



TEST REPORT

APPLICANT : You Tec Ltd
PRODUCT NAME : Smartphone
MODEL NAME : X3
BRAND NAME : STK
FCC ID : 2A2KI-STKX3
STANDARD(S) : 47 CFR Part 15 Subpart E
RECEIPT DATE : 2021-06-18
TEST DATE : 2021-06-29 to 2021-07-14
ISSUE DATE : 2021-08-09



Edited by: Peng Mi
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Change History		
Version	Date	Reason for change
1.0	2021-08-09	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	You Tec Ltd
Applicant Address:	Santok House Unit L, Braintree Industrial Estate, Braintree Road, South Ruislip, Middlesex, United Kingdom, HA4 0EJ
Manufacturer:	You Tec Ltd
Manufacturer Address:	Santok House Unit L, Braintree Industrial Estate, Braintree Road, South Ruislip, Middlesex, United Kingdom, HA4 0EJ

1.2. Equipment Under Test (EUT) Description

Product Name:	Smartphone	
Sample No.:	6#	
Hardware Version:	STKX3XW1	
Software Version:	SW2_V1.6_HW1_V.1_DSVLTEEU_SIG_240721	
Modulation Technology:	OFDM	
Modulation Mode:	802.11a, 802.11n (HT20), 802.11n (HT40) 802.11ac (VHT20), 802.11ac (VHT40), 802.11ac (VHT80)	
Operating Frequency Range:	5180MHz-5240MHz; 5260MHz-5320MHz; 5745MHz-5825MHz	
Channel Number:	Refer to 1.3	
Antenna Type:	IFA Antenna	
Antenna Gain:	-1.50dBi	
Accessory Information:	Battery	
	Brand Name:	STK
	Model No.:	STK X3
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	4000mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.40V
	Manufacturer:	Zhongshan Tianmao Battery Co., Ltd.



Accessory Information:	AC Adapter	
	Brand Name:	STK
	Model No.:	MC/X3WH2TC, MC/X3WH2TA2, MC/X3WH2TI, MC/X3WH2TI2
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5V=2A
	Rated Input:	100-240V~50/60Hz, 0.3A
	Manufacturer:	You Tec Ltd
	USB	
	Model No.:	CAB/X3WHUSBC
	Manufacturer:	You Tec Ltd

Note 1: Hereby, we, You Tec Ltd, declare that for model name: X3(FCC ID: 2A2KI-STKX3, IC: 27509-X3), there are 2 models of CPU, only the model suffix is different; Memory (EMMC+LPDDR4X) and camera have 2 Suppliers. It's just that the supplier is different. details as follows:

Part Name		Supplier (Main Supply)	Supplier (Secondary Supply)
CPU		MediaTek.Inc (Model: MT6762V/CB)	MediaTek.Inc (Model: MT6762V/WA)
Memory	EMMC	Hosin Global Electronics Co., Ltd.	Shenzhen Longsys Electronics Co., Ltd.
	LPDDR4X	Rayson Hi-Tech (HK) Limited	Shenzhen Longsys Electronics Co., Ltd.
Camera		Chongqing Ts-Precision Technology Co., Ltd.	Shen zhen Holitech opto-Electronics Co., Ltd.

Except for the above differences, their electrical circuit design, layout, components used and internal wiring are identical. We have evaluated those changes in EMC reports. The changes do not affect the results in report.

Note 2: WiFi hotspot only support U-NII-1 and U-NII-3 band.

Note 3: 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 (802.11a)	BPSK	6/9
	QPSK	12/18
	16QAM	24/36
	64QAM	48/54
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

(U-NII-1) 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		
(U-NII-2A) 5260MHz-5320MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	52	5260	56	5280
	60	5300	64	5320
40MHz	54	5270	62	5310
80MHz	58	5290		
(U-NII-3) 5745MHz-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 02, 2021	Su Xiaoxian	PASS	No deviation
3	15.407(a)	Maximum Conducted Output Power	Jul 07, 2021	Su Xiaoxian	PASS	No deviation
4	15.407(a)(e)	Emission Bandwidth	Jul 07, 2021	Su Xiaoxian	PASS	No deviation
5	15.407(a)	Peak Power Spectral Density	Jul 07, 2021	Su Xiaoxian	PASS	No deviation
6	15.407(g)	Frequency Stability	Jul 07, 2021	Su Xiaoxian	PASS	No deviation
7	15.207	Conducted Emission	Jun 29, 2021	Wu Runfeng	PASS	No deviation
8	15.407(b)	Restricted Frequency Bands	Jul 13&14, 2021	Gao Jianrou	PASS	No deviation
9	15.407(b)	Radiated Emission	Jul 13&14, 2021	Gao Jianrou	PASS	No deviation

Note 1: The DFS test report was documented in a separate report (Report No.: SZ21060226W05).

Note 2: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.102013.

Note 3: These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 v02r01.



Note 4: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 12dB contains two parts that cable loss 2dB and Attenuator 10dB.

Note 5: 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.

Note 6: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

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. Test Result: Compliant

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

2.2. Duty Cycle of the Test Signal

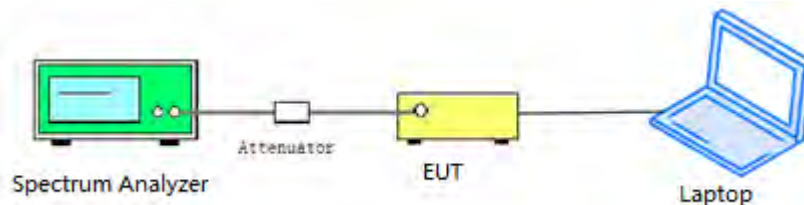
2.2.1. Requirement

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 sub clause, 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.

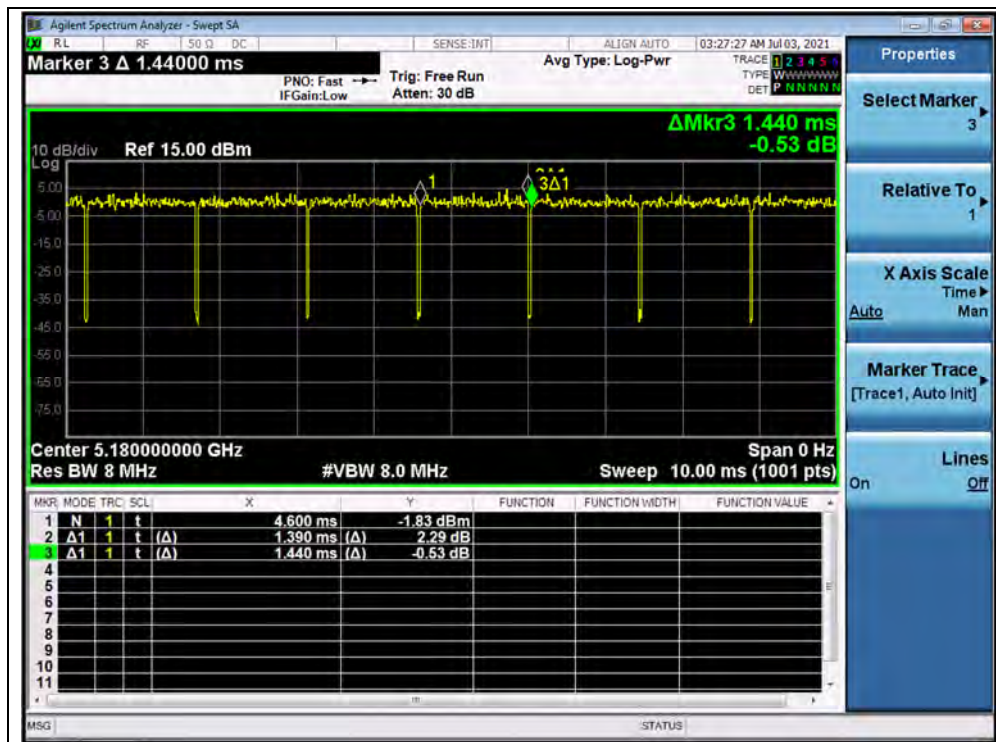


2.2.4. Test Result

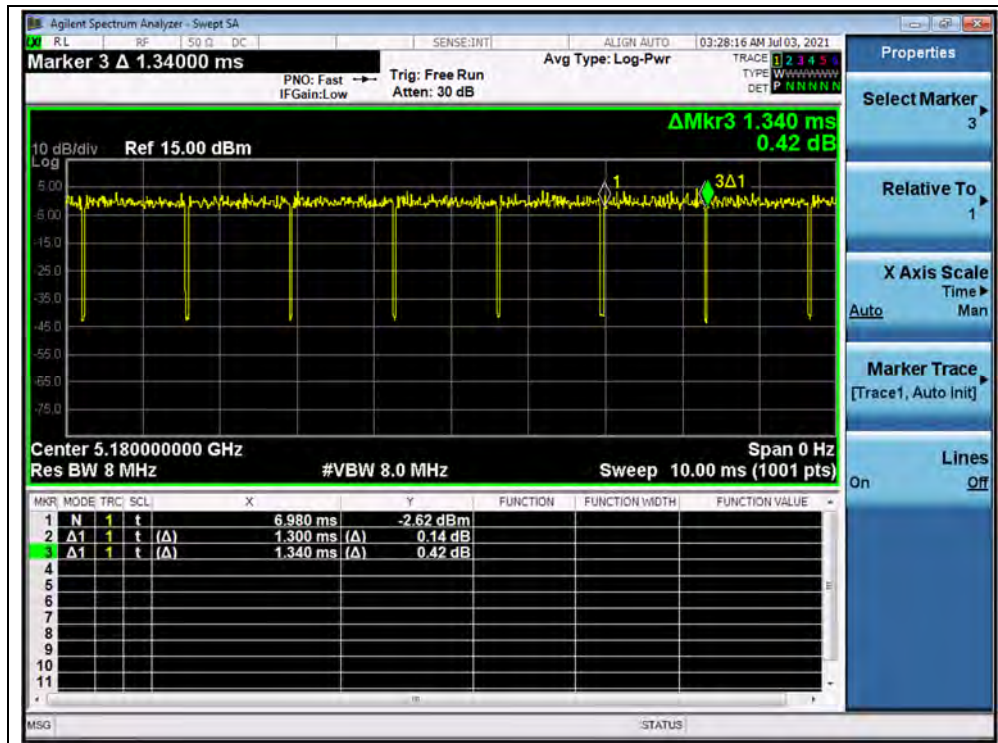
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*log[1/D])
802.11a	96.53	0.15
802.11n (HT20)	97.01	0.13
802.11n (HT40)	93.53	0.29
802.11ac (VHT20)	96.32	0.16
802.11ac (VHT40)	93.53	0.29
802.11ac (VHT80)	87.80	0.57

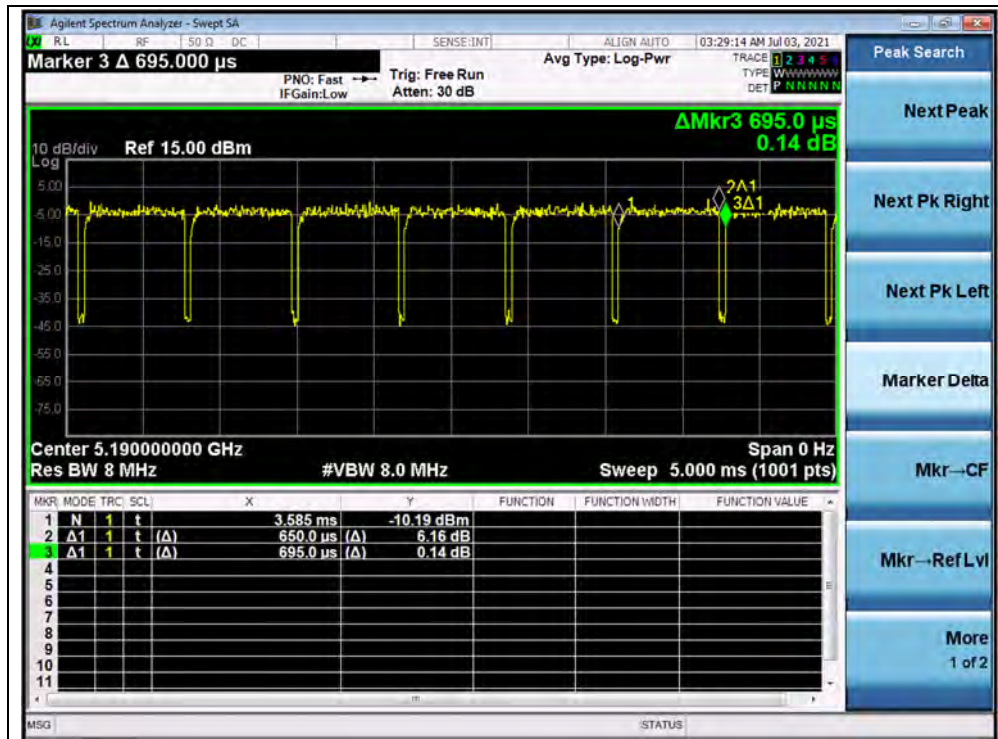
B. Test Plot:



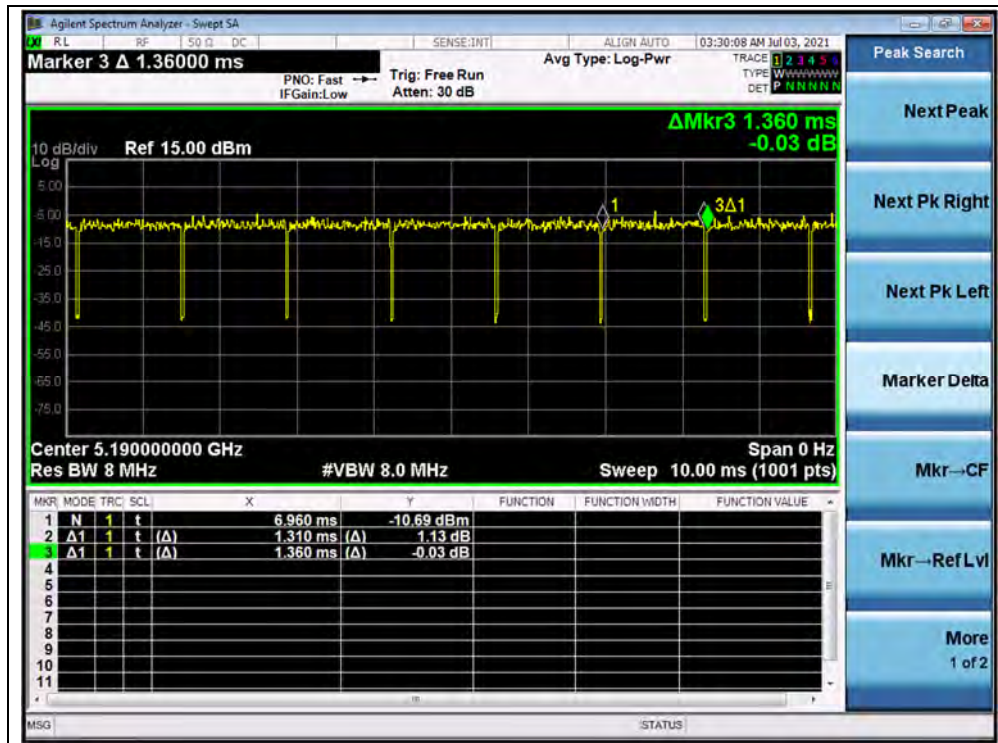
(Channel 36, 5180MHz, 802.11a)



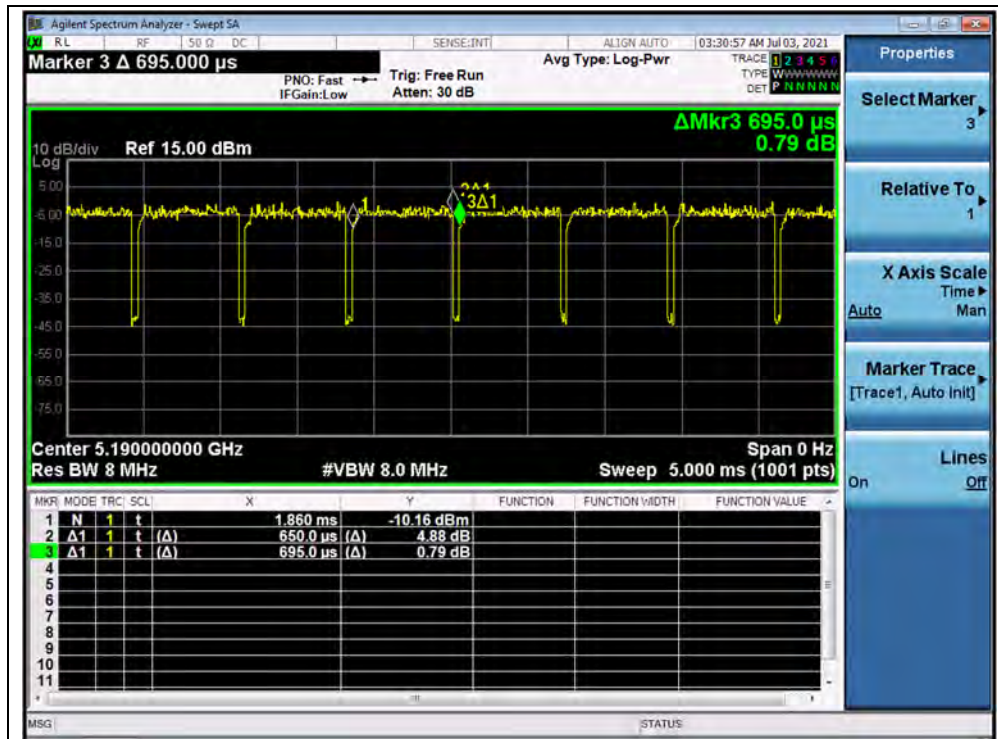
(Channel 36, 5180MHz, 802.11n (HT20))



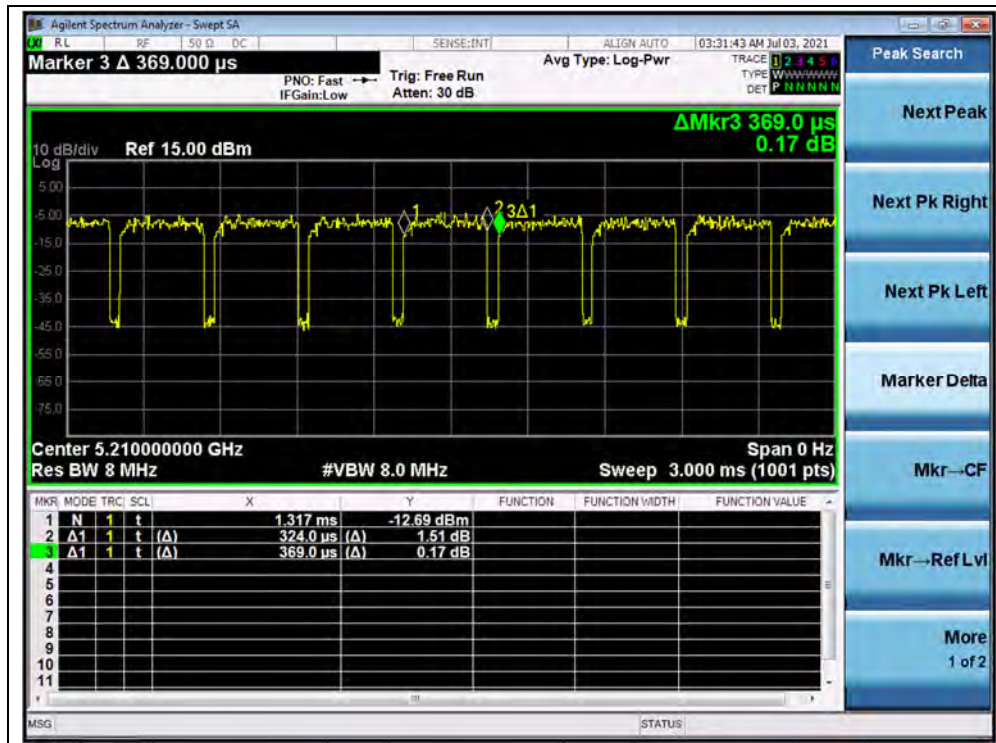
(Channel 38, 5190MHz, 802.11n (HT40))



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



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



(Channel 42, 5210MHz, 802.11ac (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 250mW provided the maximum antenna gain does not exceed 6dBi.

(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 250mW 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 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

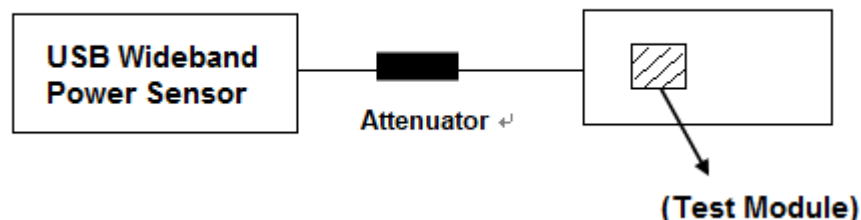
(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the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

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

2.3.2. Test Description

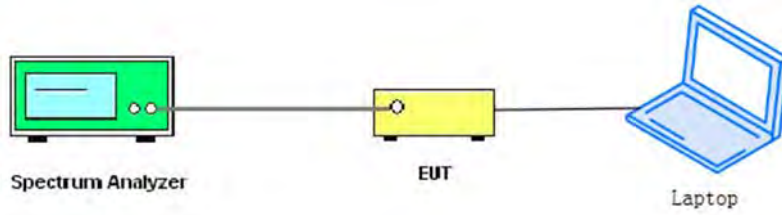
Section E) 3) of KDB 789033 defines a methodology using a USB Wideband Power Sensor.

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.

For ac (VHT80) mode power



The EUT (Equipment under the test) 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, all test result in Spectrum analyzer.

2.3.3. Limits

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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

Mode	Band	Channel (MHz)	26dB BW (MHz)	11+10log(26dB BW)	Limits (dBm)
a	UNII-2a	5260	16.53	23.18	24.00
		5300	16.44	23.16	24.00
		5320	16.46	23.16	24.00
n20	UNII-2a	5260	17.64	23.46	24.00
		5300	17.59	23.45	24.00
		5320	17.70	23.48	24.00
ac20	UNII-2a	5260	17.60	23.46	24.00
		5300	17.64	23.46	24.00
		5320	17.63	23.46	24.00



2.3.4. Test Result

Maximum Average Conducted Output Power

802.11a Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	14.55	0.15	14.70	0.030	24	0.25	PASS
5220	14.62		14.77	0.030			
5240	14.84		14.99	0.032			
5260	14.82		14.97	0.031			
5300	14.62		14.77	0.030			
5320	14.63		14.78	0.030			
5745	14.29		14.44	0.028	30	1	
5785	13.95		14.10	0.026			
5825	13.90		14.05	0.025			

802.11n (HT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	14.46	0.13	14.59	0.029	24	0.25	PASS
5220	14.41		14.54	0.028			
5240	14.65		14.78	0.030			
5260	14.62		14.75	0.030			
5300	14.51		14.64	0.029			
5320	14.51		14.64	0.029			
5745	14.12		14.25	0.027	30	1	
5785	13.80		13.93	0.025			
5825	13.91		14.04	0.025			



802.11n (HT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	10.44	0.29	10.73	0.012	24	0.25	PASS
5230	10.85		11.14	0.013			
5270	12.07		12.36	0.017			
5310	12.14		12.43	0.017			
5755	13.79		14.08	0.026	30	1	
5795	13.42		13.71	0.023			

802.11ac (VHT20) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5180	14.51	0.16	14.67	0.029	24	0.25	PASS
5220	14.56		14.72	0.030			
5240	14.47		14.63	0.029			
5260	14.69		14.85	0.031			
5300	14.46		14.62	0.029			
5320	14.52		14.68	0.029			
5745	14.14		14.30	0.027	30	1	
5785	13.82		13.98	0.025			
5825	13.93		14.09	0.026			

802.11ac (VHT40) Mode

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5190	14.26	0.29	14.55	0.029	24	0.25	PASS
5230	14.23		14.52	0.028			
5270	14.30		14.59	0.029			
5310	14.00		14.29	0.027			
5755	13.79		14.08	0.026	30	1	
5795	13.65		13.94	0.025			

**802.11ac (VHT80) Mode**

Frequency (MHz)	Average Power				Limit		Verdict
	Measured	Duty Factor	Duty factor Calculated		dBm	W	
	dBm		dBm	W			
5210	10.31	0.57	10.88	0.012	24	0.25	PASS
5290	10.80		11.37	0.014			
5775	13.20		13.77	0.024	30	1	

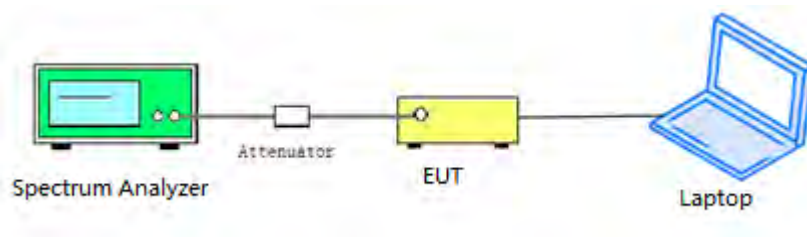
2.4. Emission Bandwidth

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 50Ohm; 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 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 theband5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:



- a) Set RBW = 100 kHz.
- b) Set 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

802.11a Mode

A. Test Verdict:

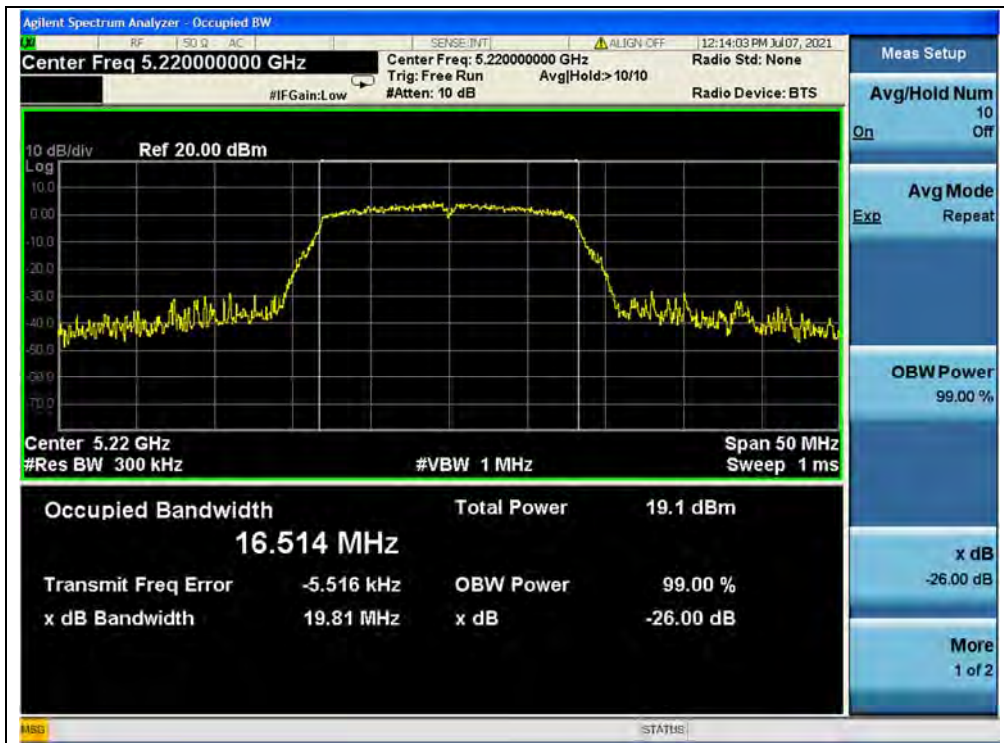
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	19.93
44	5220	19.81
48	5240	19.93
52	5260	20.05
60	5300	19.78
64	5320	19.83
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	15.13
157	5785	15.44
165	5825	15.31



