Test Report

Curtis-Straus LLC, *a wholly owned subsidiary of BV CPS*

Report No	ER2501-13
Client	Harman International Industries, Incorporated
Address	30001 Cabot Drive Novi, MI 48377
Phone	248-254-7751
Items tested	GEN3.1 HIGH VA
FCC ID	2AHPN-BE2838
IC	6434C-BE2838
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	October 20th to November 10th, 2017
Results	As detailed within this report
Prepared by	Zachary Johnson – EMC Engineer
Authorized by	Yunus Faziloglu – Sr. Engineer
Issue Date	11/28/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 27 of this report.

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Report REV Sep-08-2017 - YF

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 G3.1 High. It is a transmitter that operates in the following bands:
5.15GHz – 5.25GHz
5.725GHz – 5.85GHz

Antenna Type: PCB Trace
Gain: Maximum -1.77dBi maximum peak

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

Test samples were received in good condition.

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 testing the device in the in-vehicle setup orientation and varying the test antenna's height and polarity.

EUT operating voltage is 13.5V 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:	R2501		
Company:	Harman International Industries, Incorporated		
Company Address:	30001 Cabot Drive		
	Novi, MI, 48377		
Contact:	Mark Bowman		
	MN	**PN**	**SN**
EUT:	GEN3.1 High VA		
EUT Description:	Car Stereo System		

EUT Components	**MN**	**SN**
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 main	Power DC	2	2	Power DC	No	No	1.2	in	yes	
Audio		1	1	-	No	No	1.2	in	yes	
USB		3	1	USB	Yes	No	1	in	yes	Redundant
GPS antenna		1	1	Coaxial	Yes	No	1.3	in	yes	
FM/AM antenna	-	1	1		Yes	No	0.4	in	yes	
Back up camera		1	1		Yes	No	0.3	in	yes	
Dab/xm		1	1	Coaxial	Yes	No	1	in	yes	

Software Operating Mode Description:

EUT may be operating in 1 of 2 modes. For immunity, EUT will connect with a CMW and operate as normal with traffic while doing emissions scans eut will operate by transmitting a constant signal. For Bluetooth eut will still need to be connected to CMW.

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

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 PCB trace antenna with -1.77dBi maximum peak 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. EUT is vehicle battery powered only.

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

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.

All results below are for the in-vehicle setup orientation only.

MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)
30.681	27.1	-14.3	12.8	40	-27.2	PASS		40	-27.2	PASS	
95.66	37.7	-25.8	11.9	43.5	-31.6	PASS		43.5	-31.6	PASS	
129.303	29.5	-20.7	8.8	43.5	-34.8	PASS		43.5	-34.8	PASS	
131.197	31.1	-20.8	10.3	43.5	-33.2	PASS		43.5	-33.2	PASS	
243.008	42.7	-22.8	19.9	46	-26.1	PASS	-26.1	46	-26.1	PASS	-26.1
952.602	25.1	-7.5	17.6	46	-28.4	PASS		46	-28.4	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)
30.138	27.9	-13.9	14.1	40	-25.9	PASS	-25.9	40	-25.9	PASS	-25.9
48.034	33.6	-26.3	7.3	40	-32.7	PASS		40	-32.7	PASS	
95.336	41.2	-25.9	15.3	43.5	-28.2	PASS		43.5	-28.2	PASS	
215.983	40.2	-24.1	16.1	43.5	-27.4	PASS		43.5	-27.4	PASS	
672.032	30.4	-11.9	18.4	46	-27.6	PASS		46	-27.6	PASS	
934.754	25.5	-7.5	18	46	-28	PASS		46	-28	PASS	

30-1000MHz Low Channel Unii 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
2403.2	46.7	39.1	-10.4	36.2	74	-37.7	PASS		28.7	54	-25.3	PASS	-25.3
2414.6	45.1	38	-10.4	34.7	74	-39.3	PASS		27.6	54	-26.4	PASS	
2432.5	45.5	37	-10.3	35.2	74	-38.8	PASS		26.7	54	-27.3	PASS	
2445.2	48	36.4	-10.3	37.7	74	-36.2	PASS		26.1	54	-27.8	PASS	
2463	46	37	-10.3	35.8	74	-38.2	PASS		26.7	54	-27.3	PASS	
2479.1	72.5	36.2	-10.2	62.3	74	-11.7	PASS	-11.7	26	54	-28	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2408.3	46.3	36.7	-10.4	35.9	74	-38.1	PASS		26.3	54	-27.6	PASS	
2438.9	46.7	40.9	-10.3	36.3	74	-37.6	PASS		30.6	54	-23.4	PASS	
2446.4	47.3	38.6	-10.3	37	74	-37	PASS		28.3	54	-25.7	PASS	
2474.5	46.2	38.3	-10.2	36	74	-38	PASS		28.1	54	-25.9	PASS	
4981.7	44.4	35	-1.4	43	74	-31	PASS		33.5	54	-20.4	PASS	
5514.5	43.6	34.5	-0.3	43.4	74	-30.6	PASS	-30.6	34.3	54	-19.7	PASS	-19.7

1-6GHz Low Channel Unii 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 24.2°C; 26%RH; 1008mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 46 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
2403.2	46.7	39.1	-10.4	36.2	74	-37.7	PASS		28.7	54	-25.3	PASS	-25.3
2414.6	45.1	38	-10.4	34.7	74	-39.3	PASS		27.6	54	-26.4	PASS	
2432.5	45.5	37	-10.4	35.2	74	-38.8	PASS		26.7	54	-27.3	PASS	
2445.2	48	36.4	-10.4	37.7	74	-36.2	PASS		26.1	54	-27.8	PASS	
2463	46	37	-10.3	35.8	74	-38.2	PASS		26.7	54	-27.3	PASS	
2479.1	72.5	36.2	-10.3	62.3	74	-11.7	PASS	-11.7	26	54	-28	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 24.2°C; 26%RH; 1008mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 46 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2408.3	46.3	36.7	-10.4	35.9	74	-38.1	PASS		26.3	54	-27.6	PASS	
2438.9	46.7	40.9	-10.4	36.3	74	-37.6	PASS		30.6	54	-23.4	PASS	
2446.4	47.3	38.6	-10.4	37	74	-37	PASS		28.3	54	-25.7	PASS	
2474.5	46.2	38.3	-10.3	36	74	-38	PASS		28.1	54	-25.9	PASS	
4981.7	44.4	35	-1.8	43	74	-31	PASS		33.5	54	-20.4	PASS	
5514.5	43.6	34.5	-0.5	43.4	74	-30.6	PASS	-30.6	34.3	54	-19.7	PASS	-19.7

1-6GHz High Channel Unii 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
14004.8	42.4	34.3	11.9	54.2	83.5	-29.3	PASS		46.1	63.5	-17.4	PASS	
14426.3	43.6	34.6	10.7	54.3	83.5	-29.2	PASS		45.3	63.5	-18.2	PASS	
15134	44	36.3	7.6	51.6	83.5	-31.9	PASS		43.8	63.5	-19.7	PASS	
15508.9	45.4	36.8	6.3	51.6	83.5	-31.9	PASS		43.1	63.5	-20.4	PASS	
17517	42.1	33.8	16.6	58.7	83.5	-24.8	PASS		50.4	63.5	-13.1	PASS	
17969.7	42.7	33	18.9	61.5	83.5	-22	PASS	-22	51.9	63.5	-11.6	PASS	-11.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 38 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
13957.6	41.2	33.1	11.9	53.1	83.5	-30.4	PASS		45	63.5	-18.5	PASS	
14351.8	43.8	34.2	10.7	54.5	83.5	-29	PASS		44.9	63.5	-18.6	PASS	
15106.3	47	35.8	7.8	54.7	83.5	-28.8	PASS		43.6	63.5	-19.9	PASS	
15514.4	44.6	36.9	6.3	50.8	83.5	-32.7	PASS		43.1	63.5	-20.4	PASS	
17472.7	43.7	34.3	16.1	59.8	83.5	-23.7	PASS		50.4	63.5	-13.1	PASS	
17963.2	41.6	33	18.9	60.4	83.5	-23.1	PASS	-23.1	51.8	63.5	-11.7	PASS	-11.7

6-18GHz Low Channel Unii 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 46 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
14004.8	42.4	34.3	11.9	54.2	83.5	-29.3	PASS		46.1	63.5	-17.4	PASS	
14426.3	43.6	34.6	10.7	54.3	83.5	-29.2	PASS		45.3	63.5	-18.2	PASS	
15134	44	36.3	7.6	51.6	83.5	-31.9	PASS		43.8	63.5	-19.7	PASS	
15508.9	45.4	36.8	6.3	51.6	83.5	-31.9	PASS		43.1	63.5	-20.4	PASS	
17517	42.1	33.8	16.6	58.7	83.5	-24.8	PASS		50.4	63.5	-13.1	PASS	
17969.7	42.7	33	18.9	61.5	83.5	-22	PASS	-22	51.9	63.5	-11.6	PASS	-11.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5150-5350MHz
EUT Maximum Frequency - 802.11ac 40MHz MCS 1

Spurious TX Mode 802.11ac 40MHz MCS1 CH 46 filtering 5150-53505MHz

Data Taken at November 16 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
13957.6	41.2	33.1	11.9	53.1	83.5	-30.4	PASS		45	63.5	-18.5	PASS	
14351.8	43.8	34.2	10.7	54.5	83.5	-29	PASS		44.9	63.5	-18.6	PASS	
15106.3	47	35.8	7.8	54.7	83.5	-28.8	PASS		43.6	63.5	-19.9	PASS	
15514.4	44.6	36.9	6.3	50.8	83.5	-32.7	PASS		43.1	63.5	-20.4	PASS	
17472.7	43.7	34.3	16.1	59.8	83.5	-23.7	PASS		50.4	63.5	-13.1	PASS	
17963.2	41.6	33	18.9	60.4	83.5	-23.1	PASS	-23.1	51.8	63.5	-11.7	PASS	-11.7

6-18GHz High Channel Unii 1

Radiated Emissions Table

Date: 15-Nov-17 **Company:** Harman **Work Order:** R2501
Engineer: Chris Hamel **EUT Desc:** GEN3.1 HIGH VA **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 22.3°C **Humidity:** 24% **Pressure:** 1018mBar
Frequency Range: 18-40 GHz **Measurement Distance:** 0.1 m
Notes: Combined 18-26.5GHz and 26.5-40GHz. No emissions found. **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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
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Table Result: Pass by N/A dB ***Worst Freq:*** N/A MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2323 **Cable 2:** --- **Cable 3:** ---
Analyzer: Gold **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.197
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor
Copyright Curtis-Straus LLC 2000

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 Emissions Calculator v 1.017.197
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor
Copyright Curtis-Straus LLC 2000

18-40GHz Low Channel Unii 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)
152.683	28.8	-22.3	6.5	43.5	-37.1	PASS		43.5	-37.1	PASS	
237.38	31.1	-23	8.1	46	-37.9	PASS		46	-37.9	PASS	
430.4	28.3	-17.5	10.8	46	-35.2	PASS		46	-35.2	PASS	
790.922	30.4	-9.9	20.5	46	-25.6	PASS		46	-25.6	PASS	
798.087	42.7	-9.9	32.8	46	-13.2	PASS	-13.2	46	-13.2	PASS	-13.2
798.244	31.8	-9.9	21.9	46	-24.1	PASS		46	-24.1	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)
81.476	52	-27.2	24.8	40	-15.2	PASS		40	-15.2	PASS	
431.976	51.1	-17.1	34	46	-12	PASS	-12	46	-12	PASS	-12
448.358	45.7	-16.7	29	46	-17.1	PASS		46	-17.1	PASS	
511.527	43.9	-15.4	28.5	46	-17.5	PASS		46	-17.5	PASS	
797.938	42.5	-9.3	33.2	46	-12.8	PASS		46	-12.8	PASS	
798.269	34.3	-9.3	25	46	-21	PASS		46	-21	PASS	

30-1000MHz Mid Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1594.1	20.9	11.4	28.9	49.7	74	-24.3	PASS		40.2	54	-13.8	PASS	
2406.2	22.3	12.3	31.3	53.6	74	-20.4	PASS		43.6	54	-10.4	PASS	
2477.4	21.6	12.3	31.5	53.2	74	-20.8	PASS		43.9	54	-10.1	PASS	
3601	18.9	12.6	36	55	74	-19	PASS		48.7	54	-5.3	PASS	
3856.9	19.5	11.5	37	56.5	74	-17.5	PASS		48.4	54	-5.6	PASS	
5592.7	17.4	9.5	43.3	60.7	74	-13.3	PASS	-13.3	52.8	54	-1.2	PASS	-1.2

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1597.2	21.4	11.8	28.9	50.3	74	-23.7	PASS		40.6	54	-13.4	PASS	
2409.4	20.1	12.1	31.3	51.4	74	-22.6	PASS		43.4	54	-10.6	PASS	
2454.5	20.7	12.8	31.5	52.2	74	-21.8	PASS		44.3	54	-9.7	PASS	
3586.9	20.7	12.5	35.9	56.7	74	-17.3	PASS		48.4	54	-5.5	PASS	
3856.7	21.5	13.6	36.9	58.5	74	-15.5	PASS		50.5	54	-3.5	PASS	
5597.2	18.6	9.5	43.4	62	74	-11.9	PASS	-11.9	52.9	54	-1.1	PASS	-1.1

1-6GHz Low Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1420.2	46.3	37.9	-12.2	34.1	74	-39.9	PASS		25.7	54	-28.2	PASS	
2014.6	47.2	38.1	-9.8	37.4	74	-36.6	PASS		28.4	54	-25.6	PASS	
2463.4	48.7	37.6	-10	38.6	74	-35.4	PASS		27.6	54	-26.4	PASS	
3856.8	51	44.2	-5.2	45.8	74	-28.2	PASS		39.1	54	-14.9	PASS	-14.9
4614.1	44.7	37.3	-3.3	41.4	74	-32.6	PASS		34	54	-20	PASS	
5594.5	44.5	35.4	2.8	47.3	74	-26.7	PASS	-26.7	38.3	54	-15.7	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2441.3	44.4	36.5	-10.1	34.3	74	-39.7	PASS		26.4	54	-27.6	PASS	
2466.6	45.9	37.8	-10	35.8	74	-38.2	PASS		27.7	54	-26.3	PASS	
3856.6	52.7	46.4	-5.2	47.6	74	-26.4	PASS	-26.4	41.2	54	-12.7	PASS	-12.7
4202.9	46.5	36.9	-4.4	42.1	74	-31.9	PASS		32.5	54	-21.5	PASS	
4617	45.6	37.3	-3.3	42.3	74	-31.6	PASS		34	54	-20	PASS	
5599.8	44.3	35.2	3	47.3	74	-26.7	PASS		38.2	54	-15.8	PASS	

1-6GHz Mid Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1597.3	20.7	11.5	28.9	49.6	74	-24.4	PASS		40.4	54	-13.6	PASS	
2430.4	20.3	12.8	31.4	51.6	74	-22.3	PASS		44.2	54	-9.8	PASS	
3594.9	20.9	12.5	36	56.9	74	-17.1	PASS	-17.1	48.5	54	-5.4	PASS	-5.4
3855.7	19.1	10.4	36.9	56.1	74	-17.9	PASS		47.3	54	-6.6	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2435.3	21.5	12.2	31.4	52.9	74	-21.1	PASS		43.6	54	-10.4	PASS	
2462	21.6	14.2	31.5	53.1	74	-20.9	PASS		45.7	54	-8.3	PASS	
3542.4	21.4	12.4	35.6	57	74	-17	PASS		48	54	-6	PASS	
3856.8	20	12.4	36.9	56.9	74	-17.1	PASS		49.3	54	-4.6	PASS	
5586.3	18.3	9.5	43.1	61.3	74	-12.7	PASS	-12.7	52.6	54	-1.4	PASS	-1.4

1-6GHz High Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
6102.2	8.8	-0.3	40.7	49.5	83.5	-34	PASS		40.3	63.5	-23.2	PASS	
8456.5	7.7	-0.4	45	52.7	83.5	-30.8	PASS		44.7	63.5	-18.8	PASS	
11773.8	9.5	0.9	47.8	57.3	83.5	-26.2	PASS		48.7	63.5	-14.8	PASS	
13025.2	9.3	1.3	50	59.4	83.5	-24.1	PASS		51.4	63.5	-12.1	PASS	
13916.5	10.9	1.4	52.4	63.4	83.5	-20.1	PASS		53.9	63.5	-9.6	PASS	
17973.3	13.4	4.6	58.6	72	83.5	-11.5	PASS	-11.5	63.2	63.5	-0.3	PASS	-0.3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
8801.7	7.9	-0.9	45.7	53.6	83.5	-29.9	PASS		44.8	63.5	-18.7	PASS	
10186.1	9.7	0.5	45.6	55.3	83.5	-28.2	PASS		46	63.5	-17.5	PASS	
11711	10.6	1	47.8	58.4	83.5	-25.1	PASS		48.9	63.5	-14.6	PASS	
14182.4	11.9	2	52.2	64.1	83.5	-19.4	PASS		54.2	63.5	-9.3	PASS	
14584.3	11.4	2	50.5	61.9	83.5	-21.6	PASS		52.6	63.5	-10.9	PASS	
17863.6	13.8	4.8	58.5	72.3	83.5	-11.2	PASS	-11.2	63.3	63.5	-0.2	PASS	-0.2

6-18GHz Low Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	AV Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
13841.1	42.6	34.1	12.3	54.9	83.5	-28.6	PASS		46.4	63.5	-17.1	PASS	
16542.6	41.9	32.7	12.2	54.1	83.5	-29.4	PASS		44.9	63.5	-18.6	PASS	
16984.2	42.4	32.8	16.7	59.1	83.5	-24.4	PASS		49.6	63.5	-13.9	PASS	
17227.1	40.5	32.1	16.4	56.9	83.5	-26.6	PASS		48.6	63.5	-14.9	PASS	
17361	39.6	29.6	18.5	58.1	83.5	-25.4	PASS		48.1	63.5	-15.4	PASS	
17686.4	39.4	30.1	23.1	62.5	83.5	-21	PASS	-21	53.2	63.5	-10.3	PASS	-10.3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH 1
Conditions - 22.2°C; 24%RH; 1012mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11a 20MHz 48Mbps

Spurious TX Mode 802.11a 20MHz 48Mbps CH 157 filtering 5725-5875MHz

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
12674.8	44.4	34.5	10.4	54.8	83.5	-28.7	PASS		45	63.5	-18.5	PASS	
13870.1	42.1	33.4	12.3	54.4	83.5	-29.1	PASS		45.7	63.5	-17.8	PASS	
14468.3	40.8	32.6	11.7	52.5	83.5	-31	PASS		44.3	63.5	-19.2	PASS	
16976.5	42.4	32.9	16.6	59	83.5	-24.5	PASS		49.5	63.5	-14	PASS	
17218.3	41	32	16.3	57.2	83.5	-26.3	PASS		48.2	63.5	-15.3	PASS	
17683.2	39.1	30.4	23	62.1	83.5	-21.4	PASS	-21.4	53.4	63.5	-10.1	PASS	-10.1

6-18GHz Mid Channel Unii 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
9601.4	10.1	0.2	46.1	56.2	83.5	-27.3	PASS		46.3	63.5	-17.2	PASS	
10488.5	10.1	1.2	45.5	55.6	83.5	-27.9	PASS		46.7	63.5	-16.8	PASS	
11797.6	9.7	0.8	47.8	57.5	83.5	-26	PASS		48.6	63.5	-14.9	PASS	
12480.6	9.6	1.3	48.7	58.3	83.5	-25.2	PASS		50	63.5	-13.5	PASS	
13941.4	9.9	1.6	52.3	62.1	83.5	-21.4	PASS		53.9	63.5	-9.6	PASS	
17792.2	14.1	3.5	58.9	71.7	83.5	-10.6	PASS	-10.6	63.5	63.5	-1.2	Pass	-1.2

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:

Work Order - R2501
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.7°C; 25%RH; 1010mBar
Witnessed by - Filtering 5725-5875MHz
EUT Maximum Frequency - 802.11ac20 mcs8

EUT is Transmitting 5g 802.11ac20 mcs8. Filtering 5725-5875MHz.

Data Taken at November 14 2017

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim. FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim. FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
10460.2	11.6	3.9	45.5	57.1	83.5	-26.4	PASS		49.4	63.5	-14.1	PASS	
10532.1	10.7	0.9	45.6	56.3	83.5	-27.2	PASS		46.5	63.5	-17	PASS	
11849.3	10.9	0.9	47.9	58.9	83.5	-24.6	PASS		48.8	63.5	-14.7	PASS	
12507.5	9.8	1.3	48.8	58.7	83.5	-24.8	PASS		50.2	63.5	-13.3	PASS	
14404.3	10.6	1.8	51.9	62.5	83.5	-21	PASS		53.7	63.5	-9.8	PASS	
17973.6	13	4.6	58.6	71.6	83.5	-11.9	PASS	-11.9	63.2	63.5	-0.3	PASS	-0.3

6-18GHz High Channel Unii 3

Radiated Emissions Table

Date: 15-Nov-17 **Company:** Harman **Work Order:** R2501
Engineer: Chris Hamel **EUT Desc:** GEN3.1 HIGH VA **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 22.3°C **Humidity:** 24% **Pressure:** 1018mBar
Frequency Range: 18-40 GHz **Measurement Distance:** 0.1 m
Notes: Combined 18-26.5GHz and 26.5-40GHz. No emissions found. **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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average 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:** --- **Cable 3:** ---
Analyzer: Gold **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.197 Copyright Curtis-Straus LLC 2000
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Test Site: EMI Chamber 1 **Cable 1:** Asset #2323 **Cable 2:** Asset #2324 **Cable 3:** ---
Analyzer: Gold **Preamp:** 40GHz Mixer **Antenna:** 40GHz Mixer **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

18-40GHz Mid Channel Unii 3

Rev. 11/9/2017

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
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016

Mixers/Diplexers	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Mixer / Horn	26.5-40 GHz	11970A	Agilent	3003A10230	2154	I	3/12/2019	3/12/2016

Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2310 PA	1-1000MHz	PAM-103	COM-POWER	441175	2310	II	10/29/2018	10/29/2017
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	10/29/2018	10/29/2017
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	10/16/2018	10/16/2017

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	1/13/2019	1/13/2017
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	10/13/2018	10/13/2016
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test

Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2084		HTC-1	HDE		2084	II	3/23/2018	3/23/2017

Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1509	9kHz - 18GHz		Florida RF			II	10/2/2018	10/2/2017
Asset #1522	9kHz - 18GHz		Florida RF			II	2/11/2018	2/11/2017
Asset #2456	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017
Asset #2457	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017
Asset #2466	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017
Asset #2323	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	8/19/2018	8/19/2017
Asset #2324	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 001	2324	II	8/19/2018	8/19/2017

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

Test Equipment Used 30MHz to 40GHz

Radiated Band Edge

Radiated Emissions Table

Date: 23-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 High NA **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1017
Frequency Range: 1-6GHz **Measurement Distance:** 3 m
Notes: 5.0GHz 802.11a 20MHz 6Mbps **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5178.25	61.394		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---
H Max	5182.189	59.577		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	15.244	7.2	0.0	33.7	5.4	54.3	46.3	74.0	-19.7	Pass	54.0	-7.7	Pass
V	5123.922	18.169	6.7	0.0	33.6	5.4	57.2	45.7	74.0	-16.8	Pass	54.0	-8.3	Pass
V	5055.85	18.969	6.7	0.0	33.4	5.3	57.7	45.4	74.0	-16.3	Pass	54.0	-8.6	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5238.357	59.076		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5242.774	58.891		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5350.0	14.803	6.4	0.0	34.0	5.8	54.6	46.2	74.0	-19.4	Pass	54.0	-7.8	Pass
V	5356.767	17.989	6.4	0.0	34.0	5.8	57.8	46.2	74.0	-16.2	Pass	54.0	-7.8	Pass
V	5360.737	19.42	6.3	0.0	34.0	5.8	59.2	46.1	74.0	-14.8	Pass	54.0	-7.9	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -7.7 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

802.11a 20MHz UNII 1

Radiated Emissions Table

Date: 23-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 High NA **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1017
Frequency Range: 1-6GHz **Measurement Distance:** 3 m
Notes: 5.0GHz 802.11n 20MHz MCO 0 **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5185.876	62.762		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---
H Max	5184.686	62.398		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	18.119	9.2	0.0	33.7	5.4	57.2	48.3	74.0	-16.8	Pass	54.0	-5.7	Pass
V	5146.167	22.889	8.7	0.0	33.6	5.4	61.9	47.7	74.0	-12.1	Pass	54.0	-6.3	Pass
V	5097.562	18.75	8.2	0.0	33.6	5.3	57.7	47.1	74.0	-16.3	Pass	54.0	-6.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5234.302	61.422		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5237.644	61.361		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5350.0	14.788	6.6	0.0	34.0	5.8	54.6	46.4	74.0	-19.4	Pass	54.0	-7.6	Pass
V	5360.63	19.441	6.6	0.0	34.0	5.8	59.2	46.4	74.0	-14.8	Pass	54.0	-7.6	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -5.7 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

802.11n 20MHz UNII 1

Radiated Emissions Table

Date: 23-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 High NA **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1017
Frequency Range: 1-6GHz **Measurement Distance:** 3 m
Notes: 5.0GHz 802.11n 40MHz MCO 0 **EUT Max Freq:** None
Power= 60

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Power= 60				---	---	---	---	---	---	---	---	---	---	---
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5193.247	60.758		0.0	33.7	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5176.537	59.299		0.0	33.7	5.5	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	23.03	11.8	0.0	33.7	5.4	62.1	50.9	74.0	-11.9	Pass	54.0	-3.1	Pass
V	5149.552	26.541	11.6	0.0	33.7	5.4	65.6	50.7	74.0	-8.4	Pass	54.0	-3.3	Pass
V	5145.305	23.028	10.4	0.0	33.6	5.4	62.0	49.4	74.0	-12.0	Pass	54.0	-4.6	Pass
V	5141.27	20.753	9.0	0.0	33.6	5.4	59.8	48.0	74.0	-14.2	Pass	54.0	-6.0	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5225.308	58.185		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5233.638	56.184		0.0	33.8	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5350.0	14.045	6.5	0.0	34.0	5.8	53.8	46.3	74.0	-20.2	Pass	54.0	-7.7	Pass
V	5368.027	18.0	6.5	0.0	34.0	5.8	57.8	46.3	74.0	-16.2	Pass	54.0	-7.7	Pass
V	5361.155	18.183	6.5	0.0	34.0	5.8	58.0	46.3	74.0	-16.0	Pass	54.0	-7.7	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -3.1 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

802.11n 40MHz UNII 1

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 20MHz **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5181.217	54.375		0.0	34.2	5.5	---	---	74.0	---	---	54.0	---	---
H Max	5177.464	53.542		0.0	34.2	5.5	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	16.372	6.5	0.0	34.2	5.4	56.0	46.1	74.0	-18.0	Pass	54.0	-7.9	Pass
V	5145.496	17.841	6.5	0.0	34.2	5.4	57.4	46.1	74.0	-16.6	Pass	54.0	-7.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5236.33	53.558		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5237.33	53.209		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	15.732	6.1	0.0	34.9	6.0	56.6	47.0	74.0	-17.4	Pass	54.0	-7.0	Pass
V	5946.0	17.526	6.3	0.0	35.1	5.9	58.5	47.3	74.0	-15.5	Pass	54.0	-6.7	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -6.7 dB ***Worst Freq:*** 5946.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 20MHz UNII 1

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 40MHz **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5180.018	56.145		0.0	34.2	5.5	---	---	74.0	---	---	54.0	---	---
H Max	5180.006	53.974		0.0	34.2	5.5	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	14.348	6.8	0.0	34.2	5.4	53.9	46.4	74.0	-20.1	Pass	54.0	-7.6	Pass
V	5141.665	17.648	6.7	0.0	34.2	5.4	57.2	46.3	74.0	-16.8	Pass	54.0	-7.7	Pass
V	5129.93	18.888	6.5	0.0	34.2	5.4	58.5	46.1	74.0	-15.5	Pass	54.0	-7.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5222.867	55.7007		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5234.045	52.498		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5350.0	14.997	6.3	0.0	34.3	5.8	55.1	46.4	74.0	-18.9	Pass	54.0	-7.6	Pass
V	5365.58	17.904	6.3	0.0	34.3	5.8	58.0	46.4	74.0	-16.0	Pass	54.0	-7.6	Pass
V	5389.472	17.113	6.3	0.0	34.3	5.9	57.3	46.5	74.0	-16.7	Pass	54.0	-7.5	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -7.5 dB ***Worst Freq:*** 5389.472 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 40MHz UNII 1

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 80MHz **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5222.417	50.964		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
H Max	5243.386	48.523		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5150.0	13.772	6.6	0.0	34.2	5.4	53.4	46.2	74.0	-20.6	Pass	54.0	-7.8	Pass
V	5119.145	17.467	6.6	0.0	34.2	5.4	57.1	46.2	74.0	-16.9	Pass	54.0	-7.8	Pass
V	5080.232	18.207	6.4	0.0	34.1	5.3	57.6	45.8	74.0	-16.4	Pass	54.0	-8.2	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5222.417	50.964		0.0	34.2	5.6	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5350.0	14.027	6.3	0.0	34.3	5.8	54.1	46.4	74.0	-19.9	Pass	54.0	-7.6	Pass
V	5377.122	17.387	6.3	0.0	34.3	5.8	57.5	46.4	74.0	-16.5	Pass	54.0	-7.6	Pass
V	5365.242	17.719	6.3	0.0	34.3	5.8	57.8	46.4	74.0	-16.2	Pass	54.0	-7.6	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -7.6 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:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 80MHz UNII 1

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11a 20MHz Unii 3 **EUT Max Freq:** None
Power=50

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Power=50				---	---	---	---	---	---	---	---	---	---	---
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5743.156	56.696		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
H Max	5740.722	57.526		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5725.0	21.633	8.7	0.0	34.7	6.2	62.5	49.6	74.0	-11.5	Pass	54.0	-4.4	Pass
V	5723.31	23.592	8.0	0.0	34.7	6.2	64.5	48.9	74.0	-9.5	Pass	54.0	-5.1	Pass
V	5720.562	17.76	7.0	0.0	34.7	6.2	58.7	47.9	74.0	-15.3	Pass	54.0	-6.1	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5820.825	56.332		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
H Max	5832.337	56.387		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	14.47	6.6	0.0	34.9	6.0	55.4	47.5	74.0	-18.6	Pass	54.0	-6.5	Pass
V	5908.28	18.443	7.0	0.0	35.0	5.9	59.3	47.9	74.0	-14.7	Pass	54.0	-6.1	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -4.4 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11a 20MHz UNII 3

