

Figure 103: Peak Excursion, 5550 MHz at 802.11n, Chain 2 – 13.5 Mbps

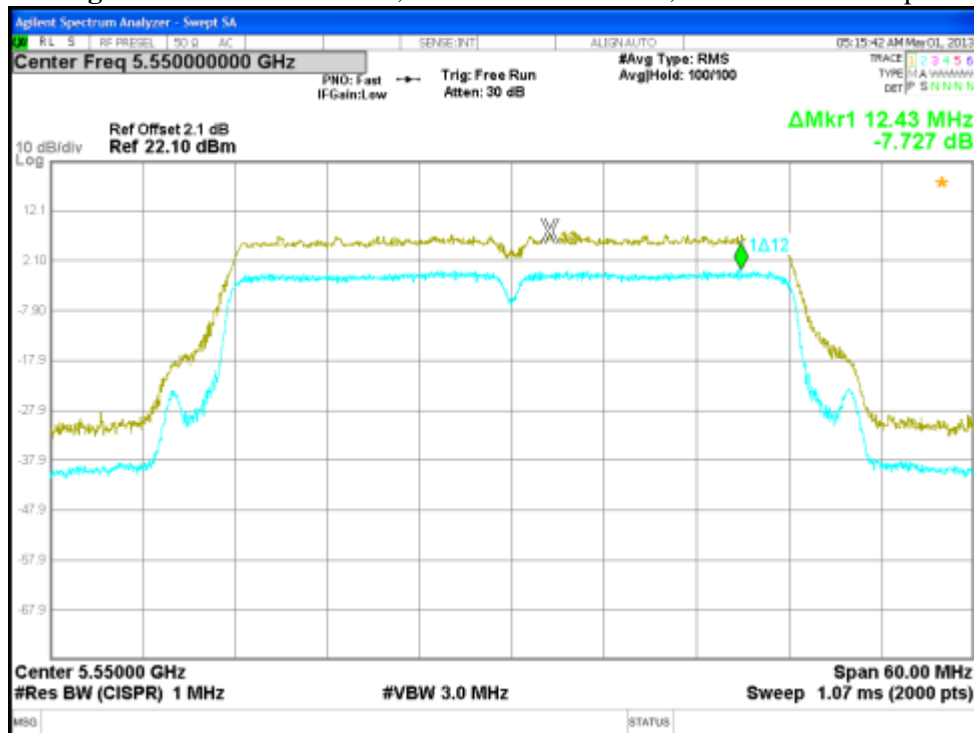


Figure 104: Peak Excursion, 5550 MHz at 802.11n, Chain 3 – 13.5 Mbps

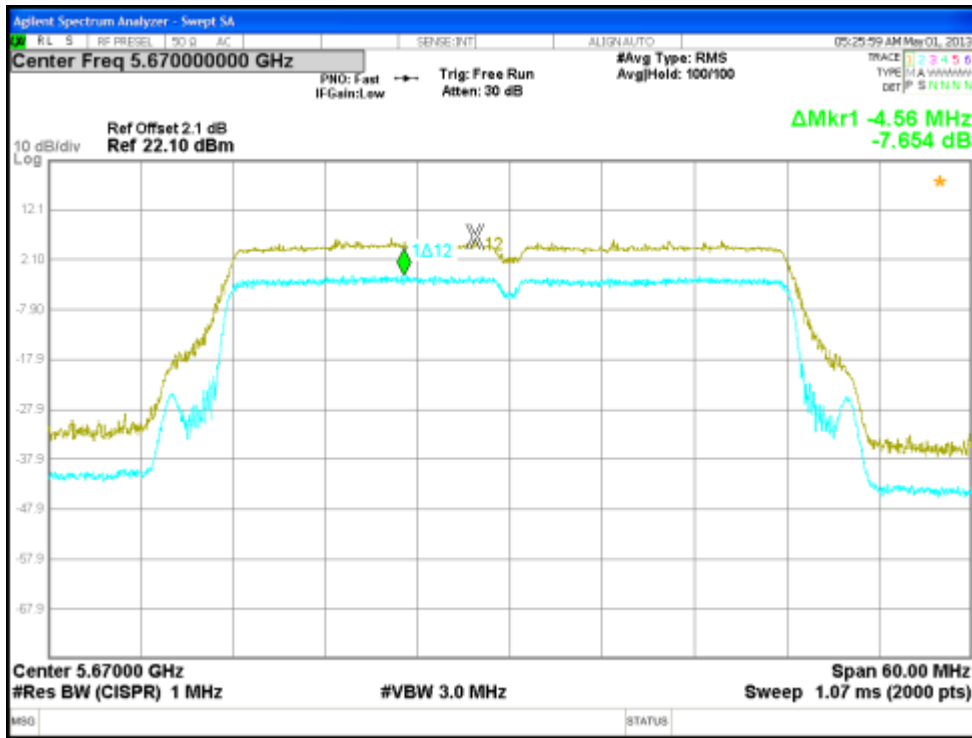


Figure 105: Peak Excursion, 5670 MHz at 802.11n, Chain 0 – 13.5 Mbps

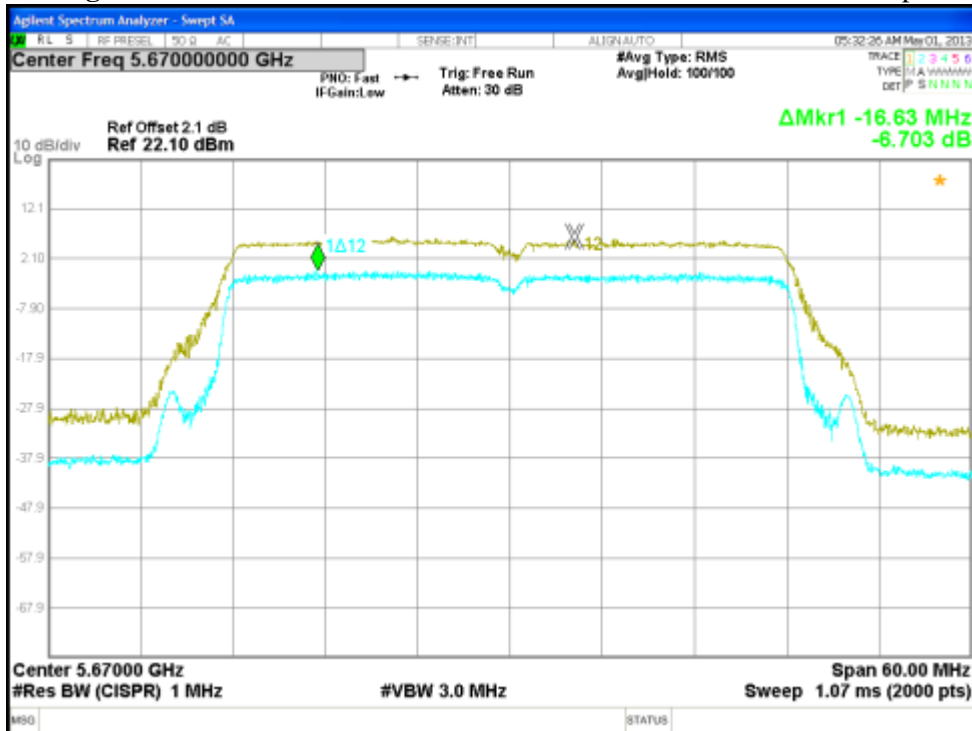


Figure 106: Peak Excursion, 5670 MHz at 802.11n, Chain 1 – 13.5 Mbps

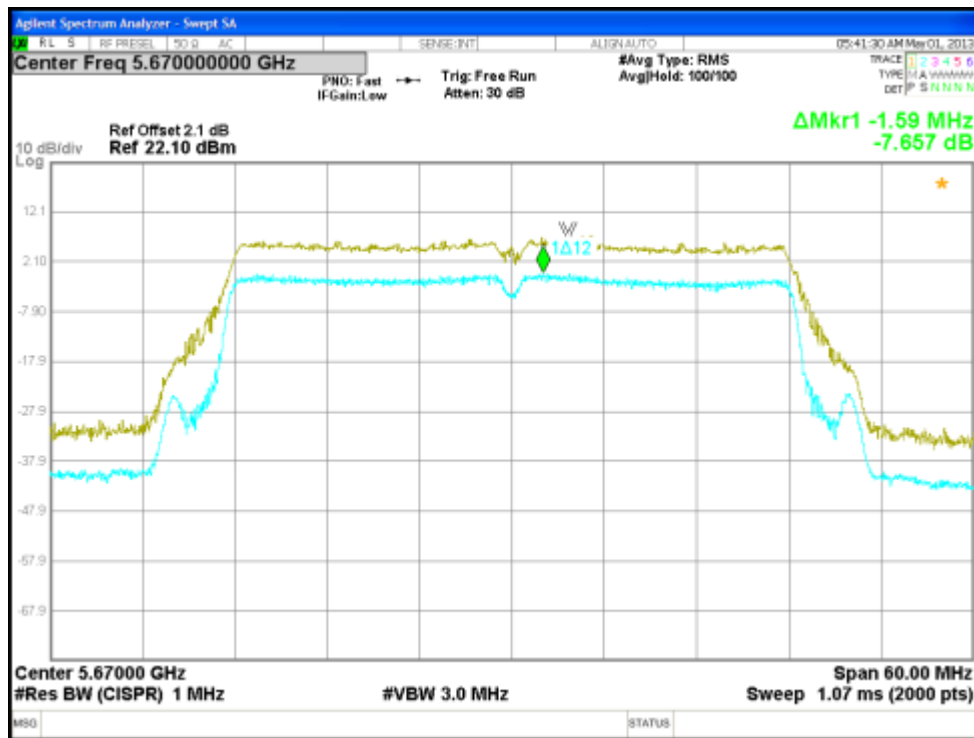


Figure 107: Peak Excursion, 5670 MHz at 802.11n, Chain 2 – 13.5 Mbps

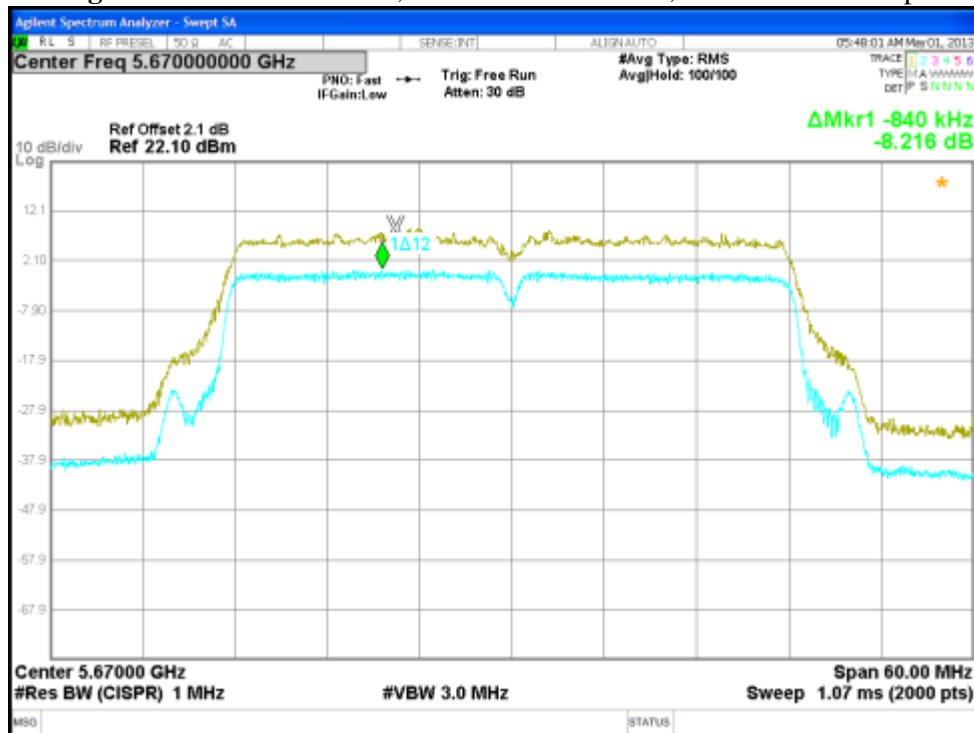


Figure 108: Peak Excursion, 5670 MHz at 802.11n, Chain 3 – 13.5 Mbps

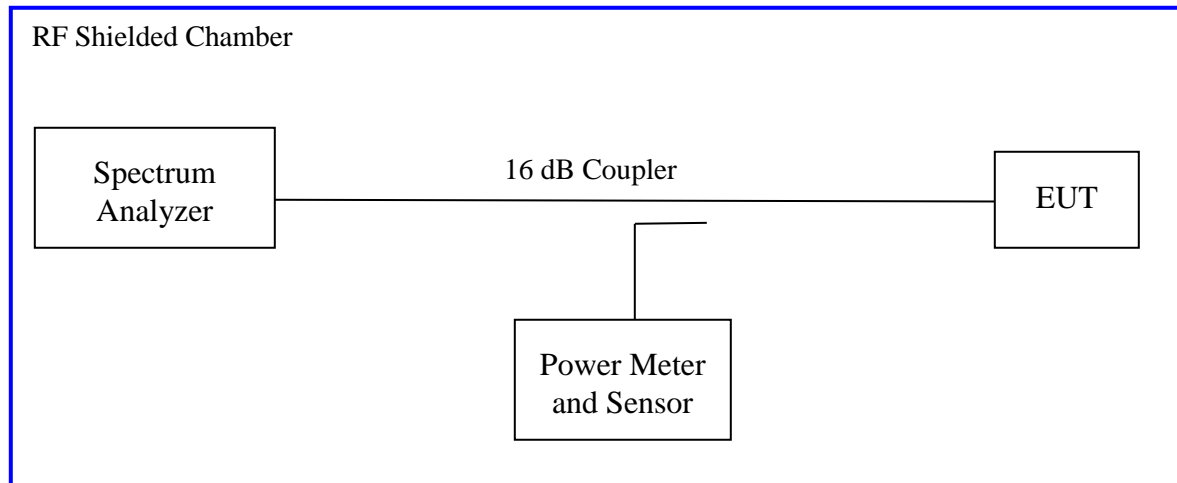
4.4 Power Spectral Density

According to the CFR47 Part 15.407 (a) and RSS 210 (A9.2), the spectral power density output of the antenna port shall be less than 11 dBm in any 1 MHz band during any time interval of continuous transmission.