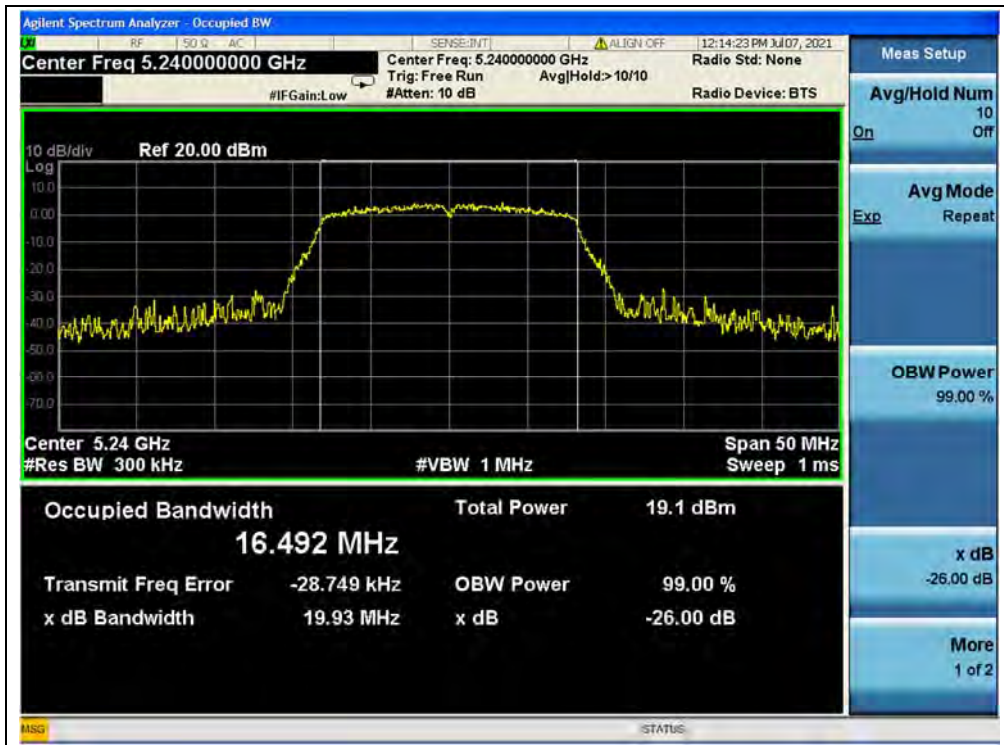
B. Test Plot:



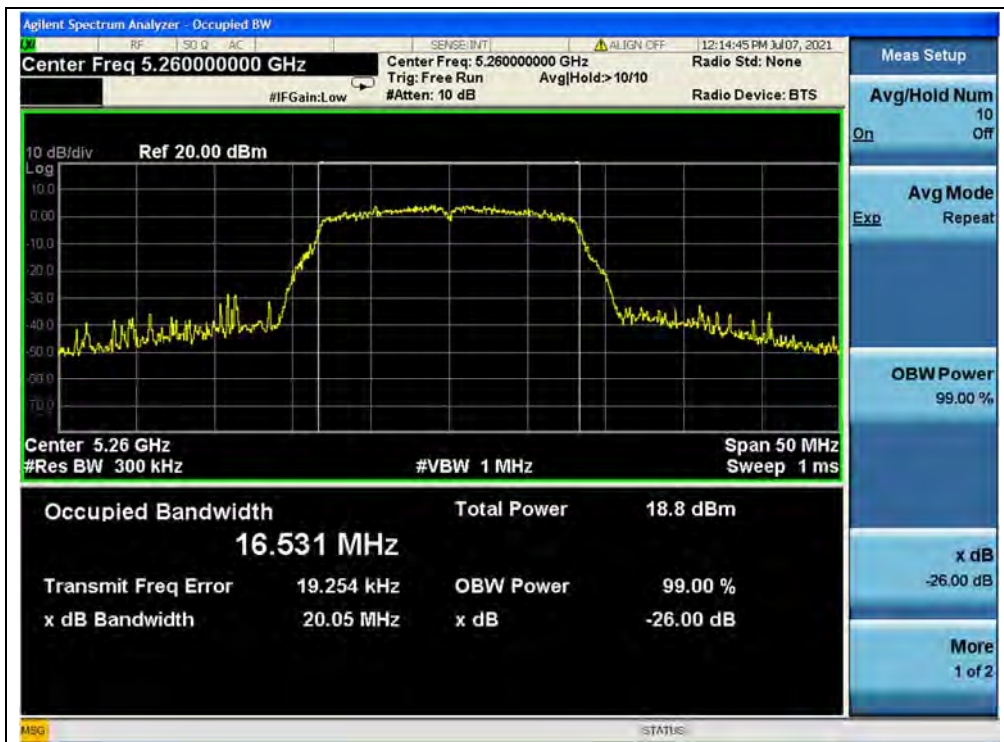
(Channel 36, 5180MHz, 802.11a)



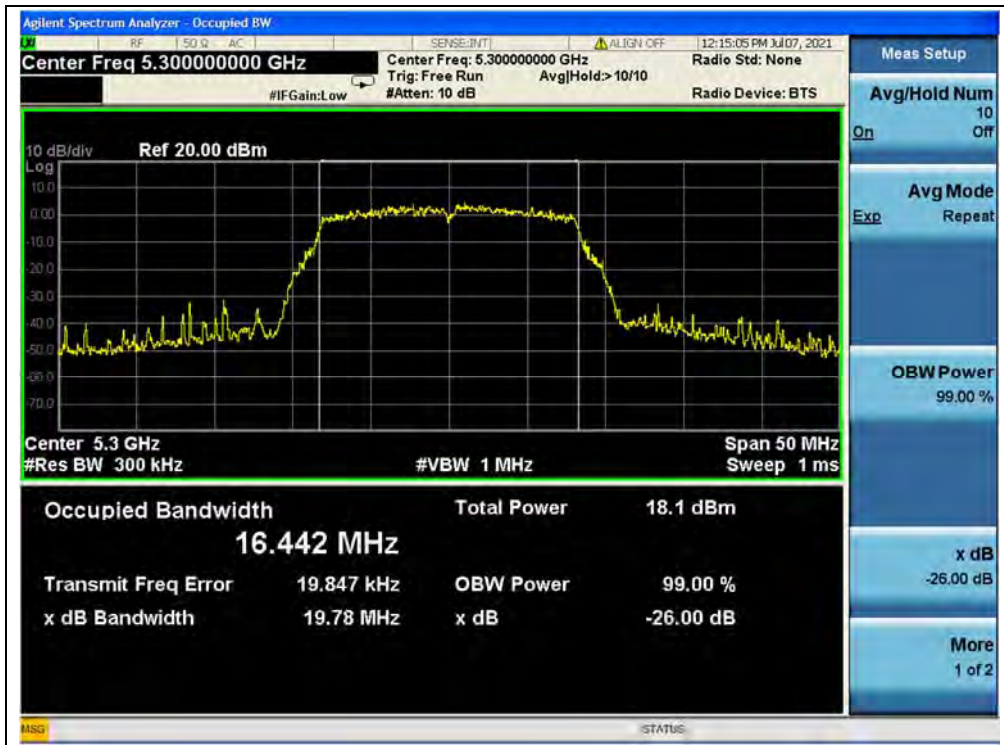
(Channel 44, 5220 MHz, 802.11a)



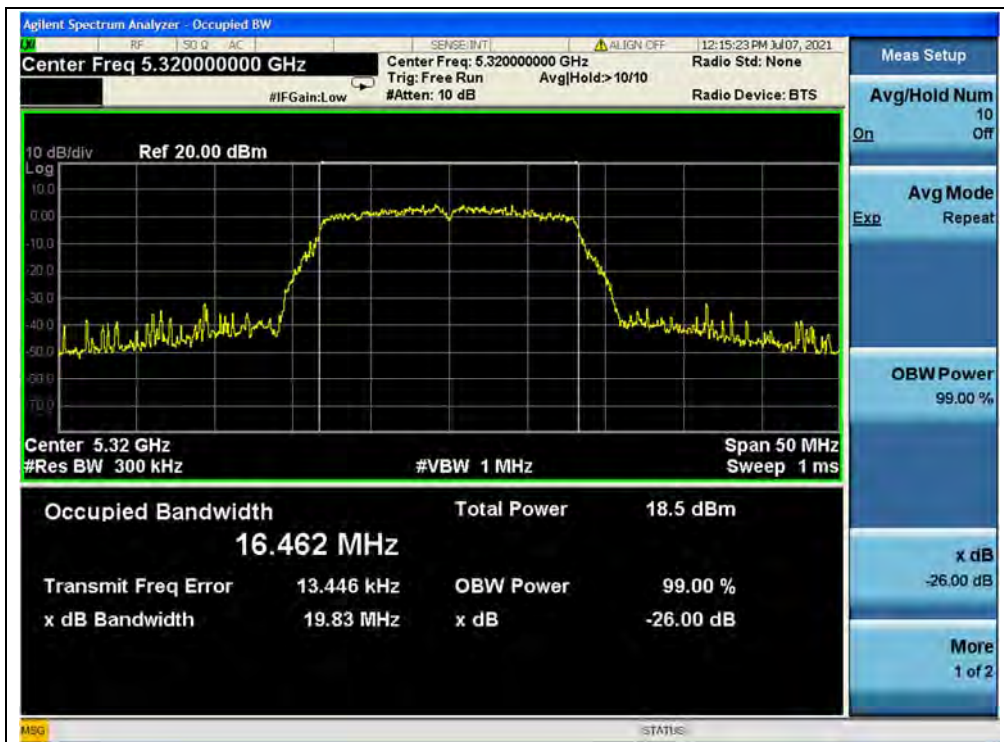
(Channel 48, 5240MHz, 802.11a)



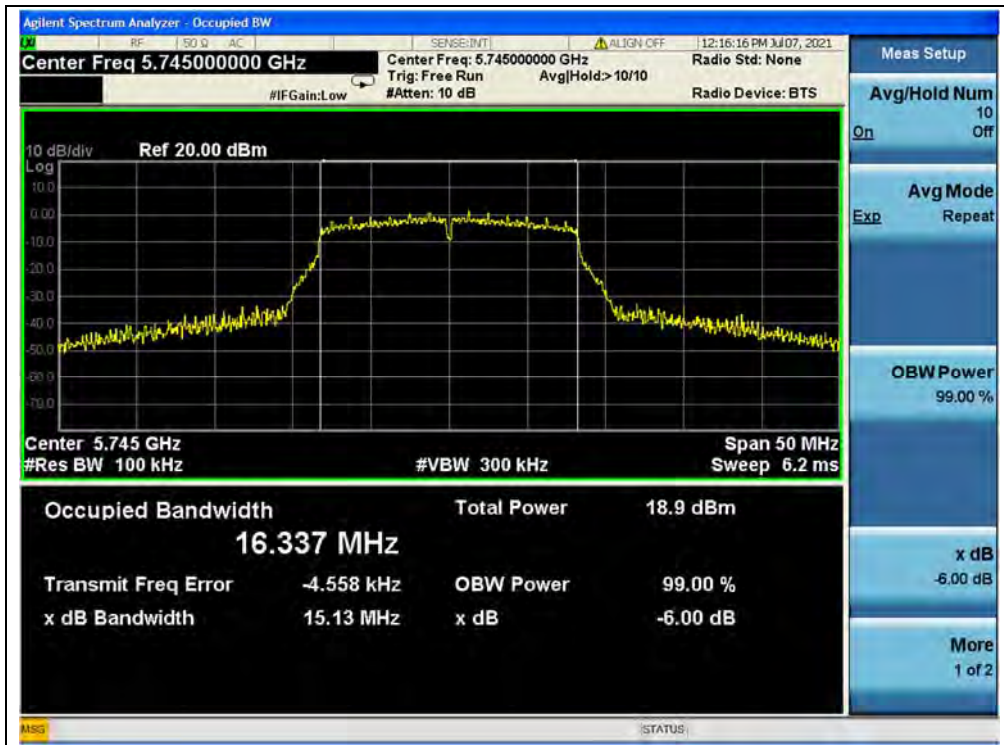
(Channel 52, 5260MHz, 802.11a)



(Channel 60, 5300 MHz, 802.11a)



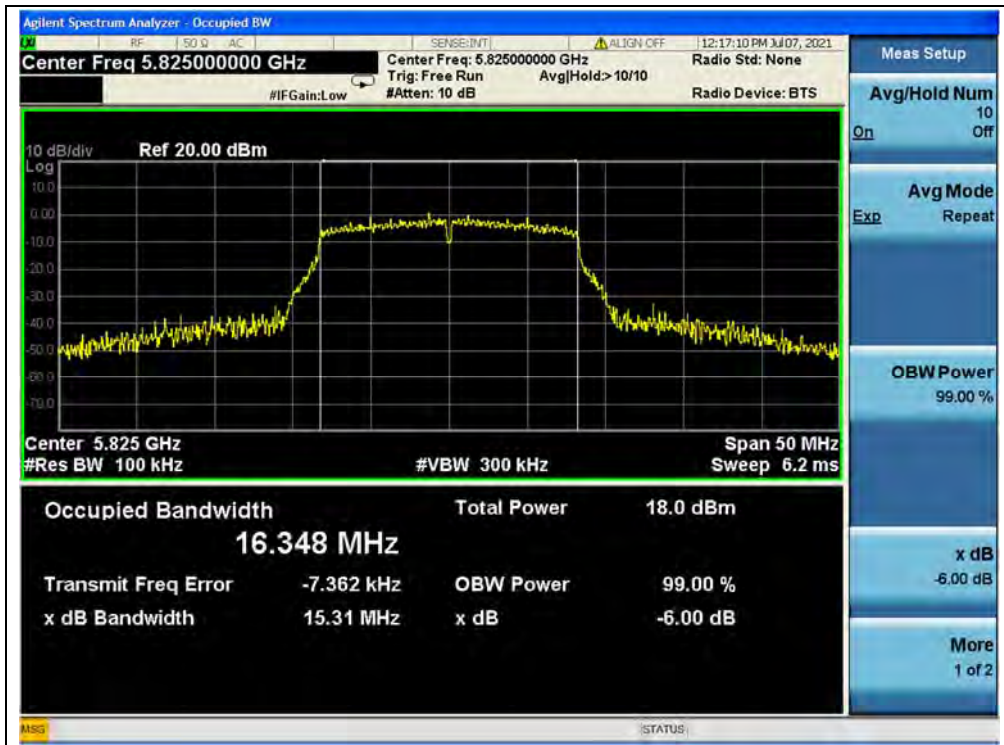
(Channel 64, 5320MHz, 802.11a)



(Channel 149,5745MHz, 802.11a)



(Channel 157,5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)



802.11n (HT20) Mode

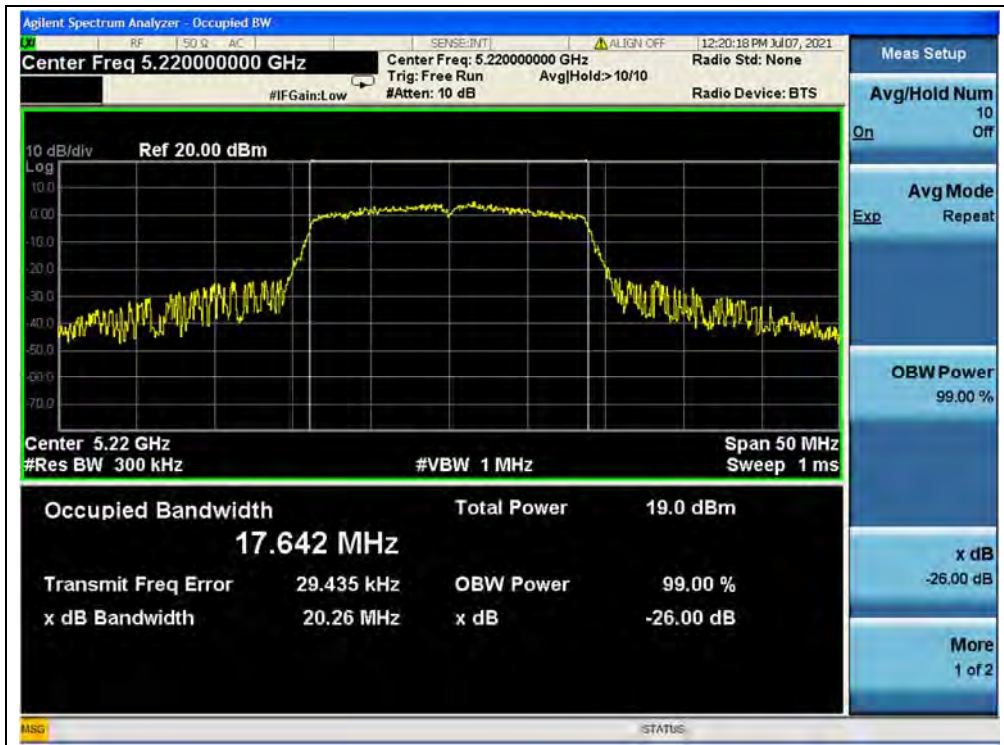
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.37
44	5220	20.26
48	5240	20.18
52	5260	20.13
60	5300	20.12
64	5320	20.51
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	13.16
157	5785	15.30
165	5825	15.10

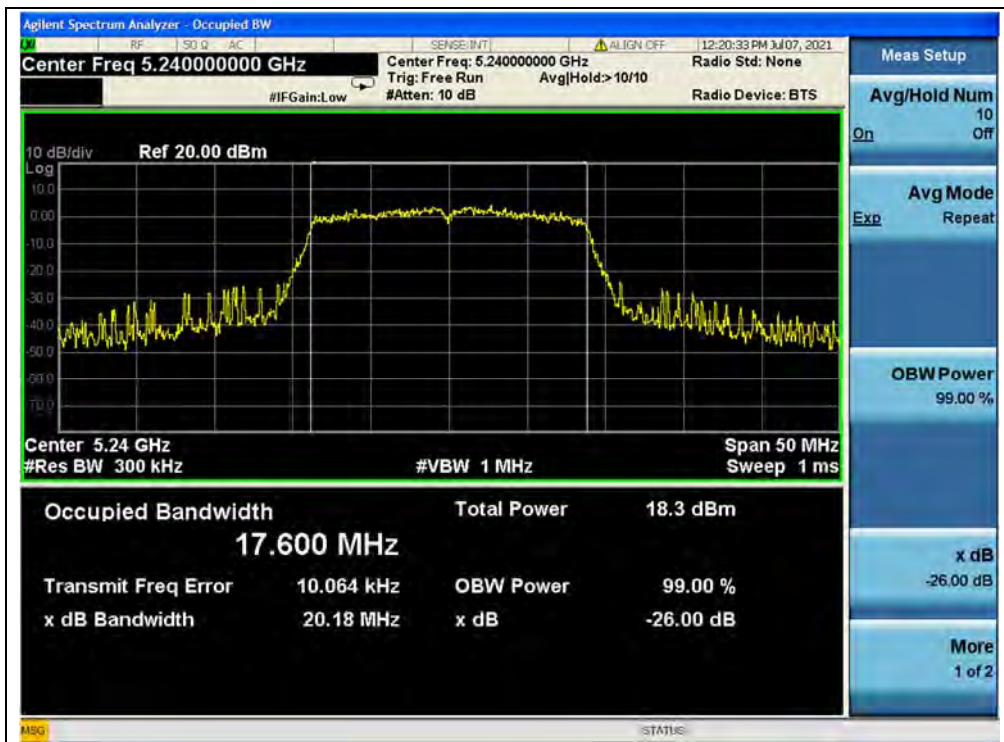
B. Test Plot:



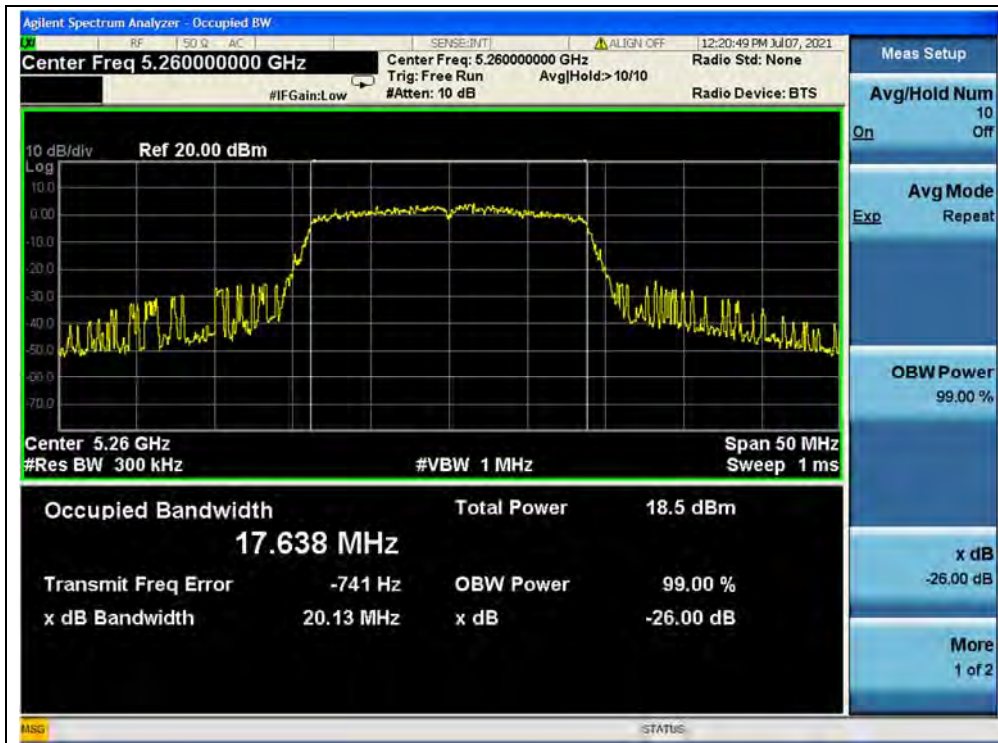
(Channel 36, 5180MHz, 802.11n (HT20))



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



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



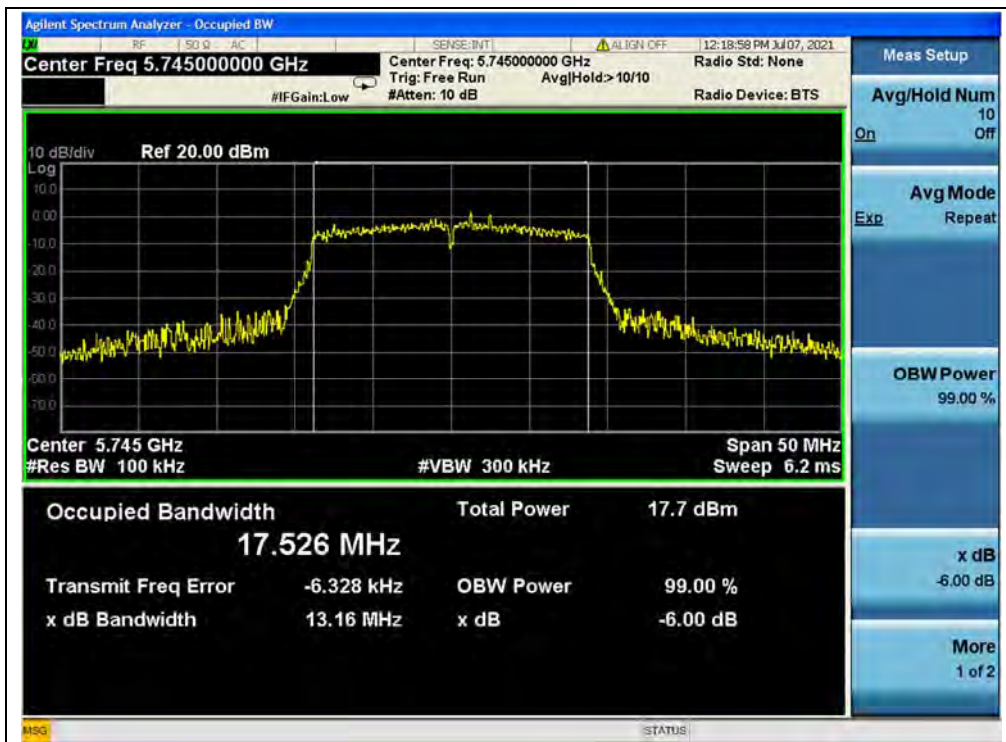
(Channel 52, 5260MHz, 802.11n (HT20))



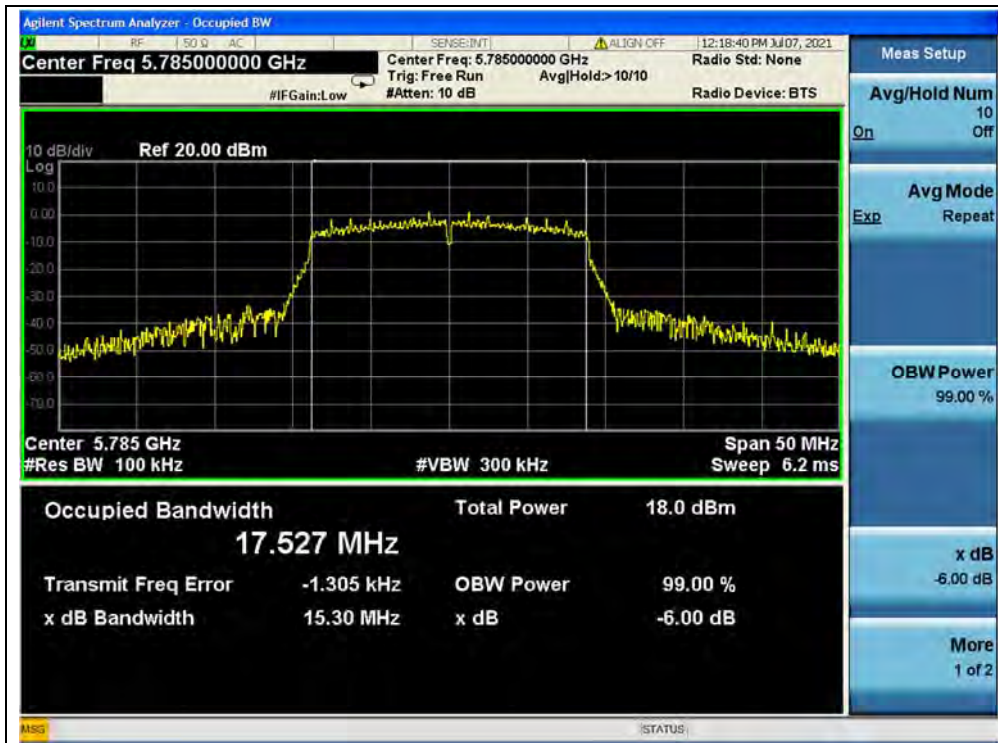
(Channel 60, 5300MHz, 802.11n (HT20))



