7. 26dB /99% EMISSION BANDWIDTH MEASUREMENT

7.1 Standard Applicable

According to §15.407(a). No Limit required.

According to RSS -247, 6.2, No Limit required.

RSS-Gen §4.4.1, the transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

7.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the.antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=300KHz, VBW =1MHz, Span= 50MHz, Sweep=auto
4. Mark the peak frequency and –26dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

Refer to section D of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v01r03

7.3 Measurement Equipment Used:

Refer to section 6.3 for details.

7.4 Test Set-up:

Refer to section 6.4 for details.

7.5 Measurement Result

5150-5250 MHz

802.11a Mode

Frequency (MHz)	99% Bandwidth (MHz)	
5180	16.939	
5200	16.888	
5240	17.053	

802.11n HT20 Mode

Frequency (MHz)	99% Bandwidth (MHz)	
5180	17.714	
5200	17.687	
5240	17.640	

802.11n HT40 Mode

Frequency (MHz)	99% Bandwidth (MHz)	
5190	36.366	
5210	36.291	
5230	36.247	

802.11a HT80 Mode

Frequency (MHz)	99% Bandwidth (MHz)	
5210	74.741	

5725-5850 MHz

802.11a Mode

Frequency (MHz)	99% Bandwidth (MHz)
5745	16.80
5785	16.79
5825	16.73

802.11n HT20 Mode

Frequency (MHz)	99% Bandwidth (MHz)
5745	16.76
5785	16.81
5825	16.79

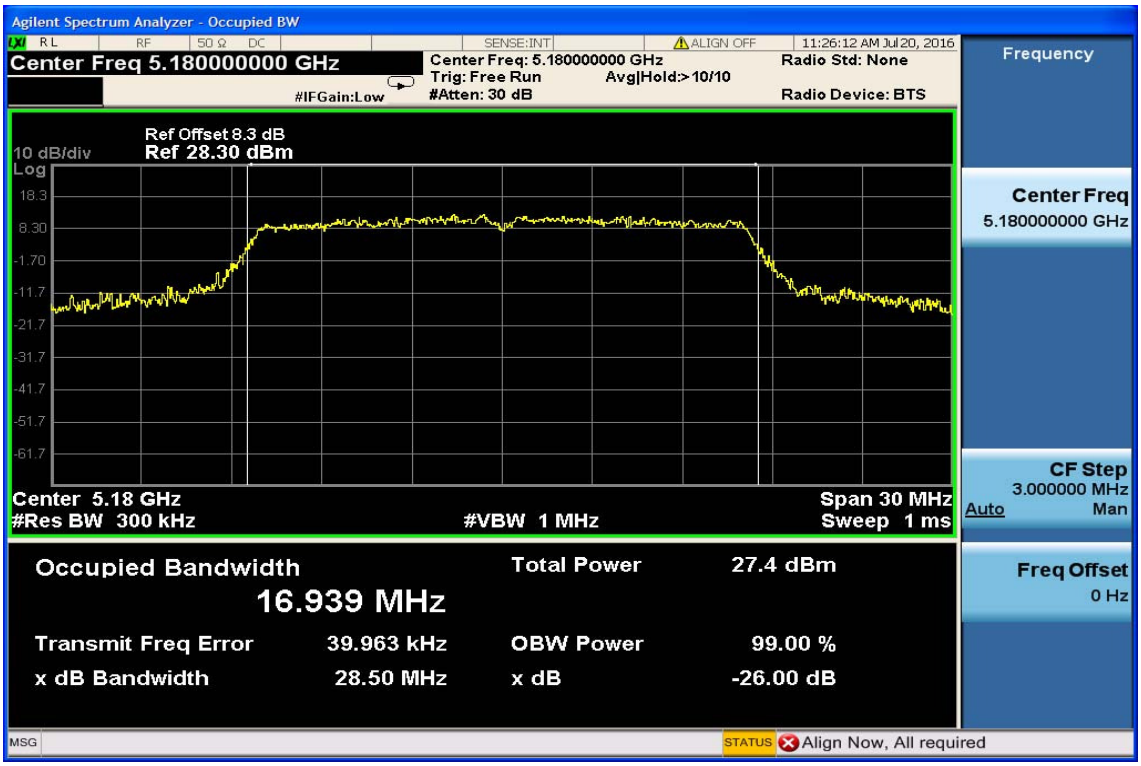
802.11n HT40 Mode

Frequency (MHz)	99% Bandwidth (MHz)
5755	36.09
5795	36.11
5815	36.09

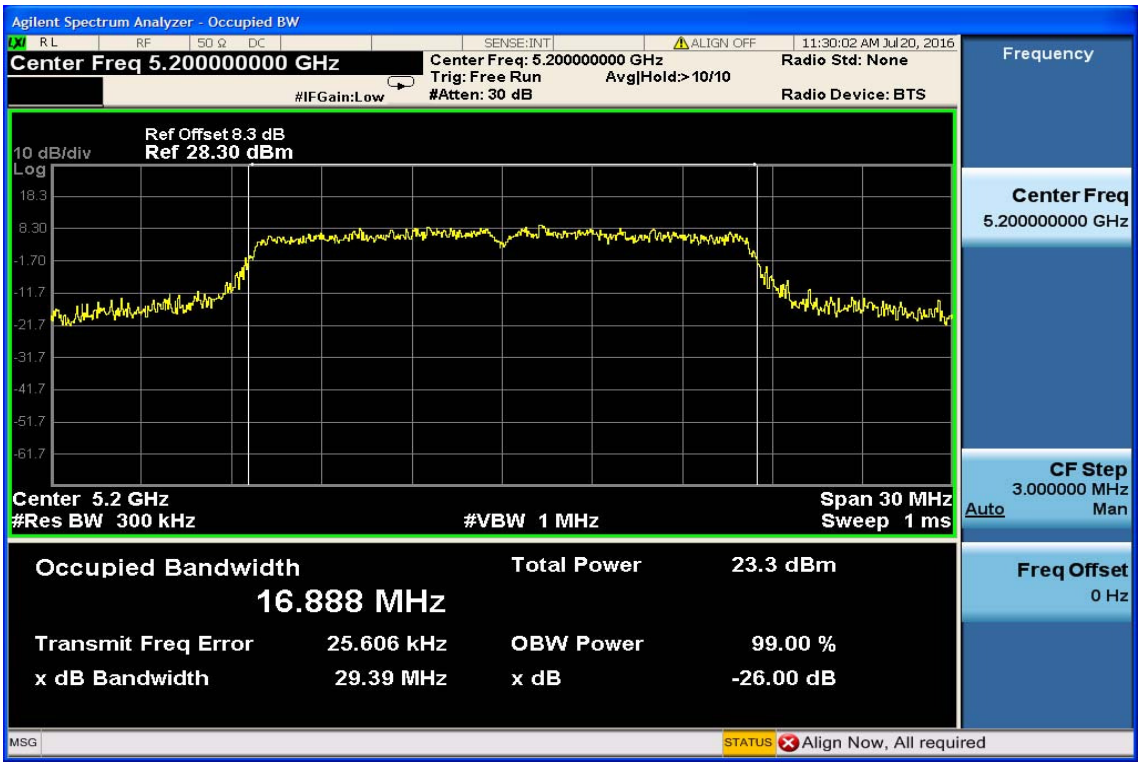
802.11a HT80 Mode

Frequency (MHz)	99% Bandwidth (MHz)
5775	74.93

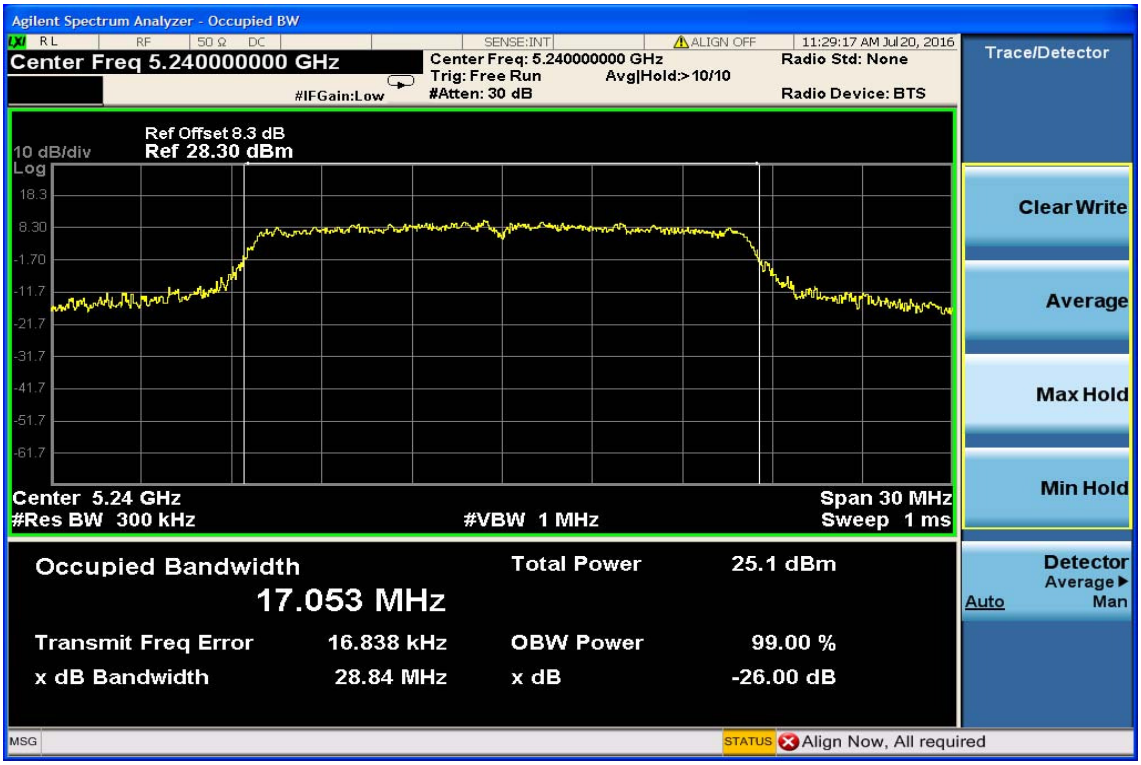
5150-5250MHz
802.11a
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

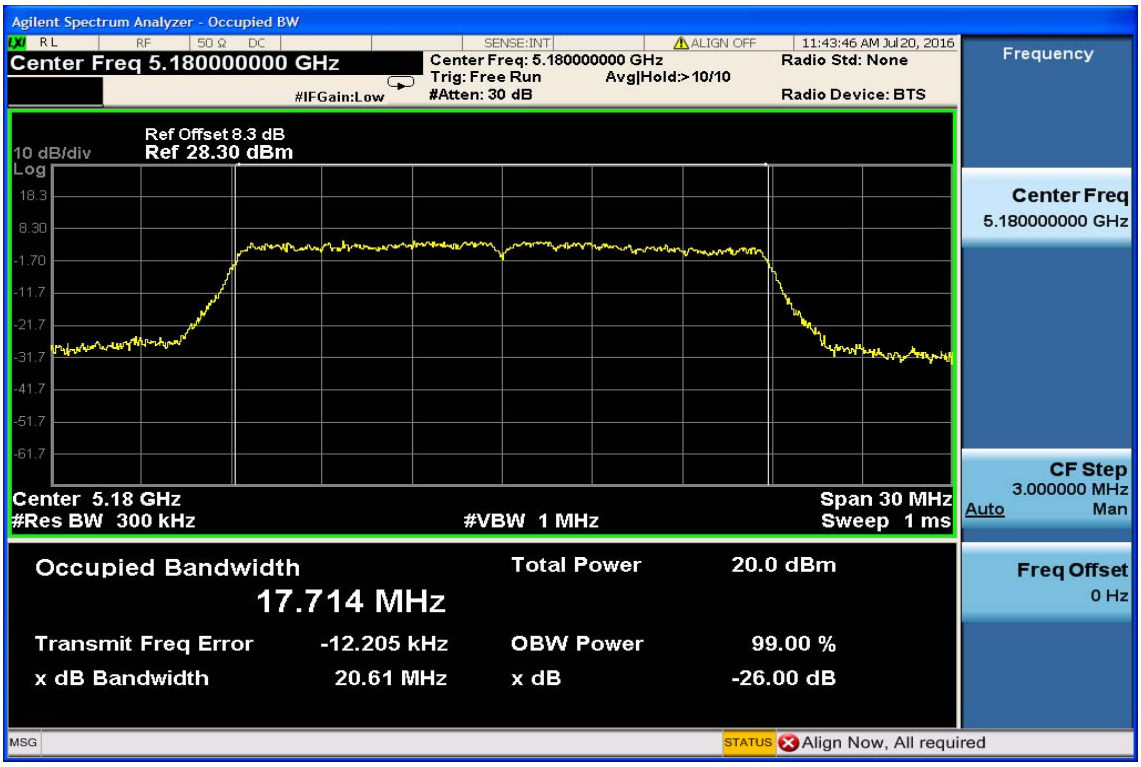


99% Band Width Test Data CH-High

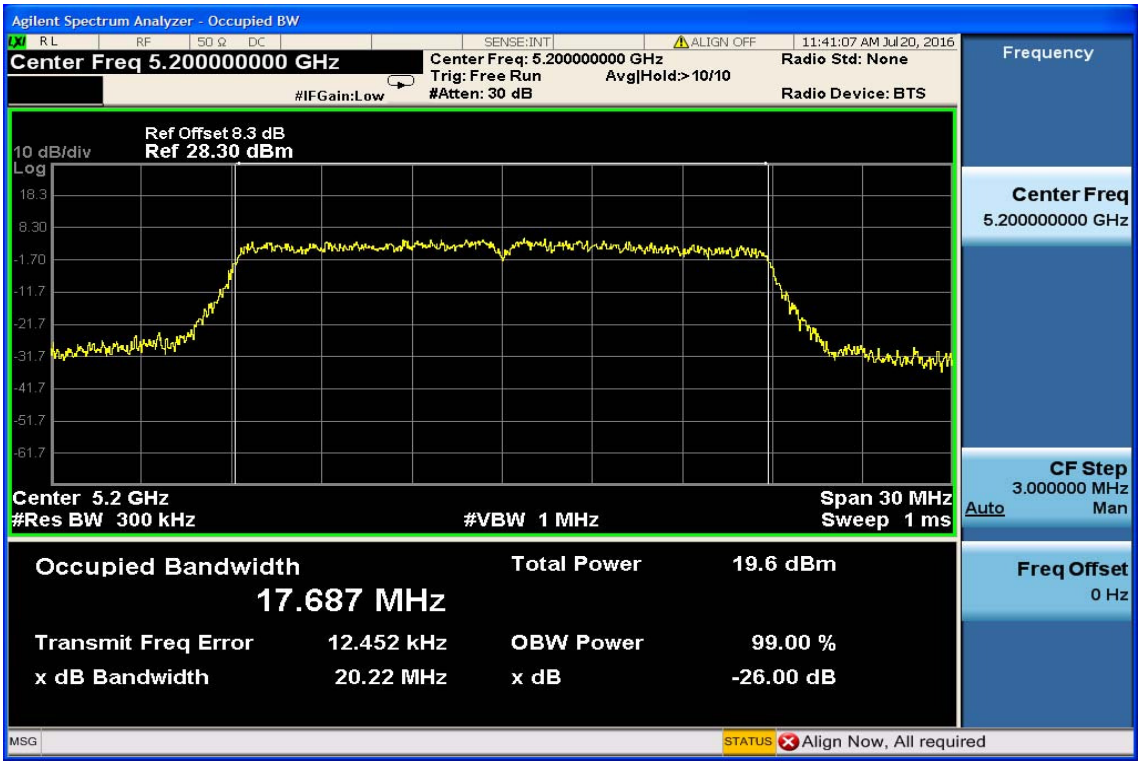


802.11n HT20

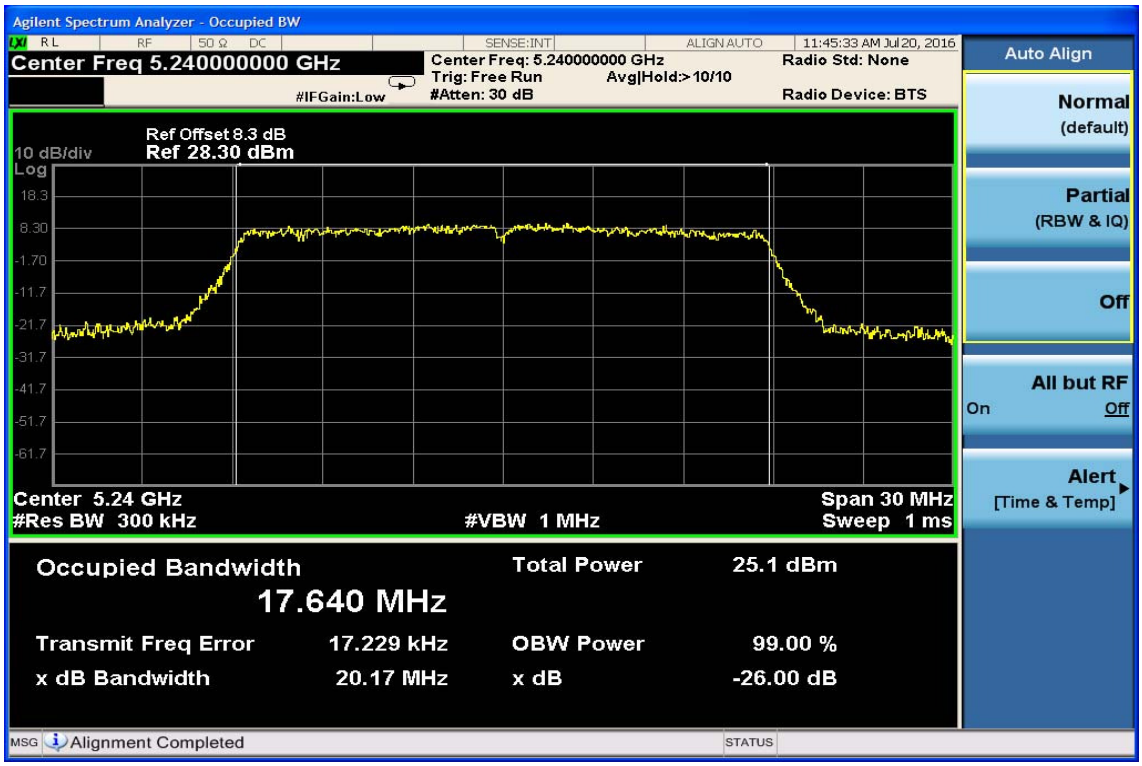
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