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11n 20MHz Unii 3 **EUT Max Freq:** None
Power=56

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Power=56				---	---	---	---	---	---	---	---	---	---	---
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5743.732	58.925		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5725.0	20.695	7.8	0.0	34.7	6.2	61.6	48.7	74.0	-12.4	Pass	54.0	-5.3	Pass
V	5724.002	20.115	7.6	0.0	34.7	6.2	61.0	48.5	74.0	-13.0	Pass	54.0	-5.5	Pass
V	5723.45	21.801	7.4	0.0	34.7	6.2	62.7	48.3	74.0	-11.3	Pass	54.0	-5.7	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5827.262	56.662		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
H Max	5832.349	55.671		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	15.668	6.7	0.0	34.9	6.0	56.6	47.6	74.0	-17.4	Pass	54.0	-6.4	Pass
V	5912.125	17.813	7.4	0.0	35.0	5.9	58.7	48.3	74.0	-15.3	Pass	54.0	-5.7	Pass
V	5900.237	18.784	7.4	0.0	35.0	5.9	59.7	48.3	74.0	-14.3	Pass	54.0	-5.7	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -5.3 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11n 20MHz UNII 3

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11n 40MHz Unii 3 **EUT Max Freq:** None
Power=52

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Power=52				---	---	---	---	---	---	---	---	---	---	---
Low Edge				---	---	---	---	---	---	---	---	---	---	---
H Max	5764.914	54.714		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	23.68	9.7	0.0	34.7	6.2	64.6	50.6	74.0	-9.4	Pass	54.0	-3.4	Pass
H	5720.105	27.348	9.1	0.0	34.7	6.2	68.2	50.0	74.0	-5.8	Pass	54.0	-4.0	Pass
H	5713.98	23.028	7.9	0.0	34.7	6.2	63.9	48.8	74.0	-10.1	Pass	54.0	-5.2	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5804.616	54.443		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
H Max	5800.998	54.682		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	14.84	6.6	0.0	34.9	6.0	55.7	47.5	74.0	-18.3	Pass	54.0	-6.5	Pass
H	5920.655	18.861	6.4	0.0	35.1	5.9	59.9	47.4	74.0	-14.1	Pass	54.0	-6.6	Pass
H				---	---	---	---	---	---	---	---	---	---	---
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -3.4 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11n 40MHz UNII 3

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 26 **Humidity:** 36% **Pressure:** 1002
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 20MHz Unii 3 **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5745.719	54.246		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
H Max	5743.629	52.183		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5725.0	14.961	6.4	0.0	34.7	6.2	55.9	47.3	74.0	-18.1	Pass	54.0	-6.7	Pass
V	5670.64	17.746	6.3	0.0	34.7	6.1	58.5	47.1	74.0	-15.5	Pass	54.0	-6.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5822.636	54.859		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
H Max	5830.706	53.81		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	16.403	6.2	0.0	34.9	6.0	57.3	47.1	74.0	-16.7	Pass	54.0	-6.9	Pass
V	5931.397	17.846	6.3	0.0	35.1	5.9	58.8	47.3	74.0	-15.2	Pass	54.0	-6.7	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -6.7 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 20MHz UNII 3

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 23.1 **Humidity:** 37% **Pressure:** 1008
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 40MHz Unii 3 **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5748.747	54.229		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
H Max	5763.531	51.923		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5725.0	13.93	6.2	0.0	34.7	6.2	54.8	47.1	74.0	-19.2	Pass	54.0	-6.9	Pass
V	5682.342	16.891	6.2	0.0	34.7	6.2	57.8	47.1	74.0	-16.2	Pass	54.0	-6.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5802.842	56.466		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
H Max	5805.07	56.232		0.0	34.8	6.1	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	14.709	6.9	0.0	34.9	6.0	55.6	47.8	74.0	-18.4	Pass	54.0	-6.2	Pass
V	5872.491	17.649	6.7	0.0	35.0	6.0	58.6	47.7	74.0	-15.4	Pass	54.0	-6.3	Pass
V	5890.854	18.591	6.4	0.0	35.0	5.9	59.5	47.3	74.0	-14.5	Pass	54.0	-6.7	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -6.2 dB ***Worst Freq:*** 5850.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 40MHz UNII 3

Radiated Emissions Table

Date: 24-Oct-17 **Company:** Harmon **Work Order:** R2501
Engineer: Aristotelis Casternopoulos **EUT Desc:** VG4 NA High **EUT Operating Voltage/Frequency:** 12VDC
Temp: 26.0 **Humidity:** 36% **Pressure:** 1002
Frequency Range: 1-6GHz **Measurement Distance:** 3m
Notes: 802.11ac 80MHz Unii 3 **EUT Max Freq:** None

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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Low Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5765.209	49.797		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
H Max	5756.963	49.409		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5725.0	13.122	6.3	0.0	34.7	6.2	54.0	47.2	74.0	-20.0	Pass	54.0	-6.8	Pass
V	5703.54	17.799	6.3	0.0	34.7	6.2	58.7	47.2	74.0	-15.3	Pass	54.0	-6.8	Pass
V	5679.447	17.353	6.3	0.0	34.7	6.2	58.3	47.2	74.0	-15.7	Pass	54.0	-6.8	Pass
				---	---	---	---	---	---	---	---	---	---	---
High Edge				---	---	---	---	---	---	---	---	---	---	---
V Max	5765.209	49.797		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
H Max	5756.963	49.409		0.0	34.7	6.2	---	---	74.0	---	---	54.0	---	---
				---	---	---	---	---	---	---	---	---	---	---
V	5850.0	14.56	6.2	0.0	34.9	6.0	55.5	47.1	74.0	-18.5	Pass	54.0	-6.9	Pass
V	5881.155	17.71	6.2	0.0	35.0	6.0	58.7	47.2	74.0	-15.3	Pass	54.0	-6.8	Pass
V	5892.61	18.019	6.3	0.0	35.0	5.9	58.9	47.2	74.0	-15.1	Pass	54.0	-6.8	Pass
				---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by -6.8 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#3 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

802.11ac 80MHz UNII 3

Rev. 10/22/2017								
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Rental MXE EMI Receiver(1168255)	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/15/2018	8/15/2017
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	10/13/2018	10/13/2016
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2084		HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/3017	10/30/2016
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

Band Edge Test Equipment Used

AC Line Conducted Emissions

LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
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

N/A. EUT is vehicle battery powered only.

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 CISPR	 5.6dB 4.6dB	 N/A 5.2dB (Ucispr)
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 CISPR	 3.9dB 3.6dB	 N/A 3.6dB (Ucispr)
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

Appendix A:

ER2501-13 Appendix A
CFR Title 47 FCC Part §15.407 and ISED Canada RSS-247 Issue 2

DUT Information

Model:	GEN3.1 HIGH VA
Manufacturer:	Harman International Industries, Inc.
Serial Number:	074

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

Antenna Gain:

Frequency	Efficiency [%]	Peak Gain [dBi]	Efficiency [dB]
5000	6.17364	-4.38687	-12.09458699
5020	6.6279	-4.19522	-11.78624053
5040	7.09273	-3.73023	-11.49186572
5060	7.51954	-3.44882	-11.23808726
5080	7.63131	-3.38354	-11.17400904
5100	8.09416	-3.03553	-10.91828215
5120	8.3574	-2.8346	-10.77928811
5140	9.13094	-2.33371	-10.39484511
5160	9.72907	-2.07419	-10.11928672
5180	10.1783	-1.97577	-9.923247527
5200	10.5349	-1.85938	-9.773695825
5220	10.6804	-1.77084	-9.714124819
5240	10.7876	-1.78853	-9.670751654
5260	10.3491	-2.03769	-9.850974166
5280	9.93704	-2.24239	-10.02742962
5300	9.25383	-2.6039	-10.33678483
5320	8.73586	-2.89648	-10.58694335
5340	8.30432	-3.26201	-10.80695924
5360	7.87053	-3.92196	-11.03996021
5380	7.54936	-4.55606	-11.22089864
5400	7.02988	-4.93885	-11.53052088
5420	6.84536	-5.04928	-11.64603707
5440	6.49079	-5.23403	-11.87702442
5460	6.37517	-5.42782	-11.9550823
5480	6.18137	-5.59921	-12.0891526
5500	5.79548	-6.16806	-12.36910589
5520	8.4359	-4.2063	-10.73868577
5540	8.13659	-4.18781	-10.89557567
5560	7.50372	-4.50665	-11.2472338
5580	7.23853	-4.56894	-11.40349621
5600	6.74936	-4.54815	-11.70737407
5620	6.64321	-4.4533	-11.77622019
5640	6.27211	-4.57246	-12.02586334
5660	6.18944	-4.53878	-12.08348643
5680	6.2233	-4.46523	-12.05979263
5700	6.36006	-4.33255	-11.96538787
5720	6.69283	-4.17606	-11.74390206
5740	6.95704	-4.07671	-11.575755
5760	7.27465	-4.09717	-11.38187897
5780	7.75395	-4.04437	-11.10477004
5800	8.07838	-3.86224	-10.92675722
5820	8.36421	-3.71688	-10.77575072
5840	8.20412	-3.96917	-10.85967996
5860	8.06364	-3.83113	-10.93468869
5880	7.56128	-4.09804	-11.21404679
5900	7.37326	-4.14055	-11.32340451
5920	7.05471	-4.47184	-11.51520834
5940	6.76225	-4.6428	-11.69908777
5960	6.69557	-4.58469	-11.74212445
5980	6.94873	-4.43099	-11.58094563
6000	7.54979	-4.12945	-11.22065128

Number of transmission chains	1
Equipment Type	Unlicensed National Information Infrastructure Device (NII)

Test Equipment Used:

Rev. 11/9/2017								
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
FSV40 Signal/Spectrum Analyzer	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	6/30/2018	6/30/2017
Signal Generators/Comparaison Noise Emitter	**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
Power/Noise Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
OSP - open switch and control platform	30MHz-18GHz	OSP120	ROHDE & SCHWARZ	101674		I	6/1/2018	6/1/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
DUT1	30MHz-26GHz		Micro-Coax			II	6/21/2018	6/21/2017
DUT2	30MHz-26GHz		Micro-Coax			II	6/22/2018	6/22/2017
DUT3	30MHz-26GHz		Micro-Coax			II	6/23/2018	6/23/2017
DUT4	30MHz-26GHz		Micro-Coax			II	6/24/2018	6/24/2017
Attenuators / Couplers	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
10dB Attenuator-01 Brown	30MHz-26GHz		Mini Curcuits			II	7/13/2018	7/14/2017
10dB Attenuator-02 Yellow	30MHz-26GHz		Mini Curcuits			II	7/13/2018	7/14/2017
10dB Attenuator-03 Red	30MHz-26GHz		Mini Curcuits			II	7/13/2018	7/14/2017
10dB Attenuator-04 orange	30MHz-26GHz		Mini Curcuits			II	7/13/2018	7/14/2017
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2217
Directional Coupler	0.5GHz-18GHz	UDC	AA MCS	001040		II	8/11/2018	8/11/2017
Communication Tester	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
CMW500 Wideband Radio Communication Tester	DC to 6GHz	CMW500	ROHDE & SCHWARZ	155905		I	6/2/2018	6/2/2017
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	4/21/2018	4/21/2017
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

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	
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		
Power Spectral Density	5775	PASS		
DTS Bandwidth (6dB)	5775	PASS		
Occupied Channel Bandwidth 99%	5775	PASS		

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	10.886	10.683	10.363	23.97	93.435
9 Mbps	10.799	10.724	10.354	23.97	90.537
12 Mbps	10.877	10.698	10.432	23.97	87.826
18 Mbps	10.882	10.624	10.454	23.97	83.077
24 Mbps	9.498	9.289	9.048	23.97	78.784
36 Mbps	8.843	8.565	8.191	23.97	71.946
48 Mbps	8.942	8.645	8.306	23.97	66.168
54 Mbps	8.815	8.549	8.257	23.97	64.287

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	10.912	10.701	10.421	23.97	93.020
MCS1	10.944	10.72	10.423	23.97	87.293
MCS2	10.987	10.627	10.449	23.97	82.498
MCS3	9.597	9.334	9.085	23.97	78.387
MCS4	8.855	8.624	8.321	23.97	71.893
MCS5	8.779	8.528	8.239	23.97	66.653
MCS6	8.843	8.599	8.272	23.97	64.799
MCS7	8.827	8.592	8.287	23.97	62.689

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	11.166	10.843	10.475	23.97	93.049
MCS1	11.167	10.807	10.577	23.97	87.335
MCS2	11.073	10.86	10.403	23.97	82.597
MCS3	9.785	9.452	9.096	23.97	78.602
MCS4	9.074	8.722	8.347	23.97	72.171
MCS5	8.965	8.779	8.267	23.97	67.071
MCS6	9.001	8.779	8.3	23.97	65.241
MCS7	9.012	8.686	8.349	23.97	63.191
MCS8	7.613	7.335	6.978	23.97	60.329

802.11n(HT40) (Power Setting: 60)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.106	11.006	23.97	86.886
MCS1	10.981	10.931	23.97	77.830
MCS2	11.07	11.034	23.97	71.257

MCS3	11.062	11.048	23.97	66.231
MCS4	11.069	11.038	23.97	59.071
MCS5	11.108	11.083	23.97	53.740
MCS6	11.154	11.135	23.97	51.970
MCS7	11.154	11.136	23.97	50.047

802.11ac(VHT40) (Power Setting: 62)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	11.271	10.826	23.97	86.947
MCS1	11.295	10.885	23.97	78.037
MCS2	11.249	10.788	23.97	71.584
MCS3	9.671	9.104	23.97	66.703
MCS4	8.908	8.336	23.97	59.715
MCS5	8.688	8.424	23.97	54.612
MCS6	8.709	8.455	23.97	52.917
MCS7	8.728	8.348	23.97	51.059
MCS8	7.16	6.584	23.97	49.059
MCS9	6.827	6.364	23.97	48.538

802.11ac(VHT80) (Power Setting: 60)

Data Rate	Gated RMS (dBm) 5210 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	10.685	23.97	77.004
MCS1	10.554	23.97	65.276
MCS2	10.609	23.97	58.389
MCS3	9.275	23.97	53.802
MCS4	8.338	23.97	48.021
MCS5	8.318	23.97	44.564
MCS6	8.331	23.97	43.337
MCS7	8.344	23.97	42.017
MCS8	6.593	23.97	40.679
MCS9	6.33	23.97	40.326

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, dBm, whichever is less (where B is 99% OBW in MHz).
In addition devices must be capable of reducing power by at least 3dB below the maximum permitted EIRP of 30mW, which is 11.77dBm.
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 (14.77dBm)

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	10.886	-1.98	8.906	13.8	n/a	n/a	Default	n/a
9 Mbps	10.799	-1.98	8.819	13.8	n/a	n/a	Default	n/a
12 Mbps	10.877	-1.98	8.897	13.8	n/a	n/a	Default	n/a
18 Mbps	10.882	-1.98	8.902	13.8	n/a	n/a	Default	n/a
24 Mbps	9.498	-1.98	7.518	13.8	n/a	n/a	Default	n/a
36 Mbps	8.843	-1.98	6.863	13.8	n/a	n/a	Default	n/a
48 Mbps	8.942	-1.98	6.962	13.8	n/a	n/a	Default	n/a
54 Mbps	8.815	-1.98	6.835	13.8	n/a	n/a	Default	n/a
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	10.683	-1.86	8.823	13.8	n/a	n/a	Default	n/a
9 Mbps	10.724	-1.86	8.864	13.8	n/a	n/a	Default	n/a
12 Mbps	10.698	-1.86	8.838	13.8	n/a	n/a	Default	n/a
18 Mbps	10.624	-1.86	8.764	13.8	n/a	n/a	Default	n/a
24 Mbps	9.289	-1.86	7.429	13.8	n/a	n/a	Default	n/a
36 Mbps	8.565	-1.86	6.705	13.8	n/a	n/a	Default	n/a
48 Mbps	8.645	-1.86	6.785	13.8	n/a	n/a	Default	n/a
54 Mbps	8.549	-1.86	6.689	13.8	n/a	n/a	Default	n/a
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	10.363	-1.79	8.573	13.8	n/a	n/a	Default	n/a
9 Mbps	10.354	-1.79	8.564	13.8	n/a	n/a	Default	n/a
12 Mbps	10.432	-1.79	8.642	13.8	n/a	n/a	Default	n/a
18 Mbps	10.454	-1.79	8.664	13.8	n/a	n/a	Default	n/a
24 Mbps	9.048	-1.79	7.258	13.8	n/a	n/a	Default	n/a
36 Mbps	8.191	-1.79	6.401	13.8	n/a	n/a	Default	n/a
48 Mbps	8.306	-1.79	6.516	13.8	n/a	n/a	Default	n/a
54 Mbps	8.257	-1.79	6.467	13.8	n/a	n/a	Default	n/a

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	10.912	-1.98	8.932	13.8	n/a	n/a	Default	n/a
MCS1	10.944	-1.98	8.964	13.8	n/a	n/a	Default	n/a
MCS2	10.987	-1.98	9.007	13.8	n/a	n/a	Default	n/a
MCS3	9.597	-1.98	7.617	13.8	n/a	n/a	Default	n/a
MCS4	8.855	-1.98	6.875	13.8	n/a	n/a	Default	n/a
MCS5	8.779	-1.98	6.799	13.8	n/a	n/a	Default	n/a
MCS6	8.843	-1.98	6.863	13.8	n/a	n/a	Default	n/a
MCS7	8.827	-1.98	6.847	13.8	n/a	n/a	Default	n/a
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	10.701	-1.86	8.841	13.8	n/a	n/a	Default	n/a
MCS1	10.72	-1.86	8.86	13.8	n/a	n/a	Default	n/a
MCS2	10.627	-1.86	8.767	13.8	n/a	n/a	Default	n/a
MCS3	9.334	-1.86	7.474	13.8	n/a	n/a	Default	n/a
MCS4	8.624	-1.86	6.764	13.8	n/a	n/a	Default	n/a
MCS5	8.528	-1.86	6.668	13.8	n/a	n/a	Default	n/a
MCS6	8.599	-1.86	6.739	13.8	n/a	n/a	Default	n/a
MCS7	8.592	-1.86	6.732	13.8	n/a	n/a	Default	n/a
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	10.421	-1.79	8.631	13.8	n/a	n/a	Default	n/a
MCS1	10.423	-1.79	8.633	13.8	n/a	n/a	Default	n/a
MCS2	10.449	-1.79	8.659	13.8	n/a	n/a	Default	n/a
MCS3	9.085	-1.79	7.295	13.8	n/a	n/a	Default	n/a
MCS4	8.321	-1.79	6.531	13.8	n/a	n/a	Default	n/a
MCS5	8.239	-1.79	6.449	13.8	n/a	n/a	Default	n/a
MCS6	8.272	-1.79	6.482	13.8	n/a	n/a	Default	n/a
MCS7	8.287	-1.79	6.497	13.8	n/a	n/a	Default	n/a

802.11ac(VHT20)

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	11.166	-1.98	9.186	13.8	n/a	n/a	Default	n/a
MCS1	11.167	-1.98	9.187	13.8	n/a	n/a	Default	n/a
MCS2	11.073	-1.98	9.093	13.8	n/a	n/a	Default	n/a
MCS3	9.785	-1.98	7.805	13.8	n/a	n/a	Default	n/a
MCS4	9.074	-1.98	7.094	13.8	n/a	n/a	Default	n/a
MCS5	8.965	-1.98	6.985	13.8	n/a	n/a	Default	n/a
MCS6	9.001	-1.98	7.021	13.8	n/a	n/a	Default	n/a
MCS7	9.012	-1.98	7.032	13.8	n/a	n/a	Default	n/a
MCS8	7.613	-1.98	5.633	13.8	n/a	n/a	Default	n/a
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	10.843	-1.86	8.983	13.8	n/a	n/a	Default	n/a
MCS1	10.807	-1.86	8.947	13.8	n/a	n/a	Default	n/a
MCS2	10.86	-1.86	9	13.8	n/a	n/a	Default	n/a
MCS3	9.452	-1.86	7.592	13.8	n/a	n/a	Default	n/a
MCS4	8.722	-1.86	6.862	13.8	n/a	n/a	Default	n/a
MCS5	8.779	-1.86	6.919	13.8	n/a	n/a	Default	n/a
MCS6	8.779	-1.86	6.919	13.8	n/a	n/a	Default	n/a
MCS7	8.686	-1.86	6.826	13.8	n/a	n/a	Default	n/a
MCS8	7.335	-1.86	5.475	13.8	n/a	n/a	Default	n/a
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	10.475	-1.79	8.685	13.8	n/a	n/a	Default	n/a
MCS1	10.577	-1.79	8.787	13.8	n/a	n/a	Default	n/a
MCS2	10.403	-1.79	8.613	13.8	n/a	n/a	Default	n/a
MCS3	9.096	-1.79	7.306	13.8	n/a	n/a	Default	n/a
MCS4	8.347	-1.79	6.557	13.8	n/a	n/a	Default	n/a
MCS5	8.267	-1.79	6.477	13.8	n/a	n/a	Default	n/a
MCS6	8.3	-1.79	6.51	13.8	n/a	n/a	Default	n/a
MCS7	8.349	-1.79	6.559	13.8	n/a	n/a	Default	n/a
MCS8	6.978	-1.79	5.188	13.8	n/a	n/a	Default	n/a

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	11.106	-1.92	9.186	13.8	n/a	n/a	60	n/a
MCS1	10.981	-1.92	9.061	13.8	n/a	n/a	60	n/a
MCS2	11.07	-1.92	9.15	13.8	n/a	n/a	60	n/a
MCS3	11.062	-1.92	9.142	13.8	n/a	n/a	60	n/a
MCS4	11.069	-1.92	9.149	13.8	n/a	n/a	60	n/a
MCS5	11.108	-1.92	9.188	13.8	n/a	n/a	60	n/a
MCS6	11.154	-1.92	9.234	13.8	n/a	n/a	60	n/a
MCS7	11.154	-1.92	9.234	13.8	n/a	n/a	60	n/a
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	11.006	-1.78	9.226	13.8	n/a	n/a	60	n/a
MCS1	10.931	-1.78	9.151	13.8	n/a	n/a	60	n/a
MCS2	11.034	-1.78	9.254	13.8	n/a	n/a	60	n/a
MCS3	11.048	-1.78	9.268	13.8	n/a	n/a	60	n/a

MCS4	11.038	-1.78	9.258	13.8	n/a	n/a	60	n/a
MCS5	11.083	-1.78	9.303	13.8	n/a	n/a	60	n/a
MCS6	11.135	-1.78	9.355	13.8	n/a	n/a	60	n/a
MCS7	11.136	-1.78	9.356	13.8	n/a	n/a	60	n/a

802.11ac(VHT40)

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	11.271	-1.92	9.351	13.8	n/a	n/a	Default	n/a
MCS1	11.295	-1.92	9.375	13.8	n/a	n/a	Default	n/a
MCS2	11.249	-1.92	9.329	13.8	n/a	n/a	Default	n/a
MCS3	9.671	-1.92	7.751	13.8	n/a	n/a	Default	n/a
MCS4	8.908	-1.92	6.988	13.8	n/a	n/a	Default	n/a
MCS5	8.688	-1.92	6.768	13.8	n/a	n/a	Default	n/a
MCS6	8.709	-1.92	6.789	13.8	n/a	n/a	Default	n/a
MCS7	8.728	-1.92	6.808	13.8	n/a	n/a	Default	n/a
MCS8	7.16	-1.92	5.24	13.8	n/a	n/a	Default	n/a
MCS9	6.827	-1.92	4.907	13.8	n/a	n/a	Default	n/a
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	10.826	-1.78	9.046	13.8	n/a	n/a	Default	n/a
MCS1	10.885	-1.78	9.105	13.8	n/a	n/a	Default	n/a
MCS2	10.788	-1.78	9.008	13.8	n/a	n/a	Default	n/a
MCS3	9.104	-1.78	7.324	13.8	n/a	n/a	Default	n/a
MCS4	8.336	-1.78	6.556	13.8	n/a	n/a	Default	n/a
MCS5	8.424	-1.78	6.644	13.8	n/a	n/a	Default	n/a
MCS6	8.455	-1.78	6.675	13.8	n/a	n/a	Default	n/a
MCS7	8.348	-1.78	6.568	13.8	n/a	n/a	Default	n/a
MCS8	6.584	-1.78	4.804	13.8	n/a	n/a	Default	n/a
MCS9	6.364	-1.78	4.584	13.8	n/a	n/a	Default	n/a

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	10.685	-1.815	8.87	13.8	n/a	n/a	Default	n/a
MCS1	10.554	-1.815	8.739	13.8	n/a	n/a	Default	n/a
MCS2	10.609	-1.815	8.794	13.8	n/a	n/a	Default	n/a
MCS3	9.275	-1.815	7.46	13.8	n/a	n/a	Default	n/a
MCS4	8.338	-1.815	6.523	13.8	n/a	n/a	Default	n/a
MCS5	8.318	-1.815	6.503	13.8	n/a	n/a	Default	n/a
MCS6	8.331	-1.815	6.516	13.8	n/a	n/a	Default	n/a
MCS7	8.344	-1.815	6.529	13.8	n/a	n/a	Default	n/a
MCS8	6.593	-1.815	4.778	13.8	n/a	n/a	Default	n/a
MCS9	6.33	-1.815	4.515	13.8	n/a	n/a	Default	n/a

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802.11a (Power Setting: 50)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	14.909	14.362	14.057	30	93.430
9 Mbps	14.908	14.318	14.035	30	90.533
12 Mbps	14.955	14.407	14.113	30	87.822
18 Mbps	14.994	14.415	14.128	30	83.065
24 Mbps	14.971	14.403	14.136	30	78.783
36 Mbps	15.028	14.452	14.152	30	71.894
48 Mbps	15.147	14.568	14.266	30	66.176
54 Mbps	15.135	14.545	14.249	30	64.279

802.11n(HT20) (Power Setting: 56)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	14.162	13.568	13.264	30	93.009
MCS1	14.134	13.559	13.276	30	87.276
MCS2	14.179	13.593	13.306	30	82.478
MCS3	14.219	13.616	13.348	30	78.404
MCS4	14.262	13.696	13.414	30	71.872
MCS5	14.3	13.708	13.421	30	66.631
MCS6	14.338	13.753	13.485	30	64.766
MCS7	14.311	13.749	13.483	30	62.663

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	13.353	12.865	12.541	30	93.047
MCS1	13.285	12.898	12.459	30	87.340
MCS2	13.349	12.837	12.5	30	82.596
MCS3	12.081	11.694	11.272	30	78.584
MCS4	11.34	10.872	10.554	30	72.181
MCS5	11.336	10.919	10.506	30	67.068
MCS6	11.376	10.943	10.554	30	65.238
MCS7	11.302	10.843	10.488	30	63.205
MCS8	9.734	9.341	8.959	30	60.312

802.11n(HT40) (Power Setting: 52)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	13.945	13.288	30	86.882
MCS1	13.976	13.329	30	77.864
MCS2	14.015	13.374	30	71.255
MCS3	14.037	13.394	30	66.217
MCS4	14.078	13.39	30	59.053
MCS5	14.093	13.463	30	53.773
MCS6	14.146	13.502	30	51.991
MCS7	14.137	13.481	30	50.085

802.11ac(VHT40) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	13.461	12.924	30	86.954
MCS1	13.445	12.973	30	78.038
MCS2	13.367	12.866	30	71.573
MCS3	12.099	11.559	30	66.664
MCS4	11.155	10.647	30	59.711
MCS5	11.186	10.631	30	54.603
MCS6	11.194	10.648	30	52.896
MCS7	11.09	10.577	30	51.053
MCS8	9.53	9.056	30	49.086
MCS9	9.53	9.018	30	46.924

802.11ac(VHT80) (Power Setting: Default)

Data Rate	Gated RMS (dBm) 5775 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	12.7	30	76.835
MCS1	12.736	30	65.259
MCS2	12.762	30	58.361
MCS3	11.553	30	53.783
MCS4	10.595	30	48.001
MCS5	10.609	30	44.602
MCS6	10.625	30	43.307
MCS7	10.644	30	42.039
MCS8	8.878	30	40.653
MCS9	8.89	30	39.216

Power Spectral Density

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

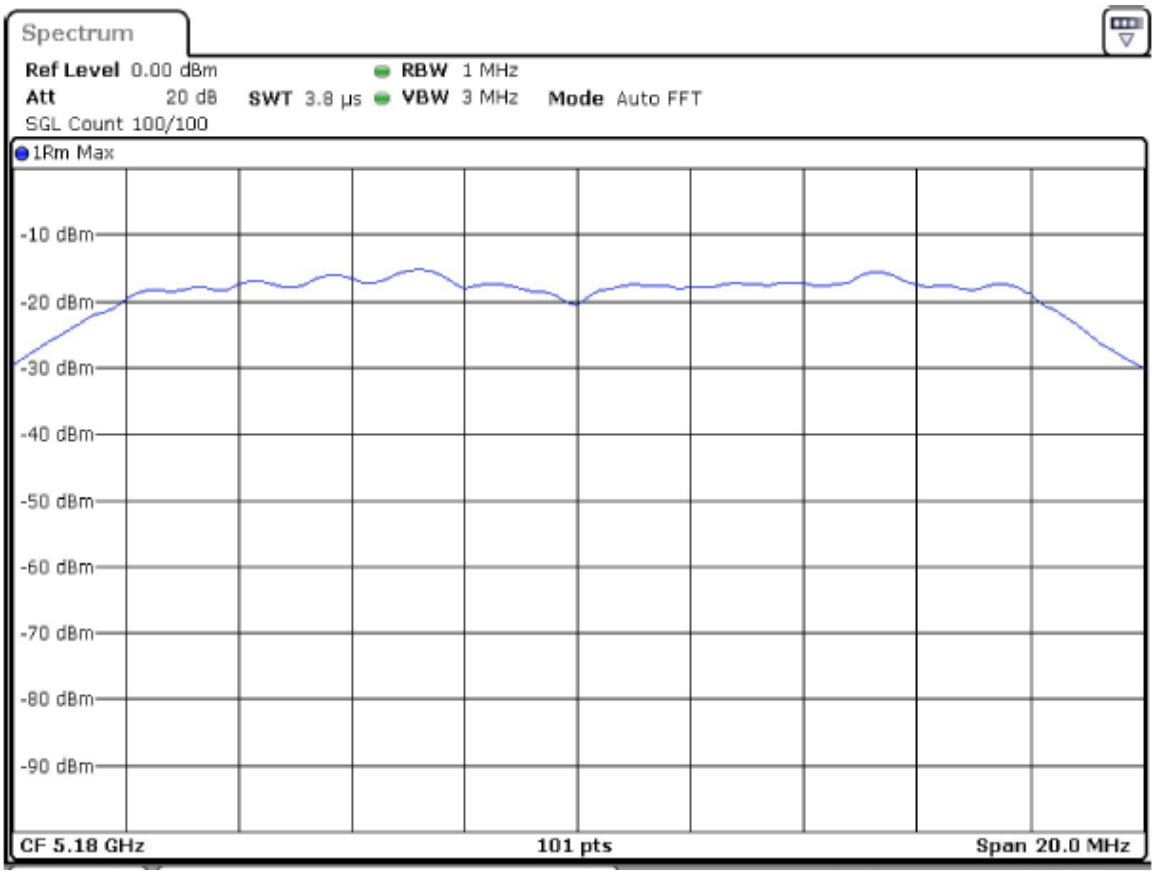
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