4.4.1 Test Method

The conducted method was used to measure the power spectral density per ANSI C63.10-2009 Section 6.11.2. The measurement was performed with modulation per CFR47 Part 15.407 (a) and RSS 210 (A9.2). The pre-evaluation was performed to find the worst modes. The worst findings were conducted on 3 channels in frequency range of 5470 MHz to 5725 MHz for the test sample, S/N 09130M000104. The result indicated below.

Test Setup:



4.4.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: Power Spectral Density – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only			
Antenna Type: Integrated		Power Setting: See Test plan	
Max. Directional Gain: + 8 dBi		Signal State: Modulated at 100%.	
Ambient Temp.: 23 °C		Relative Humidity: 28%	
Power Spectral Density			
802.11a Mode			
Freq. (MHz)	Total PSD [dBm]	Limit [dBm]	Margin [dB]
5500	7.91	9.00	-1.09
5580	7.97	9.00	-1.03
5700	7.28	9.00	-1.72
Note: 1. The highest power spectral density was observed at 802.11a 6Mbps per data stream. 2. According KDB 662911, amplitude bins of all chains were sum together. 3. The total directional gain would be 8 dBi; 2 dBi +10*Log(4). Per CFR47 Part 15.407 (a), the limit is reduced for every dBi gain exceeding 6 dBi. The limit would be 9.00 dBm.			
802.11n (HT20) Mode			
Freq. (MHz)	Total PSD [dBm]	Limit [dBm]	Margin [dB]
5500	8.185	9.00	-0.82
5580	8.442	9.00	-0.56
5700	7.645	9.00	-1.36
Note: 1. The highest power spectral density was observed at HT20 6.5 Mbps per data stream. 2. According KDB 662911, amplitude bins of all chains were sum together. 3. The total directional gain would be 8 dBi; 2 dBi +10*Log(4). Per CFR47 Part 15.407 (a), the limit is reduced for every dBi gain exceeding 6 dBi. The limit would be 9.00 dBm.			

802.11n (HT40) Mode			
Freq. (MHz)	Total PSD [dBm]	Limit [dBm]	Margin [dB]
5510	6.947	9.00	-2.05
5550	6.999	9.00	-2.00
5670	6.839	9.00	-2.16
<p>Note: 1. The highest peak output power was observed at HT40 13.5 Mbps per data stream. 2. According KDB 662911, amplitude bins of all chains were sum together. 3. The total directional gain would be 8 dBi; 2 dBi +10*Log(4). Per CFR47 Part 15.407 (a), the limit is reduced for every dBi gain exceeding 6 dBi. The limit would be 9.00 dBm.</p>			

