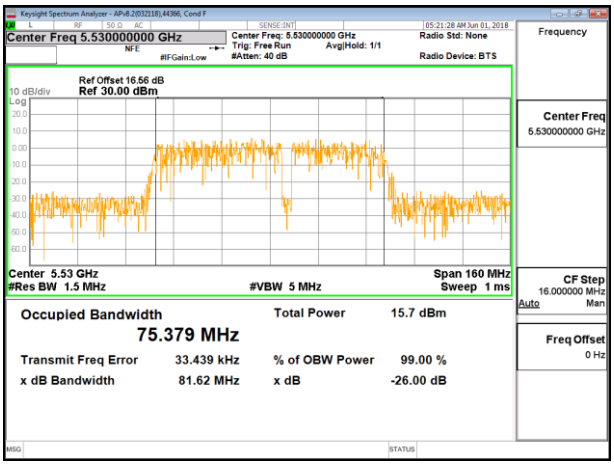
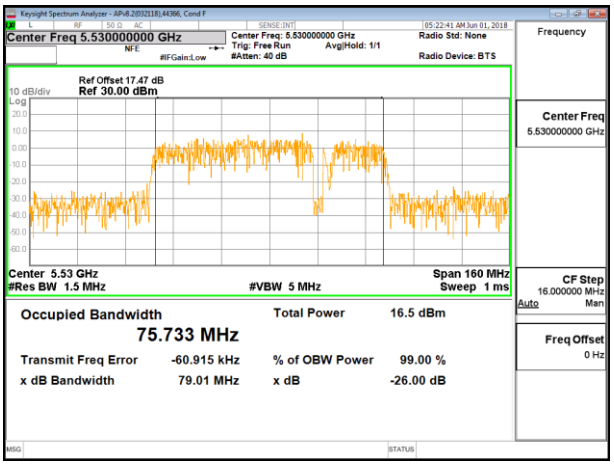
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Ant 4 (MHz)	99% Bandwidth Ant 5 (MHz)
Low	5530	75.379	75.733
High	5610	75.584	75.477
138	5690	75.848	75.657

LOW CHANNEL

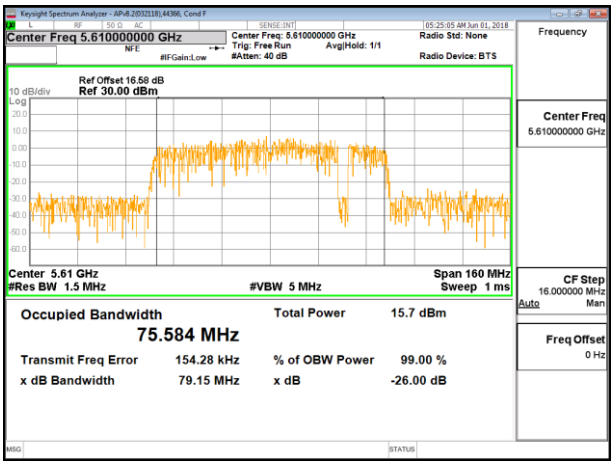


LOW CHANNEL ANTENNA 4

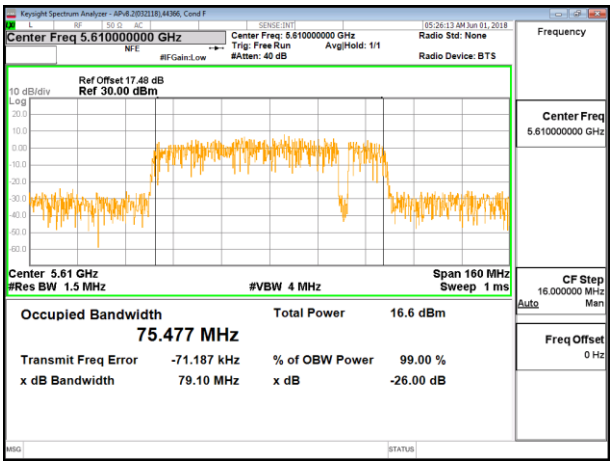


LOW CHANNEL ANTENNA 5

HIGH CHANNEL

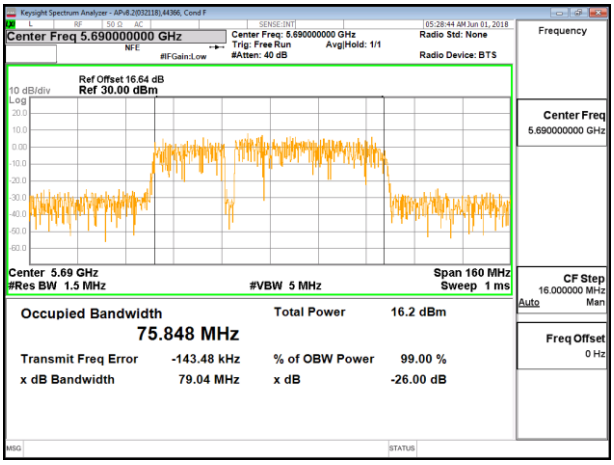


HIGH CHANNEL ANTENNA 4

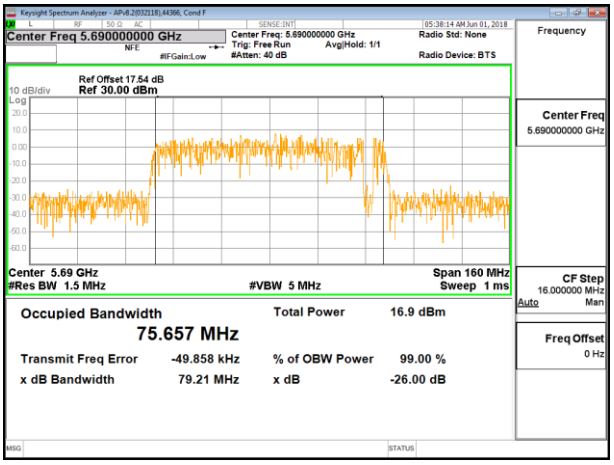


HIGH CHANNEL ANTENNA 5

CHANNEL 138



CHANNEL 138 ANTENNA 4

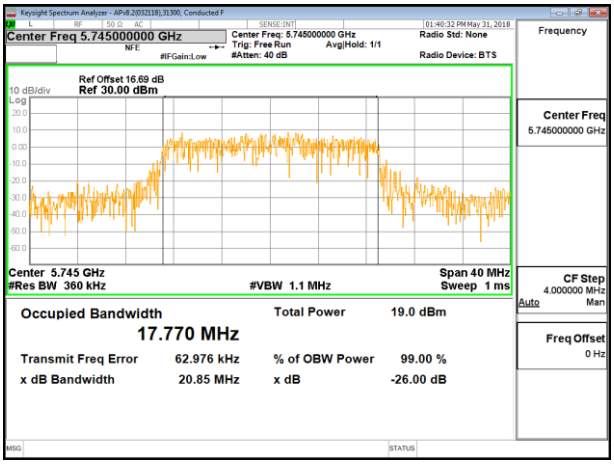


CHANNEL 138 ANTENNA 5

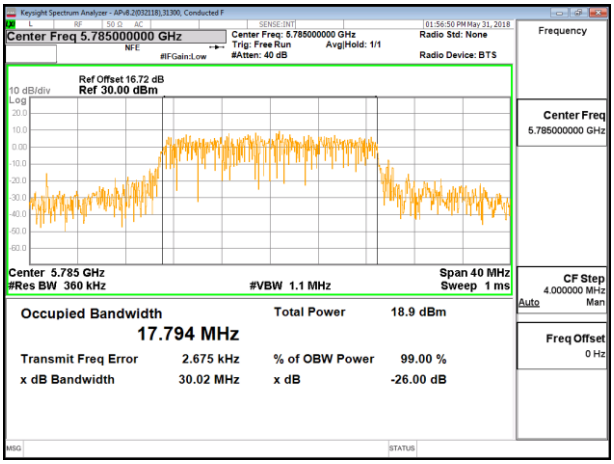
8.3.10. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

