

# Test Report

FCC ID: 2ADZ7MGS101053168

Date of issue: June 12, 2019

Report Number: MTi190601E004

Sample Description: Gaming tablet

Model(s): MGS101-05

Applicant: ThinPAD Technology (ShenZhen) Co., Ltd

Address: The 3rd floor, Building 7, Zhengzhong Industrial Park, Xintian Community, Fuhai Street, Bao'an District, Shenzhen, China

Date of Test: May 07, 2019 to June 12, 2019

Shenzhen Microtest Co., Ltd.  
<http://www.mtitest.com>

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## Test Result Certification

Applicant's name: ThinPAD Technology (ShenZhen) Co., Ltd

Address: The 3rd floor, Building 7, Zhengzhong Industrial Park, Xintian Community, Fuhai Street, Bao 'an District, Shenzhen, China

Manufacture's Name: ThinPAD Technology (ShenZhen) Co., Ltd

Address: The 3rd floor, Building 7, Zhengzhong Industrial Park, Xintian Community, Fuhai Street, Bao 'an District, Shenzhen, China

Product name: Gaming tablet

Trademark: Tptech

Model name: MGS101-05

Standards: FCC Part 15.407

Test Procedure: ANSI C63.10-2013  
KDB 789033 D02 General UNII Test Procedures New Rules v02r01

*This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.*

Tested by:

Demi Mu

June 12, 2019

Reviewed by:

Blue Zheng

June 12, 2019

Approved by:

Smith Chen

June 12, 2019

## 1 General information

### 1.1 Description of EUT

Equipment:	Gaming tablet
Model name:	MGS101-05
Serial Model:	N/A
Model difference:	N/A
Frequency range:	U-NII-1: 5150 MHz to 5250 MHz, U-NII-3: 5725 MHz to 5850 MHz
Modulation type:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
Transfer rate:	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40):NSS1, MCS0-MCS9
Channel bandwidth:	802.11a: 20 MHz 802.11n: 20 MHz/40 MHz 802.11ac: 20 MHz/40 MHz
Antenna type:	FPCB antenna
Antenna gain:	U-NII-1:0.98dBi, U-NII-3:1.36dBi
Max. output power:	U-NII-1: 11.99dBm U-NII-3: 9.67dBm
Hardware version:	MGB101-05
Software version:	Win8.1 and Android 8.1
Power supply:	DC 12V from adapter
Adapter information:	N/A
Battery:	Button Battery: DC 3V

## 1.2 Operation channel list

For U-NII-1:

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	--	--
44	5220	--	--	--	--
48	5240	--	--	--	--

For U-NII-3:

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795	--	--
157	5785	--	--	--	--
161	5805	--	--	--	--
165	5825	--	--	--	--

## 1.3 Test channel list

For 802.11a/n/ac (HT20)

U-NII-1 (5150 - 5250 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
36	Low	5180	149	Low	5745
44	Mid	5220	157	Mid	5785
48	High	5240	165	High	5825

For 802.11n/ac (HT40)

U-NII-1 (5150 - 5250 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
38	Low	5190	151	Low	5755
46	High	5230	159	High	5795

## 1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
/	/	/	/	/

## 1.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
/	Adapter	/	/	/	/
/	/	/	/	/	/

Note:

- (1)The support equipment was authorized by Declaration of Confirmation.
- (2)For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2 Summary of the Test Results

Test procedures according to the technical standards:

No.	Standard Section	Test Item	Result	Remark
1	15.203/15.407	Antenna Requirement	Pass	
2	15.407(a)	RF Output Power	Pass	
3	15.207	Power Line Conducted Emission	Pass	
4	15.407(a)	26dB Emission Bandwidth and Occupied bandwidth	Pass	
5	15.407(e)	6 dB bandwidth	Pass	
6	15.407(a)	Power Spectral Density	Pass	
7	15.407(b) 15.209	Radiation Spurious Emission	Pass	
8	15.407(b) 15.209	Conducted Spurious Emission	Pass	

### 3 Test Facilities and Accreditations

#### 3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

#### 3.2 Environmental conditions

Temperature:	20°C~30°C
Humidity	30%~70%
Atmospheric pressure	98kPa~101kPa

### 3.3 Measurement uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

### 3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Farad	LZ-RF	Lz_Rf 3A3

## 4 Equipment list

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E001	Spectrum Analyzer	Agilent	E4407B	MY41441082	2018/09/18	2019/09/17
MTI-E002	CMU 200 universal radio communication tester	Rohde&schwarz	CMU 200	114587	2018/09/18	2019/09/17
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI	1000314	2018/09/18	2019/09/17
MTI-E006	Broadband antenna	schwarabeck	VULB916 3	872	2018/09/18	2019/09/17
MTI-E007	Horn antenna	schwarabeck	BBHA912 0D	1201	2018/09/18	2019/09/17
MTI-E014	amplifier	America	8447D	3113A06150	2018/09/18	2019/09/17
MTI-E015	Conduction Immunity Signal Generator	Schloder	CDG6000	126A1343/20 15	2018/09/18	2019/09/17
MTI-E016	Coupled decoupling network	Schloder	CDA M2/M3	A2210332/20 15	2018/09/18	2019/09/17
MTI-E032	Comprehensive test instrument	Rohde&schwarz	CMW500	124192	2018/09/18	2019/09/17
MTI-E034	amplifier	Agilent	8449B	3008A02400	2018/09/18	2019/09/17
MTI-E037	Artificial power network	Schwarzbeck	NSLK812 7	#841	2018/09/18	2019/09/17
MTI-E040	Spectrum analyzer	Agilent	N9020A	MY49100060	2018/09/18	2019/09/17
MTI-E041	Signal generator	Agilent	N5182A	MY49060455	2018/09/18	2019/09/17
MTI-E042	Analog signal generator	Agilent	E4421B	GB40051240	2018/09/18	2019/09/17
MTI-E043	Power probe	Dare Instruments	RPR3006 W	16I00054SN O16	2018/09/18	2019/09/17
MTI-E047	10dB attenuator	Mini-Circuits	UNAT-10+	15542	2018/09/18	2019/09/17
MTI-E049	spectrum analyzer	Rohde&schwarz	FSP-38	100019	2018/09/18	2019/09/17
MTI-E050	PSG Signal generator	Agilent	E8257D	MY46520873	2018/09/18	2019/09/17
MTI-E061	Active Loop Antenna 9kHz - 30MHz	Schwarzbeek	FMZB 1519 B	00044	2018/09/18	2019/09/17
MTI-E052	18-40GHz amplifier	Chengdu step Micro Technology	ZLNA-18-40G-21	1608001	2018/09/18	2019/09/17
MTI-E053	15-40G Antenna	Schwarzbeek	BBHA917 0	BBHA91705 82	2018/09/18	2019/09/17
MTI-E058	Artificial power network	Schwarzbeck	NSLK812 7	#841	2018/09/18	2019/09/17

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 5 Test Results

### 5.1 Antenna requirement

#### 5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 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.

#### 5.1.2 EUT Antenna

The antenna is an FPCB antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is U-NII-1:0.98dBi, U-NII-3:1.36dBi.

## 5.2 RF output power

### 5.2.1 Limit

#### For the 5.15-5.25 GHz band

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

#### For the 5.25-5.35 GHz and 5.47-5.725 GHz band

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

#### 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.

### 5.2.2 Test procedure

The maximum peak conducted output power may be measured using a broadband Average RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.

### 5.2.3 Test setup



### 5.2.4 Test results

For U-NII-1

Modulation mode	Test Channel	Frequency(MHz)	Maximum Peak Conducted Power		Limit(mW)
			(dBm)	(mW)	
11a	CH36	5180	11.75	14.96	250
11a	CH40	5200	11.73	14.89	250
11a	CH48	5240	11.95	15.67	250
11n (HT20)	CH36	5180	11.60	14.45	250
11n (HT20)	CH40	5200	11.84	15.28	250
11n (HT20)	CH48	5240	11.99	15.81	250
11n (HT40)	CH38	5190	10.46	11.12	250
11n (HT40)	CH46	5230	10.84	12.13	250

Modulation mode	Test Channel	Frequency(MHz)	Maximum Peak Conducted Power		Limit(mW)
			(dBm)	(mW)	
11ac (HT20)	CH36	5180	11.59	14.42	250
11ac (HT20)	CH40	5200	11.65	14.62	250
11ac (HT20)	CH48	5240	11.89	15.45	250
11ac (HT40)	CH38	5190	10.59	11.46	250
11ac (HT40)	CH46	5230	10.83	12.11	250

For U-NII-3

Modulation mode	Test Channel	Frequency(MHz)	Maximum Peak Conducted Power		Limit(mW)
			(dBm)	(mW)	
11a	CH149	5745	9.32	8.55	1000
11a	CH157	5785	8.90	7.76	1000
11a	CH165	5825	9.40	8.71	1000
11n (HT20)	CH149	5745	8.98	7.91	1000
11n (HT20)	CH157	5785	9.39	8.69	1000
11n (HT20)	CH165	5825	9.67	9.27	1000
11n (HT40)	CH151	5755	9.33	8.57	1000
11n (HT40)	CH159	5795	9.32	8.55	1000

Modulation mode	Test Channel	Frequency(MHz)	Maximum Peak Conducted Power		Limit(mW)
			(dBm)	(mW)	
11ac (HT20)	CH149	5745	9.32	8.55	1000
11ac (HT20)	CH157	5785	8.97	7.89	1000
11ac (HT20)	CH165	5825	9.39	8.69	1000
11ac (HT40)	CH151	5755	9.65	9.23	1000
11ac (HT40)	CH159	5795	9.50	8.91	1000
11ac (HT80)	CH155	5775	9.23	8.38	1000

## 5.3 Power line conducted emission

### 5.3.1 Limits

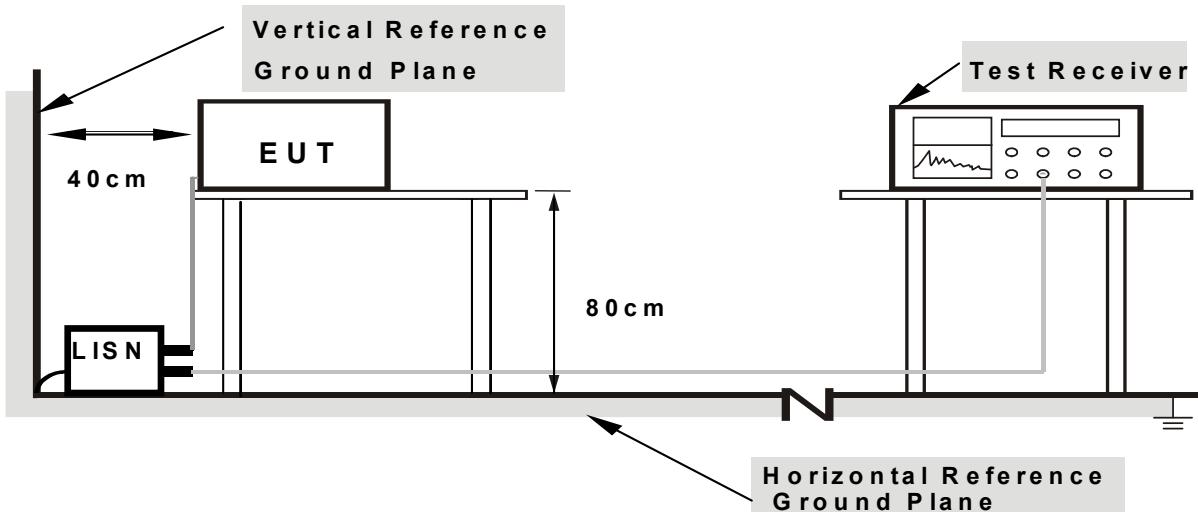
FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

#### Note

(1)The tighter limit applies at the band edges.

(2)The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 5.3.2 Test setup



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 5.3.3 Test procedure

#### a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### b. The following table is the setting of the receiver

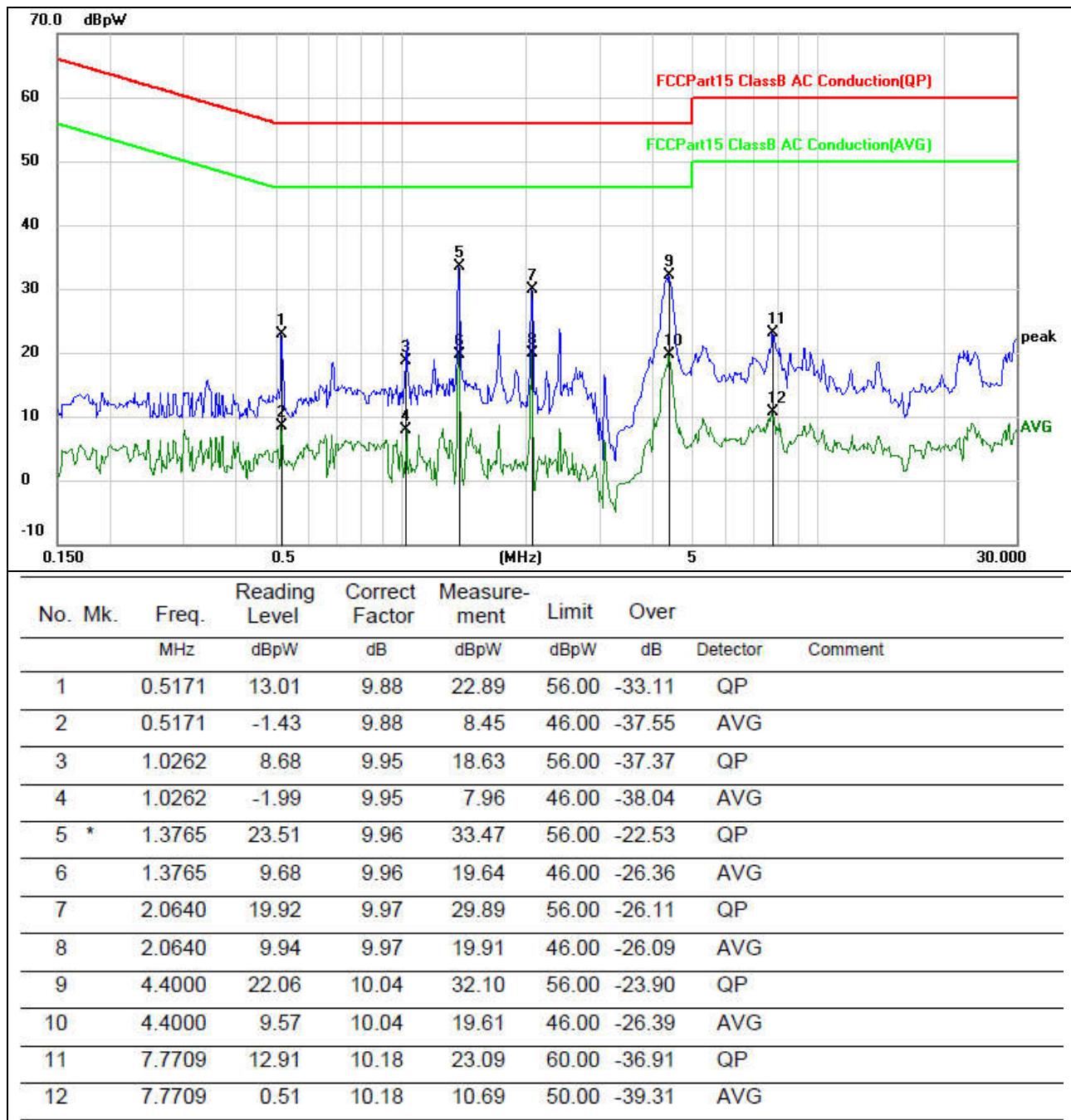
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

- c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The over all length shall not exceed 1 m.
- f. LISN at least 80 cm from nearest part of EUT chassis.

