

ANT 0:  
Test Mode: IEEE 802.11AC(20)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	10.10	21.99	Pass
Mid	5200	10.07	21.99	Pass
High	5240	9.33	21.99	Pass
Low	5745	8.84	27.99	Pass
Mid	5785	8.81	27.99	Pass
High	5825	8.41	27.99	Pass

ANT 0:  
Test Mode: IEEE 802.11AC(40)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5190	11.31	21.99	Pass
High	5230	10.70	21.99	Pass
Low	5755	9.77	27.99	Pass
High	5795	9.58	27.99	Pass

ANT 0:  
Test Mode: IEEE 802.11AC(80)

Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
5190	11.34	21.99	Pass
5755	9.42	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11AC(20)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5180	11.32	21.99	Pass
Mid	5200	11.54	21.99	Pass
High	5240	11.75	21.99	Pass
Low	5745	7.98	27.99	Pass
Mid	5785	8.45	27.99	Pass
High	5825	7.66	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11AC(40)

Channel	Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
Low	5190	11.76	21.99	Pass
High	5230	11.45	21.99	Pass
Low	5755	8.25	27.99	Pass
High	5795	7.46	27.99	Pass

## ANT 1:

Test Mode: IEEE 802.11AC(80)

Frequency (MHz)	Maximum transmit power (dBm)	Limit (dBm)	Result
5190	11.02	21.99	Pass
5755	8.81	27.99	Pass

Channel	Channel Frequency (MHz)	ANT 0 Output Power (dBm)	ANT 1 Output Power (dBm)	Data Rate (Mbps)	MIMO Output Power (dBm)	Limit (dBm)
<b>802.11ac (20M MIMO) Mode</b>						
Low	5180	10.10	11.32	MCS0	13.76	21.99
Middle	5200	10.07	11.54	MCS0	13.88	21.99
High	5240	9.33	11.75	MCS0	13.72	21.99
Low	5745	8.84	7.98	MCS0	11.44	27.99
Middle	5785	8.81	8.45	MCS0	11.64	27.99
High	5825	8.41	7.66	MCS0	11.06	27.99
<b>802.11ac (40M MIMO) Mode</b>						
Low	5190	11.31	11.76	MCS0	14.55	21.99
High	5230	10.7	11.45	MCS0	14.10	21.99
Low	5755	9.77	8.25	MCS0	12.09	27.99
High	5795	9.58	7.46	MCS0	11.66	27.99
<b>802.11ac (80M MIMO) Mode</b>						
Low	5210	11.34	11.02	MCS0	14.19	21.99
High	5775	9.42	8.81	MCS0	12.14	27.99

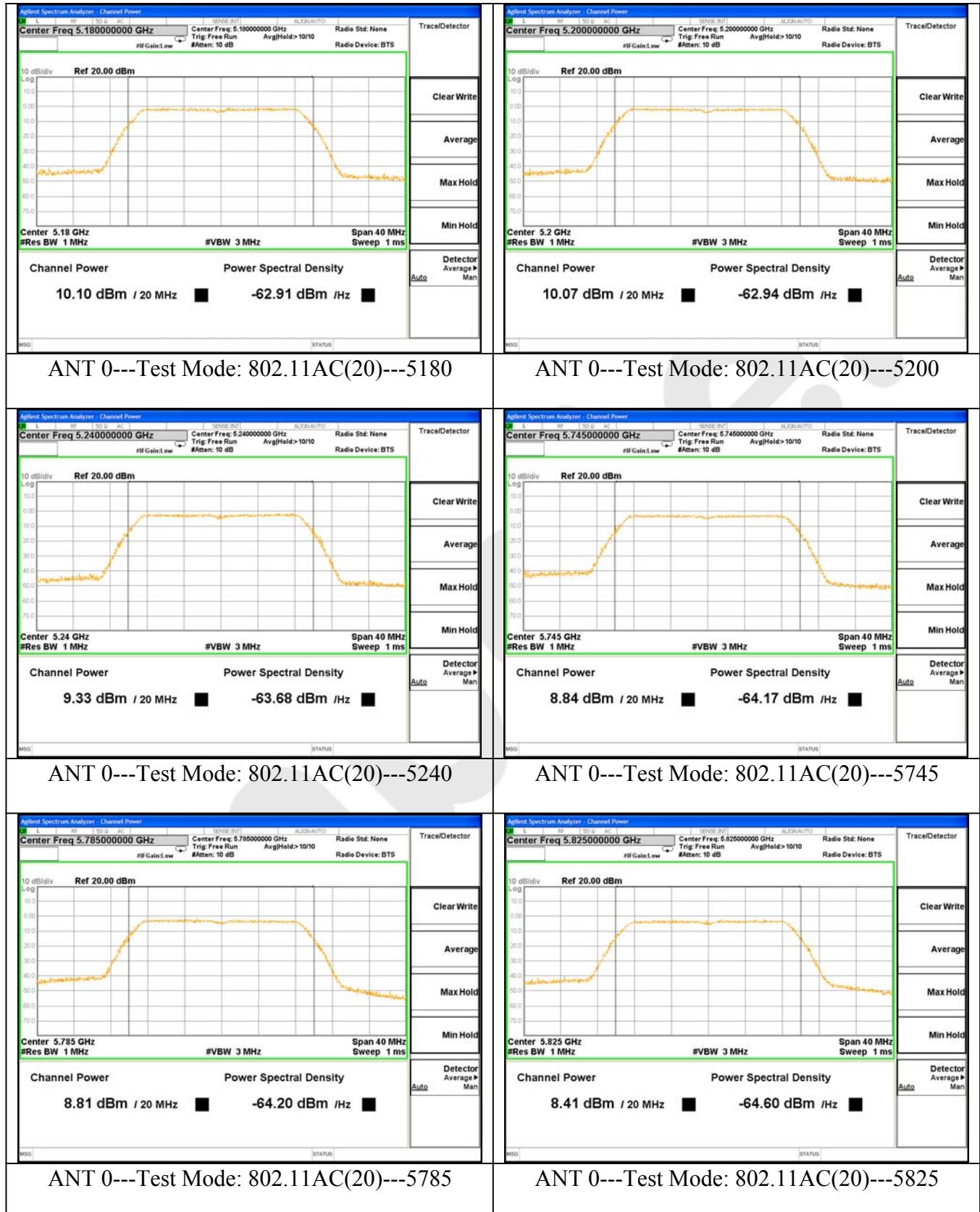
Remark:

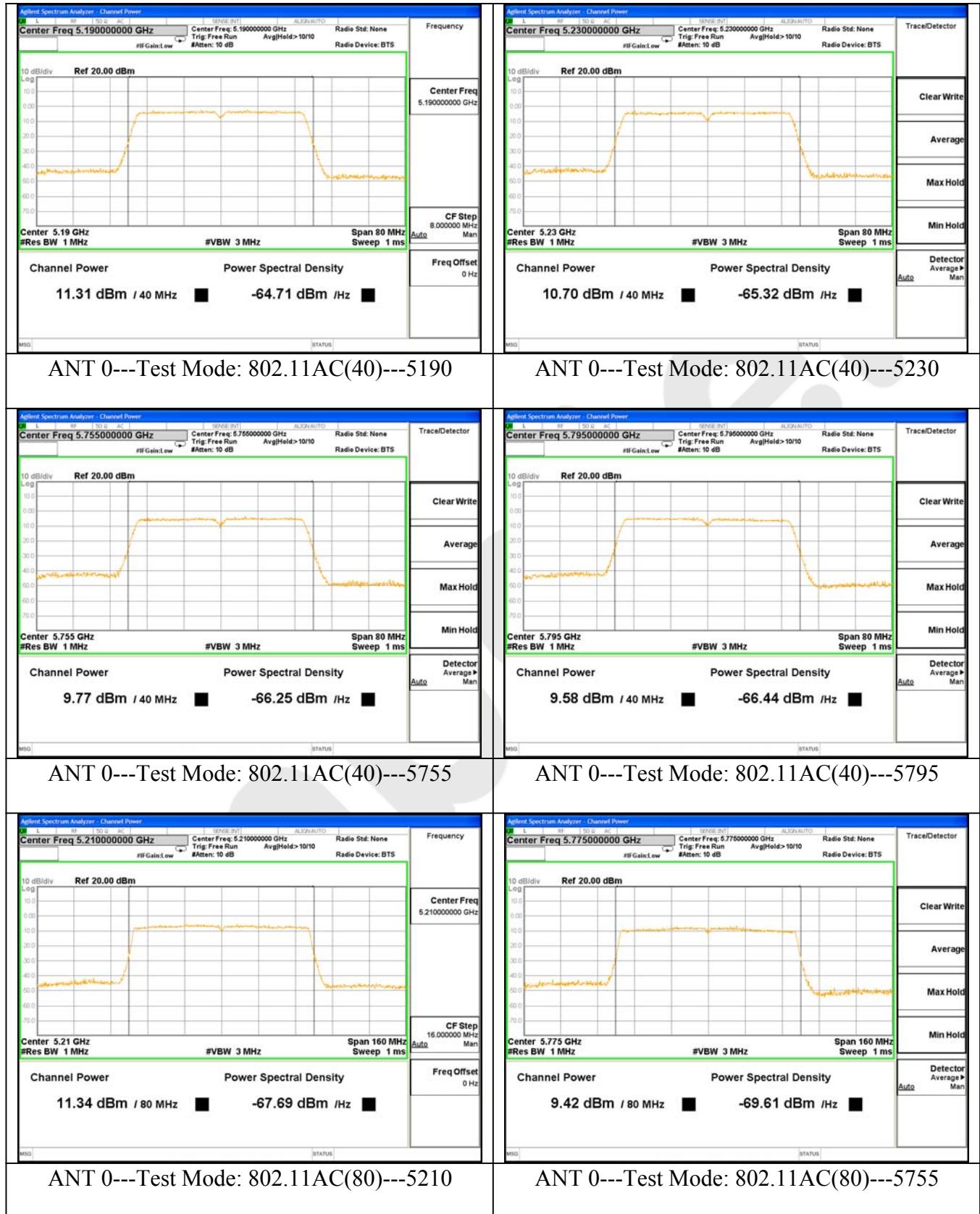
ANT 0 Gain= 5.0dBi

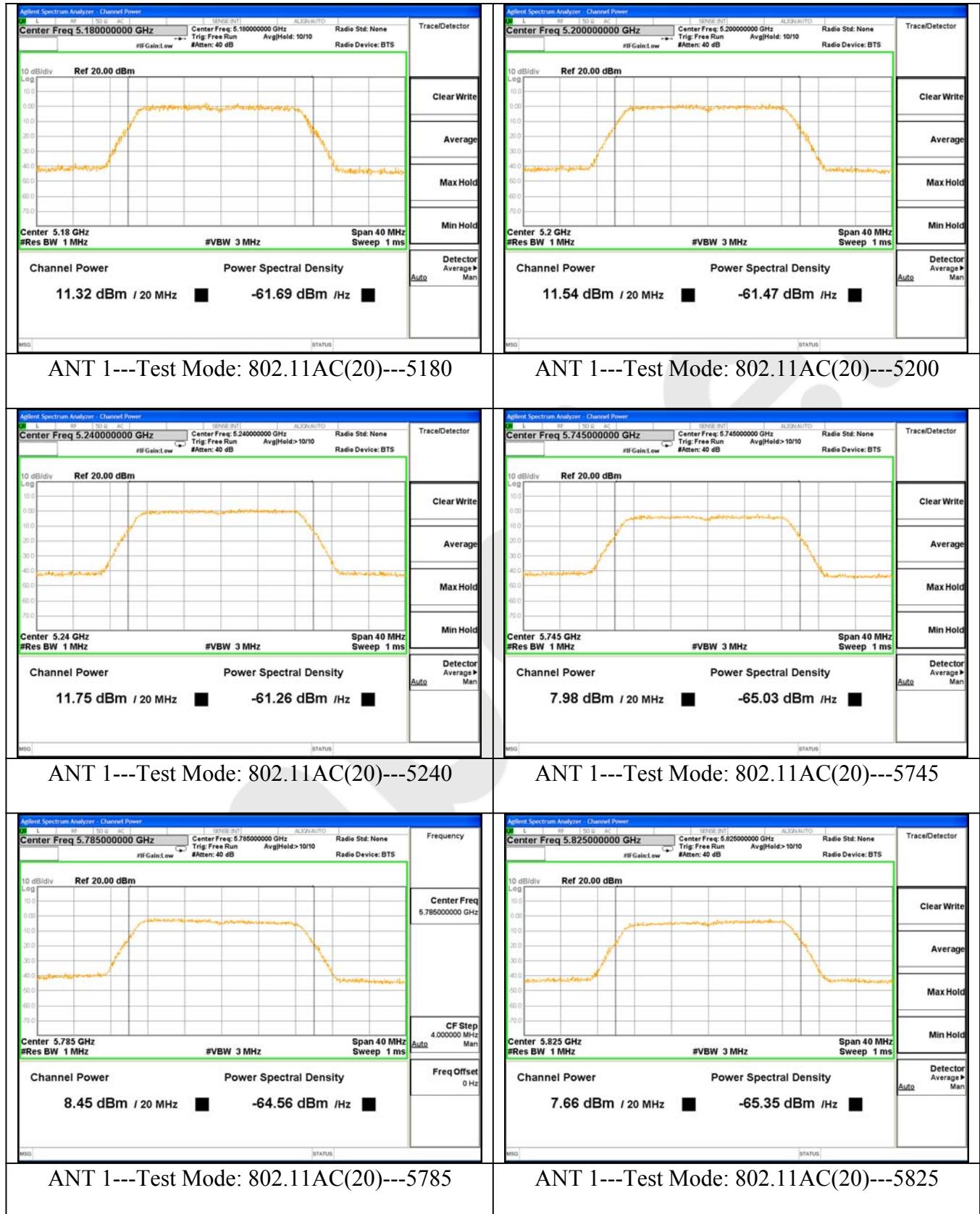
ANT 0 Gain= 5.0dBi

$$10 * \log[10^{(x/10)} + 10^{(y/10)}] = 8.01 \text{dBi}$$

**Output Power Limit=Limit-(6-Ant gain)**









## 6. Peak Power Spectral Density Test

### 6.1. Test Limit

1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable 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. In addition, 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, 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.

(3) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. In addition, 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, 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.

(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. In addition, 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, 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

## 6.2. Test Setup



## 6.3. Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

1. The EUT is directly connected to the spectrum analyzer;
2. Set RBW  $\geq 1/T$ ;
3. Set VBW  $\geq 3$  RBW. ;
3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;
5. Detector=RMS;
6. Sweep time= auto couple;
7. Trace mode=max. hold;

## 6.4. Test Equipment

Same as clause 4.4.

## 6.5. Test Results

Pass.

Please refer to the following data.

ANT 0:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	3.249	8.99	Pass
Mid	5200	3.084	8.99	Pass
High	5240	1.890	8.99	Pass
Low	5745	-3.023	27.99	Pass
Mid	5785	-1.550	27.99	Pass
High	5825	-2.748	27.99	Pass

ANT 0:

Test Mode: IEEE 802.11n(HT20)

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	4.003	8.99	Pass
Mid	5200	3.370	8.99	Pass
High	5240	2.189	8.99	Pass
Low	5745	-2.273	27.99	Pass
Mid	5785	-1.275	27.99	Pass
High	5825	-2.674	27.99	Pass

ANT 0:

Test Mode: IEEE 802.11n(HT40)

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5190	0.680	8.99	Pass
High	5230	0.982	8.99	Pass
Low	5755	-4.230	27.99	Pass
High	5795	-4.406	27.99	Pass

ANT 1:

Test Mode: IEEE 802.11a

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	3.357	8.99	Pass
Mid	5200	2.953	8.99	Pass
High	5240	2.369	8.99	Pass
Low	5745	-4.577	27.99	Pass
Mid	5785	-3.545	27.99	Pass
High	5825	-4.468	27.99	Pass

ANT 1:

Test Mode: IEEE 802.11n(HT20)

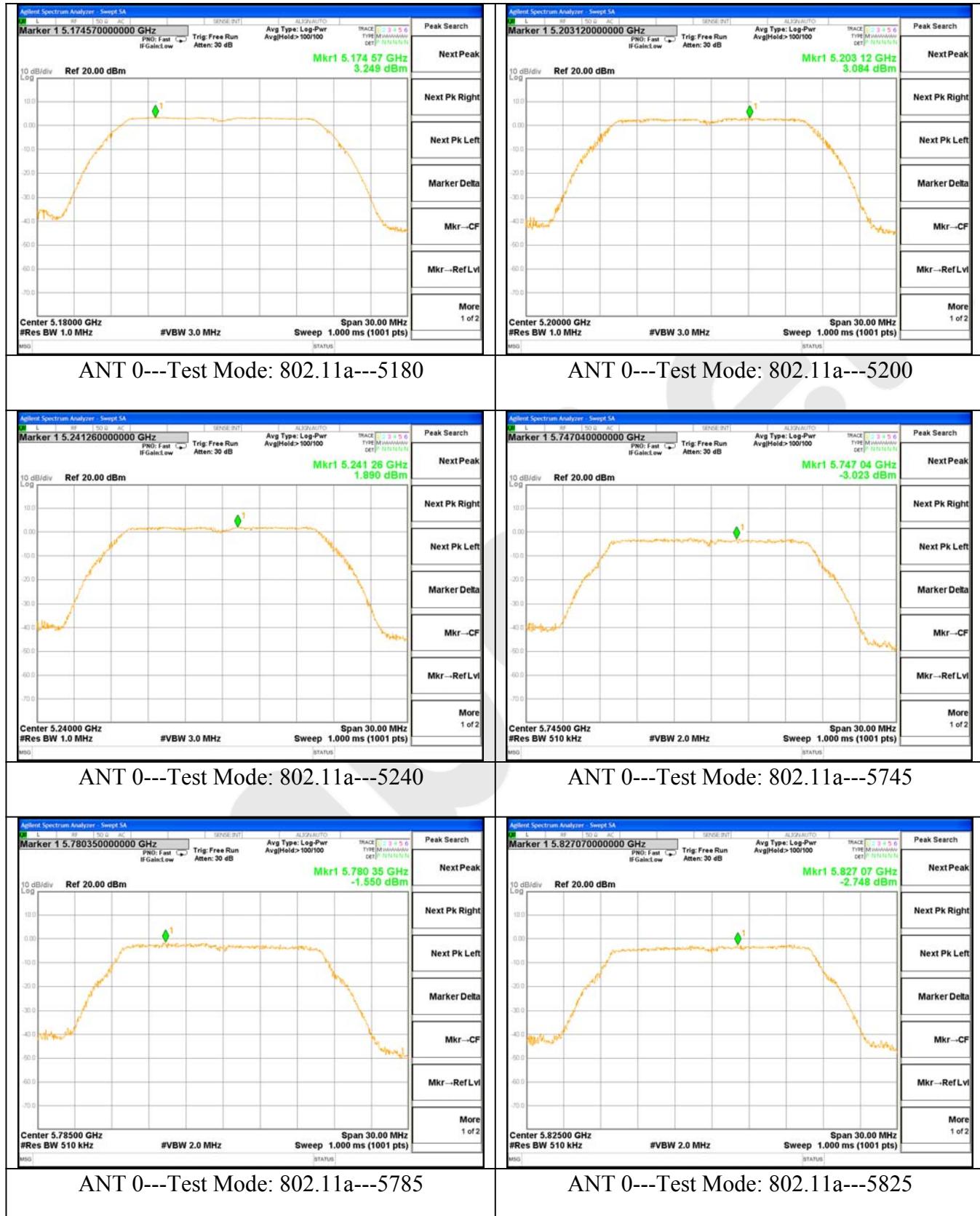
Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	4.260	8.99	Pass
Mid	5200	3.023	8.99	Pass
High	5240	3.247	8.99	Pass
Low	5745	-4.259	27.99	Pass
Mid	5785	-2.538	27.99	Pass
High	5825	-4.053	27.99	Pass

