Nemko Korea Co., Ltd.

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FCC and IC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, Korea.
(Post code : 16677)
Attn. : Ohoon. Choi

Dates of Issue : April 14, 2016
Test Report No. : NK-16-R-029
Test Site : Nemko Korea Co., Ltd.

FCC	**A3LATKM052000**
IC	**649E-ATKM052000**
Brand Name	**SAMSUNG**
Contact Person	**Samsung Electronics Co., Ltd.** **129, Samsung-ro, Yeongtong-gu,** **Suwon-si, Gyeonggi-do, Korea, 16885.** **Ohoon Choi** **Telephone No. : +82-31-8000-3754**

Applied Standard: FCC 47 CFR Part 15.407 and IC RSS-247 Issue 1
Classification: Unlicensed National Information Infrastructure (NII)
EUT Type: IoT Module

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

April 14. 2016

Tested By : Seungyong Shin
Engineer

April 14. 2016

Reviewed By : Deokha Ryu
Technical Manager

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1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15 and IC RSS-247 Issue1.

Responsible Party :	Samsung Electronics Co., Ltd.
Contact Person :	Ohoon Choi
Manufacturer :	129, Samsung-ro, Yeongtong-gu, Suwon-si,Gyeonggi-do, Korea 16677 Samsung Electronics Co., Ltd. 1,Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea 17113

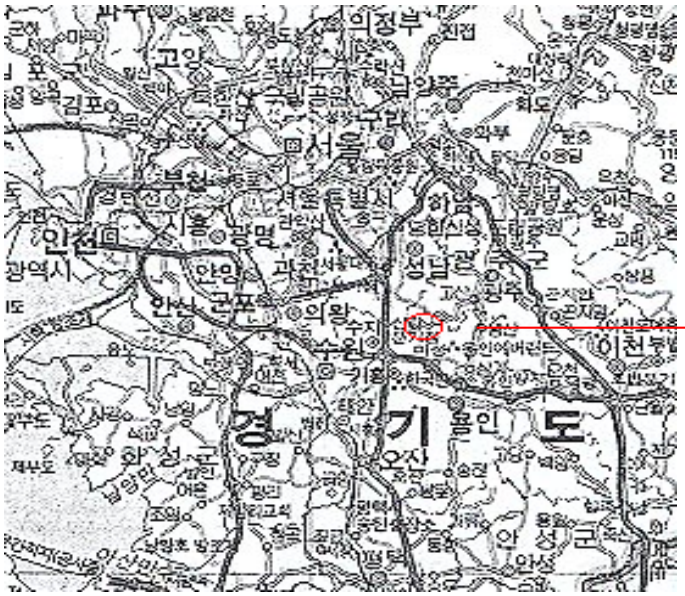
- FCC ID: A3LATKM052000
- IC : 649E-ATKM052000
- Model: ATKM052000
- Variants Model: ATKM052001, ATKM052002
- Brand Name: SAMSUNG
- EUT Type: IoT Module
- Classification: Unlicensed National Information Infrastructure (NII)
- Applied Standard: FCC 47 CFR Part 15.407 and IC RSS-247 Issue 1
- Test Procedure(s): ANSI C63.10-2013 and FCC guidance of 789033 D02 General UNII Test Procedures New Rules v01r01 dated January 8, 2016 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E” KDB 644545 D03 Guidance for IEEE 802.11ac v01
- Dates of Test: March 22, 2016 ~ April 6, 2016
- Place of Tests: Nemko Korea Co., Ltd.

2. INTRODUCTION

2.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in determining radiated and conducted emissions emanating from **Samsung Electronics Co., Ltd. FCC ID : A3LATKM052000** and **IC : 649E-ATKM052000.**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory*** .
The site address 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-852 KOREA, REPULIC OF.
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 km (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 km (18miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of ANSI C63.4-2014 according to §2.948.



Nemko Korea Co., Ltd.
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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab. and Incheon Airport.

2.2 Accreditation and listing

Accreditation type		Accreditation number
	CAB Accreditation for DOC	Designation No. KR0026
	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. 155
Industry Canada	Canada IC Registered site	Site No. 2040E
	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
	EMC CBTL	-
	KCC(RRL)Designated Lab.	Registration No. KR0026

3. TEST CONDITIONS & EUT INFORMATION

3.1 Operation During Test

The EUT is the SISO, CDD, MIMO transceiver which is module supporting the 802.11a/b/g/n/ac mode (802.11a/b/g : 1TX/1RX, 802.11n(20,40MHz)/ac(20,40,80MHz) : 1TX/1RX, 2TX/2RX).
During the test, the EUT was connected to laptop PC and then a test program was executed to operate EUT constantly (duty cycle< 98%). The operating voltage of EUT was 4.2 Vdc supplied from JIG board connected with Laptop PC using USB cable.
The EUT was tested at the lowest channel, middle channel and the highest channel with the maximum output power in accordance with the manufacturer's specifications. The worst data were recorded in the report.

3.1.1 Table of test power setting

Frequency	Mode	5180 ~ 5220 MHz	5745 ~ 5825 MHz
Power setting Level	802.11a	Default	Default
	802.11n(20MHz)	Defualt	Default
	802.11n(40MHz)	Defualt	15
	802.11ac(20MHz)	Default	Default
	802.11ac(40MHz)	Defualt	15
	802.11ac(80MHz)	Default	15

3.1.2 Table of test channels

Frequency band	Mode	Test Channel (CH)	Frequency (MHz)
U-NII-1	802.11a,n,ac(20MHz)	36	5180
		40	5200
		44	5220
	802.11n,ac(40MHz)	38	5190
U-NII-3	802.11a,n,ac(20MHz)	149	5745
		157	5785
		165	5825
	802.11n.ac(40 MHz)	151	5755
		159	5795
	802.11ac(80MHz)	155	5775

3.1.3 Table of test modes

Test Items	Mode	Data rate (Mbps)	Test Channel (CH)
Conducted Emissions	802.11n(20 MHz)	MCS0	40
Radiated Emissions	802.11n(20 MHz)	MCS0	40
26 dB Spectrum Bandwidth	802.11a	6	36/40/44 149/157/165
	802.11n(20 MHz)	MCS0 / MCS8	
	802.11ac(20 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11n(40 MHz)	MCS0 / MCS8	38 151/159
	802.11ac(40 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11ac(80 MHz)	MCS0NSS1 / MCS0NSS2	155
Maximum Conducted Output Power	802.11a	6	36/40/44 149/157/165
	802.11n(20 MHz)	MCS0 / MCS8	
	802.11ac(20 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11n(40 MHz)	MCS0 / MCS8	38 151/159
	802.11ac(40 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11ac(80 MHz)	MCS0NSS1 / MCS0NSS2	155
Power Spectral Density	802.11a	6	36/40/44 149/157/165
	802.11n(20 MHz)	MCS0 / MCS8	
	802.11ac(20 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11n(40 MHz)	MCS0 / MCS8	38 151/159
	802.11ac(40 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11ac(80 MHz)	MCS0NSS1 / MCS0NSS2	155
*Radiated Spurious Emission,	802.11a	6	36/40/44 149/157/165
	802.11ac(20 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11ac(40 MHz)	MCS0NSS1 / MCS0NSS2	38 151/159
	802.11ac(80 MHz)	MCS0NSS1 / MCS0NSS2	155
Radiated Band edge Emission	802.11a	6	36/40/44 149/157/165
	802.11n(20 MHz)	MCS0 / MCS8	
	802.11ac(20 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11n(40 MHz)	MCS0 / MCS8	38 151/159
	802.11ac(40 MHz)	MCS0NSS1 / MCS0NSS2	
	802.11ac(80 MHz)	MCS0NSS1 / MCS0NSS2	155

The Worst Test Mode

The EUT was tested at the lowest channel, middle channel and the highest channel with the maximum output power in accordance with the manufacturer's specifications. The worst data were recorded in the report as specified table above.

1. Data Rate

The worst data was determined by the conducted output power that generates the highest emission performing pre-scan testing in all data rates of each mode.

The highest conducted output power was generated at the lowest data rate for a/n(20,40MHz)/ac(20, 40,80M), therefore the lowest data rate was chosen as the worst-case for other mandatory test requiredments.

2. Antenna Port

For conducted testing, all of measurements were done on ANT port 0 and port 1, and results on ANT port 0 are higher output power in UNII-1, UNII-3 band. Therefore, the radiated emissions testing was done on ANT port 0 in SISO mode.

For radiated emissions testing, the worst position was tested as resulted in pre-scanned measurement with respect to 802.11a/n(20,40MHz)/ac(20,40,80MHz).

3. Position for Radiated emissions testing

Pre-scanning was performed by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

4. *Radiated Spurious Emission

Same digital modulation is used by 802.11n and 802.11ac mode.

The worst conducted output power was generated in 802.11ac mode, therefore the 802.11ac mode was chosen as the worst-case for relevant mandatory test requiredments.

3.1.4 Table of actual operating channels

Frequency band	Bandwidth	channel	Frequency (MHz)
UNII-1	20MHz	36	5180
		40	5200
		44	5220
	40MHz	38	5190
UNII-3	20MHz	149	5745
		153	5765
		157	5785
		161	5805
		165	5825
	40MHz	151	5755
		159	5795
	80MHz	155	5775

3.1.5. Additional Information Related to Testing

The cable and attenuator loss from 30MHz to 25GHz was reflected in spectrum analyzer with correction factor for all conducted testing.

3.1.6 Antenna information:

Frequency band	Mode	Data rate	Antenna TX mode	Support CDD	Support MIMO
5 GHz	802.11a	All	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11n (20 MHz)	MCS 0~7	■ 1TX, ■ 2TX	■ Yes, □ No	□ Yes, ■ No
		MCS 8~15	□ 1TX, ■ 2TX	□ Yes, ■ No	■ Yes, □ No
	802.11n (40 MHz)	MCS 0~7	■ 1TX, ■ 2TX	■ Yes, □ No	□ Yes, ■ No
		MCS 8~15	□ 1TX, ■ 2TX	□ Yes, ■ No	■ Yes, □ No
	802.11ac (20 MHz)	MCS0NSS1~ MCS8NSS1	■ 1TX, ■ 2TX	■ Yes, □ No	□ Yes, ■ No
		MCS0NSS2~ MCS8NSS2	□ 1TX, ■ 2TX	□ Yes, ■ No	■ Yes, □ No
	802.11ac (40 MHz)	MCS0NSS1~ MCS9NSS1	■ 1TX, ■ 2TX	■ Yes, □ No	□ Yes, ■ No
		MCS0NSS2~ MCS9NSS2	□ 1TX, ■ 2TX	□ Yes, ■ No	■ Yes, □ No
	802.11ac (80 MHz)	MCS0NSS1~ MCS9NSS1	■ 1TX, ■ 2TX	■ Yes, □ No	□ Yes, ■ No
		MCS0NSS2~ MCS9NSS2	□ 1TX, ■ 2TX	□ Yes, ■ No	■ Yes, □ No

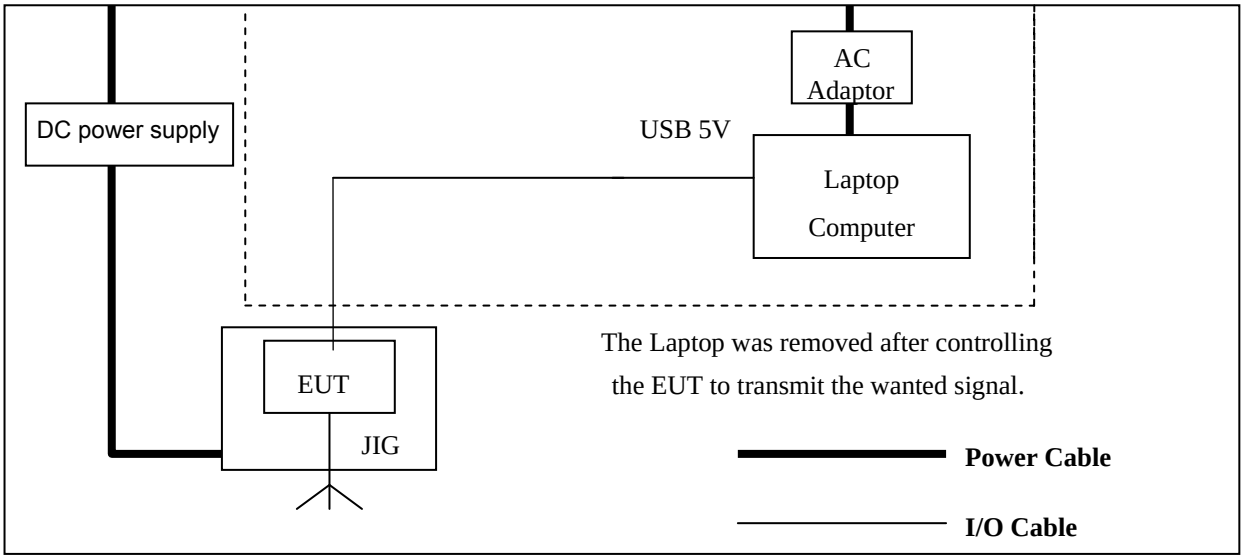
Note :

1. CDD mode is Cyclic Delay Diversity mode.
2. For 802.11n(20 MHz),EUT support SISO,CDD mode for MCS0~7 and MIMO mode for MCS8~15.
3. For 802.11n(40 MHz),EUT support SISO,CDD mode for MCS0~7 and MIMO mode for MCS8~15.
4. For 802.11ac(20 MHz),EUT support SISO,CDD mode for MCS0NSS1~MCS8NSS1 and MIMO mode for MCS0NSS2~MCS8NSS2.
5. For 802.11ac(40 MHz),EUT support SISO,CDD mode for MCS0NSS1~MCS9NSS1 and MIMO mode for MCS0NSS2~MCS9NSS2.
6. For 802.11ac(80 MHz),EUT support SISO,CDD mode for MCS0NSS1~MCS9NSS1 and MIMO mode for MCS0NSS2~MCS9NSS2.
7. CDD mode, N_{SS}=1, MIMO mode, N_{SS}=2, where N_{SS} = number of spatial streams.
8. MIMO mode means SM-MIMO transmission.

3.2 Support Equipment

EUT	Samsung Electronics Co., Ltd. Model : ATKM052000	S/N: N/A
Laptop Computer	HP Model : 15-AC631TU 0.3 m unshielded pin connector cable	FCC DOC S/N : CND55093NW
AC/DC Adapter	LITE-ON TECHNOLOGY Model : HSTNN-LA40 1.5 m unshielded power cable	FCC DOC S/N : 5Y23208202

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Samsung IoT Module FCC ID: A3LATKM052000, IC: 649E-ATKM052000.**

Specifications:

Category	IoT Module
Model Name	ATKM052000
Brand Name	SAMSUNG
Frequency of Operation	For U-NII-1 Band 802.11a,n,ac(20 MHz): 5180 MHz ~ 5220 MHz 802.11n,ac(40 MHz): 5190 MHz For U-NII-3 Band 802.11a,n,ac(20 MHz): 5745 MHz ~ 5825 MHz 802.11n,ac(40 MHz): 5755 MHz ~ 5795 MHz 802.11ac(80 MHz): 5775 MHz
Output power (Conducted)	For U-NII-1 Band 802.11a : 10.26 dBm 802.11n(20 MHz) : 12.37 dBm 802.11n(40 MHz) : 11.93 dBm 802.11ac(20 MHz) : 12.31 dBm 802.11ac(40 MHz) : 12.03 dBm For U-NII-3 Band 802.11a : 7.52 dBm 802.11n(20 MHz) : 9.13 dBm 802.11n(40 MHz) : 7.54 dBm 802.11ac(20 MHz) : 9.17 dBm 802.11ac(40 MHz) : 7.54 dBm 802.11ac(80 MHz) : 6.79 dBm
Channels	For U-NII-1 Band 802.11a,n,ac(20 MHz): 3ch 802.11n,ac(40 MHz): 1ch For U-NII-3 Band 802.11a,n,ac(20 MHz): 5ch 802.11n,ac(40 MHz): 2ch 802.11ac(80 MHz): 1ch
Antenna Gain (peak)	Ant0 : 2.7 dBi, Ant1 : 2.7 dBi
Antenna setup	802.11a : 1TX/1RX 802.11n(20,40MHz)/ac(20.40.80MHz) : 1TX/1RX, 2TX/2RX
Modulations	OFDM(BPSK,QPSK,16QAM,64QAM) for 802.11a,n,ac
Temperature Range	0 ℃ ~ +70 ℃

Voltage	4.2 Vdc
Dimensions (L x W x H)	About 45 mm x 40 mm X 3.5 mm
Weight	About 3 g
H/W Status	-
S/W Status	-
Remarks	-

**Devices is not capable of transmitting in the band 5600-5650 MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band.*

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	FCC Paragraph No.	IC Paragraph No.	Result	Remark
Conducted Emission	15.207	RSS-GEN Issue 4 8.8	Complies	
Radiated Emission	15.209	RSS-GEN Issue 4 8.9	Complies	
26 dB Spectrum Bandwidth and 99% Occupied bandwidth	15.407(a)	RSS-247 Issue 1 6.2	Complies	
6 dB Bandwidth	15.407(e)	RSS-247 Issue 1 6.2	Complies	
Maximum Conducted Output Power	15.407(a)	RSS-247 Issue 1 6.2	Complies	
Power Spectral Density	15.407(a)	RSS-247 Issue 1 6.2	Complies	
Radiated Spurious Emission	15.407(b)	RSS-247 Issue 1 6.2	Complies	
DFS	15.407(h)	RSS-247 Issue 1 6.3	Complies	
Maximum Permissible Exposure	1.1307(b)	RSS-102	Complies	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Samsung IoT Module FCC ID: A3LATKM052000, IC : 649E-ATKM052000** is in compliance with Part 15.247 of the FCC Rule and RSS-247 Issue 1 of the IC Specification.

6. ANTENNA REQUIREMENTS

§15.203 of the FCC Rules part 15 Subpart C

: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the **Samsung IoT Module FCC ID: A3LATKM052000, IC : 649E-ATKM052000** is **permanently attached** and there are no provisions for connection to an external antenna. It complies with the requirement of §15.203.

Directional gain was be calculated according to "**662911 D01 Multiple Transmitter Output v02r01**" and would be found at end of average output power and PSD results in this report.

7. DESCRIPTION OF TESTS

7.1 Conducted Emissions

The Line conducted emission test facility is located inside a 4 x 7 x 2.5 meter shielded enclosure. It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6. A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 1.5 m away from the side of wall of the shielded room Rohde & Schwarz (ESH3-Z5) and (ESH2-Z5) of the 50 ohm/50 μH Line Impedance Stabilization Network (LISN) are bonded to the shielded room. The EUT is powered from the Rohde & Schwarz LISN (ESH3-Z5) and the support equipment is powered from the Rohde & Schwarz LISN (ESH2-Z5). Power to the LISNs are filtered by high-current high insertion loss Power line filters. The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ”. If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentinefashion) to a 1 meter length. Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150 kHz to 30 MHz with 200 msec sweep time. The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30). The detector functions were set to CISPR quasi-peak mode & average mode. The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux AC outlet, if applicable; whichever determined the worst case emission.

Each EME reported was calibrated using the R&S signal generator.

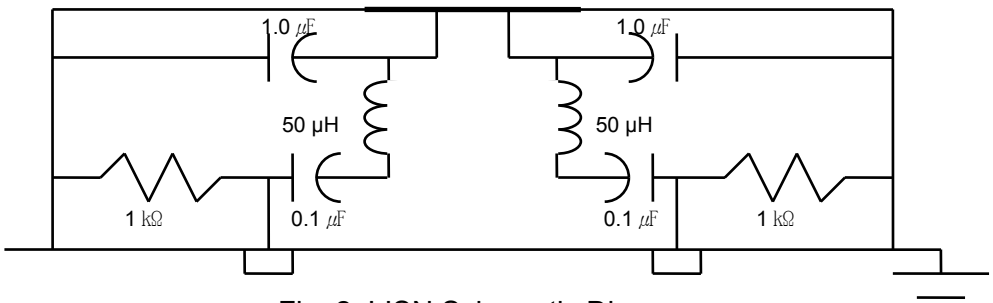


Fig. 2. LISN Schematic Diagram

7.2 Radiated Emissions

The measurement was performed at the test site that is specified in accordance with ANCI C63.10-2013.

The spurious emission was scanned from 9 kHz to 30 MHz using Loop Antenna(Rohde&Schwarz, HFH2-Z2) and 30 to 1000 MHz using Trilog broadband test antenna(Schwarzbeck, VULB 9163). Above 1 GHz, Horn antenna (Schwarzbeck BBHA 9120D: up to 18 GHz, Q-par Angus QSH20S20 : 18 to 26.5 GHz, QSH22K20: up to 40 GHz) was used.

For emissions testing at below 1GHz, The test equipment was placed on turntable with 0.8 m above ground. For emission measurements above 1 GHz, The test equipment was placed on turntable with 1.5 m above ground. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, cable, wire arrangement and mode of operation that has the highest amplitude relative to the limit was selected. Then, the turn table was rotated from 0° to 360° and an antenna mast was moved from 1 m to 4 m height to maximize the suspected highest amplitude signal. The final maximized level was recorded.

Unwanted emissions in the restricted bands

At frequencies below 1000 MHz, measurements performed using the CISPR quasi-peak detection.

At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in KDB “789033 D02 General UNII Test Procedures New Rules v01r01”in section G)5) and G)6). Peak emission levels was measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = max hold. Average emission levels was measured using the “Method VB” by setting the analyzer RBW = 1 MHz, VBW = 1 kHz (VBW ≤ RBW/100), Detector = Peak , if the EUT is configured to transmit with duty cycle ≥ 98 percent. When the duty cycle ≤ 98 percent, VBW ≥ 1/T(T = minimum transmission duration over which the transmitter is on) was used.

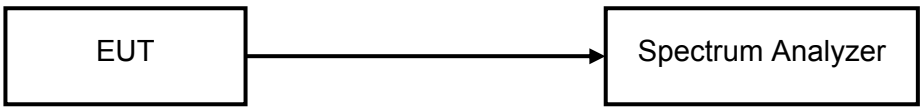
Unwanted emissions outside of the restricted bands

At frequencies below 1000 MHz, measurements performed using the CISPR quasi-peak detection.

At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in KDB “789033 D02 General UNII Test Procedures New Rules v01”in section G)5). Peak emission levels was measured by setting the analyzer RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Trace mode = max hold. If the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

7.3 26 dB Bandwidth and 99% Occupied bandwidth

Test Setup

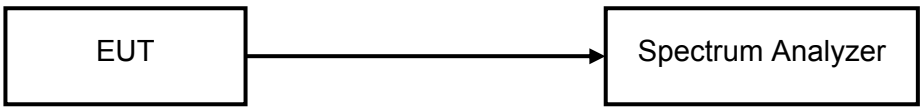


Test Procedure

EUTs 26 dB bandwidth is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
RBW = approximately 1 % of the emission bandwidth
VBW ≥ 3 x RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple.
The bandwidth measurement function on the spectrum analyzer is used to measure the 26 dB bandwidth and 99% occupied bandwidth.

7.4 6 dB Bandwidth

Test Setup

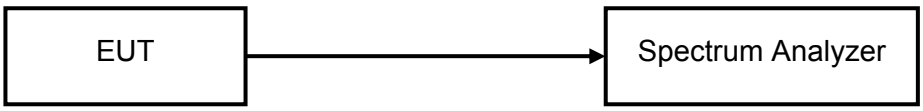


Test Procedure

EUTs 6 dB bandwidth is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
RBW = 100 kHz
VBW > 3 x RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple
The bandwidth measurement function on the spectrum analyzer is used to measure the 6 dB bandwidth.

7.5 Maximum Conducted Output Power (average)

Test Setup

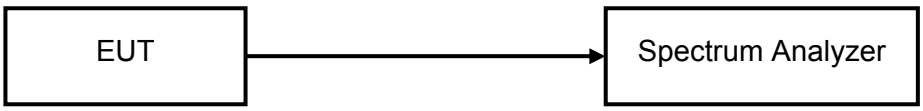


Test Procedure

EUTs Maximum Conducted Output Power is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
The spectrum analyzer setting is as follows.
Measure the duty cycle
Span = encompass the EBW of the signal.
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points in sweep ≥ 2 Span / RBW
Sweep time = auto
Detector = RMS
Trace average at least 100 traces in power averaging mode
The band power measurement function on the spectrum analyzer is used to measure the Maximum conducted output power.
Add 10 log(1/x), where x is the duty cycle.

7.6 Maximum Power Spectral Density (average)

Test Setup

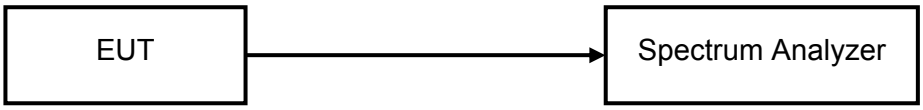


Test Procedure

EUTs Maximum Conducted Output Power is measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.
Measure the duty cycle.
The spectrum analyzer setting is as follows.
Span = encompass the EBW of the signal.
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points in sweep ≥ 2 Span / RBW
Sweep time = auto
Detector = RMS
Trace average at least 100 traces in power averaging mode
The peak search function on the spectrum analyzer is used to find the peak of the spectrum.
Add 10 log(1/x), where x is the duty cycle.

7.7 Duty Cycle

Test Setup



Test Procedure

EUTs duty cycle are measured at middle channel with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level. The spectrum analyzer setting is as follows.

Center frequency = Center frequency of the transmission
Span = zero
RBW = 8 MHz
VBW = 8 MHz
Detector = peak
Sweep time = at least 2 ms
Trace mode = view
The marker function on the spectrum analyzer is used to determine the duty cycle.

Following is the worst result of the duty cycle measurements according to the above test procedure

	Data rate	On time (ms)	On + Off time (ms)	Duty Cycle (%)	Duty Factor (dB)
a mode	6Mbps	1.426	1.727	83	0.83
n(20MHz) mode	MCS0	1.336	1.636	82	0.88
	MCS8	0.679	0.980	69	1.59
n(40MHz) mode	MCS0	0.657	0.958	69	1.64
	MCS8	0.351	0.651	54	2.68
ac(20MHz) mode	MCS0	1.342	1.643	82	0.88
	MCS8	0.692	0.996	69	1.58
ac(40MHz) mode	MCS0	0.655	0.966	68	1.69
	MCS8	0.354	0.655	54	2.75
ac(80MHz) mode	MCS0	0.330	0.632	52	2.82
	MCS8	0.192	0.491	39	4.08

8. TEST DATA

8.1 Conducted Emissions

FCC §15.207, RSS-Gen Issue 4 8.8

Frequency (MHz)	Level (dBμV)		*) Factor (dB)	**) Line	Limit (dBμV)		Margin (dB)	
	Q-Peak	Average			Q-Peak	Average	Q-Peak	Average
0.15	40.4	22.7	10.84	L	66.0	56.0	25.6	33.3
0.17	38.8	23.2	10.80	L	65.0	55.0	26.2	31.8
0.19	37.0	22.0	10.75	L	64.0	54.0	27.0	32.0
0.21	35.8	21.7	10.71	L	63.2	53.2	27.4	31.5
0.23	34.1	22.0	10.67	L	62.4	52.4	28.3	30.4
0.49	33.7	26.7	10.16	L	56.2	46.2	22.5	19.5

Line Conducted Emissions Tabulated Data

Notes:

1. Measurements using CISPR quasi-peak mode & average mode.

2. All modes of operation were investigated and the worst -case emission are reported.
See attached Plots.

*3. *) Factor = LISN + Cable Loss*

*4. **) LINE : L = Line , N = Neutral*

5. The limit is on the FCC §15.207 and IC RSS-GEN issue4 8.8.

PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Line)***

NEMKO KOREA (NK-16-R-029) 01 Apr 2016 15:22

Conducted Emissions

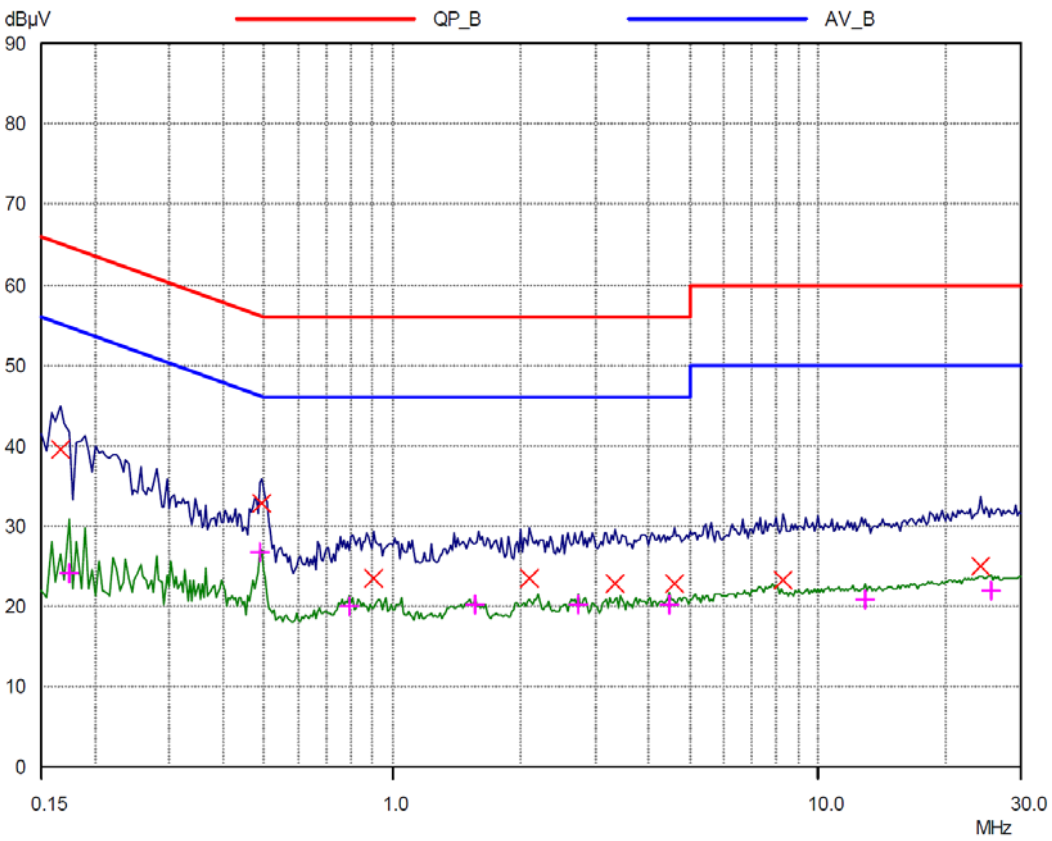
EUT:	EUT
Manuf:	Samsung Electronics. Co., Ltd.
Op Cond:	d.c. 4.2 V // Wifi 5 GHz
Operator:	Wonho. Son
Test Spec:	FCC Part 15
Comment:	MODEL : ATKM052000
	LINE : LINE
Result File:	r24_5gl.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Line

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	60 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Neutral)***

NEMKO KOREA (NK-16-R-029) 01 Apr 2016 15:32

Conducted Emissions

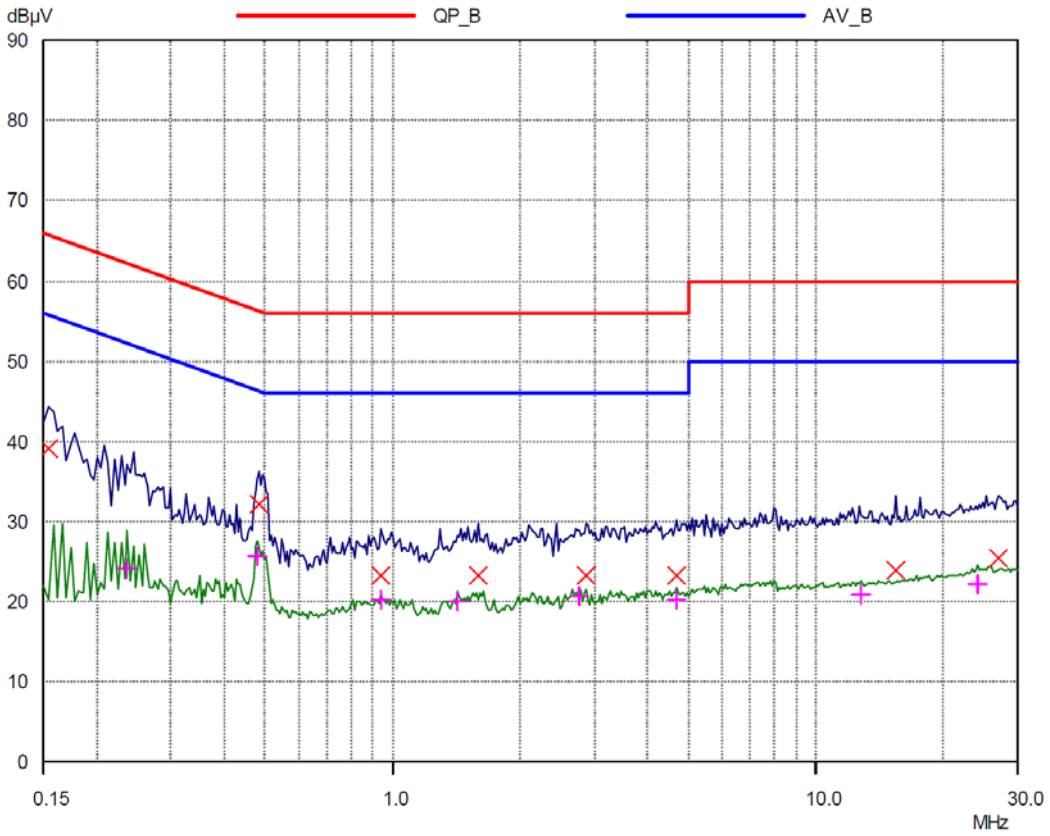
EUT:	EUT
Manuf:	Samsung Electronics. Co., Ltd.
Op Cond:	d.c. 4.2 V // Wifi 5 GHz
Operator:	Wonho. Son
Test Spec:	FCC Part 15
Comment:	MODEL : ATKM052000
	LINE : NEUTRAL
Result File:	r24_5gn.dat : New Measurement

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Neutral

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	60 dB



8.2 Radiated Emissions

FCC §15.209, RSS-Gen Issue 4 8.9

Frequency (MHz)	Reading (dBµV/m)	Pol* (H/V)	Antenna Heights (cm)	Turntable Angles (°)	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.10	55.30	V	116	186	-24.3	31.0	40.0	9.0
32.04	53.20	V	100	15	-24.0	29.2	40.0	10.8
35.09	56.60	V	100	202	-23.4	33.2	40.0	6.8
39.26	57.20	V	100	177	-22.4	34.8	40.0	5.2
43.63	50.50	V	100	195	-22.0	28.5	40.0	11.5
67.10	51.10	V	100	158	-25.5	25.6	40.0	14.4

Radiated Measurements at 3meters

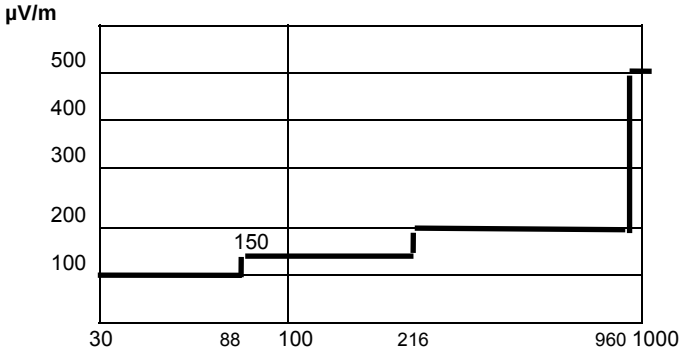


Fig. 3. Limits at 3 meters

Notes:

1. All modes were measured and the worst-case emission was reported.

2 The radiated limits are shown on Figure 3.

Above 1 GHz the limit is 500 µV/m.

*3. *Pol. H = Horizontal, V = Vertical*

*4. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

5. Measurements using CISPR quasi-peak mode.

6. The radiated emissions testing were made by rotating through three orthogonal axes. The worst date was recorded.

7. n(20MHz) CDD mode on the middle channel (5200MHz) is the worst case channel.

7. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

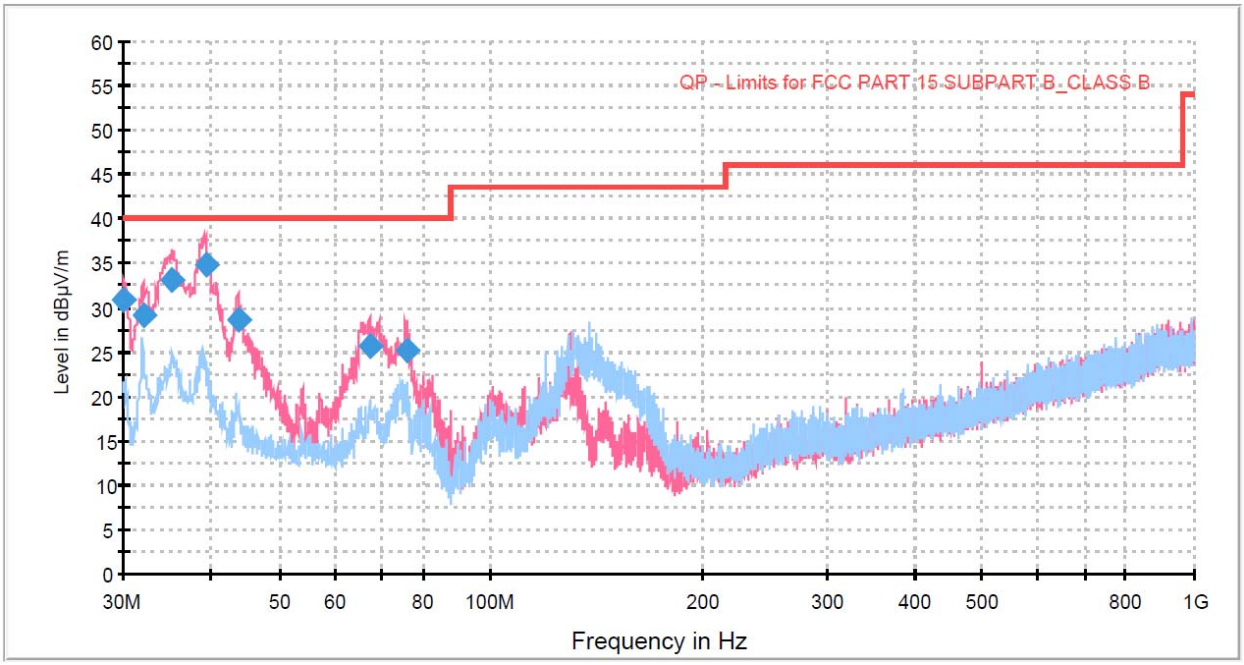
8. The limit is on the FCC §15.209 and RSS-Gen Issue4 8.9

PLOTS OF EMISSIONS

Worst Case – UNII-1 band

802.11n (20 MHz) mode – CDD

Middle channel (5200MHz)



8.3 26 dB Bandwidth and 99 % Occupied bandwidth

8.3.1 26 dB Bandwidth and 99 % Occupied bandwidth – UNII-1 band

FCC §15.407(a), RSS-247 Issue 1 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.53	21.76	16.86	16.94
Middle	5200	21.51	21.67	16.89	16.90
High	5220	21.66	21.65	16.91	16.89

802.11n (20 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.71	21.93	17.97	17.98
Middle	5200	21.72	21.87	17.91	17.99
High	5220	21.81	21.62	17.99	17.95

802.11n (20 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.84	21.94	18.01	17.94
Middle	5200	21.85	21.71	17.97	17.90
High	5220	22.03	21.73	17.98	17.91

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.68	21.71	17.98	17.91
Middle	5200	21.79	21.88	17.95	17.89
High	5220	21.68	21.62	17.93	17.90

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	40.25	39.89	36.41	36.28

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	40.16	39.47	36.36	36.28

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	39.82	39.61	36.3	36.27

802.11ac (20 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.54	21.77	17.95	17.91
Middle	5200	21.76	21.86	17.95	18.02
High	5220	21.99	21.89	18.02	17.97

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	21.74	22.41	17.97	17.96
Middle	5200	21.97	21.74	17.98	17.88
High	5220	21.83	21.51	17.95	17.92

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5180	22.26	21.63	18.00	17.87
Middle	5200	21.85	21.80	17.98	17.88
High	5220	21.65	18.15	17.96	17.47

802.11ac (40 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	40.11	40.10	36.36	36.31

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	40.31	39.25	36.38	36.25

802.11ac (40 MHz) mode - MIMO

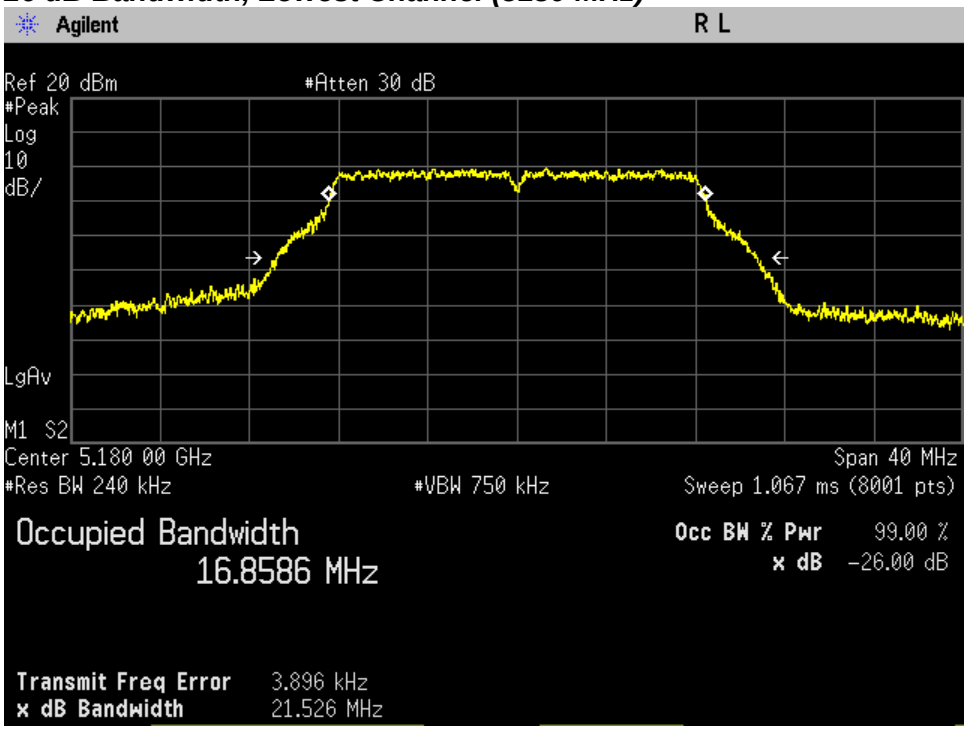
Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5190	39.97	39.71	36.38	36.31

PLOTS OF EMISSIONS

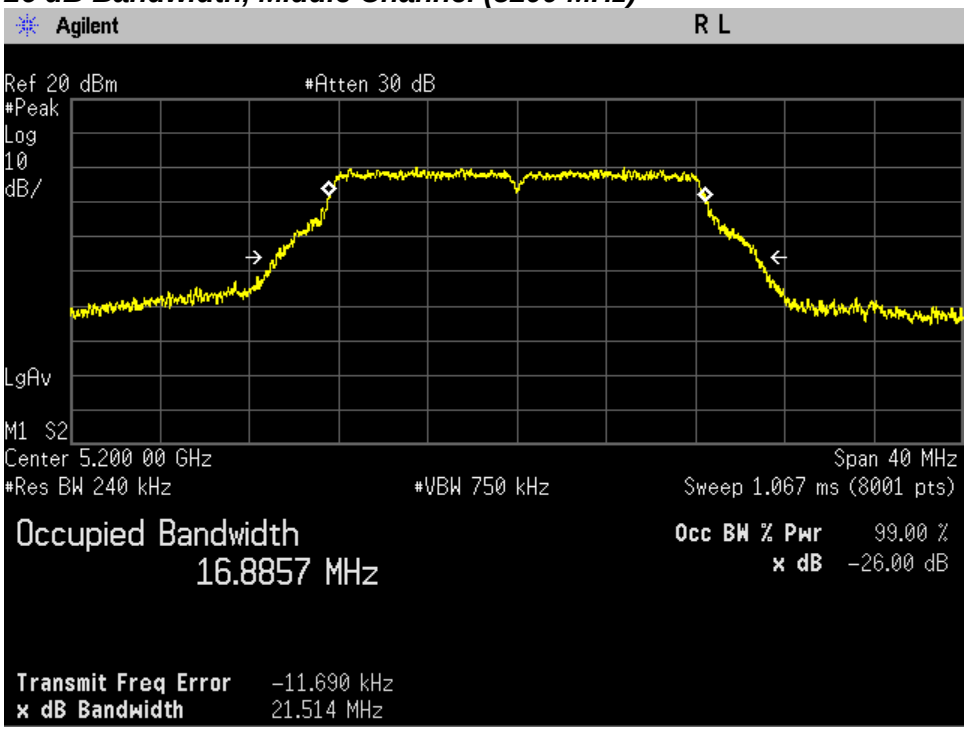
802.11a mode

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

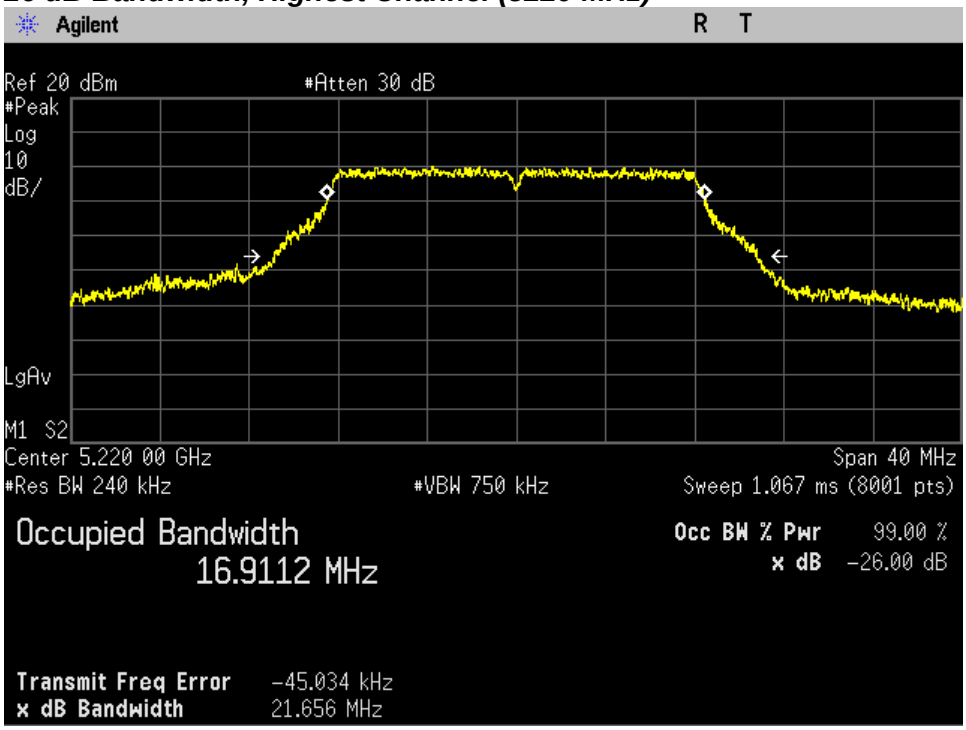


26 dB Bandwidth, Middle Channel (5200 MHz)



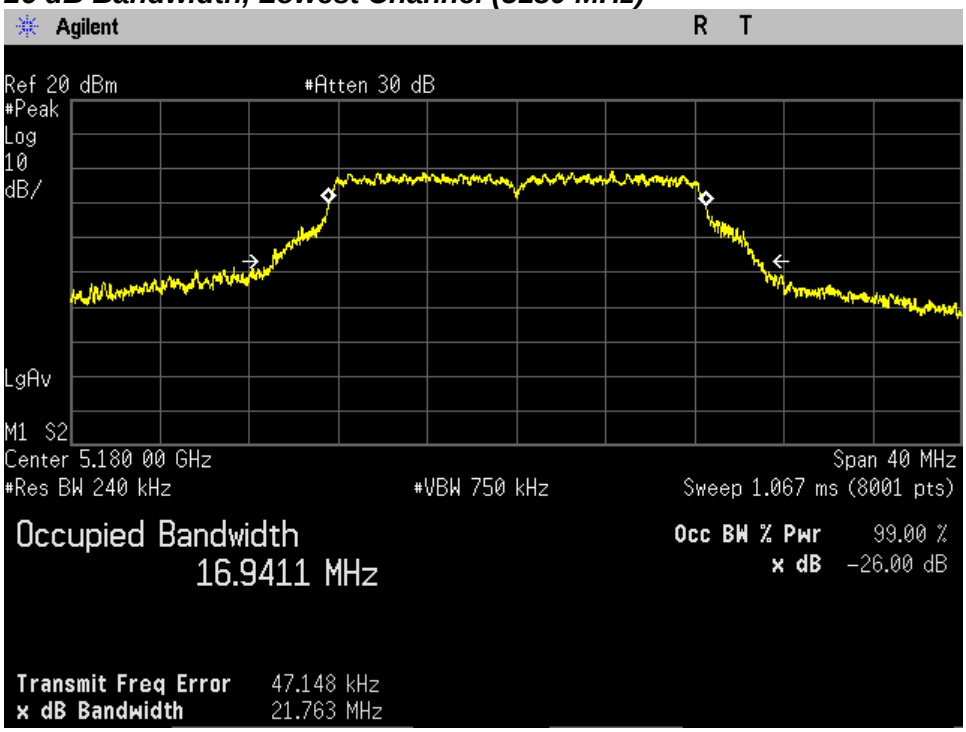
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



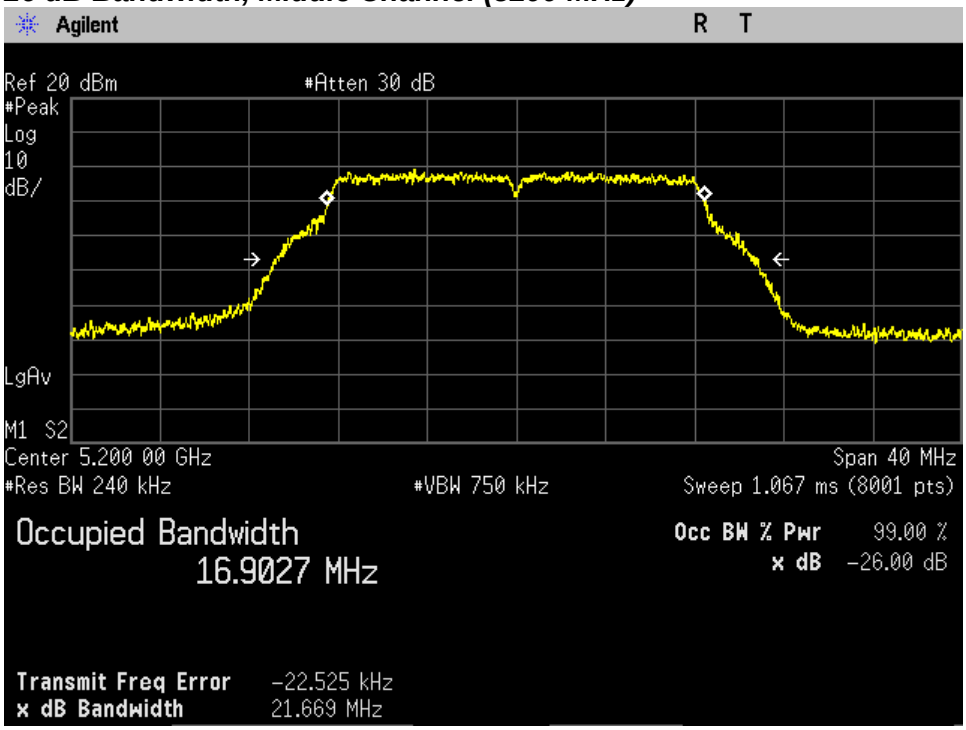
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

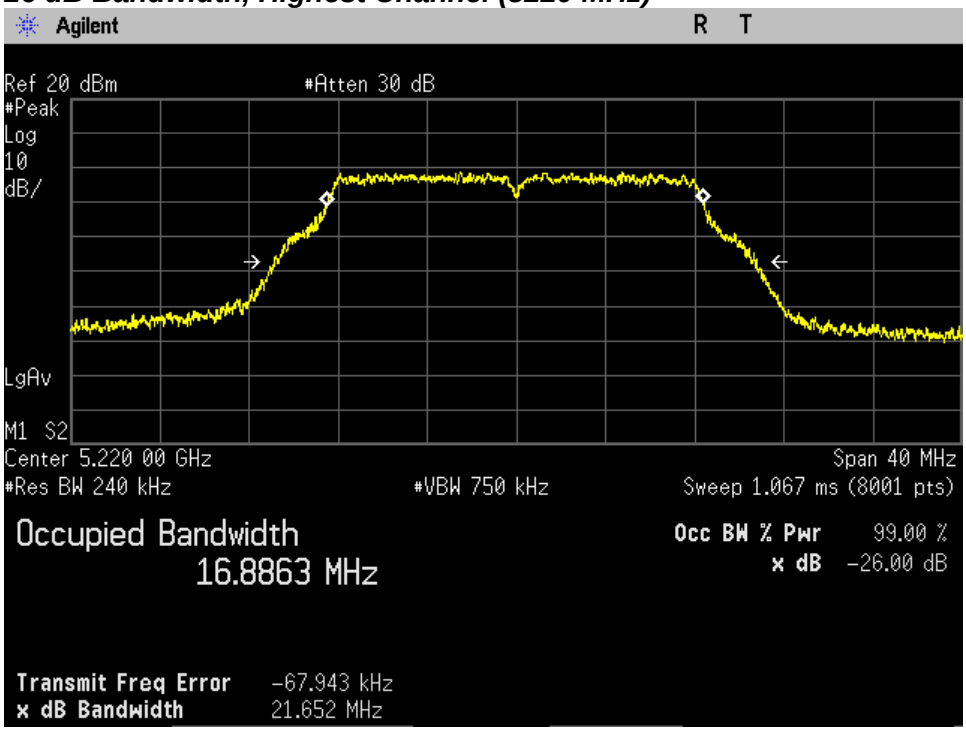


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

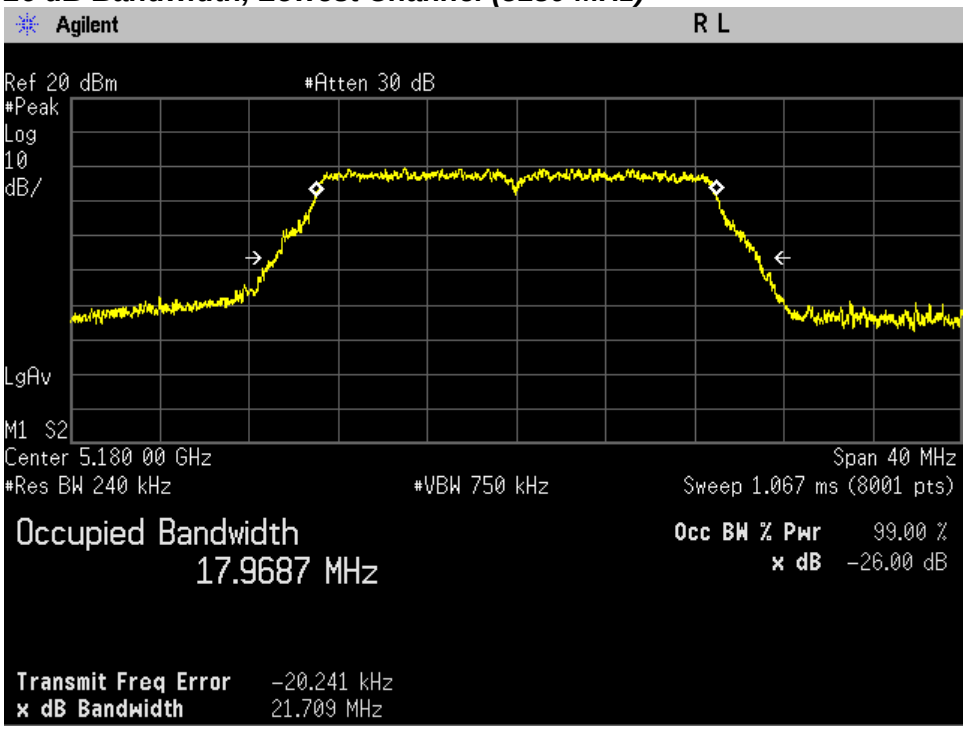


PLOTS OF EMISSIONS

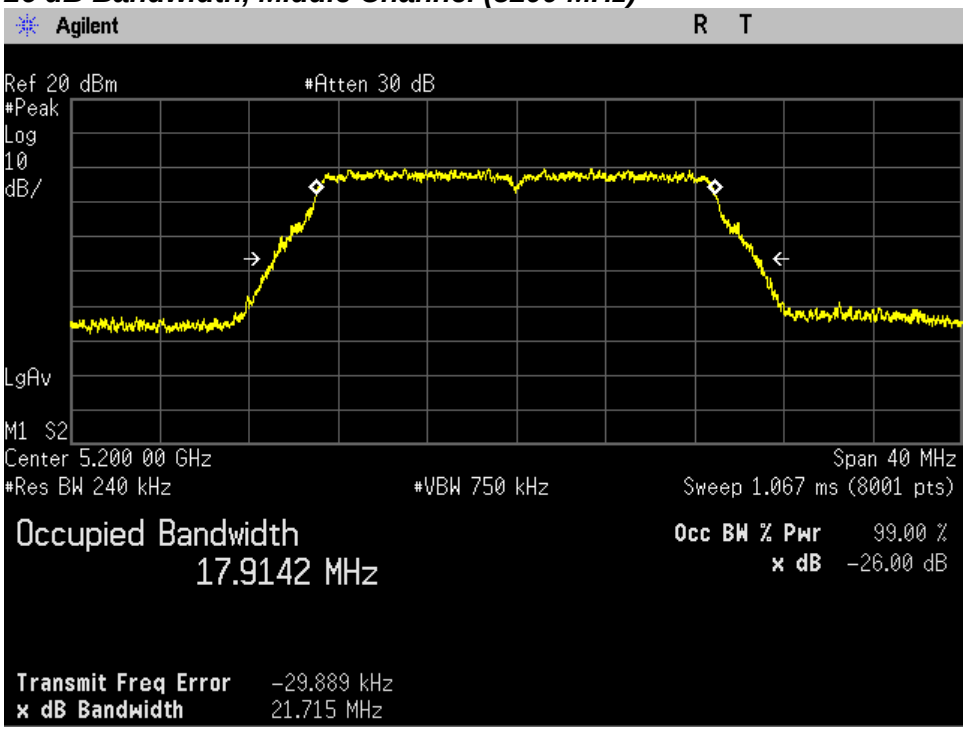
802.11n (20 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

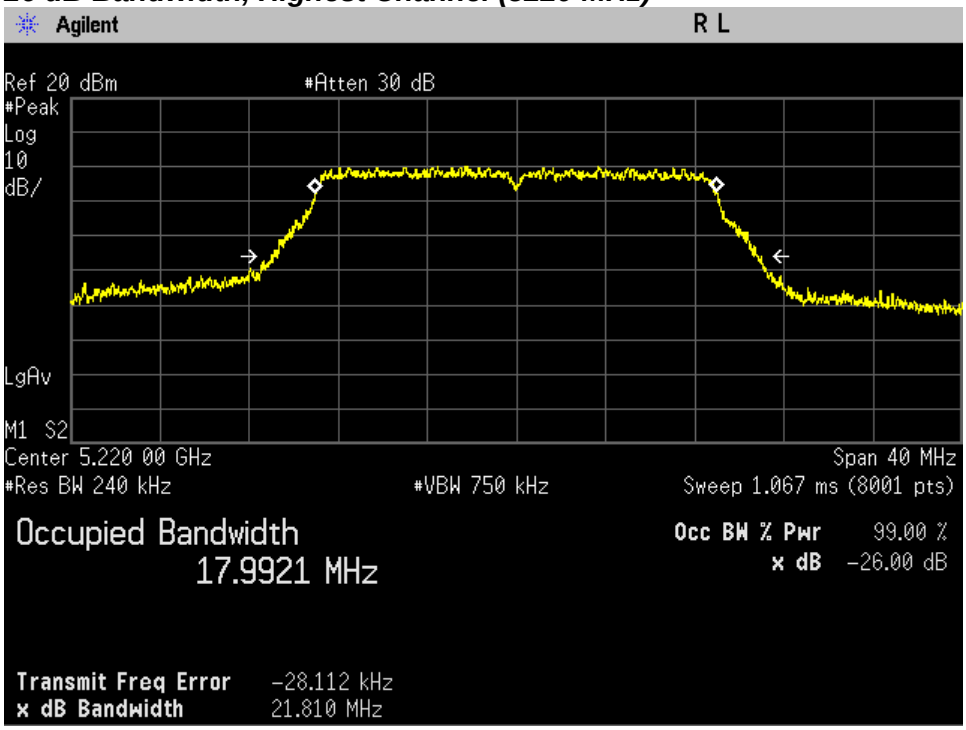


26 dB Bandwidth, Middle Channel (5200 MHz)



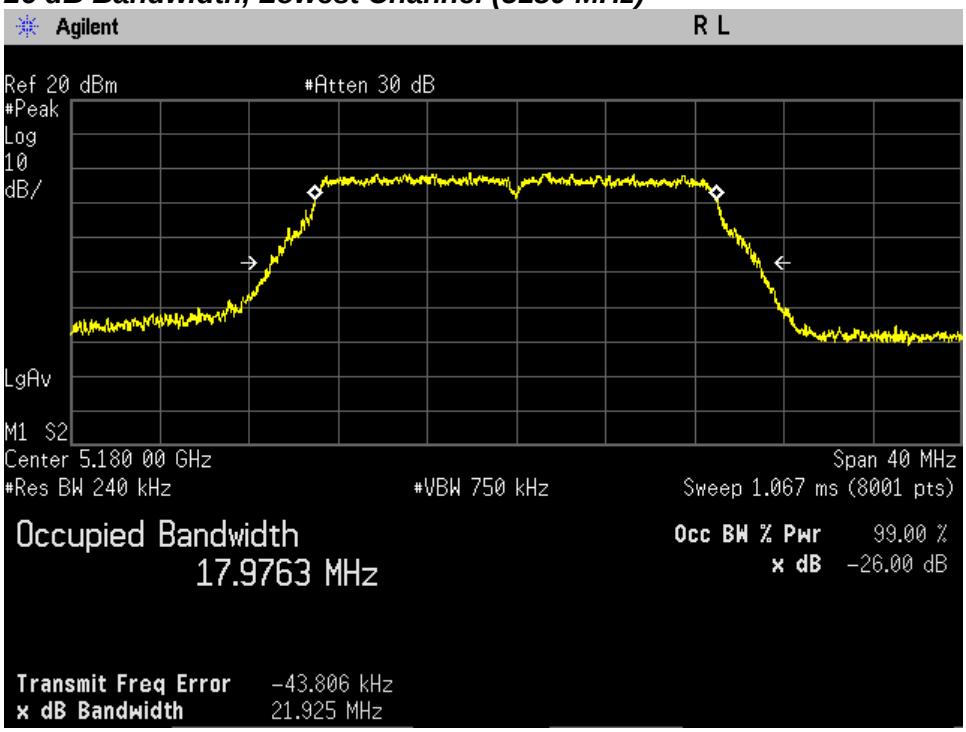
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



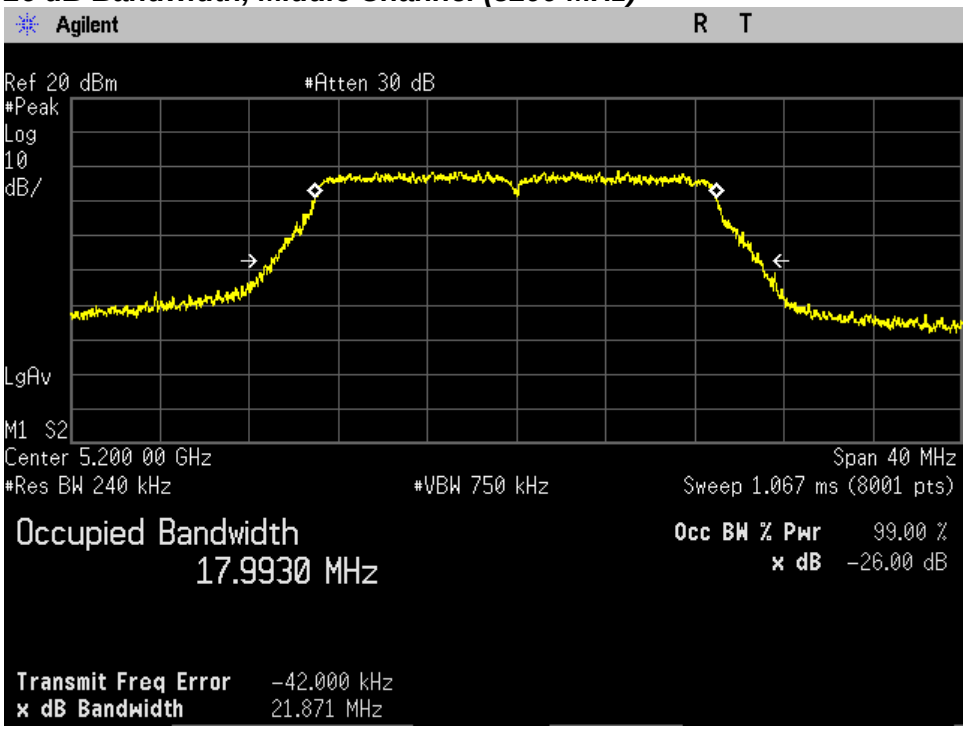
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

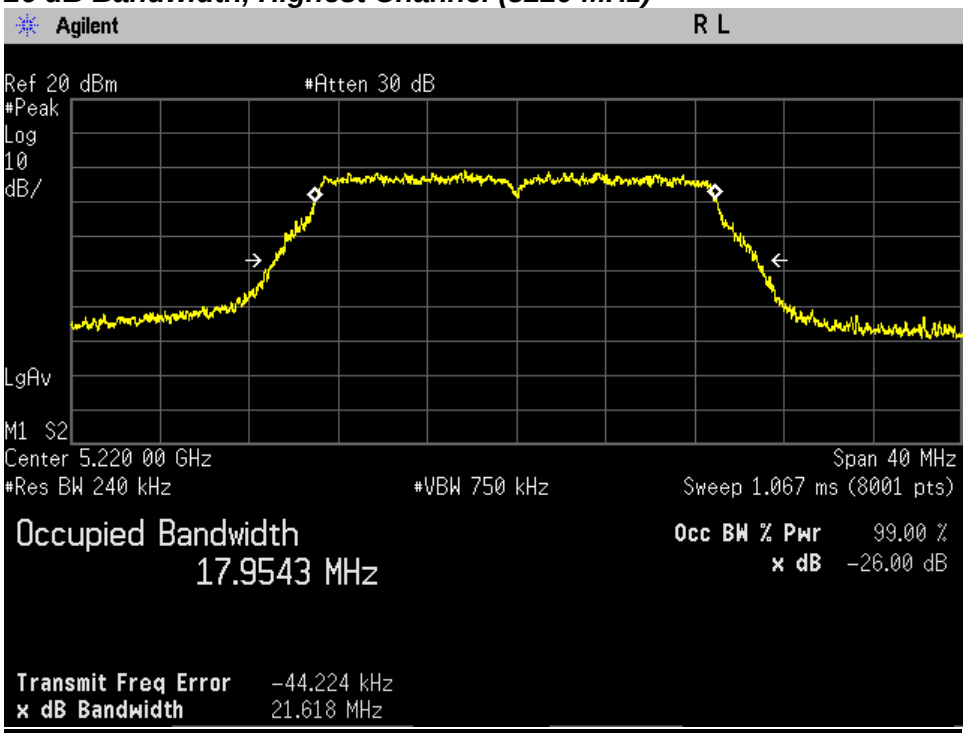


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

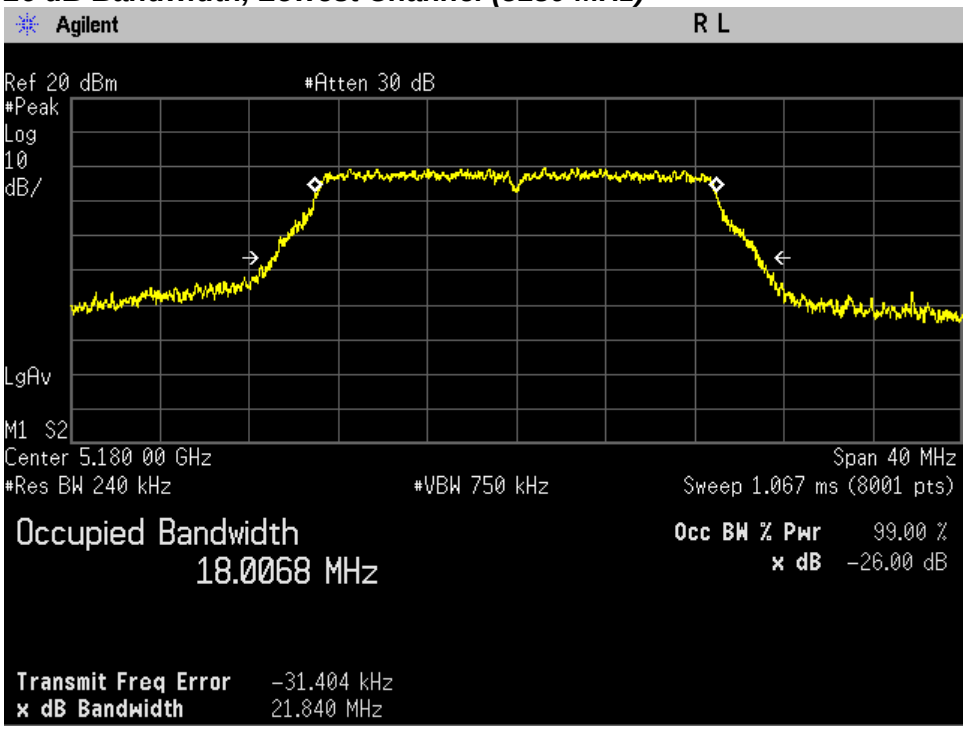


PLOTS OF EMISSIONS

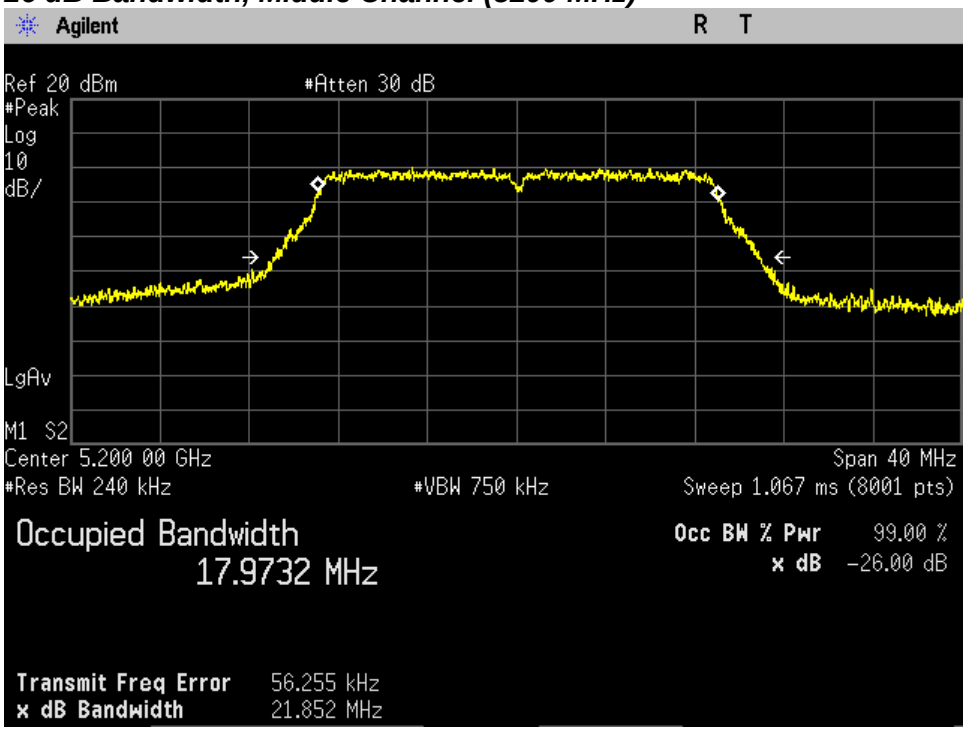
802.11n (20 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

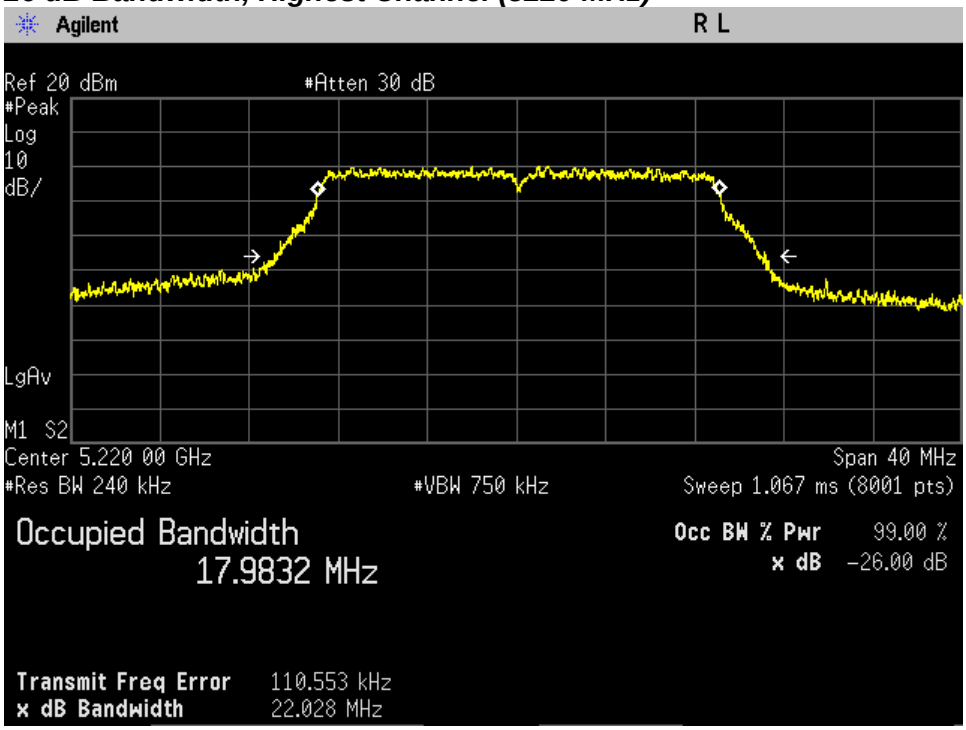


26 dB Bandwidth, Middle Channel (5200 MHz)



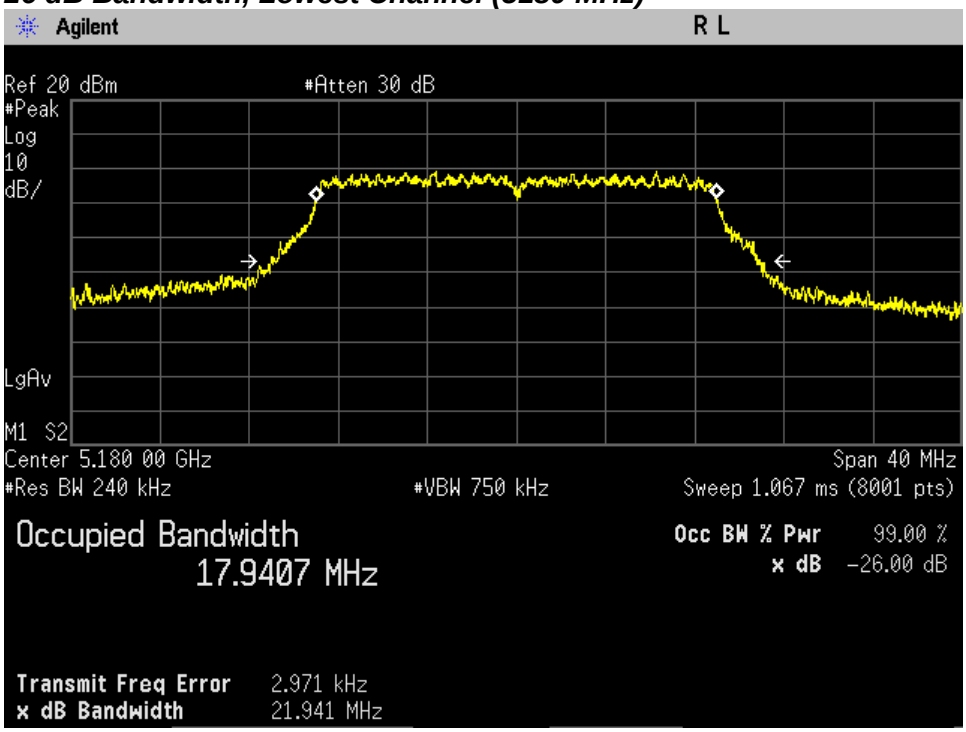
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



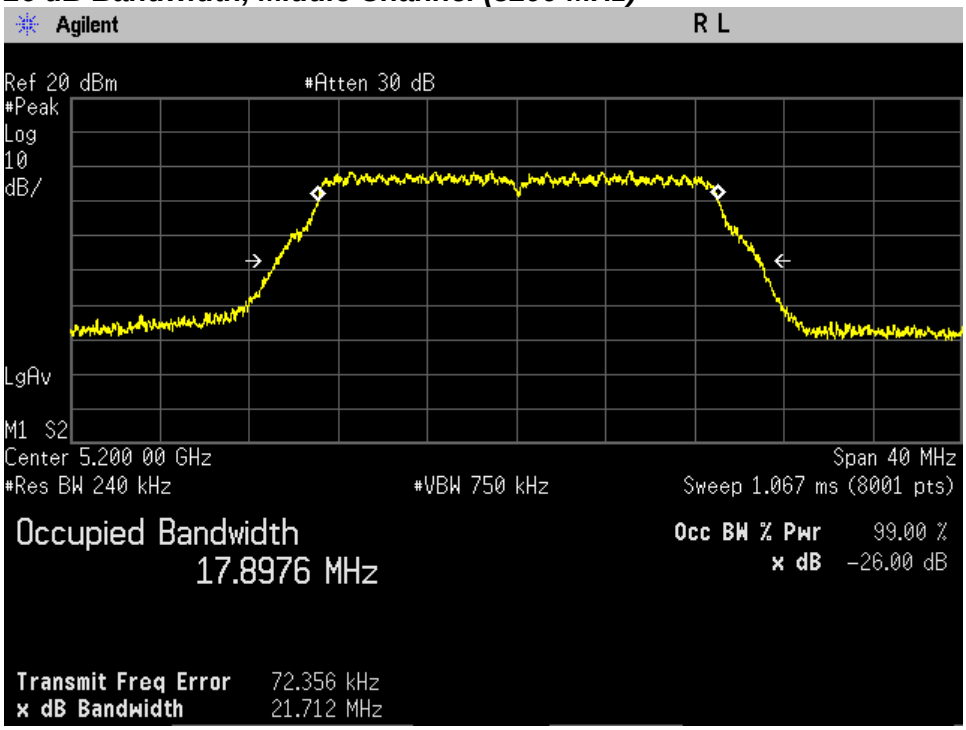
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

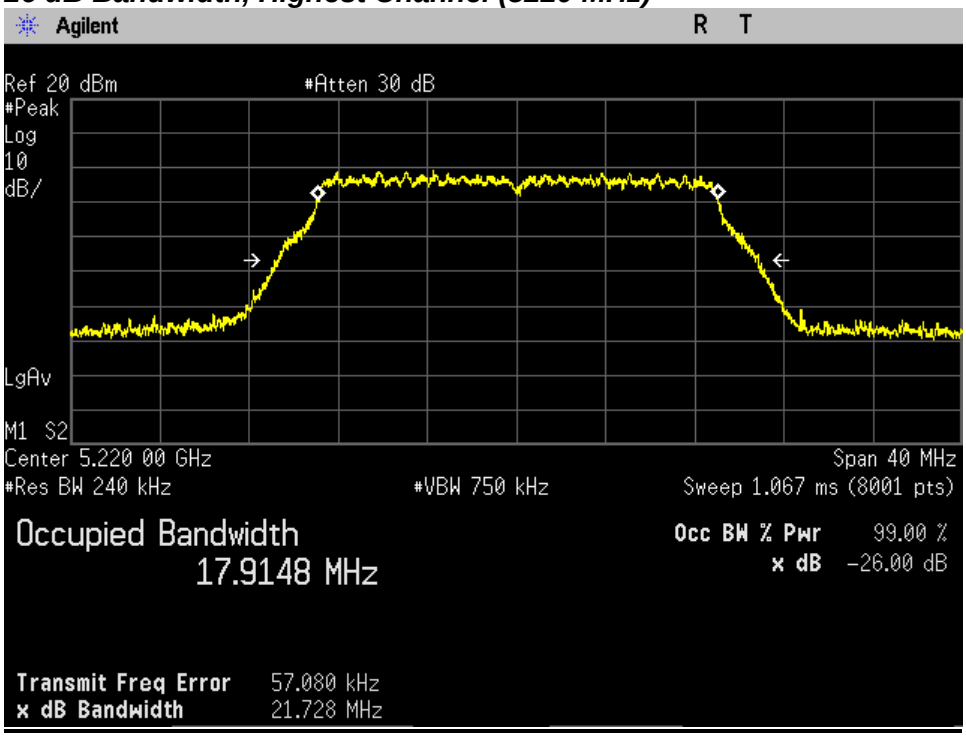


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

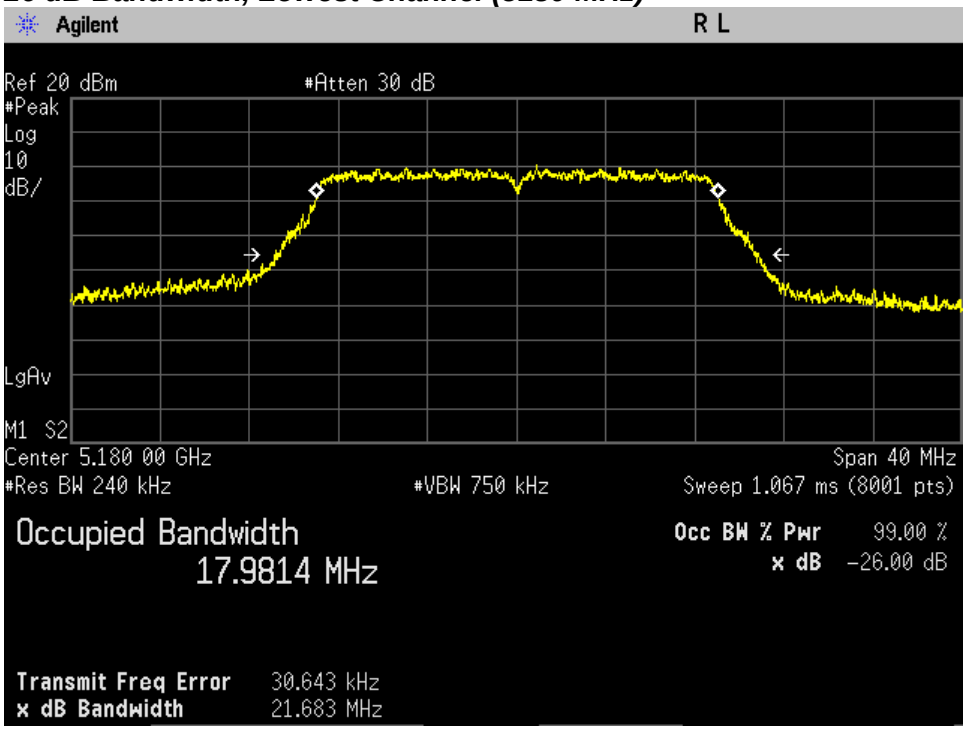


PLOTS OF EMISSIONS

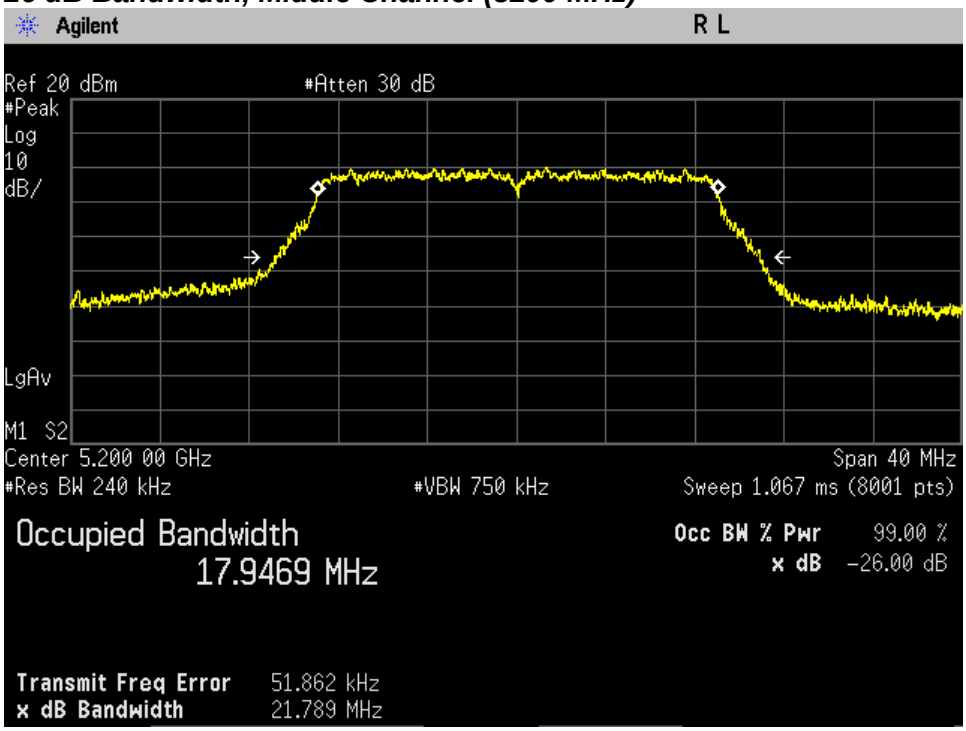
802.11n (20 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

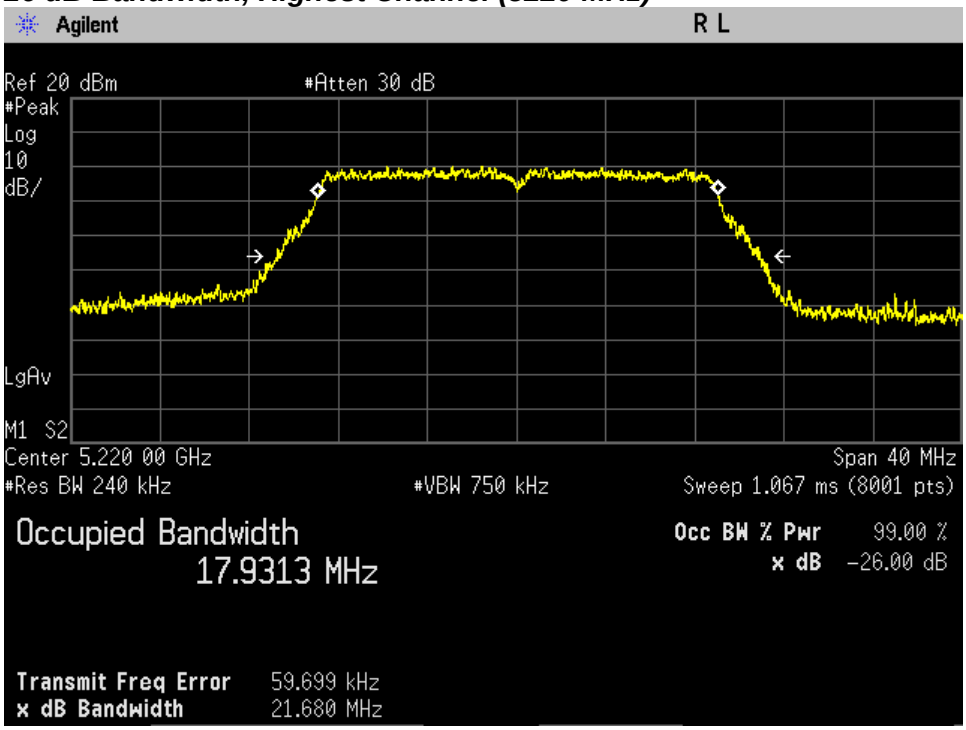


26 dB Bandwidth, Middle Channel (5200 MHz)



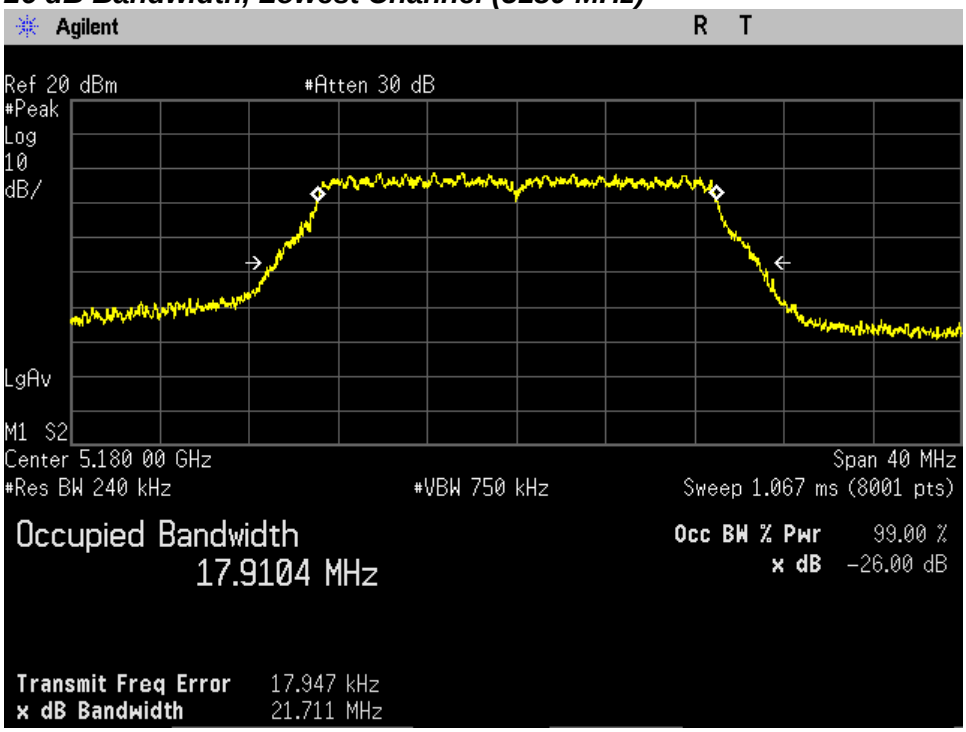
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



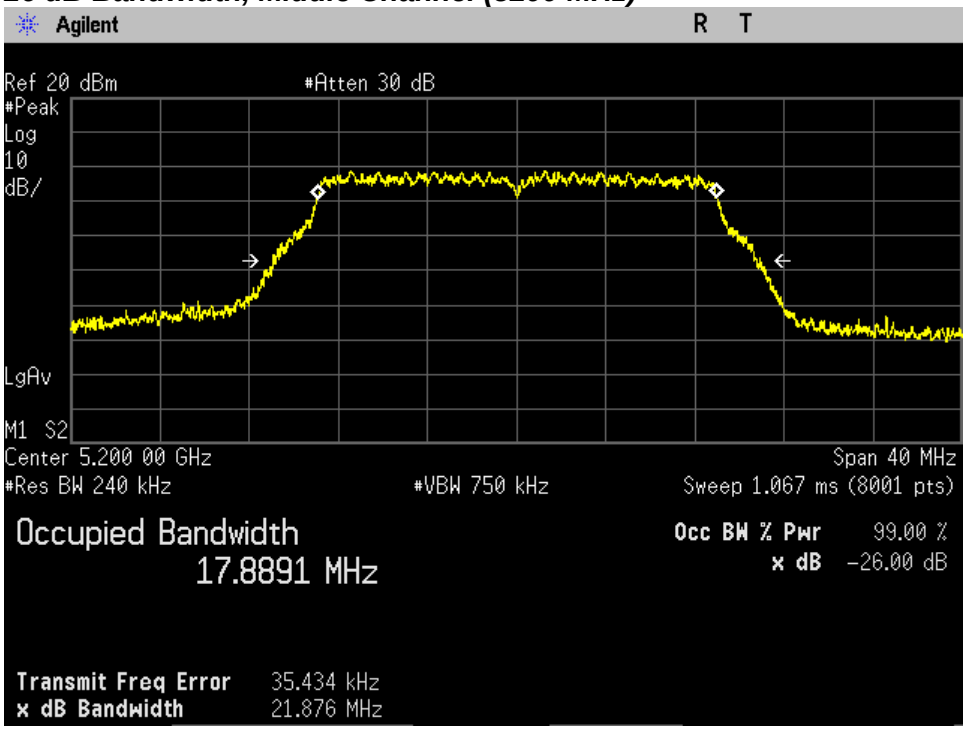
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

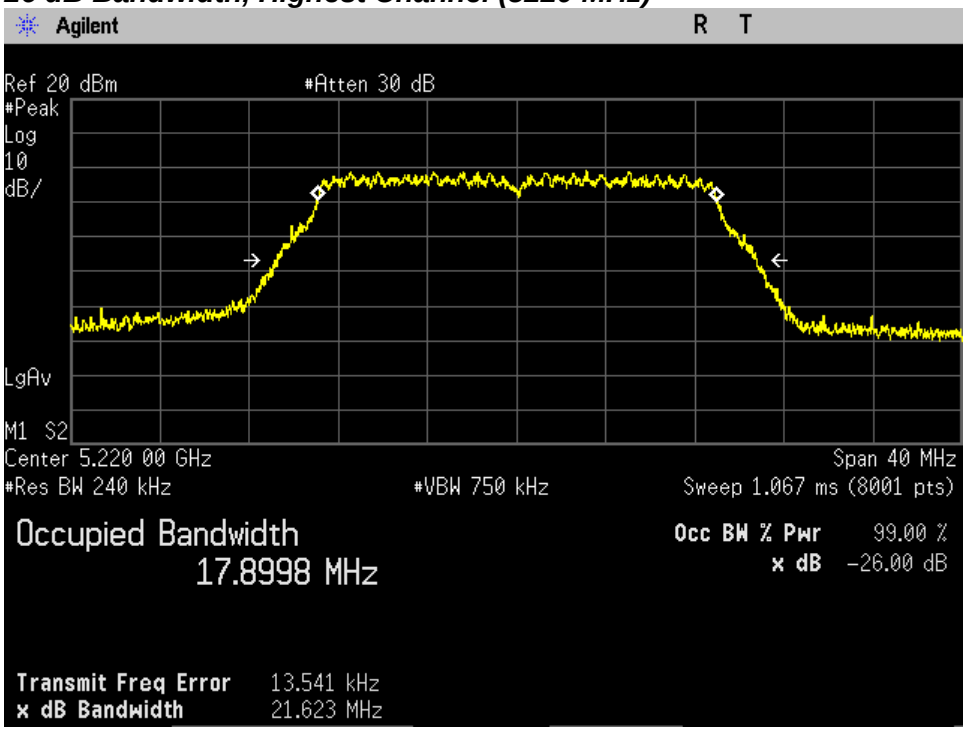


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

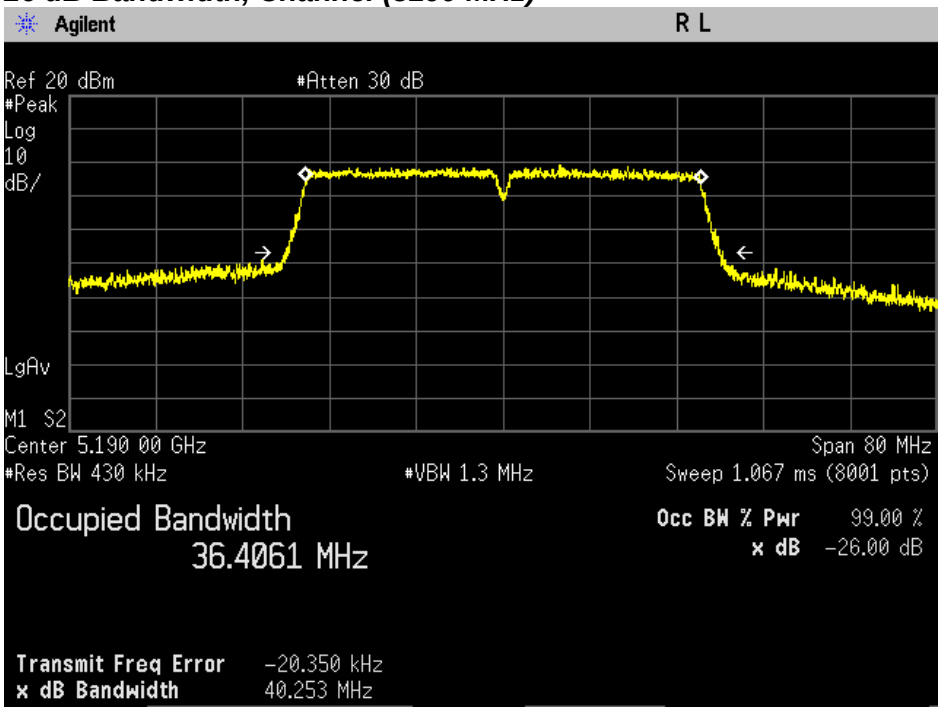


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - SISO

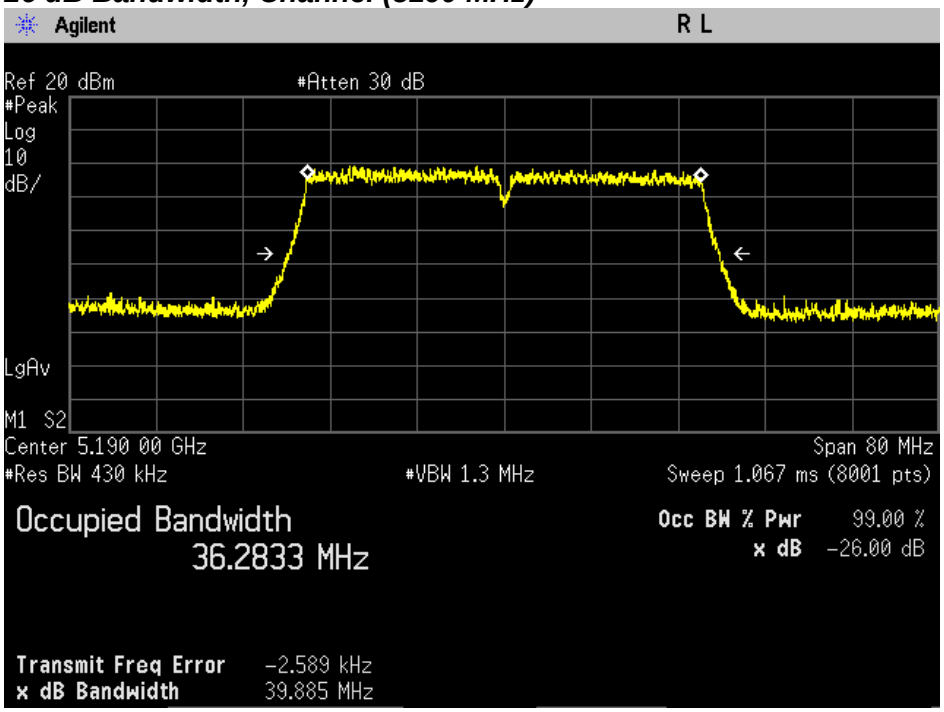
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)

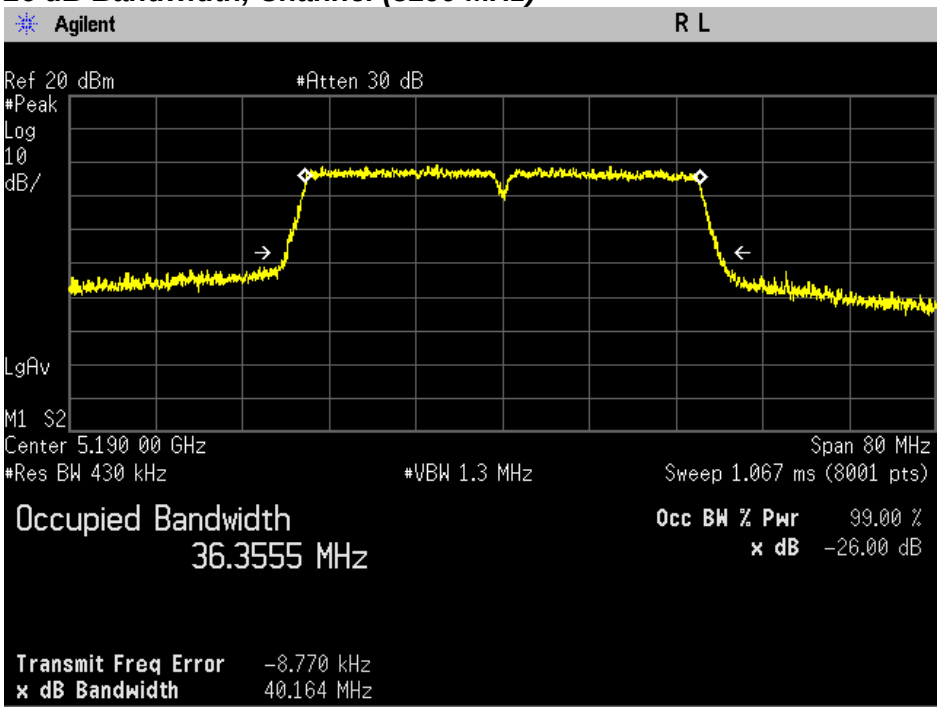


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - CDD

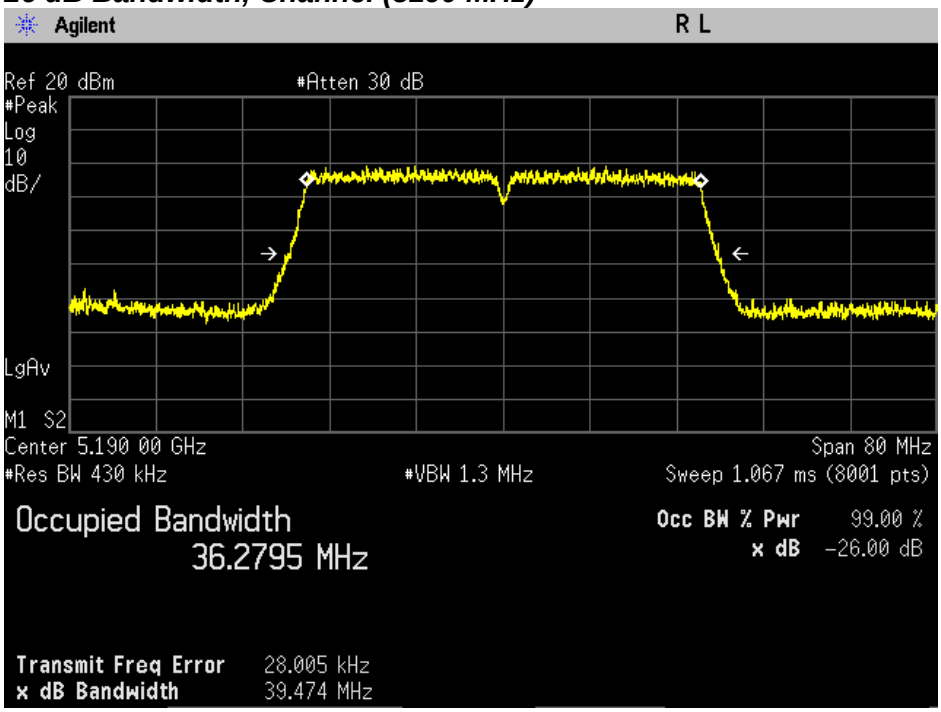
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)

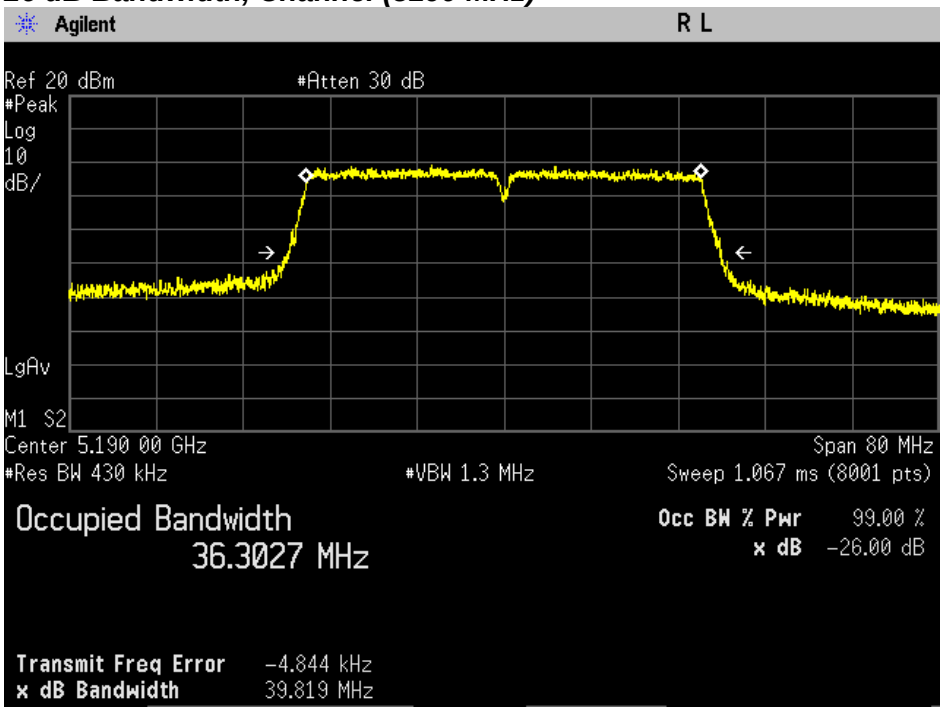


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - MIMO

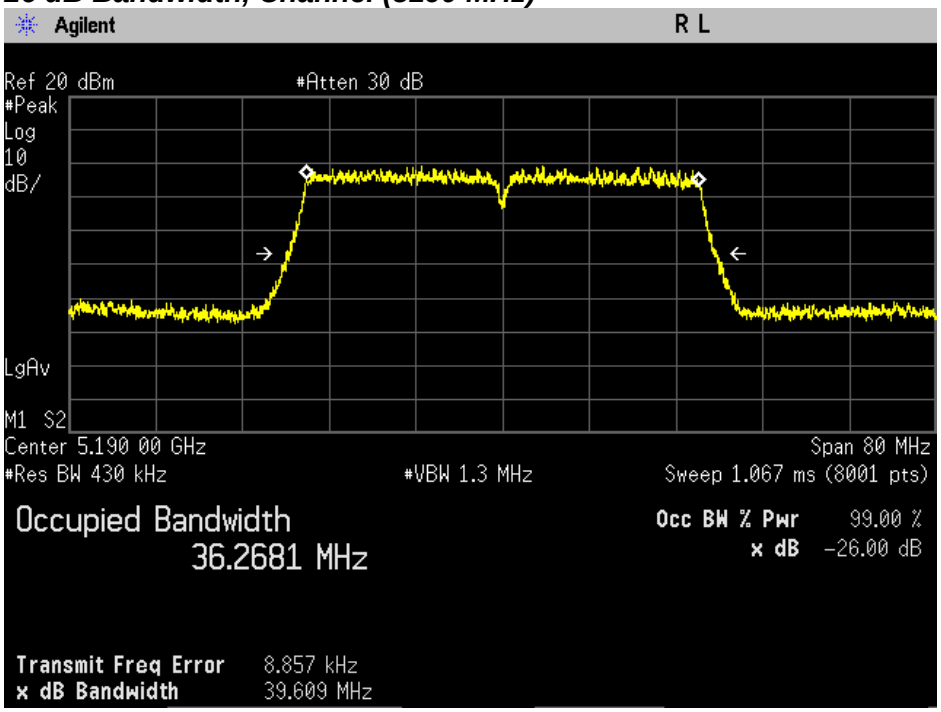
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)

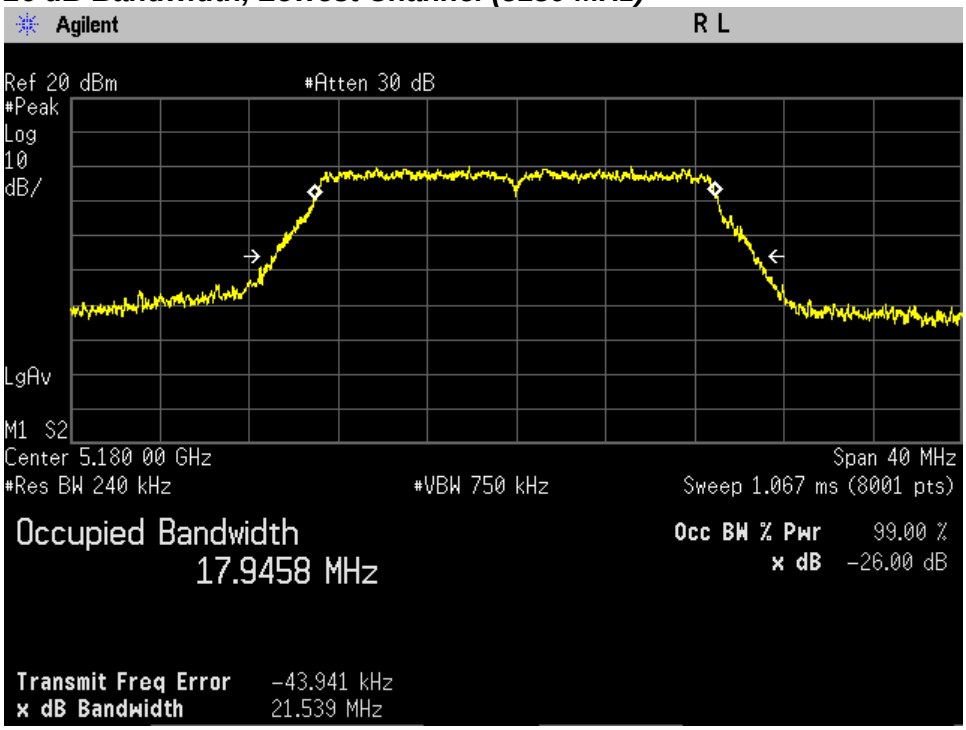


PLOTS OF EMISSIONS

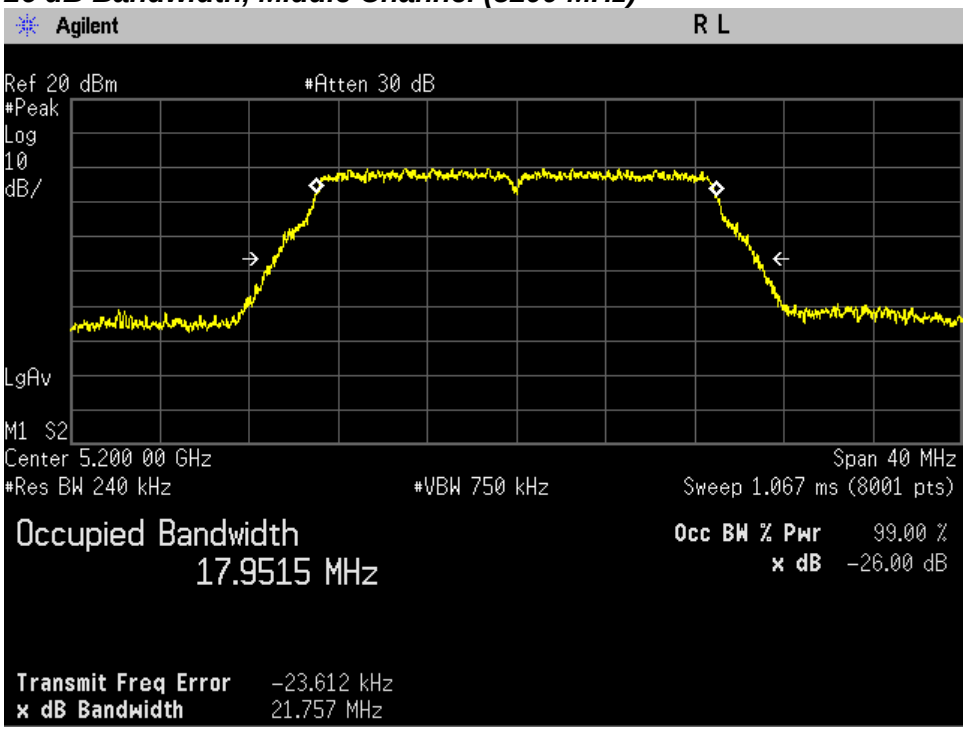
802.11ac (20 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

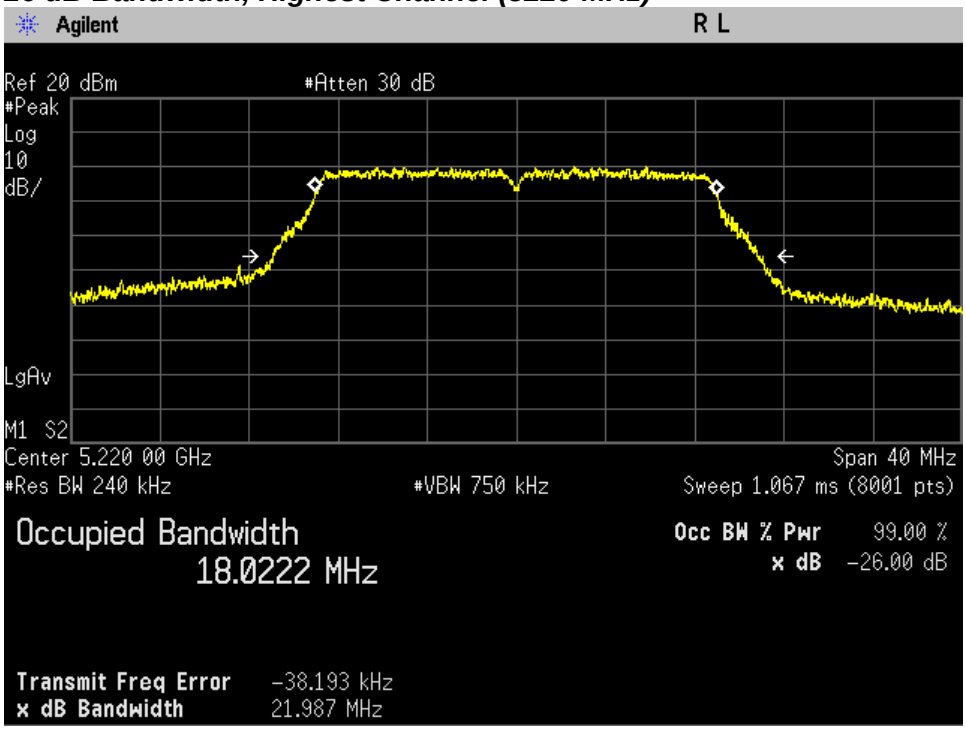


26 dB Bandwidth, Middle Channel (5200 MHz)



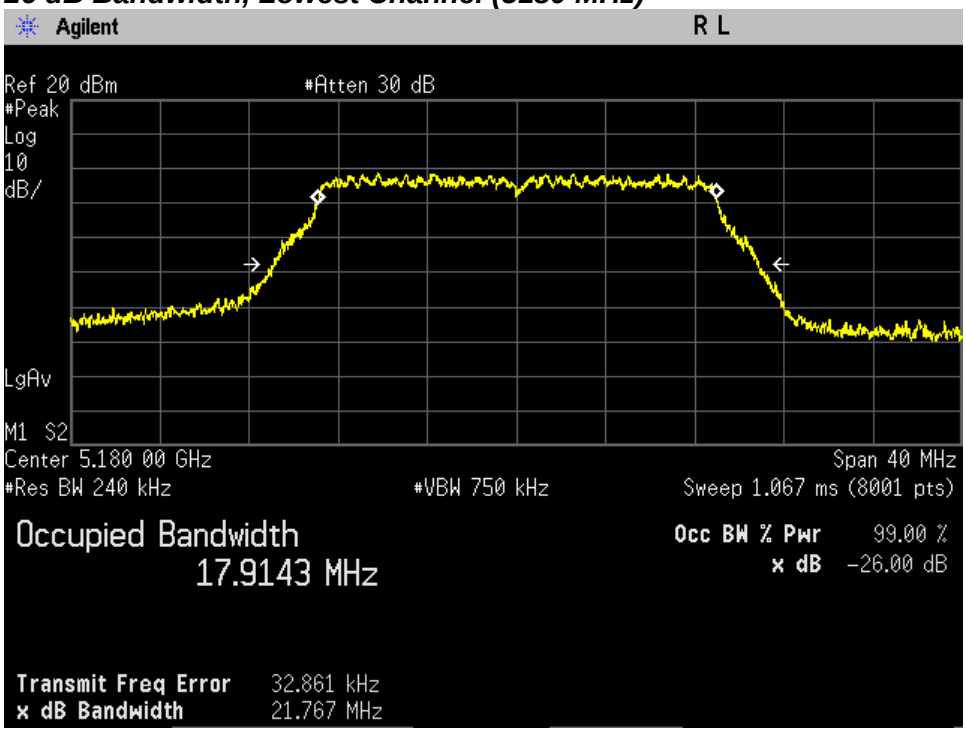
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



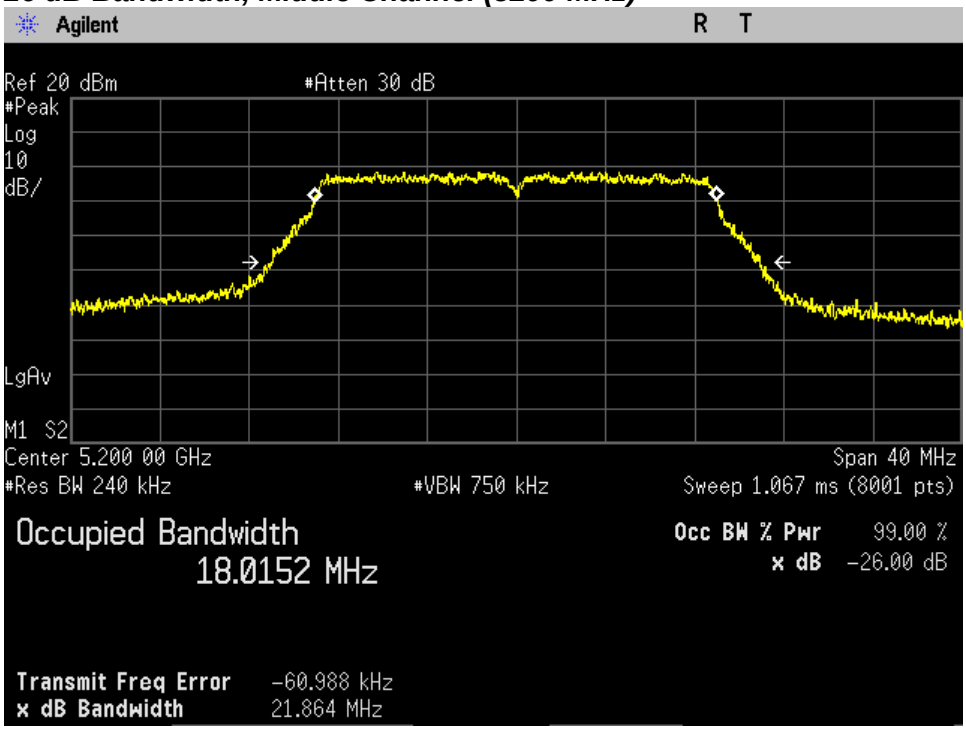
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

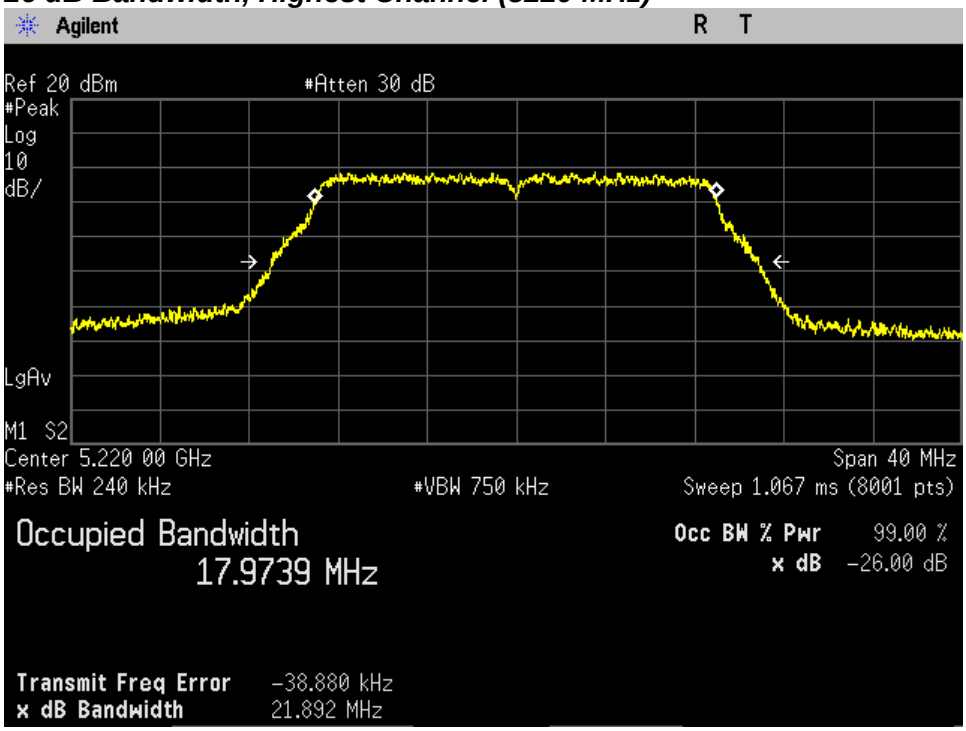


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

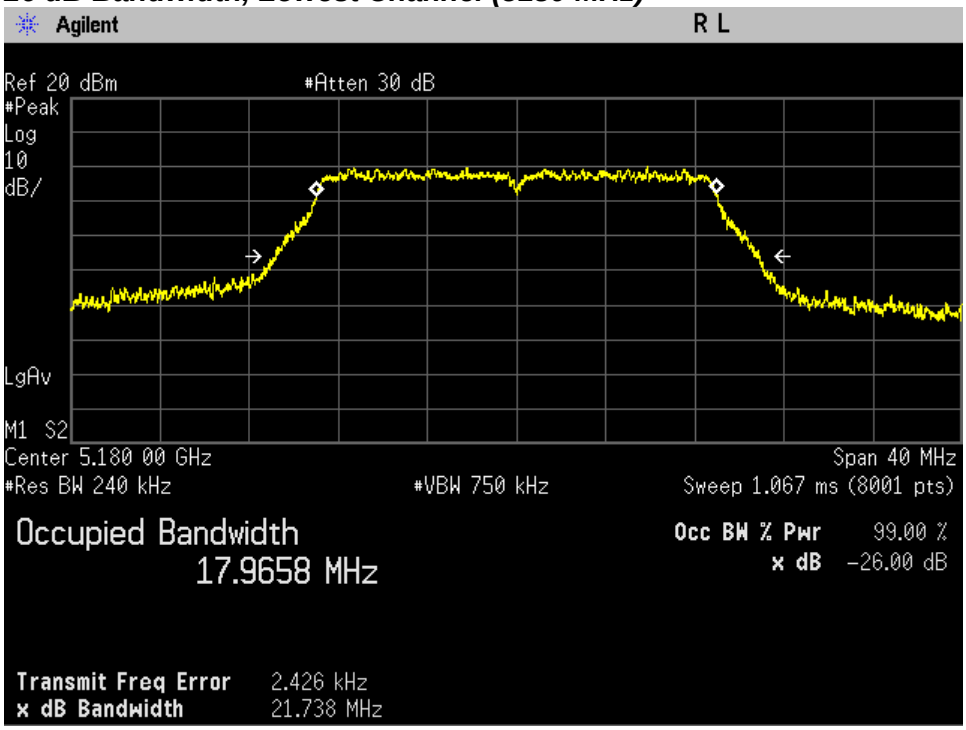


PLOTS OF EMISSIONS

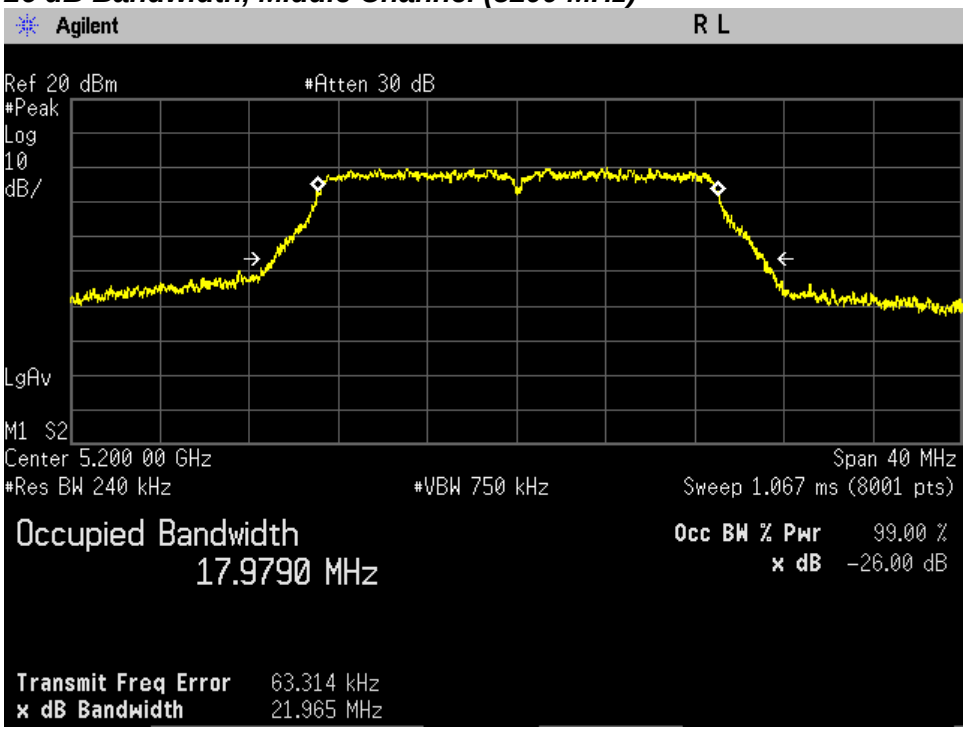
802.11ac (20 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

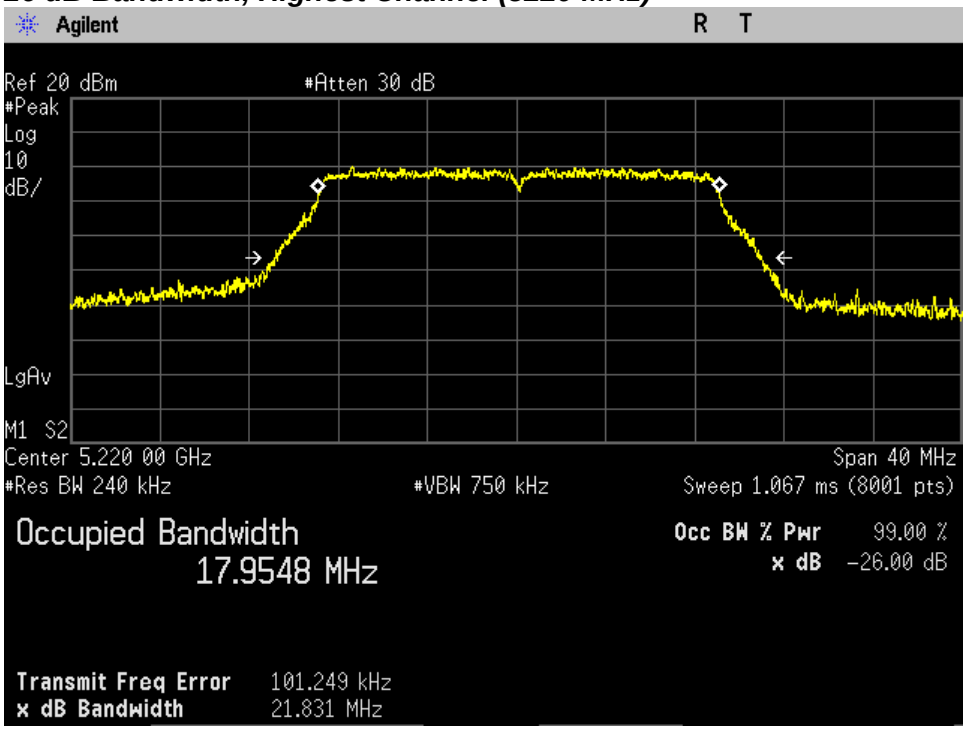


26 dB Bandwidth, Middle Channel (5200 MHz)



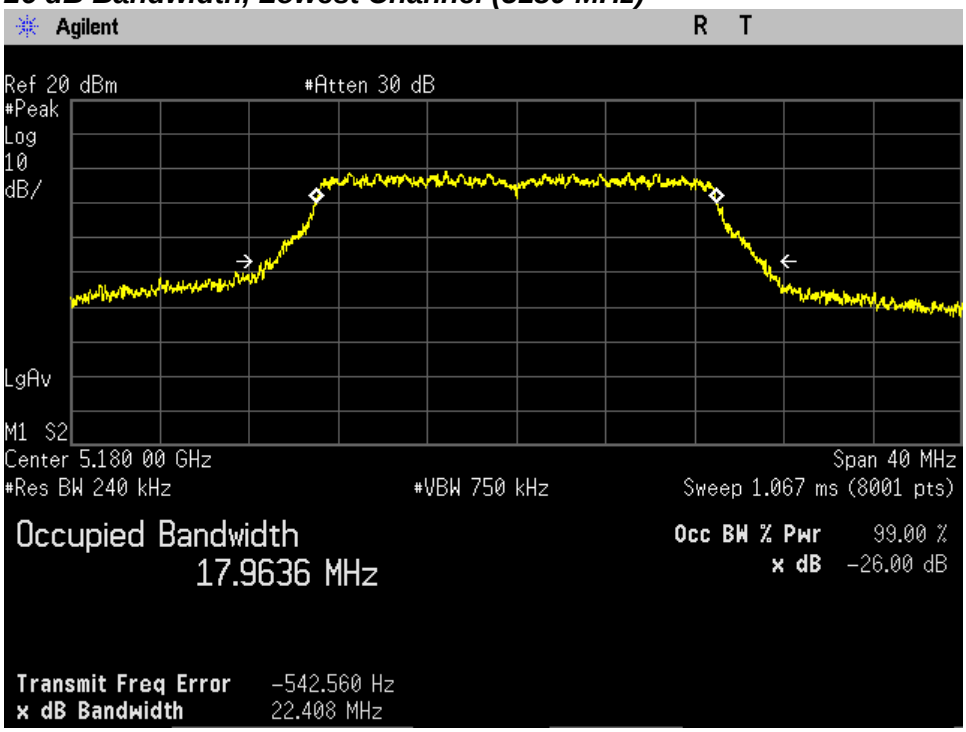
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



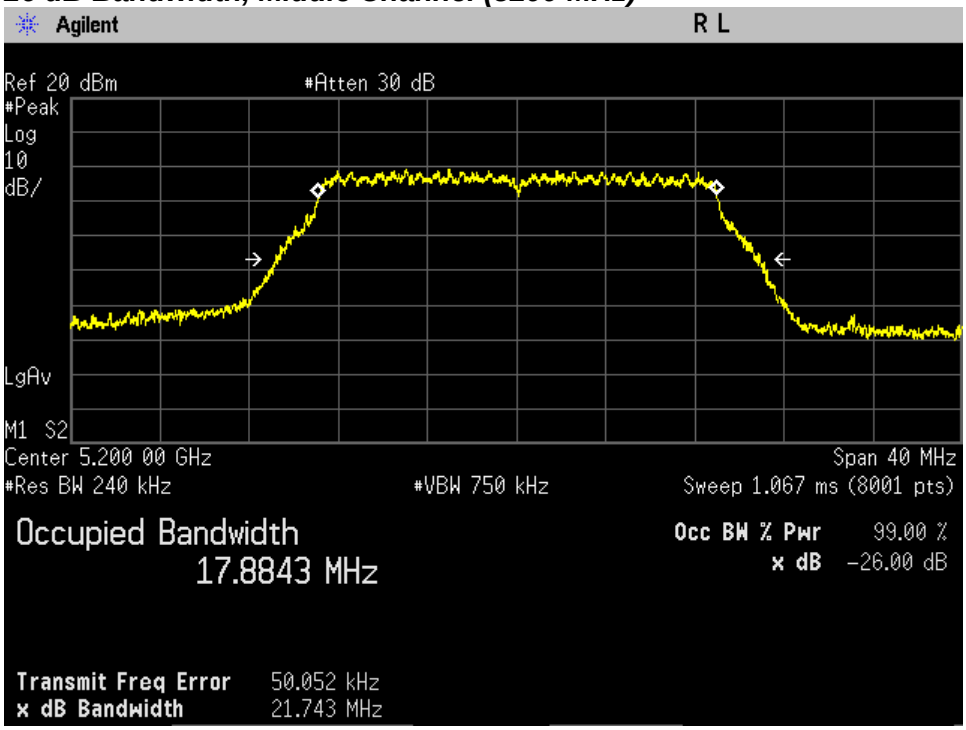
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

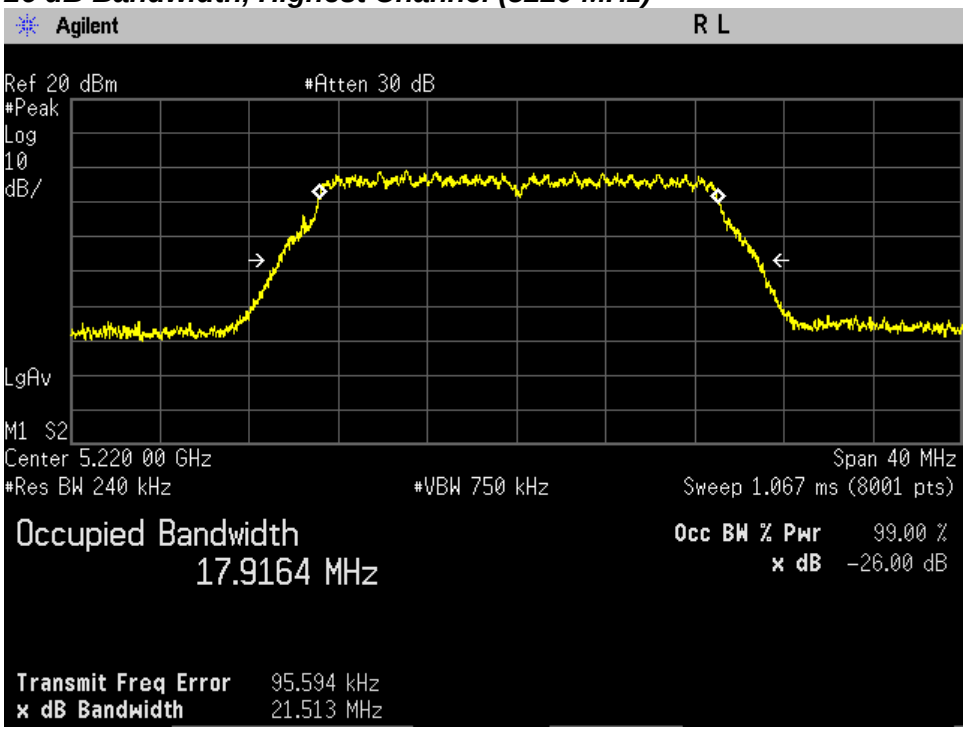


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

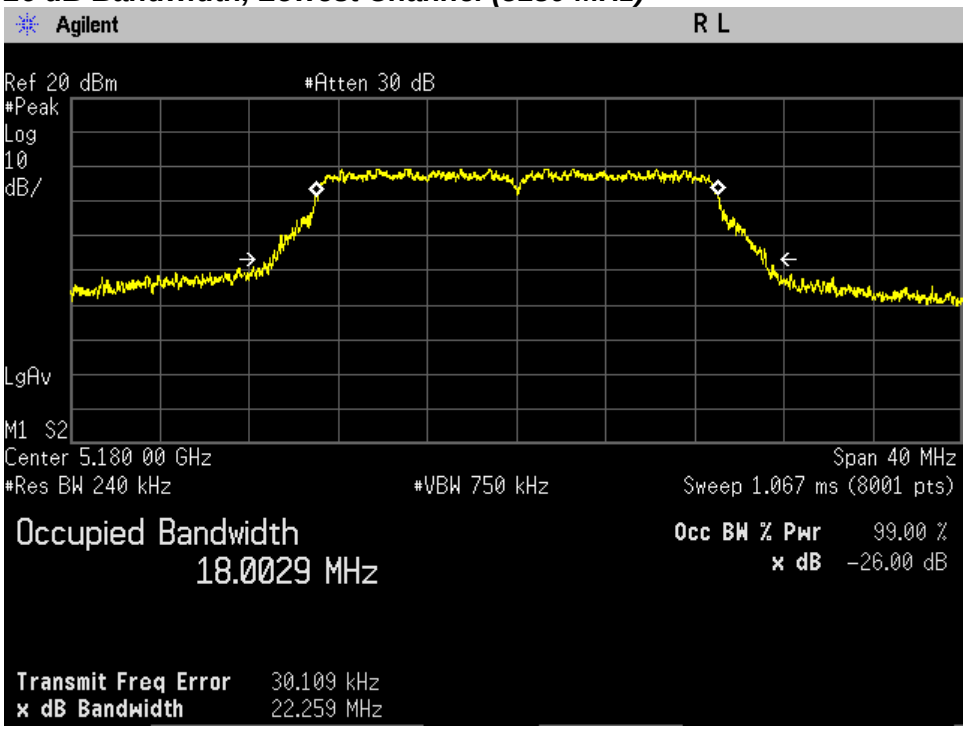


PLOTS OF EMISSIONS

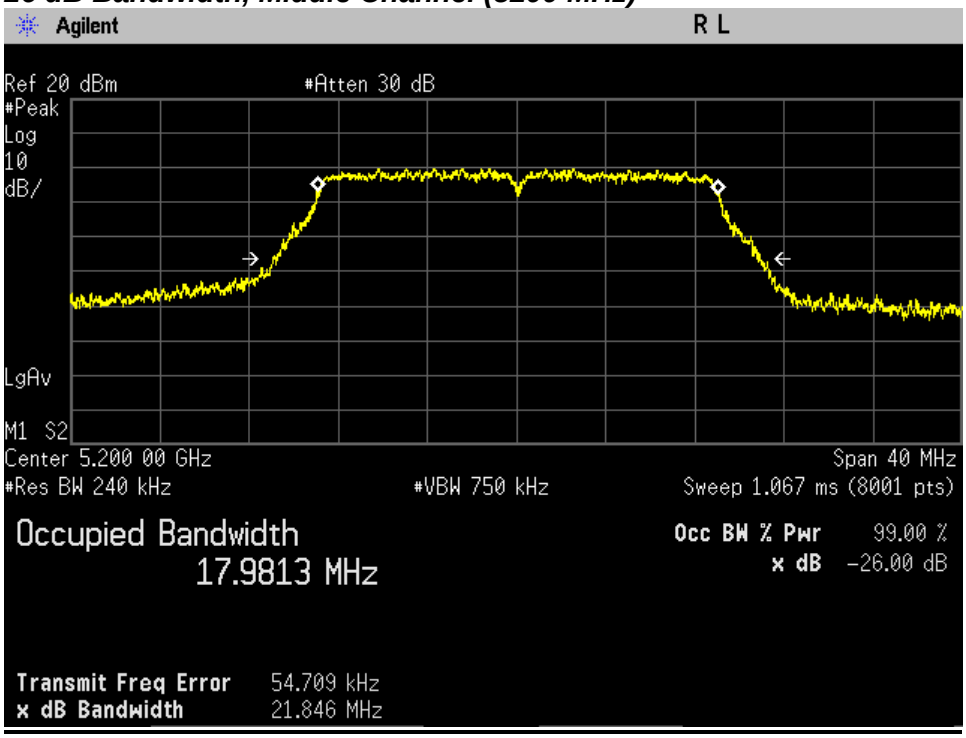
802.11ac (20 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5180 MHz)