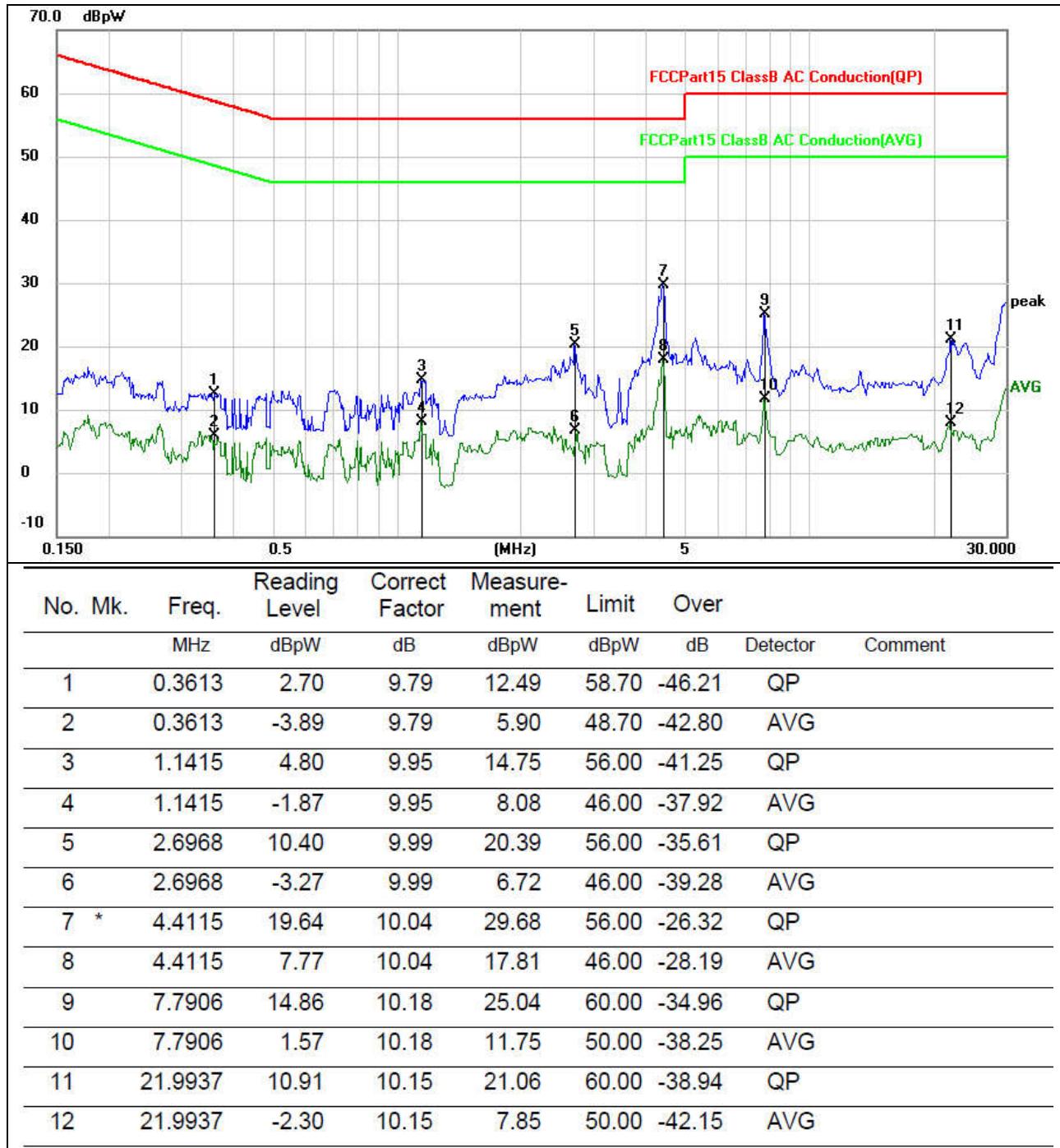
For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.3.4 Test results

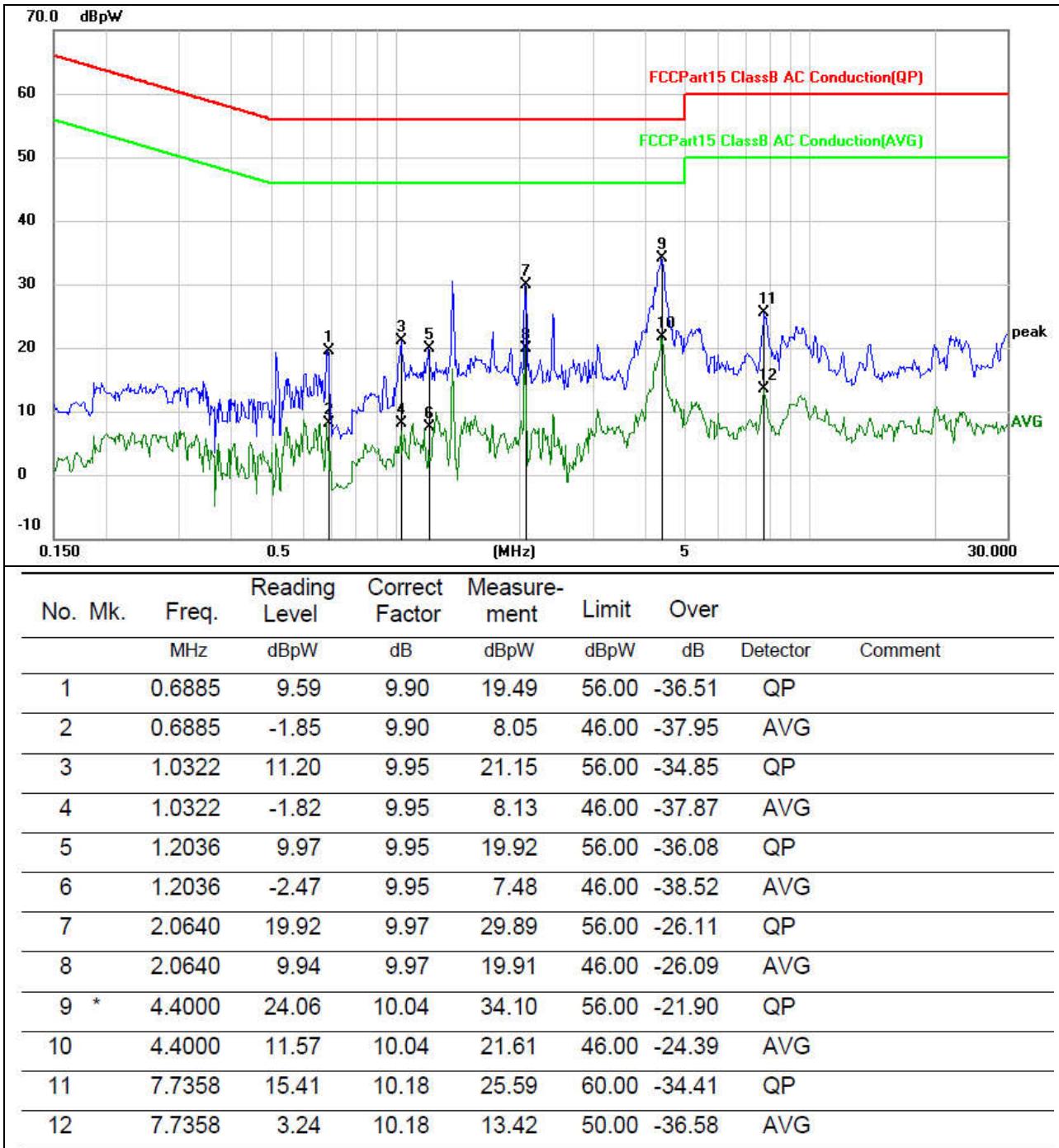
EUT :	Gaming tablet	Model Name. :	MGS101-05
Temperature :	24.9 °C	Relative Humidity :	69%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from adapter AC 120V/60Hz	Test Mode :	Normal link



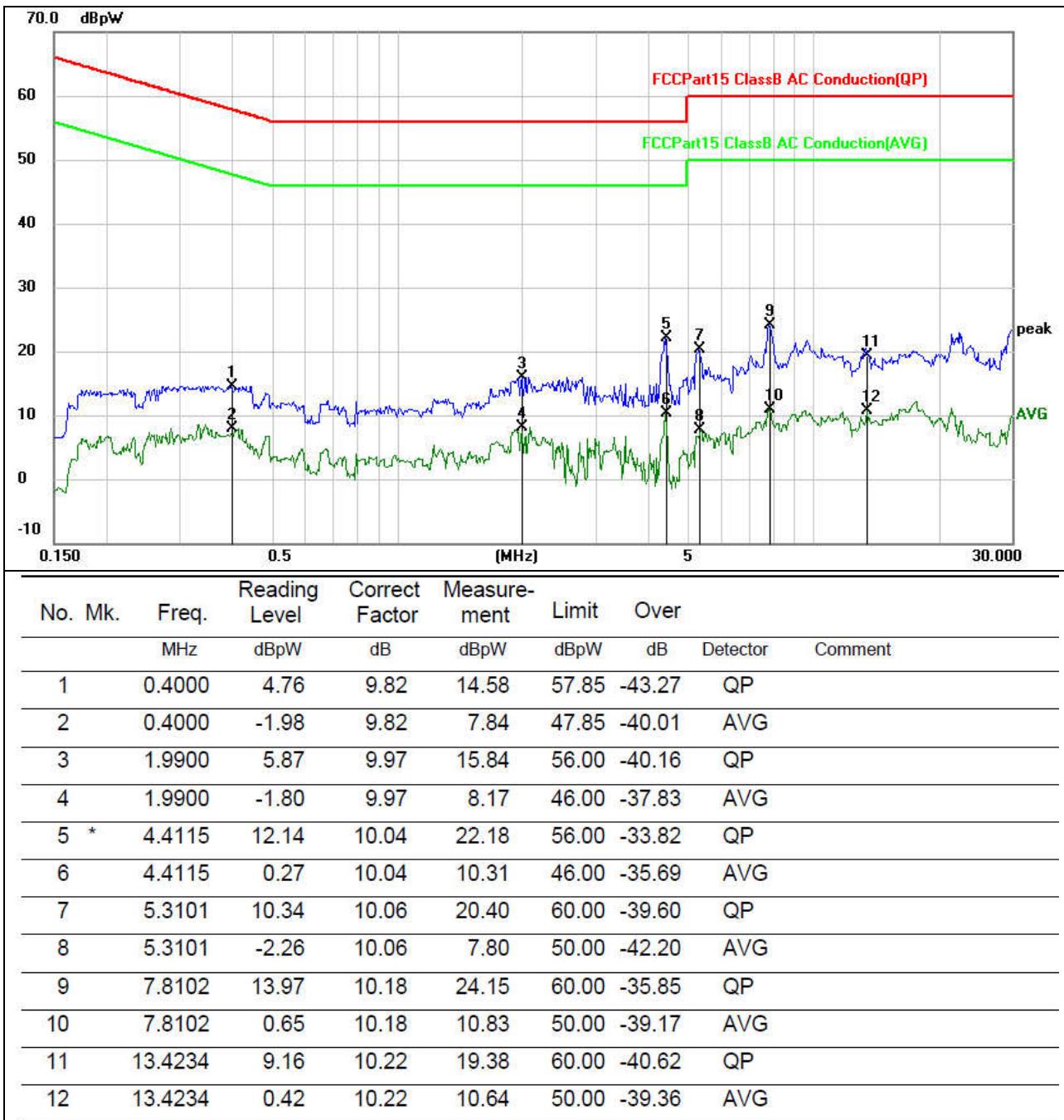
EUT :	Gaming tablet	Model Name. :	MGS101-05
Temperature :	24.9 °C	Relative Humidity :	69%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from adapter AC 120V/60Hz	Test Mode :	Normal link



EUT :	Gaming tablet	Model Name. :	MGS101-05
Temperature :	24.9 °C	Relative Humidity :	69%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from adapter AC 240V/60Hz	Test Mode :	Normal link



EUT :	Gaming tablet	Model Name. :	MGS101-05
Temperature :	24.9 °C	Relative Humidity :	69%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from adapter AC 240V/60Hz	Test Mode :	Normal link



## 5.4 26dB Emission Bandwidth and Occupied bandwidth

### 5.4.1 Limit

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

### 5.4.2 Test procedure

#### 26d Emission bandwidth

Set RBW = approximately 1% of the emission bandwidth.

Set VBW  $\geq 3 \times$  RBW

Detector = Peak.

Trace mode = Max hold.

Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

#### Occupied Bandwidth

Set Span = 1.5 times to 5.0 times the OBW

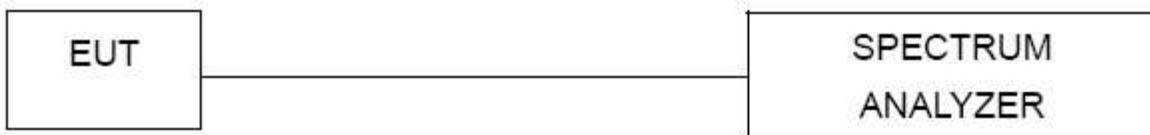
Set RBW = 1% to 5% of the OBW.

Set VBW  $\geq 3 \times$  RBW, Detector = Peak.

Trace mode = Max hold.

Use the 99% power bandwidth function of the instrument.

### 5.4.3 Test setup



#### 5.4.4 Test results

For U-NII-1

Channel	Test Channel	Frequency(MHz)	26dB bandwidth(MHz)	99% bandwidth	Limit(kHz)	Result
11a	CH36	5180	19.66	17.719	/	Pass
11a	CH40	5200	19.44	17.684	/	Pass
11a	CH48	5240	19.54	17.685	/	Pass
11n (HT20)	CH36	5180	19.52	17.707	/	Pass
11n (HT20)	CH40	5200	19.38	17.713	/	Pass
11n (HT20)	CH48	5240	19.66	17.715	/	Pass
11n (HT40)	CH38	5190	39.41	35.977	/	Pass
11n (HT40)	CH46	5230	38.65	35.957	/	Pass

Channel	Test Channel	Frequency(MHz)	26dB bandwidth(MHz)	99% bandwidth	Limit(kHz)	Result
11ac (HT20)	CH36	5180	19.44	17.715	/	Pass
11ac (HT20)	CH40	5200	19.47	17.707	/	Pass
11ac (HT20)	CH48	5240	19.68	17.685	/	Pass
11ac (HT40)	CH38	5190	38.79	36.007	/	Pass
11ac (HT40)	CH46	5230	38.81	35.969	/	Pass

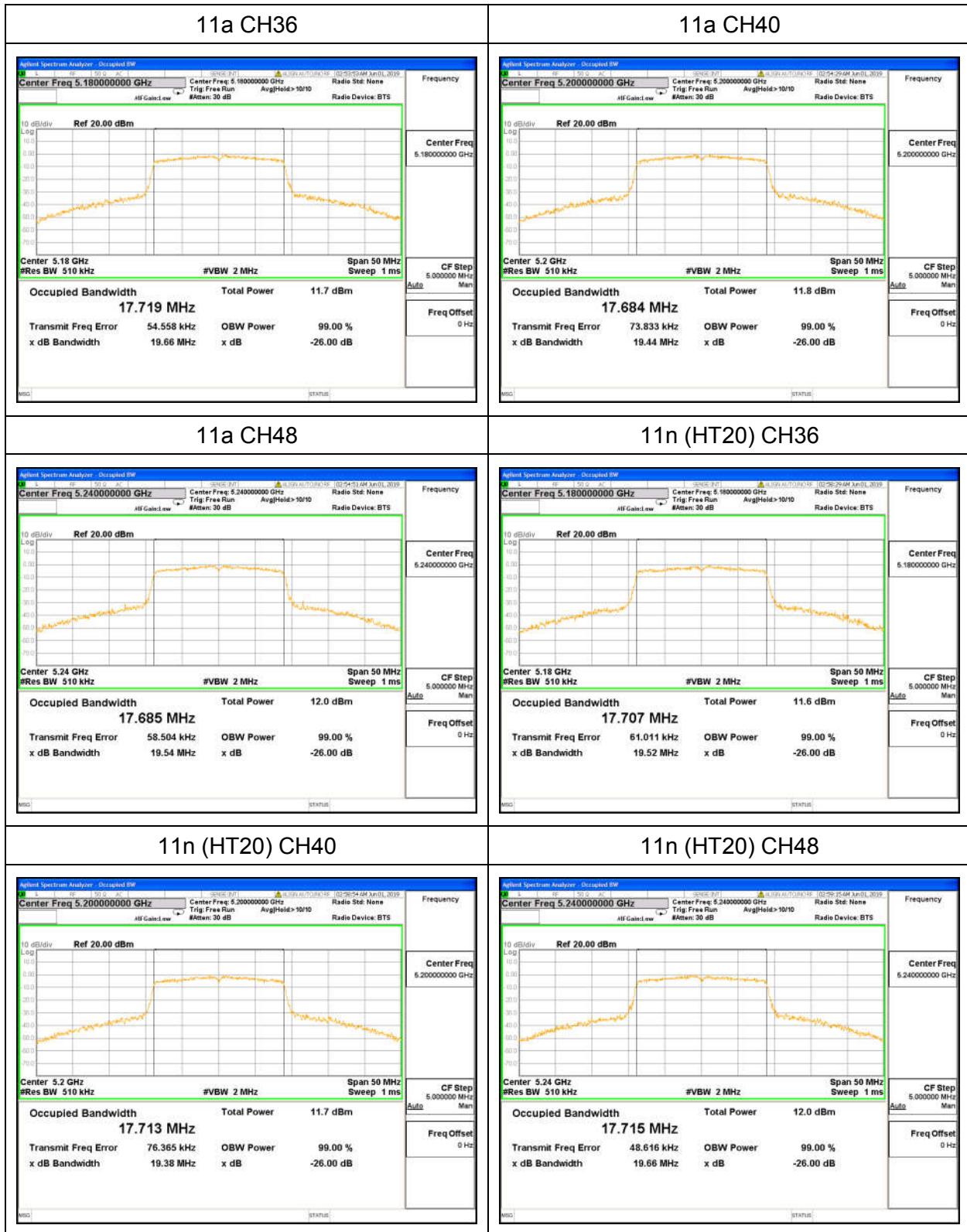
For U-NII-3

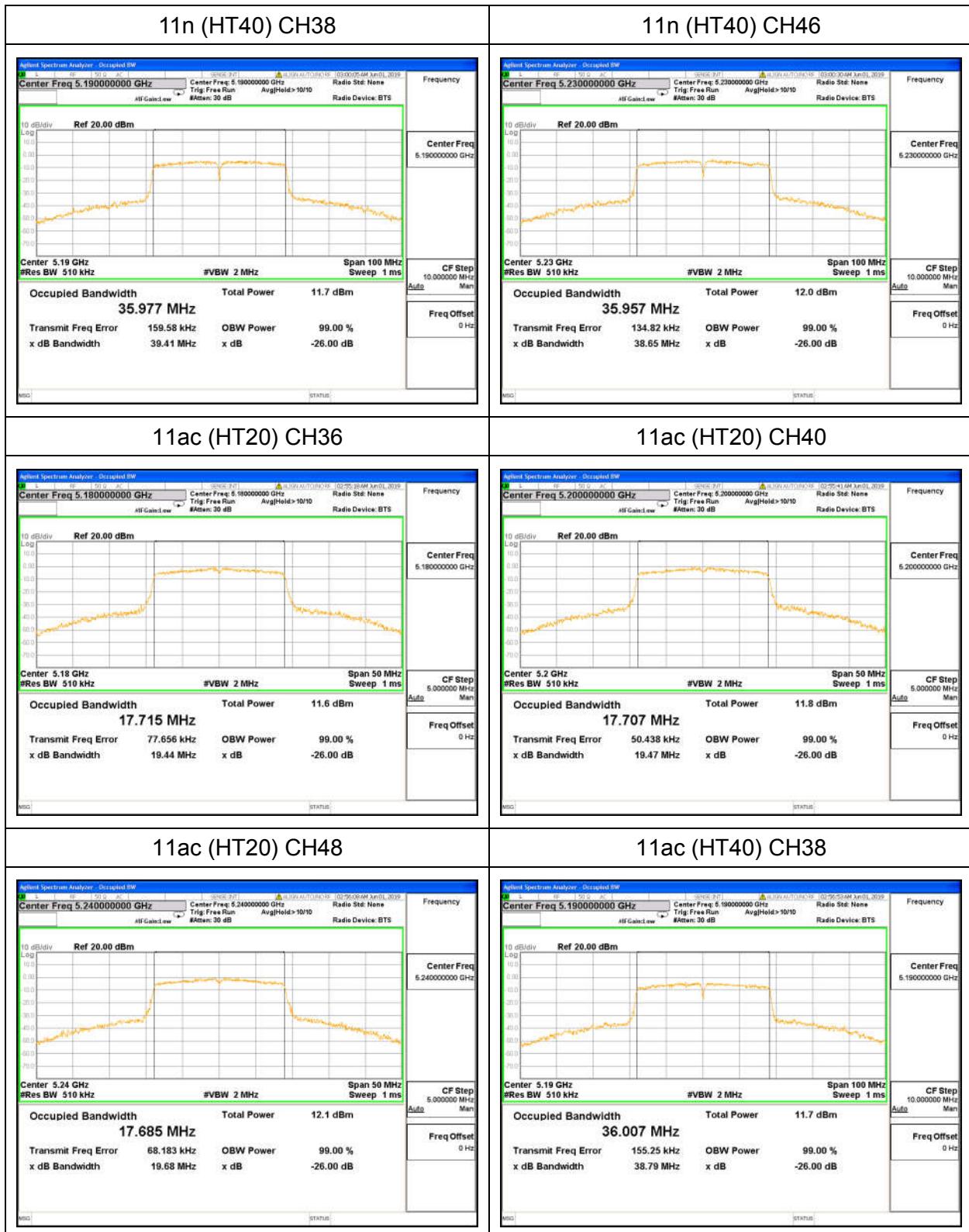
Channel	Test Channel	Frequency(MHz)	26dB bandwidth(MHz)	99% bandwidth	Limit(kHz)	Result
11a	CH149	5745	20.77	17.799	/	Pass
11a	CH157	5785	19.59	17.760	/	Pass
11a	CH165	5825	20.39	17.751	/	Pass
11n (HT20)	CH149	5745	20.00	17.725	/	Pass
11n (HT20)	CH157	5785	19.96	17.775	/	Pass
11n (HT20)	CH165	5825	19.63	17.737	/	Pass
11n (HT40)	CH151	5755	43.33	35.993	/	Pass
11n (HT40)	CH159	5795	46.31	36.194	/	Pass