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	7.964	7.189	7.075	11
9 Mbps	7.350	7.212	6.878	11
12 Mbps	7.962	7.432	6.970	11
18 Mbps	8.780	7.120	8.305	11
24 Mbps	7.175	6.981	6.808	11
36 Mbps	7.021	6.709	6.515	11
48 Mbps	7.172	6.903	6.583	11
54 Mbps	7.580	7.028	6.734	11

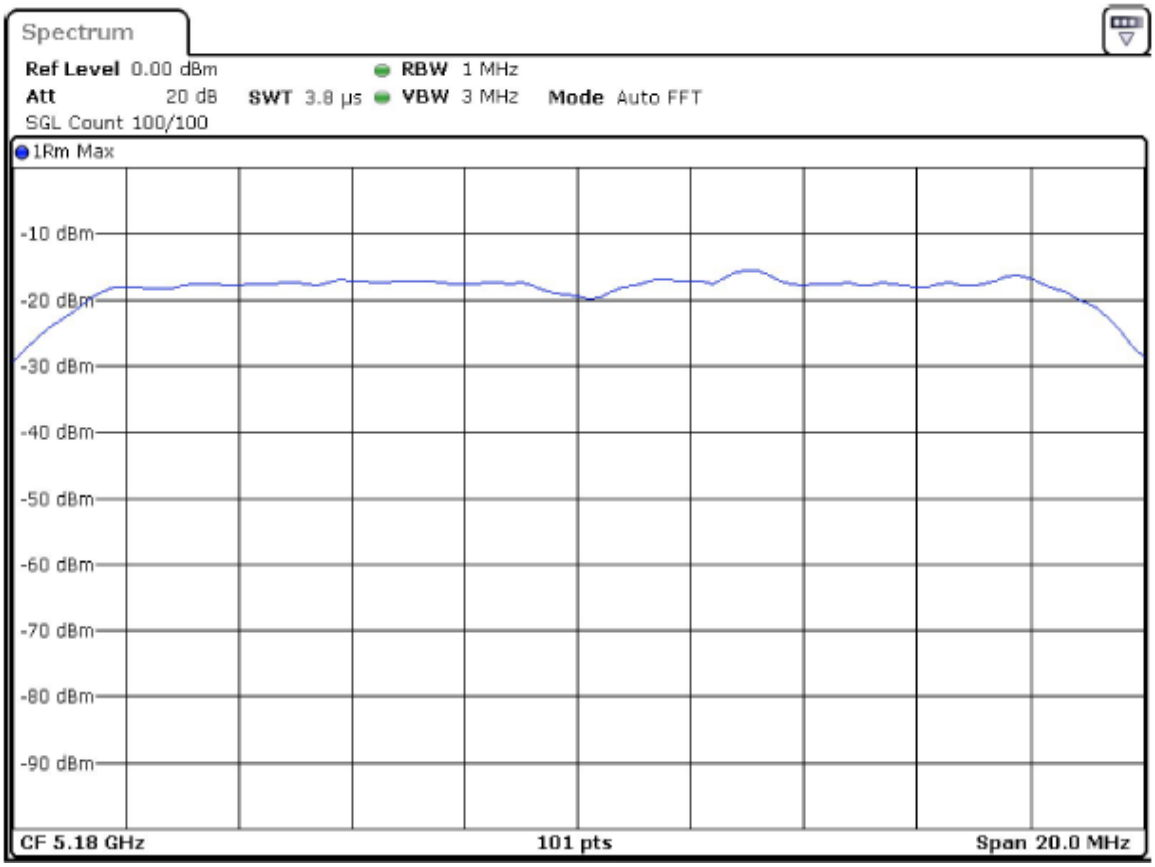
802.11a 18 Mbps 5180MHz



802.11n(HT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	6.993	7.470	6.204	11
MCS1	7.443	7.339	6.759	11
MCS2	8.473	6.867	6.585	11
MCS3	7.020	6.483	7.211	11
MCS4	6.143	6.088	5.656	11
MCS5	6.805	6.072	6.519	11
MCS6	6.748	6.725	5.726	11
MCS7	7.204	6.711	6.555	11

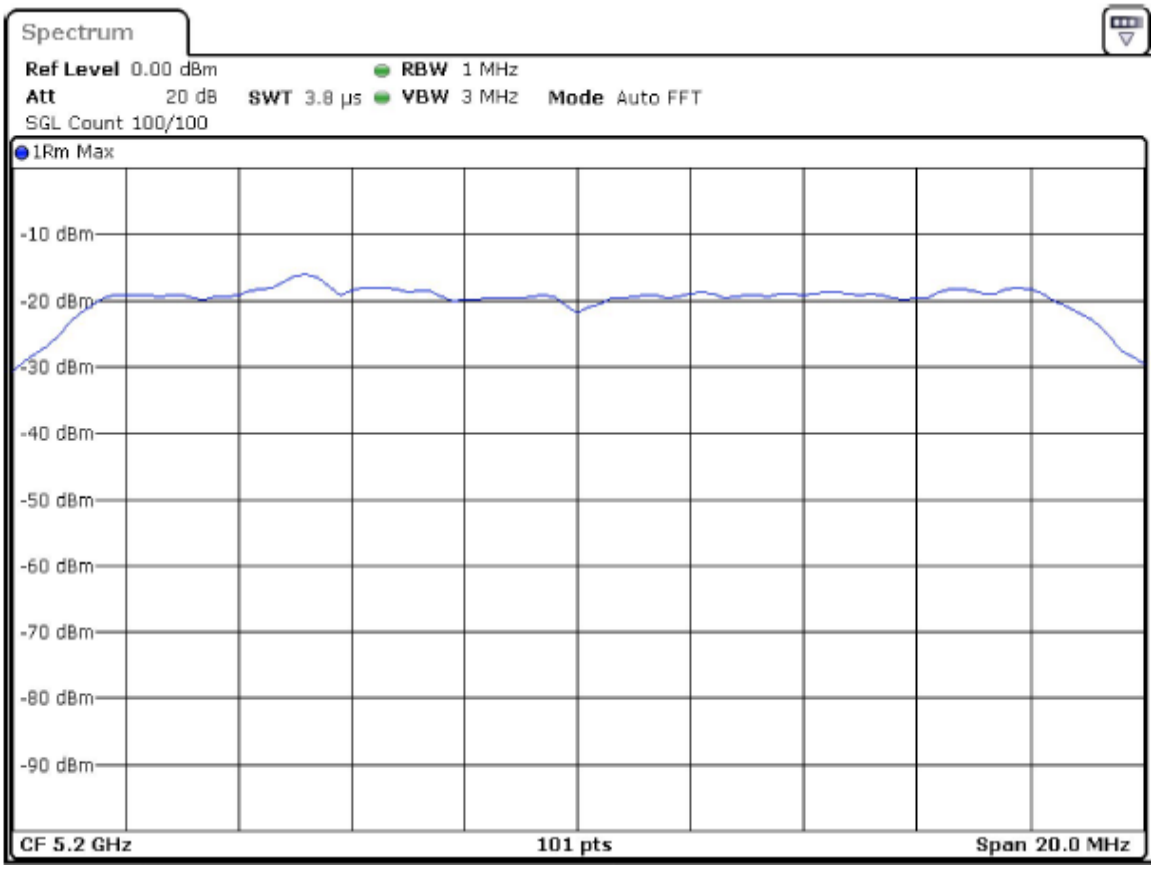
802.11n(HT20) MCS2 5180 MHz



802.11ac(VHT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	7.151	6.768	6.294	11
MCS1	7.520	7.605	7.640	11
MCS2	7.650	6.929	6.712	11
MCS3	7.667	8.100	7.283	11
MCS4	6.752	5.815	5.462	11
MCS5	6.649	6.134	6.458	11
MCS6	7.539	6.326	6.684	11
MCS7	7.657	7.168	6.303	11
MCS8	6.575	5.717	5.202	11

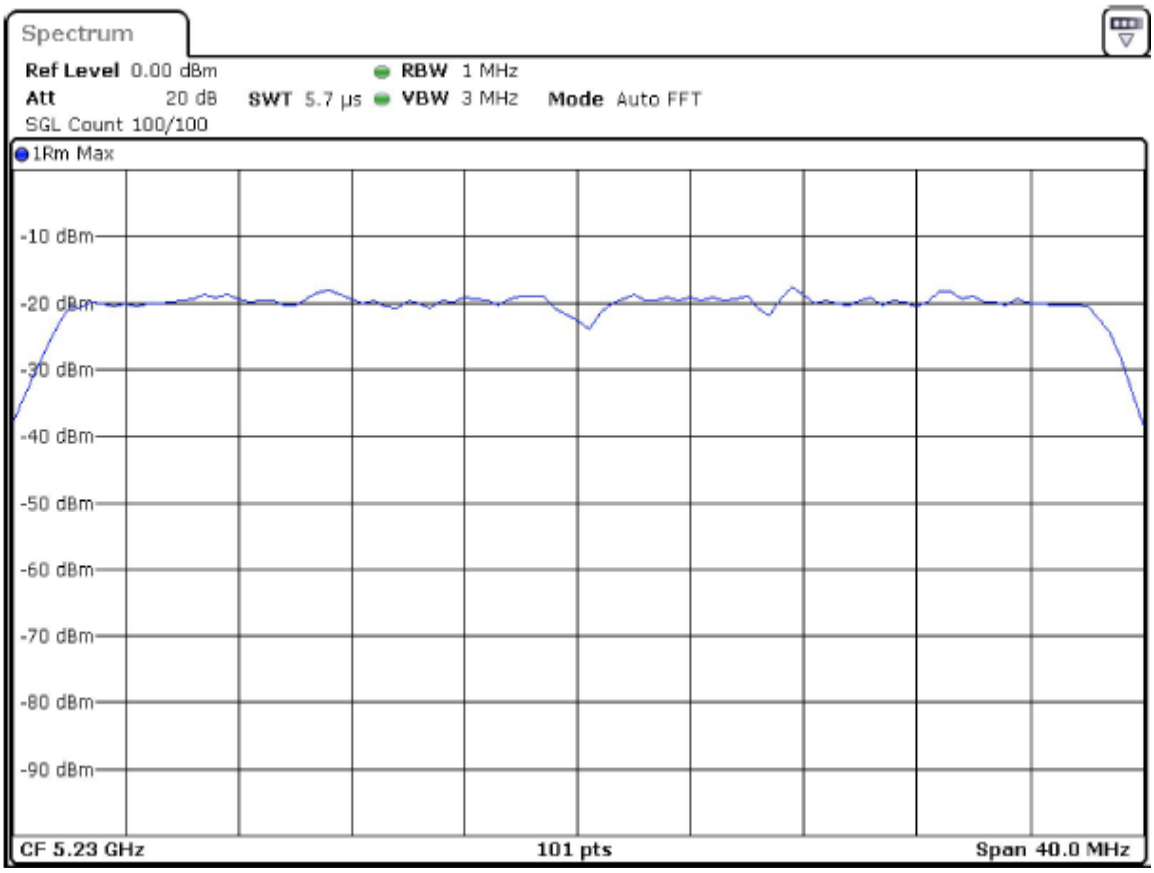
802.11ac(VHT20) MCS3 5200MHz



802.11n(HT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	5.362	4.914	11
MCS1	6.425	6.108	11
MCS2	6.841	6.459	11
MCS3	7.341	6.621	11
MCS4	7.097	7.359	11
MCS5	8.070	7.801	11
MCS6	7.990	7.981	11
MCS7	8.027	8.388	11

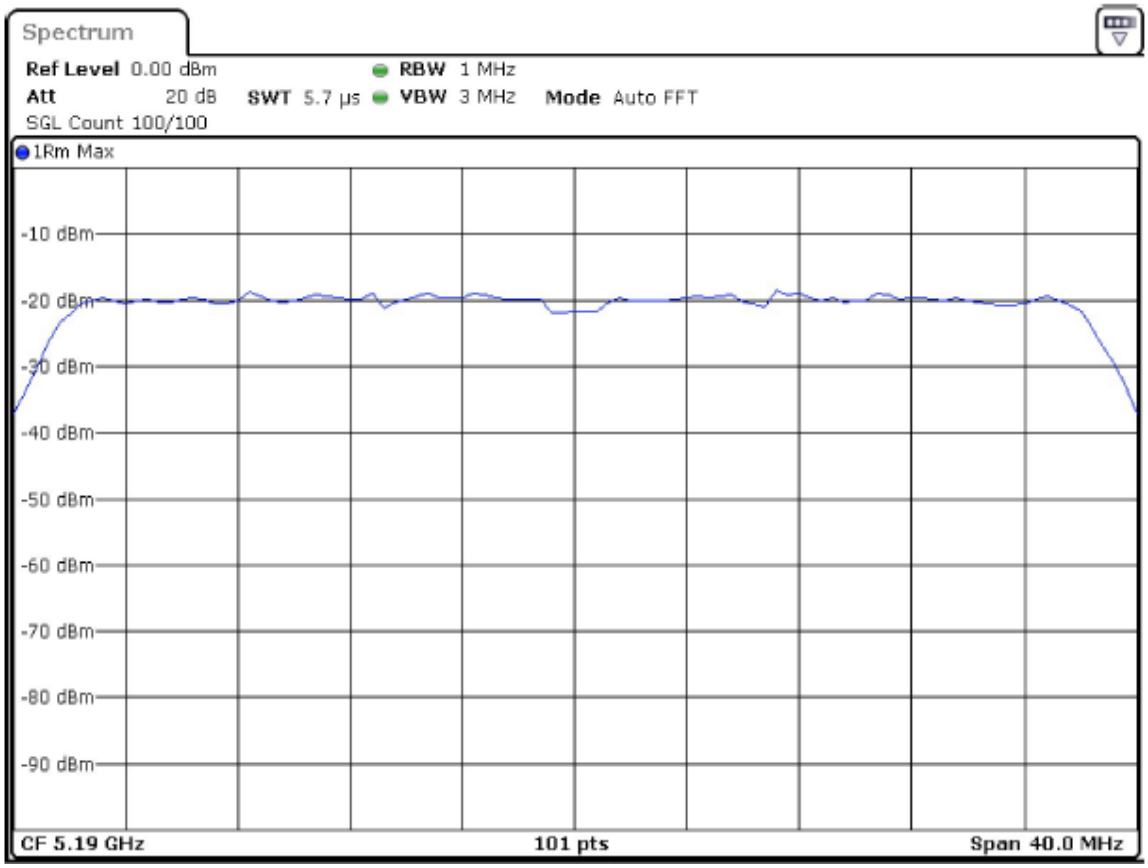
802.11n(HT40) MCS7 5230MHz



802.11ac(VHT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	5.718	4.727	11
MCS1	5.889	5.577	11
MCS2	5.937	5.561	11
MCS3	5.721	5.185	11
MCS4	4.616	4.165	11
MCS5	4.880	4.498	11
MCS6	5.398	4.978	11
MCS7	5.360	5.092	11
MCS8	4.240	3.151	11
MCS9	5.446	4.039	11

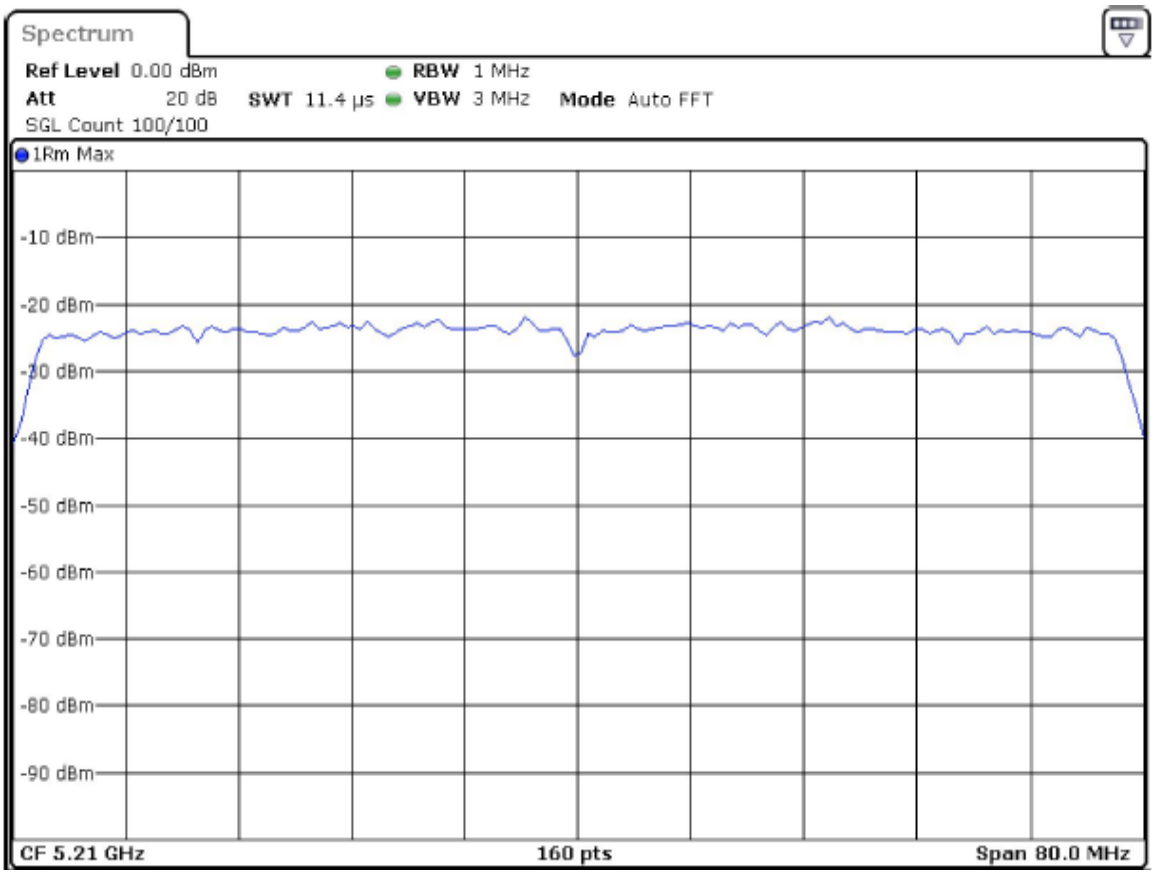
802.11ac(VHT40) MCS2 5190MHz



802.11ac(VHT80)

Data Rate	Peak PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	2.507	11
MCS1	3.333	11
MCS2	3.609	11
MCS3	3.195	11
MCS4	1.965	11
MCS5	2.378	11
MCS6	3.032	11
MCS7	2.375	11
MCS8	1.525	11
MCS9	0.797	11

802.11ac(VHT80) MCS2 5210MHz

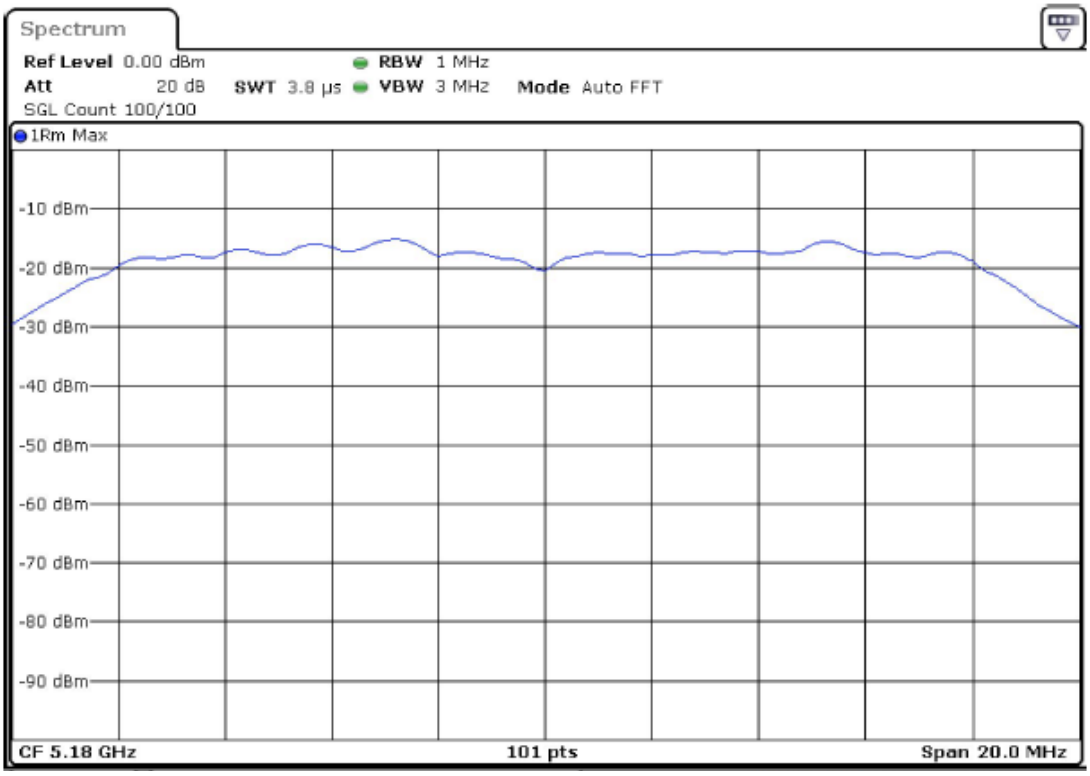


RSS-247 UNII-1

802.11a

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
6 Mbps	7.964	-1.98	5.984	10
9 Mbps	7.350	-1.98	5.37	10
12 Mbps	7.962	-1.98	5.982	10
18 Mbps	8.780	-1.98	6.8	10
24 Mbps	7.175	-1.98	5.195	10
36 Mbps	7.021	-1.98	5.041	10
48 Mbps	7.172	-1.98	5.192	10
54 Mbps	7.580	-1.98	5.6	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
6 Mbps	7.189	-1.86	5.329	10
9 Mbps	7.212	-1.86	5.352	10
12 Mbps	7.432	-1.86	5.572	10
18 Mbps	7.120	-1.86	5.26	10
24 Mbps	6.981	-1.86	5.121	10
36 Mbps	6.709	-1.86	4.849	10
48 Mbps	6.903	-1.86	5.043	10
54 Mbps	7.028	-1.86	5.168	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
6 Mbps	7.075	-1.79	5.285	10
9 Mbps	6.878	-1.79	5.088	10
12 Mbps	6.970	-1.79	5.18	10
18 Mbps	8.305	-1.79	6.515	10
24 Mbps	6.808	-1.79	5.018	10
36 Mbps	6.515	-1.79	4.725	10
48 Mbps	6.583	-1.79	4.793	10
54 Mbps	6.734	-1.79	4.944	10

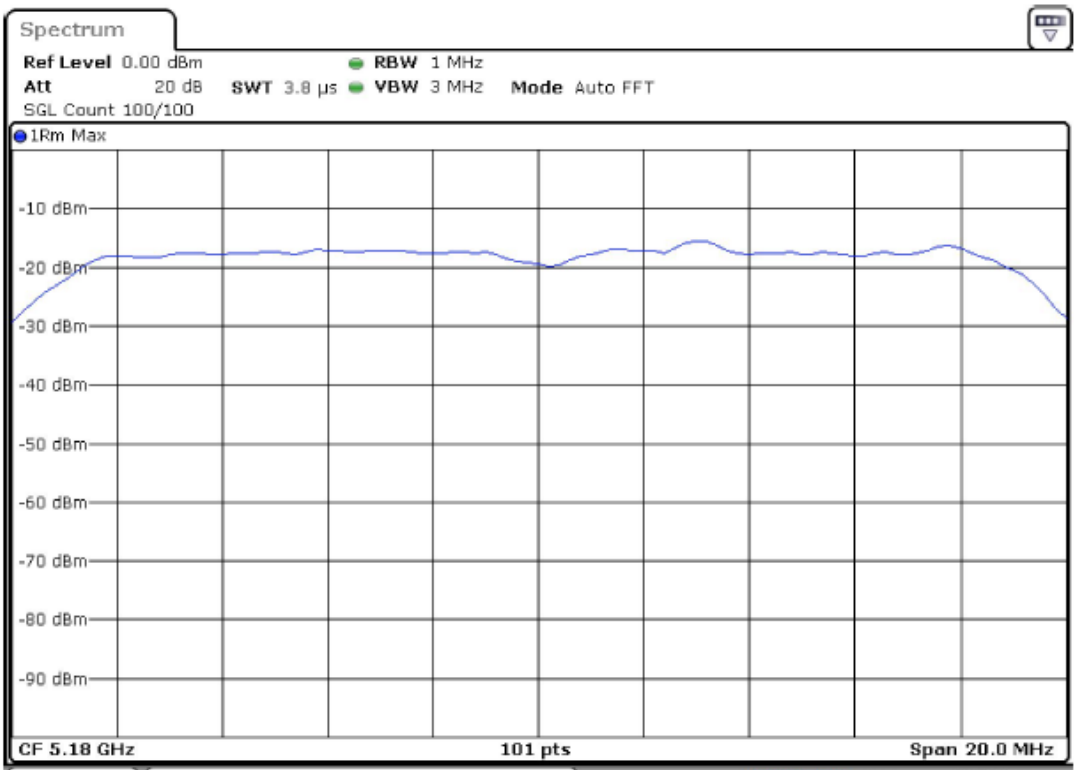
802.11a 18 Mbps 5180MHz



802.11n(HT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	6.993	-1.98	5.013	10
MCS1	7.443	-1.98	5.463	10
MCS2	8.473	-1.98	6.493	10
MCS3	7.020	-1.98	5.04	10
MCS4	6.143	-1.98	4.163	10
MCS5	6.805	-1.98	4.825	10
MCS6	6.748	-1.98	4.768	10
MCS7	7.204	-1.98	5.224	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
MCS0	7.470	-1.86	5.61	10
MCS1	7.339	-1.86	5.479	10
MCS2	6.867	-1.86	5.007	10
MCS3	6.483	-1.86	4.623	10
MCS4	6.088	-1.86	4.228	10
MCS5	6.072	-1.86	4.212	10
MCS6	6.725	-1.86	4.865	10
MCS7	6.711	-1.86	4.851	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	6.204	-1.79	4.414	10
MCS1	6.759	-1.79	4.969	10
MCS2	6.585	-1.79	4.795	10
MCS3	7.211	-1.79	5.421	10
MCS4	5.656	-1.79	3.866	10
MCS5	6.519	-1.79	4.729	10
MCS6	5.726	-1.79	3.936	10
MCS7	6.555	-1.79	4.765	10

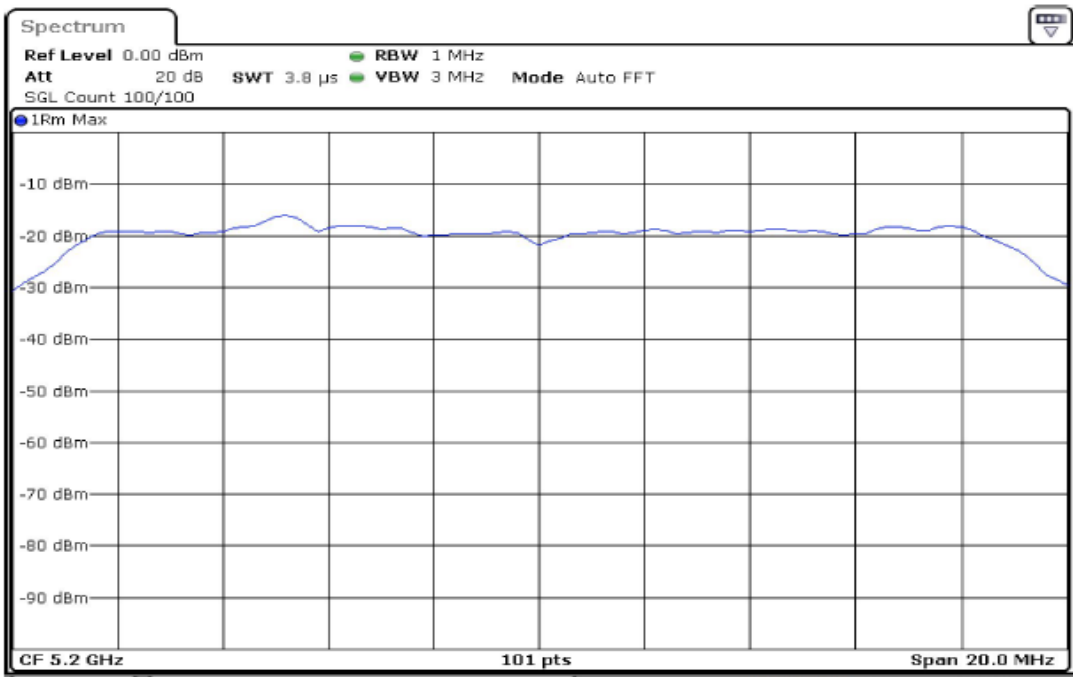
802.11n(HT20) MCS2 5180MHz



802.11ac(VHT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	7.151	-1.98	5.171	10
MCS1	7.520	-1.98	5.54	10
MCS2	7.650	-1.98	5.67	10
MCS3	7.667	-1.98	5.687	10
MCS4	6.752	-1.98	4.772	10
MCS5	6.649	-1.98	4.669	10
MCS6	7.539	-1.98	5.559	10
MCS7	7.657	-1.98	5.677	10
MCS8	6.575	-1.98	4.595	10
Data Rate	**PSD (dBm) 5200 MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm) 5200 MHz**	**Limit (dBm)**
MCS0	6.768	-1.86	4.908	10
MCS1	7.605	-1.86	5.745	10
MCS2	6.929	-1.86	5.069	10
MCS3	8.100	-1.86	6.24	10
MCS4	5.815	-1.86	3.955	10
MCS5	6.134	-1.86	4.274	10
MCS6	6.326	-1.86	4.466	10
MCS7	7.168	-1.86	5.308	10
MCS8	5.717	-1.86	3.857	10
Data Rate	**PSD (dBm) 5240 MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm) 5240 MHz**	**Limit (dBm)**
MCS0	6.294	-1.79	4.504	10
MCS1	7.640	-1.79	5.85	10
MCS2	6.712	-1.79	4.922	10
MCS3	7.283	-1.79	5.493	10
MCS4	5.462	-1.79	3.672	10
MCS5	6.458	-1.79	4.668	10
MCS6	6.684	-1.79	4.894	10
MCS7	6.303	-1.79	4.513	10
MCS8	5.202	-1.79	3.412	10

