



REPORT No.: SZ20050354W08

TEST REPORT

APPLICANT : Nortek Security & Control LLC

PRODUCT NAME : Edge Panel

MODEL NAME : 2GIG-EDG-NA-A

BRAND NAME : 2GIG

FCC ID : EF400168

STANDARD(S) : 47 CFR Part 15 Subpart E

RECEIPT DATE : 2020-07-02

TEST DATE : 2020-07-16 to 2020-07-20

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Edited by:

Peng Mi

Peng Mi (Rapporteur)

Approved by:

Peng Huarui

Peng Huarui (Supervisor)

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MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





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Change History		
Version	Date	Reason for change
1.0	2020-08-11	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Nortek Security & Control LLC
Applicant Address:	5919 Sea Otter Place, Carlsbad, CA 92010, United States
Manufacturer:	Flextronics Electronics Technology (Shenzhen) Co., Ltd
Manufacturer Address:	89 Yong Fu Road, Tong Fu Yu Industrial Park, Fu Yong Town, Bao An District, Shenzhen, Guangdong, 518103, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Edge Panel	
Serial No.:	(N/A, marked #1 by test site)	
Hardware Version:	A	
Software Version:	0	
Modulation Technology:	OFDM	
Modulation Mode:	802.11n(HT20), 802.11n(HT40) 802.11ac(VHT20), 802.11ac(VHT40), 802.11ac(VHT80)	
Operating Frequency Range:	5.180 GHz- 5.240 GHz; 5.745GHz- 5.825GHz	
Channel Number:	Refer to 1.4	
Antenna Type:	FPC Antenna	
Antenna Gain:	0.75dBi	
Accessory Information:	Battery	
	Brand Name:	Highpower
	Model No.:	115150
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	4020mAh
	Rated Voltage:	3.80V
	Charge Limit:	4.40V

Accessory Information:	Adaptor	
	Brand Name:	ZBPOWER
	Model No.:	ZB-H140017
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	14.00V $\pm$ 1.70A
	Rated Input:	100-240V $\sim$ 50/60Hz, Max 0.6A

Note 1: WIFI hotspot does not support U-NII band.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Modulation Type and Data Rate of EUT

Modulation Technology	Modulation Type	Data Rate (Mbps) Note1
OFDM (802.11n)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11ac)	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
	256QAM	78

Note1: The worst-case mode (black bold) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.



1.4. The Channel Number and Frequency

Frequency Range: 5180MHz-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: 5745-5825MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	149	5745	153	5765
	157	5785	161	5805
	165	5825		
40MHz	151	5775	159	5795
80MHz	155	5775		

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



1.5. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (U-NII band) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (5-1-14 Edition)	Radio Frequency Devices

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

No.	Section	Description	Test Date	Test Engineer	Result	Method determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	ANSI C63.10	Duty Cycle of the test signal	Jul 17, 2020	Lu Qiang	PASS	No deviation
3	15.407(a)	Maximum conducted output Power	Jul 17, 2020	Lu Qiang	PASS	No deviation
4	15.407(a)(e)	Emission Bandwidth	Jul 20, 2020	Lu Qiang	PASS	No deviation
5	15.407(a)	Maximum Power spectral density	Jul 17, 2020	Lu Qiang	PASS	No deviation
6	15.407(g)	Frequency Stability	Jul 17, 2020	Lu Qiang	PASS	No deviation
7	15.207	Conducted Emission	Jul 17, 2020	Lin Jiayong	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Jul 16, 2020	Peng Xuwei	PASS	No deviation
9	15.407(b)	Radiated Emission	Jul 17&18, 2020	Peng Xuwei	PASS	No deviation

Note 1: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

Note 2: These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 v02r01.

Note 3: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 12.5dB contains two parts that cable loss 2.5dB and Attenuator 10dB.



Note 4: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

1.6. 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 with the RP-SMA Jack. Please refer to the EUT external and internal photos.

2.2. Duty Cycle of the Test Signal

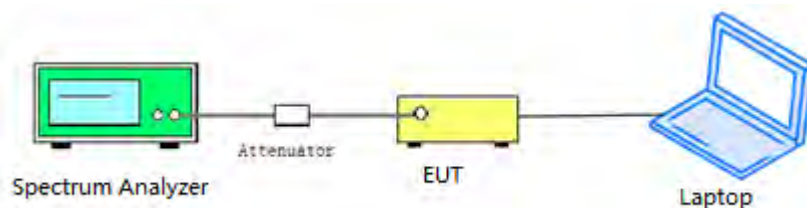
2.2.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this subclause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than $\pm 2\%$; otherwise, the duty cycle is considered to be nonconstant.

2.2.2. Test Description

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.

2.2.3. Test Procedure

KDB 789033 Section B was used in order to prove compliance.

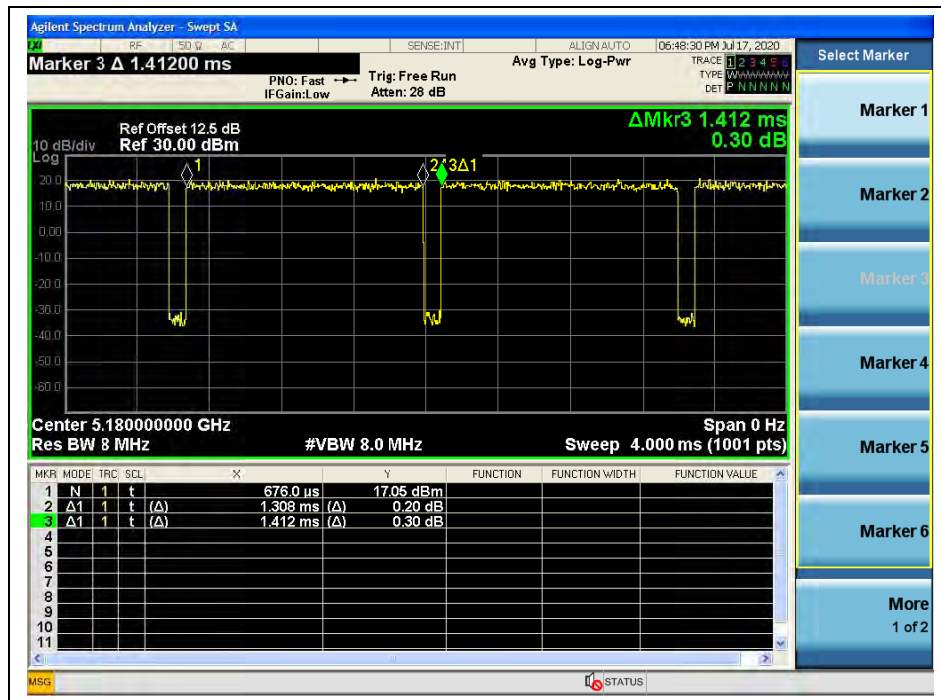


2.2.4. Test Result

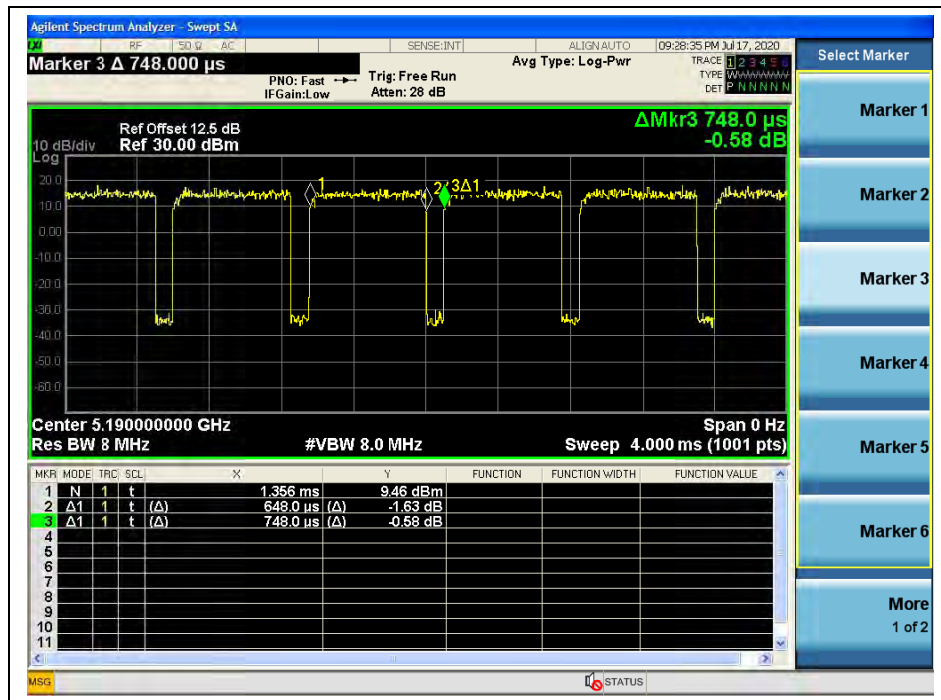
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11n(HT20)	92.91	0.32
802.11n(HT40)	86.67	0.62
802.11ac(VHT20)	92.96	0.32
802.11ac(VHT40)	86.84	0.61
802.11ac(VHT80)	76.19	1.18

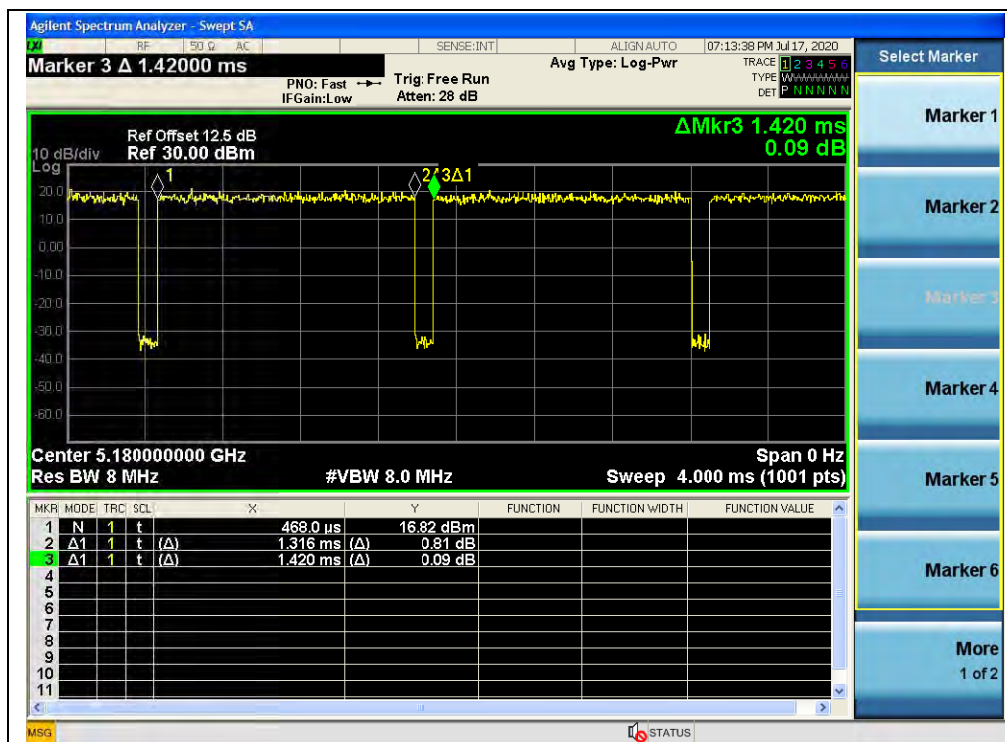
B. Test Plots



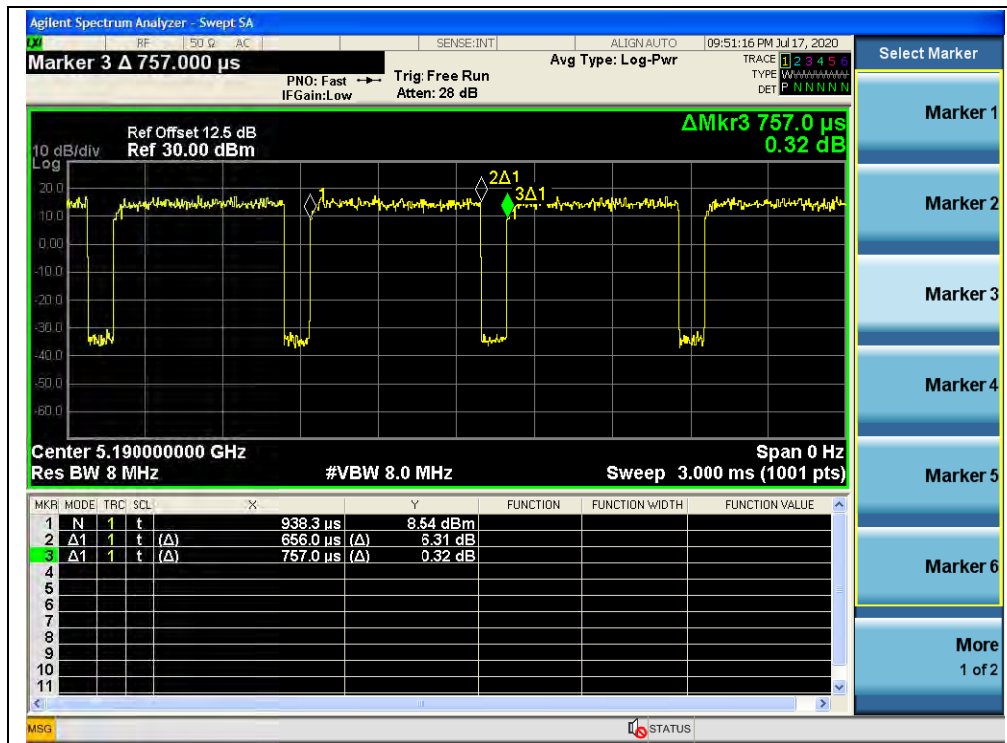
(CH36_5180MHz_802.11n(HT20))



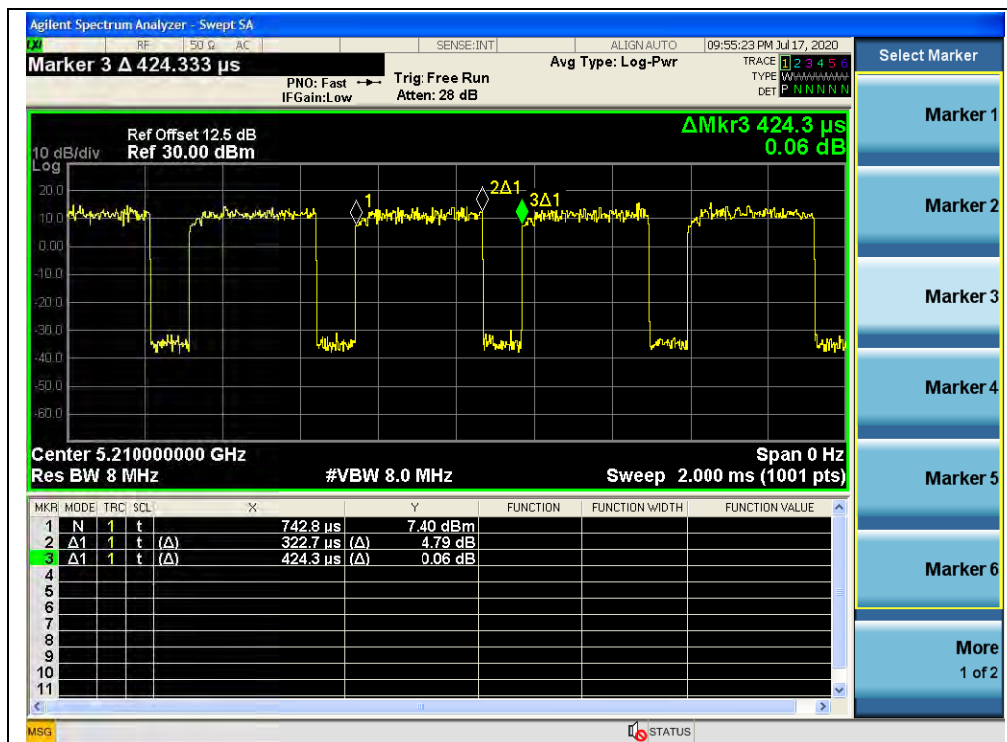
(CH38_5190MHz _802.11n(HT40))



(CH36_5180MHz _802.11ac(VHT20))



(CH38_5190MHz_802.11 ac(VHT40))



(CH42_5210MHz_802.11 ac(VHT80))

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 and 5.47-5.725 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.

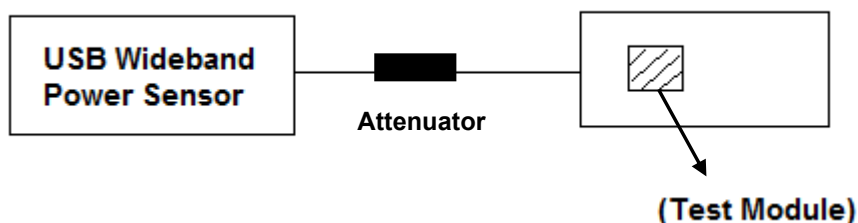
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the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

Test Setup:



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 50Ohm; 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****Maximum Average Conducted Output Power****802.11 n (HT20) Test mode**

Channel	Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
		Measured	Duty Factor	Duty factor Calculated				
				dBm		dBm	W	
36	5180	14.35	0.32	14.67	0.029	24	0.25	PASS
44	5220	14.52		14.84	0.030			
48	5240	14.89		15.21	0.033			
149	5745	14.74		15.06	0.032	30	1	
157	5785	14.62		14.94	0.031			
165	5825	14.65		14.97	0.031			

802.11 n (HT40) Test mode

Channel	Frequency (MHz)	Average Power				Limit (dBm)		Verdict
		Measured	Duty Factor	Duty factor Calculated				
		dBm		dBm	W	dBm	W	
38	5190	13.68	0.62	14.30	0.027	24	0.25	PASS
46	5230	14.02		14.64	0.029			
151	5755	14.15		14.77	0.030	30	1	
159	5795	14.29		14.91	0.031			

802.11 ac (VHT20) Test mode

Channel	Frequency (MHz)	Average Power (dBm)				Limit (dBm)		Verdict
		Measured	Duty Factor	Duty factor Calculated		dBm	W	
		dBm		dBm	W			
36	5180	14.26	0.32	14.58	0.029	24	0.25	PASS
44	5220	14.53		14.85	0.031			
48	5240	14.83		15.15	0.033			
149	5745	14.84		15.16	0.033	30	1	
157	5785	14.67		14.99	0.032			
165	5825	14.56		14.88	0.031			

**802.11 ac (VHT40) Test mode**

Channel	Frequency (MHz)	Average Power				Limit (dBm)		Verdict
		Measured	Duty Factor	Duty factor Calculated		dBm	W	
		dBm		dBm	W			
38	5190	13.52	0.61	14.13	0.026	24	0.25	PASS
46	5230	13.95		14.56	0.029			
151	5755	14.03		14.64	0.029	30	1	
159	5795	14.25		14.86	0.031			

802.11ac (VHT80) Test mode

Channel	Frequency (MHz)	Average Power				Limit (dBm)		Verdict
		Measured	Duty Factor	Duty factor Calculated		dBm	W	
		dBm		dBm	W			
42	5210	13.29	1.18	14.47	0.028	24	0.25	PASS
155	5775	13.76		14.94	0.031	30	1	

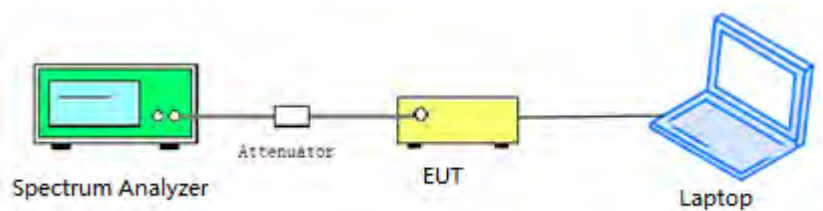
2.4. Emission Bandwidth

2.4.1. 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.

2.4.2. Test Description

Test Setup:



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

2.4.3. 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.

2.4.4. Test Result

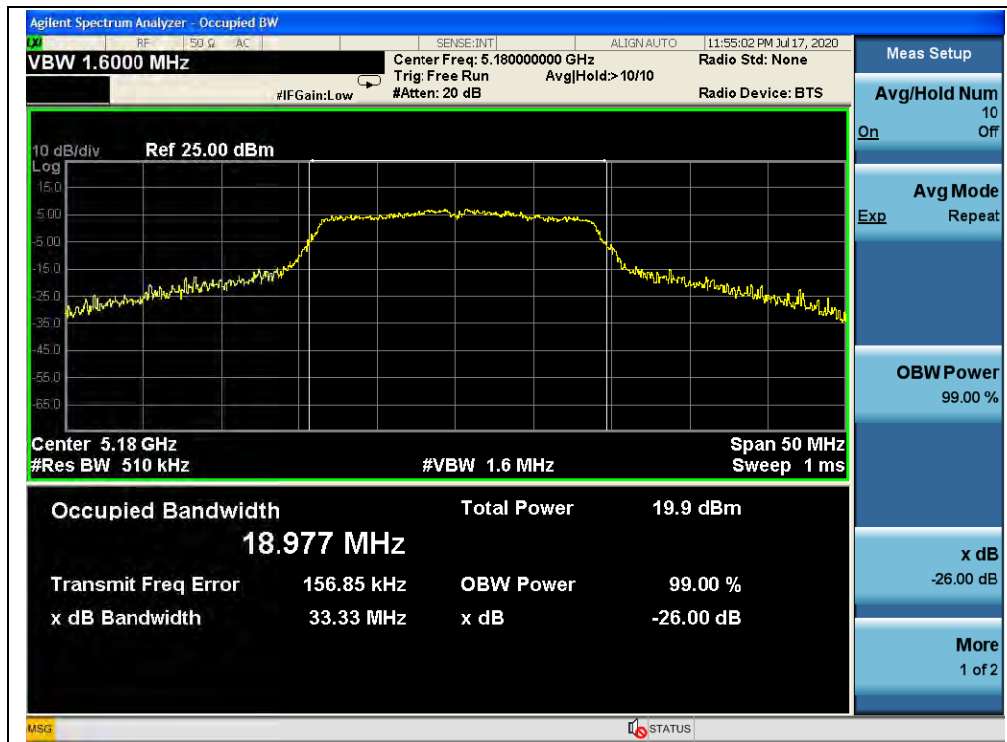
802.11n (HT20) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	33.33
44	5220	30.43
48	5240	29.91
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
149	5745	17.30
157	5785	17.22
165	5825	17.36



B. Test Plots



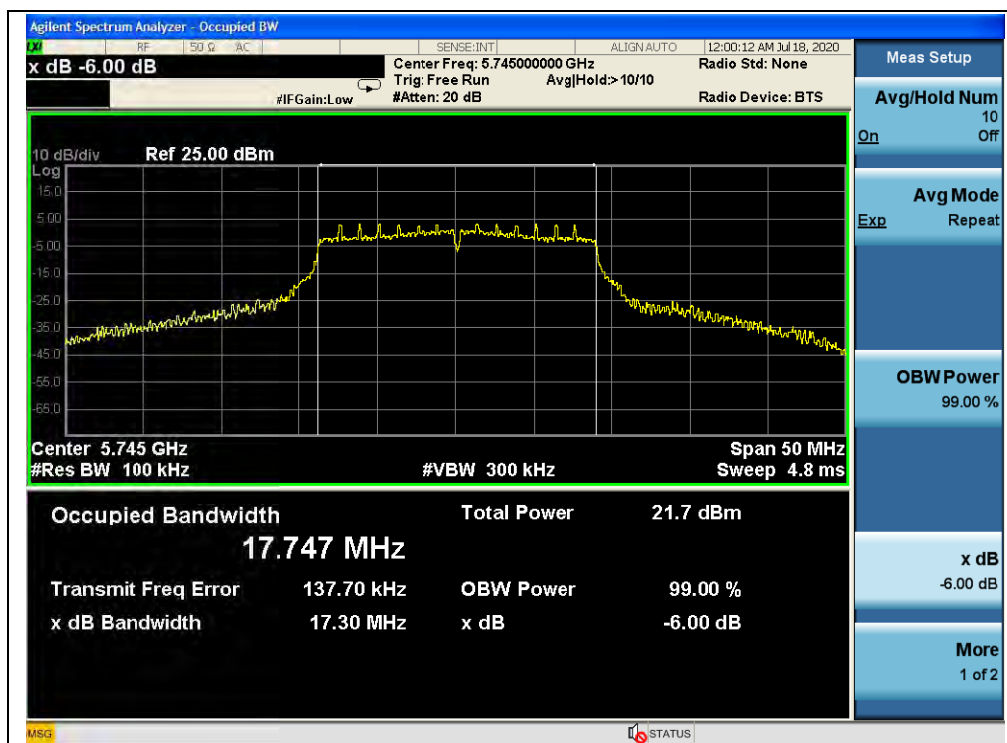
(Channel 36, 5180MHz, 802.11 n (HT20))



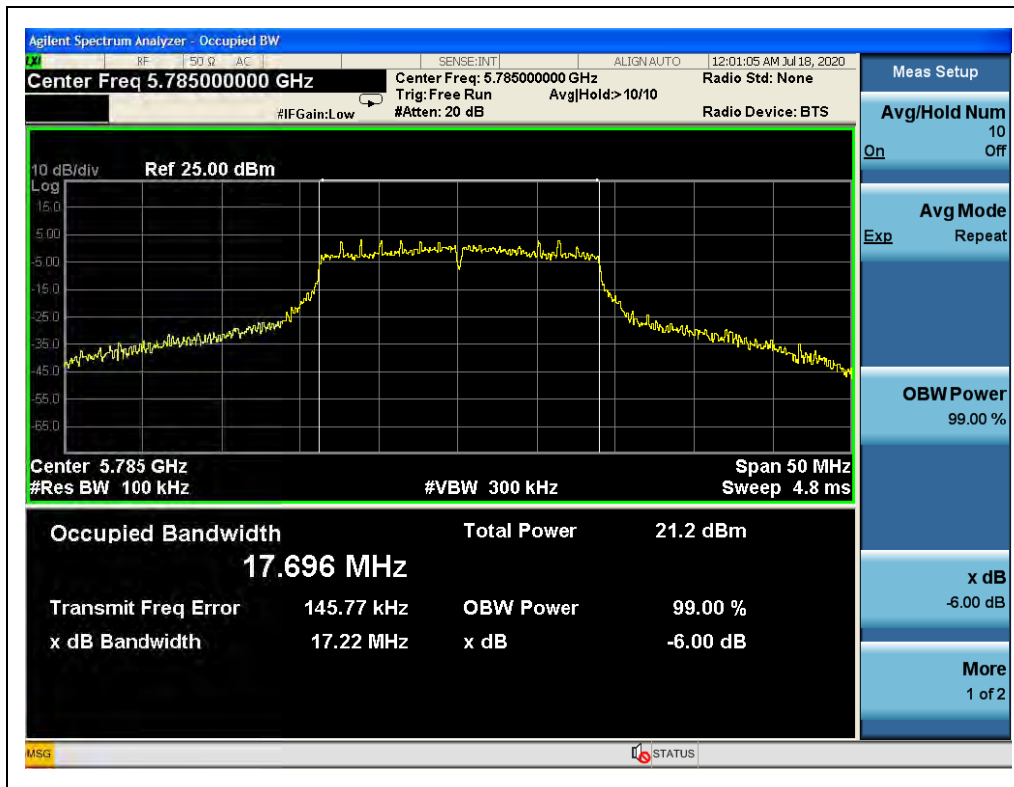
(Channel 44, 5220 MHz, 802.11 n (HT20))



