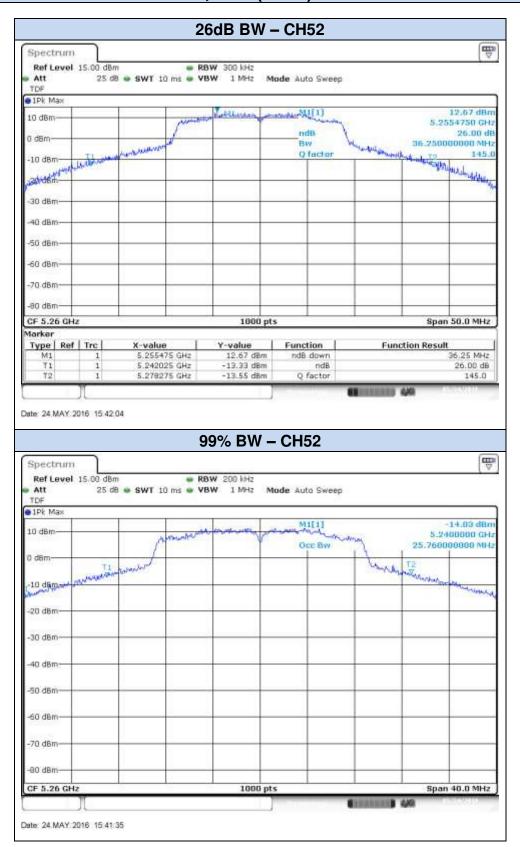
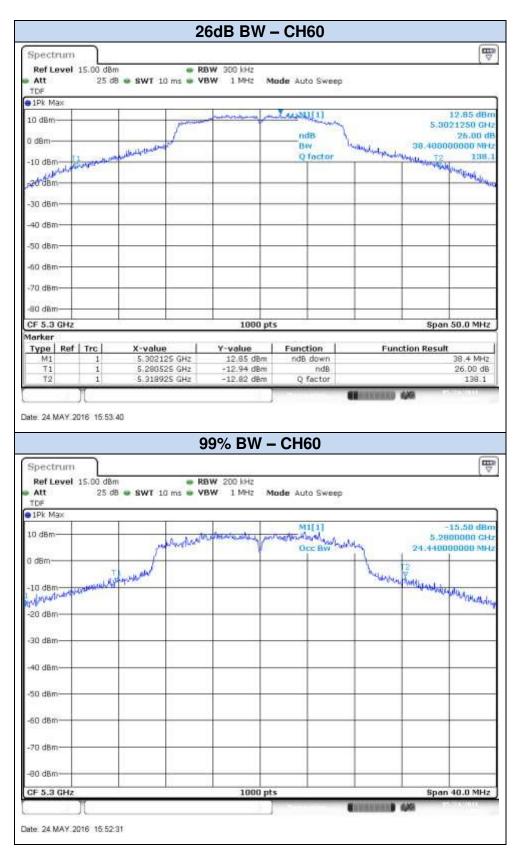
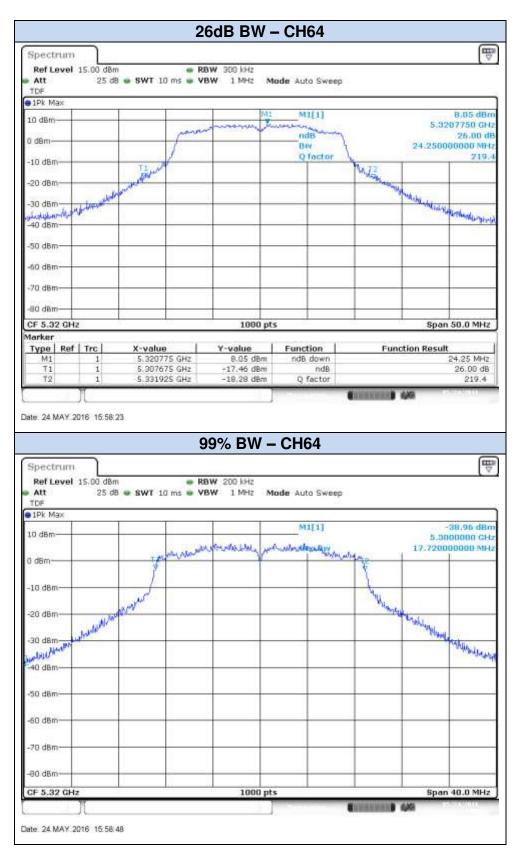