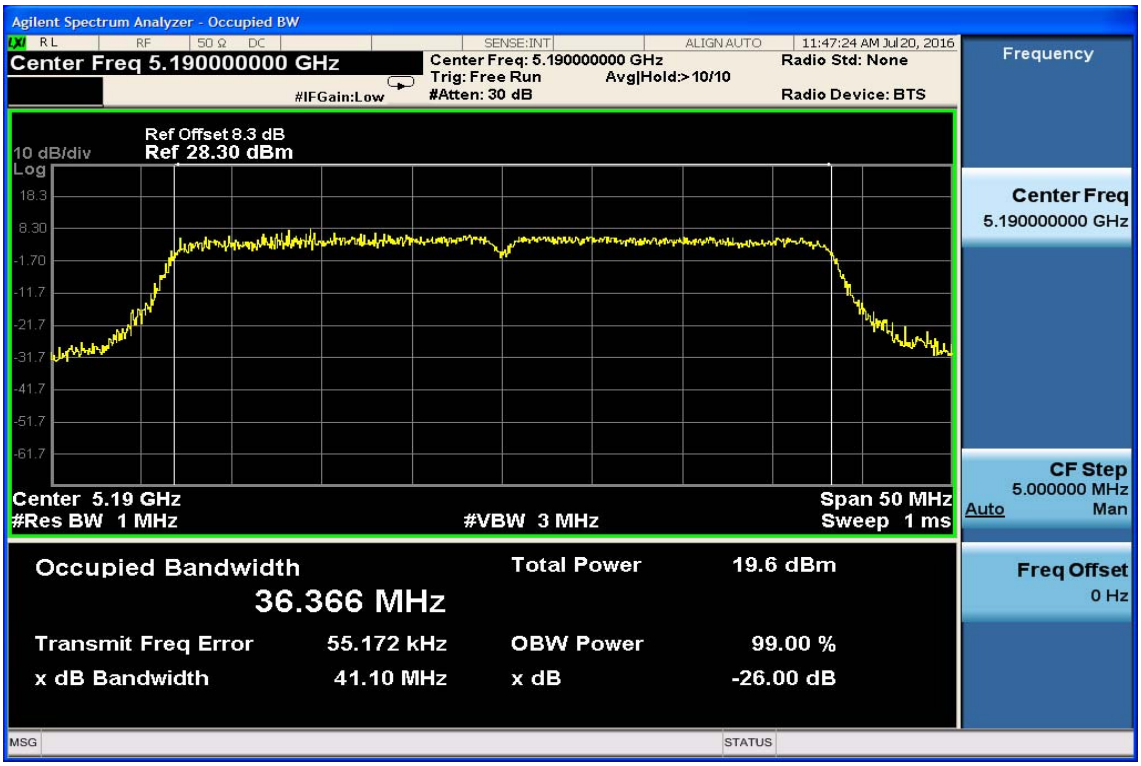


99% Band Width Test Data CH-High

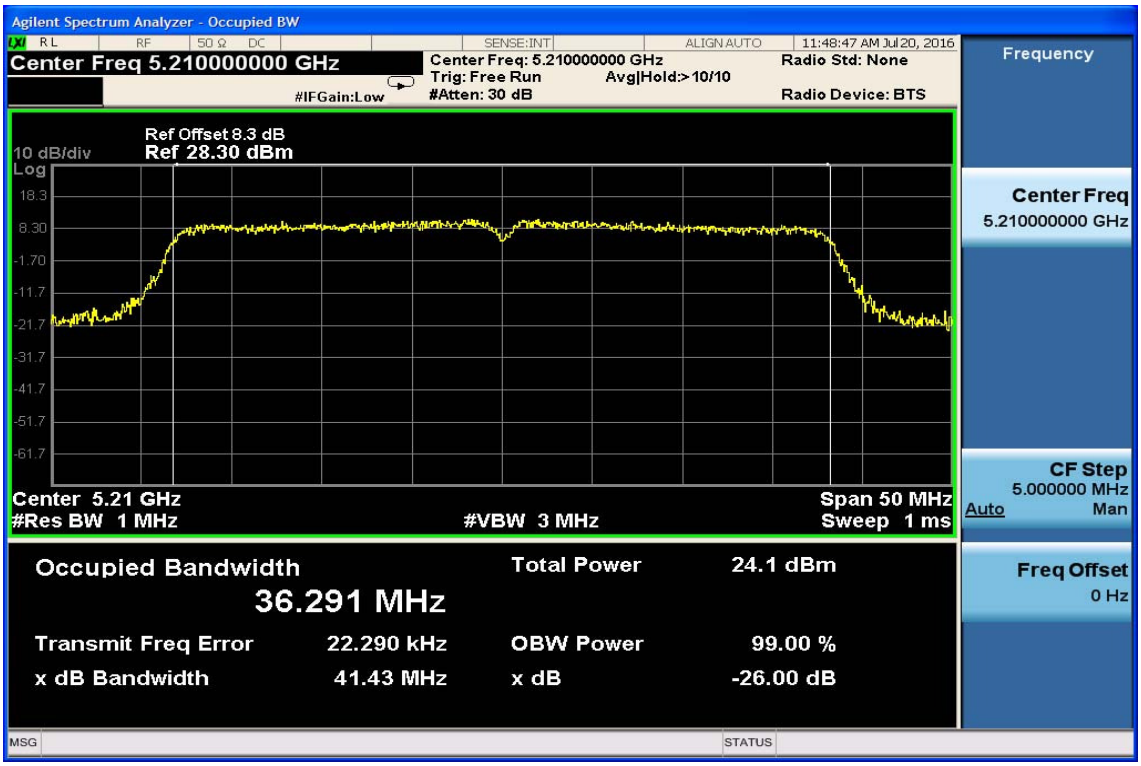


802.11n HT40

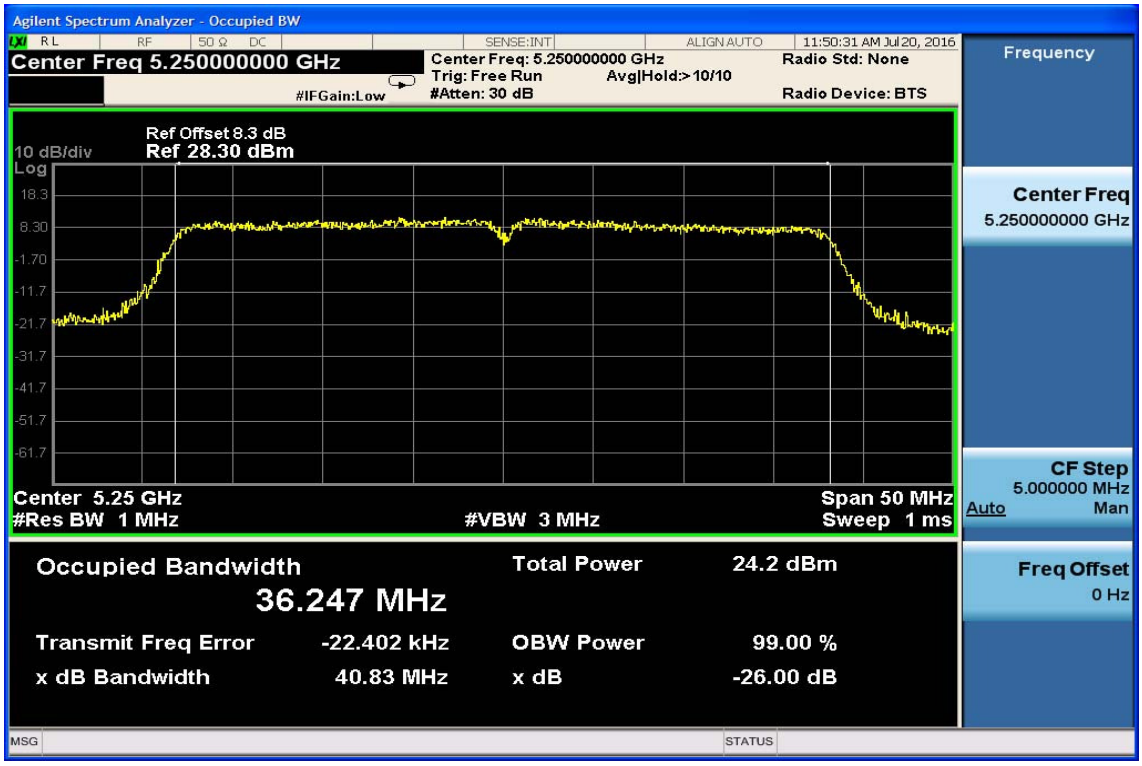
99% Band Width Test Data CH-Low



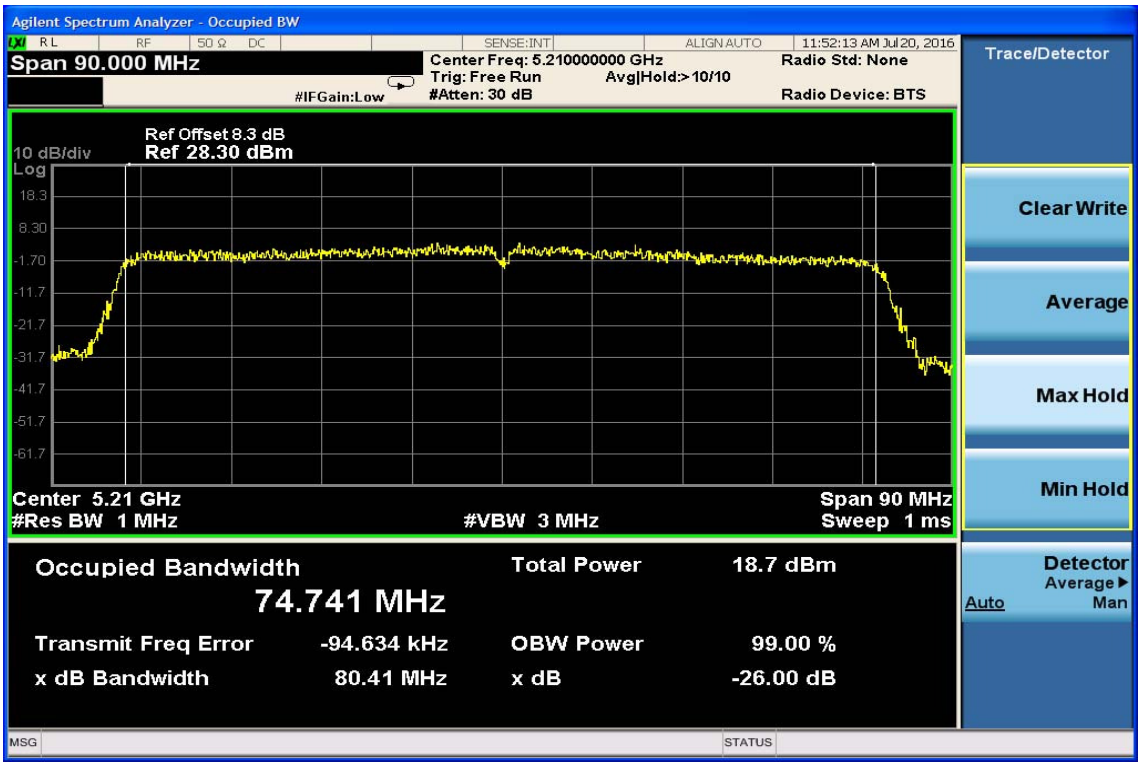
99% Band Width Test Data CH-Mid



99%Band Width Test Data CH-High



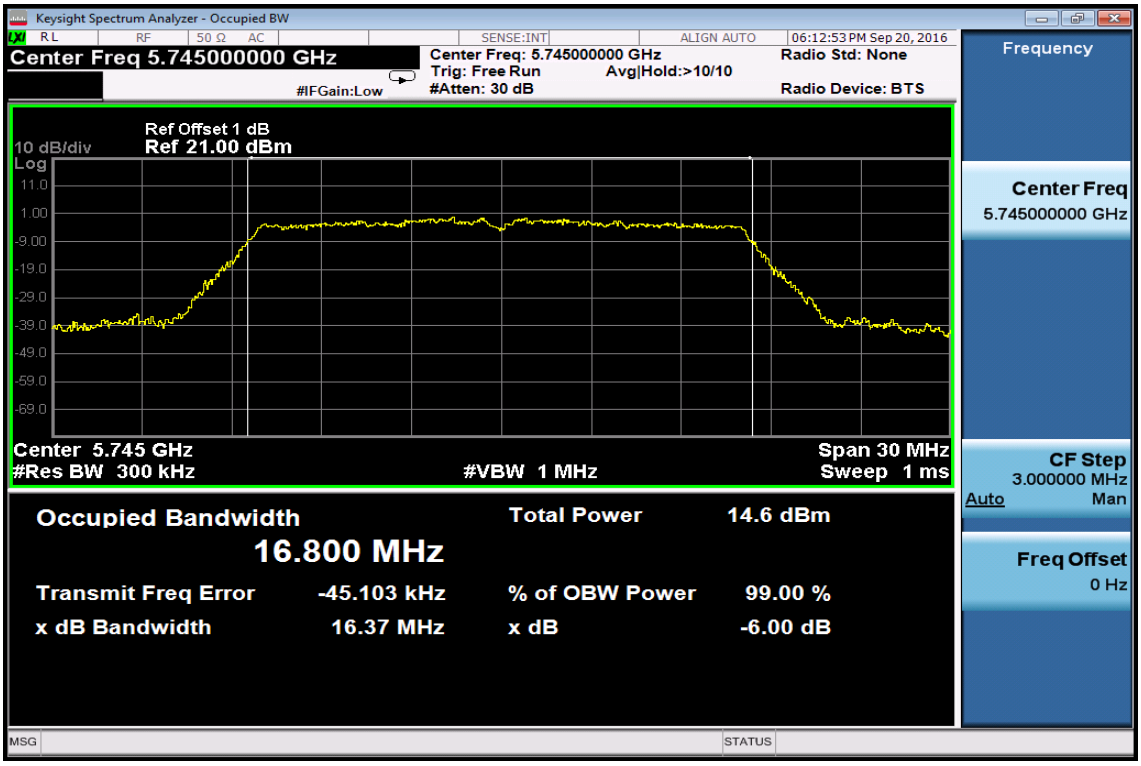
802.11AC HT80
99% Band Width Test Data