(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))

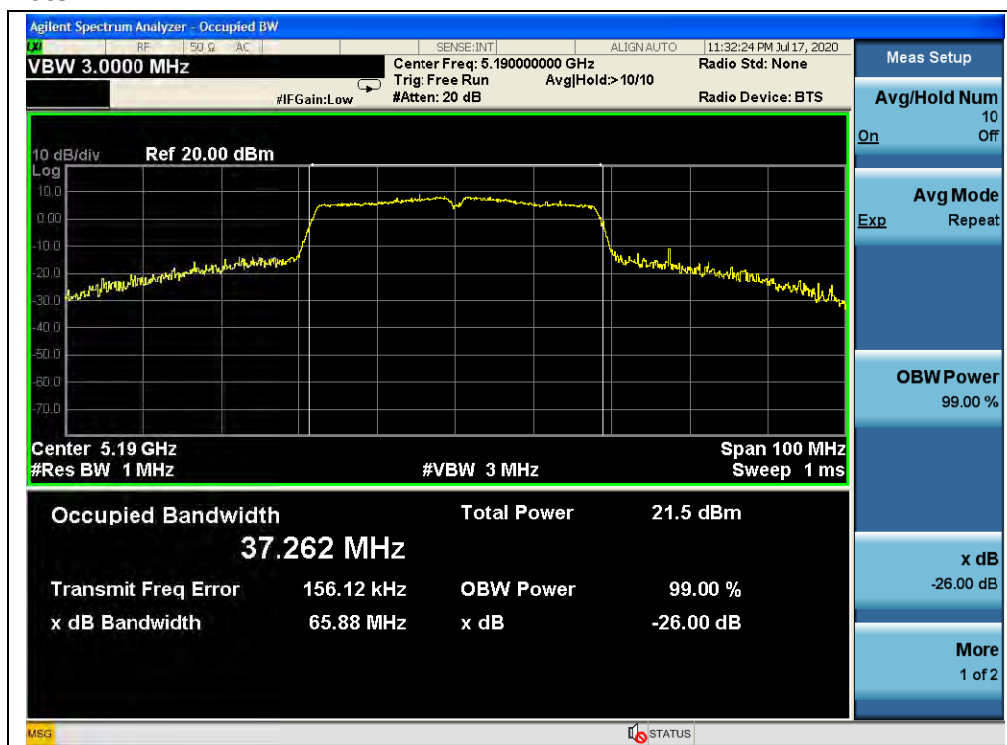


802.11n (HT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	65.88
46	5230	66.14
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
151	5755	35.60
159	5795	35.92

B. Test Plots



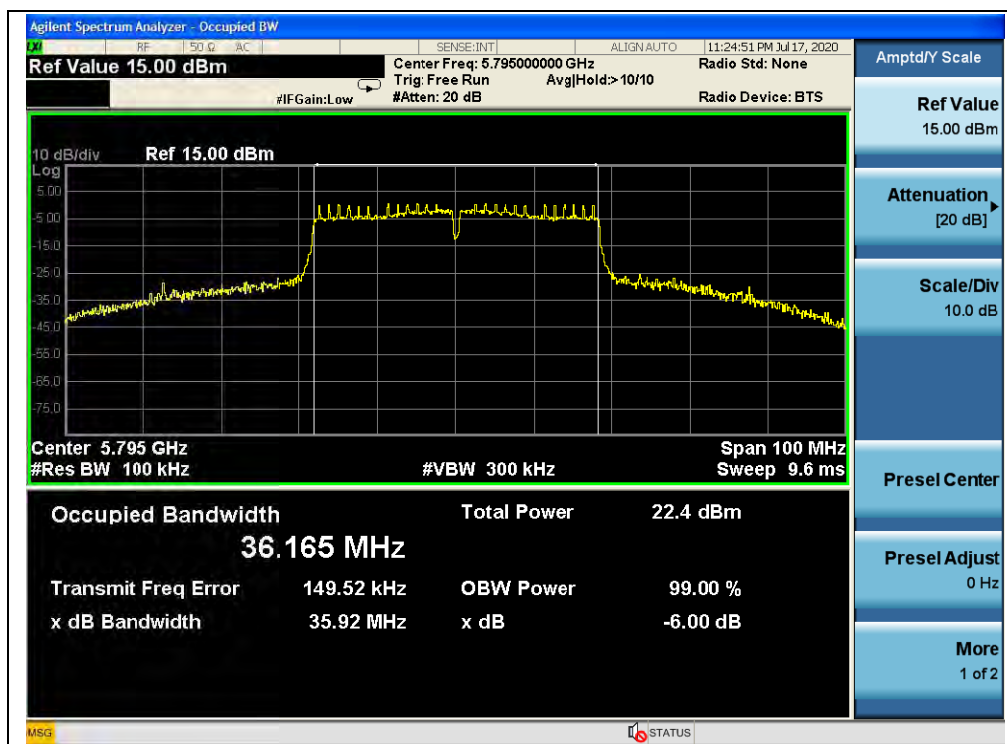
(Channel 38, 5190MHz, 802.11n (HT40))



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



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



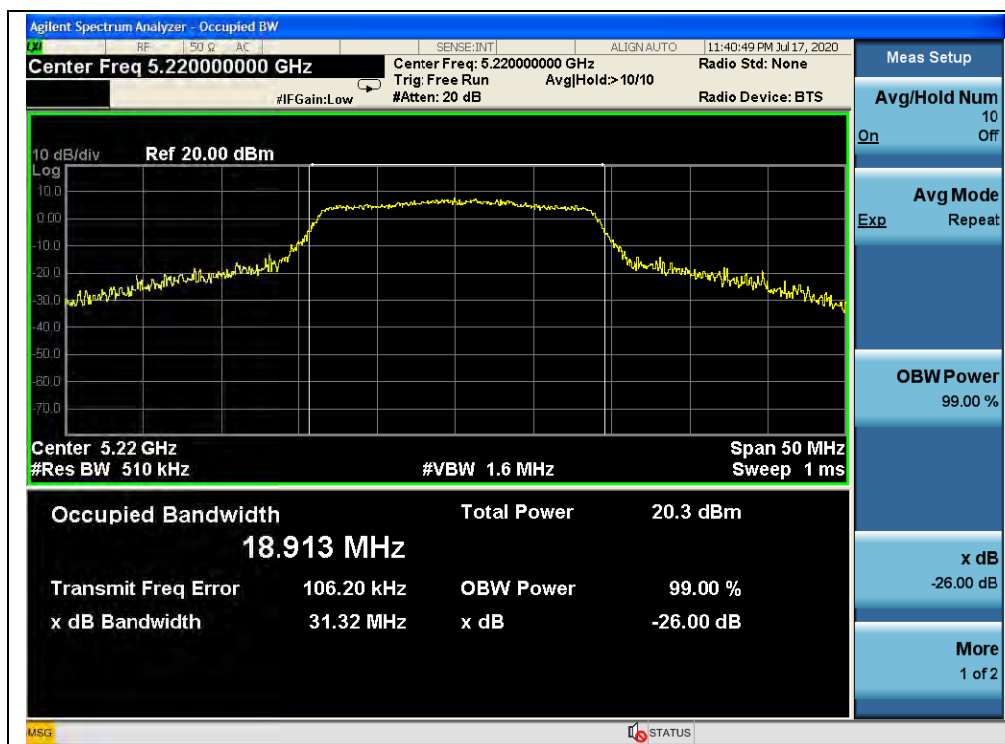
(Channel 159, 5795MHz, 802.11n (HT40))

**802.11ac (VHT20) Test mode****A. Test Verdict:**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	32.29
44	5220	31.32
48	5240	33.16
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
149	5745	17.55
157	5785	16.32
165	5825	16.83

B. Test Plots

(Channel 36, 5180MHz, 802.11 ac (VHT20))



(Channel 44, 5220 MHz, 802.11 ac (VHT20))



(Channel 48, 5240MHz, 802.11 ac (VHT20))



(Channel 149, 5745MHz, 802.11 ac (VHT20))



(Channel 157, 5785MHz, 802.11 ac (VHT20))



(Channel 165, 5825MHz, 802.11 ac (VHT20))

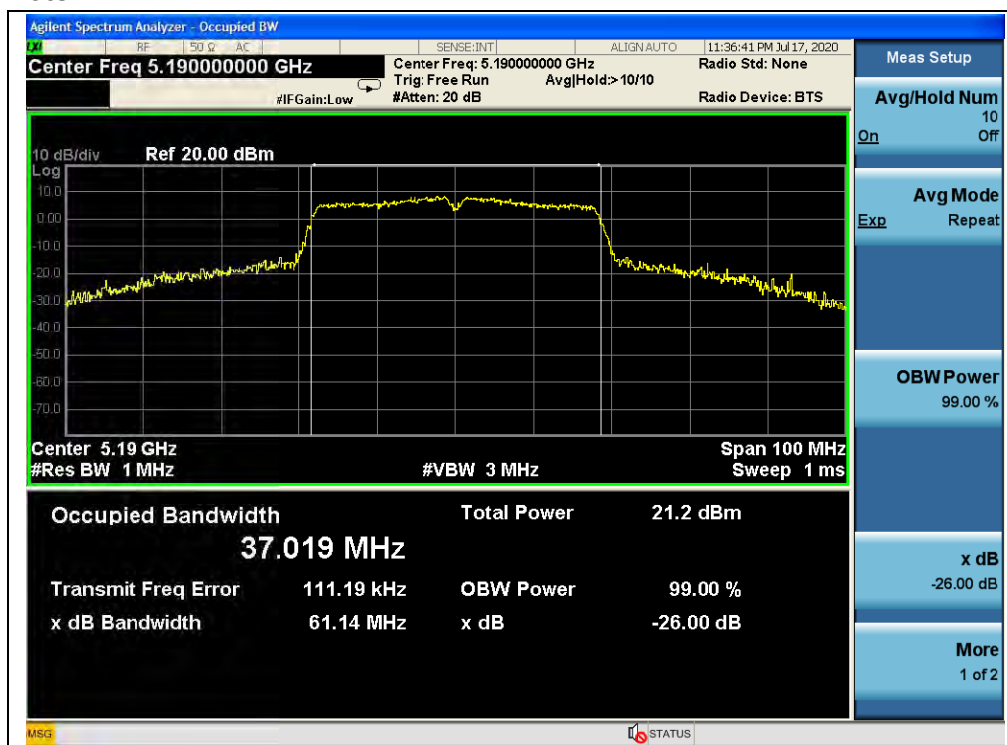


802.11 ac (VHT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	61.14
46	5230	63.66
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
151	5755	36.28
159	5795	36.04

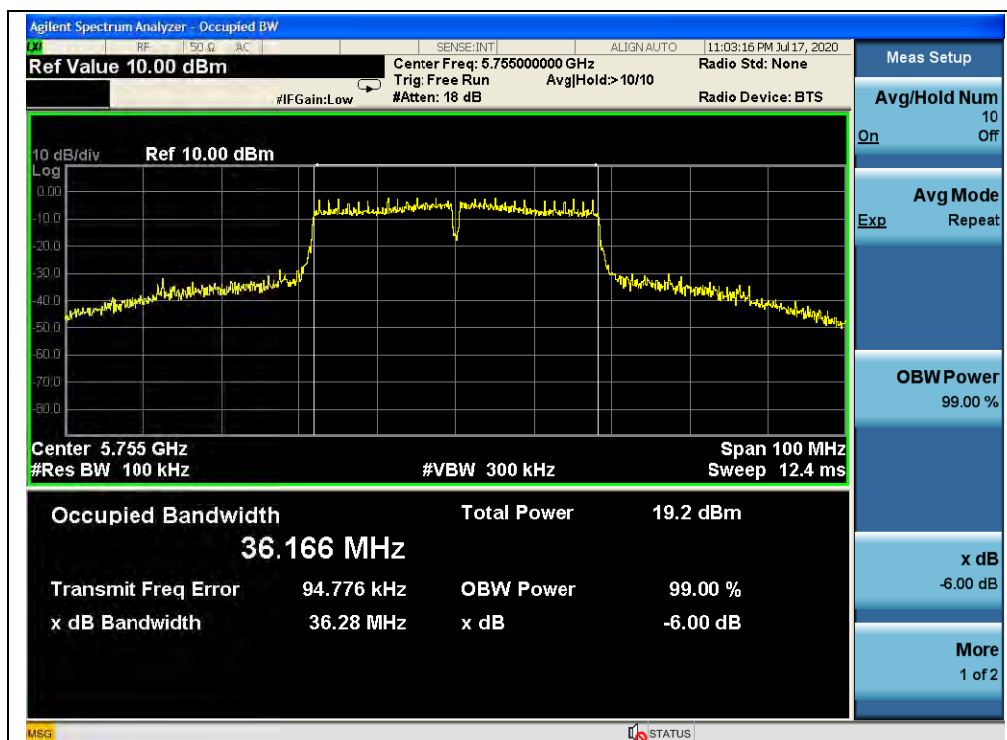
B. Test Plots



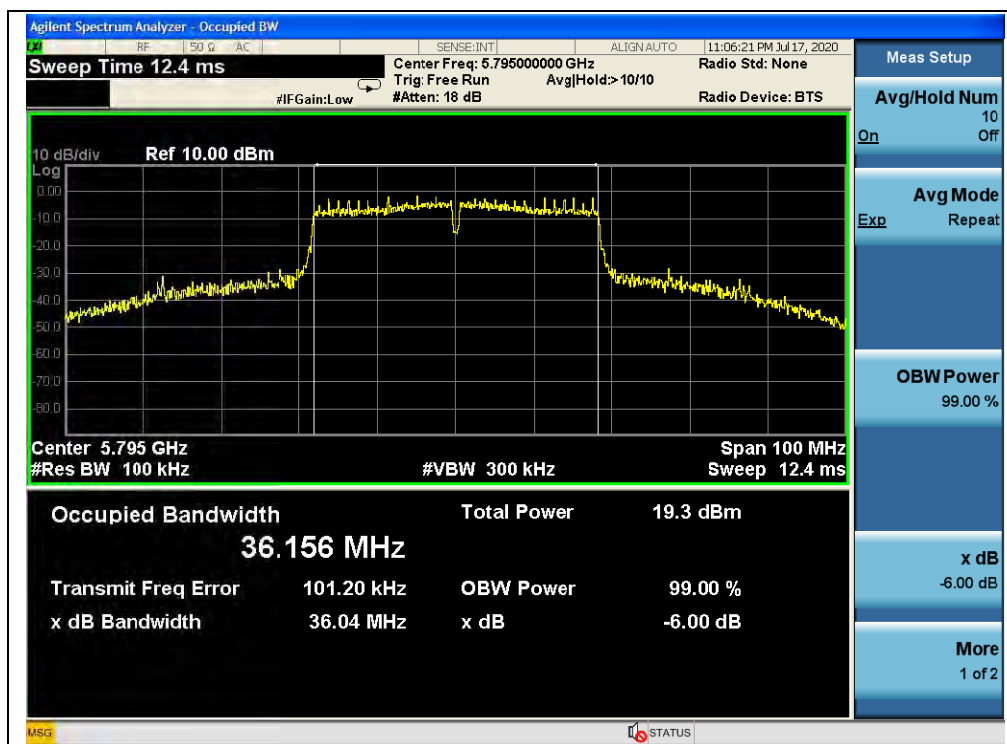
(Channel 38, 5190MHz, 802.11 ac (VHT40))



(Channel 46, 5230 MHz, 802.11 ac (VHT40))



(Channel 151, 5755 MHz, 802.11 ac (VHT40))



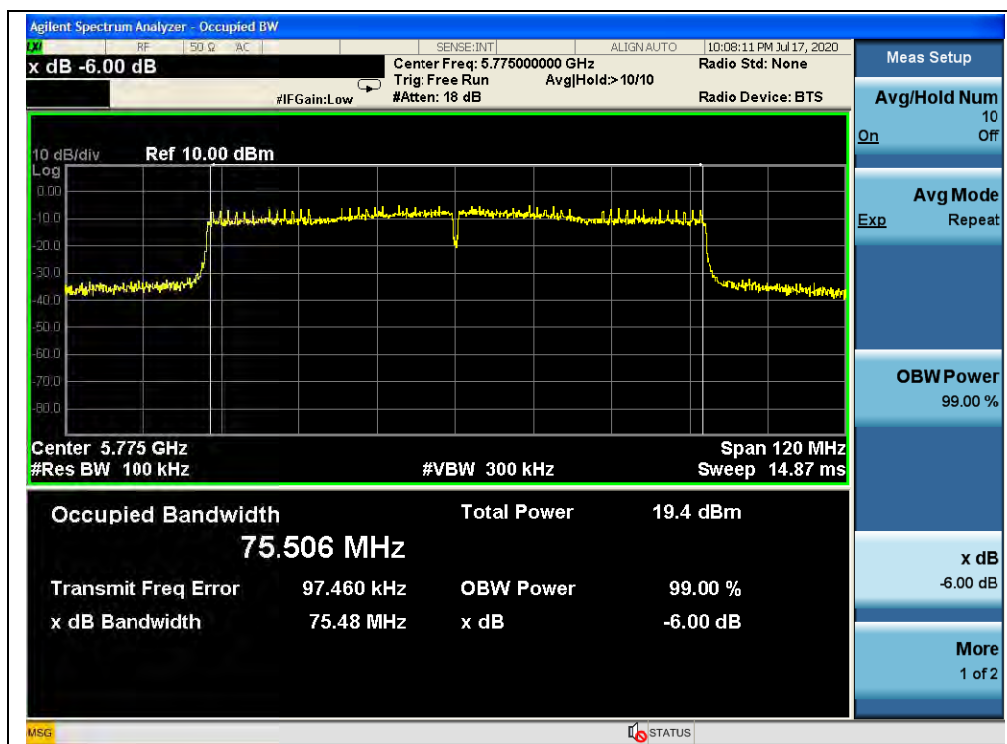
(Channel 159, 5795MHz, 802.11 ac (VHT40))

**802.11 ac (VHT80) Test mode****A. Test Verdict:**

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	109.50
Channel	Frequency (MHz)	6dB Bandwidth (MHz)
155	5775	75.48

B. Test Plots

(Channel 42, 5210MHz, 802.11 ac (VHT80))



(Channel 155, 5775 MHz, 802.11 ac (VHT80))

2.5. Peak Power spectral density

2.5.1. 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 and 5.47-5.725 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.

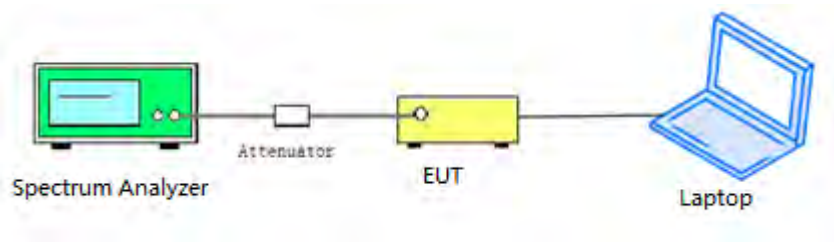
If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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.

2.5.2. Test Description

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.



2.5.3. 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 = Peak
- 5) Trace mode=Max hold
- 6) Record the max value

2.5.4. Test Result

802.11n (HT20) Test mode

A. Test Verdict:

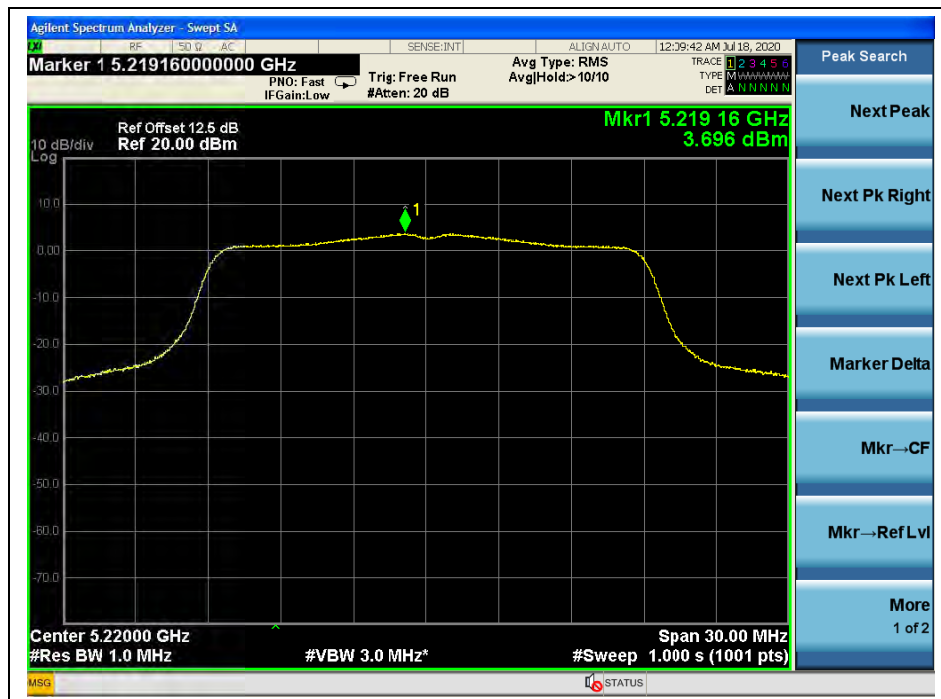
Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	3.64	11	PASS
44	5220	3.70		
48	5240	3.73		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
149	5745	1.41	30	PASS
157	5785	1.56		
165	5825	1.48		



B. Test Plots



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

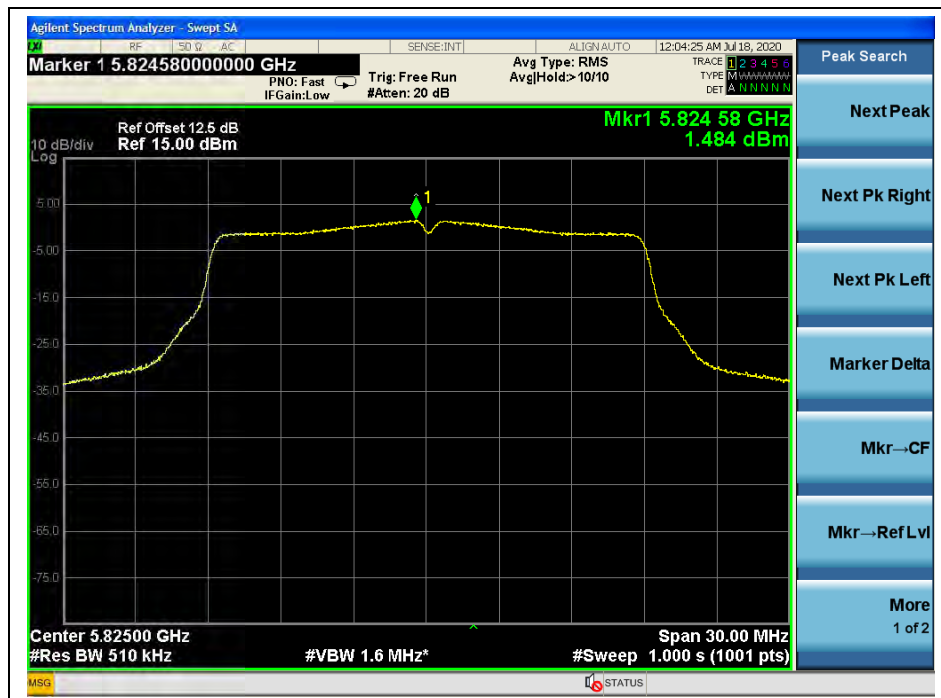


(Channel 44, 5220 MHz, 802.11 n (HT20))





(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)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
38	5190	-0.12	11	PASS
46	5230	0.47		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
151	5755	-2.03	30	PASS
159	5795	-1.88		

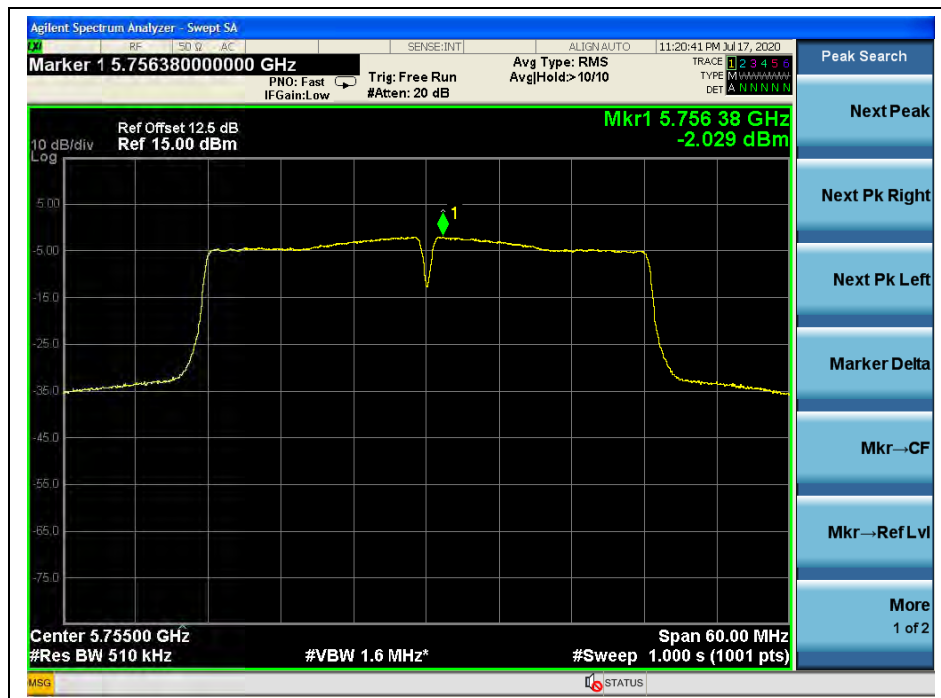
B. Test Plots



(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 (VHT20) Test mode

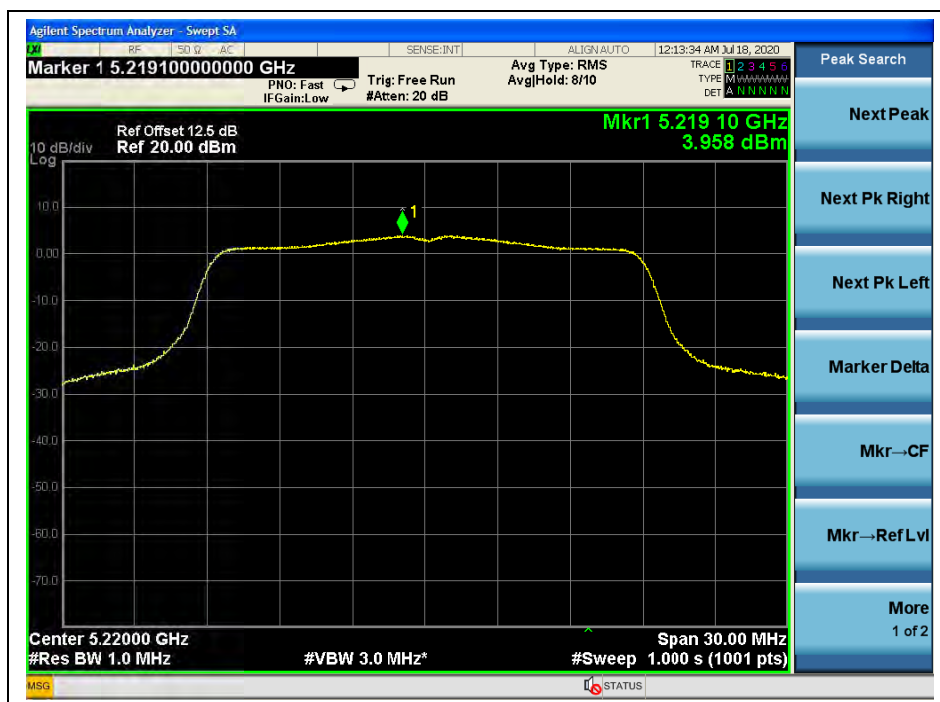
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSP (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	3.59	11	PASS
44	5220	3.96		
48	5240	3.95		
Channel	Frequency (MHz)	Measured PPSP (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
149	5745	1.73	30	PASS
157	5785	1.65		
165	5825	1.78		