802.11n20, HT0 (SISO) - Chain A

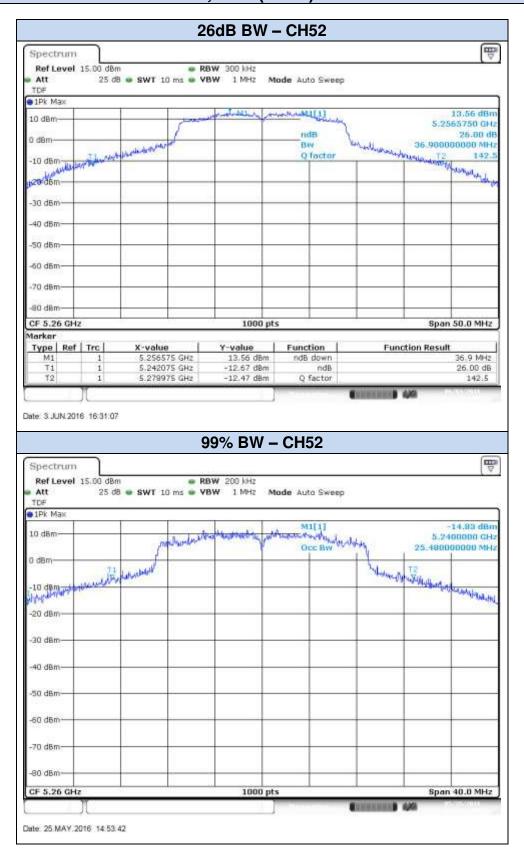


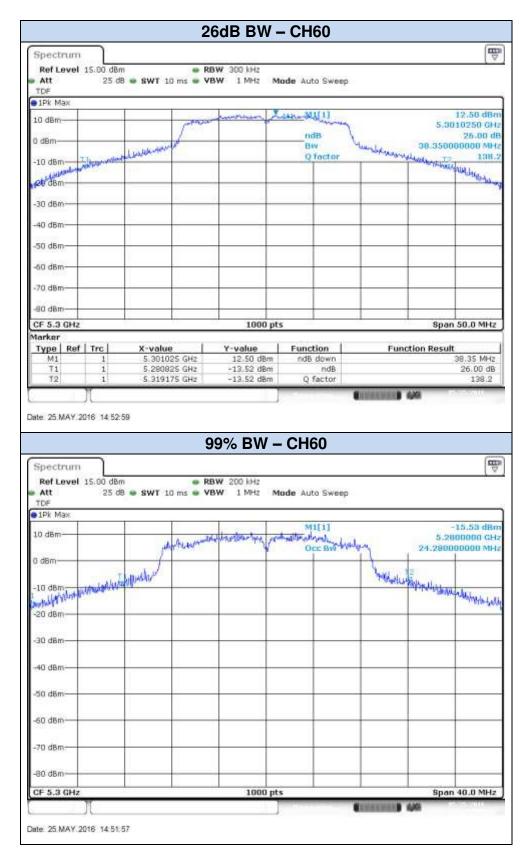


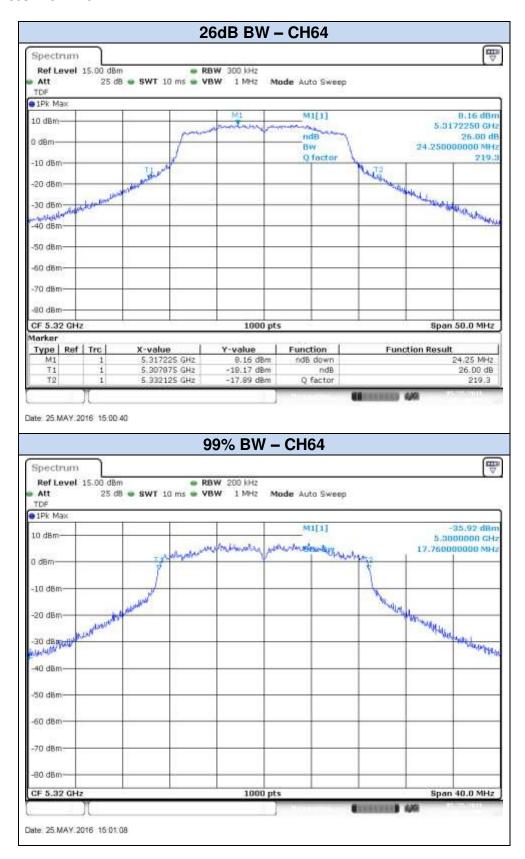




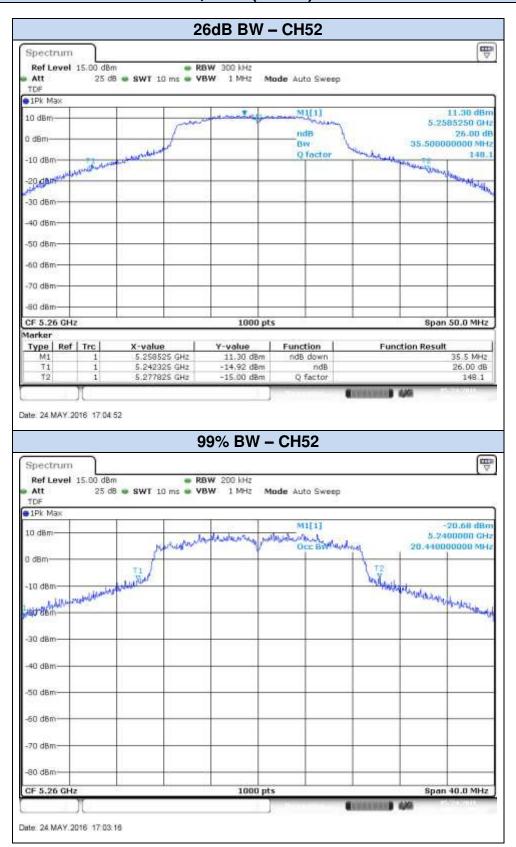
802.11n20, HT0 (SISO) - Chain B

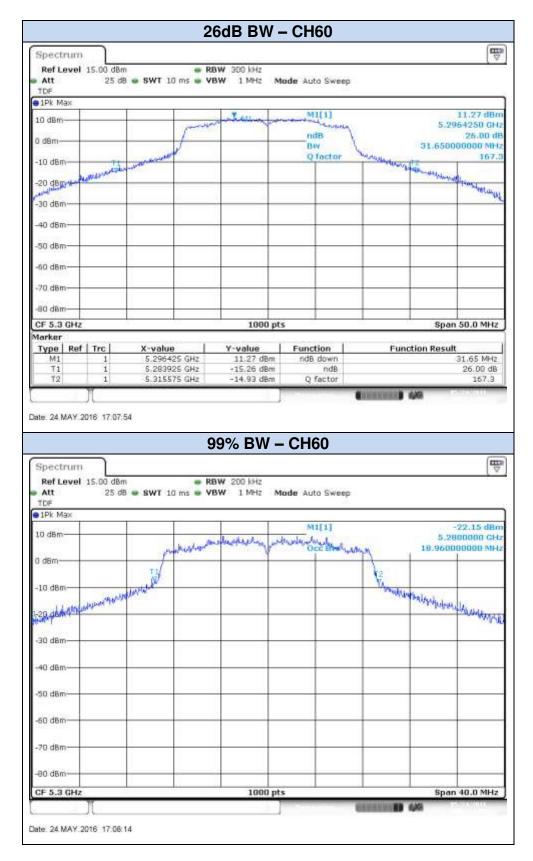




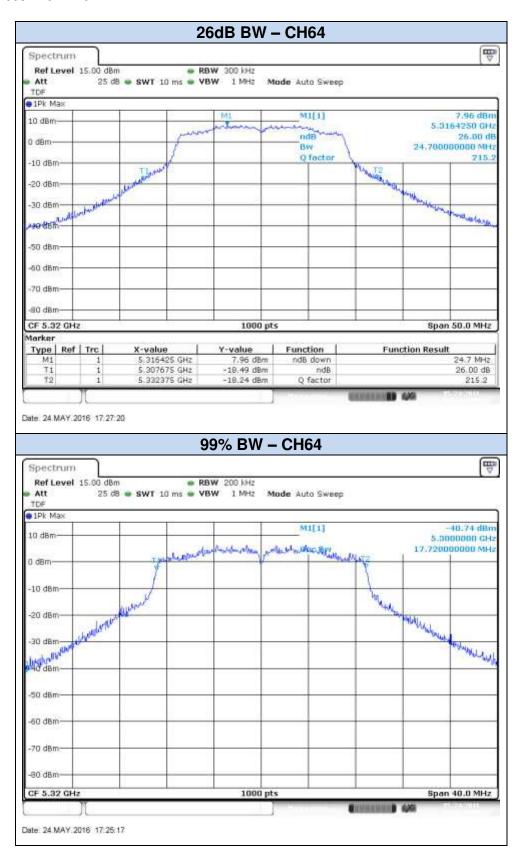


802.11n20, HT8 (MIMO) - Chain A

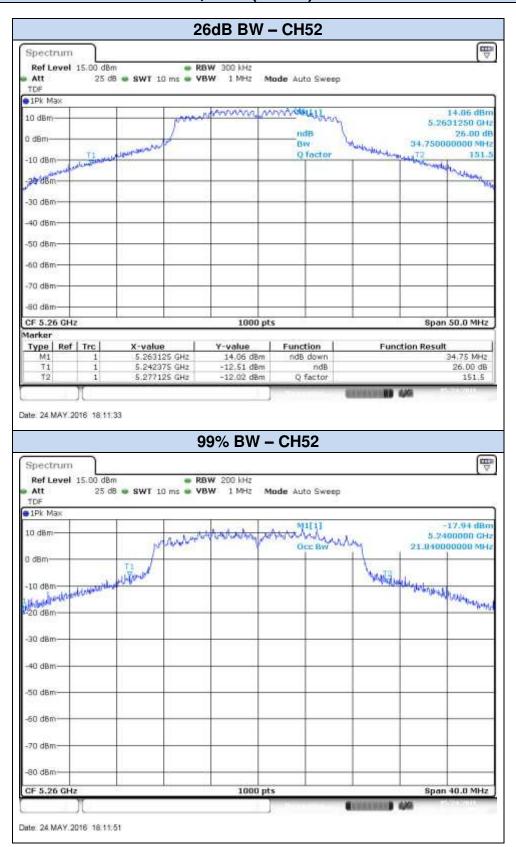


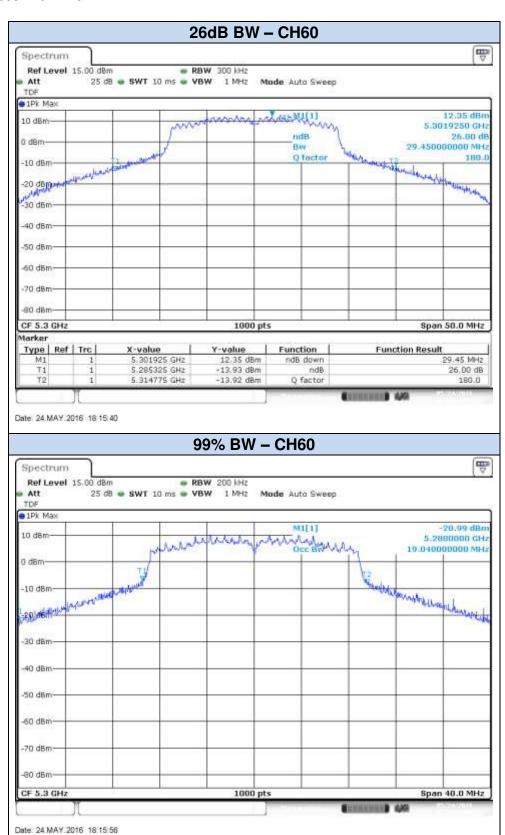


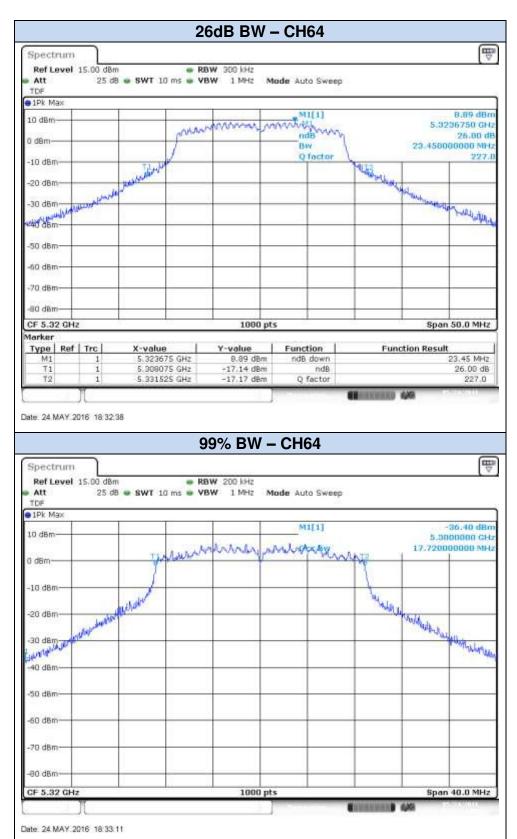




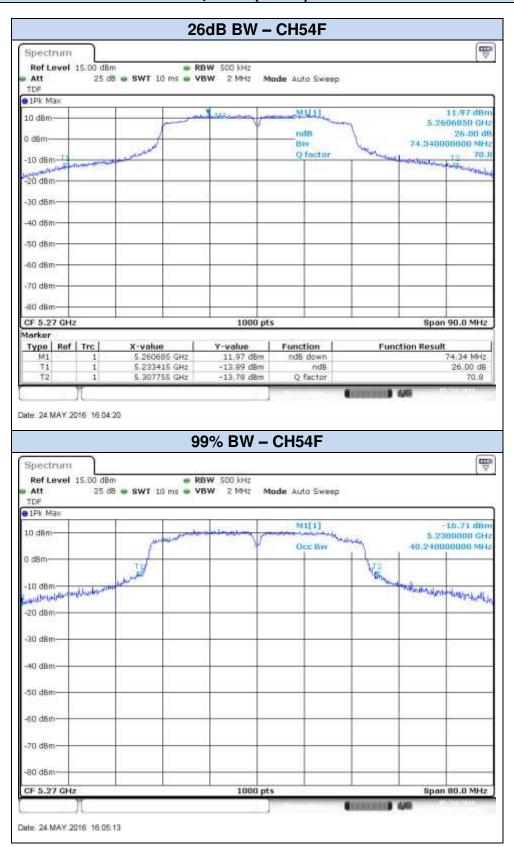
802.11n20, HT8 (MIMO) - Chain B

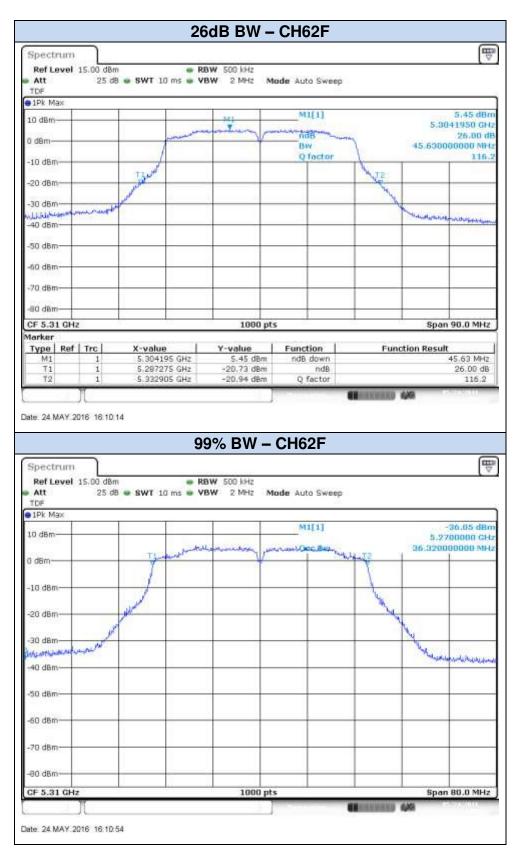




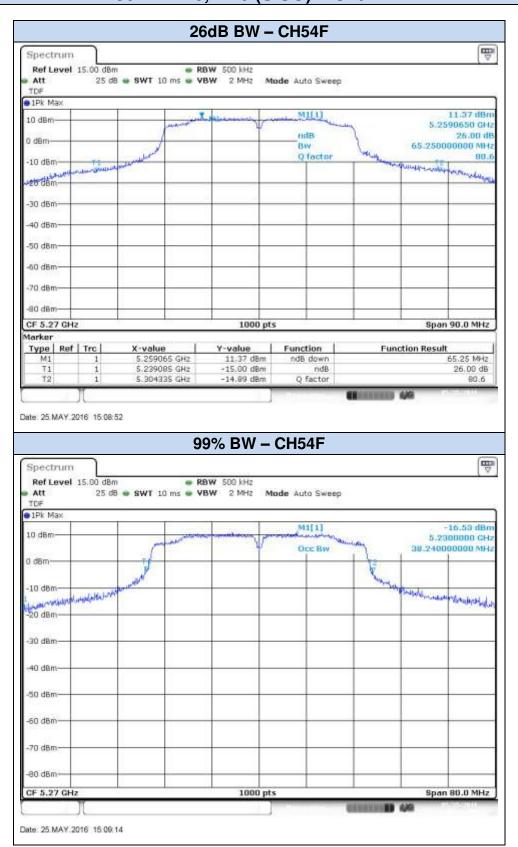


802.11n40, HT0 (SISO) - Chain A



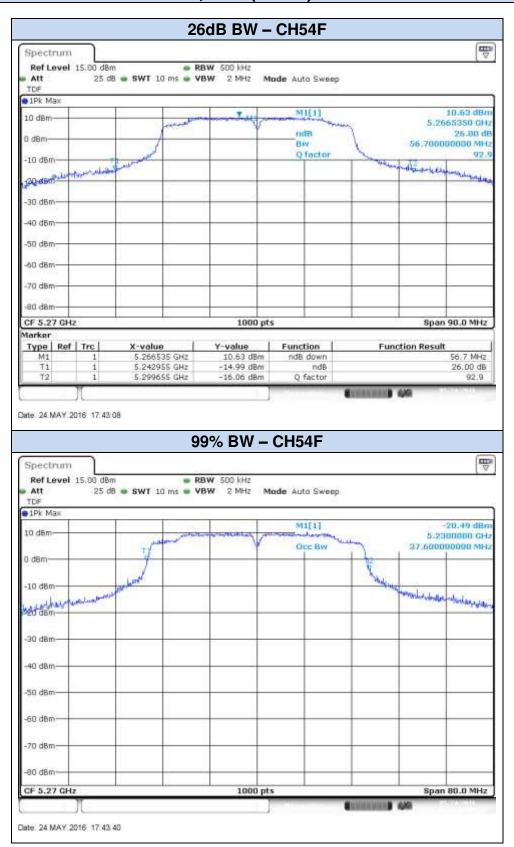


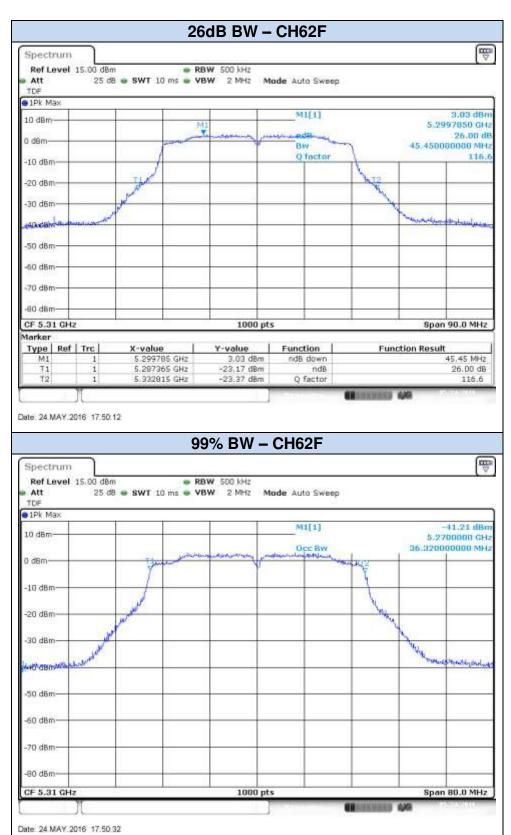
802.11n40, HT0 (SISO) - Chain B





802.11n40, HT8 (MIMO) - Chain A





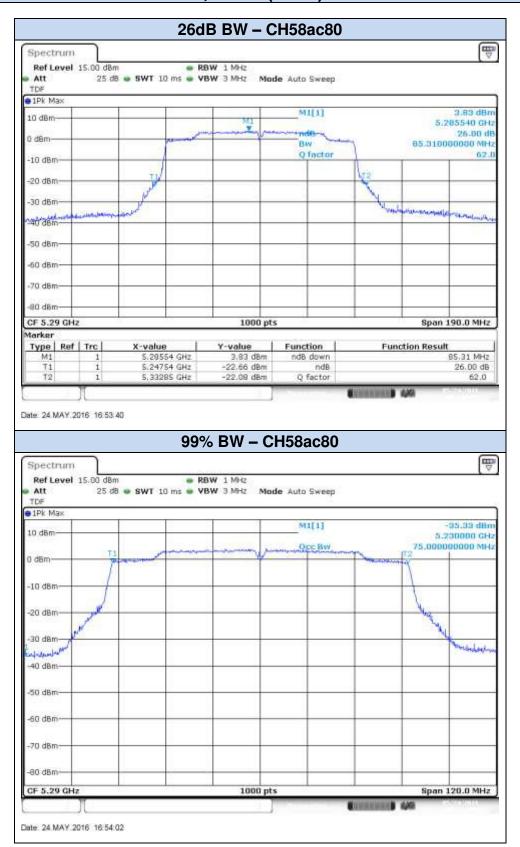
802.11n40, HT8 (MIMO) - Chain B



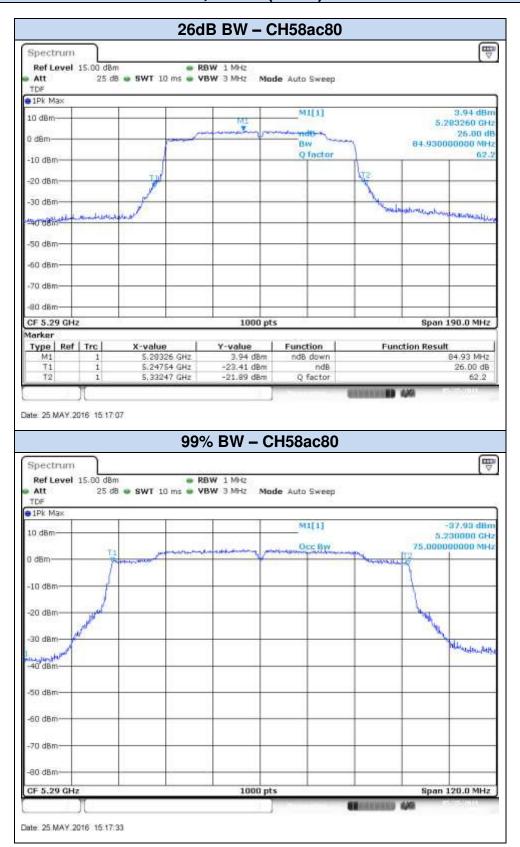




802.11ac80, VHT0 (SISO) - Chain A

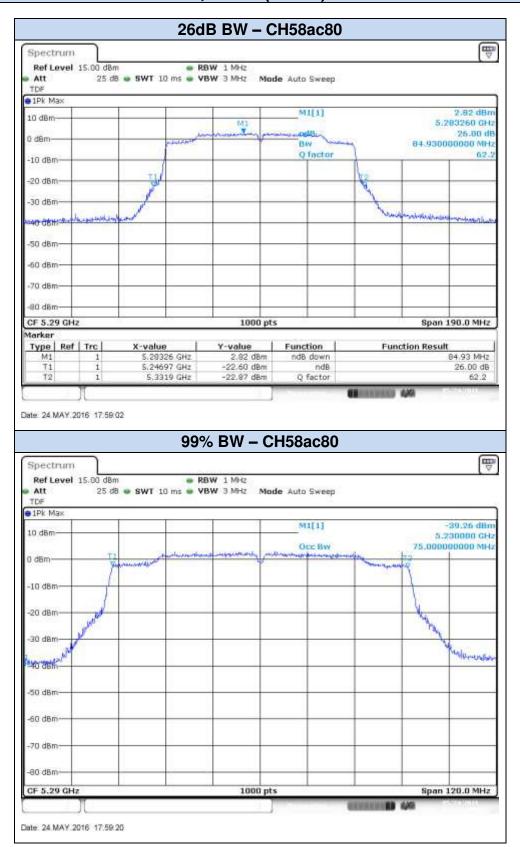


802.11ac80, VHT0 (SISO) - Chain B

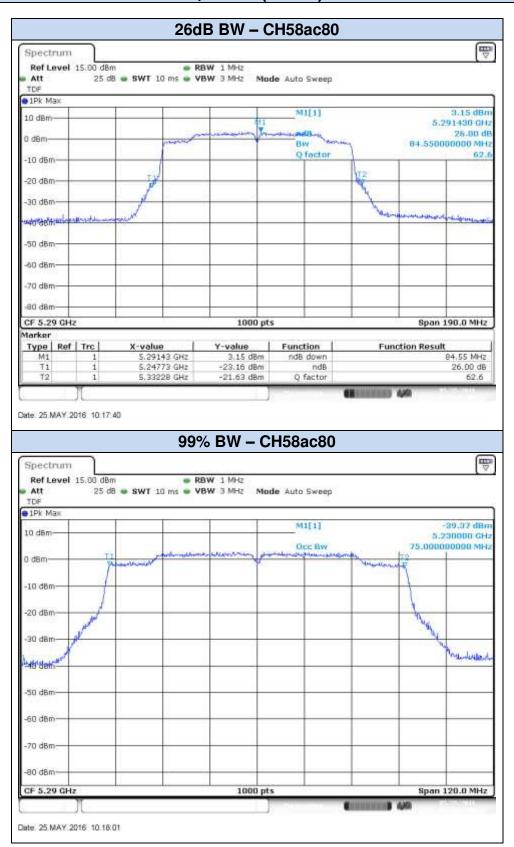




802.11ac80, VHT0 (MIMO) - Chain A



802.11ac80, VHT0 (MIMO) - Chain B





C.2 Power Limits. Maximum Output power & Peak power spectral density

Test limits:

FCC part	Limits
15.407 (a) (2)	For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.

Test procedure:

The Maximum Conducted Output Power was measured using the channel integration method according to point E) 2) e) (Method SA-2 Alternative) of KDB 789033 D02.

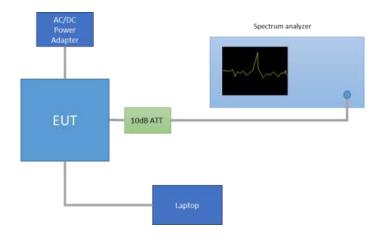
The maximum power spectral density (PSD) was measured using the method according to point F) (Method SA-2 Alternative) of KDB 789033 D02.

In the measure-and-sum approach for MIMO mode, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically in linear power units to determine the total emission level from the device.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

The setup below was used to measure the maximum conducted output power and power spectral density. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

The declared maximum antenna gain is 5dBi.





