6.3 UNII Output Power Measurement – 802.11a/n

§15.407 (a)(1); RSS-210 [A9.2]

A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made using a broadband average power meter while the EUT is operating continuously at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies.

In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is the lesser of 50mW (16.99dBm) and 4 dBm + 10log$_{10}$(26dB BW) = 4 dBm + 10log$_{10}$(38.83) = 19.89dBm.

In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log$_{10}$(26dB BW) = 11 dBm + 10log$_{10}$(40.28) = 27.05dBm.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log$_{10}$(26dB BW) = 11 dBm + 10log$_{10}$(35.66) = 26.52dBm.

Mode	Freq	Channel	Detector	802.11a Conducted Power [dBm]							
				Data Rate [Mbps]							
	[MHz]			6	9	12	18	24	36	48	54
802.11a	**5180**	**36**	AVG	13.95	13.94	12.12	12.14	12.11	12.07	11.42	11.18
802.11a	5200	40	AVG	14.64	14.54	12.74	12.63	12.52	12.76	11.29	11.79
802.11a	5220	44	AVG	13.96	13.92	12.98	12.89	12.68	13.03	12.02	11.92
802.11a	**5240**	**48**	AVG	14.02	13.98	12.82	12.89	12.66	12.96	12.01	11.84
802.11a	**5260**	**52**	AVG	14.14	14.17	13.01	13.04	12.88	13.06	11.68	12.11
802.11a	5280	56	AVG	14.24	14.36	13.06	12.94	13.03	13.14	12.09	12.01
802.11a	5300	60	AVG	15.23	15.28	13.10	13.11	12.97	13.06	11.91	12.07
802.11a	**5320**	**64**	AVG	12.03	12.08	12.07	12.01	12.12	12.04	11.81	12.13
802.11a	5500	100	AVG	13.97	13.94	13.31	13.22	13.09	13.36	12.41	12.62
802.11a	**5520**	**104**	AVG	14.49	14.52	12.91	12.84	12.65	12.88	11.92	11.86
802.11a	5540	108	AVG	14.37	14.35	12.99	12.91	12.75	13.06	12.06	12.04
802.11a	5560	112	AVG	14.25	14.27	12.84	12.77	12.67	12.94	11.93	12.14
802.11a	**5580**	**116**	AVG	14.20	14.21	12.73	12.67	12.56	12.81	11.80	12.03
802.11a	5660	132	AVG	14.59	14.63	13.25	13.15	13.06	13.30	12.35	12.56
802.11a	**5680**	**136**	AVG	14.49	14.52	13.14	13.32	13.16	13.39	12.37	12.61
802.11a	5700	140	AVG	13.84	13.85	13.79	13.77	13.82	13.74	13.76	13.83

Table 6-3. UNII (802.11a) Maximum Conducted Output Power

Mode	Freq	Channel	Detector	802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
	[MHz]			6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.4	52/57.8	58.5/65	65/72.2
802.11n	**5180**	**36**	AVG	14.26	14.42	12.64	12.66	12.61	12.37	11.46	11.51
802.11n	5200	40	AVG	14.78	14.83	12.95	13.22	13.01	12.95	12.34	12.11
802.11n	5220	44	AVG	14.39	14.29	13.15	13.27	13.18	13.01	12.32	12.18
802.11n	**5240**	**48**	AVG	14.89	14.28	13.07	13.31	13.27	12.91	12.02	12.28
802.11n	**5260**	**52**	AVG	14.22	14.21	13.26	13.67	13.29	13.11	12.26	12.42
802.11n	5280	56	AVG	14.63	14.39	13.24	13.52	13.41	13.08	12.34	12.31
802.11n	5300	60	AVG	15.10	15.18	13.37	13.48	13.46	13.29	12.38	12.47
802.11n	**5320**	**64**	AVG	12.63	12.61	12.67	12.48	12.49	12.57	12.57	12.51
802.11n	5500	100	AVG	13.84	13.91	13.01	13.19	13.28	12.95	12.28	12.39
802.11n	**5520**	**104**	AVG	14.44	14.51	13.29	13.38	13.21	13.08	12.09	12.24
802.11n	5540	108	AVG	14.34	14.43	12.78	13.07	12.88	12.69	11.95	12.11
802.11n	5560	112	AVG	14.31	14.36	12.67	12.87	12.78	12.58	11.86	12.15
802.11n	**5580**	**116**	AVG	14.19	14.26	12.50	12.74	12.66	12.59	11.64	11.89
802.11n	5660	132	AVG	14.63	14.73	13.08	13.27	13.19	13.15	12.27	12.42
802.11n	**5680**	**136**	AVG	14.56	14.61	12.97	13.15	13.09	12.88	12.19	12.38
802.11n	5700	140	AVG	13.73	13.72	13.75	13.58	13.61	13.71	13.67	13.64

Table 6-4. UNII (802.11n, 800ns – 20MHz BW) Maximum Conducted Output Power

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Mode	Freq [MHz]	Channel	Power Cont [dBm]	Conducted Power [dBm] Data Rate [Mbps]							
				6.5/7.2	**13/14.4**	**19.5/21.7**	**26/28.9**	**39/43.4**	**52/57.8**	**58.5/65**	**65/72.2**
802.11n	**5180**	**36**	AVG	14.51	14.62	13.23	12.96	12.98	12.91	12.02	12.49
802.11n	5200	40	AVG	14.35	14.39	13.09	12.81	12.83	12.84	11.83	12.36
802.11n	5220	44	AVG	14.19	14.26	13.02	12.77	12.71	12.75	11.81	12.18
802.11n	**5240**	**48**	AVG	14.04	13.94	12.70	12.62	12.59	12.46	11.55	12.01
802.11n	**5260**	**52**	AVG	14.41	14.49	13.14	13.04	12.98	12.92	12.12	12.43
802.11n	5280	56	AVG	14.08	14.20	12.94	12.71	12.68	12.64	11.72	12.17
802.11n	5300	60	AVG	13.85	13.96	12.74	12.46	12.49	12.36	11.49	11.78
802.11n	**5320**	**64**	AVG	11.82	11.13	11.19	11.32	11.41	11.46	11.34	11.22
802.11n	5560	112	AVG	13.41	13.46	12.94	12.61	12.69	12.60	11.74	12.23
802.11n	**5580**	**116**	AVG	13.34	13.42	12.84	12.64	12.57	12.55	11.61	12.03
802.11n	5600	120	AVG	13.22	13.28	12.68	12.42	12.44	12.38	11.27	11.83
802.11n	**5620**	**124**	AVG	13.87	14.01	13.37	13.25	13.18	13.16	12.26	12.73
802.11n	5640	128	AVG	13.85	13.90	13.38	13.18	13.14	13.07	12.23	12.65
802.11n	5660	132	AVG	13.81	13.85	13.31	13.05	13.11	13.16	12.29	12.49
802.11n	**5680**	**136**	AVG	13.72	13.88	13.24	13.02	12.94	12.96	12.06	12.56
802.11n	5700	140	AVG	13.64	13.75	13.22	12.96	12.91	12.87	12.03	12.37

Table 6-5. UNII (802.11n, 400ns – 20MHz BW) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Power Cont [dBm]	Conducted Power [dBm] Data Rate [Mbps]							
				13.5/15	**27/30**	**40.5/45**	**54/60**	**81/90**	**108/120**	**121.5/135**	**135/150**
802.11n	**5190**	**38**	AVG	11.19	11.36	11.32	11.24	11.21	11.17	11.35	11.34
802.11n	5230	46	AVG	12.26	12.14	12.33	12.08	12.13	12.17	12.31	11.91
802.11n	**5270**	**54**	AVG	12.63	12.68	12.64	12.57	12.51	12.54	12.68	12.31
802.11n	5310	62	AVG	12.56	12.54	12.55	12.53	12.61	12.52	12.59	12.62
802.11n	5510	102	AVG	12.27	12.31	12.26	12.22	12.26	12.19	12.30	12.21
802.11n	**5550**	**110**	AVG	12.03	12.01	12.04	12.02	11.98	11.96	12.01	12.07
802.11n	5590	118	AVG	11.77	11.84	11.86	11.83	11.77	11.75	11.87	11.76
802.11n	5630	126	AVG	12.46	12.49	12.54	12.51	12.47	12.48	12.61	12.48
802.11n	5670	134	AVG	12.31	12.32	12.34	12.37	12.39	12.28	12.36	12.24
802.11n	**5690**	**138**	AVG	12.28	12.31	12.32	12.34	12.30	12.24	12.38	12.33

Table 6-6. UNII (802.11n, 800ns – 40MHz BW) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Power Cont [dBm]	Conducted Power [dBm] Data Rate [Mbps]							
				13.5/15	**27/30**	**40.5/45**	**54/60**	**81/90**	**108/120**	**121.5/135**	**135/150**
802.11n	**5190**	**38**	AVG	12.12	11.98	12.03	11.97	12.05	11.94	11.96	11.83
802.11n	5230	46	AVG	11.81	11.78	11.82	11.77	11.79	11.74	11.80	11.76
802.11n	**5270**	**54**	AVG	11.24	11.23	11.26	11.27	11.29	11.21	11.28	11.22
802.11n	5310	62	AVG	10.61	10.59	10.64	10.58	10.60	10.56	10.57	10.63
802.11n	5510	102	AVG	12.51	12.53	12.58	12.46	12.49	12.52	12.44	12.39
802.11n	**5550**	**110**	AVG	12.08	12.07	12.04	11.98	12.03	12.01	11.97	11.96
802.11n	5590	118	AVG	11.78	11.75	11.81	11.79	11.80	11.77	11.73	11.76
802.11n	5630	126	AVG	12.55	12.52	12.56	12.47	12.41	12.51	12.44	12.39
802.11n	5670	134	AVG	12.38	12.36	12.39	12.33	12.35	12.27	12.31	12.29
802.11n	**5690**	**138**	AVG	12.19	12.17	12.20	12.15	12.19	12.14	12.21	12.18

Table 6-7. UNII (802.11n, 400ns – 40MHz BW) Maximum Conducted Output Power

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6.4 Peak Power Spectral Density – 802.11a/n

§15.407 (a)(1),(5) / RSS-210 [A9.2]

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in a transmission mode with the duty cycle below 98% at the appropriate center frequencies. Method SA-1, as defined in KDB 789033, was used to measure the power spectral density. The span is set to 50MHz in order to encompass the entire emission bandwidth, RBW = 1MHz, VBW = 3MHz, detector = RMS with 100 traces in power averaging. Number of points = 1001 ≥ 2 Span / RBW (2 x 50 MHz / 1 MHz = 100 points). A video trigger is used to enable triggering only on full power pulses. ***The maximum permissible peak power spectral density is 4dBm/MHz in the 5.15GHz – 5.25GHz band and 11dBm/MHz in the 5.25GHz – 5.35 GHz and 5.47 – 5.725GHz bands.***

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]
Band I	5180	36	a	6	3.893	4.0	-0.11
	5200	40	a	6	3.463	4.0	-0.54
	5240	48	a	6	3.768	4.0	-0.23
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	3.698	4.0	-0.30
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	2.862	4.0	-1.14
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	3.392	4.0	-0.61
	5190	38	n (40MHz)	13.5/15 (MCS0)	0.487	4.0	-3.51
	5230	46	n (40MHz)	13.5/15 (MCS0)	0.024	4.0	-3.98
Band II	5260	52	a	6	5.116	11.0	-5.88
	5280	56	a	6	3.313	11.0	-7.69
	5320	64	a	6	3.774	11.0	-7.23
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	3.589	11.0	-7.41
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	3.152	11.0	-7.85
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	2.675	11.0	-8.33
	5270	54	n (40MHz)	13.5/15 (MCS0)	-0.013	11.0	-11.01
	5310	62	n (40MHz)	13.5/15 (MCS0)	-0.324	11.0	-11.32
Band III	5500	100	a	6	2.318	11.0	-8.68
	5580	116	a	6	2.383	11.0	-8.62
	5700	140	a	6	1.944	11.0	-9.06
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	2.312	11.0	-8.69
	5580	116	n (20MHz)	6.5/7.2 (MCS0)	2.285	11.0	-8.72
	5700	140	n (20MHz)	6.5/7.2 (MCS0)	2.147	11.0	-8.85
	5510	102	n (40MHz)	13.5/15 (MCS0)	-0.107	11.0	-11.11
	5670	134	n (40MHz)	13.5/15 (MCS0)	-0.732	11.0	-11.73

Table 6-8. Conducted Power Spectral Density Measurements

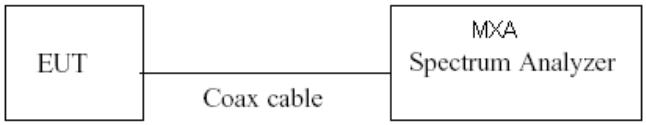

Figure 6-2. Test Instrument & Measurement Setup

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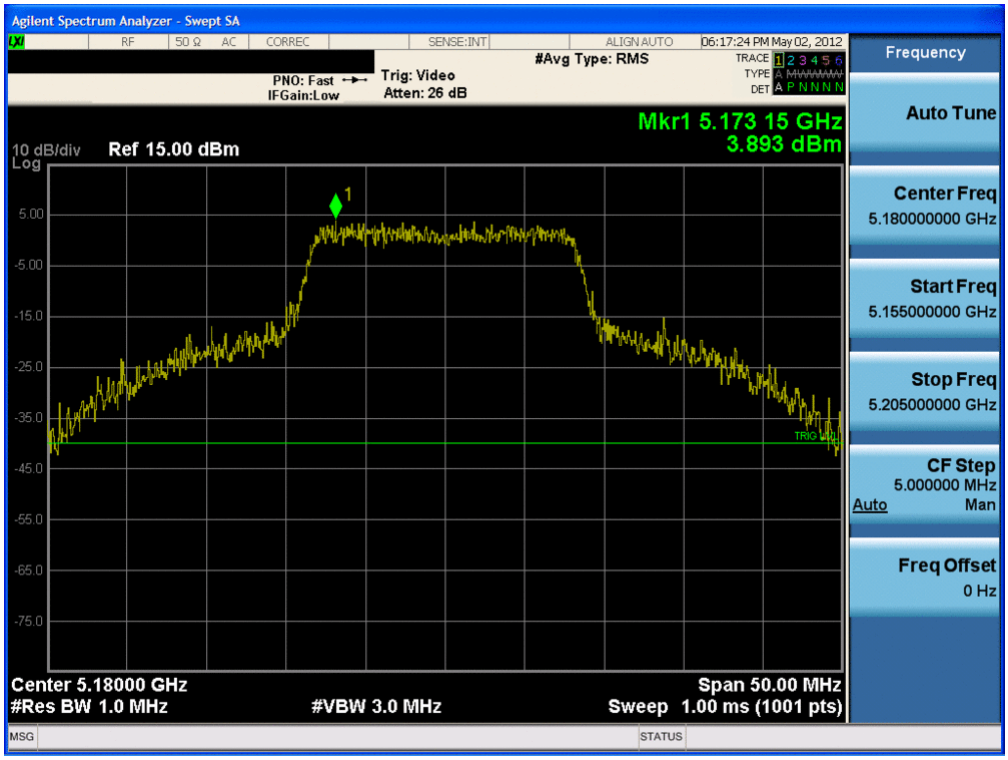
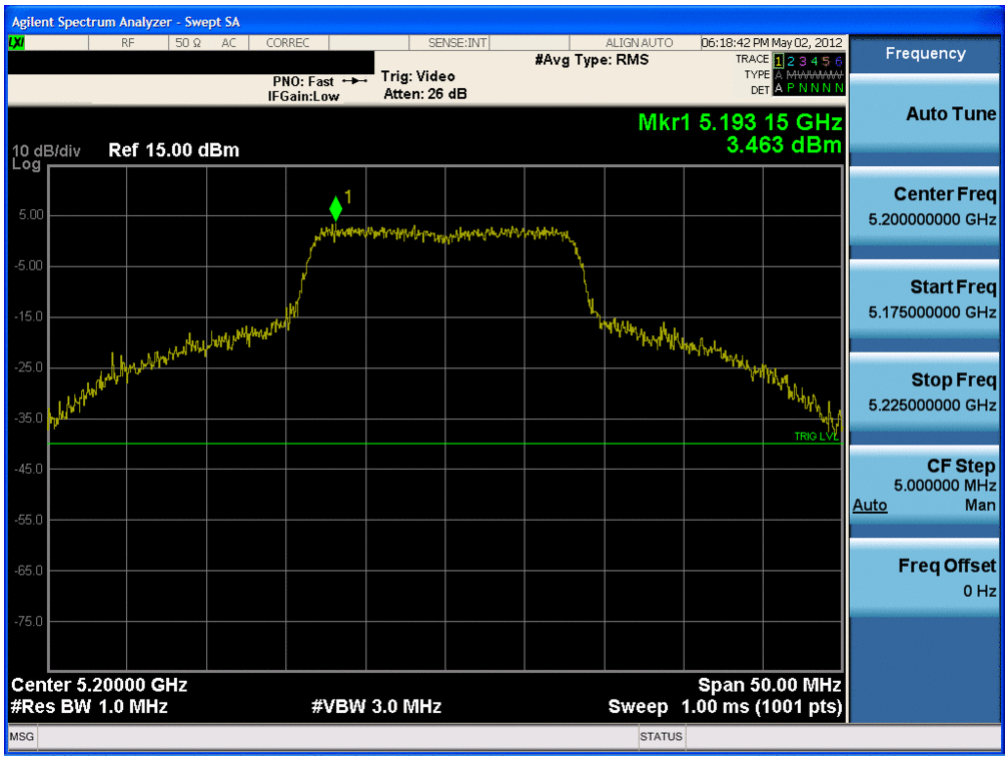


Plot 6-25. Peak Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 36)



Plot 6-26. Peak Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 40)

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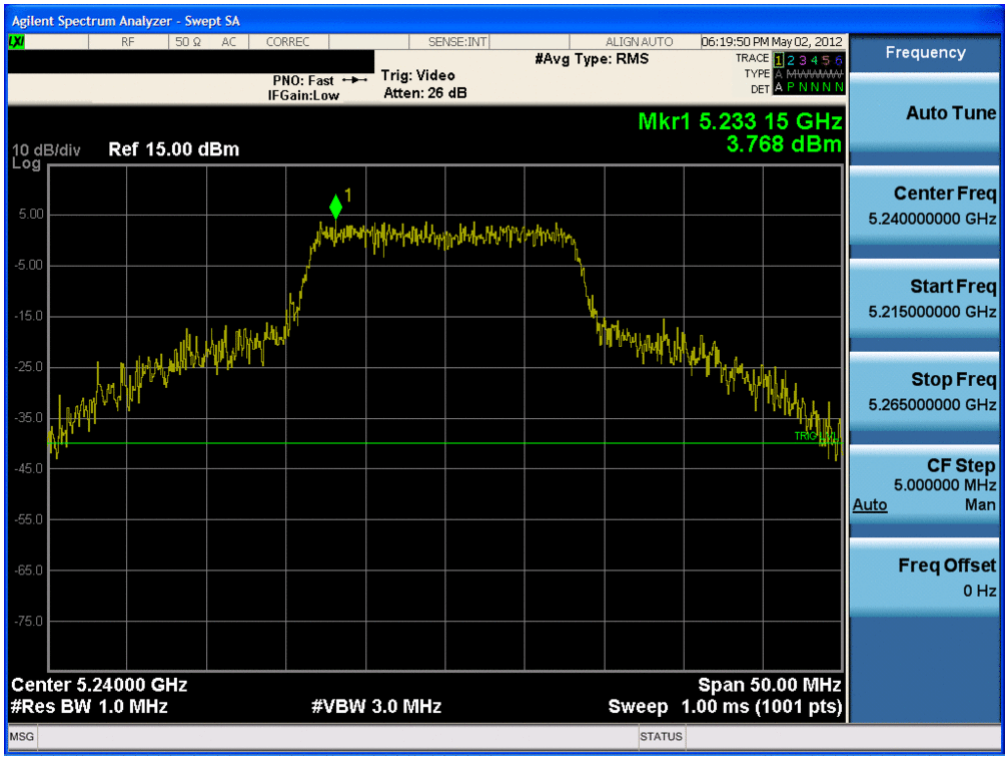
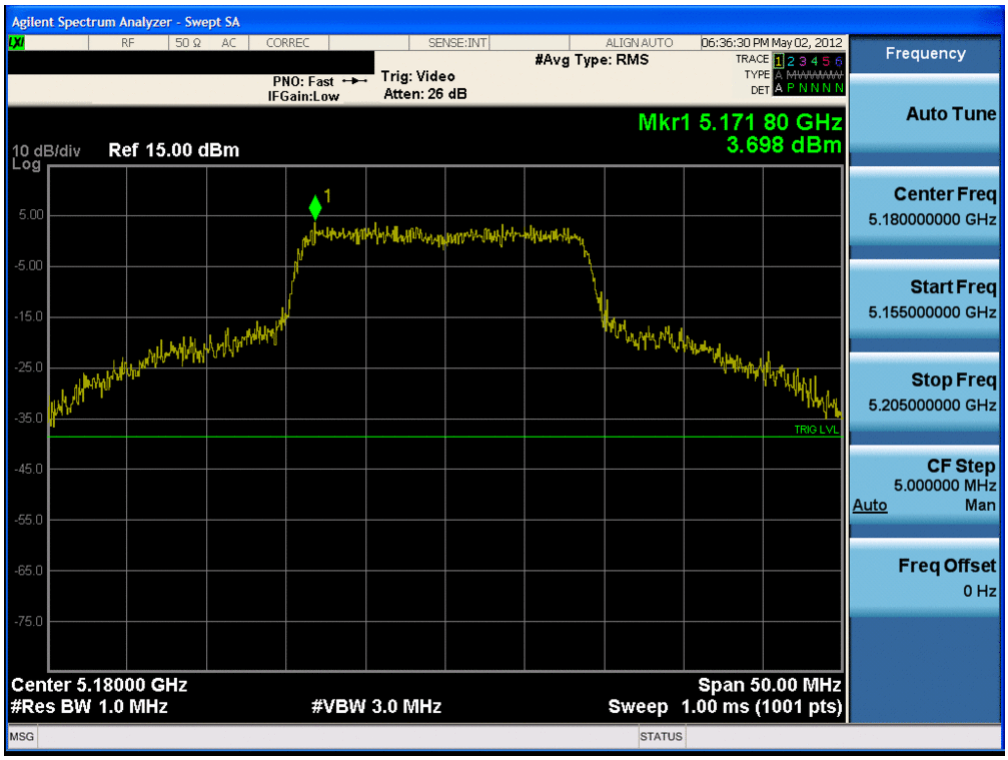