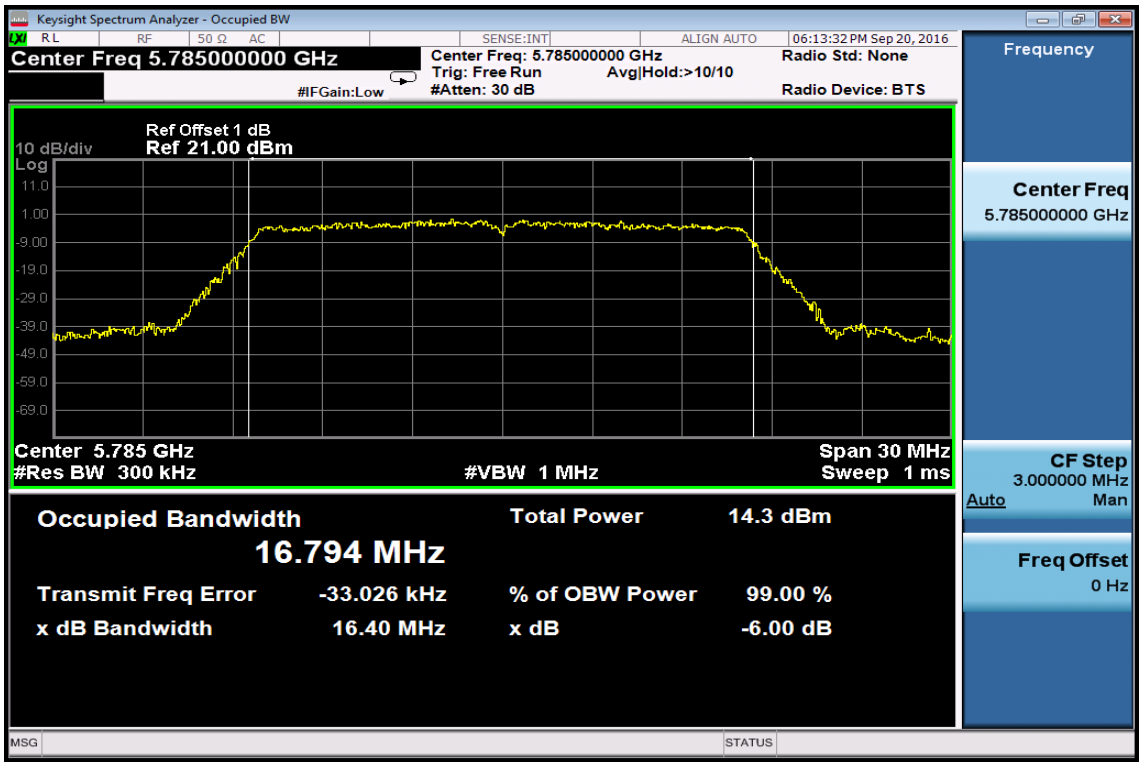
5725-5850 MHz

802.11a

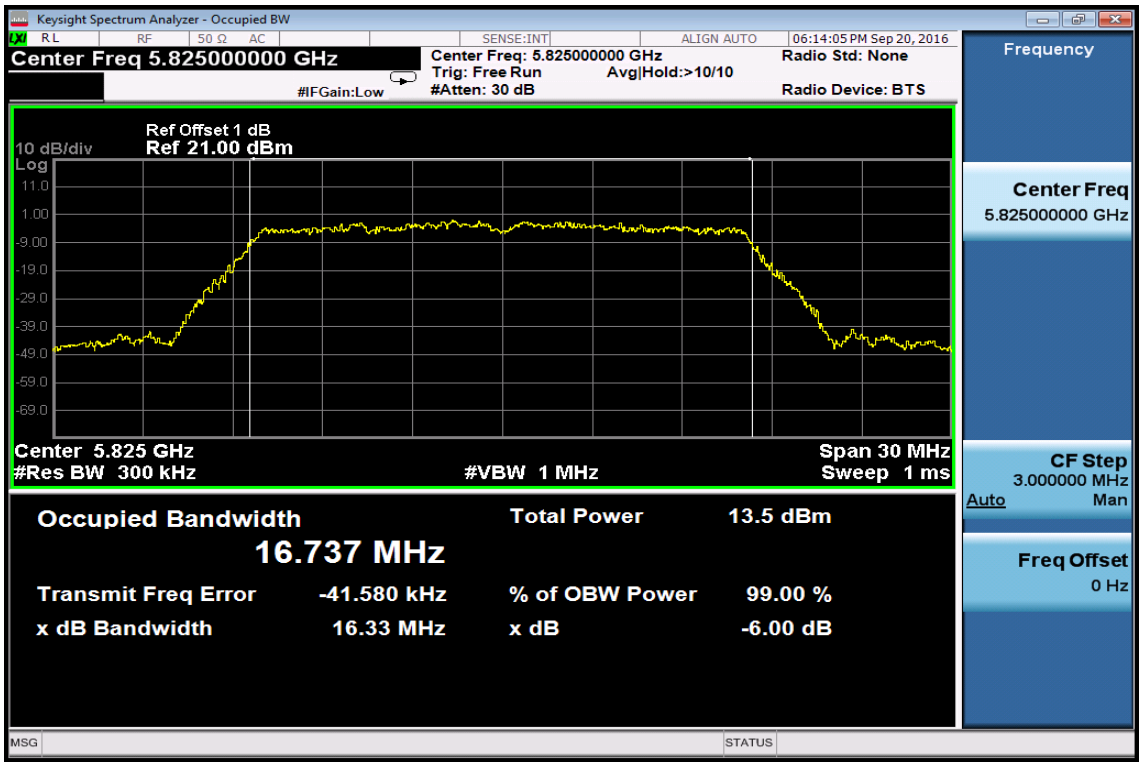
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

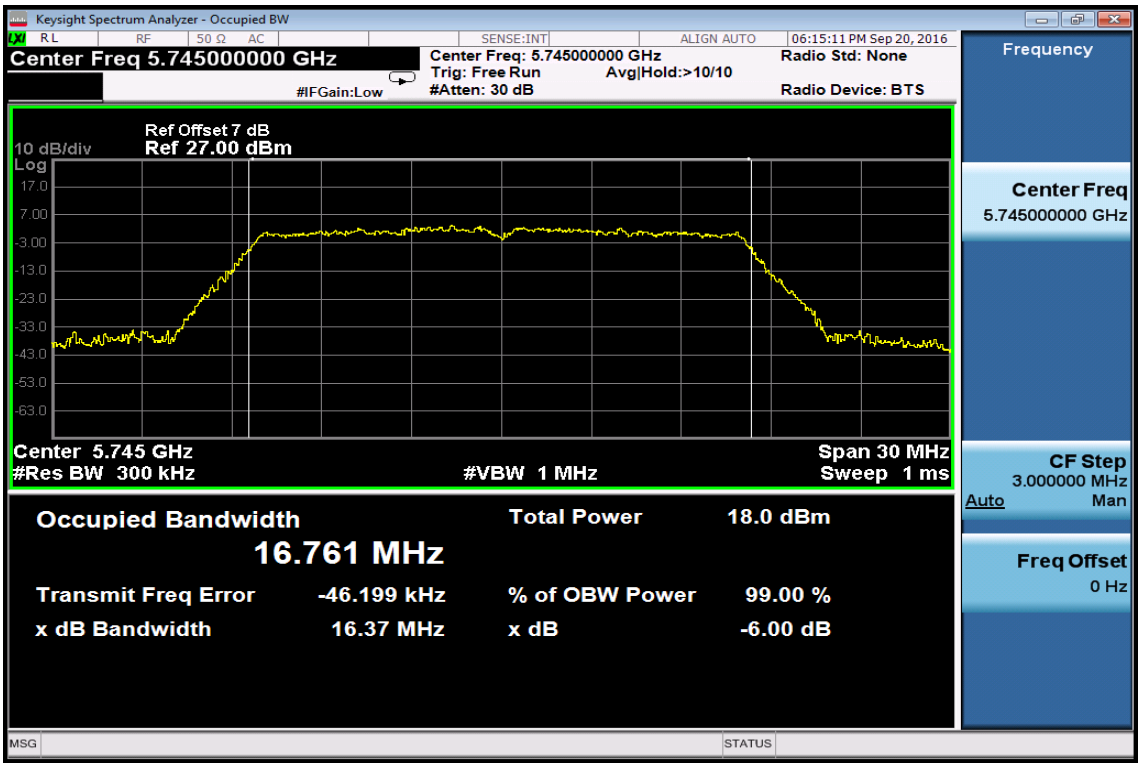


99% Band Width Test Data CH-High

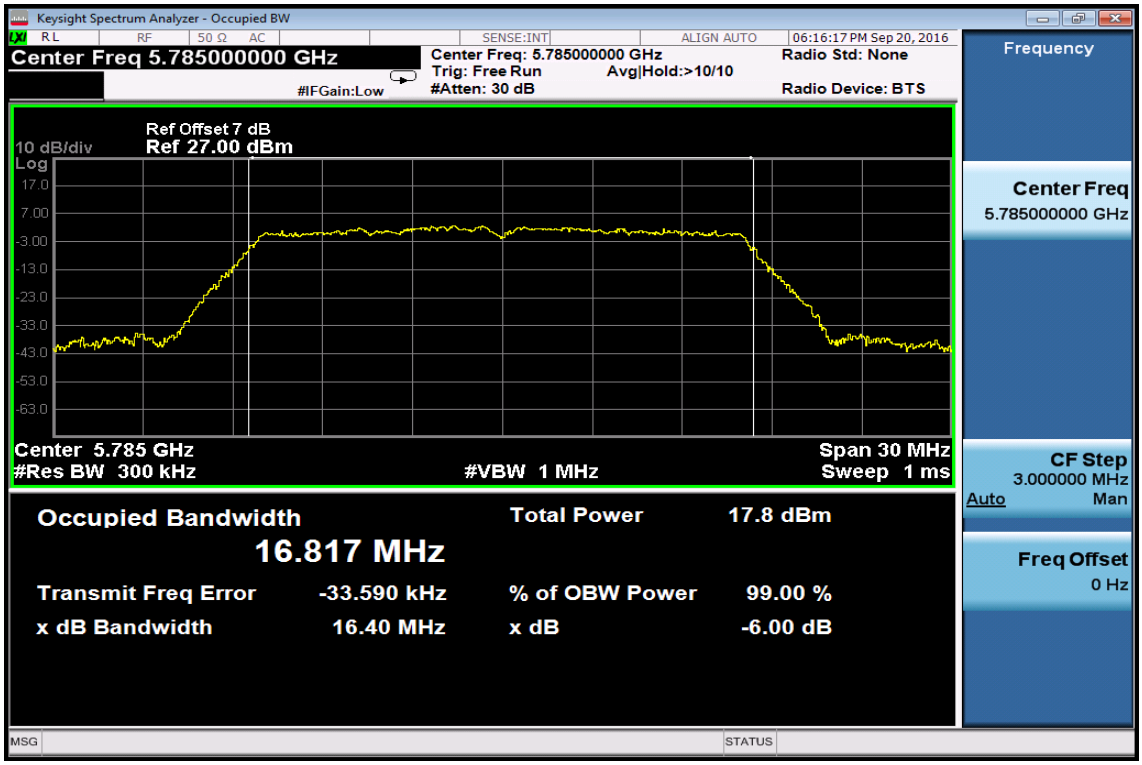


802.11n HT20

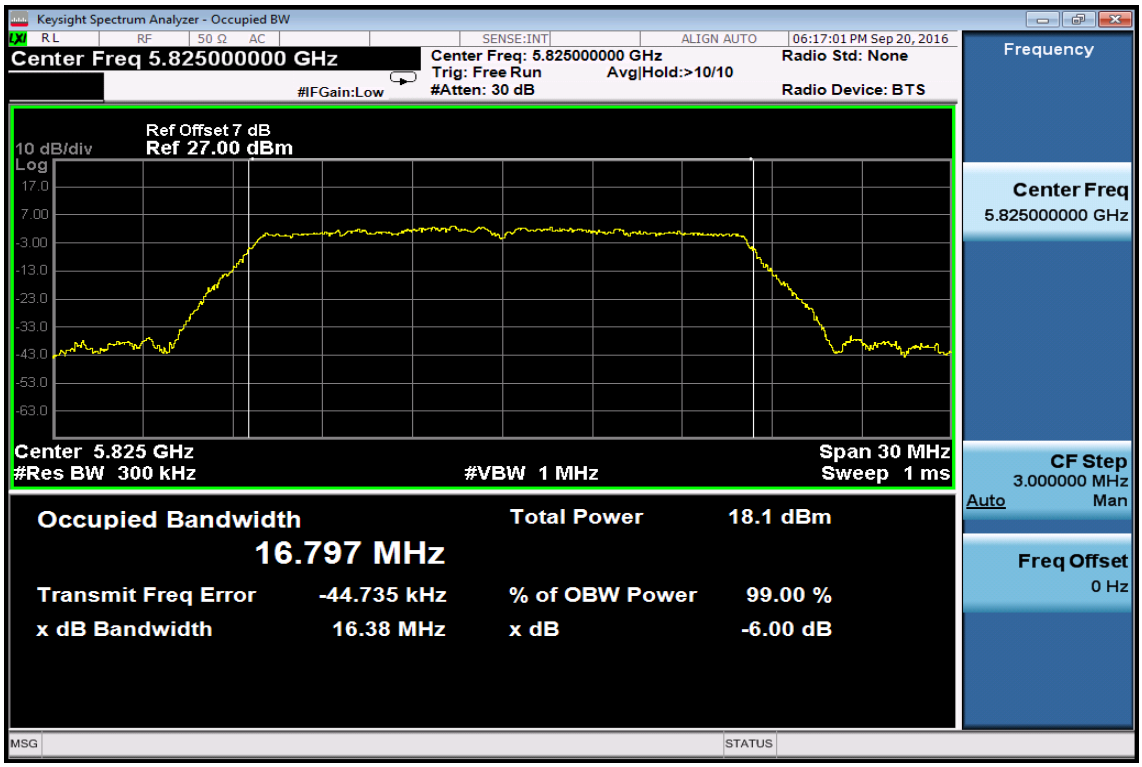
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

