



TEST REPORT

APPLICANT : Nanjing Juplink Intelligent Technologies Co., Ltd.

PRODUCT NAME : Dual-band Gigabit Router

MODEL NAME : RX4-1500

BRAND NAME : JupLink

FCC ID : 2AT9Z-RX4-1500

STANDARD(S) : 47 CFR Part 15 Subpart E

RECEIPT DATE : 2019-08-06

TEST DATE : 2019-08-07 to 2019-08-21

ISSUE DATE : 2019-09-02

Edited by:

Bowers Zeng

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Change History		
Version	Date	Reason for change
1.0	2019-09-02	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Nanjing Juplink Intelligent Technologies Co., Ltd.
Applicant Address:	No. 757, Dixiu Road, Binjiang Economic Development Zone, Jiangning District, Nanjing, China
Manufacturer:	Sichuan Tianyi Comheart Telecom Co., Ltd.
Manufacturer Address:	No. 198, Section 1, Xueshan Avenue, Dayi County, Chengdu, Sichuan, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Dual-band Gigabit Router	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	V1.0.0	
Software Version:	V1.0.1	
Modulation Type:	OFDM	
Modulation Mode:	802.11a, 802.11n(HT20), 802.11n(HT40),802.11ac(HT80)	
Operating Frequency Range:	5.180 GHz- 5.240 GHz;5.725GHz- 5.850GHz	
Channel Number:	Refer to 1.3	
Antenna Type:	External antenna	
Antenna Gain:	Ant 0:5dBi;Ant 1:5dBi	
Accessory Information:	AC Adapter	
	Brand Name:	Transin
	Model No:	TS-A012-120010Aq
	Serial No:	(N/A, marked #1 by test site)
	Rated Output:	12V=1A
	Rated Input:	200-240V~50/60Hz

Note 1: The U-NII band is applicable to this report, another bands of operation (2.4GHz) is documented in a separate report.

Note 2: The EUT has two antennas and supports a MIMO function. Physically, the EUT provides two completed transmitters and two receivers for 802.11n and 802.11ac modulation mode.

Modulation Mode: TX Function



Modulation Mode:	TX Function
802.11a	1TX
802.11n	2TX
802.11ac	2TX

Note 3: According to KDB 662911 D01, the directional gain = $GANT + 10\log(NANT)$ dBi, where GANT is the maximum antenna gain in dBi, NANT is the number of outputs.

Note 4: During test, the duty cycle of the EUT was setting to 100%.

Note 5: For conducted test item Maximum conducted output Power and Peak Power spectral density of each modulation mode, we recorded the test result of two antennas separately, for other conducted test items both of the two antennas were tested separately, we only recorded the worst test result(Ant 0) in this report.

Note 6: All radiation test items for 802.11n modulation mode operate at MIMO mode during the test. Other modulation mode operate at SISO mode, both of the two antennas were tested separately, we only recorded the worst test result(ANT0) in this report.

Note 7: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. The channel number and frequency of EUT

Frequency Range: 5180-5240MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	36	5180	40	5200
	44	5220	48	5240
40MHz	38	5190	46	5230
80MHz	42	5210	/	/
Frequency Range: 5725-5850MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	149	5745	153	5765
	157	5785	161	5805
	165	5825	/	/
40MHz	151	5755	159	5795
80MHz	155	5775	/	/

Note 1: The black bold channels were selected for test.



1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.407(a) (e)	Emission Bandwidth	Aug 09, 2019	Elvis Wang	PASS
3	15.407(a)	Maximum conducted output Power	Aug 09, 2019	Elvis Wang	PASS
4	15.407(a)	Peak Power spectral density	Aug 09, 2019	Elvis Wang	PASS
5	15.407(b)	Restricted Frequency Bands	Aug 16, 2019 Aug 18, 2019	Bowers Zeng	PASS
6	15.407(g)	Frequency Stability	Aug 09, 2019 Aug 09, 2019	Elvis Wang	PASS
7	15.207	Conducted Emission	Aug 08, 2019	Bowers Zeng	PASS
8	15.407(b)	Radiated Emission	Aug 10, 2019 Aug 18, 2019	Bowers Zeng	PASS
9	15.407(c)	Automatically discontinue transmission requirement	N/A	N/A	PASS

Note: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013 and KDB789033 D02 V02r01.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106



2. 47 CFR Part 15E Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, 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.

2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

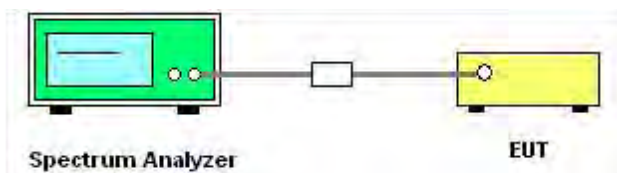
2.2. Emission Bandwidth

2.2.1. Requirement

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement. Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

2.2.2. Test Description

A. Test Setup:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

B. Test Procedure

1. KDB 789033 Section C) 1) Emission Bandwidth was used in order to prove compliance

- a) Set RBW = approximately 1% of the emission bandwidth.
 - b) Set the VBW > RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission.
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. KDB 789033 Section C) 2) minimum emission bandwidth for the band 5.725-5.85GHz was used in order to prove compliance.

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.



e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

2.2.3. Test Result

802.11a Test mode

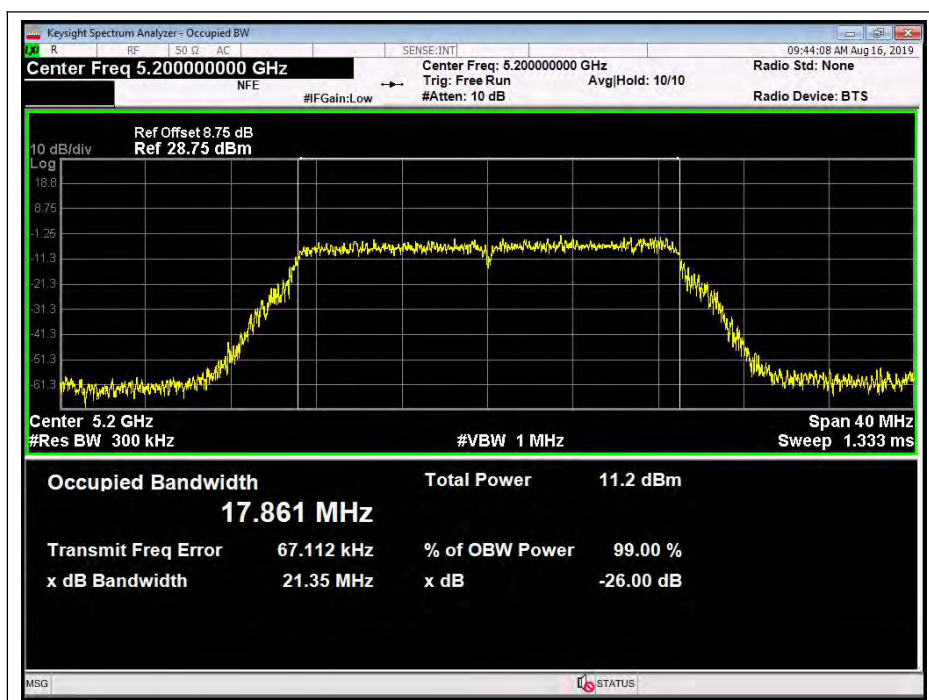
A. Test Verdict:

Channel	Frequency (MHz)	ANTO 26 dB Bandwidth (MHz)
36	5180	21.39
40	5200	21.35
48	5240	21.54
Channel	Frequency (MHz)	ANTO 6dB Bandwidth (MHz)
149	5745	17.69
157	5785	17.66
165	5825	17.68

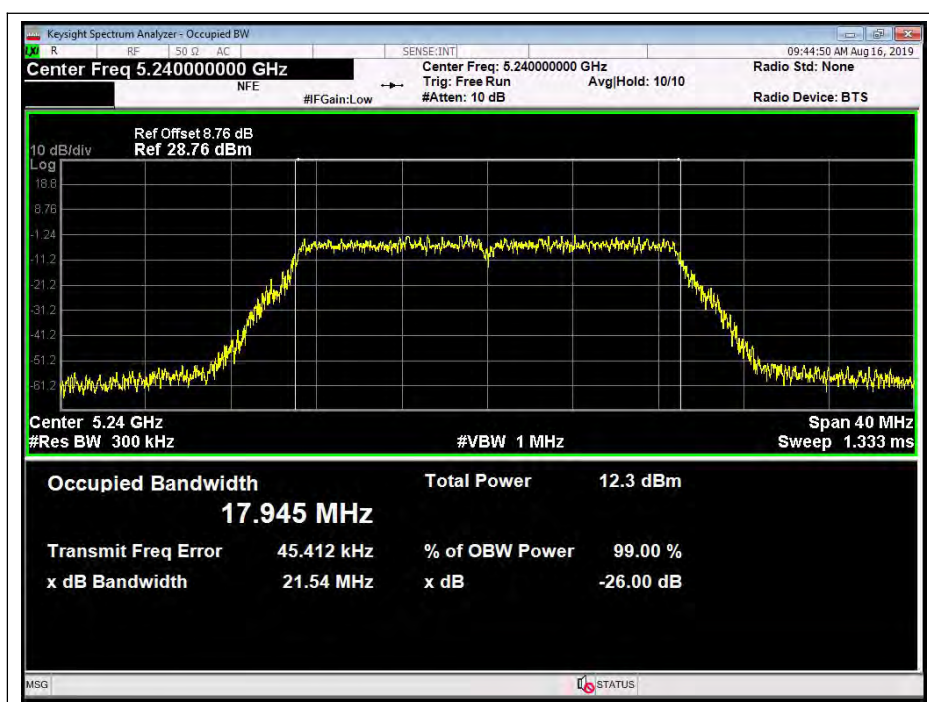
B. Test Plots



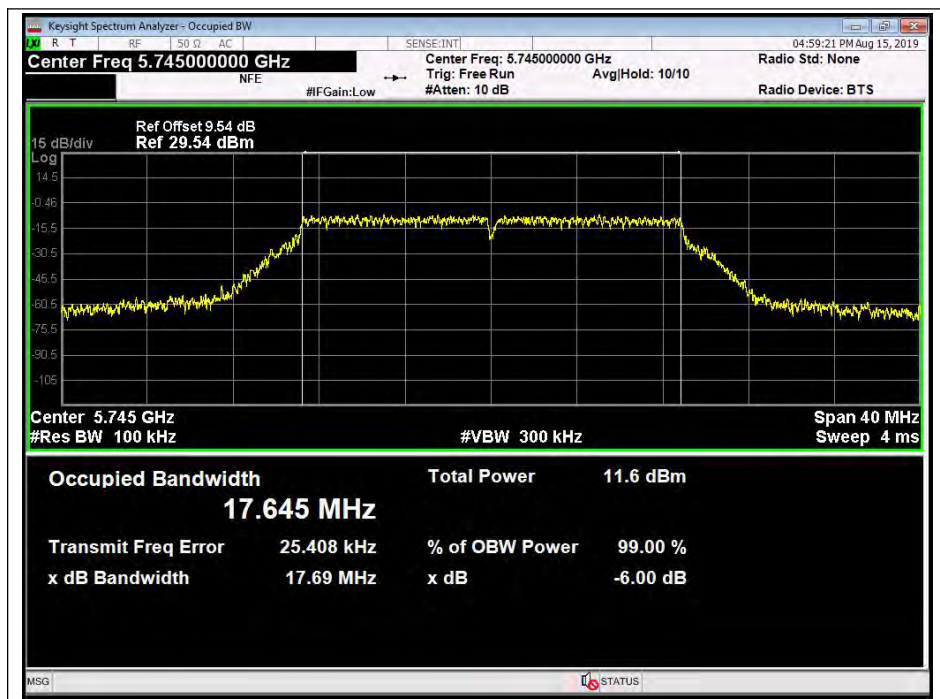
(Channel 36, 5180MHz, 802.11a)



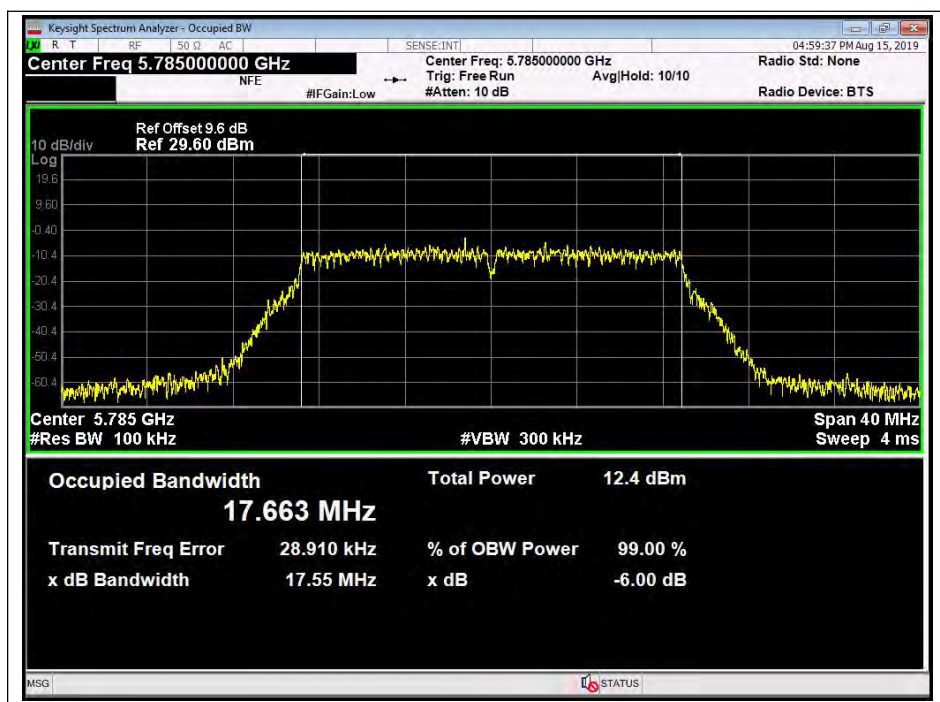
(Channel 40, 5200 MHz, 802.11a)



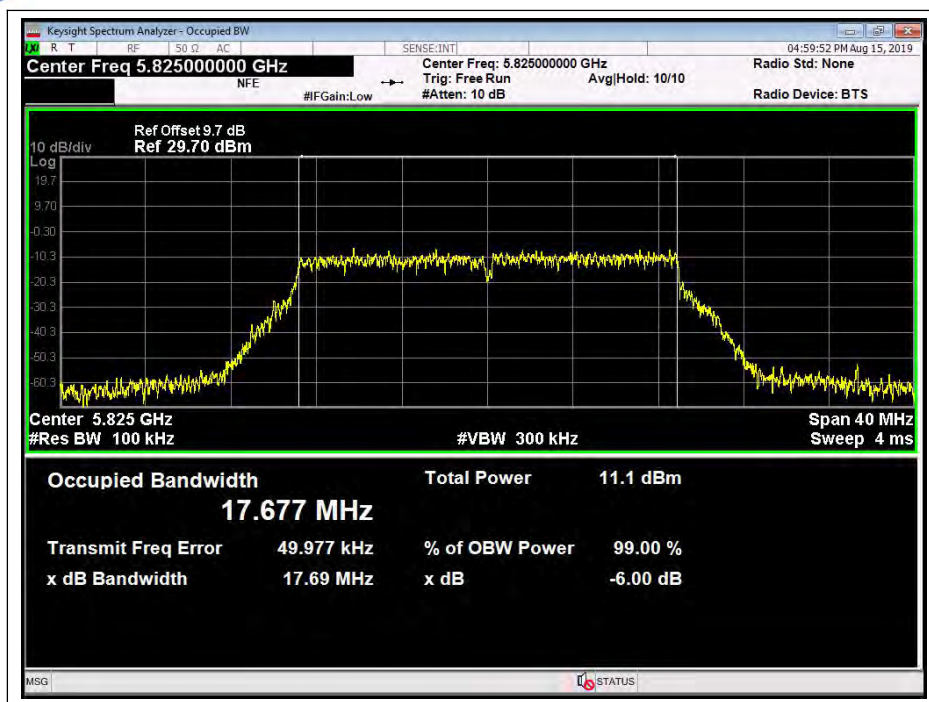
(Channel 48, 5240MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)

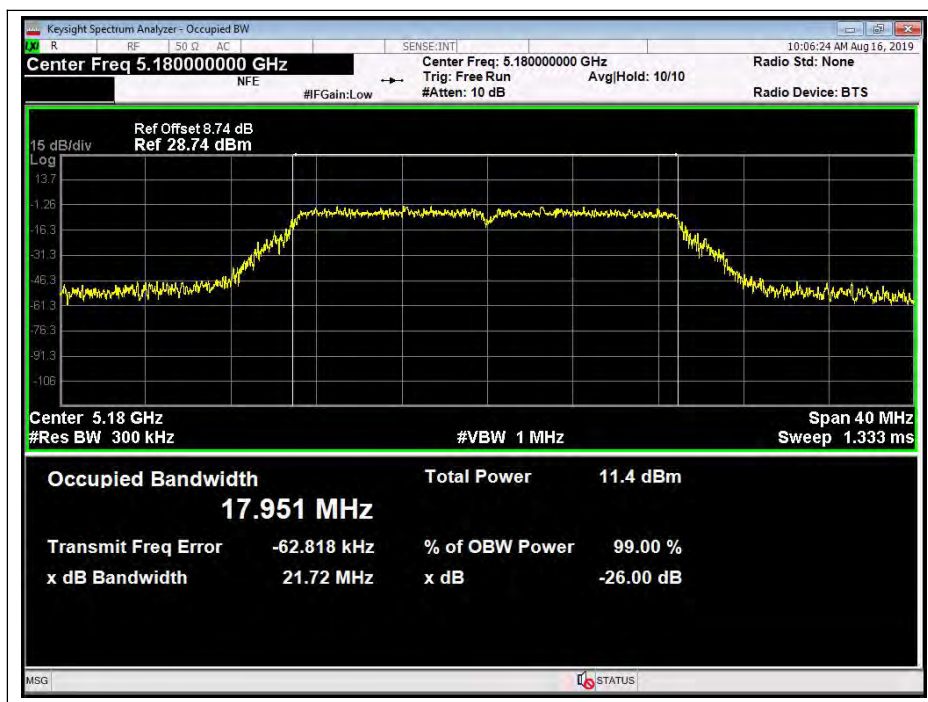
802.11n (HT20) Test mode

A. Test Verdict:

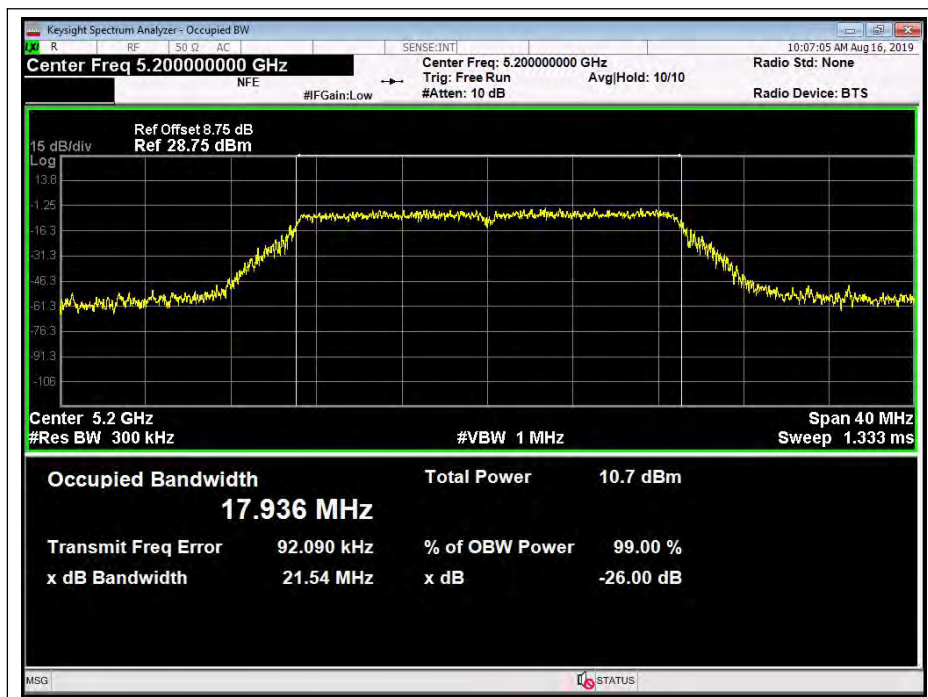
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	21.72
40	5200	21.54
48	5240	21.54
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
149	5745	17.62
157	5785	17.55
165	5825	17.78



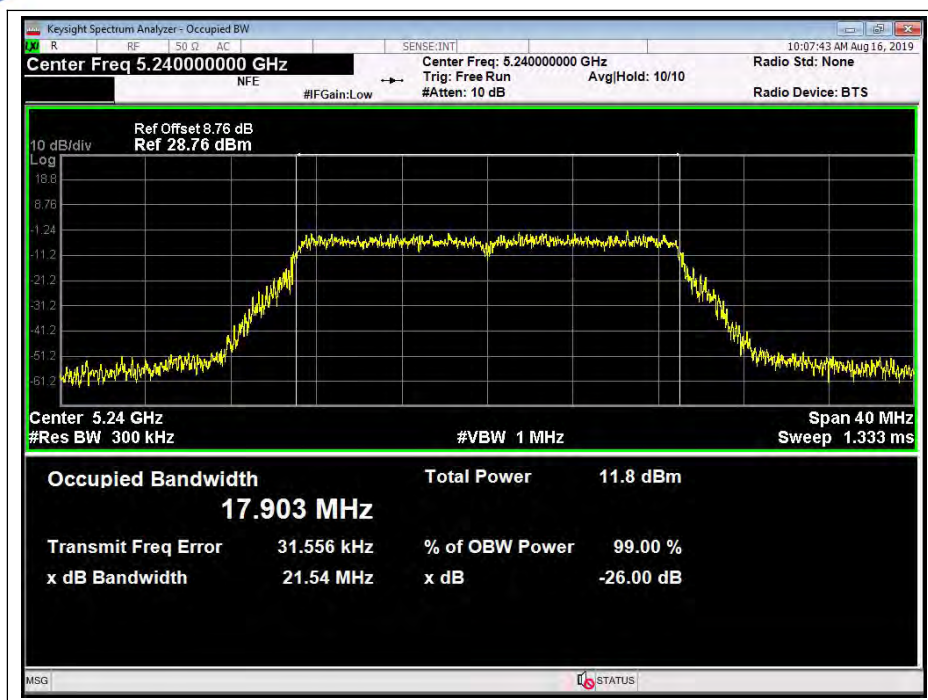
B. Test Plots



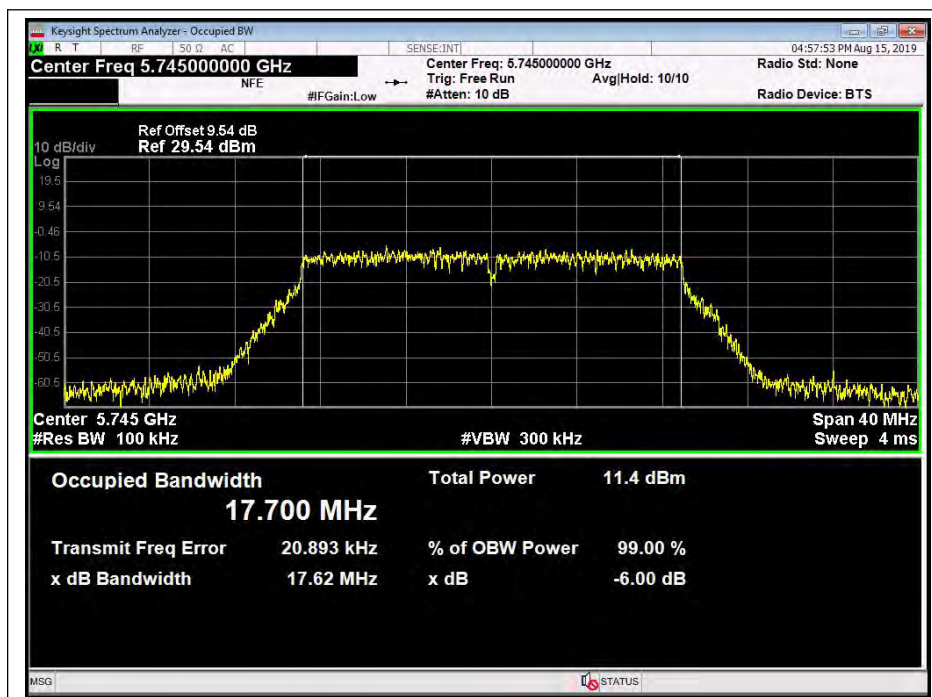
(Channel 36, 5180MHz, 802.11 n (HT20))



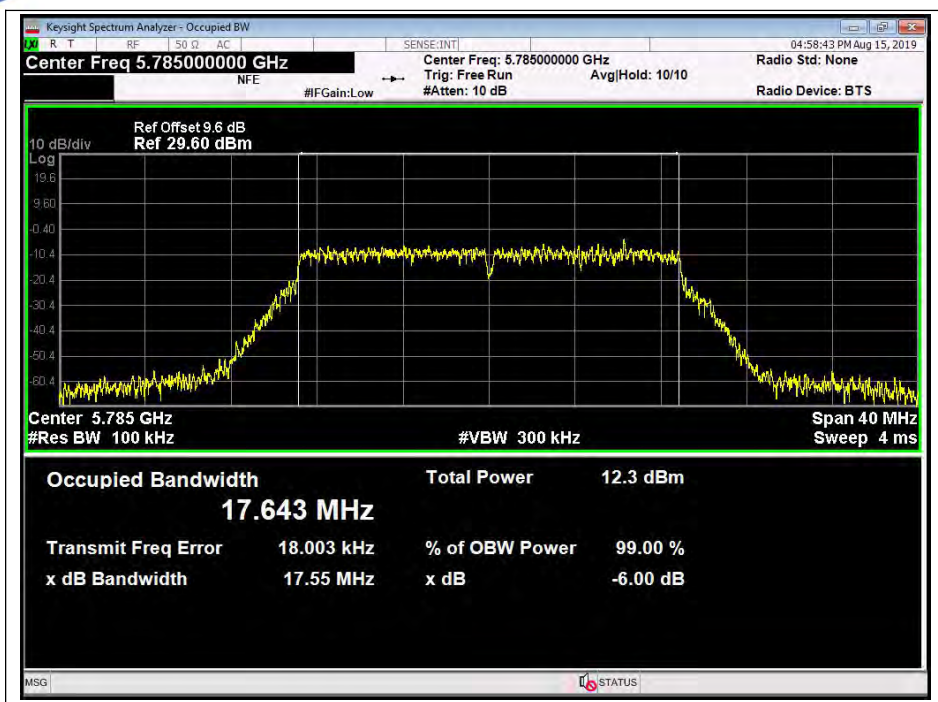
(Channel 40, 5200 MHz, 802.11 n (HT20))



