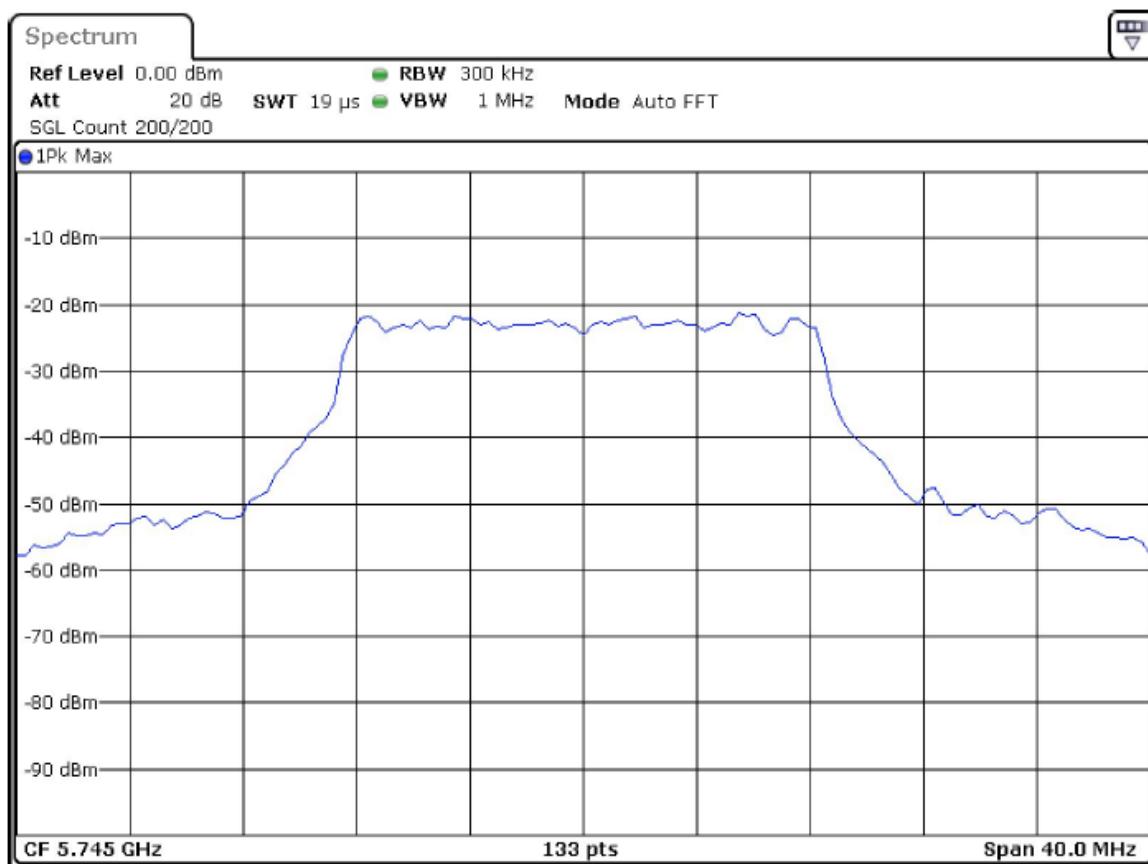
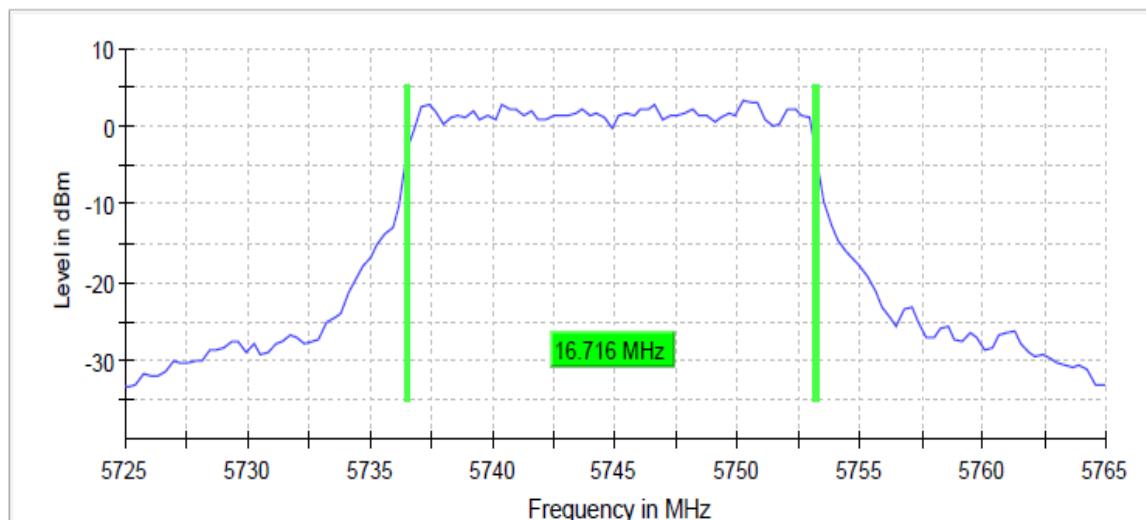