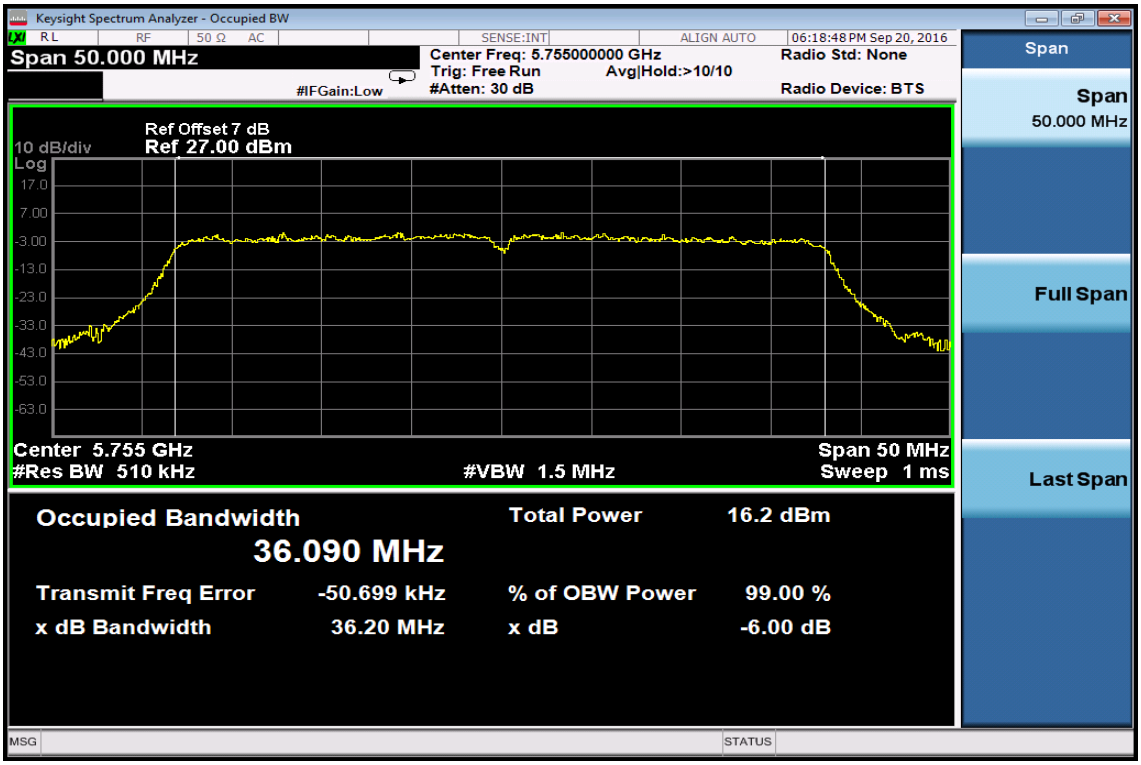


99% Band Width Test Data CH-High

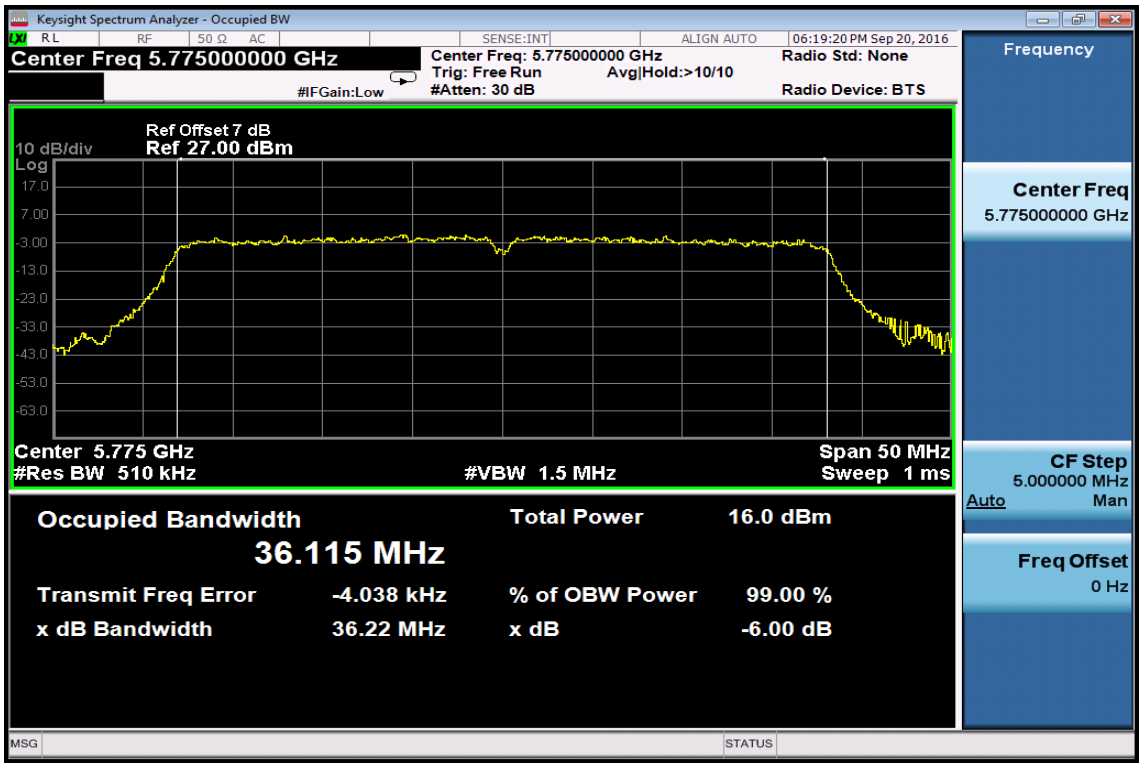


802.11n HT40

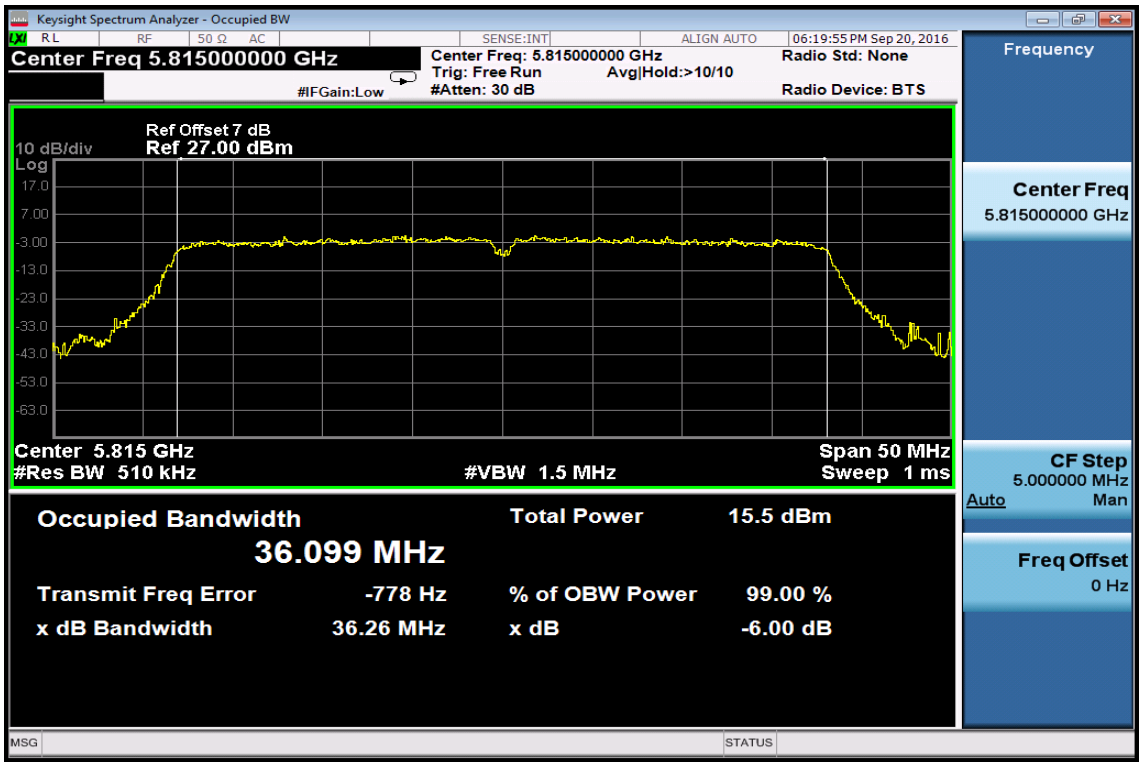
99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

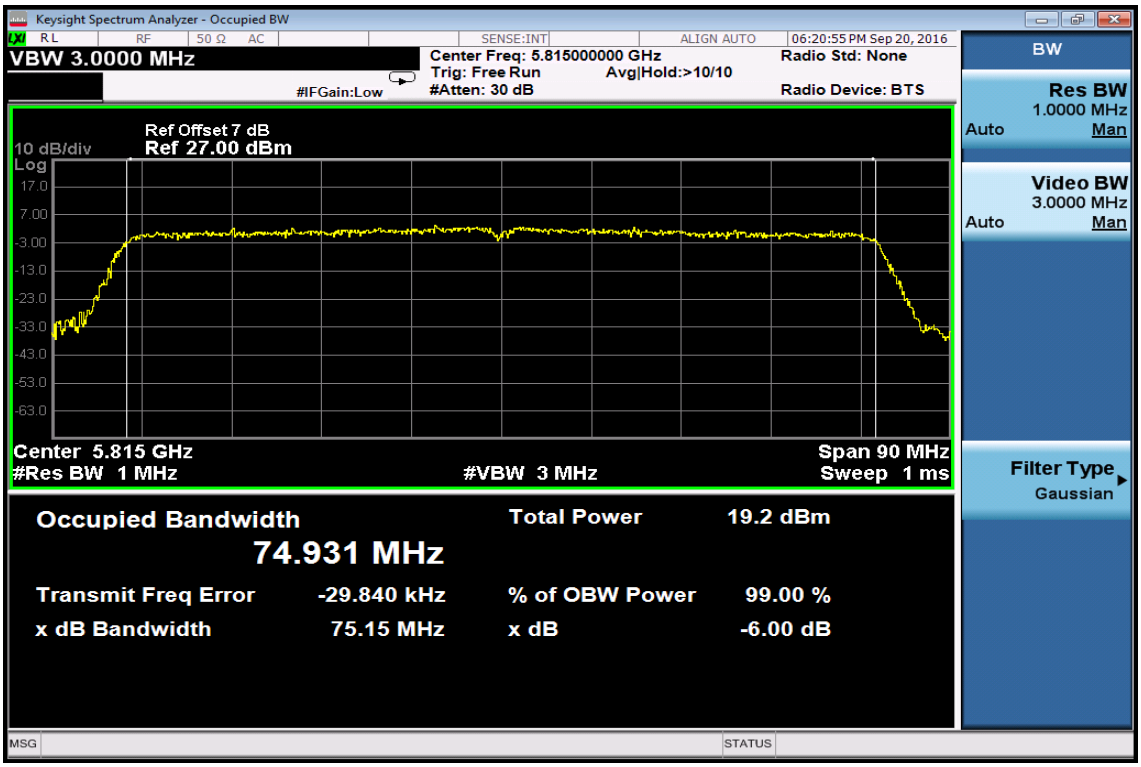


99% Band Width Test Data CH-High



802.11AC HT80

99% Band Width Test Data CH-Low



8. 6dB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

According to §15.407 (e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

According to RSS-247, 6.2.4

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100KHz, VBW =300MHz, Span= 50MHz, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

Refer to section D of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v01r03

8.3 Measurement Equipment Used:

Refer to section 6.3 for details.

8.4 Test Set-up:

Refer to section 6.4 for details.

8.5 Measurement Result

5725-5850 MHz

802.11a Mode

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)
5745	16.280	>500
5785	16.290	>500
5825	16.320	>500

802.11n HT20 Mode

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)
5745	16.960	>500
5785	17.240	>500
5825	16.920	>500

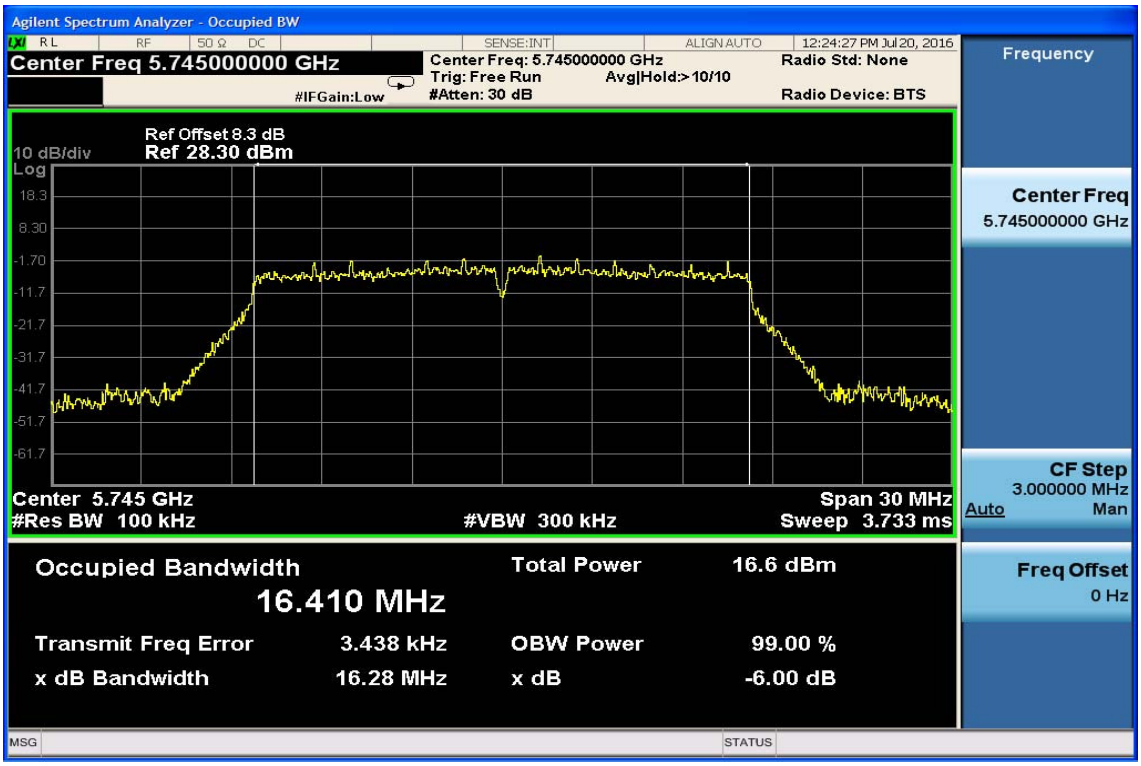
802.11n HT40 Mode

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)
5755	35.160	>500
5775	32.530	>500
5815	35.110	>500

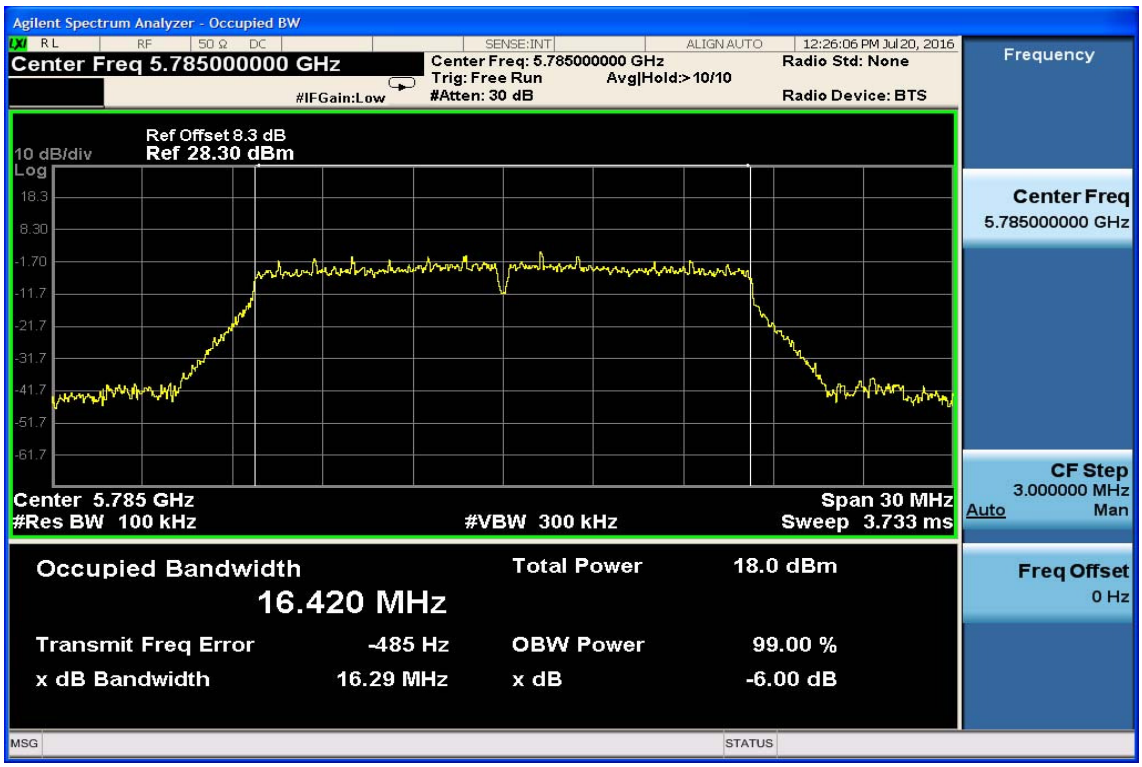
802.11a HT80 Mode

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)
5775	74.380	>500

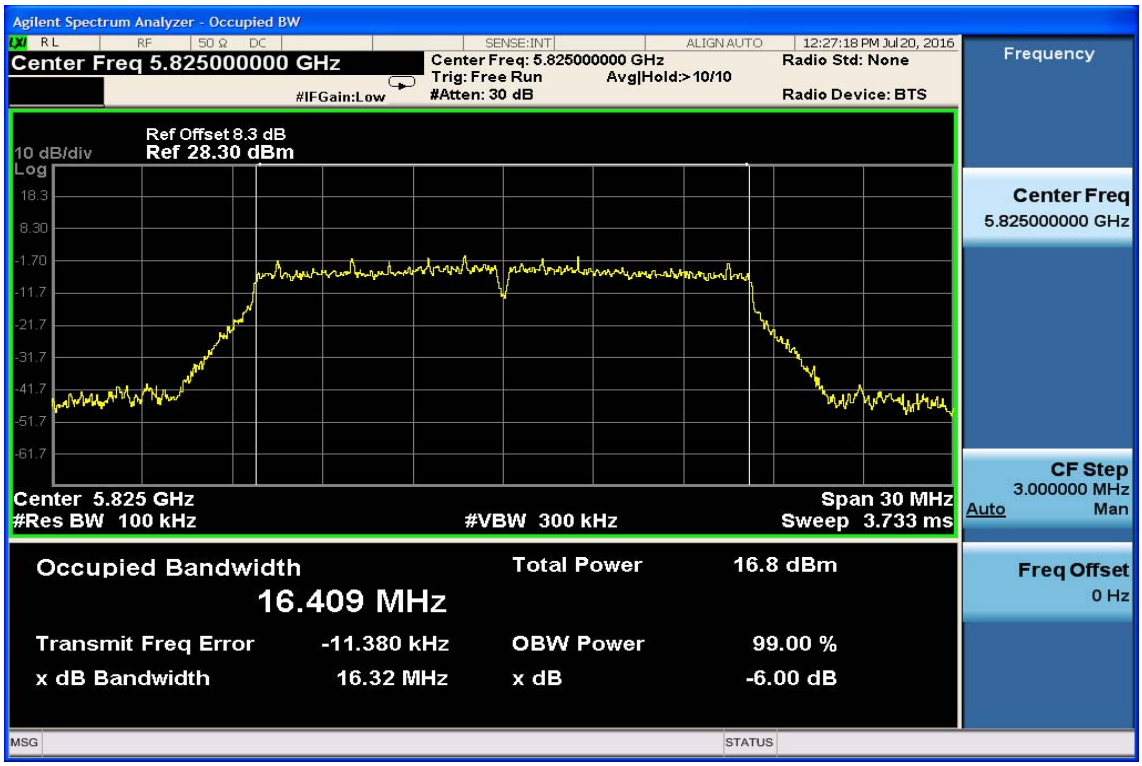
5725-5850 MHz
802.11a
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