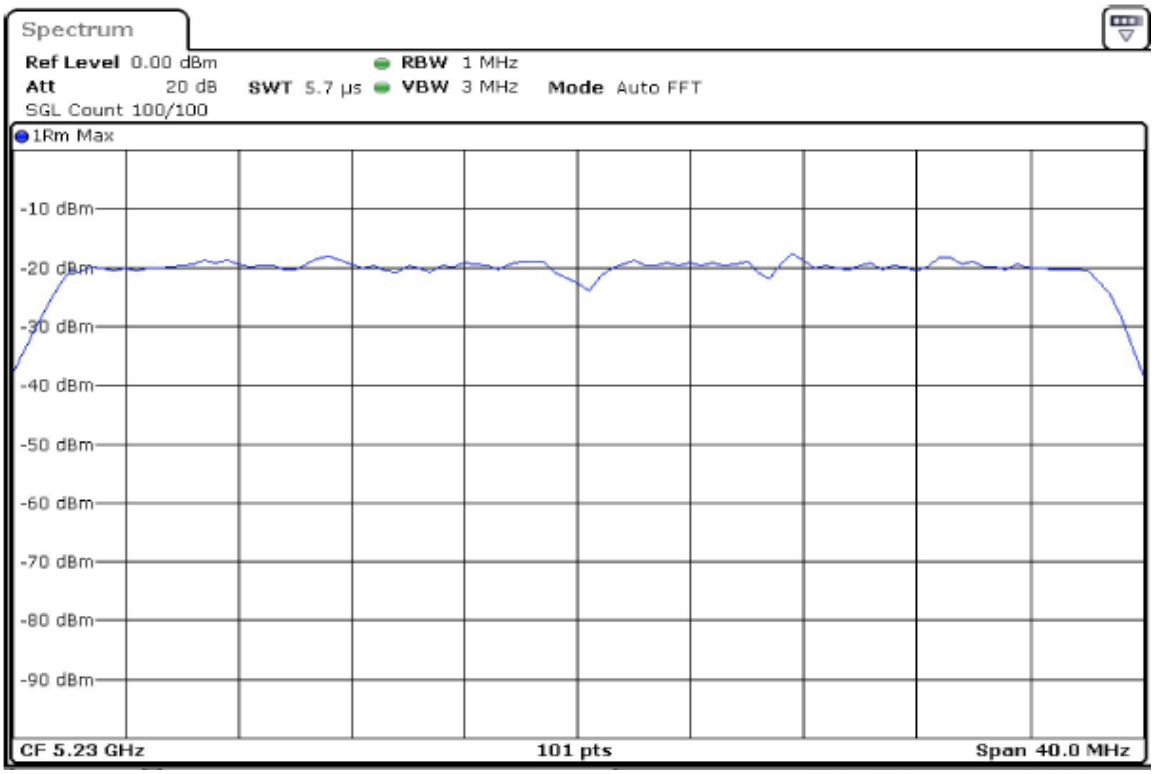
802.11ac(VHT20) MCS3 5200MHz



802.11n(HT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	5.362	-1.92	3.442	10
MCS1	6.425	-1.92	4.505	10
MCS2	6.841	-1.92	4.921	10
MCS3	7.341	-1.92	5.421	10
MCS4	7.097	-1.92	5.177	10
MCS5	8.070	-1.92	6.15	10
MCS6	7.990	-1.92	6.07	10
MCS7	8.027	-1.92	6.107	10
Data Rate	**PSD (dBm) 5230 MHz**	**Antenna Gain (dBi)**	**EIRP PSD (dBm) 5230 MHz**	**Limit (dBm)**
MCS0	4.914	-1.78	3.134	10
MCS1	6.108	-1.78	4.328	10
MCS2	6.459	-1.78	4.679	10
MCS3	6.621	-1.78	4.841	10
MCS4	7.359	-1.78	5.579	10
MCS5	7.801	-1.78	6.021	10
MCS6	7.981	-1.78	6.201	10
MCS7	8.388	-1.78	6.608	10

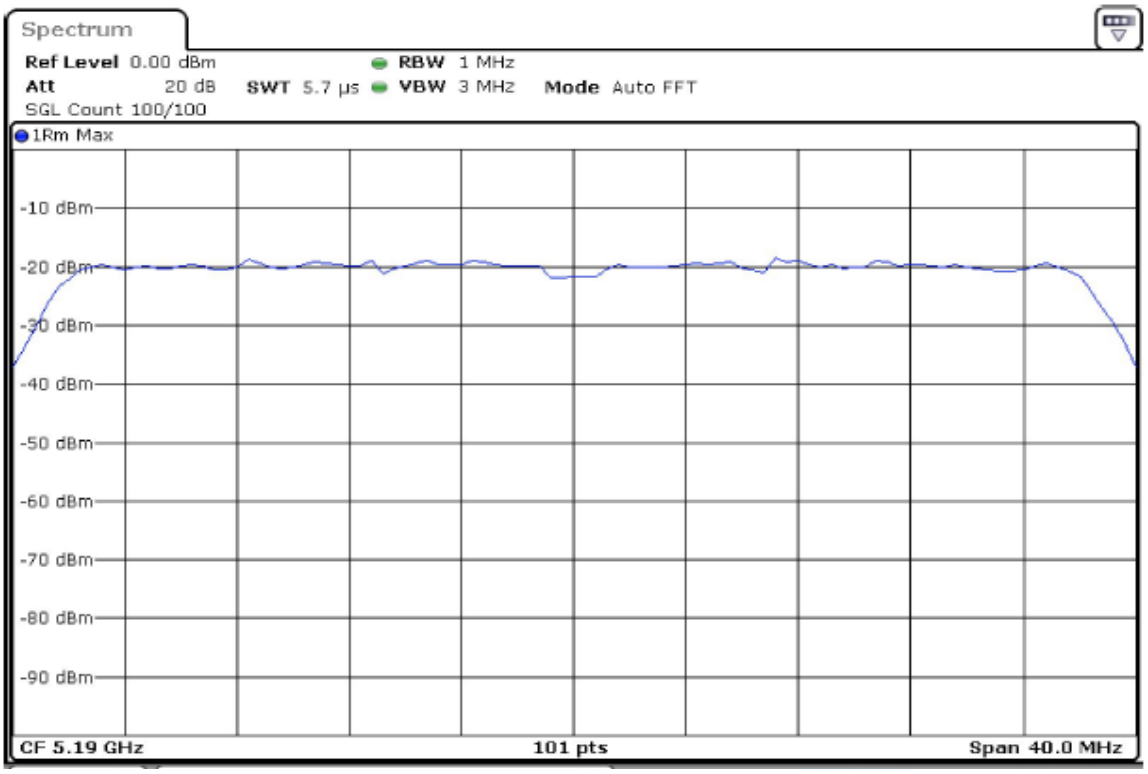
802.11n(HT40) MCS7 5230MHz



802.11ac(VHT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	5.718	-1.92	3.798	10
MCS1	5.889	-1.92	3.969	10
MCS2	5.937	-1.92	4.017	10
MCS3	5.721	-1.92	3.801	10
MCS4	4.616	-1.92	2.696	10
MCS5	4.880	-1.92	2.96	10
MCS6	5.398	-1.92	3.478	10
MCS7	5.360	-1.92	3.44	10
MCS8	4.240	-1.92	2.32	10
MCS9	5.446	-1.92	3.526	10
Data Rate	PSD (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	4.727	-1.78	2.947	10
MCS1	5.577	-1.78	3.797	10
MCS2	5.561	-1.78	3.781	10
MCS3	5.185	-1.78	3.405	10
MCS4	4.165	-1.78	2.385	10
MCS5	4.498	-1.78	2.718	10
MCS6	4.978	-1.78	3.198	10
MCS7	5.092	-1.78	3.312	10
MCS8	3.151	-1.78	1.371	10
MCS9	4.039	-1.78	2.259	10

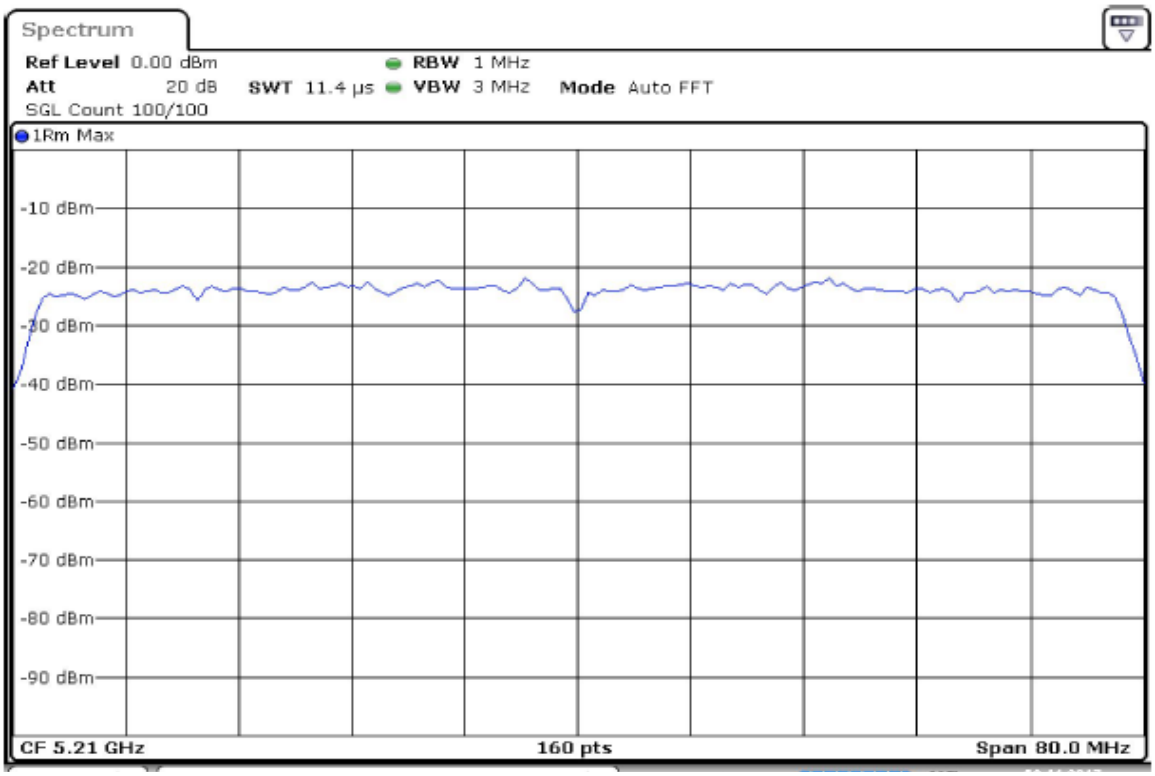
802.11ac(VHT40) MCS2 5190MHz



802.11ac(VHT80)

Data Rate	PSD (dBm) 5210 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	2.507	-1.815	0.692	10
MCS1	3.333	-1.815	1.518	10
MCS2	3.609	-1.815	1.794	10
MCS3	3.195	-1.815	1.38	10
MCS4	1.965	-1.815	0.15	10
MCS5	2.378	-1.815	0.563	10
MCS6	3.032	-1.815	1.217	10
MCS7	2.375	-1.815	0.56	10
MCS8	1.525	-1.815	-0.29	10
MCS9	0.797	-1.815	-1.018	10

802.11ac(VHT80) MCS2 5210MHz

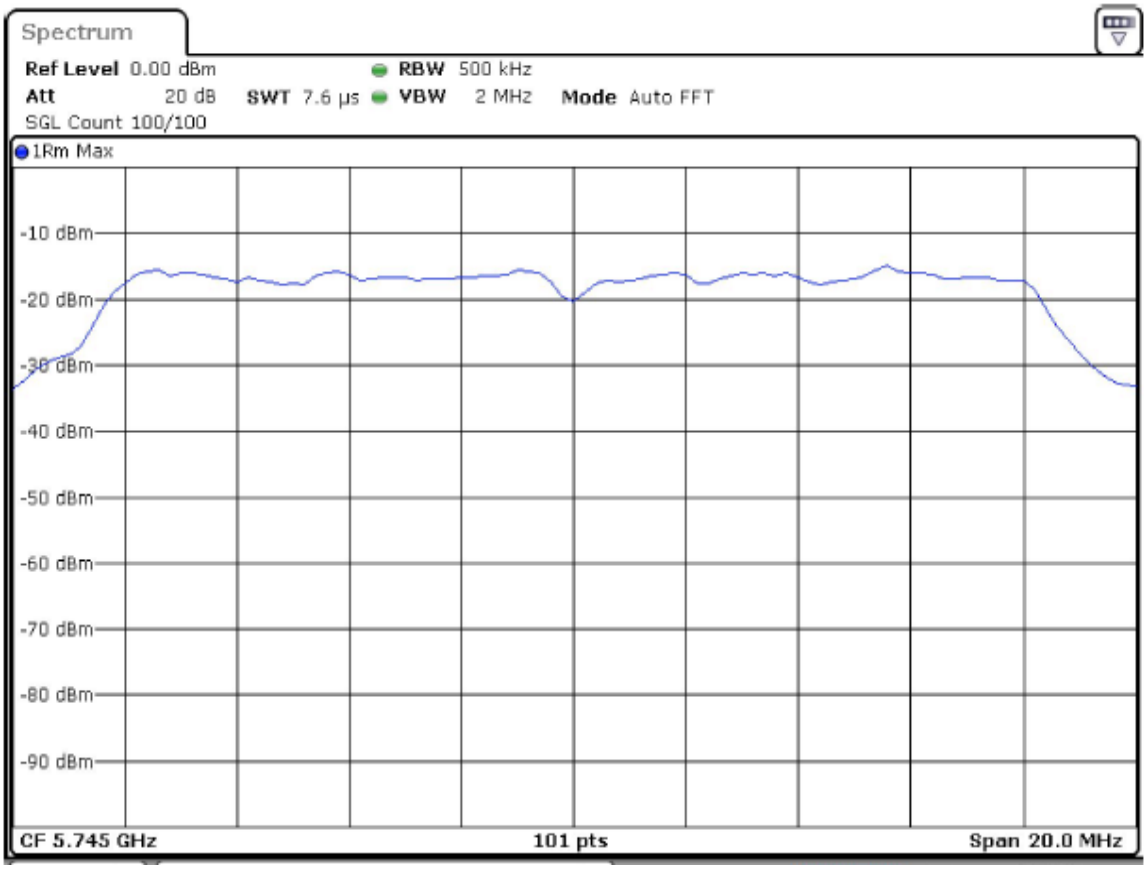


FCC and RSS-247 UNII-3

802.11a

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
6 Mbps	7.493	6.699	6.579	30.0
9 Mbps	9.171	8.399	8.142	30.0
12 Mbps	8.645	7.894	7.507	30.0
18 Mbps	9.560	8.736	8.421	30.0
24 Mbps	9.388	8.780	8.492	30.0
36 Mbps	10.288	9.715	9.518	30.0
48 Mbps	10.227	9.618	9.438	30.0
54 Mbps	10.343	9.533	9.206	30.0

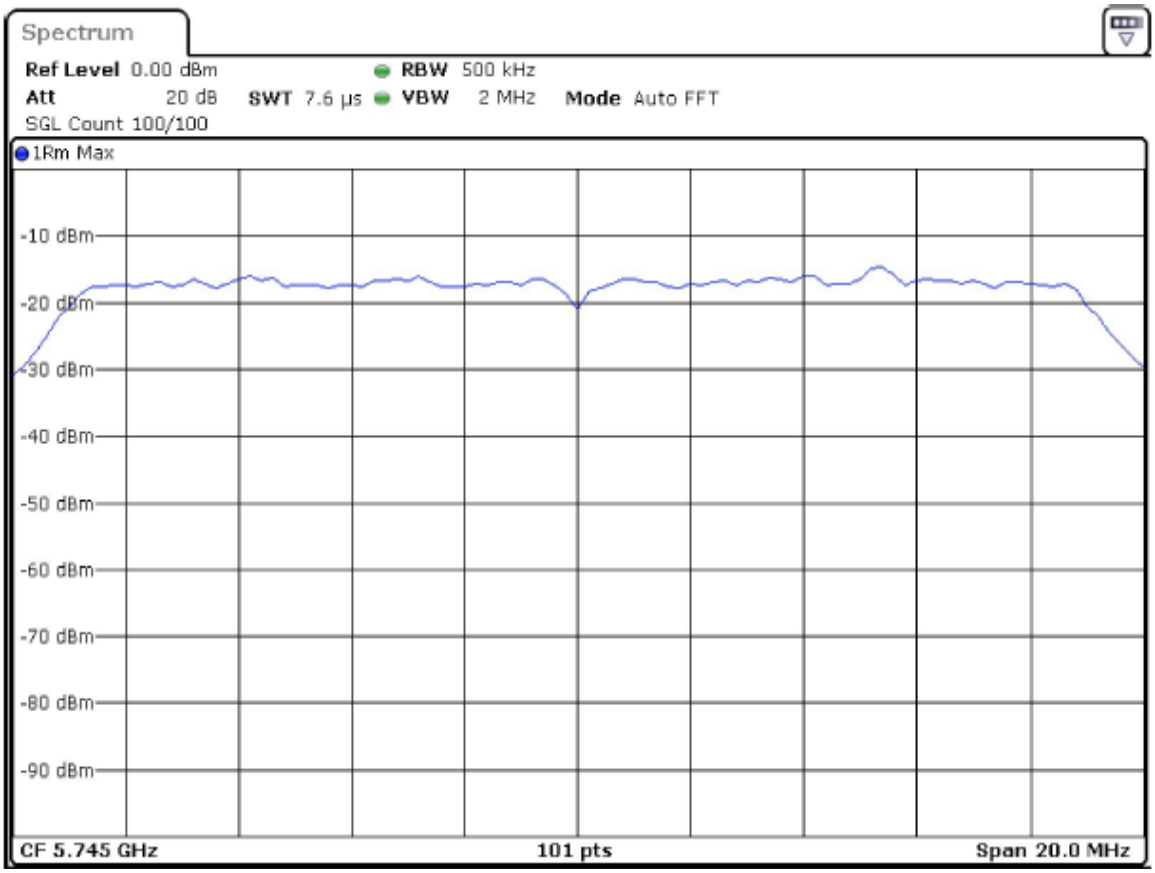
802.11a 54 Mbps 5745MHz



802.11n(HT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	7.643	5.953	5.904	30
MCS1	8.4	7.729	7.550	30
MCS2	8.059	7.341	7.072	30
MCS3	9.287	8.252	7.408	30
MCS4	9.054	8.402	8.237	30
MCS5	10.277	9.734	9.559	30
MCS6	10.522	9.868	8.102	30
MCS7	10.598	8.668	8.367	30

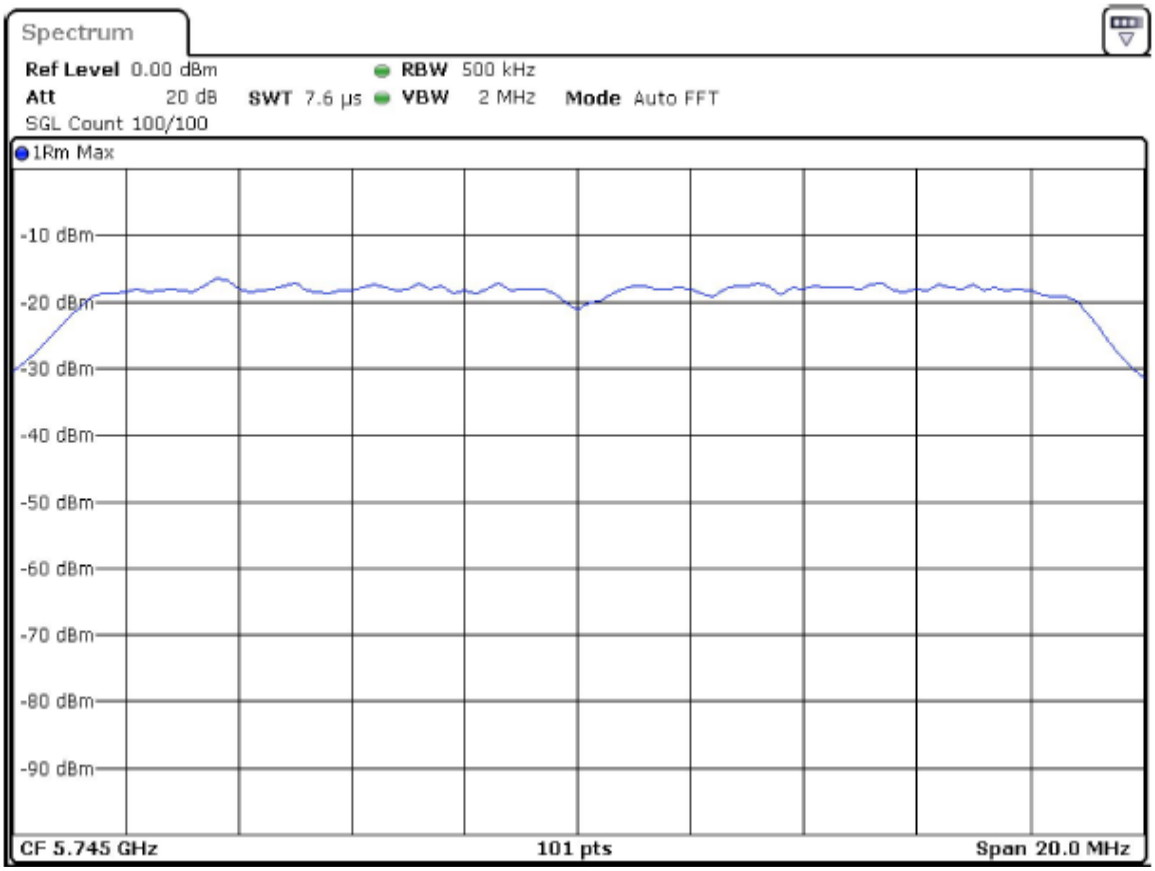
802.11n(HT20) MCS7 5745MHz



802.11ac(VHT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	5.220	5.510	5.032	30
MCS1	6.618	6.524	5.381	30
MCS2	7.669	6.601	6.609	30
MCS3	6.597	6.345	6.195	30
MCS4	6.927	6.749	4.607	30
MCS5	6.973	6.353	5.053	30
MCS6	7.364	6.198	6.510	30
MCS7	7.256	6.605	5.471	30
MCS8	5.990	4.871	4.713	30

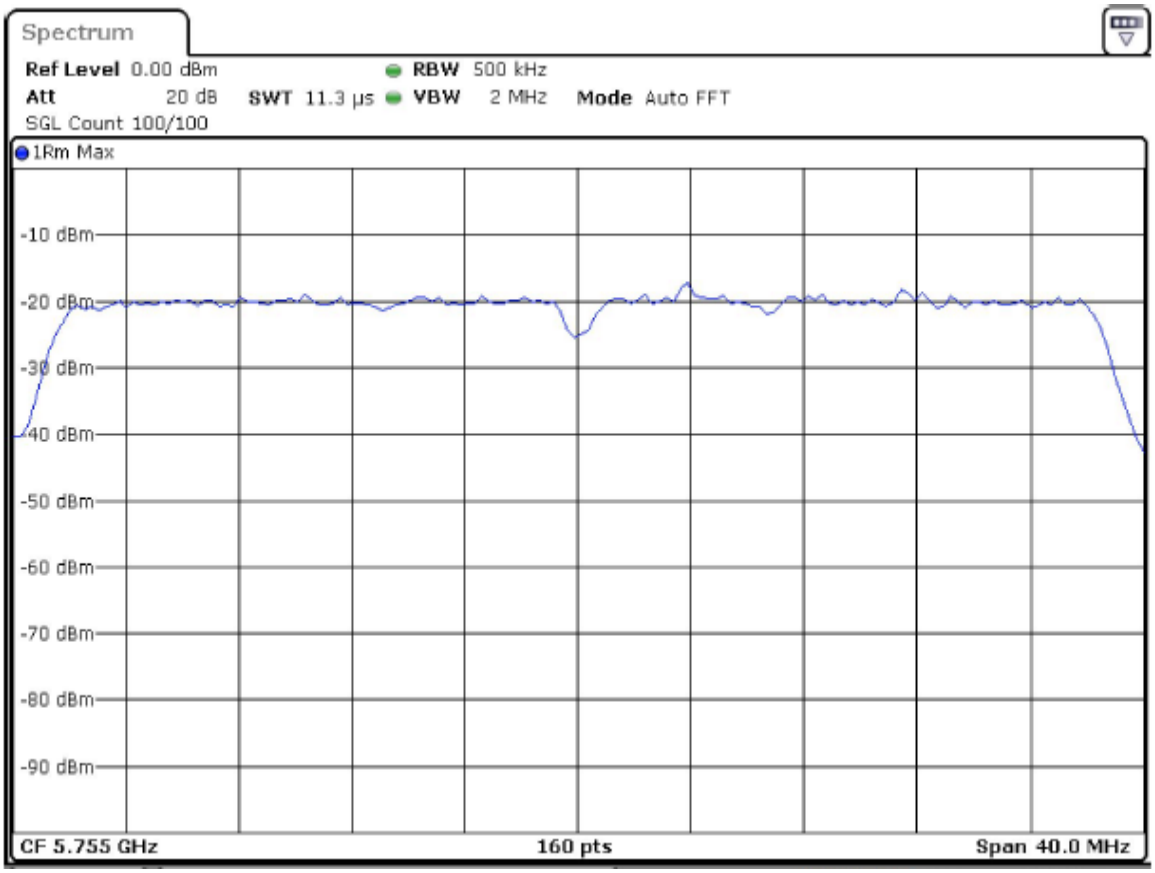
802.11ac(VHT20) MCS2 5745MHz



802.11n(HT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	3.928	3.633	30
MCS1	5.731	4.807	30
MCS2	5.598	5.172	30
MCS3	6.705	6.269	30
MCS4	7.794	6.9899	30
MCS5	7.568	6.550	30
MCS6	7.415	7.018	30
MCS7	8.936	6.811	30

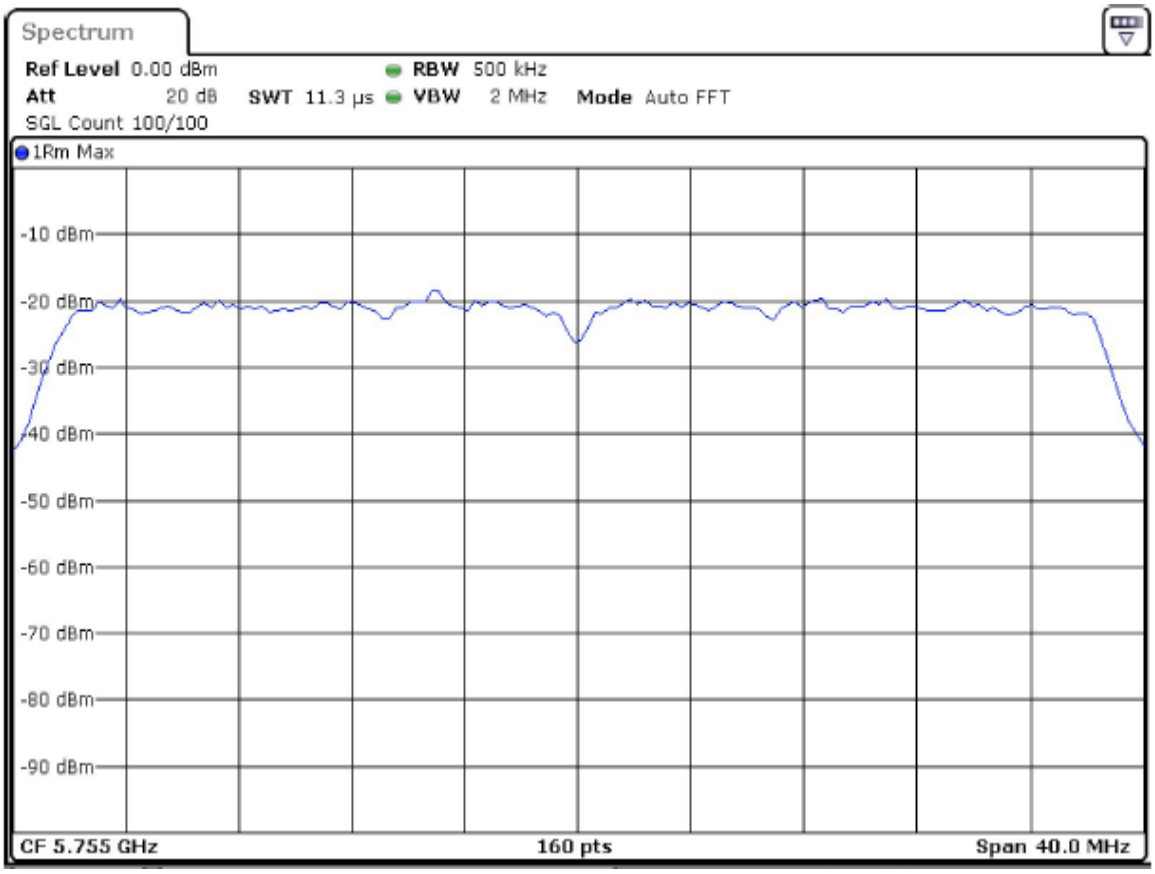
802.11n(HT40) MCS7 5755MHz



802.11ac(VHT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	3.785	3.428	30
MCS1	5.872	4.669	30
MCS2	5.514	4.527	30
MCS3	5.082	4.703	30
MCS4	5.288	3.396	30
MCS5	4.623	4.267	30
MCS6	4.703	3.896	30
MCS7	5.769	3.683	30
MCS8	3.742	2.986	30
MCS9	3.599	2.552	30