(Channel 64, 5320MHz, 802.11n (HT20))



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



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



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

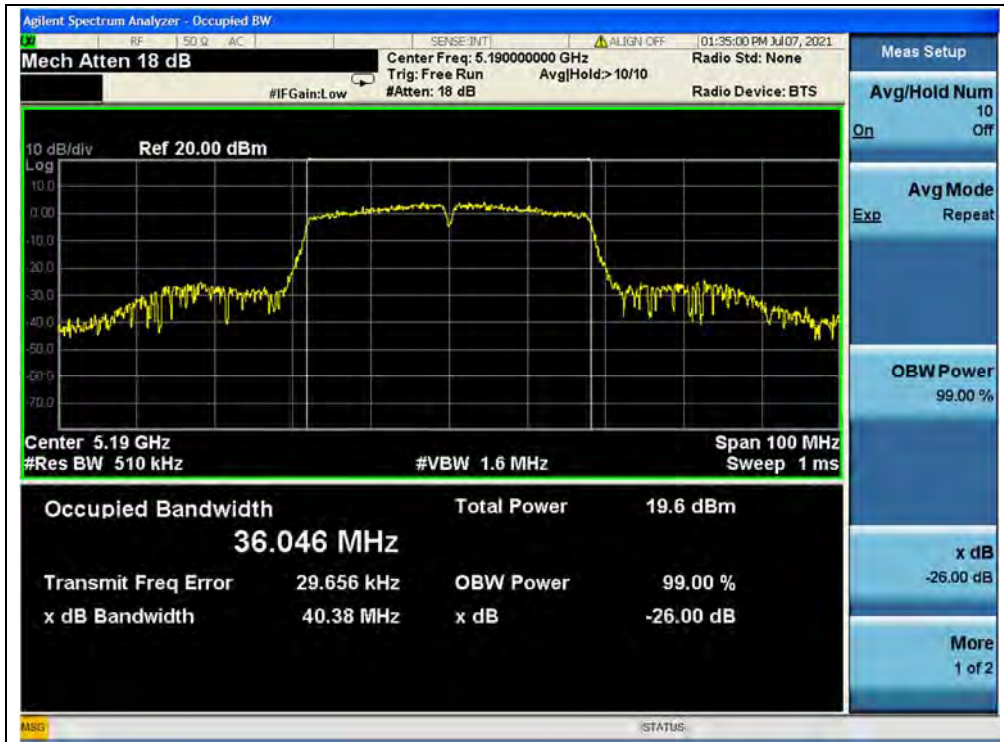


802.11n (HT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	40.38
46	5230	40.21
54	5270	40.50
62	5310	40.22
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
151	5755	35.14
159	5795	35.16

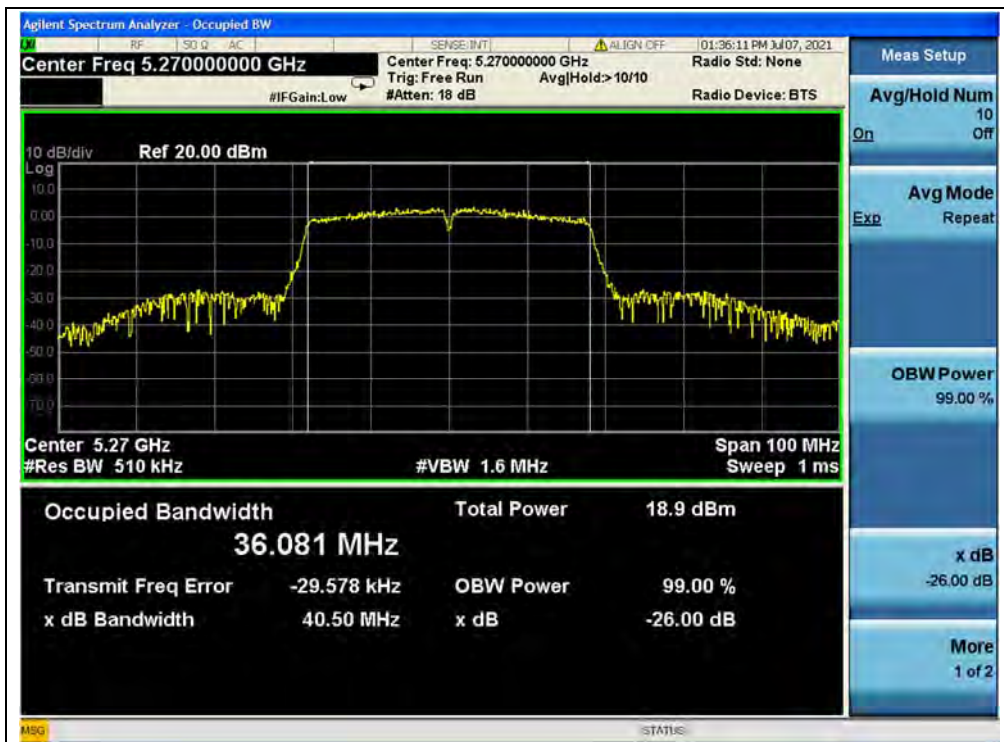
B. Test Plot:



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



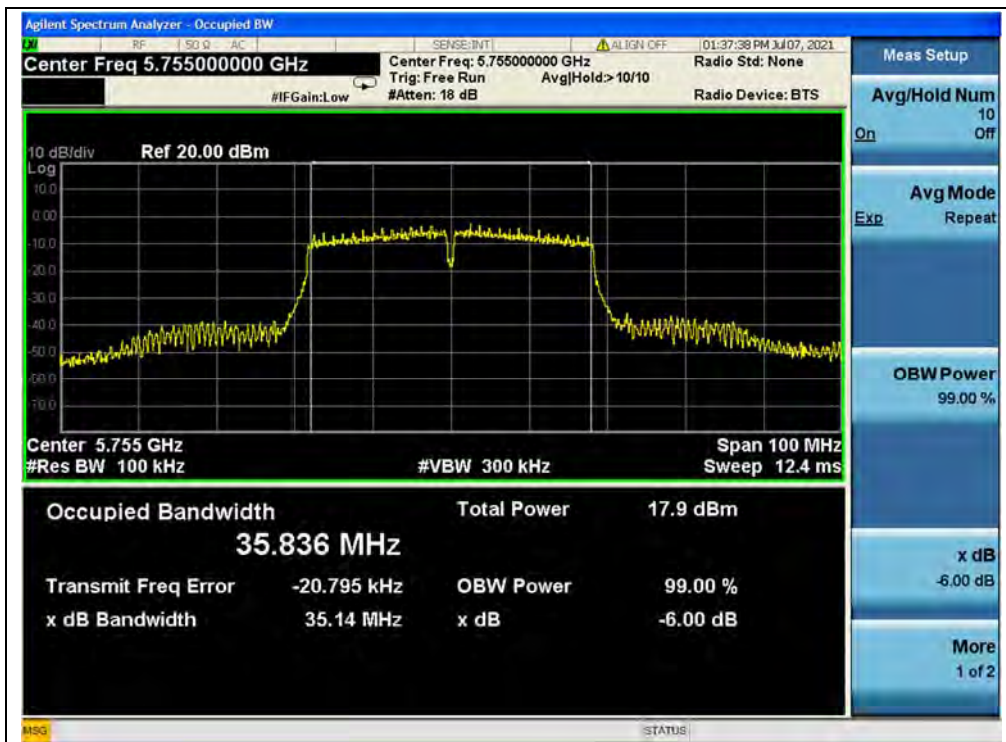
(Channel 46, 5230MHz, 802.11n (HT40))



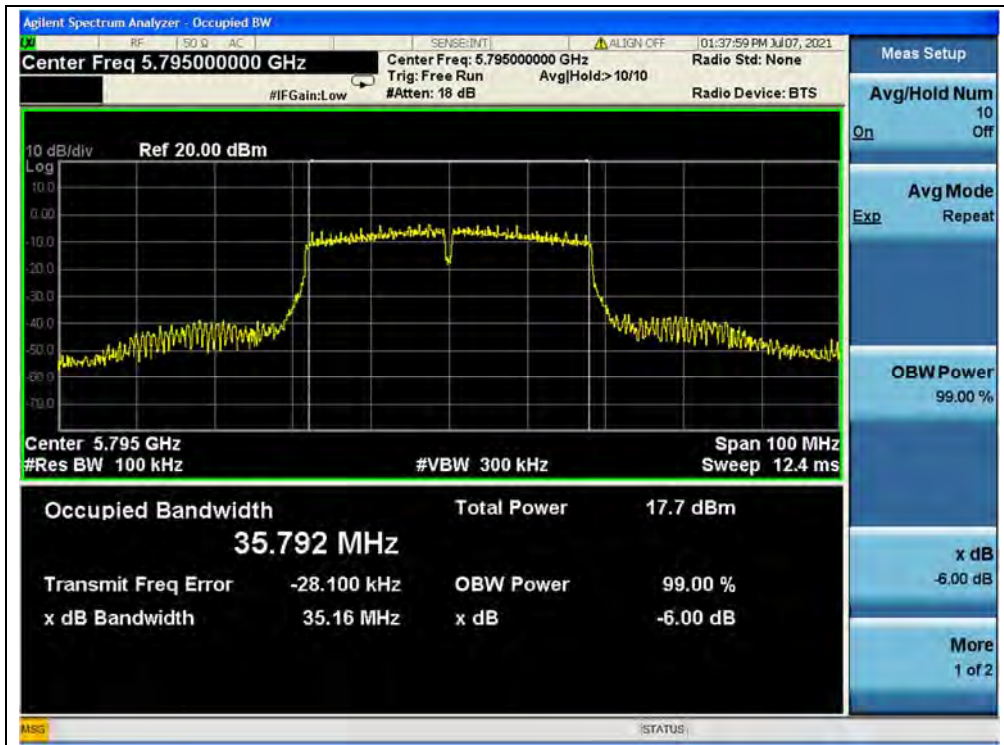
(Channel 54, 5270MHz, 802.11n (HT40))



(Channel 62, 5310MHz, 802.11n (HT40))



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



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

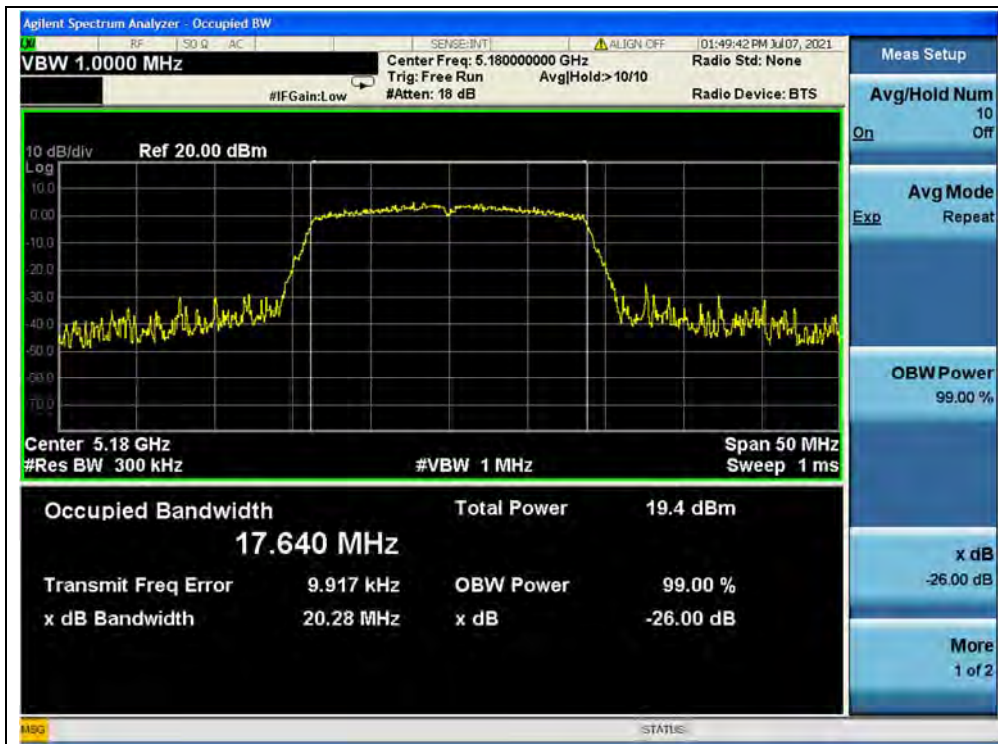


802.11ac (VHT20) Mode

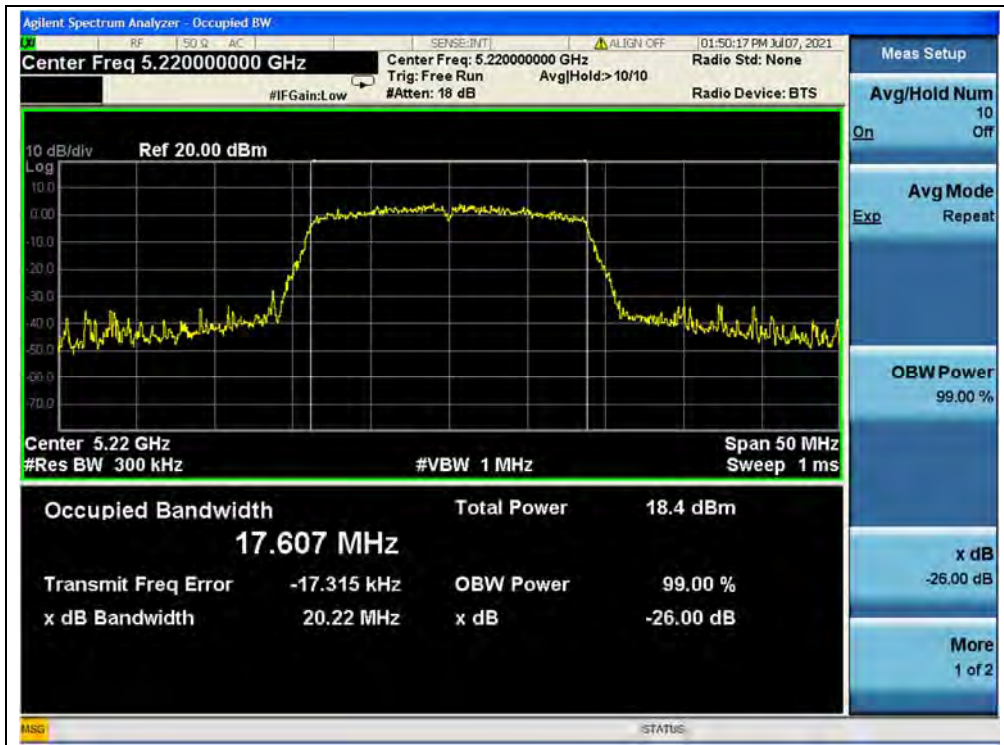
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	20.28
44	5220	20.22
48	5240	20.23
52	5260	20.24
60	5300	20.35
64	5320	20.19
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
149	5745	19.43
157	5785	19.56
165	5825	19.63

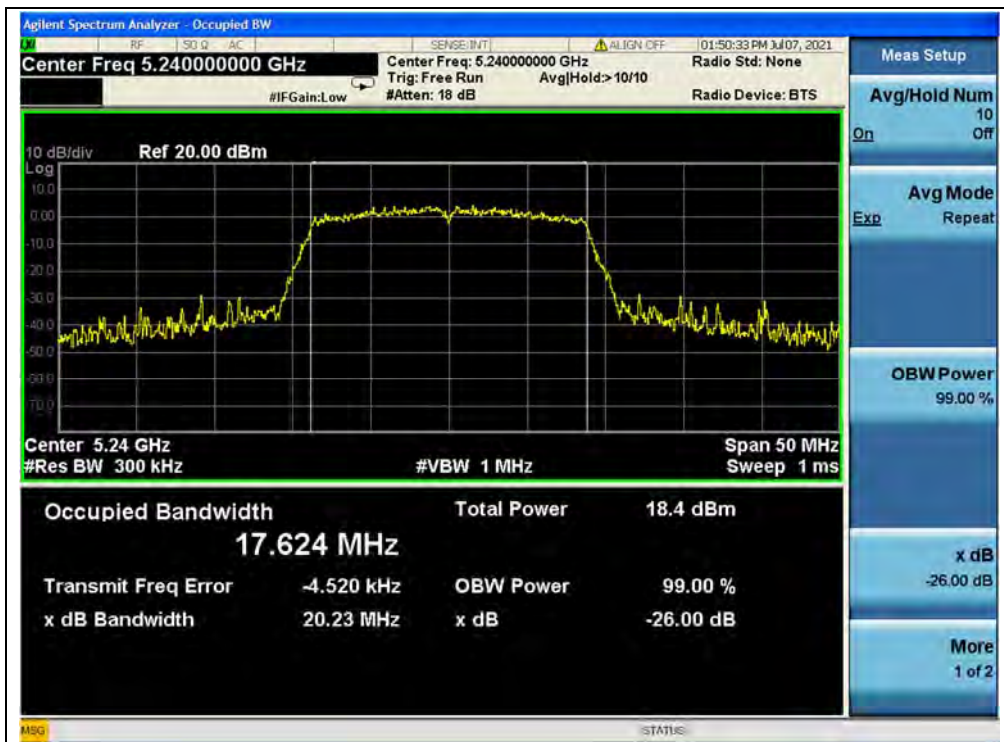
B. Test Plot:



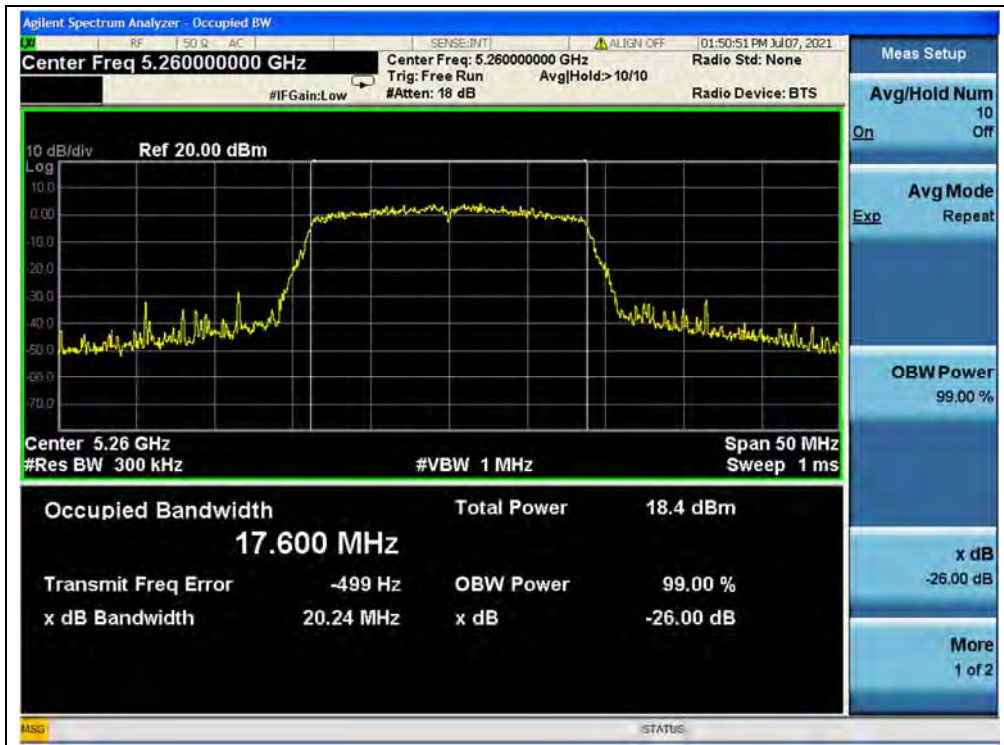
(Channel 36, 5180MHz, 802.11ac (VHT20))



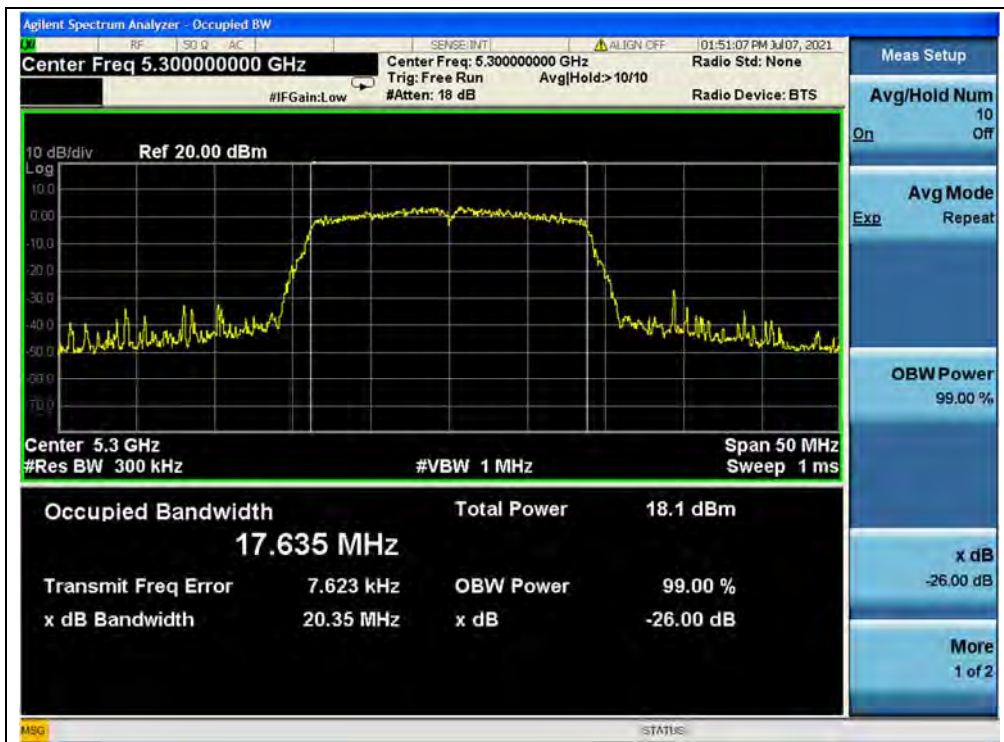
(Channel 44, 5220MHz, 802.11ac (VHT20))



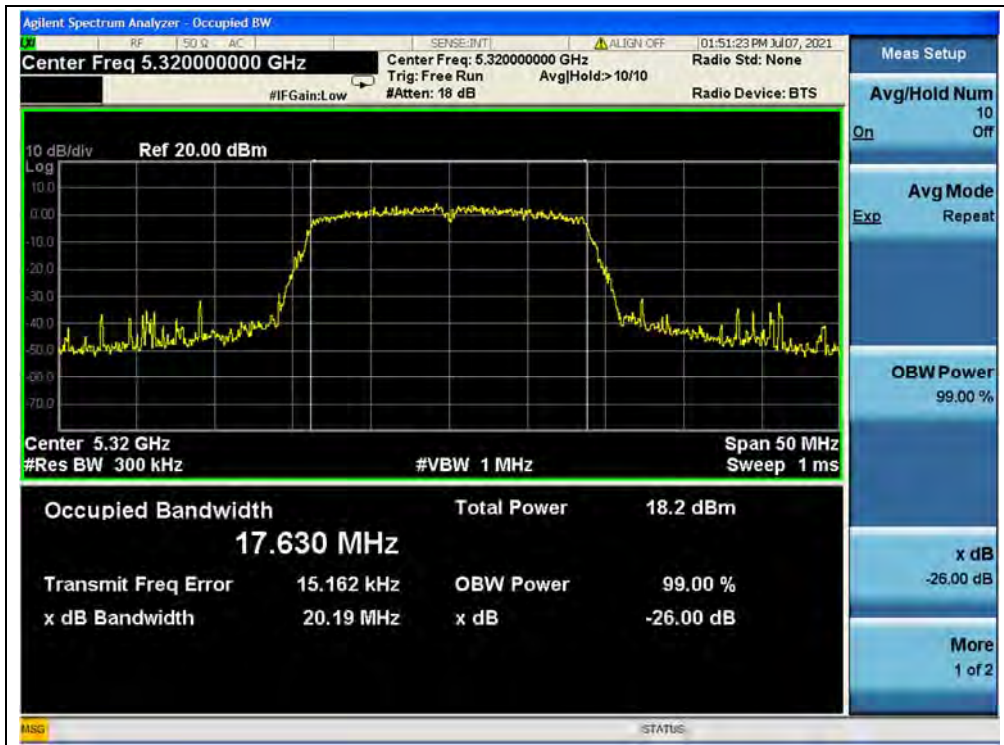
(Channel 48, 5240MHz, 802.11ac (VHT20))



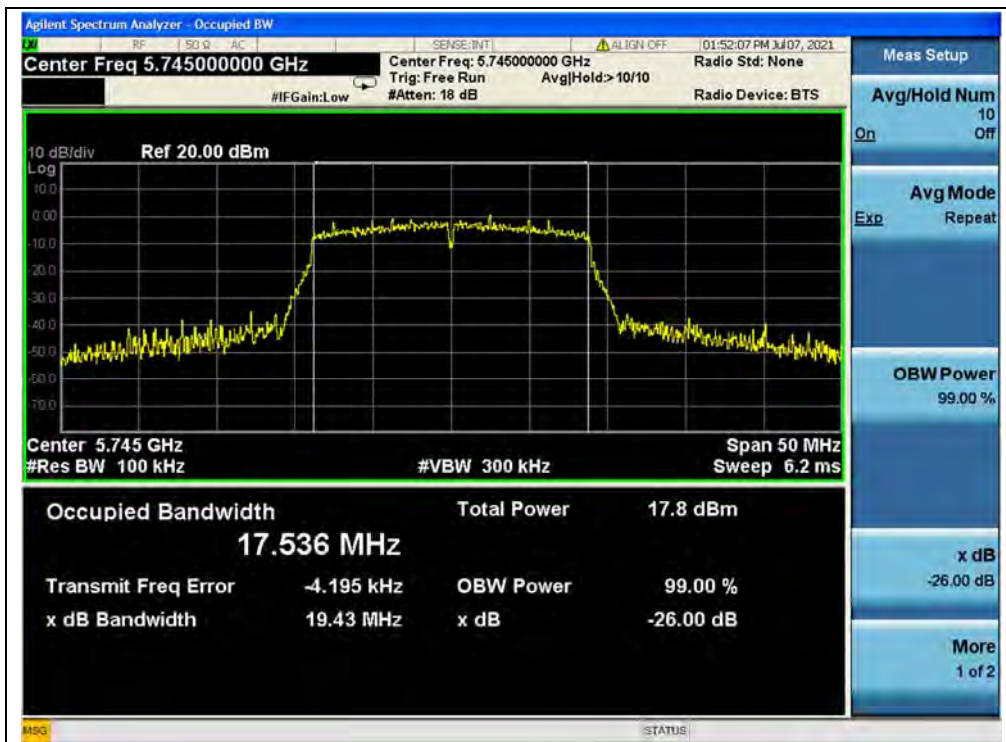
(Channel 52, 5260MHz, 802.11ac (VHT20))