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Testing Cert. No. 1627-01

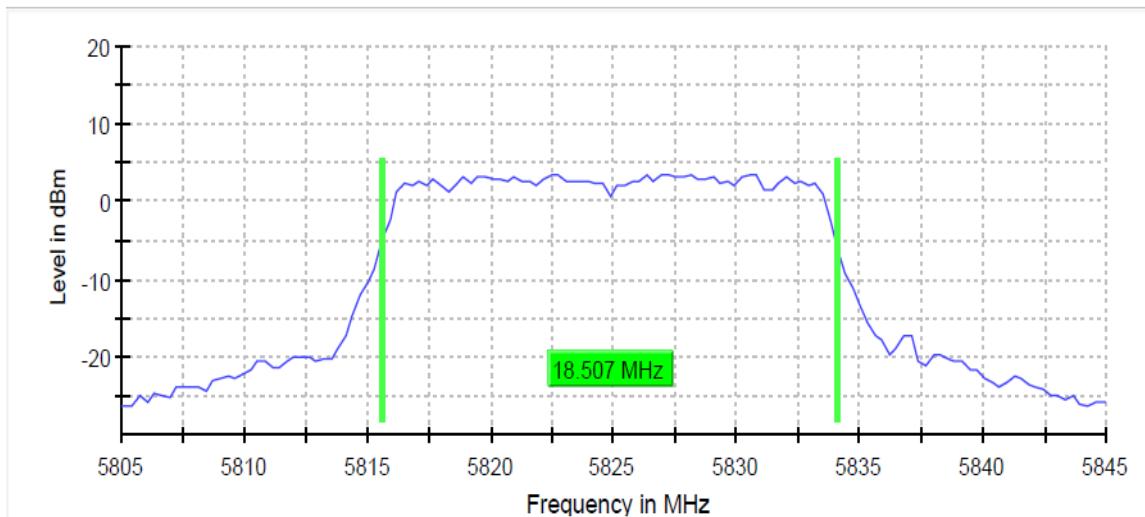
802.11a 48 Mbps 5745MHz

99 % Bandwidth



802.11n(HT20) MCS0 5825MHz

99 % Bandwidth



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802.11ac(VHT20) MCS2 5825MHz