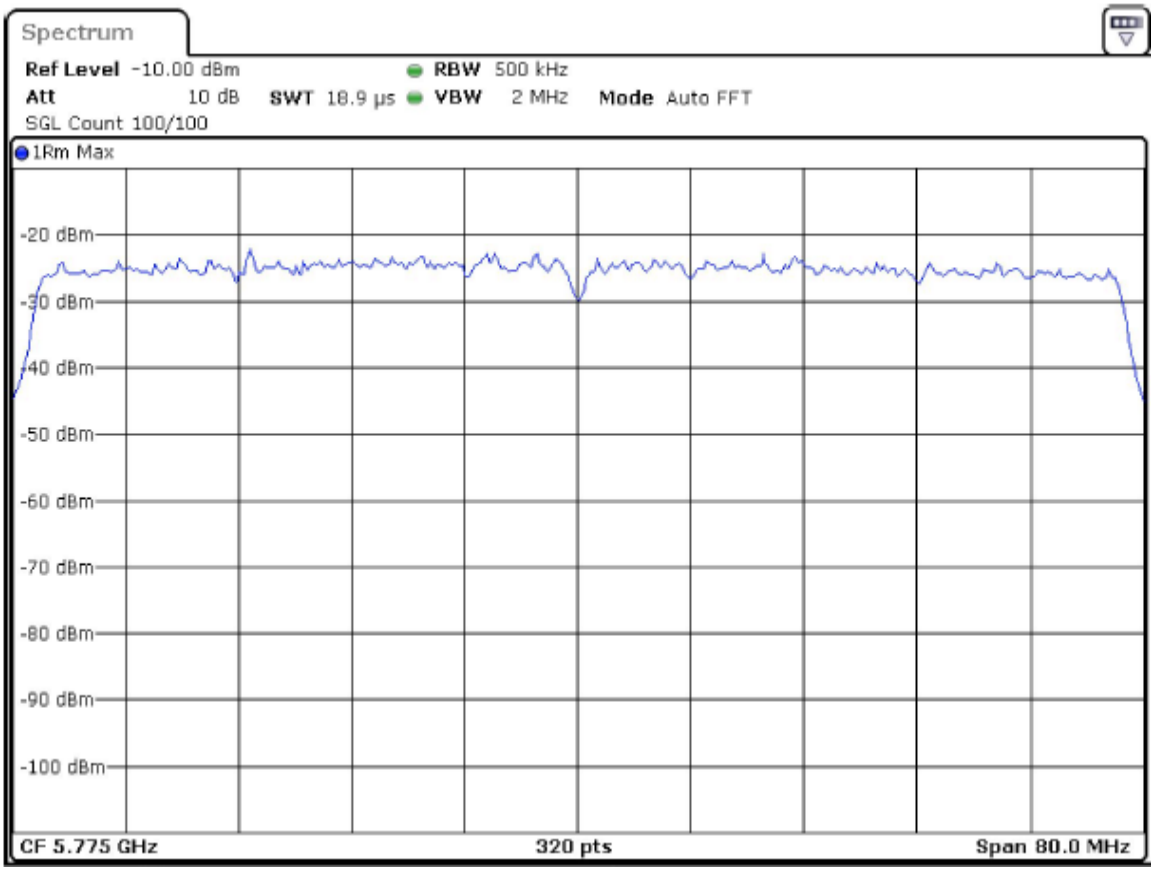
802.11ac(VHT40) MCS1 5755MHz



802.11ac(VHT80)

Data Rate	Peak PSD (dBm) 5775 MHz	Limit (dBm)
MCS0	1.378	30
MCS1	1.882	30
MCS2	3.302	30
MCS3	2.153	30
MCS4	1.505	30
MCS5	2.132	30
MCS6	1.802	30
MCS7	2.001	30
MCS8	0.236	30
MCS9	0.842	30

802.11ac(VHT80) MCS2 5775MHz



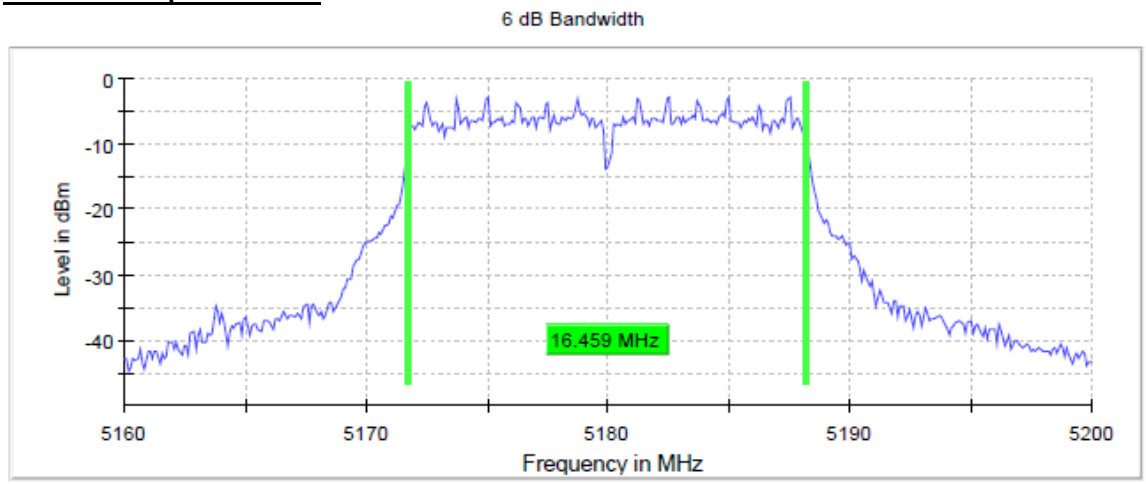
DTS Bandwidth (6dB)

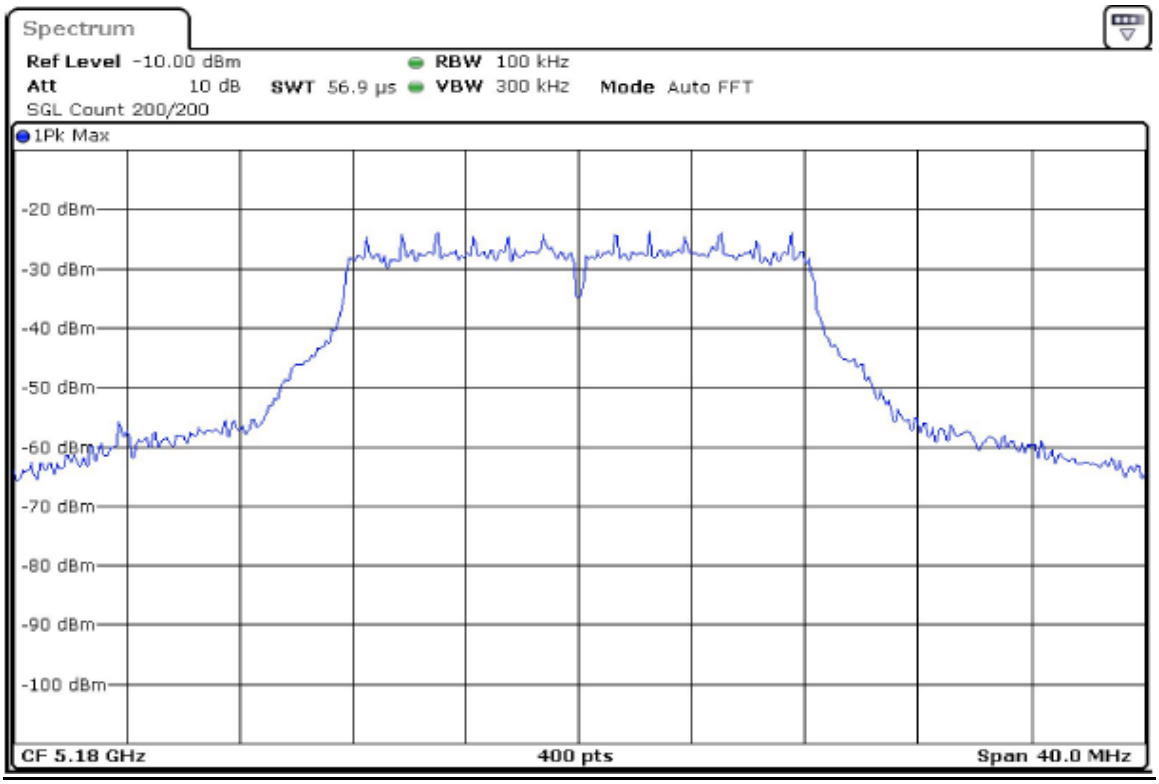
Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.C.2.
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

UNII-1

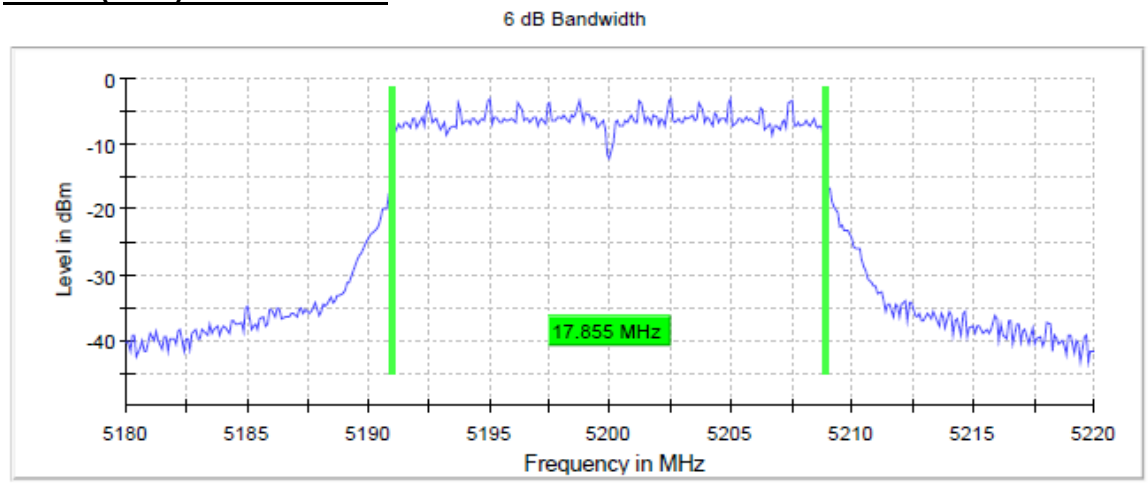
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 6 Mbps	5180.000	16.458853	0.5	5171.720698	5188.179551
802.11n(HT20) MSC2	5180.000	17.855361	0.5	5171.022444	5188.877805
802.11ac(VHT20) MCS1	5180.000	17.855361	0.5	5171.022444	5188.877805
802.11n(HT40) MSC7	5190.000	36.654183	0.5	5171.622971	5208.277154
802.11ac(VHT40) MCS1	5190.000	36.554308	0.5	5171.722846	5208.277154
802.11a 6 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) MCS1	5200.000	17.855361	0.5	5191.022444	5208.877805
802.11ac(VHT80) MSC0	5210.000	76.152405	0.5	5172.02373	5248.17614
802.11n(VHT40) MCS7	5230.000	36.654183	0.5	5211.622971	5248.277154
802.11ac(VHT40) MCS1	5230.000	36.554308	0.5	5211.72284	5248.27715
802.11a 6 Mbps	5240.000	16.458853	0.5	5231.720698	5248.179551
802.11n(HT20) MSC2	5240.000	17.855361	0.5	5231.022444	5248.877805
802.11ac(VHT20) MCS1	5240.000	17.855361	0.5	5231.022444	5248.877805