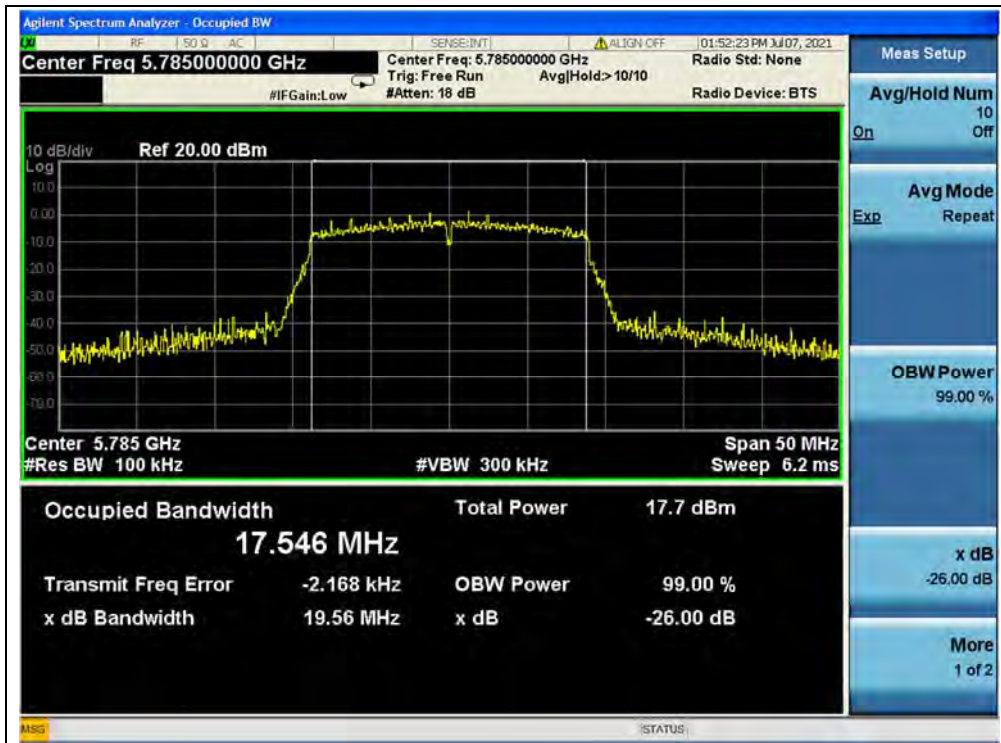
(Channel 60, 5300MHz, 802.11ac (VHT20))



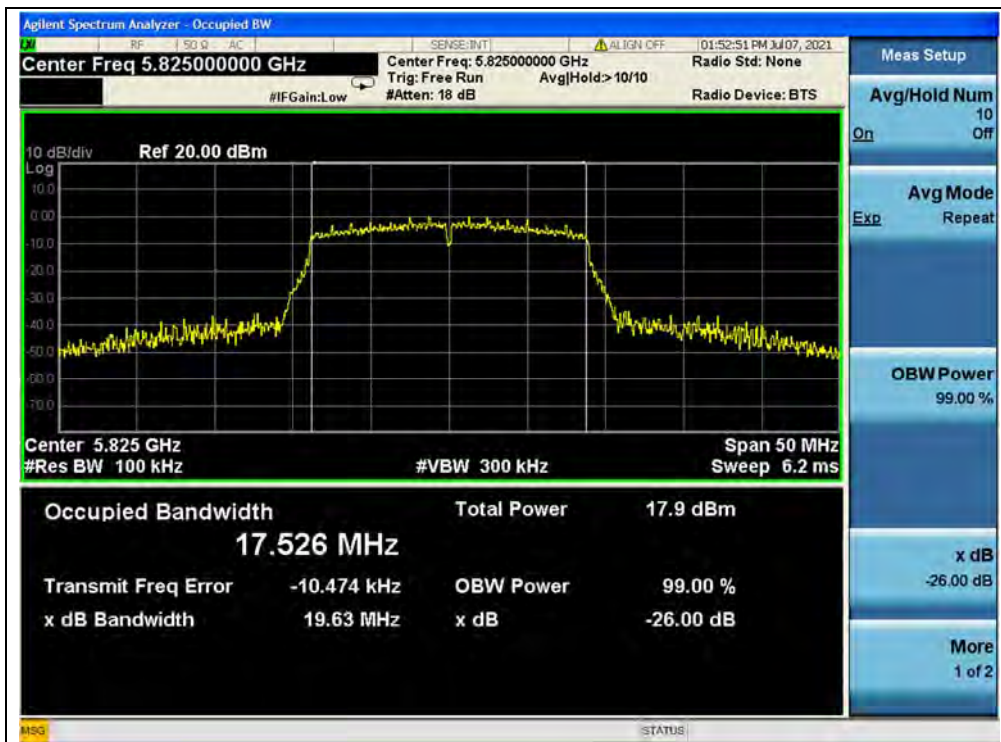
(Channel 64, 5320MHz, 802.11ac (VHT20))



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



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



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



802.11ac (VHT40) Mode

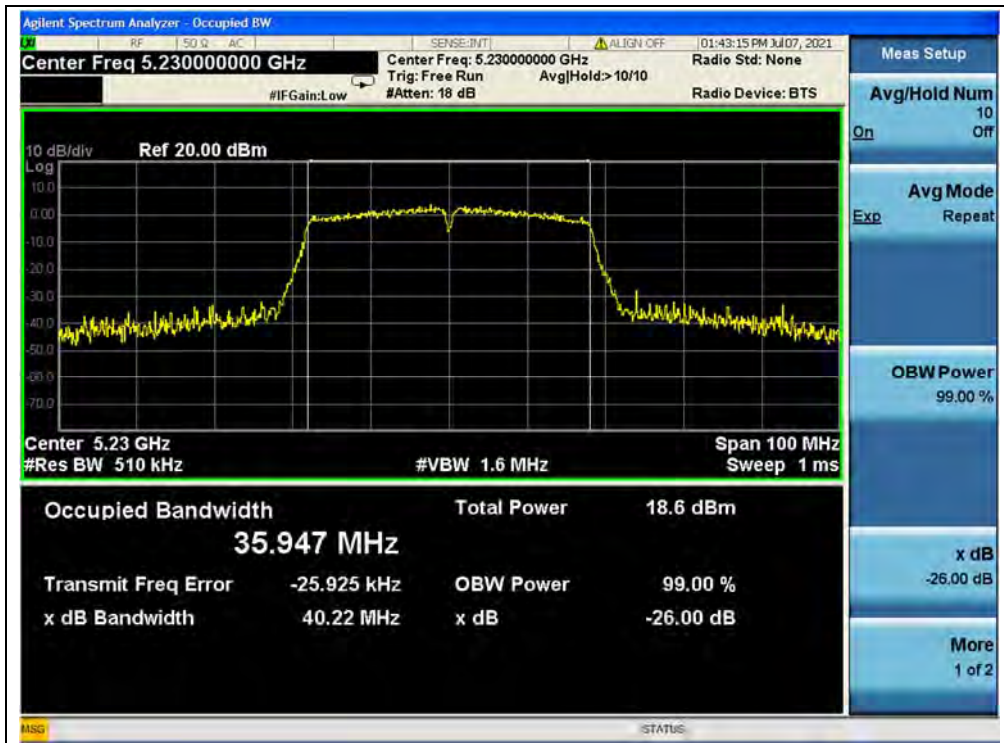
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	40.41
46	5230	40.22
54	5270	40.64
62	5310	40.02
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
151	5755	35.14
159	5795	33.88

B. Test Plot:



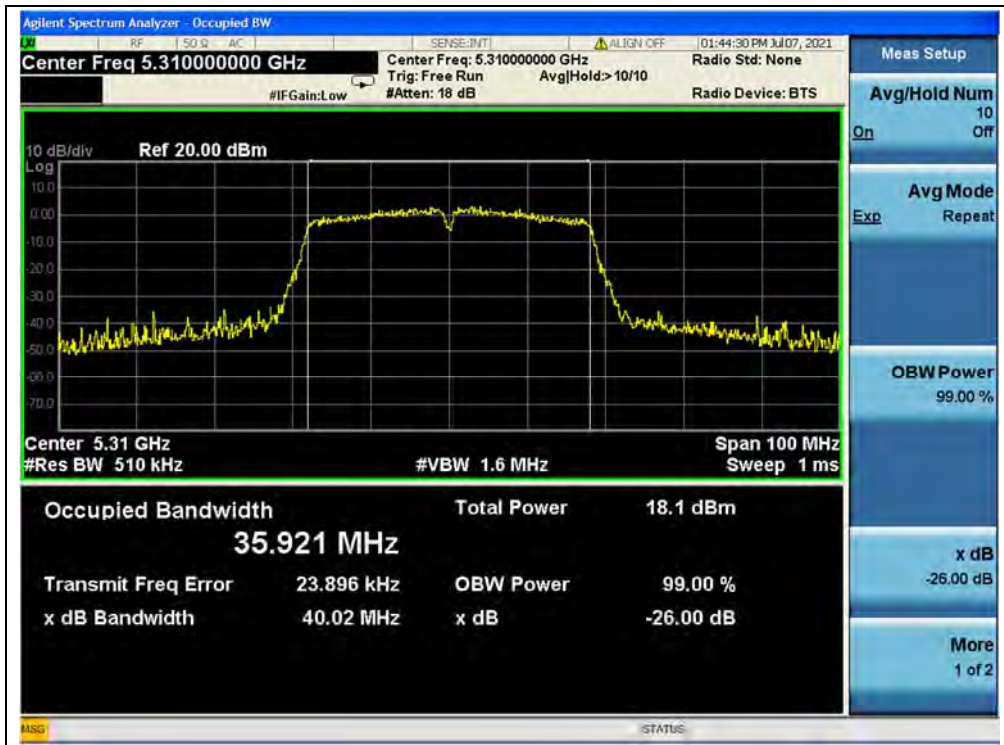
(Channel 38, 5190MHz, 802.11ac (VHT40))



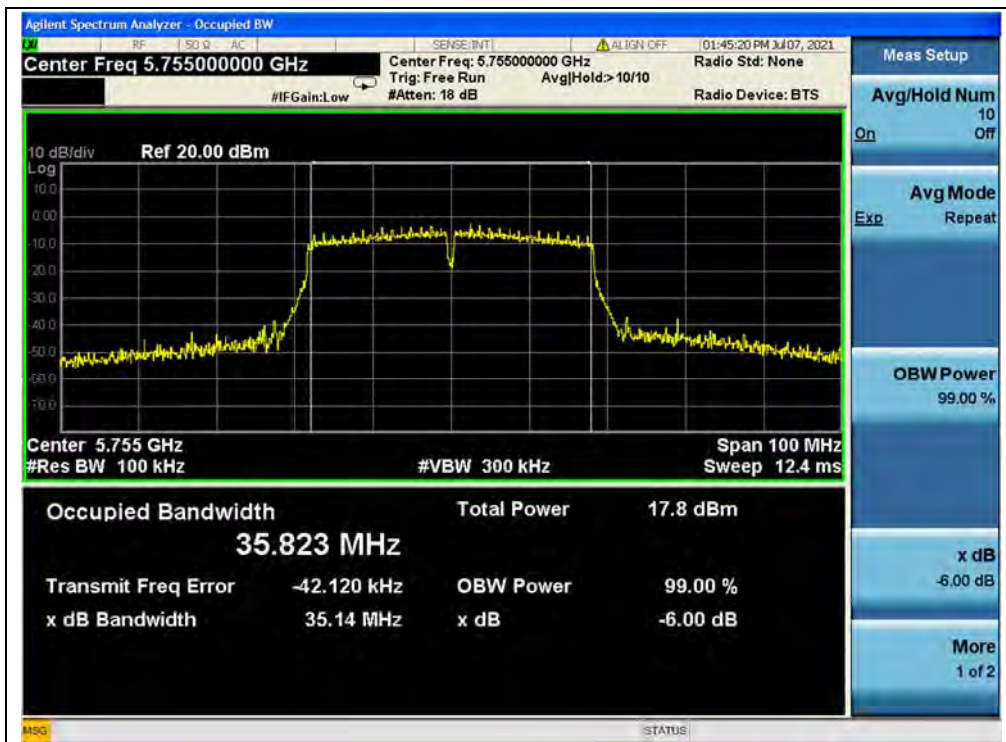
(Channel 46, 5230MHz, 802.11ac (VHT40))



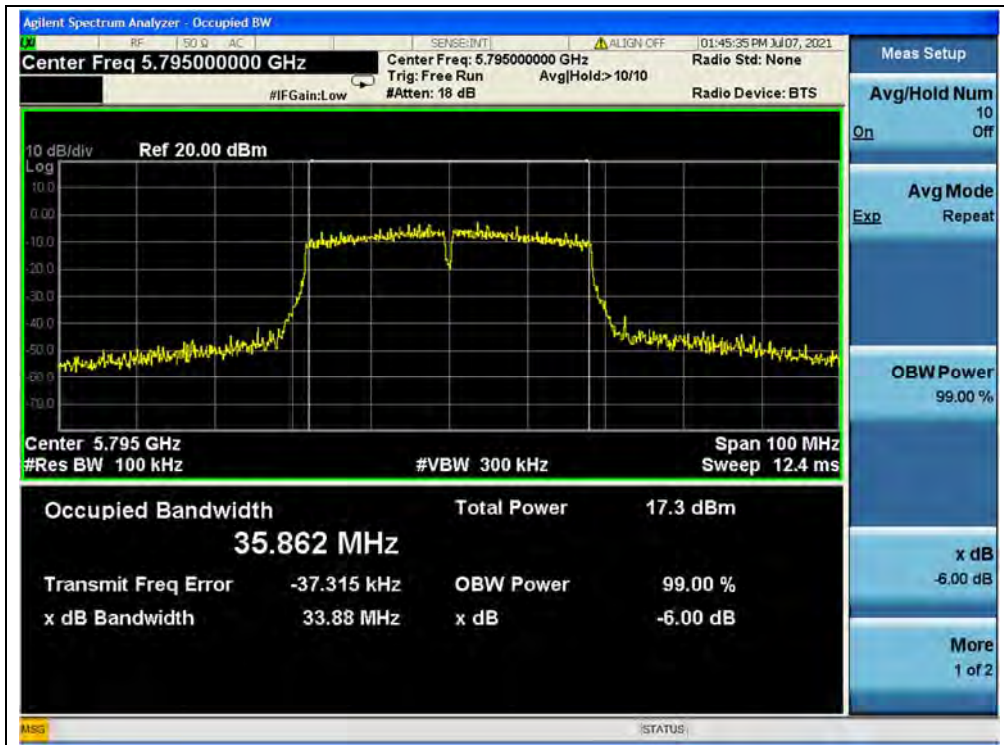
(Channel 54, 5270MHz, 802.11ac (VHT40))



(Channel 62, 5310MHz, 802.11ac (VHT40))



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



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



802.11ac (VHT80) Mode

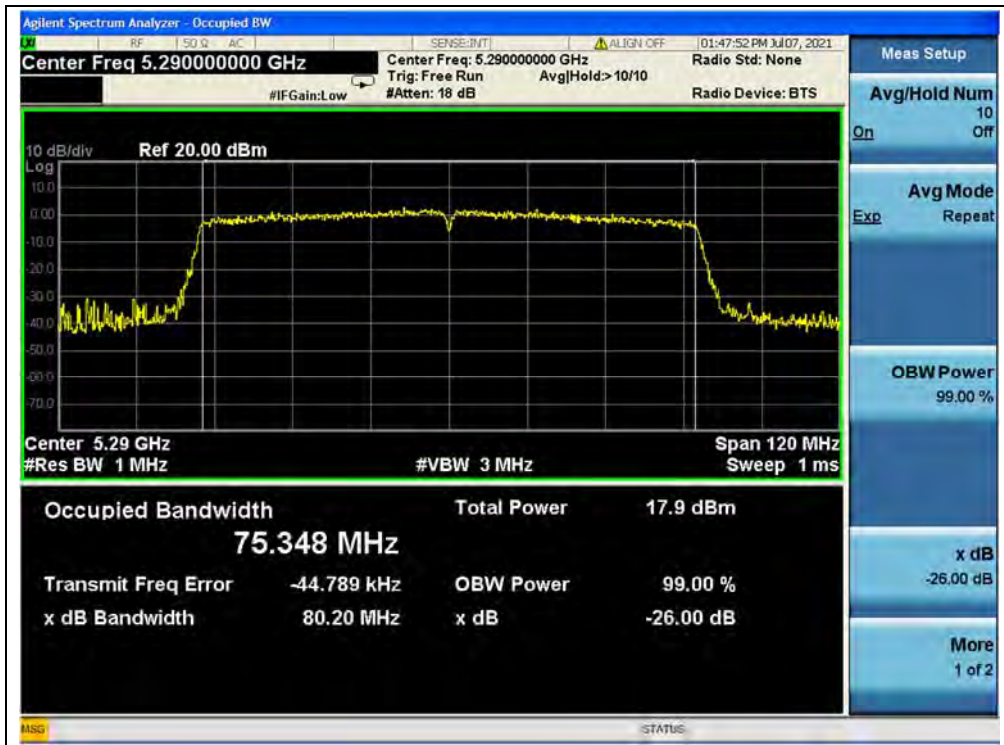
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
42	5210	80.53
58	5290	80.20
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
155	5775	75.14

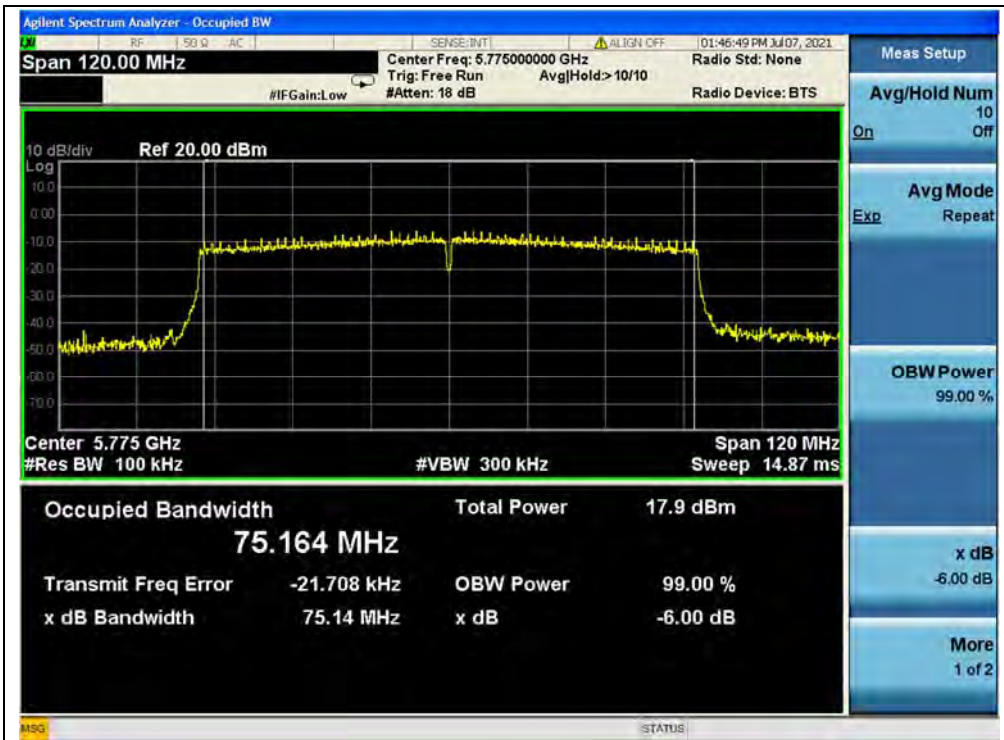
B. Test Plot:



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



(Channel 58, 5290MHz, 802.11ac (VHT80))



(Channel 155, 5775MHz, 802.11ac (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 11dBm 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 11dBm in any 1 megahertz band.

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

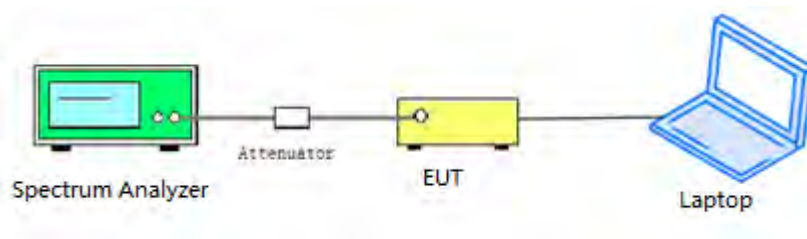
If transmitting antennas of directional gain greater than 6dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

(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-3 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
- 2) Set RBW = 1MHz. Set VBW ≥ 3MHz
- 3) Number of points in sweep ≥ 2 Span / RBW. Sweep time = auto
- 4) Detector = Average
- 5) Trace mode=Max hold
- 6) Record the max value

2.5.4. Test Result

802.11a Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	4.17	0.15	4.32	11	PASS
44	5220	3.95		4.10		
48	5240	3.86		4.01		
52	5260	3.64		3.79		
60	5300	3.46		3.61		
64	5320	3.58		3.73		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
149	5745	0.81	0.15	0.96	30	PASS
157	5785	0.95		1.10		
165	5825	0.54		0.69		



B. Test Plot:



(Channel 36, 5180MHz, 802.11a)



(Channel 44, 5220MHz, 802.11a)



(Channel 48, 5240MHz, 802.11a)



(Channel 52, 5260MHz, 802.11a)



(Channel 60, 5300MHz, 802.11a)



(Channel 64, 5320MHz, 802.11a)



(Channel 149, 5745MHz, 802.11a)



(Channel 157, 5785MHz, 802.11a)



(Channel 165, 5825MHz, 802.11a)



802.11n (HT20) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Corrected PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	3.73	0.13	3.86	11	PASS
44	5220	3.66		3.79		
48	5240	3.61		3.74		
52	5260	3.31		3.44		
60	5300	3.27		3.40		
64	5320	3.30		3.43		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
149	5745	0.45	0.13	0.58	30	PASS
157	5785	0.48		0.61		
165	5825	0.16		0.29		

B. Test Plot:



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



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



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



(Channel 52, 5260MHz, 802.11n (HT20))



(Channel 60, 5300MHz, 802.11n (HT20))



(Channel 64, 5320MHz, 802.11n (HT20))



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



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



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



802.11n (HT40) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Corrected PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
38	5190	0.86	0.29	1.15	11	PASS
46	5230	0.63		0.92		
54	5270	0.31		0.60		
62	5310	0.41		0.70		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
151	5755	-2.50	0.29	-2.21	30	PASS
159	5795	-2.58		-2.29		

B. Test Plot:



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



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



(Channel 54, 5270MHz, 802.11n (HT40))



(Channel 62, 5310MHz, 802.11n (HT40))



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



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



802.11ac (VHT20) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Corrected PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
36	5180	3.74	0.16	3.90	11	PASS
44	5220	3.64		3.80		
48	5240	3.43		3.59		
52	5260	3.38		3.54		
60	5300	3.08		3.24		
64	5320	3.19		3.35		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
149	5745	0.54	0.16	0.70	30	PASS
157	5785	0.39		0.55		
165	5825	0.17		0.33		

B. Test Plot:



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



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



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



(Channel 52, 5260MHz, 802.11ac (VHT20))



(Channel 60, 5300MHz, 802.11ac (VHT20))



(Channel 64, 5320MHz, 802.11ac (VHT20))



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



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



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



802.11ac (VHT40) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Duty Factor	Corrected PPSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
38	5190	1.09	0.29	1.38	11	PASS
46	5230	0.88		1.17		
54	5270	0.30		0.59		
62	5310	0.34		0.63		
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
151	5755	-2.67	0.29	-2.38	30	PASS
155	5795	-2.54		-2.25		

B. Test Plot:



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



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



(Channel 54, 5270MHz, 802.11ac (VHT40))



(Channel 62, 5310MHz, 802.11ac (VHT40))



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



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



802.11ac (VHT80) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Corrected PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
42	5210	-2.58	0.57	-2.01	11	PASS
58	5290	-2.88		-2.31		
Channel	Frequency (MHz)	Measured PSD (dBm/500KHz)	Duty Factor	Corrected (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
155	5775	-5.56	0.57	-4.99	30	PASS

B. Test Plot:



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



(Channel 58, 5290MHz, 802.11ac (VHT80))



(Channel 155, 5775MHz, 802.11ac (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 Procedure

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)	Fre. Dev. (kHz)	Deviation (ppm)
100%	5.00	+20(Ref)	20	3.861
100%		-30	31	5.985
100%		-20	18	3.475
100%		-10	24	4.633
100%		0	25	4.826
100%		+10	21	4.054
100%		+20	20	3.861
100%		+30	23	4.440
100%		+40	23	4.440
100%		+50	21	4.054
85%		4.25	+20	28
115%	5.75	+20	20	3.861



U-NII-2A (Ch. 52)				
5260MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Fre. Dev. (kHz)	Deviation (ppm)
100%	5.00	+20(Ref)	18	3.422
100%		-30	22	4.183
100%		-20	25	4.753
100%		-10	27	5.133
100%		0	19	3.612
100%		+10	17	3.232
100%		+20	21	3.992
100%		+30	26	4.943
100%		+40	24	4.563
100%		+50	25	4.753
85%	4.25	+20	19	3.612
115%	5.75	+20	22	4.183

U-NII-3 (Ch. 149)				
5745MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Fre. 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 50μH/50Ω line impedance stabilization network (LISN).