Results tables:

Duty cycle

Mode	Rate	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
802.11a	6Mbps	SISO-A	1.45	1.48	98.2
802.11a		SISO-B	1.45	1.48	98.2
802.11n20	HT0	SISO-A	1.47	1.50	97.6
		SISO-B	1.47	1.50	97.6
	HT8	MIMO-A	1.47	1.51	97.5
		MIMO-B	1.47	1.51	97.5
	HT0	SISO-A	1.46	1.49	98.1
802.11n40		SISO-B	1.46	1.49	98.1
	HT8	MIMO-A	1.48	1.52	97.3
		MIMO-B	1.48	1.52	97.3
802.11ac80	VHT0	SISO-A	1.46	1.49	98.1
		SISO-B	1.46	1.49	98.1
		MIMO-A	1.48	1.52	97.2
		MIMO-B	1.48	1.52	97.2

Maximum output power

Mode	Rate	Channel	Freq. [MHz]	Antenna	Average Conducted Output Power [dBm]	Maximum* Conducte d Output Power [dBm]	Maximum* Conducted Output Power [mW]	Maximum* EIRP [dBm]
		52	5260	SISO CHAIN A	20.06	20.14	103.24	25.14
m l		52		SISO CHAIN B	20.71	20.79	119.91	25.79
<u> </u>	6Mbps	60	5300	SISO CHAIN A	20.21	20.29	106.87	25.29
802.11a	olvibps	0	5500	SISO CHAIN B	20.28	20.36	108.61	25.36
ω		64	5320	SISO CHAIN A	16.16	16.24	42.06	21.24
		04	5520	SISO CHAIN B	16.14	16.22	41.87	21.22
		52	5260	SISO CHAIN A	20.23	20.33	108.00	25.33
		32		SISO CHAIN B	20.78	20.88	122.58	25.88
	HT0	60	5300	SISO CHAIN A	20.20	20.30	107.26	25.30
	пто	00	5500	SISO CHAIN B	20.32	20.42	110.26	25.42
		64	5000	SISO CHAIN A	15.84	15.94	39.30	20.94
		04	5320	SISO CHAIN B	16.35	16.45	44.20	21.45
n2(52	5260	MIMO CHAIN A	18.87	18.98	79.05	23.98
Ξ.	HT8			MIMO CHAIN B	19.08	19.19	82.97	24.19
302.11n20				Combined A+B	21.99	22.10	162.01	27.10
ω			5300	MIMO CHAIN A	18.55	18.66	73.43	23.66
		60		MIMO CHAIN B	18.76	18.87	77.07	23.87
				Combined A+B	21.67	21.78	150.51	26.78
		64	5320	MIMO CHAIN A	15.59	15.70	37.14	20.70
				MIMO CHAIN B	15.80	15.91	38.99	20.91
				Combined A+B	18.71	18.82	76.13	23.82
		54F	5270	SISO CHAIN A	19.95	20.03	100.76	25.03
	HT0			SISO CHAIN B	19.68	19.76	94.68	24.76
		62F	5310	SISO CHAIN A	14.44	14.52	28.33	19.52
40			3310	SISO CHAIN B	14.67	14.75	29.87	19.75
802.11n40		54F	5270	MIMO CHAIN A	19.18	19.30	85.07	24.30
2.1				MIMO CHAIN B	18.75	18.87	77.05	23.87
80	⊔то			Combined A+B	21.98	22.10	162.13	27.10
	HT8	62F	5310	MIMO CHAIN A	11.89	12.01	15.88	17.01
				MIMO CHAIN B	11.63	11.75	14.96	16.75
				Combined A+B	14.77	14.89	30.83	19.89
	VHT0	58ac80	5290	SISO CHAIN A	11.75	11.83	15.25	16.83
108				SISO CHAIN B	11.64	11.72	14.87	16.72
19				MIMO CHAIN A	10.57	10.69	11.74	15.69
802.11ac80				MIMO CHAIN B	10.42	10.54	11.34	15.54
8				Combined A+B	13.51	13.63	23.07	18.63

^{*} Maximum values are the duty cycle compensated values calculated from the average (measured) values

Max Value Min Value



Maximum Power Spectral Density (PSD)

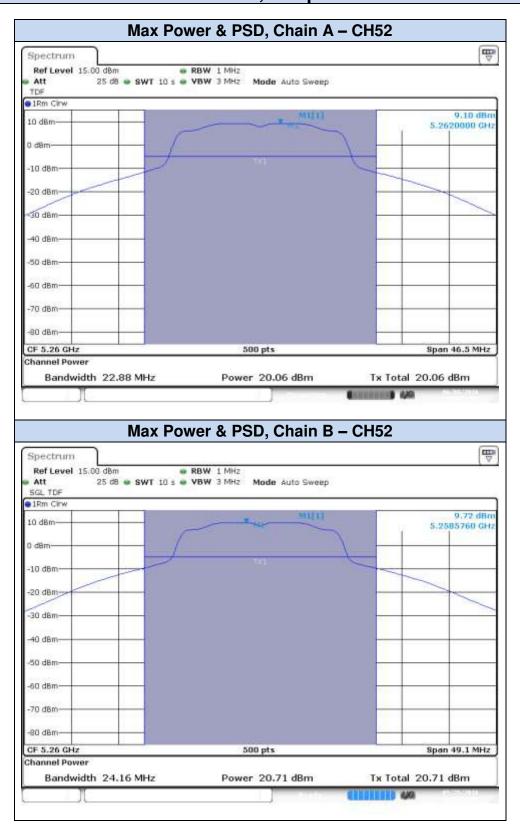
Mode	Rate	Channel	Freq. [MHz]	Antenna	Average conducted PSD [dBm/MHz]	Maximum* conducted PSD [dBm/MHz]
		52	5260 5300	SISO CHAIN A	9.10	9.18
<u>1</u> a				SISO CHAIN B	9.72	9.80
802.11a	6Mbps	60		SISO CHAIN A	9.24 9.30	9.32 9.38
80				SISO CHAIN A	5.29	5.37
		64	5320	SISO CHAIN B	5.28	5.36
				SISO CHAIN A	9.07	9.17
		52	5260	SISO CHAIN B	9.58	9.68
				SISO CHAIN A	9.05	9.15
	HT0	60	5300	SISO CHAIN B	9.15	9.25
				SISO CHAIN A	4.77	4.87
		64	5320	SISO CHAIN B	5.28	5.38
120			5260	MIMO CHAIN A	7.71	7.82
802.11n20		52		MIMO CHAIN B	7.95	8.06
02.				Combined A+B	10.84	10.95
ω	НТ8	60	5300	MIMO CHAIN A	7.39	7.50
				MIMO CHAIN B	7.65	7.76
				Combined A+B	10.53	10.64
		64	5320	MIMO CHAIN A	4.52	4.63
				MIMO CHAIN B	4.76	4.87
				Combined A+B	7.65	7.76
	HT0	54F	5270	SISO CHAIN A	5.50	5.58
				SISO CHAIN B	5.25	5.33
		62F	5310	SISO CHAIN A	0.01	0.09
40				SISO CHAIN B	0.26	0.34
7	HT8	54F	5270	MIMO CHAIN A	4.75	4.87
802.11n40				MIMO CHAIN B	4.34	4.46
80				Combined A+B	7.56	7.68
		62F	5310	MIMO CHAIN A	-2.48	-2.36
				MIMO CHAIN B	-2.76	-2.64
				Combined A+B	0.39	0.51
000	VHT0			SISO CHAIN A	-5.49	-5.41
ace		58ac80	5290	SISO CHAIN B	-5.60	-5.52
-				MIMO CHAIN A	-6.70	-6.58
802.11ac80				MIMO CHAIN B	-6.83	-6.71
8				Combined A+B	-3.75	-3.63

^{*} Maximum values are the duty cycle compensated values calculated from the measured average values

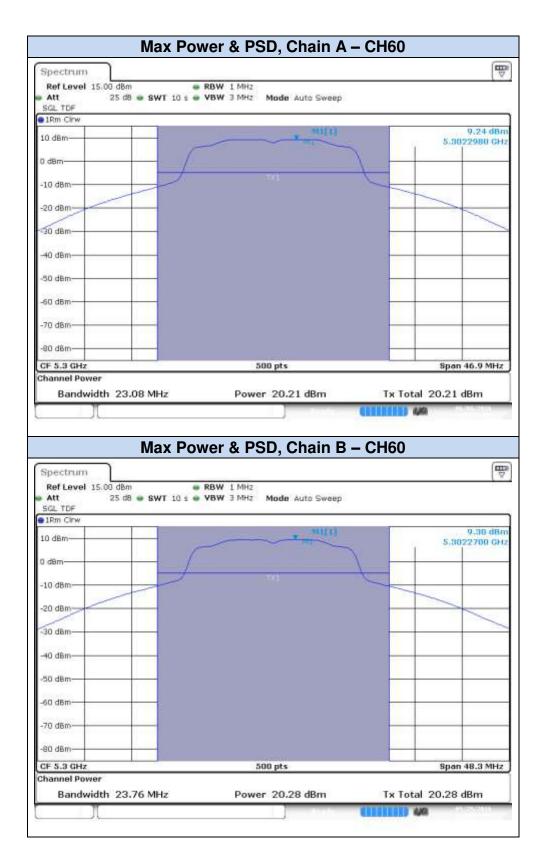


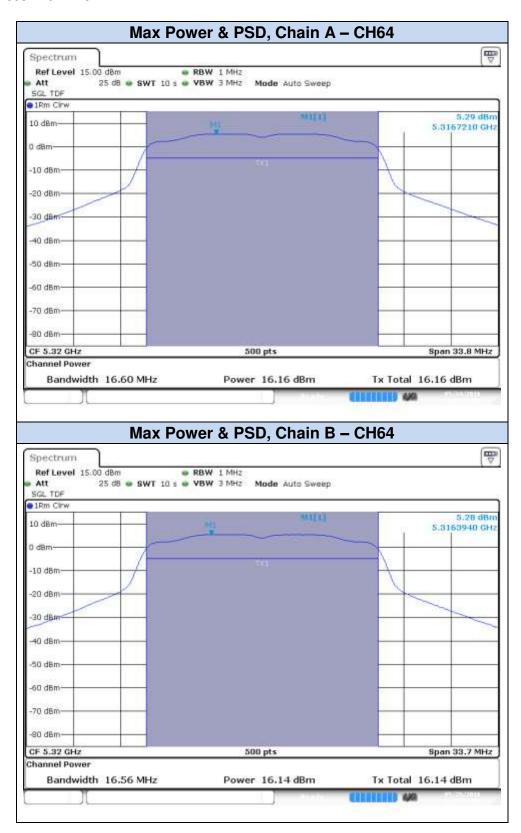
Results screenshot:

802.11a, 6Mbps



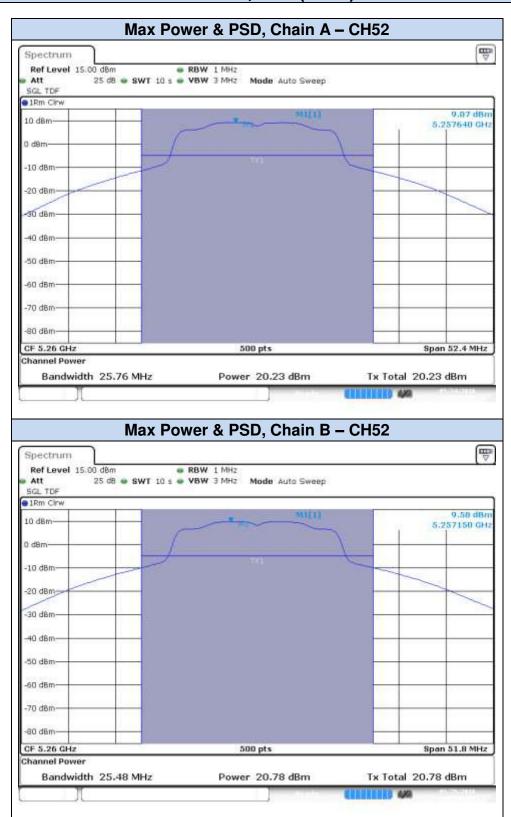


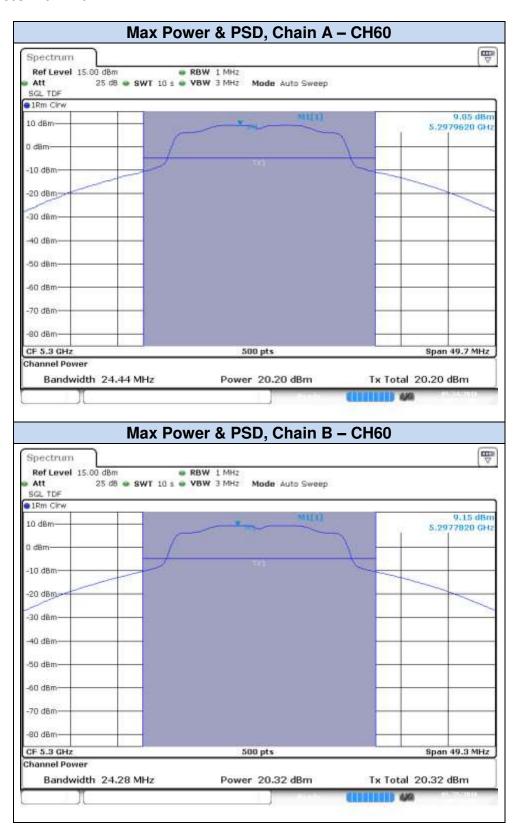


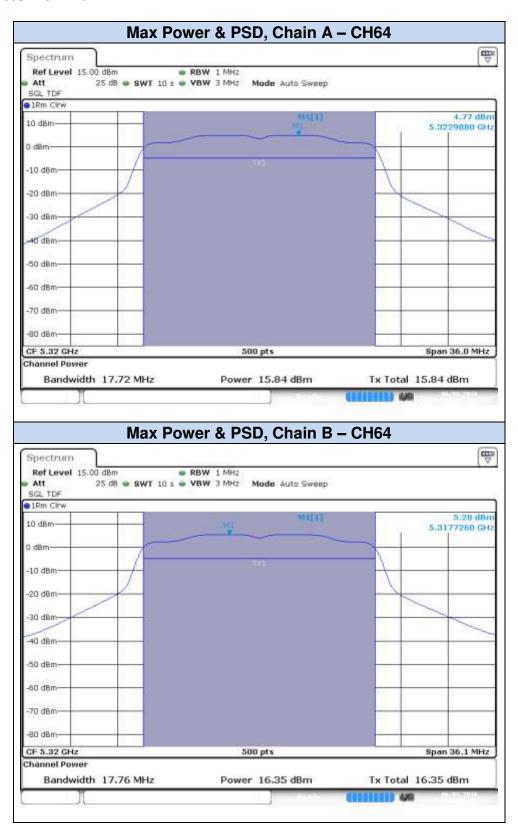




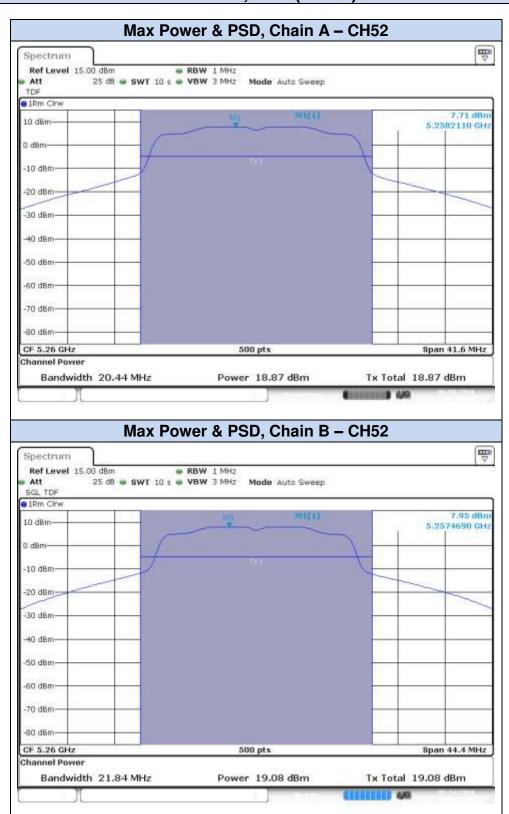
802.11n20, HT0 (SISO)

