Test Report

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

Report No	ES1636-2
Client	Harman International Industries Inc. Mark Bowman
Address	30001 Cabot Dr. Novi, MI 48377
Phone	1-248-254-7751
Items tested FCC ID IC	INFO3.5 CSM MY20 2AHPN-BE2843 6434C-BE2843
Equipment Type Equipment Code	Unlicensed National Information Infrastructure Device NII
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.407, ISED Canada RSS-247 Issue 2
Test Dates	09/20/2018 to 11/24/2018
Results	As detailed within this report

Prepared by

Christopher Hamel – Test Engineer

Authorized by

Yunus Faziloglu – Sr. Engineer

Issue Date: 11/30/2018

Conditions of Issue: This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 28 of this report.

Contents

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 INFO3.5 CSM MY20. It is a transmitter that operates in the following bands:
UNII-1: 5.15GHz – 5.25GHz
UNII-3: 5.725GHz – 5.85GHz

Antenna Type: Non-detachable internal PCB trace
Gain: 5.05dBi

We found that the product met the above requirements with modification.
Modifications: Power reduced for 802.11n and 802.11ac modes for all channel bandwidths from 14 to 11 in UNII-3 band.

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, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity. EUT antenna is internal and cannot be maximized separately.

EUT operating voltage is 13.8V DC from a vehicle battery only, therefore AC line conducted emissions requirements are not applicable.

The following bandwidths were used during radiated spurious emissions testing.

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

Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	S1636		
Company:	Harman International Industries Inc.		
Company Address:	30001 Cabot Dr.		
	Novi MI 48377		
Contact:	Mark Bowman		
	MN	**PN**	**SN**
EUT:	INFO3.5 CSM MY20	--	--
EUT Description:	Automotive Infotainment Unit with Bluetooth/WLAN		
EUT Max Frequency:	5825 MHz		
EUT Min Frequency:	5825 MHz		

EUT Components	**MN**	**SN**
Head Unit	INFO3.5 CSM MY20	

Support Equipment	**MN**	**SN**
ADB Dev board		

Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
USB Port	other	1	1	other	Yes	No	1.5	in	yes	
Power/Low speed signal	other	2	2	other	No	No	1	in	yes	
Display	other	1	1	other	Yes	No	1.5	in	yes	
Back up cam	other	1	1	other	Yes	No	2	in	yes	Orange Fackra
External 2.4G wifi	other	1	1	other	Yes	No		in	yes	Beige Fakra
GPS port	other	1	1	other	Yes	No	2	in	yes	Blue fakra Cable
AM/FM Antenna	other	2	2	other	Yes	No	2	in	yes	Black Fakra am and fm, Green FM only
Sdards	other	1	1	other	Yes	No	1.5	in	yes	Yellow Fakra Cable

Software Operating Mode Description:

EUT placed in required test modes via commands supplied by client.

Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.4			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.
	3.2		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3.2			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1			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.
6.8			15.203	EUT employs a non-detachable internal PCB trace antenna with 5.05dBi 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.
15.407(a)(1)(i) requirement for EIRP measurement at any elevation angle above 30 degrees is not applicable. Antenna gain of 5.05dBi is the highest among different elevation angles per the antenna specifications supplied by the client and based on the output power measured as shown in Appendix A of this report, EIRP cannot exceed 125mW (21dBm).

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.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) and worst case emissions observed in X orientation. All the results below are for the worst case orientation only.

MEASUREMENTS / RESULTS

Worst case mode: 802.11a 6Mbps

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.994	36.3	-7.1	29.2	40	-10.8	PASS	-10.8
139.392	44.9	-14.1	30.8	43.5	-12.7	PASS	
141.477	43.5	-14.3	29.2	43.5	-14.3	PASS	
456.194	39.3	-9.7	29.6	46	-16.4	PASS	
460.389	39.8	-9.5	30.3	46	-15.7	PASS	
897.665	33.9	-1.8	32.1	46	-13.9	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.606	32.8	-6.8	25.9	40	-14.1	PASS	
139.416	44.4	-14.1	30.3	43.5	-13.2	PASS	
141.526	43.3	-14.3	29	43.5	-14.5	PASS	
456.218	42.1	-9.7	32.4	46	-13.6	PASS	
460.438	40.6	-9.5	31.1	46	-14.9	PASS	
897.641	36.4	-1.8	34.7	46	-11.3	PASS	-11.3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.873	36.2	-7	29.2	40	-10.8	PASS	-10.8
139.368	44.2	-14.1	30.1	43.5	-13.4	PASS	
154.184	41.5	-15.2	26.3	43.5	-17.2	PASS	
456.145	38.6	-9.7	28.9	46	-17.1	PASS	
836.385	32.8	-3	29.8	46	-16.2	PASS	
897.665	35.6	-1.8	33.9	46	-12.1	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.412	31.9	-6.7	25.2	40	-14.8	PASS	
139.392	45.1	-14.1	31	43.5	-12.5	PASS	
141.526	43.4	-14.3	29.1	43.5	-14.4	PASS	
456.17	42.3	-9.7	32.6	46	-13.4	PASS	
828.601	33.8	-3.1	30.7	46	-15.3	PASS	
897.665	36.8	-1.8	35.1	46	-10.9	PASS	-10.9

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
31.14	36.1	-7.2	28.9	40	-11.1	PASS	-11.1
133.063	41.1	-14	27.1	43.5	-16.4	PASS	
139.368	43.8	-14.1	29.7	43.5	-13.8	PASS	
154.184	42.4	-15.2	27.2	43.5	-16.3	PASS	
483.354	37.4	-8.5	29	46	-17	PASS	
897.641	34.3	-1.8	32.6	46	-13.4	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.461	32.6	-6.7	25.9	40	-14.1	PASS	
139.392	44.6	-14.1	30.5	43.5	-13	PASS	
141.477	43.4	-14.3	29.1	43.5	-14.4	PASS	
283.51	44.5	-13.6	30.9	46	-15.1	PASS	
451.998	40.3	-9.7	30.6	46	-15.4	PASS	
897.641	36.6	-1.8	34.8	46	-11.2	PASS	-11.2

30-1000MHz UNII 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
31.116	35.9	-7.2	28.7	40	-11.3	PASS	-11.3
133.087	40.7	-14	26.7	43.5	-16.8	PASS	
139.368	43.8	-14.1	29.7	43.5	-13.8	PASS	
143.636	41.6	-14.5	27	43.5	-16.5	PASS	
154.184	42	-15.2	26.9	43.5	-16.6	PASS	
897.641	34.6	-1.8	32.8	46	-13.2	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.097	32.4	-6.4	26	40	-14	PASS	
139.392	44.6	-14.1	30.5	43.5	-13	PASS	
141.526	43.8	-14.3	29.5	43.5	-14	PASS	
154.184	42.2	-15.2	27.1	43.5	-16.4	PASS	
621.482	36.6	-6.6	29.9	46	-16.1	PASS	
897.665	37.5	-1.8	35.8	46	-10.2	PASS	-10.2

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.752	35.7	-6.9	28.8	40	-11.2	PASS	-11.2
133.087	41.2	-14	27.2	43.5	-16.3	PASS	
139.392	43.5	-14.1	29.4	43.5	-14.1	PASS	
143.611	41.4	-14.5	26.8	43.5	-16.7	PASS	
154.184	42.5	-15.2	27.3	43.5	-16.2	PASS	
897.641	34	-1.8	32.3	46	-13.7	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.073	32.3	-6.4	25.8	40	-14.2	PASS	
139.392	44.3	-14.1	30.2	43.5	-13.3	PASS	
141.501	42.8	-14.3	28.5	43.5	-15	PASS	
451.998	39.3	-9.7	29.6	46	-16.4	PASS	
759.561	34.4	-3.8	30.6	46	-15.4	PASS	
897.641	36	-1.8	34.2	46	-11.8	PASS	-11.8

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Horizontal 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.631	32.3	-6.8	25.5	40	-14.5	PASS	
139.392	44.2	-14.1	30.1	43.5	-13.4	PASS	
141.501	42.8	-14.3	28.5	43.5	-15	PASS	
154.16	42.7	-15.2	27.5	43.5	-16	PASS	
897.641	36.1	-1.8	34.4	46	-11.6	PASS	-11.6
958.799	33	-1.6	31.5	46	-14.5	PASS	

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 30-1000MHz
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)
30.97	36.9	-7.1	29.8	40	-10.2	PASS	-10.2
133.038	40.8	-14	26.9	43.5	-16.6	PASS	
139.416	42.9	-14.1	28.8	43.5	-14.7	PASS	
143.636	42.4	-14.5	27.8	43.5	-15.7	PASS	
154.184	42.4	-15.2	27.2	43.5	-16.3	PASS	
897.665	33.9	-1.8	32.1	46	-13.9	PASS	

30-1000MHz UNII 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1021.4	41.6	32.2	-5.5	36.1	74	-37.9	PASS		26.7	54	-27.3	PASS	
1114	41.5	32.3	-5.5	36	74	-38	PASS		26.9	54	-27.1	PASS	
3292.8	42.1	32.7	1.2	43.3	74	-30.7	PASS		33.8	54	-20.2	PASS	
4631.5	39.9	31	4.7	44.6	74	-29.4	PASS	-29.4	35.7	54	-18.3	PASS	-18.3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1270.6	41	32.2	-3.9	37.1	74	-36.9	PASS		28.3	54	-25.7	PASS	
1593.7	40.6	32.3	-5.1	35.5	74	-38.5	PASS		27.2	54	-26.8	PASS	
1684.7	41.4	32.2	-3.5	37.9	74	-36.1	PASS		28.7	54	-25.3	PASS	
1777.9	40.5	32.3	-2.7	37.8	74	-36.2	PASS		29.6	54	-24.4	PASS	
4677.9	39.5	31	4.6	44.1	74	-29.9	PASS		35.5	54	-18.5	PASS	
5755.5	38.6	30.9	6	44.6	74	-29.4	PASS	-29.4	36.9	54	-17.1	PASS	-17.1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1375.7	41.7	32.2	-4.2	37.5	74	-36.5	PASS		28.1	54	-25.9	PASS	
2305.9	43.5	32.4	-0.4	43.1	74	-30.9	PASS		32	54	-22	PASS	
3449.3	41	32.4	1.7	42.7	74	-31.3	PASS		34.1	54	-19.9	PASS	
4612.1	39.4	31.2	4.6	44.1	74	-29.9	PASS	-29.9	35.8	54	-18.2	PASS	
5752.8	37.6	30.8	6	43.6	74	-30.4	PASS		36.9	54	-17.1	PASS	-17.1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1395.6	40.7	32.1	-4.2	36.5	74	-37.5	PASS		27.9	54	-26.1	PASS	
1412.1	42	32.1	-4.4	37.6	74	-36.4	PASS		27.8	54	-26.2	PASS	
3368.1	42.1	32.4	1.5	43.6	74	-30.4	PASS		34	54	-20	PASS	
4675.3	38.8	30.9	4.6	43.4	74	-30.6	PASS		35.5	54	-18.5	PASS	
5476.2	39.8	30.7	6.8	46.6	74	-27.4	PASS	-27.4	37.5	54	-16.5	PASS	-16.5

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
3538.9	41.1	32.4	1.9	43.1	74	-30.9	PASS		34.3	54	-19.7	PASS	
4656.6	39.5	30.9	4.8	44.3	74	-29.7	PASS		35.6	54	-18.4	PASS	
5773.9	41.4	30.8	6.1	47.5	74	-26.5	PASS	-26.5	36.8	54	-17.2	PASS	-17.2

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1507.8	39.1	32.2	-5.2	33.9	74	-40.1	PASS		26.9	54	-27.1	PASS	
2199.7	41.5	32.5	-0.3	41.2	74	-32.8	PASS		32.2	54	-21.8	PASS	
3175.1	43	32.7	1.5	44.5	74	-29.5	PASS		34.2	54	-19.8	PASS	
4649.1	40.8	30.9	4.8	45.5	74	-28.5	PASS		35.6	54	-18.4	PASS	
5922.7	40.4	30.7	6.5	46.9	74	-27.1	PASS	-27.1	37.1	54	-16.9	PASS	-16.9

1-6GHz UNII 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1079.4	43	32.3	-5.6	37.4	74	-36.6	PASS		26.7	54	-27.3	PASS	
1739.9	41.2	32	-3	38.3	74	-35.7	PASS		29	54	-25	PASS	
2012.9	40.7	32.1	-1.1	39.5	74	-34.5	PASS		31	54	-23	PASS	
3206	42.3	32.7	1.5	43.7	74	-30.3	PASS		34.2	54	-19.8	PASS	
4541.5	41.2	30.9	4.3	45.5	74	-28.5	PASS		35.2	54	-18.8	PASS	
5883	39.5	30.8	6.3	45.9	74	-28.1	PASS	-28.1	37.1	54	-16.9	PASS	-16.9

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1220.3	43	32.1	-4.4	38.6	74	-35.4	PASS		27.7	54	-26.3	PASS	
1292.8	41.5	32.1	-3.8	37.7	74	-36.3	PASS		28.3	54	-25.7	PASS	
3559.3	40.4	32.3	1.9	42.3	74	-31.7	PASS		34.2	54	-19.8	PASS	
4631.3	39.1	31	4.7	43.7	74	-30.3	PASS		35.7	54	-18.3	PASS	
5756.5	39.3	30.9	6	45.3	74	-28.7	PASS	-28.7	36.9	54	-17.1	PASS	-17.1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
3390.6	41.3	32.5	2.6	43.9	74	-30.1	PASS		35.1	54	-18.9	PASS	
4218.9	40.9	31.2	2.9	43.8	74	-30.2	PASS		34.2	54	-19.8	PASS	
5581.4	39.6	31.1	6.9	46.5	74	-27.5	PASS	-27.5	37.9	54	-16.1	PASS	-16.1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1499.2	41.3	31.7	-5.1	36.2	74	-37.8	PASS		26.5	54	-27.5	PASS	
1553.7	41.7	31.6	-5.2	36.4	74	-37.6	PASS		26.3	54	-27.7	PASS	
1638	40.5	32.1	-4.4	36.1	74	-37.9	PASS		27.7	54	-26.3	PASS	
2779.4	41.8	32.5	0.6	42.4	74	-31.6	PASS		33.1	54	-20.9	PASS	
3551.5	41.2	32.4	2.8	44	74	-30	PASS		35.2	54	-18.8	PASS	
5577.1	40.2	31	6.8	47	74	-27	PASS	-27	37.7	54	-16.3	PASS	-16.3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1331.6	40.6	32.3	-4	36.6	74	-37.4	PASS		28.3	54	-25.7	PASS	
3335.5	41.7	32.5	1.3	43	74	-31	PASS		33.8	54	-20.2	PASS	
4643.6	40.2	30.9	4.7	45	74	-29	PASS		35.6	54	-18.4	PASS	
5469.7	39.5	30.8	7	46.4	74	-27.6	PASS	-27.6	37.8	54	-16.2	PASS	-16.2

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1375.3	42	32	-4.2	37.8	74	-36.2	PASS		27.9	54	-26.1	PASS	
3528	41.2	32.4	1.9	43.1	74	-30.9	PASS		34.3	54	-19.7	PASS	
4634.3	39.6	31	4.7	44.3	74	-29.7	PASS		35.7	54	-18.3	PASS	
5725.3	39.8	31	6	45.8	74	-28.2	PASS	-28.2	37	54	-17	PASS	-17

1-6GHz UNII 3

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
17963.1	40.2	30.9	21.6	61.8	83.5	-21.7	PASS	-21.7	52.5	63.5	-11	PASS	-11

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 36 (5180MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
7784.8	39.4	30.3	8.1	47.5	83.5	-36	PASS		38.4	63.5	-25.1	PASS	
17992	39.8	30.9	22	61.7	83.5	-21.8	PASS	-21.8	52.9	63.5	-10.6	PASS	-10.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
7824.8	38.5	30.2	8	46.5	83.5	-37	PASS		38.2	63.5	-25.3	PASS	
17015.5	39.5	31.5	18.9	58.3	83.5	-25.2	PASS		50.4	63.5	-13.1	PASS	
17967.8	38.8	30.9	21.6	60.4	83.5	-23.1	PASS	-23.1	52.6	63.5	-10.9	PASS	-10.9

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 44 (5220MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
7104.2	38.9	30.1	7.8	46.7	83.5	-36.8	PASS		38	63.5	-25.5	PASS	
17988.7	40.1	30.9	21.9	62	83.5	-21.5	PASS	-21.5	52.9	63.5	-10.6	PASS	-10.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
8096.5	38.4	30.2	8.9	47.2	83.5	-36.3	PASS		39.1	63.5	-24.4	PASS	
17987.3	38.2	30.9	21.9	60.1	83.5	-23.4	PASS	-23.4	52.8	63.5	-10.7	PASS	-10.7

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 48 (5240MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 20, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
17981.6	41.4	31	21.8	63.2	83.5	-20.3	PASS	-20.3	52.8	63.5	-10.7	PASS	-10.7

6-18GHz UNII 1

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
17978.8	40.7	31	21.8	62.5	83.5	-21	PASS	-21	52.8	63.5	-10.7	PASS	-10.7

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 149 (5745MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
17987.5	40.1	31	21.9	62	83.5	-21.5	PASS	-21.5	52.9	63.5	-10.6	PASS	-10.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
17032.2	41.2	30.9	18.9	60.1	83.5	-23.4	PASS		49.8	63.5	-13.7	PASS	
17990.7	40.6	31	22	62.5	83.5	-21	PASS	-21	52.9	63.5	-10.6	PASS	-10.6

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 157 (5785MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
17995	41.5	30.8	22	63.5	83.5	-20	PASS	-20	52.8	63.5	-10.7	PASS	-10.7

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
17984.9	39.7	30.9	21.9	61.6	83.5	-21.9	PASS	-21.9	52.7	63.5	-10.8	PASS	-10.8

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: CCH
Notes:
5g wifi 802.11a 6Mbps CH 165 (5825MHz)

Work Order - S1636
EUT Power Input - 13.8V DC
Test Site - CH2
Conditions - 23.1°C; 42%RH; 1008mBar
Witnessed by - N/A
EUT Maximum Frequency - 5825MHz

Data Taken at September 21, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
10653.4	38.6	29.8	12.7	51.3	83.5	-32.2	PASS		42.5	63.5	-21	PASS	
17982.5	39	31	21.8	60.8	83.5	-22.7	PASS	-22.7	52.8	63.5	-10.7	PASS	-10.7

6-18GHz UNII 3

Radiated Emissions Table

Date: 21-Sep-18 **Company:** Harman International **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GM MY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 23.1°C **Humidity:** 41% **Pressure:** 1008mBar

Frequency Range: 18-40GHz **Measurement Distance:** 0.1 m

Notes: No Emissions Found **EUT Max Freq:** 5825MHz
5g wifi 802.11a 6Mbps Channels 36, 44, 48

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
				---	---	---	---	---	---	---	---	---	---	---

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

Test Site: EMI Chamber 2 **Cable 1:** Asset #2323 **Cable 2:** --- **Cable 3:** ---
Analyzer: Gold **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.208
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Test Site: EMI Chamber 2 **Cable 1:** Asset #2323 **Cable 2:** Asset #2324 **Cable 3:** ---
Analyzer: Gold **Preamp:** 40GHz Mixer **Antenna:** 40GHz Mixer **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.208
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

18-40GHz UNII 1

Radiated Emissions Table

Date: 21-Sep-18 **Company:** Harman International **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GM MY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 23.1°C **Humidity:** 41% **Pressure:** 1008mBar

Frequency Range: 18-40GHz **Measurement Distance:** 0.1 m

Notes: No Emissions Found **EUT Max Freq:** 5825MHz
5g wifi 802.11a 6Mbps Channels 149, 157, 165

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
				---	---	---	---	---	---	---	---	---	---	---

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

Test Site: EMI Chamber 2 **Cable 1:** Asset #2323 **Cable 2:** --- **Cable 3:** ---
Analyzer: Gold **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.208
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Test Site: EMI Chamber 2 **Cable 1:** Asset #2323 **Cable 2:** Asset #2324 **Cable 3:** ---
Analyzer: Gold **Preamp:** 40GHz Mixer **Antenna:** 40GHz Mixer **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.208
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

18-40GHz UNII 3

Rev. 10/9/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/19/2019
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/16/2018

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/21/2018
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018

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

Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2311 PA	1-1000MHz	PAM-103	COM-POWER	441174	2311	II	10/29/2018
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/19/2018
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	10/16/2018

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/21/2019
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019

Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
TH A#2082		HTC-1	HDE		2082	II	3/22/2019

Cables	Range		Mfr			Cat	Calibration Due
Asset #2051	9kHz - 18GHz		Florida RF			II	3/7/2019
Asset #2054	9kHz - 18GHz		Florida RF			II	10/31/2018
Asset #2466	9KHz-18GHz		MegaPhase			II	10/29/2018
Asset #2323	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	8/9/2019
Asset #2324	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 001	2324	II	8/9/2019

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

TEU

Radiated Band Edge

Radiated Band Edges

Date: 25-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 21.8°C **Humidity:** 28% **Pressure:** 1020mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-1 20MHz BW **EUT Max Freq:** 5825MHz
Worst Case Antenna Polarization: H

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)
802.11a Low 6Mbps				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	23.1	12.1	0.0	34.5	5.9	63.5	52.5	83.5	-20.0	Pass	63.5	-11.0	Pass
H	5104.0	22.5	9.6	0.0	34.4	5.8	62.7	49.8	83.5	-20.8	Pass	63.5	-13.7	Pass
802.11a High 6Mbps				---	---	---	---	---	---	---	---	---	---	---
H pk	5350.0	11.1	11.1	0.0	34.7	5.7	51.5	51.5	83.5	-32.0	Pass	63.5	-12.0	Pass
H	5358.0	19.3	9.3	0.0	34.7	5.7	59.7	49.7	83.5	-23.8	Pass	63.5	-13.8	Pass
H pk	5390.0	15.7	15.7	0.0	34.8	5.7	56.2	56.2	83.5	-27.3	Pass	63.5	-7.3	Pass
802.11n Low MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	23.3	11.6	0.0	34.5	5.9	63.7	52.0	83.5	-19.8	Pass	63.5	-11.5	Pass
H	5144.8	22.9	11.3	0.0	34.4	5.9	63.2	51.6	83.5	-20.3	Pass	63.5	-11.9	Pass
H	5135.1	22.9	10.8	0.0	34.4	5.9	63.2	51.1	83.5	-20.3	Pass	63.5	-12.4	Pass
802.11n High MCS 0				---	---	---	---	---	---	---	---	---	---	---
H pk	5350.0	11.8	11.8	0.0	34.7	5.7	52.2	52.2	83.5	-31.3	Pass	63.5	-11.3	Pass
H	5353.0	17.8	9.2	0.0	34.7	5.7	58.2	49.6	83.5	-25.3	Pass	63.5	-13.9	Pass
H pk	5393.0	15.3	15.3	0.0	34.8	5.7	55.8	55.8	83.5	-27.7	Pass	63.5	-7.7	Pass
802.11ac Low MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	20.1	11.4	0.0	34.5	5.9	60.5	51.8	83.5	-23.0	Pass	63.5	-11.7	Pass
H	5147.1	23.6	11.1	0.0	34.5	5.9	64.0	51.5	83.5	-19.5	Pass	63.5	-12.0	Pass
802.11ac High MCS 0				---	---	---	---	---	---	---	---	---	---	---
H pk	5350.0	9.7	9.7	0.0	34.7	5.7	50.1	50.1	83.5	-33.4	Pass	63.5	-13.4	Pass
H pk	5392.3	14.6	14.6	0.0	34.8	5.7	55.1	55.1	83.5	-28.4	Pass	63.5	-8.4	Pass

Table Result: Pass by -7.3 dB ***Worst Freq:*** 5390.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-1 20MHz BW

Radiated Band Edges

Date: 25-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 21.8°C **Humidity:** 28% **Pressure:** 1020mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-1 40MHz BW **EUT Max Freq:** 5825MHz
Worst Case Antenna Polarization: H

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)
802.11n Low MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	19.3	10.0	0.0	34.5	5.9	59.7	50.4	83.5	-23.8	Pass	63.5	-13.1	Pass
H	5148.7	21.2	9.8	0.0	34.5	5.9	61.6	50.2	83.5	-21.9	Pass	63.5	-13.3	Pass
802.11n High MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5350.0	13.2	13.2	0.0	34.7	5.7	53.6	53.6	83.5	-29.9	Pass	63.5	-9.9	Pass
H	5378.5	16.9	16.9	0.0	34.8	5.7	57.4	57.4	83.5	-26.1	Pass	63.5	-6.1	Pass
802.11ac Low MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	26.2	12.7	0.0	34.5	5.9	66.6	53.1	83.5	-16.9	Pass	63.5	-10.4	Pass
H	5146.7	24.0	12.5	0.0	34.5	5.9	64.4	52.9	83.5	-19.1	Pass	63.5	-10.6	Pass
802.11ac High MCS 0				---	---	---	---	---	---	---	---	---	---	---
H	5350.0	13.1	13.1	0.0	34.7	5.7	53.5	53.5	83.5	-30.0	Pass	63.5	-10.0	Pass
H	5377.0	19.0	8.3	0.0	34.8	5.7	59.5	48.8	83.5	-24.0	Pass	63.5	-14.7	Pass

Table Result: Pass by -6.1 dB ***Worst Freq:*** 5378.5 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-1 40MHz BW

Radiated Band Edges

Date: 25-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 21.8°C **Humidity:** 28% **Pressure:** 1020mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-1 80MHz BW (802.11ac MCS0) **EUT Max Freq:** 5825MHz
Worst Case Antenna Polarization: H