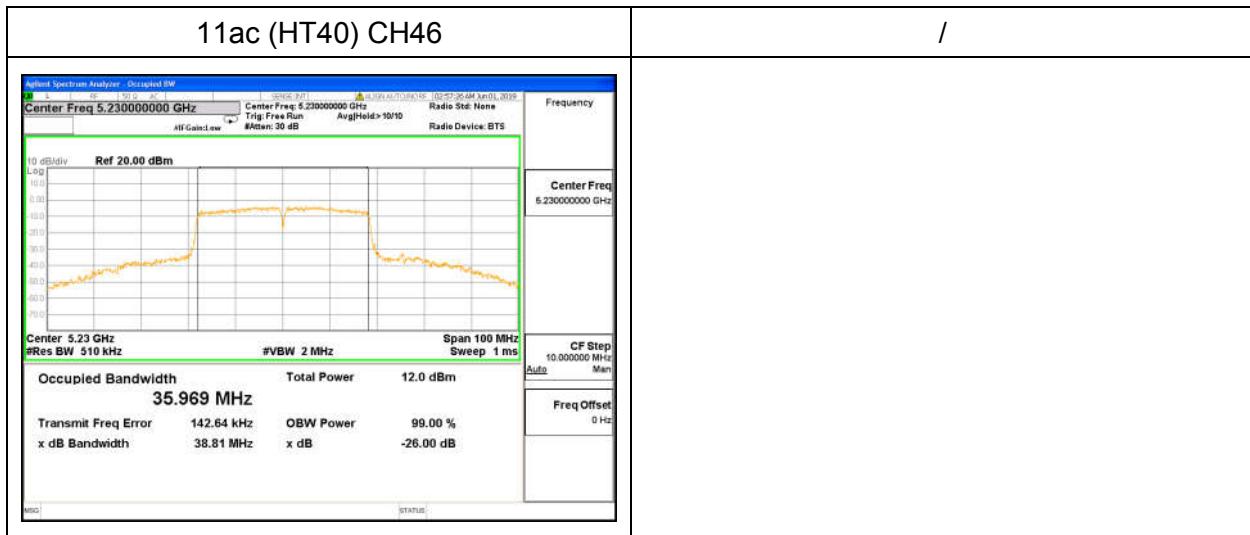
Channel	Test Channel	Frequency(MHz)	26dB bandwidth(MHz)	99% bandwidth	Limit(kHz)	Result
11ac (HT20)	CH149	5745	20.22	17.752	/	Pass
11ac (HT20)	CH157	5785	20.45	17.741	/	Pass
11ac (HT20)	CH165	5825	19.91	17.721	/	Pass
11ac (HT40)	CH151	5755	43.15	36.135	/	Pass
11ac (HT40)	CH159	5795	41.30	36.045	/	Pass

Test plots:

For U-NII-1





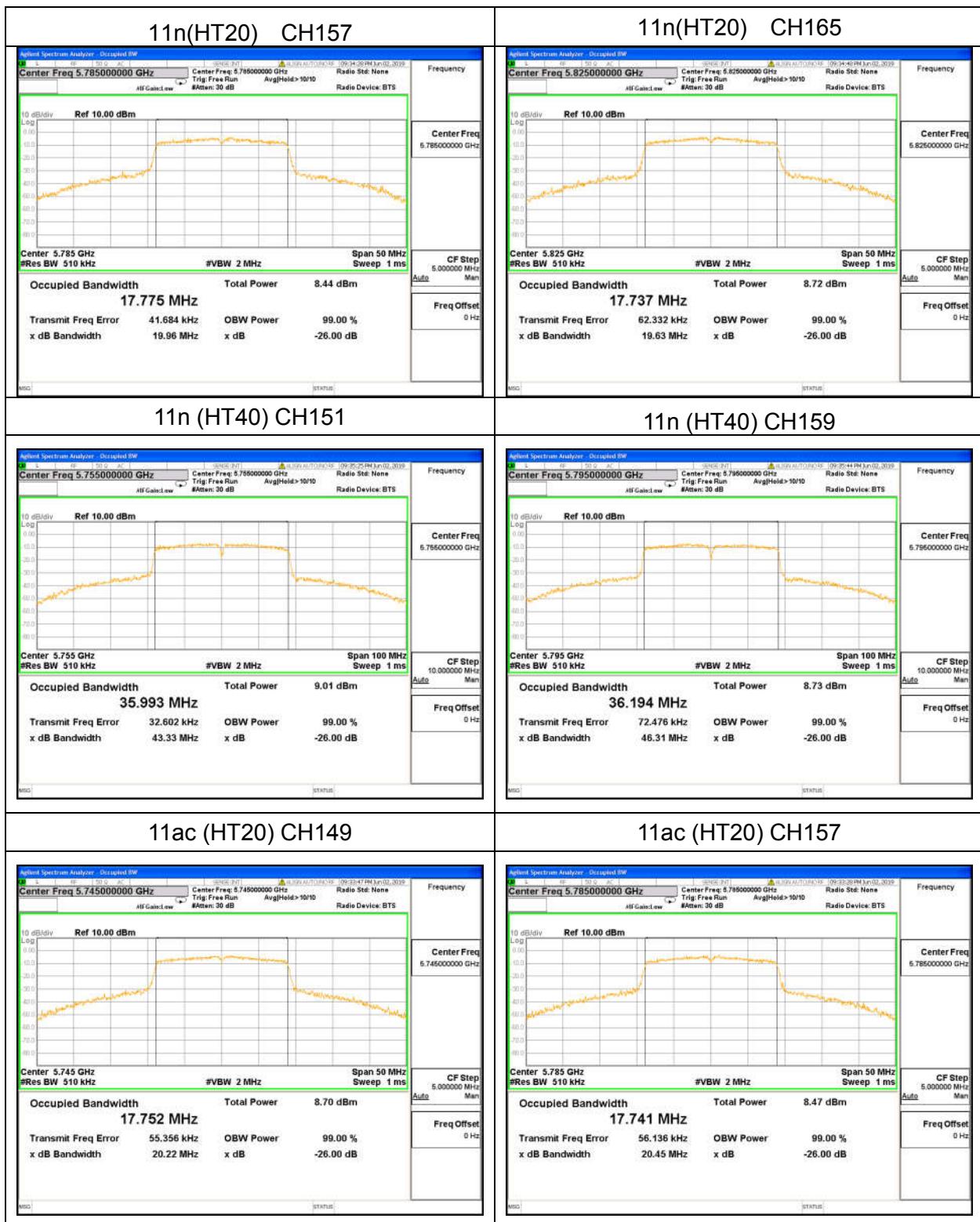


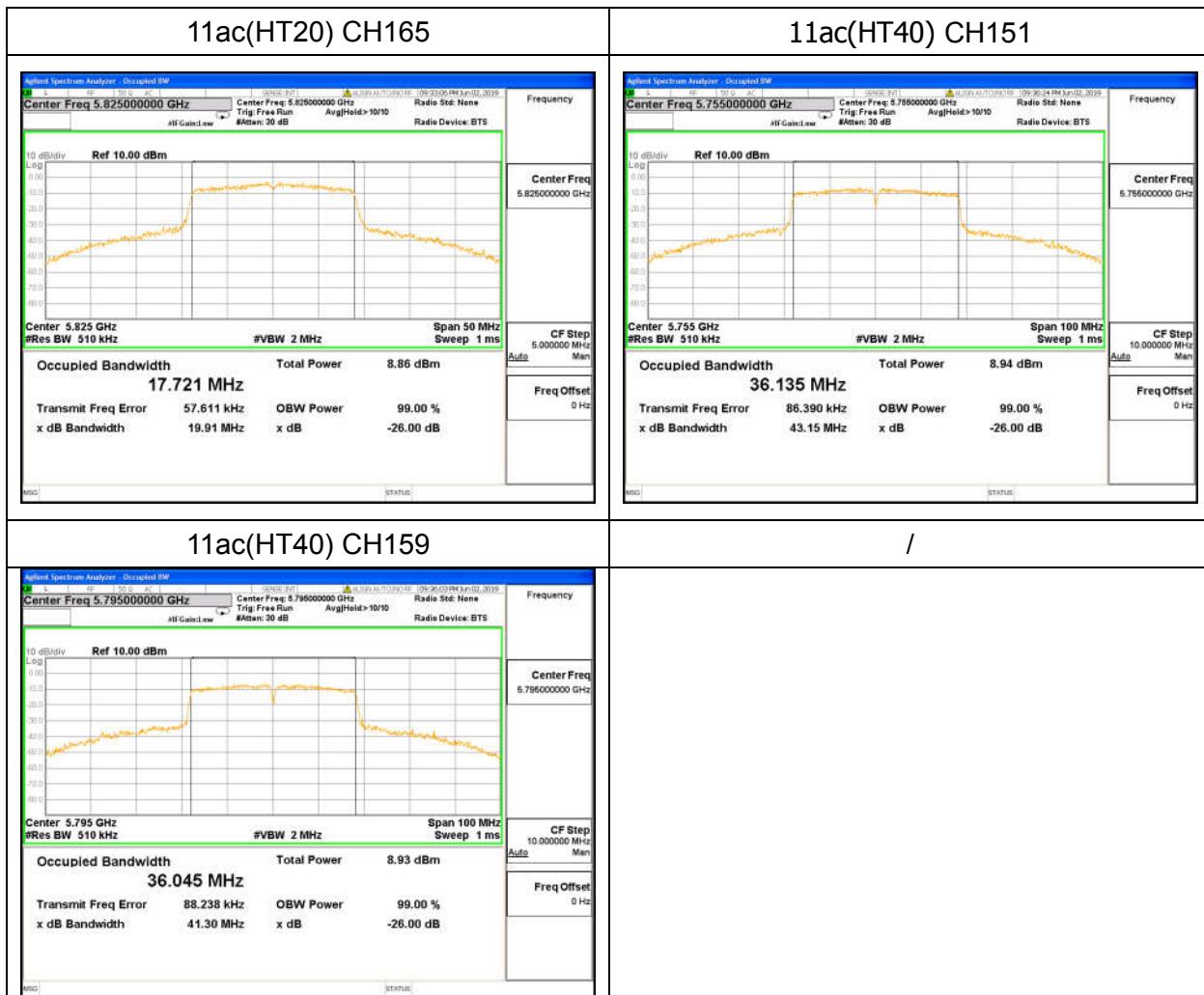
### For U-NII-3



### 11a CH165







## 5.5 6dB Bandwidth

### 5.5.1 Limit

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

### 5.5.2 Test procedure

1. Set RBW= 100 kHz.
2. Set the IVdeo bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

### 5.5.3 Test setup



### 5.5.4 Test results

#### For U-NII-1

Channel	Test Channel	Frequency(MHz)	6dB bandwidth(MHz)	Limit(kHz)	Result
11a	CH36	5180	17.62	500	Pass
11a	CH40	5200	17.68	500	Pass
11a	CH48	5240	17.64	500	Pass
11n (HT20)	CH36	5180	17.66	500	Pass
11n (HT20)	CH40	5200	17.67	500	Pass
11n (HT20)	CH48	5240	17.64	500	Pass
11n (HT40)	CH38	5190	36.34	500	Pass
11n (HT40)	CH46	5230	36.13	500	Pass

Channel	Test Channel	Frequency(MHz)	6dB bandwidth(MHz)	Limit(kHz)	Result
11ac(HT20)	CH36	5180	17.53	500	Pass
11ac (HT20)	CH40	5200	17.67	500	Pass
11ac (HT20)	CH48	5240	17.62	500	Pass
11ac (HT40)	CH38	5190	36.34	500	Pass
11ac (HT40)	CH46	5230	36.31	500	Pass

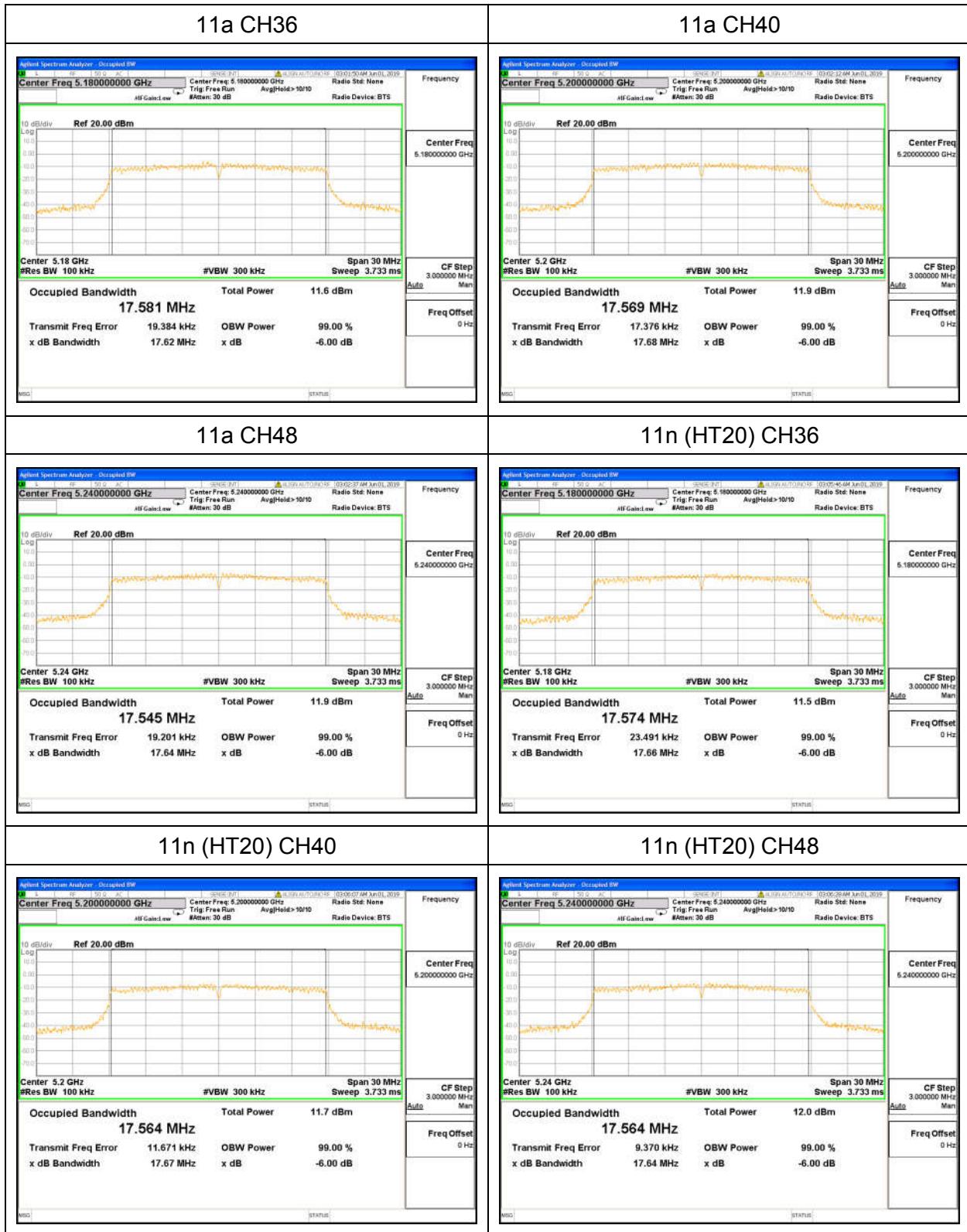
For U-NII-3

Channel	Test Channel	Frequency(MHz)	6dB bandwidth(MHz)	Limit(kHz)	Result
11a	CH149	5745	17.63	500	Pass
11a	CH157	5785	17.66	500	Pass
11a	CH165	5825	17.63	500	Pass
11n (HT20)	CH149	5745	17.63	500	Pass
11n (HT20)	CH157	5785	17.69	500	Pass
11n (HT20)	CH165	5825	17.63	500	Pass
11n (HT40)	CH151	5755	36.38	500	Pass
11n (HT40)	CH159	5795	36.24	500	Pass