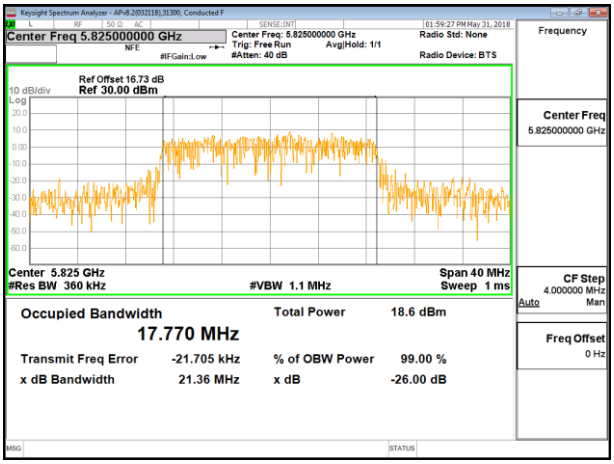
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.770
Mid	5785	17.794
High	5825	17.770



LOW CHANNEL



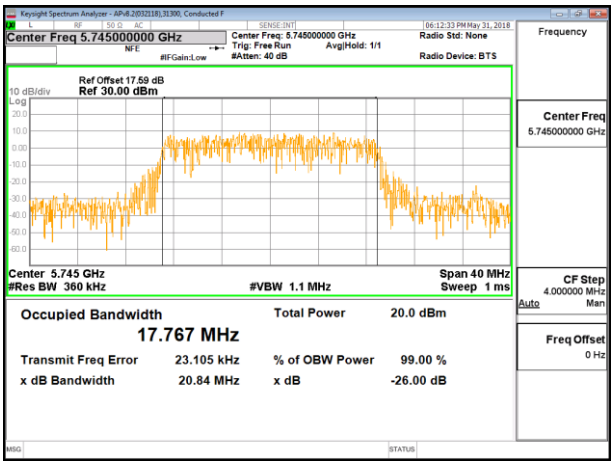
MID CHANNEL



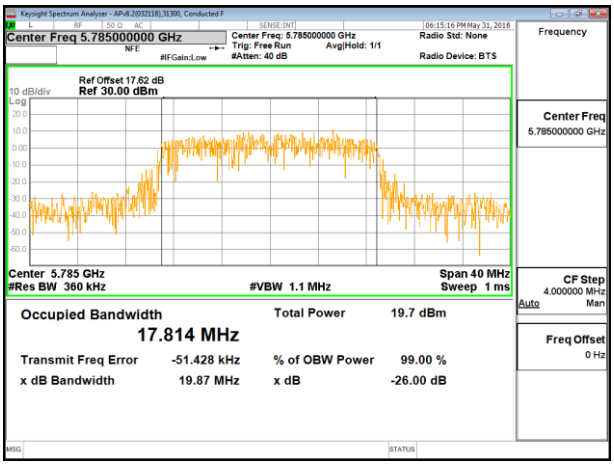
HIGH CHANNEL

1TX ANTENNA 5

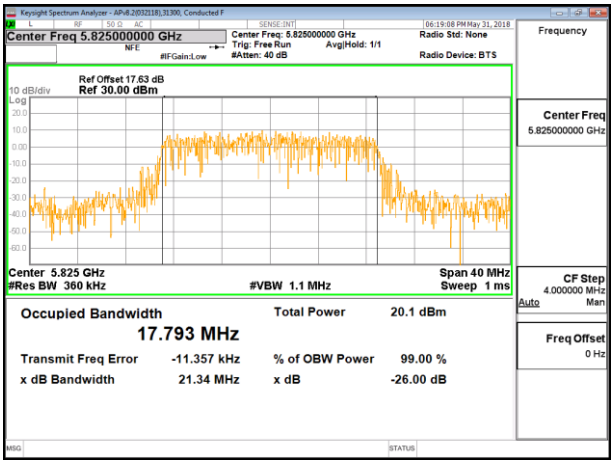
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.767
Mid	5785	17.814
High	5825	17.793



LOW CHANNEL



MID CHANNEL

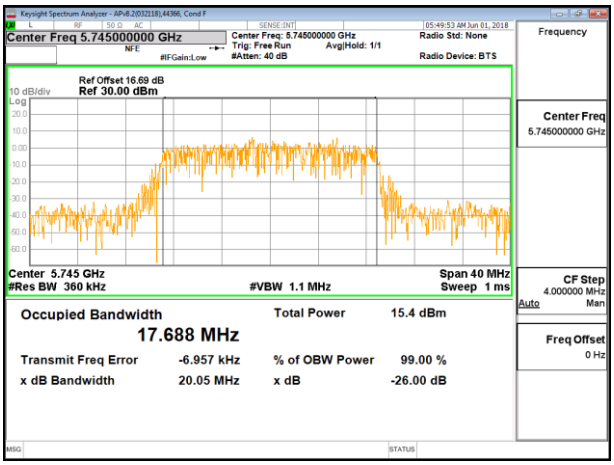


HIGH CHANNEL

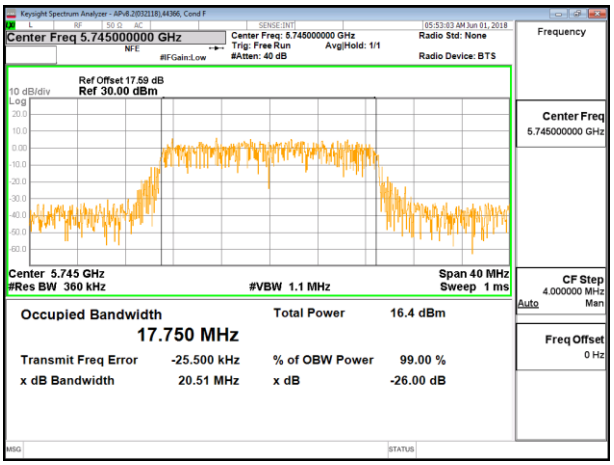
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Ant 4 (MHz)	99% Bandwidth Ant 5 (MHz)
Low	5745	17.688	17.750
Mid	5785	17.741	17.805
High	5825	17.749	17.857