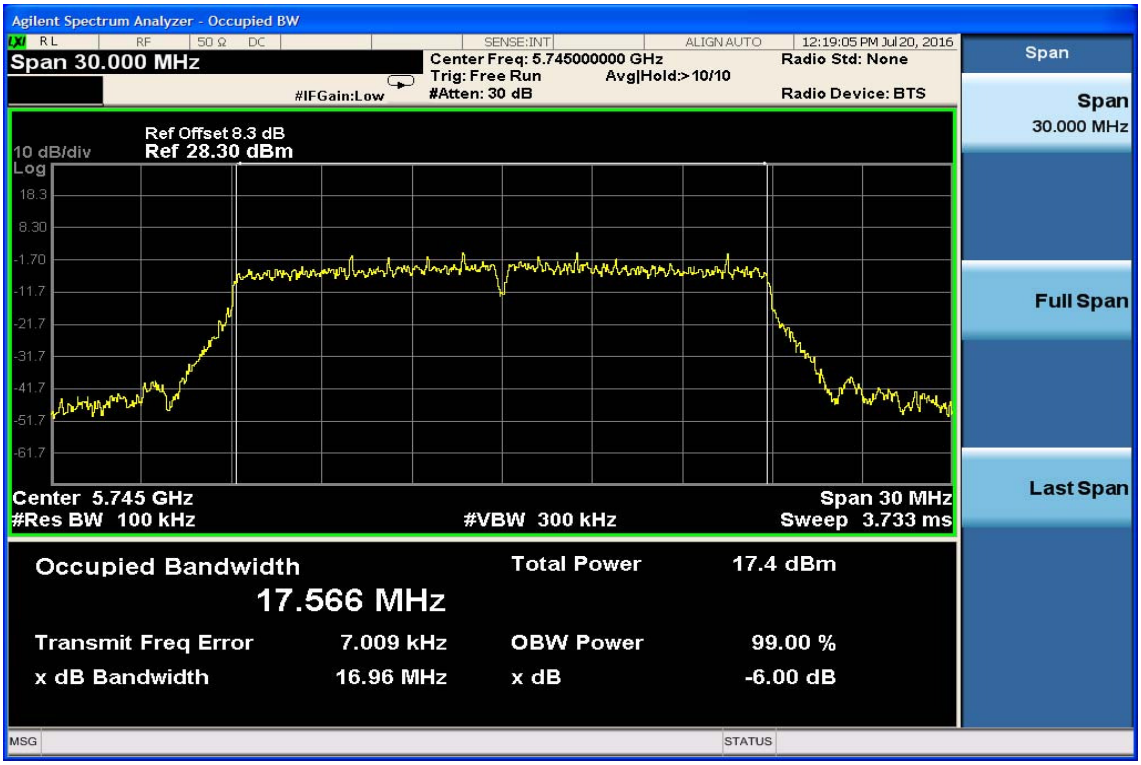


6dB Band Width Test Data CH-High

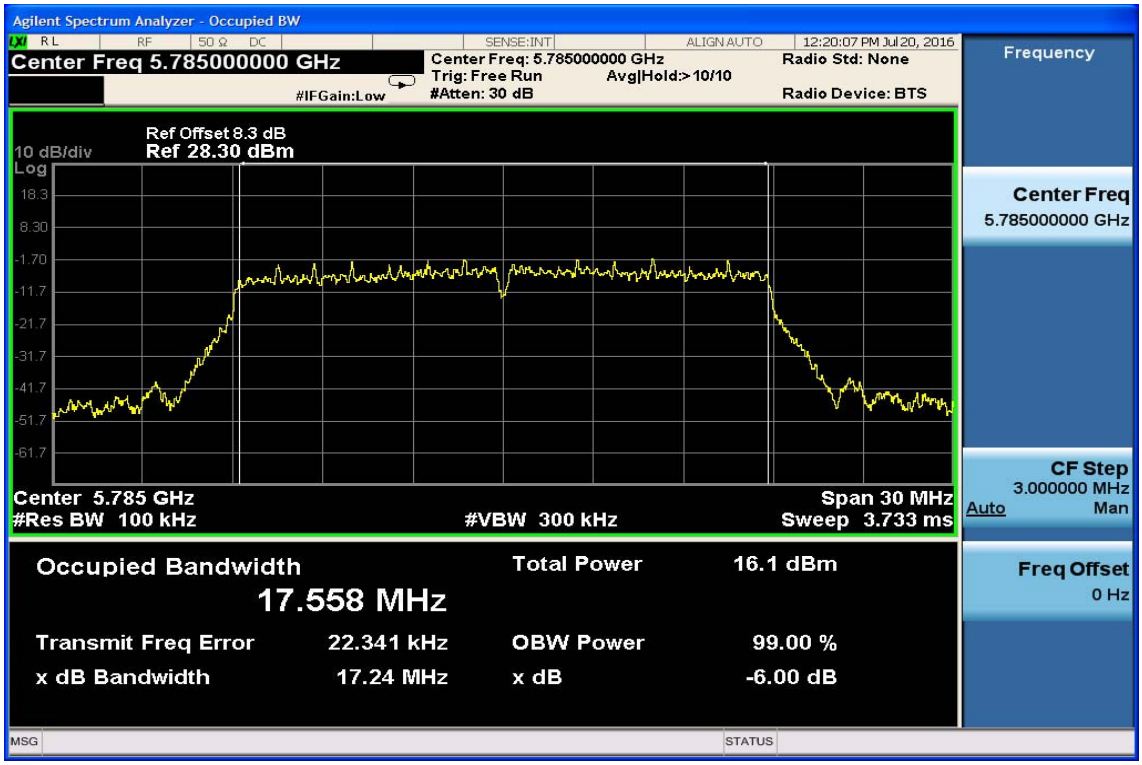


802.11n HT20

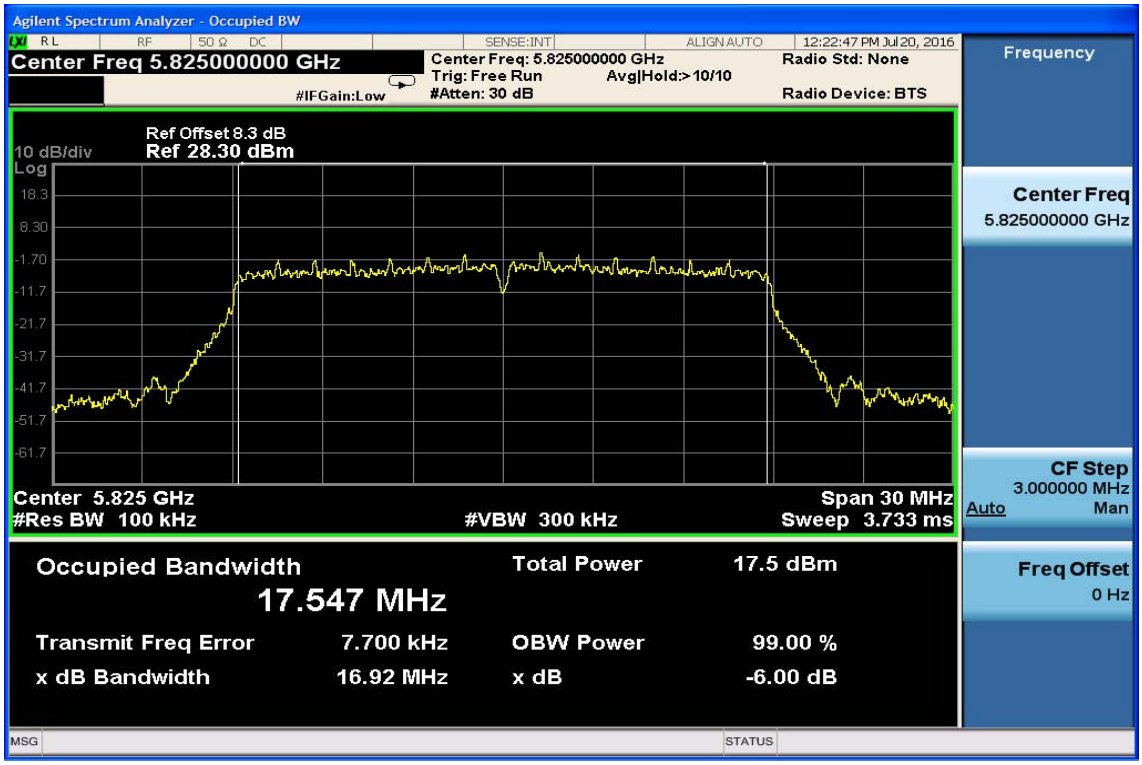
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

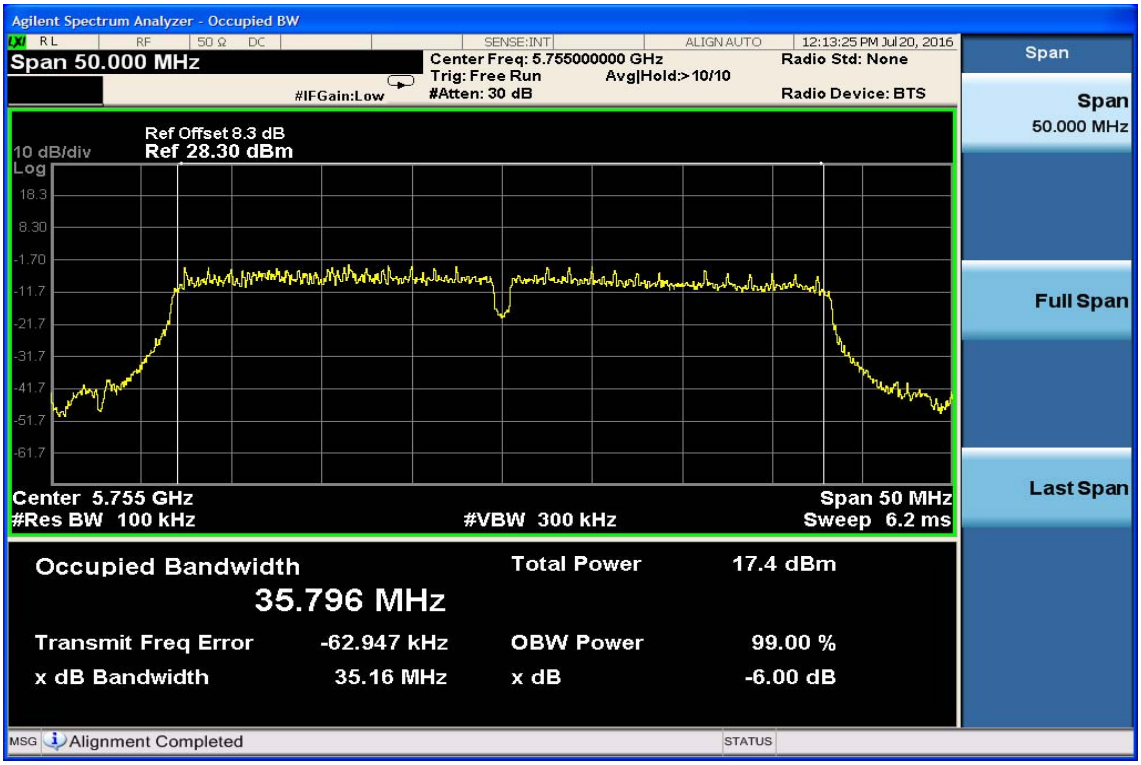


6dB Band Width Test Data CH-High

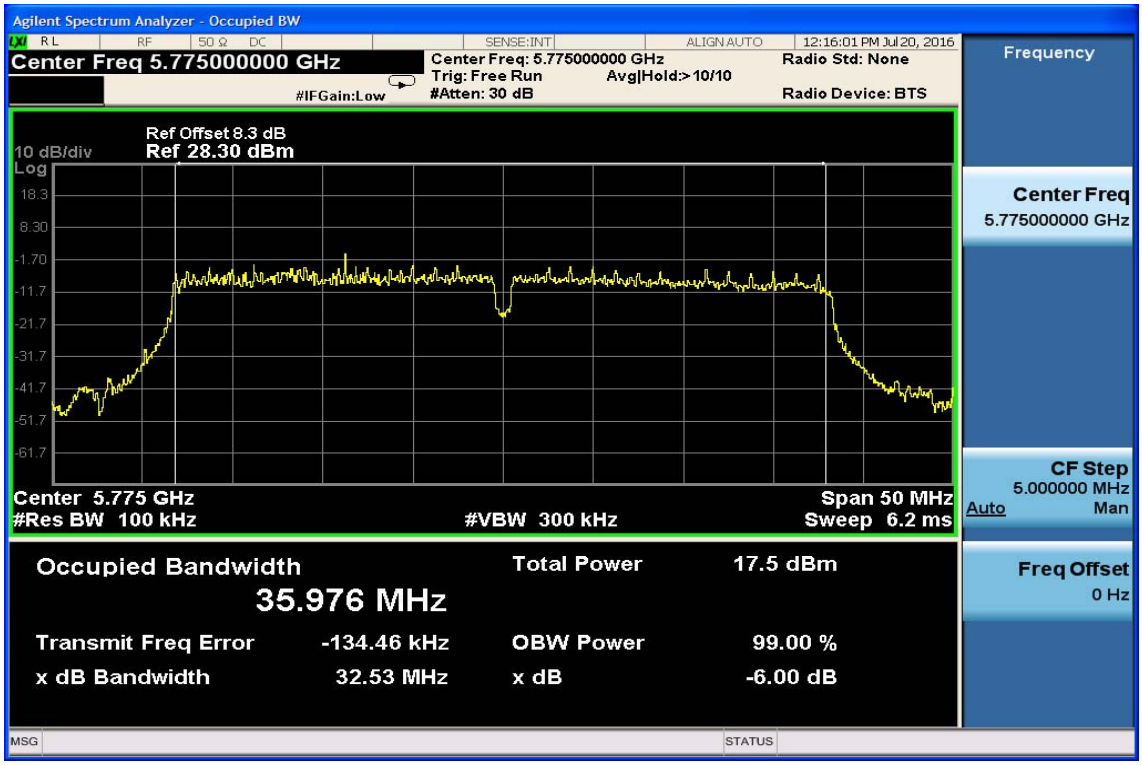


802.11n HT40

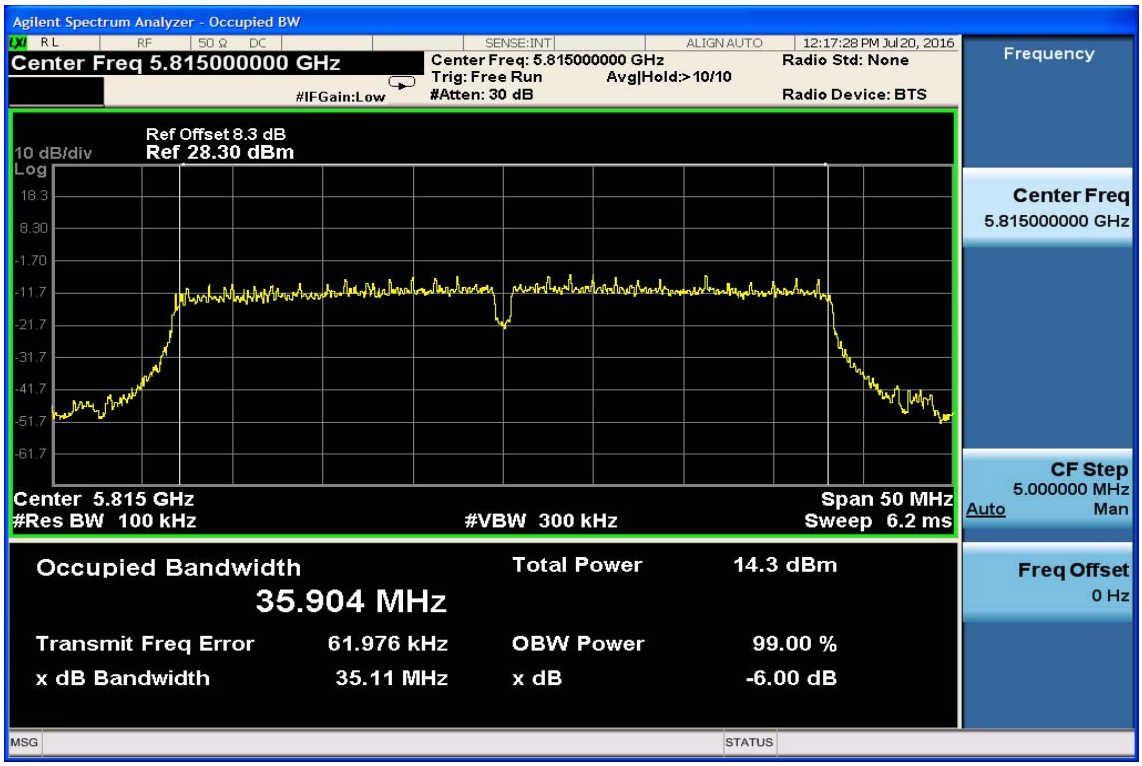
6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