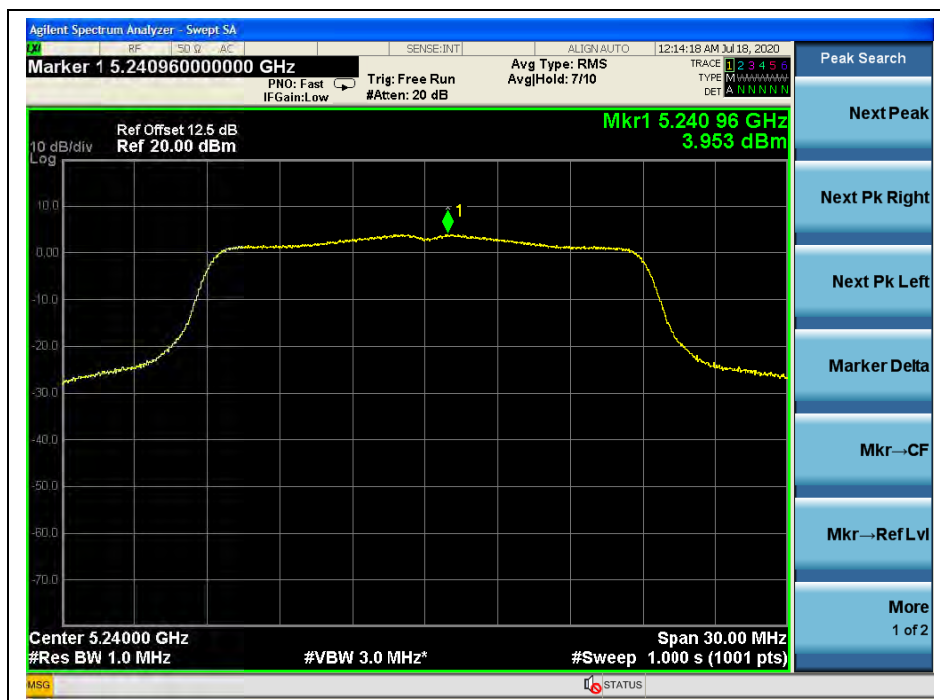
B. Test Plots



(Channel 36, 5180MHz, 802.11ac (VHT20))



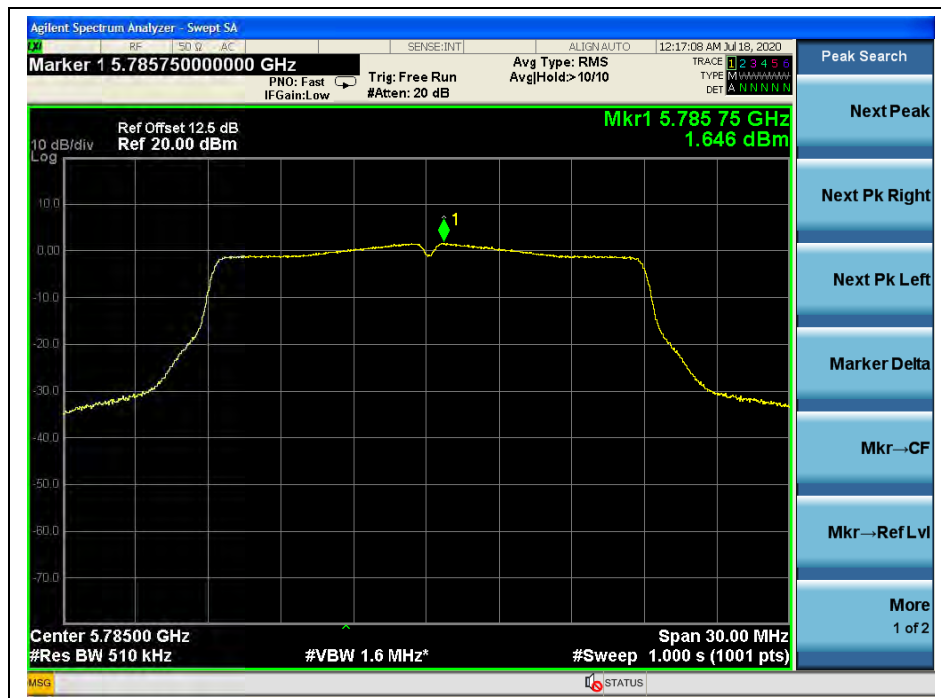
(Channel 44, 5220 MHz, 802.11 ac (VHT20))



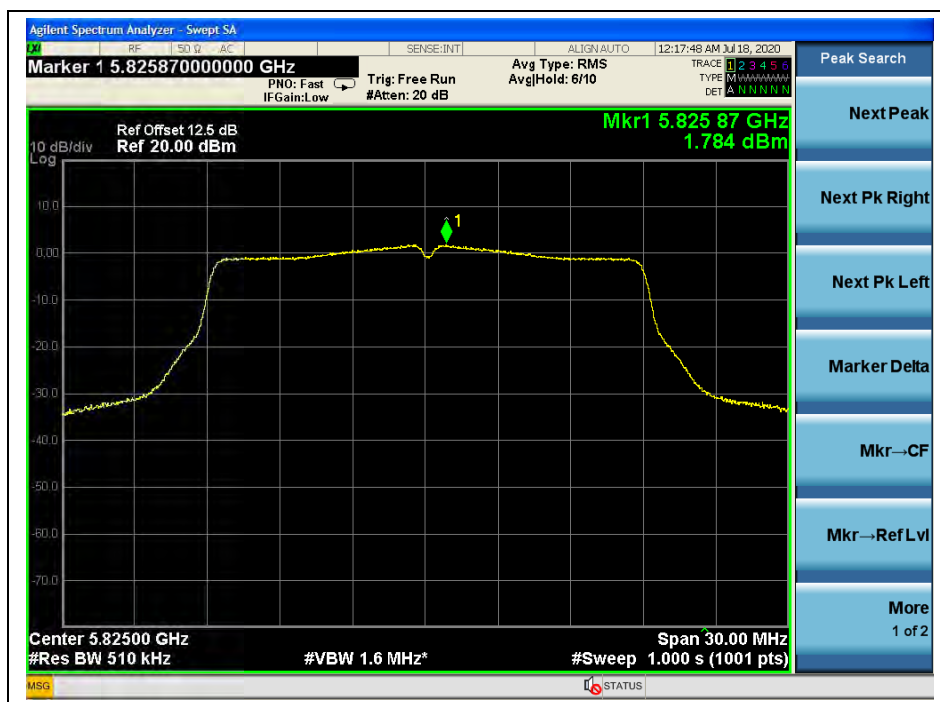
(Channel 48, 5240MHz, 802.11 ac (VHT20))



(Channel 149, 5745MHz, 802.11 ac (VHT20))



(Channel 157, 5785MHz, 802.11 ac (VHT20))



(Channel 165, 5825MHz, 802.11 ac (VHT20))



802.11ac (VHT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
38	5190	-0.08	11	PASS
46	5230	0.28		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
151	5755	-0.08	30	PASS
155	5795	0.28		

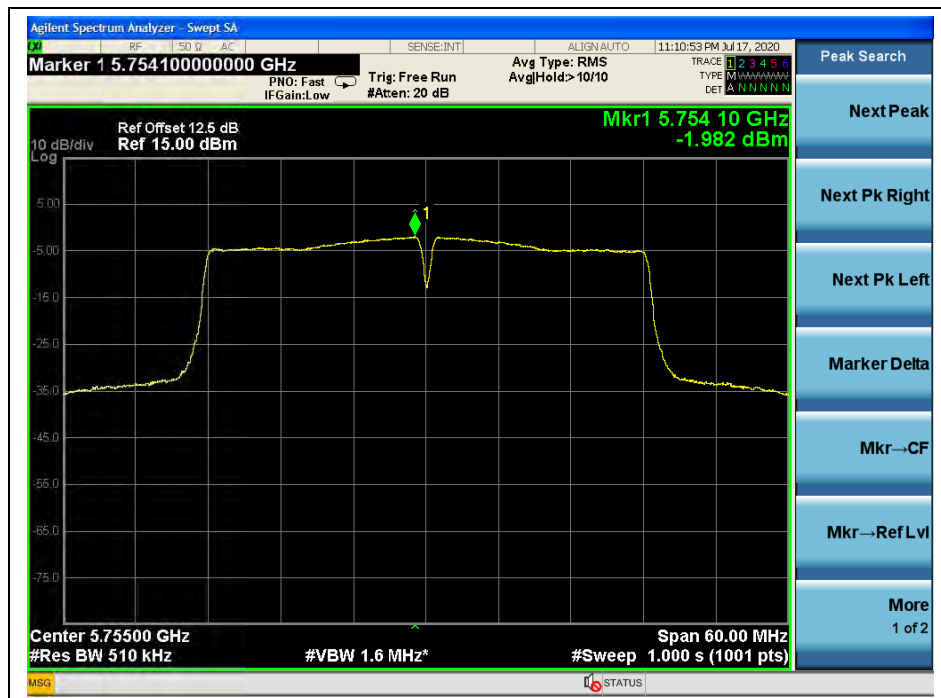
B. Test Plots



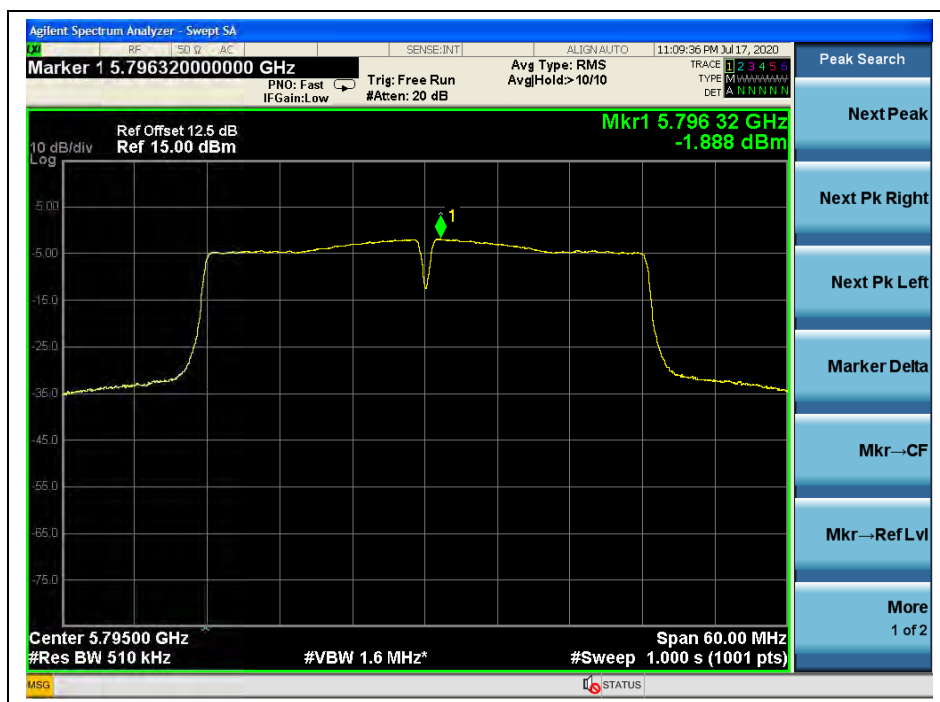
(Channel 38, 5190MHz, 802.11 ac (VHT40))



(Channel 46, 5230 MHz, 802.11 ac (VHT40))



(Channel 151, 5755MHz, 802.11 ac (VHT40))



(Channel 159, 5795MHz, 802.11 ac (VHT40))

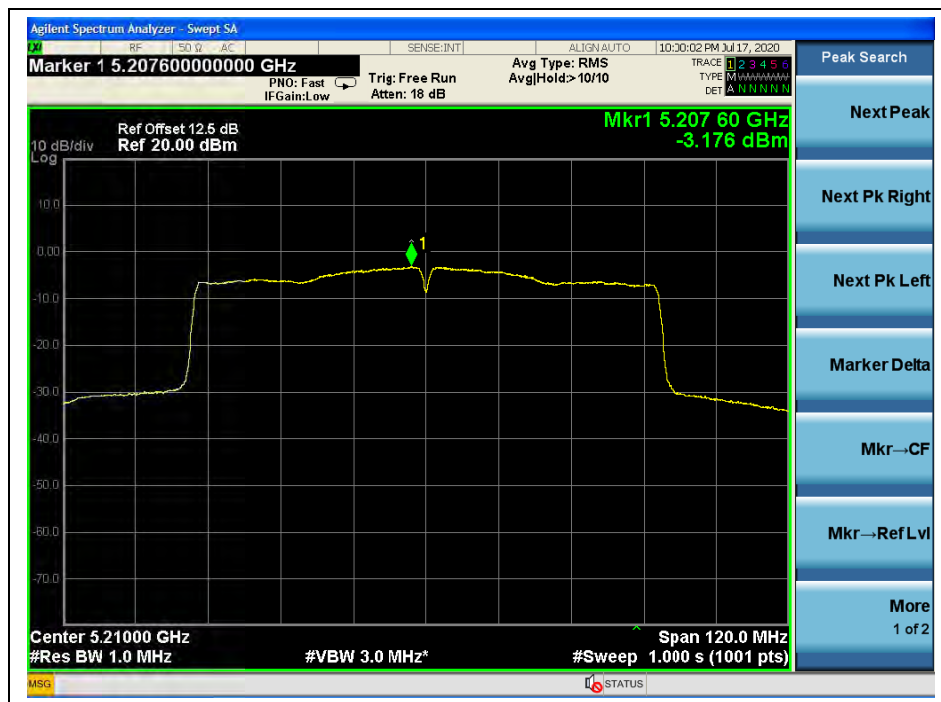


802.11ac (VHT80) Test mode

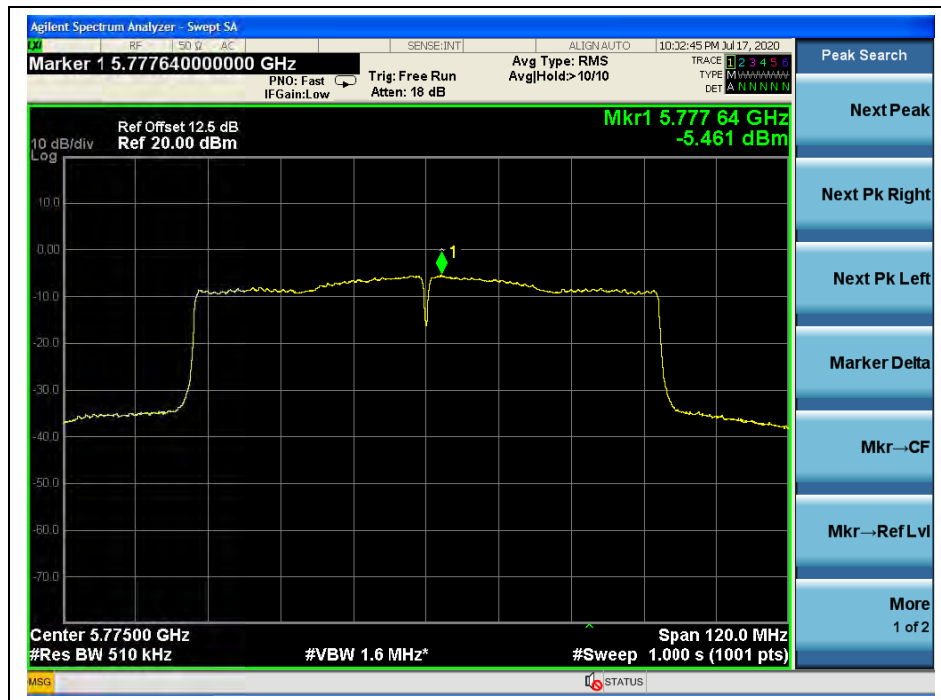
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSP (dBm/MHz)	Limit (dBm/MHz)	Verdict
42	5210	-3.18	11	PASS
Channel	Frequency (MHz)	Measured PPSP (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
155	5775	-5.46	30	PASS

B. Test Plots



(Channel 42, 5210MHz, 802.11ac (VHT80))



(Channel 155, 5775MHz, 802.11 ac (VHT80))



2.6. Frequency Stability

2.6.1. Requirement

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

2.6.2. Test Description

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between 5°C to 40°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

2.6.3. Test Result

U-NII-1 (Ch. 36) 5180MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (kHz)	Deviation (ppm)
100%	5.00	+20(Ref)	23	4.440
100%		-30	31	5.985
100%		-20	29	5.598
100%		-10	26	5.019
100%		0	25	4.826
100%		+10	22	4.247
100%		+20	20	3.861
100%		+30	23	4.440
100%		+40	26	5.019
100%		+50	23	4.440
85%	4.25	+20	28	5.405
115%	5.75	+20	30	5.792



U-NII-3 (Ch. 149) 5745MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (kHz)	Deviation (ppm)
100%	5.00	+20(Ref)	22	3.829
100%		-30	26	4.526
100%		-20	27	4.700
100%		-10	21	3.655
100%		0	30	5.222
100%		+10	25	4.352
100%		+20	26	4.526
100%		+30	26	4.526
100%		+40	28	4.874
100%		+50	28	4.874
85%	4.25	+20	31	5.396
115%	5.75	+20	29	5.048

2.7. Conducted Emission

2.7.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

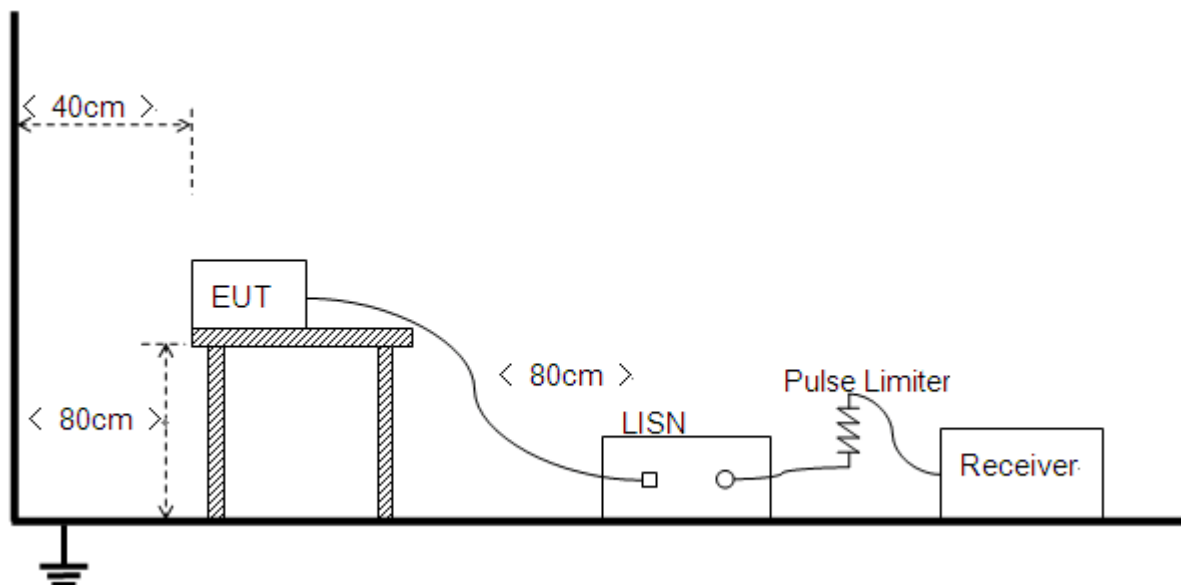
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.7.2. Test Description

Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.



2.7.3. Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Note: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

A. Test Setup:

Test Mode: EUT + Adapter +wifi TX

Test Voltage: AC 120V/60Hz

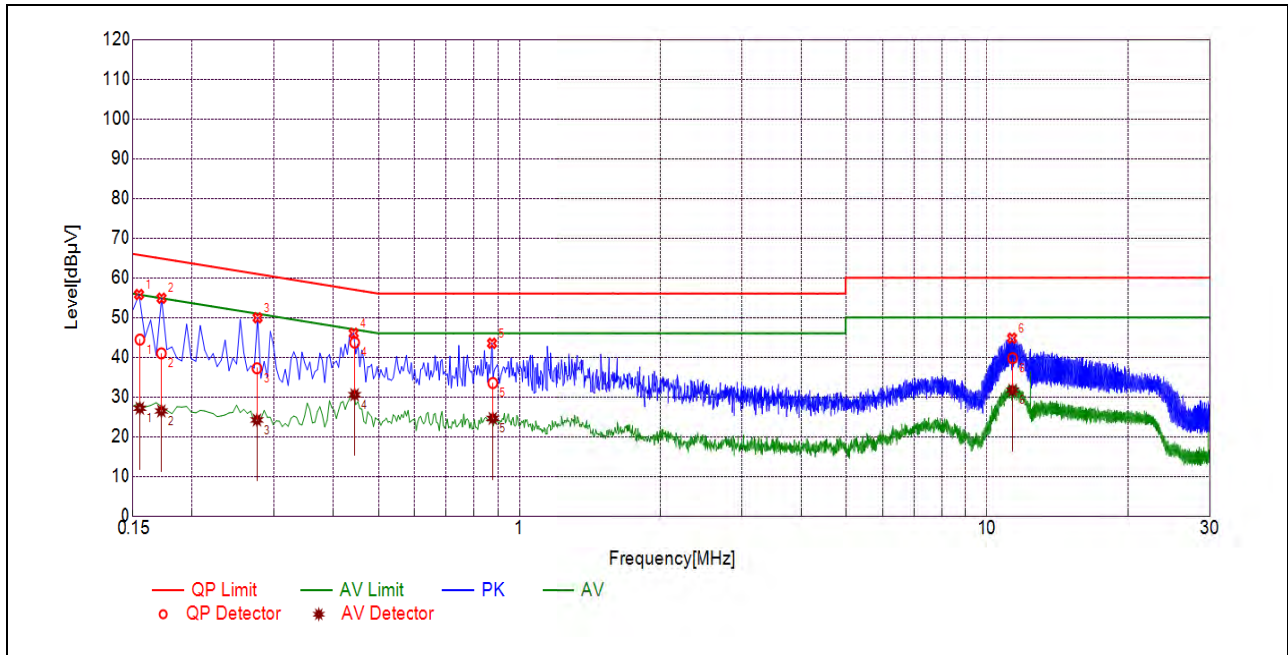
The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V]} = U_R + L_{\text{Cable loss}} \text{ [dB]} + A_{\text{Factor}}$$

U_R : Receiver Reading

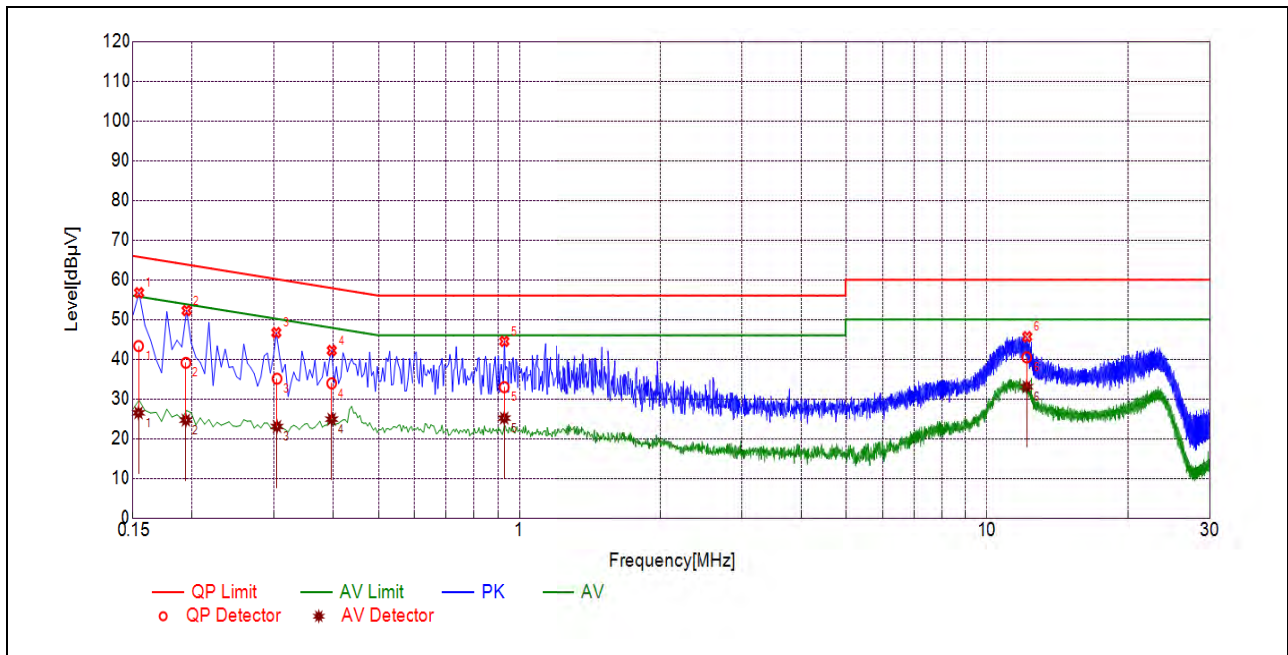
A_{Factor} : Voltage division factor of LISN

B. Test Plots:



(L Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1551	44.44	27.16	65.72	55.72	Line	PASS
2	0.1723	40.97	26.46	64.85	54.85		PASS
3	0.2752	37.21	24.19	60.96	50.96		PASS
4	0.4445	43.69	30.55	56.98	46.98		PASS
5	0.8778	33.49	24.59	56.00	46.00		PASS
6	11.3825	39.76	31.69	60.00	50.00		PASS



(N Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1541	43.32	26.50	65.77	55.77	Neutral	PASS
2	0.1943	39.08	24.66	63.85	53.85		PASS
3	0.3040	35.10	23.06	60.13	50.13		PASS
4	0.3973	33.92	24.89	57.91	47.91		PASS
5	0.9280	32.96	25.17	56.00	46.00		PASS
6	12.1910	40.47	33.09	60.00	50.00		PASS

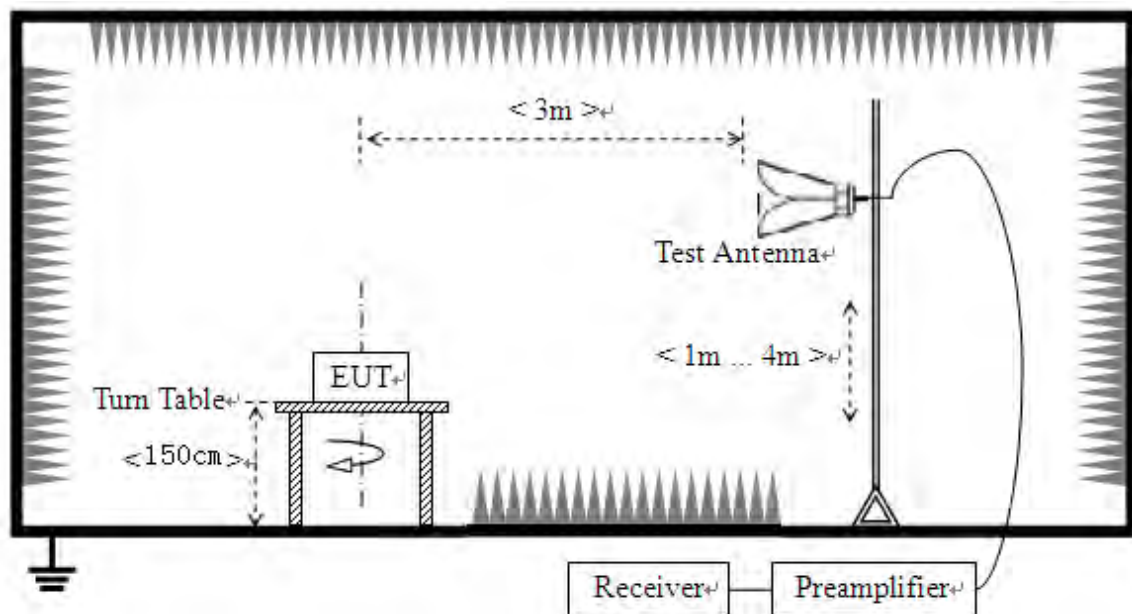
2.8. Restricted Frequency Bands

2.8.1. 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).