LOW CHANNEL

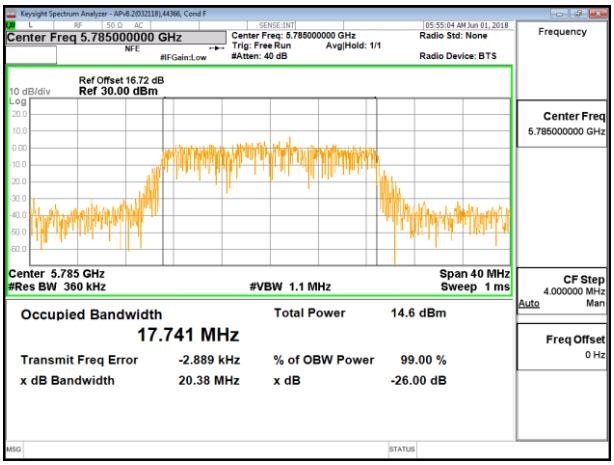


LOW CHANNEL ANTENNA 4

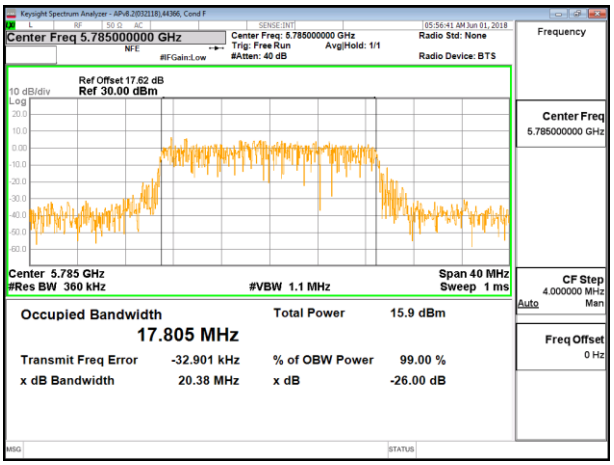


LOW CHANNEL ANTENNA 5

MID CHANNEL

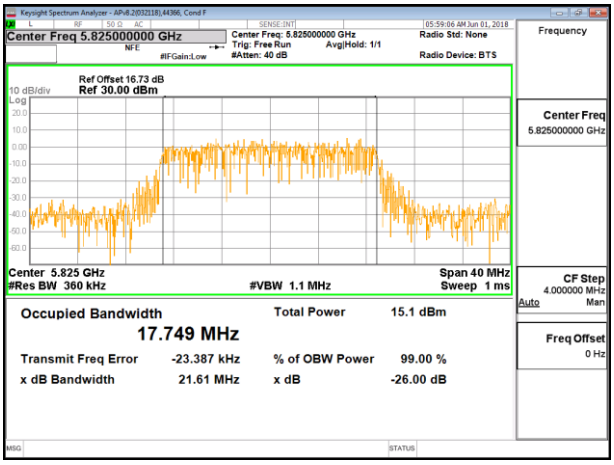


MID CHANNEL ANTENNA 4

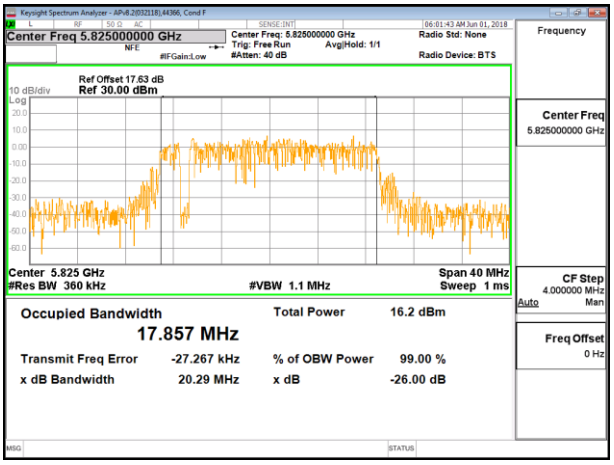


MID CHANNEL ANTENNA 5

HIGH CHANNEL



HIGH CHANNEL ANTENNA 4

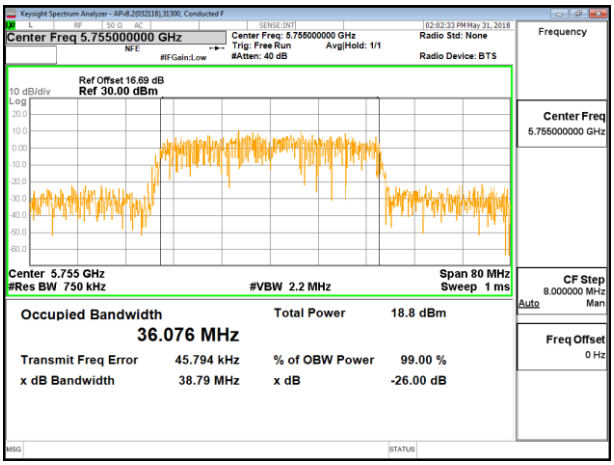


HIGH CHANNEL ANTENNA 5

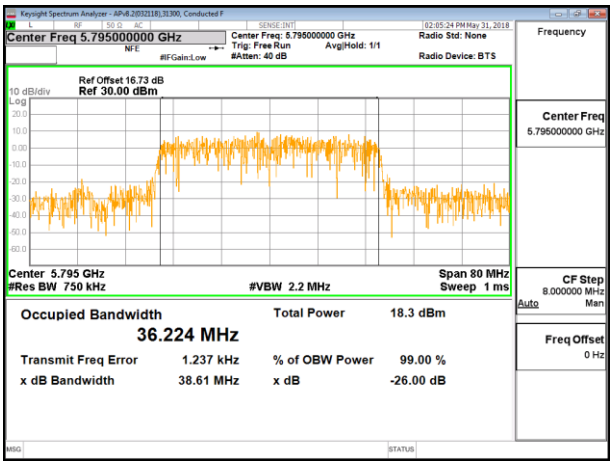
8.3.11. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.076
High	5795	36.224



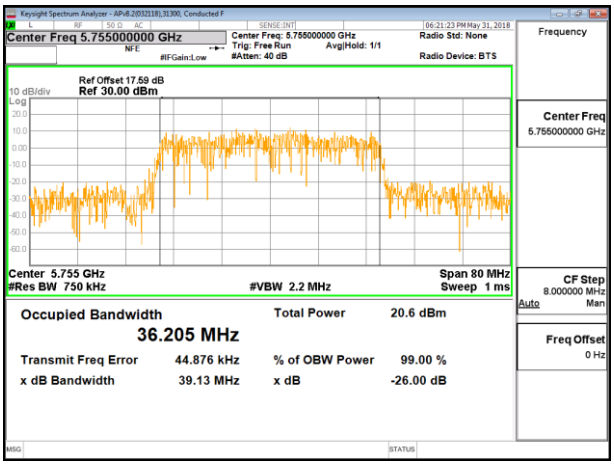
LOW CHANNEL



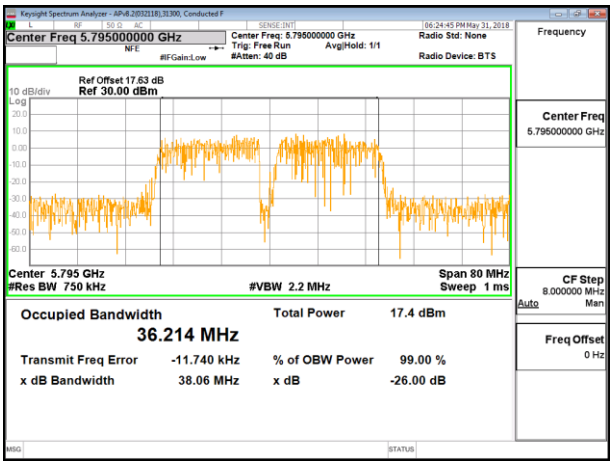
HIGH CHANNEL

1TX ANTENNA 5

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.205
High	5795	36.214



LOW CHANNEL

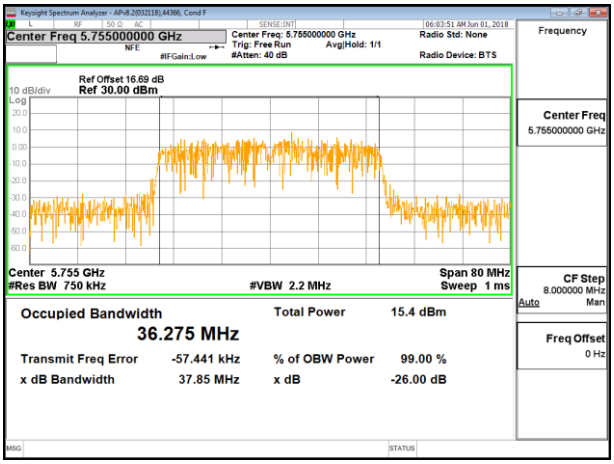


HIGH CHANNEL

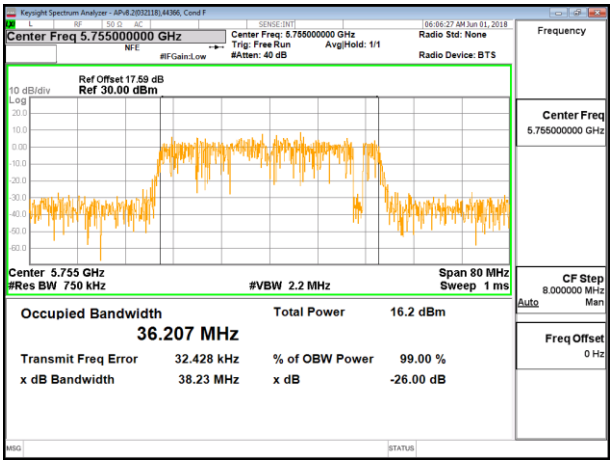
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Ant 4 (MHz)	99% Bandwidth Ant 5 (MHz)
Low	5755	36.275	36.207
High	5795	36.341	36.360