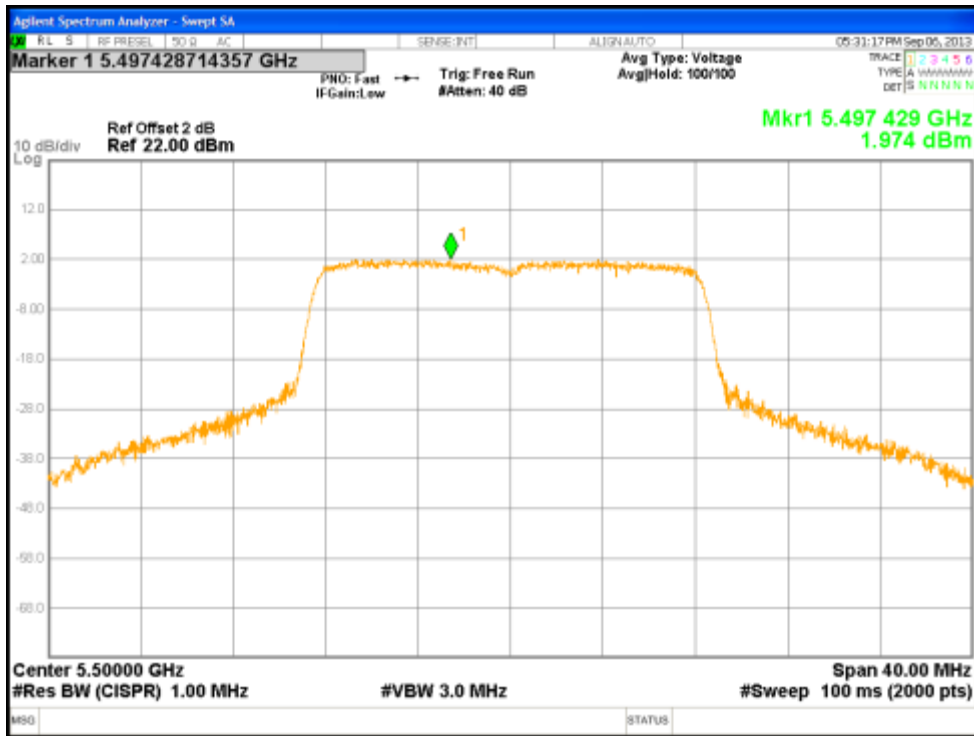


Figure 109: Power Spectral Density, 5500 MHz at 802.11a, Chain 0 – 6 Mbps

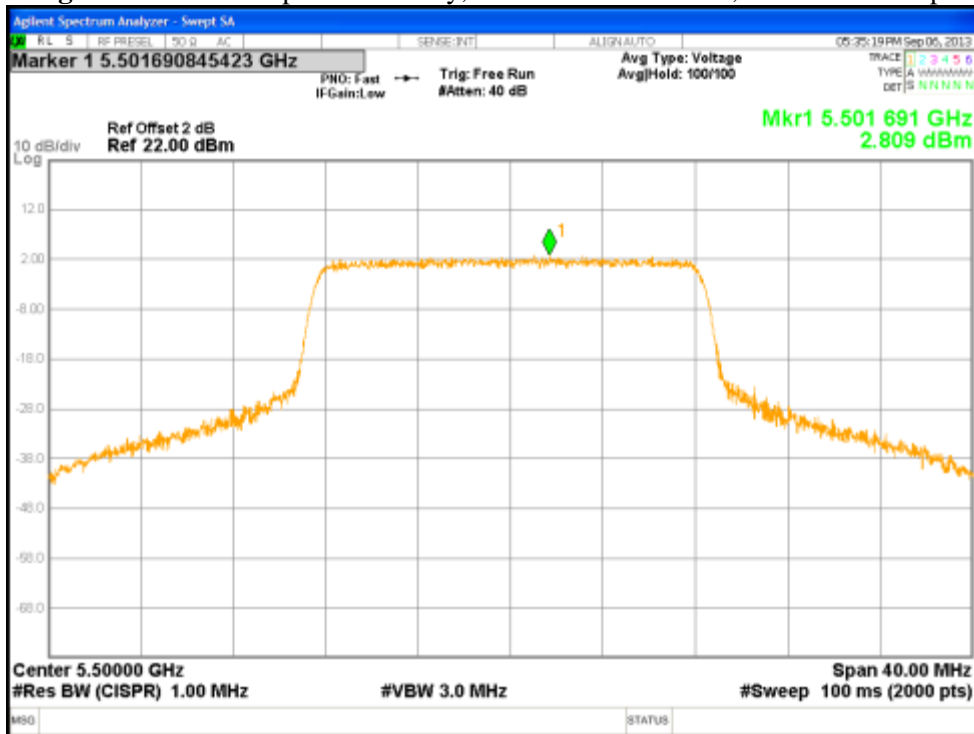


Figure 110: Power Spectral Density, 5500 MHz at 802.11a, Chain 1 – 6 Mbps

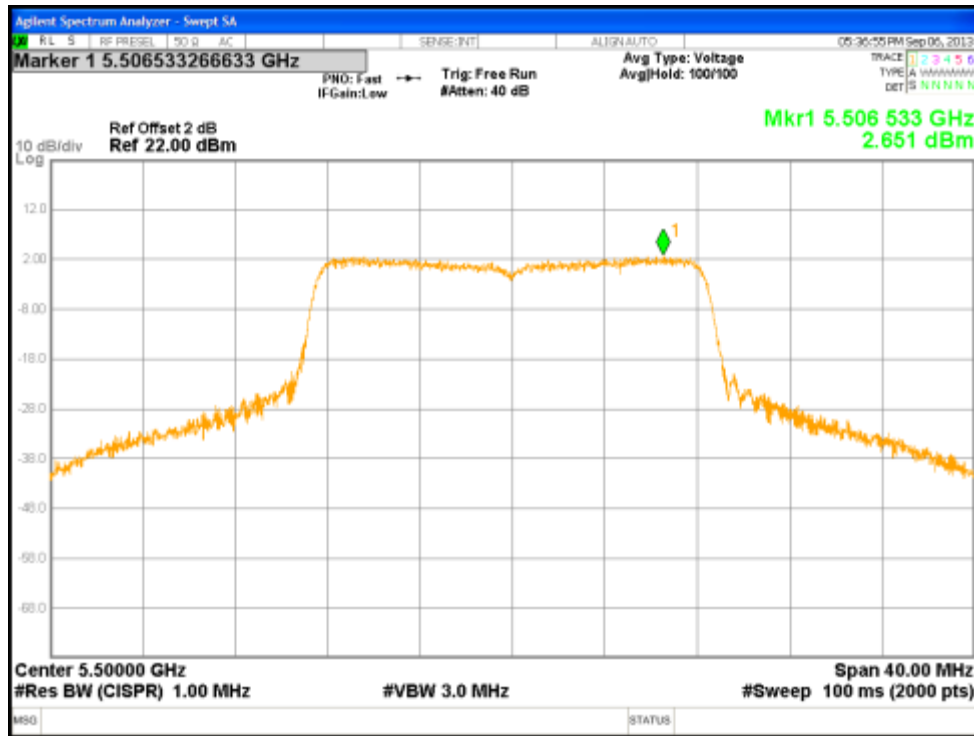


Figure 111: Power Spectral Density, 5500 MHz at 802.11a, Chain 2 – 6 Mbps

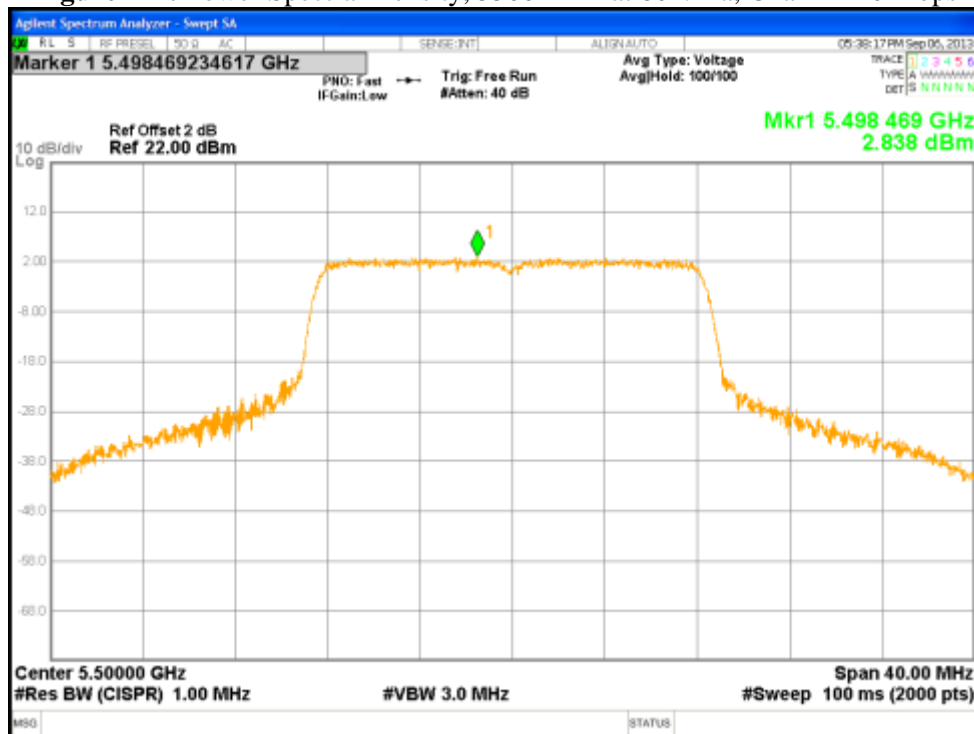


Figure 112: Power Spectral Density, 5500 MHz at 802.11a, Chain 3 – 6 Mbps

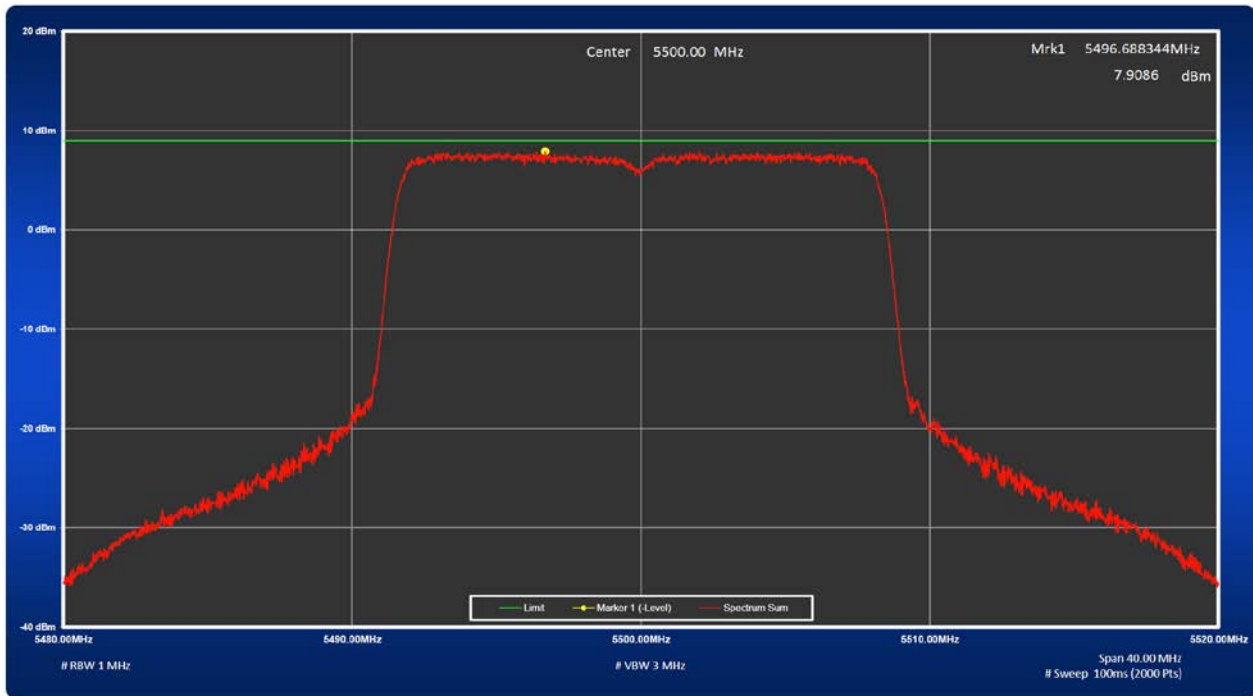


Figure 113: Total Sum of Power Spectral Density, 5500 MHz at 802.11a, 6 Mbps

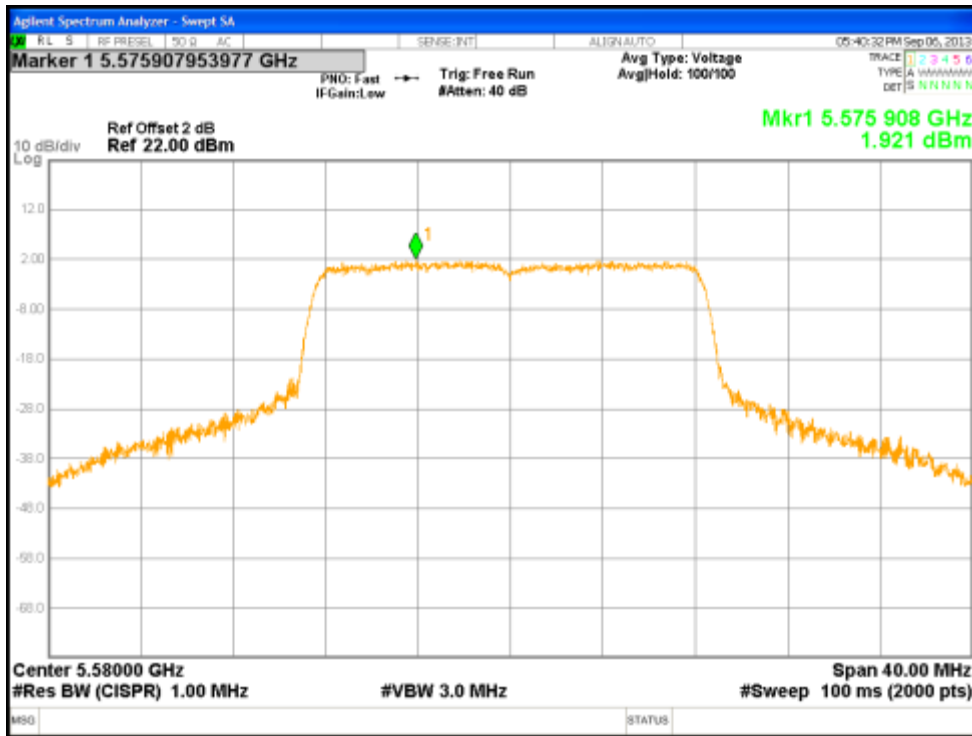


Figure 114: Power Spectral Density, 5580 MHz at 802.11a, Chain 0 – 6 Mbps

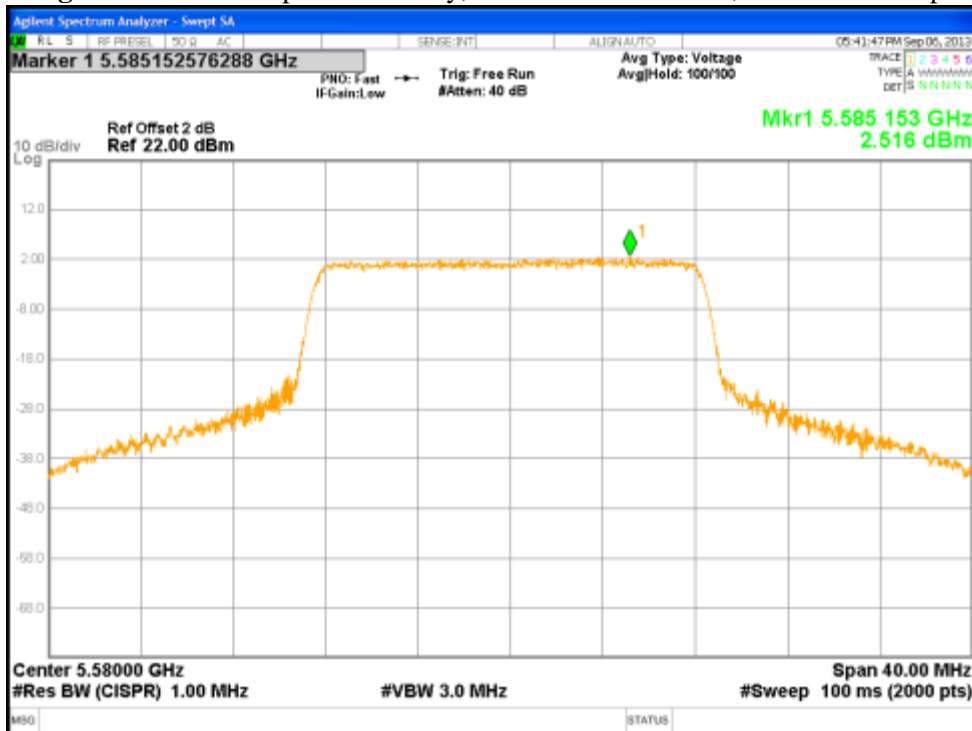


