Nemko Korea Co., Ltd.

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FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Healcerion Co., Ltd
804ho, 38-21, Digital-ro 31-gil, Guro-gu, Seoul, 08376, Republic of KOREA
Attn. : Minji Bang

Dates of Issue : December 18, 2017
Test Report No. : NK-17-R-218
Test Site : Nemko Korea Co., Ltd.

FCC ID	**2ADXVSWM500**
Brand Name	**Healcerion Co., Ltd**
Contact Person	**Healcerion Co., Ltd** **804ho, 38-21, Digital-ro 31-gil, Guro-gu,** **Seoul, 08376, Republic of KOREA** **Minji Bang** **Telephone No. : 82-2-6342-6326**

Applied Standard: FCC 47 CFR Part 15.407
Classification: Unlicensed National Information Infrastructure (NII)
EUT Type: Wifi 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.

Dec. 18. 2017

Tested By : Yonghwan Kim
Engineer

Dec 18. 2017

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.

Responsible Party :	Healcerion Co., Ltd 804ho, 38-21, Digital-ro 31-gil, Guro-gu, Seoul, 08376, Republic of KOREA
Contact Person :	Minji Bang
Manufacturer :	Healcerion Co., Ltd 804ho, 38-21, Digital-ro 31-gil, Guro-gu, Seoul, 08376, Republic of KOREA

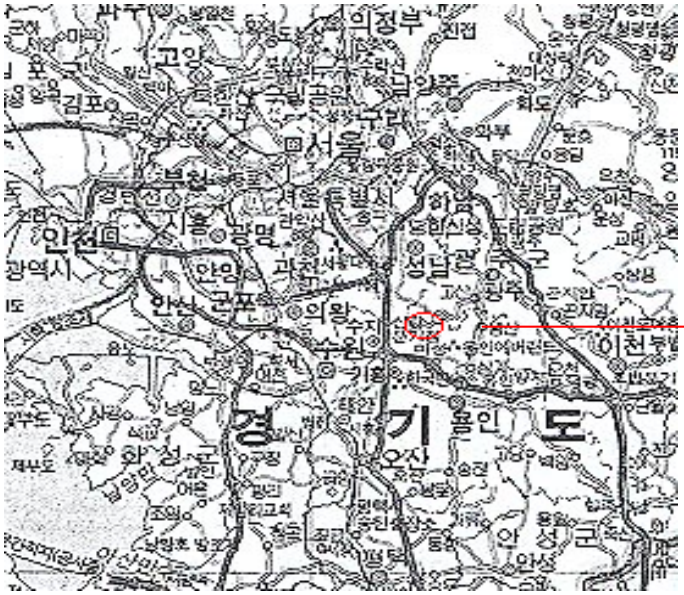
- FCC ID: 2ADXVSWM500
- Model: SWM-500
- Brand Name: Healcerion Co., Ltd
- EUT Type: Wifi Module
- Classification: Unlicensed National Information Infrastructure (NII)
- Applied Standard: FCC 47 CFR Part 15.407
- Test Procedure(s): 789033 D02 General UNII Test Procedures New Rules v01r04 dated May 2, 2017 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E”.
- Dates of Test: October 12, 2017 ~ December 11, 2017
- 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 **Healcerion Co., Ltd FCC ID : 2ADXVSWM500.**

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 16885 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.
EMC Lab.
155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 KOREA, REPUBLIC OF
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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 transceiver which is module supporting the 802.11n mode (802.11n(20,40MHz) : 1TX/1RX).
The Laptop was used to control the EUT to transmit the wanted TX channel continuously (dutycycle 100%) by the testing program (TeraTerm) supported by manufacturer. The Laptop was removed after controlling the EUT to transmit the wanted signal.
The operating voltage of EUT was 3.3 Vdc, 1.8Vdc supplied from jig board.
The EUT was tested at the lowest , middle and the highest channels 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	Power setting Level
5180 MHz ~ 5220 MHz	802.11n (20 MHz)	13
	802.11n (40 MHz)	13
5745 MHz ~ 5825 MHz	802.11n (20 MHz)	14
	802.11n (40 MHz)	14

3.1.2 Table of test channels

Frequency band	Mode	Test Channel (CH)	Frequency (MHz)
U-NII-1	802.11n (20MHz)	36	5180
		44	5220
		48	5240
	802.11n (40MHz)	38	5190
		46	5230
U-NII-3	802.11n (20MHz)	149	5745
		157	5785
		165	5825
	802.11n (40 MHz)	151	5755
		159	5795

3.1.3 Antenna information:

Frequency band	Mode	Data rate	Antenna TX mode	Support CDD	Support MIMO
5 GHz	802.11n (20 MHz)	MCS 0~7	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No
	802.11n (40 MHz)	MCS 0~7	■ 1TX, □ 2TX	□ Yes, ■ No	□ Yes, ■ No

3.1.4 Additional Information Related to Testing

The cable and attenuator loss from 30MHz to 26.5GHz was reflected in spectrum analyzer with correction factor for all conducted testing.

3.1.5 Table of test modes

Test Items	Mode	*Data rate (Mbps)	Test Channel (CH)
Radiated Emissions	802.11n (20 MHz)	MCS0	157
26 dB Bandwidth	802.11n (20 MHz)	MCS0	36/44/48 149/157/165
	802.11n (40 MHz)	MCS0	38/46 151/159
6 dB Bandwidth	802.11n (20 MHz)	MCS0	149/157/165
	802.11n (40 MHz)	MCS0	151/159
Maximum conducted Output Power	802.11n (20 MHz)	MCS0	36/44/48 149/157/165
	802.11n (40 MHz)	MCS0	38/46 151/159
Power Spectral Density	802.11n (20 MHz)	MCS0	36/44/48 149/157/165
	802.11n (40 MHz)	MCS0	38/46 151/159
Radiated Spurious Emission	802.11n (20 MHz)	MCS0	36/44/48 149/157/165
	802.11n (40 MHz)	MCS0	38/46 151/159
Radiated Band edge Emission	802.11n (20 MHz)	MCS0	36/48 149//165
	802.11n (40 MHz)	MCS0	38/46 151/159

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

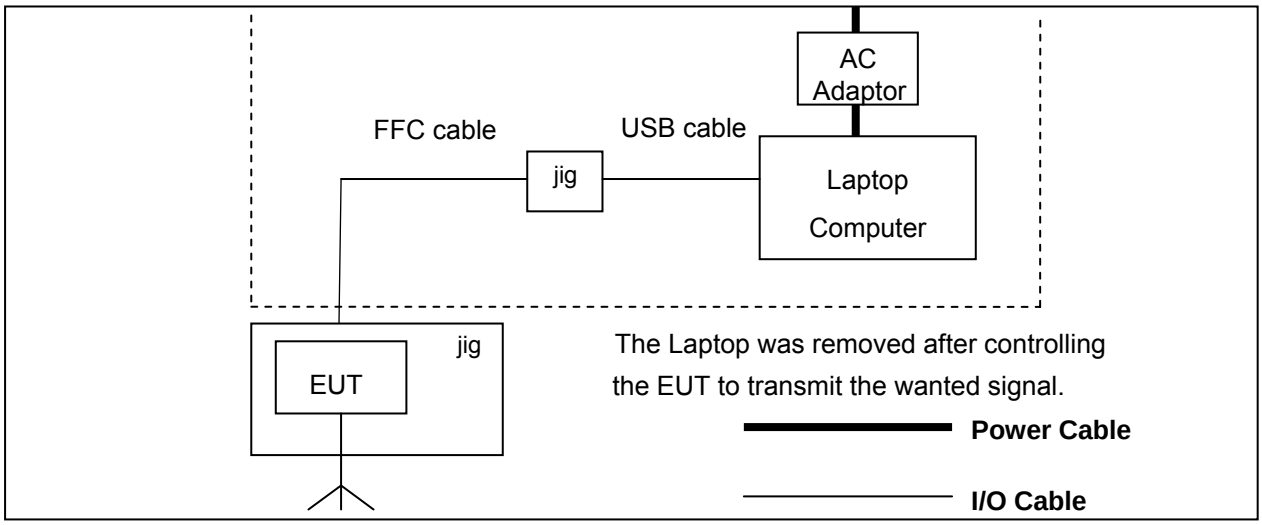
3.1.6 Table of actual operating channels

Frequency band	Bandwidth	channel	Frequency (MHz)
UNII-1	20MHz	36	5180
		40	5200
		44	5220
		48	5240
	40MHz	38	5190
		46	5230
UNII-3	20MHz	149	5745
		153	5765
		157	5785
		161	5805
		165	5825
	40MHz	151	5755
		159	5795

3.2 Support Equipment

EUT	Healcerion Co., Ltd. Model : SWM-500	S/N: N/A
Laptop Computer	LG Model : 14Z970	FCC DOC S/N : 701NZFQ065883
AC/DC Adapter	LG Model : LCAP48-WK 1.5 m unshielded power cable	FCC DOC S/N : N/A

3.3 Setup Drawing



3.4 EUT Information

The EUT is the **Healcerion Co., Ltd Wifi Module FCC ID: 2ADXVSWM500.**

Specifications:

EUT Type	Wifi Module
Model Name	SWM-500
Brand Name	Healcerion Co., Ltd.
Frequency of Operation	For U-NII-1 Band 802.11n(20 MHz): 5180 MHz ~ 5240 MHz 802.11n(40 MHz): 5190 MHz ~ 5230 MHz For U-NII-3 Band 802.11n(20 MHz): 5745 MHz ~ 5825 MHz 802.11n(40 MHz): 5755 MHz ~ 5795 MHz
Maximum Conducted Output Power	For U-NII-1 Band 802.11n(20 MHz): 10.77 dBm 802.11n(40 MHz): 10.82 dBm For U-NII-3 Band 802.11n(20 MHz): 10.58 dBm 802.11n(40 MHz): 10.63 dBm
FCC Classification	Unlicensed National Information Infrastructure (NII)
Number of Channels	For U-NII-1 Band 802.11n(20 MHz): 4ch, 802.11n(40 MHz): 2ch For U-NII-3 Band 802.11n(20 MHz): 5ch, 802.11n(40 MHz): 2ch
Modulations	OFDM(BPSK,QPSK,16QAM,64QAM) for 802.11n
Antenna Gain (peak)	4.5 dBi
Antenna Setup	802.11n (20, 40MHz) : 1TX / 1RX
Voltage	3.3 Vdc, 1.8 Vdc
Temperature Range	-20 ℃ ~ +50 ℃
Size (L x W x H)	About 20 mm x 25 mm x 1 mm
Weight	About 1 g
Remarks	-

4. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	FCC Paragraph No.	Result	Remark
Radiated Emission	15.209	Complies	
26 dB Spectrum Bandwidth and 99% Occupied bandwidth	15.407(a)	Complies	
6 dB Bandwidth	15.407(e)	Complies	
Maximum Conducted Output Power	15.407(a)	Complies	
Power Spectral Density	15.407(a)	Complies	
Radiated Spurious Emission	15.407(b)	Complies	
Maximum Permissible Exposure	1.1307(b)	Complies	

5. RECOMMENDATION/CONCLUSION

The data collected shows that the **Healcerion Co., Ltd Wifi Module FCC ID: 2ADXVSWM500** is in compliance with Part 15.407 of the FCC Rule.

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 **Healcerion Co., Ltd Wifi Module FCC ID: 2ADXVSWM500** is **permanently attached** and there are no provisions for connection to an external antenna. It complies with the requirement of §15.203.

7. DESCRIPTION OF TESTS

7.1 Radiated Emissions

The measurement was performed at the test site that is specified in accordance with ANSI 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, Q-par Angus QSH22K20 : 26.5 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 v01r04”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, and allow max hold to run for at least 50 times (1/duty cycle) traces.

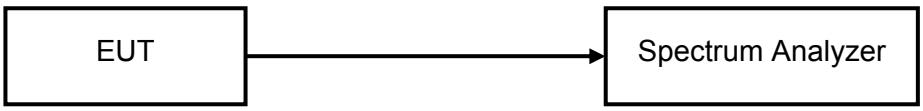
Unwanted emissions outside of the restricted bands

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

At frequencies above 1000 MHz, measurements performed using the peak measurement procedures described in KDB “789033 D02 General UNII Test Procedures New Rules v01r04” 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.

7.2 26 dB Bandwidth and 99% Occupied bandwidth

Test Setup

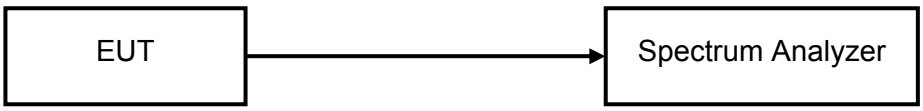


Test Procedure

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.

7.3 6 dB Bandwidth

Test Setup

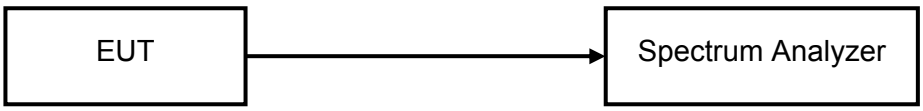


Test Procedure

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.

7.4 Maximum Conducted Output Power (average)

Test Setup

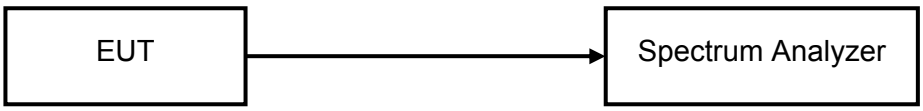


Test Procedure

EUTs Maximum Conducted Output Power (average) 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, x, of the transmitter output signal
Span = encompass the EBW of the signal.
RBW = 1 MHz
VBW ≥ 3 MHz
Number of points in sweep ≥ 2 x 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.

7.5 Maximum Power Spectral Density (average)

Test Setup

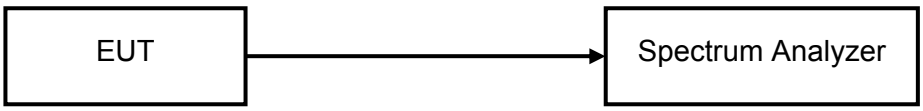


Test Procedure

EUTs Maximum Power Spectral Density (average) 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, x, of the transmitter output signal
The spectrum analyzer setting is as follows.
Span = encompass the EBW of the signal.
RBW = 1 MHz for UNII-1, 2A, 2C band or 500kHz for UNII-3 band
VBW ≥ 3 RBW
Number of points in sweep ≥ 2 Span / RBW
Sweep time = auto
Detector = RMS
Trace average at least 100 traces in power averaging mode
Use the peak search function on the instrument to find the peak of the spectrum.

7.6 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 3 ms
Sweep mode = Single
The marker function on the spectrum analyzer is used to determine the duty cycle

The results of the duty cycle measurement according to the above test procedure

	Data rate	On time (ms)	On + Off time (ms)	Duty Cycle (%)	Duty Factor (dB)
n(20MHz)mode	MCS0	-	-	100	-
n(40MHz)mode	MCS0	-	-	100	-

8. TEST DATA

8.1 Radiated Emissions

FCC §15.209

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)
395.96	48.68	H	100	248	-18.3	30.4	46.0	15.6
484.01	56.54	H	177	122	-16.5	40.0	46.0	6.0
571.96	54.56	H	170	299	-14.4	40.2	46.0	5.8
748.02	46.07	H	100	172	-12.3	33.8	46.0	12.2
839.68	31.22	H	330	168	-11.1	20.1	46.0	25.9
881.82	45.35	V	278	196	-10.6	34.8	46.0	11.3

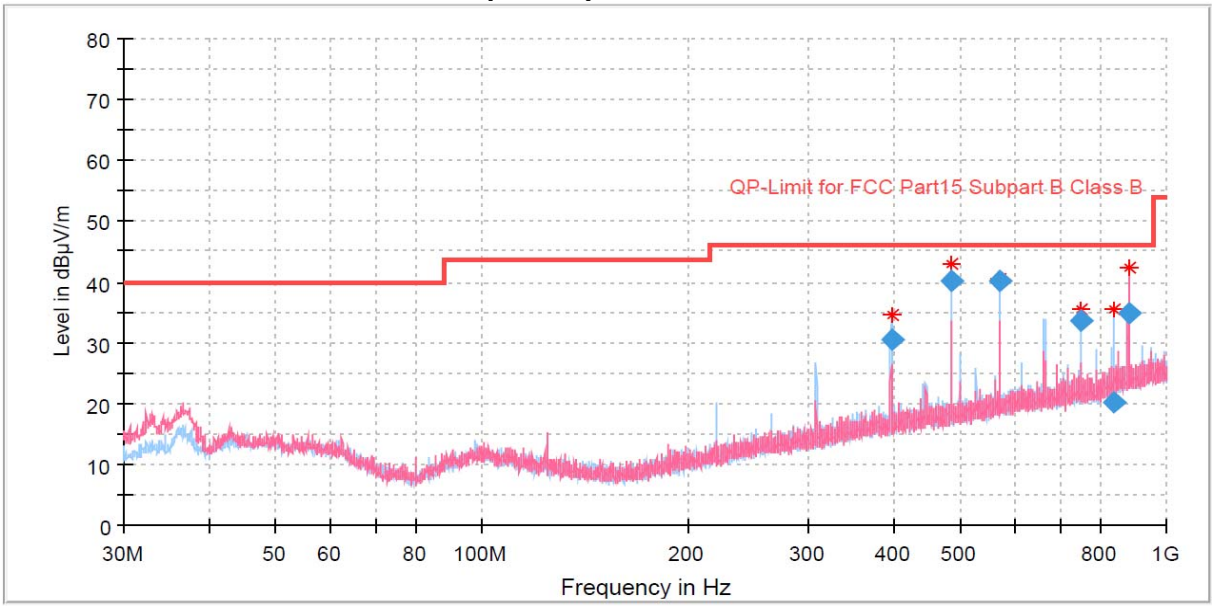
Radiated Measurements at 3meters

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 below 1 GHz.*
6. *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.*
7. *Middle channel (5785MHz) in n (20MHz) mode is the worst case.*
8. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).*
9. *The limit is on the FCC §15.209.*