LOW CHANNEL

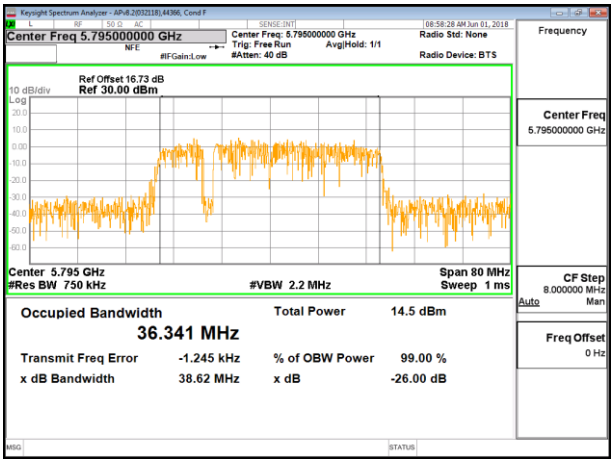


LOW CHANNEL ANTENNA 4

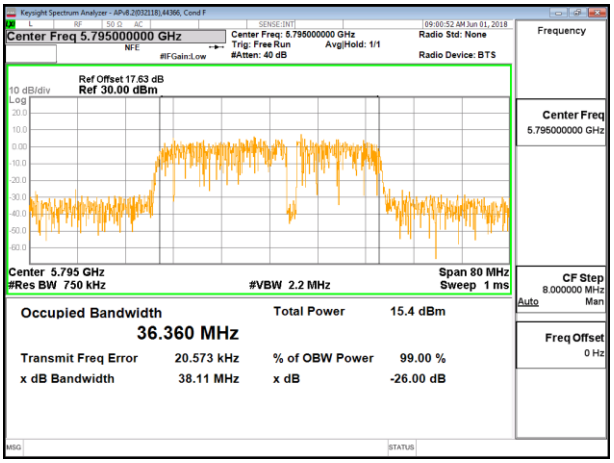


LOW CHANNEL ANTENNA 5

HIGH CHANNEL



HIGH CHANNEL ANTENNA 4

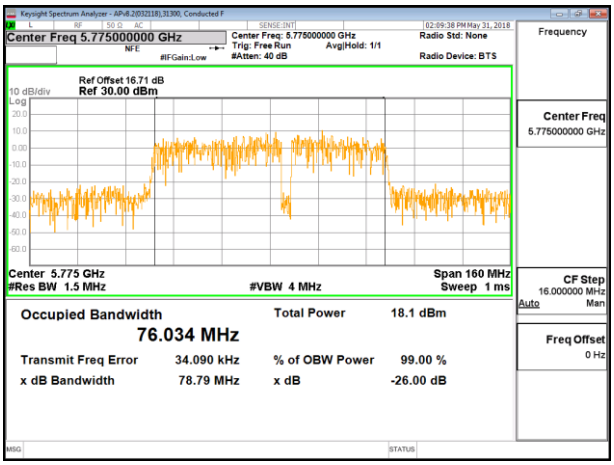


HIGH CHANNEL ANTENNA 5

8.3.12. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

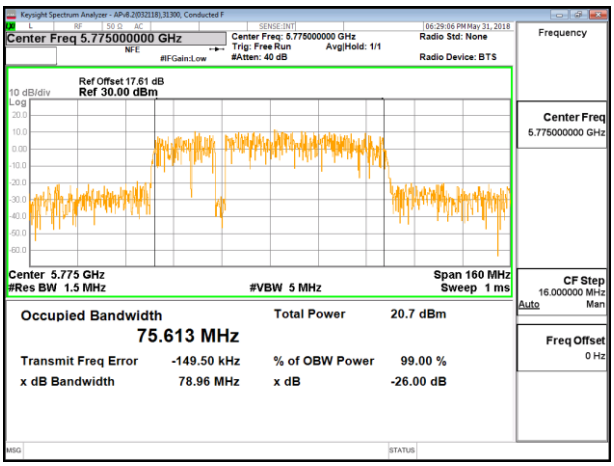
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	76.034



MID CHANNEL

1TX ANTENNA 5

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	75.613

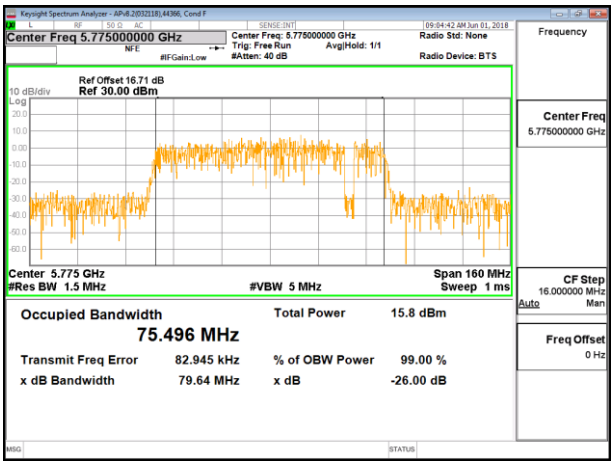


MID CHANNEL

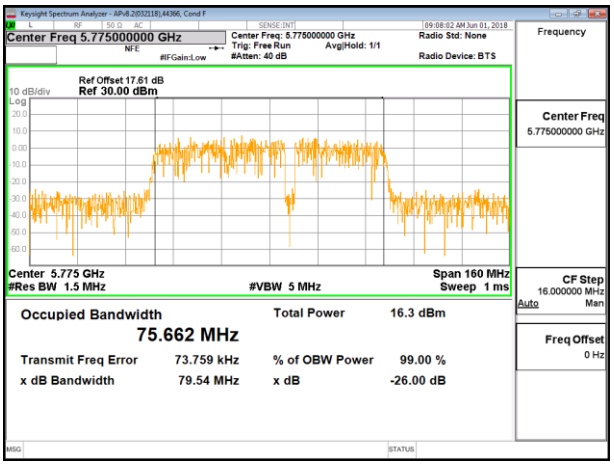
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Ant 4 (MHz)	99% Bandwidth Ant 5 (MHz)
Mid	5775	75.496	75.662

MID CHANNEL



MID CHANNEL ANTENNA 4



MID CHANNEL ANTENNA 5

8.4. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

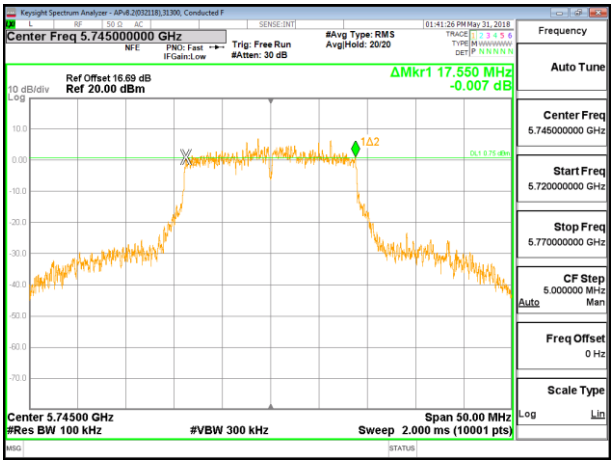
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

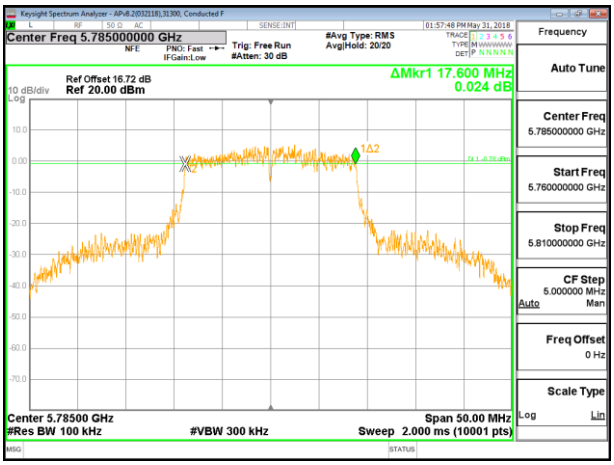
8.4.1. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

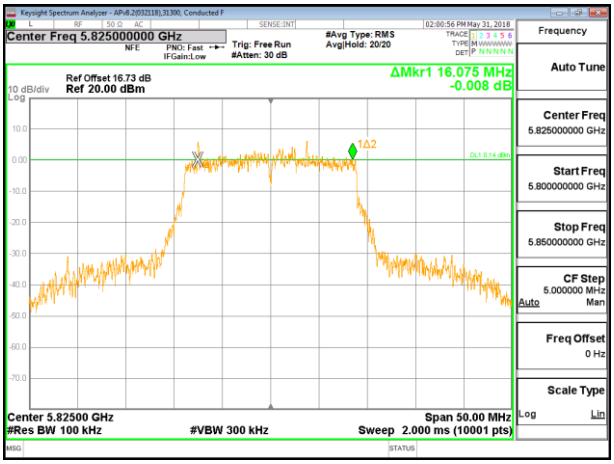
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.550	0.5
Mid	5785	17.600	0.5
High	5825	16.075	0.5
144	5720	3.120	0.5