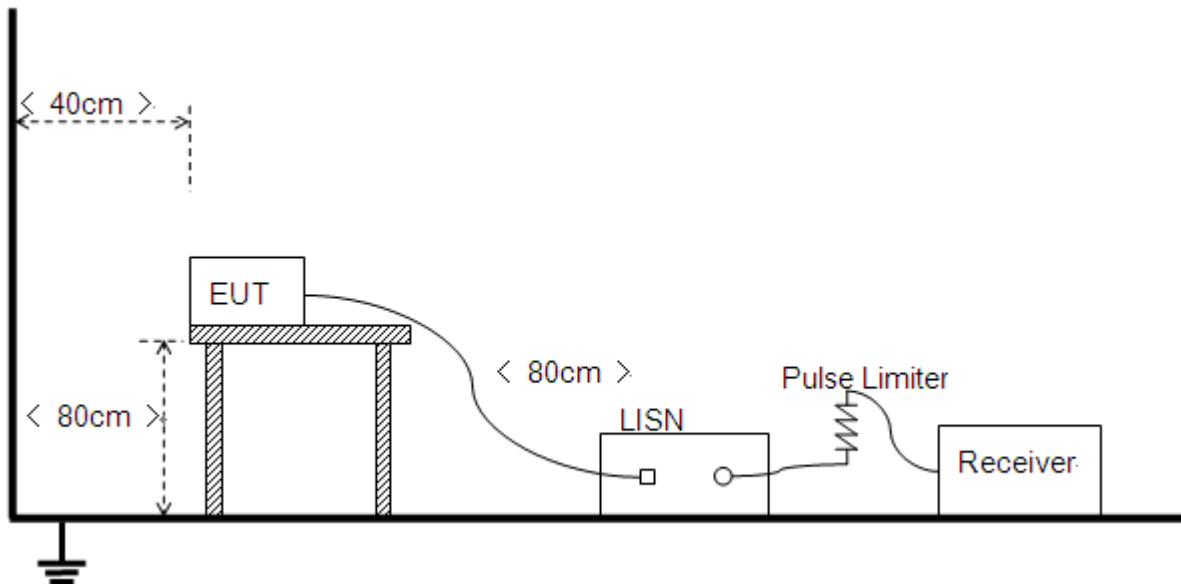
Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

- (a) The lower limit shall apply at the band edges.
- (b) 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. Set RBW=9kHz, VBW=30kHz. Refer to recorded points and Plot 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

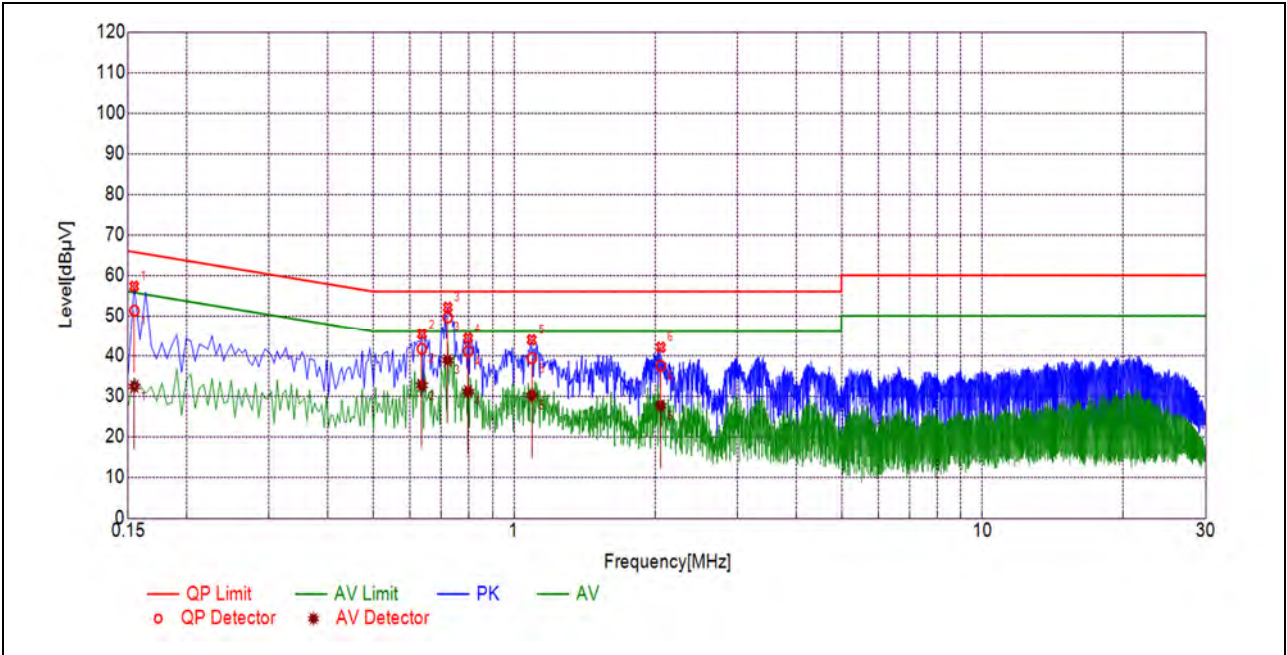
The measurement results are obtained as below:

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

U_R : Receiver Reading

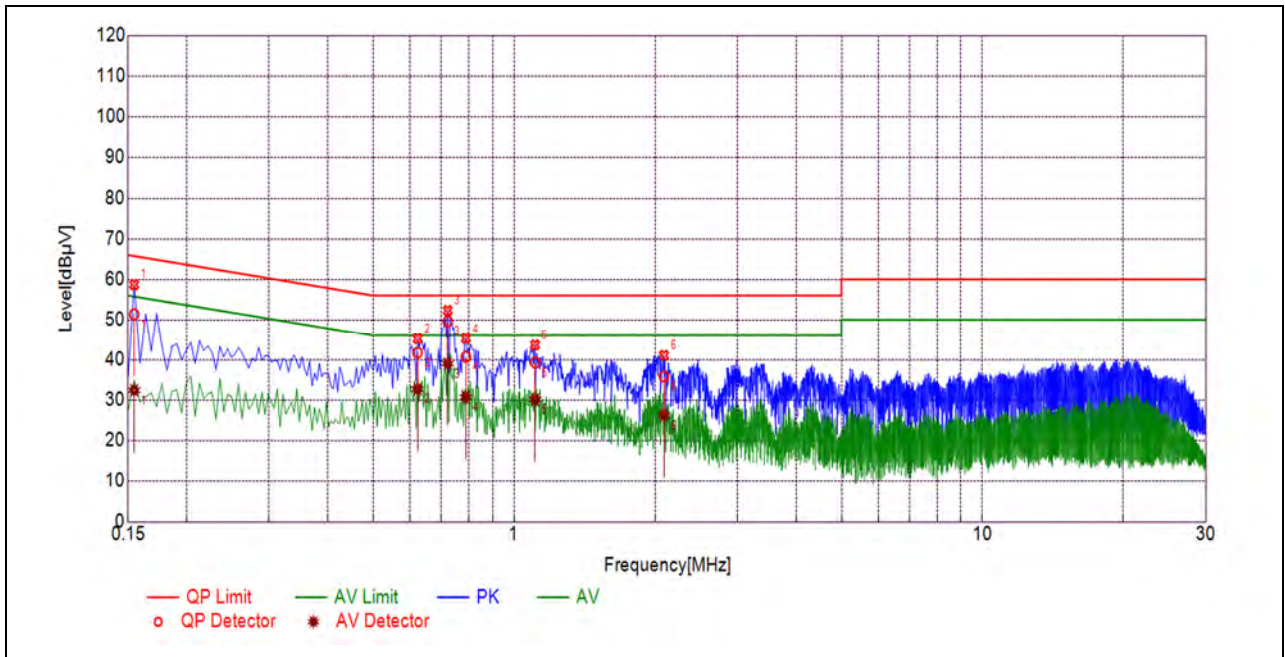
A_{Factor} : Voltage division factor of LISN

B. Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1546	51.26	32.36	65.75	55.75	Line	PASS
2	0.6357	41.64	32.64	56.00	46.00		PASS
3	0.7215	49.61	38.82	56.00	46.00		PASS
4	0.7977	41.07	31.14	56.00	46.00		PASS
5	1.0913	39.32	30.12	56.00	46.00		PASS
6	2.0562	37.42	27.58	56.00	46.00		PASS



(N Phase)

No.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1544	51.36	32.38	65.76	55.76	Neutral	PASS
2	0.6221	41.70	32.67	56.00	46.00		PASS
3	0.7216	49.62	38.98	56.00	46.00		PASS
4	0.7891	40.69	30.68	56.00	46.00		PASS
5	1.1096	39.24	30.12	56.00	46.00		PASS
6	2.0889	35.82	26.22	56.00	46.00		PASS

2.8. Restricted Frequency Bands

2.8.1. 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:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The following formula is used to convert the equipment isotropic radiated power(e.i.r.p.) 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

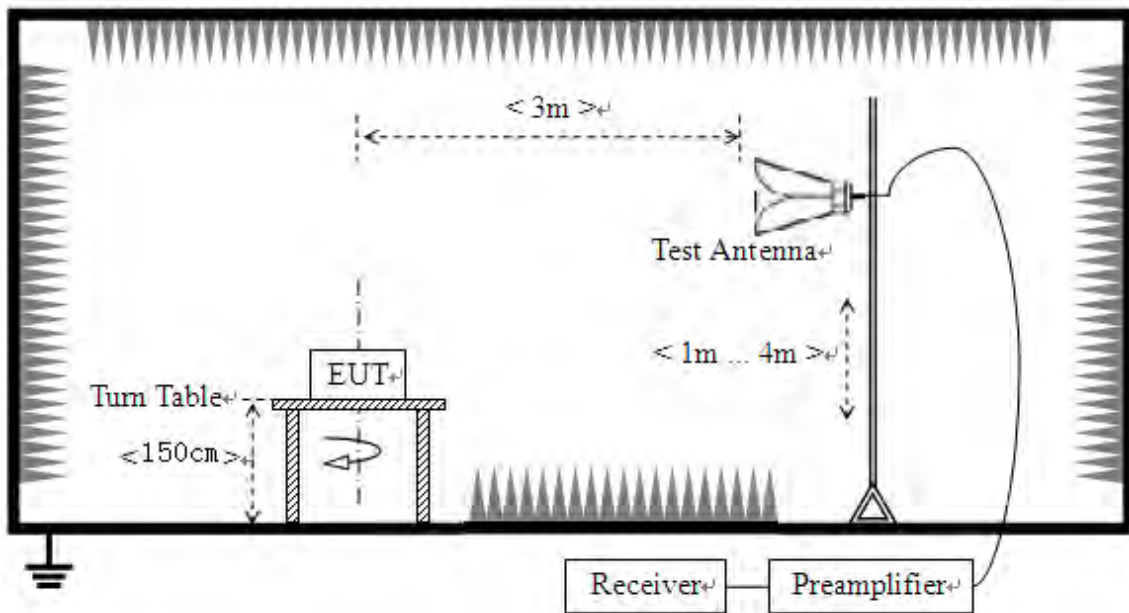
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following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

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	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

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).

2.8.2. Test Description

Test Setup





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.

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 1: 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.

Note 2 All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

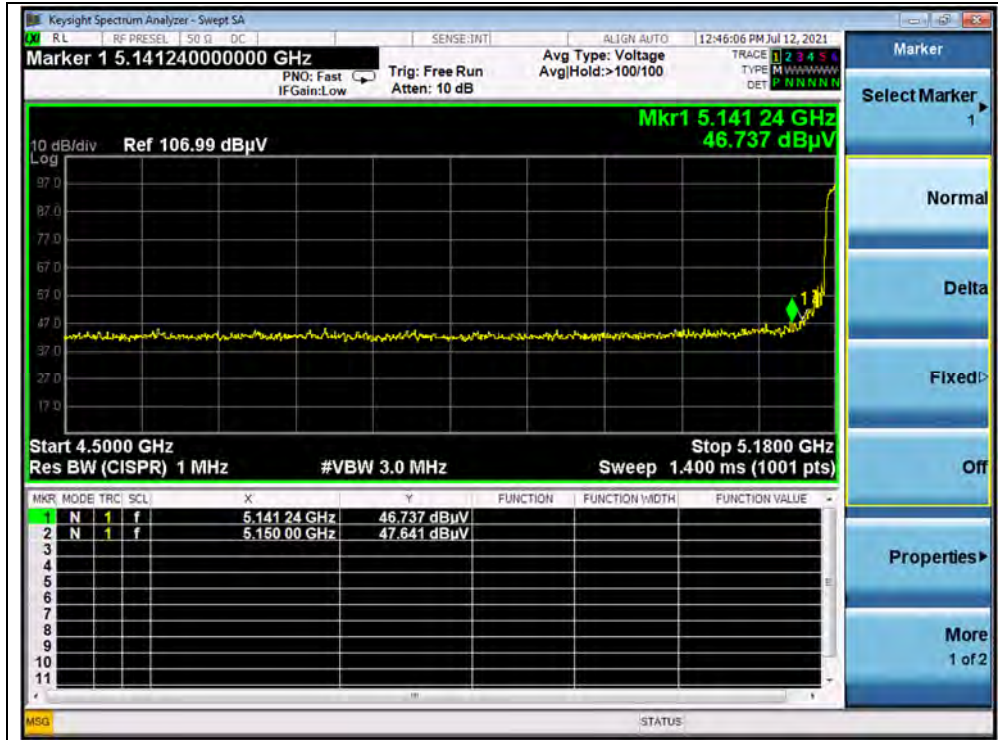
802.11a Mode

A. Test Verdict:

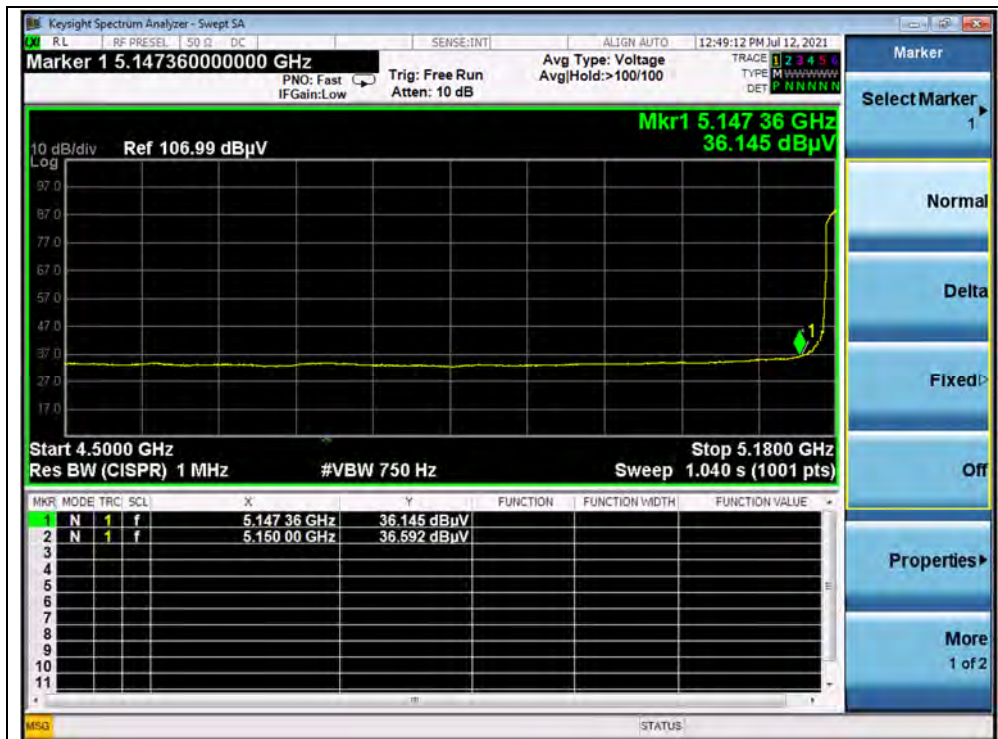
Channel	Frequency (MHz)	Detector	Receiver Reading	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV	U_R (dB μ V)					
36	5150.00	PK	47.64	-19.54	32.20	60.30	74	PASS
36	5150.00	AV	36.59	-19.54	32.20	49.25	54	PASS
64	5357.24	PK	44.44	-18.80	32.20	57.84	74	PASS
64	5351.78	AV	34.65	-18.80	32.20	48.05	54	PASS
149	5725.00	PK	53.15	-19.01	32.20	66.34	122.23	PASS
165	5850.00	PK	44.78	-19.01	32.20	57.97	122.23	PASS



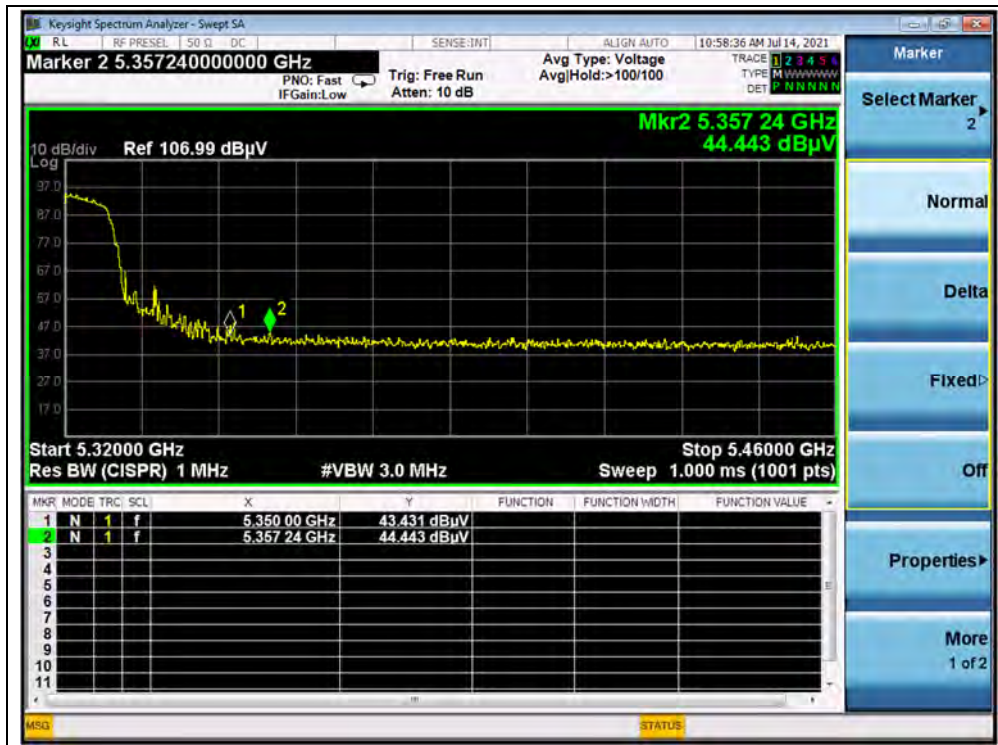
B.Test Plot:



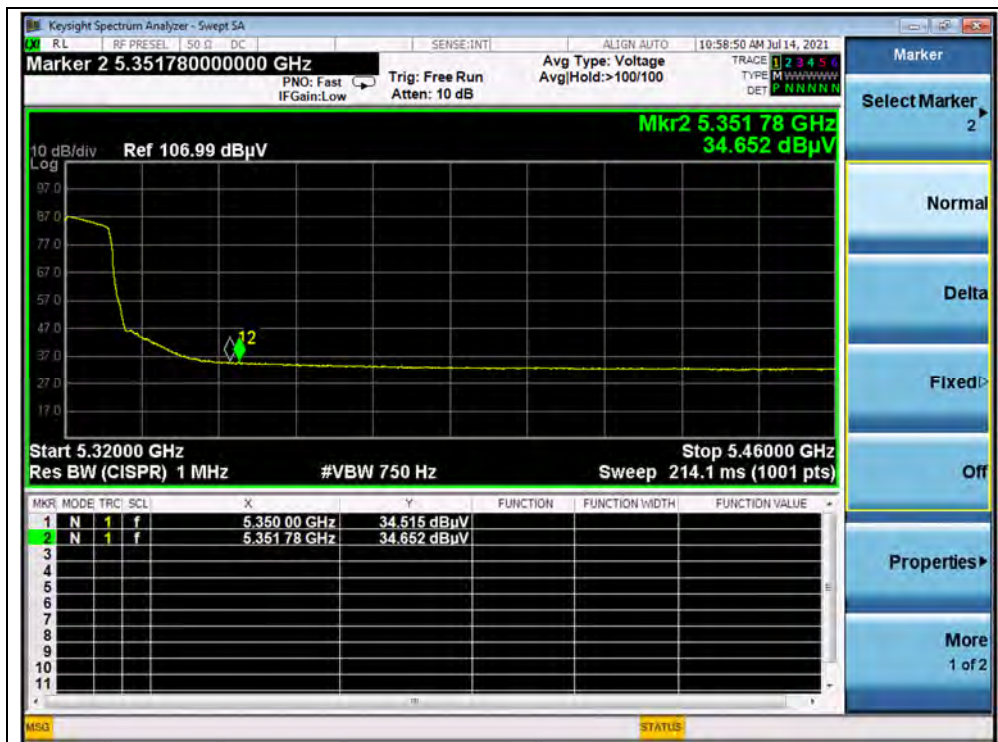
(PEAK, Channel 36, 802.11a)



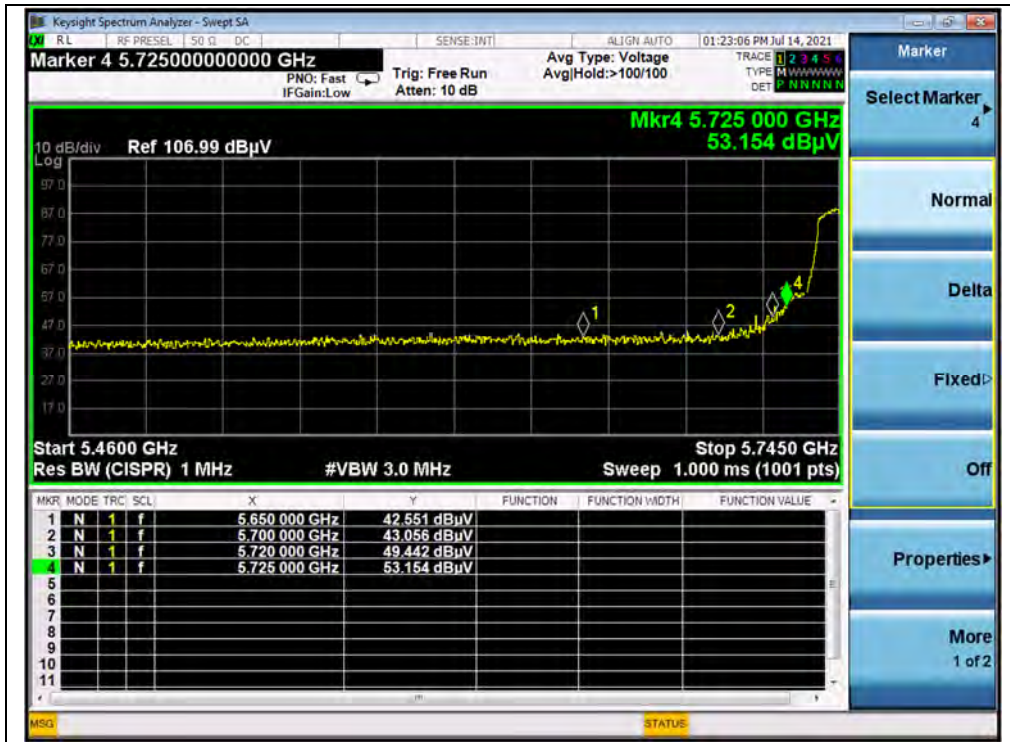
(AVERAGE, Channel 36, 802.11a)



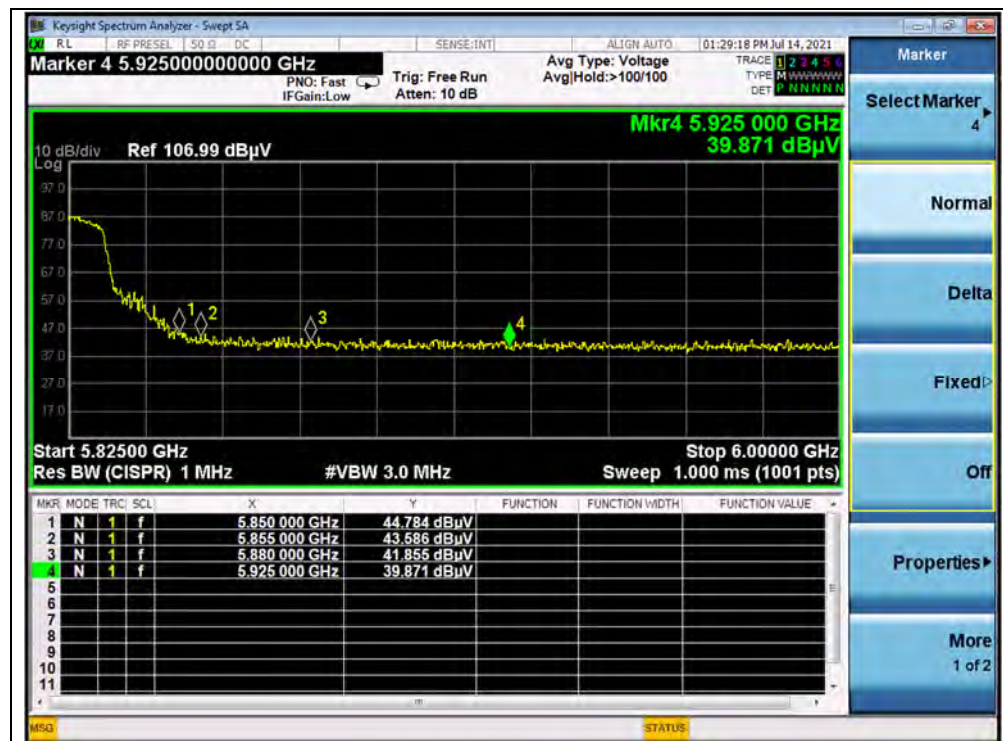
(PEAK, Channel 64, 802.11a)



(AVERAGE, Channel 64, 802.11a)



(PEAK, Channel 149, 802.11a)



(PEAK, Channel 165, 802.11a)