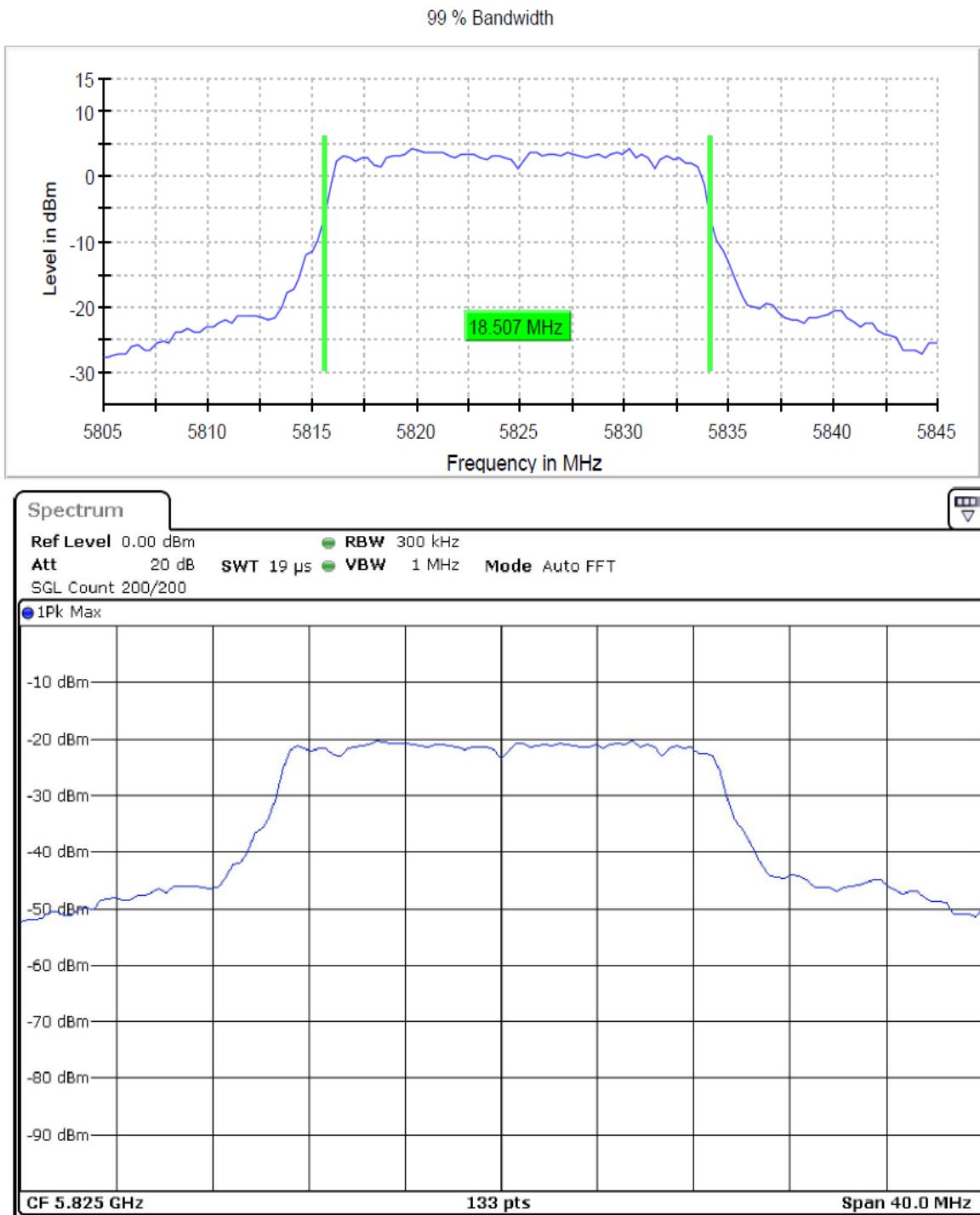


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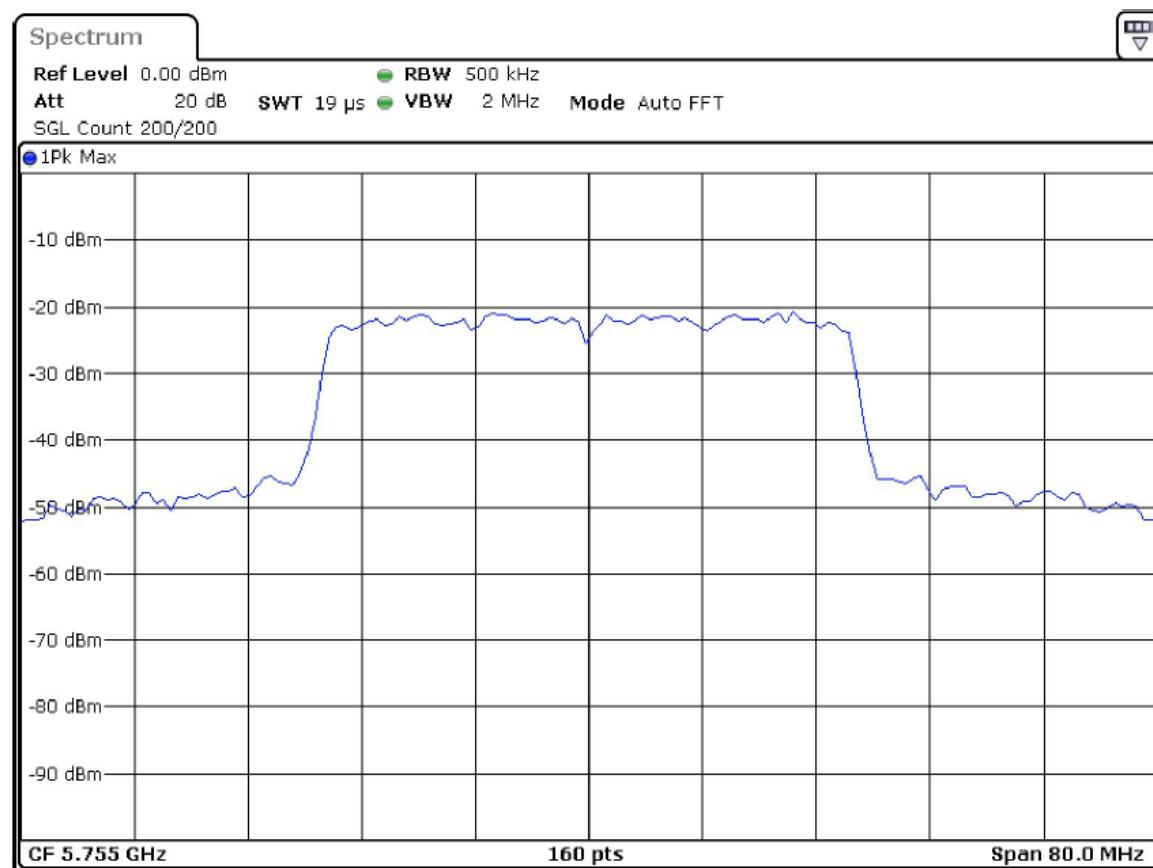