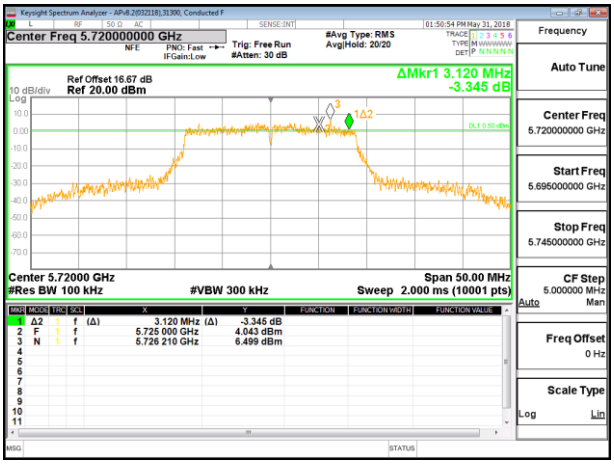
LOW CHANNEL



MID CHANNEL



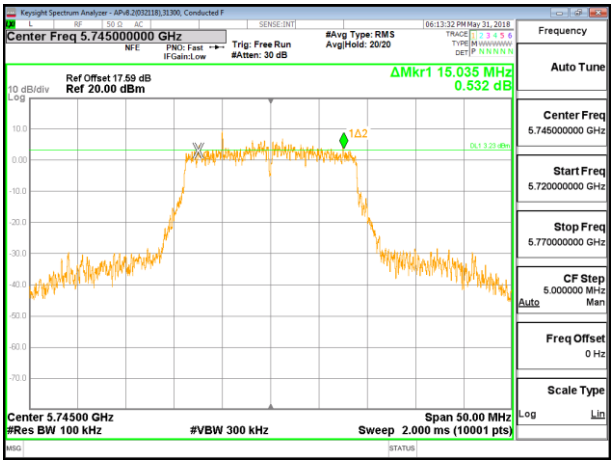
HIGH CHANNEL



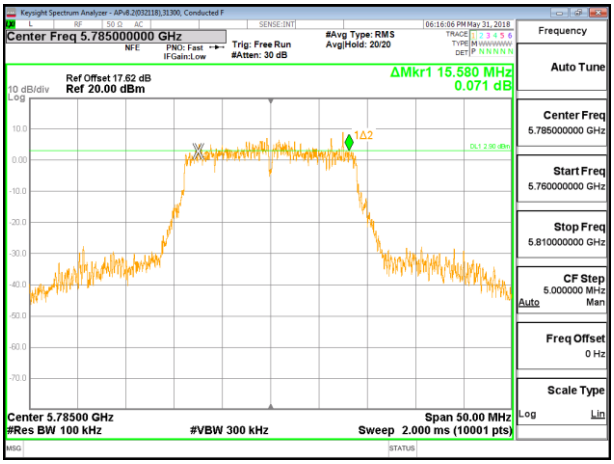
CHANNEL 144

1TX ANTENNA 5

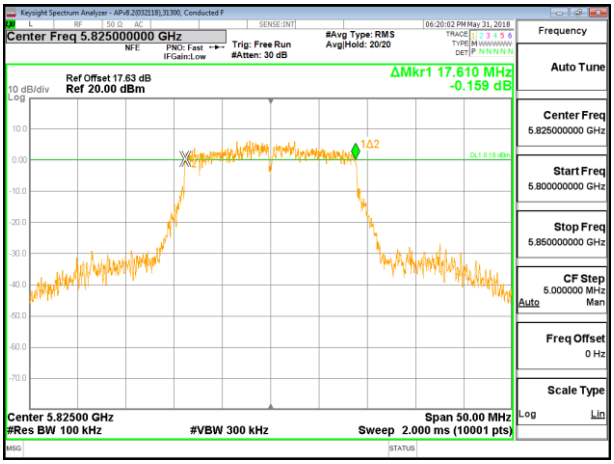
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.035	0.5
Mid	5785	15.580	0.5
High	5825	17.610	0.5
144	5720	3.755	0.5



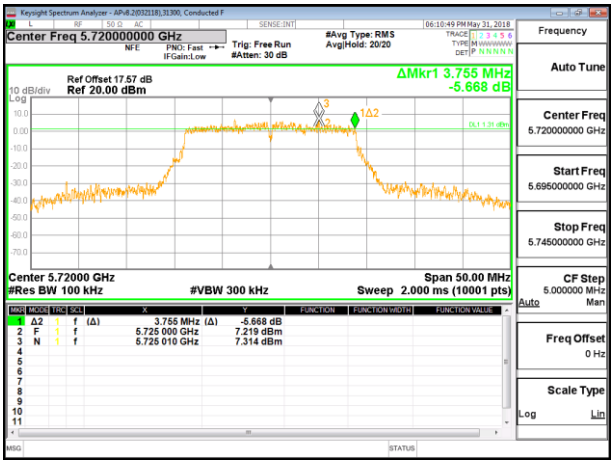
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



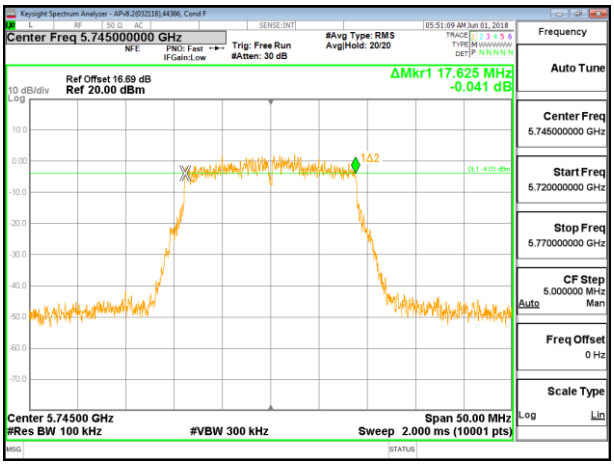
CHANNEL 144

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 771-1000 FAX:(510) 661-0888

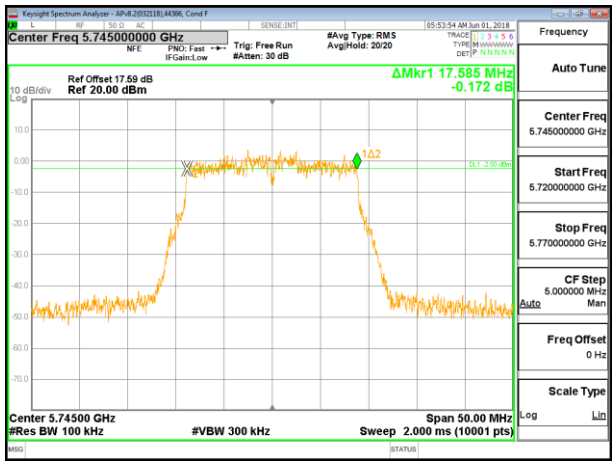
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	6 dB BW Ant 4 (MHz)	6 dB BW Ant 5 (MHz)	Minimum Limit (MHz)
Low	5745	17.625	17.585	0.5
Mid	5785	17.560	17.620	0.5
High	5825	17.610	17.570	0.5
144	5720	3.835	3.595	0.5