Plot 6-27. Peak Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 48)



Plot 6-28. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 36)

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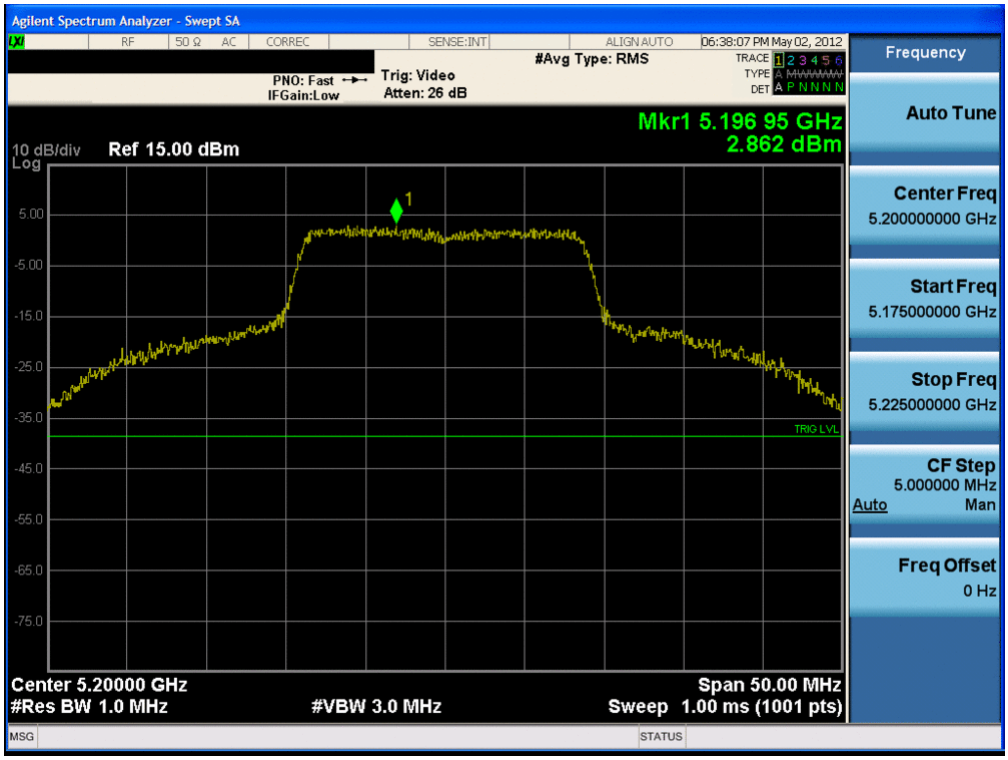
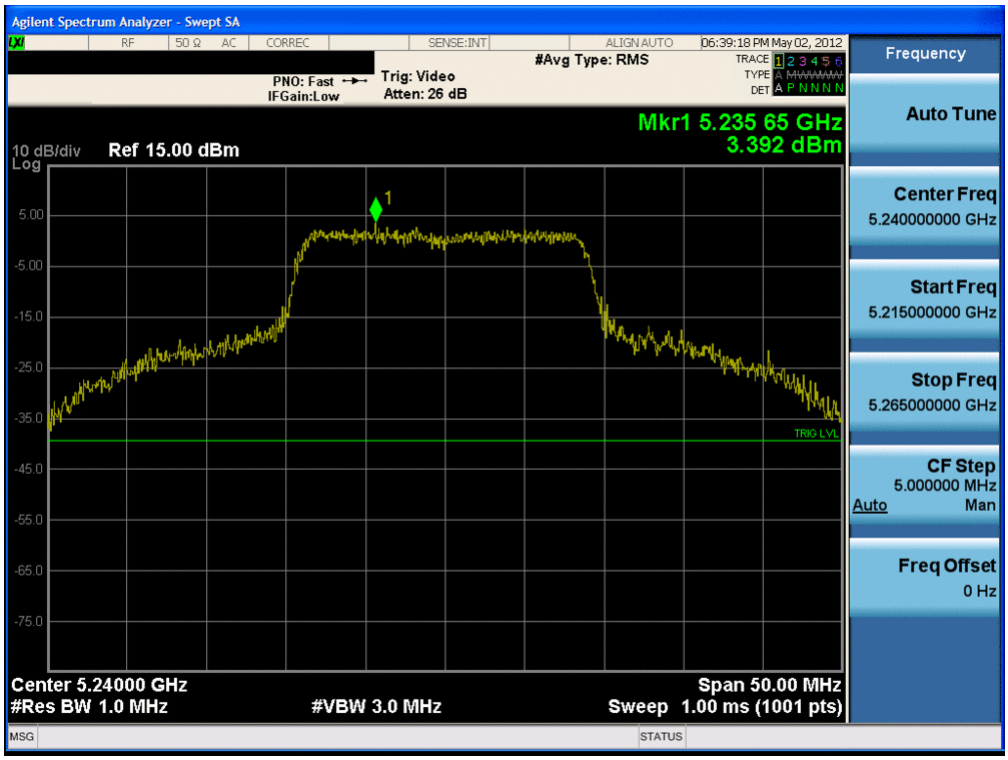


Plot 6-29. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 40)



Plot 6-30. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 48)

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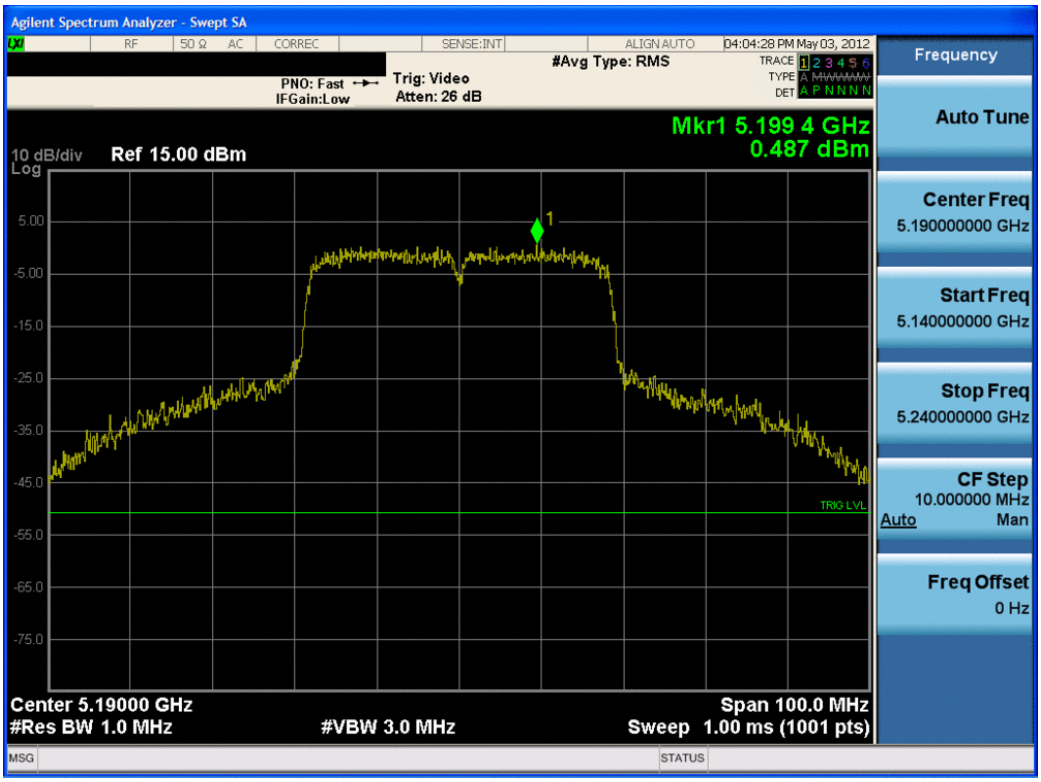
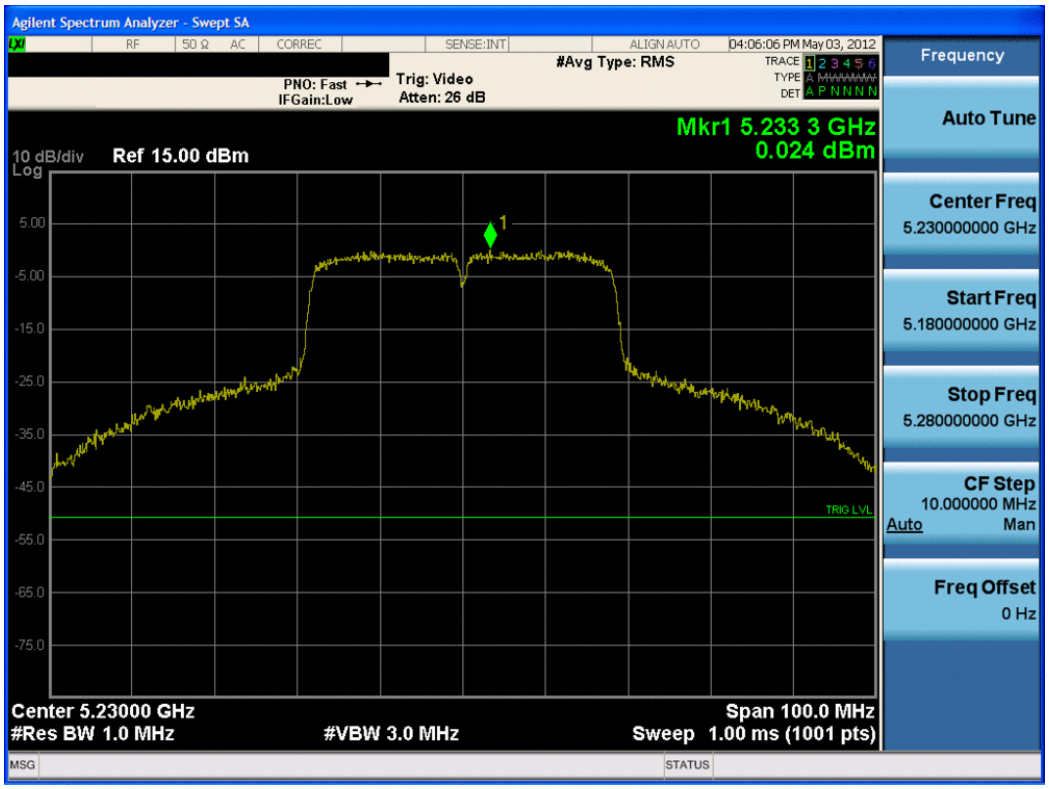


Plot 6-31. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 1) – Ch. 38)



Plot 6-32. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 1) – Ch. 46)

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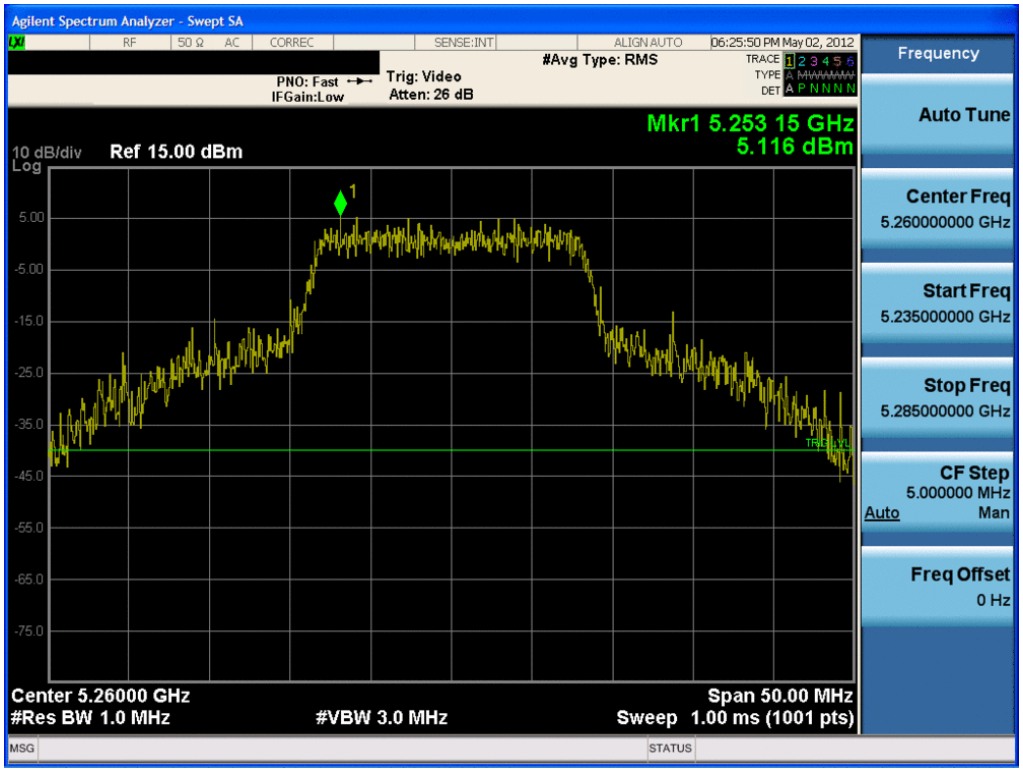
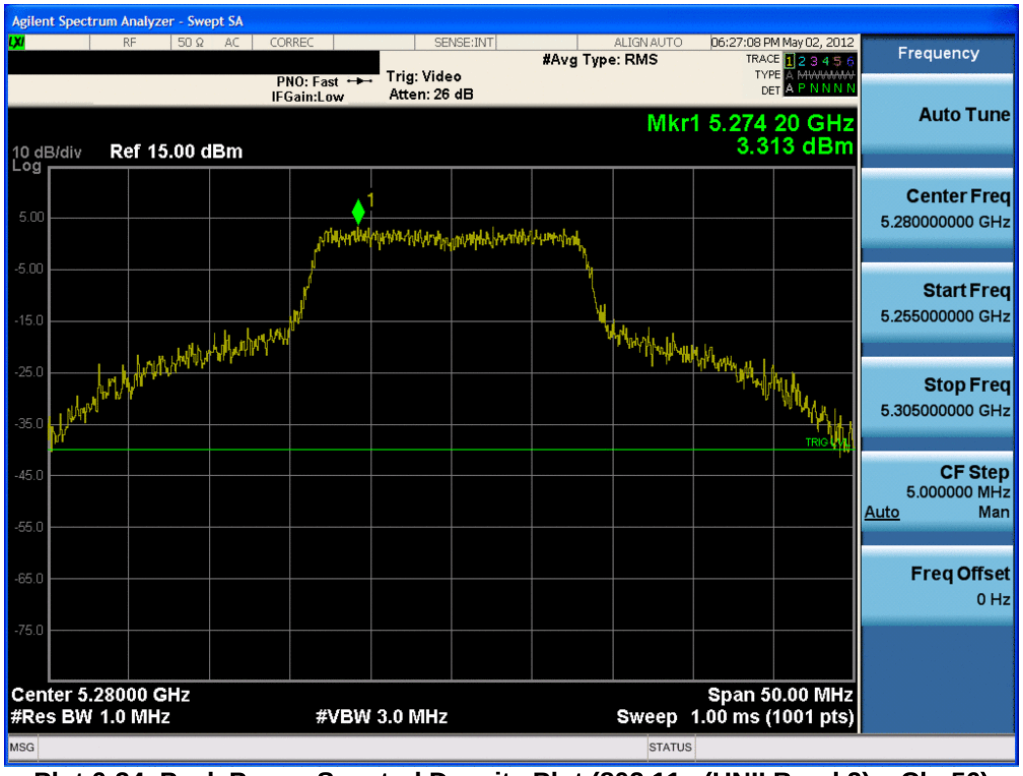


Plot 6-33. Peak Power Spectral Density Plot (802.11a (UNII Band 2) – Ch. 52)



Plot 6-34. Peak Power Spectral Density Plot (802.11a (UNII Band 2) – Ch. 56)

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Plot 6-35. Peak Power Spectral Density Plot (802.11a (UNII Band 2) – Ch. 64)

Plot 6-36. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 52)

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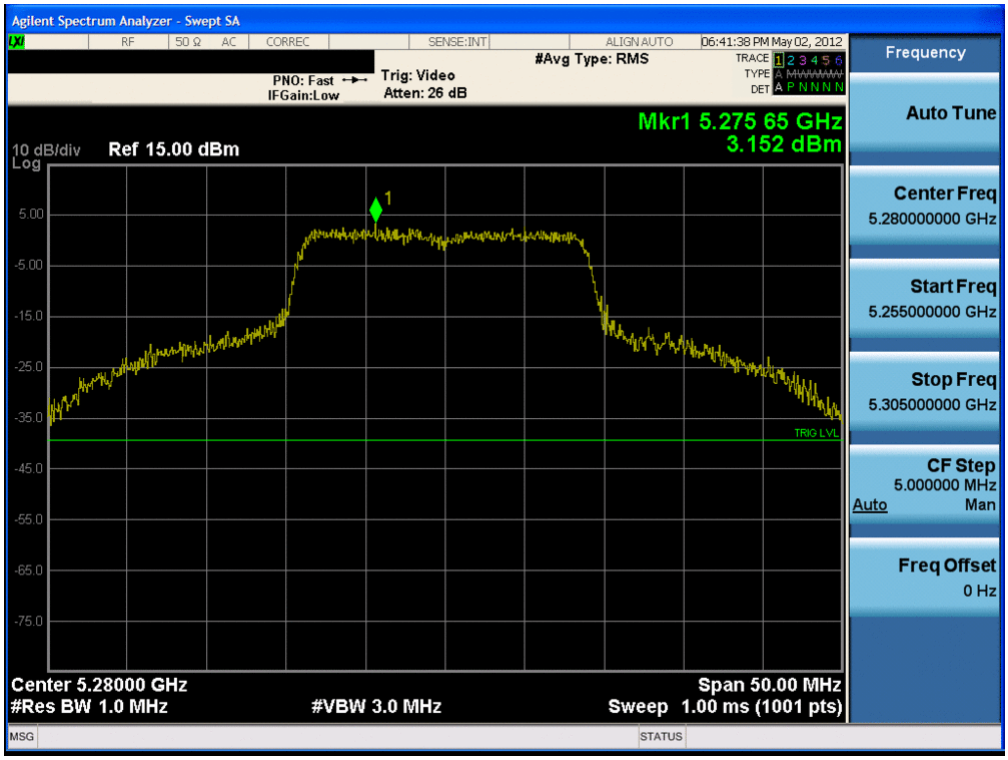
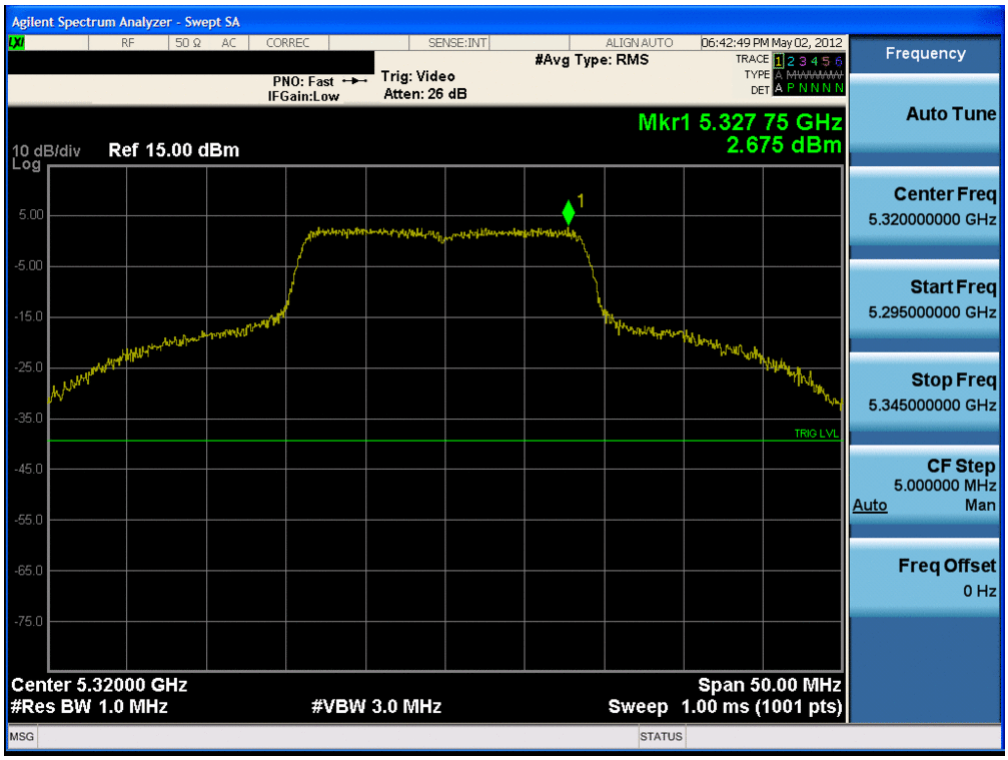


