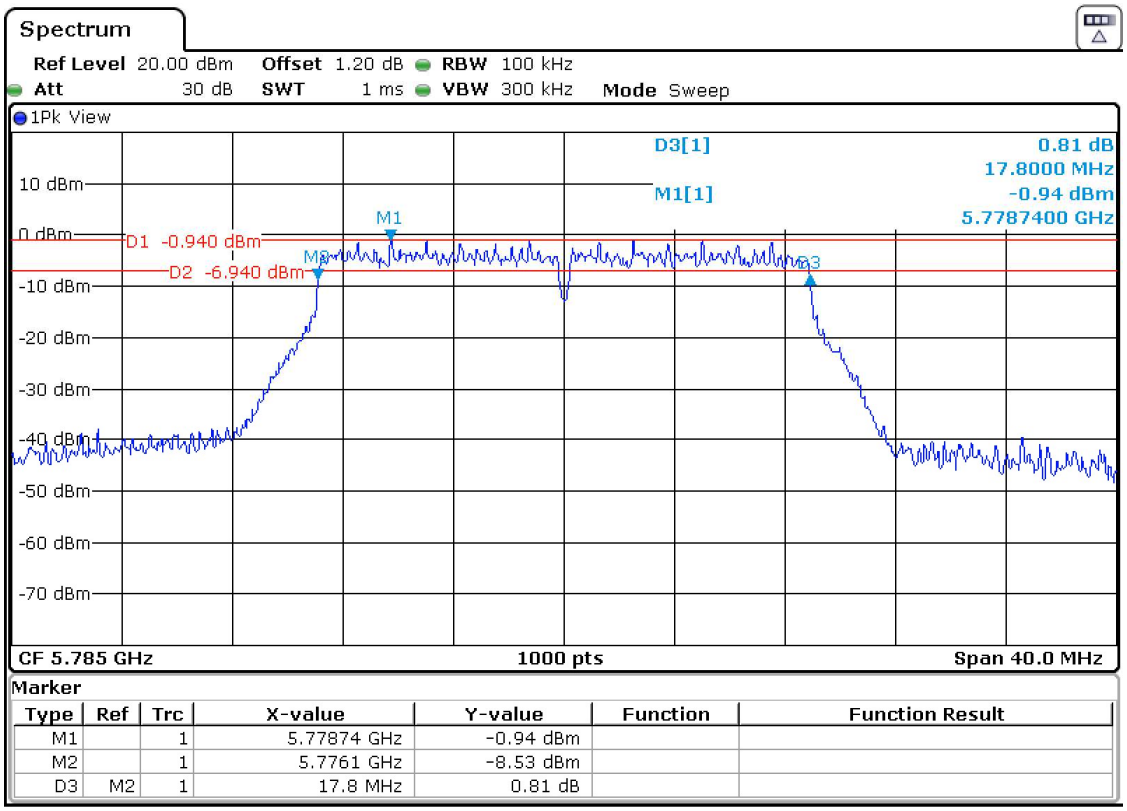
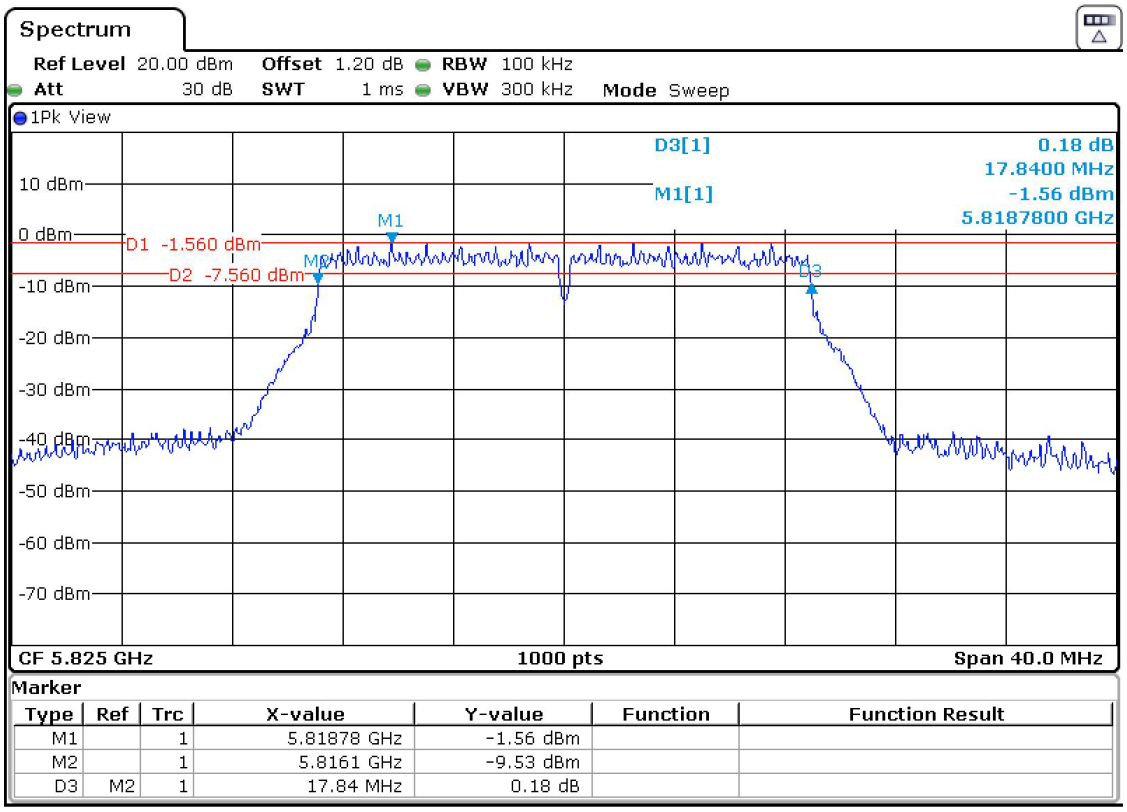
- Middle Channel 157:

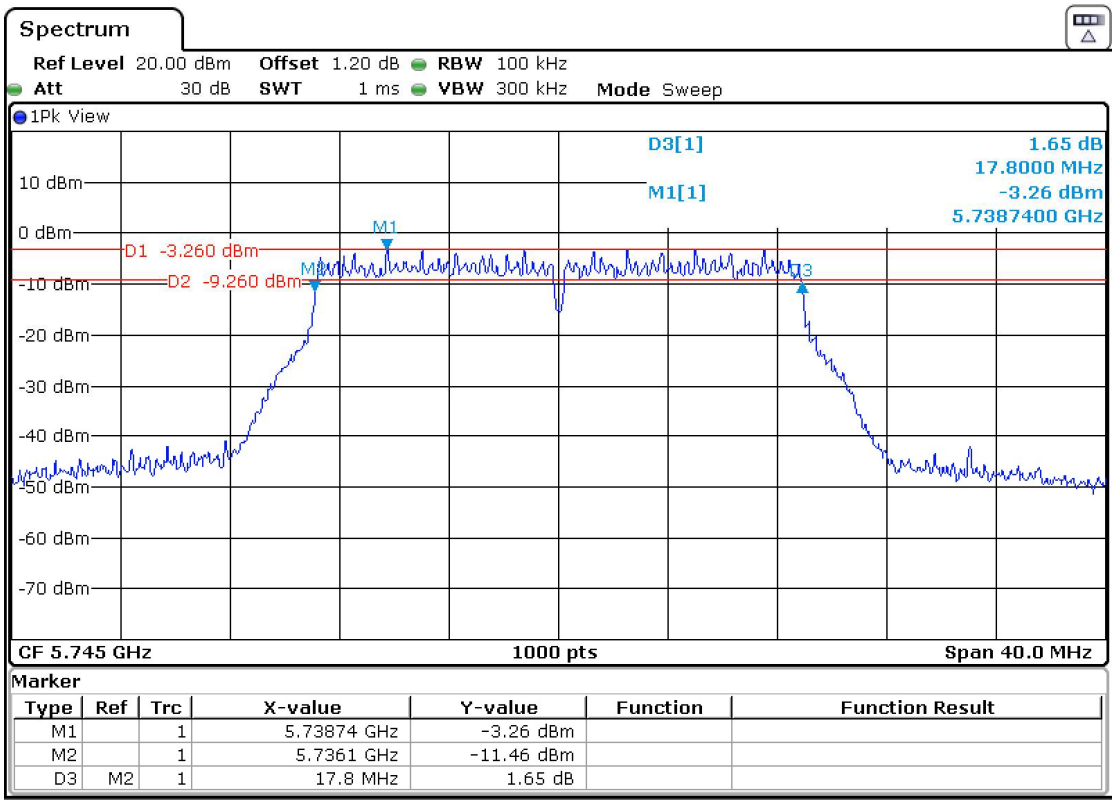


- High Channel 165:

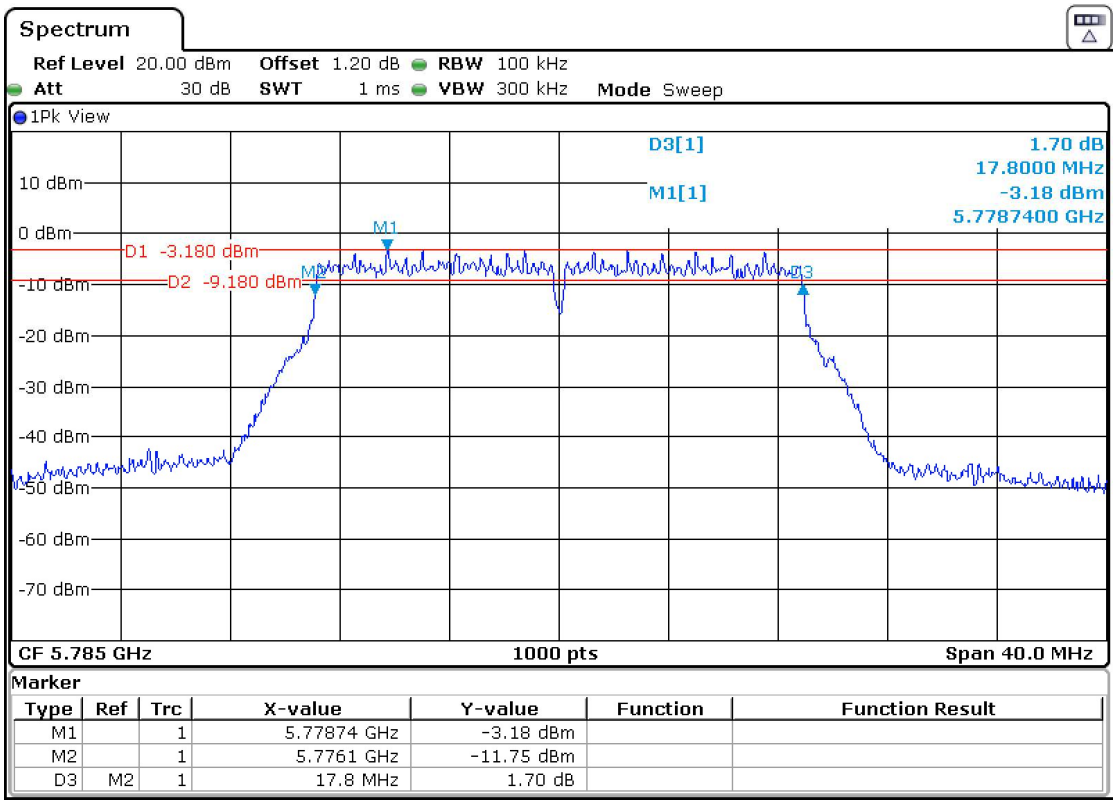


Mode 802.11 ac20 (VHT20)

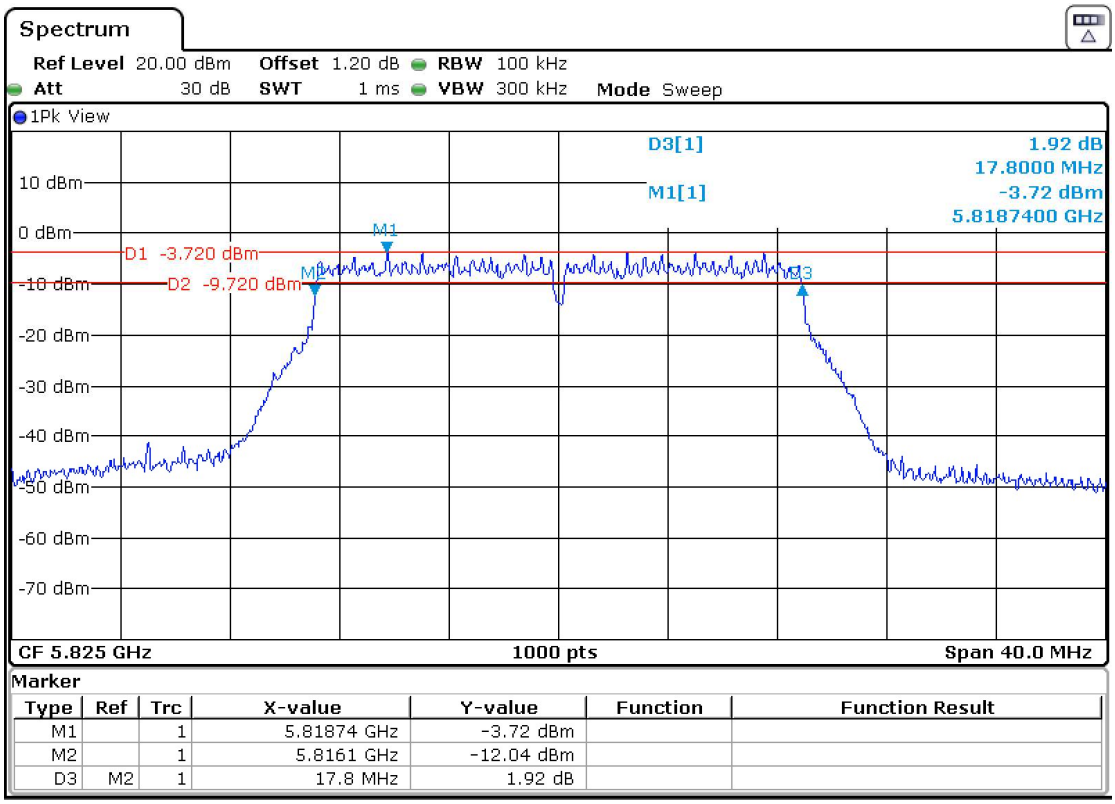
- Low Channel 149:



- Middle Channel 157:

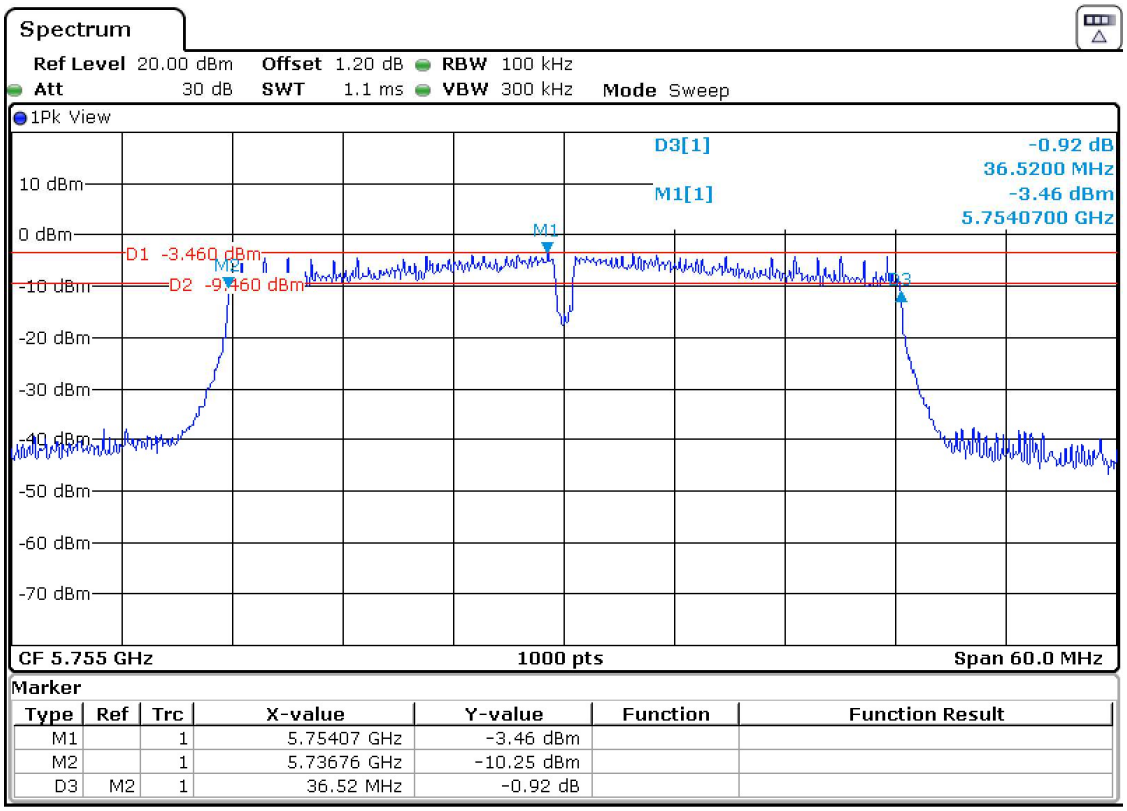


- High Channel 165:

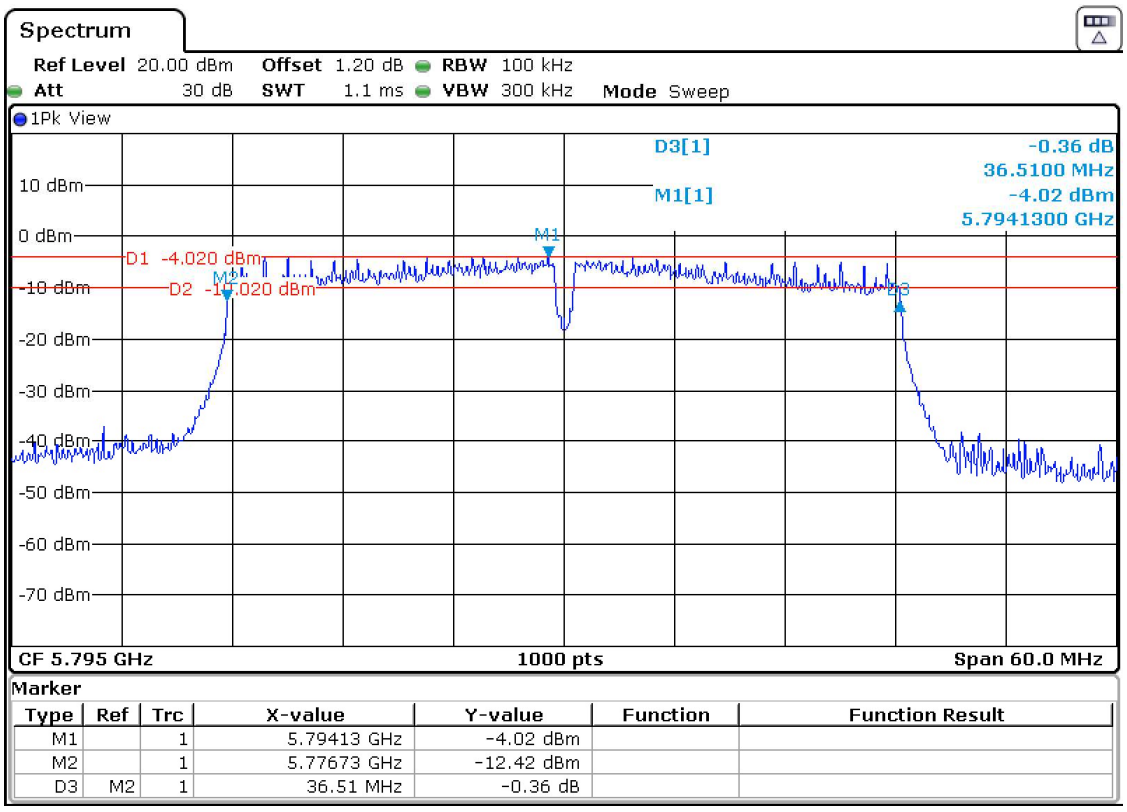


Mode 802.11 n40 (HT40)