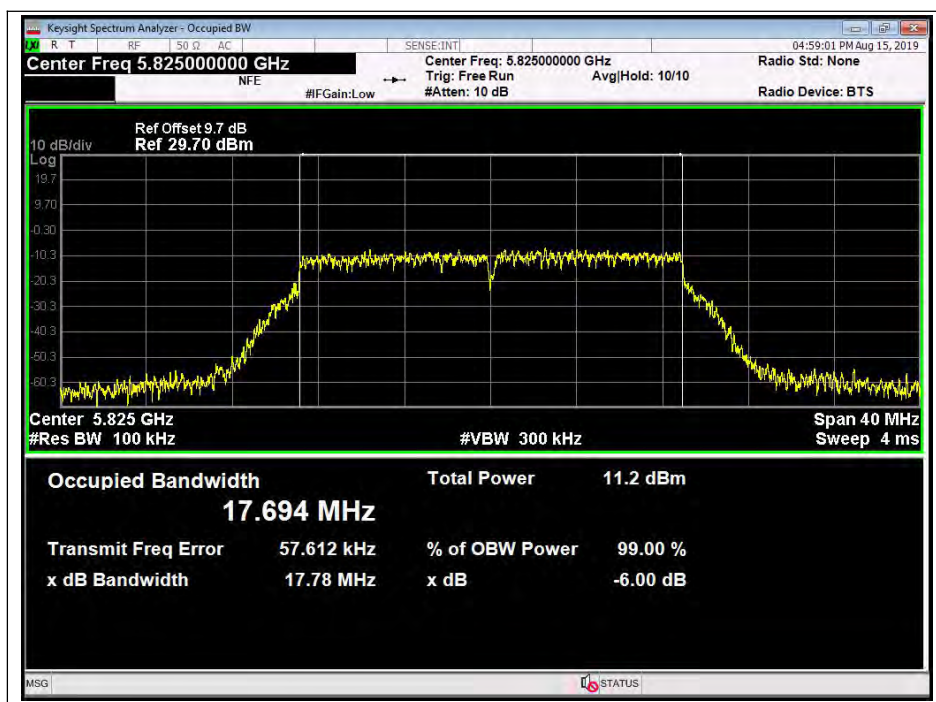
(Channel 48, 5240MHz, 802.11 n (HT20))



(Channel 149, 5745MHz, 802.11 n (HT20))



(Channel 157, 5785MHz, 802.11 n (HT20))



(Channel 165, 5825MHz, 802.11 n (HT20))

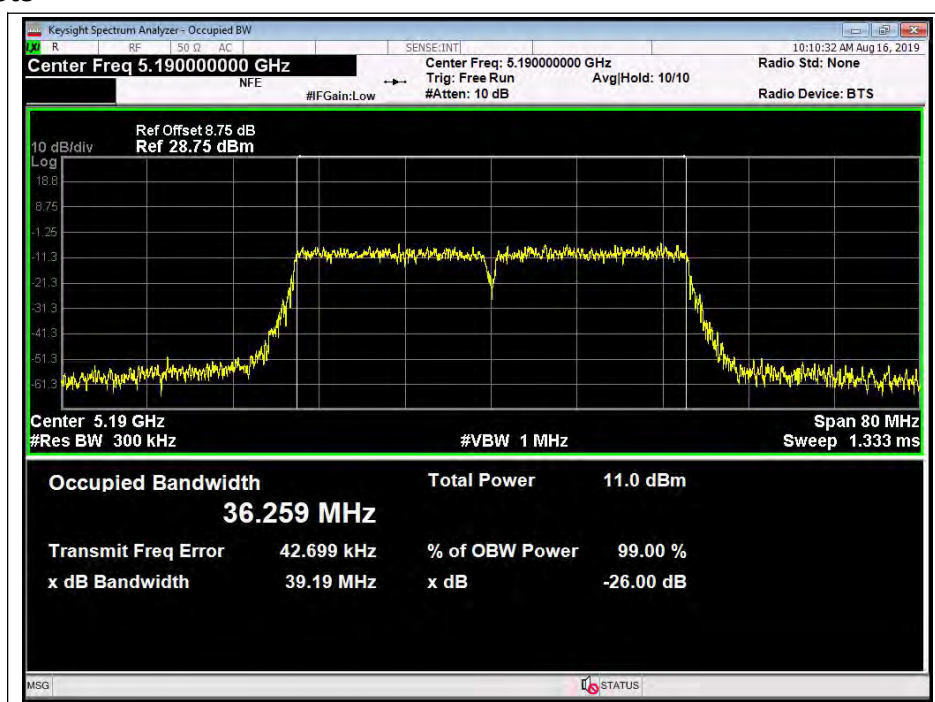


802.11n (HT40) Test mode

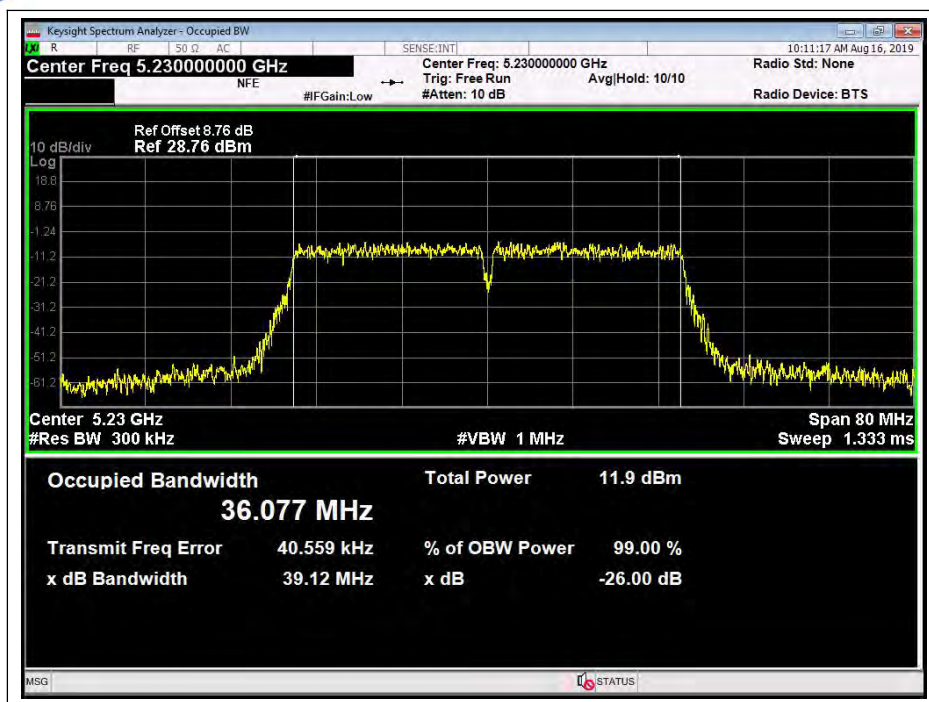
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	39.19
46	5230	39.12
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
151	5755	36.33
159	5795	35.71

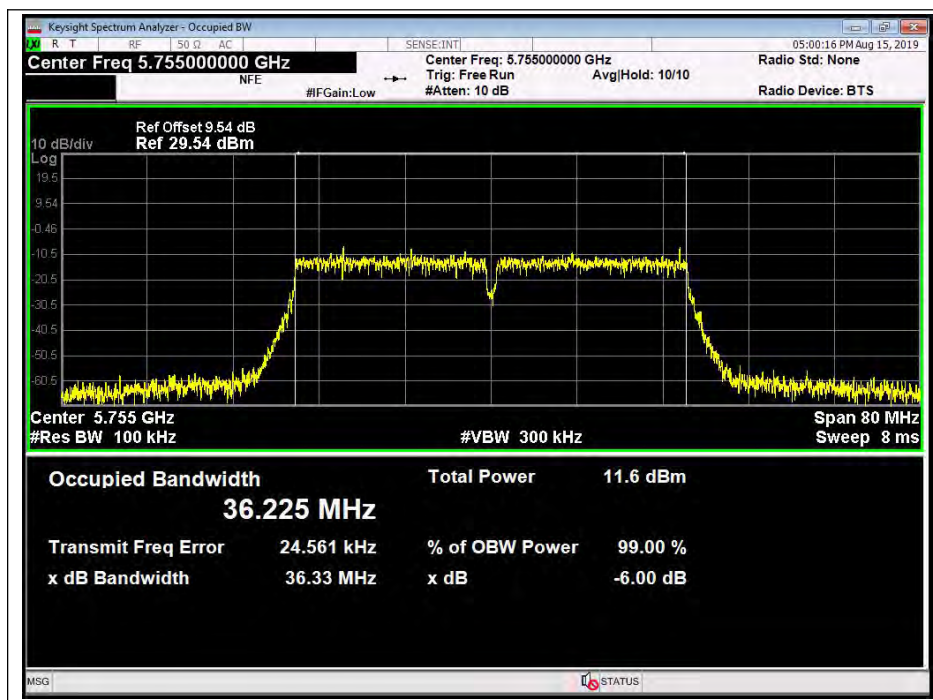
B. Test Plots



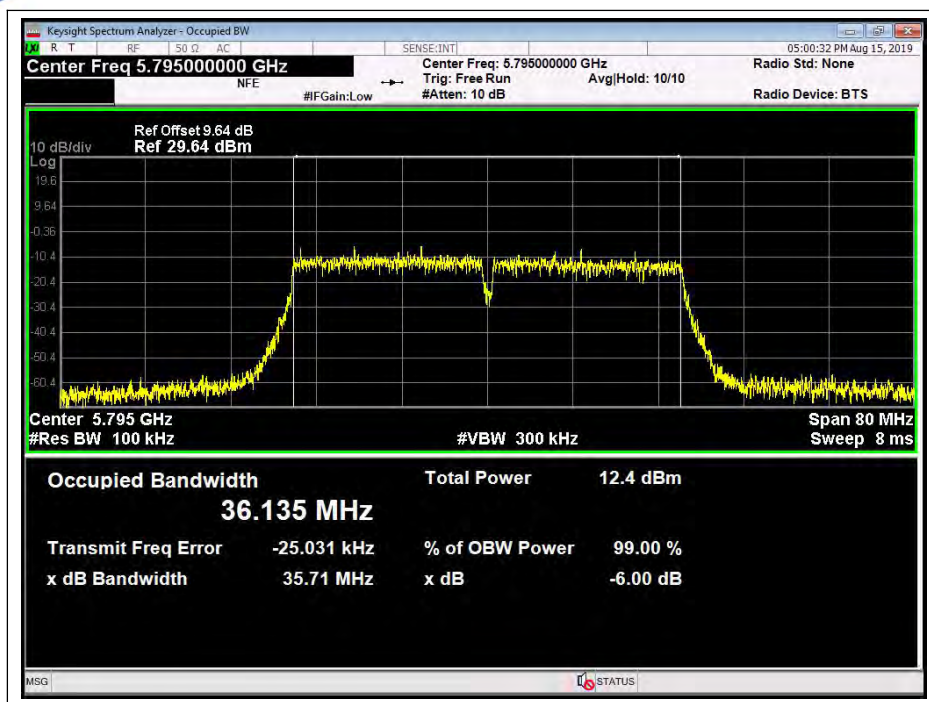
(Channel 38, 5190MHz, 802.11n (HT40))



(Channel 46, 5230 MHz, 802.11n (HT40))



(Channel 151, 5755 MHz, 802.11n (HT40))



(Channel 159, 5795MHz, 802.11n (HT40))

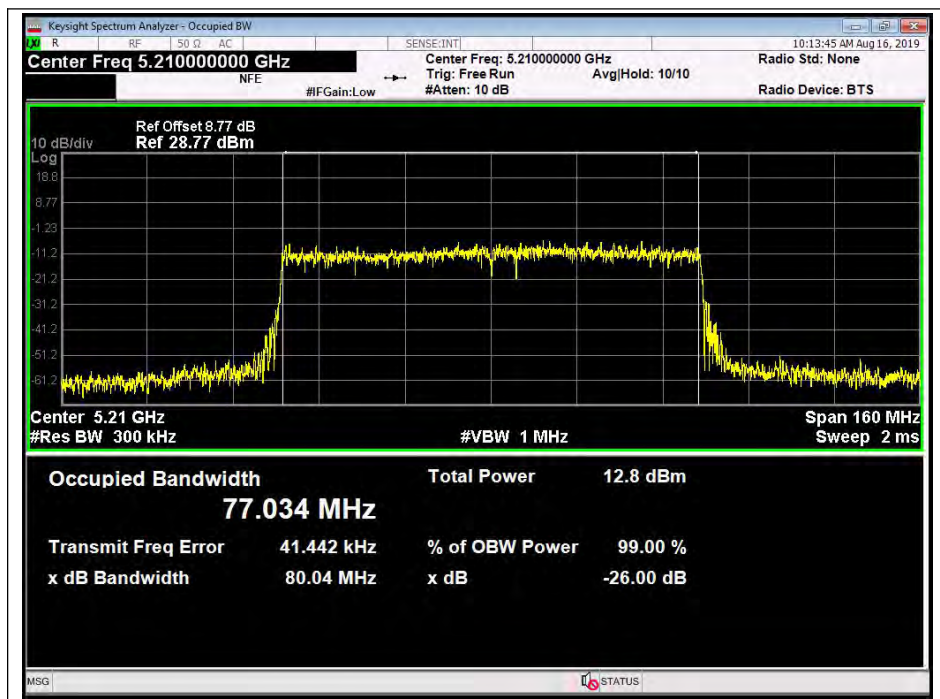
802.11ac (HT80) Test mode

C. Test Verdict:

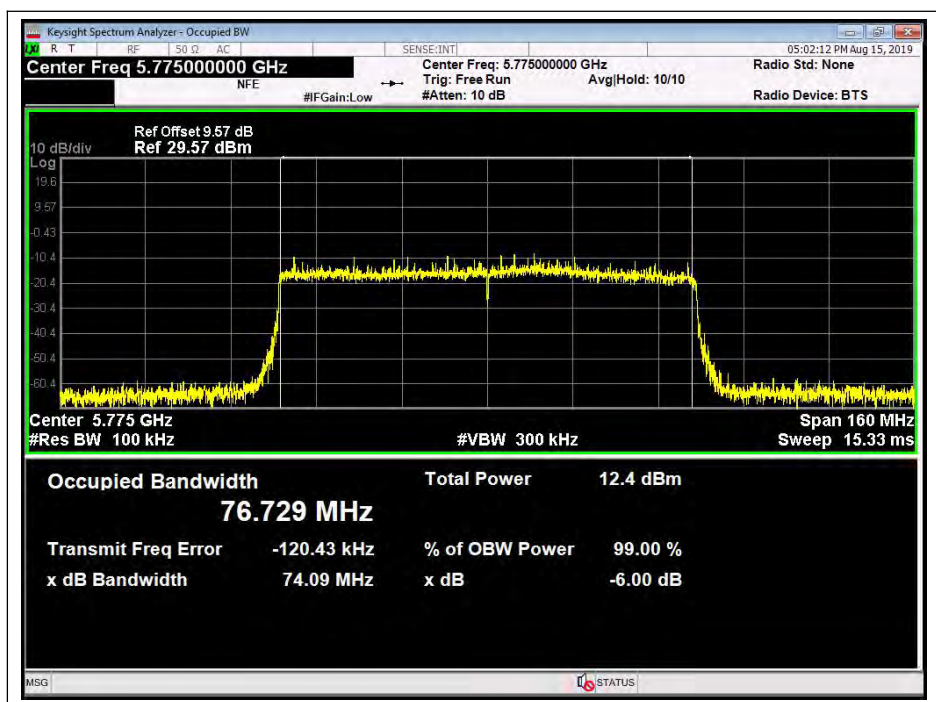
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	80.04
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
155	5775	74.09



D. Test Plots



(Channel 42, 5210MHz, 802.11ac (HT80))



(Channel 155, 5775MHz, 802.11ac (HT80))

2.3. Maximum conducted output power

2.3.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

(2) For the 5.25-5.35 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

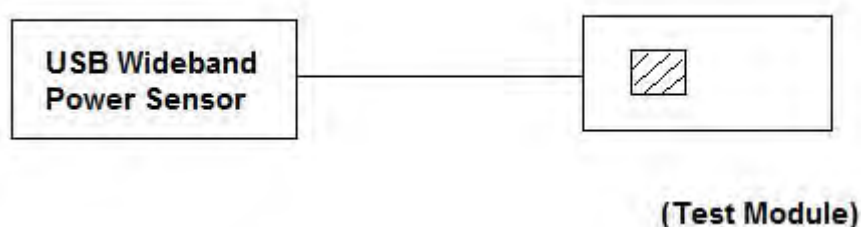
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in units that are directly proportional to power.

(5) According to KDB 662911 D01, the directional gain = $G_{\text{ANT}} + 10 \log(N_{\text{ANT}})$ dBi, where G_{ANT} is the antenna gain in dBi, N_{ANT} is the number of outputs.

2.3.2. Test Description

Section E) 3) of KDB 789033 defines a methodology using a USB Wideband Power Sensor.

A. Test Set:



The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; the RF load attached to the EUT antenna terminal is 50Ω; the path loss as the factor is calibrated to correct the reading, all test result in USB Wideband Power Sensor.



2.3.3. Test Result

Duty Cycle Factor

ANT0

Mode	Channel	Frequency (MHz)	T _{on} (ms)	T _(on+off) (ms)	Duty Cycle (%)	Duty Cycle Factor
802.11 a	36	5180	100	100	100	0
802.11 HT20	36	5180	100	100	100	0
802.11 HT40	38	5190	100	100	100	0
802.11 HT80	42	5210	100	100	100	0

ANT1

Mode	Channel	Frequency (MHz)	T _{on} (ms)	T _(on+off) (ms)	Duty Cycle (%)	Duty Cycle Factor
802.11 a	36	5180	100	100	100	0
802.11 HT20	36	5180	100	100	100	0
802.11 HT40	38	5190	100	100	100	0
802.11 HT80	42	5210	100	100	100	0

802.11a Test mode

Channel	Frequency (MHz)	Average Output Power (dBm)		Limit		Verdict
		ANT0	ANT1	(dBm)	11+10*log(EBW) (dBm)	
36	5180	12.38	12.42	24	24.30	PASS
40	5200	11.55	11.59		24.29	
48	5240	12.53	12.57		24.33	
149	5745	11.32	11.90	30		
157	5785	11.23	11.69			
165	5825	11.19	11.00			

Note: Power limit is 24dBm or 11+10*log(EBW)

802.11n (HT20) Test mode

Channel	Frequency (MHz)	Average Output Power (dBm)			Limit		Verdict
		ANT0	ANT1	Total	(dBm)	11+10*log(EBW) (dBm)	
36	5180	13.04	13.74	16.42	24	24.37	PASS
40	5200	12.33	13.50	15.96		24.33	
48	5240	13.10	13.32	16.22		24.33	



Channel	Frequency (MHz)	Average Output Power (dBm)			Limit		Verdict
		ANT0	ANT1	Total	(dBm)	11+10*log(EBW) (dBm)	
149	5745	14.09	13.42	16.78	30		
157	5785	14.02	13.39	16.73			
165	5825	13.86	13.26	16.58			
Note: Power limit is 24dBm or 11+10*log(EBW)							

802.11n (HT40) Test mode

Channel	Frequency (MHz)	Average Output Power (dBm)			Limit		Verdict
		ANT0	ANT1	Total	(dBm)	11+10*log(EBW) (dBm)	
38	5190	12.47	13.75	16.17	24	26.93	PASS
46	5230	13.45	13.53	16.50		26.92	PASS
151	5755	13.93	13.36	16.67	30		PASS
159	5795	14.26	13.31	16.82			PASS
Note: Power limit is 24dBm or 11+10*log(EBW)							

802.11ac (HT80) Test mode

Channel	Frequency (MHz)	Average Output Power (dBm)			Limit		Verdict
		ANT0	ANT1	Total	(dBm)	11+10*log(EBW) (dBm)	
42	5210	13.75	14.70	17.26	24	30.03	PASS
149	5745	14.26	13.31	16.82	30		
Note: Power limit is 24dBm or 11+10*log(EBW)							

Note: The duty cycle factor has been compensated into the test result

2.4. Peak Power spectral density

2.4.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(2) For the 5.25-5.35 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500KHz band.

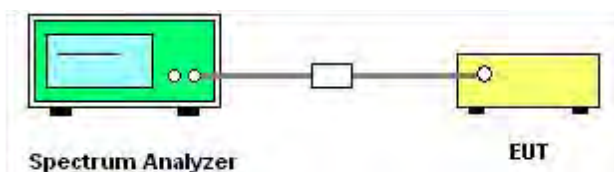
If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in units that are directly proportional to power.

(5) According to KDB 662911 D01, the directional gain = $G_{ANT} + 10\log(N_{ANT})$ dBi, where G_{ANT} is the antenna gain in dBi, N_{ANT} is the number of outputs.

2.4.2. Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

B. Test Procedure

KDB 789033 Section F) Maximum Power Spectral Density (PSD) Method SA-1 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
- 2) Set RBW = 1 MHz. Set VBW $\geq$ 3 MHz.
- 3) Number of points in sweep $\geq$ 2 Span / RBW. Sweep time = auto.
- 4) Detector = RMS (i.e., power averaging)
- 5) Trace average at least 100 traces in power averaging (i.e., RMS) mode
- 6) Record the max value



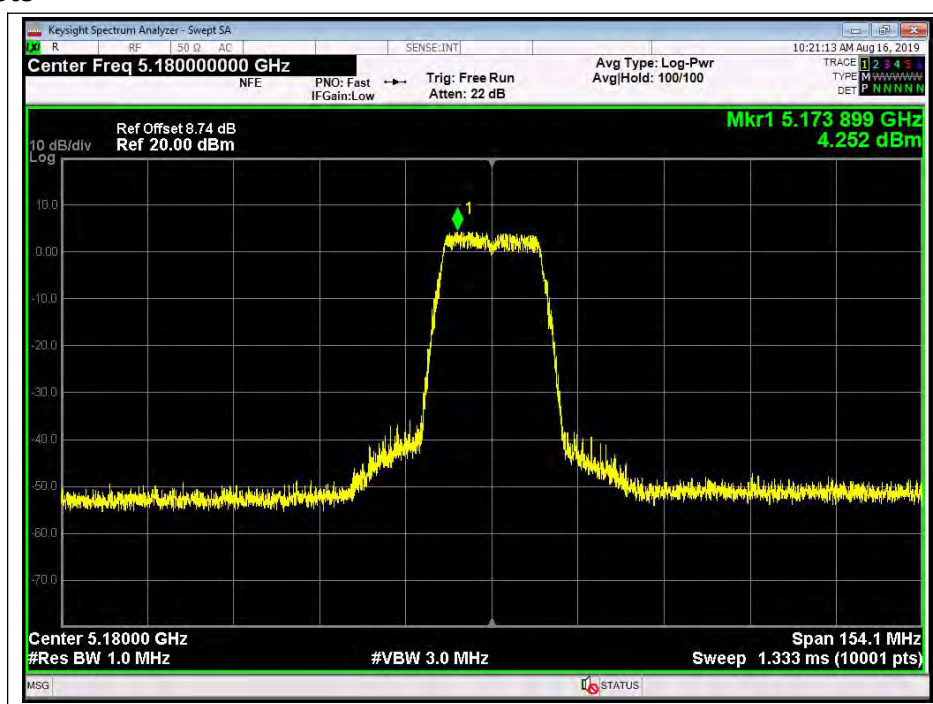
2.4.3. Test Result

802.11a Test mode

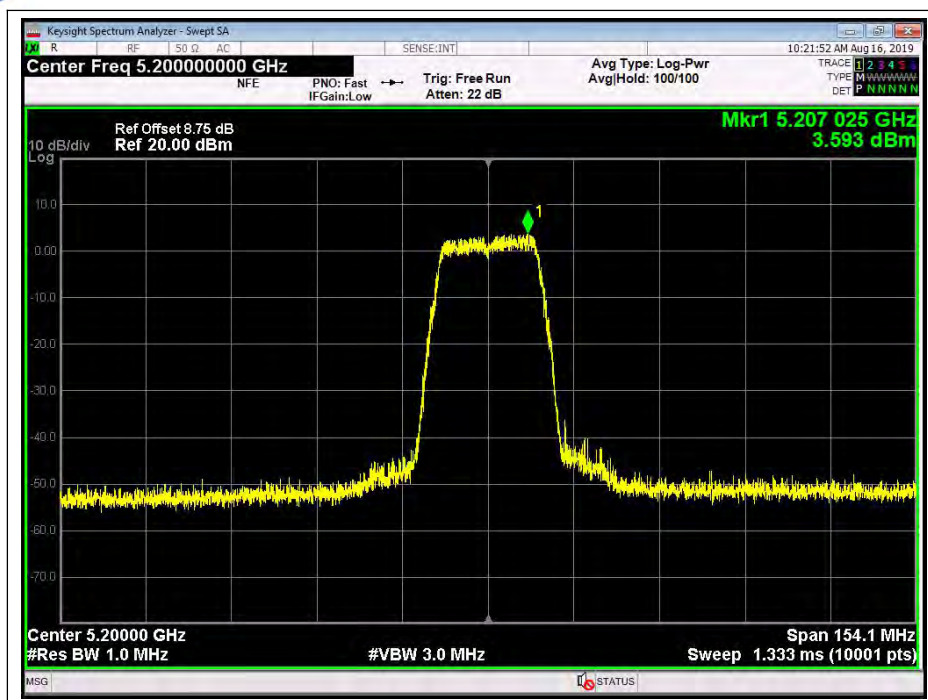
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)		Limit (dBm/MHz)	Verdict
		ANT0	ANT1		
36	5180	4.252	5.033	11	PASS
40	5200	3.593	4.313		
48	5240	4.655	4.753		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)		Limit (dBm/500KHz)	Verdict
		ANT0	ANT1		
149	5745	0.592	1.378	30	PASS
157	5785	2.020	1.825		
165	5825	0.031	0.931		