Plot 6-37. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 56)



Plot 6-38. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 64)

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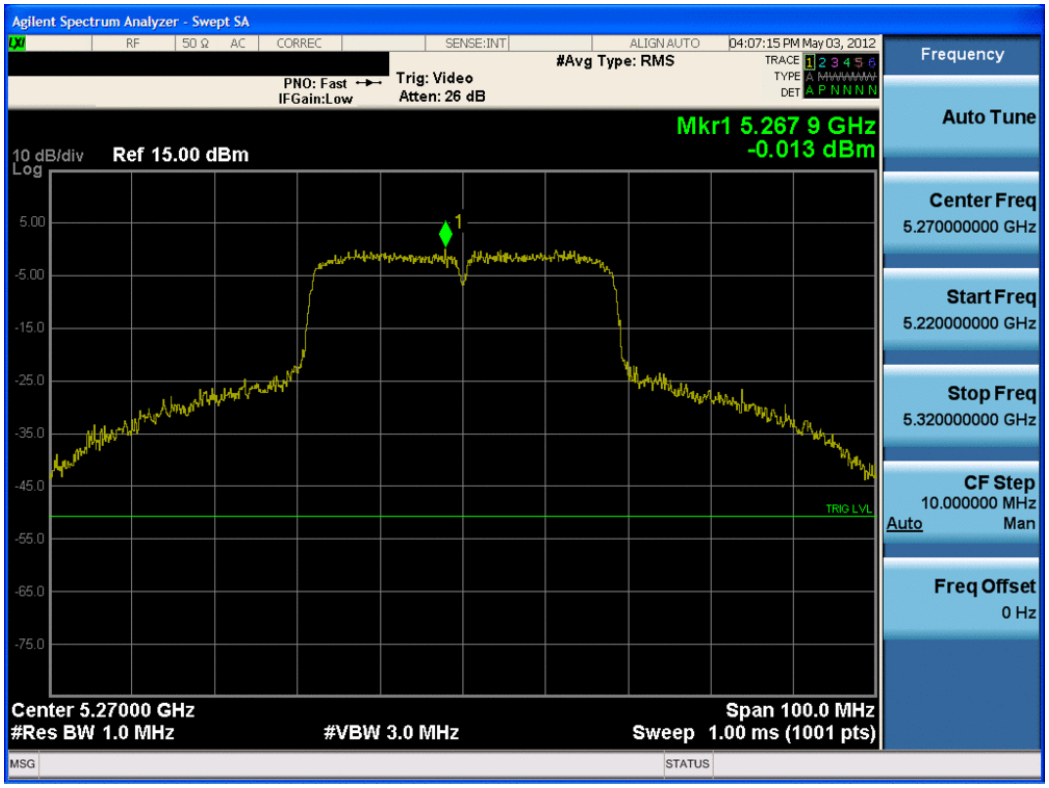
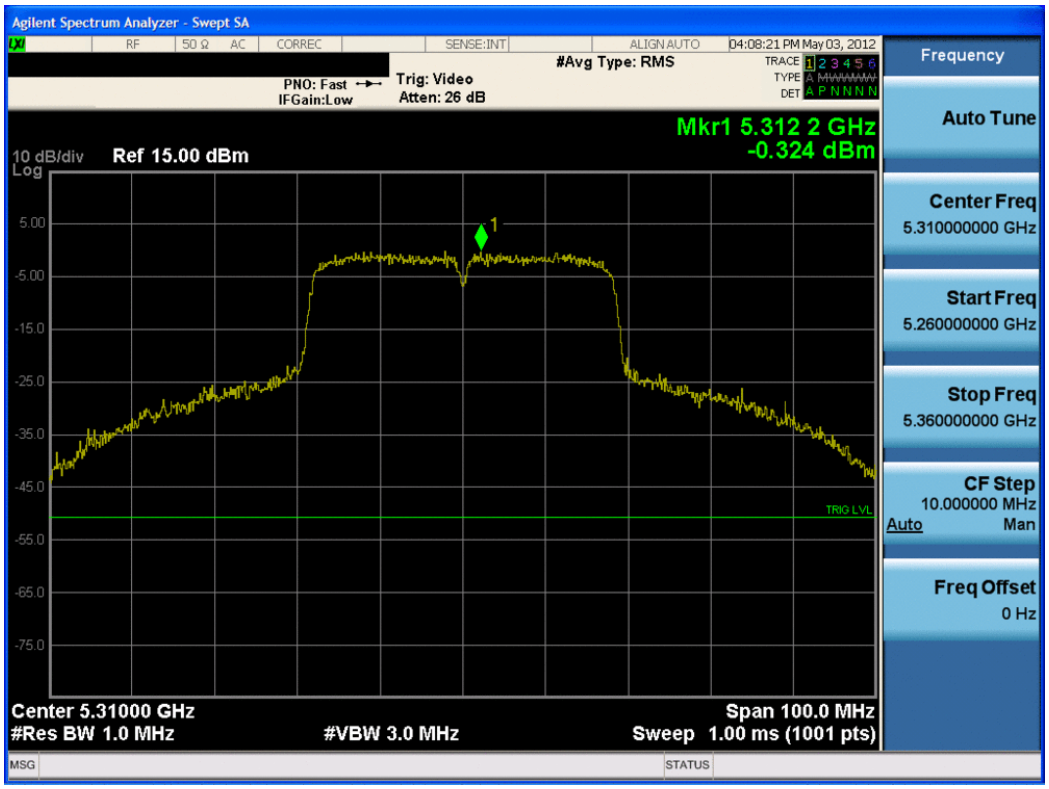


Plot 6-39. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 2) – Ch. 54)



Plot 6-40. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 2) – Ch. 62)

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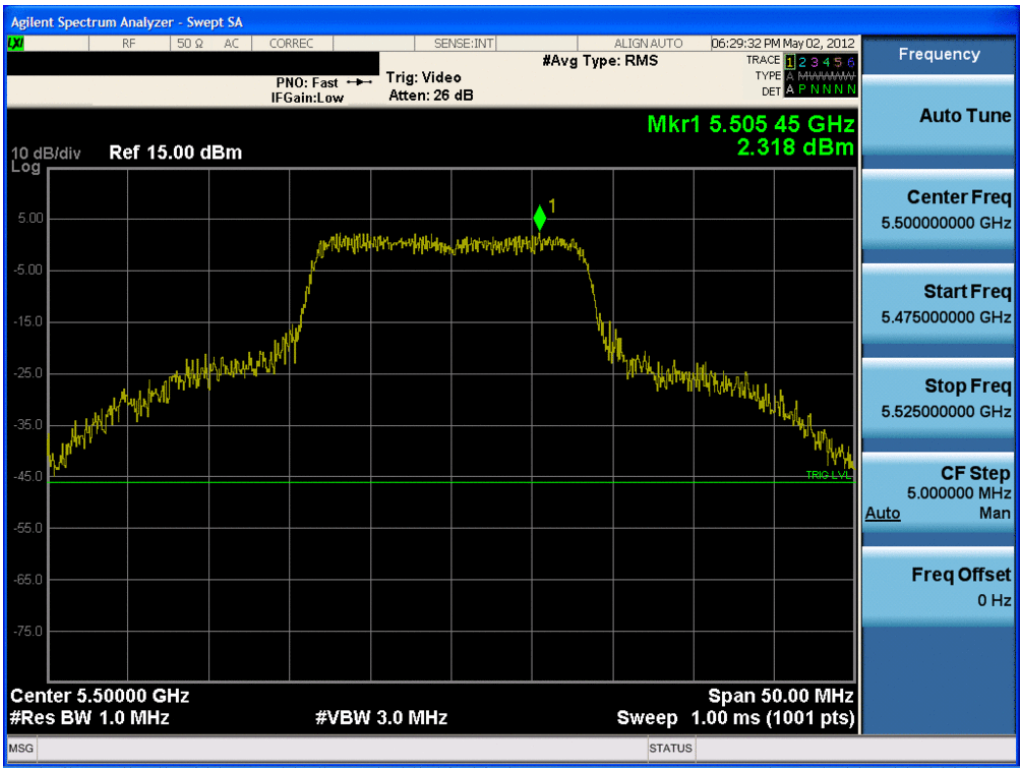
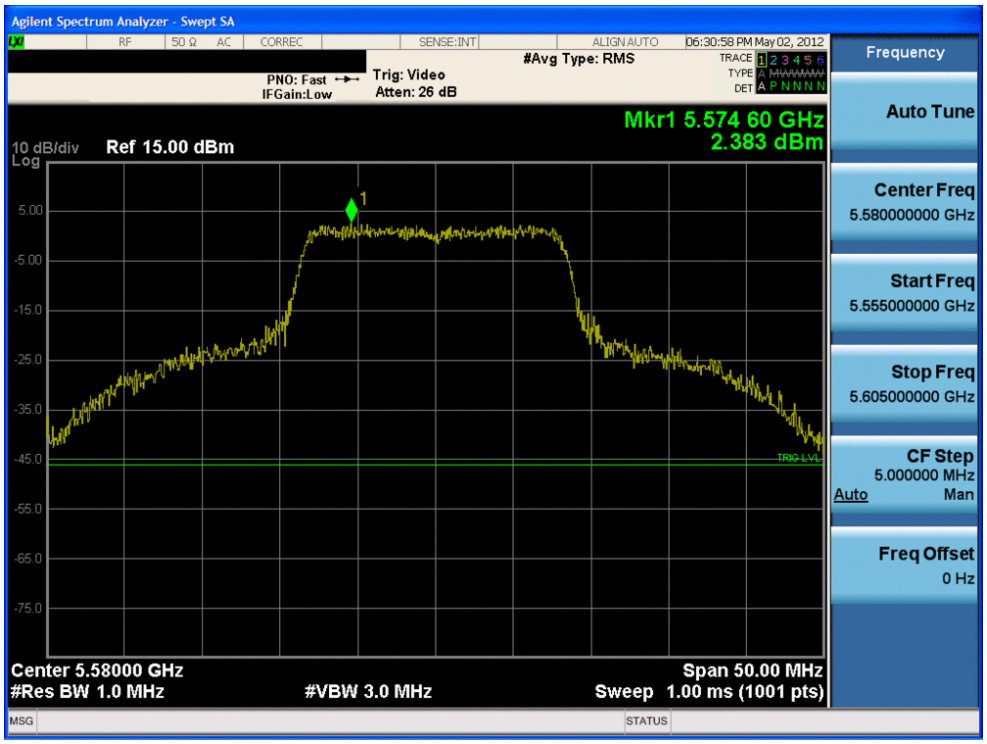


Plot 6-41. Peak Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 100)



Plot 6-42. Peak Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 116)

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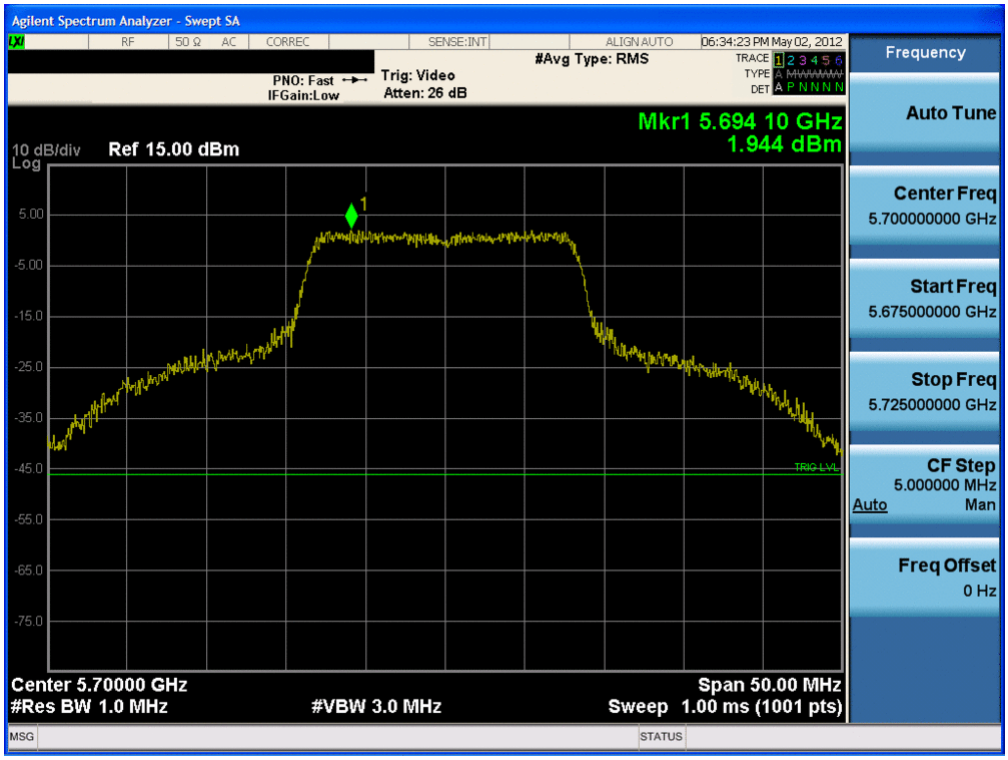
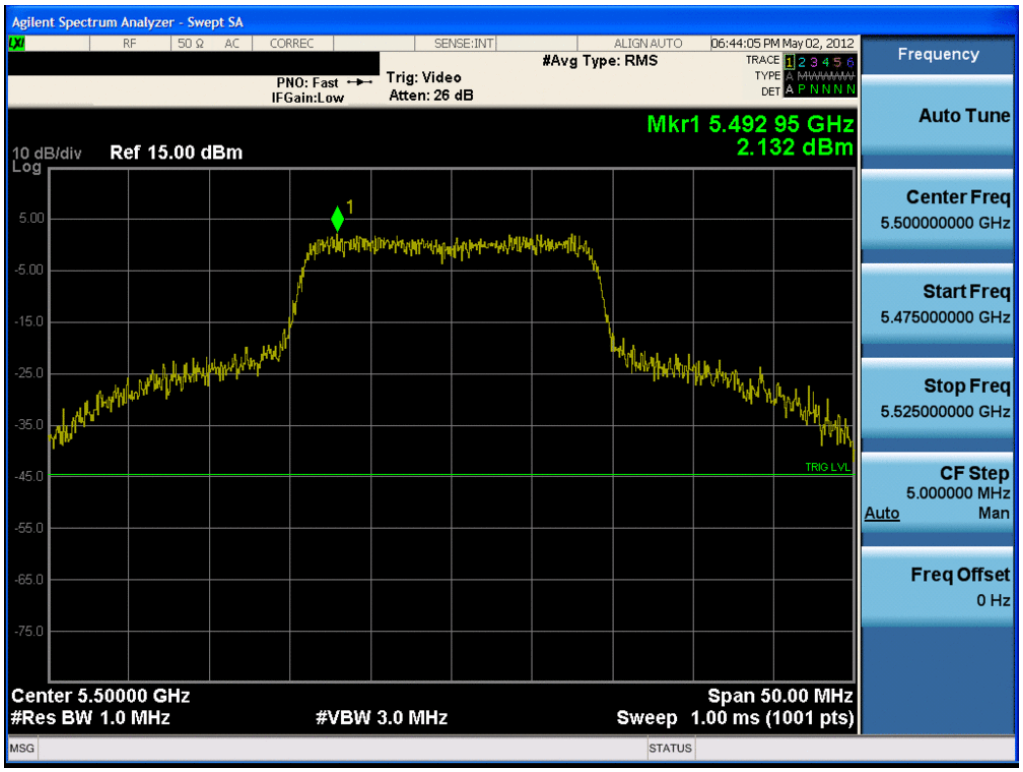


Plot 6-43. Peak Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 140)



Plot 6-44. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 3) – Ch. 100)

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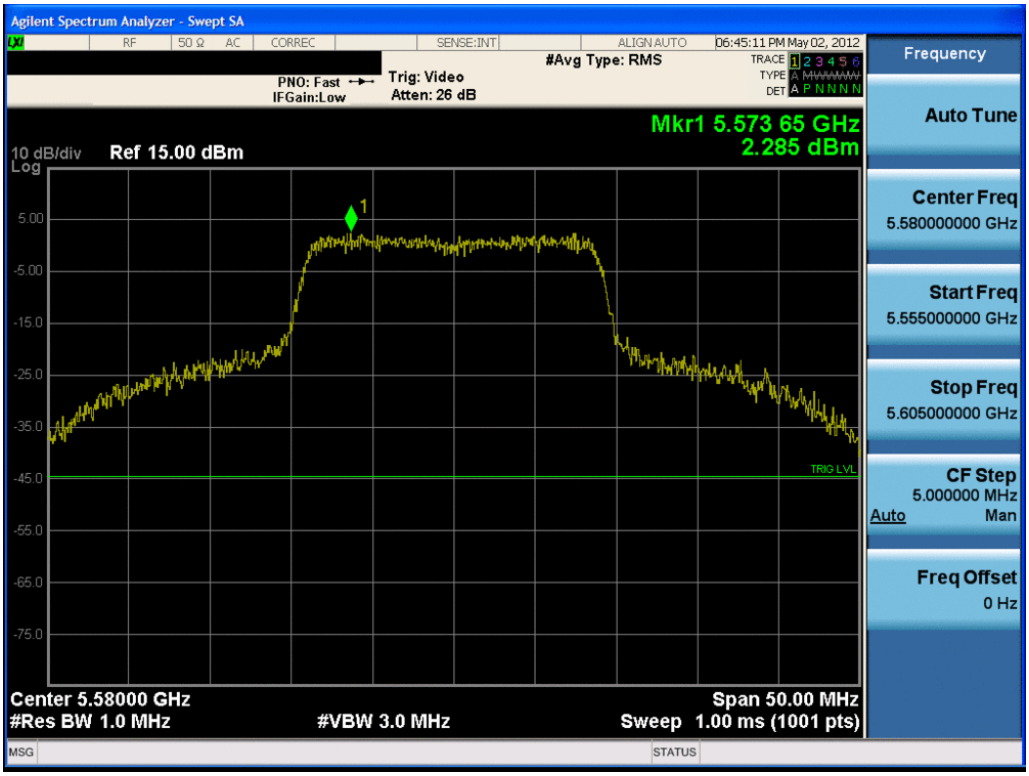
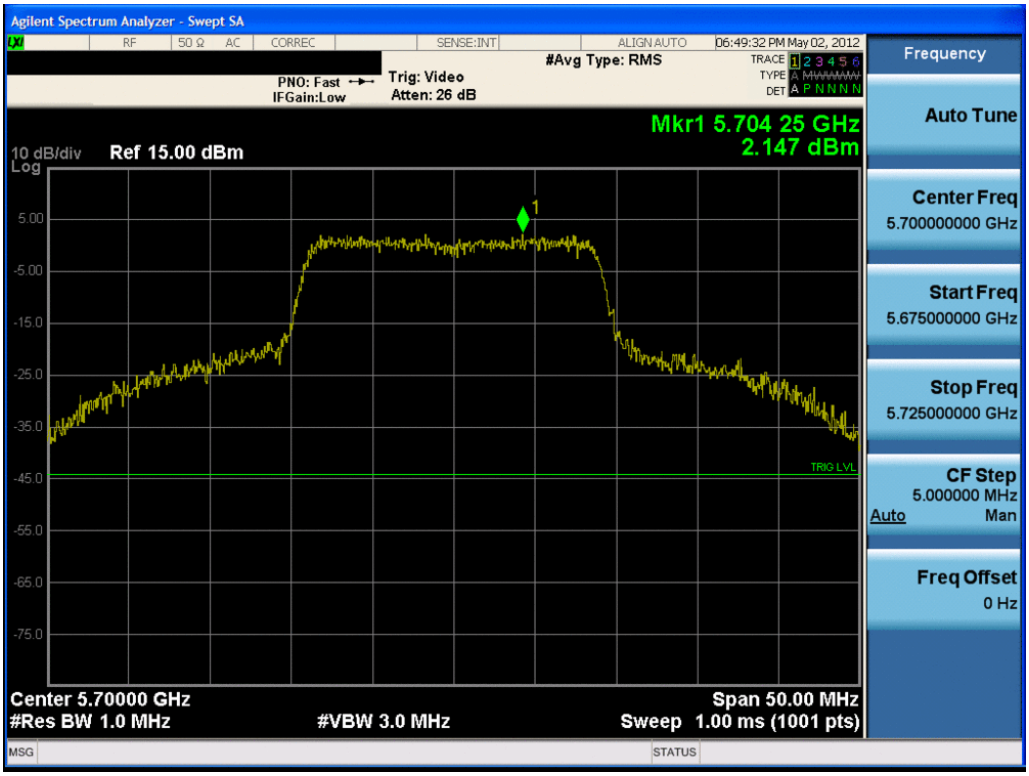


Plot 6-45. Peak Power Spectral Density Plot – 20MHz BW (802.11n (UNII Band 3) – Ch. 116)