LOW CHANNEL

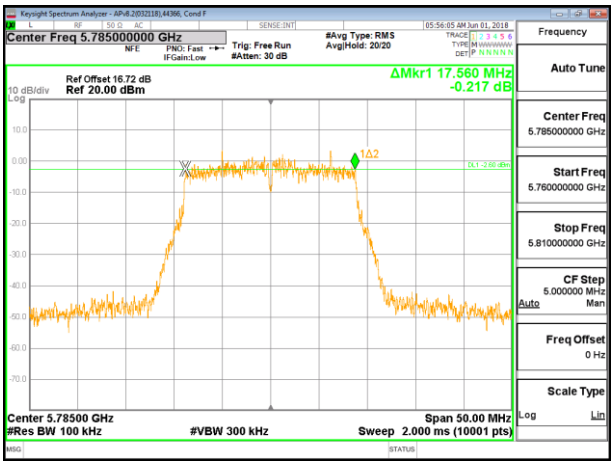


LOW CHANNEL ANTENNA 4

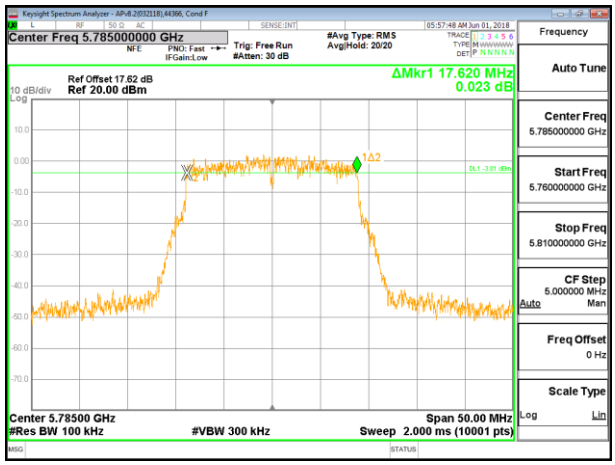


LOW CHANNEL ANTENNA 5

MID CHANNEL

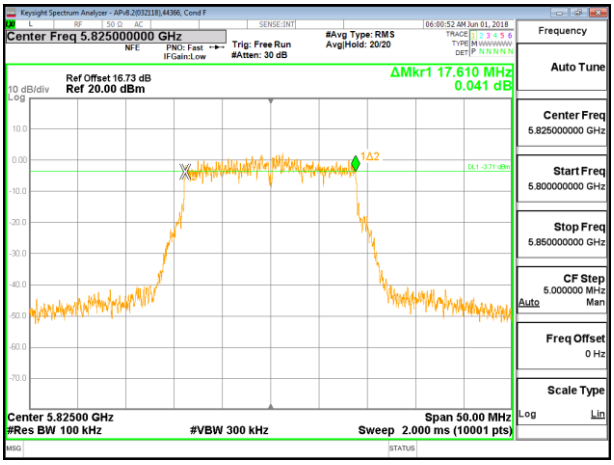


MID CHANNEL ANTENNA 4

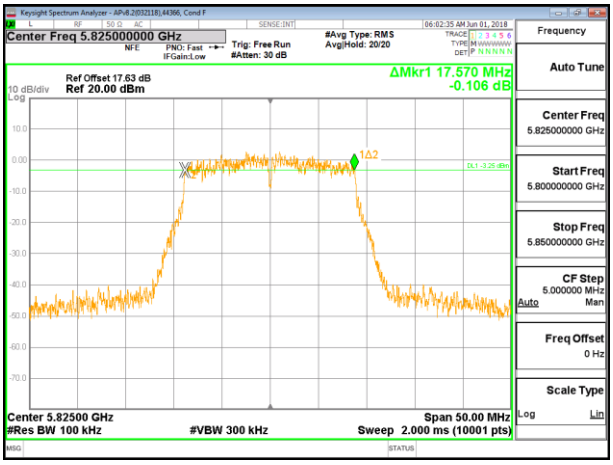


MID CHANNEL ANTENNA 5

HIGH CHANNEL

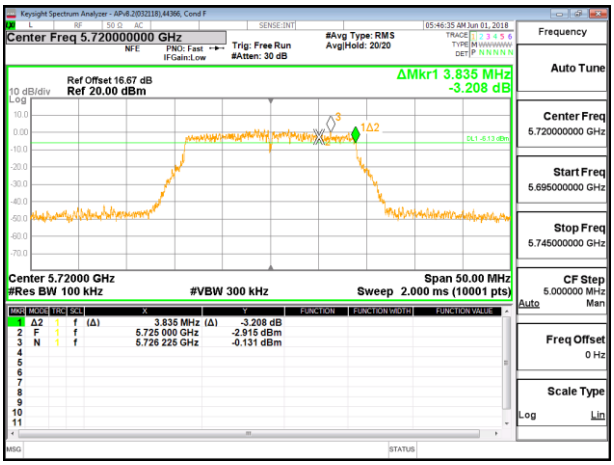


HIGH CHANNEL ANTENNA 4

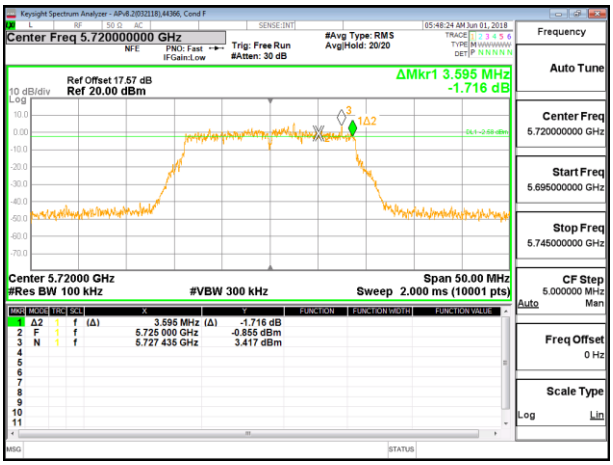


HIGH CHANNEL ANTENNA 5

CHANNEL 144



CHANNEL 144 ANTENNA 4

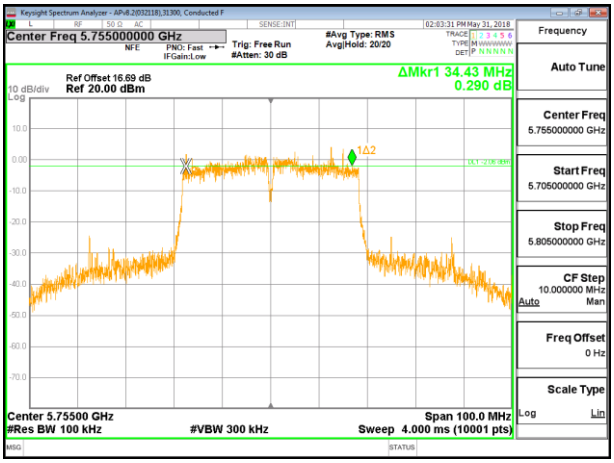


CHANNEL 144 ANTENNA 5

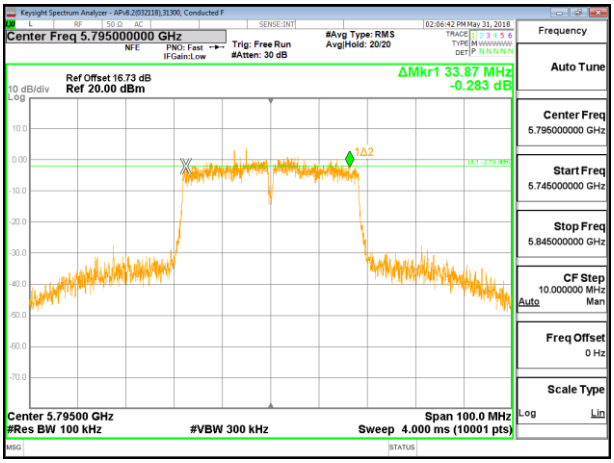
8.4.2. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

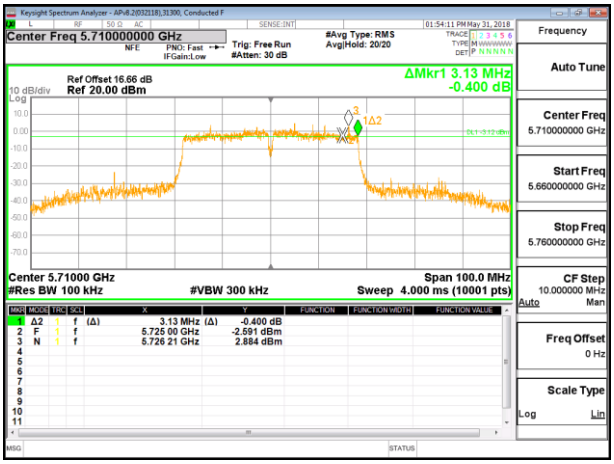
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	34.430	0.5
High	5795	33.870	0.5
142	5710	3.130	0.5