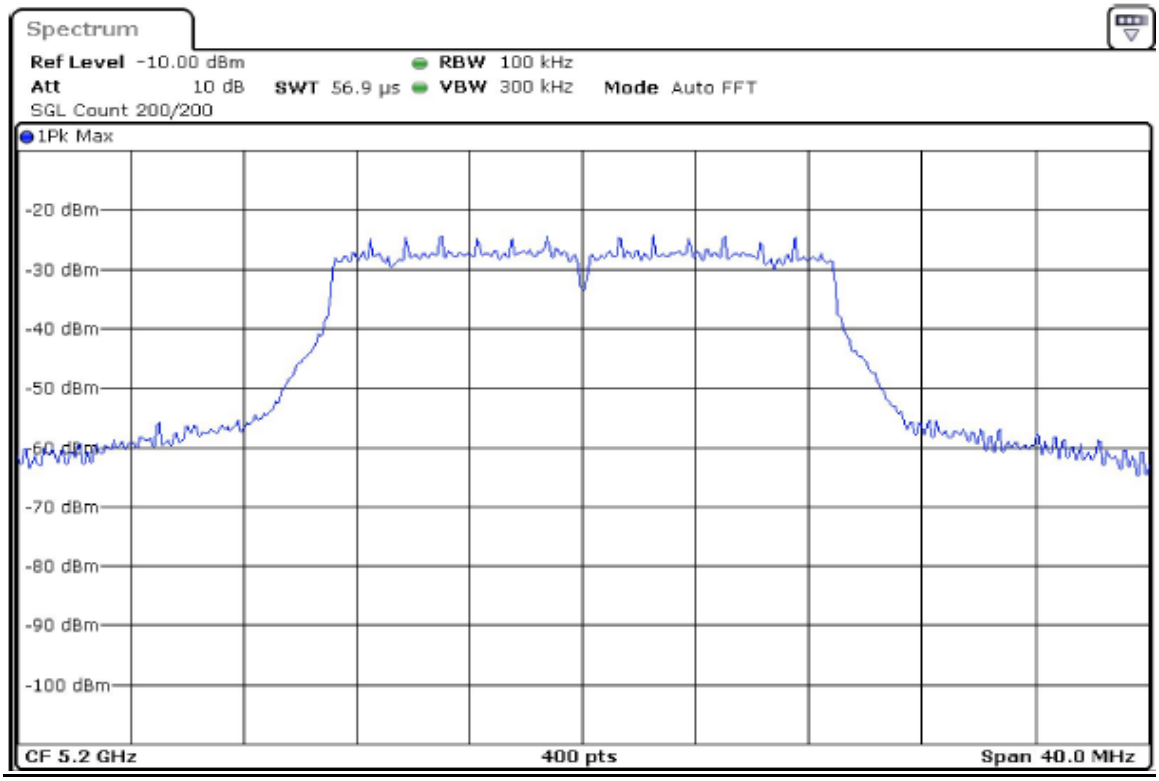
802.11a 6 Mbps 5180MHz



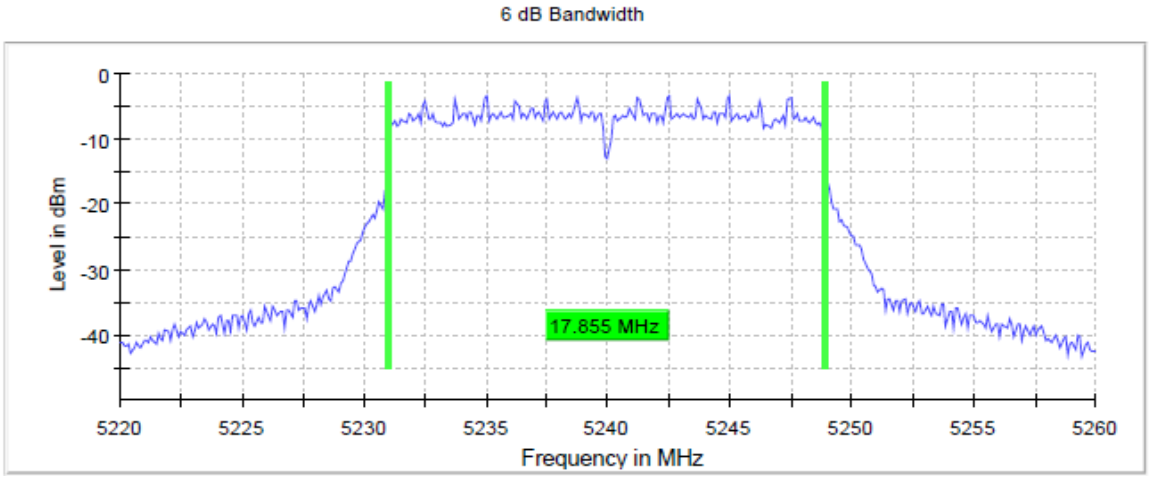


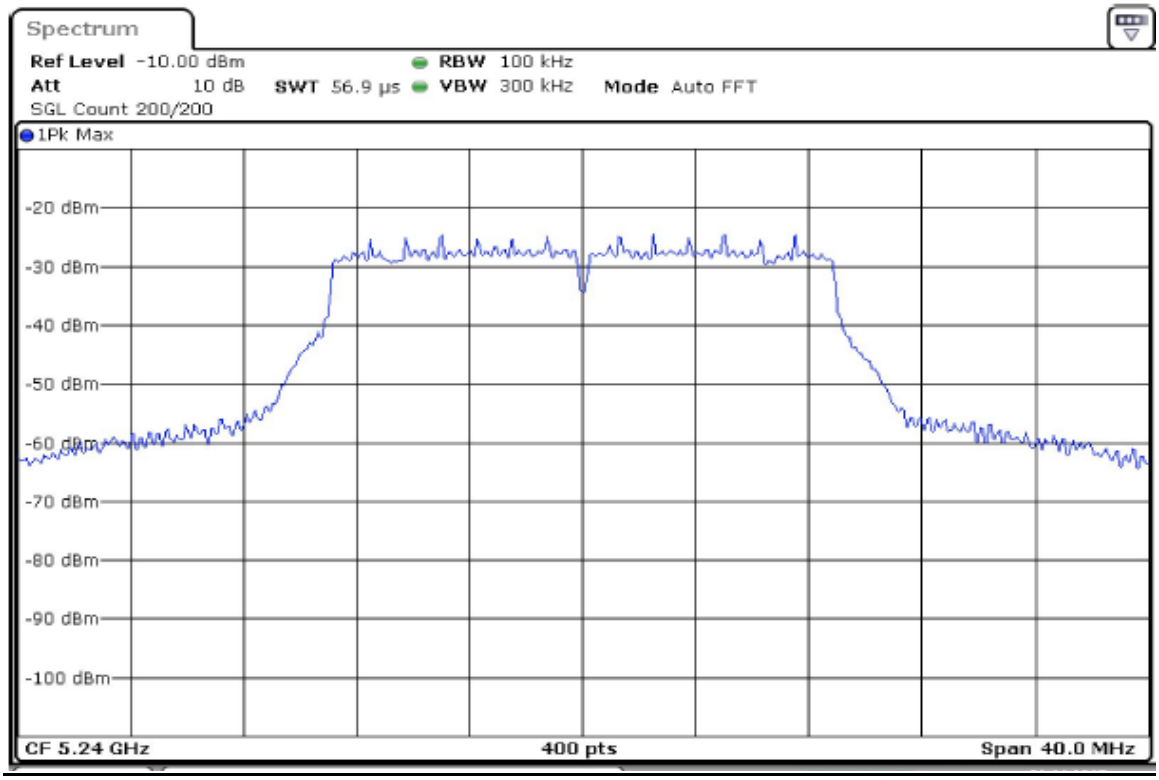
802.11n(HT20) MCS2 5200MHz



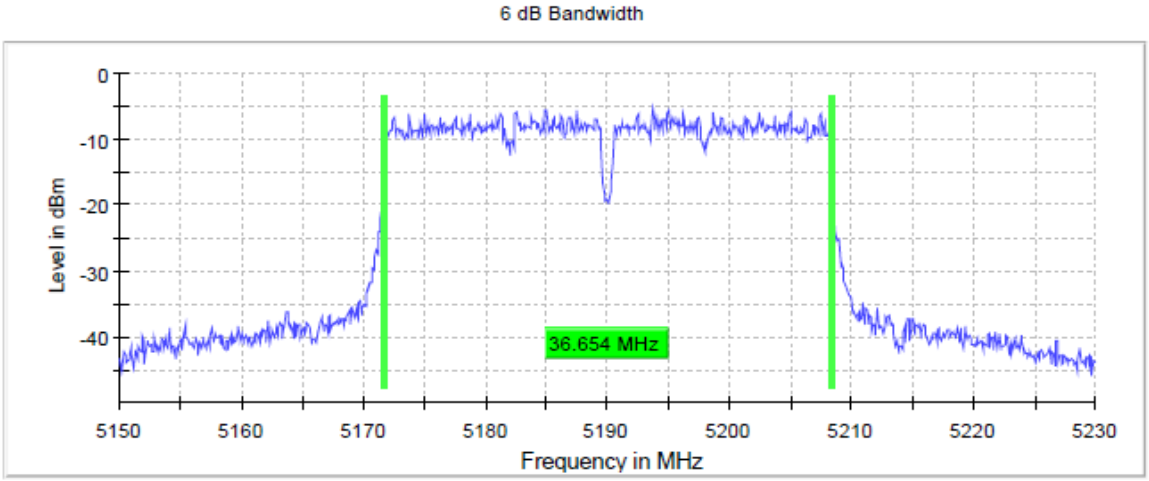


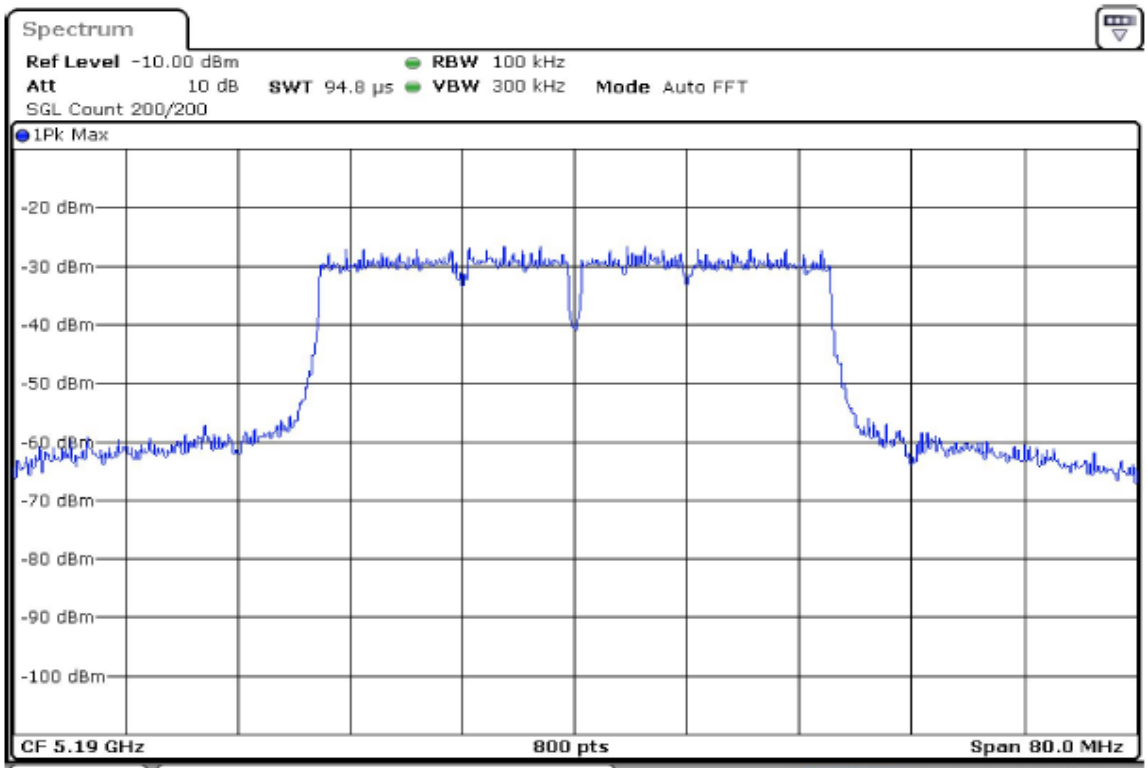
802.11ac(VHT20) MCS1 5240MHz



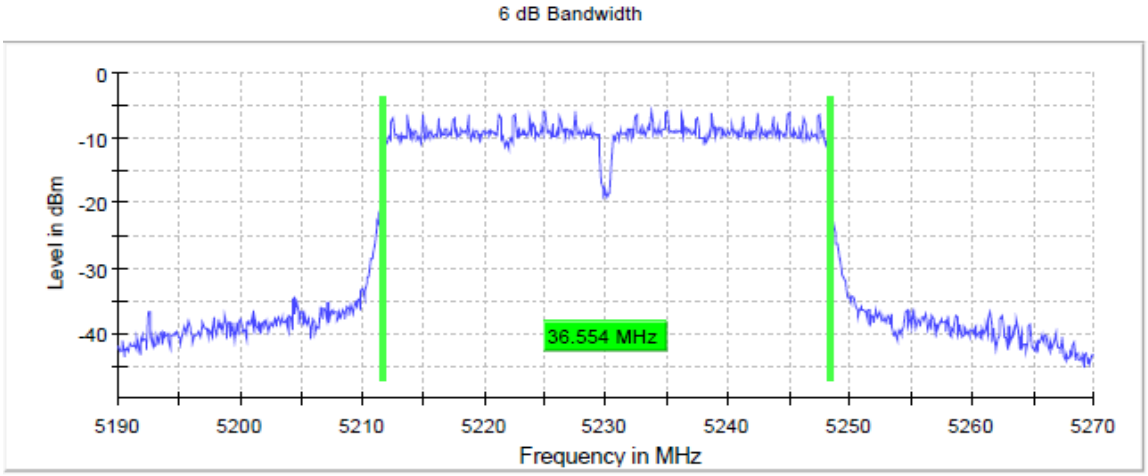


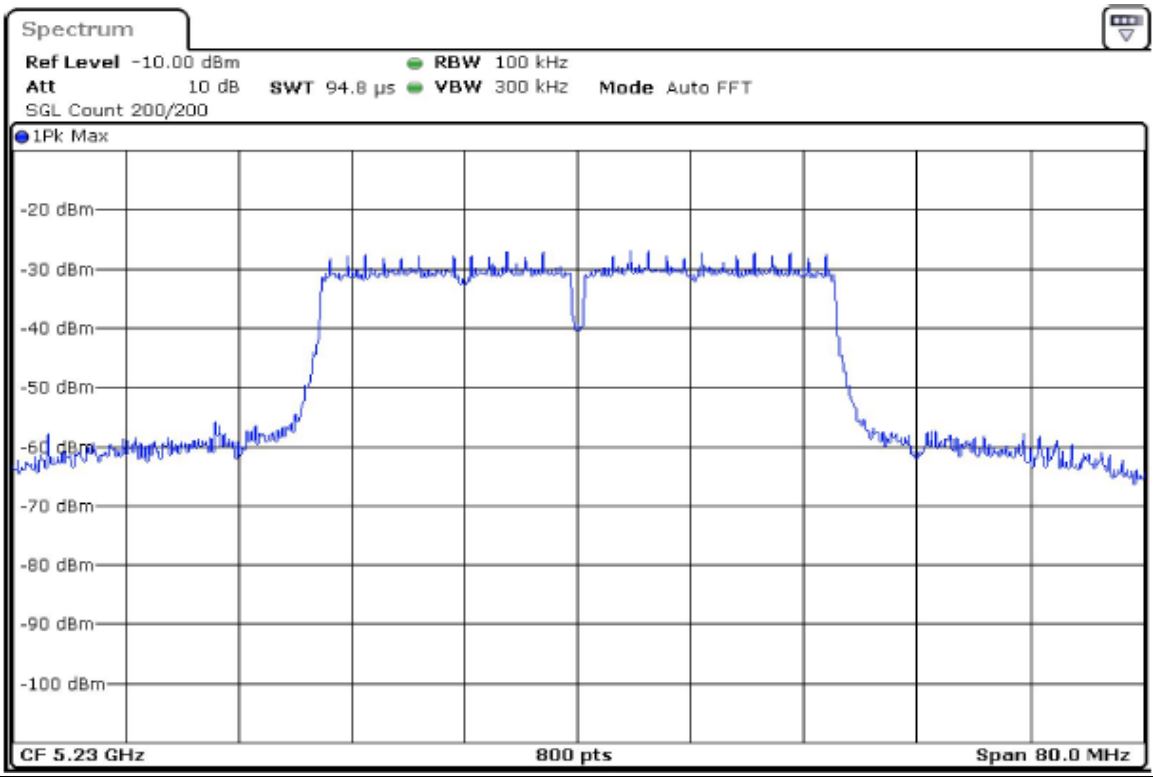
802.11n(HT40) MCS7 5190 MHz



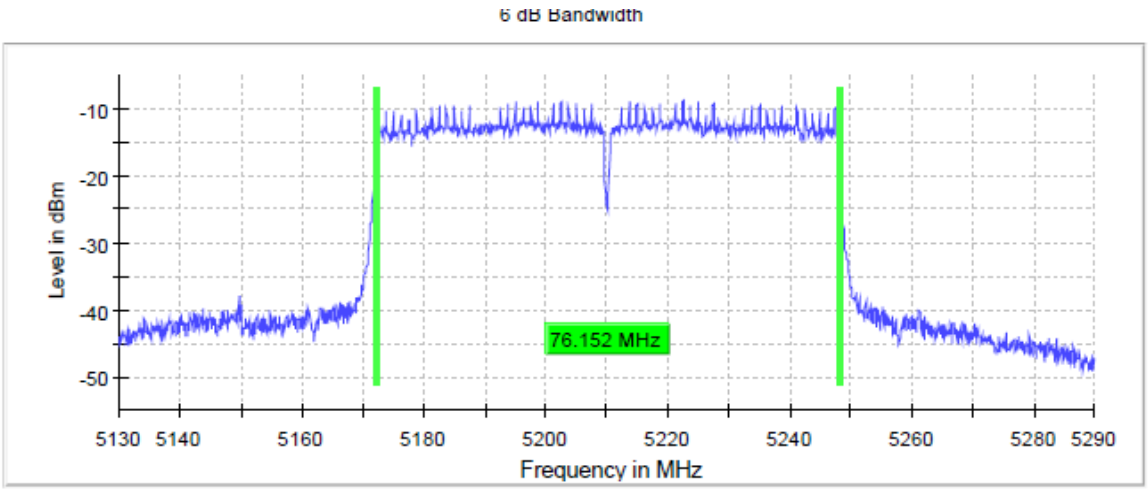


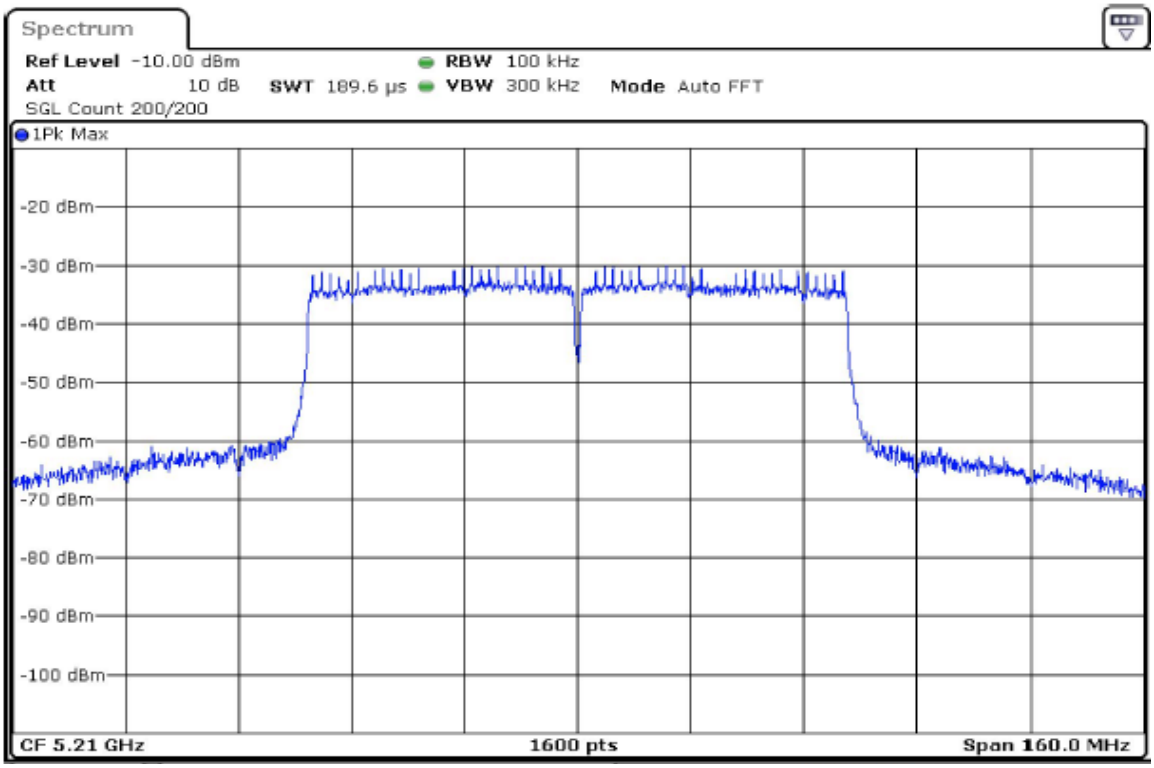
802.11ac(VHT40) MCS1 5230MHz





802.11ac(VHT80) MCS0 5210MHz

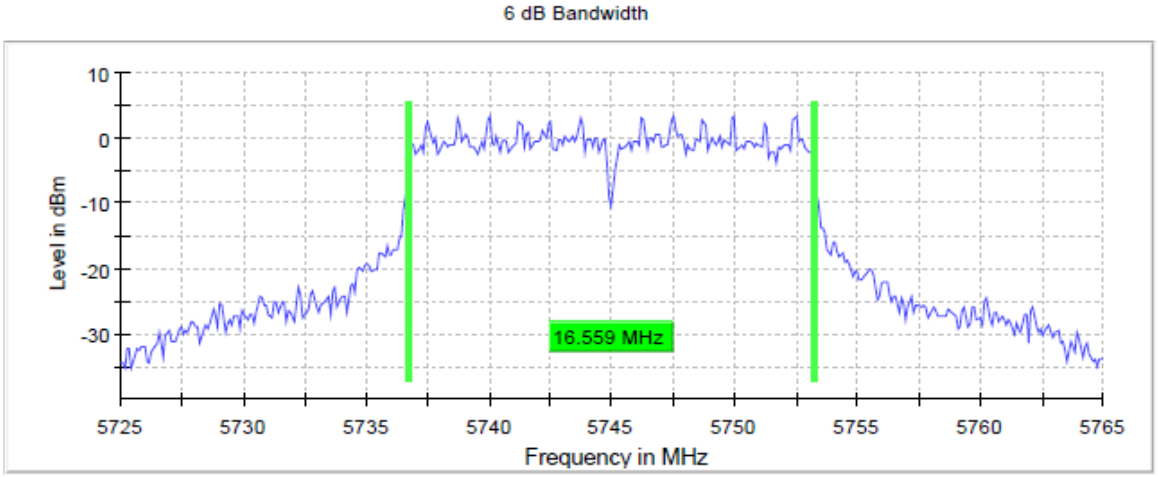


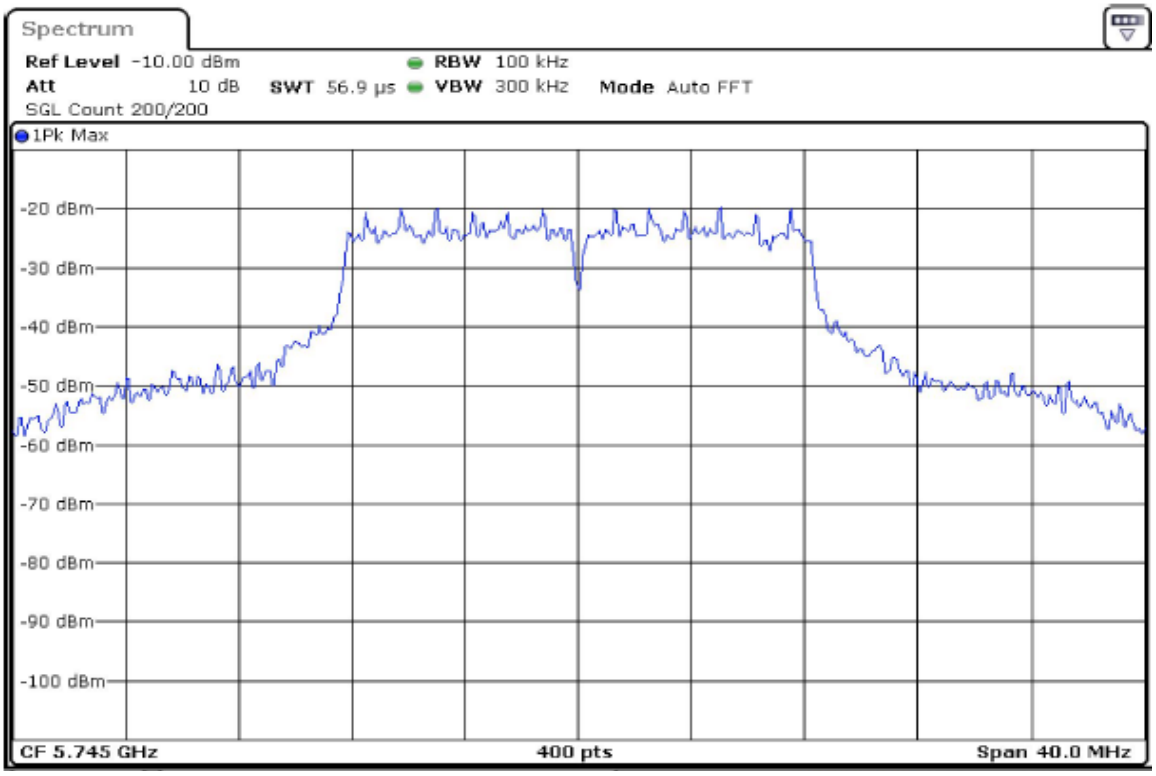


UNII-3

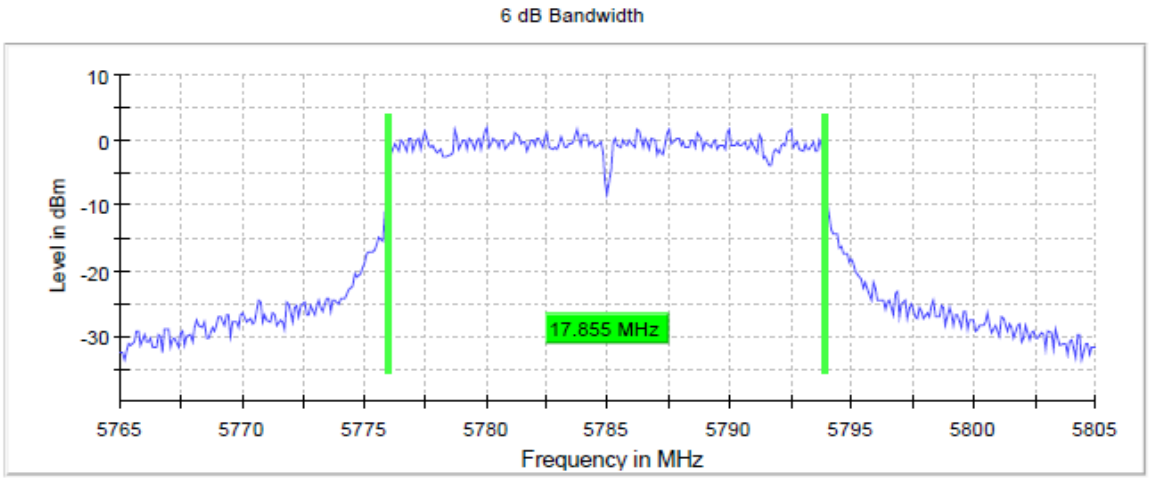
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 48 Mbps	5745.00	16.558604	0.5	5736.720698	5753.279302
802.11n(HT20) MSC6	5745.00	17.855361	0.5	5736.022444	5753.877805
802.11ac(VHT20) MCS0	5745.00	17.755610	0.5	5736.122195	5753.877805
802.11n(HT40) MSC6	5755.00	36.654183	0.5	5736.622971	5773.277154
802.11ac(VHT40) MCS0	5755.00	36.454432	0.5	5736.722846	5773.177278
802.11ac(VHT80) MCS2	5775.00	76.452217	0.5	5736.723923	5813.176140
802.11a 48 Mbps	5785.00	16.558604	0.5	5776.720698	5793.279302
802.11n(HT20) MSC6	5785.00	17.855361	0.5	5776.022444	5793.877805
802.11ac(VHT20) MCS0	5785.00	17.755610	0.5	5776.122195	5793.877805
802.11n(HT40) MSC6	5795.00	36.654183	0.5	5776.622971	5813.277154
802.11ac(VHT40) MCS0	5795.00	36.454432	0.5	5776.722846	5813.177278
802.11a 48 Mbps	5825.00	16.458853	0.5	5816.720698	5833.179551
802.11n(HT20) MSC6	5825.00	17.955112	0.5	5816.022444	5833.977556
802.11ac(VHT20) MCS0	5825.00	17.755610	0.5	5816.122195	5833.877805

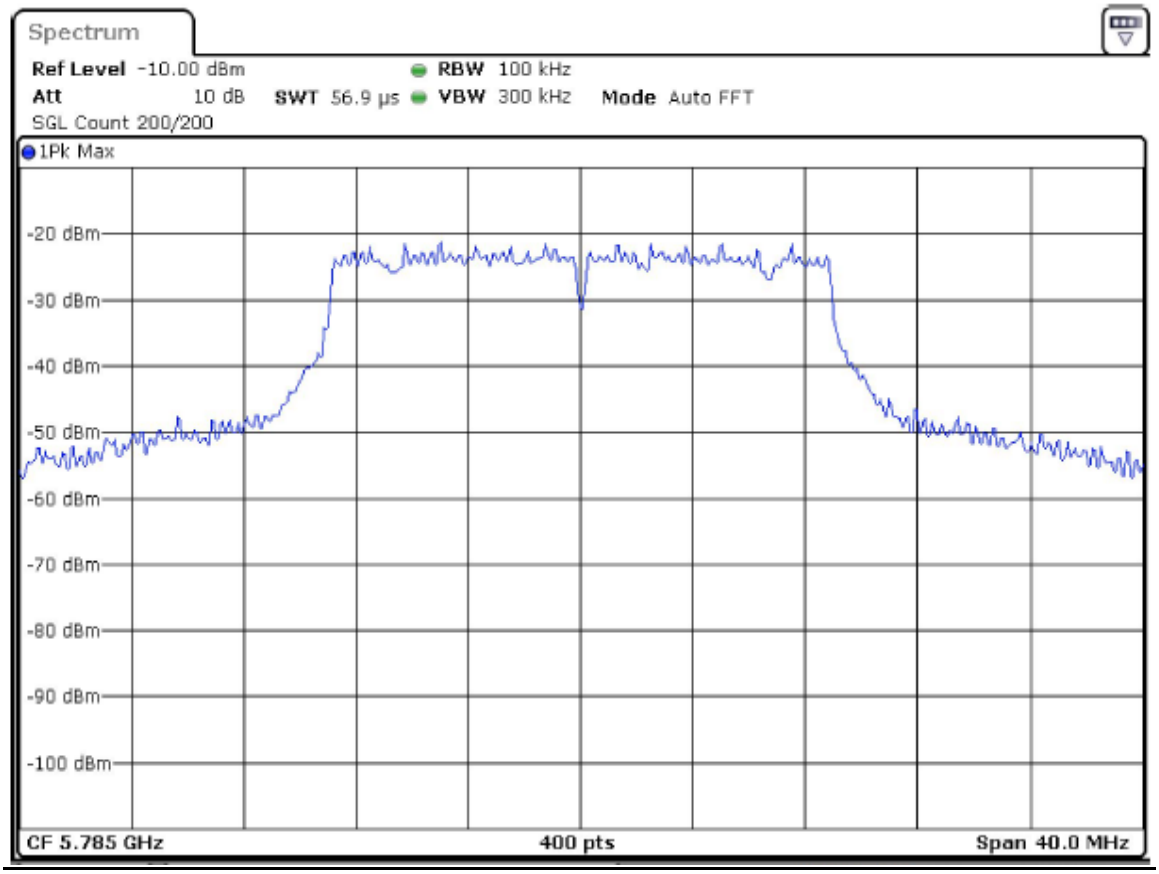
802.11a 48 Mbps 5745MHz



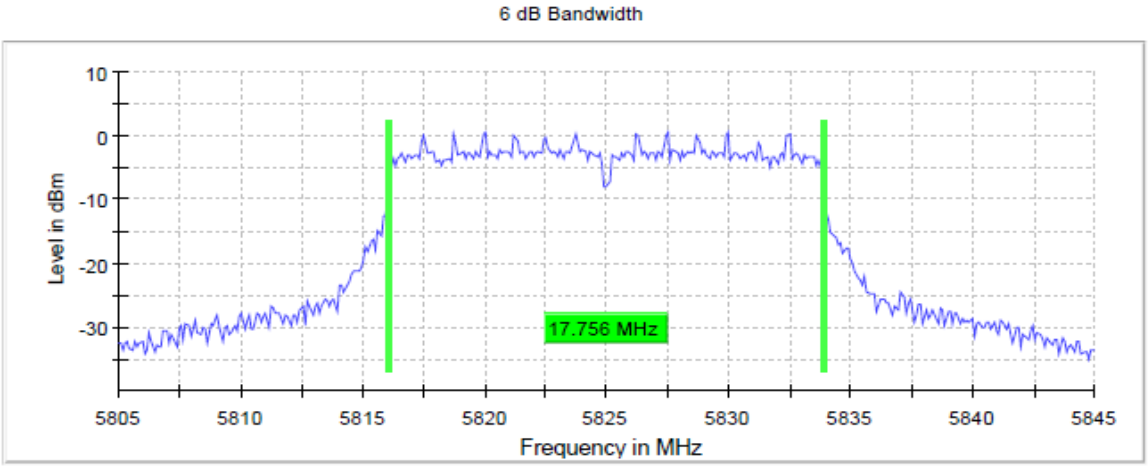


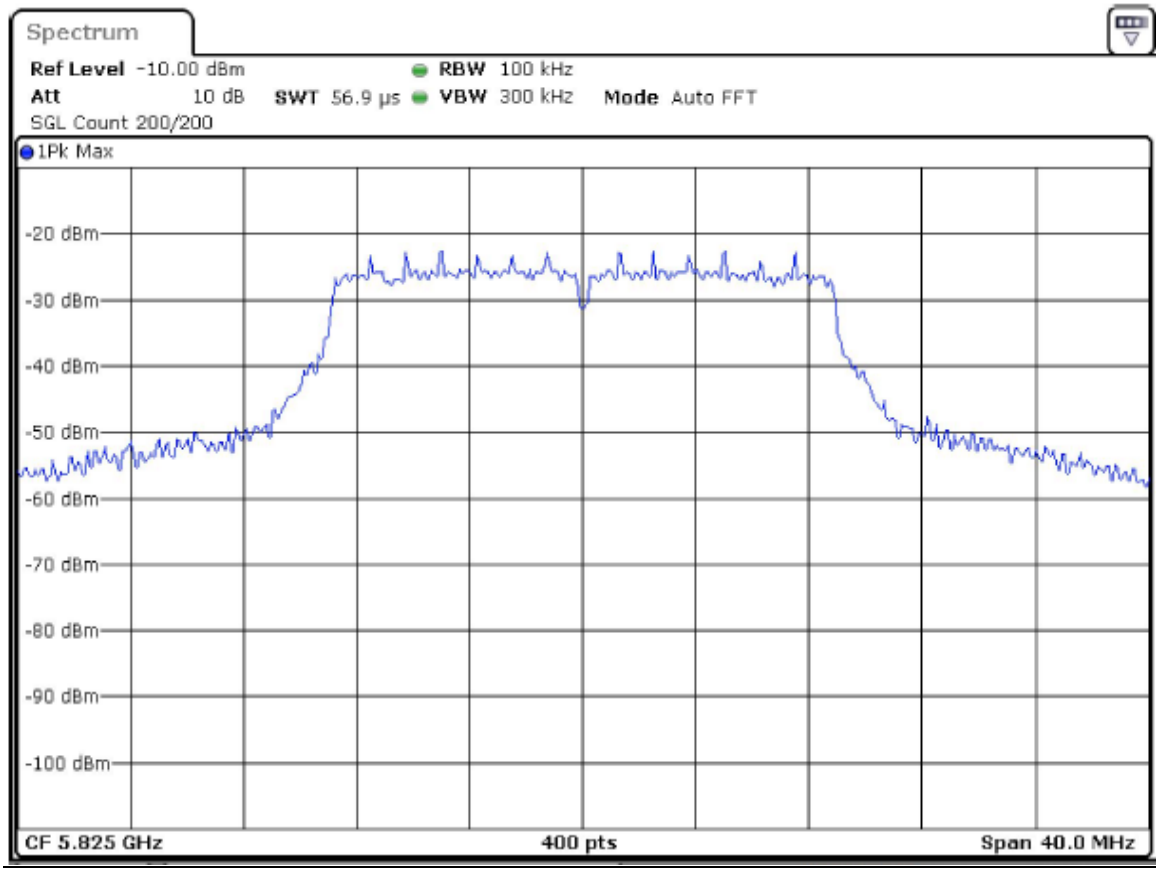
802.11n(HT20) MCS6 5785MHz



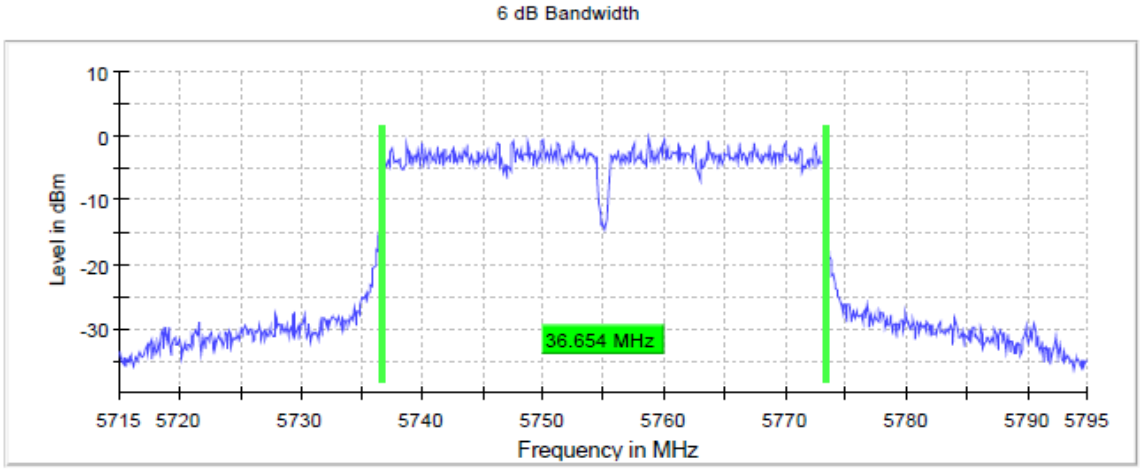


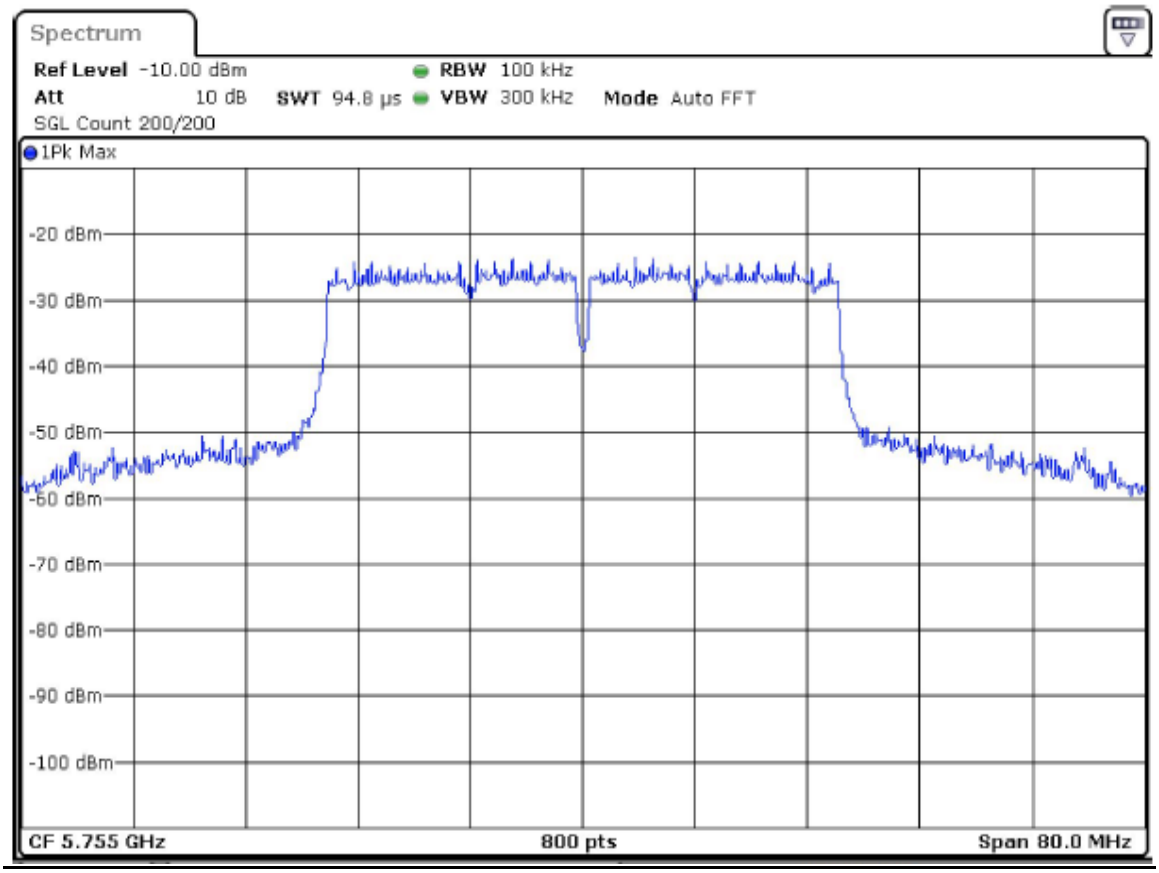
802.11ac(VHT20) MCS0 5825MHz



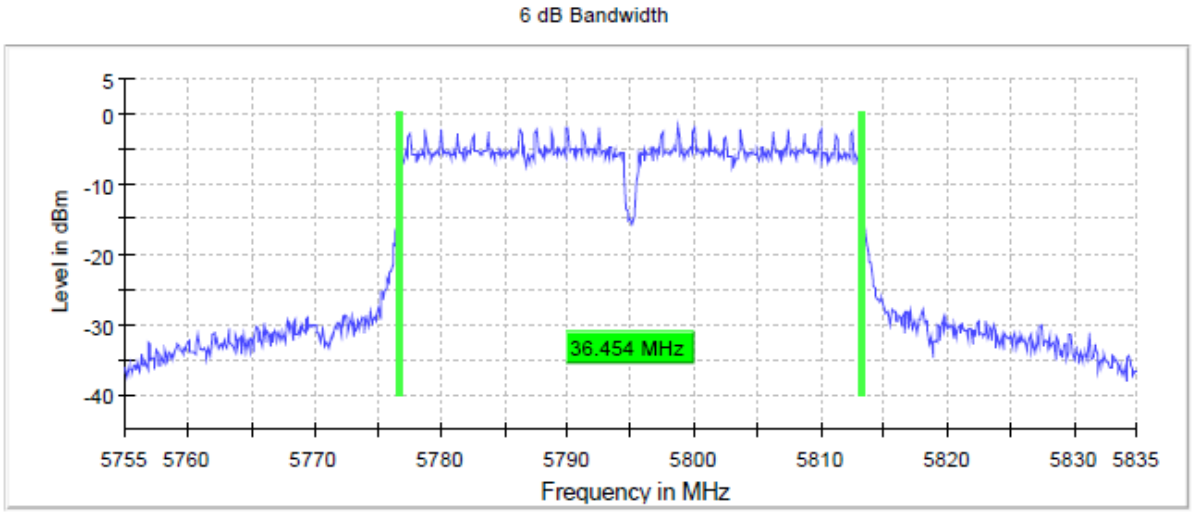


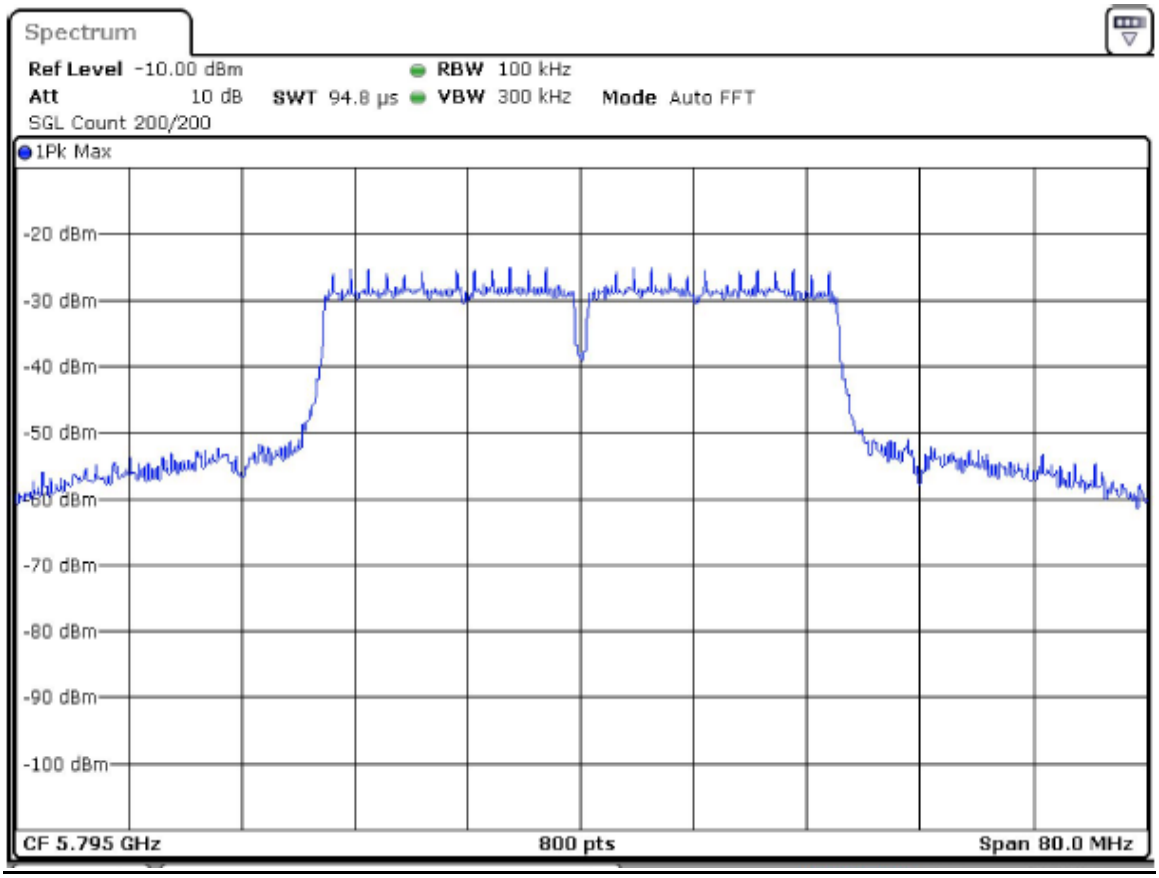
802.11n(HT40) MCS6 5755MHz



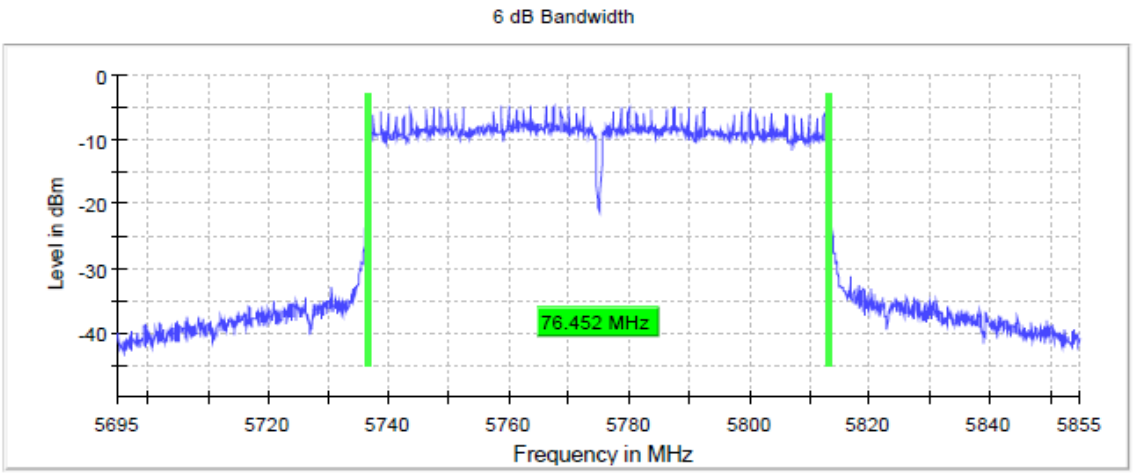


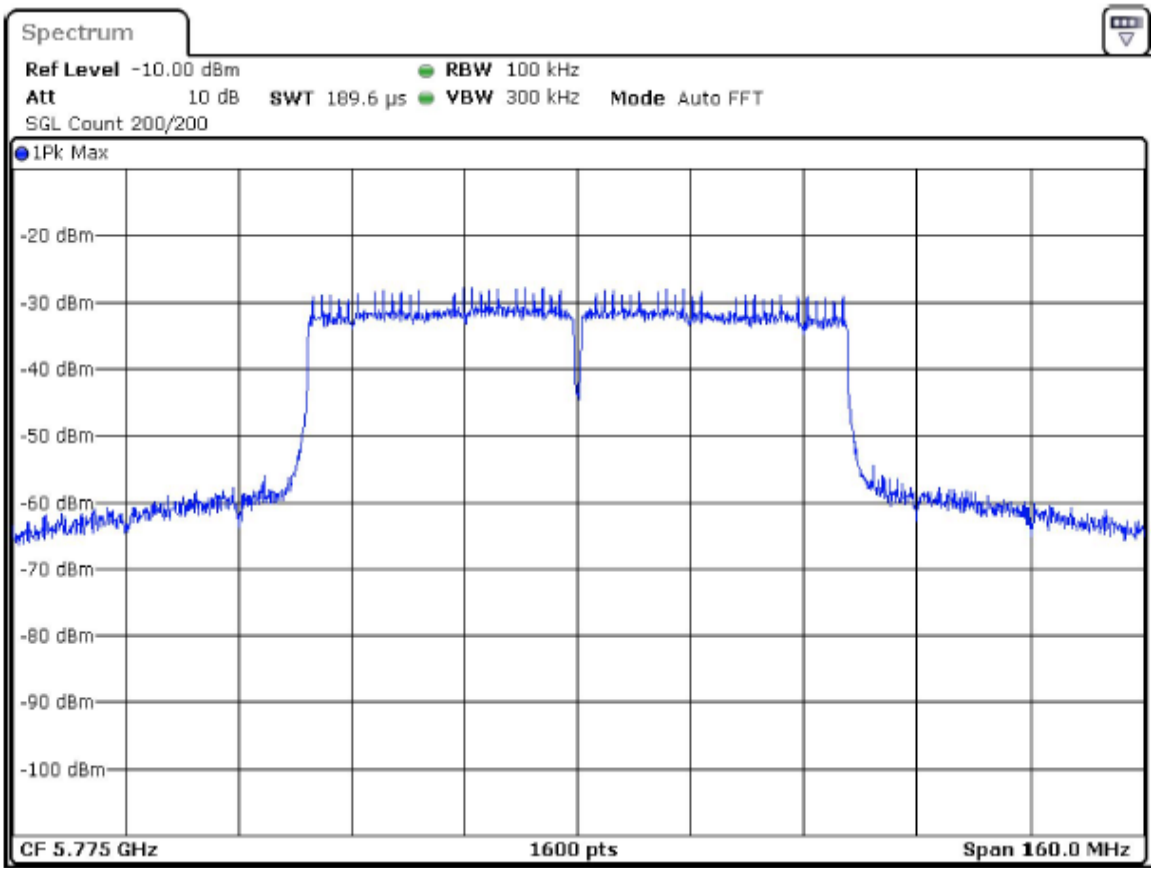
802.11ac(VHT40) MCS0 5795MHz





802.11ac(VHT80) MCS2 5775MHz





Occupied Channel Bandwidth 99%

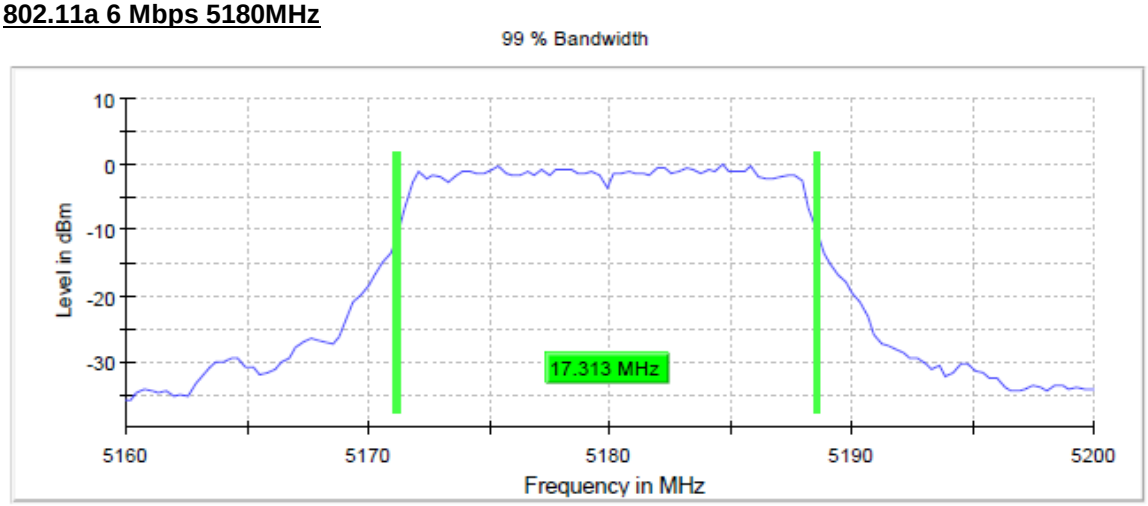
Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04 Section II.D.