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
Low				---	---	---	---	---	---	---	---	---	---	---
H	5150.0	23.2	14.0	0.0	34.5	5.9	63.6	54.4	83.5	-19.9	Pass	63.5	-9.1	Pass
H	5146.9	24.9	14.4	0.0	34.5	5.9	65.3	54.8	83.5	-18.2	Pass	63.5	-8.7	Pass
High				---	---	---	---	---	---	---	---	---	---	---
H	5350.0	15.6	15.6	0.0	34.7	5.7	56.0	56.0	83.5	-27.5	Pass	63.5	-7.5	Pass
H	5365.7	20.9	10.0	0.0	34.8	5.7	61.4	50.5	83.5	-22.1	Pass	63.5	-13.0	Pass

Table Result: Pass by -7.5 dB ***Worst Freq:*** 5350.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-1 80MHz BW

Radiated Band Edges

Date: 26-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 22.3°C **Humidity:** 36% **Pressure:** 1008mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-3 20MHz BW **EUT Max Freq:**
Worst Case Antenna Polarization: H

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
802.11a Low 6Mbps				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	21.5	12.6	0.0	35.0	6.3	62.8	53.9	83.5	-20.7	Pass	63.5	-9.6	Pass
H	5718.3	23.3	12.3	0.0	35.0	6.3	64.6	53.6	83.5	-18.9	Pass	63.5	-9.9	Pass
802.11a High 6Mbps				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	22.7	14.8	0.0	35.3	6.5	64.5	56.6	83.5	-19.0	Pass	63.5	-6.9	Pass
H	5866.1	25.2	13.5	0.0	35.3	6.5	67.0	55.3	83.5	-16.5	Pass	63.5	-8.2	Pass
802.11n Low MCS0 Power Reduced to 11				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	36.0	16.0	0.0	35.0	6.3	77.3	57.3	83.5	-6.2	Pass	63.5	-6.2	Pass
H	5723.7	27.0	15.5	0.0	35.0	6.3	68.3	56.8	83.5	-15.2	Pass	63.5	-6.7	Pass
802.11n High MCS0 Power Reduced to 11				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	21.3	11.3	0.0	35.3	6.5	63.1	53.1	83.5	-20.4	Pass	63.5	-10.4	Pass
H	5851.6	22.6	10.3	0.0	35.3	6.5	64.4	52.1	83.5	-19.1	Pass	63.5	-11.4	Pass
802.11ac MCS0 Low Power Reduced to 11				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	29.7	16.7	0.0	35.0	6.3	71.0	58.0	83.5	-12.5	Pass	63.5	-5.5	Pass
H	5724.0	30.0	15.2	0.0	35.0	6.3	71.3	56.5	83.5	-12.2	Pass	63.5	-7.0	Pass
H	5722.5	28.5	13.3	0.0	35.0	6.3	69.8	54.6	83.5	-13.7	Pass	63.5	-8.9	Pass
802.11ac MCS0 High Power Reduced to 11				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	21.1	12.3	0.0	35.3	6.5	62.9	54.1	83.5	-20.6	Pass	63.5	-9.4	Pass
H	5860.4	18.9	9.3	0.0	35.3	6.5	60.7	51.1	83.5	-22.8	Pass	63.5	-12.4	Pass

Table Result: Pass by -5.5 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-3 20MHz BW

Radiated Band Edges

Date: 26-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 22.3°C **Humidity:** 36% **Pressure:** 1008mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-3 40MHz BW. Power Reduced to 11 for all modes. **EUT Max Freq:**
Worst Case Antenna Polarization: H

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)	Peak Margin (dB)	Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)
802.11ac Low MCS0				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	29.7	17.9	0.0	35.0	6.3	71.0	59.2	83.5	-12.5	Pass	63.5	-4.3	Pass
H	5723.7	34.7	17.8	0.0	35.0	6.3	76.0	59.1	83.5	-7.5	Pass	63.5	-4.4	Pass
H	5713.8	31.1	17.9	0.0	35.0	6.3	72.4	59.2	83.5	-11.1	Pass	63.5	-4.3	Pass
H	5712.7	31.0	17.9	0.0	35.0	6.3	72.3	59.2	83.5	-11.2	Pass	63.5	-4.3	Pass
802.11ac High MCS0				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	15.9	8.0	0.0	35.3	6.5	57.7	49.8	83.5	-25.8	Pass	63.5	-13.7	Pass
H	5862.4	19.5	8.4	0.0	35.3	6.5	61.3	50.2	83.5	-22.2	Pass	63.5	-13.3	Pass
802.11n Low MCS0				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	36.4	17.7	0.0	35.0	6.3	77.7	59.0	83.5	-5.8	Pass	63.5	-4.5	Pass
H	5721.5	35.2	17.4	0.0	35.0	6.3	76.5	58.7	83.5	-7.0	Pass	63.5	-4.8	Pass
H	5718.5	33.2	14.7	0.0	35.0	6.3	74.5	56.0	83.5	-9.0	Pass	63.5	-7.5	Pass
802.11n High MCS0				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	15.5	7.8	0.0	35.3	6.5	57.3	49.6	83.5	-26.2	Pass	63.5	-13.9	Pass
H	5857.1	19.8	8.2	0.0	35.3	6.5	61.6	50.0	83.5	-21.9	Pass	63.5	-13.5	Pass

Table Result: Pass by -4.3 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-3 40MHz BW

Radiated Band Edges

Date: 26-Sep-18 **Company:** Harman **Work Order:** S1636
Engineer: Chris Hamel **EUT Desc:** GMY20 **EUT Operating Voltage/Frequency:** 13.8V DC
Temp: 22.3°C **Humidity:** 36% **Pressure:** 1008mBar
Frequency Range: **Measurement Distance:** 1 m
Notes: UNII-3 80MHz BW (802.11ac MCS0). Power reduced to 11. **EUT Max Freq:**
Worst Case Antenna Polarization: H

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)	Peak Margin (dB)	Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	Average Margin (dB)	Average Result (Pass/Fail)
Low				---	---	---	---	---	---	---	---	---	---	---
H	5725.0	29.1	16.4	0.0	35.0	6.3	70.4	57.7	83.5	-13.1	Pass	63.5	-5.8	Pass
H	5712.7	25.8	14.4	0.0	35.0	6.3	67.1	55.7	83.5	-16.4	Pass	63.5	-7.8	Pass
H	5703.6	23.0	12.9	0.0	34.9	6.3	64.2	54.1	83.5	-19.3	Pass	63.5	-9.4	Pass
H	5718.7	27.0	16.1	0.0	35.0	6.3	68.3	57.4	83.5	-15.2	Pass	63.5	-6.1	Pass
High				---	---	---	---	---	---	---	---	---	---	---
H	5850.0	25.0	12.2	0.0	35.3	6.5	66.8	54.0	83.5	-16.7	Pass	63.5	-9.5	Pass
H	5864.8	23.2	9.5	0.0	35.3	6.5	65.0	51.3	83.5	-18.5	Pass	63.5	-12.2	Pass

Table Result: Pass by -5.8 dB ***Worst Freq:*** 5725.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2051 **Cable 2:** Asset #2054 **Cable 3:** ---
Analyzer: Rental SA#5 **Preamp:** None **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.207

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

UNII-3 80MHz BW

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/16/2018
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
TH A#2082		HTC-1	HDE		2082	II	3/22/2019
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
Asset #2051	9kHz - 18GHz		Florida RF			II	3/7/2019
Asset #2054	9kHz - 18GHz		Florida RF			II	10/31/2018

TEU

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

Not Applicable. 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

ES1636-2 Appendix A
CFR Title 47 FCC Part §15.407 and ISED Canada RSS-247 Issue 2

DUT Information

Model:	INFO3.5 CSM MY20
Manufacturer:	Harman International Industries, Inc.
Serial Number:	02

UNII-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
802.11n(HT40) 802.11ac(VHT40)	46	5230
802.11a 802.11n(HT20) 802.11ac(VHT20)	48	5240

UNII-3

Mode	Channel	Frequency
802.11a 802.11n(HT20) 802.11ac(VHT20)	149	5745
802.11n(HT40) 802.11ac(VHT40)	151	5755
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)	165	5825

Notes
1. Channels and modes above were tested.
2. Output power measurements were performed at the lowest and highest data rate of each supported 802.11 mode. Worst cases found to be: 802.11a 6Mbps, 802.11n (HT20) MCS0, 802.11ac (VHT20) MCS0, 802.11n (HT40) MCS0, 802.11ac (VHT40) MCS0, 802.11ac (VHT80) MCS0. 6dB BW, 99% OBW were only tested at these worst case data rates.

Antenna Gain	5.05 dBi
Number of transmit chains	1
Equipment Type	Unlicensed National Information Infrastructure Device

Test Equipment Used:

Rev. 10/22/2018								
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	10/1/2019	10/1/2018
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	10/1/2019	10/1/2018
SMB100A Signal Generator	100kHz-40GHz	SMB100A	ROHDE & SCHWARZ	179846	2557	I	10/1/2019	10/1/2018
Power/Noise Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
OSP - open switch and control platform	30MHz-18GHz	OSP-B157W8	ROHDE & SCHWARZ	1527.1144.02-100955-Ck	2558	I	2/1/2019	2/1/2018
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
DUT1	30MHz-26GHz		Micro-Coax			III	verify before use	
DUT2	30MHz-26GHz		Micro-Coax			III	verify before use	
DUT3	30MHz-26GHz		Micro-Coax			III	verify before use	
DUT4	30MHz-26GHz		Micro-Coax			III	verify before use	
Attenuators / Couplers	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
10dB Attenuator-01 Brown	30MHz-26GHz		Mini Curcuits			III	verify before use	
10dB Attenuator-02 Yellow	30MHz-26GHz		Mini Curcuits			III	verify before use	
10dB Attenuator-03 Red	30MHz-26GHz		Mini Curcuits			III	verify before use	
10dB Attenuator-04 orange	30MHz-26GHz		Mini Curcuits			III	verify before use	
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	II	3/23/2019	3/23/2018
Directional Coupler	0.5GHz-18GHz	UDC	AA MCS	001040	2434	III	verify before use	
Communication Tester	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
CMW270 Wideband Radio Communication Tester	DC to 6GHz	CMW270	ROHDE & SCHWARZ	1201.0002K75-101066-MV		I	6/13/2019	6/13/2018
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	1/5/2019	1/5/2018
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

Power settings:
UNII-1

802.11a		802.11n (HT20)		802.11ac (VHT20)	
Channel U-NII-1	**Power Setting**	**Channel U-NII-1**	**Power Setting**	**Channel U-NII-1**	**Power Setting**
36	Default	**36**	Default	**36**	Default
40	Default	**40**	Default	**40**	Default
48	Default	**48**	Default	**48**	Default

802.11n (HT40)		802.11ac (VHT40)	
Channel U-NII-1	**Power Setting**	**Channel U-NII-1**	**Power Setting**
38	Default	**38**	Default
46	Default	**46**	Default

802.11ac (VHT80)	
Channel U-NII-1	**Power Setting**
42	Default

UNII-3

802.11a		802.11n (HT20)		802.11ac (VHT20)	
Channel U-NII-3	**Power Setting**	**Channel U-NII-3**	**Power Setting**	**Channel U-NII-3**	**Power Setting**
149	Default	**149**	11	**149**	11
157	Default	**157**	11	**157**	11
165	Default	**165**	11	**165**	11

802.11n (HT40)		802.11ac (VHT40)	
Channel U-NII-3	**Power Setting**	**Channel U-NII-3**	**Power Setting**
151	11	**151**	11
159	11	**159**	11

802.11ac (VHT80)	
Channel U-NII-3	**Power Setting**
155	11

Test Results Summary

UNII-1

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

UNII-3

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

Average Output Power (Gated)

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 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

Device has both client and access point modes and has identical RF characteristics and settings for both.
Limits are as follows:
15.407(a)(1)(i): 1W (30dBm) for outdoor access points with antenna gains less than 6dBi.
15.407(a)(1)(iv): 250mW (23.97dBm) for client devices with antenna gains less than 6dBi.
Since client devices are subject to more stringent limits, unit was tested against the limits for a client device.

802.11a

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	6.672	7.135	7.005	23.97	98.702
54 Mbps	5.927	6.553	6.506	23.97	90.913

802.11n (HT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	6.416	6.992	6.745	23.97	98.613
MCS7	6.111	6.583	6.530	23.97	89.508

802.11ac (VHT20)

Data Rate	Gated RMS (dBm) 5180 MHz	Gated RMS (dBm) 5200 MHz	Gated RMS (dBm) 5240 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	6.295	6.907	6.874	23.97	98.606
MCS8	6.109	6.552	6.511	23.97	88.238

802.11n (HT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	5.801	6.069	23.97	97.346
MCS7	5.710	5.854	23.97	84.647

802.11ac (VHT40)

Data Rate	Gated RMS (dBm) 5190 MHz	Gated RMS (dBm) 5230 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	5.915	6.25	23.97	97.329
MCS9	5.754	5.884	23.97	82.088

802.11ac (VHT80)

Data Rate	Gated RMS (dBm) 5210 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	5.625	23.97	96.357
MCS9	4.355	23.97	89.866

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 with TPC
6 Mbps	6.67	5.05	11.72	13.8	n/a	n/a	n/a
54 Mbps	5.93	5.05	10.98	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
6 Mbps	7.14	5.05	12.19	13.8	n/a	n/a	n/a
54 Mbps	6.55	5.05	11.60	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
6 Mbps	7.01	5.05	12.06	13.8	n/a	n/a	n/a
54 Mbps	6.51	5.05	11.56	13.8	n/a	n/a	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 with TPC
MCS0	6.42	5.05	11.47	13.8	n/a	n/a	n/a
MCS7	6.11	5.05	11.16	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.99	5.05	12.04	13.8	n/a	n/a	n/a
MCS7	6.58	5.05	11.63	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.74	5.05	11.80	13.8	n/a	n/a	n/a
MCS7	6.53	5.05	11.58	13.8	n/a	n/a	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 with TPC
MCS0	6.30	5.05	11.35	13.8	n/a	n/a	n/a
MCS8	6.11	5.05	11.16	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.91	5.05	11.96	13.8	n/a	n/a	n/a
MCS8	6.55	5.05	11.60	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.87	5.05	11.92	13.8	n/a	n/a	n/a
MCS8	6.51	5.05	11.56	13.8	n/a	n/a	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 with TPC
MCS0	5.80	5.05	10.85	13.8	n/a	n/a	n/a
MCS7	5.71	5.05	10.76	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.07	5.05	11.12	13.8	n/a	n/a	n/a
MCS7	5.85	5.05	10.90	13.8	n/a	n/a	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 with TPC
MCS0	5.92	5.05	10.97	13.8	n/a	n/a	n/a
MCS9	5.75	5.05	10.80	13.8	n/a	n/a	n/a
Data Rate	Gated RMS (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Gated RMS (dBm) with TPC	Difference	Power Setting with TPC
MCS0	6.25	5.05	11.30	13.8	n/a	n/a	n/a
MCS9	5.88	5.05	10.93	13.8	n/a	n/a	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 with TPC
MCS0	5.63	5.05	10.68	13.8	n/a	n/a	n/a
MCS9	4.36	5.05	9.41	13.8	n/a	n/a	n/a

FCC and RSS-247 UNII-3

802.11a

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
6 Mbps	7.685	8.425	9.148	30	99.901
54 Mbps	6.86	7.651	8.705	30	90.435

802.11n (HT20)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	4.799	5.754	6.658	30	100.00
MCS7	4.528	5.210	5.976	30	100.00

802.11ac (VHT20)

Data Rate	Gated RMS (dBm) 5745 MHz	Gated RMS (dBm) 5785 MHz	Gated RMS (dBm) 5825 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	4.712	5.810	6.464	30	100.00
MCS8	4.284	5.067	5.943	30	100.00

802.11n (HT40)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	4.796	4.961	30	100.00
MCS7	3.798	4.162	30	100.00

802.11ac (VHT40)

Data Rate	Gated RMS (dBm) 5755 MHz	Gated RMS (dBm) 5795 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	4.797	4.732	30	100.00
MCS9	3.557	4.043	30	100.00

802.11ac (VHT80)

Data Rate	Gated RMS (dBm) 5775 MHz	Limit (dBm)	Duty Cycle (%)
MCS0	4.302	30	100.00
MCS9	2.856	30	100.00

Power Spectral Density

Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.F
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 1.3 dB

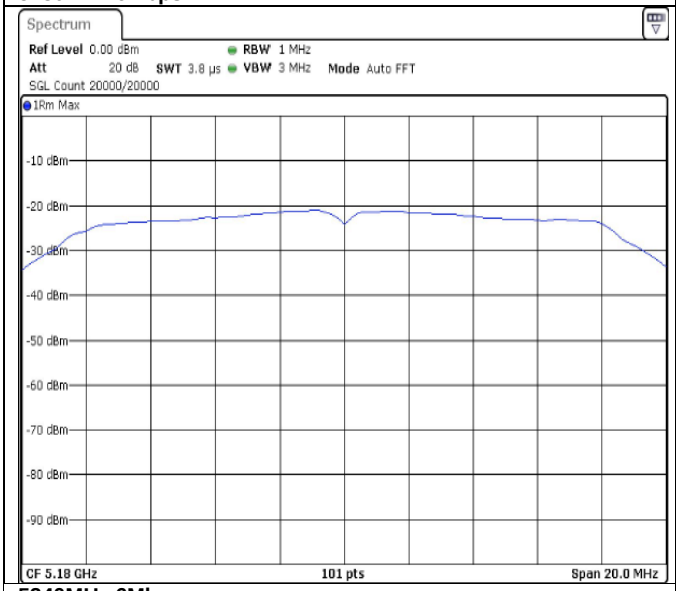
FCC UNII-1

Device has both client and access point modes and has identical RF characteristics and settings for both.
Limits are as follows:
15.407(a)(1)(i): 17dBm for outdoor access points with antenna gains less than 6dBi.
15.407(a)(1)(iv): 11dBm for client devices with antenna gains less than 6dBi.
Since client devices are subject to more stringent limits, unit was tested against the limits for a client device.

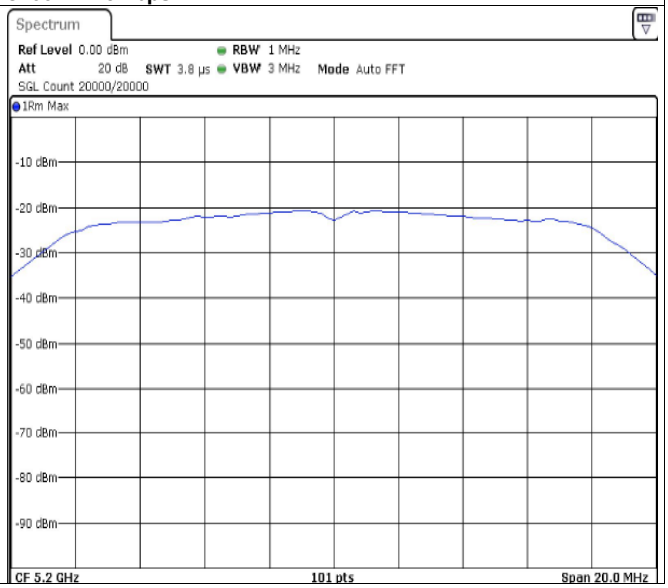
802.11a

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
6 Mbps	3.446	3.853	3.798	11
54 Mbps	2.856	3.425	3.257	11

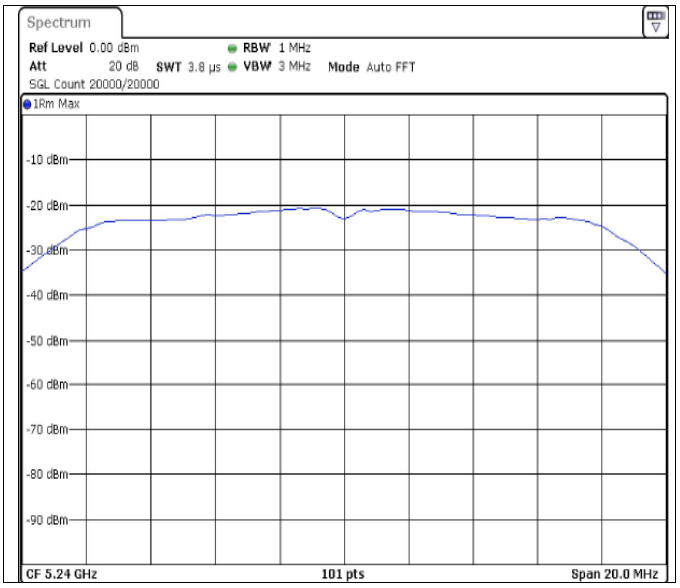
5180MHz 6Mbps



5200MHz 6Mbps



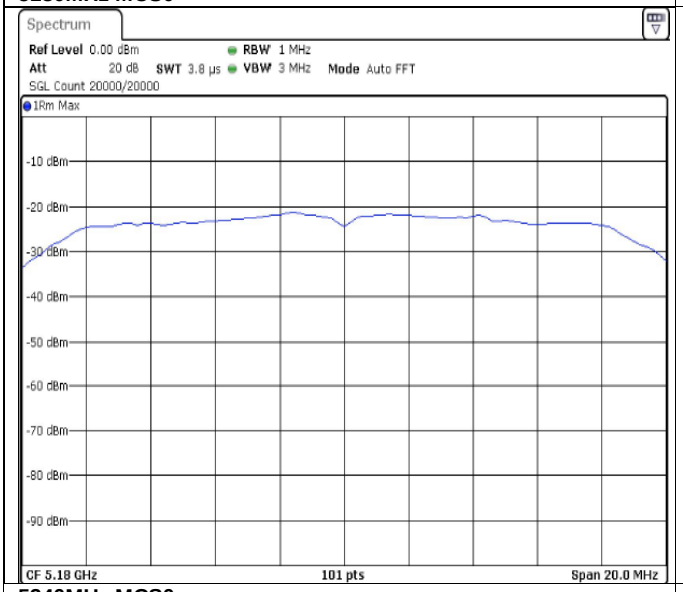
5240MHz 6Mbps



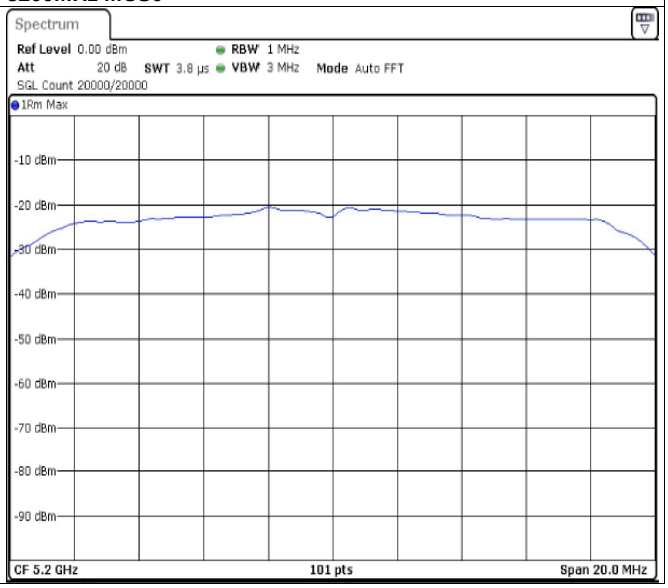
802.11n (HT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	3.293	3.893	3.470	11
MCS7	3.889	3.822	4.225	11

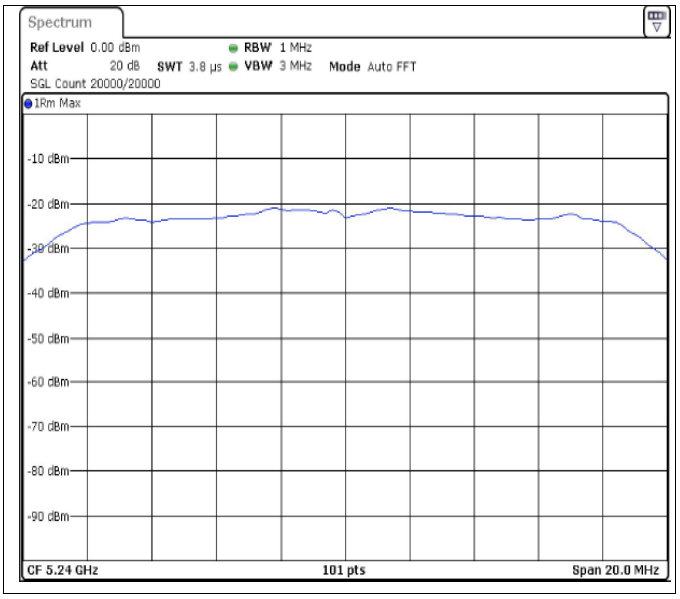
5180MHz MCS0



5200MHz MCS0



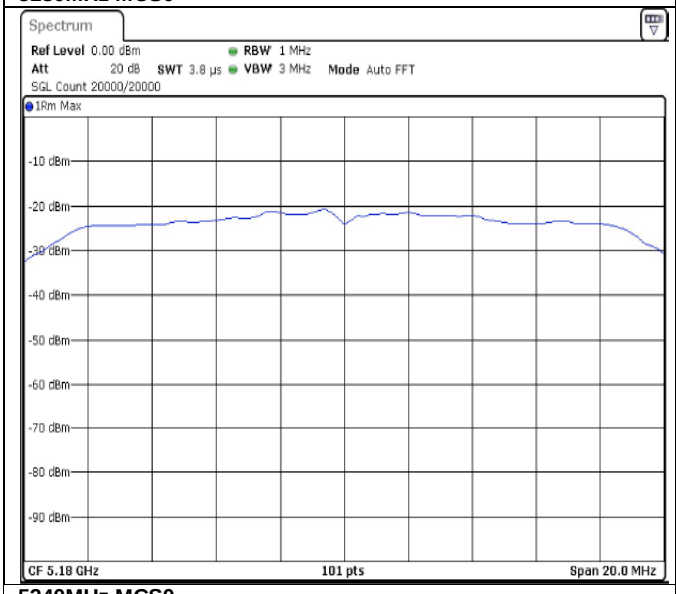
5240MHz MCS0


Spectrum
Ref Level 0.00 dBm
RBW 1 MHz
Att 20 dB SWT 3.8 µs VBW 3 MHz Mode Auto FFT
SGL Count 20000/20000
1Rm Max
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
CF 5.24 GHz
101 pts
Span 20.0 MHz