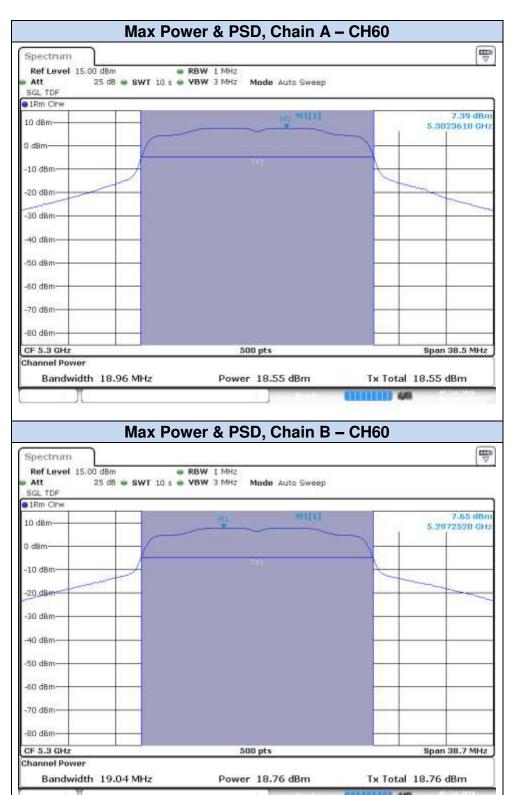


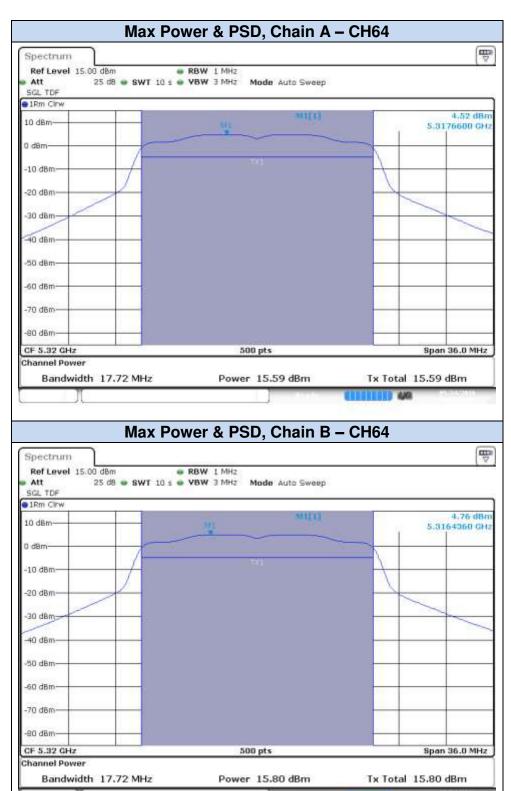




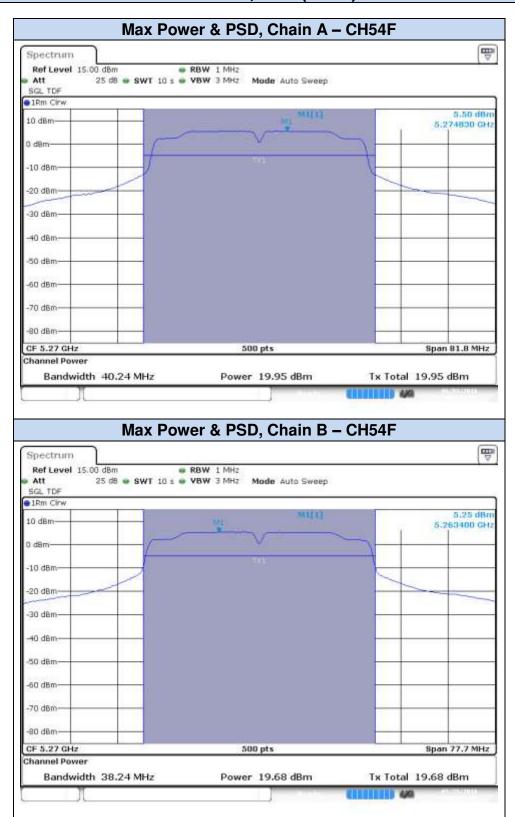
802.11n20, HT8 (MIMO)

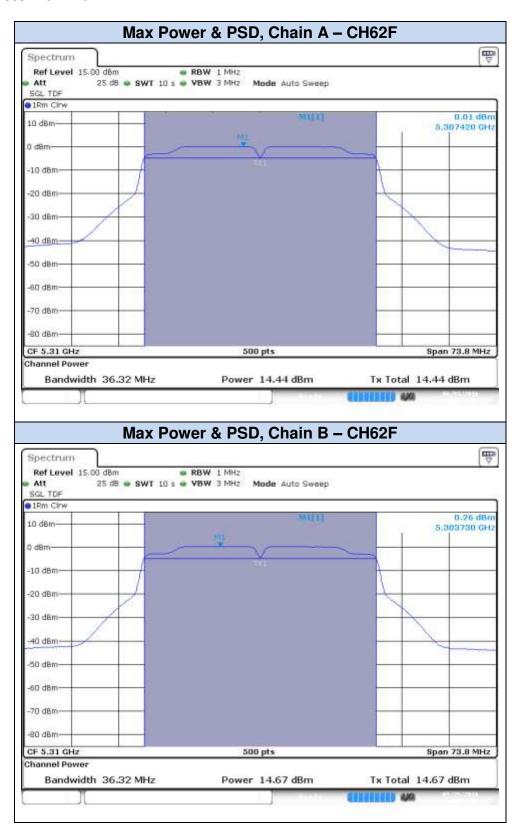




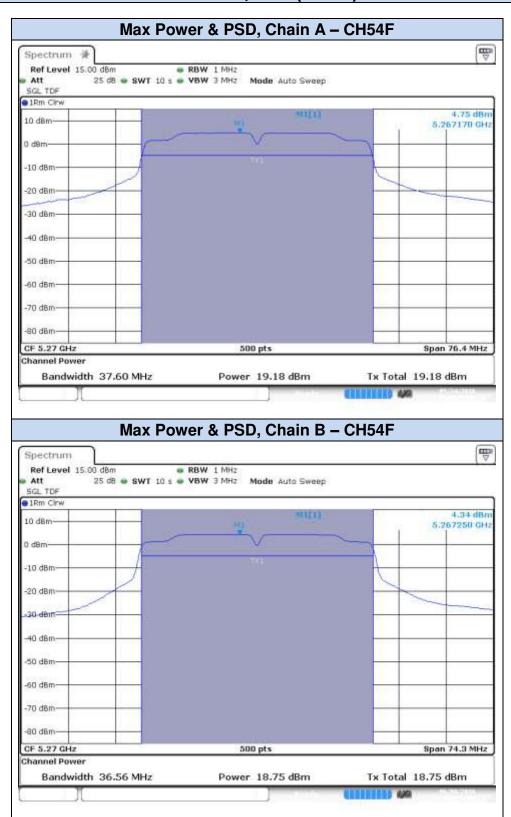


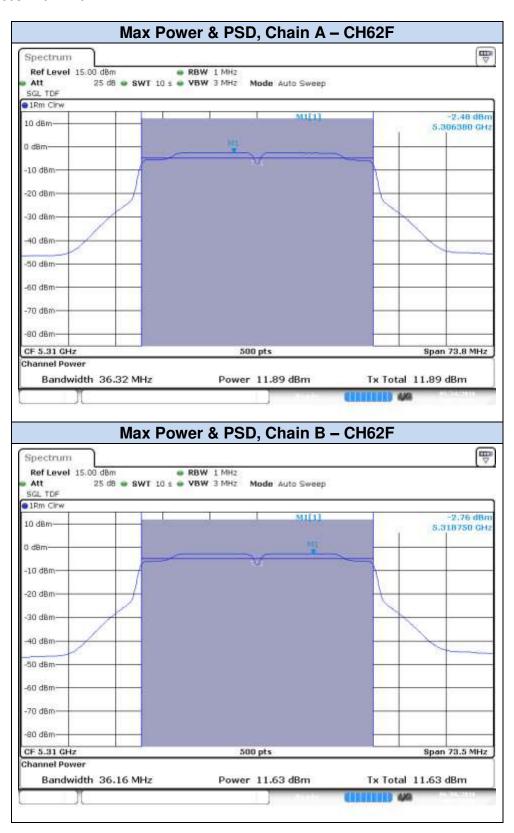
802.11n40, HT0 (SISO)





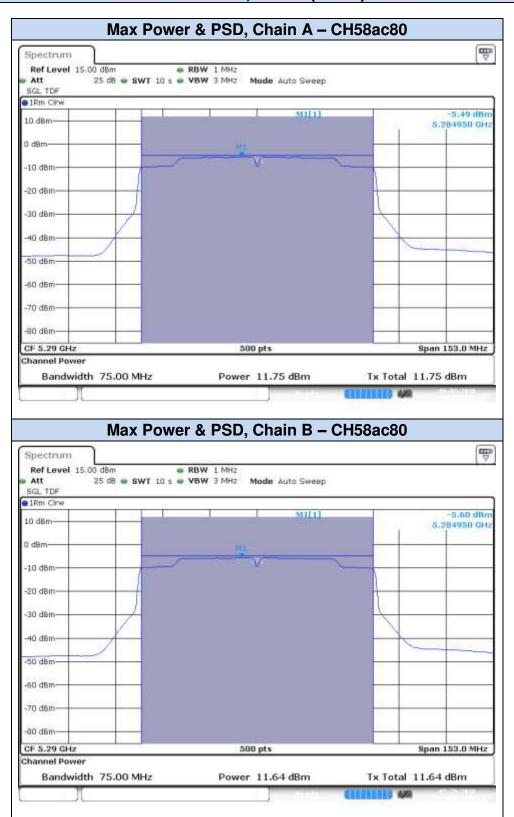
802.11n40, HT8 (MIMO)



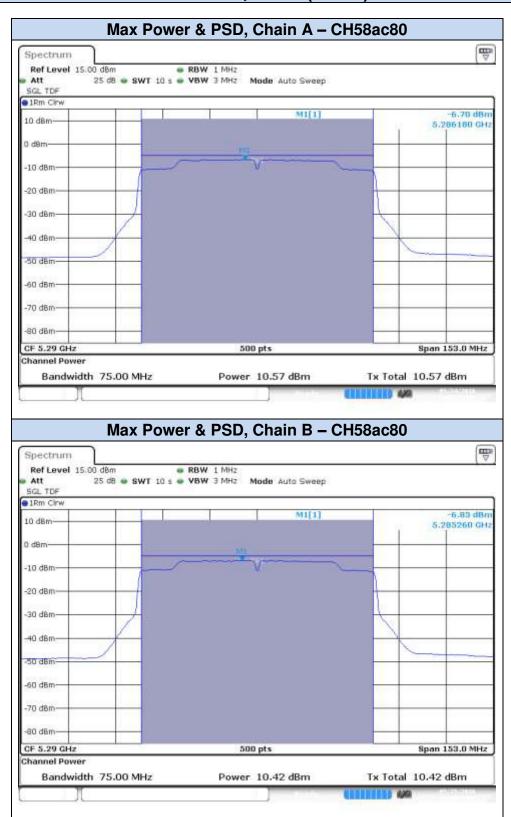




802.11ac80, VHT0 (SISO)



802.11ac80, VHT0 (MIMO)





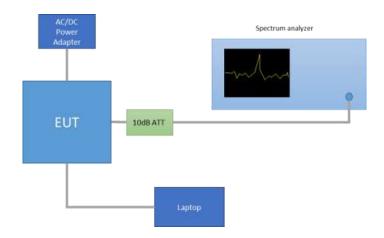
C.3 Undesirable emissions limits: Band Edge (conducted)

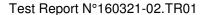
Test limits:

FCC part	Limits					
15.407 (b) (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 EIRP of –27 dBm/MHz.				
	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):					
		Freq Range (MHz)	Field Strength (μV/m)	Field Strength (dB _µ V/m)	Meas. Distance (m)	
		0.009-0.490	2400/f(kHz)	-	300	1
		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	
15.209		216-960	200	46	3	
		Above 960	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 specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.					

Test procedure:

The setup below was used to measure undesirable emissions on the Band Edge domain. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss and the declared Antenna Gain.







The Band Edge High, was measured using the method according to point G) 3) d) (ii) (Integration Method) of KDB 789033 D02. This measurement performs a band-power integration across the 1MHz in which the band-edge emission level has to be measured

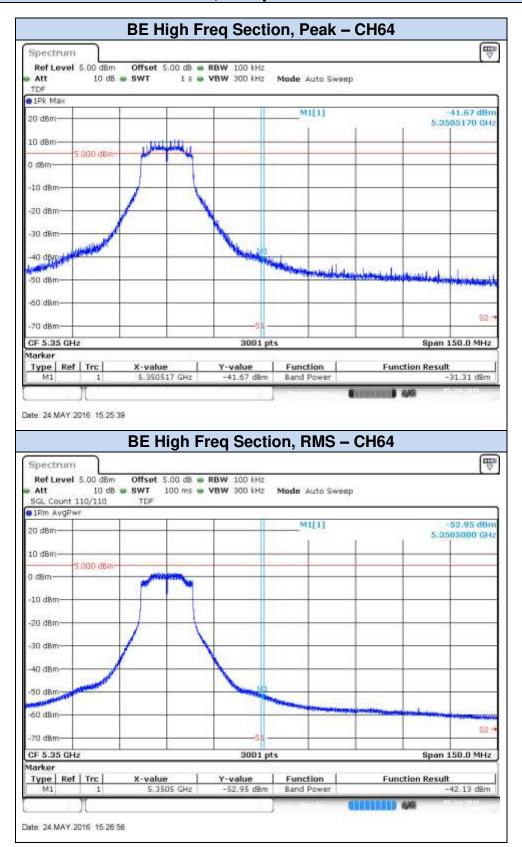
In case of Band Edge measurements falling in restricted bands, the declared Antenna Gain is also compensated in the graph. The declared maximum antenna gain is 5dBi.

The following limits in dBm were applied for the average detector after the conversion from the limits detailed above in dB μ V/m, according to FCC 47 CFR part 15 - Subpart C – §15.209(a). The limits in dBm for peak detector are 20dB above the indicated values in the table.

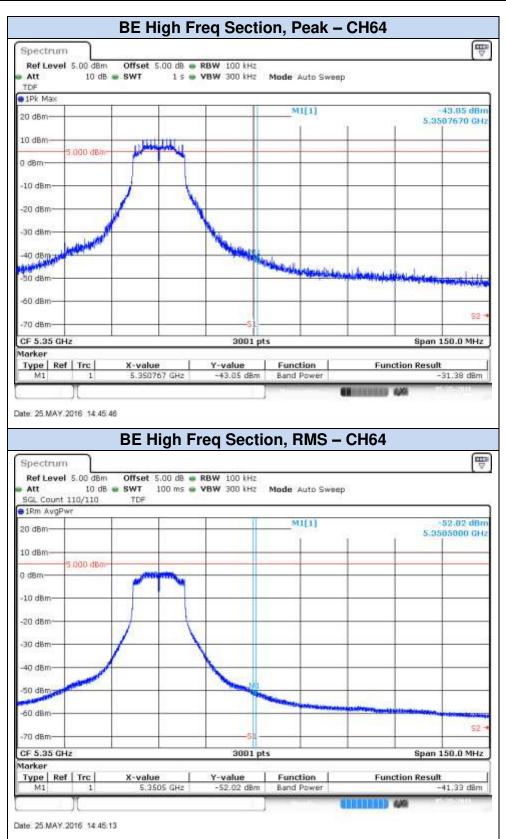
§15.209(a)			Converted values		
Freq Range Distance (MHz) (m)		Field strength (microvolts/meter)	Field strength (dB microvolts/meter)	Power (dBm)	
960-25000	3	500	53.98	-41.2	

Results Screenshot:

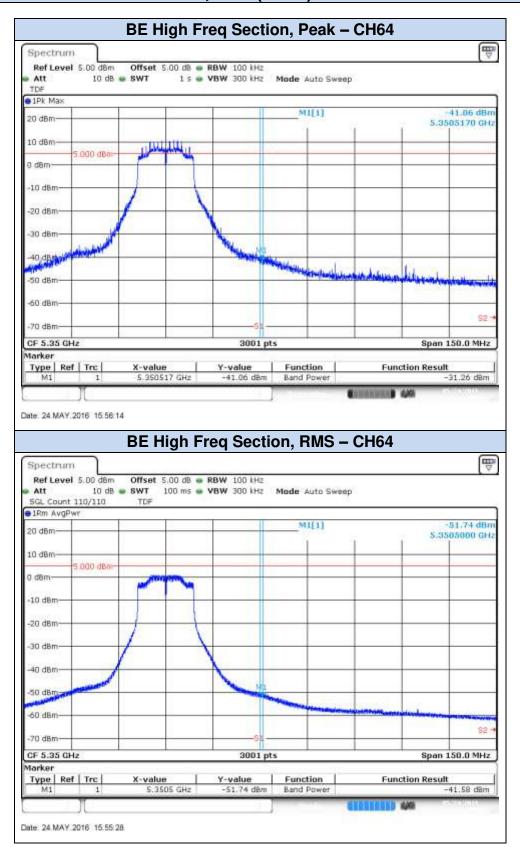
802.11a, 6Mbps - Chain A



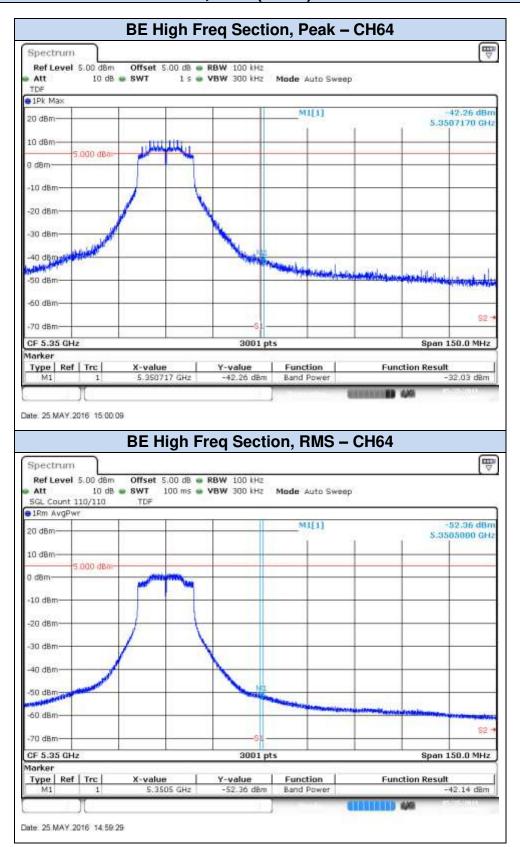
802.11a, 6Mbps - Chain B



802.11n20, HT0 (SISO) - Chain A

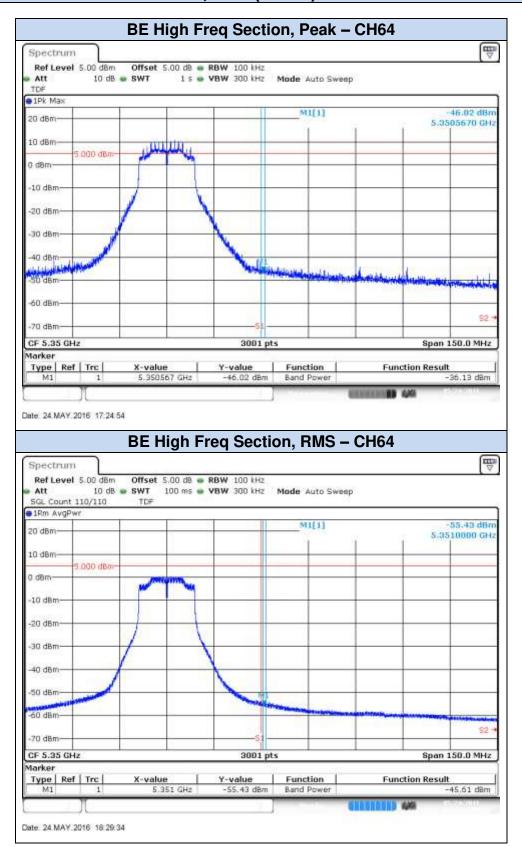


802.11n20, HT0 (SISO) - Chain B

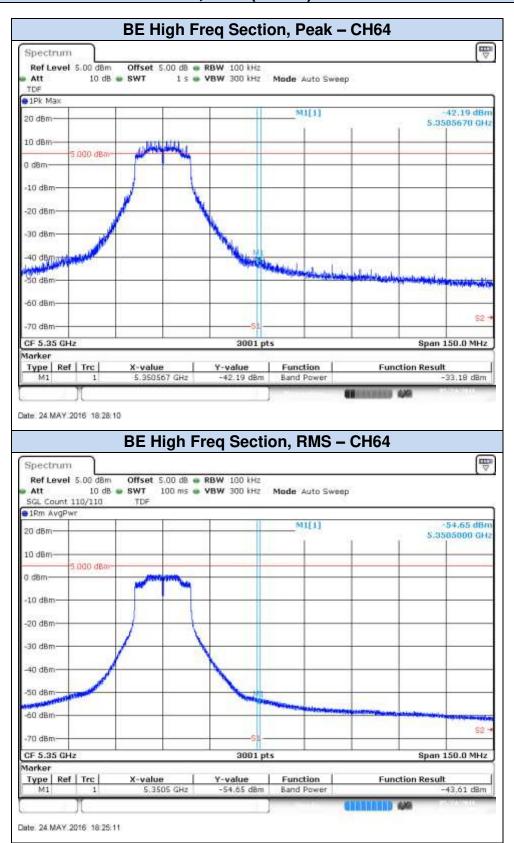




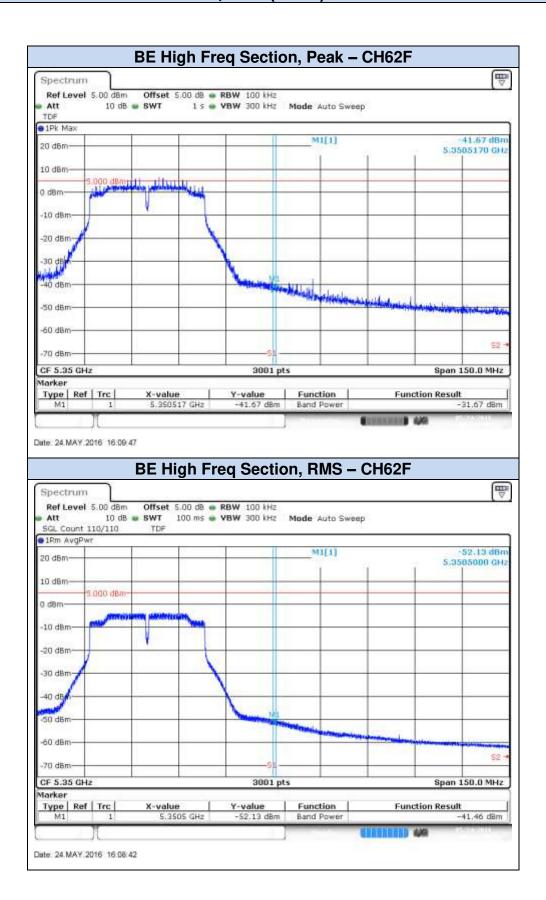
802.11n20, HT8 (MIMO) - Chain A



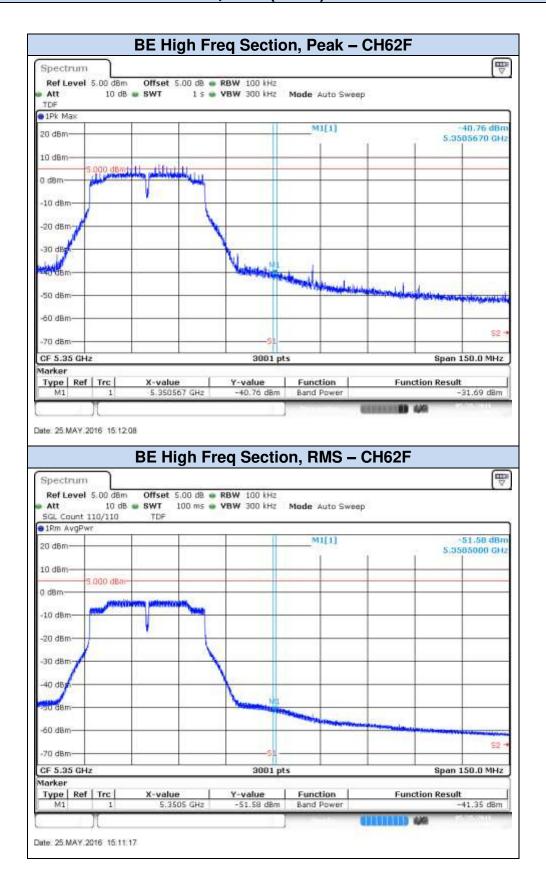
802.11n20, HT8 (MIMO) - Chain B



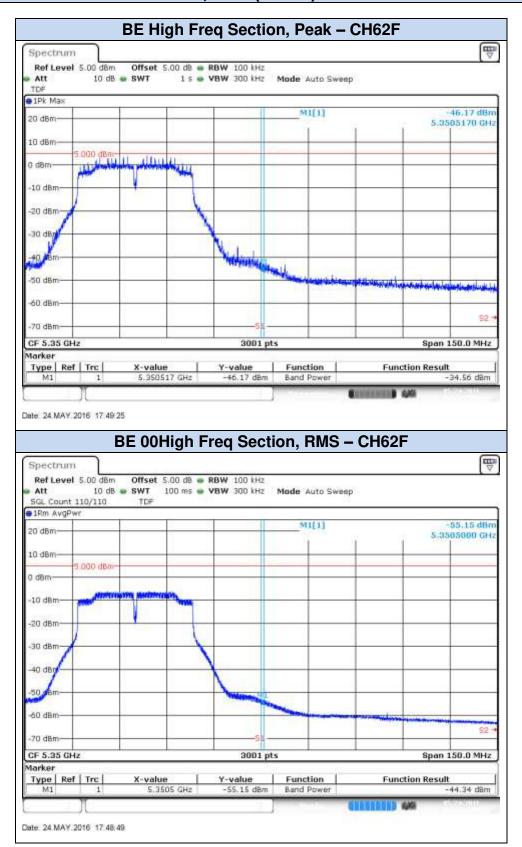
802.11n40, HT0 (SISO) - Chain A



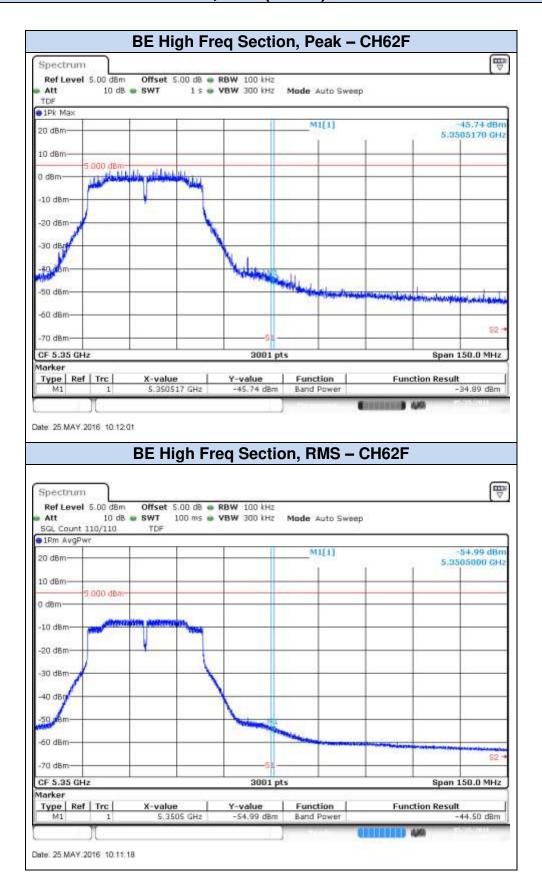
802.11n40, HT0 (SISO) - Chain B



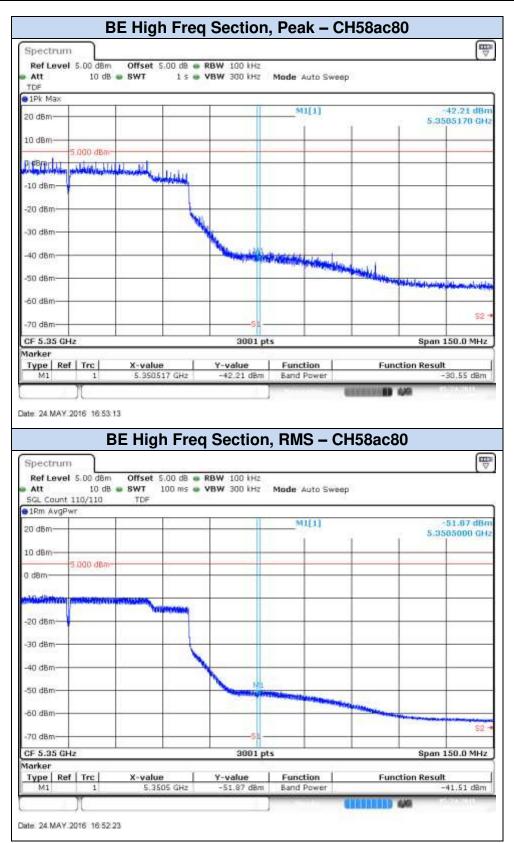
802.11n40, HT8 (MIMO) - Chain A



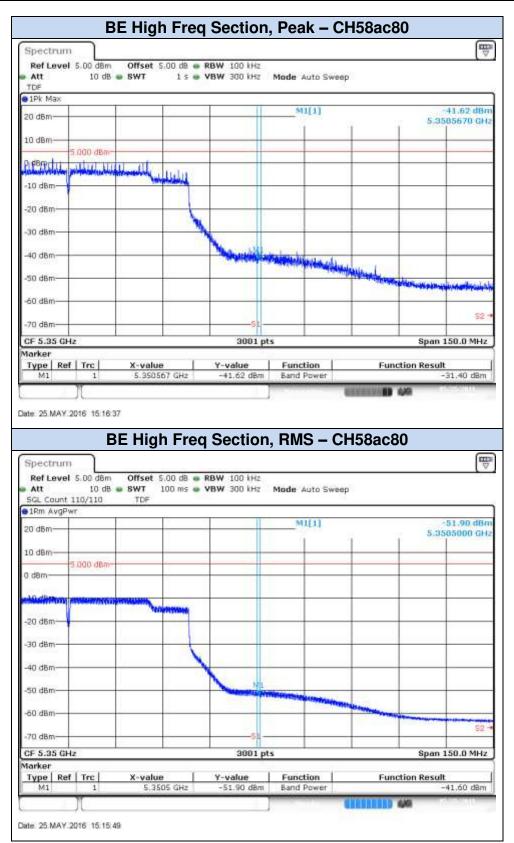
802.11n40, HT8 (MIMO) - Chain B



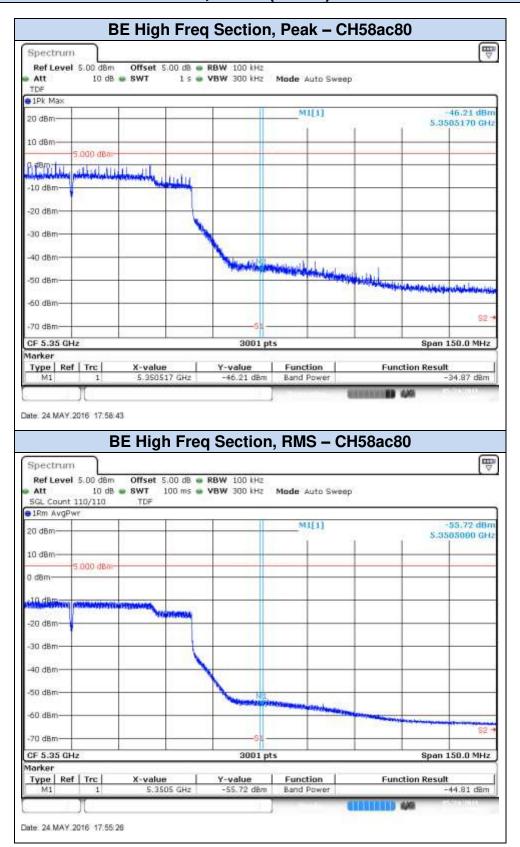
802.11ac80, VHT0 (SISO)- Chain A



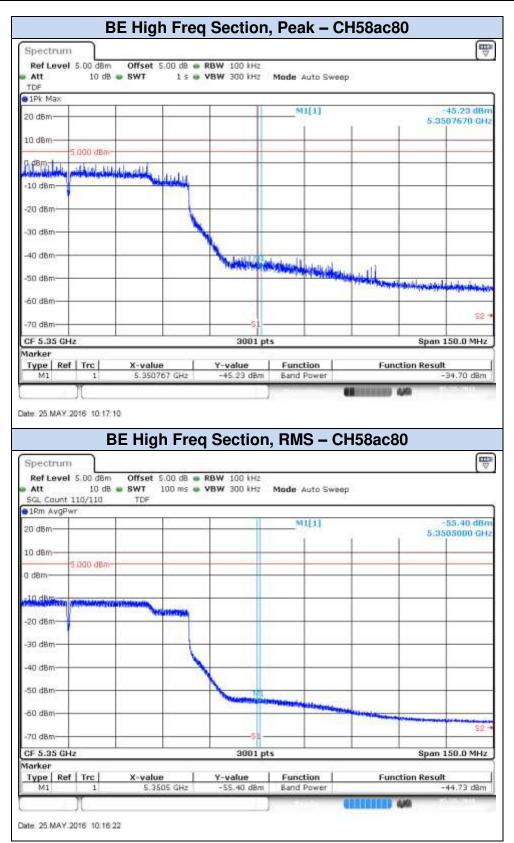
802.11ac80, VHT0 (SISO)- Chain B



802.11ac80, VHT0 (MIMO)- Chain A



802.11ac80, VHT0 (MIMO)- Chain B



C.4 Radiated spurious emission

Standard references:

FCC part	Limits					
15.407 (a) (2)	For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band.					
	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):					
	Freq Range	Field Strength	Field Strength	Meas. Distance		
	(MHz)	(µV/m)	(dBµV/m)	(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		
15.209	216-960	200	46	3		
	Above 960	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 specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.					