- Low Channel 151:

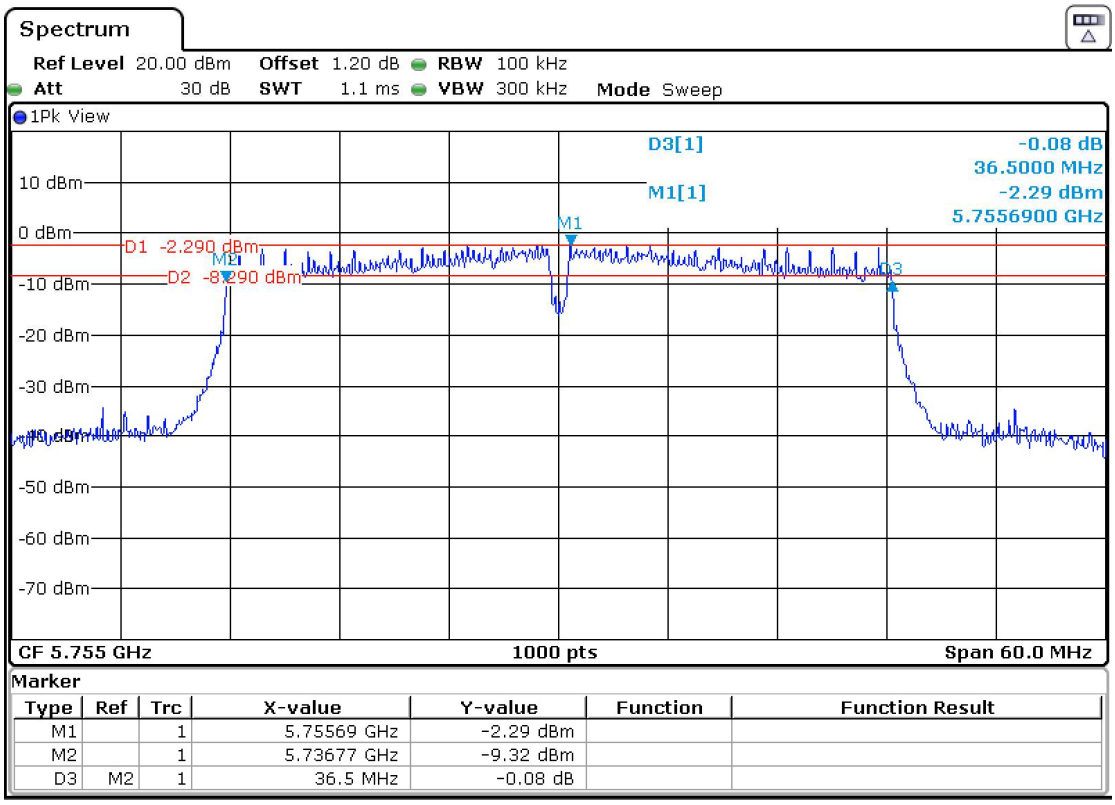


- High Channel 159:



Mode 802.11 ac40 (VHT40)

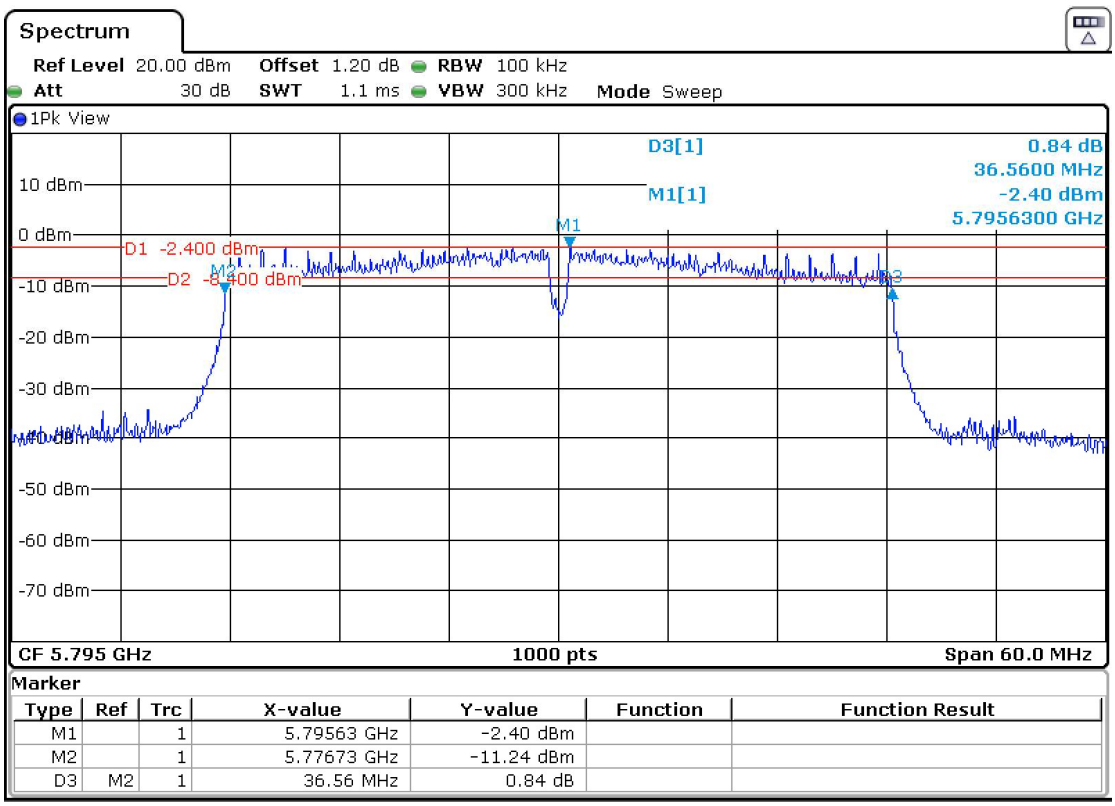
- Low Channel 151:



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.75569 GHz	-2.29 dBm		
M2		1	5.73677 GHz	-9.32 dBm		
D3	M2	1	36.5 MHz	-0.08 dB		

- High Channel 159:

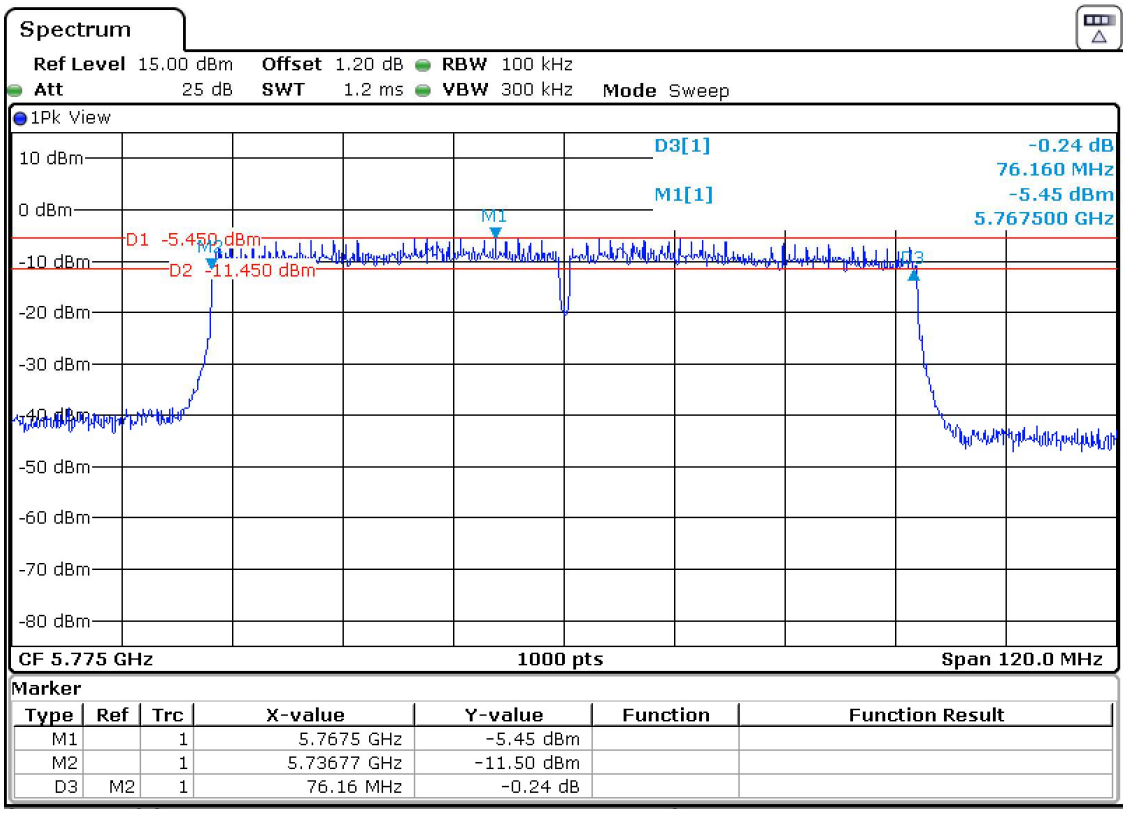


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.79563 GHz	-2.40 dBm		
M2		1	5.77673 GHz	-11.24 dBm		
D3	M2	1	36.56 MHz	0.84 dB		

Mode 802.11 ac80 (VHT80)

- Single Channel 155:



FCC 15.407 (a)(3) / RSS-247 6.2.4.1. Transmitter Maximum Conducted Output Power

SPECIFICATION:

FCC 15.407 / RSS-247: For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30 dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RESULTS:

The maximum conducted output power was measured using the channel power integration method according to point E) 2) b) (Method SA-1) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is >98% and the channel power integration method according to point E) 2) d) (Method SA-2) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is <98%.

For data rates where the EUT was transmitting at <98% duty cycle, the duty calculated in Appendix A was added to the measured power in order to calculate the total average power during the actual transmission time.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

For all modes of operation, the antenna gain is less than 6 dBi.