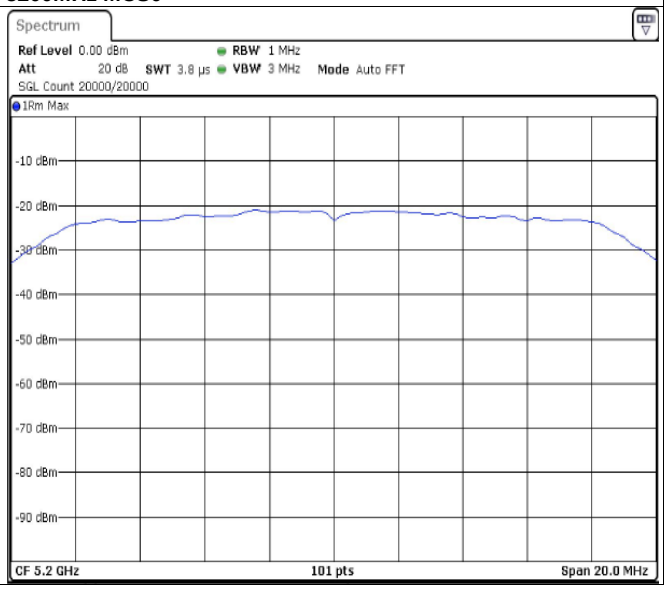
802.11ac (VHT20)

Data Rate	Peak PSD (dBm) 5180 MHz	Peak PSD (dBm) 5200 MHz	Peak PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	3.657	3.512	3.652	11
MCS8	3.538	3.920	3.638	11

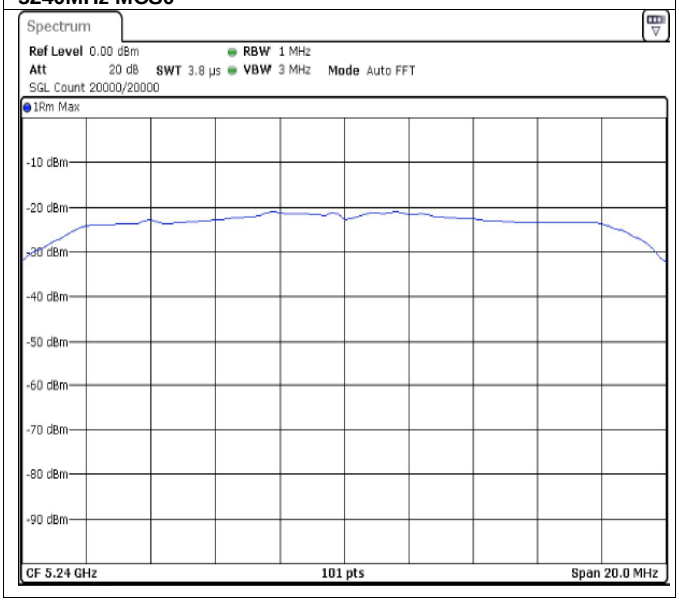
5180MHz MCS0



5200MHz MCS0



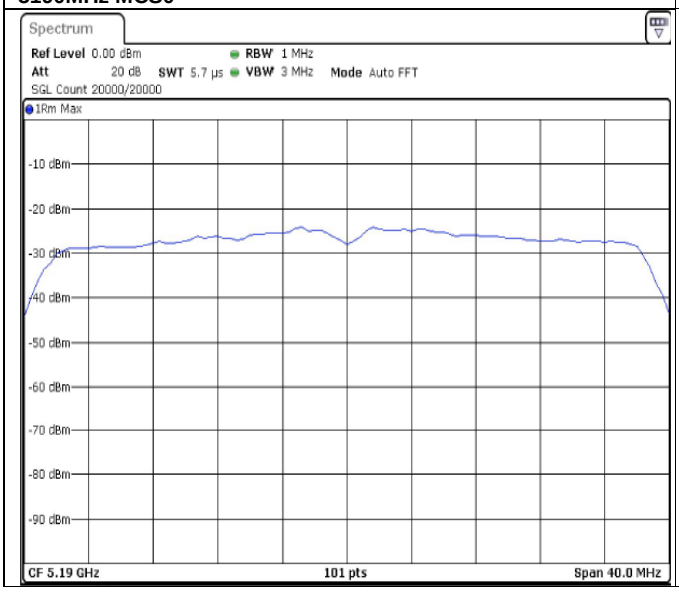
5240MHz MCS0



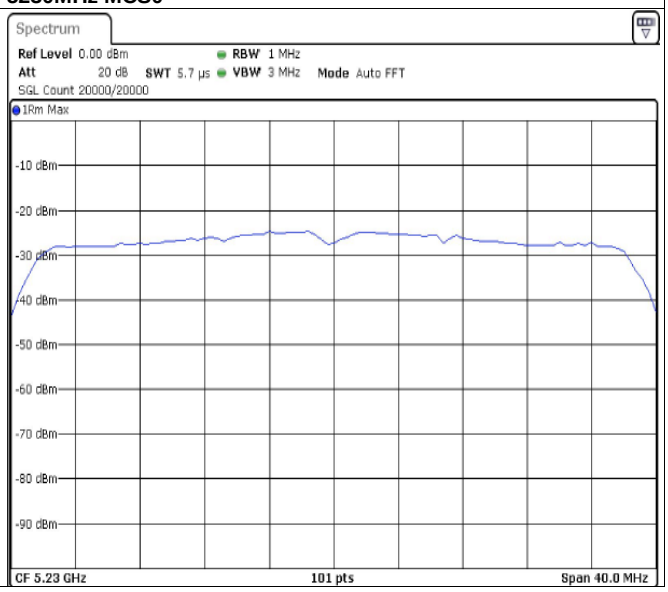
802.11n (HT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	0.416	0.110	11
MCS7	1.888	1.491	11

5190MHz MCS0



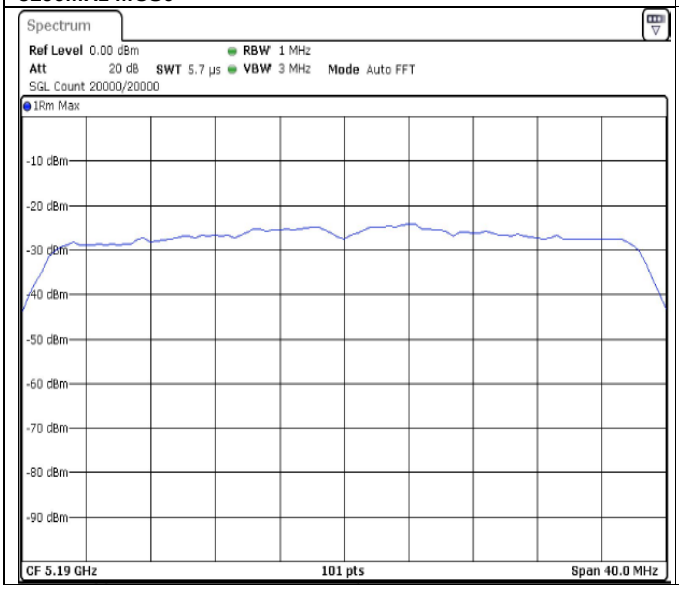
5230MHz MCS0



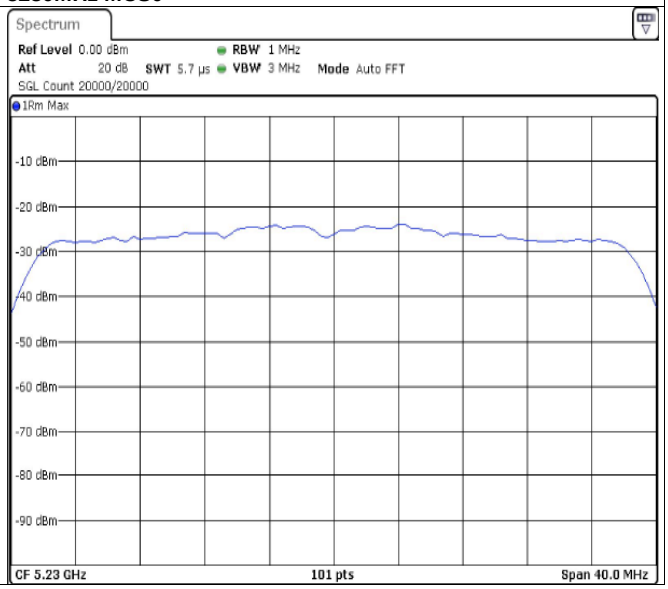
802.11ac(VHT40)

Data Rate	Peak PSD (dBm) 5190 MHz	Peak PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	0.524	0.768	11
MCS9	2.196	2.336	11

5190MHz MCS0



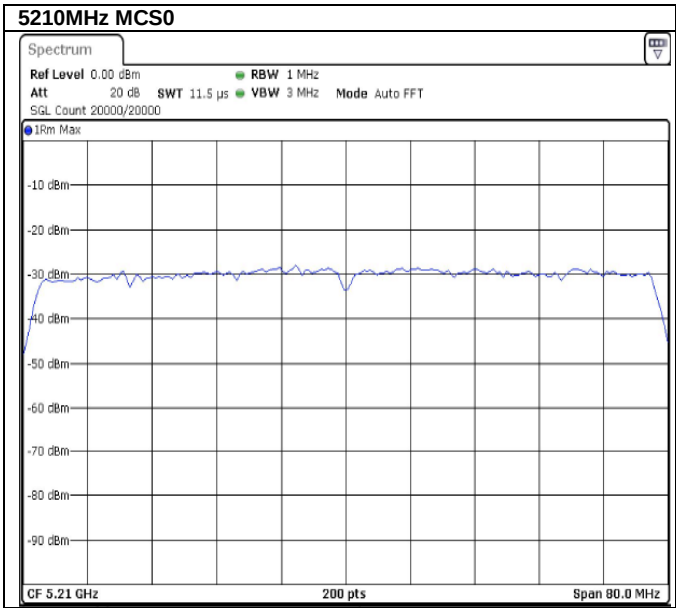
5230MHz MCS0



802.11ac (VHT80)

Data Rate	Peak PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	-2.228	11
MCS9	-1.782	11

5210MHz MCS0



RSS-247 UNII-1

802.11a

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
6 Mbps	3.45	5.05	8.50	10
54 Mbps	2.86	5.05	7.91	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
6 Mbps	3.85	5.05	8.90	10
54 Mbps	3.43	5.05	8.48	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
6 Mbps	3.80	5.05	8.85	10
54 Mbps	3.26	5.05	8.31	10

802.11n (HT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	3.29	5.05	8.34	10
MCS7	3.89	5.05	8.94	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
MCS0	3.89	5.05	8.94	10
MCS7	3.82	5.05	8.87	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	3.47	5.05	8.52	10
MCS7	4.23	5.05	9.28	10

802.11ac (VHT20)

Data Rate	PSD (dBm) 5180 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5180 MHz	Limit (dBm)
MCS0	3.66	5.05	8.71	10
MCS8	3.54	5.05	8.59	10
Data Rate	PSD (dBm) 5200 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5200 MHz	Limit (dBm)
MCS0	3.51	5.05	8.56	10
MCS8	3.92	5.05	8.97	10
Data Rate	PSD (dBm) 5240 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5240 MHz	Limit (dBm)
MCS0	3.65	5.05	8.70	10
MCS8	3.64	5.05	8.69	10

802.11n (HT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	0.42	5.05	5.47	10
MCS7	1.89	5.05	6.94	10
Data Rate	PSD (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	0.11	5.05	5.16	10
MCS7	1.49	5.05	6.54	10

802.11ac (VHT40)

Data Rate	PSD (dBm) 5190 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5190 MHz	Limit (dBm)
MCS0	0.52	5.05	5.57	10
MCS9	2.20	5.05	7.25	10
Data Rate	PSD (dBm) 5230 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5230 MHz	Limit (dBm)
MCS0	0.77	5.05	5.82	10
MCS9	2.34	5.05	7.39	10

802.11ac (VHT80)

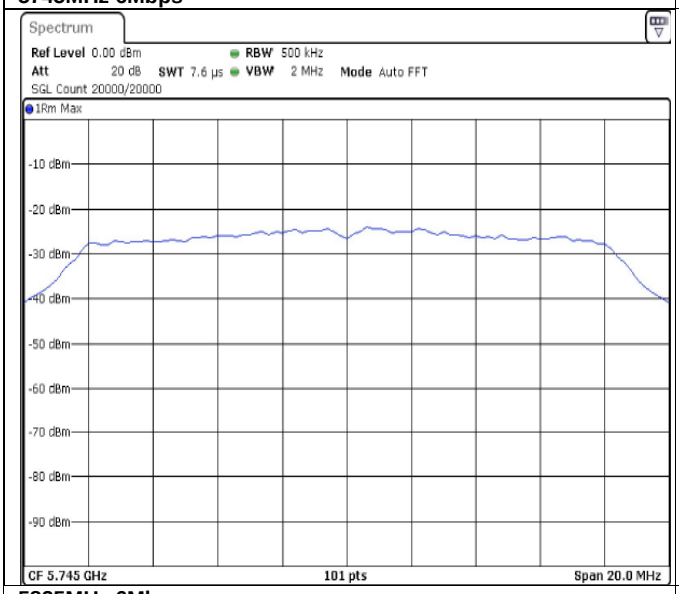
Data Rate	PSD (dBm) 5210 MHz	Antenna Gain (dBi)	EIRP PSD (dBm) 5210 MHz	Limit (dBm)
MCS0	-2.23	5.05	2.82	10
MCS9	-1.78	5.05	3.27	10

FCC and RSS-247 UNII-3

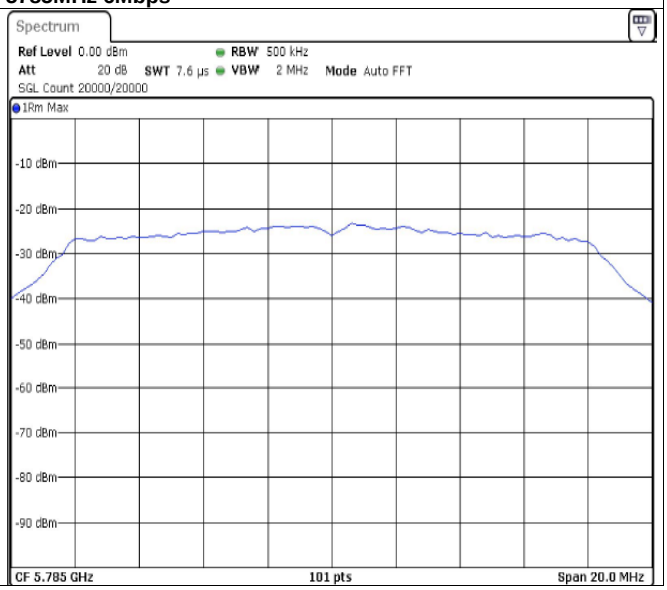
802.11a

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
6 Mbps	0.898	1.663	2.152	30.0
54 Mbps	0.884	1.352	2.146	30.0

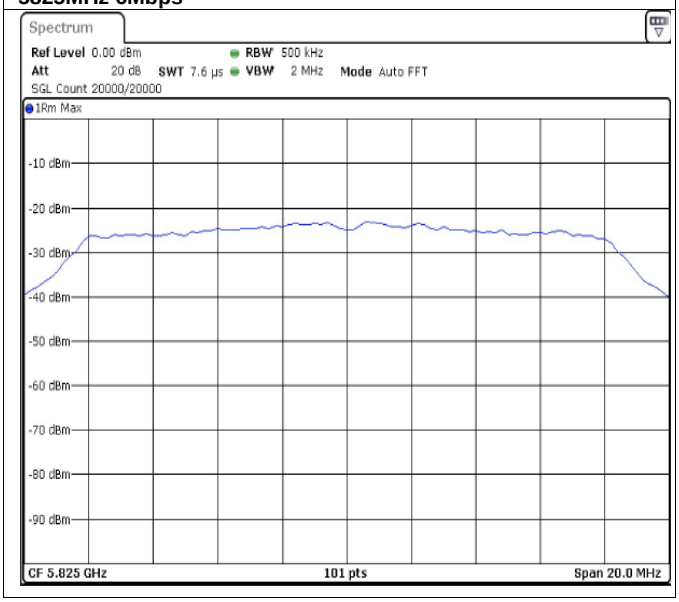
5745MHz 6Mbps



5785MHz 6Mbps



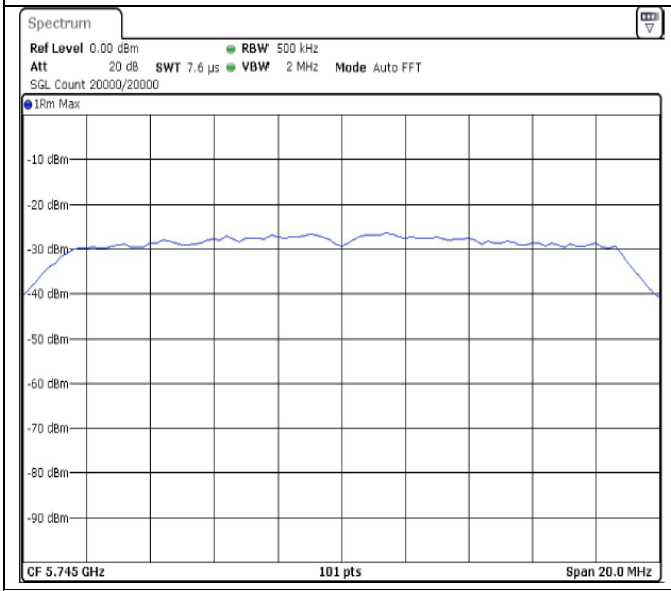
5825MHz 6Mbps



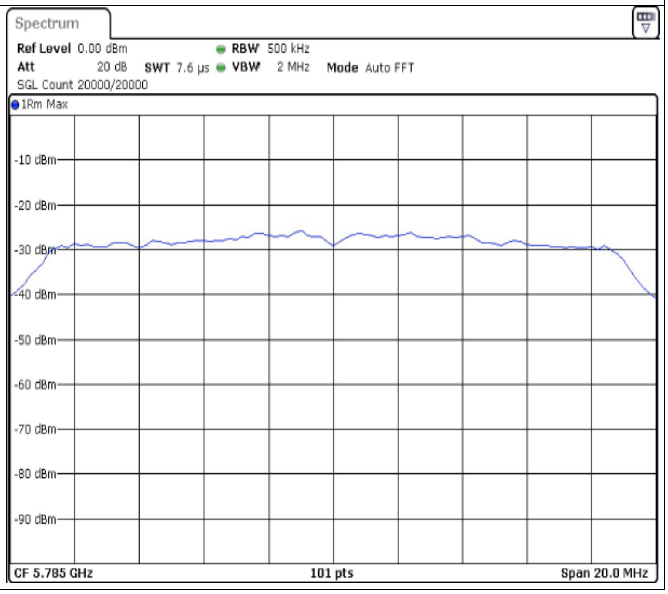
802.11n (HT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	-1.466	-0.678	-0.224	30
MCS7	-0.858	-0.045	0.843	30

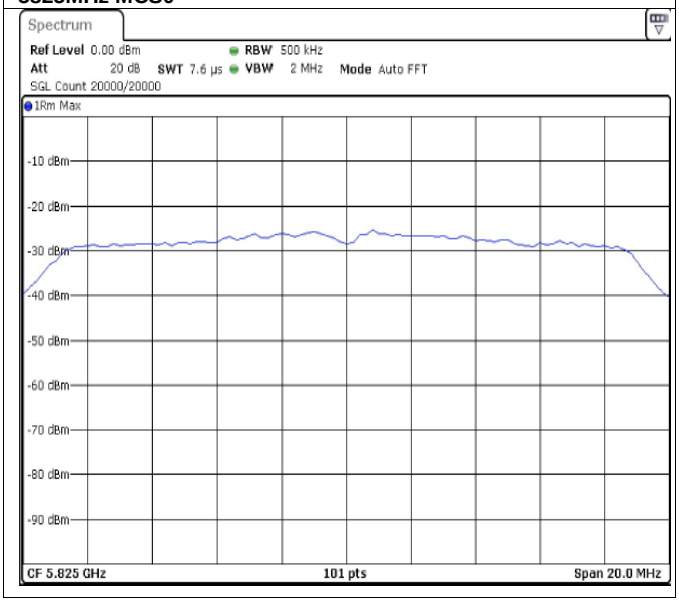
5745MHz MCS0



5785MHz MCS0



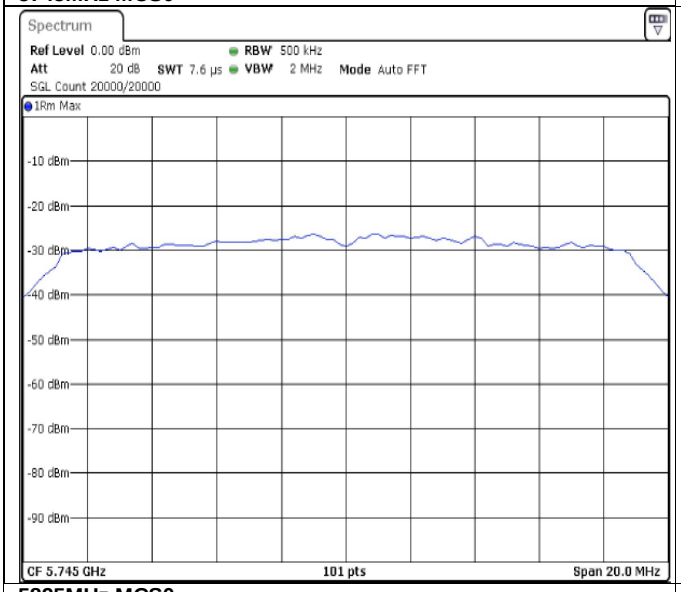
5825MHz MCS0



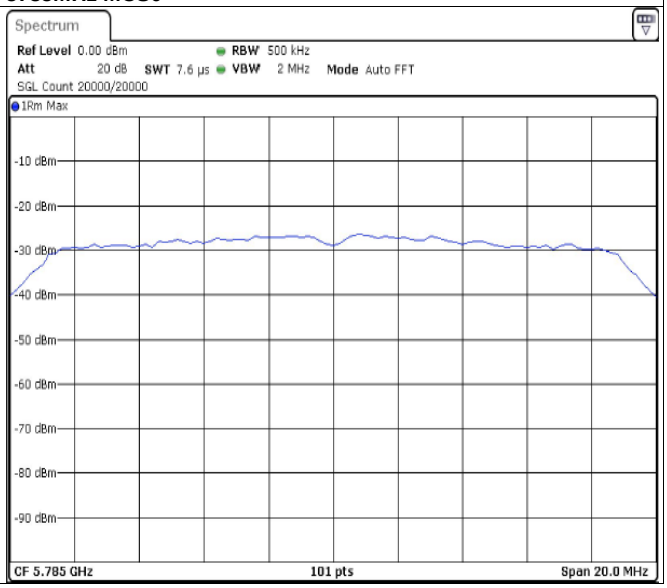
802.11ac (VHT20)

Data Rate	Peak PSD (dBm) 5745 MHz	Peak PSD (dBm) 5785 MHz	Peak PSD (dBm) 5825 MHz	Limit (dBm)
MCS0	-1.438	-1.552	-0.413	30
MCS8	-0.685	0.200	0.296	30

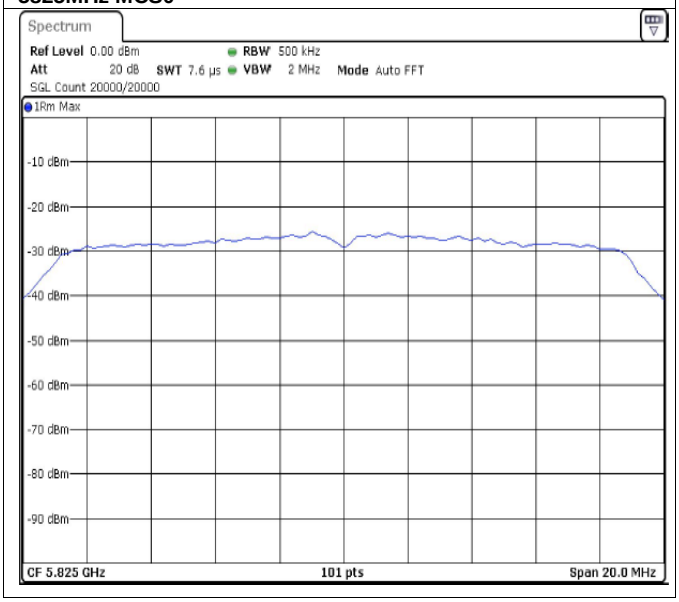
5745MHz MCS0



5785MHz MCS0



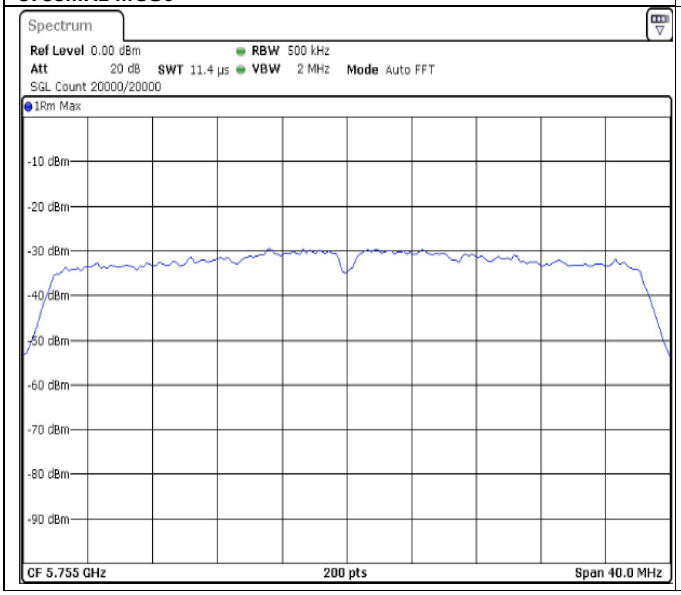
5825MHz MCS0



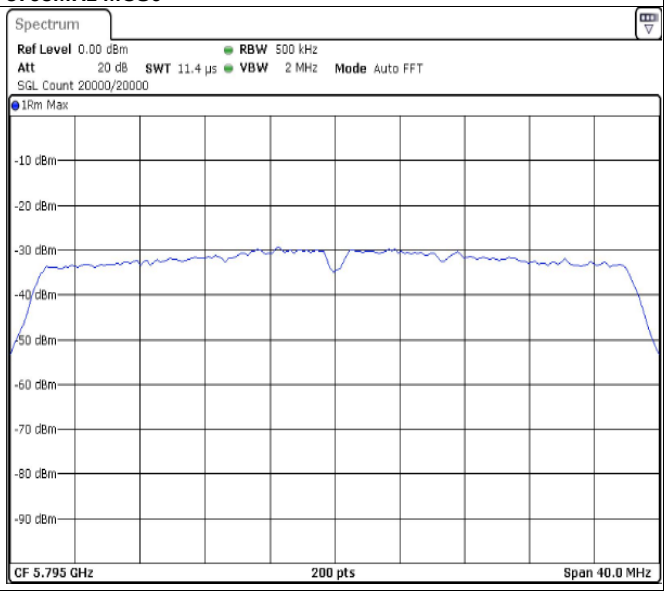
802.11n (HT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	-4.553	-4.193	30
MCS7	-3.206	-2.132	30