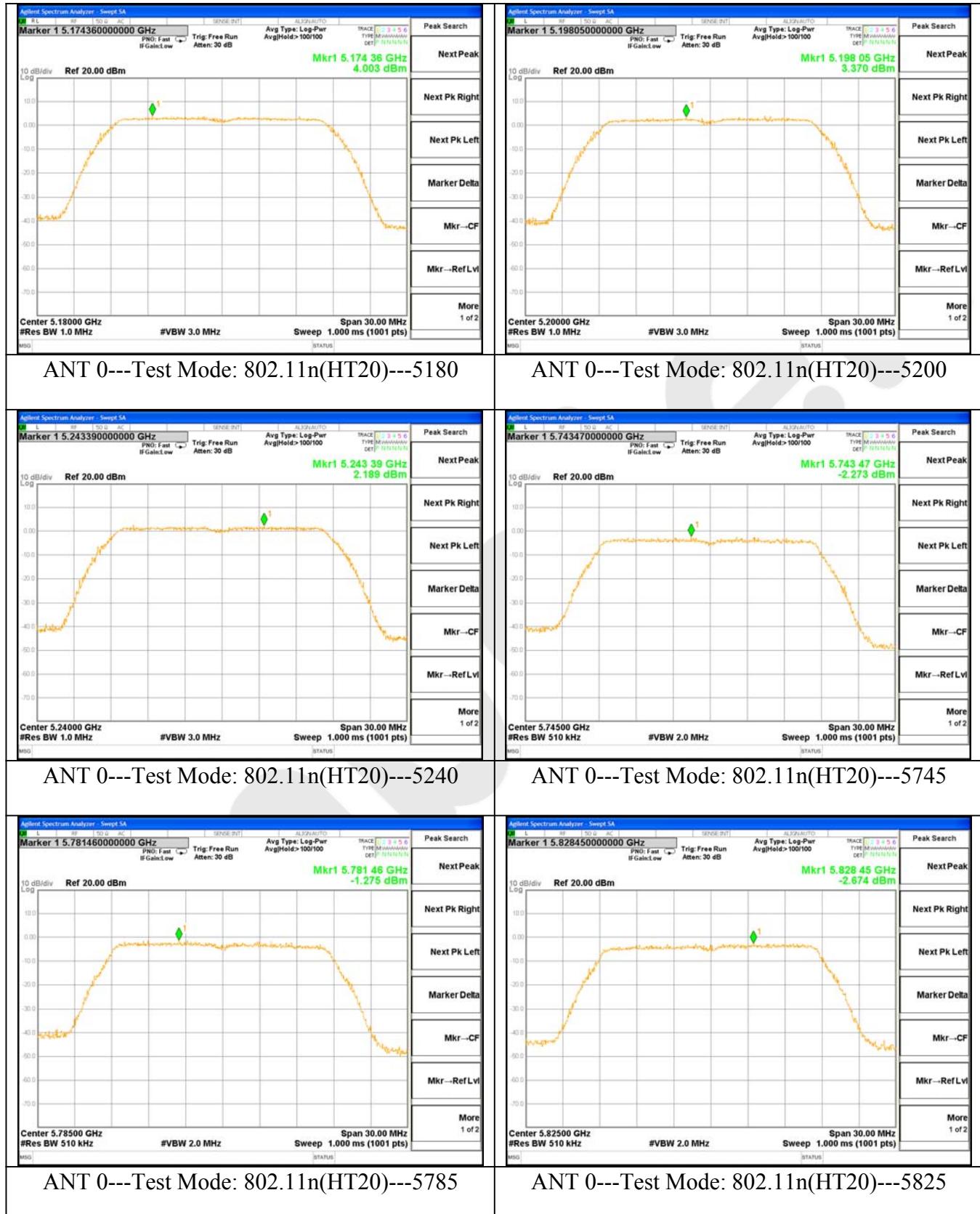
ANT 1:

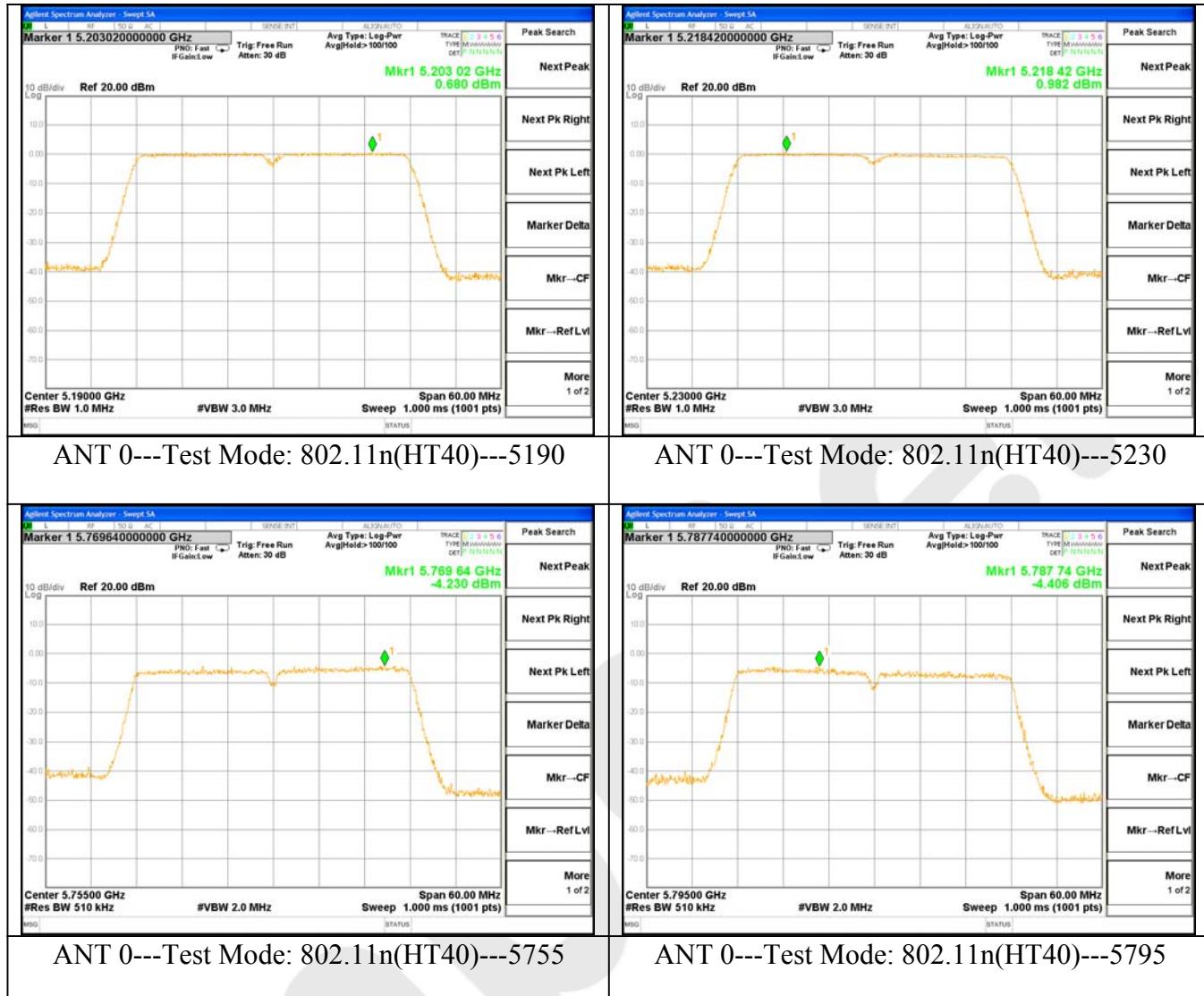
Test Mode: IEEE 802.11n(HT40)

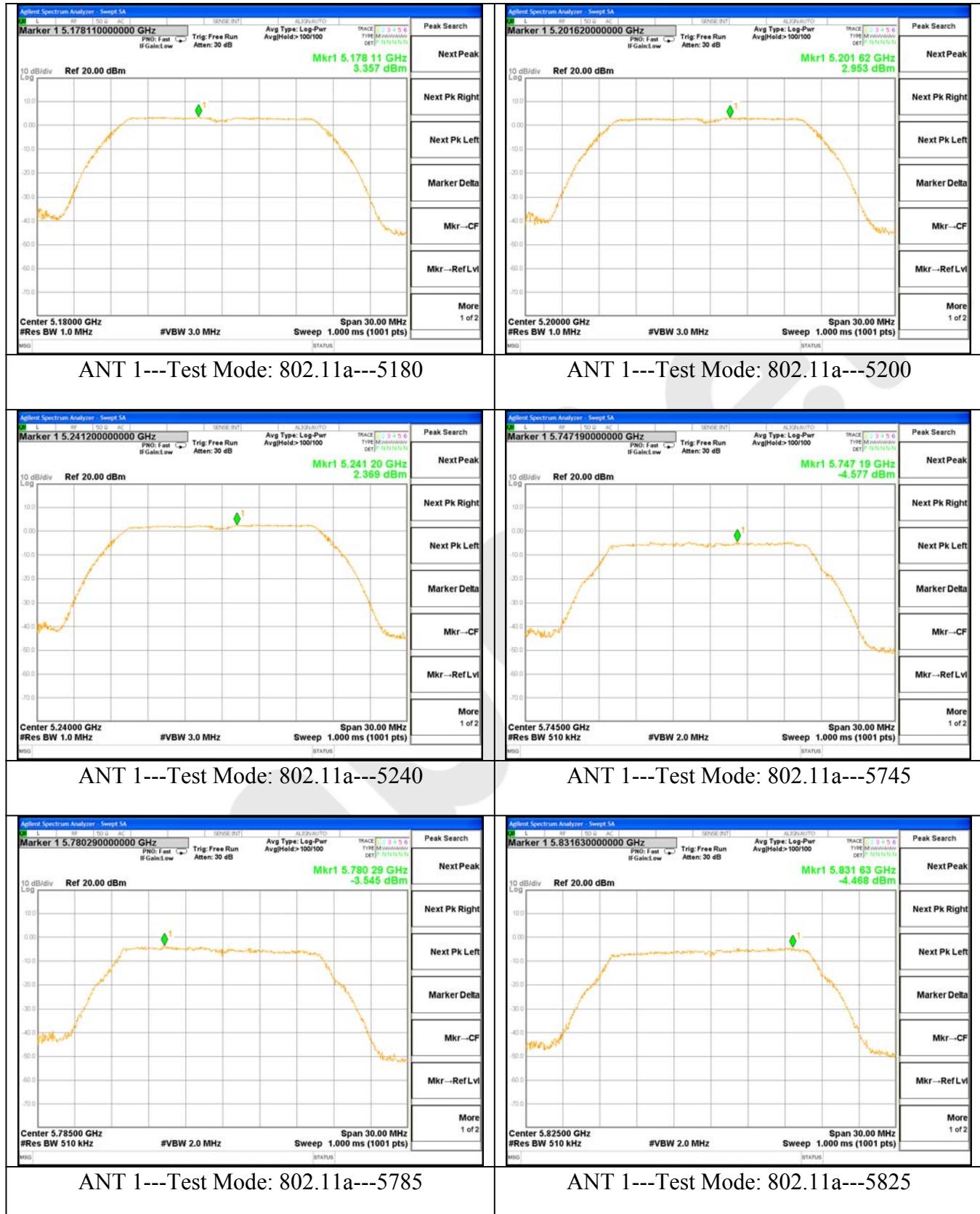
Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5190	0.540	8.99	Pass
High	5230	0.390	8.99	Pass
Low	5755	-5.206	27.99	Pass
High	5795	-6.231	27.99	Pass

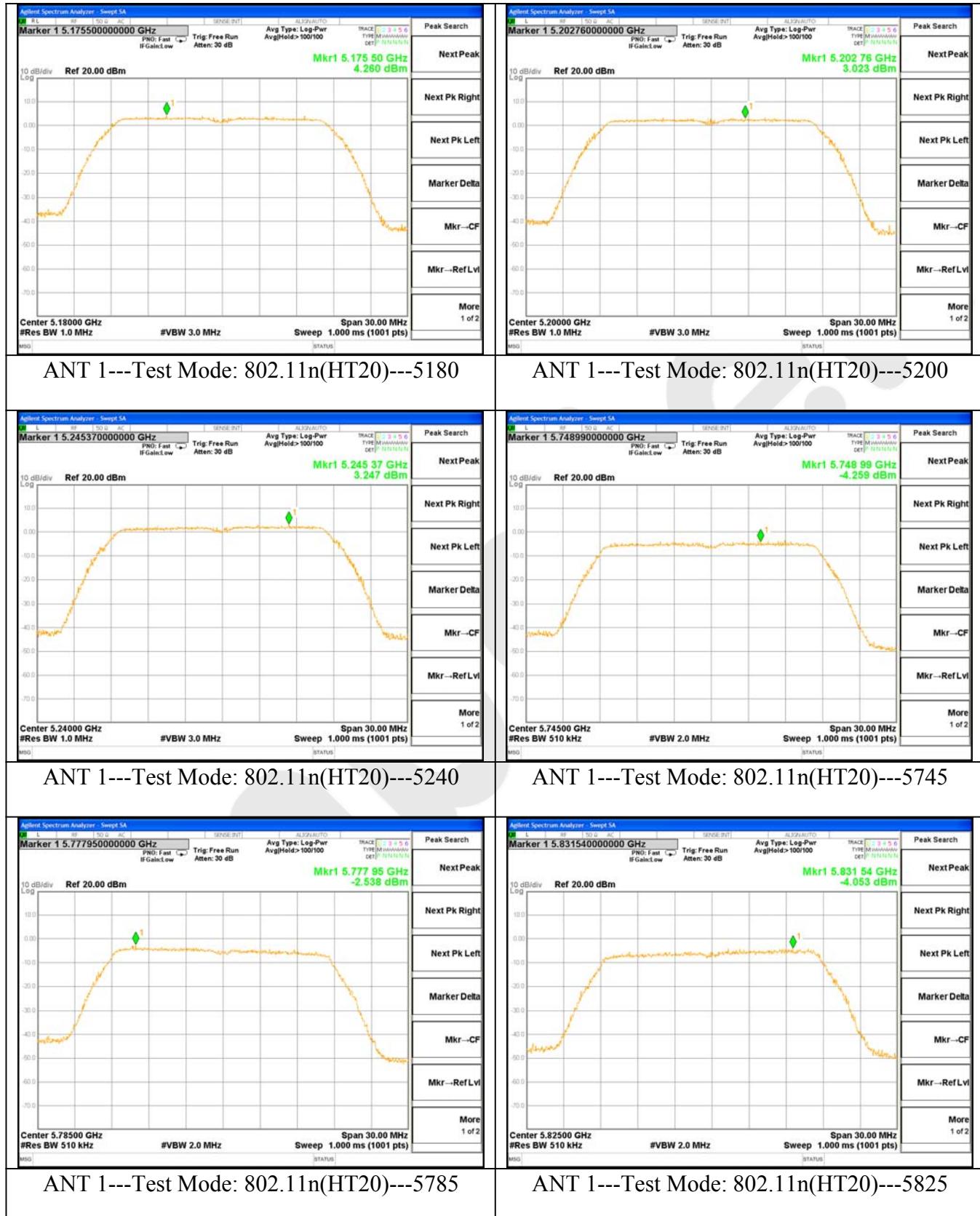
**Power Spectral Density Limit=Limit-(6-Ant gain)**

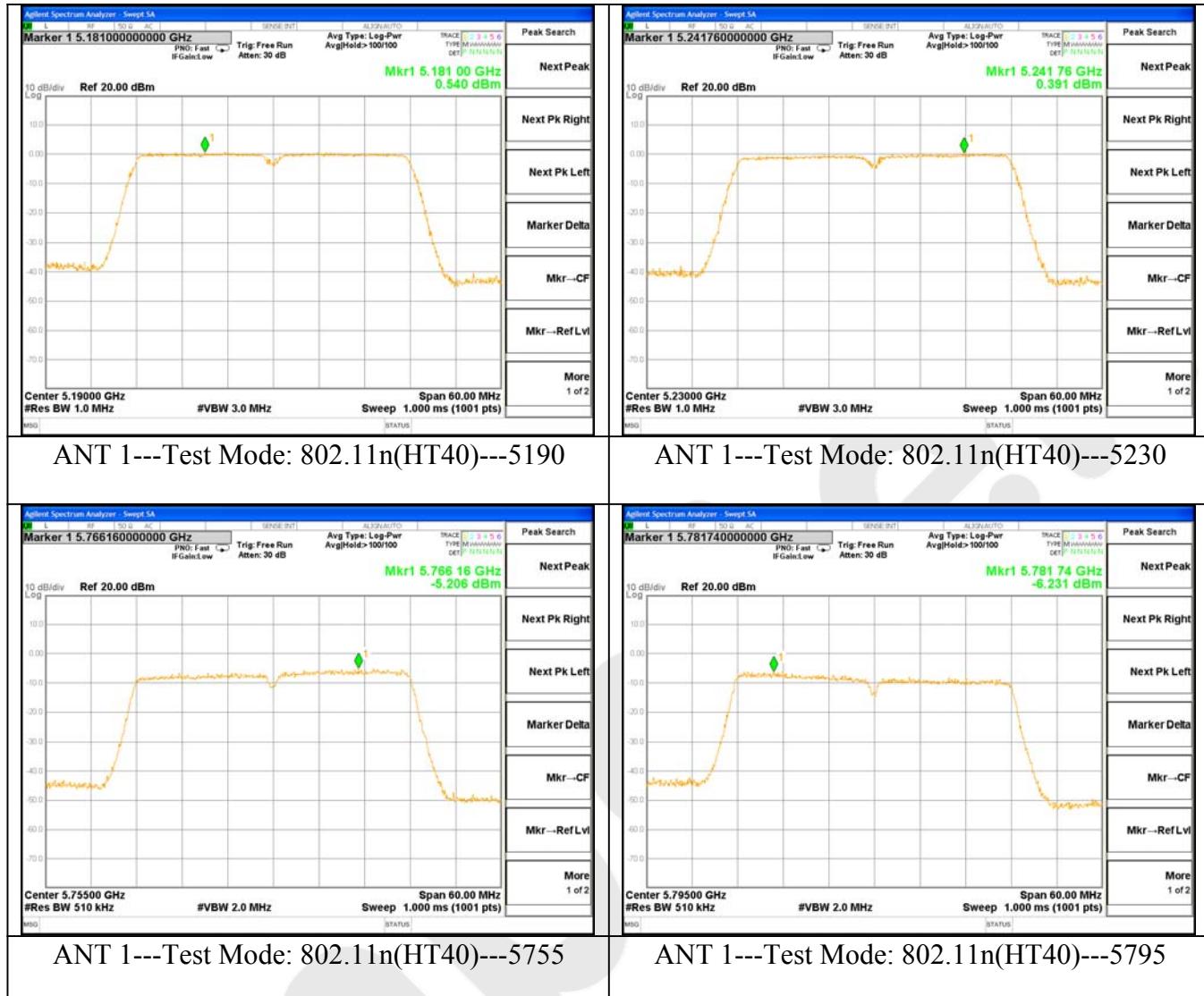












ANT 0:

Test Mode: IEEE 802.11AC(HT20)

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	4.099	11	Pass
Mid	5200	2.972	11	Pass
High	5240	2.830	11	Pass
Low	5745	-2.284	30	Pass
Mid	5785	-1.499	30	Pass
High	5825	-2.969	30	Pass

ANT 0:

Test Mode: IEEE 802.11AC(HT40)

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5190	0.837	11	Pass
High	5230	0.555	11	Pass
Low	5755	-3.735	30	Pass
High	5795	-3.919	30	Pass

ANT 0:

Test Mode: IEEE 802.11AC(HT80)

Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
5210	-1.252	11	Pass
5755	-7.812	30	Pass

ANT 1:

Test Mode: IEEE 802.11AC(HT20)

Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5180	3.436	11	Pass
Mid	5200	3.214	11	Pass
High	5240	2.617	11	Pass
Low	5745	-3.605	30	Pass
Mid	5785	-3.183	30	Pass
High	5825	-4.468	30	Pass

ANT 1:

Test Mode: IEEE 802.11AC(HT40)

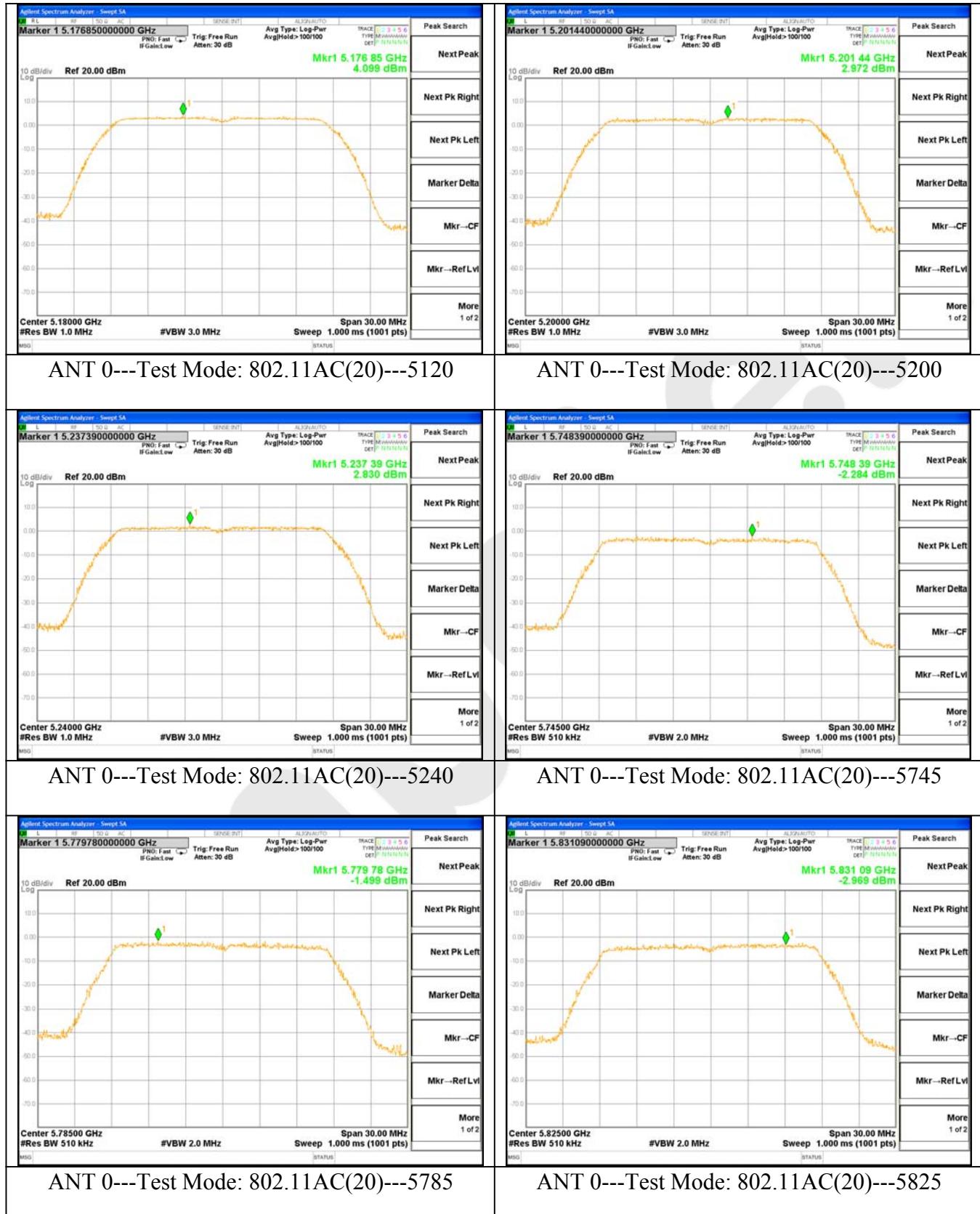
Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
Low	5190	1.410	11	Pass
High	5230	2.000	11	Pass
Low	5755	-4.871	30	Pass
High	5795	-6.687	30	Pass

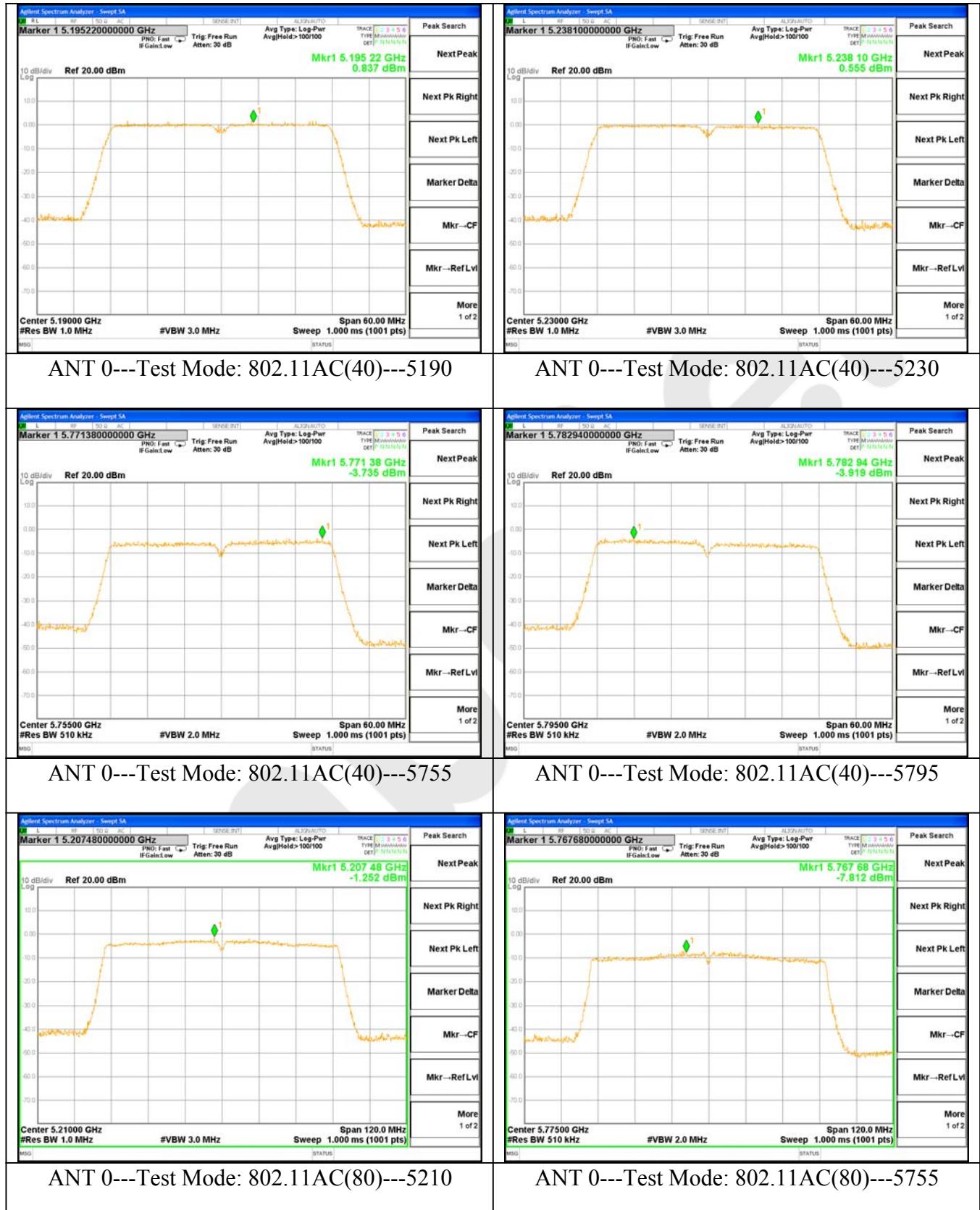
ANT 1:

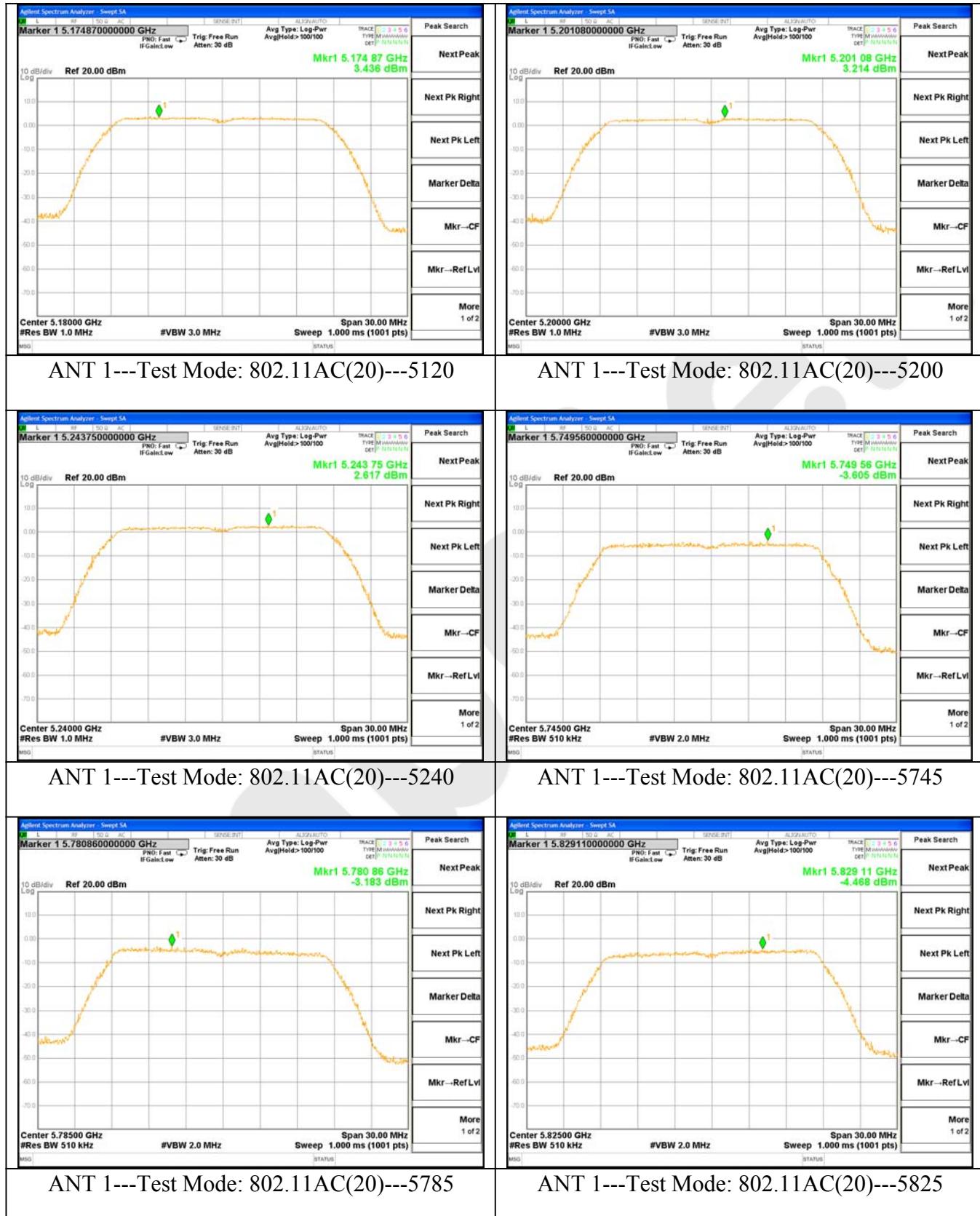
Test Mode: IEEE 802.11AC(HT80)

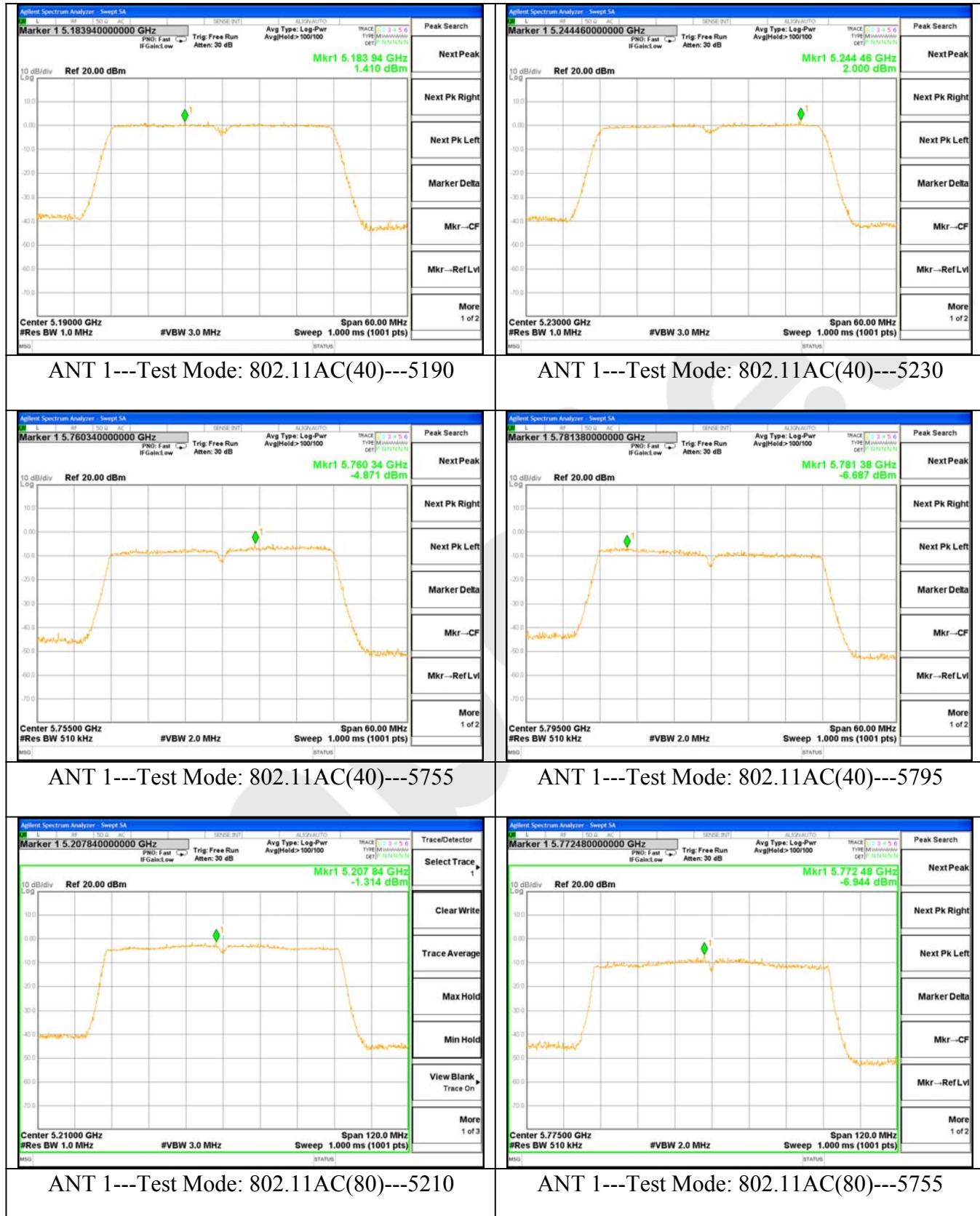
Frequency (MHz)	Final Power Spectral Density (dBm)	Power Spectral Density Limit (dBm)	Result
5210	-1.314	11	Pass
5755	-6.944	30	Pass

**Power Spectral Density Limit=Limit-(6-Ant gain)**









## 7. Radiated Emission Test

### 7.1. Test Limit

#### 8.1.1. Test Limits (< 30 MHZ)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

#### 7.1.2. Test Limits ( $\geq$ 30 MHZ)

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz	40 dB $\mu$ V/m
902-928 MHZ		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dB $\mu$ V/m @3m	54 dB $\mu$ V/m @3m	ABOVE 960 MHz	54dB $\mu$ V/m