PLOTS OF EMISSIONS

Radiated emission below 1GHz_ n (20MHz) mode_ 5785 MHz



8.2 26 dB Bandwidth and 99 % Occupied bandwidth

8.2.1 26 dB Bandwidth and 99 % Occupied bandwidth – U-NII-1 band

FCC §15.407(a)

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

802.11n (20 MHz) mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)	99% Occupied Bandwidth (MHz)
Lowest	5180	20.25	17.78
Middle	5220	20.29	17.79
Highest	5240	20.29	17.78

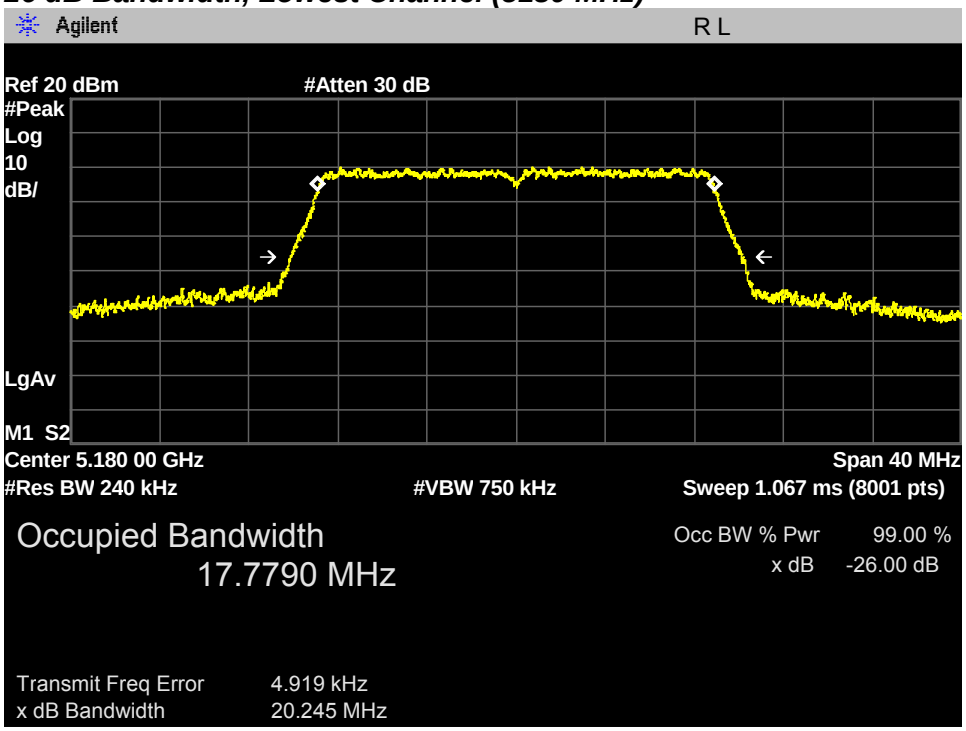
802.11n (40 MHz) mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)	99% Occupied Bandwidth (MHz)
Lowest	5190	40.99	36.35
Highest	5230	40.99	36.40

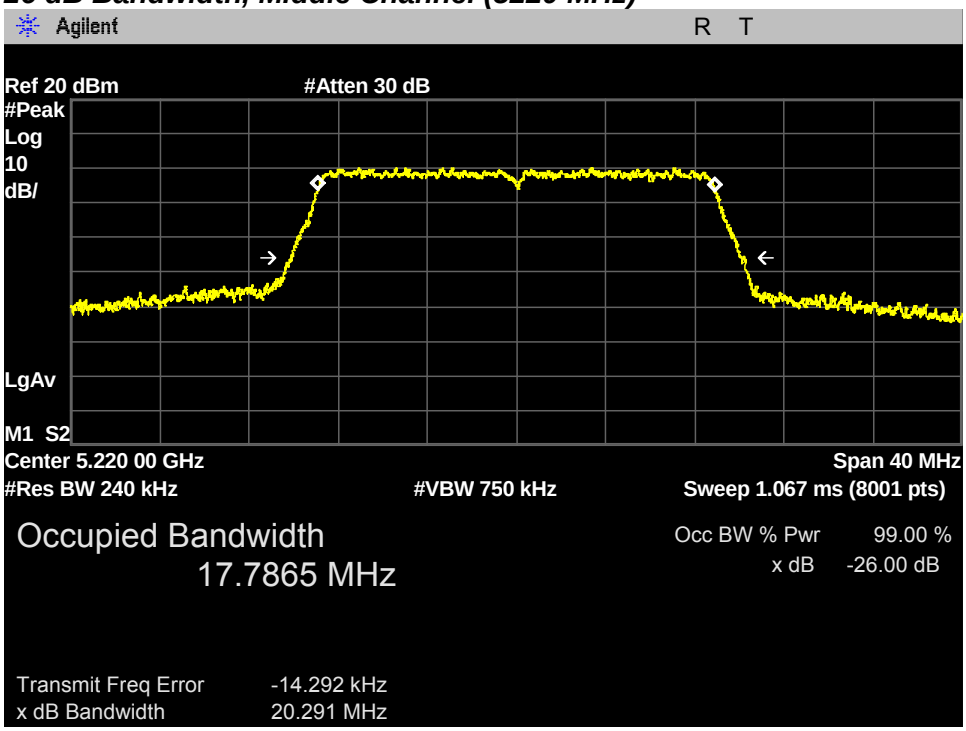
PLOTS OF EMISSIONS

802.11n (20 MHz) mode

26 dB Bandwidth, Lowest Channel (5180 MHz)

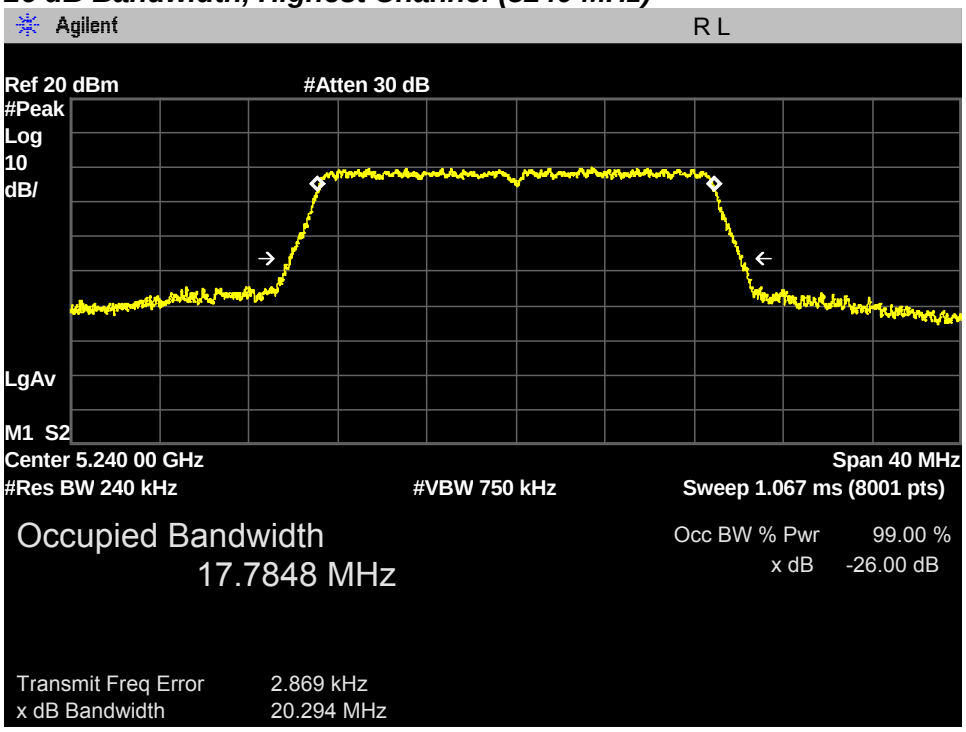


26 dB Bandwidth, Middle Channel (5220 MHz)



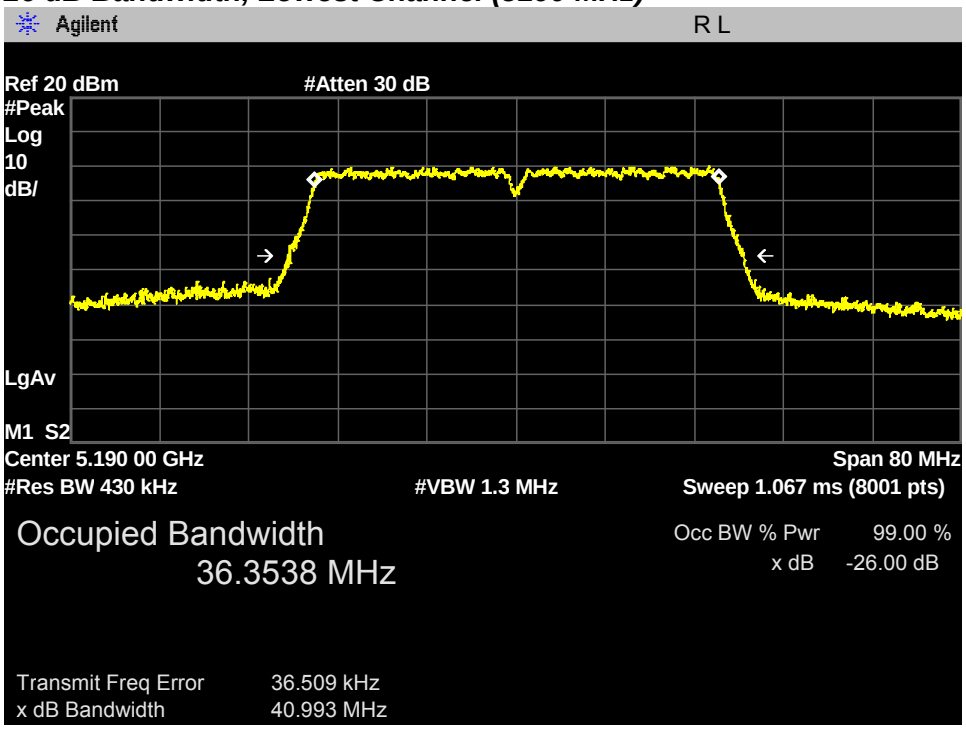
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5240 MHz)



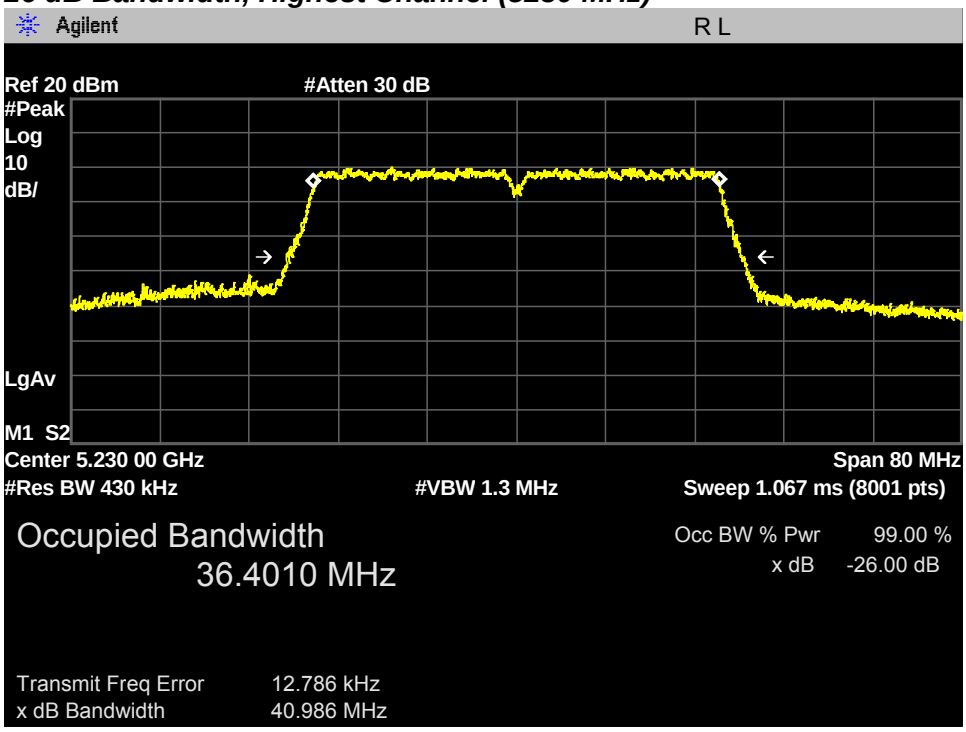
802.11n (40 MHz) mode

26 dB Bandwidth, Lowest Channel (5190 MHz)



PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5230 MHz)



8.2.2 26 dB Bandwidth and 99 % Occupied bandwidth – U-NII-3 band

FCC §15.407(a)

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

802.11n (20 MHz) mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)	99% Occupied Bandwidth (MHz)
Lowest	5745	20.28	17.78
Middle	5785	20.21	17.79
Highest	5825	20.16	17.78

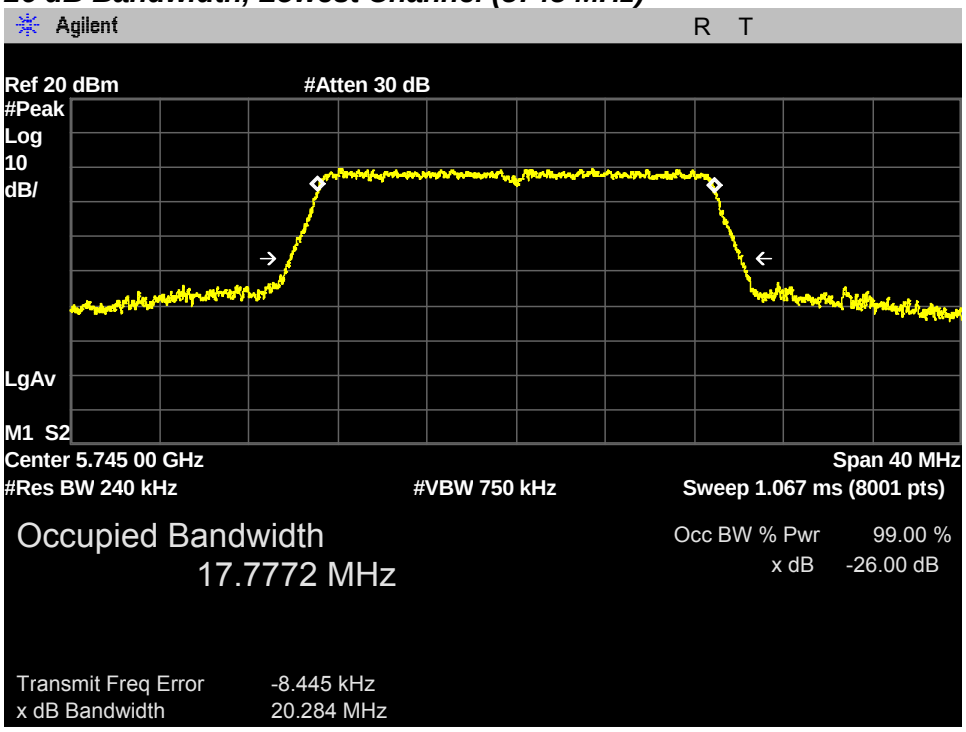
802.11n (40 MHz) mode

Channel	Frequency (MHz)	26 dB Bandiwidth (MHz)	99% Occupied Bandwidth (MHz)
Lowest	5755	40.95	36.36
Highest	5795	40.78	36.40

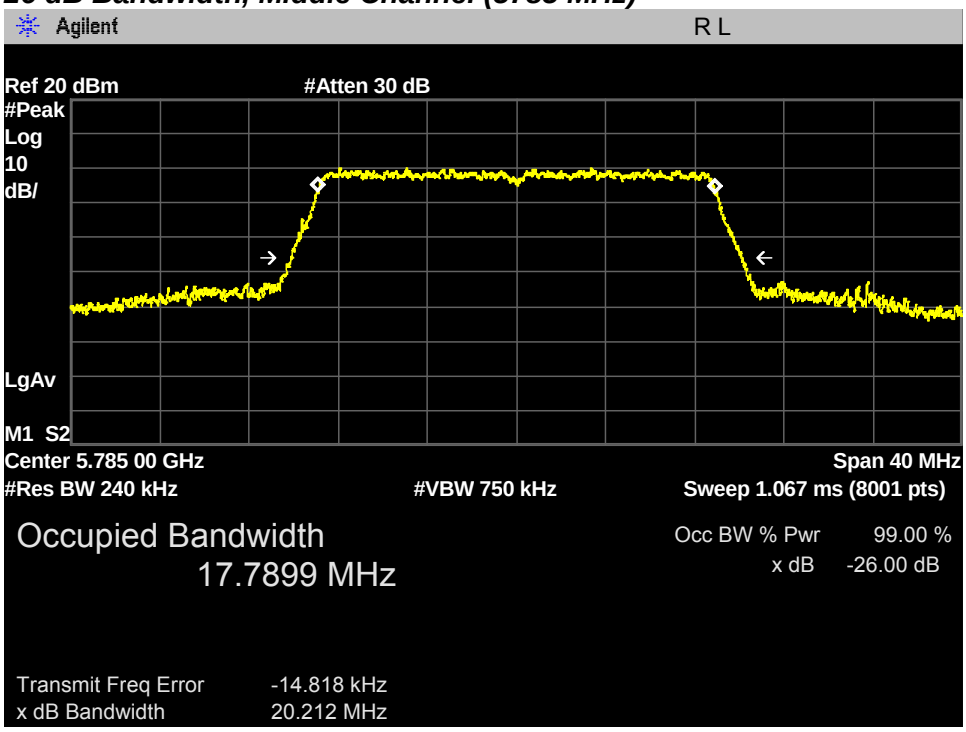
PLOTS OF EMISSIONS

802.11n (20 MHz) mode

26 dB Bandwidth, Lowest Channel (5745 MHz)