Figure 115: Power Spectral Density, 5580 MHz at 802.11a, Chain 1 – 6 Mbps

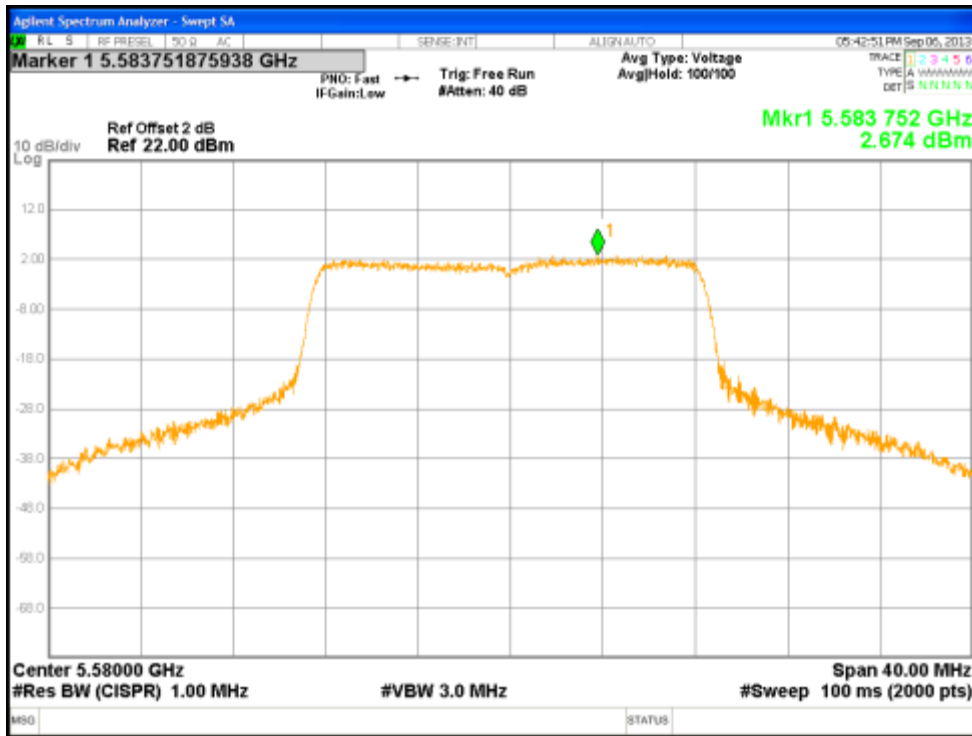


Figure 116: Power Spectral Density, 5580 MHz at 802.11a, Chain 2 – 6 Mbps

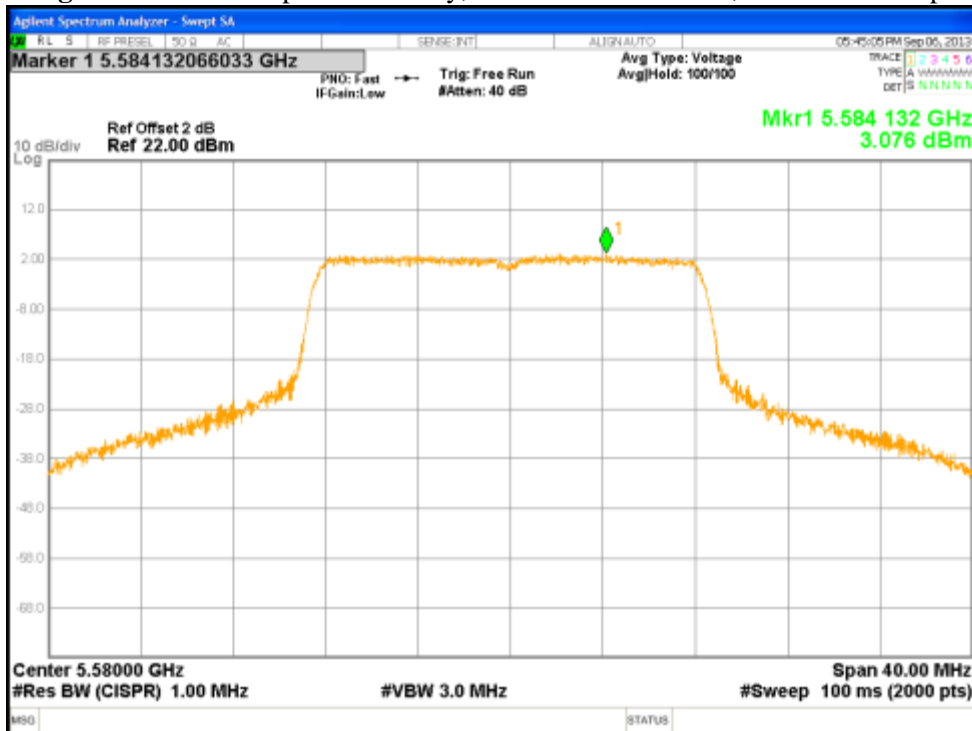


Figure 117: Power Spectral Density, 5580 MHz at 802.11a, Chain 3 – 6 Mbps

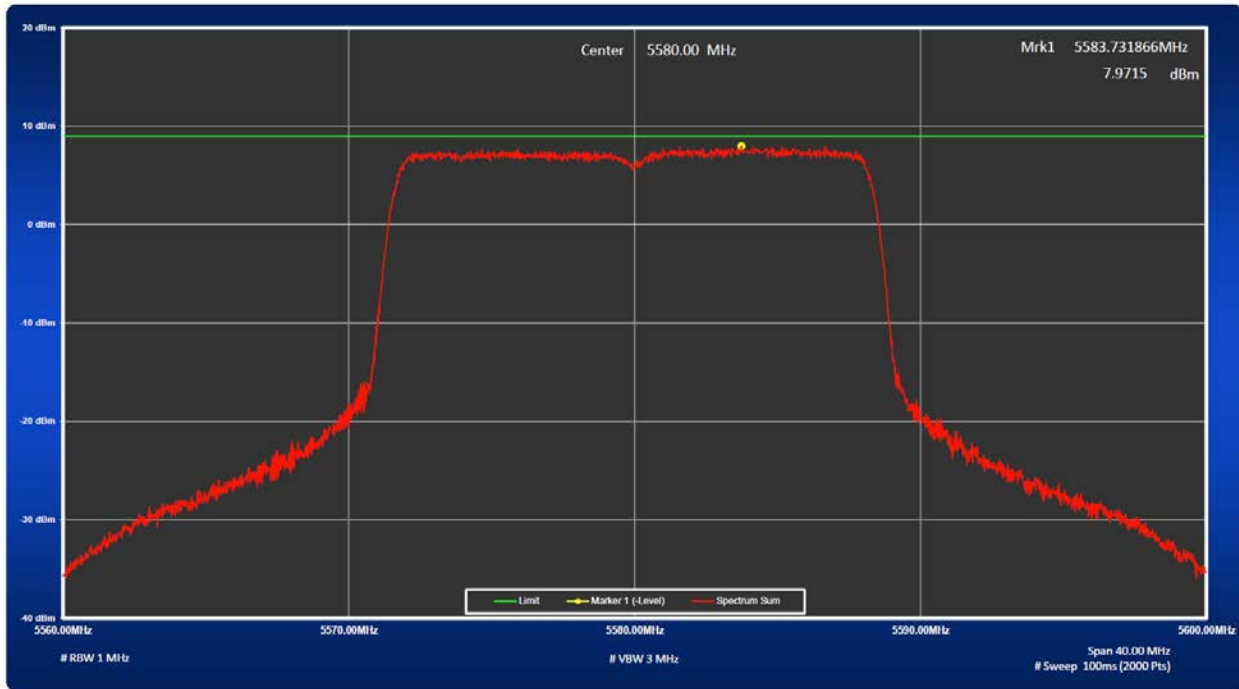


Figure 118: Total Sum of Power Spectral Density, 5580 MHz at 802.11a, 6 Mbps

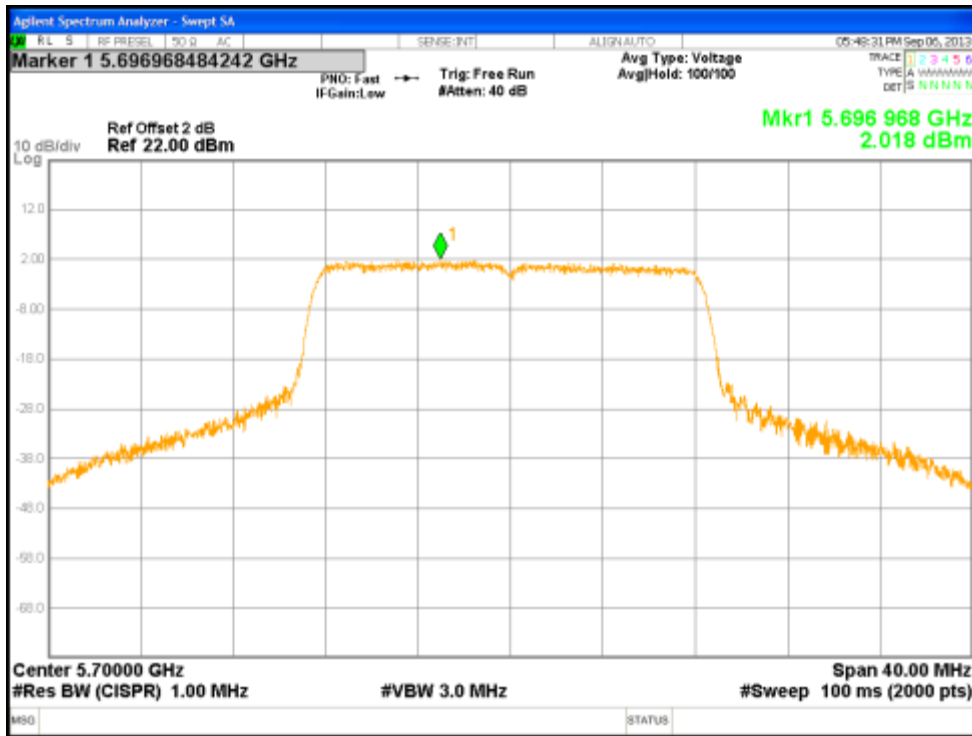


Figure 119: Power Spectral Density, 5700 MHz at 802.11a, Chain 0 – 6 Mbps

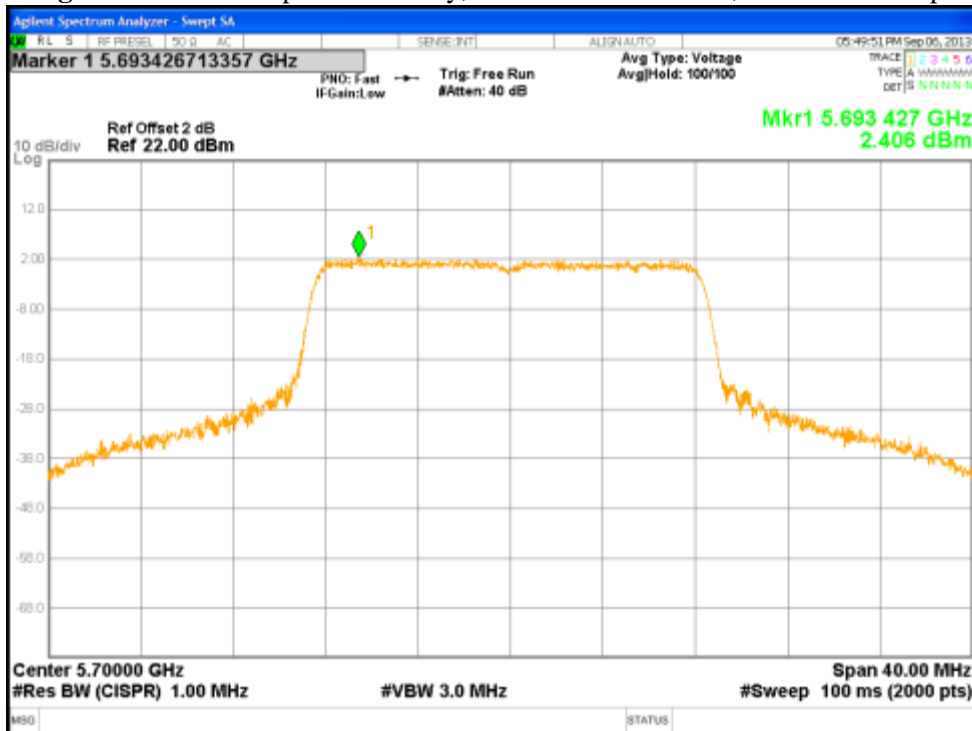


Figure 120: Power Spectral Density, 5700 MHz at 802.11a, Chain 1 – 6 Mbps

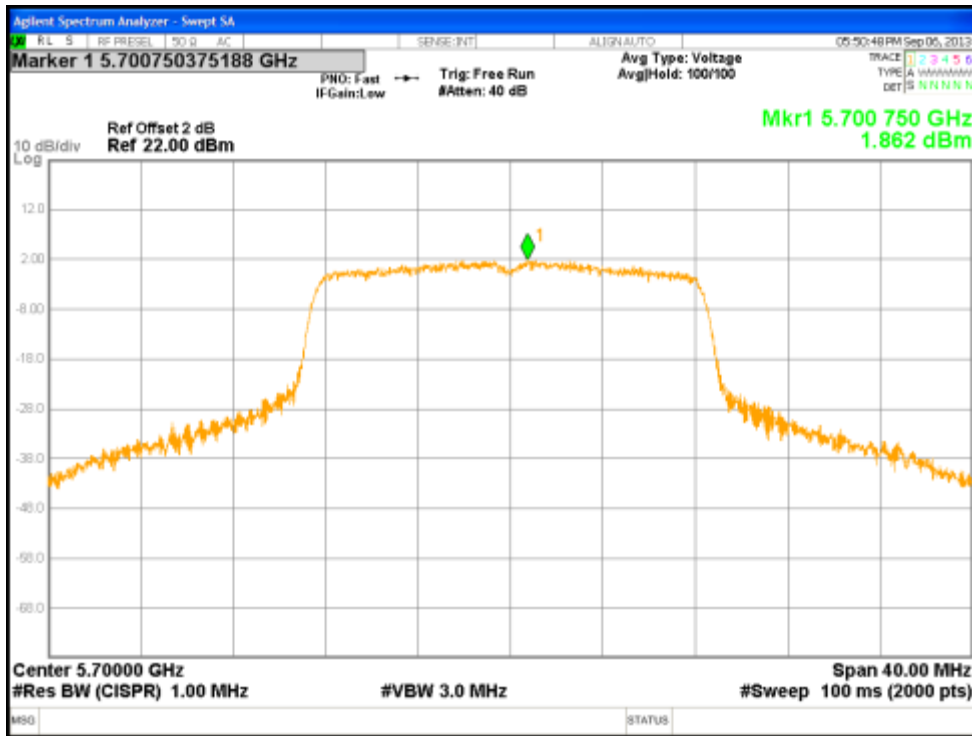