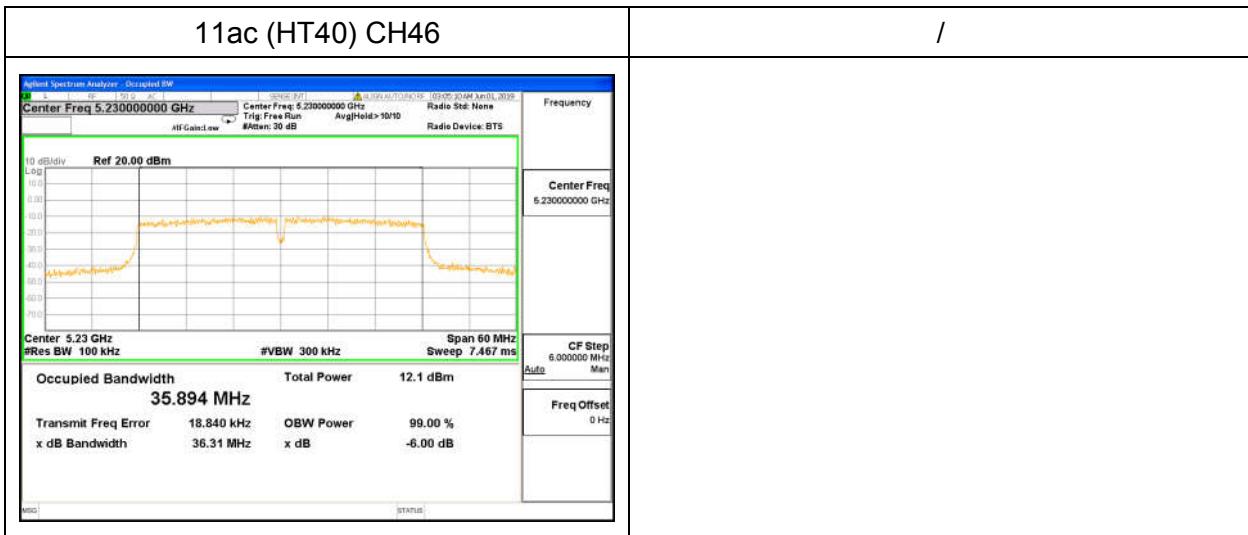
Channel	Test Channel	Frequency(MHz)	6dB bandwidth(MHz)	Limit(kHz)	Result
11ac (HT20)	CH149	5745	17.66	500	Pass
11ac (HT20)	CH157	5785	17.66	500	Pass
11ac (HT20)	CH165	5825	17.62	500	Pass
11ac (HT40)	CH151	5755	36.33	500	Pass
11ac (HT40)	CH159	5795	36.35	500	Pass

Test plots:

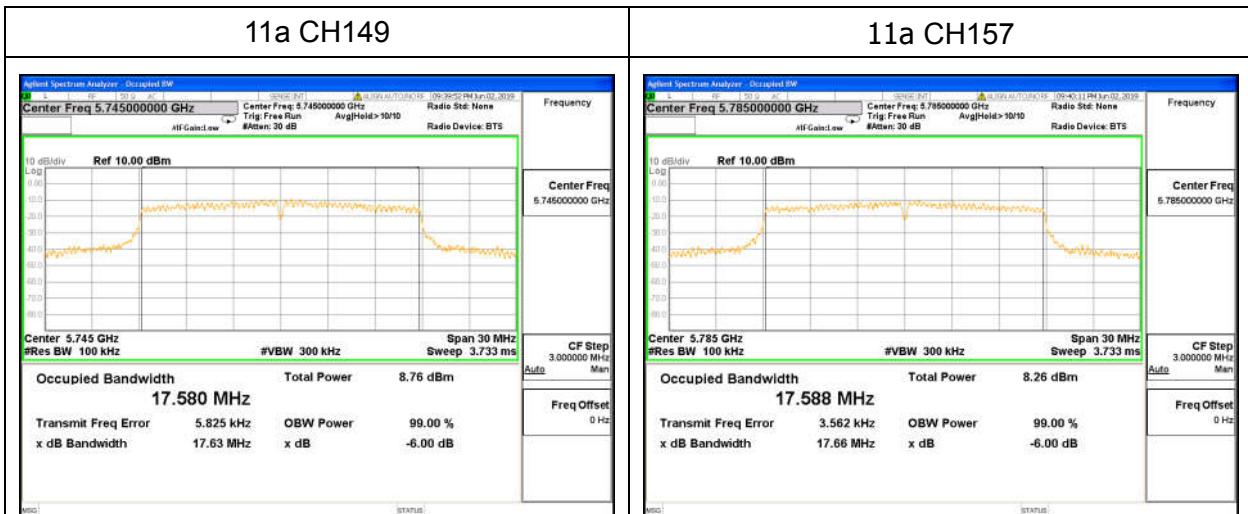
For U-NII-1







For U-NII-3





11ac(HT20) CH165	11ac(HT40) CH151	11ac(HT40) CH159
<p><b>11ac(HT20) CH165</b></p> <p>Center Freq 5.825000000 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 3.733 ms Occupied Bandwidth 17.577 MHz Transmit Freq Error 9.360 kHz x dB Bandwidth 17.62 MHz Total Power 8.92 dBm OBW Power 99.00 % x dB 6.00 dB Freq Offset 0 Hz</p>	<p><b>11ac(HT40) CH151</b></p> <p>Center Freq 5.755000000 GHz #Res BW 100 kHz #VBW 300 kHz Span 60 MHz Sweep 7.467 ms Occupied Bandwidth 36.056 MHz Transmit Freq Error 8.366 kHz x dB Bandwidth 36.33 MHz Total Power 9.10 dBm OBW Power 99.00 % x dB 6.00 dB Freq Offset 0 Hz</p>	<p><b>11ac(HT40) CH159</b></p> <p>Center Freq 5.795000000 GHz #Res BW 100 kHz #VBW 300 kHz Span 60 MHz Sweep 7.467 ms Occupied Bandwidth 36.037 MHz Transmit Freq Error 7.732 kHz x dB Bandwidth 36.35 MHz Total Power 8.62 dBm OBW Power 99.00 % x dB 6.00 dB Freq Offset 0 Hz</p>
		/

## 5.6 Radiated spurious emission

### **Radiated Emission Limits**

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 5.6.1 Test procedure

The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the floor on a support that is RF transparent for the frequencies of interest. Final measurements for the EUT require a measurement antenna height scan of 1 m to 4 m.

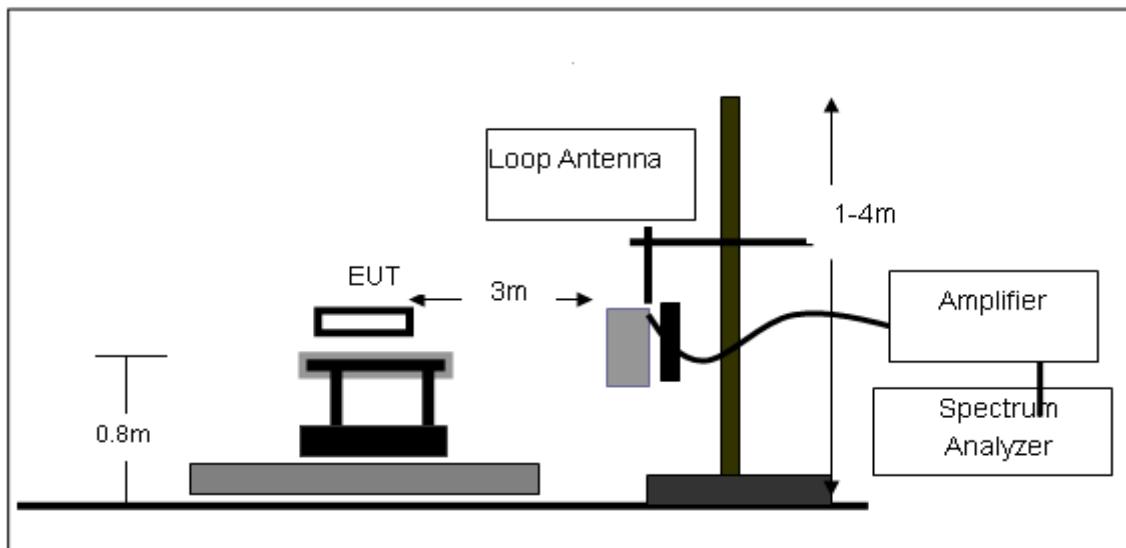
The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. For the actual test configuration, please refer to the related Item –EUT Test Photos.

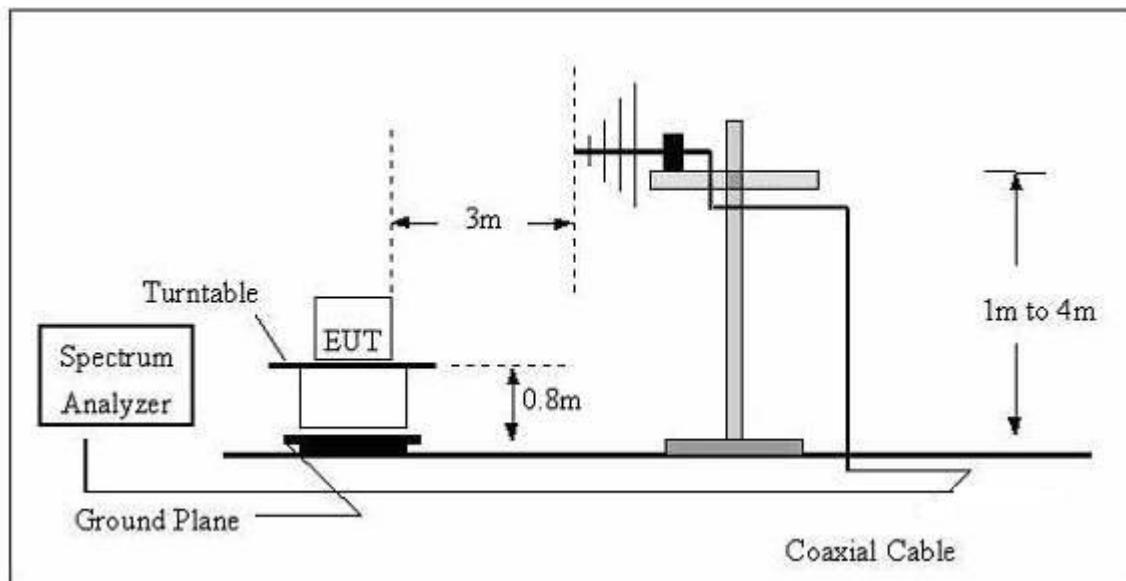
Note:Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 5.6.2 Test setup

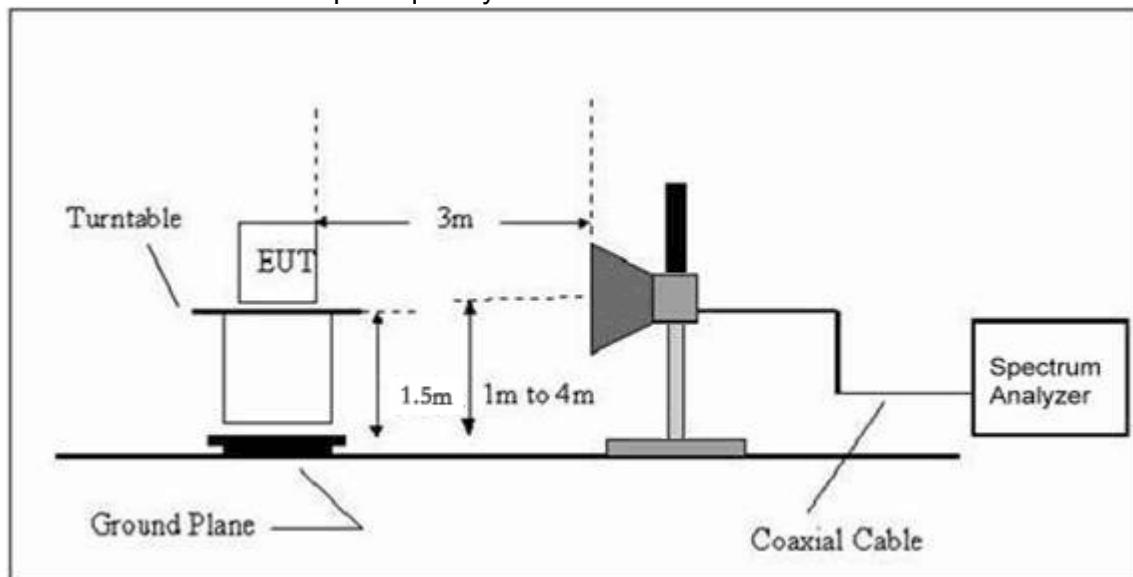
#### (A) Radiated Emission test-up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



### 5.6.3 Test results

EUT:	Gaming tablet	Model Name:	MGS101-05
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX	Polarization :	--

#### Below 30MHz

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
--	--	--	--	P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note1: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Note2: Distance extrapolation factor =  $40 \log(\text{specific distance}/\text{test distance})$  (dB); Limit line = specific limits(dBuV) + distance extrapolation factor.

Between 30MHz – 1GHz

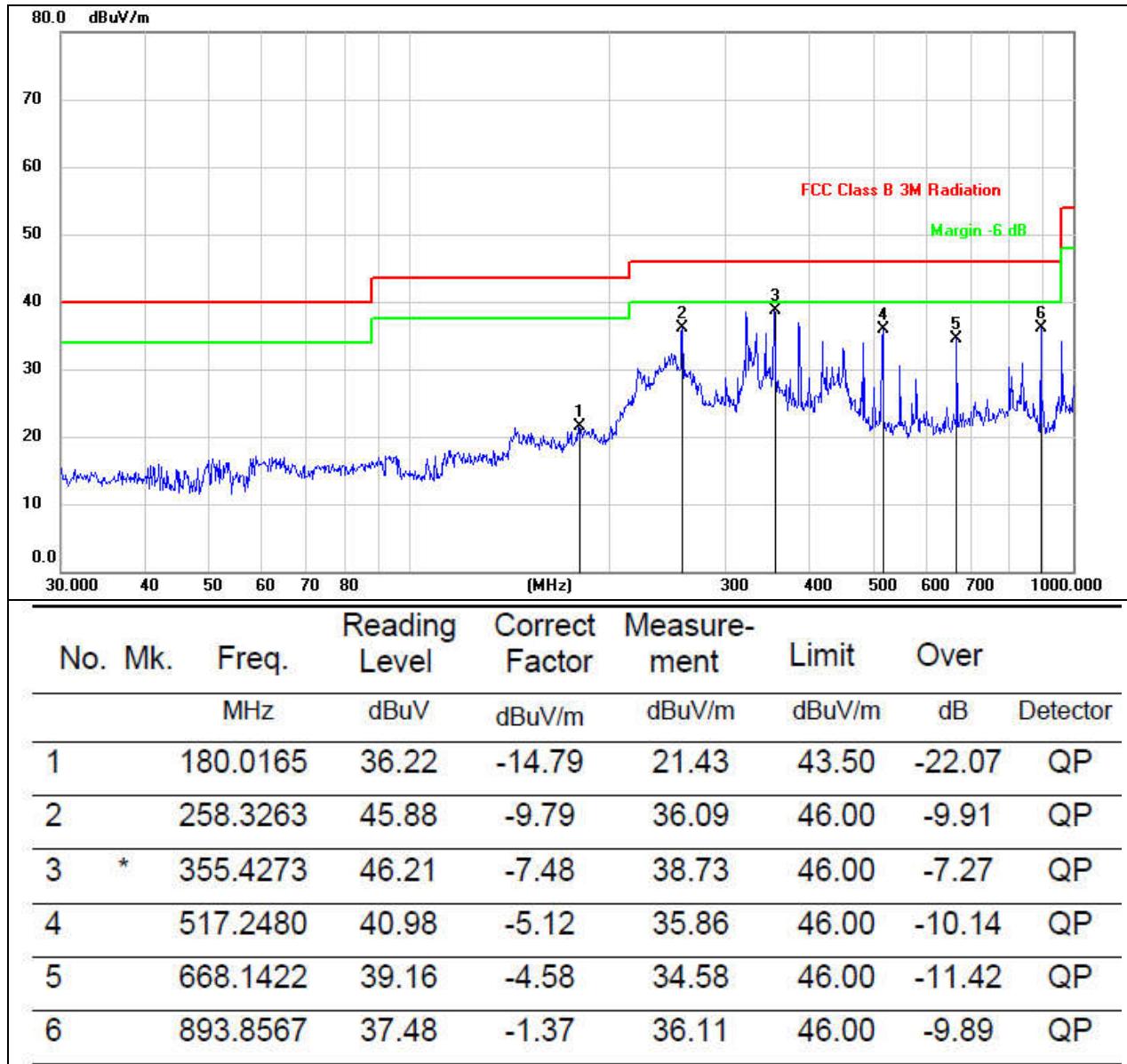
Note1 : Emission Level = Meter Reading + Factor, Margin= Emission Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 : The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