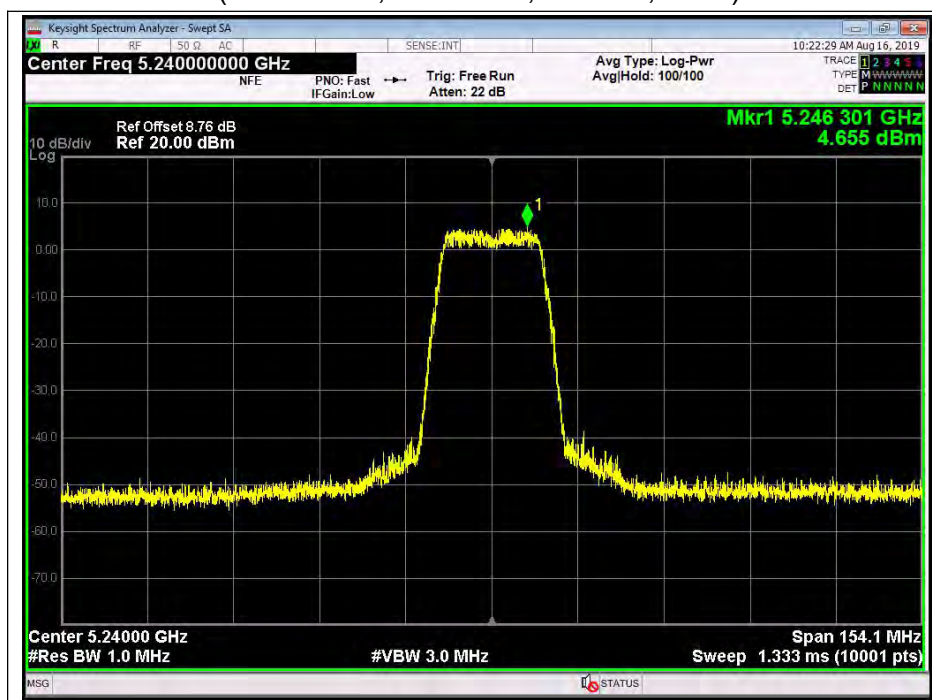
B. Test Plots



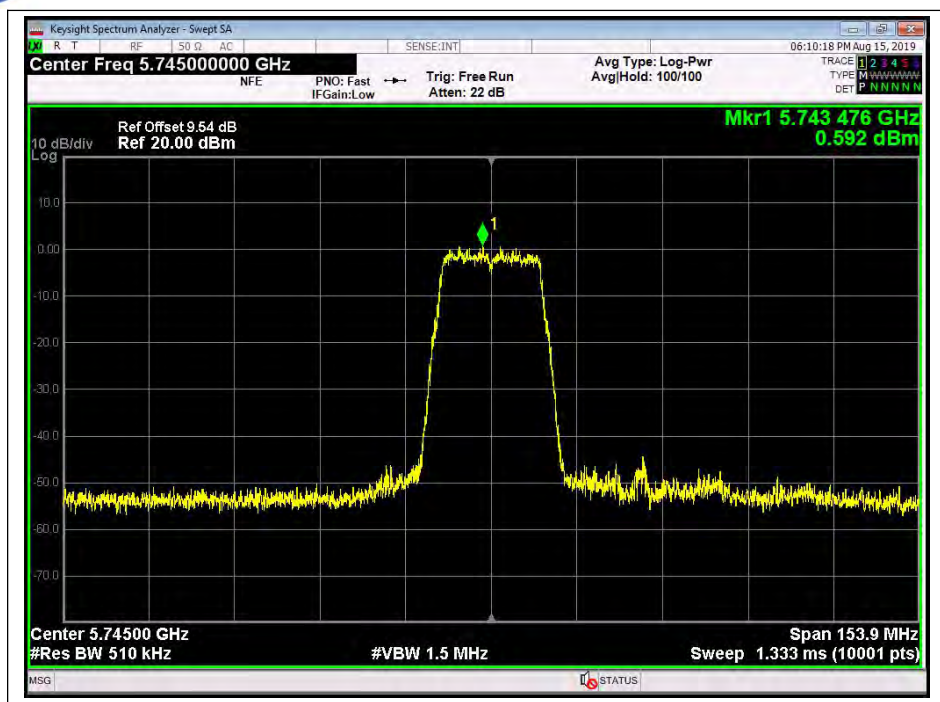
(Channel 36, 5180MHz, 802.11a,ANT0)



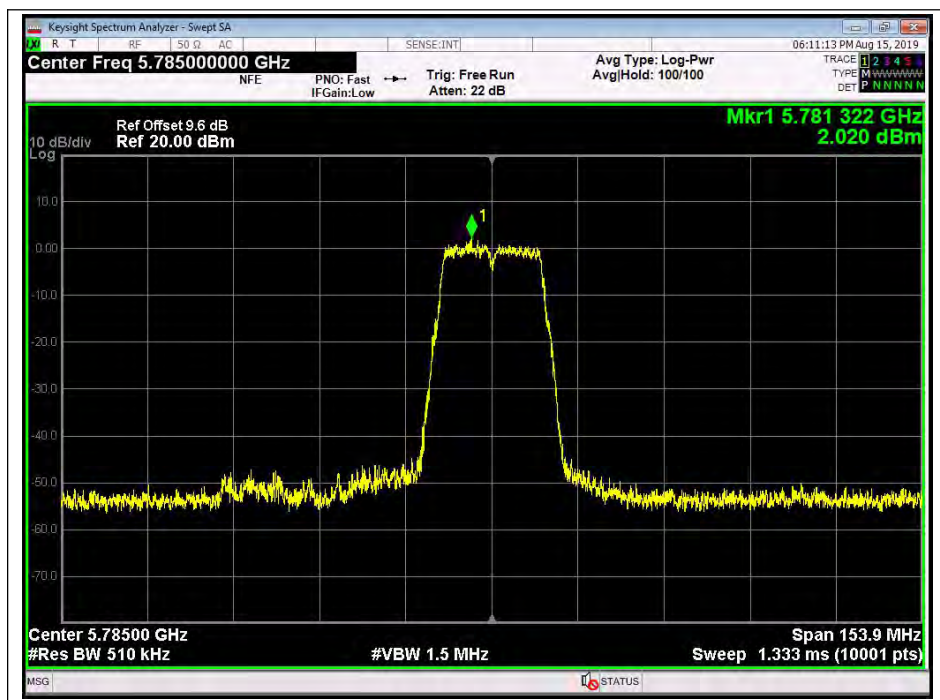
(Channel 40, 5200 MHz, 802.11a,ANT0)



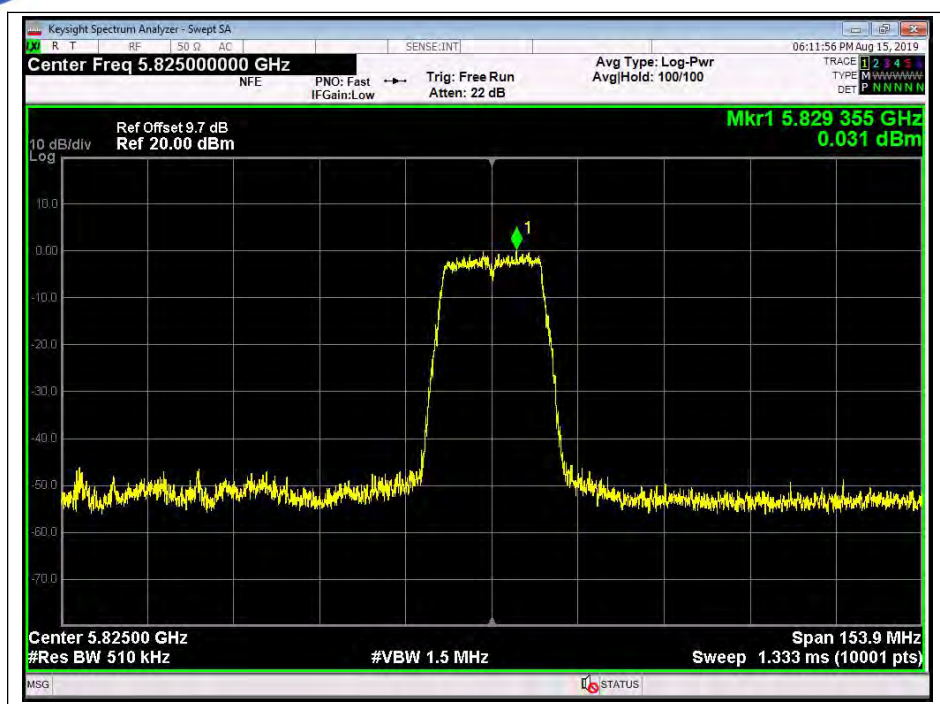
(Channel 48, 5240MHz, 802.11a,ANT0)



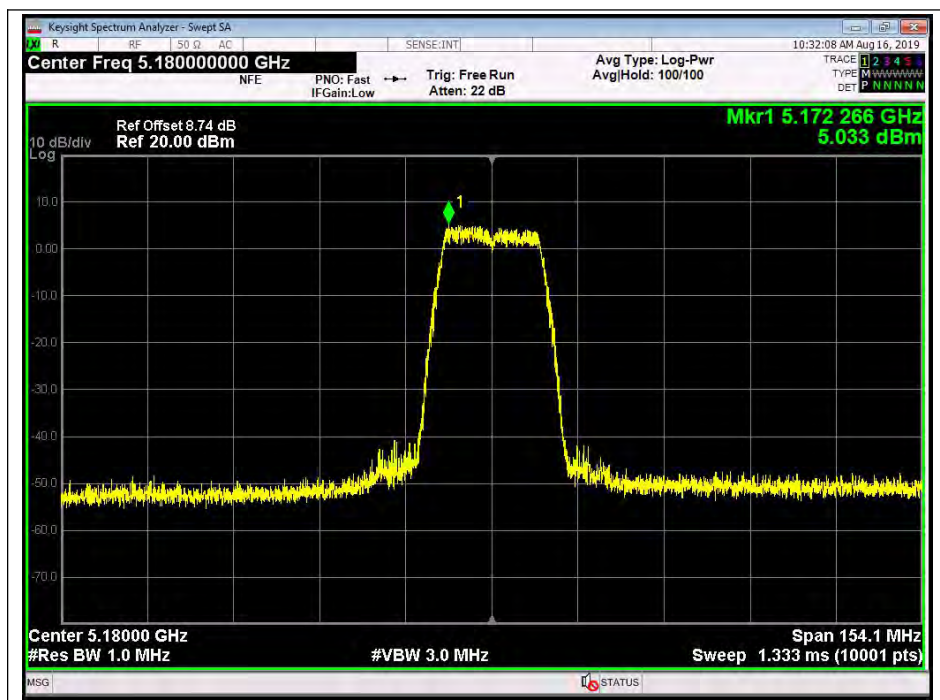
(Channel 149, 5745MHz, 802.11a,ANT0)



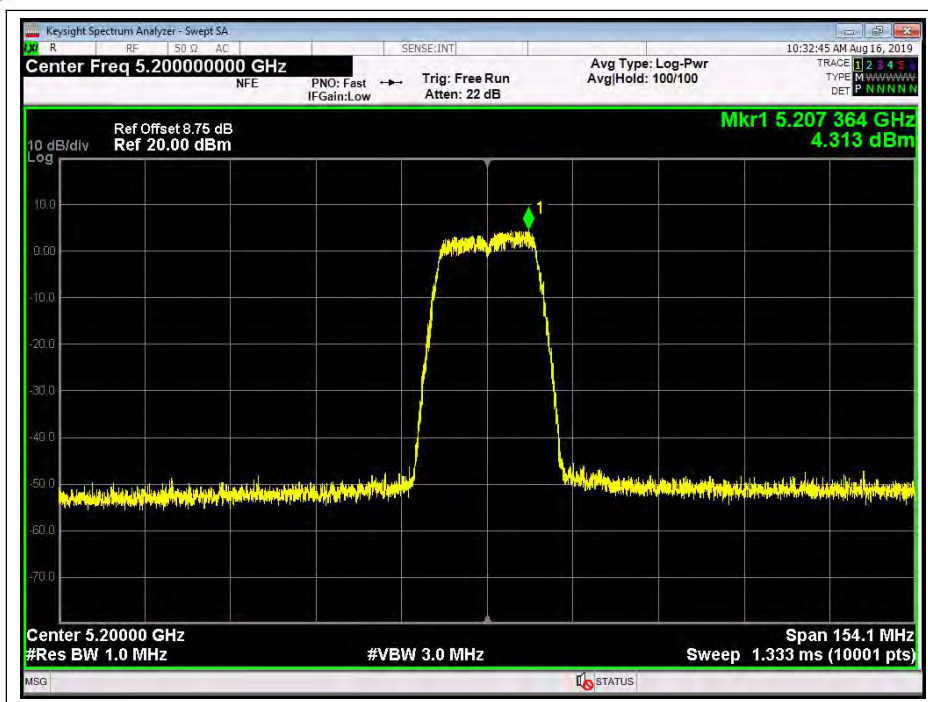
(Channel 157, 5785MHz, 802.11a,ANT0)



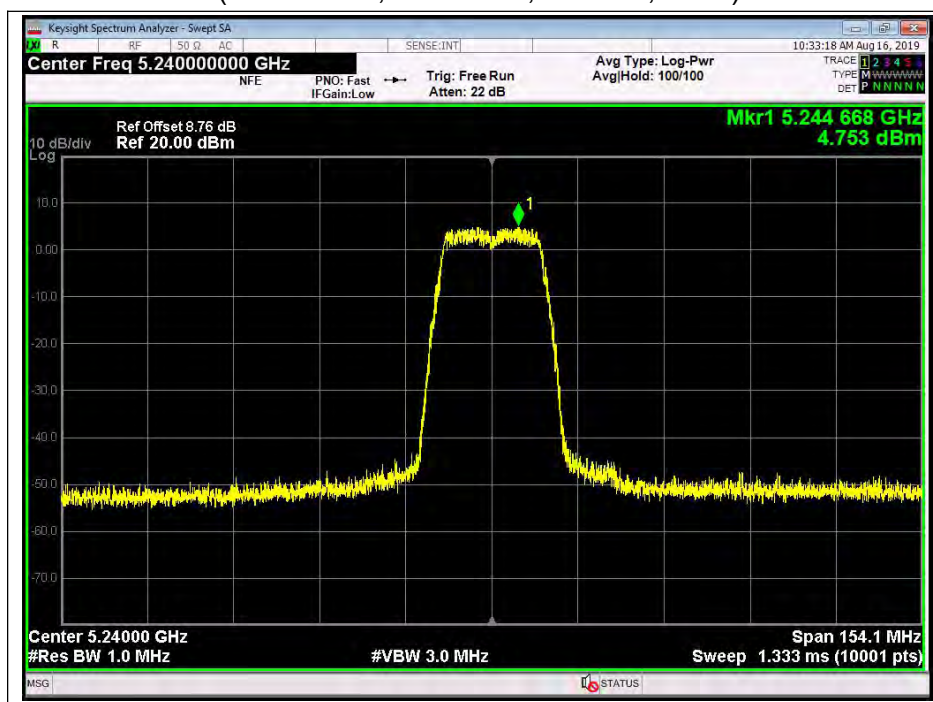
(Channel 165, 5825MHz, 802.11a,ANT0)



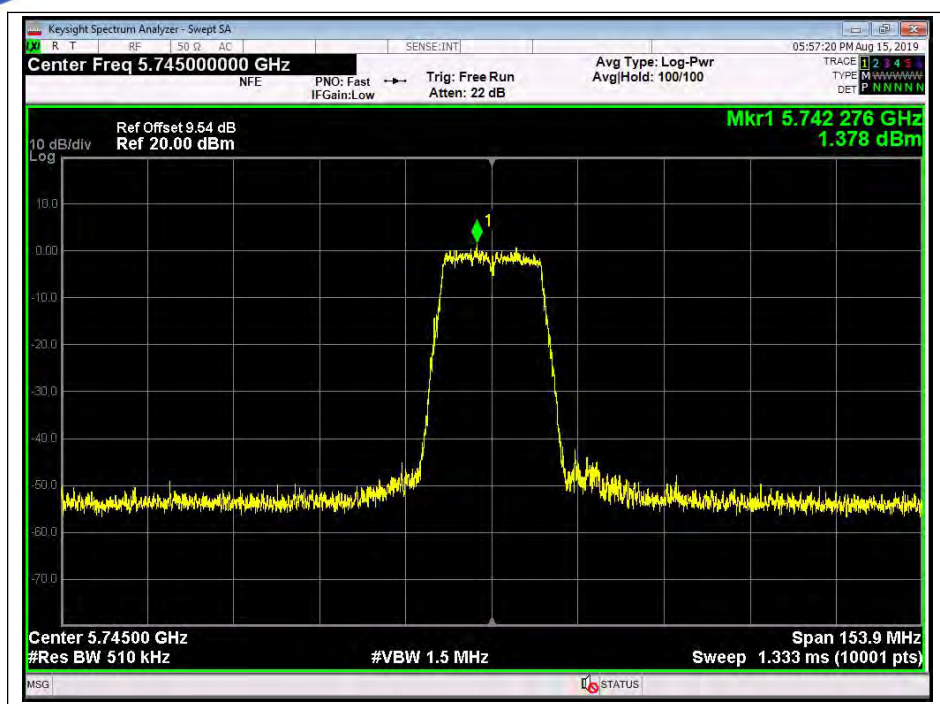
(Channel 36, 5180MHz, 802.11a,ANT1)



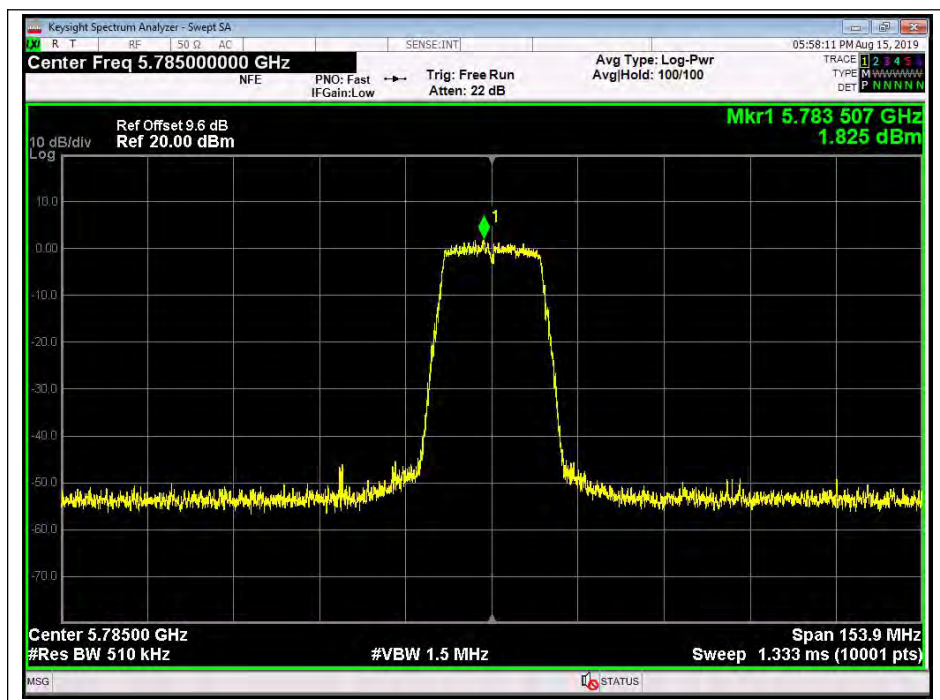
(Channel 40, 5200 MHz, 802.11a, ANT1)



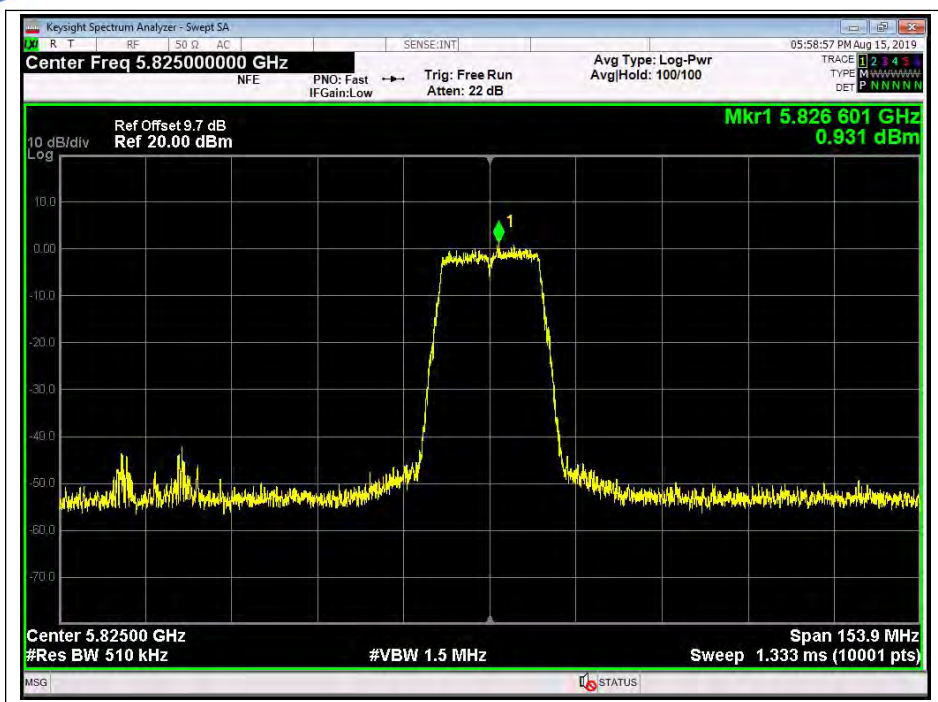
(Channel 48, 5240MHz, 802.11a, ANT1)



(Channel 149, 5745MHz, 802.11a,ANT1)



(Channel 157, 5785MHz, 802.11a,ANT1)

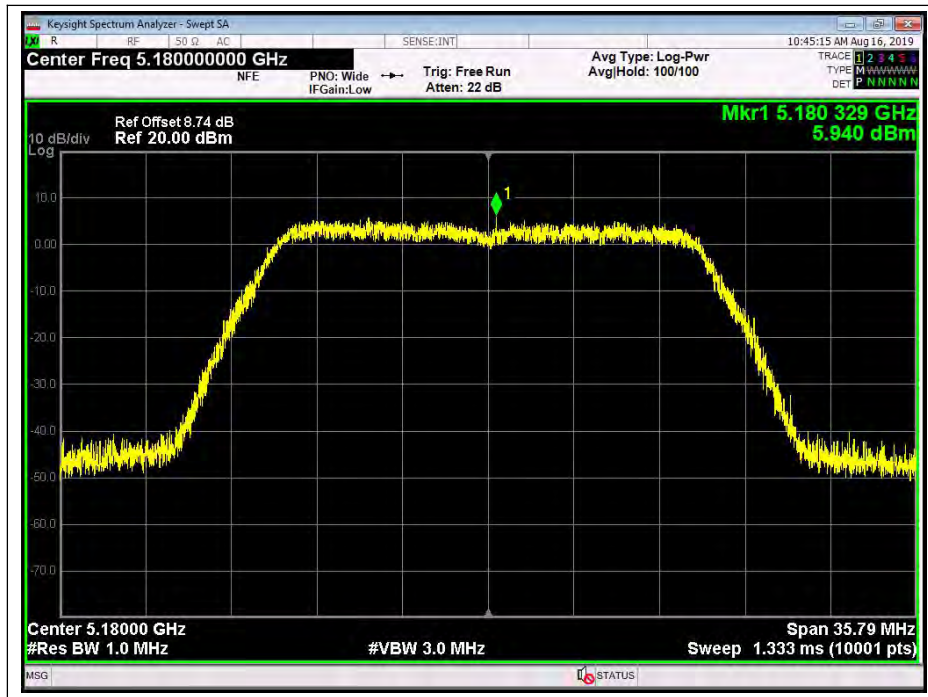


(Channel 165, 5825MHz, 802.11a,ANT1)

802.11n (HT20) Test mode

A. Test Verdict:

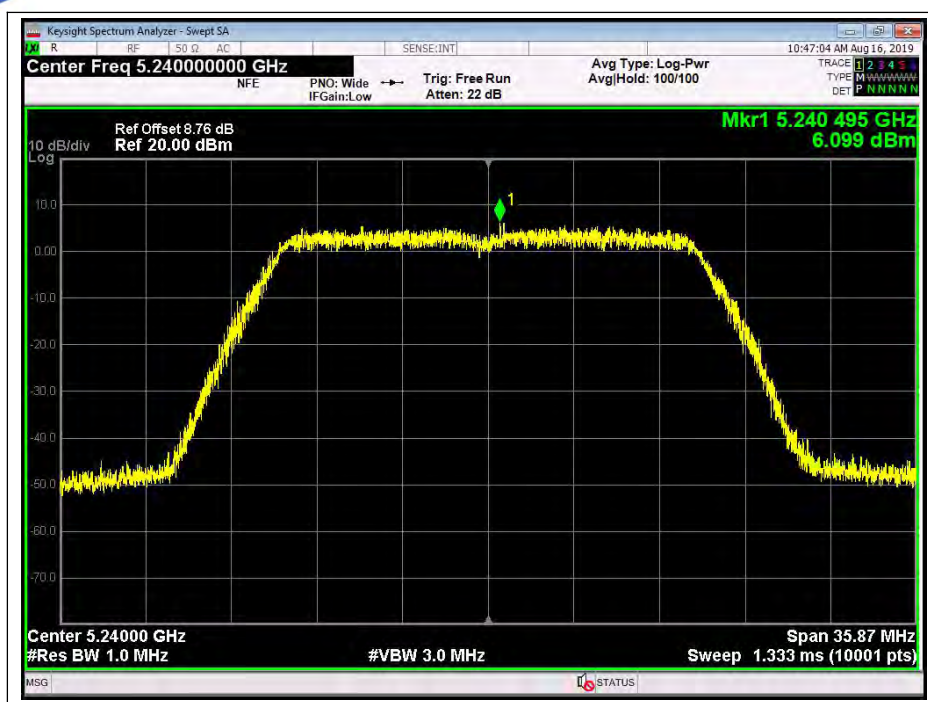
Channel	Frequency (MHz)	Measured PSD (dBm/MHz)			Limit (dBm/MHz)	Verdict
		ANT0	ANT1	Total		
36	5180	5.940	5.705	8.834	11	PASS
40	5200	4.883	5.415	8.167		
48	5240	6.099	5.829	8.976		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)			Limit (dBm/500KHz)	Verdict
		ANT0	ANT1	Total		
149	5745	1.441	2.382	4.947	30	PASS
157	5785	3.609	1.584	5.724		
165	5825	1.966	1.244	4.630		

**B. Test Plots**

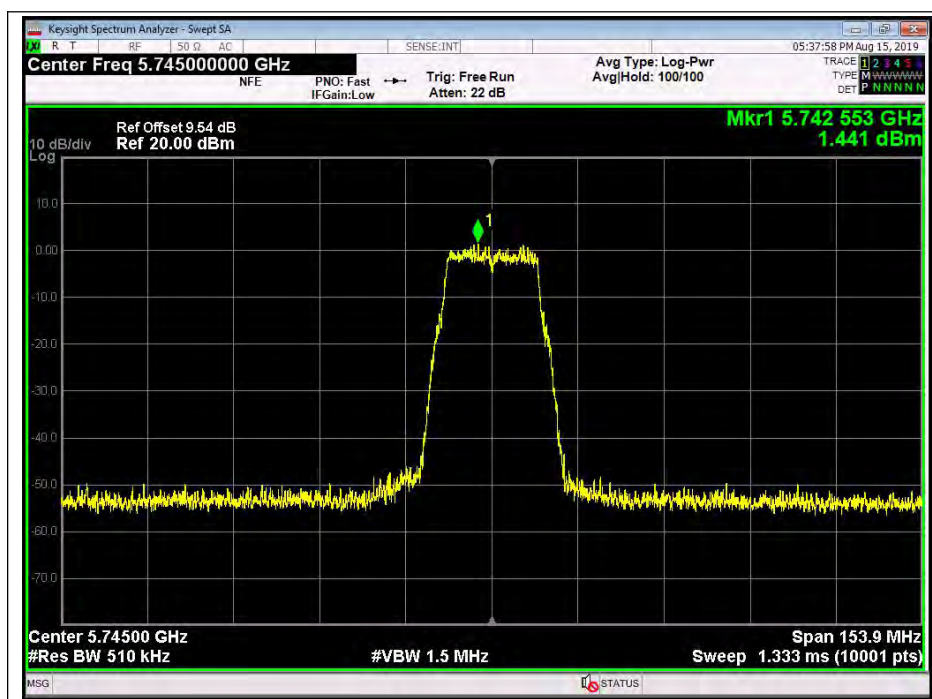
(Channel 36, 5180MHz, 802.11 n (HT20),ANT0)