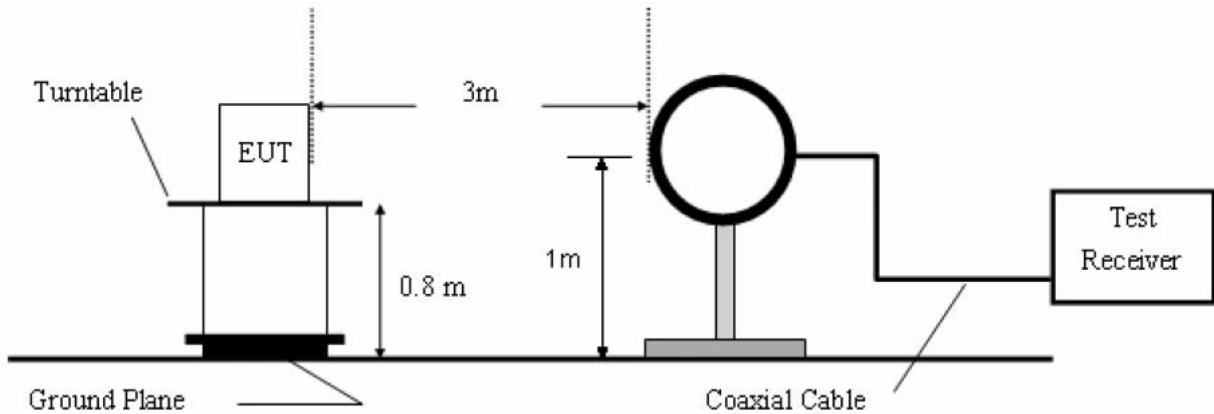
#### 7.1.3. Restriction Band of Operation

MHz	MHz	MHz	GHz
0.090-0.110 .....	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505 .....	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905 .....	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128 .....	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775 .....	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775 .....	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218 .....	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825 .....	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225 .....	123-138	2200-2300	14.47-14.5
8.291-8.294 .....	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366 .....	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675 .....	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475 .....	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293 .....	167.72-173.2	3332-3339	31.2-31.8

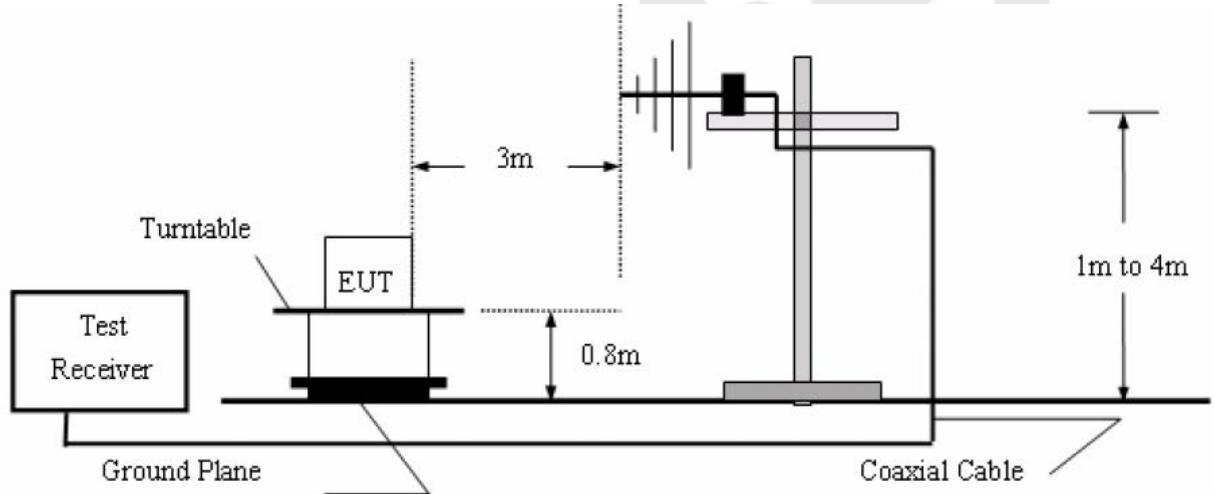
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

## 7.2. Test Setup

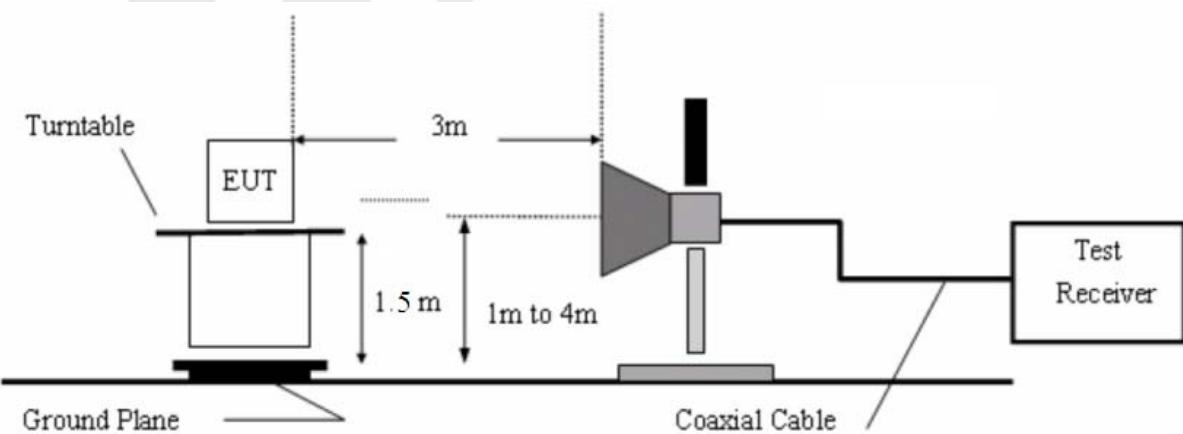
### 7.2.1. 9k to 30MHz emissions:



### 7.2.2. 30M to 1G emissions:



### 7.2.3. 1G to 40G emissions:



### 7.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turntable shall be rotated 360 degrees to determine the position of max. emission level.  
EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz.

The EUT is tested in 9\*6\*6 Chamber. The device is evaluated in xyz orientation.

The test results are listed in Section 8.5.

### 7.4. Test Equipment

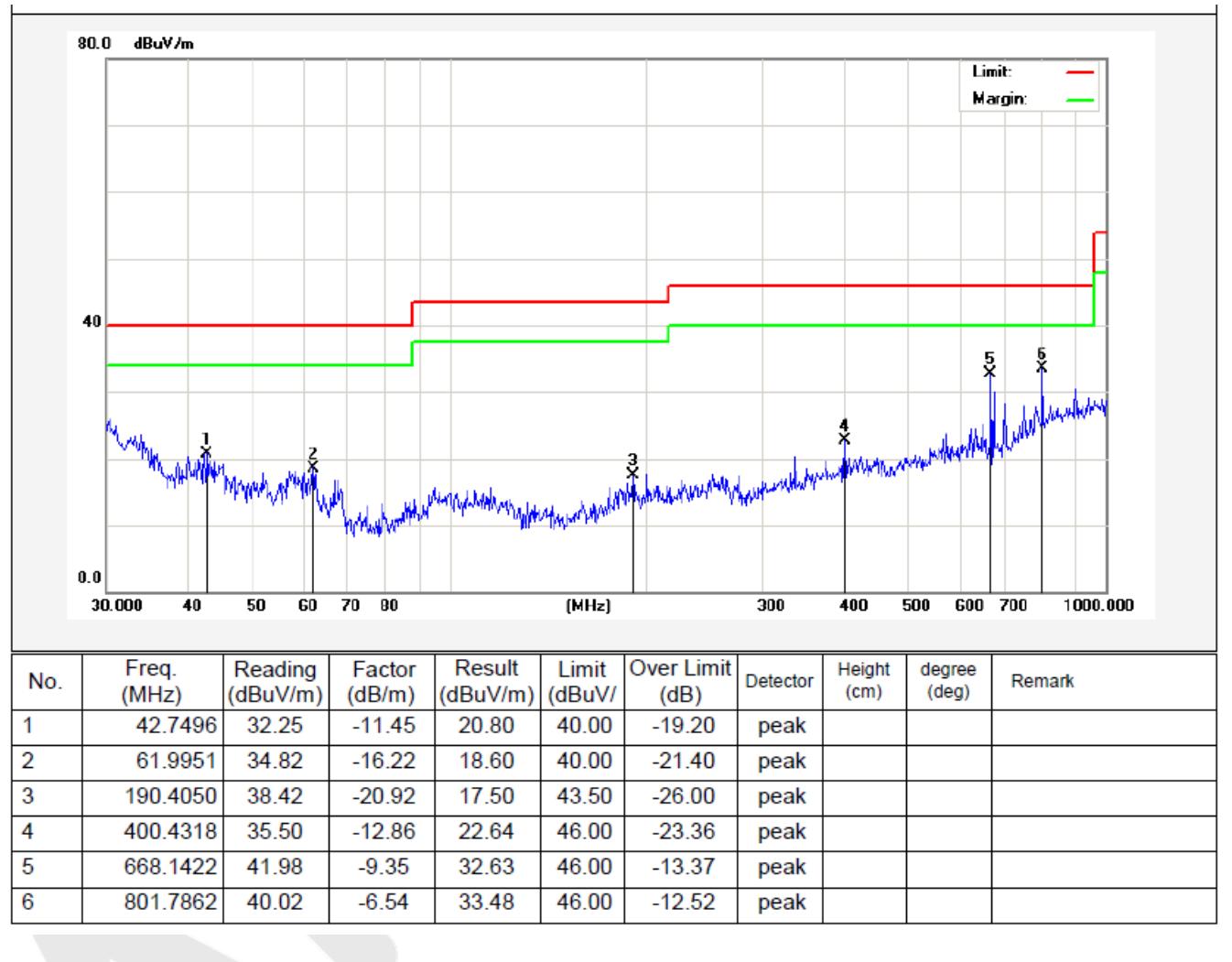
Same as clause 4.4.

### 7.5. Test Results

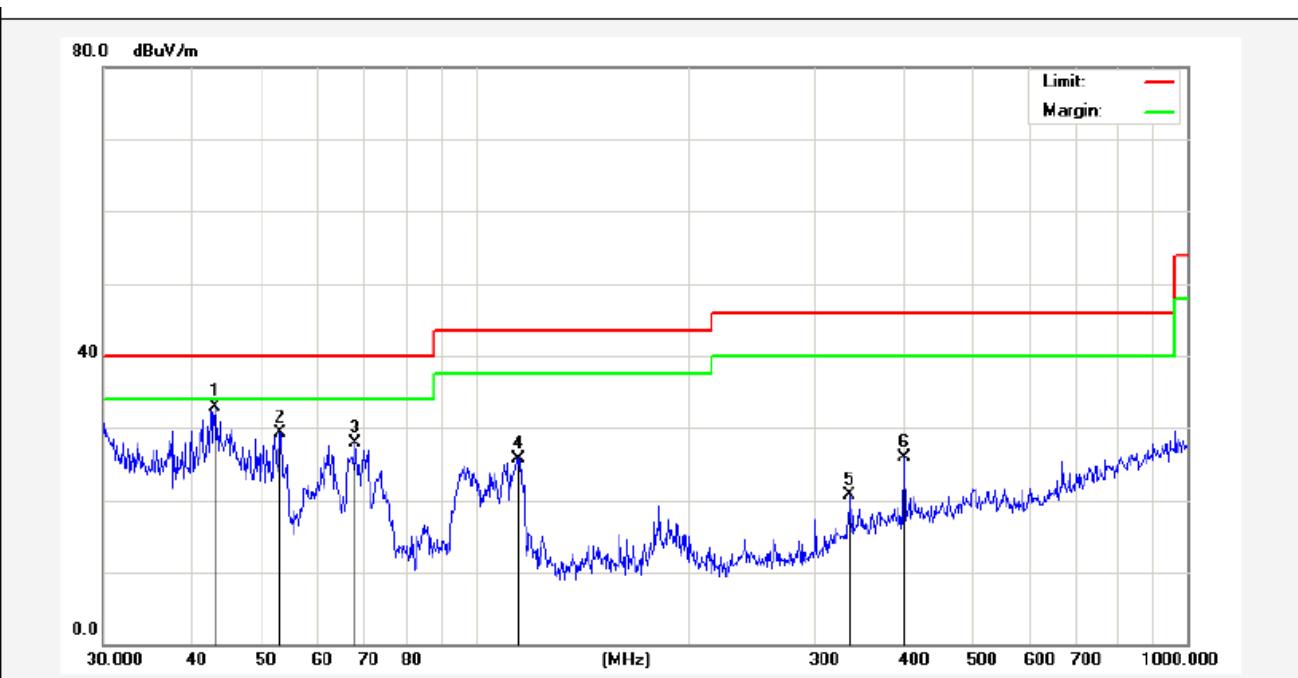
The EUT was tested on (WiFi Mode) is attached in the following pages.

Only the worst case (x orientation).

Job No.:	011609746I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	WiFi Mode	Distance:	3m



Job No.:	011609746I	Polarization:	Vertical
Standard:	(RE)FCC PART15 C _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	WiFi Mode	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	43.0504	44.55	-11.57	32.98	40.00	-7.02	peak			
2	53.1313	44.11	-14.79	29.32	40.00	-10.68	peak			
3	67.9128	46.59	-18.73	27.86	40.00	-12.14	peak			
4	114.9167	41.70	-15.97	25.73	43.50	-17.77	peak			
5	336.0350	34.10	-13.49	20.61	46.00	-25.39	peak			
6	400.4318	37.78	-11.86	25.92	46.00	-20.08	peak			

The EUT was tested on (IEEE 802.11a, IEEE 802.11n(HT20), IEEE 802.11n(HT40), IEEE 802.11ac(HT20), IEEE 802.11ac(HT40), 802.11ac(HT80))modes, only the worst data of (IEEE 802.11n(HT20)) is attached in the following pages.

**Test mode: IEEE 802.11n(HT20)**

**Low Channel(5180MHz)**

Frequency (MHz)	Antenna	Reading (dBuV/m)	Cable Loss (dB)	Ant Factor (dB)	Amplifier (dB)	Corrected Level (dBuV/m)	Limits (dBuV/m)	Det
								Mode
10400	H	47.34	3.55	38.2	32.1	56.99	74	PK
10360	H	40.29	3.55	38.2	32.1	49.94	54	AV
10360	V	47.95	3.55	38.2	32.1	57.60	74	PK
10360	V	40.28	3.55	38.2	32.1	49.93	54	AV
15540	H	47.63	5.81	39.8	31.75	61.49	74	PK
15540	H	37.38	5.81	39.8	31.75	51.24	54	AV
15540	V	44.94	5.81	39.8	31.75	58.80	74	PK
15540	V	37.28	5.81	39.8	31.75	51.14	54	AV
20720	H	--	7.85	40.2	40.4	--	74	PK
20720	H	--	7.85	40.2	40.4	--	54	AV
20720	V	--	7.85	40.2	40.4	--	74	PK
20720	V	--	7.85	40.2	40.4	--	54	AV

**Middle Channel(5200MHz)**

Frequency (MHz)	Antenna	Reading (dBuV/m)	Cable Loss (dB)	Ant Factor (dB)	Amplifier (dB)	Corrected Level (dBuV/m)	Limits (dBuV/m)	Det
								Mode
10400	H	47.26	3.61	38.2	32.1	56.97	74	PK
10400	H	39.82	3.61	38.2	32.1	49.53	54	AV
10400	V	48.20	3.61	38.2	32.1	57.91	74	PK
10400	V	39.23	3.61	38.2	32.1	48.94	54	AV
15600	H	48.12	5.83	39.8	31.75	62.00	74	PK
15600	H	37.42	5.83	39.8	31.75	51.30	54	AV
15600	V	45.01	5.83	39.8	31.75	58.89	74	PK
15600	V	37.19	5.83	39.8	31.75	51.07	54	AV
20800	H	--	7.92	40.2	40.4	--	74	PK
20800	H	--	7.92	40.2	40.4	--	54	AV
20800	V	--	7.92	40.2	40.4	--	74	PK
20800	V	--	7.92	40.2	40.4	--	54	AV

### High Channel(5240MHz)

Frequency (MHz)	Antenna	Reading (dBuV/m)	Cable Loss (dB)	Ant Factor (dB)	Amplifier (dB)	Corrected Level (dBuV/m)	Limits (dBuV/m)	Det
	Polarization							Mode
10480	H	47.87	3.62	38.2	32.1	57.59	74	PK
10480	H	39.68	3.62	38.2	32.1	49.40	54	AV
10480	V	48.28	3.62	38.2	32.1	58.00	74	PK
10480	V	40.11	3.62	38.2	32.1	49.83	54	AV
15720	H	47.83	5.86	39.8	31.75	61.74	74	PK
15720	H	37.13	5.86	39.8	31.75	51.04	54	AV
15720	V	45.30	5.86	39.8	31.75	59.21	74	PK
15720	V	36.98	5.86	39.8	31.75	50.89	54	AV
20960	H	--	7.95	40.2	40.4	--	74	PK
20960	H	--	7.95	40.2	40.4	--	54	AV
20960	V	--	7.95	40.2	40.4	--	74	PK
20960	V	--	7.95	40.2	40.4	--	54	AV

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

Note: 2. Remark “---” means that the emissions level is too low to be measured

**Low Channel(5745MHz)**

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Corrected Level	Limits	Det
(MHz)	Polarization	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
11490	H	47.75	3.63	38.2	32.1	57.48	74	PK
11490	H	39.08	3.63	38.2	32.1	48.81	54	AV
11490	V	47.79	3.63	38.2	32.1	57.52	74	PK
11490	V	39.36	3.63	38.2	32.1	49.09	54	AV
17235	H	48.51	5.85	39.8	31.75	62.41	74	PK
17235	H	37.43	5.85	39.8	31.75	51.33	54	AV
17235	V	45.22	5.85	39.8	31.75	59.12	74	PK
17235	V	37.34	5.85	39.8	31.75	51.24	54	AV
22980	H	--	7.97	40.2	40.4	--	74	PK
22980	H	--	7.97	40.2	40.4	--	54	AV
22980	V	--	7.97	40.2	40.4	--	74	PK
22980	V	--	7.97	40.2	40.4	--	54	AV

**Middle Channel(5785MHz)**

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Corrected Level	Limits	Det
(MHz)	Polarization	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
11570	H	46.79	3.66	38.2	32.1	56.55	74	PK
11570	H	39.72	3.66	38.2	32.1	49.48	54	AV
11570	V	48.15	3.66	38.2	32.1	57.91	74	PK
11570	V	39.47	3.66	38.2	32.1	49.23	54	AV
17355	H	48.04	5.88	39.8	31.75	61.97	74	PK
17355	H	36.22	5.88	39.8	31.75	50.15	54	AV
17355	V	44.61	5.88	39.8	31.75	58.54	74	PK
17355	V	37.26	5.88	39.8	31.75	51.19	54	AV
23140	H	--	7.95	40.2	40.4	--	74	PK
23140	H	--	7.95	40.2	40.4	--	54	AV
23140	V	--	7.95	40.2	40.4	--	74	PK
23140	V	--	7.95	40.2	40.4	--	54	AV

**High Channel(5825MHz)**

Frequency (MHz)	Antenna	Reading (dBuV/m)	Cable Loss (dB)	Ant Factor (dB)	Amplifier (dB)	Corrected Level (dBuV/m)	Limits (dBuV/m)	Det
11650	H	46.72	3.68	38.2	32.1	56.50	74	PK
11650	H	40.17	3.68	38.2	32.1	49.95	54	AV
11650	V	48.35	3.68	38.2	32.1	58.13	74	PK
11650	V	40.39	3.68	38.2	32.1	50.17	54	AV
17475	H	47.49	5.89	39.8	31.75	61.43	74	PK
17475	H	36.87	5.89	39.8	31.75	50.81	54	AV
17475	V	44.55	5.89	39.8	31.75	58.49	74	PK
17475	V	36.47	5.89	39.8	31.75	50.41	54	AV
23300	H	--	7.98	40.2	40.4	--	74	PK
23300	H	--	7.98	40.2	40.4	--	54	AV
23300	V	--	7.98	40.2	40.4	--	74	PK
23300	V	--	7.98	40.2	40.4	--	54	AV

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

Note: 2. Remark “---” means that the emissions level is too low to be measured

## 8. Band Edge Test

### 8.1. Test Limit

For transmitter operating in the 5.15-5.25GHz band: all emissions outside of the 5.15-5.35GHz outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5.25-5.35GHz band: all emissions outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz. Devices operating in the 5.25-5.35GHz band that generate emissions in the 5.15-5.25GHz band must meet all applicable technical requirements for operation in the 5.15-5.25GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27dBm/MHz in the 5.15-5.25GHz band.