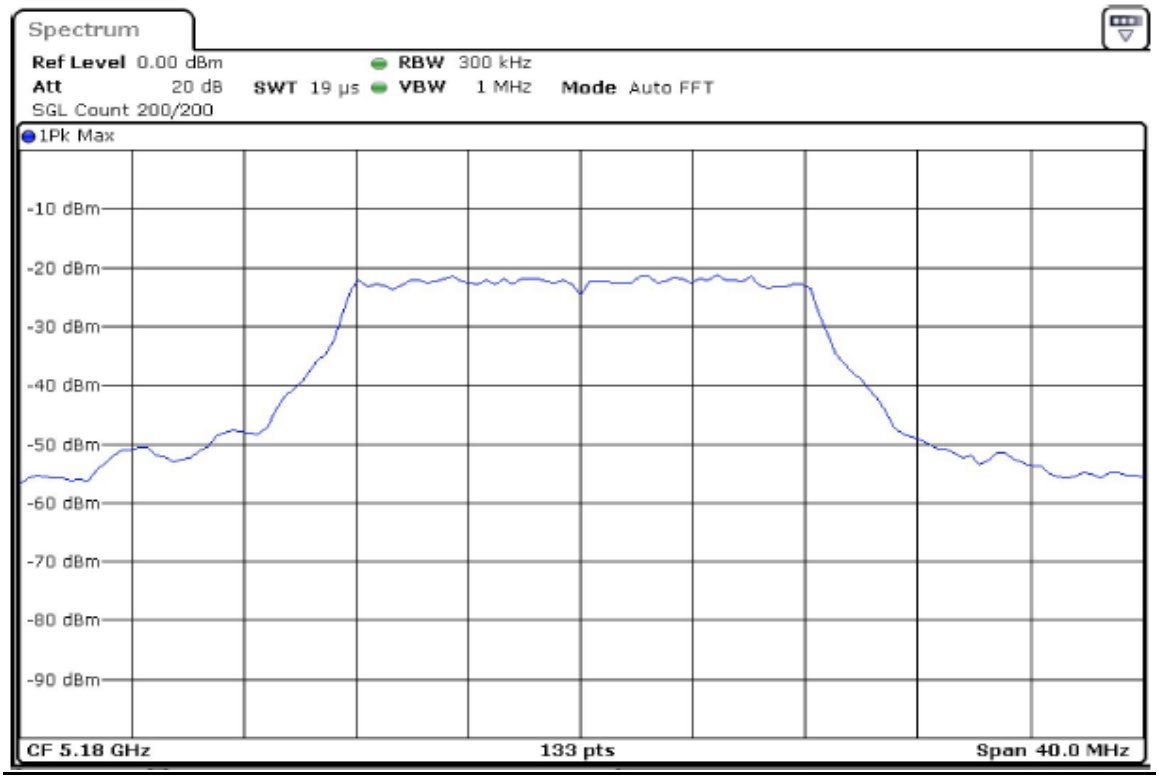
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

UNII-1

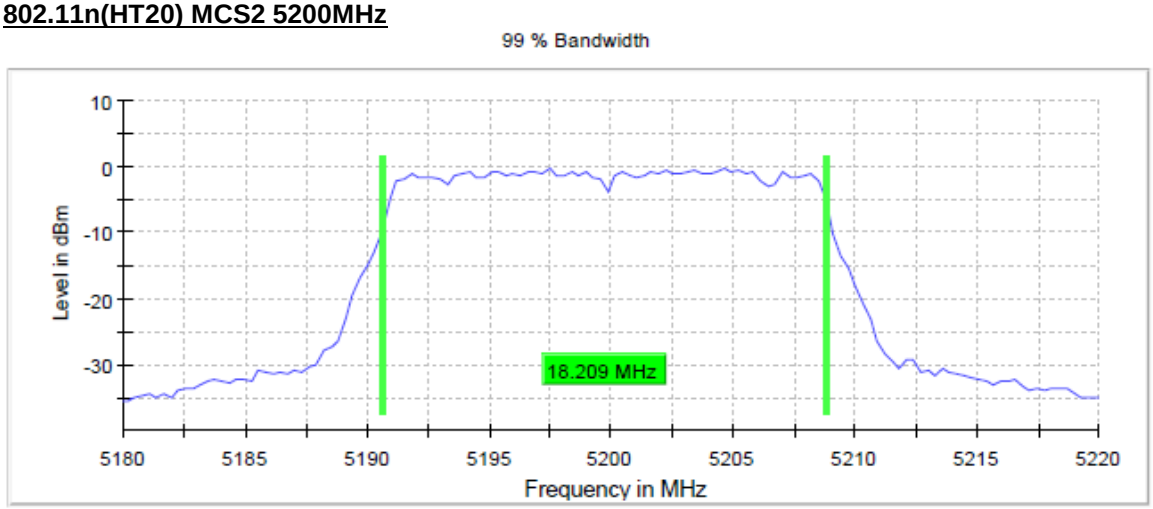
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 6 Mbps	5180.000	17.313433	5171.19403	5188.50746	5150-5250
802.11n(HT20) MSC2	5180.000	18.208956	5170.895522	5189.104478	5150-5250
802.11ac(VHT20) MCS1	5180.000	17.910448	5170.895522	5188.805970	5150-5250
802.11n(HT40) MSC7	5190.000	36.273292	5171.614907	5207.888199	5150-5250
802.11ac(VHT40) MCS1	5190.000	36.273292	5171.614907	5207.888199	5150-5250
802.11a 6 Mbps	5200.000	17.313433	5191.194030	5208.507463	5150-5250
802.11n(HT20) MSC2	5200.000	18.208955	5190.597015	5208.805970	5150-5250
802.11ac(VHT20) MCS1	5200.000	17.910448	5190.895522	5208.80597	5150-5250
802.11ac(VHT80) MSC0	5210.000	76.521739	5171.242236	5247.763975	5150-5250
802.11n(VHT40) MCS7	5230.000	36.273292	5211.614907	5247.888199	5150-5250
802.11ac(VHT40) MCS1	5230.000	36.273292	5211.614907	5247.888199	5150-5250
802.11a 6 Mbps	5240.000	17.313433	5231.194030	5248.507463	5150-5250
802.11n(HT20) MSC2	5240.000	18.208956	5230.895522	5249.104478	5150-5250
802.11ac(VHT20) MCS1	5240.000	18.208956	5230.895522	5249.104478	5150-5250