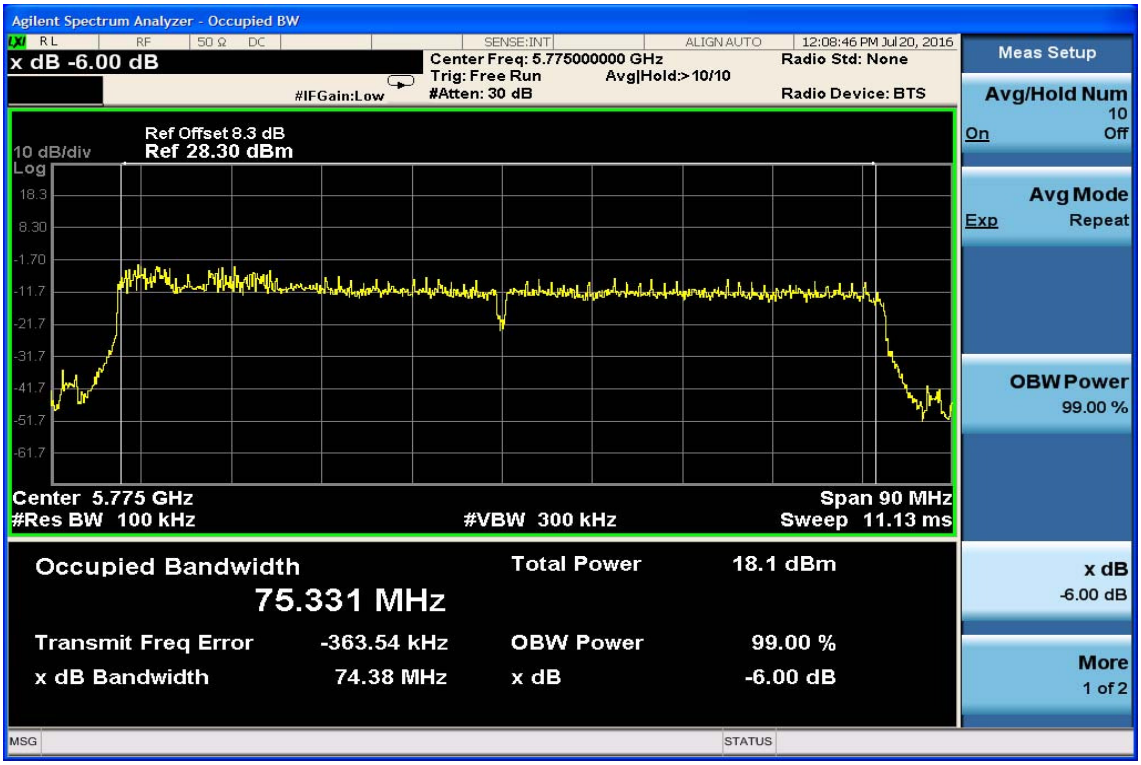


6dB Band Width Test Data CH-High



802.11AC HT80

6dB Band Width Test Data CH-Low



9. UNDESIRABLE EMISSION - RADIATED MEASUREMENT

9.1Standard Applicable

According to §15.407(b), Undesirable Emission Limits: Except as shown in Paragraph (b)(7) of this section, 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 e.i.r.p. of -27 dBm/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 e.i.r.p. of -27 dBm/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 e.i.r.p. of -27 dBm/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 -17dBm/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.

(5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

(7) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

According to RSS-247, 6.2

6.2.1 Frequency Band 5150-5250 MHz

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz.

6.2.2 Frequency Band 5250-5350 MHz

i) For devices with both operating frequencies and channel bandwidths contained within the band 5250-5350 MHz, the device shall comply with the following:

a. All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. if the equipment is intended for outdoor use; or

b. All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and any emissions within the band 5150-5250 MHz shall meet the power spectral density limits of Section 6.2.1. The device shall be labelled "for indoor use only."

ii) For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only."

(3) Additional requirements

In addition to the above requirements, devices operating in the band 5250-5350 MHz with a maximum e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below:

(i) -13 dBW/MHz for 0o≤ θ< 8o

(ii) -13 − 0.716 (θ-8) dBW/MHz for 8o ≤ θ< 40o

(iii) -35.9 − 1.22 (θ-40) dBW/MHz for 40o ≤ θ ≤45o

(iv) -42 dBW/MHz for θ> 45o

The measurement procedure defined in Annex A of this document shall be used to verify the compliance to the e.i.r.p. at different elevations.

6.2.3 Frequency Bands 5470-5600 MHz and 5650-5725 MHz

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

6.2.4 Frequency Band 5725-5850 MHz

For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz.

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

9.2 EUT Setup

1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.10: 2013
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 120Vac/60Hz power source.

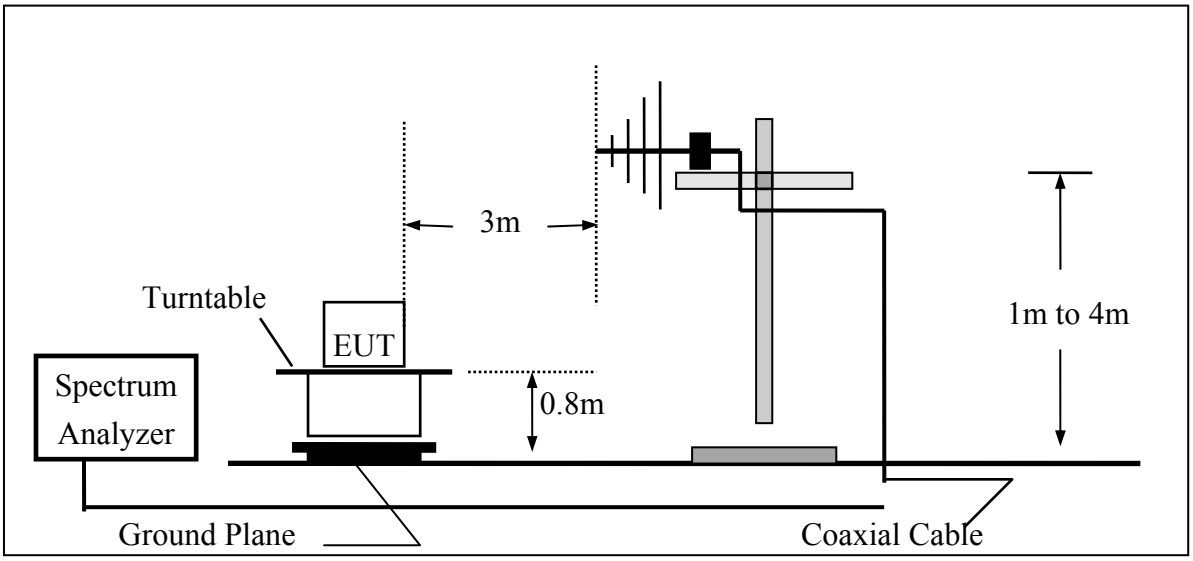
9.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

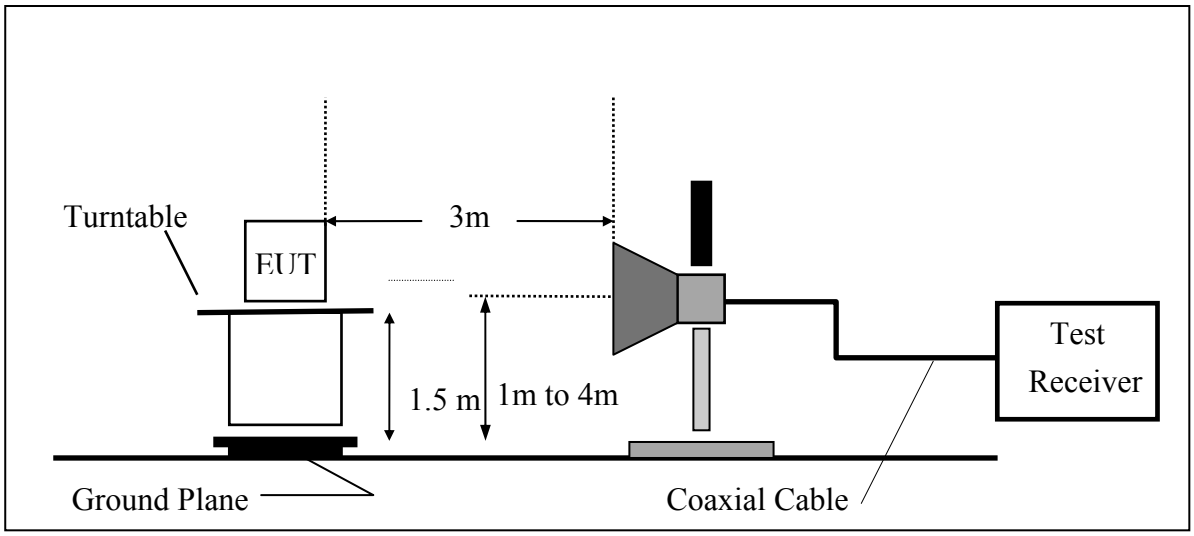
Refer to section F of KDB Document: KDB 789033 D02 General UNII Test Procedures New Rules v01r03

9.4 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



9.5 Measurement Equipment Used:

Chamber 14(966)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/29/2016	07/28/2017
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/20/2016	05/19/2017
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/22/2016	05/21/2017
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	06/17/2015	06/16/2017
Bilog Antenna30-1G	SCHWARZBECK	VULB9168	644	03/02/2016	03/01/2017
Horn antenna1-18G	ETS	3117	00066665	11/30/2015	11/29/2016
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/21/2015	01/20/2017
Horn antenna18-26G(04)	Com-power	AH-826	081001	07/24/2015	07/23/2017
Preamplifier9-1000M	HP	8447D	NA	03/11/2016	03/10/2017
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/27/2016	07/26/2017
Preamplifier1-26G	EM	EM01M26G	NA	03/10/2016	03/09/2017
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	07/23/2015	07/22/2017
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	11/25/2015	11/24/2016
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/02/2015	10/01/2016
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/03/2015	11/02/2017
2.4G Filter	Micro-Tronics	Brm50702	76	12/26/2015	12/25/2016
5G Filter	Micro-Tronics	Brm50716	005	12/26/2015	12/25/2016
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

9.6 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

9.7 Measurement Result

Refer to attach tabular data sheets.

NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz. And RBW 1MHz for frequency above 1GHz.

Radiated Spurious Emission Measurement Result (below 1GHz) (worst case)

Operation Mode	802.11n HT20 TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5170MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	48.43	40.48	-12.27	28.21	40.00	-11.79	Peak	VERTICAL
2	97.90	45.73	-17.43	28.30	43.50	-15.20	Peak	VERTICAL
3	172.59	29.51	-12.77	16.74	43.50	-26.76	Peak	VERTICAL
4	285.11	37.59	-11.35	26.24	46.00	-19.76	Peak	VERTICAL
5	600.36	32.86	-5.39	27.47	46.00	-18.53	Peak	VERTICAL
6	879.72	34.38	-0.83	33.55	46.00	-12.45	Peak	VERTICAL
1	97.90	48.61	-17.43	31.18	43.50	-12.32	Peak	HORIZONTAL
2	285.11	41.12	-11.35	29.77	46.00	-16.23	Peak	HORIZONTAL
3	431.58	25.99	-8.31	17.68	46.00	-28.32	Peak	HORIZONTAL
4	571.26	30.41	-6.04	24.37	46.00	-21.63	Peak	HORIZONTAL
5	699.30	28.31	-4.05	24.26	46.00	-21.74	Peak	HORIZONTAL
6	900.09	25.04	-0.50	24.54	46.00	-21.46	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX CH Mid	Test Date	2016/08/16
Fundamental Frequency	5200MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	51.34	40.86	-12.33	28.53	40.00	-11.47	Peak	VERTICAL
2	97.90	45.89	-17.43	28.46	43.50	-15.04	Peak	VERTICAL
3	285.11	37.43	-11.35	26.08	46.00	-19.92	Peak	VERTICAL
4	399.57	30.56	-9.03	21.53	46.00	-24.47	Peak	VERTICAL
5	600.36	33.48	-5.39	28.09	46.00	-17.91	Peak	VERTICAL
6	879.72	30.89	-0.83	30.06	46.00	-15.94	Peak	VERTICAL
1	97.90	49.09	-17.43	31.66	43.50	-11.84	Peak	HORIZONTAL
2	285.11	41.24	-11.35	29.89	46.00	-16.11	Peak	HORIZONTAL
3	571.26	28.42	-6.04	22.38	46.00	-23.62	Peak	HORIZONTAL
4	640.13	28.51	-4.92	23.59	46.00	-22.41	Peak	HORIZONTAL
5	699.30	27.83	-4.05	23.78	46.00	-22.22	Peak	HORIZONTAL
6	856.44	25.17	-1.24	23.93	46.00	-22.07	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	802.11n HT20 TX CH High	Test Date	2016/08/16
Fundamental Frequency	5240MHz	Test By	Dino
Temperature	25 ℃	Pol	Ver./Hor
Humidity	65 %		

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	48.43	40.42	-12.27	28.15	40.00	-11.85	Peak	VERTICAL
2	97.90	44.87	-17.43	27.44	43.50	-16.06	Peak	VERTICAL
3	285.11	37.18	-11.35	25.83	46.00	-20.17	Peak	VERTICAL
4	399.57	30.70	-9.03	21.67	46.00	-24.33	Peak	VERTICAL
5	600.36	33.40	-5.39	28.01	46.00	-17.99	Peak	VERTICAL
6	819.58	25.26	-1.87	23.39	46.00	-22.61	Peak	VERTICAL
1	97.90	48.20	-17.43	30.77	43.50	-12.73	Peak	HORIZONTAL
2	285.11	40.70	-11.35	29.35	46.00	-16.65	Peak	HORIZONTAL
3	416.06	25.51	-8.66	16.85	46.00	-29.15	Peak	HORIZONTAL
4	569.32	28.64	-6.09	22.55	46.00	-23.45	Peak	HORIZONTAL
5	699.30	27.27	-4.05	23.22	46.00	-22.78	Peak	HORIZONTAL
6	870.99	24.19	-0.99	23.20	46.00	-22.80	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.