For transmitters operating in the 5.45-5.725GHz band: all emissions outside of the 5.47-5.725GHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5.725-5.825GHz band: all emissions within the frequency range from the band edge to 10MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

### 8.2. Test Setup

Same as clause 7.2.

### 8.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.  
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turntable shall be rotated 360 degrees to determine the position of max. emission level. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All readings above 1GHz, peak & average values with a resolution bandwidth of 1MHz.

The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 9.5.

#### 8.4. Test Equipment

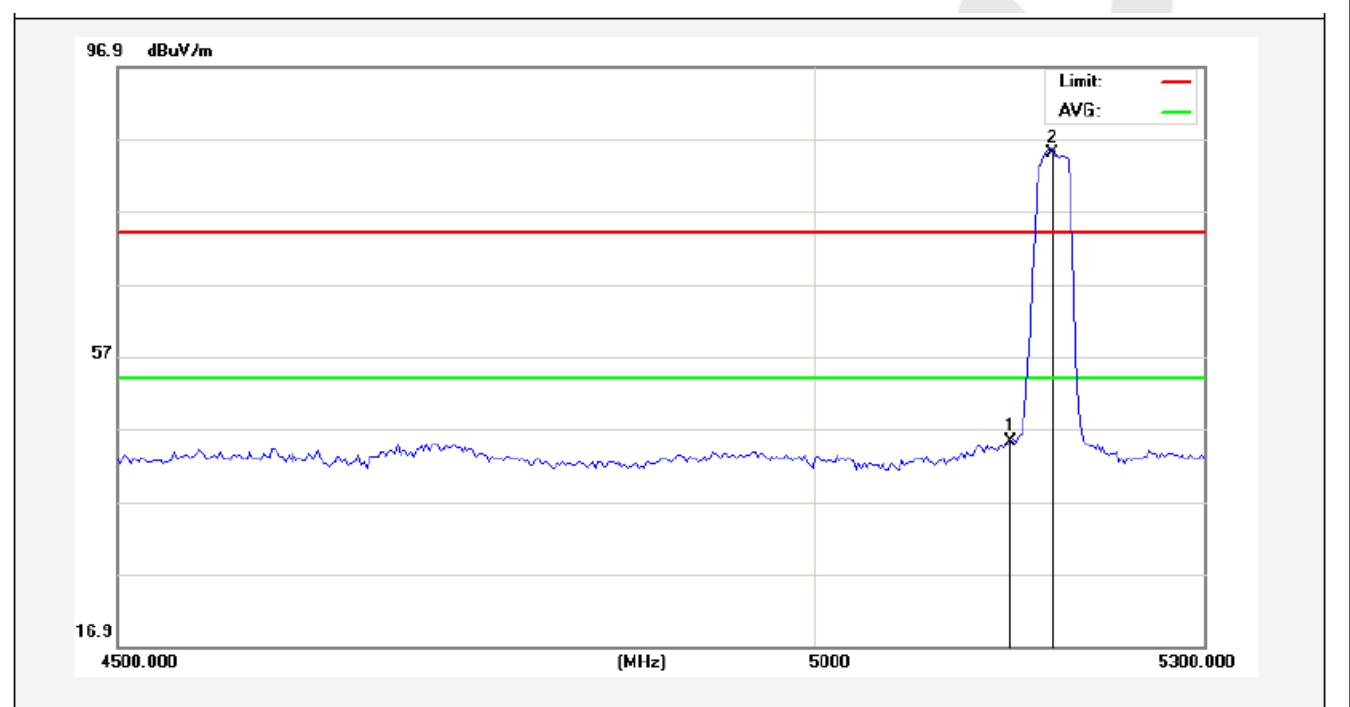
Same as clause 4.4.

#### 8.5. Test Results

Please refer to the following pages.

The EUT was tested on (IEEE 802.11a, IEEE 802.11n(HT20), IEEE 802.11n(HT40), IEEE 802.11ac(HT20), IEEE 802.11ac(HT40), 802.11ac(HT80))modes, only the worst data of (IEEE 802.11n(HT20)) is attached in the following pages.

Job No.:	011609746I	Polarization:	Horizontal-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5180MHz)	Distance:	3m

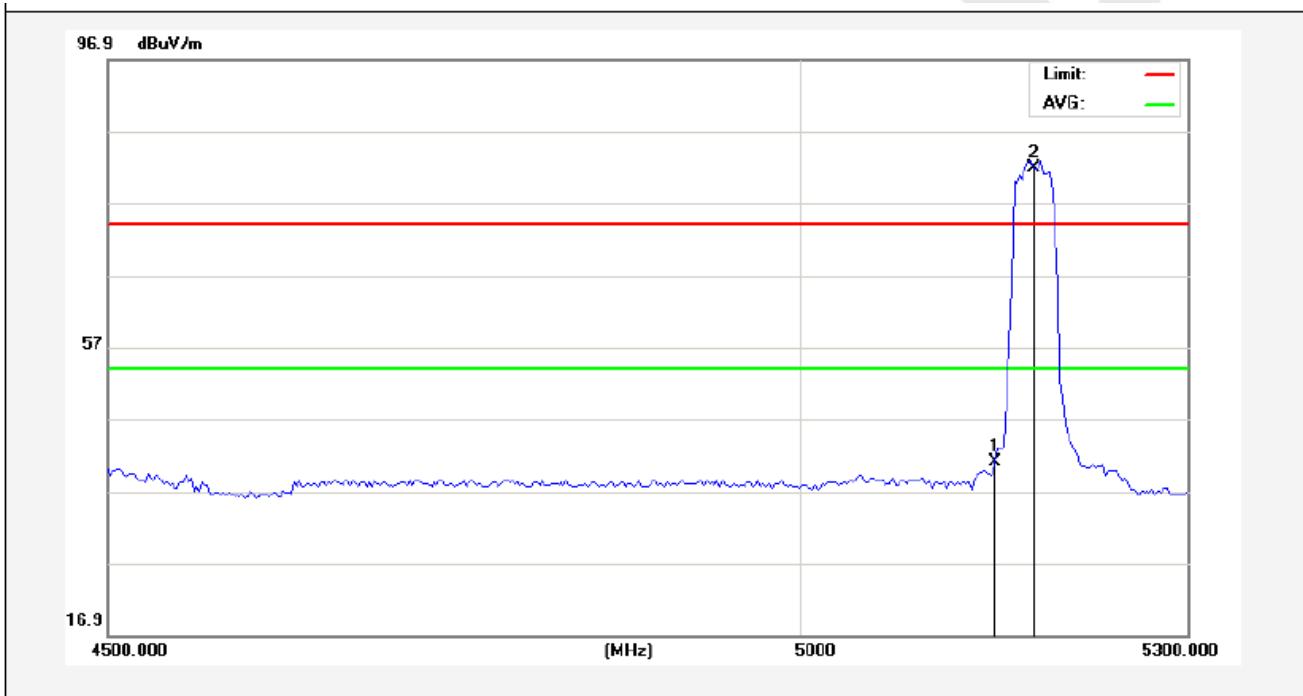


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5150.000	3.85	37.51	32.60	40.56	49.32	74.00	-24.68	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Vertical-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5180MHz)	Distance:	3m

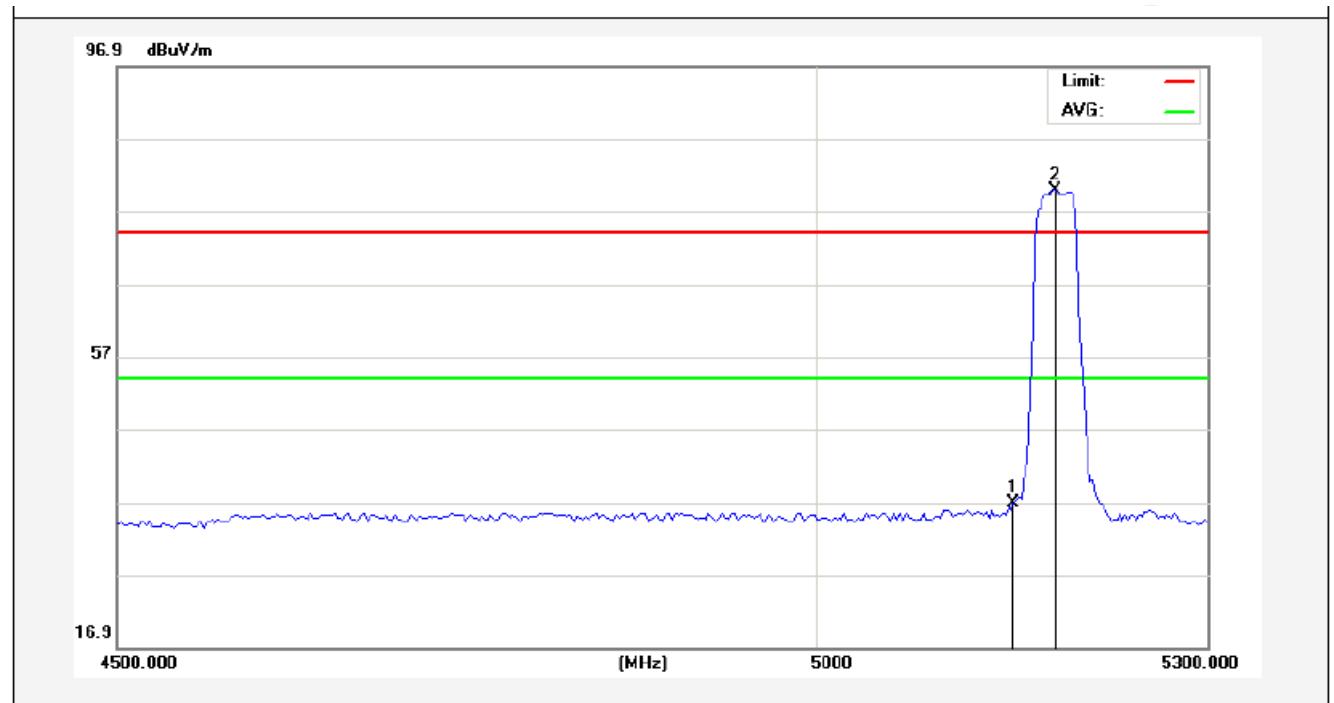


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dBµV	dBµV/m	dBµV/m	dB	
5150.000	3.85	37.51	32.60	30.52	39.28	74.00	-34.72	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	<b>011609746I</b>	Plarization:	<b>Horizontal-AV</b>
Standard:	<b>(RE)FCC PART15 E _3m</b>	Power Source:	<b>AC 120V/60Hz for PC</b>
Test item:	<b>Radiation Test</b>	Temp.(C)/Hum.(%RH):	<b>24.3(C)/55%RH</b>
Test Mode:	<b>IEEE 802.11n(HT20) (5180MHz)</b>	Distance:	<b>3m</b>

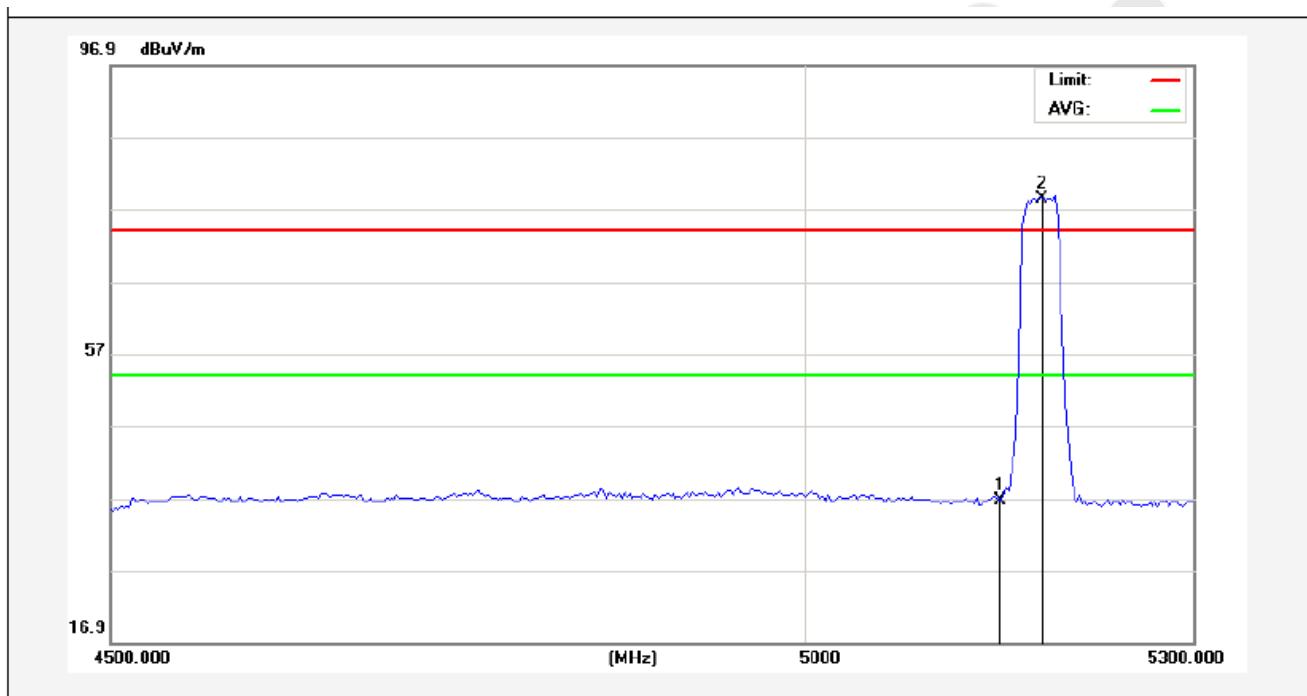


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dBµV	dBµV/m	dBµV/m	dB	
5150.000	3.85	37.51	32.60	32.50	41.26	54.00	-12.74	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Vertical-AV
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5180MHz)	Distance:	3m

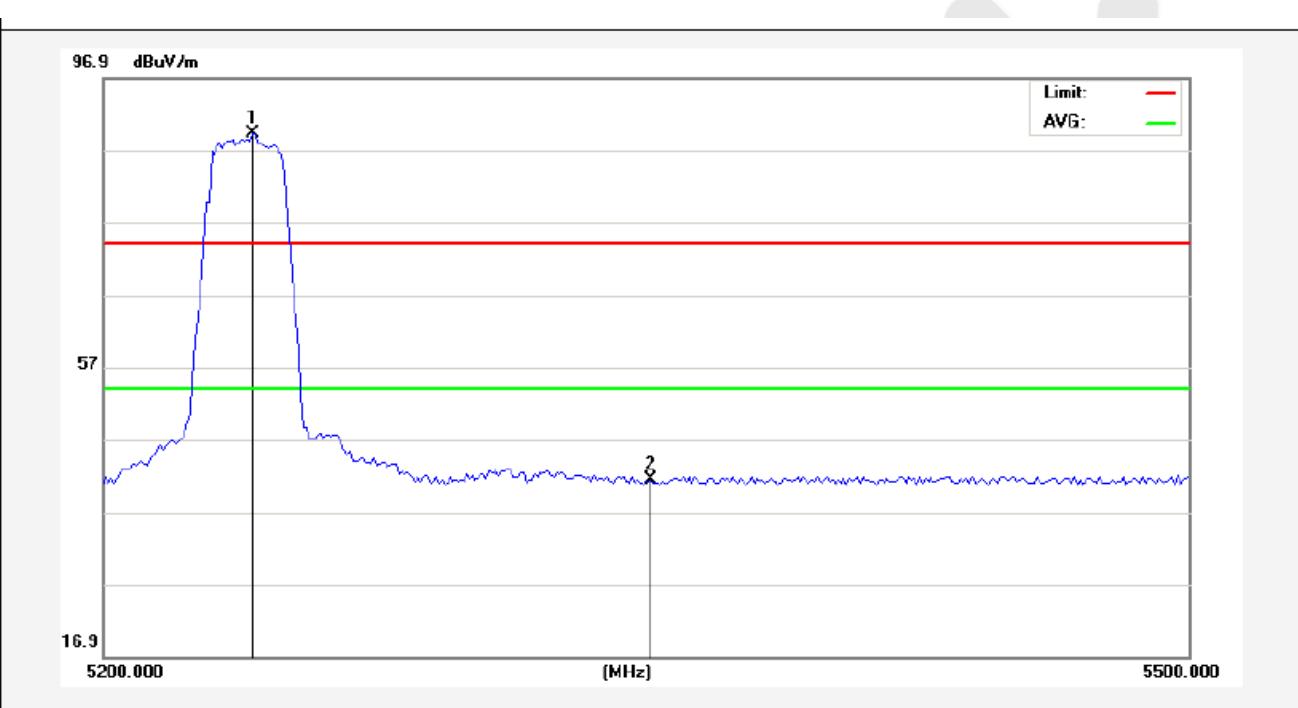


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5150.000	3.85	37.51	32.60	31.77	40.53	54.00	-13.47	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

<b>Job No.:</b>	<b>011609746I</b>	<b>Polarization:</b>	<b>Horizontal-PEAK</b>
<b>Standard:</b>	<b>(RE)FCC PART15 E _3m</b>	<b>Power Source:</b>	<b>AC 120V/60Hz for PC</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3(C)/55%RH</b>
<b>Test Mode:</b>	<b>IEEE 802.11n(HT20) (5240MHz)</b>	<b>Distance:</b>	<b>3m</b>