802.11a 6 Mbps 5180MHz

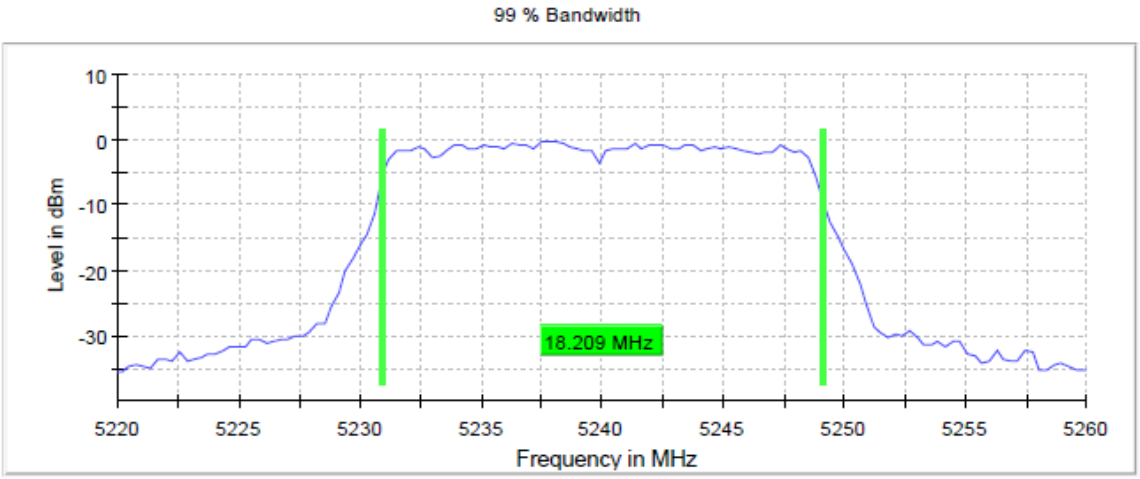


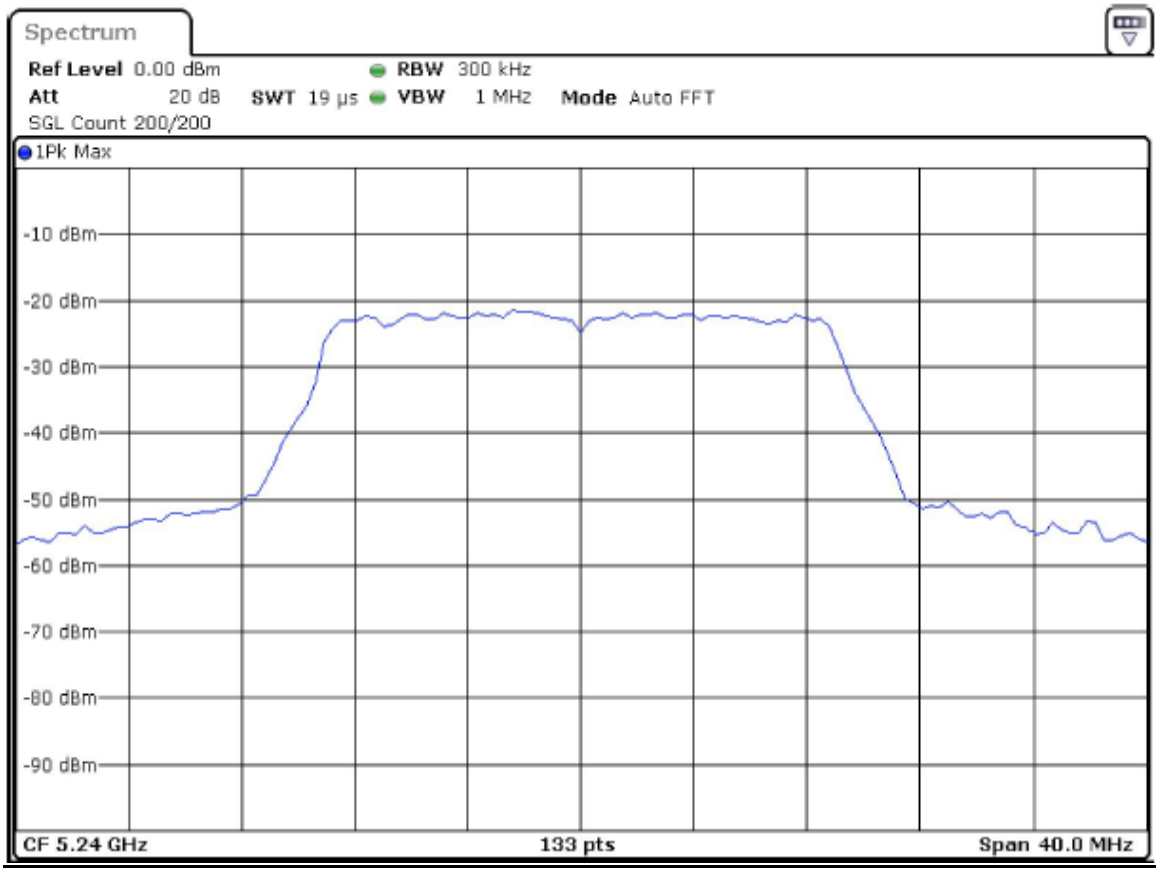


802.11n(HT20) MCS2 5200MHz

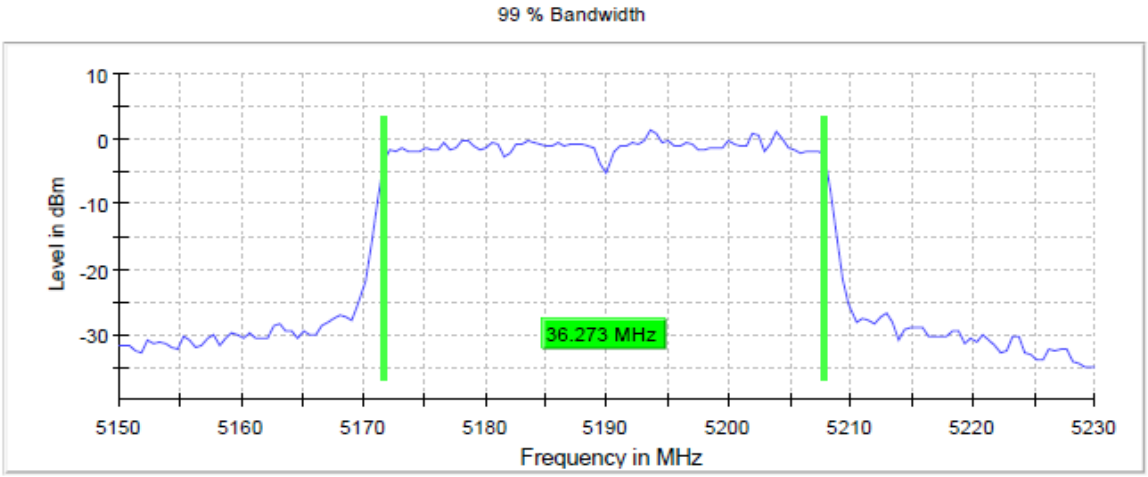


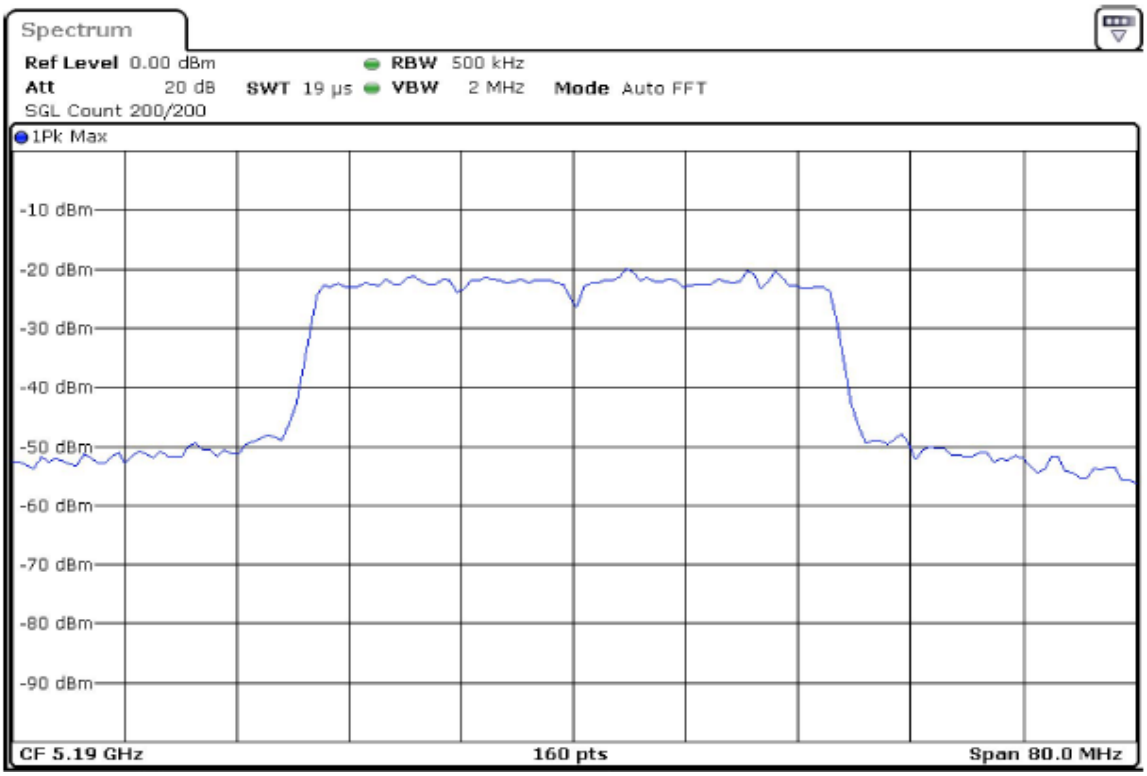
802.11ac(VHT20) MCS1 5240MHz



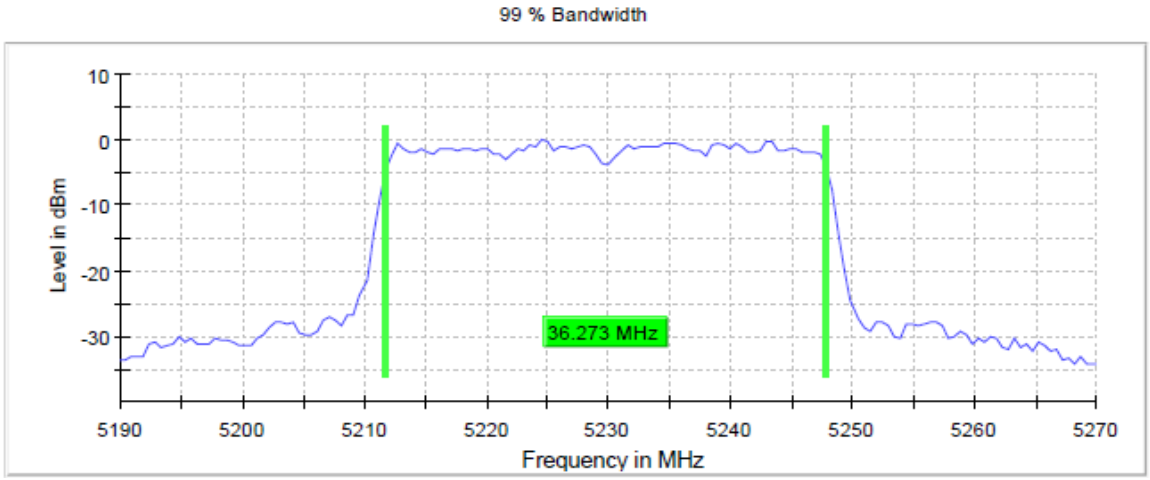


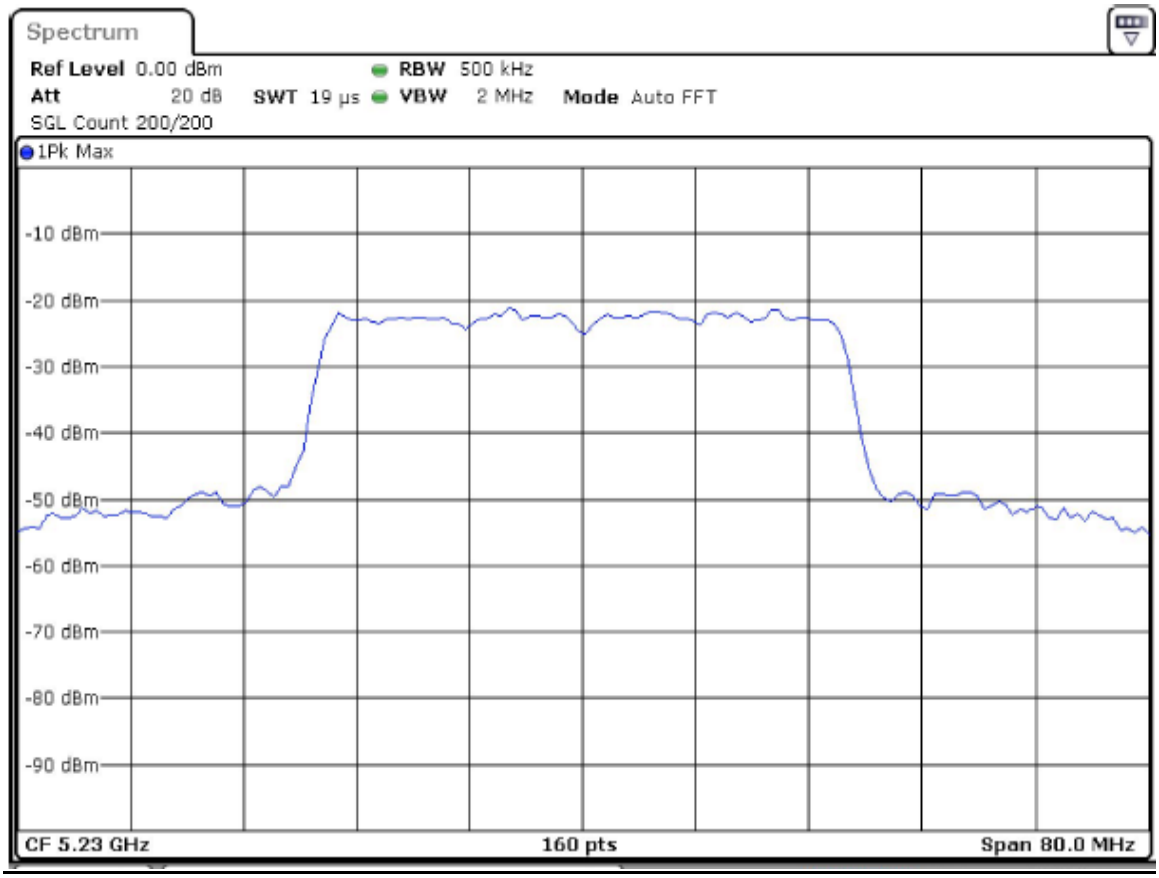
802.11n(HT40) MCS7 5190 MHz



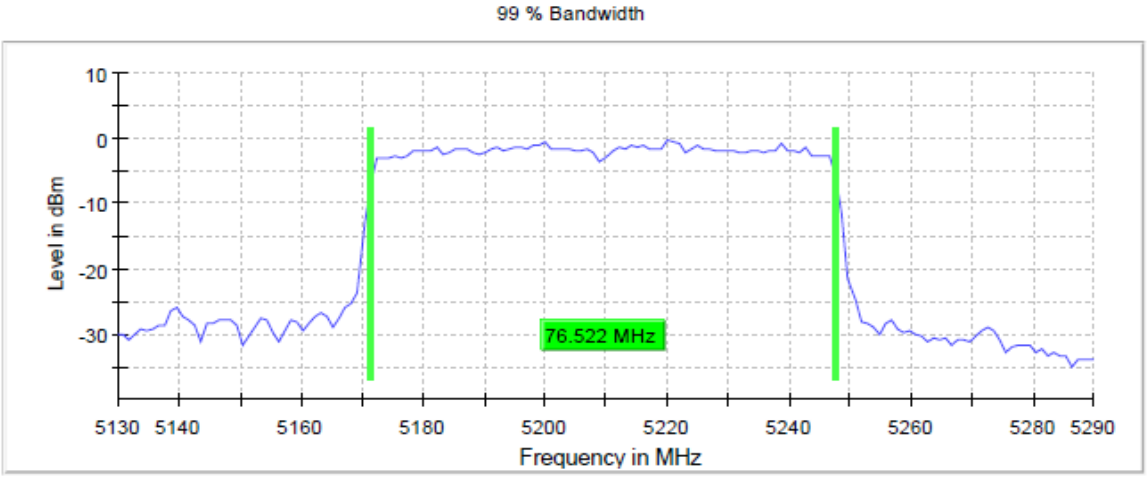


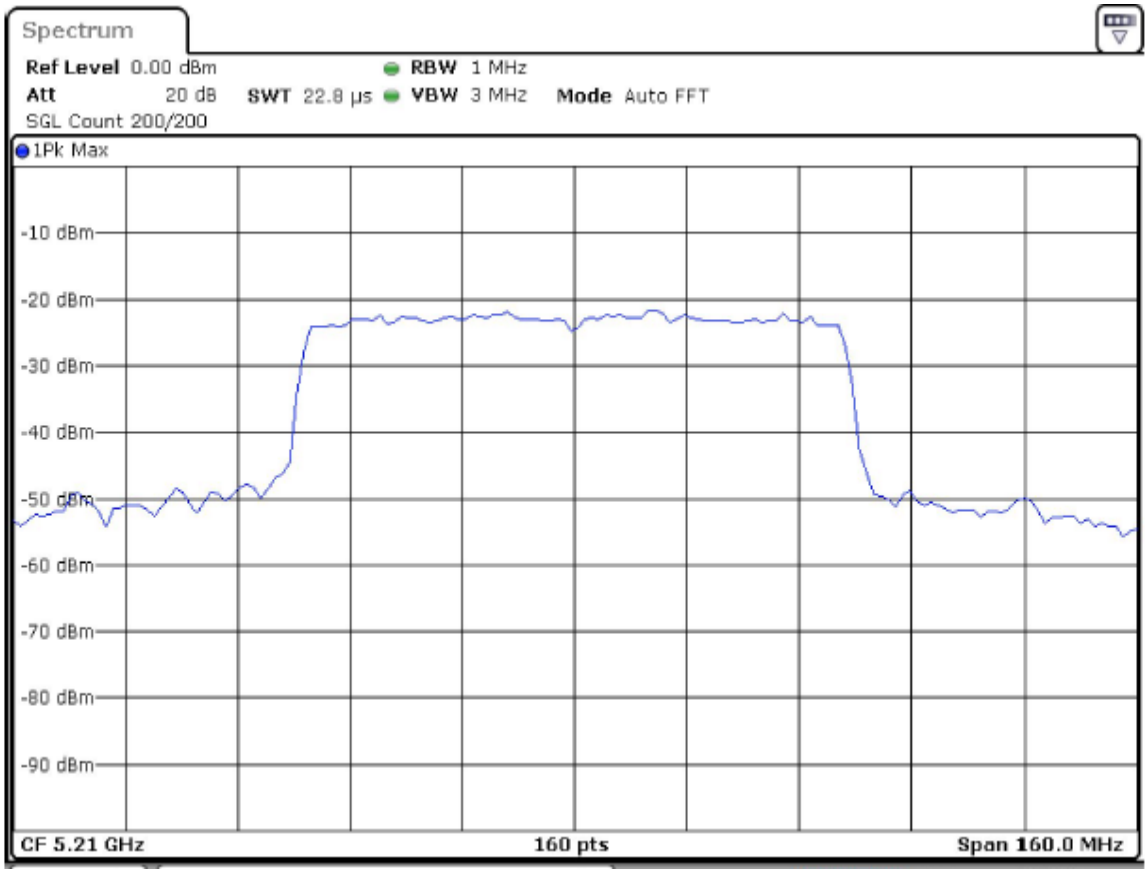
802.11ac(VHT40) MCS1 5230MHz





802.11ac(VHT80) MCS0 5210MHz

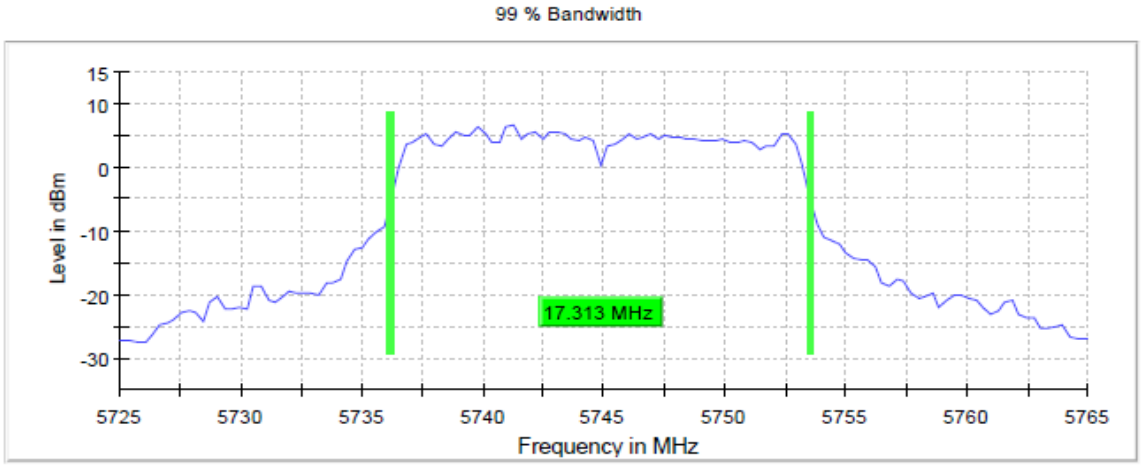


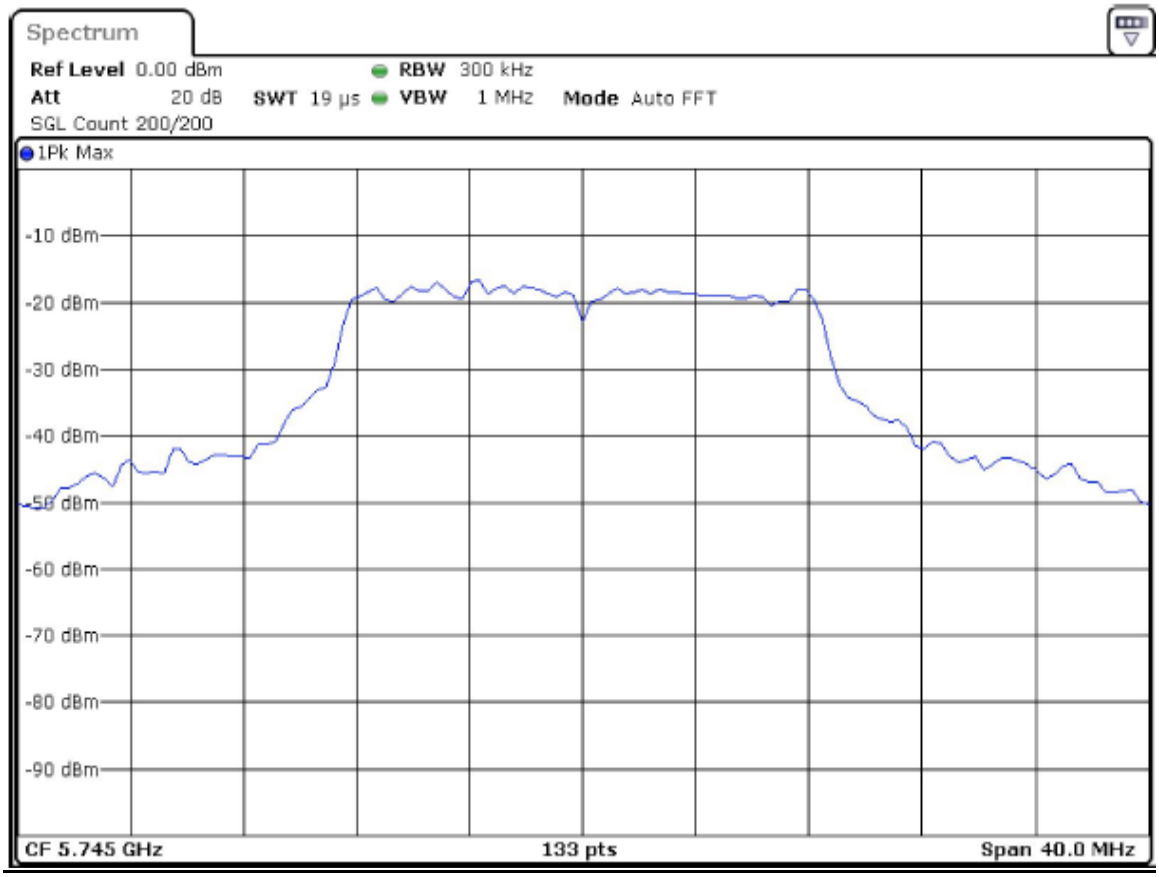


UNII-3

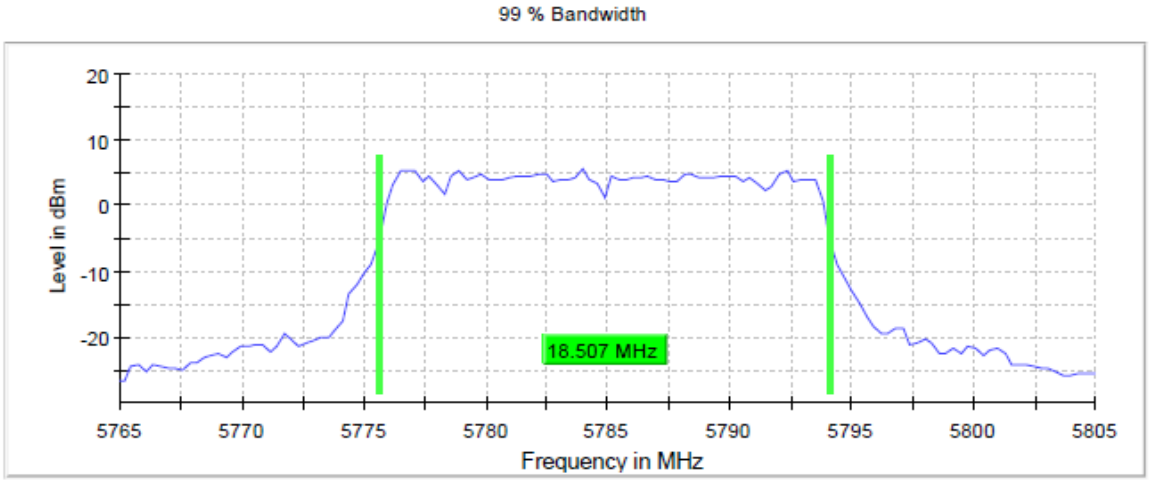
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 48 Mbps	5745.00	17.313433	5736.194030	5753.507463	5725-5850
802.11n(HT20) MSC6	5745.00	18.208956	5735.895522	5754.104478	5725-5850
802.11ac(VHT20) MCS0	5745.00	18.507463	5735.597015	5754.104478	5725-5850
802.11n(HT40) MSC6	5755.00	36.770186	5736.614907	5773.385093	5725-5850
802.11ac(VHT40) MCS0	5755.00	36.273292	5736.614907	5772.888199	5725-5850
802.11ac(VHT80) MCS2	5775.00	76.521739	5736.242236	5812.763975	5725-5850
802.11a 48 Mbps	5785.00	17.313433	5776.194030	5793.507463	5725-5850
802.11n(HT20) MSC6	5785.00	18.507463	5775.597015	5794.104478	5725-5850
802.11ac(VHT20) MCS0	5785.00	18.507463	5775.597015	5794.104478	5725-5850
802.11n(HT40) MSC6	5795.00	36.770186	5776.614907	5813.385093	5725-5850
802.11ac(VHT40) MCS0	5795.00	37.267081	5776.118012	5813.385093	5725-5850
802.11a 48 Mbps	5825.00	17.313433	5816.194030	5833.507463	5725-5850
802.11n(HT20) MSC6	5825.00	18.208956	5815.895522	5834.104478	5725-5850
802.11ac(VHT20) MCS0	5825.00	18.507463	5815.597015	5834.104478	5725-5850

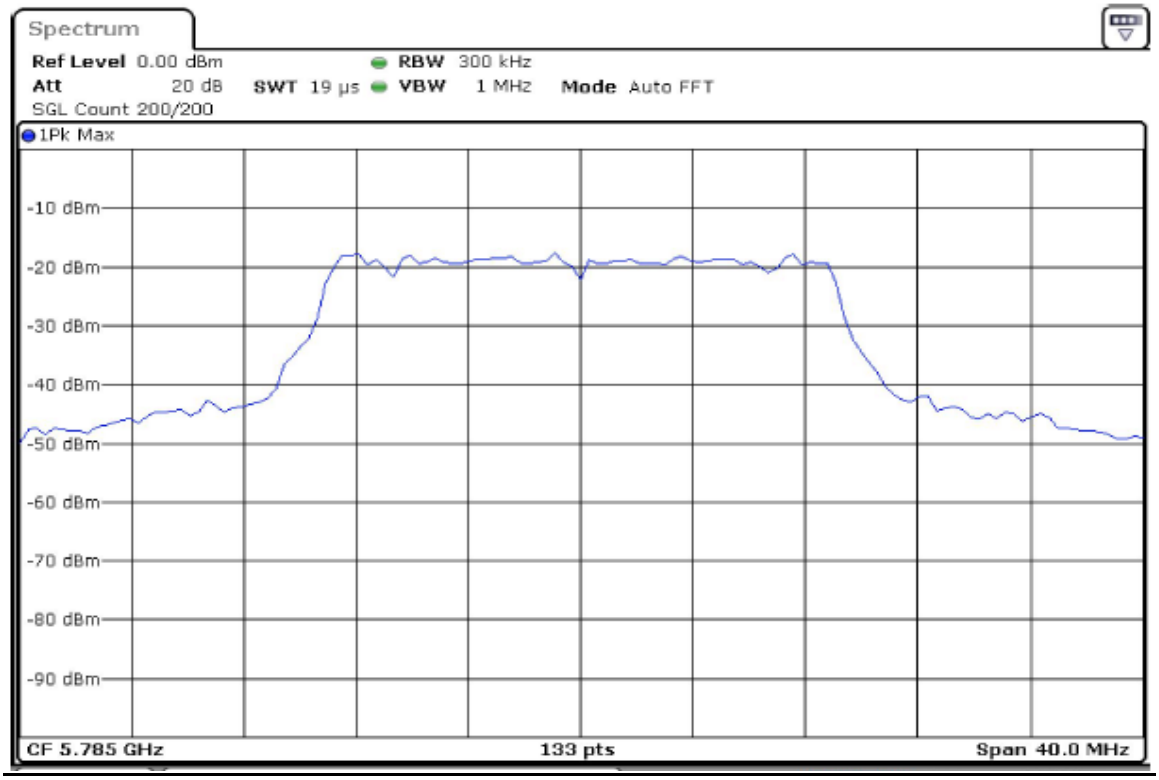
802.11a 48 Mbps 5745MHz



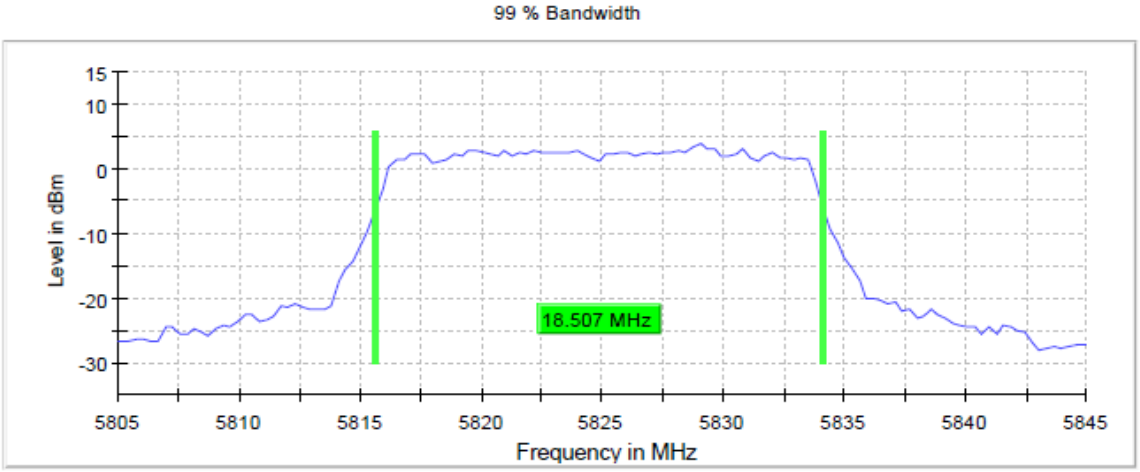


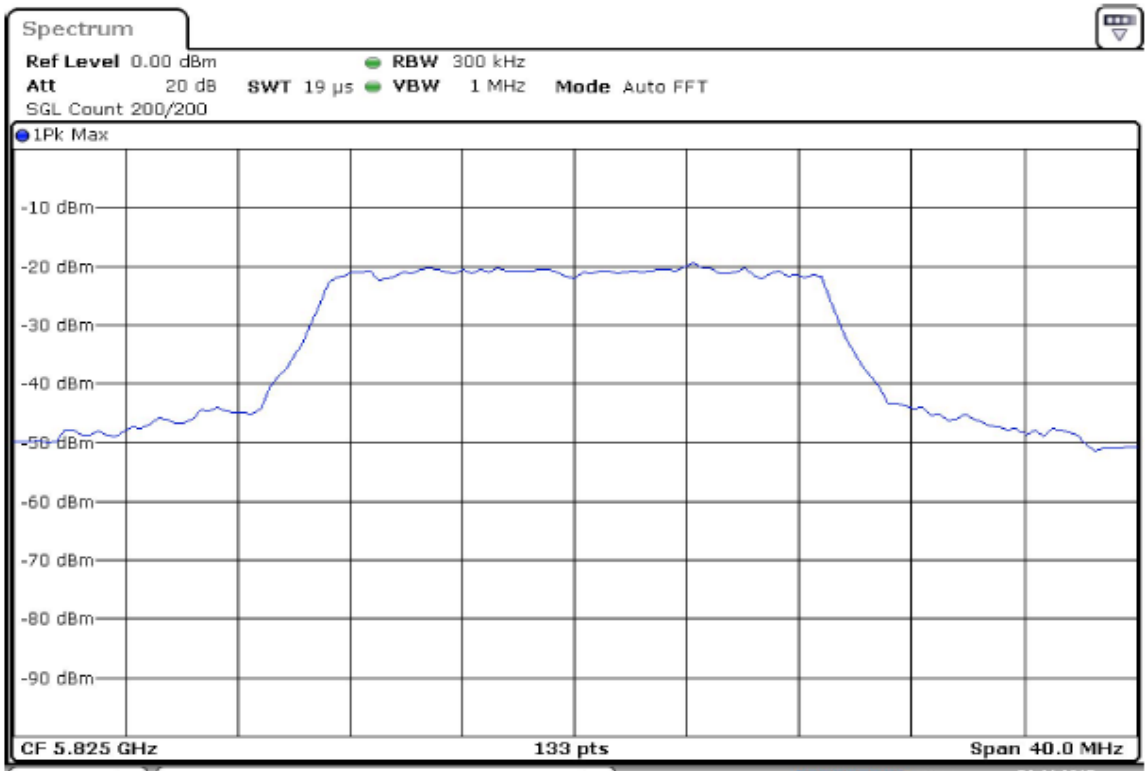
802.11n(HT20) MCS6 5785MHz



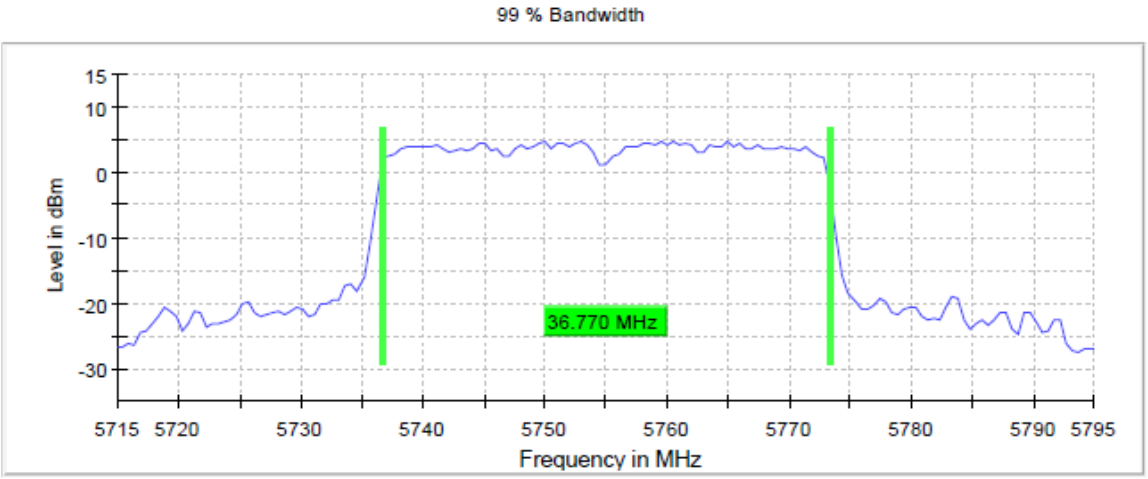


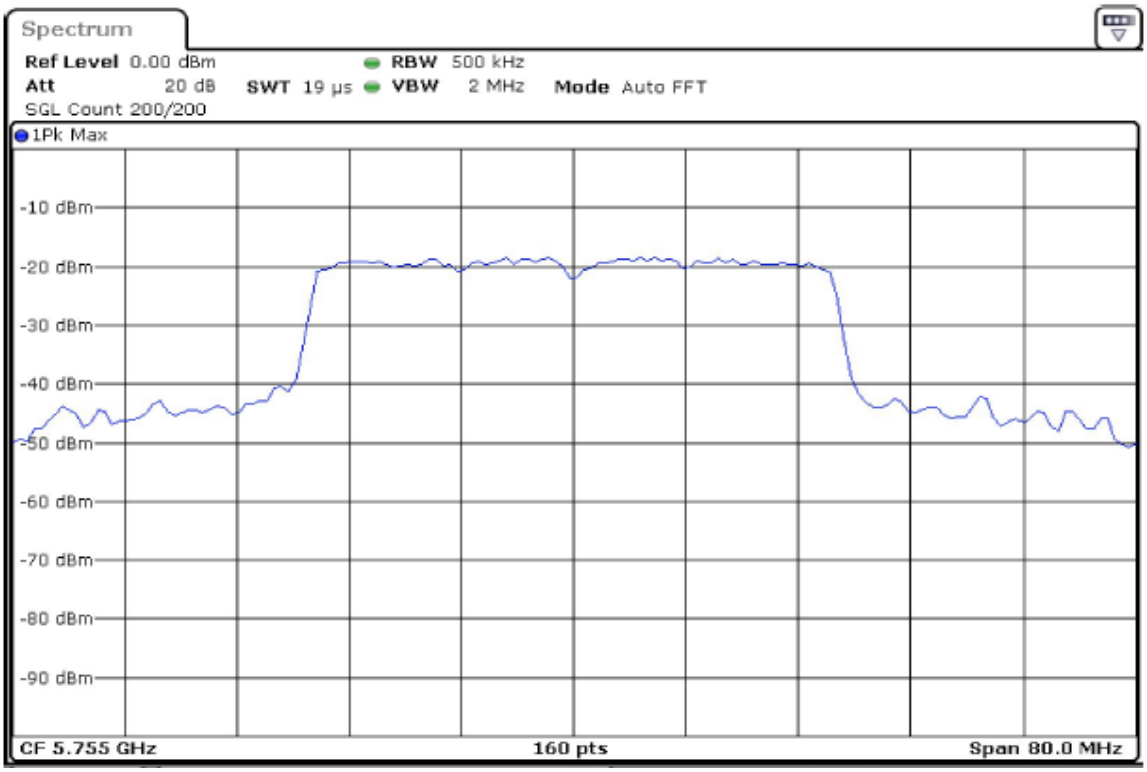
802.11ac(VHT20) MCS0 5825MHz



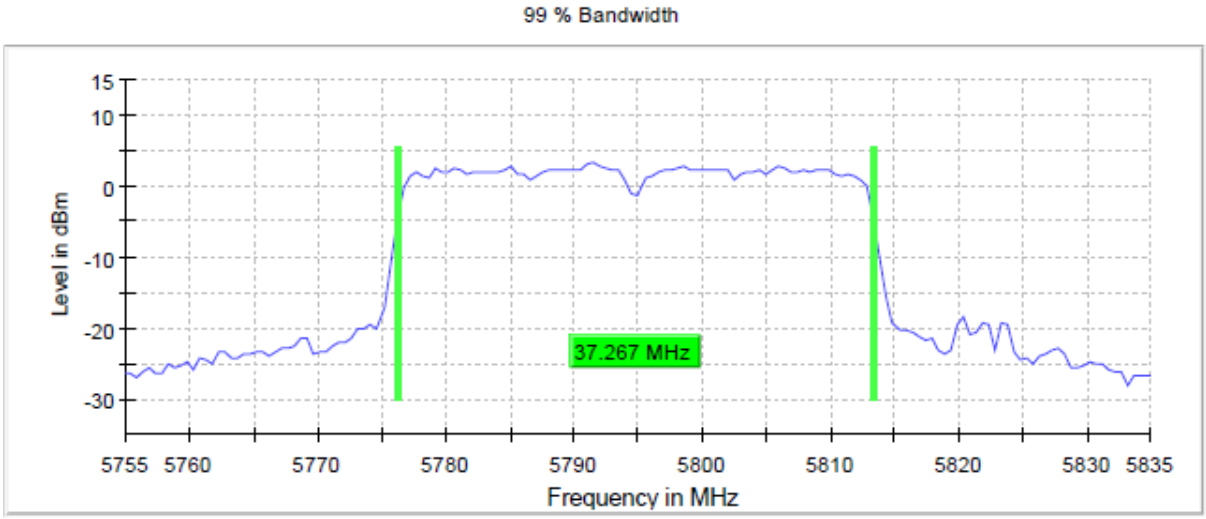


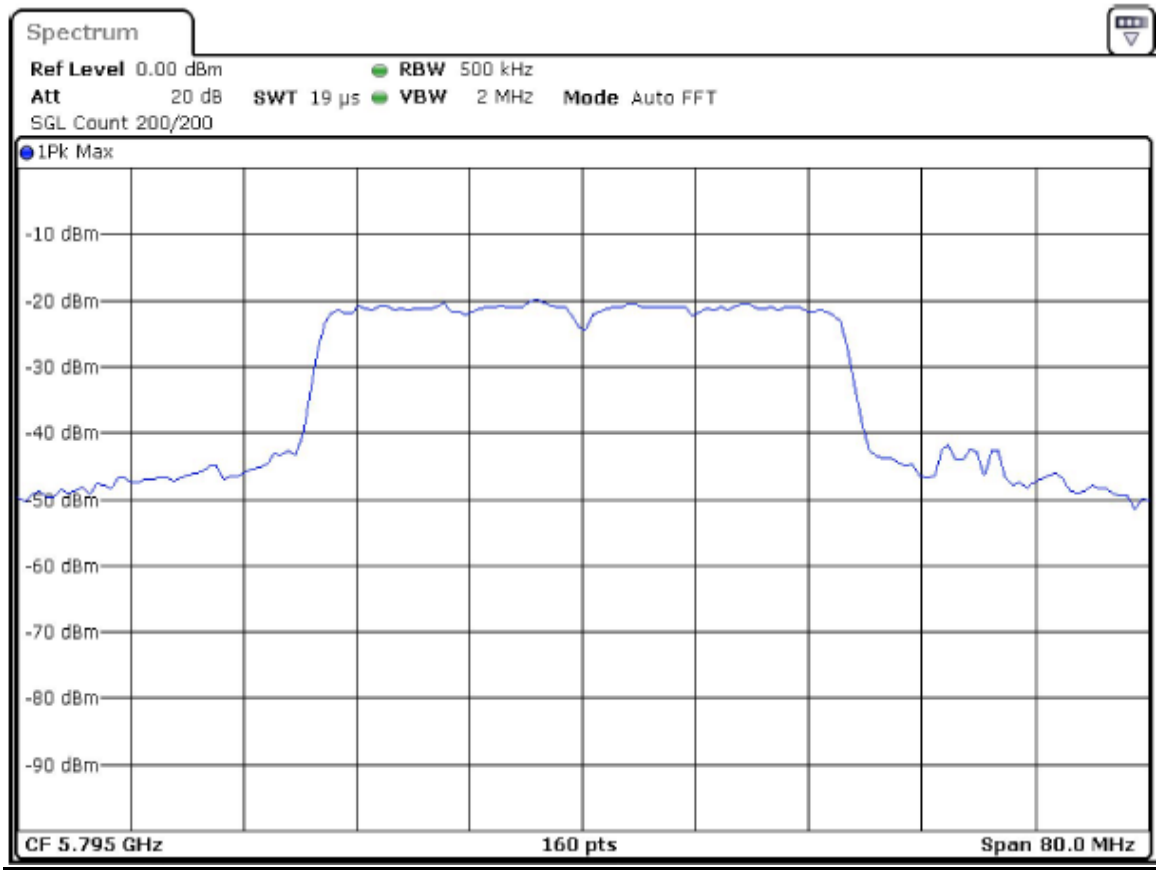
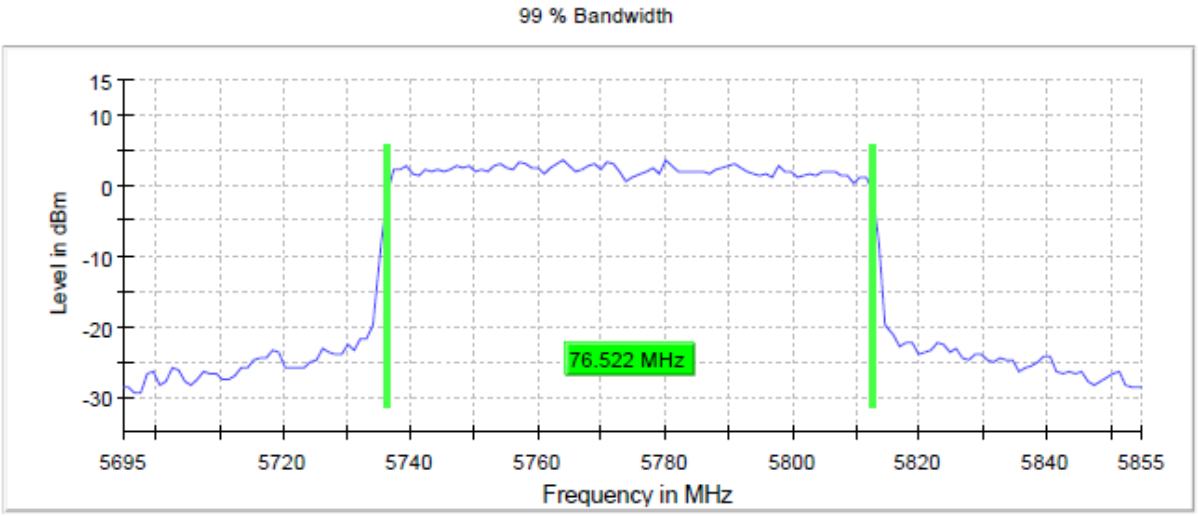
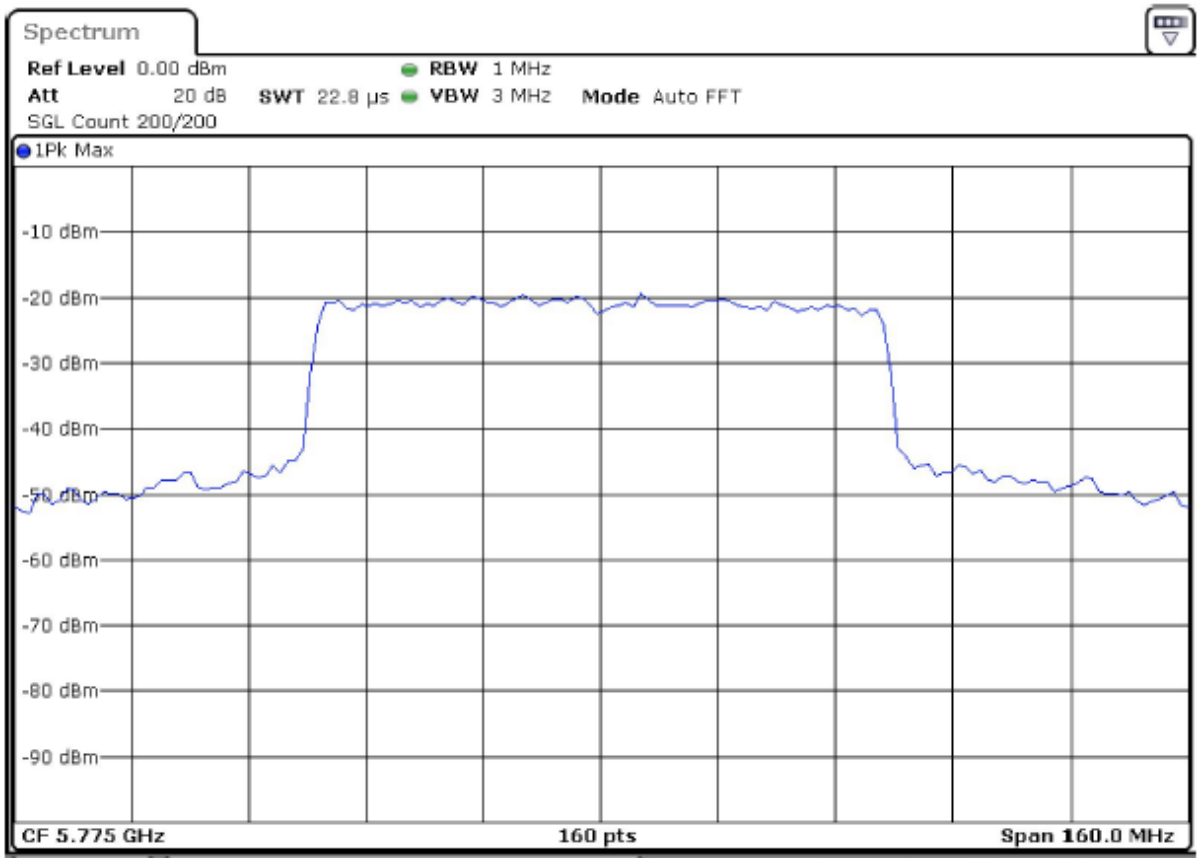
802.11n(HT40) MCS6 5755MHz





802.11ac(VHT40) MCS0 5795MHz





802.11ac(VHT80) MCS2 5775MHz