Figure 121: Power Spectral Density, 5700 MHz at 802.11a, Chain 2 – 6 Mbps

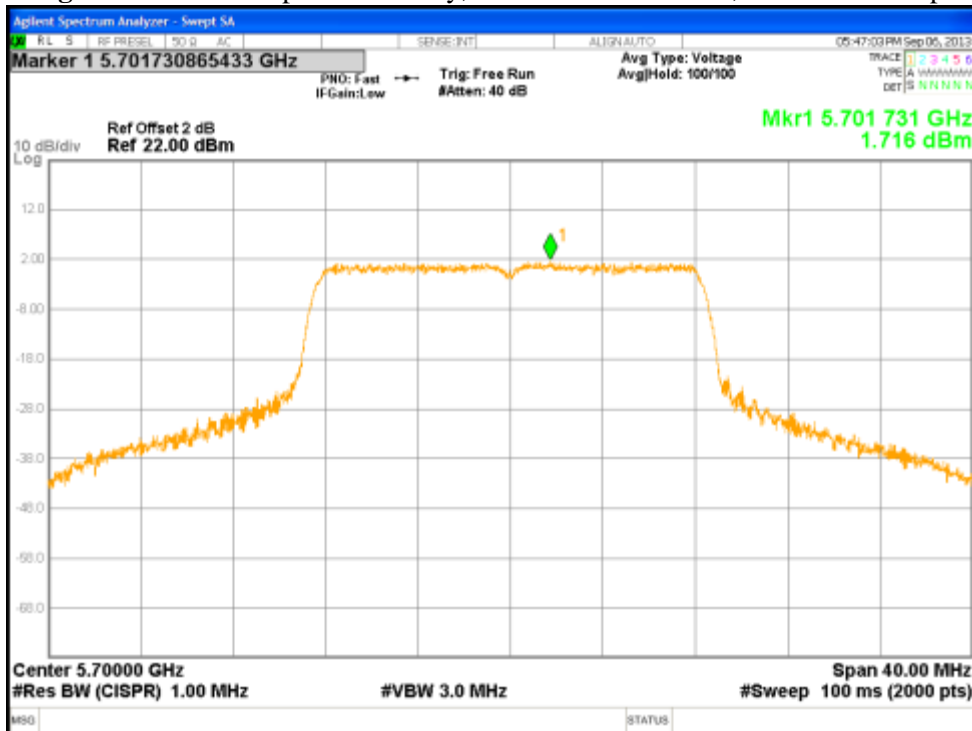


Figure 122: Power Spectral Density, 5700 MHz at 802.11a, Chain 3 – 6 Mbps

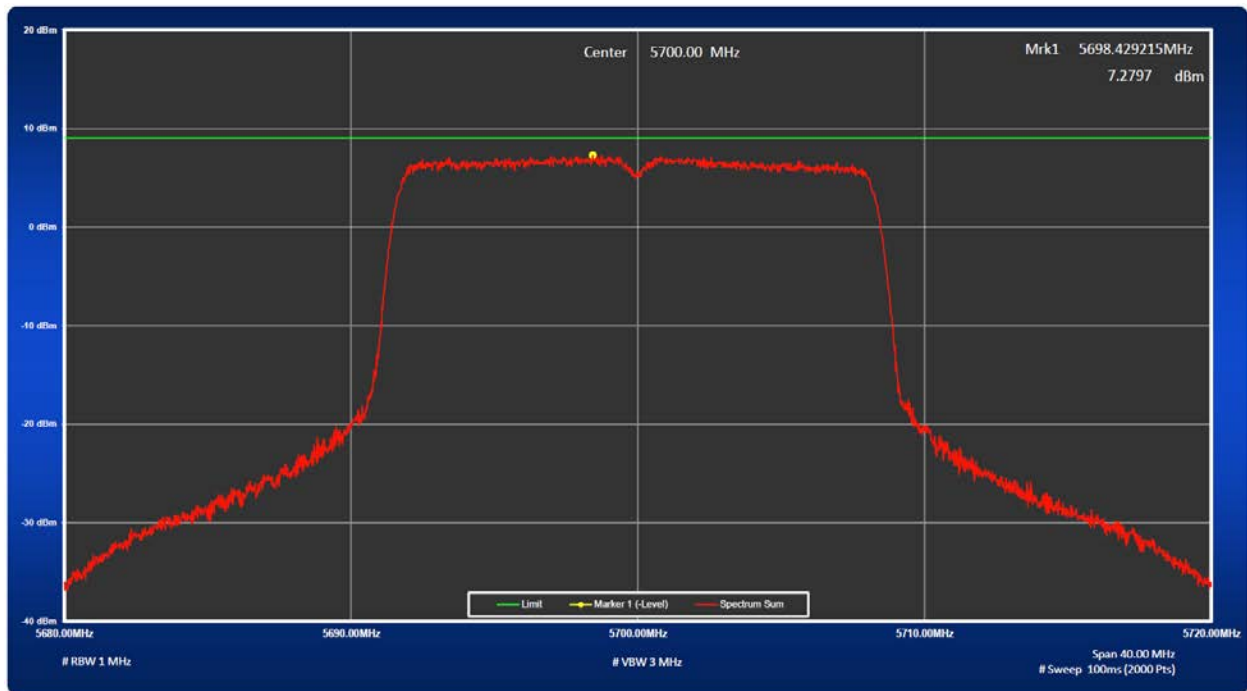


Figure 123: Total Sum of Power Spectral Density, 5700 MHz at 802.11a, 6 Mbps

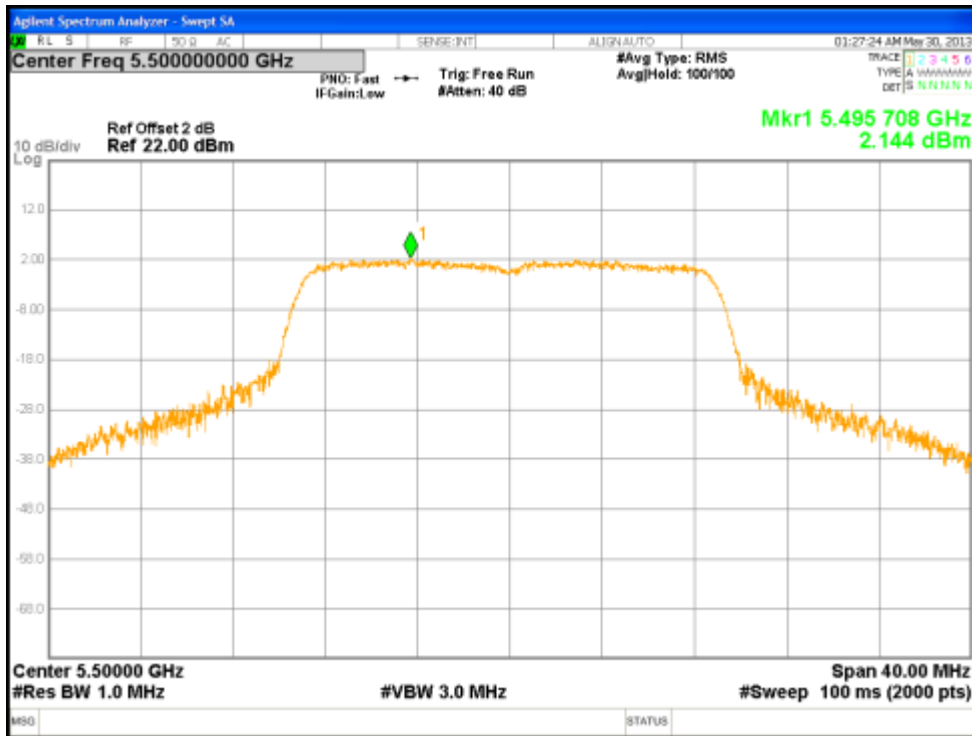


Figure 124: Power Spectral Density, 5500 MHz at 802.11n, Chain 0 – 6.5 Mbps

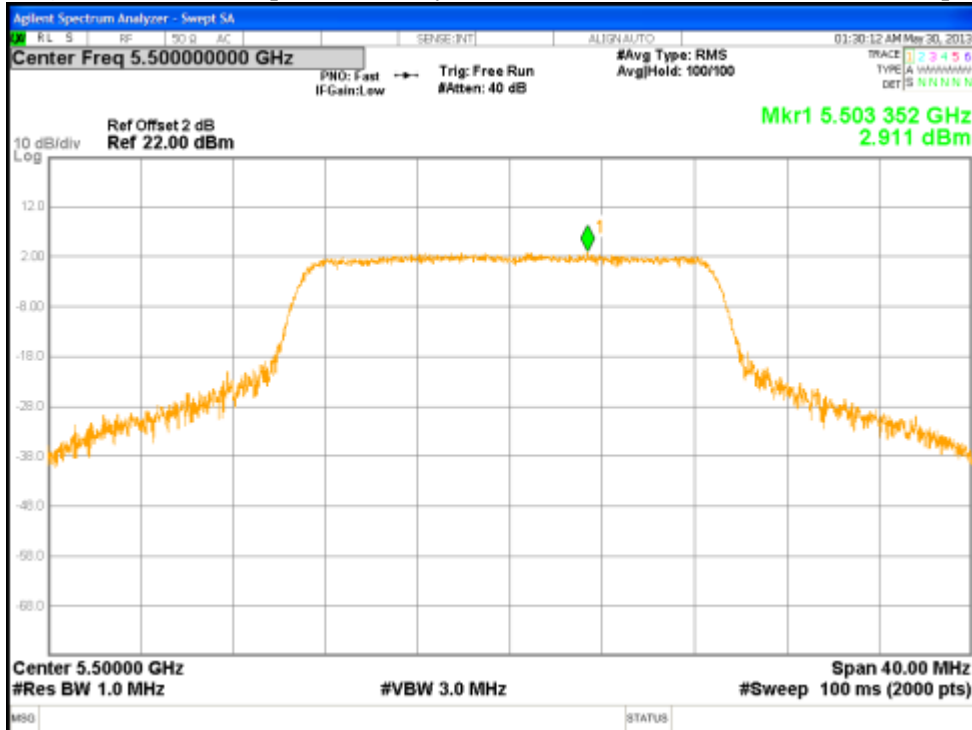


Figure 125: Power Spectral Density, 5500 MHz at 802.11n, Chain 1 – 6.5 Mbps

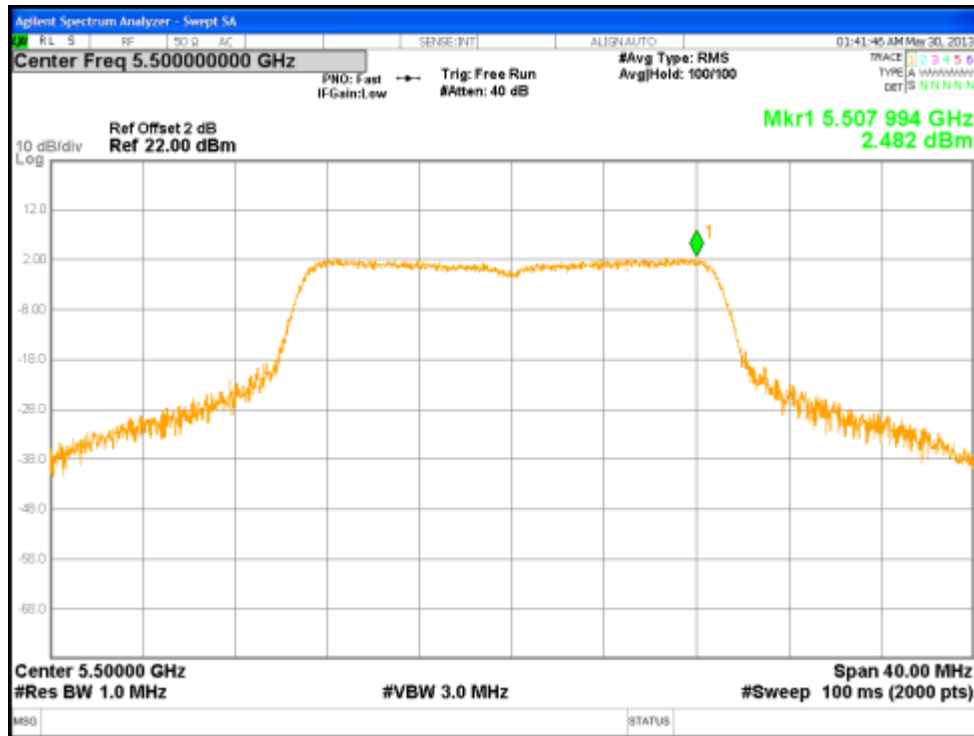


Figure 126: Power Spectral Density, 5500 MHz at 802.11n, Chain 2 – 6.5 Mbps

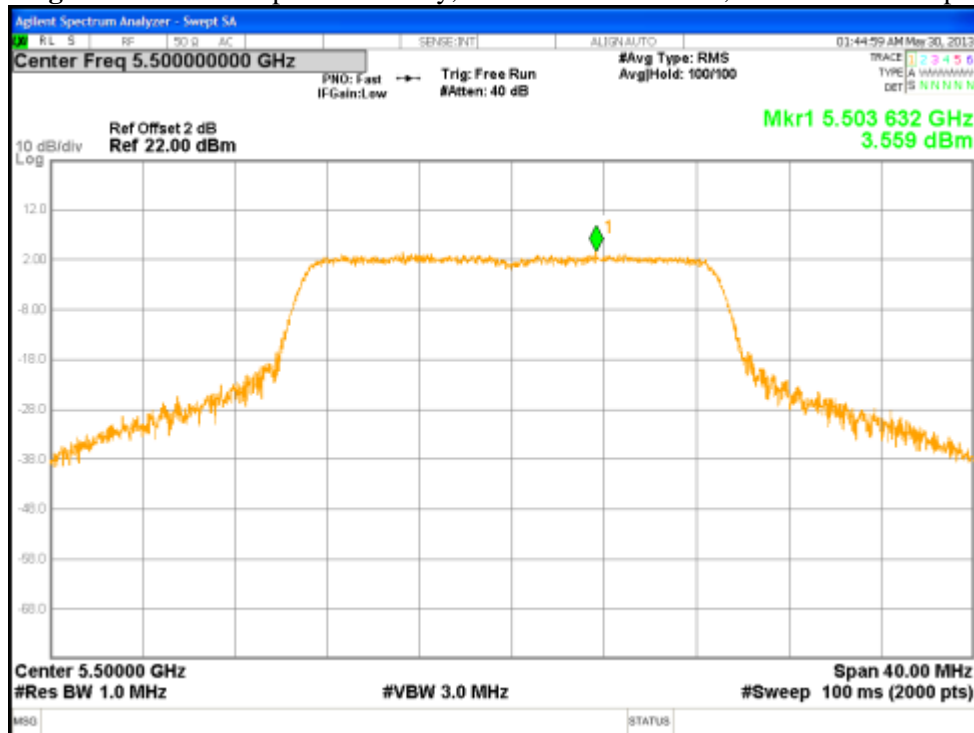