Plot 6-46. Peak Power Spectral Density Plot (802.11n – 20MHz BW (UNII Band 3) – Ch. 140)

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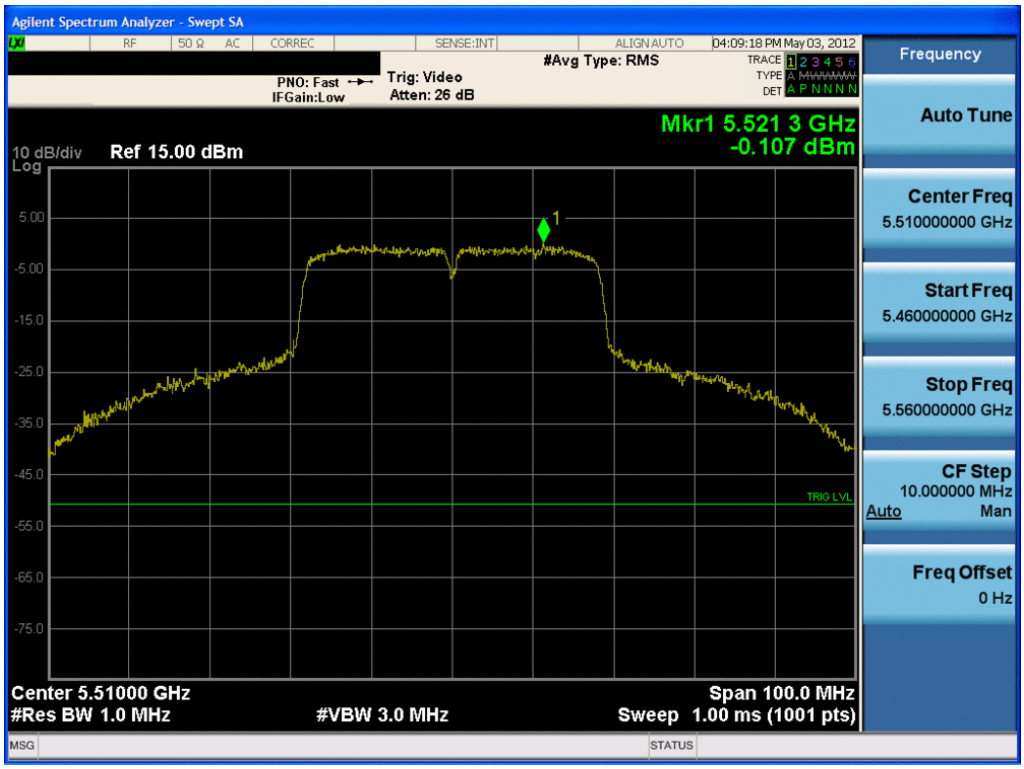
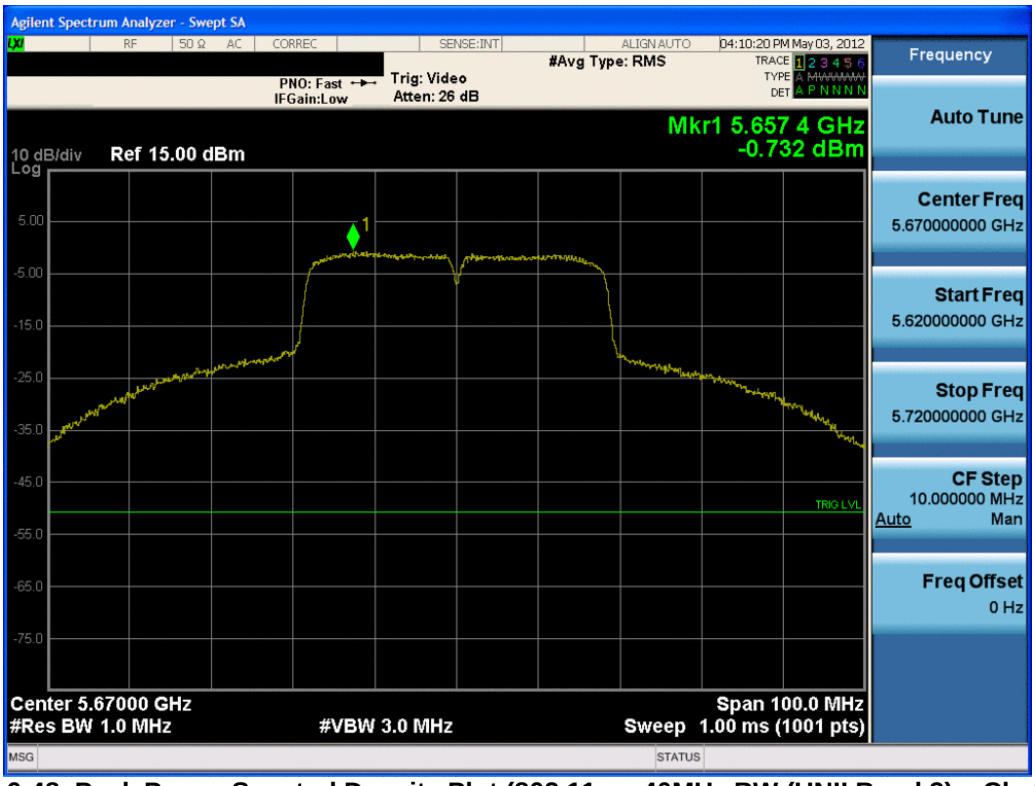


Plot 6-47. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 3) – Ch. 102)



Plot 6-48. Peak Power Spectral Density Plot (802.11n – 40MHz BW (UNII Band 3) – Ch. 134)

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6.5 Peak Excursion Ratio – 802.11a/n

§15.407(a)(6)

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in a transmission mode with the duty cycle below 98% at the appropriate center frequencies. Method SA-1, as defined in KDB 789033, was used to generate the average signal trace and the procedure outlined in section F) was used to generate the peak signal trace. The peak and average traces are then used to determine the peak excursion. ***The largest permissible difference between the modulation envelope (measured using a peak hold function) and the maximum conducted output power is 13 dBm/MHz.***

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Peak Excursion Ratio [dBm]	Max Permissible Peak Excursion Ratio [dBm/MHz]	Margin [dB]
Band I	5180	36	a	6	5.681	13.0	-7.32
	5200	40	a	6	7.068	13.0	-5.93
	5240	48	a	6	6.017	13.0	-6.98
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	6.052	13.0	-6.95
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	7.350	13.0	-5.65
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.004	13.0	-7.00
	5190	38	n (40MHz)	13.5/15 (MCS0)	6.814	13.0	-6.19
	5230	46	n (40MHz)	13.5/15 (MCS0)	7.591	13.0	-5.41
Band II	5260	52	a	6	4.228	13.0	-8.77
	5280	56	a	6	6.763	13.0	-6.24
	5320	64	a	6	7.239	13.0	-5.76
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	5.964	13.0	-7.04
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	6.444	13.0	-6.56
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	7.565	13.0	-5.44
	5270	54	n (40MHz)	13.5/15 (MCS0)	7.330	13.0	-5.67
	5310	62	n (40MHz)	13.5/15 (MCS0)	7.619	13.0	-5.38
Band III	5500	100	a	6	6.552	13.0	-6.45
	5580	116	a	6	7.177	13.0	-5.82
	5700	140	a	6	7.971	13.0	-5.03
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.417	13.0	-6.58
	5580	116	n (20MHz)	6.5/7.2 (MCS0)	6.969	13.0	-6.03
	5700	140	n (20MHz)	6.5/7.2 (MCS0)	6.631	13.0	-6.37
	5510	102	n (40MHz)	13.5/15 (MCS0)	7.821	13.0	-5.18
	5670	134	n (40MHz)	13.5/15 (MCS0)	7.839	13.0	-5.16

Table 6-9. Conducted Peak Excursion Ratio Measurements

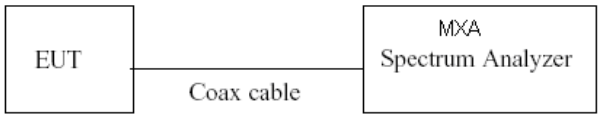

Figure 6-3. Test Instrument & Measurement Setup

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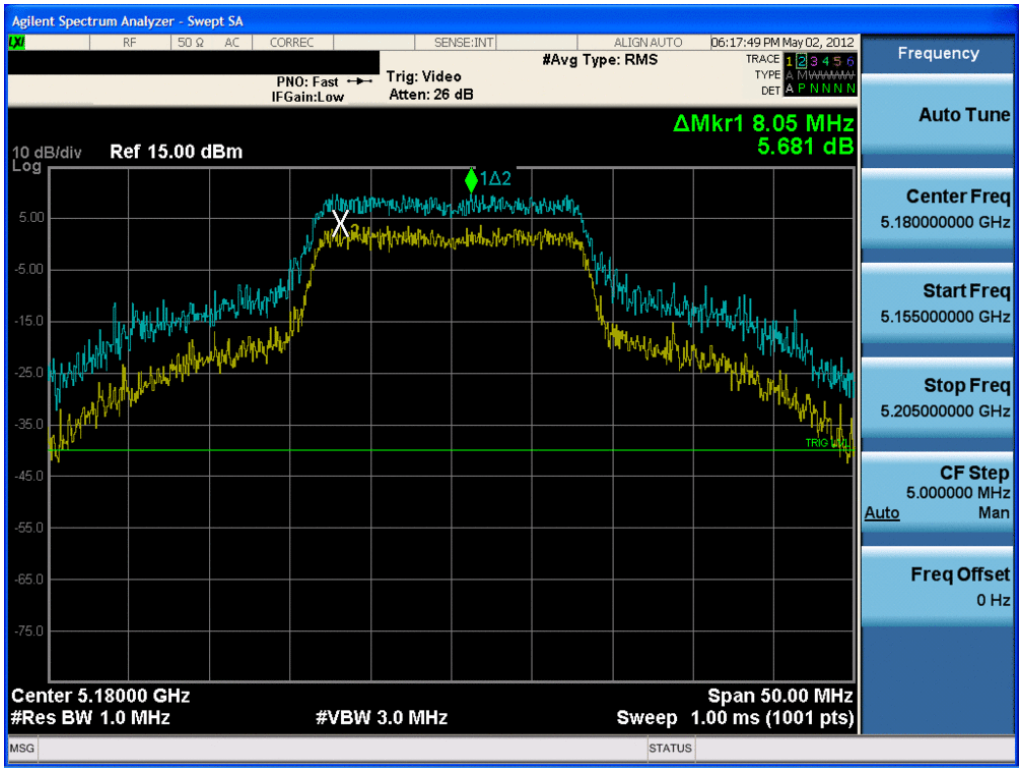
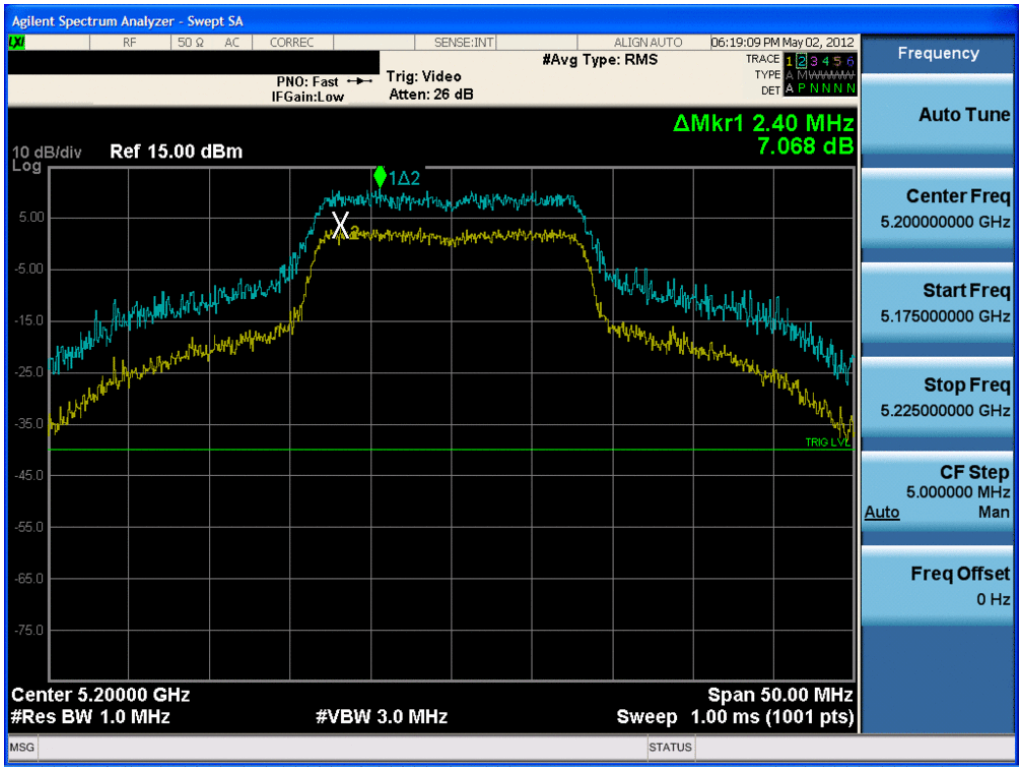


Plot 6-49. Peak Excursion Ratio Plot (802.11a (UNII Band 1) – Ch. 36)



Plot 6-50. Peak Excursion Ratio Plot (802.11a (UNII Band 1) – Ch. 40)

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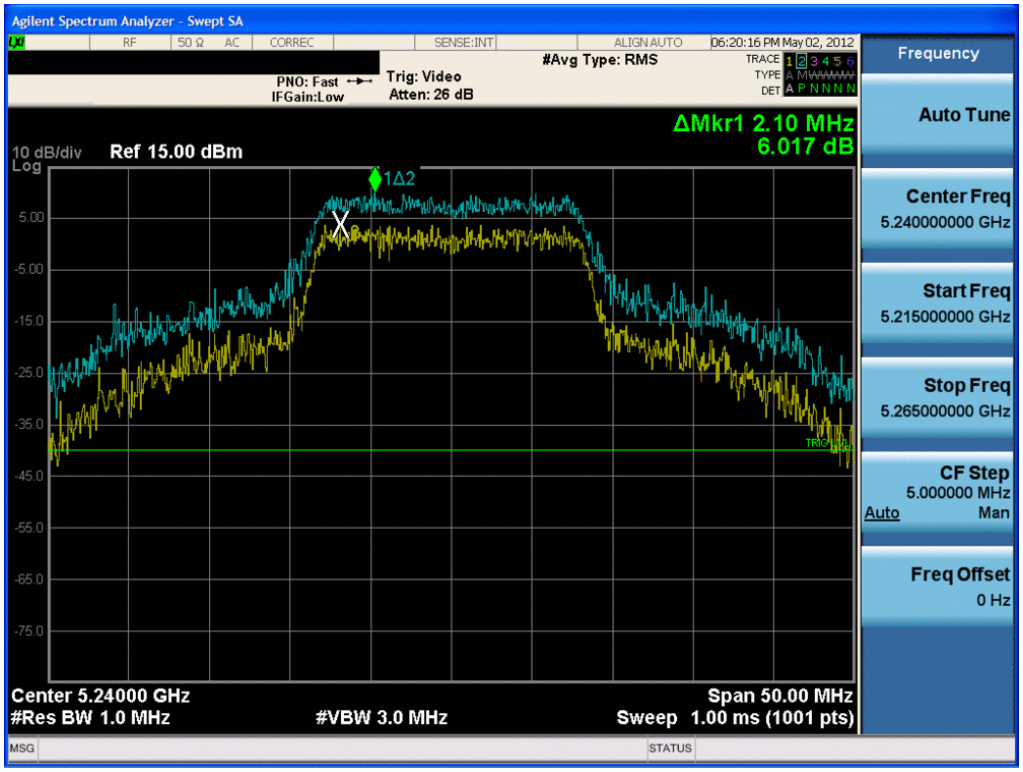
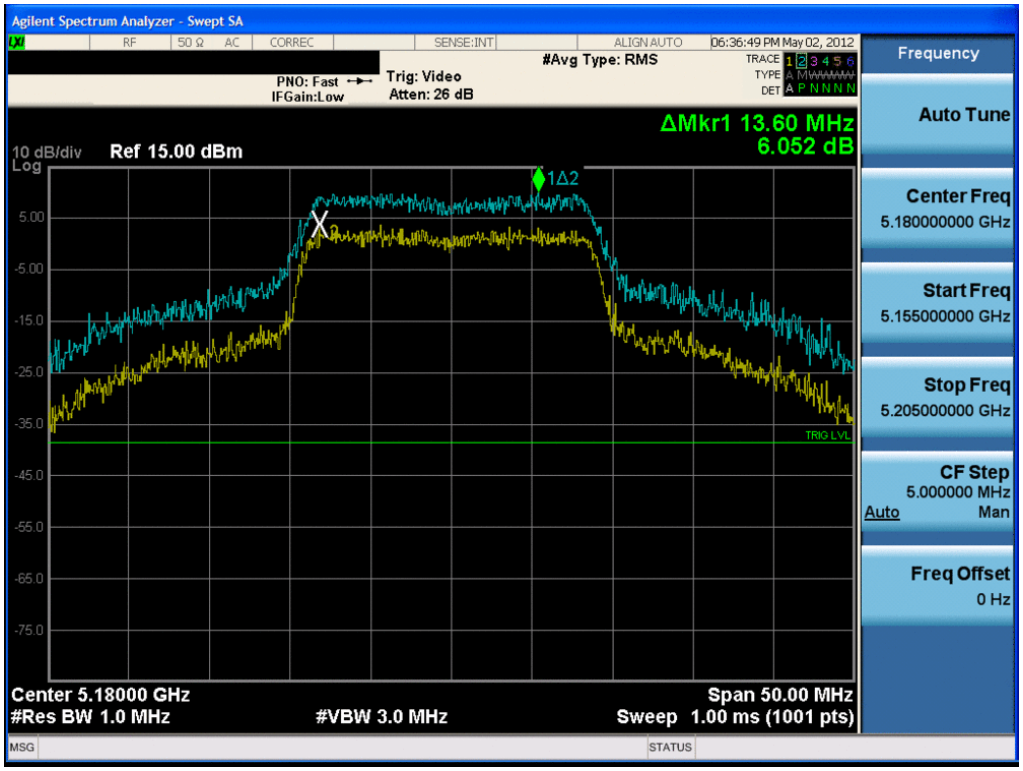


Plot 6-51. Peak Excursion Ratio Plot (802.11a (UNII Band 1) – Ch. 48)



Plot 6-52. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 36)

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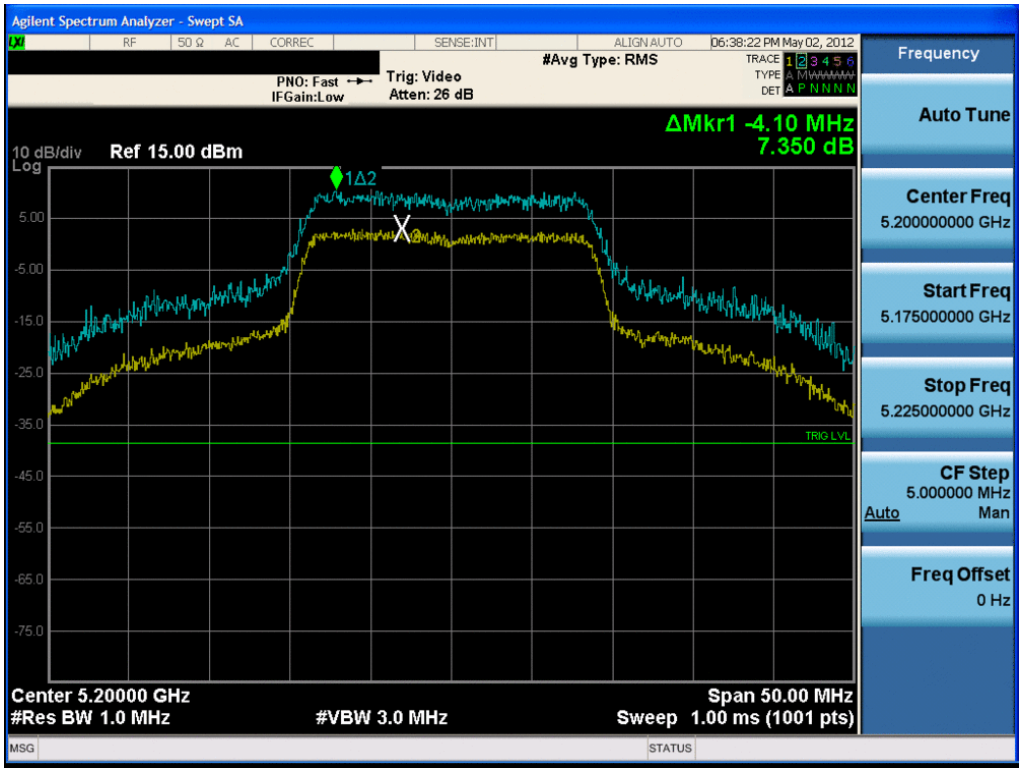
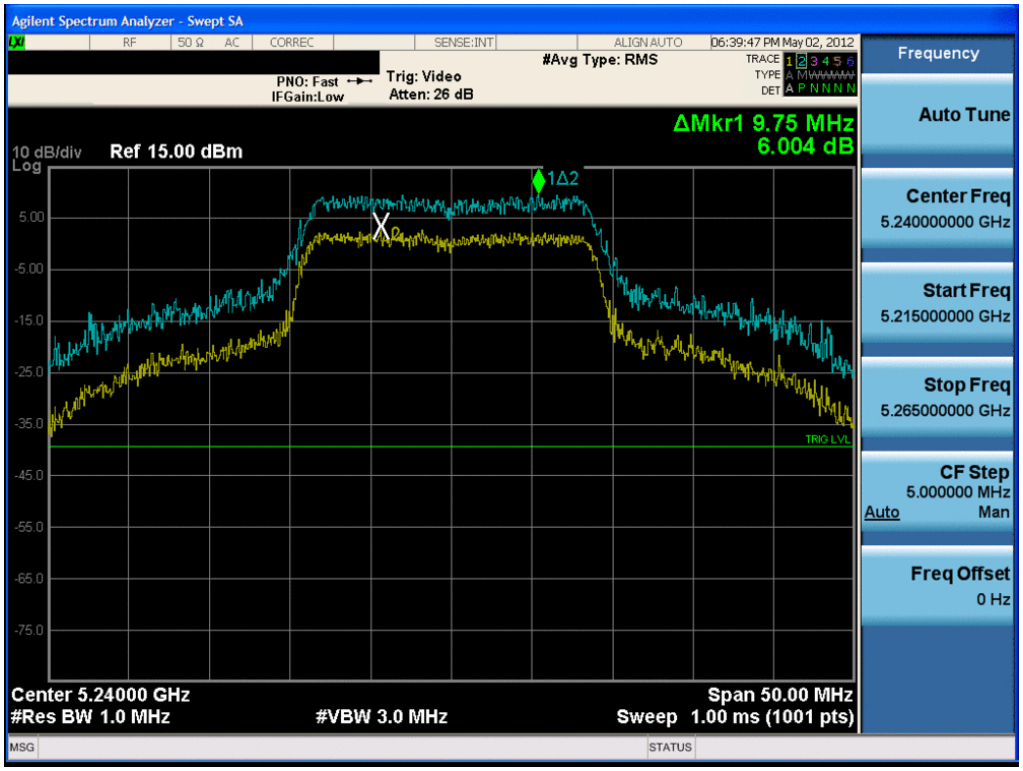