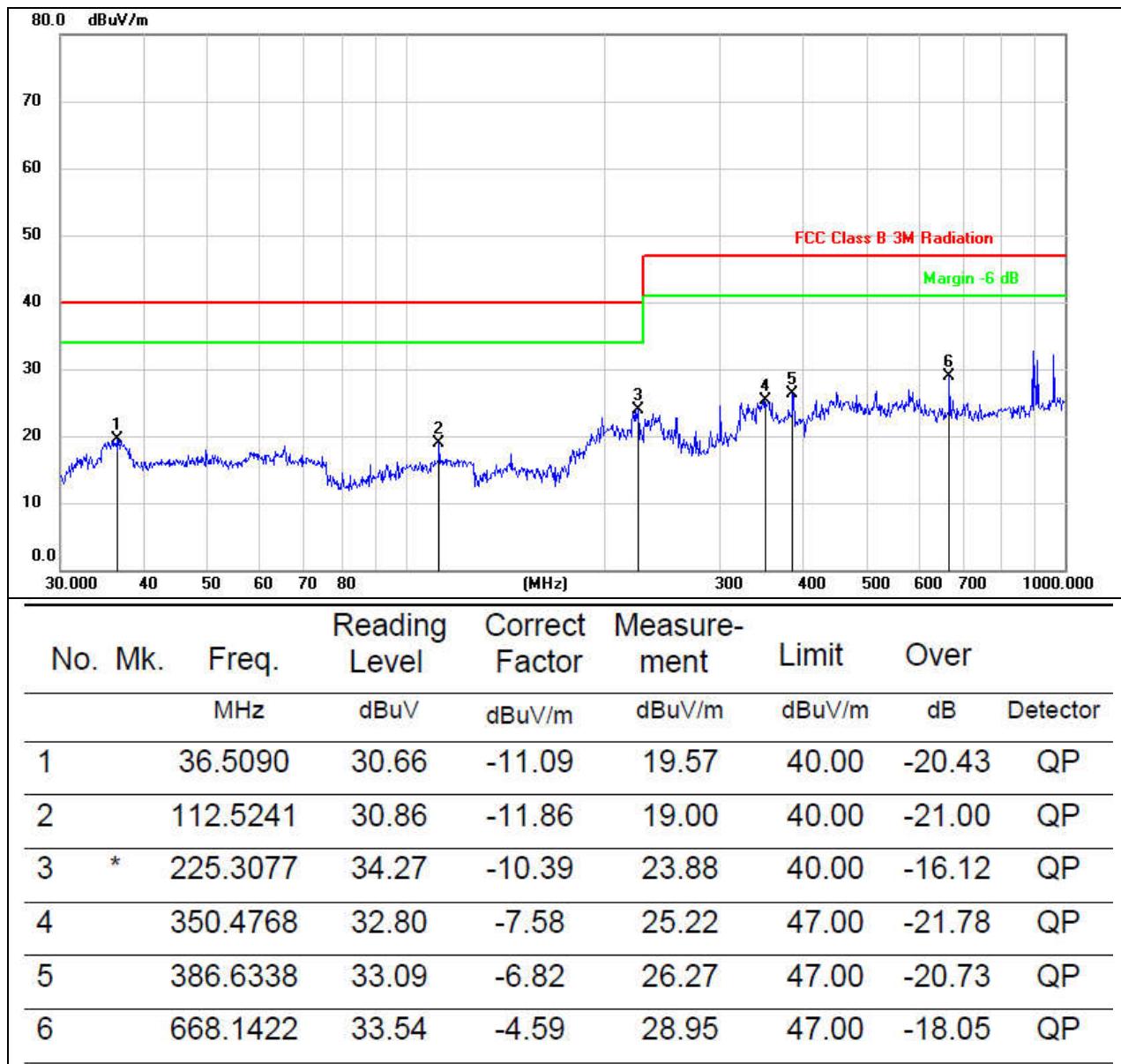
Note3 : All the modulation modes have been tested, the report only shows the worst mode.

The worst mode is U-NII-1 CH48, the worst result was report as below:

EUT :	Gaming tablet	Model Name :	MGS101-05
Temperature :	24.3 °C	Relative Humidity :	59%
Pressure:	1010 hPa	Phase :	H
Test Voltage :	DC 12V from adapter AC 120V/60Hz	Mode:	TX+Charging



EUT :	Gaming tablet	Model Name :	MGS101-05
Temperature :	24.3 °C	Relative Humidity :	59%
Pressure:	1010 hPa	Phase :	V
Test Voltage :	DC 12V from adapter AC 120V/60Hz	Mode:	TX+Charging



### 1G-40GHz

Note1 : Emission Level = Meter Reading + Factor, Margin= Emission Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

Note3 :The spurious emission of 25GHz – 40GHz band which the margin is lower more than 20dB, So that it is not reported in this test report.

Note4 : All the modulation modes have been tested, the report only shows the worst mode.

The worst mode is U-NII-1 11a and U-NII-3 11a , the worst result was report as below:

#### For U-NII-1

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
<b>Low Channel (5185 MHz)-Above 1G</b>									
Vertical	4434.205	56.17	5.94	35.40	44.00	53.51	74.00	-20.49	Pk
Vertical	4434.205	44.53	5.94	35.40	44.00	41.87	54.00	-12.13	AV
Vertical	10370.169	61.59	8.46	39.75	44.50	65.30	74.00	-8.70	Pk
Vertical	10370.169	44.04	8.46	39.75	44.50	47.75	54.00	-6.25	AV
Vertical	15540.124	55.58	10.12	38.80	44.10	60.40	74.00	-13.60	Pk
Vertical	15540.124	42.61	10.12	38.80	42.70	48.83	54.00	-5.17	AV
Horizontal	4434.249	59.21	5.94	35.18	44.00	56.33	74.00	-17.67	Pk
Horizontal	4434.249	43.46	5.94	35.18	44.00	40.58	54.00	-13.42	AV
Horizontal	10370.126	62.47	8.46	38.71	44.50	65.14	74.00	-8.86	Pk
Horizontal	10730.126	45.89	8.46	38.71	44.50	48.56	54.00	-5.44	AV
Horizontal	15540.103	58.18	10.12	38.38	44.10	62.58	74.00	-11.42	Pk
Horizontal	15540.103	42.21	10.12	38.38	44.10	46.61	54.00	-7.39	AV
<b>middle Channel (5200 MHz)-Above 1G</b>									
Vertical	4592.154	56.76	6.48	36.35	44.05	55.54	74.00	-18.46	Pk
Vertical	4592.154	43.51	6.48	36.35	44.05	42.29	54.00	-11.71	AV
Vertical	10401.223	60.43	8.47	37.88	44.51	62.27	74.00	-11.73	Pk
Vertical	10401.223	45.98	8.47	37.88	44.51	47.82	54.00	-6.18	AV
Vertical	15600.182	56.95	10.12	38.8	44.10	61.77	74.00	-12.23	Pk
Vertical	15600.182	41.09	10.12	38.8	42.70	47.31	54.00	-6.69	AV
Horizontal	4592.315	59.95	6.48	36.37	44.05	58.75	74.00	-15.25	Pk
Horizontal	4592.315	42.45	6.48	36.37	44.05	41.25	54.00	-12.75	AV
Horizontal	10400.206	60.81	8.47	38.64	44.50	63.42	74.00	-10.58	Pk
Horizontal	10400.206	46.73	8.47	38.64	44.50	49.34	54.00	-4.66	AV
Horizontal	15600.179	57.73	10.12	38.38	44.10	62.13	74.00	-11.87	Pk
Horizontal	15600.179	42.44	10.12	38.38	44.10	46.84	54.00	-7.16	AV

High Channel (5240 MHz)-Above 1G									
Vertical	4739.216	59.04	7.10	37.24	43.50	59.88	74.00	-14.12	Pk
Vertical	4739.216	46.76	7.10	37.24	43.50	47.60	54.00	-6.40	AV
Vertical	10480.274	61.09	8.46	37.68	44.50	62.73	74.00	-11.27	Pk
Vertical	10480.274	47.23	8.46	37.68	44.50	48.87	54.00	-5.13	AV
Vertical	15720.189	57.45	10.12	38.8	44.10	62.27	74.00	-11.73	Pk
Vertical	15720.189	42.30	10.12	38.8	42.70	48.52	54.00	-5.48	AV
Horizontal	4739.116	59.58	7.10	37.24	43.50	60.42	74.00	-13.58	Pk
Horizontal	4739.116	44.94	7.10	37.24	43.50	45.78	54.00	-8.22	AV
Horizontal	10481.402	59.86	8.46	38.57	44.50	62.39	74.00	-11.61	Pk
Horizontal	10481.402	44.22	8.46	38.57	44.50	46.75	54.00	-7.25	AV
Horizontal	15720.263	56.67	10.12	38.38	44.10	61.07	74.00	-12.93	Pk
Horizontal	15720.263	43.01	10.12	38.38	44.10	47.41	54.00	-6.59	AV

Note: Both horizontal and vertical antenna polarities were tested and only the worst case(horizontal) emissions were reported.

For U-NII-3

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4679.136	58.15	5.94	35.40	44.00	55.49	74.00	-18.51	Pk
Vertical	4679.136	46.75	5.94	35.40	44.00	44.09	54.00	-9.91	AV
Vertical	11490.052	60.21	8.46	39.75	44.50	63.92	74.00	-10.08	Pk
Vertical	11490.052	45.65	8.46	39.75	44.50	49.36	54.00	-4.64	AV
Vertical	17235.261	57.20	10.12	38.80	44.10	62.02	74.00	-11.98	Pk
Vertical	17235.261	41.26	10.12	38.80	42.70	47.48	54.00	-6.52	AV
Horizontal	4679.135	58.81	5.94	35.18	44.00	55.93	74.00	-18.07	Pk
Horizontal	4679.135	45.21	5.94	35.18	44.00	42.33	54.00	-11.67	AV
Horizontal	11490.302	59.45	8.46	38.71	44.50	62.12	74.00	-11.88	Pk
Horizontal	11490.302	44.42	8.46	38.71	44.50	47.09	54.00	-6.91	AV
Horizontal	17235.246	58.92	10.12	38.38	44.10	63.32	74.00	-10.68	Pk
Horizontal	17235.246	43.68	10.12	38.38	44.10	48.08	54.00	-5.92	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.208	59.48	6.48	36.35	44.05	58.26	74.00	-15.74	Pk
Vertical	4592.208	44.12	6.48	36.35	44.05	42.90	54.00	-11.10	AV
Vertical	11570.136	59.89	8.47	37.88	44.51	61.73	74.00	-12.27	Pk
Vertical	11570.136	44.49	8.47	37.88	44.51	46.33	54.00	-7.67	AV
Vertical	17355.249	59.37	10.12	38.8	44.10	64.19	74.00	-9.81	Pk
Vertical	17355.249	41.89	10.12	38.8	42.70	48.11	54.00	-5.89	AV
Horizontal	4592.138	59.90	6.48	36.37	44.05	58.70	74.00	-15.30	Pk
Horizontal	4592.138	45.41	6.48	36.37	44.05	44.21	54.00	-9.79	AV
Horizontal	11570.256	61.72	8.47	38.64	44.50	64.33	74.00	-9.67	Pk
Horizontal	11570.256	47.14	8.47	38.64	44.50	49.75	54.00	-4.25	AV
Horizontal	17355.127	60.23	10.12	38.38	44.10	64.63	74.00	-9.37	Pk
Horizontal	17355.127	44.36	10.12	38.38	44.10	48.76	54.00	-5.24	AV

High Channel (5825 MHz)-Above 1G									
Vertical	5039.156	60.17	7.10	37.24	43.50	61.01	74.00	-11.61	Pk
Vertical	5039.156	47.75	7.10	37.24	43.50	48.59	54.00	-6.52	AV
Vertical	11650.131	55.67	8.46	37.68	44.50	57.31	74.00	-15.58	Pk
Vertical	11650.131	43.70	8.46	37.68	44.50	45.34	54.00	-8.38	AV
Vertical	17475.289	61.24	10.12	38.8	44.10	66.06	74.00	-9.08	Pk
Vertical	17475.289	39.77	10.12	38.8	42.70	45.99	54.00	-7.29	AV
Horizontal	5039.316	67.84	7.10	37.24	43.50	68.68	74.00	-6.24	Pk
Horizontal	5039.316	43.96	7.10	37.24	43.50	44.80	54.00	-9.58	AV
Horizontal	11650.203	57.28	8.46	38.57	44.50	59.81	74.00	-14.86	Pk
Horizontal	11650.203	44.74	8.46	38.57	44.50	47.27	54.00	-7.29	AV
Horizontal	17475.152	61.71	10.12	38.38	44.10	66.11	74.00	-9.41	Pk
Horizontal	17475.152	44.69	10.12	38.38	44.10	49.09	54.00	-4.36	AV

## 5.7 Conduction spurious emission

### 5.7.1 Limits

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

Frequency Band (MHz)	Limit
5150 - 5250	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5250 - 5350	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5470 - 5725	Outside of the 5.47-5.725 GHz band: e.i.r.p. -27 dBm
5725 - 5850	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.