5755MHz MCS0



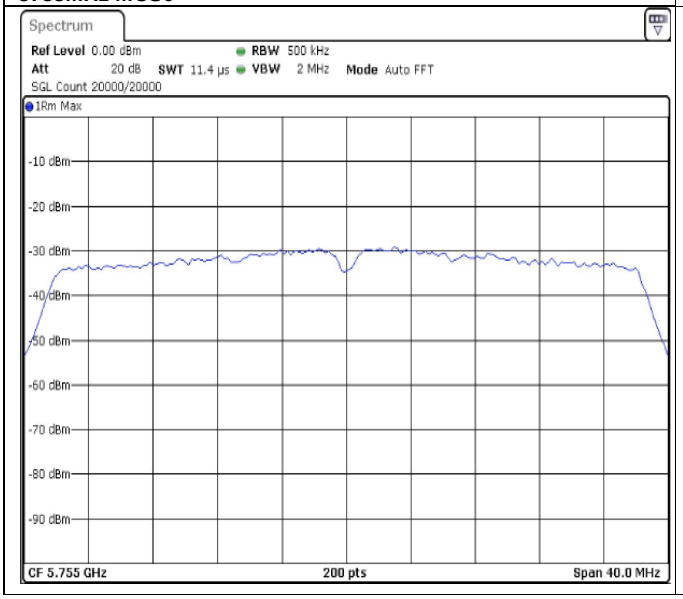
5795MHz MCS0



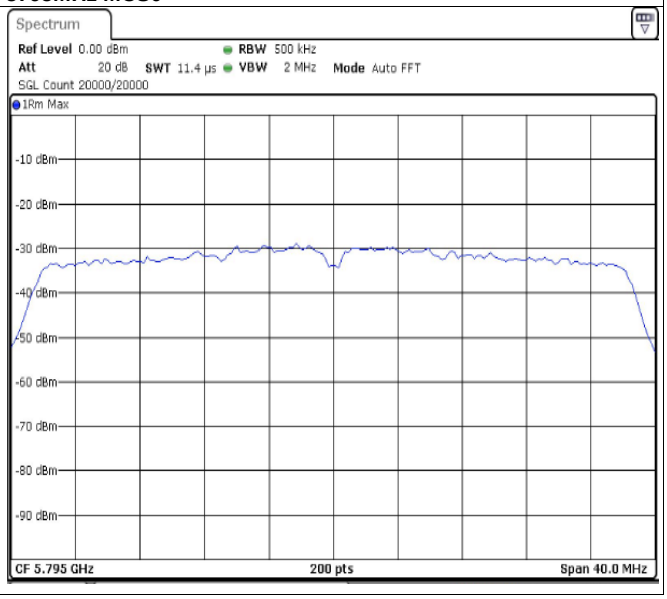
802.11ac (VHT40)

Data Rate	Peak PSD (dBm) 5755 MHz	Peak PSD (dBm) 5795 MHz	Limit (dBm)
MCS0	-4.240	-3.835	30
MCS9	-3.806	-2.971	30

5755MHz MCS0



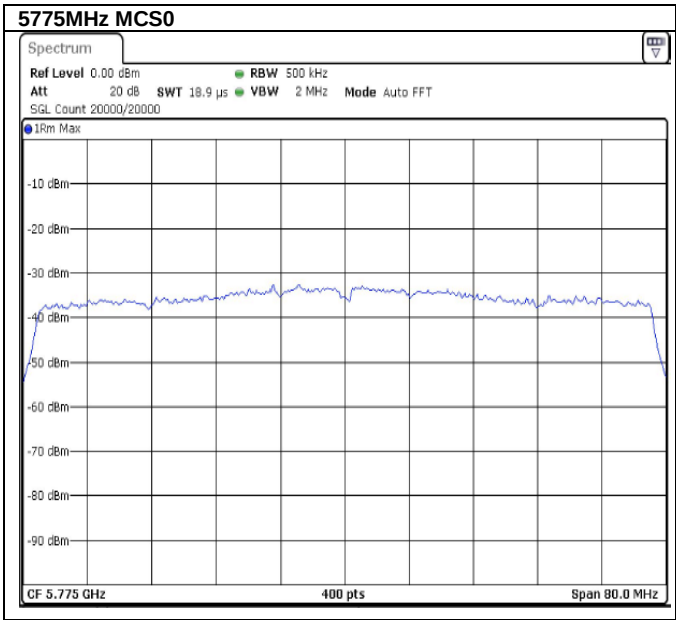
5795MHz MCS0



802.11ac (VHT80)

Data Rate	Peak PSD (dBm) 5775 MHz	Limit (dBm)
MCS0	-7.752	30
MCS9	-7.650	30

5775MHz MCS0



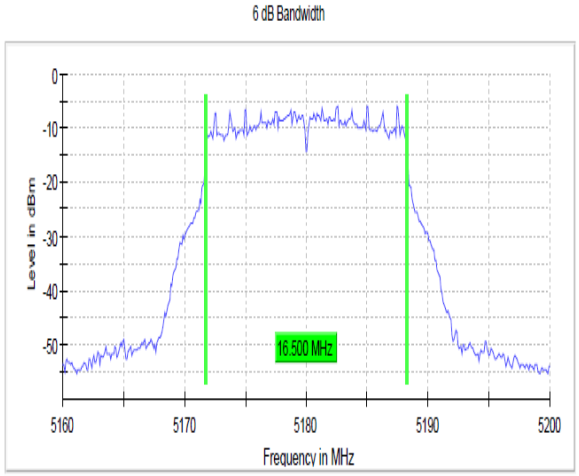
DTS Bandwidth (6dB)

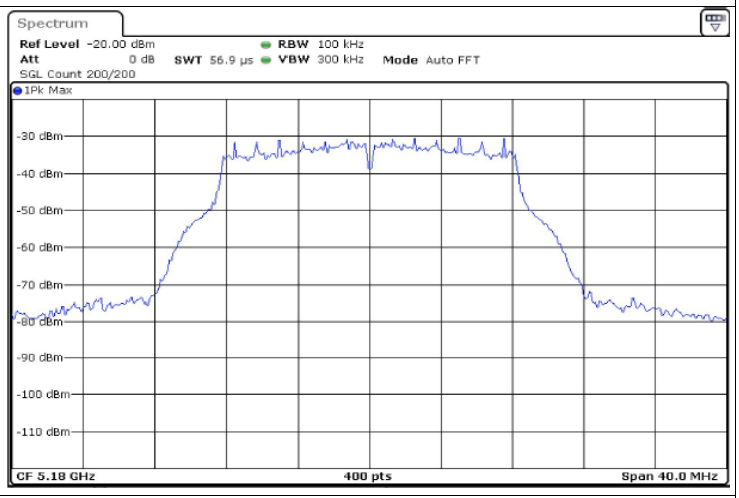
Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.C.2.
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

FCC/RSS-247 UNII-1

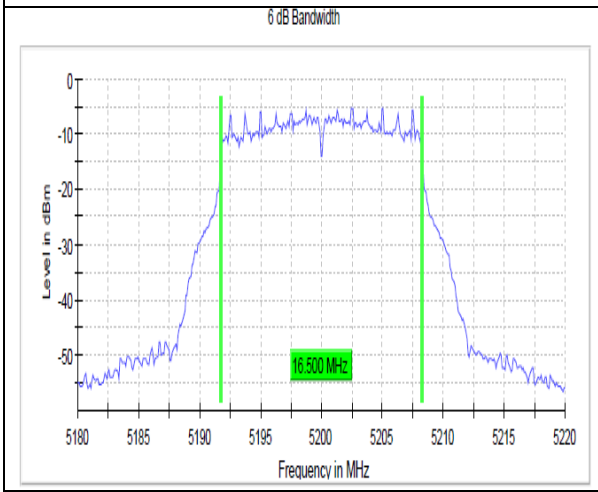
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 6 Mbps	5180.000	16.500000	0.5	5171.750000	5188.250000
802.11n(HT20) MCS0	5180.000	17.700000	0.5	5171.150000	5188.850000
802.11ac(VHT20) MCS0	5180.000	17.700000	0.5	5171.150000	5188.850000
802.11n(HT40) MCS0	5190.000	35.900000	0.5	5172.350000	5208.250000
802.11ac(VHT40) MCS0	5190.000	35.900000	0.5	5172.350000	5208.250000
802.11a 6 Mbps	5200.000	16.500000	0.5	5191.750000	5208.250000
802.11n(HT20) MCS0	5200.000	17.700000	0.5	5191.150000	5208.850000
802.11ac(VHT20) MCS0	5200.000	17.700000	0.5	5191.150000	5208.850000
802.11ac(VHT80) MCS0	5210.000	75.600000	0.5	5172.350000	5247.950000
802.11n(HT40) MCS0	5230.000	36.200000	0.5	5212.050000	5248.250000
802.11ac(VHT40) MCS0	5230.000	36.200000	0.5	5212.050000	5248.250000
802.11a 6 Mbps	5240.000	16.500000	0.5	5231.750000	5248.250000
802.11n(HT20) MCS0	5240.000	17.700000	0.5	5231.150000	5248.850000
802.11ac(VHT20) MCS0	5240.000	17.700000	0.5	5231.150000	5248.850000