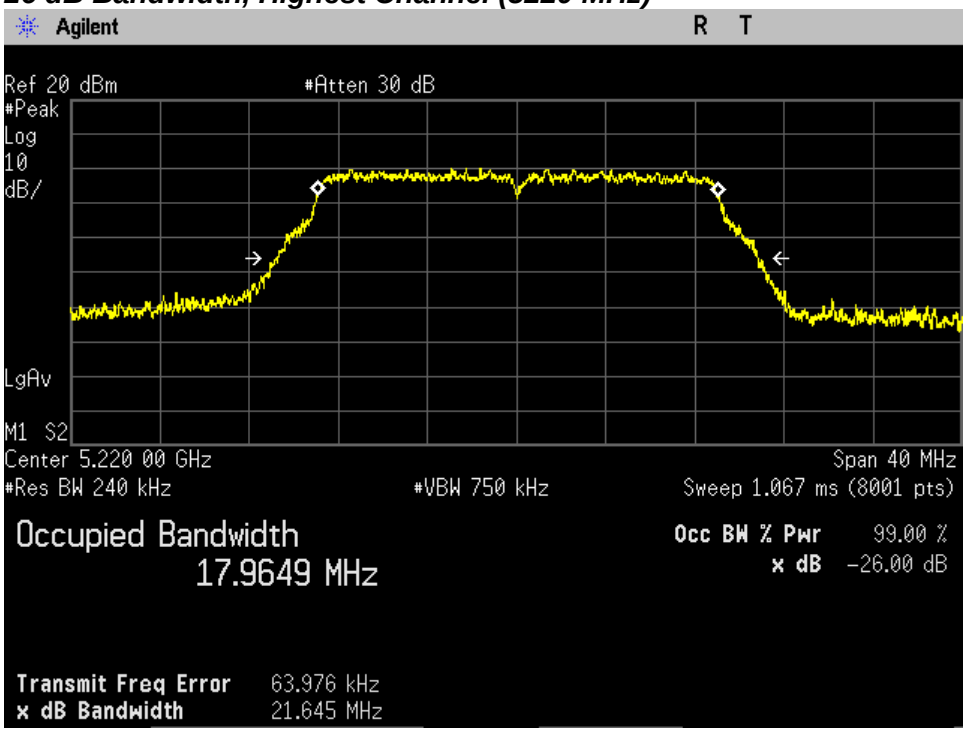


26 dB Bandwidth, Middle Channel (5200 MHz)



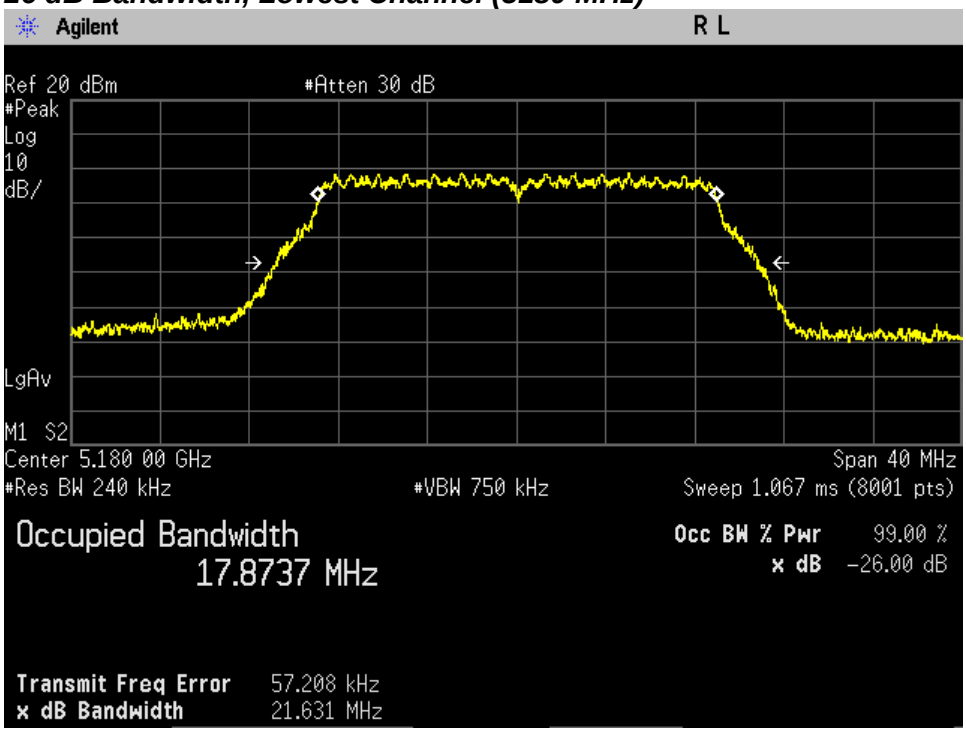
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5220 MHz)



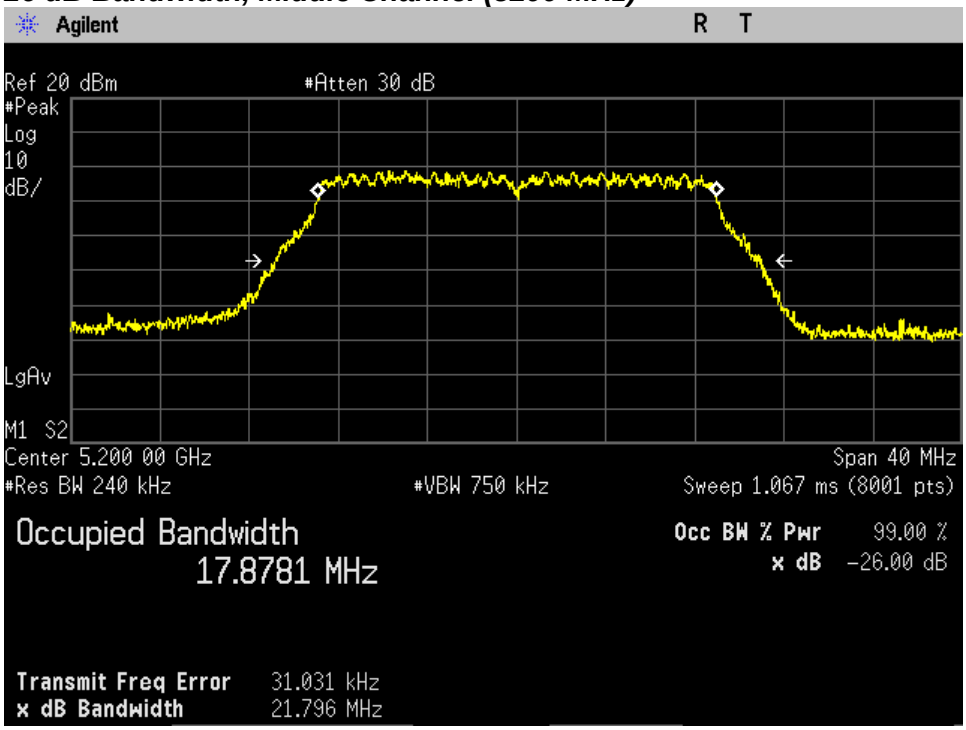
Chain 1

26 dB Bandwidth, Lowest Channel (5180 MHz)

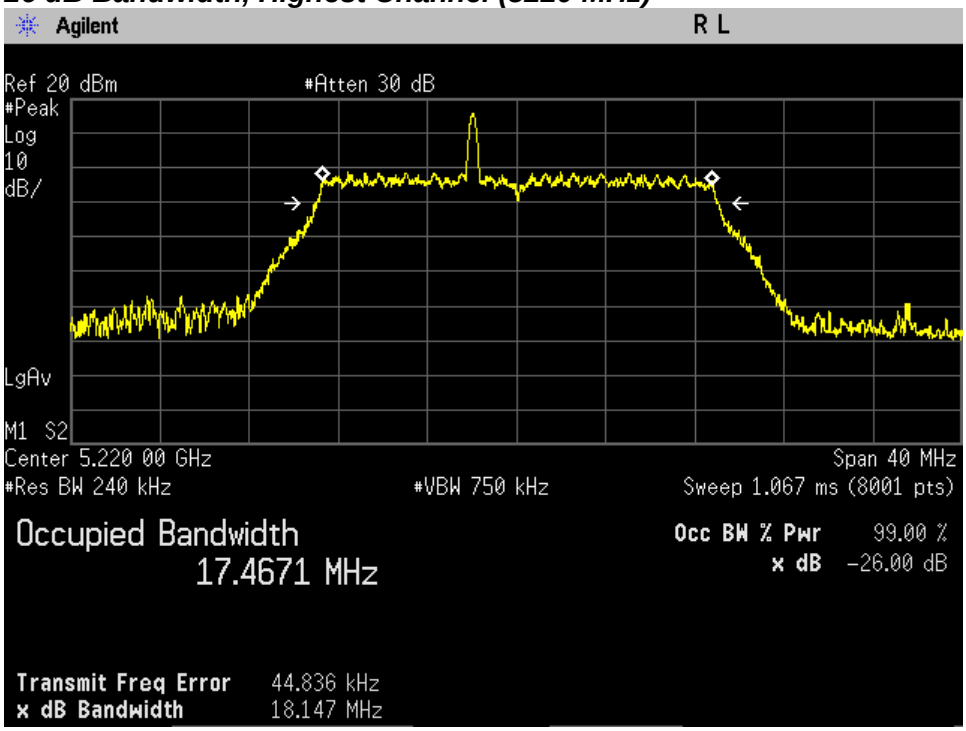


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5200 MHz)



26 dB Bandwidth, Highest Channel (5220 MHz)

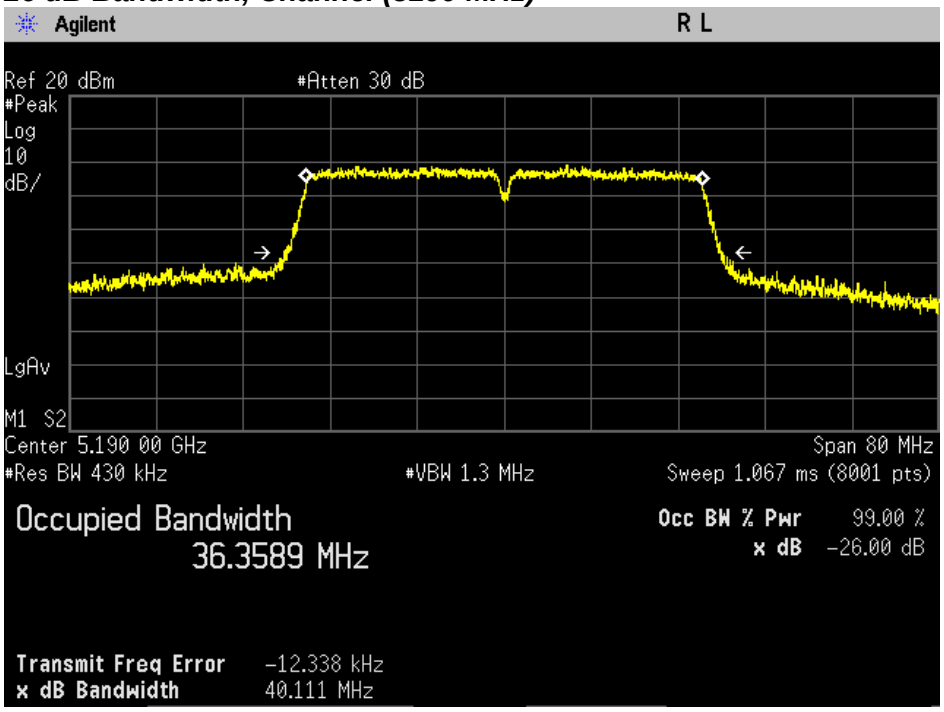


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - SISO

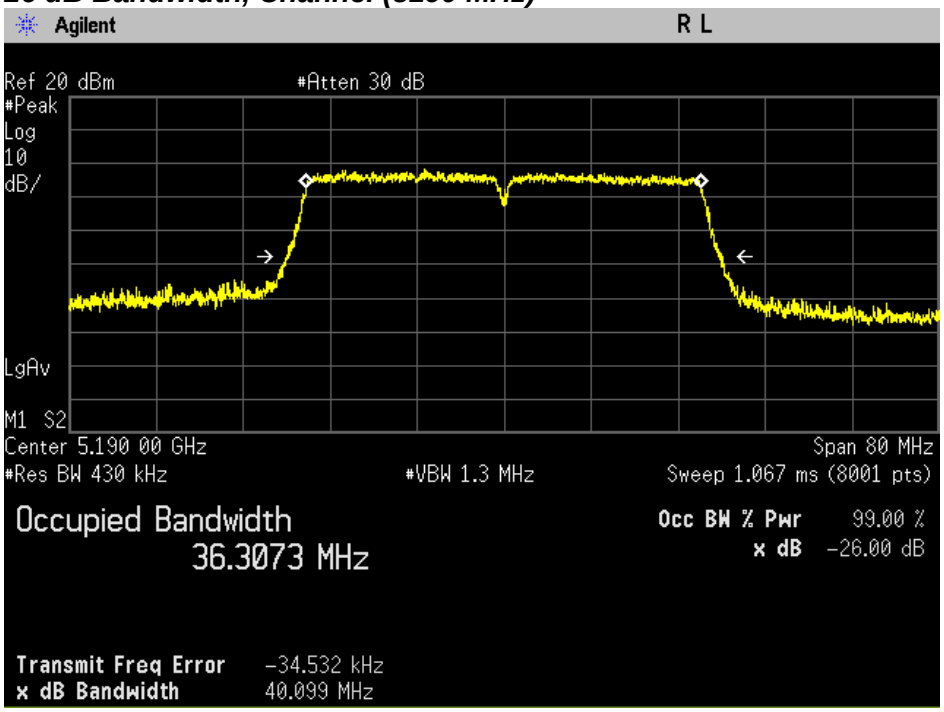
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)

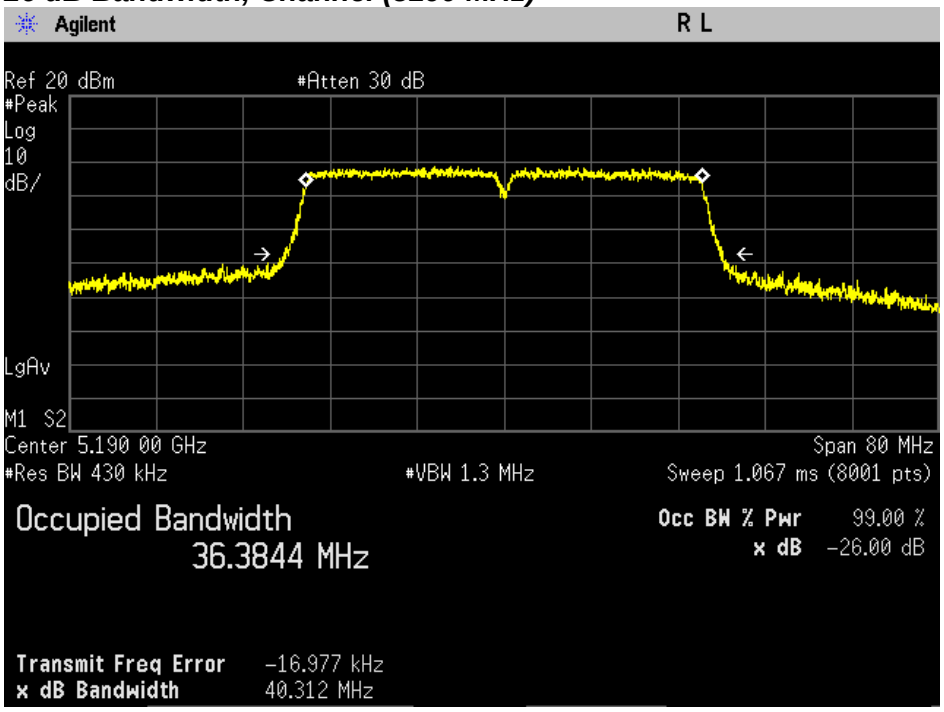


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - CDD

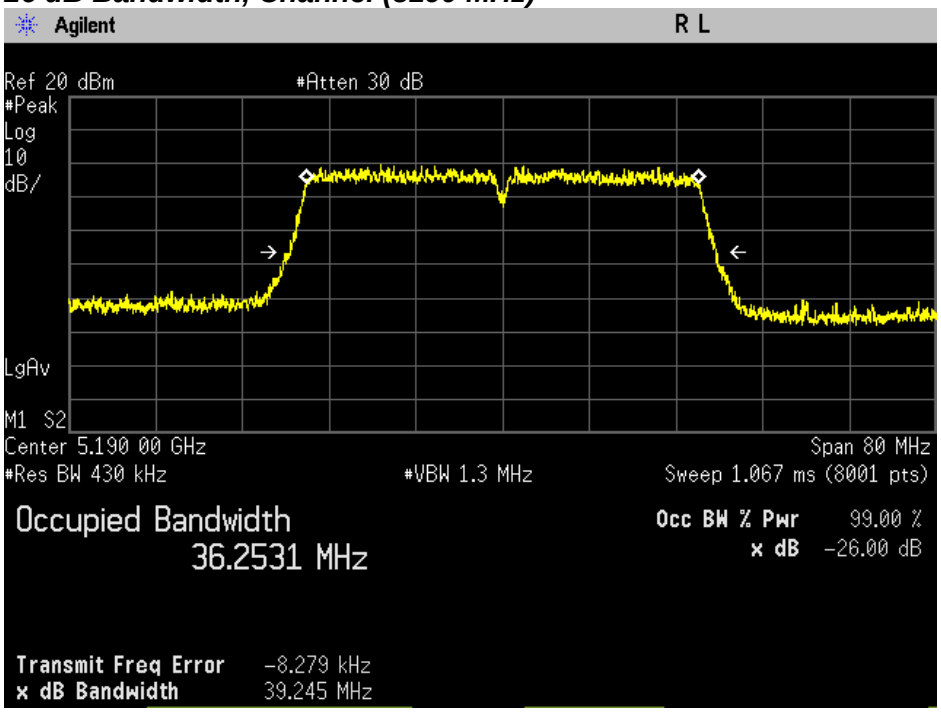
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)

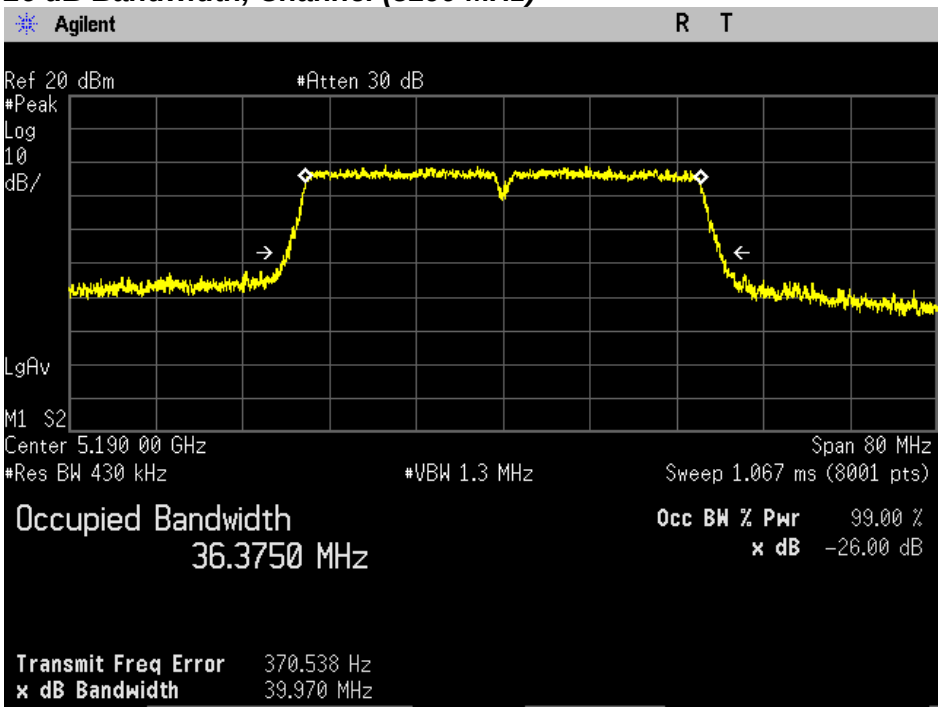


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - MIMO

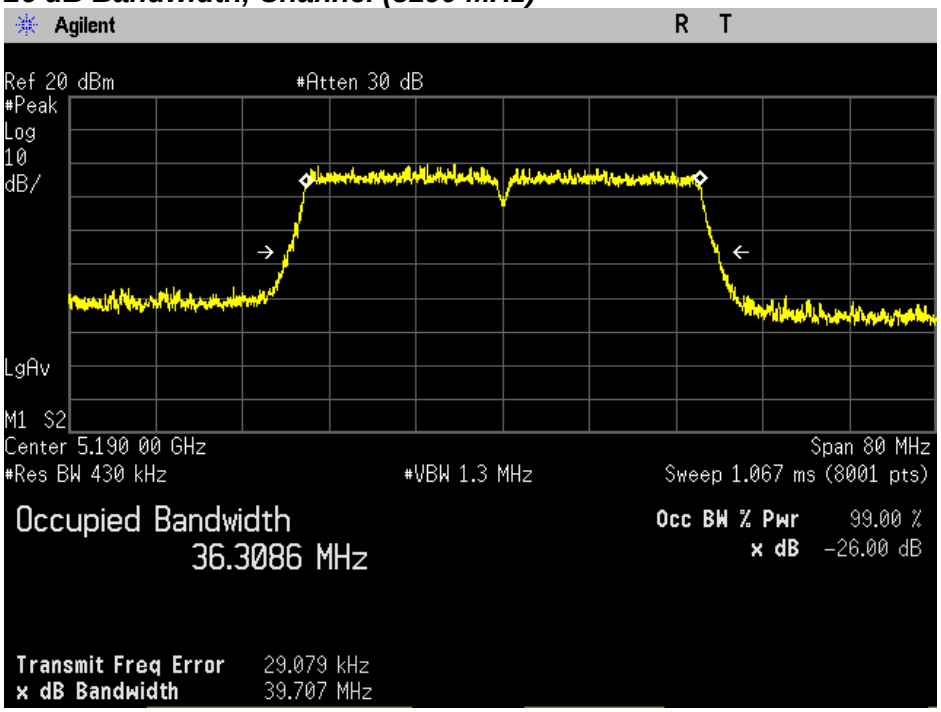
Chain 0

26 dB Bandwidth, Channel (5190 MHz)



Chain 1

26 dB Bandwidth, Channel (5190 MHz)



8.3.2 26 dB Bandwidth and 99 % Occupied bandwidth – UNII-3 band

FCC §15.407(a), RSS-247 Issue 1 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.81	21.71	16.91	16.95
Middle	5785	21.72	21.96	16.87	16.96
High	5825	21.45	23.51	16.85	17.01

802.11n (20 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.63	21.92	17.96	18.03
Middle	5785	21.84	22.10	18.01	18.00
High	5825	21.91	22.49	17.95	18.06

802.11n (20 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.80	22.23	17.98	18.01
Middle	5785	21.91	21.95	18.02	17.94
High	5825	22.15	21.60	17.97	17.91

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.96	21.59	17.96	17.90
Middle	5785	22.05	21.94	17.94	17.94
High	5825	21.76	21.77	17.97	17.92

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	40.18	40.01	36.73	36.31
High	5795	40.01	40.16	36.30	36.37

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	40.39	40.45	36.34	36.30
High	5795	40.06	39.92	36.32	36.35

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	39.67	39.38	36.31	36.32
High	5795	40.19	39.67	36.33	36.32

802.11ac (20 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.93	21.91	17.97	17.94
Middle	5785	21.83	22.18	17.98	18.03
High	5825	21.81	22.68	17.95	18.03

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	21.77	21.74	17.95	17.90
Middle	5785	22.66	21.78	17.99	17.90
High	5825	22.31	21.89	18.02	17.90

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5745	22.37	22.23	17.97	17.97
Middle	5785	21.85	22.07	17.97	17.89
High	5825	22.18	21.76	18.00	17.91

802.11ac (40 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	40.06	39.76	36.33	36.30
High	5795	39.92	39.97	36.31	36.39

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	39.99	39.79	36.37	36.34
High	5795	40.06	39.48	36.37	36.32

802.11ac (40 MHz) mode - MIMO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
Low	5755	39.80	39.58	36.37	36.31
High	5795	40.10	39.47	36.45	36.31

802.11ac (80 MHz) mode - SISO

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5775	81.55	81.77	75.78	75.79

802.11ac (80 MHz) mode - CDD

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5775	81.77	81.30	75.78	75.85

802.11ac (80 MHz) mode – MIMO

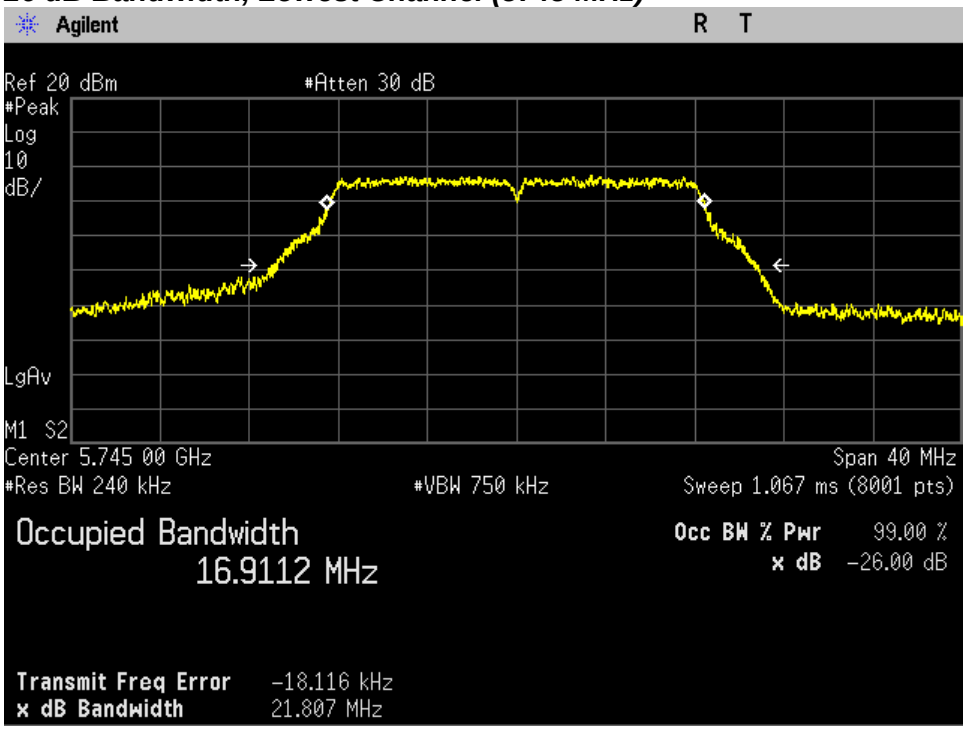
Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)		99% Occupied Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
	5775	81.72	81.28	75.79	75.71

PLOTS OF EMISSIONS

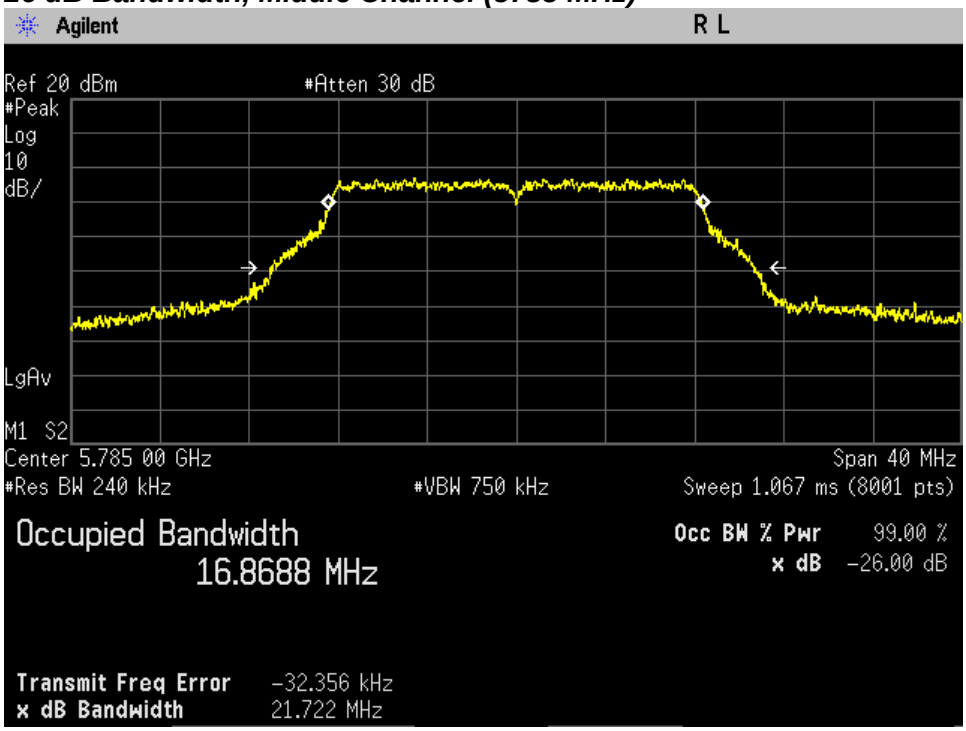
802.11a mode

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

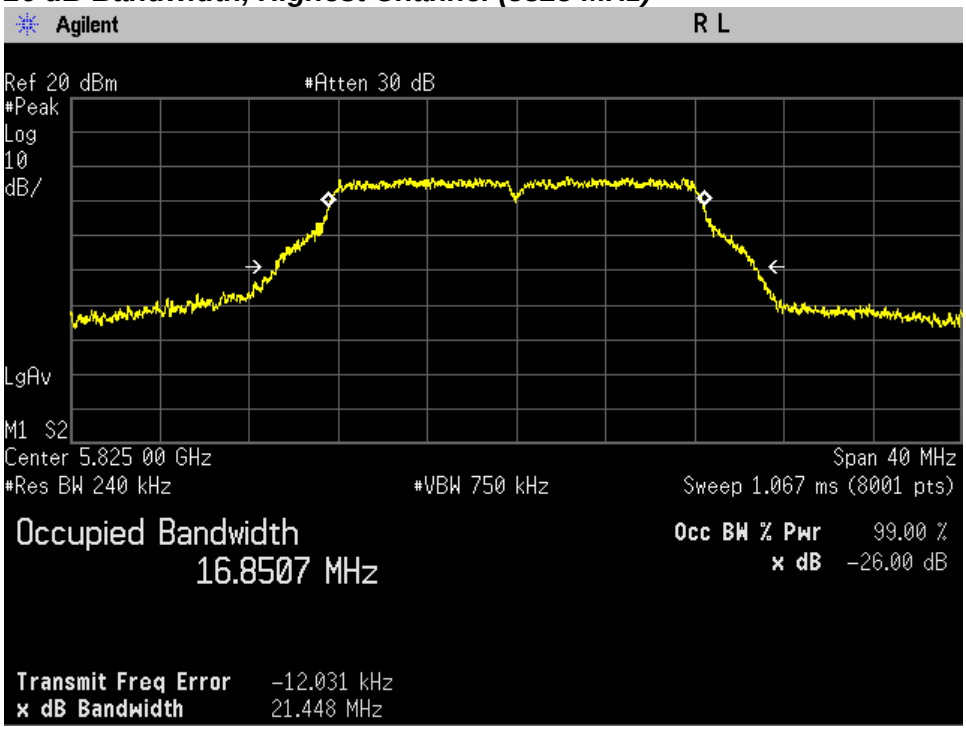


26 dB Bandwidth, Middle Channel (5785 MHz)



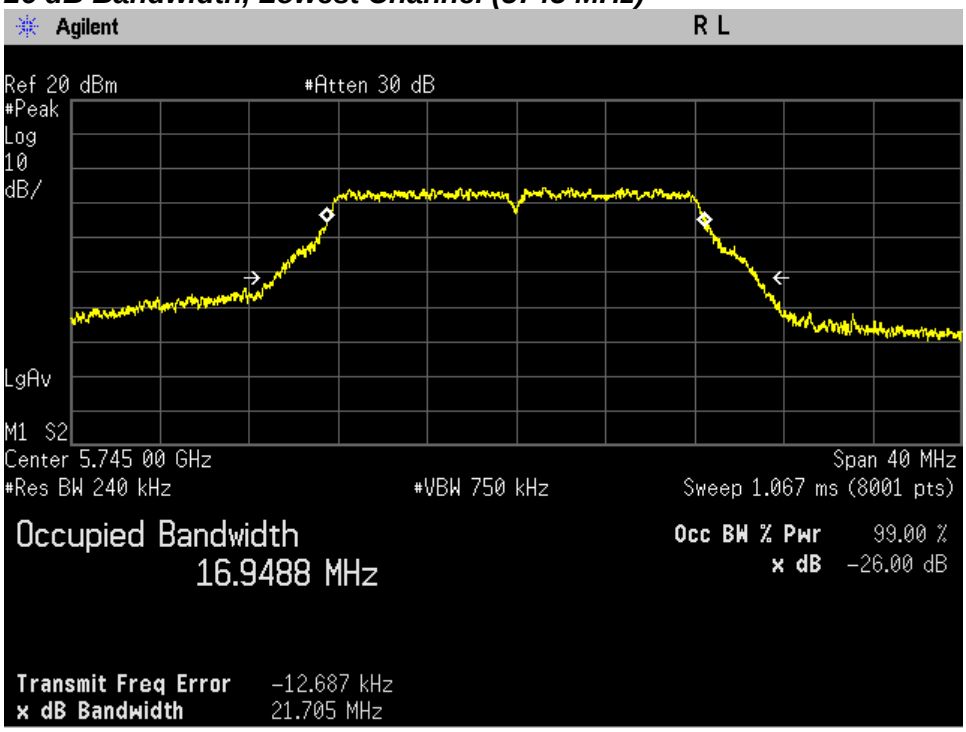
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



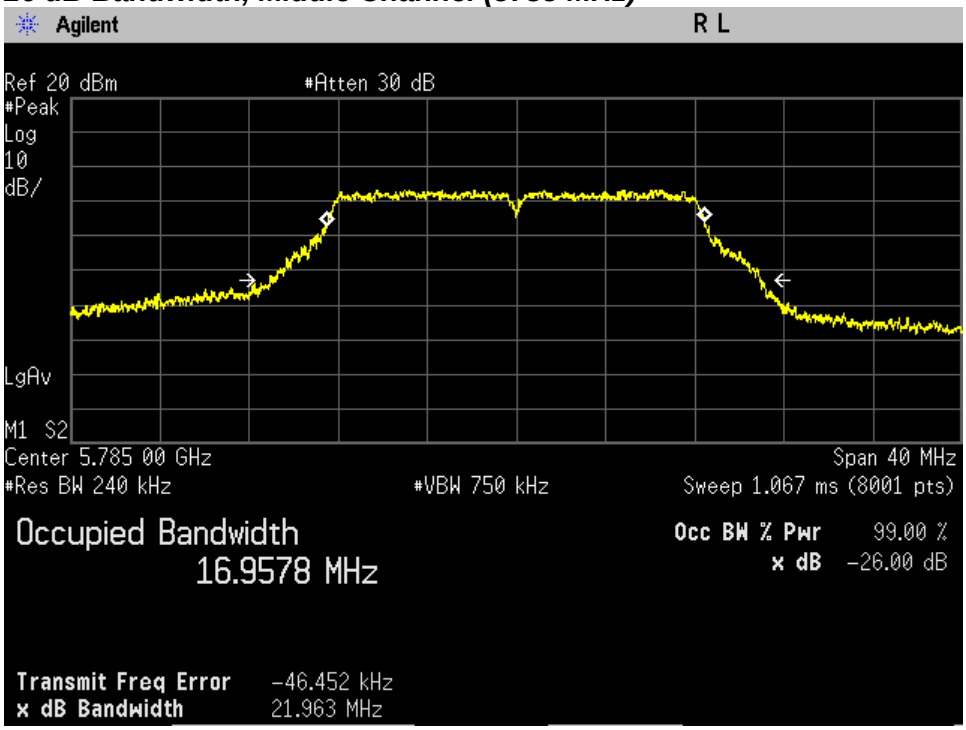
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

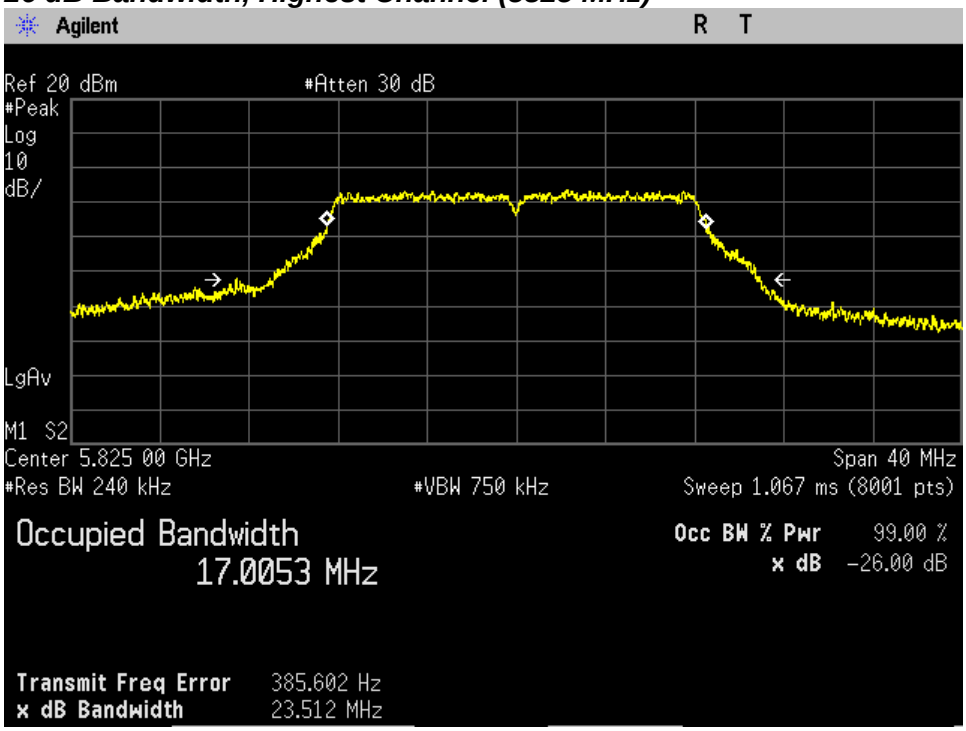


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

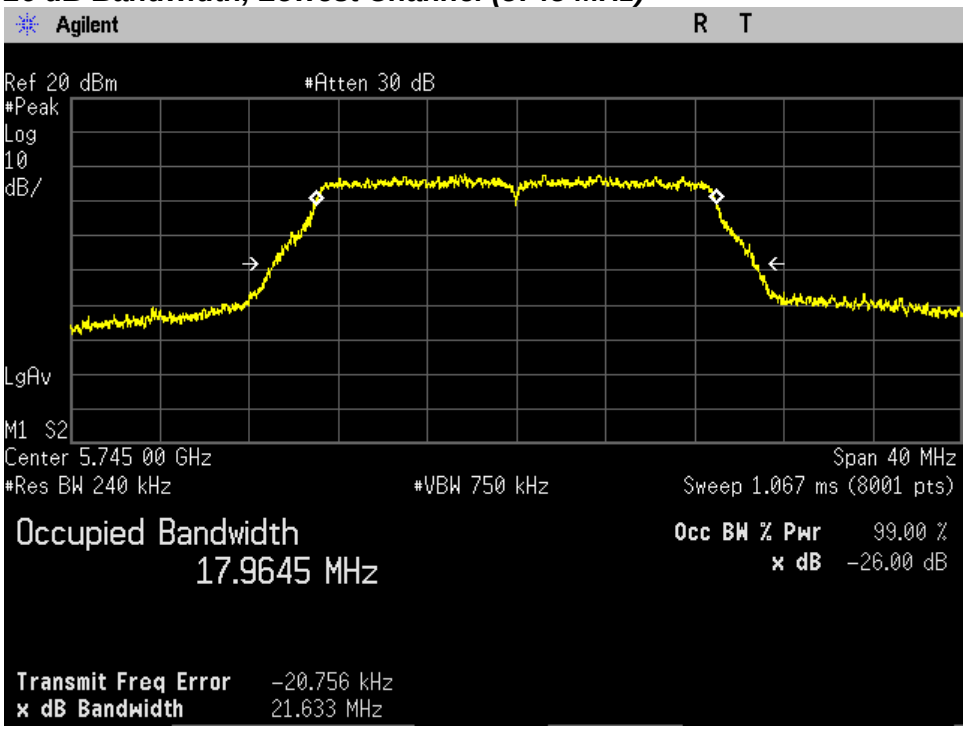


PLOTS OF EMISSIONS

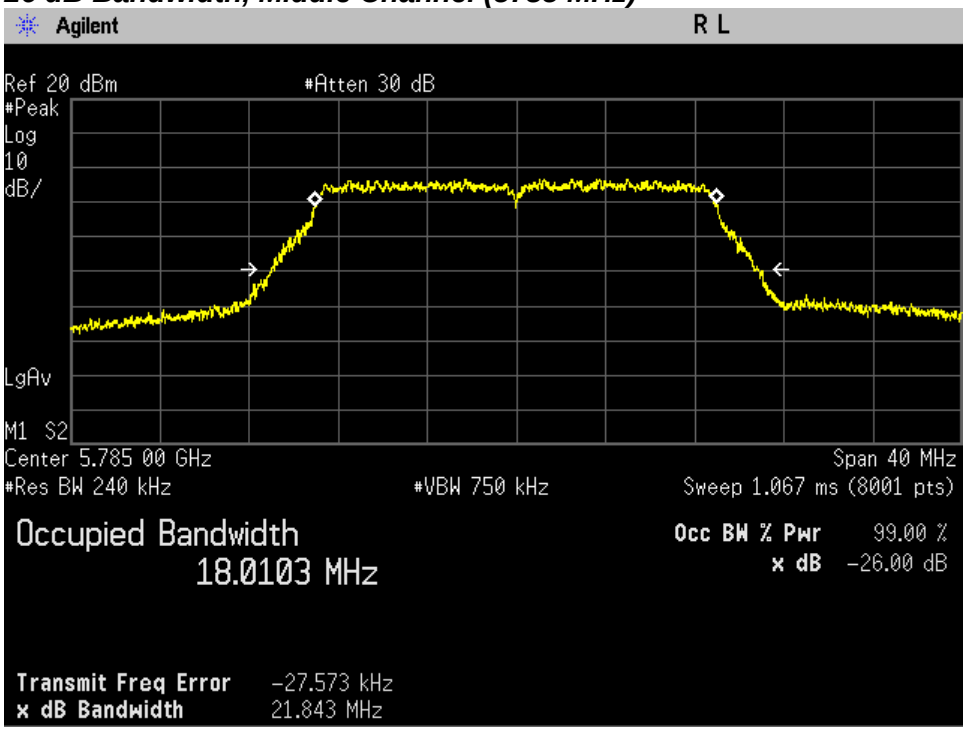
802.11n (20 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

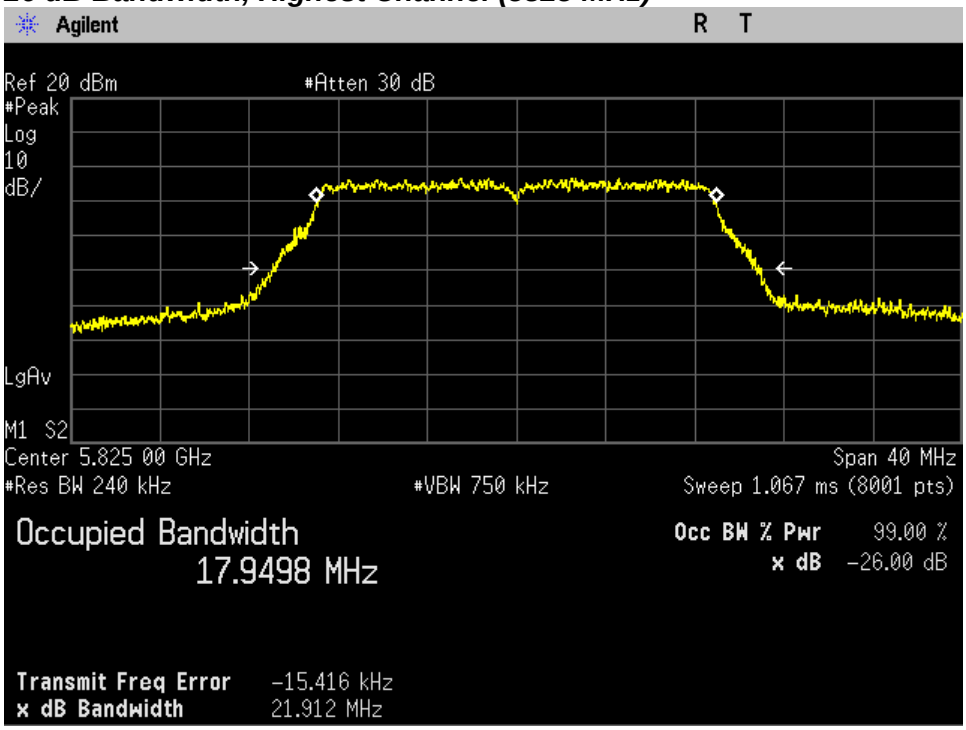


26 dB Bandwidth, Middle Channel (5785 MHz)



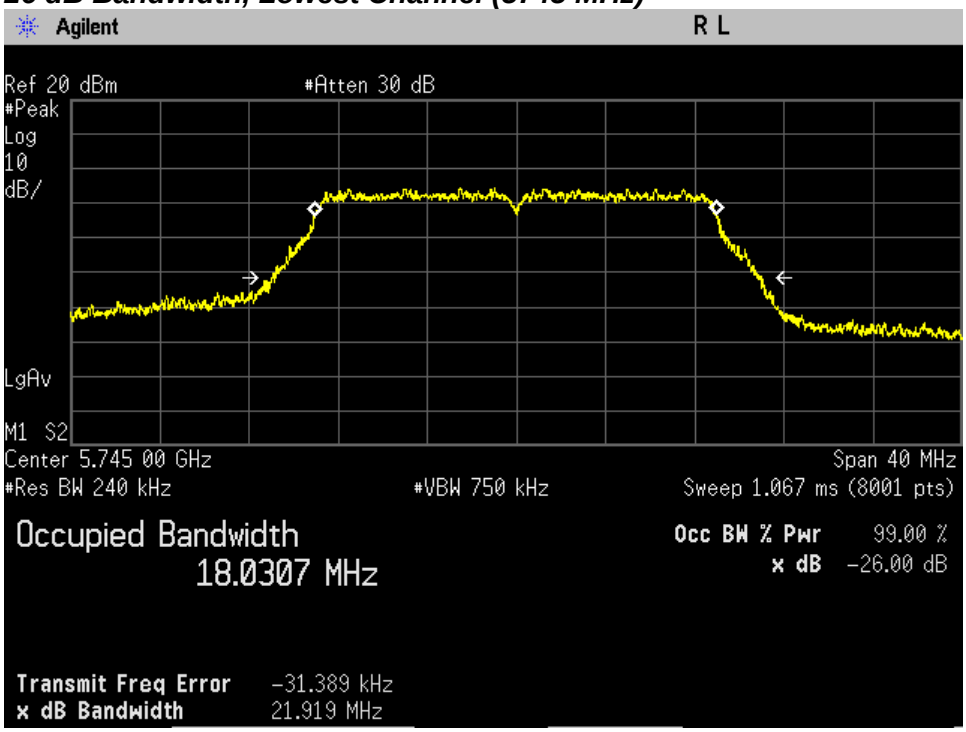
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



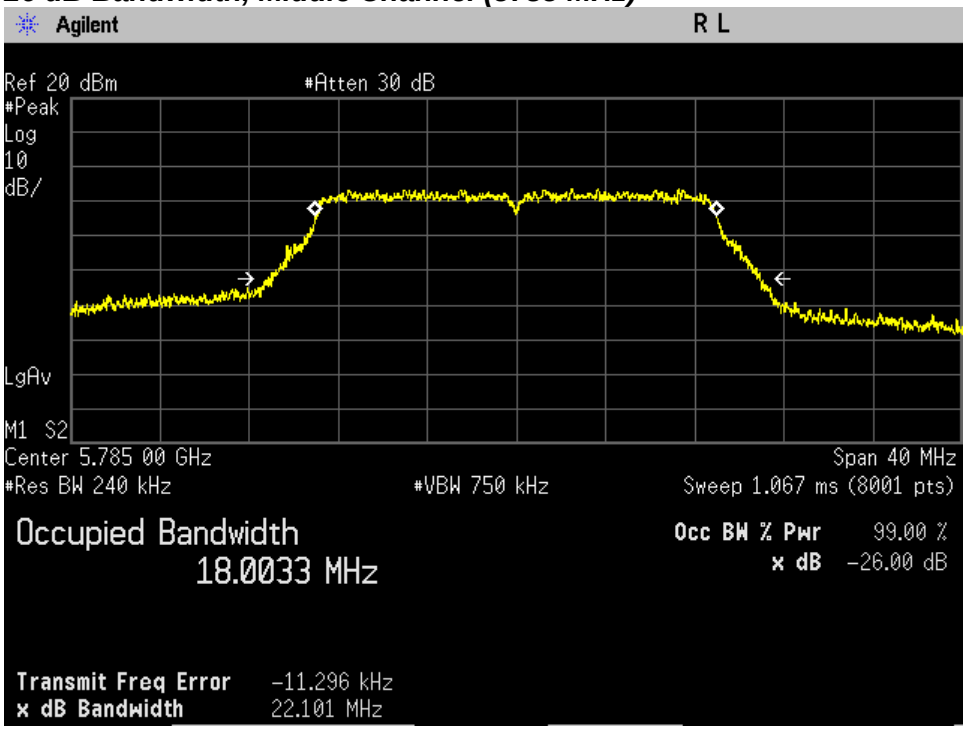
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

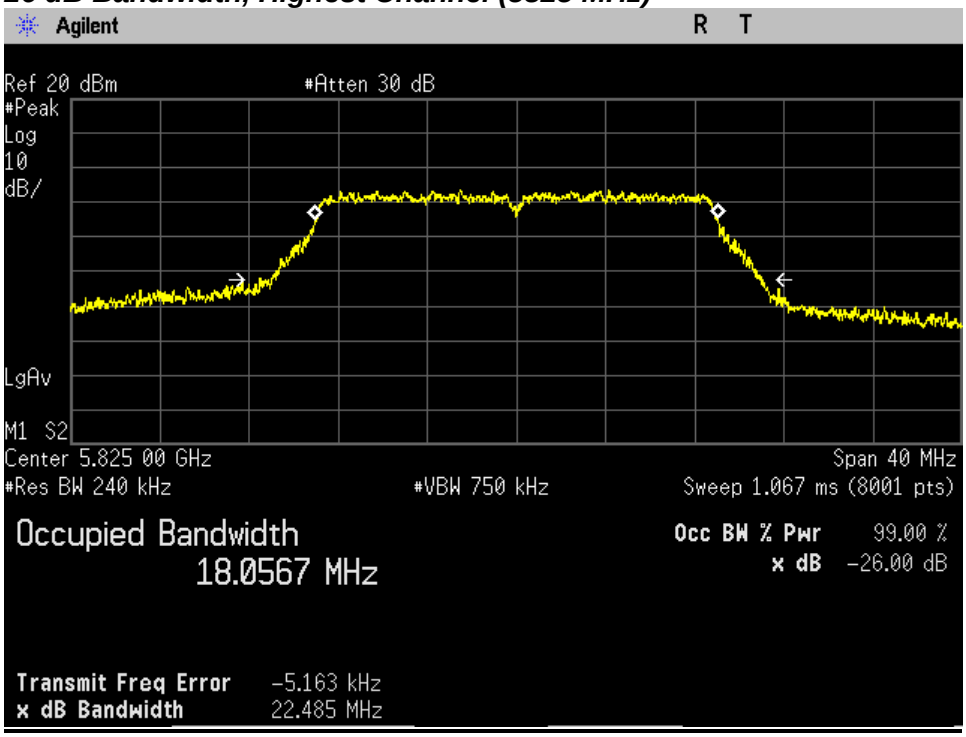


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

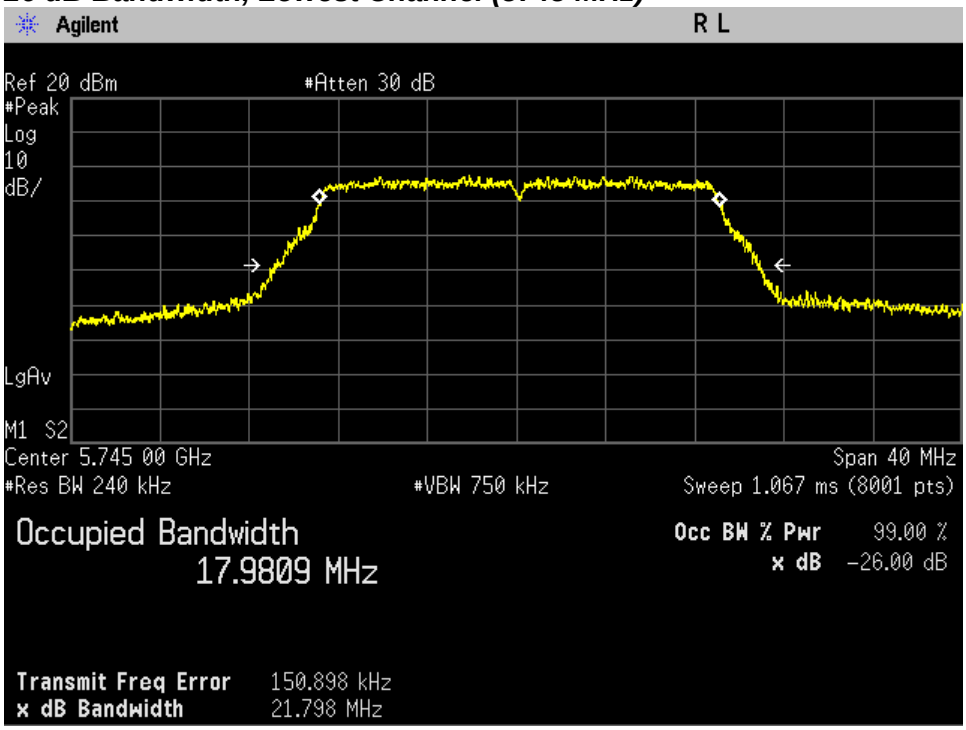


PLOTS OF EMISSIONS

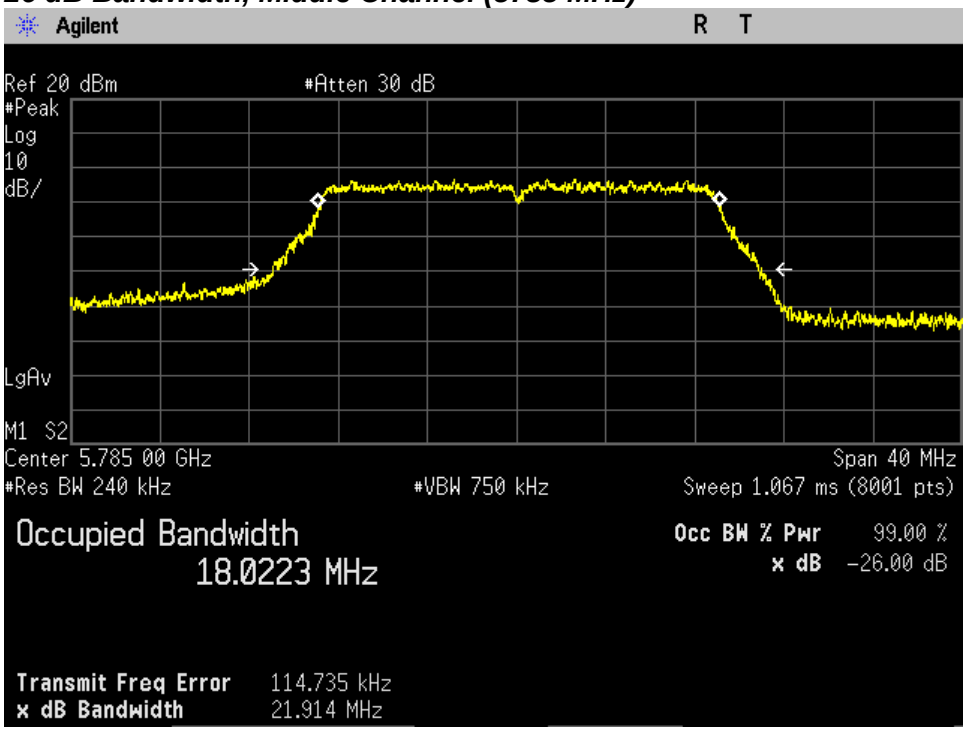
802.11n (20 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

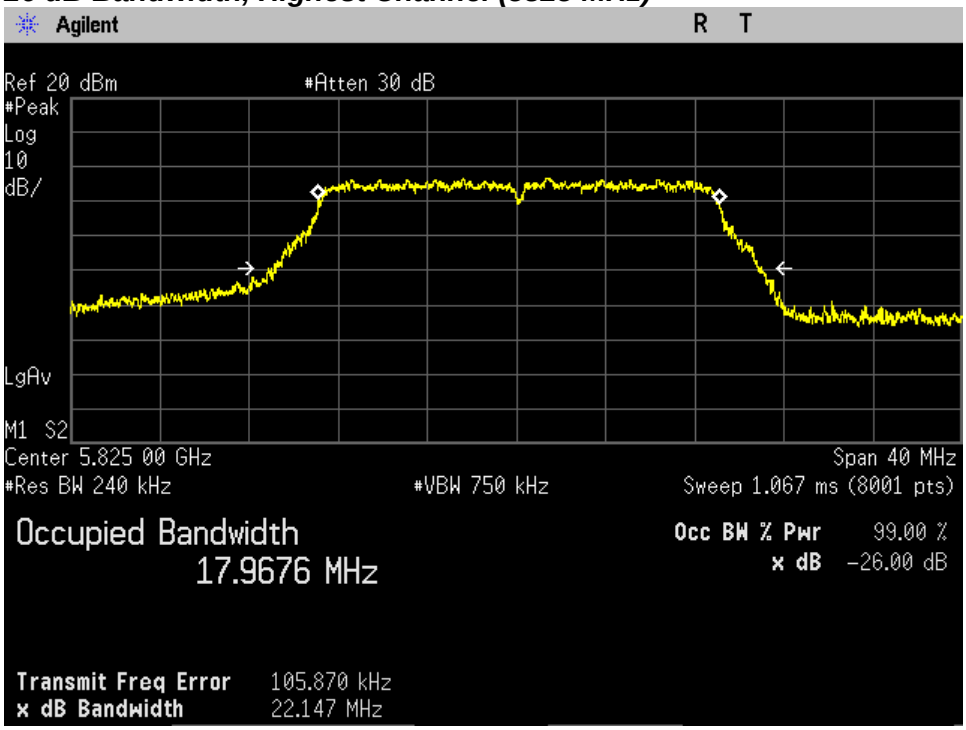


26 dB Bandwidth, Middle Channel (5785 MHz)



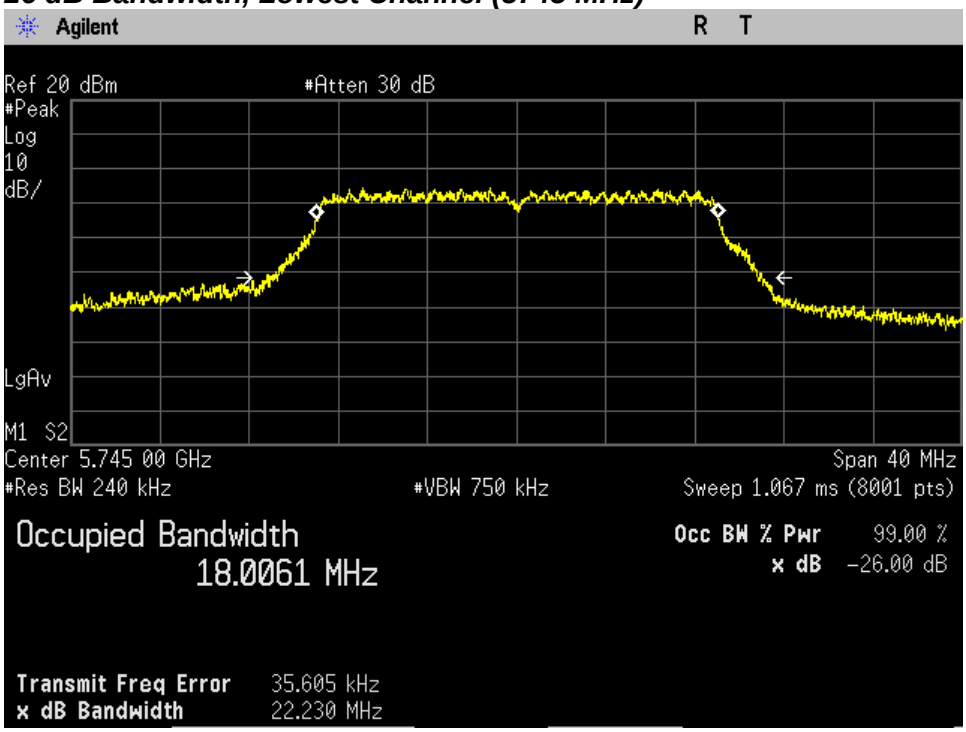
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



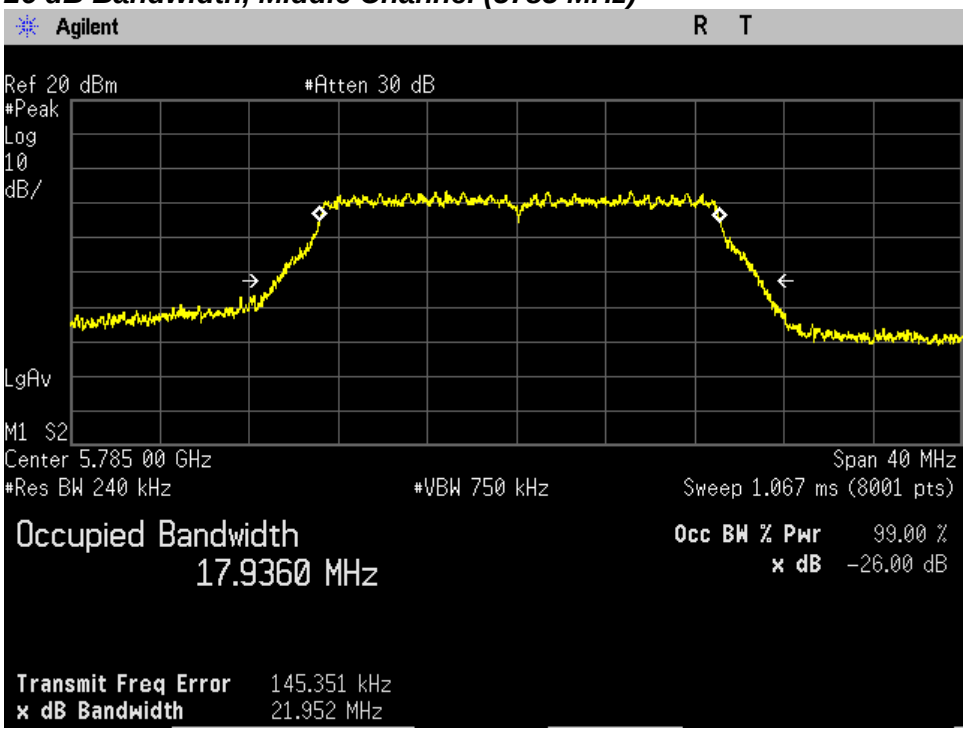
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

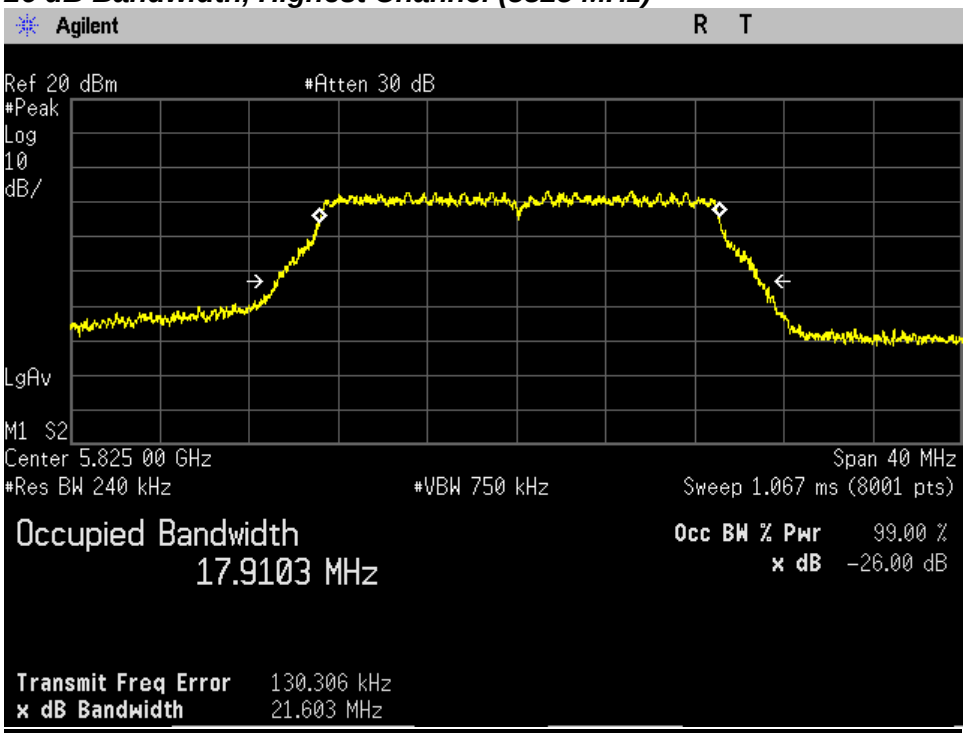


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

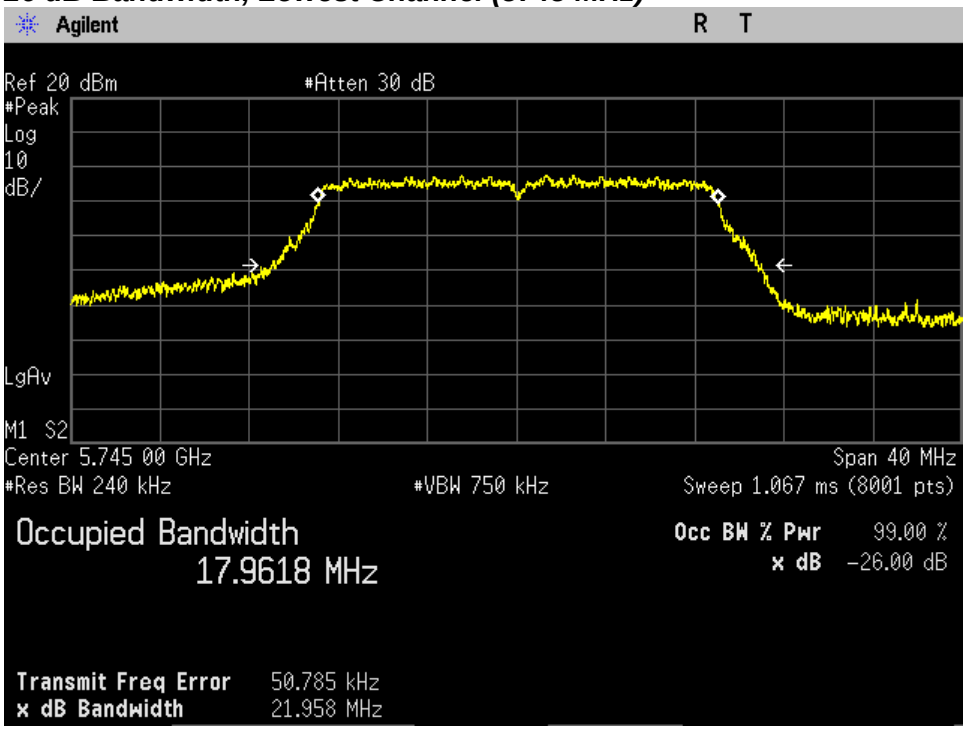


PLOTS OF EMISSIONS

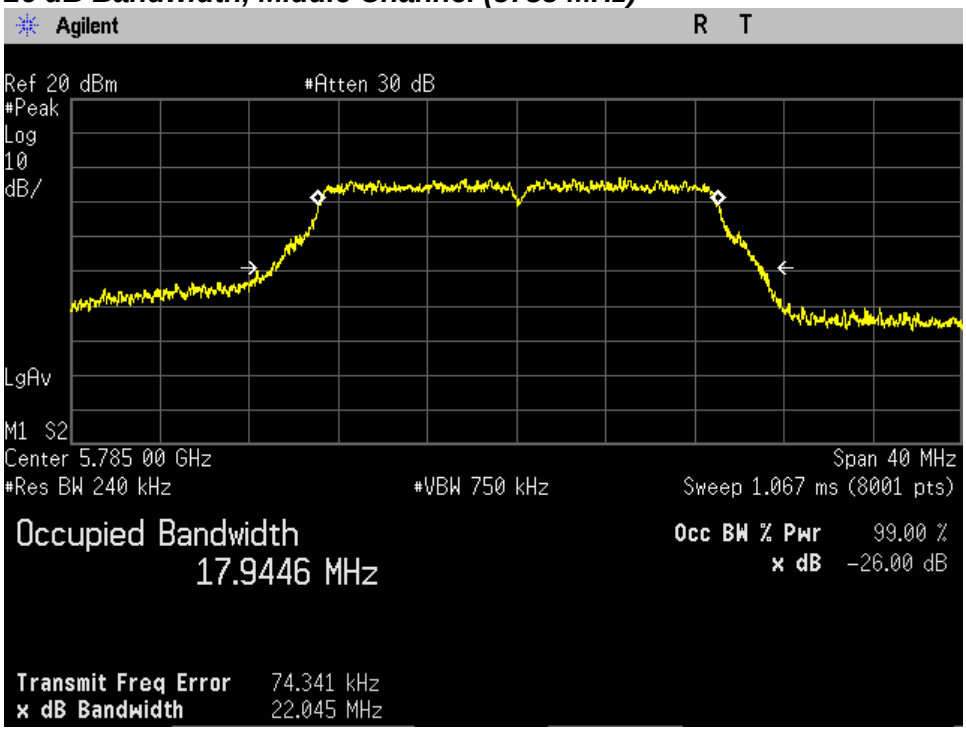
802.11n (20 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

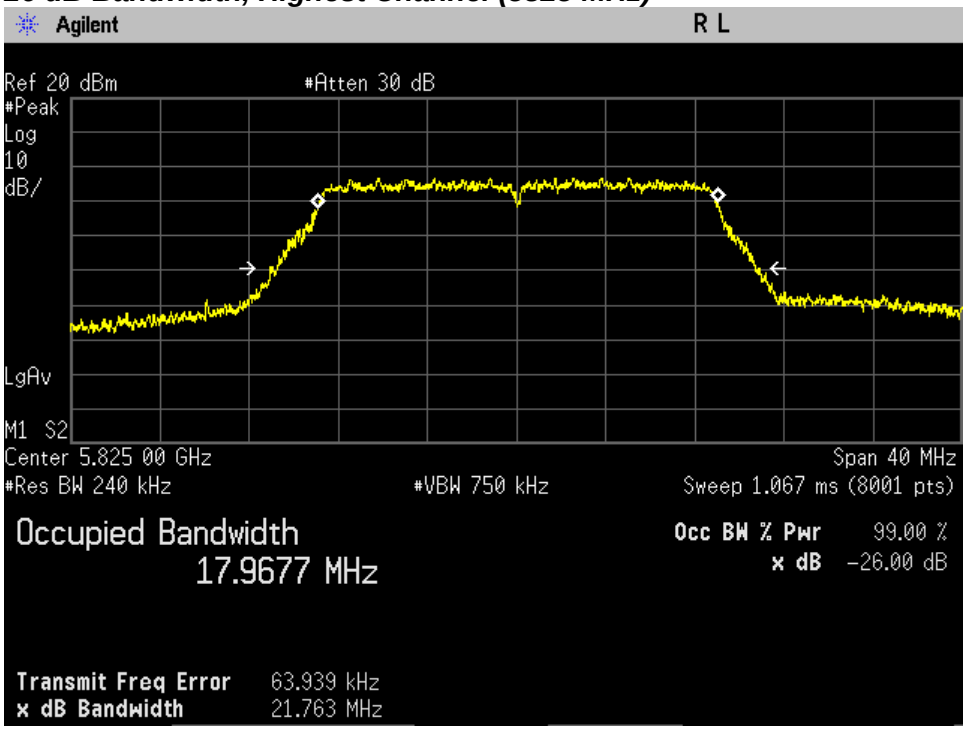


26 dB Bandwidth, Middle Channel (5785 MHz)



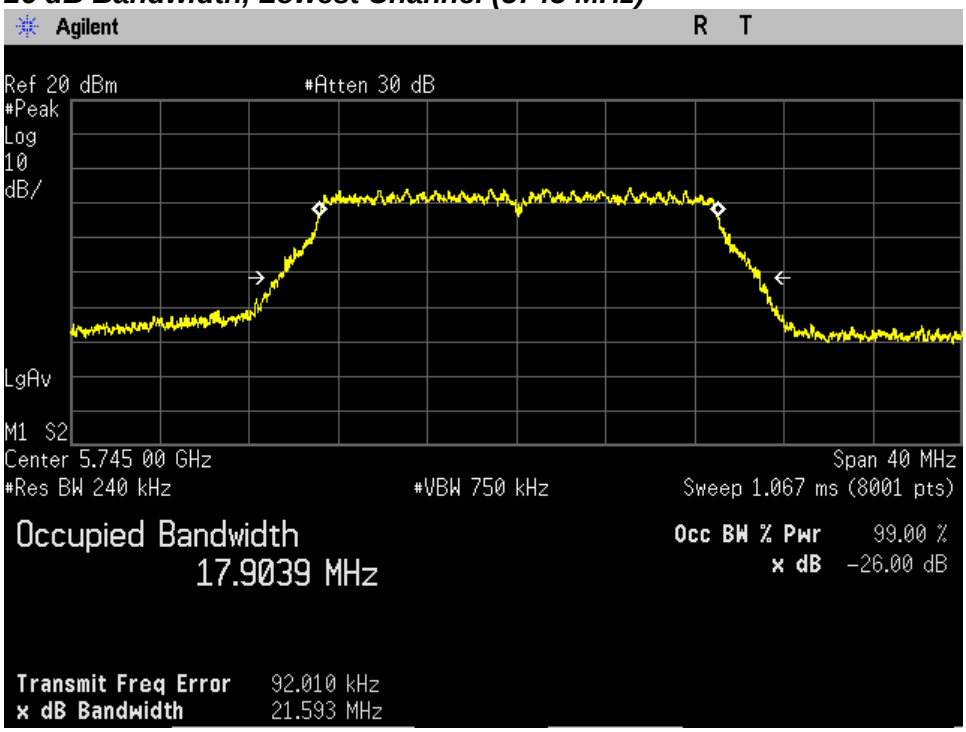
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



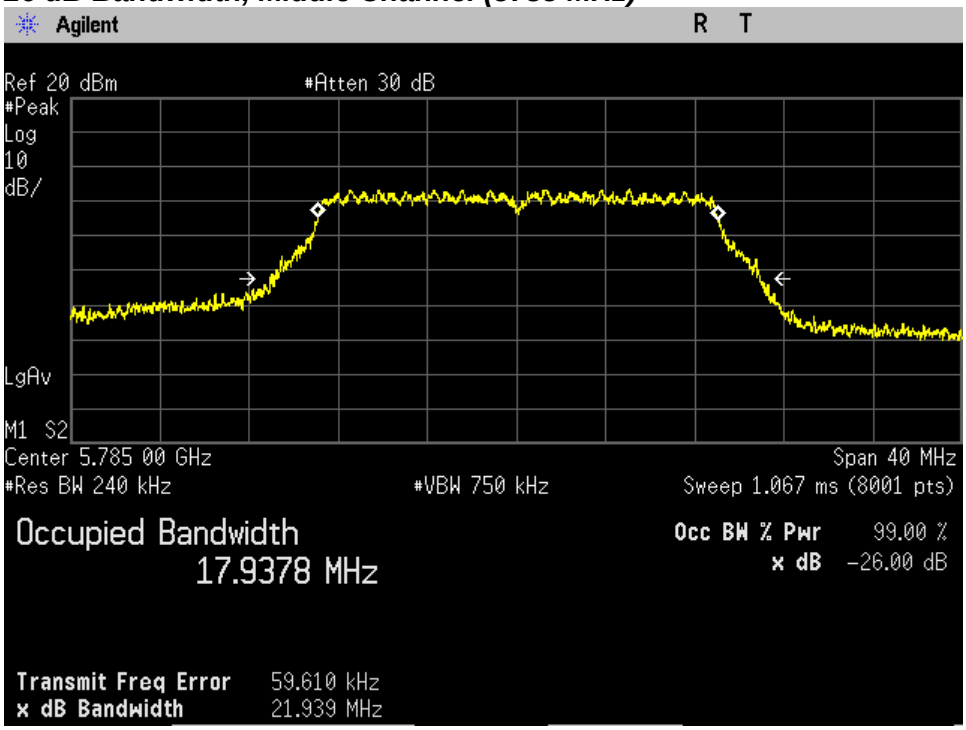
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

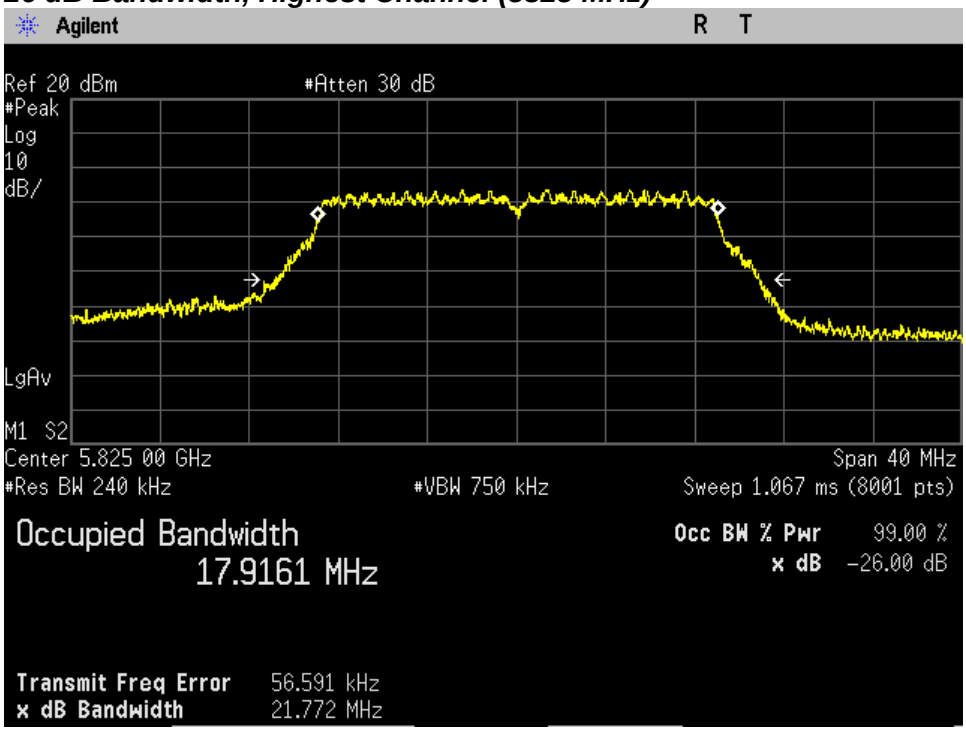


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

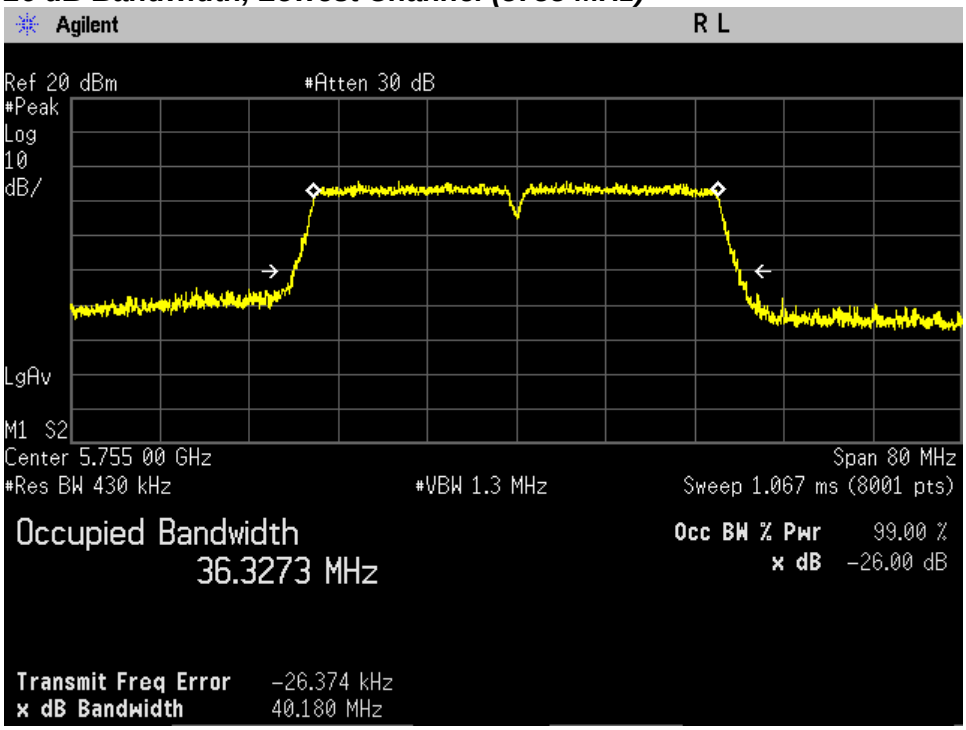


PLOTS OF EMISSIONS

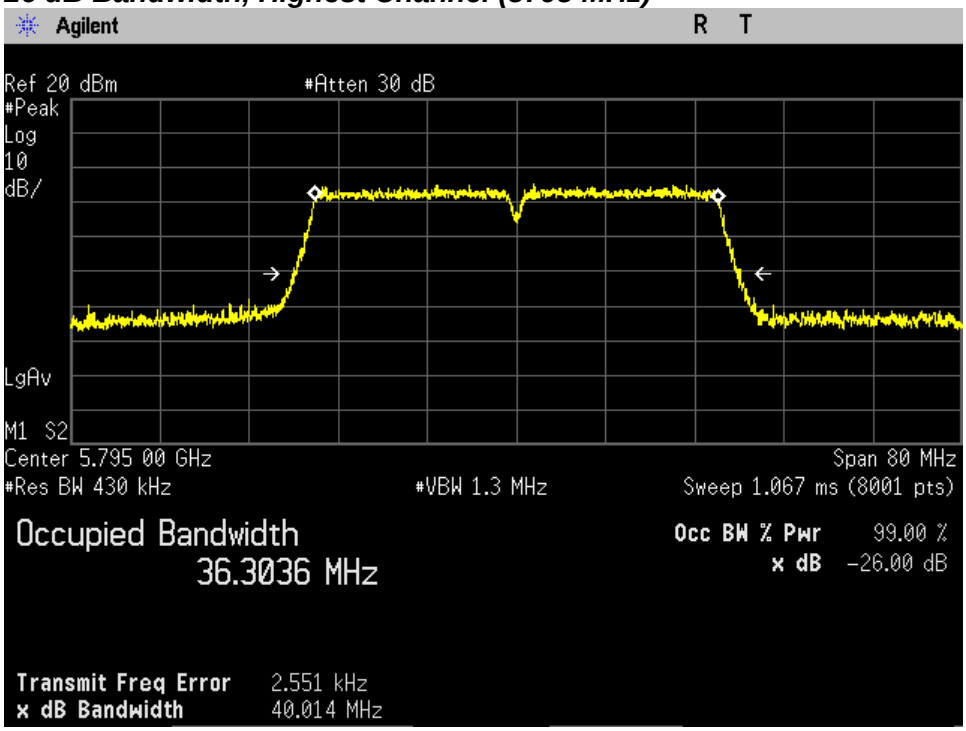
802.11n (40 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



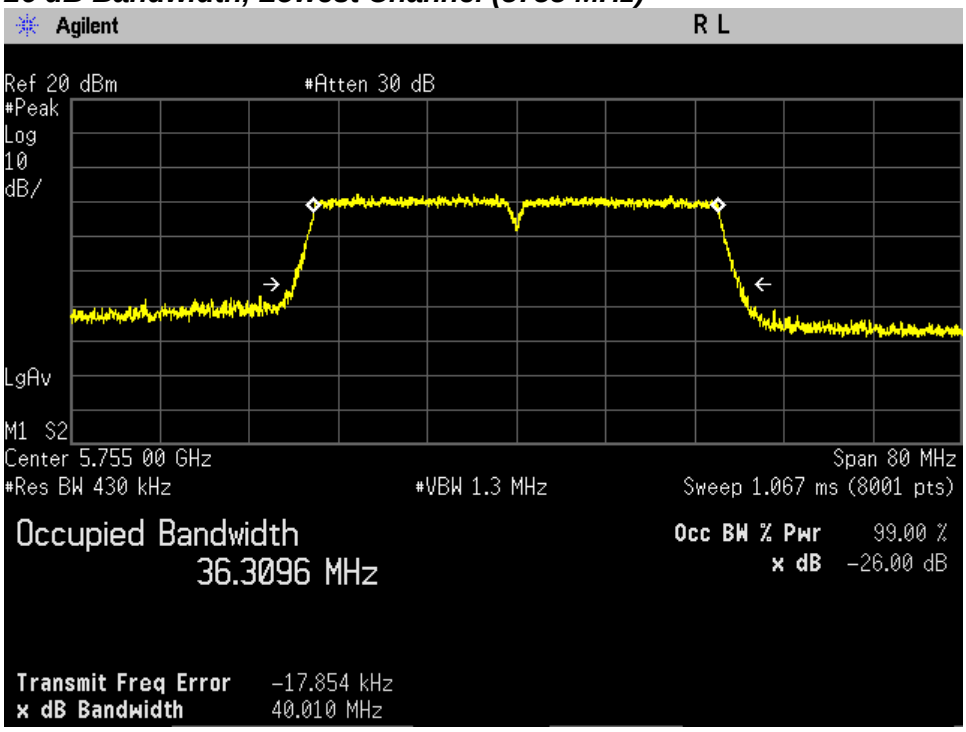
26 dB Bandwidth, Highest Channel (5795 MHz)



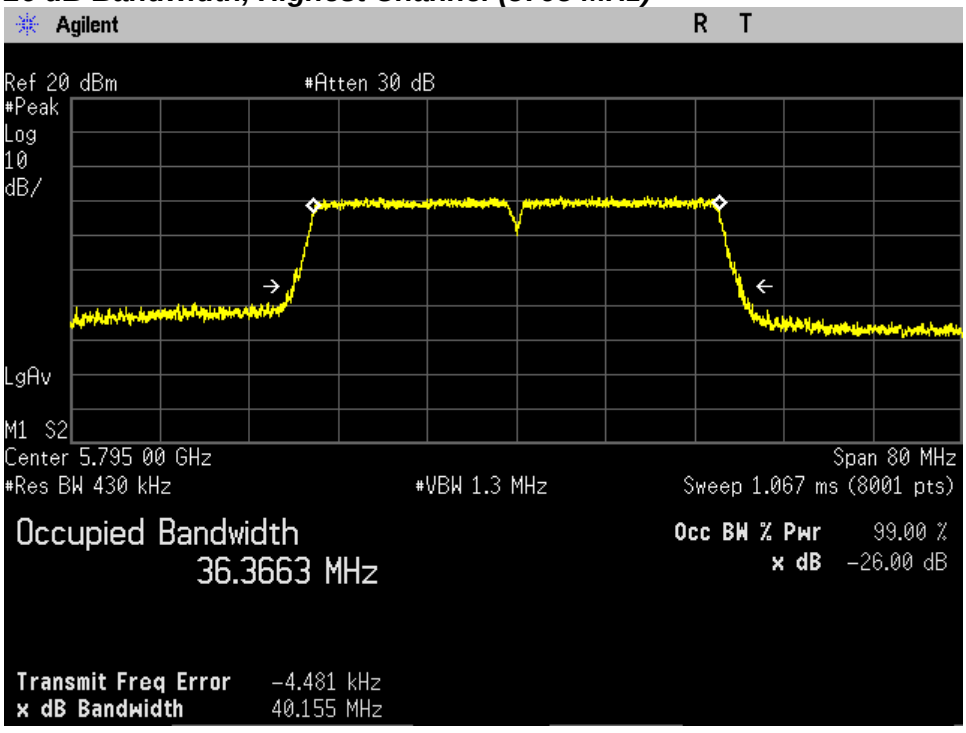
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

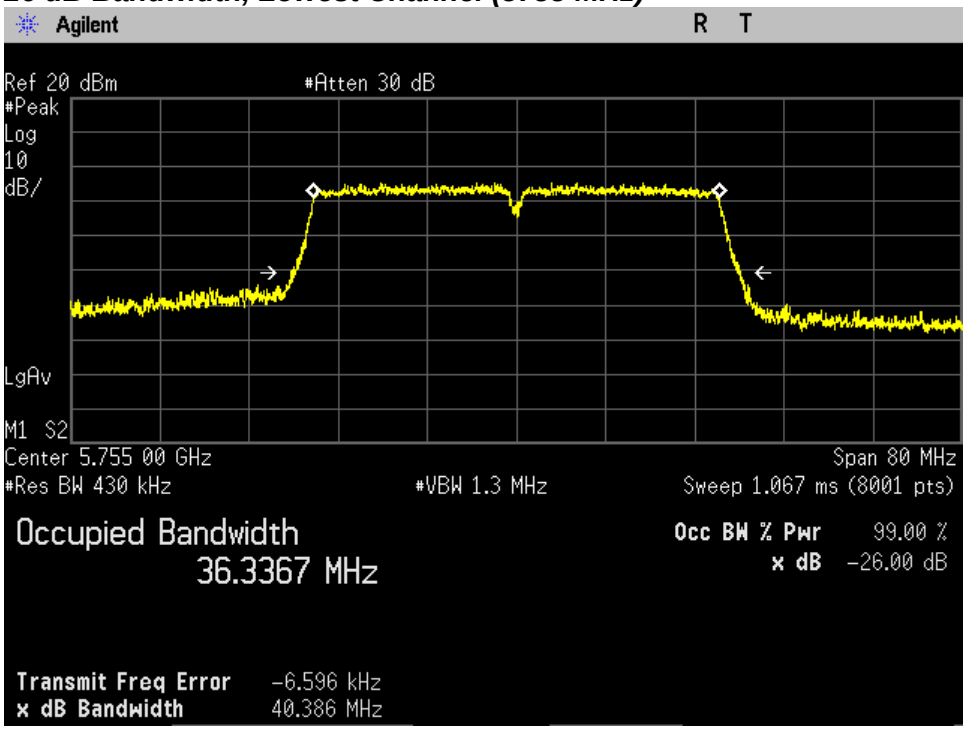


PLOTS OF EMISSIONS

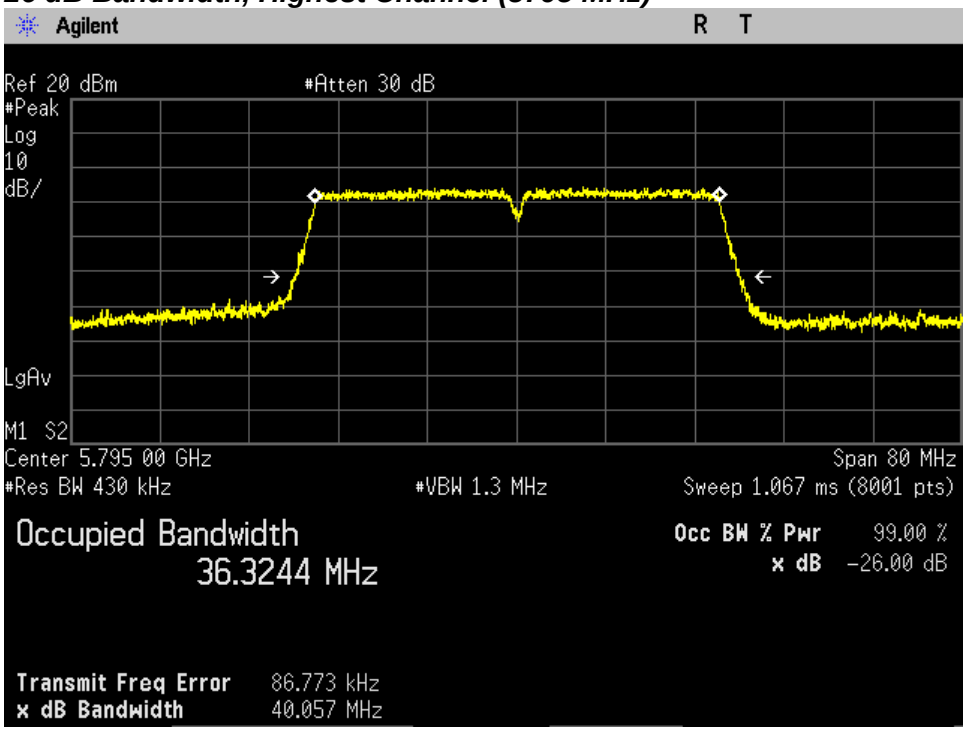
802.11n (40 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



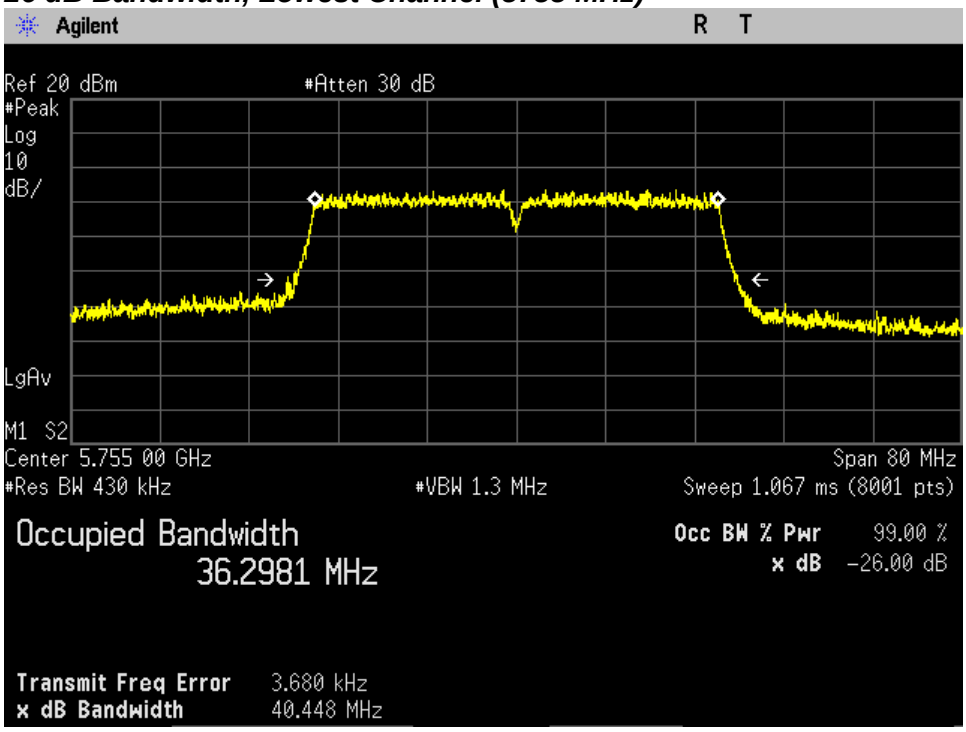
26 dB Bandwidth, Highest Channel (5795 MHz)



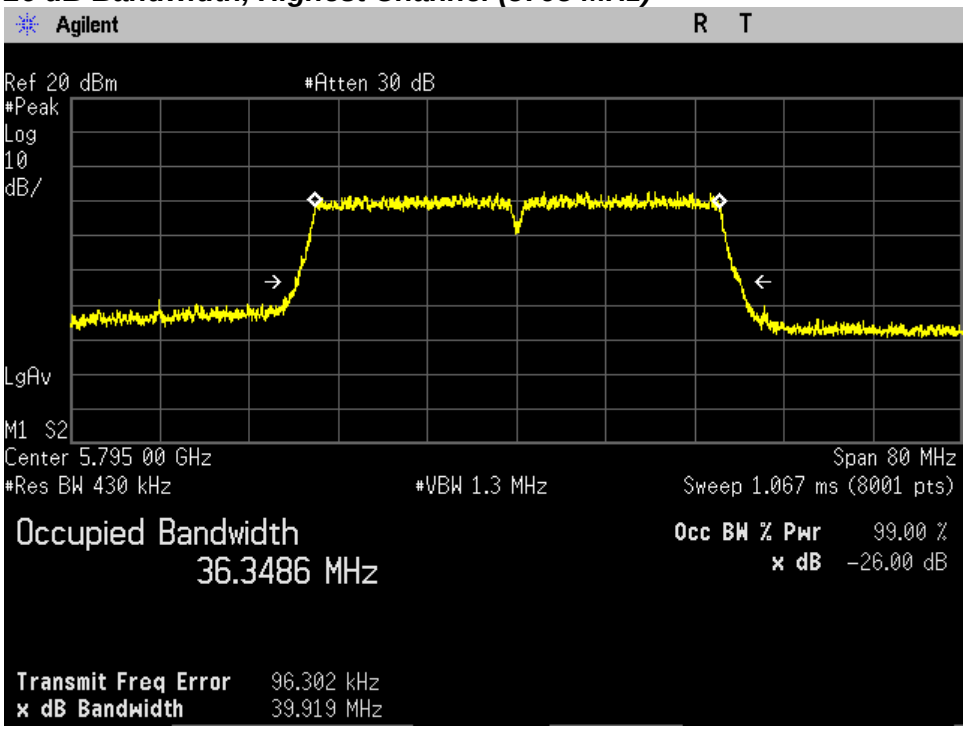
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

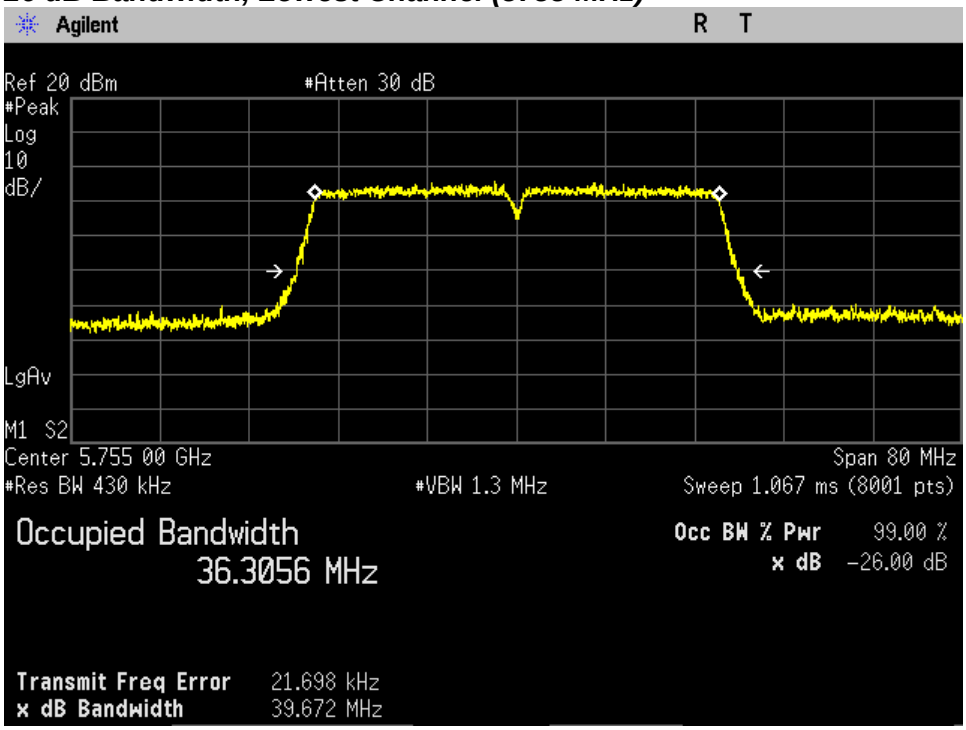


PLOTS OF EMISSIONS

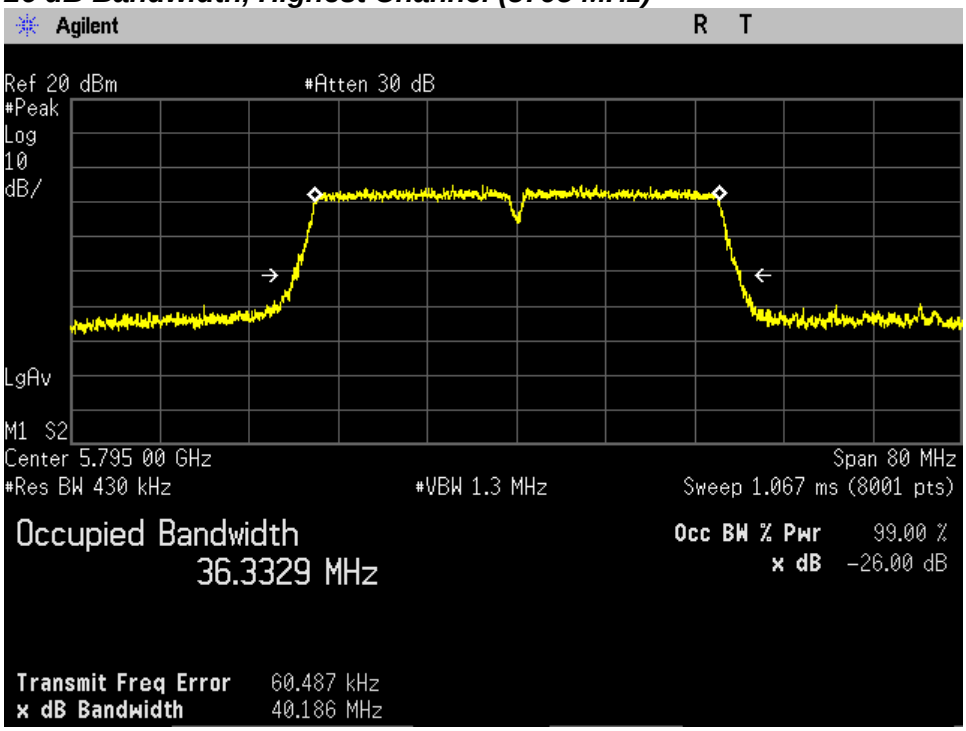
802.11n (40 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



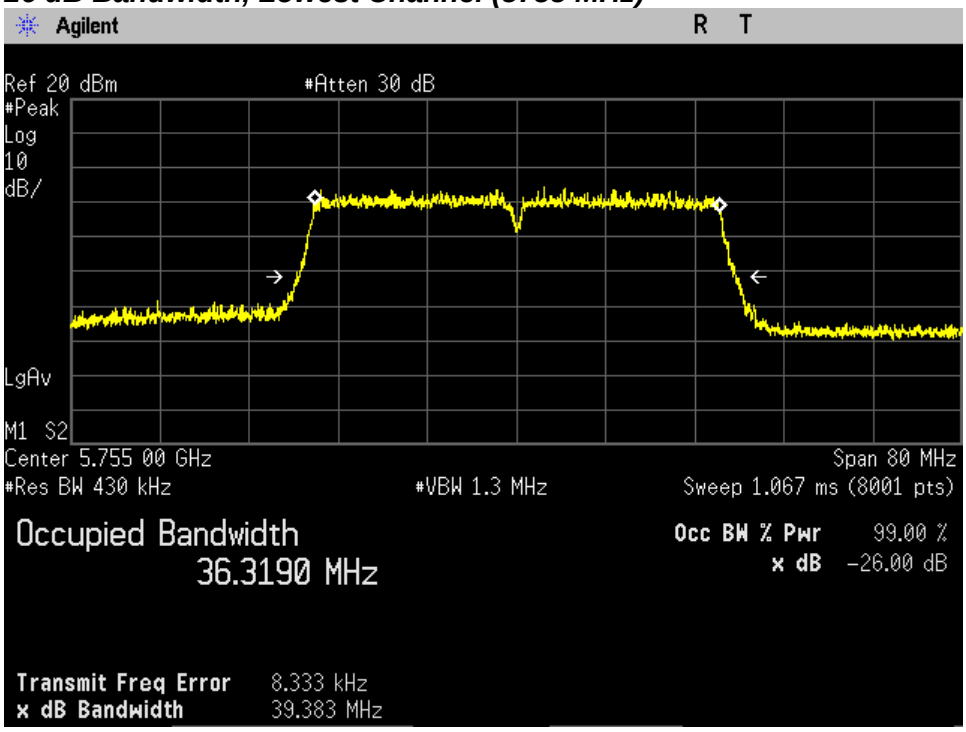
26 dB Bandwidth, Highest Channel (5795 MHz)



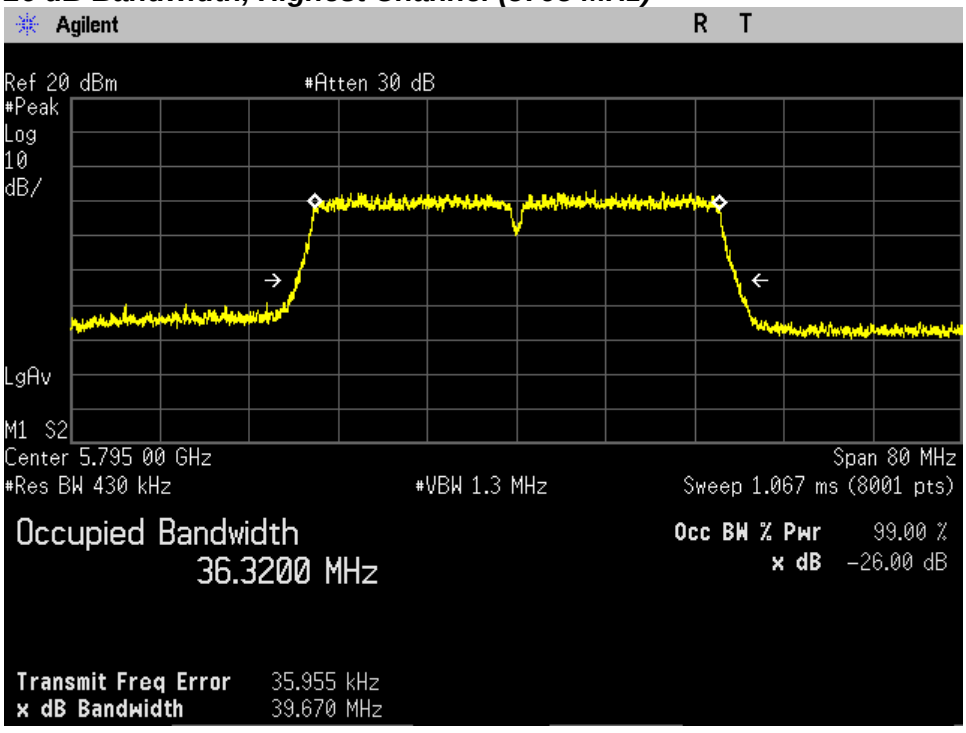
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

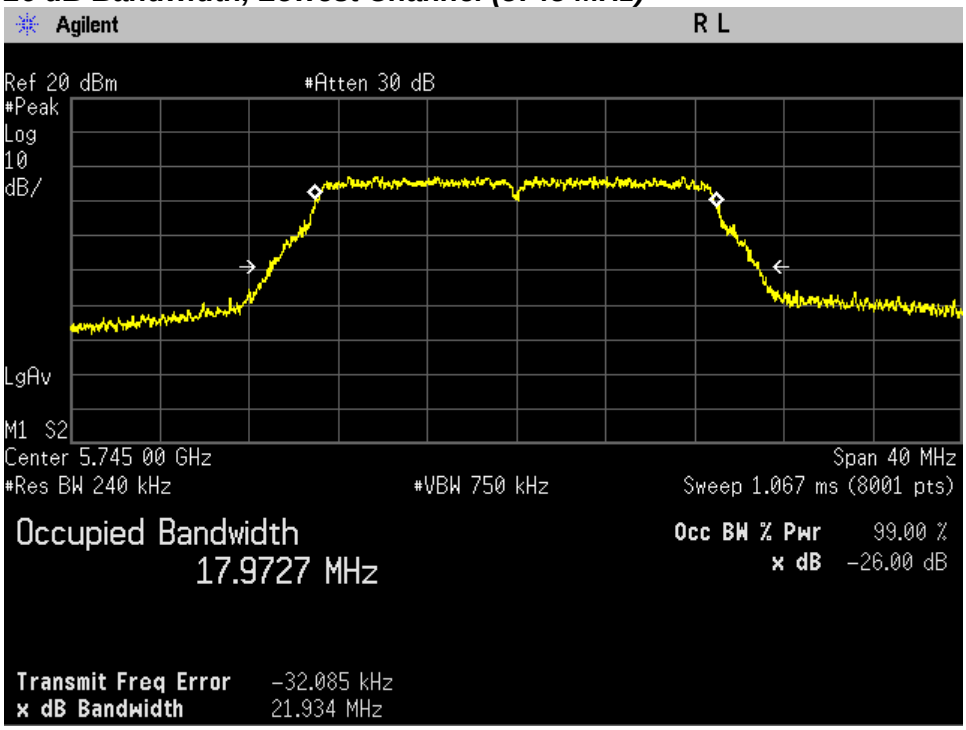


PLOTS OF EMISSIONS

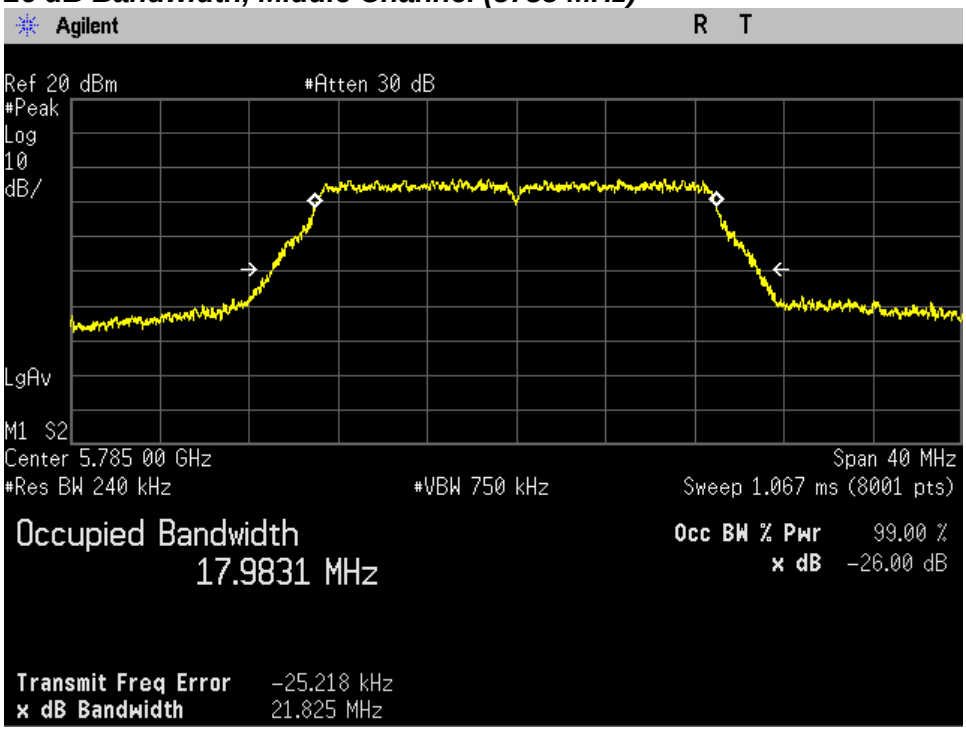
802.11ac (20 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

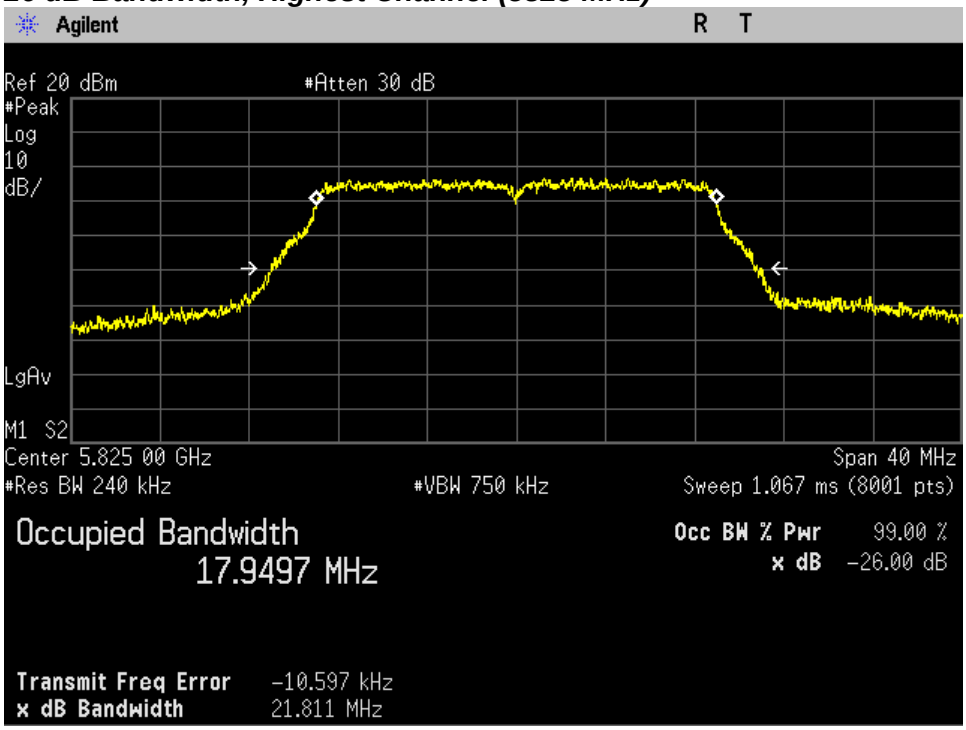


26 dB Bandwidth, Middle Channel (5785 MHz)



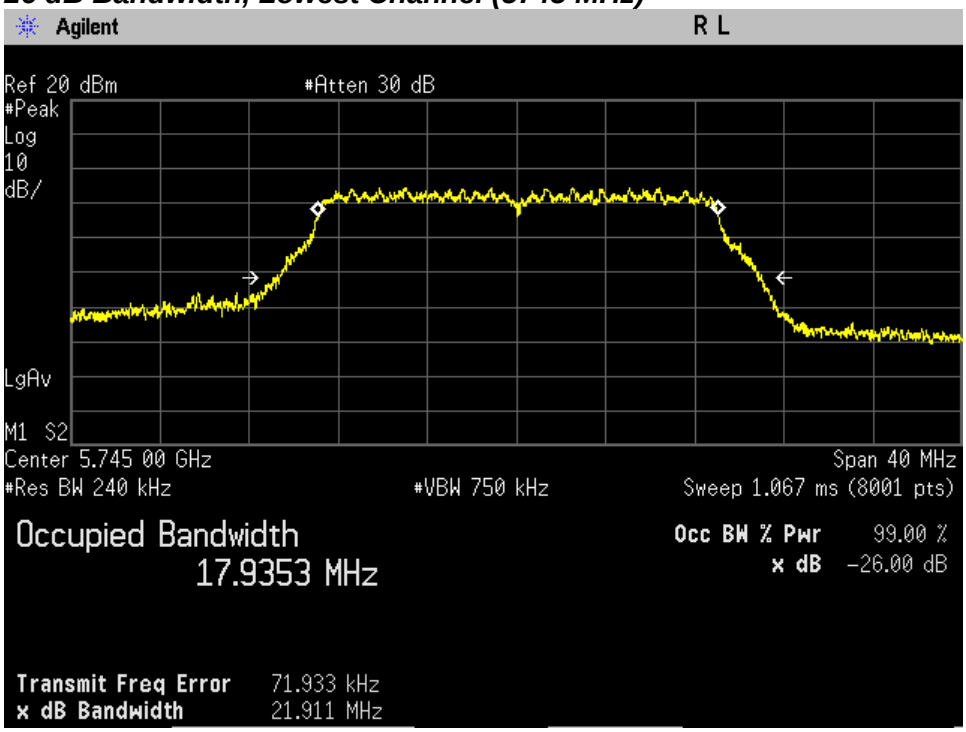
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



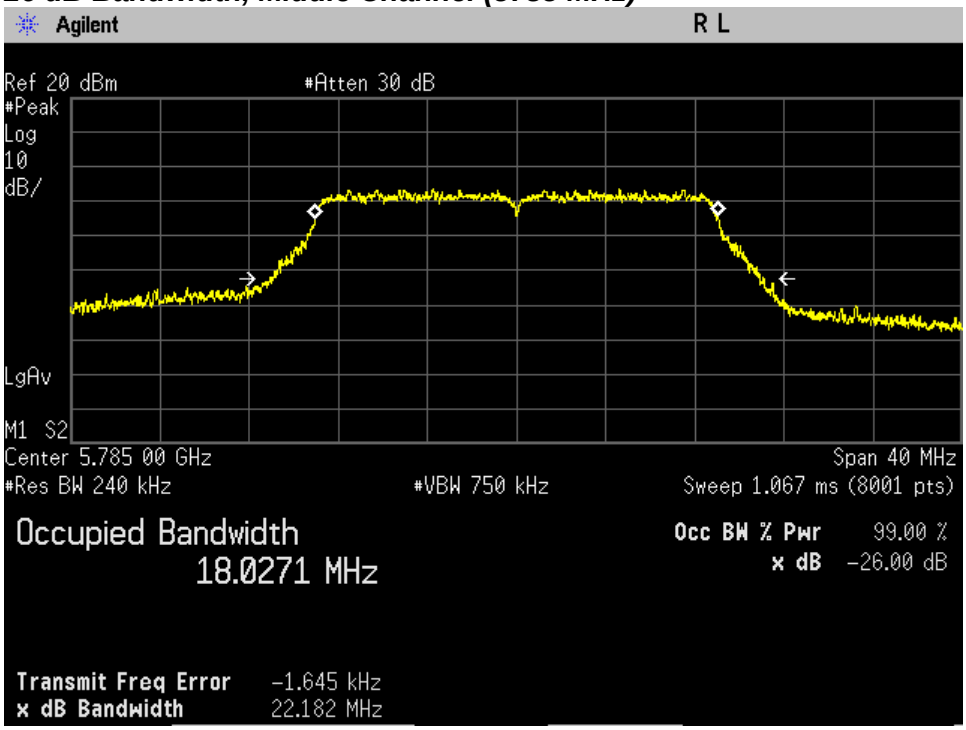
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

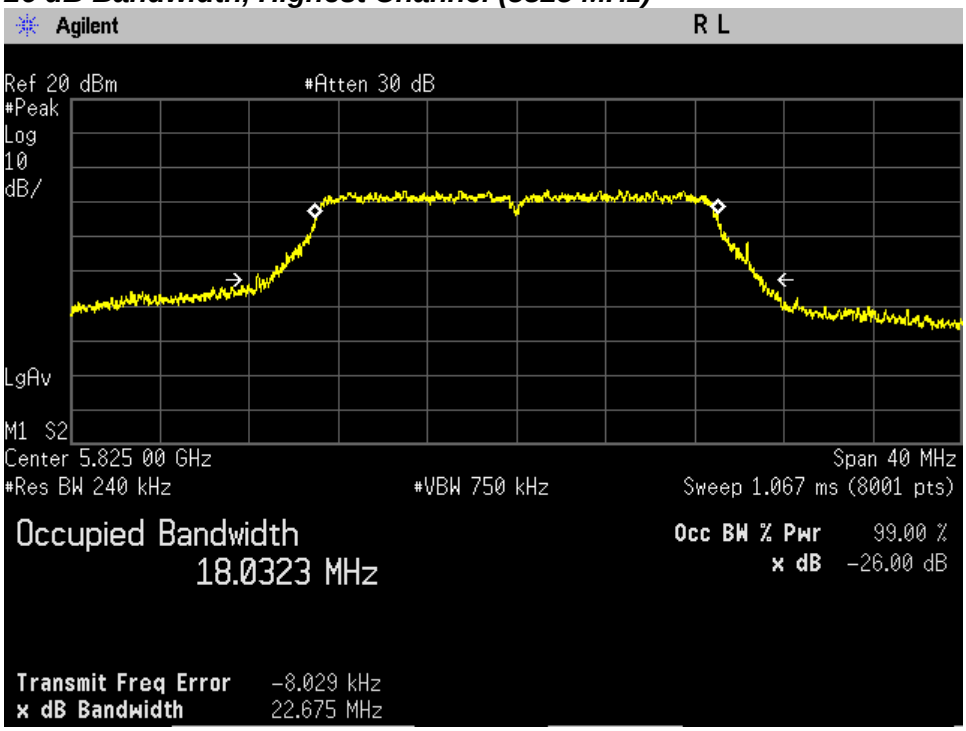


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

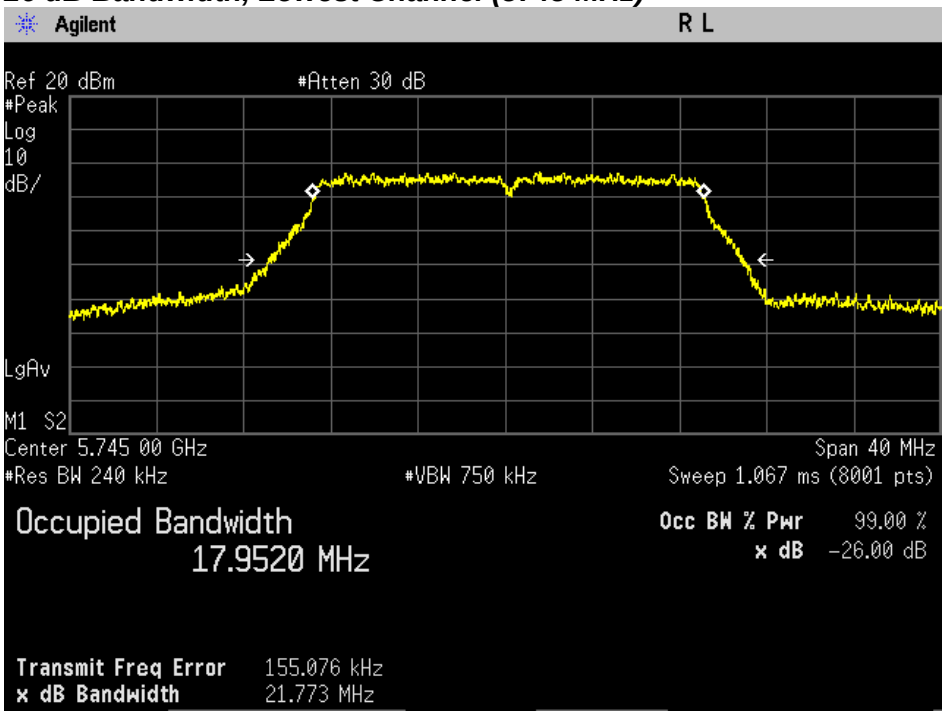


PLOTS OF EMISSIONS

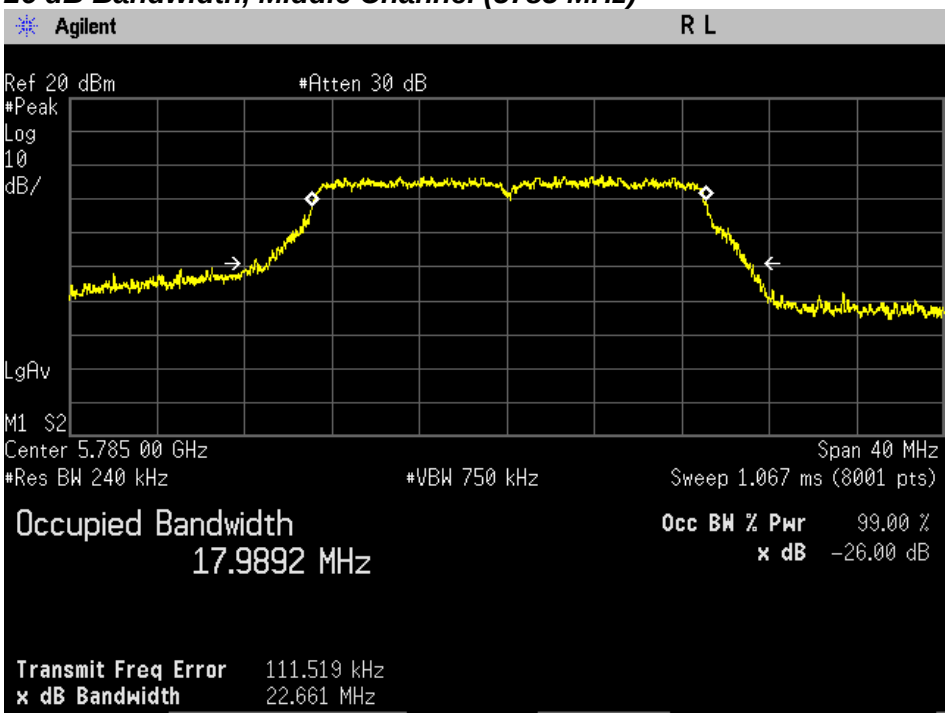
802.11ac (20 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

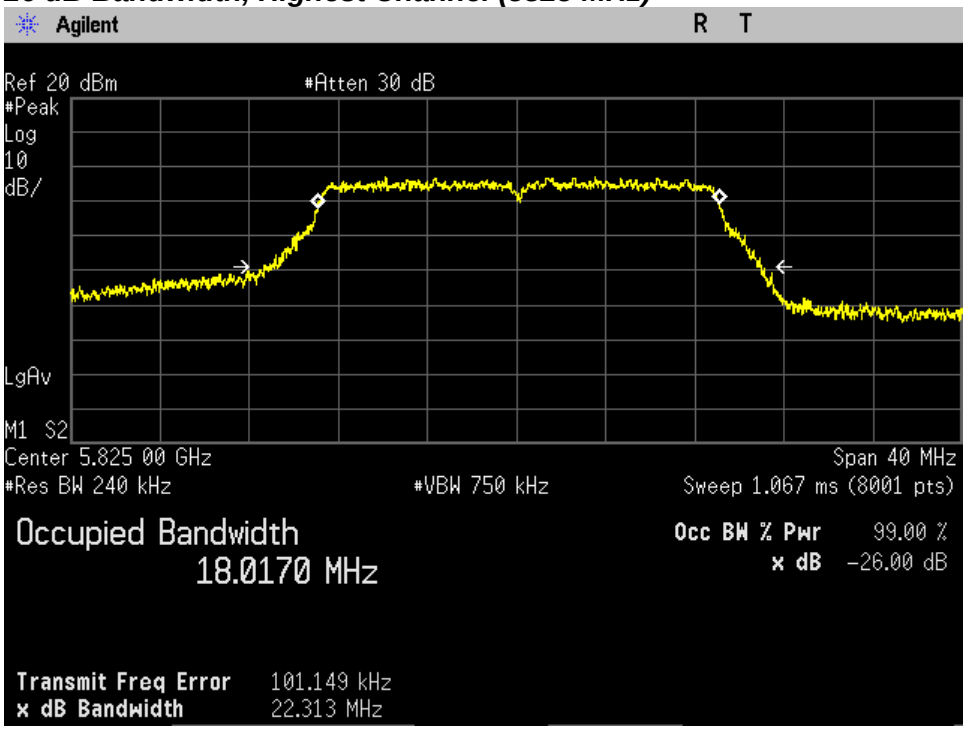


26 dB Bandwidth, Middle Channel (5785 MHz)



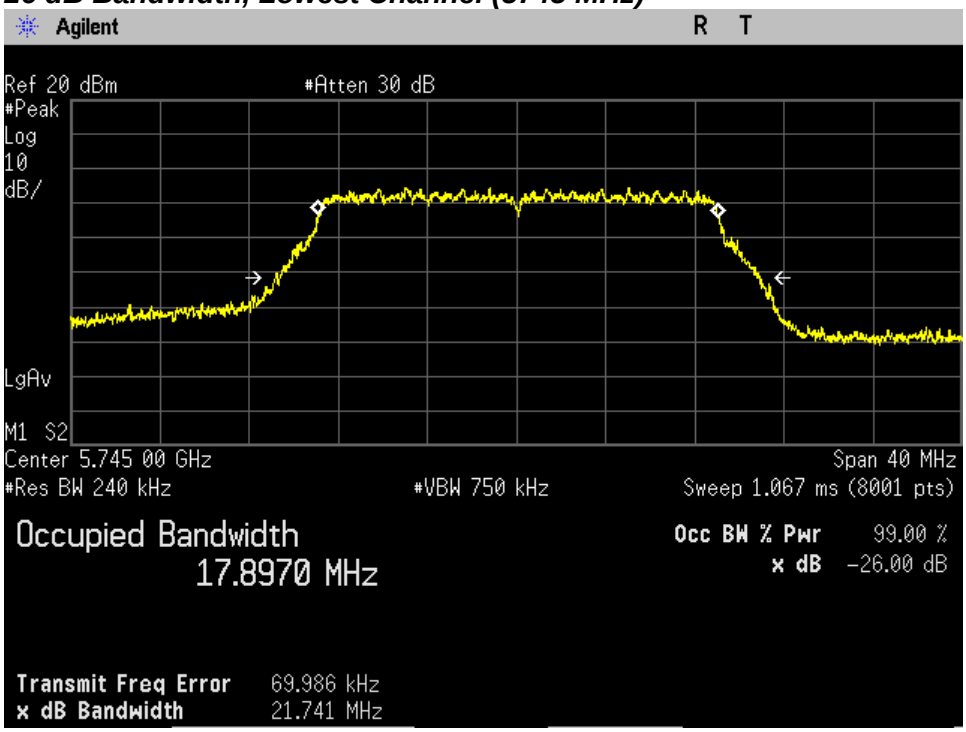
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



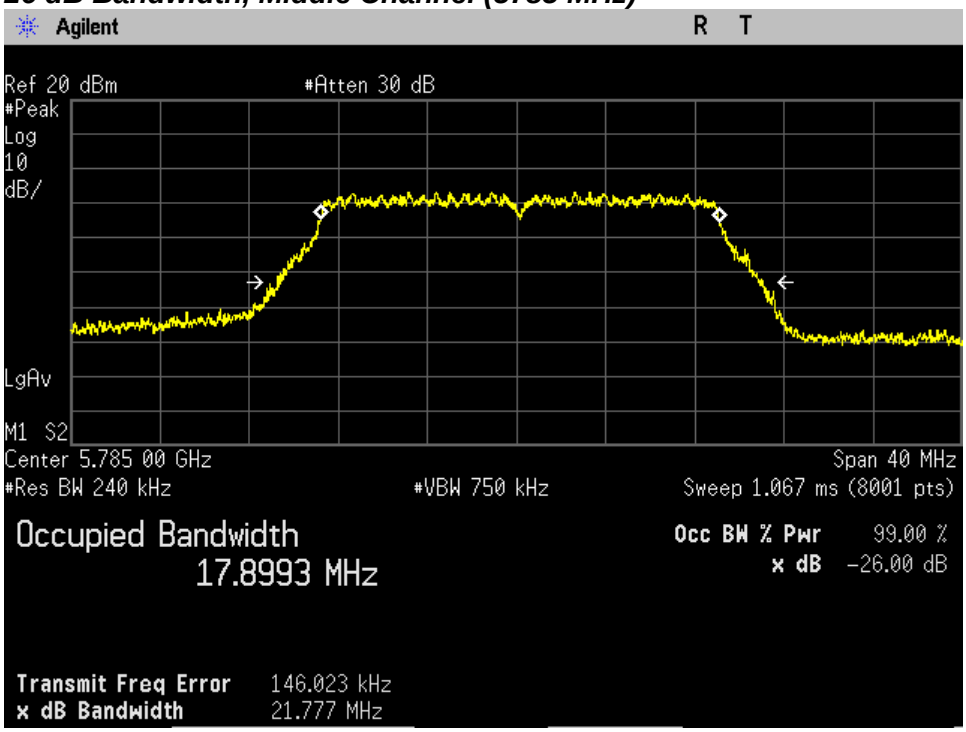
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

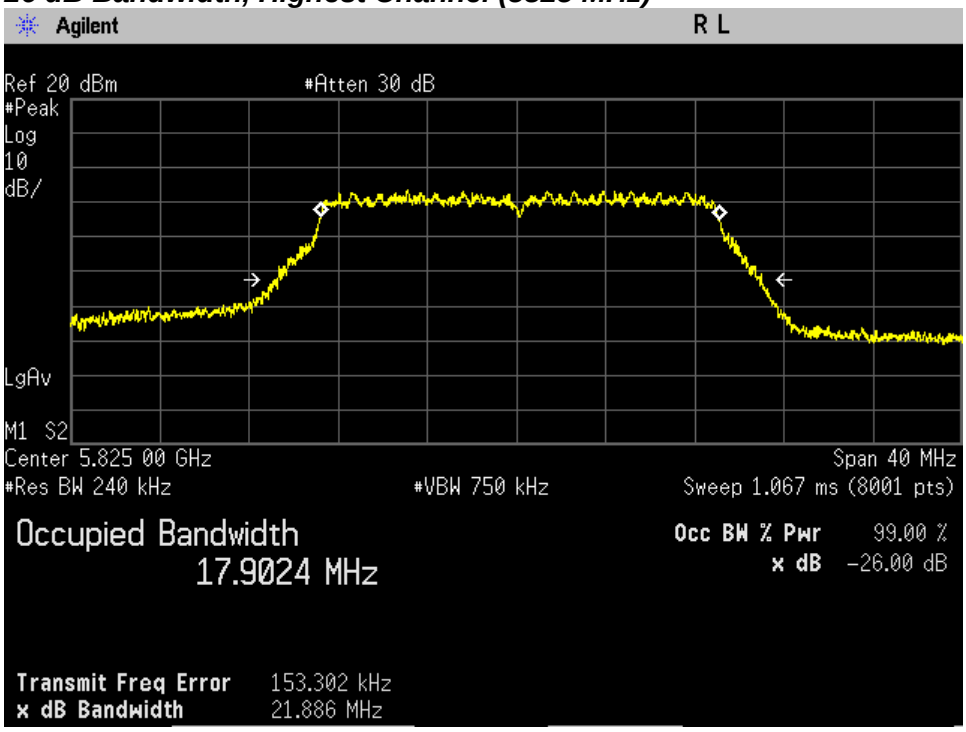


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

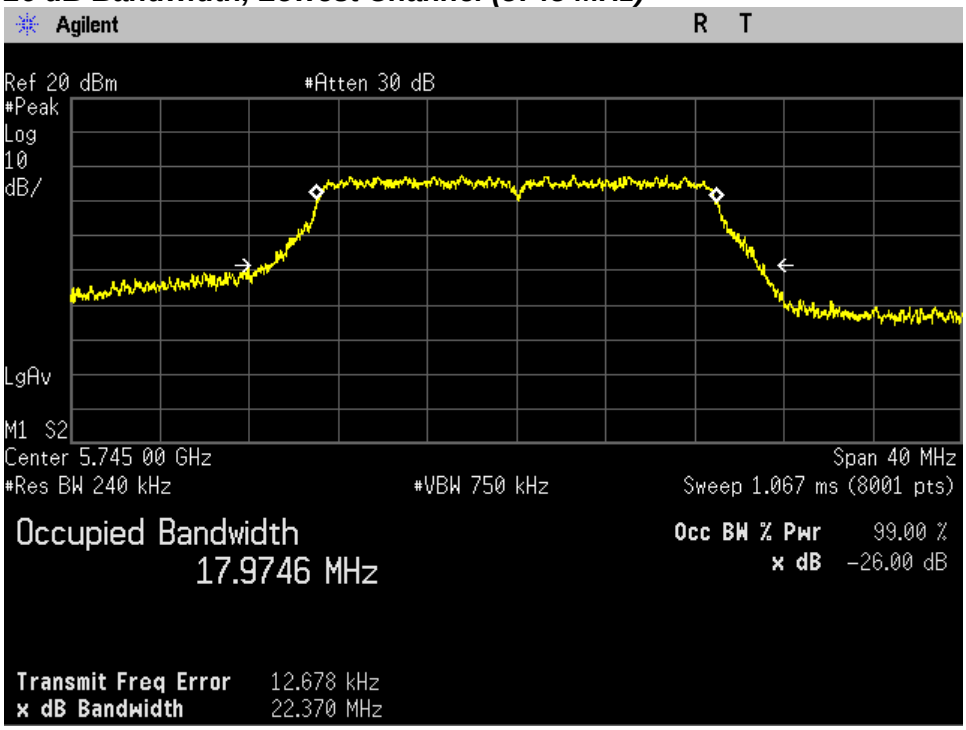


PLOTS OF EMISSIONS

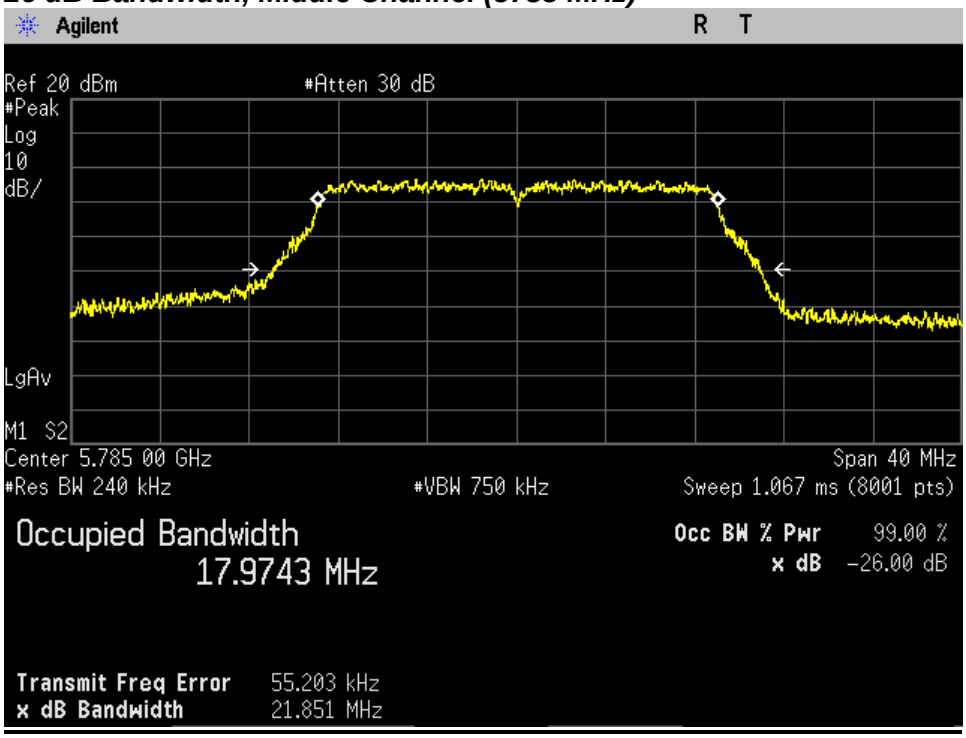
802.11ac (20 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5745 MHz)

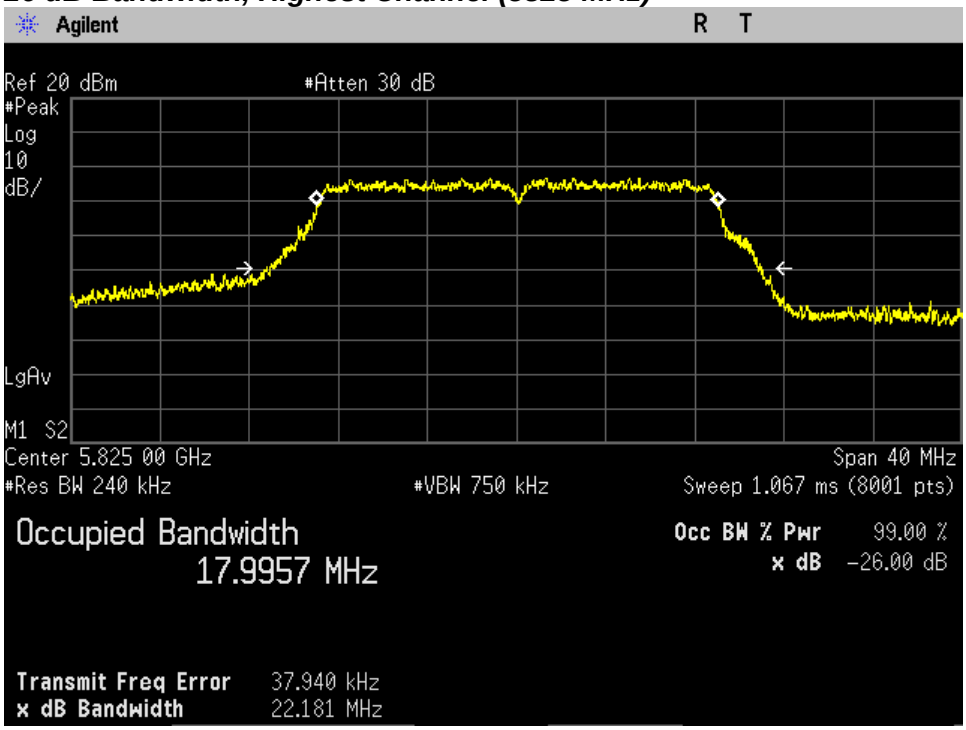


26 dB Bandwidth, Middle Channel (5785 MHz)