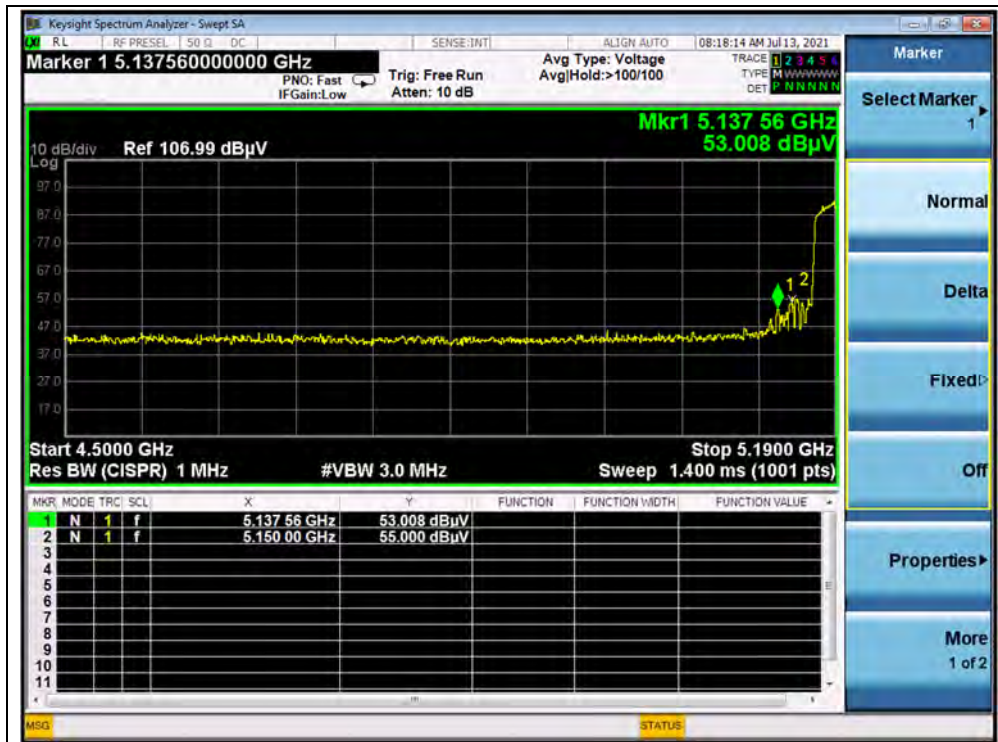


802.11n (HT40) Mode

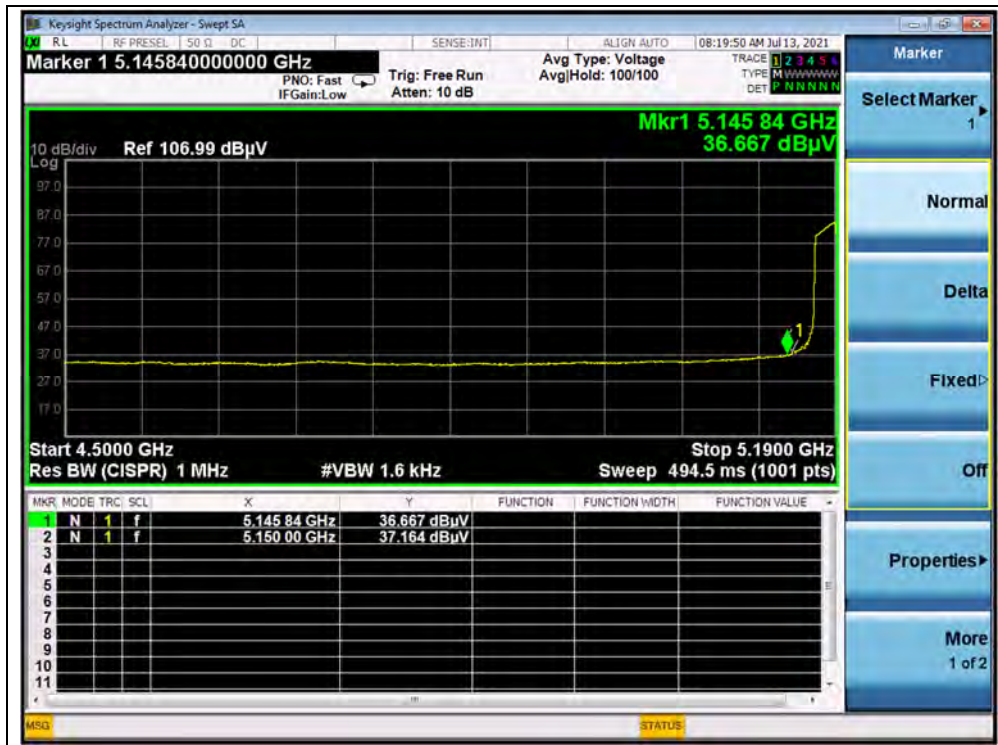
A.Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading	A_T	A_{Factor}	Max. Emission	Limit (dB μ V/m)	Verdict
		PK/ AV	U_R (dB μ V)	(dB)	(dB@3m)	E (dB μ V/m)		
38	5150.00	PK	55.00	-19.54	32.20	67.66	74	PASS
38	5150.00	AV	37.16	-19.54	32.20	49.82	54	PASS
62	5351.25	PK	52.15	-18.80	32.20	65.55	74	PASS
62	5350.00	AV	36.39	-18.80	32.20	49.79	54	PASS
151	5725.00	PK	57.46	-19.01	32.20	70.65	122.23	PASS
159	5850.00	PK	45.59	-19.01	32.20	58.78	122.23	PASS

B.Test Plot:



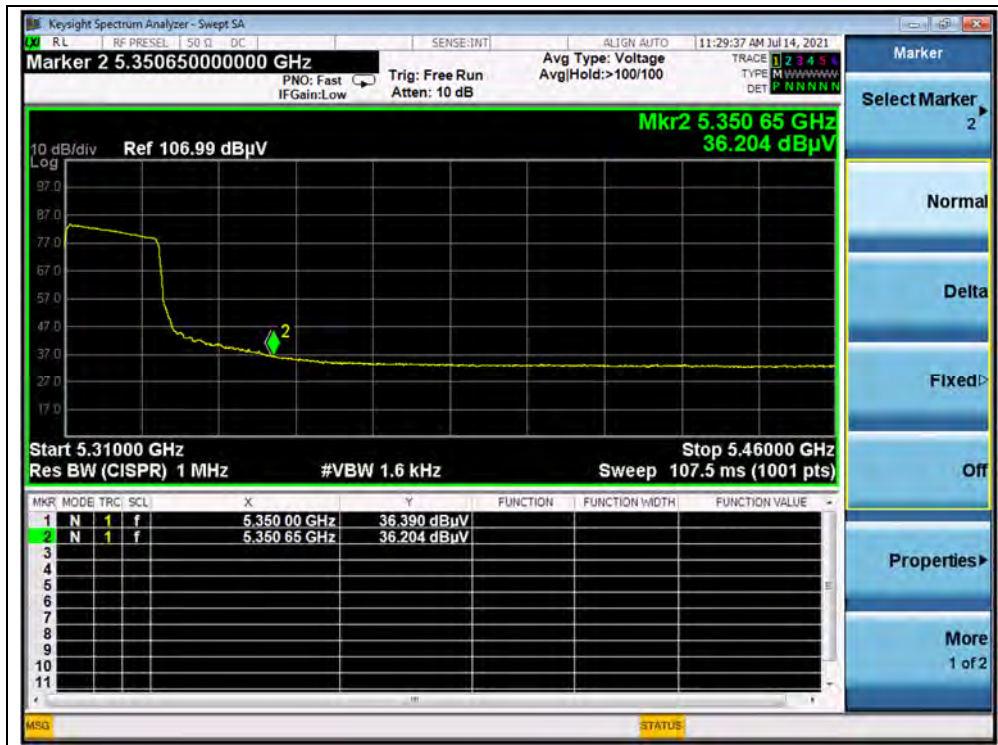
(PEAK, Channel 38, 802.11n (HT40))



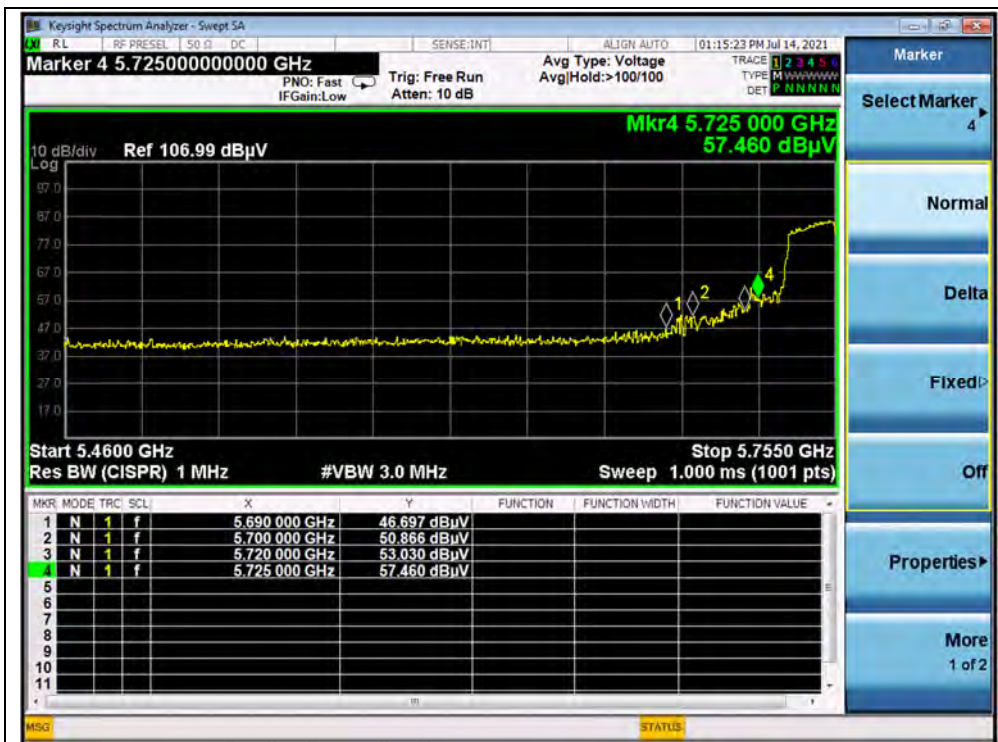
(AVERAGE, Channel 38, 802.11n (HT40))



(PEAK, Channel 62, 802.11n (HT40))



(AVERAGE, Channel 62, 802.11n (HT40))



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



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

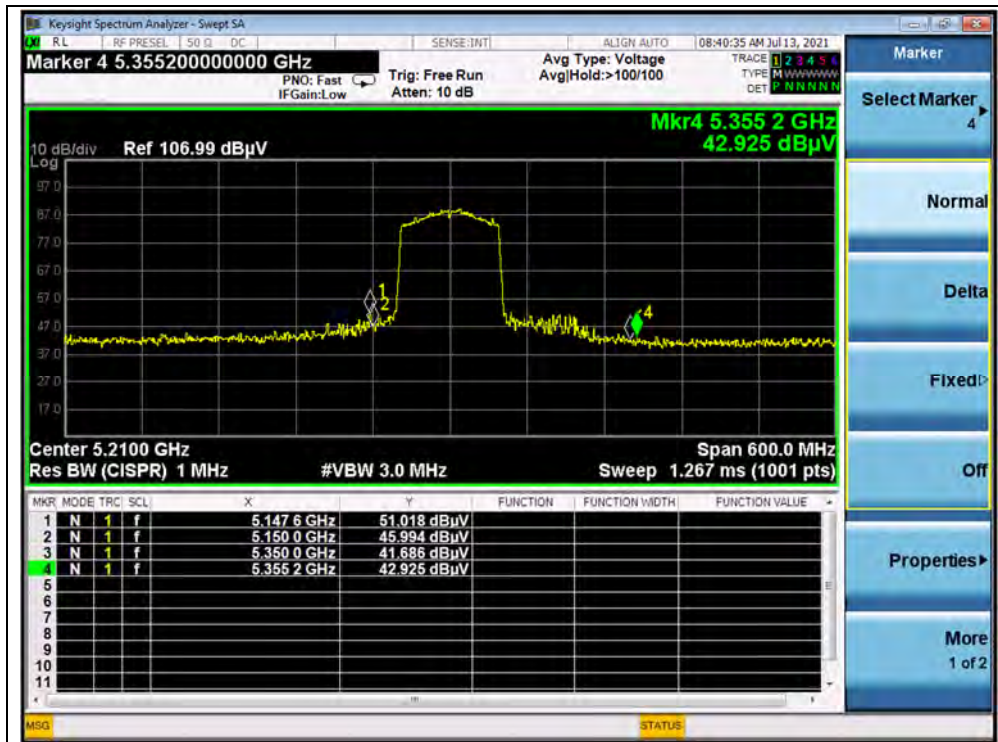


802.11ac (VHT80) Mode

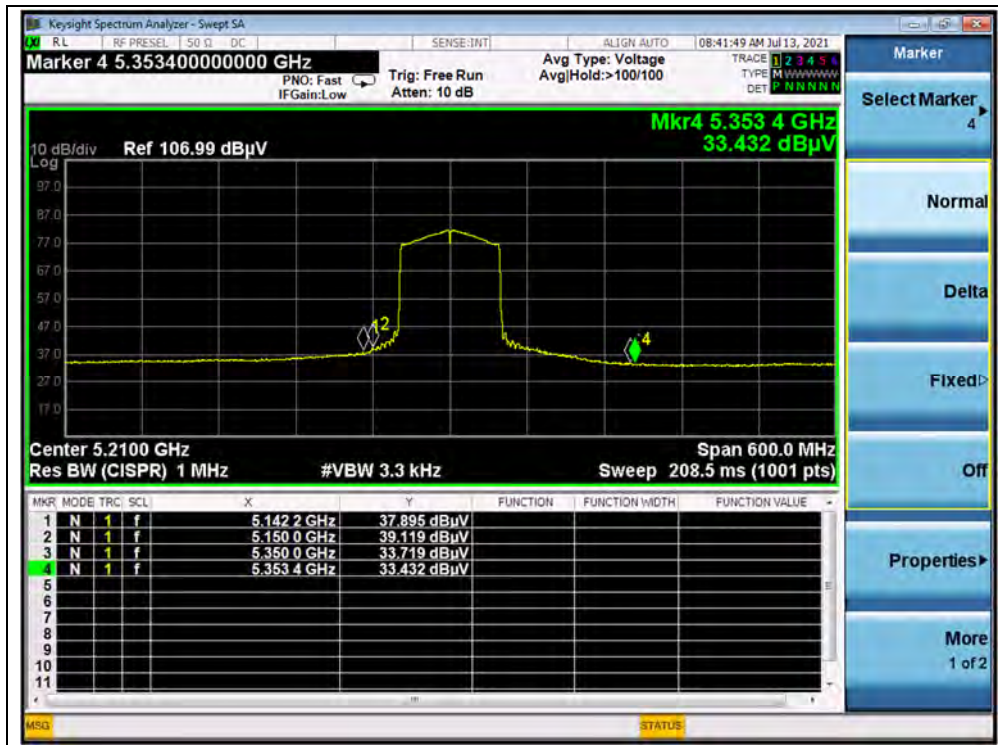
A.Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading	A_T	A_{Factor}	Max. Emission	Limit	Verdict
		PK/ AV	U_R (dB μ V)	(dB)	(dB@3m)	E (dB μ V/m)	(dB μ V/m)	
42	5147.60	PK	51.02	-19.54	32.20	63.68	74	PASS
42	5150.00	AV	39.12	-19.54	32.20	51.78	54	PASS
58	5377.60	PK	47.02	-18.80	32.20	60.42	74	PASS
58	5350.00	AV	37.27	-18.80	32.20	50.67	54	PASS
155	5725.00	PK	57.33	-19.01	32.20	70.52	122.23	PASS
155	5850.00	PK	51.92	-19.01	32.20	65.11	122.23	PASS

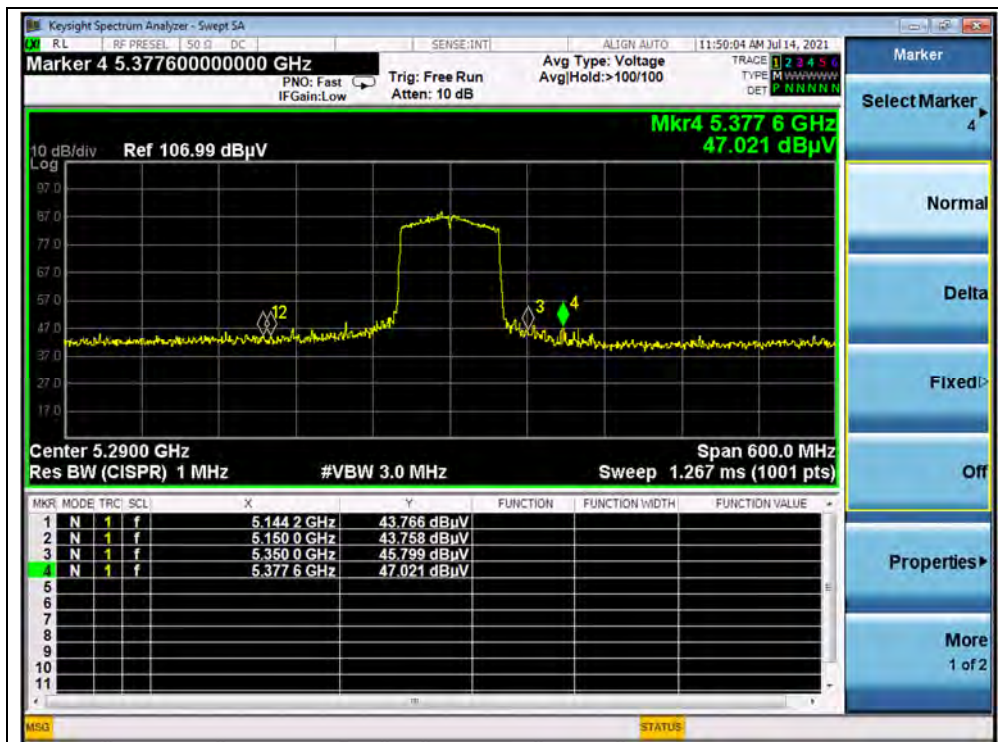
B.Test Plot:



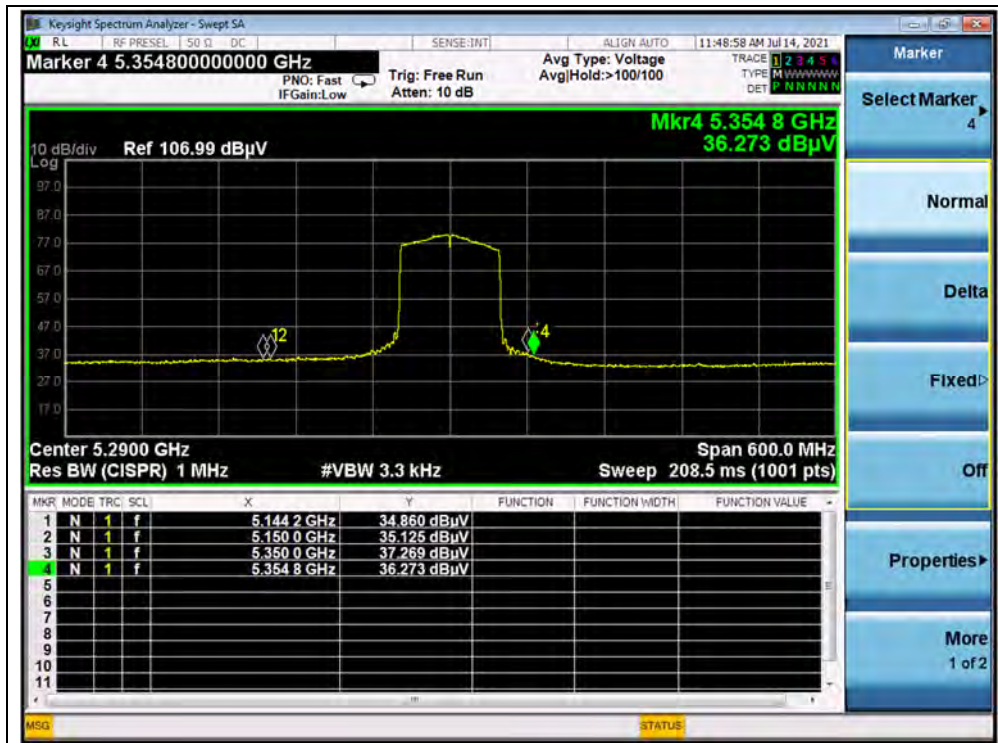
(PEAK, Channel 42, 802.11ac (VHT80))



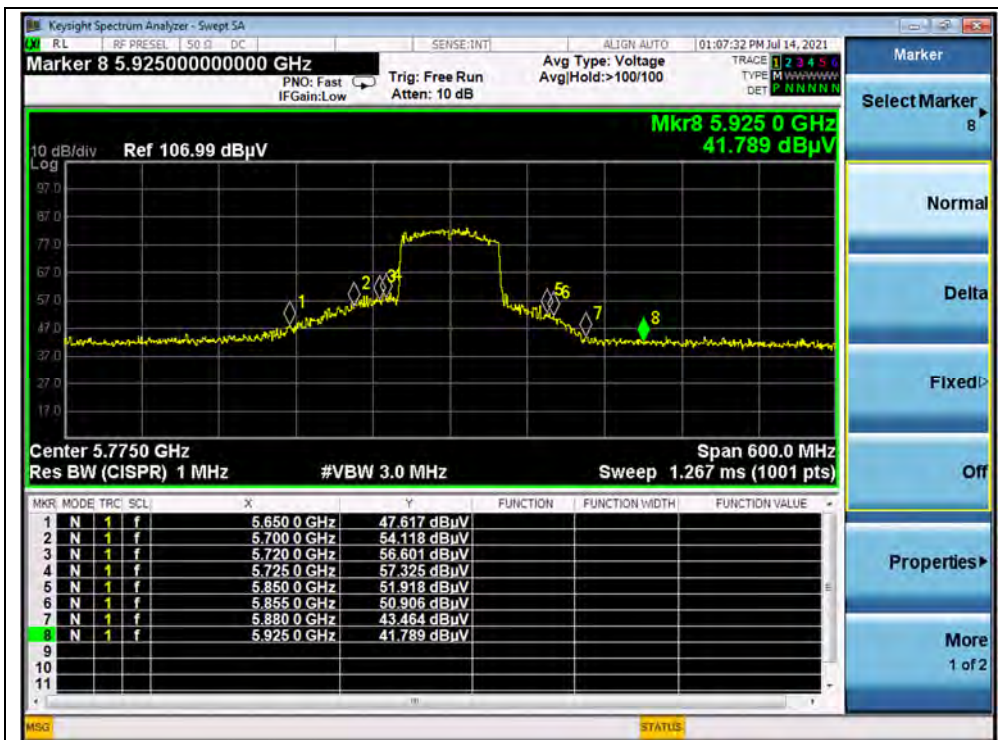
(AVERAGE, Channel 42, 802.11ac (VHT80))



(PEAK, Channel 58, 802.11ac (VHT80))



(AVERAGE, Channel 58, 802.11ac (VHT80))



(PEAK, Channel 155, 802.11ac (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(e.i.r.p.) 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:

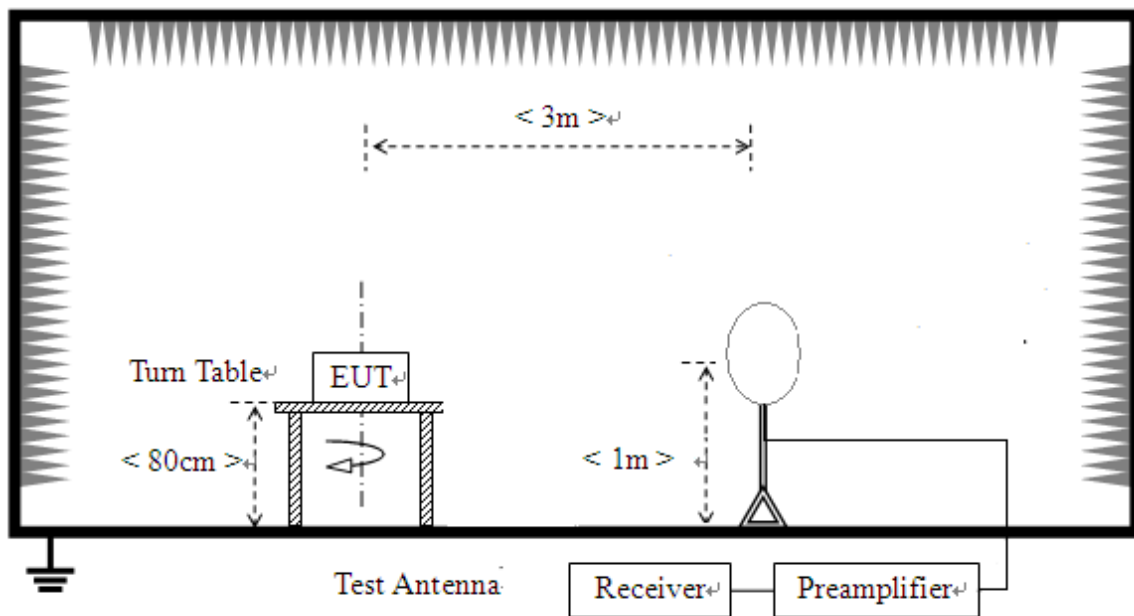
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

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).

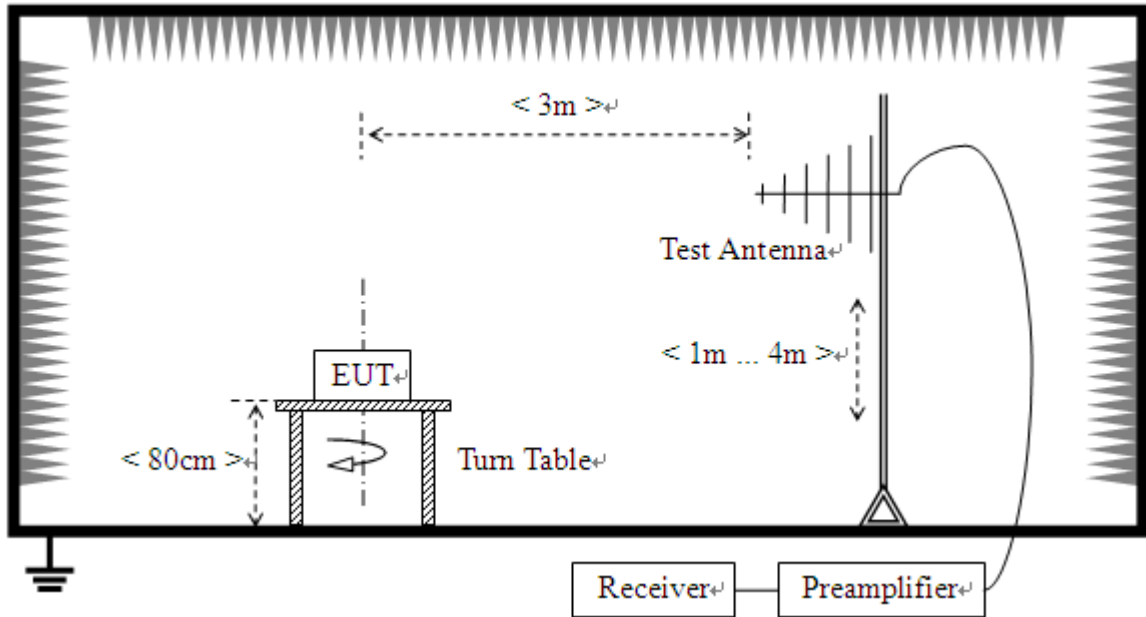
2.9.2. Test Description

Test Setup:

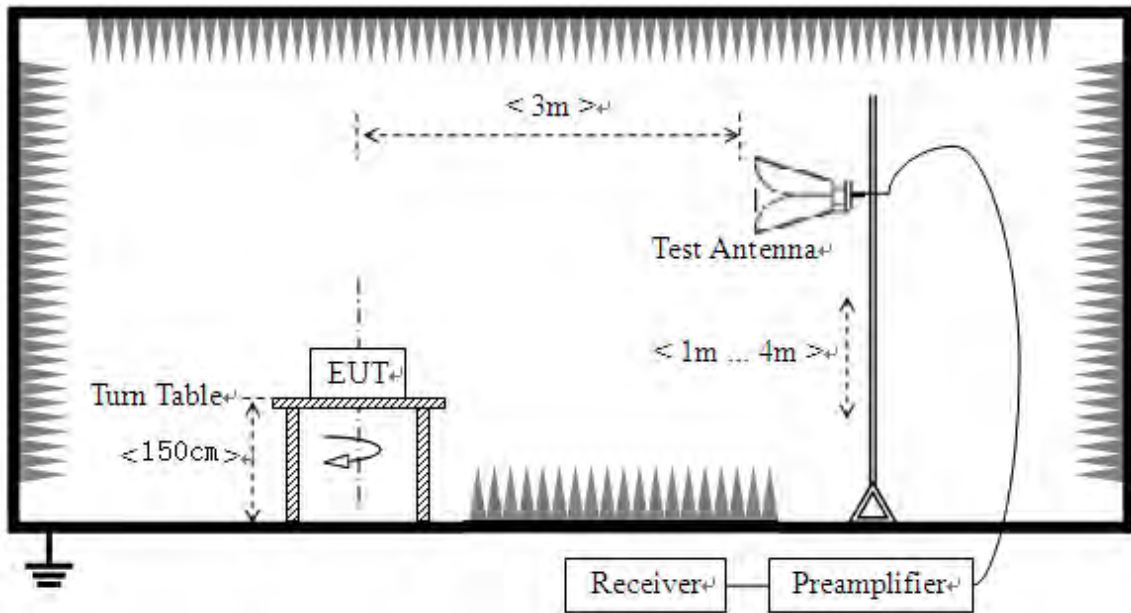
- 1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.