Test procedure:

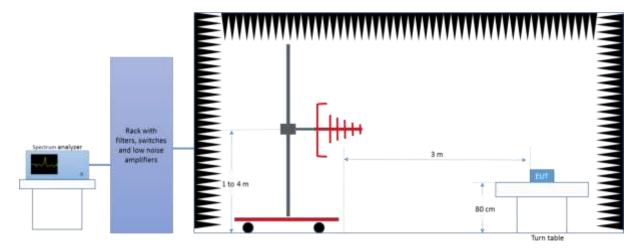
The below setups were used to measure the radiated spurious emissions.

Depending of the frequency range and bands being tested, different antennas and filters were used. The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

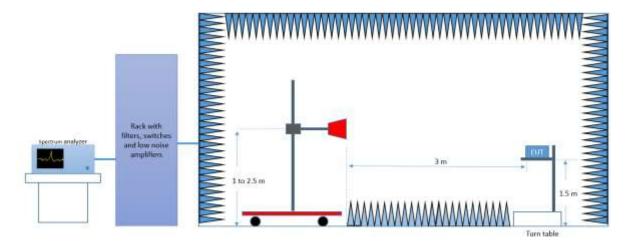
The radiated spurious emissions were measured on the worst case configuration selected from the chapter C.2 and using the lowest, middle and highest channels.



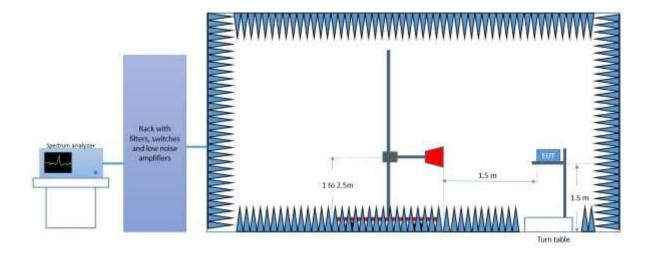
Radiated Setup < 1GHz



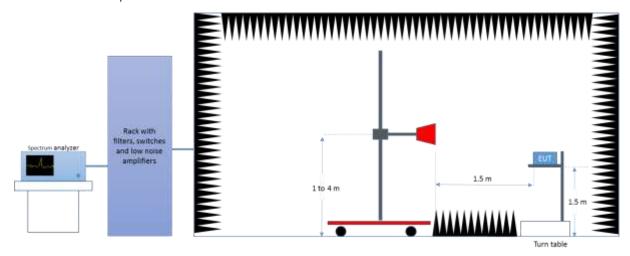
Radiated Setup 1 GHz - 18 GHz



Radiated Setup 18 GHz - 26.5 GHz

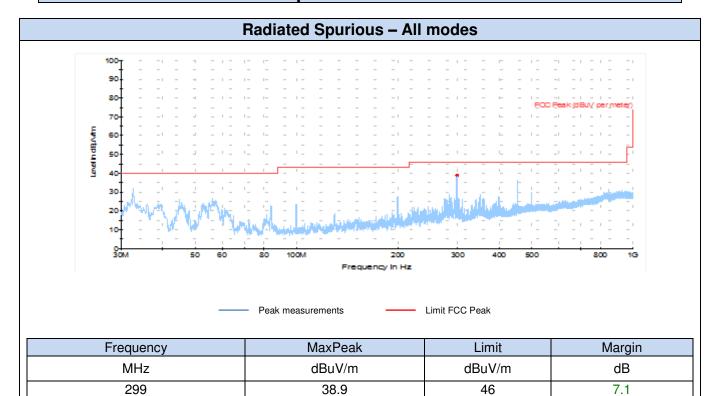


Radiated Setup > 26.5 GHz



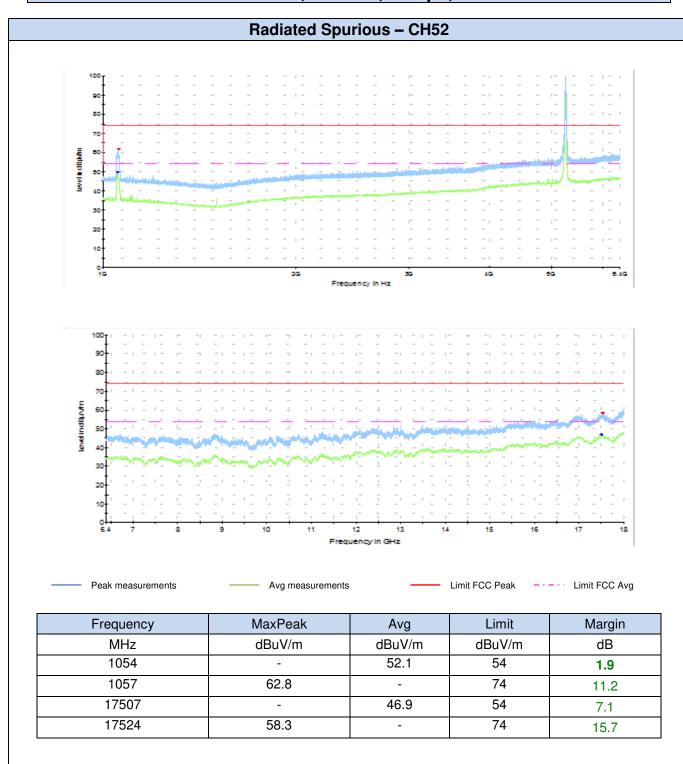
Test Results:

Radiated Spurious - 30MHz to 1GHz

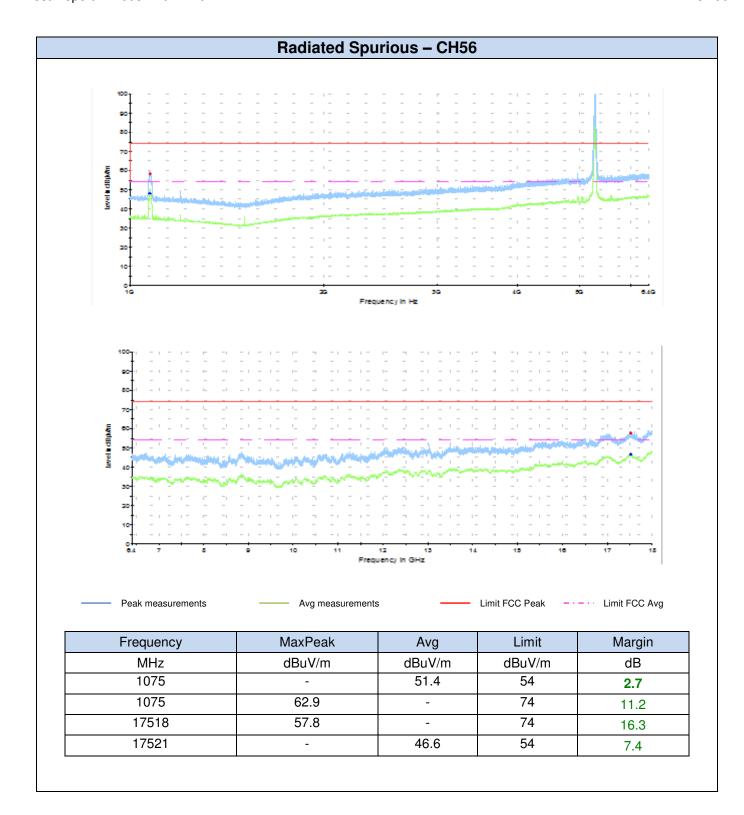


Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

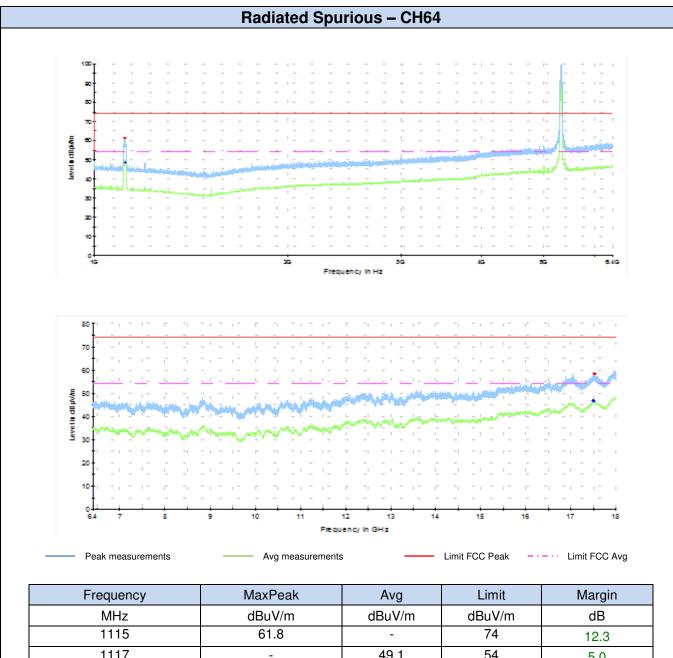
1 GHz - 18GHz, 802.11a, 6Mbps, Chain A





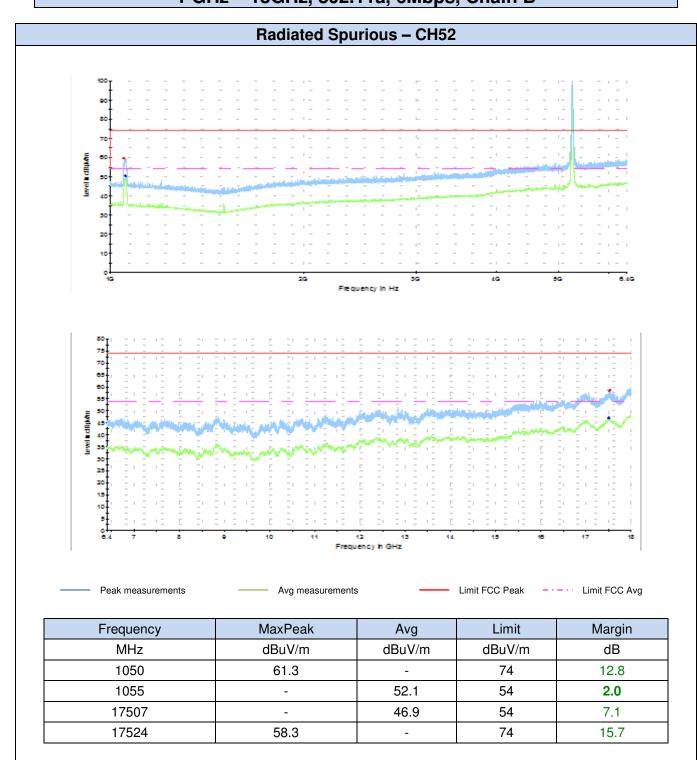




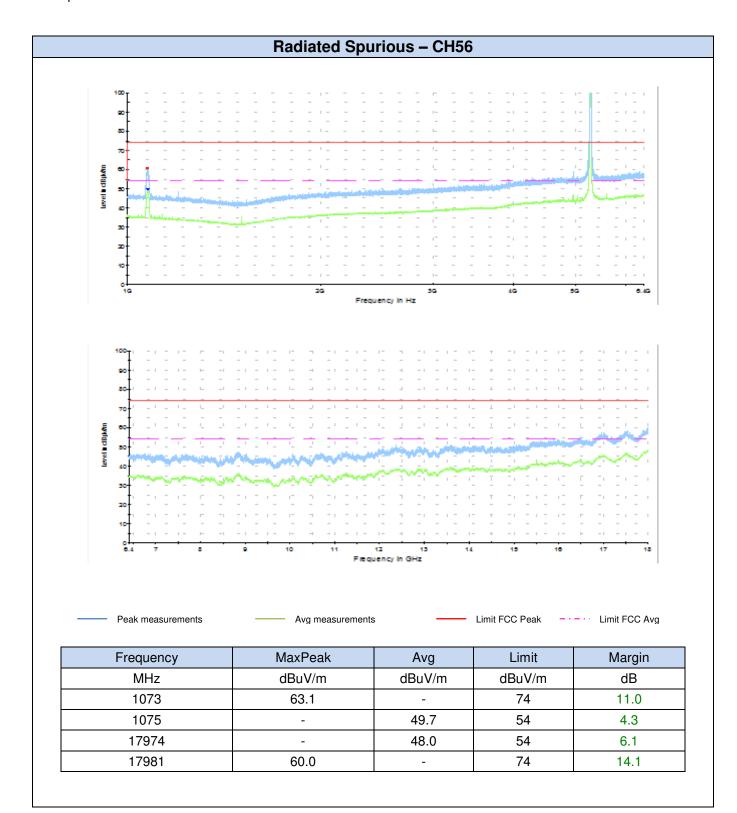


Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
1115	61.8	-	74	12.3
1117	-	49.1	54	5.0
17499	-	46.8	54	7.3
17519	58.3	-	74	15.7