Maximum Declared Antenna Gain: -5.4 dBi

Mode 802.11 a20

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Max. Conducted Power (dBm)	7.06	6.98	6.18
Maximum EIRP power (dBm)	6,454504971	6,374504971	5,574504971
Duty Cycle Correction Factor (dB)	4.794504971		
Max. Conducted Power Corrected (dBm)	11,85450497	11,77450497	10,97450497
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 n20 (HT20)

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Max. Conducted Power (dBm)	5.35	5.72	4.95
Maximum EIRP power (dBm)	5.003842073	5.373842073	4.603842073
Duty Cycle Correction Factor (dB)	5.053842073		
Max. Conducted Power Corrected (dBm)	10.40384207	10.77384207	10.00384207
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 ac20 (VHT20)

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Max. Conducted Power (dBm)	2.7	2.71	2.08
Maximum EIRP power (dBm)	2,753058804	2,763058804	2,133058804
Duty Cycle Correction Factor (dB)	5.453058804		
Max. Conducted Power Corrected (dBm)	8,153058804	8,163058804	7,533058804
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 n40 (HT40)

	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
Max. Conducted Power (dBm)	3.19	3.00
Maximum EIRP power (dBm)	4,643971971	4,453971971
Duty Cycle Correction Factor (dB)	6.853971971	
Max. Conducted Power Corrected (dBm)	10,04397197	9,853971971
Measurement uncertainty (dB)	<±1.20	

Mode 802.11 ac40 (VHT40)

	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
Max. Conducted Power (dBm)	4.08	4.05
Maximum EIRP power (dBm)	5,978603764	5,948603764
Duty Cycle Correction Factor (dB)	7.298603764	
Max. Conducted Power Corrected (dBm)	11,37860376	11,34860376
Measurement uncertainty (dB)	<±1.20	

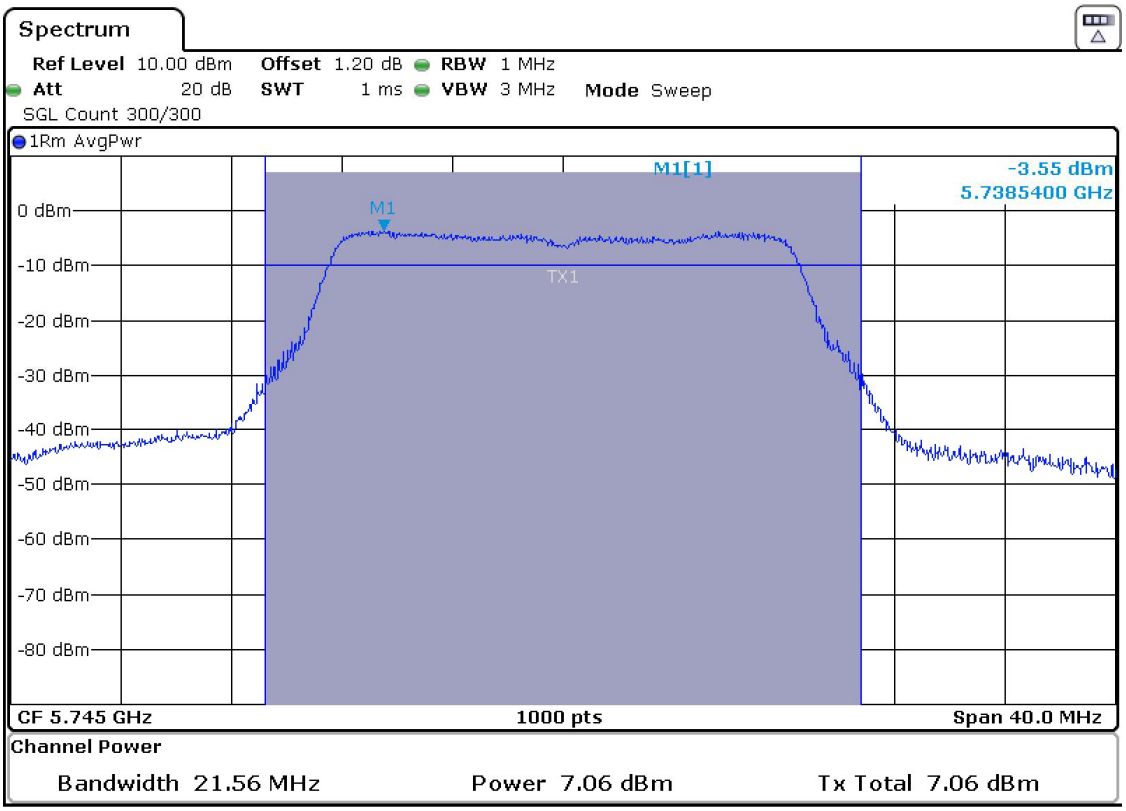
Mode 802.11 ac80 (VHT80)

	Low Channel 155 (5775 MHz)
Max. Conducted Power (dBm)	2.43
Maximum EIRP power (dBm)	5,837846692
Duty Cycle Correction Factor (dB)	8.807846692
Max. Conducted Power Corrected (dBm)	11,23784669
Measurement uncertainty (dB)	<±1.20

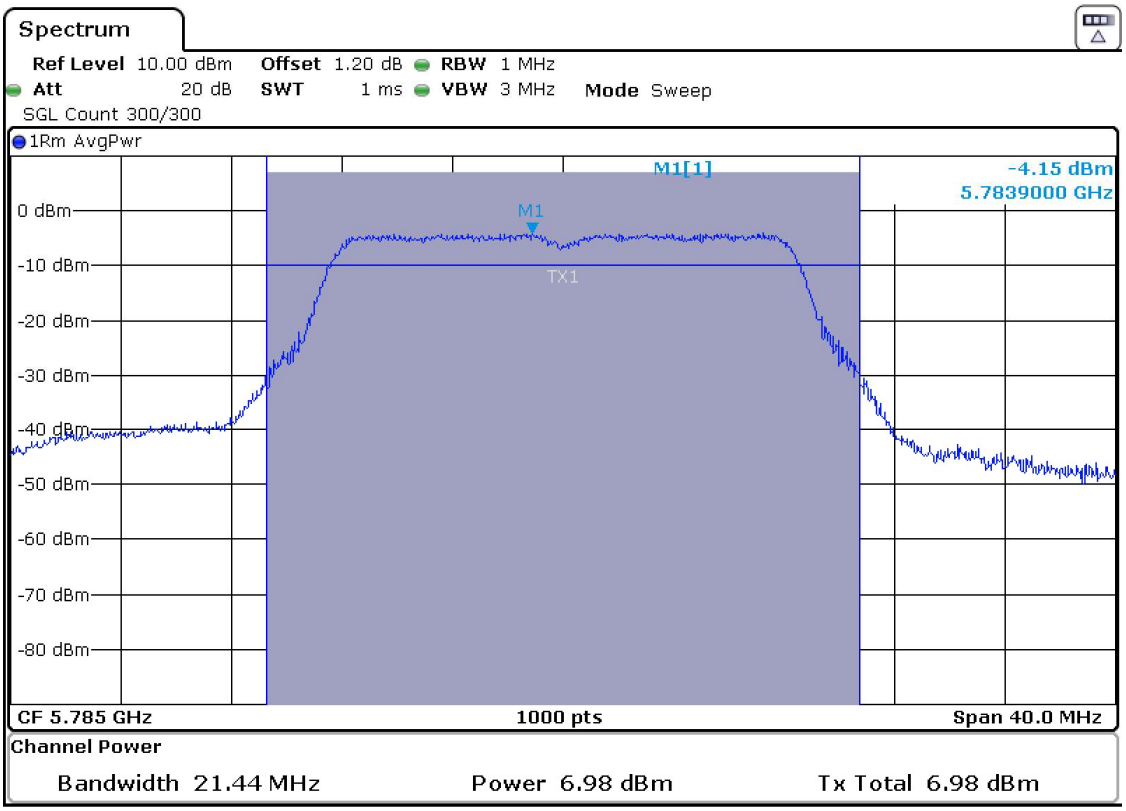
Verdict: PASS

Mode 802.11 a20

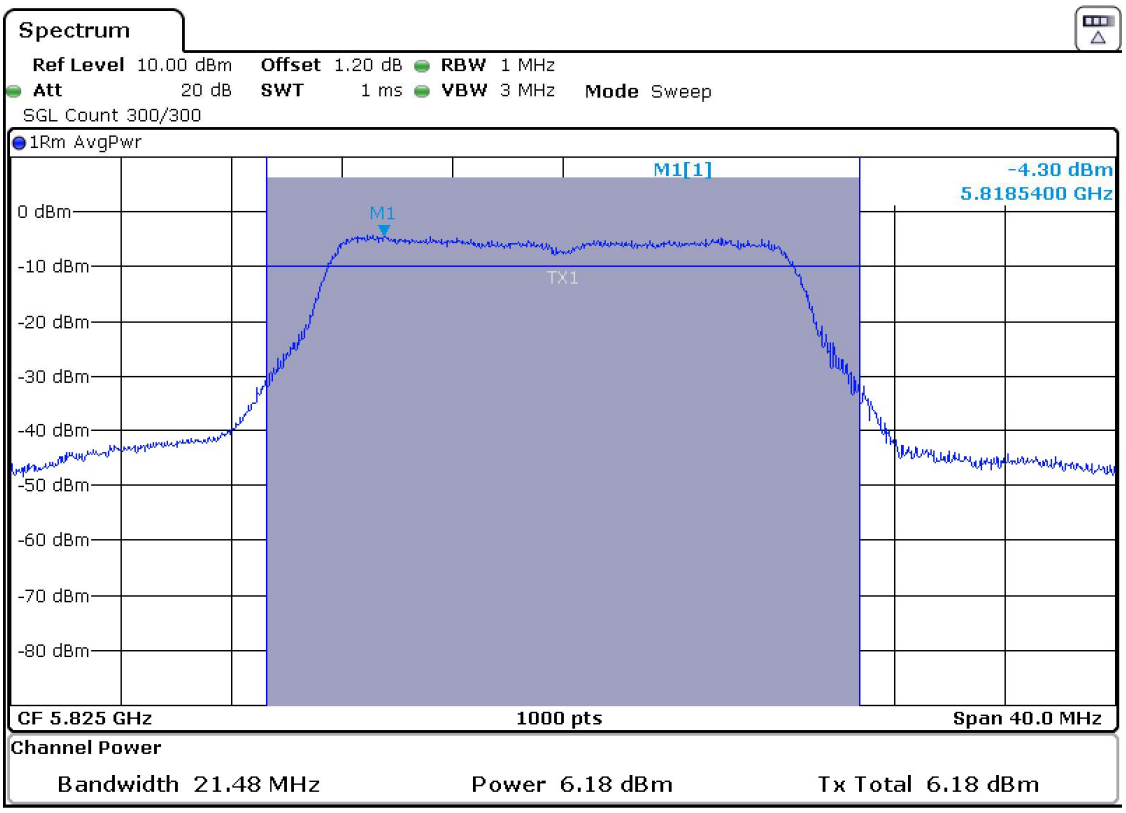
- Low Channel 149:



- Middle Channel 157:

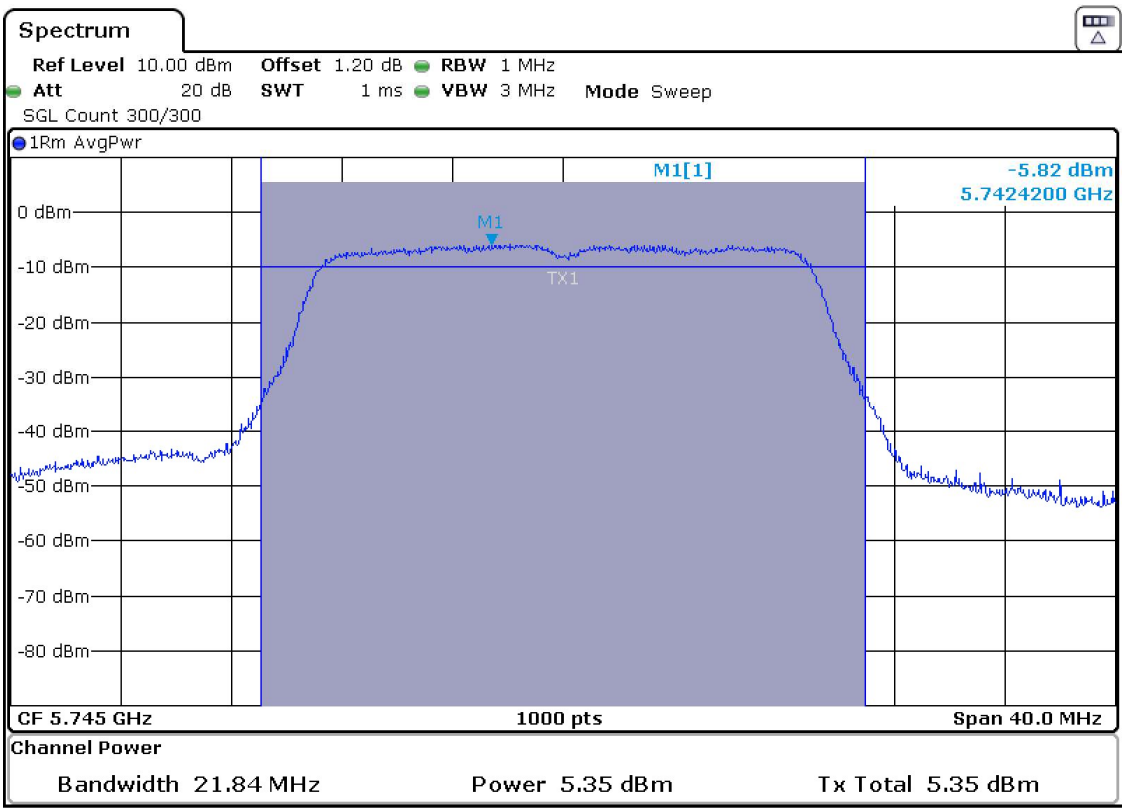


- High Channel 165:

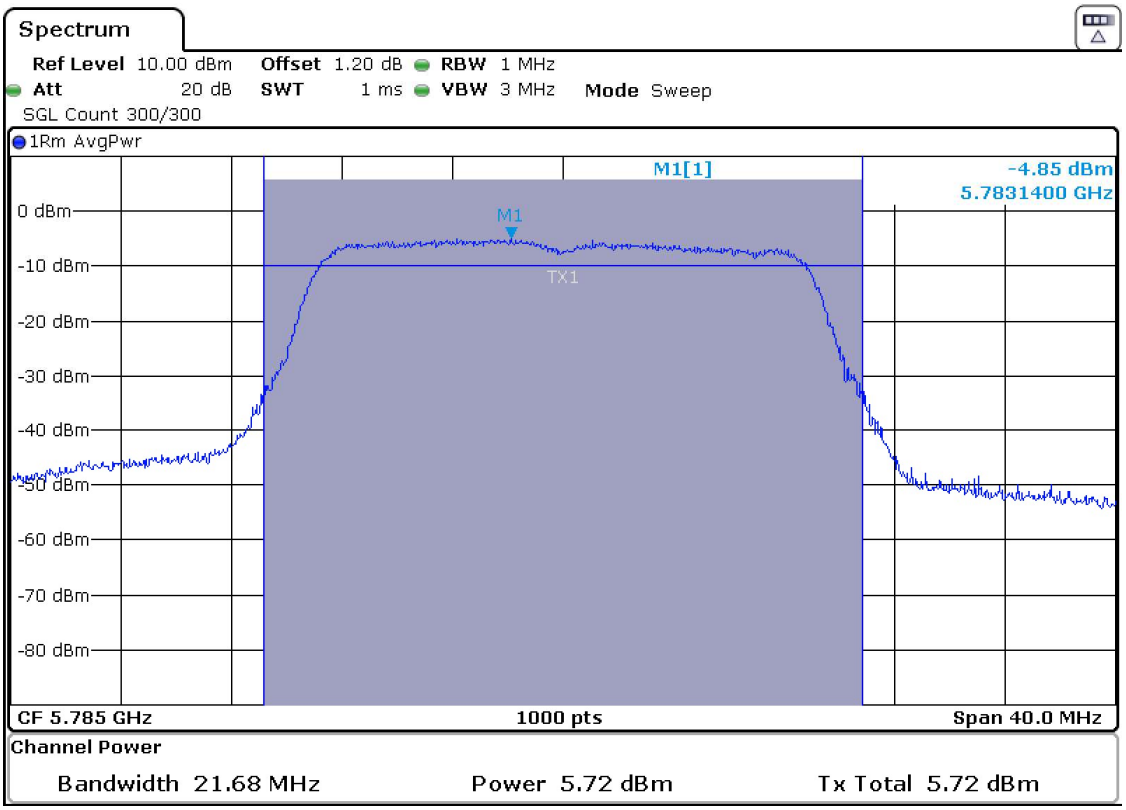


Mode 802.11 n20 (HT20)

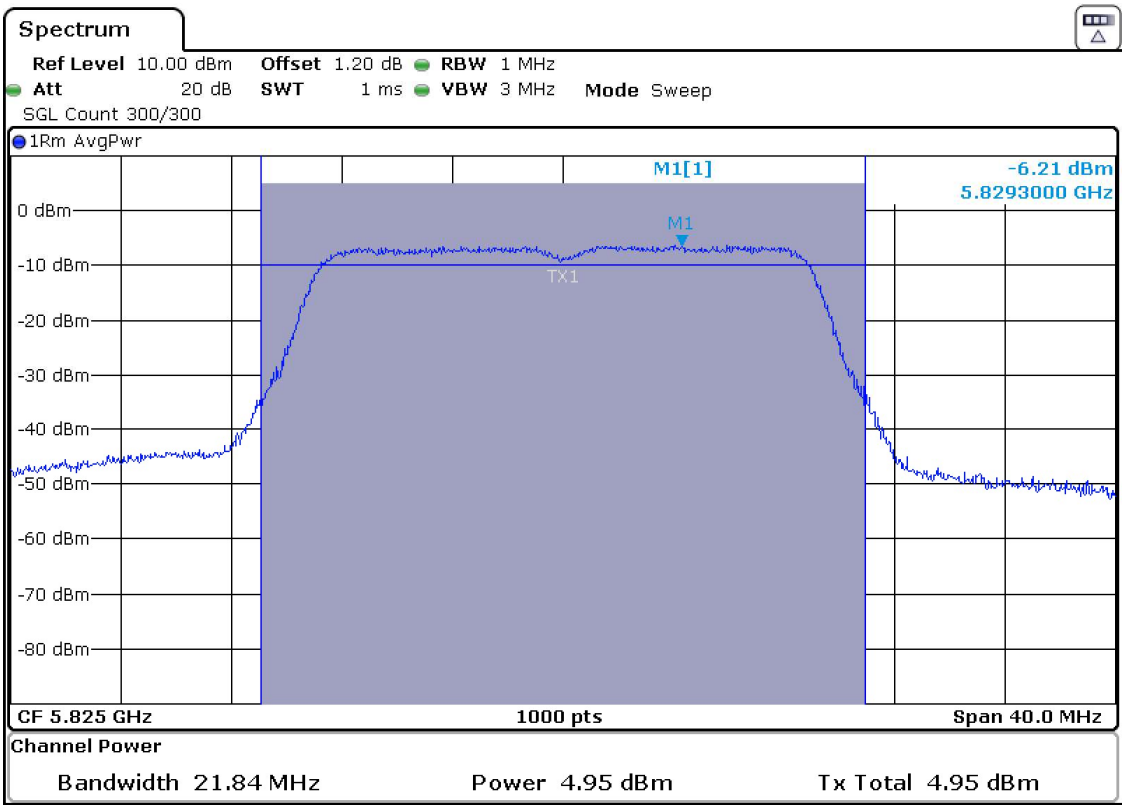
- Low Channel 149:



- Middle Channel 157:

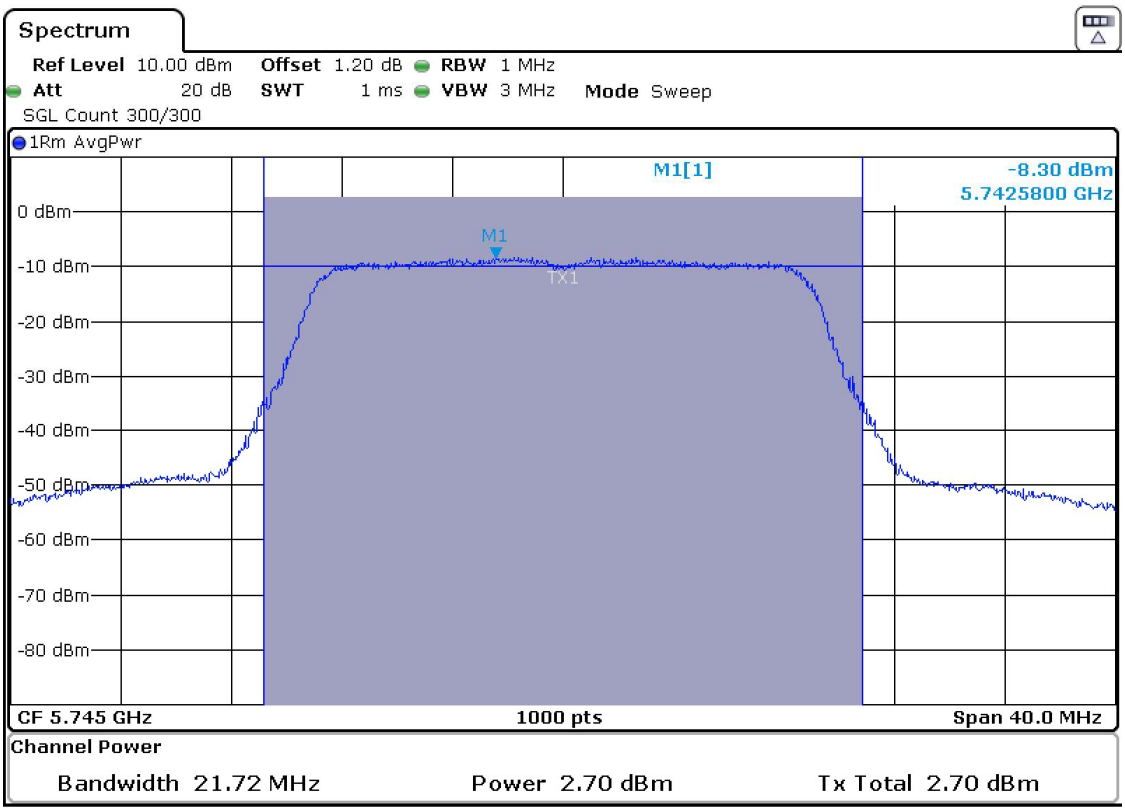


- High Channel 165:

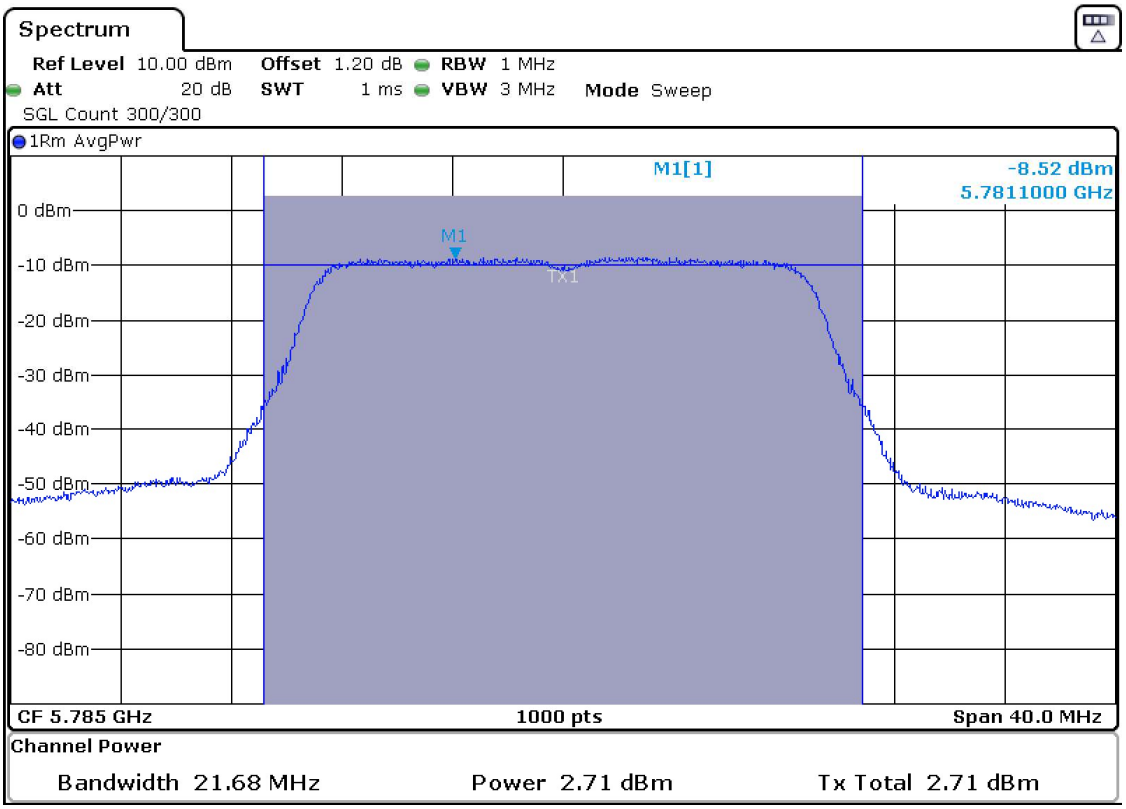


Mode 802.11 ac20 (VHT20)

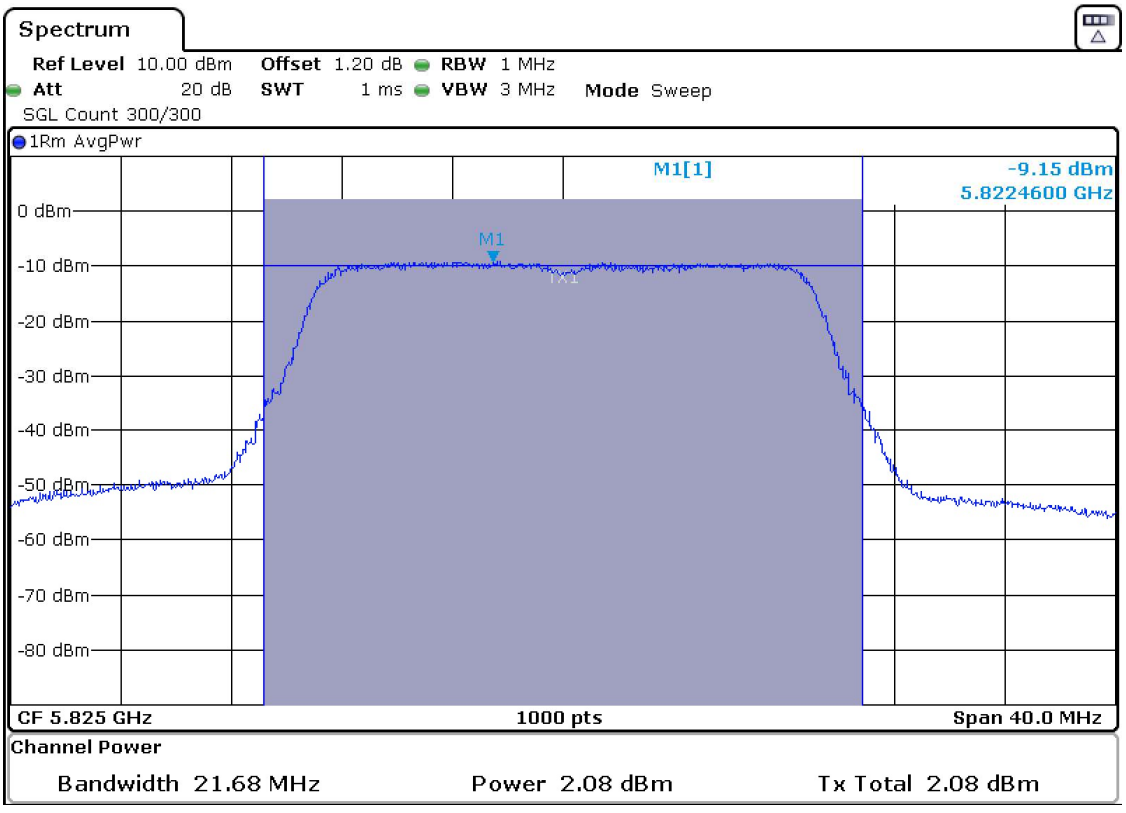
- Low Channel 149:



- Middle Channel 157:

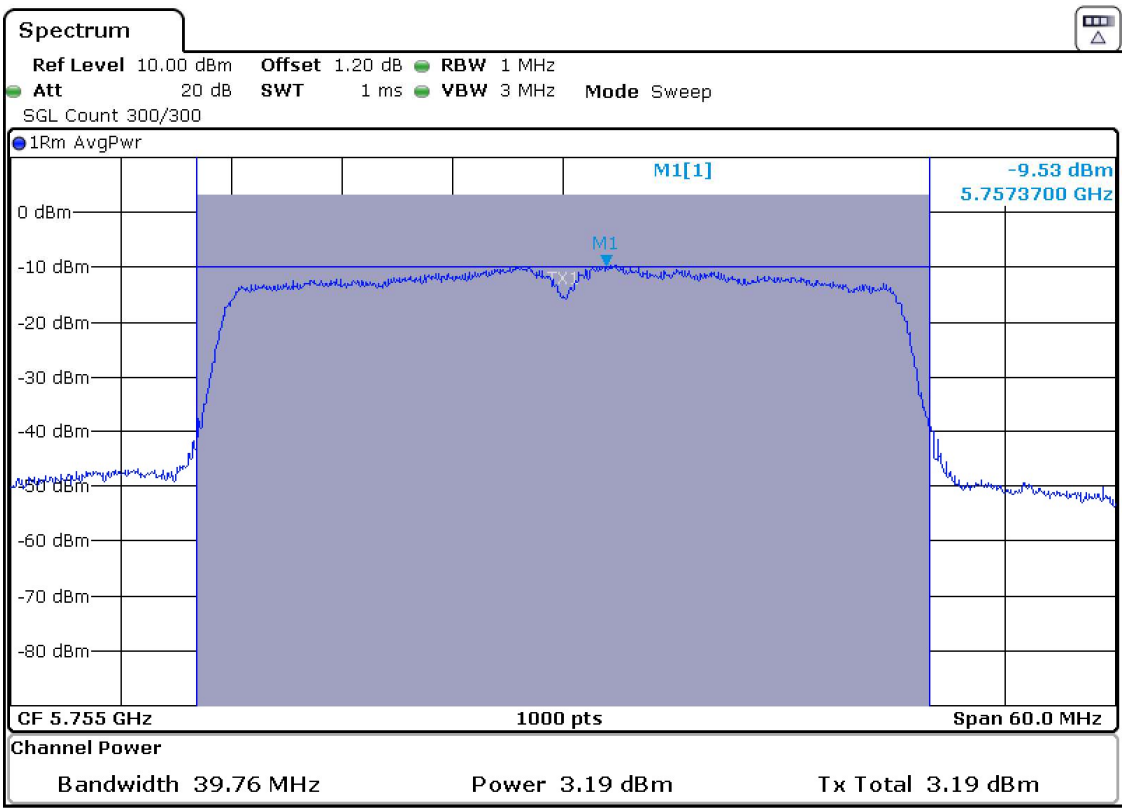


- High Channel 165:

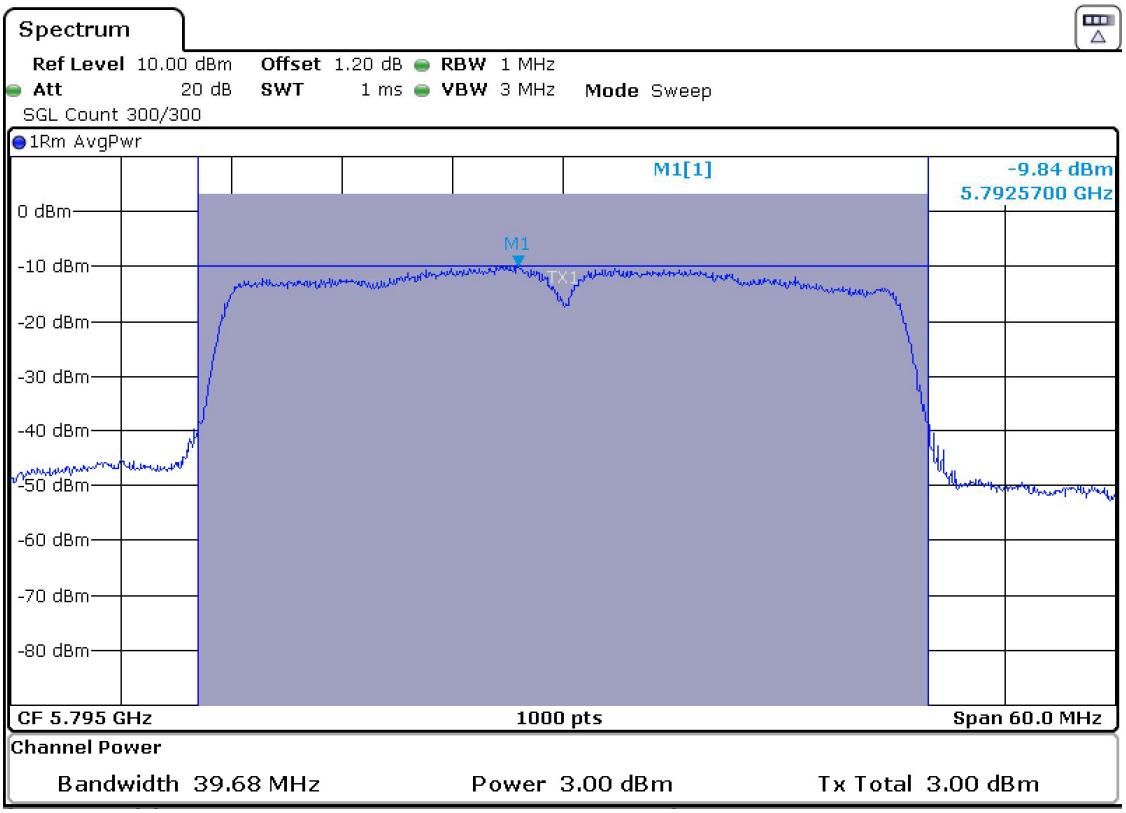


Mode 802.11 n40 (HT40)

- Low Channel 151:

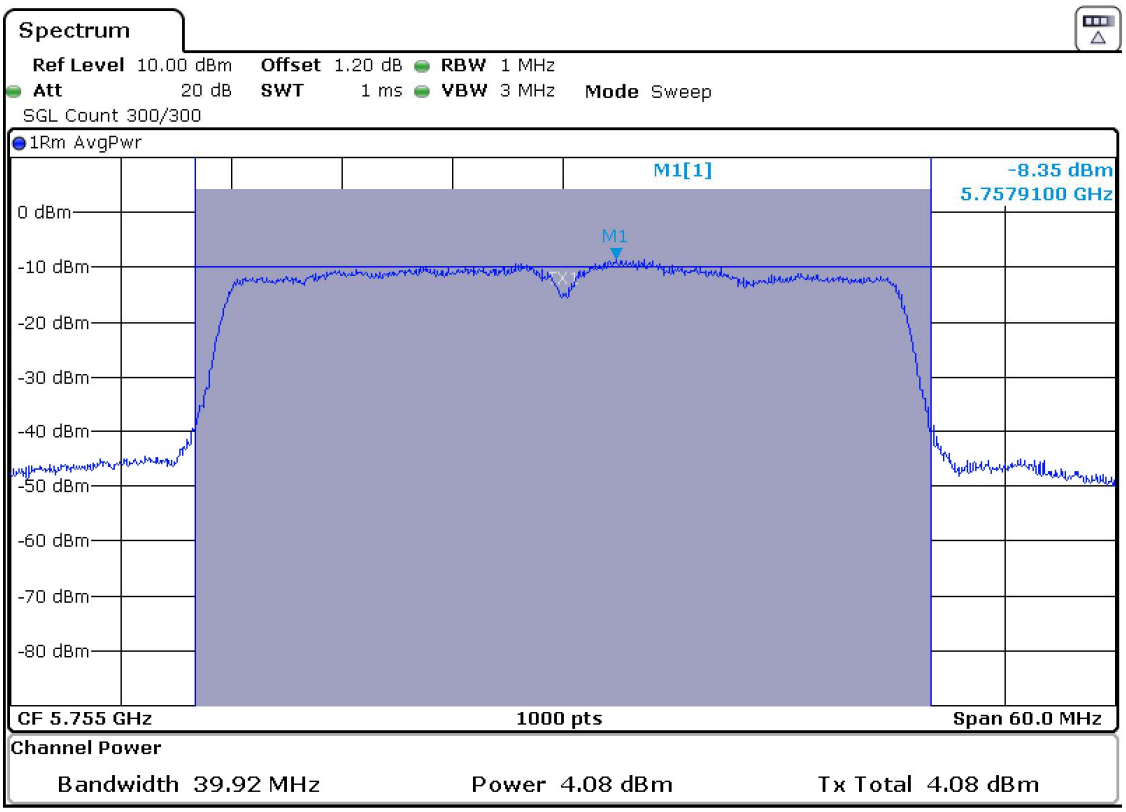


- High Channel 159:

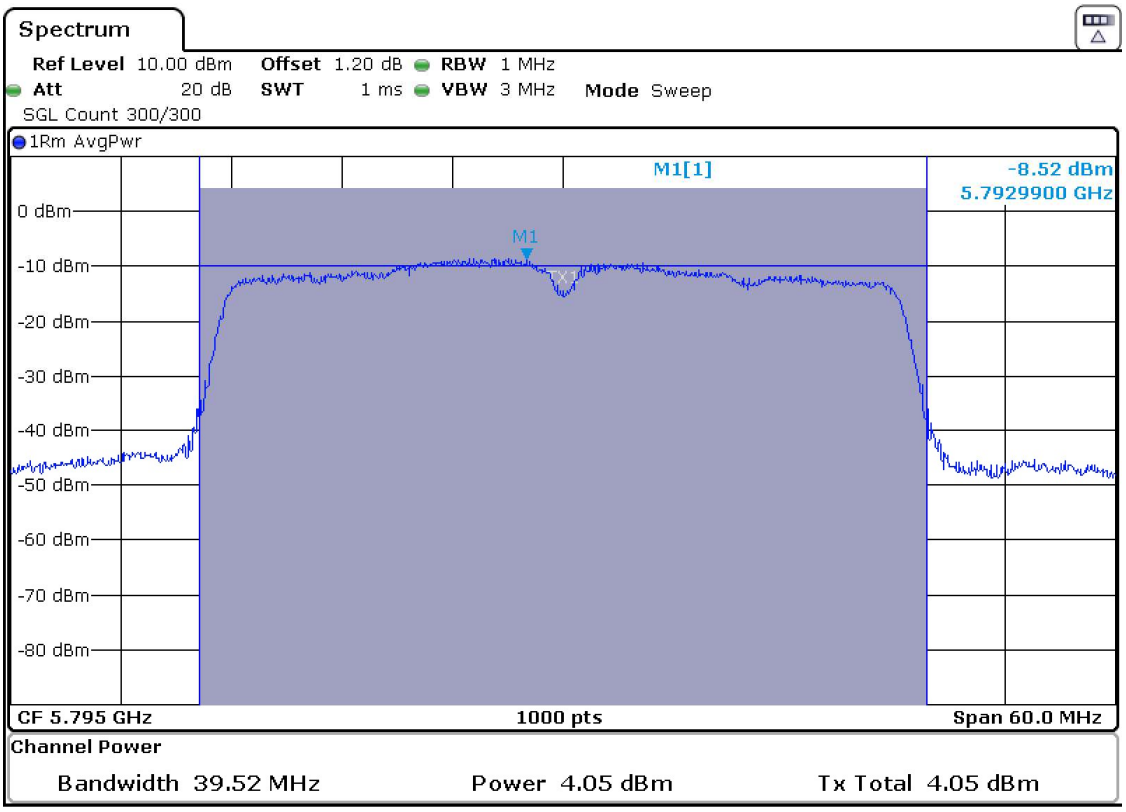


Mode 802.11 ac40 (VHT40)