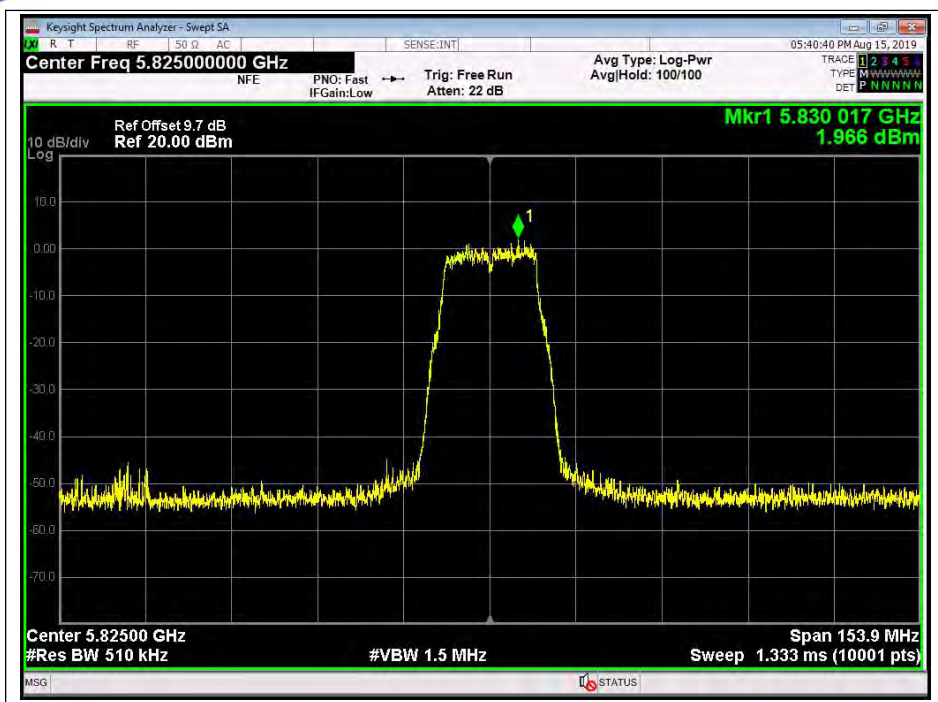
(Channel 40, 5200 MHz, 802.11 n (HT20),ANT0)



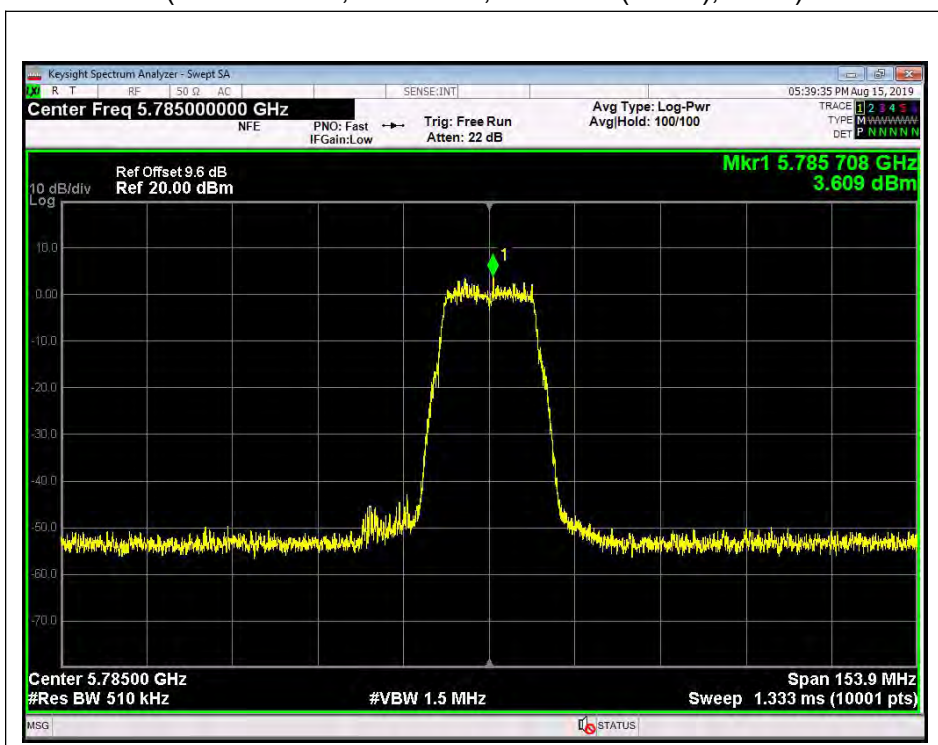
(Channel 48, 5240MHz, 802.11 n (HT20),ANT0)



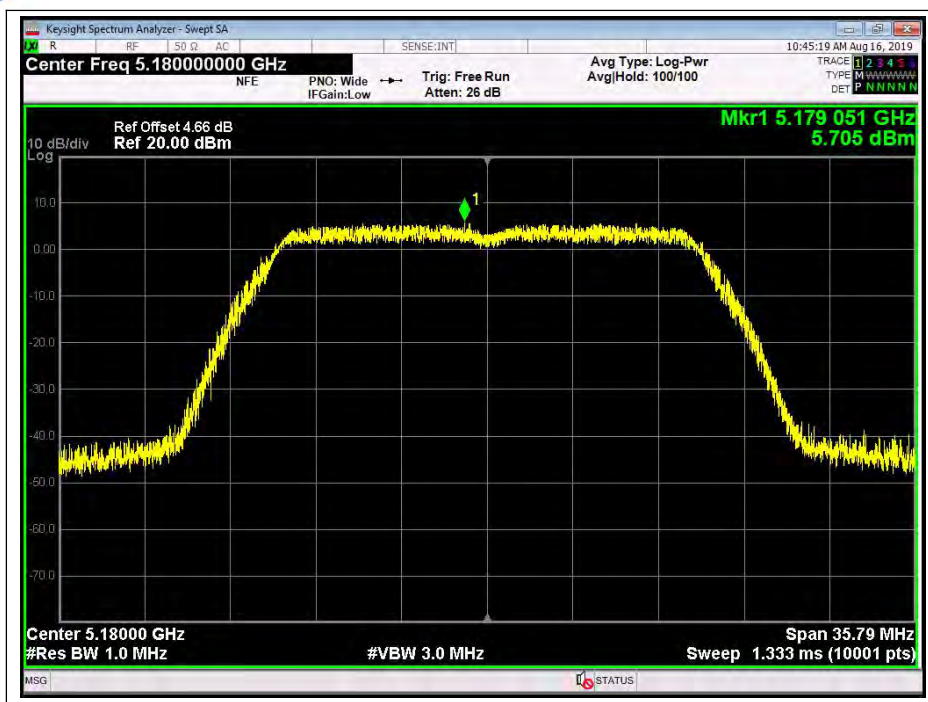
(Channel 149, 5745MHz, 802.11 n (HT20),ANT0)



(Channel 157, 5785MHz, 802.11 n (HT20),ANT0)



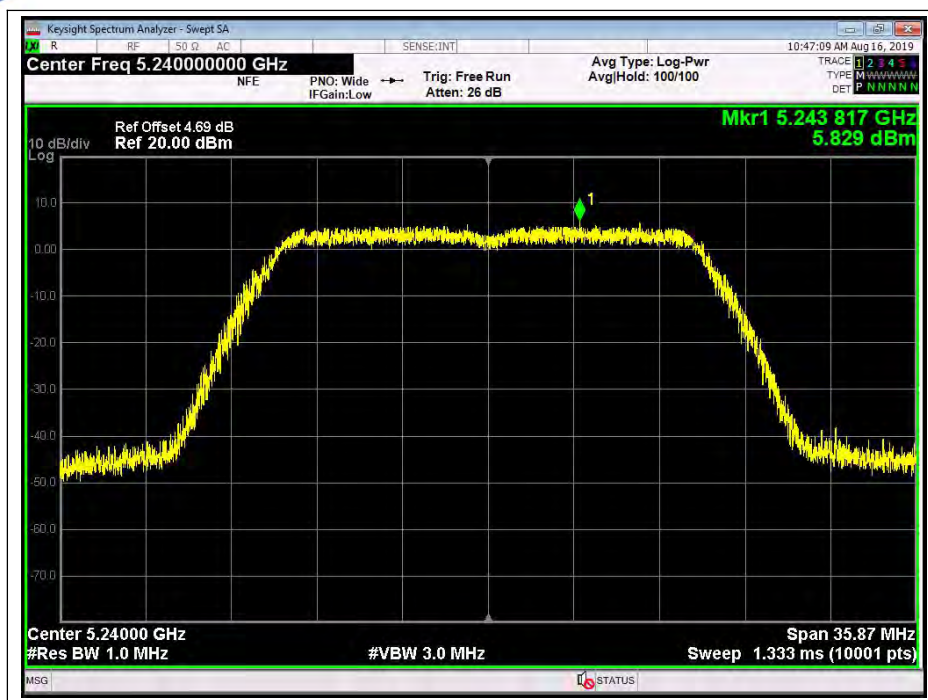
(Channel 165, 5825MHz, 802.11 n (HT20),ANT0)



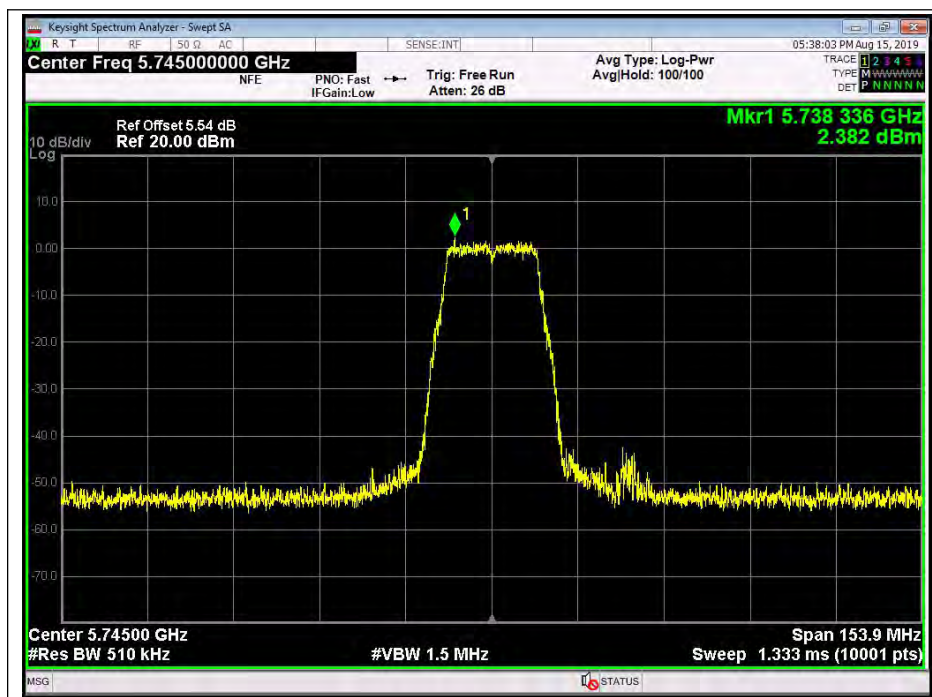
(Channel 36, 5180MHz, 802.11 n (HT20),ANT1)



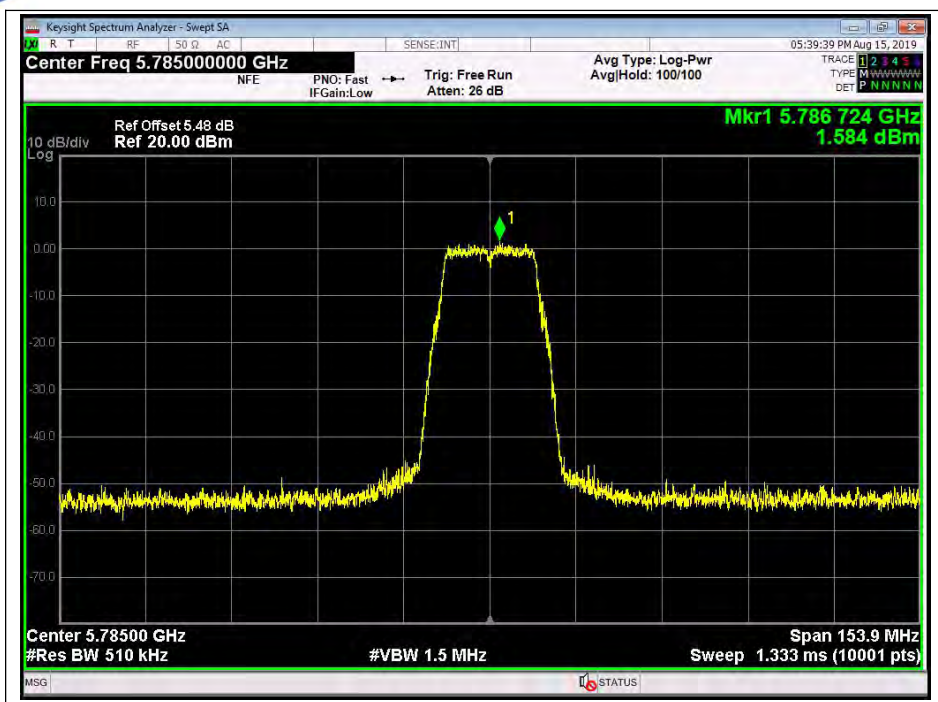
(Channel 40, 5200 MHz, 802.11 n (HT20),ANT1)



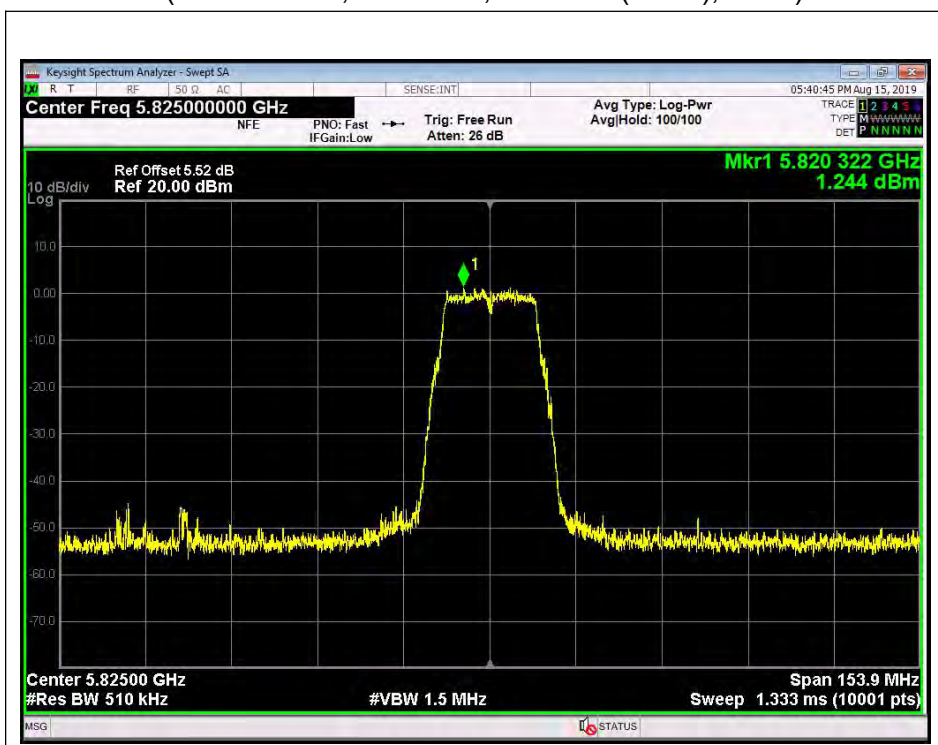
(Channel 48, 5240MHz, 802.11 n (HT20),ANT1)



(Channel 149, 5745MHz, 802.11 n (HT20),ANT1)



(Channel 157, 5785MHz, 802.11 n (HT20),ANT1)



(Channel 165, 5825MHz, 802.11 n (HT20),ANT1)

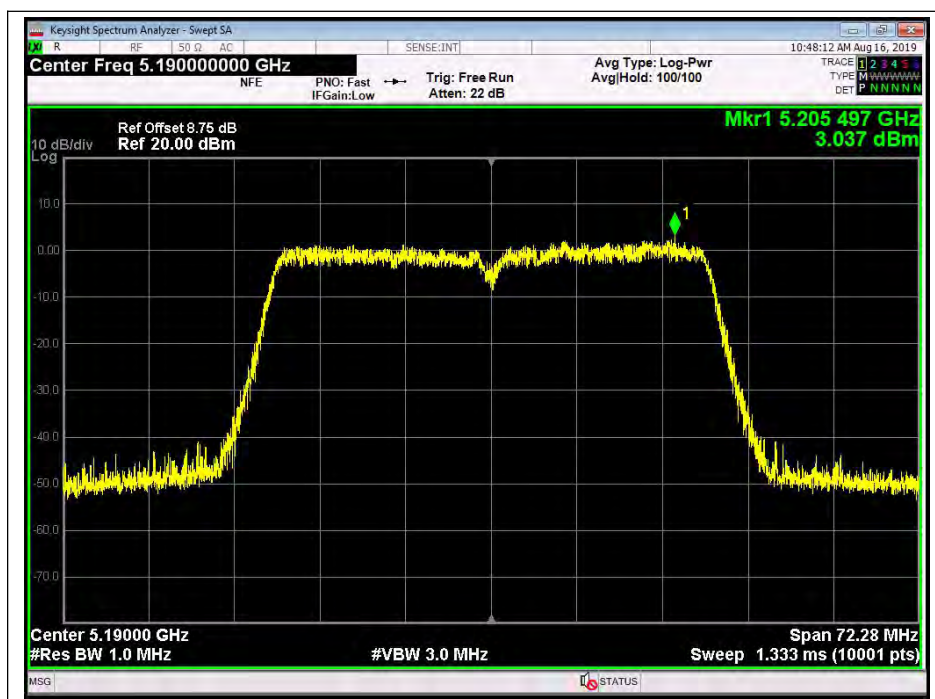


802.11n (HT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)			Limit (dBm/MHz)	Verdict
		ANT0	ANT1	Total		
38	5190	3.037	3.110	6.084	11	PASS
46	5230	2.847	2.490	5.682		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)			Limit (dBm/500KHz)	Verdict
		ANT0	ANT1	Total		
151	5755	-0.314	-0.981	2.376	30	PASS
159	5795	0.400	-1.385	2.609		

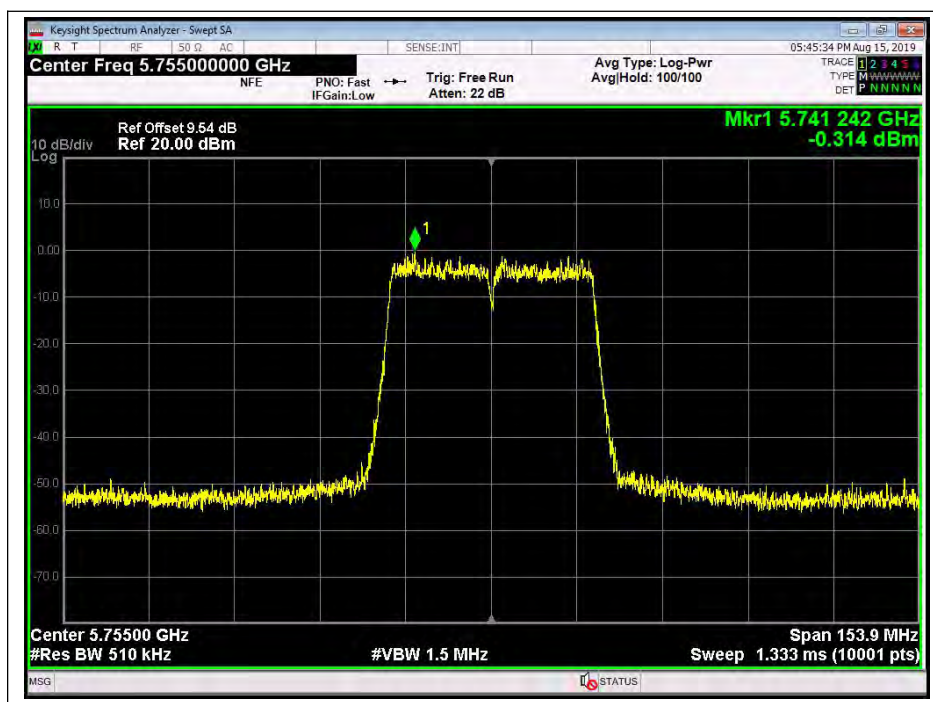
B. Test Plots



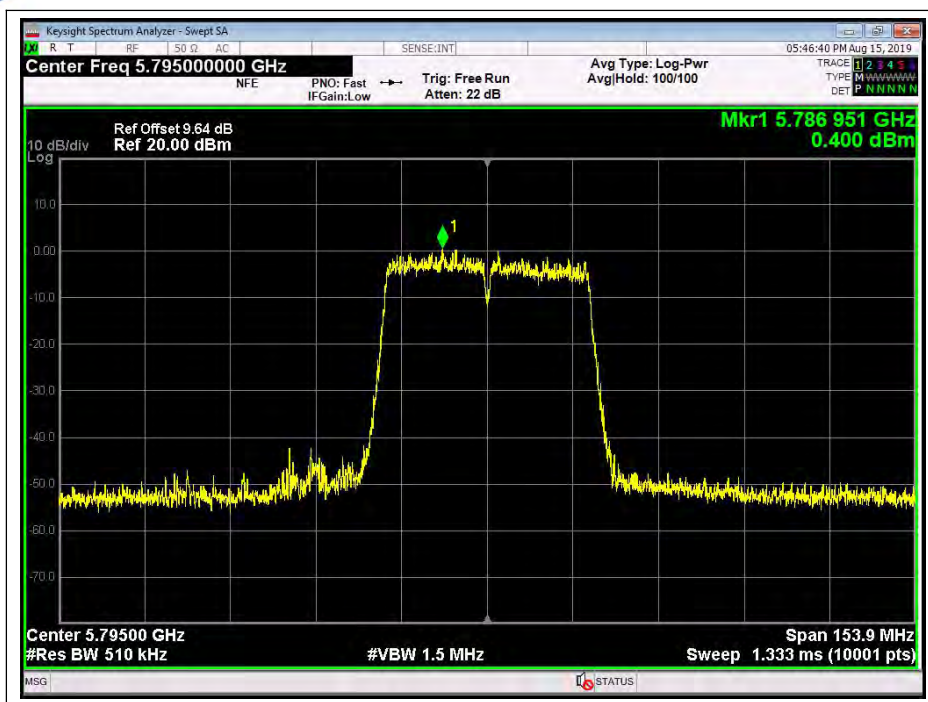
(Channel 38, 5190MHz, 802.11n (HT40),ANT0)



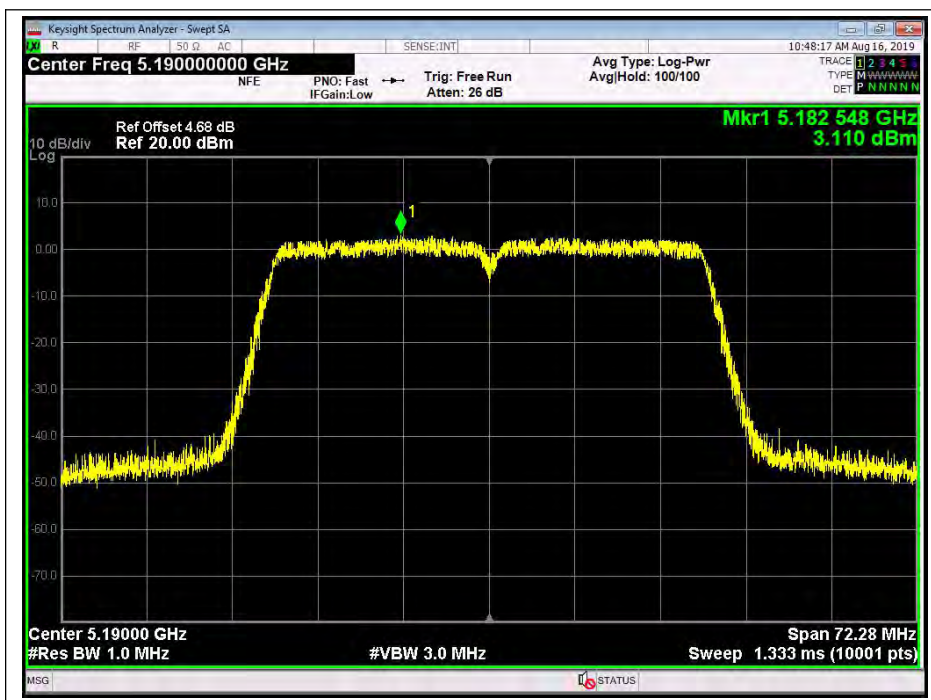
(Channel 46, 5230 MHz, 802.11n (HT40),ANT0)



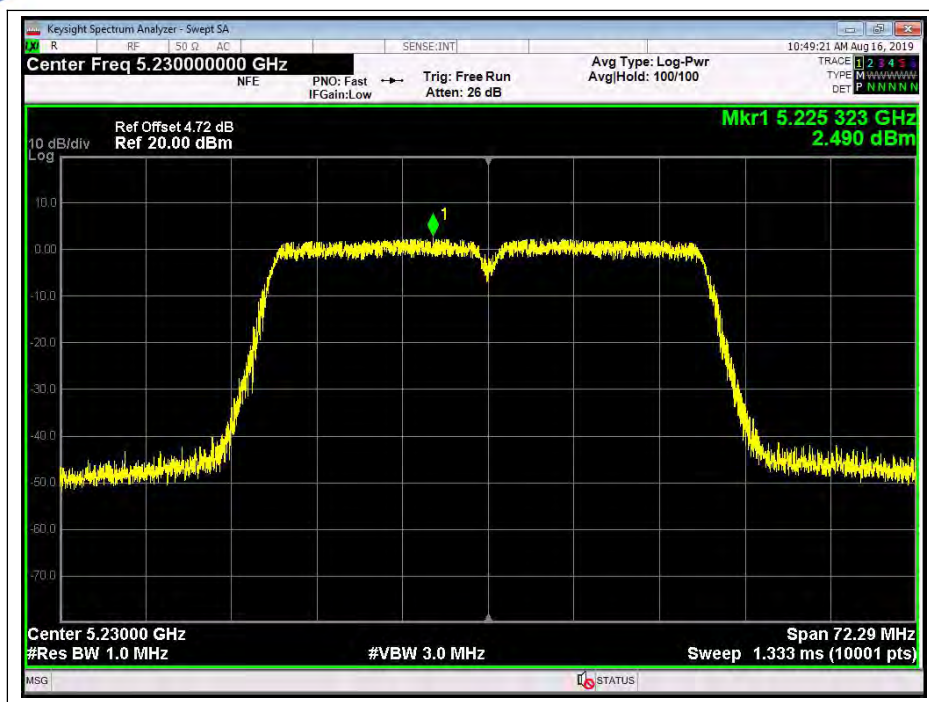
(Channel 151, 5755 MHz, 802.11n (HT40),ANT0)



(Channel 159, 5795MHz, 802.11n (HT40),ANT0)



(Channel 38, 5190MHz, 802.11n (HT40),ANT1)



(Channel 46, 5230 MHz, 802.11n (HT40),ANT1)



(Channel 151, 5755 MHz, 802.11n (HT40),ANT1)



(Channel 159, 5795MHz, 802.11n (HT40),ANT1)