For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

2.9.3. Test Result

According to ANSI C63.10, 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 (or average) limit, it is unnecessary to perform a quasi-peak measurement (or average).

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.

Note 1: 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.

Note 2: 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.

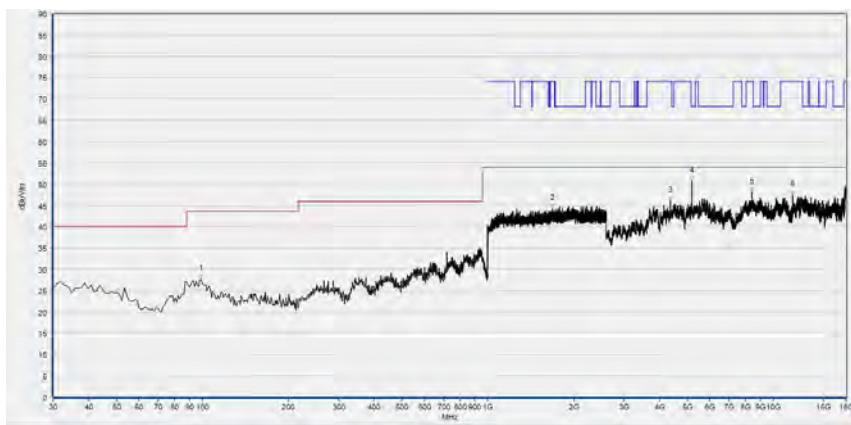
Note 3: For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note 4: All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.



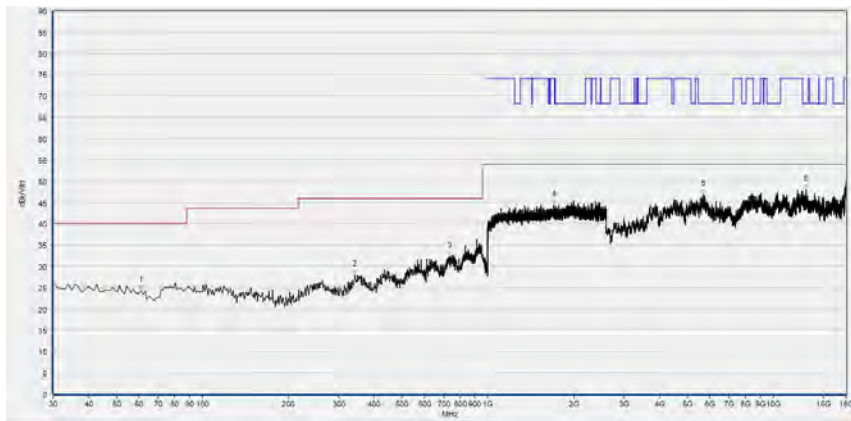
802.11a Mode

Plot 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
98.870	27.59	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1685.867	44.31	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4367.920	46.03	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5181.040	50.55	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
8427.360	48.16	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11716.800	47.47	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

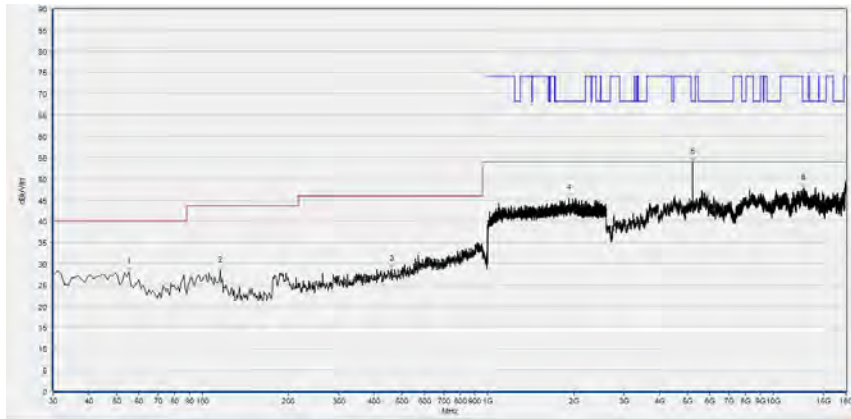
(Antenna Horizontal, 30MHz to 18GHz)



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
61.040	24.38	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
342.340	28.01	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
733.250	32.43	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1701.333	44.40	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5698.480	46.92	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
13068.920	48.18	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

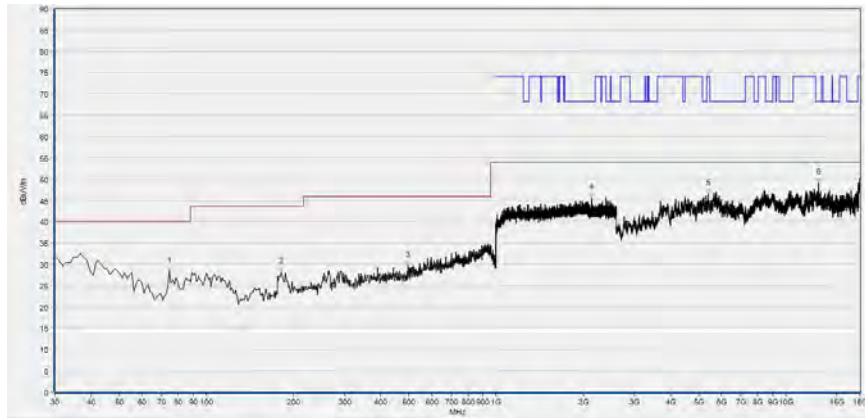
(Antenna Vertical, 30MHz to 18GHz)

Plot 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
55.220	28.03	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
115.360	28.30	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
459.710	28.73	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1921.067	45.36	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5218.000	53.86	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12760.920	47.80	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

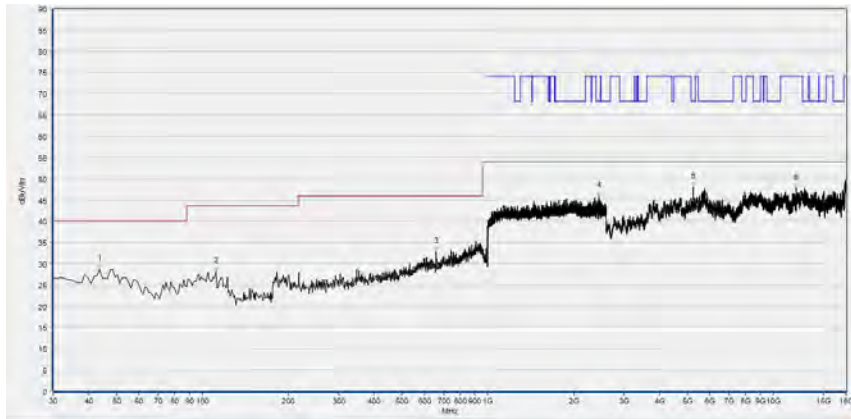
(Antenna Horizontal, 30MHz to 18GHz)



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
74.620	28.39	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
181.320	28.12	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
496.570	29.63	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2140.267	45.65	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5402.800	46.59	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12930.320	49.19	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

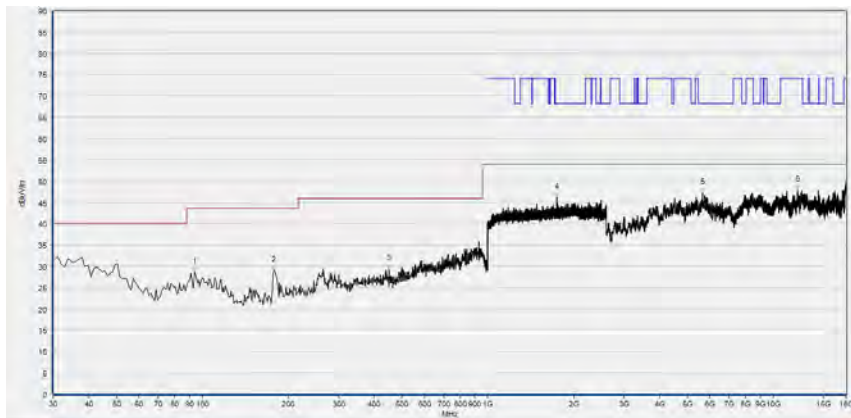
(Antenna Vertical, 30MHz to 18GHz)

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
43.580	28.66	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
111.480	28.15	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
658.560	32.86	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2453.333	45.90	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5236.480	48.04	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12055.600	47.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

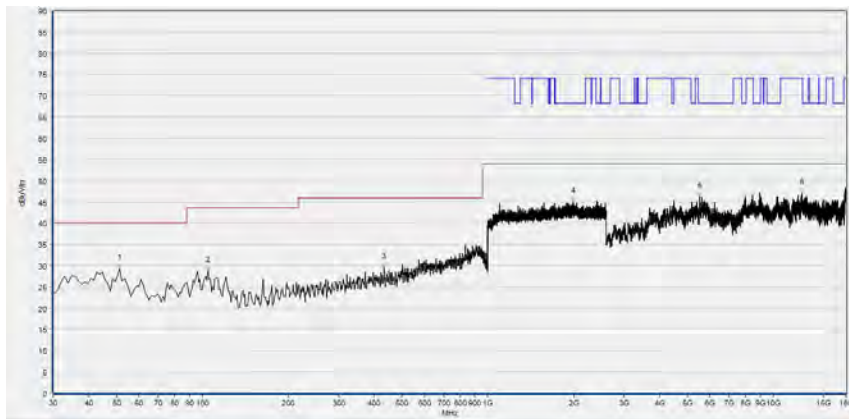
(Antenna Horizontal, 30MHz to 18GHz)



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
94.020	28.73	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
178.410	29.05	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
450.980	29.34	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1745.600	46.25	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5646.120	47.32	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12151.080	47.85	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

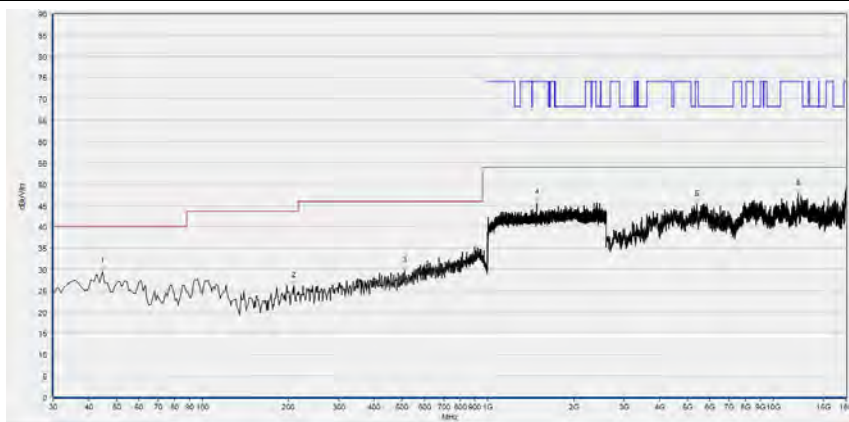
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 52



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
51.340	29.26	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
104.690	28.81	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
433.520	29.65	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1994.133	45.13	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5535.240	46.31	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12560.720	47.09	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

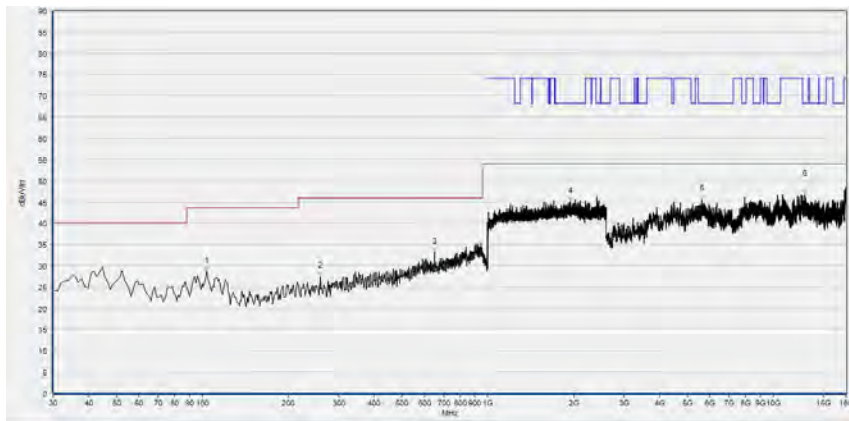
(Antenna Horizontal, 30MHz to 18GHz)



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
44.550	29.41	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
209.450	26.14	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
511.120	29.67	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1484.267	45.57	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5402.800	45.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12203.440	47.74	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

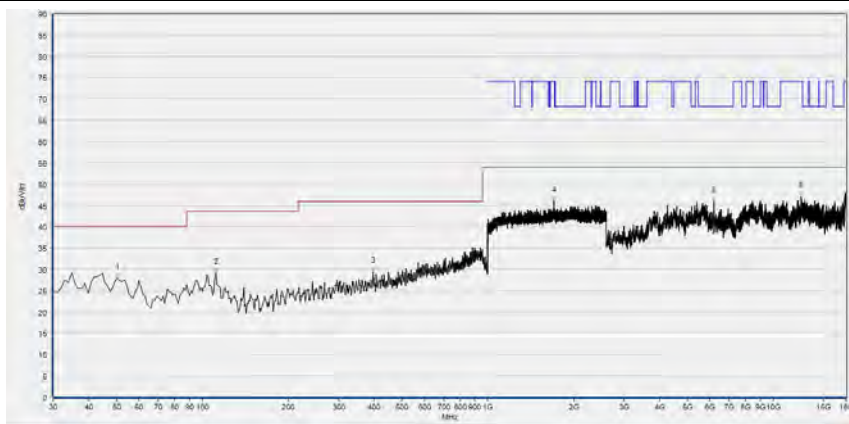
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 60



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
103.720	28.73	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
258.920	27.50	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
649.830	33.19	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1950.933	45.01	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5624.560	45.53	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12911.840	46.71	N/A	N/A	68.23	N/A <td N/A	Horizontal	PASS	

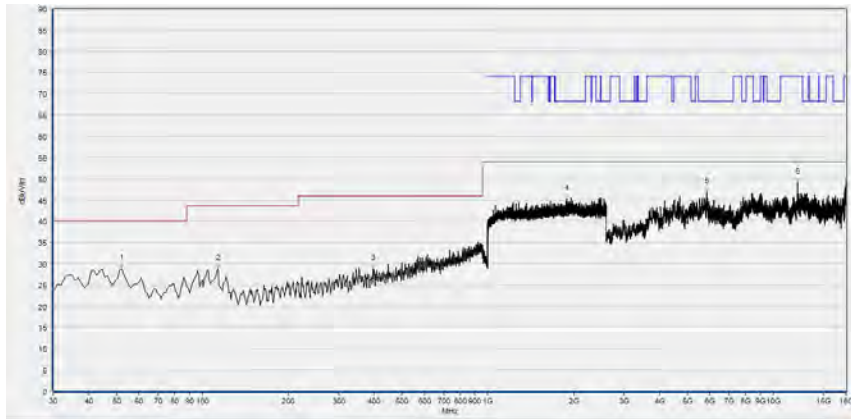
(Antenna Horizontal, 30MHz to 18GHz)



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
50.370	28.05	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
111.480	29.16	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
396.660	29.53	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1708.267	46.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
6197.440	45.88	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12523.760	47.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

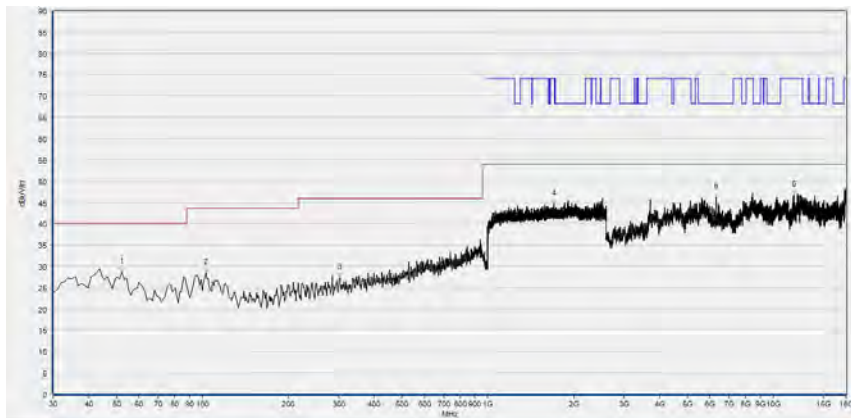
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 64



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
52.310	28.80	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
113.420	28.91	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
397.630	28.80	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1891.733	45.23	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5855.560	46.92	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12154.160	49.15	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

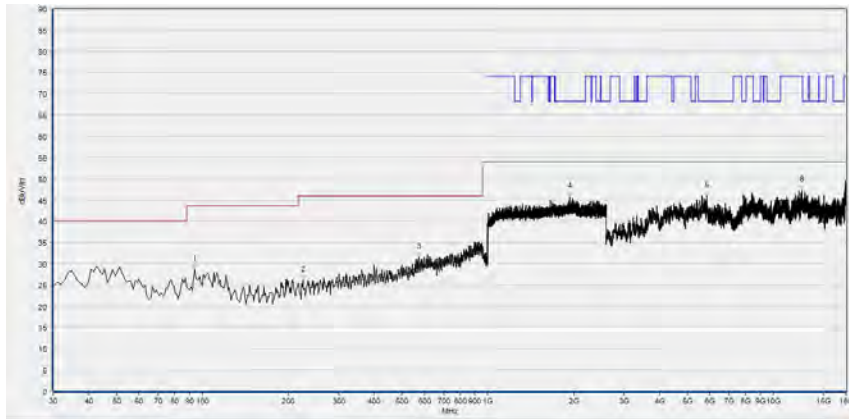
(Antenna Horizontal, 30MHz to 18GHz)



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
52.310	28.62	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
102.750	28.54	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
302.570	27.31	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1701.867	44.56	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
6323.720	46.22	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
11840.000	46.78	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

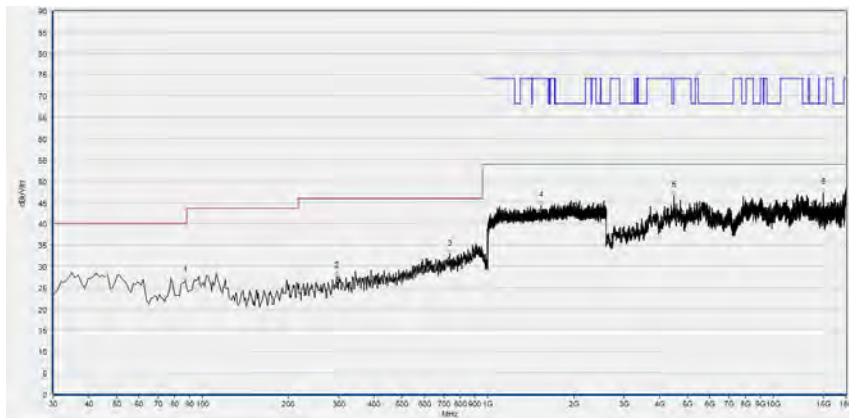
(Antenna Vertical, 30MHz to 18GHz)

Plot 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
94.020	28.60	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
224.970	26.22	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
572.230	31.51	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1940.267	45.79	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5858.640	45.97	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12622.320	47.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

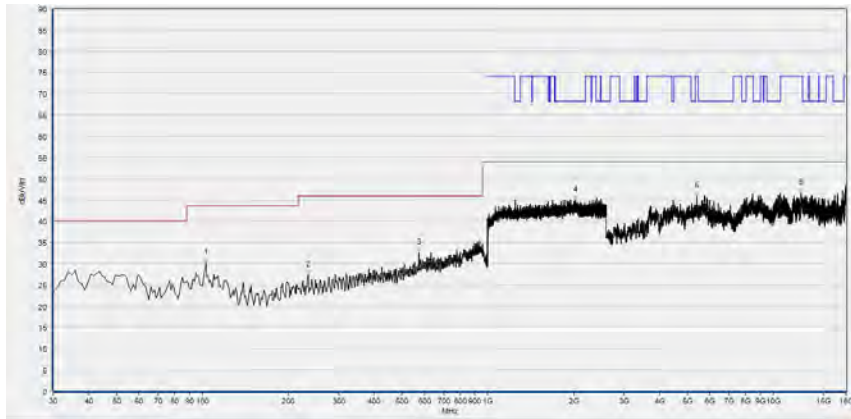
(Antenna Horizontal, 30MHz to 18GHz)



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
87.230	26.62	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
294.810	27.62	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
736.160	32.89	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1537.067	44.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4497.280	46.67	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
15000.080	47.23	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

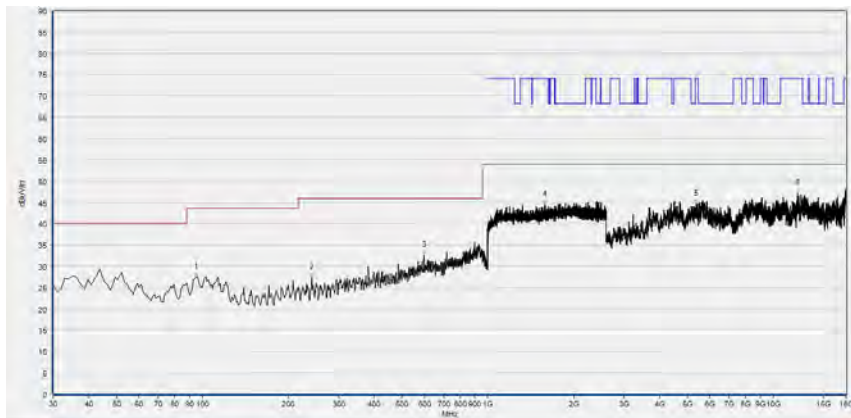
(Antenna Vertical, 30MHz to 18GHz)

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
102.750	30.11	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
234.670	27.27	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
573.200	32.50	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2030.933	44.88	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5396.640	45.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12523.760	46.51	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

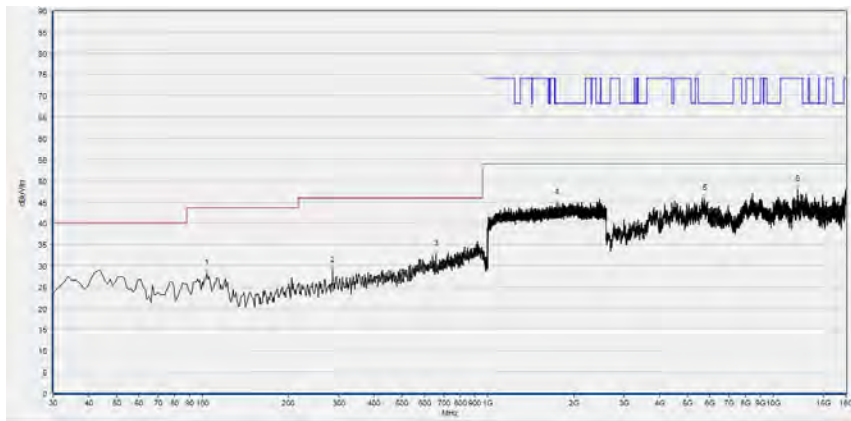
(Antenna Horizontal, 30MHz to 18GHz)



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
94.990	27.47	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
241.460	27.38	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
598.420	32.44	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1577.067	44.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5356.600	44.63	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12132.600	47.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

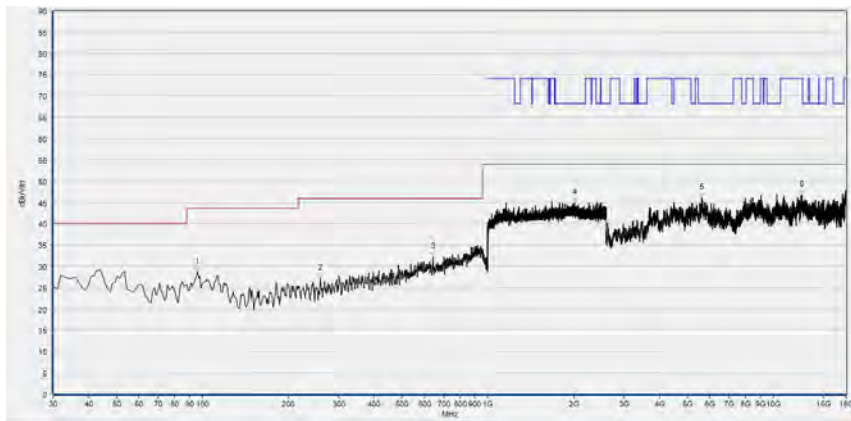
(Antenna Vertical, 30MHz to 18GHz)

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
103.720	28.23	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
286.080	28.79	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
659.530	32.64	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1744.000	44.67	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5750.840	45.75	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12166.480	47.94	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