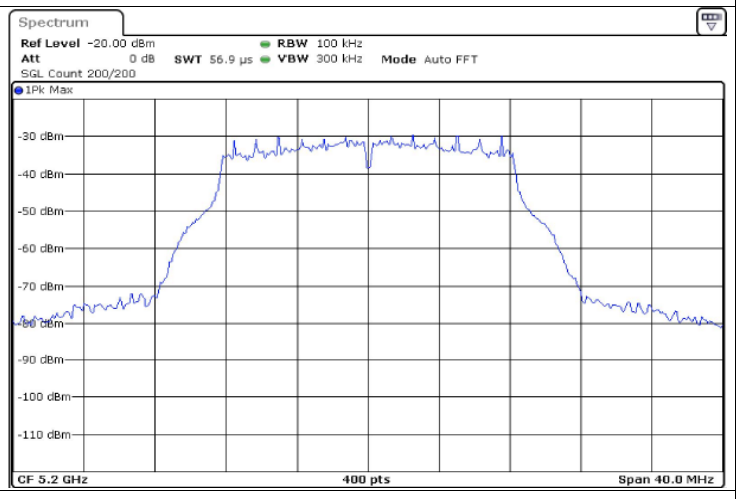
802.11a 5180MHz 6Mbps



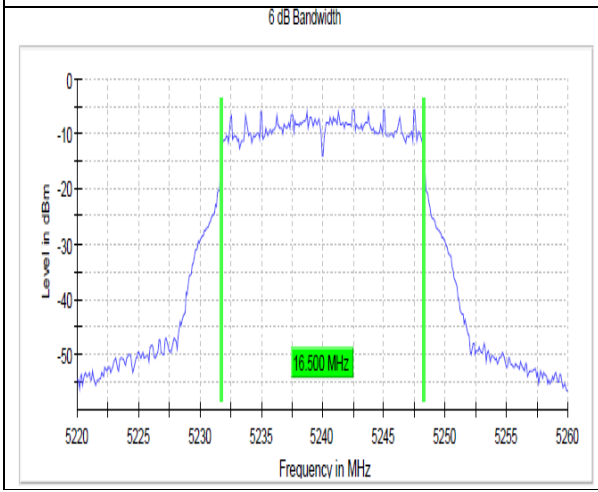


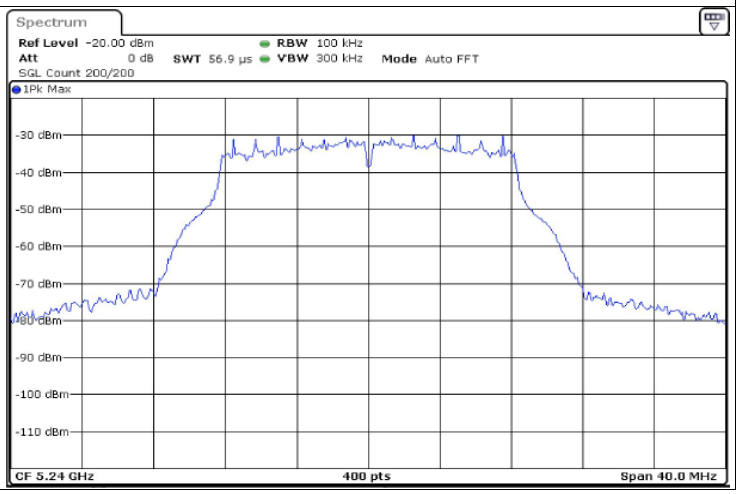
802.11a 5200MHz 6Mbps



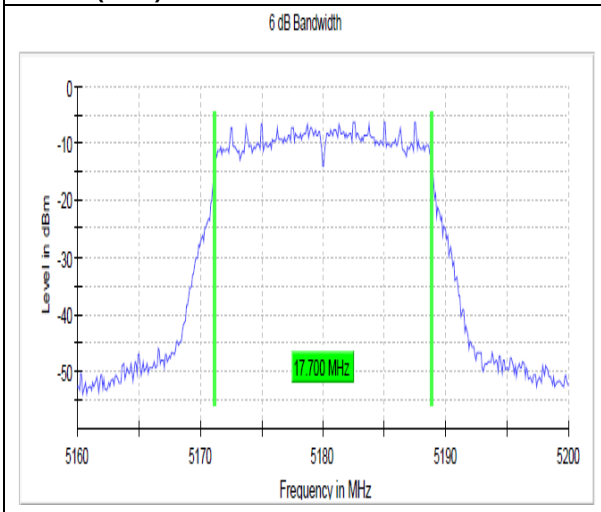


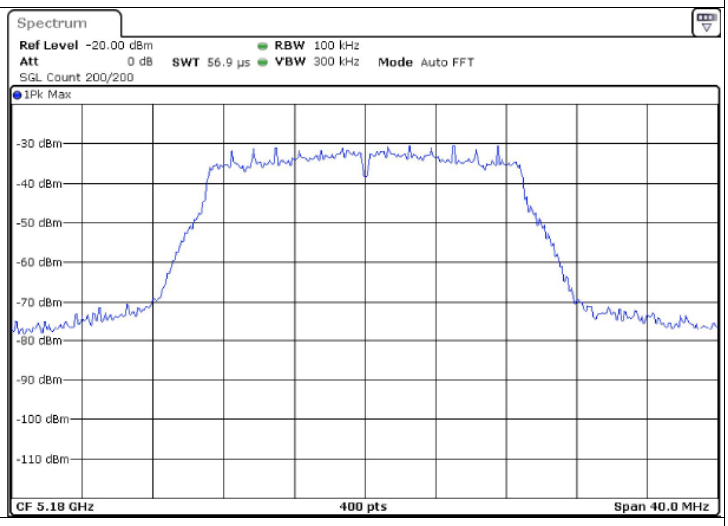
802.11a 5240MHz 6Mbps



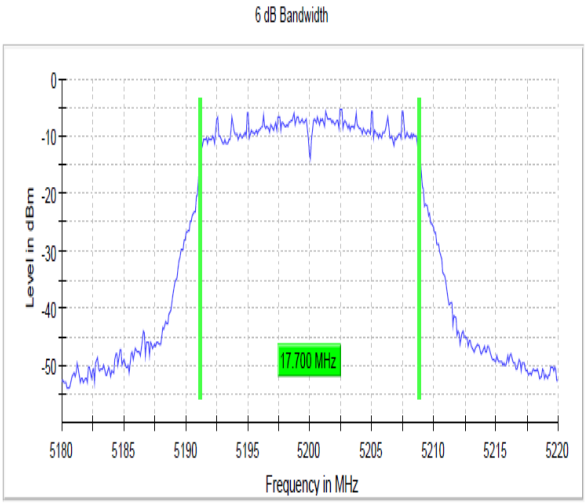


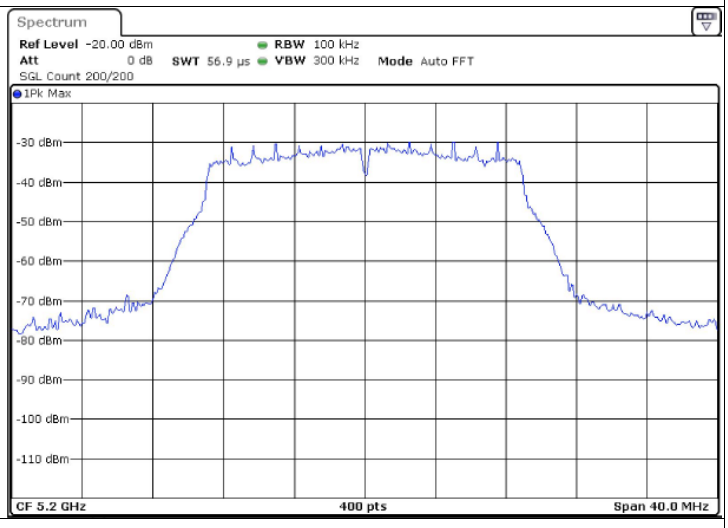
802.11n(HT20) 5180MHz MCS0



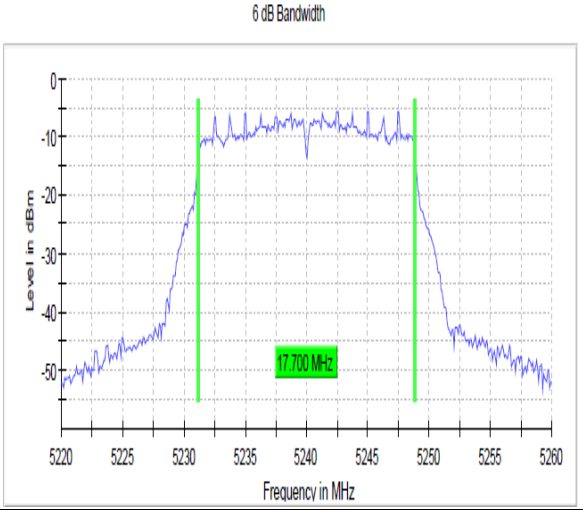


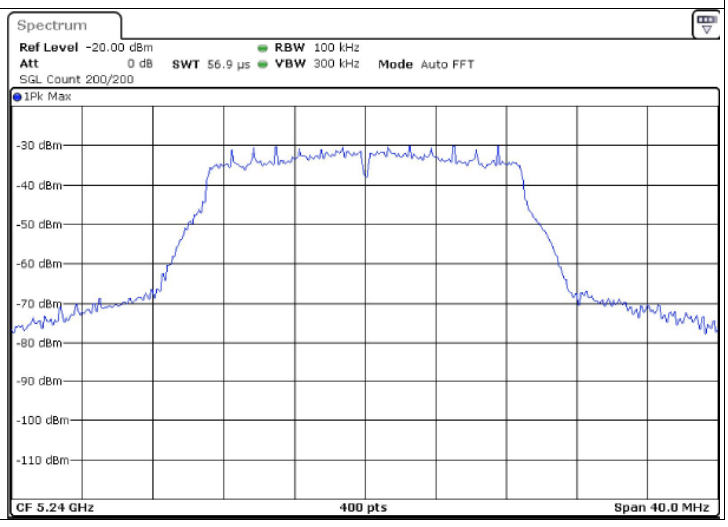
802.11n(HT20) 5200MHz MCS0



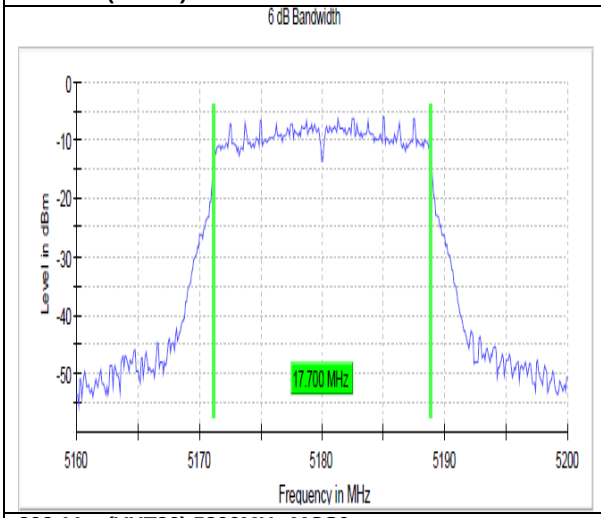


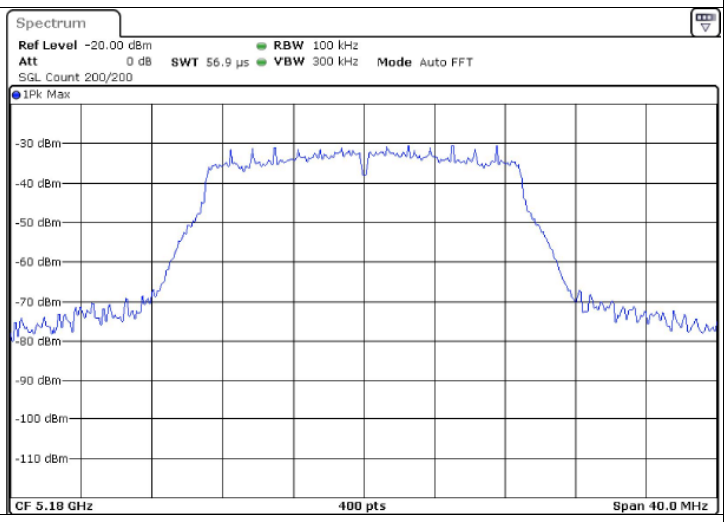
802.11n(HT20) 5240MHz MCS0



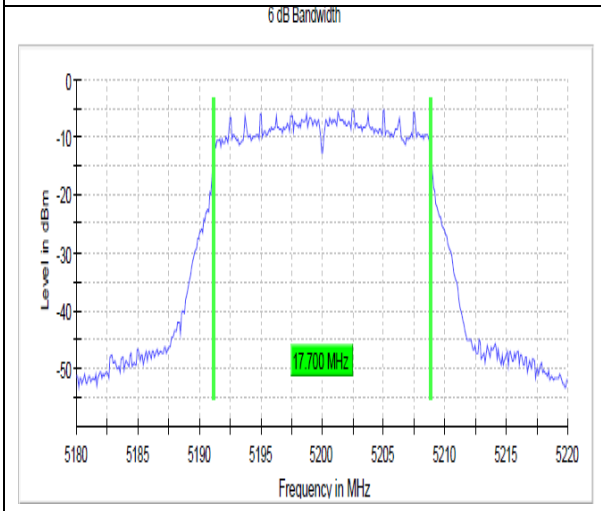


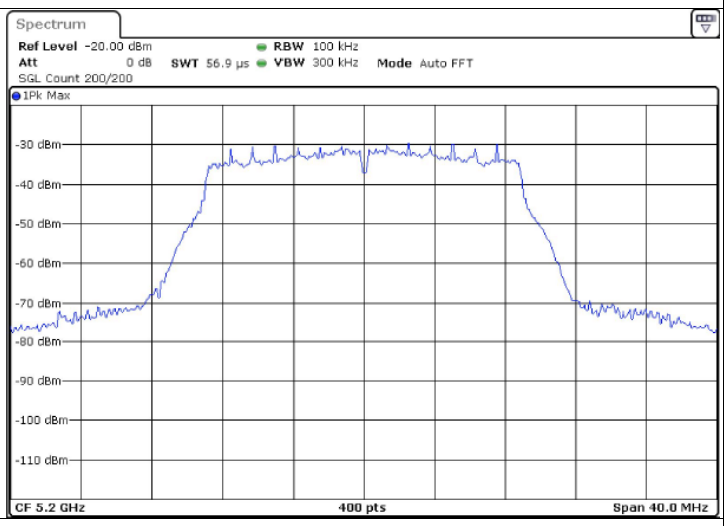
802.11ac(VHT20) 5180MHz MCS0



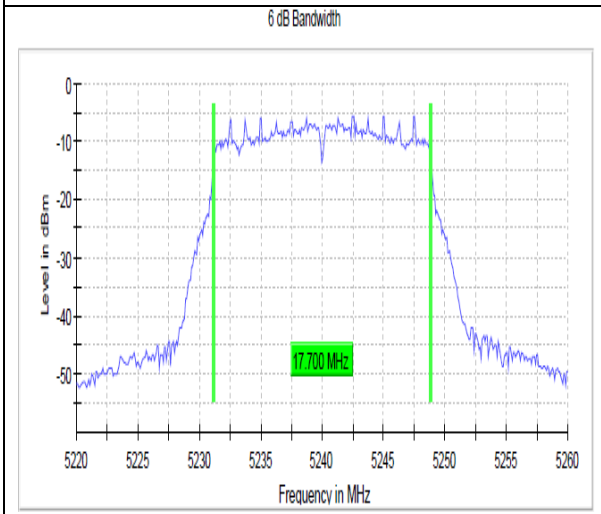


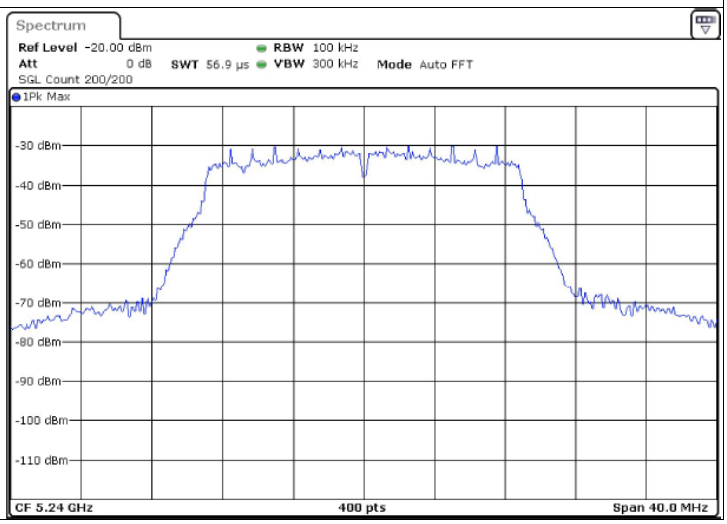
802.11ac(VHT20) 5200MHz MCS0



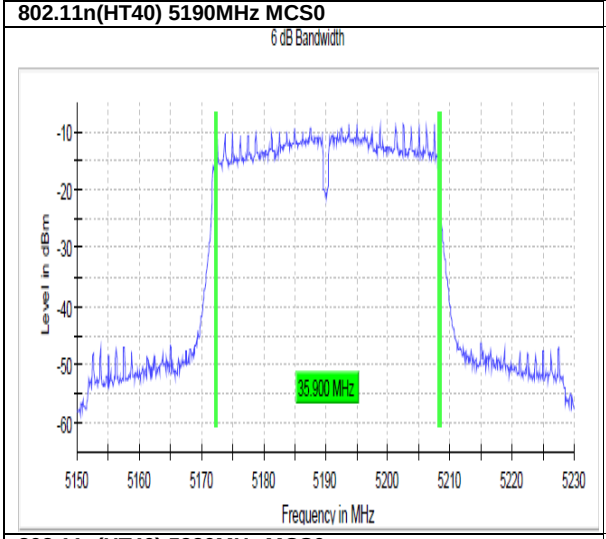


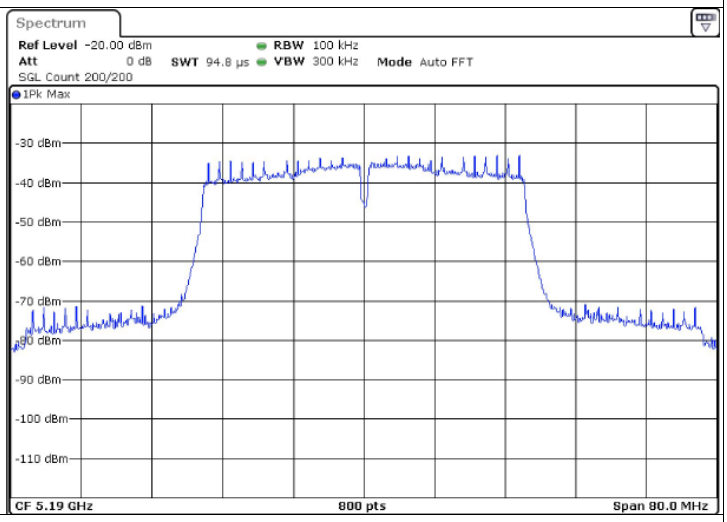
802.11ac(VHT20) 5240MHz MCS0



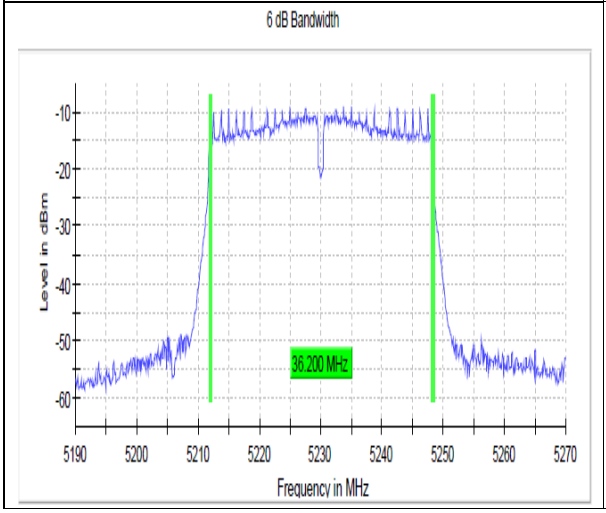


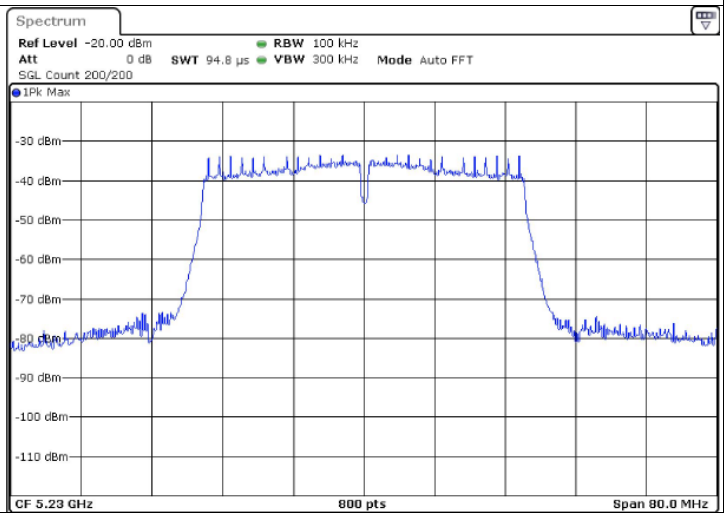
802.11n(HT40) 5190MHz MCS0



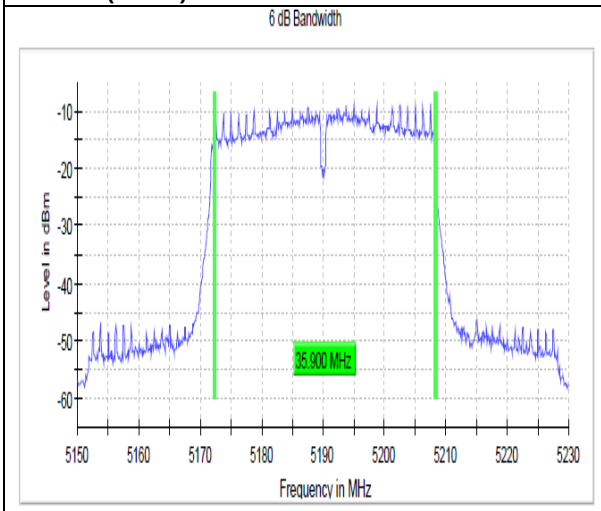


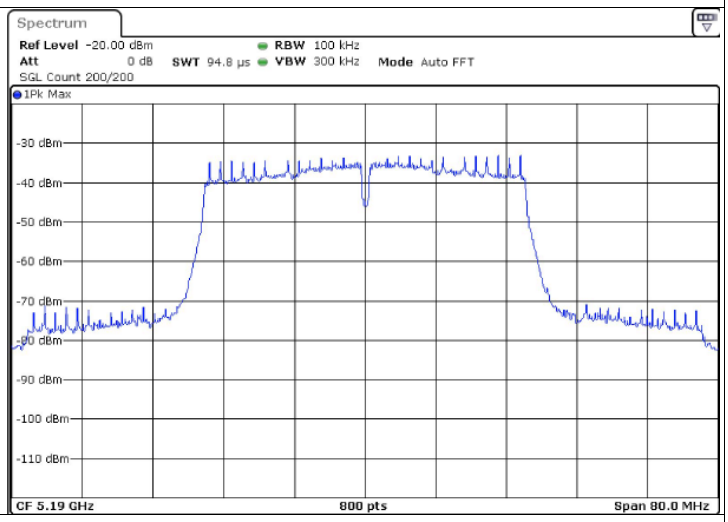
802.11n(HT40) 5230MHz MCS0



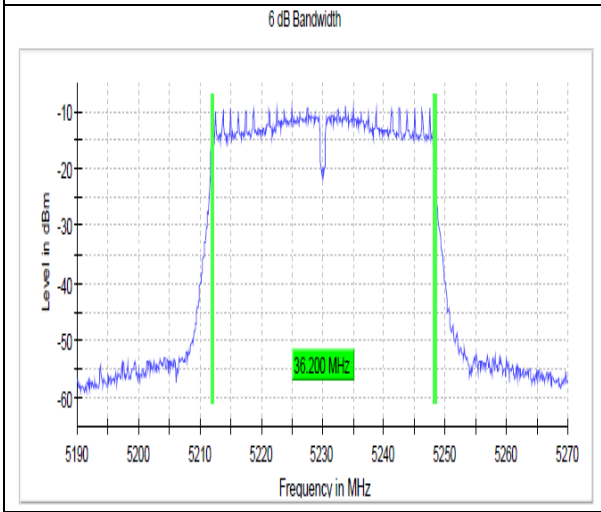


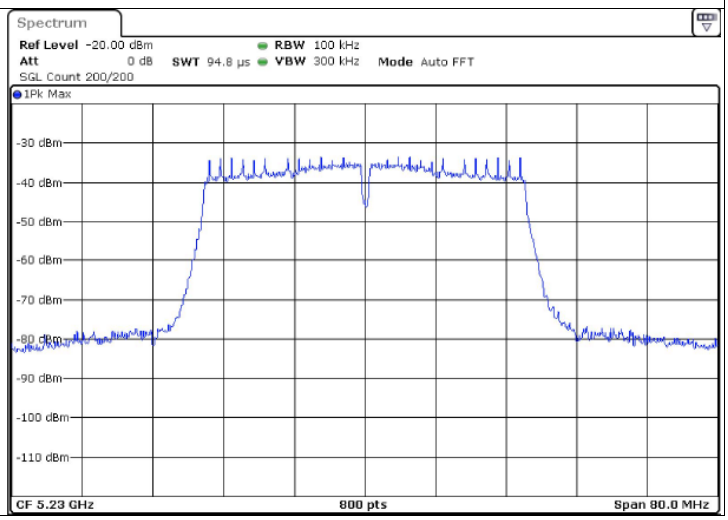
802.11ac(VHT40) 5190MHz MCS0



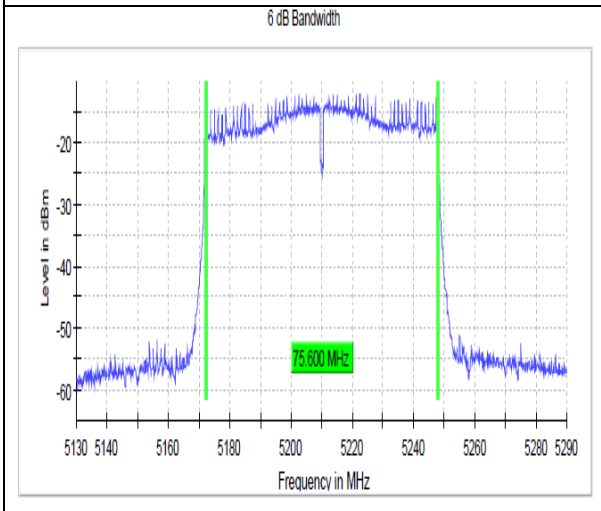


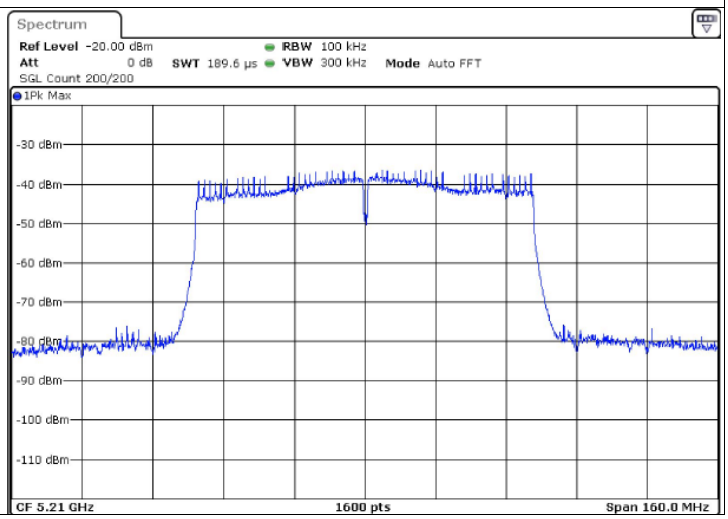
802.11ac(VHT40) 5230MHz MCS0





802.11ac(VHT80) 5210MHz MCS0

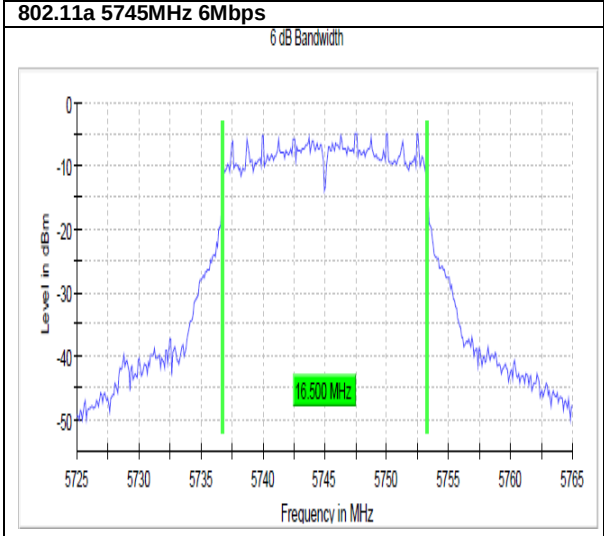


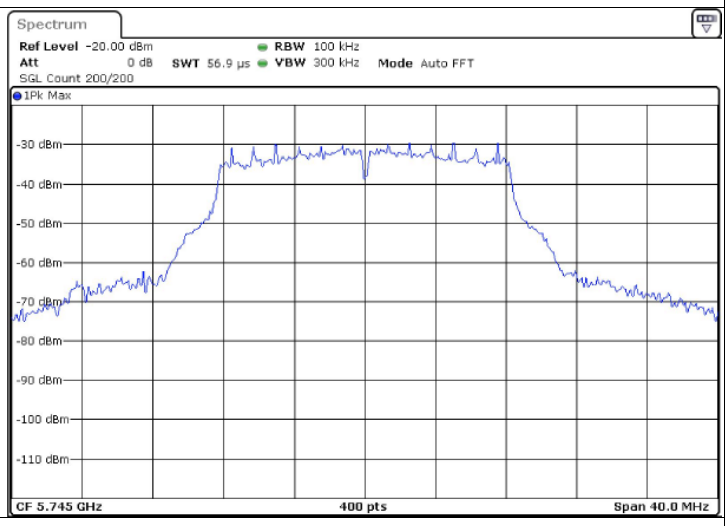


FCC/RSS-247 UNII-3

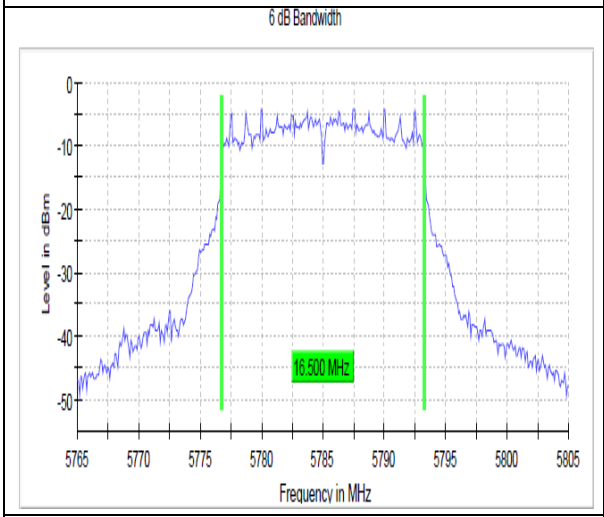
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Minimum Limit (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
802.11a 6 Mbps	5745.00	16.500000	0.5	5736.750000	5753.250000
802.11n(HT20) MCS0	5745.00	17.700000	0.5	5736.150000	5753.850000
802.11ac(VHT20) MCS0	5745.00	17.700000	0.5	5736.150000	5753.850000
802.11n(HT40) MCS0	5755.00	35.700000	0.5	5737.350000	5773.050000
802.11ac(VHT40) MCS0	5755.00	35.900000	0.5	5737.350000	5773.250000
802.11ac(VHT80) MCS0	5775.00	75.700000	0.5	5737.350000	5813.050000
802.11a 6 Mbps	5785.00	16.500000	0.5	5776.750000	5793.250000
802.11n(HT20) MCS0	5785.00	17.700000	0.5	5776.150000	5793.850000
802.11ac(VHT20) MCS0	5785.00	17.700000	0.5	5776.150000	5793.850000
802.11n(HT40) MCS0	5795.00	35.900000	0.5	5777.050000	5812.950000
802.11ac(VHT40) MCS0	5795.00	35.900000	0.5	5777.050000	5812.950000
802.11a 6 Mbps	5825.00	16.500000	0.5	5816.750000	5833.250000
802.11n(HT20) MCS0	5825.00	17.700000	0.5	5816.150000	5833.850000
802.11ac(VHT20) MCS0	5825.00	17.700000	0.5	5816.150000	5833.850000