Plot 6-53. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 40)



Plot 6-54. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 1) – Ch. 48)

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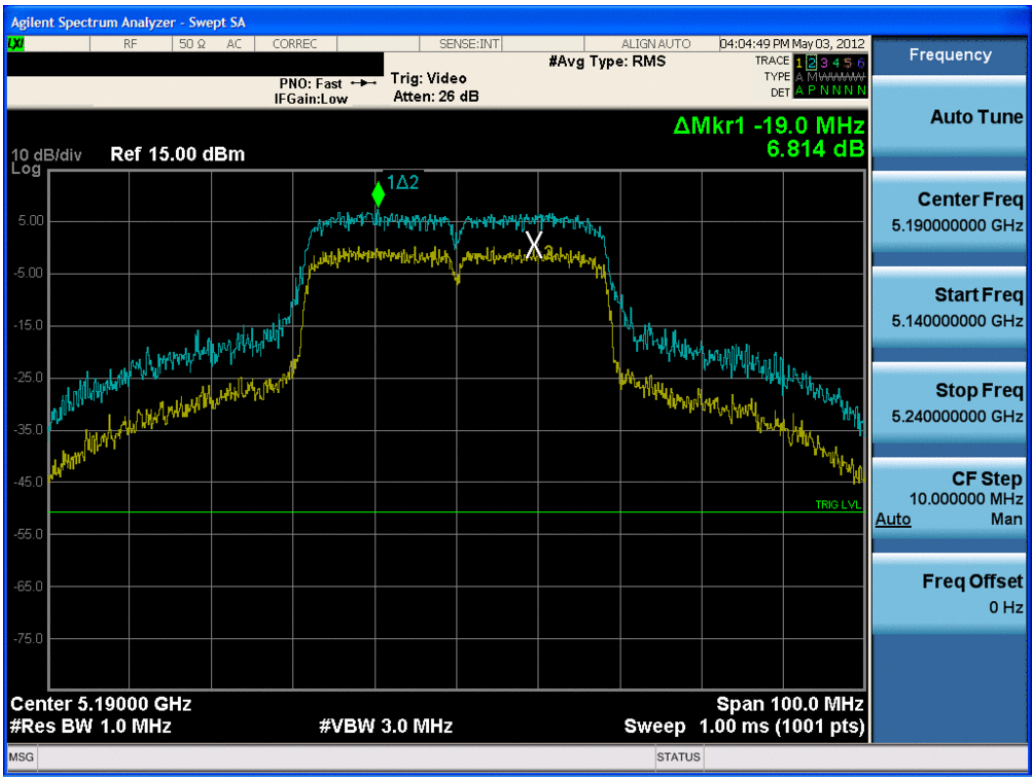
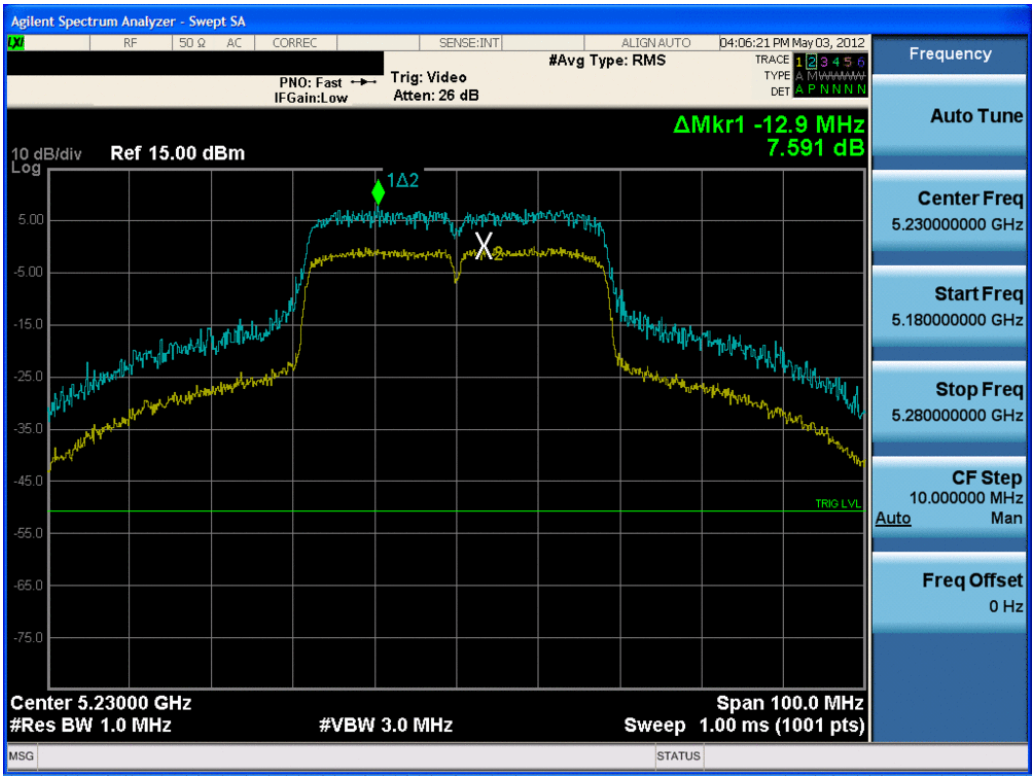


Plot 6-55. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 1) – Ch. 38)



Plot 6-56. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 1) – Ch. 46)

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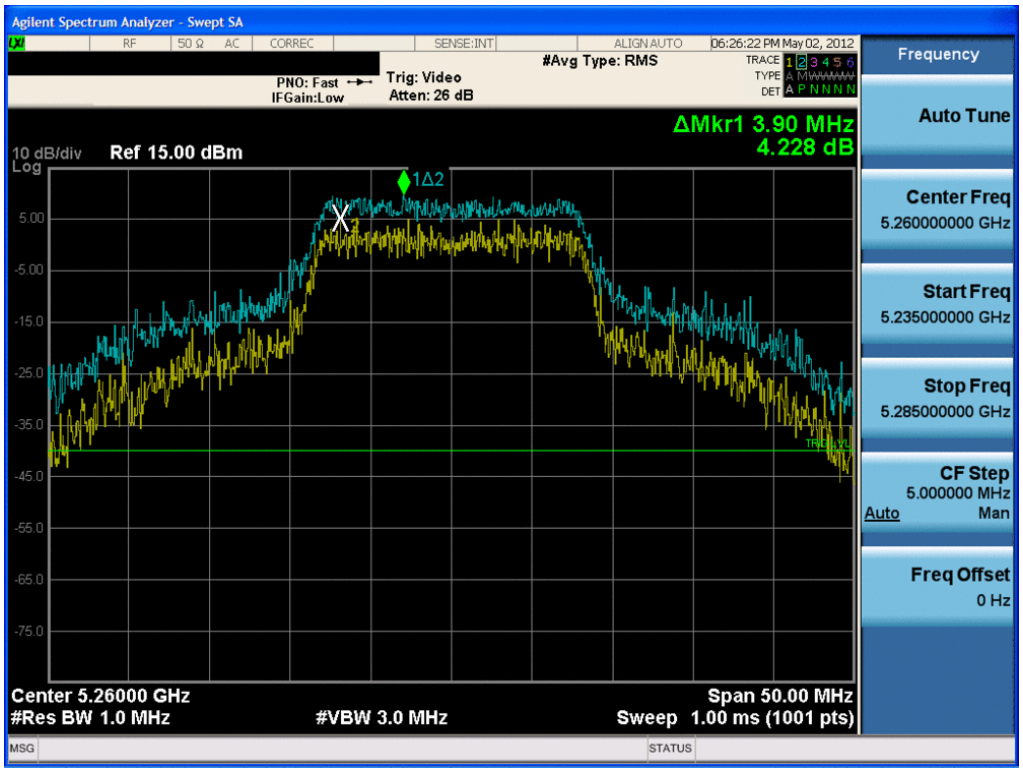
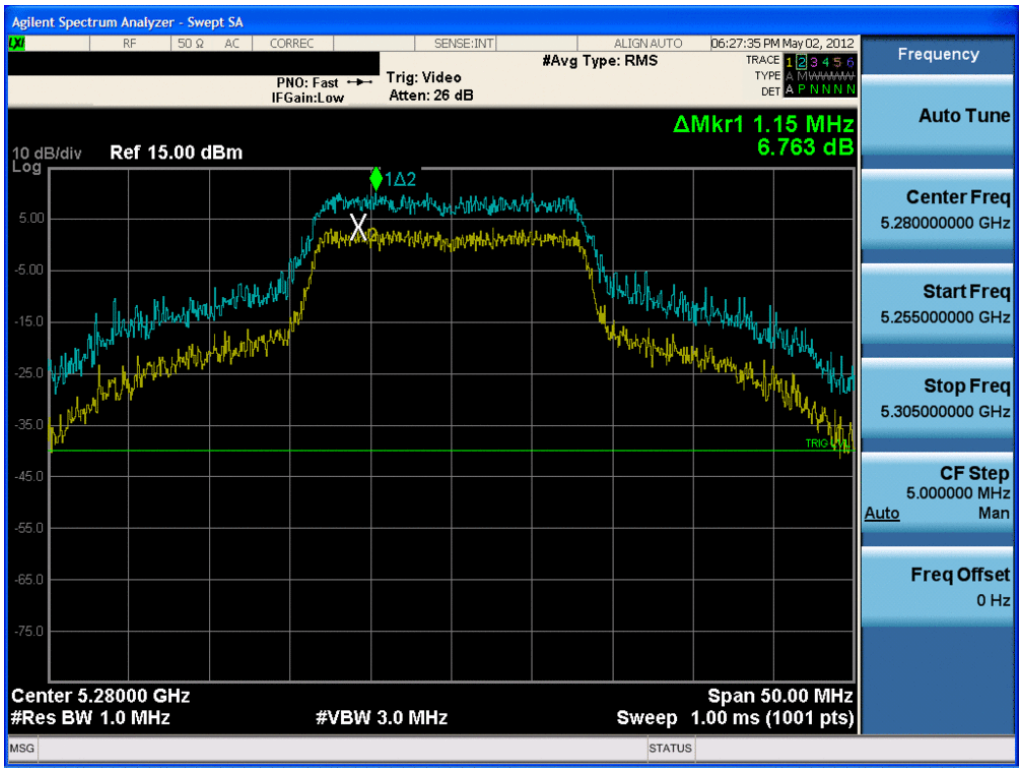


Plot 6-57. Peak Excursion Ratio Plot (802.11a (UNII Band 2) – Ch. 52)



Plot 6-58. Peak Excursion Ratio Plot (802.11a (UNII Band 2) – Ch. 56)

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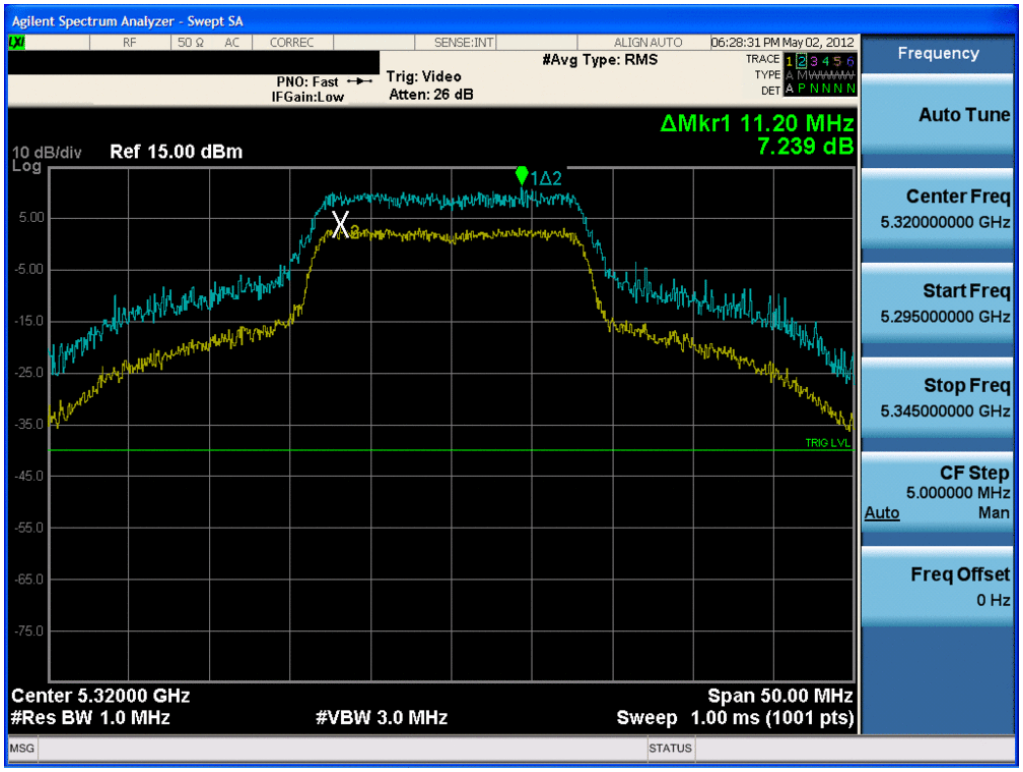
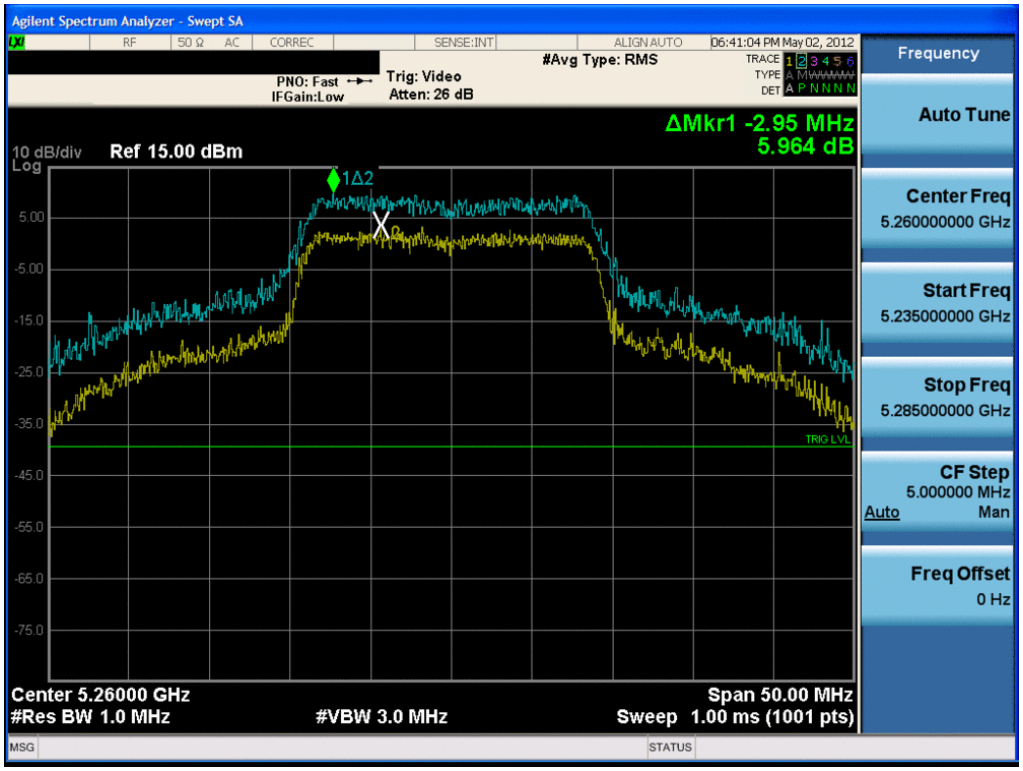


Plot 6-59. Peak Excursion Ratio Plot (802.11a (UNII Band 2) – Ch. 64)



Plot 6-60. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 52)

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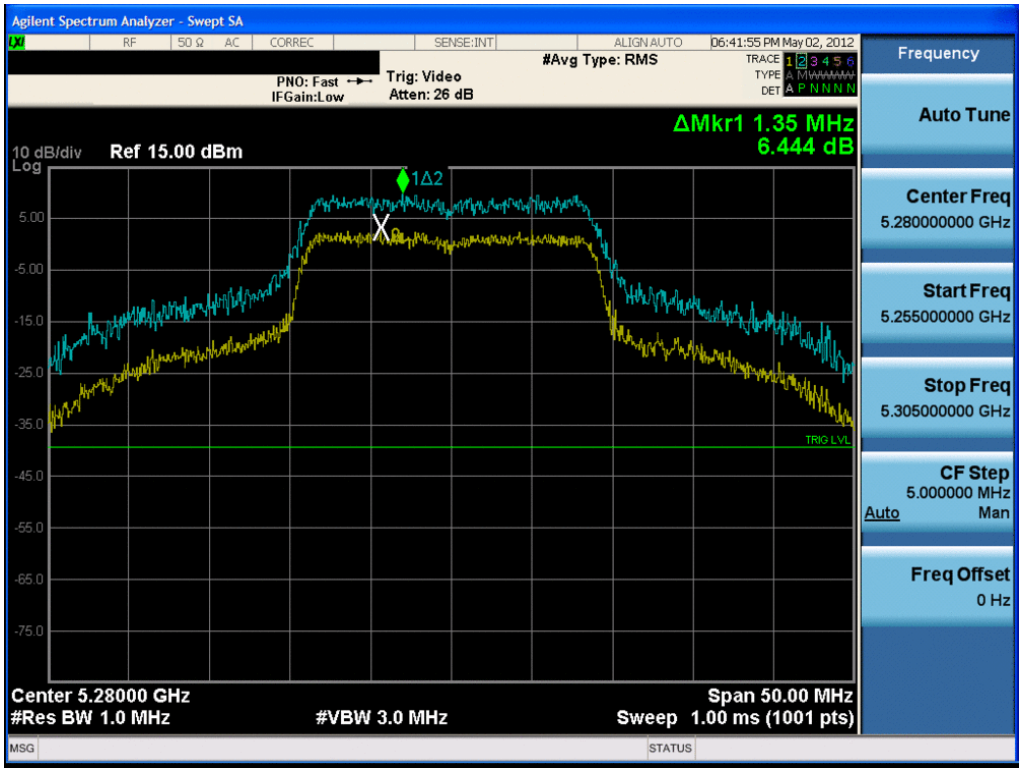
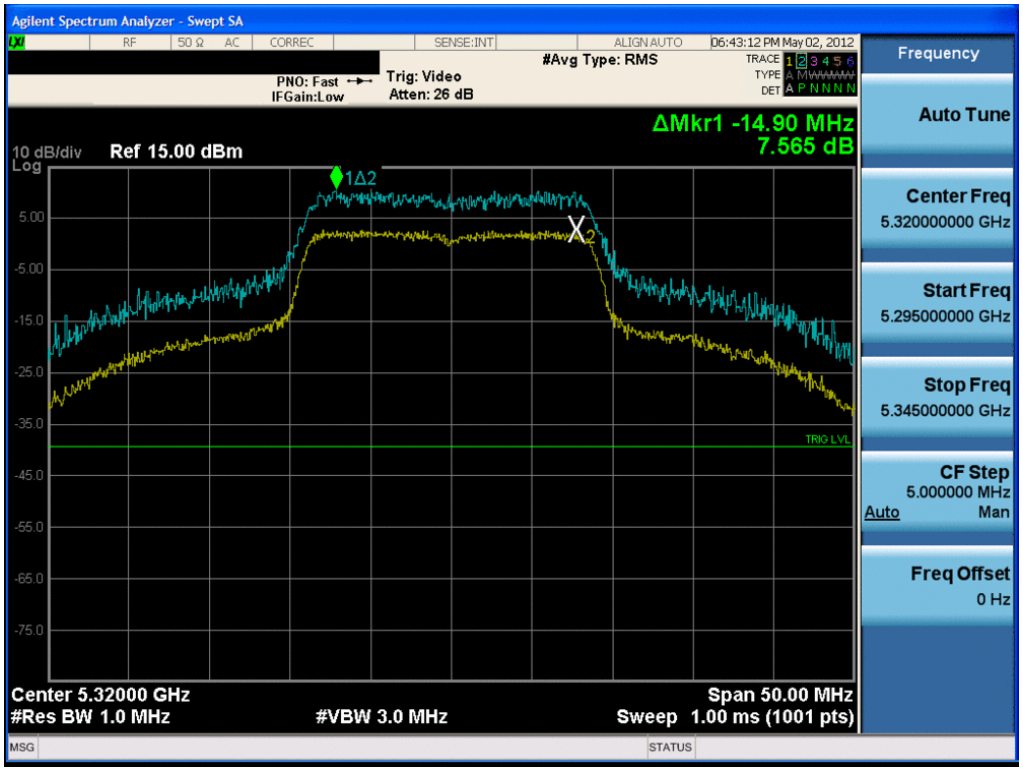