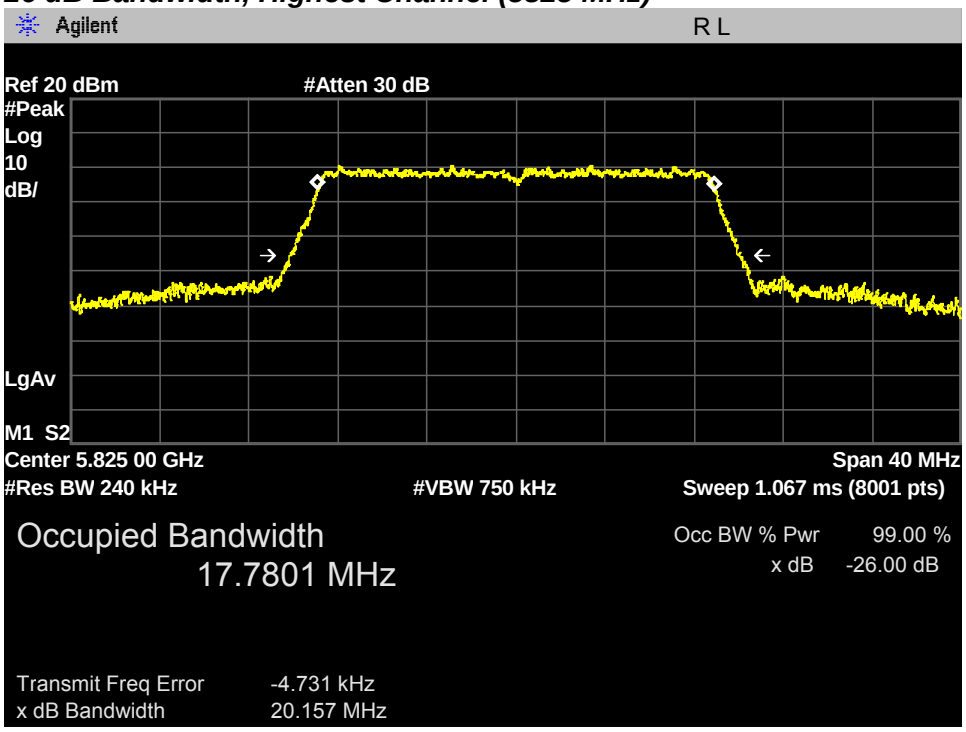


26 dB Bandwidth, Middle Channel (5785 MHz)



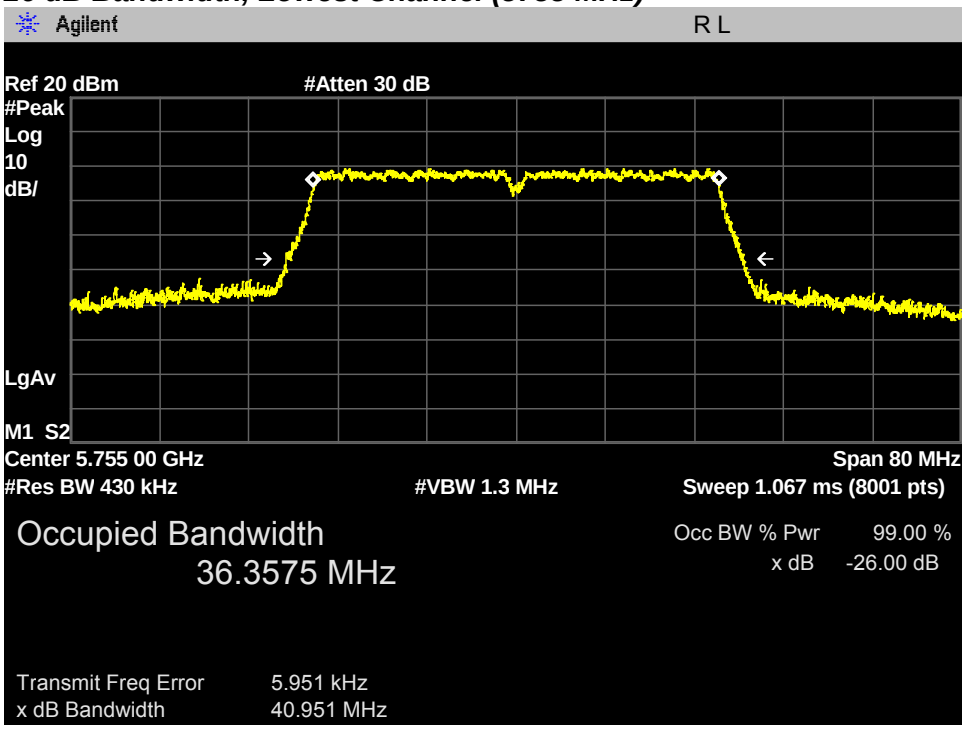
PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5825 MHz)



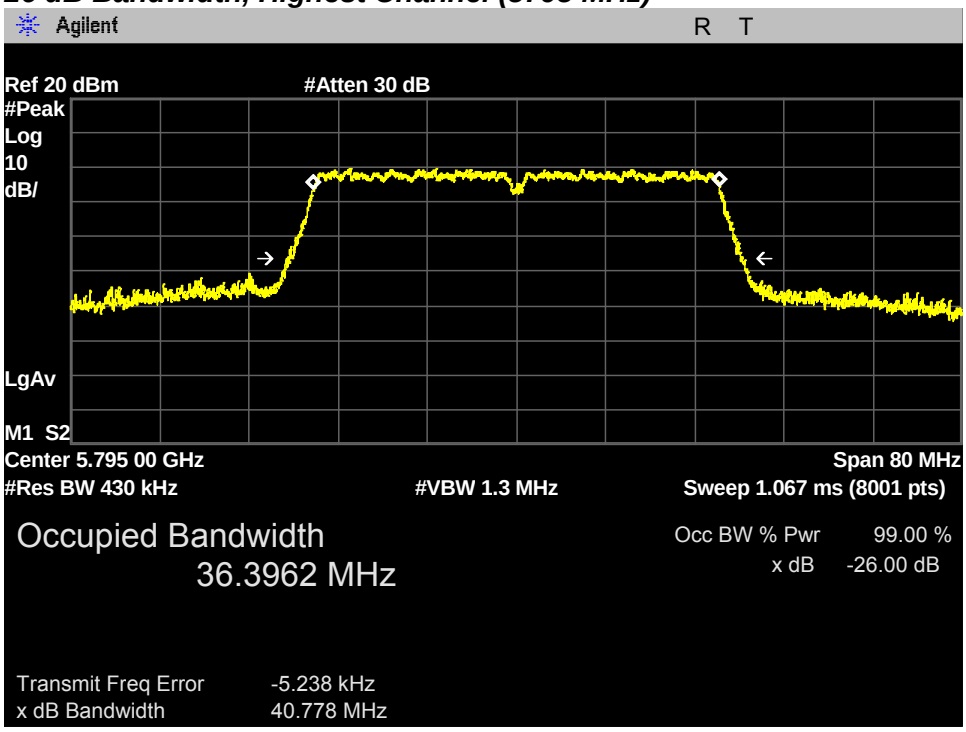
802.11n (40 MHz) mode

26 dB Bandwidth, Lowest Channel (5755 MHz)



PLOTS OF EMISSIONS

26 dB Bandwidth, Highest Channel (5795 MHz)



8.3 6 dB Bandwidth – UNII-3 band

FCC §15.407(e)

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

802.11n (20 MHz) mode

Channel	Frequency(MHz)	6dB Bandwidth(MHz)	Limit (kHz)
Lowest	5745	17.82	>500
Middle	5785	17.78	
Highest	5825	17.81	

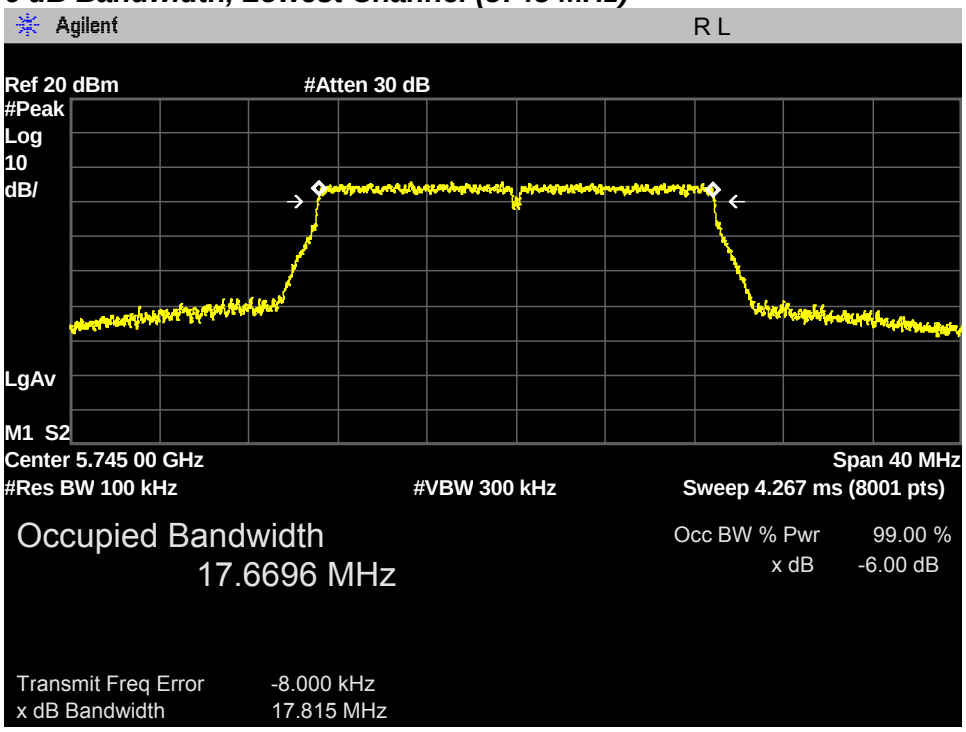
802.11n (40 MHz) mode

Channel	Frequency(MHz)	6dB Bandwidth(MHz)	Limit (kHz)
Lowest	5755	36.54	>500
Highest	5795	36.57	

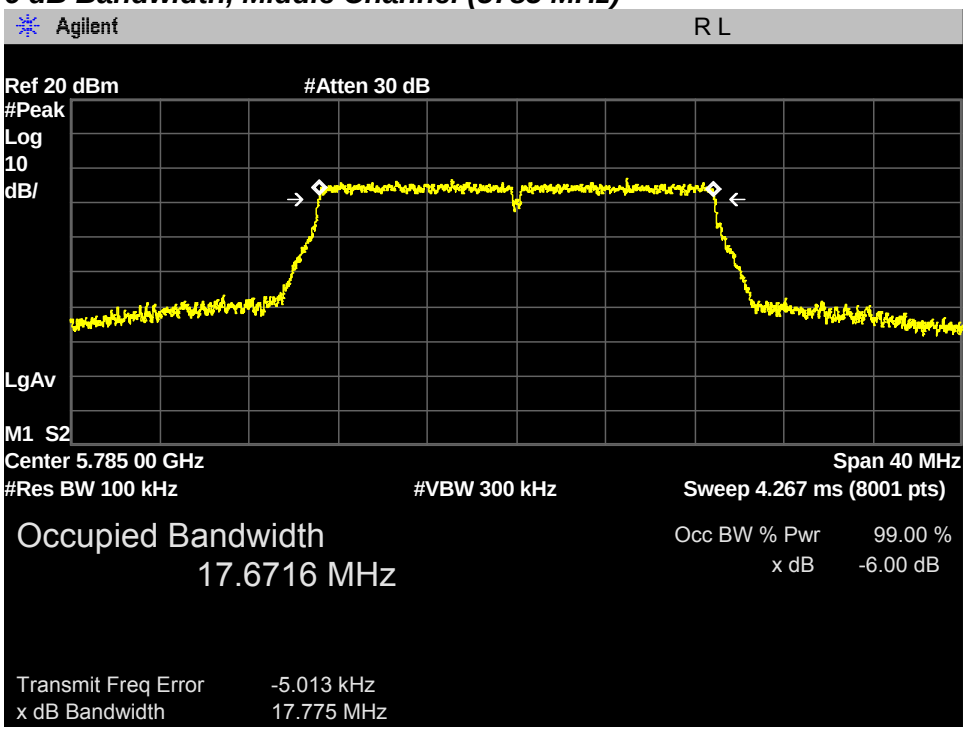
PLOTS OF EMISSIONS

802.11n (20 MHz) mode

6 dB Bandwidth, Lowest Channel (5745 MHz)

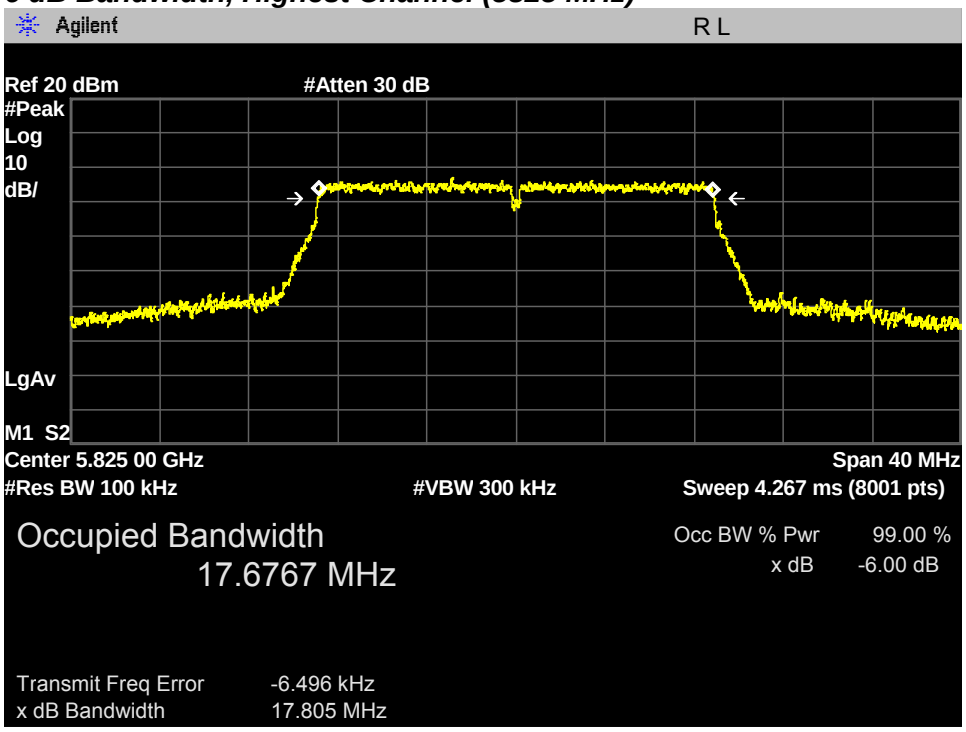


6 dB Bandwidth, Middle Channel (5785 MHz)



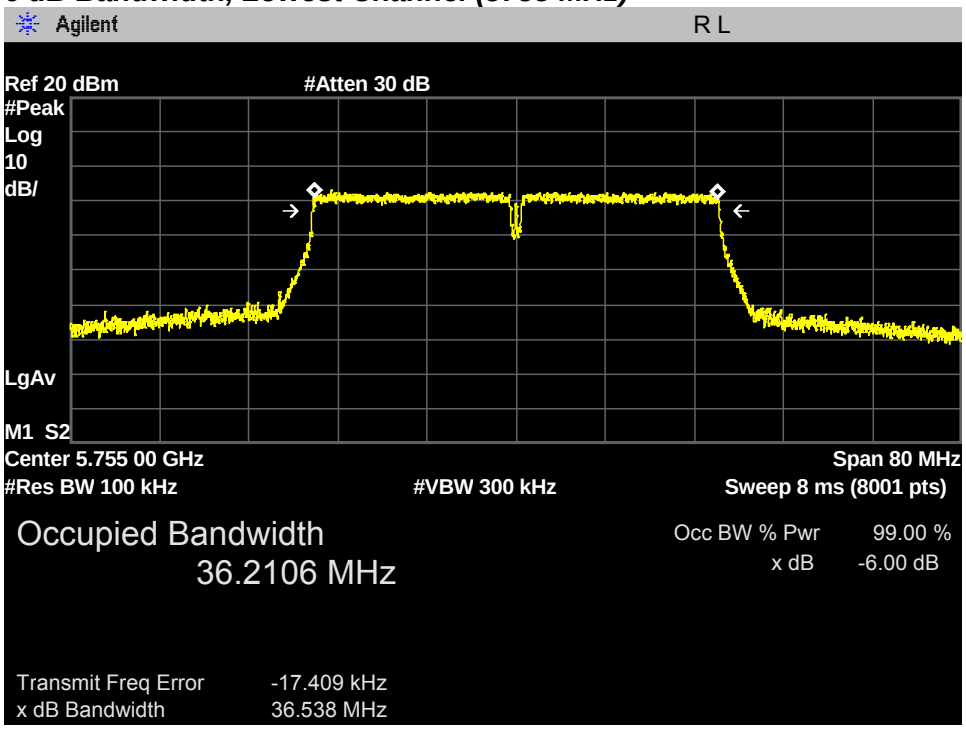
PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5825 MHz)