2.8.2. Test Description

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.



2.8.3. Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna; U_R : Receiver Reading

G_{preamp} : Preamplifier Gain; A_{Factor} : Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

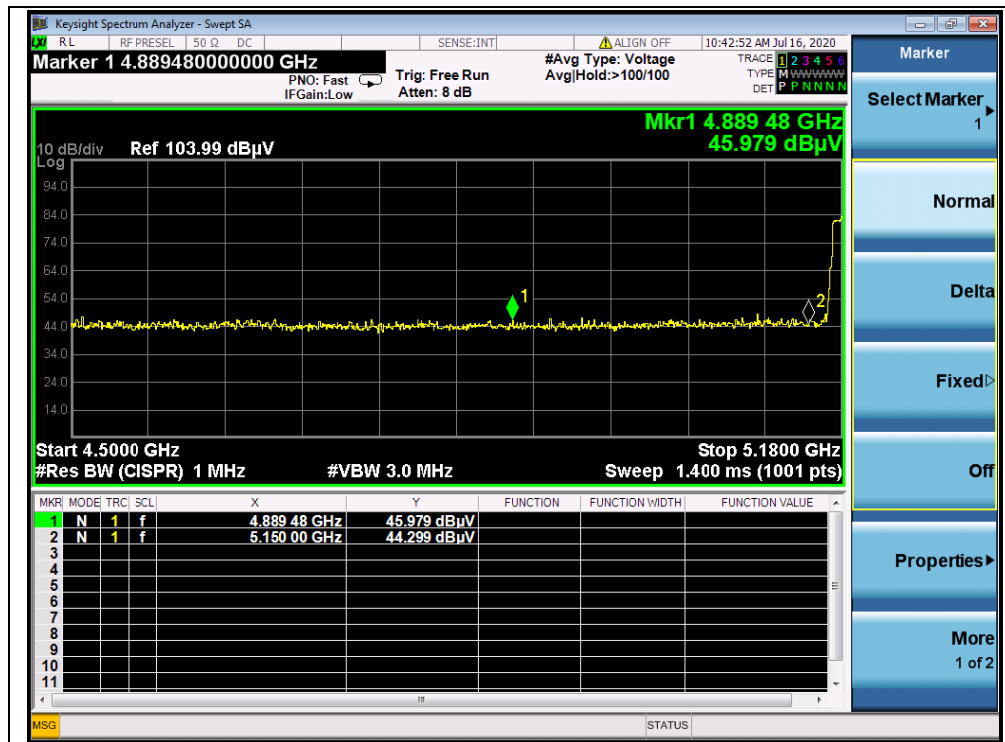
802.11n (HT20) Test mode

A. Test Verdict:

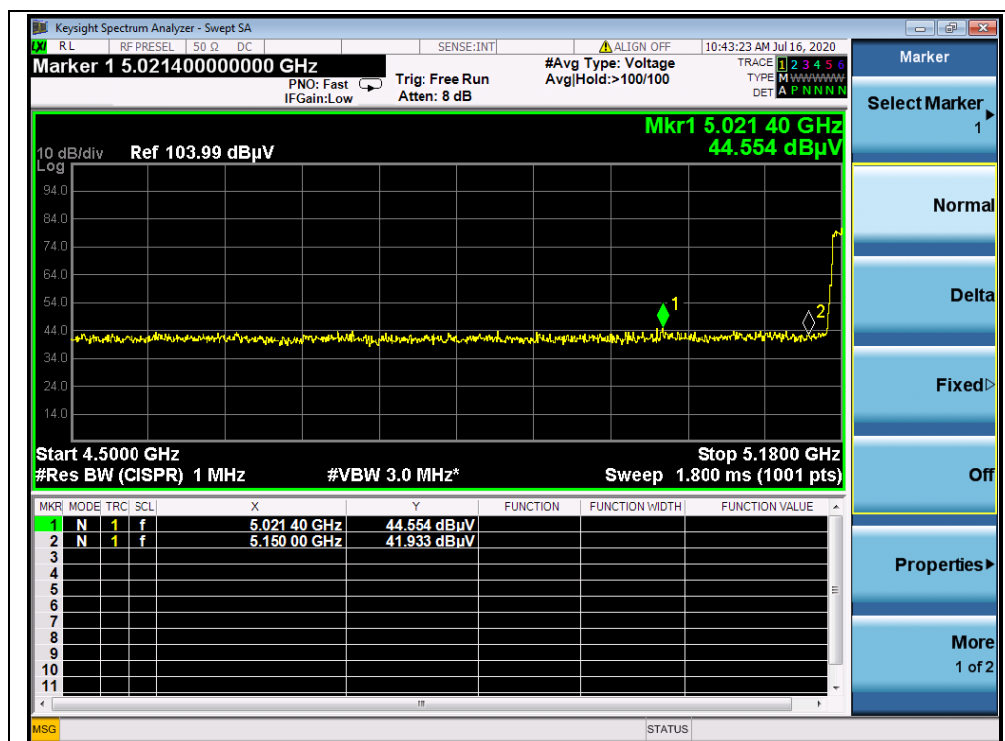
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
36	4889.48	PK	45.98	-26.92	32.2	51.26	74	PASS
36	5021.40	AV	44.55	-26.92	32.2	49.83	54	PASS
48	5350.00	PK	44.12	-26.92	32.2	49.40	74	PASS
48	5368.58	AV	42.87	-26.92	32.2	48.15	54	PASS
149	5725.00	PK	44.41	-26.23	32.2	50.38	122.23	PASS
165	5875.00	PK	44.05	-26.23	32.2	50.02	54.83	PASS



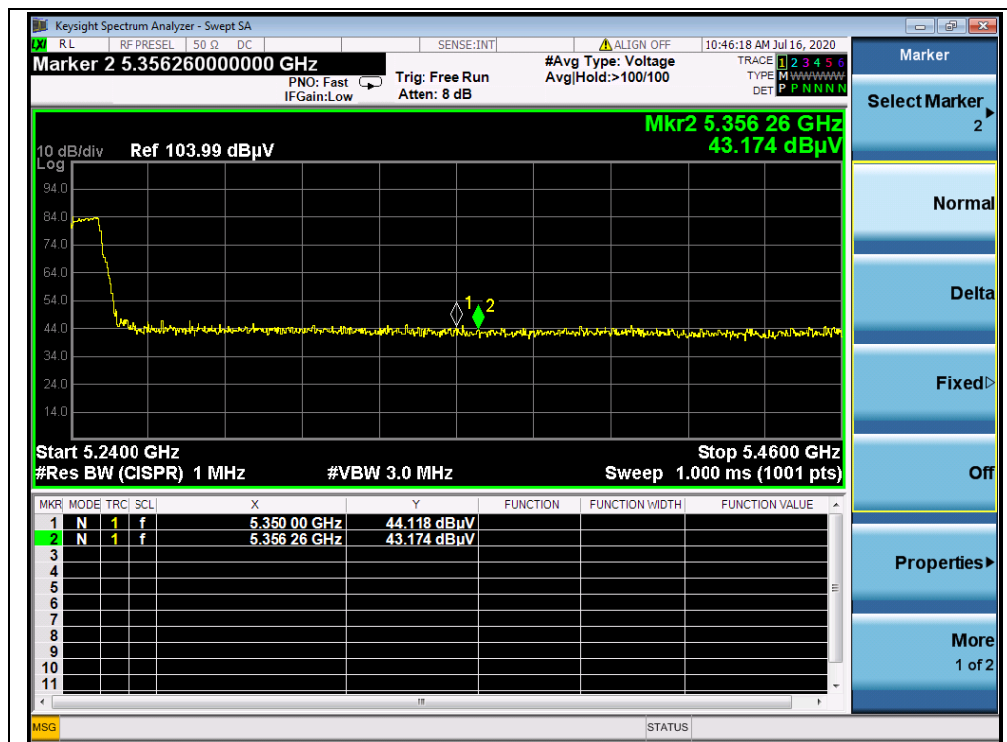
B. Test Plots:



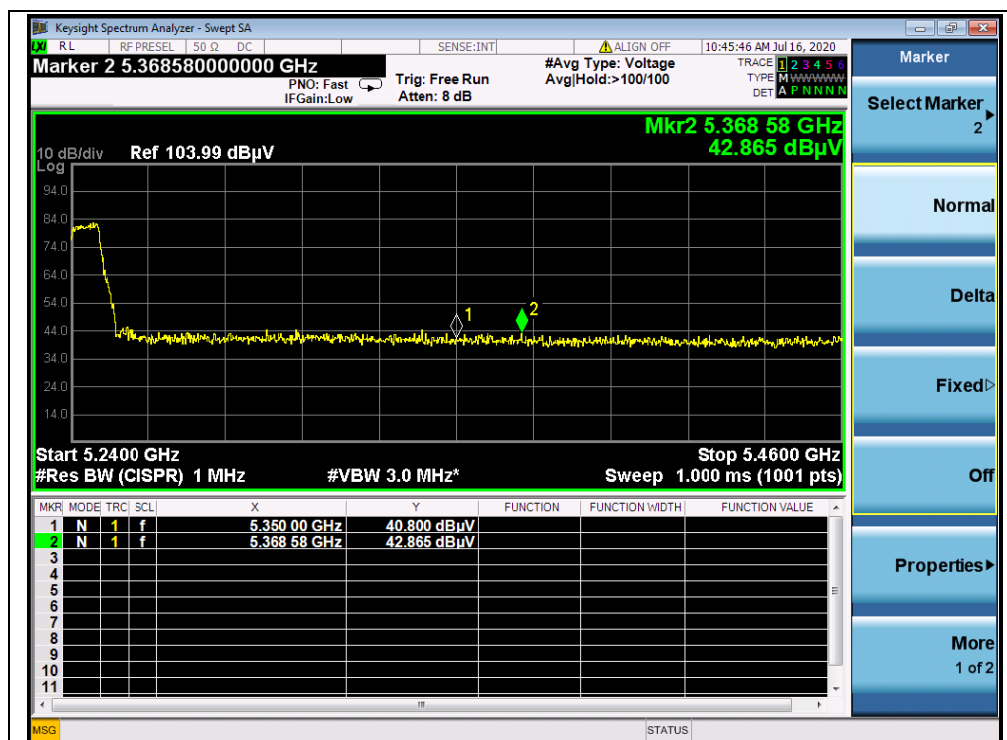
(Channel 36, PEAK, 802.11n (HT20))



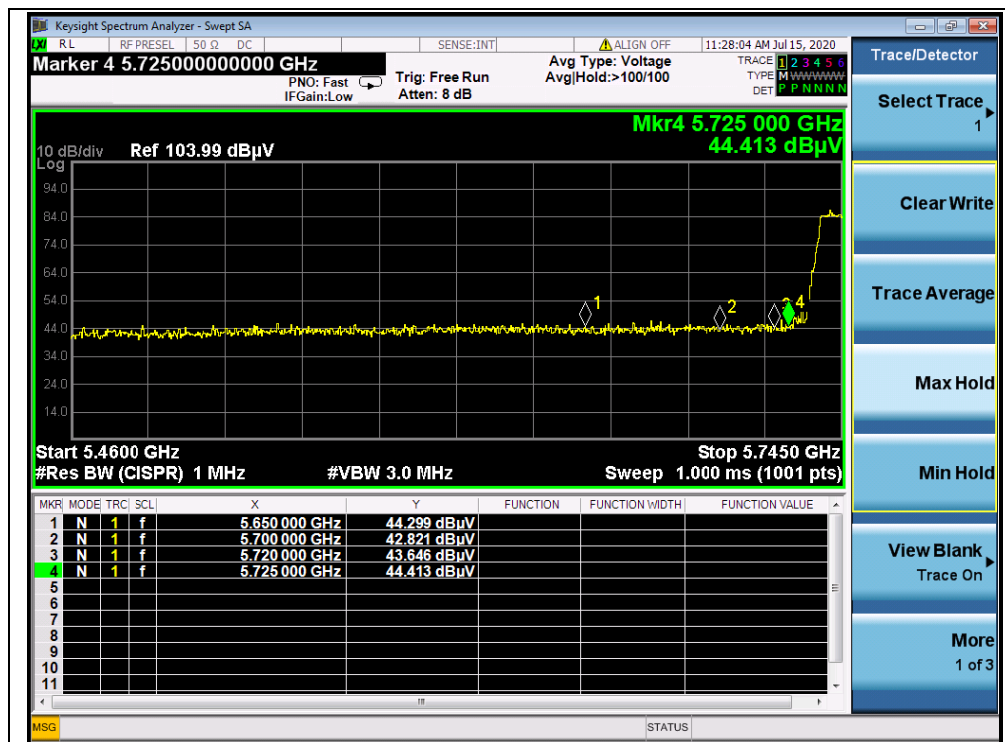
(Channel 36, AVG, 802.11 n (HT20))



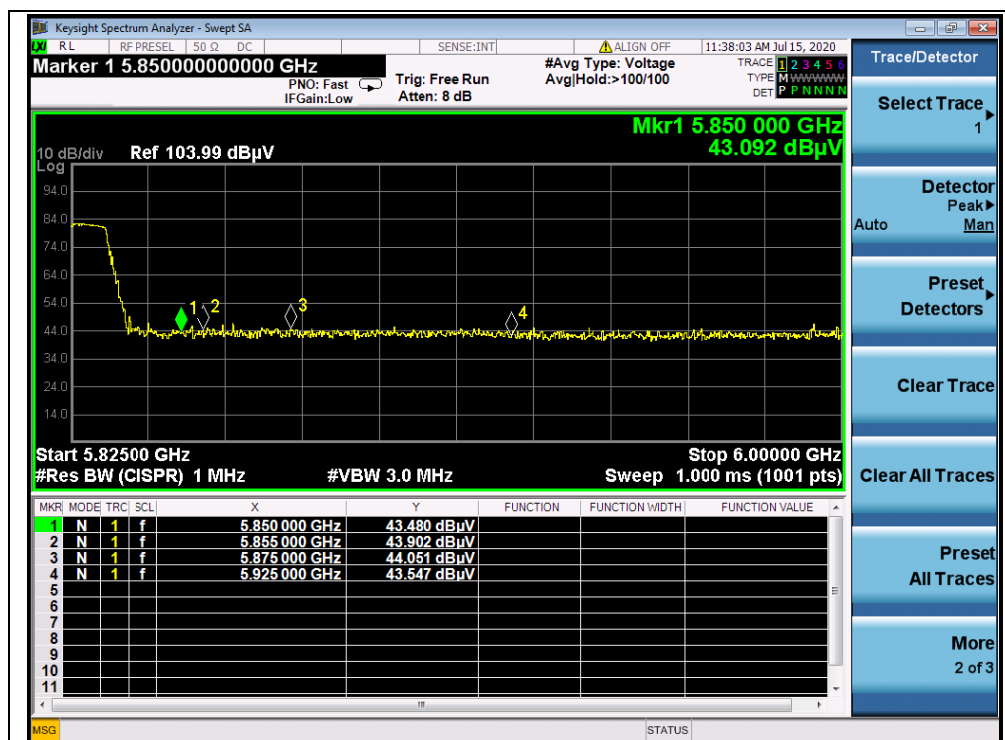
(Channel 48, PEAK, 802.11 n (HT20))



(Channel 48, AVG, 802.11n (HT20))



(Channel 149, PEAK, 802.11 n (HT20))



(Channel 165, PEAK, 802.11 n (HT20))

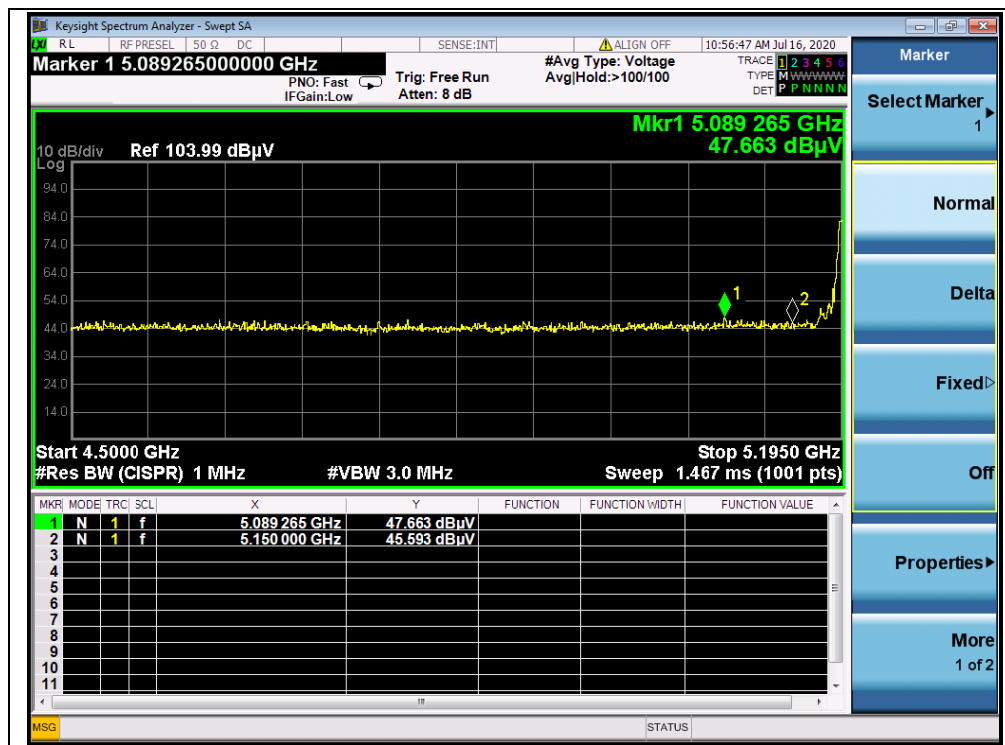


802.11n (HT40) Test mode

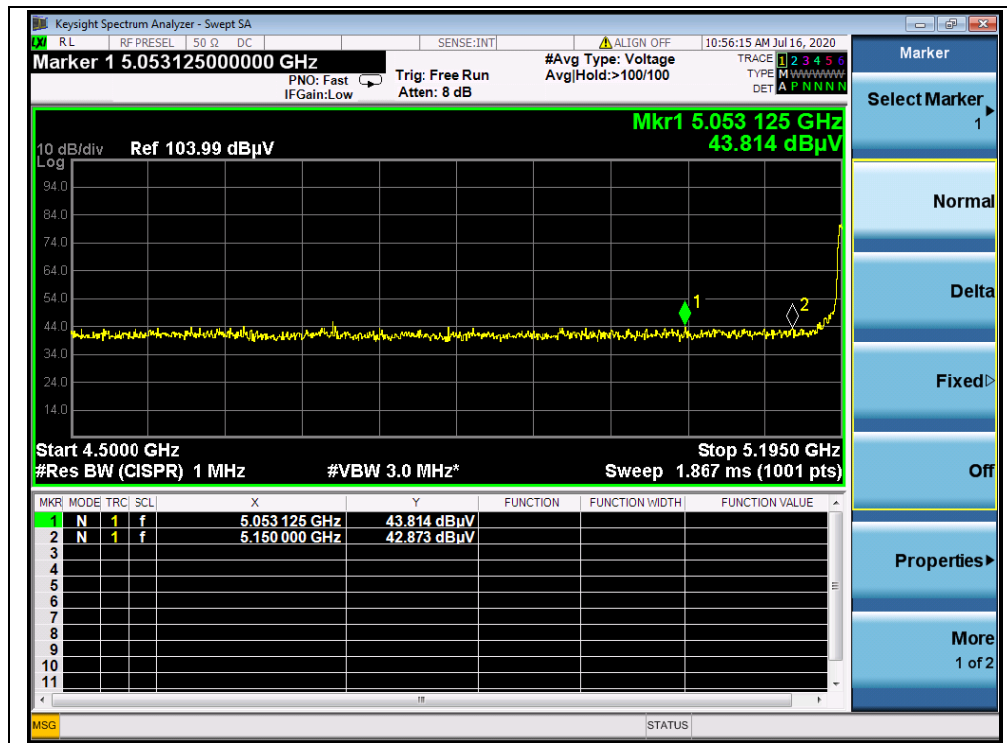
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E	Limit (dB μ V/m)	Verdict
		PK/ AV	U_R (dB μ V)			(dB μ V/m)		
38	5089.27	PK	47.66	-26.92	32.2	52.94	74	PASS
38	5053.13	AV	43.81	-26.92	32.2	49.09	54	PASS
46	5384.84	PK	45.18	-26.92	32.2	50.46	74	PASS
46	5384.84	AV	41.14	-26.92	32.2	46.42	54	PASS
151	5725.00	PK	44.51	-26.23	32.2	50.48	122.23	PASS
159	5925.00	PK	43.38	-26.23	32.2	49.35	68.23	PASS

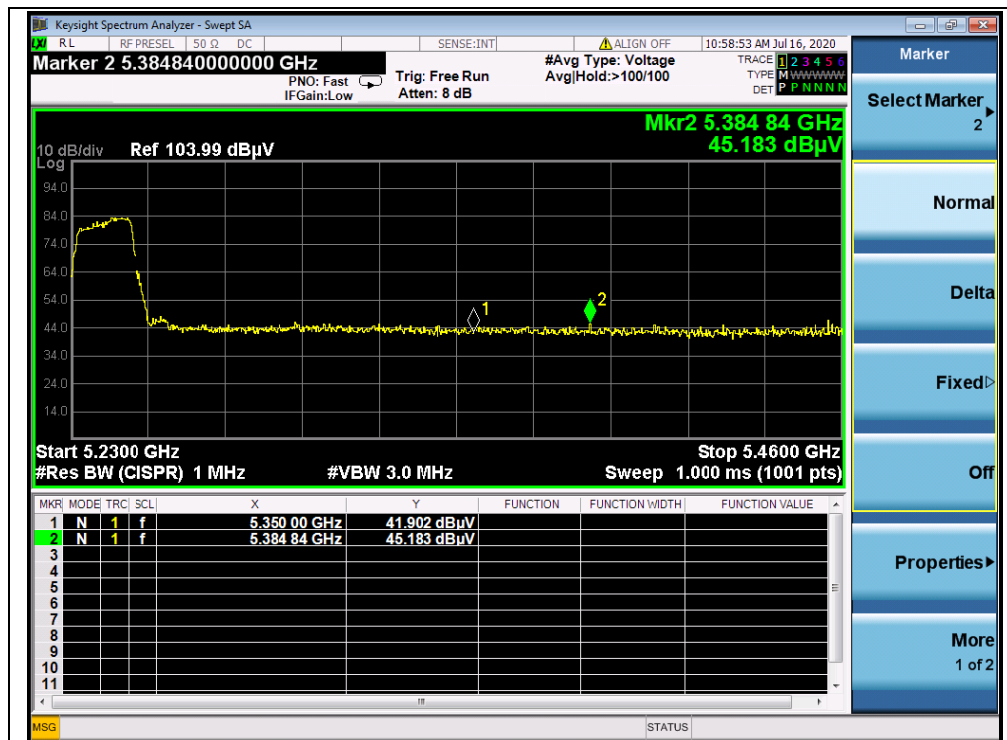
B. Test Plots:



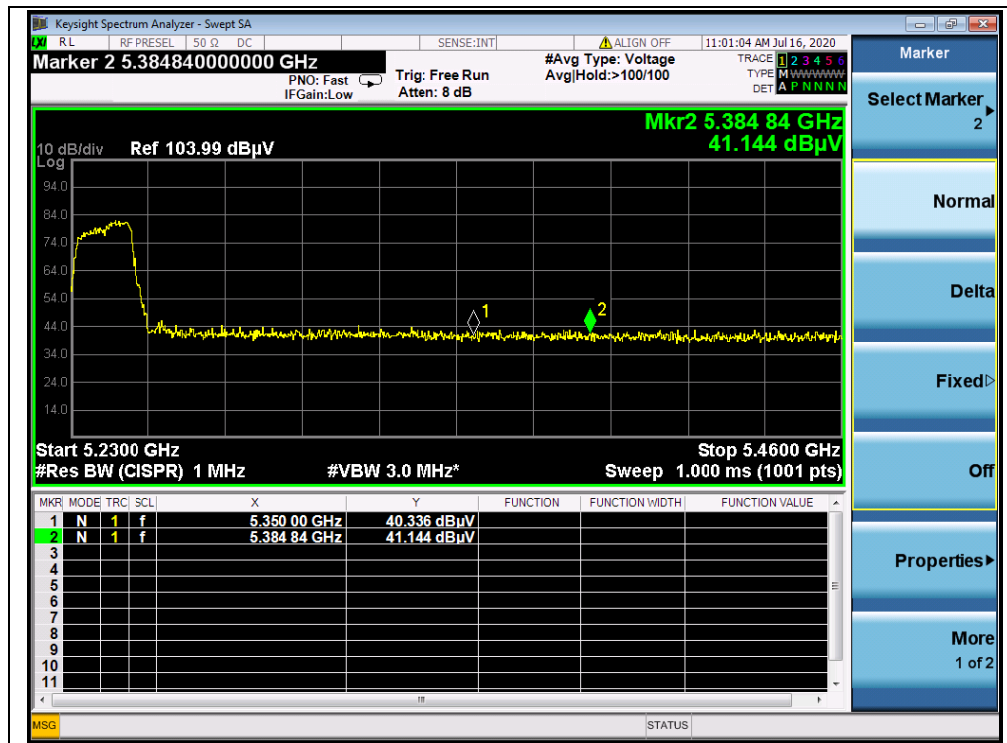
(Channel 38, PEAK, 802.11n (HT40))



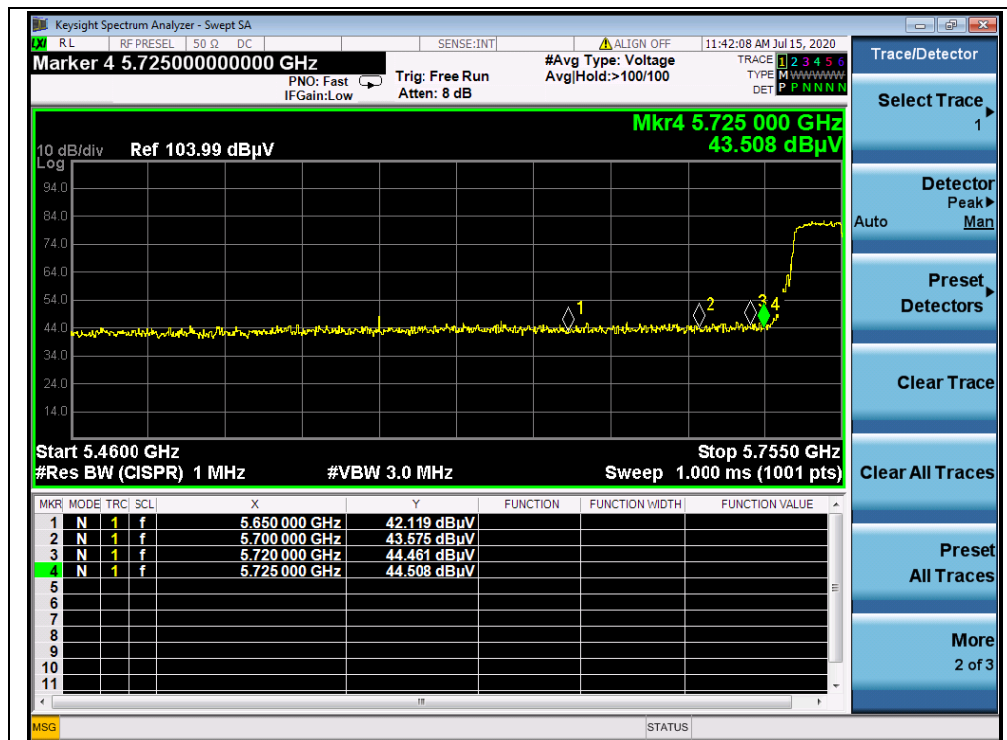
(Channel 38, AVG, 802.11n (HT40))



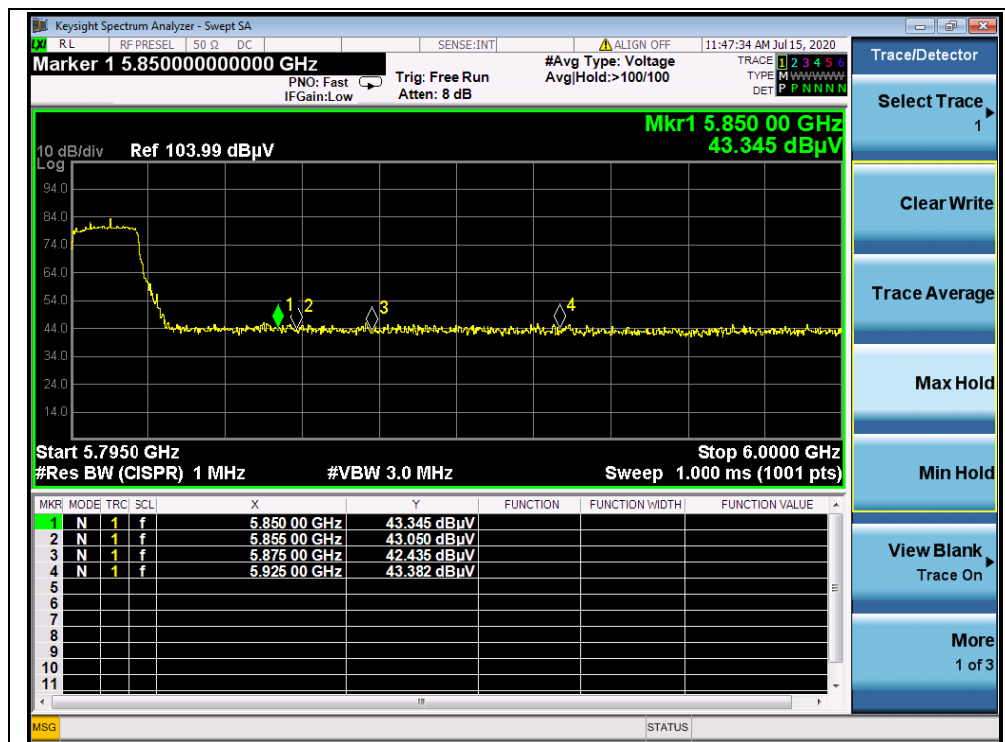
(Channel 46, PEAK, 802.11n (HT40))



(Channel 46, AVG, 802.11n (HT40))



(Channel 151, PEAK, 802.11n (HT40))



(Channel 159, PEAK, 802.11n (HT40))

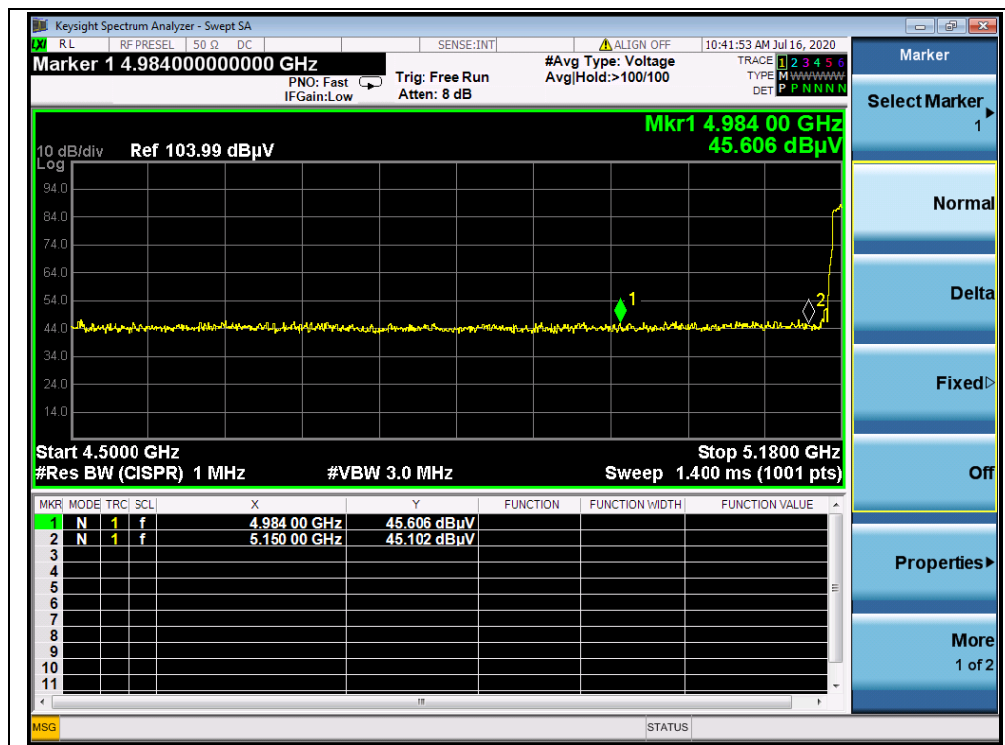


802.11 ac (VHT20) Test mode

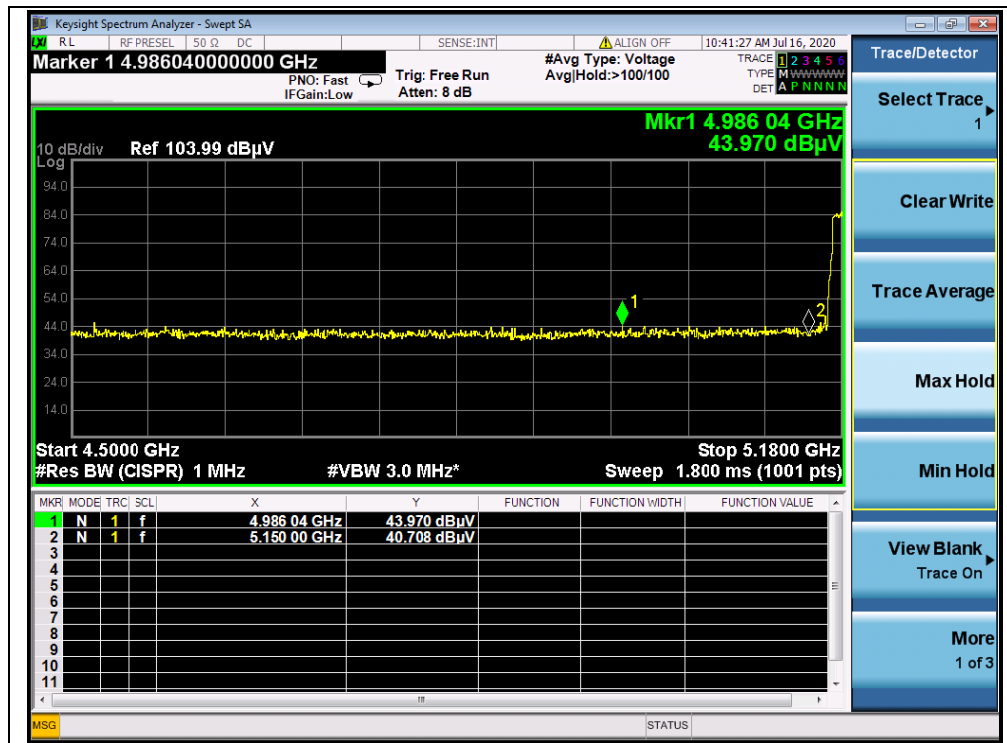
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
36	4984.00	PK	45.61	-26.92	32.2	50.89	74	PASS
36	4986.04	AV	43.97	-26.92	32.2	49.25	54	PASS
48	5403.56	PK	46.94	-26.92	32.2	52.22	74	PASS
48	5409.28	AV	42.95	-26.92	32.2	48.23	54	PASS
149	5700.00	PK	45.80	-26.23	32.2	51.77	105.23	PASS
165	5850.00	PK	44.47	-26.23	32.2	50.44	122.23	PASS

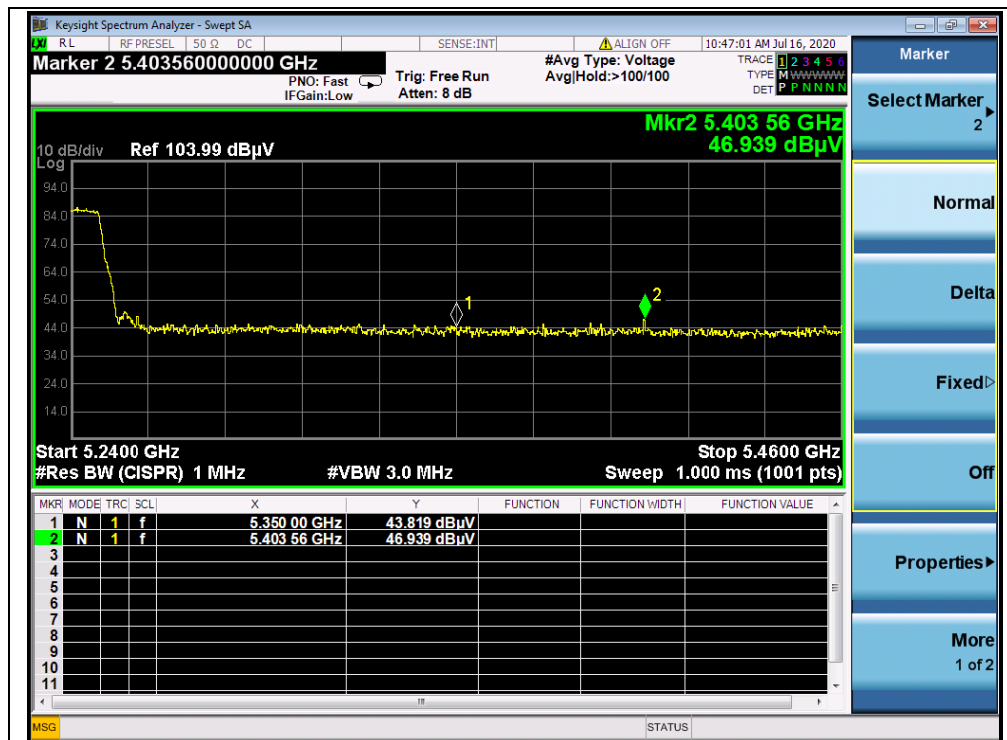
B. Test Plots:



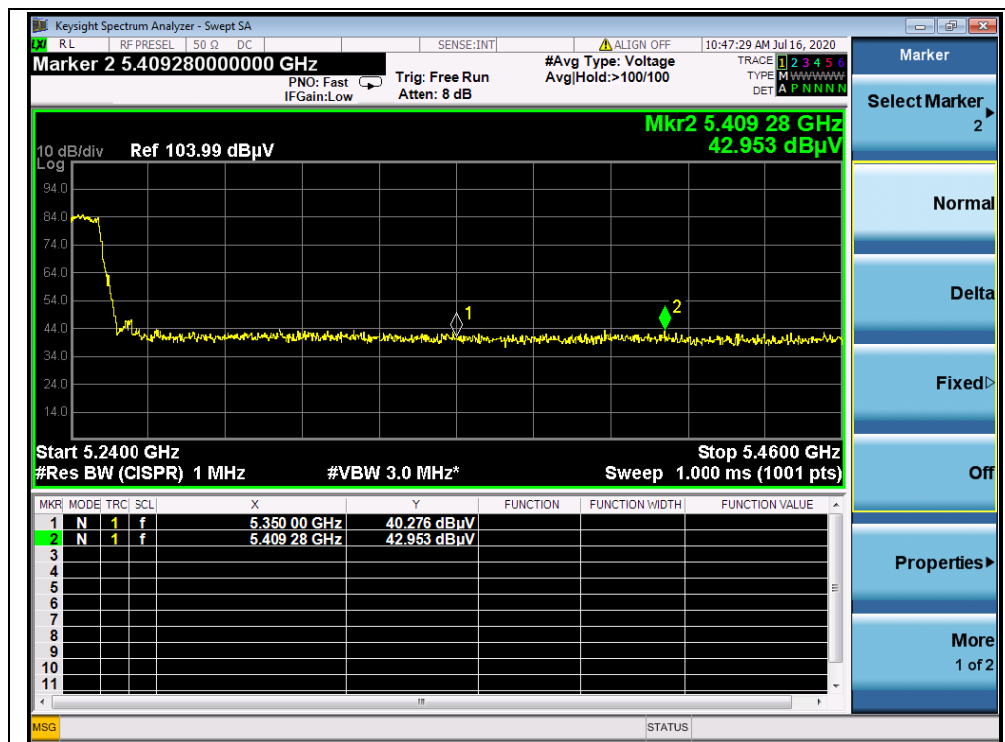
(Channel 36, PEAK, 802.11 ac (VHT20))



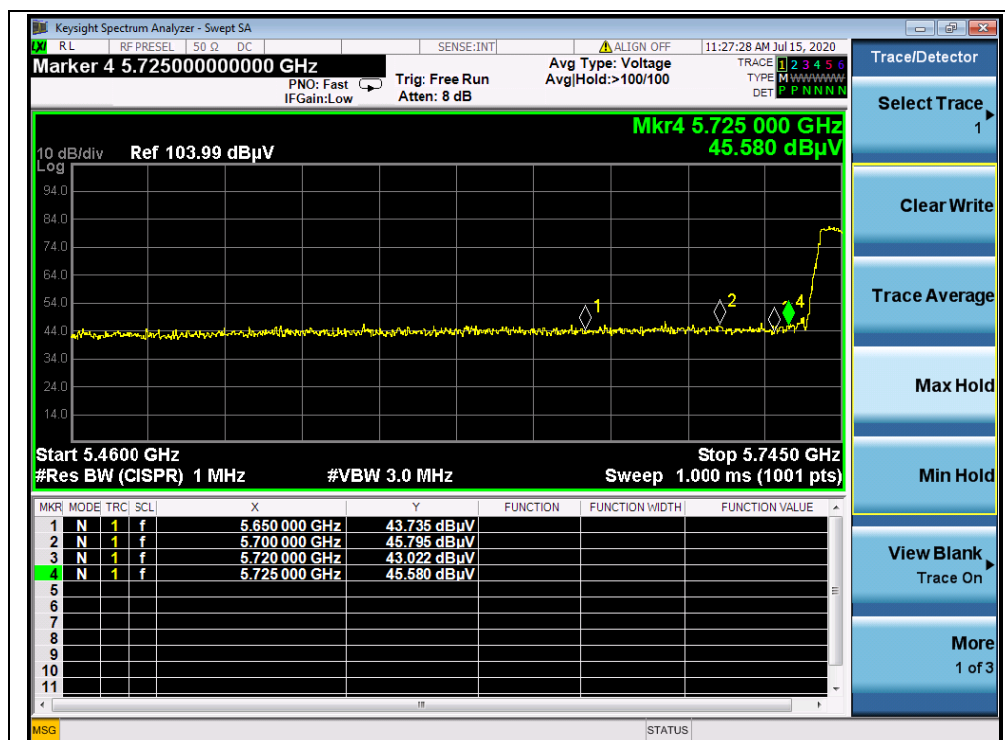
(Channel 36, AVG, 802.11 ac (VHT20))



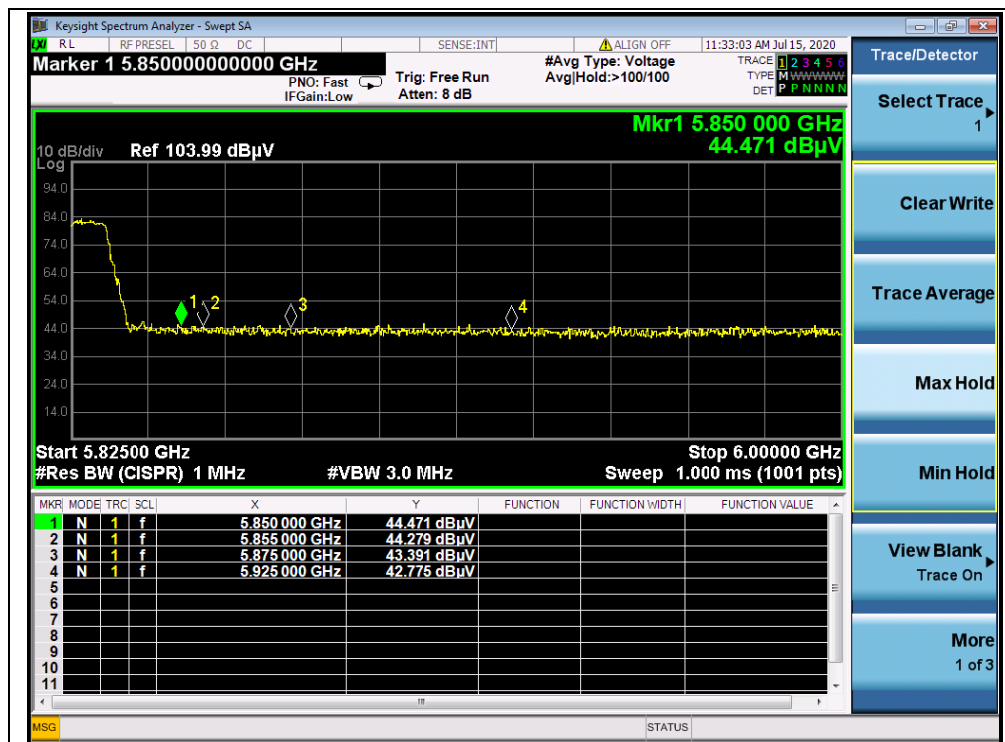
(Channel 48, PEAK, 802.11 ac (VHT20))



(Channel 48, AVG, 802.11 ac (VHT20))



(Channel 149, PEAK, 802.11 ac (VHT20))



(Channel 165, PEAK, 802.11 ac (VHT20))

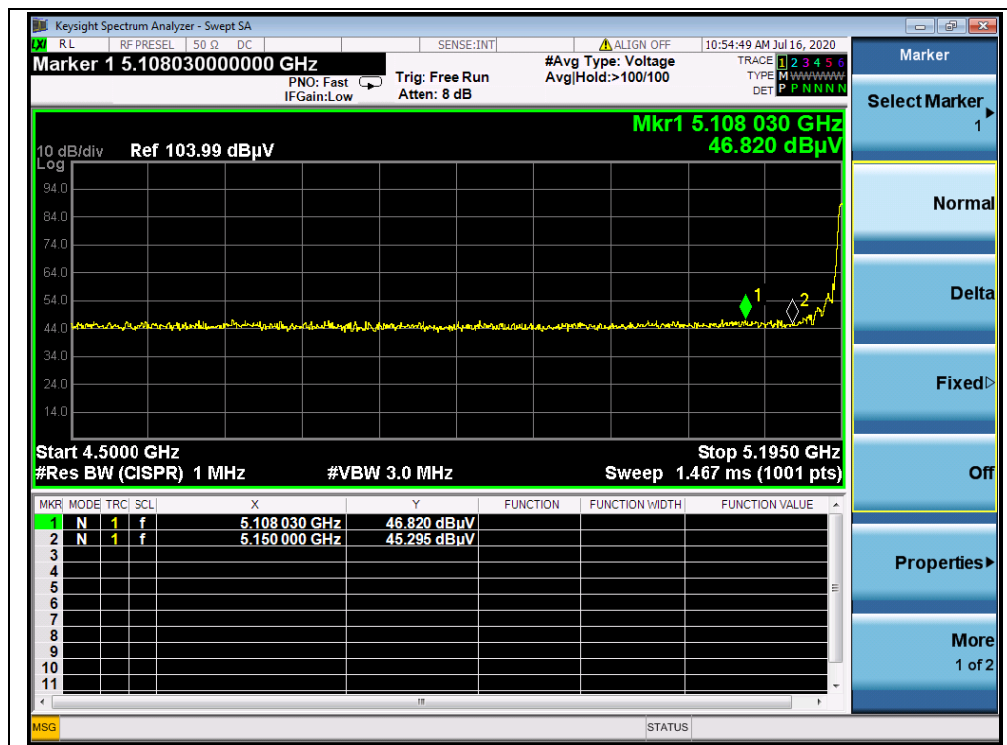


802.11 ac (VHT40) Test mode

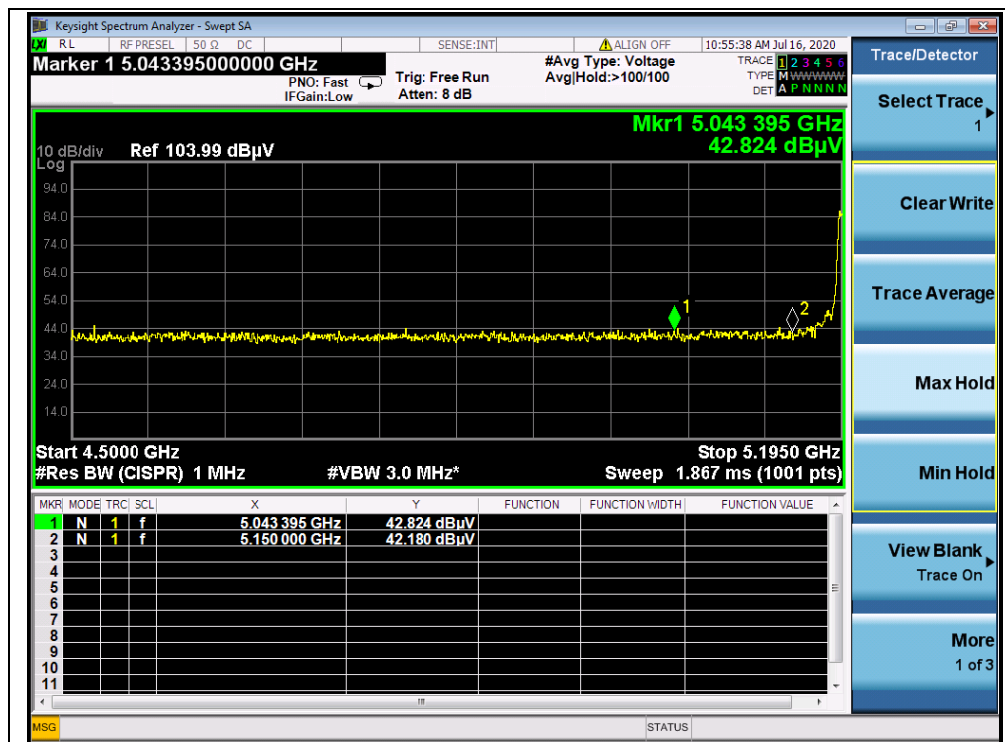
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
38	5108.03	PK	46.82	-26.92	32.2	52.10	74	PASS
38	5043.40	AV	42.82	-26.92	32.2	48.10	54	PASS
46	5361.61	PK	43.80	-26.92	32.2	49.08	74	PASS
46	5359.31	AV	42.47	-26.92	32.2	47.75	54	PASS
151	5725.00	PK	45.48	-26.23	32.2	51.45	122.23	PASS
159	5855.00	PK	44.09	-26.23	32.2	50.06	110.83	PASS