### 5.7.2 Test setup



### 5.7.3 Test procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

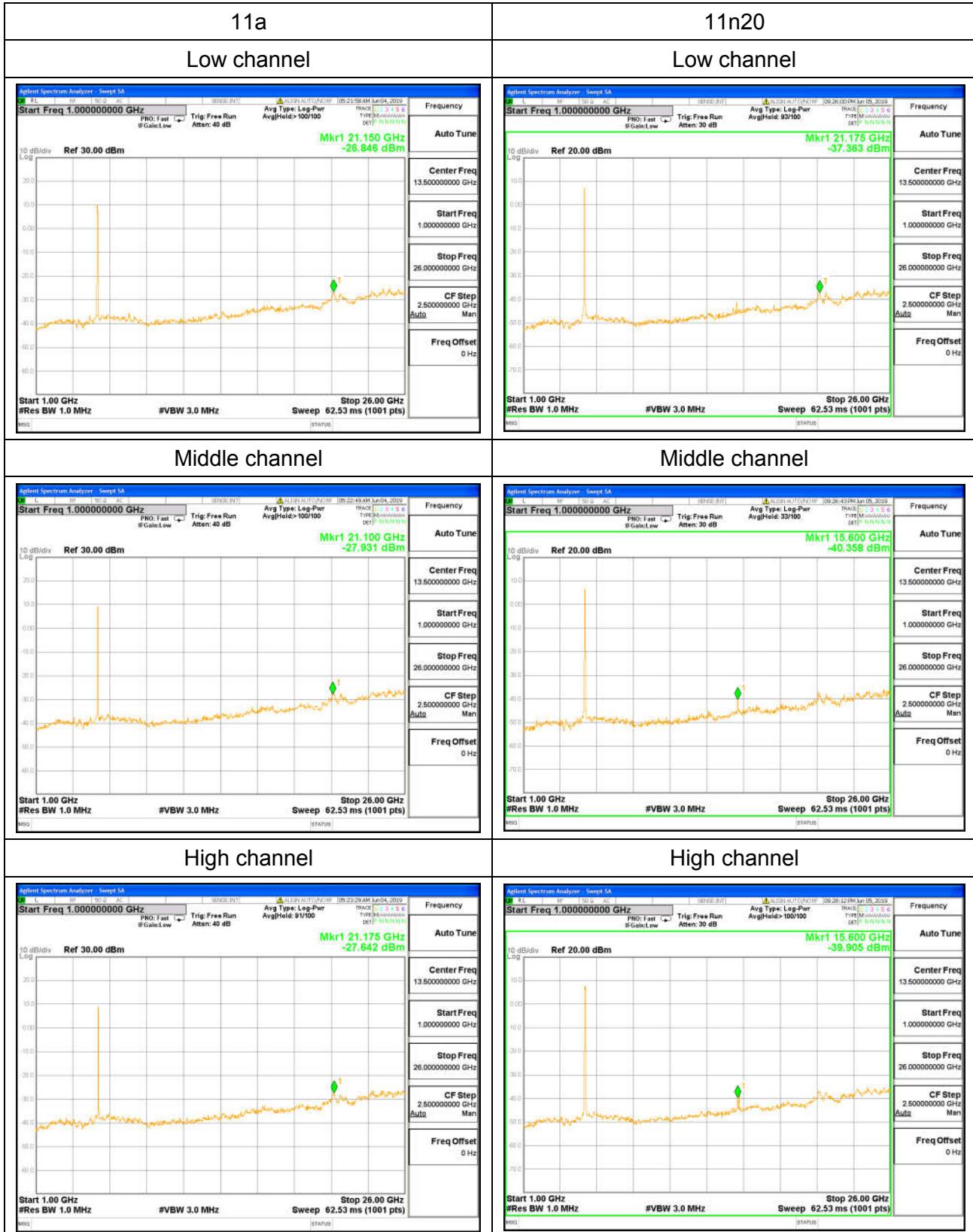
Detector function = peak

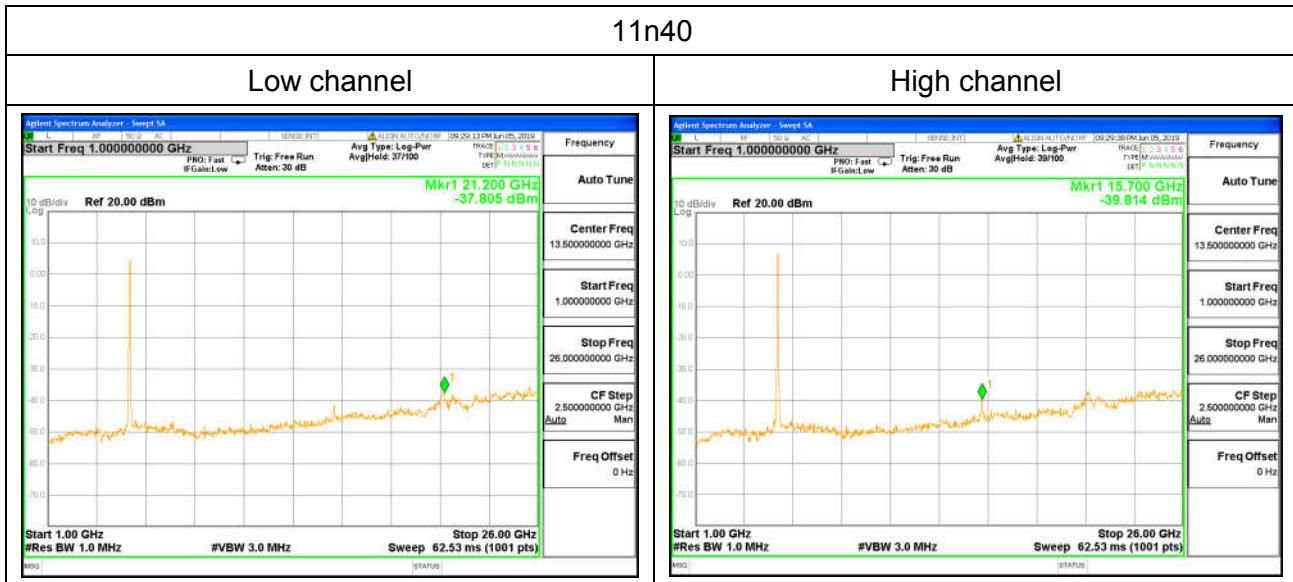
Trace = max hold

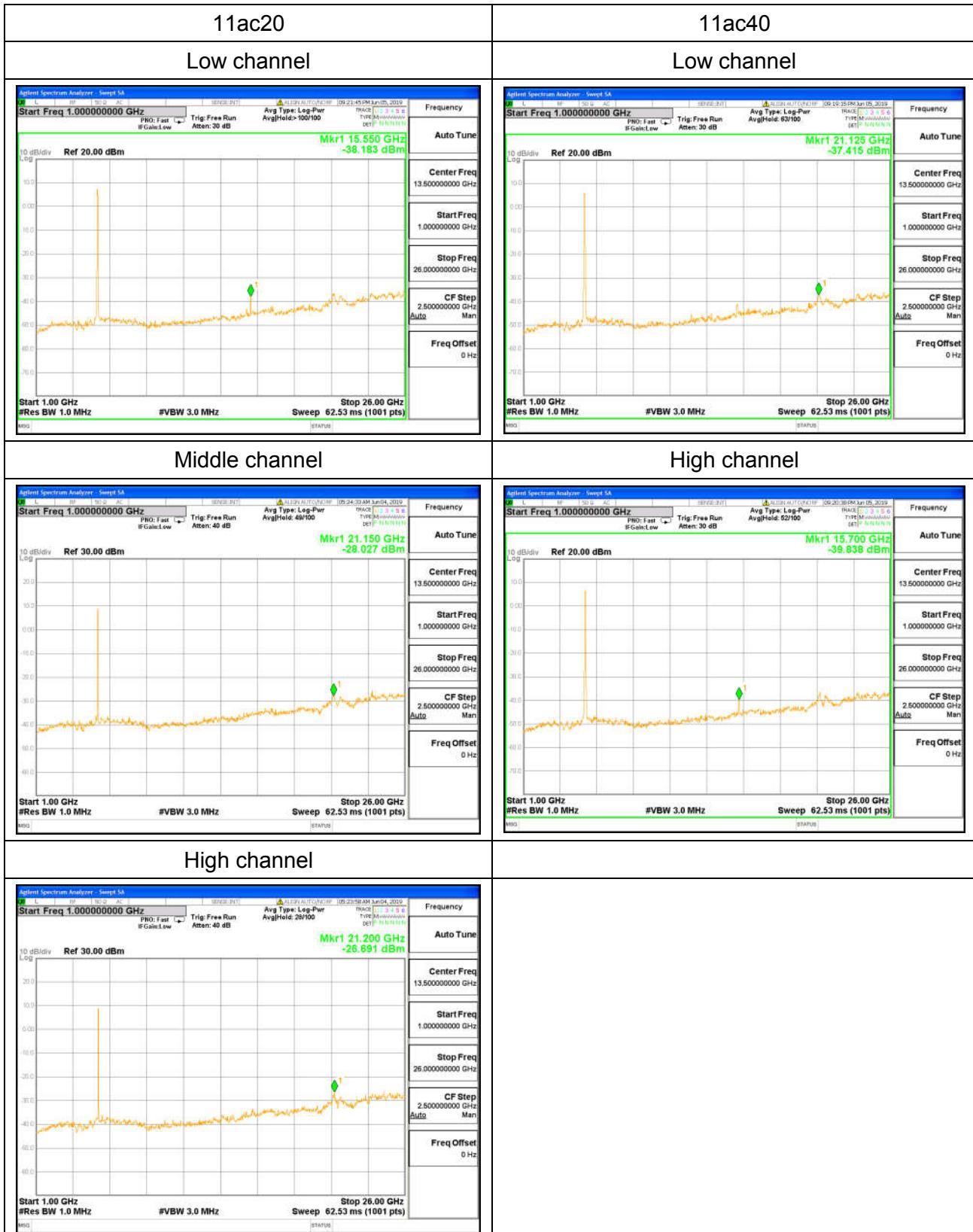
Allow the trace to stabilize

### 5.7.4 Test results

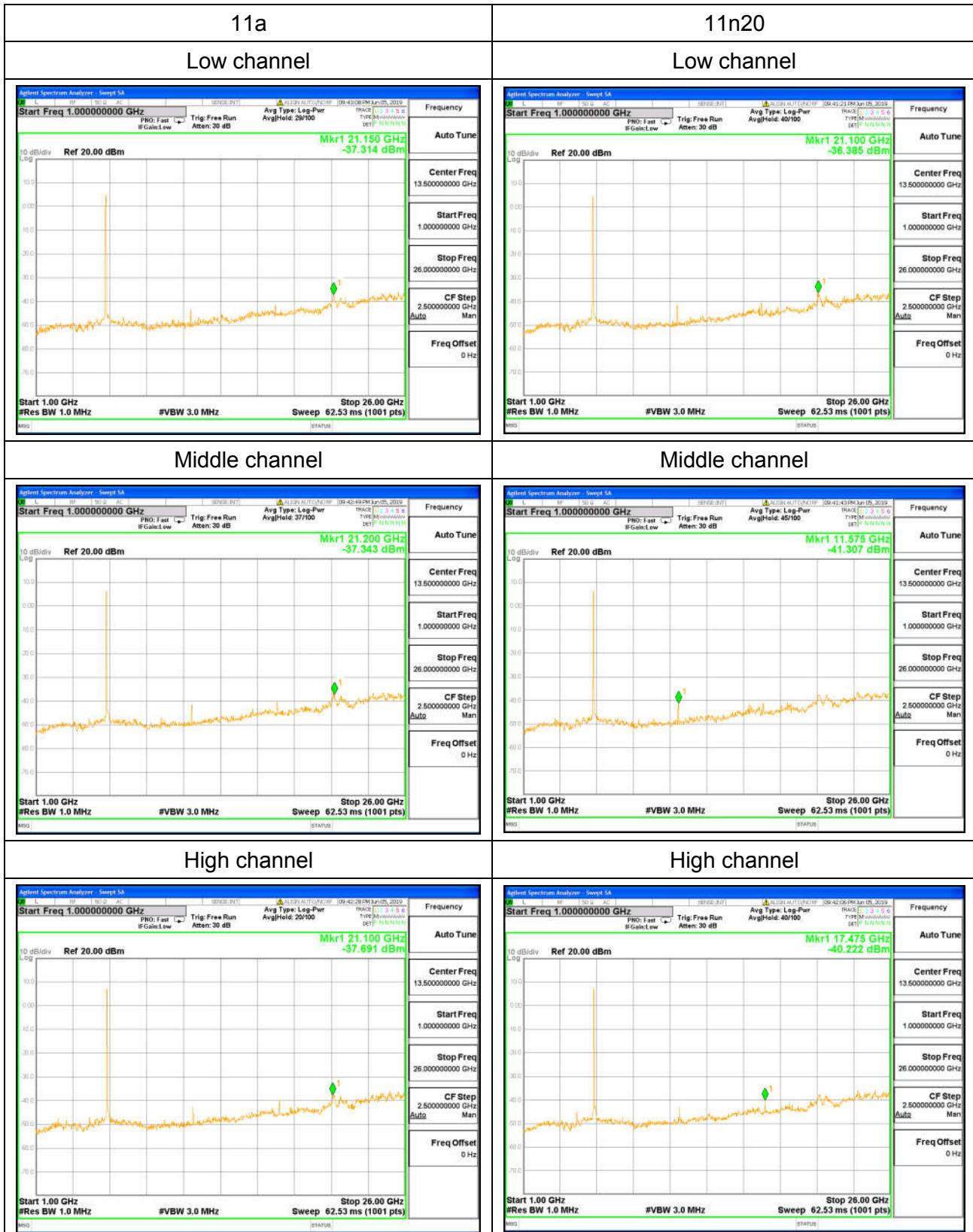
For U-NII-1:

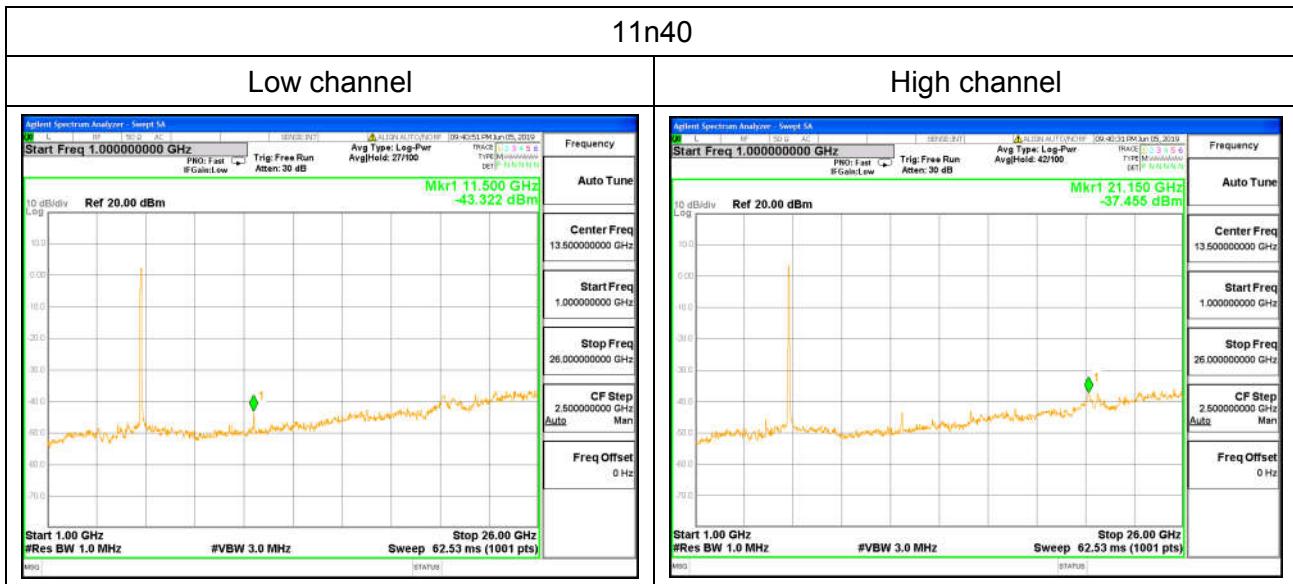


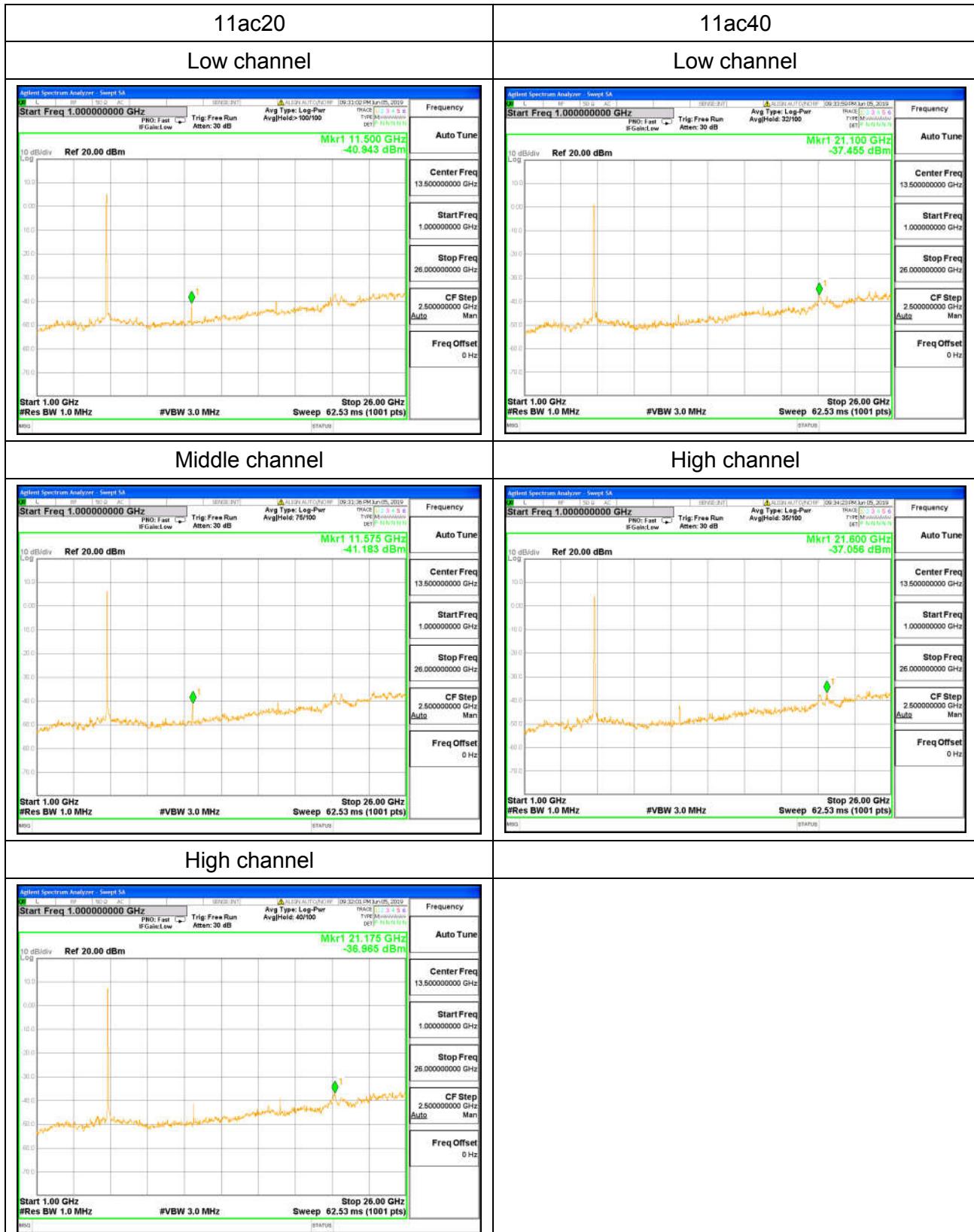




For U-NII-3:





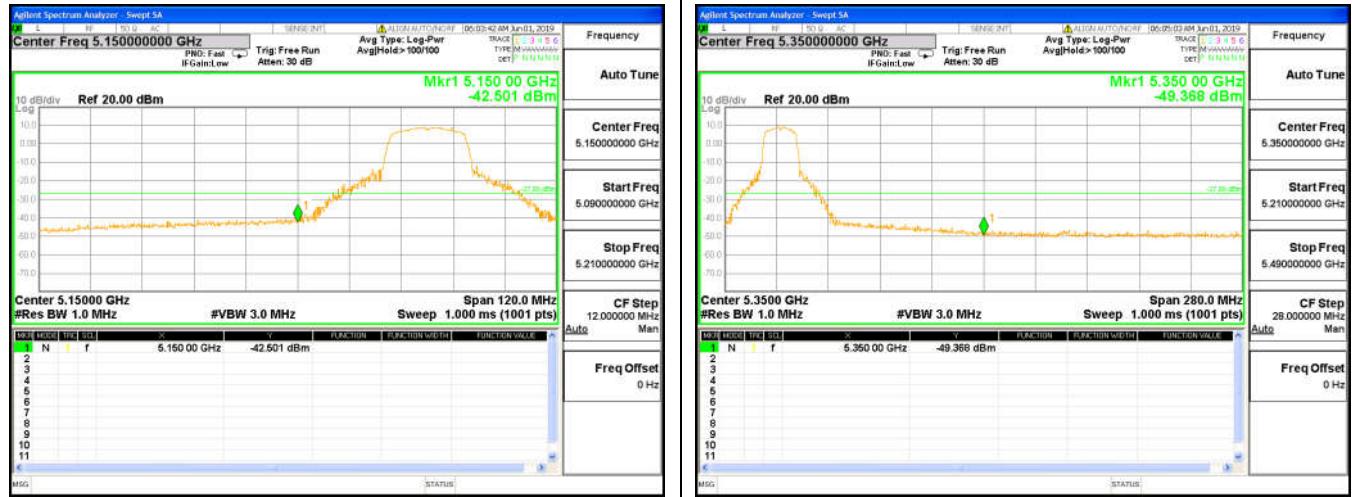


**Conduction Band edge For U-NII-1**

11a

Bandedge-Left

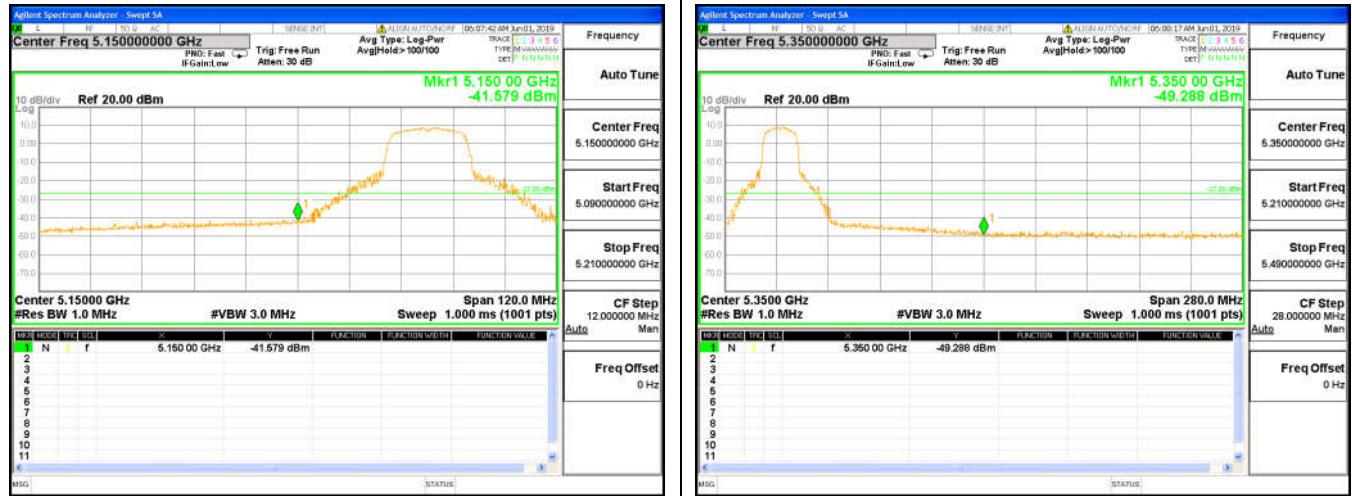
Bandedge-Right



11n20

Bandedge-Left

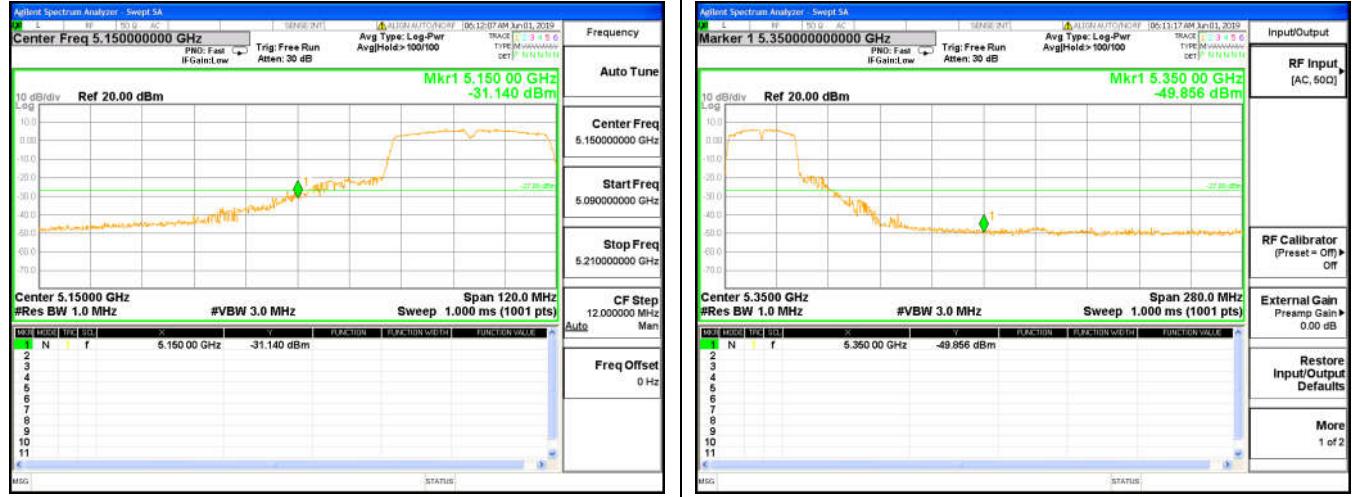
Bandedge-Right

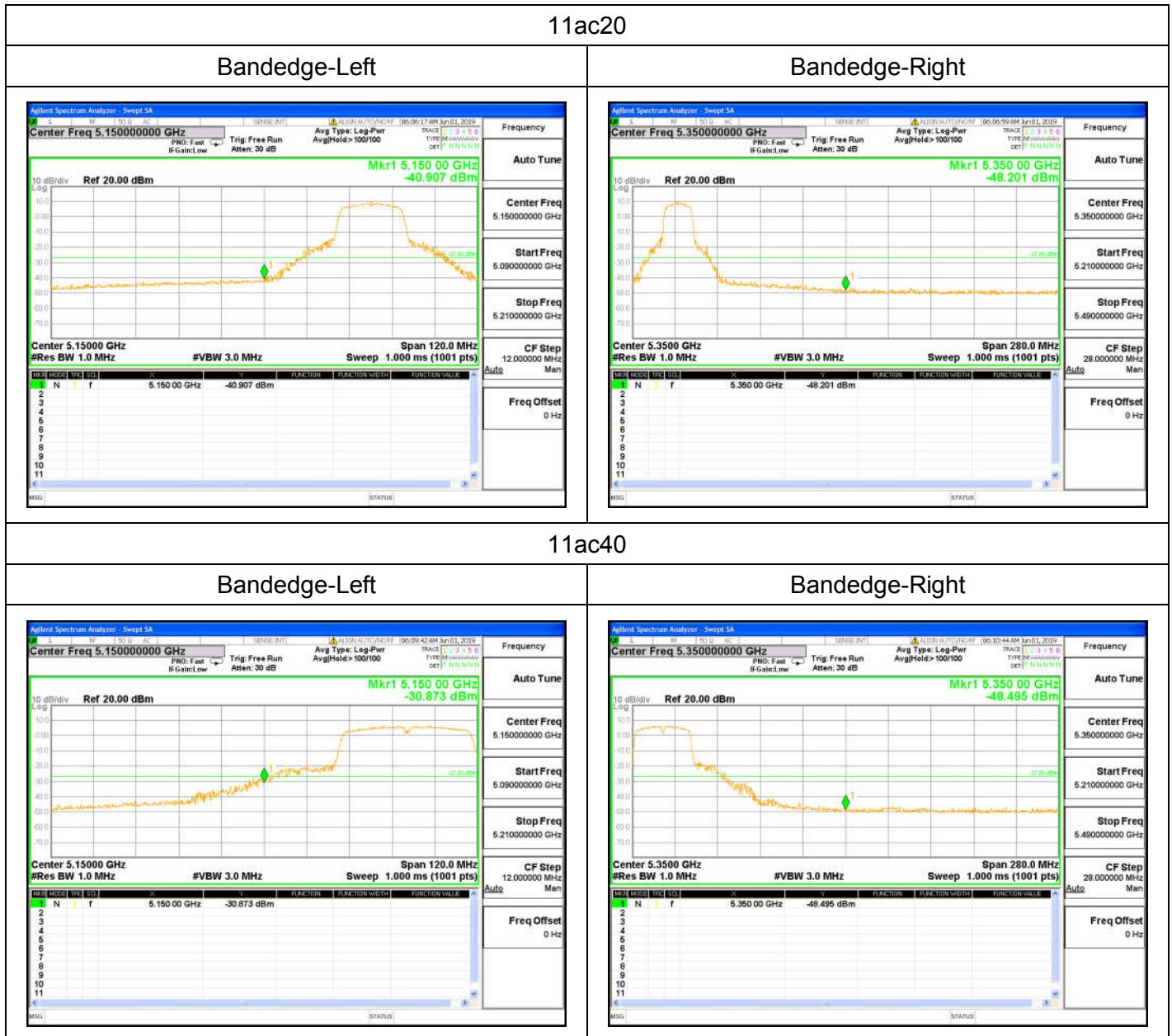


11n40

Bandedge-Left

Bandedge-Right

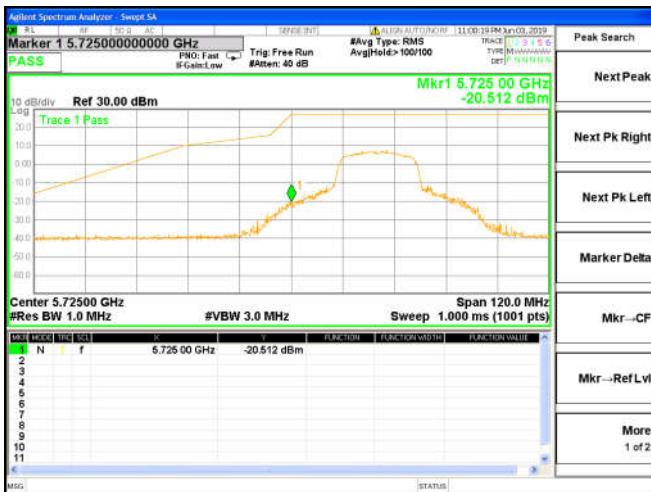




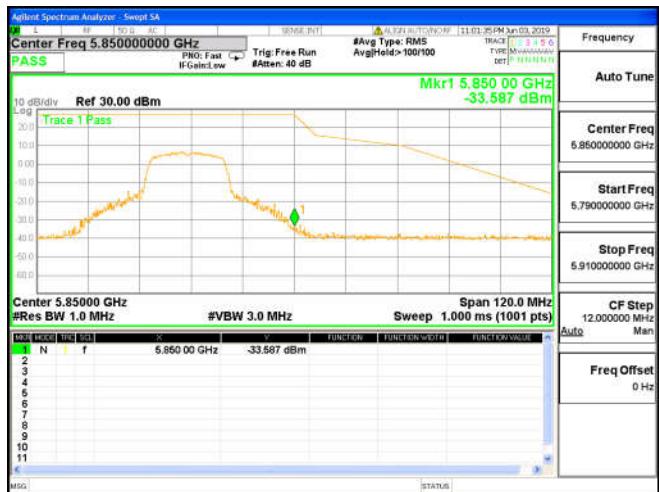
**Conduction Band edge For U-NII-3**

11a

Bandedge-Left

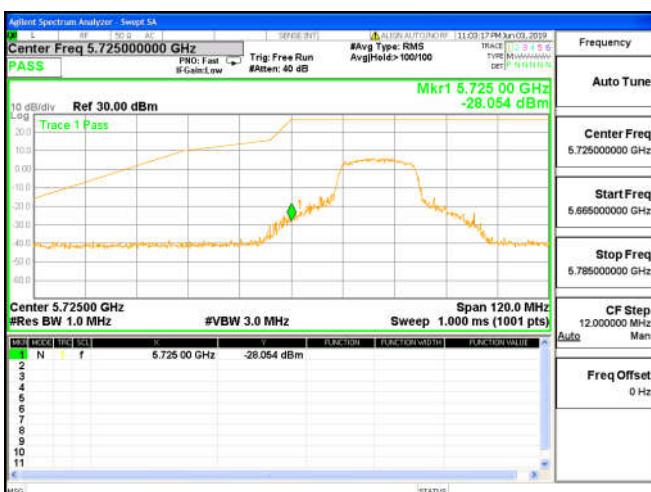


Bandedge-Right



11n20

Bandedge-Left



Bandedge-Right

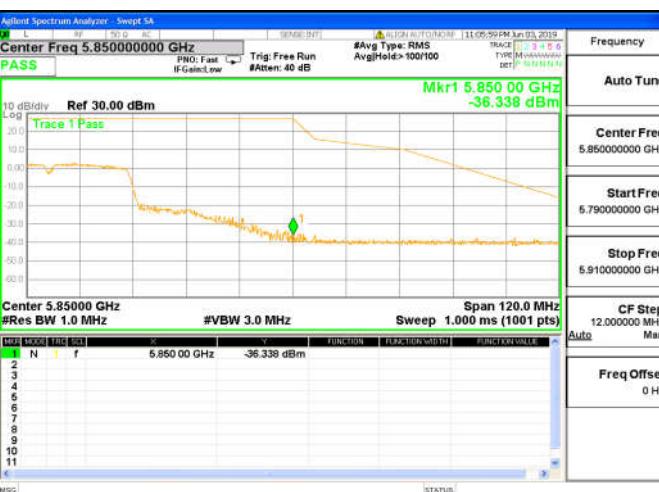


11n40

Bandedge-Left



Bandedge-Right





## 5.8 Power spectral density

### 5.8.1 Limit

#### For the band 5.15-5.25 GHz

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. 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.

#### For the band 5.25-5.35 GHz and 5.47-5.725 GHz

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

#### For the band 5.725-5.85 GHz

The maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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.

### 5.8.2 Test procedure

#### For U-NII-1:

1. Set analyzer center frequency to NII channel center frequency.
2. Set the RBW  $\geq$  1MHz.
3. Set the VBW  $\geq$  3 x RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

#### For U-NII-3

1. Set analyzer center frequency to NII channel center frequency.
2. Set the RBW  $\geq$  510kHz.
3. Set the VBW  $\geq$  3 x RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