Plot 6-61. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 56)



Plot 6-62. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 2) – Ch. 64)

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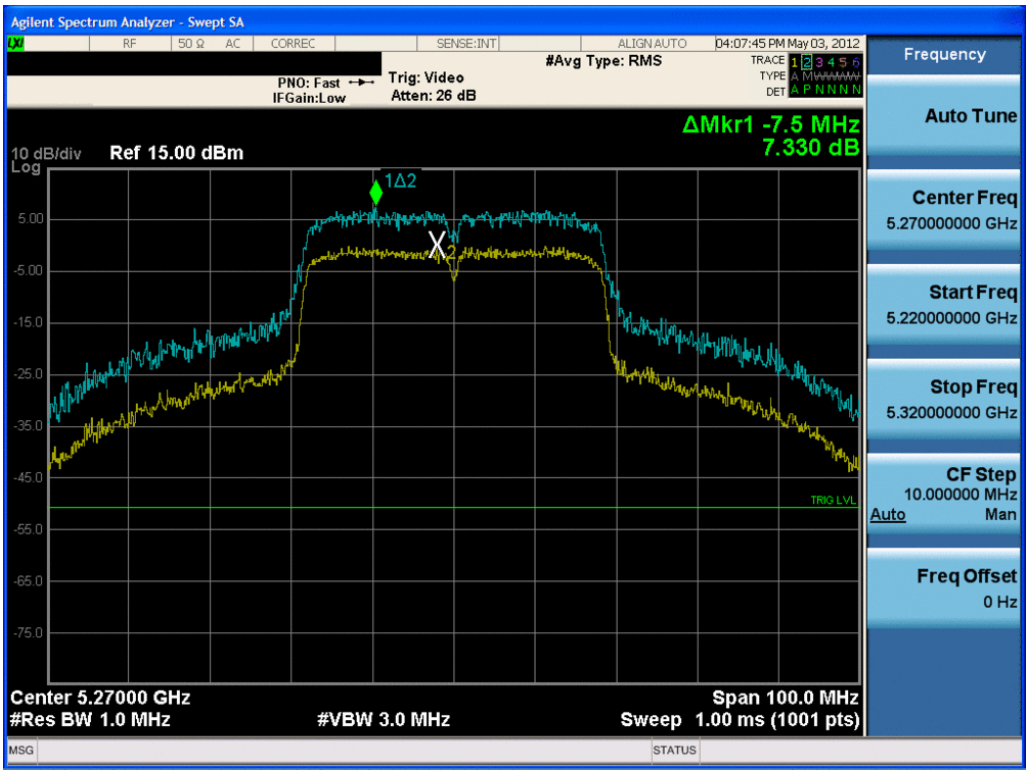
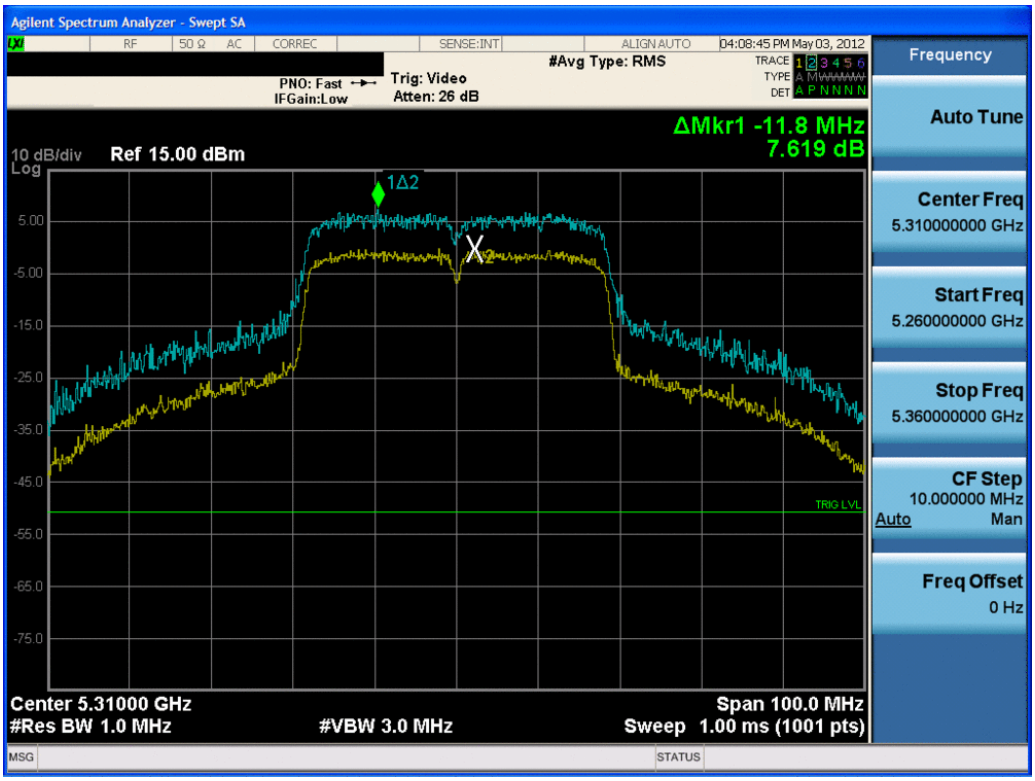


Plot 6-63. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 2) – Ch. 54)



Plot 6-64. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 2) – Ch. 62)

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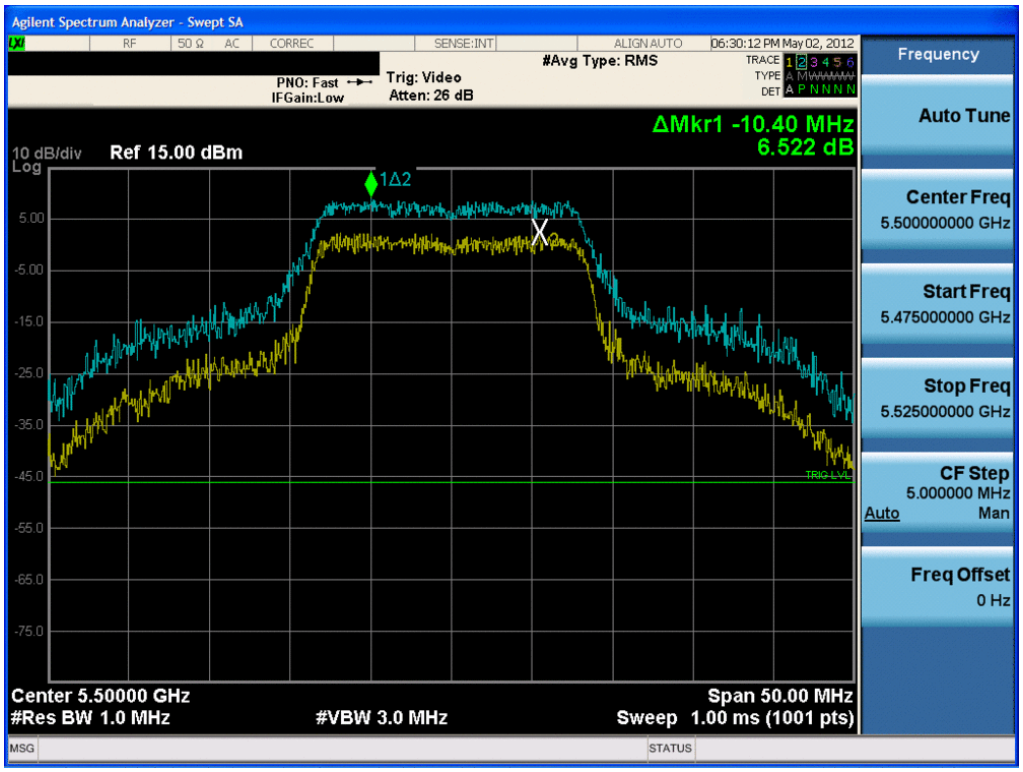
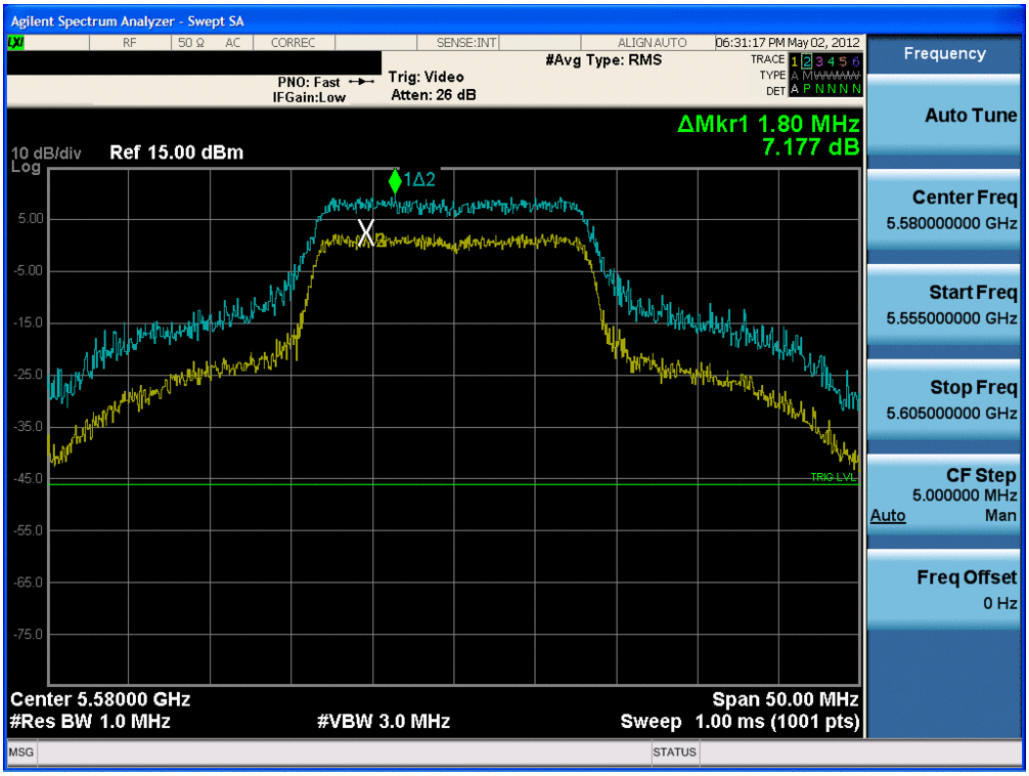


Plot 6-65. Peak Excursion Ratio Plot (802.11a (UNII Band 3) – Ch. 100)



Plot 6-66. Peak Excursion Ratio Plot (802.11a (UNII Band 3) – Ch. 116)

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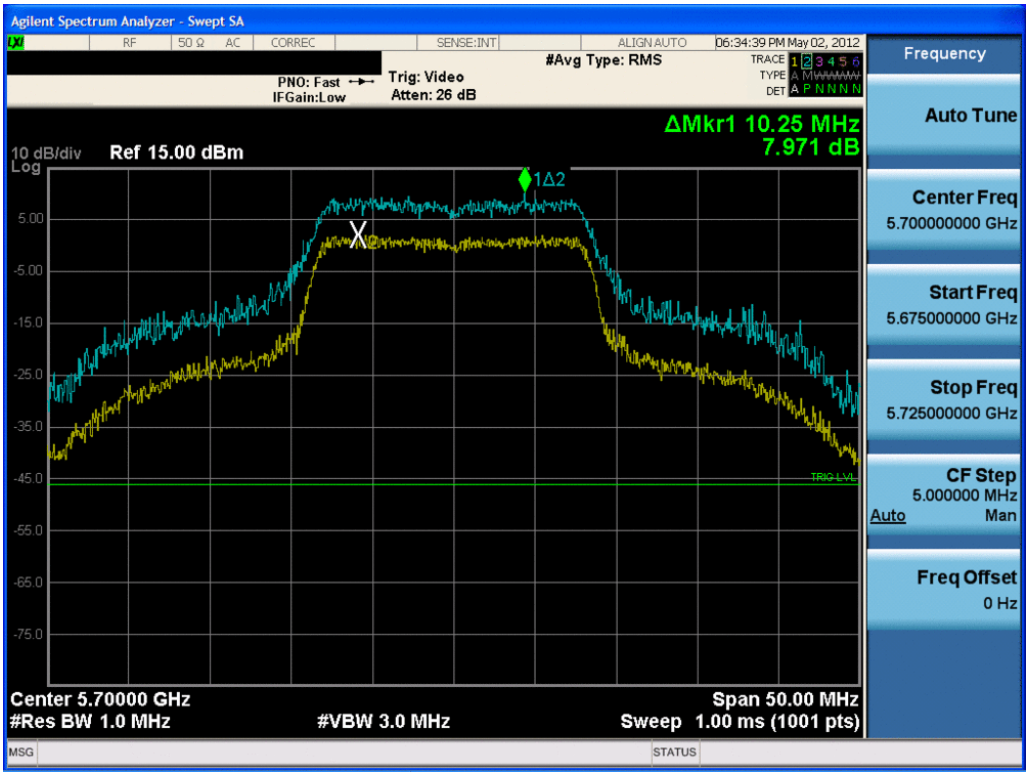
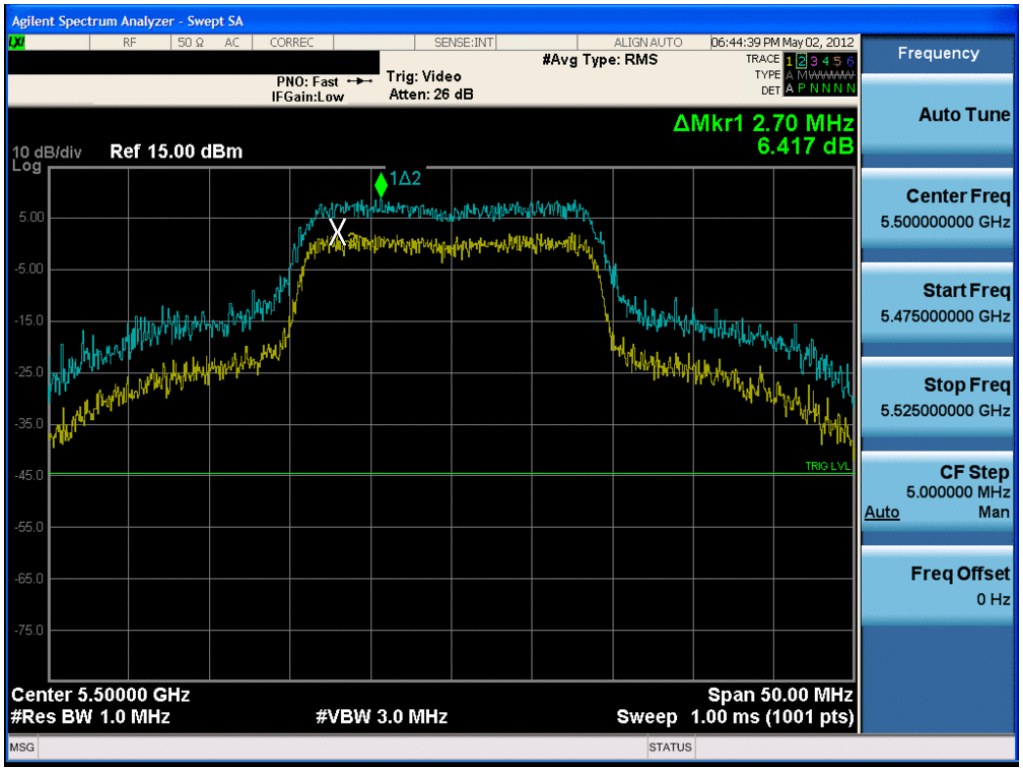


Plot 6-67. Peak Excursion Ratio Plot (802.11a (UNII Band 3) – Ch. 140)



Plot 6-68. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 3) – Ch. 100)

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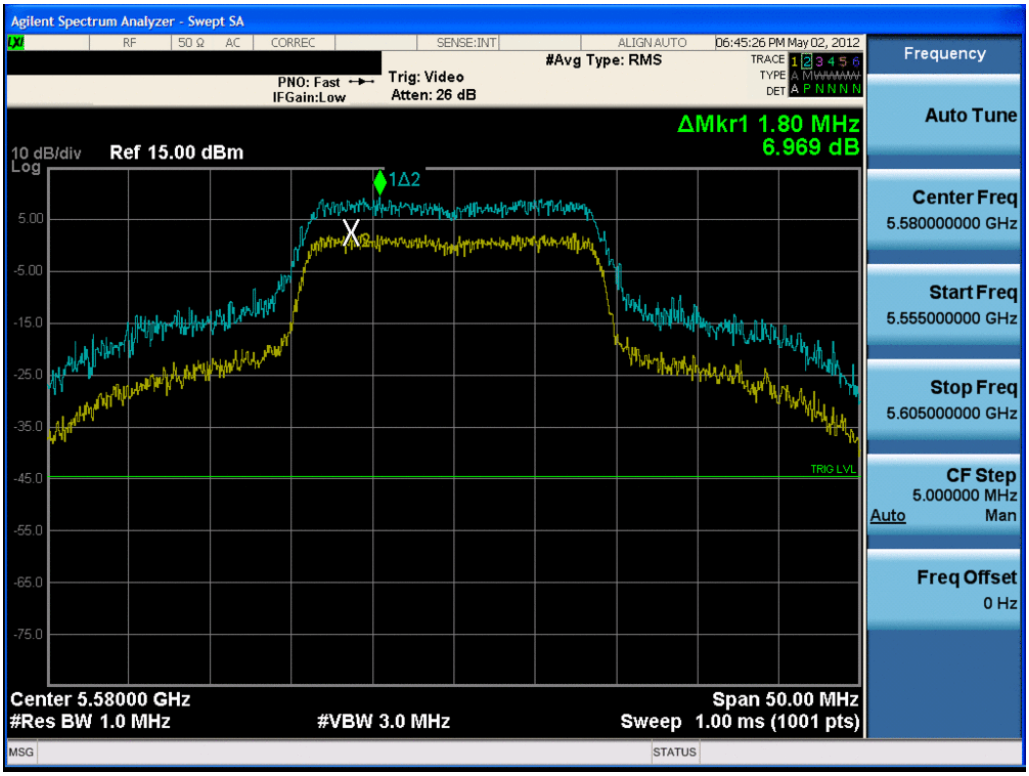
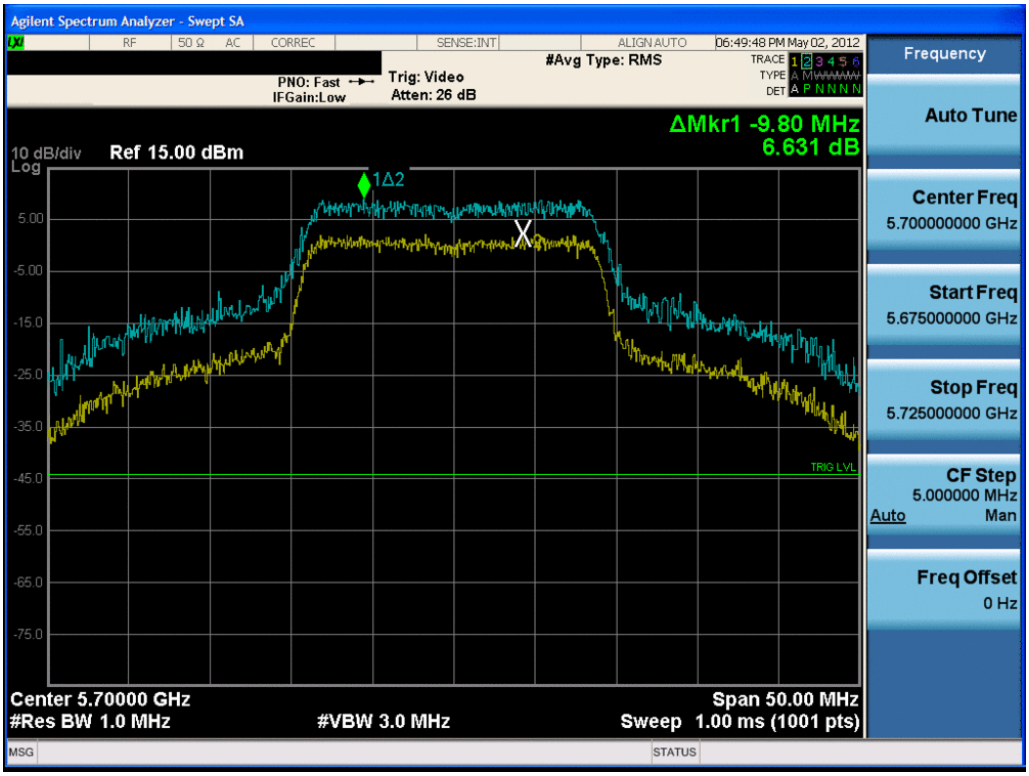