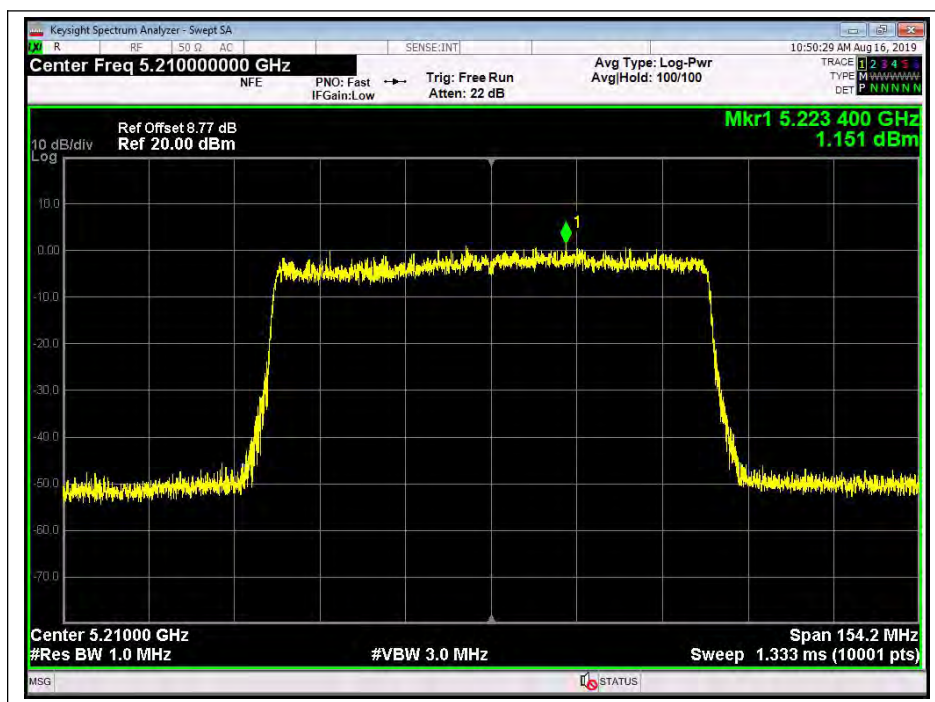


802.11ac (HT80) Test mode

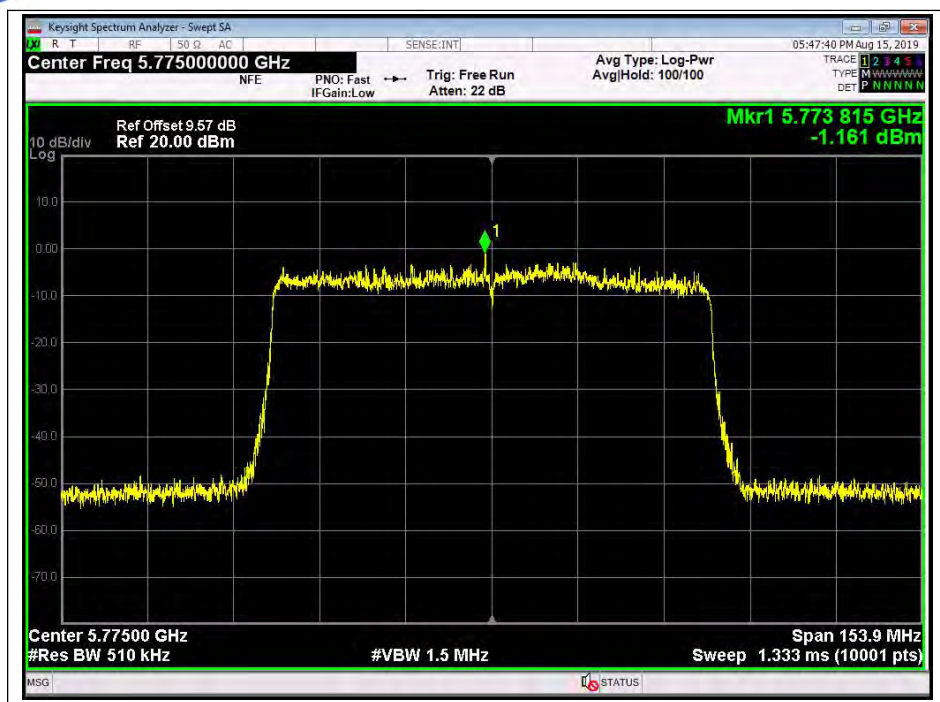
C. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)			Limit (dBm/MHz)	Verdict
		ANT0	ANT1	Total		
42	5210	1.151	1.906	4.555	11	PASS
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)			Limit (dBm/500KHz)	Verdict
		ANT0	ANT1	Total		
155	5775	-1.161	-1.501	1.683	30	PASS

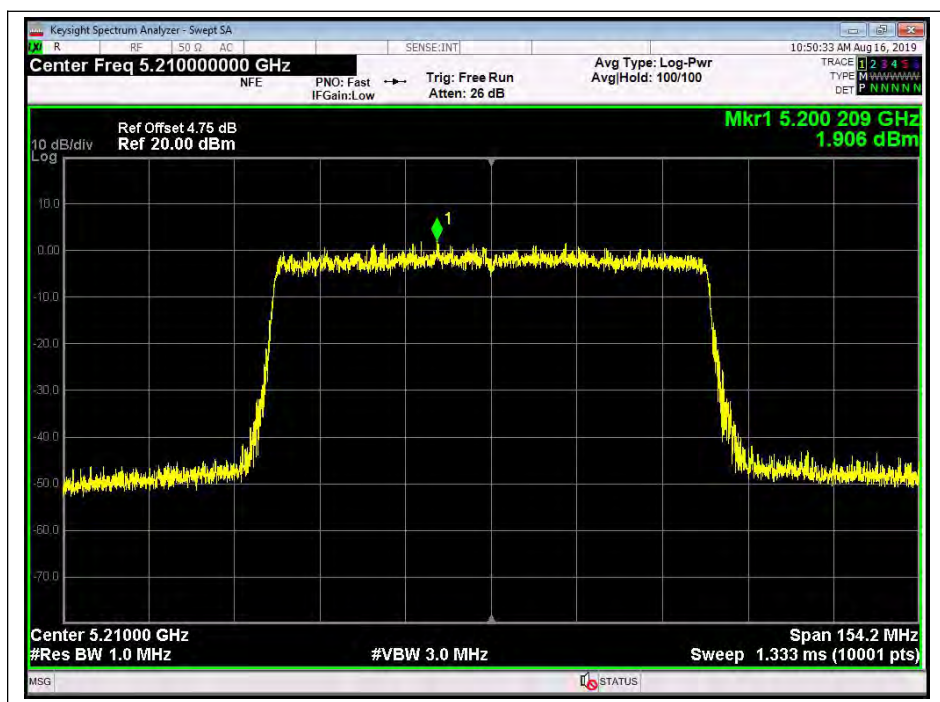
D. Test Plots



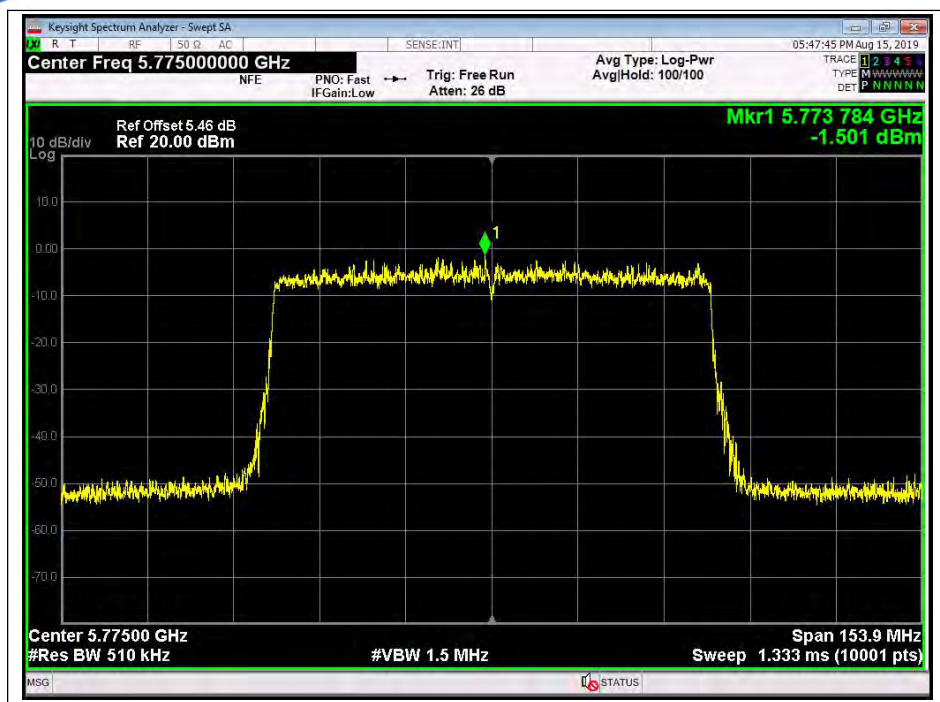
(Channel 42, 5210MHz, 802.11ac (HT80),ANT0)



(Channel 155, 5775MHz, 802.11ac (HT80),ANT0)



(Channel 42, 5210MHz, 802.11ac (HT80),ANT1)



(Channel 155, 5775MHz, 802.11ac (HT80),ANT1)

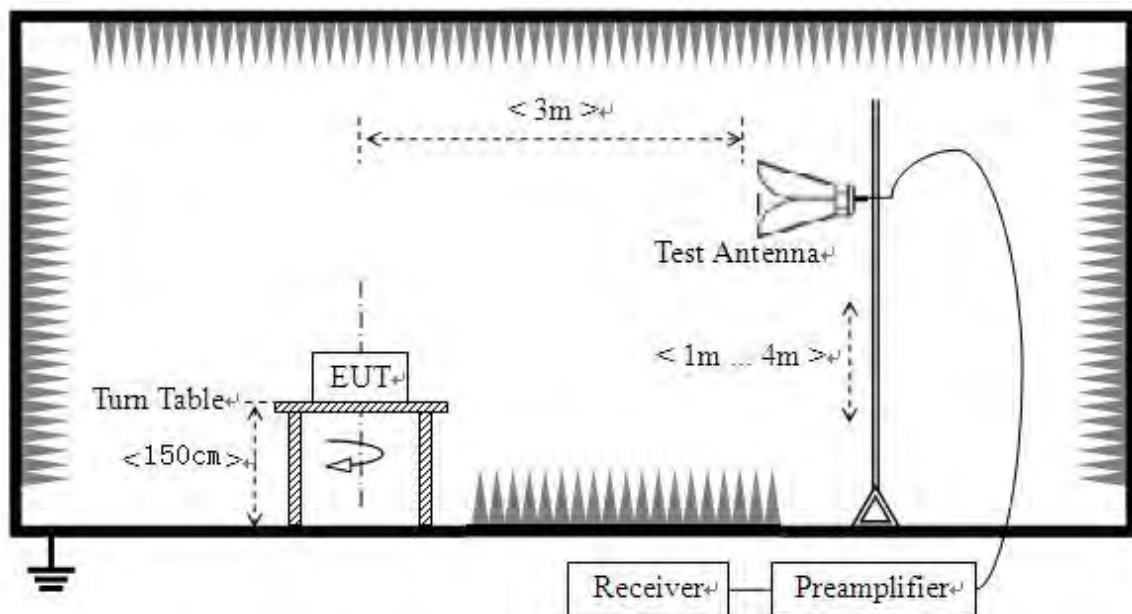
2.5. Restricted Frequency Bands

2.5.1. Requirement

According to FCC section 15.407(b)(7), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.5.2. Test Description

A. Test Setup



The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

KDB 789033 Section H) 3)5)6(d)) was used in order to prove compliance

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.



- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

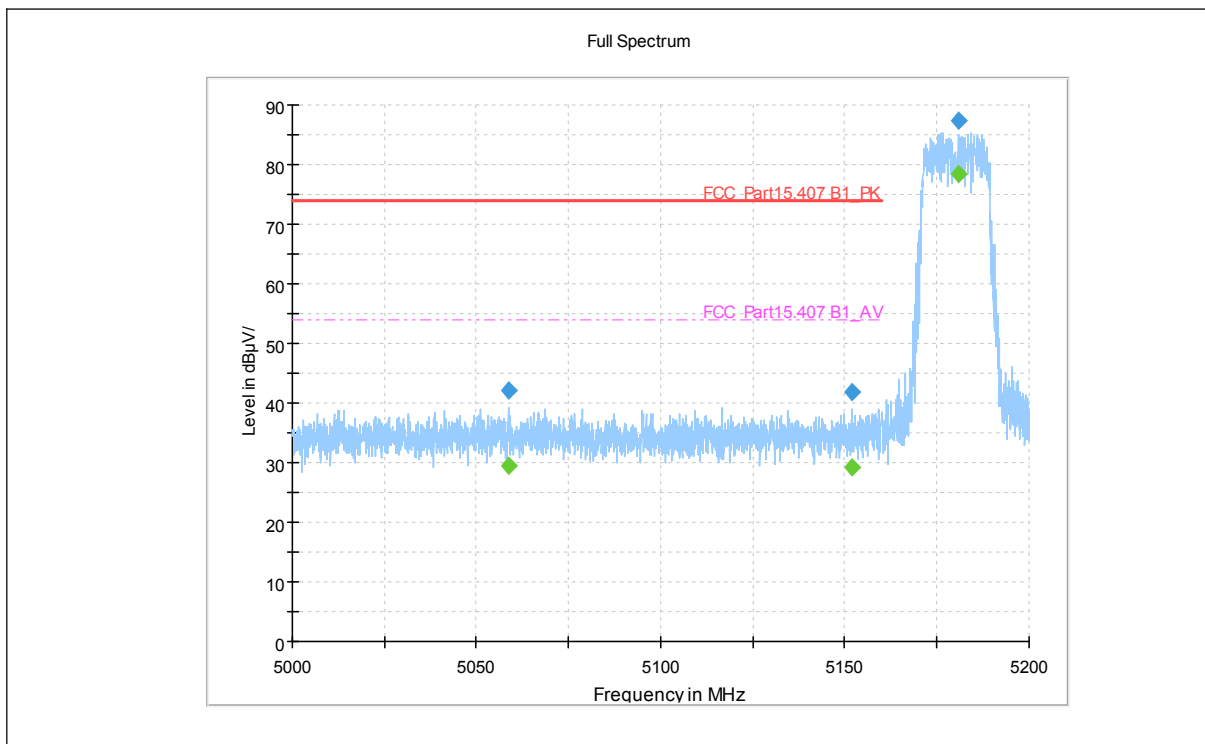
Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.



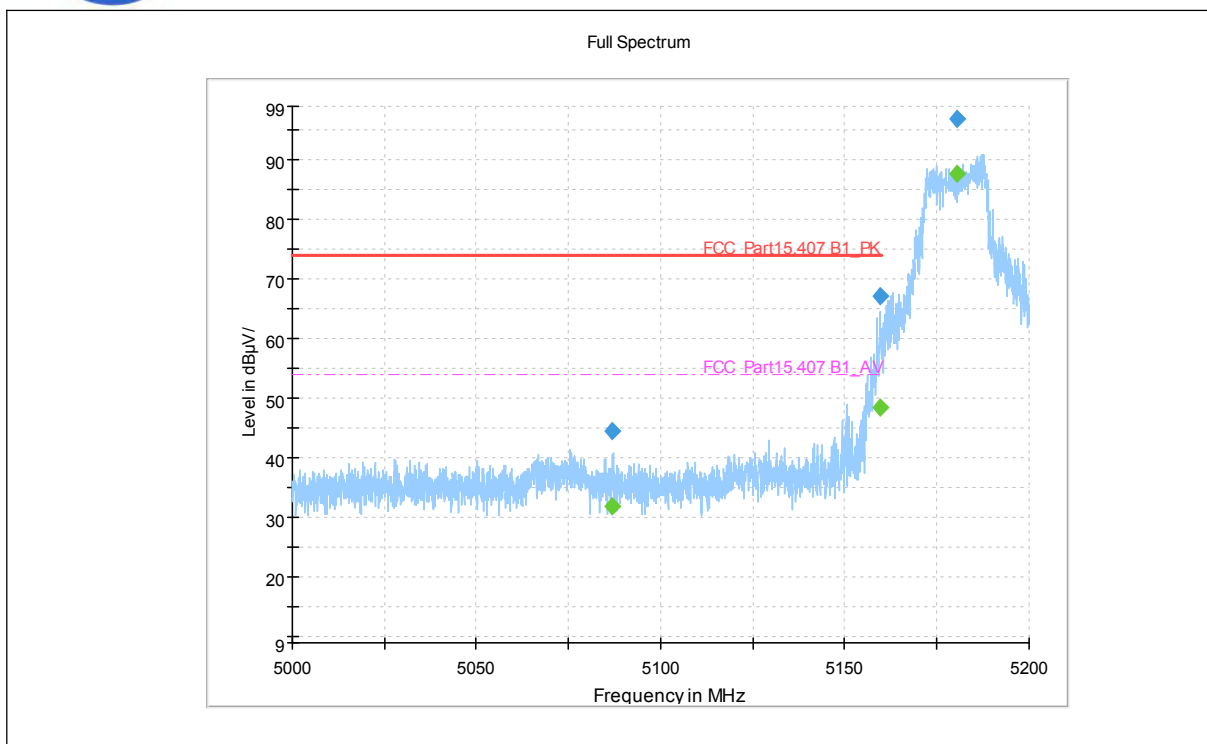
2.5.3. Test Result

802.11a Test mode

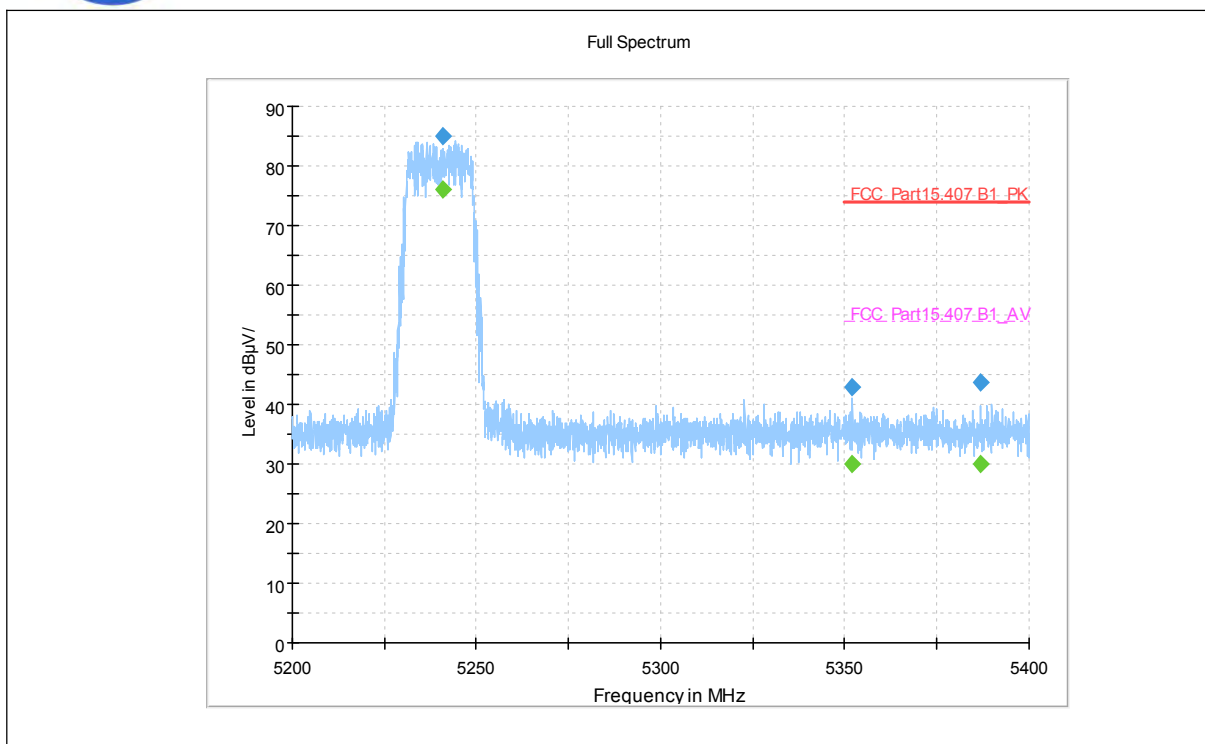


(802.11a _5180MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5058.600000	41.99	---	74.00	32.01	H	-2.9
5058.600000	---	29.36	54.00	24.64	H	-2.9
5151.800000	41.78	---	74.00	32.22	H	-3.3
5151.800000	---	29.31	54.00	24.69	H	-3.3
5180.950000	---	78.51	---	---	H	-3.1
5180.950000	87.38	---	---	---	H	-3.1

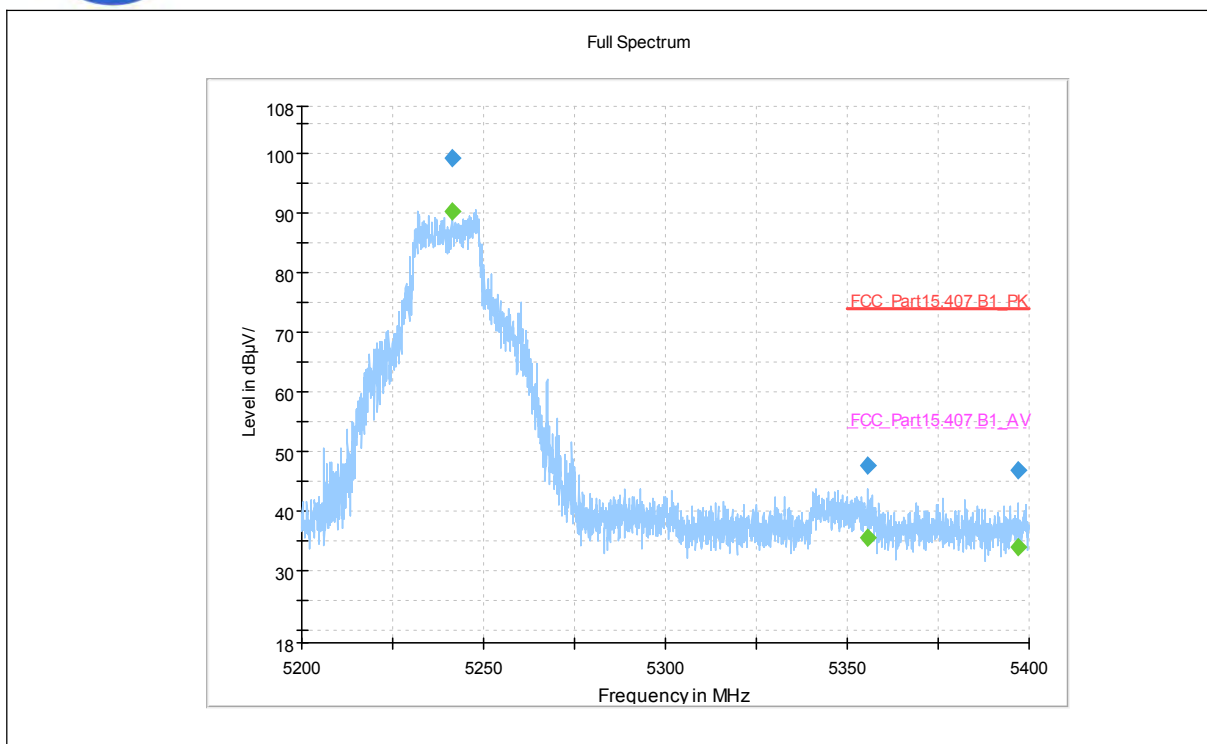


Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5087.000000	44.50	---	74.00	29.50	V	-3.0
5087.000000	---	31.83	54.00	22.17	V	-3.0
5159.450000	67.18	---	74.00	6.82	V	-3.2
5159.450000	---	48.50	54.00	5.50	V	-3.2
5180.250000	---	87.66	---	---	V	-3.1
5180.250000	96.81	---	---	---	V	-3.1



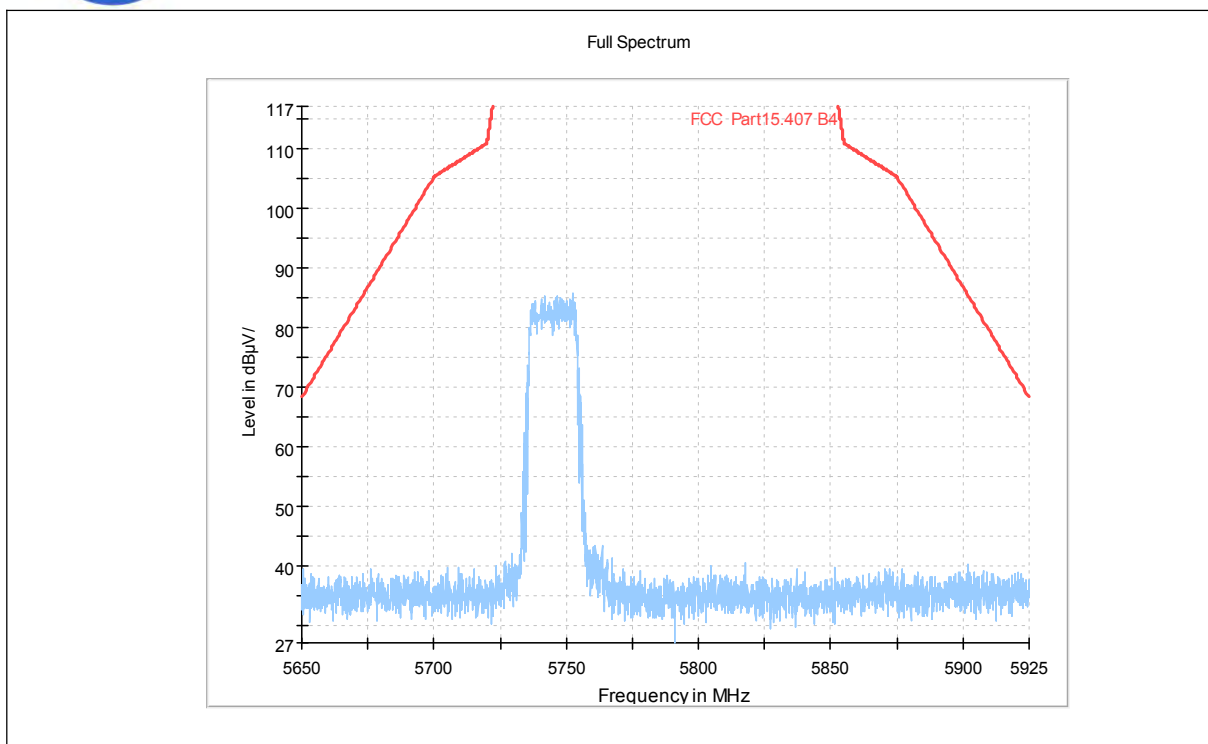
(802.11a _5240MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5240.900000	---	76.18	---	---	H	-3.1
5240.900000	85.08	---	---	---	H	-3.1
5352.100000	43.01	---	74.00	30.99	H	-2.5
5352.100000	---	30.03	54.00	23.97	H	-2.5
5386.900000	43.78	---	74.00	30.22	H	-2.4
5386.900000	---	30.00	54.00	24.00	H	-2.4