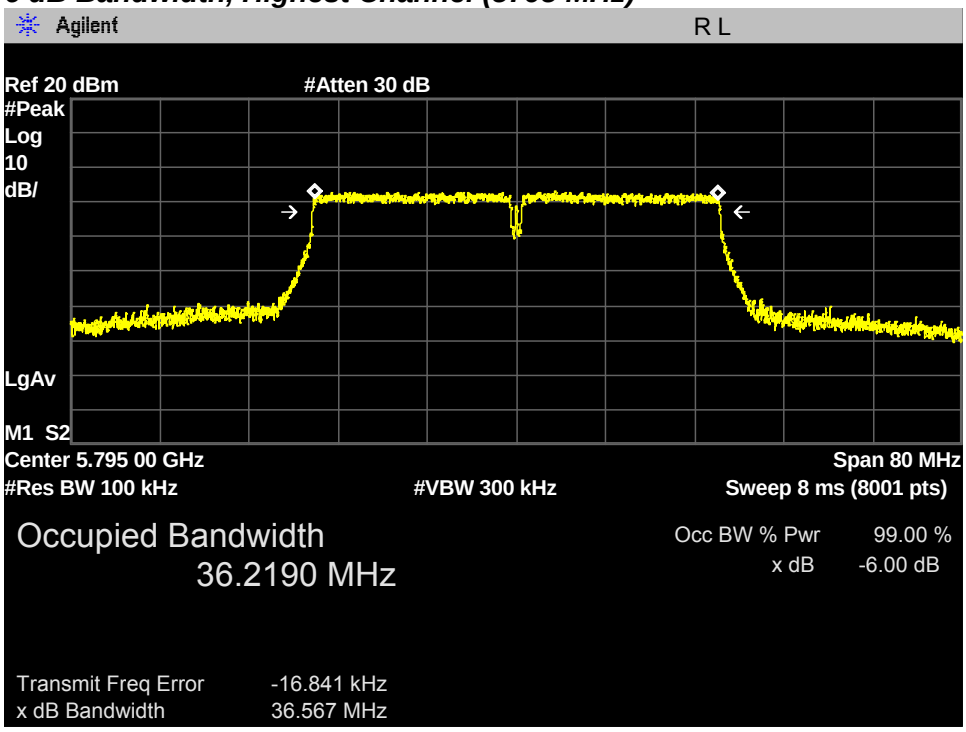
802.11n (40 MHz) mode

6 dB Bandwidth, Lowest Channel (5755 MHz)



PLOTS OF EMISSIONS

6 dB Bandwidth, Highest Channel (5795 MHz)



8.4 Maximum Conducted Output Power (average)

8.4.1 Maximum Conducted Output Power – U-NII-1 band

FCC §15.407(a)

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

802.11n (20MHz) mode

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)
Lowest	5180	10.58	23.98
Middle	5220	10.70	23.98
Highest	5240	10.77	23.98

802.11n (40MHz) mode

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)
Lowest	5190	10.82	23.98
Highest	5230	10.71	23.98

Note:

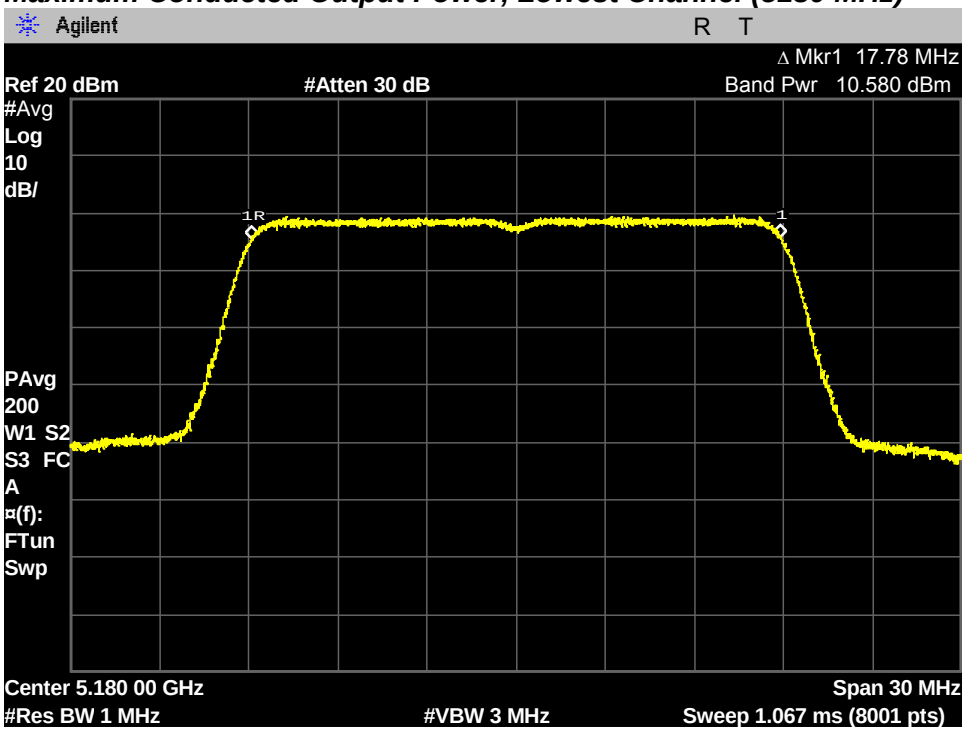
1. The following equation was used for spectrum offset:

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

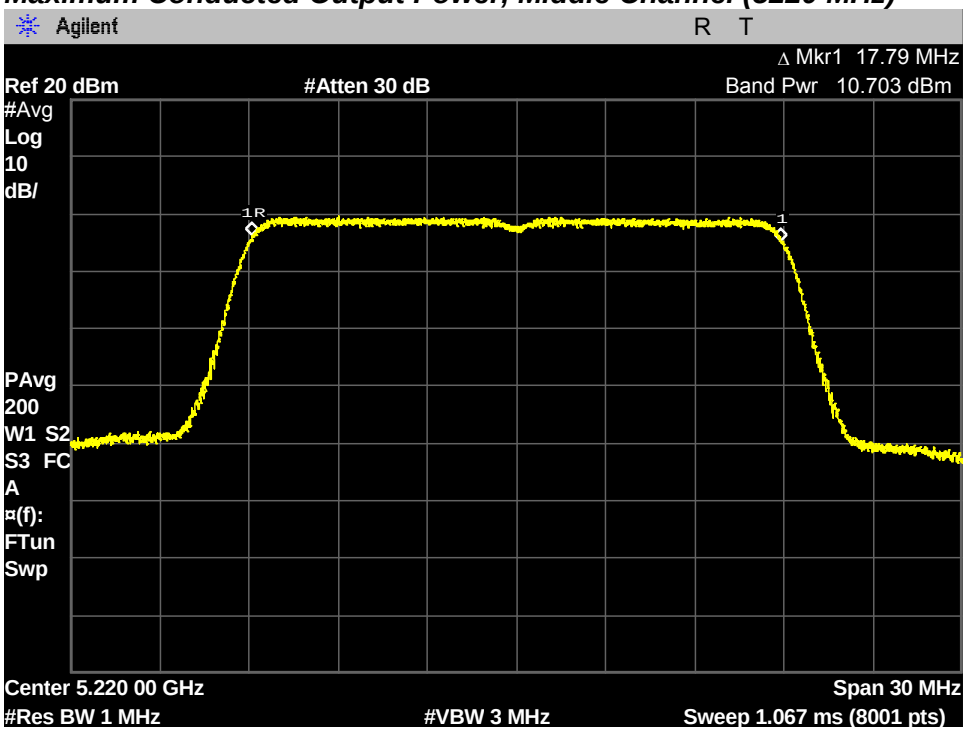
PLOT OF TEST DATA

802.11n (20 MHz) mode

Maximum Conducted Output Power, Lowest Channel (5180 MHz)

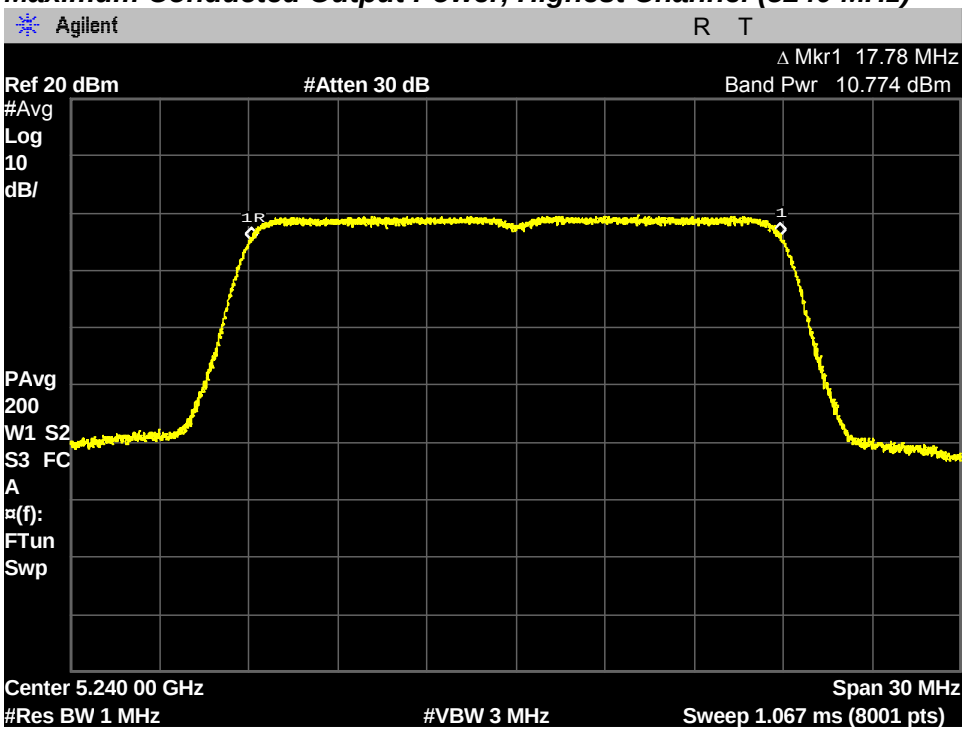


Maximum Conducted Output Power, Middle Channel (5220 MHz)



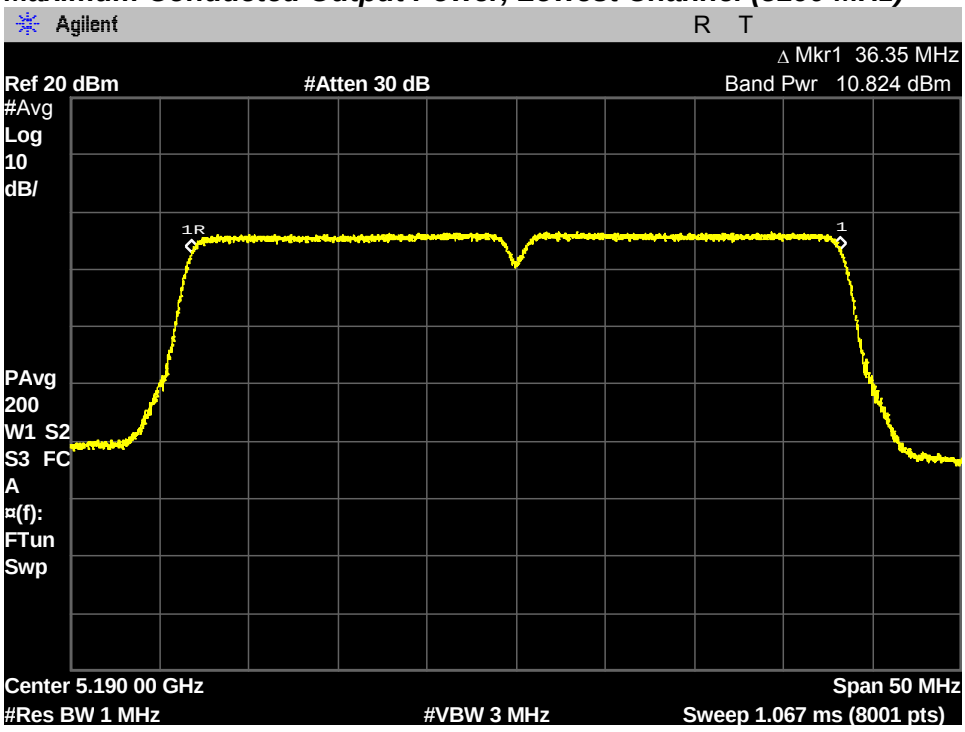
PLOT OF TEST DATA

Maximum Conducted Output Power, Highest Channel (5240 MHz)



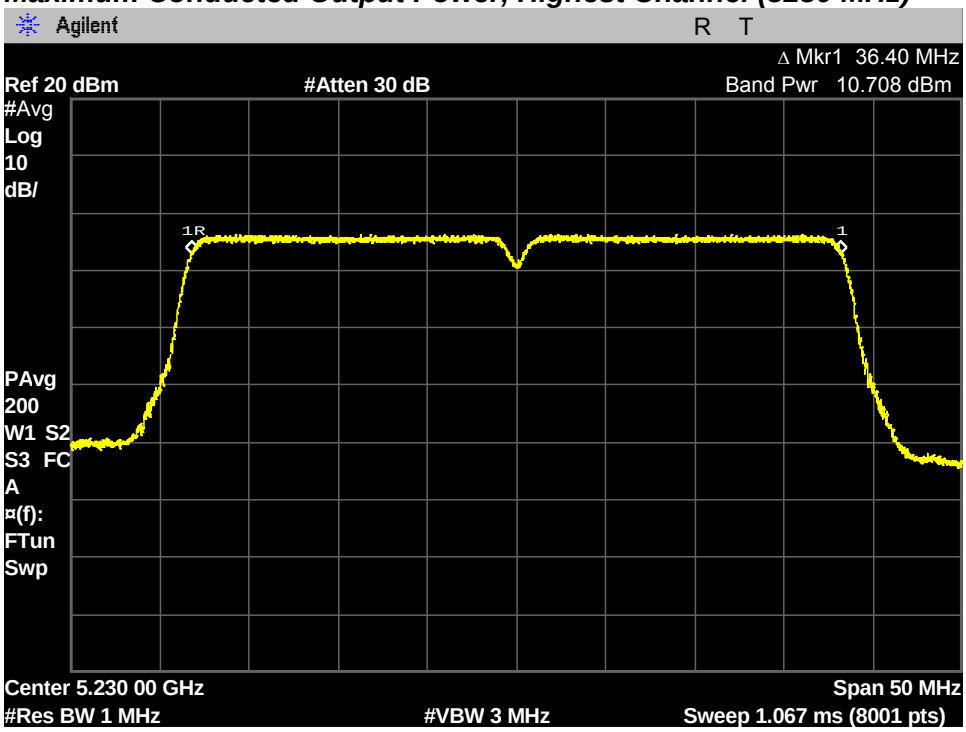
802.11n (40 MHz) mode

Maximum Conducted Output Power, Lowest Channel (5190 MHz)



PLOT OF TEST DATA

Maximum Conducted Output Power, Highest Channel (5230 MHz)



8.4.2 Maximum Conducted Output Power – U-NII-3 band

FCC §15.407(a)

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

802.11n (20MHz) mode

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)
Lowest	5745	10.28	30.00
Middle	5785	10.36	30.00
Highest	5825	10.58	30.00

802.11n (40MHz) mode

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	FCC Limit (dBm)
Lowest	5755	10.29	30.00
Highest	5795	10.63	30.00

Note:

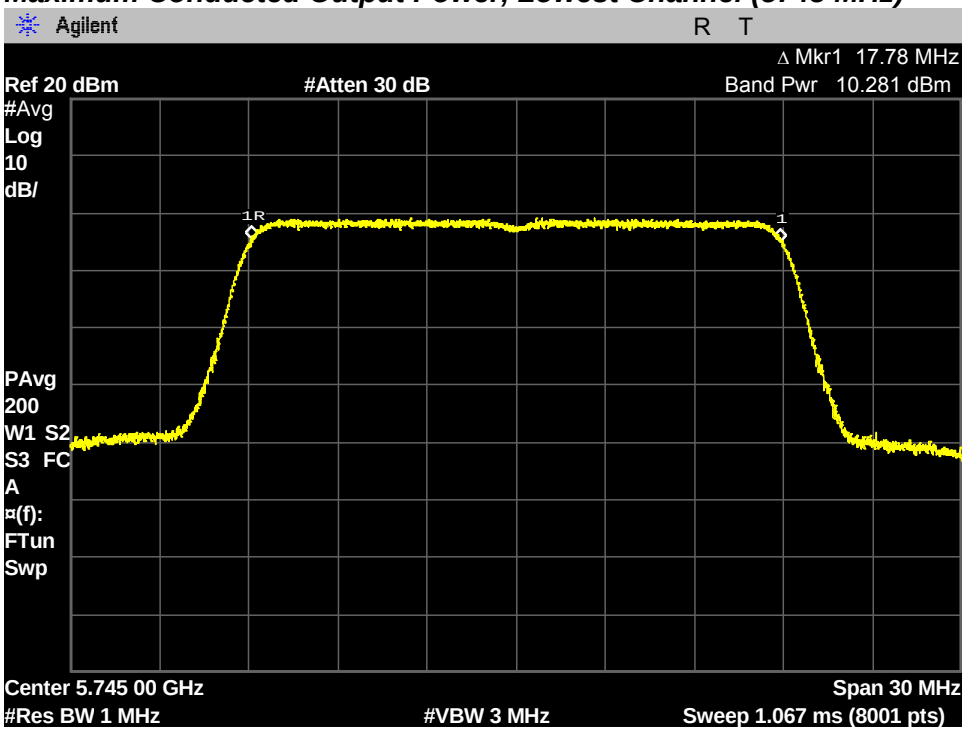
1. The following equation was used for spectrum offset:

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

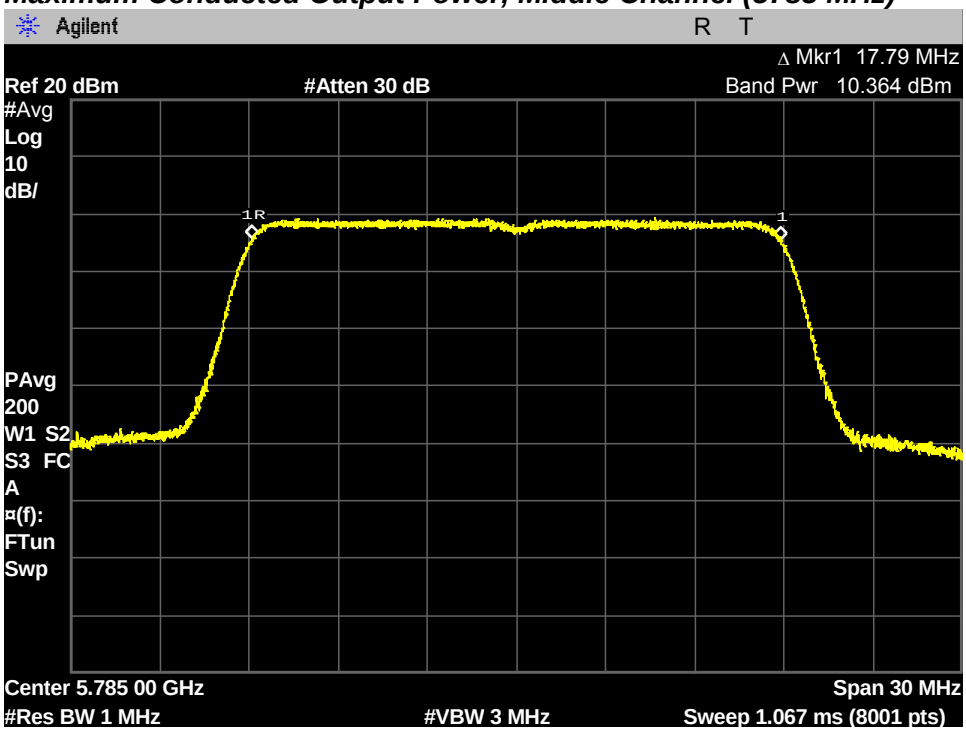
PLOT OF TEST DATA

802.11n (20 MHz) mode

Maximum Conducted Output Power, Lowest Channel (5745 MHz)

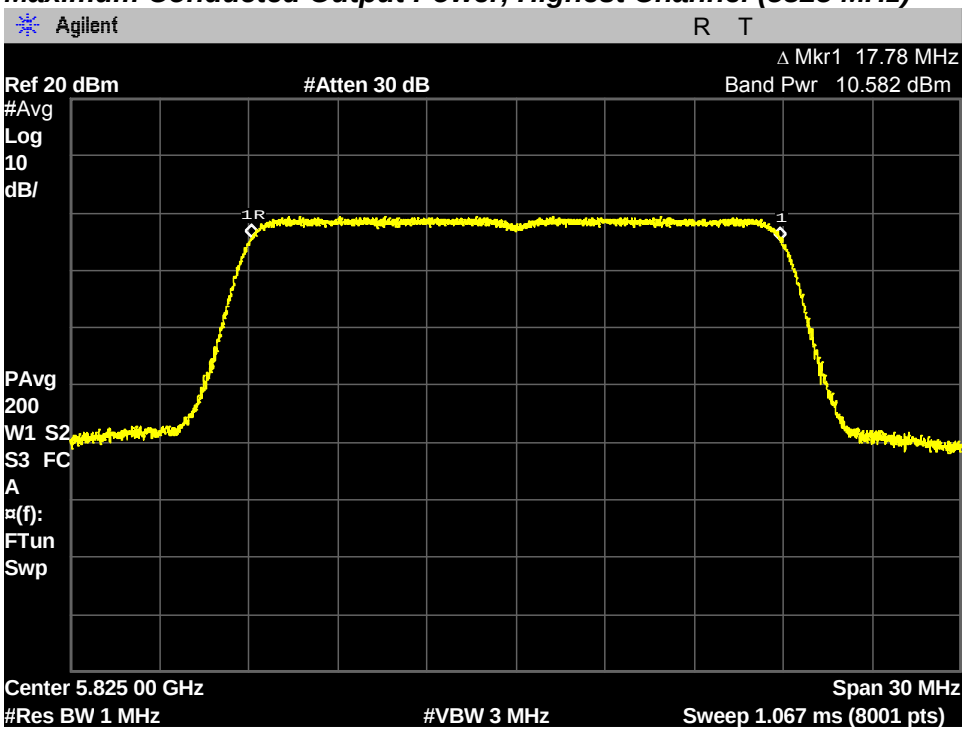


Maximum Conducted Output Power, Middle Channel (5785 MHz)



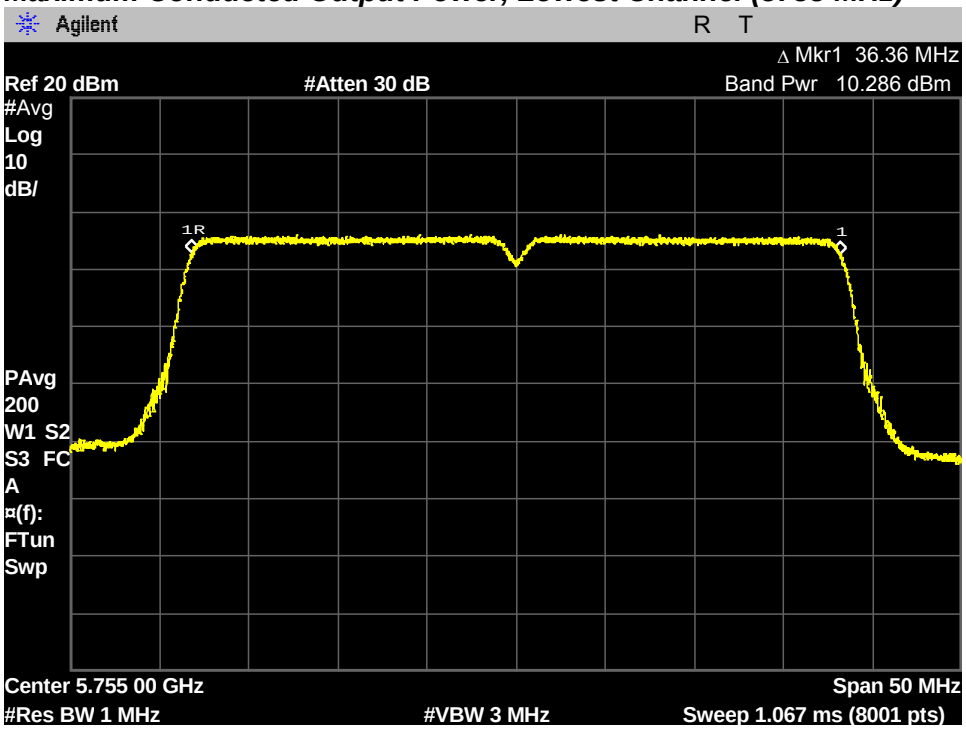
PLOT OF TEST DATA

Maximum Conducted Output Power, Highest Channel (5825 MHz)



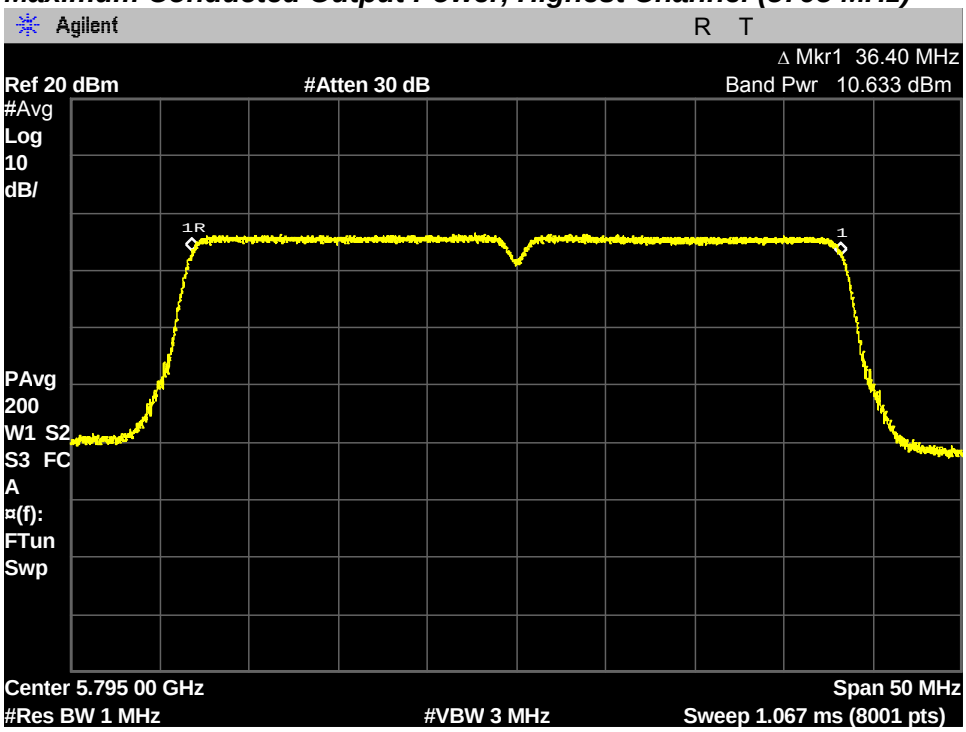
802.11n (40 MHz) mode

Maximum Conducted Output Power, Lowest Channel (5755 MHz)



PLOT OF TEST DATA

Maximum Conducted Output Power, Highest Channel (5795 MHz)



8.5 Maximum Power Spectral Density (average)

8.5.1 Maximum Power Spectral Density – U-NII-1 band

FCC §15.407(a)

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

802.11n (20MHz) mode

Channel	Frequency (MHz)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5180	-0.79	11.00
Middle	5220	-0.44	11.00
Highest	5240	-0.38	11.00

802.11n (40MHz) mode

Channel	Frequency (MHz)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5190	-3.55	11.00
Highest	5230	-3.63	11.00

Note:

1. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

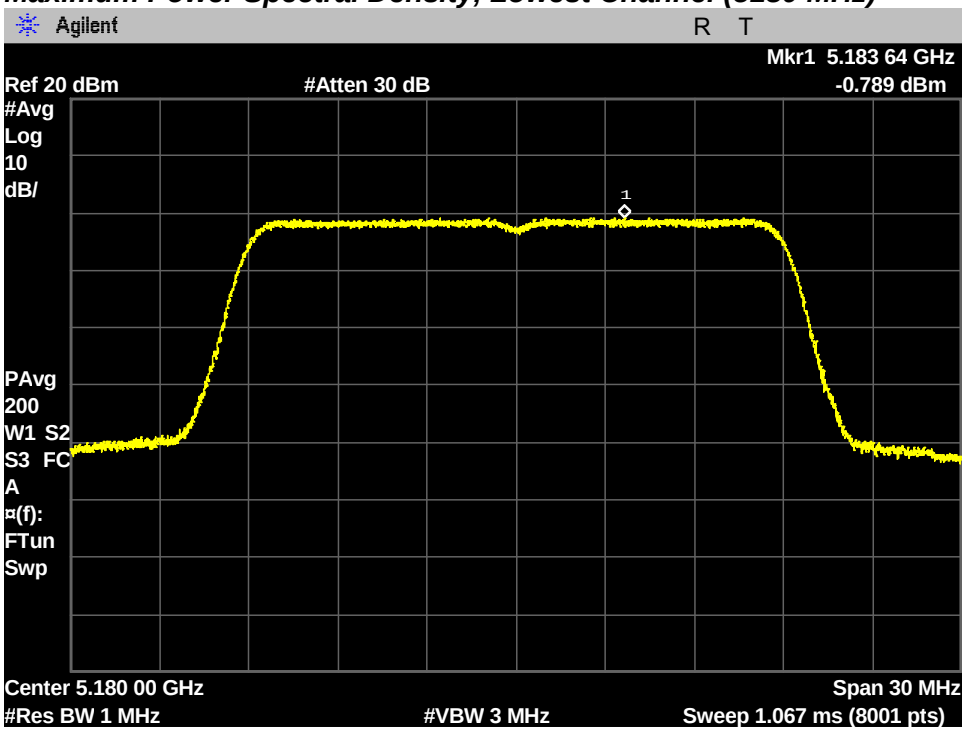
2. The following equation was used for spectrum offset:

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

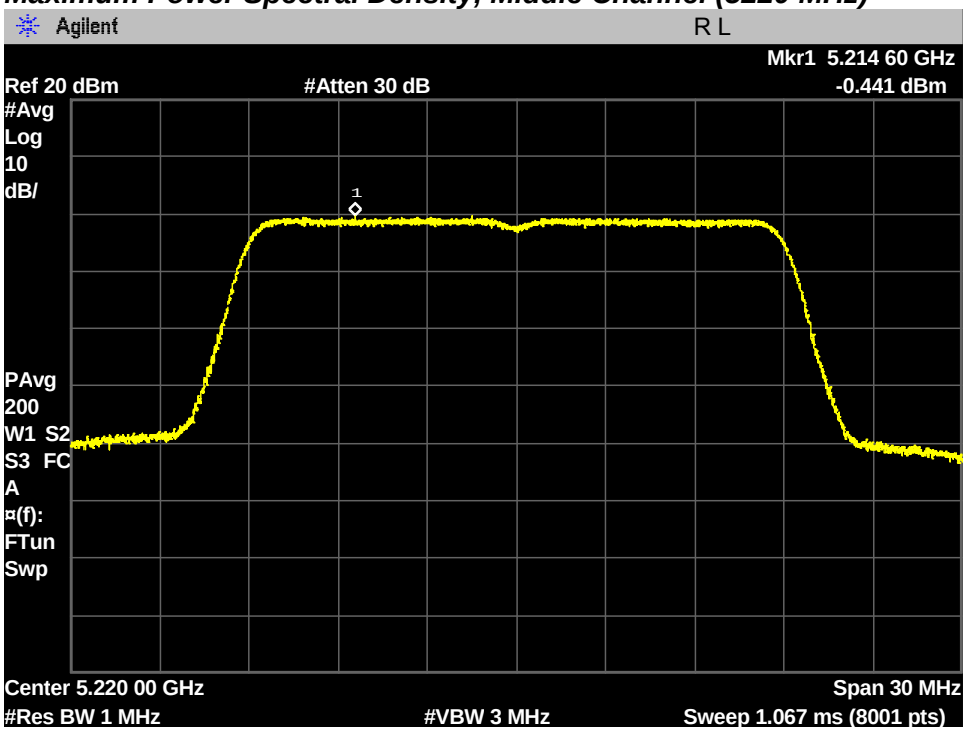
PLOT OF TEST DATA

802.11n (20 MHz) mode

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

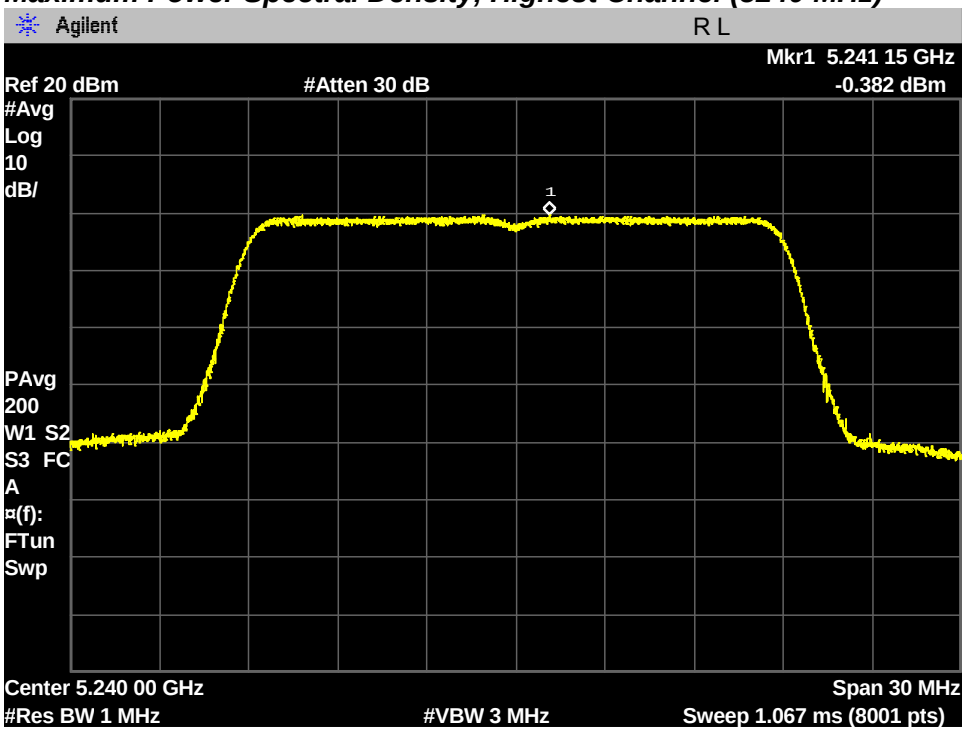


Maximum Power Spectral Density, Middle Channel (5220 MHz)