Plot 6-69. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 3) – Ch. 116)



Plot 6-70. Peak Excursion Ratio Plot (802.11n – 20MHz BW (UNII Band 3) – Ch. 140)

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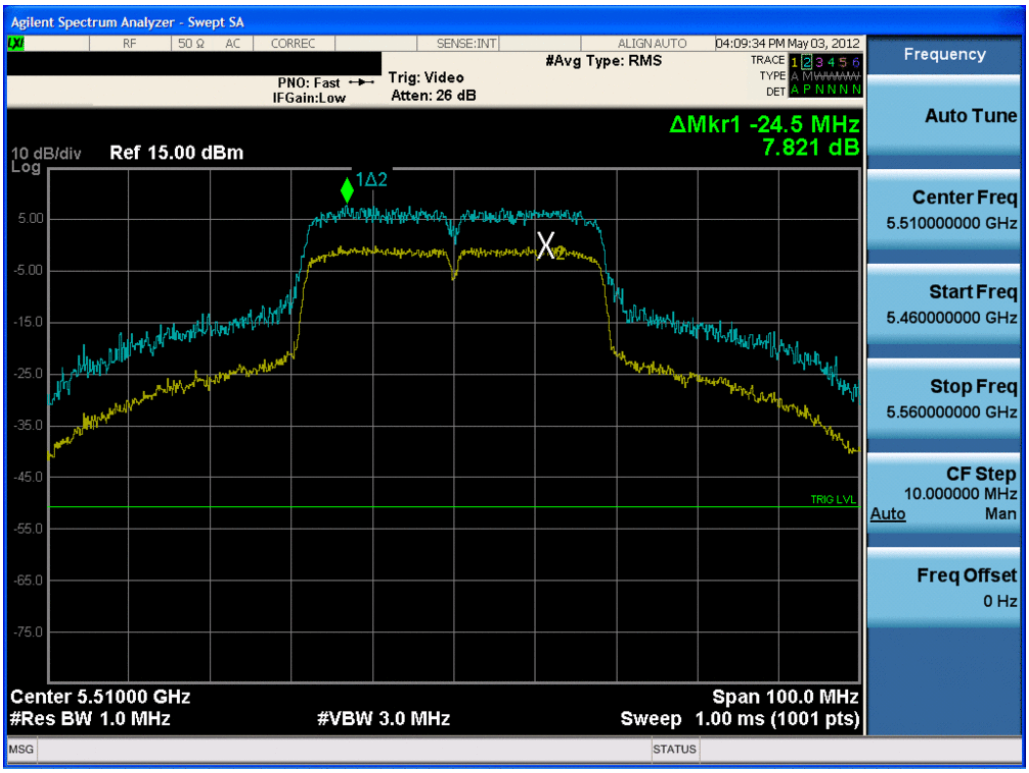
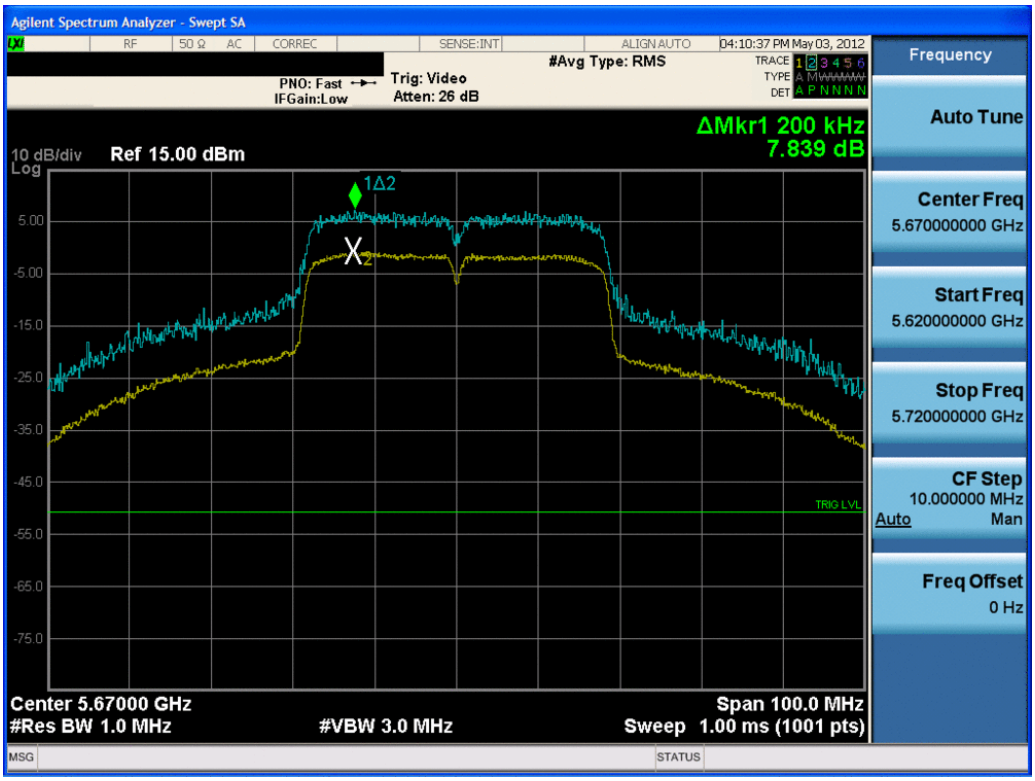


6-71. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 3) – Ch. 102)



6-72. Peak Excursion Ratio Plot (802.11n – 40MHz BW (UNII Band 3) – Ch. 134)

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6.6 Frequency Stability

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,180,000,000 Hz

CHANNEL: 36

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	5,179,999,988	-12	-0.0000002
100 %		- 30	5,179,999,982	-18	-0.0000003
100 %		- 20	5,180,000,003	3	0.0000001
100 %		- 10	5,179,999,989	-11	-0.0000002
100 %		0	5,180,000,006	6	0.0000001
100 %		+ 10	5,179,999,993	-7	-0.0000001
100 %		+ 20	5,179,999,996	-4	-0.0000001
100 %		+ 30	5,179,999,987	-13	-0.0000003
100 %		+ 40	5,179,999,991	-9	-0.0000002
100 %		+ 50	5,179,999,990	-10	-0.0000002
115 %	4.26	+ 20	5,179,999,984	-16	-0.0000003
BATT. ENDPOINT	3.40	+ 20	5,179,999,999	-1	0.0000000

Table 6-10. Frequency Stability Measurements for UNII Band 1 (Ch. 36)

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Frequency Stability (Cont'd)
§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,260,000,000 Hz

CHANNEL: 52

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	5,259,999,994	-6	-0.0000001
100 %		- 30	5,259,999,989	-11	-0.0000002
100 %		- 20	5,259,999,991	-9	-0.0000002
100 %		- 10	5,259,999,986	-14	-0.0000003
100 %		0	5,259,999,987	-13	-0.0000002
100 %		+ 10	5,259,999,992	-8	-0.0000002
100 %		+ 20	5,259,999,994	-6	-0.0000001
100 %		+ 30	5,259,999,984	-16	-0.0000003
100 %		+ 40	5,259,999,991	-9	-0.0000002
100 %		+ 50	5,259,999,982	-18	-0.0000003
115 %	4.26	+ 20	5,260,000,004	4	0.0000001
BATT. ENDPOINT	3.40	+ 20	5,259,999,986	-14	-0.0000003

Table 6-11. Frequency Stability Measurements for UNII Band 2 (Ch. 52)

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Frequency Stability (Cont'd)
§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,500,000,000 Hz

CHANNEL: 100

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	5,499,999,988	-12	-0.0000002
100 %		- 30	5,499,999,992	-8	-0.0000001
100 %		- 20	5,499,999,989	-11	-0.0000002
100 %		- 10	5,499,999,996	-4	-0.0000001
100 %		0	5,499,999,995	-5	-0.0000001
100 %		+ 10	5,499,999,982	-18	-0.0000003
100 %		+ 20	5,499,999,992	-8	-0.0000001
100 %		+ 30	5,499,999,997	-3	-0.0000001
100 %		+ 40	5,499,999,999	-1	0.0000000
100 %		+ 50	5,499,999,994	-6	-0.0000001
115 %	4.26	+ 20	5,499,999,984	-16	-0.0000003
BATT. ENDPOINT	3.40	+ 20	5,499,999,983	-17	-0.0000003

Table 6-12. Frequency Stability Measurements for UNII Band 3 (Ch. 100)

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6.7 Radiated Spurious Emission Measurements

§15.407(b)(1), (6), §15.205, §15.209; RSS-210 [A9.2]

The EUT was tested from 9kHz and up to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHZ. Above 1 GHz, average measurements were taken using RBW = 1MHz and VBW = 10Hz. Peak measurements were taken using RBW = VBW = 1MHz and linearly polarized horn antennas. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6- per Section 15.209.

All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section. All measurements shown in this section were obtained using traditional radiated test methods. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 789033 were not used to evaluate this device.

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 6-13. Radiated Limits

Sample Calculation

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5180MHz

Channel: 36

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10360.00	-100.07	Peak	H	45.40	0.00	52.32	68.20	-15.88
*	15540.00	-113.78	Average	H	55.99	0.00	49.21	53.98	-4.77
*	15540.00	-100.35	Peak	H	55.99	0.00	62.64	73.98	-11.34
*	20720.00	-98.97	Average	H	42.21	-9.54	40.70	53.98	-13.28
*	20720.00	-89.89	Peak	H	42.21	-9.54	49.78	73.98	-24.20
	25900.00	-125.00	Peak	H	42.77	-9.54	24.77	68.20	-43.43

Table 6-14. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBµV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBµV/m.

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5200MHz

Channel: 40

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10400.00	-100.32	Peak	H	45.42	0.00	52.10	68.20	-16.10
*	15600.00	-113.88	Average	H	56.13	0.00	49.25	53.98	-4.73
*	15600.00	-100.16	Peak	H	56.13	0.00	62.97	73.98	-11.01
*	20800.00	-99.56	Average	H	42.12	-9.54	40.02	53.98	-13.96
*	20800.00	-89.61	Peak	H	42.12	-9.54	49.97	73.98	-24.01
	26000.00	-125.00	Peak	H	42.81	-9.54	24.81	68.20	-43.39

Table 6-15. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5240MHz

Channel: 48

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10480.00	-99.74	Peak	H	45.42	0.00	52.68	68.20	-15.52
*	15720.00	-113.97	Average	H	56.36	0.00	49.40	53.98	-4.58
*	15720.00	-100.21	Peak	H	56.36	0.00	63.16	73.98	-10.82
*	20960.00	-98.15	Average	H	41.95	-9.54	41.26	53.98	-12.72
*	20960.00	-90.24	Peak	H	41.95	-9.54	49.17	73.98	-24.81
	26200.00	-125.00	Peak	H	42.70	-9.54	24.70	68.20	-43.50

Table 6-16. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5260MHz

Channel: 52

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10520.00	-99.84	Peak	H	45.50	0.00	52.66	68.20	-15.54
*	15780.00	-113.79	Average	H	56.56	0.00	49.77	53.98	-4.21
*	15780.00	-100.28	Peak	H	56.56	0.00	63.28	73.98	-10.70
*	21040.00	-96.88	Average	H	42.01	-9.54	42.59	53.98	-11.39
*	21040.00	-90.36	Peak	H	42.01	-9.54	49.11	73.98	-24.87
	26300.00	-125.00	Peak	H	42.74	-9.54	24.74	68.20	-43.46

Table 6-17. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5280MHz

Channel: 56

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
	10560.00	-100.22	Peak	H	45.50	0.00	52.28	68.20	-15.92
*	15840.00	-113.85	Average	H	56.67	0.00	49.82	53.98	-4.16
*	15840.00	-99.44	Peak	H	56.67	0.00	64.23	73.98	-9.75
*	21120.00	-97.32	Average	H	42.01	-9.54	42.15	53.98	-11.83
*	21120.00	-89.80	Peak	H	42.01	-9.54	49.67	73.98	-24.31
	26400.00	-125.00	Peak	H	42.69	-9.54	24.69	68.20	-43.51

Table 6-18. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5320MHz

Channel: 64

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	10640.00	-111.35	Average	H	45.59	0.00	41.24	53.98	-12.74
*	10640.00	-99.08	Peak	H	45.59	0.00	53.51	73.98	-20.47
*	15960.00	-113.56	Average	H	57.15	0.00	50.59	53.98	-3.39
*	15960.00	-100.38	Peak	H	57.15	0.00	63.77	73.98	-10.21
*	21280.00	-96.94	Average	H	42.03	-9.54	42.54	53.98	-11.44
*	21280.00	-90.67	Peak	H	42.03	-9.54	48.81	73.98	-25.17
	26600.00	-125.00	Peak	H	42.63	-9.54	24.63	68.20	-43.57

Table 6-19. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5500MHz

Channel: 100

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11000.00	-112.31	Average	H	45.42	0.00	40.11	53.98	-13.87
*	11000.00	-99.59	Peak	H	45.42	0.00	52.83	73.98	-21.15
	16500.00	-99.61	Peak	H	55.80	0.00	63.19	68.20	-5.01
	22000.00	-89.57	Peak	H	42.32	-9.54	50.21	68.20	-17.99
	27500.00	-125.00	Peak	H	42.66	-9.54	24.66	68.20	-43.54

Table 6-20. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5580MHz

Channel: 116

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11160.00	-112.95	Average	H	45.78	0.00	39.83	53.98	-14.15
*	11160.00	-101.65	Peak	H	45.78	0.00	51.13	73.98	-22.85
	16740.00	-101.80	Peak	H	55.59	0.00	60.79	68.20	-7.41
*	22320.00	-108.51	Average	H	42.43	-9.54	31.38	53.98	-22.60
*	22320.00	-99.12	Peak	H	42.43	-9.54	40.77	73.98	-33.21
	27900.00	-125.00	Peak	H	42.70	-9.54	24.70	68.20	-43.50

Table 6-22. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1, 3 Meter

Operating Frequency: 5700MHz

Channel: 140

	Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
*	11400.00	-114.70	Average	H	46.38	0.00	38.68	53.98	-15.30
*	11400.00	-102.39	Peak	H	46.38	0.00	50.99	73.98	-22.99
	17100.00	-102.37	Peak	H	54.48	0.00	59.12	68.20	-9.08
*	22800.00	-111.94	Average	H	42.60	-9.54	28.12	53.98	-25.86
*	22800.00	-98.38	Peak	H	42.60	-9.54	41.68	73.98	-32.30
	28500.00	-125.00	Peak	H	42.68	-9.54	24.68	68.20	-43.52

Table 6-23. Radiated Measurements

NOTES:

1. All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz (68.2dBµV/m).

2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-.

3. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

6. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

7. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

8. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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6.8 Radiated Band Edge Measurements

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meter

Operating Frequency: 5180MHz

Channel: 36

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
5119.52	-105.95	Average	H	39.12	40.17	53.98	-13.81
5119.52	-91.66	Peak	H	39.12	54.46	73.98	-19.52
5137.34	-102.61	Average	H	39.12	43.51	53.98	-10.47
5137.34	-82.98	Peak	H	39.12	63.14	73.98	-10.84
5149.83	-93.72	Average	H	39.17	52.44	53.98	-1.54
5149.83	-72.28	Peak	H	39.17	73.88	73.98	-0.10

Table 6-24. Radiated Restricted Band Measurements at 3-meter (4.5 – 5.15GHz)

NOTES:

1. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

2. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

3. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

4. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

5. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

6. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Band Edge Measurements (Cont'd)
§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meter

Operating Frequency: 5300MHz

Channel: 60

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
5352.12	-65.48	Average	H	39.62	47.58	53.98	-6.40
5352.12	-55.42	Peak	H	39.62	57.64	73.98	-16.34
5360.40	-67.36	Average	H	39.65	45.73	53.98	-8.25
5360.40	-56.69	Peak	H	39.65	56.40	73.98	-17.58
5375.38	-68.08	Average	H	39.65	45.01	53.98	-8.97
5375.38	-57.94	Peak	H	39.65	55.15	73.98	-18.83

Table 6-25. Radiated Restricted Band Measurements at 3-meter (5.35 – 5.46GHz)

NOTES:

1. Emissions within 5.35 – 5.46GHz lie in a restricted band and are subject to the radiated emissions limits specified in §15.209. Emission within 5.46 – 5.47GHz are at the lower band edge of UNII Band 3 transmission and are subject to the -27dBm/MHz (68.2dBµV/m) EIRP limit specified in §15.407.

2. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricteds band specified in §15.205.

8. Channel 60 was measured for Band Edge compliance due to a power reduction in Channel 64.

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Radiated Band Edge Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meter

Operating Frequency: 5320MHz

Channel: 64

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
5350.00	-93.29	Average	H	39.62	53.34	53.98	-0.64
5350.00	-72.91	Peak	H	39.62	73.72	73.98	-0.26
5358.90	-100.98	Average	H	39.65	45.67	53.98	-8.31
5358.90	-84.65	Peak	H	39.65	62.00	73.98	-11.98
5372.39	-104.14	Average	H	39.65	42.51	53.98	-11.47
5372.39	-90.69	Peak	H	39.65	55.96	73.98	-18.02

Table 6-26. Radiated Restricted Band Measurements at 3-meter (5.35 – 5.46GHz)

NOTES:

1. Emissions within 5.35 – 5.46GHz lie in a restricted band and are subject to the radiated emissions limits specified in §15.209. Emission within 5.46 – 5.47GHz are at the lower band edge of UNII Band 3 transmission and are subject to the -27dBm/MHz (68.2dBµV/m) EIRP limit specified in §15.407.

2. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricteds band specified in §15.205.

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Radiated Band Edge Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meter

Operating Frequency: 5500MHz

Channel: 100

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
5449.92	-104.84	Average	H	39.80	41.96	53.98	-12.02
5449.92	-91.11	Peak	H	39.80	55.69	73.98	-18.29
5457.49	-103.84	Average	H	39.80	42.96	53.98	-11.02
5457.49	-90.28	Peak	H	39.80	56.52	73.98	-17.46
5470.00	-78.73	Peak	H	39.82	68.09	68.20	-0.11

Table 6-27. Radiated Restricted Band Measurements at 3-meter (5.35 – 5.46GHz, 5.46 – 5.47GHz)

NOTES:

1. Emissions within 5.35 – 5.46GHz lie in a restricted band and are subject to the radiated emissions limits specified in §15.209. Emission within 5.46 – 5.47GHz are at the lower band edge of UNII Band 3 transmission and are subject to the -27dBm/MHz (68.2dBµV/m) EIRP limit specified in §15.407.

2. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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Radiated Band Edge Measurements (Cont'd)
§15.407(b)(1) and (2), §15.205 & §15.209; RSS-210 [A9.2]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meter

Operating Frequency: 5700MHz

Channel: 140

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
5726.93	-79.43	Peak	H	40.10	67.68	68.20	-0.52
5728.29	-80.47	Peak	H	40.10	66.64	68.20	-1.56
5730.37	-82.73	Peak	H	40.11	64.38	68.20	-3.82

Table 6-28. Radiated Restricted Band Measurements at 3-meter

NOTES:

1. For frequencies above 1GHz, peak emissions are measured using RBW = 1MHz and VBW = 3MHz. Average emissions are measured using RBW = 1MHz and VBW = 10Hz ("Method VB") per KDB 789033.

2. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

3. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

4. The spectrum is measured from 9kHz to 40GHz and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

5. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

6. Above 960MHz the limit is 500 µV/m (54dBµ/m) at 3 meters radiated for emissions that lie in restricted bands specified in §15.205.