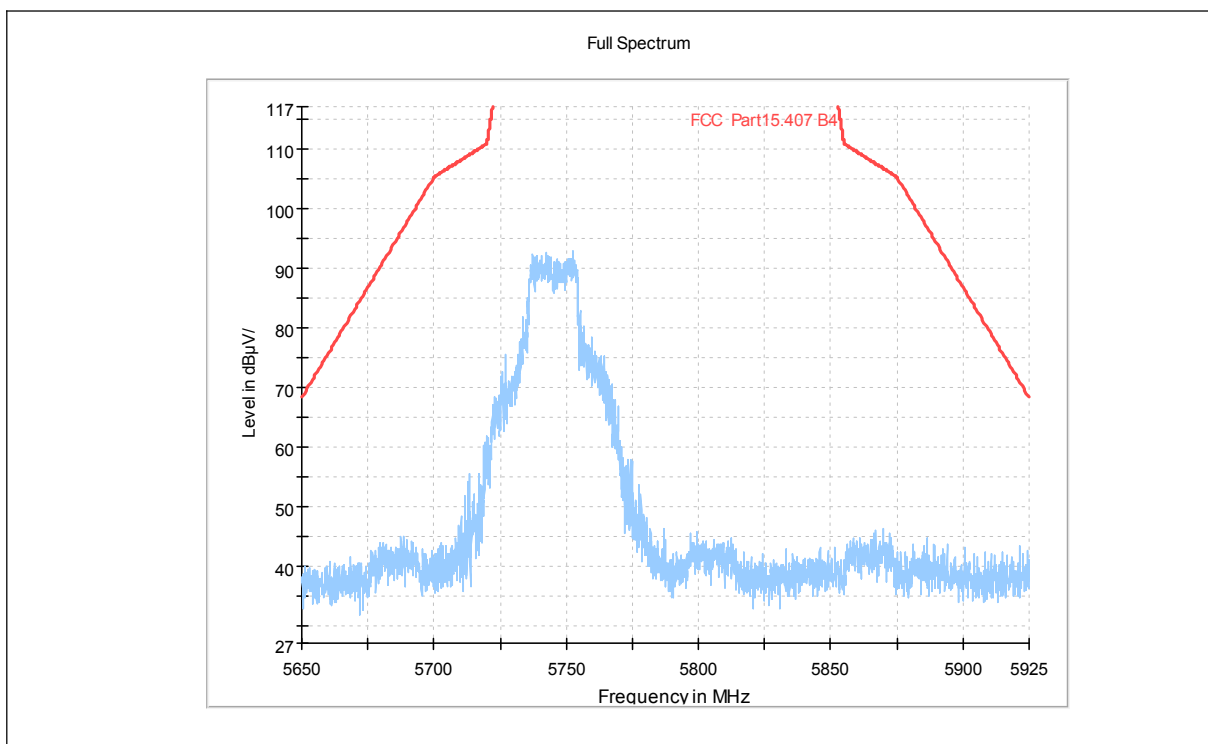


(802.11a _5240MHz, Antenna Vertical)

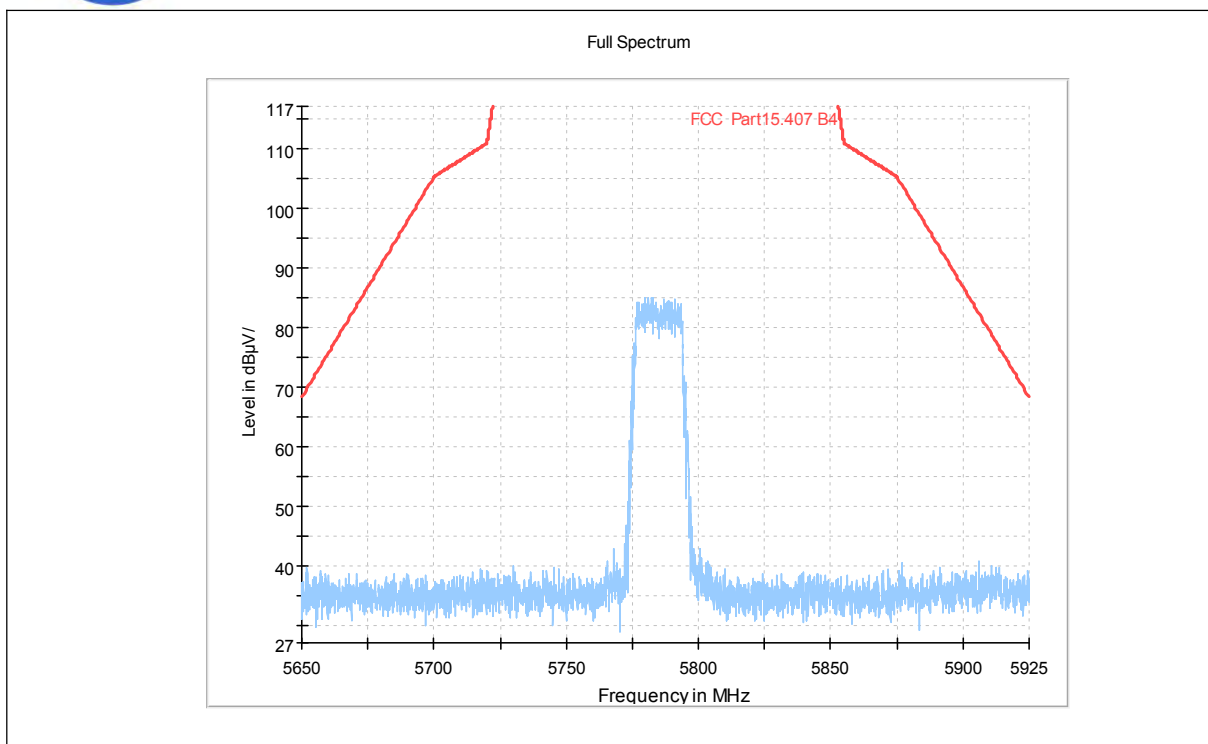
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5241.200000	---	90.48	---	---	V	-3.1
5241.200000	99.38	---	---	---	V	-3.1
5355.750000	47.65	---	74.00	26.35	V	-2.5
5355.750000	---	35.68	54.00	18.32	V	-2.5
5396.900000	46.99	---	74.00	27.01	V	-2.5
5396.900000	---	34.12	54.00	19.88	V	-2.5



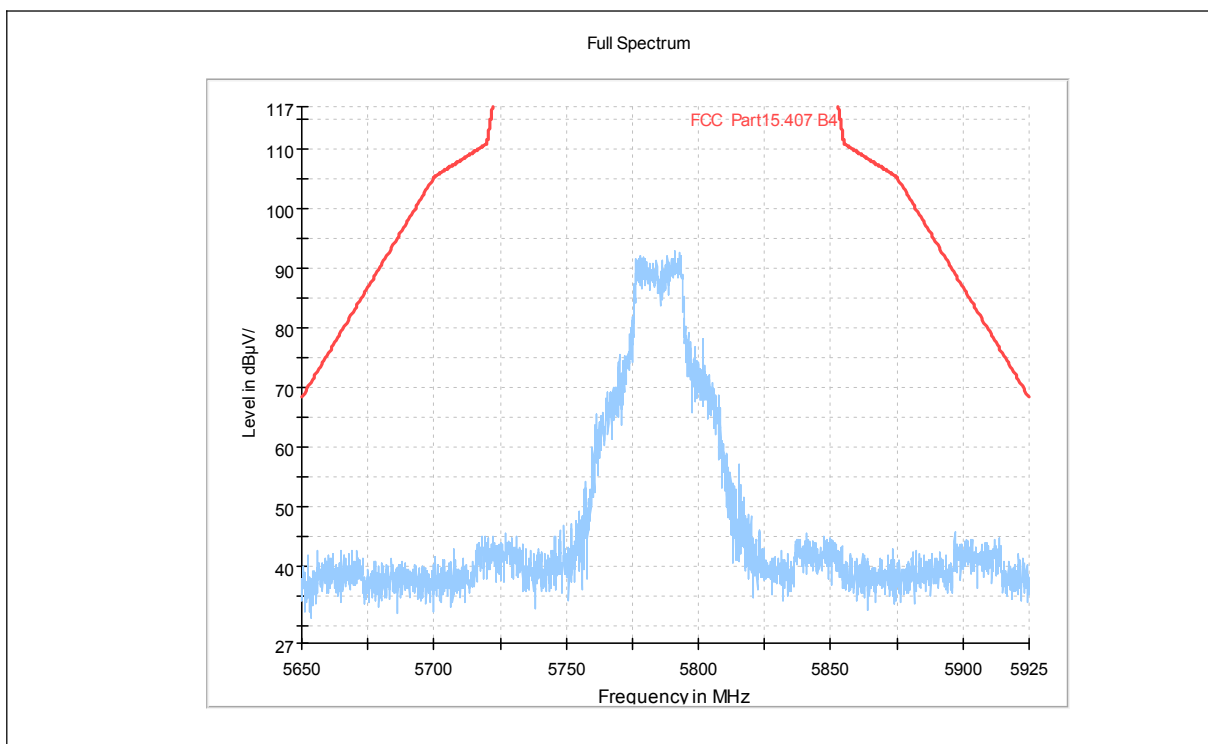
(802.11a _5745MHz, Antenna Horizontal)



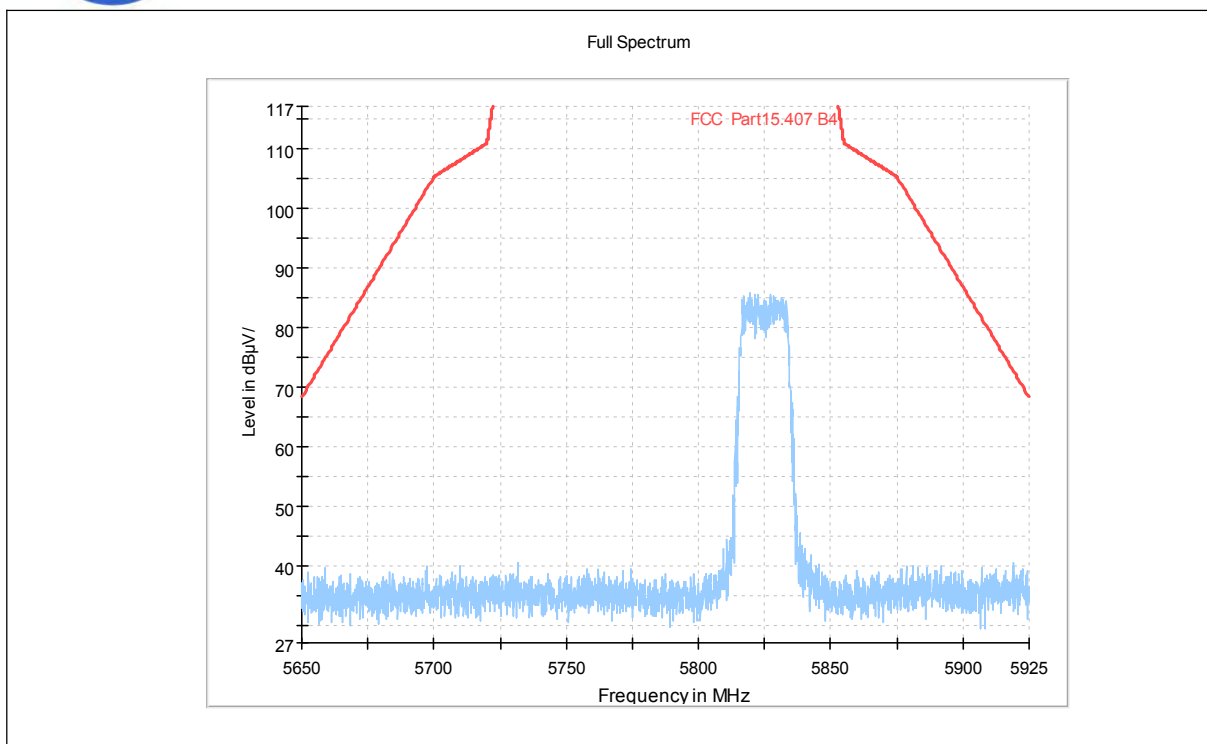
(802.11a _5745MHz, Antenna Vertical)



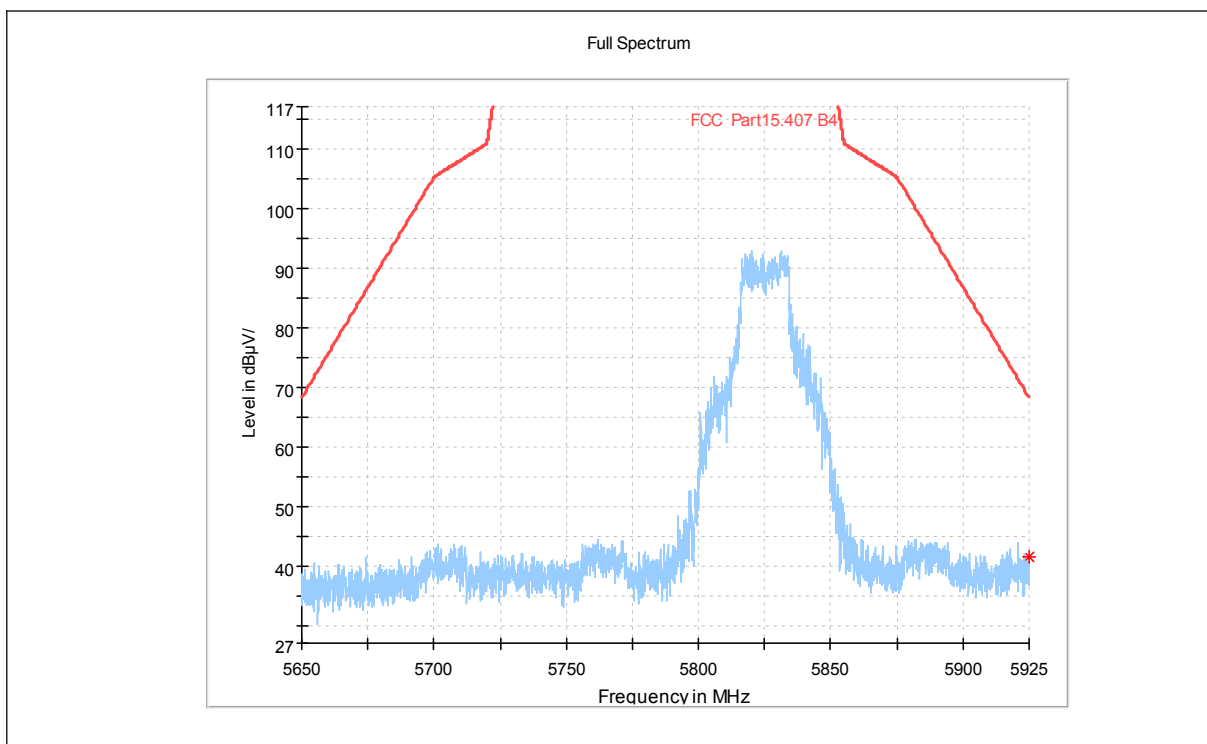
(802.11a _5785MHz, Antenna Horizontal)



(802.11a _5785MHz, Antenna Vertical)

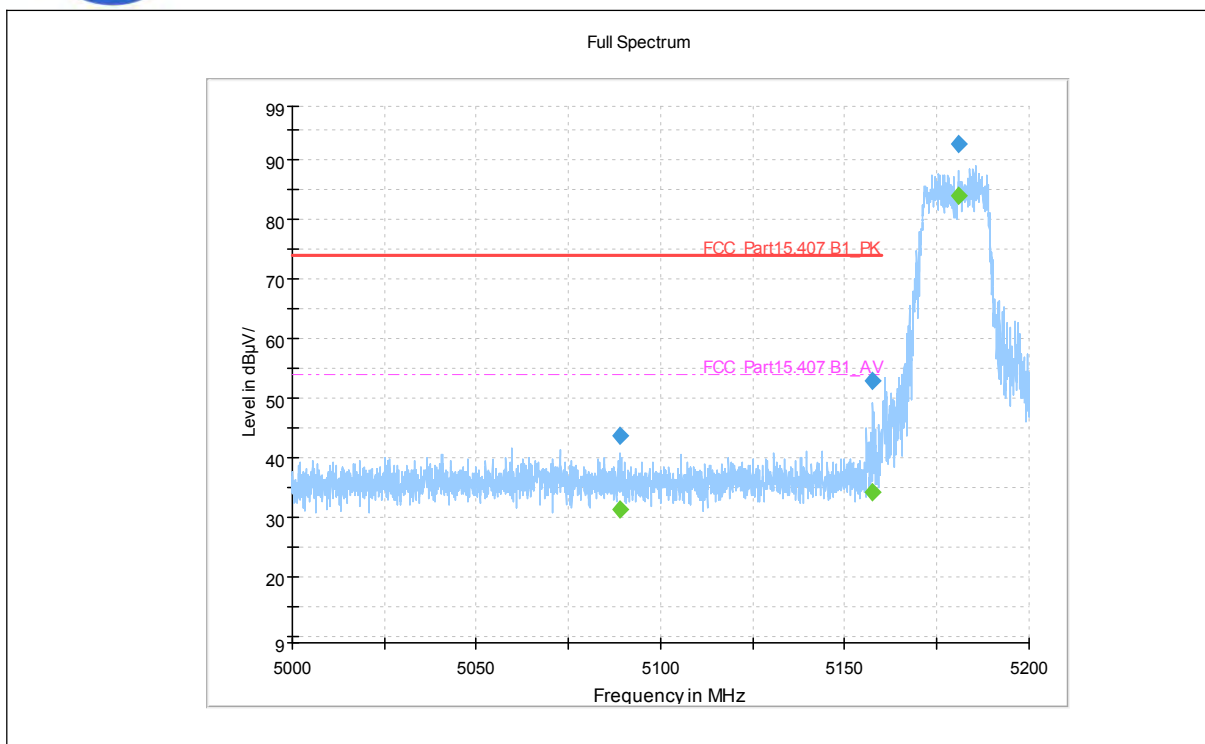


(802.11a _5825MHz, Antenna Horizontal)



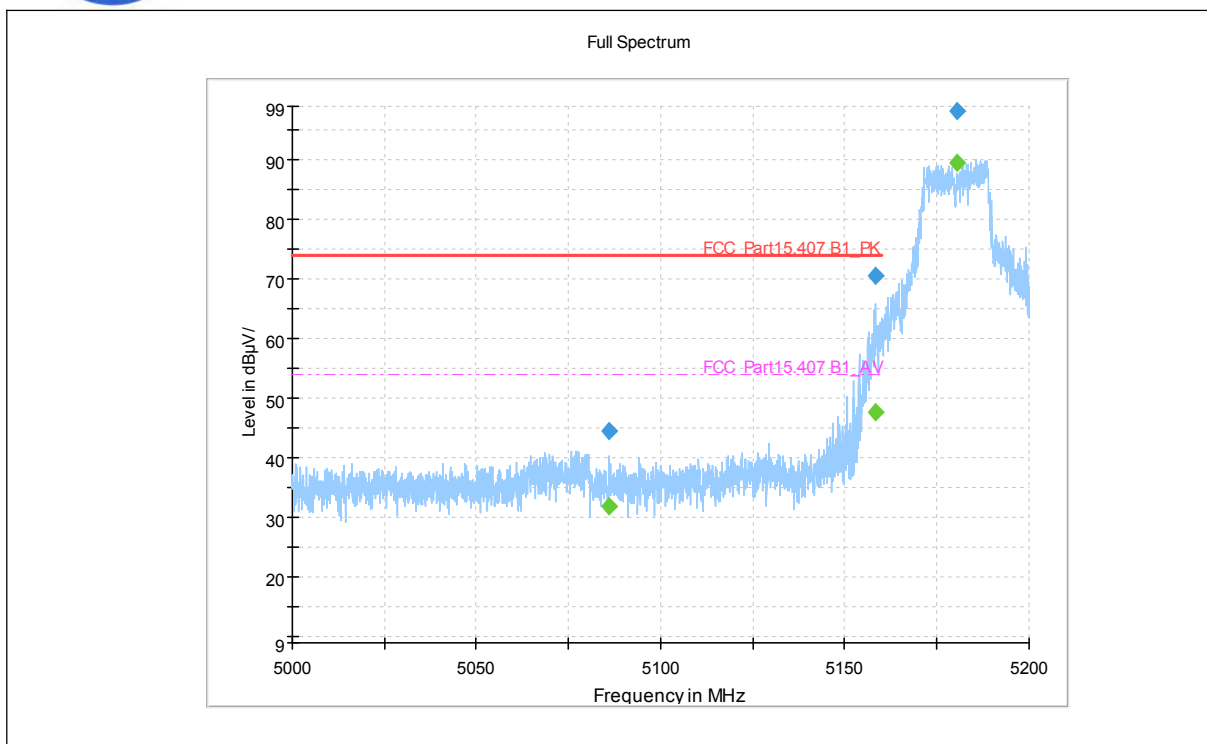
(802.11a _5825MHz, Antenna Vertical)

802.11n (HT20) Test mode



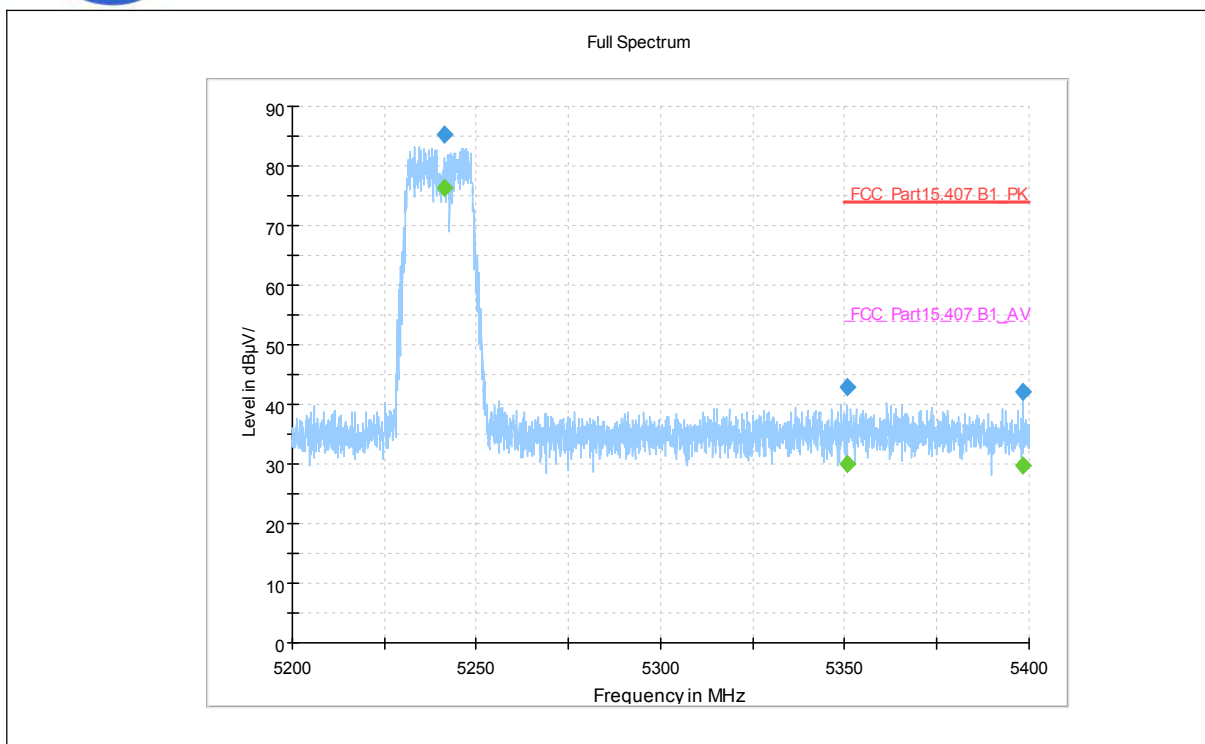
(802.11n (HT20) _5180MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5089.050000	---	31.42	54.00	22.58	H	-3.0
5089.050000	43.86	---	74.00	30.14	H	-3.0
5157.650000	---	34.21	54.00	19.79	H	-3.2
5157.650000	52.85	---	74.00	21.15	H	-3.2
5180.950000	---	84.01	---	---	H	-3.1
5180.950000	92.79	---	---	---	H	-3.1



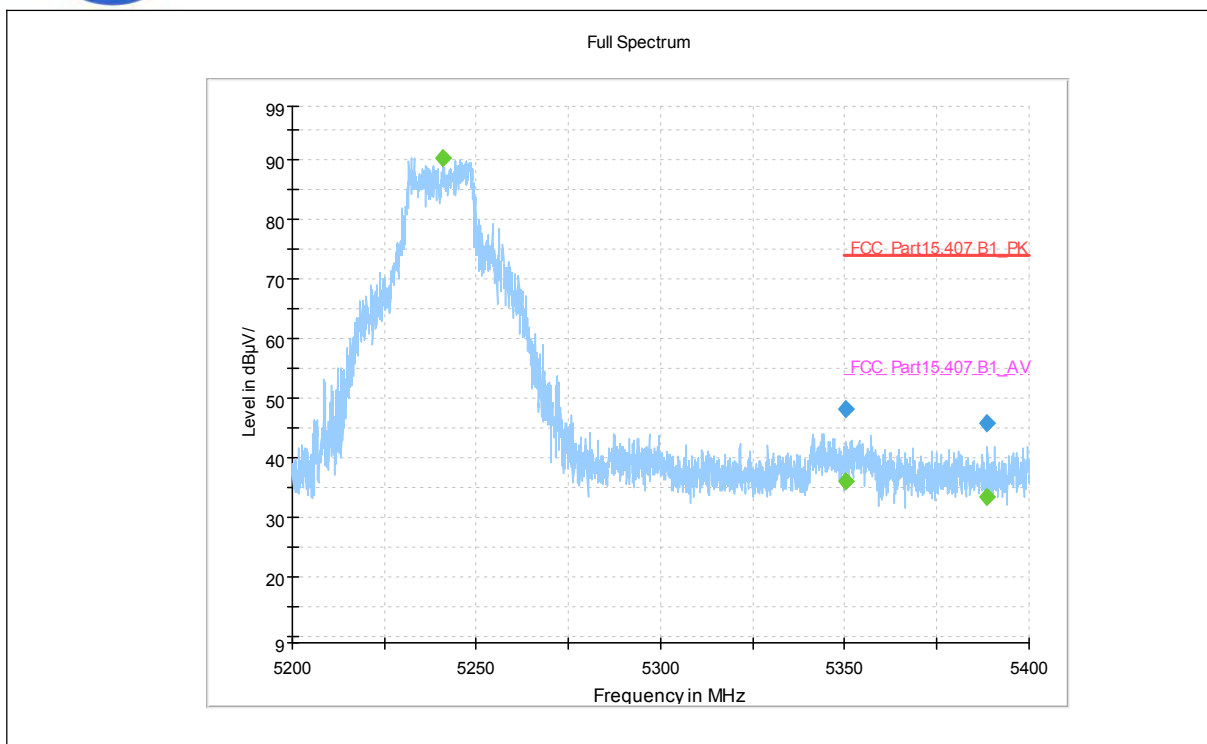
(802.11n (HT20) _5180MHz,, Antenna Vertical)

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5086.050000	44.53	---	74.00	29.47	V	-3.0
5086.050000	---	31.82	54.00	22.18	V	-3.0
5158.300000	70.62	---	74.00	3.38	V	-3.2
5158.300000	---	47.66	54.00	6.34	V	-3.2
5180.550000	---	89.62	---	---	V	-3.1
5180.550000	98.20	---	---	---	V	-3.1