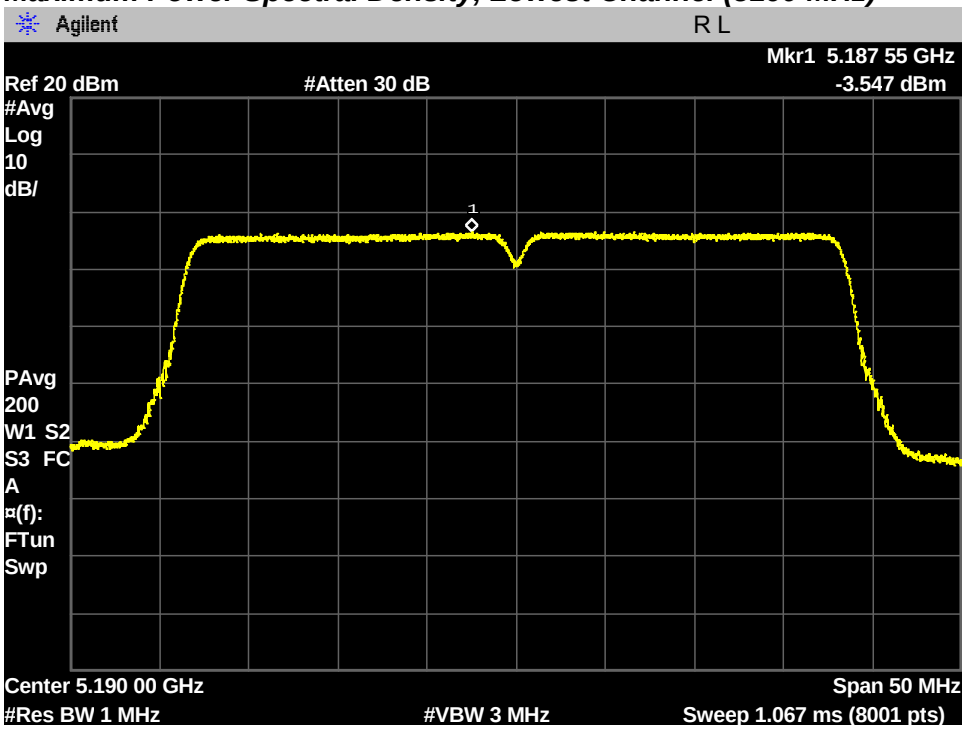
PLOT OF TEST DATA

Maximum Power Spectral Density, Highest Channel (5240 MHz)



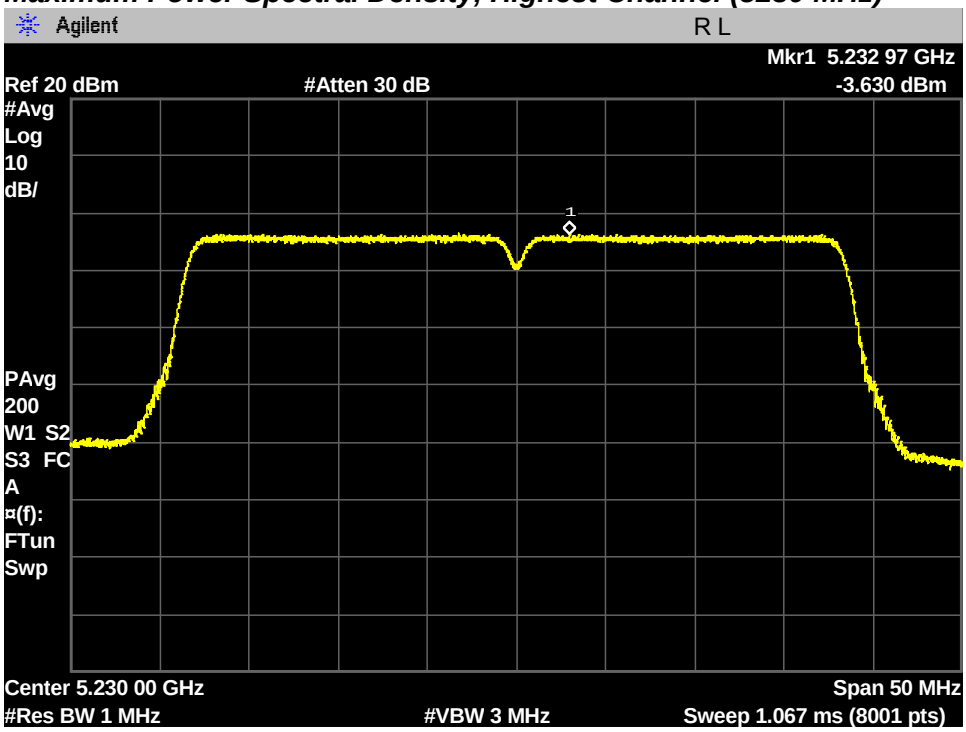
802.11n (40 MHz) mode

Maximum Power Spectral Density, Lowest Channel (5190 MHz)



PLOT OF TEST DATA

Maximum Power Spectral Density, Highest Channel (5230 MHz)



8.5.2 Maximum Power Spectral Density – U-NII-3 band

FCC §15.407(a)

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

802.11n (20MHz) mode

Channel	Frequency (MHz)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Lowest	5745	-3.92	30.00
Middle	5785	-3.63	30.00
Highest	5825	-3.25	30.00

802.11n (40MHz) mode

Channel	Frequency (MHz)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Lowest	5755	-7.17	30.00
Highest	5795	-6.62	30.00

Note:

1. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v01r04

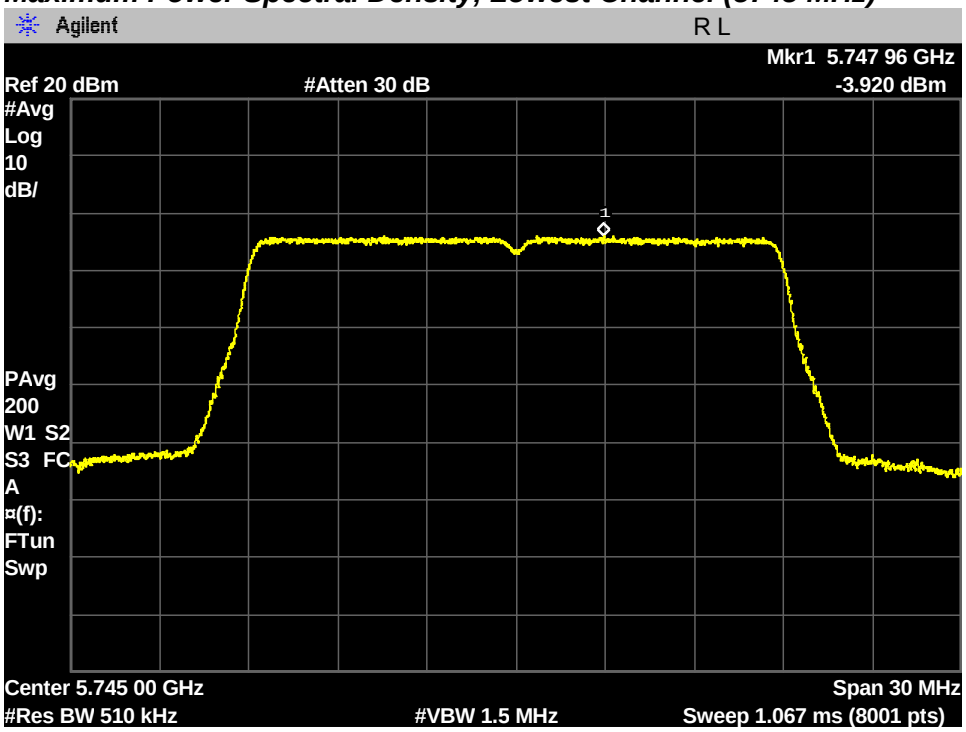
2. The following equation was used for spectrum offset:

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

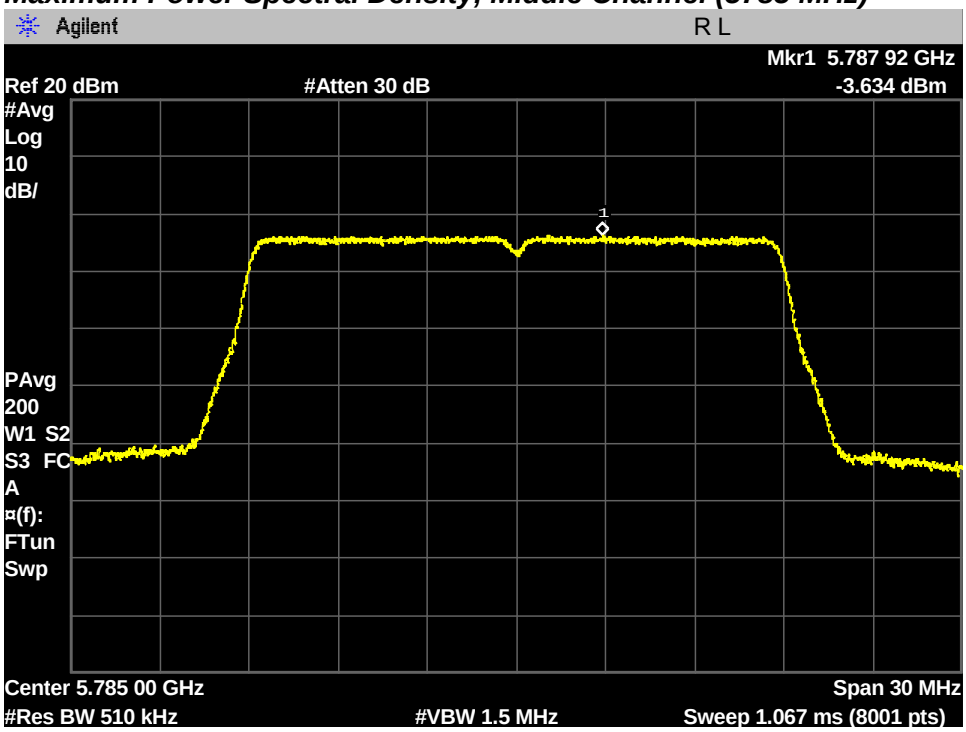
PLOT OF TEST DATA

802.11n (20 MHz) mode

Maximum Power Spectral Density, Lowest Channel (5745 MHz)

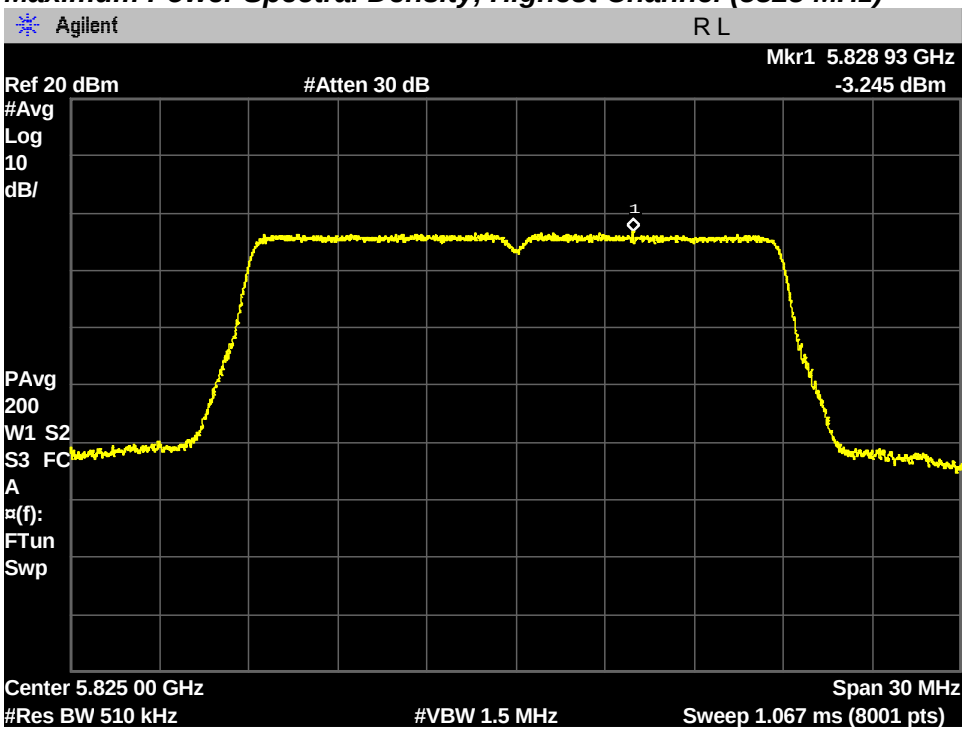


Maximum Power Spectral Density, Middle Channel (5785 MHz)



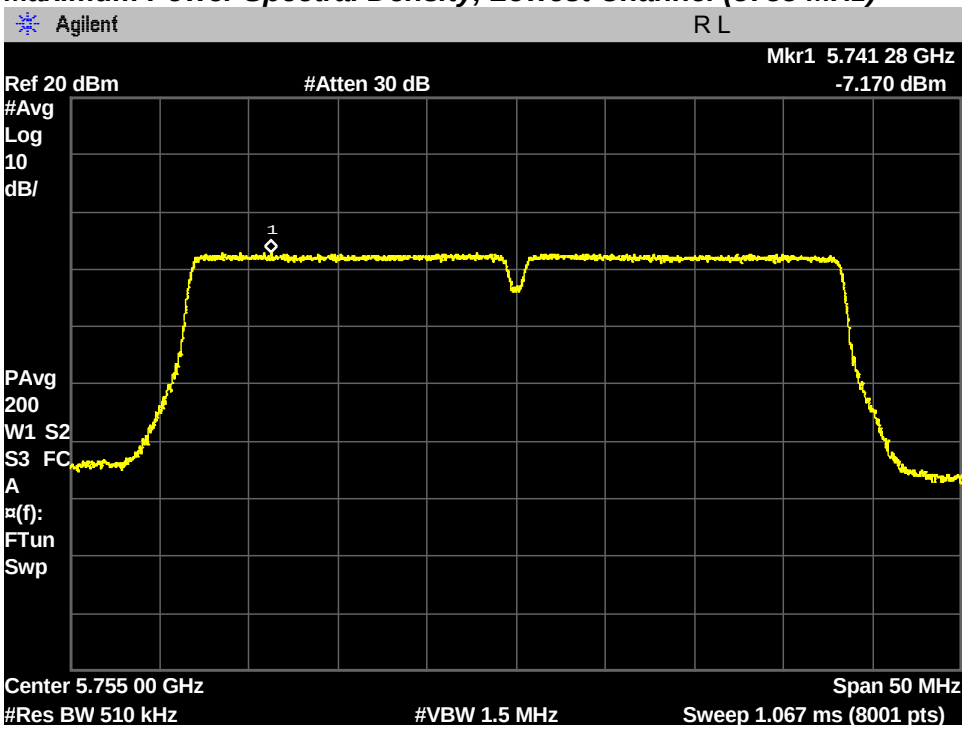
PLOT OF TEST DATA

Maximum Power Spectral Density, Highest Channel (5825 MHz)



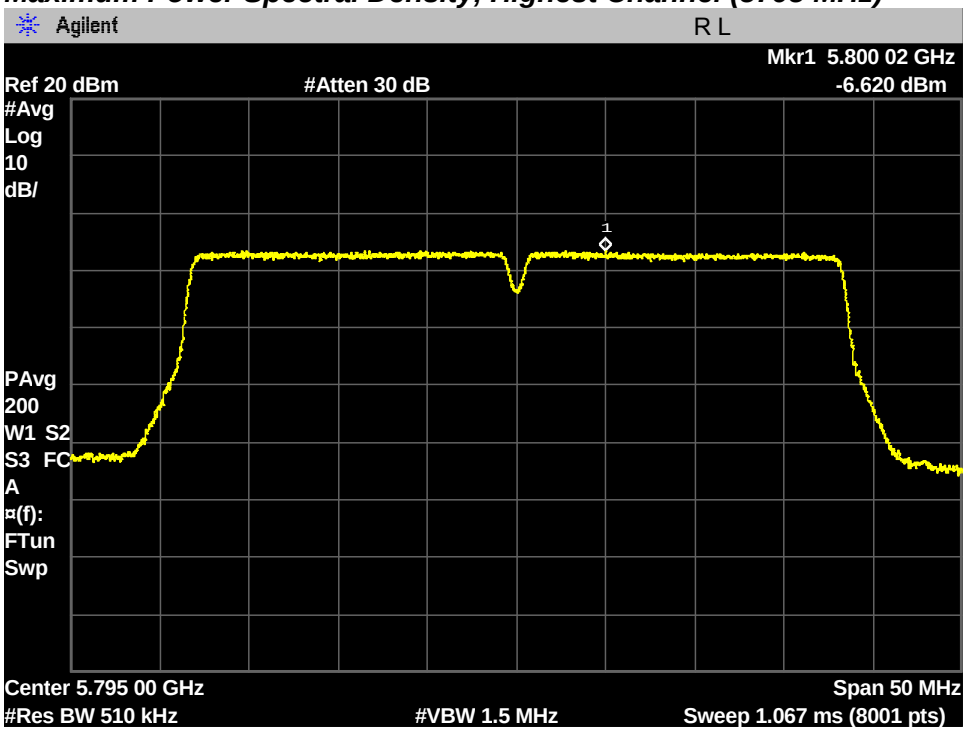
802.11n (40 MHz) mode

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



PLOT OF TEST DATA

Maximum Power Spectral Density, Highest Channel (5795 MHz)



8.6 Radiated Spurious Emissions

8.6.1 Radiated Spurious Emissions – U-NII-1 band

FCC §15.407(b)

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

802.11n (20 MHz) mode

Lowest Channel (5180 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
6906.50***	56.1	H	peak	4.9	61.0	68.2	7.2
10361.00***	46.0	V	peak	11.4	57.4	68.2	10.8

Middle Channel (5220 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
6960.00***	55.7	H	peak	5.1	60.8	68.2	7.4
10433.00***	42.7	V	peak	11.7	54.4	68.2	13.8

Highest Channel (5240 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
6986.50***	54.1	H	peak	5.3	59.4	68.2	8.8
10479.50***	45.6	V	peak	11.7	57.3	68.2	10.9

802.11n (40 MHz) mode

Lowest Channel (5190 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
6920.00***	55.5	H	peak	4.9	60.4	68.2	7.8
10382.00***	45.7	V	peak	11.5	57.2	68.2	11.0

Highest Channel (5230 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
6973.50***	54.7	H	peak	5.2	59.9	68.2	8.3

Note:

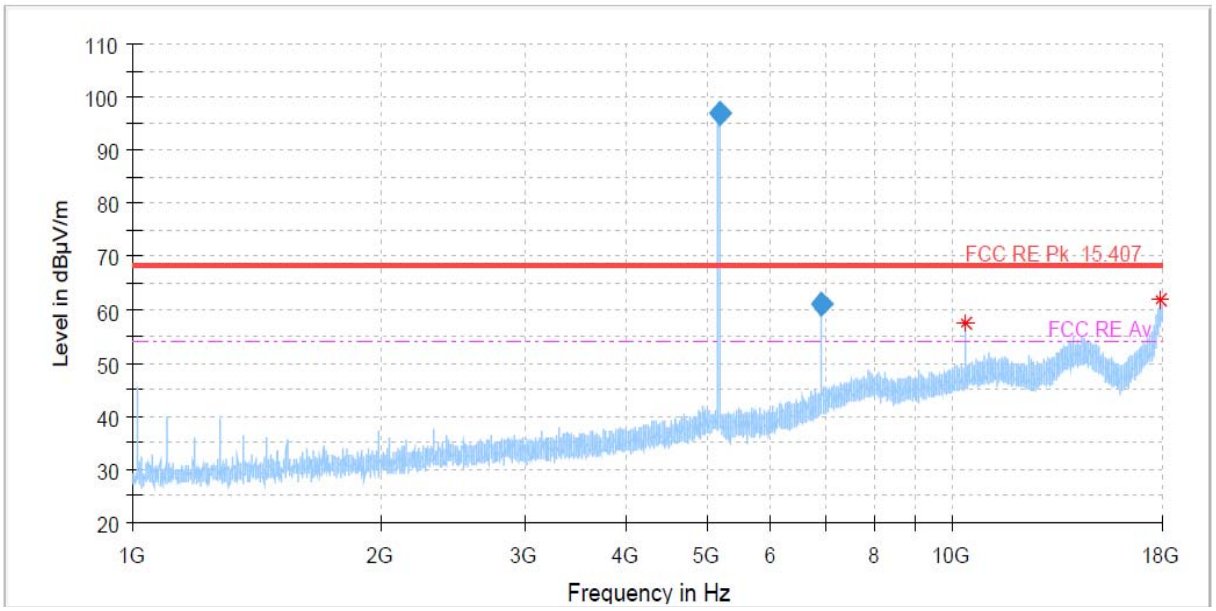
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. EUT has 100% duty cycle. As the EUT was configured to transmit with duty cycles ≥ 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 1 kHz (VBW ≤ RBW/100), Detector = Peak.
5. The spectrum is measured from 9 kHz to 10^{th} harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Second harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBµV/m. (E[dBµV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm.)
7. For restricted band, the peak limit is 68.2 dBµV/m, the average limit is 54 dBµV/m per FCC §15.209
8. Lowest channel(5180MHz) in n (20MHz) mode was the worst channel with respect to spurious emission.
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

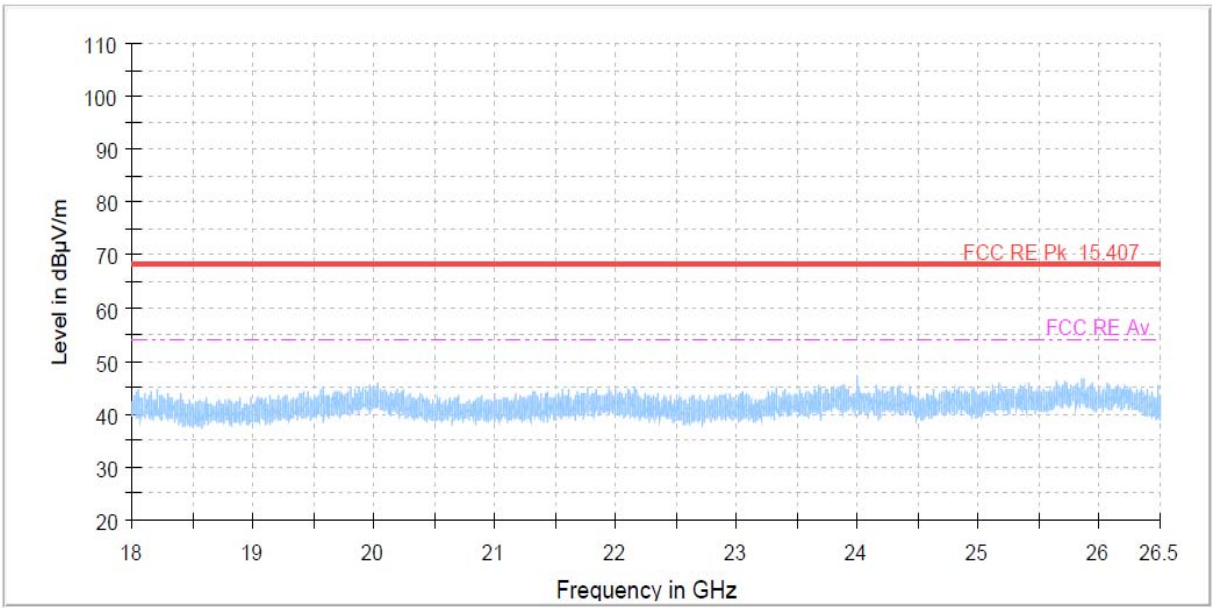
Worst Case

802.11n (20MHz) mode

Lowest channel : 1 GHz to 18 GHz_Peak

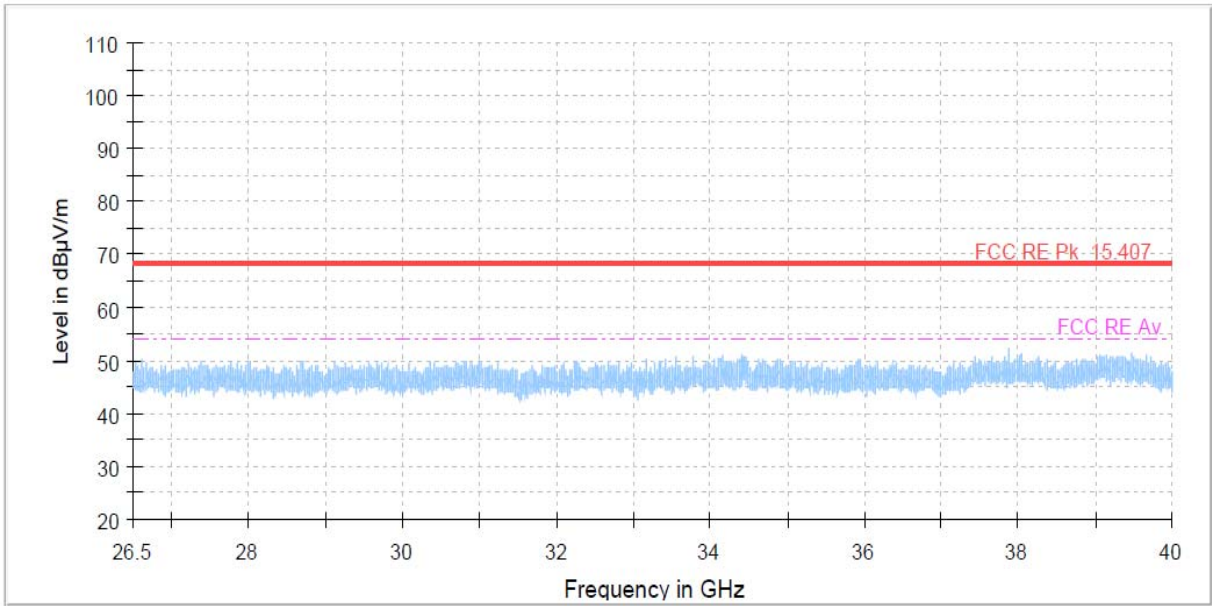


Lowest channel : 18 GHz to 26.5 GHz_Peak



PLOTS OF EMISSIONS

Lowest channel : 26.5 GHz to 40 GHz_Peak



8.6.2 Radiated Spurious Emissions – U-NII-3 band

FCC §15.407(b)

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

802.11n (20 MHz) mode

Lowest Channel (5745 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11487.82	44.8	H	peak	12.6	57.4	68.2	10.8
11489.31	37.1	V	average	12.6	49.7	54.0	4.3

Middle Channel (5785 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11574.17	44.7	V	peak	12.6	57.3	68.2	10.9
11569.78	37.2	V	average	12.6	49.8	54.0	4.2

Highest Channel (5825 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11647.48	45.6	V	peak	12.4	58.0	68.2	10.2
11649.80	36.8	V	average	12.4	49.2	54.0	4.8

802.11n (40 MHz) mode

Lowest Channel (5755 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11517.33	43.5	V	peak	12.6	56.1	68.2	12.2
11510.40	35.1	V	average	12.6	47.7	54.0	6.3

Highest Channel (5795 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11590.29	42.8	V	peak	12.6	55.4	68.2	12.8
11590.21	35.4	V	average	12.6	48.0	54.0	6.0

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. EUT has 100% duty cycle. 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 = 1 kHz (VBW ≤ RBW/100), Detector = Peak.

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

6. For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBµV/m. (E[dBµV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm.)

7. For restricted band, the peak limit is 68.2 dBµV/m, the average limit is 54 dBµV/m per FCC §15.209

8. Middle channel(5785MHz) in n (20MHz) was the worst channel with respect to spurious emission.

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.

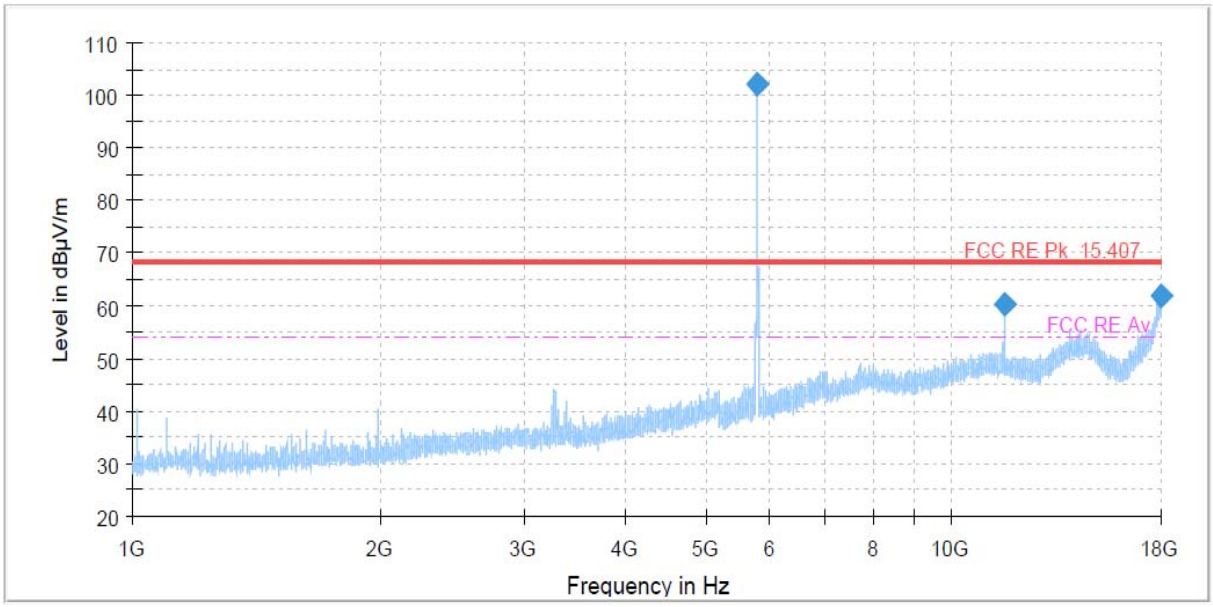
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