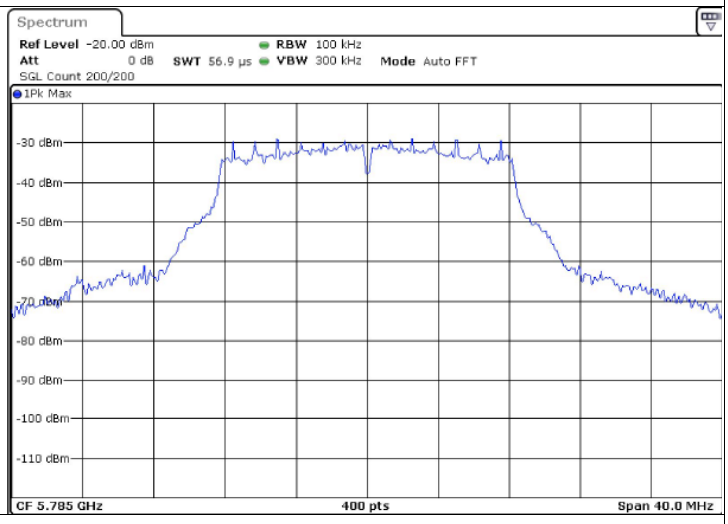
802.11a 5745MHz 6Mbps



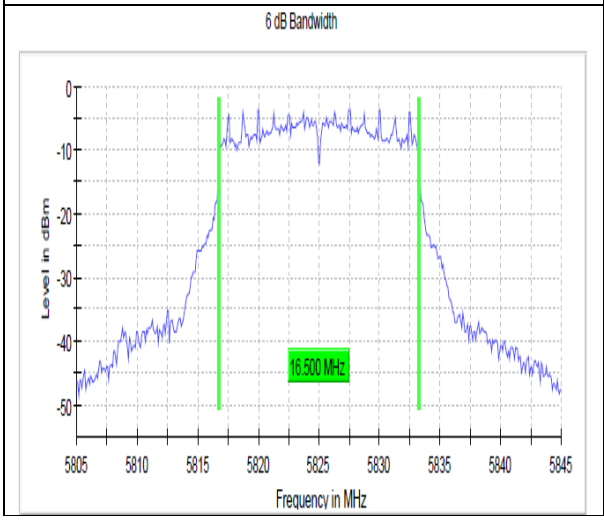


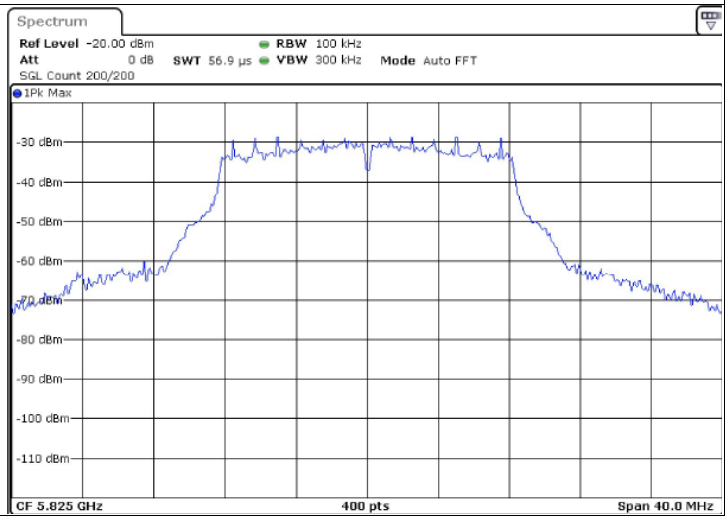
802.11a 5785MHz 6Mbps



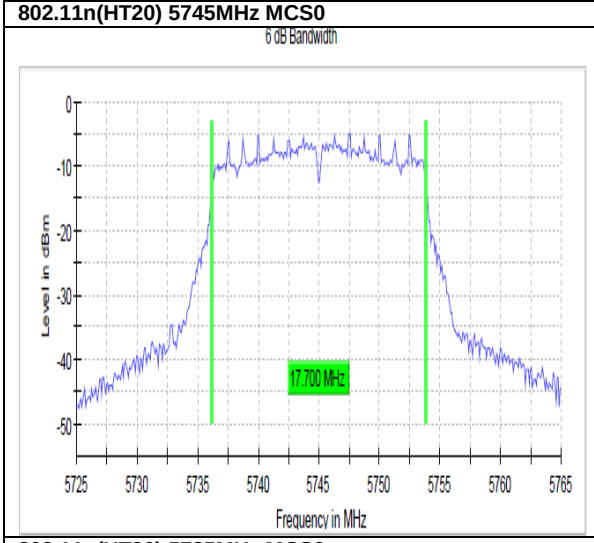


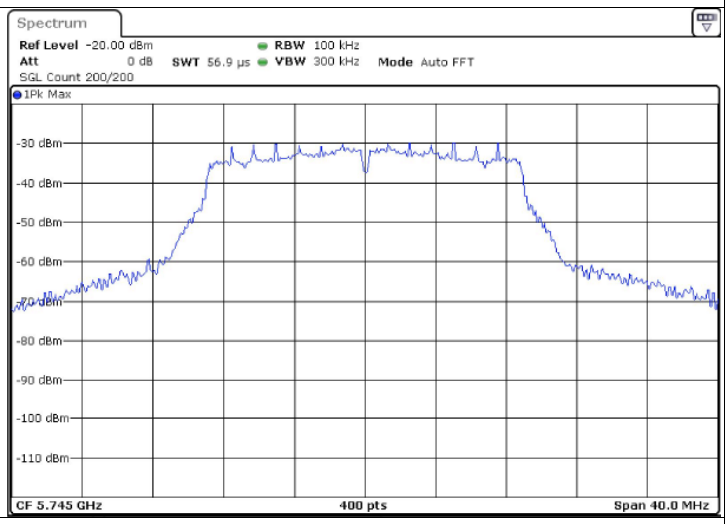
802.11a 5825MHz 6Mbps



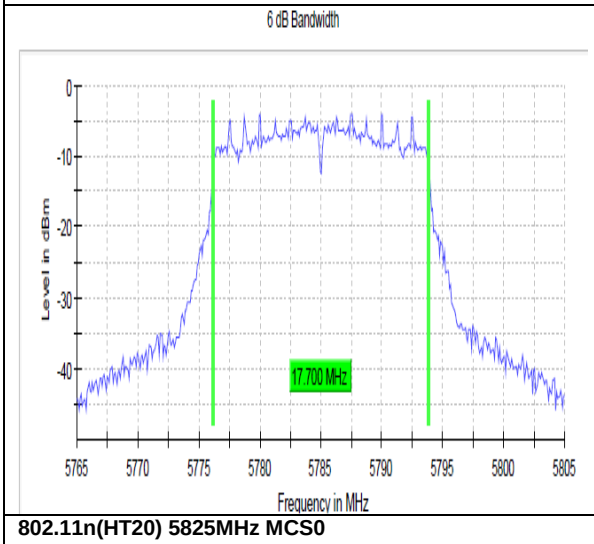


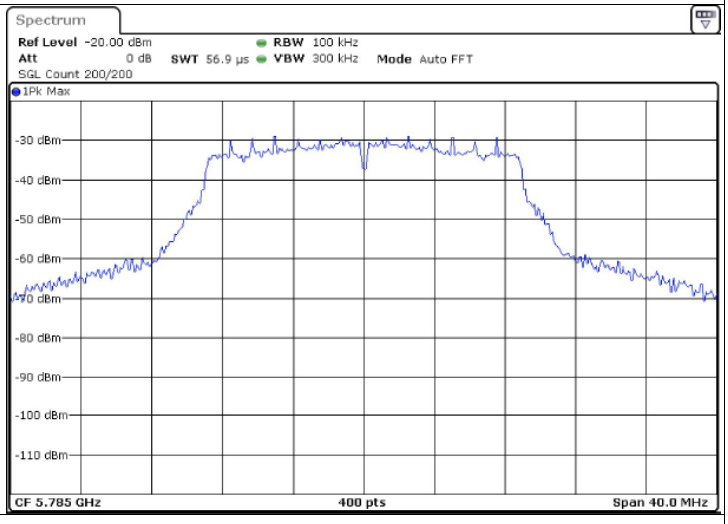
802.11n(HT20) 5745MHz MCS0



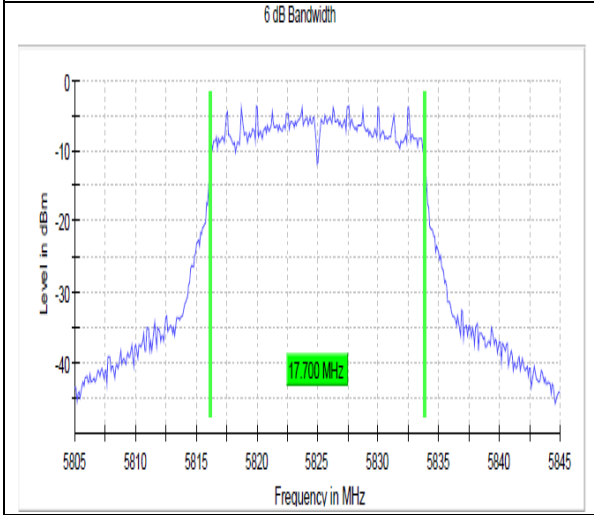


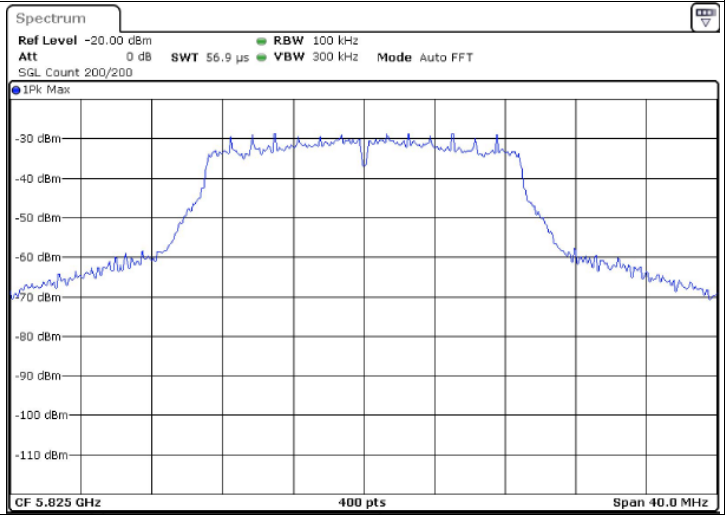
802.11n(HT20) 5785MHz MCS0



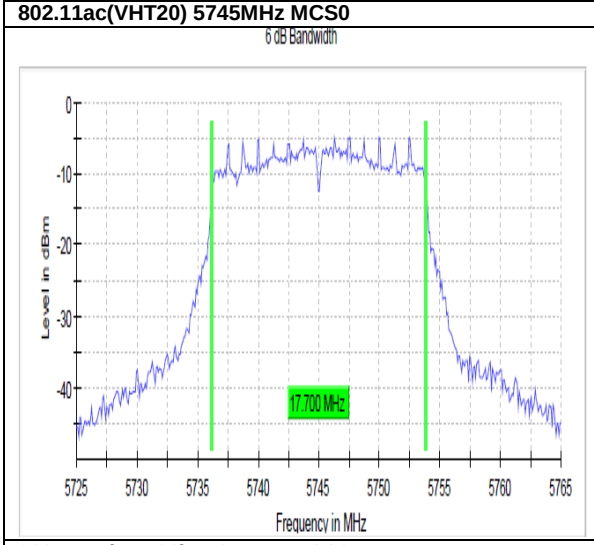


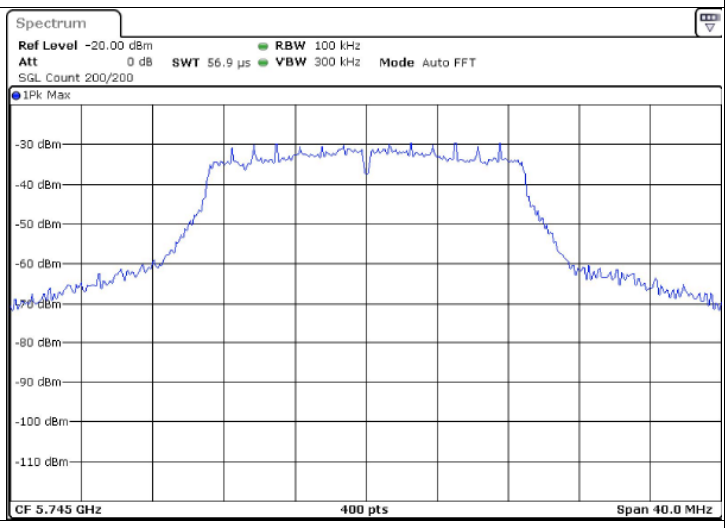
802.11n(HT20) 5825MHz MCS0



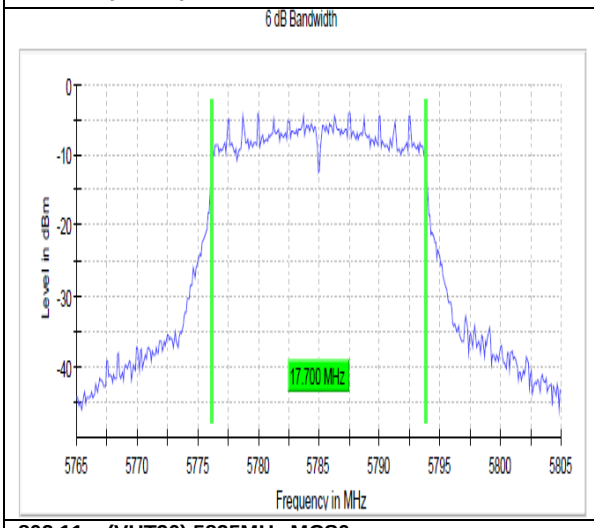


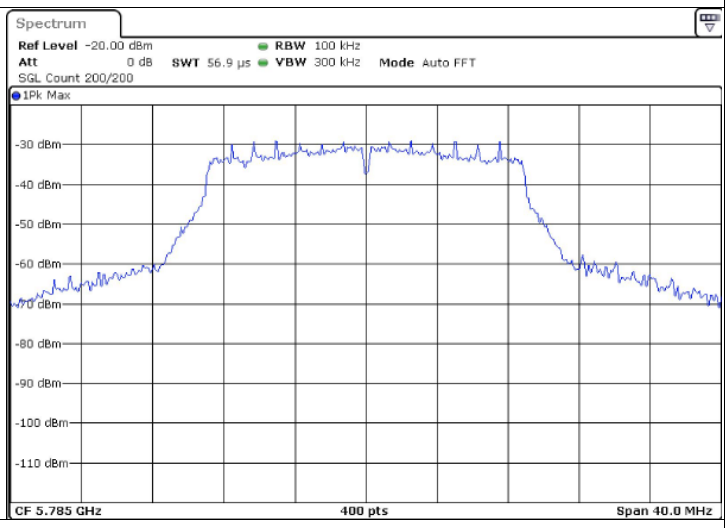
802.11ac(VHT20) 5745MHz MCS0



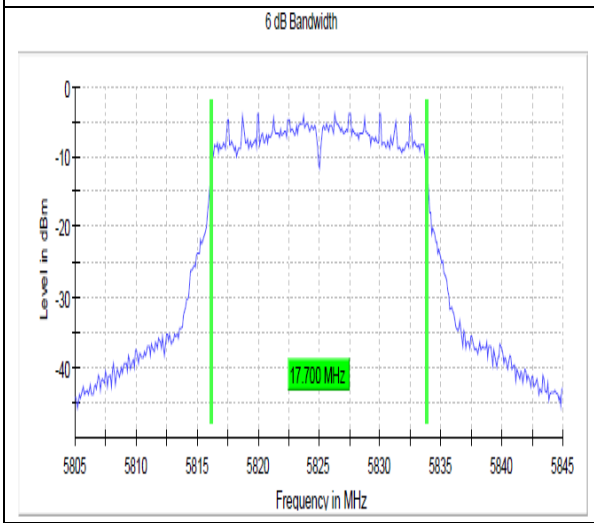


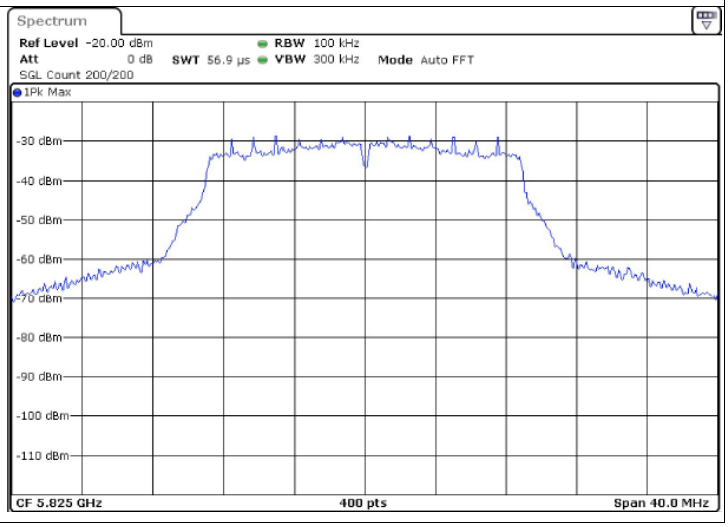
802.11ac(VHT20) 5785MHz MCS0



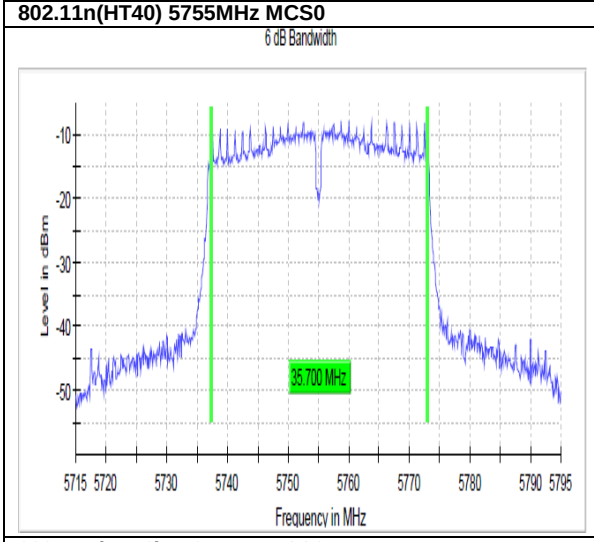


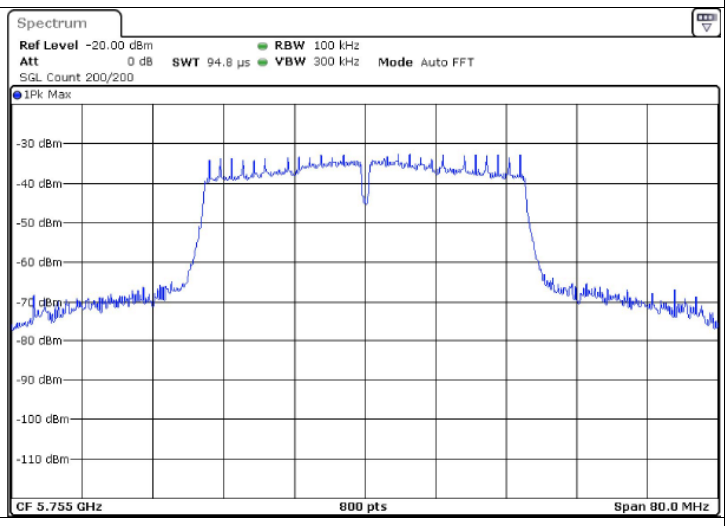
802.11ac(VHT20) 5825MHz MCS0



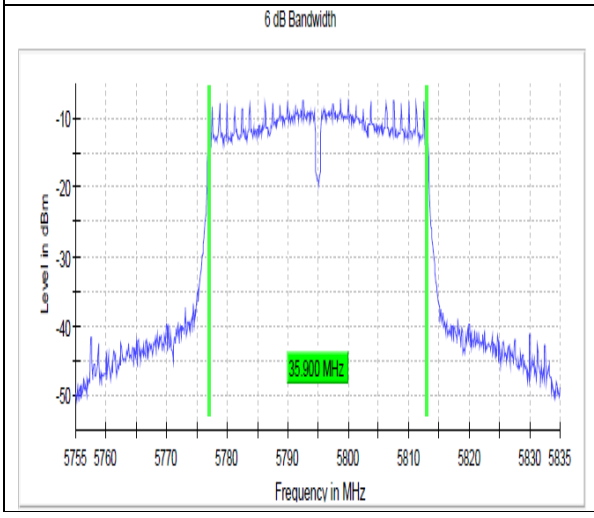


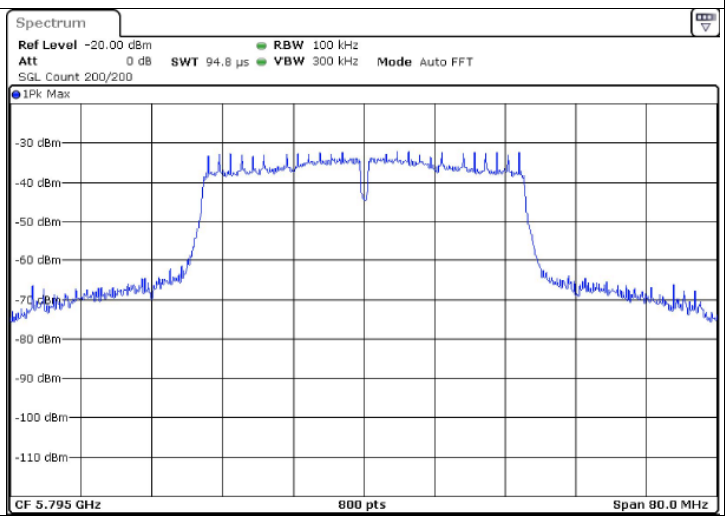
802.11n(HT40) 5755MHz MCS0



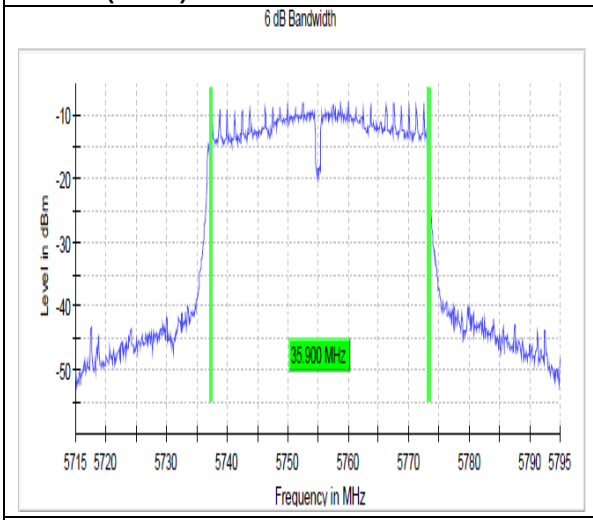


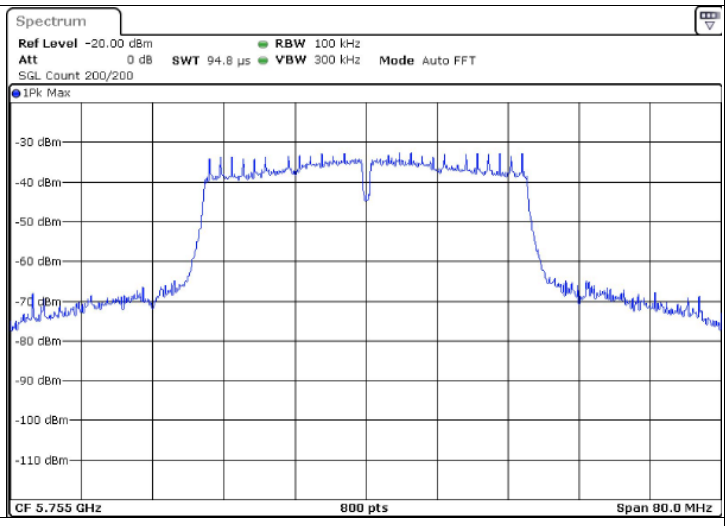
802.11n(HT40) 5795MHz MCS0



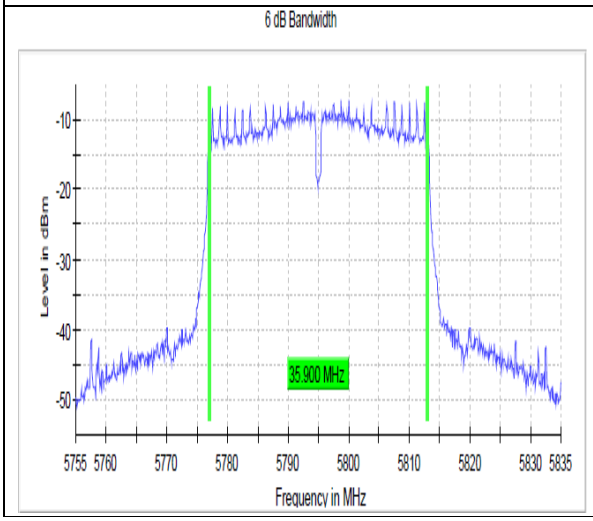


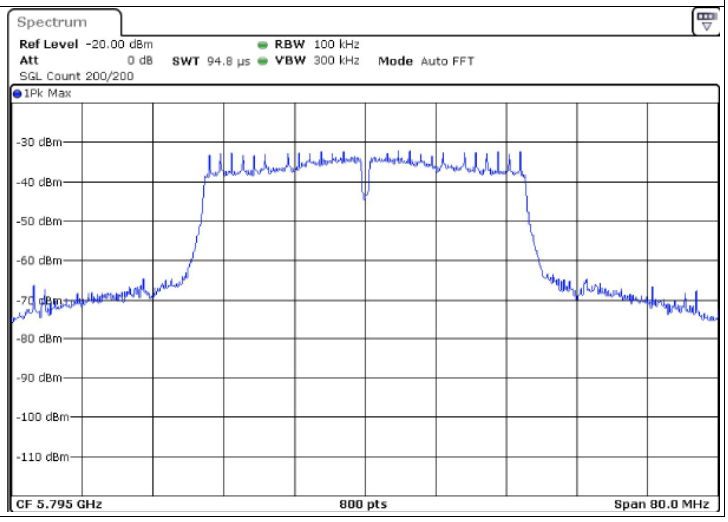
802.11ac(VHT40) 5755MHz MCS0



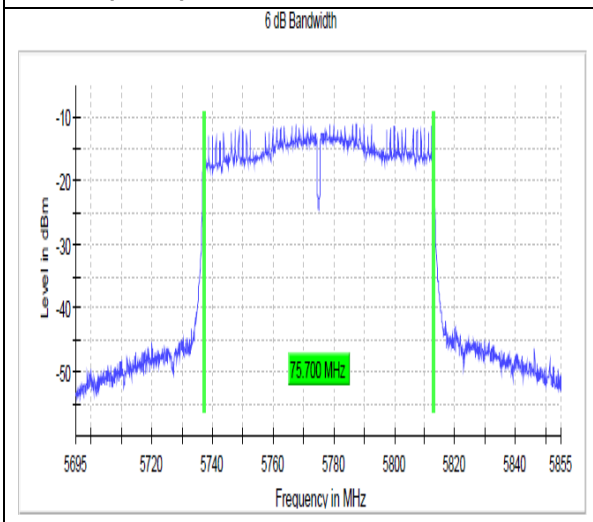


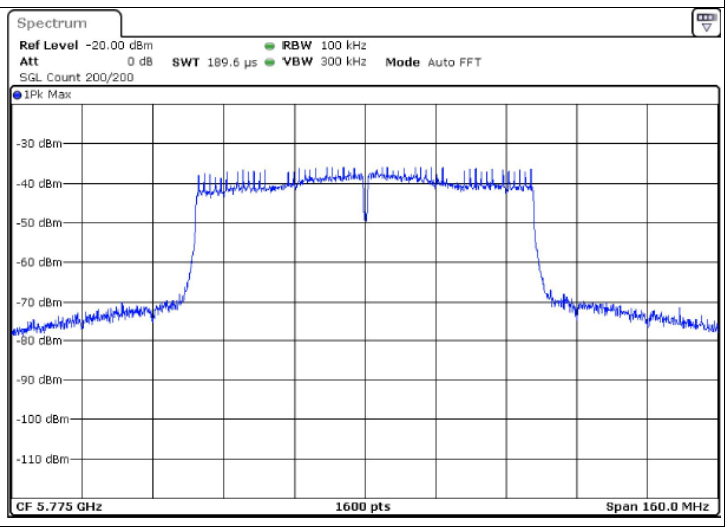
802.11ac(VHT40) 5795MHz MCS0





802.11ac(VHT80) 5775MHz MCS0





Occupied Channel Bandwidth 99%

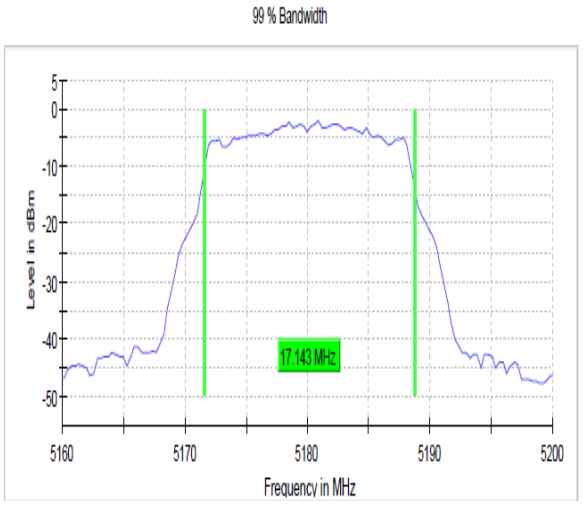
Tested according to FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.D.

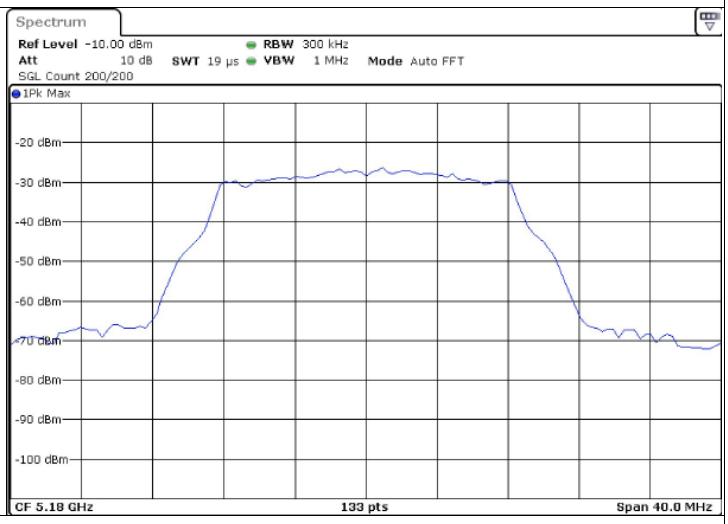
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 2%

UNII-1

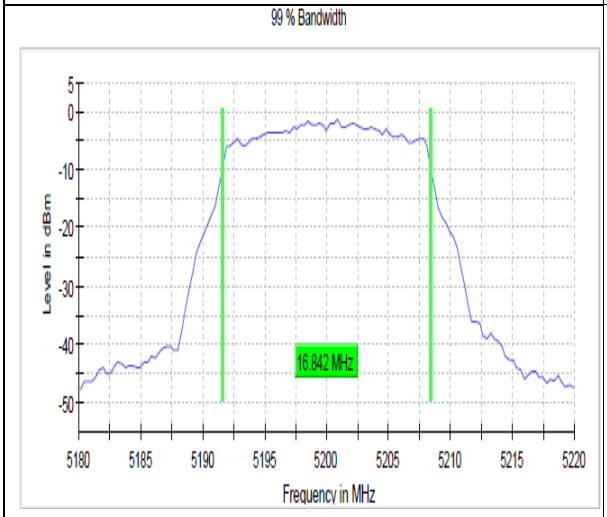
Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 6 Mbps	5180.000	17.142858	5171.578947	5188.721805	5150-5250
802.11n(HT20) MCS0	5180.000	18.045112	5170.977444	5189.022556	5150-5250
802.11ac(VHT20) MCS0	5180.000	18.045112	5170.977444	5189.022556	5150-5250
802.11n(HT40) MCS0	5190.000	36.500000	5171.750000	5208.250000	5150-5250
802.11ac(VHT40) MCS0	5190.000	36.500000	5171.750000	5208.250000	5150-5250
802.11a 6 Mbps	5200.000	16.842106	5191.578947	5208.421053	5150-5250
802.11n(HT20) MCS0	5200.000	18.045112	5190.977444	5209.022556	5150-5250
802.11ac(VHT20) MCS0	5200.000	18.045112	5190.977444	5209.022556	5150-5250
802.11ac(VHT80) MCS0	5210.000	76.000000	5172.500000	5248.500000	5150-5250
802.11n(HT40) MCS0	5230.000	36.500000	5211.750000	5248.250000	5150-5250
802.11ac(VHT40) MCS0	5230.000	36.500000	5171.750000	5208.250000	5150-5250
802.11a 6 Mbps	5240.000	17.443610	5231.278195	5248.721805	5150-5250
802.11n(HT20) MCS0	5240.000	18.345864	5230.977444	5249.323308	5150-5250
802.11ac(VHT20) MCS0	5240.000	18.045112	5230.977444	5249.022556	5150-5250