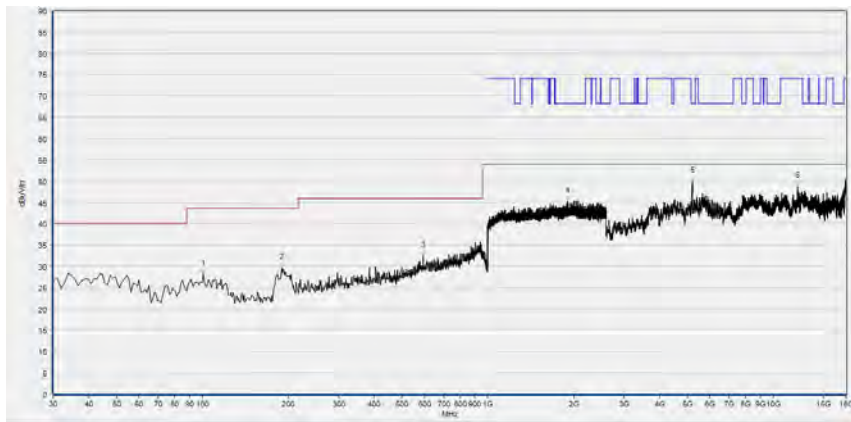
Fre. (MHz)	PK (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
95.960	28.64	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
258.920	27.18	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
642.070	32.24	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2012.800	44.84	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5609.160	46.03	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12622.320	46.75	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



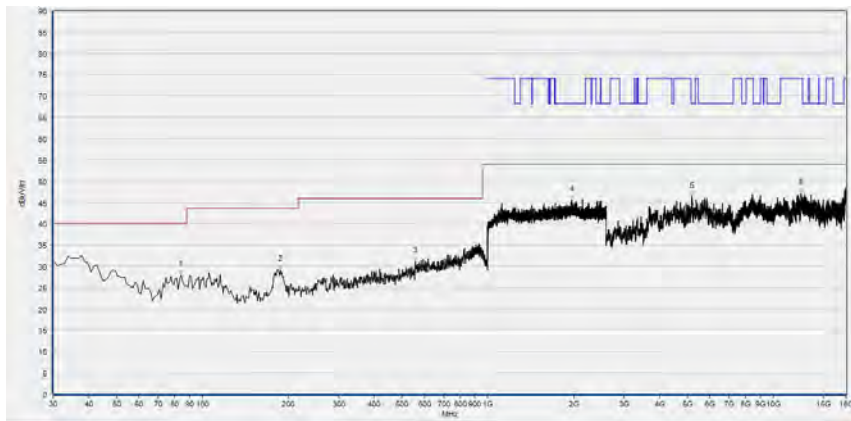
802.11n (HT40) mode

Plot 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
100.810	28.17	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
190.050	29.64	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
593.570	32.35	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1906.133	45.24	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5199.520	49.98	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12178.800	48.80	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

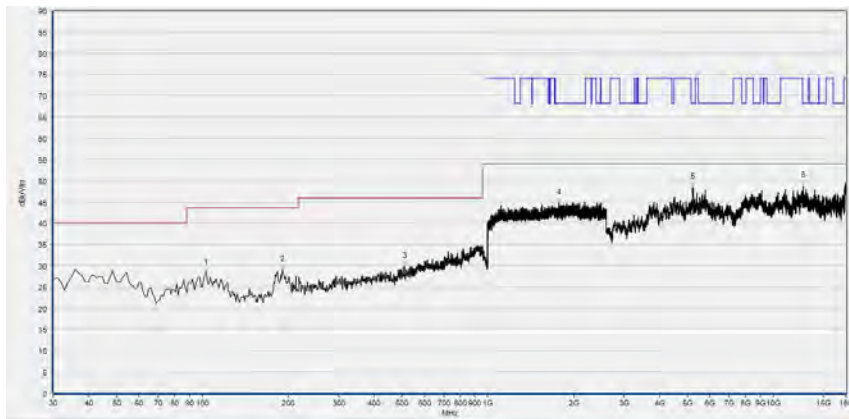
(Antenna Horizontal, 30MHz to 18GHz)



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
84.320	28.00	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
187.140	29.23	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
556.710	31.15	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1963.200	45.55	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5196.440	46.34	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12529.920	47.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

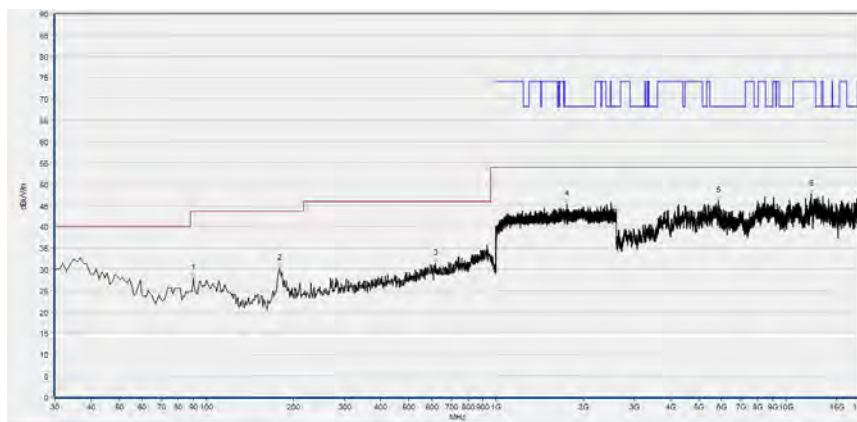
(Antenna Vertical, 30MHz to 18GHz)

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
102.750	28.40	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
191.020	29.02	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
512.090	29.85	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1774.400	44.76	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5214.920	48.50	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12736.280	48.69	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

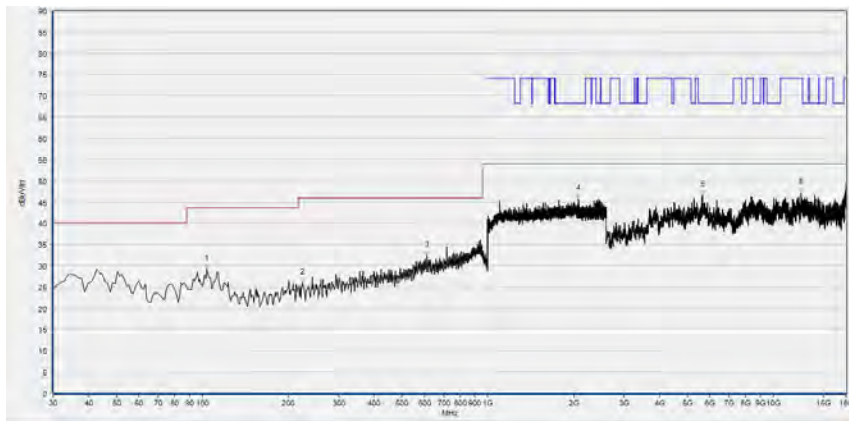
(Antenna Horizontal, 30MHz to 18GHz)



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
90.140	27.79	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
179.380	30.14	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
618.790	31.41	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1753.600	45.28	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5858.640	46.02	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12255.800	47.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

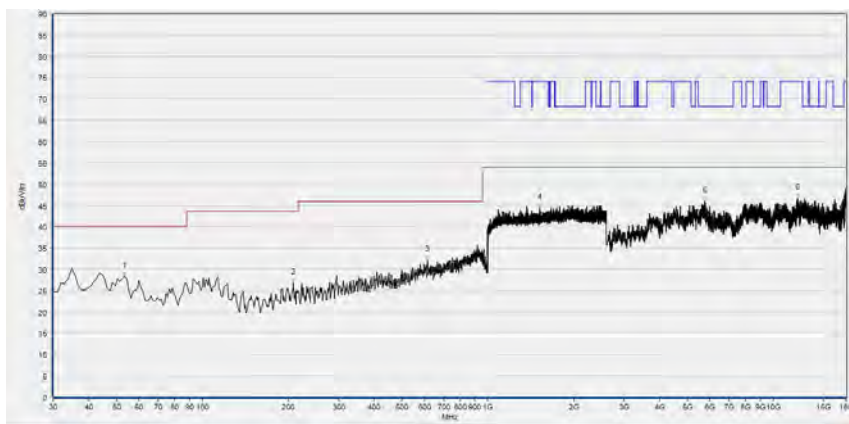
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 54



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
103.720	29.21	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
224.000	26.01	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
612.000	32.43	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2079.467	45.67	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5661.520	46.51	N/A	N/A	68.23	N/A <td N/A	Horizontal	PASS	
12536.080	47.16	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

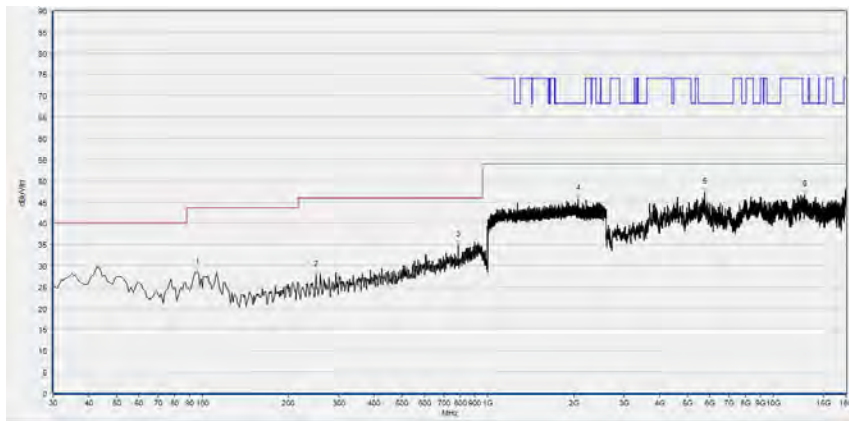
(Antenna Horizontal, 30MHz to 18GHz)



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
53.280	28.36	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
208.480	26.74	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
615.880	32.25	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1521.067	44.38	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5750.840	46.00	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12191.120	46.75	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

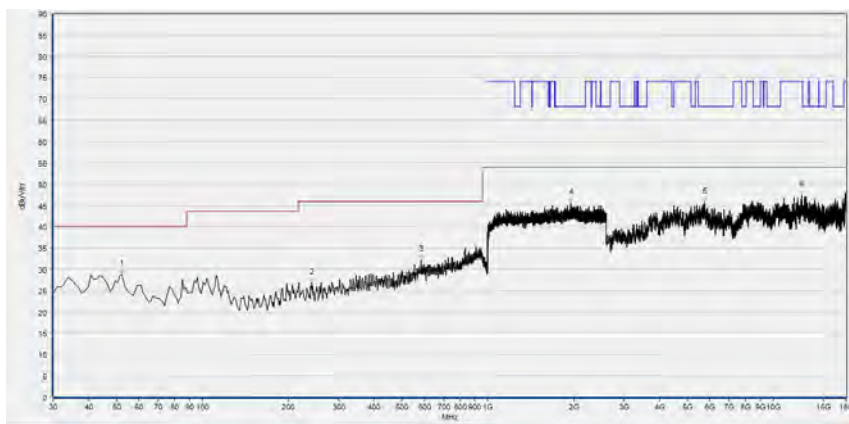
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 62



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
95.960	28.41	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
250.190	27.86	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
787.570	34.87	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2070.400	45.78	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5744.680	47.25	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12862.560	46.72	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

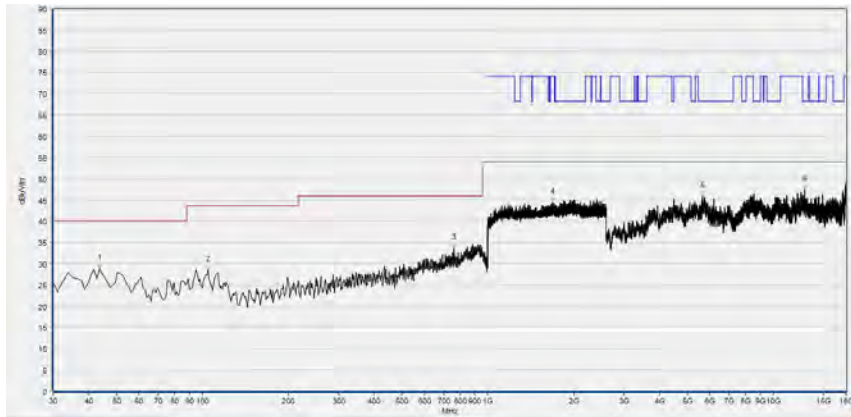
(Antenna Horizontal, 30MHz to 18GHz)



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
52.310	28.77	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
241.460	26.81	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
581.930	32.21	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1952.000	45.52	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5750.840	45.75	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12619.240	47.46	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

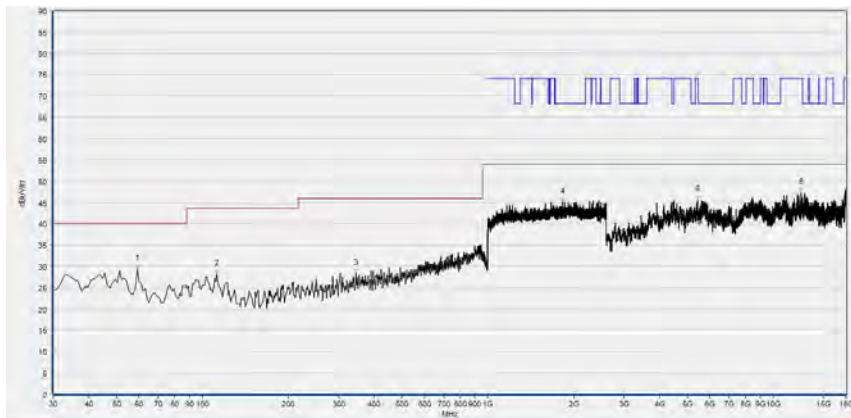
(Antenna Vertical, 30MHz to 18GHz)

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
43.580	28.81	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
104.690	28.53	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
762.350	33.61	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1681.600	44.45	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5658.440	45.85	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12893.360	47.40	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

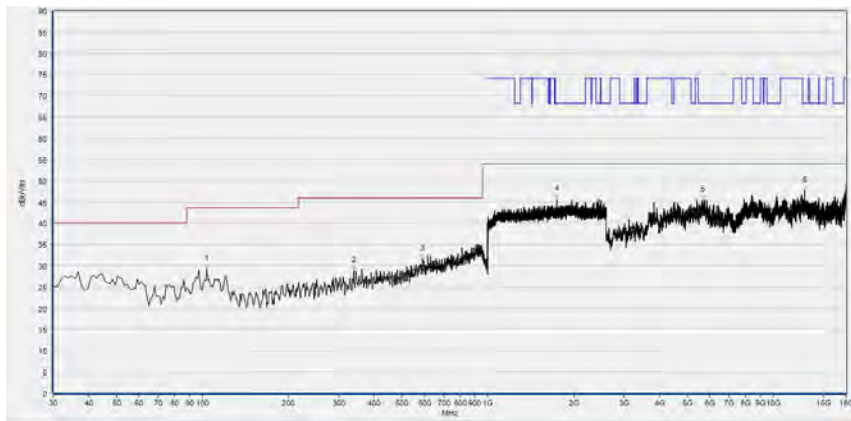
(Antenna Horizontal, 30MHz to 18GHz)



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
59.100	29.30	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
112.450	28.15	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
345.250	28.33	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1823.467	45.08	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5427.440	45.57	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12492.960	47.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

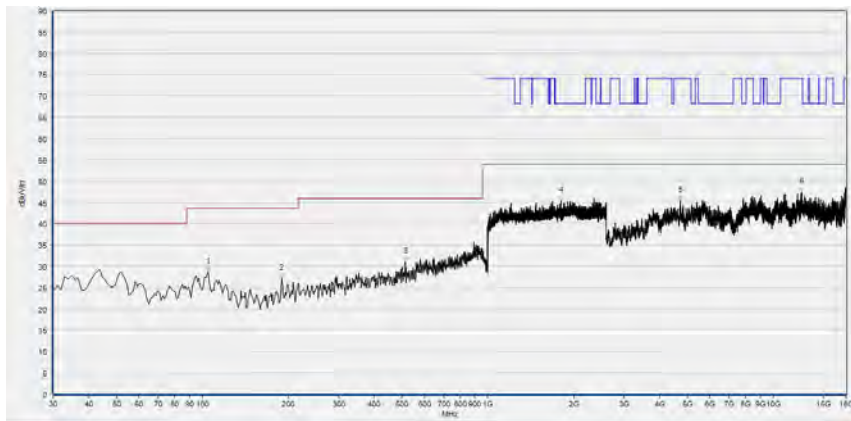
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 159



Fre. (MHz)	PK (dB μ V/m)	QP (dB μ V/m)	AV (dB μ V/m)	Limit-PK (dB μ V/m)	Limit-QP (dB μ V/m)	Limit-AV (dB μ V/m)	Antenna	Verdict
103.720	29.12	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
339.430	28.82	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
589.690	31.46	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1741.867	45.52	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5643.040	45.47	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12896.440	47.59	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



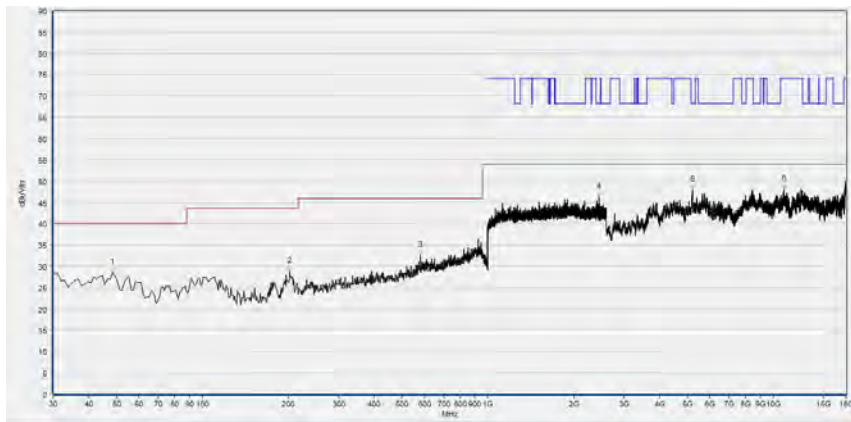
Fre. (MHz)	PK (dB μ V/m)	QP (dB μ V/m)	AV (dB μ V/m)	Limit-PK (dB μ V/m)	Limit-QP (dB μ V/m)	Limit-AV (dB μ V/m)	Antenna	Verdict
104.690	28.63	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
190.050	27.23	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
513.060	31.06	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1810.133	45.43	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4715.960	45.45	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12613.080	47.48	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



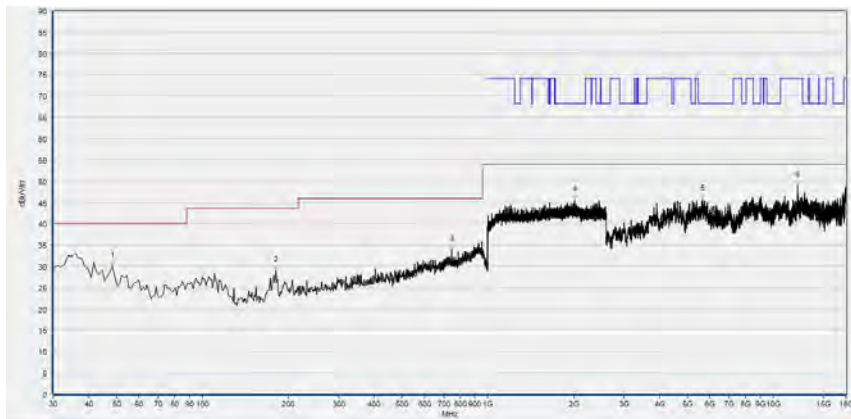
802.11ac (VHT80) Mode

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
48.430	28.53	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
202.660	28.77	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
580.960	32.44	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2451.733	46.28	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
5211.840	47.86	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
10906.760	48.02	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

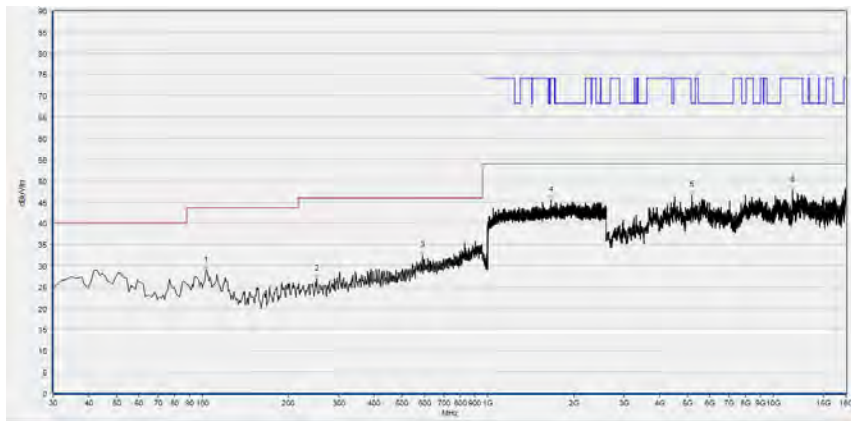
(Antenna Horizontal, 30MHz to 18GHz)



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
48.430	29.99	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
181.320	28.99	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
745.860	33.87	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2019.733	45.56	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5664.600	45.75	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12151.080	48.97	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

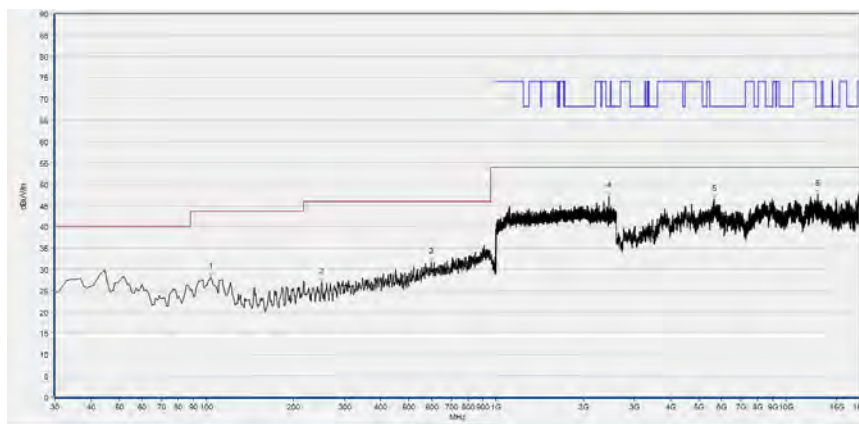
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 58



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
102.750	28.75	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
252.130	26.86	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
588.720	32.41	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1663.467	45.43	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5181.040	46.67	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11713.720	47.81	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

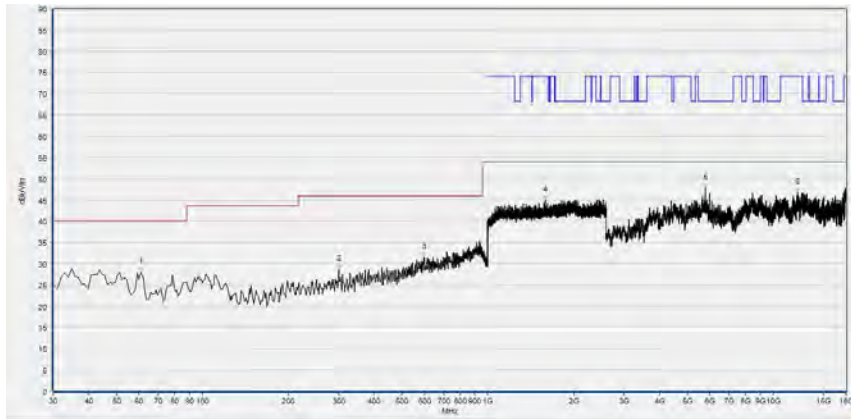
(Antenna Horizontal, 30MHz to 18GHz)



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
103.720	28.14	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
250.190	27.05	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
597.450	31.65	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2456.533	47.12	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
5655.360	46.35	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12908.760	47.65	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

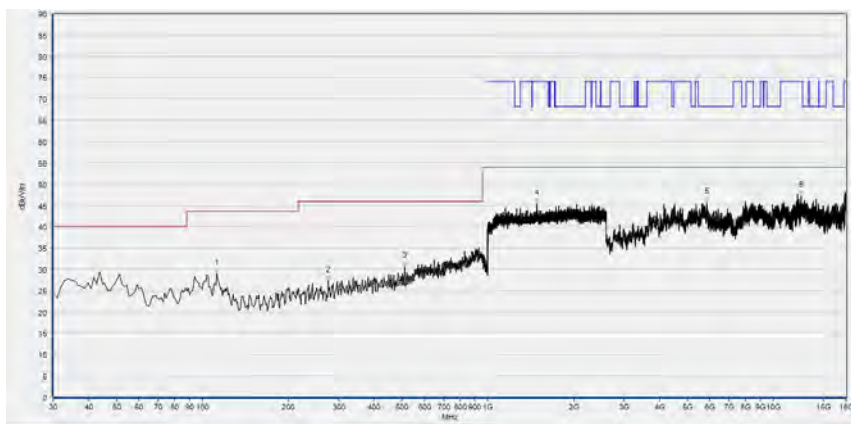
(Antenna Vertical, 30MHz to 18GHz)

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
61.040	28.07	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
300.630	28.69	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
596.480	31.46	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1593.067	44.95	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5769.320	47.74	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
12157.240	46.72	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
112.450	28.92	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
276.380	27.27	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
512.090	30.64	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1483.200	45.49	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5861.720	45.69	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
12511.440	47.22	N/A	N/A	74.00	N/A	54.00	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	$\pm 2.22\text{dB}$
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.
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.
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	Due Date
Attenuator 1	N/A	10dB	Resnet	N/A	N/A
EXA Signal Analyzer	MY53470836	N9010A	Agilent	2021.03.25	2022.03.24
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2021.03.25	2022.03.24
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	12108015	DTL-003S101	YOMA	2020.10.26	2021.10.25

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY56400093	N9038A	KEYSIGHT	2021.03.09	2022.03.08
LISN	812744	NSLK 8127	Schwarzbeck	2021.03.09	2022.03.08
Pulse Limiter (10dB)	VTSD 9561 F-B #206	VTSD 9561-F	Schwarzbeck	2020.07.24	2021.07.23
Coaxial Cable(BNC) (30MHz-26GHz)	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
TS+ -[JS32-CE]	Tonscend	V2.5.0.0



4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2020.07.21	2021.07.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Horn	BBHA9170 #774	BBHA 9170	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	S020180L32 03	Tonscend	2020.07.21	2021.07.20
18-26.5GHz pre-Amplifier	46732	S10M100L38 02	Tonscend	2020.07.21	2021.07.20
26-40GHz pre-Amplifier	56774	S40M400L40 02	Tonscend	2020.07.21	2021.07.20
Notch Filter	N/A	WRCG-5150-5350	Wainwright	2020.07.21	2021.07.20
Notch Filter	N/A	WRCG-5470-5725	Wainwright	2020.07.21	2021.07.20
Notch Filter	N/A	WRCG-5725-5850	Wainwright	2020.07.21	2021.07.20



Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Anechoic Chamber	N/A	9m*6m*6m	CRT	2020.01.06	2023.01.05

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