2 Measuring frequencies from the lowest internal frequency to the 1GHz.

3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP

4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11n HT20 TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5170MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	55.98	-12.22	43.76	74.00	-30.24	Peak	VERTICAL
2	7027.00	41.91	3.69	45.60	74.00	-28.40	Peak	VERTICAL
3	10360.00	36.08	7.59	43.67	74.00	-30.33	Peak	VERTICAL
4	14320.00	37.27	12.53	49.80	74.00	-24.20	Peak	VERTICAL
1	3002.00	51.71	-9.25	42.46	74.00	-31.54	Peak	HORIZONTAL
2	7041.00	43.26	3.70	46.96	74.00	-27.04	Peak	HORIZONTAL
3	10360.00	36.98	7.59	44.57	74.00	-29.43	Peak	HORIZONTAL
4	14320.00	37.39	12.53	49.92	74.00	-24.08	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11n HT20 TX CH Mid	Test Date	2016/08/16
Fundamental Frequency	5200MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	58.12	-12.22	45.90	74.00	-28.10	Peak	VERTICAL
2	7027.00	43.24	3.69	46.93	74.00	-27.07	Peak	VERTICAL
3	10440.00	36.71	7.74	44.45	74.00	-29.55	Peak	VERTICAL
4	14256.00	36.96	12.49	49.45	74.00	-24.55	Peak	VERTICAL
1	1994.00	56.30	-12.22	44.08	74.00	-29.92	Peak	HORIZONTAL
2	7041.00	41.95	3.70	45.65	74.00	-28.35	Peak	HORIZONTAL
3	10440.00	36.55	7.74	44.29	74.00	-29.71	Peak	HORIZONTAL
4	14208.00	37.19	12.47	49.66	74.00	-24.34	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

Operation Mode	802.11n HT20 TX CH High	Test Date	2016/08/16
Fundamental Frequency	5240MHz	Test By	Dino
Temperature	25 ℃	Humidity	60 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1994.00	59.85	-12.22	47.63	74.00	-26.37	Peak	VERTICAL
2	7069.00	41.87	3.76	45.63	74.00	-28.37	Peak	VERTICAL
3	10480.00	36.49	7.80	44.29	74.00	-29.71	Peak	VERTICAL
4	14816.00	39.34	11.36	50.70	74.00	-23.30	Peak	VERTICAL
1	3002.00	51.69	-9.25	42.44	74.00	-31.56	Peak	HORIZONTAL
2	7020.00	41.56	3.66	45.22	74.00	-28.78	Peak	HORIZONTAL
3	10480.00	36.26	7.80	44.06	74.00	-29.94	Peak	HORIZONTAL
4	14304.00	37.66	12.52	50.18	74.00	-23.82	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test

5150MHz – 5250MHz

Radiated Emission: 802.11a mode

Operation Mode	TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5170 MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5150.00	41.79	-2.50	39.29	54.00	-14.71	Average	VERTICAL
2	5150.00	68.67	-2.50	66.17	74.00	-7.83	Peak	VERTICAL
1	5150.00	54.47	-2.50	51.97	74.00	-22.03	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2016/08/16
Fundamental Frequency	5240MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5350.00	50.31	-2.05	48.26	74.00	-25.74	Peak	VERTICAL
1	5350.00	50.55	-2.05	48.50	74.00	-25.50	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Emission: 802.11n HT20 mode, Combine

Operation Mode	TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5170 MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5150.00	39.74	-2.50	37.24	54.00	-16.76	Average	VERTICAL
2	5150.00	58.87	-2.50	56.37	74.00	-17.63	Peak	VERTICAL
1	5150.00	52.81	-2.50	50.31	74.00	-23.69	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2016/08/16
Fundamental Frequency	5240MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5350.00	49.88	-2.05	47.83	74.00	-26.17	Peak	VERTICAL
1	5350.00	50.46	-2.05	48.41	74.00	-25.59	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Emission: 802.11n HT40 mode, Combine

Operation Mode	TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5190 MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5150.00	50.47	-2.50	47.97	54.00	-6.03	Average	VERTICAL
2	5150.00	65.07	-2.50	62.57	74.00	-11.43	Peak	VERTICAL
1	5150.00	53.10	-2.50	50.60	74.00	-23.40	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2016/08/16
Fundamental Frequency	5230MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5350.00	51.42	-2.05	49.37	74.00	-24.63	Peak	VERTICAL
1	5350.00	50.55	-2.05	48.50	74.00	-25.50	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Emission: 802.11AC HT80 mode, Combine

Operation Mode	TX CH Low	Test Date	2016/08/16
Fundamental Frequency	5210 MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5150.00	49.04	-2.50	46.54	54.00	-7.46	Average	VERTICAL
2	5150.00	67.58	-2.50	65.08	74.00	-8.92	Peak	VERTICAL
1	5150.00	54.28	-2.50	51.78	74.00	-22.22	Peak	HORIZONTAL

Operation Mode	TX CH High	Test Date	2016/08/16
Fundamental Frequency	5210MHz	Test By	Dino
Temperature	25 ℃	Humidity	65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	5350.09	49.78	-2.05	47.73	74.00	-26.27	Peak	VERTICAL
1	5350.00	49.32	-2.05	47.27	74.00	-26.73	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

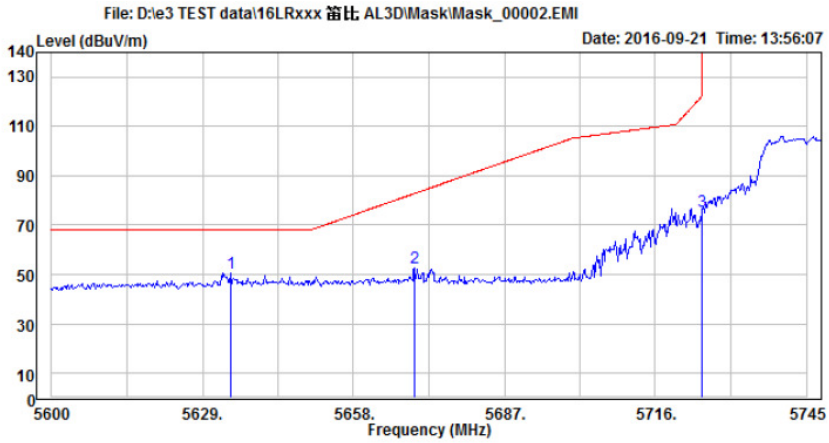
4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test - Radiated

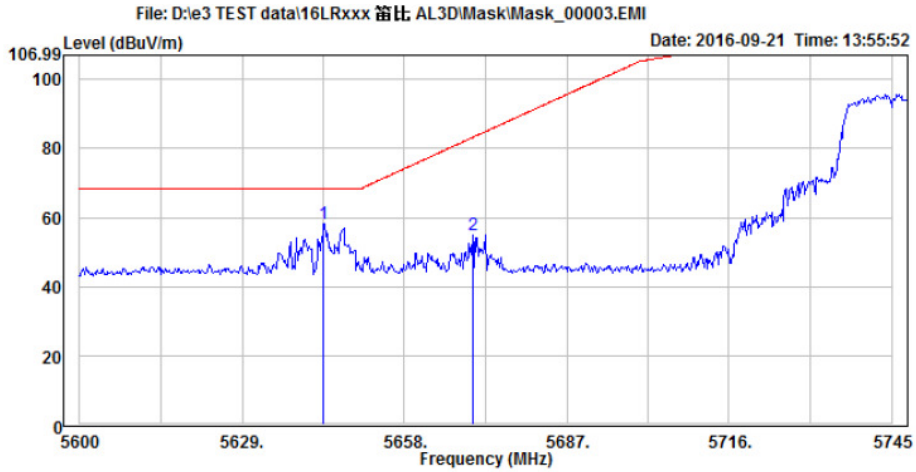
5725MHz – 5850MHz

Radiated Emission: 802.11a mode



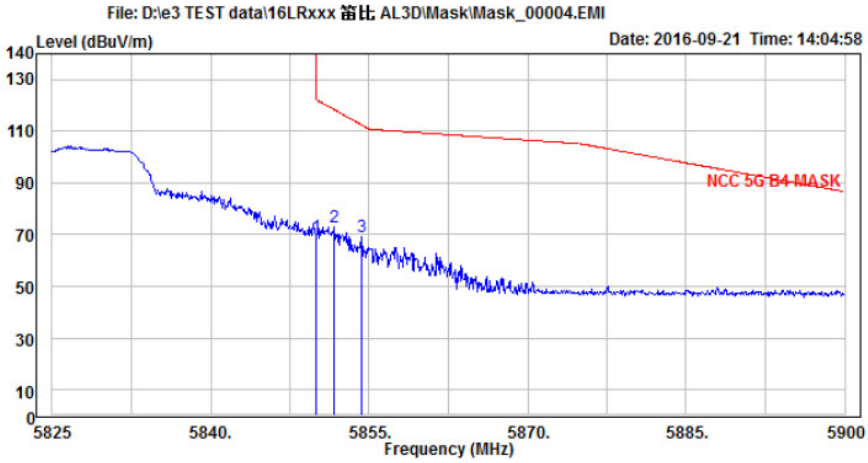

```
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
         : RBW:1000kHz VBW:1000kHz SWT:Auto DET:Positive
EUT      : AL3D
Mode     : B4 802.11a Mask Low Ch
Note     :
```

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5634.400	47.95	2.61	50.56	68.20	-17.64	Vertical
2		5669.800	49.97	2.71	52.68	82.89	-30.21	Vertical
3		5725.000	72.97	2.85	75.82	122.20	-46.38	Vertical



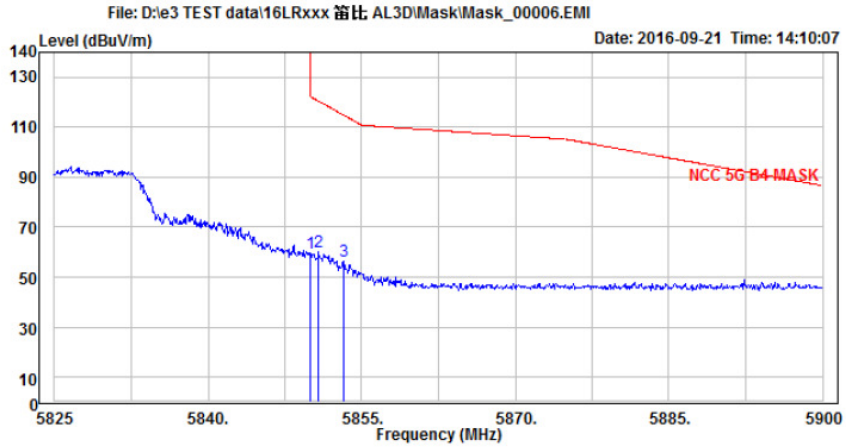

```
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
         : RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT      : AL3D
Mode     : B4 802.11a Mask Low Ch
Note     :
```

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5643.600	55.38	2.64	58.02	68.20	-10.18	Horizontal
2		5670.200	52.07	2.71	54.78	83.19	-28.41	Horizontal



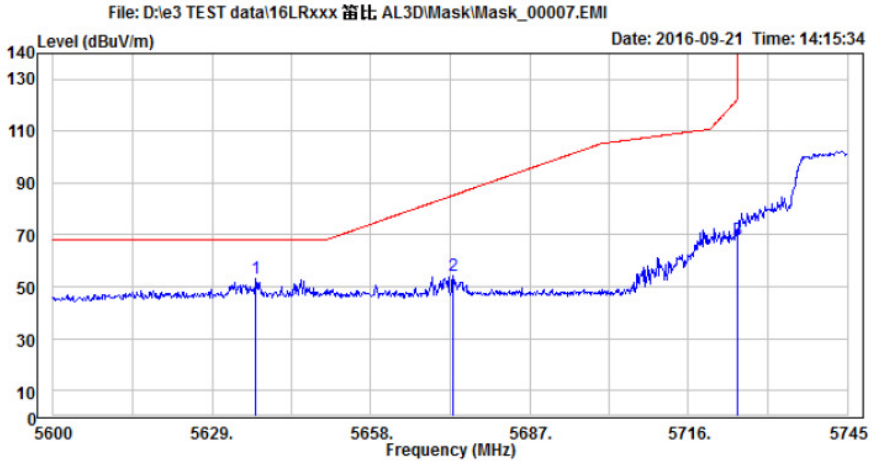
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11a Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	65.81	3.18	68.99	122.20	-53.21	Vertical
2	5851.700	69.87	3.18	73.05	118.32	-45.27	Vertical
3 PP	5854.250	66.08	3.19	69.27	112.51	-43.24	Vertical



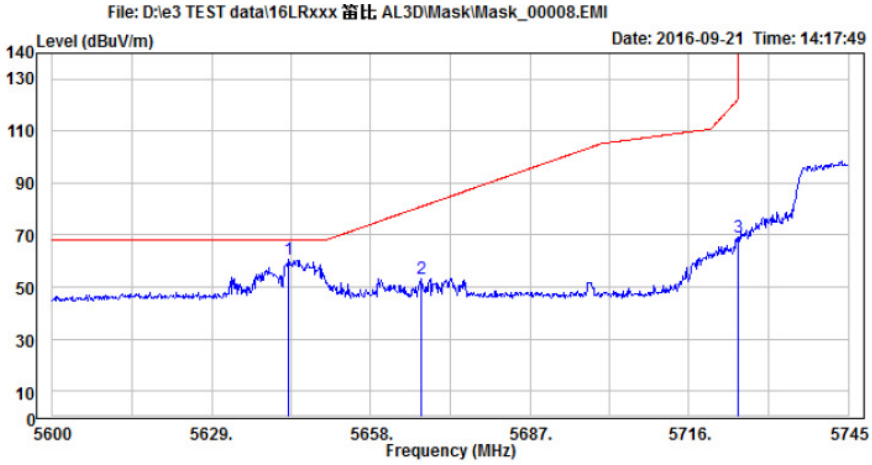
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11a Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	56.32	3.18	59.50	122.20	-62.70	Horizontal
2	5850.800	57.23	3.18	60.41	120.38	-59.97	Horizontal
3 PP	5853.200	53.43	3.19	56.62	114.90	-58.28	Horizontal



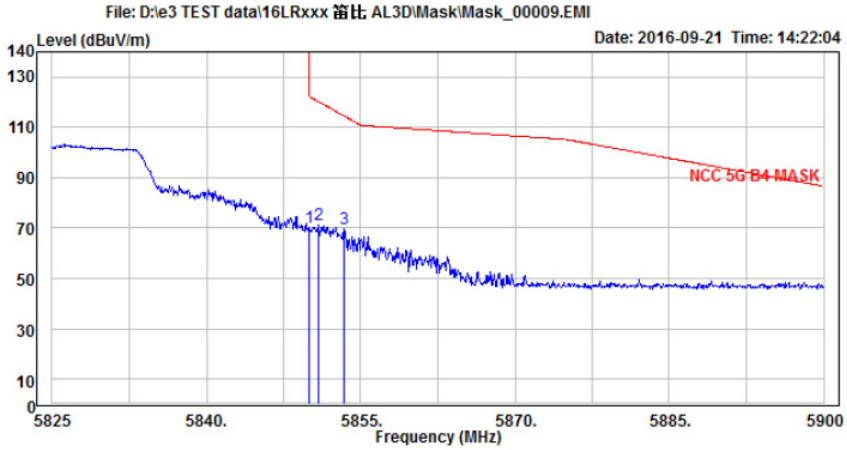
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT20 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5636.975	50.80	2.61	53.41	68.20	-14.79	Vertical
2		5673.080	51.50	2.72	54.22	85.32	-31.10	Vertical
3		5725.000	65.26	2.85	68.11	122.20	-54.09	Vertical



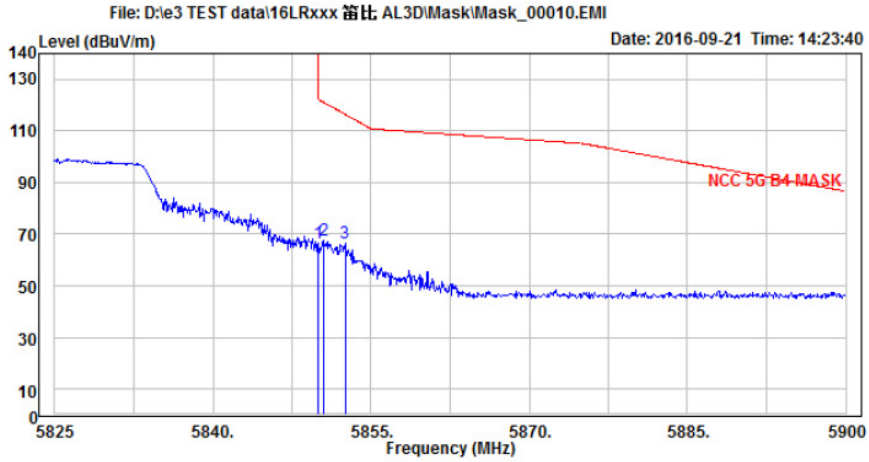
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT20 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5642.920	58.20	2.64	60.84	68.20	-7.36	Horizontal
2		5667.280	50.79	2.69	53.48	81.02	-27.54	Horizontal
3		5725.000	66.56	2.85	69.41	122.20	-52.79	Horizontal