Figure 127: Power Spectral Density, 5500 MHz at 802.11n, Chain 3 – 6.5 Mbps

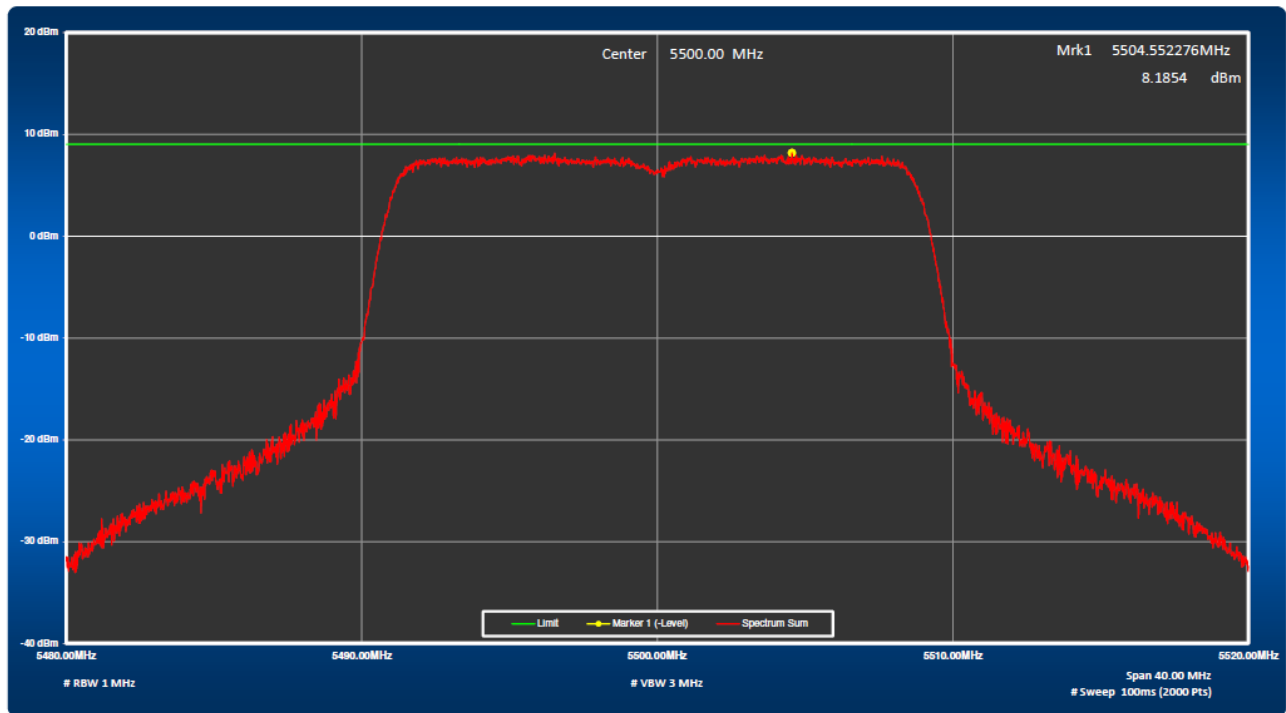


Figure 128: Total Sum of Power Spectral Density, 5500 MHz at 802.11n, 6.5 Mbps

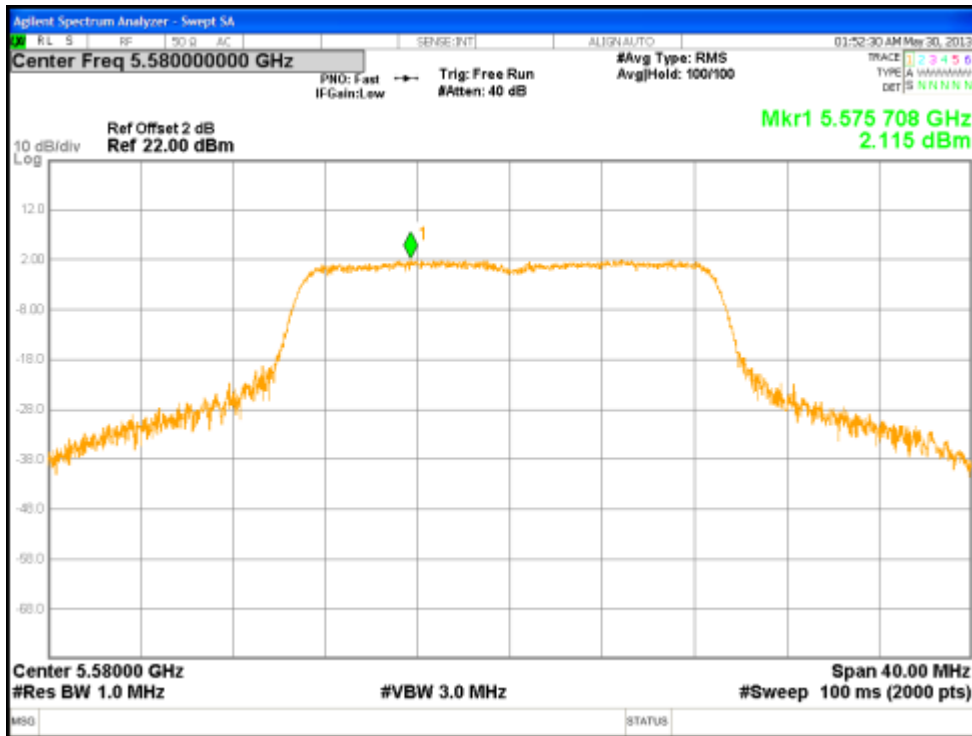


Figure 129: Power Spectral Density, 5580 MHz at 802.1 In, Chain 0 – 6.5 Mbps

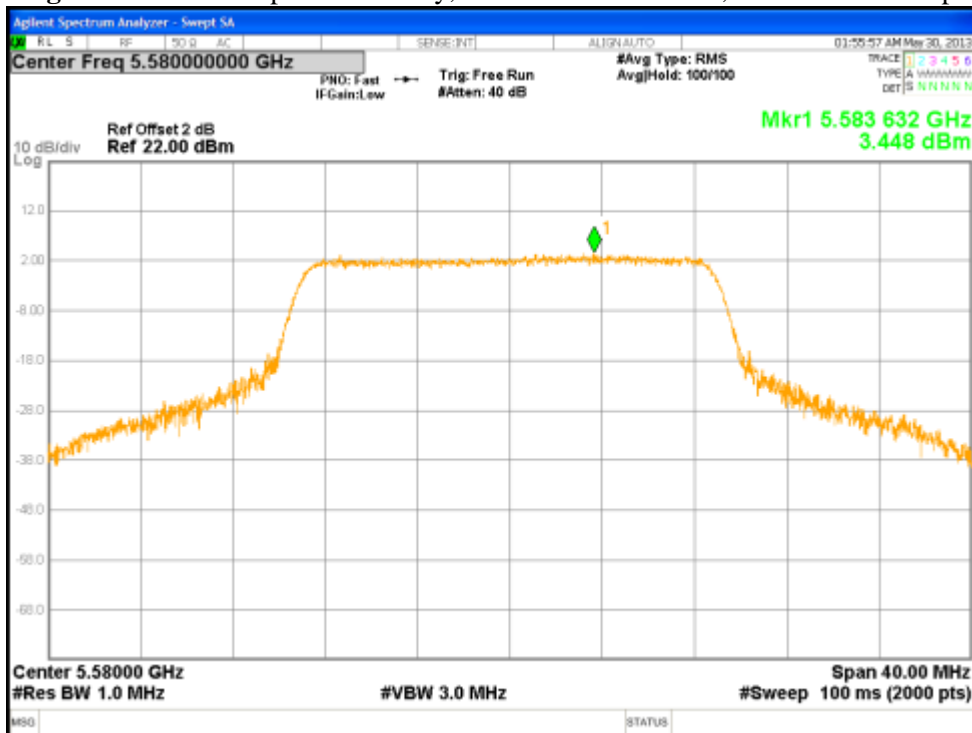


Figure 130: Power Spectral Density, 5580 MHz at 802.1 In, Chain 1 – 6.5 Mbps

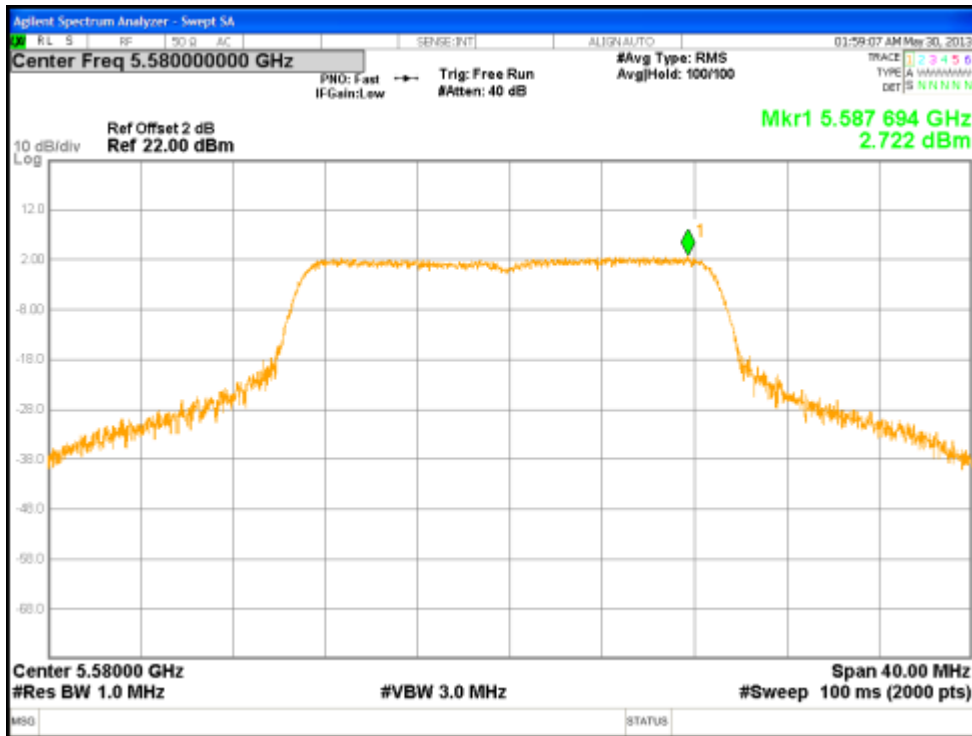


Figure 131: Power Spectral Density, 5580 MHz at 802.1 In, Chain 2 – 6.5 Mbps

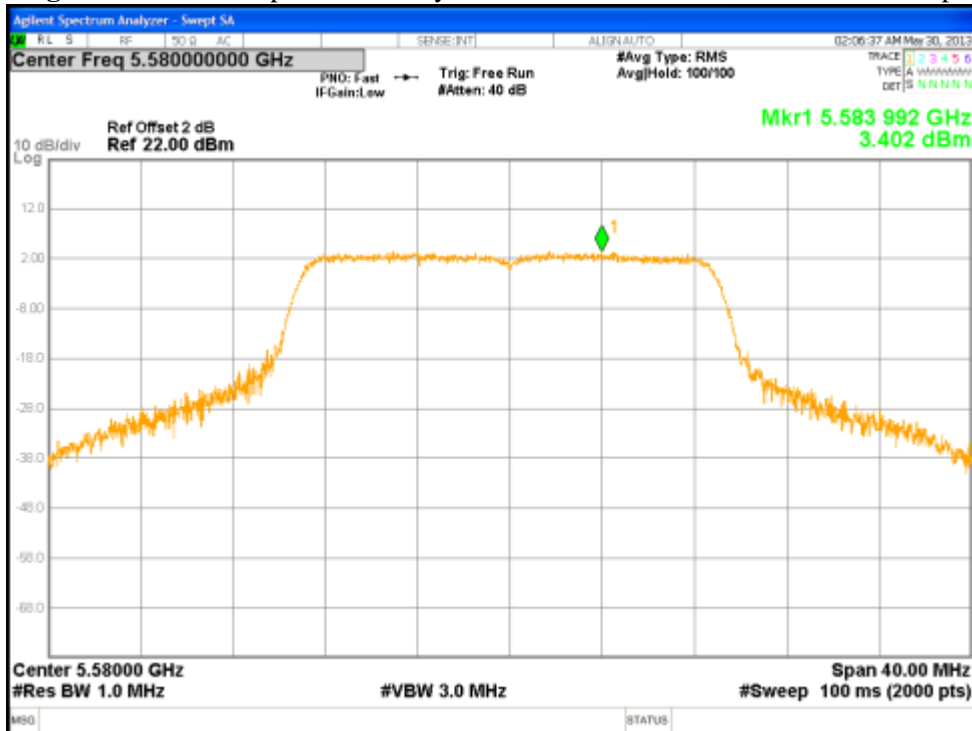


Figure 132: Power Spectral Density, 5580 MHz at 802.1 In, Chain 3 – 6.5 Mbps

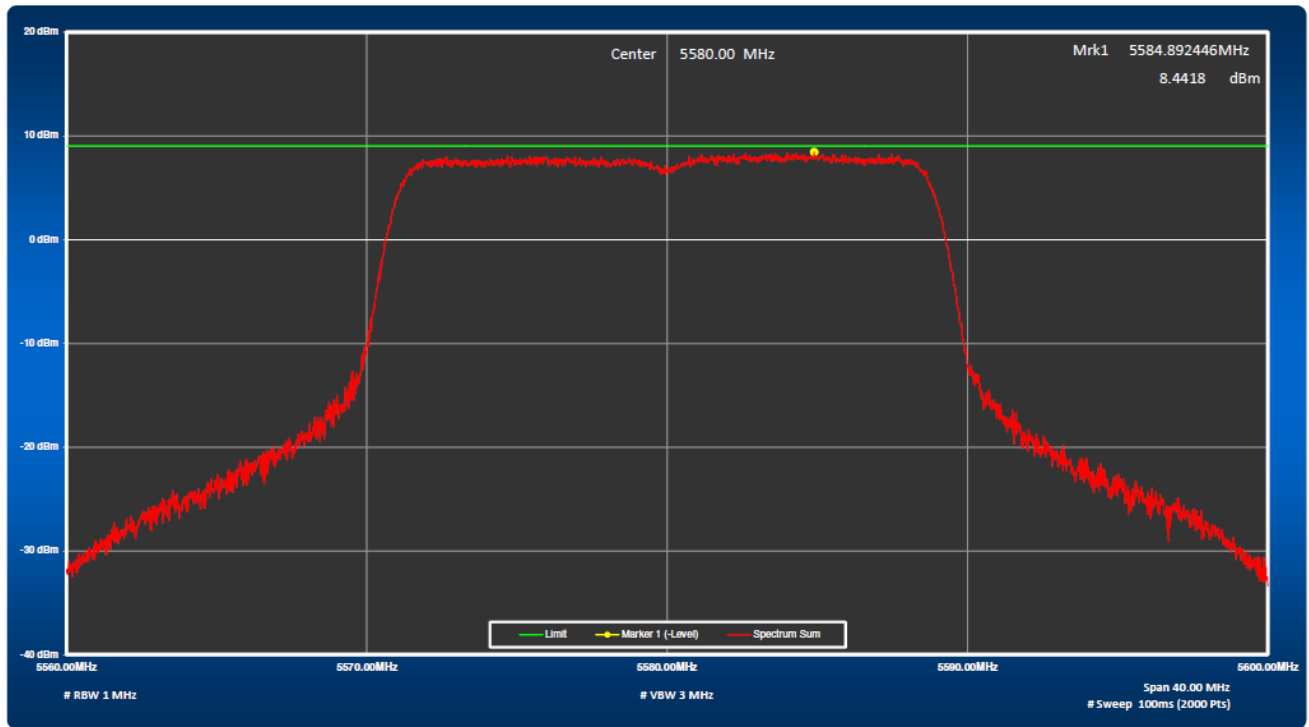