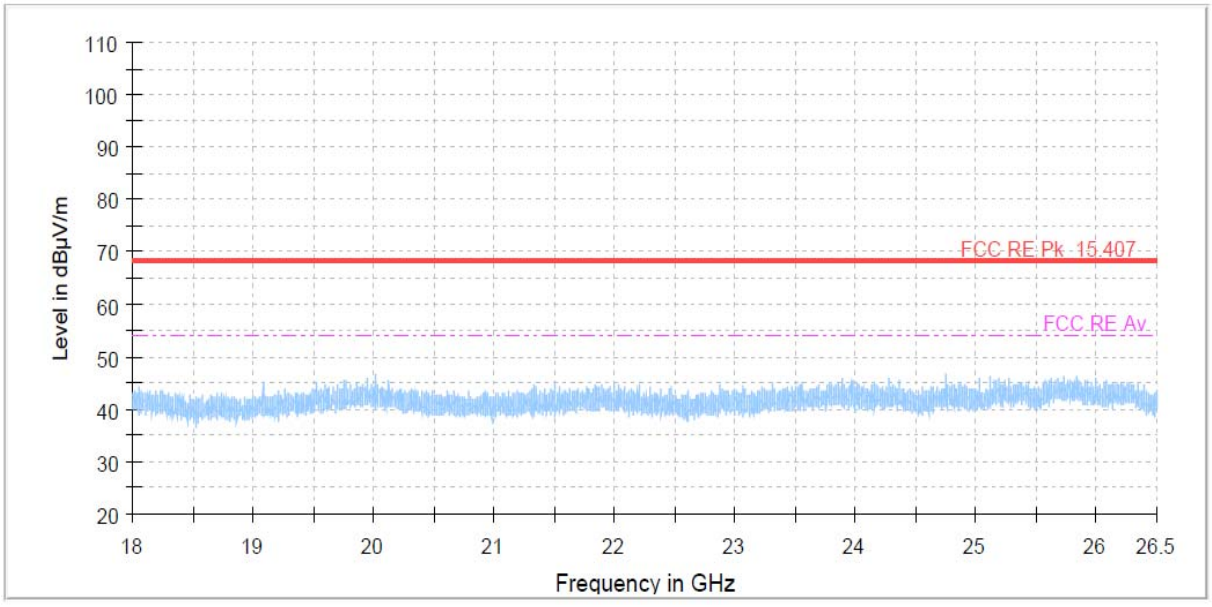
Worst Case

802.11n (20MHz) mode

Middle channel : 1 GHz to 18 GHz_Peak

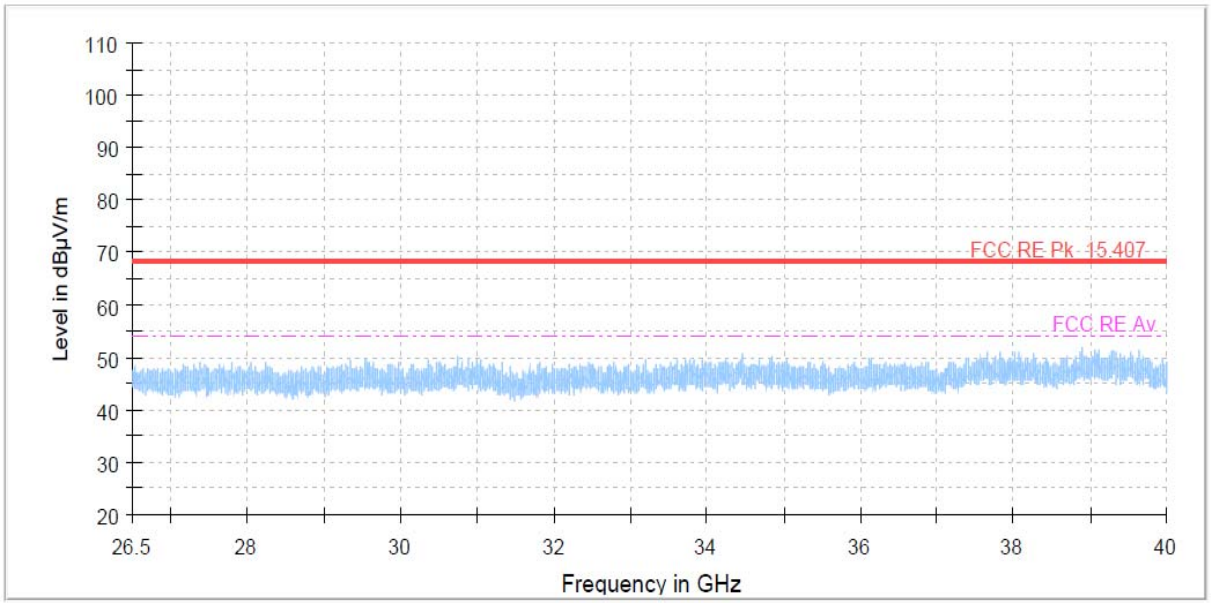


Middle channel : 18 GHz to 26.5 GHz_Peak

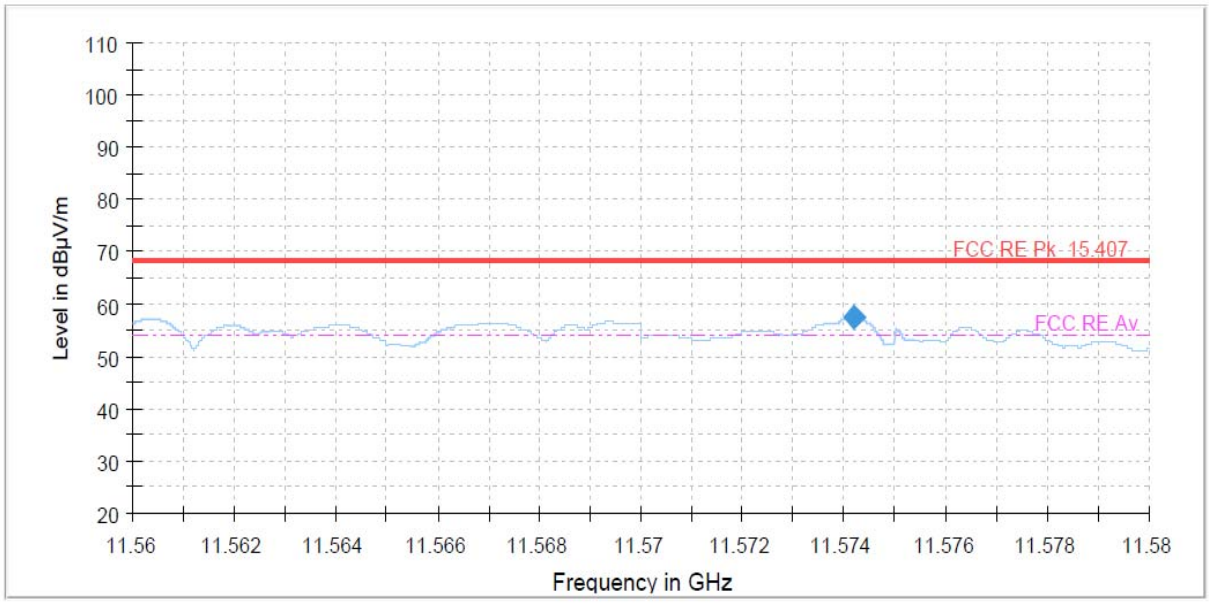


PLOTS OF EMISSIONS

Middle channel : 26.5 GHz to 40 GHz_Peak

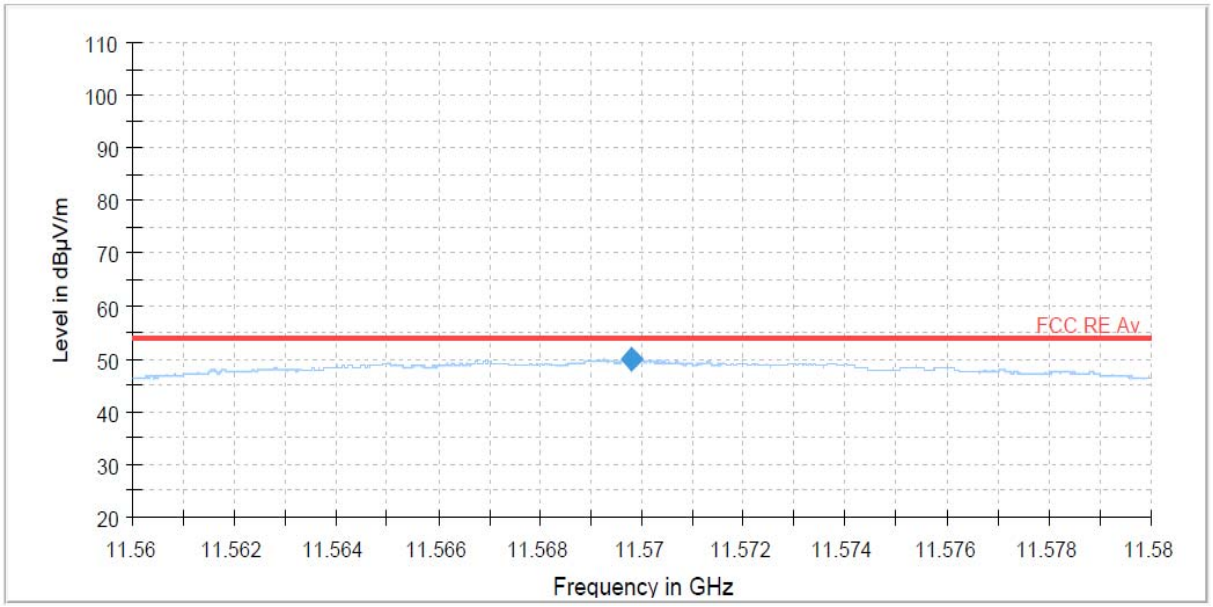


Middle channel : 2nd Harmonic_Peak



PLOTS OF EMISSIONS

Middle channel : 2nd Harmonic_Average



8.7 Radiated Band Edge

8.7.1 Radiated Band Edge – U-NII-1 band

FCC §15.407(b)

Test Mode : Set to Lowest channel and Highest channel

802.11n (20 MHz) mode

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***	44.3	V	peak	-0.2	44.1	68.2	24.1

Highest Channel (5240 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5350.00***	44.3	H	peak	0.0	44.3	68.2	23.9

802.11n (40 MHz) mode

Lowest Channel (5190 MHz)

Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5150.00	61.4	V	peak	-0.2	61.2	68.2	7.0
5150.00	48.1	V	average	-0.2	47.9	54.0	6.1

TEST DATA

Highest Channel (5230 MHz)

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5350.00***	44.4	H	peak	0.0	44.4	68.2	23.8

8.7.2 Radiated Band Edge – U-NII-3 band

FCC §15.407(b)

Test Mode : Set to Lowest channel and Highest channel

802.11n (20 MHz) mode

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	68.5	V	peak	0.8	69.3	122.2	52.9

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	57.8	V	peak	1.0	58.8	122.2	63.4

802.11n (40 MHz) mode

Lowest Channel (5755 MHz)

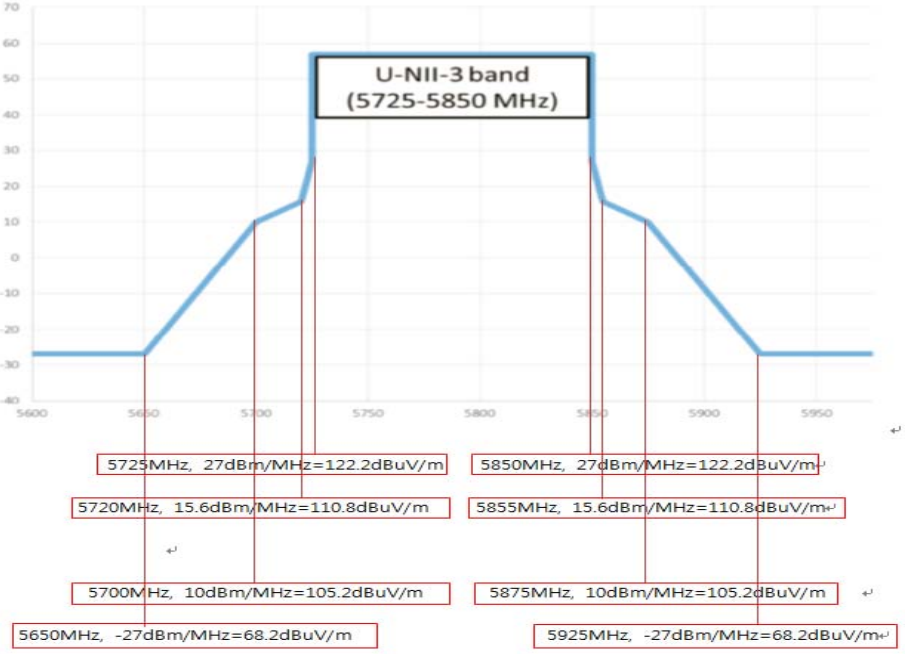
Frequency (MHz)	Reading (dBµV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5725.00	68.3	V	peak	0.8	69.1	122.2	53.1

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	51.8	V	peak	1.0	52.8	122.2	69.4

Note:

1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. ***Average measurement was not performed because peak-detected emission complies with the average limit.
4. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
5. EUT has 100% duty cycle. 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 = 1 kHz (VBW ≤ RBW/100), Detector = Peak.
6. 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.
7. 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.
8. Lowest channel (5190MHz) in n (40MHz) mode for UNII-1 band, Lowest channel (5745MHz) in n (20MHz) mode for UNII-3 band were the worst channels in each band.
9. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
10. For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
    For UNII-1 band, peak limit is 68.2 dBμV/m. (E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm.)
    For UNII 3 band, the peak limit of bandedge to 75MHz above or below bandedge is specified in 15.407(b)(4)(i) as below.



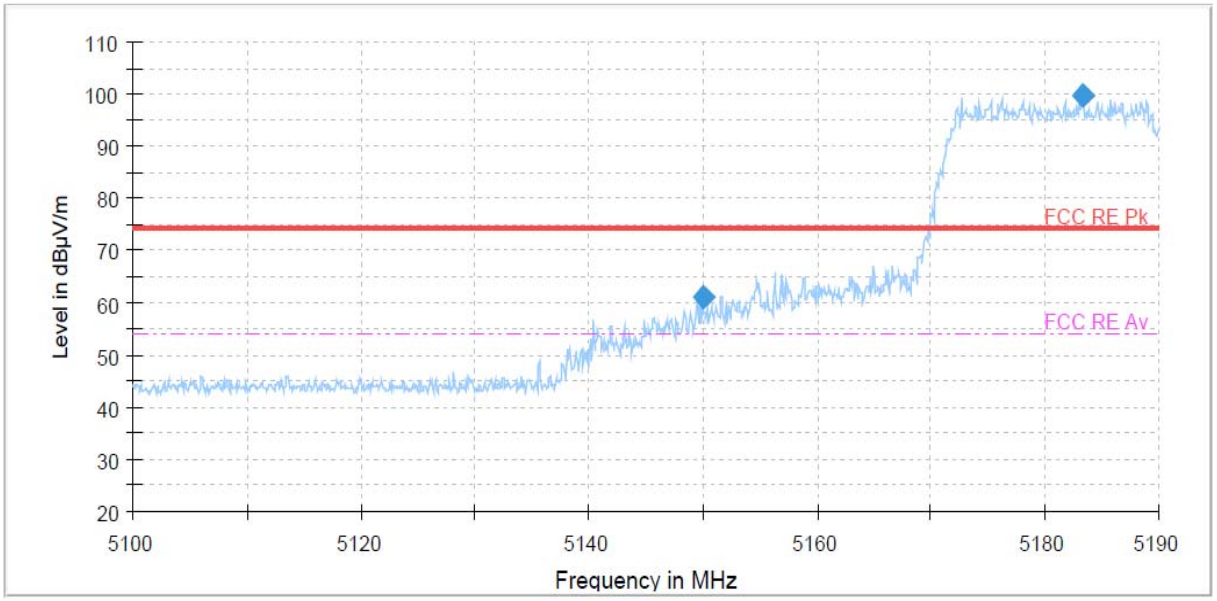
PLOT OF TEST DATA

Worst Case

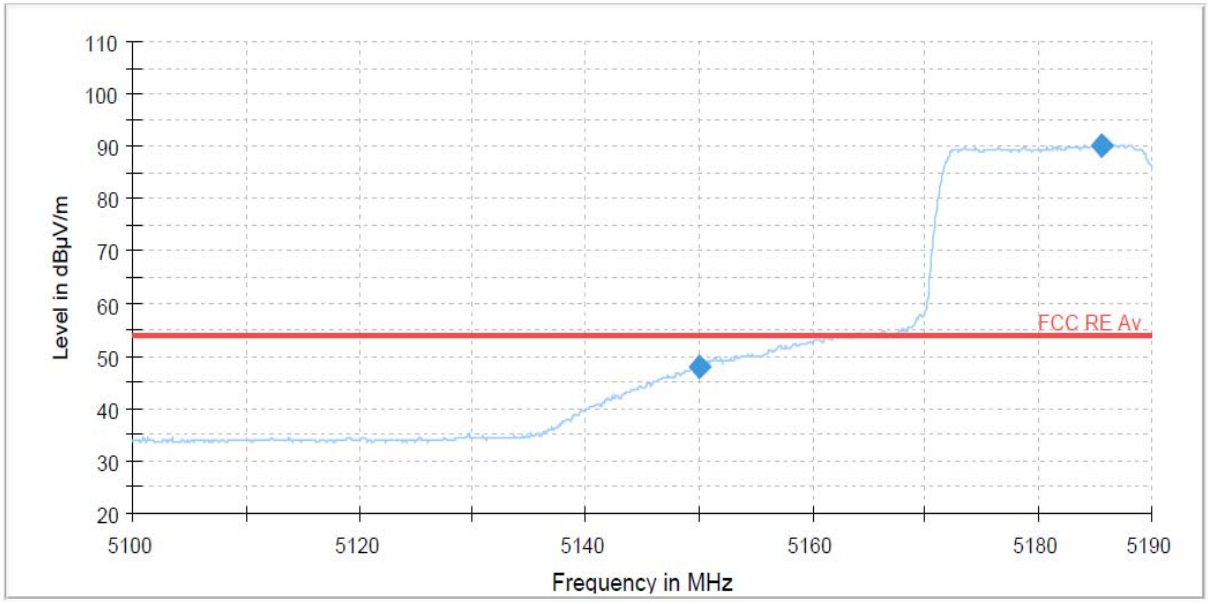
Radiated Band Edge – U-NII-1 band

802.11n (40MHz) mode

Lowest channel (5190 MHz) _Peak



Lowest channel (5190 MHz) _Average

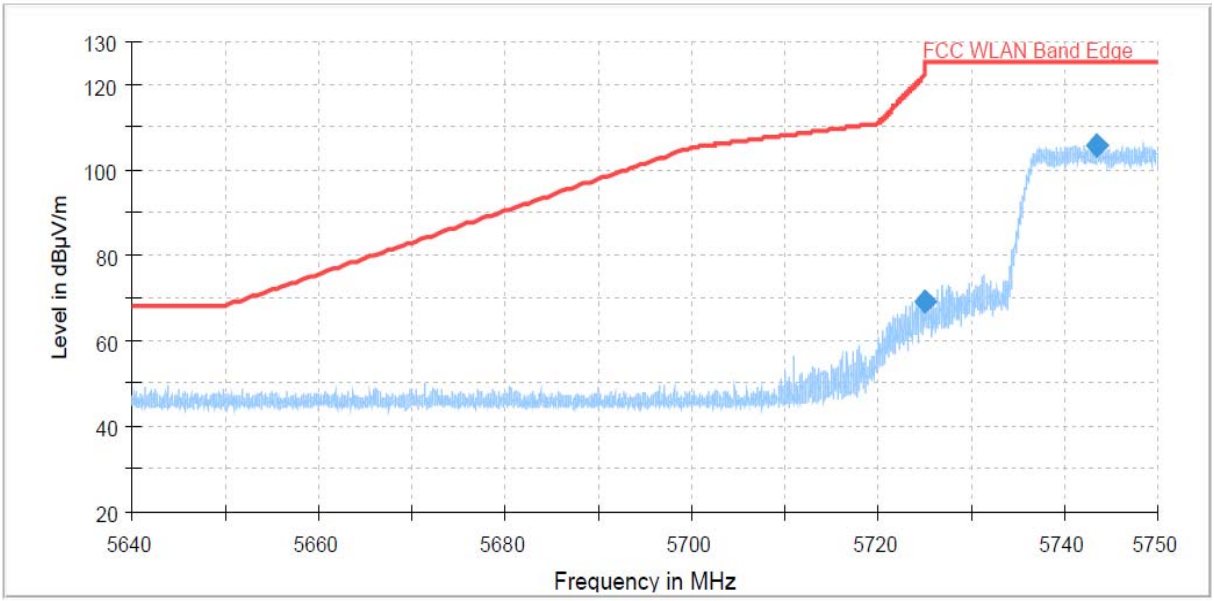


PLOT OF TEST DATA

Radiated Band Edge – U-NII-3 band

802.11n mode(20MHz)

Lowest channel (5745 MHz) _Peak



9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	Apr. 04 2017	1 year
2	Test Receiver	R & S	ESCS30	100302	Oct. 12 2017	1 year
3	*Attenuator	PASTERNACK	PE7395-10	1441-1	Jul. 13 2017	1 year
4	*Attenuator	FAIRVIEW	SA3N5W-06	N/A	Jan. 09 2017	1 year
5	*Attenuator	FAIRVIEW	SA3N5W-10	N/A	Apr. 03 2017	1 year
6	*Attenuator	WEINSCHEL	56-10	58765	Oct. 10 2017	1 year
7	*Amplifier	R & S	SCU 01	10029	Apr. 03 2017	1 year
8	*Amplifier	R & S	SCU18F	180025	Apr. 03 2017	1 year
9	*Amplifier	R & S	SCU26	10011	Jul. 13 2017	1 year
10	*Amplifier	R & S	SCU40	100380	Jul. 13 2017	1 year
11	Pre Amplifier	HP	8449B	3008A00107	Jan. 10 2017	1 year
12	Spectrum Analyzer	R & S	FSW43	100732	Apr. 11 2017	1 year
13	*Spectrum Analyzer	Agilent	E4440A	MY44303257	Oct. 13 2017	1 year
14	*Spectrum Analyzer	R & S	FSW43	104084	Apr. 04 2017	1 year
15	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 22 2016	2 year
16	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-508	Feb. 13 2017	2 year
17	*Horn Antenna	Q-par Angus	QSH20S20	8179	Aug. 01 2017	2 year
18	*Horn Antenna	Q-par Angus	QSH22K20	8180	Aug. 02 2017	2 year
19	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	9163-454	Feb. 11 2016	2 year
20	LISN	R & S	ESH3-Z5	833874/006	Oct. 12 2017	1 year
21	ESH2-Z5 Artiticial Mains Network	R & S	ESH2-Z5	100227	Apr. 04 2017	1 year
22	*Position Controller	INNCO	CO2000	12480406/L	N/A	N/A
23	*Controller	INNCO	CO3000	CO3000/937/38330516/L	N/A	N/A
24	*Turn Table	INNCO	DS1200S	N/A	N/A	N/A
25	*Turn Table	INNCO	DT2000-2t	N/A	N/A	N/A
26	*Antenna Mast	INNCO	MA4000	N/A	N/A	N/A
27	*TILT Antenna Mast	INNCO	MA4640-XP-EP	N/A	N/A	N/A
28	*Open Switch And Control Unit	R & S	OSP-120	100081	N/A	N/A
29	*Open Switch And Control Unit	R & S	OSP-120	101766	N/A	N/A
30	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A
31	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
32	*WiFi Filter Bank	R & S	U083	N/A	N/A	N/A
33	*WiFi Filter Bank	R & S	U082	N/A	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)						