6. Emissions in Restricted Frequency Bands (Radiated emission measurements)

6.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,165 for 20MHz 38,46,151,159 for 40MHz 42, 155 for 80 MHz	

6.2 Limit for emission in restricted frequency bands (Radiated emission measurement)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	2400/F(kHz)	30
1.705~30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit

Applicable to	Limit	
	Field strength at 3m (dBμV/m)	
V	PK	AV
	74	54
	EIRP Limit (dBm)	**Equivalent Field Strength at 3m (dBμV/m)**
	PK	PK
	-27	68.2

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength: E = 1000000(√30P)/3 (μV/m), where P is the eirp (Watt)

6.3 Measuring instrument setting

Below 1GHz measurement

Receiver settings	
Receiver function	**Setting**
Detector	QP
RBW	9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz
VBW	≧3 x RBW
Sweep	Auto couple
Attenuation	Auto

Above 1GHz measurement

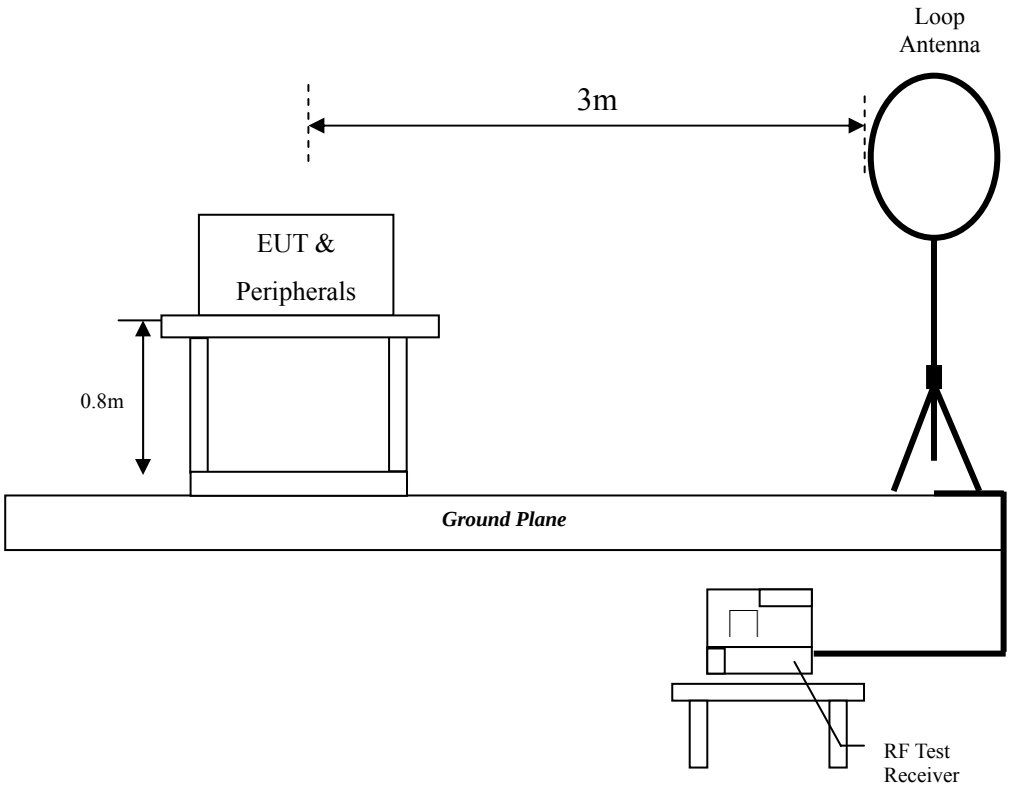
Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Start Frequency	1GHz
Stop Frequency	Tenth harmonic
Attenuation	Auto

6.4 Test procedure

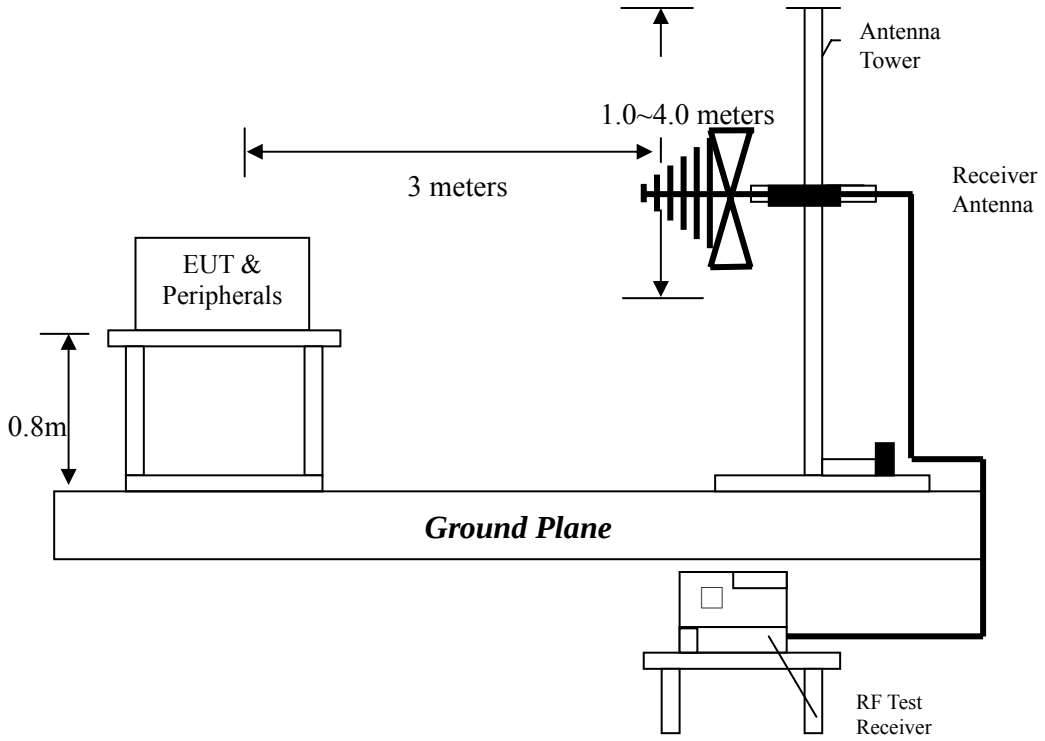
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground for above 1GHz and placed on the top of the turntable 0.8 meter above ground for below 1GHz. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level.
3. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization
4. If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading.
5. Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
   Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
7. If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be quasi-peak measured by receiver.

6.5 Test configuration

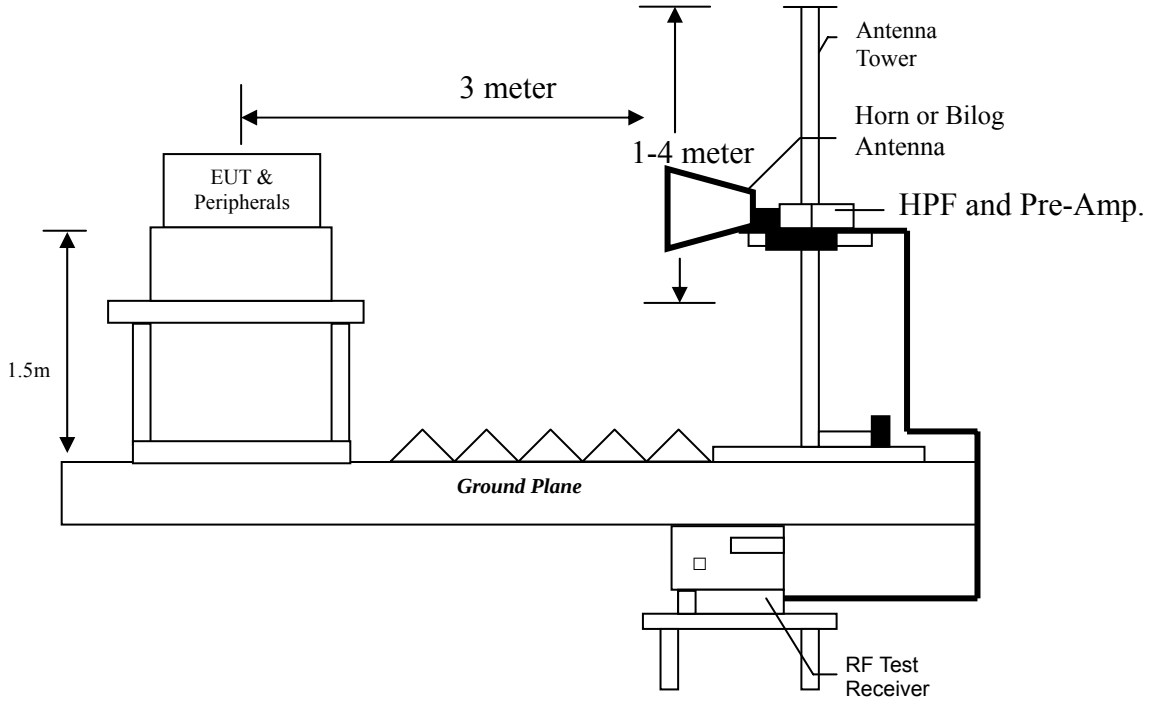
6.5.1 Radiated emission from 9 kHz to 30MHz using Loop Antenna



6.5.2 Radiated emission below 1GHz using Bilog Antenna



6.5.3 Radiated emission above 1GHz using Horn Antenna



6.6 Test results

6.6.1 Measurement results: frequencies from 9 kHz to 30MHz

EUT : G10
Test mode : 802.11n (HT20) Tx channel 40

Frequency (MHz)	Detection value	Factor (dB/m)	Reading (dBμV)	Value (dBμV/m)	Limit @ 3m (dBμV/m)	Tolerance (dB)
2.39	QP	21.41	35.10	56.51	69.54	-13.03
17.88	QP	22.22	24.13	46.35	69.54	-23.19
21.40	QP	22.19	16.56	38.75	69.54	-30.79
2.09	QP	21.39	33.27	54.66	69.54	-14.88
15.39	QP	22.25	22.84	45.09	69.54	-24.45
22.24	QP	22.19	15.97	38.16	69.54	-31.38

Remark: Corr. Factor = Antenna Factor + Cable Loss

6.6.2 Measurement results: frequencies from 30 MHz to 1GHz

The test was performed on EUT under 802.11a/n/ac continuously transmitting mode. The worst case occurred at 802.11a Tx channel 165.

EUT : G10
Worst Case : 802.11a Tx channel 165

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Vertical	202.66	QP	14.02	17.69	31.71	43.50	-11.79
Vertical	375.32	QP	19.33	14.94	34.27	46.00	-11.73
Vertical	499.48	QP	22.02	11.69	33.71	46.00	-12.29
Vertical	625.58	QP	24.50	7.30	31.80	46.00	-14.20
Vertical	749.74	QP	26.54	9.07	35.61	46.00	-10.39
Vertical	875.84	QP	28.33	8.52	36.85	46.00	-9.15
Horizontal	200.72	QP	16.17	18.75	34.92	43.50	-8.58
Horizontal	375.32	QP	19.23	18.76	37.99	46.00	-8.01
Horizontal	499.48	QP	21.41	14.76	36.17	46.00	-9.83
Horizontal	625.58	QP	23.62	13.46	37.08	46.00	-8.92
Horizontal	749.74	QP	25.80	10.79	36.59	46.00	-9.41
Horizontal	875.84	QP	28.01	10.76	38.77	46.00	-7.23

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

6.6.3 Measurement results: frequency above 1GHz to 40GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11a Ch_36 chain0	6906	PK	V	38.40	9.61	48.96	58.57	74.00	-15.43
	6906	AV	V	38.40	9.61	25.69	35.30	54.00	-18.70
	10360	PK	V	38.95	12.23	48.81	61.04	74.00	-12.96
	10360	AV	V	38.95	12.23	31.77	44.00	54.00	-10.00
	6891	PK	H	38.40	9.79	40.24	50.03	74.00	-23.97
	10360	PK	H	38.95	12.23	41.73	53.96	74.00	-20.04
802.11a Ch_40 chain0	6933	PK	V	38.40	9.28	48.64	57.92	74.00	-16.08
	6933	AV	V	38.40	9.28	39.20	48.48	54.00	-5.52
	10400	PK	V	38.97	12.36	55.23	67.59	74.00	-6.41
	10400	AV	V	38.97	12.36	32.94	45.30	54.00	-8.70
	10400	PK	H	38.97	12.36	48.88	61.24	74.00	-12.76
	10400	AV	H	38.97	12.36	28.69	41.05	54.00	-12.95
802.11a Ch_48 chain0	6983	PK	V	38.40	8.66	43.27	51.93	74.00	-22.07
	10480	PK	V	39.03	12.62	52.82	65.44	74.00	-8.56
	10480	AV	V	39.03	12.62	26.29	38.91	54.00	-15.09
	6983	PK	H	38.40	8.66	41.64	50.30	74.00	-23.70
	10480	PK	H	39.03	12.62	48.84	61.46	74.00	-12.54
	10480	AV	H	39.03	12.62	29.36	41.98	54.00	-12.02
802.11a Ch_149 chain0	11490	PK	V	39.01	14.46	51.54	66.00	74.00	-8.00
	11490	AV	V	39.01	14.46	36.27	50.73	54.00	-3.27
	11490	PK	H	39.01	14.46	44.97	59.43	74.00	-14.57
	11490	AV	H	39.01	14.46	30.70	45.16	54.00	-8.84
802.11a Ch_157 chain0	11570	PK	V	38.98	14.33	51.97	66.30	74.00	-7.70
	11570	AV	V	38.98	14.33	36.24	50.57	54.00	-3.43
	7696	PK	H	37.67	9.74	29.71	39.45	74.00	-34.55
	11570	PK	H	38.98	14.33	50.21	64.54	74.00	-9.46
	11570	AV	H	38.98	14.33	27.35	41.68	54.00	-12.32
802.11a Ch_165 chain0	11650	PK	V	38.94	14.16	53.33	67.49	74.00	-6.51
	11650	AV	V	38.94	14.16	37.53	51.69	54.00	-2.31
	11650	PK	H	38.94	14.16	47.23	61.39	74.00	-12.61
	11650	AV	H	38.94	14.16	32.19	46.35	54.00	-7.65