Figure 133: Total Sum of Power Spectral Density, 5580 MHz at 802.11n, 6.5 Mbps

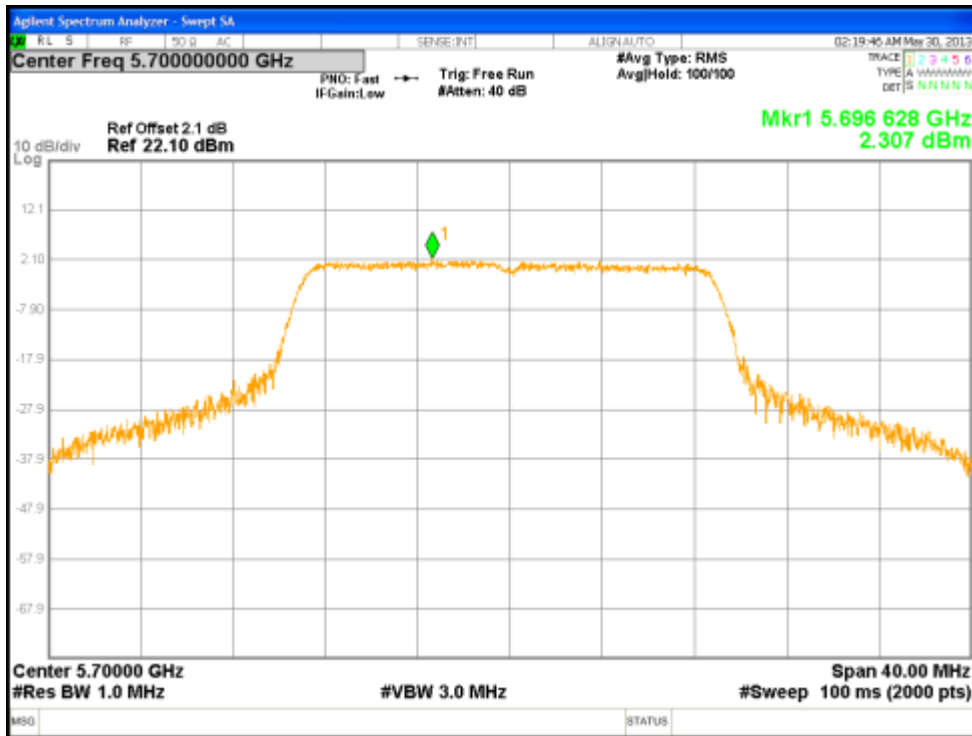


Figure 134: Power Spectral Density, 5700 MHz at 802.1 In, Chain 0 – 6.5 Mbps

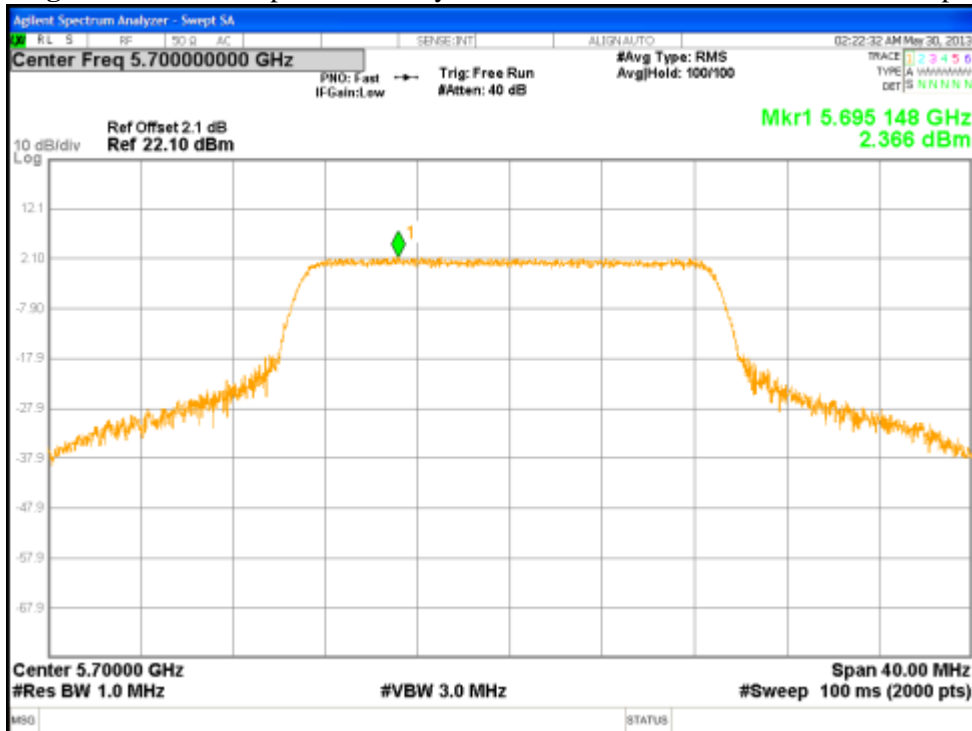


Figure 135: Power Spectral Density, 5700 MHz at 802.1 In, Chain 1 – 6.5 Mbps

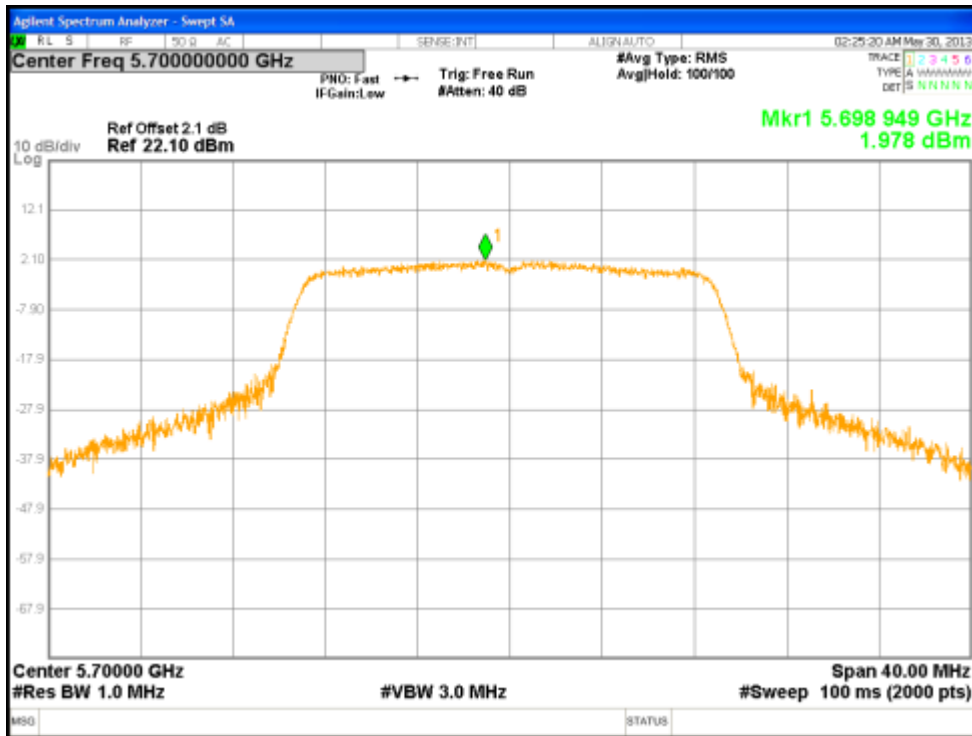


Figure 136: Power Spectral Density, 5700 MHz at 802.1 In, Chain 2 – 6.5 Mbps

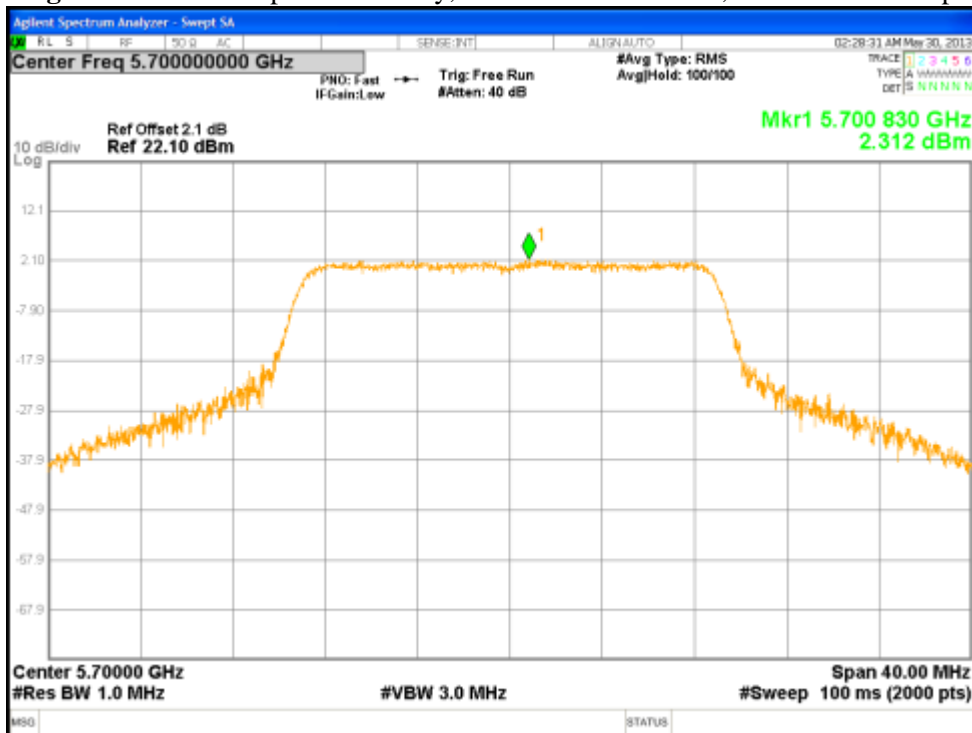


Figure 137: Power Spectral Density, 5700 MHz at 802.1 In, Chain 3 – 6.5 Mbps

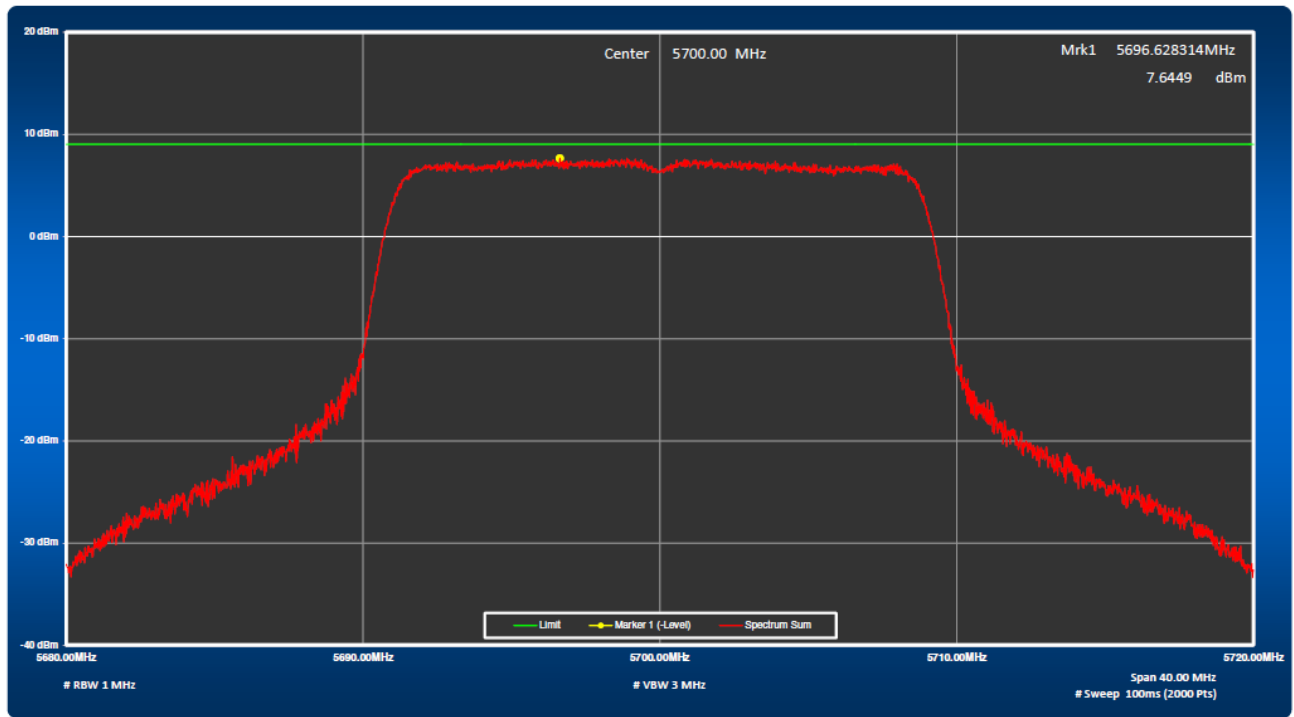


Figure 138: Total Sum of Power Spectral Density, 5700 MHz at 802.11n, 6.5 Mbps

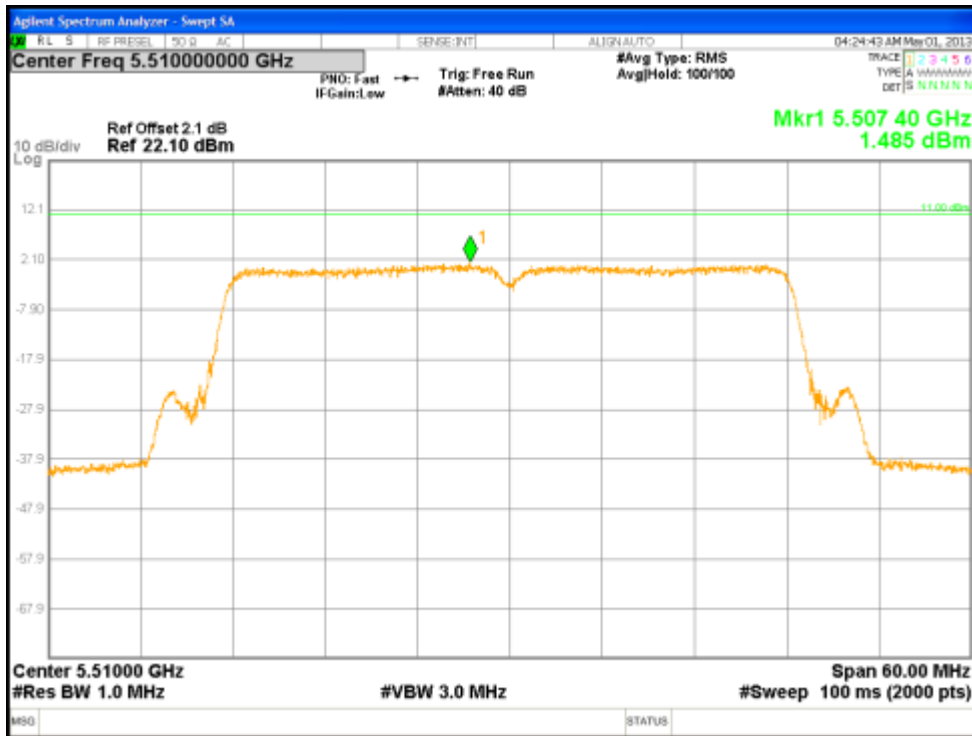