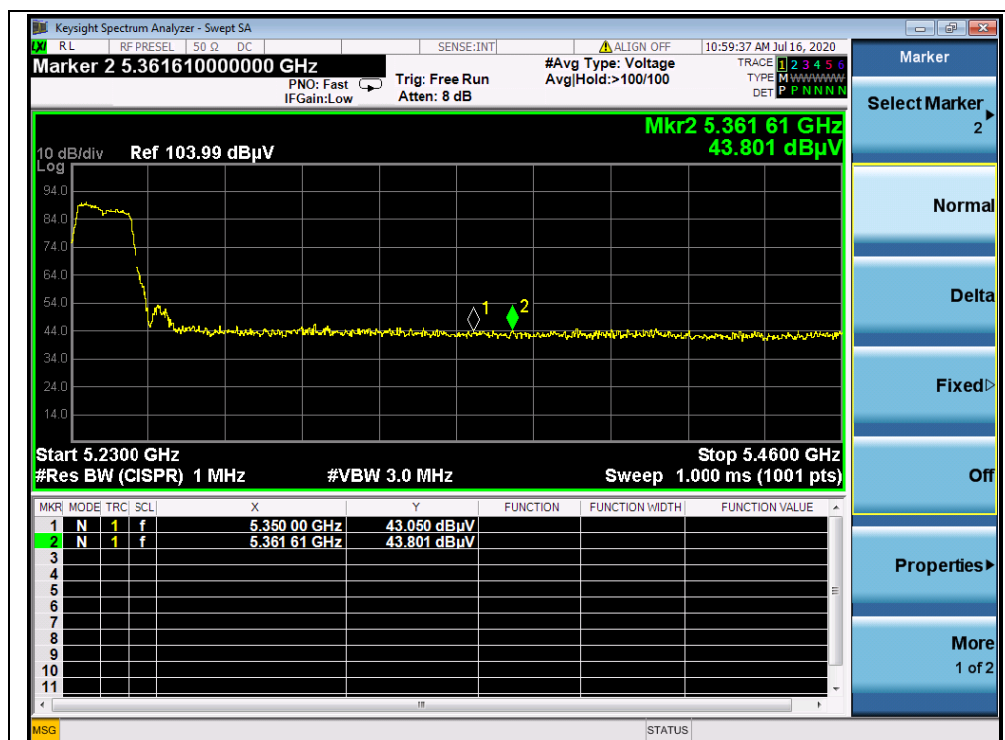
B. Test Plots:



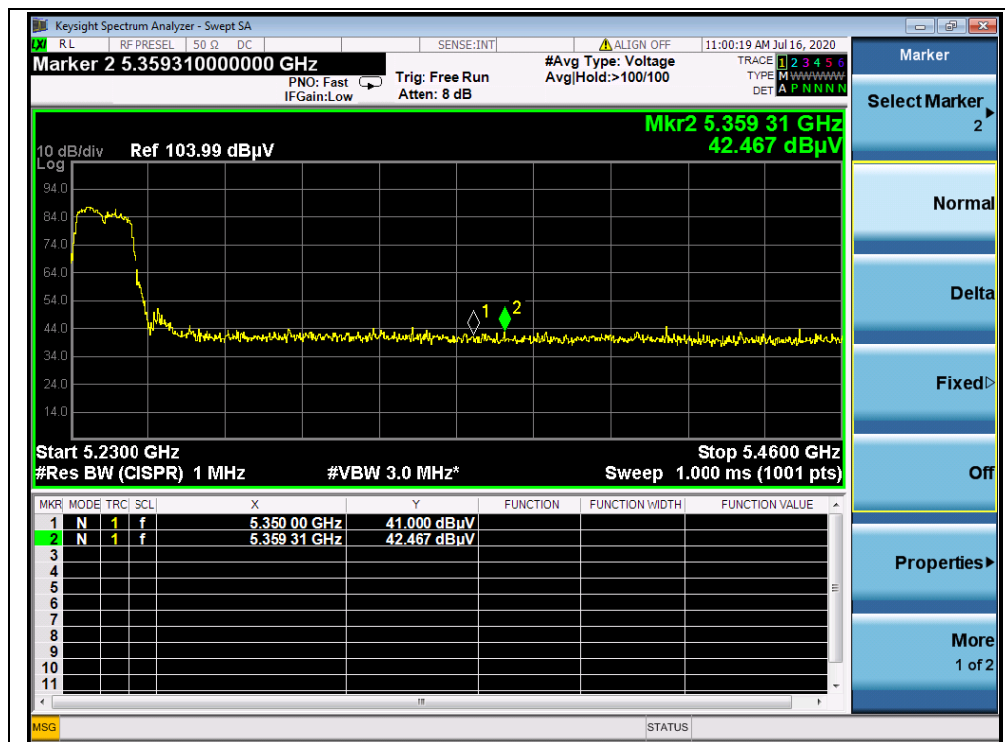
(Channel 38, PEAK, 802.11 ac (VHT40))



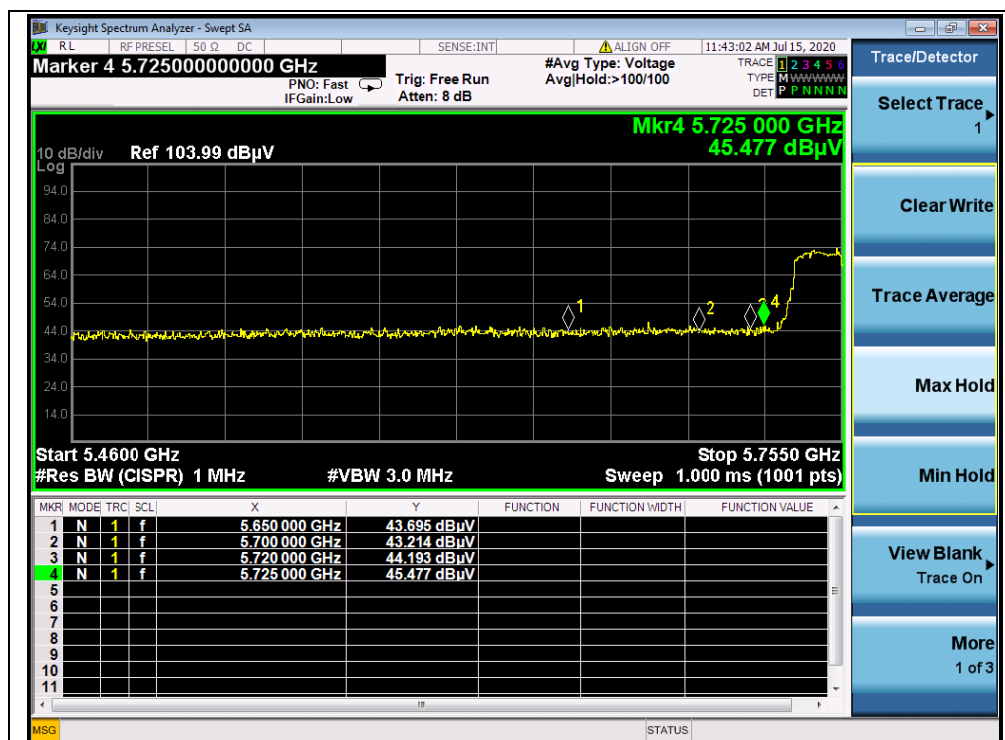
(Channel 38, AVG, 802.11 ac (VHT40))



(Channel 46, PEAK, 802.11 ac (VHT40))



(Channel 46, AVG, 802.11 ac (VHT40))



(Channel 151, PEAK, 802.11 ac (VHT40))



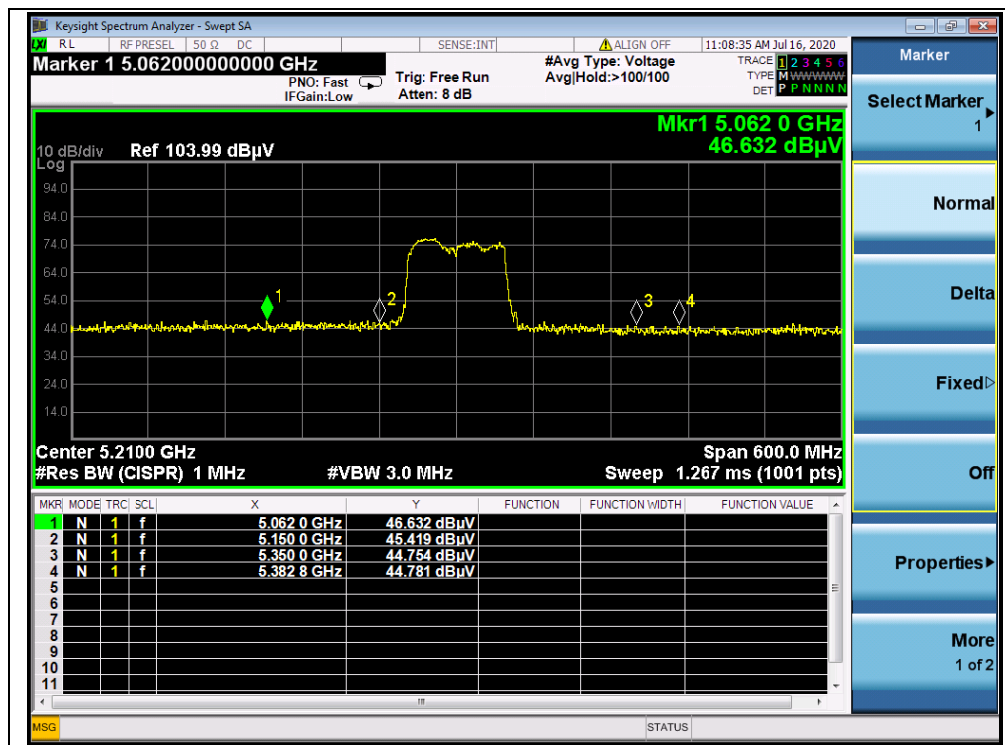


802.11 ac (VHT80) Test mode

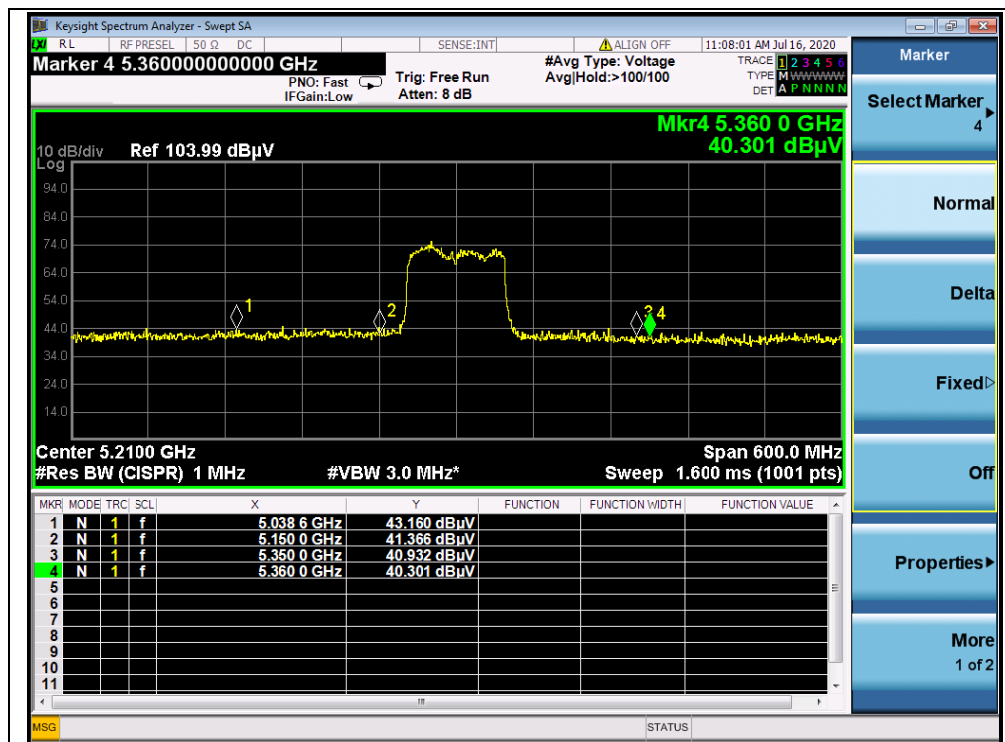
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
42	5062.00	PK	46.63	-26.92	32.2	51.91	74	PASS
42	5038.60	AV	43.16	-26.92	32.2	48.44	54	PASS
42	5382.80	PK	44.78	-26.92	32.2	50.06	74	PASS
42	5350.00	AV	40.93	-26.92	32.2	46.21	54	PASS
155	5725.00	PK	45.75	-26.23	32.2	51.72	122.23	PASS
155	5850.00	PK	46.25	-26.92	32.2	51.53	122.23	PASS

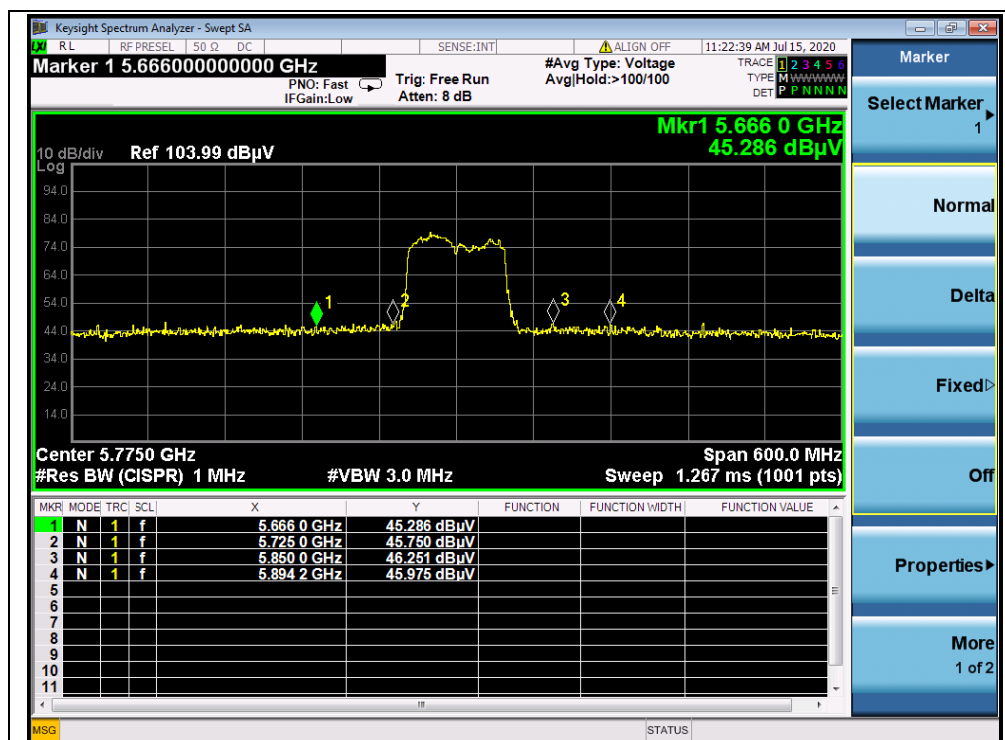
B. Test Plots:



(Channel 42, PEAK, 802.11 ac (VHT80))



(Channel 42, AVG, 802.11 ac (VHT80))



(Channel 155, PEAK, 802.11 ac (VHT80))

2.9. Radiated Emission

2.9.1. Requirement

The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

The following formula is used to convert the equipment isotropic radiated power(eirp) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m}$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

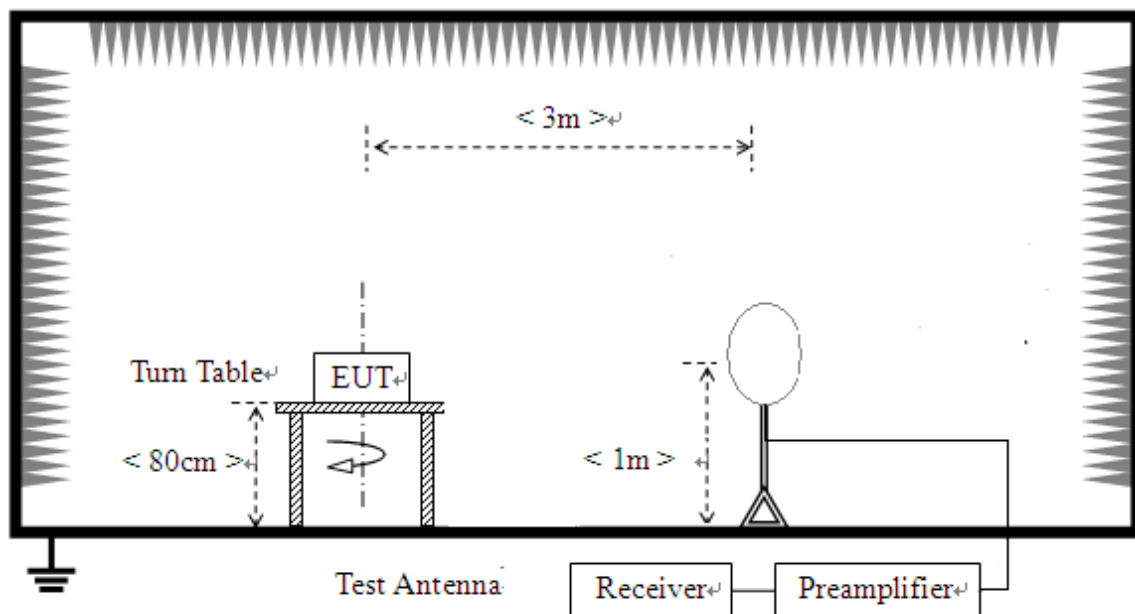
Note:

For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

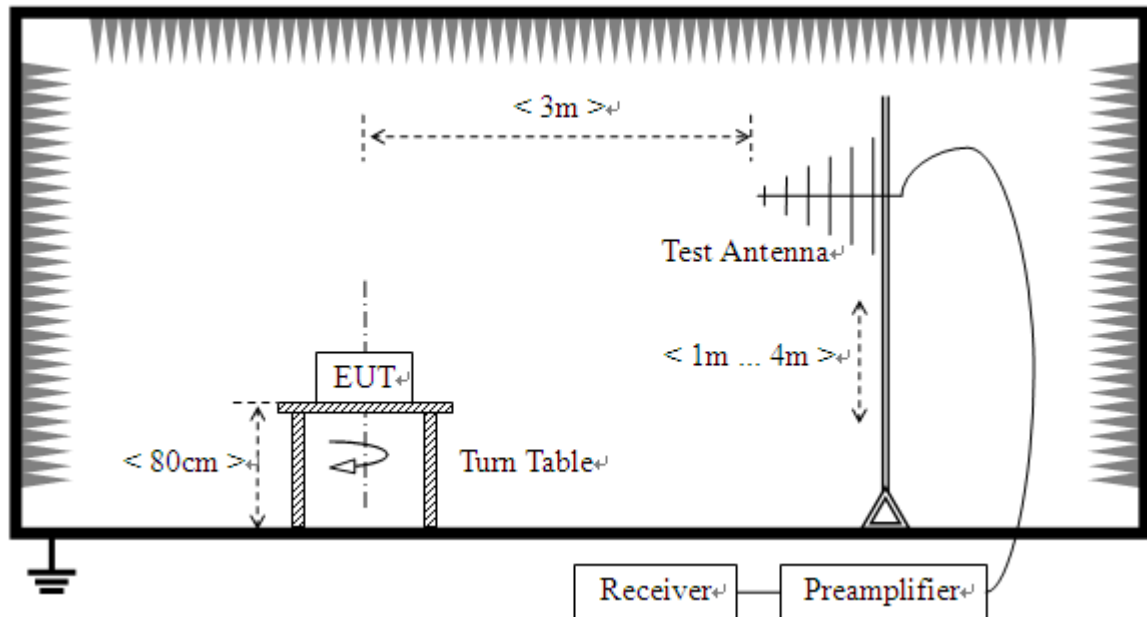
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

2.9.2. Test Description
Test Setup:

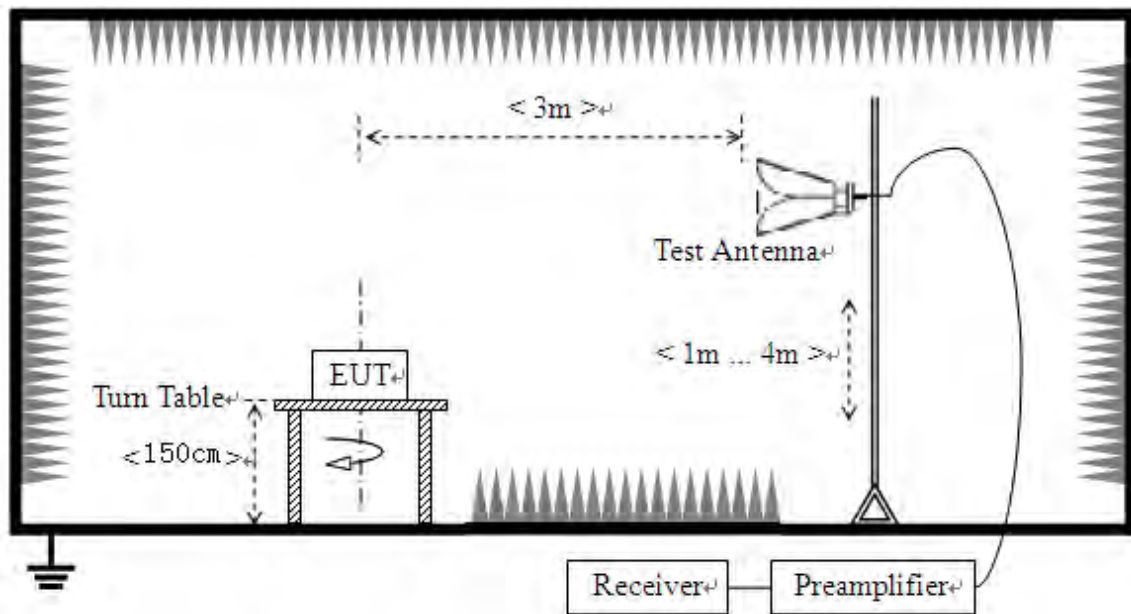
- 1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT



was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

The EUT 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

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.

(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.



2.9.3. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

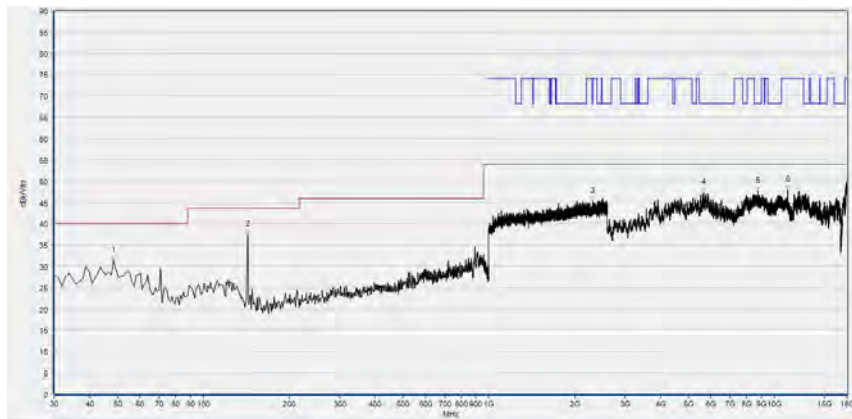
Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note3: For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

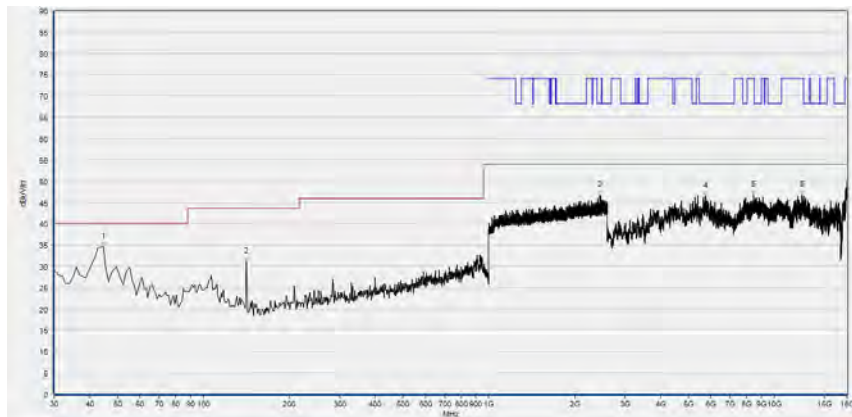
**802.11n (HT20) Test mode**

Plots for Channel = 36



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	31.26	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
142.633	37.30	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2314.572	45.27	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5668.294	47.30	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8776.635	47.61	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11127.145	48.00	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

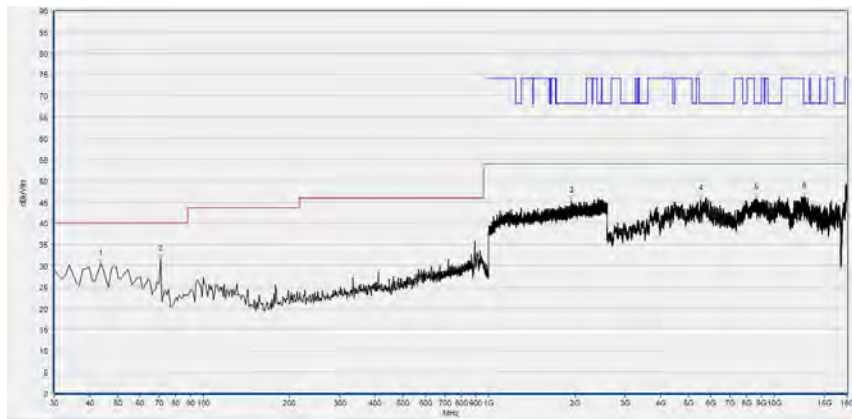
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
44.565	34.57	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	30.96	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2452.217	46.79	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5748.390	46.46	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8459.332	46.71	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12516.503	46.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

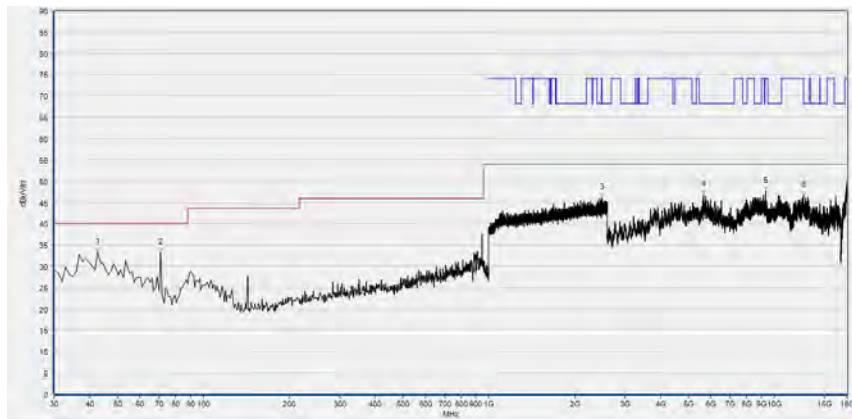
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 44