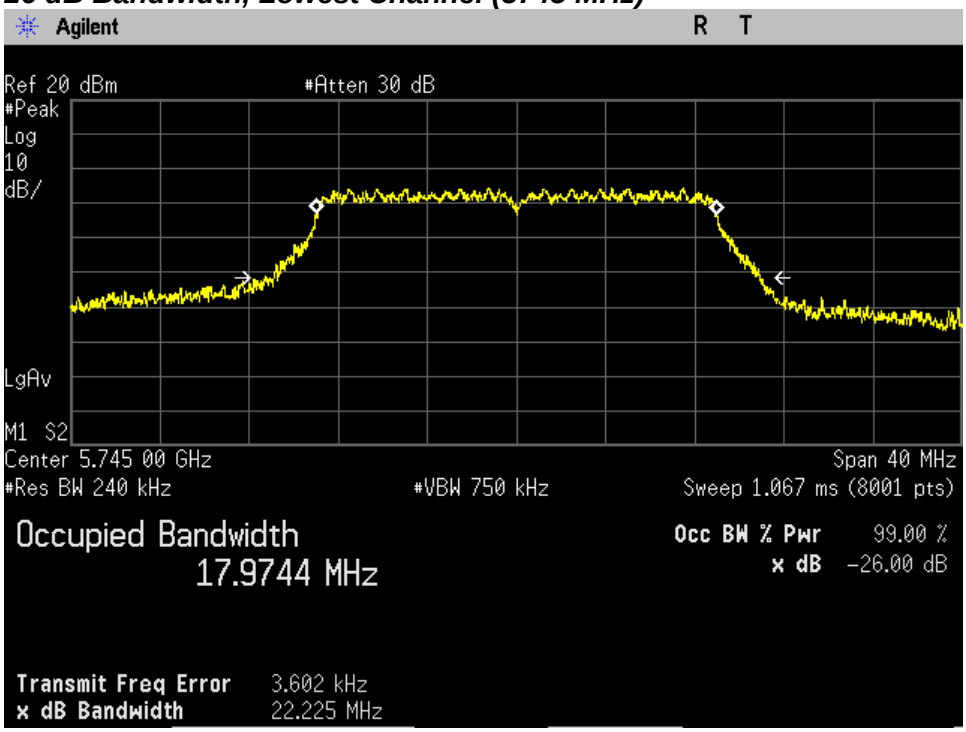
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



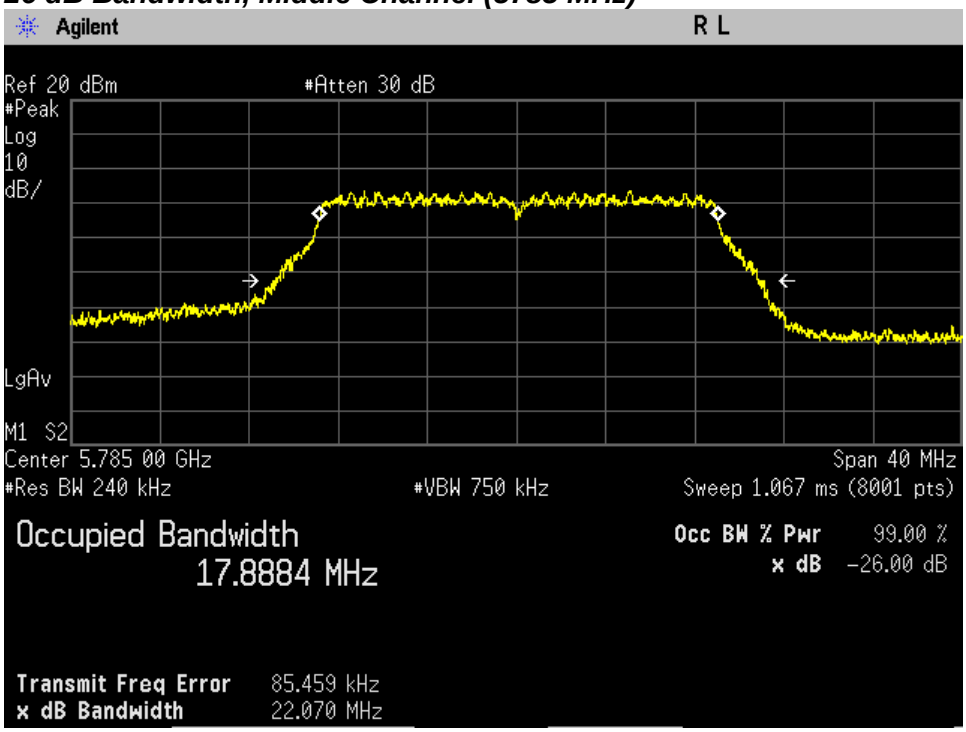
Chain 1

26 dB Bandwidth, Lowest Channel (5745 MHz)

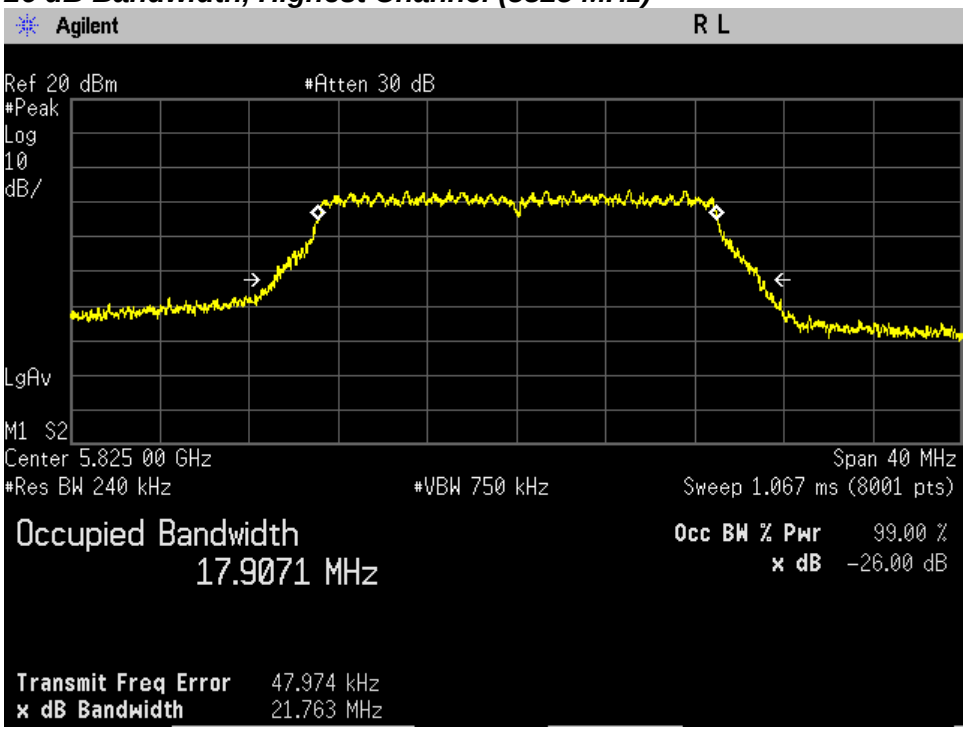


PLOTS OF EMISSIONS

26 dB Bandwidth, Middle Channel (5785 MHz)



26 dB Bandwidth, Highest Channel (5825 MHz)

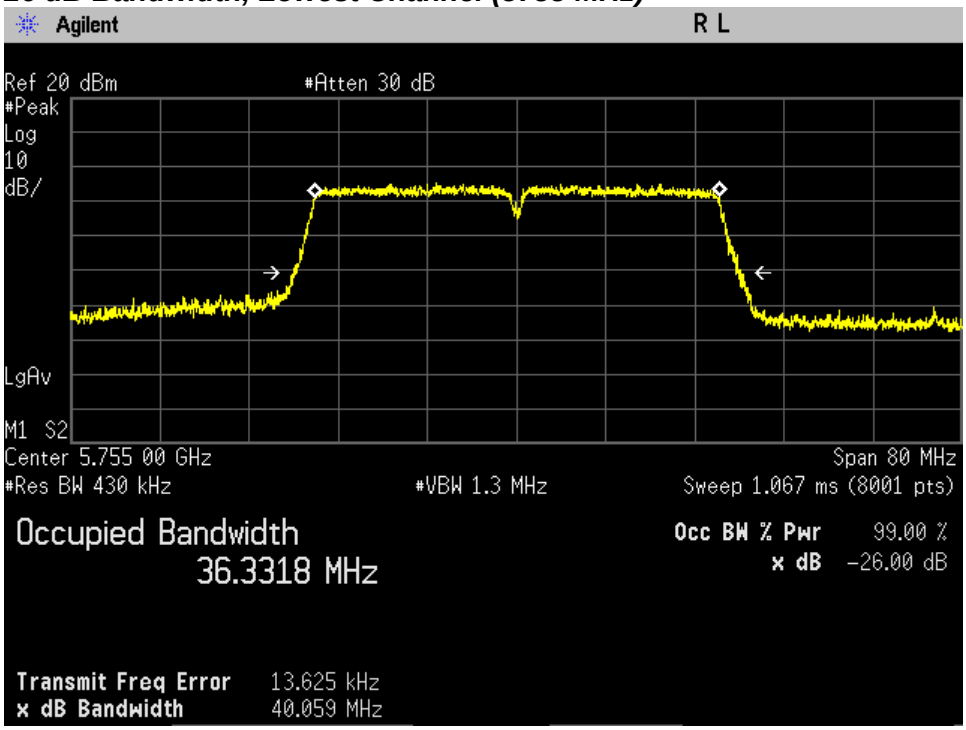


PLOTS OF EMISSIONS

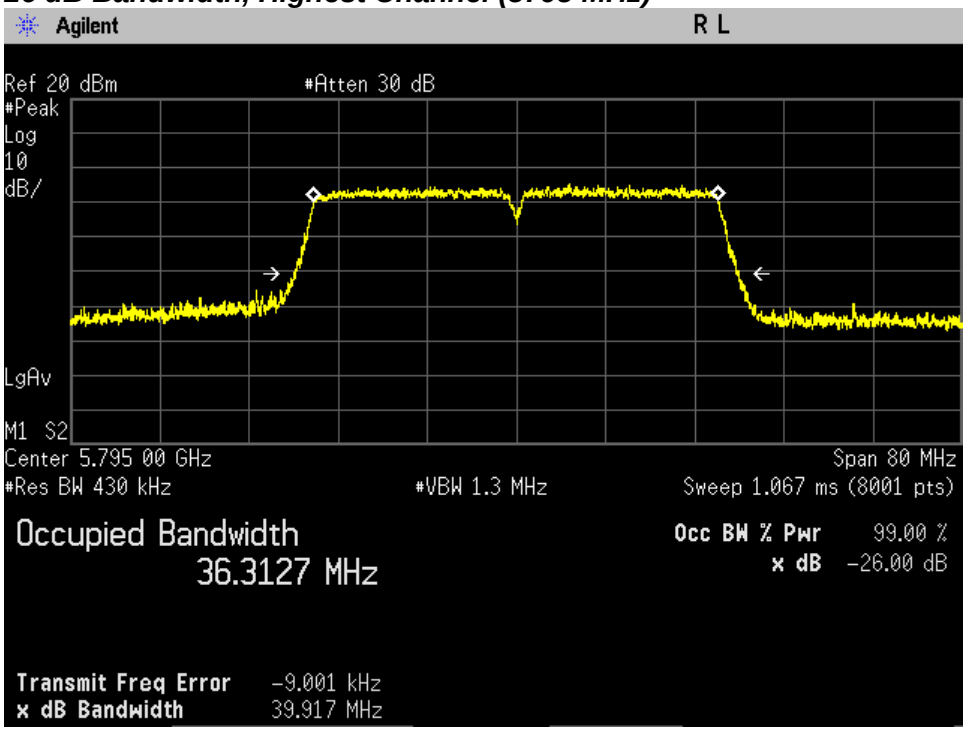
802.11ac (40 MHz) mode - SISO

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



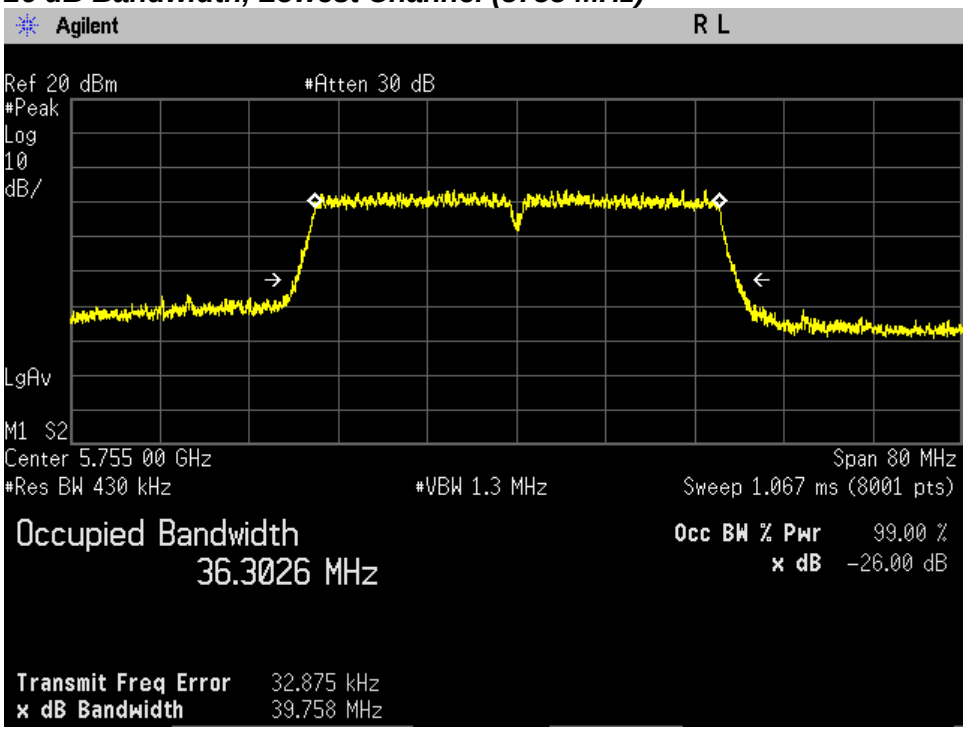
26 dB Bandwidth, Highest Channel (5795 MHz)



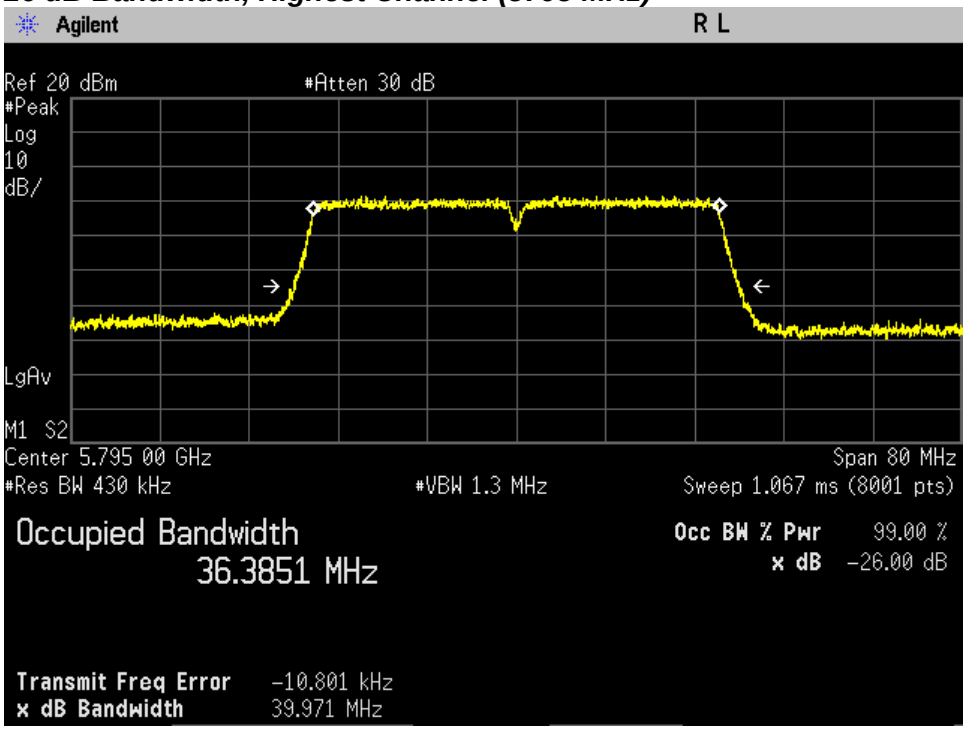
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

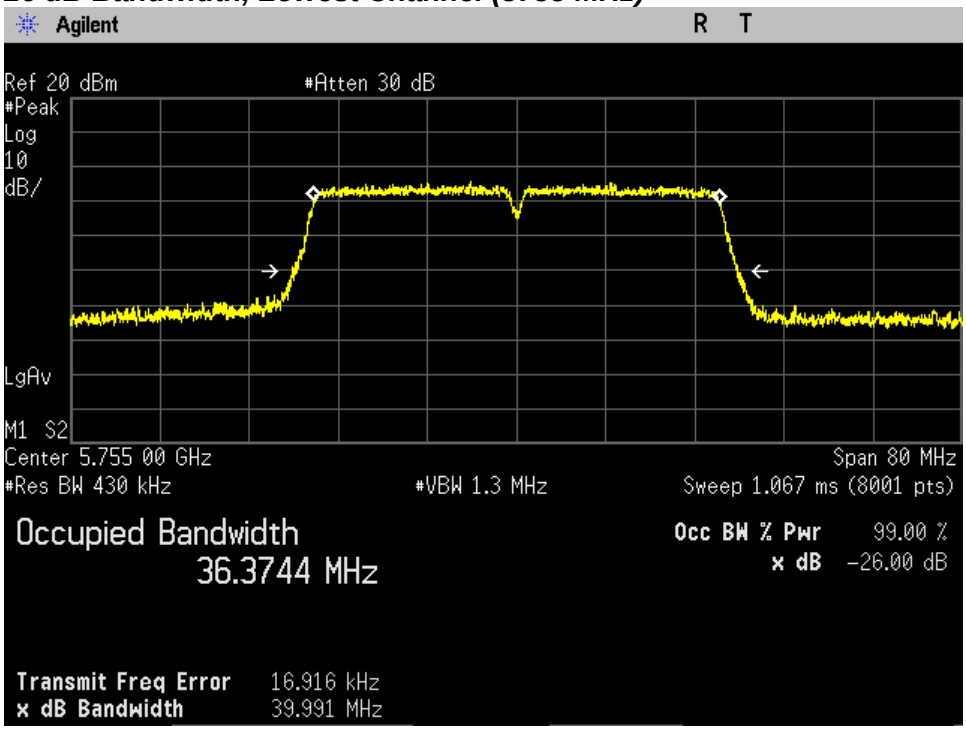


PLOTS OF EMISSIONS

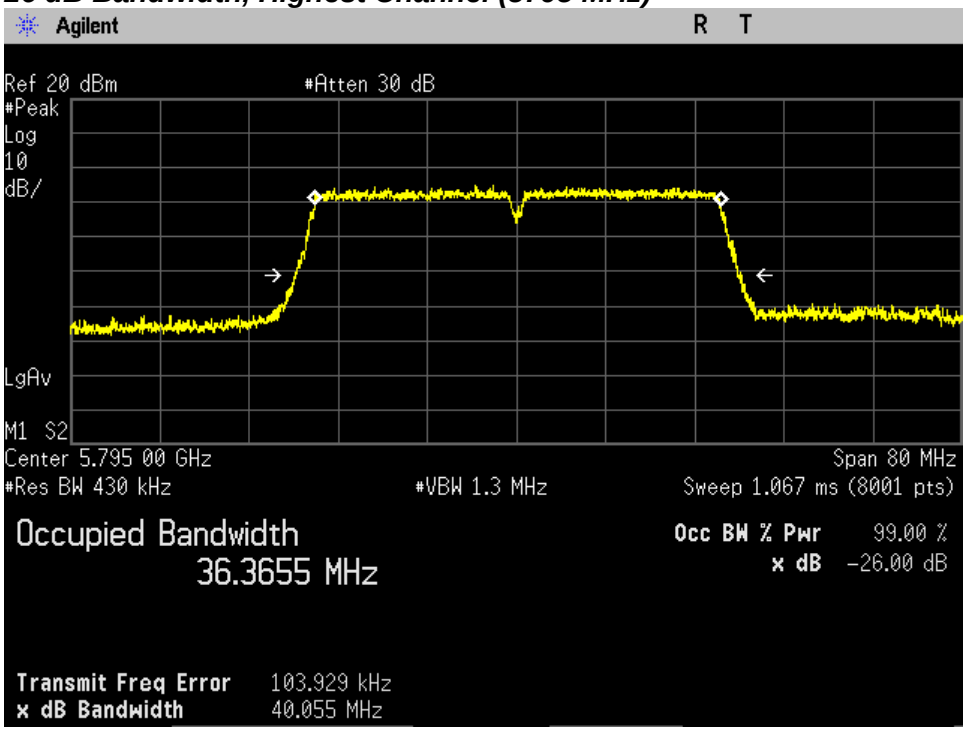
802.11ac (40 MHz) mode - CDD

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



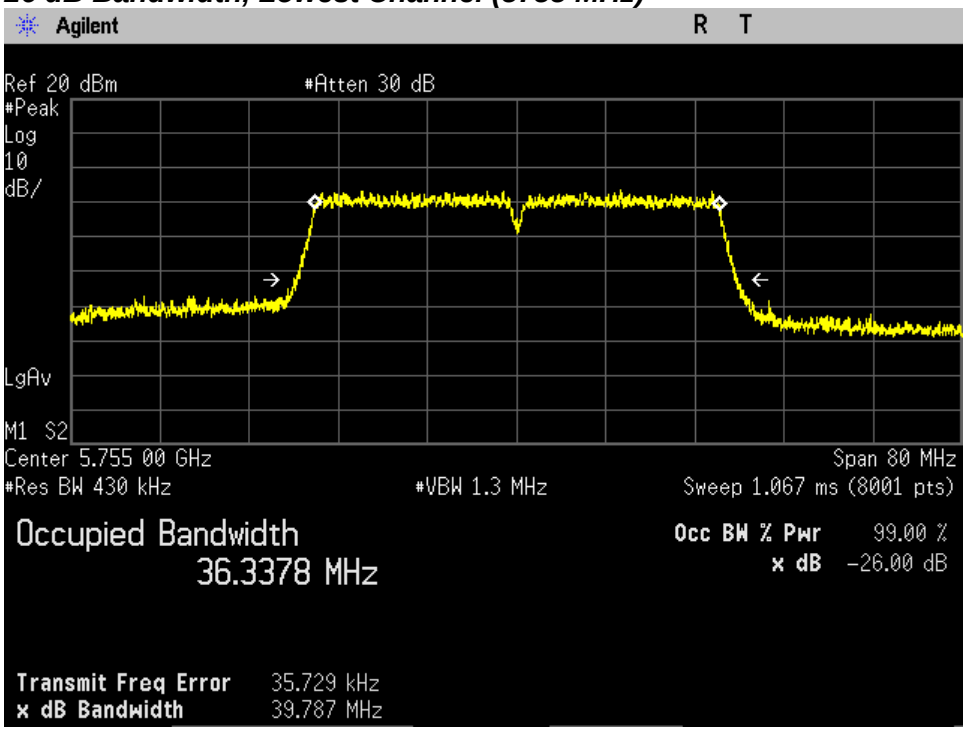
26 dB Bandwidth, Highest Channel (5795 MHz)



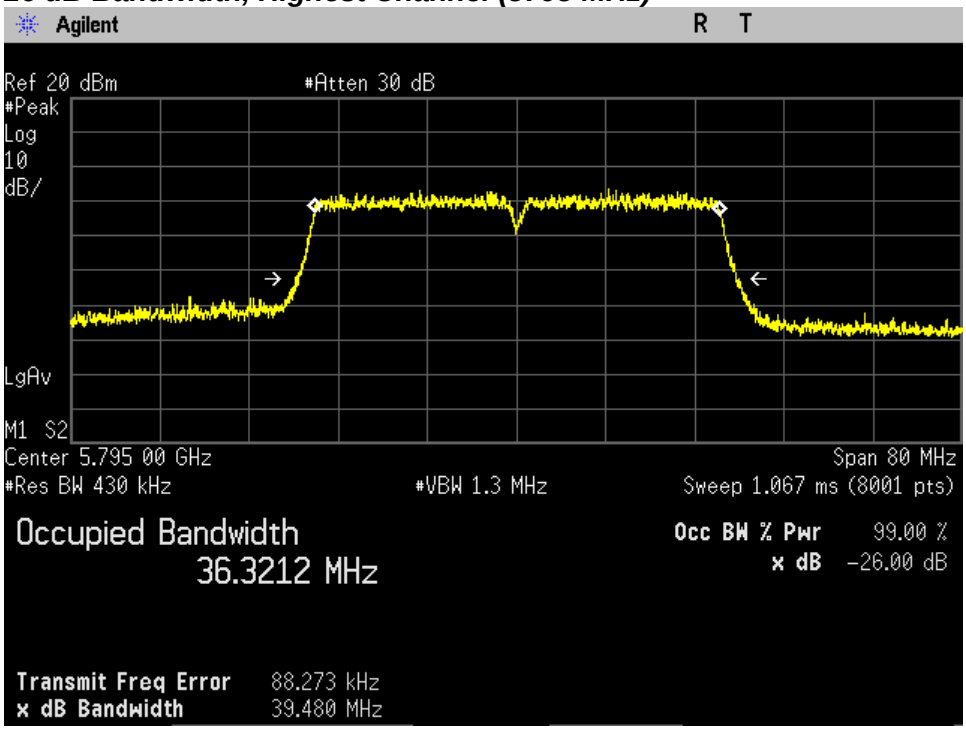
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

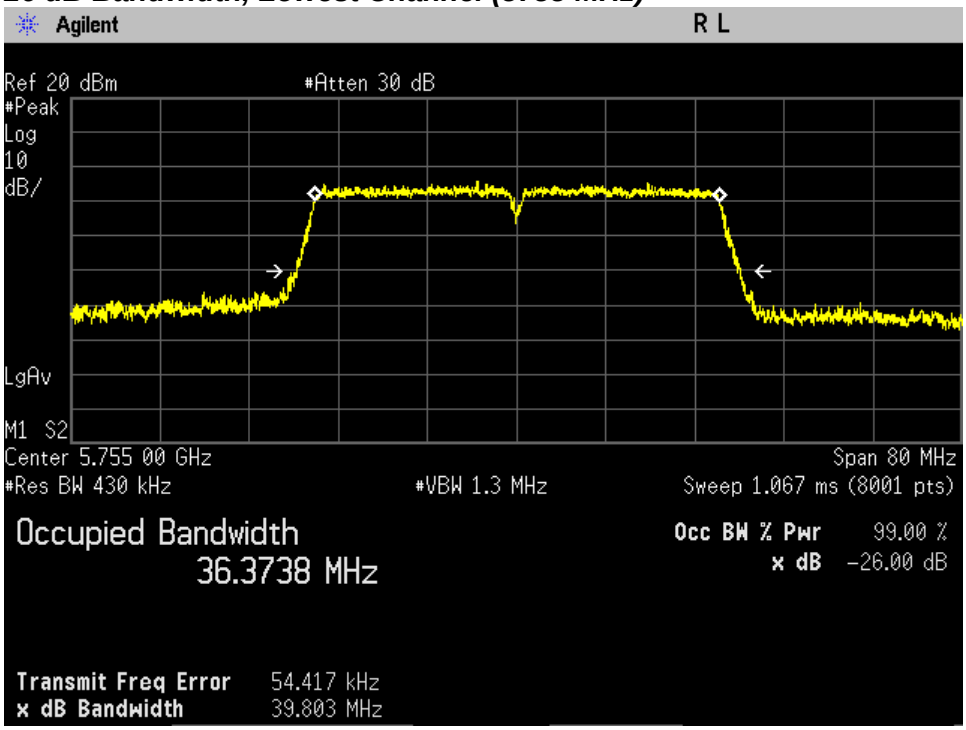


PLOTS OF EMISSIONS

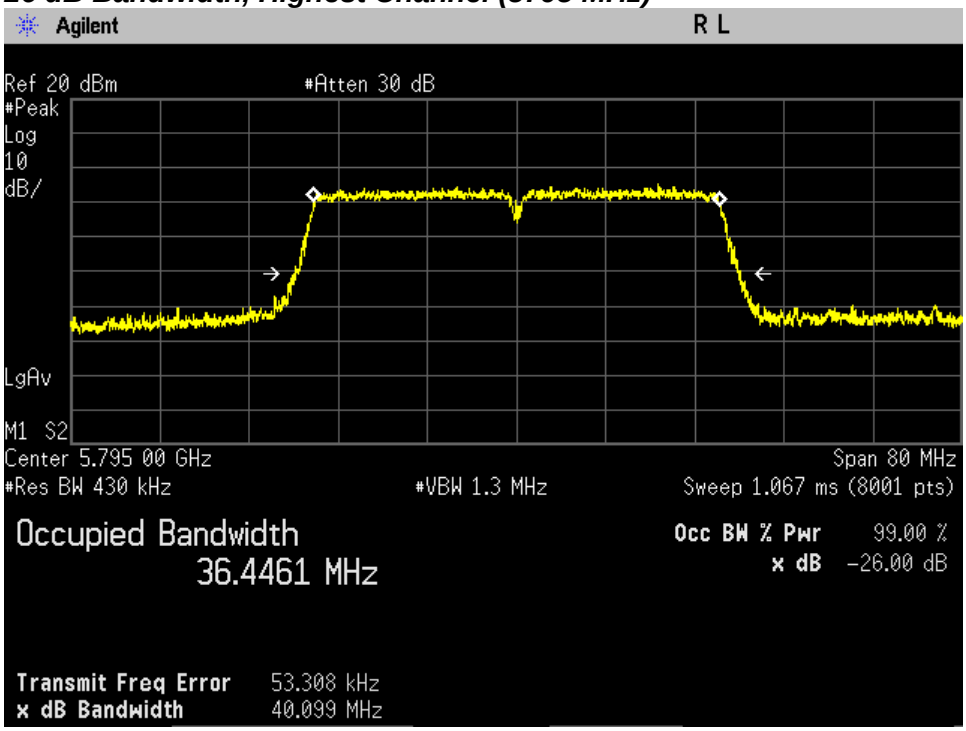
802.11ac (40 MHz) mode - MIMO

Chain 0

26 dB Bandwidth, Lowest Channel (5755 MHz)



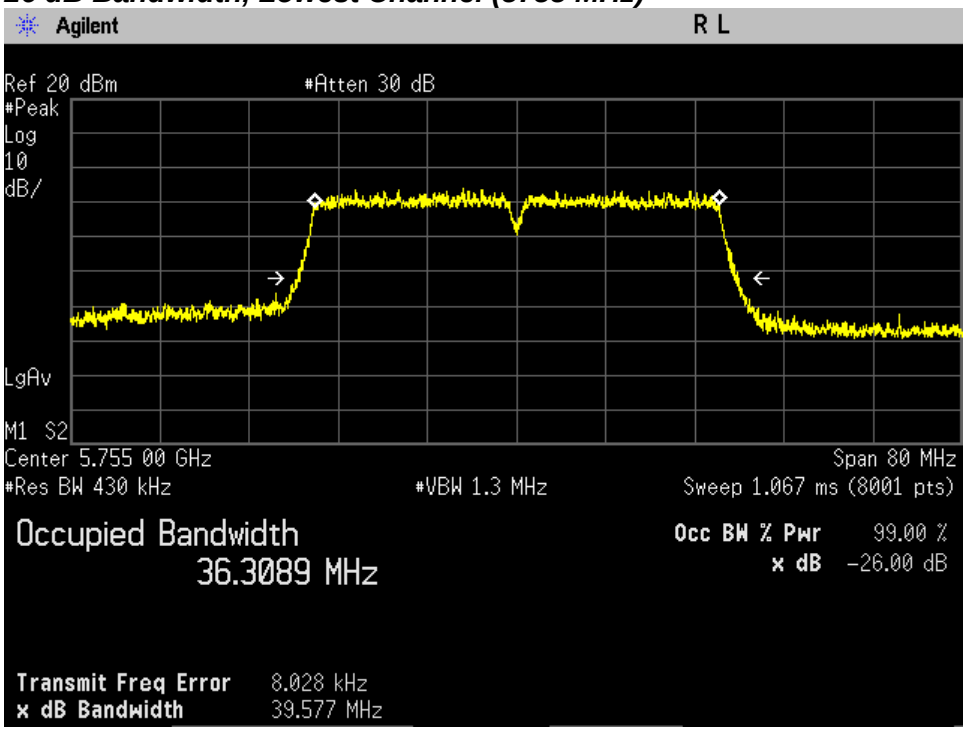
26 dB Bandwidth, Highest Channel (5795 MHz)



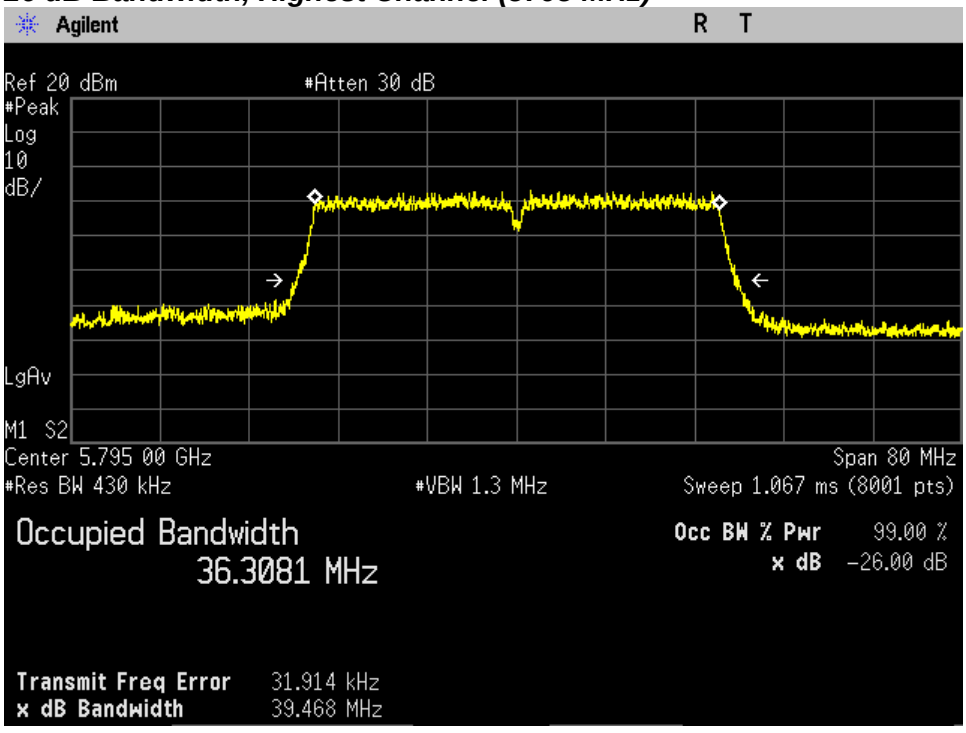
PLOTS OF EMISSIONS

Chain 1

26 dB Bandwidth, Lowest Channel (5755 MHz)



26 dB Bandwidth, Highest Channel (5795 MHz)

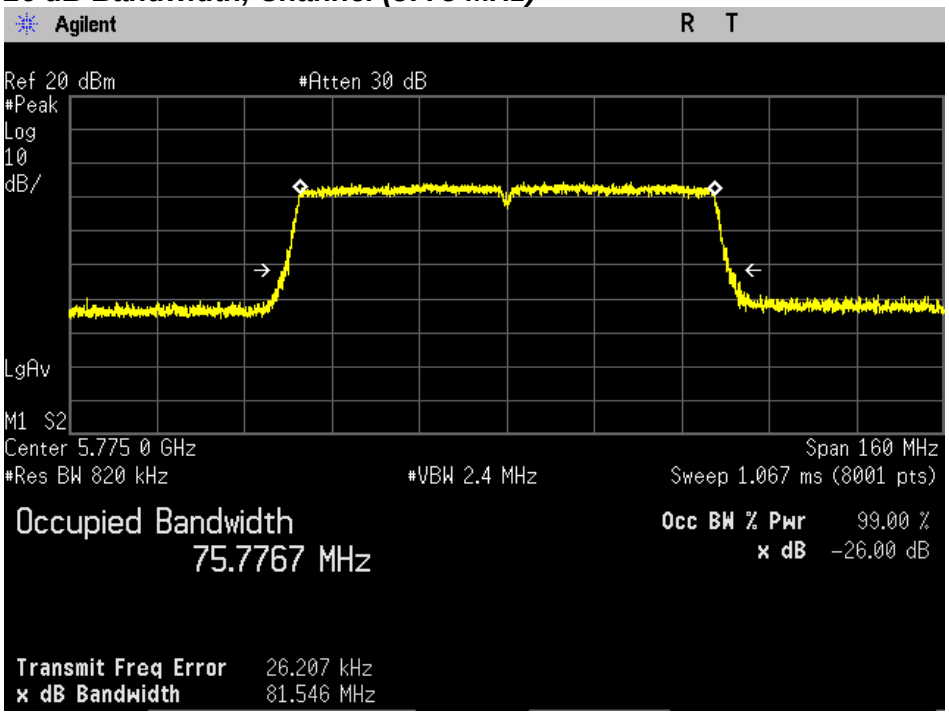


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - SISO

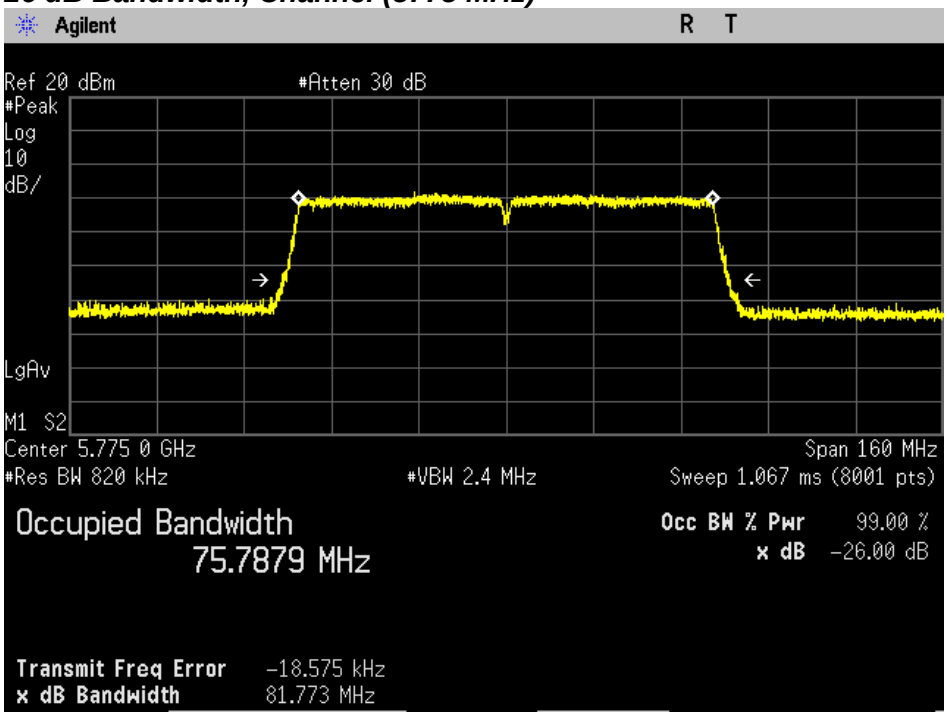
Chain 0

26 dB Bandwidth, Channel (5775 MHz)



Chain 1

26 dB Bandwidth, Channel (5775 MHz)

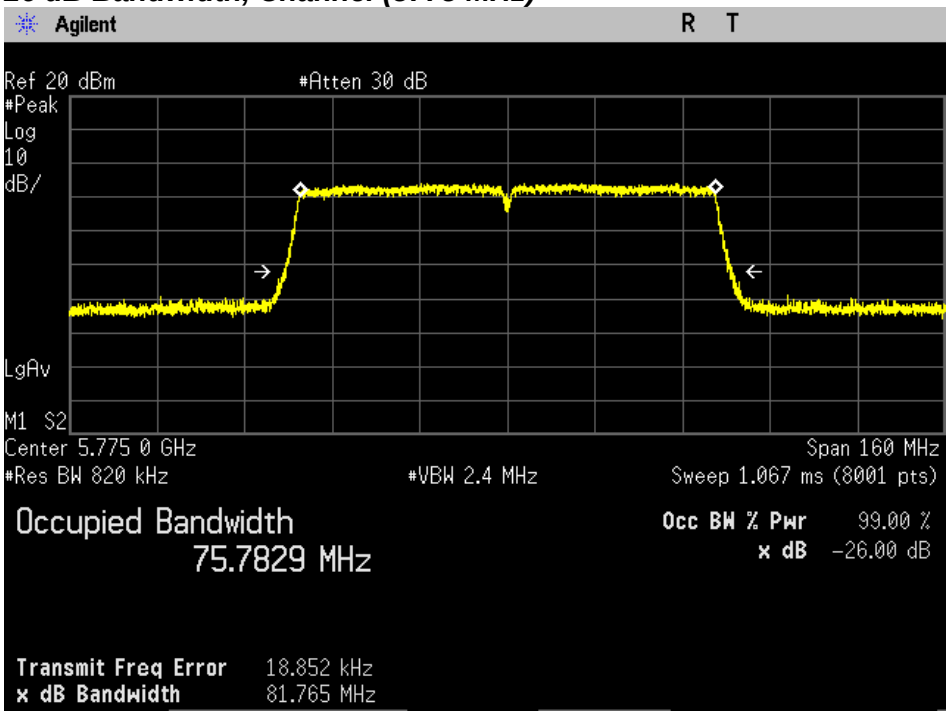


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - CDD

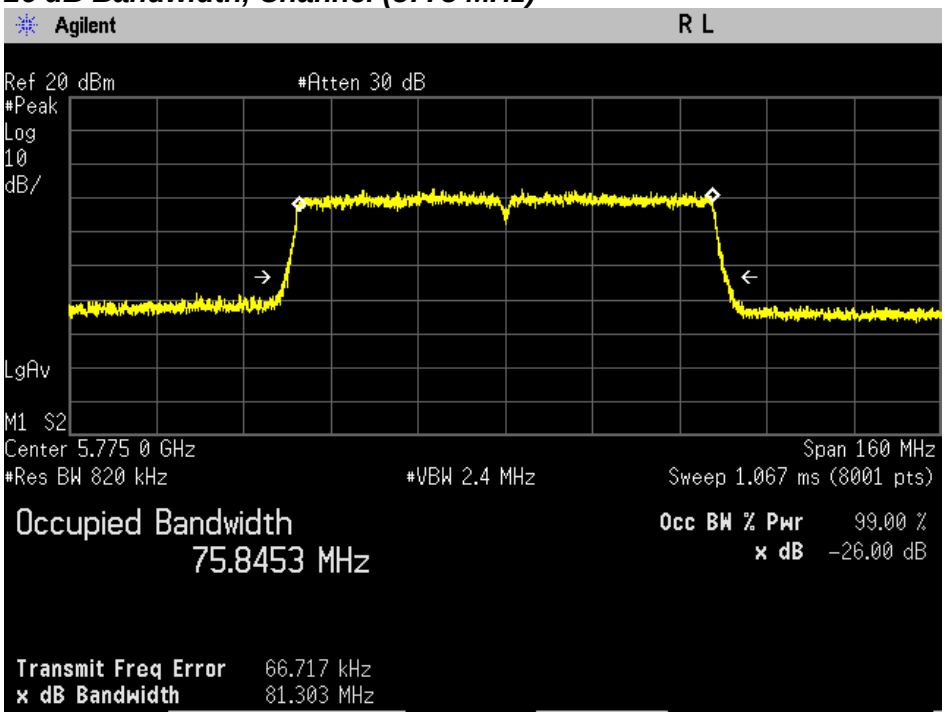
Chain 0

26 dB Bandwidth, Channel (5775 MHz)



Chain 1

26 dB Bandwidth, Channel (5775 MHz)

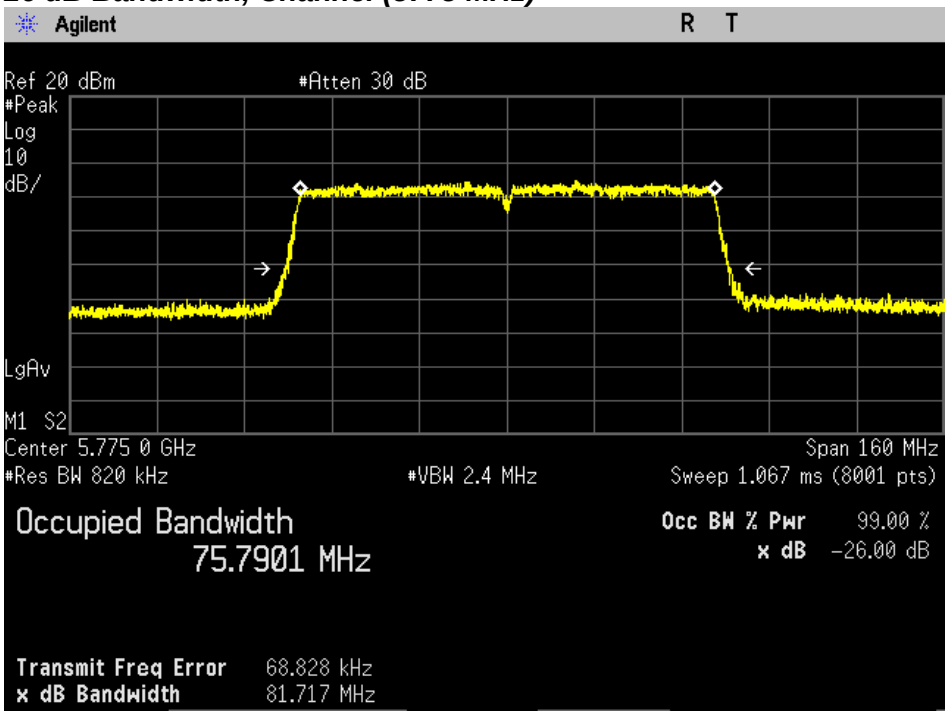


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - MIMO

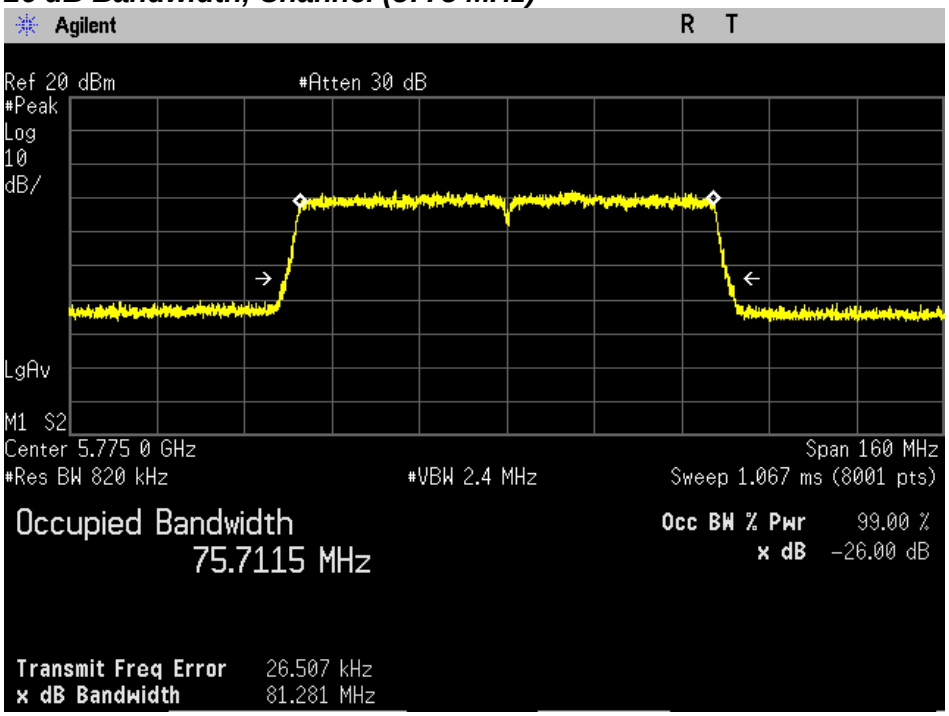
Chain 0

26 dB Bandwidth, Channel (5775 MHz)



Chain 1

26 dB Bandwidth, Channel (5775 MHz)



8.4 6dB Emission Bandwidth – UNII-3 band

FCC §15.407(e), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	16.34	16.35	>500
Middle	5785	16.33	16.34	
High	5825	16.34	16.35	

802.11n (20 MHz) mode - SISO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.59	17.59	>500
Middle	5785	17.59	17.58	
High	5825	17.56	17.58	

802.11n (20 MHz) mode - CDD

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.57	17.62	>500
Middle	5785	17.59	17.60	
High	5825	17.55	17.59	

802.11n (20 MHz) mode – MIMO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.57	17.60	>500
Middle	5785	17.58	17.61	
High	5825	17.59	17.57	

802.11n (40 MHz) mode – SISO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.35	36.31	>500
High	5795	36.31	36.33	

802.11n (40 MHz) mode - CDD

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.33	36.32	>500
High	5795	36.33	36.34	

802.11n (40 MHz) mode - MIMO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.32	36.35	>500
High	5795	36.32	36.32	

802.11ac (20 MHz) mode - SISO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.58	17.60	>500
Middle	5785	17.60	17.58	
High	5825	17.58	17.58	

802.11ac (20 MHz) mode - CDD

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.58	17.59	>500
Middle	5785	17.57	17.59	
High	5825	17.58	17.60	

802.11ac (20 MHz) mode - MIMO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5745	17.58	17.61	>500
Middle	5785	17.59	17.59	
High	5825	17.58	17.58	

802.11ac (40 MHz) mode - SISO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.33	36.32	>500
High	5795	36.34	36.32	

802.11ac (40 MHz) mode - CDD

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.32	36.34	>500
High	5795	36.32	36.33	

802.11ac (40 MHz) mode - MIMO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
Low	5755	36.33	36.32	>500
High	5795	36.31	36.31	

802.11ac (80 MHz) mode - SISO

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
	5775	75.73	75.83	>500

802.11ac (80 MHz) mode - CDD

Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
	5775	75.74	75.69	>500

802.11ac (80 MHz) mode – MIMO

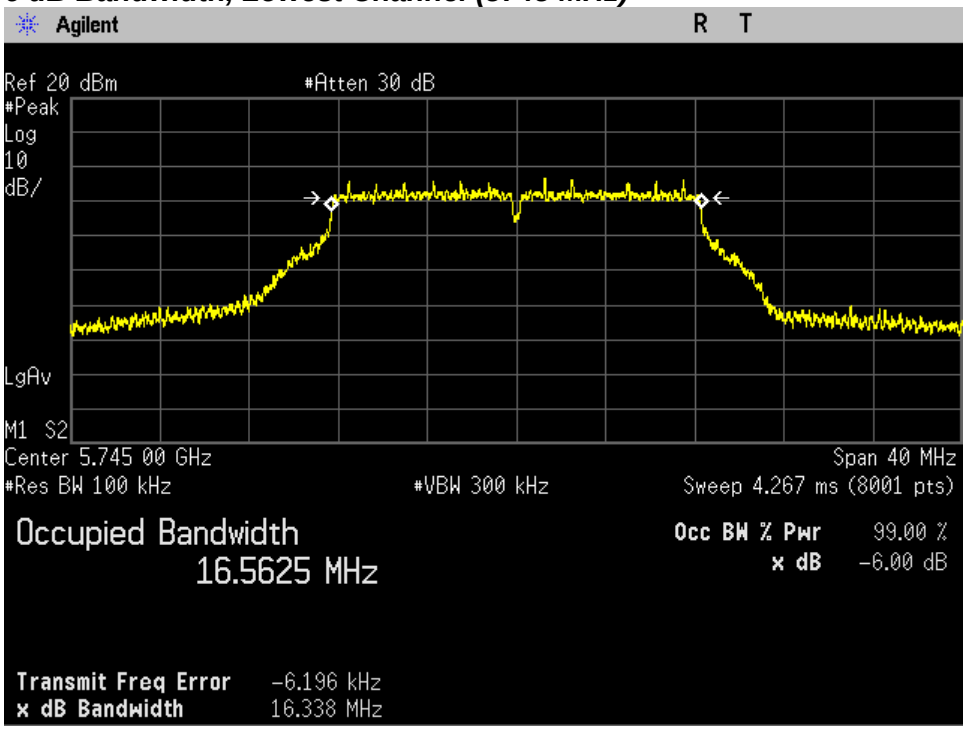
Channel	Frequency(MHz)	6dB Emission Bandwidth(MHz)		Limit (kHz)
		Chain 0	Chain 1	
	5775	75.46	75.95	>500

PLOTS OF EMISSIONS

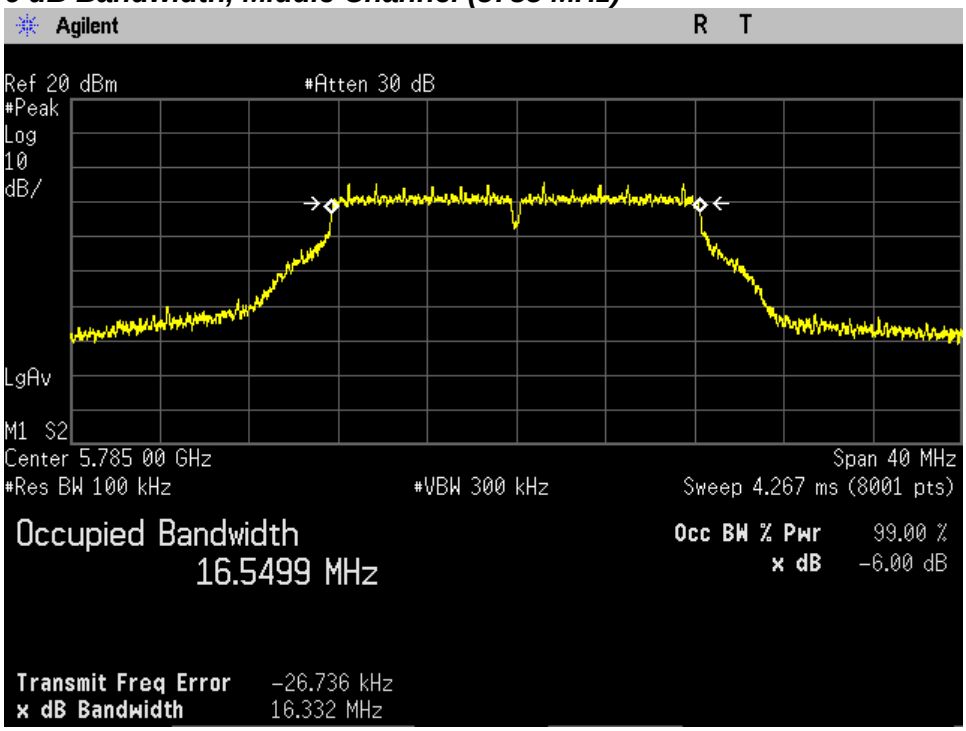
802.11a mode

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

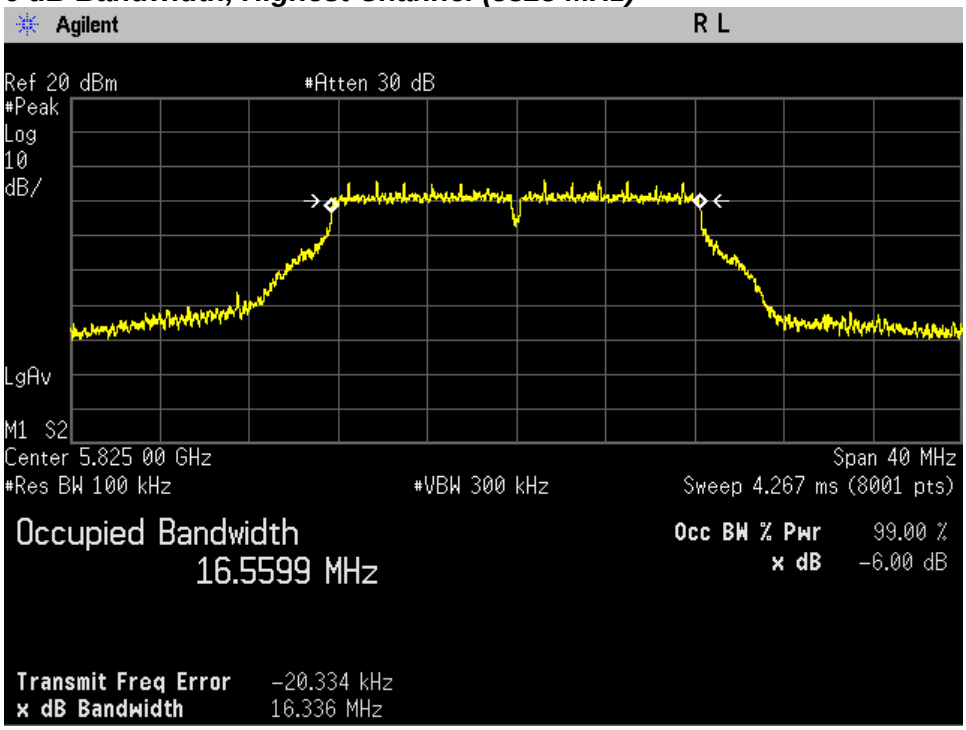


6 dB Bandwidth, Middle Channel (5785 MHz)



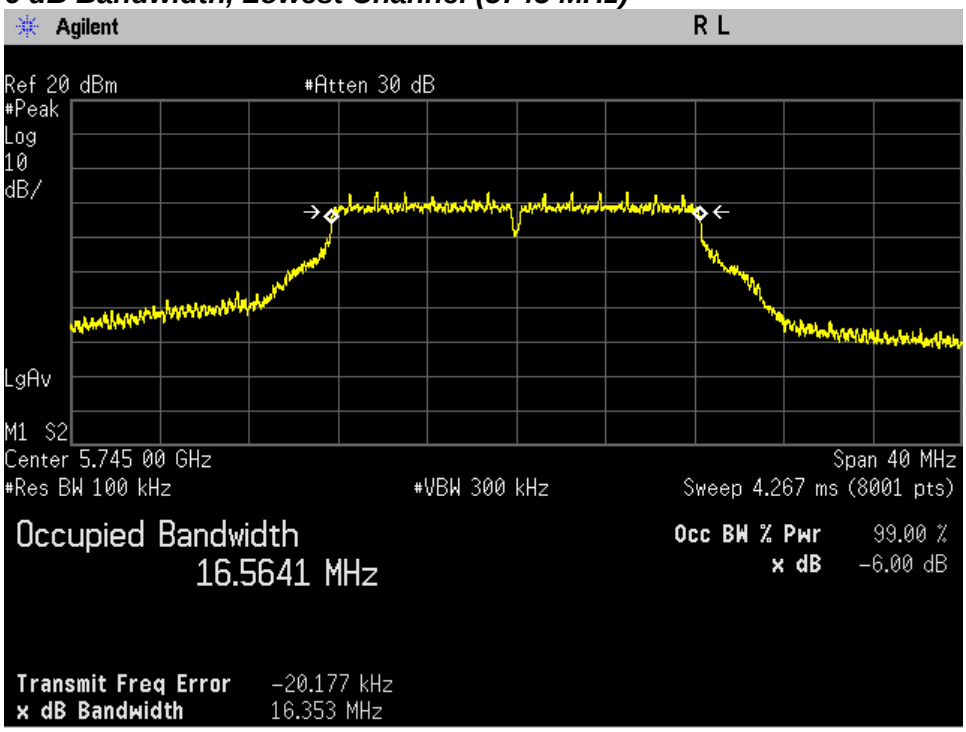
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



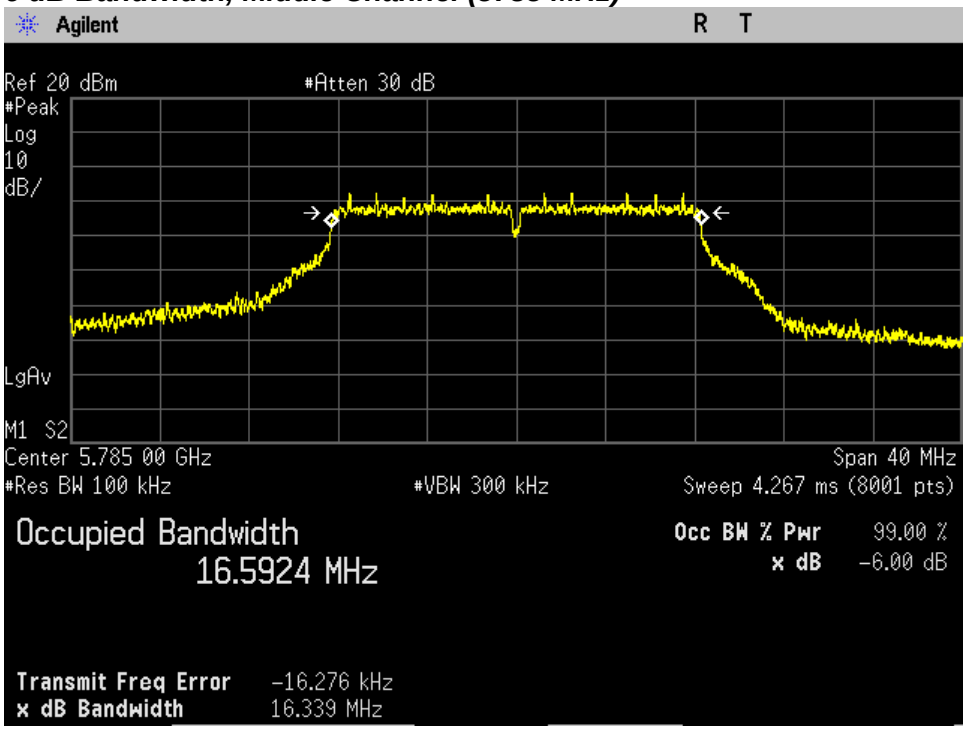
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

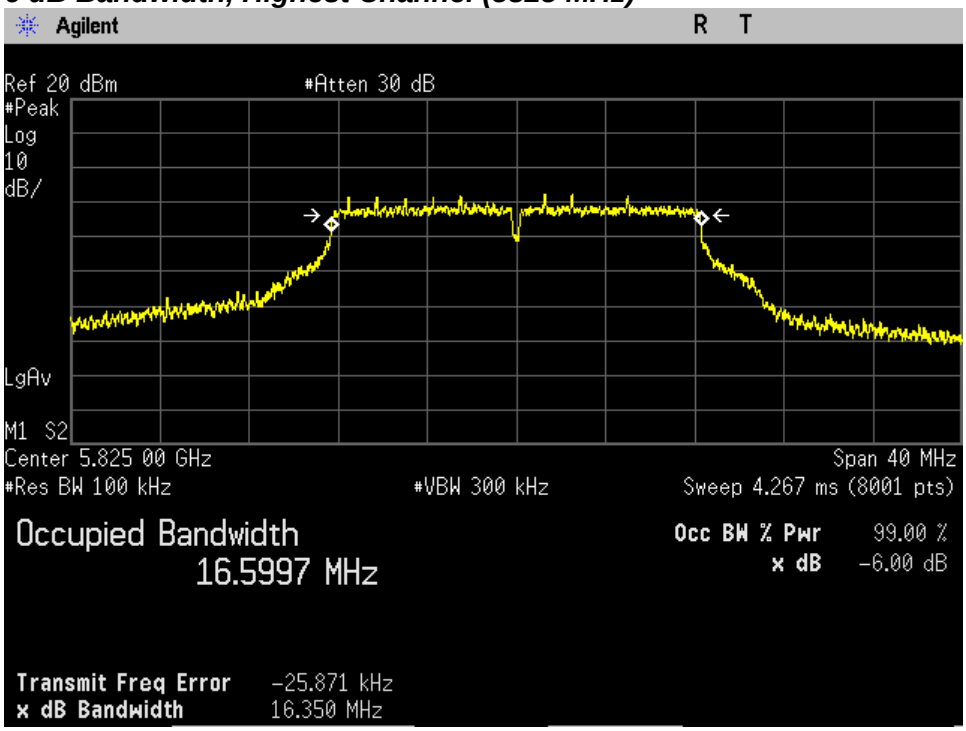


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

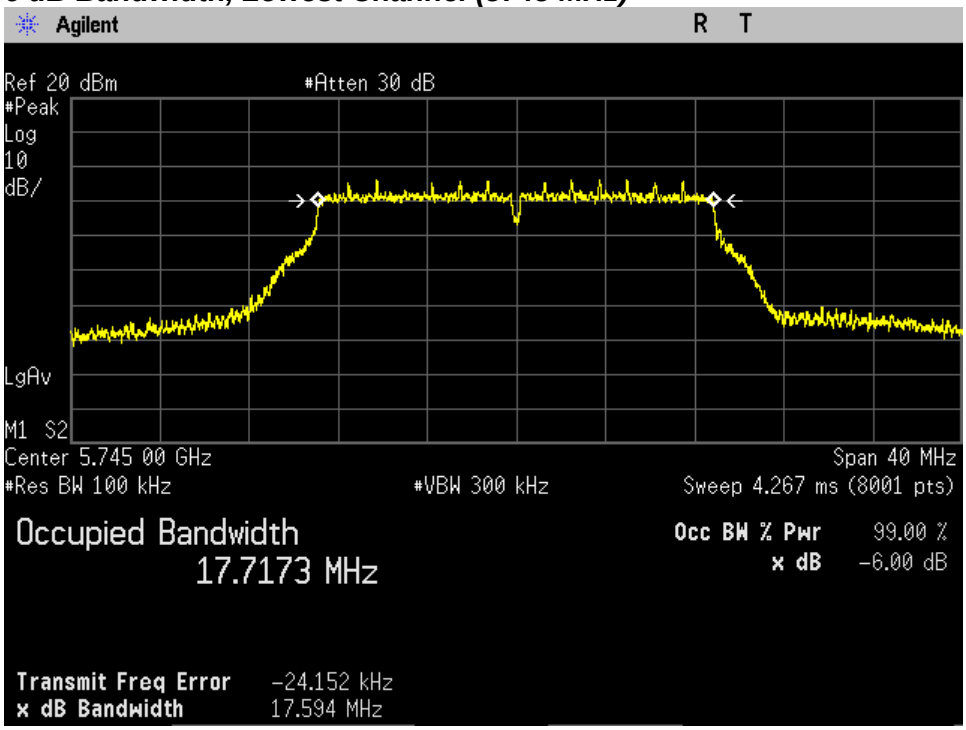


PLOTS OF EMISSIONS

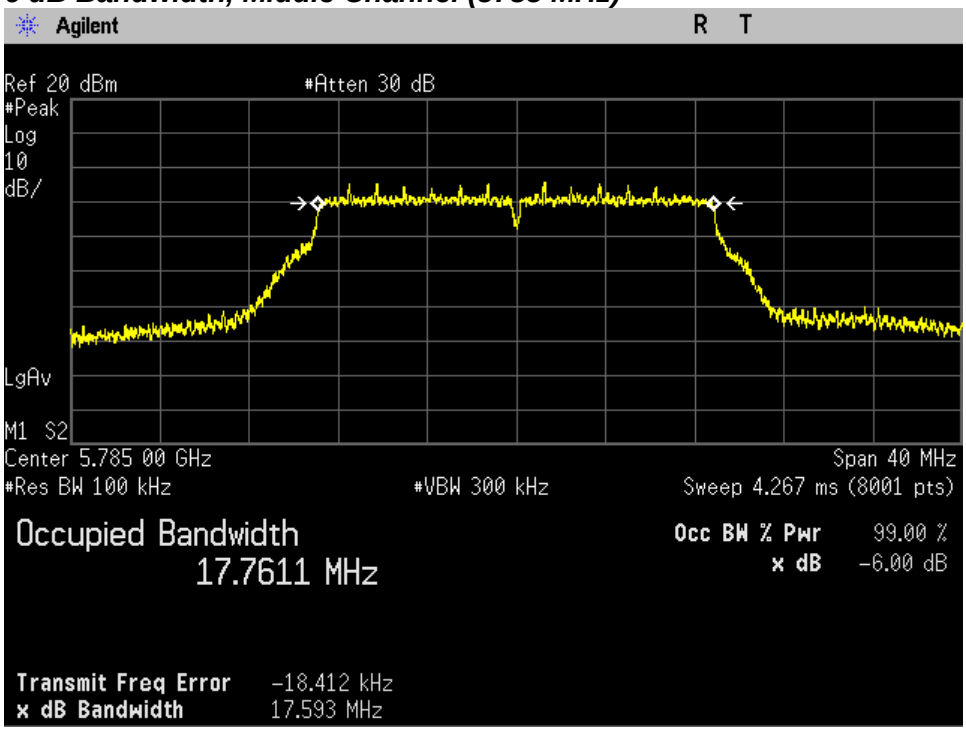
802.11n (20 MHz) mode - SISO

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

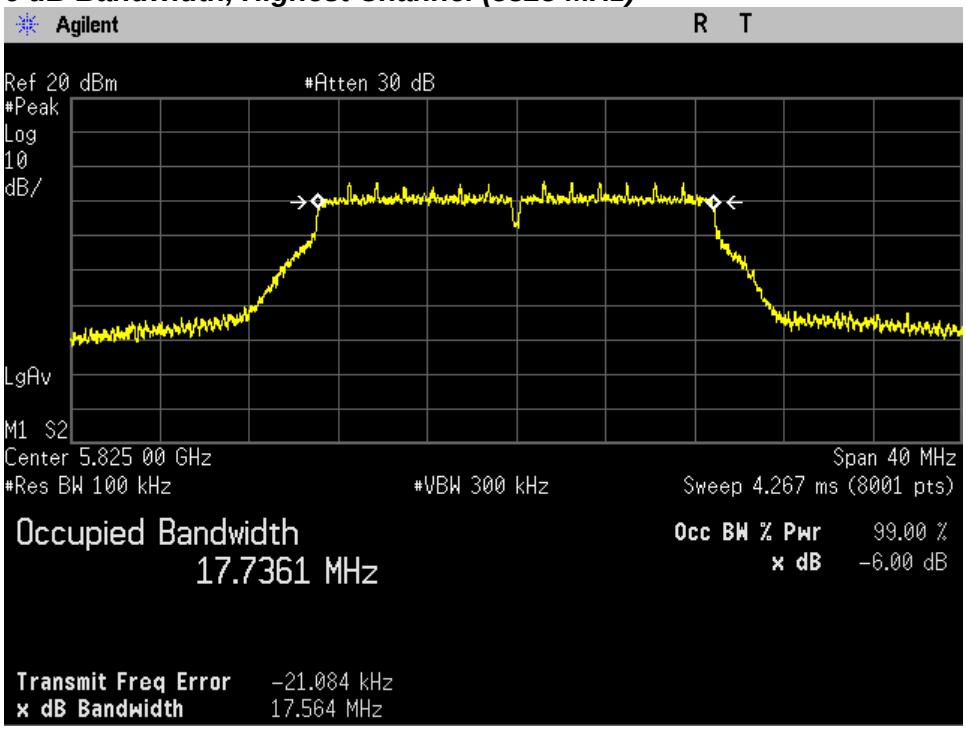


6 dB Bandwidth, Middle Channel (5785 MHz)



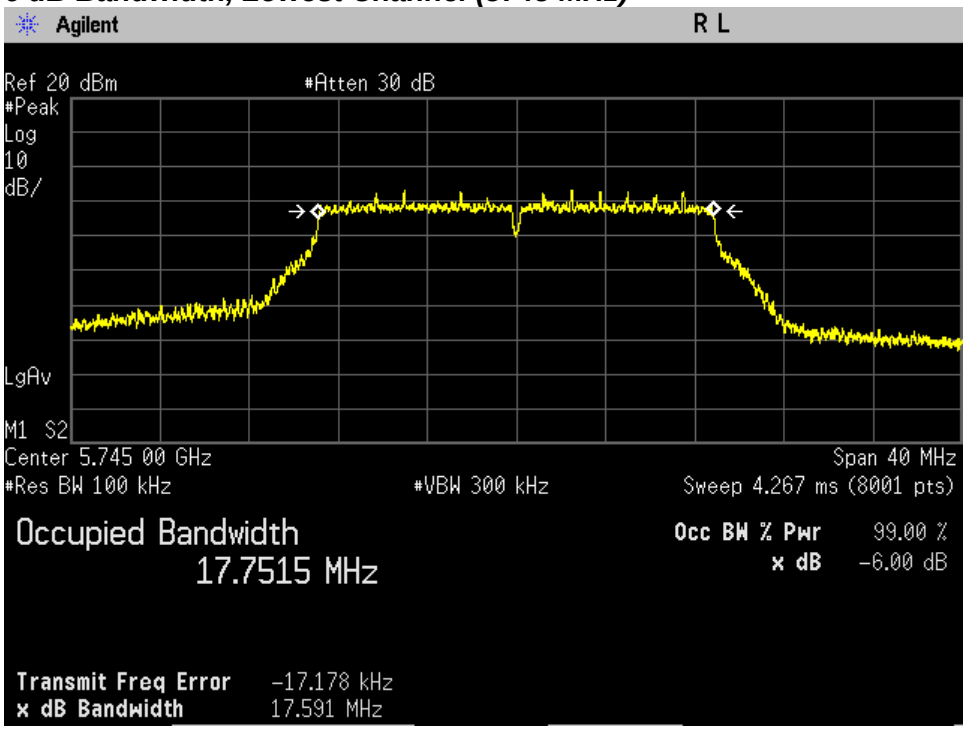
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



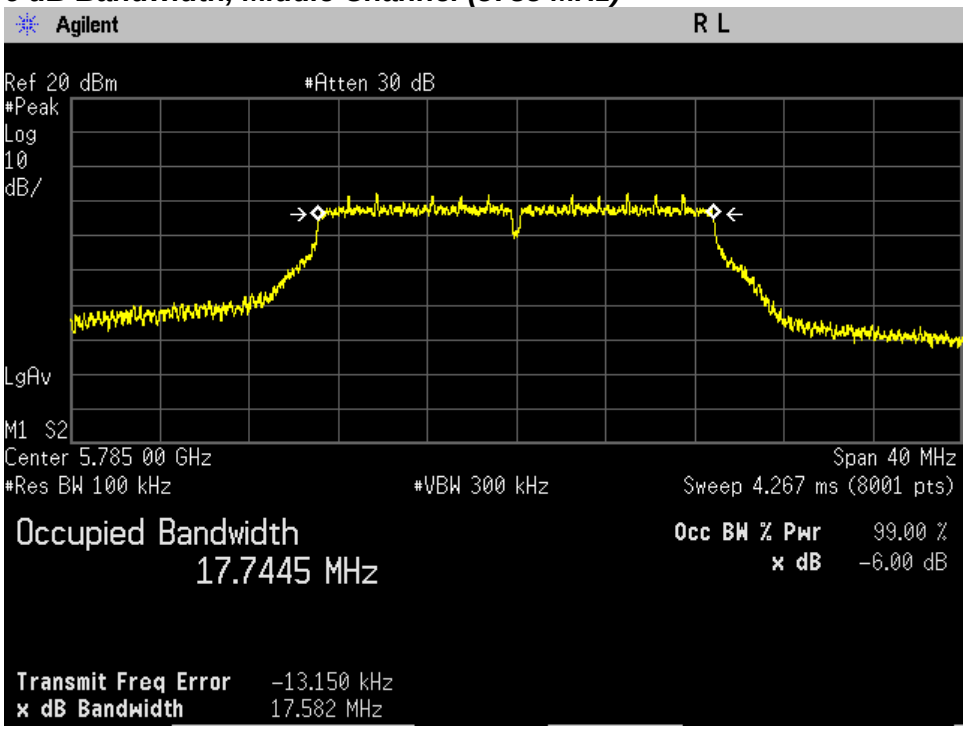
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

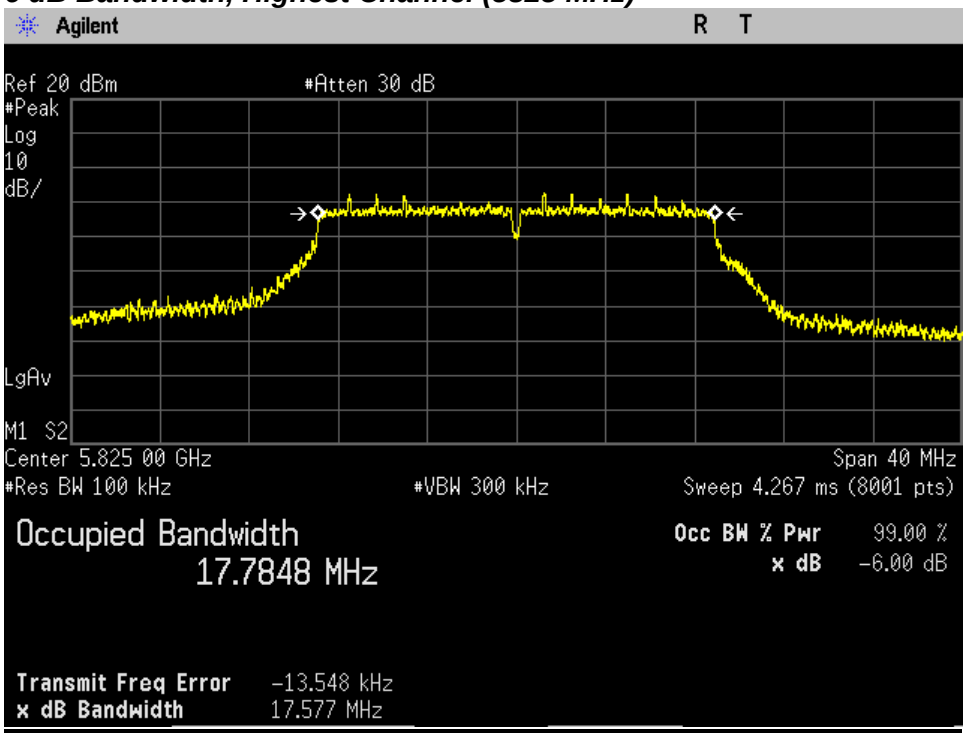


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

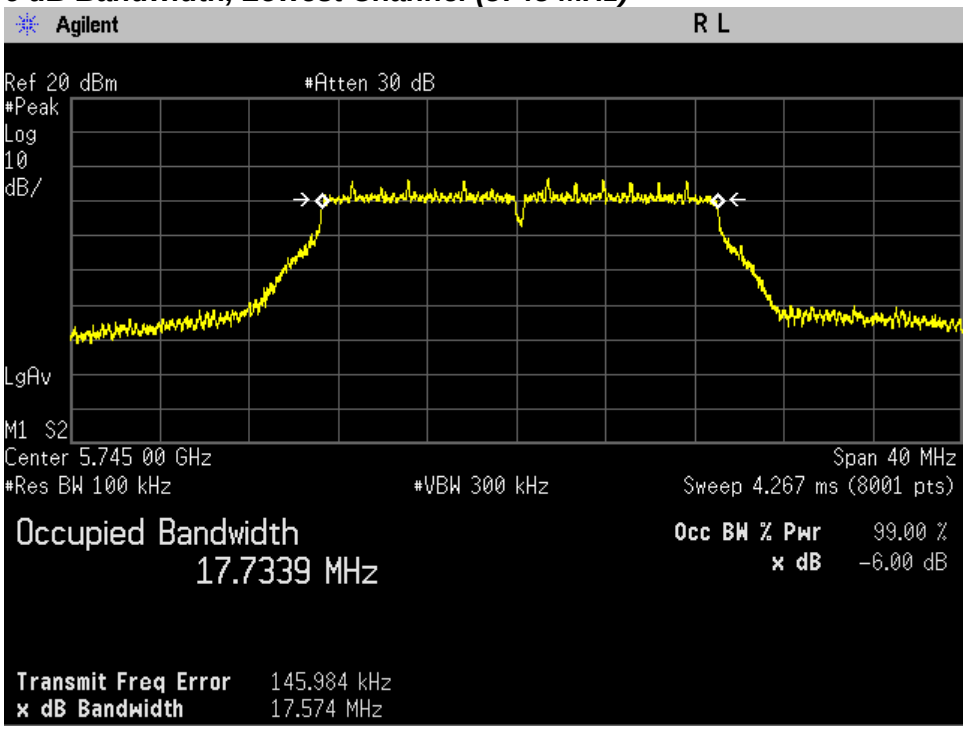


PLOTS OF EMISSIONS

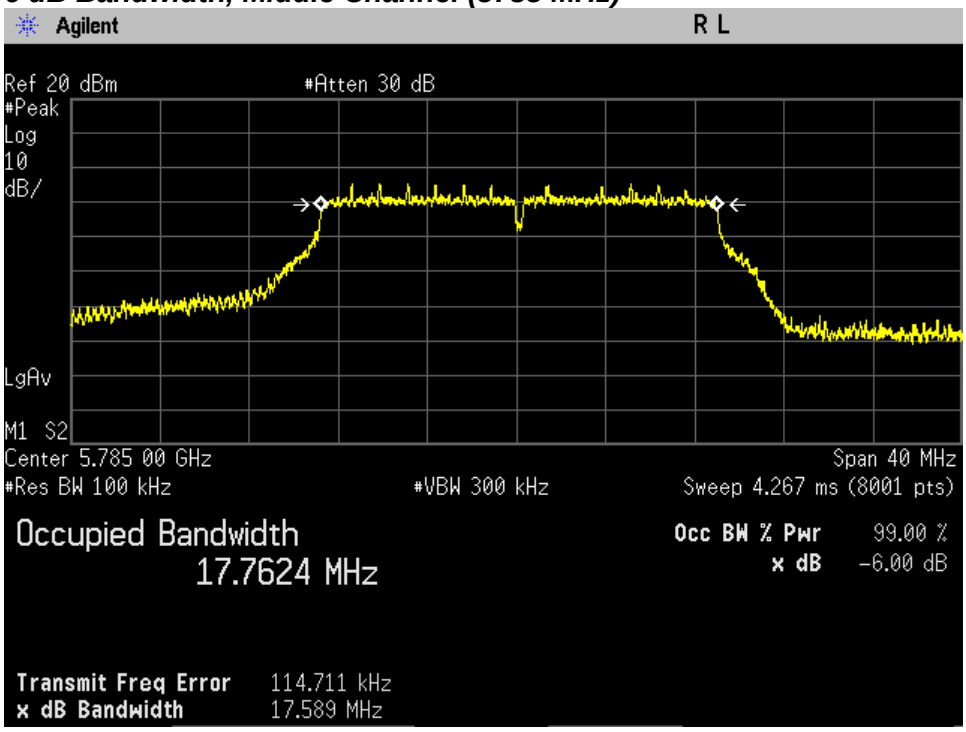
802.11n (20 MHz) mode - CDD

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

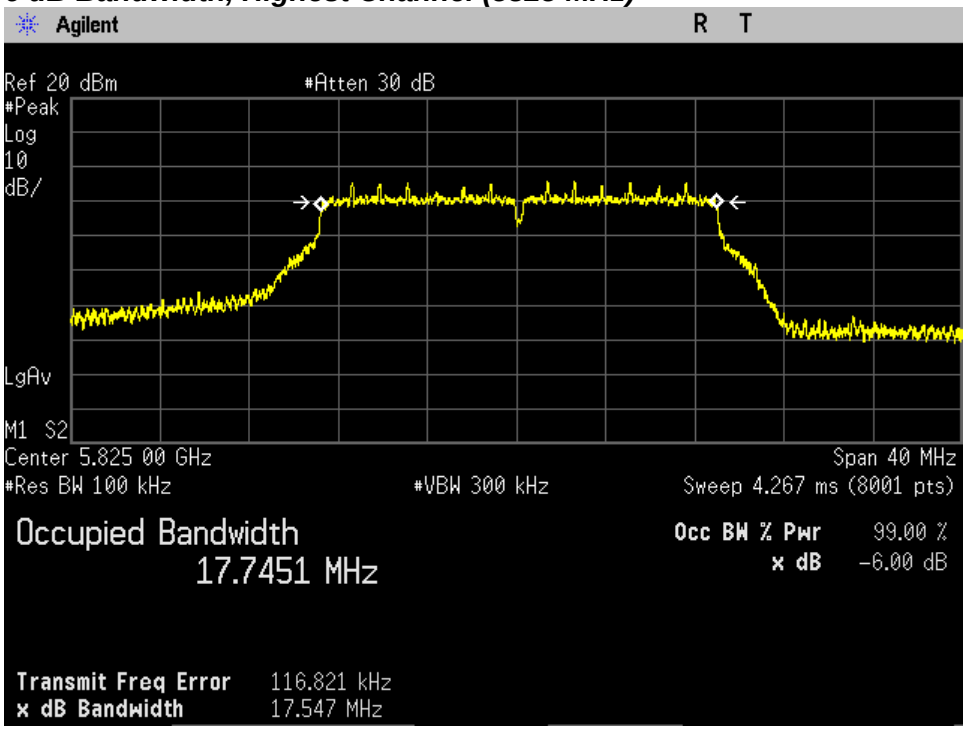


6 dB Bandwidth, Middle Channel (5785 MHz)



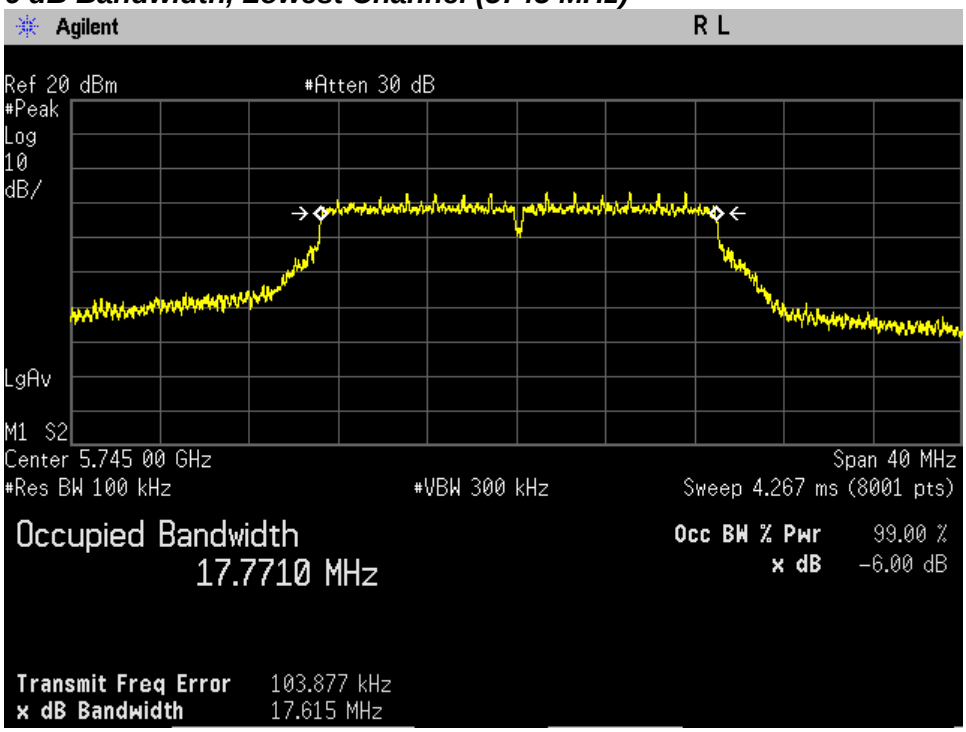
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



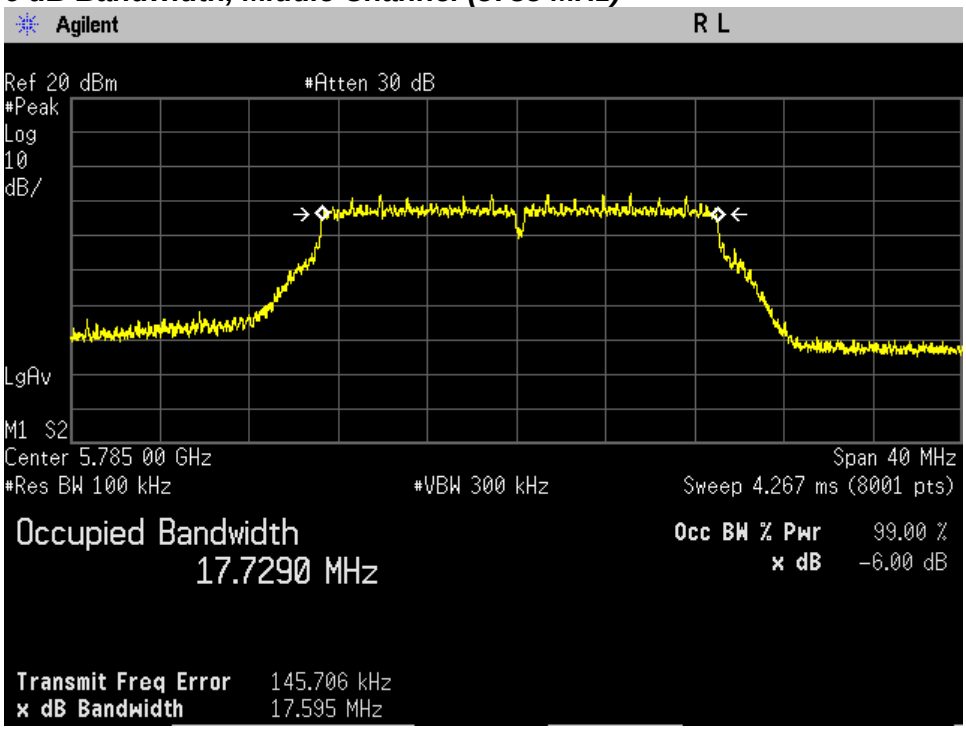
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

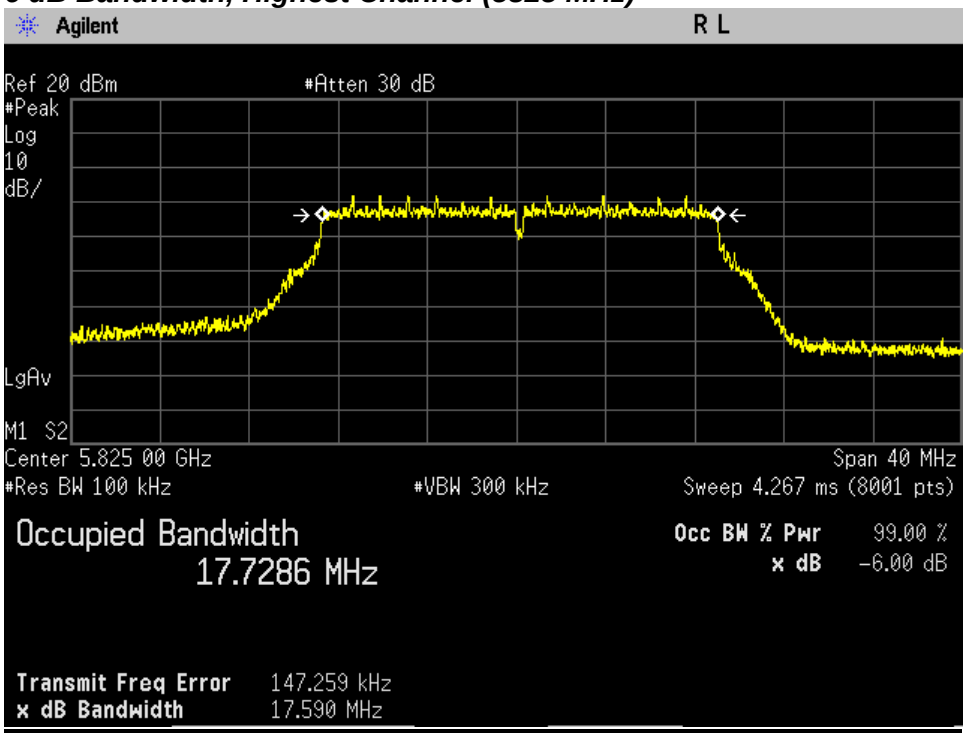


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

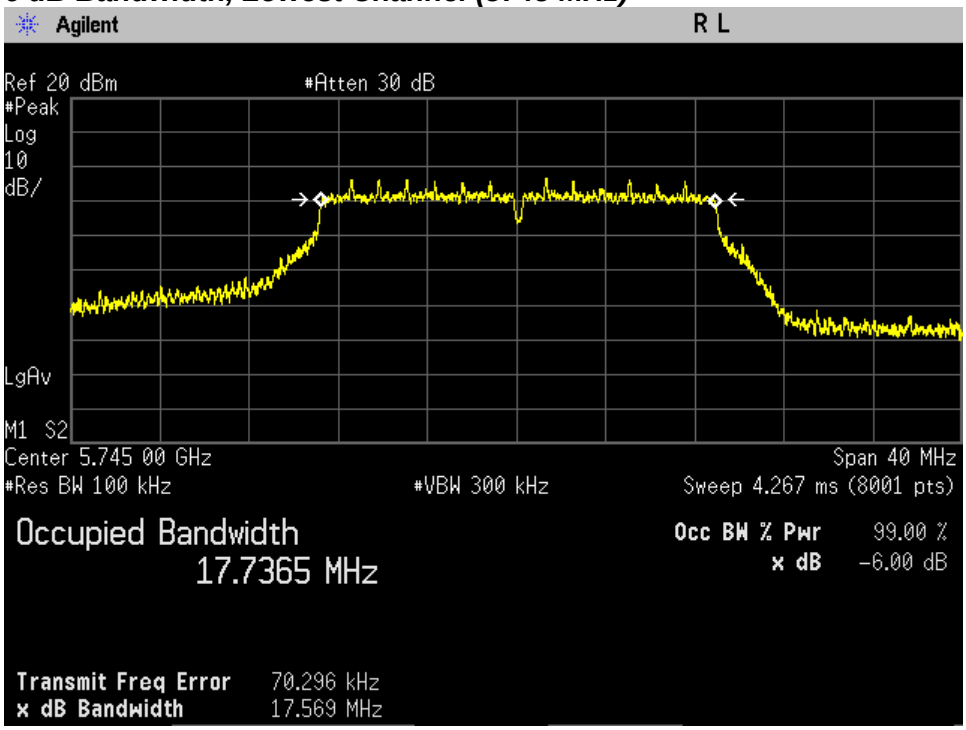


PLOTS OF EMISSIONS

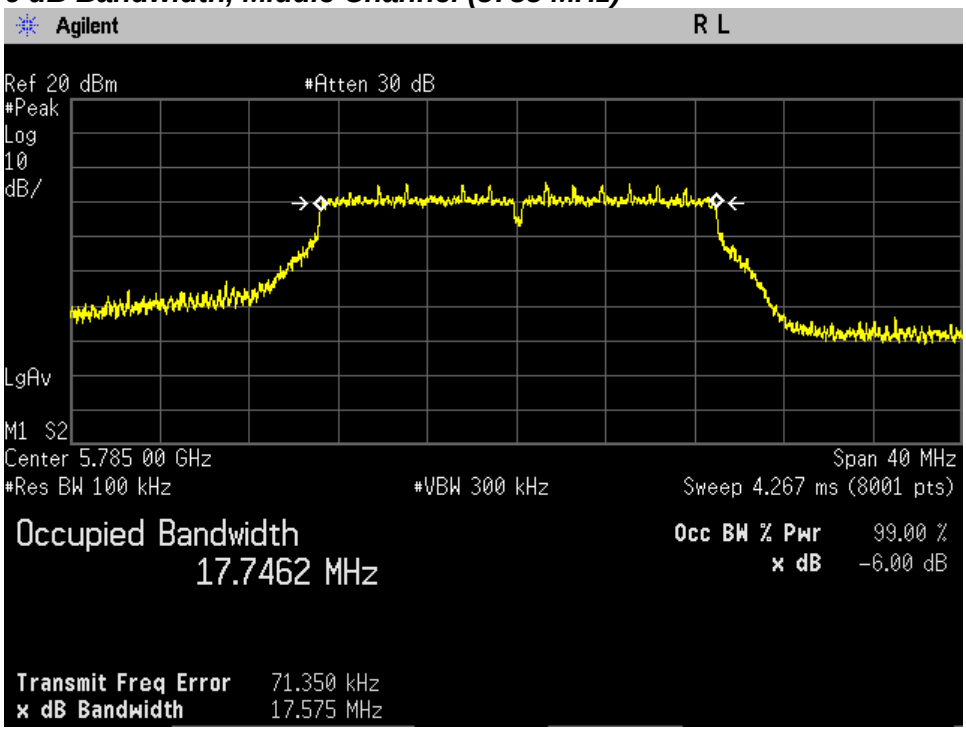
802.11n (20 MHz) mode - MIMO

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

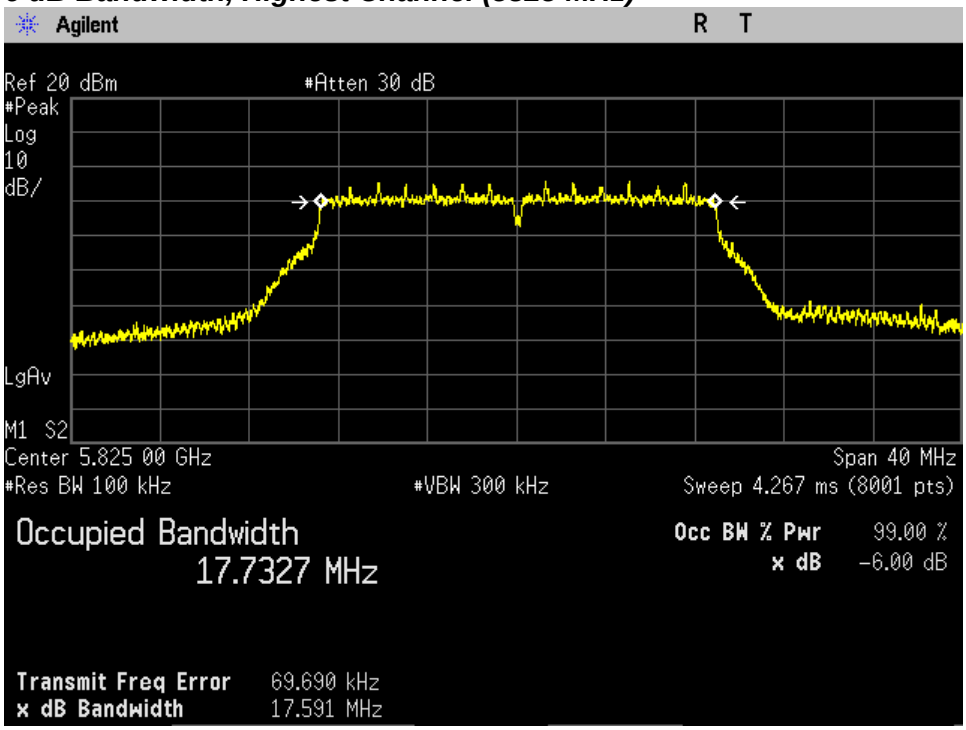


6 dB Bandwidth, Middle Channel (5785 MHz)



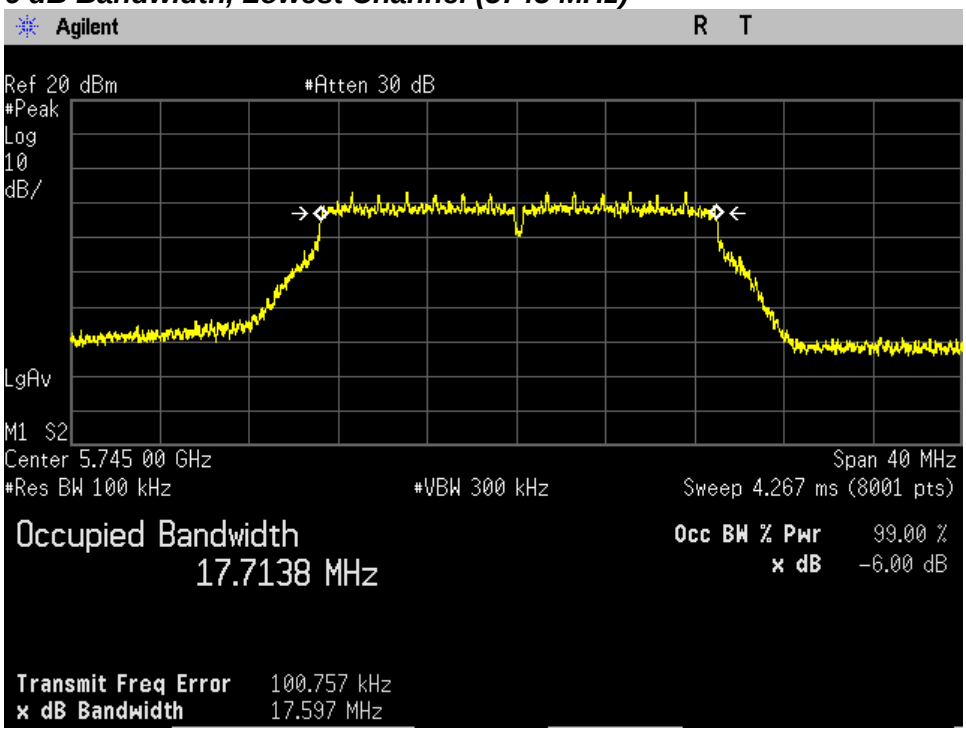
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



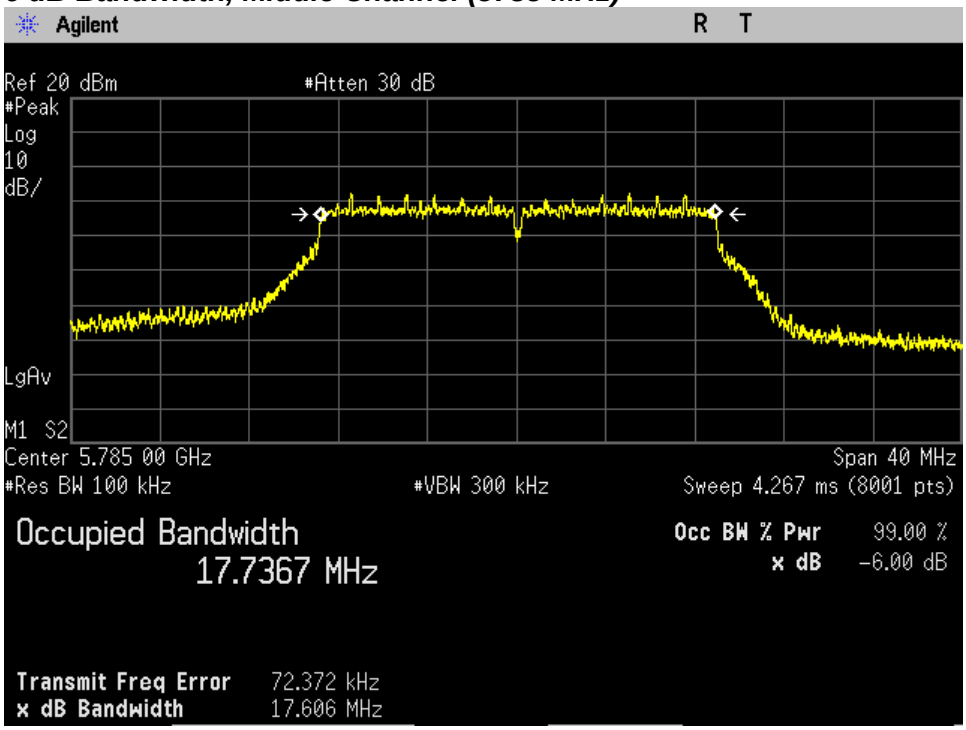
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

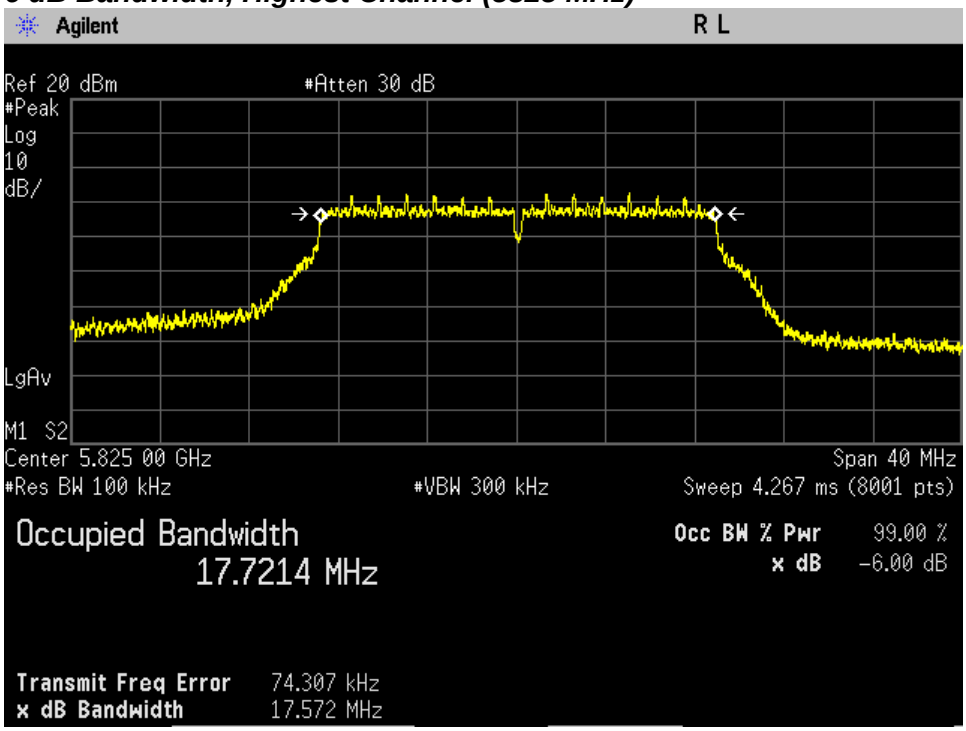


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

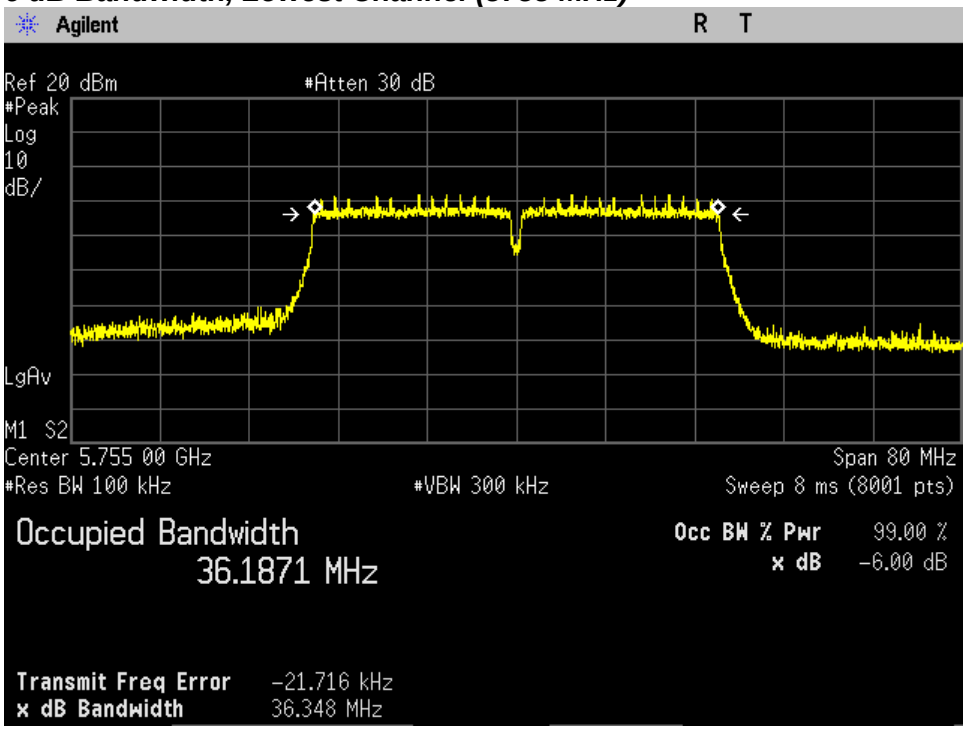


PLOTS OF EMISSIONS

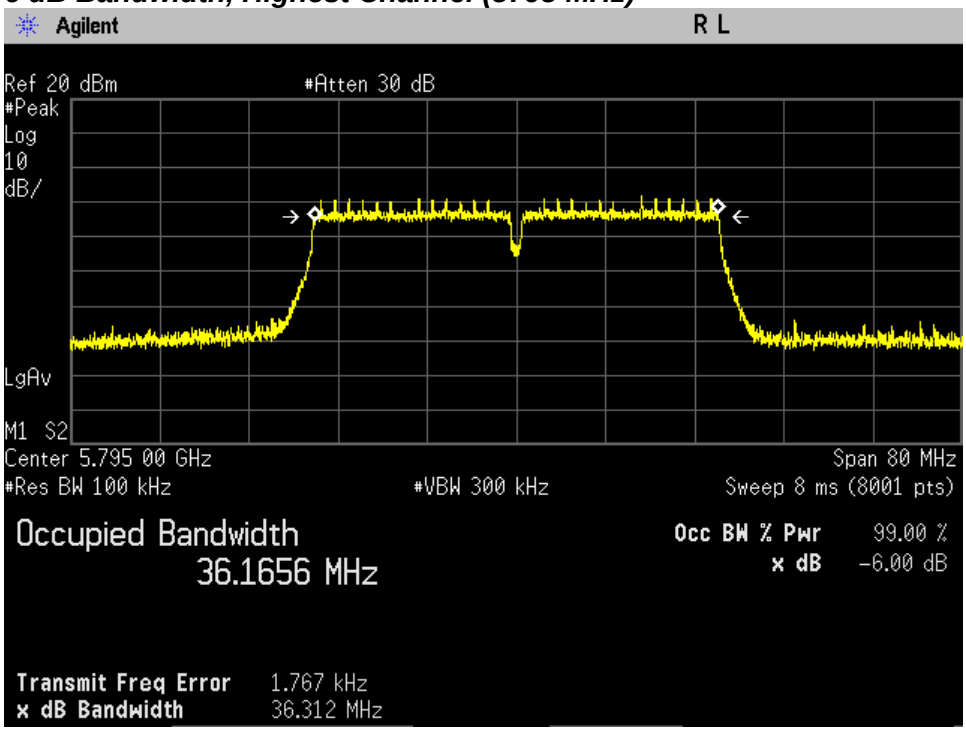
802.11n (40 MHz) mode - SISO

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



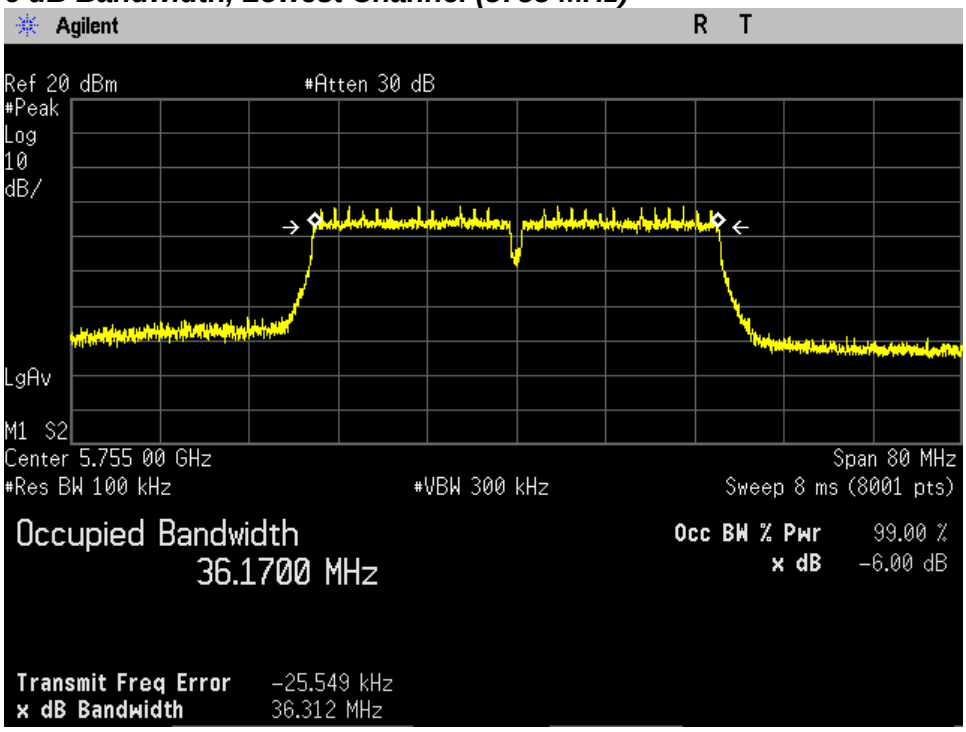
6 dB Bandwidth, Highest Channel (5795 MHz)



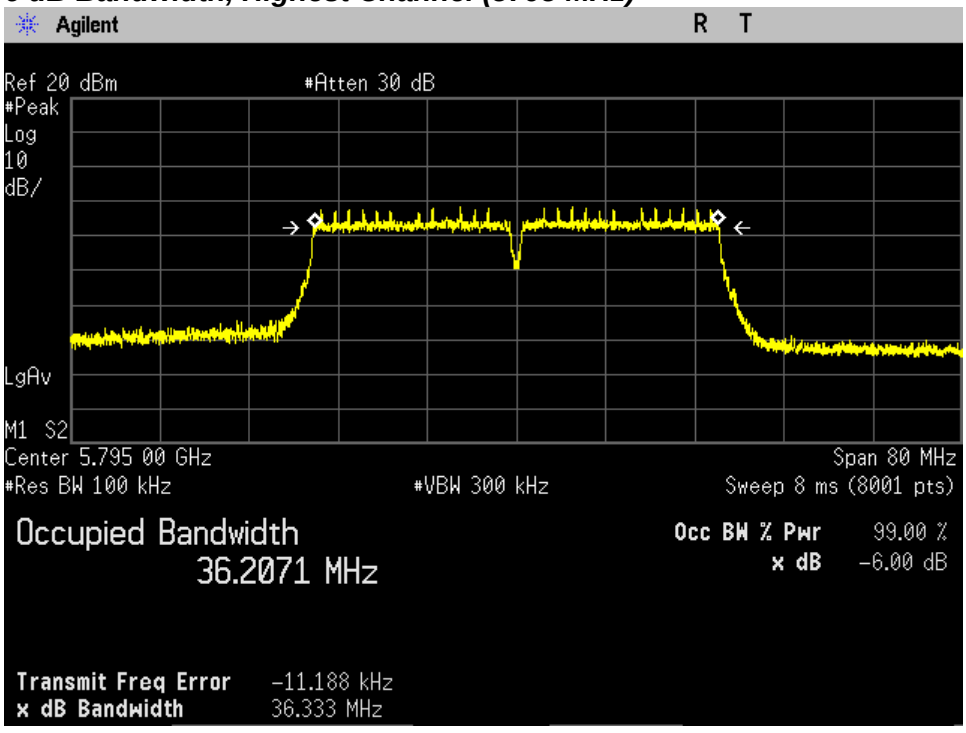
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

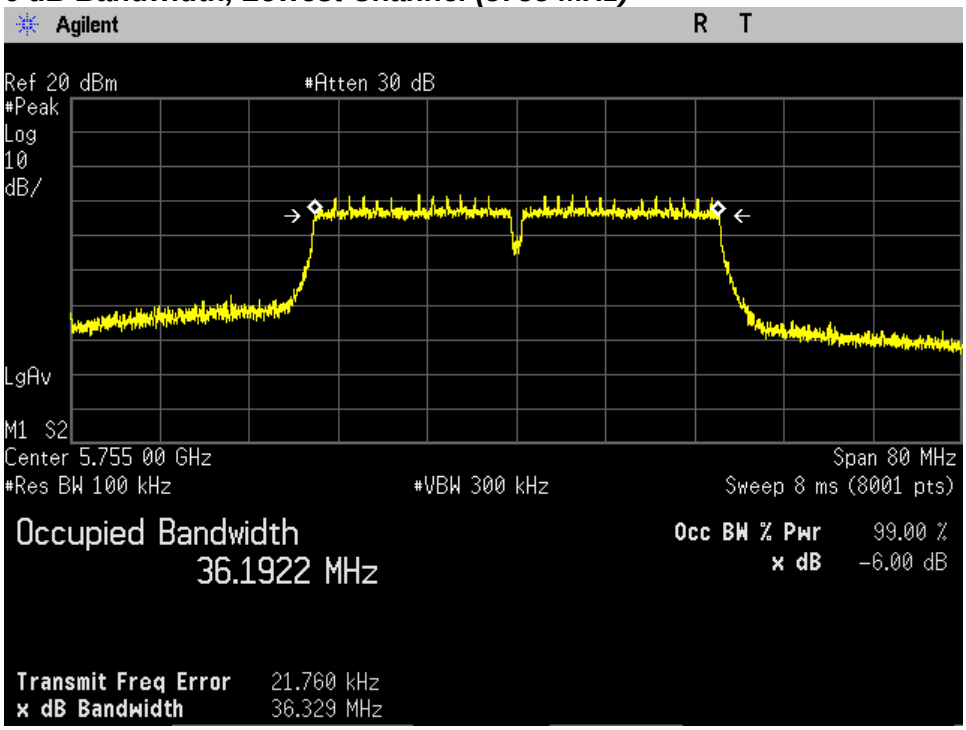


PLOTS OF EMISSIONS

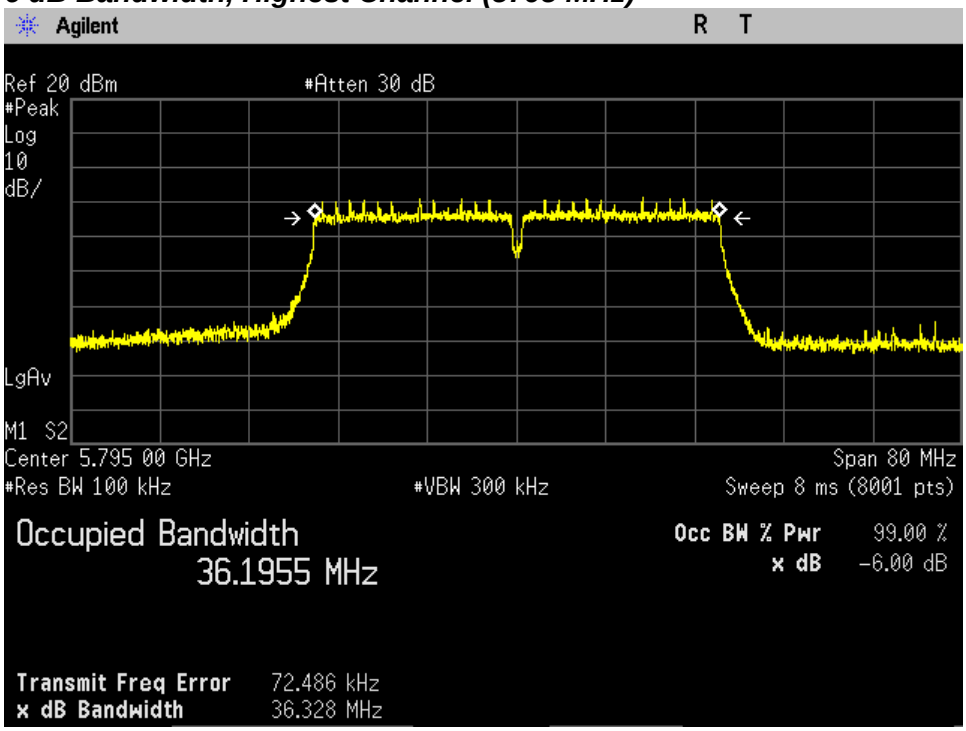
802.11n (40 MHz) mode - CDD

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



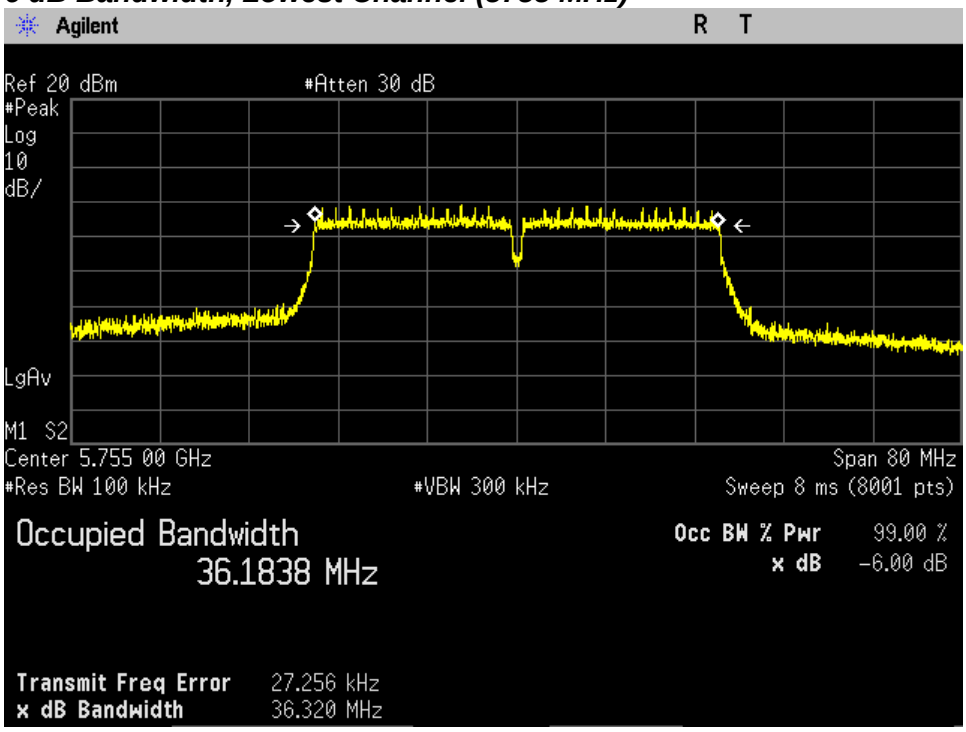
6 dB Bandwidth, Highest Channel (5795 MHz)



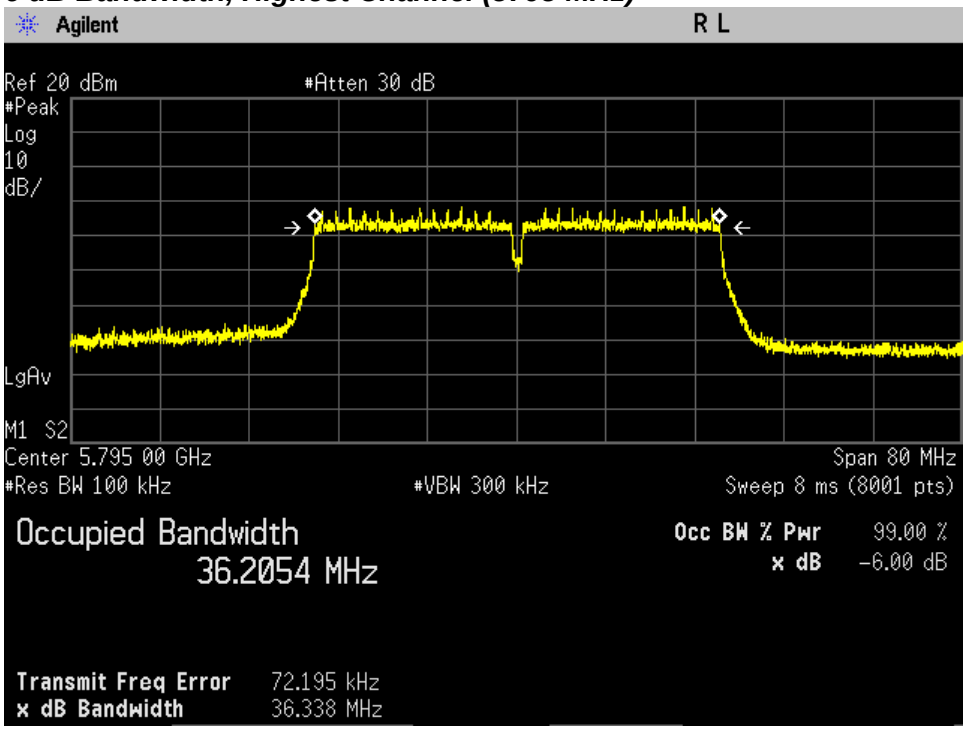
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

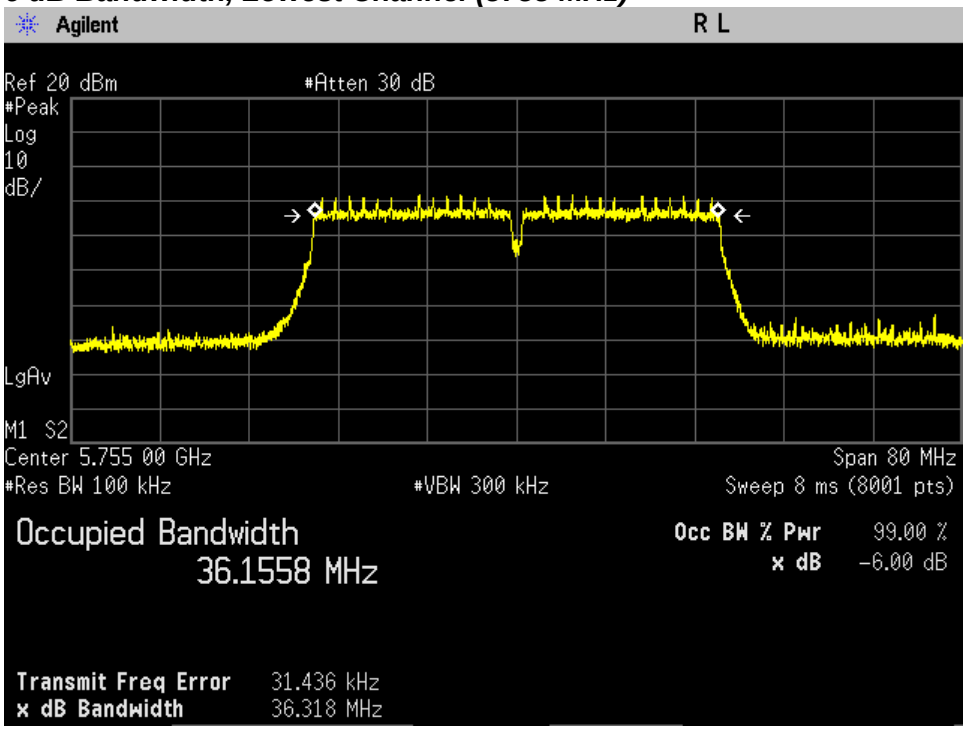


PLOTS OF EMISSIONS

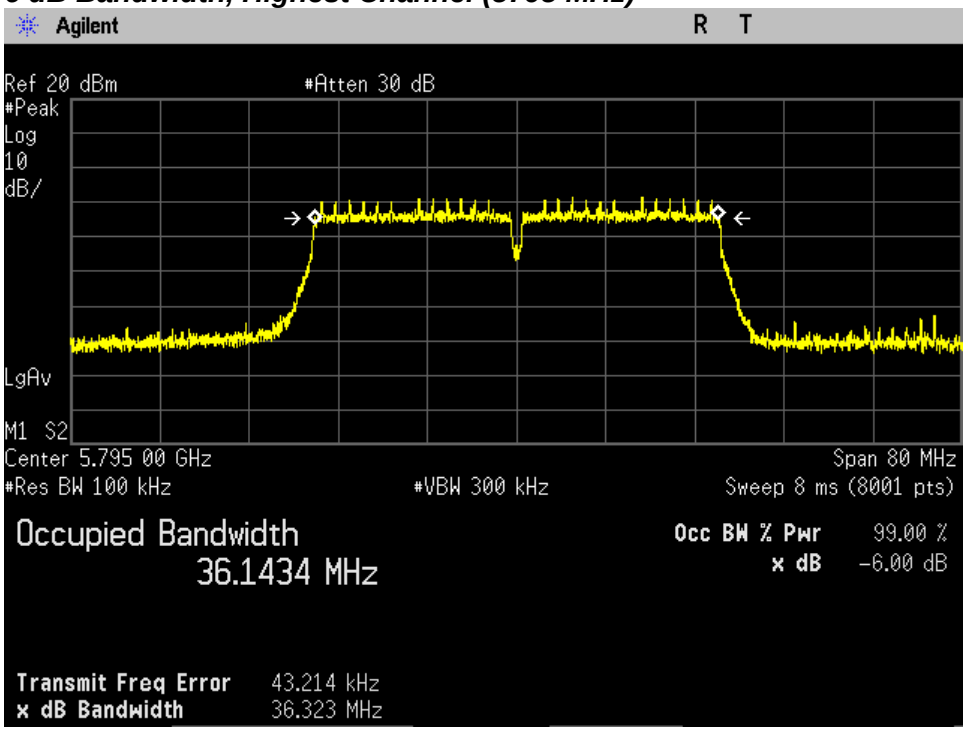
802.11n (40 MHz) mode - MIMO

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



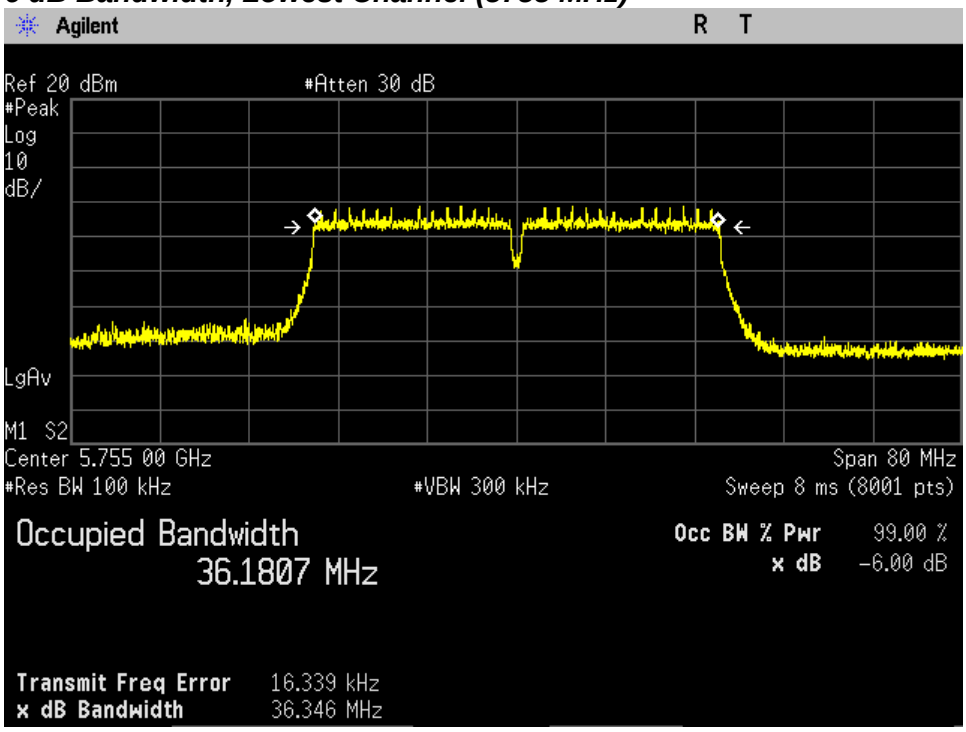
6 dB Bandwidth, Highest Channel (5795 MHz)



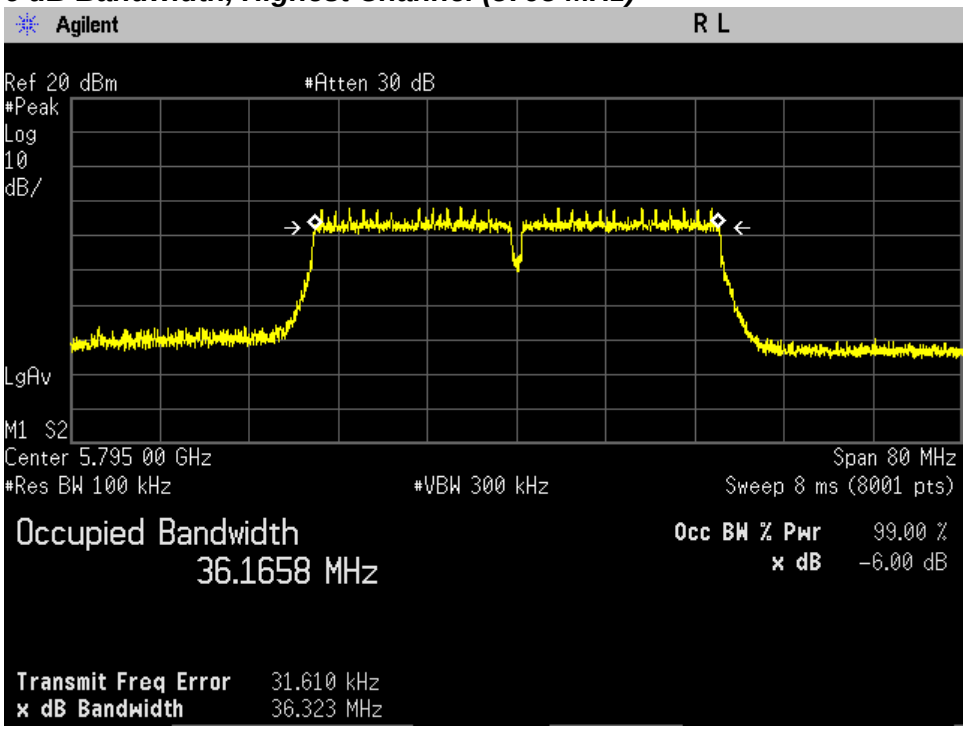
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

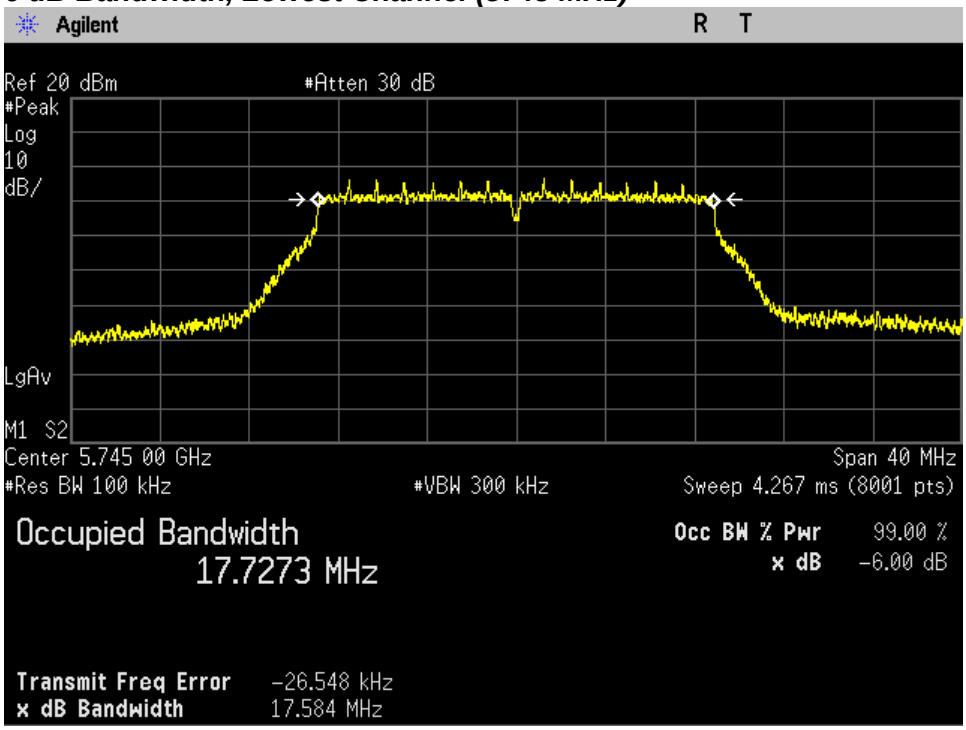


PLOTS OF EMISSIONS

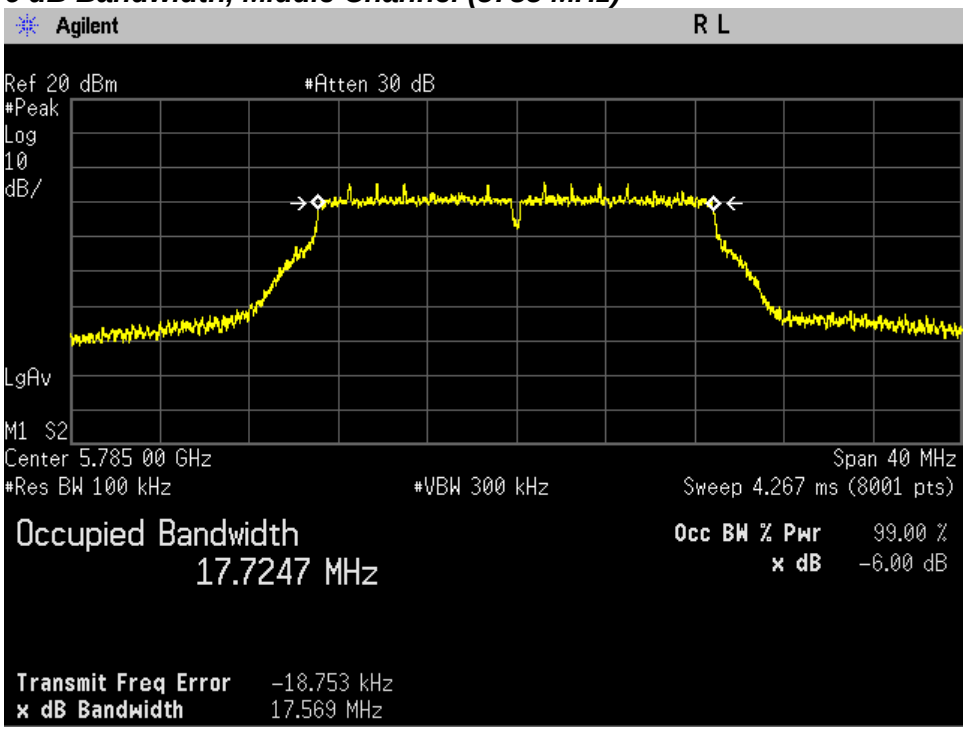
802.11ac (20 MHz) mode - SISO

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

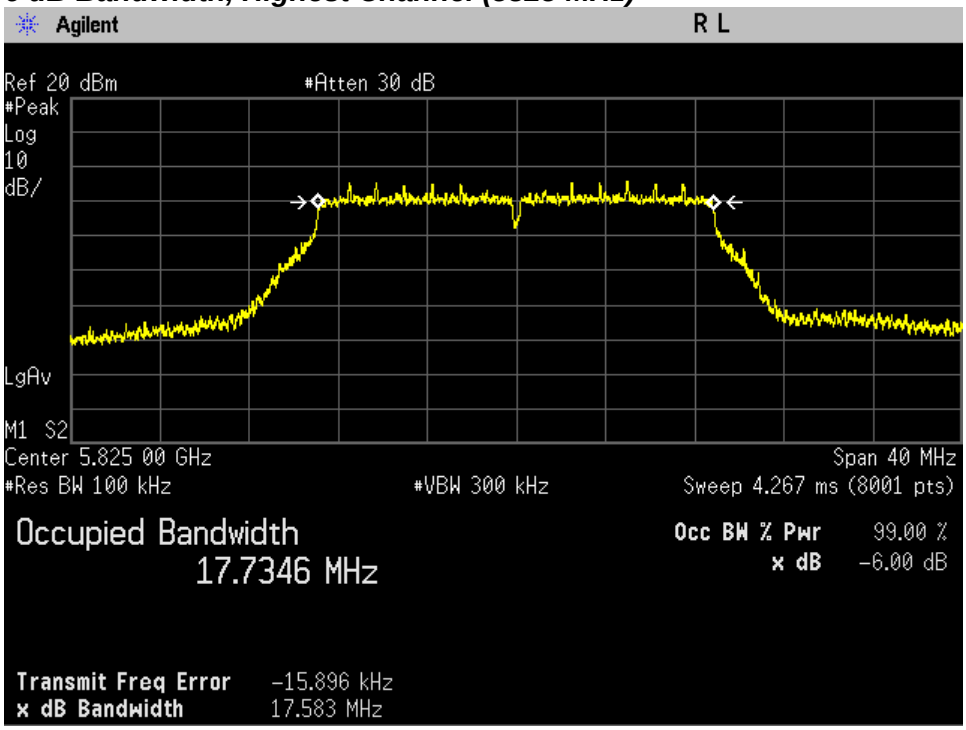


6 dB Bandwidth, Middle Channel (5785 MHz)



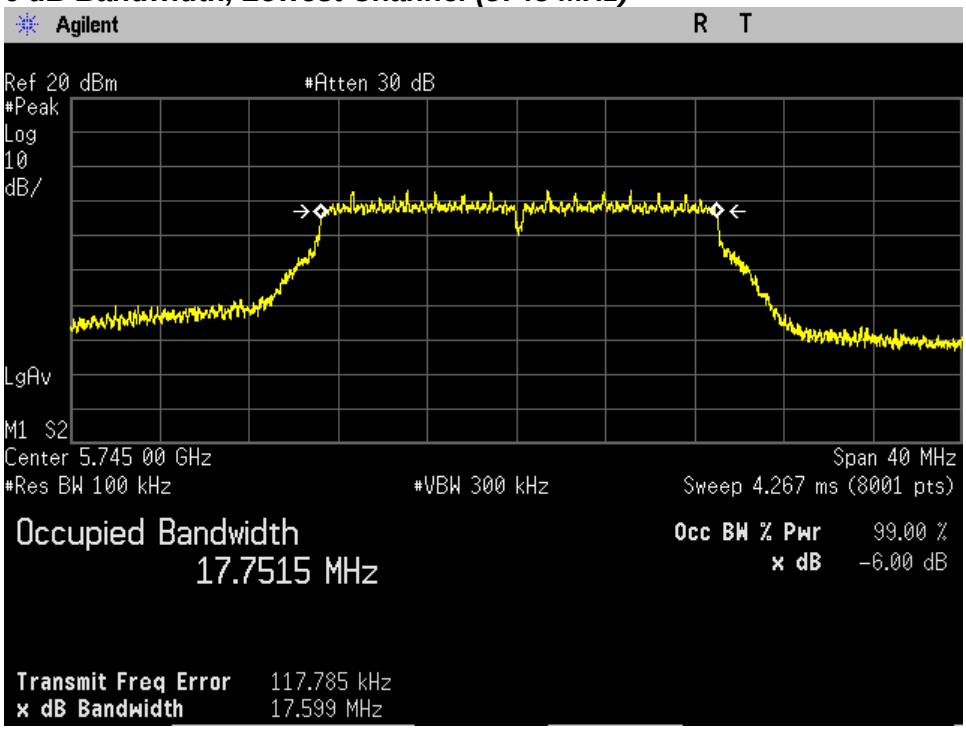
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