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11n(HT20) Ch_36	6906	PK	V	38.40	9.61	49.64	59.25	74.00	-14.75
	6906	AV	V	38.40	9.61	34.19	43.80	54.00	-10.20
	10360	PK	V	38.95	12.23	48.31	60.54	74.00	-13.46
	10360	AV	V	38.95	12.23	28.20	40.43	54.00	-13.57
	6891	PK	H	38.40	9.79	40.12	49.91	74.00	-24.09
	10360	PK	H	38.95	12.23	46.95	59.18	74.00	-14.82
	10360	AV	H	38.95	12.23	26.69	38.92	54.00	-15.08
802.11n(HT20) Ch_40	6933	PK	V	38.40	9.28	48.11	57.39	74.00	-16.61
	6933	AV	V	38.40	9.28	32.46	41.74	54.00	-12.26
	10400	PK	V	38.97	12.36	53.95	66.31	74.00	-7.69
	10400	AV	V	38.97	12.36	29.65	42.01	54.00	-11.99
	10400	PK	H	38.97	12.36	51.46	63.82	74.00	-10.18
	10400	AV	H	38.97	12.36	27.68	40.04	54.00	-13.96
802.11n(HT20) Ch_48	6986	PK	V	38.40	8.62	46.50	55.12	74.00	-18.88
	6986	AV	V	38.40	8.62	32.01	40.63	54.00	-13.37
	10480	PK	V	39.03	12.62	56.25	68.87	74.00	-5.13
	10480	AV	V	39.03	12.62	28.91	41.53	54.00	-12.47
	6983	PK	H	38.40	8.66	41.76	50.42	74.00	-23.58
	10480	PK	H	39.03	12.62	49.73	62.35	74.00	-11.65
	10480	AV	H	39.03	12.62	27.50	40.12	54.00	-13.88
802.11n(HT20) Ch_149	11490	PK	V	39.01	14.46	51.45	65.91	74.00	-8.09
	11490	AV	V	39.01	14.46	36.22	50.68	54.00	-3.32
	11490	PK	H	39.01	14.46	47.52	61.98	74.00	-12.02
	11490	AV	H	39.01	14.46	31.31	45.77	54.00	-8.23
802.11n(HT20) Ch_157	11570	PK	V	38.98	14.33	59.22	73.55	74.00	-0.45
	11570	AV	V	38.98	14.33	31.59	45.92	54.00	-8.08
	7696	PK	H	37.67	9.74	41.76	51.50	74.00	-22.50
	11570	PK	H	38.98	14.33	53.89	68.22	74.00	-5.78
	11570	AV	H	38.98	14.33	29.48	43.81	54.00	-10.19
802.11n(HT20) Ch_165	11650	PK	V	38.94	14.16	58.13	72.29	74.00	-1.71
	11650	AV	V	38.94	14.16	35.71	49.87	54.00	-4.13
	11650	PK	H	38.94	14.16	55.80	69.96	74.00	-4.04
	11650	AV	H	38.94	14.16	30.37	44.53	54.00	-9.47

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
802.11n(HT40) Ch_38	6914	PK	V	38.40	9.51	49.93	59.44	74.00	-14.56
	6914	AV	V	38.40	9.51	41.79	51.30	54.00	-2.70
	11380	PK	V	39.02	14.31	54.82	69.13	74.00	-4.87
	11380	AV	V	39.02	14.31	31.53	45.84	54.00	-8.16
	11380	PK	H	39.02	14.31	38.34	52.65	74.00	-21.35
802.11n(HT40) Ch_46	6960	PK	V	38.40	8.94	53.37	62.31	74.00	-11.69
	6960	AV	V	38.40	8.94	41.46	50.40	54.00	-3.60
	10460	PK	V	39.01	12.56	58.42	70.98	74.00	-3.02
	10460	AV	V	39.01	12.56	35.18	47.74	54.00	-6.26
	6960	PK	H	38.40	8.94	43.94	52.88	74.00	-21.12
	10460	AV	H	39.01	12.56	49.41	61.97	54.00	7.97
	10460	PK	H	39.01	12.56	28.99	41.55	74.00	-32.45
802.11n(HT40) Ch_151	11510	PK	V	39.01	14.46	54.74	69.20	74.00	-4.80
	11510	AV	V	39.01	14.46	32.06	46.52	54.00	-7.48
	11510	PK	H	39.01	14.46	50.62	65.08	74.00	-8.92
	11510	AV	H	39.01	14.46	29.94	44.40	54.00	-9.60
802.11n(HT40) Ch_159	11590	PK	V	38.97	14.29	55.54	69.83	74.00	-4.17
	11590	AV	V	38.97	14.29	32.71	47.00	54.00	-7.00
	11590	PK	H	38.97	14.29	50.59	64.88	74.00	-9.12
	11590	AV	H	38.97	14.29	30.04	44.33	54.00	-9.67
	6937	PK	V	38.40	9.23	43.74	52.97	74.00	-21.03
	10420	PK	V	38.99	12.43	52.62	65.05	74.00	-8.95
802.11ac(VHT80) Ch_42	10420	AV	V	38.99	12.43	31.34	43.77	54.00	-10.23
	6937	PK	H	38.40	9.23	42.00	51.23	74.00	-22.77
	10420	PK	H	38.99	12.43	39.89	52.32	74.00	-21.68
	11550	PK	V	38.99	14.37	57.05	71.42	74.00	-2.58
	11550	AV	V	38.99	14.37	32.28	46.65	54.00	-7.35
802.11ac(VHT80) Ch_155	11550	PK	H	38.99	14.37	54.16	68.53	74.00	-5.47
	11550	AV	H	38.99	14.37	33.13	47.50	54.00	-6.50
	6914	PK	V	38.40	9.51	49.93	59.44	74.00	-14.56
	6914	AV	V	38.40	9.51	41.79	51.30	54.00	-2.70

Remark1: Correction Factor =Antenna Factor+ Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

Remark 2: The test mode of 802.11nHT20 are both “Chain 0 & Chain 1” on.

7. Emission on The Band Edge

7.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Requirement	15.407(b), 15.209	
Channel	36, 38, 42, 46, 48 149,157,165,151, 159, 155	

7.2 Measuring instrument setting

Spectrum analyzer settings	
Spectrum Analyzer function	**Setting**
Detector	Peak
RBW	1MHz
VBW	3MHz for Peak; 10Hz for Average
Sweep	Auto couple
Restrict bands	4500~5150MHz
	5350 ~5460MHz
Attenuation	Auto

Applicable to	**Limit**	
	EIRP Limit (dBm)	**Equivalent Field Strength at 3m (dBμV/m)**
5715-5725MHz 5850-5860MHz	AV	AV
	-17	78.2

7.3 Test procedure

The test procedure is the same as clause 6.4

7.4 Test Result

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11a	4842.50	PK	V	39.72	22.91	62.63	74	-11.37	4500~5150
	4865.50	AV	V	39.76	9.04	48.80	54	-5.20	
	5409.16	PK	V	40.73	19.63	60.36	74	-13.64	5350~5460
	5446.53	AV	V	40.79	7.72	48.51	54	-5.49	
802.11an (HT20)	4859.90	PK	V	39.75	23.47	63.22	74	-10.78	4500~5150
	4867.50	AV	V	39.76	9.14	48.90	54	-5.10	
	5430.28	PK	V	40.77	18.51	59.28	74	-14.72	5350~5460
	5446.79	AV	V	40.80	7.32	48.12	54	-5.88	
802.11an (HT40)	5136.70	PK	V	40.24	26.87	67.11	74	-6.89	4500~5150
	4867.30	AV	V	39.76	9.09	48.85	54	-5.15	
	5365.96	PK	V	40.65	18.72	59.37	74	-14.63	5350~5460
	5447.34	AV	V	40.80	7.39	48.19	54	-5.81	
802.11ac (VHT80)	5147.50	PK	V	40.26	26.69	66.95	74	-7.05	4500~5150
	4864.90	AV	V	39.76	8.95	48.71	54	-5.29	
	5447.32	PK	V	40.80	19.56	60.36	74	-13.64	5350~5460
	5446.70	AV	V	40.80	7.39	48.19	54	-5.81	

Remark: Correction Factor = Antenna Factor + Cable Loss

Mode	Freq. (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
802.11a 5745MHz	5725.00	AV	V	41.05	6.08	47.13	78.2	-31.07	5715~5725
	5850.00	AV	V	41.14	5.84	46.97	78.2	-31.23	5850~5860
802.11a 5785MHz	5725.00	AV	V	41.05	5.91	46.96	78.2	-31.24	5715~5725
	5864.61	AV	V	41.15	7.34	48.49	78.2	-29.71	5850~5860
802.11a 5825MHz	5725.00	AV	V	41.05	5.88	46.93	78.2	-31.27	5715~5725
	5864.73	AV	V	41.15	7.37	48.52	78.2	-29.68	5850~5860
802.11n (HT20) 5745MHz	5725.00	AV	V	41.05	7.67	48.72	78.2	-29.48	5715~5725
	5864.61	AV	V	41.15	7.37	48.52	78.2	-29.68	5850~5860
802.11n (HT20) 5785MHz	5725.00	AV	V	41.05	6.59	47.64	78.2	-30.56	5715~5725
	5864.61	AV	V	41.15	7.37	48.52	78.2	-29.68	5850~5860
802.11n (HT20) 5825MHz	5725.00	AV	V	41.05	6.02	47.07	78.2	-31.13	5715~5725
	5864.73	AV	V	41.15	7.43	48.58	78.2	-29.62	5850~5860
802.11n (HT40) 5755MHz	5721.76	AV	V	41.05	7.37	48.42	78.2	-29.78	5715~5725
	5864.73	AV	V	41.15	7.35	48.50	78.2	-29.70	5850~5860
802.11n (HT40) 5795MHz	5725.00	AV	V	41.05	5.91	46.96	78.2	-31.24	5715~5725
	5864.37	AV	V	41.15	7.14	48.29	78.2	-29.91	5850~5860
802.11ac (VHT80) 5775MHz	5724.27	AV	V	41.05	10.80	51.85	78.2	-26.35	5715~5725
	5864.61	AV	V	41.15	7.38	48.53	78.2	-29.67	5850~5860

Part 2: For Beamforming off mode

8. Maximum Conducted Output Power

8.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,165 for 20MHz 38,46,151,159 for 40MHz 42, 155 for 80MHz	

8.2 Limit for maximum output power

Operating Frequency (MHz)	Conducted output power limit
5150~5250	< 1 W (30 dBm)
5725~5850	< 1 W (30 dBm)

Operating Frequency (MHz)	Maximum E.I.R.P. limit
5150~5250	< 4 W (36 dBm)
5725~5850	< 4 W (36 dBm)

8.3 Measuring instrument setting

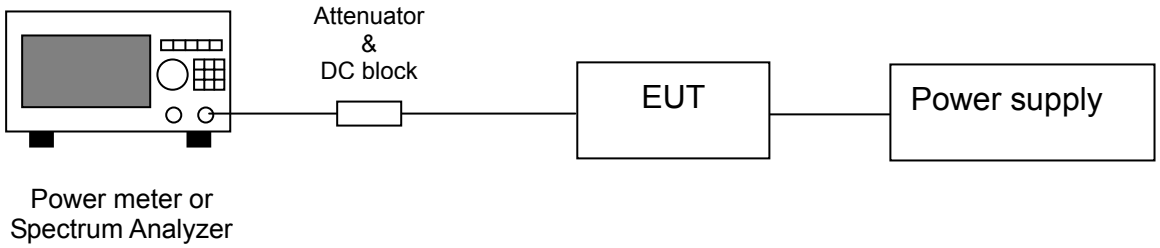
Power meter for Nominal Bandwidth less than 65MHz	
Power meter	**Setting**
Bandwidth	65MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

Spectrum Analyzer for Nominal Bandwidth greater than 65MHz	
Power meter	**Setting**
Span	Encompass the entire emission bandwidth
RBW	1MHz
VBW	≧ 3MHz
Sweep point	≧ 2 Span/RBW
Sweep time	auto
Detector	RMS or Sample
Video trigger	free run or specific level
Trace average mode	At least 100 traces
Bandwidth of Integrating Power mode	Equal to the emission bandwidth

8.4 Test procedure

Test procedures refer to clause E) 3) b) measurement using a gated RF average power meter of KDB 789033 D02 v01
Test procedures refer to clause E) 2) b) Method SA-1 of KDB 789033 D02 v01