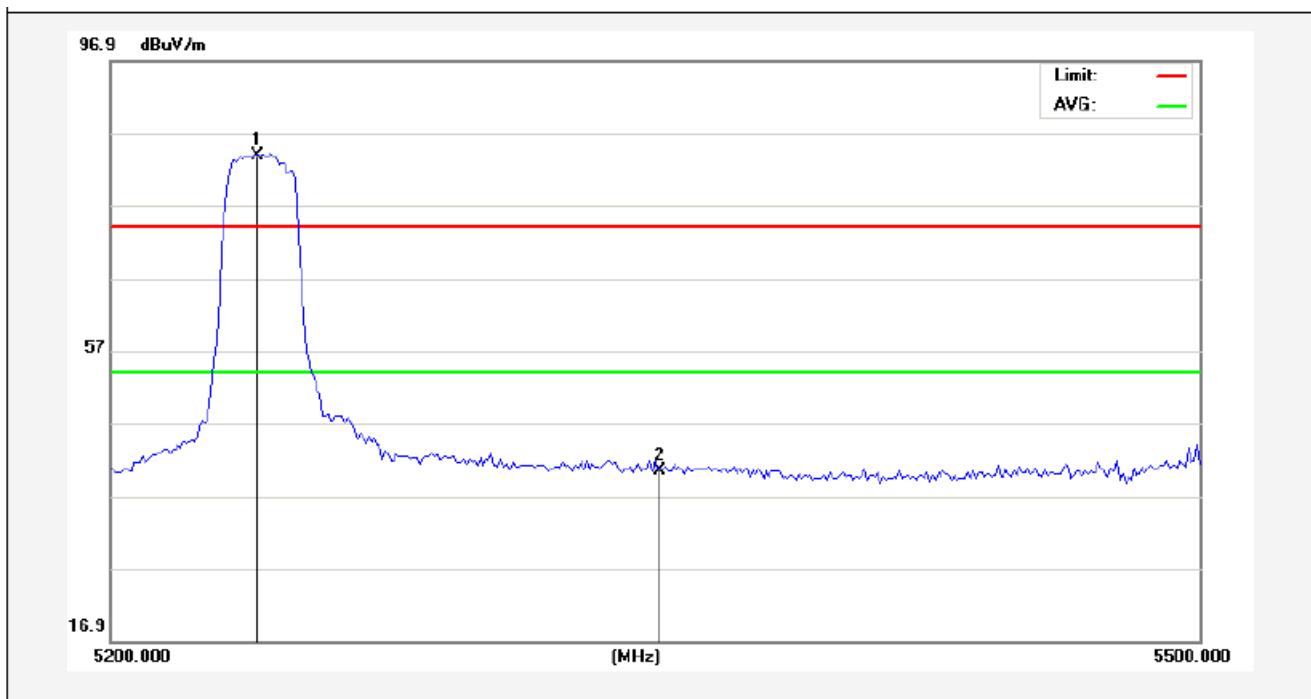


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5350.000	3.87	37.59	32.60	37.39	46.25	74.00	-27.75	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

<b>Job No.:</b>	<b>011609746I</b>	<b>Polarization:</b>	<b>Vertical-PEAK</b>
<b>Standard:</b>	<b>(RE)FCC PART15 E _3m</b>	<b>Power Source:</b>	<b>AC 120V/60Hz for PC</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3(C)/55%RH</b>
<b>Test Mode:</b>	<b>IEEE 802.11n(HT20) (5240MHz)</b>	<b>Distance:</b>	<b>3m</b>

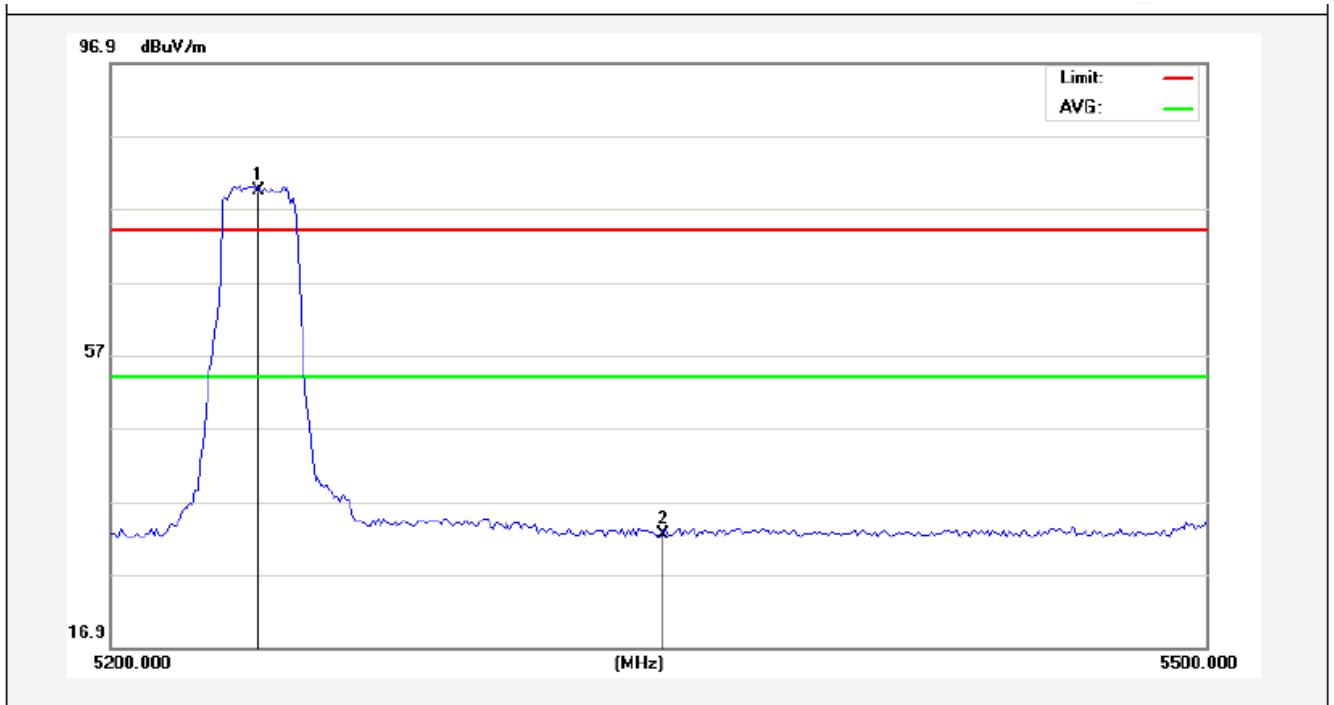


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5350.000	3.87	37.59	32.60	36.75	45.61	74.00	-28.39	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Horizontal-AV
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5240MHz)	Distance:	3m

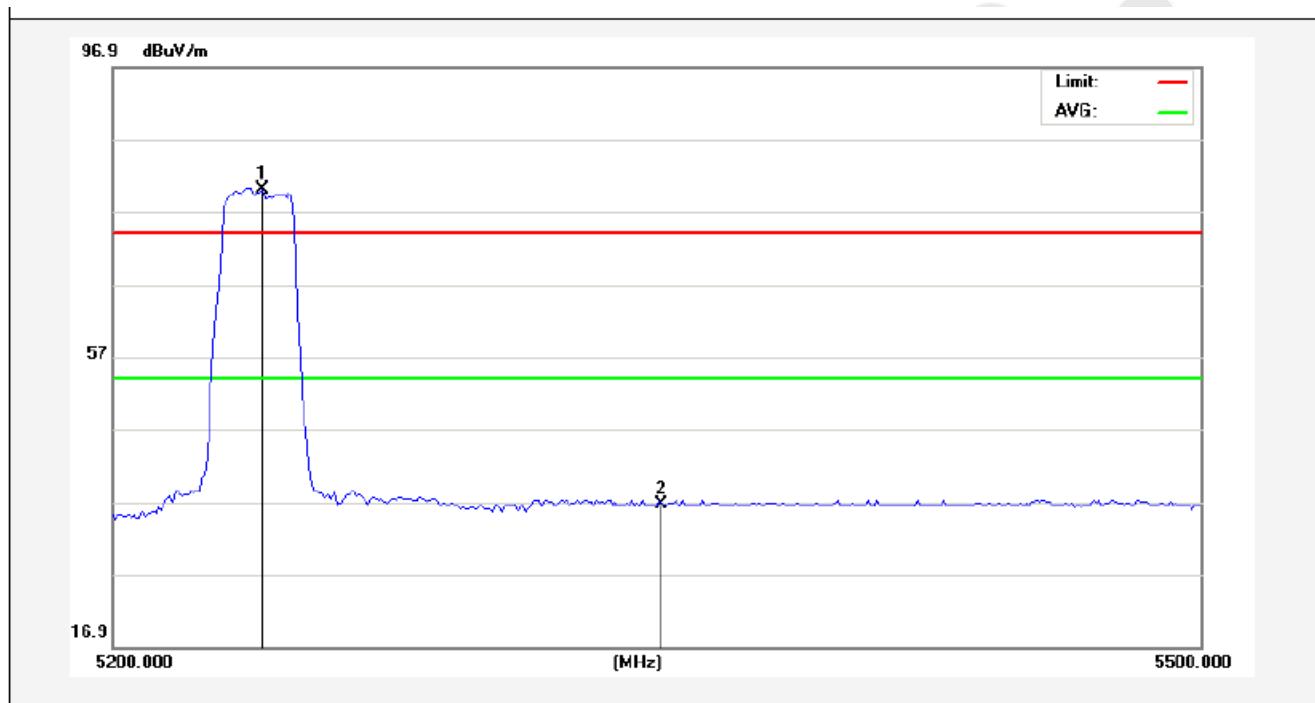


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5350.000	3.87	37.59	32.60	29.78	38.64	54.00	-15.36	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

<b>Job No.:</b>	<b>011609746I</b>	<b>Polarization:</b>	<b>Vertical-AV</b>
<b>Standard:</b>	<b>(RE)FCC PART15 E _3m</b>	<b>Power Source:</b>	<b>AC 120V/60Hz for PC</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3(C)/55%RH</b>
<b>Test Mode:</b>	<b>IEEE 802.11n(HT20) (5240MHz)</b>	<b>Distance:</b>	<b>3m</b>

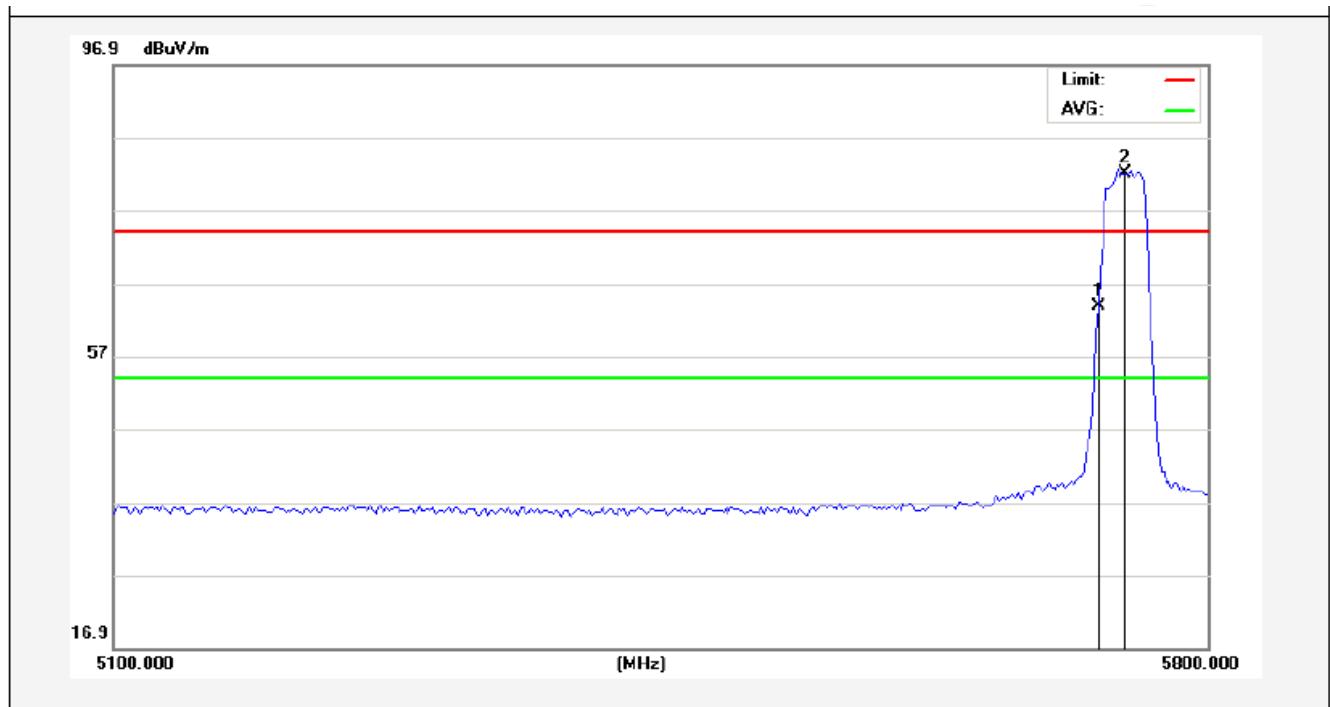


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5350.000	3.87	37.59	32.60	31.39	40.25	54.00	-13.75	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Horizontal-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5745MHz)	Distance:	3m

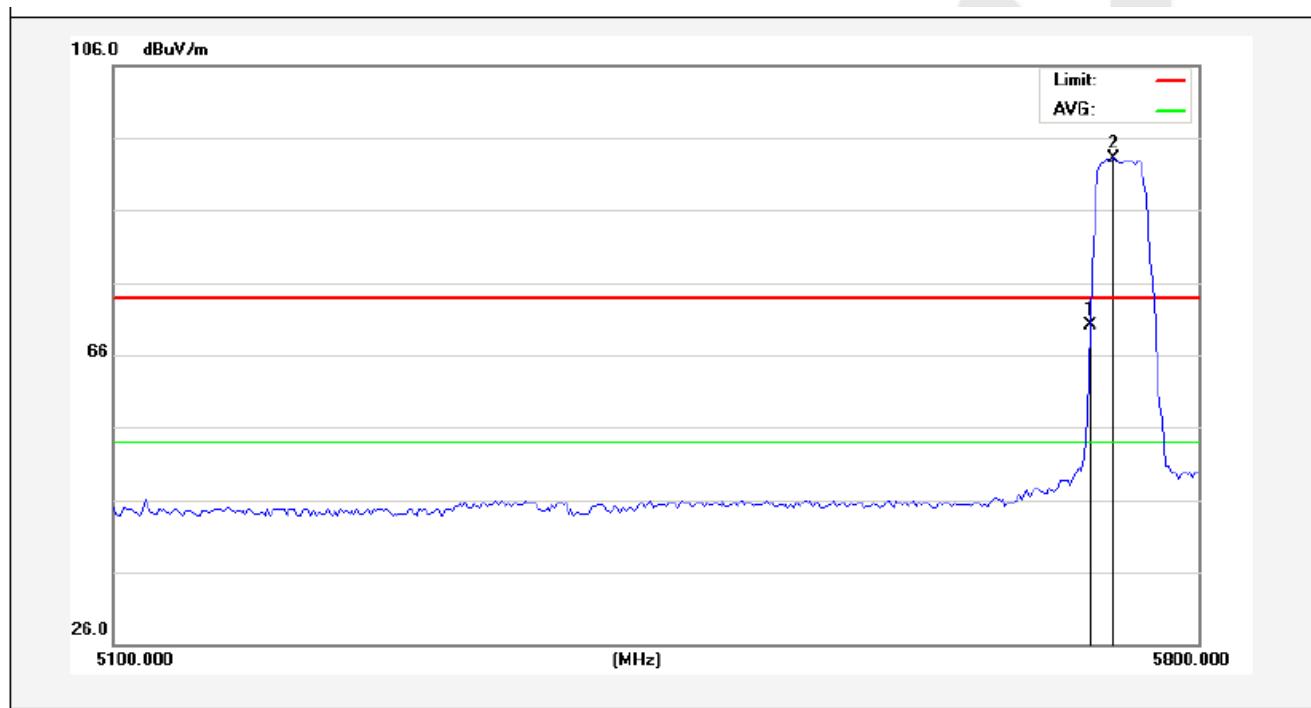


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	58.74	67.69	74.00	-6.31	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Vertical-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5745MHz)	Distance:	3m

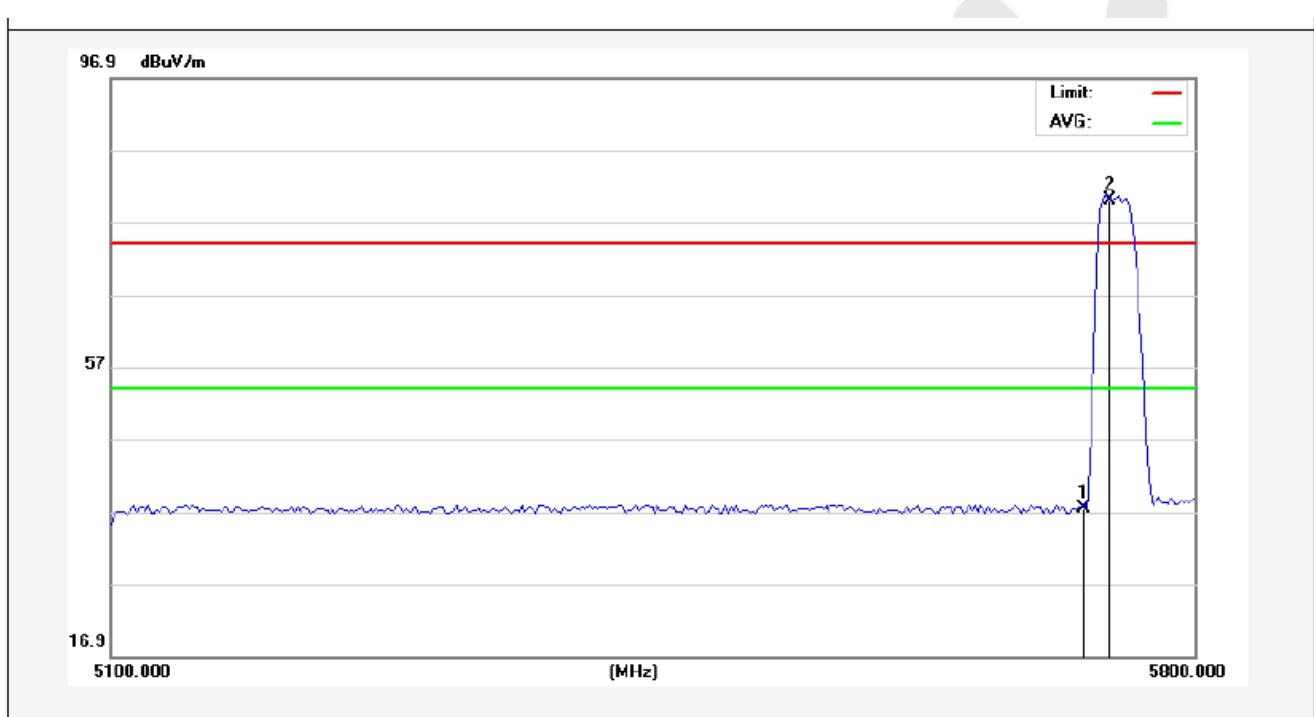


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	59.99	68.94	74.00	-5.06	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	<b>011609746I</b>	Plarization:	<b>Horizontal-AV</b>
Standard:	<b>(RE)FCC PART15 E _3m</b>	Power Source:	<b>AC 120V/60Hz for PC</b>
Test item:	<b>Radiation Test</b>	Temp.(C)/Hum.(%RH):	<b>24.3(C)/55%RH</b>
Test Mode:	<b>IEEE 802.11n(HT20) (5745MHz)</b>	Distance:	<b>3m</b>