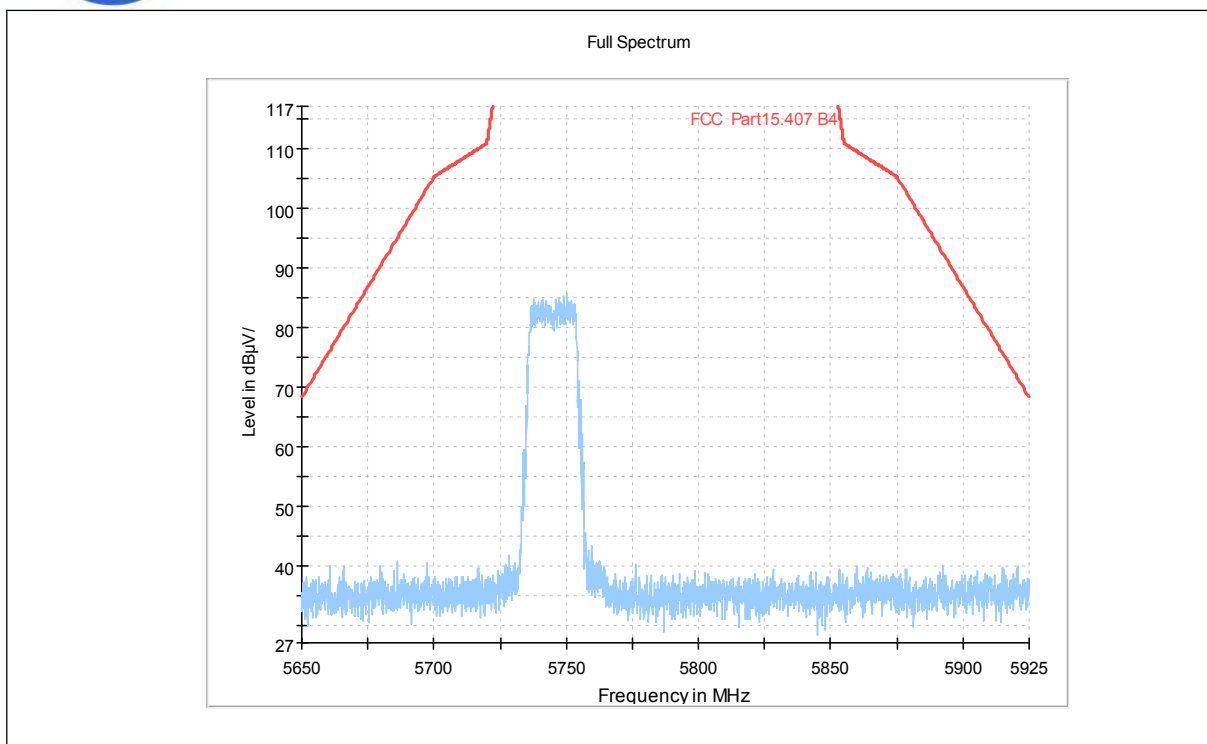
(802.11n (HT20) _5240MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5241.150000	---	76.31	---	---	H	-3.1
5241.150000	85.38	---	---	---	H	-3.1
5350.650000	43.00	---	74.00	31.00	H	-2.5
5350.650000	---	29.96	54.00	24.04	H	-2.5
5398.200000	42.22	---	74.00	31.78	H	-2.5
5398.200000	---	29.75	54.00	24.25	H	-2.5

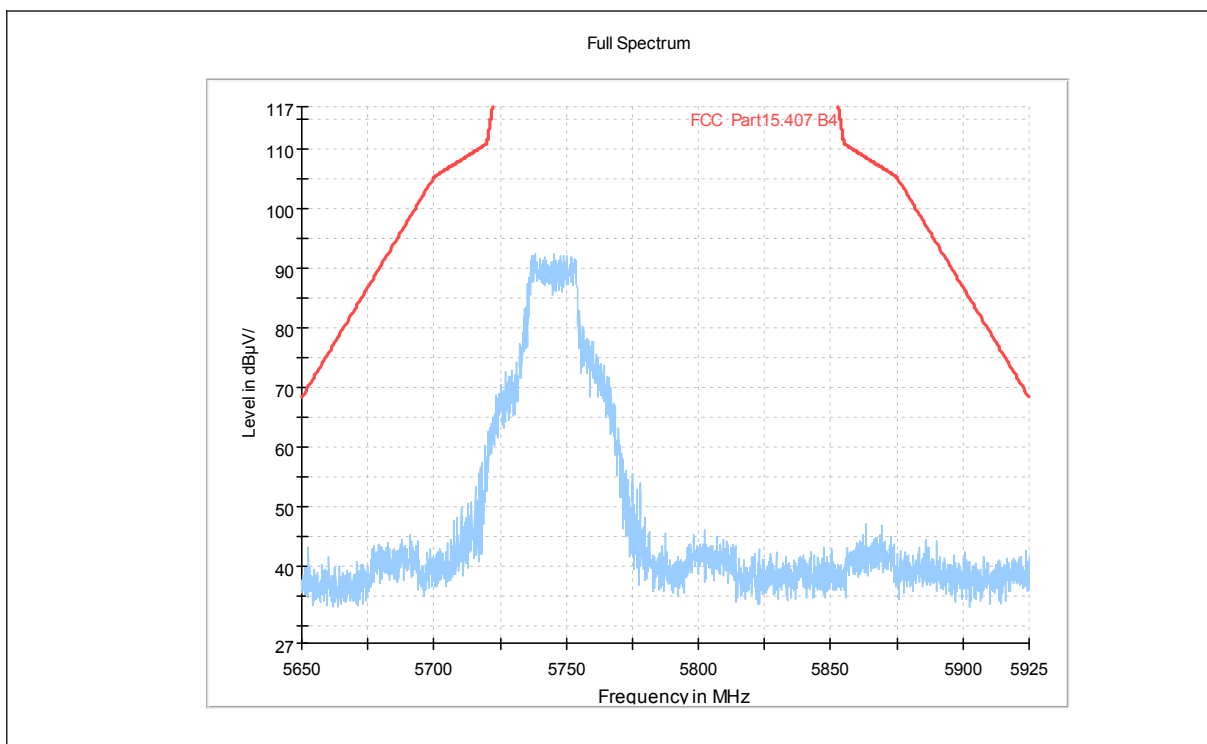


(802.11n (HT20) _5240MHz, Antenna Vertical)

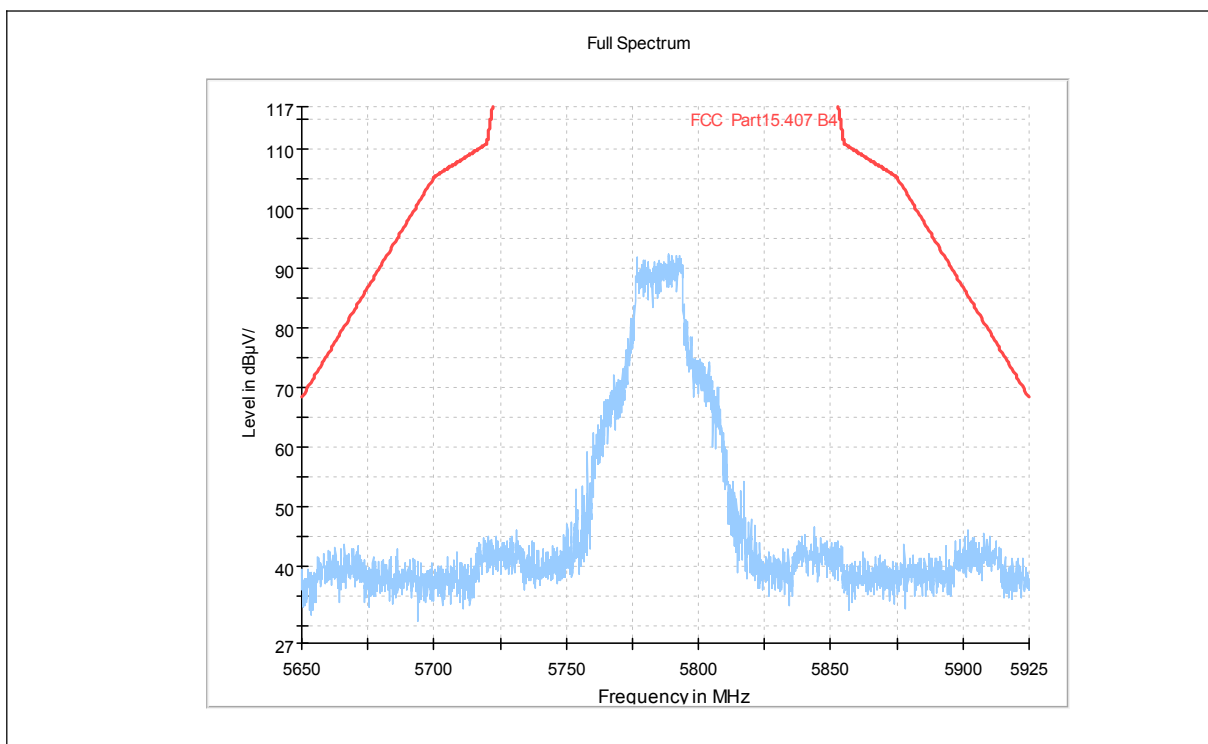
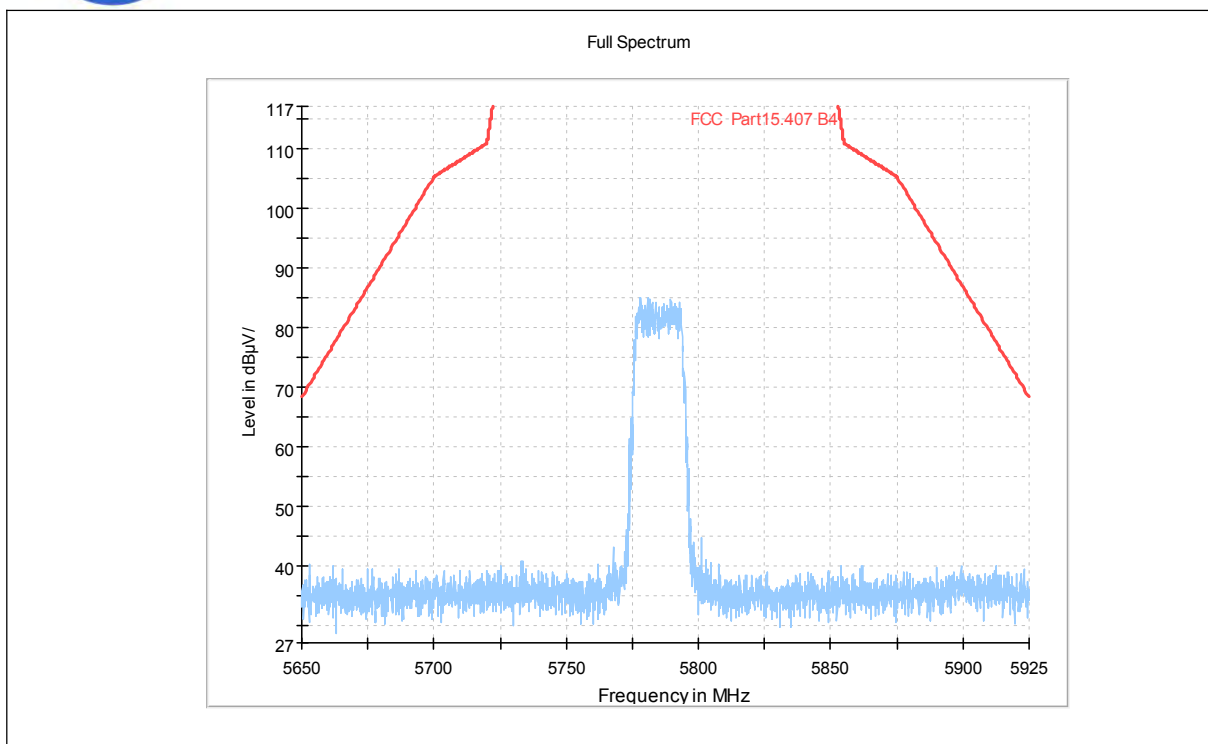
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5240.700000	---	90.35	---	---	V	-3.1
5240.700000	99.14	---	---	---	V	-3.1
5350.250000	---	36.11	54.00	17.89	V	-2.5
5350.250000	48.10	---	74.00	25.90	V	-2.5
5388.700000	---	33.35	54.00	20.65	V	-2.4
5388.700000	45.87	---	74.00	28.13	V	-2.4

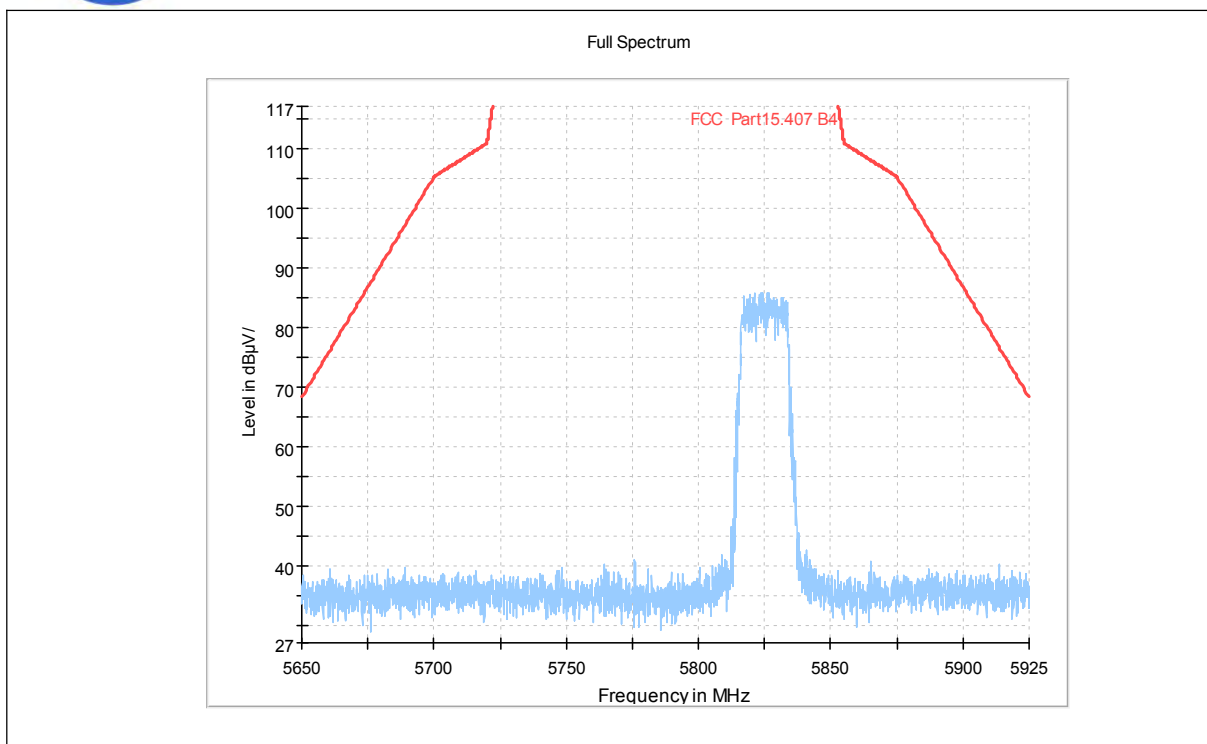


(802.11n(HT20) _5745MHz, Antenna Horizontal)

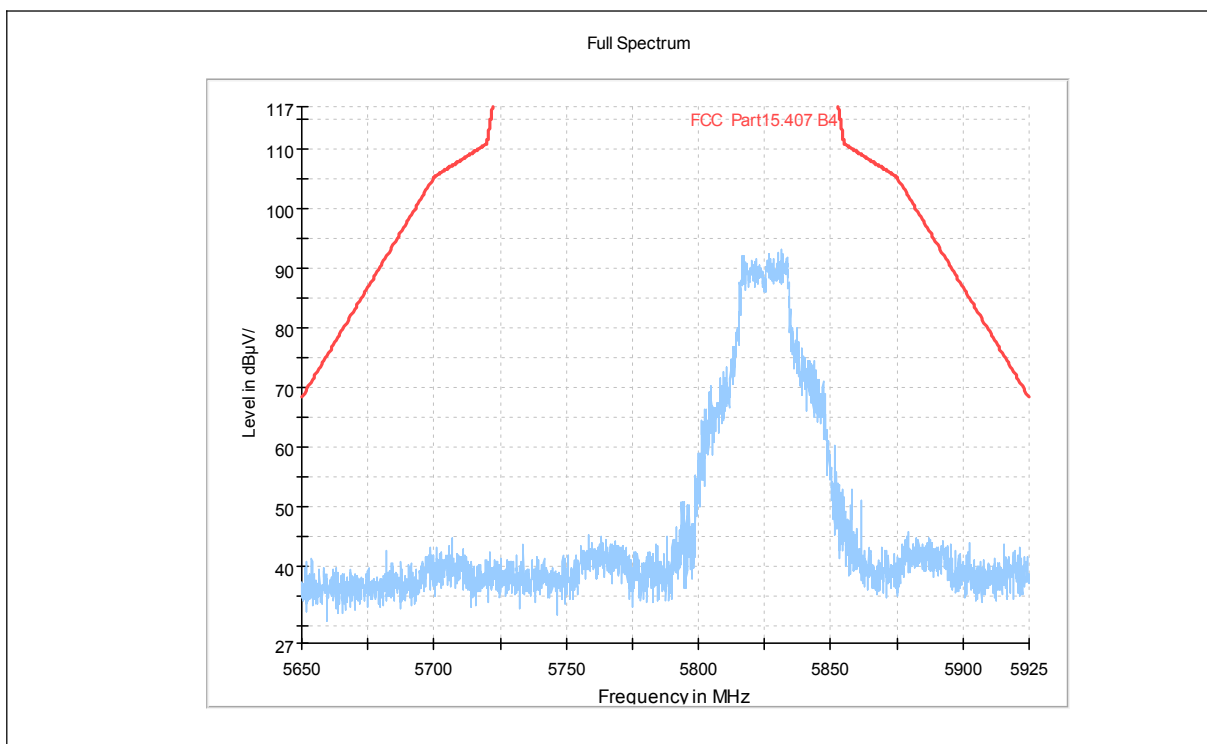


(802.11n(HT20) _5745MHz, Antenna Vertical)





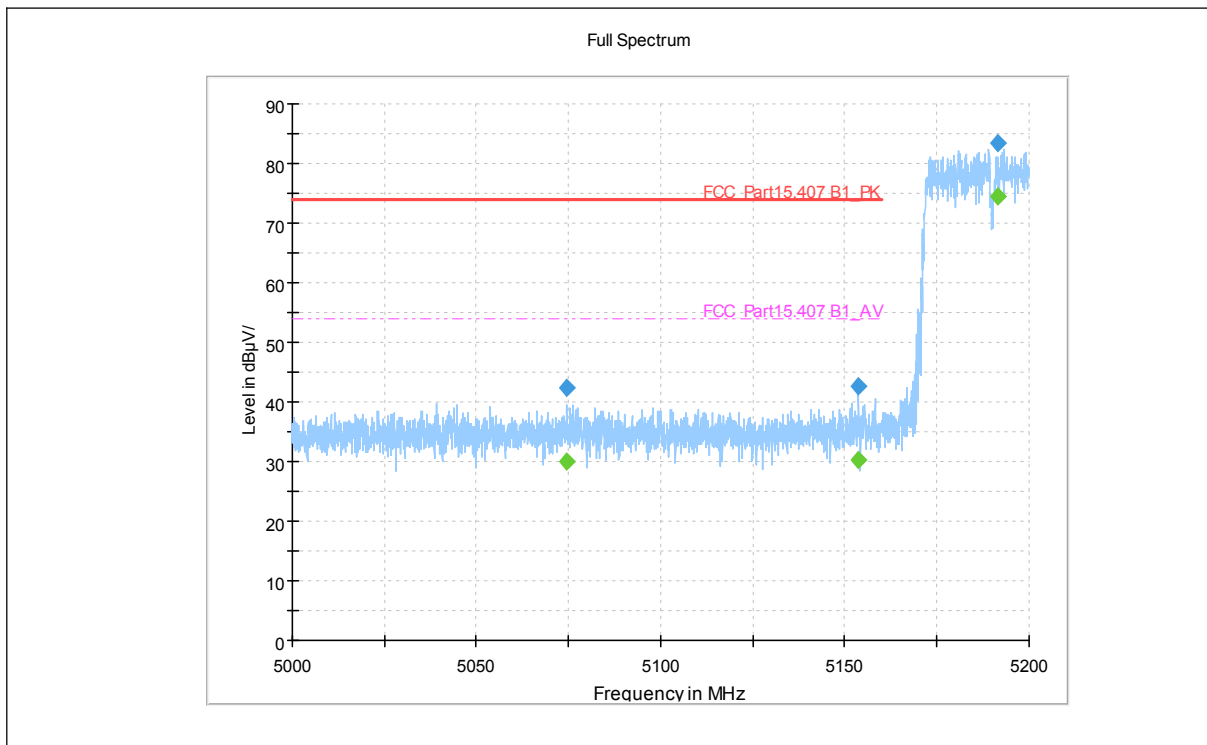
(802.11n(HT20)_5825MHz, Antenna Horizontal)



(802.11n(HT20)_5825MHz, Antenna Vertical)

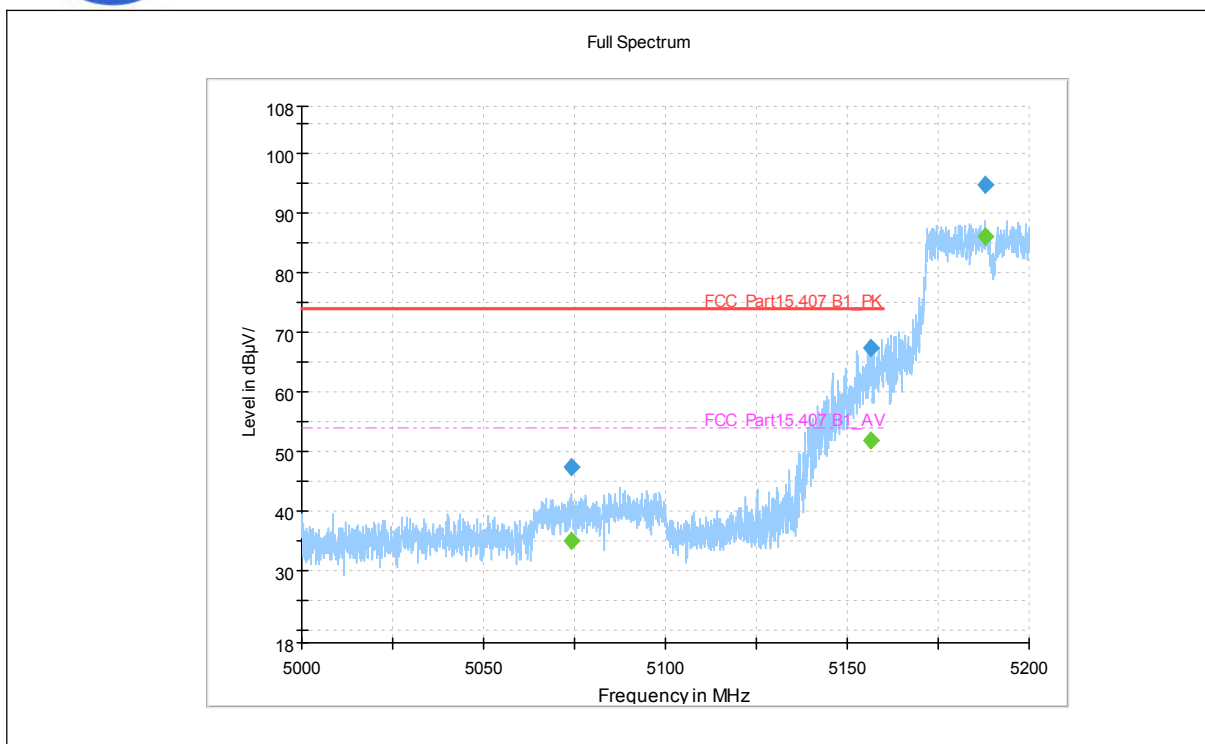


802.11n (HT40) Test mode



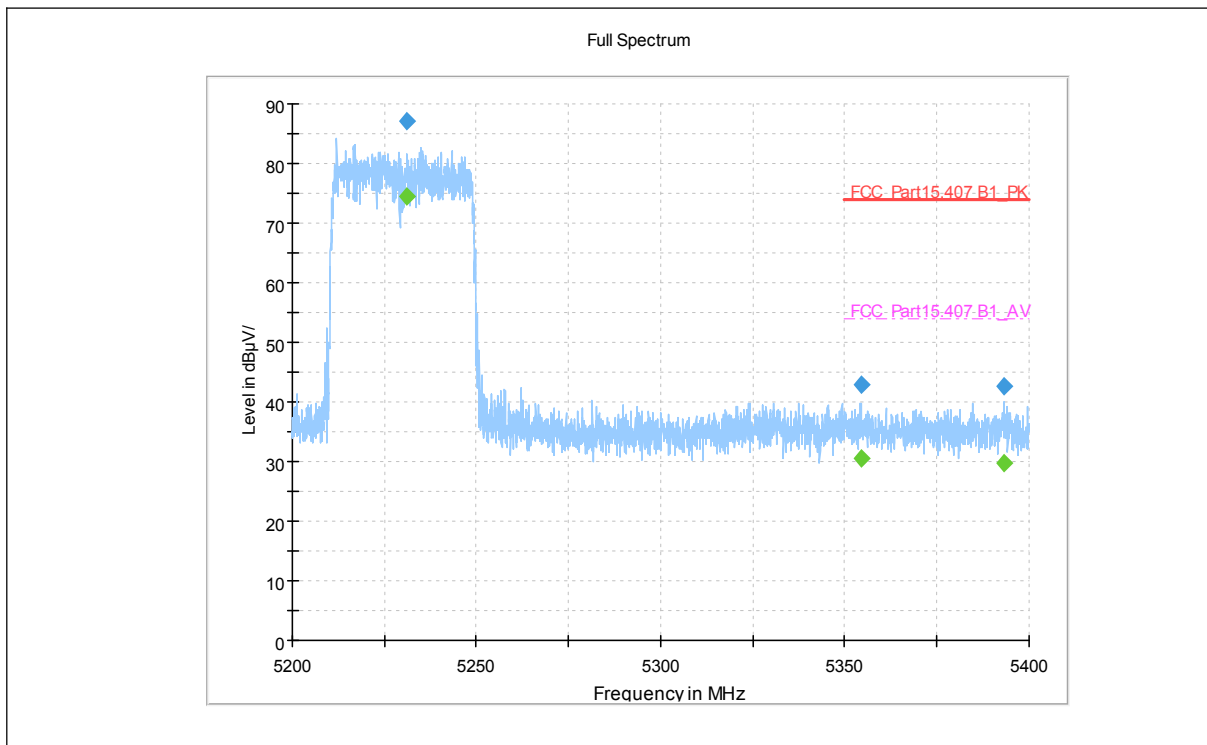
(802.11n (HT40) _5190MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5074.450000	---	30.00	54.00	24.00	H	-3.0
5074.450000	42.28	---	74.00	31.72	H	-3.0
5153.750000	---	30.13	54.00	23.87	H	-3.2
5153.750000	42.70	---	74.00	31.30	H	-3.2
5191.600000	---	74.47	---	---	H	-3.0
5191.600000	83.48	---	---	---	H	-3.0