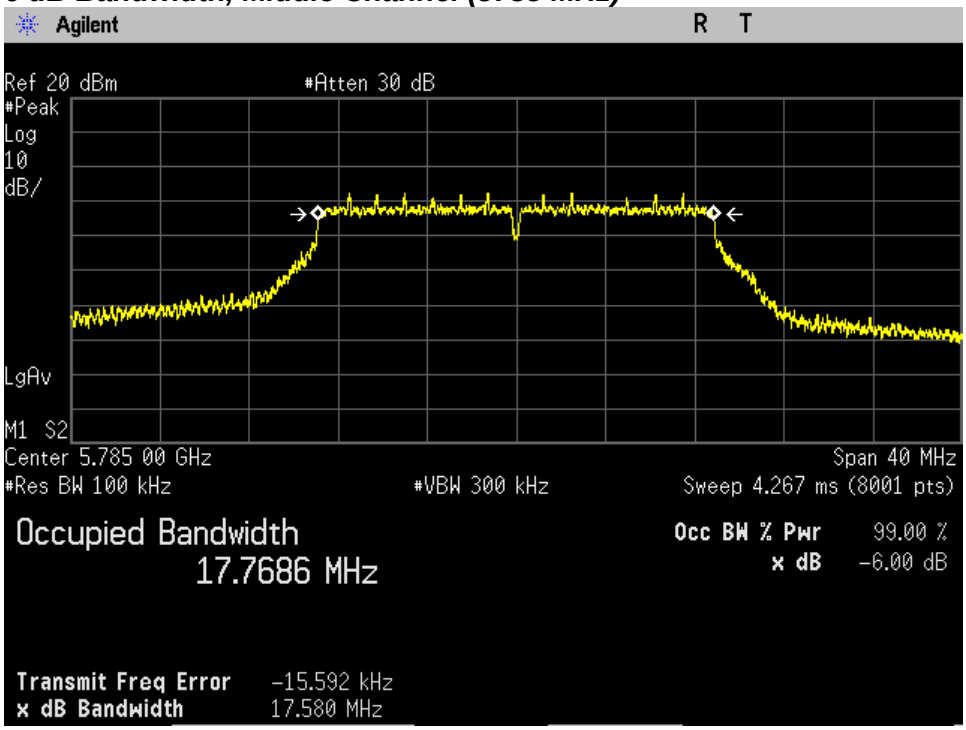
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

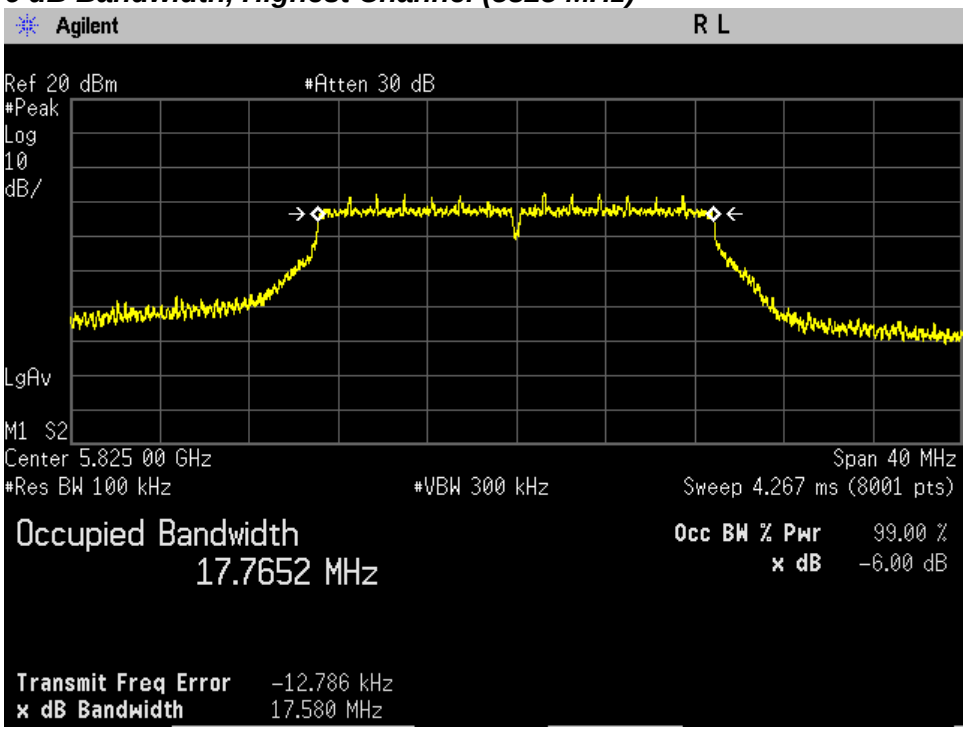


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

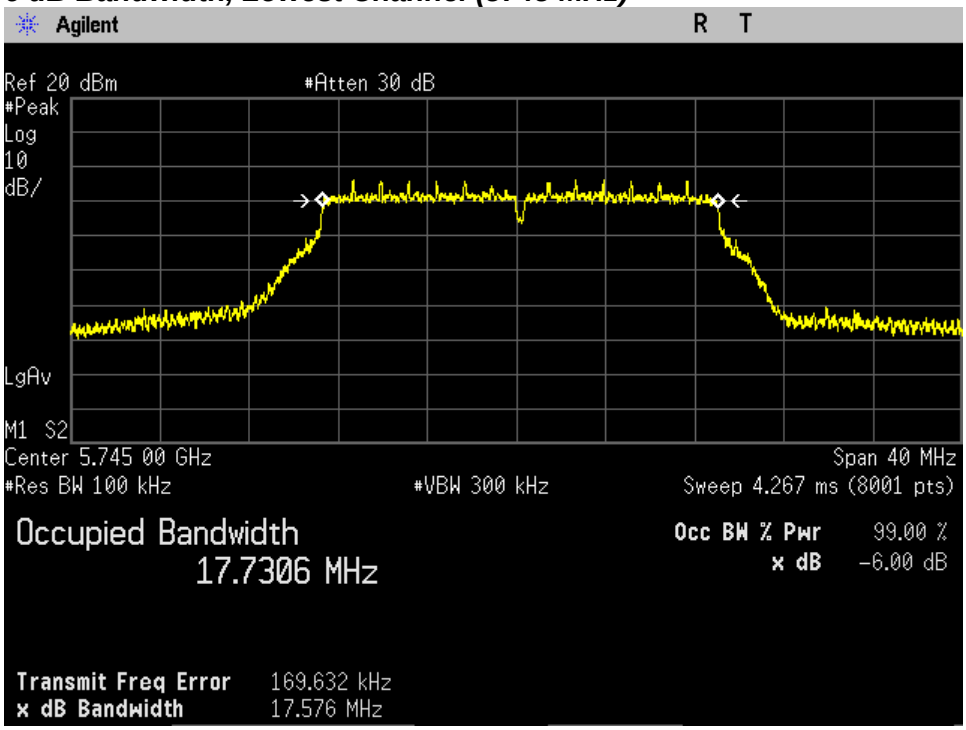


PLOTS OF EMISSIONS

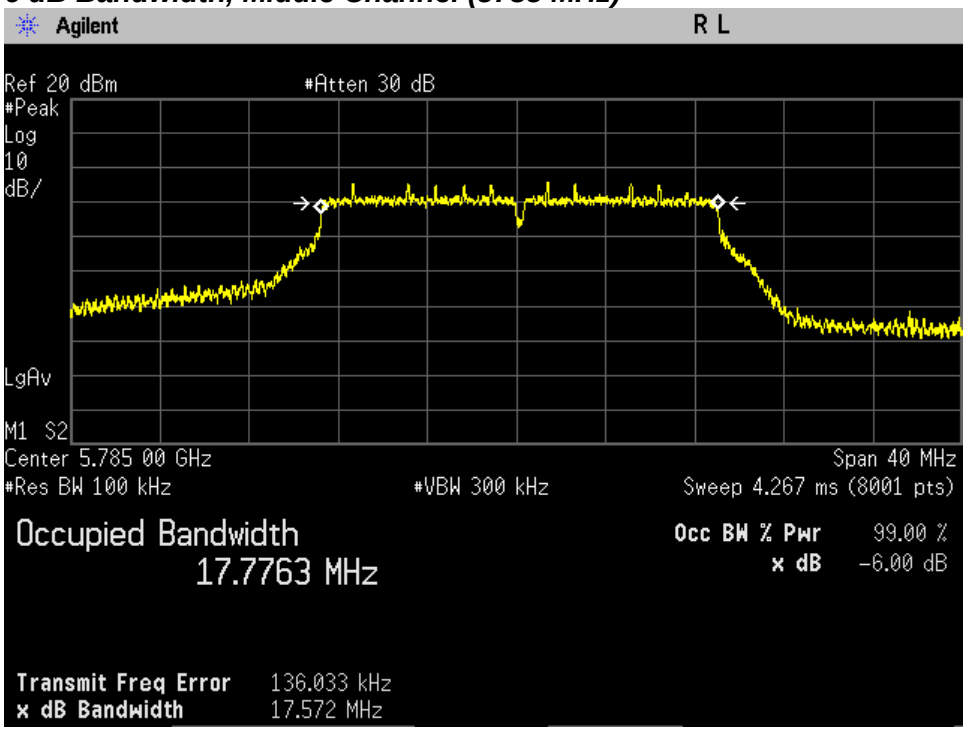
802.11ac (20 MHz) mode - CDD

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

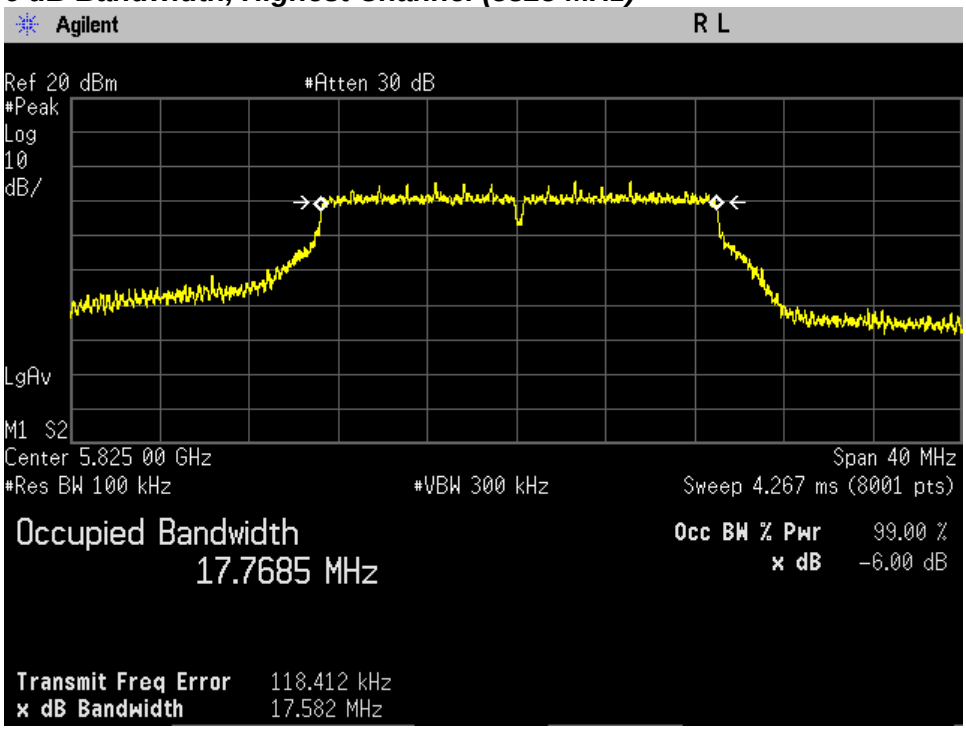


6 dB Bandwidth, Middle Channel (5785 MHz)



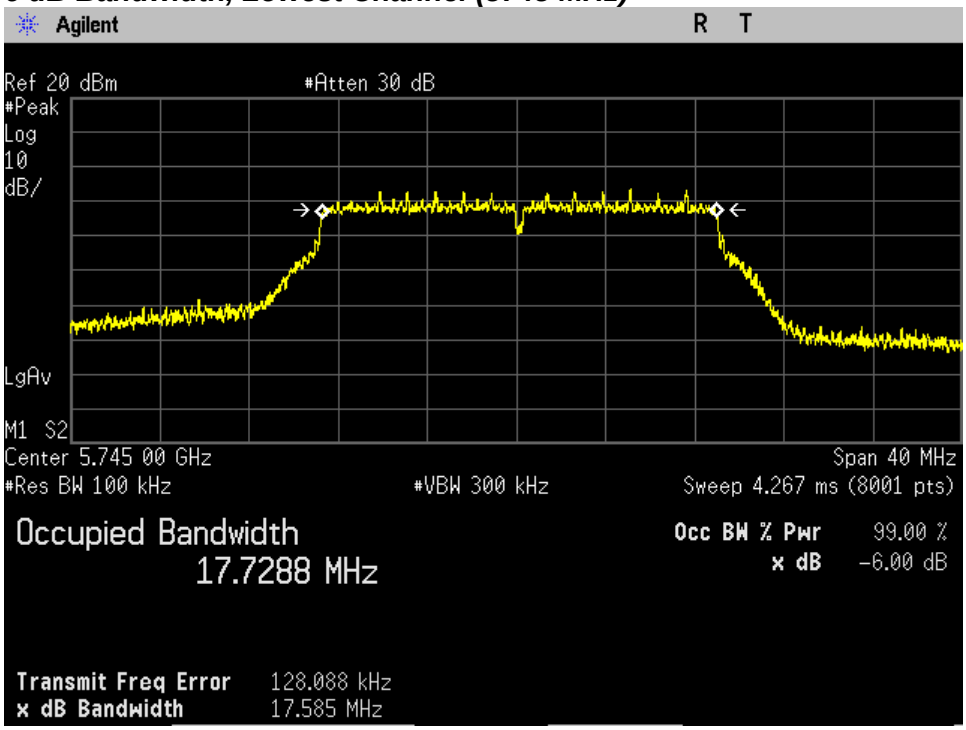
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



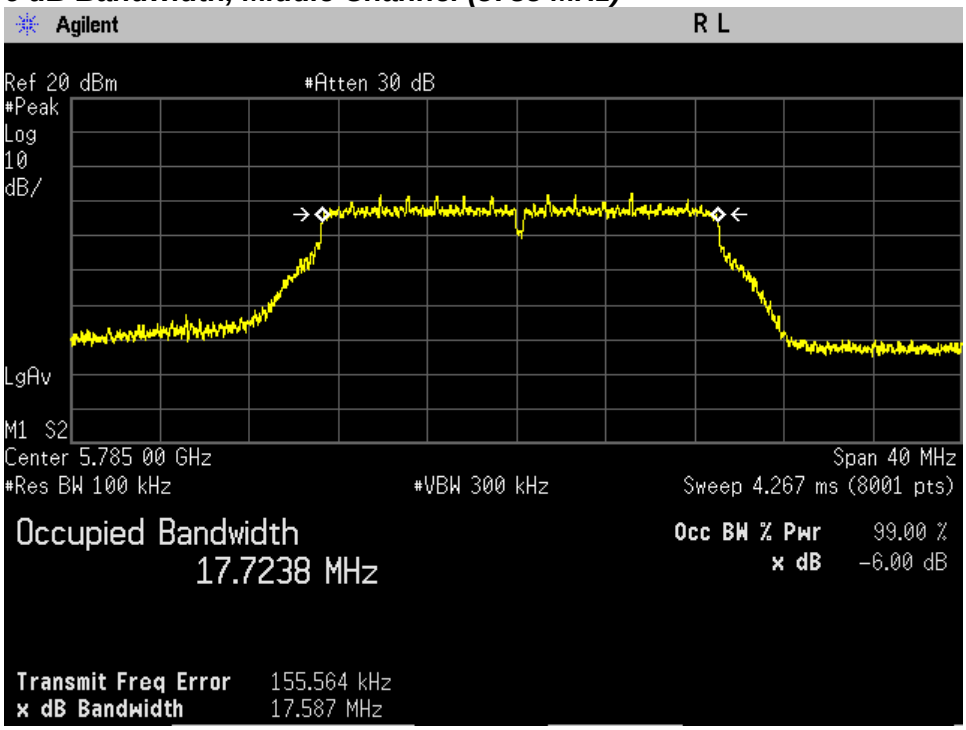
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

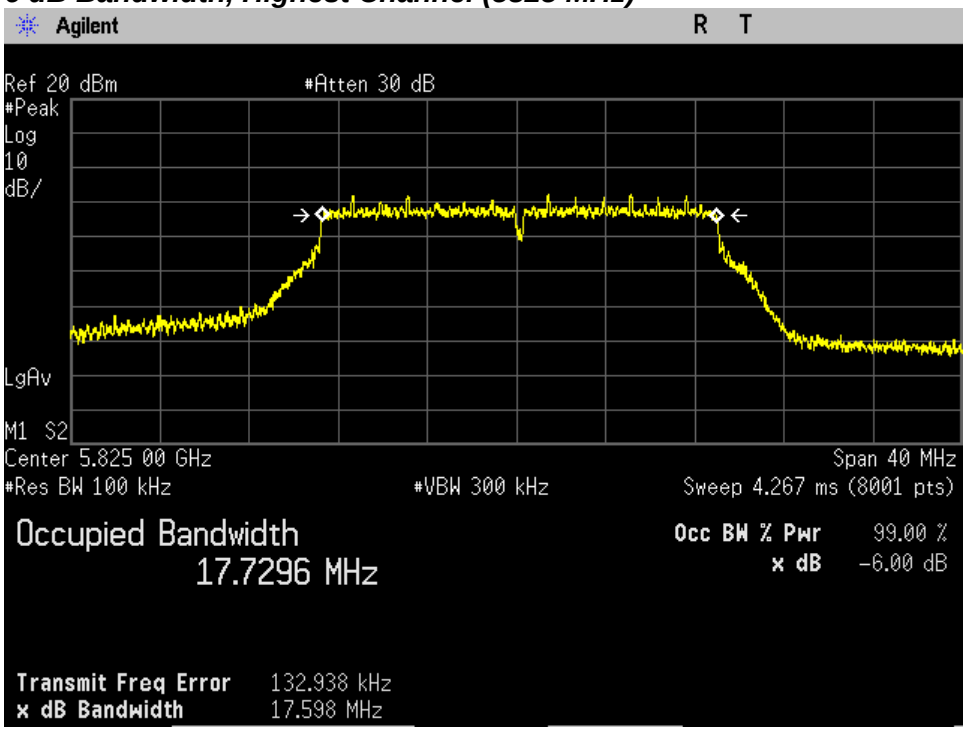


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

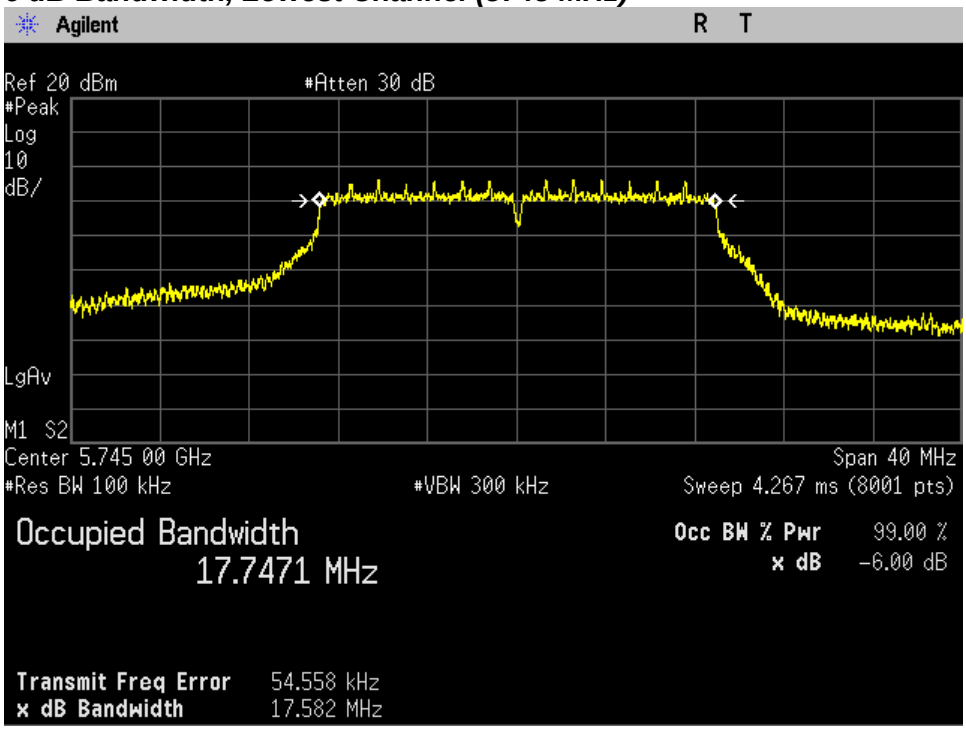


PLOTS OF EMISSIONS

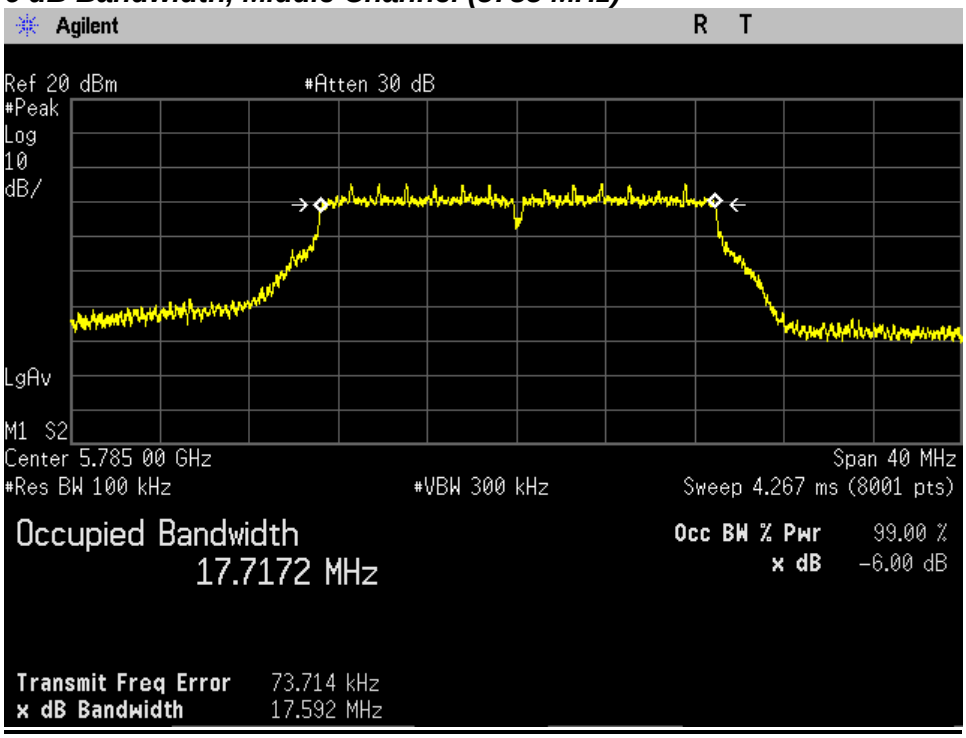
802.11ac (20 MHz) mode - MIMO

Chain 0

6 dB Bandwidth, Lowest Channel (5745 MHz)

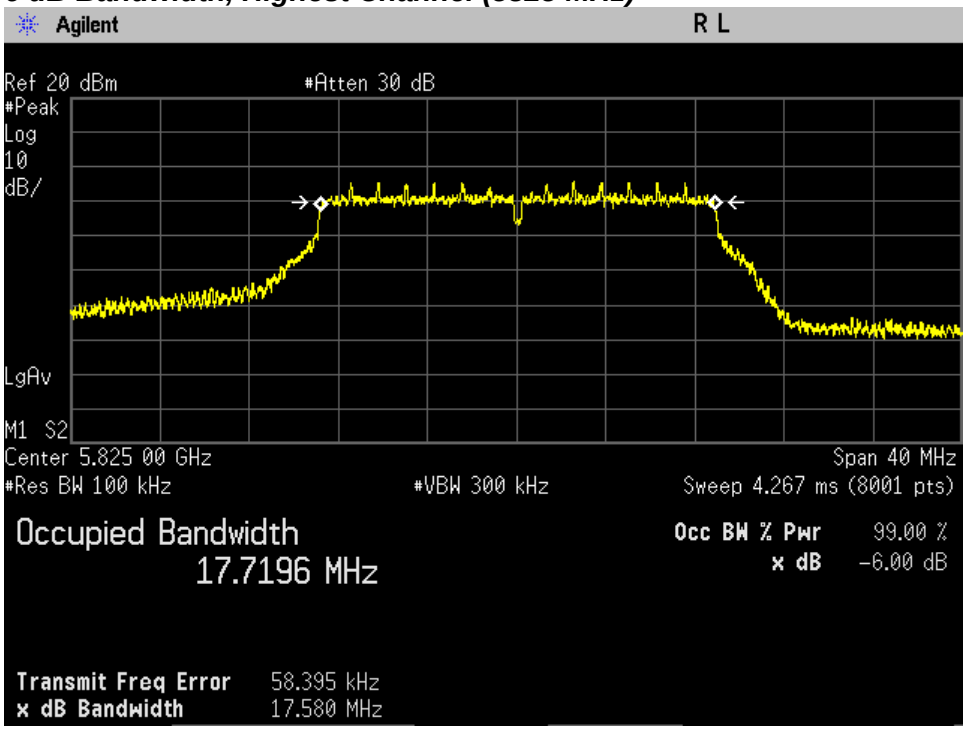


6 dB Bandwidth, Middle Channel (5785 MHz)



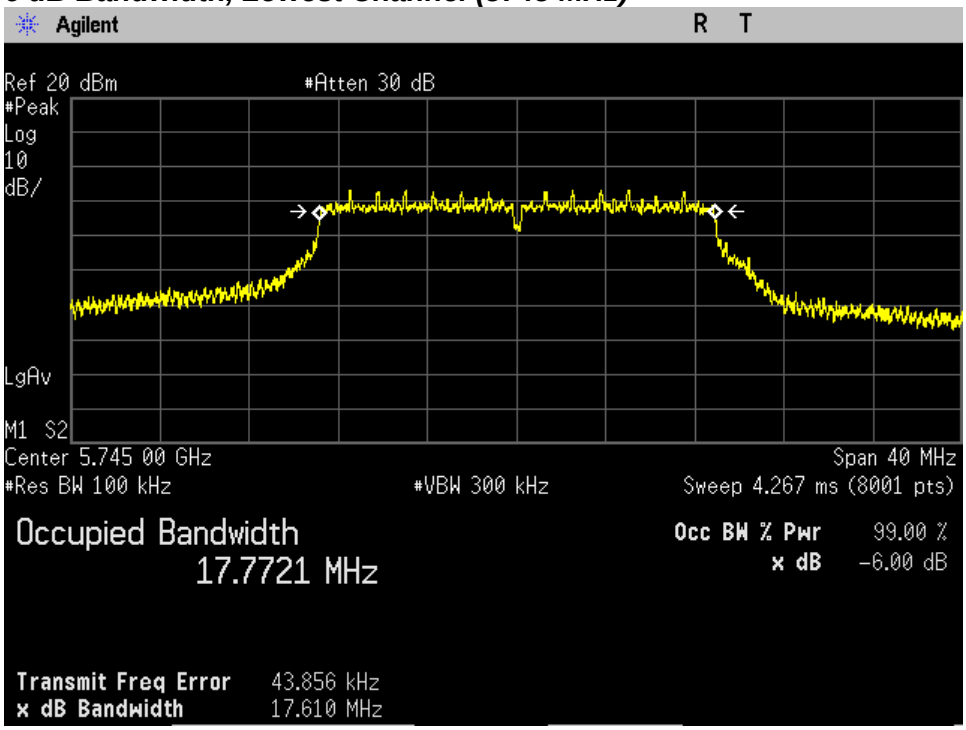
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



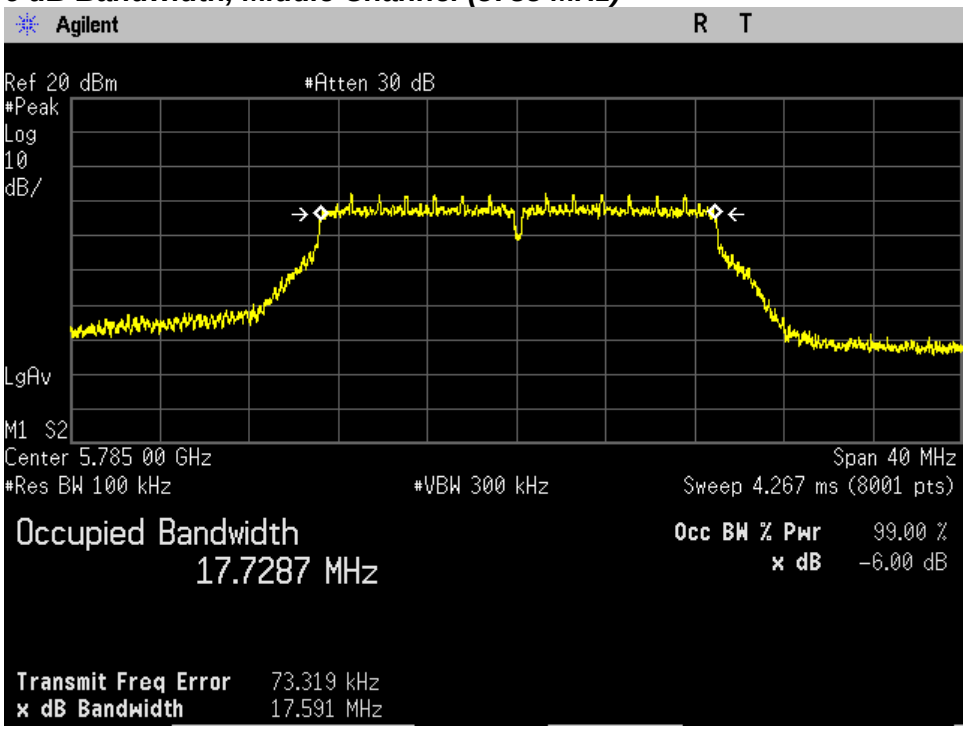
Chain 1

6 dB Bandwidth, Lowest Channel (5745 MHz)

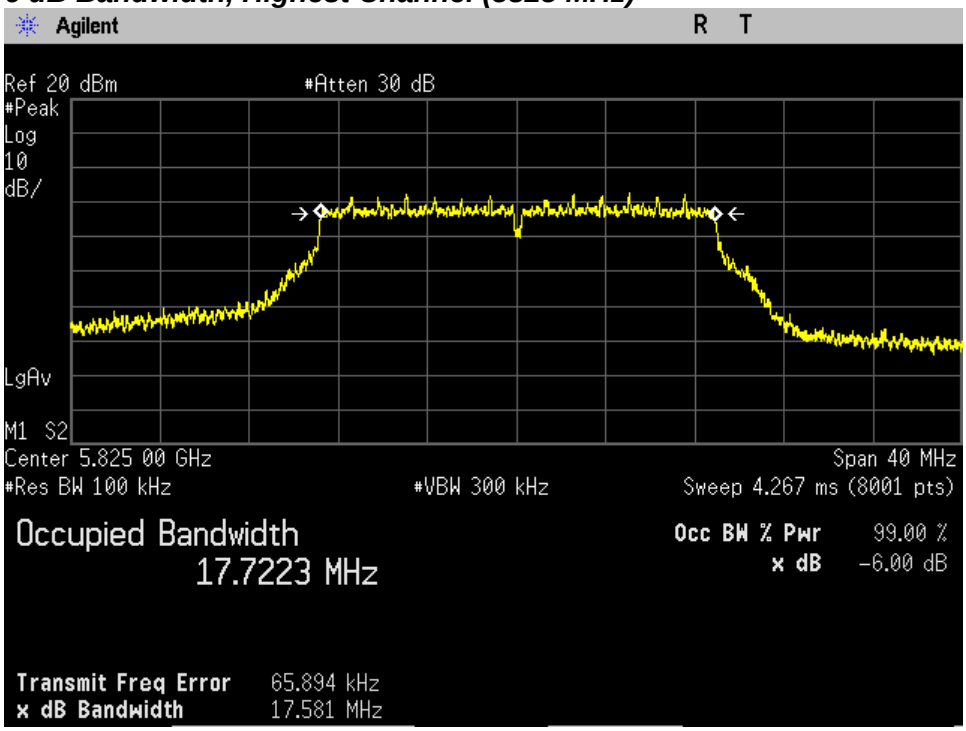


PLOTS OF EMISSIONS

6 dB Bandwidth, Middle Channel (5785 MHz)



6 dB Bandwidth, Highest Channel (5825 MHz)

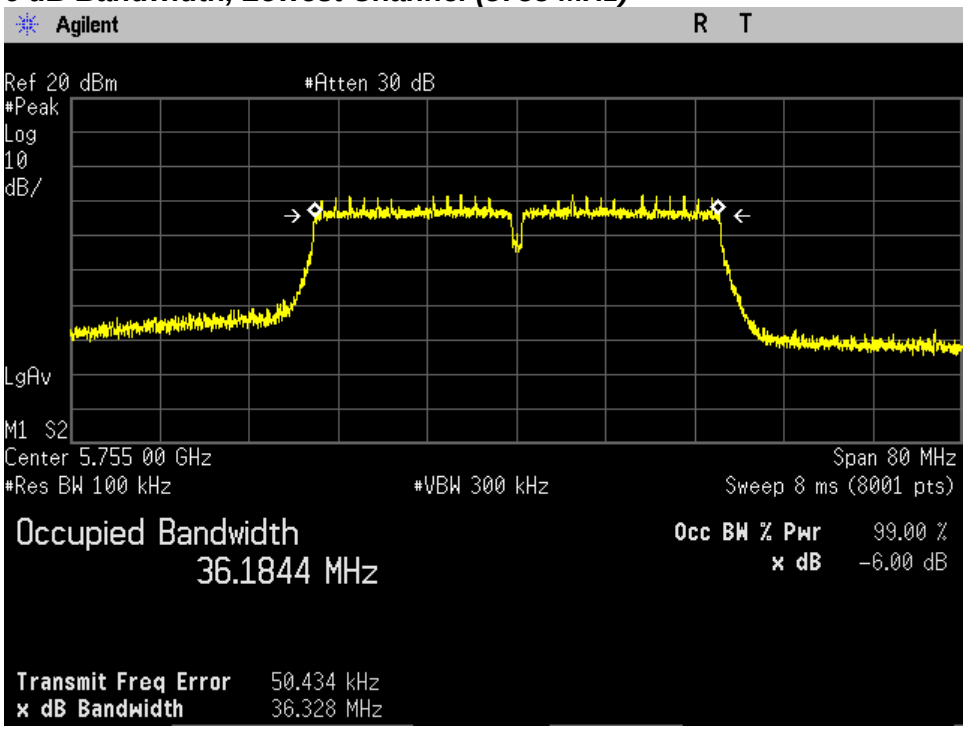


PLOTS OF EMISSIONS

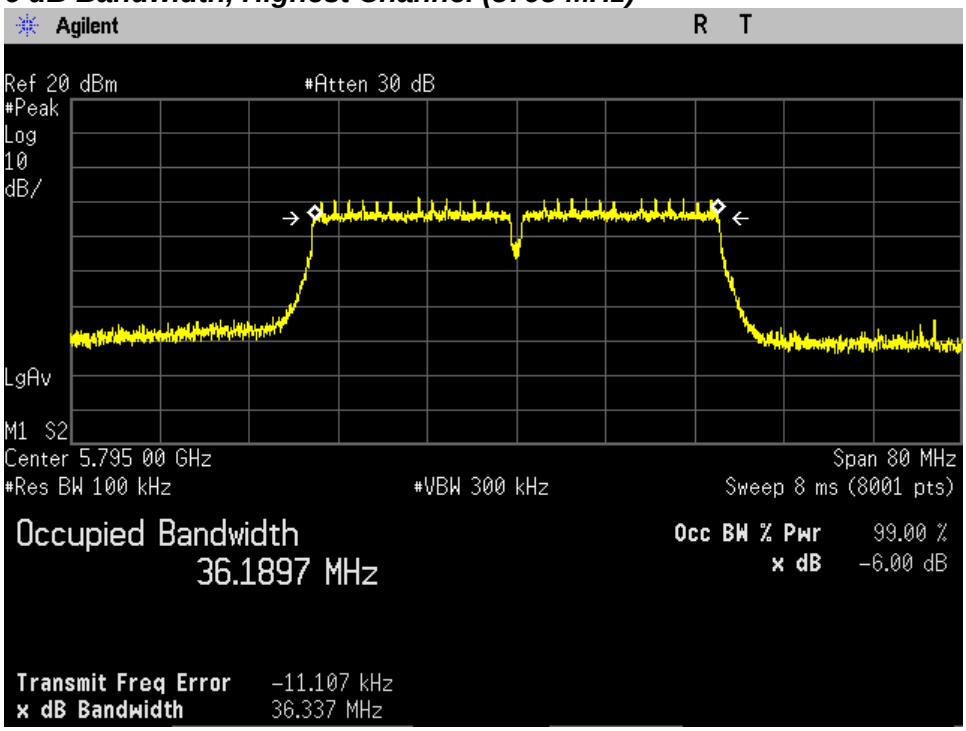
802.11ac (40 MHz) mode - SISO

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



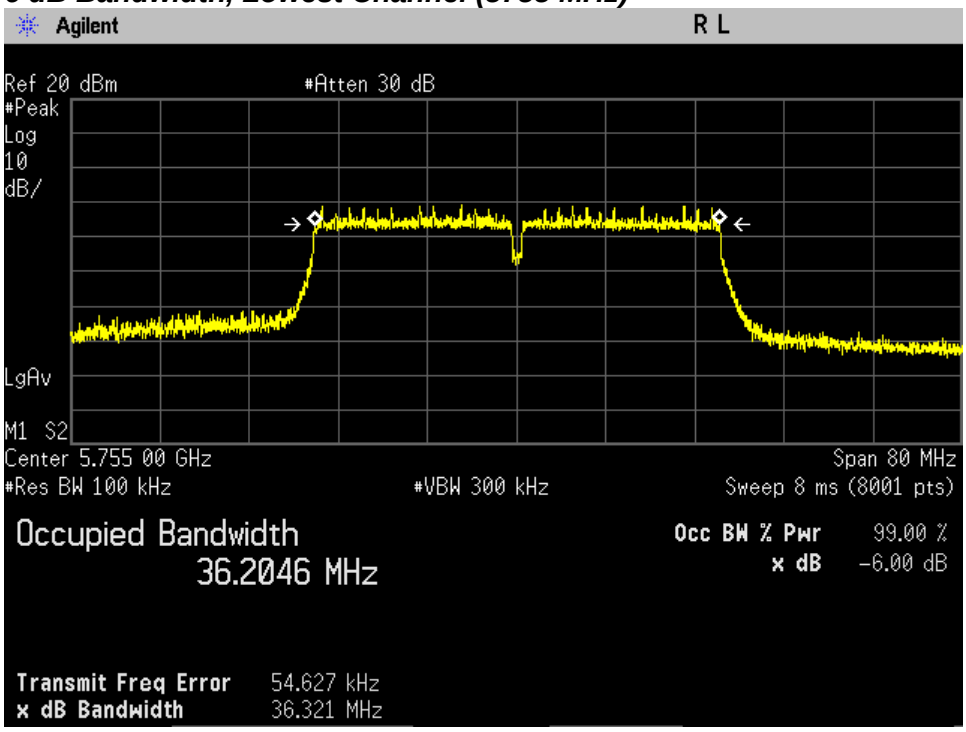
6 dB Bandwidth, Highest Channel (5795 MHz)



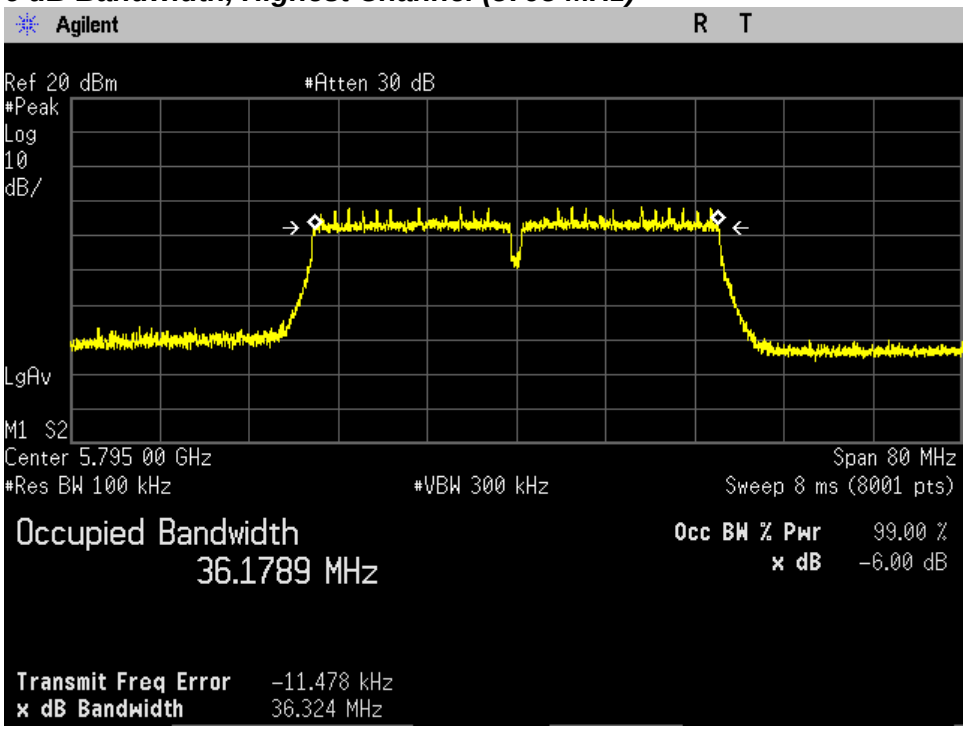
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

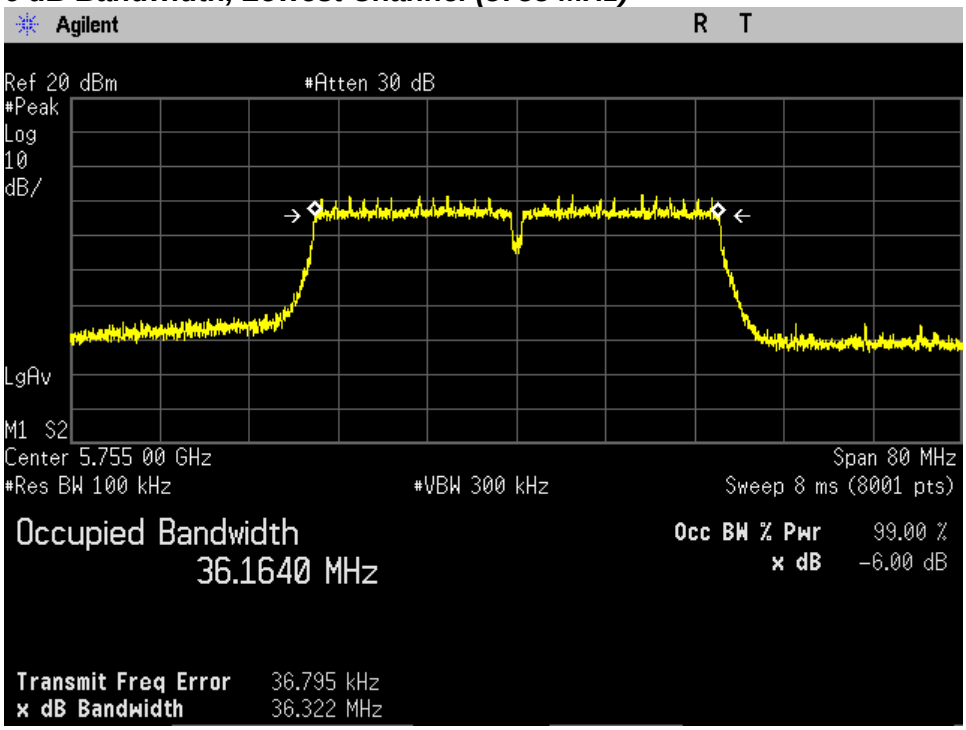


PLOTS OF EMISSIONS

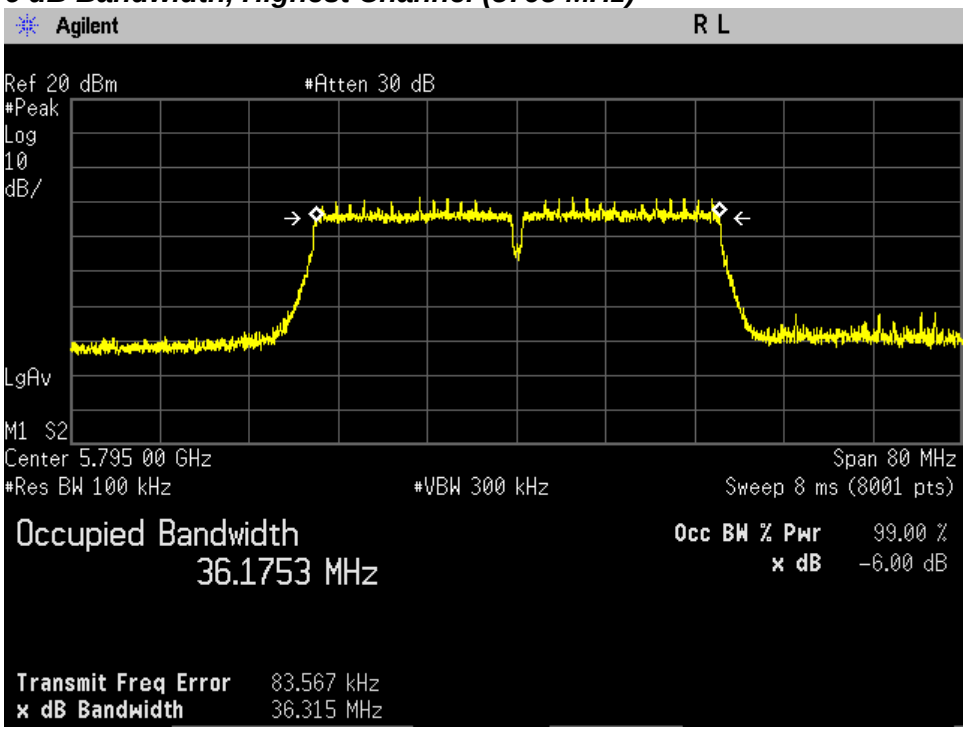
802.11ac (40 MHz) mode - CDD

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



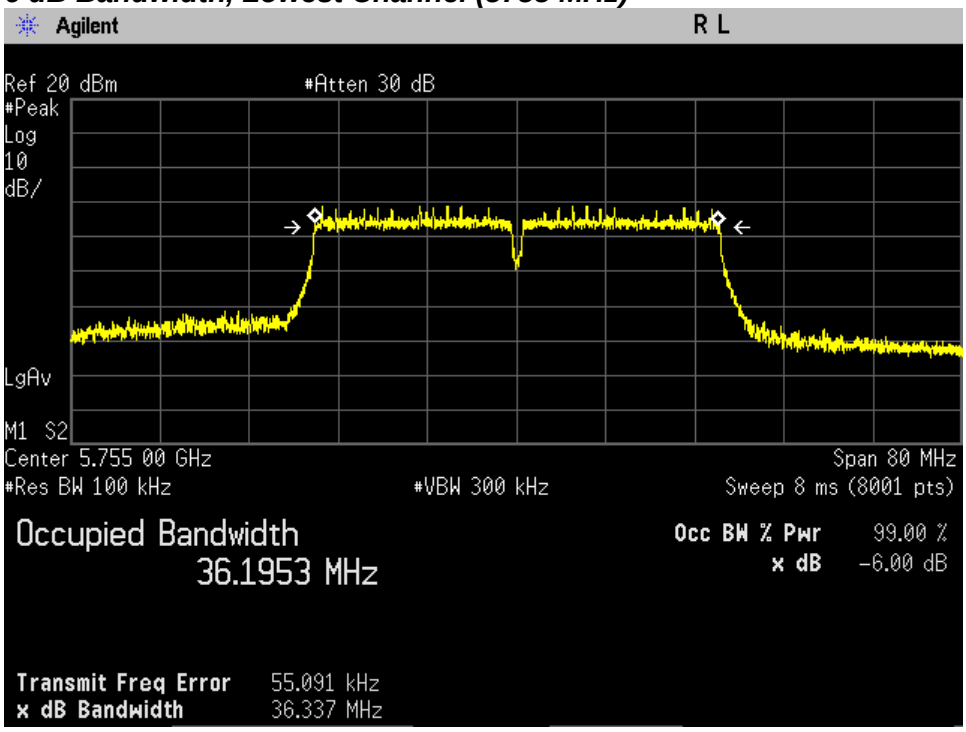
6 dB Bandwidth, Highest Channel (5795 MHz)



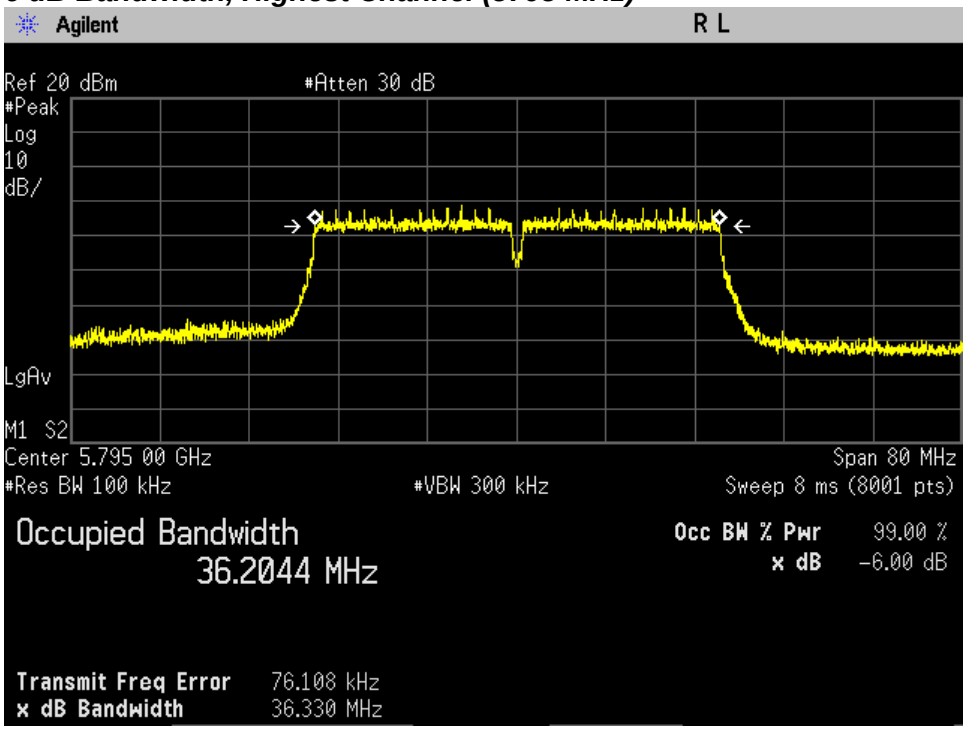
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

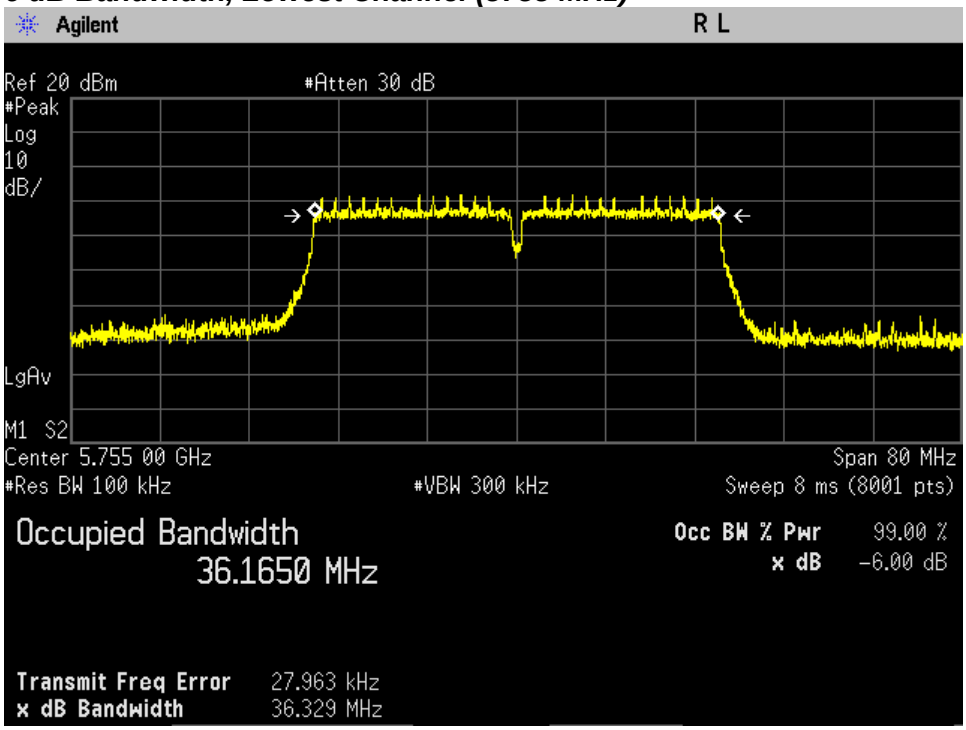


PLOTS OF EMISSIONS

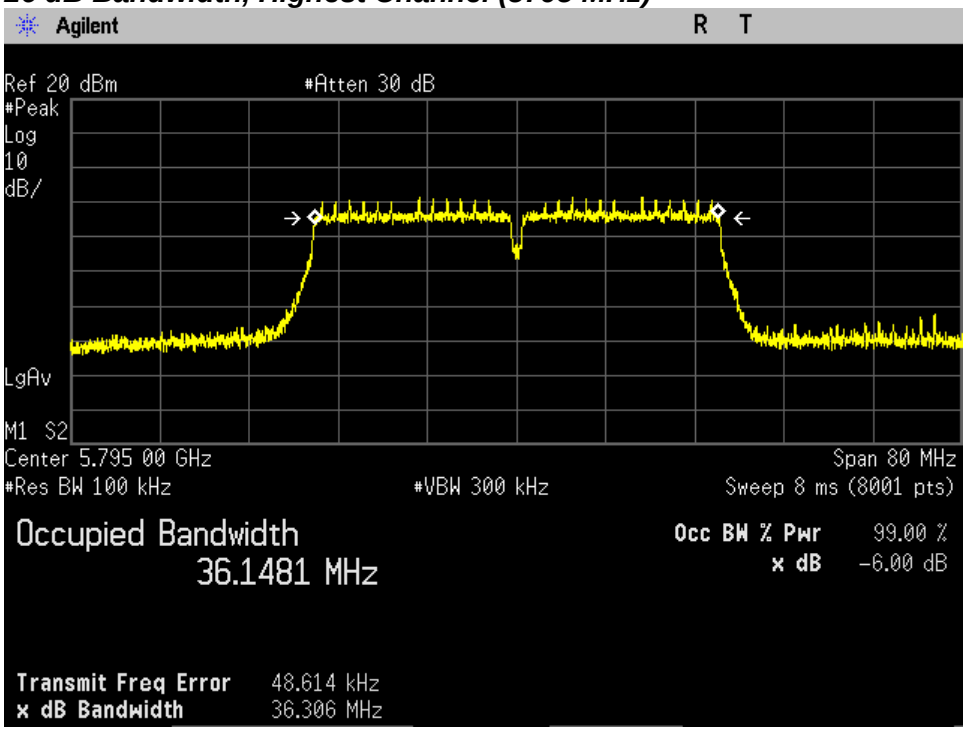
802.11ac (40 MHz) mode - MIMO

Chain 0

6 dB Bandwidth, Lowest Channel (5755 MHz)



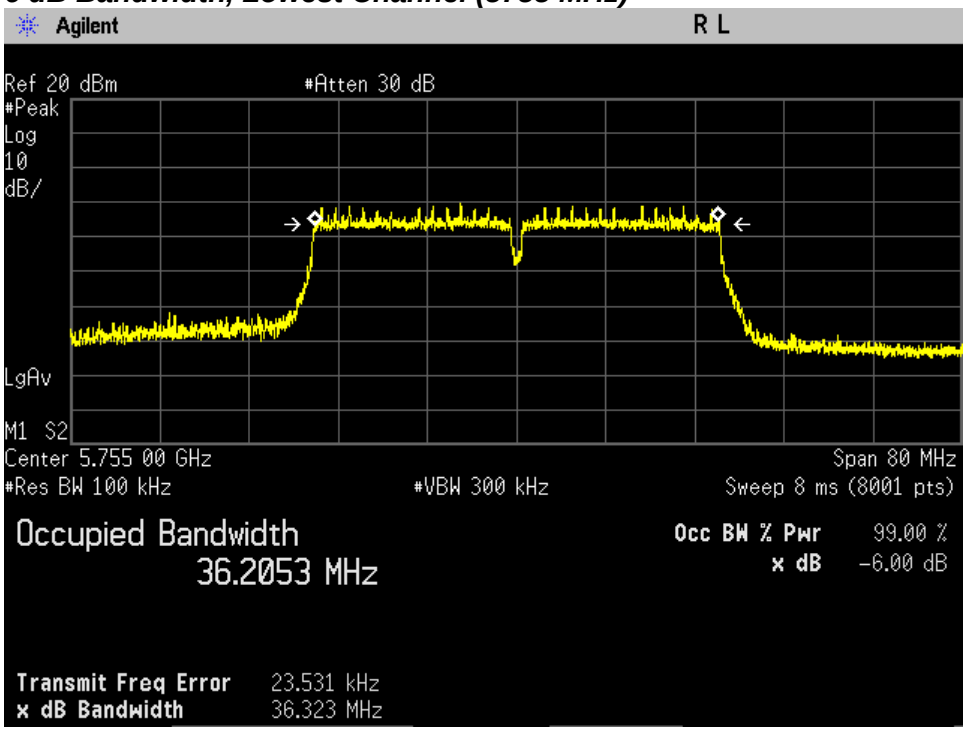
26 dB Bandwidth, Highest Channel (5795 MHz)



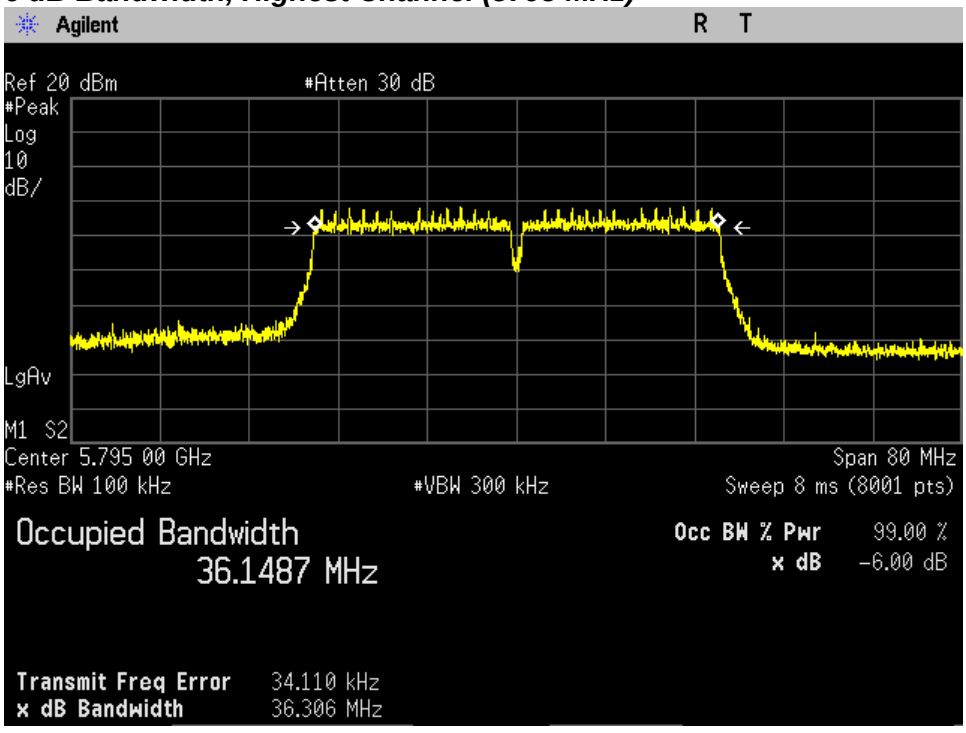
PLOTS OF EMISSIONS

Chain 1

6 dB Bandwidth, Lowest Channel (5755 MHz)



6 dB Bandwidth, Highest Channel (5795 MHz)

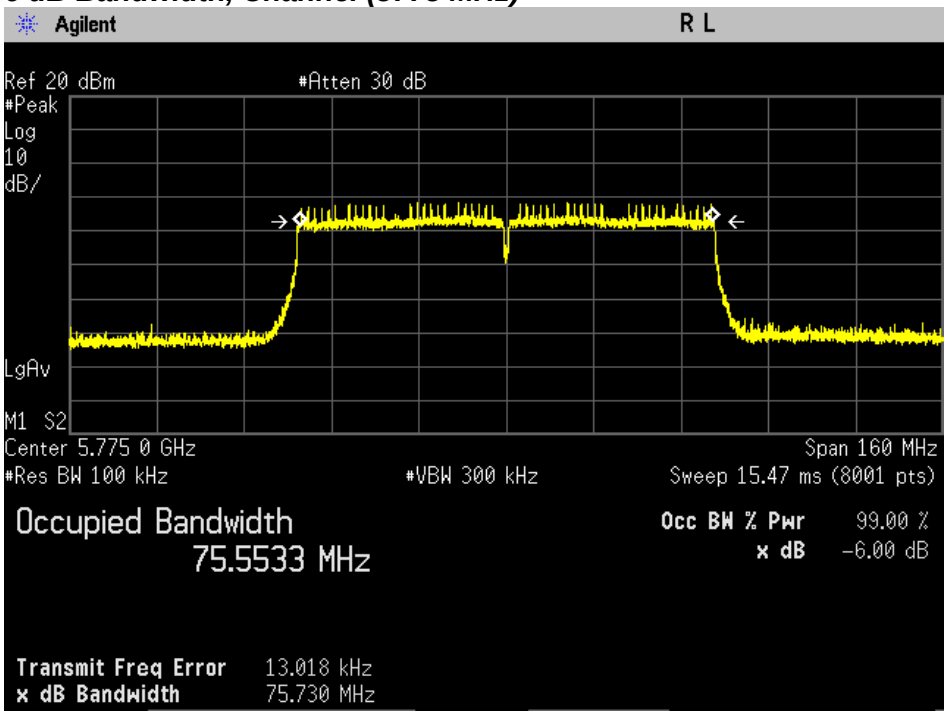


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - SISO

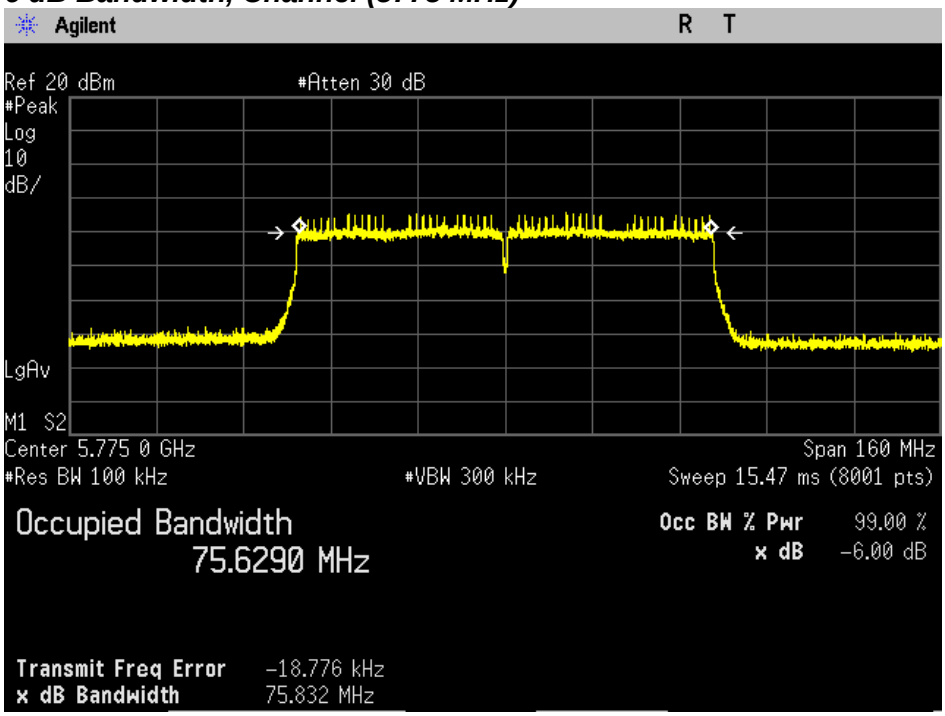
Chain 0

6 dB Bandwidth, Channel (5775 MHz)



Chain 1

6 dB Bandwidth, Channel (5775 MHz)

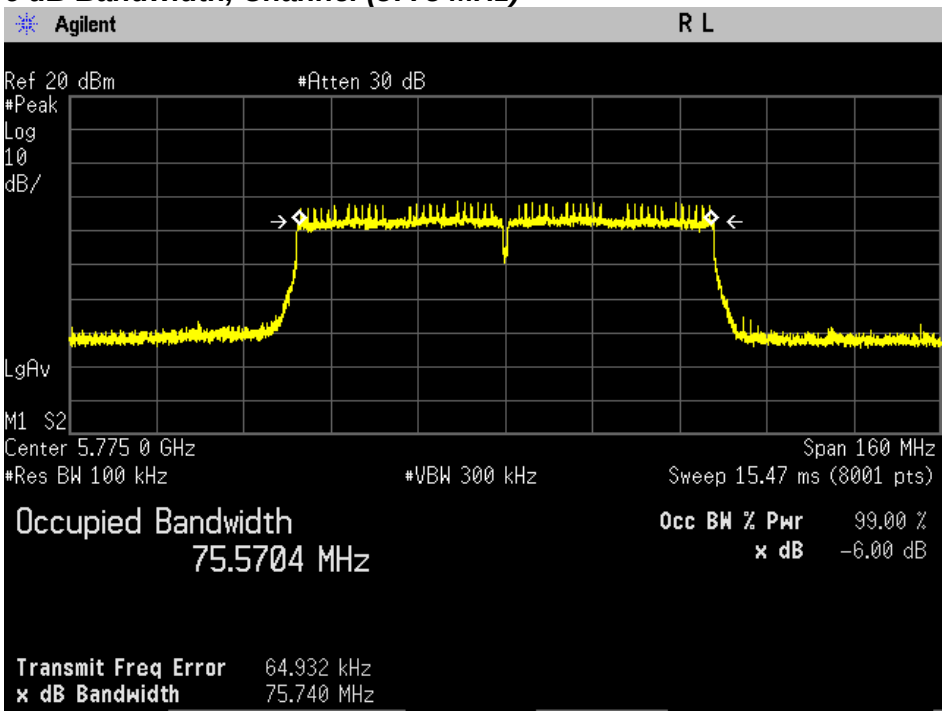


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - CDD

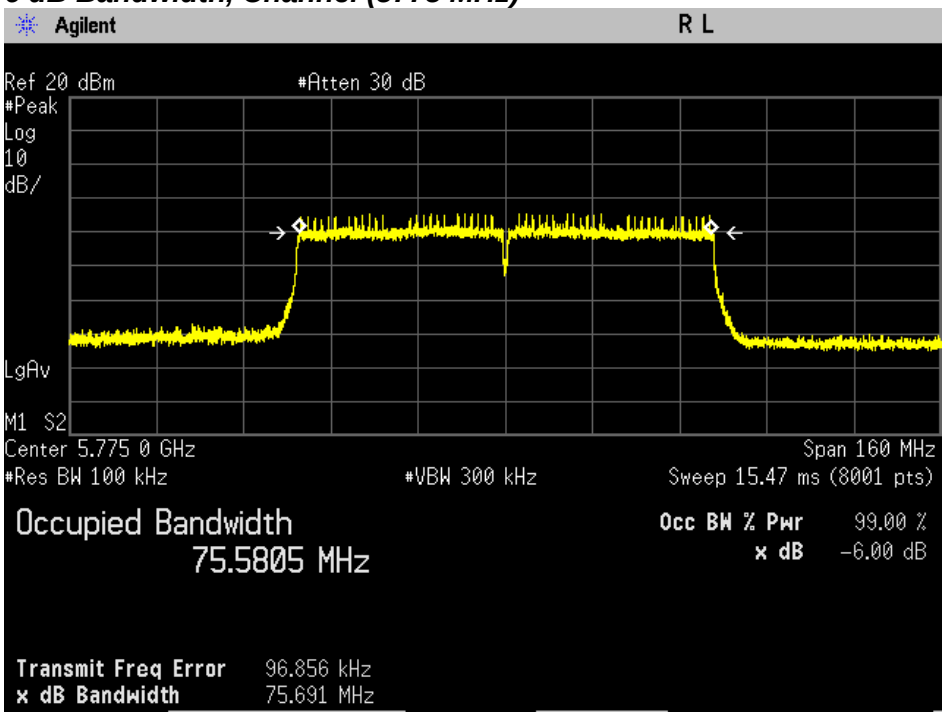
Chain 0

6 dB Bandwidth, Channel (5775 MHz)



Chain 1

6 dB Bandwidth, Channel (5775 MHz)

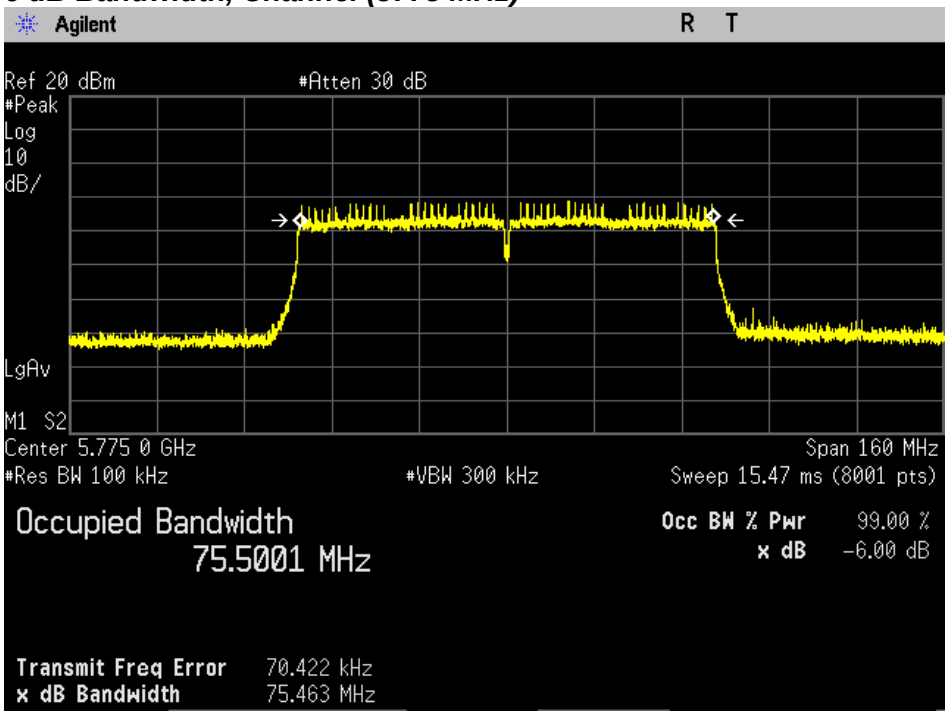


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - MIMO

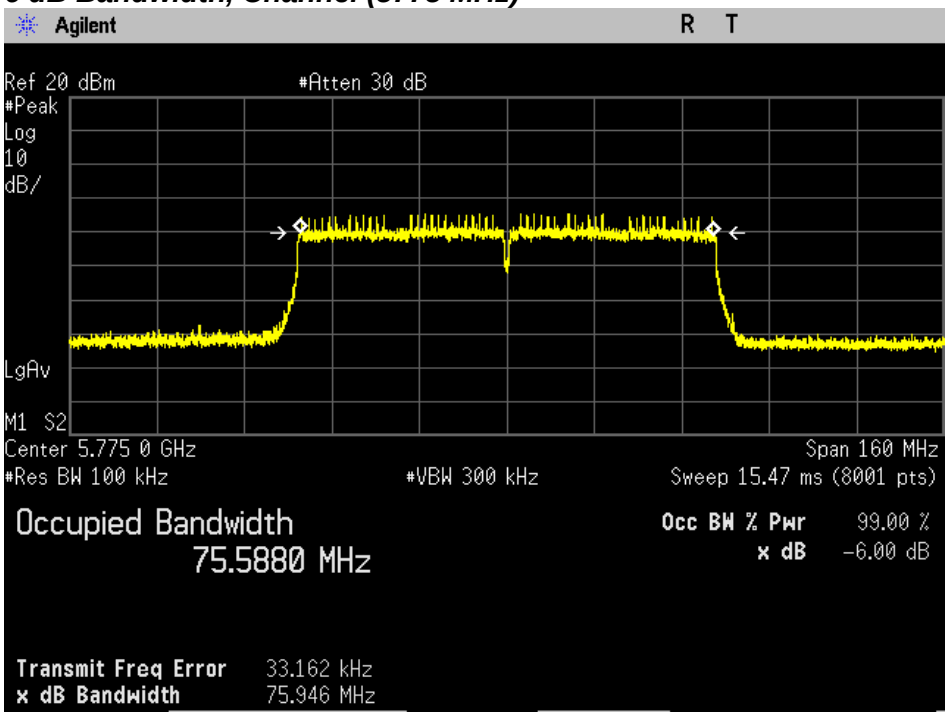
Chain 0

6 dB Bandwidth, Channel (5775 MHz)



Chain 1

6 dB Bandwidth, Channel (5775 MHz)



8.5 Maximum Conducted Output Power (average)

8.5.1 Maximum Conducted Output Power – UNII-1 band

FCC §15.407(a), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	8.77	7.94	9.60	8.77	23.98	12.30	11.47	22.27
Middle	5200	9.05	7.83	9.88	8.66	23.98	12.58	11.36	22.28
Highest	5220	9.43	7.78	10.26	8.61	23.98	12.96	11.31	22.28

802.11n (20 MHz) mode – SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	8.70	7.71	9.58	8.59	23.98	12.28	11.29	22.55
Middle	5200	8.99	7.75	9.87	8.63	23.98	12.57	11.33	22.53
Highest	5220	9.15	7.84	0.89	0.89	23.98	3.59	3.59	22.54

802.11n (20 MHz) mode – CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
Lowest	5180	8.90	8.02	0.88	12.37	23.98	15.07	22.54
Middle	5200	8.92	7.63	0.88	12.21	23.98	14.91	22.53
Highest	5220	9.02	7.70	0.89	12.31	23.98	15.01	22.53

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
Lowest	5180	7.91	6.98	1.59	12.07	23.98	14.77	22.53
Middle	5200	8.28	7.02	1.57	12.28	23.98	14.98	22.53
Highest	5220	8.22	7.04	1.56	12.24	23.98	14.94	22.53

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
	5190	7.81	6.70	9.43	8.32	23.98	12.13	11.02	23.01

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	7.75	6.71	1.62	11.89	23.98	14.59	23.01

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	6.72	5.74	2.67	11.94	23.98	14.64	23.01

802.11ac (20 MHz) mode - SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	8.73	7.72	9.61	8.60	23.98	12.31	11.30	22.53
Middle	5200	8.92	7.90	9.80	8.78	23.98	12.50	11.48	22.54
Highest	5220	9.20	7.74	10.08	8.62	23.98	12.78	11.32	22.55

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
Lowest	5180	8.85	7.81	0.88	12.25	23.98	14.95	22.54
Middle	5200	8.89	7.81	0.88	12.27	23.98	14.97	22.52
Highest	5220	8.99	7.61	0.88	12.24	23.98	14.94	22.53

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
Lowest	5180	8.13	7.01	1.55	12.17	23.98	14.87	22.52
Middle	5200	8.37	7.02	1.56	12.32	23.98	15.02	22.52
Highest	5220	8.55	6.73	1.56	12.30	23.98	16.80	22.42

802.11ac (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
	5190	7.86	6.86	9.48	8.48	23.98	12.18	11.18	23.01

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	7.91	6.83	1.62	12.03	23.98	14.73	23.01

802.11ac (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	6.88	5.51	2.64	11.90	23.98	14.60	23.01

TEST DATA

Note:

1. *Maximum Conducted (average) Power = Measured conducted power + Duty Factor
2. Total output power = 10 log [10^{(Chain 0 Power + duty factor)/10} + 10^{(Chain 1 Power + duty factor)/10}]
3. For CDD transmission, directional gain is. **2.7 dBi**

   For MIMO transmission, directional gain is **2.7 dBi.**

   Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.

   For power measurements on IEEE 802.11 devices employing CDD, directional gain is as follows,

   Directional gain = G_{ANT} + Array Gain = 2.7 dBi + 0 dB = 2.7 dBi

   Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

   Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

   Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

   For power measurements on all devices employing MIMO, directional gain is as follows,

   Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/2) dB = 2.7 dBi.

   For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and N_{SS}=2.
4. E.I.R.P = Maximum conducted Power + Duty Cycle Factor + Antenna gain.

   E.I.R.P was calculated by following equation according to KDB412172 D01 Determining ERP and EIRP v01.

   E.I.R.P = $P_T + G_T - Lc$

   P_T = Peak outputpower (dBm)

   G_T = Gain of the transmitting antenna in dBi, Directional antenna gain is **2.7 dBi.**

   L_C = Signal attenuation in the connecting cable between the transmitter and antenna in dB. This factor of an integral antenna is negligible.
5. IC E.I.R.P Limit = 200 mW or 10 + 10 log10B, dBm, whichever power is less.

   B is the worst 99% emission bandwidth in megahertz of the two results on ANT port0 and ANT port 1.
6. The following equation was used for spectrum offset:

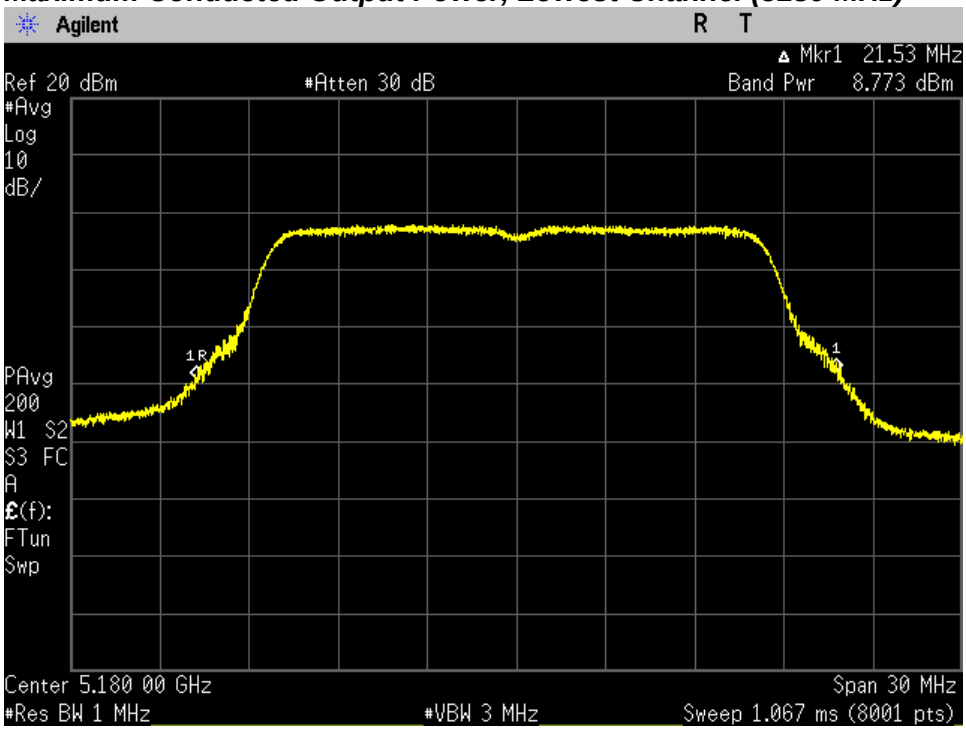
   Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOTS OF EMISSIONS

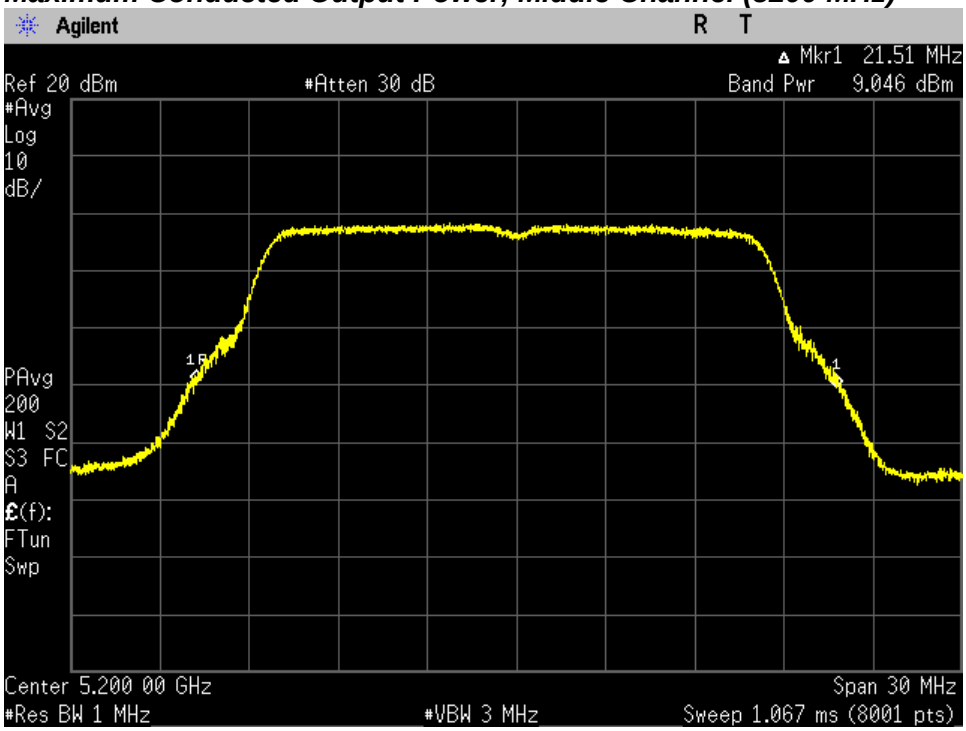
802.11a mode

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

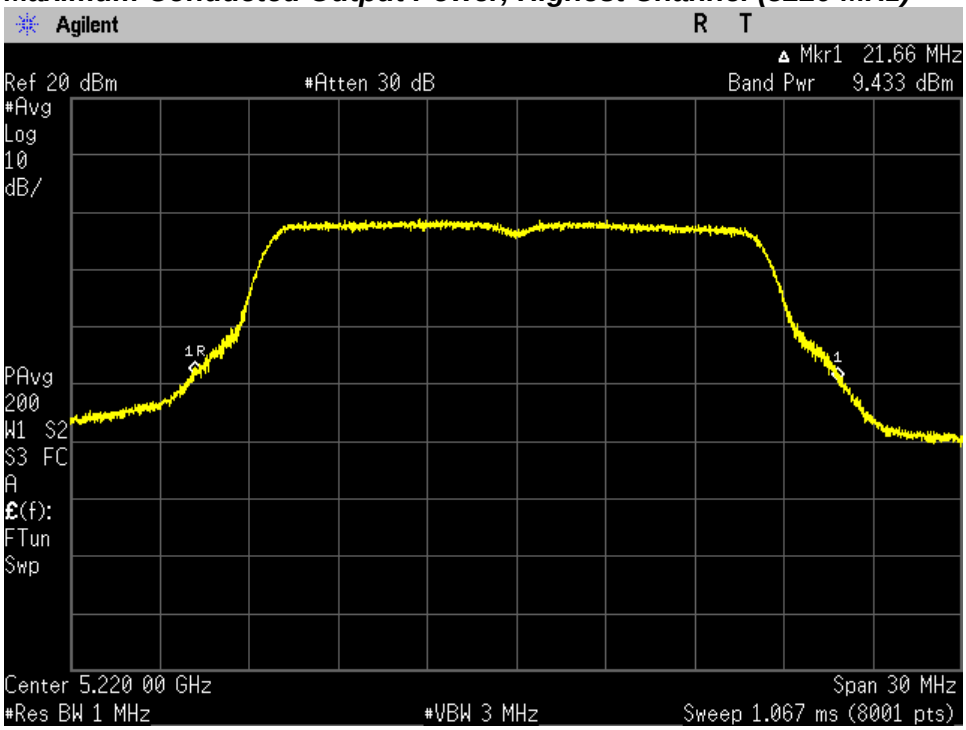


Maximum Conducted Output Power, Middle Channel (5200 MHz)



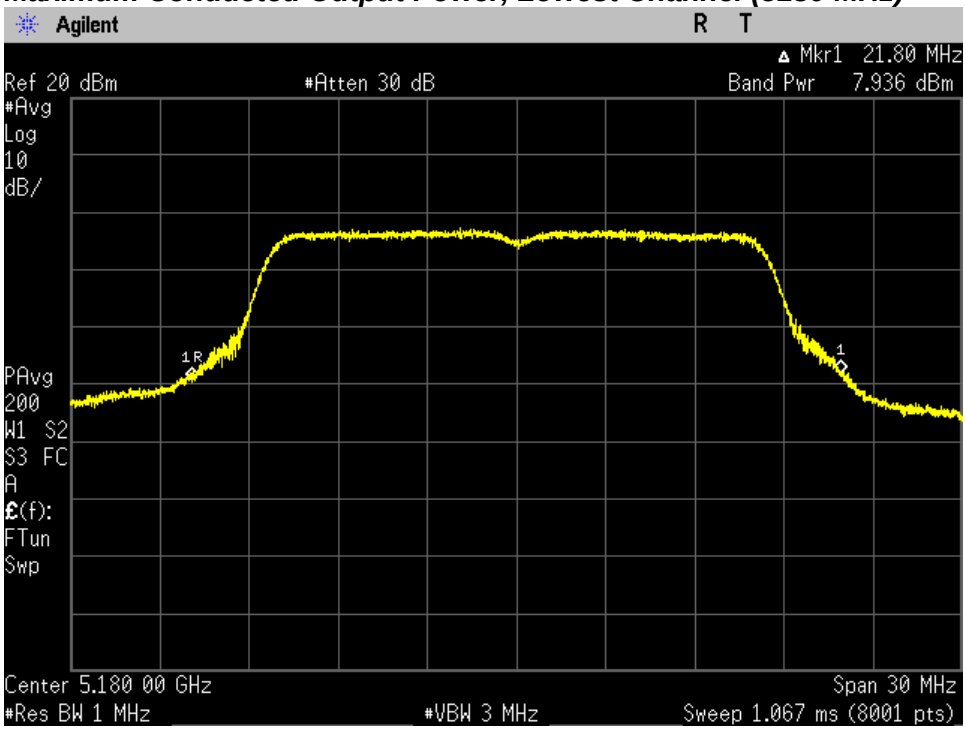
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



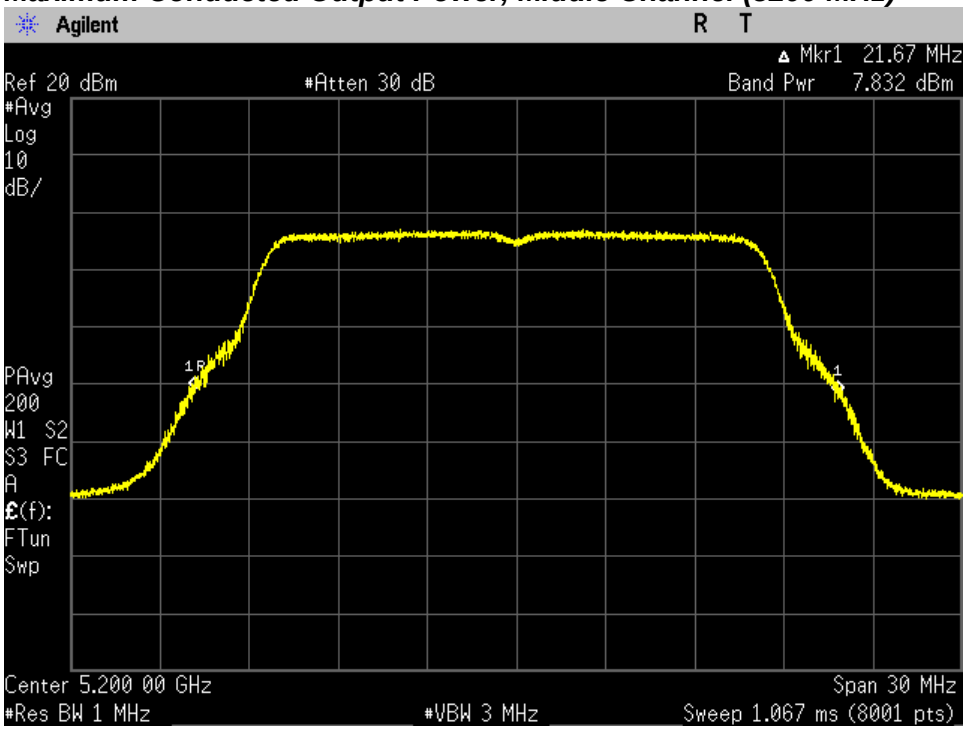
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

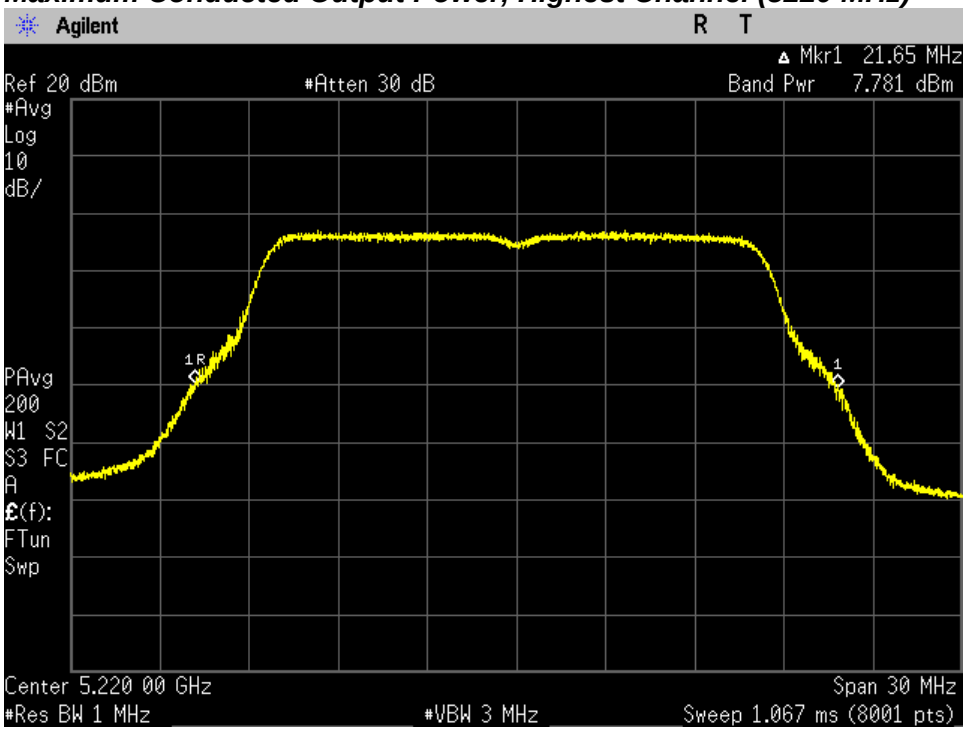


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

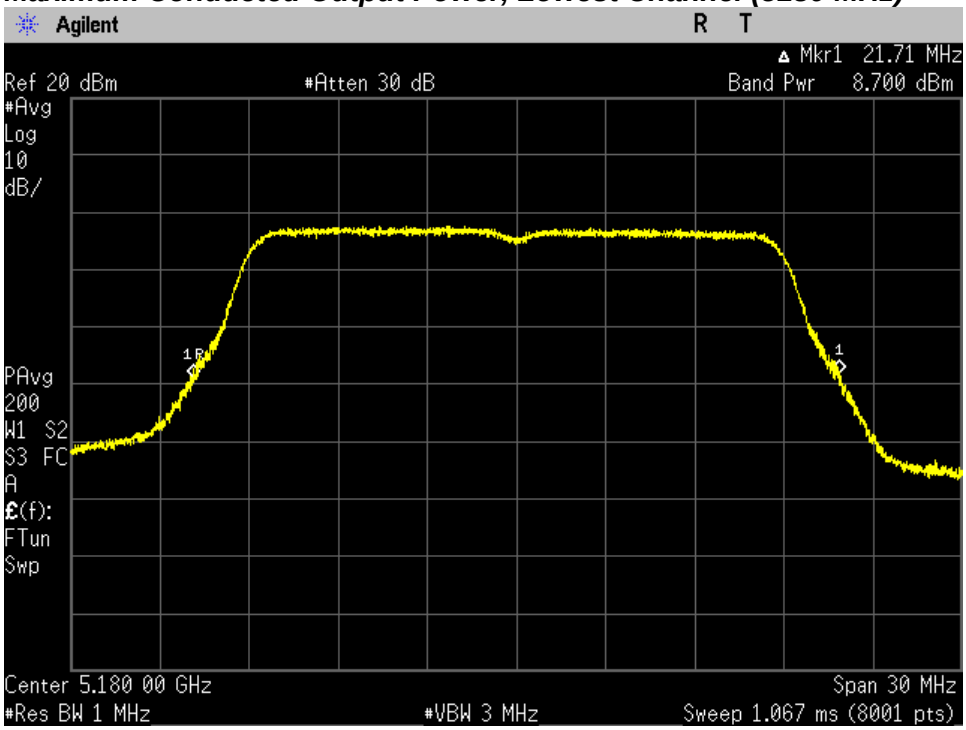


PLOTS OF EMISSIONS

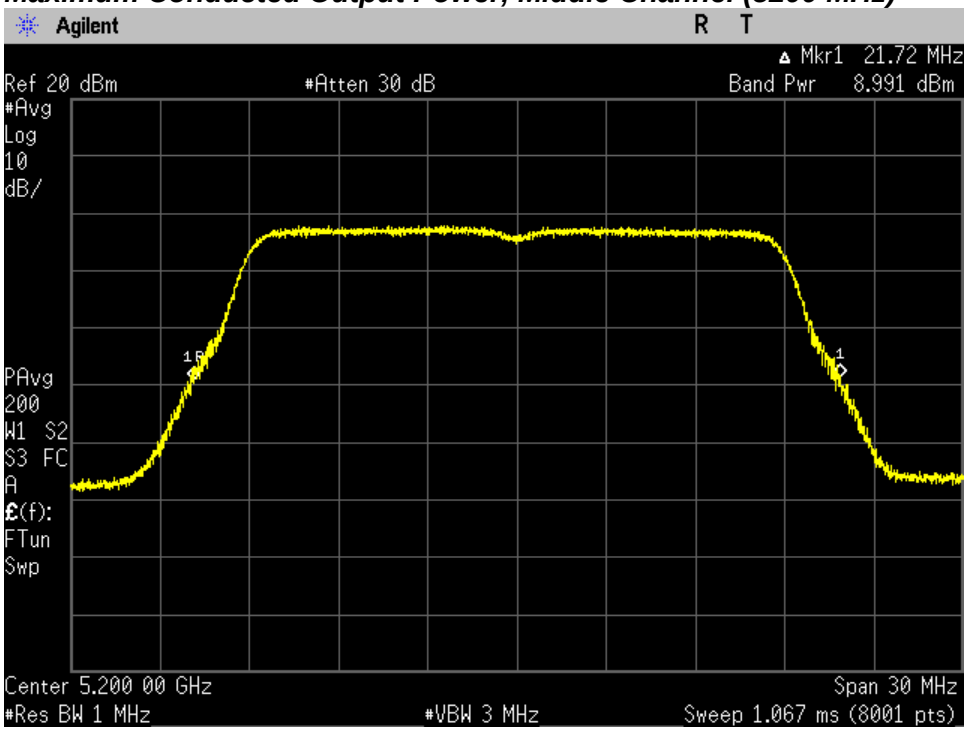
802.11n (20 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

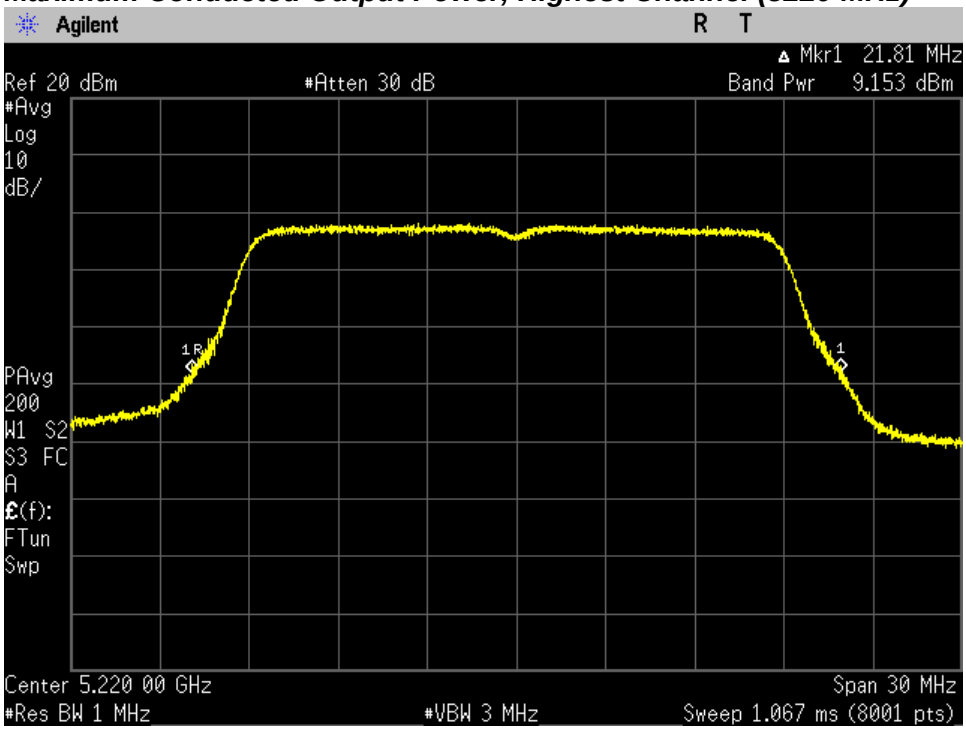


Maximum Conducted Output Power, Middle Channel (5200 MHz)



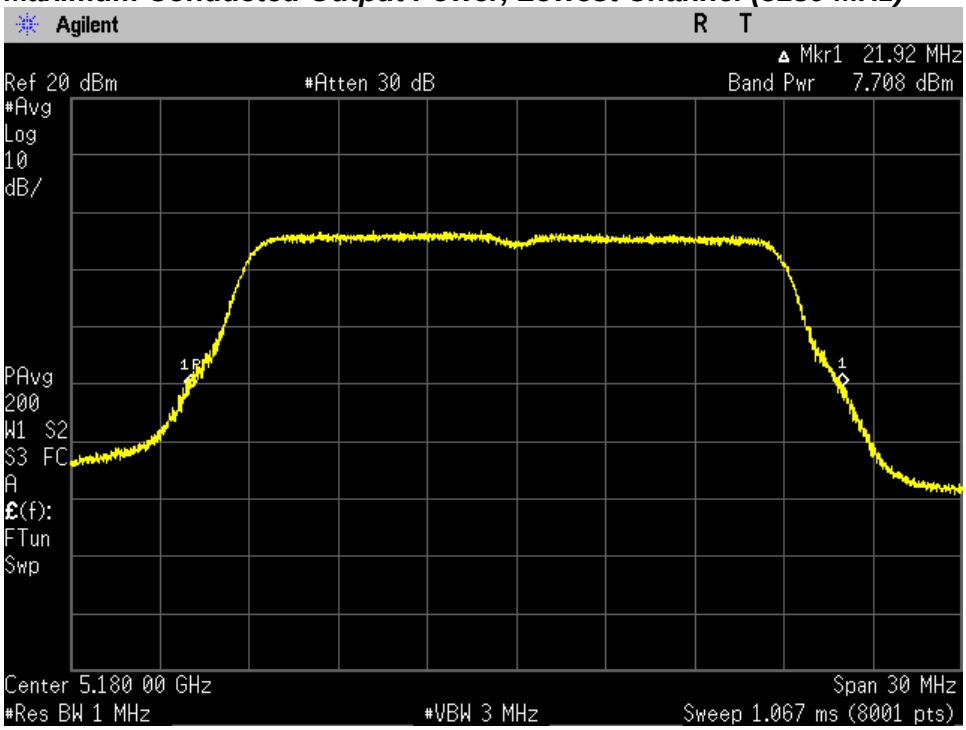
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



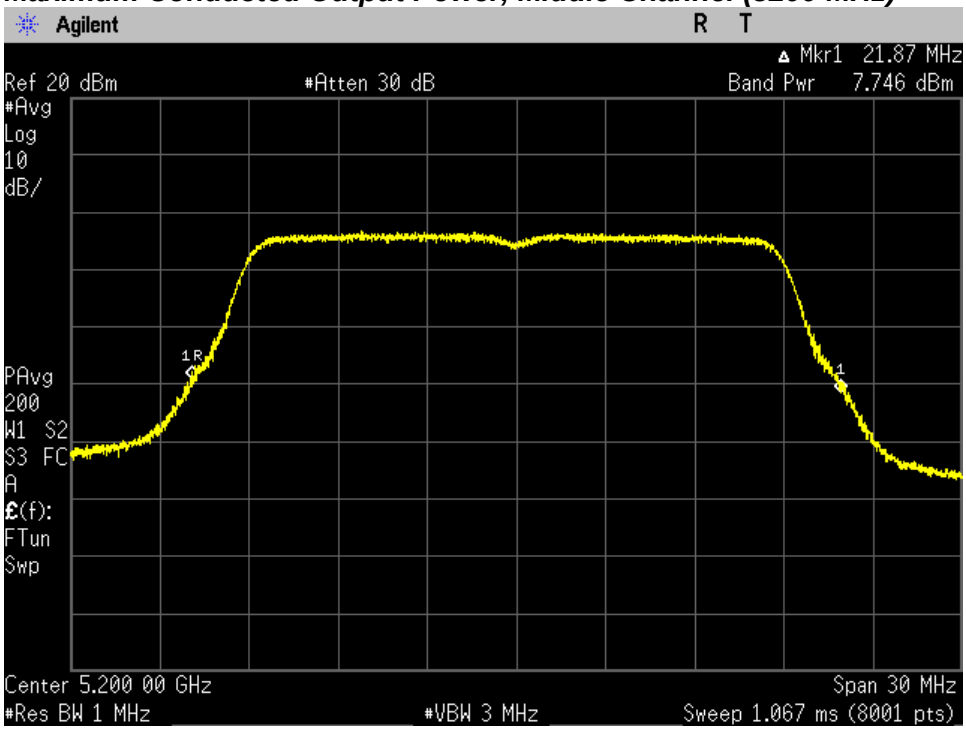
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

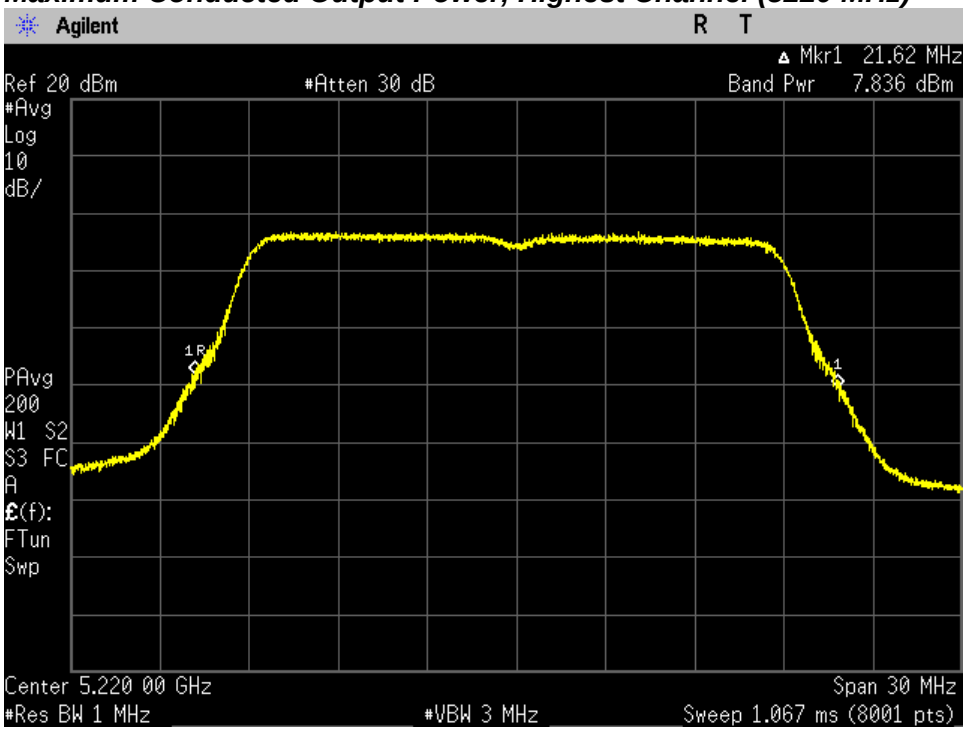


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

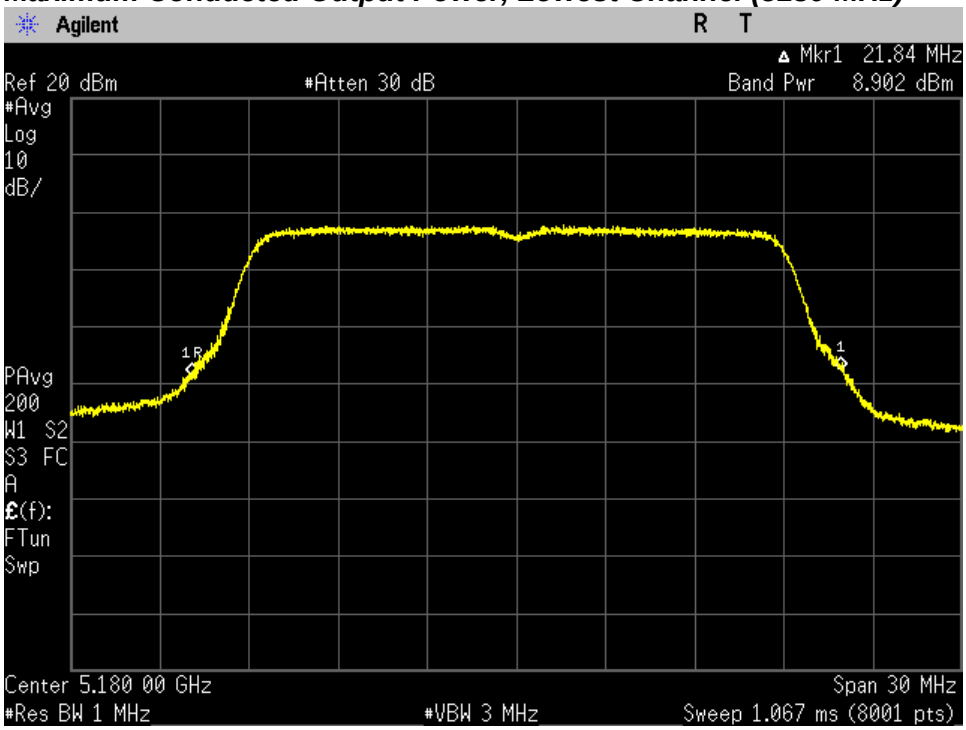


PLOTS OF EMISSIONS

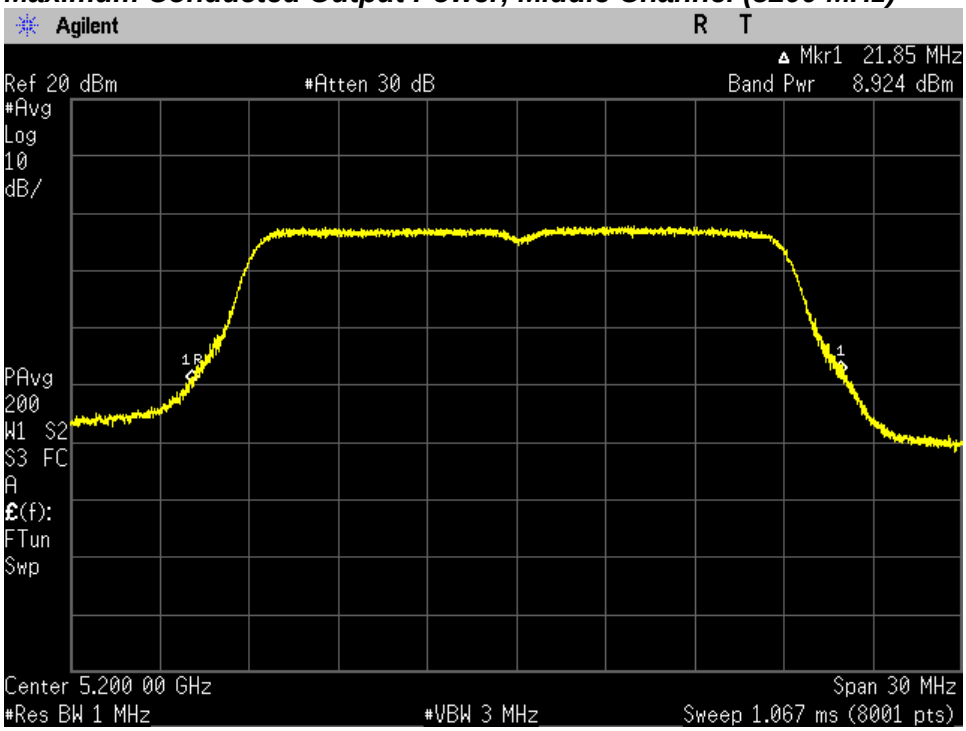
802.11n (20 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

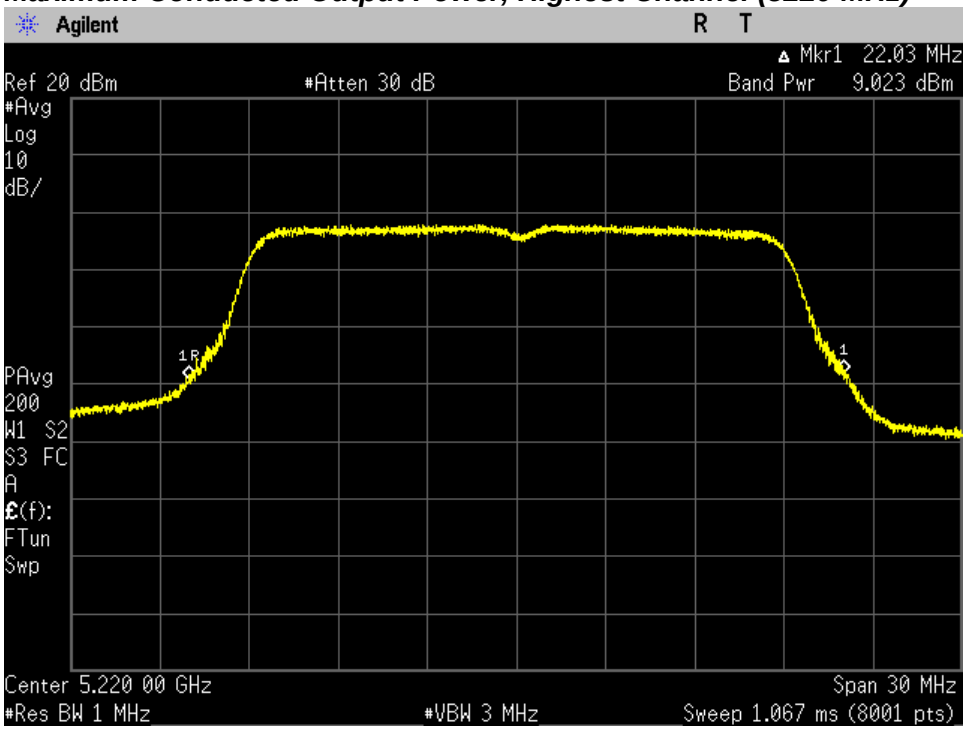


Maximum Conducted Output Power, Middle Channel (5200 MHz)



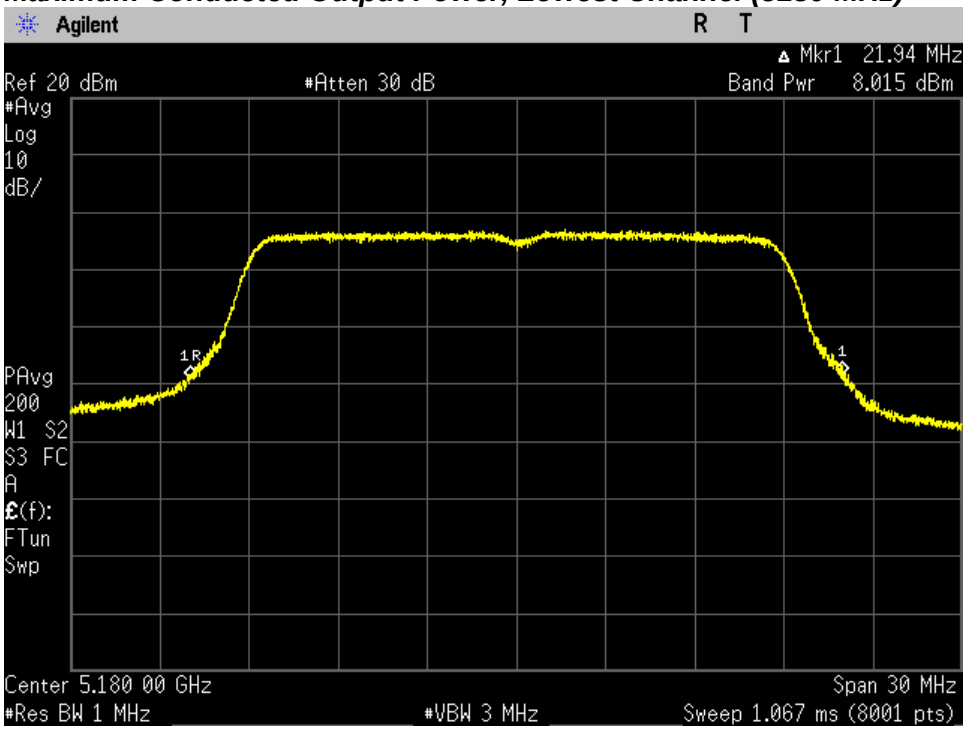
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



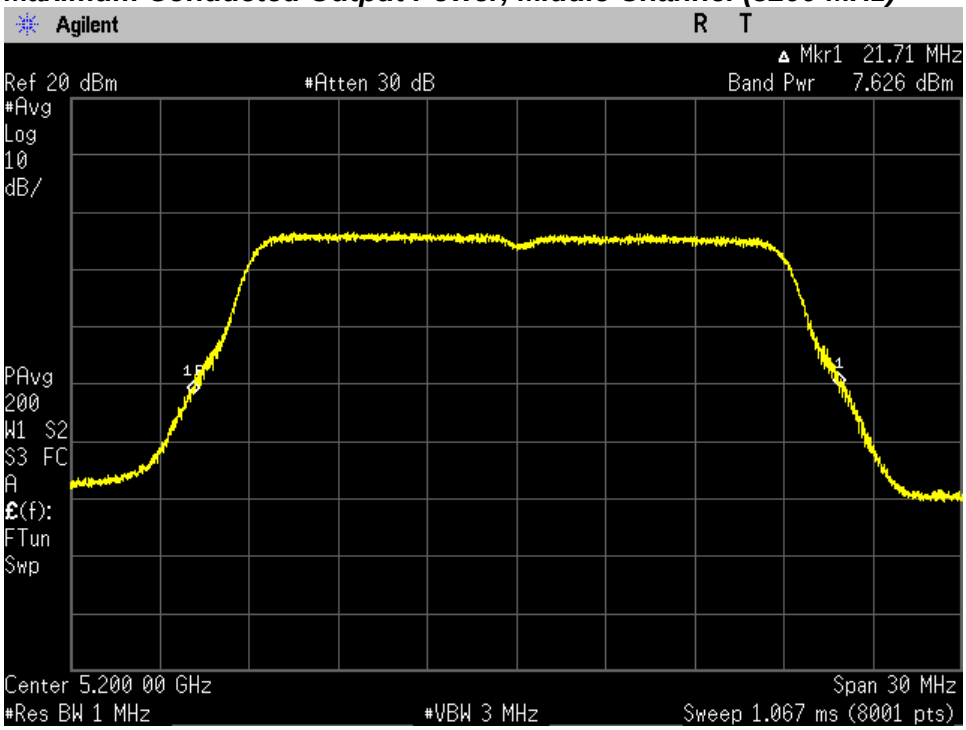
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

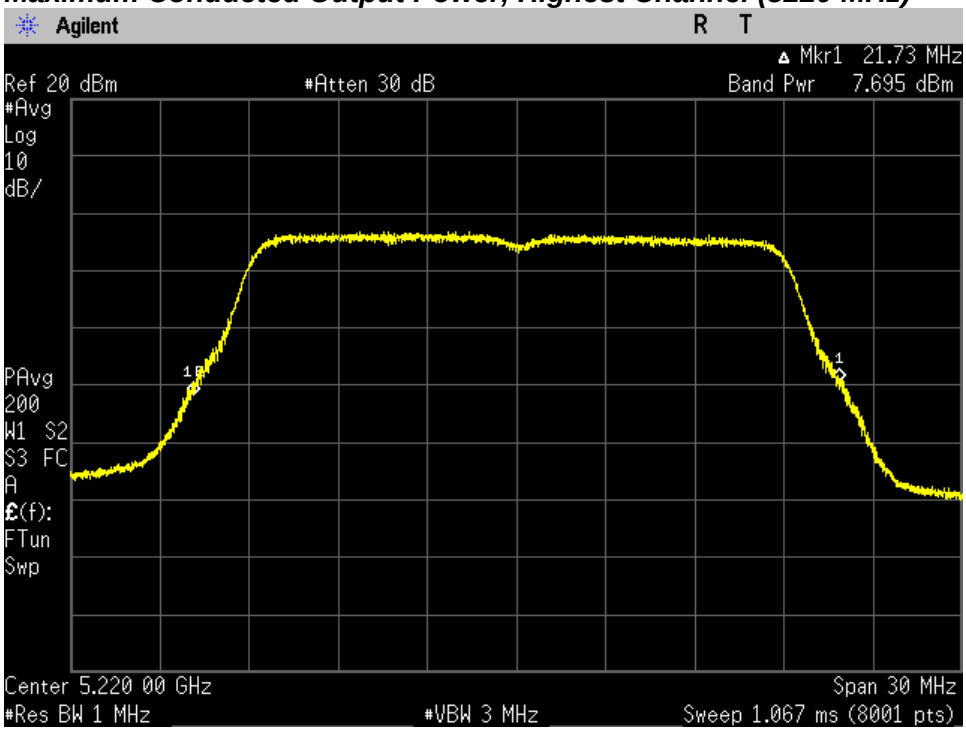


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

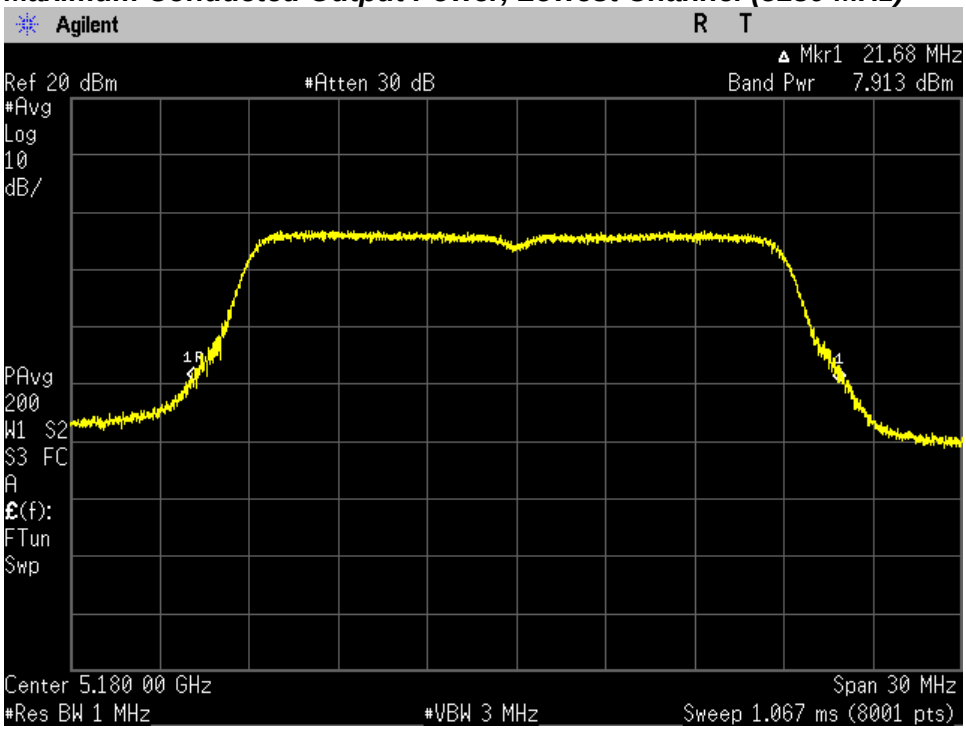


PLOTS OF EMISSIONS

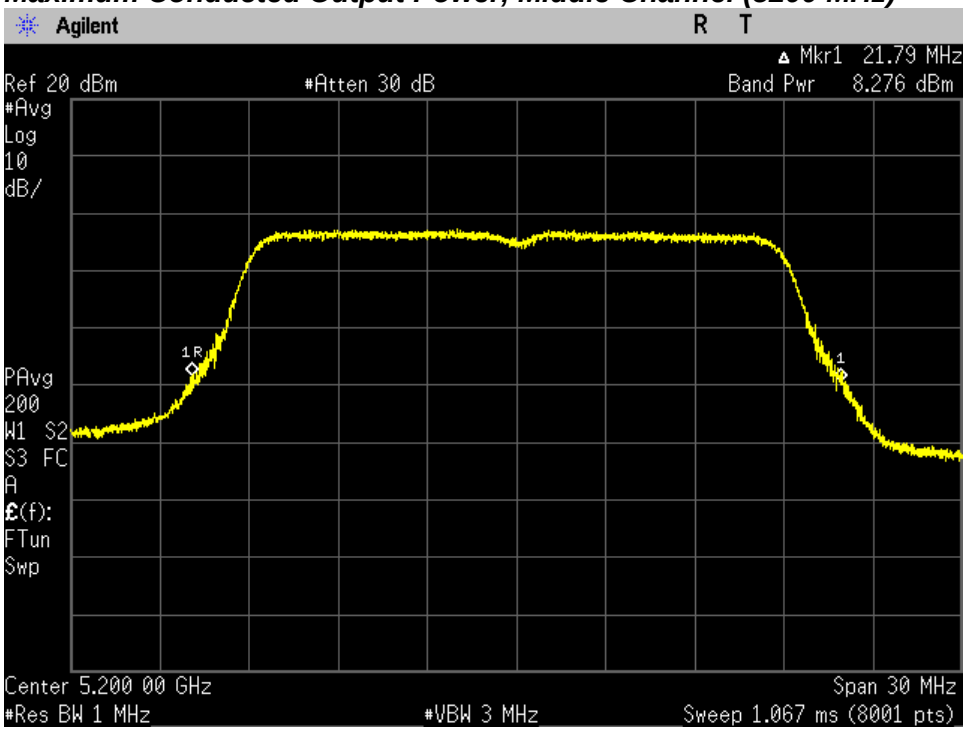
802.11n (20 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

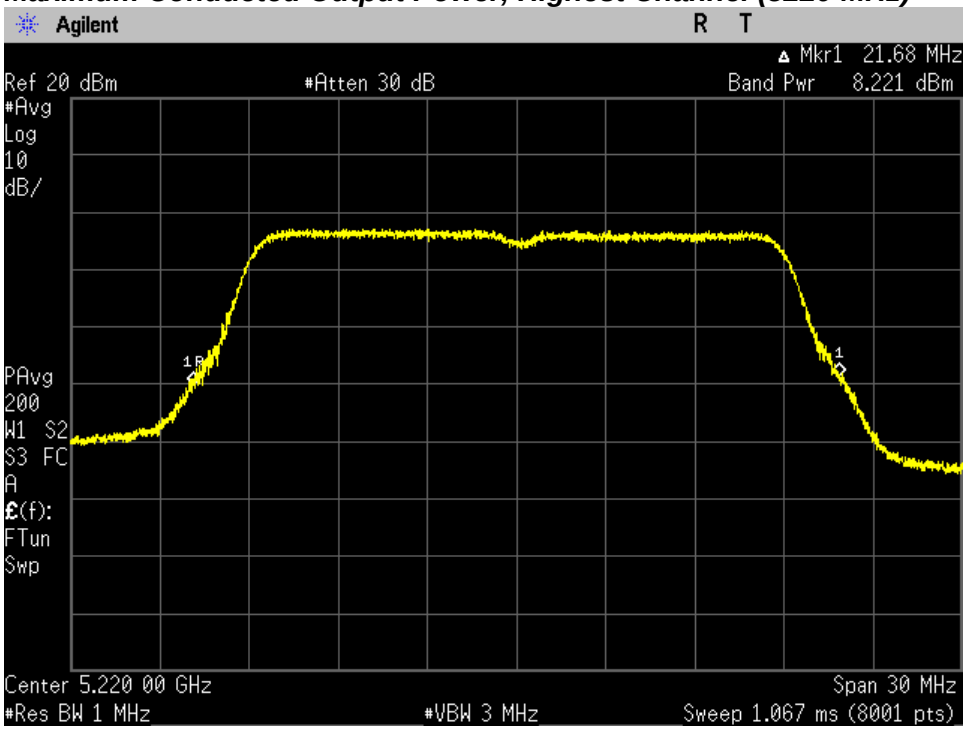


Maximum Conducted Output Power, Middle Channel (5200 MHz)



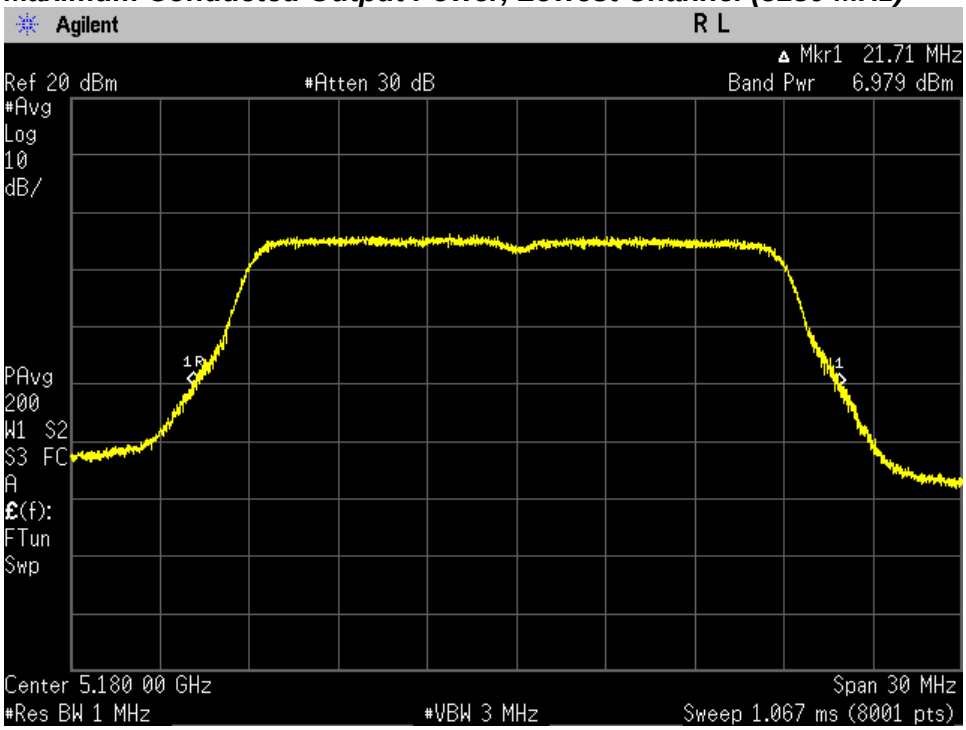
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



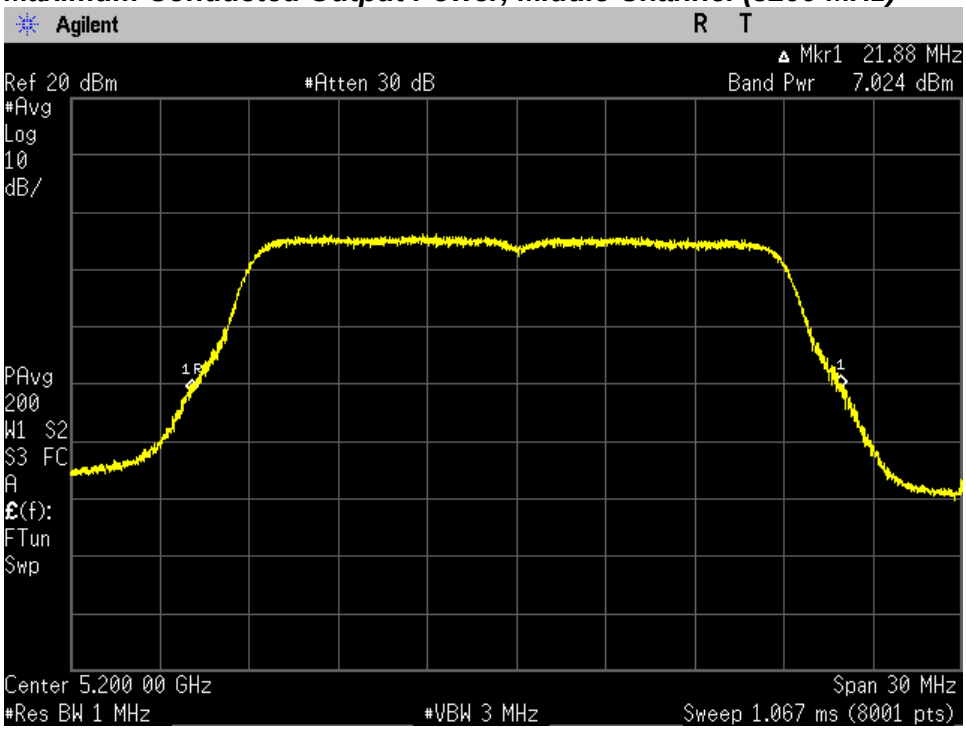
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

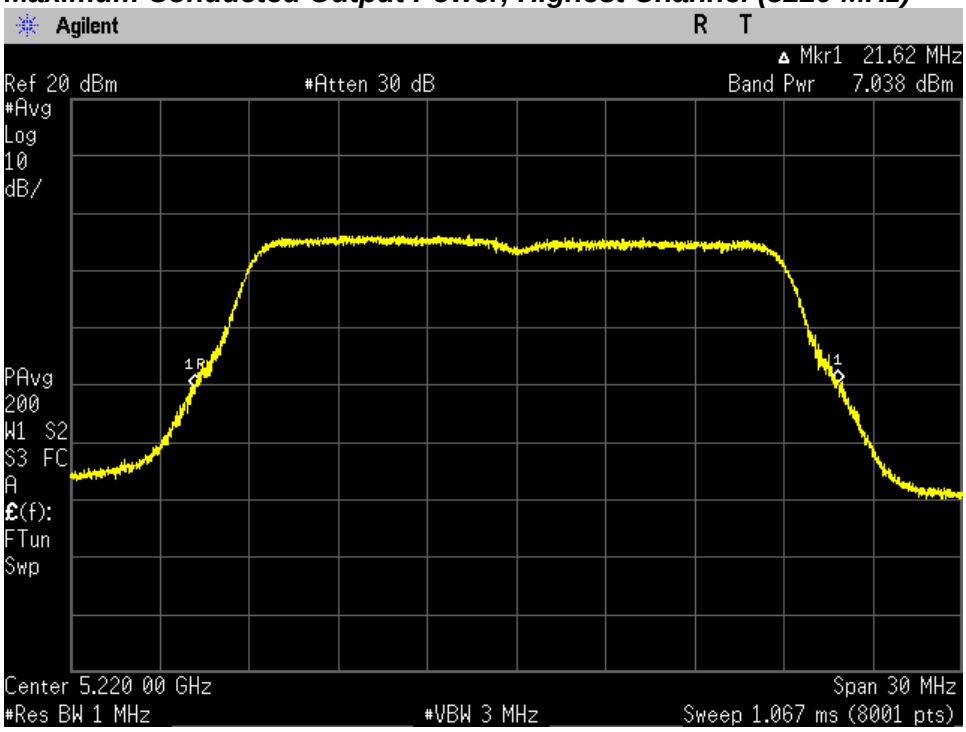


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

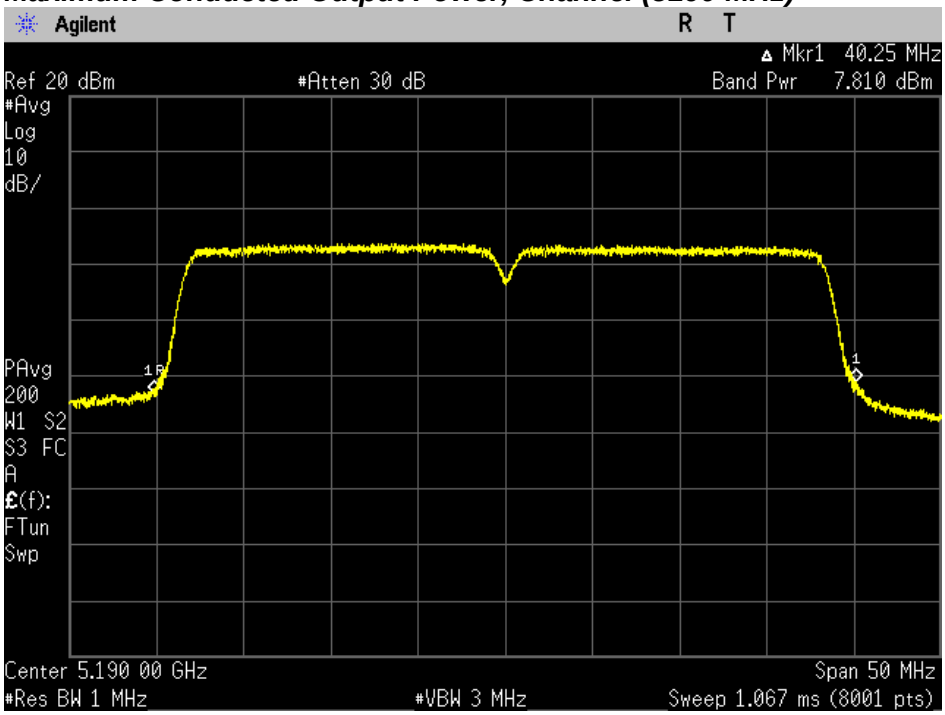


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - SISO

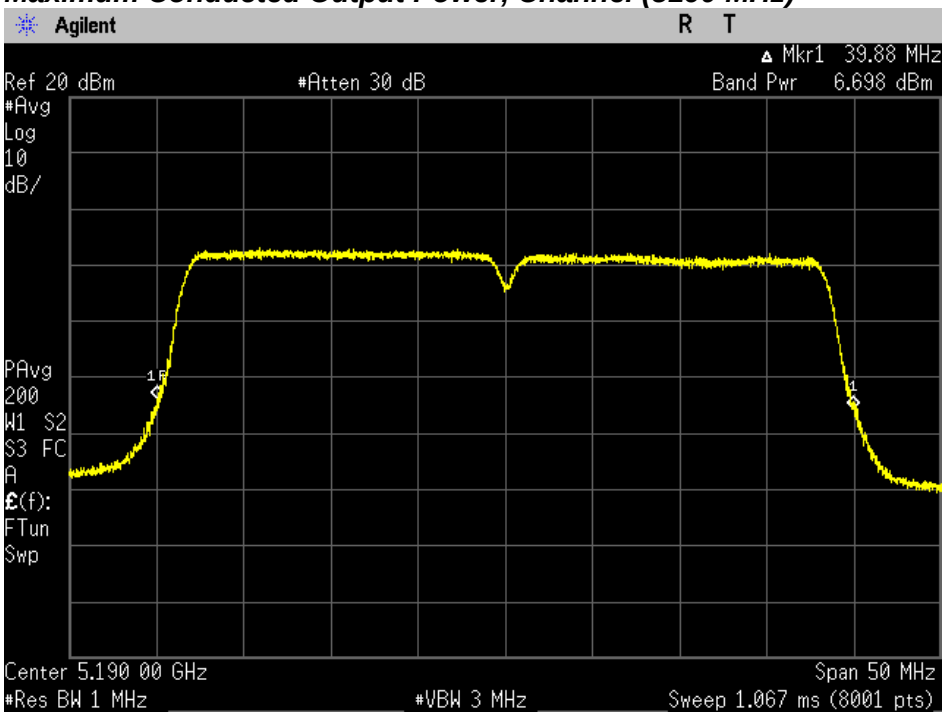
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)

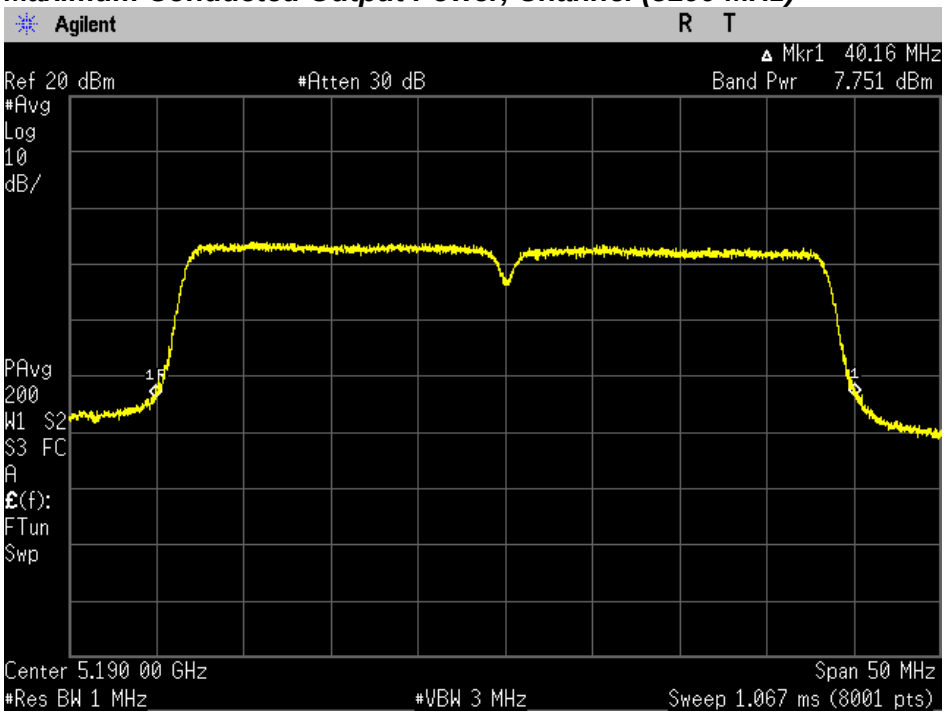


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - CDD

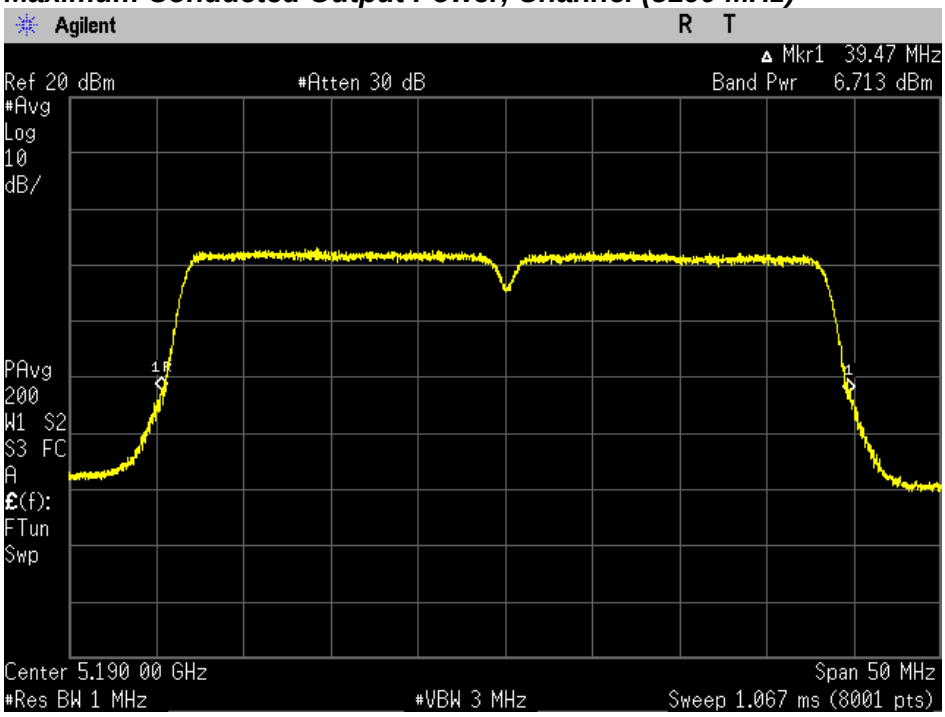
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)