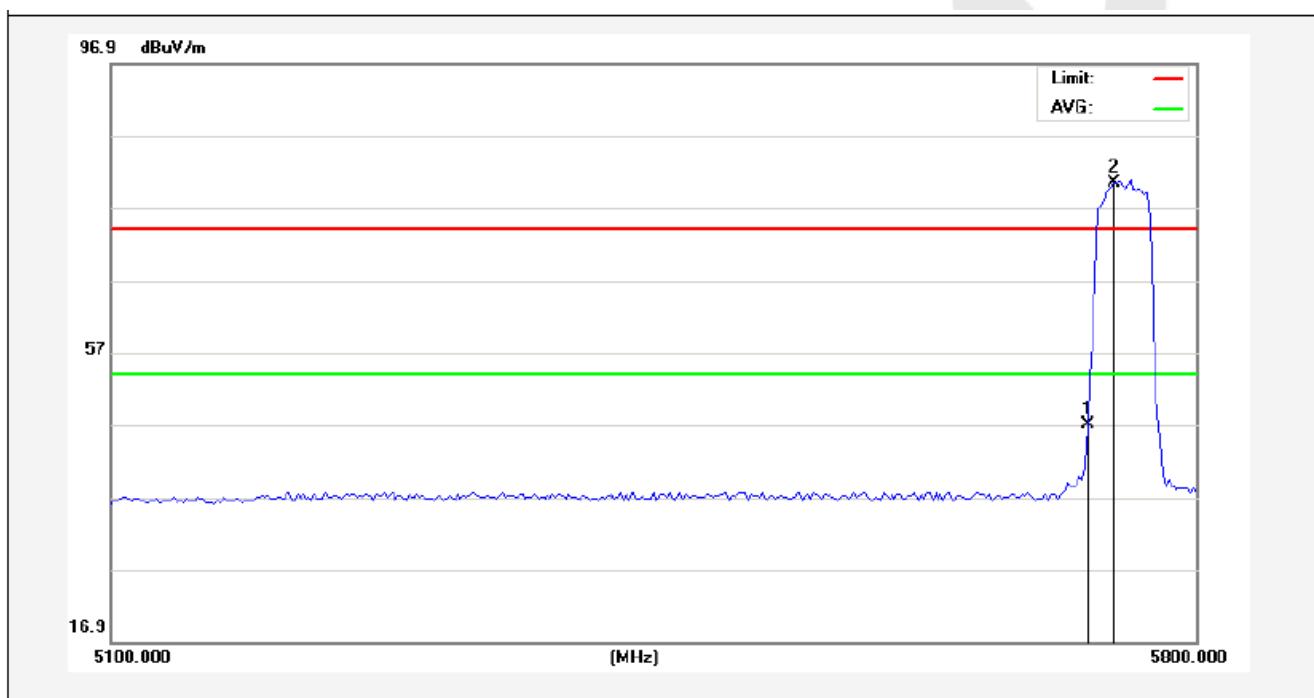


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	31.36	40.31	54.00	-13.69	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

<b>Job No.:</b>	<b>011609746I</b>	<b>Polarization:</b>	<b>Vertical-AV</b>
<b>Standard:</b>	<b>(RE)FCC PART15 E _3m</b>	<b>Power Source:</b>	<b>AC 120V/60Hz for PC</b>
<b>Test item:</b>	<b>Radiation Test</b>	<b>Temp.(C)/Hum.(%RH):</b>	<b>24.3(C)/55%RH</b>
<b>Test Mode:</b>	<b>IEEE 802.11n(HT20) (5745MHz)</b>	<b>Distance:</b>	<b>3m</b>

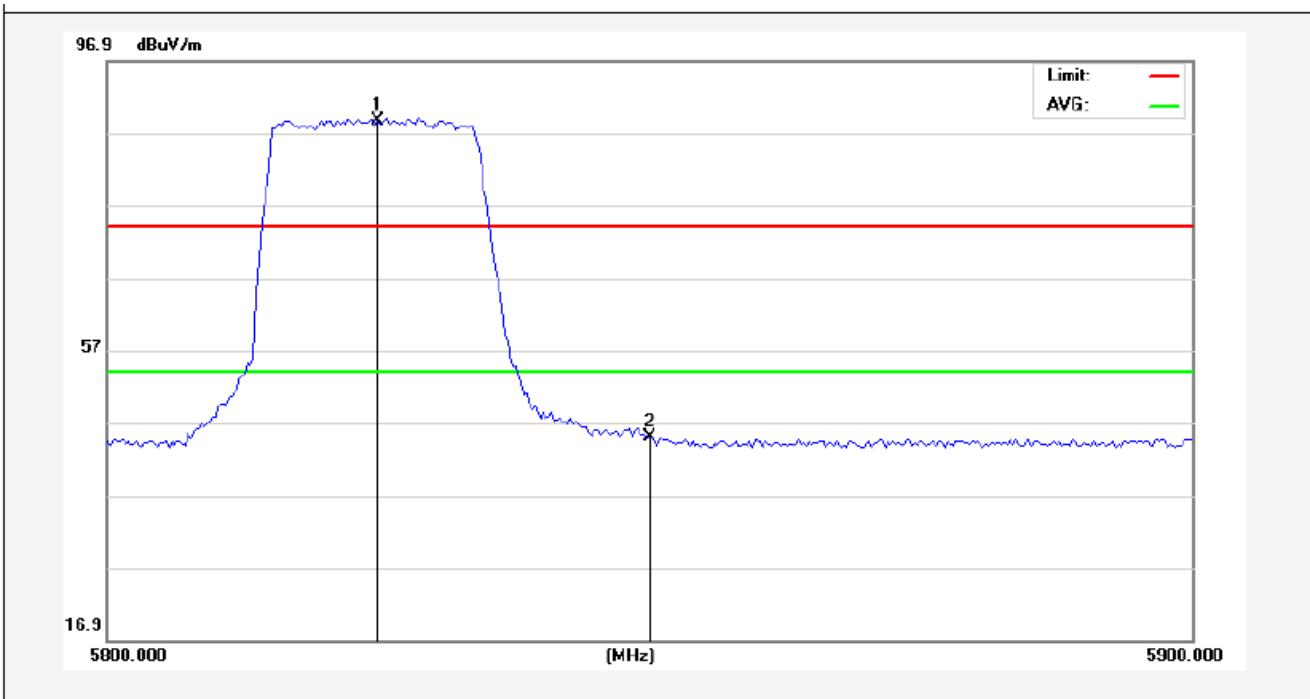


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	32.33	41.28	54.00	-12.72	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Horizontal-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5825MHz)	Distance:	3m

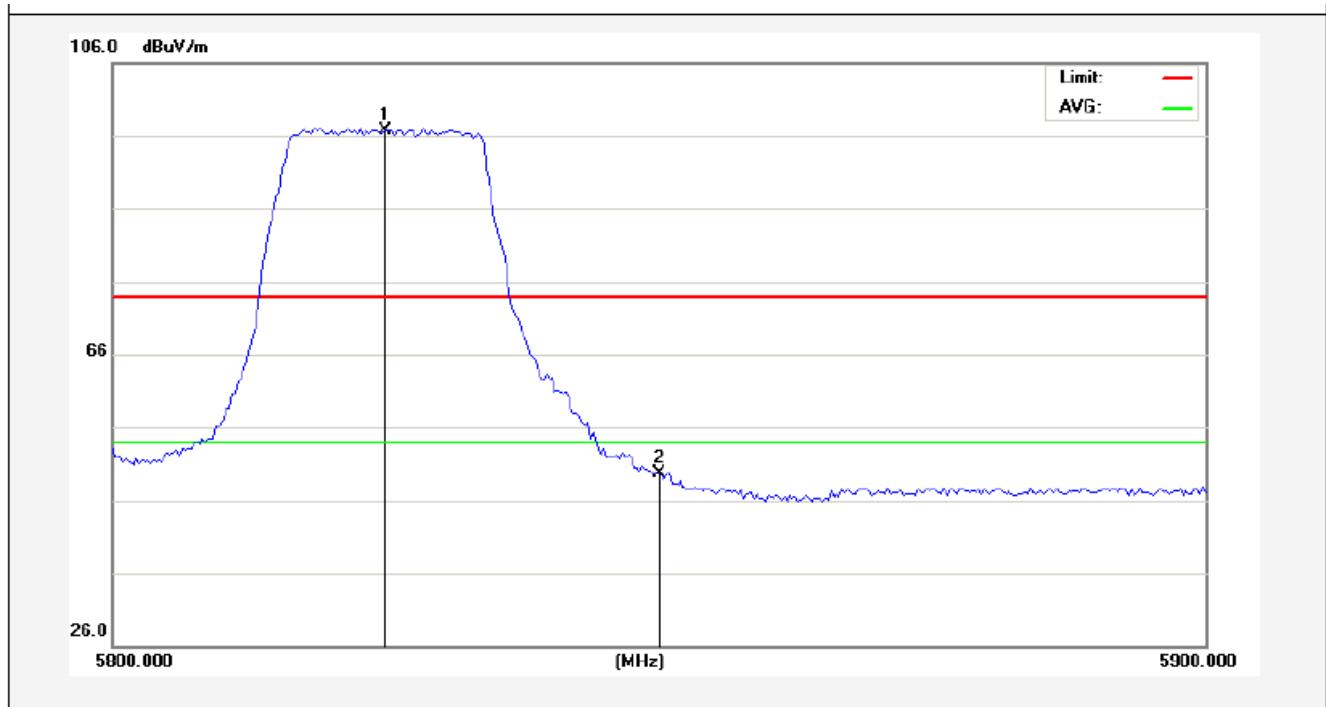


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5850.000	3.95	37.67	32.60	40.33	49.35	74.00	-24.65	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Vertical-PEAK
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5825MHz)	Distance:	3m

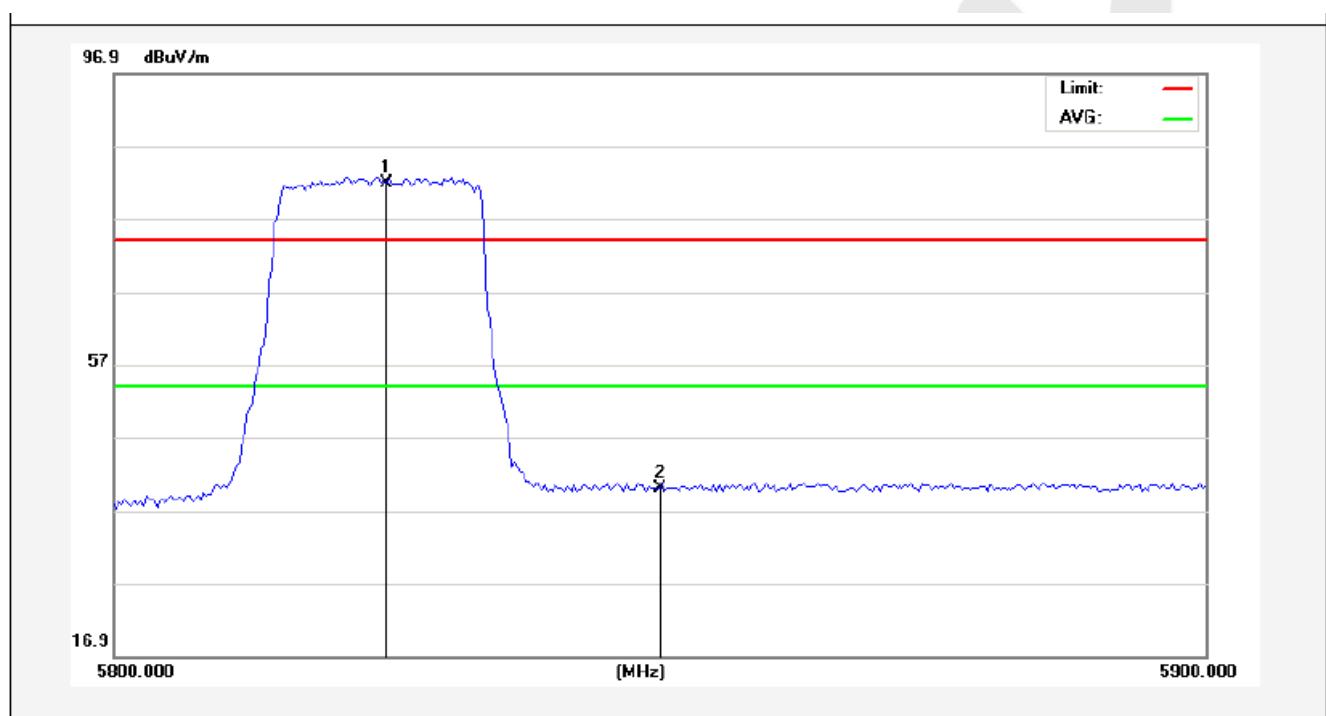


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5850.000	3.95	37.67	32.60	37.56	46.58	74.00	-27.42	Peak

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Horizontal-AV
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5825MHz)	Distance:	3m

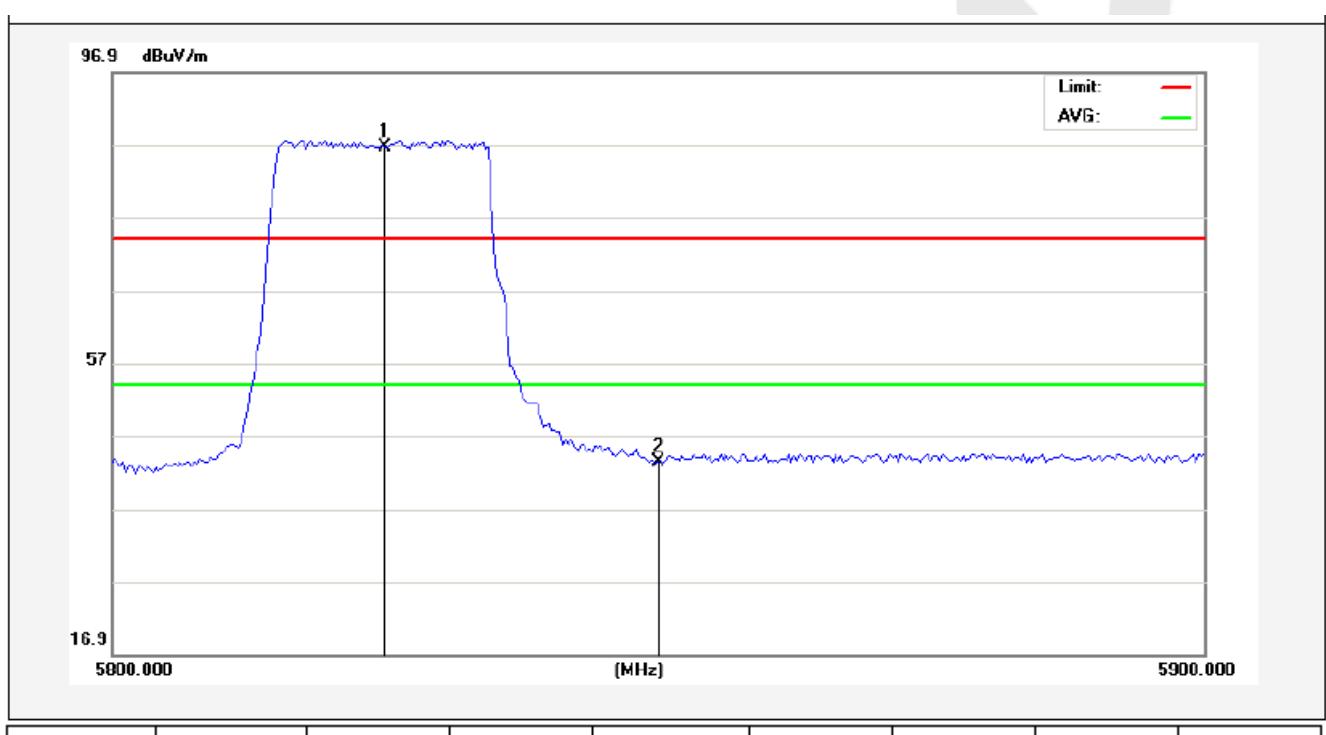


Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	35.34	44.29	54.00	-9.71	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

Job No.:	011609746I	Polarization:	Vertical-AV
Standard:	(RE)FCC PART15 E _3m	Power Source:	AC 120V/60Hz for PC
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	IEEE 802.11n(HT20) (5825MHz)	Distance:	3m



Frequency	CableLoss	AntFactor	PreampFactor	ReadLevel	Level	Limit	Over Limit	Remark
MHz	dB	dB/m	dB	dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m	dB	
5725.000	3.92	37.63	32.60	37.34	46.29	54.00	-7.71	AVG

**Remark:**

According to KDB 789033 section g (2), for measurement above 1000MHz @3m distance, out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

## 9. ANTENNA APPLICATION

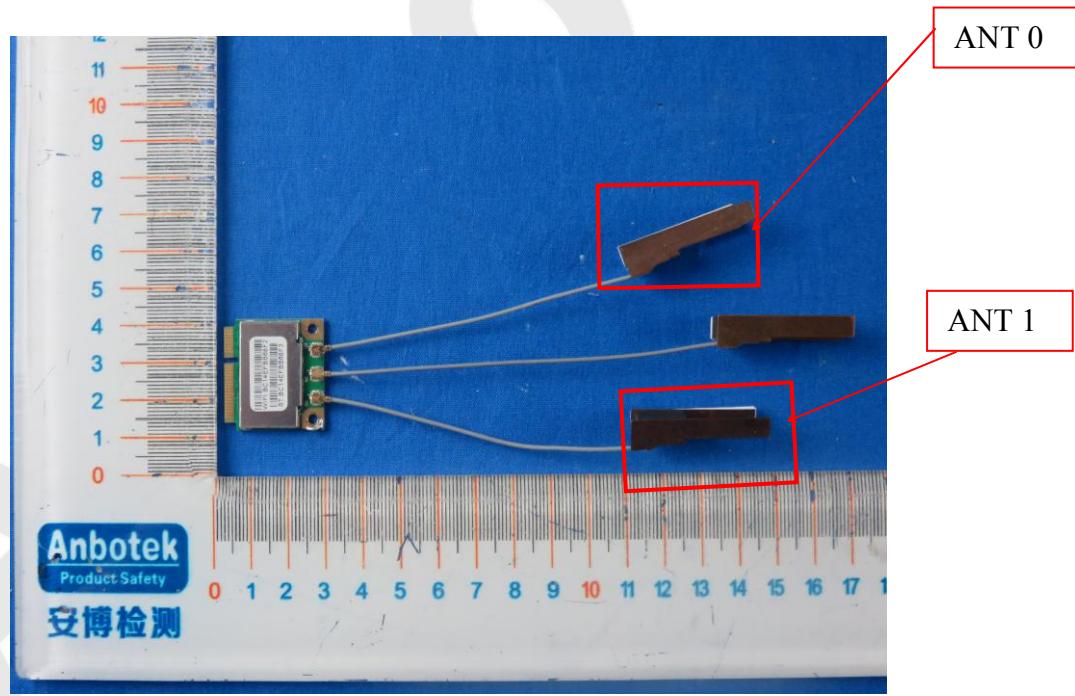
### 9.1. Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.407.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### 9.2. Result

The EUT's antenna used a copper Antenna, which is permanently attached to the PCB with glue, The antenna's gain is 5dBi and meets the requirement.