8.5 Test diagram



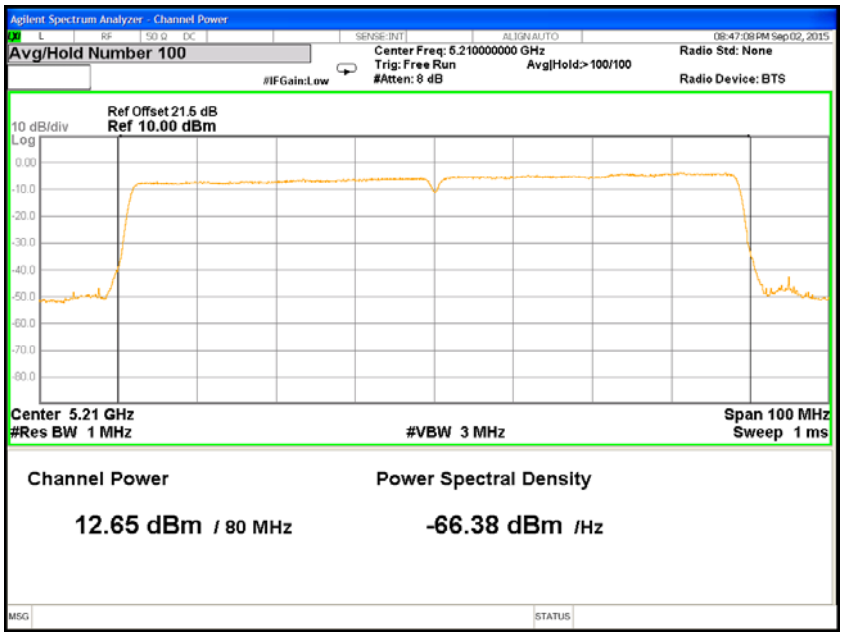
8.6 Test results

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (AV)		Antenna Gain (dBi)	Total Output Power (dBm)	Limit of Conducted Power (dBm)	Margin (dB)	Limit of E.I.R.P. (dBm)	Margin (dB)
				dBm	mW						
802.11a chain0	36	5180	6	21.28	134.28	2	23.28	30.00	-8.72	36.00	-12.72
	40	5200		21.36	136.77	2	23.36	30.00	-8.64	36.00	-12.64
	48	5240		21.48	140.60	2	23.48	30.00	-8.52	36.00	-12.52
	149	5745		12.88	19.41	2	14.88	30.00	-17.12	36.00	-21.12
	157	5785		13.25	21.13	2	15.25	30.00	-16.75	36.00	-20.75
	165	5825		13.19	20.84	2	15.19	30.00	-16.81	36.00	-20.81
802.11a chain1	36	5180	6	20.48	111.69	2	22.48	30.00	-9.52	36.00	-13.52
	40	5200		20.55	113.50	2	22.55	30.00	-9.45	36.00	-13.45
	48	5240		20.52	112.72	2	22.52	30.00	-9.48	36.00	-13.48
	149	5745		14.23	26.49	2	16.23	30.00	-15.77	36.00	-19.77
	157	5785		14.76	29.92	2	16.76	30.00	-15.24	36.00	-19.24
	165	5825		15.25	33.50	2	17.25	30.00	-14.75	36.00	-18.75
802.11a chain2	36	5180	6	19.87	97.05	2	21.87	30.00	-10.13	36.00	-14.13
	40	5200		19.65	92.26	2	21.65	30.00	-10.35	36.00	-14.35
	48	5240		18.95	78.52	2	20.95	30.00	-11.05	36.00	-15.05
	149	5745		16.57	45.39	2	18.57	30.00	-13.43	36.00	-17.43
	157	5785		17.23	52.84	2	19.23	30.00	-12.77	36.00	-16.77
	165	5825		17.66	58.34	2	19.66	30.00	-12.34	36.00	-16.34
802.11a chain3	36	5180	6	20.84	121.34	2	22.84	30.00	-9.16	36.00	-13.16
	40	5200		20.63	115.61	2	22.63	30.00	-9.37	36.00	-13.37
	48	5240		20.04	100.93	2	22.04	30.00	-9.96	36.00	-13.96
	149	5745		13.73	23.60	2	15.73	30.00	-16.27	36.00	-20.27
	157	5785		14.21	26.36	2	16.21	30.00	-15.79	36.00	-19.79
	165	5825		15.07	32.14	2	17.07	30.00	-14.93	36.00	-18.93

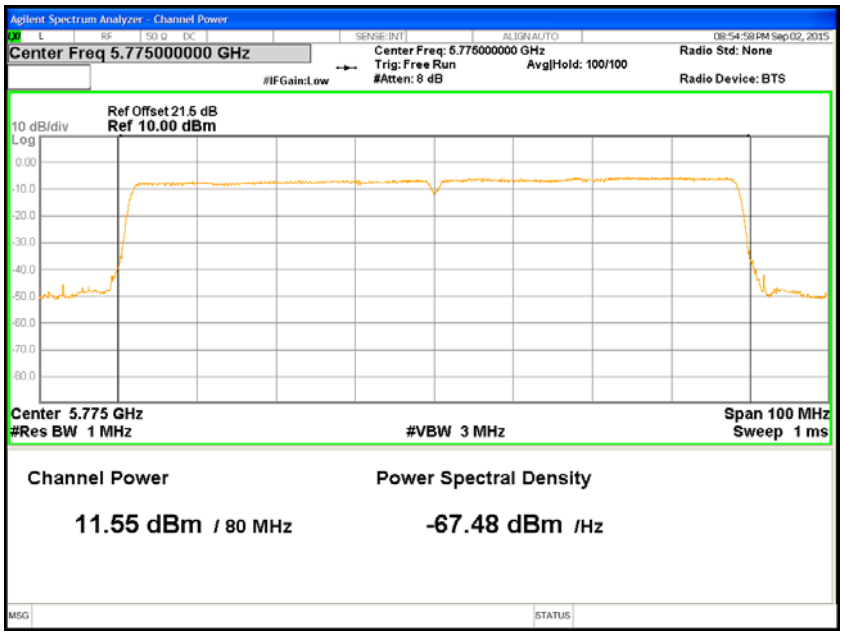
4TX

Mode	Ch	Freq. (MHz)	Data Rate (Mbps)	Output Power (dBm)				Total Power (dBm)		Conducted Power Limit (dBm)	Margin (dB)	Antenna gain (dB)	EIRP	EIRP Power Limit (dBm)	Margin (dB)
				Chain0	Chain1	Chain2	Chain3	AV							
				AV	AV	AV	AV	0+1+2+3 (mW)	0+1+2+3 (dBm)						
11n (20M)	36	5180	26	15.1	15.54	15.67	16.19	146.66	21.66	30	-8.34	2.00	23.66	36	-12.34
	40	5200		15.24	15.66	15.62	16.34	149.76	21.75	30	-8.25	2.00	23.75	36	-12.25
	48	5240		15.46	15.8	15.13	15.85	144.22	21.59	30	-8.41	2.00	23.59	36	-12.41
	149	5745		9.05	8.64	8.65	9.45	31.49	14.98	30	-15.02	2.00	16.98	36	-19.02
	157	5785		9.33	9.17	9.05	10.37	35.76	15.53	30	-14.47	2.00	17.53	36	-18.47
	165	5825		9.34	9.61	9.62	10.93	39.28	15.94	30	-14.06	2.00	17.94	36	-18.06
11n (40M)	38	5190	54	13.54	13.91	13.74	14.54	99.30	19.97	30	-10.03	2.00	21.97	36	-14.03
	46	5230		13.26	13.87	13.22	13.88	90.99	19.59	30	-10.41	2.00	21.59	36	-14.41
	151	5755		11.2	11.03	10.74	11.35	51.36	17.11	30	-12.89	2.00	19.11	36	-16.89
	159	5795		10.52	11.76	11.33	12.17	56.33	17.51	30	-12.49	2.00	19.51	36	-16.49
11ac (20M)	36	5180	26	15.05	15.51	15.62	16.11	144.86	21.61	30	-8.39	2.00	23.61	36	-12.39
	40	5200		15.2	15.62	15.57	16.27	148.01	21.70	30	-8.30	2.00	23.70	36	-12.30
	48	5240		15.42	15.73	15.06	15.76	141.98	21.52	30	-8.48	2.00	23.52	36	-12.48
	149	5745		9.01	8.6	8.58	9.38	31.09	14.93	30	-15.07	2.00	16.93	36	-19.07
	157	5785		9.29	9.14	8.99	10.3	35.34	15.48	30	-14.52	2.00	17.48	36	-18.52
	165	5825		9.31	9.55	9.55	10.85	38.72	15.88	30	-14.12	2.00	17.88	36	-18.12
11ac (40M)	38	5190	54	13.5	13.87	13.66	14.51	98.24	19.92	30	-10.08	2.00	21.92	36	-14.08
	46	5230		13.19	13.74	13.14	13.82	89.21	19.50	30	-10.50	2.00	21.50	36	-14.50
	151	5755		11.17	10.96	10.68	11.26	50.63	17.04	30	-12.96	2.00	19.04	36	-16.96
	159	5795		10.44	11.7	11.25	12.09	55.37	17.43	30	-12.57	2.00	19.43	36	-16.57
11ac (80M)	42	5210	117	12.65	20.53	12.38	13.19	75.69	18.79	30	-11.21	2.00	20.79	36	-15.21
	155	5775		11.55	19.09	11.05	11.7	55.40	17.43	30	-12.57	2.00	19.43	36	-16.57

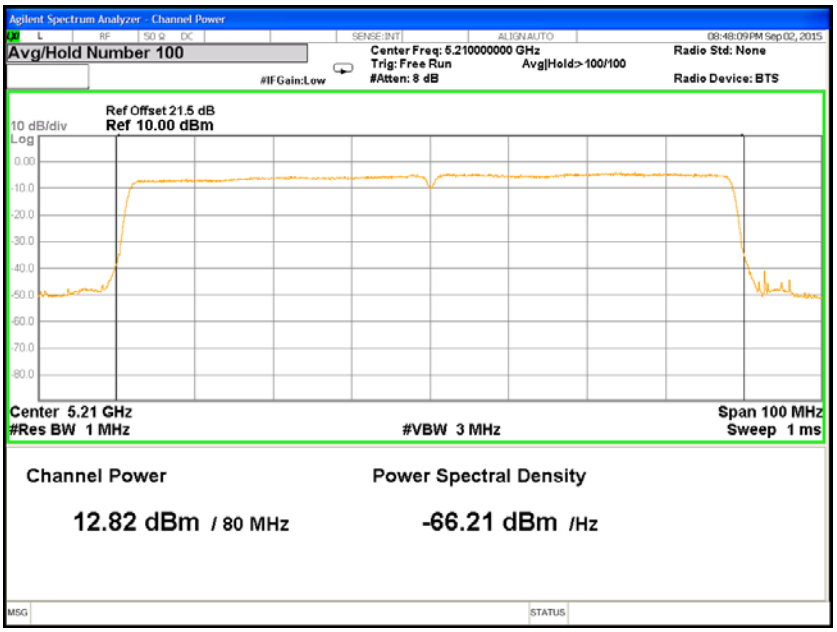
Chain0 : Output Power @ 802.11ac(VHT80) Mode Ch42



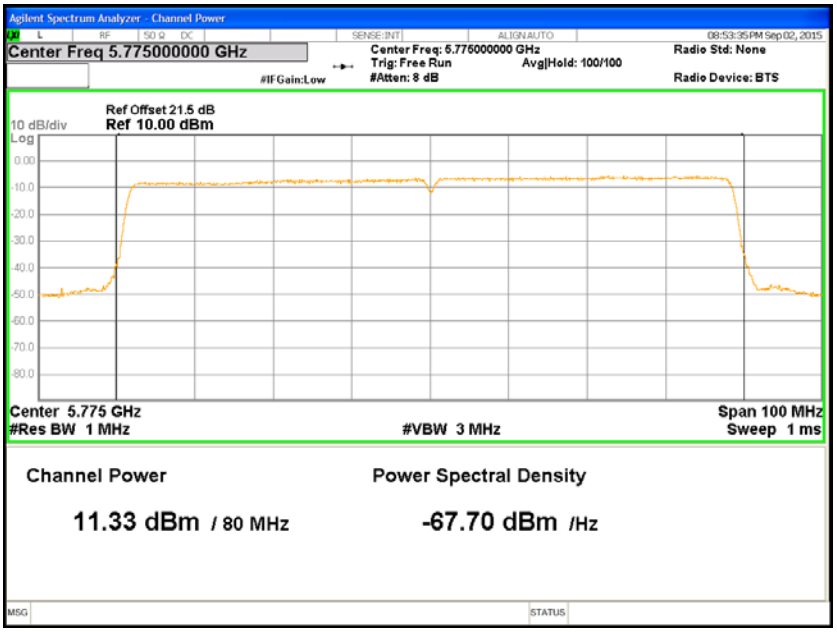
Chain0 : Output Power @ 802.11ac(VHT80) Mode Ch155