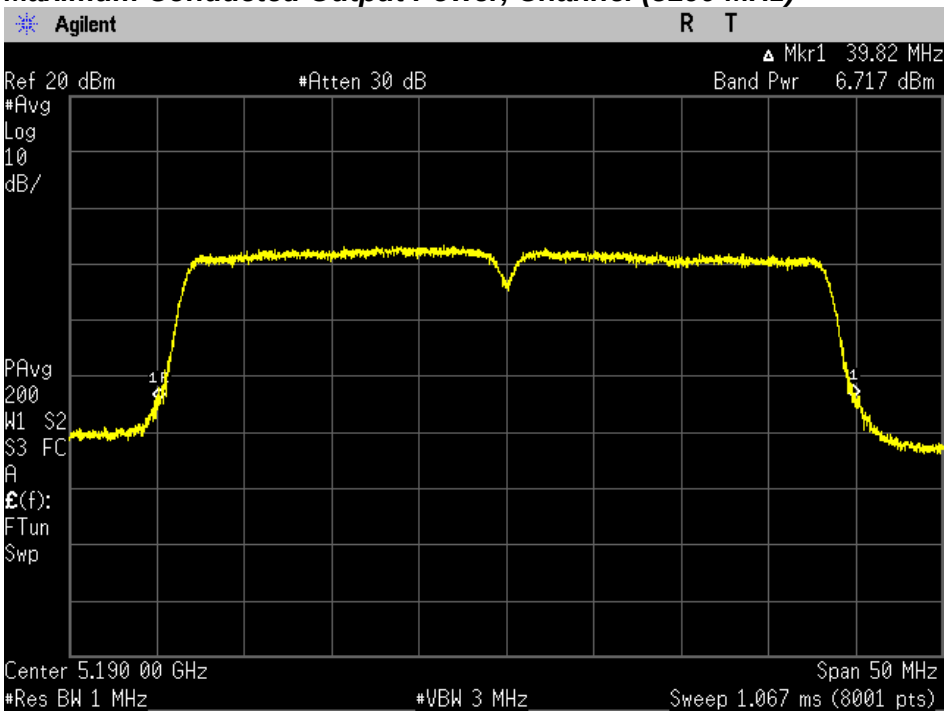


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - MIMO

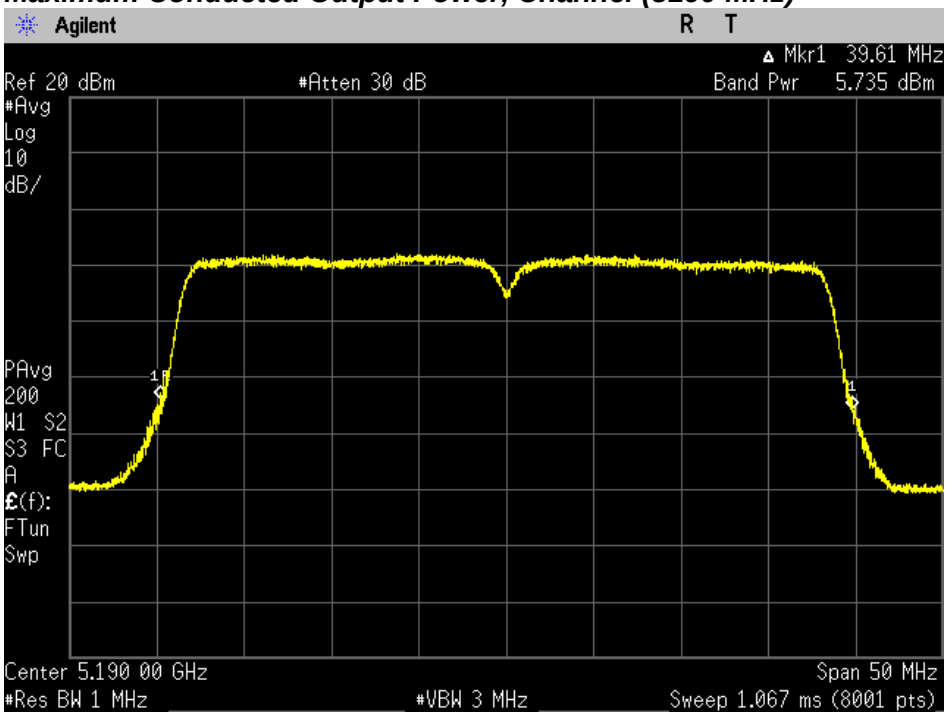
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)

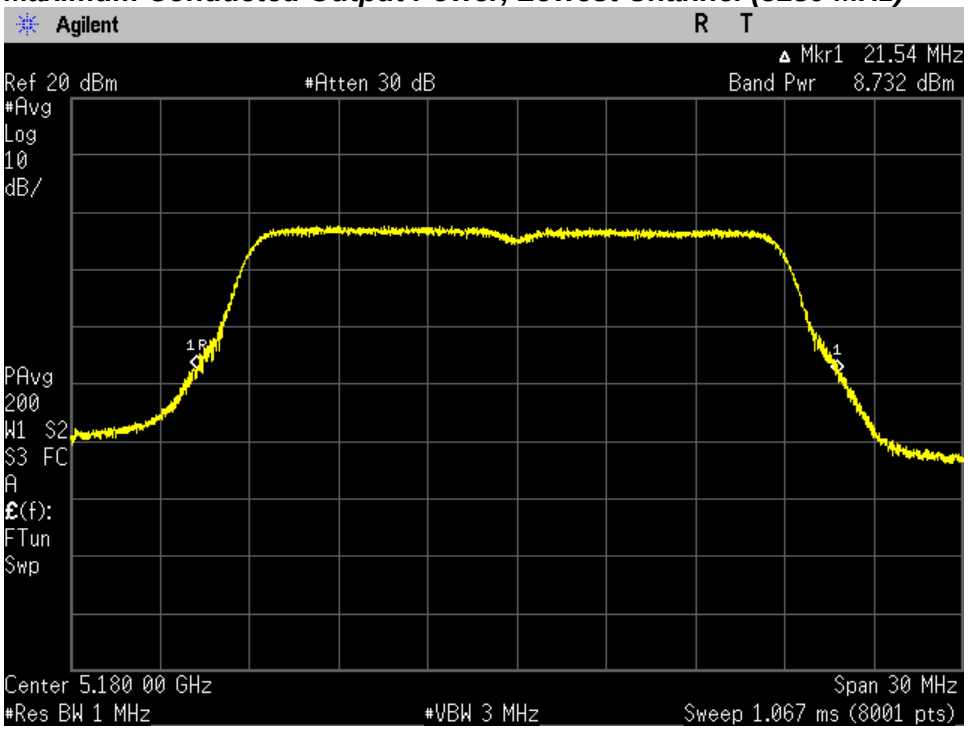


PLOTS OF EMISSIONS

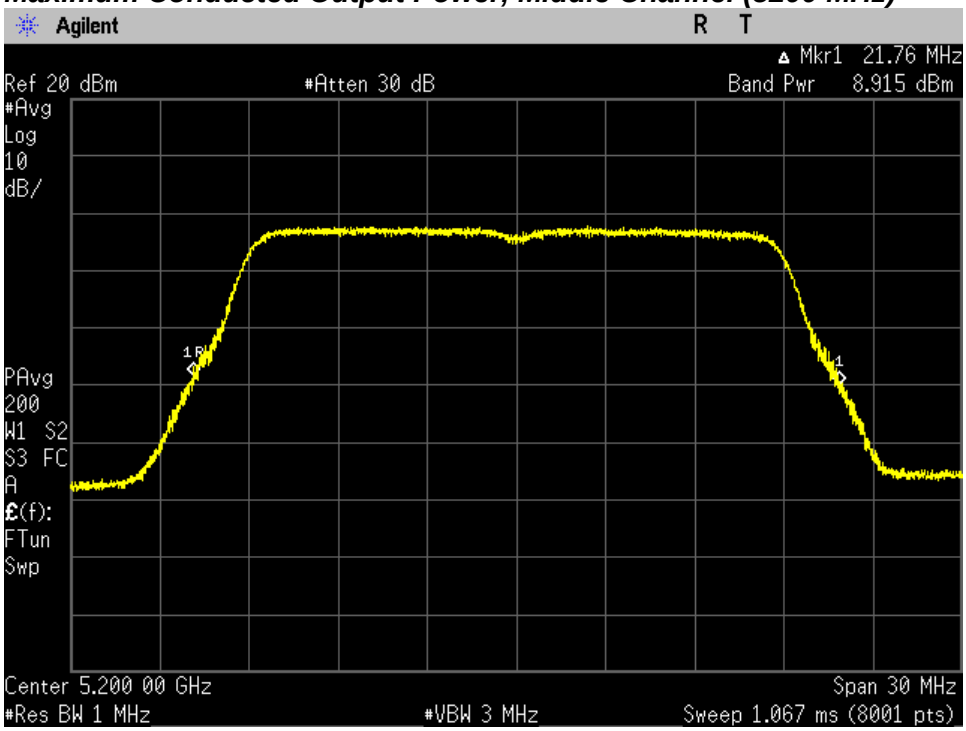
802.11ac (20 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

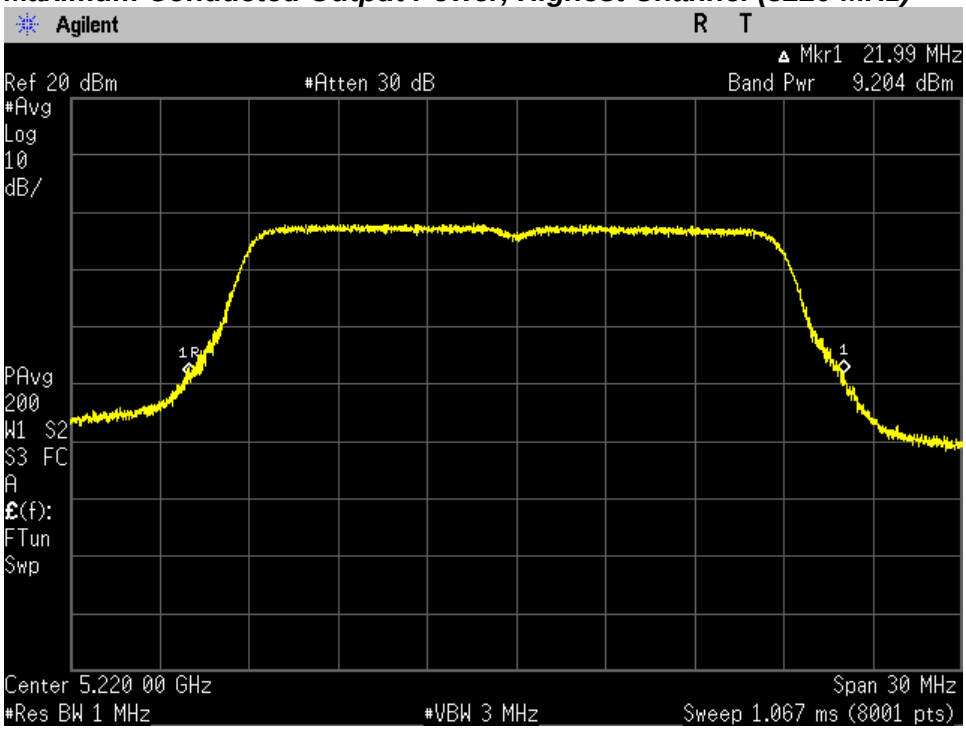


Maximum Conducted Output Power, Middle Channel (5200 MHz)



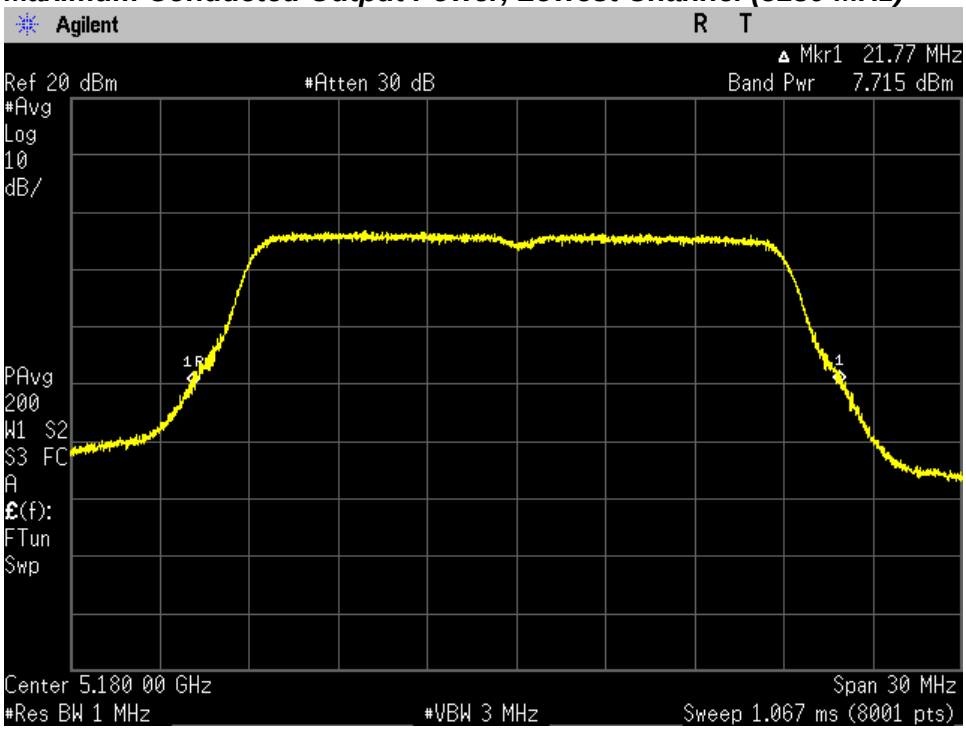
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



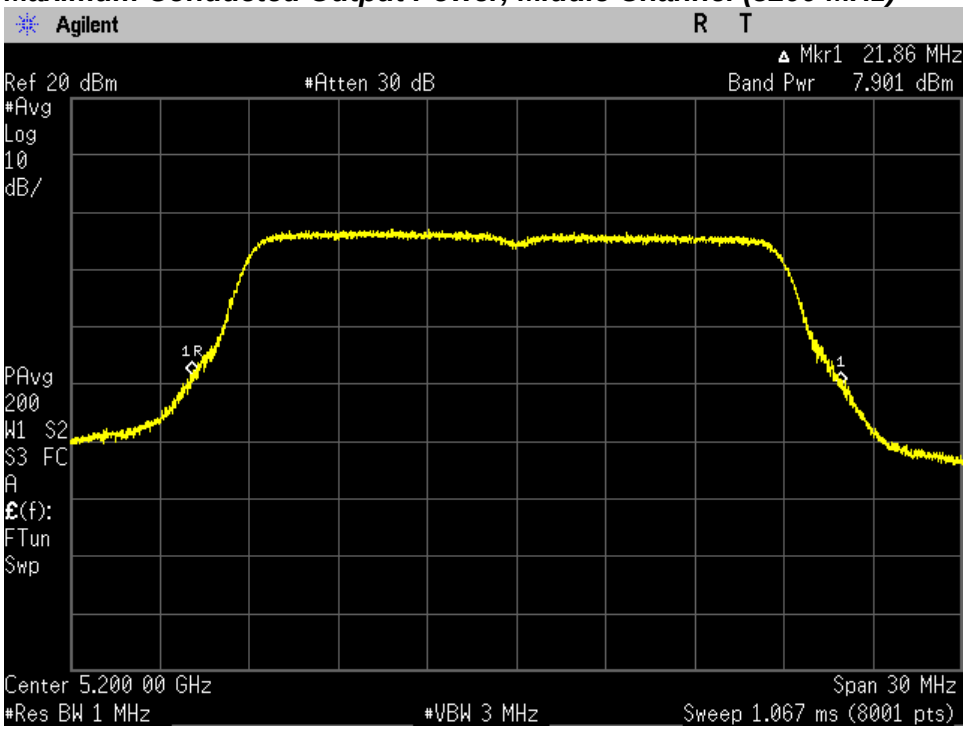
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

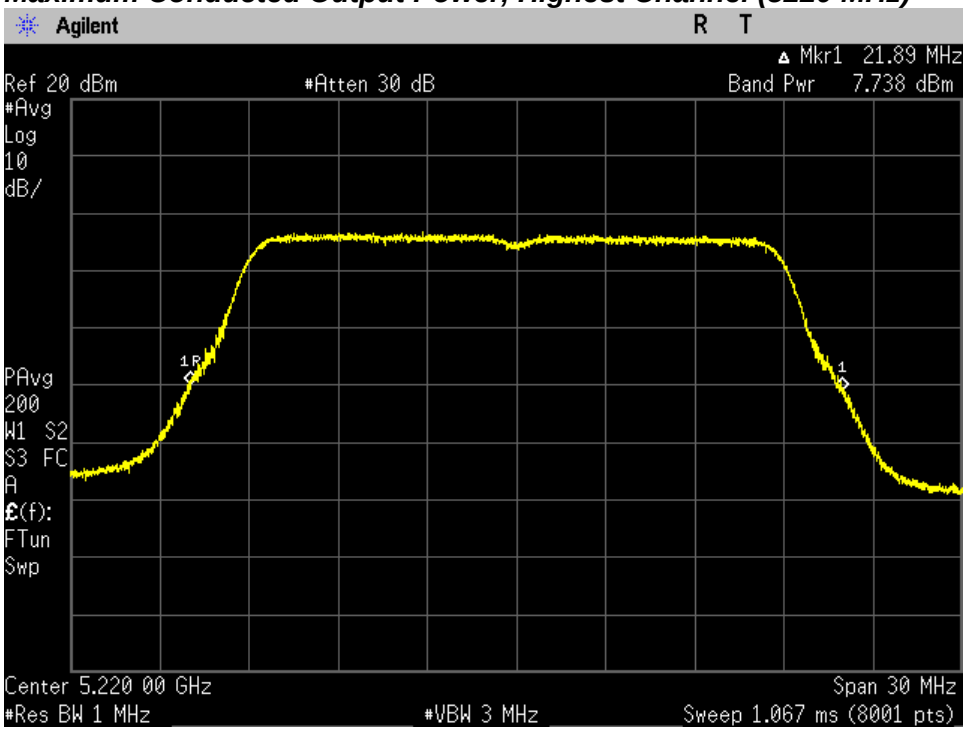


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

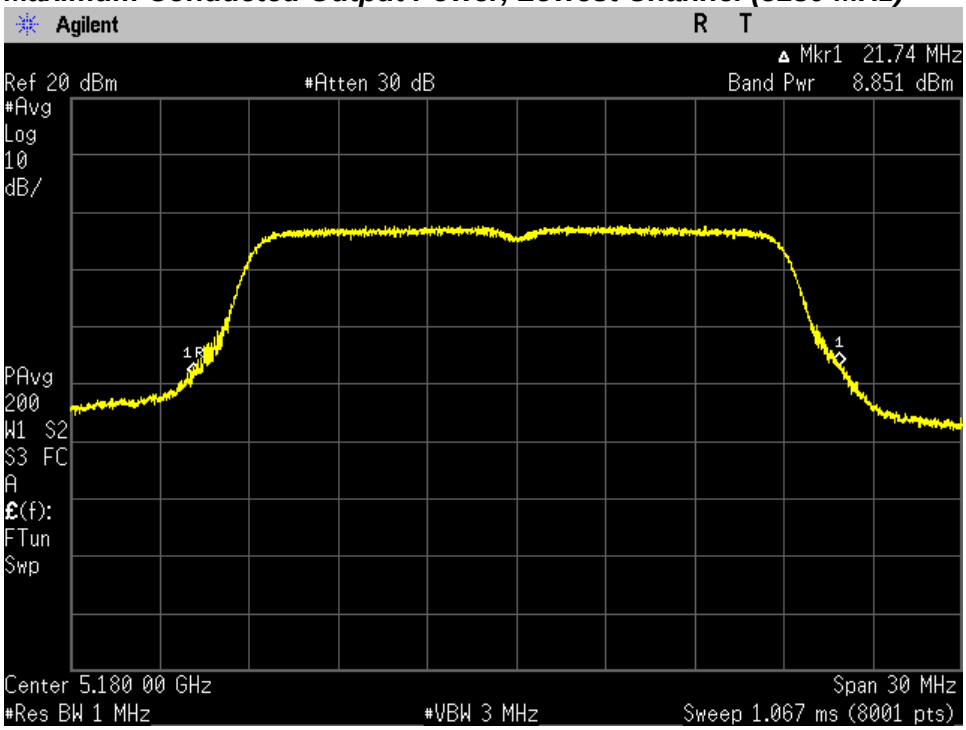


PLOTS OF EMISSIONS

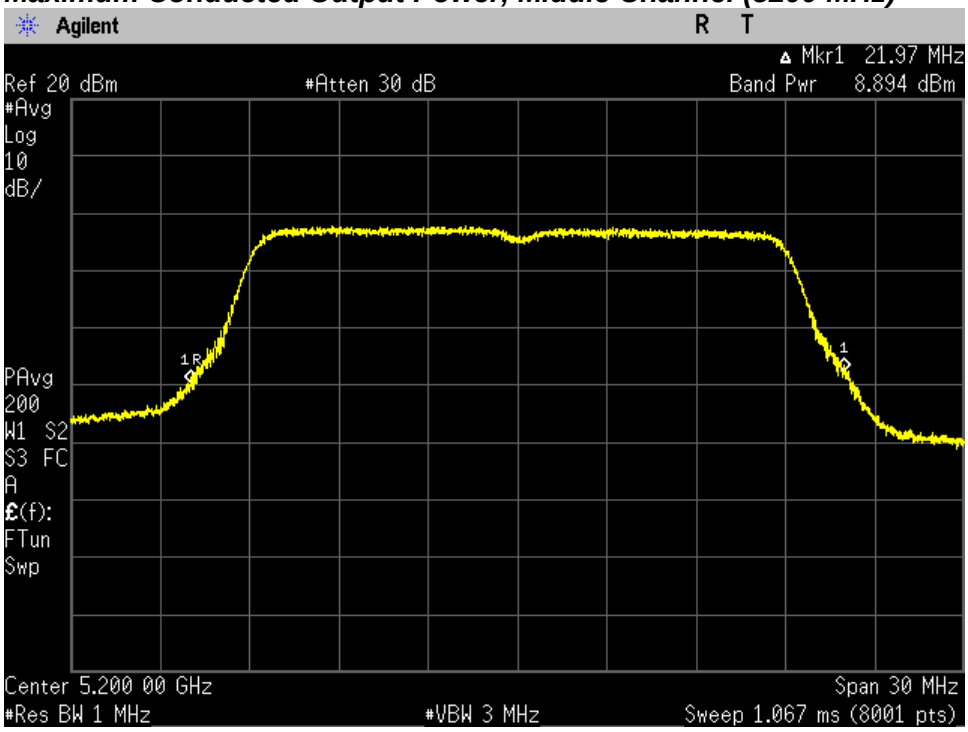
802.11ac (20 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

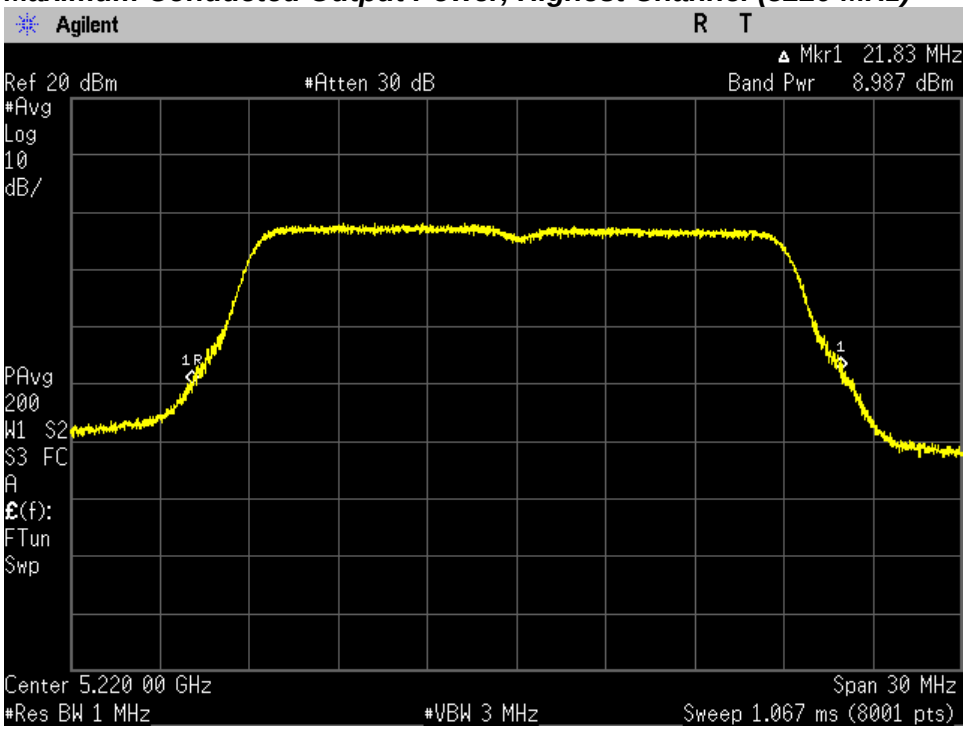


Maximum Conducted Output Power, Middle Channel (5200 MHz)



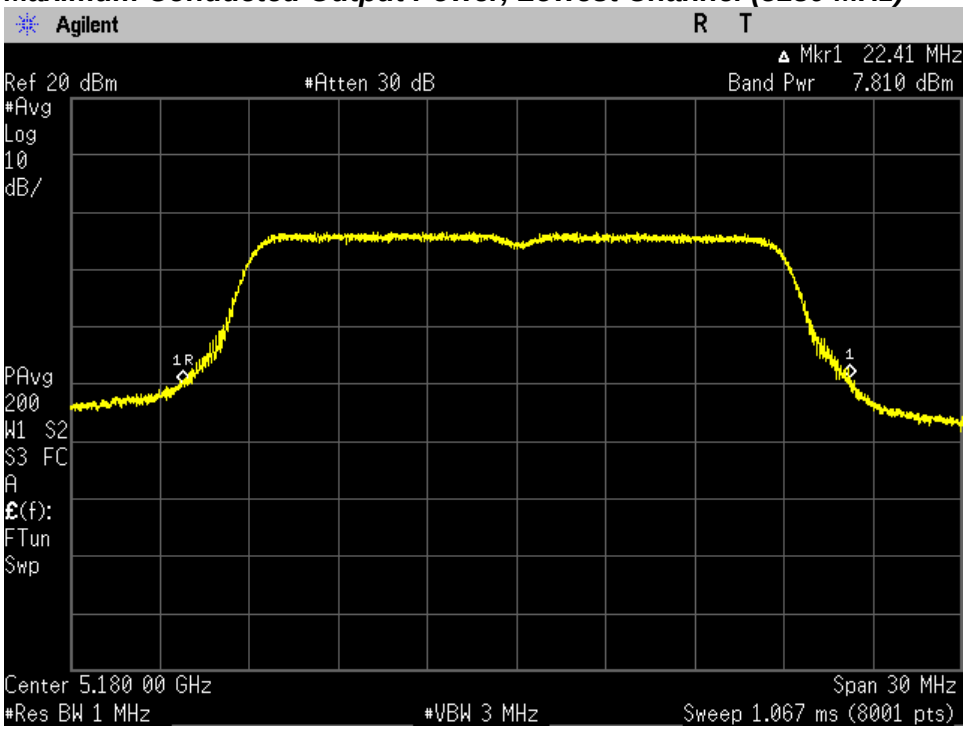
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



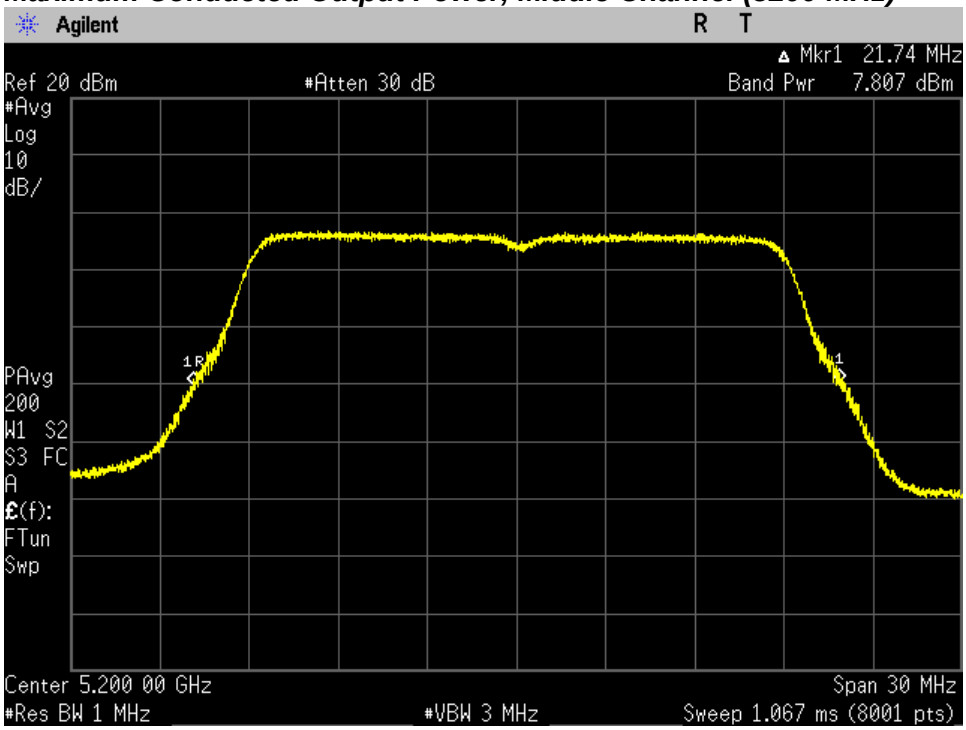
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

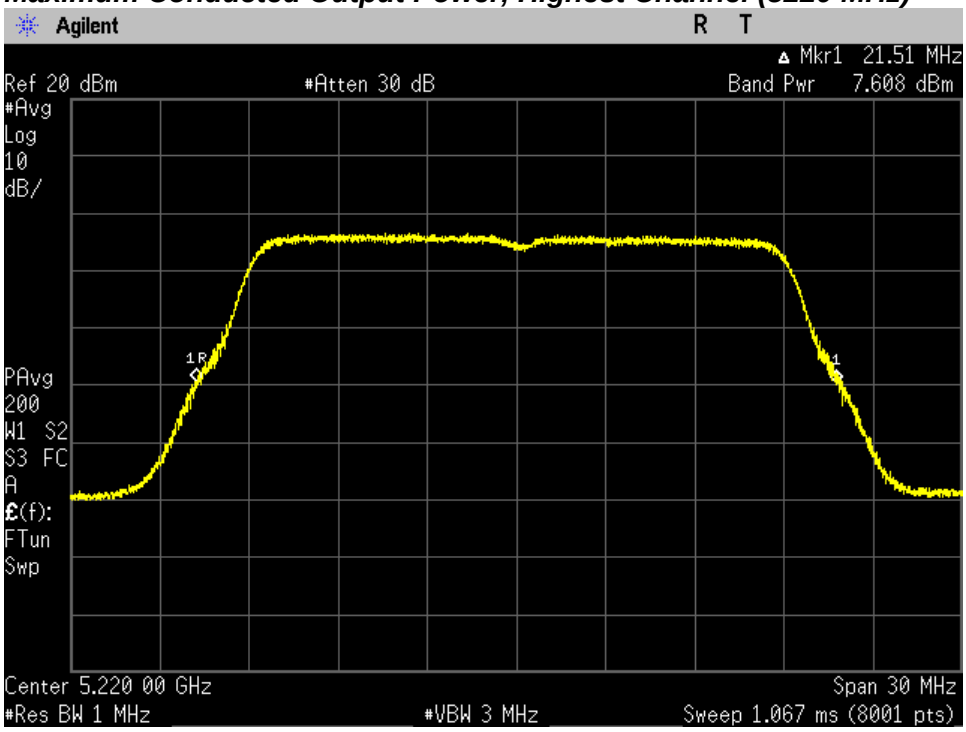


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

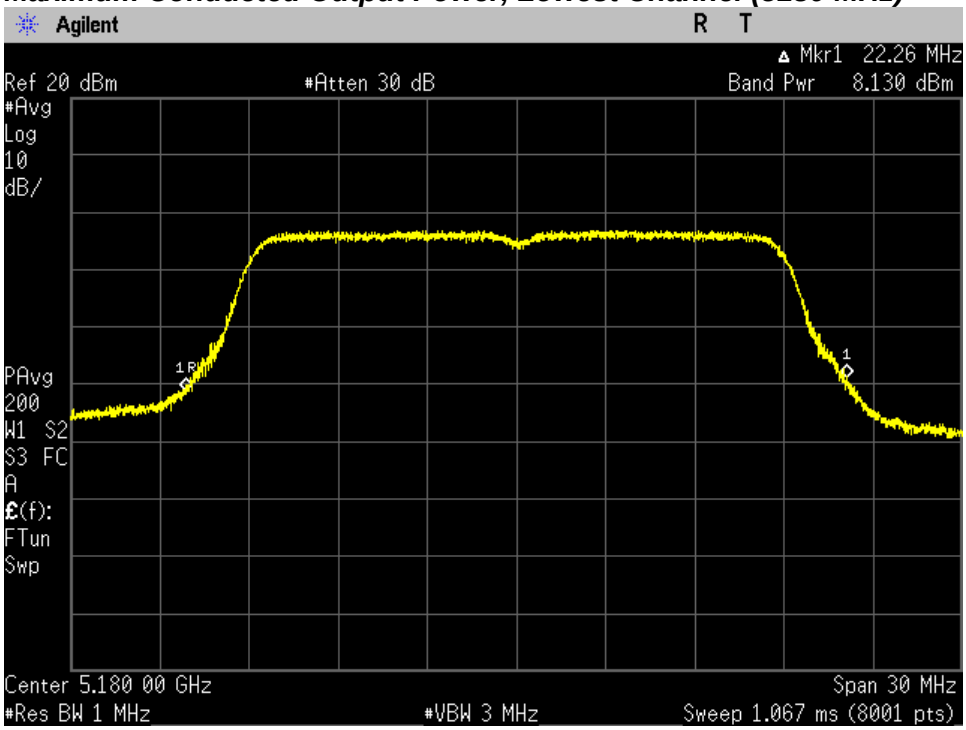


PLOTS OF EMISSIONS

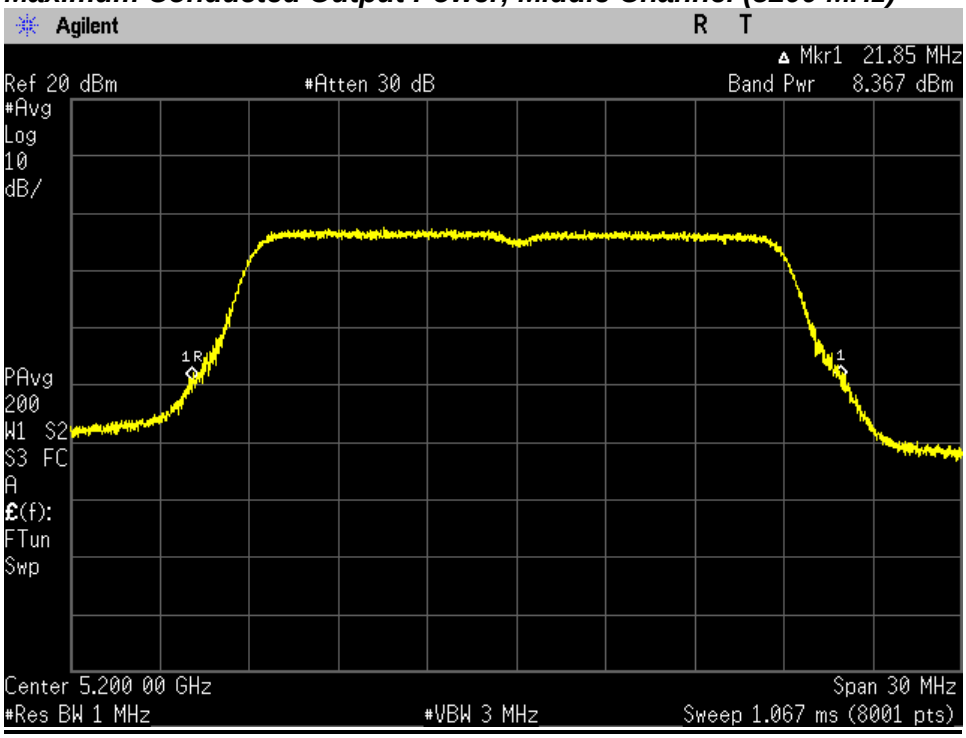
802.11ac (20 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

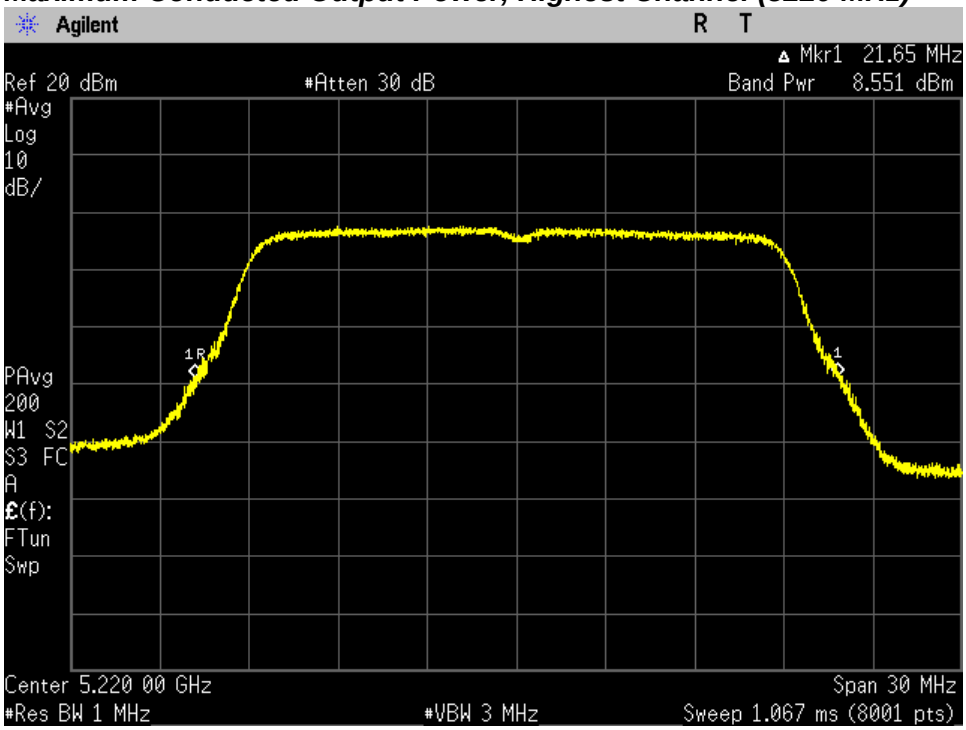


Maximum Conducted Output Power, Middle Channel (5200 MHz)



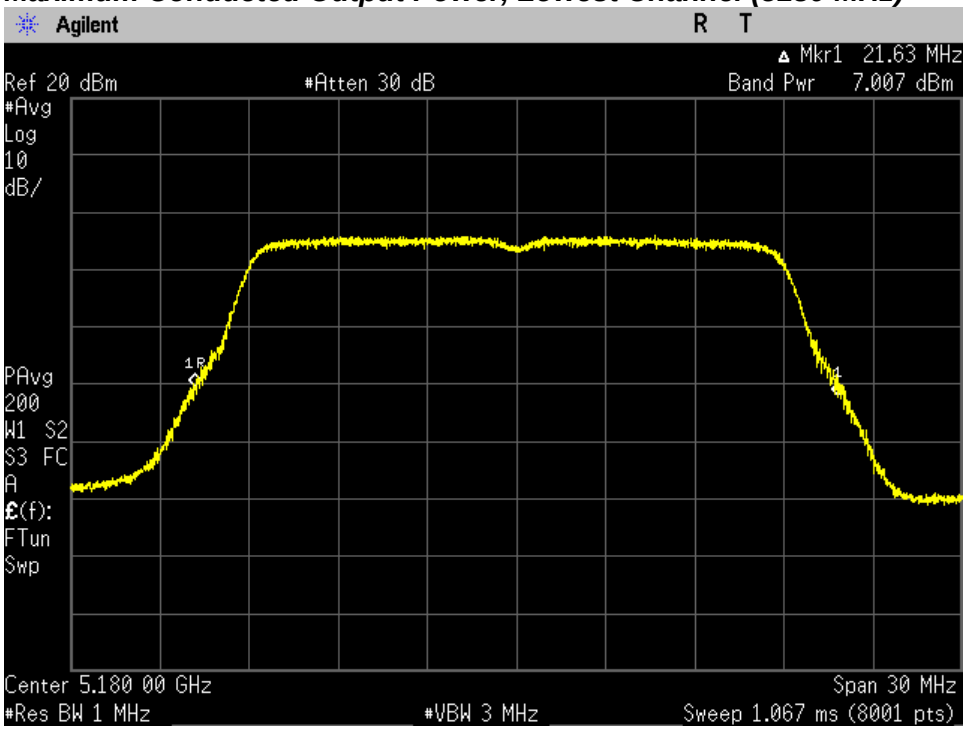
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5220 MHz)



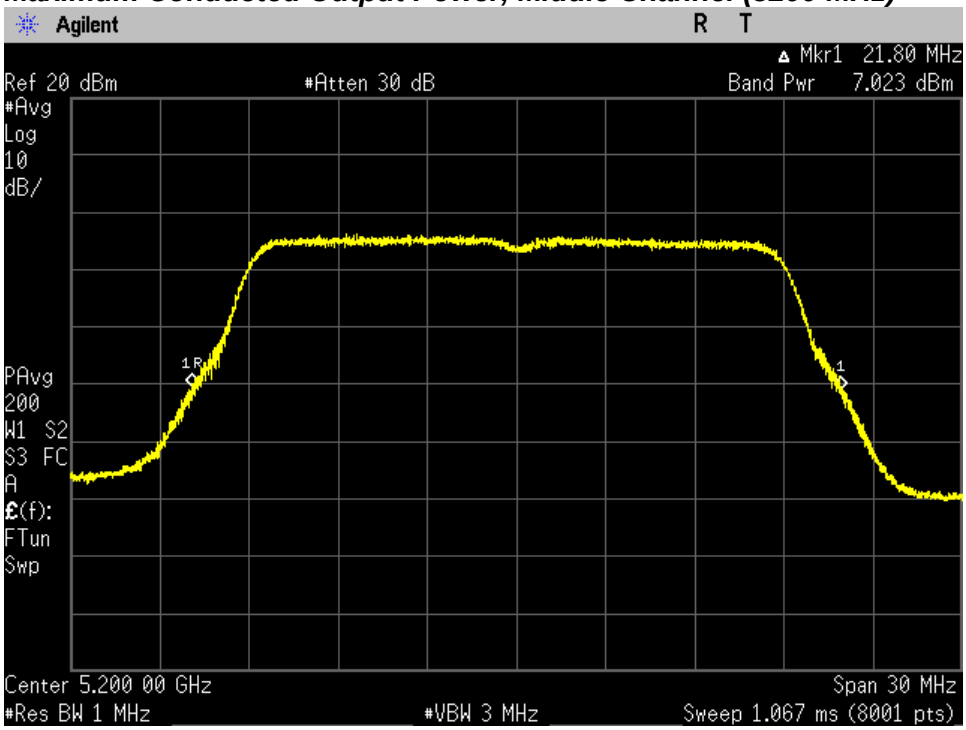
Chain 1

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

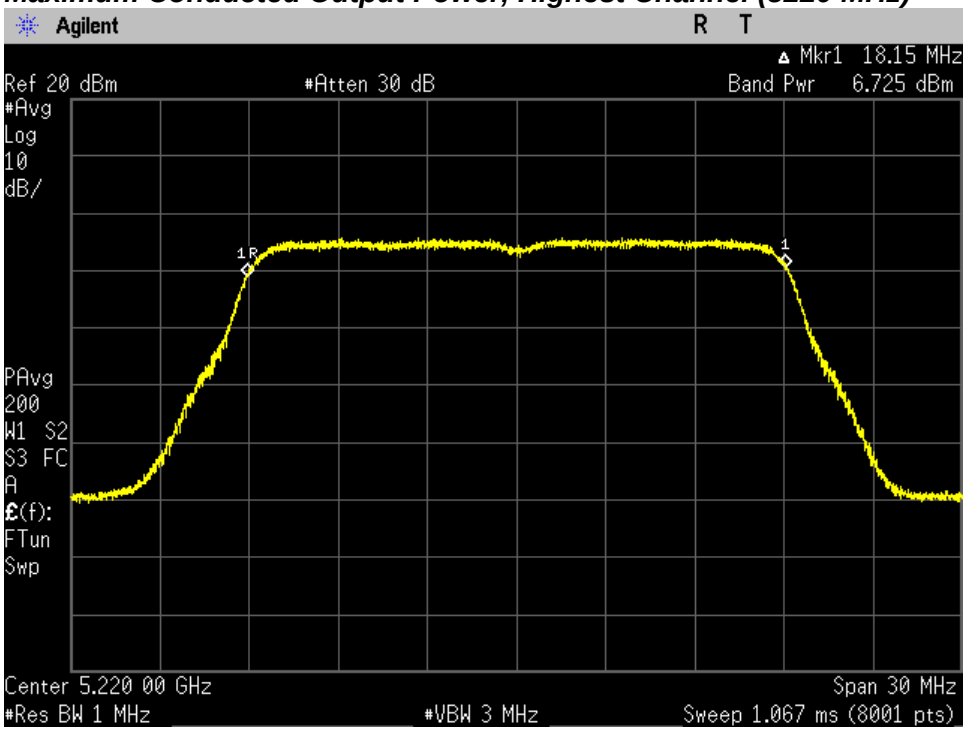


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5200 MHz)



Maximum Conducted Output Power, Highest Channel (5220 MHz)

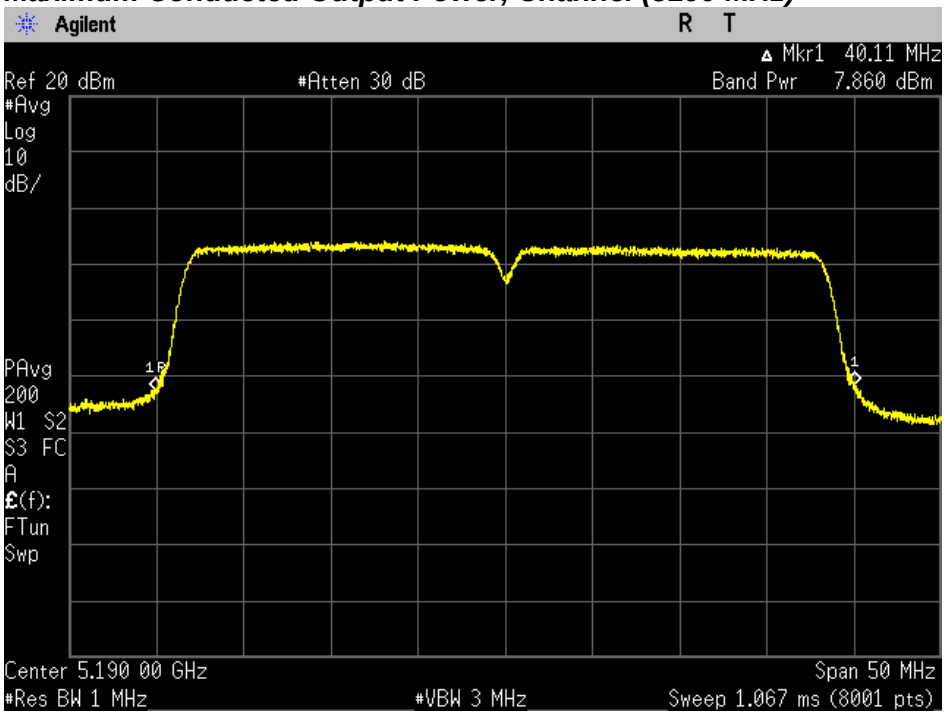


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - SISO

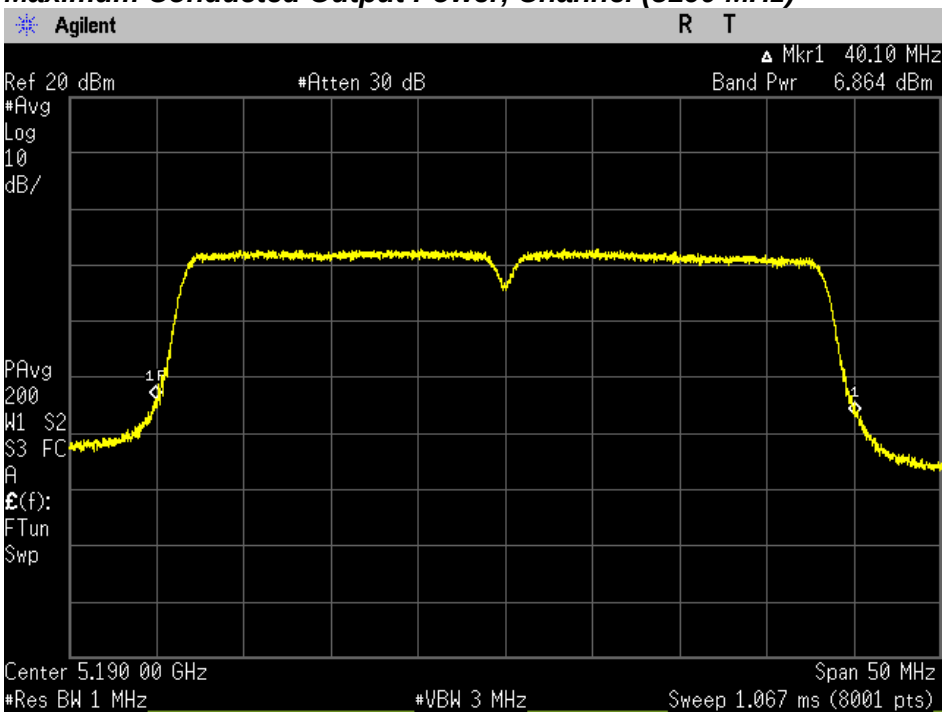
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)

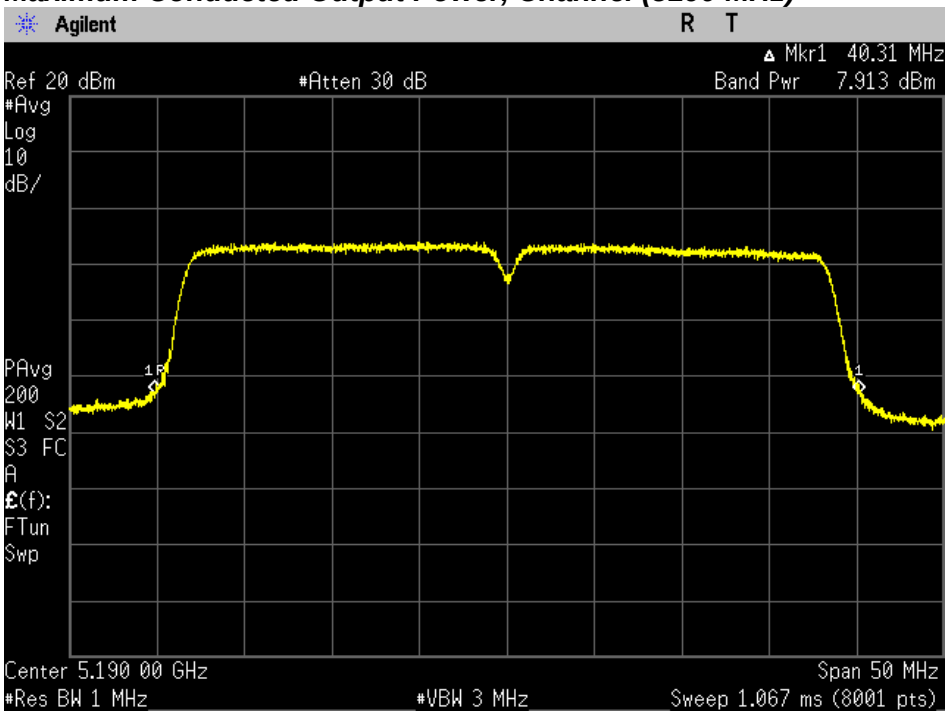


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - CDD

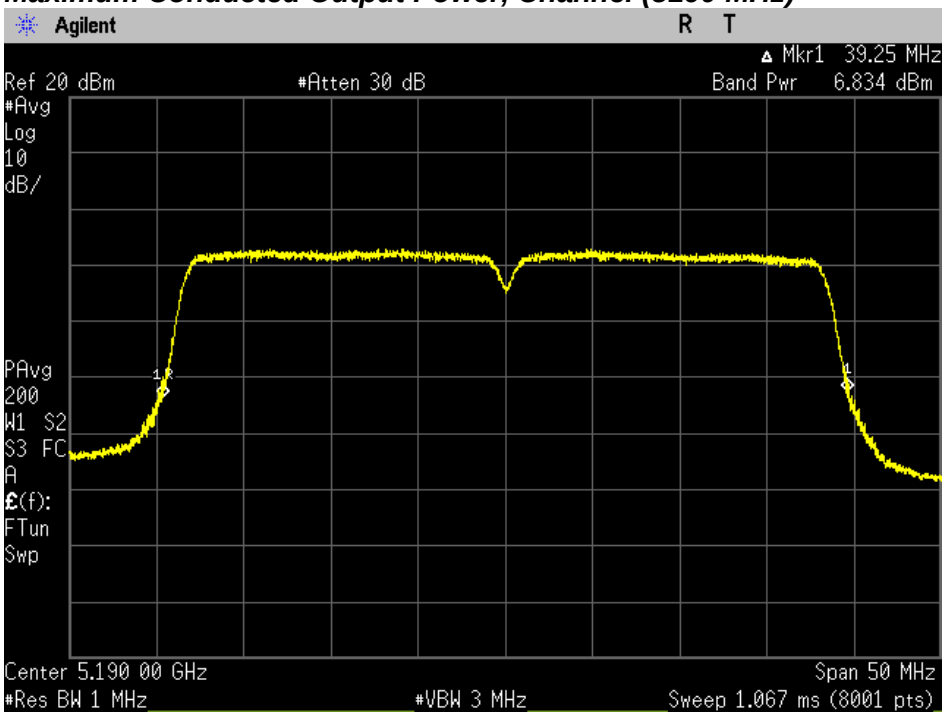
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)

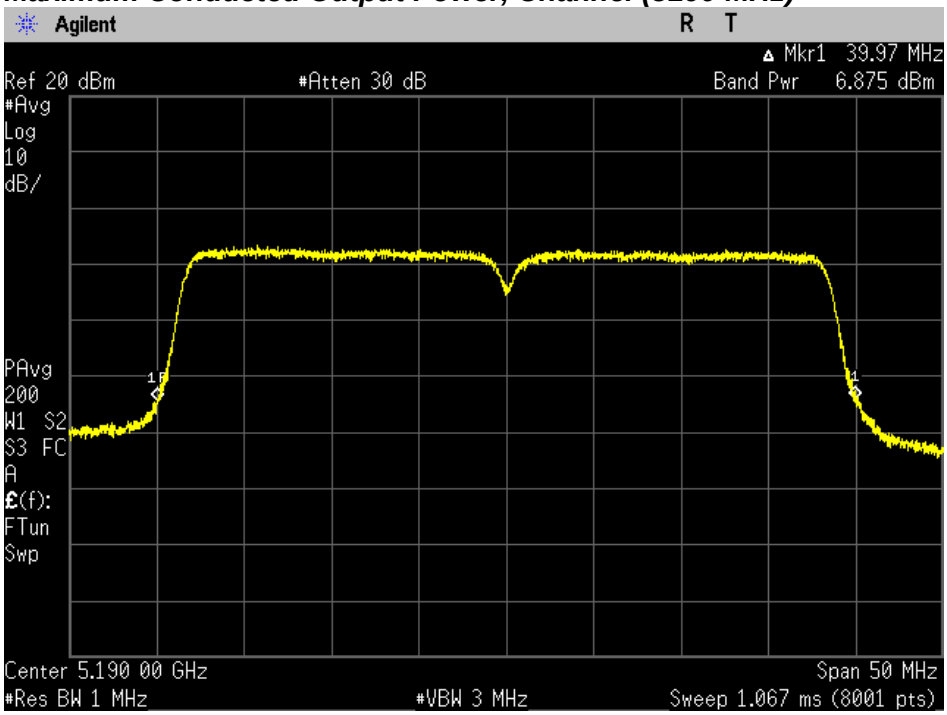


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - MIMO

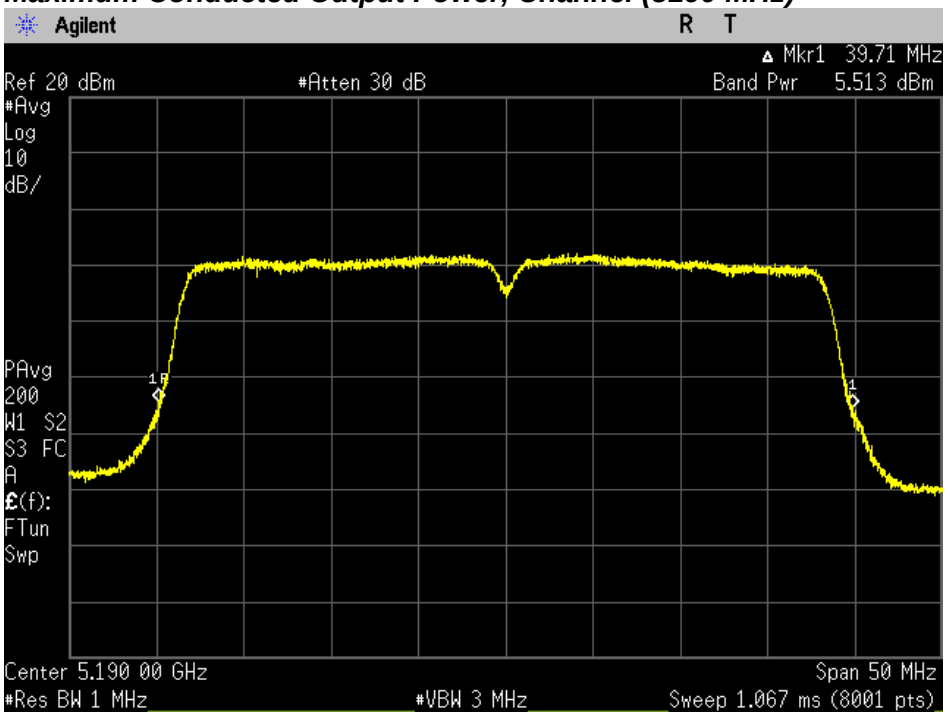
Chain 0

Maximum Conducted Output Power, Channel (5190 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5190 MHz)



8.5.2 Maximum Conducted Output Power (average) – UNII-3 band

FCC §15.407(a), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
Lowest	5745	6.69	3.73	7.52	4.56	30.00	
Middle	5785	5.76	2.88	6.59	3.71	30.00	
Highest	5825	6.11	2.79	6.94	3.62	30.00	

802.11n mode - SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
Lowest	5745	6.43	3.49	7.31	4.37	30.00	
Middle	5785	5.92	2.76	6.80	3.64	30.00	
Highest	5825	5.84	2.73	6.72	3.61	30.00	

802.11n (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5745	6.16	3.26	0.88	8.84	30.00	
Middle	5785	5.81	1.96	0.88	8.19	30.00	
Highest	5825	5.58	2.22	0.88	8.11	30.00	

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5745	5.75	2.62	1.58	9.05	30.00	
Middle	5785	5.25	1.72	1.56	8.40	30.00	
Highest	5825	5.00	1.85	1.57	8.28	30.00	

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
Lowest	5755	4.46	1.44	6.10	3.08	30.00	
Highest	5795	3.77	0.77	5.41	2.41	30.00	

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5755	4.15	1.12	1.64	7.54	30.00	
Highest	5795	3.62	0.43	1.64	6.96	30.00	

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5755	3.10	-0.04	2.68	7.50	30.00	
Highest	5795	2.53	-0.50	2.67	6.95	30.00	

802.11ac (20 MHz) mode - SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
Lowest	5745	6.50	3.25	7.38	4.13	30.00	
Middle	5785	5.74	2.72	6.62	3.60	30.00	
Highest	5825	5.87	2.65	6.75	3.53	30.00	

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5745	6.52	3.17	0.88	9.05	30.00	
Middle	5785	5.88	2.29	0.88	8.34	30.00	
Highest	5825	5.89	2.24	0.88	8.33	30.00	

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5745	5.91	2.75	1.55	9.17	30.00	
Middle	5785	5.11	1.79	1.56	8.33	30.00	
Highest	5825	5.23	1.64	1.58	8.39	30.00	

802.11ac (40 MHz) mode - SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
Lowest	5755	4.19	1.10	5.80	2.71	30.00	
Highest	5795	3.88	0.60	5.57	2.29	30.00	

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5755	4.16	1.17	1.61	7.54	30.00	
Highest	5795	3.60	0.41	1.69	6.99	30.00	

802.11ac (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
Lowest	5755	3.18	0.22	2.75	7.71	30.00	
Highest	5795	2.68	-0.31	2.67	7.12	30.00	

802.11ac (80 MHz) mode - SISO

Channel	Frequency (MHz)	Measured conducted power (dBm)		*Maximum Conducted Power (dBm)		Conducted Limit (dBm)	
		Chain 0	Chain 1	Chain 0	Chain 1	FCC	IC
	5775	2.36	-0.64	5.18	2.18	30.00	

802.11ac (80 MHz) mode - CDD

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
	5775	2.15	-0.96	2.82	6.70	30.00	

802.11ac (80 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	*Maximum Conducted Power (dBm)	Conducted Limit (dBm)	
		Chain 0	Chain 1		Total output power	FCC	IC
	5775	0.99	-2.15	4.08	6.79	30.00	

Note:

*1. *Maximum Conducted (average) Power = Measured conducted power + Duty Factor*

2. Total output power = 10 log [10^{(Chain 0 Power + duty factor)/10} + 10^{(Chain 1 Power + duty factor)/10}]

3. For CDD transmission, directional gain is. ***2.7 dBi***

For MIMO transmission, directional gain is ***2.7 dBi.***

Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.

For power measurements on IEEE 802.11 devices employing CDD, directional gain is as follows,

Directional gain = G_{ANT} + Array Gain = 2.7 dBi + 0 dB = 2.7 dBi

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all devices employing MIMO, directional gain is as follows,

***Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/2) dB = 2.7 dBi**.*

For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and N_{SS}=2.

4. The following equation was used for spectrum offset:

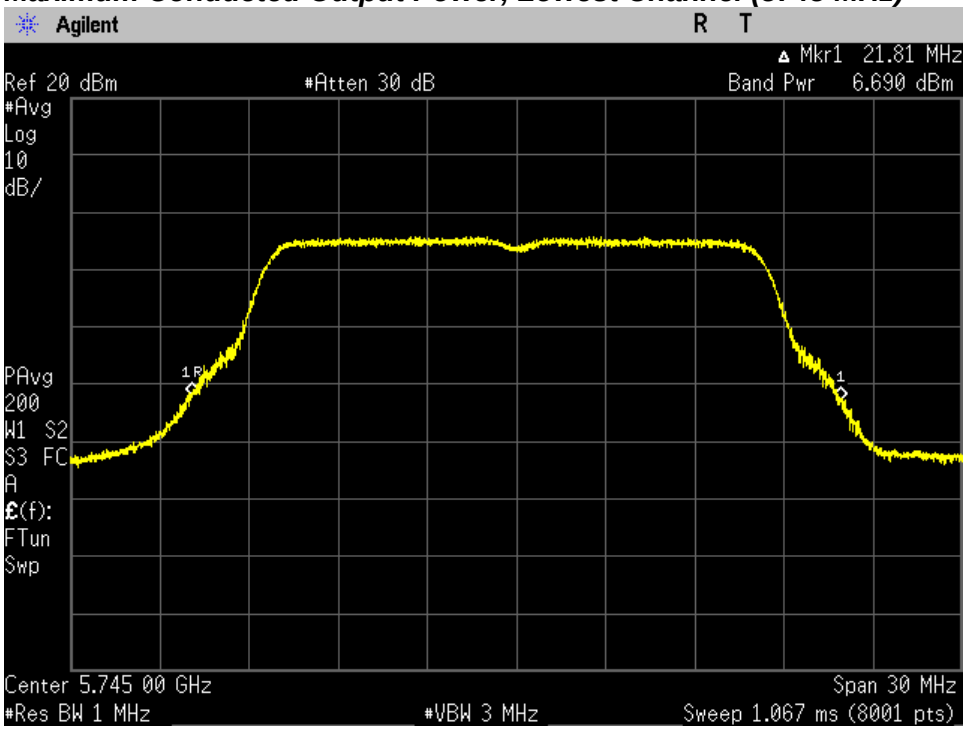
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOTS OF EMISSIONS

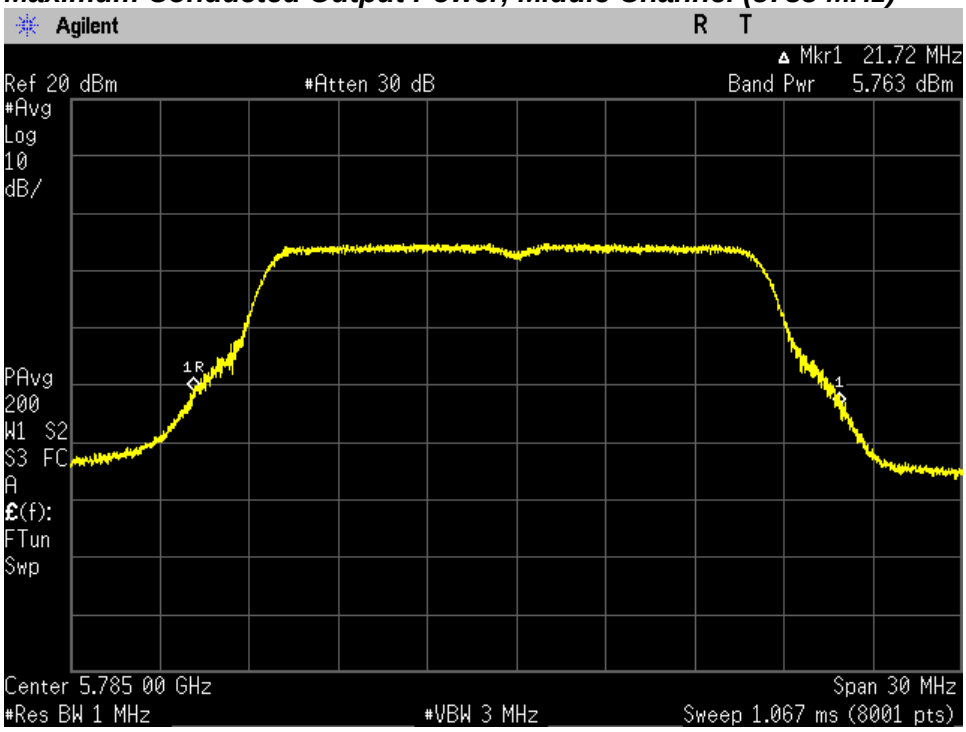
802.11a mode

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

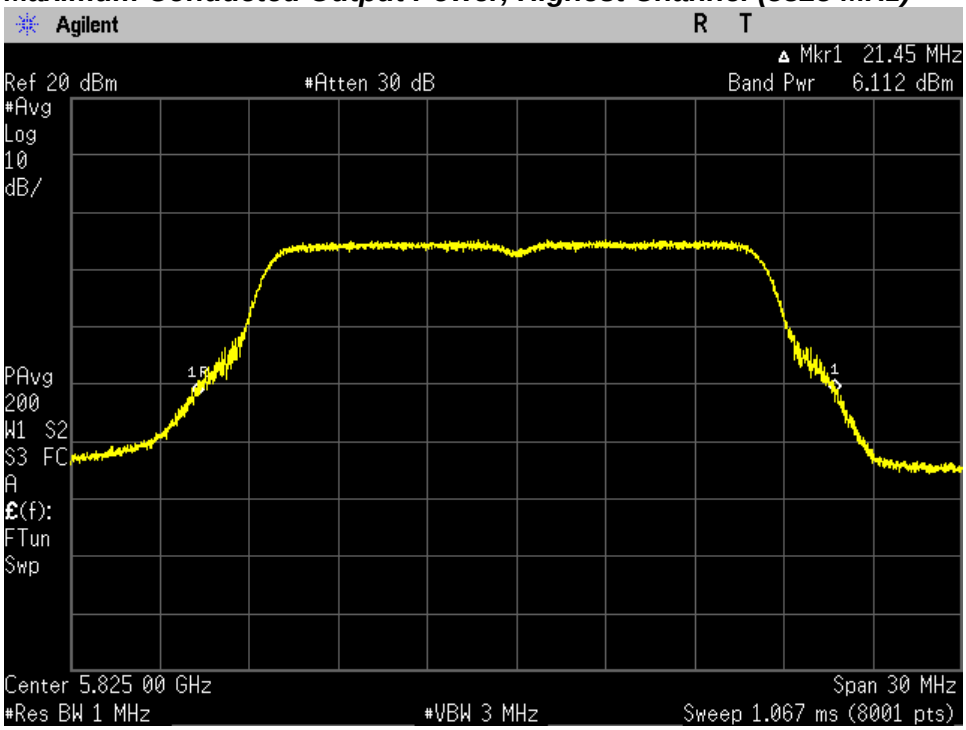


Maximum Conducted Output Power, Middle Channel (5785 MHz)



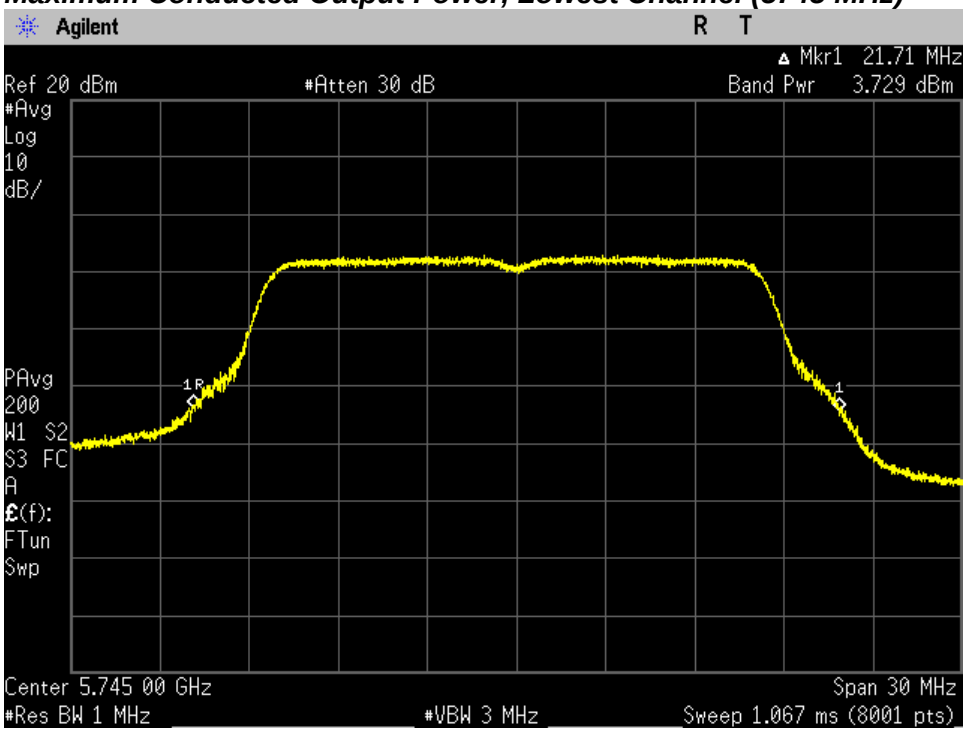
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



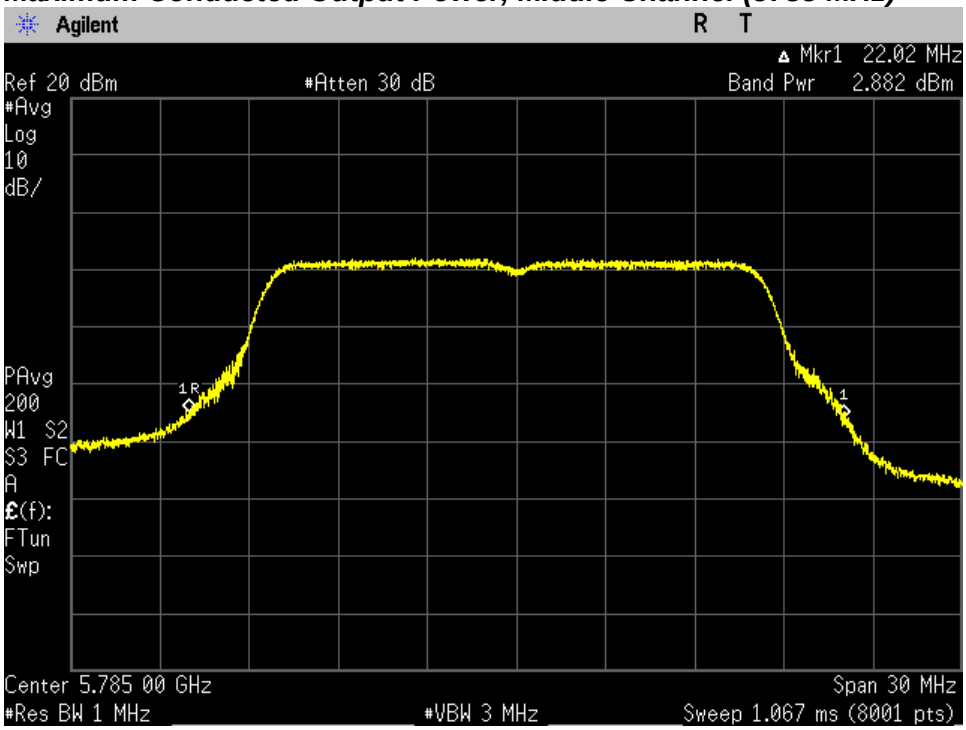
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

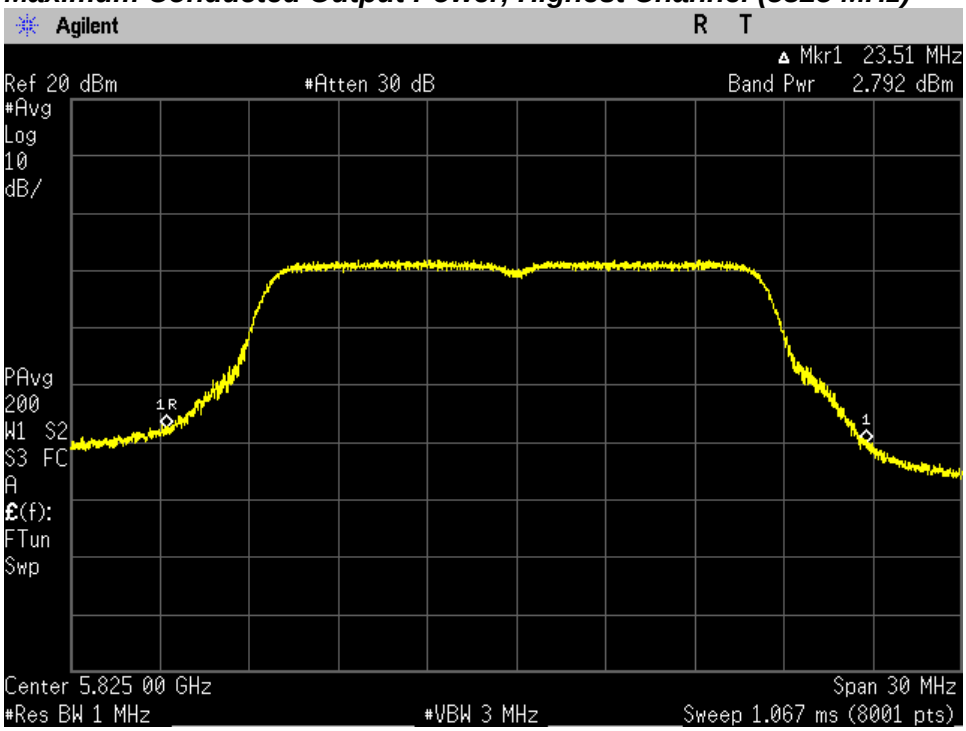


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

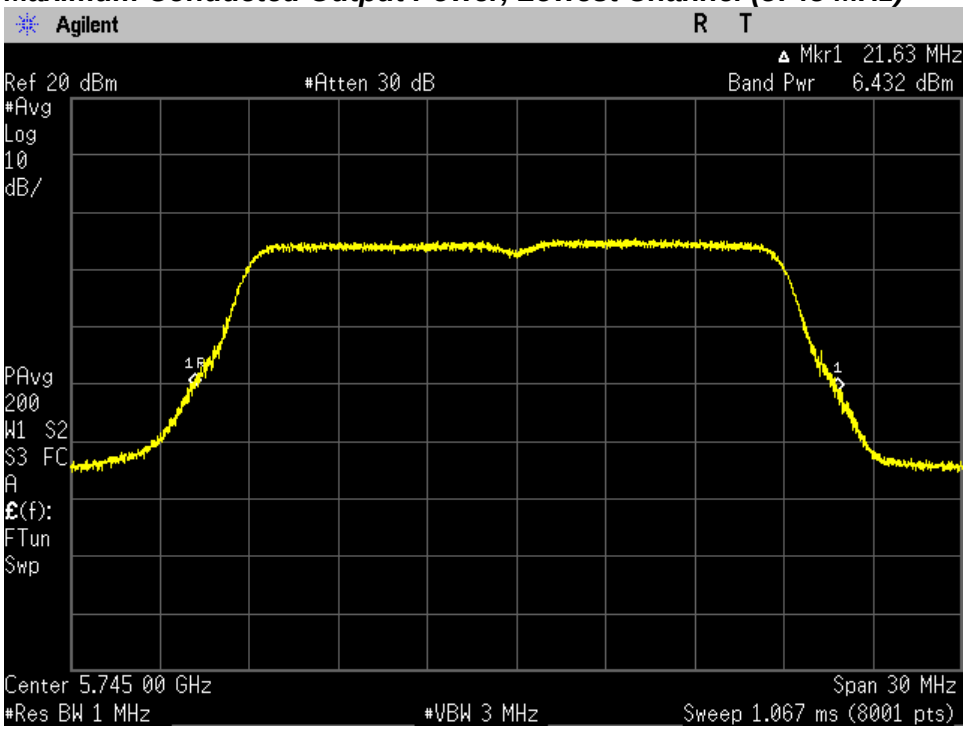


PLOTS OF EMISSIONS

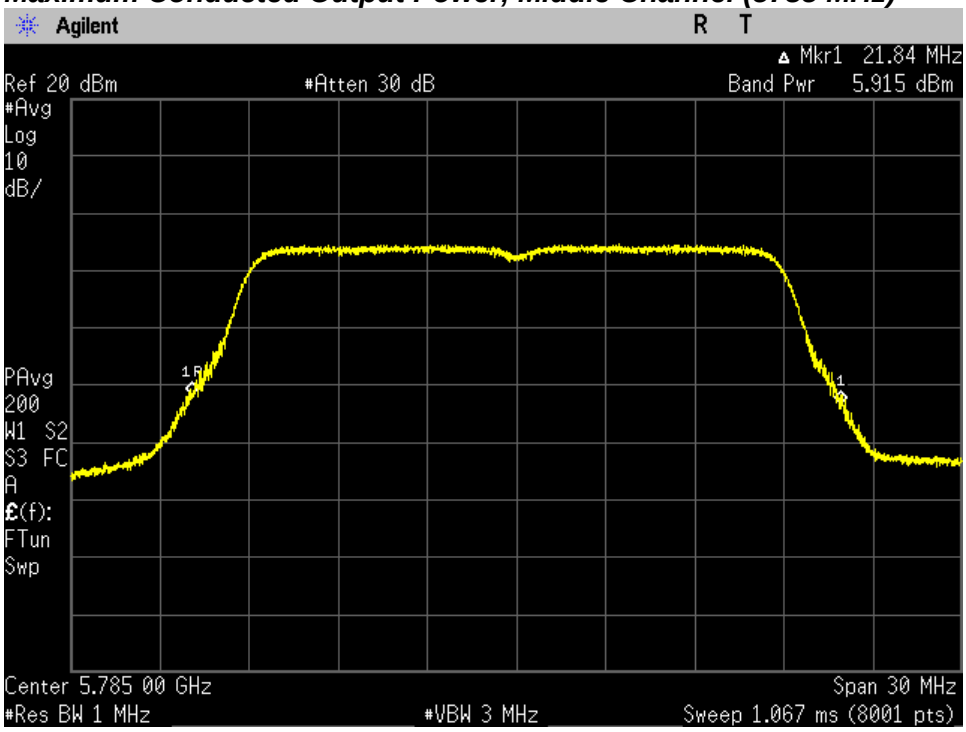
802.11n (20 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

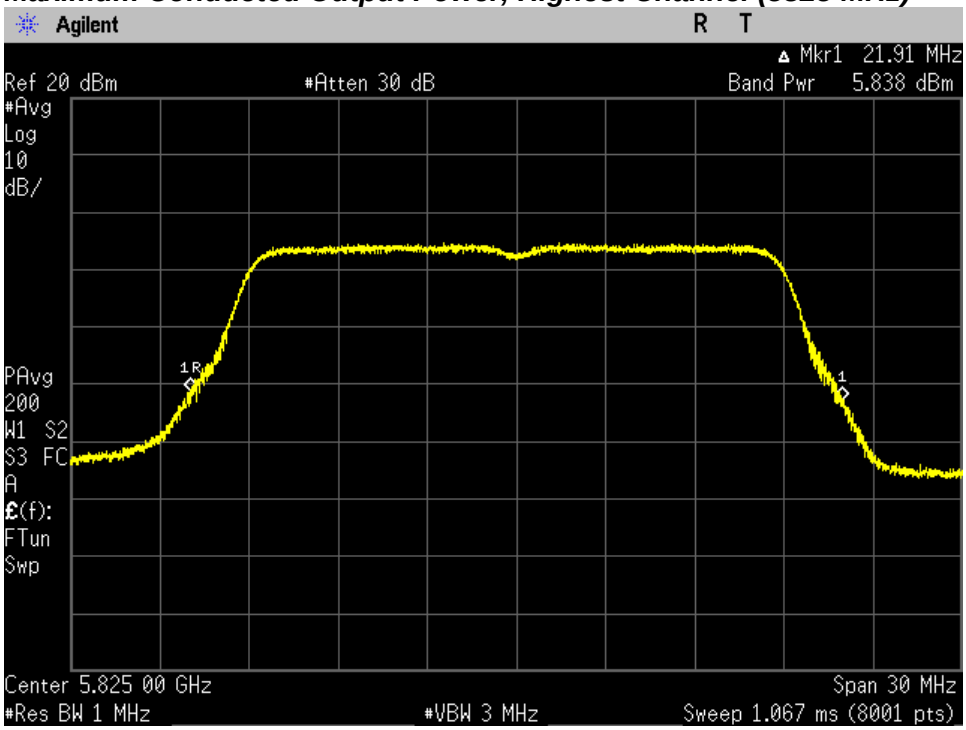


Maximum Conducted Output Power, Middle Channel (5785 MHz)



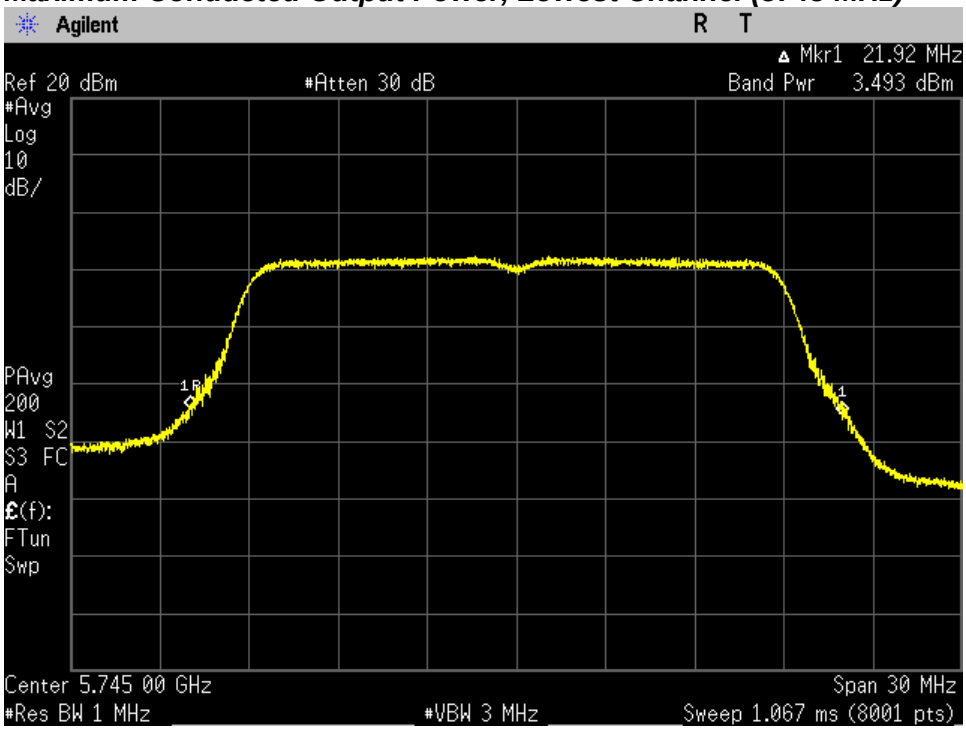
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



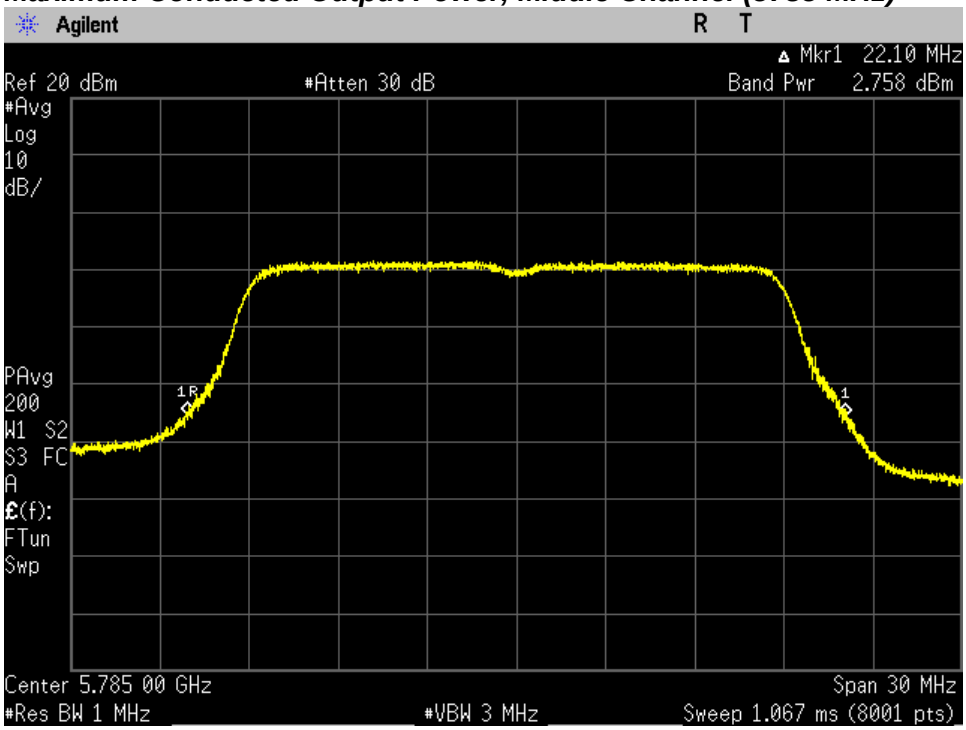
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

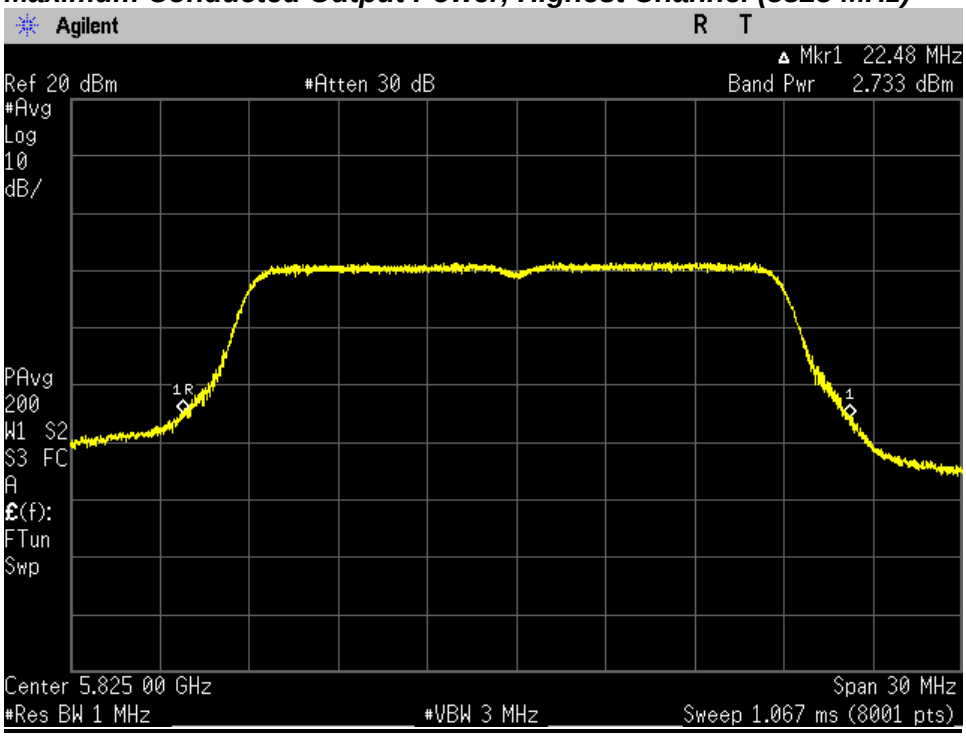


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

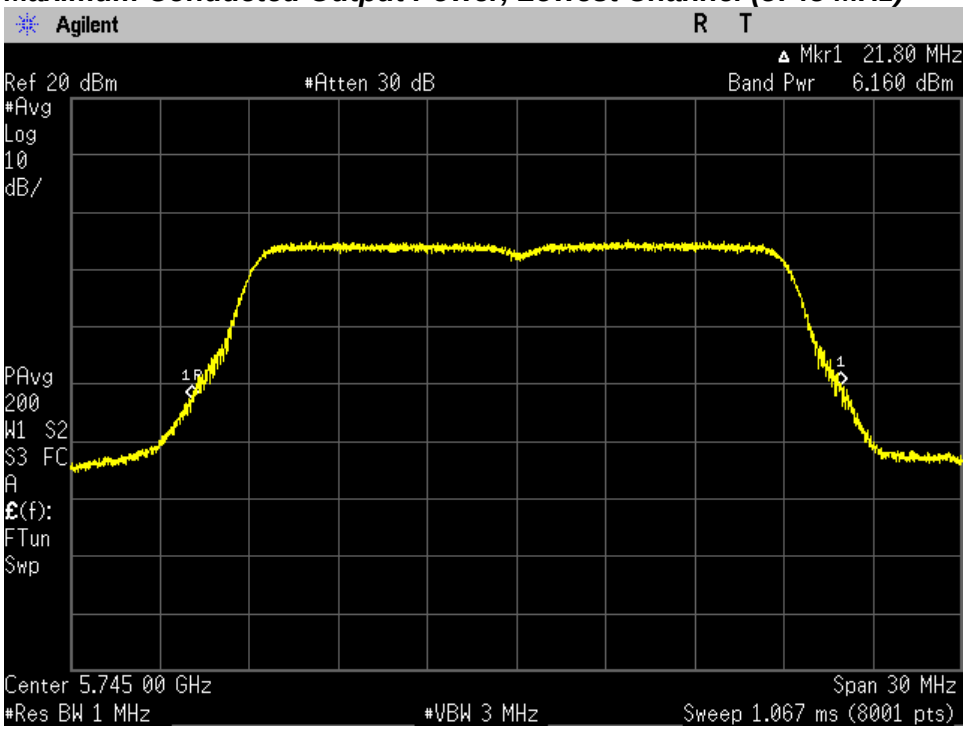


PLOTS OF EMISSIONS

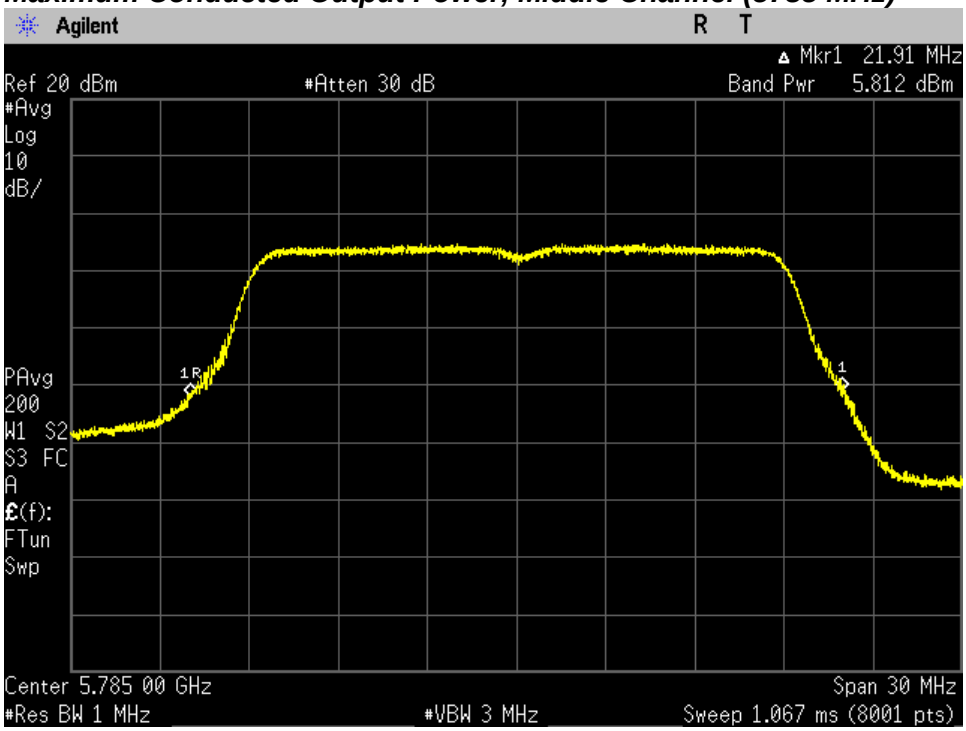
802.11n (20 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

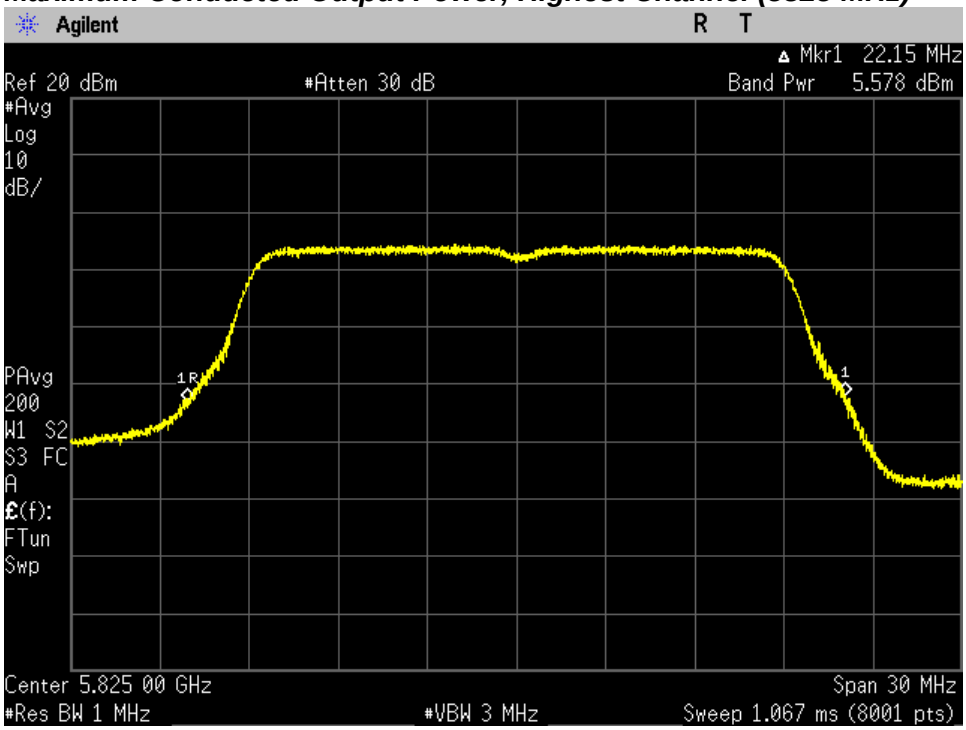


Maximum Conducted Output Power, Middle Channel (5785 MHz)



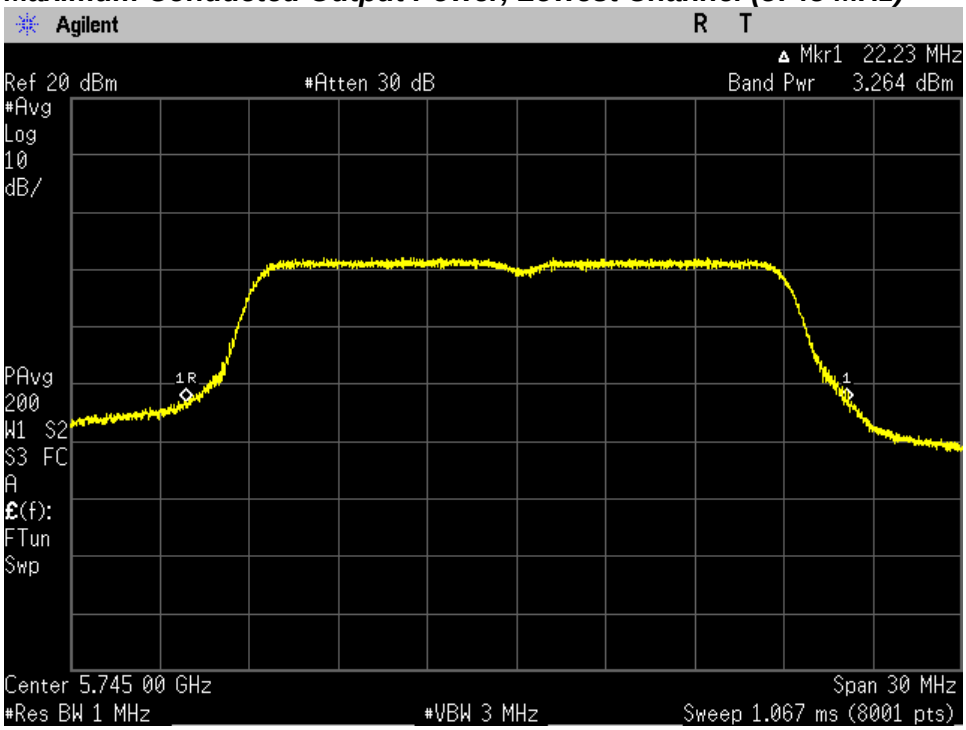
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



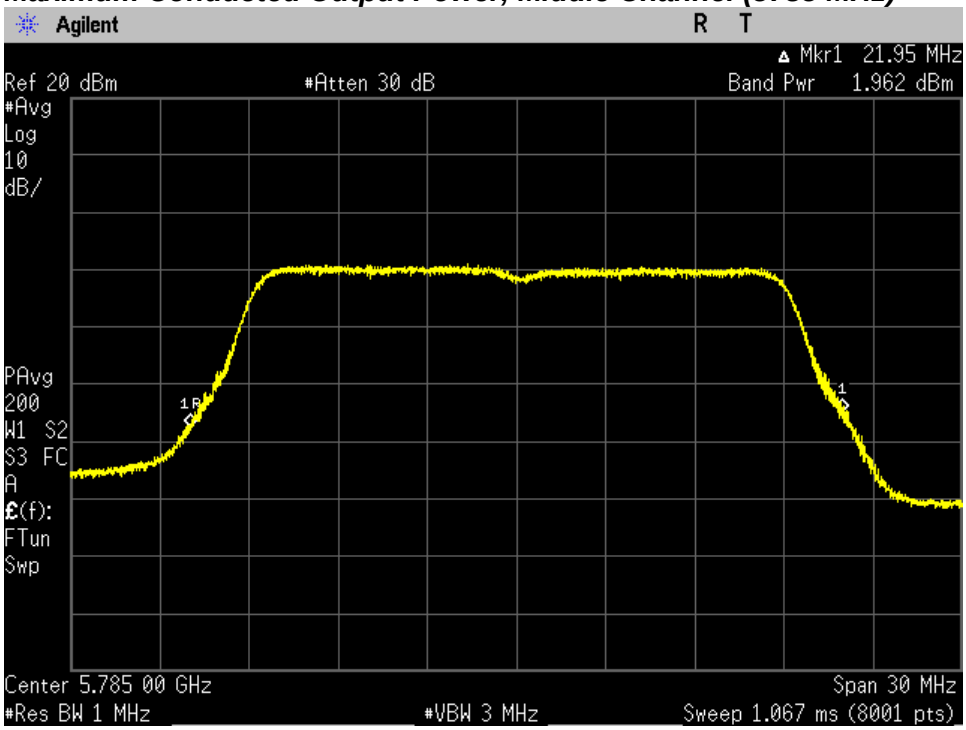
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

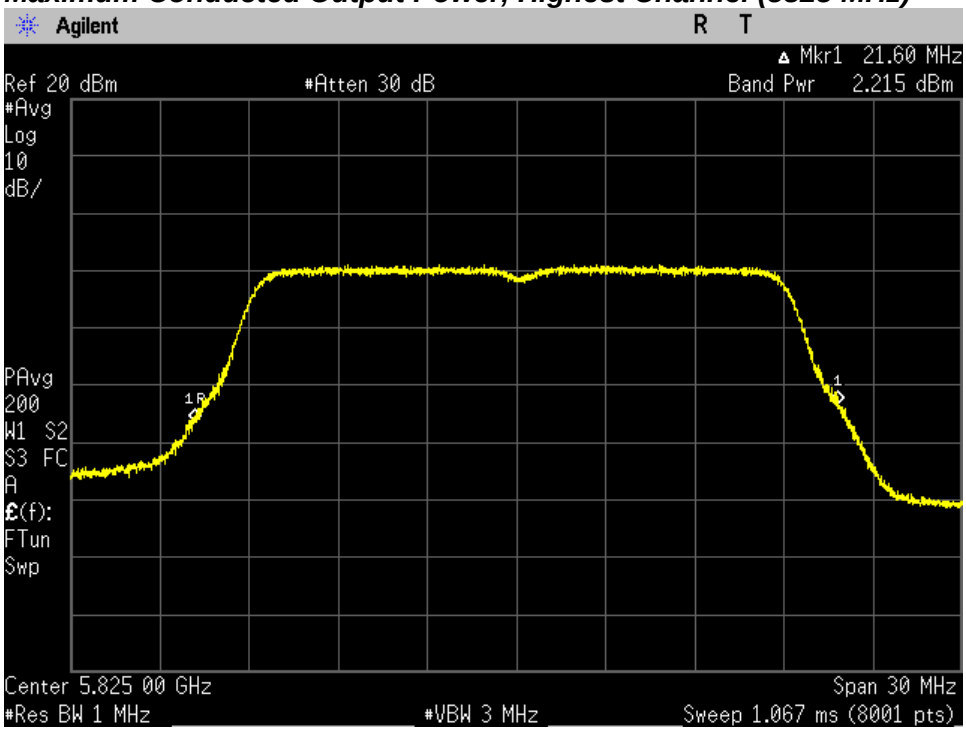


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

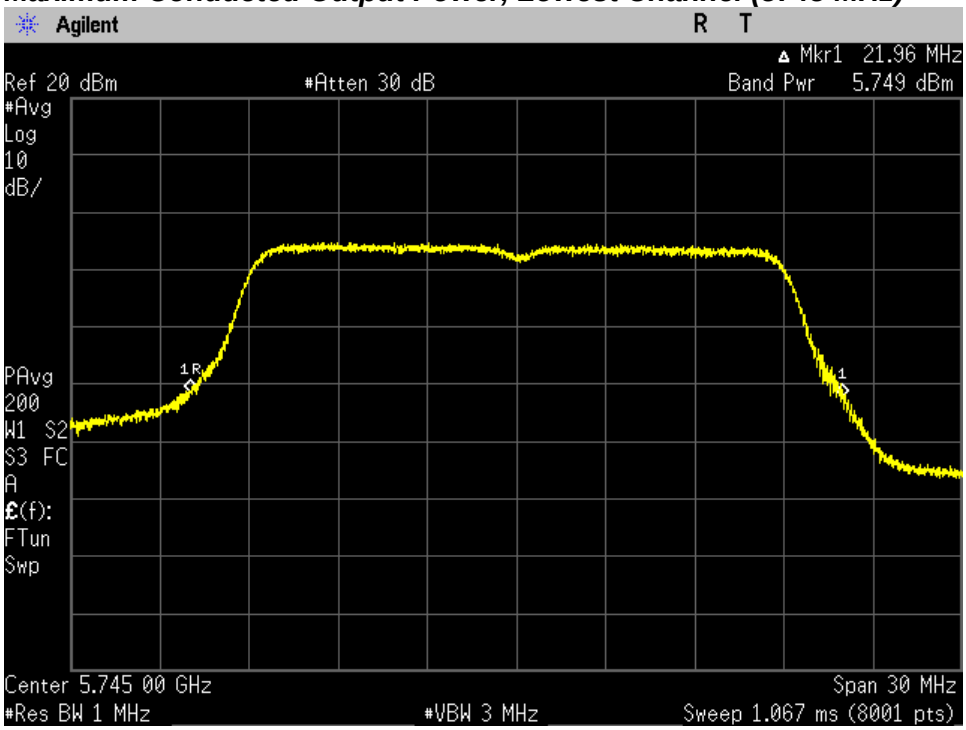


PLOTS OF EMISSIONS

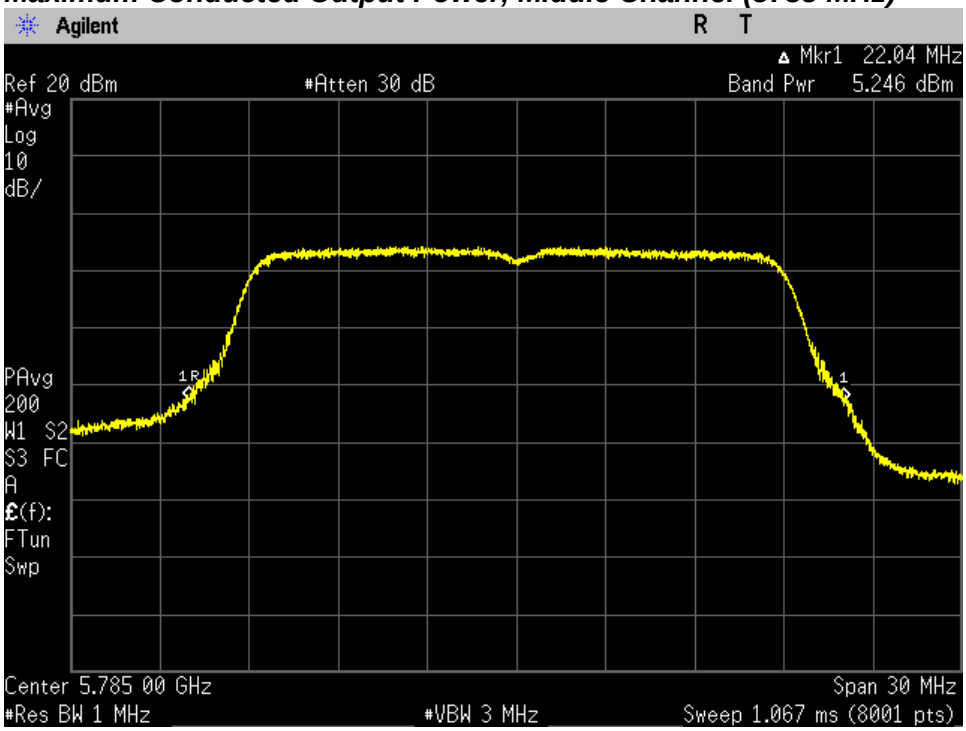
802.11n (20 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

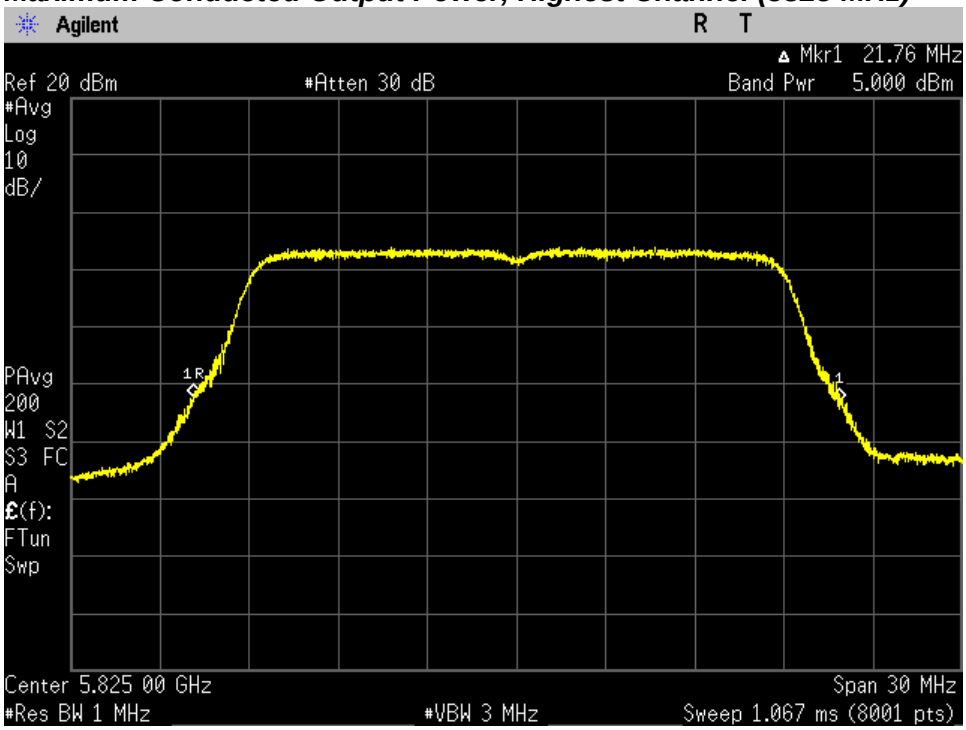


Maximum Conducted Output Power, Middle Channel (5785 MHz)



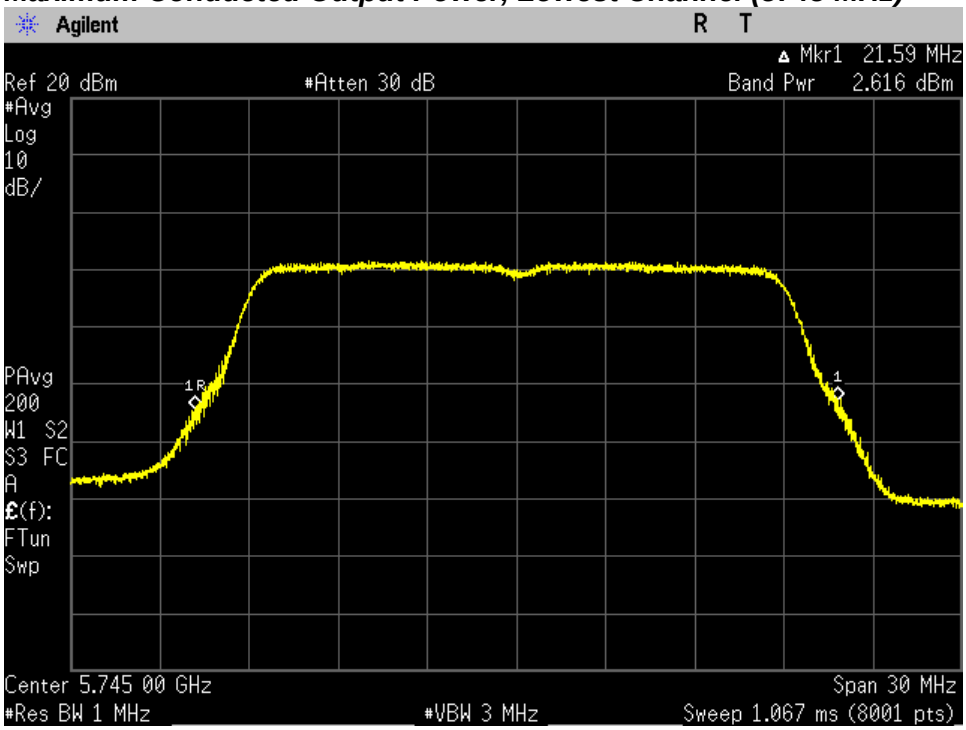
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



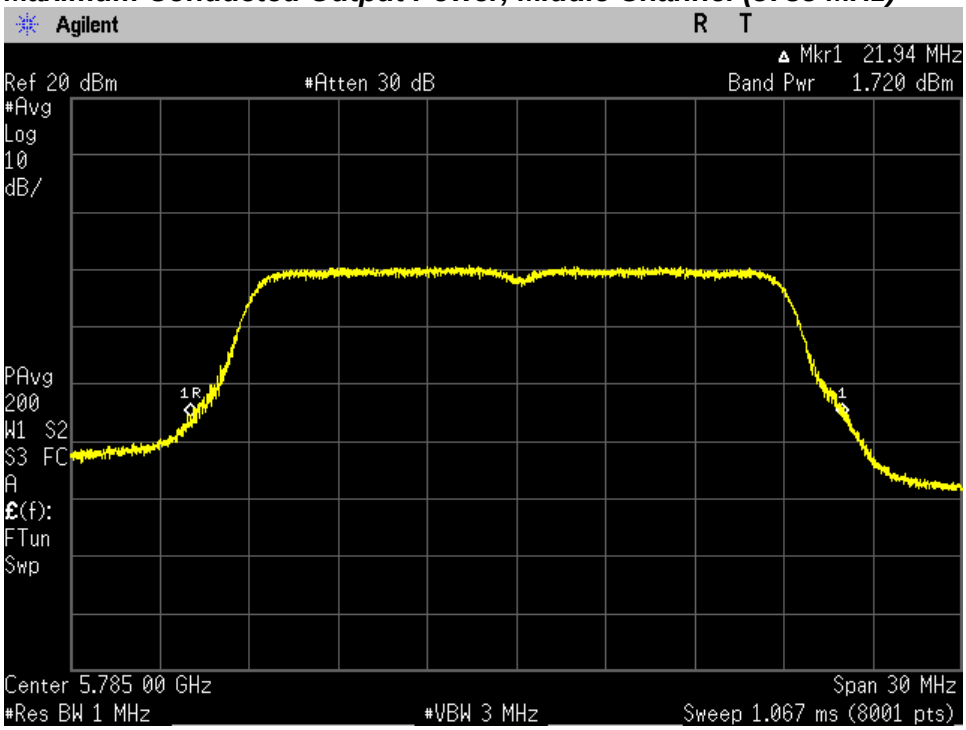
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

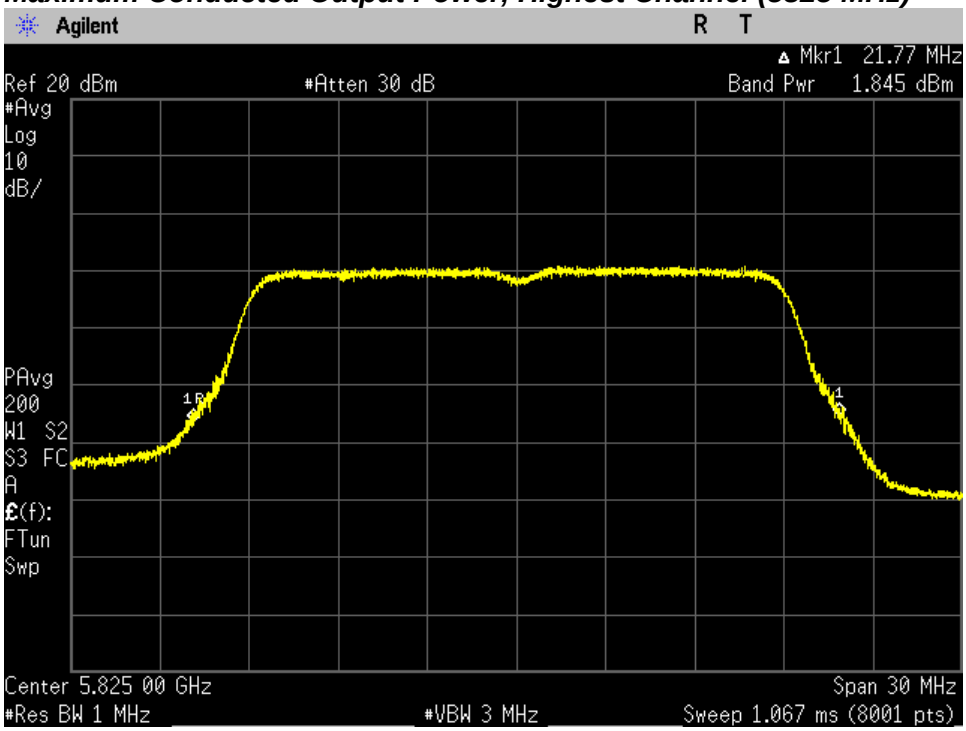


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

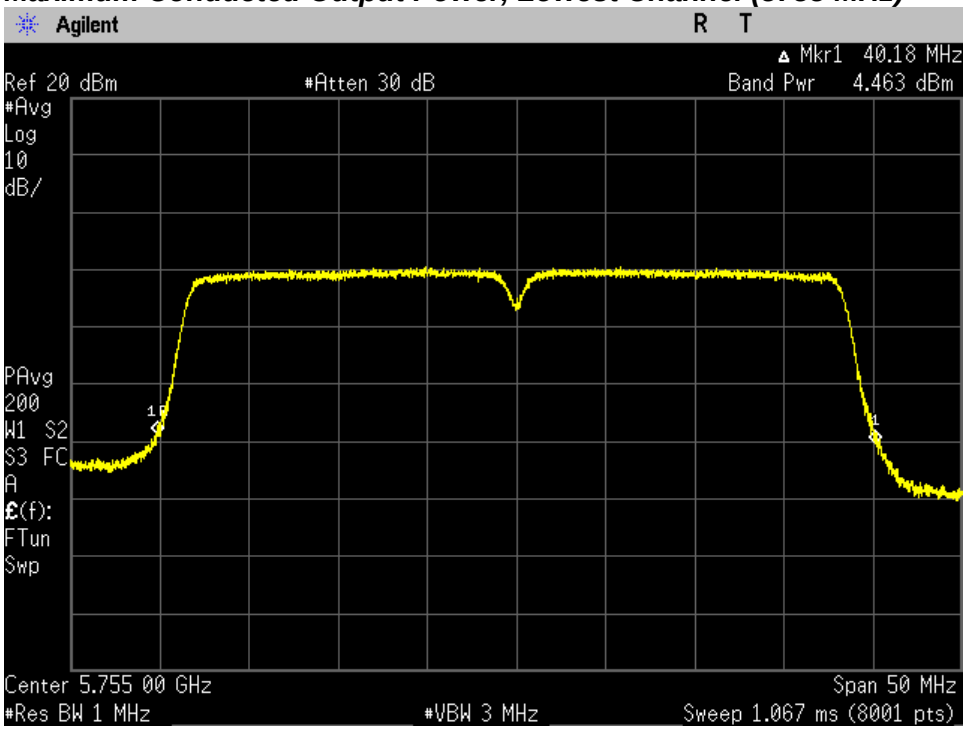


PLOTS OF EMISSIONS

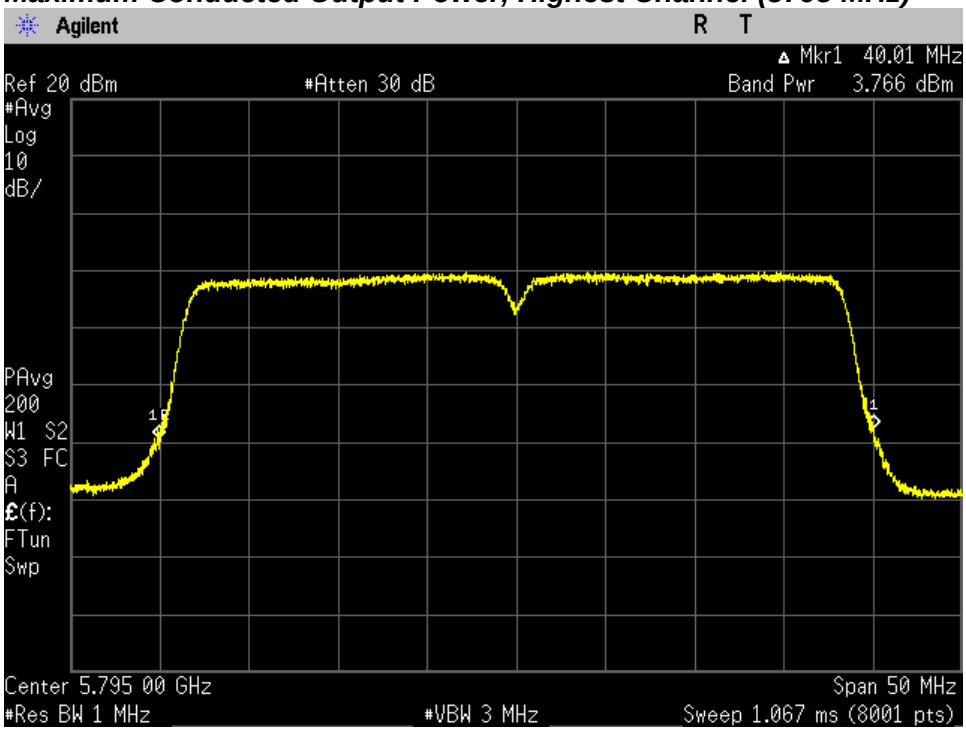
802.11n (40 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



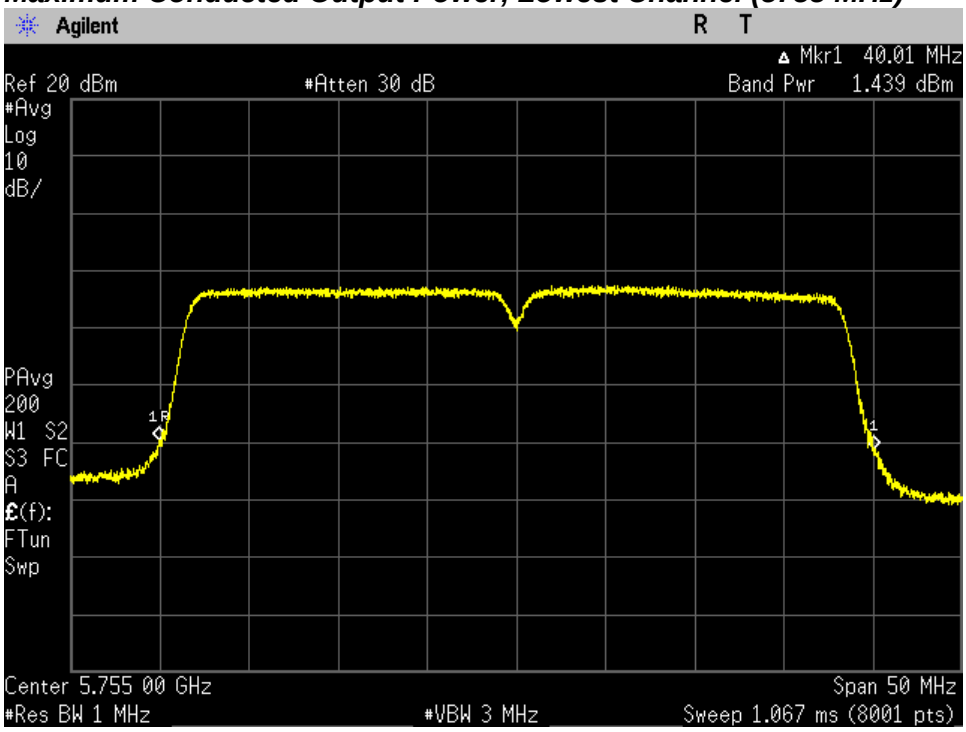
Maximum Conducted Output Power, Highest Channel (5795 MHz)



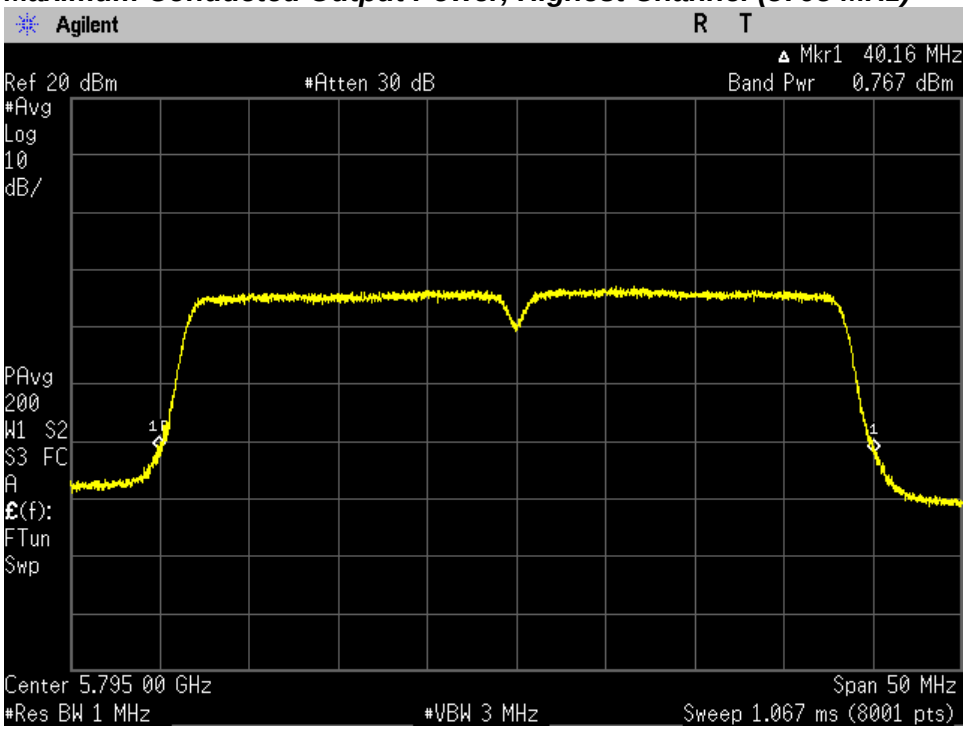
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

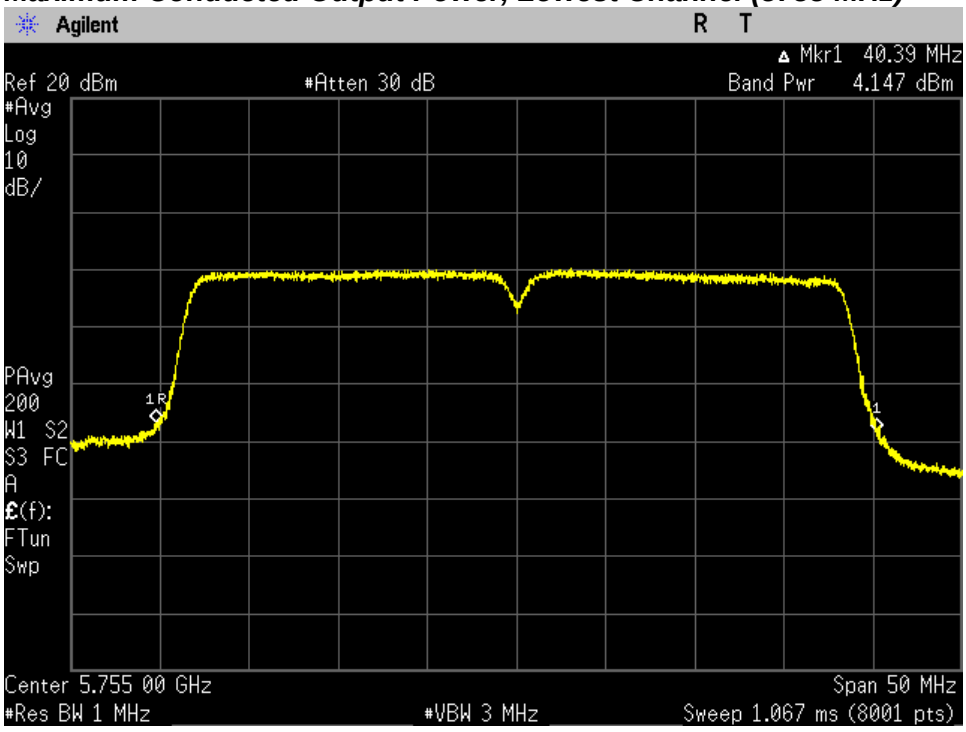


PLOTS OF EMISSIONS

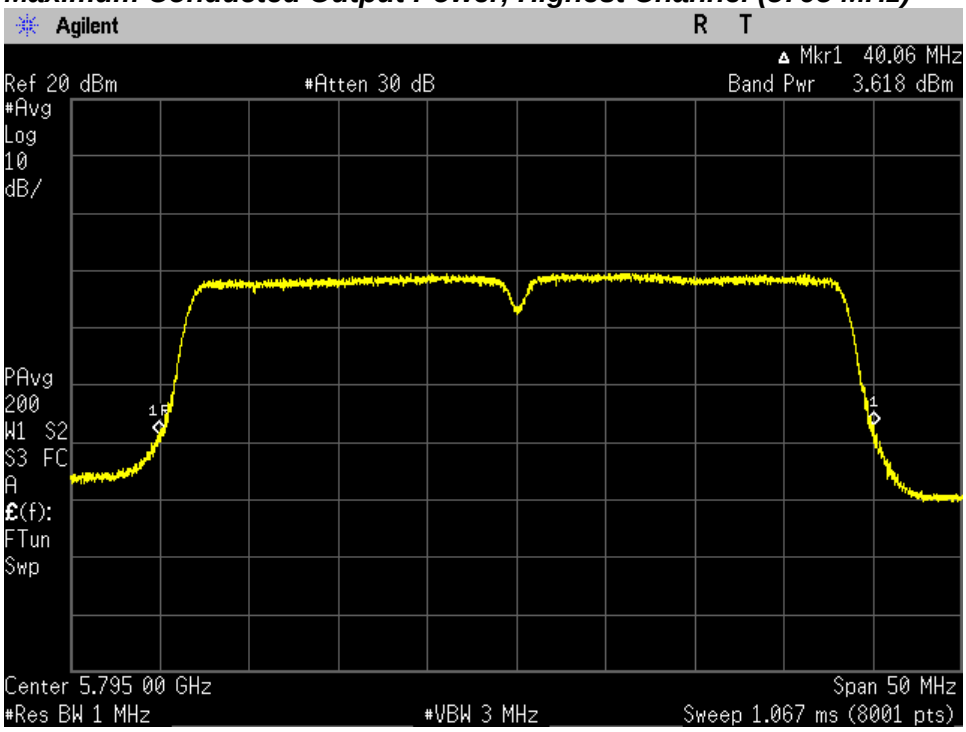
802.11n (40 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



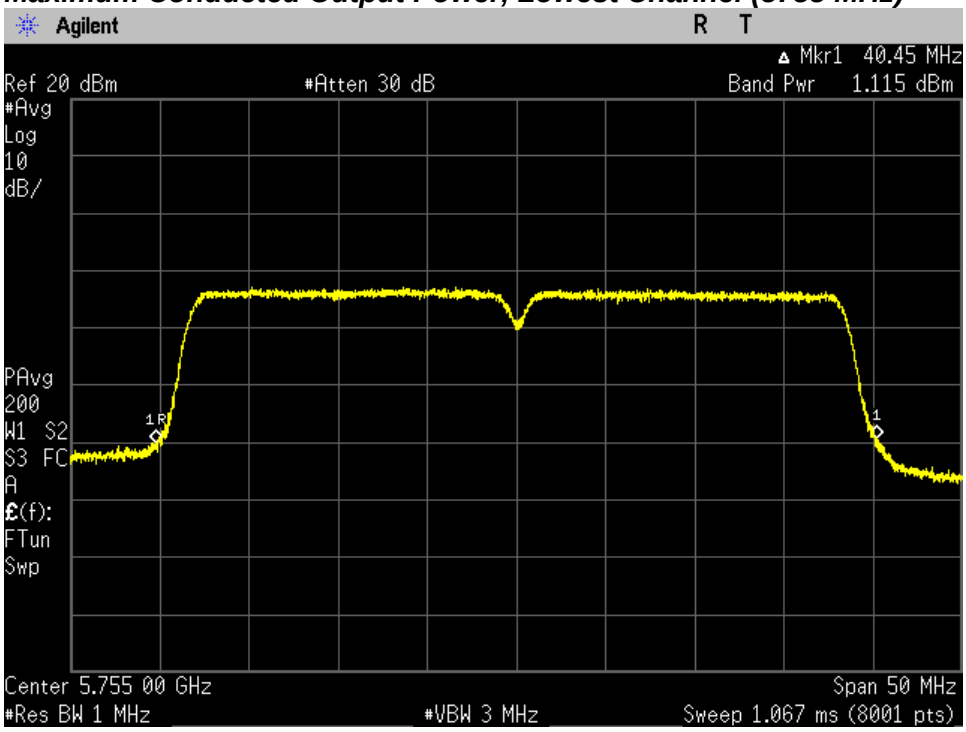
Maximum Conducted Output Power, Highest Channel (5795 MHz)



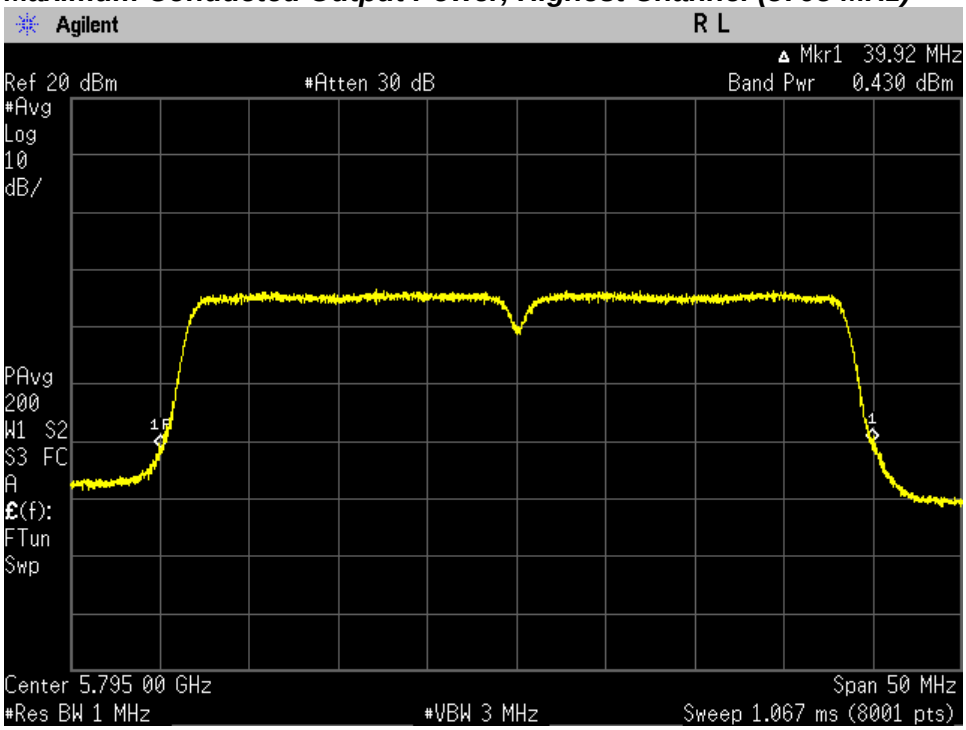
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

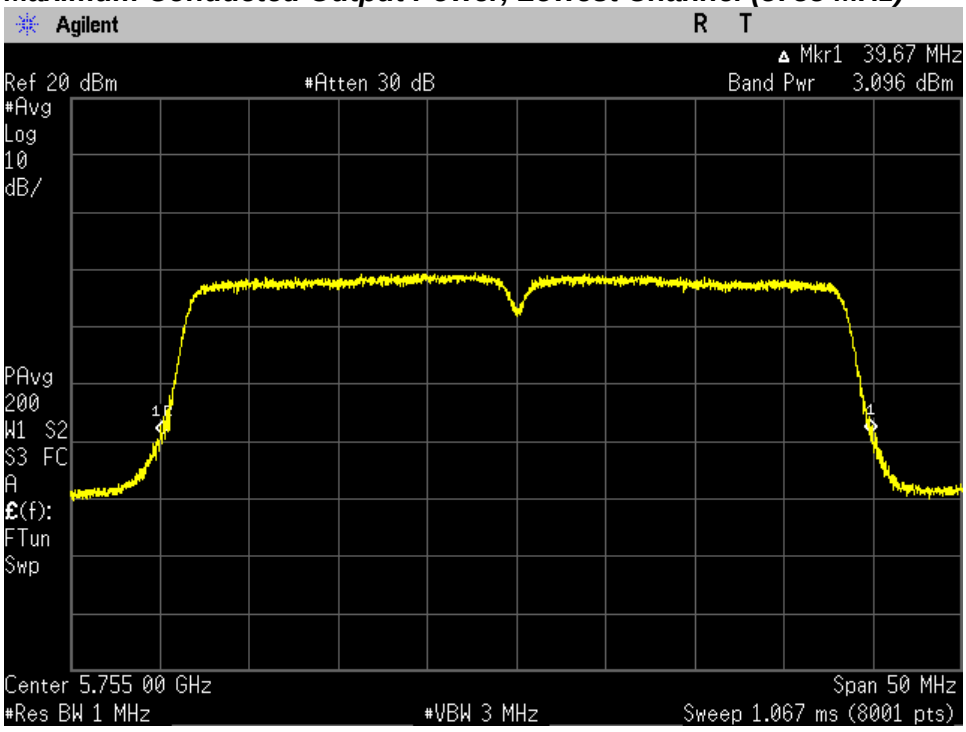


PLOTS OF EMISSIONS

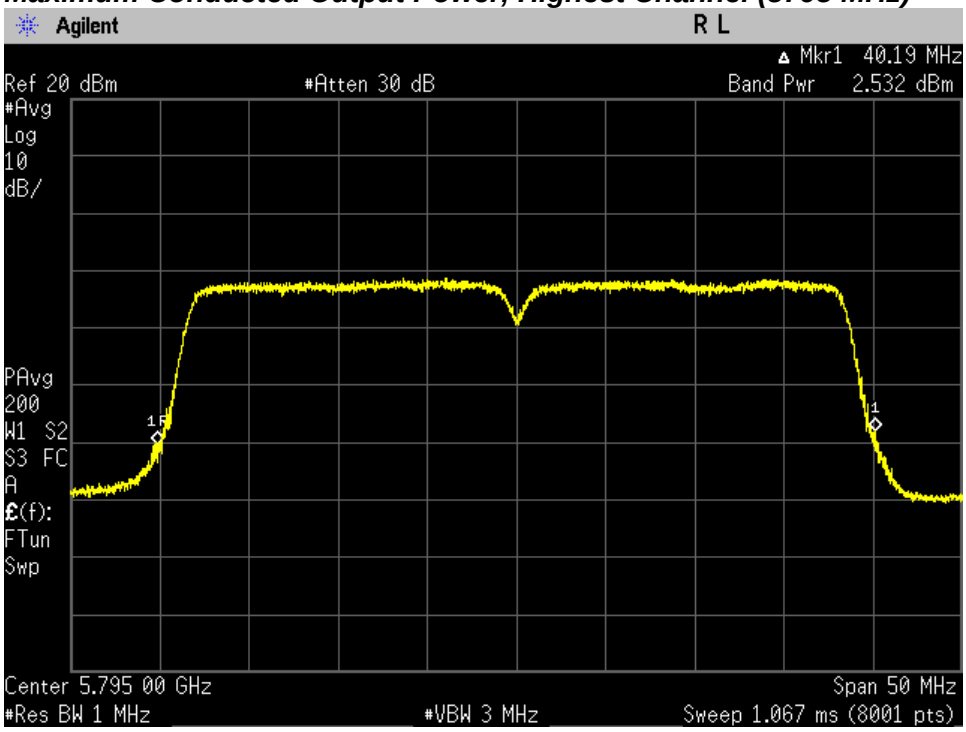
802.11n (40 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