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	30.51	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	31.58	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1945.915	45.29	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5529.666	45.70	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8662.653	45.97	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12741.388	46.34	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

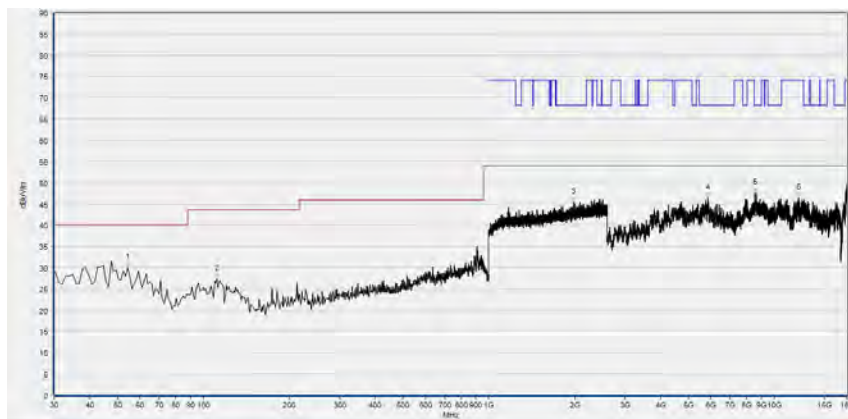
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
42.623	33.35	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	33.19	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2490.097	46.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5649.810	46.83	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
9337.307	47.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12645.889	46.67	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

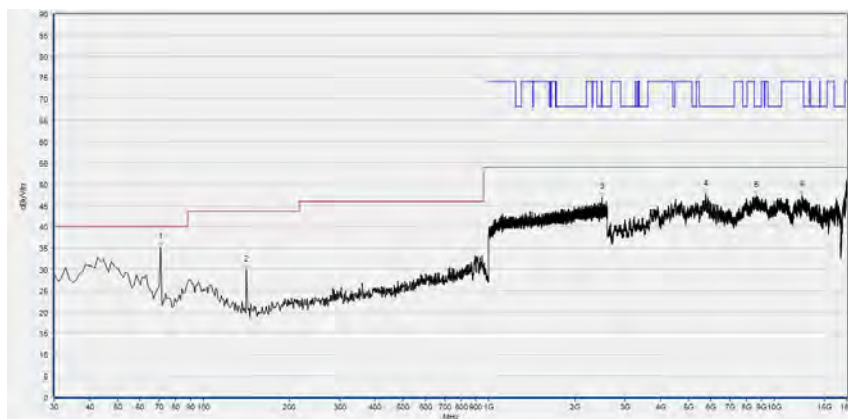
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 48



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
54.274	30.02	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
111.562	27.32	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1978.993	45.35	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5856.211	46.39	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8567.153	47.64	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12159.152	46.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

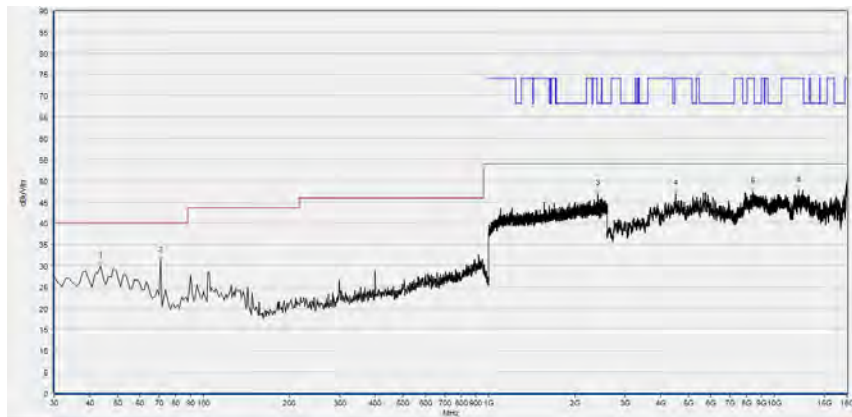


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	35.17	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	29.80	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2489.563	46.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5766.873	47.59	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8656.491	47.33	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12531.906	47.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

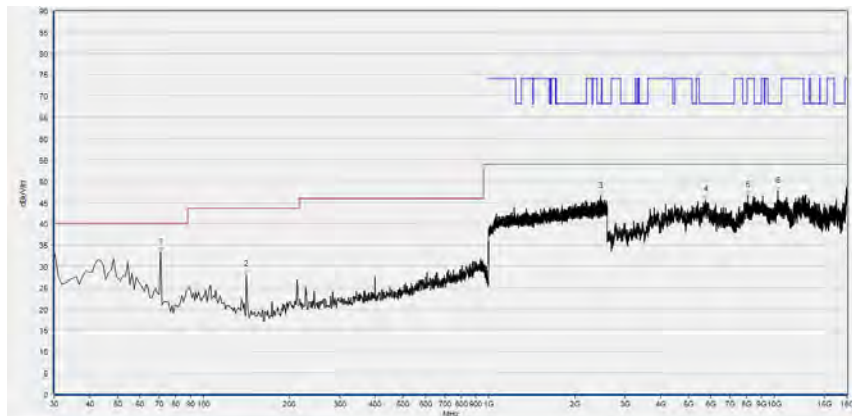


Plots for Channel = 149



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	29.75	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	31.25	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
2412.738	46.88	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4519.224	46.97	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8410.042	47.43	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12156.071	47.72	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

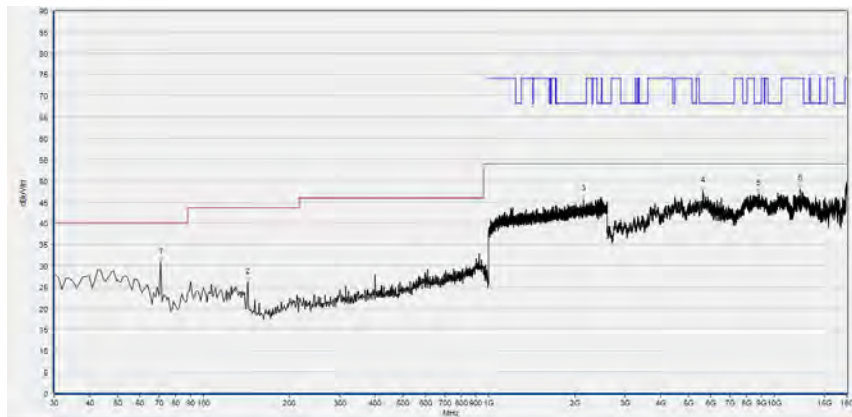
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	33.31	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	27.98	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2459.153	46.49	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5763.793	45.55	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8098.900	46.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10316.943	47.61	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

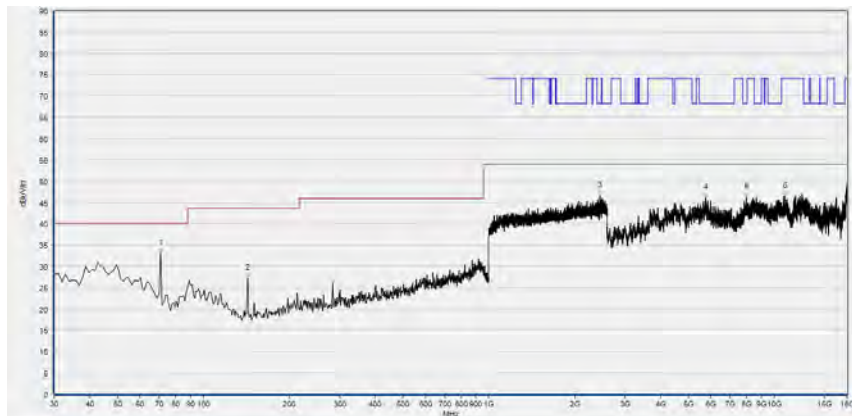
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 157



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	30.89	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
142.633	26.19	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2145.982	45.51	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5628.246	47.64	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8801.280	46.91	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12337.828	48.08	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

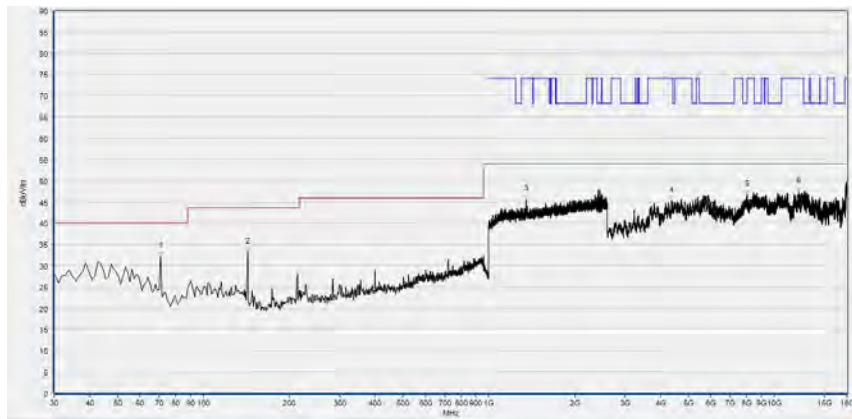
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	32.94	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
142.633	27.20	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2456.485	46.53	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5748.390	46.09	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
7972.595	46.29	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
10908.422	46.37	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

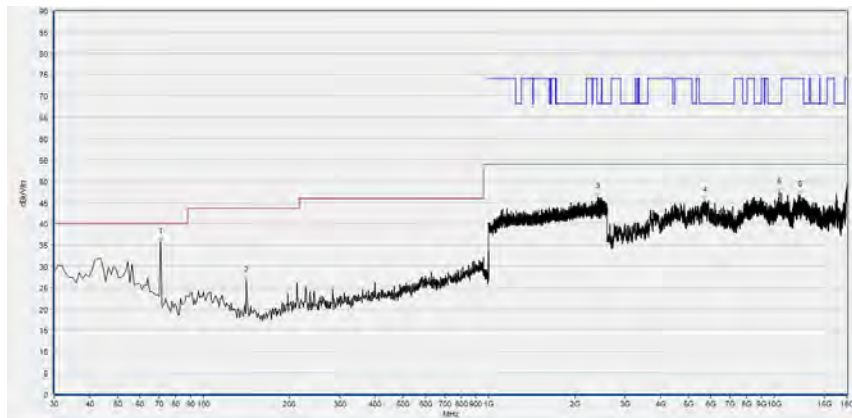
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 165



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	32.11	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
142.633	33.18	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1349.983	45.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4371.354	45.26	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8018.804	46.71	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12196.119	47.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

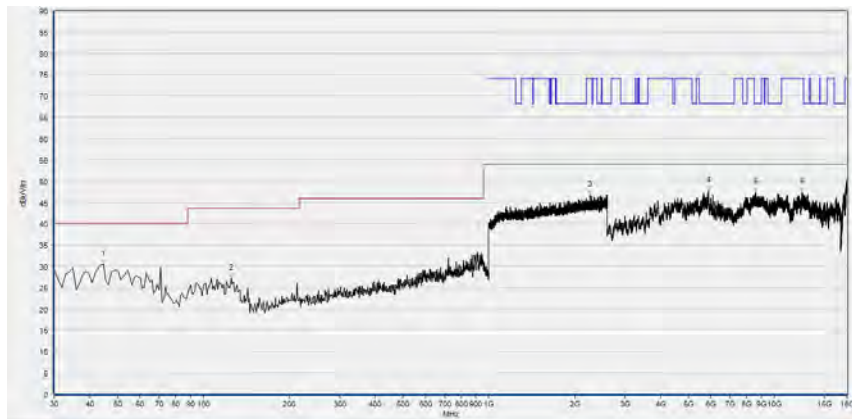


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	35.66	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	26.60	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2405.268	46.19	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5729.906	45.42	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
10421.684	47.49	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12300.860	46.72	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

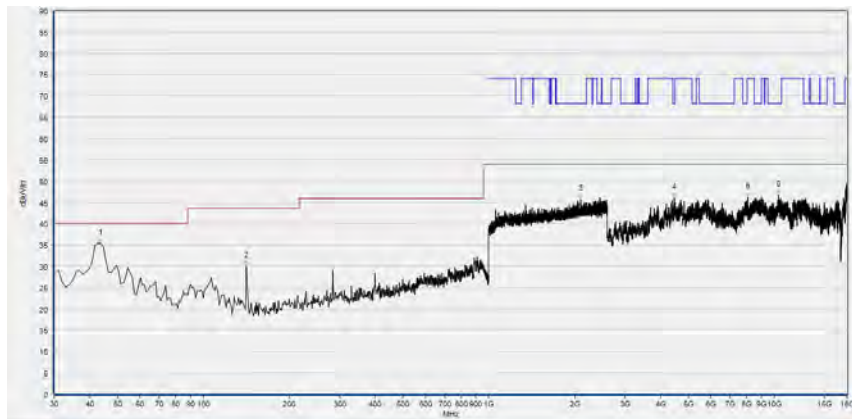
**802.11n (HT40) Test mode**

Plots for Channel = 38



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
44.565	30.44	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
125.155	27.13	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2256.419	46.83	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5877.776	47.85	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8610.282	47.49	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12534.987	47.51	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

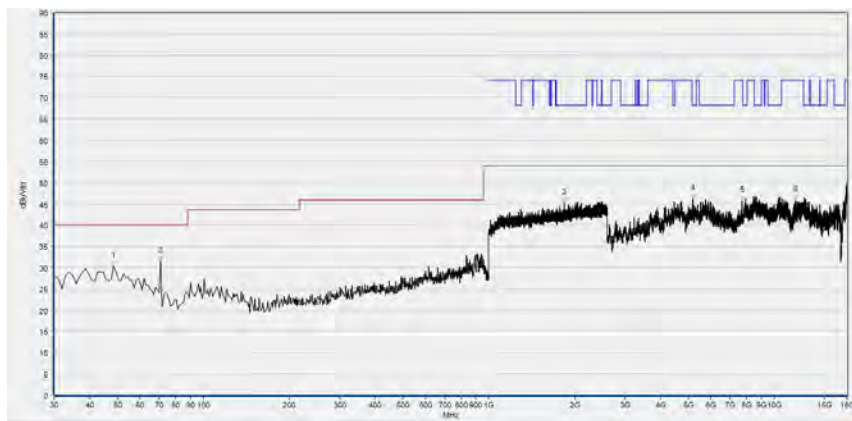


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	35.42	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	29.93	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2098.499	45.79	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4469.934	46.13	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8068.094	46.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10341.588	46.79	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

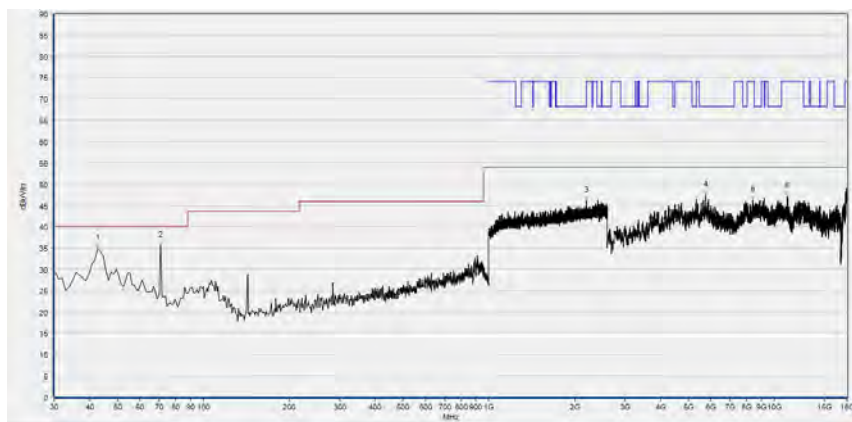


Plot for Channel = 46



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	30.34	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	31.46	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1832.811	45.24	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5203.476	46.25	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
7695.339	45.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11866.493	45.94	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

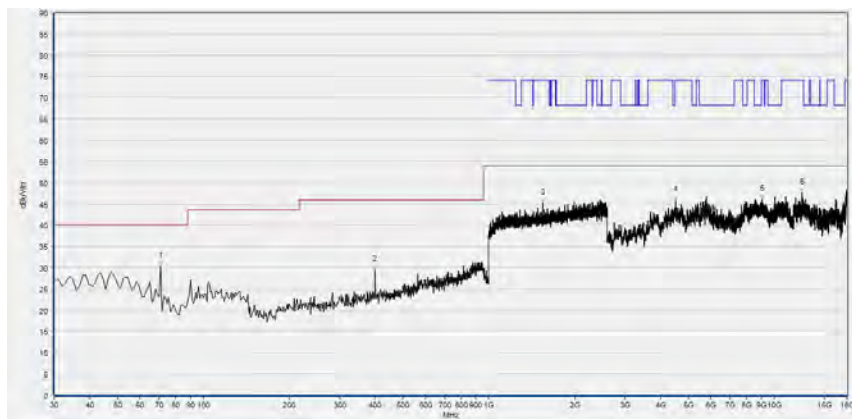
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
42.623	34.85	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	35.53	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2199.867	46.07	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
5754.551	47.47	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
8388.478	46.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11124.065	47.11	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

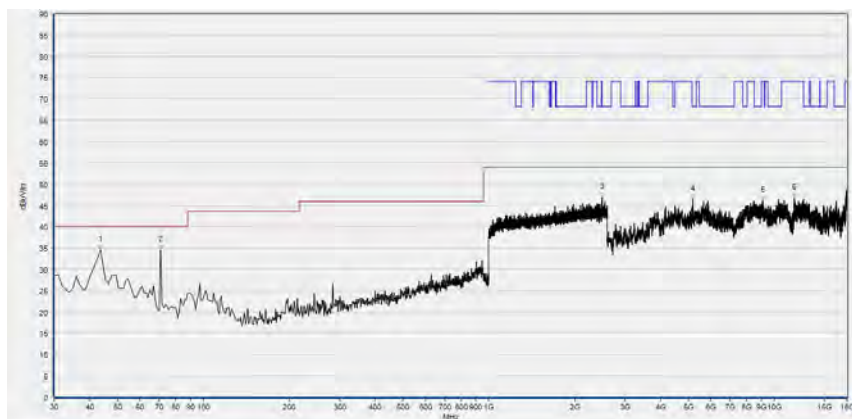
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 151



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	30.37	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
399.940	29.45	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1547.382	45.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4506.901	45.97	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
9053.891	46.15	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12519.584	47.60	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

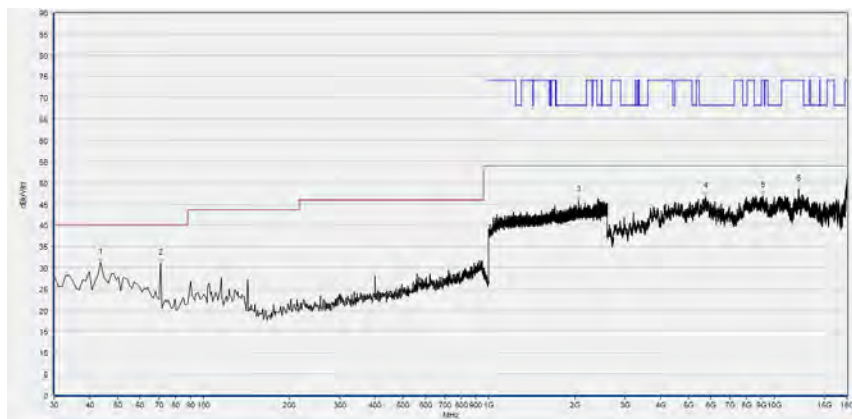
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	34.58	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	34.50	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2494.365	46.89	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5181.556	46.39	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
9109.342	46.15	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11727.866	46.72	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

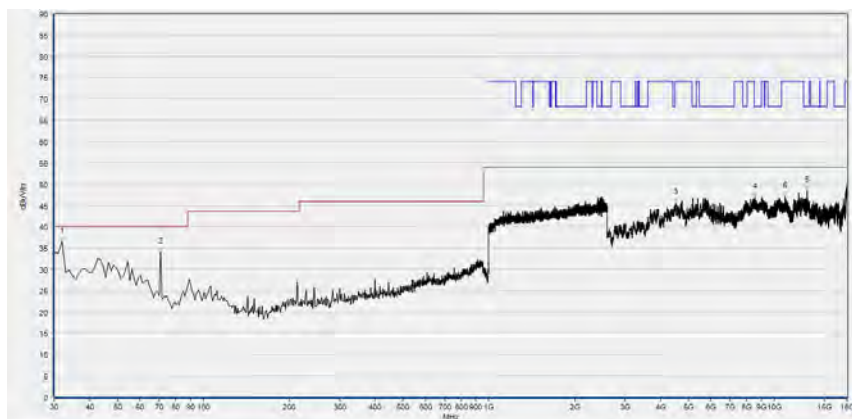
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 159



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	31.20	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	31.07	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
2063.821	45.98	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5757.632	46.77	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
9109.342	46.94	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12146.829	48.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

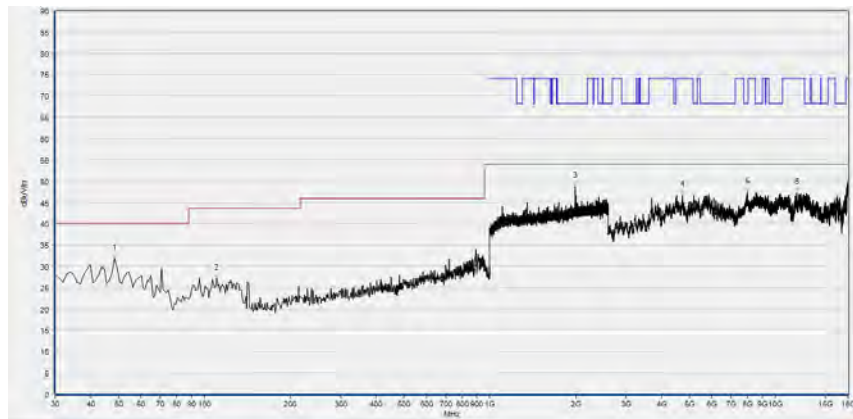


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
31.942	36.53	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	33.96	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
4522.304	45.55	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8539.428	46.95	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
10880.696	47.11	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
13052.531	48.50	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

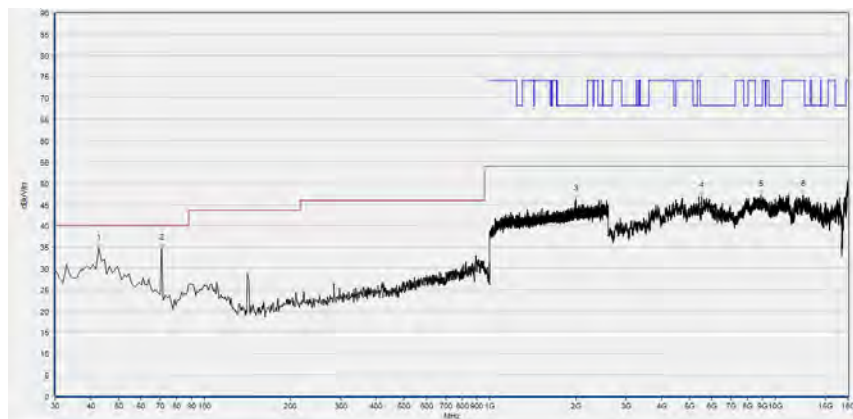
**802.11ac (VHT20) Test mode**

Plots for Channel = 36



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	31.89	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
110.591	27.17	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1990.197	48.72	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4737.948	46.80	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8006.481	47.40	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11863.413	47.20	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

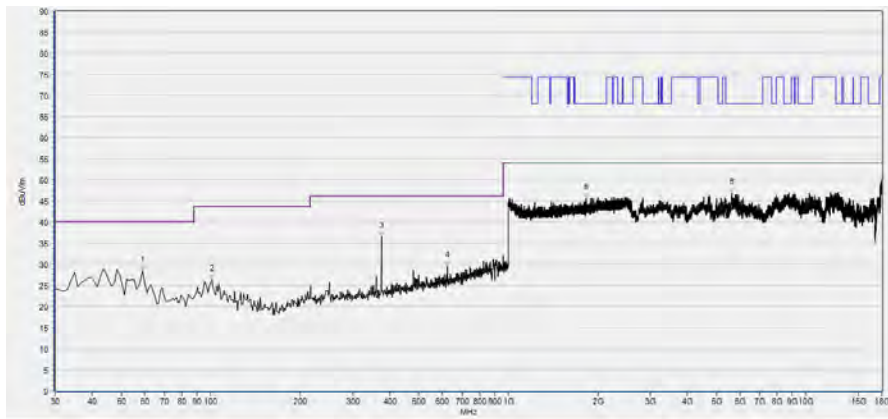


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
42.623	34.67	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	34.61	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1999.266	46.22	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5529.666	47.00	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8924.505	47.25	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12534.987	47.30	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

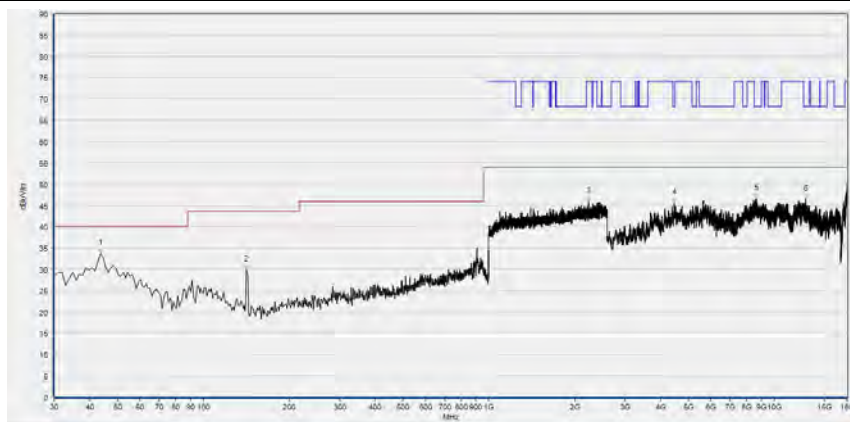


Plots for Channel = 44



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
53.303	29.63	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
115.445	28.01	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2245.749	45.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4725.625	45.76	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8638.008	47.03	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12898.500	47.06	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

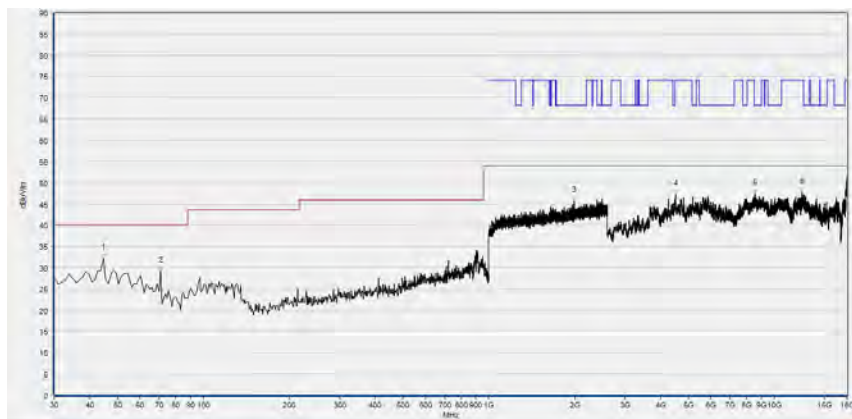
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	33.73	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	29.92	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2239.346	45.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4469.934	45.55	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8650.330	46.63	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12870.774	46.46	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