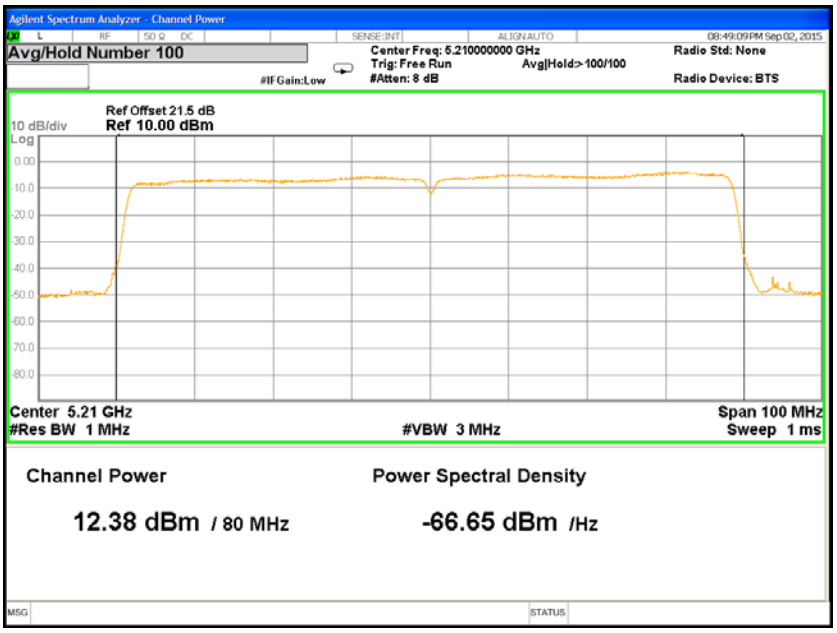
Chain1 : Output Power @ 802.11ac(VHT80) Mode Ch42



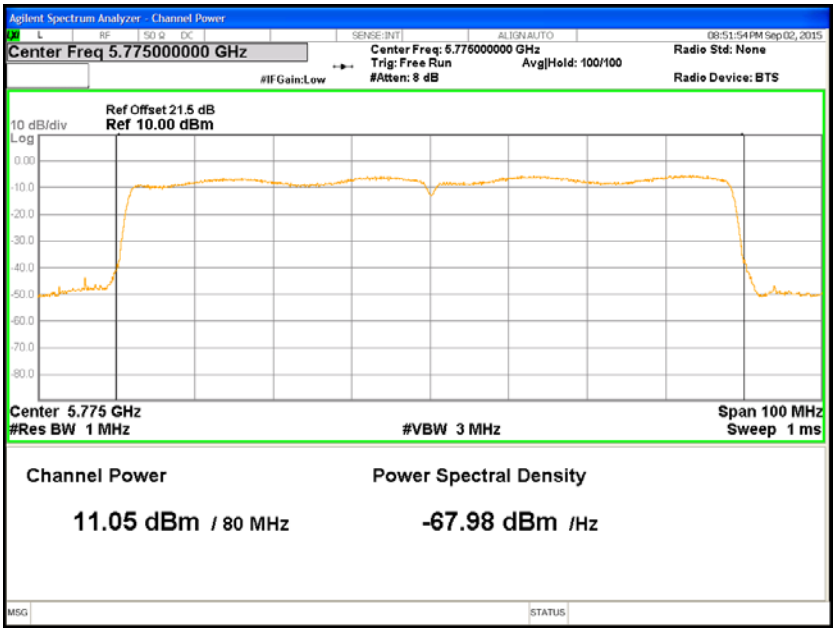
Chain1 : Output Power @ 802.11ac(VHT80) Mode Ch155



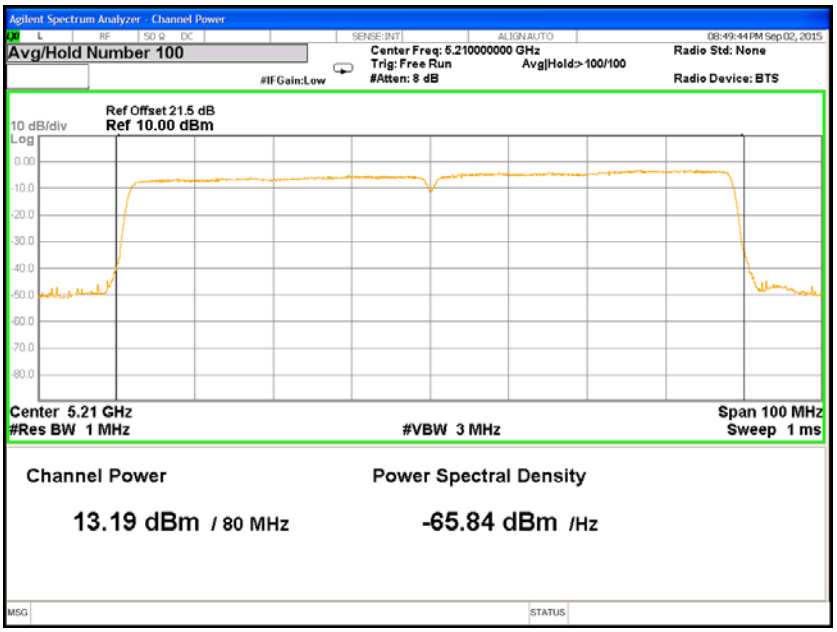
Chain2 : Output Power @ 802.11ac(VHT80) Mode Ch42



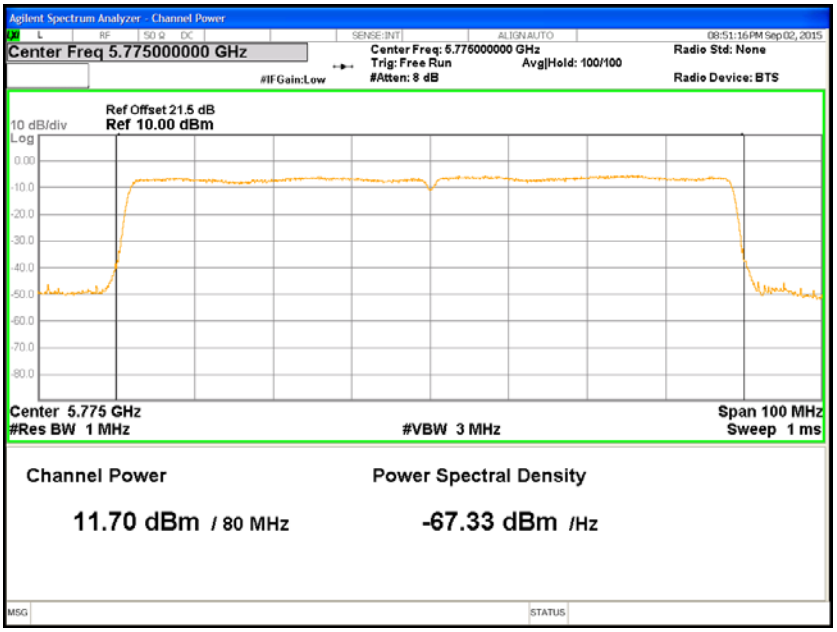
Chain2 : Output Power @ 802.11ac(VHT80) Mode Ch155



Chain3 : Output Power @ 802.11ac(VHT80) Mode Ch42



Chain3 : Output Power @ 802.11ac(VHT80) Mode Ch155



9. Power Spectrum Density

9.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure	1008	hPa
Channel number	36,40,48,149,157,165 for 20MHz 38,46,151,159 for 40MHz 42, 155 for 80MHz	

9.2 Limit for power spectrum density

Operating Frequency (MHz)	Power density limit
5150~5250	< 17 dBm/MHz
5725~5850	< 30 dBm/500kHz

9.3 Measuring instrument setting

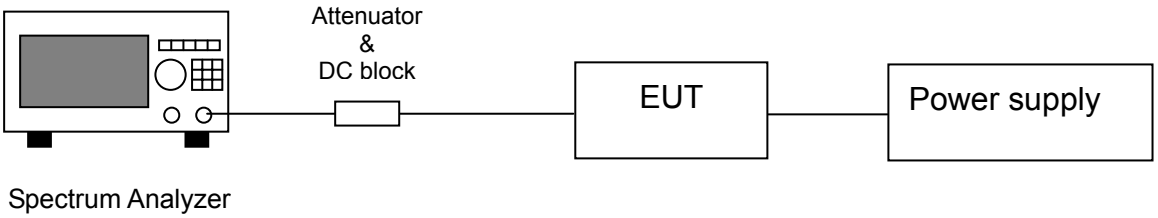
Spectrum analyzer settings (5150~5250MHz)	
Spectrum Analyzer function	**Setting**
Detector	RMS
RBW	1MHz
VBW	≧3 MHz
Sweep	Auto couple
Trace	Average
Span	Encompass the 26 dB EBW
Attenuation	Auto
Sweep point	≥ 2 Span / RBW

Spectrum analyzer settings (5725~5850MHz)	
Spectrum Analyzer function	**Setting**
Detector	RMS
RBW	100kHz
VBW	≧300 kHz
Sweep	Auto couple
Trace	Average
Span	Encompass the 6 dB EBW
Attenuation	Auto
Sweep point	≥ 2 Span / RBW

9.4 Test procedure

5. Set relevant parameter according to clause 4.3.
6. Trace average at least 100 traces in power averaging mode.
7. Compute power by integrating the spectrum across the 26 dB or 6dB EBW of the signal using the instrument's band power measurement function with band limits set equal to the EBW band edges
8. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. The RBW is 100 kHz. So, we will add 6.989 to the results.

9.5 Test diagram



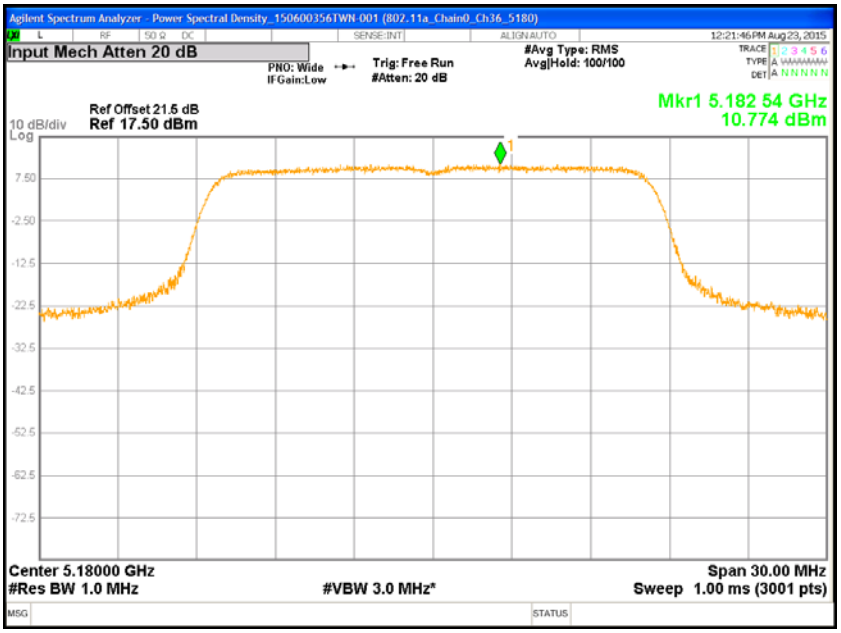
9.6 Test results

1TX

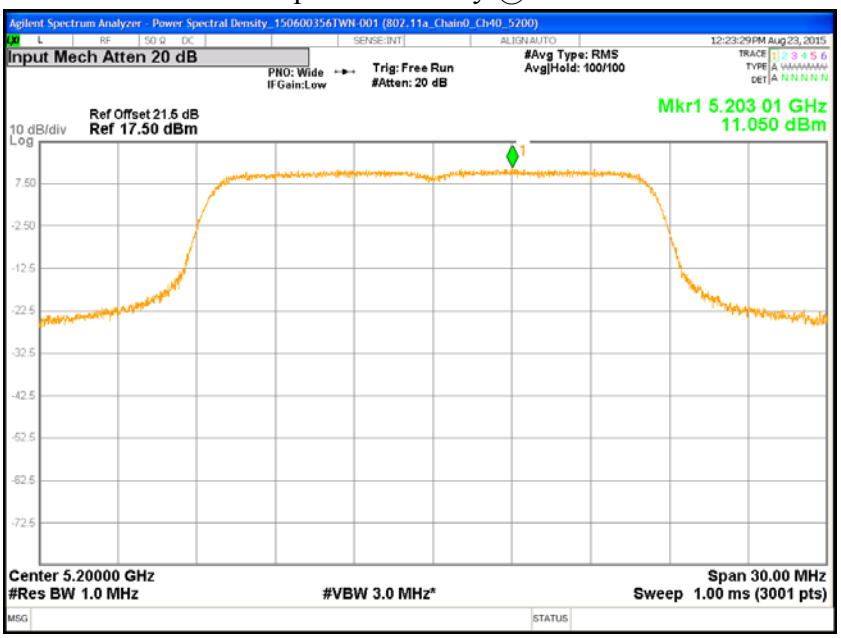
Mode	Channel	Frequency (MHz)	Data rate (Mbps)	PSD	Duty Cycle Factor	Total PSD with Duty factor		Limit (dBm)	Margin (dB)
				(dBm)		mW	dBm		
802.11a (Chain0)	36	5180	6	10.774	0.00	11.95	10.77	17	-6.23
	40	5200		11.050	0.00	12.74	11.05	17	-5.95
	48	5240		11.204	0.00	13.19	11.20	17	-5.80
	149	5745		0.263	0.00	1.06	0.26	30	-29.74
	157	5785		0.538	0.00	1.13	0.54	30	-29.46
	165	5825		0.660	0.00	1.16	0.66	30	-29.34
802.11a (Chain1)	36	5180	6	10.087	0.00	10.20	10.09	17	-6.91
	40	5200		10.210	0.00	10.50	10.21	17	-6.79
	48	5240		10.462	0.00	11.12	10.46	17	-6.54
	149	5745		1.771	0.00	1.50	1.77	30	-28.23
	157	5785		1.932	0.00	1.56	1.93	30	-28.07
	165	5825		2.662	0.00	1.85	2.66	30	-27.34
802.11a (Chain2)	36	5180	6	9.032	0.00	8.00	9.03	17	-7.97
	40	5200		9.323	0.00	8.56	9.32	17	-7.68
	48	5240		8.407	0.00	6.93	8.41	17	-8.59
	149	5745		3.393	0.00	2.18	3.39	30	-26.61
	157	5785		4.149	0.00	2.60	4.15	30	-25.85
	165	5825		4.751	0.00	2.99	4.75	30	-25.25
802.11a (Chain3)	36	5180	6	10.319	0.00	10.76	10.32	17	-6.68
	40	5200		10.285	0.00	10.68	10.29	17	-6.72
	48	5240		9.807	0.00	9.57	9.81	17	-7.19
	149	5745		0.585	0.00	1.14	0.59	30	-29.42
	157	5785		1.524	0.00	1.42	1.52	30	-28.48
	165	5825		2.213	0.00	1.66	2.21	30	-27.79