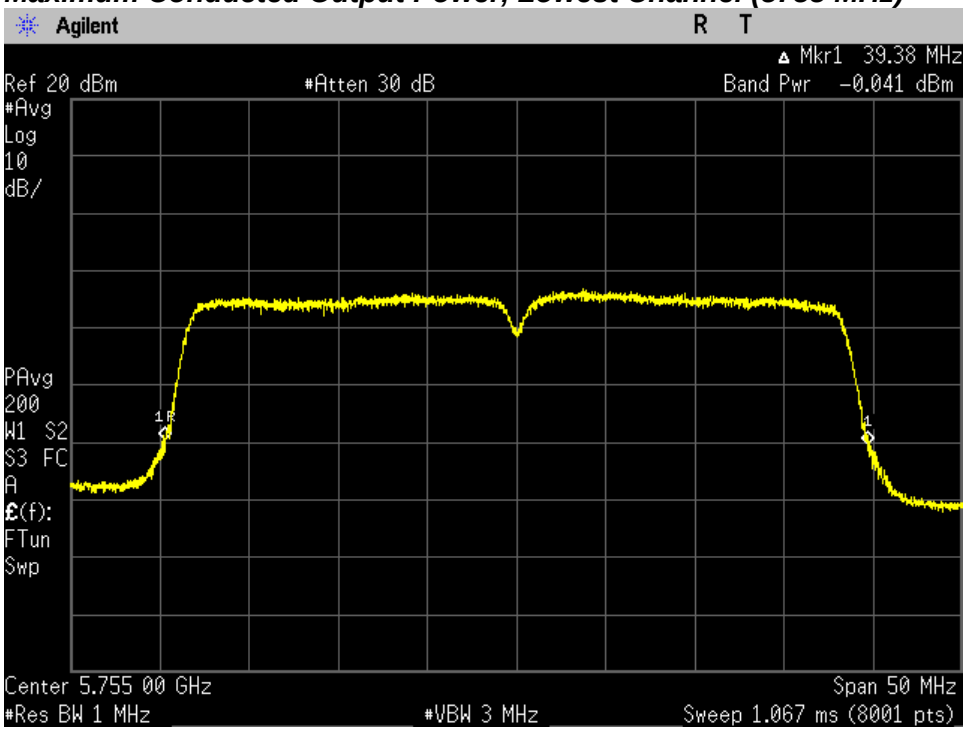
Maximum Conducted Output Power, Highest Channel (5795 MHz)



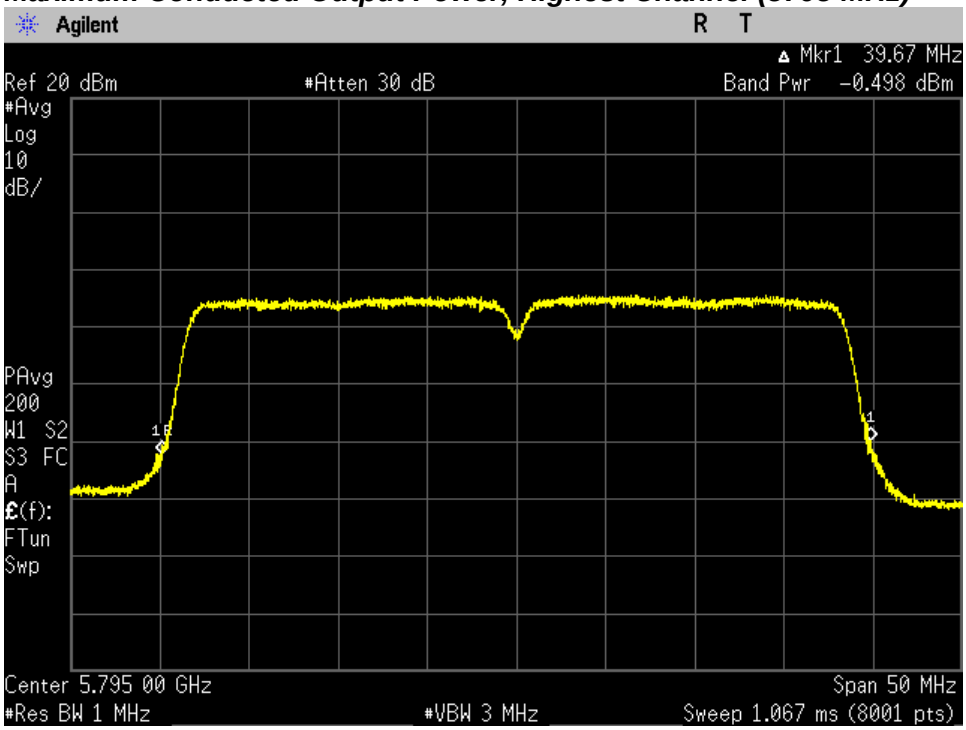
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

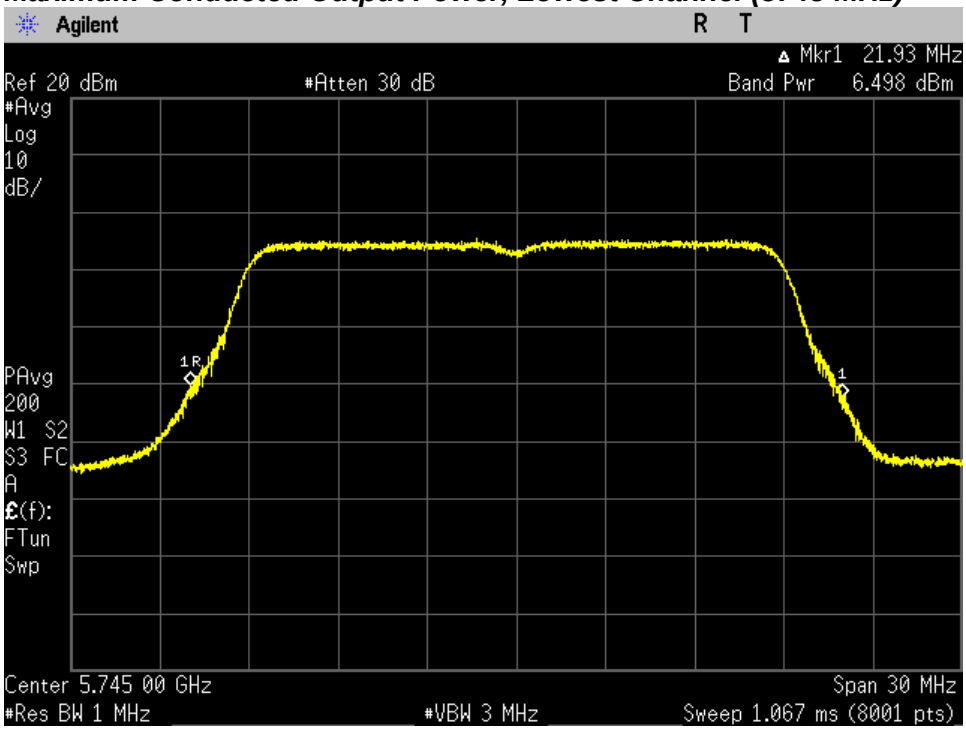


PLOTS OF EMISSIONS

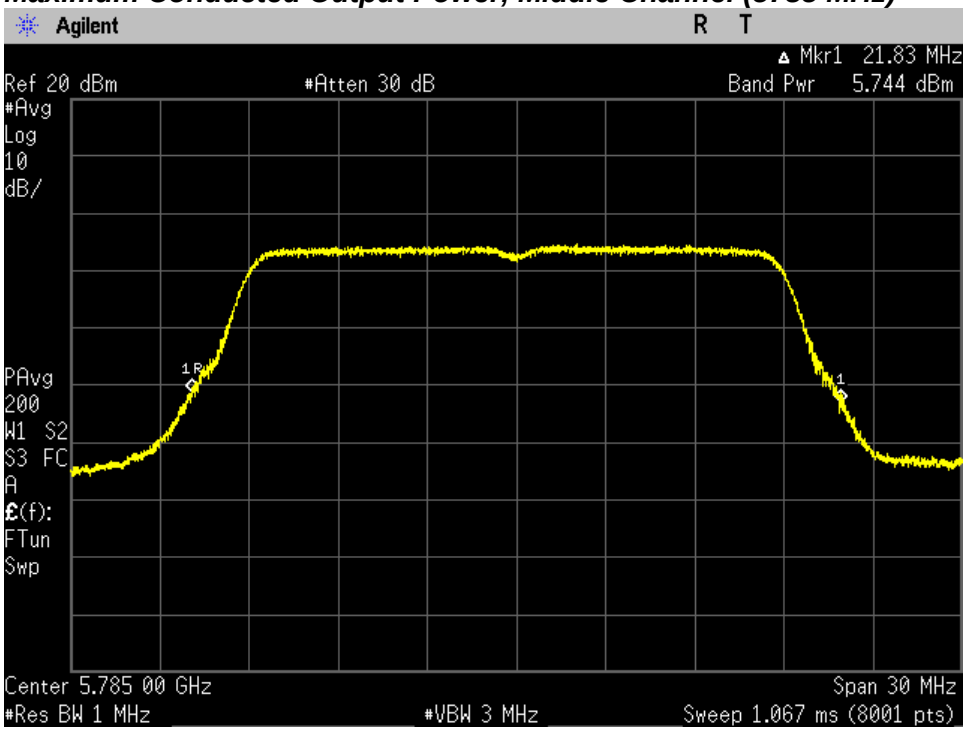
802.11ac (20 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

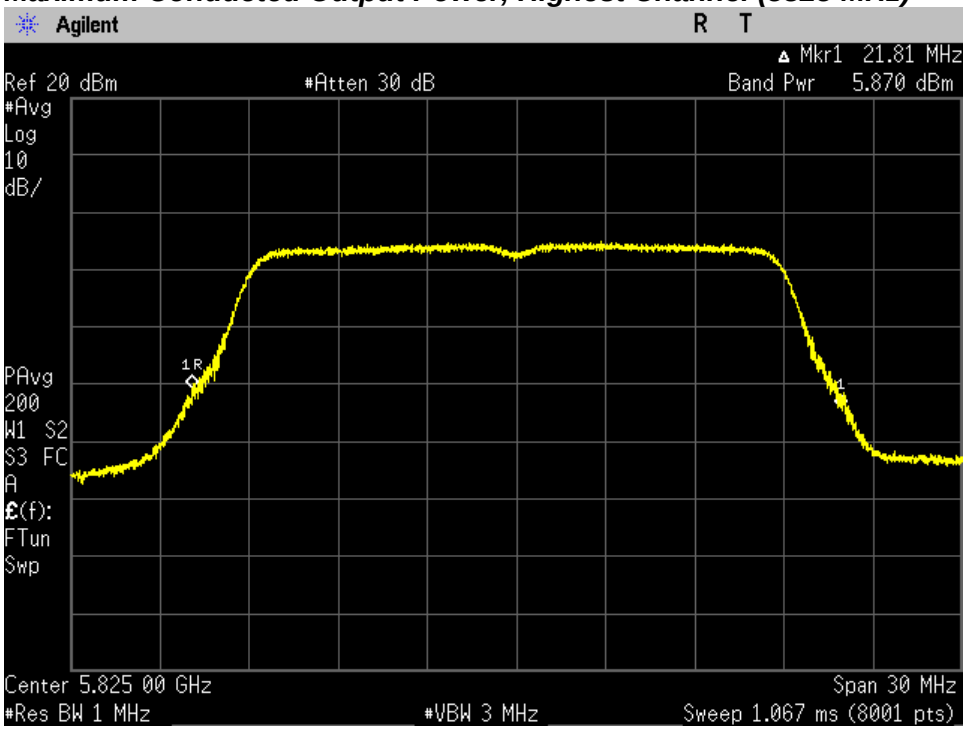


Maximum Conducted Output Power, Middle Channel (5785 MHz)



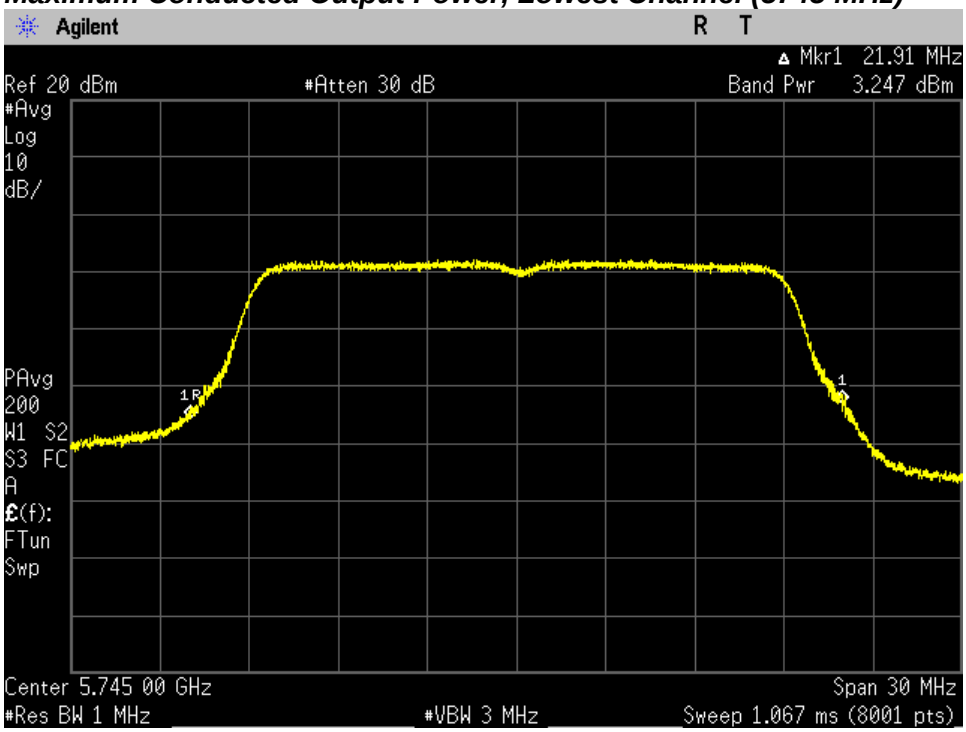
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



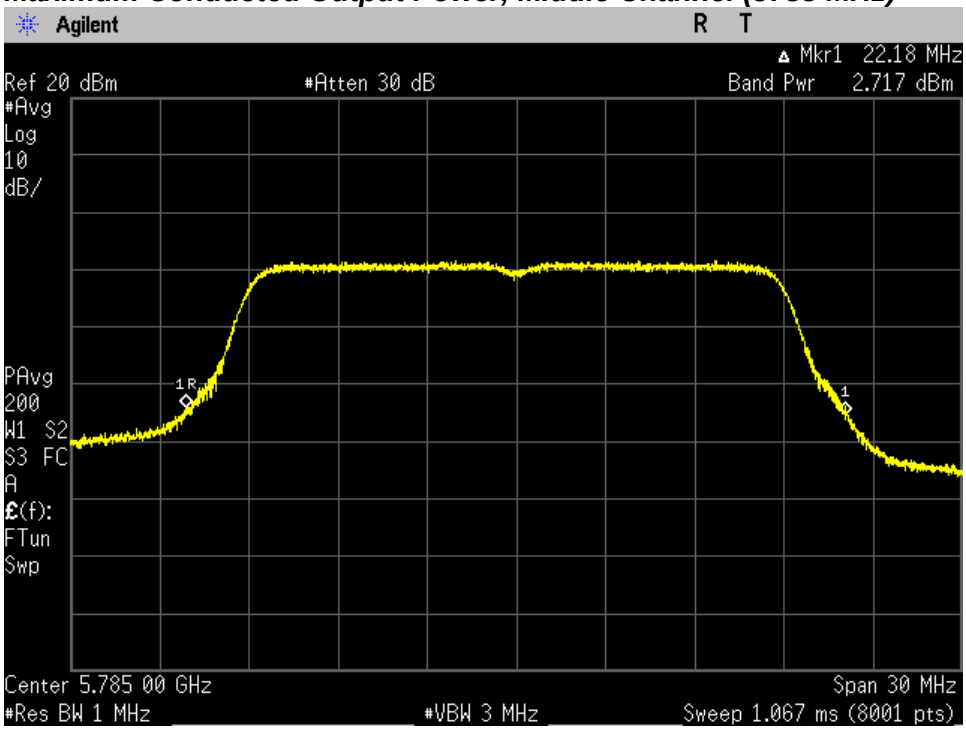
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

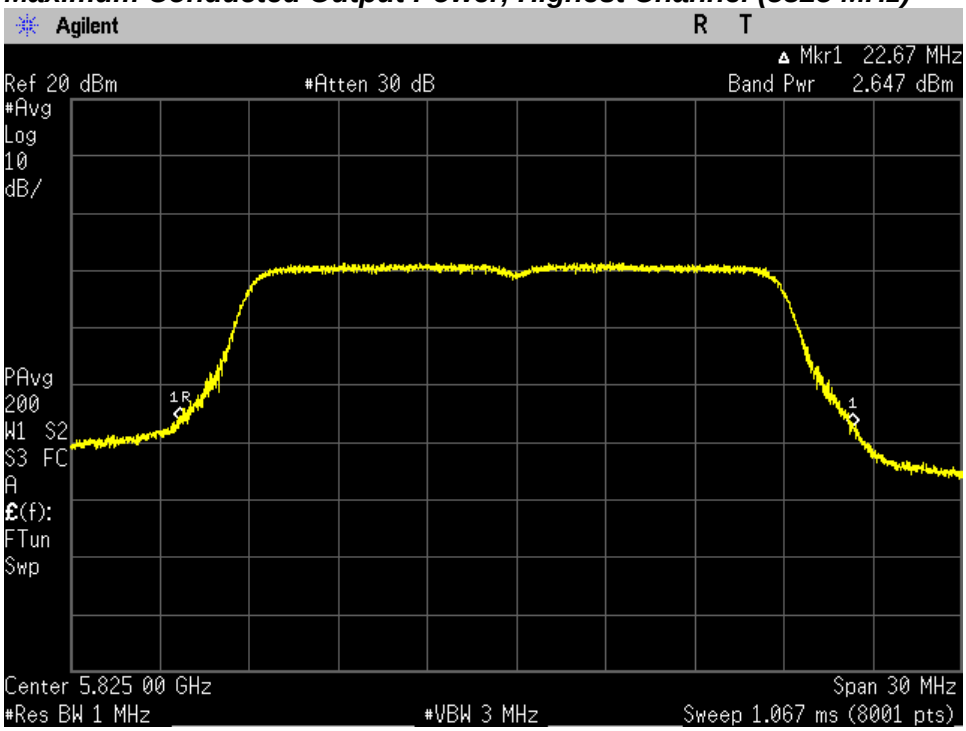


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

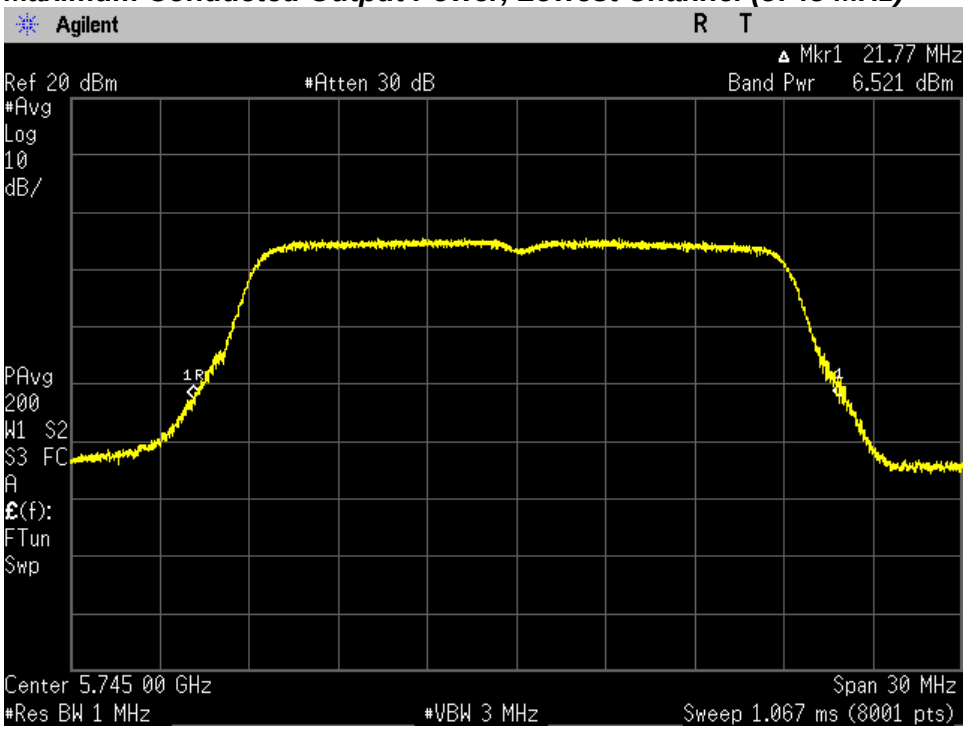


PLOTS OF EMISSIONS

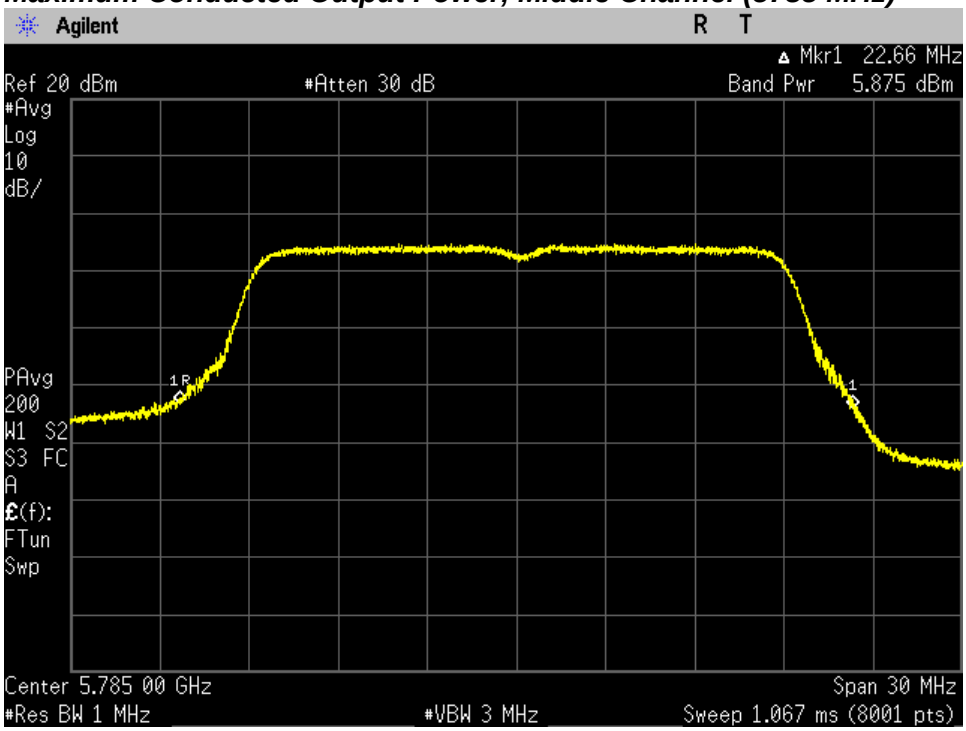
802.11ac (20 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

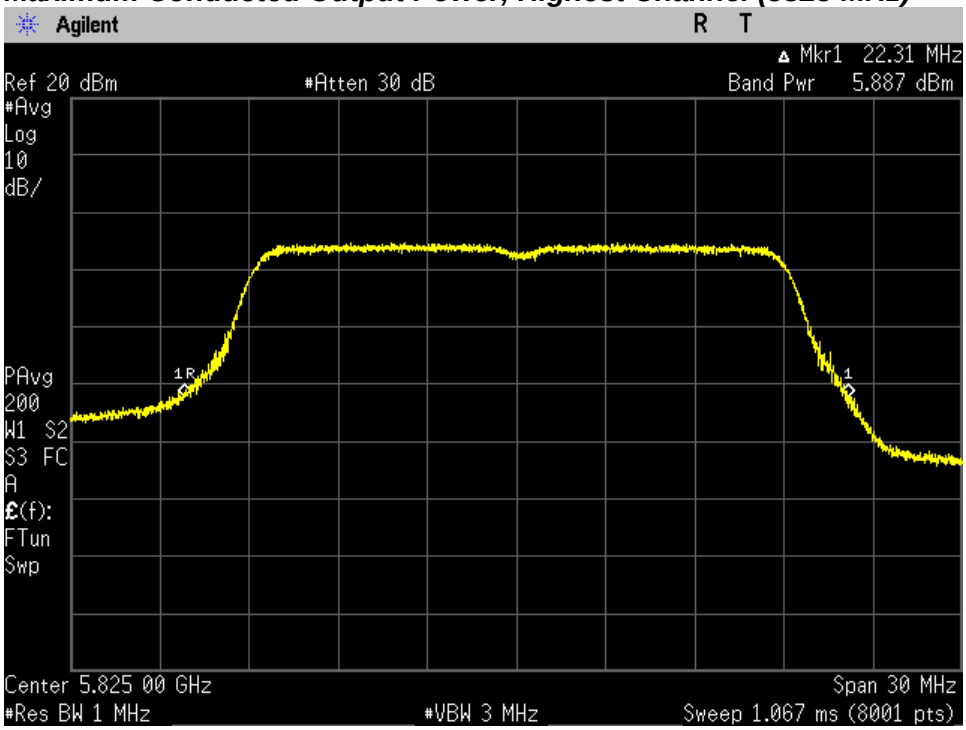


Maximum Conducted Output Power, Middle Channel (5785 MHz)



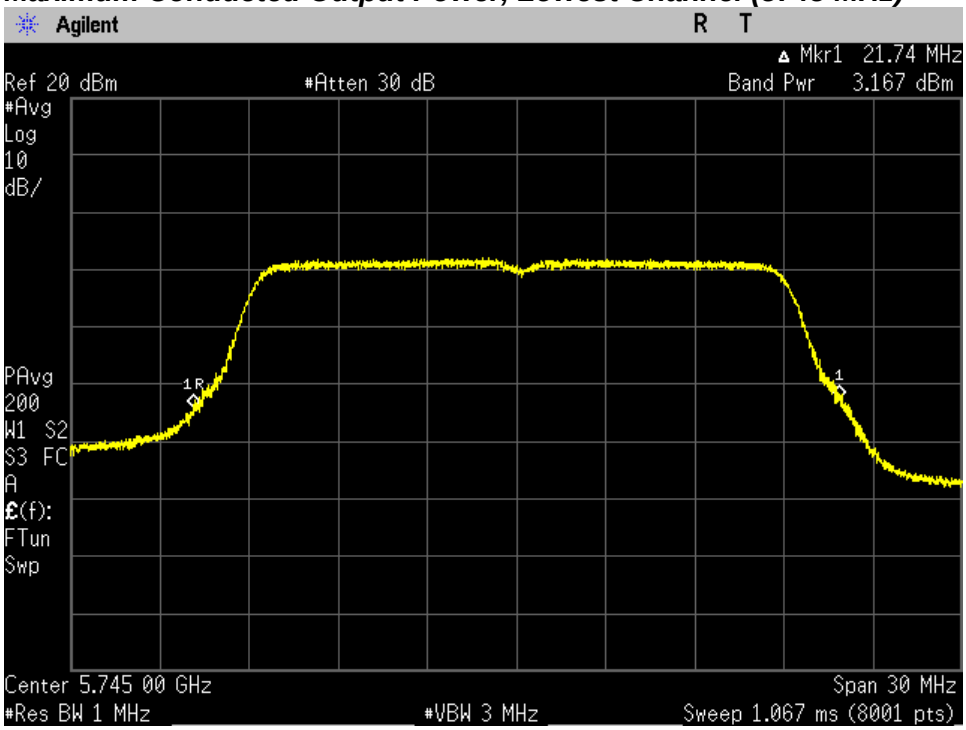
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



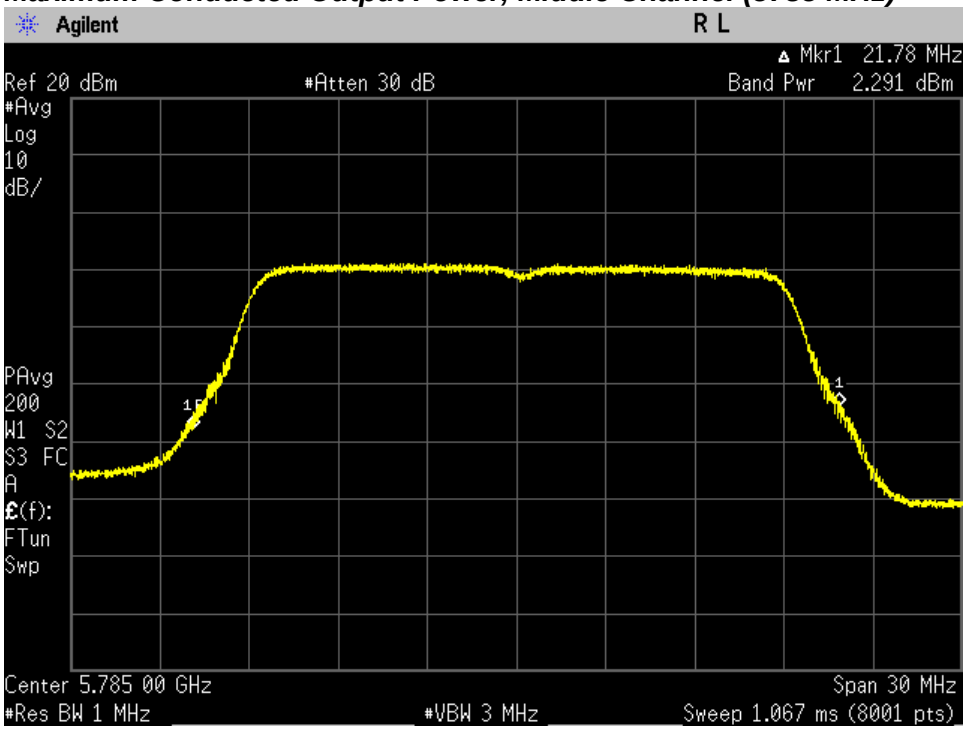
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

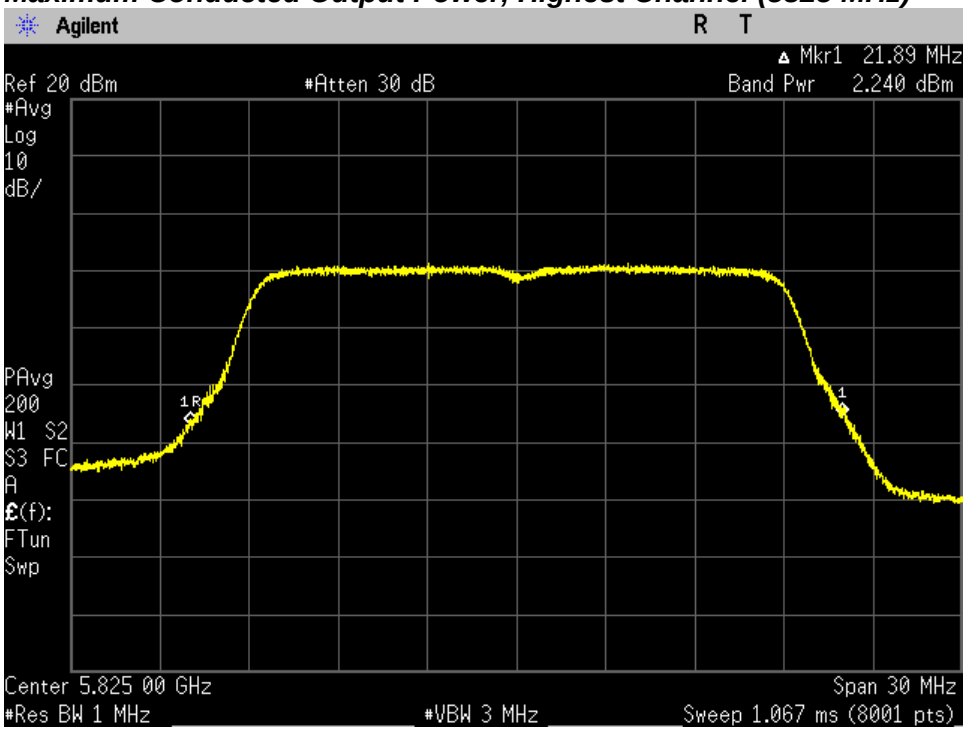


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

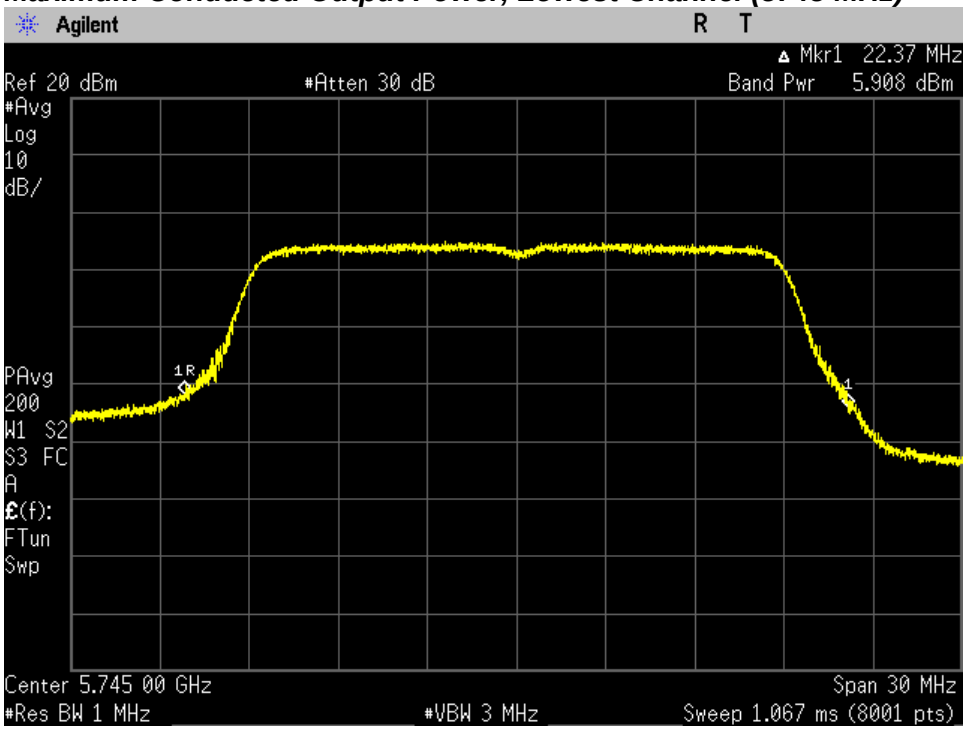


PLOTS OF EMISSIONS

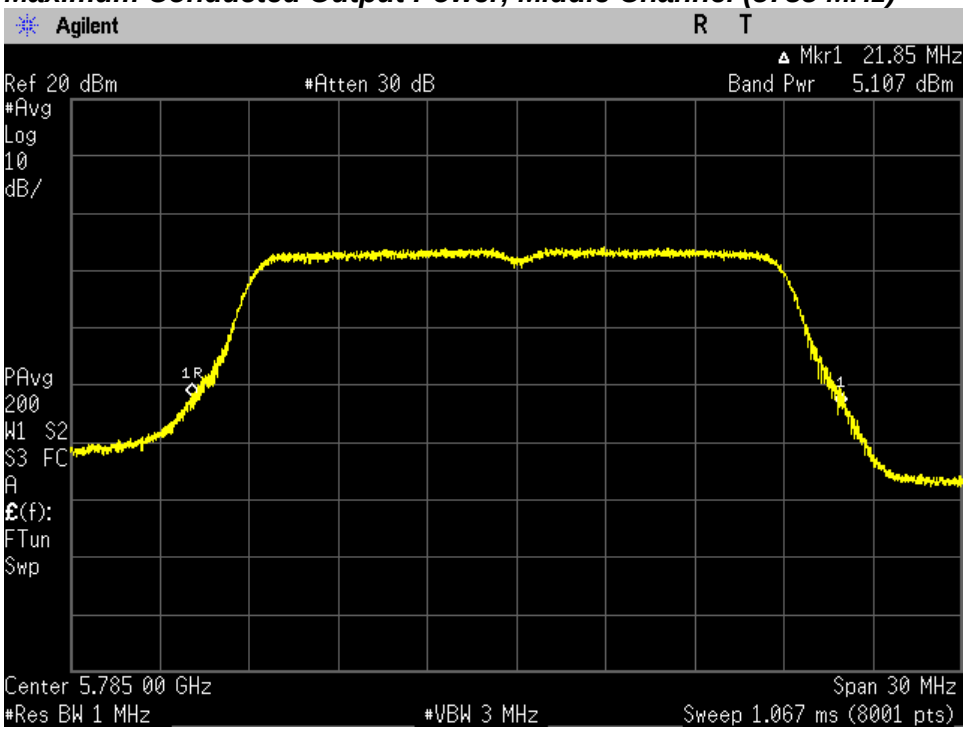
802.11ac (20 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

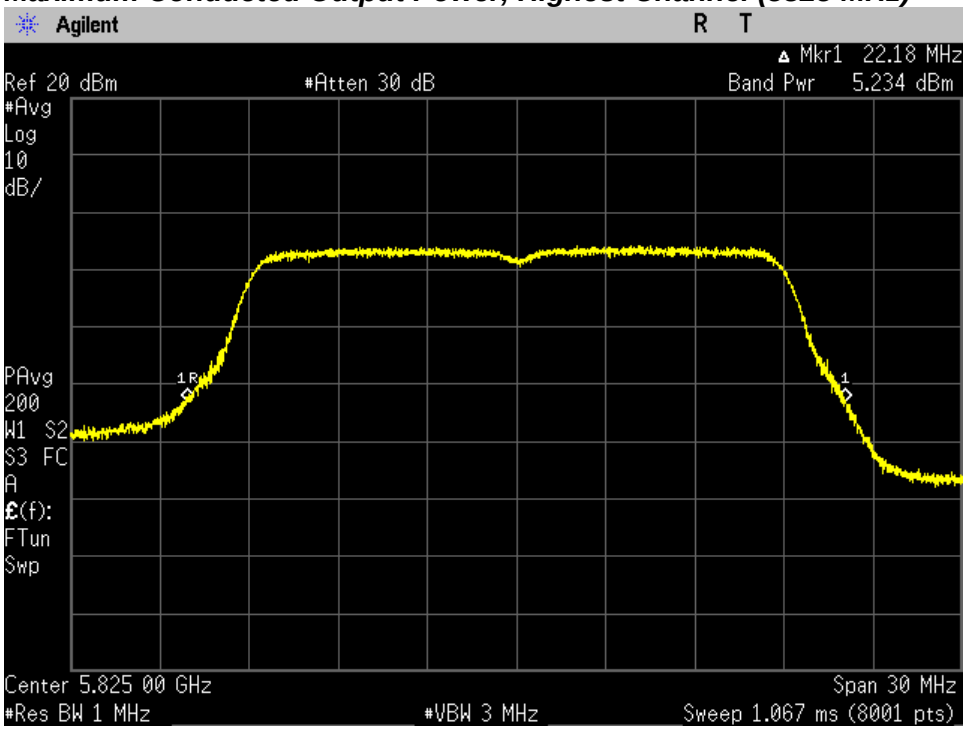


Maximum Conducted Output Power, Middle Channel (5785 MHz)



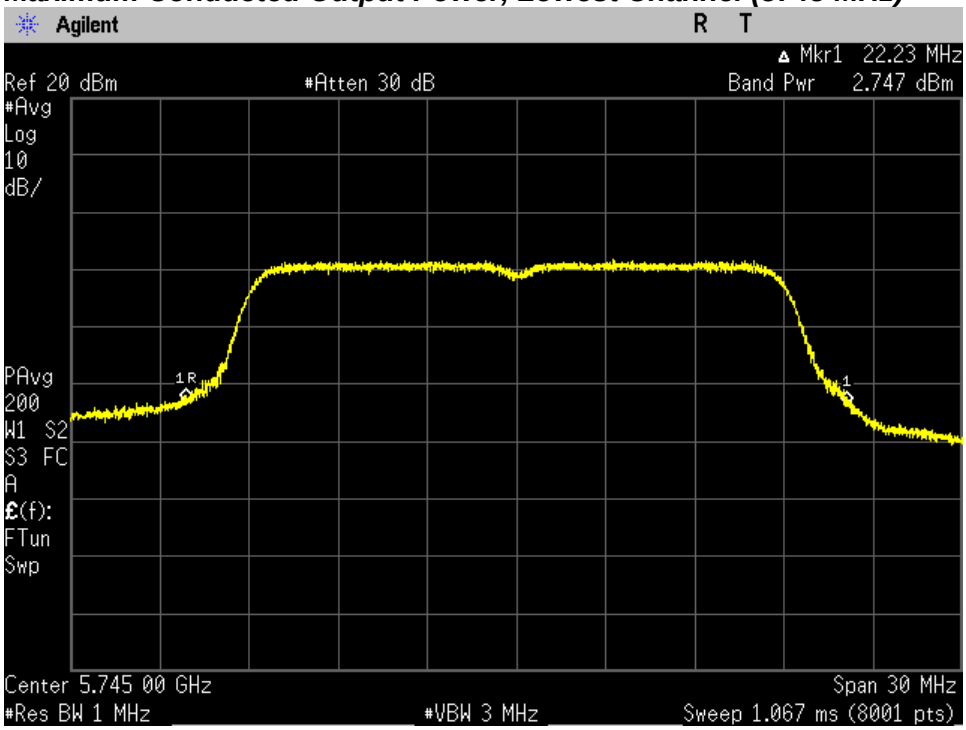
PLOTS OF EMISSIONS

Maximum Conducted Output Power, Highest Channel (5825 MHz)



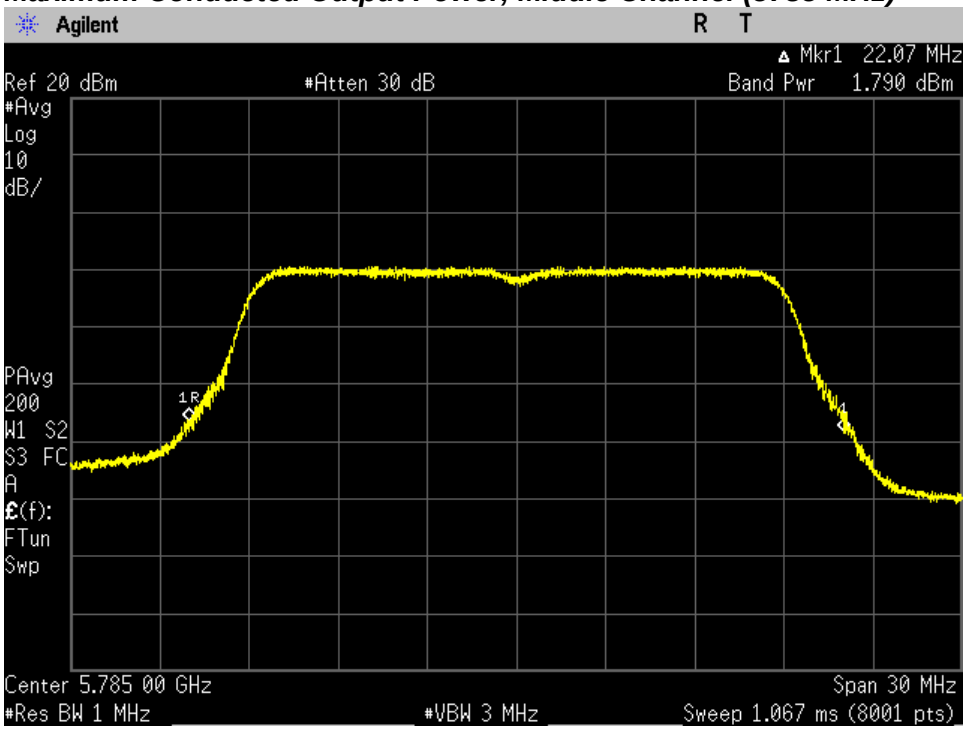
Chain 1

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

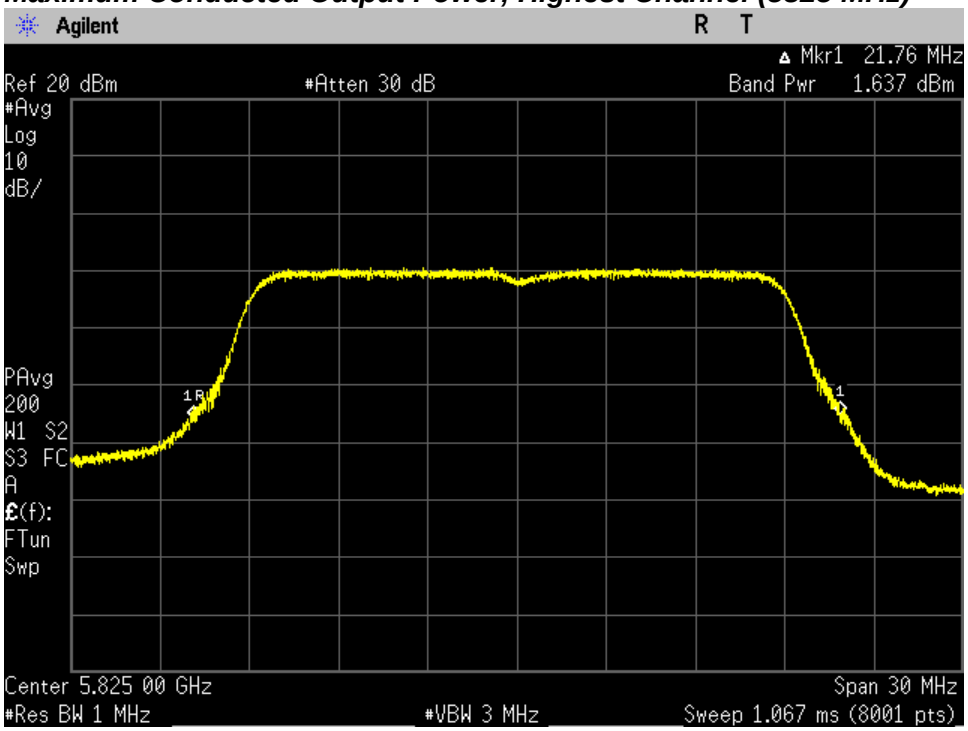


PLOTS OF EMISSIONS

Maximum Conducted Output Power, Middle Channel (5785 MHz)



Maximum Conducted Output Power, Highest Channel (5825 MHz)

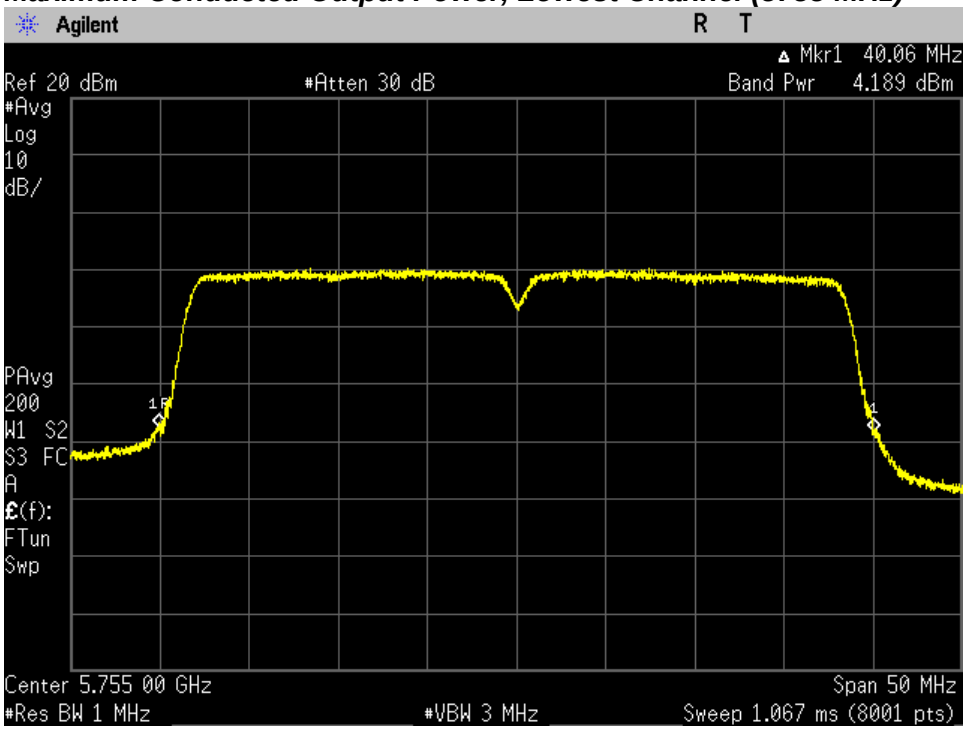


PLOTS OF EMISSIONS

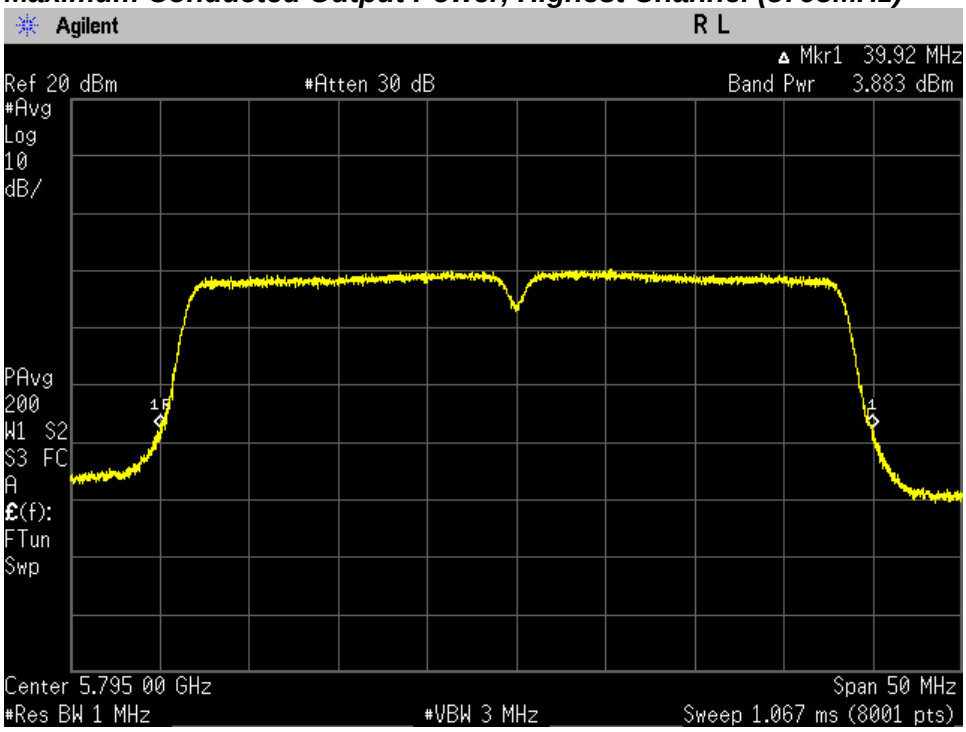
802.11ac (40 MHz) mode - SISO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



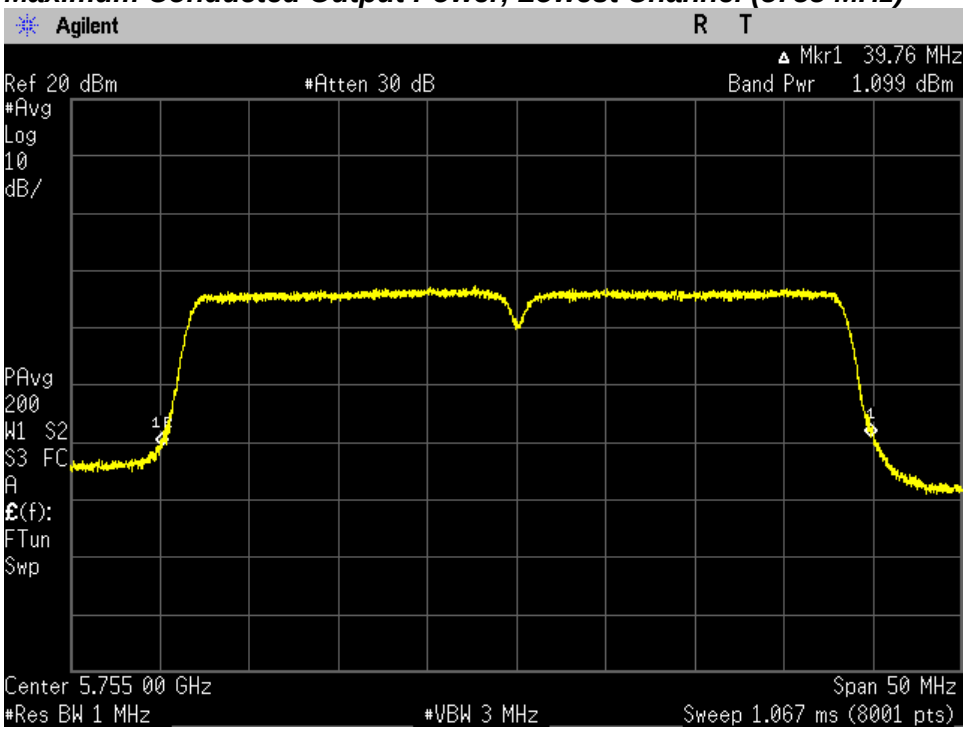
Maximum Conducted Output Power, Highest Channel (5795MHz)



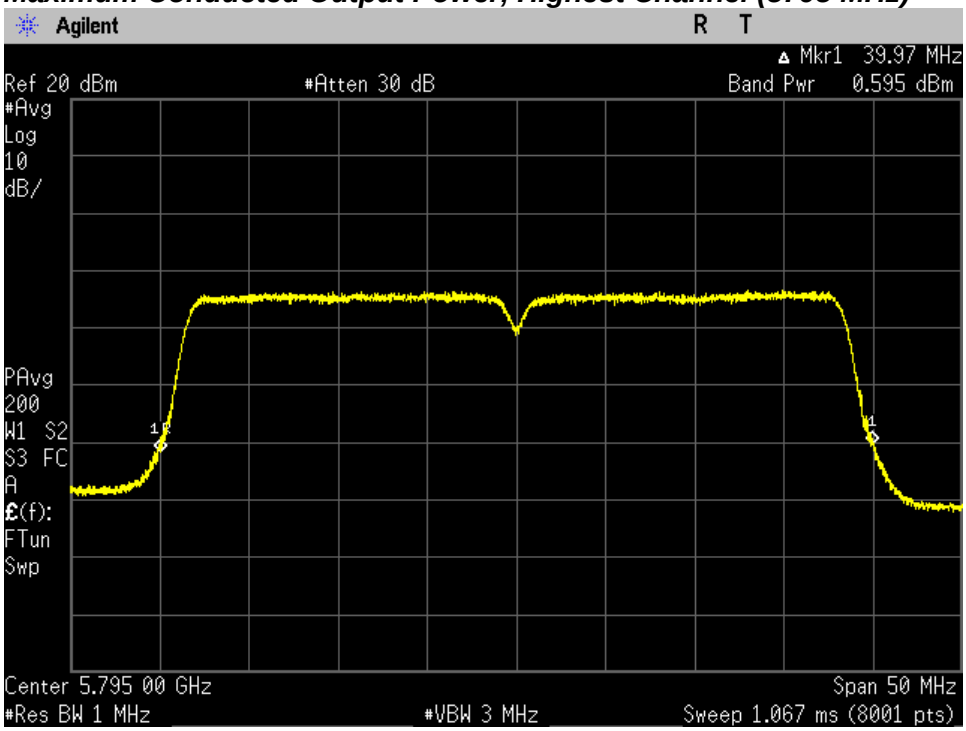
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

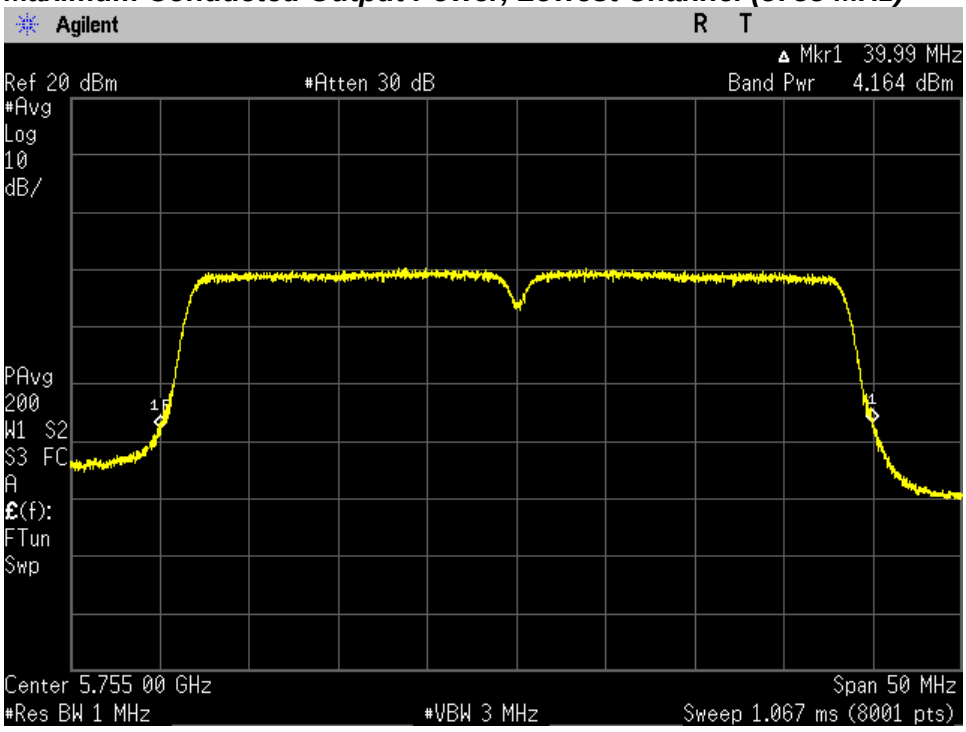


PLOTS OF EMISSIONS

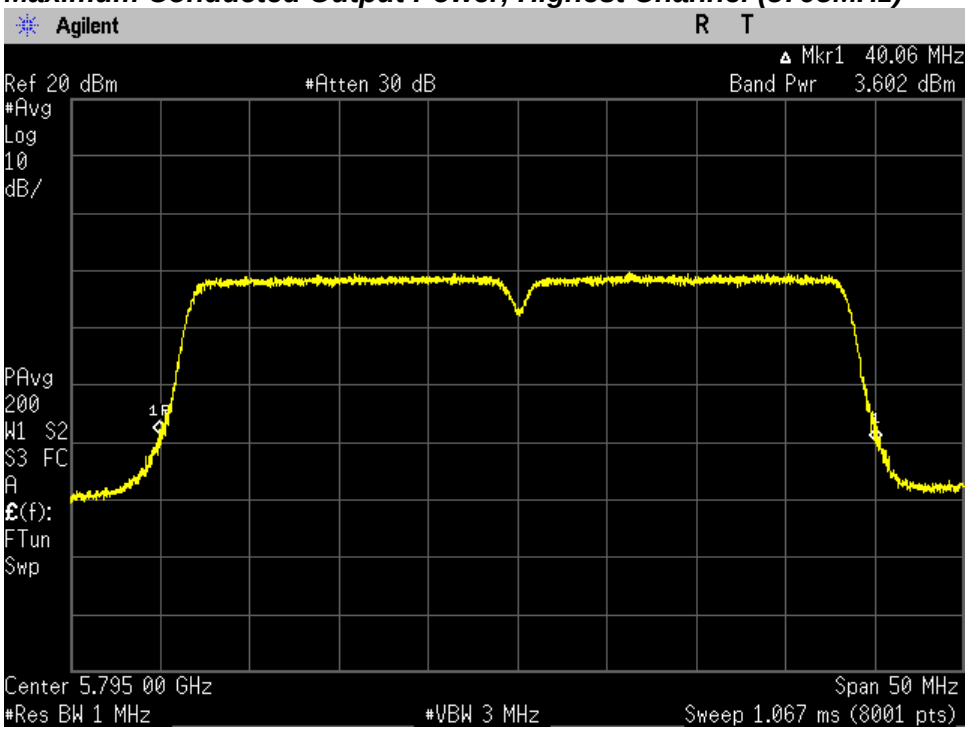
802.11ac (40 MHz) mode - CDD

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



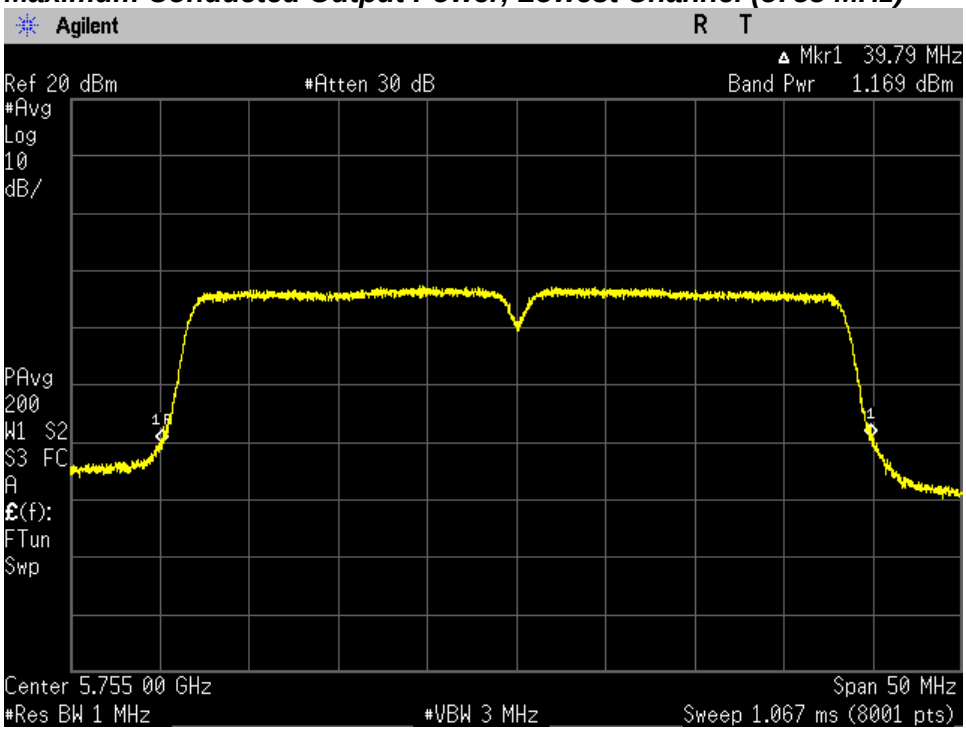
Maximum Conducted Output Power, Highest Channel (5795MHz)



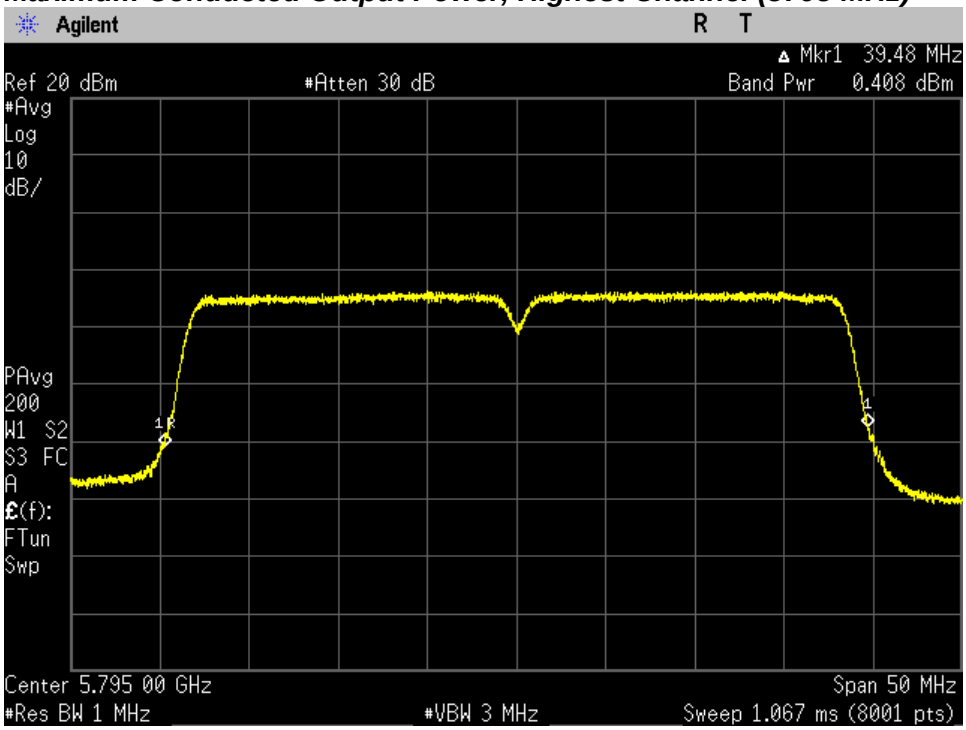
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

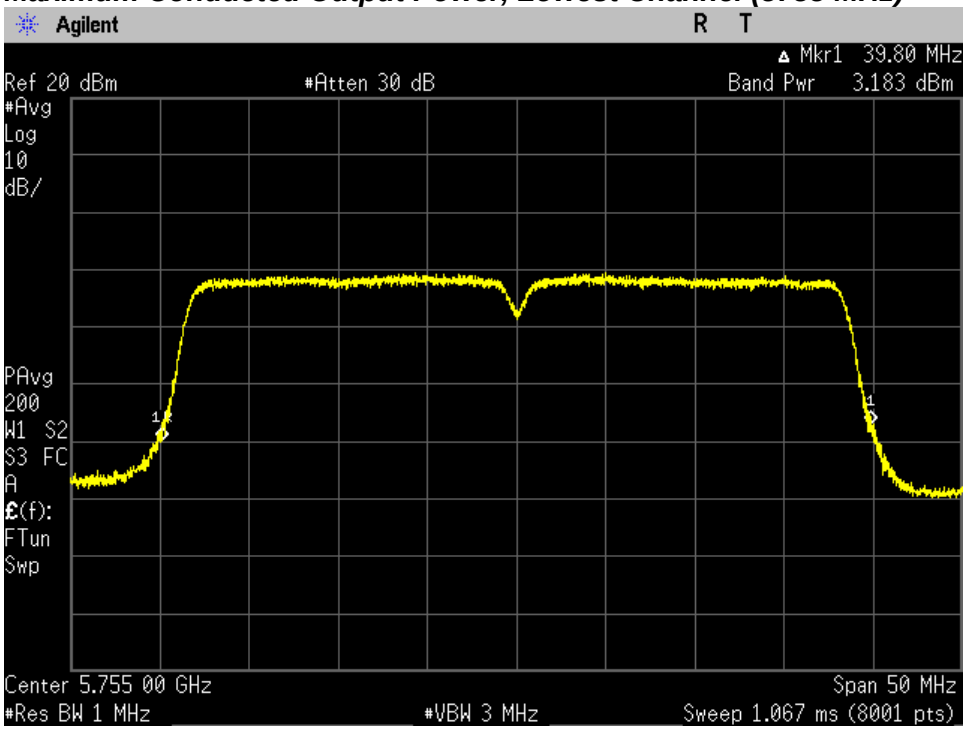


PLOTS OF EMISSIONS

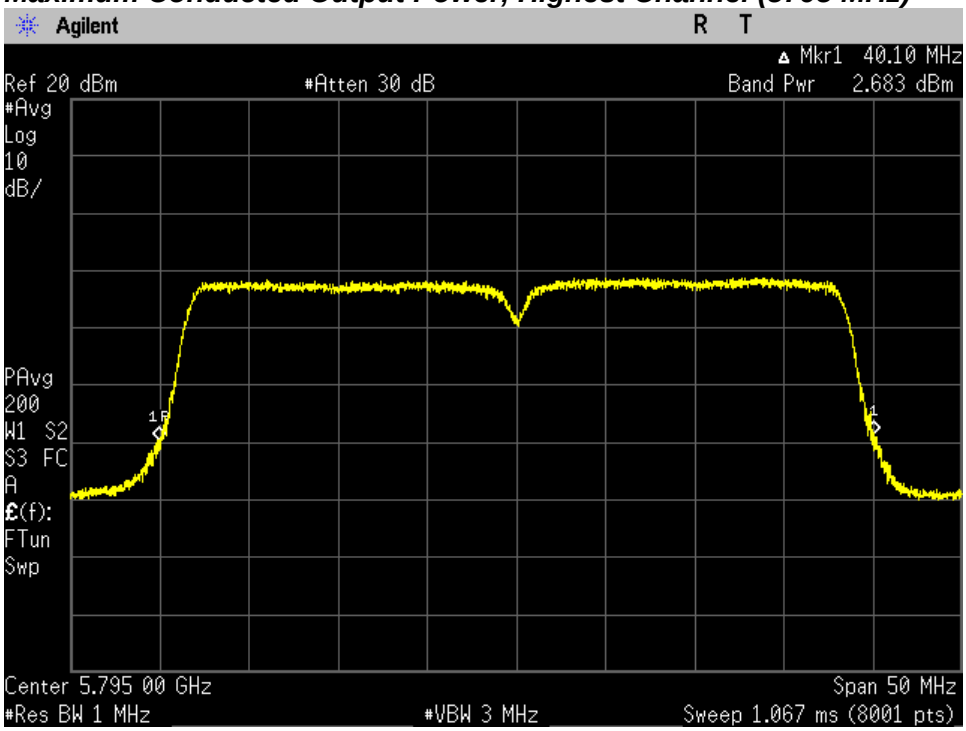
802.11ac (40 MHz) mode - MIMO

Chain 0

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



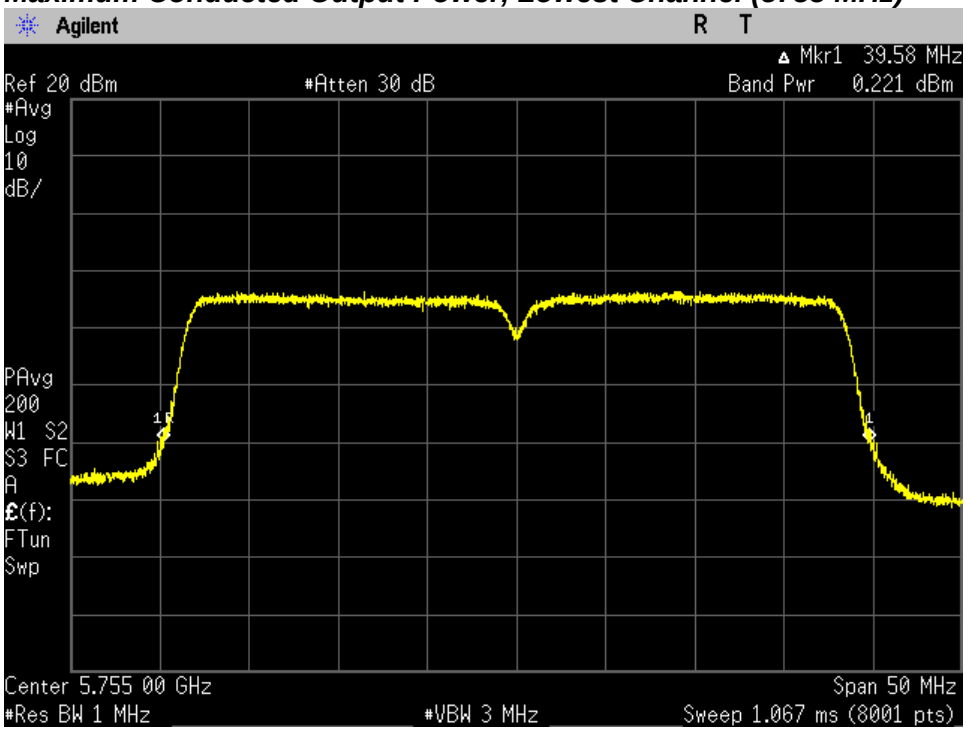
Maximum Conducted Output Power, Highest Channel (5795 MHz)



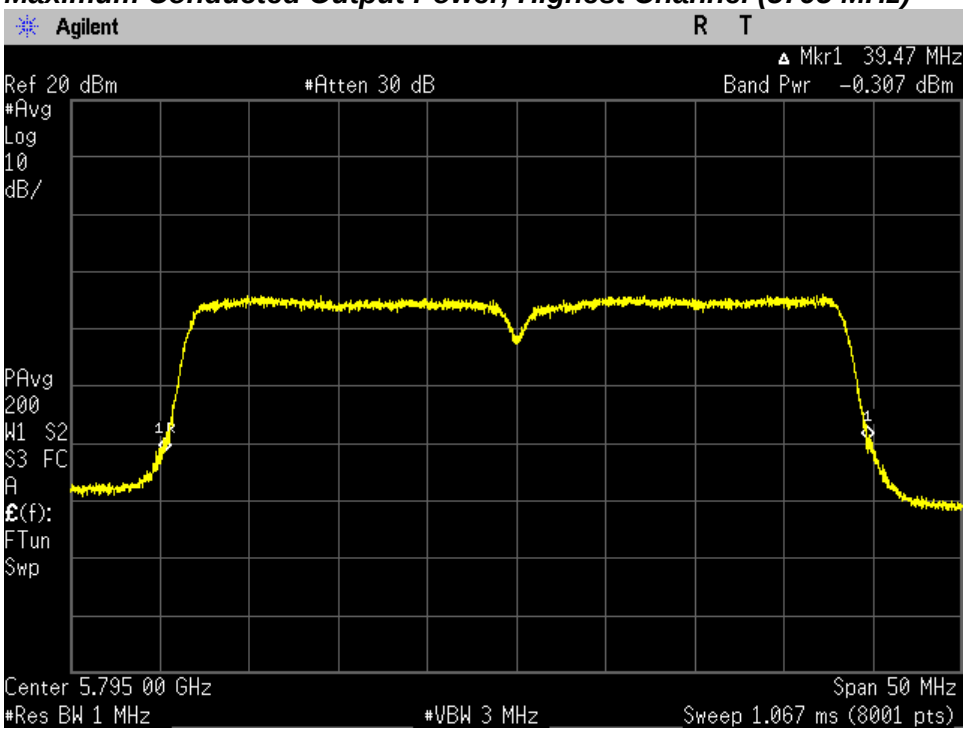
PLOTS OF EMISSIONS

Chain 1

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



Maximum Conducted Output Power, Highest Channel (5795 MHz)

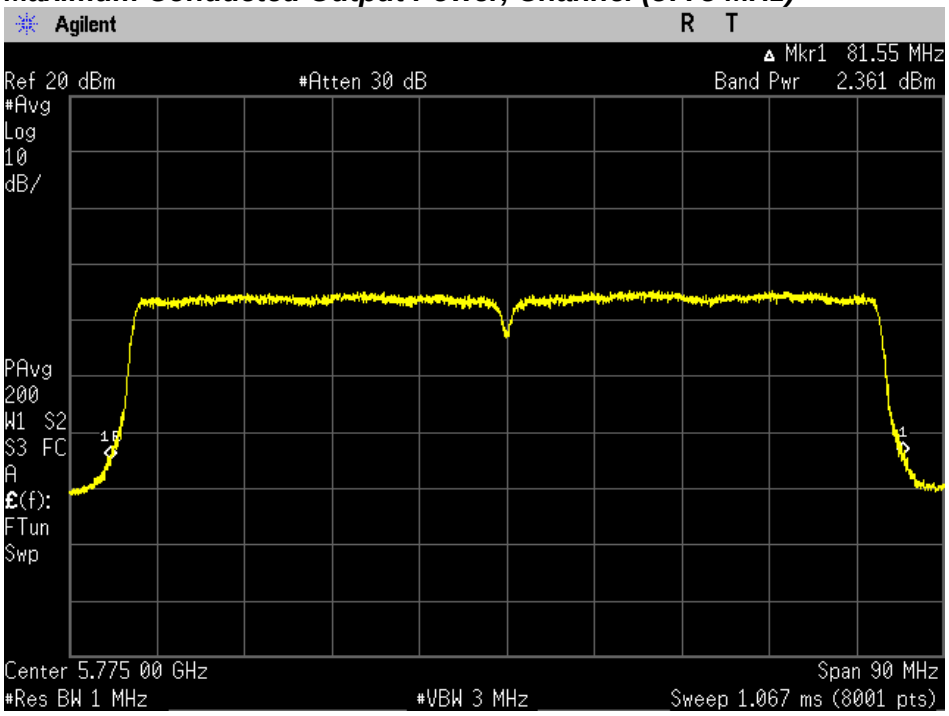


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - SISO

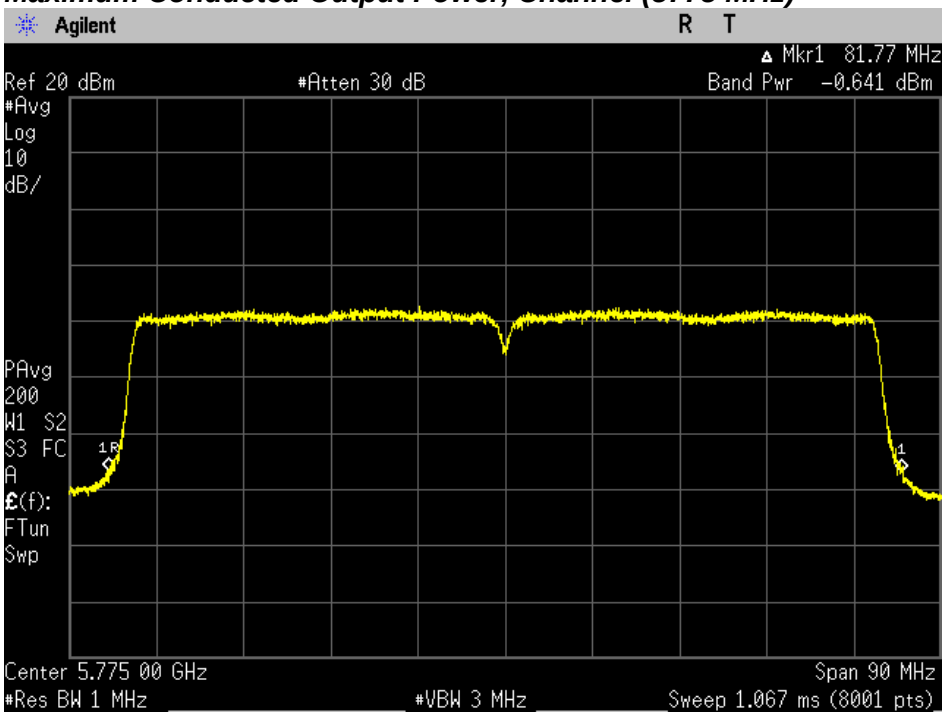
Chain 0

Maximum Conducted Output Power, Channel (5775 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5775 MHz)

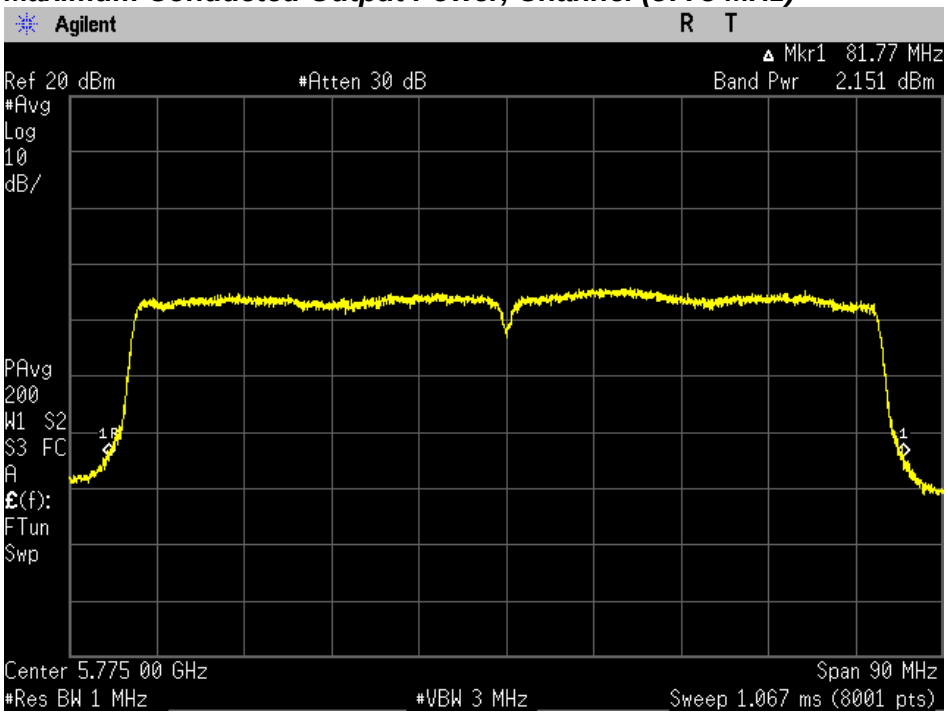


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - CDD

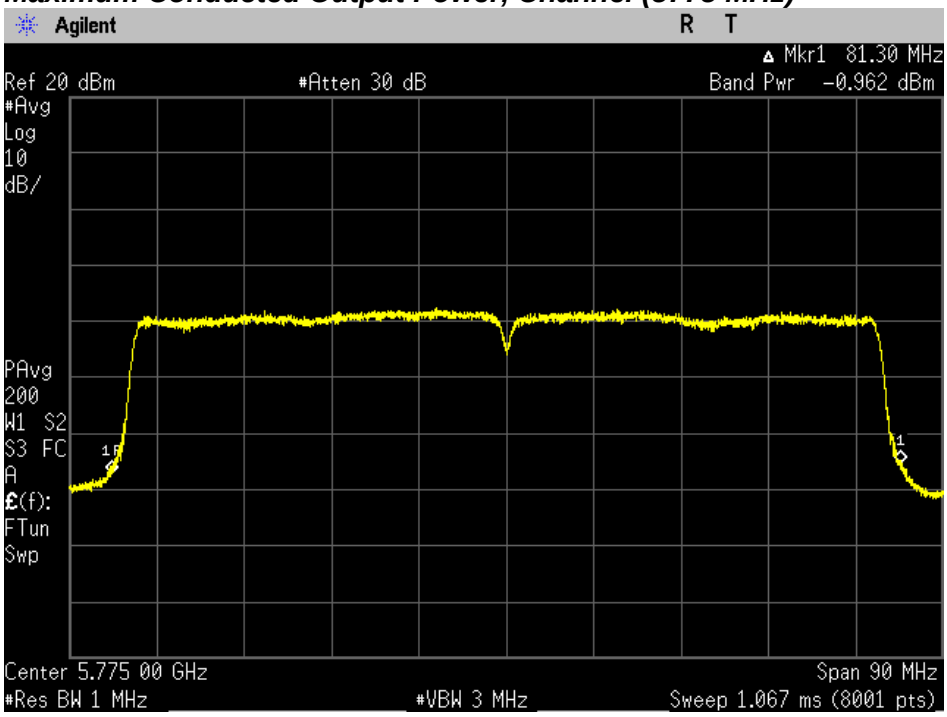
Chain 0

Maximum Conducted Output Power, Channel (5775 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5775 MHz)

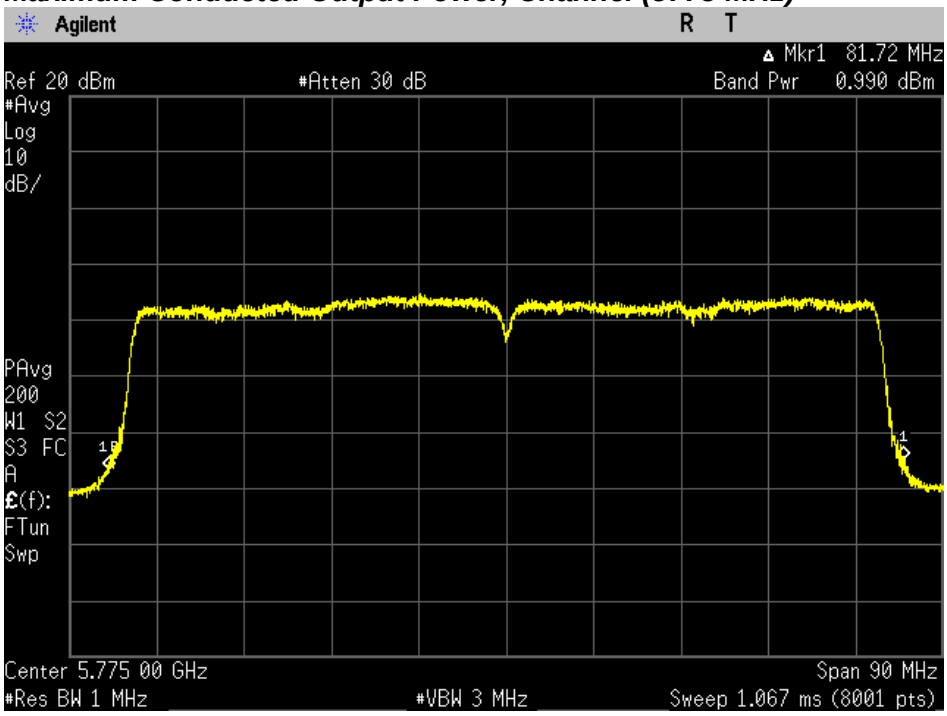


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - MIMO

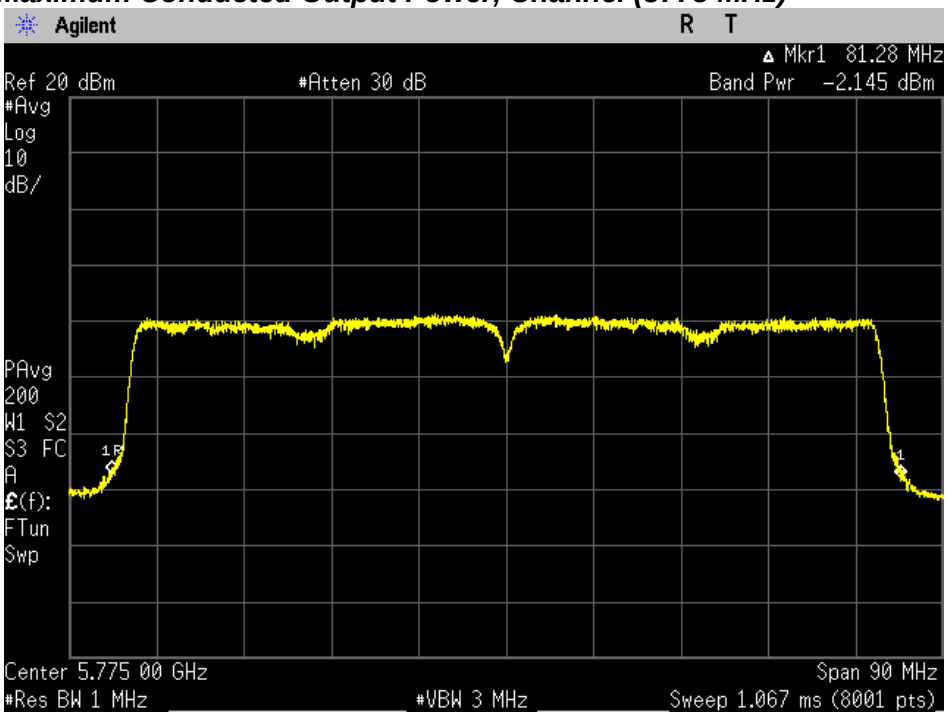
Chain 0

Maximum Conducted Output Power, Channel (5775 MHz)



Chain 1

Maximum Conducted Output Power, Channel (5775 MHz)



8.6 Maximum Power Spectral Density

8.6.1 Maximum Power Spectral Density – UNII-1 band

FCC §15.407(a), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode-SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ MHz)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	-2.12	-2.53	-1.29	-1.70	11.00	1.41	1.00	10.00
Middle	5200	-1.91	-3.21	-1.08	-2.38	11.00	1.62	0.32	10.00
Highest	5220	-1.30	-3.18	-0.47	-2.35	11.00	2.23	0.35	10.00

802.11n (20 MHz) mode - SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ MHz)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	-2.50	-3.24	-1.62	-2.36	11.00	1.08	0.34	10.00
Middle	5200	-2.28	-3.17	-1.40	-2.29	11.00	1.30	0.41	10.00
Highest	5220	-1.77	-2.93	-0.89	-2.05	11.00	1.81	0.65	10.00

802.11n (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1		Total output power			
Lowest	5180	-2.41	-3.10	0.88	1.15	11.00	6.86	10.00
Middle	5200	-2.14	-3.35	0.88	1.19	11.00	6.90	10.00
Highest	5220	-1.96	-3.40	0.88	1.27	11.00	6.98	10.00

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1		Total output power			
Lowest	5180	-3.04	-3.85	1.59	1.17	11.00	3.87	10.00
Middle	5200	-2.48	-4.00	1.57	1.41	11.00	4.11	10.00
Highest	5220	-2.5	-3.84	1.56	1.45	11.00	4.15	10.00

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
	5190	-6.33	-7.12	-4.71	1.62	11.00	-2.01	4.32	10.00

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	-6.27	-6.87	1.62	-1.93	11.00	3.78	10.00

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	-6.88	-8.13	2.67	-1.78	11.00	0.92	10.00

802.11ac (20MHz) mode-SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ MHz)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
Lowest	5180	-2.49	-3.41	-1.61	-2.53	11.00	1.09	0.17	10.00
Middle	5200	-2.03	-3.11	-1.15	-2.23	11.00	1.55	0.47	10.00
Highest	5220	-1.73	-3.38	-0.85	-2.50	11.00	1.85	0.20	10.00

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1		Total output power			
Lowest	5180	-2.57	-2.99	0.88	1.12	11.00	6.83	10.00
Middle	5200	-2.21	-3.36	0.88	1.14	11.00	6.85	10.00
Highest	5220	-1.70	-3.28	0.88	1.47	11.00	7.18	10.00

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1		Total output power			
Lowest	5180	-2.71	-4.06	1.55	1.23	11.00	3.93	10.00
Middle	5200	-2.50	-4.10	1.56	1.34	11.00	4.04	10.00
Highest	5220	-2.61	-3.68	1.56	1.46	11.00	4.16	10.00

802.11ac (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm)	E.I.R.P (dBm)		IC E.I.R.P Limit (dBm/ MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		Chain 0	Chain 1	
	5190	-6.07	-7.07	-4.45	-5.45	11.00	-1.75	-2.75	10.00

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	-6.14	-7.23	1.62	-2.02	11.00	3.69	10.00

802.11ac (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	Maximum PSD (dBm)	FCC Limit (dBm)	E.I.R.P (dBm)	IC E.I.R.P Limit (dBm)
		Chain 0	Chain 1		Total output power			
	5190	-7.08	-8.39	2.64	-2.04	9.49	0.66	10.00

TEST DATA

Note:

1. *Maximum Conducted (average) Power = Measured conducted power + Duty Factor
2. Total output power = 10 log [10^{(Chain 0 Power + duty factor)/10} + 10^{(Chain 1 Power + duty factor)/10}]
3. For CDD transmission, directional gain is. **5.71 dBi**

   For MIMO transmission, directional gain is **2.7 dBi.**

   Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.

   For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,

   Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/1) dB = 5.71 dBi.

   For CDD mode of this device, N_{SS}=1.

   For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,

   Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/2) dB = 2.7 dBi.

   For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and N_{SS}=2.
4. E.I.R.P = Maximum conducted Power + Duty Cycle Factor + Antenna gain.

   E.I.R.P was calculated by following equation according to KDB412172 D01 Determining ERP and EIRP v01.

   $E.I.R.P = P_T + G_T - Lc$

   P_T = Peak outputpower (dBm)

   G_T = Gain of the transmitting antenna in dBi, Directional antenna gain is **5.71 dBi or 2.7dBi**

   L_C = Signal attenuation in the connecting cable between the transmitter and antenna in dB. This factor of an integral antenna is negligible.
5. For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
6. The following equation was used for spectrum offset:

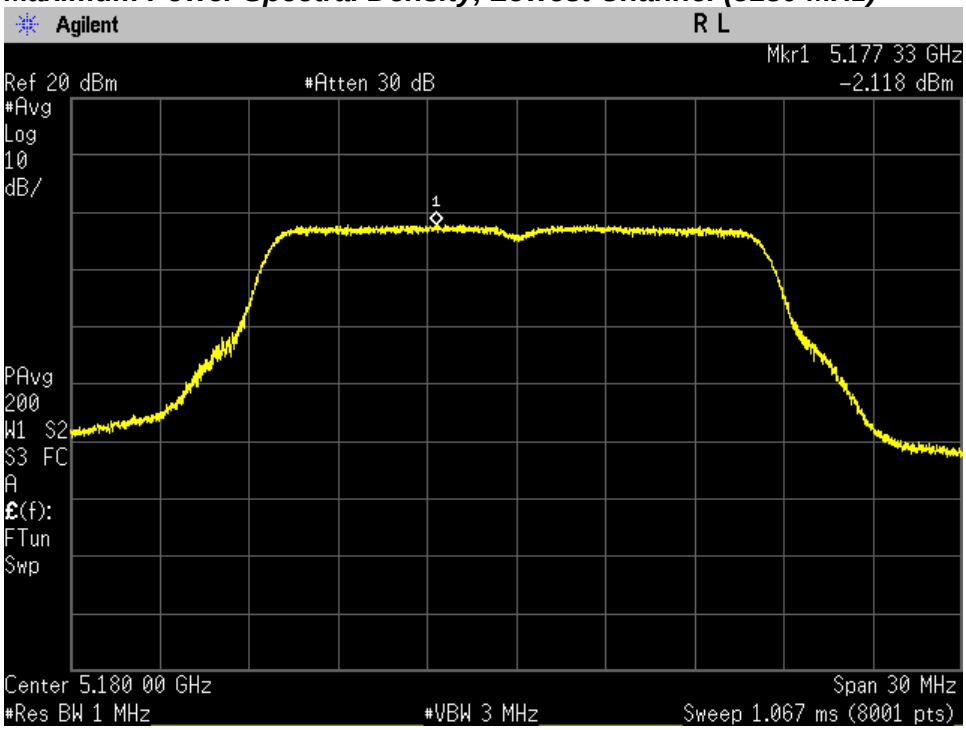
   Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOTS OF EMISSIONS

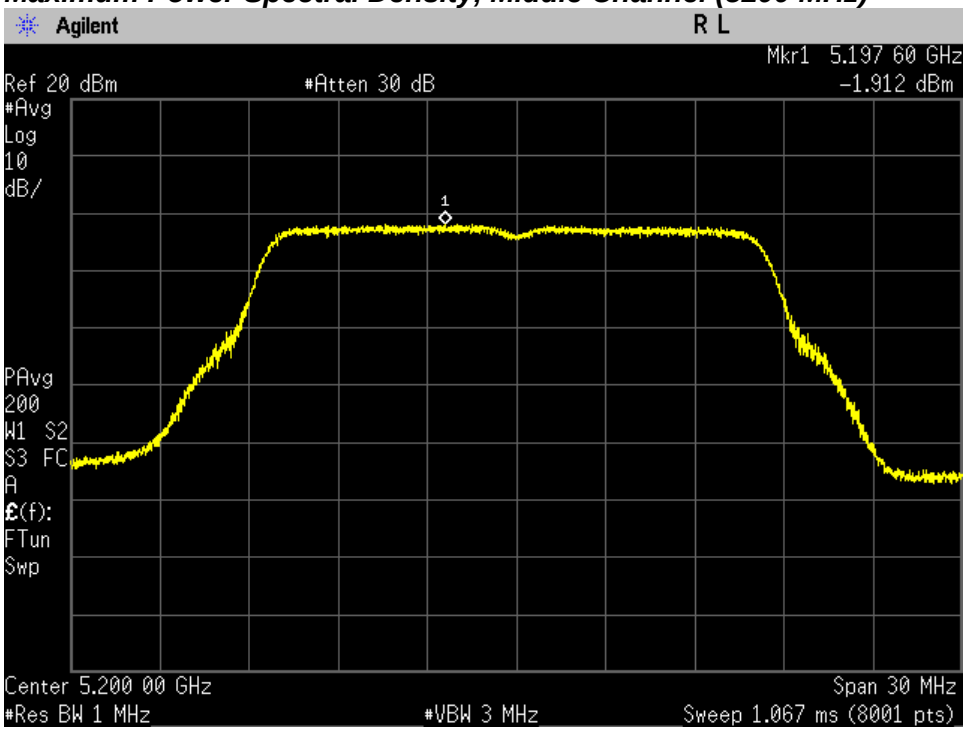
802.11a mode

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

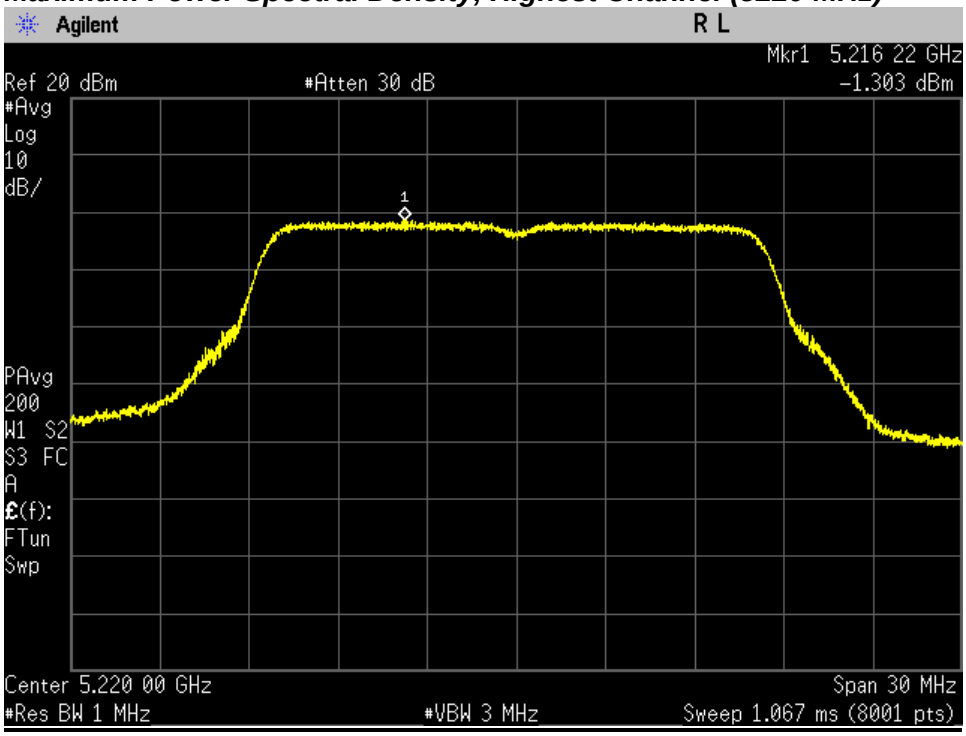


Maximum Power Spectral Density, Middle Channel (5200 MHz)



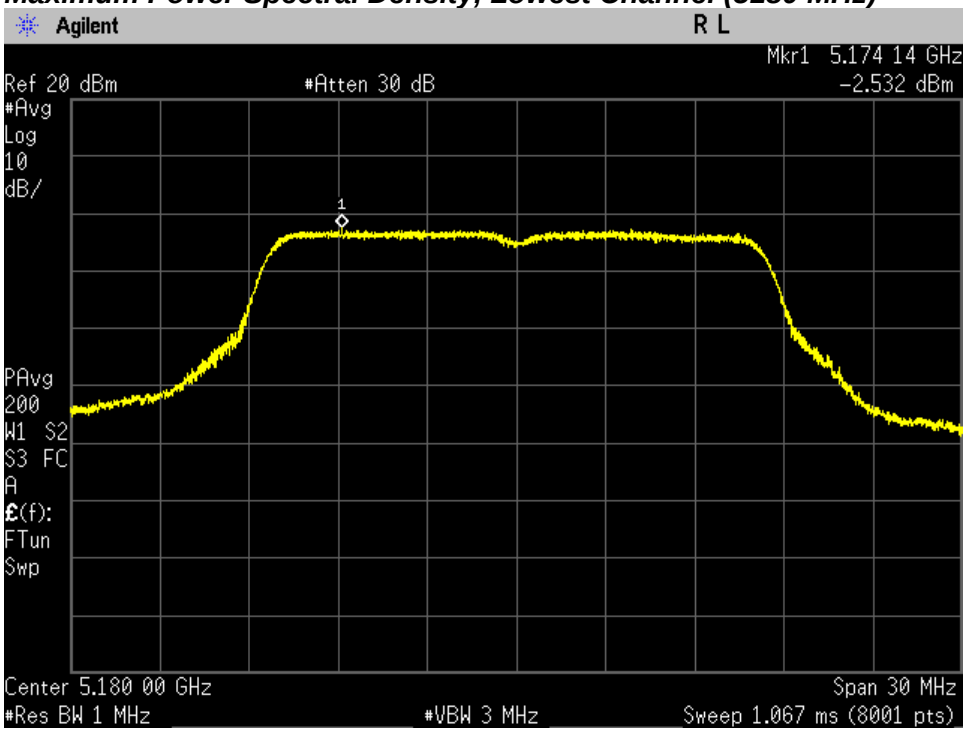
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



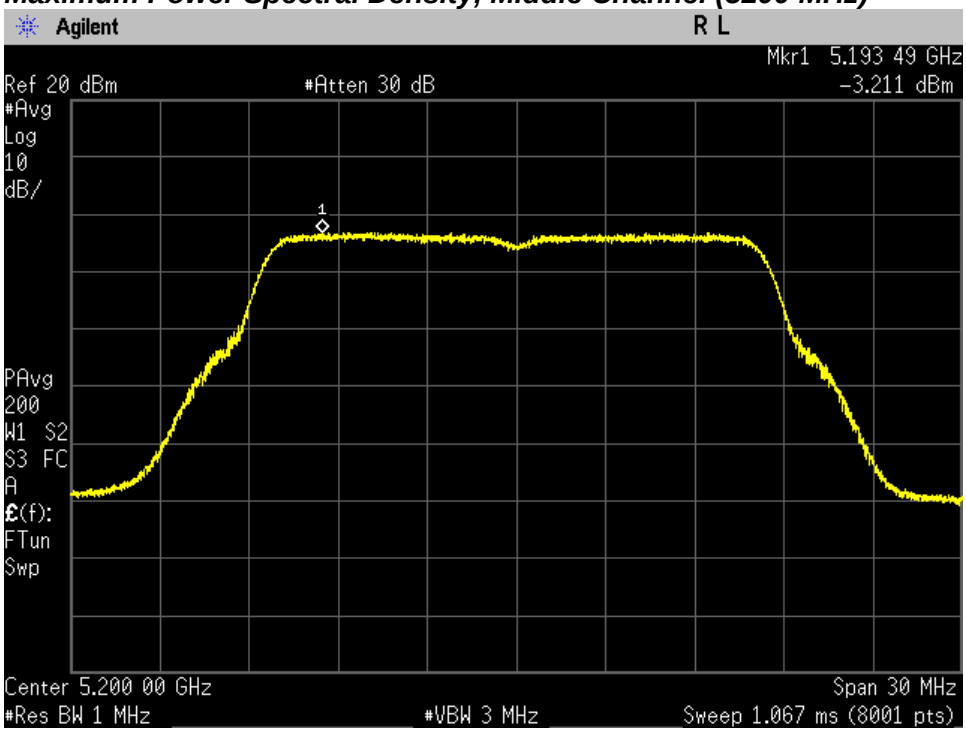
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

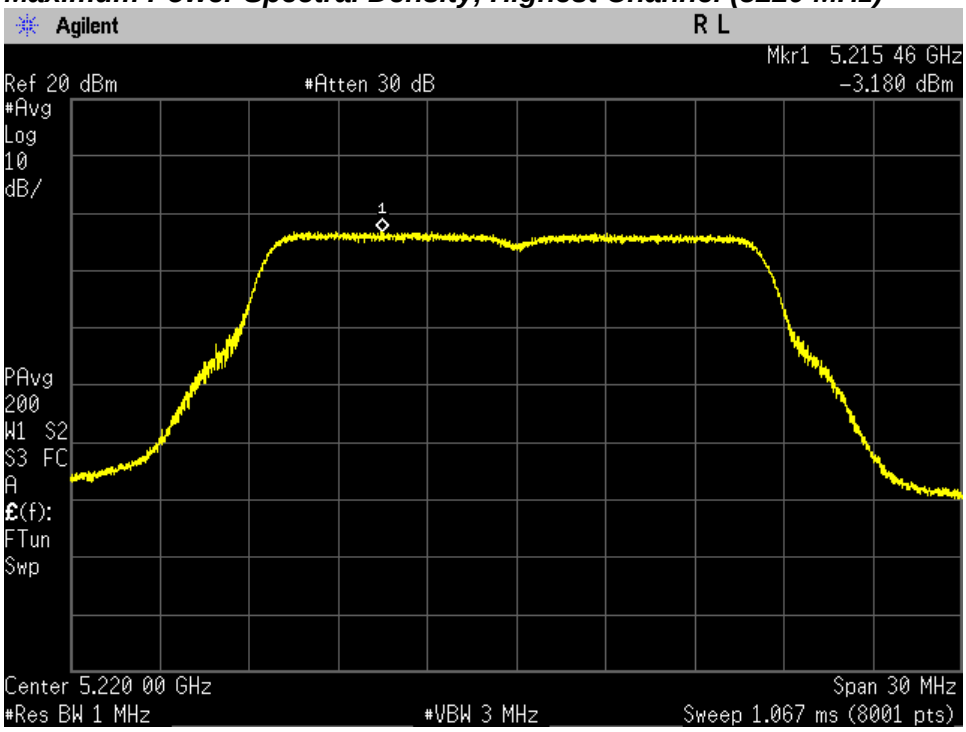


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

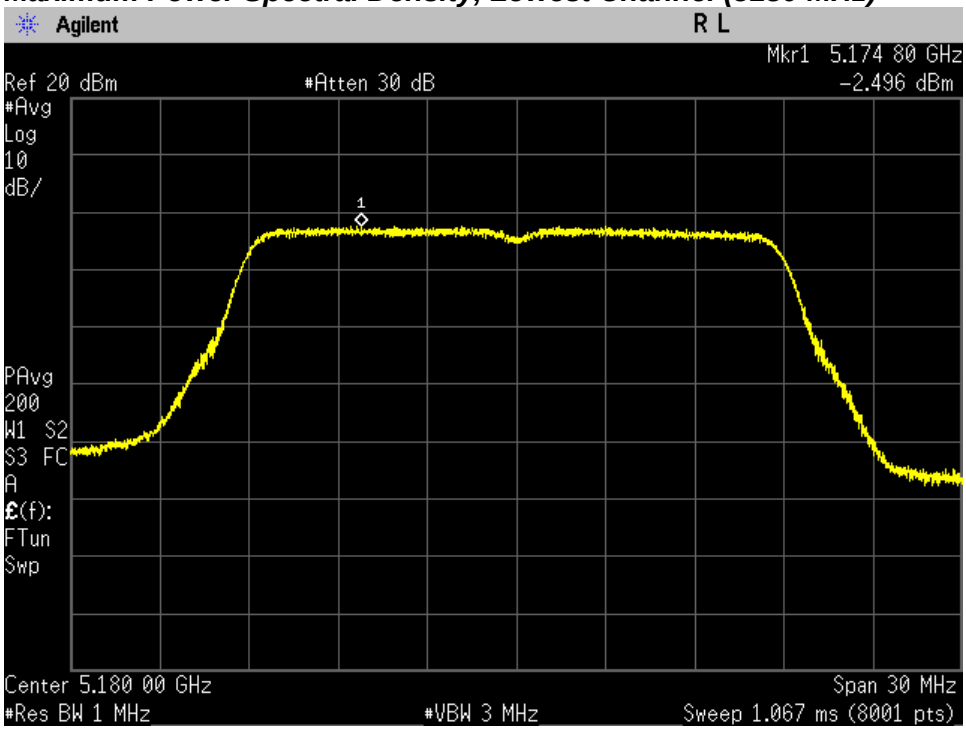


PLOTS OF EMISSIONS

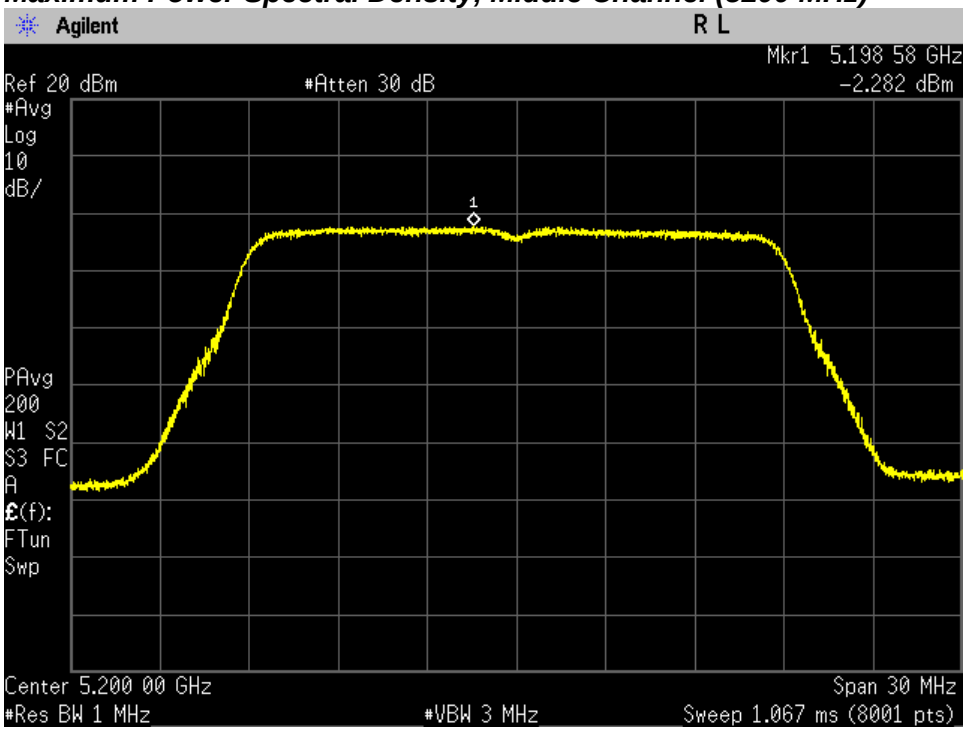
802.11n (20 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

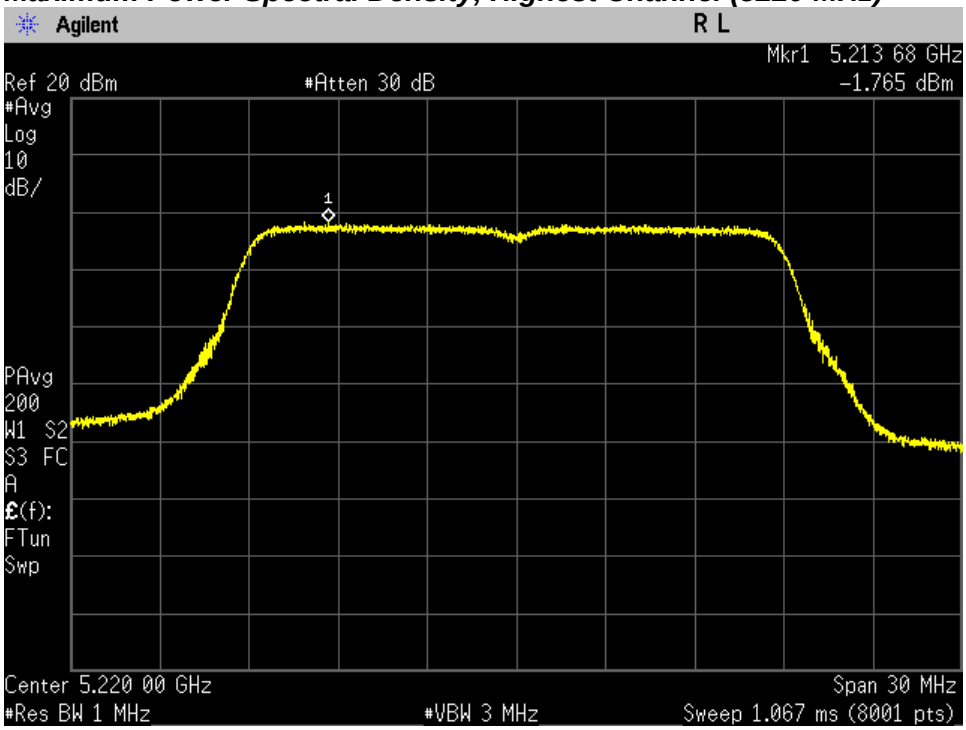


Maximum Power Spectral Density, Middle Channel (5200 MHz)



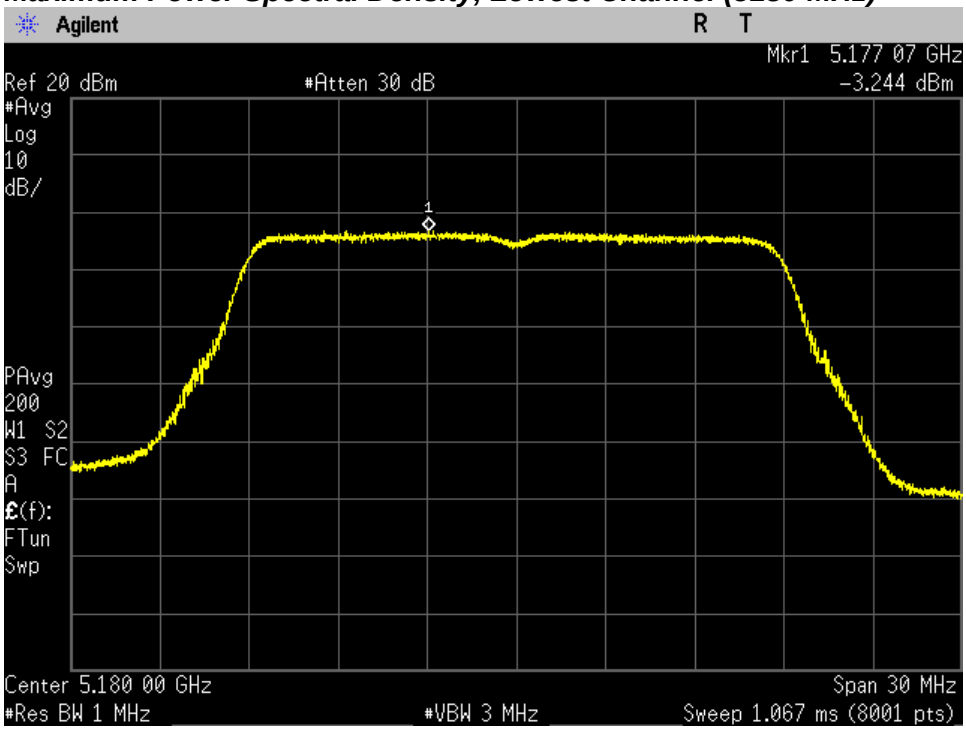
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



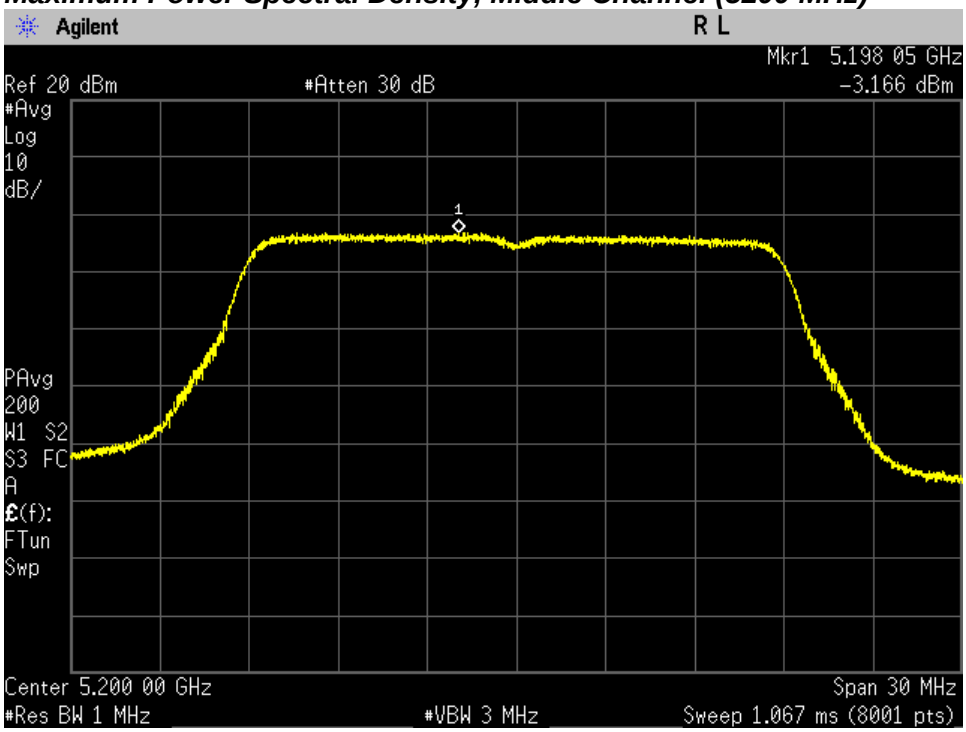
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

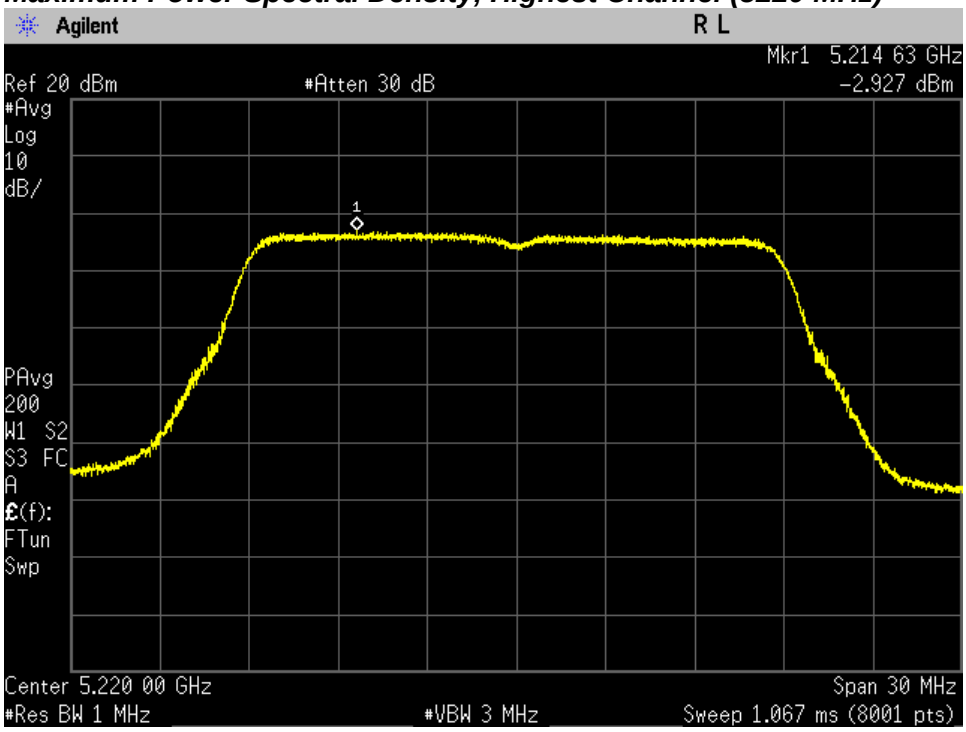


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

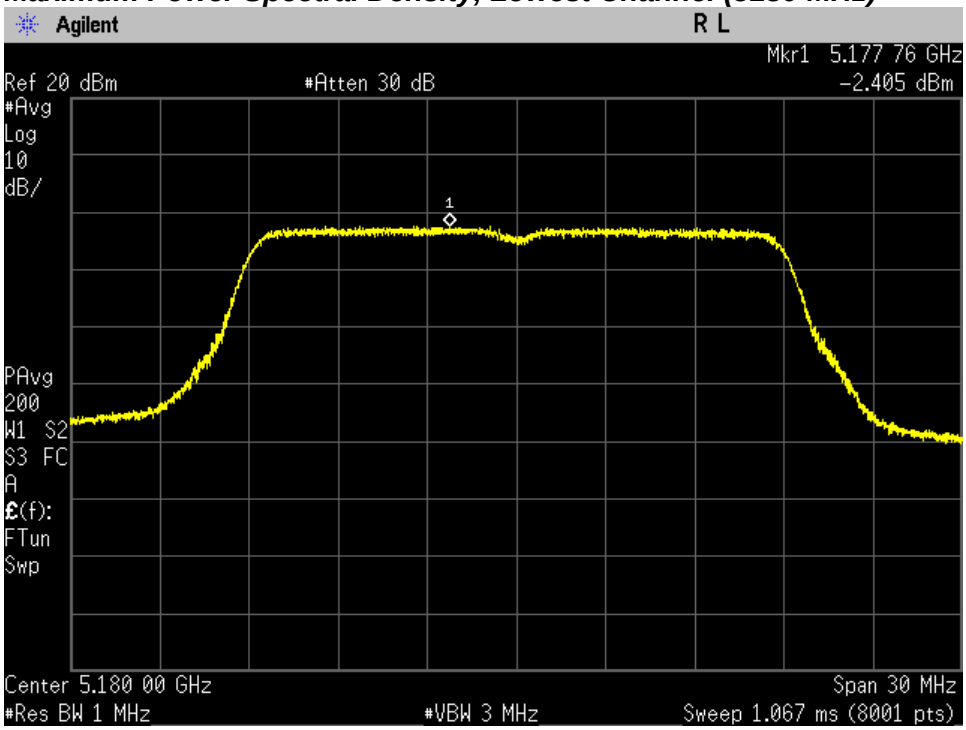


PLOTS OF EMISSIONS

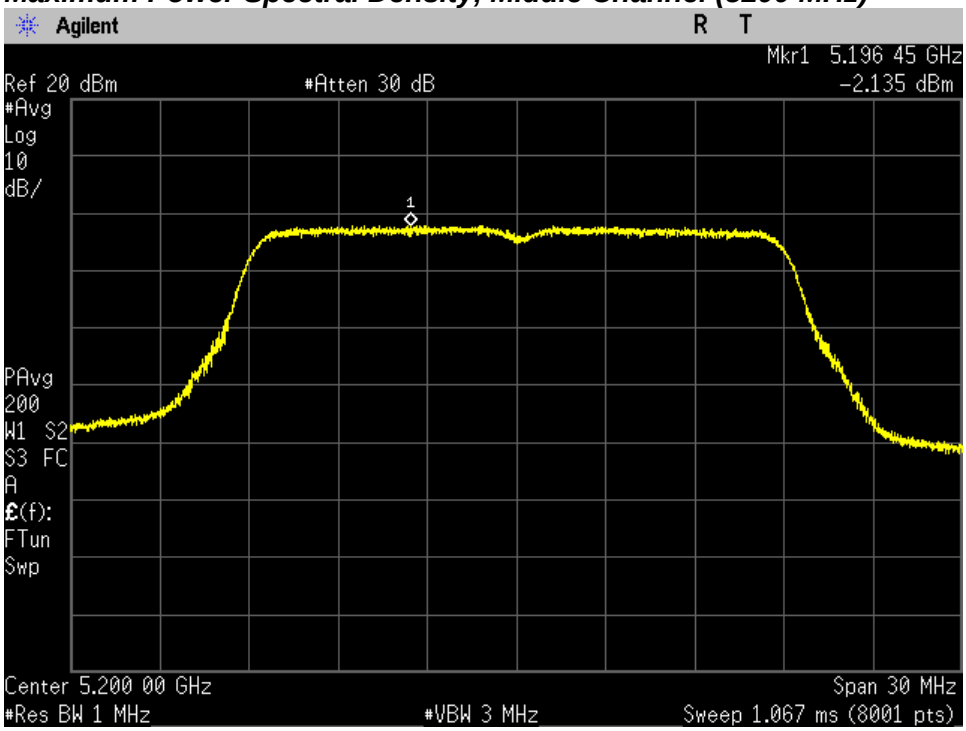
802.11n (20 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

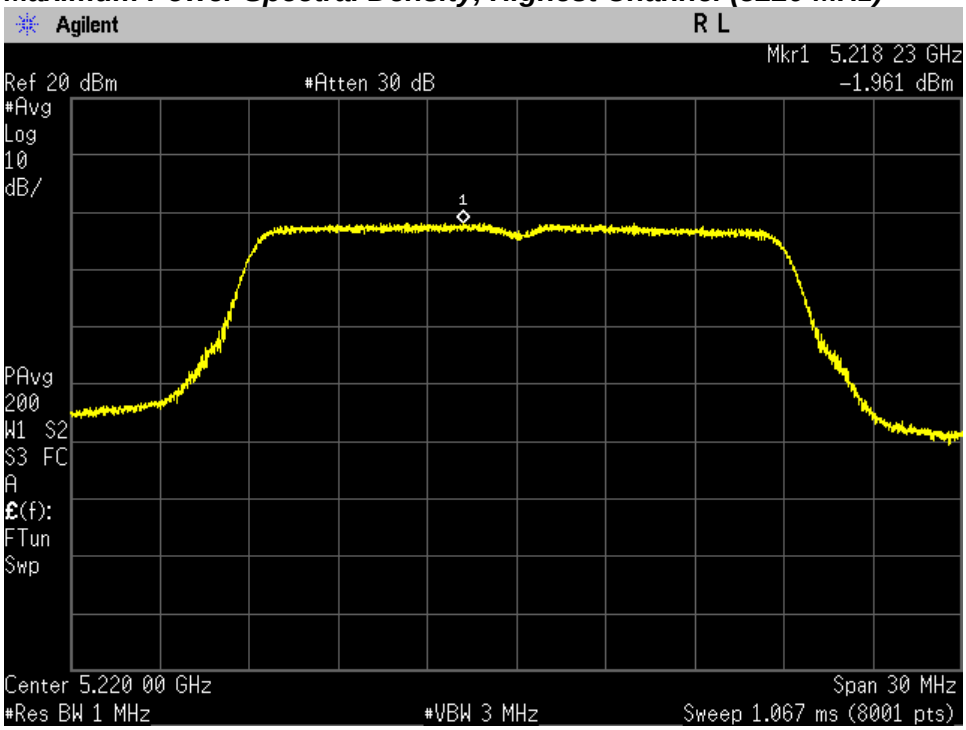


Maximum Power Spectral Density, Middle Channel (5200 MHz)



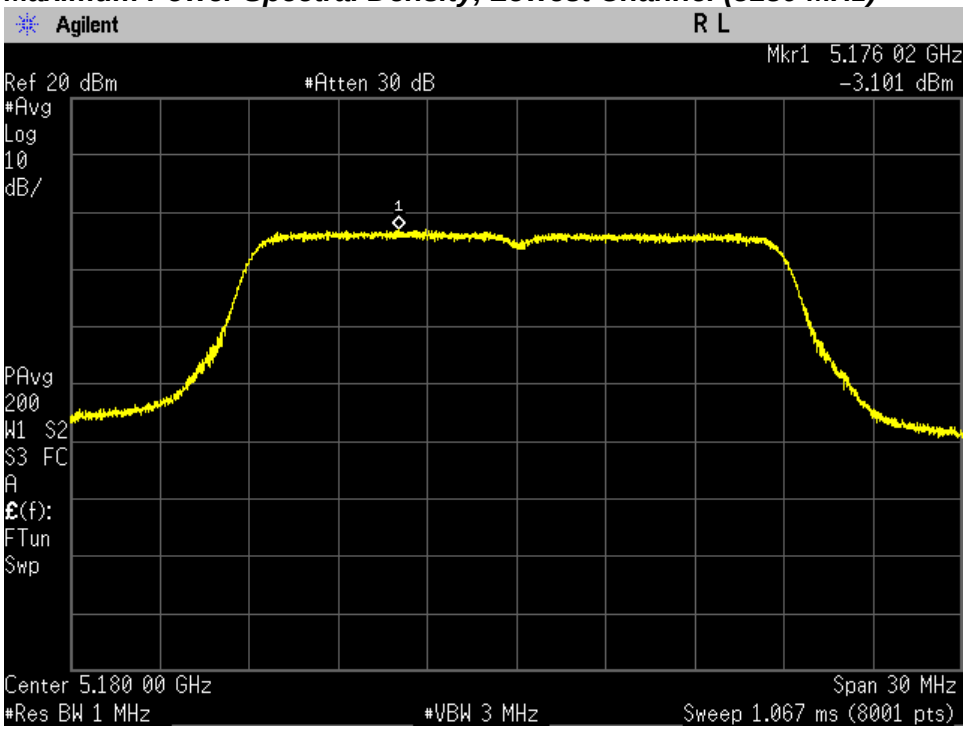
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



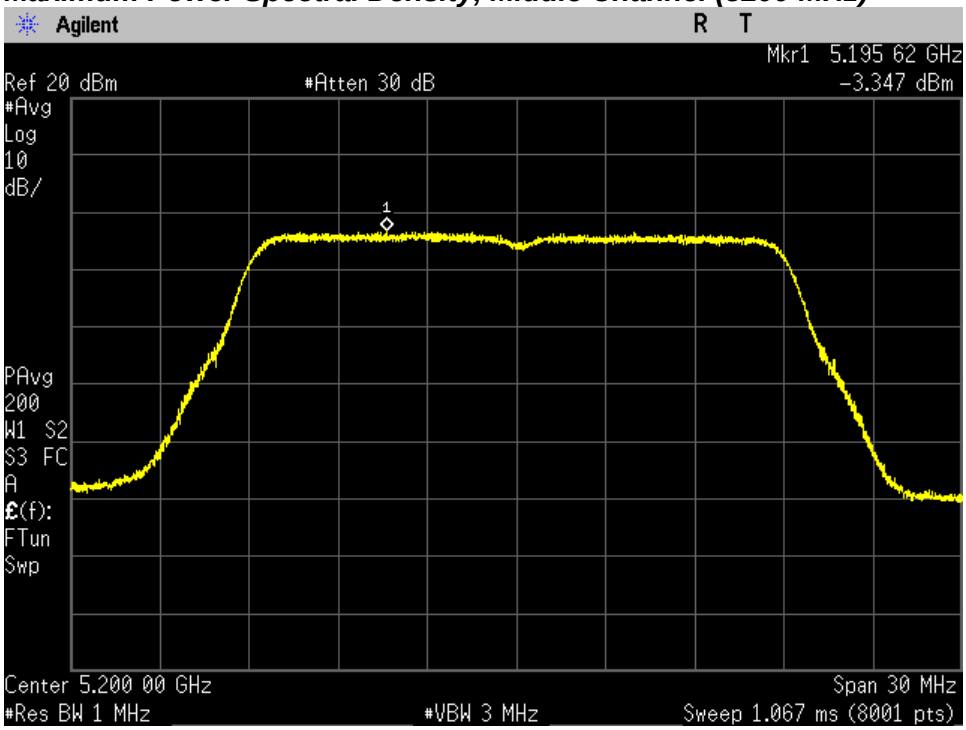
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

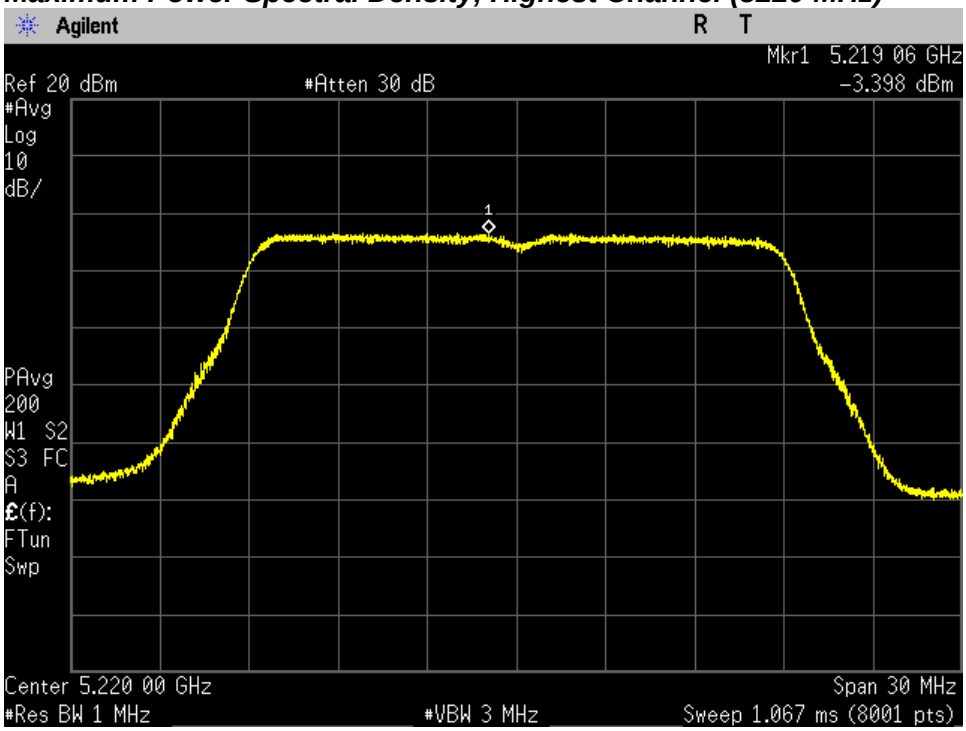


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

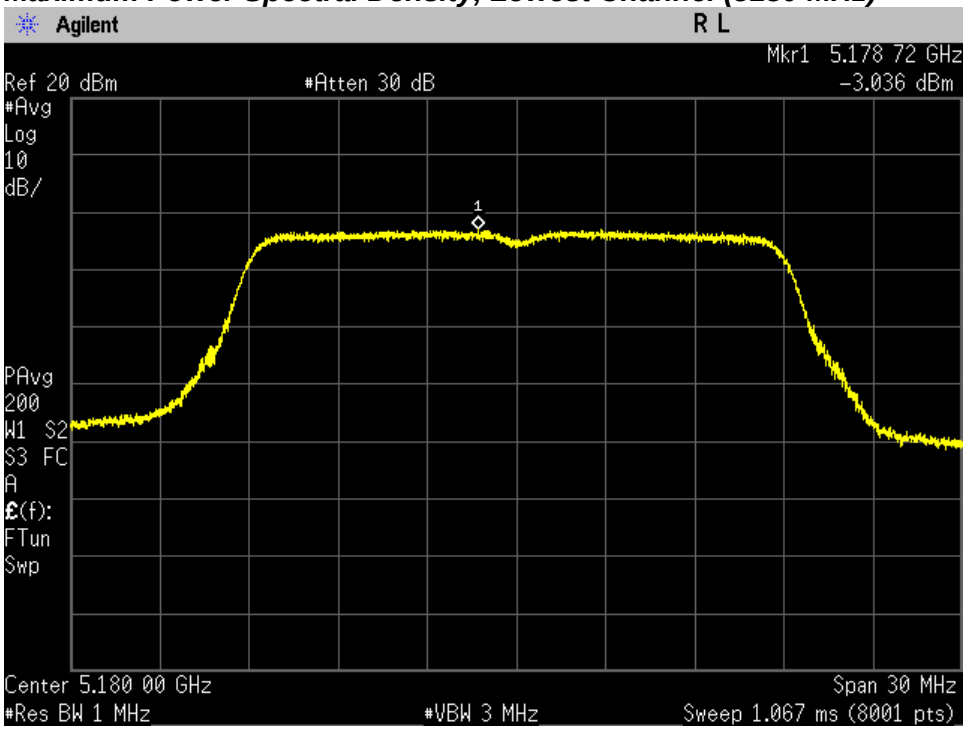


PLOTS OF EMISSIONS

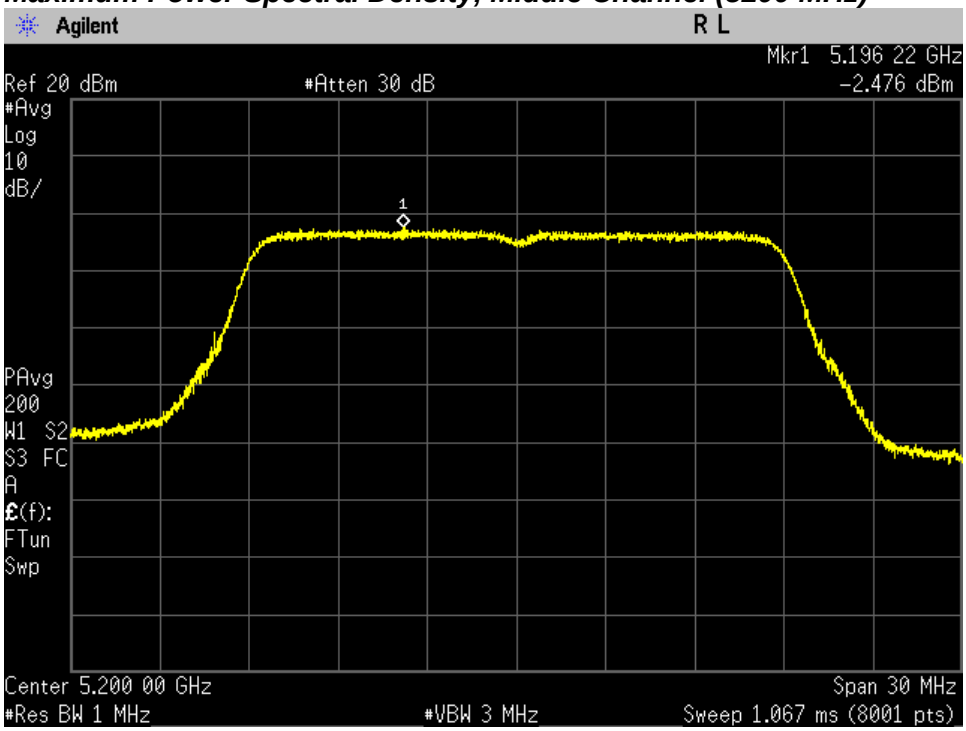
802.11n (20 MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

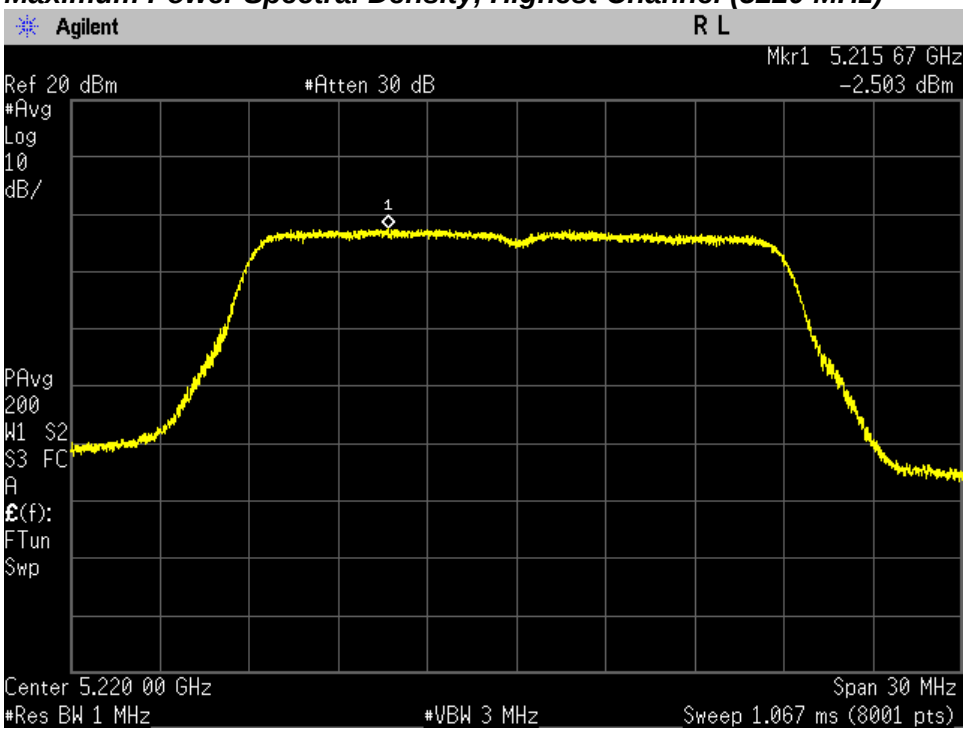


Maximum Power Spectral Density, Middle Channel (5200 MHz)



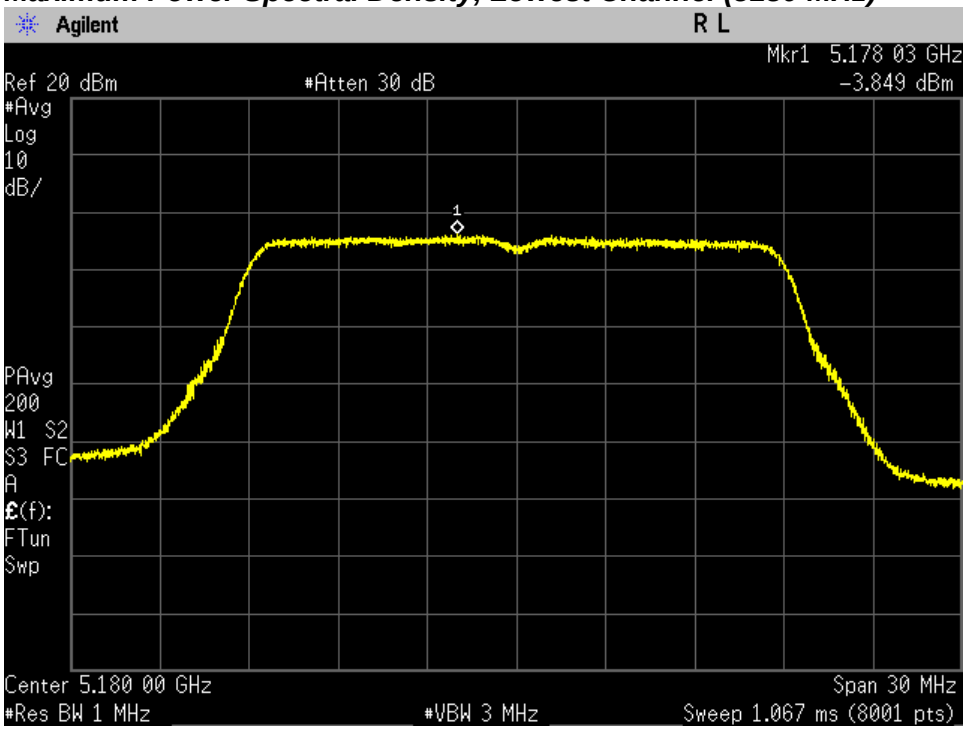
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