LOW CHANNEL



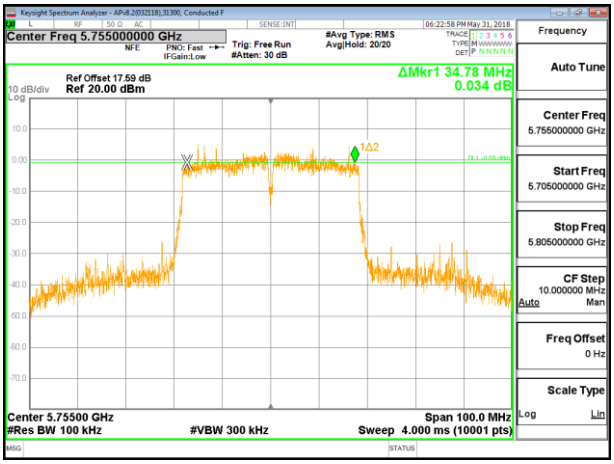
HIGH CHANNEL



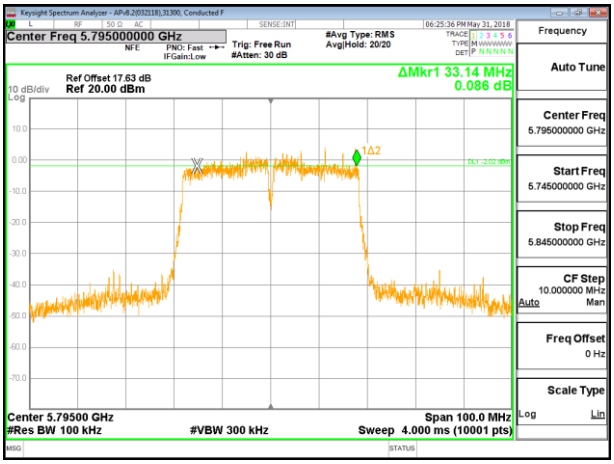
CHANNEL 142

1TX ANTENNA 5

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	34.780	0.5
High	5795	33.140	0.5
142	5710	3.260	0.5



LOW CHANNEL



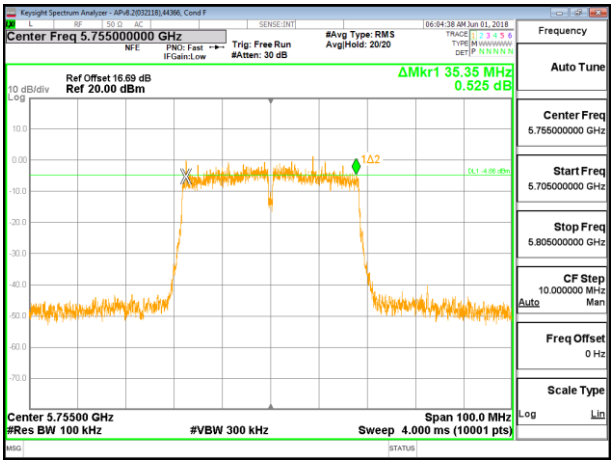
HIGH CHANNEL

CHANNEL 142

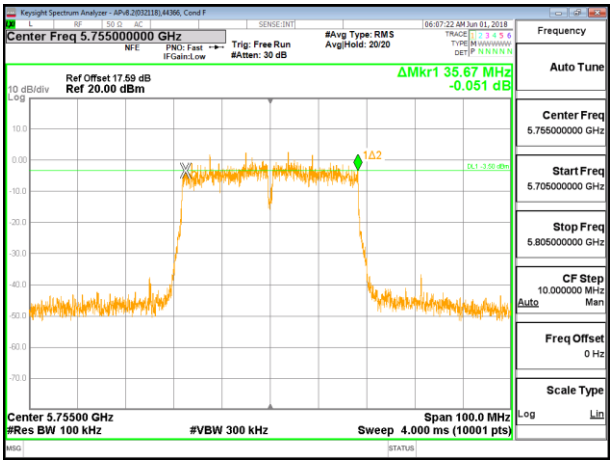
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	6 dB BW Ant 4 (MHz)	6 dB BW Ant 5 (MHz)	Minimum Limit (MHz)
Low	5755	35.350	35.670	0.5
High	5795	34.800	35.100	0.5
142	5710	3.240	3.230	0.5

LOW CHANNEL

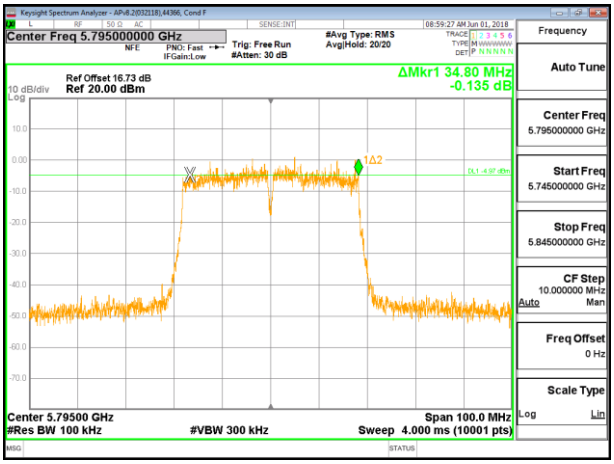


LOW CHANNEL ANTENNA 4

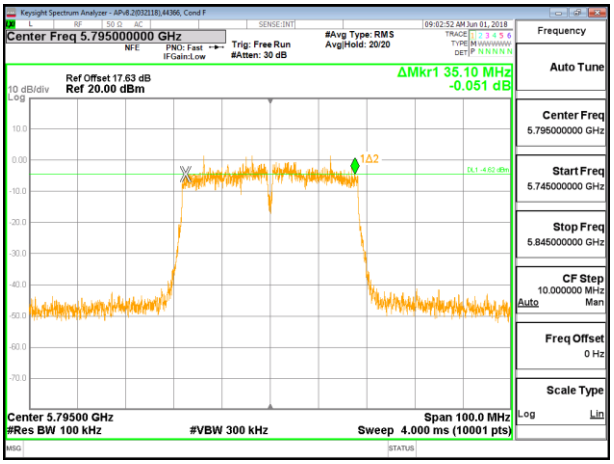


LOW CHANNEL ANTENNA 5

HIGH CHANNEL

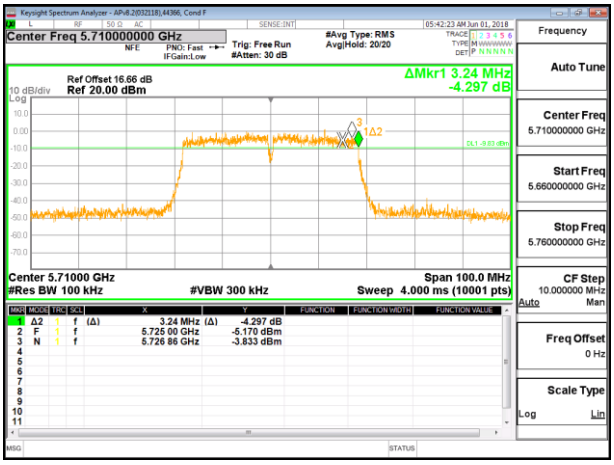


HIGH CHANNEL ANTENNA 4

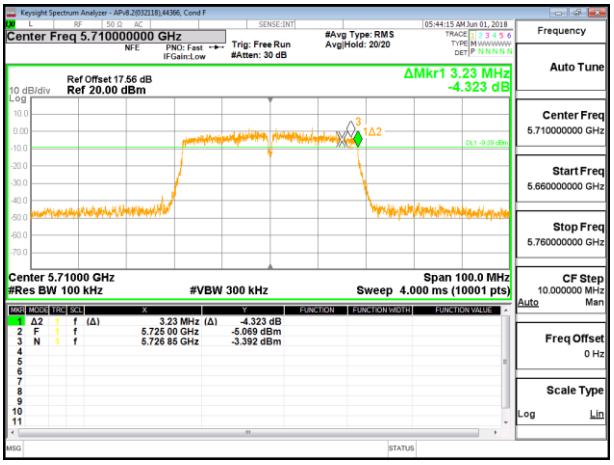


HIGH CHANNEL ANTENNA 5

CHANNEL 142



CHANNEL 142 ANTENNA 4

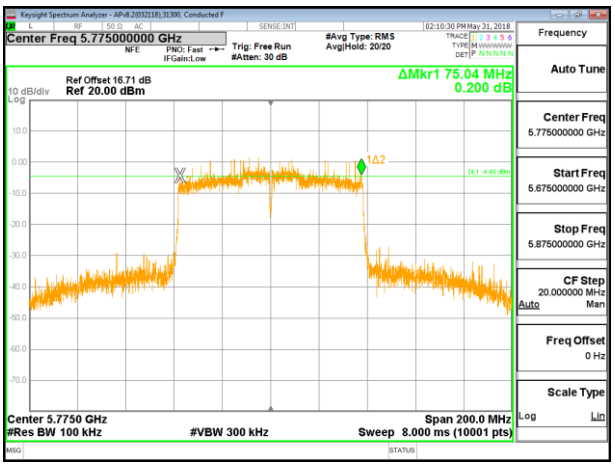


CHANNEL 142 ANTENNA 5

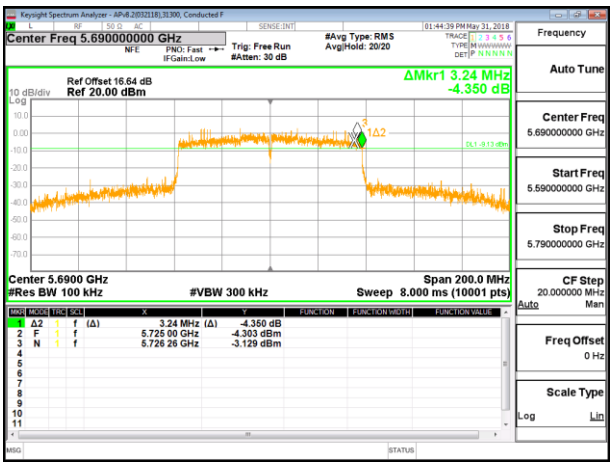
8.4.3. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX Antenna 4