802.11a 5180MHz 6Bbps

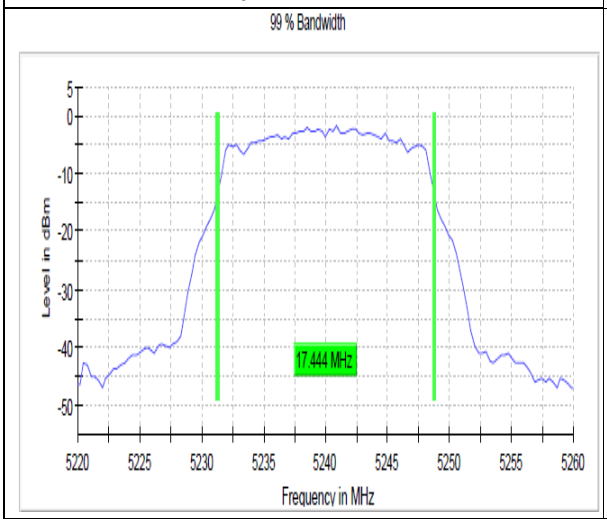


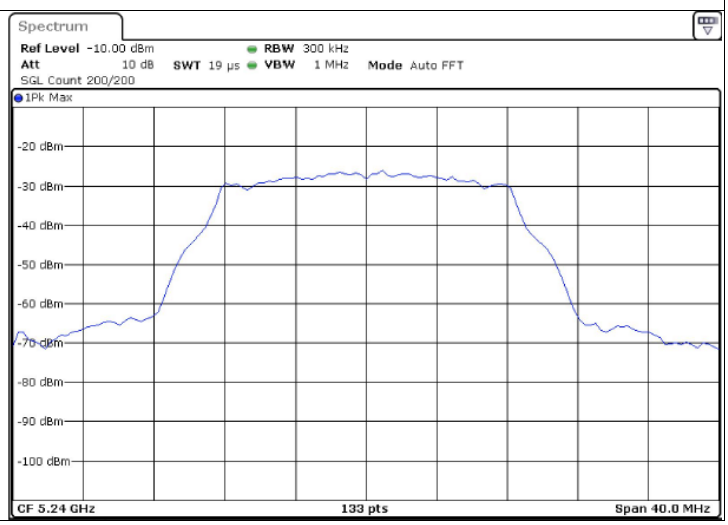


802.11a 5200MHz 6Mbps

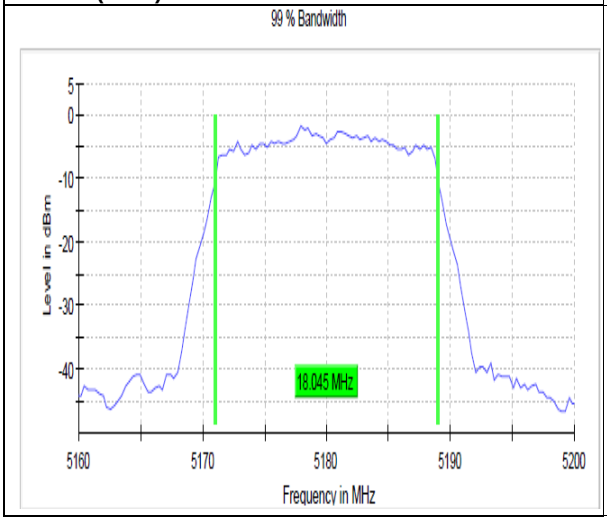


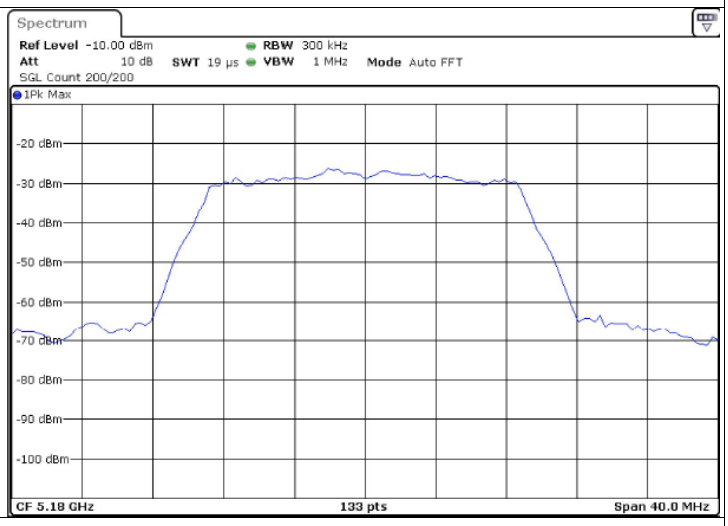
802.11a 5240MHz 6Mbps



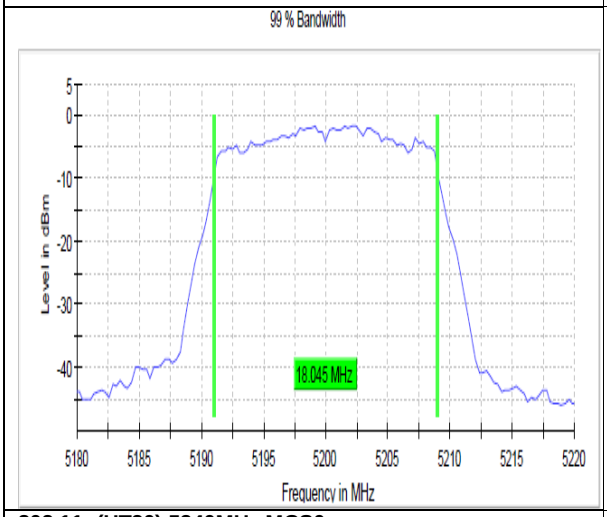


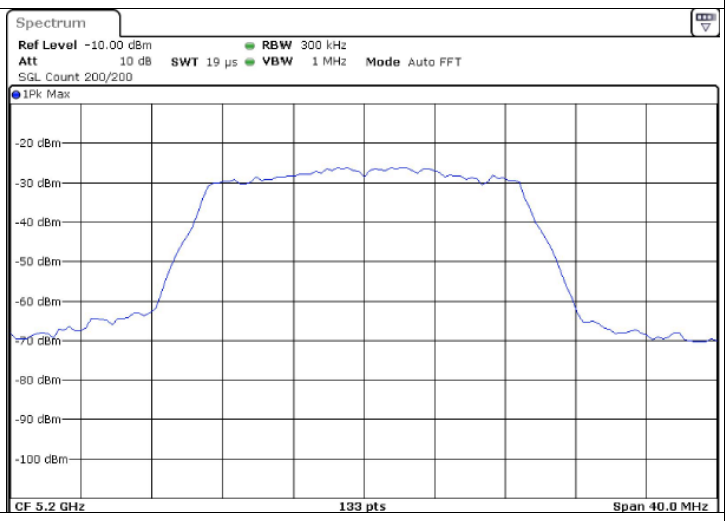
802.11n(HT20) 5180MHz MCS0



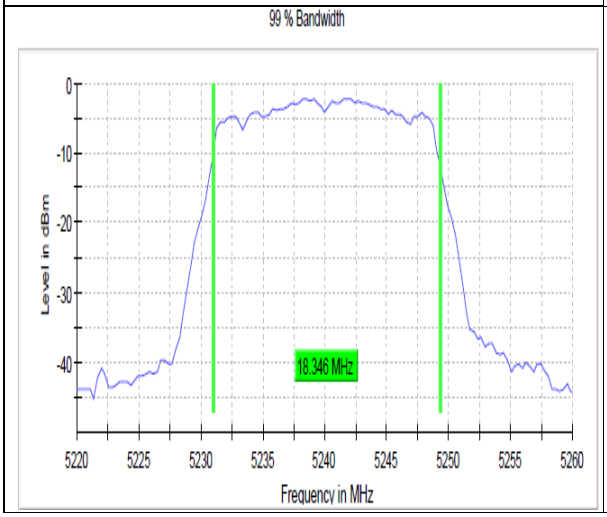


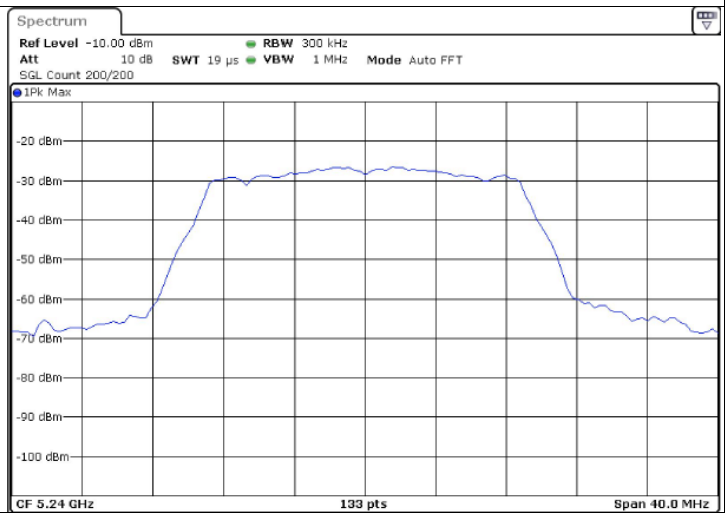
802.11n(HT20) 5200MHz MCS0



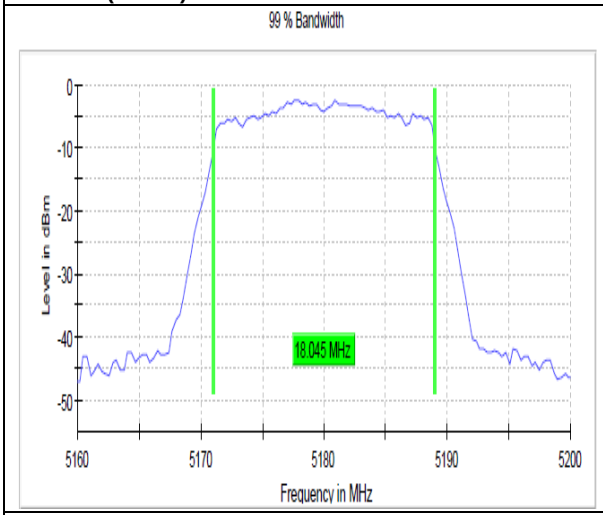


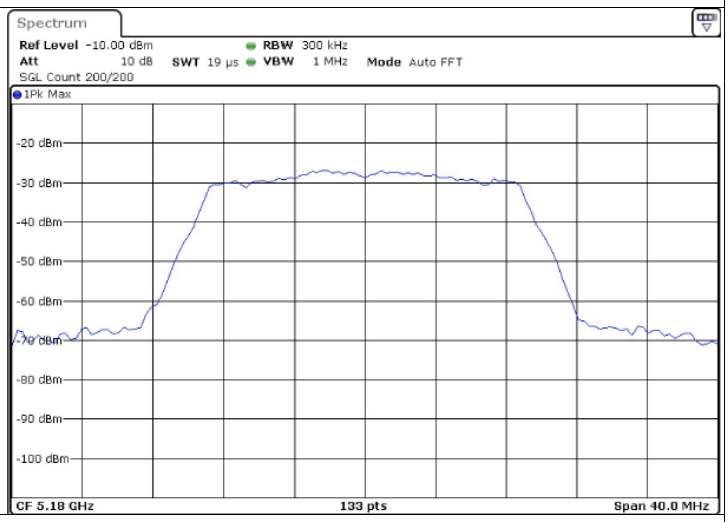
802.11n(HT20) 5240MHz MCS0



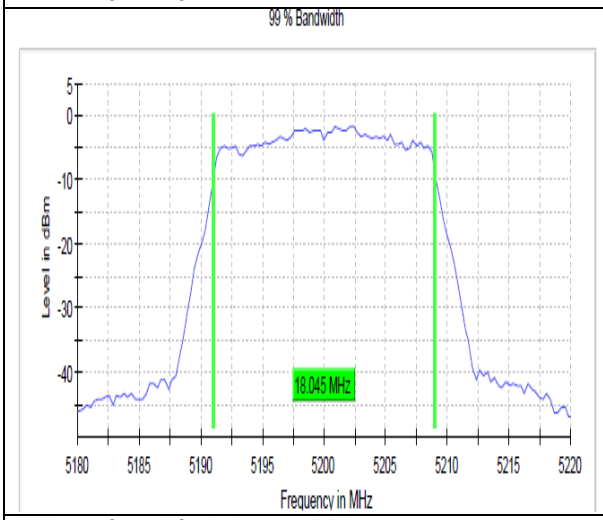


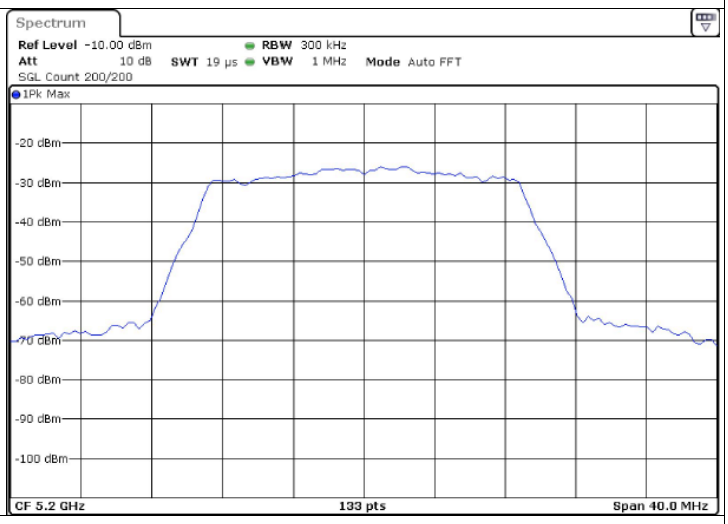
802.11ac(VHT20) 5180MHz MCS0



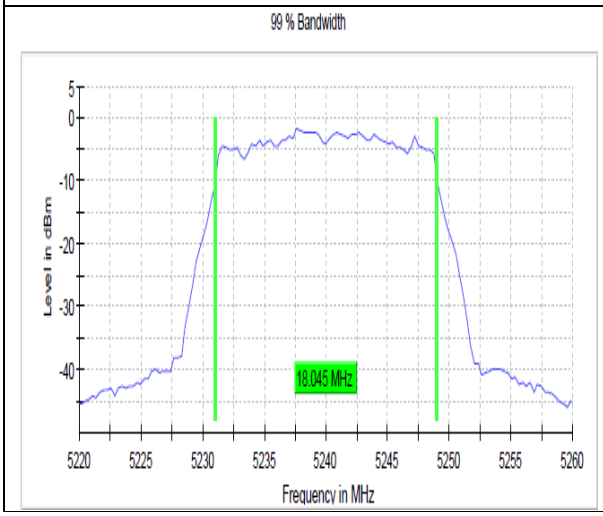


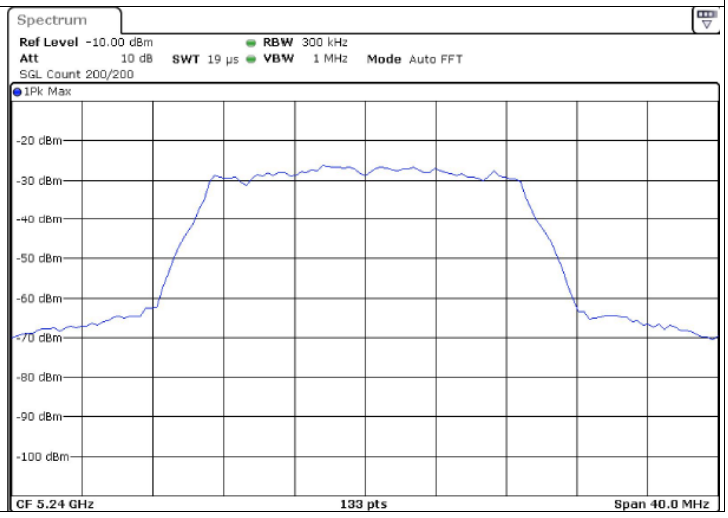
802.11ac(VHT20) 5200MHz MCS0



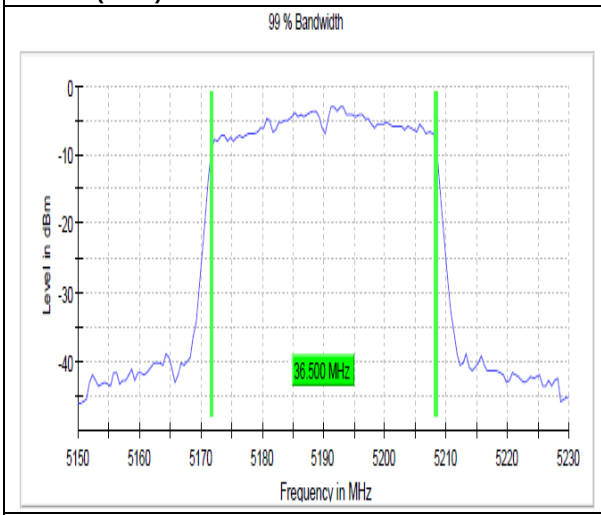


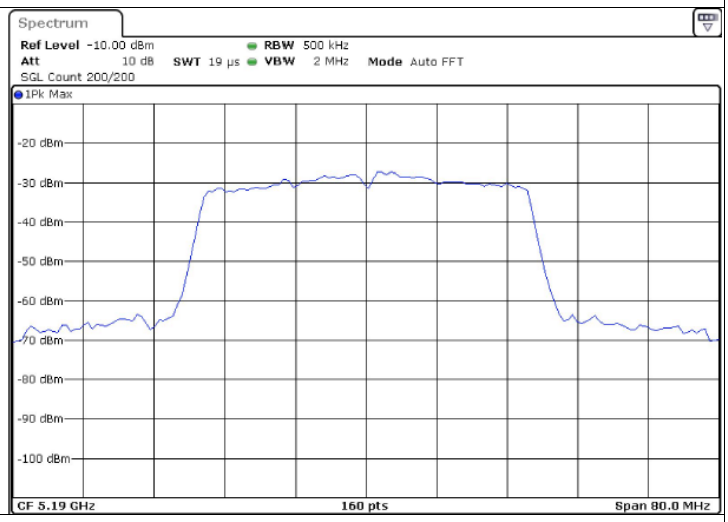
802.11ac(VHT20) 5240MHz MCS0



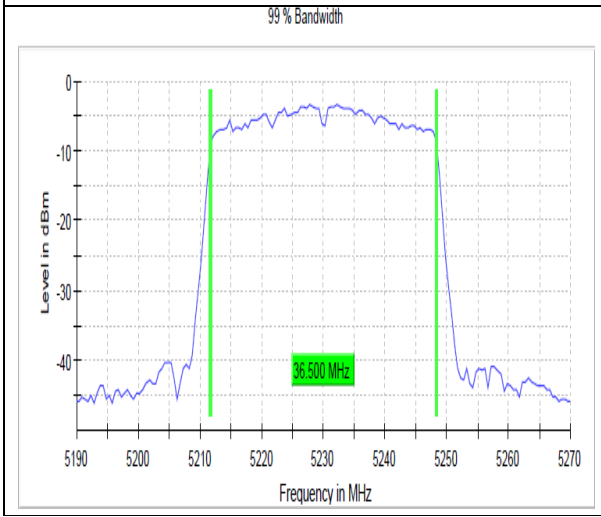


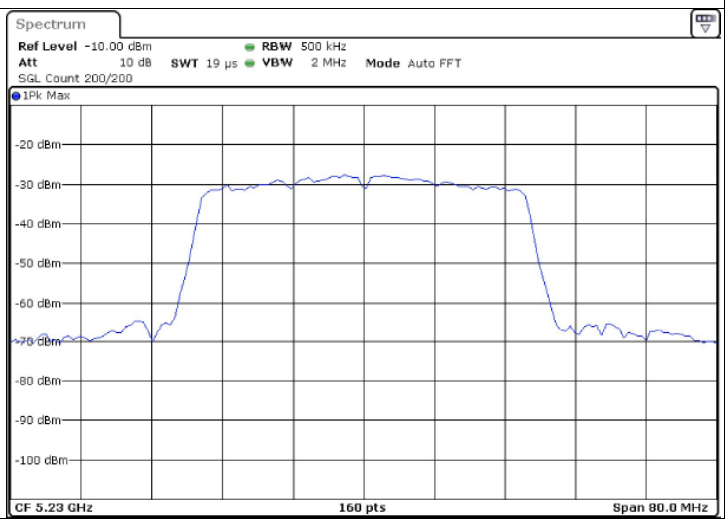
802.11n(HT40) 5190MHz MCS0



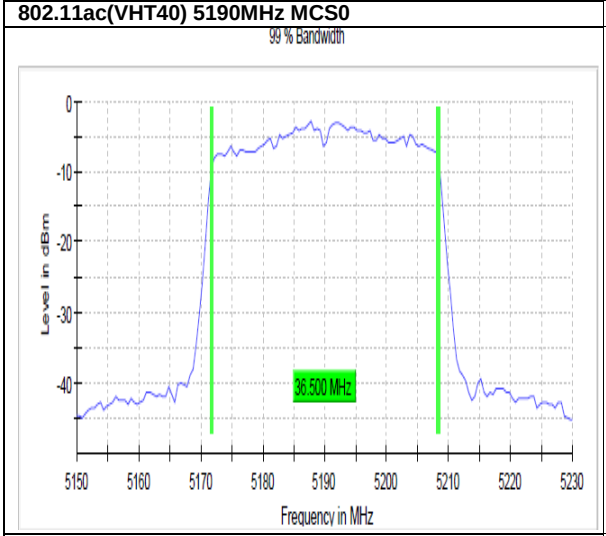


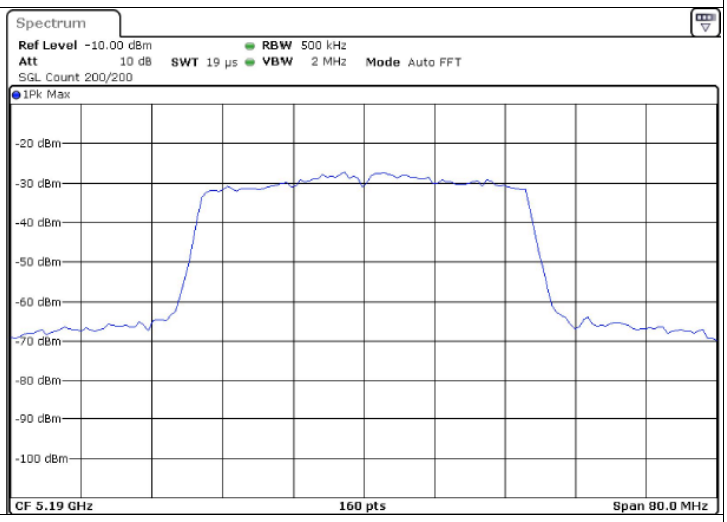
802.11n(HT40) 5230MHz MCS0



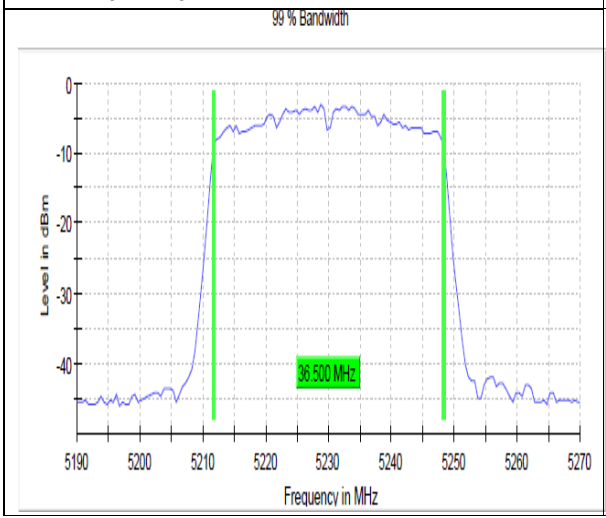


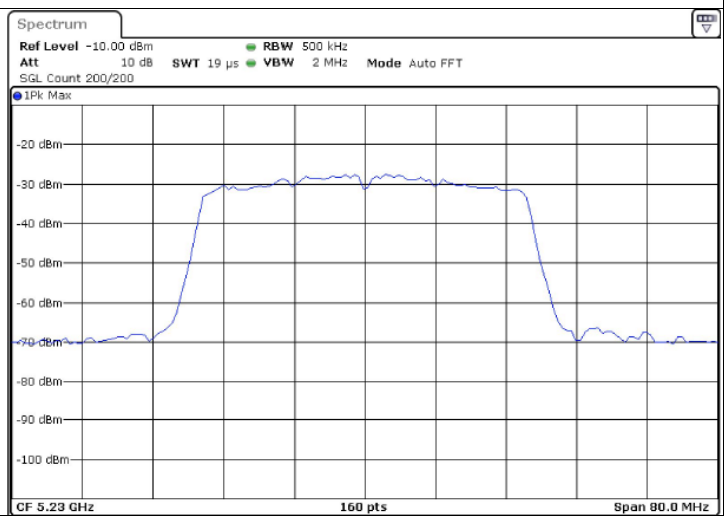
802.11ac(VHT40) 5190MHz MCS0



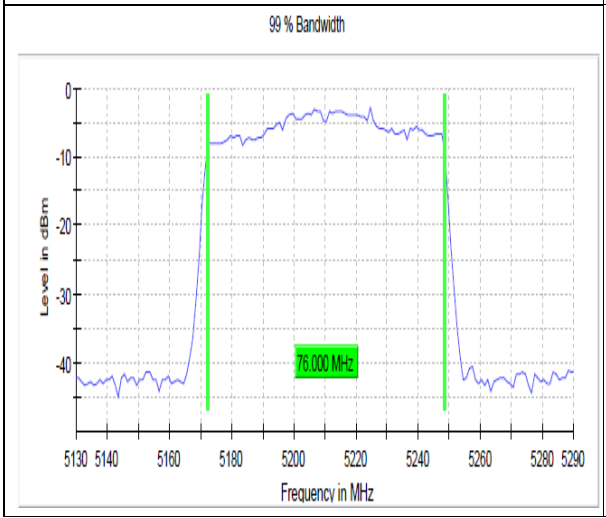


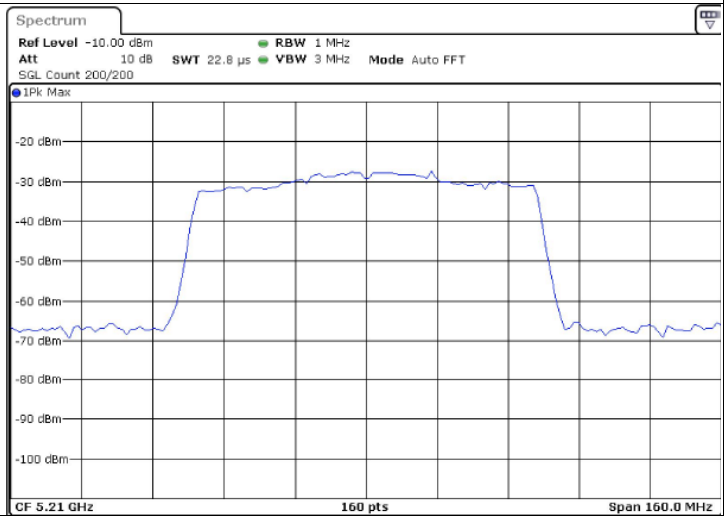
802.11ac(VHT40) 5230MHz MCS0





802.11ac(VHT80) 5210MHz MCS0



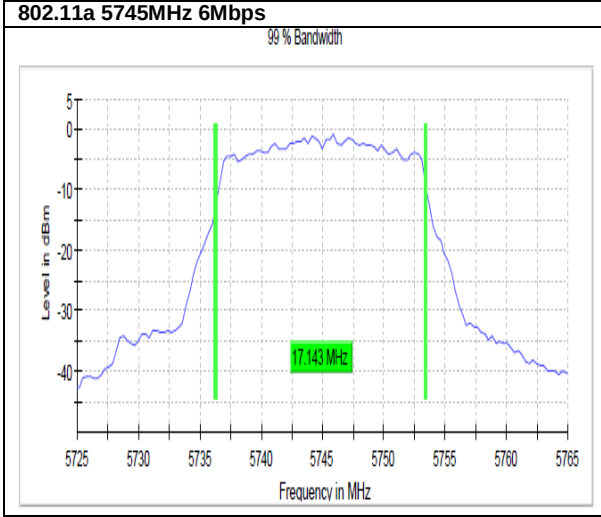


Occupied Channel Bandwidth 99%

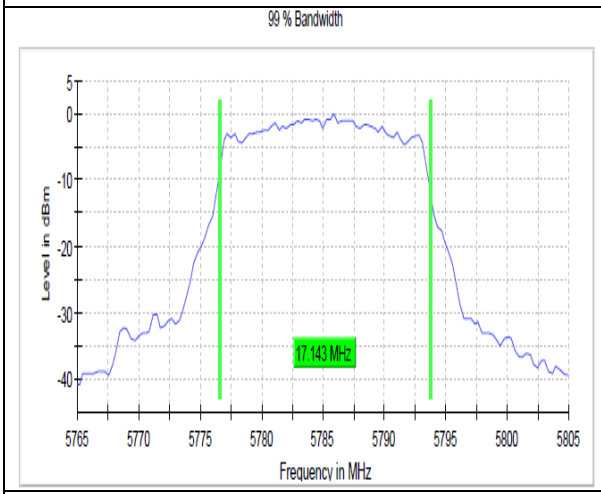
UNII-3

Data Rate	DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Band Limits
802.11a 6 Mbps	5745.00	17.142858	5736.27819	5753.42105	5725-5850
802.11n(HT20) MCS0	5745.00	18.345864	5735.97744	5754.32330	5725-5850
802.11ac(VHT20) MCS0	5745.00	18.045112	5735.97744	5754.02255	5725-5850
802.11n(HT40) MCS0	5755.00	36.500000	5736.75000	5773.25000	5725-5850