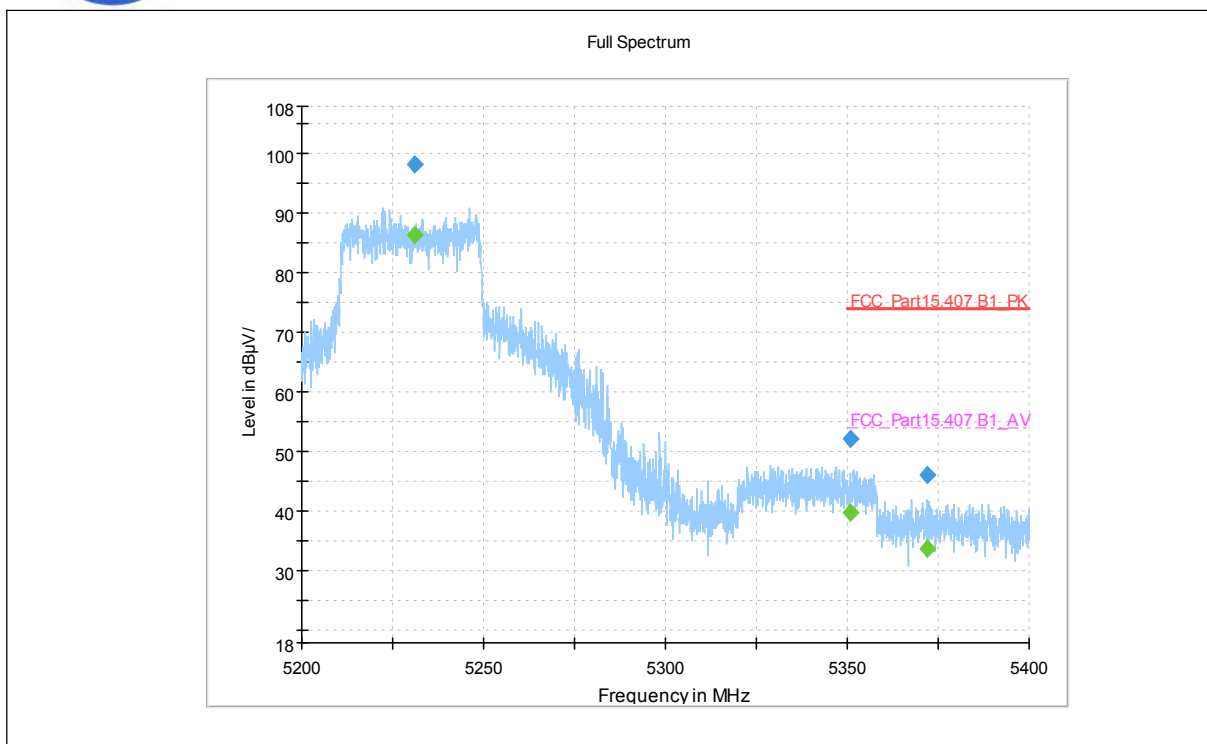
(802.11n (HT40) _5190MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5074.100000	---	35.17	54.00	18.83	V	-3.0
5074.100000	47.42	---	74.00	26.58	V	-3.0
5156.300000	---	51.84	54.00	2.16	V	-3.2
5156.300000	67.40	---	74.00	6.60	V	-3.2
5188.000000	---	86.03	---	---	V	-3.1
5188.000000	94.80	---	---	---	V	-3.1



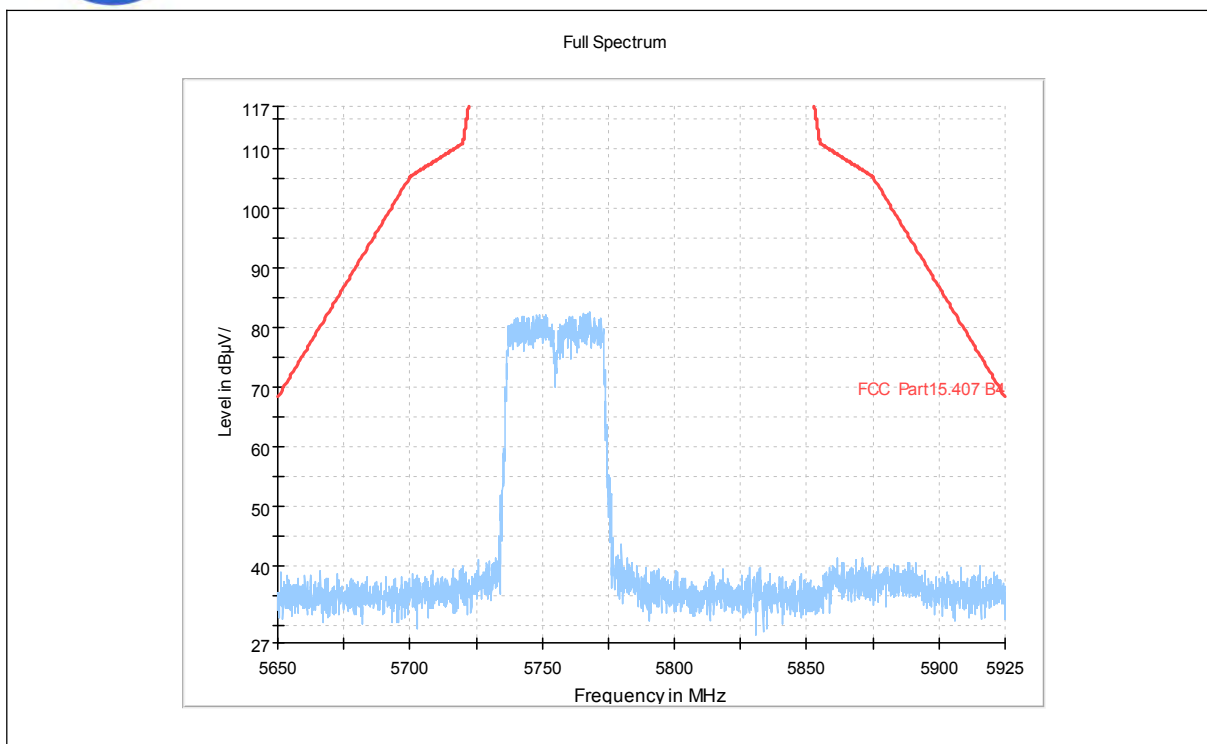
(802.11n (HT40) _5230MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5231.150000	87.06	---	---	---	H	-3.0
5231.150000	---	74.54	---	---	H	-3.0
5354.300000	42.98	---	74.00	31.03	H	-2.5
5354.300000	---	30.40	54.00	23.60	H	-2.5
5393.250000	---	29.82	54.00	24.18	H	-2.4
5393.250000	42.60	---	74.00	31.40	H	-2.4

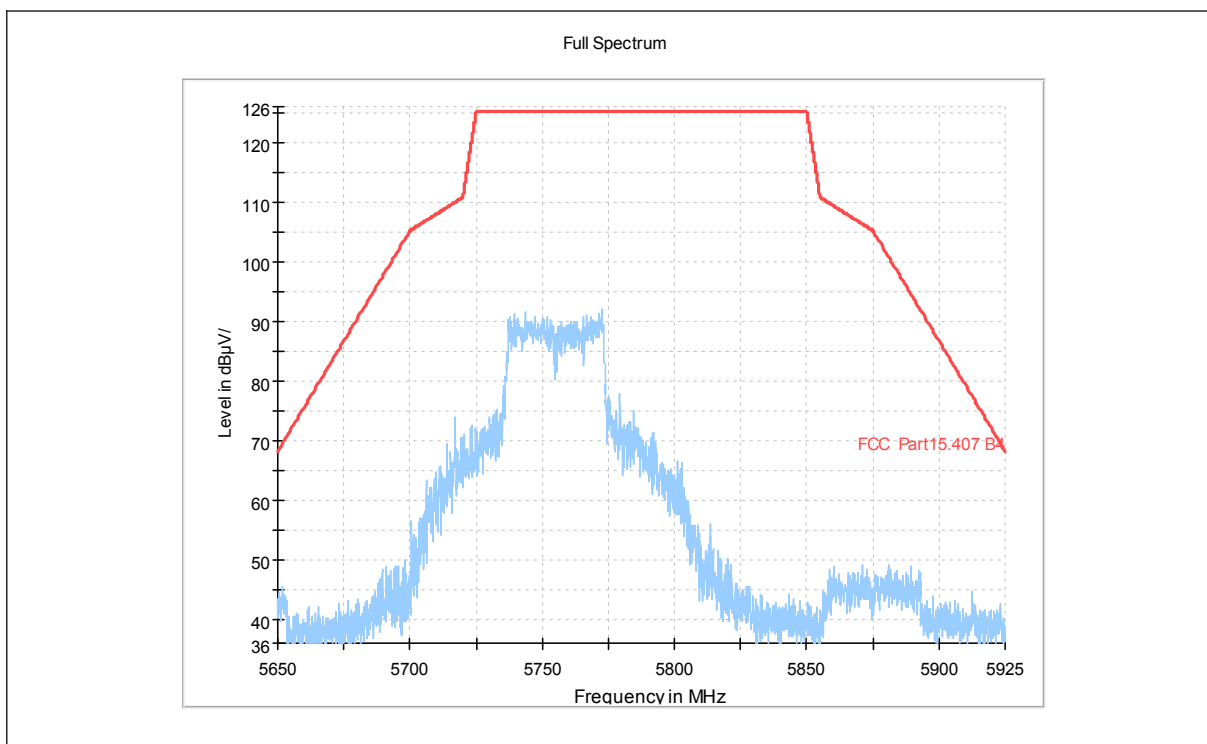


(802.11n (HT40) _5230MHz, Antenna Vertical)

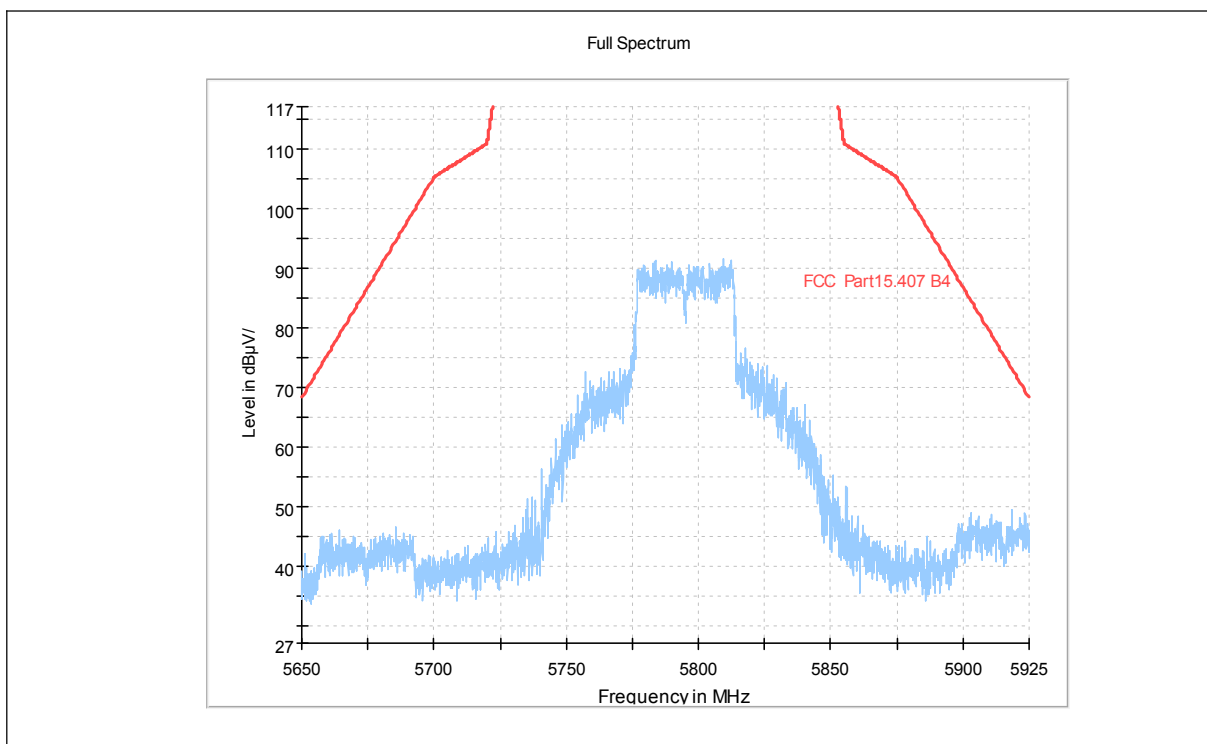
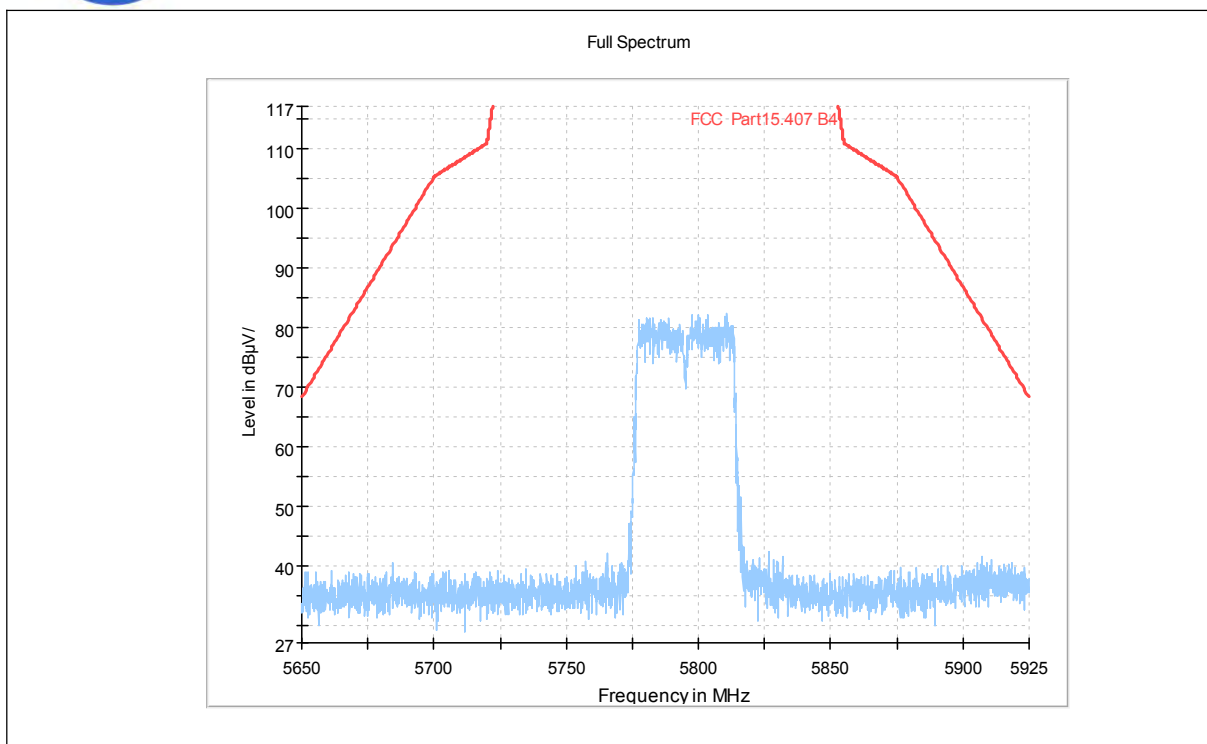
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5230.900000	98.35	---	---	---	V	-3.0
5230.900000	---	86.32	---	---	V	-3.0
5350.700000	52.26	---	74.00	21.74	V	-2.5
5350.700000	---	39.71	54.00	14.29	V	-2.5
5371.950000	---	33.71	54.00	20.29	V	-2.3
5371.950000	46.12	---	74.00	27.88	V	-2.3

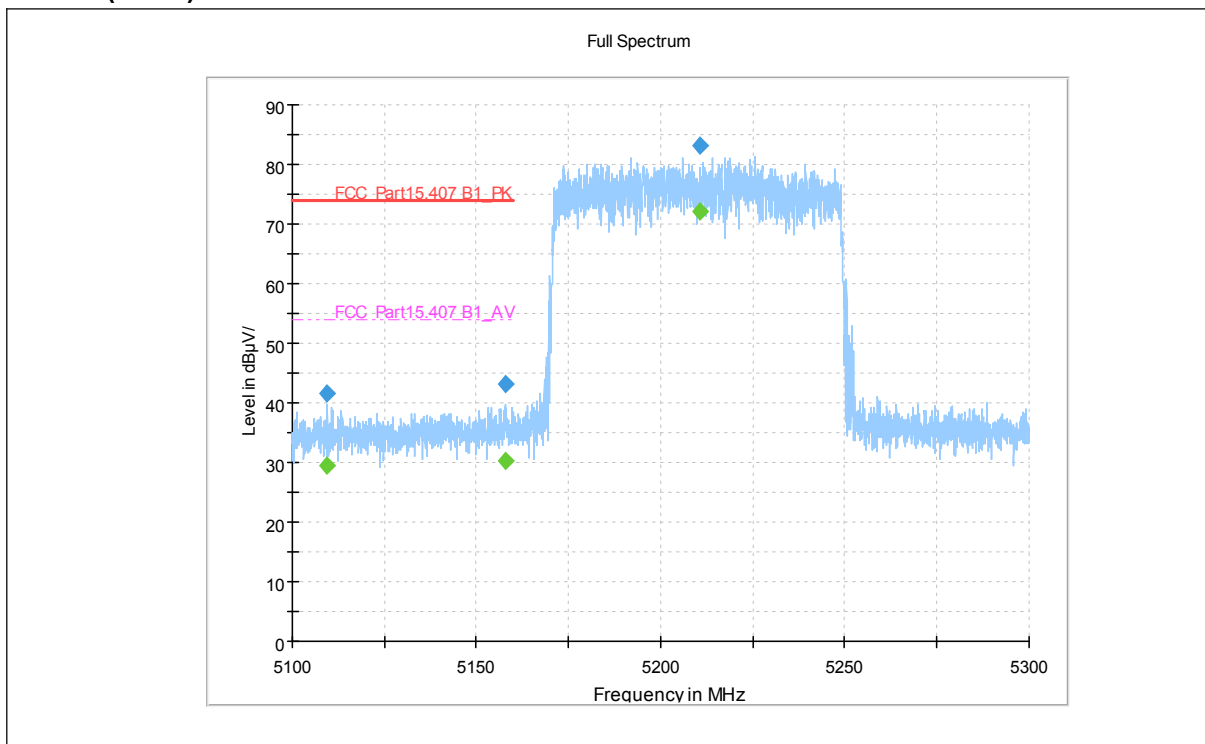


(802.11n(HT40)_5755MHz, Antenna Horizontal)



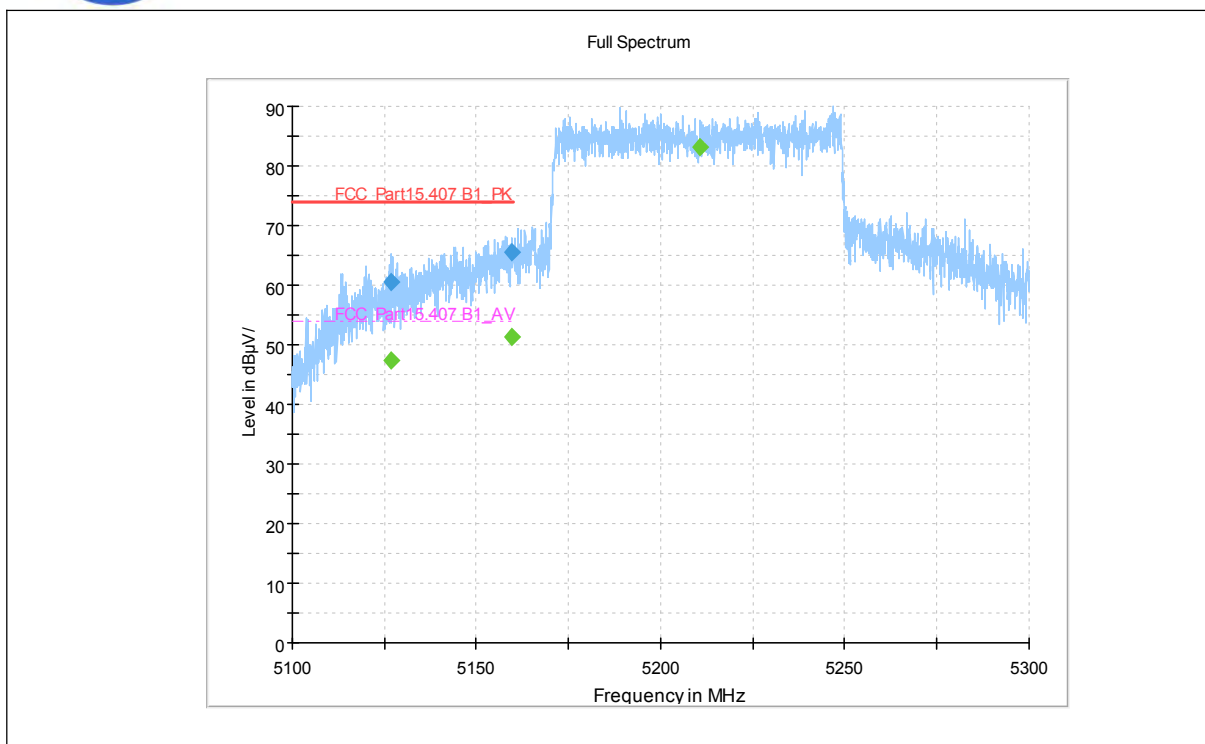
(802.11n(HT40)_5755MHz, Antenna Vertical)



**802.11ac (HT80) Test mode**

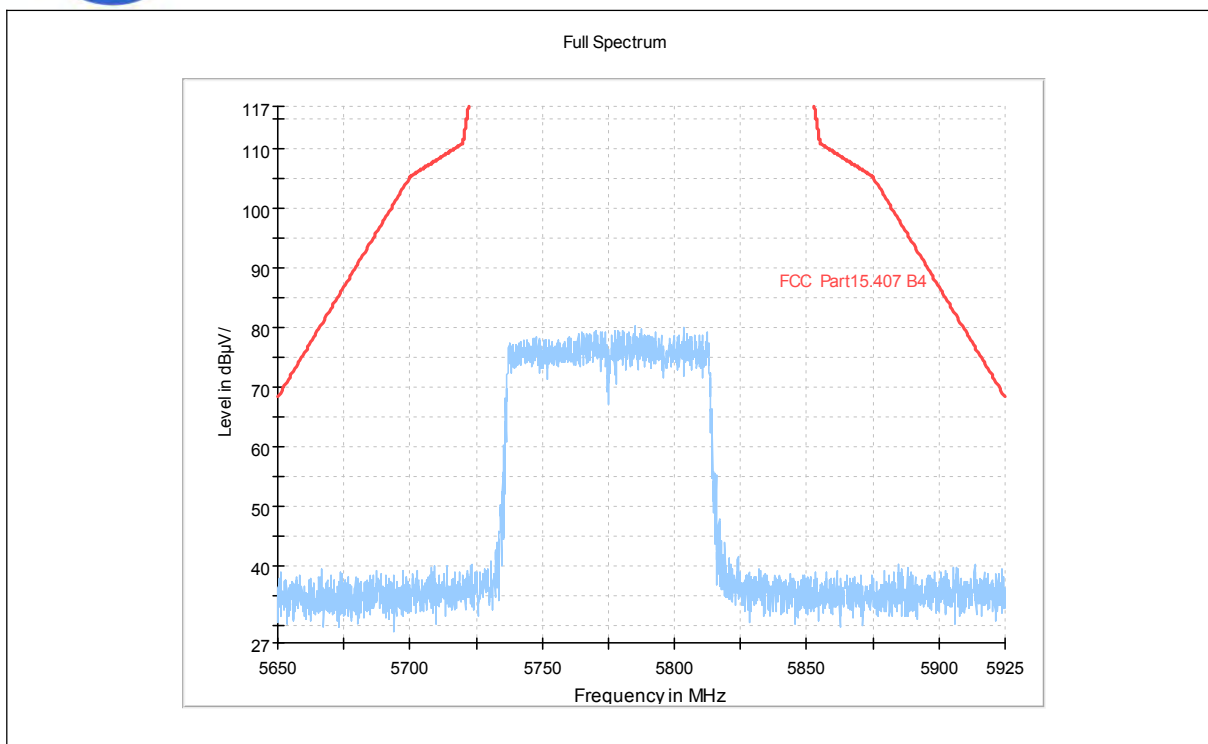
(802.11ac (HT80) _5210MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB/m)
5109.500000	---	29.36	54.00	24.64	H	-3.1
5109.500000	41.46	---	74.00	32.54	H	-3.1
5157.700000	---	30.21	54.00	23.79	H	-3.2
5157.700000	43.26	---	74.00	30.74	H	-3.2
5210.800000	---	72.13	---	---	H	-3.0
5210.800000	83.28	---	---	---	H	-3.0

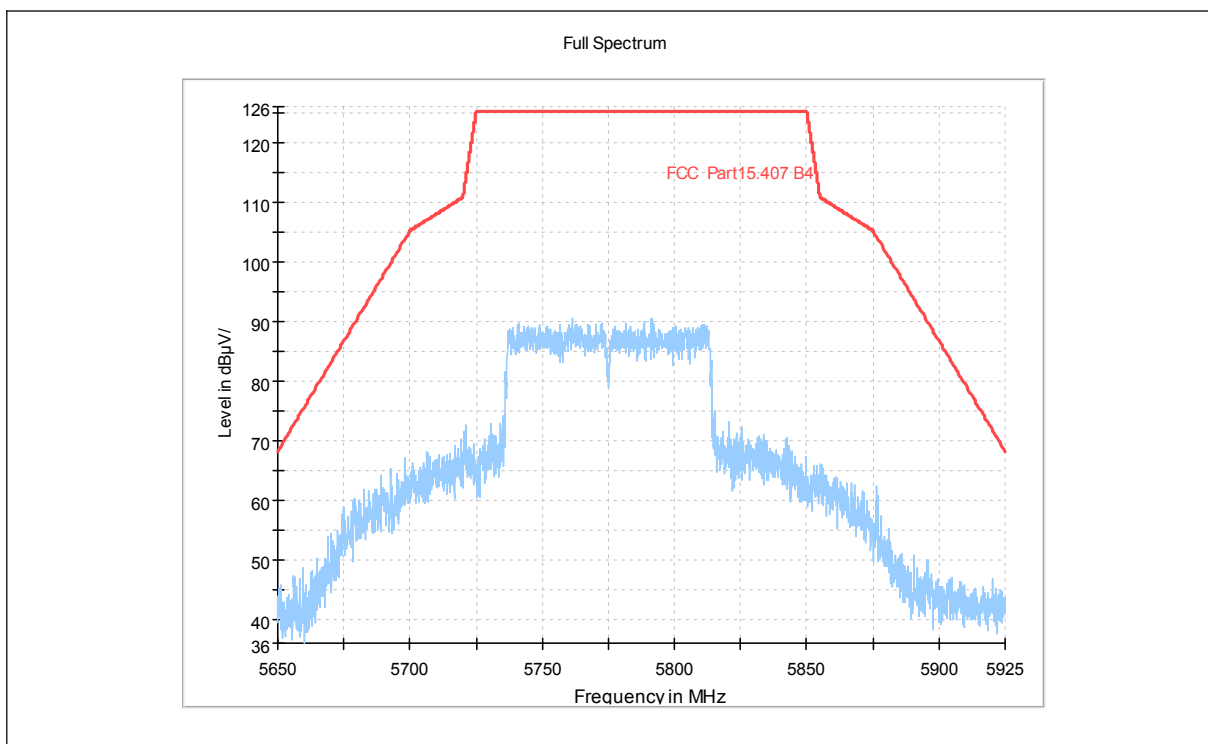


(802.11ac (HT80) _5210MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5127.000000	---	47.37	54.00	6.63	V	-3.1
5127.000000	60.51	---	74.00	13.49	V	-3.1
5159.700000	65.46	---	74.00	8.54	V	-3.2
5159.700000	---	51.45	54.00	2.55	V	-3.2
5210.550000	94.10	---	---	---	V	-3.0
5210.550000	---	83.14	---	---	V	-3.0



(802.11ac(HT80)_5775MHz, Antenna Horizontal)



(802.11ac(HT80)_5775MHz, Antenna Vertical)