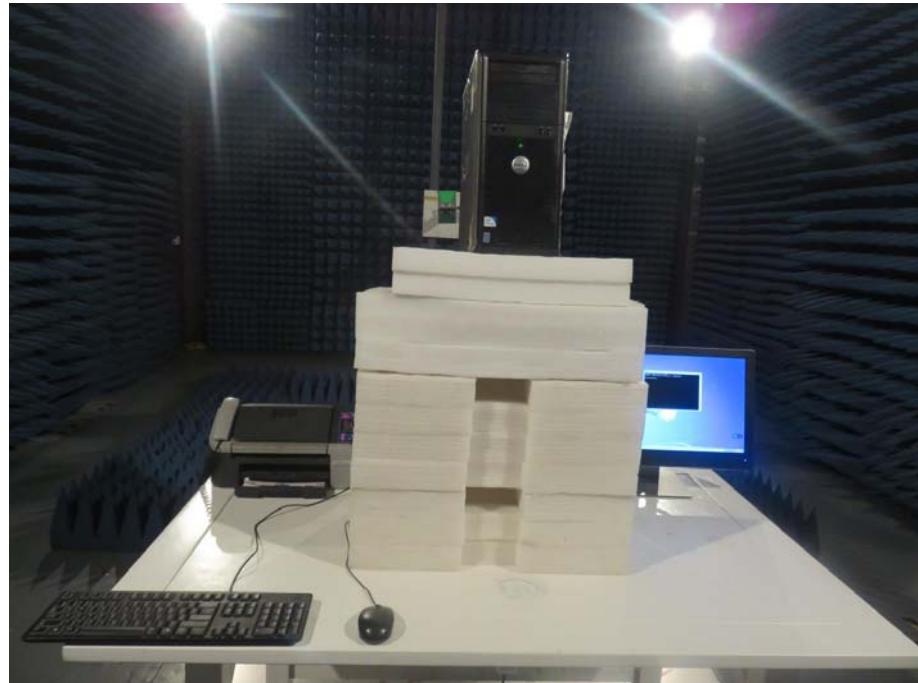
## 10. PHOTOGRAPH

### 10.1. Photo of Conducted Emission Measurement



### 10.2. Photo of Radiation Emission Test





10.3. Photo of EUT in the PC

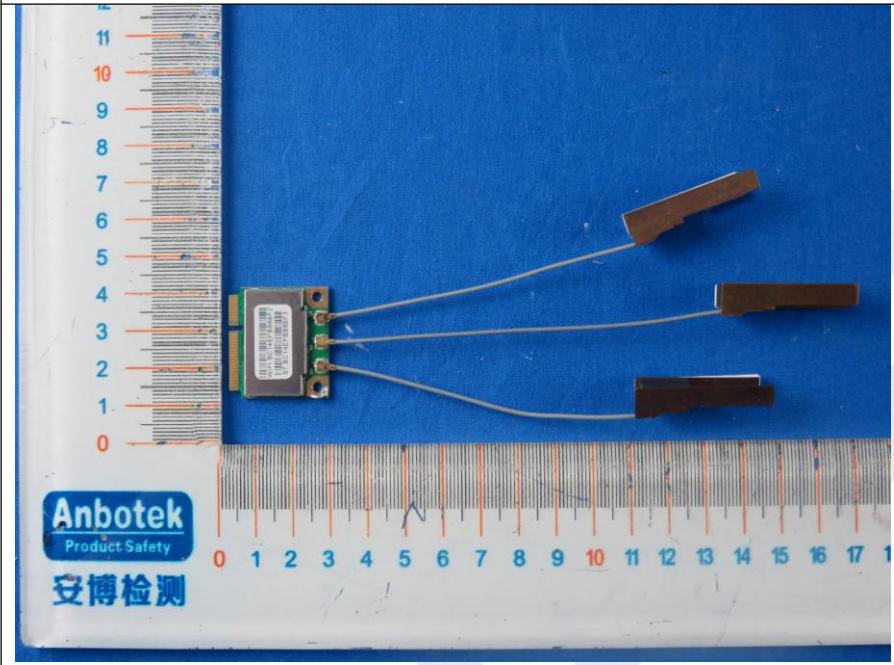




## APPENDIX I (EXTERNAL PHOTOS)

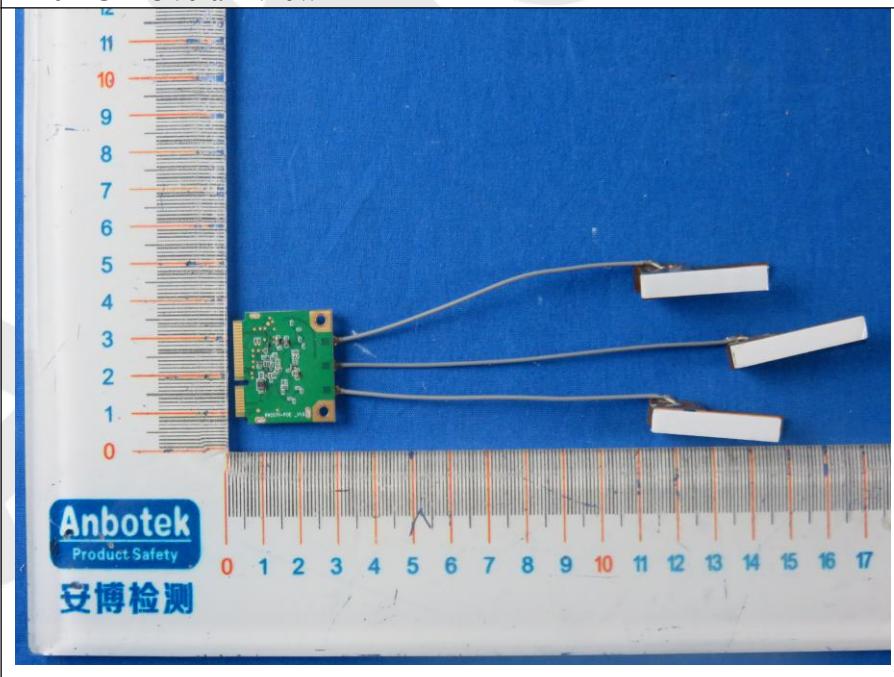
1. Figure

The EUT-Overall View

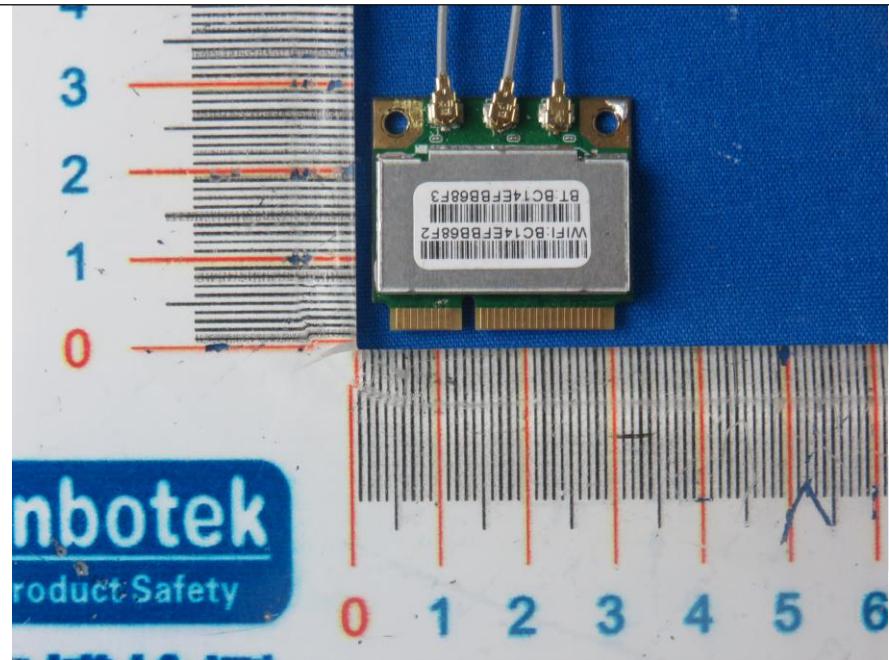


2. Figure

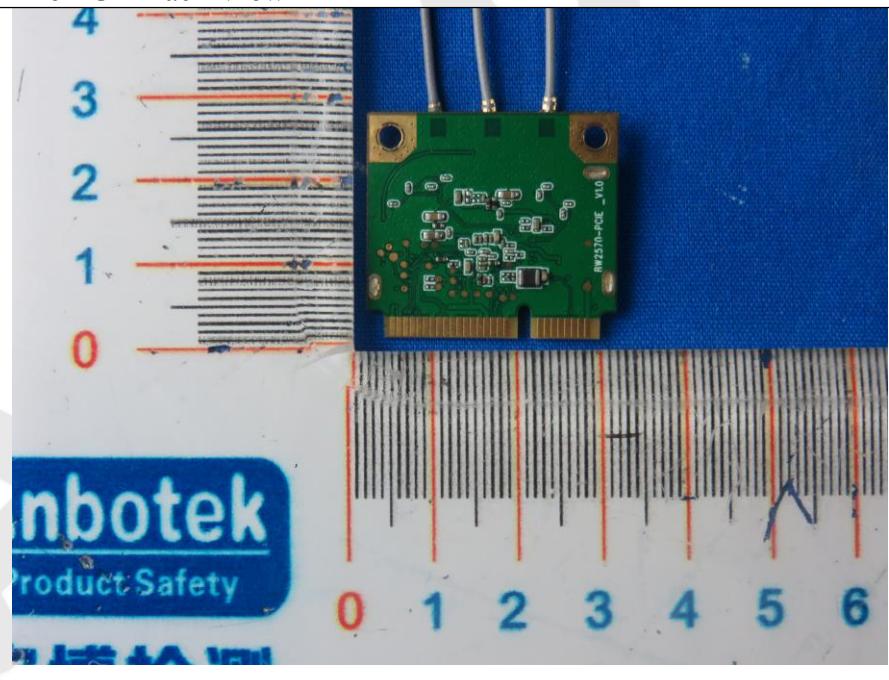
The EUT-Overall View



3. Figure  
The EUT-Front View



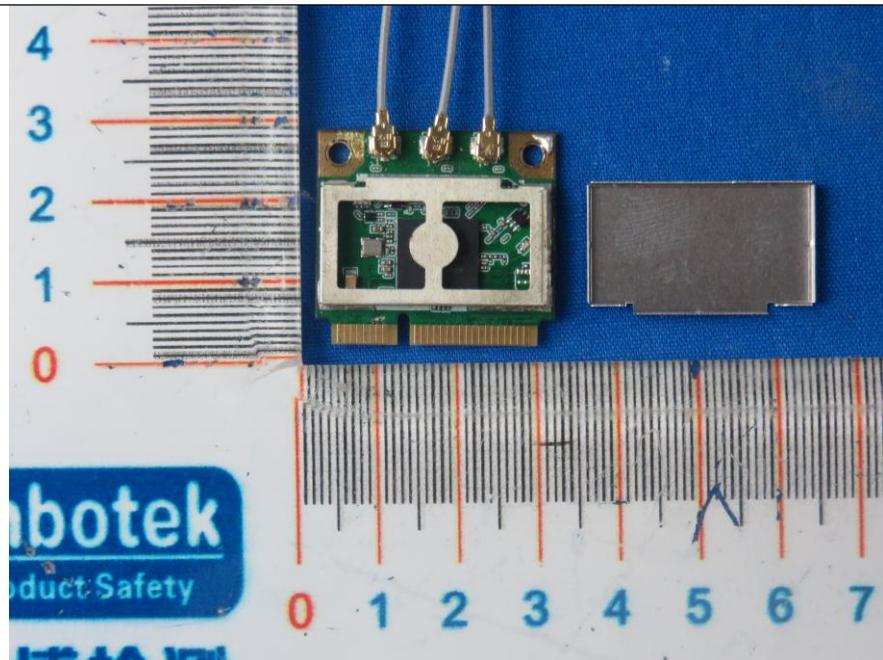
4. Figure  
The EUT-Back View



## APPENDIX II (INTERNAL PHOTOS)

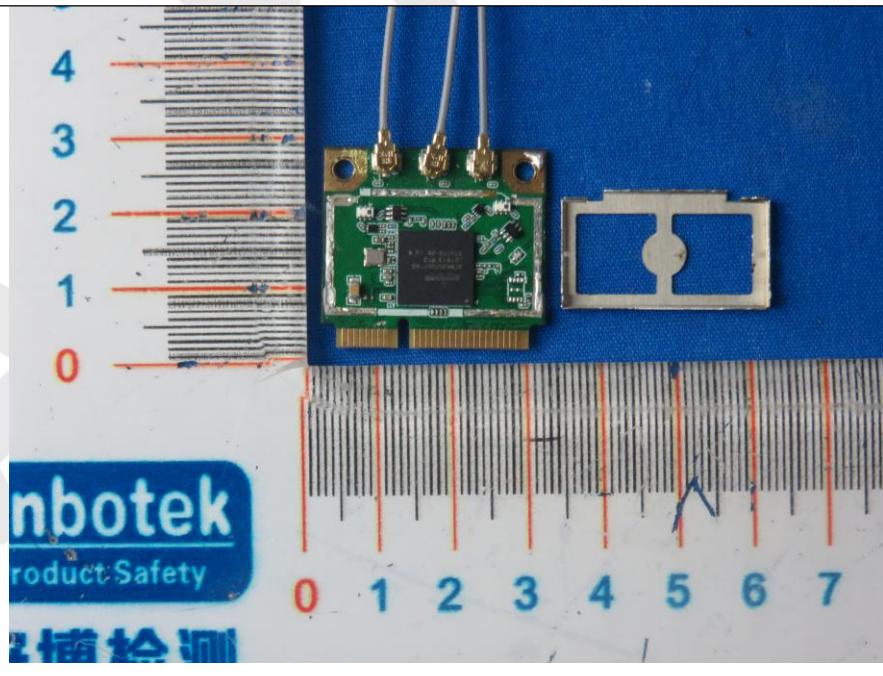
1. Figure

The EUT-Inside View

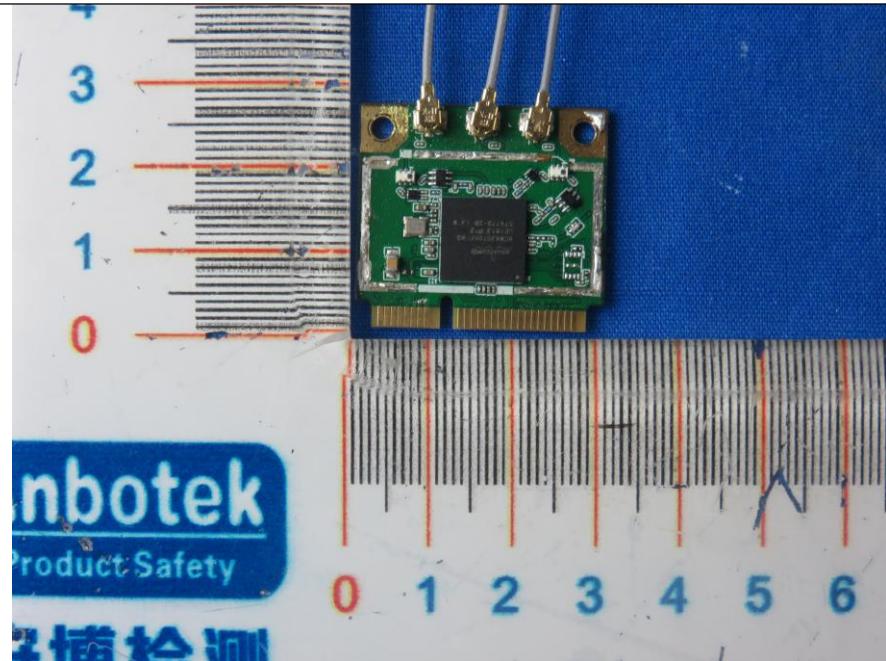


2. Figure

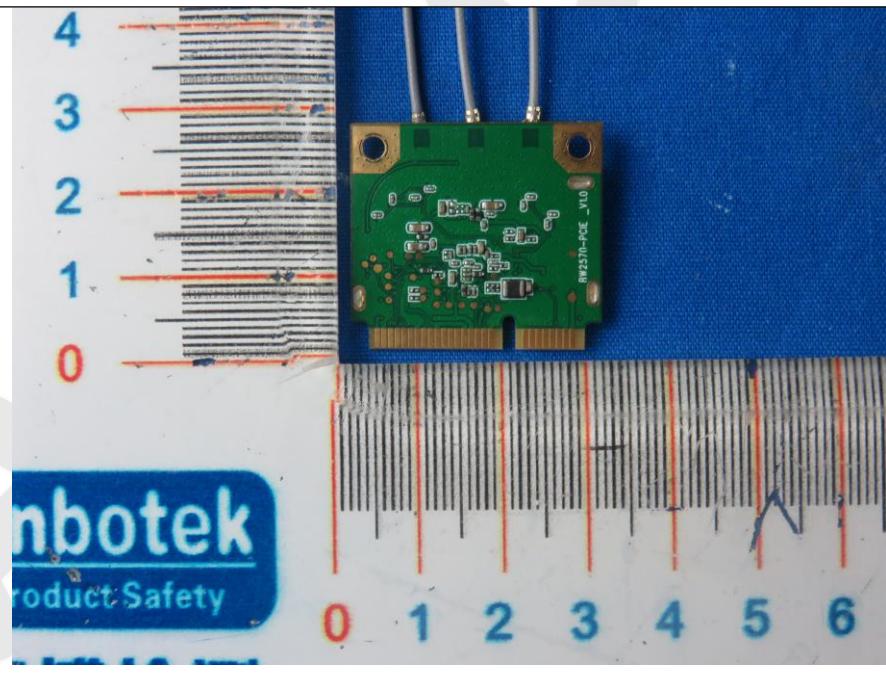
The EUT-Inside View



3. Figure  
PCB of the EUT-Front View



4. Figure  
PCB of the EUT-Back View



**5. Figure**  
PCB of the EUT-Front View



**6. Figure**  
PCB of the EUT-Back View