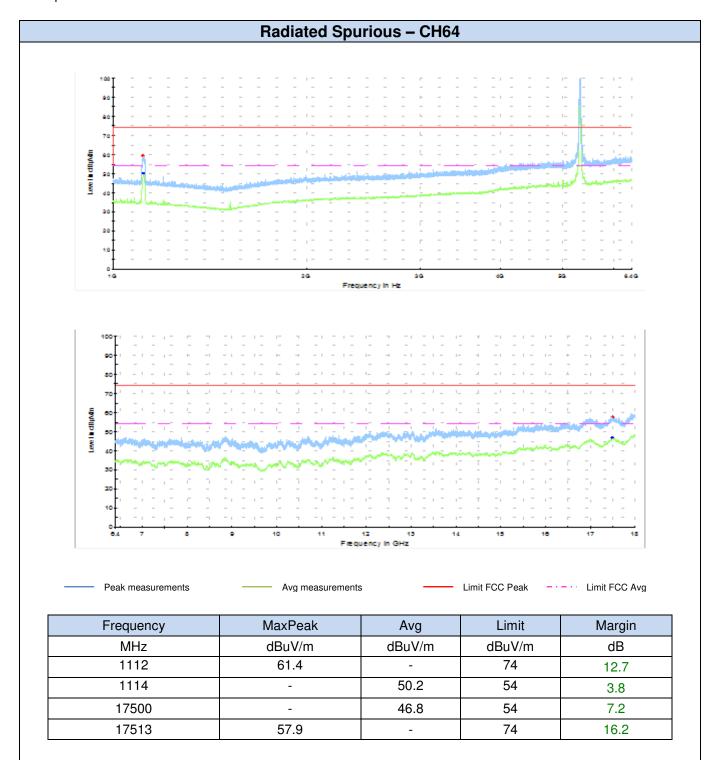
1 GHz – 18GHz, 802.11a, 6Mbps, Chain B



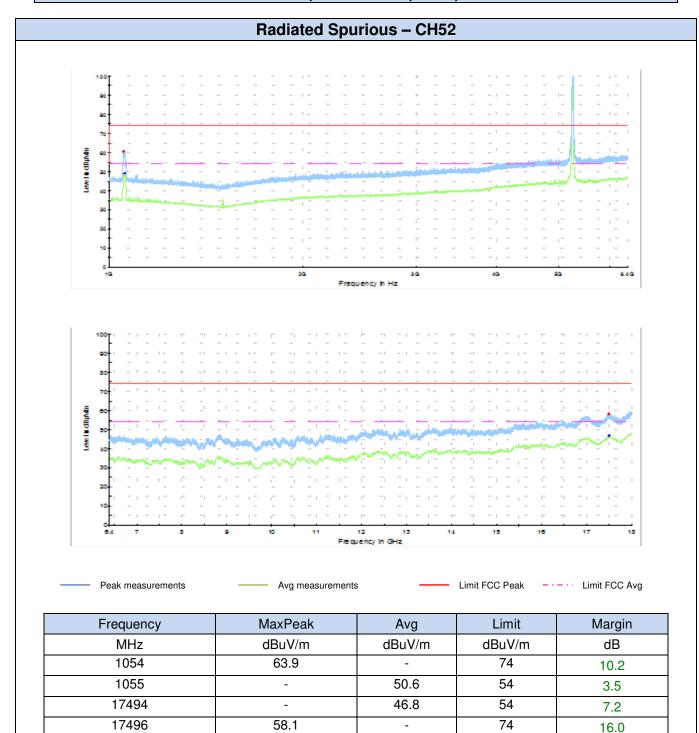




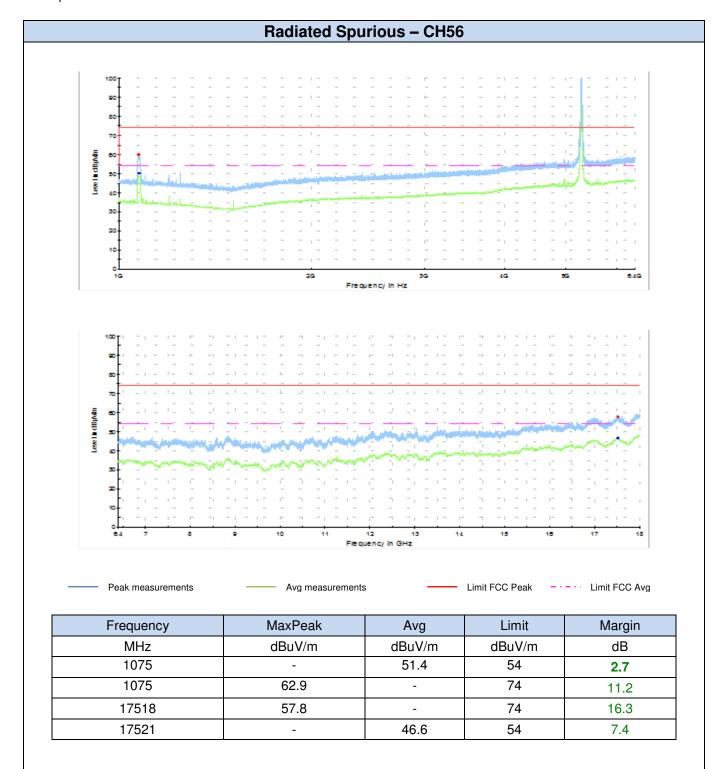




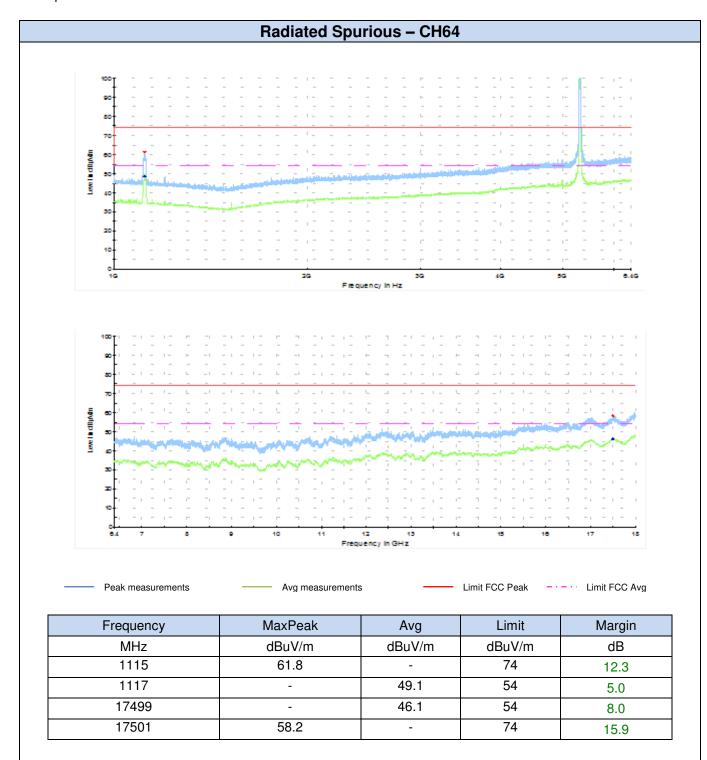
1 GHz - 18GHz, 802.11n20, HT0, Chain A





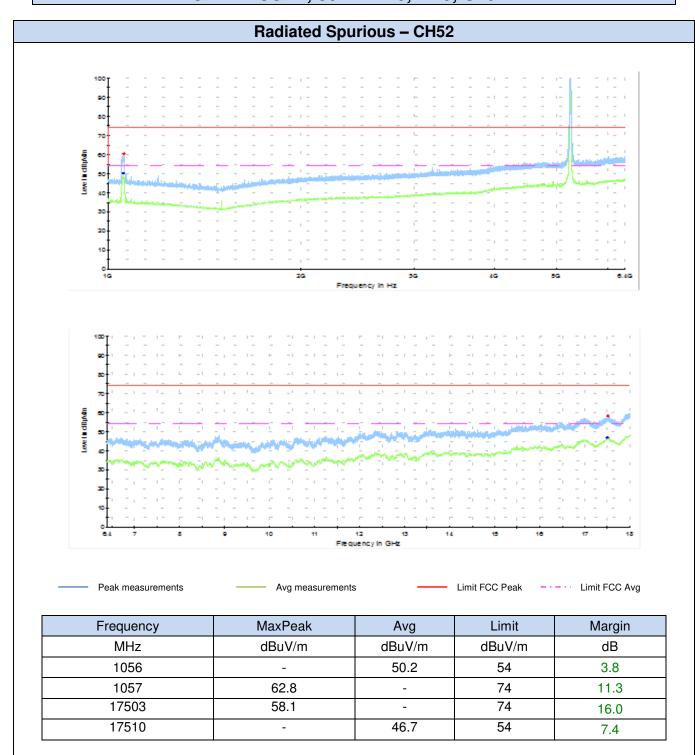




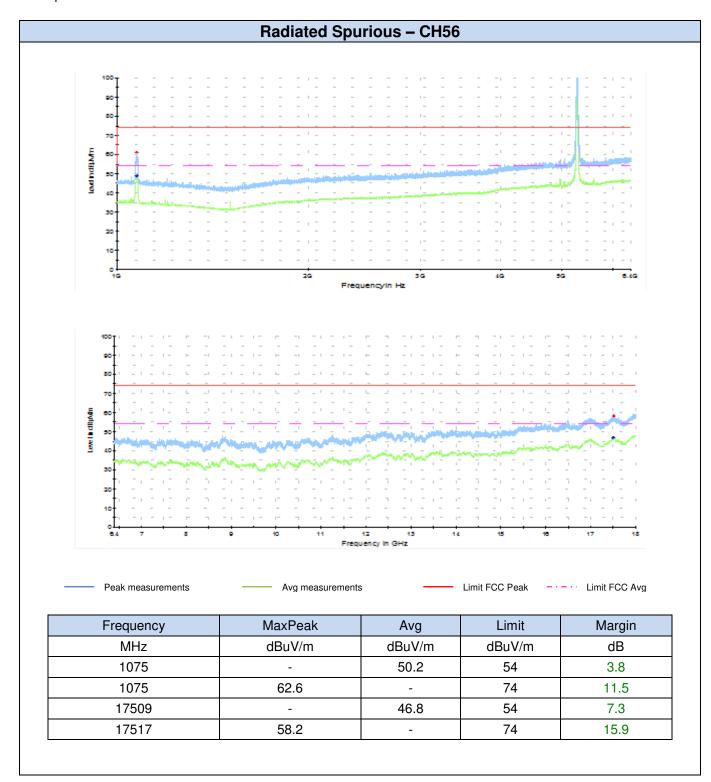




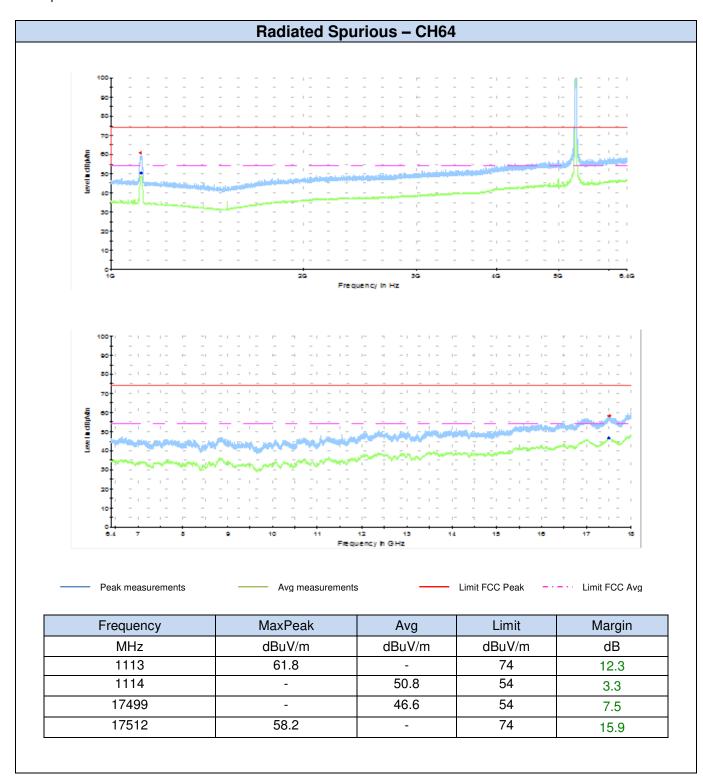
1 GHz - 18GHz, 802.11n20, HT0, Chain B





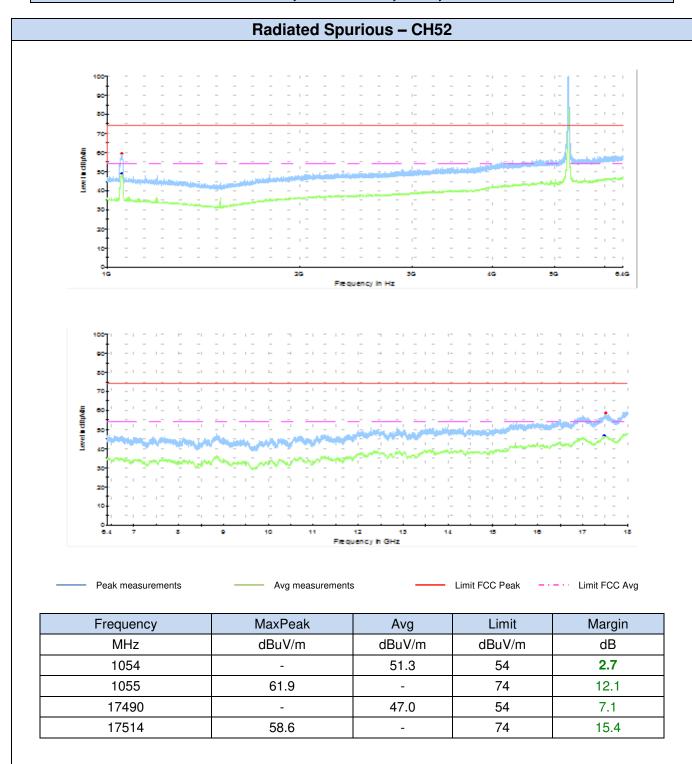




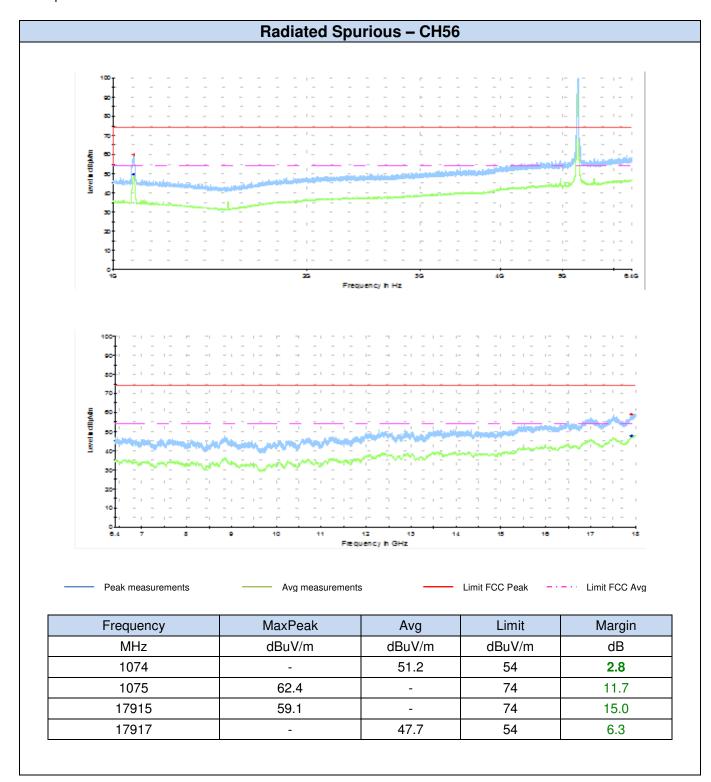




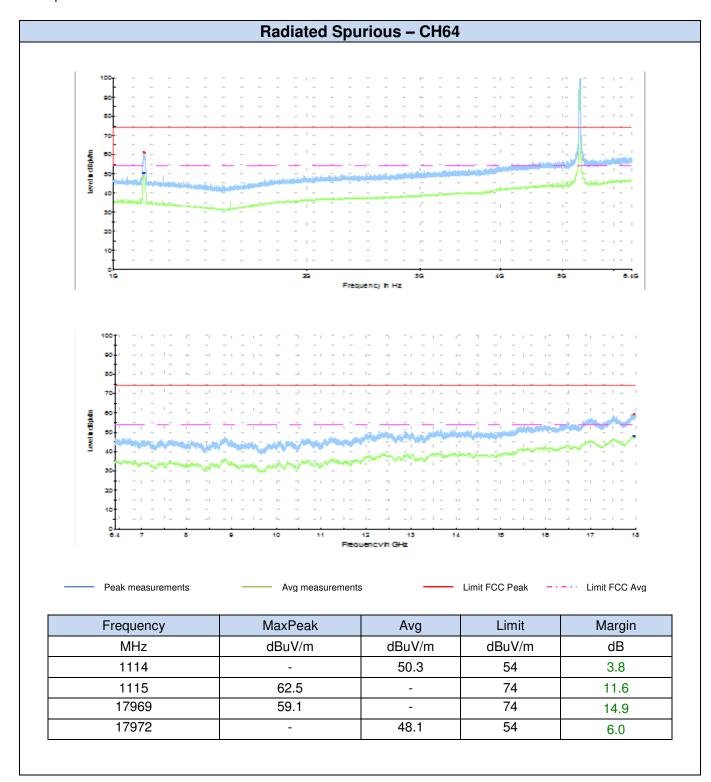
1 GHz - 18GHz, 802.11n20, HT8, Chain A+B