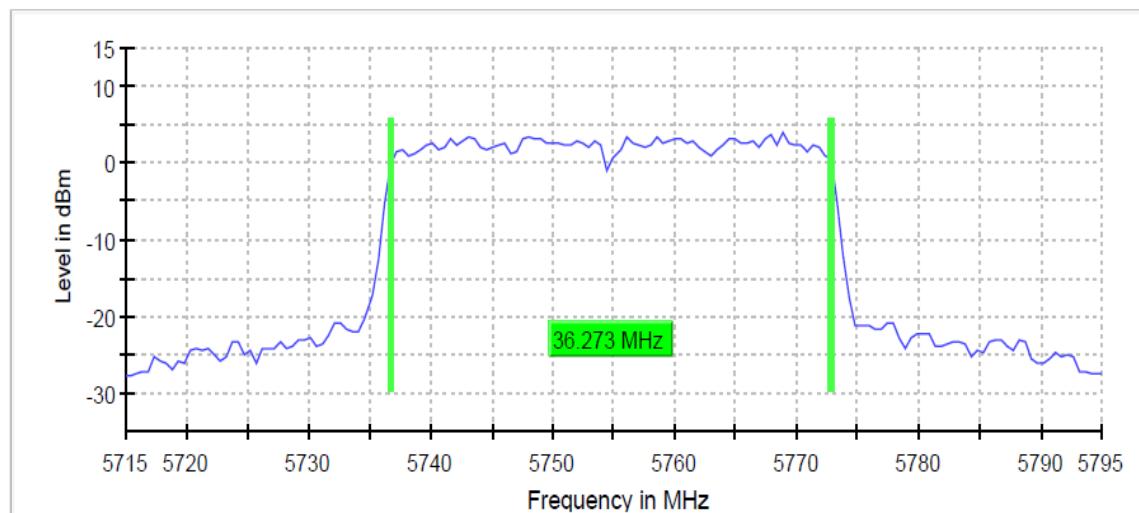
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802.11n(HT40) MCS7 5755MHz