- Low Channel 151:

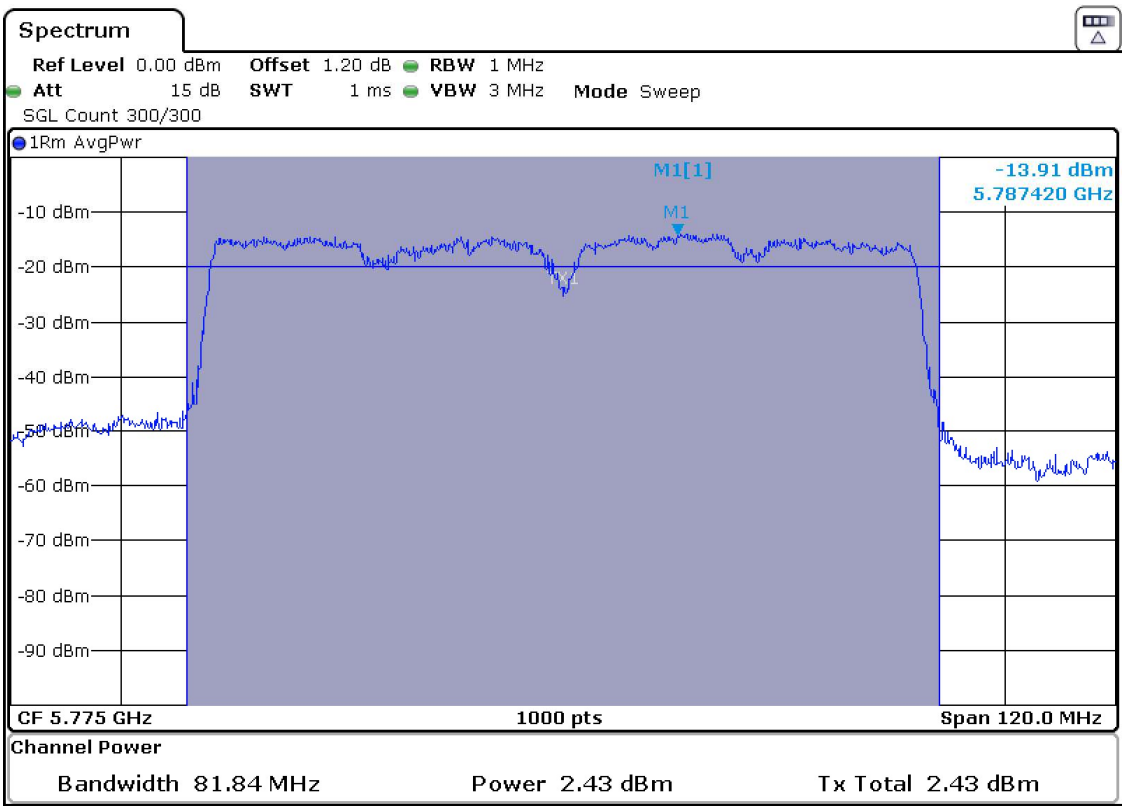


- High Channel 159:



Mode 802.11 ac80 (VHT80)

- Single Channel 155:



FCC 15.407 (a)(3) / RSS-247 6.2.4.1. Transmitter Maximum Power Spectral Density

SPECIFICATION:

FCC 15.407 / RSS-247: 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.

RESULTS:

The maximum power spectral density (PSD) was measured using the method according to point F) referencing E.2.b) (Method SA-1) and E.2.b) (Method SA-2) of Guidance 789033 D02 General UNII Test Procedures New Rules v02r01.

In accordance with ANSI C63.10 Section 4.1.4.1, use of bandwidths greater than those specified can produce higher readings. Compliance against the applicable limits is showns using a 1 MHz resolution bandwidth. This was deemed worst case.

The PSD test uses the same setup than the transmitter maximum conducted output power test. The result of the Peak PSD was measured by colocation a maker on the peak of the signal and the results are in the tables below.

For all modes of operation, the antenna gain is < 6 dBi.

Maximum Declared Antenna Gain: -5.4 dBi

Mode 802.11 a20

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Maximum PSD (dBm/MHz)	-3.55	-4.15	-4.3
Maximum EIRP PSD (dBm/MHz)	-4,155495029	-4,755495029	-4,905495029
Duty Cycle Correction Factor (dB)	4,794504971		
Maximum PSD Corrected (dBm/MHz)	1,244504971	0,644504971	0,494504971
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 n20 (HT20)

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Maximum PSD (dBm/MHz)	-5.82	-4.85	-6.21
Maximum EIRP PSD (dBm/MHz)	-6.166157927	-5.196157927	-6.556157927
Duty Cycle Correction Factor (dB)	5.053842073		
Maximum PSD Corrected (dBm/MHz)	-0.766157927	0.203842073	-1.156157927
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 ac20 (VHT20)

	Low Channel 149 (5745 MHz)	Middle Channel 157 (5785 MHz)	High Channel 165 (5825 MHz)
Maximum PSD (dBm/MHz)	-8.3	-8.52	-9.15
Maximum EIRP PSD (dBm/MHz)	-8,246941196	-8,466941196	-9,096941196
Duty Cycle Correction Factor (dB)	5,453058804		
Maximum PSD Corrected (dBm/MHz)	-2,846941196	-3,066941196	-3,696941196
Measurement uncertainty (dB)	<±1.20		

Mode 802.11 n40 (HT40)

	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
Maximum PSD (dBm/MHz)	-9.53	-9.84
Maximum EIRP PSD (dBm/MHz)	-8,076028029	-8,386028029
Duty Cycle Correction Factor (dB)	6,853971971	
Maximum PSD Corrected (dBm/MHz)	-2,676028029	-2,986028029
Measurement uncertainty (dB)	<±1.20	

Mode 802.11 ac40 (VHT40)

	Low Channel 151 (5755 MHz)	High Channel 159 (5795 MHz)
Maximum PSD (dBm/MHz)	-8.35	-8.52
Maximum EIRP PSD (dBm/MHz)	-6,451396236	-6,621396236
Duty Cycle Correction Factor (dB)	7,298603764	
Maximum PSD Corrected (dBm/MHz)	-1,051396236	-1,221396236
Measurement uncertainty (dB)	<±1.20	

Mode 802.11 ac80 (VHT80)

	Low Channel 155 (5775 MHz)
Maximum PSD (dBm/MHz)	-13,91
Maximum EIRP PSD (dBm/MHz)	-10,50215331
Duty Cycle Correction Factor (dB)	8,807846692
Maximum PSD Corrected (dBm/MHz)	-5,102153308
Measurement uncertainty (dB)	<±1.20

Verdict: PASS

FCC 15.407 (b)(4) / RSS-247 6.2.4.2. Undesirable Radiated Emissions (Transmitter) 1 to 40 GHz

SPECIFICATION:

For transmitters operating in the 5.725–5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz (68.23 dBµV/m at 3 m distance) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 1m for the frequency range 1 – 40 GHz and a distance of 3m for frequency range 30 MHz – 1 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Frequency range 30 MHz - 1 GHz

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious frequencies operating (radiated) detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
37.776	22.5	40	V	Quasi-Peak	± 3.88
250.012	29.6	46	V	Quasi-Peak	± 3.88

Frequency range 1 - 40 GHz

The results in the next tables show the maximum measured levels in the 1-40 GHz range including the 5.650 - 5.725 GHz and 5.850 - 5.925 GHz adjacent bands (see following plots).

Spurious frequencies with peak levels above the average limit (54 dBµV/m at 3 m) are measured with an average detector for checking compliance with the average limit.

OUT OF BAND EMISSIONS: For outside emissions of the band 5.65 - 5.925 GHz only the OFDM worst mode case determined after preliminary measurements was tested in the Low, Middle and High Channels.

BAND EDGES EMISSIONS: For band edge emissions of the band 5.65 – 5.725 and 5.850 - 5.925 GHz all modes were tested in the Low Middle and High Channels.

- **Mode 802.11 a20** (worst mode case)

OUT OF BAND EMISSIONS. Spurious emissions out of the band 5.65 - 5.925 GHz:

- Low Channel:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
1.39998	49.22	74	V	Peak	± 3.70
11.48243	59.56	74	V	Peak	± 3.70
	51.82	54		Peak	± 3.70
17.23115	41.39	68.23	H	Peak	± 3.70

- Middle Channel:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
1.398	48.73	74	V	Peak	± 3.70
10.00023	47.8	68.23	V	Peak	± 3.70
11.56608	58.96	74	V	Peak	± 3.70
	49.76	54		Peak	± 3.70
17.35075	42.71	68.23	V	Peak	± 3.70

- High Channel:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
1.3997	48.81	74	H	Peak	± 3.70
11.64588	58.92	74	V	Peak	± 3.70
17.43526	39.8	68.23	H	Peak	± 3.70

Verdict: PASS

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 – 5.725 and 5.850 - 5.925 GHz:

- Low Channel 149 (5745 MHz): Inside band 5.65-5.68 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel 157 (5785 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- High Channel 165 (5825 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- **Mode 802.11 n20 (HT20)**

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 - 5.925 GHz:

- Low Channel 149 (5745 MHz): Inside band 5.65-5.68 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel 157 (5785 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- High Channel 165 (5825 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- **Mode 802.11 ac20 (VHT20)**

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 - 5.925 GHz:

- Low Channel 149 (5745 MHz): Inside band 5.65-5.68 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- Middle Channel 157 (5785 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- High Channel 165 (5825 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- **Mode 802.11 n40 (HT40)**

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 - 5.925 GHz:

- Low Channel 151 (5755 MHz): Inside band 5.65-5.68 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- High Channel 159 (5795 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- **Mode 802.11 ac40 (VHT40)**

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 - 5.925 GHz:

- Low Channel 151 (5755 MHz): Inside band 5.65-5.68 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- High Channel 159 (5795 MHz): Inside band 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

- **Mode 802.11 ac80 (VHT80)**

BAND EDGES EMISSIONS. Spurious band edge emissions of the band 5.65 - 5.925 GHz:

- Single Channel 155 (5775 MHz): Inside band 5.65-5.68 GHz and 5.898-5.925 GHz.

No radiated spurious frequencies detected at less than 20 dB below the limit.

Verdict: PASS