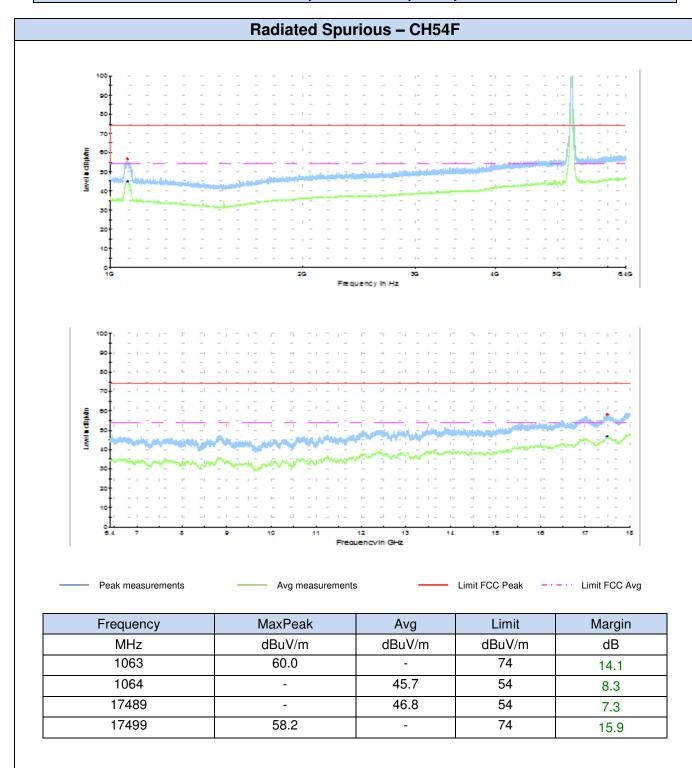




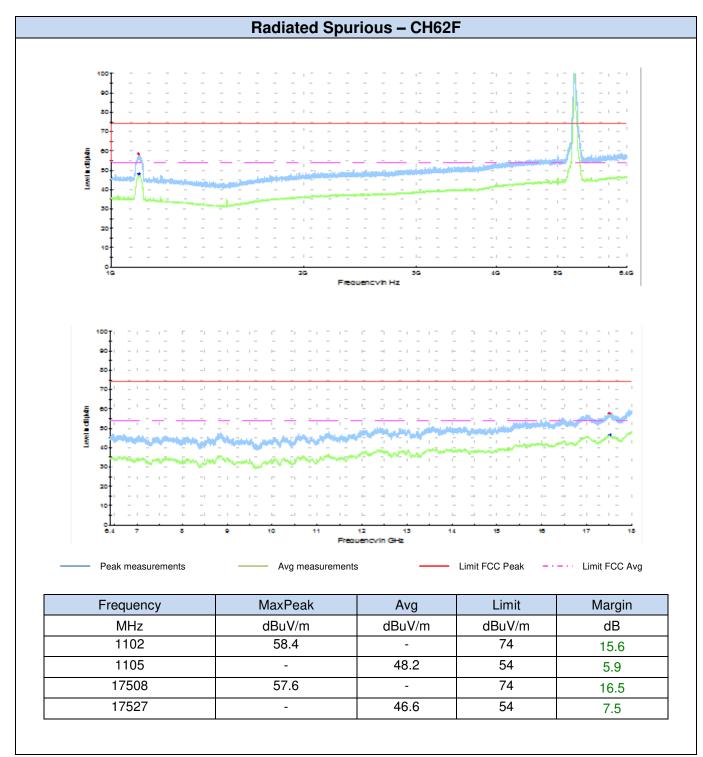




1 GHz - 18GHz, 802.11n40, HT0, Chain A



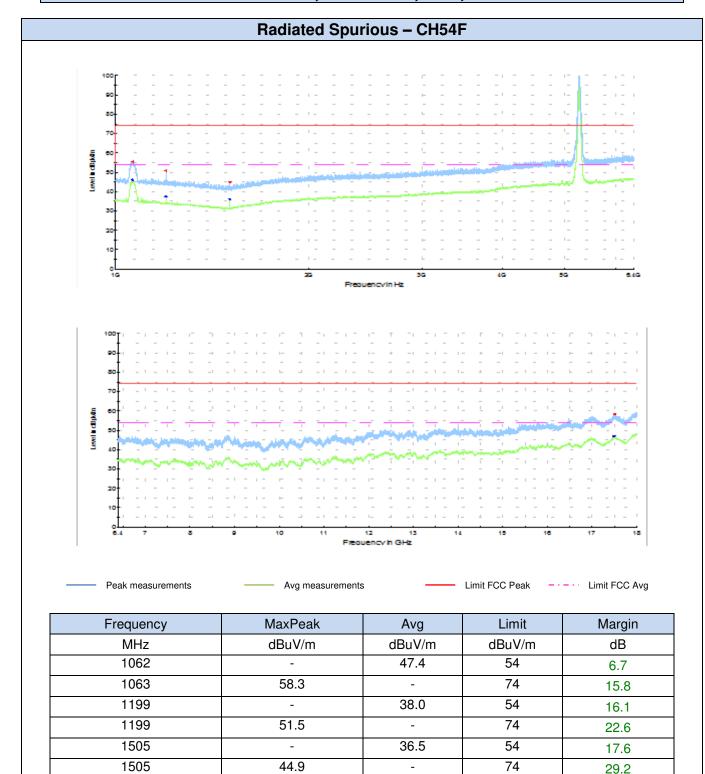




17492

17514

1 GHz - 18GHz, 802.11n40, HT0, Chain B



58.2

46.9

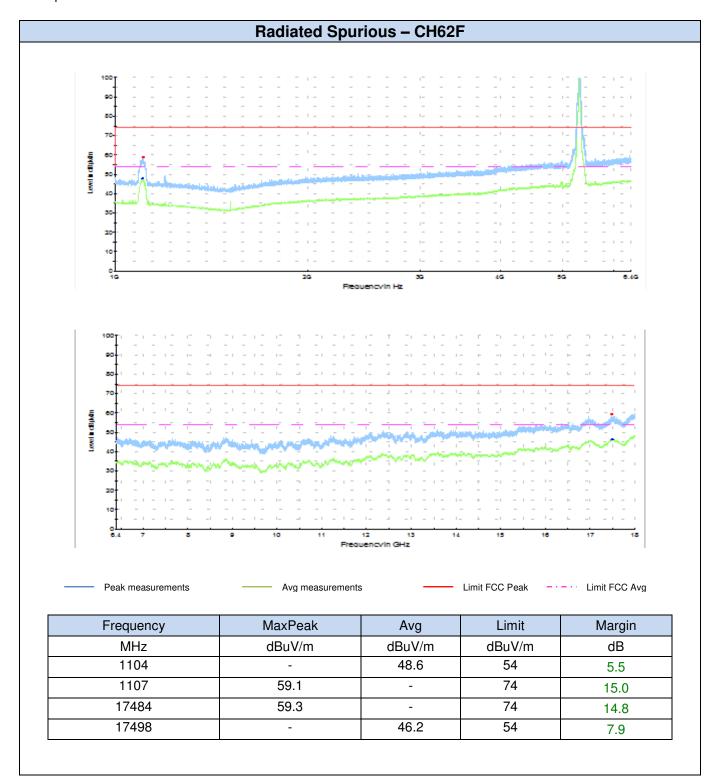
54

74

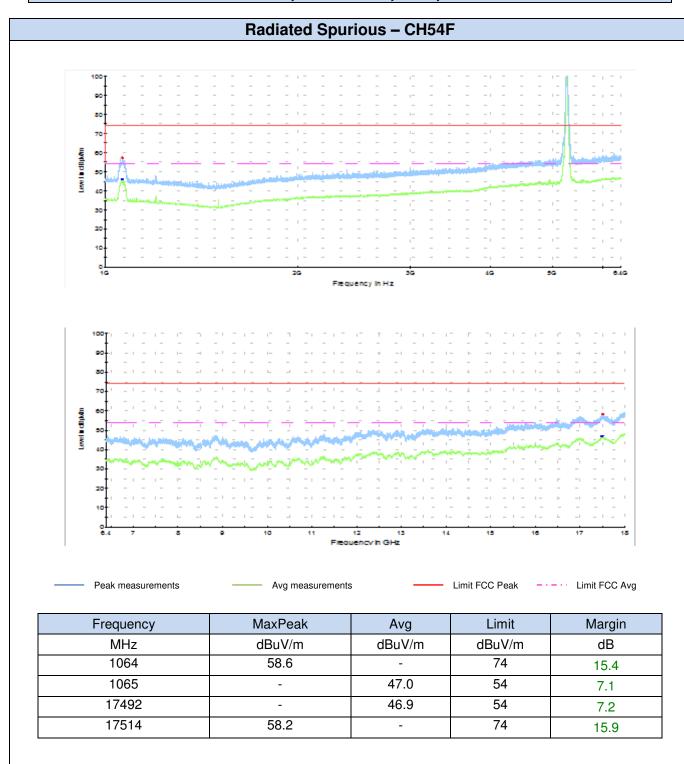
7.2

15.9



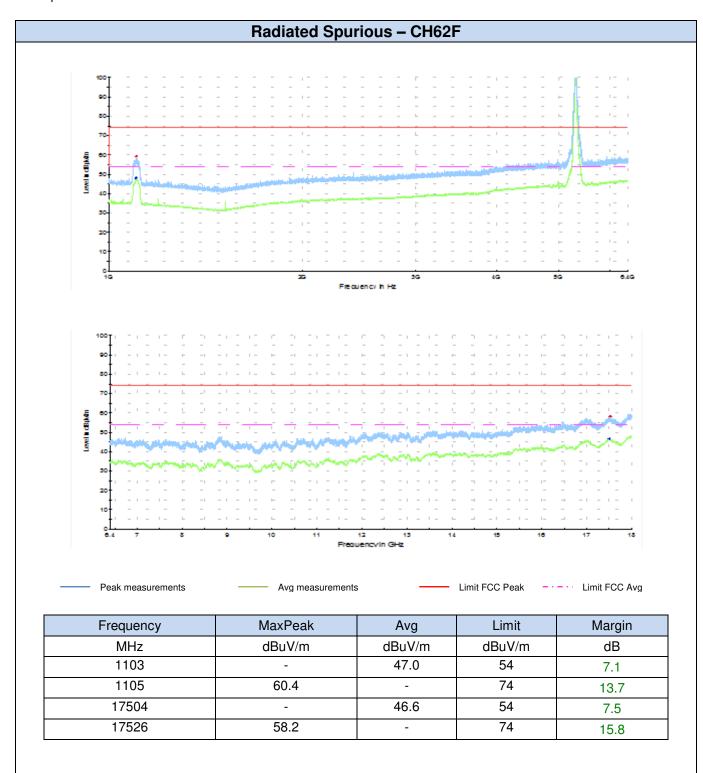


1 GHz - 18GHz, 802.11n40, HT8, Chain A+B



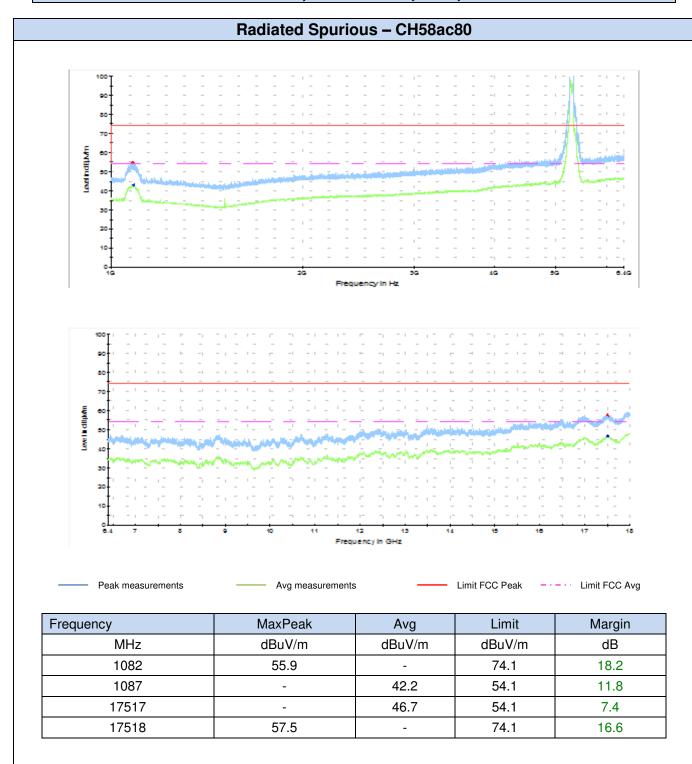




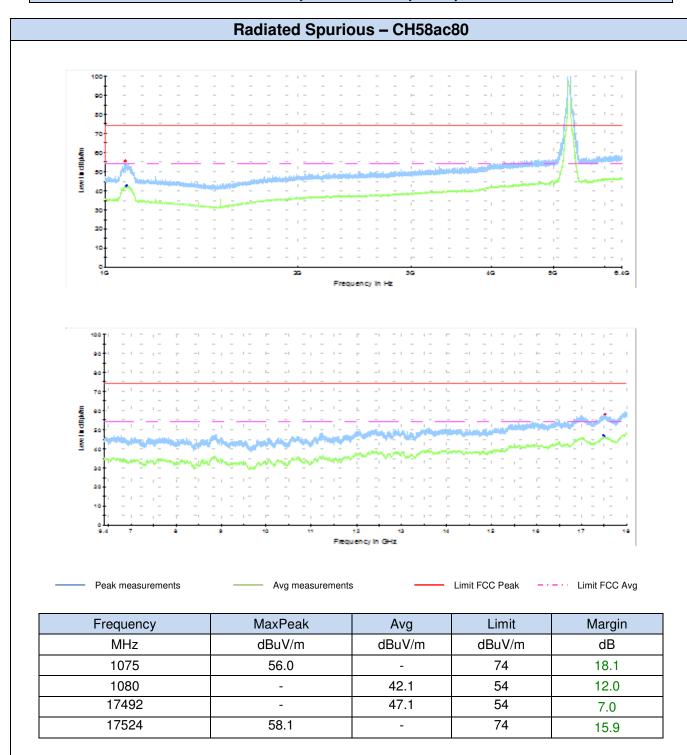




1 GHz - 18GHz, 802.11ac80, HT0, Chain A

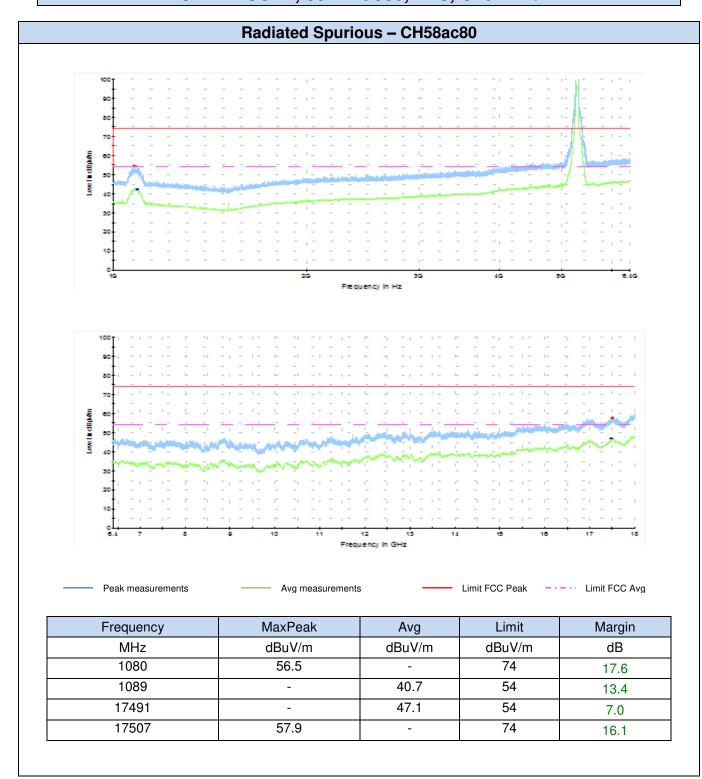


1 GHz - 18GHz, 802.11ac80, HT0, Chain B

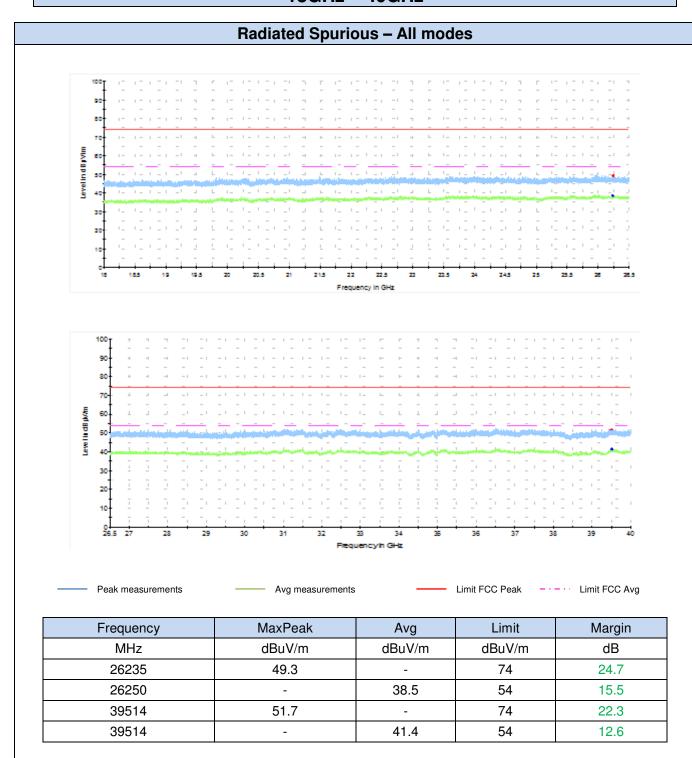




1 GHz - 18GHz, 802.11ac80, HT8, Chain A+B



18GHz - 40GHz



Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.