99 % Bandwidth

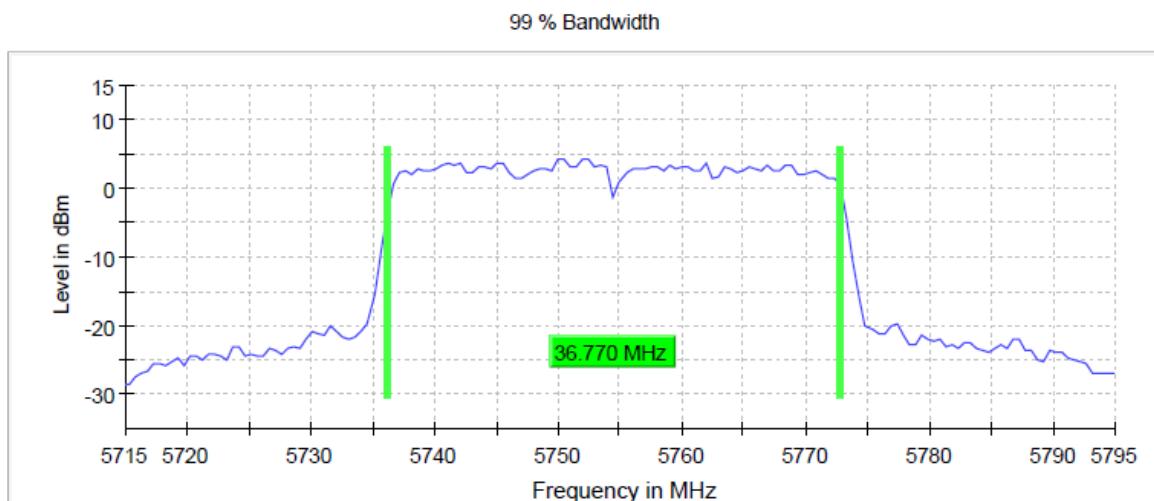


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802.11ac(VHT40) MCS9 5755MHz

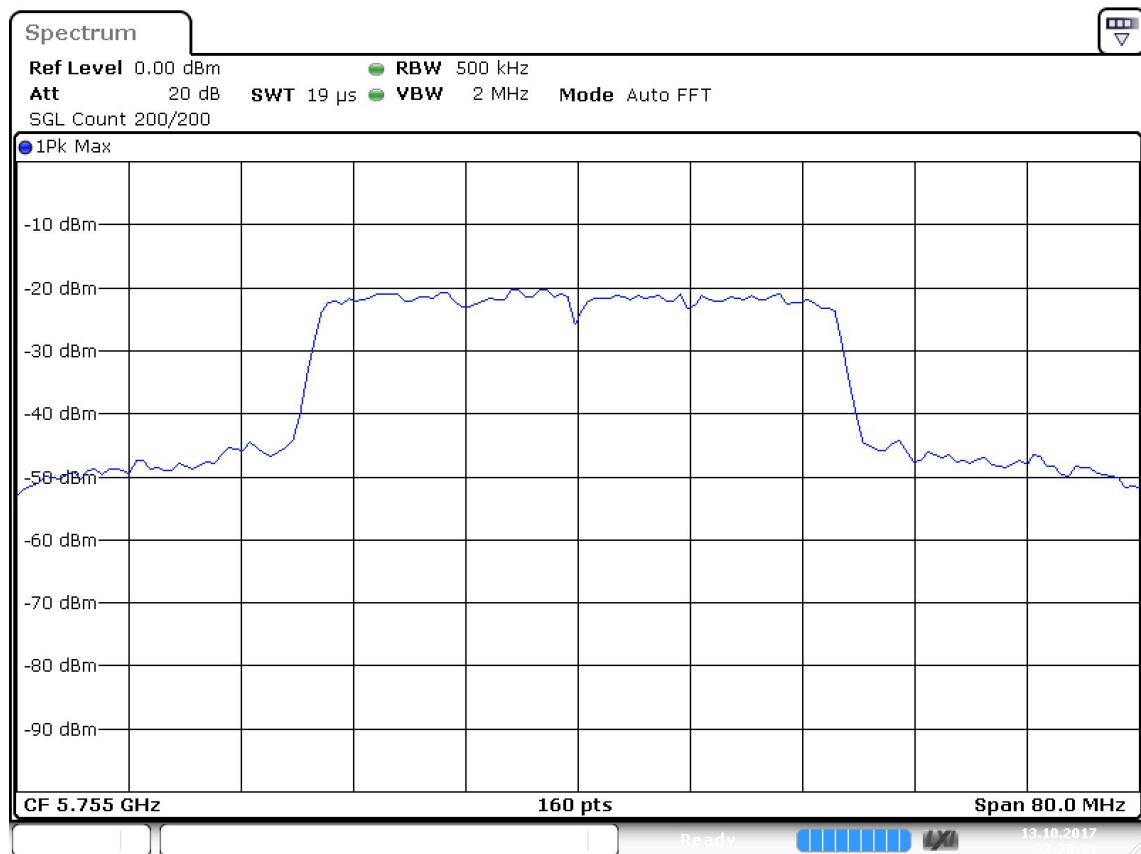


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Date: 13.OCT.2017 23:20:31



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802.11ac(VHT80) MCS8 5775MHz

99 % Bandwidth