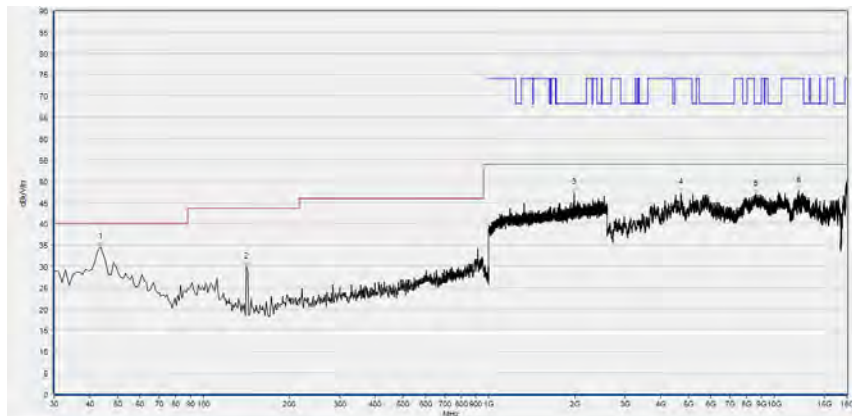
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 48



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
44.565	32.23	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	29.19	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1995.532	45.79	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4503.821	47.33	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8560.992	47.48	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12504.181	47.70	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

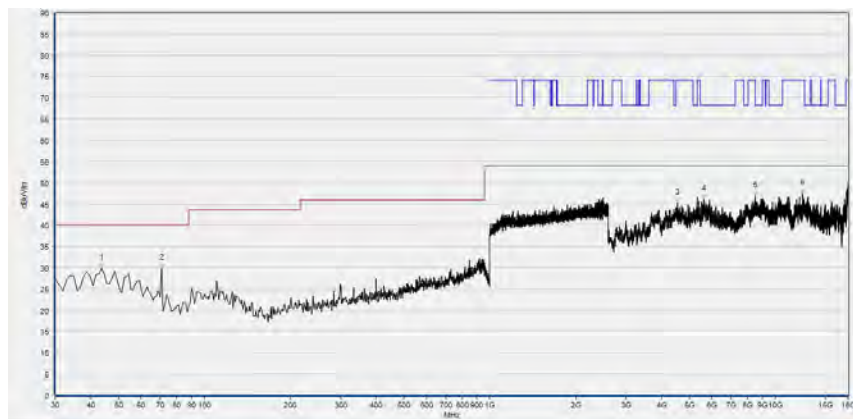


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	34.48	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	29.90	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1993.398	47.24	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4713.303	47.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8597.960	46.97	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12152.991	47.73	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

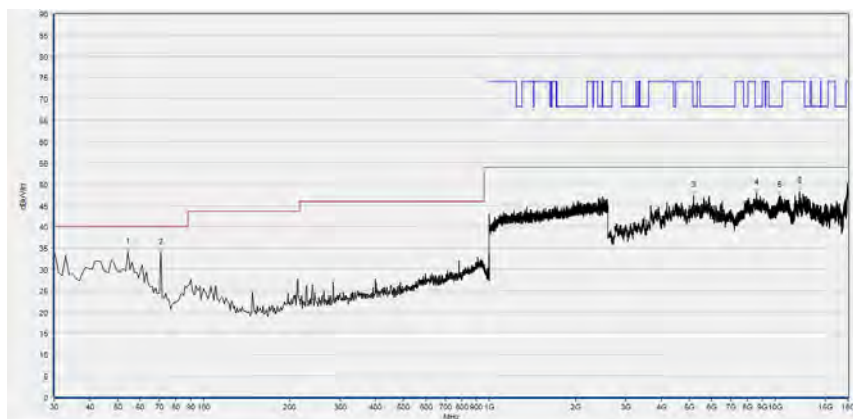


Plots for Channel = 149



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	29.79	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	29.83	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
4537.708	45.27	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5634.407	46.02	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8524.025	46.85	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12482.617	47.37	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

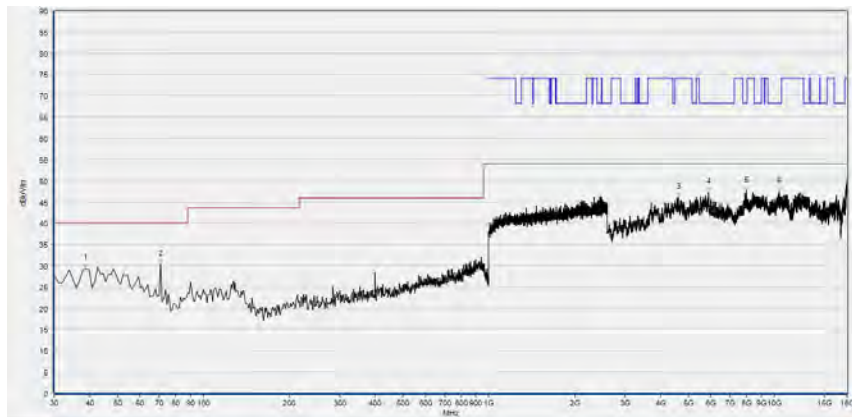


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
54.274	34.06	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	33.93	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
5187.718	47.26	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8631.846	47.87	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
10344.669	47.29	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12186.877	48.22	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

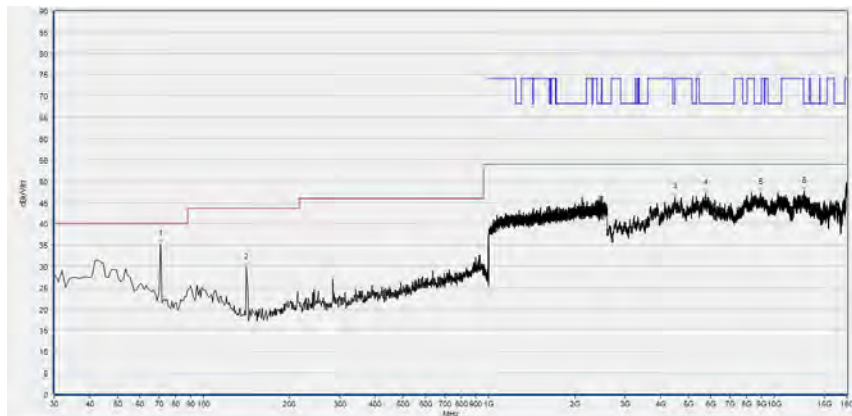


Plot for Channel = 157



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
38.739	29.26	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	30.35	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
4614.723	46.12	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5877.776	47.23	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
7987.998	47.53	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
10387.798	47.40	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

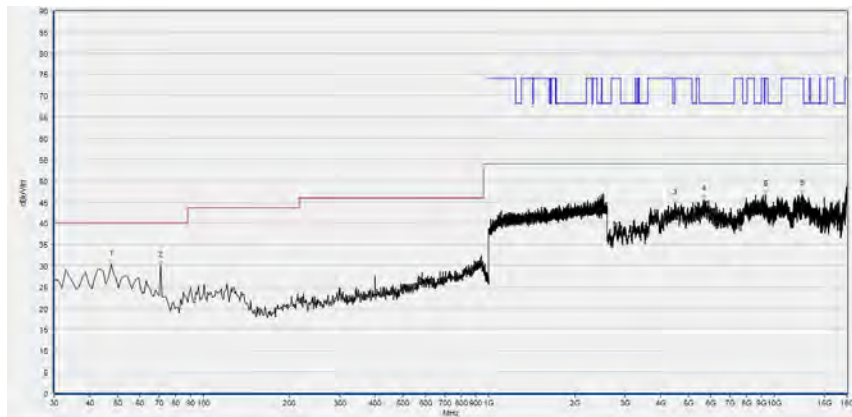
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	35.20	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	29.67	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
4476.095	46.23	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5760.712	47.15	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8952.230	47.33	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12753.711	47.54	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

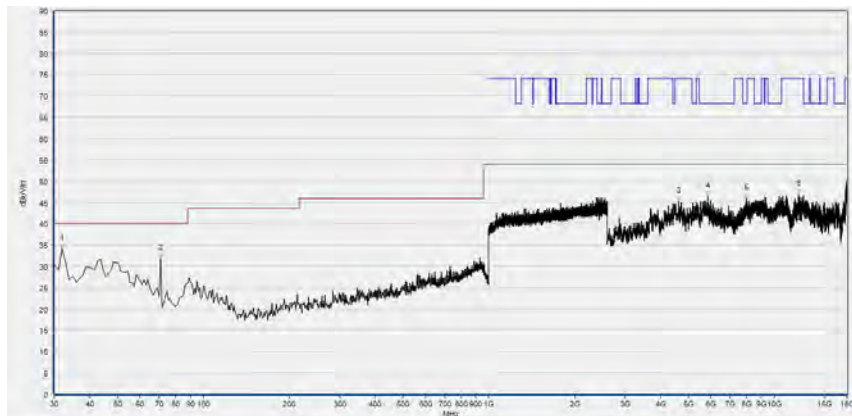
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 165



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
47.477	30.31	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	30.07	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
4494.579	44.68	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5655.971	45.54	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
9318.824	46.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12510.342	46.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



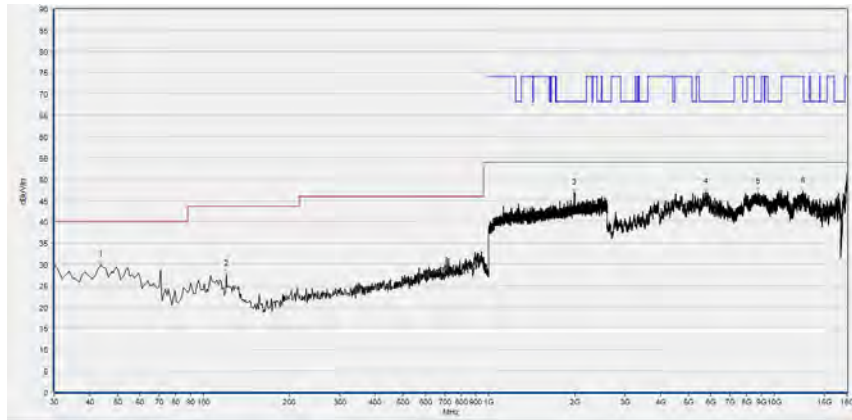
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
31.942	34.02	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	31.92	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
4623.965	45.17	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5862.372	46.42	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8000.320	45.85	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12165.313	46.97	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



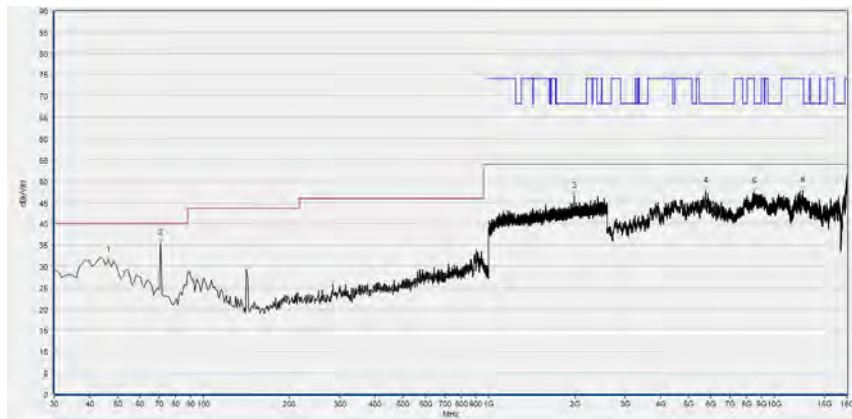
802.11ac (VHT40) Test mode

Plots for Channel = 38



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	29.82	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
120.300	27.59	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1994.465	46.74	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5760.712	47.00	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8764.313	46.89	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12590.438	47.02	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

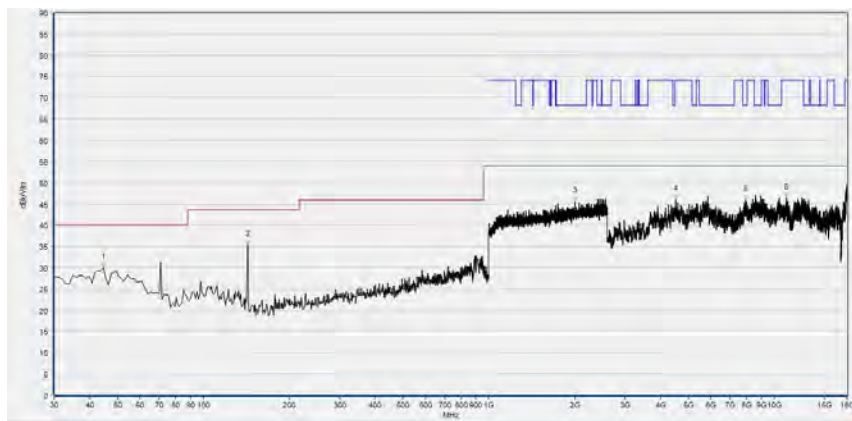
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
46.507	31.27	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	35.30	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1994.998	46.38	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5754.551	47.55	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8527.105	47.39	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12587.357	47.84	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

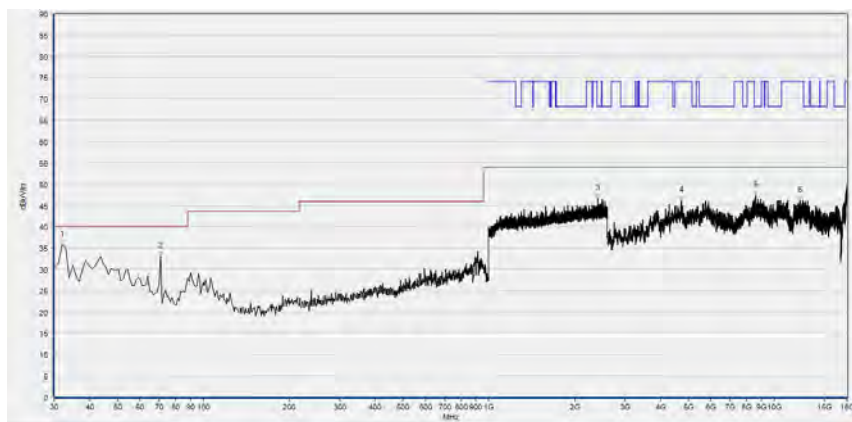
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 46



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
44.565	29.98	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
142.633	35.29	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2008.336	45.51	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4522.304	46.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7960.272	45.87	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11000.840	46.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

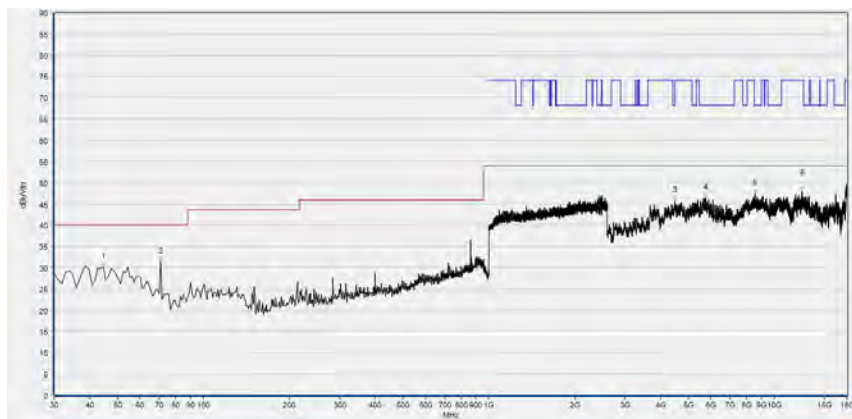
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
31.942	35.69	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	33.02	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2407.402	46.66	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4737.948	46.01	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8585.637	47.38	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12294.699	46.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

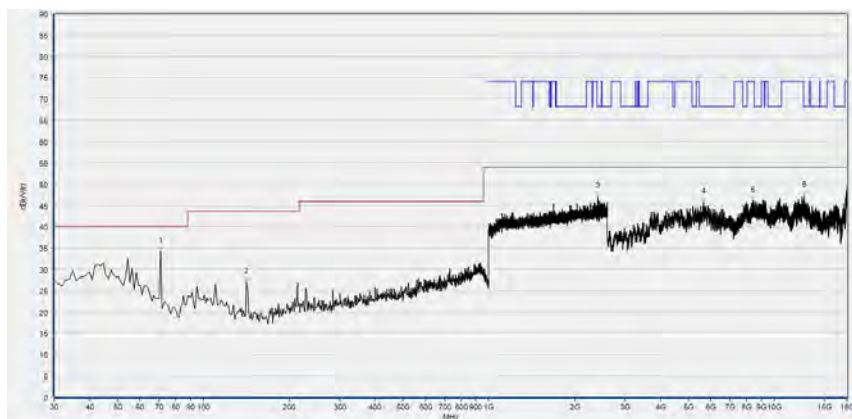
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 151



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
44.565	30.10	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	31.38	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
4482.256	45.75	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5748.390	46.43	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8579.476	47.43	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12501.100	47.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

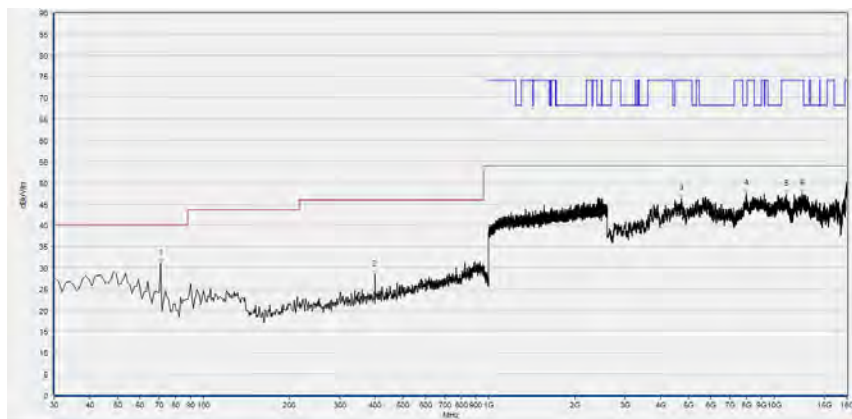


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	34.17	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
141.662	27.07	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2413.271	47.04	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5655.971	45.69	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8413.123	46.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12735.227	47.28	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

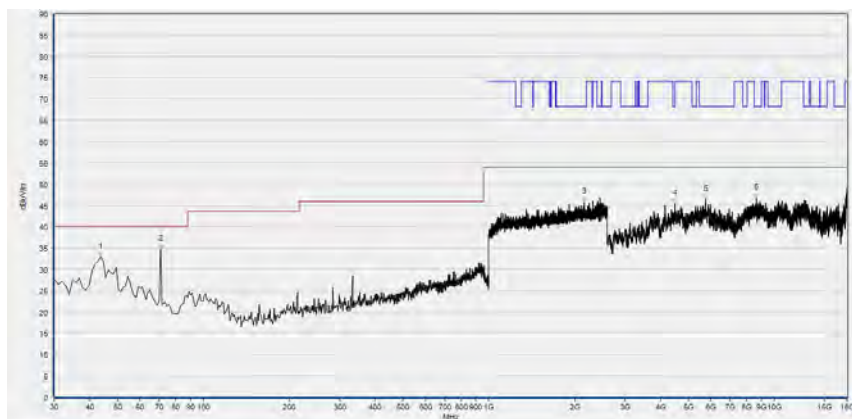


Plots for Channel = 159



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	30.94	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
399.940	28.28	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
4722.545	46.20	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7972.595	47.46	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11022.404	47.26	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12507.261	47.46	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

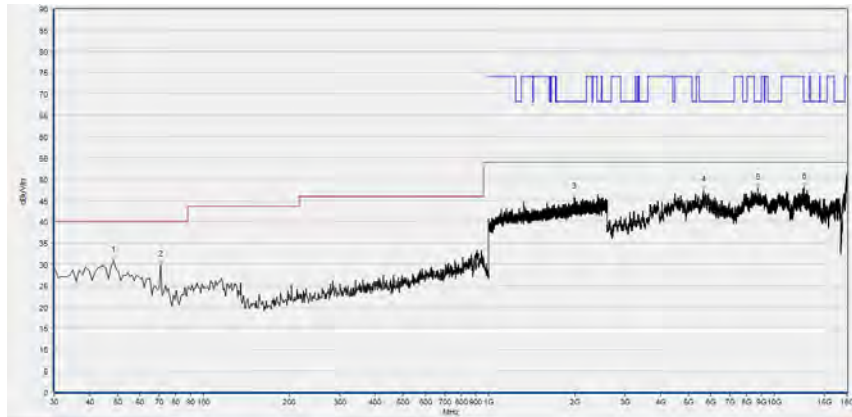


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	32.85	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	34.69	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2153.985	45.84	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4479.176	45.39	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5754.551	46.39	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8659.572	46.73	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

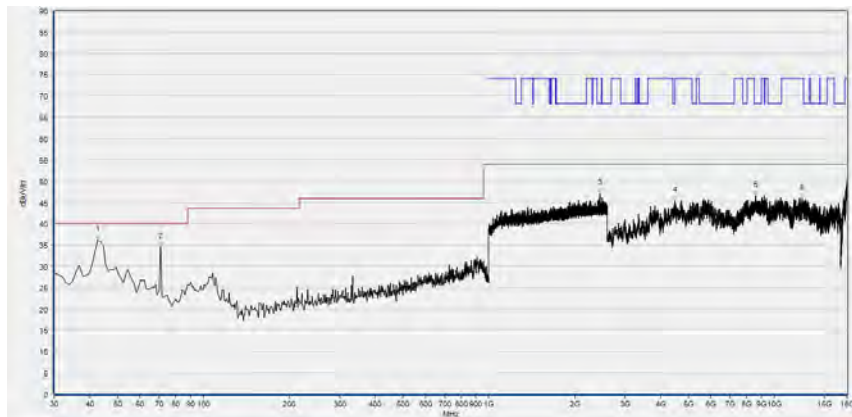
**802.11ac (VHT80) Test mode**

Plot for Channel = 42



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	30.80	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
70.781	29.76	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1991.264	45.79	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5649.810	47.50	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8770.474	47.90	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12707.502	48.04	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

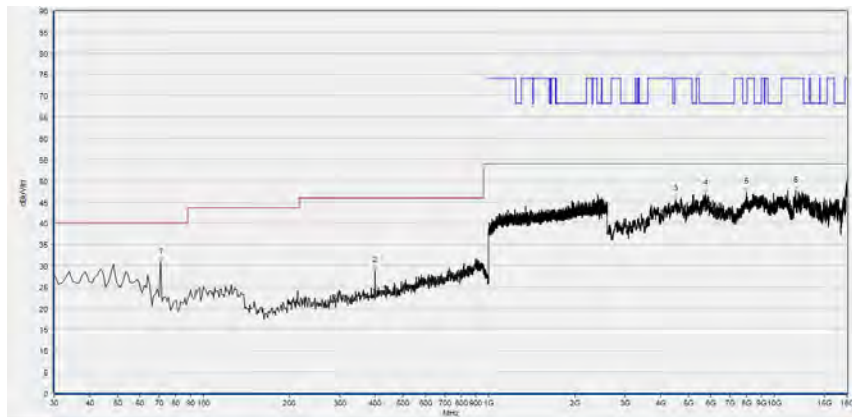
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
42.623	36.25	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	34.56	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2445.282	47.16	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4476.095	45.49	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
8631.846	46.62	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12522.665	45.84	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

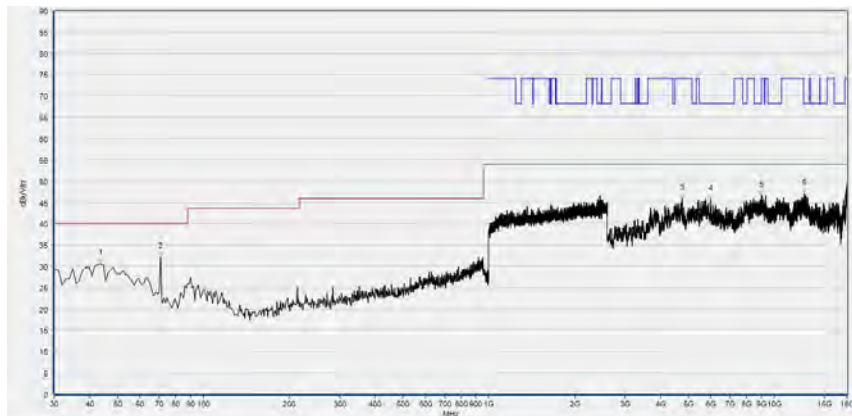
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 155



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
70.781	30.90	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
399.940	28.85	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
4503.821	45.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5742.228	46.86	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
7981.836	47.18	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11891.138	47.63	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.594	30.71	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
70.781	32.12	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
4753.351	45.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5976.355	45.70	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
9016.923	46.55	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12741.388	47.14	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Peak Output Power	$\pm 2.22\text{dB}$
Power spectral density (PSD)	$\pm 2.22\text{dB}$
Bandwidth	$\pm 5\%$
Restricted Frequency Bands	$\pm 5\%$
Radiated Emission	$\pm 2.95\text{dB}$
Conducted Emission	$\pm 2.44\text{dB}$

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Attenuator 1	(N/A)	10dB	Resnet	N/A	N/A
EXA Signal Analyzer	MY53470836	N9010A	Agilent	2020.04.01	2021.03.31
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2020.04.01	2021.03.31
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A
Temperature Chamber	YOMA	DTL-003S101	12108015	2020.01.08	2021.01.07
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY56400093	N9038A	KEYSIGHT	2020.03.26	2021.03.25
LISN	8127449	NSLK 8127	Schwarzbeck	2020.03.26	2021.03.25
Pulse Limiter (10dB)	9391	VTSD 9561-D	Schwarzbeck	2019.08.13	2020.08.12
Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A

4.3 List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8
MORLAB EMCR V1.2	MORLAB	V1.0

**4.4 Radiated Test Equipments**

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY54130016	N9038A	Agilent	2019.07.29	2020.07.28
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2019.07.26	2022.07.25
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2019.02.14	2022.02.13
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2022.07.25
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-40GHz)	CB05	EMC05	Morlab	N/A	N/A
1-18GHz pre-Amplifier	61171/61172	S020180L3203	Tonscend	2019.07.29	2020.07.28
18-26.5GHz pre-Amplifier	46732	S10M100L3802	Tonscend	2019.07.29	2020.07.28
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2019.07.29	2020.07.28
Anechoic Chamber	N/A	9m*6m*6m	CRT	2020.01.06	2023.01.05

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