Mode	Ch.	Freq. (MHz)	Data rate (Mbps)	PSD (dBm)				Duty Cycle Factor	PSD with Duty factor (mw)				PSD with Duty factor		MIMO	Total PSD	Limit (dBm)	Margin (dB)
				Chain 0	Chain 1	Chain 2	Chain 3		Chain 0	Chain 1	Chain 2	Chain 3	mW	dBm	Correction	dBm		
802.11n (HT 20)	36	5180	6.5	3.556	3.883	4.165	4.263	0.00	2.27	2.45	2.61	2.67	9.99	10.00	6.00	16.00	17	-1.00
	40	5200		3.971	4.216	3.978	4.207	0.00	2.50	2.64	2.50	2.63	10.27	10.12	6.00	16.12	17	-0.88
	48	5240		3.877	4.206	3.641	3.693	0.00	2.44	2.63	2.31	2.34	9.73	9.88	6.00	15.88	17	-1.12
	149	5745		-3.865	-4.806	-4.824	-4.982	0.00	0.41	0.33	0.33	0.32	1.39	1.42	6.00	7.42	30	-22.58
	157	5785		-4.175	-4.506	-4.380	-4.132	0.00	0.38	0.35	0.36	0.39	1.49	1.73	6.00	7.73	30	-22.27
	165	5825		-3.795	-3.642	-3.374	-3.186	0.00	0.42	0.43	0.46	0.48	1.79	2.53	6.00	8.53	30	-21.47
802.11n (HT 40)	38	5190	13.5	-1.455	-1.253	-1.233	-1.020	0.00	0.72	0.75	0.75	0.79	3.01	4.78	6.00	10.78	17	-6.22
	46	5230		-1.023	-0.916	-1.444	-1.298	0.00	0.79	0.81	0.72	0.74	3.06	4.86	6.00	10.86	17	-6.14
	151	5755		-5.236	-5.893	-5.913	-5.642	0.00	0.30	0.26	0.26	0.27	1.09	0.36	6.00	6.36	30	-23.64
	159	5795		-4.746	-5.140	-5.026	-4.821	0.00	0.34	0.31	0.31	0.33	1.29	1.09	6.00	7.09	30	-22.91
802.11ac (VHT 80)	42	5210	29.3	-4.607	-4.656	-5.192	-4.360	0.00	0.35	0.34	0.30	0.37	1.36	1.33	6.00	7.33	17	-9.67
	155	5775		-8.386	-8.586	-9.373	-9.076	0.00	0.15	0.14	0.12	0.12	0.52	-2.82	6.00	3.18	30	-26.82

Chain0 : Power Spectral Density @ 802.11a Mode Ch36



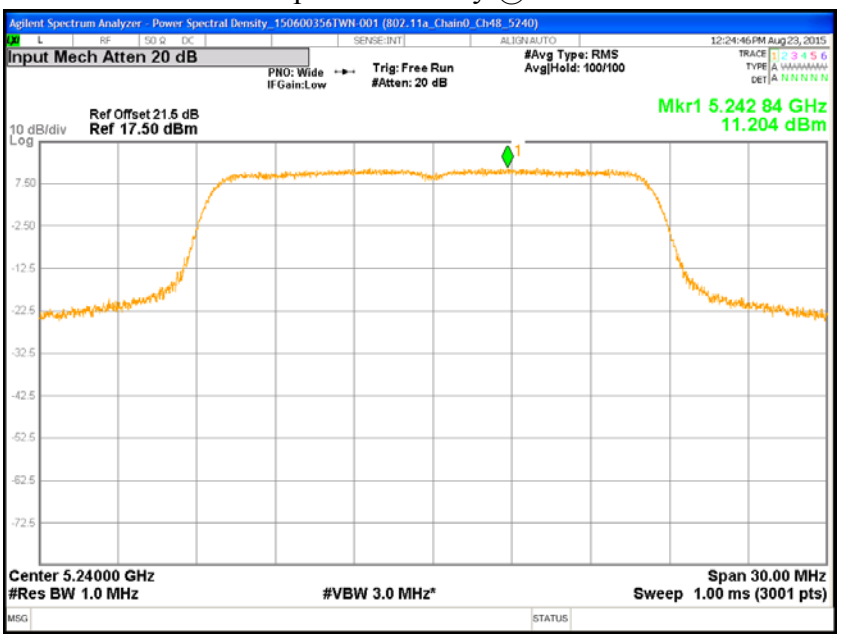
Chain0 : Power Spectral Density @ 802.11a Mode Ch40



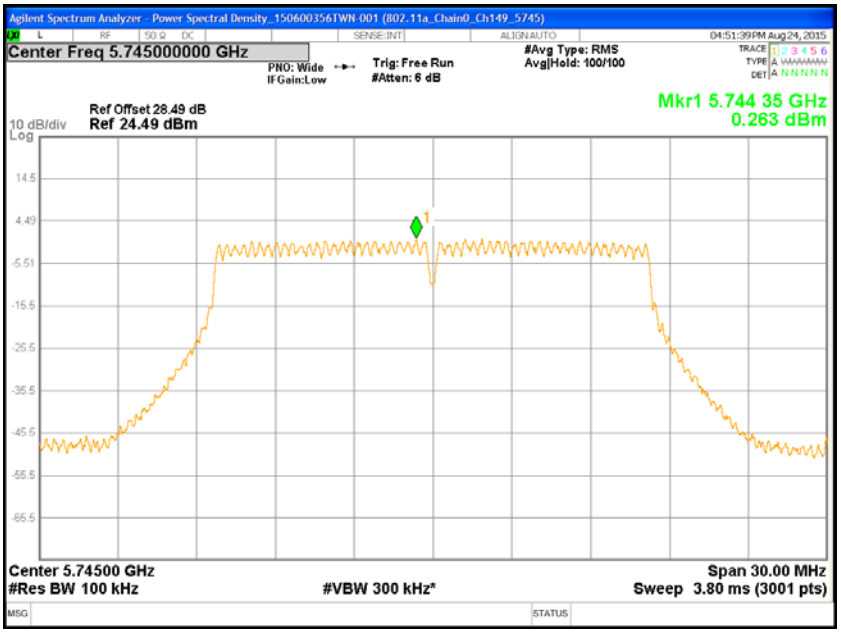
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11a Mode Ch48



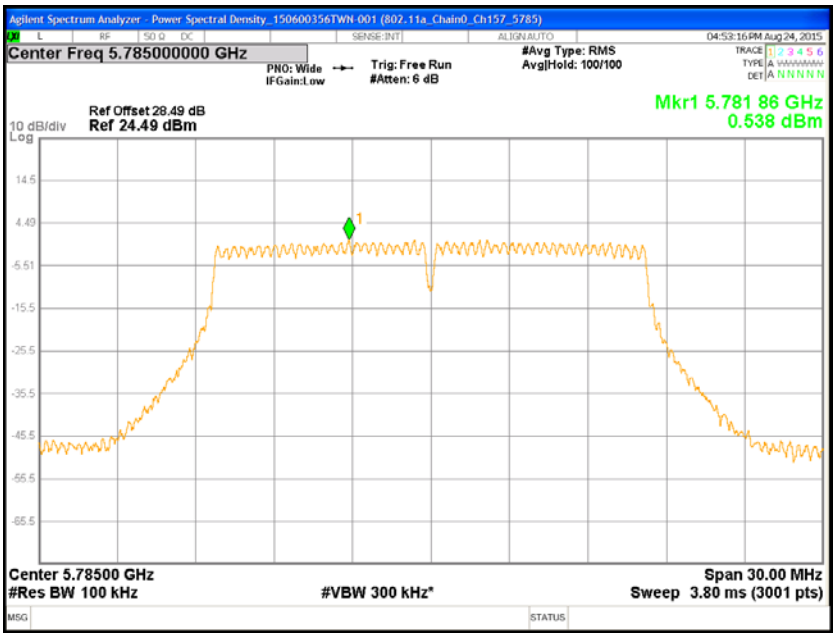
Chain0 : Power Spectral Density @ 802.11a Mode Ch149



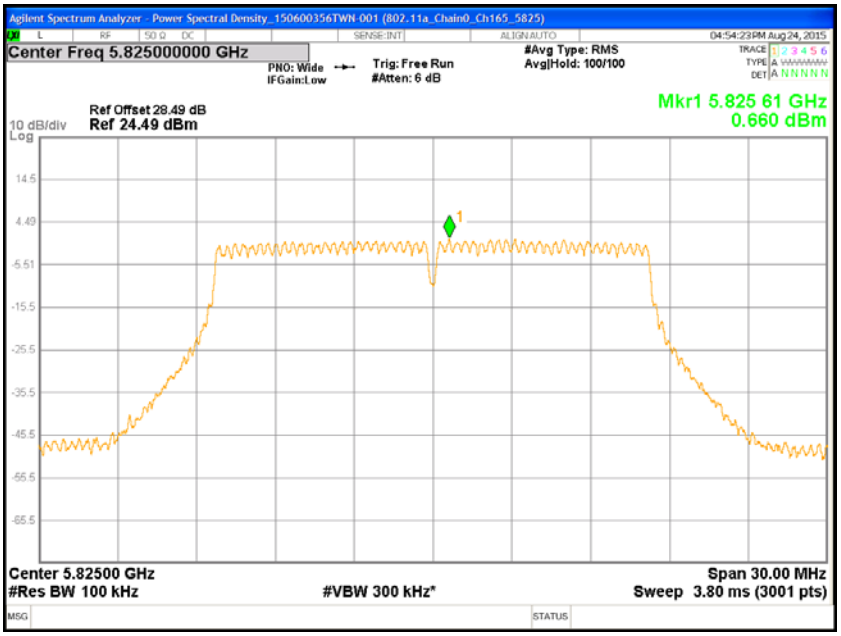
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11a Mode Ch157



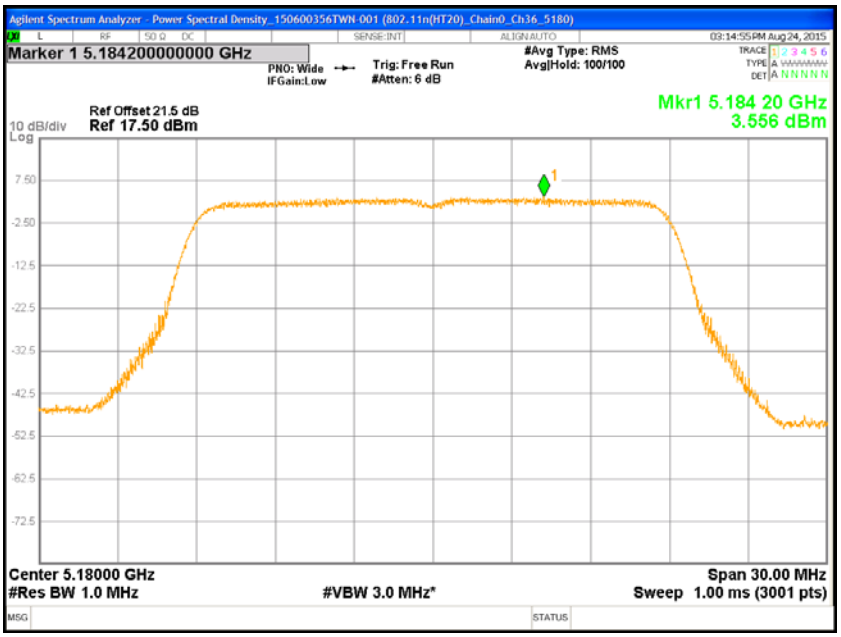
Chain0 : Power Spectral Density @ 802.11a Mode Ch165