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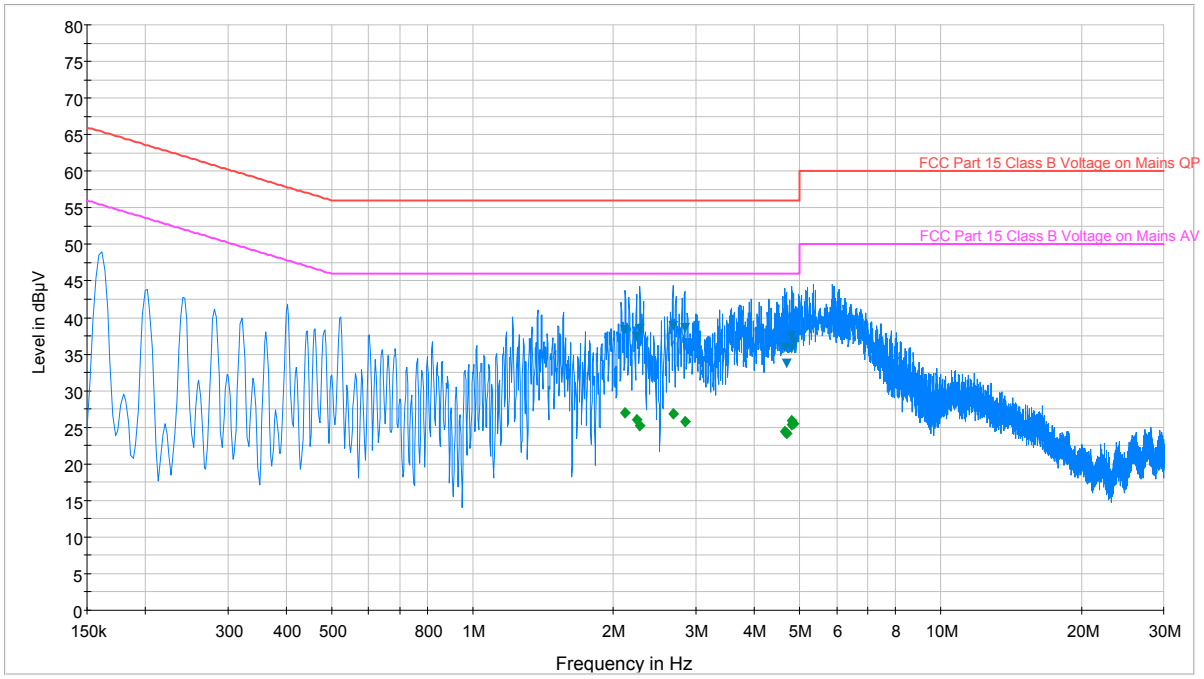
6.9 Line-Conducted Test Data

§15.207; RSS-Gen [7.2.2]



Plot 6-7. Line Conducted Plot with 802.11a (UNII Band I, L1)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.121	L1	9	38.30	56.00	17.70	26.90	46.00	19.10
2.240	L1	9	37.40	56.00	18.60	26.00	46.00	20.00
2.279	L1	9	38.50	56.00	17.50	25.30	46.00	20.70
2.679	L1	9	38.90	56.00	17.10	26.90	46.00	19.10
2.841	L1	9	38.60	56.00	17.40	25.70	46.00	20.30
4.643	L1	9	35.90	56.00	20.10	24.40	46.00	21.60
4.684	L1	9	33.80	56.00	22.20	24.10	46.00	21.90
4.805	L1	9	35.70	56.00	20.30	25.40	46.00	20.60
4.819	L1	9	37.40	56.00	18.60	26.00	46.00	20.00
4.859	L1	9	36.70	56.00	19.30	25.60	46.00	20.40

Table 6-29. Line Conducted Data with 802.11a (UNII Band I, L1)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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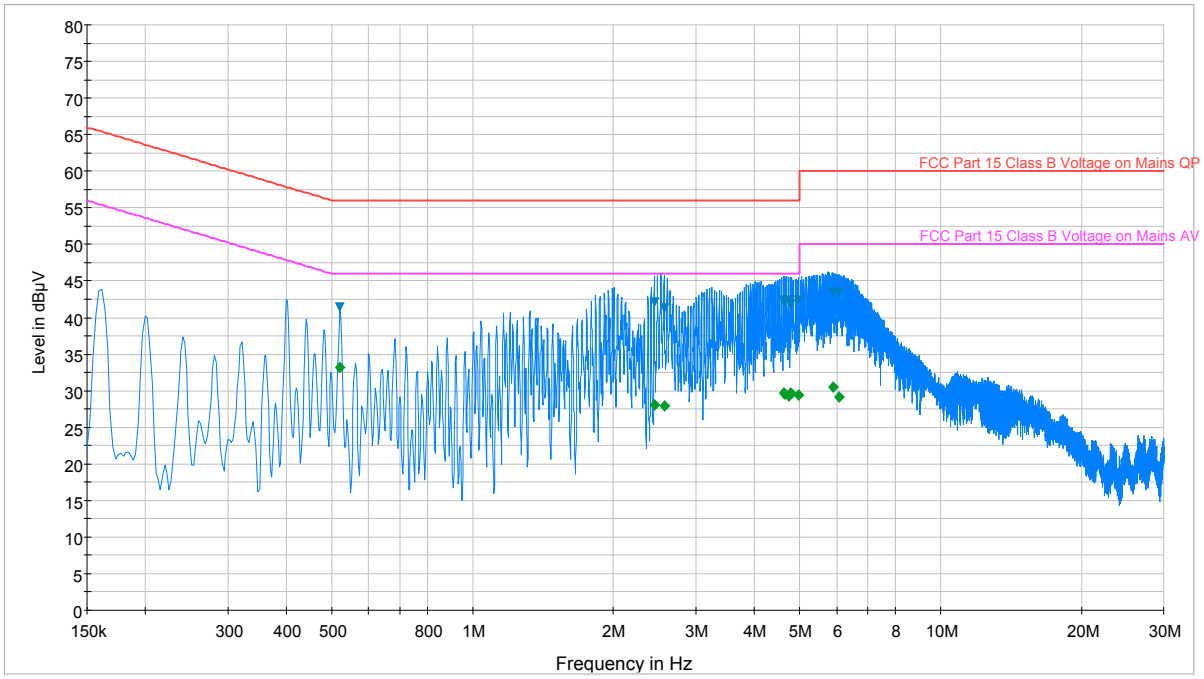
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-56. Line Conducted Plot with 802.11a (UNII Band I, N)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.521	N	9	41.40	56.00	14.60	33.20	46.00	12.80
2.445	N	9	42.10	56.00	13.90	28.00	46.00	18.00
2.564	N	9	41.30	56.00	14.70	28.00	46.00	18.00
4.619	N	9	42.20	56.00	13.80	29.70	46.00	16.30
4.657	N	9	42.40	56.00	13.60	29.60	46.00	16.40
4.740	N	9	42.40	56.00	13.60	29.30	46.00	16.70
4.778	N	9	41.80	56.00	14.20	29.60	46.00	16.40
4.979	N	9	42.40	56.00	13.60	29.40	46.00	16.60
5.901	N	9	43.40	60.00	16.60	30.50	50.00	19.50
6.061	N	9	43.50	60.00	16.50	29.20	50.00	20.80

Table 6-30. Line Conducted Data with 802.11a (UNII Band I, N)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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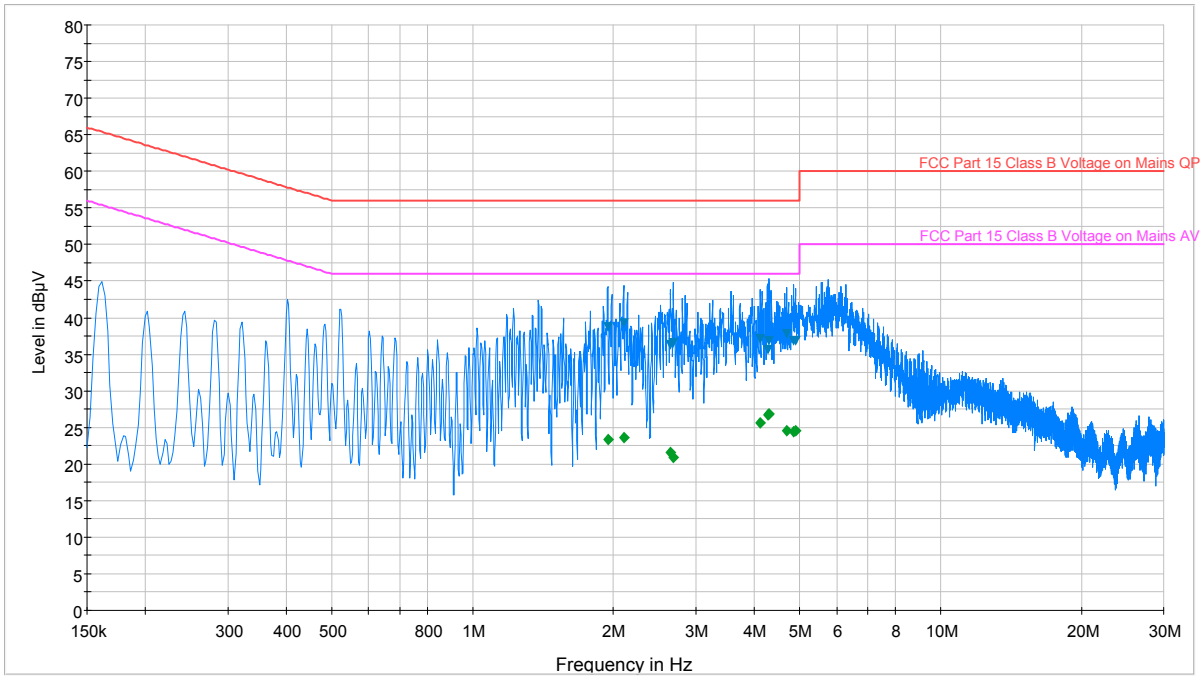
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-57. Line Conducted Plot with 802.11a (UNII Band 2, L1)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
1.946	L1	9	38.80	56.00	17.20	23.30	46.00	22.70
2.105	L1	9	39.30	56.00	16.70	23.60	46.00	22.40
2.645	L1	9	36.30	56.00	19.70	21.60	46.00	24.40
2.686	L1	9	36.50	56.00	19.50	20.90	46.00	25.10
4.119	L1	9	37.10	56.00	18.90	25.60	46.00	20.40
4.270	L1	9	35.50	56.00	20.50	26.70	46.00	19.30
4.308	L1	9	36.90	56.00	19.10	26.80	46.00	19.20
4.691	L1	9	37.70	56.00	18.30	24.60	46.00	21.40
4.855	L1	9	36.90	56.00	19.10	24.40	46.00	21.60
4.893	L1	9	36.80	56.00	19.20	24.60	46.00	21.40

Table 6-31. Line Conducted Data with 802.11a (UNII Band 2, L1)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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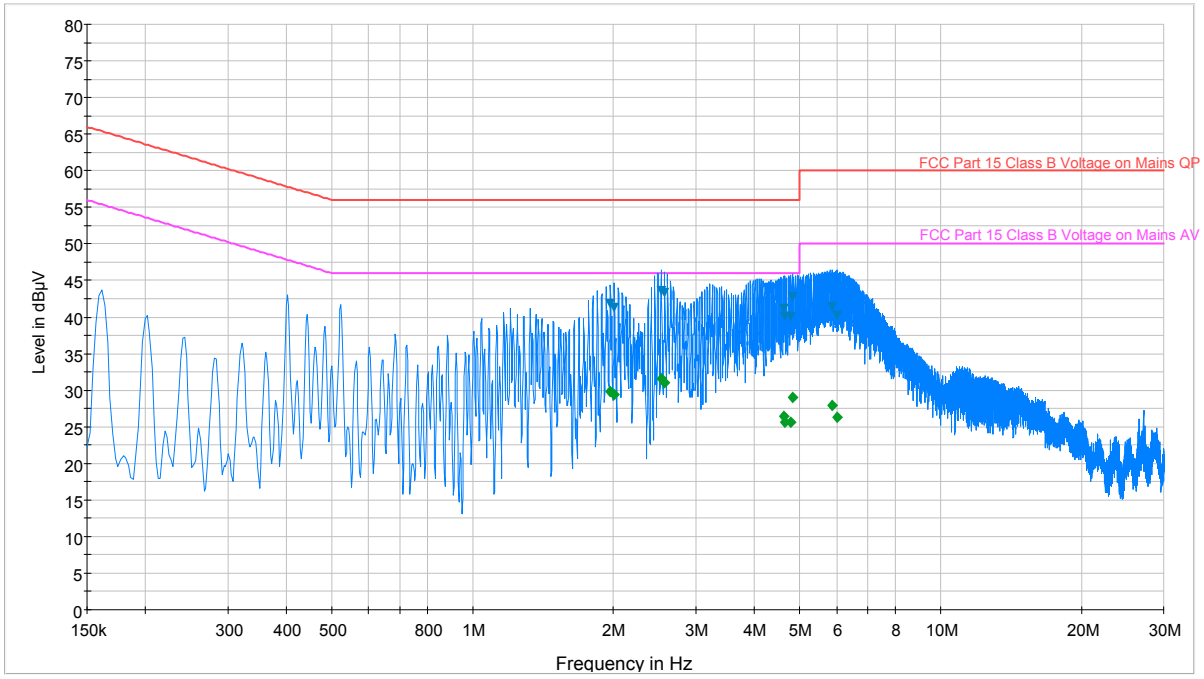
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-58. Line Conducted Plot with 802.11a (UNII Band 2, N)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
1.970	N	9	41.90	56.00	14.10	29.80	46.00	16.20
2.009	N	9	41.30	56.00	14.70	29.50	46.00	16.50
2.533	N	9	43.50	56.00	12.50	31.60	46.00	14.40
2.573	N	9	43.30	56.00	12.70	31.00	46.00	15.00
4.614	N	9	41.20	56.00	14.80	26.40	46.00	19.60
4.652	N	9	40.00	56.00	16.00	25.60	46.00	20.40
4.774	N	9	40.00	56.00	16.00	25.70	46.00	20.30
4.821	N	9	42.80	56.00	13.20	29.00	46.00	17.00
5.858	N	9	41.40	60.00	18.60	27.90	50.00	22.10
6.018	N	9	40.10	60.00	19.90	26.40	50.00	23.60

Table 6-32. Line Conducted Data with 802.11a (UNII Band 2, N)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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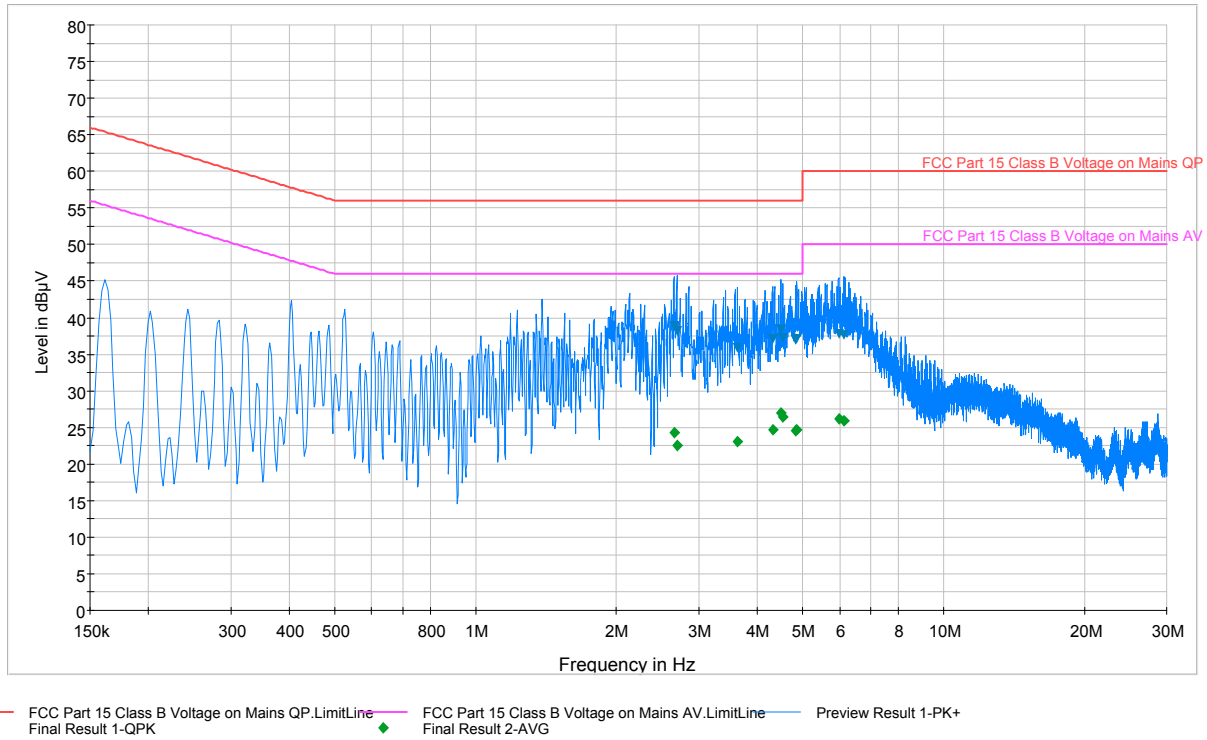
Line-Conducted Test Data (Cont'd)
§15.207; RSS-Gen [7.2.2]



Plot 6-59. Line Conducted Plot with 802.11a (UNII Band 3, L1)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.654	L1	9	38.90	56.00	17.10	24.30	46.00	21.70
2.695	L1	9	38.10	56.00	17.90	22.60	46.00	23.40
3.626	L1	9	35.80	56.00	20.20	23.00	46.00	23.00
4.313	L1	9	37.10	56.00	18.90	24.60	46.00	21.40
4.490	L1	9	38.40	56.00	17.60	27.00	46.00	19.00
4.531	L1	9	37.30	56.00	18.70	26.50	46.00	19.50
4.826	L1	9	37.00	56.00	19.00	24.50	46.00	21.50
4.866	L1	9	37.20	56.00	18.80	24.70	46.00	21.30
5.969	L1	9	37.80	60.00	22.20	26.20	50.00	23.80
6.128	L1	9	37.70	60.00	22.30	25.90	50.00	24.10

Table 6-33. Line Conducted Data with 802.11a (UNII Band 3, L1)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 1Mbps on Channel 6. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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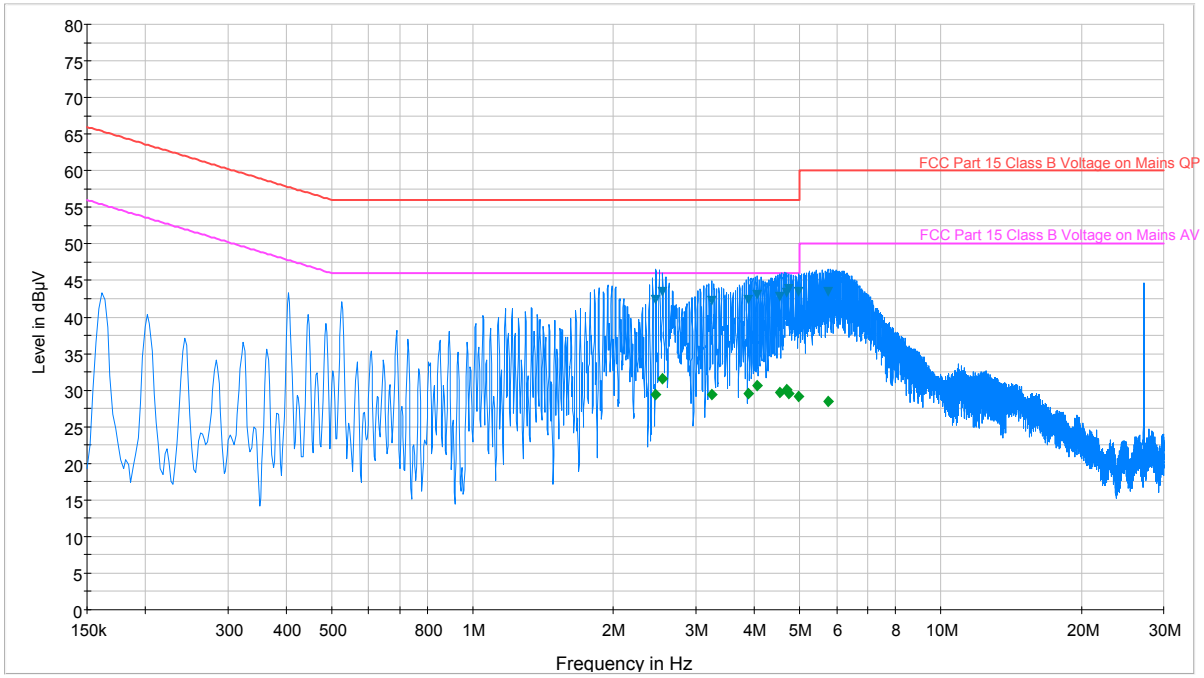
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-60. Line Conducted Data with 802.11a (UNII Band 3, N)

Frequency MHz	Line	Bandwidth kHz	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.465	N	9	29.40	46.00	16.60	42.40	56.00	13.60
2.549	N	9	31.60	46.00	14.40	43.50	56.00	12.50
3.239	N	9	29.40	46.00	16.60	42.20	56.00	13.80
3.887	N	9	29.60	46.00	16.40	42.40	56.00	13.60
4.049	N	9	30.60	46.00	15.40	43.00	56.00	13.00
4.535	N	9	29.70	46.00	16.30	42.70	56.00	13.30
4.697	N	9	30.10	46.00	15.90	43.30	56.00	12.70
4.740	N	9	29.50	46.00	16.50	43.90	56.00	12.10
4.976	N	9	29.10	46.00	16.90	43.40	56.00	12.60
5.741	N	9	28.50	50.00	21.50	43.40	60.00	16.60

Table 6-34. Line Conducted Data with 802.11a (UNII Band 3, N)

Notes:

1. All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 100. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line L1 = Phase; Line N = Neutral
4. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
5. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
6. Margin (dB) = QP/AV Level (dBµV) – Limit (dBµV)
7. Traces shown in plot are made using a peak detector.

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7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Motorola Portable Handset FCC ID: IHDP56MB4** is in compliance with Part 15E of the FCC Rules and RSS-210 of the Industry Canada Rules.

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