802.11ac(VHT40) MCS0	5755.00	36.500000	5736.75000	5773.25000	5725-5850
802.11ac(VHT80) MCS0	5775.00	76.000000	5737.50000	5813.50000	5725-5850
802.11a 6 Mbps	5785.00	17.142858	5776.57894	5793.72180	5725-5850
802.11n(HT20) MCS0	5785.00	18.345864	5775.97744	5794.32330	5725-5850
802.11ac(VHT20) MCS0	5785.00	18.646616	5775.67669	5794.32330	5725-5850
802.11n(HT40) MCS0	5795.00	36.500000	5776.75000	5813.25000	5725-5850
802.11ac(VHT40) MCS0	5795.00	36.500000	5776.75000	5813.25000	5725-5850
802.11a 6 Mbps	5825.00	17.142858	5816.27819	5833.42105	5725-5850
802.11n(HT20) MCS0	5825.00	18.045112	5815.97744	5834.02255	5725-5850
802.11ac(VHT20) MCS0	5825.00	18.345864	5815.67669	5834.02255	5725-5850

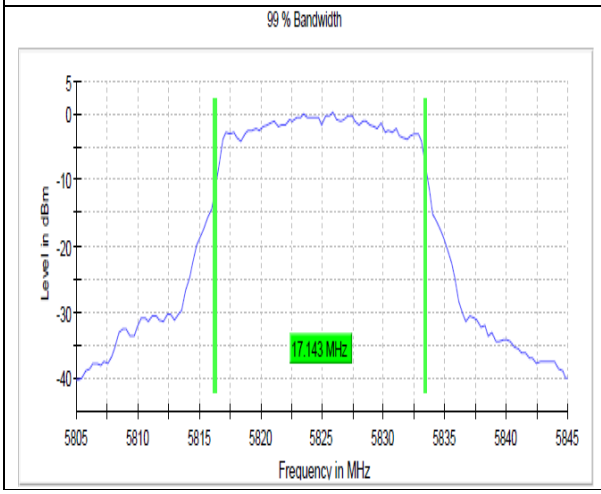
802.11a 5745MHz 6Mbps



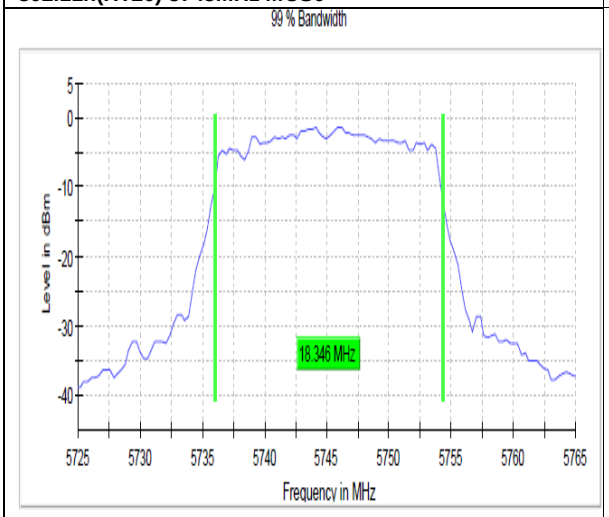
802.11a 5785MHz 6Mbps

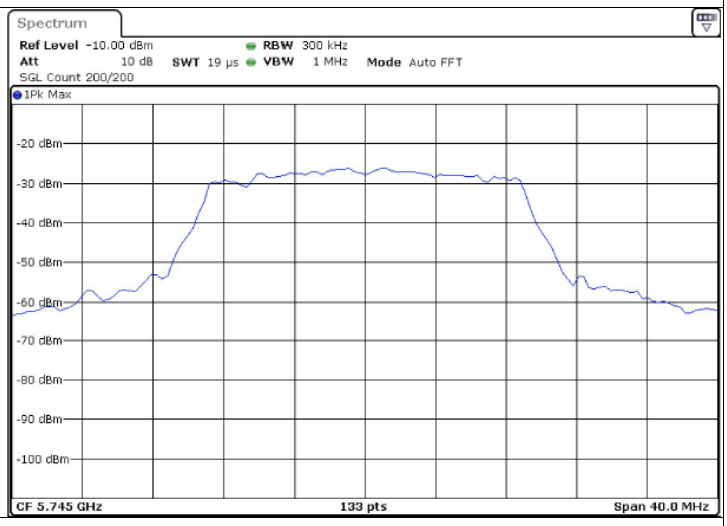


802.11a 5825MHz 6Mbps

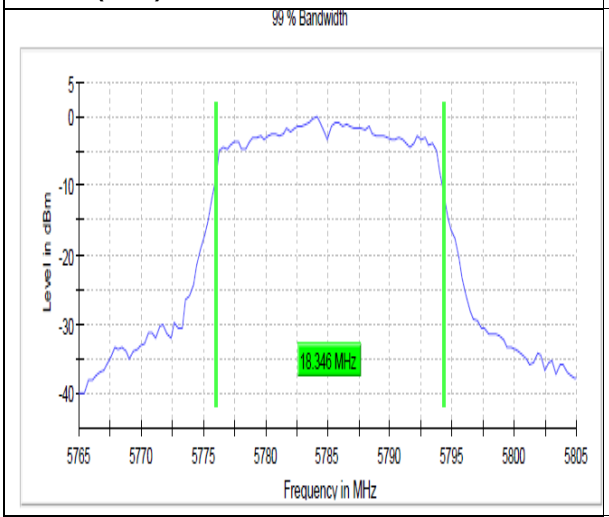


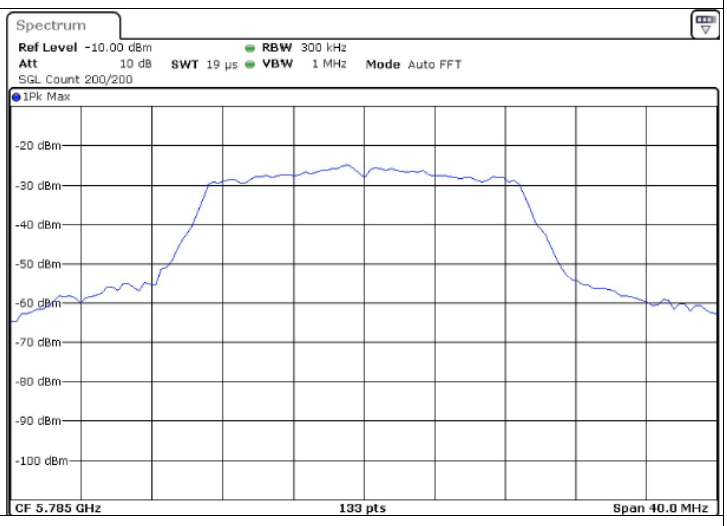
802.11n(HT20) 5745MHz MCS0



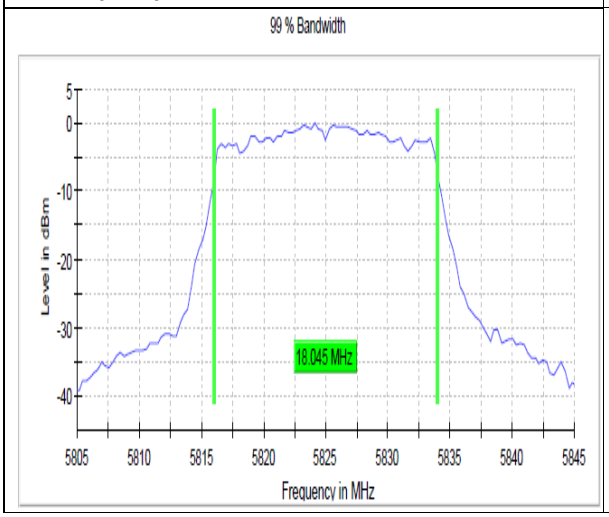


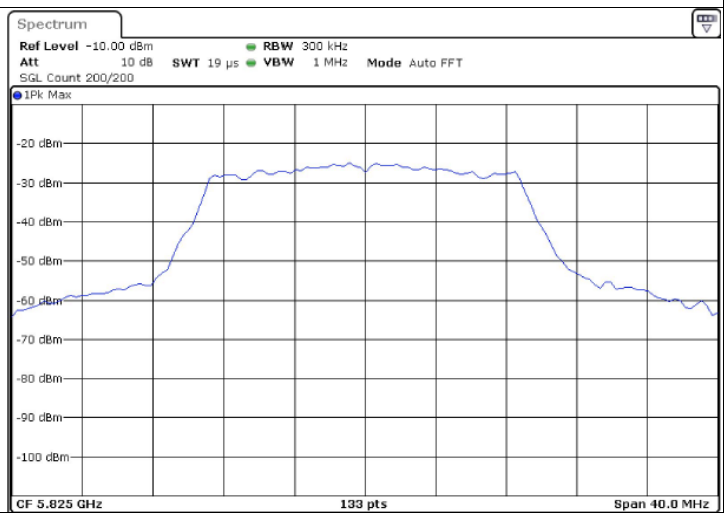
802.11n(HT20) 5785MHz MCS0



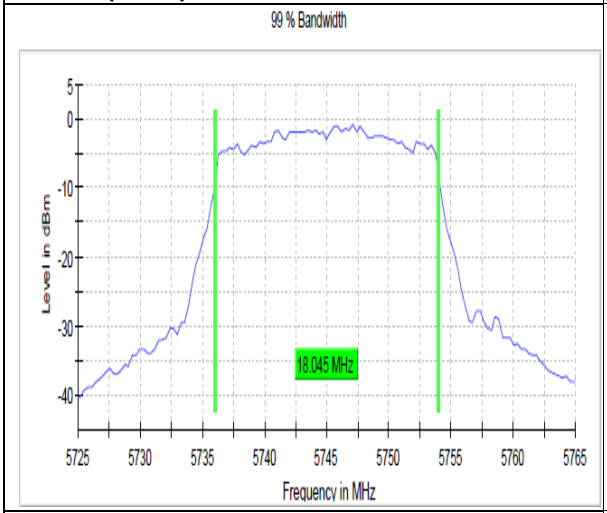


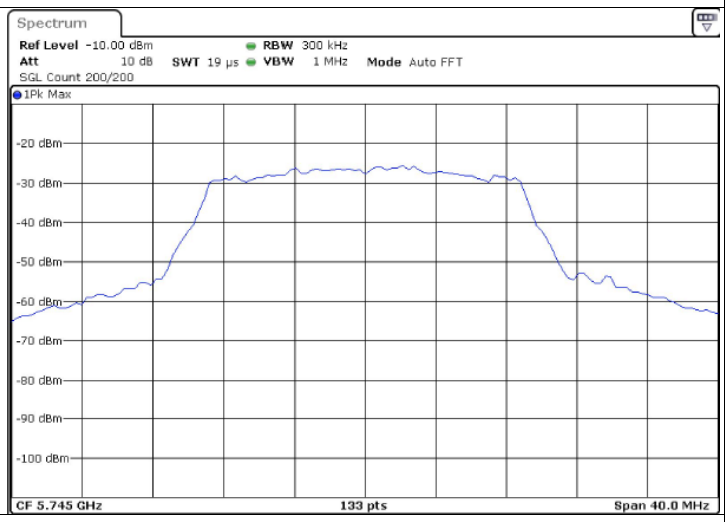
802.11n(HT20) 5825MHz MCS0



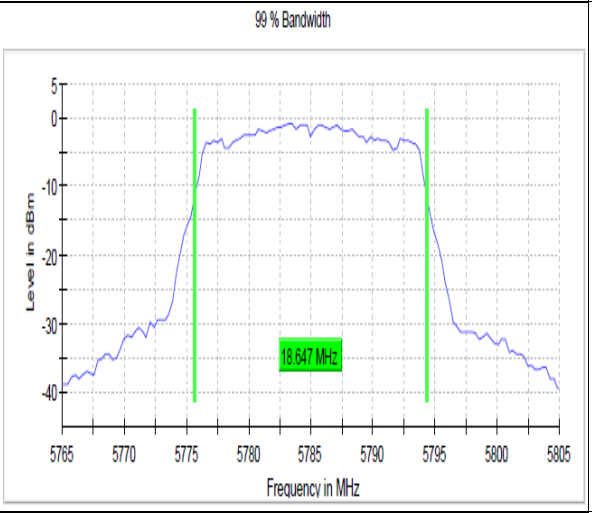


802.11ac(VHT20) 5745MHz MCS0

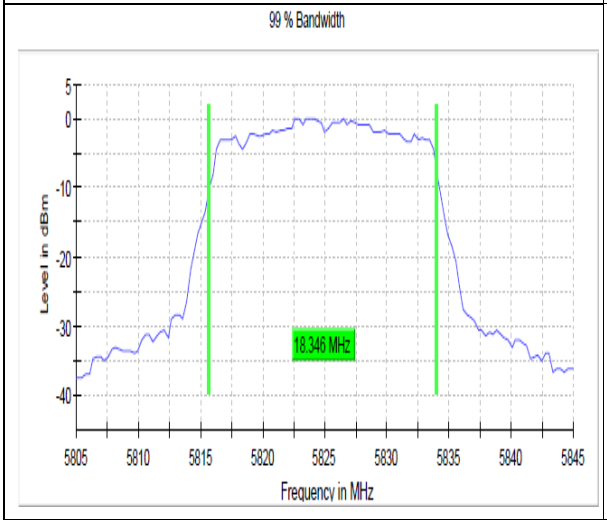




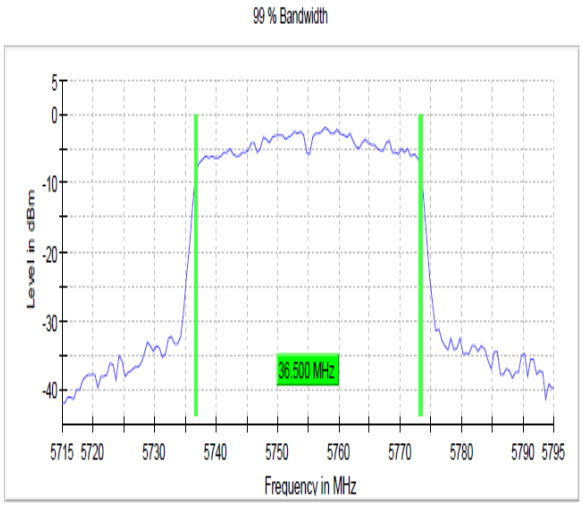
802.11ac(VHT20) 5785MHz MCS0

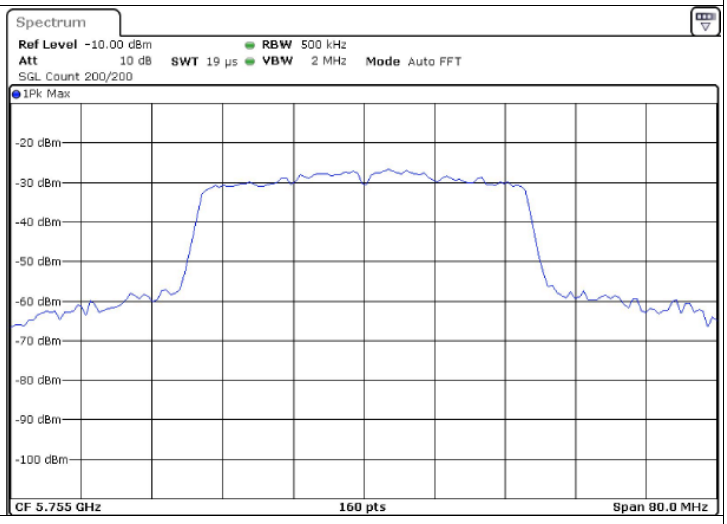


802.11ac(VHT20) 5825MHz MCS0

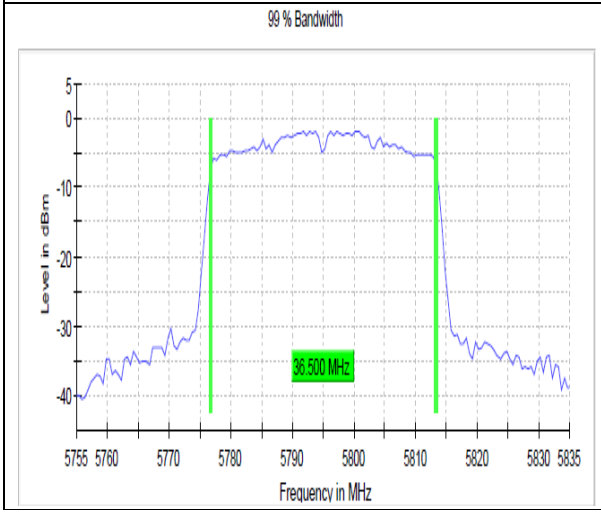


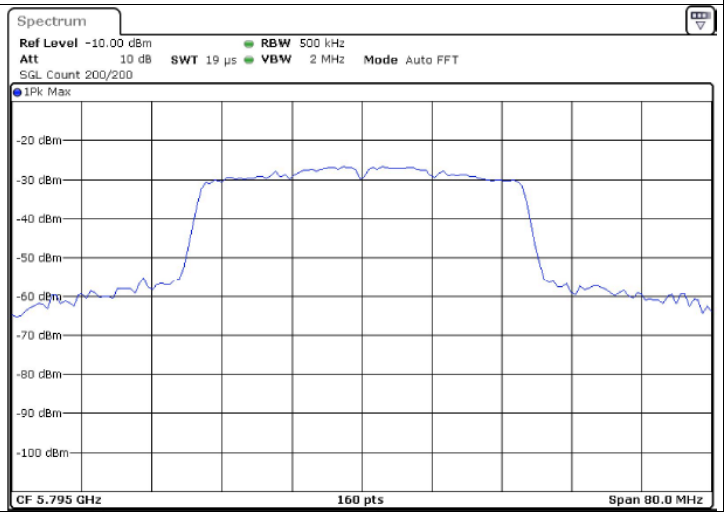
802.11n(HT40) 5755MHz MCS0



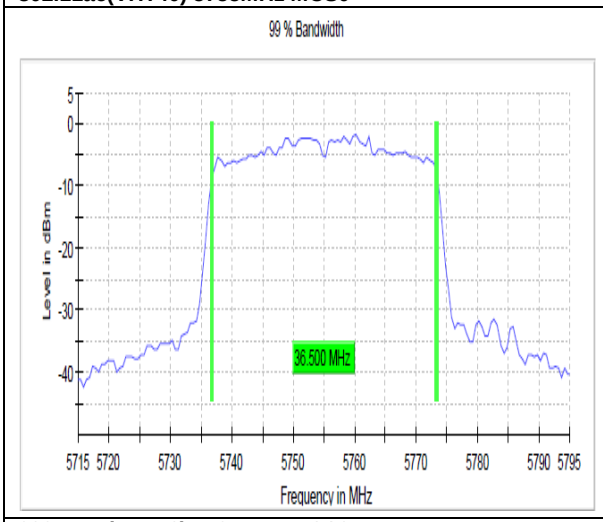


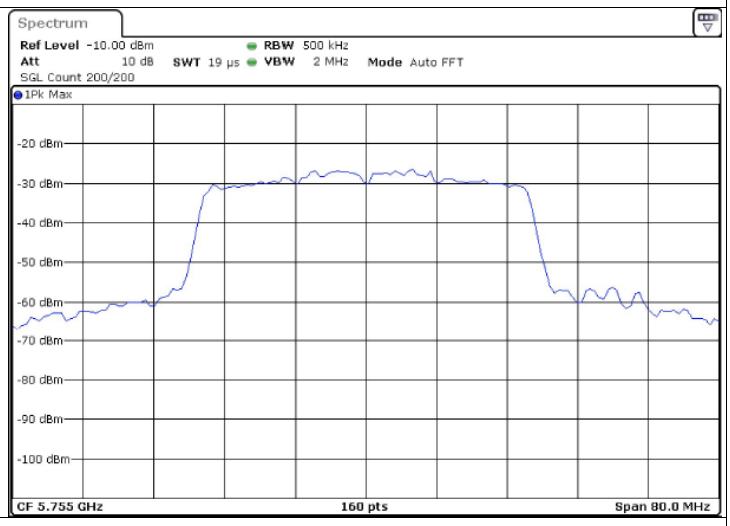
802.11n(HT40) 5795MHz MCS0



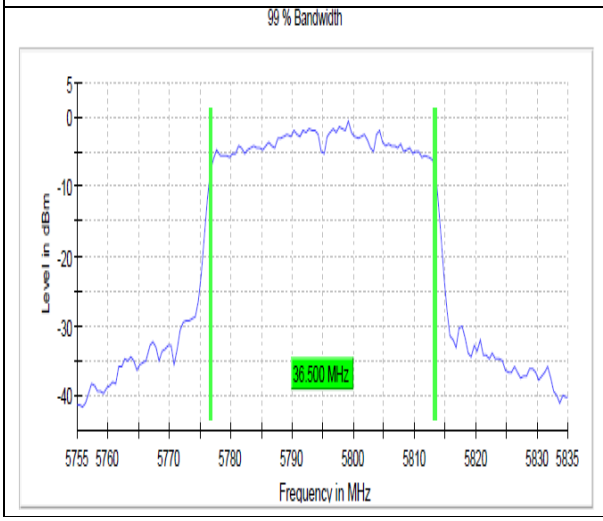


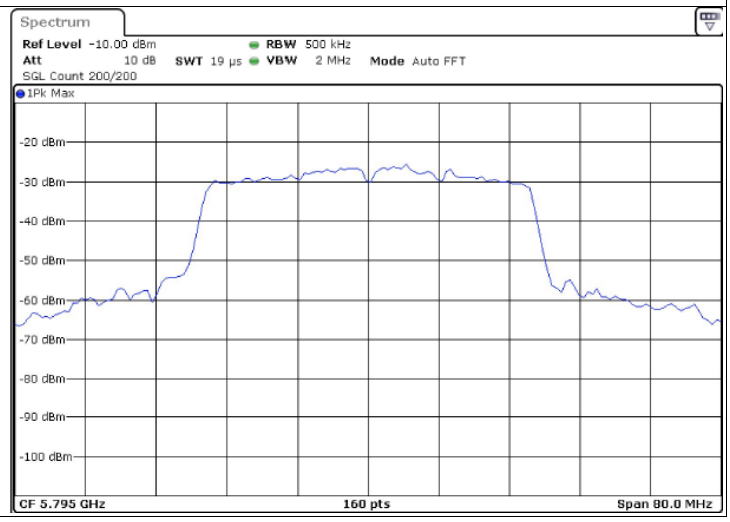
802.11ac(VHT40) 5755MHz MCS0





802.11ac(VHT40) 5795MHz MCS0





802.11ac(VHT80) 5775MHz MCS0