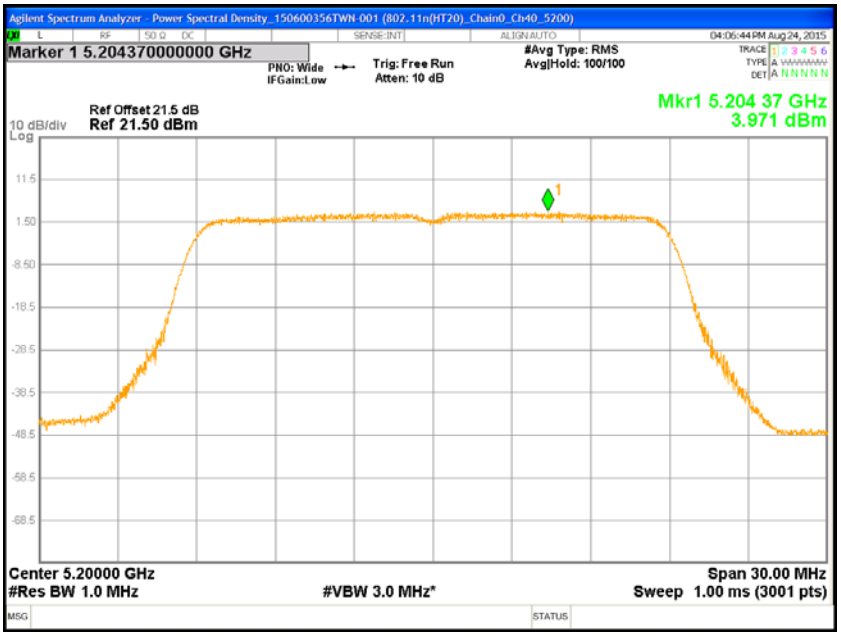
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch36



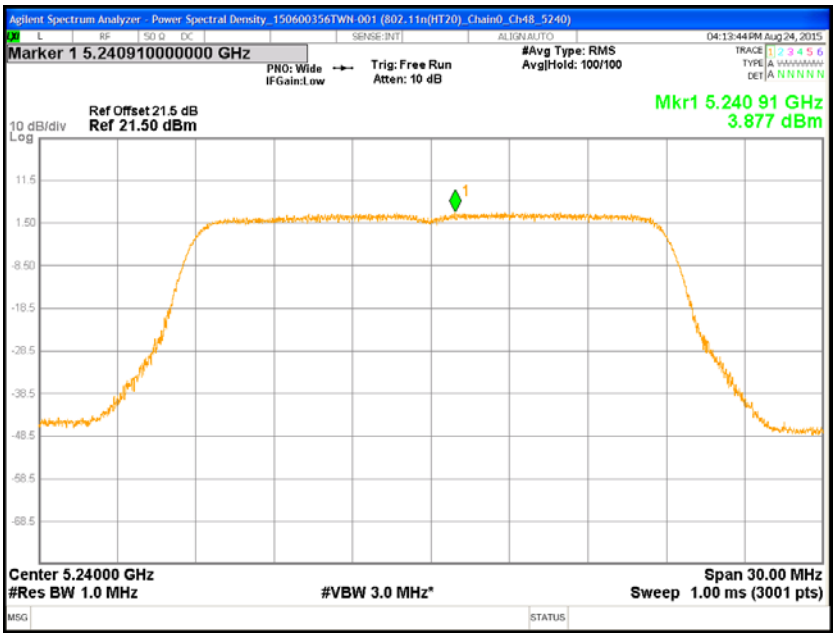
Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch40



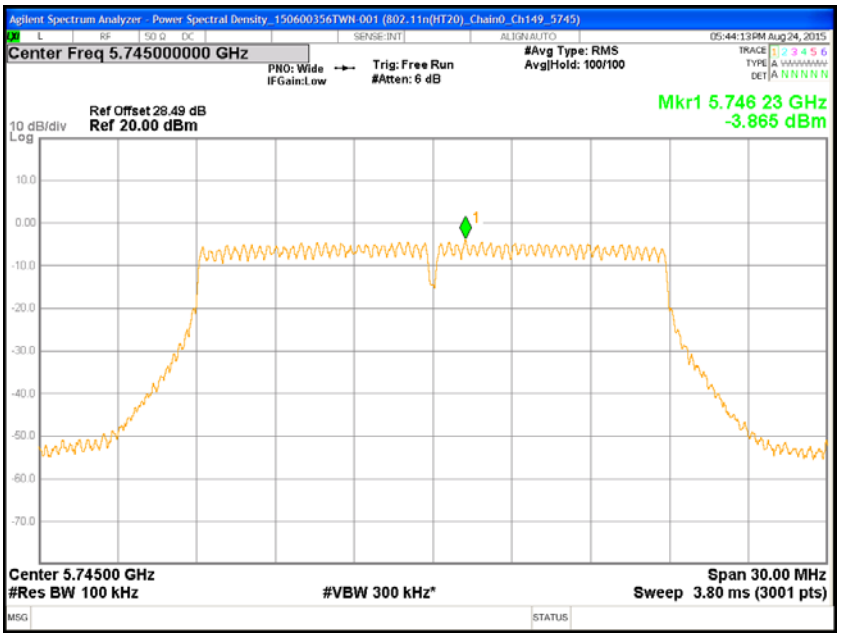
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch48



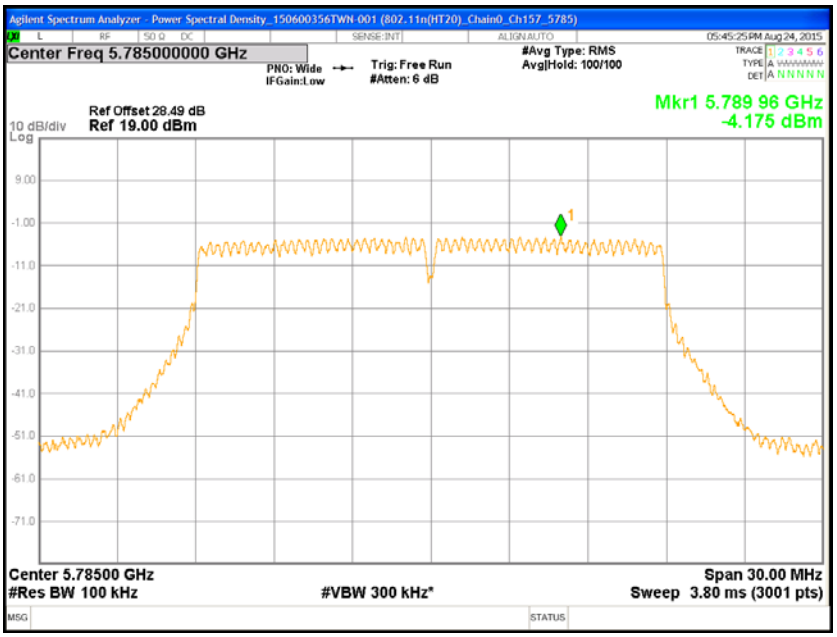
Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch149



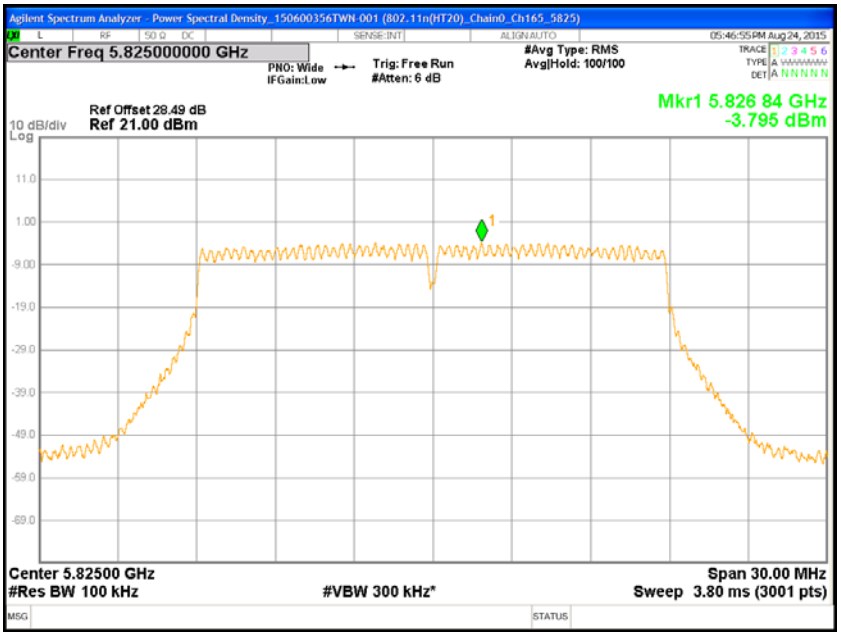
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch157



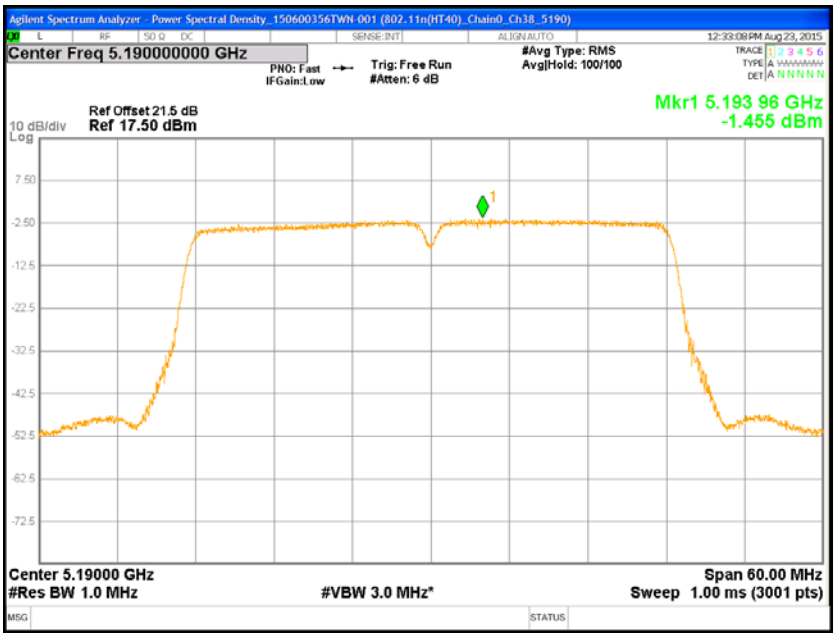
Chain0 : Power Spectral Density @ 802.11an(HT20) Mode Ch165



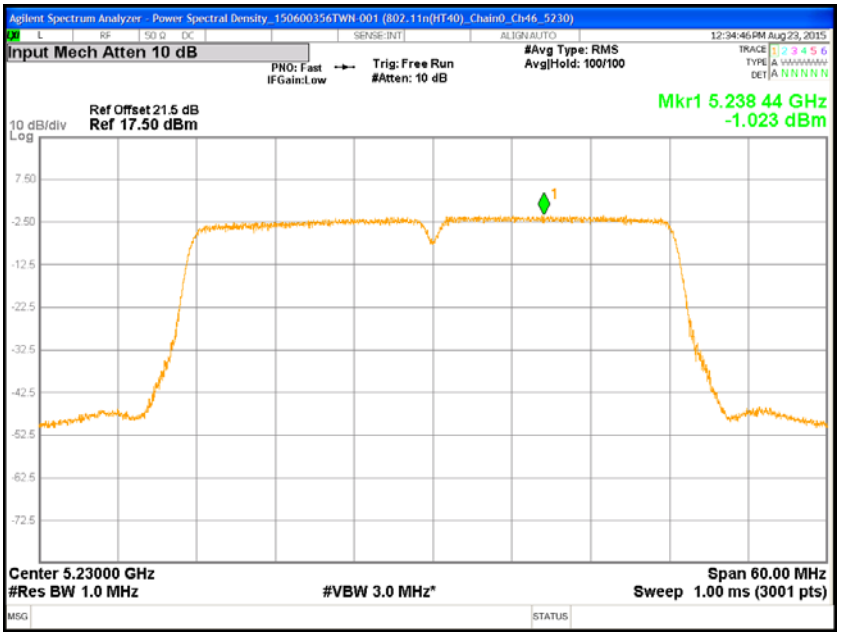
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11an(HT40) Mode Ch38



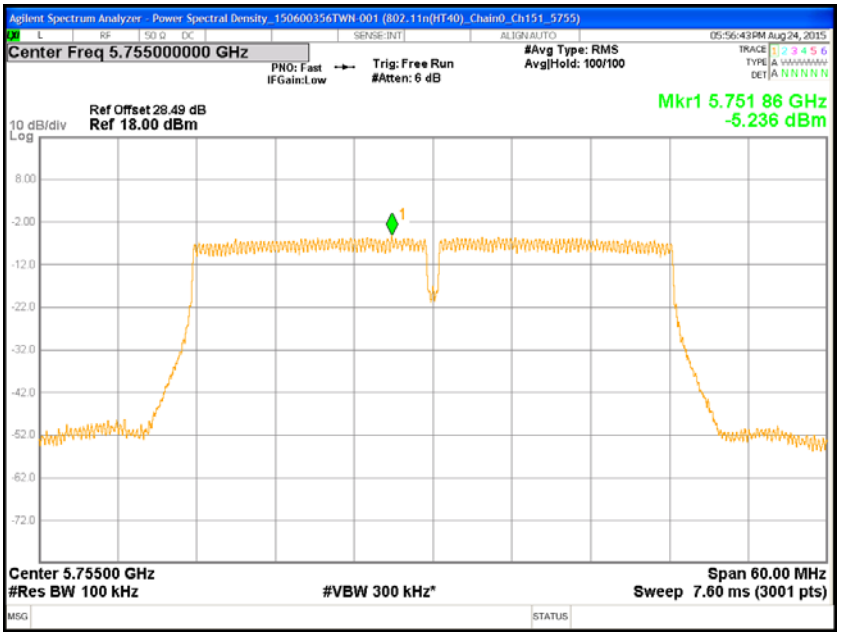
Chain0 : Power Spectral Density @ 802.11an(HT40) Mode Ch46