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	75.040	0.5
138	5690	3.240	0.5



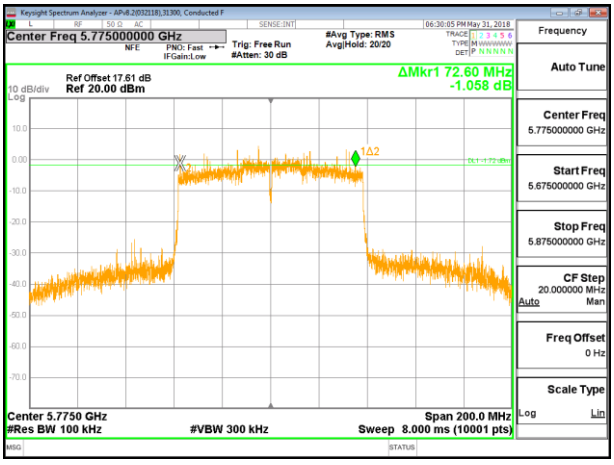
MID CHANNEL



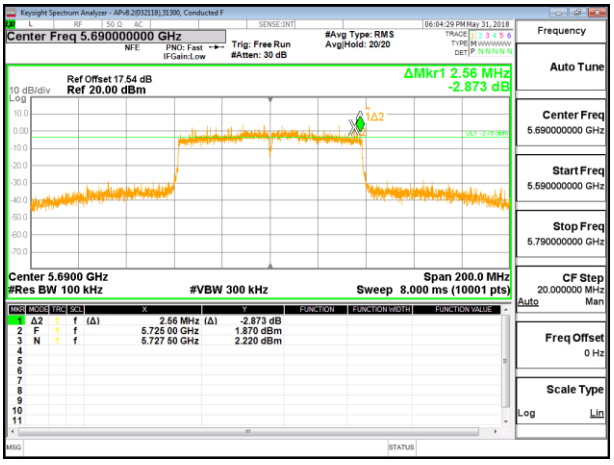
CHANNEL 138

1TX ANTENNA 5

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	72.600	0.5
138	5690	2.560	0.5



MID CHANNEL

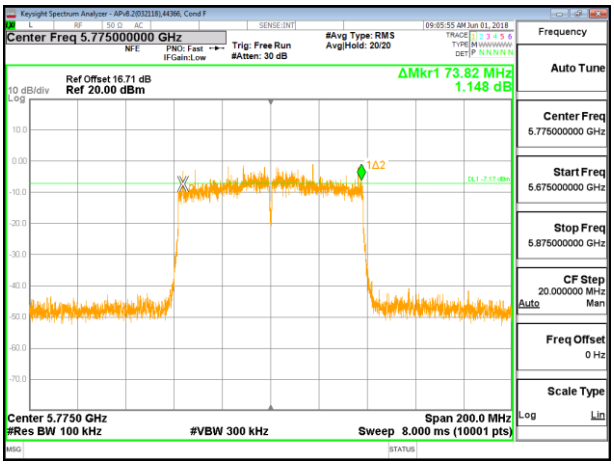


CHANNEL 138

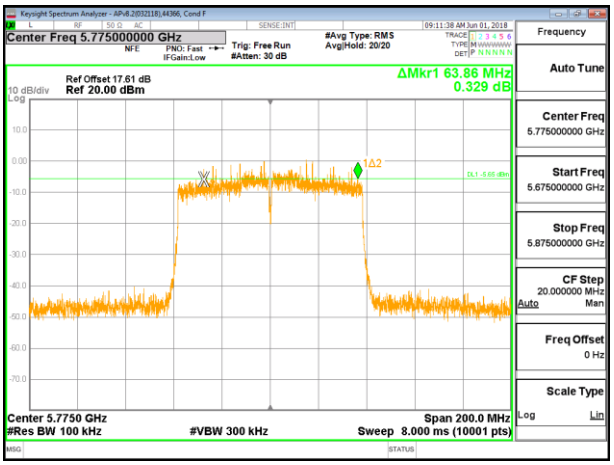
2TX Antenna 4 + ANTENNA 5 CDD MODE

Channel	Frequency (MHz)	6 dB BW Ant 4 (MHz)	6 dB BW Ant 5 (MHz)	Minimum Limit (MHz)
Mid	5775	73.820	63.860	0.5
138	5690	3.140	3.100	0.5

MID CHANNEL

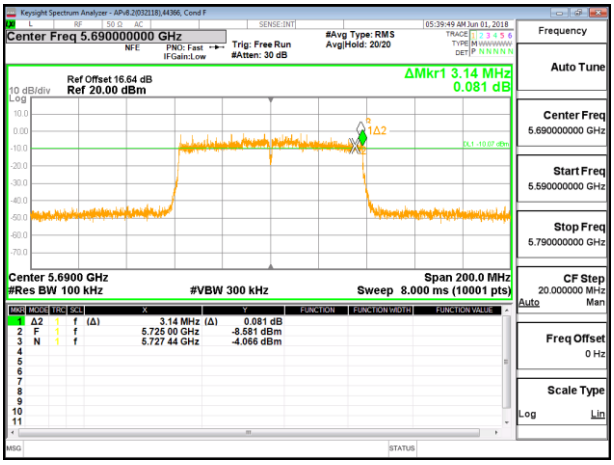


MID CHANNEL ANTENNA 4

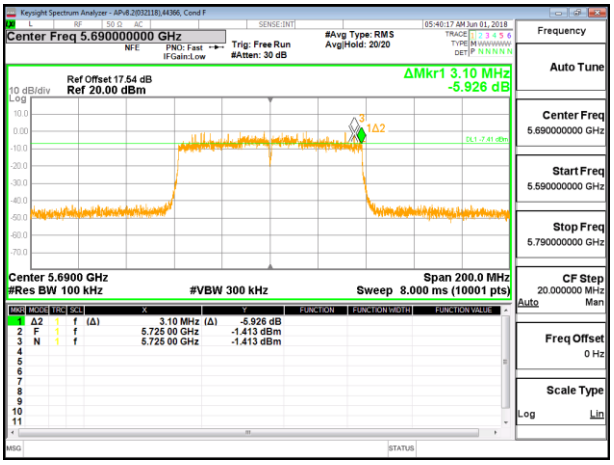


MID CHANNEL ANTENNA 5

CHANNEL 138



CHANNEL 138 ANTENNA 4



CHANNEL 138 ANTENNA 5

8.5. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.15–5.25 GHz

(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.

Bands 5.25-5.35 GHz and 5.47-5.725 GHz

The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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.

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.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and for straddles channels KDB 789033 D02 v02r01, Section E.2.b (Method SA-2) was used.

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Ant 4 Antenna Gain (dBi)	Ant 5 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
5.2	-5.3	-5.0	-5.15	-2.14
5.3	-5.0	-5.2	-5.10	-2.09
5.6	-3.8	-3.9	-3.85	-0.84
5.8	-3.7	-4.9	-4.26	-1.27

ID:	30554	Date:	08/01/2018

RESULTS

8.5.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

1TX ANTENNA 4 MOBILE

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5180	-5.30	24.00	11.00
Mid	5200	-5.30	24.00	11.00
High	5240	-5.30	24.00	11.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	18.89	18.89	24.00	-5.11
Mid	5200	20.91	20.91	24.00	-3.09
High	5240	20.86	20.86	24.00	-3.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	9.34	9.34	11.00	-1.66
Mid	5200	10.35	10.35	11.00	-0.65
High	5240	10.38	10.38	11.00	-0.62

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