### 5.8.3 Test setup



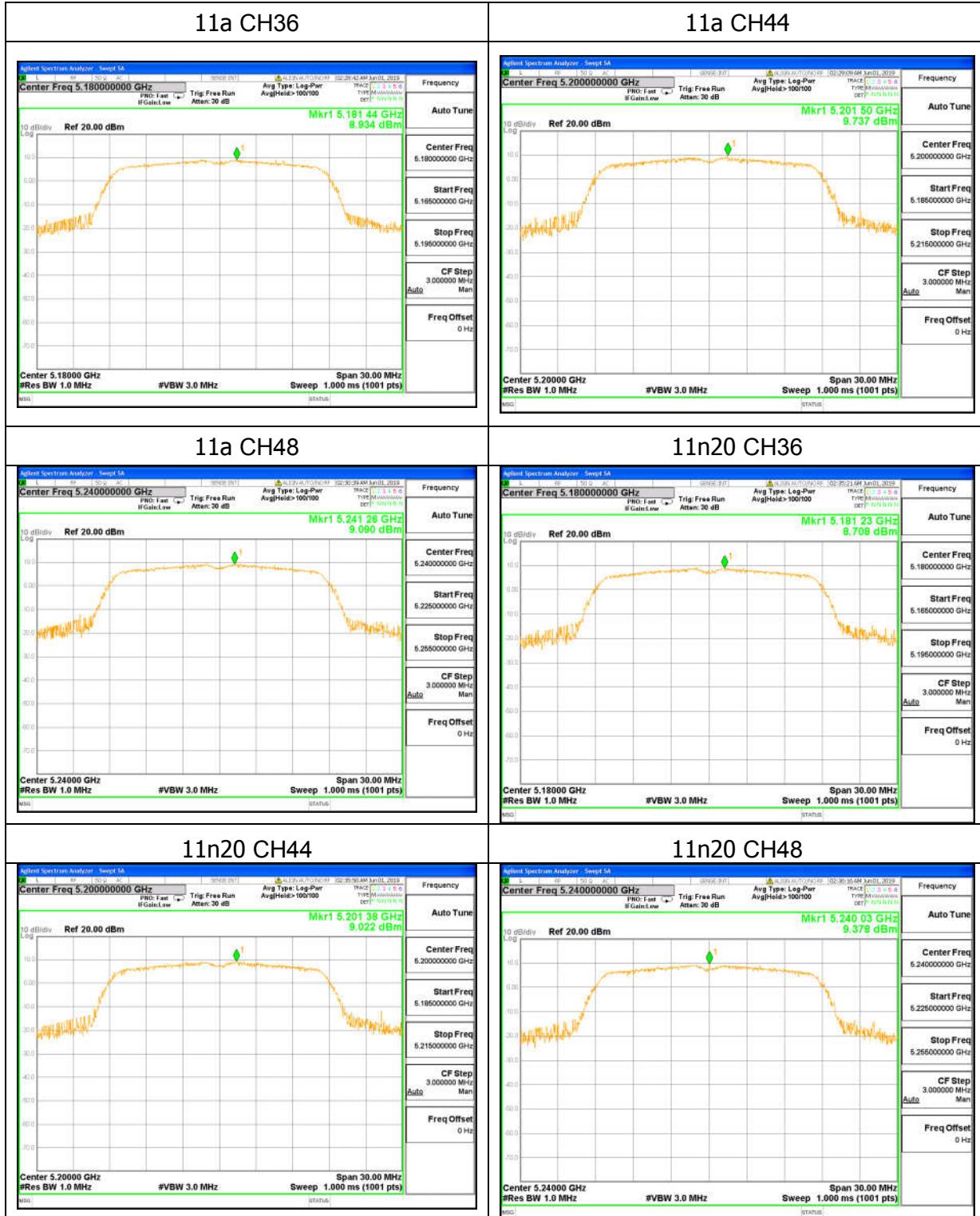
### 5.8.4 Test results

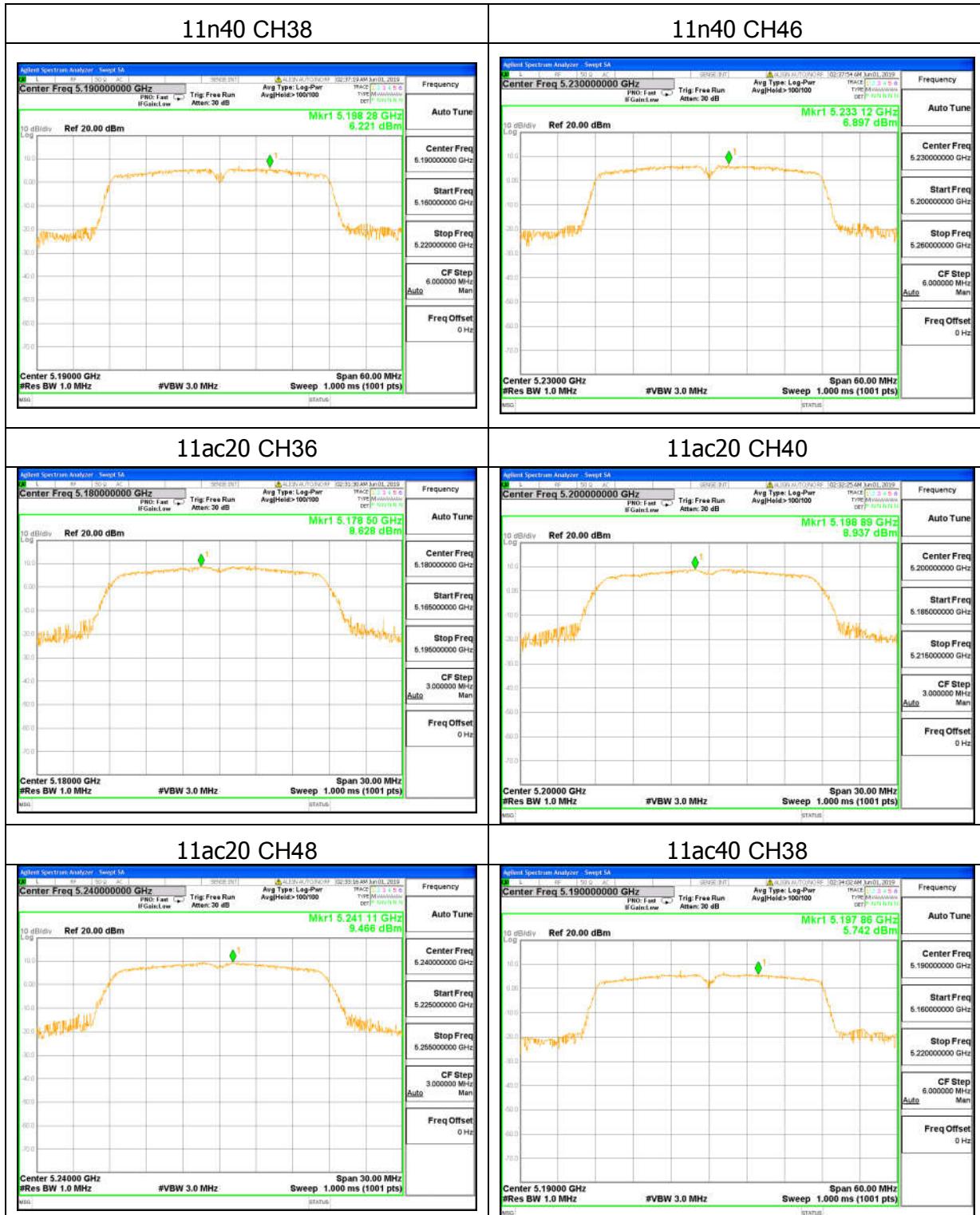
For U-NII-1

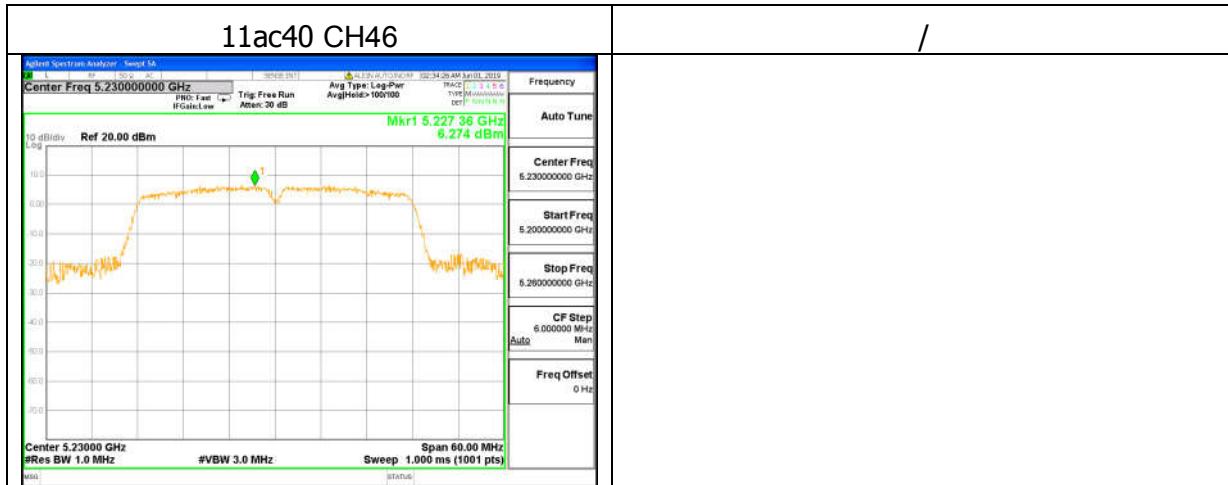
Mode	Channel	Frequency(MHz)	Measurement PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11a	CH36	5180	8.934	11	Pass
11a	CH44	5220	9.737	11	Pass
11a	CH48	5240	9.090	11	Pass
11n(HT20)	CH36	5180	8.708	11	Pass
11n(HT20)	CH44	5220	9.022	11	Pass
11n(HT20)	CH48	5240	9.378	11	Pass
11n(HT40)	CH38	5190	6.221	11	Pass
11n(HT40)	CH46	5230	6.897	11	Pass
11ac(HT20)	CH36	5180	8.628	11	Pass
11ac (HT20)	CH40	5200	8.937	11	Pass
11ac (HT20)	CH48	5240	9.466	11	Pass
11ac (HT40)	CH38	5190	5.742	11	Pass
11ac (HT40)	CH46	5230	6.274	11	Pass

Test plots

For U-NII-1







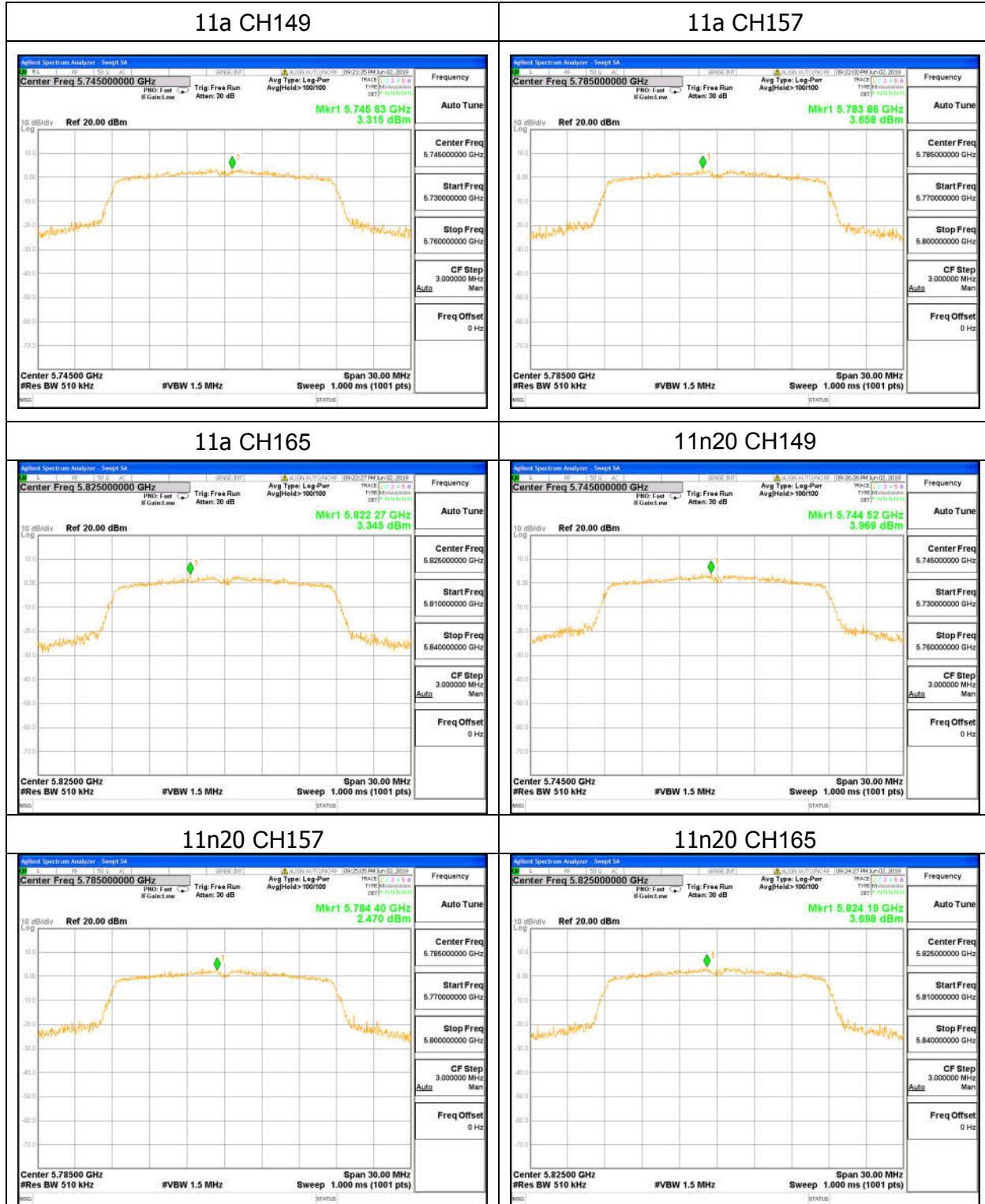
For U-NII-3

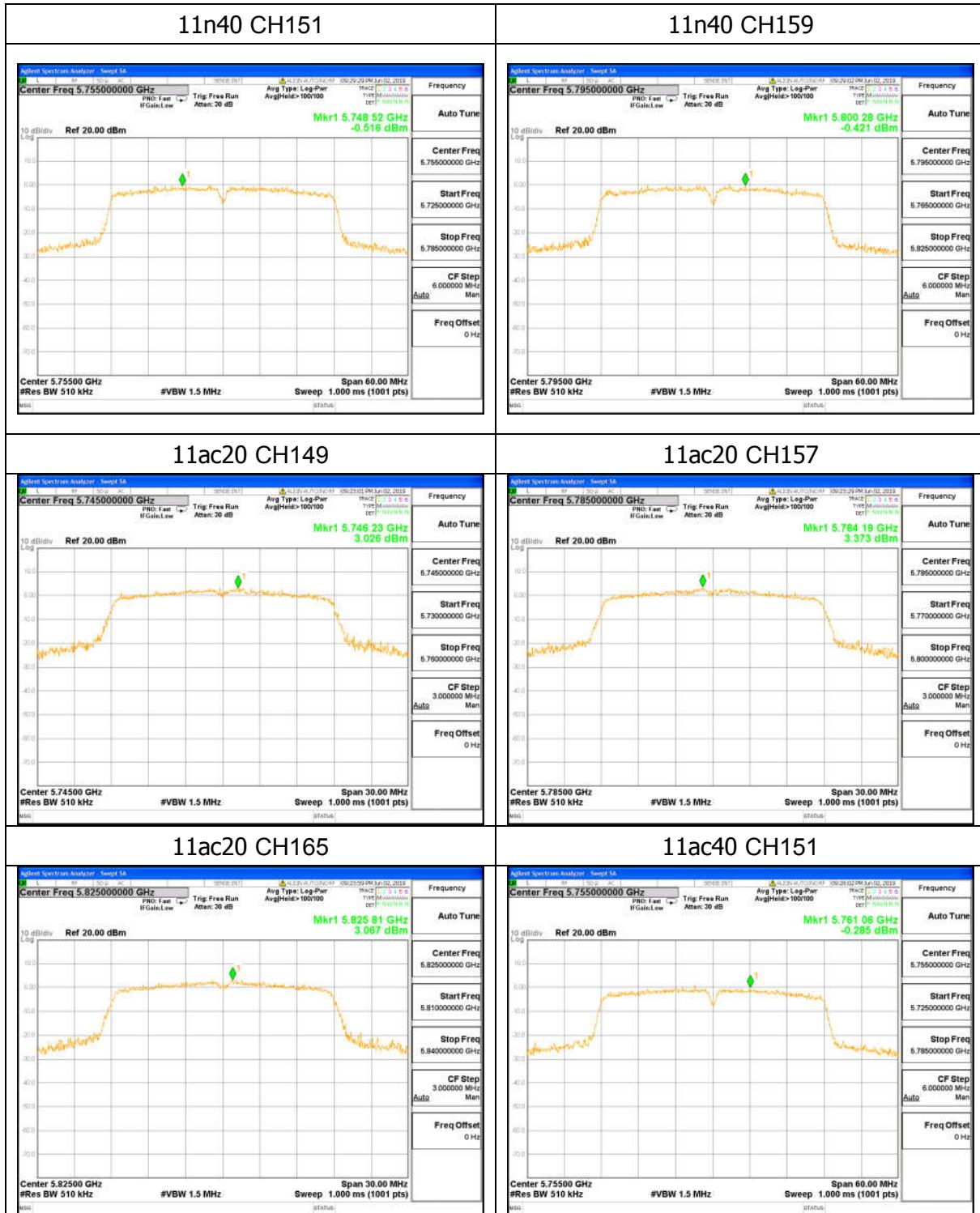
Mode	Channel	Frequency(MHz)	PSD (dBm/510kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
11a	CH149	5745	3.315	2.103	30	Pass
11a	CH157	5785	3.658	2.276	30	Pass
11a	CH165	5825	3.345	2.118	30	Pass
11n20	CH149	5745	3.969	2.445	30	Pass
11n20	CH157	5785	2.470	1.731	30	Pass
11n20	CH165	5825	3.698	2.297	30	Pass
11n40	CH151	5755	-0.516	0.871	30	Pass
11n40	CH159	5795	-0.421	0.890	30	Pass
11ac20	CH149	5745	3.026	1.968	30	Pass
11ac20	CH157	5785	3.373	2.132	30	Pass
11ac20	CH165	5825	3.067	1.987	30	Pass
11ac40	CH151	5755	-0.285	0.918	30	Pass
11ac40	CH159	5795	0.043	0.990	30	Pass

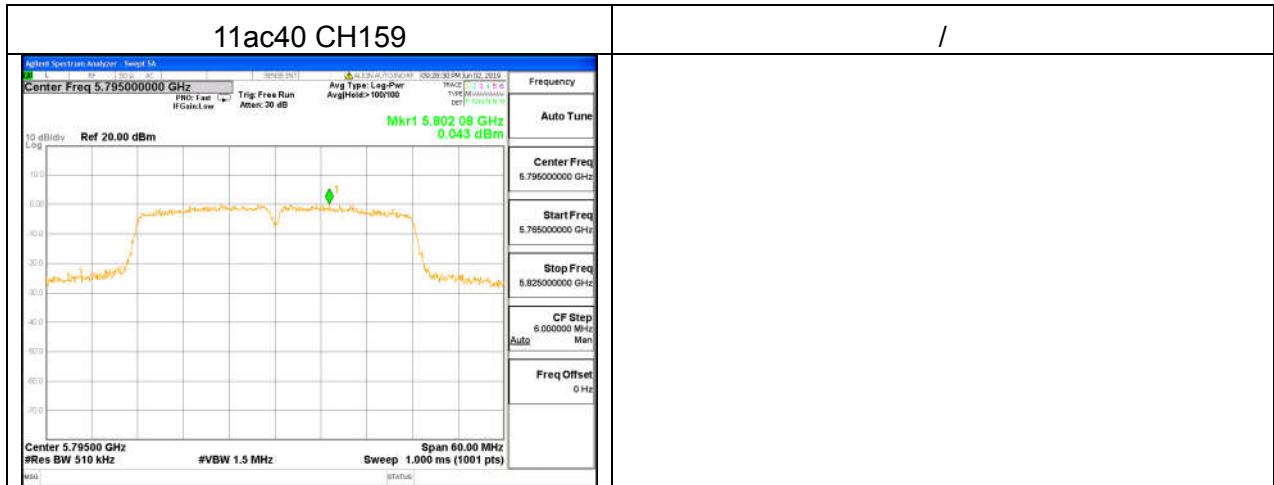
Note: If the measurement is X dBm/510kHz, thus X dBm/510kHz =  $(10^{X/10}) * (500 / 510)$  dBm/500kHz

Test plots

For U-NII-3

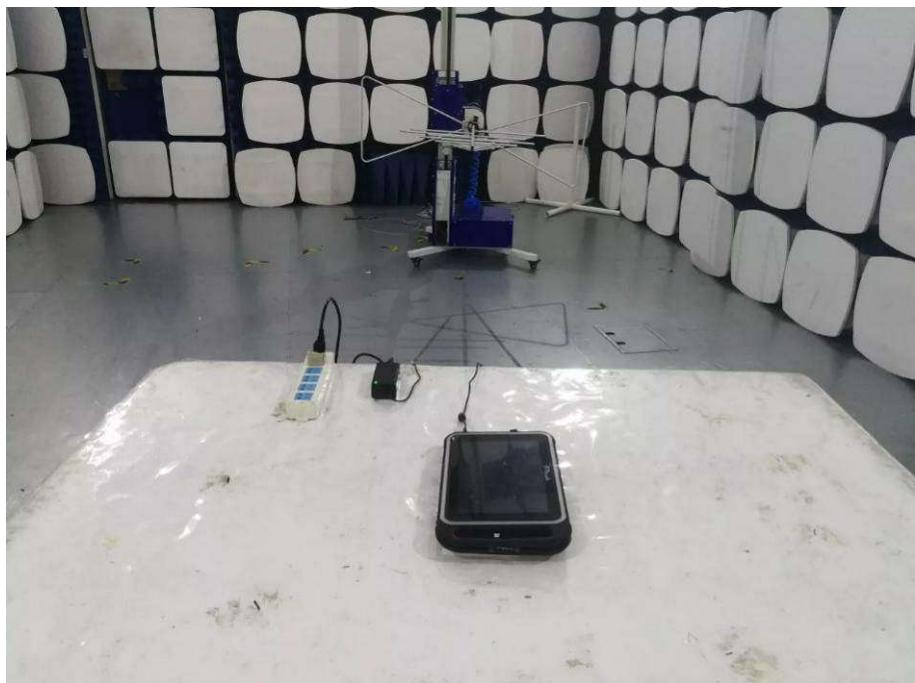






**Photographs of the Test Setup**

Radiated emission



Conducted emission



**Photographs of the EUT**

See the APPENDIX 1: EUT PHOTO in the report No.: MTi190601E003-1.

**----END OF REPORT----**