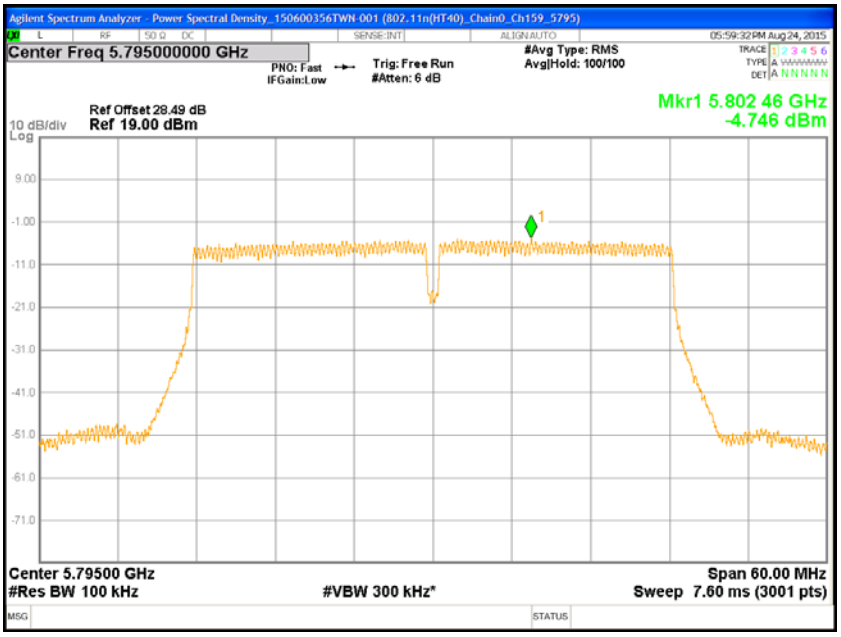
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11an(HT40) Mode Ch151



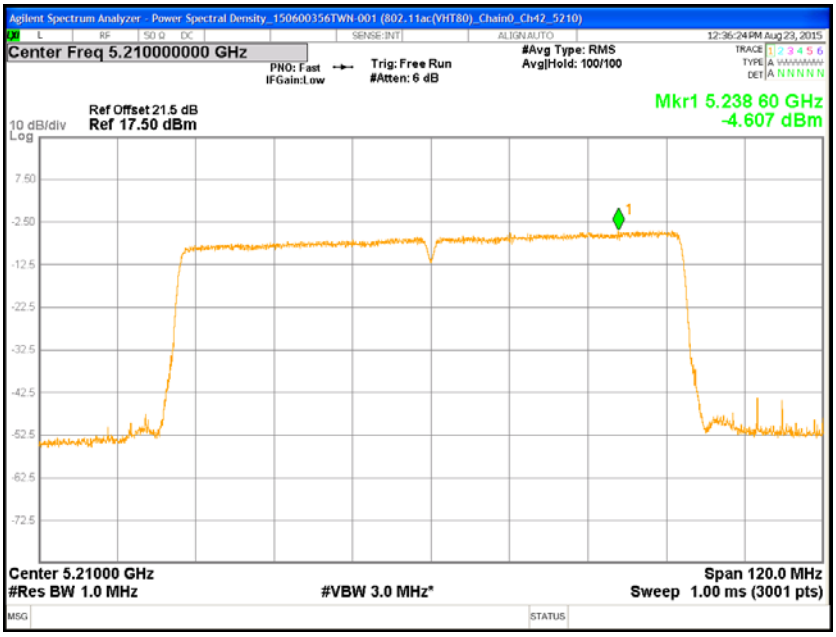
Chain0 : Power Spectral Density @ 802.11an(HT40) Mode Ch159



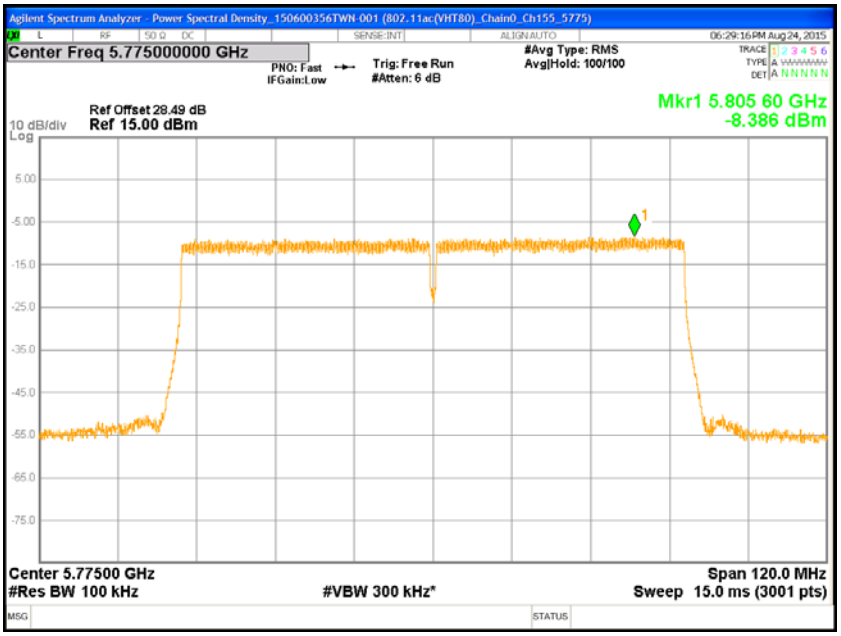
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain0 : Power Spectral Density @ 802.11ac(VHT80) Mode Ch42



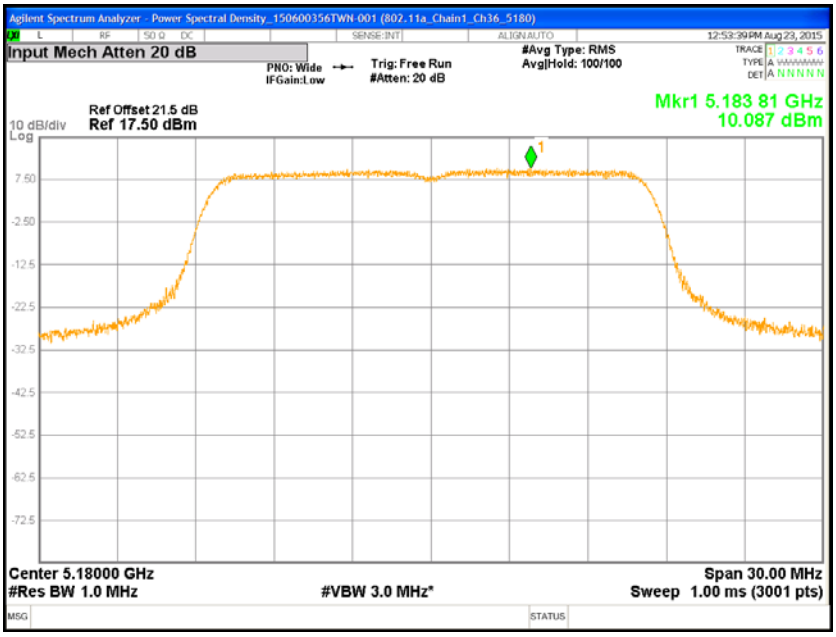
Chain0 : Power Spectral Density @ 802.11ac(VHT80) Mode Ch155



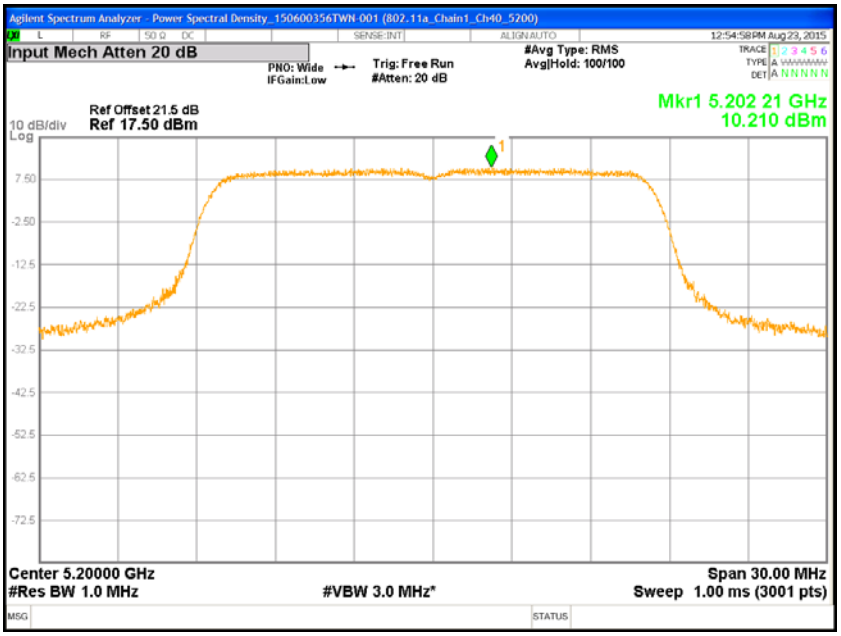
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1 : Power Spectral Density @ 802.11a Mode Ch36



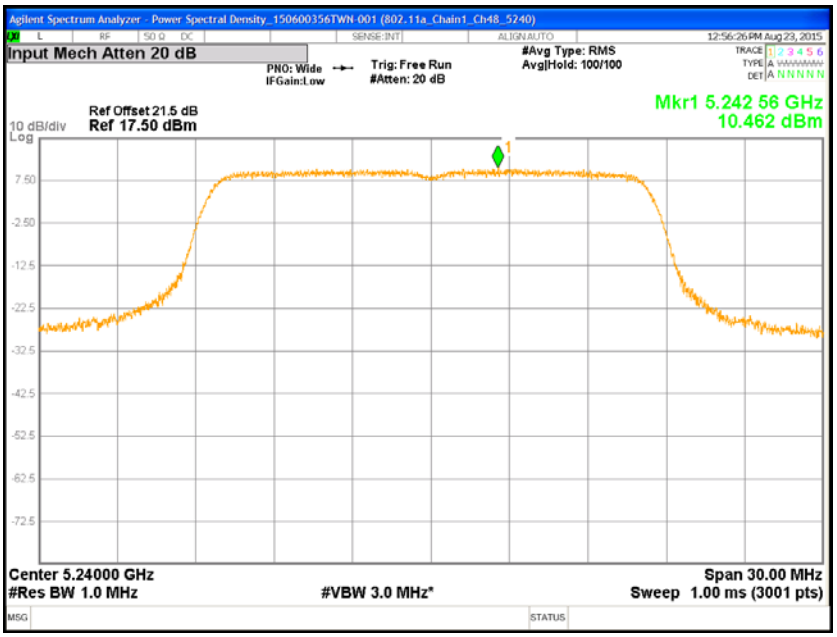
Chain1 : Power Spectral Density @ 802.11a Mode Ch40



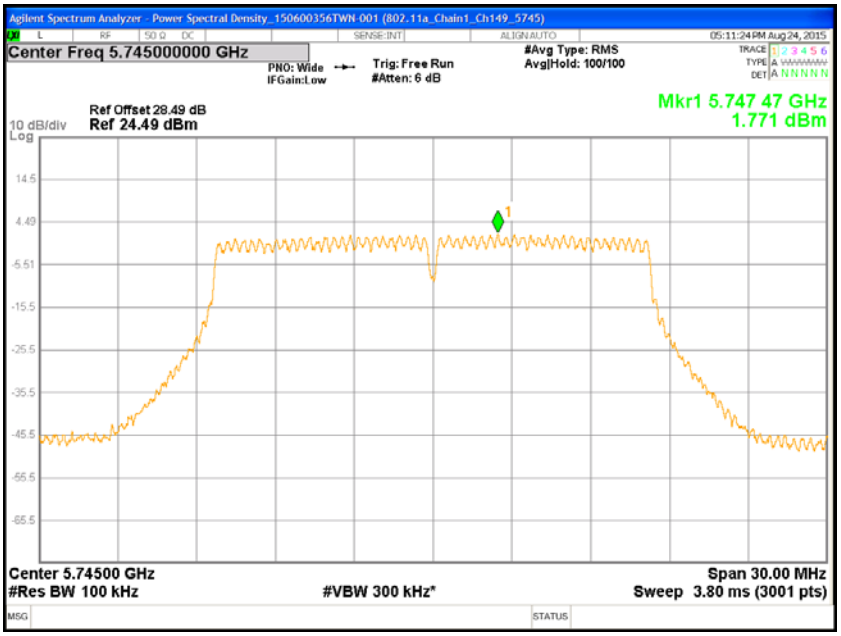
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1： Power Spectral Density @ 802.11a Mode Ch48



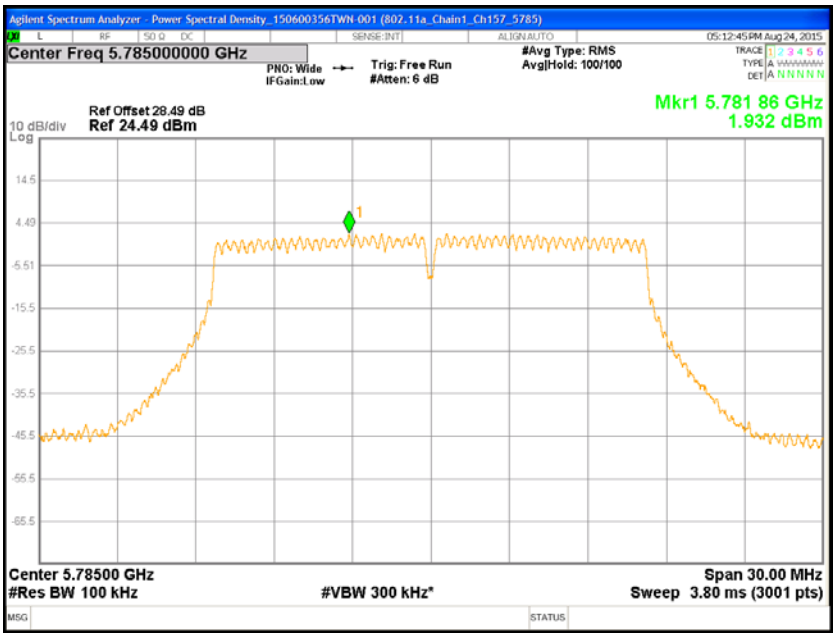
Chain1： Power Spectral Density @ 802.11a Mode Ch149