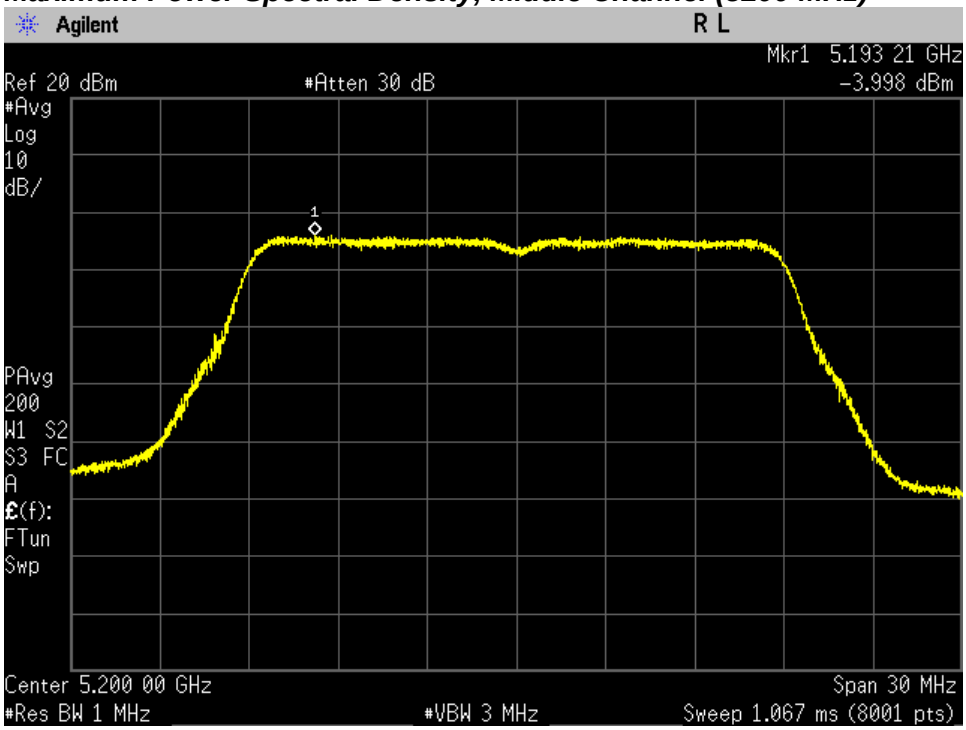
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

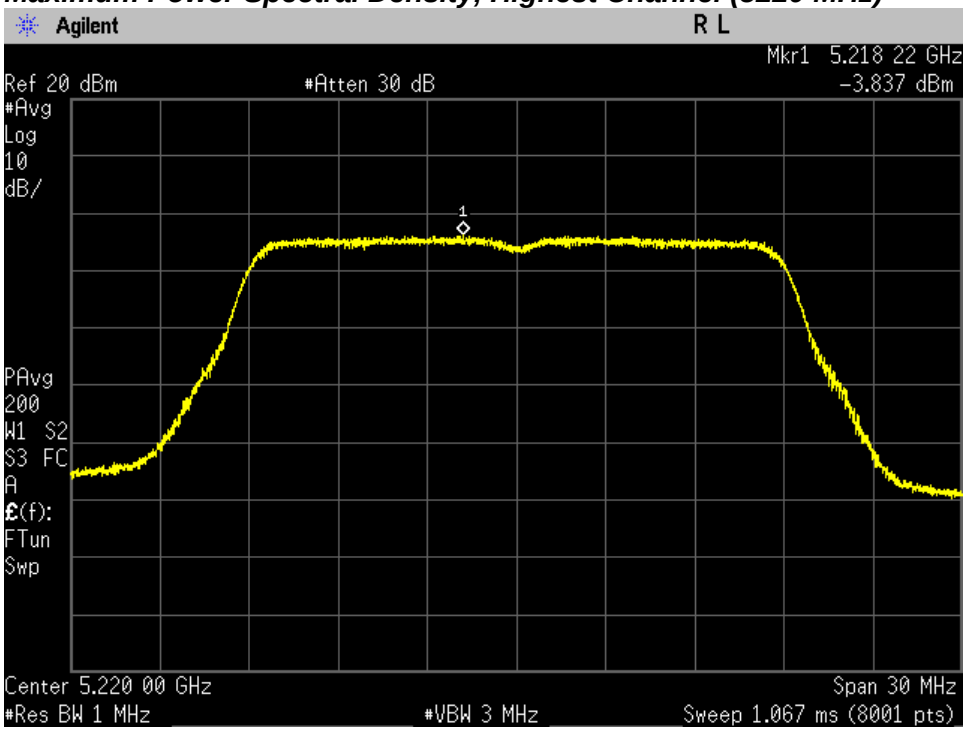


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

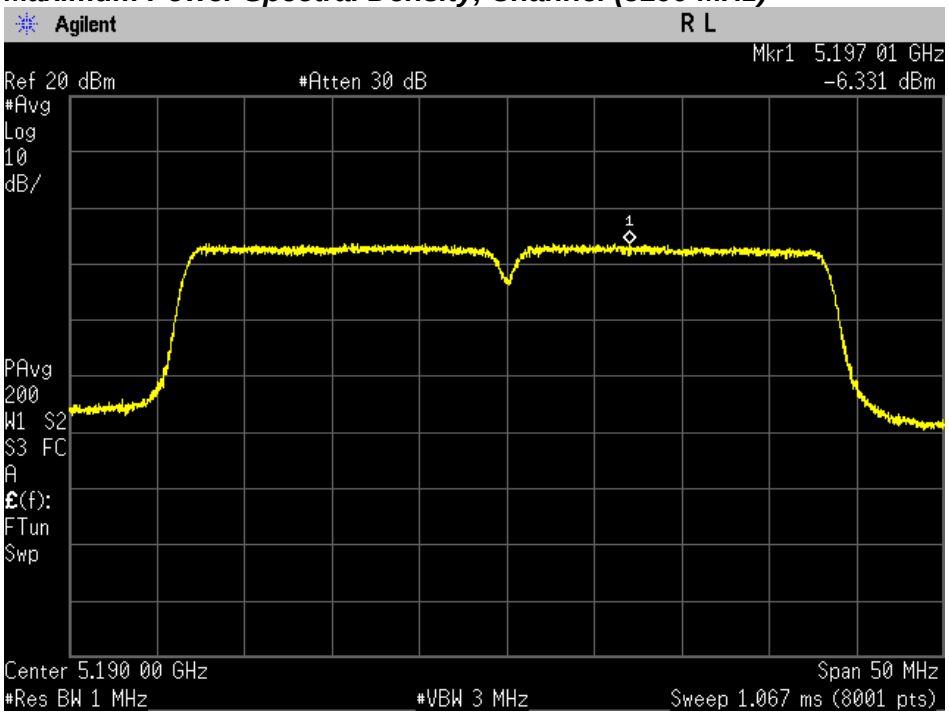


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - SISO

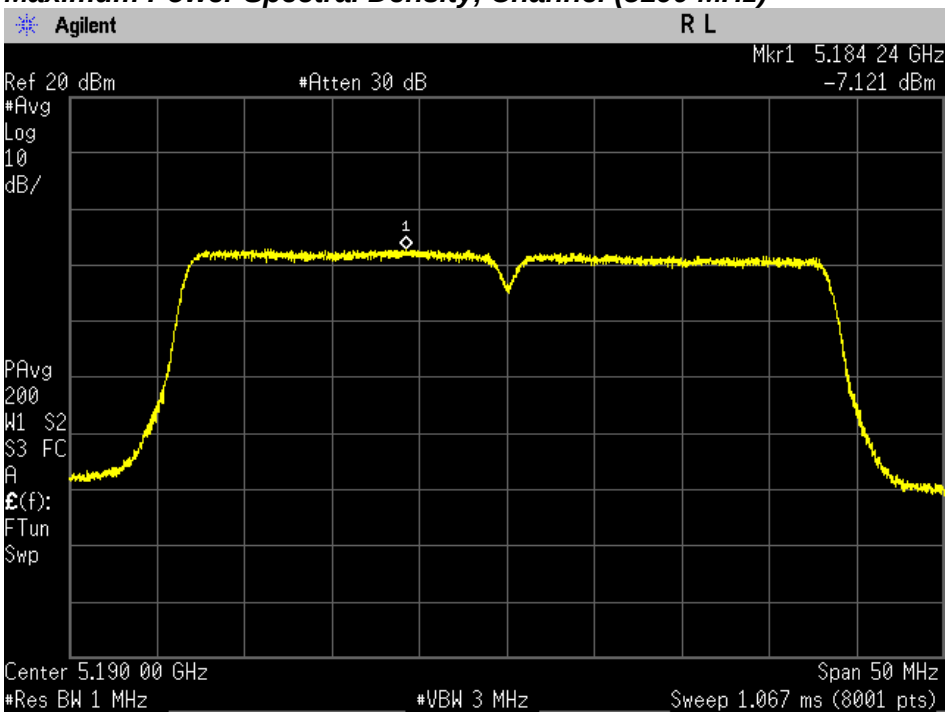
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)

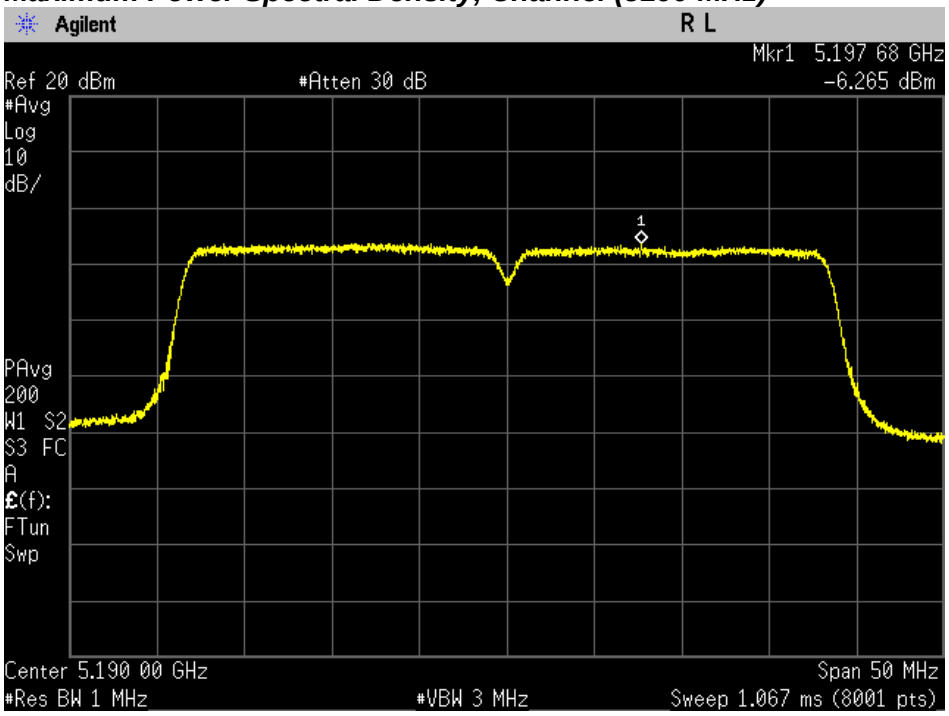


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - CDD

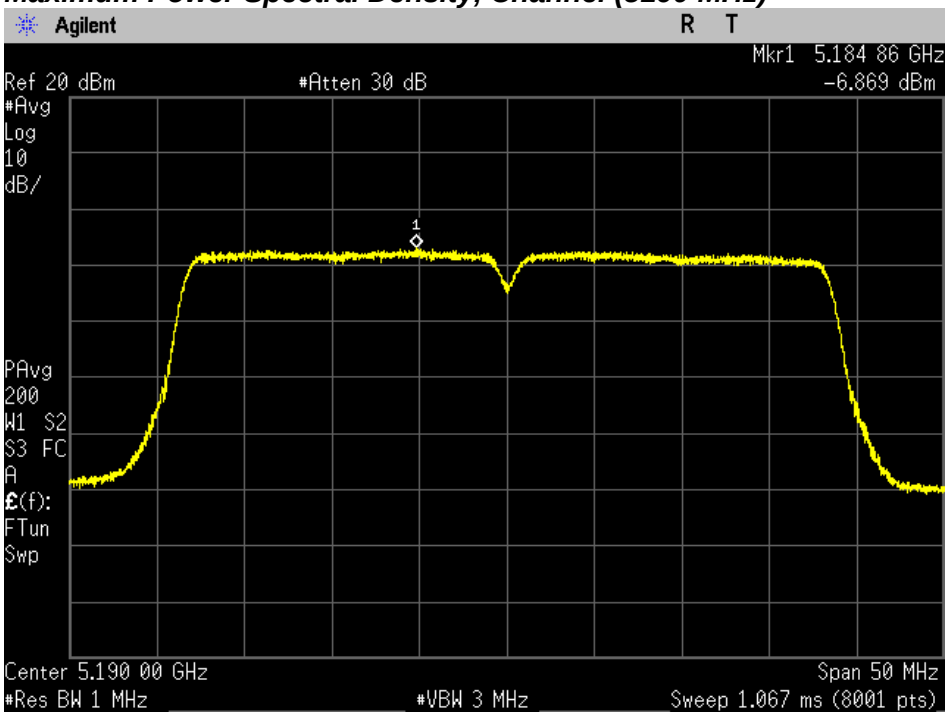
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)

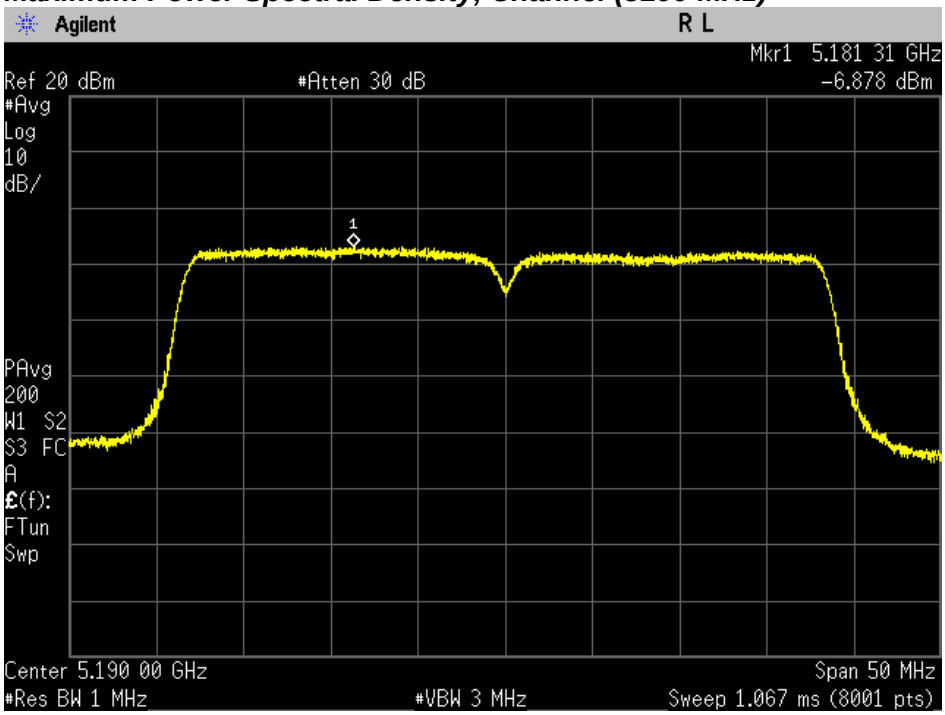


PLOTS OF EMISSIONS

802.11n (40 MHz) mode - MIMO

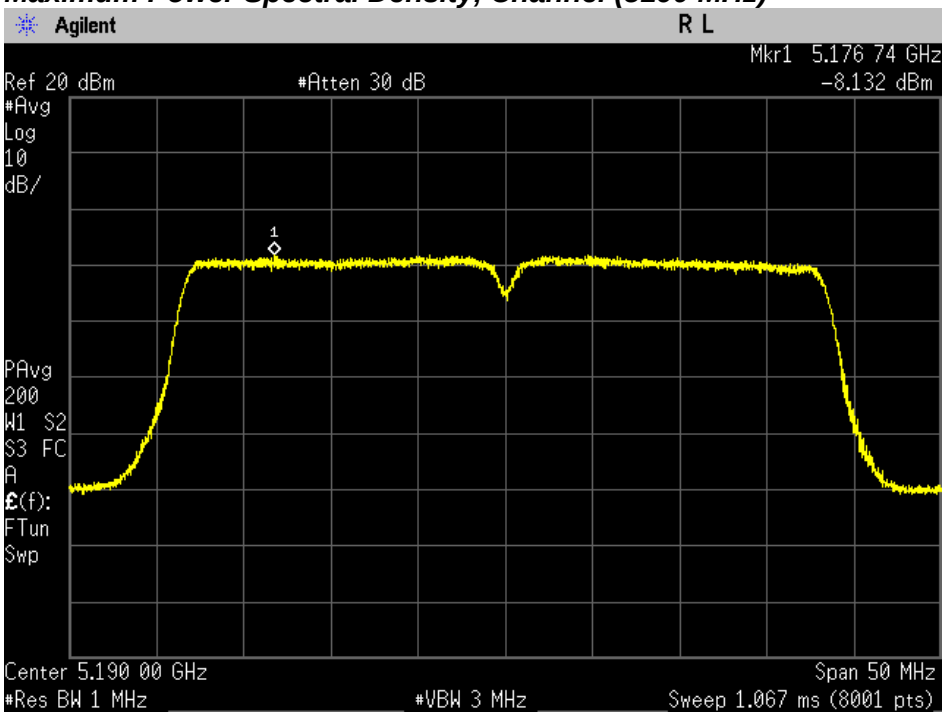
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)

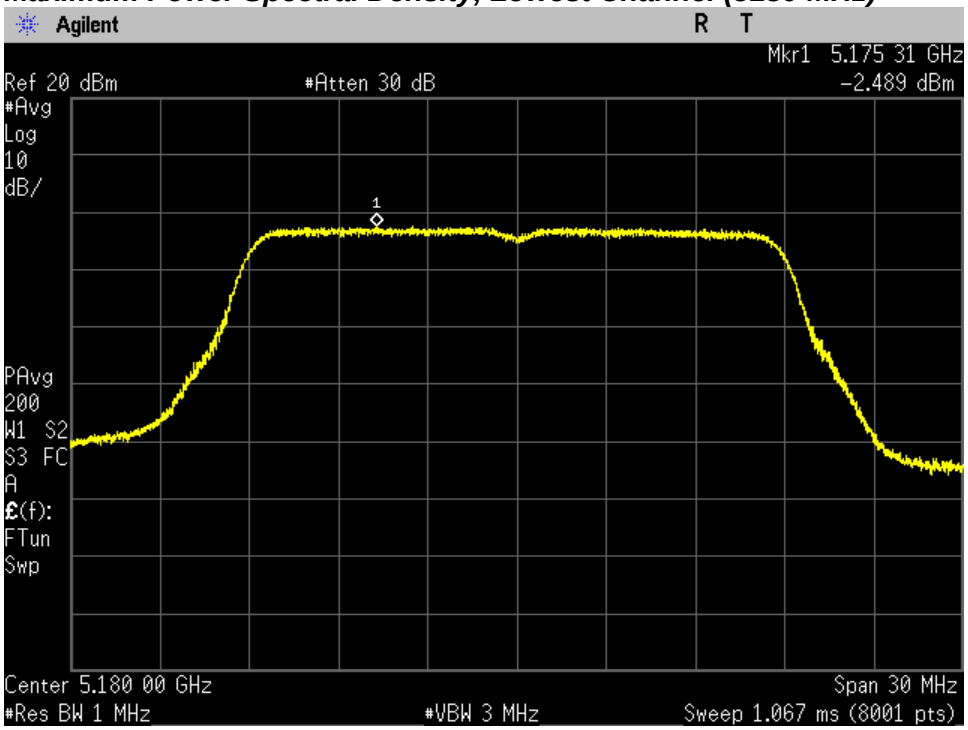


PLOTS OF EMISSIONS

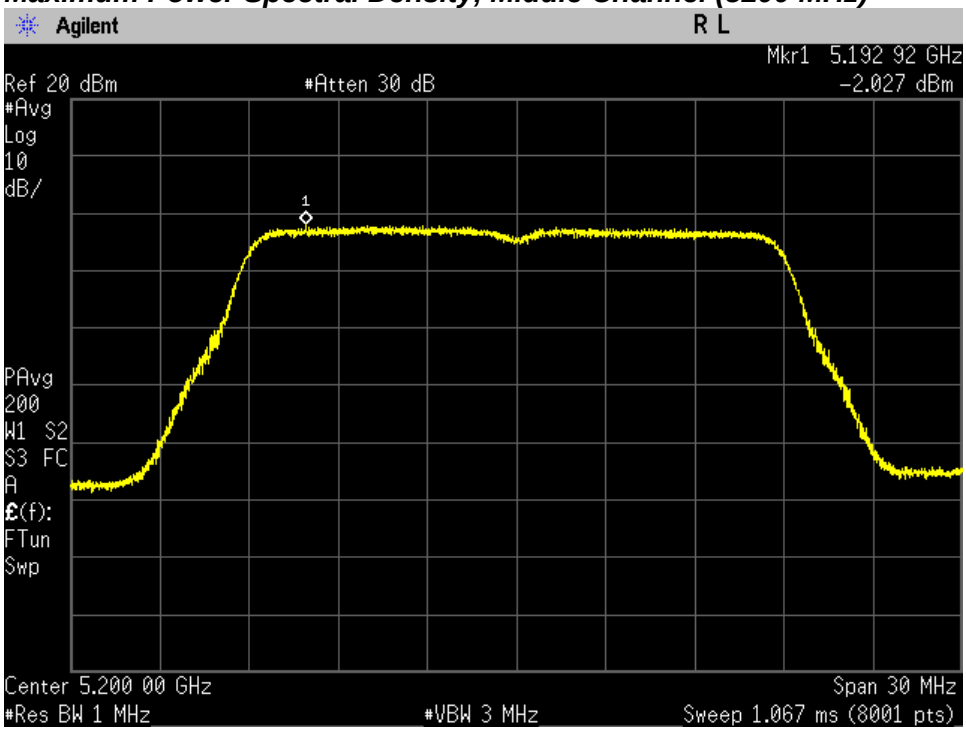
802.11ac (20 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

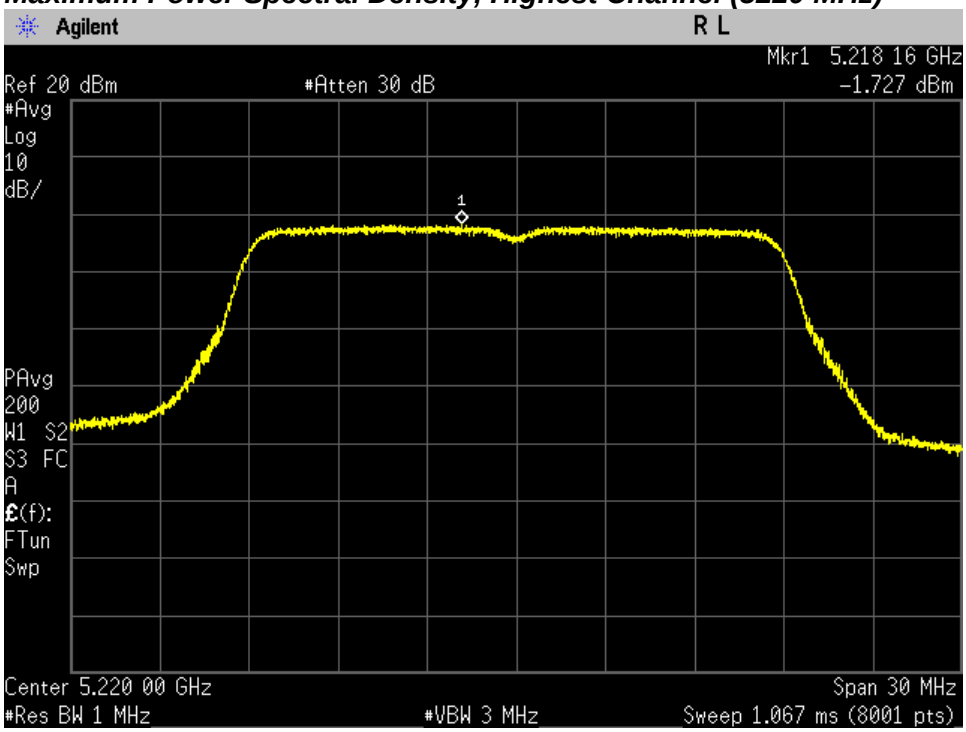


Maximum Power Spectral Density, Middle Channel (5200 MHz)



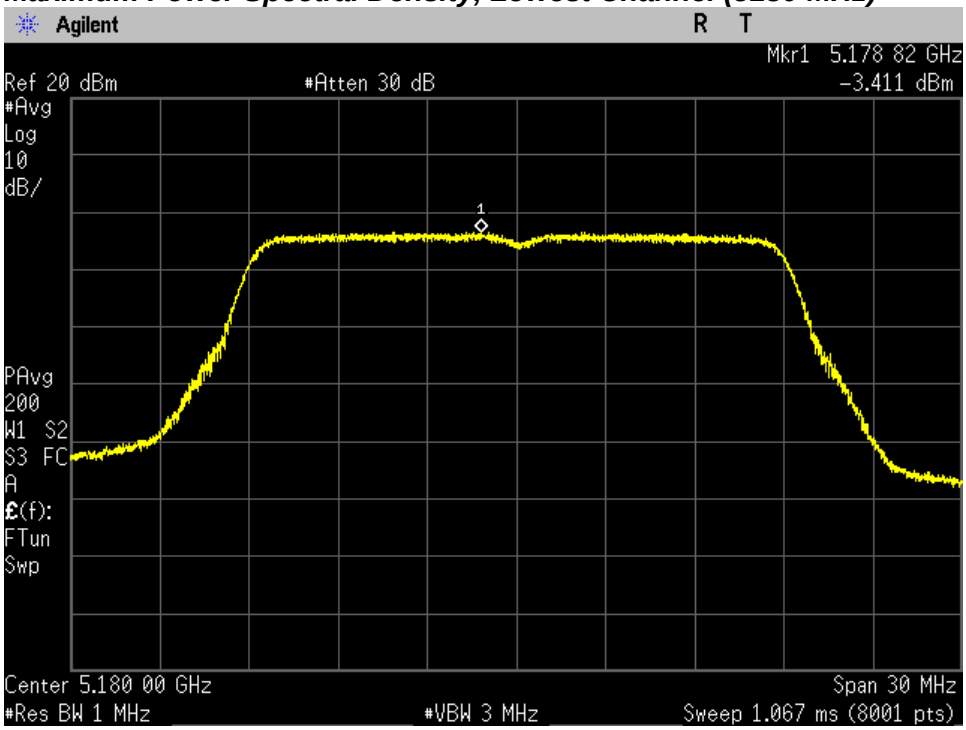
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



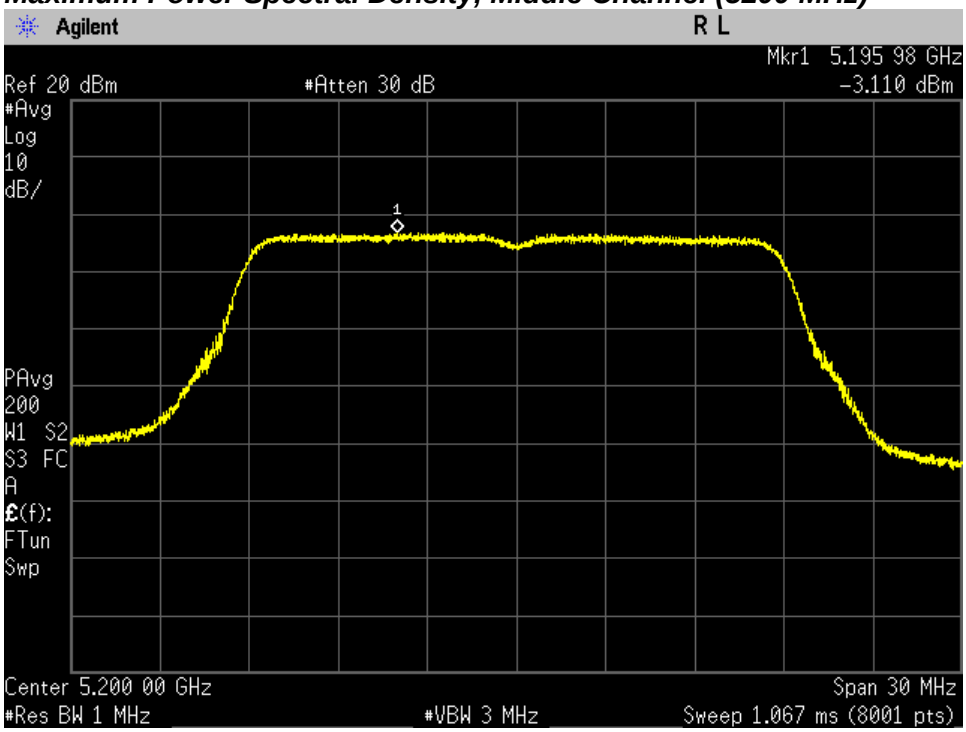
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

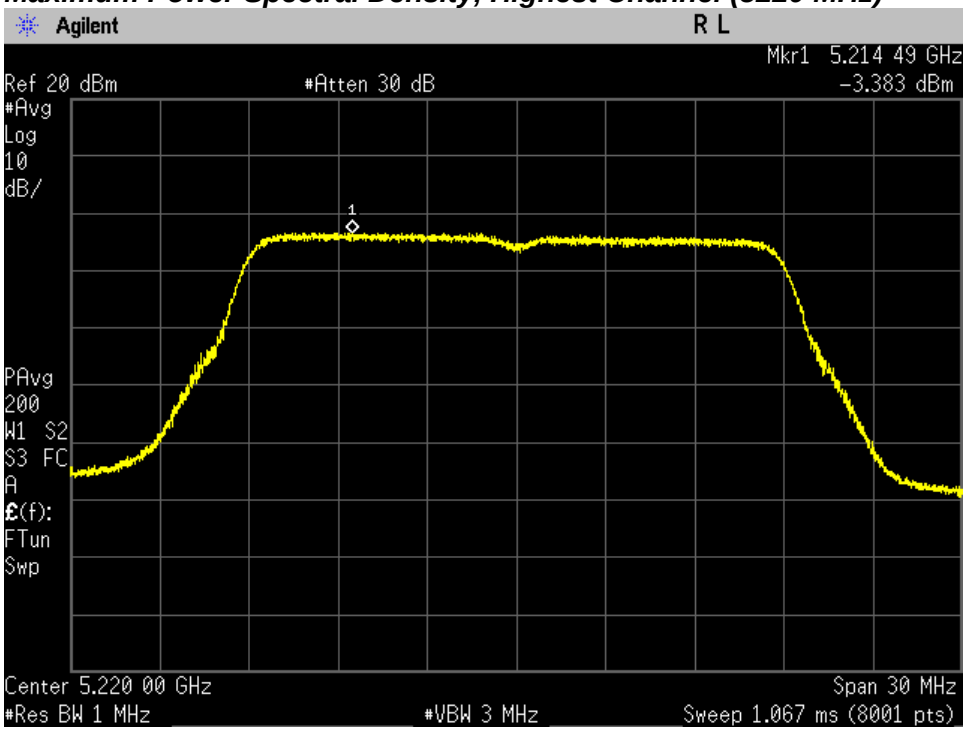


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

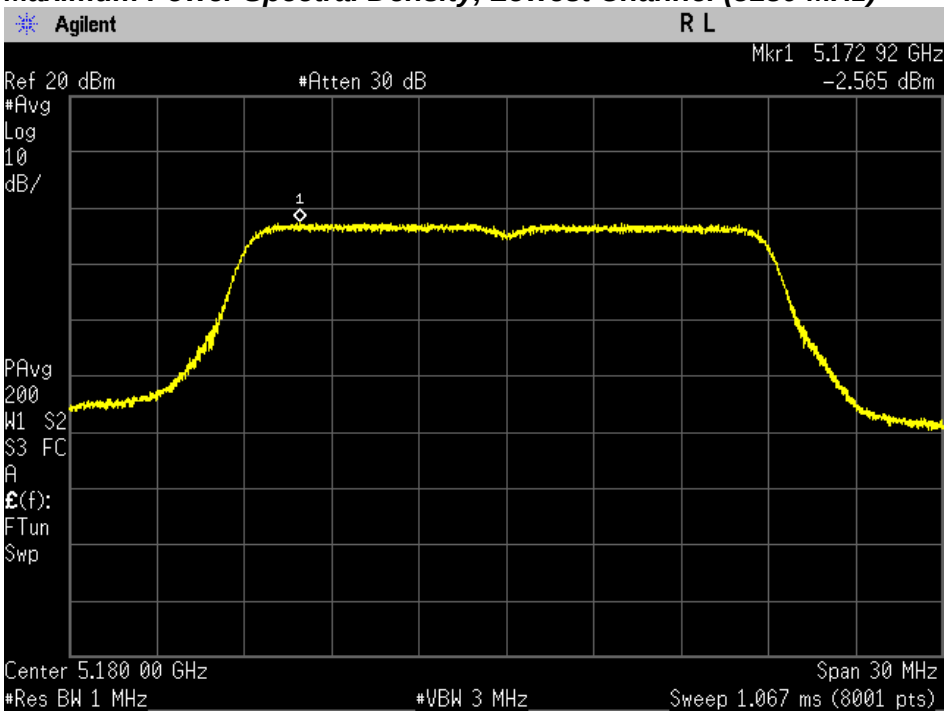


PLOTS OF EMISSIONS

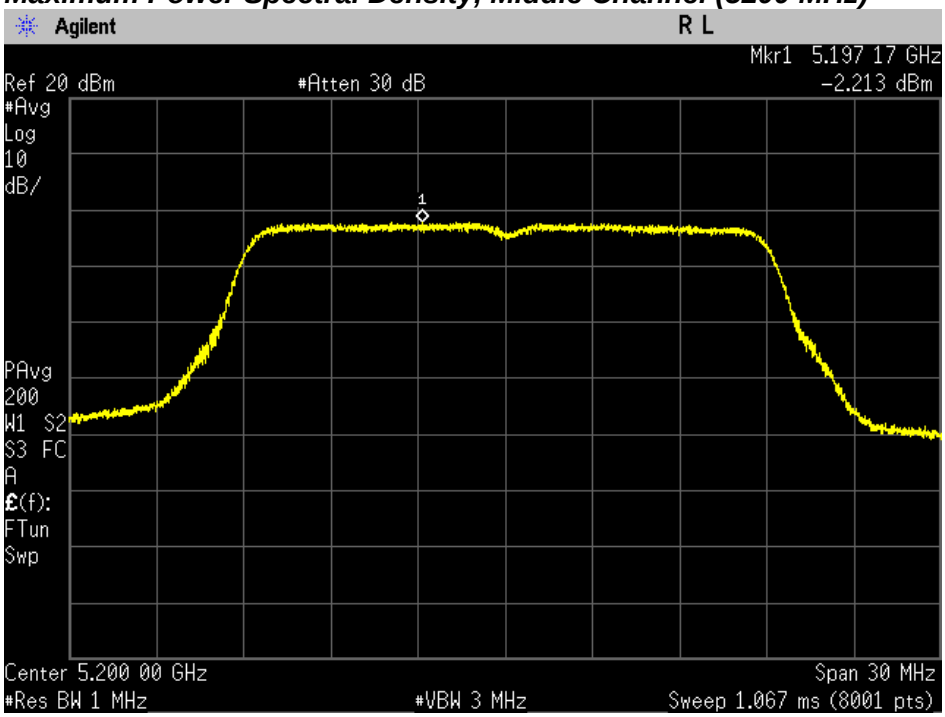
802.11ac (20 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

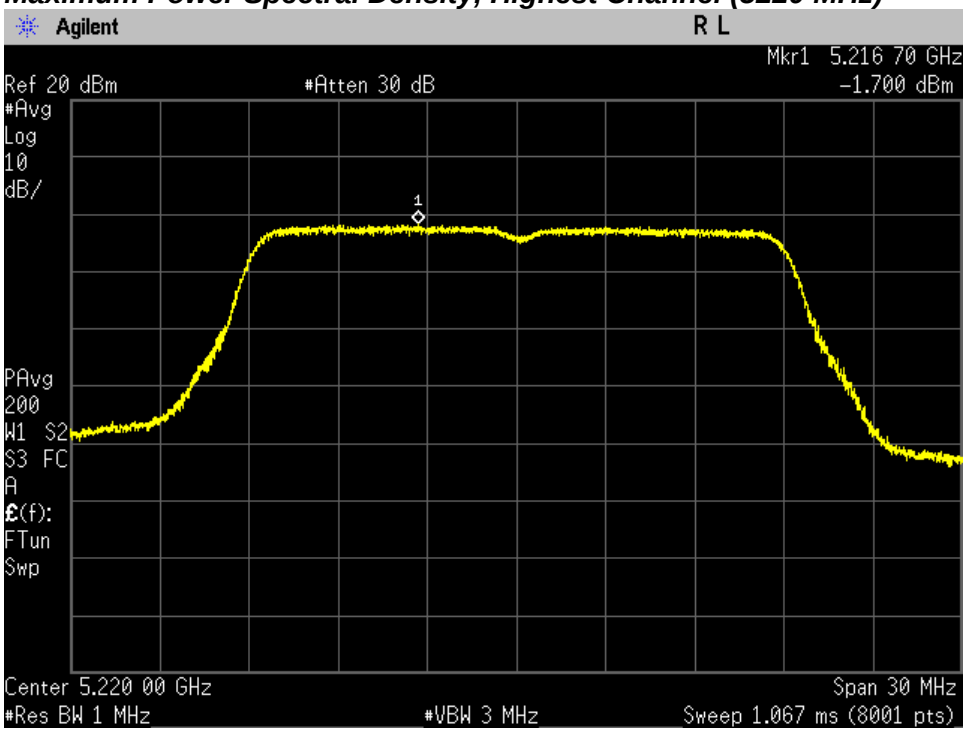


Maximum Power Spectral Density, Middle Channel (5200 MHz)



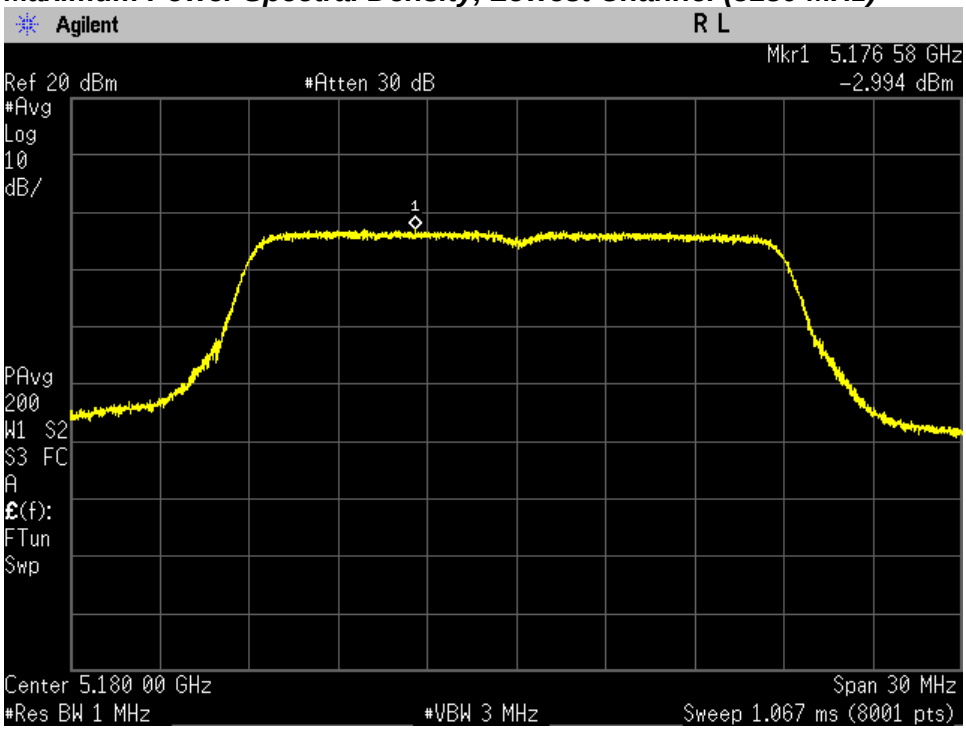
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



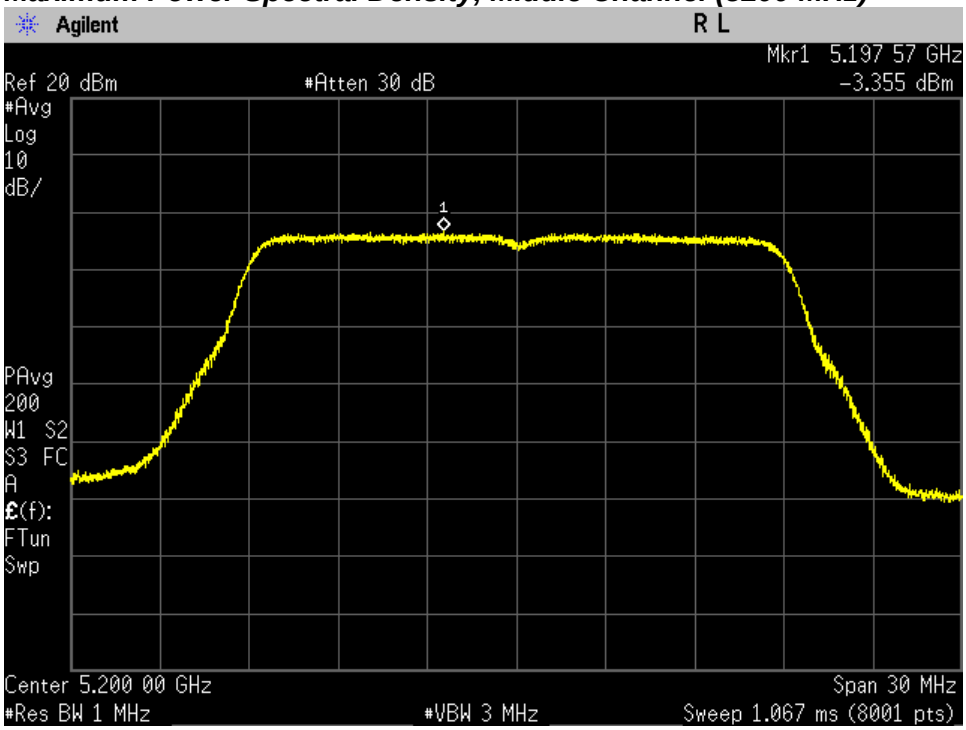
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

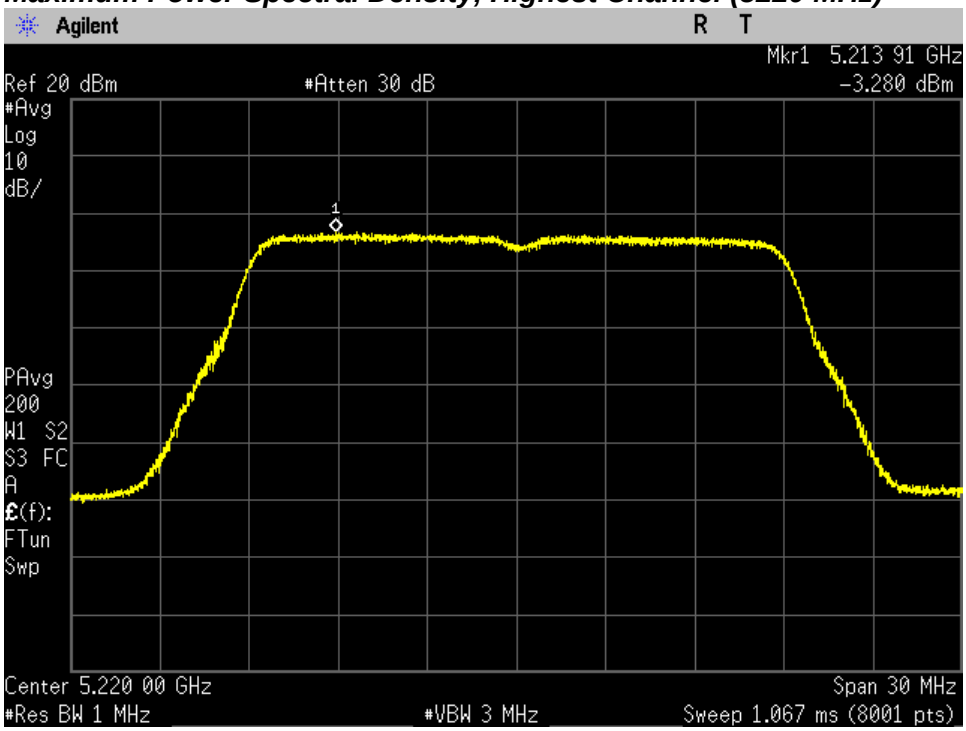


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

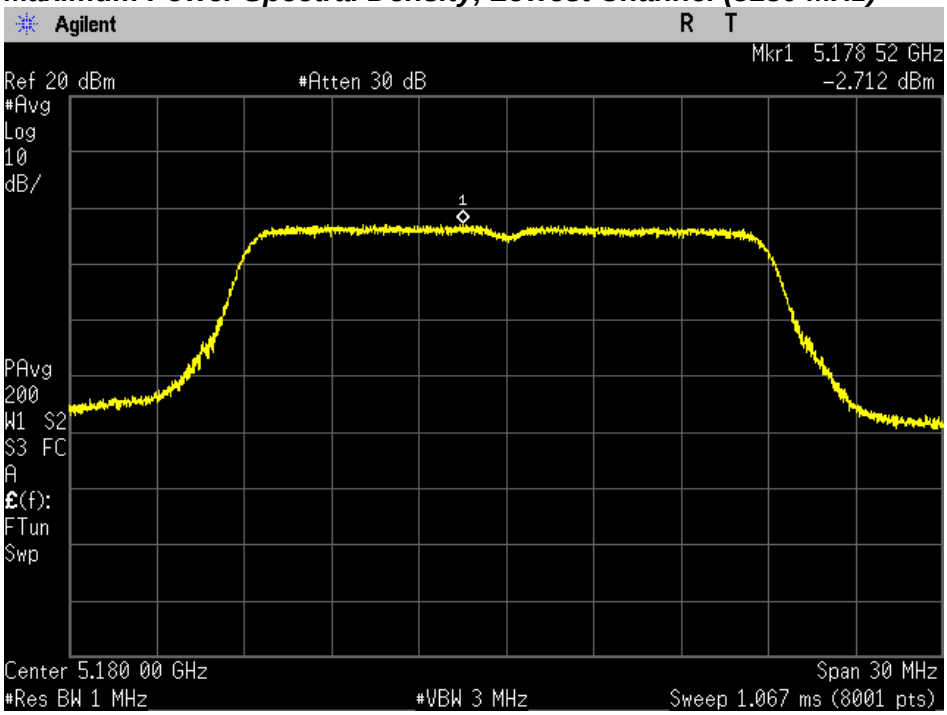


PLOTS OF EMISSIONS

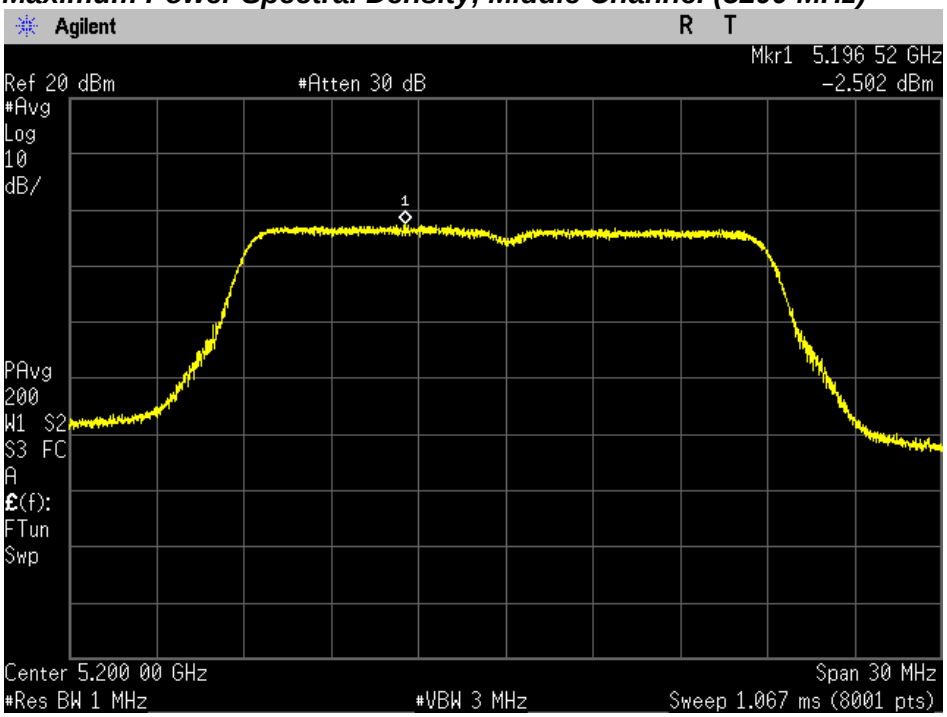
802.11ac (20 MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

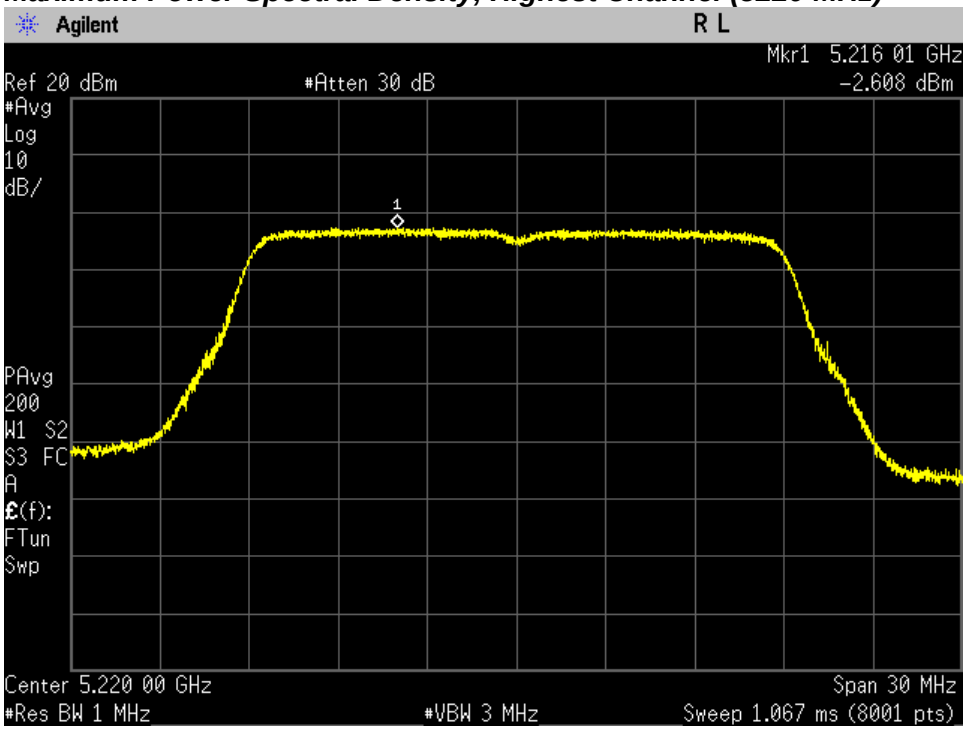


Maximum Power Spectral Density, Middle Channel (5200 MHz)



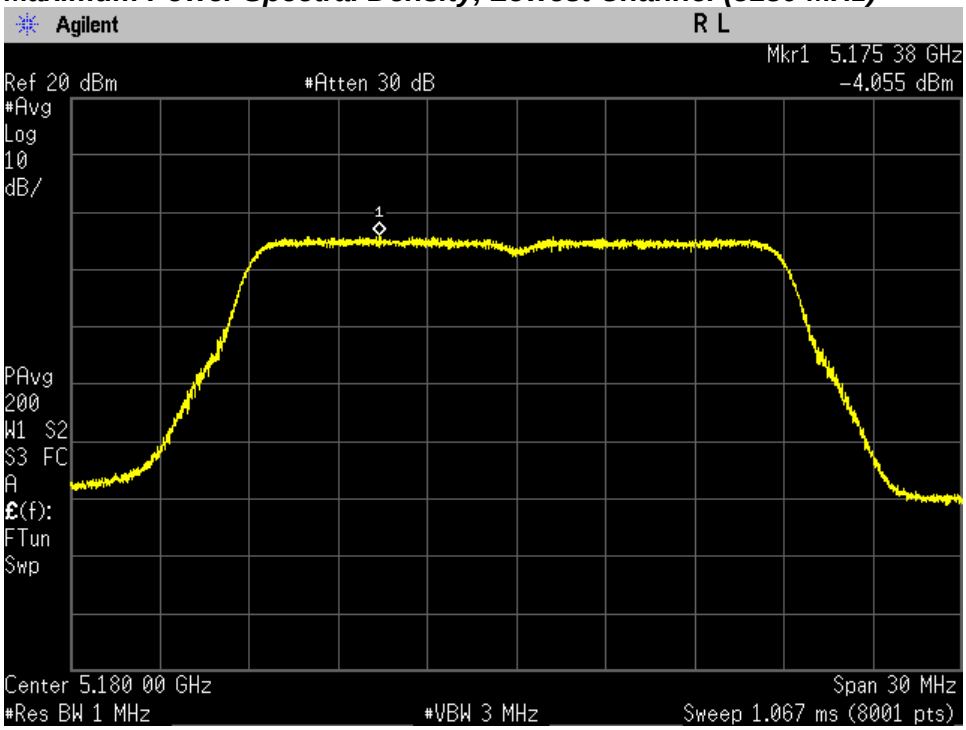
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5220 MHz)



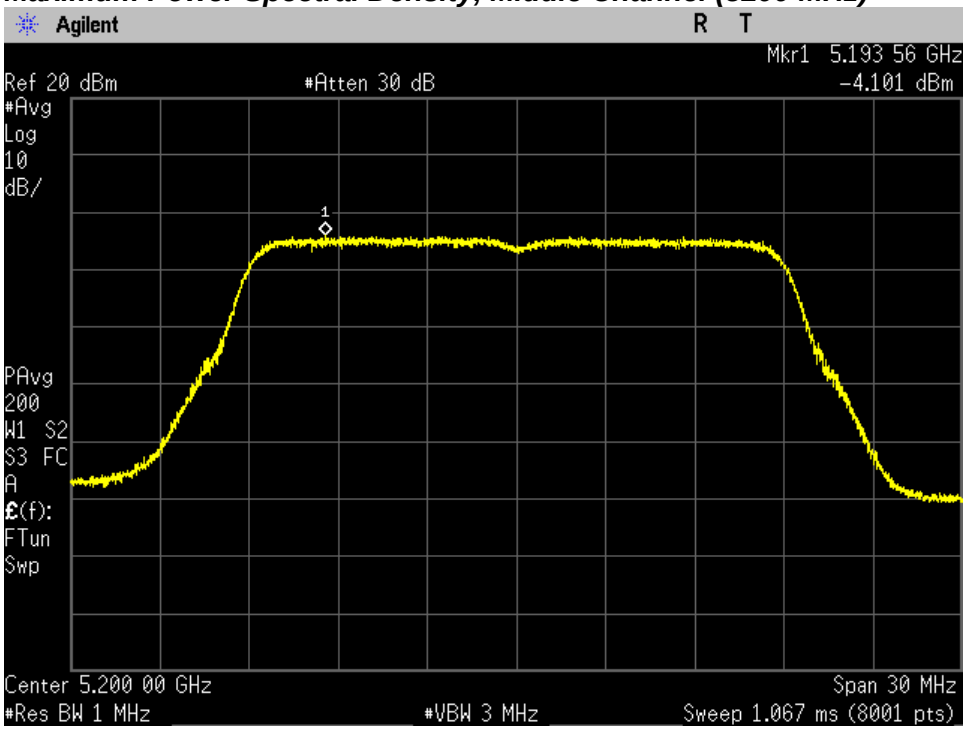
Chain 1

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

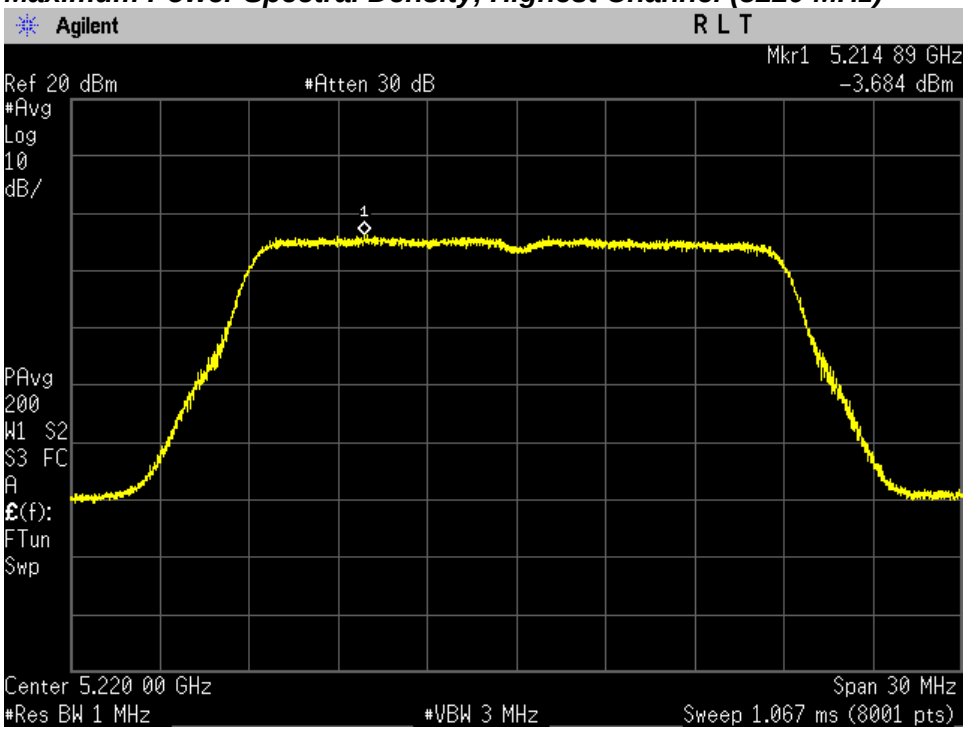


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5200 MHz)



Maximum Power Spectral Density, Highest Channel (5220 MHz)

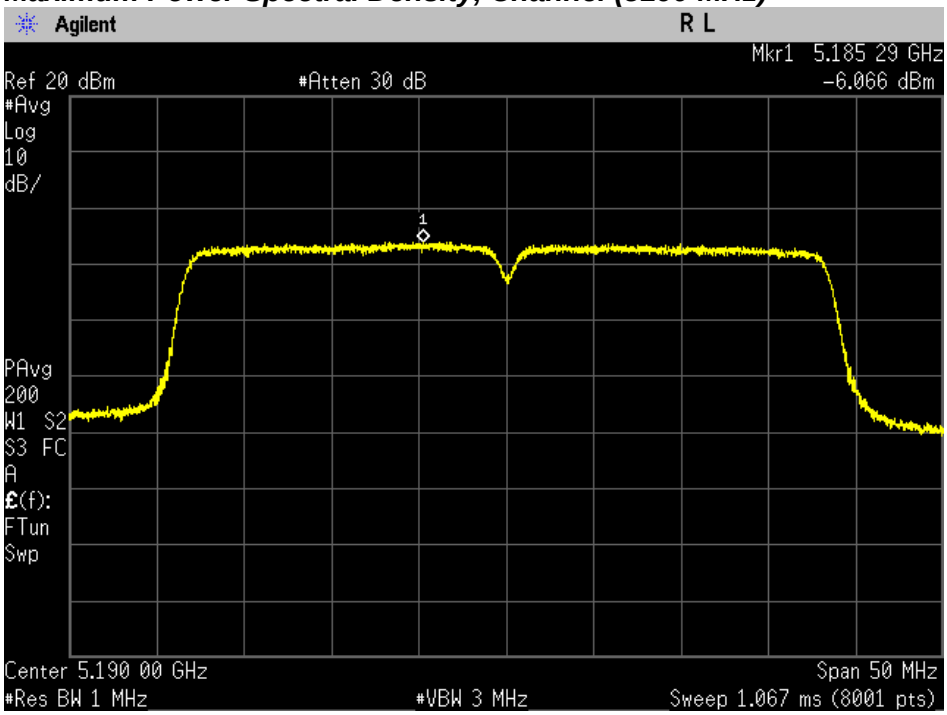


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - SISO

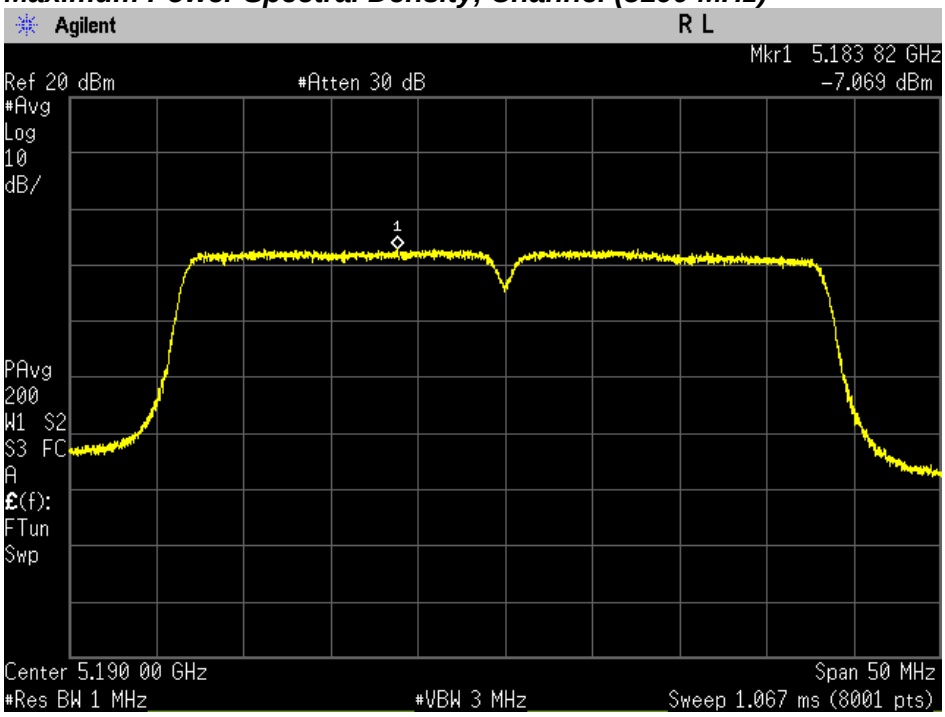
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)

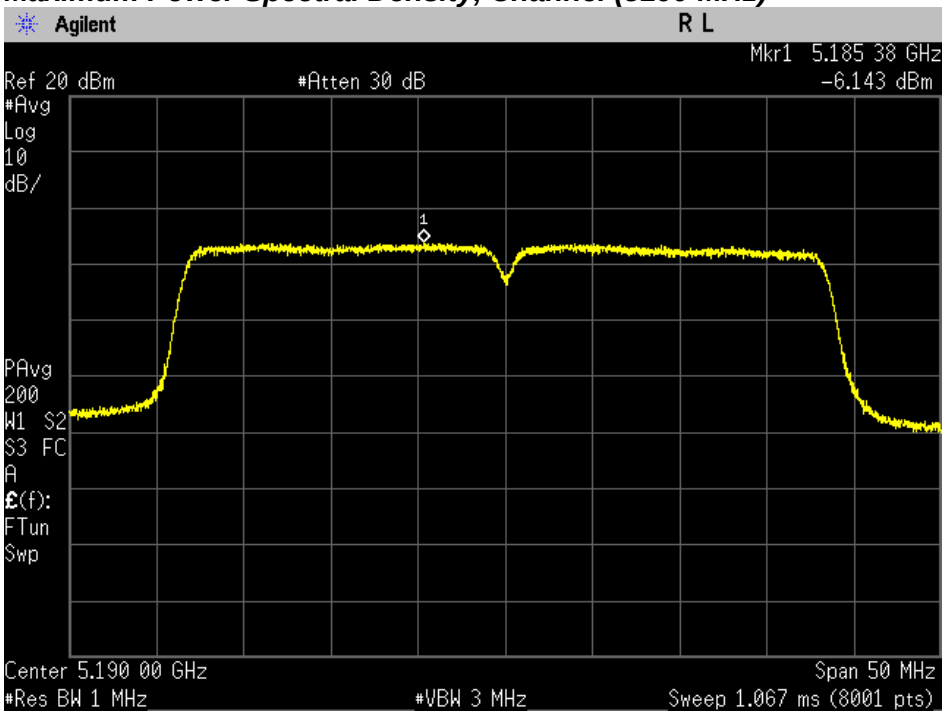


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - CDD

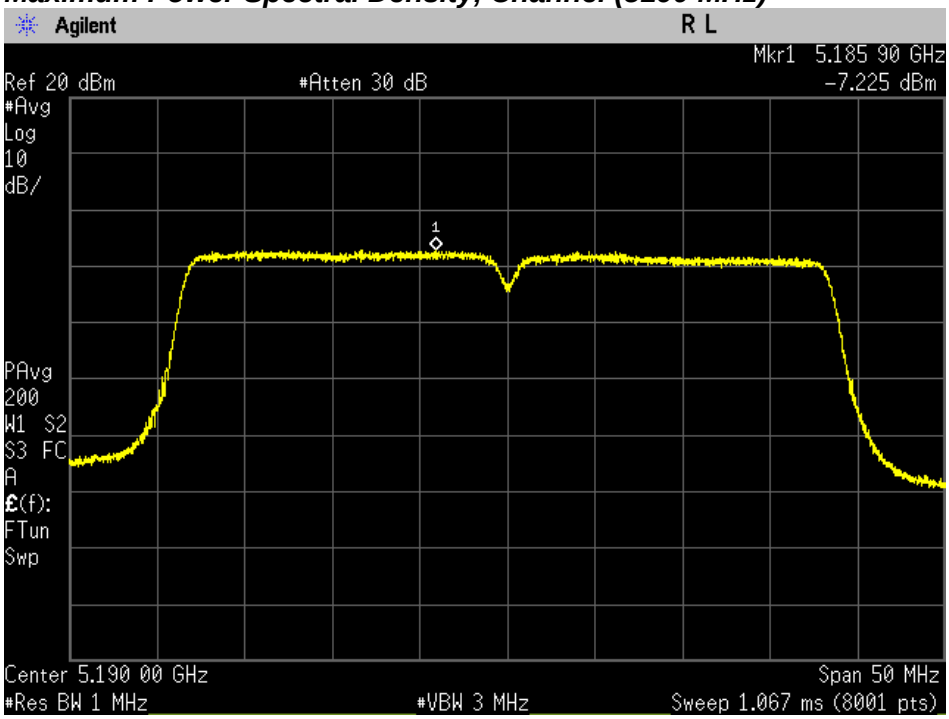
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)

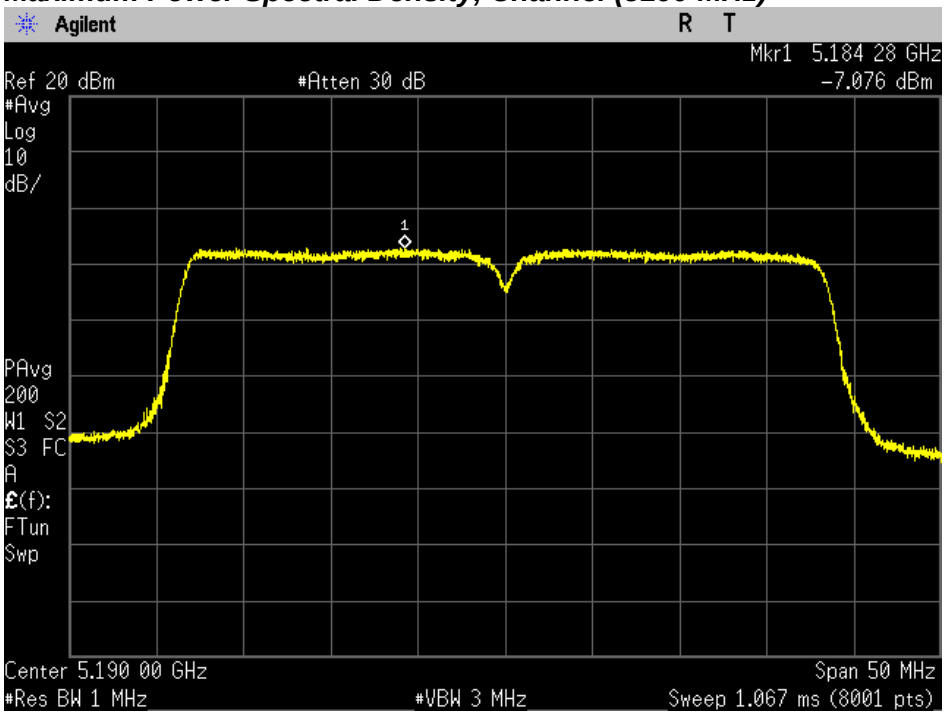


PLOTS OF EMISSIONS

802.11ac (40 MHz) mode - MIMO

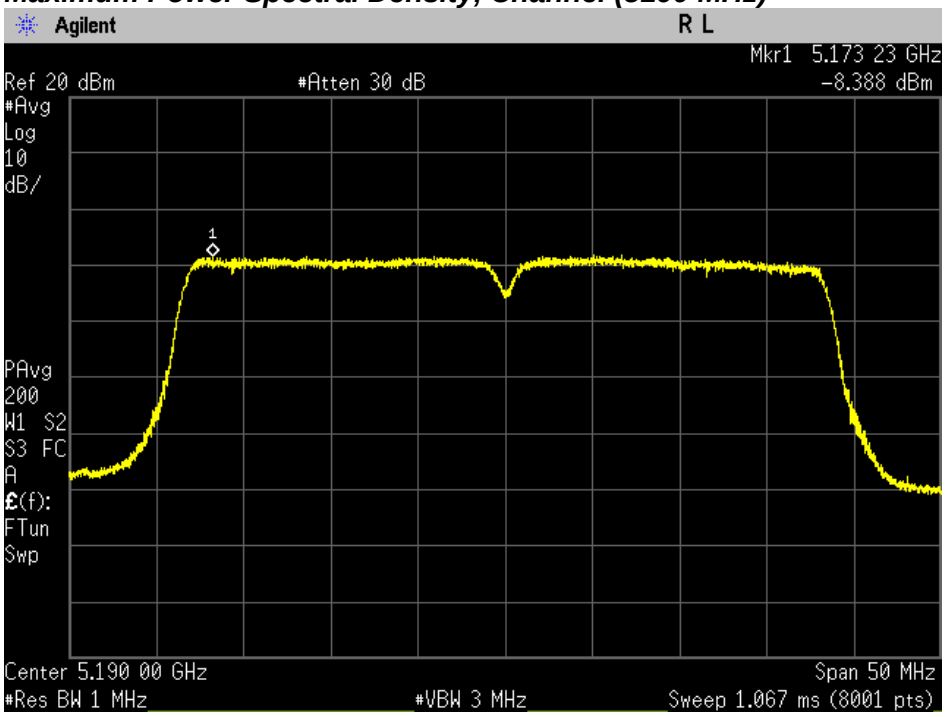
Chain 0

Maximum Power Spectral Density, Channel (5190 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5190 MHz)



8.6.2 Maximum Power Spectral Density – UNII-3 band

FCC §15.407(a), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
Lowest	5745	-7.20	-9.89	-6.37	-9.06	30.00	30.00
Middle	5785	-7.75	-10.91	-6.92	-10.08	30.00	30.00
Highest	5825	-7.31	-10.98	-6.48	-10.15	30.00	30.00

802.11n (20MHz) mode-SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
Lowest	5745	-7.42	-10.65	-6.54	-9.77	30.00	30.00
Middle	5785	-8.40	-11.60	-7.52	-10.72	30.00	30.00
Highest	5825	-8.43	-11.46	-7.55	-10.58	30.00	30.00

802.11n (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/ 500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5745	-7.72	-10.92	0.88	-5.14	30.00	30.00
Middle	5785	-8.18	-11.80	0.88	-5.73	30.00	30.00
Highest	5825	-8.43	-12.10	0.88	-6.00	30.00	30.00

802.11n (20 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5745	-8.02	-11.15	1.58	-4.72	30.00	30.00
Middle	5785	-8.80	-12.32	1.56	-5.64	30.00	30.00
Highest	5825	-8.76	-12.27	1.57	-5.59	30.00	30.00

802.11n (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
Lowest	5755	-12.76	-15.69	-11.12	-14.05	30.00	30.00
Highest	5795	-13.23	-16.24	-11.59	-14.60	30.00	30.00

802.11n (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5755	-12.88	-15.75	1.64	-9.43	30.00	30.00
Highest	5795	-13.40	-16.43	1.64	-10.01	30.00	30.00

802.11n (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5755	-13.79	-16.47	2.68	-9.24	30.00	30.00
Highest	5795	-14.07	-17.27	2.67	-9.70	30.00	30.00

802.11ac (20MHz) mode-SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
Lowest	5745	-7.41	-10.91	-6.53	-10.03	30.00	30.00
Middle	5785	-8.32	-11.49	-7.44	-10.61	30.00	30.00
Highest	5825	-8.17	-11.52	-7.29	-10.64	30.00	30.00

802.11ac (20 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/ 500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5745	-7.86	-10.74	0.88	-5.18	30.00	30.00
Middle	5785	-8.18	-11.91	0.88	-5.77	30.00	30.00
Highest	5825	-8.21	-11.75	0.88	-5.74	30.00	30.00

802.11ac (20 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/ 500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5745	-8.02	-11.08	1.55	-4.73	30.00	30.00
Middle	5785	-8.81	-12.18	1.56	-5.61	30.00	30.00
Highest	5825	-8.95	-12.01	1.58	-5.63	30.00	30.00

802.11ac (40 MHz) mode – SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/ 500kHz)	IC Limit (dBm/500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
Lowest	5755	-12.59	-15.89	-10.98	-14.28	30.00	30.00
Highest	5795	-12.94	-16.31	-11.25	-14.62	30.00	30.00

802.11ac (40 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/ 500kHz)	IC Limit (dBm/ 500kHz)
		Chain 0	Chain 1		Total output power		
Lowest	5755	-12.69	-15.65	1.61	-9.30	30.00	30.00
Highest	5795	-13.40	-16.43	1.69	-9.96	30.00	30.00

802.11ac (40 MHz) mode - MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	IC Limit (dBm/MHz)
		Chain 0	Chain 1		Total output power		
Lowest	5755	-13.31	-16.36	2.75	-8.81	30.00	30.00
Highest	5795	-13.99	-16.72	2.67	-9.46	30.00	30.00

802.11ac (80 MHz) mode - SISO

Channel	Frequency (MHz)	Measured PSD (dBm)		*Maximum PSD (dBm)		FCC Limit (dBm/MHz)	IC Limit (dBm/MHz)
		Chain 0	Chain 1	Chain 0	Chain 1		
	5775	-17.20	-20.31	-14.38	-17.49	30.00	30.00

802.11ac (80 MHz) mode - CDD

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	IC Limit (dBm/MHz)
		Chain 0	Chain 1		Total output power		
	5775	-17.63	-20.80	2.82	-13.10	30.00	30.00

802.11ac (80 MHz) mode – MIMO

Channel	Frequency (MHz)	Measured PSD (dBm)		Duty Factor (dB)	*Maximum PSD (dBm)	FCC Limit (dBm/MHz)	IC Limit (dBm/MHz)
		Chain 0	Chain 1		Total output power		
	5775	-18.20	-21.32	4.08	-12.40	30.00	30.00

Note:

1. Maximum Conducted (average) Power = Measured conducted power + Duty Factor

2. Total output power = 10 log [10^{(Chain 0 Power + duty factor)/10} + 10^{(Chain 1 Power + duty factor)/10}]

*3. For CDD transmission, directional gain is **5.71 dBi***

*For MIMO transmission, directional gain is **2.7 dBi.***

Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.

For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,

***Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/1) dB = 5.71 dBi**.*

For CDD mode of this device, N_{SS}=1.

For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,

***Directional gain = G_{ANT} + 10 log(N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi. = 2.7 dBi + 10 log(2/2) dB = 2.7 dBi**.*

For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and N_{SS}=2.

4. For FCC and IC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5. The following equation was used for spectrum offset:

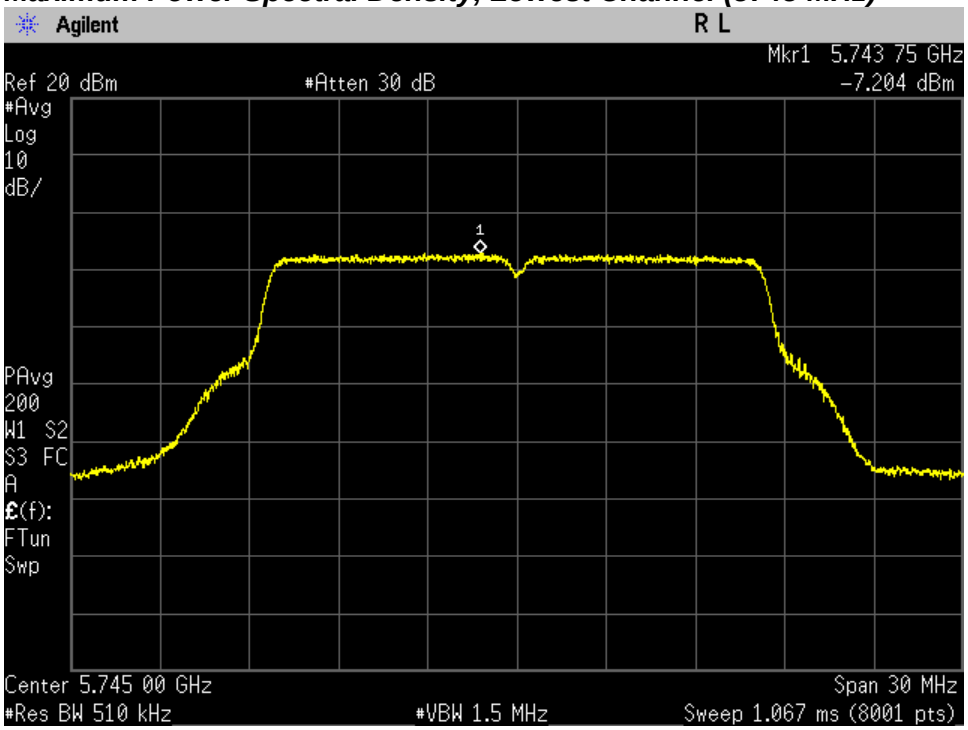
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

PLOTS OF EMISSIONS

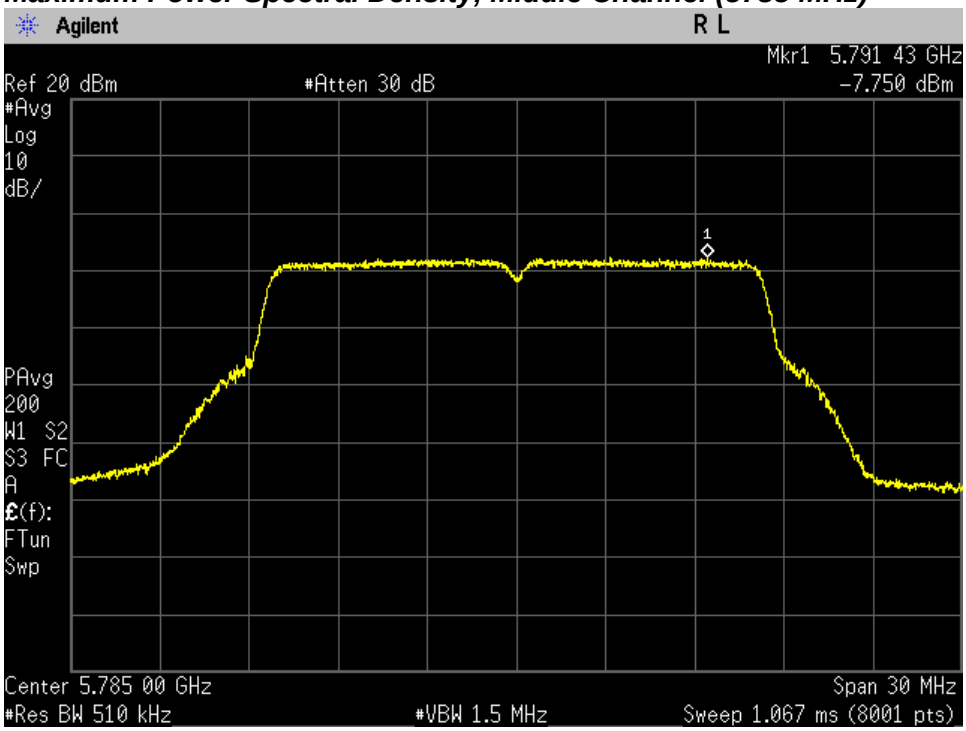
802.11a mode

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

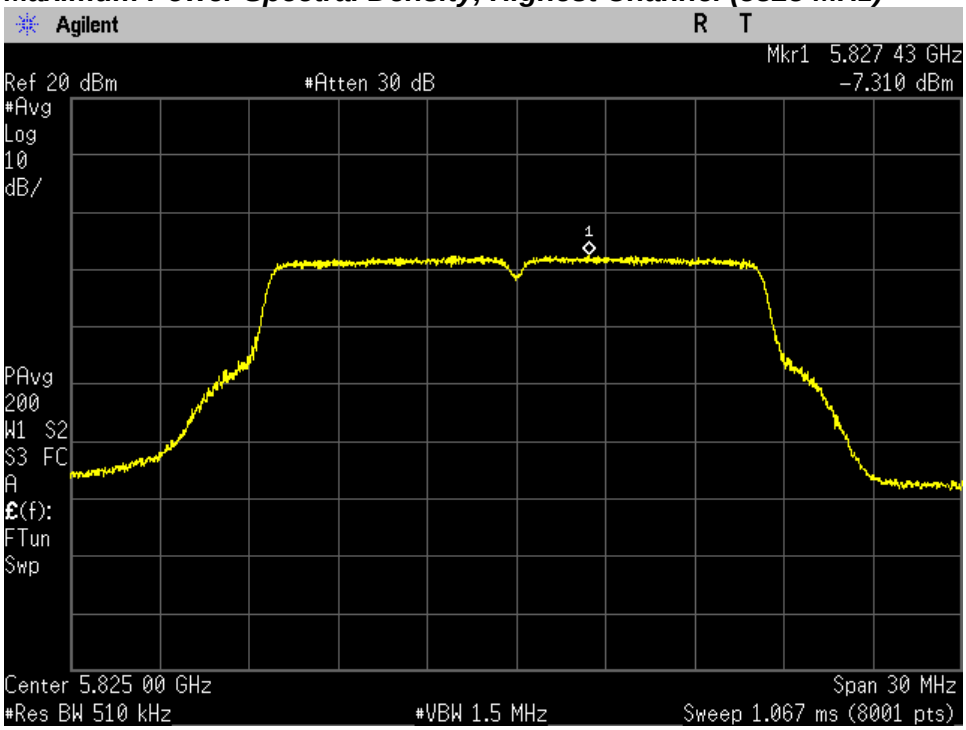


Maximum Power Spectral Density, Middle Channel (5785 MHz)



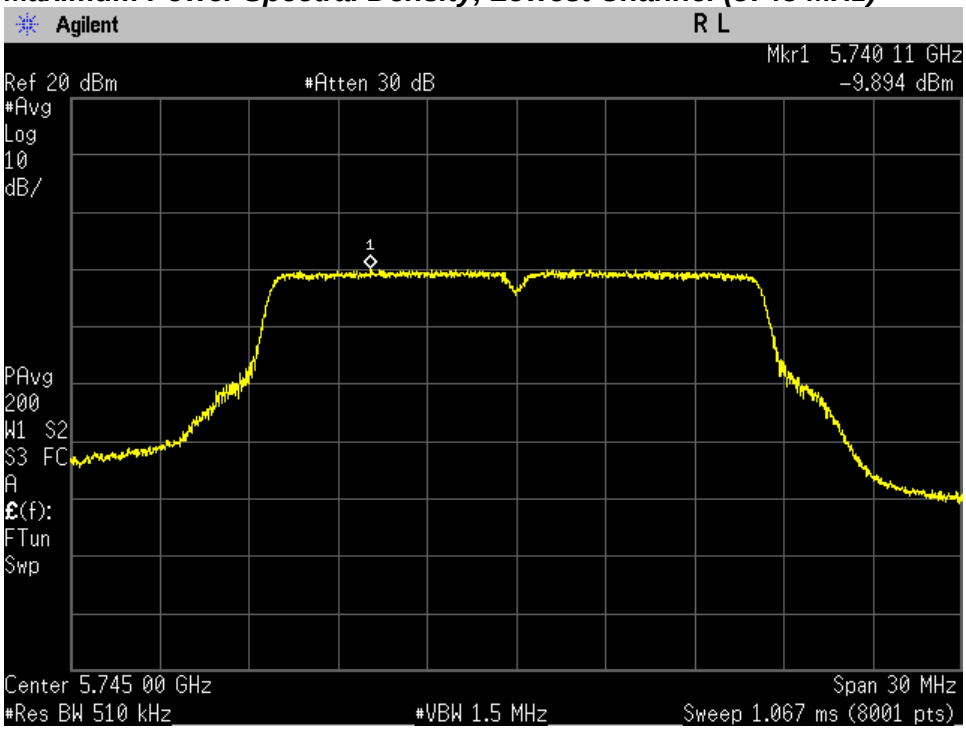
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



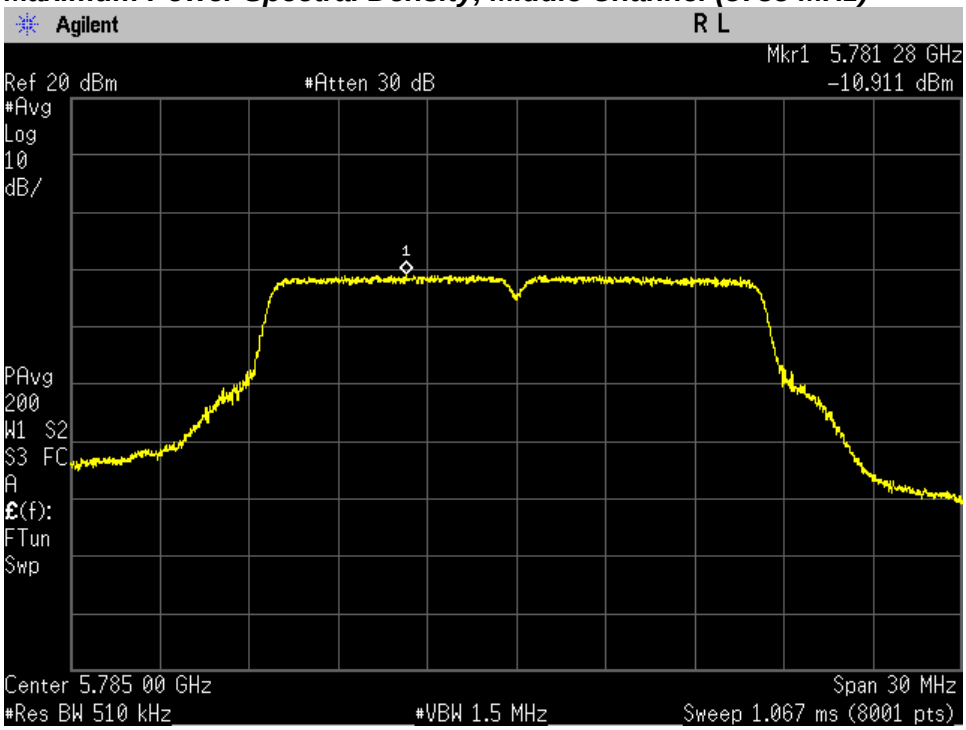
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

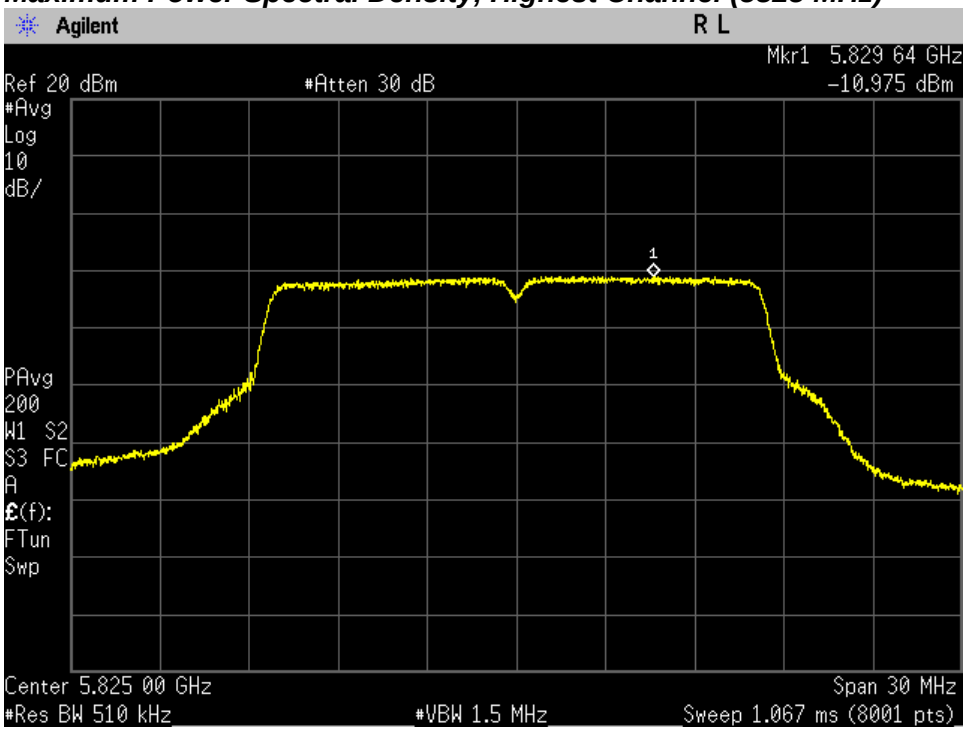


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

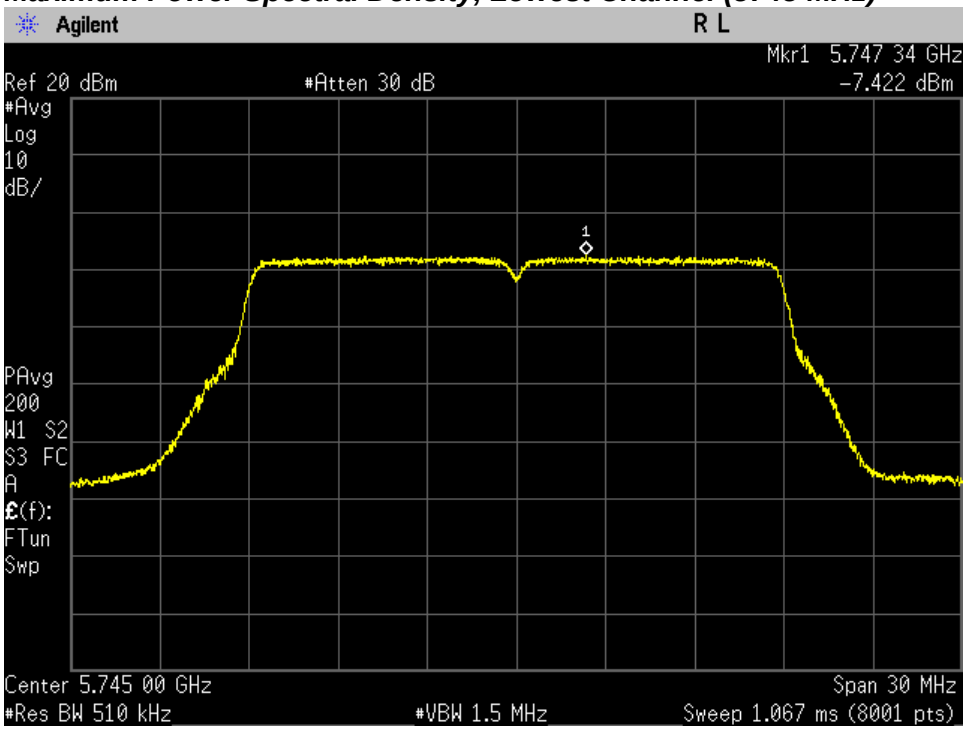


PLOTS OF EMISSIONS

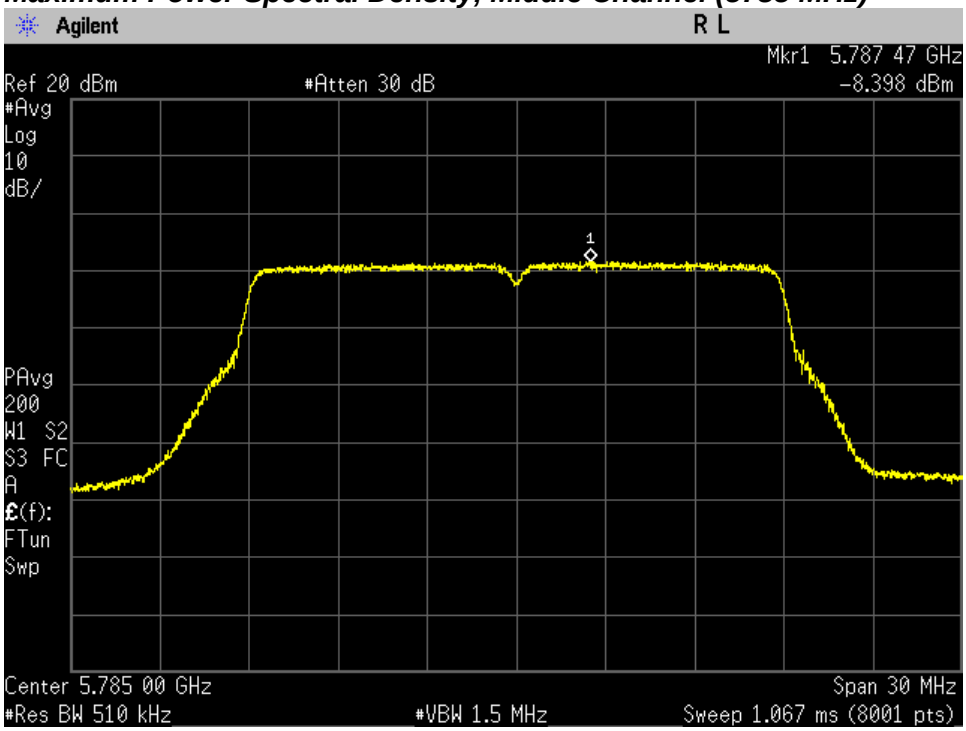
802.11n (20 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

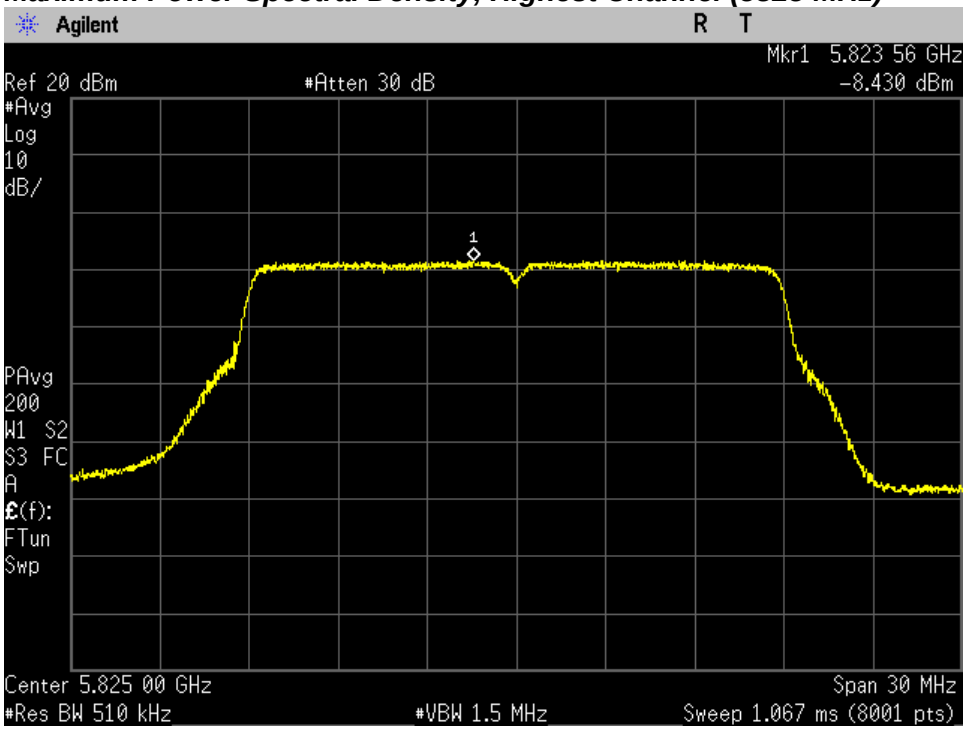


Maximum Power Spectral Density, Middle Channel (5785 MHz)



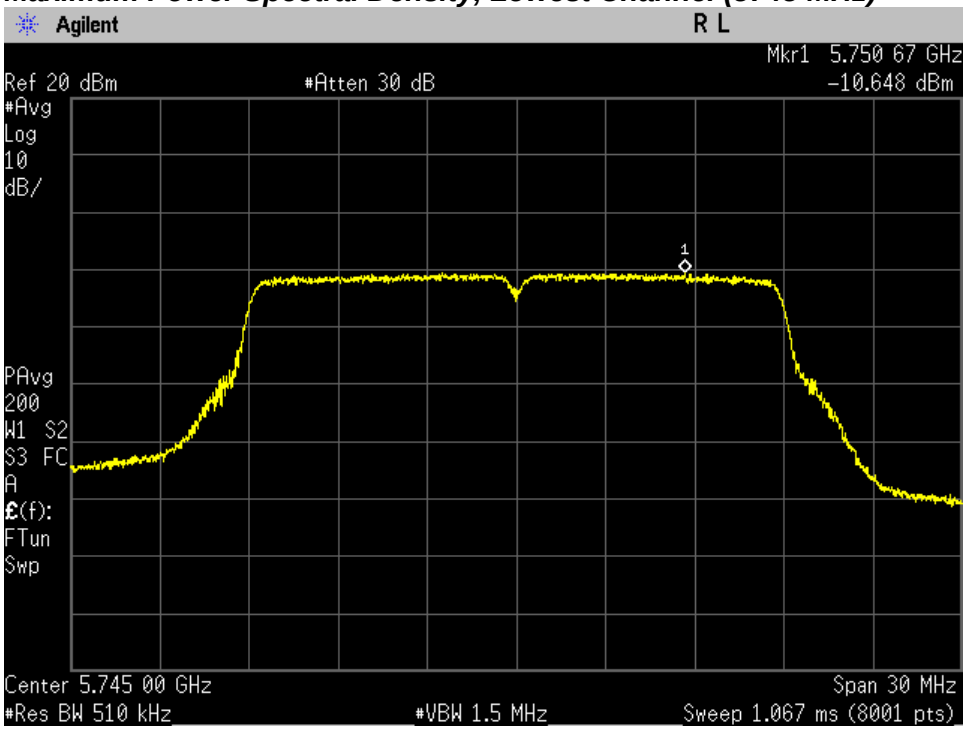
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



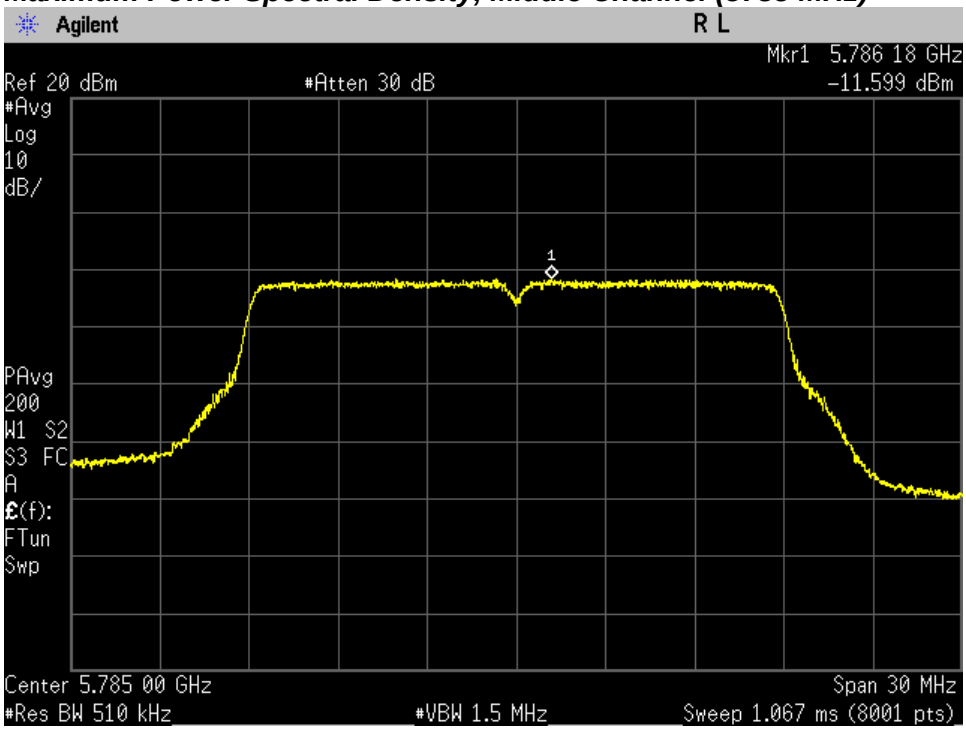
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

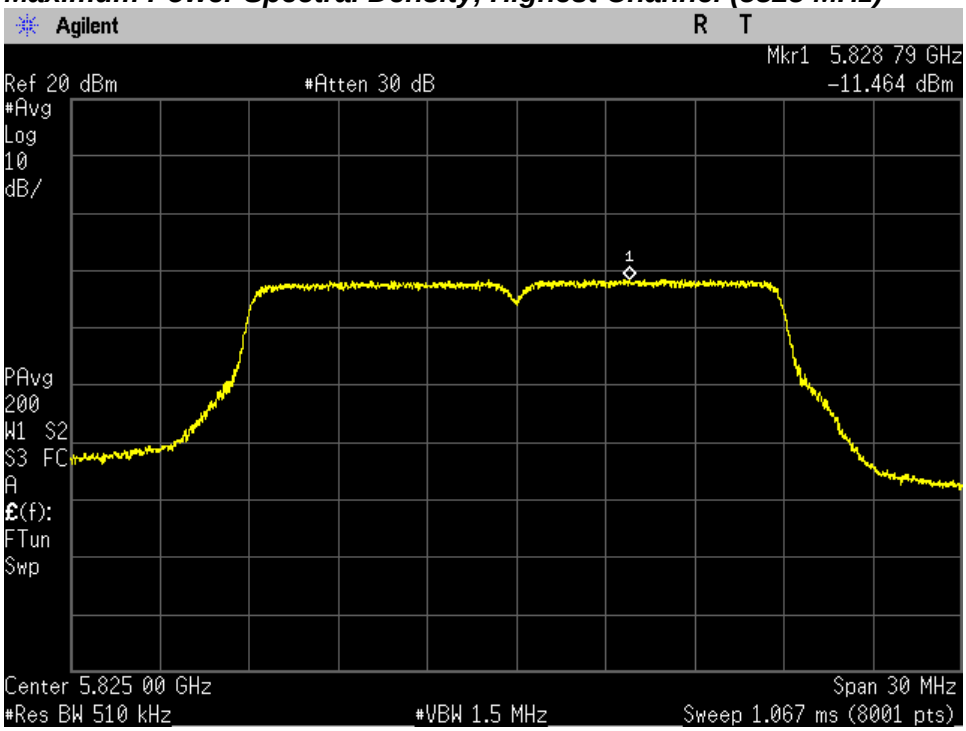


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

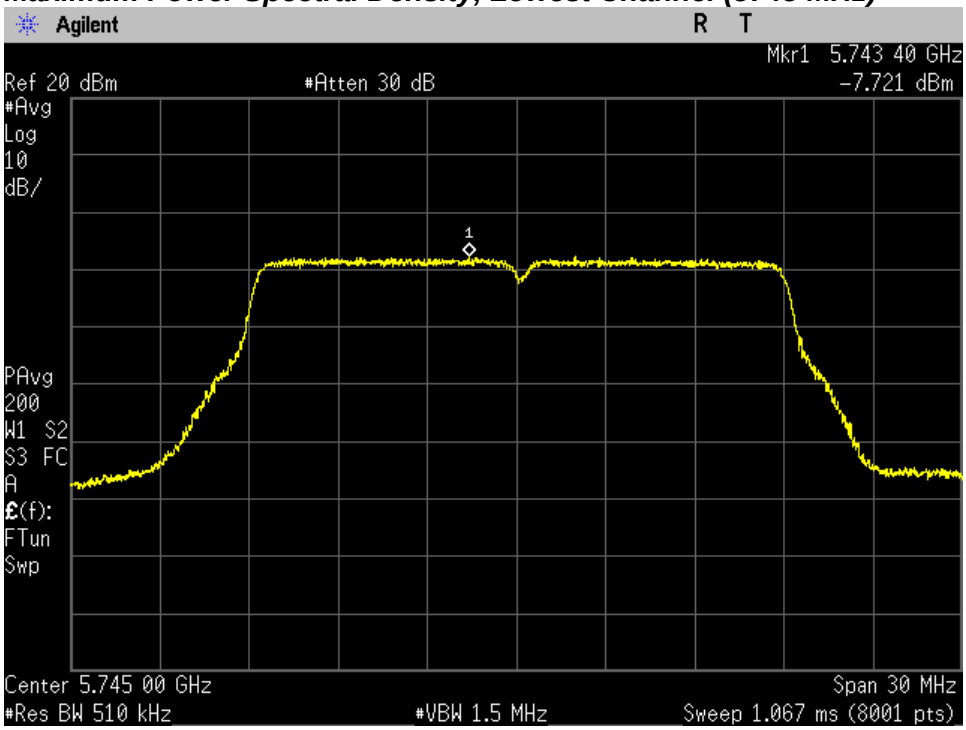


PLOTS OF EMISSIONS

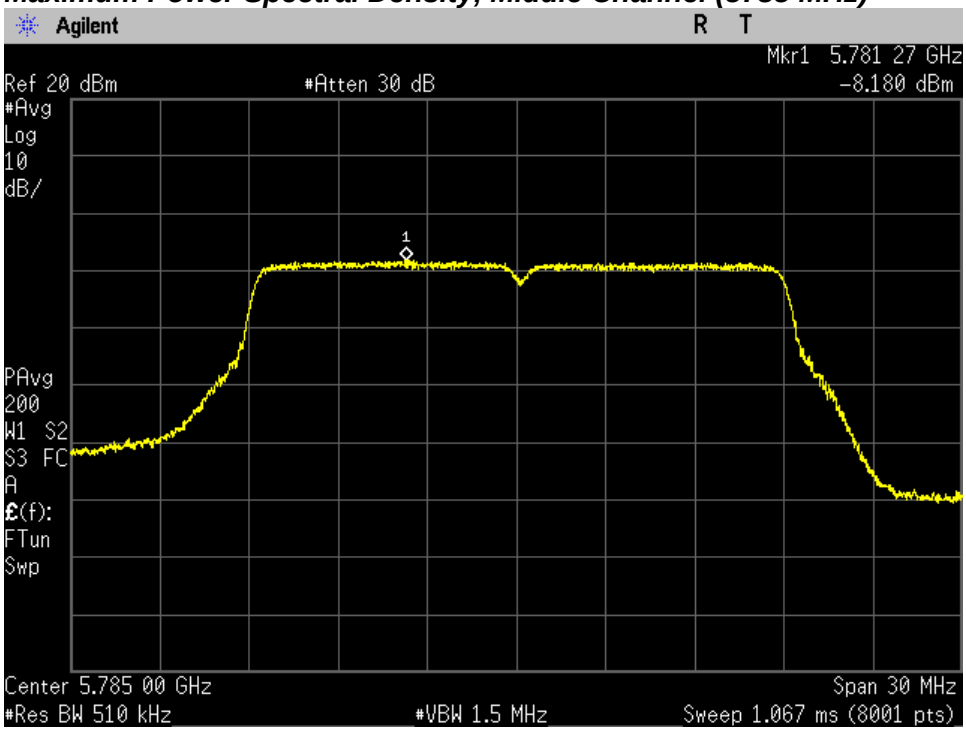
802.11n (20 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

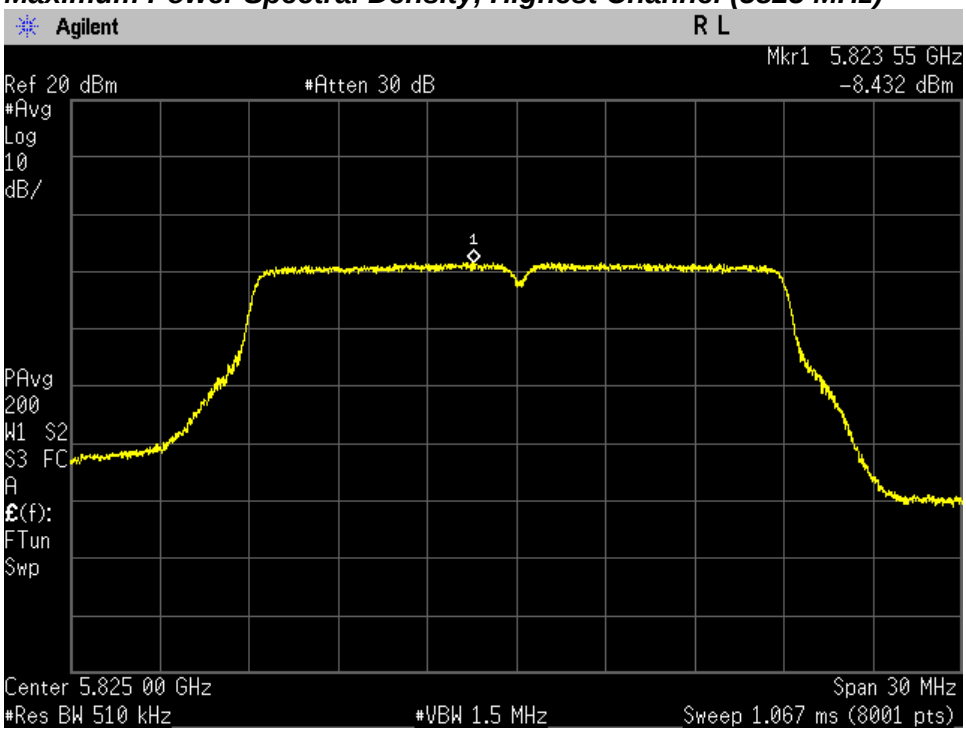


Maximum Power Spectral Density, Middle Channel (5785 MHz)



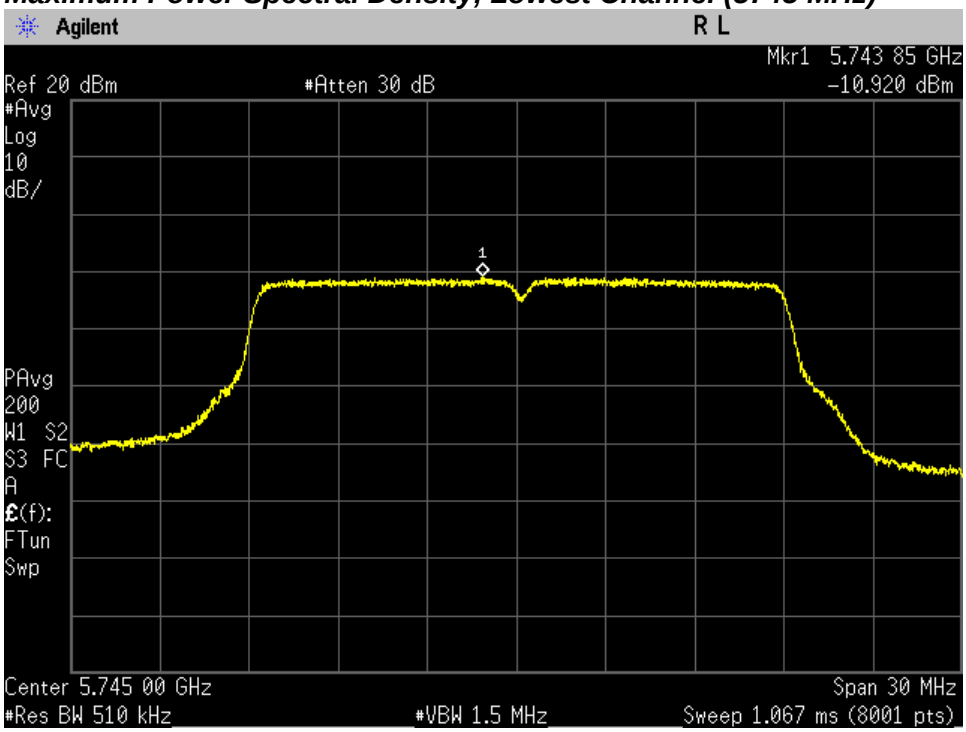
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



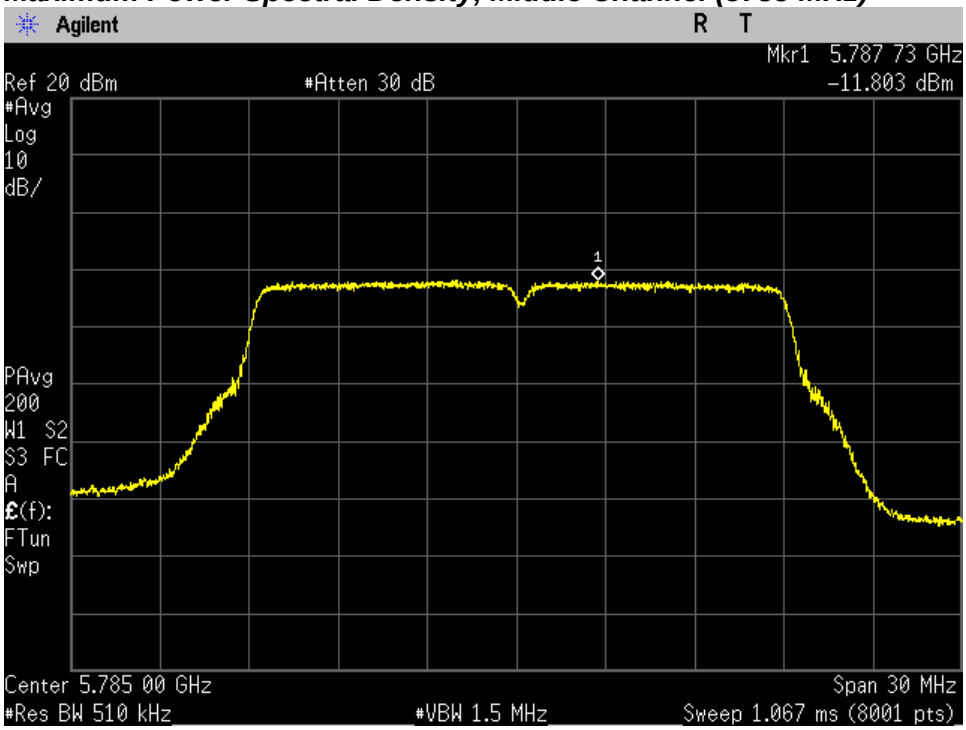
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

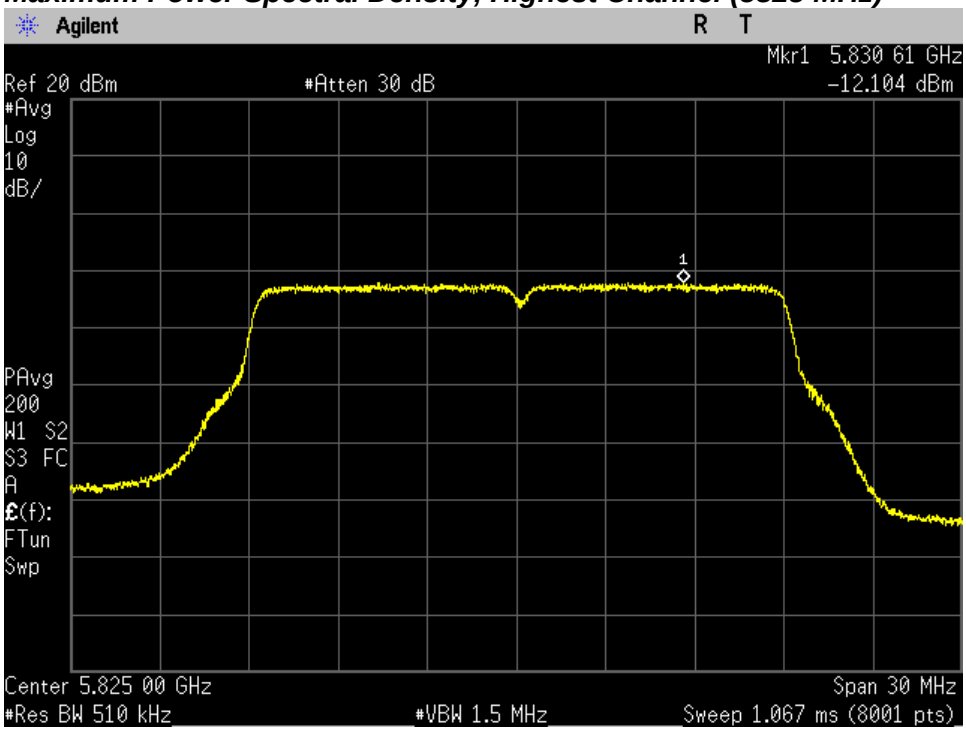


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

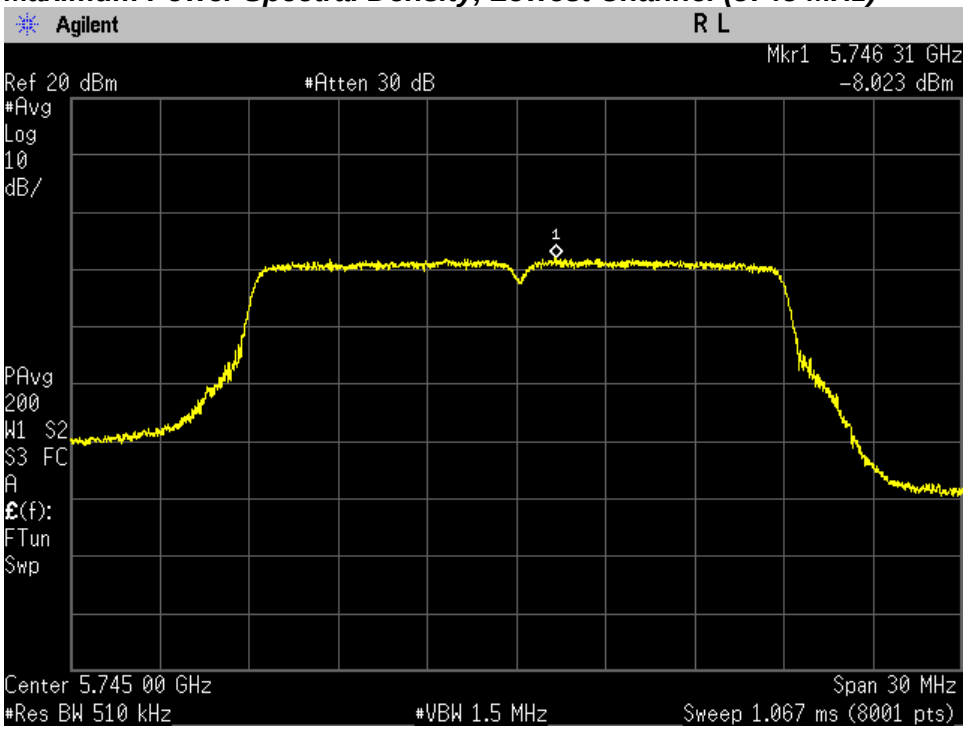


PLOTS OF EMISSIONS

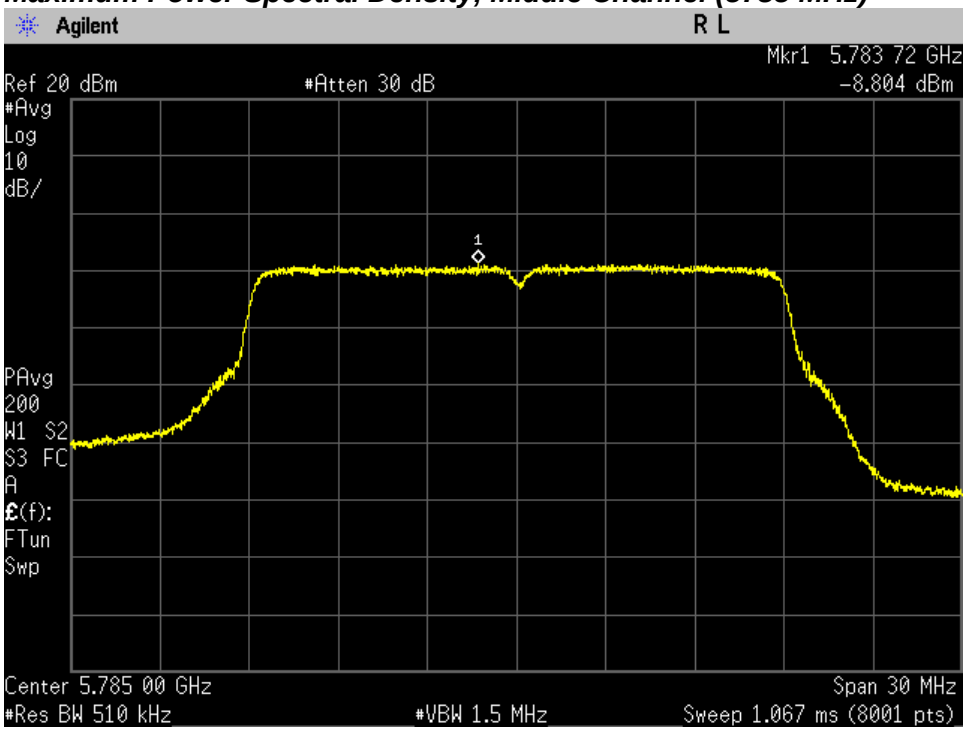
802.11n (20 MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

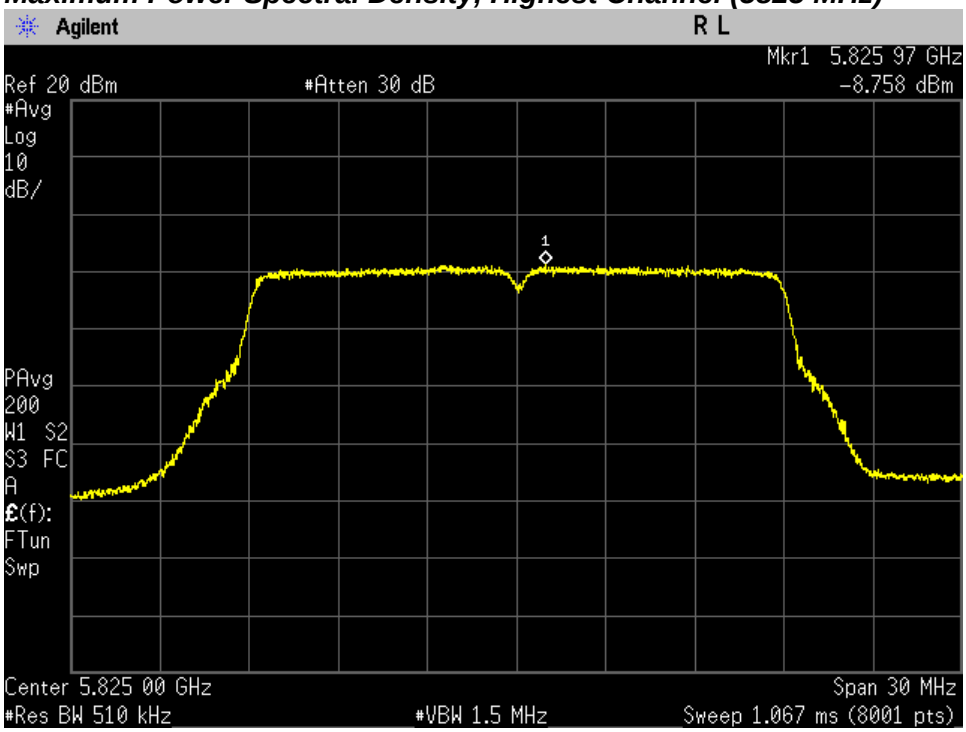


Maximum Power Spectral Density, Middle Channel (5785 MHz)



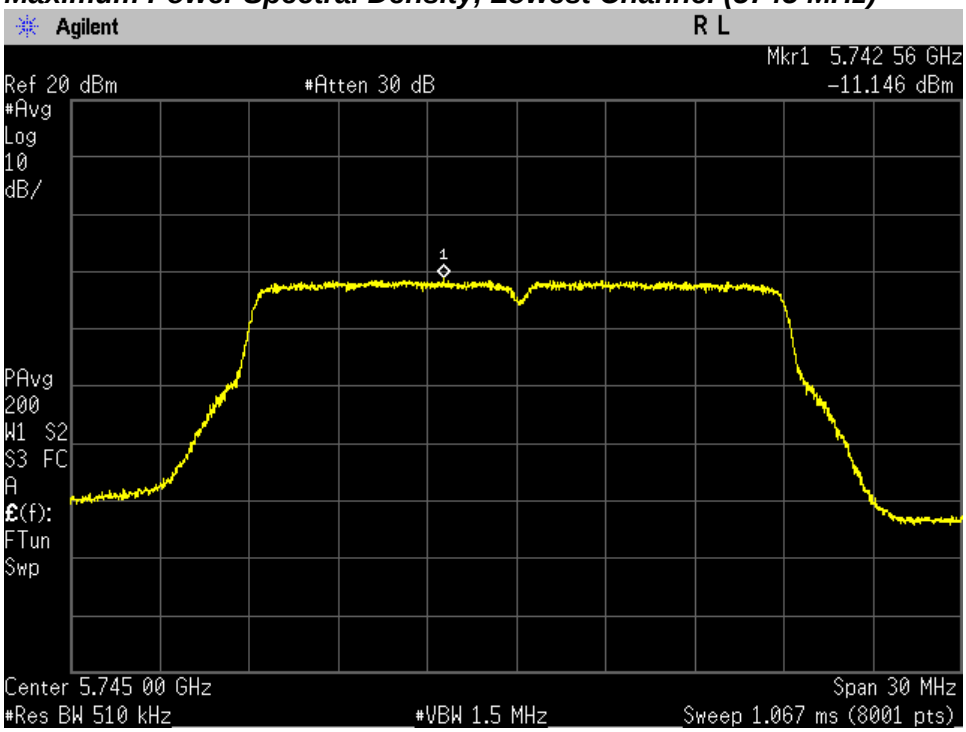
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



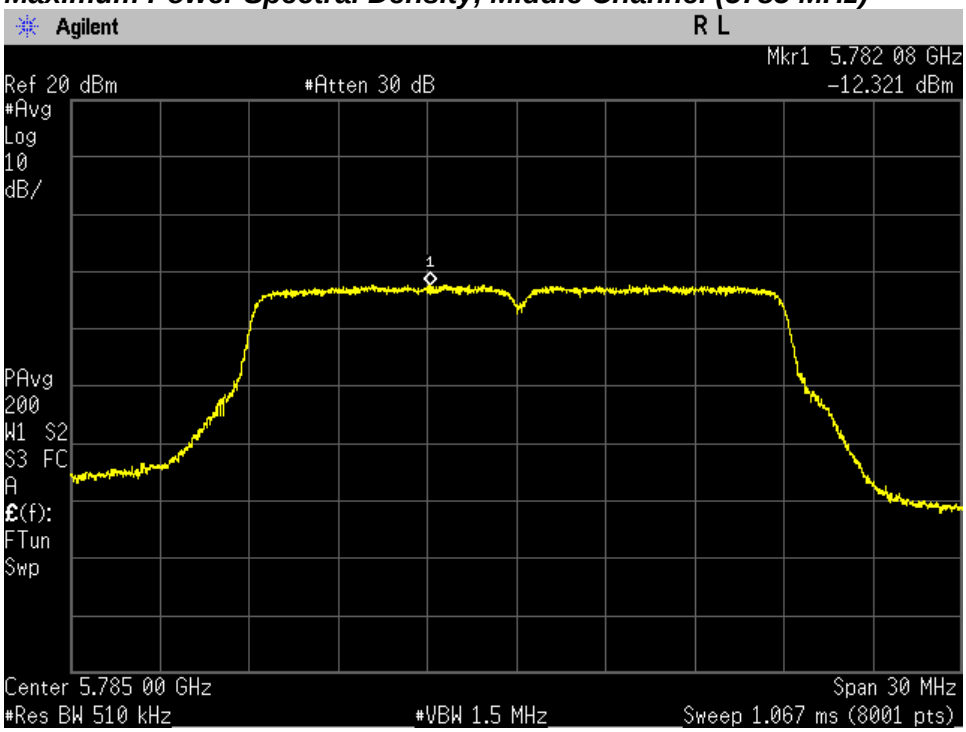
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

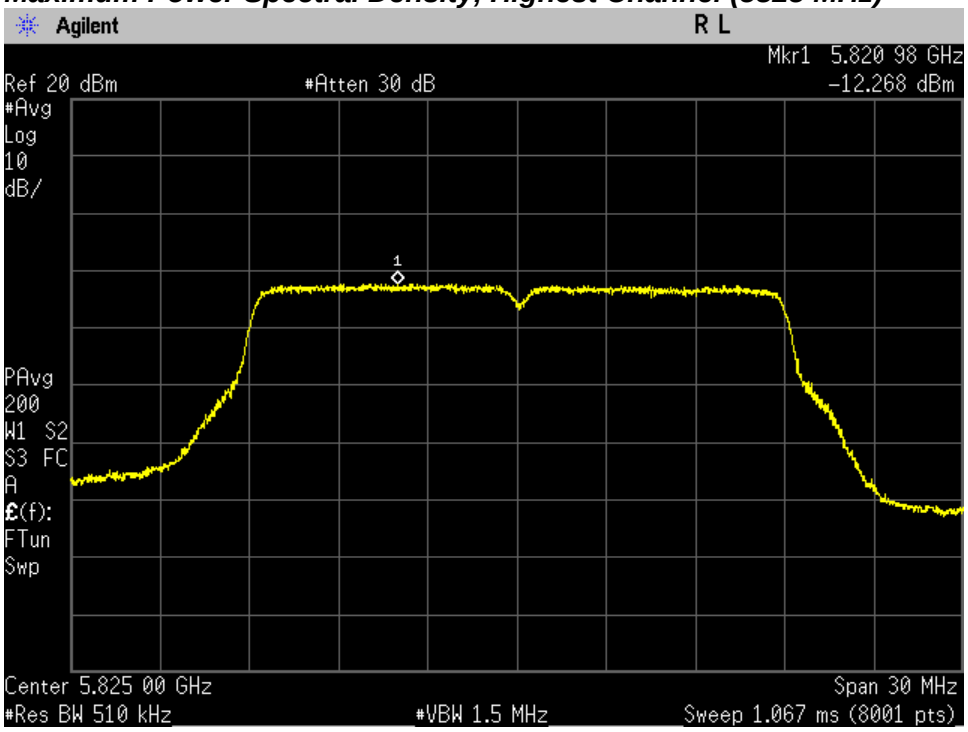


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

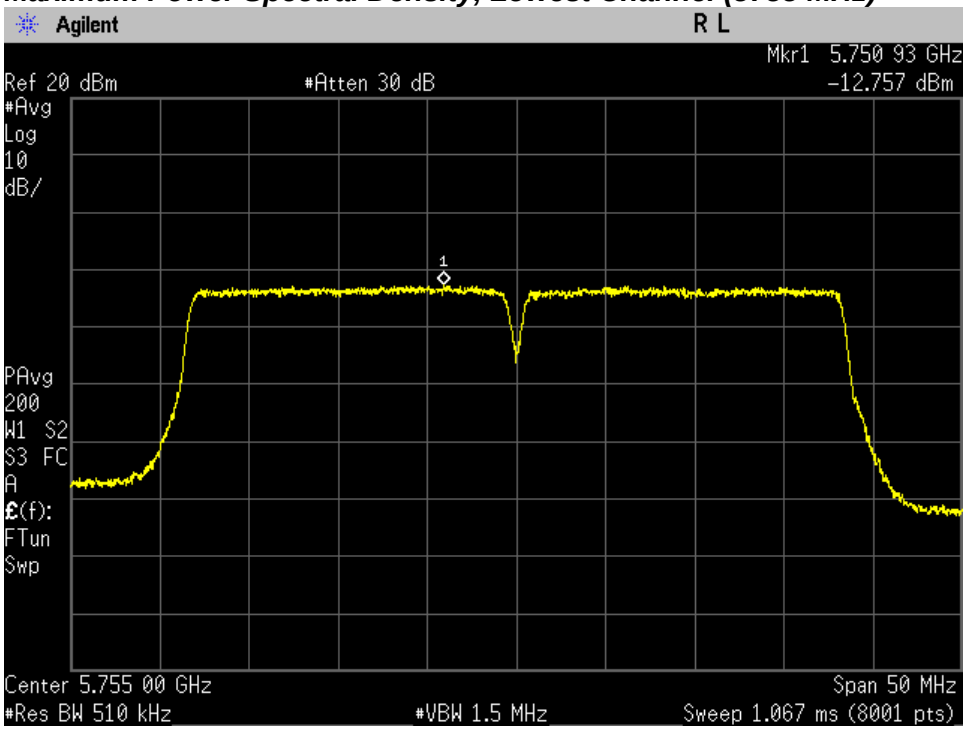


PLOTS OF EMISSIONS

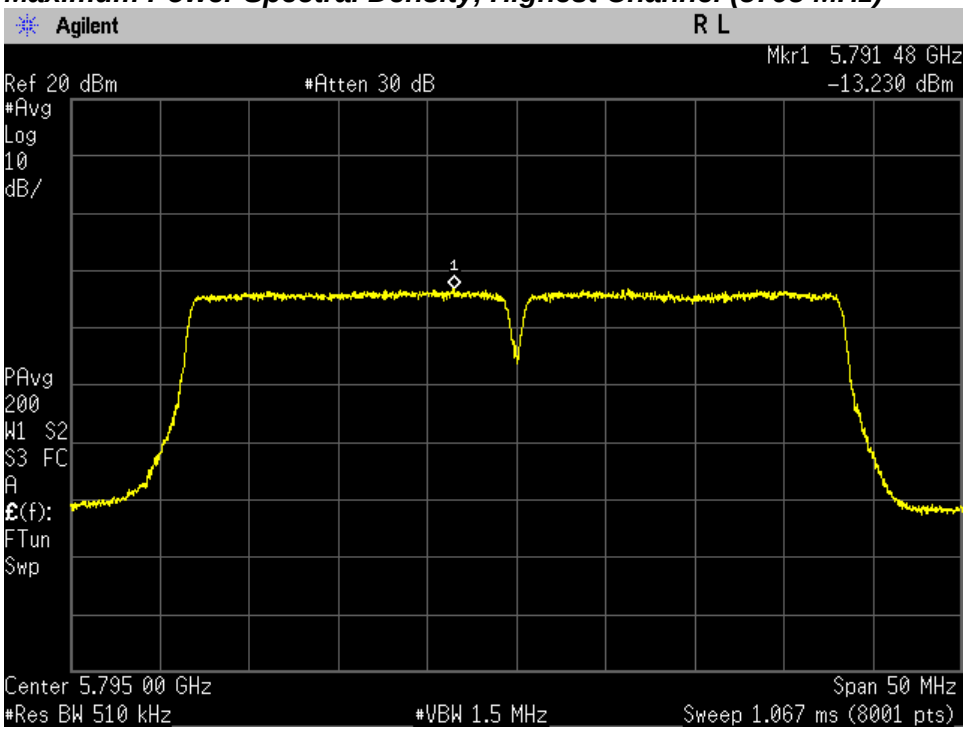
802.11n (40 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



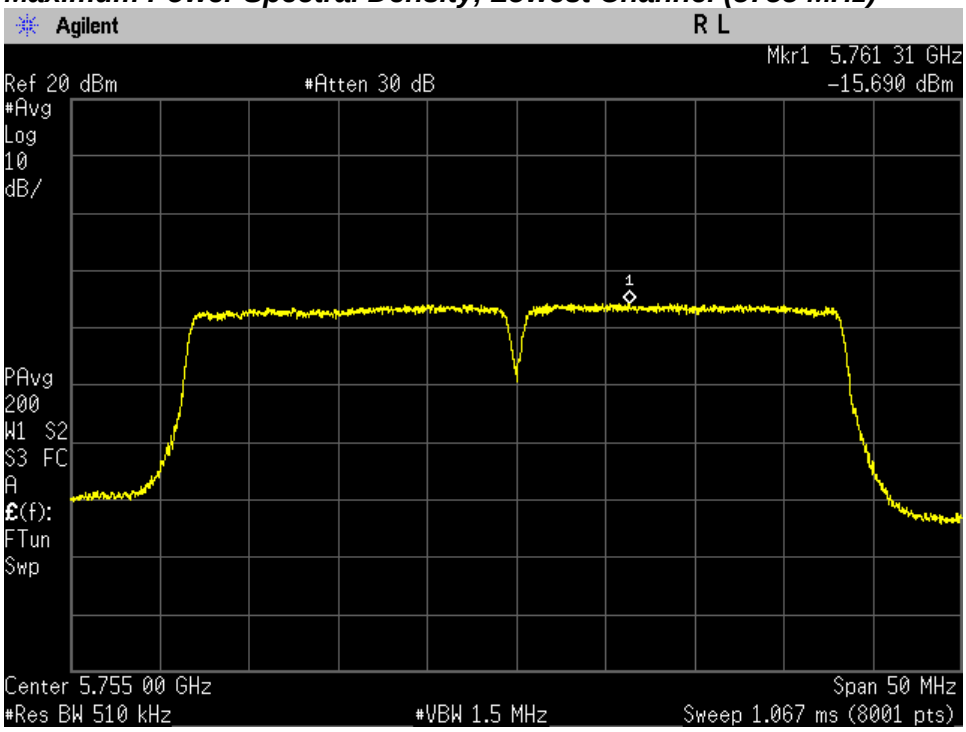
Maximum Power Spectral Density, Highest Channel (5795 MHz)



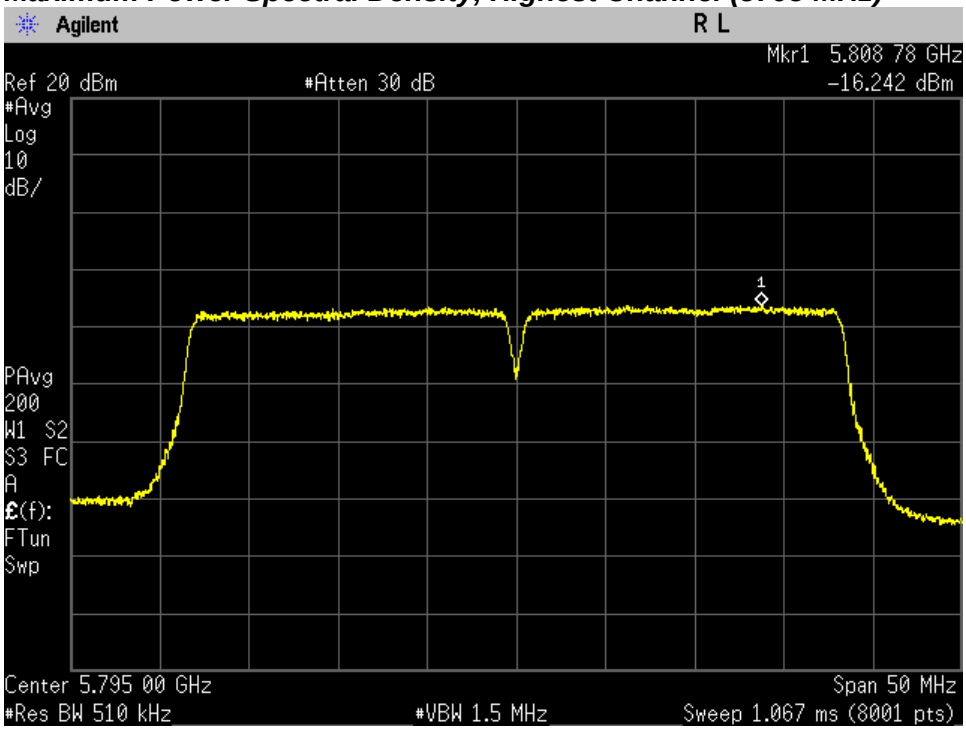
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