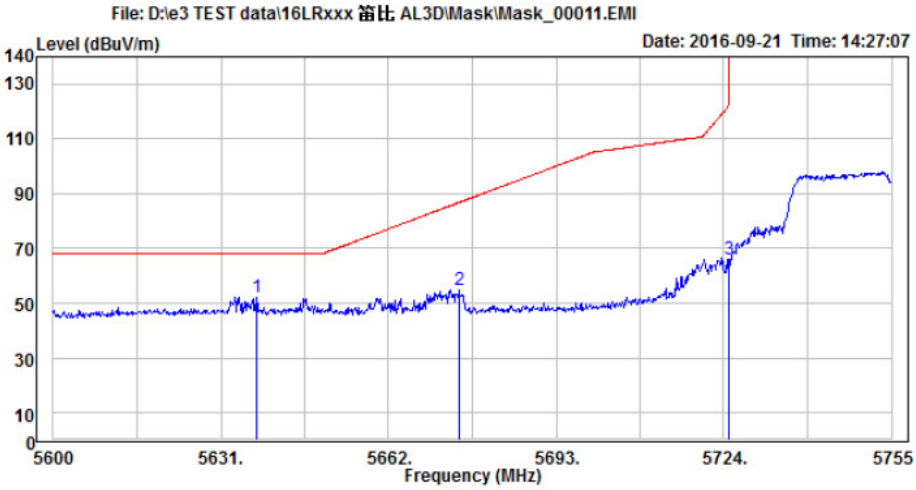
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT20 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	67.00	3.18	70.18	122.20	-52.02	Vertical
2	5850.950	68.07	3.18	71.25	120.03	-48.78	Vertical
3 PP	5853.350	66.48	3.19	69.67	114.56	-44.89	Vertical



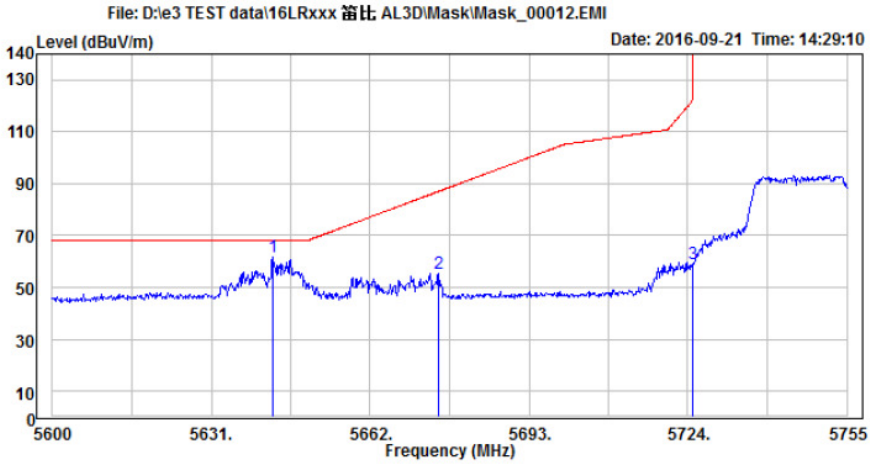
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT20 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5849.975	63.58	3.18	66.76	150.00	-83.24	Horizontal
2	5850.500	64.23	3.18	67.41	121.06	-53.65	Horizontal
3 PP	5852.525	63.16	3.19	66.35	116.44	-50.09	Horizontal



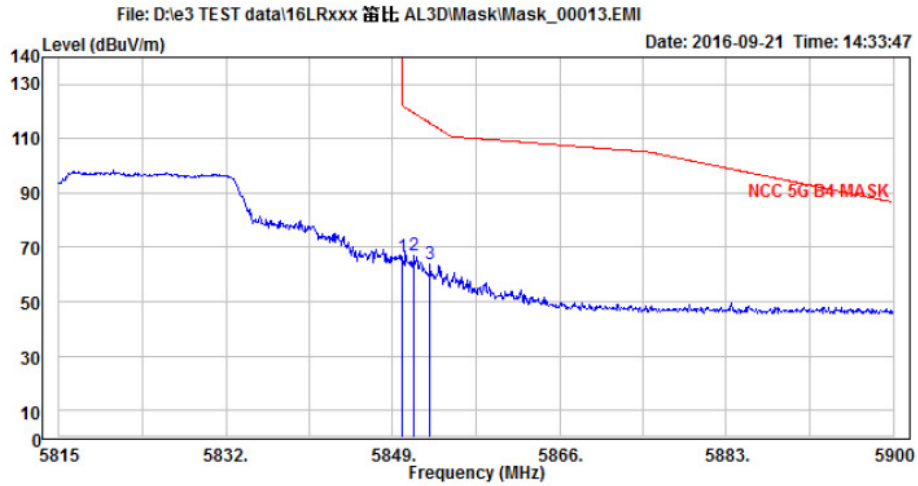
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT40 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5637.665	49.61	2.63	52.24	68.20	-15.96	Vertical
2		5675.020	52.32	2.72	55.04	86.76	-31.72	Vertical
3		5725.000	63.05	2.85	65.90	122.20	-56.30	Vertical



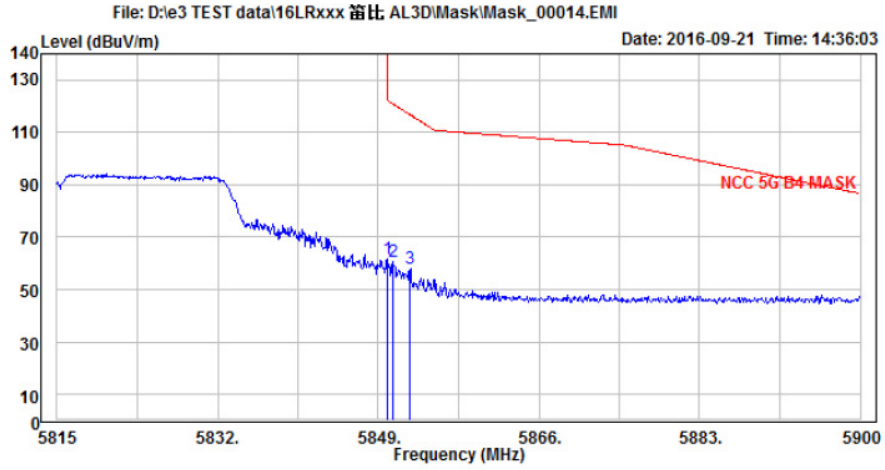
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT40 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5643.090	59.26	2.64	61.90	68.20	-6.30	Horizontal
2		5675.330	52.89	2.72	55.61	86.99	-31.38	Horizontal
3		5725.000	56.31	2.85	59.16	122.20	-63.04	Horizontal



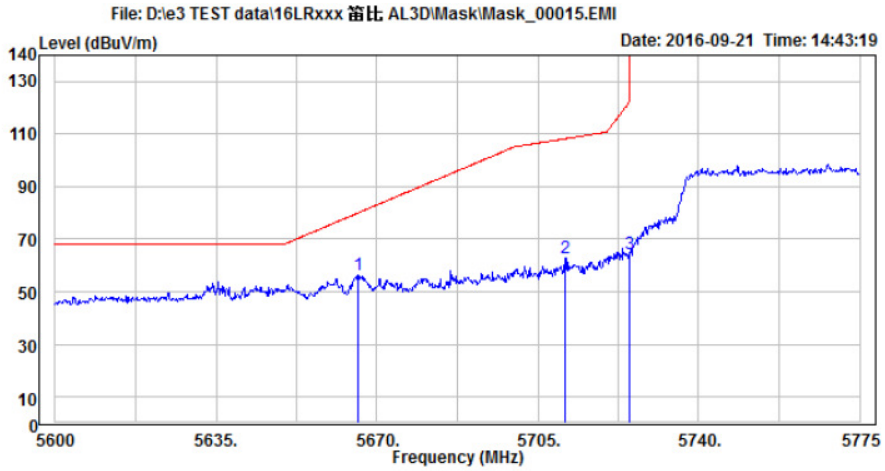
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT40 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	63.26	3.18	66.44	122.20	-55.76	Vertical
2	5851.210	63.90	3.18	67.08	119.44	-52.36	Vertical
3 PP	5852.825	60.59	3.19	63.78	115.76	-51.98	Vertical



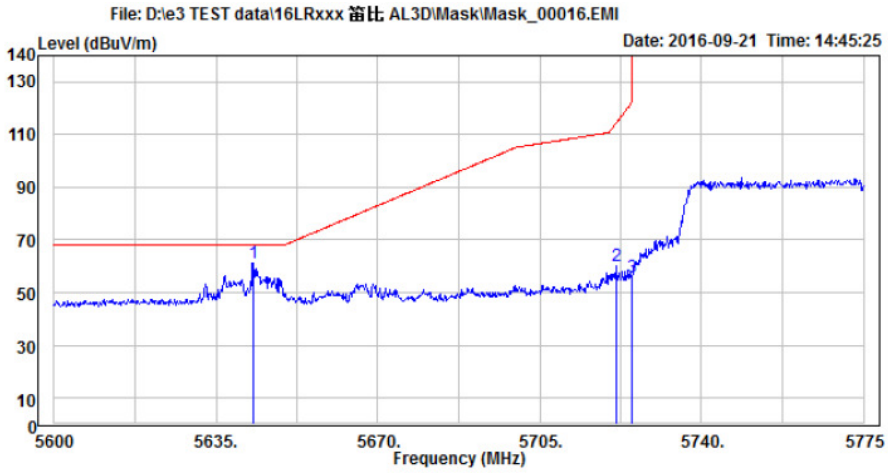
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11HT40 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.020	58.44	3.18	61.62	122.15	-60.53	Horizontal
2	5850.530	57.57	3.18	60.75	120.99	-60.24	Horizontal
3 PP	5852.400	54.81	3.18	57.99	116.73	-58.74	Horizontal



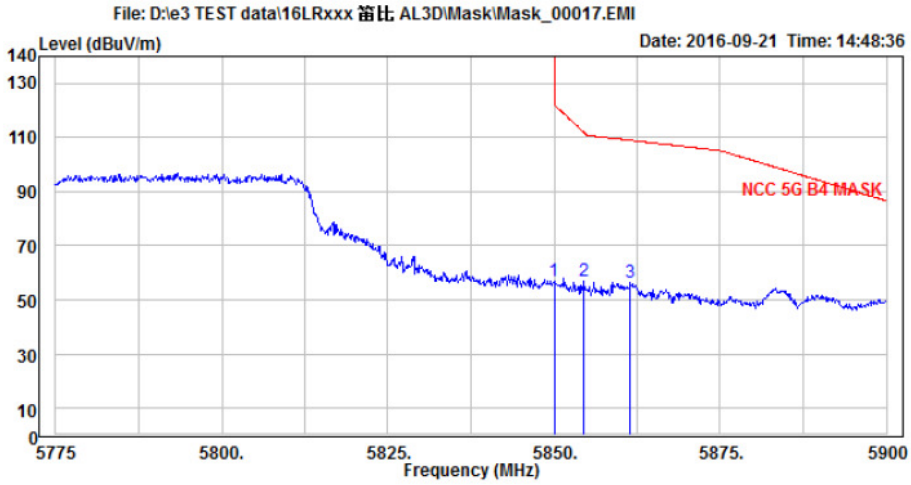
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11AC80 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5665.800	53.75	2.69	56.44	79.93	-23.49	Vertical
2		5710.950	60.16	2.81	62.97	108.27	-45.30	Vertical
3		5725.000	61.80	2.85	64.65	122.20	-57.55	Vertical



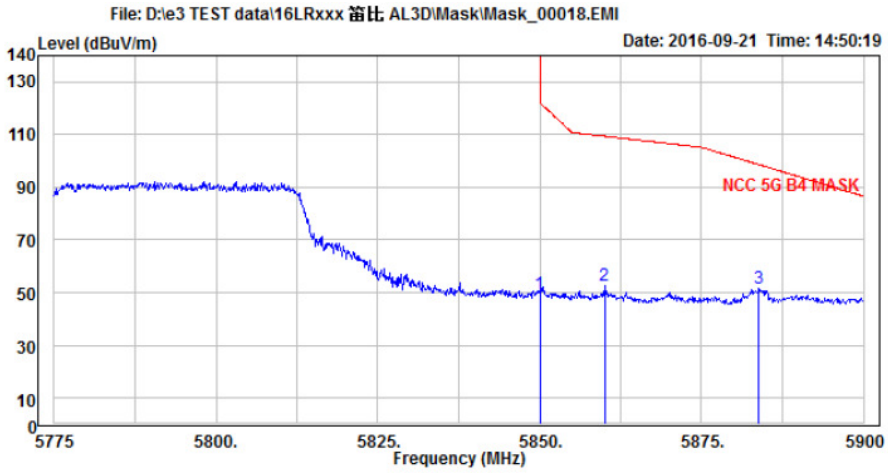
Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11AC80 Mask Low Ch
Note :

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	PP	5643.050	58.67	2.64	61.31	68.20	-6.89	Horizontal
2		5721.450	57.20	2.84	60.04	114.11	-54.07	Horizontal
3		5725.000	53.27	2.85	56.12	122.20	-66.08	Horizontal



Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 V 1-18G Vertical
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11AC80 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	53.54	3.18	56.72	122.20	-65.48	Vertical
2	5854.500	53.91	3.19	57.10	111.94	-54.84	Vertical
3 PP	5861.500	53.03	3.20	56.23	108.98	-52.75	Vertical



Condition: NCC 5G B4 MASK 3m 1166 EMAH10180 H 1-18G Horizontal
: RBW:1050kHz VBW:1000kHz SWT:0.001sec DET:Positive
EUT : AL3D
Mode : B4 802.11AC80 Mask High Ch
Note :

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	5850.000	46.45	3.18	49.63	122.20	-72.57	Horizontal
2	5860.000	49.37	3.20	52.57	109.40	-56.83	Horizontal
3 PP	5883.875	48.25	3.27	51.52	98.61	-47.09	Horizontal

10. TRANSMISSION IN THE ABSENCE OF DATA

10.1 Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

According to RSS-247, 6.4(2)

The device shall automatically discontinue transmission in cases of absence of information to transmit, or operational failure. A description on how this is done shall accompany the application for equipment certification. Note that this is not intended to prohibit transmission of control or signalling information or the use of repetitive codes where required by the technology.

10.2 Result:

No non-compliance noted:

Refer to the theory of operation.

11. FREQUENCY STABILITY

11.1 Standard Applicable

According to §15.407 (g) 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.

According to A9.5

(5) The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.

11.2 Result

Test frequency : 5180 MHz

Temperature test				
Power Supply	Environment	Frequency	Delta (MHz)	frequency drift (PPM)
Vdc	Temperature (℃)	(MHz)		
12	-20	5180.014000	0.014000	2.70
	-10	5180.048000	0.048000	9.27
	0	5180.052000	0.052000	10.04
	10	5180.063000	0.063000	12.16
	20	5180.039000	0.039000	7.53
	30	5180.029000	0.029000	5.60
	40	5180.083000	0.083000	16.02
	50	5180.037000	0.037000	7.14

Voltage test				
Power Supply	Environment	Frequency	Delta (KHz)	frequency drift (PPM)
Vdc	Temperature (℃)	(MHz)		
12	20	5180.039000	0.03900	7.53
13.2	20	5180.083000	0.08300	16.02
10.8	20	5180.073000	0.07300	14.09

12. ANTENNA REQUIREMENT

12.1 Standard Applicable

According to §15.203, Antenna requirement.

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 Sections 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 Section 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.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-247 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-247 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5745-5850 MHz Bands) or RSS-247 Annex 9 (Local Area Network Devices), the total antenna gain shall be ad
ded to the measured RF output power before using the specified power limits. For devices subject to RSS-247 Annex 8 or Annex 9, the antenna gain shall not be added.

12.2 Antenna Connected Construction

The directional gins of antenna used for transmitting is below table, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

Antenna Designation:

	Manufacturer	AD NO.：	Type	Gain (2.4GHz)	Gain (5GHz)
Ant 1	Brito Technology	WLA-EM-1607-0051-B	PIFA Ant	3.12dBi	6.14dBi
Ant 2	Brito Technology	WLA-EM-1607-0050-B	PIFA Ant	1.94dBi	2.62dBi

According to KDB662911 D01 SM-MIMO signals could be considered uncorrelated for purposes of directional gain computation.

Directional gain = G_{ANT}