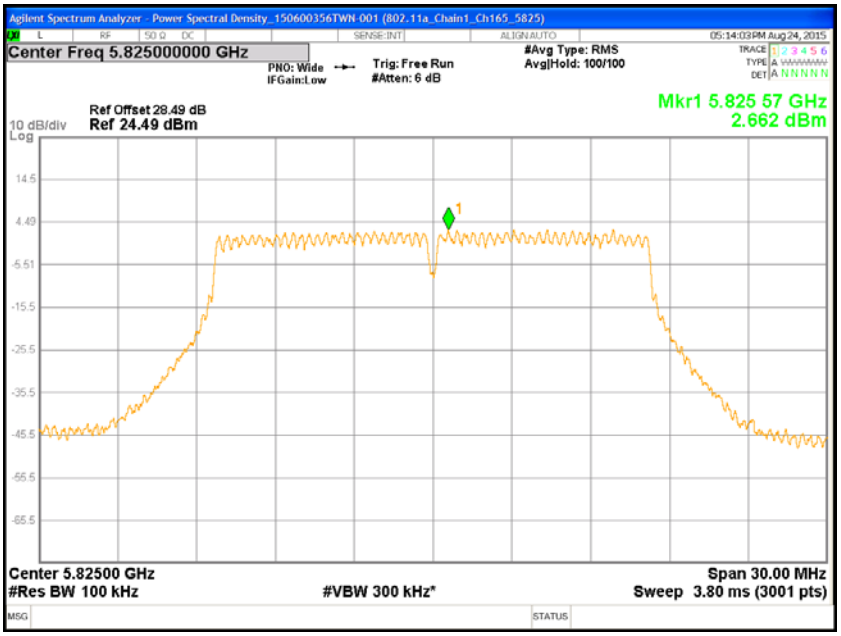
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1 : Power Spectral Density @ 802.11a Mode Ch157



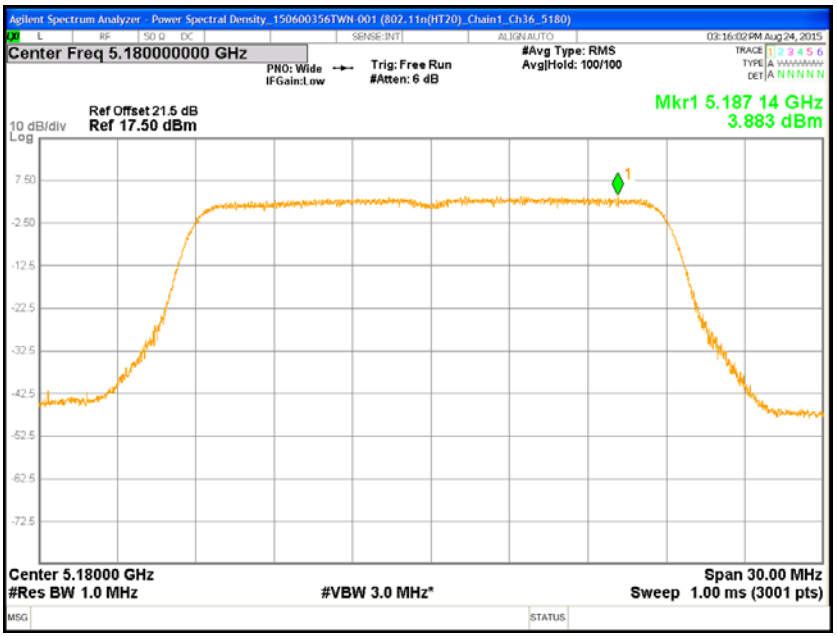
Chain1 : Power Spectral Density @ 802.11a Mode Ch165



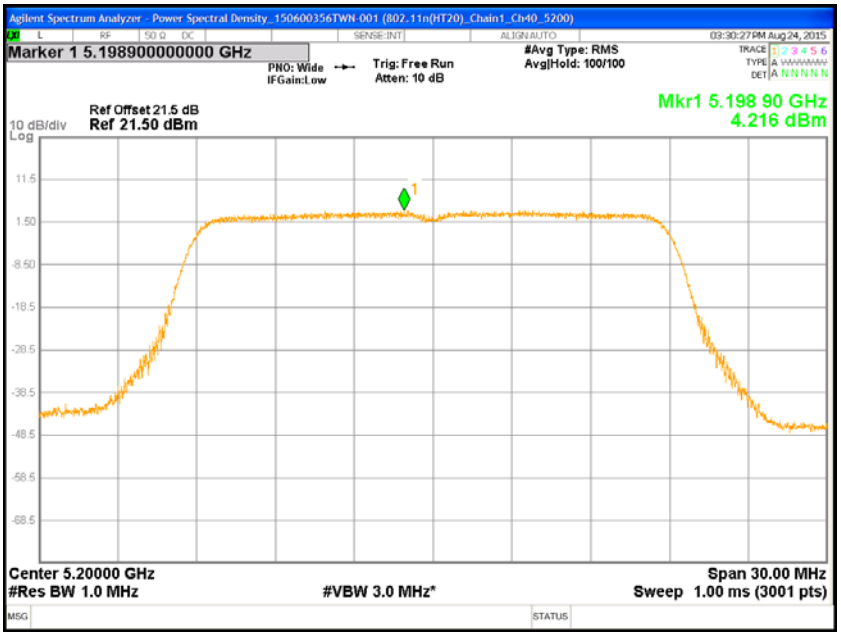
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch36



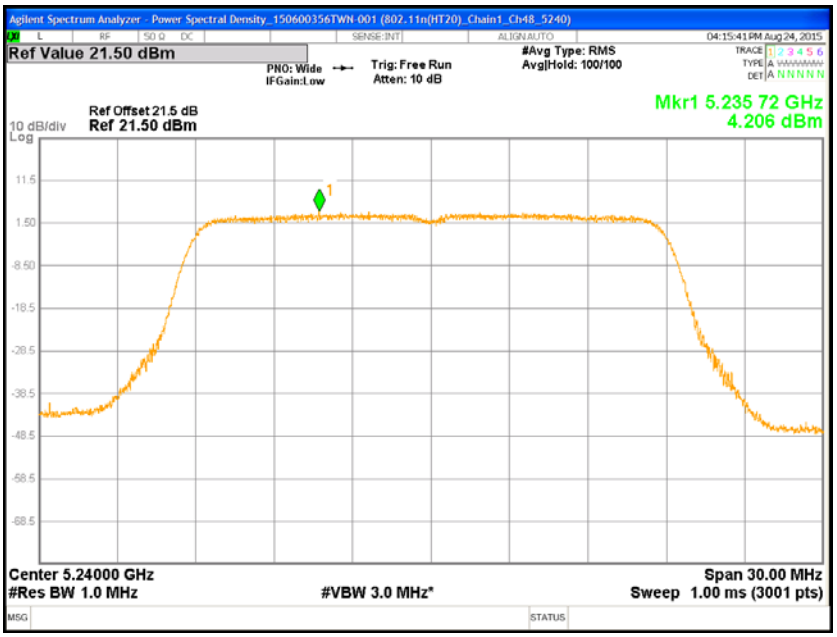
Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch40



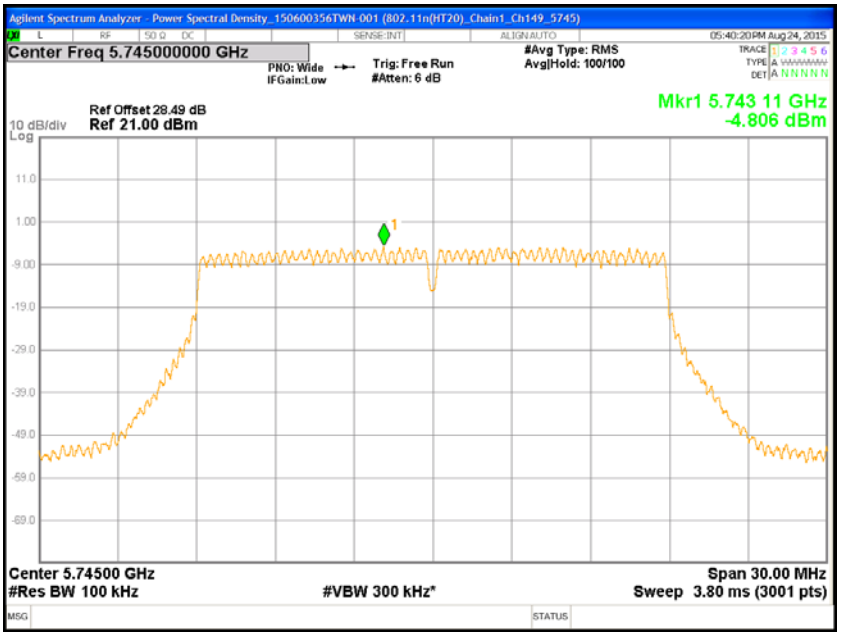
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch48



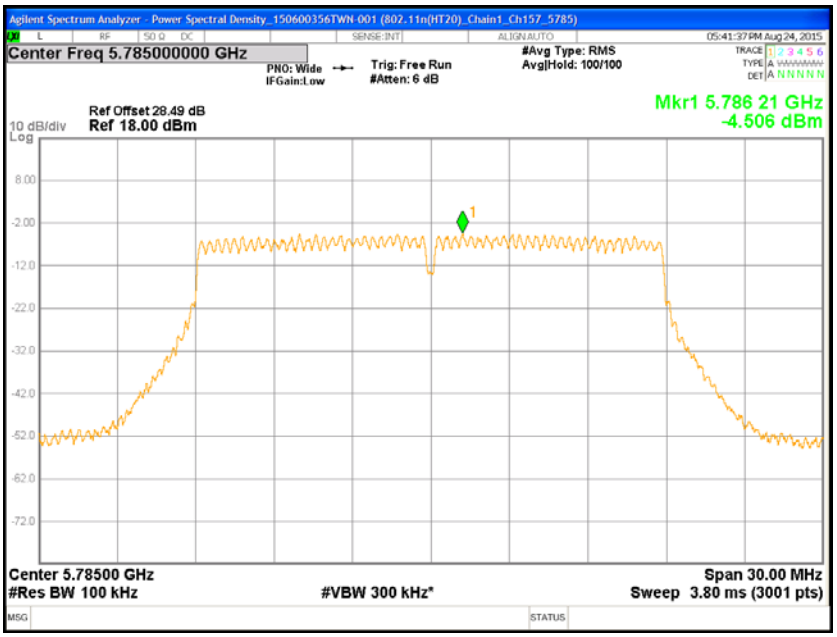
Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch149



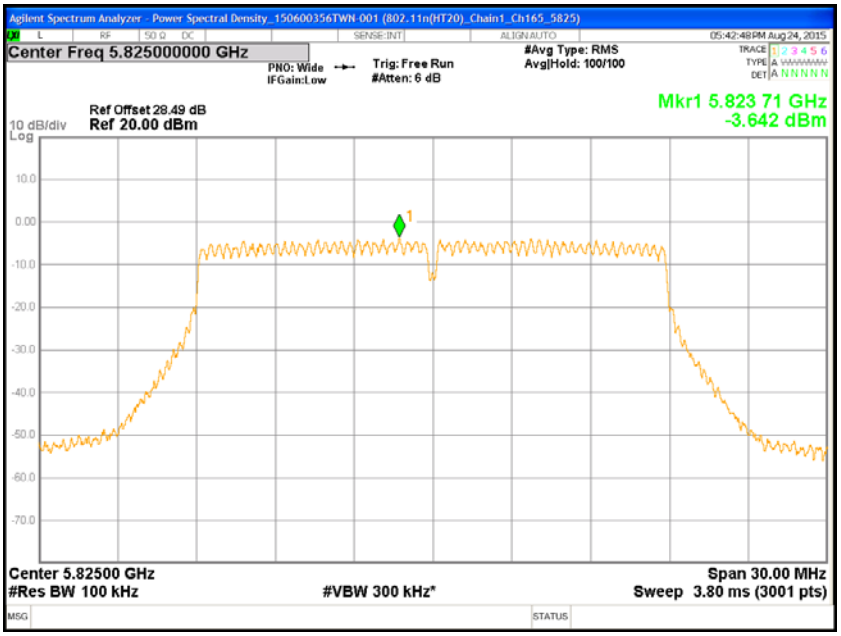
Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)

Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch157



Chain1 : Power Spectral Density @ 802.11an(HT20) Mode Ch165



Note: Ref Offset 21.5 dB= Cable loss + Attenuation

Ref Offset 28.49 dB= Cable loss + Attenuation +10log(500/100)