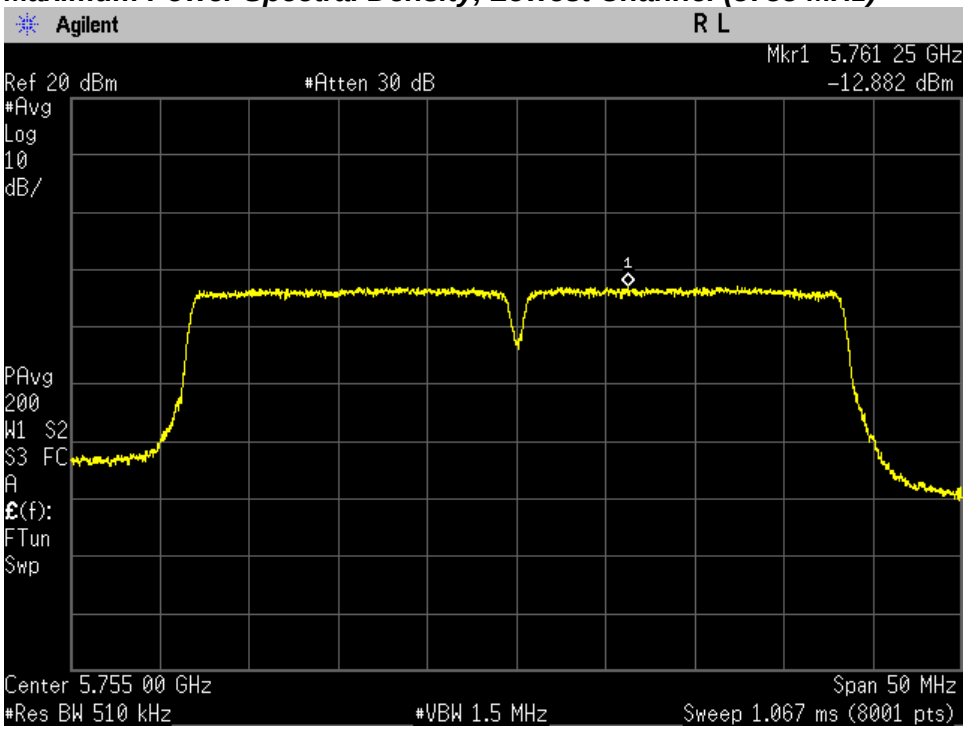


PLOTS OF EMISSIONS

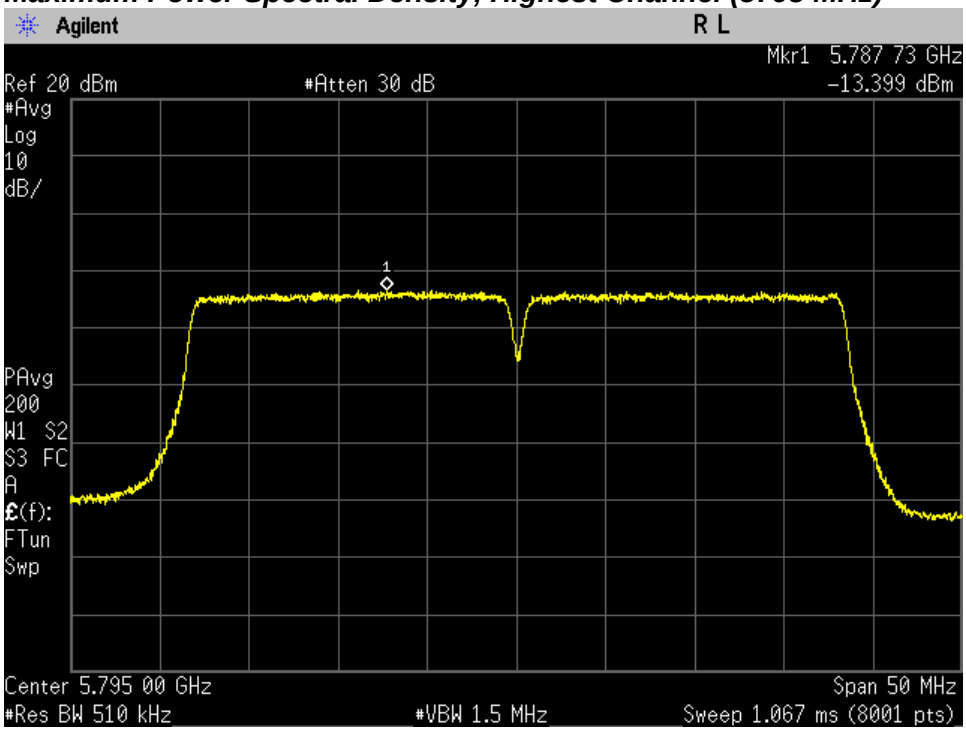
802.11n (40 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



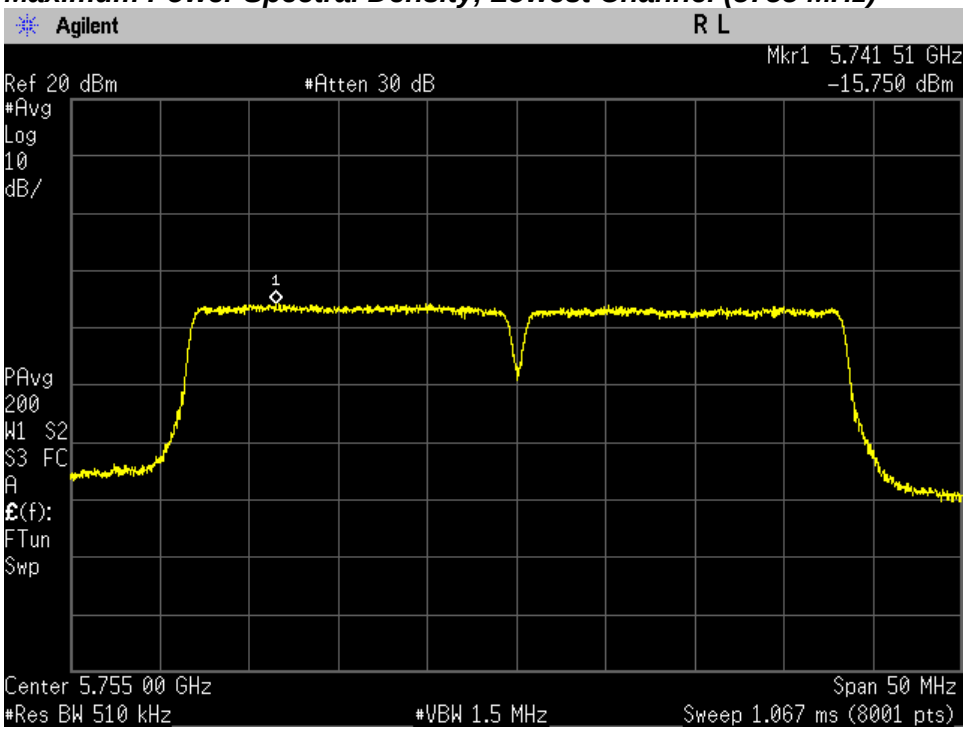
Maximum Power Spectral Density, Highest Channel (5795 MHz)



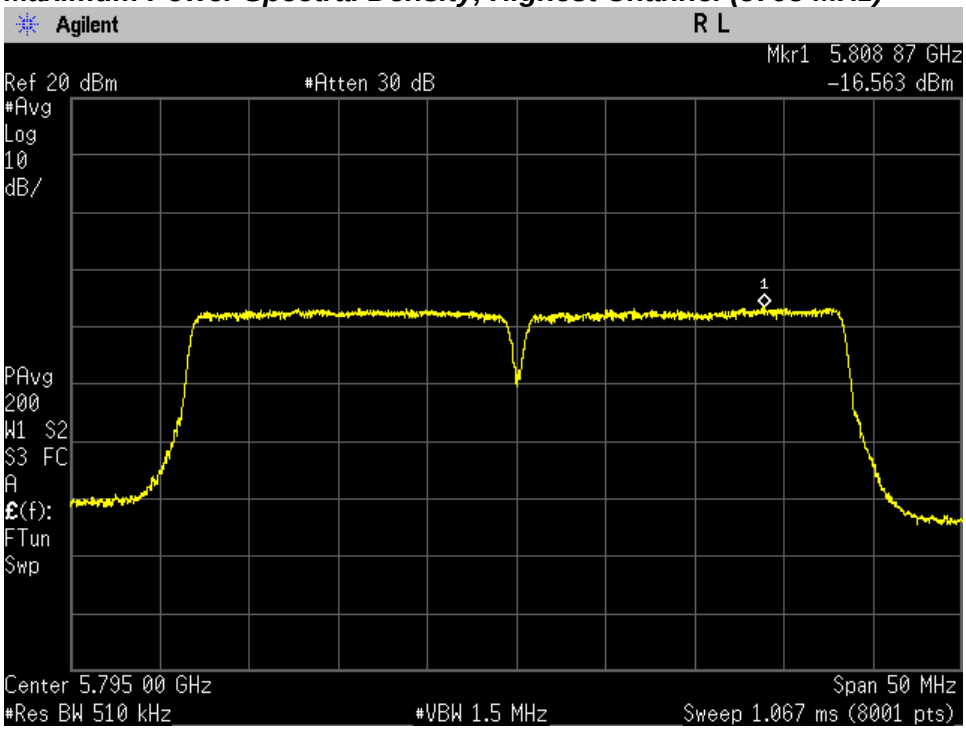
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

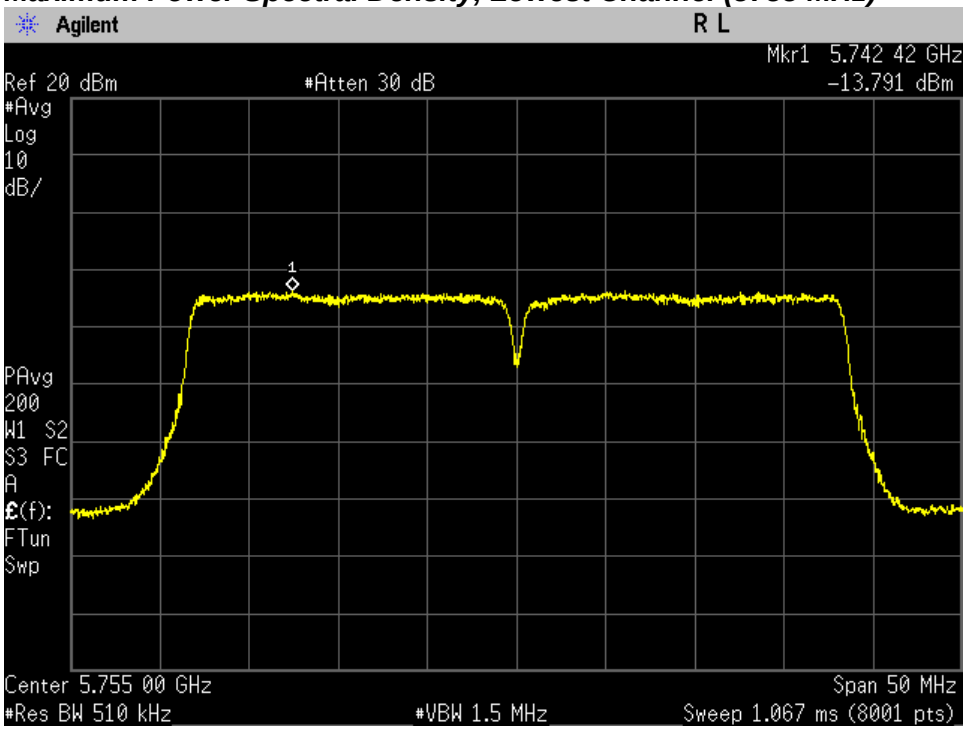


PLOTS OF EMISSIONS

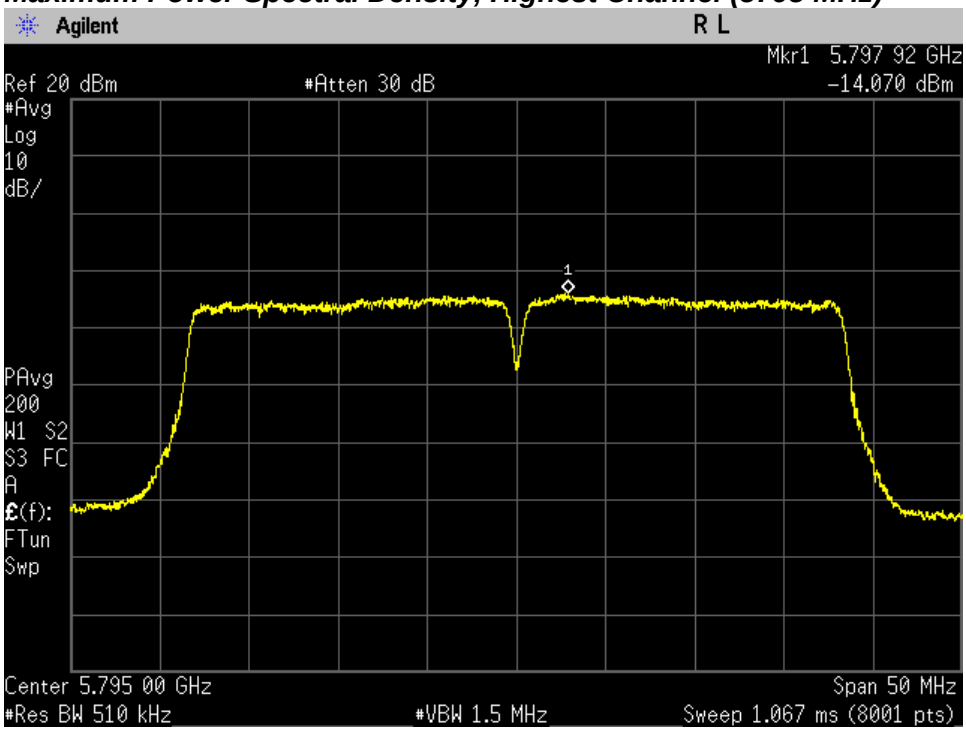
802.11n (40 MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



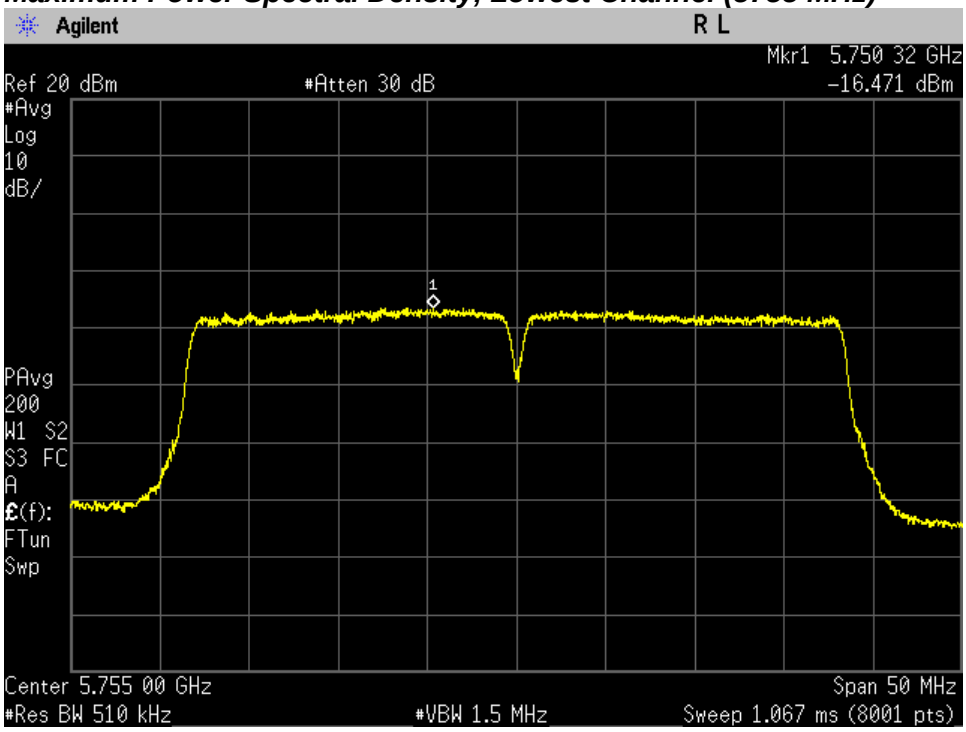
Maximum Power Spectral Density, Highest Channel (5795 MHz)



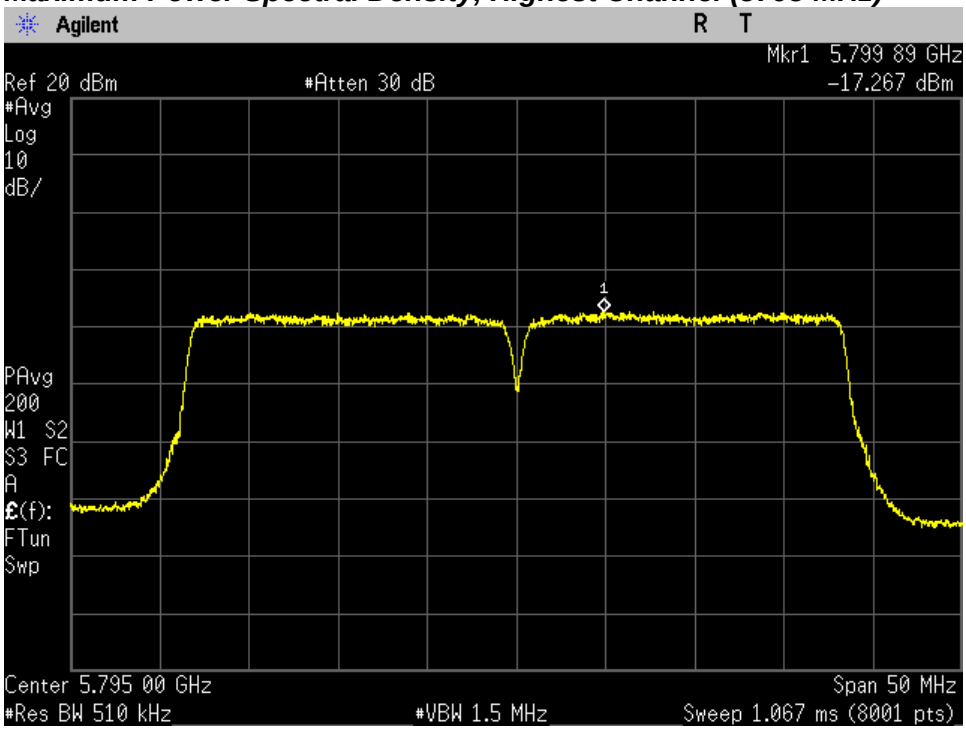
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

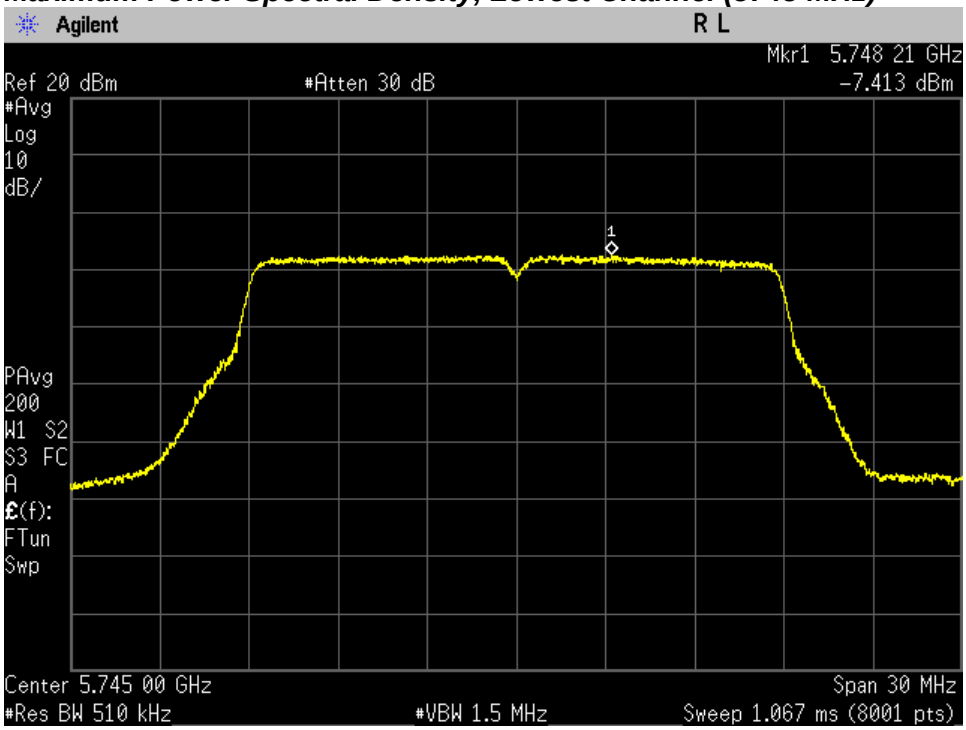


PLOTS OF EMISSIONS

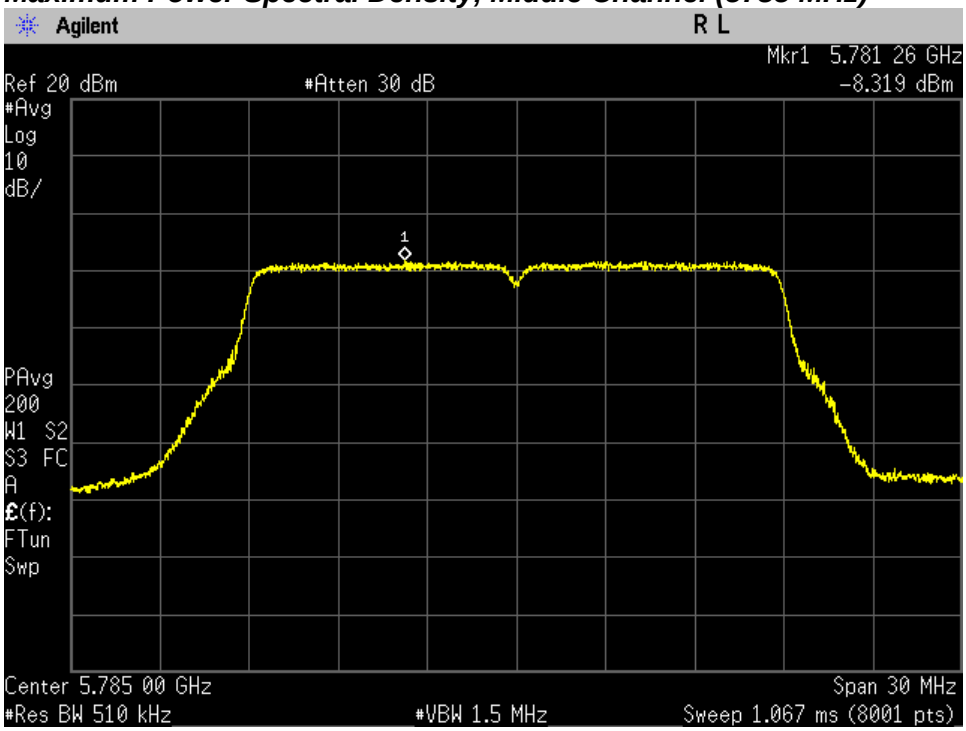
802.11ac (20 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

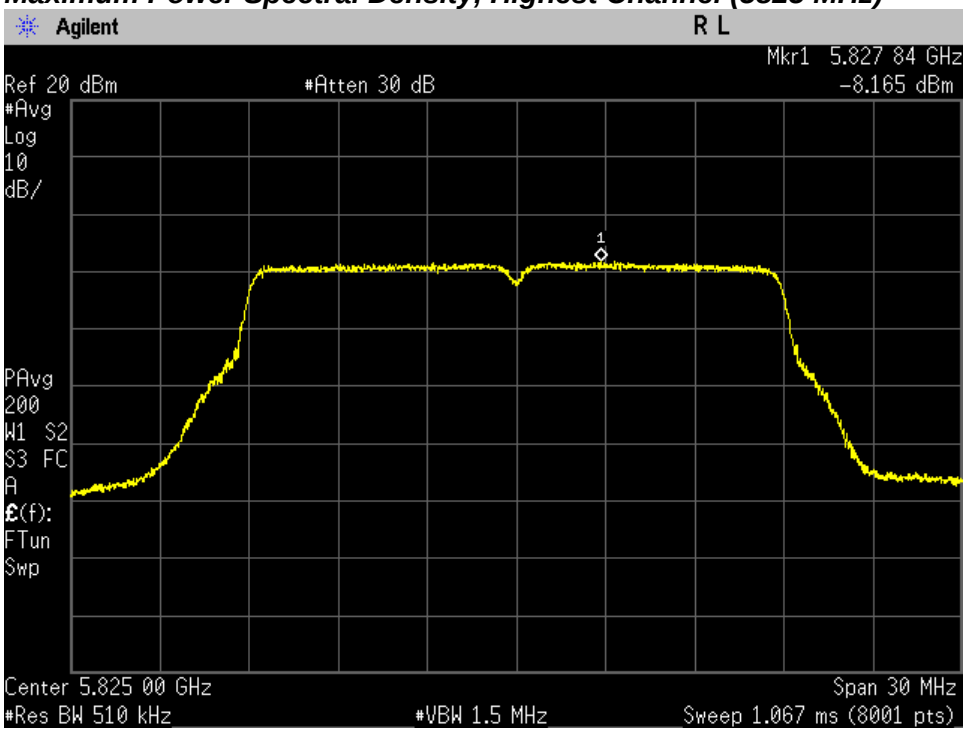


Maximum Power Spectral Density, Middle Channel (5785 MHz)



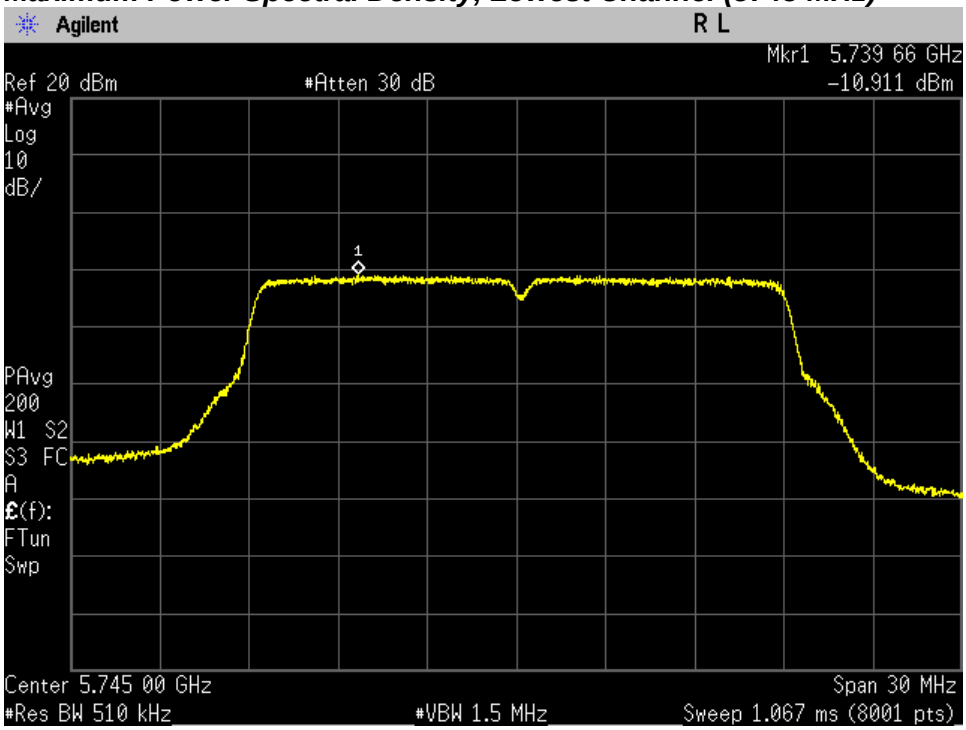
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



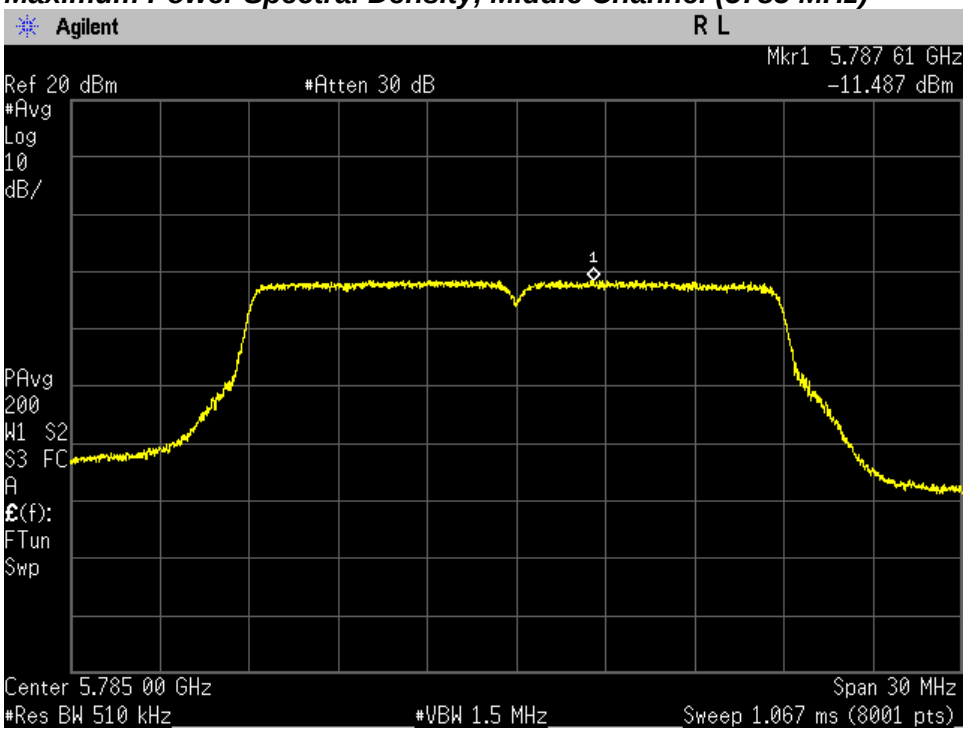
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

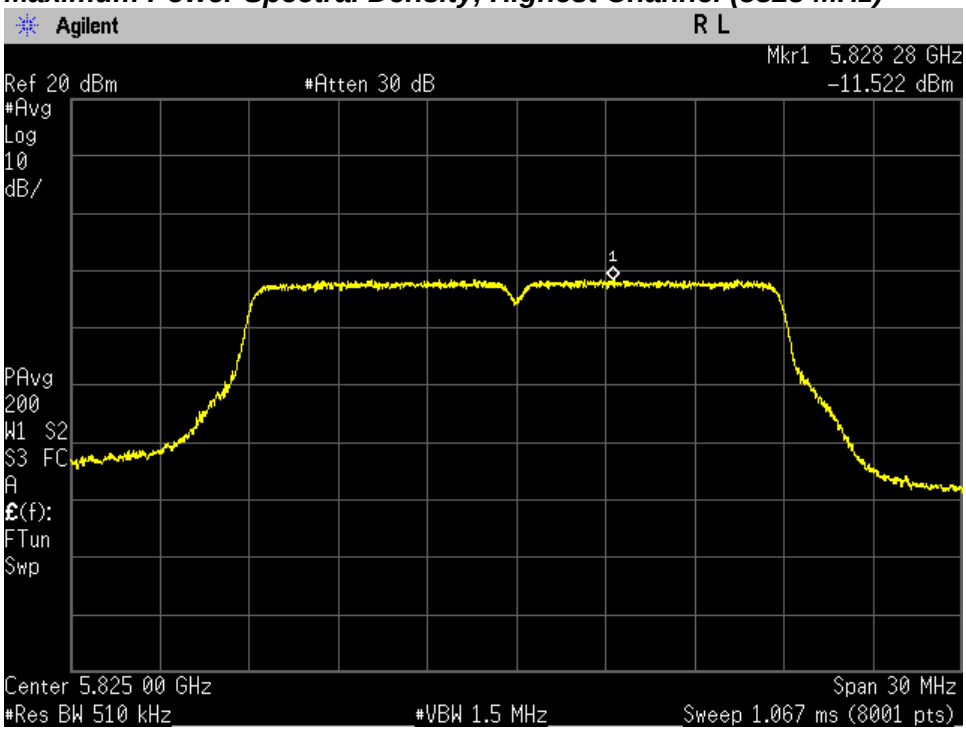


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

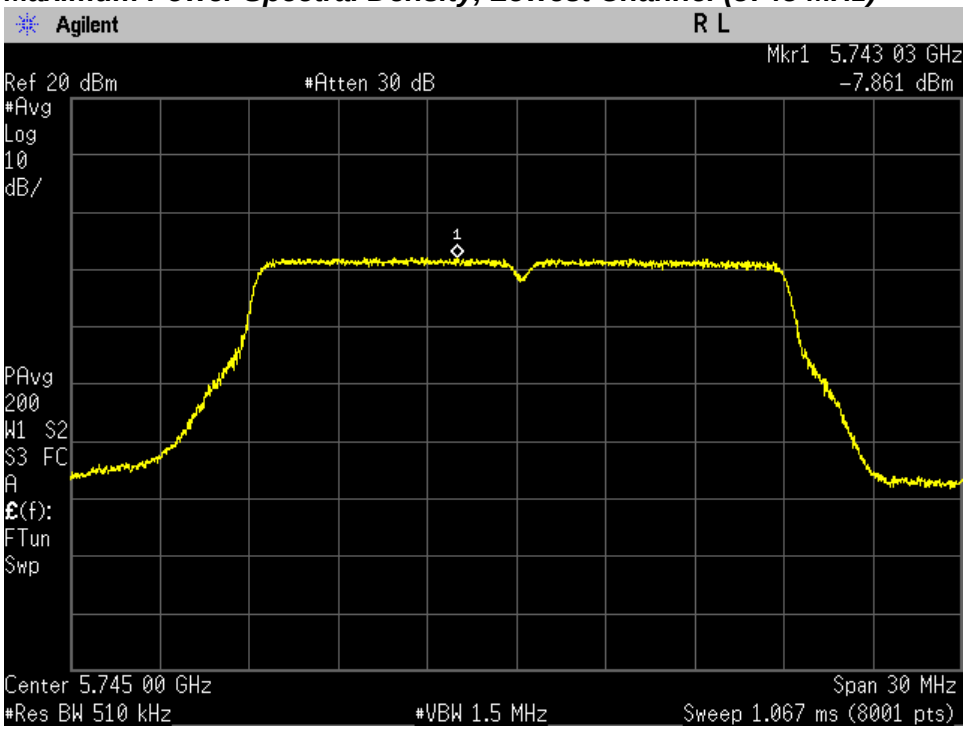


PLOTS OF EMISSIONS

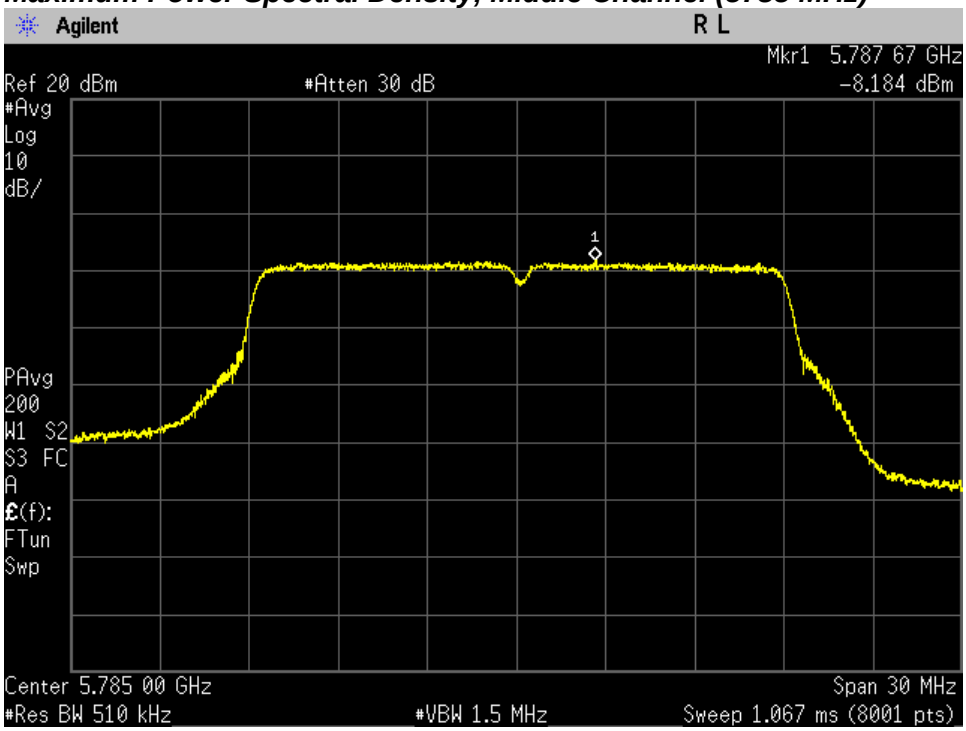
802.11ac (20 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

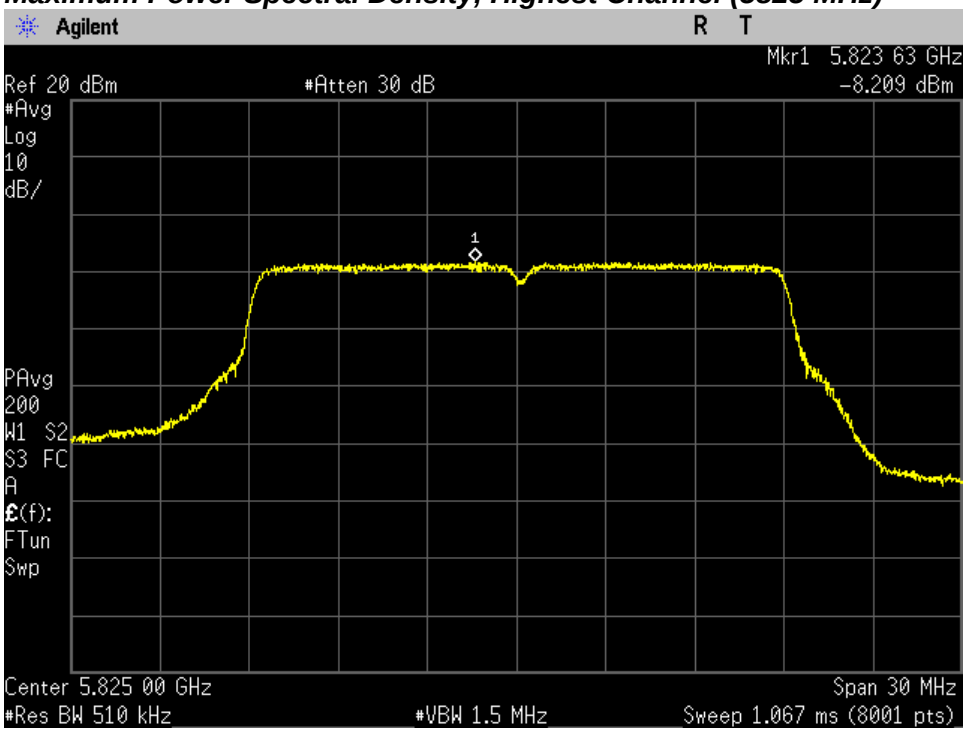


Maximum Power Spectral Density, Middle Channel (5785 MHz)



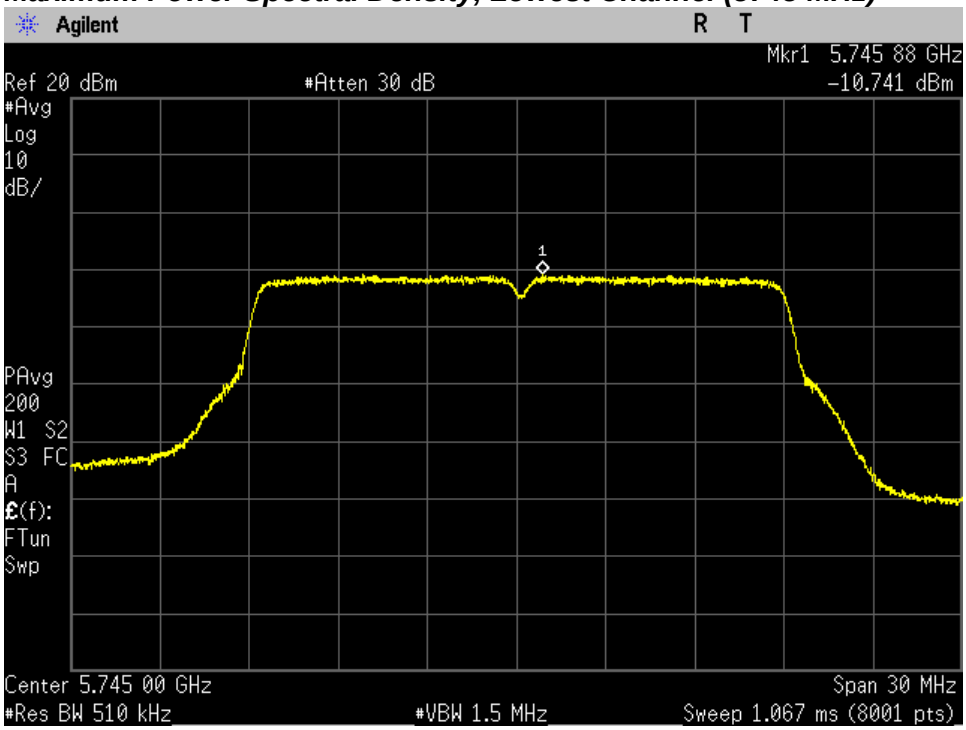
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



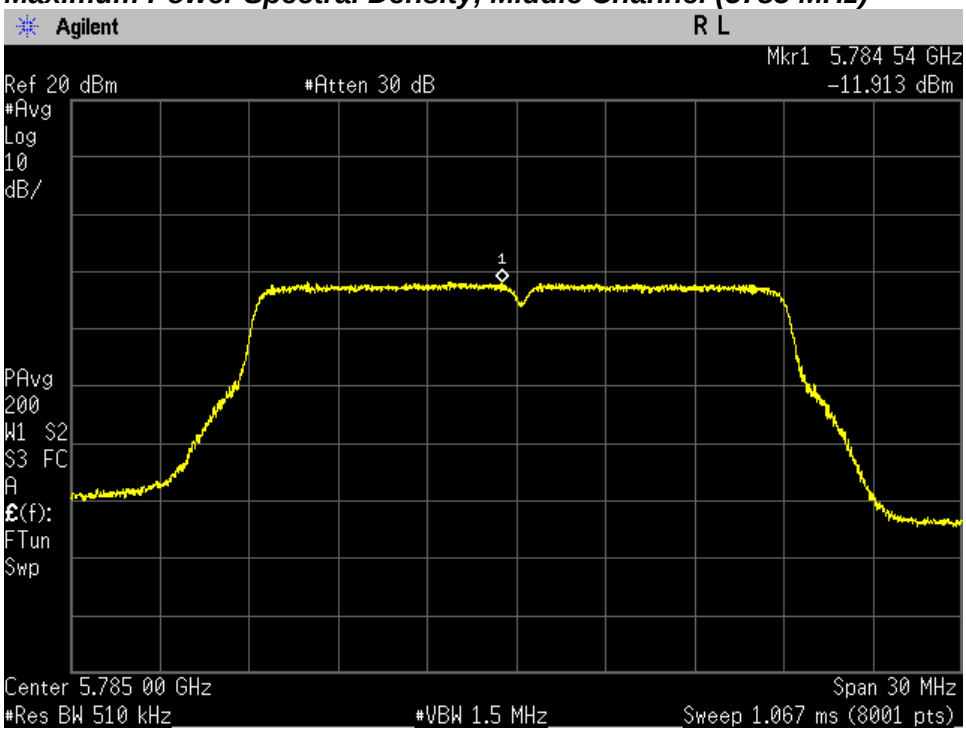
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

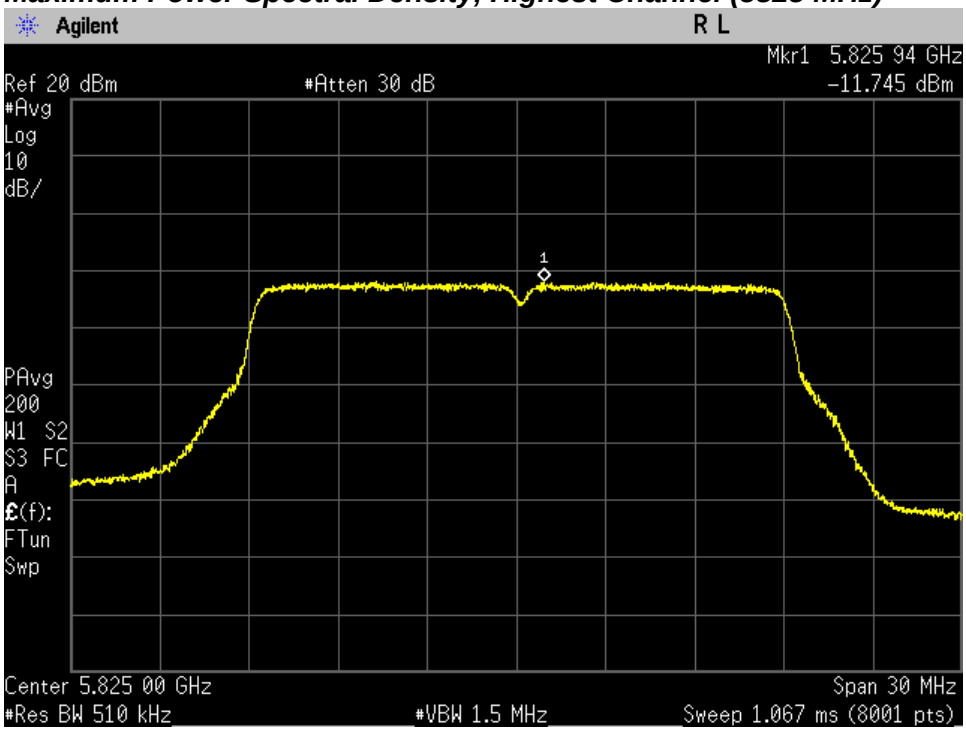


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

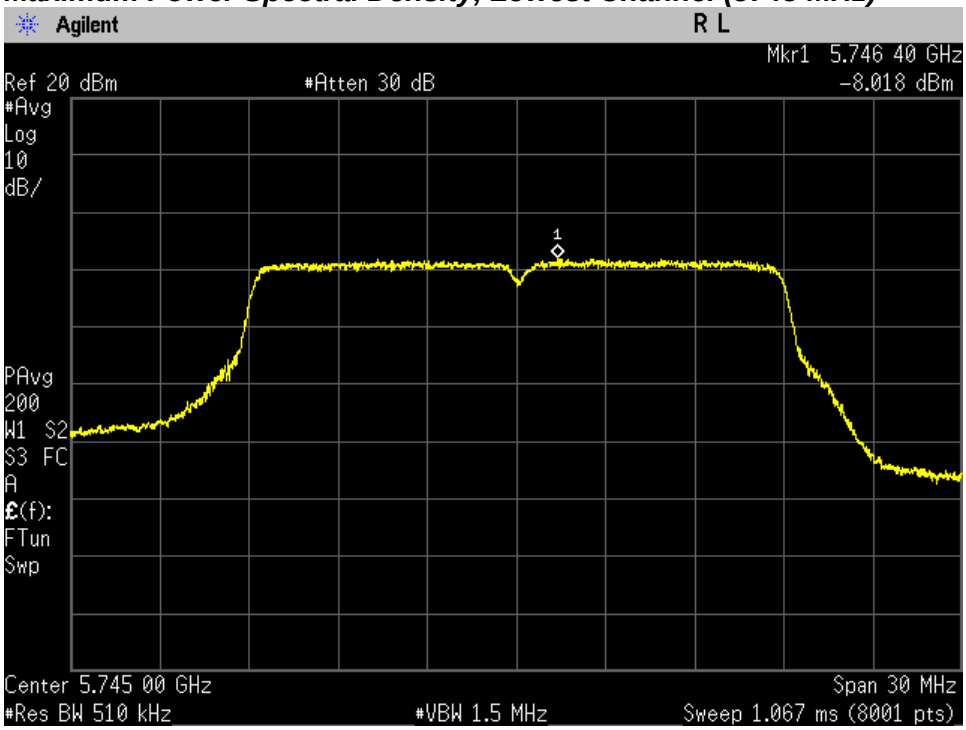


PLOTS OF EMISSIONS

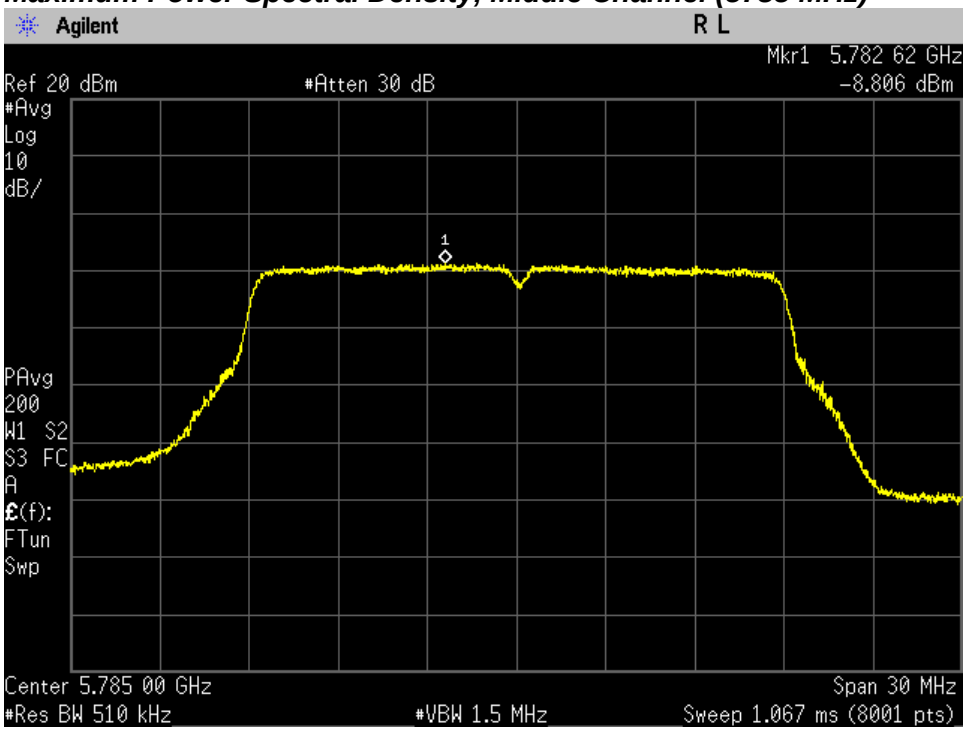
802.11ac (2 0MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

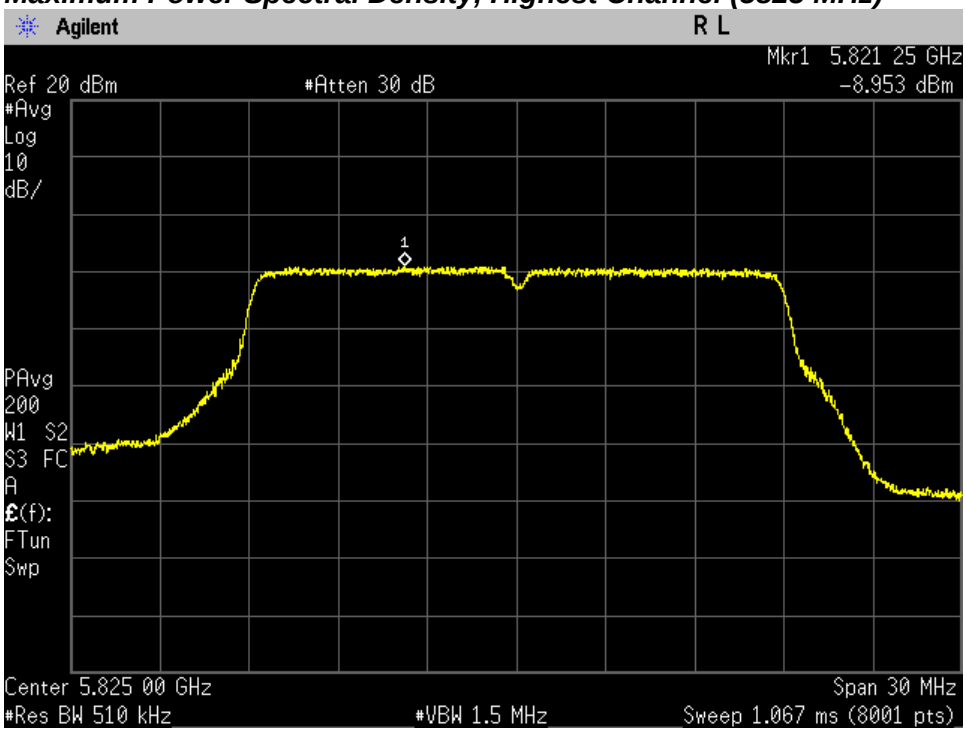


Maximum Power Spectral Density, Middle Channel (5785 MHz)



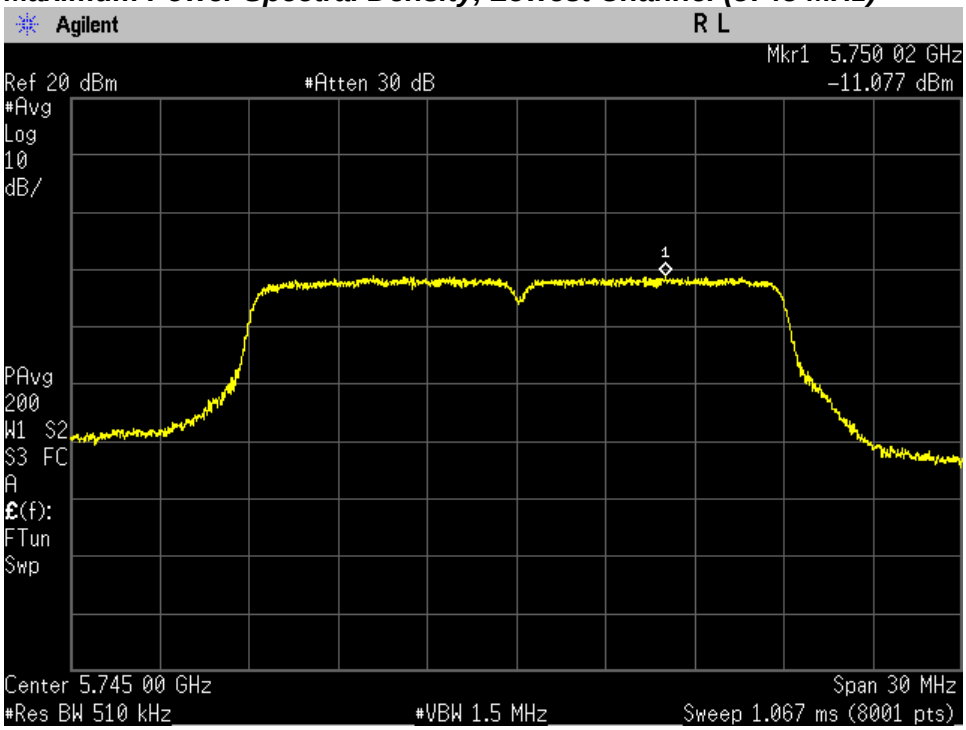
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5825 MHz)



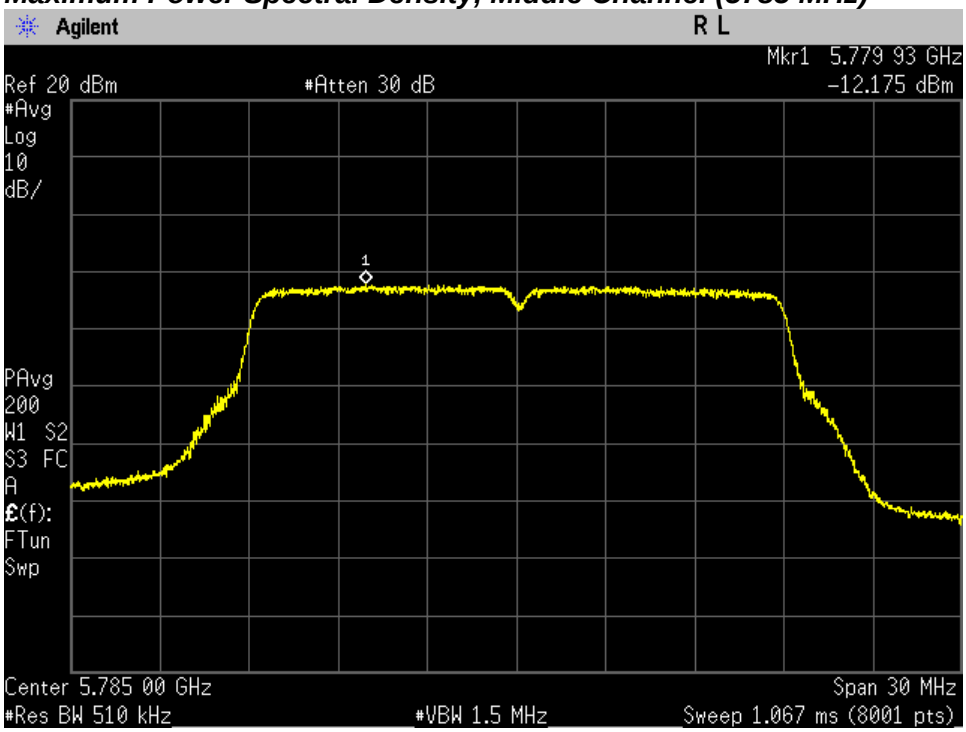
Chain 1

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

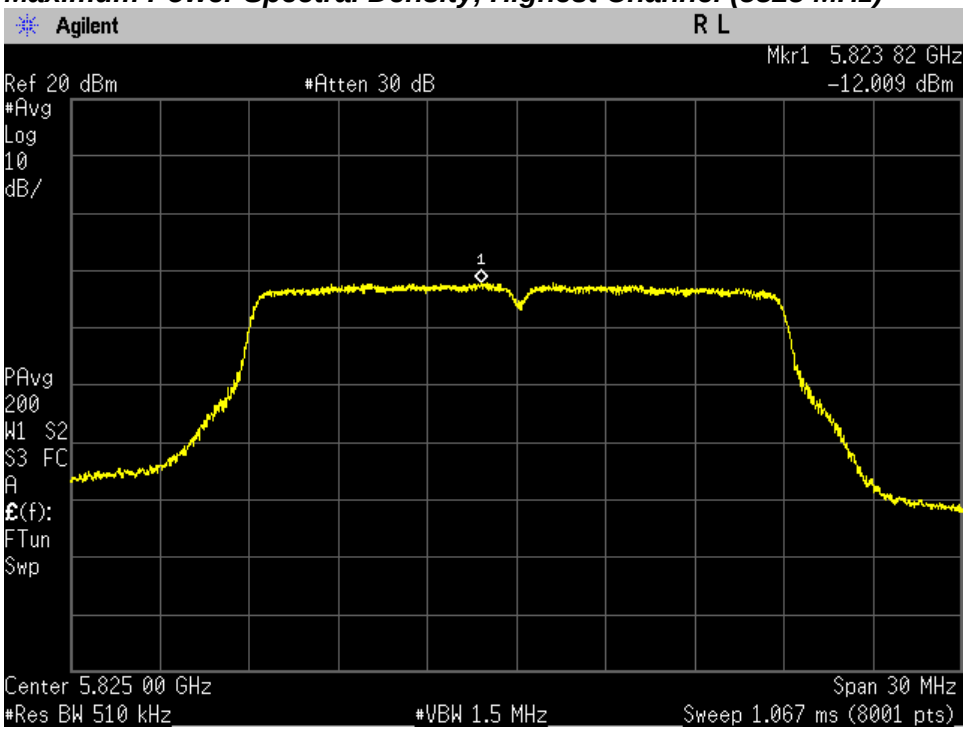


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



Maximum Power Spectral Density, Highest Channel (5825 MHz)

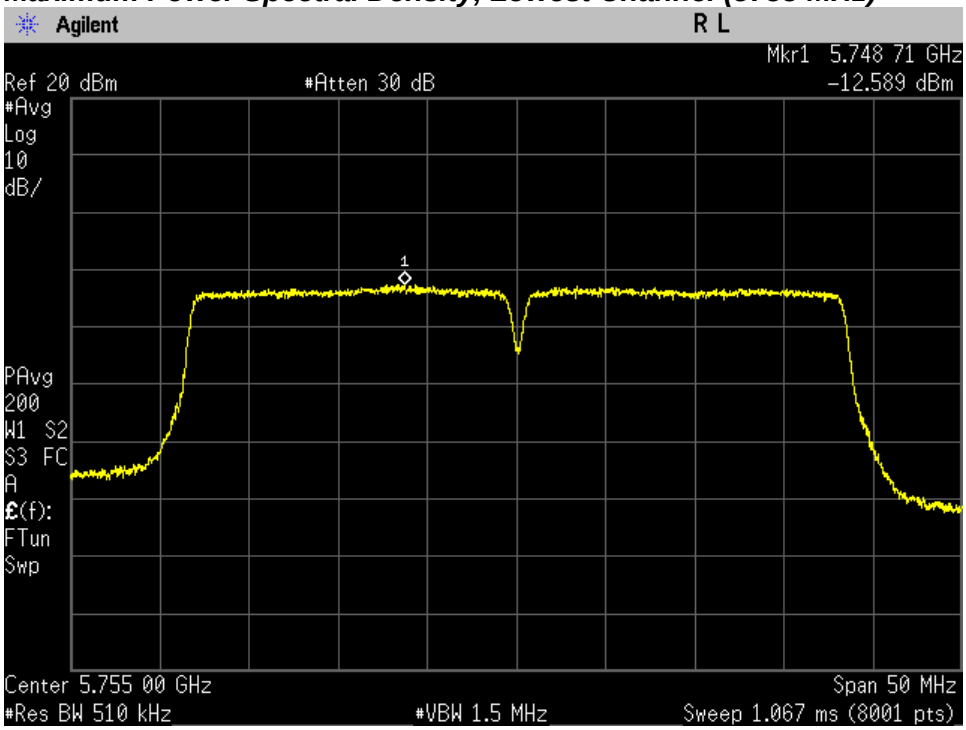


PLOTS OF EMISSIONS

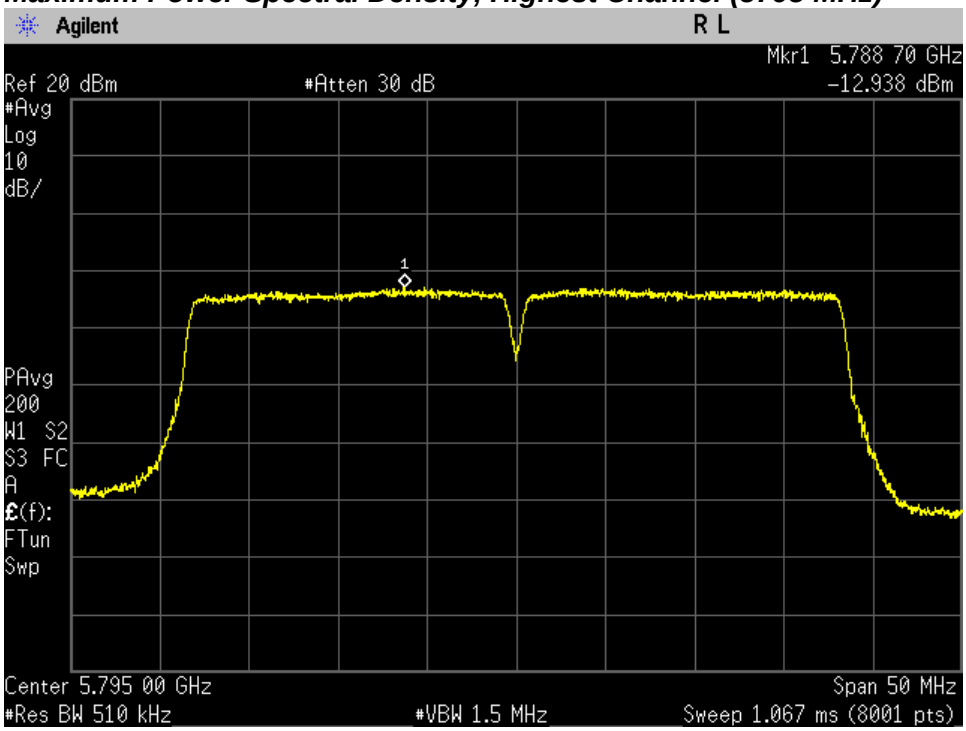
802.11ac (40 MHz) mode - SISO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



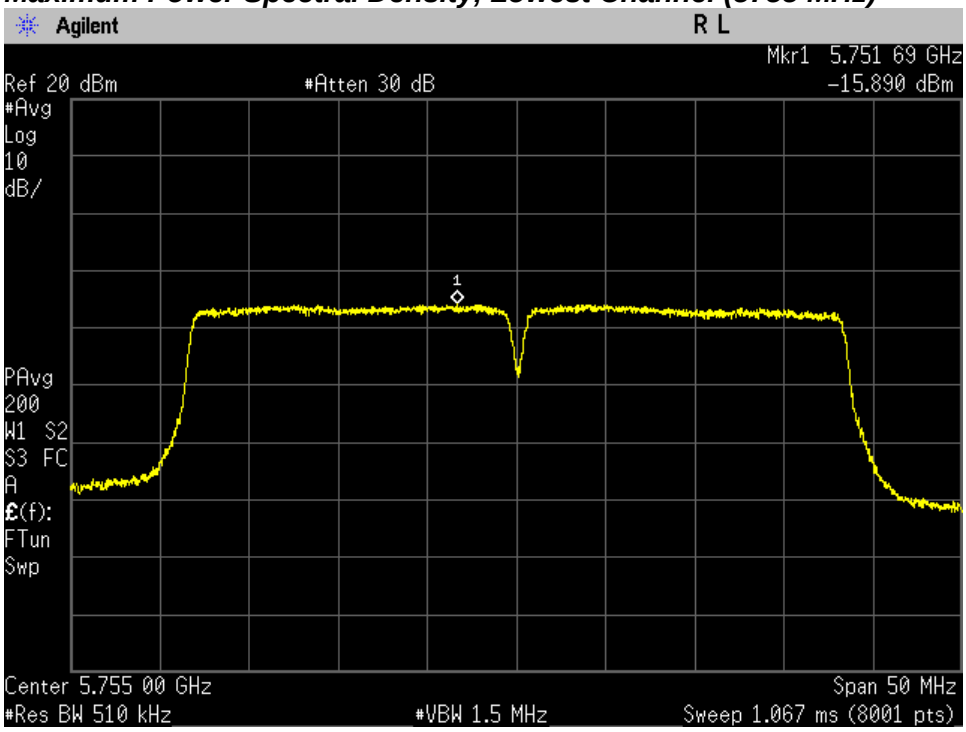
Maximum Power Spectral Density, Highest Channel (5795 MHz)



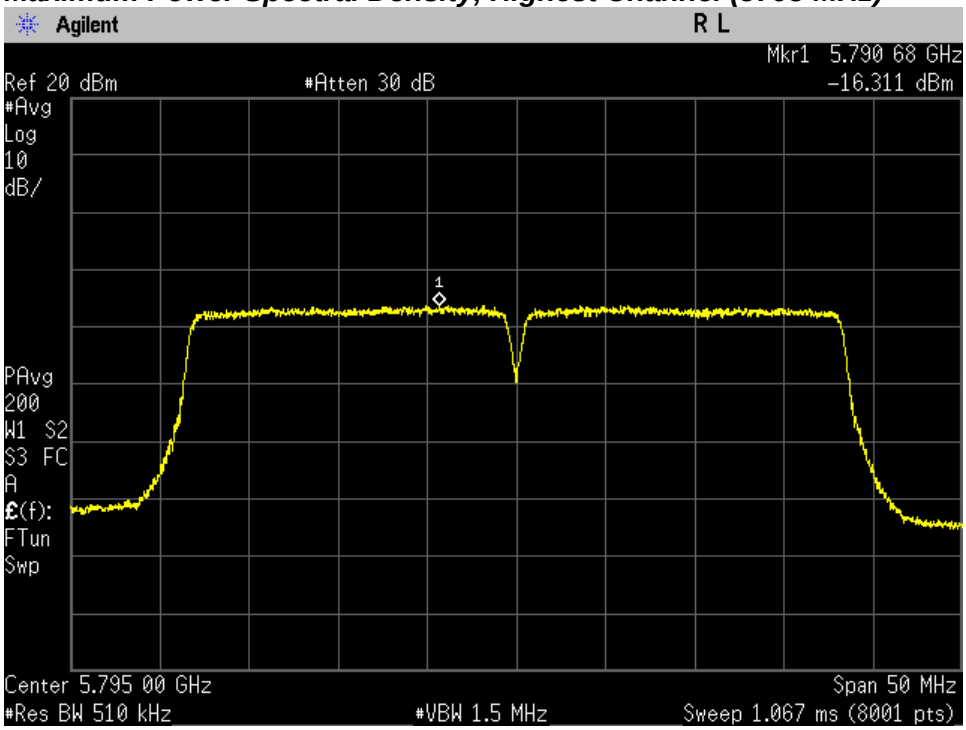
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

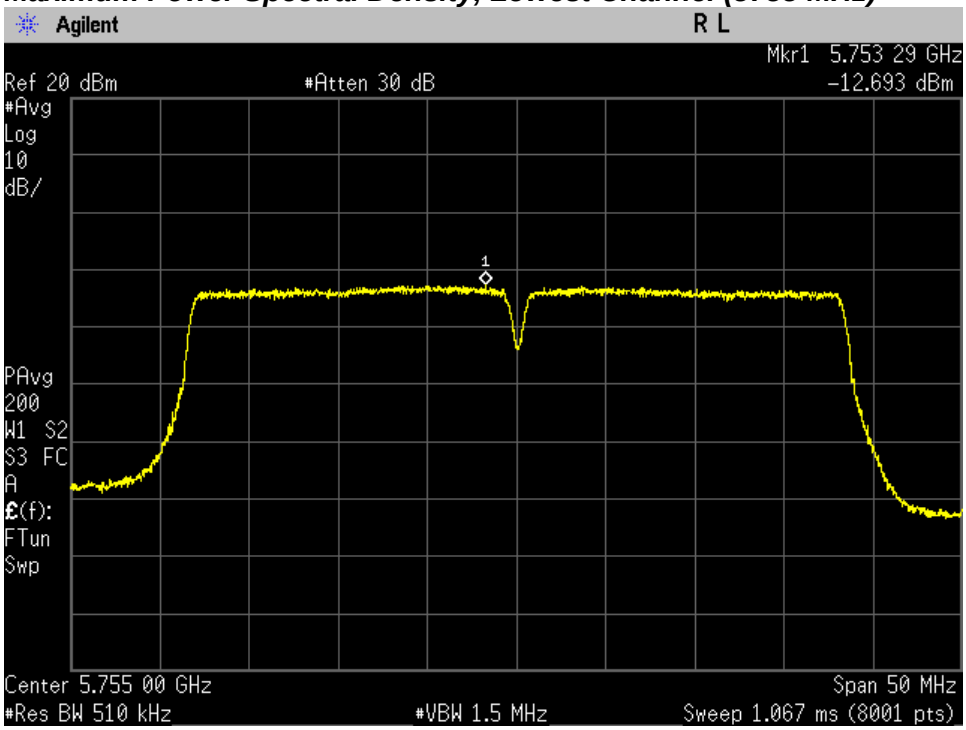


PLOTS OF EMISSIONS

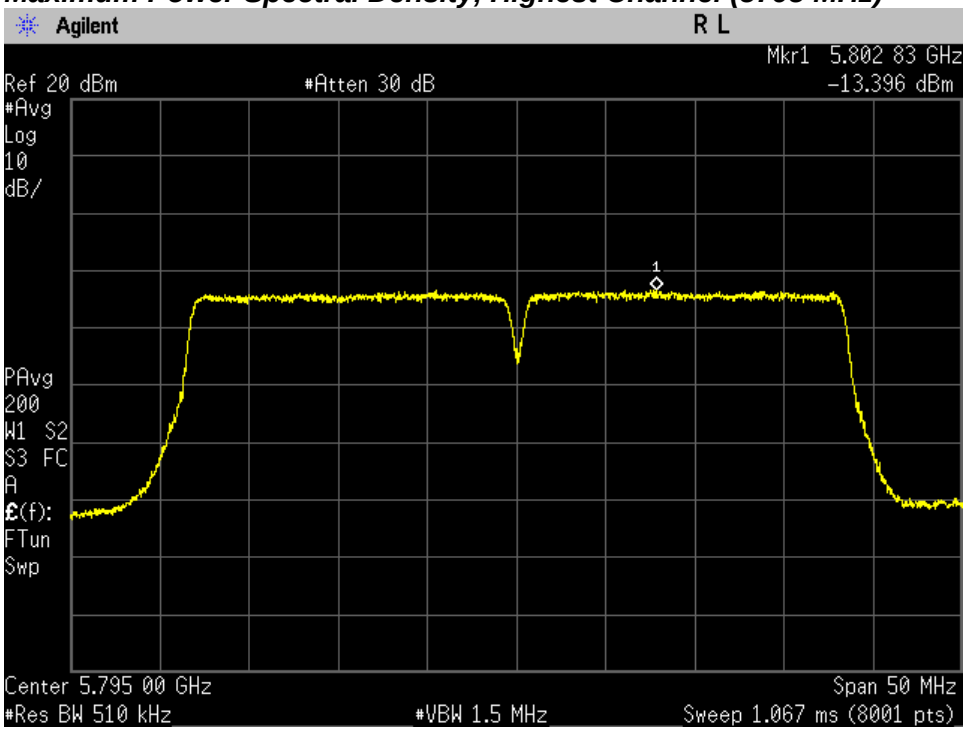
802.11ac (40 MHz) mode - CDD

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



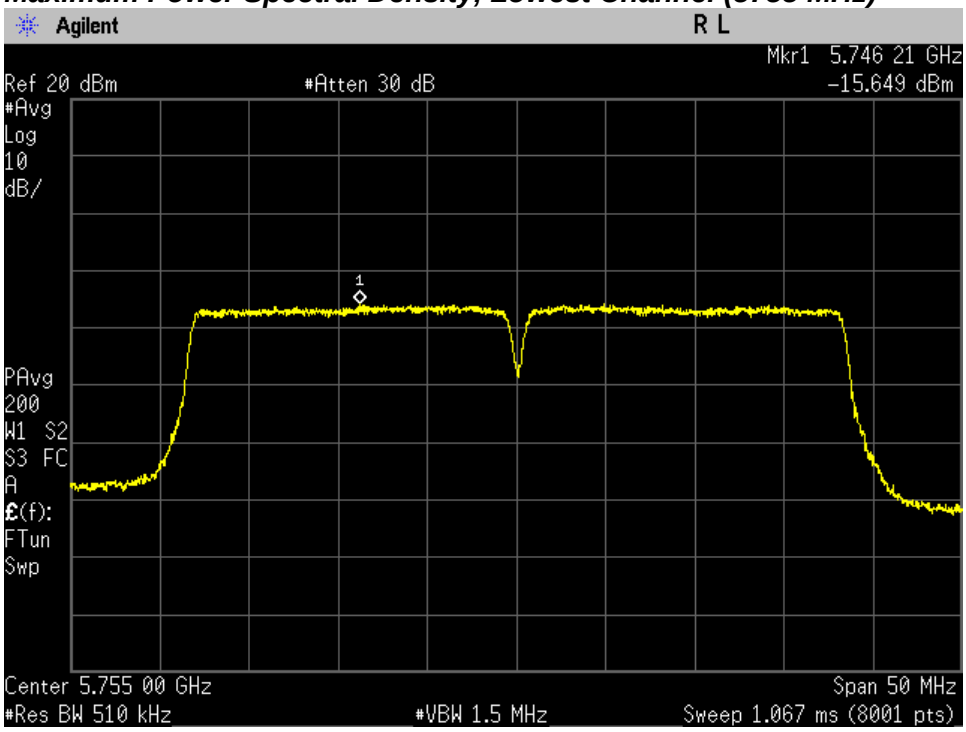
Maximum Power Spectral Density, Highest Channel (5795 MHz)



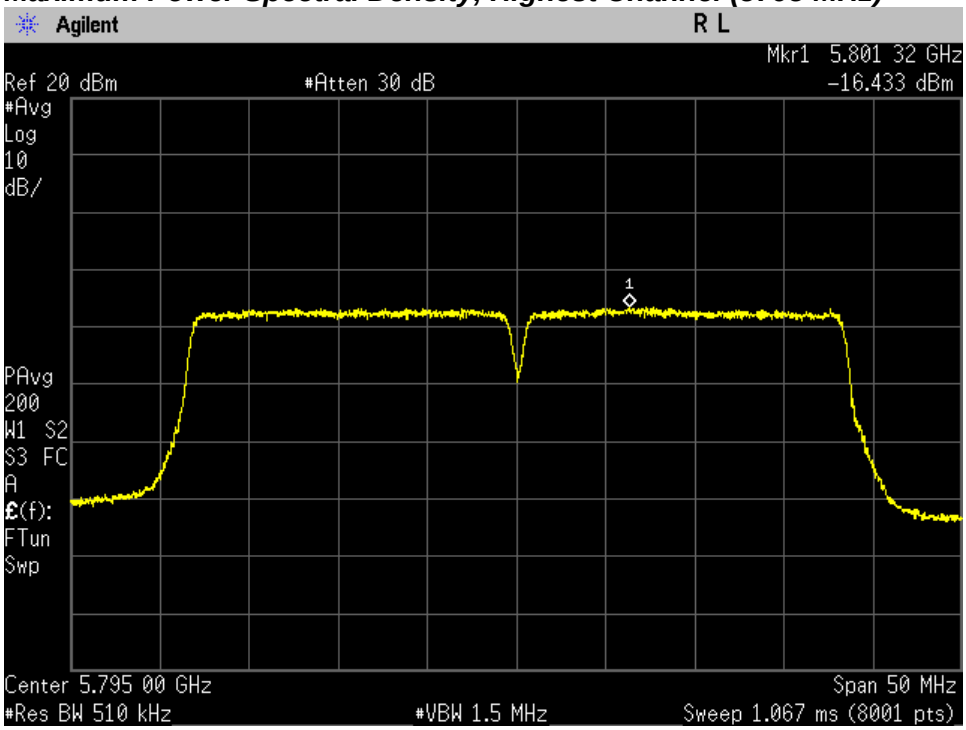
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

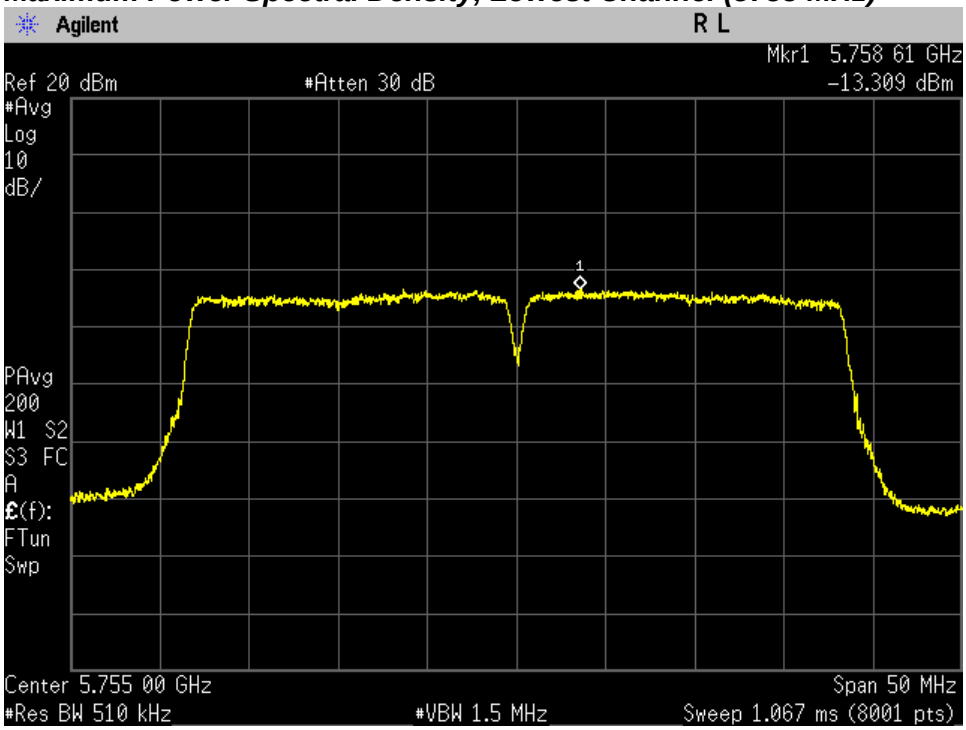


PLOTS OF EMISSIONS

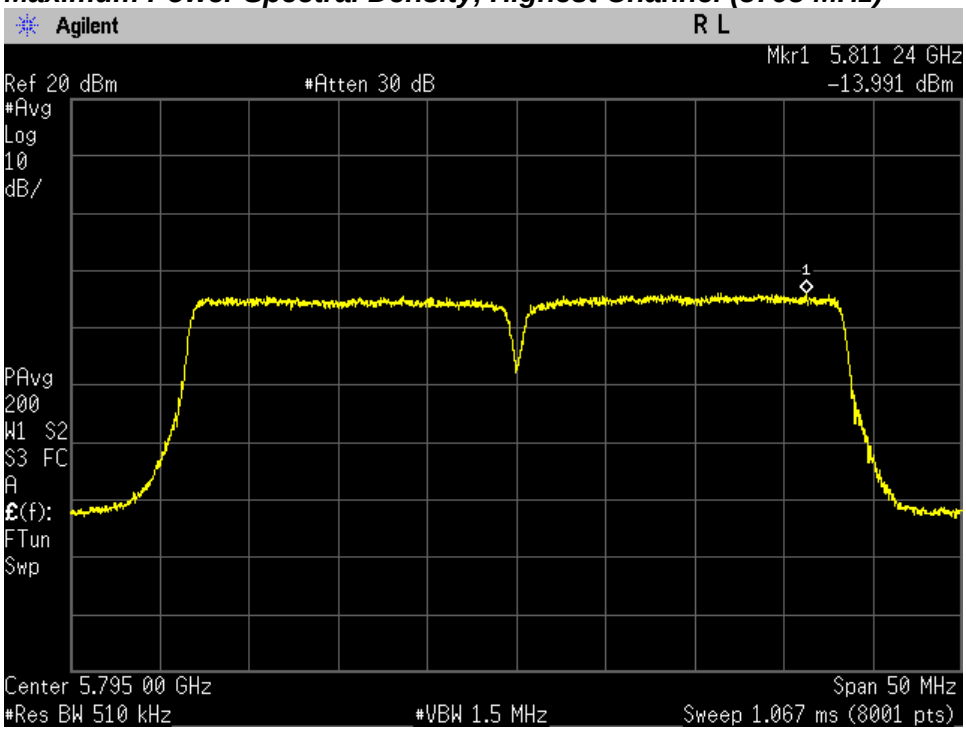
802.11ac (40 MHz) mode - MIMO

Chain 0

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



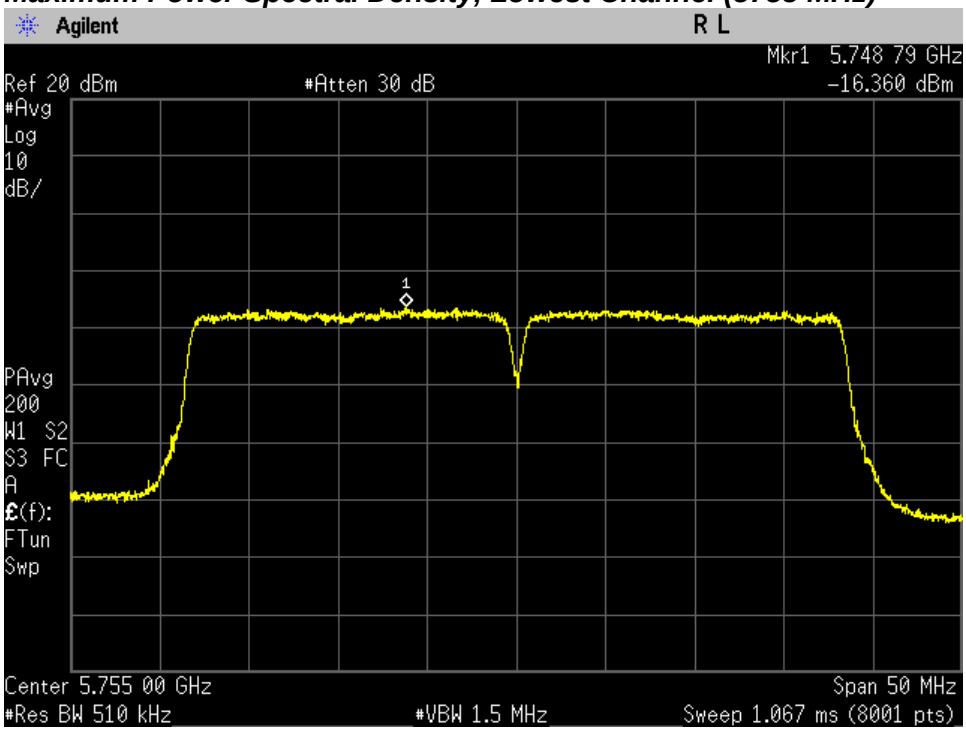
Maximum Power Spectral Density, Highest Channel (5795 MHz)



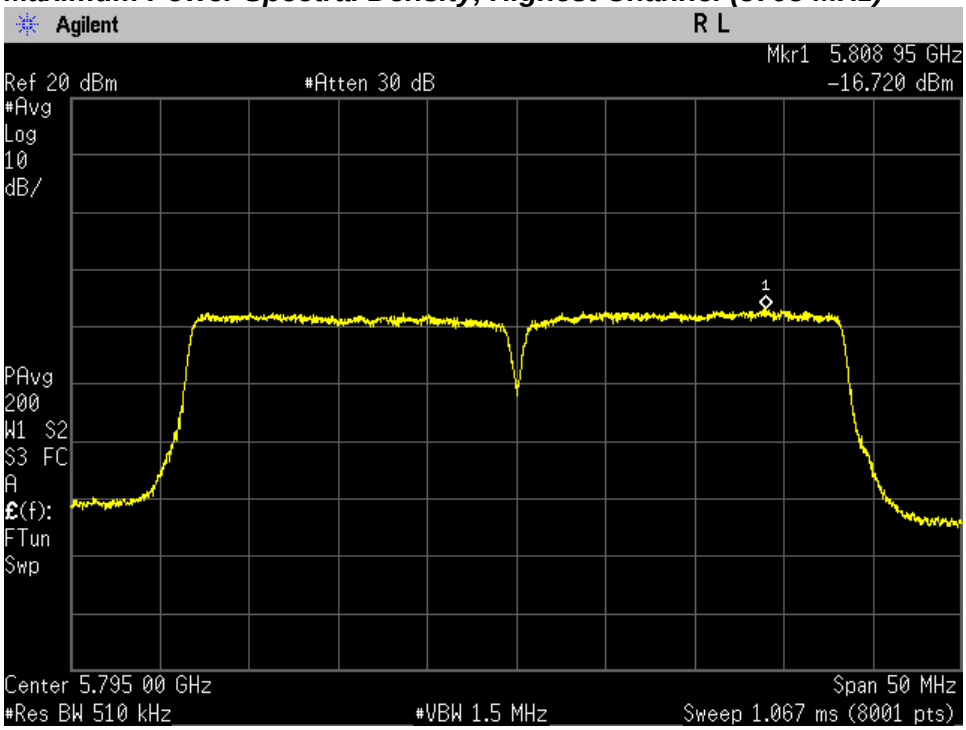
PLOTS OF EMISSIONS

Chain 1

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



Maximum Power Spectral Density, Highest Channel (5795 MHz)

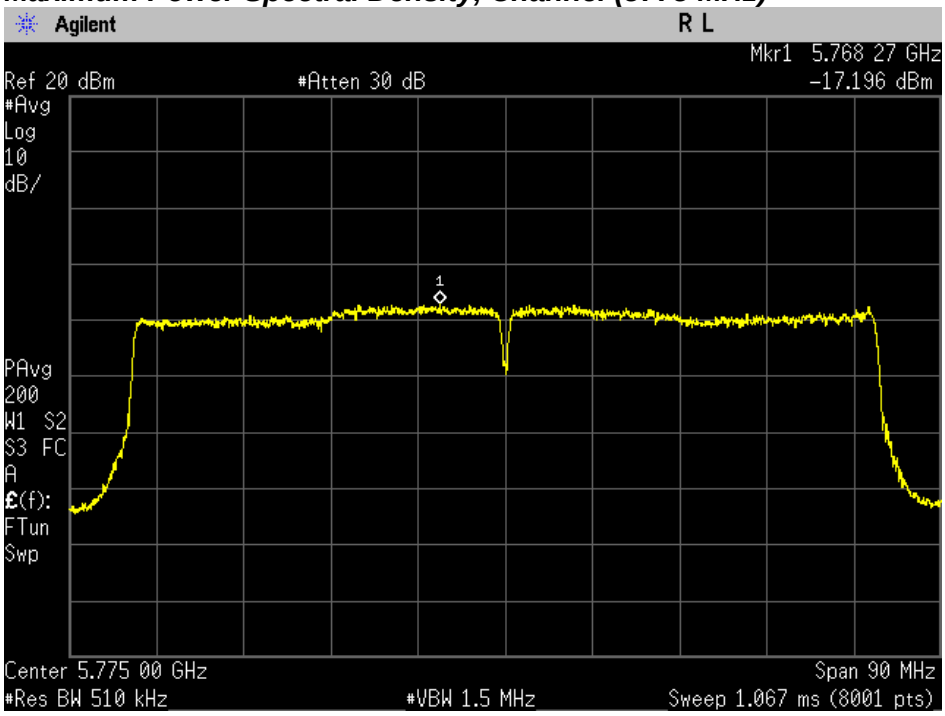


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - SISO

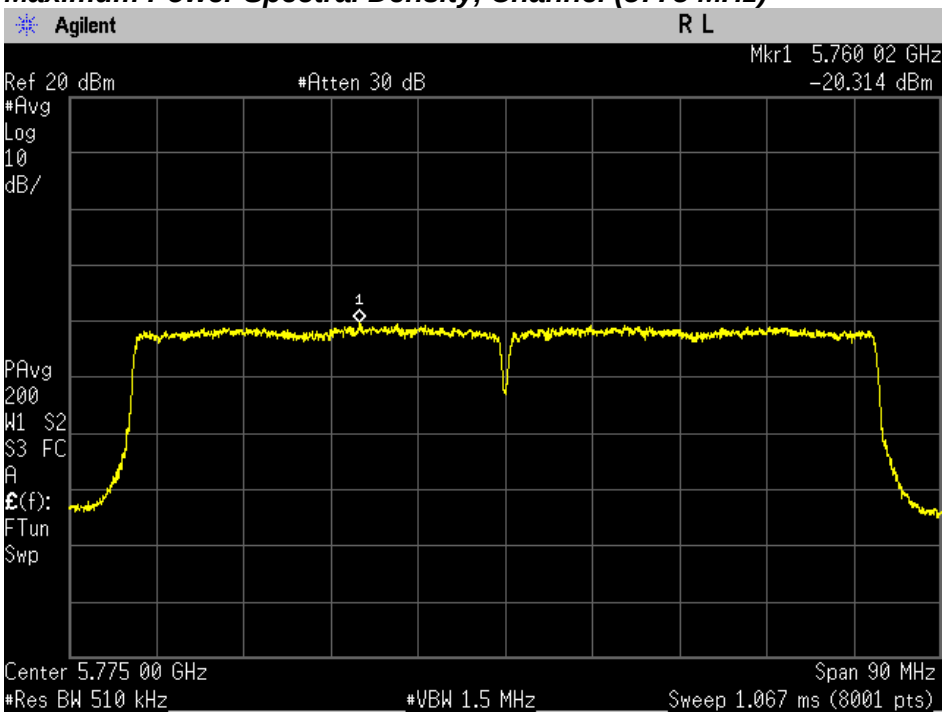
Chain 0

Maximum Power Spectral Density, Channel (5775 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5775 MHz)

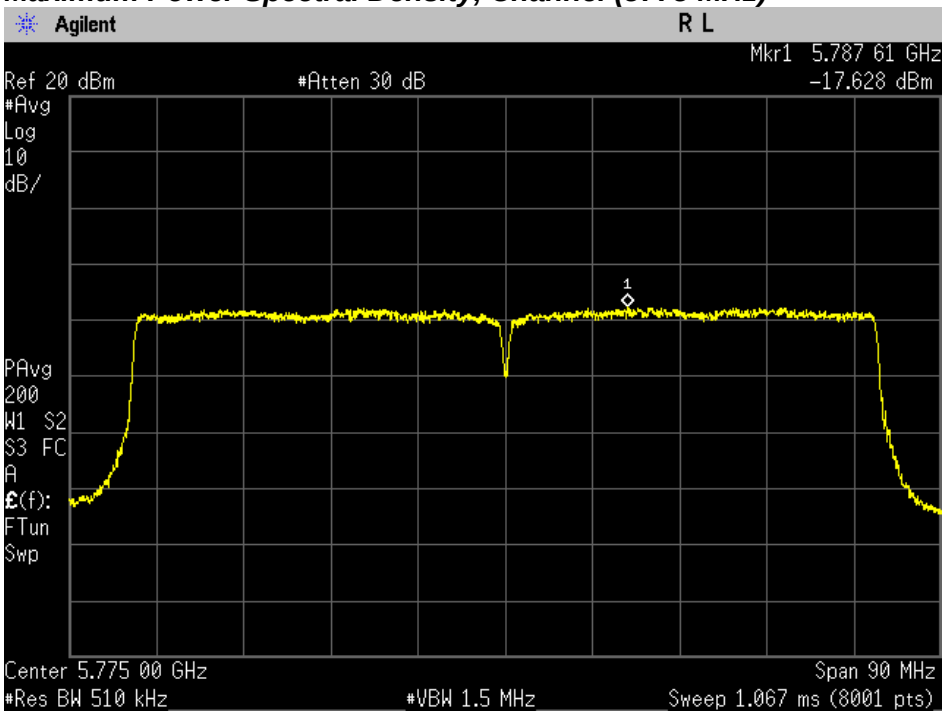


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - CDD

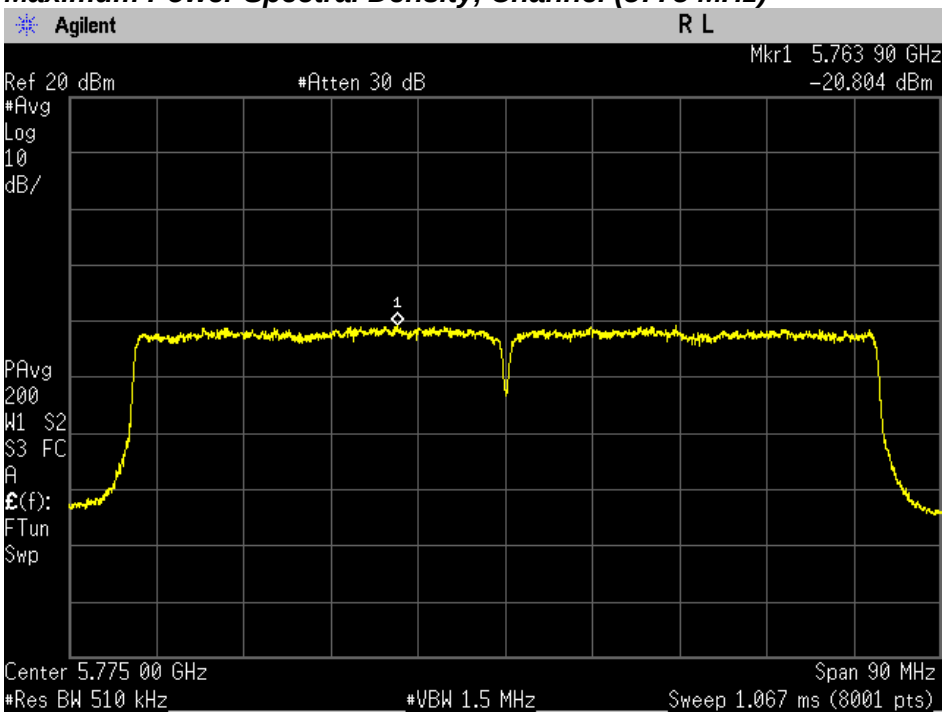
Chain 0

Maximum Power Spectral Density, Channel (5775 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5775 MHz)

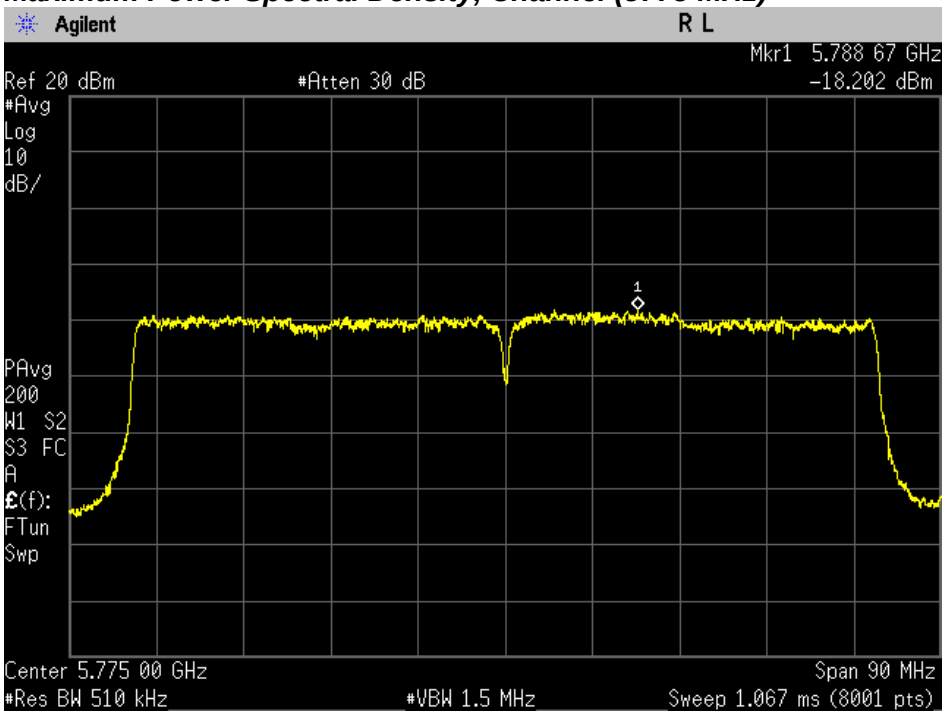


PLOTS OF EMISSIONS

802.11ac (80 MHz) mode - MIMO

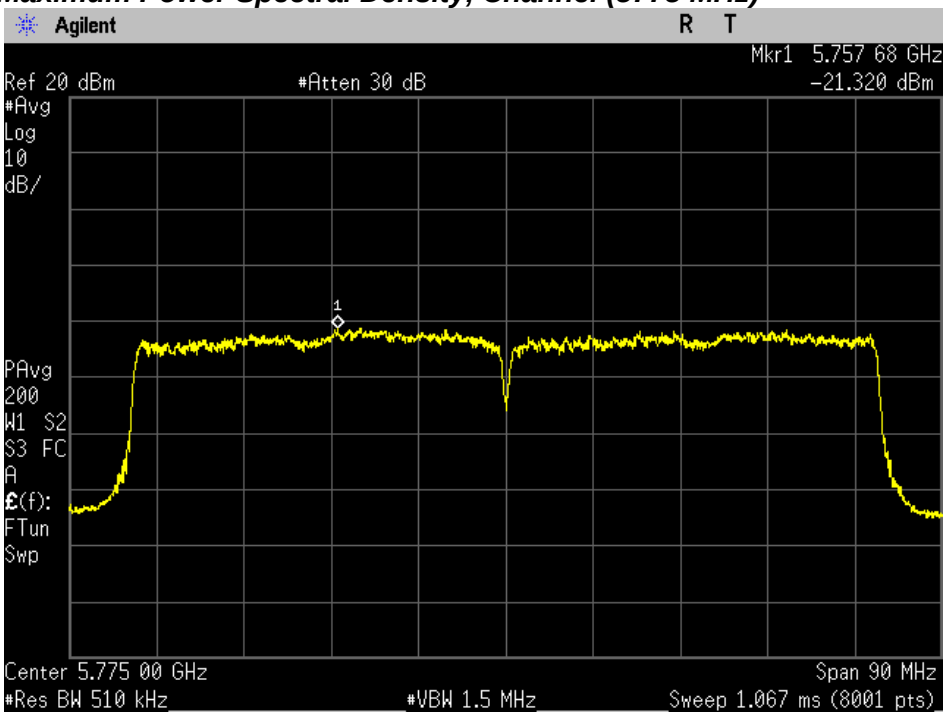
Chain 0

Maximum Power Spectral Density, Channel (5775 MHz)



Chain 1

Maximum Power Spectral Density, Channel (5775 MHz)



8.7 Radiated Spurious Emissions

8.7.1 Radiated Spurious Emissions – UNII-1 band

FCC §15.407(b), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Chain 0

Lowest Channel (5180 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	46.8	V	peak	4.2	51.0	68.2	17.2

Middle Channel (5200 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.40	47.1	V	peak	4.4	51.5	68.2	16.7

Highest Channel (5220 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.44	46.9	V	peak	4.7	51.6	68.2	16.6

802.11ac (20 MHz) mode – SISO

Chain 0

Lowest Channel (5180 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	47.0	V	peak	4.2	51.2	68.2	17.0

Middle Channel (5200 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.40	46.7	V	peak	4.4	51.1	68.2	17.1

Highest Channel (5220 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.44	46.8	V	peak	4.7	51.5	68.2	16.7

802.11ac (20 MHz) mode – CDD

Lowest Channel (5180 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	47.7	H	peak	4.2	51.9	68.2	16.3

Middle Channel (5200 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	46.8	V	peak	4.4	51.2	68.2	17.0

Highest Channel (5220 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.44	46.8	H	peak	4.7	51.5	68.2	16.7

802.11ac (20 MHz) mode – MIMO

Lowest Channel (5180 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	47.3	H	peak	4.2	51.5	68.2	16.7

Middle Channel (5200 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.36	46.7	V	peak	4.4	51.1	68.2	17.1

Highest Channel (5220 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.44	46.4	V	peak	4.7	51.1	68.2	17.1

802.11ac (40 MHz) mode – SISO

Chain 0

Channel (5190 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.38	47.4	H	peak	4.3	51.7	68.2	16.5

802.11ac (40 MHz) mode – CDD

Channel (5190 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.38	46.8	V	peak	4.3	51.1	68.2	17.1

802.11ac (40 MHz) mode – MIMO

Channel (5190 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
10.38	47.1	H	peak	4.3	51.4	68.2	16.8

Note:

*1. *Pol. H = Horizontal V = Vertical*

*2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.*

3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.

4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 3 kHz (VBW ≥ 1/T), Detector = Peak.

5. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the third harmonic and 26.5GHz for this device.

6. For outside of the restricted band, the peak limit is 68.2 dBµV/m. (E[dBµV/m] = EIRP[dBm] + 95.2 = 68.2 dBuV/m, for EIPR[dBm] = -27dBm.)

7. For restricted band, the peak limit is 74 dBµV/m, the average limit is 54 dBµV/m per FCC §15.209 and RSS-GEN Issue4 8.9

8. ac mode was the worst case of a/n/ac modes.

8. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.

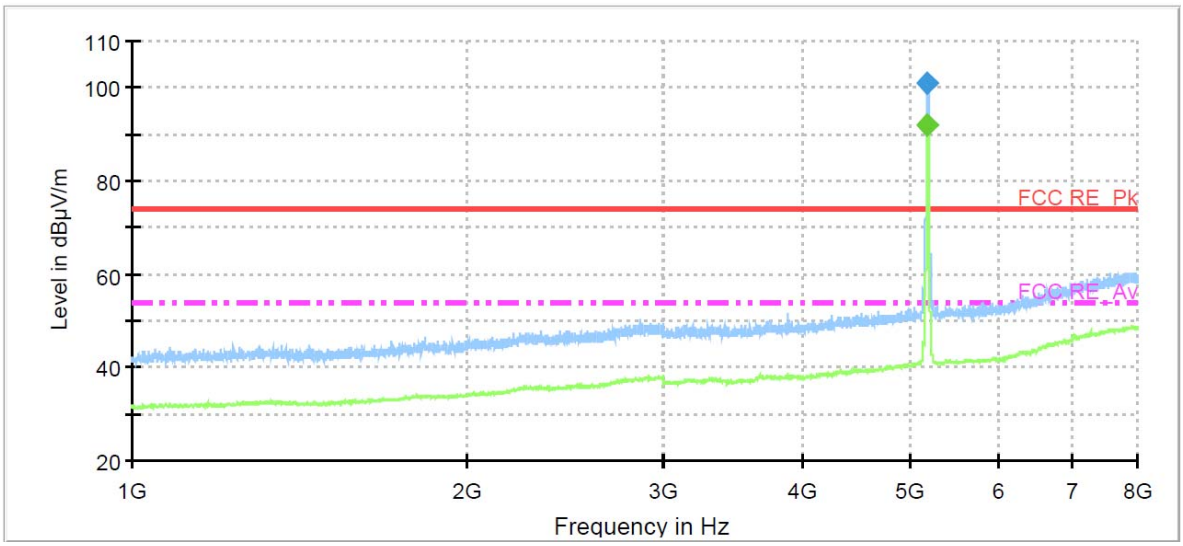
9. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

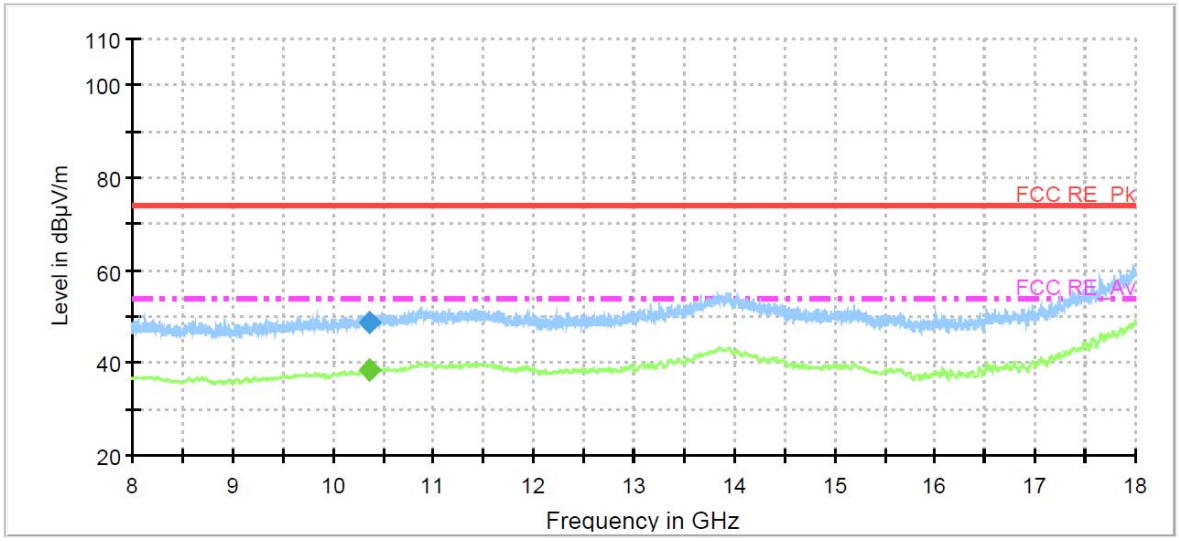
Worst Case

802.11ac (20 MHz) mode-CDD

Lowest Channel : 1 GHz to 8 GHz

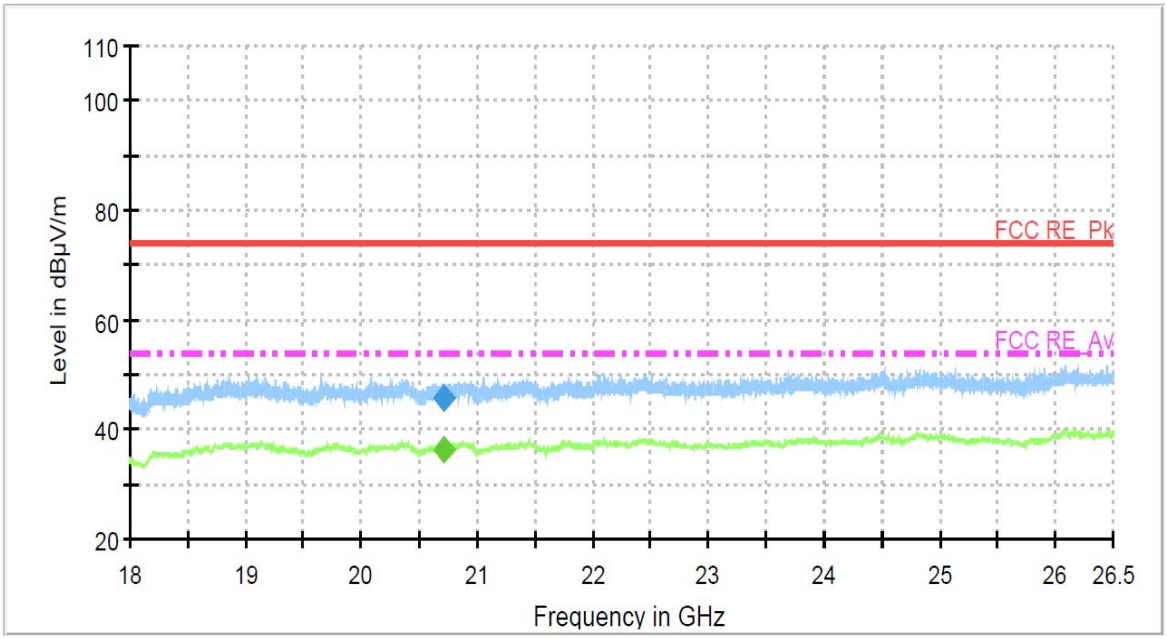


Lowest channel : 8 GHz to 18 GHz



PLOTS OF EMISSIONS

Lowest channel : 18 GHz to 26 GHz



8.7.2 Radiated Spurious Emissions – UNII-3 band

FCC §15.407(b), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode

Chain 0

Lowest Channel (5745 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.49	46.2	V	peak	5.8	52.0	74.0	22.0
11.49	33.0	V	average	5.8	38.8	54.0	15.2

Middle Channel (5785 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.57	46.4	V	peak	5.9	52.3	74.0	21.7
11.57	32.7	V	average	5.9	38.6	54.0	15.4

Highest Channel (5825 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.65	46.5	V	peak	5.6	52.1	74.0	21.9
11.65	32.7	V	average	5.6	38.3	54.0	15.7

802.11ac (20 MHz) mode - SISO

Chain 0

Lowest Channel (5745 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.49	46.9	V	peak	5.8	52.7	74.0	21.3
11.49	32.8	V	average	5.8	38.6	54.0	15.4

Middle Channel (5785 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.57	46.0	V	peak	5.9	51.9	74.0	22.1
11.57	32.6	V	average	5.9	38.5	54.0	15.5

Highest Channel (5825 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.65	46.6	V	peak	5.6	52.2	74.0	21.8
11.65	32.7	V	average	5.6	38.3	54.0	15.7

802.11ac (20 MHz) mode - CDD

Lowest Channel (5745 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.49	46.1	V	peak	5.8	51.9	74.0	22.1
11.49	33.2	V	average	5.8	39.0	54.0	15.0

Middle Channel (5785 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.57	46.1	V	peak	5.9	52.0	74.0	22.0
11.57	32.7	V	average	5.9	38.6	54.0	15.4

Highest Channel (5825 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.65	46.4	V	peak	5.6	52.0	74.0	22.0
11.65	32.6	V	average	5.6	38.2	54.0	15.8

802.11ac (20 MHz) mode - MIMO

Lowest Channel (5745 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.49	46.3	V	peak	5.8	52.1	74.0	21.9
11.49	32.6	V	average	5.8	38.4	54.0	15.6

Middle Channel (5785 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.57	46.1	V	peak	5.9	52.0	74.0	22.0
11.57	32.8	V	average	5.9	38.7	54.0	15.3

Highest Channel (5825 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.65	46.6	V	peak	5.6	52.2	74.0	21.8
11.65	32.7	V	average	5.6	38.3	54.0	15.7

802.11n (40 MHz) mode - SISO

Chain 0

Lowest Channel (5755 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.51	46.7	V	peak	5.8	52.5	74.0	21.5
11.51	32.5	V	average	5.8	38.3	54.0	15.7

Highest Channel (5795 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.59	45.8	V	peak	5.9	51.7	74.0	22.3
11.59	32.5	V	average	5.9	38.4	54.0	15.6

802.11n (40 MHz) mode - CDD

Lowest Channel (5755 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.51	46.5	V	peak	5.8	52.3	74.0	21.7
11.51	32.5	V	average	5.8	38.3	54.0	15.7

Highest Channel (5795 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.59	46.8	V	peak	5.9	52.7	74.0	21.3
11.59	32.4	V	average	5.9	38.3	54.0	15.7

802.11ac (40 MHz) mode - MIMO

Lowest Channel (5755 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.51	46.0	V	peak	5.8	51.8	74.0	22.2
11.51	32.6	V	average	5.8	38.4	54.0	15.6

Highest Channel (5795 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.59	46.0	V	peak	5.9	51.9	74.0	22.1
11.59	32.4	V	average	5.9	38.3	54.0	15.7

802.11ac (80 MHz) mode - MIMO

Chain 0

Channel (5775 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.55	45.9	V	peak	5.9	51.8	74.0	22.2
11.55	32.5	V	average	5.9	38.4	54.0	15.6

802.11ac (80 MHz) mode - CDD

Channel (5775 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.55	46.1	V	peak	5.9	52.0	74.0	22.0
11.55	32.5	V	average	5.9	38.4	54.0	15.6

802.11ac (80 MHz) mode - MIMO

Channel (5775 MHz)

Frequency (GHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.55	46.6	V	peak	5.8	52.4	74.0	21.6
11.55	32.5	V	average	5.8	38.3	54.0	15.7

TEST DATA

Note:

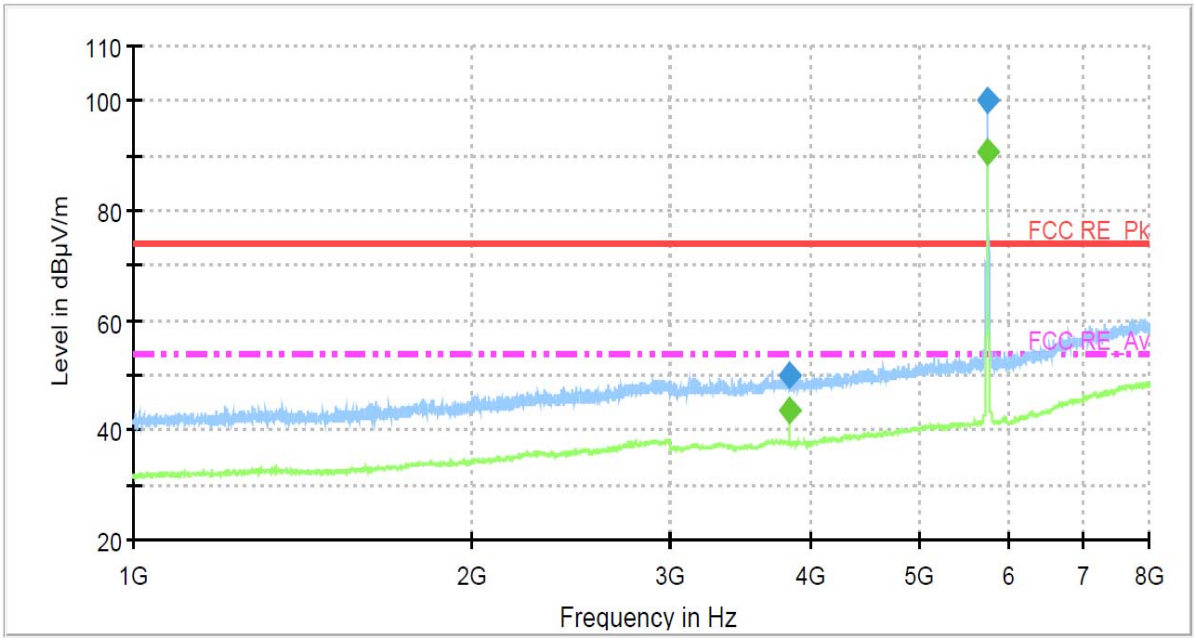
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 3 kHz (VBW ≥ 1/T), Detector = Peak.
5. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the third harmonic and 26.5GHz for this device.
6. For outside of the restricted band, the peak limit is 68.2 dBμV/m. (E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2 dBuV/m, for EIPR[dBm] = -27dBm.)
7. For restricted band, the peak limit is 74 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209 and RSS-GEN Issue4 8.9
8. ac mode was the worst case of a/n/ac modes.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

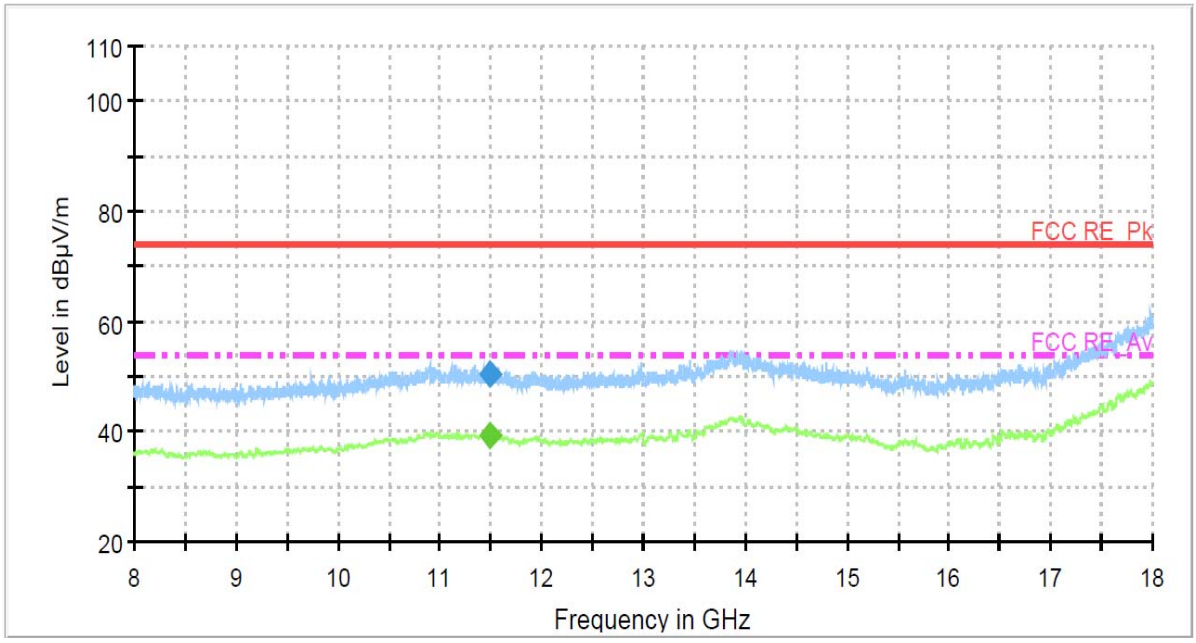
Worst Case

802.11ac (20 MHz) mode – CDD

Lowest channel : 1 GHz to 8 GHz

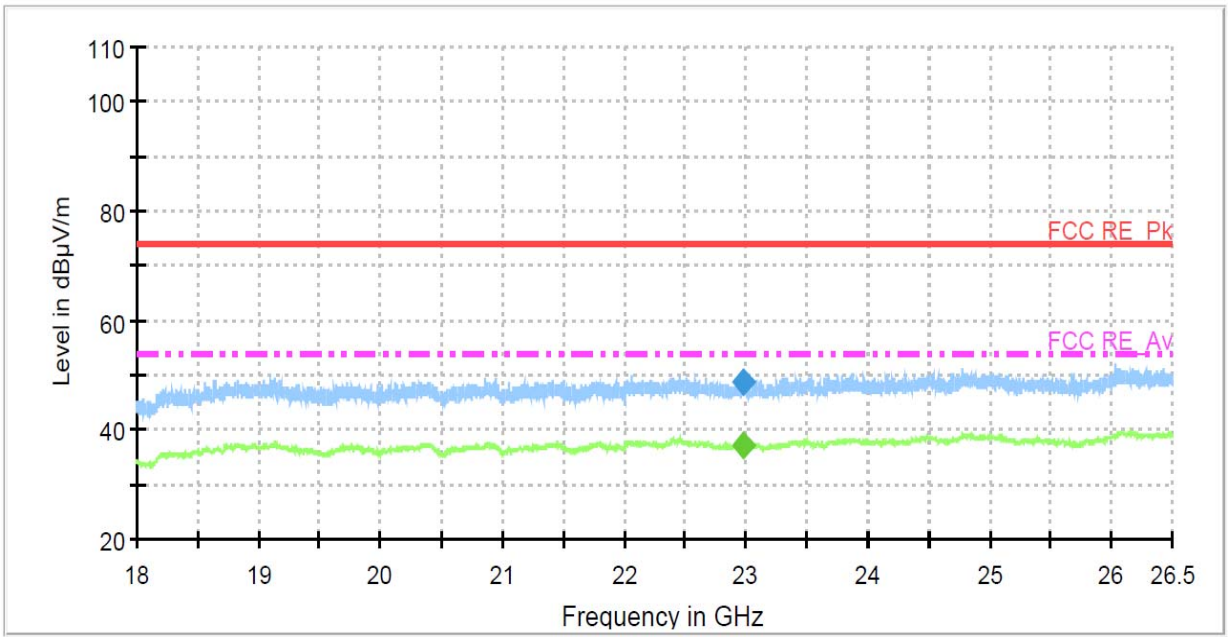


Lowest channel : 8 GHz to 18 GHz



PLOTS OF EMISSIONS

Lowest channel : 18 GHz to 26 GHz



8.8 Radiated Band Edge

8.8.1 Radiated Band Edge – UNII-1 band

FCC §15.407(b), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel and Highest channel

802.11a mode

Chain 0

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	48.00	H	peak	10.20	58.20	74.0	15.80
5150.00	32.20	H	average	10.20	42.40	54.0	11.60

802.11n (20 MHz) mode – SISO

Chain 0

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	51.60	H	peak	10.20	61.80	74.0	12.20
5150.00	34.10	H	average	10.20	44.30	54.0	9.70

802.11n (20 MHz) mode – CDD

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	53.80	H	peak	10.20	64.00	74.0	10.00
5150.00	38.80	H	average	10.20	49.00	54.0	5.00

802.11n (20 MHz) mode – MIMO

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	50.50	H	peak	10.20	60.70	74.0	13.30
5150.00	34.20	H	average	10.20	44.40	54.0	9.60

802.11n (40 MHz) mode – SISO

Chain 0

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	53.40	H	peak	10.20	63.60	74.0	10.40
5150.00	37.70	H	average	10.20	47.90	54.0	6.10

TEST DATA

802.11n (40 MHz) mode – CDD

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	55.90	H	peak	10.20	66.10	74.0	7.90
5150.00	41.20	H	average	10.20	51.40	54.0	2.60

802.11n (40 MHz) mode – MIMO

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	55.20	H	peak	10.20	65.40	74.0	8.60
5150.00	40.80	H	average	10.20	51.00	54.0	3.00

TEST DATA

802.11ac (20 MHz) mode – SISO

Chain 0

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	48.70	H	peak	10.20	58.90	74.0	15.10
5150.00	32.60	H	average	10.20	42.80	54.0	11.20

802.11ac (20 MHz) mode – CDD

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	50.70	H	peak	10.20	60.90	74.0	13.10
5150.00	35.10	H	average	10.20	45.30	54.0	8.70

802.11ac (20 MHz) mode – MIMO

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	49.00	H	peak	10.20	59.20	74.0	14.80
5150.00	34.20	H	average	10.20	44.40	54.0	9.60

TEST DATA

802.11ac (40 MHz) mode – SISO

Chain 0

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	53.60	H	peak	10.20	63.80	74.0	10.20
5150.00	37.70	H	average	10.20	47.90	54.0	6.10

802.11ac (40 MHz) mode – CDD

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5149.57	56.20	H	peak	10.20	66.40	74.0	7.60
5150.00	40.90	H	average	10.20	51.10	54.0	2.90

802.11ac (40 MHz) mode – MIMO

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	52.90	H	peak	10.20	63.10	74.0	10.90
5150.00	39.50	H	average	10.20	49.70	54.0	4.30

8.8.2 Radiated Band Edge – UNII-3 band

FCC §15.407(b), RSS-247 Issue 1, 6.2

Test Mode : Set to Lowest channel and Highest channel

802.11a mode

Chain 0

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5725.00	50.90	V	peak	11.00	61.90	78.2	16.30

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	56.20	V	peak	11.40	67.60	78.2	10.60
5860.89	47.70	V	peak	11.40	59.10	68.2	9.10

802.11n (20 MHz) mode – SISO

Chain 0

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5713.83	50.20	V	peak	11.00	61.20	68.2	7.00
5724.74	58.50	V	peak	11.00	69.50	78.2	8.70

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	49.40	V	peak	11.40	60.80	78.2	17.40
5860.09	46.30	V	peak	11.40	57.70	68.2	10.50

802.11n (20 MHz) mode – CDD

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5709.96	46.50	V	peak	11.00	57.50	68.2	10.70
5725.00	53.00	V	average	11.00	64.00	78.2	14.20

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	52.90	V	peak	11.40	64.30	78.2	13.90
5860.63	49.30	V	peak	11.40	60.70	68.2	7.50

802.11n (20 MHz) mode – MIMO

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5713.89	46.80	V	peak	11.00	57.80	68.2	10.40
5725.00	50.20	V	average	11.00	61.20	78.2	17.00

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.71	54.00	V	peak	11.40	65.40	78.2	12.80
5860.43	49.30	V	peak	11.40	60.70	68.2	7.50

802.11n (40 MHz) mode – SISO

Chain 0

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5713.63	49.50	V	peak	11.00	60.50	68.2	7.70
5723.59	49.70	V	average	11.00	60.70	78.2	17.50

Highest Channel (5795 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	43.60	V	peak	11.40	55.00	78.2	23.20

802.11n (40 MHz) mode – CDD

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5714.53	52.50	V	peak	11.00	63.50	68.2	4.70
5723.54	55.90	V	peak	11.00	66.90	78.2	11.30
5725.00	51.80	V	peak	11.00	62.80	78.2	15.40

Highest Channel (5795 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	44.80	V	peak	11.40	56.20	78.2	22.00
5856.54	46.30	V	peak	11.40	57.70	78.2	20.50
5863.46	45.10	V	peak	11.40	56.50	68.2	11.70

802.11n (40 MHz) mode – MIMO

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5705.88	46.70	V	peak	11.00	57.70	68.2	10.50
5718.13	48.20	V	peak	11.00	59.20	78.2	19.00
5725.00	46.40	V	peak	11.00	57.40	78.2	20.80

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	43.30	V	peak	11.40	54.70	78.2	23.50
5861.10	44.20	V	peak	11.40	55.60	68.2	12.60

TEST DATA

802.11ac (20 MHz) mode – SISO

Chain 0

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5725.00	49.30	V	peak	11.00	60.30	78.2	17.90

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	53.00	V	peak	11.40	64.40	78.2	13.80
5860.44	47.90	V	peak	11.40	59.30	68.2	8.90

802.11ac (20 MHz) mode – CDD

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5714.64	49.10	V	peak	11.00	60.10	68.2	8.10
5724.38	57.80	V	peak	11.00	68.80	78.2	9.40
5725.00	56.10	V	peak	11.00	67.10	78.2	11.10

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	54.20	V	peak	11.40	65.60	78.2	12.60
5864.15	47.30	V	peak	11.40	58.70	68.2	9.50

TEST DATA

802.11n (20 MHz) mode – MIMO

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5714.91	49.30	V	peak	11.00	60.30	68.2	7.90
5725.00	56.30	V	average	11.00	67.30	78.2	10.90

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	53.00	V	peak	11.40	64.40	78.2	13.80
5862.13	46.70	V	peak	11.40	58.10	68.2	10.10

802.11ac (40 MHz) mode – SISO

Chain 0

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5713.63	49.50	V	peak	11.00	60.50	68.2	7.70
5723.59	49.70	V	average	11.00	60.70	78.2	17.50

Highest Channel (5795 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	43.60	V	peak	11.40	55.00	78.2	23.20

TEST DATA

802.11ac (40 MHz) mode – CDD

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5713.85	52.10	V	peak	11.00	63.10	68.2	5.10
5723.01	55.50	V	peak	11.00	66.50	78.2	11.70
5725.00	54.30	V	peak	11.00	65.30	78.2	12.90

Highest Channel (5795 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	44.40	V	peak	11.40	55.80	78.2	22.40

802.11n (40 MHz) mode – MIMO

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5711.56	46.90	V	peak	11.00	57.90	68.2	10.30
5724.08	48.00	V	peak	11.00	59.00	78.2	19.20
5724.95	46.50	V	peak	11.00	57.50	78.2	20.70

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.17	43.90	V	peak	11.40	55.30	78.2	22.90

802.11ac (80 MHz) mode – SISO

Chain 0

Low Band Edge Channel (5775 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5709.04	46.10	V	peak	11.00	57.10	68.2	11.10
5718.95	47.40	V	peak	11.00	58.40	78.2	19.80
5725.00	43.50	V	peak	11.00	54.50	78.2	23.70

High Band Edge Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	47.30	V	peak	11.40	58.70	78.2	19.50
5853.98	50.10	V	peak	11.40	61.50	78.2	16.70
5860.73	48.30	V	peak	11.40	59.70	68.2	8.50

802.11ac (80 MHz) mode – CDD

Low Band Edge Channel (5775 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5706.03	47.80	V	peak	11.00	58.80	68.2	9.40
5724.74	48.20	V	peak	11.00	59.20	78.2	19.00
5725.00	44.90	V	peak	11.00	55.90	78.2	22.30

High Band Edge - Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	48.30	V	peak	11.40	59.70	78.2	18.50
5861.31	47.70	V	peak	11.40	59.10	68.2	9.10

802.11ac (80 MHz) mode – MIMO

Low Band Edge - Channel (5775 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5707.55	49.00	V	peak	11.00	60.00	68.2	8.20
5720.14	50.10	V	peak	11.00	61.10	78.2	17.10
5725.00	48.30	V	peak	11.00	59.30	78.2	18.90

High Band Edge - Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5850.00	47.80	V	peak	11.40	59.20	78.2	19.00
5862.00	48.10	V	peak	11.40	59.50	68.2	8.70

TEST DATA

Note:

1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. All modes of operation and all lowest, highest channels were investigated and the worst -case emissions in each band are reported.
4. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
5. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 3kHz (VBW ≥ 1/T), Detector = Peak.
6. For outside of the restricted band, the peak limit is 68.2 dBμV/m. (E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2 dBuV/m, for EIPR[dBm] = -27dBm.)

   ***For 5.725-5.85 GHz band, All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

   peak limit is 78.2 dBμV/m. (E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2 dBuV/m, for EIPR[dBm] = -17dBm.)

   peak limit is 68.2 dBμV/m. (E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2 dBuV/m, for EIPR[dBm] = -27dBm.)
7. For restricted band, the peak limit is 74 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209 and RSS-GEN Issue4 8.9
8. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
9. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

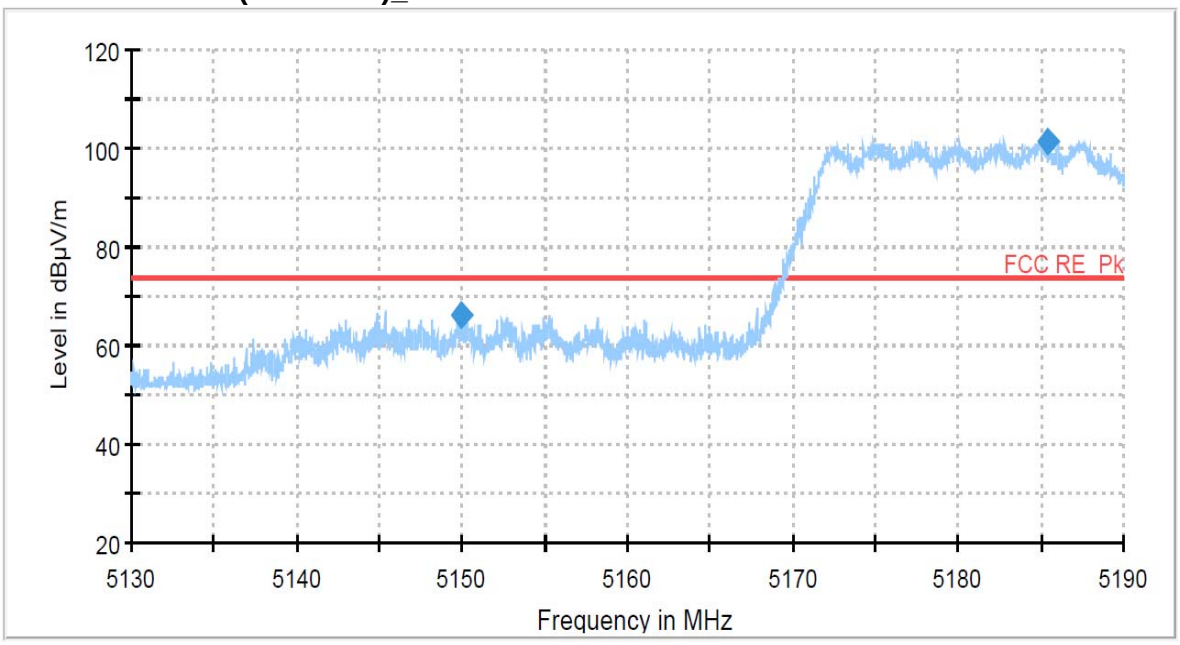
PLOTS OF EMISSIONS

Worst Case

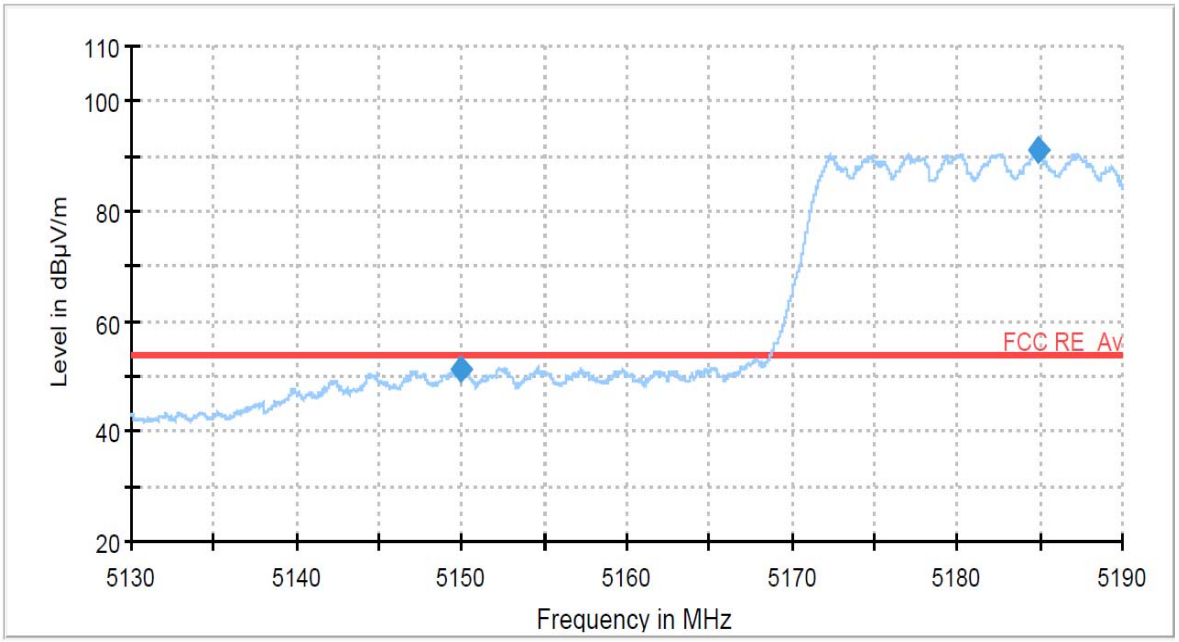
Radiated Band Edge – UNII-1 band

802.11n (40 MHz) mode - CDD

Lowest Channel (5150 MHz)_PK



Lowest Channel (5150 MHz)_AV

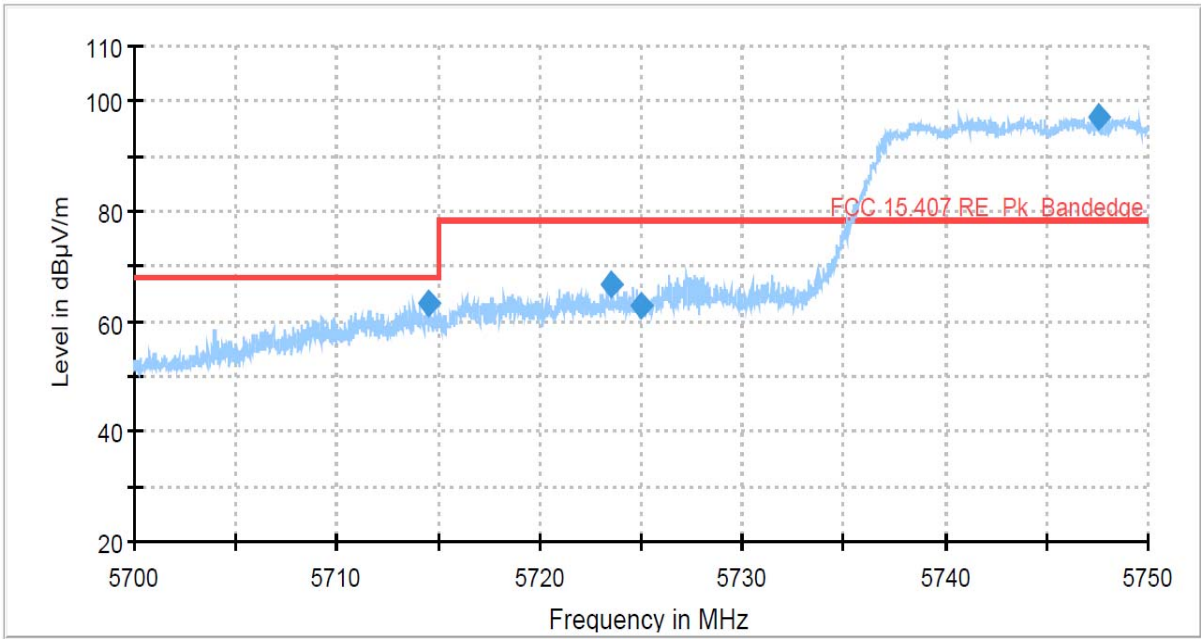


PLOTS OF EMISSIONS

Radiated Band Edge – UNII-3

802.11n (40 MHz) mode - CDD

Lowest Channel (5755 MHz)_PK



9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	Apr. 04 2016	1 year
2	*Test Receiver	R & S	ESCS30	100302	Oct. 06 2015	1 year
3	*Attenuator	PASTERNACK	PE7395-10	1441	Jan. 19 2016	1 year
4	*Attenuator	FAIRVIEW	SA3N5W-06	N/A	Apr. 04 2016	1 year
5	*Attenuator	FAIRVIEW	SA3N5W-10	N/A	Apr. 04 2016	1 year
6	Attenuator	WEINSCHEL	56-10	58765	Oct. 02 2015	1 year
7	*Amplifier	R & S	SCU 01	10030	Apr. 04 2016	1 year
8	*Amplifier	R & S	SCU18	10065	Apr. 04 2016	1 year
9	*Amplifier	R & S	SCU26	10011	Jul. 17 2015	1 year
10	*Amplifier	R & S	SCU40	10008	Aug. 10 2015	1 year
11	*Pre Amplifier	HP	8449B	3008A00107	Jan. 07 2016	1 year
12	Spectrum Analyzer	R & S	FSW43	100732	Apr. 05 2016	1 year
13	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Oct. 15 2015	1 year
14	*Spectrum Analyzer	R&S	FSP40	100361	Jul. 16 2015	1 year
15	DC Power Supply	HP	6574A	US36340190	Jul. 17 2015	1 year
16	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 22 2016	2 year
17	Wideband Power Sensor	R & S	NRP-Z81	100634	Jul. 17 2015	1 year
18	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-474	Sep. 01 2014	2 year
19	*Horn Antenna	Q-par Angus	QSH20S20	8179	Apr. 30 2015	2 year
20	*Horn Antenna	Q-par Angus	QSH22K20	8180	Apr. 30 2015	2 year
21	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	9163-423	Nov. 04 2015	2 year
22	*LISN	R & S	ESH3-Z5	833874/006	Oct. 06 2015	1 year
23	*Controller	INNCO	CO2000-G	CO2000/562/23890210/L	N/A	N/A
24	*Turn Table	INNCO	DT3000-3T	N/A	N/A	N/A
25	*Antenna Mast	INNCO	MA4000-EP	N/A	N/A	N/A
26	*Open Switch And Control Unit	R & S	OSP-120	100015	N/A	N/A
27	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
28	*Position Controller	INNCO	CO2000	12480406/L	N/A	N/A
29	*Turn Table	INNCO	DS1200S	N/A	N/A	N/A
30	*Antenna Mast	INNCO	MA4000	N/A	N/A	N/A
31	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
32	Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A
33	*Open Switch And Control Unit	R & S	OSP-120	100081	N/A	N/A

*) Test equipment used during the test

10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	ⓐ: AMN-Receiver Mismatch : + ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expended Uncertainty U	Normal (k = 2)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	**RS**	0.34	normal 1	1.00	0.34	1	0.34
Receiver reading	**Ri**	± 0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	**dVsw**	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	**dVpa**	± 0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	**dVpr**	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	**dVnf**	± 0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	**AF**	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	**CL**	± 1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	**AD**	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	**AH**	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	**AP**	± 0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	**Ai**	± 0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	**Si**	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	**DV**	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	**Dbal**	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	**DCross**	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.18
Mismatch	**M**	+ 0.98 - 1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
EUT Volume Diameter	**Vd**	0.33	normal 1	1.00	0.33	1	0.11
Remark							
Combined Standard Uncertainty	Normal						
Expended Uncertainty U	Normal (k = 2)						