Figure 139: Power Spectral Density, 5510 MHz at 802.11n, Chain 0 – 13.5 Mbps



Figure 140: Power Spectral Density, 5510 MHz at 802.11n, Chain 1 – 13.5 Mbps

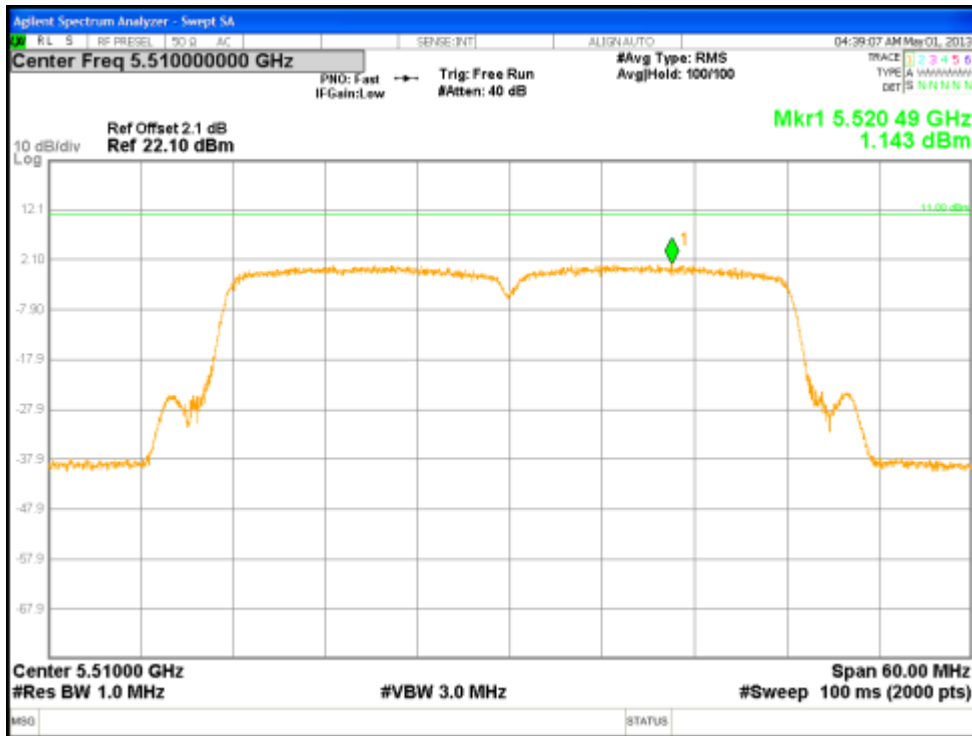


Figure 141: Power Spectral Density, 5510 MHz at 802.11n, Chain 2 – 13.5 Mbps

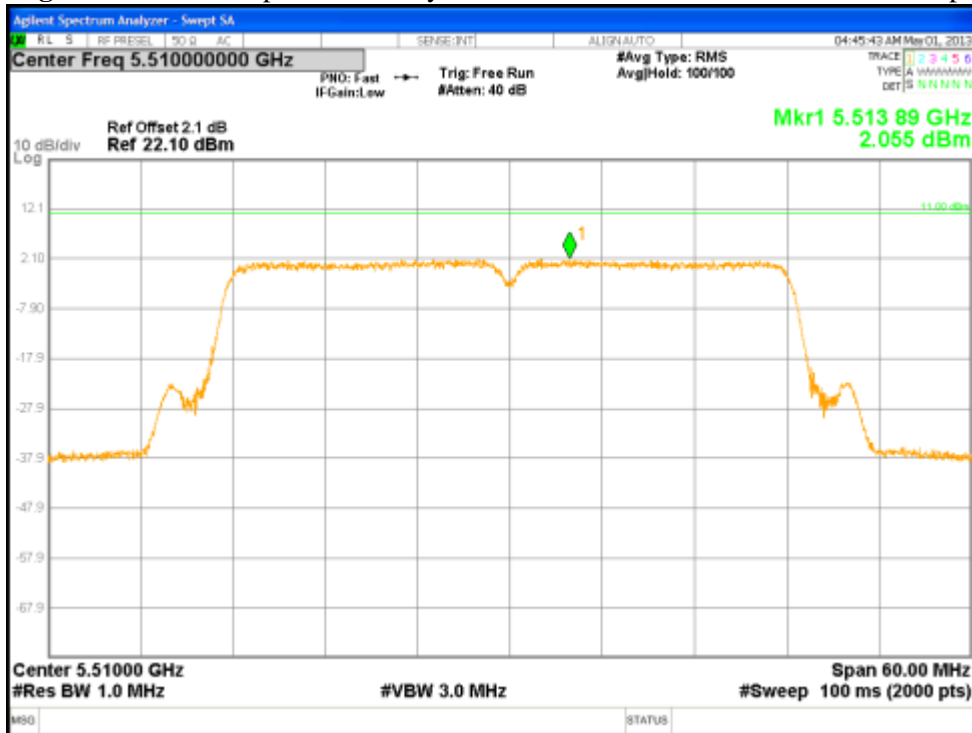


Figure 142: Power Spectral Density, 5510 MHz at 802.11n, Chain 3 – 13.5 Mbps

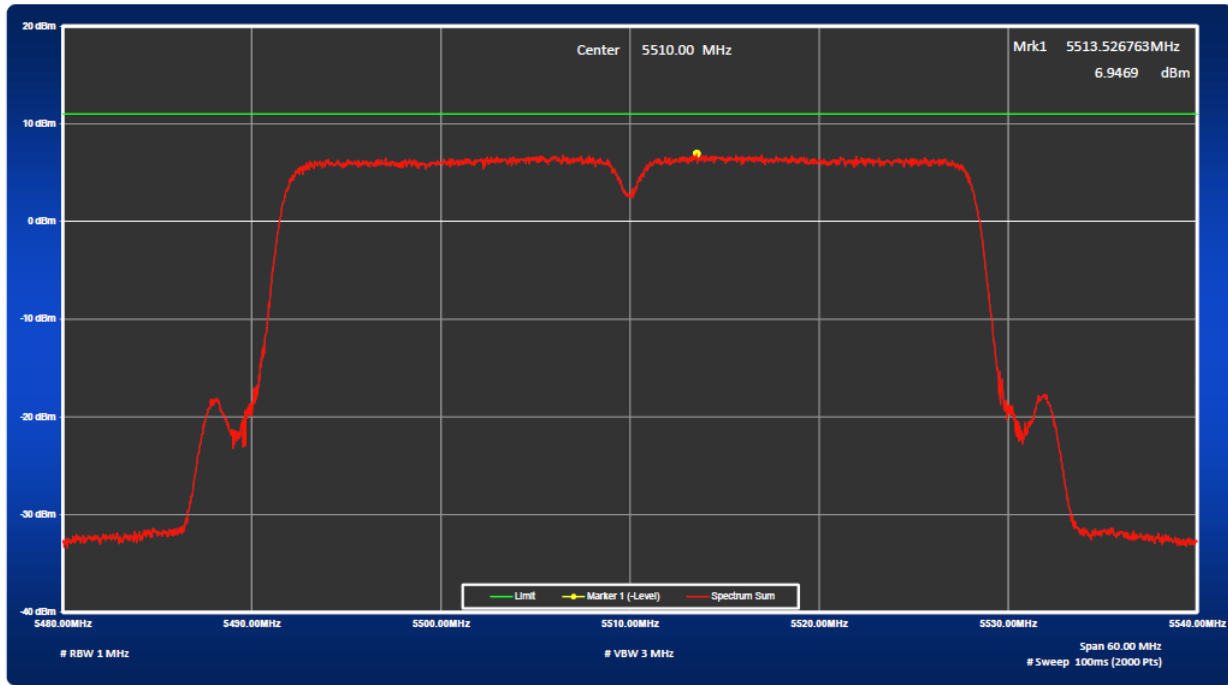


Figure 143: Total Sum of Power Spectral Density, 5510 MHz at 802.11n, 13.5 Mbps

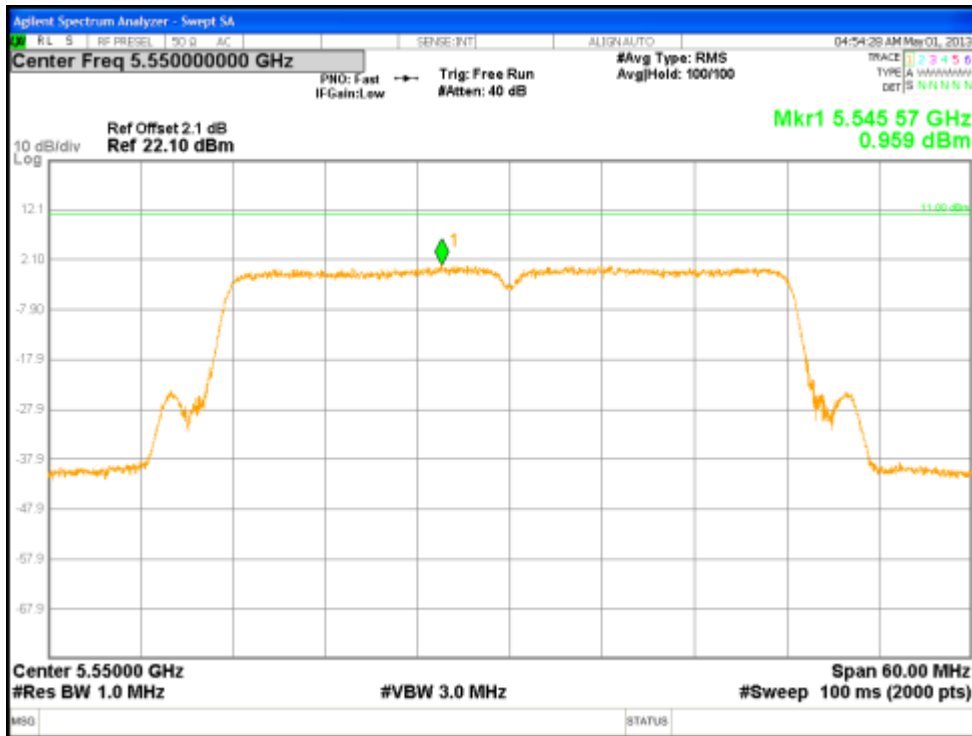


Figure 144: Power Spectral Density, 5550 MHz at 802.11n, Chain 0 – 13.5 Mbps

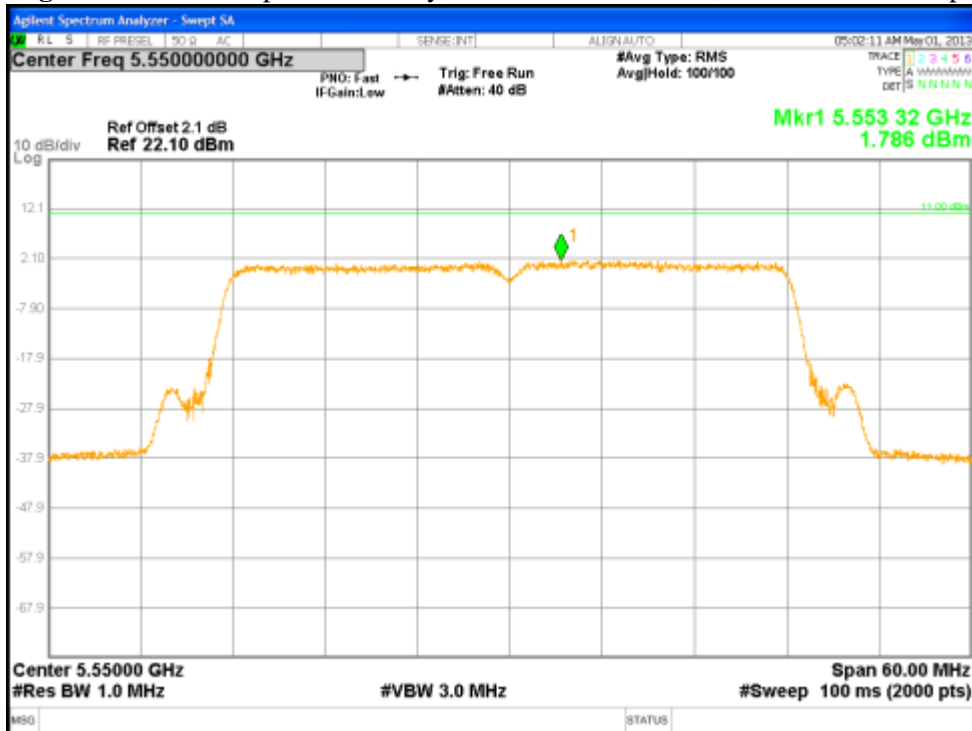


Figure 145: Power Spectral Density, 5550 MHz at 802.11n, Chain 1 – 13.5 Mbps

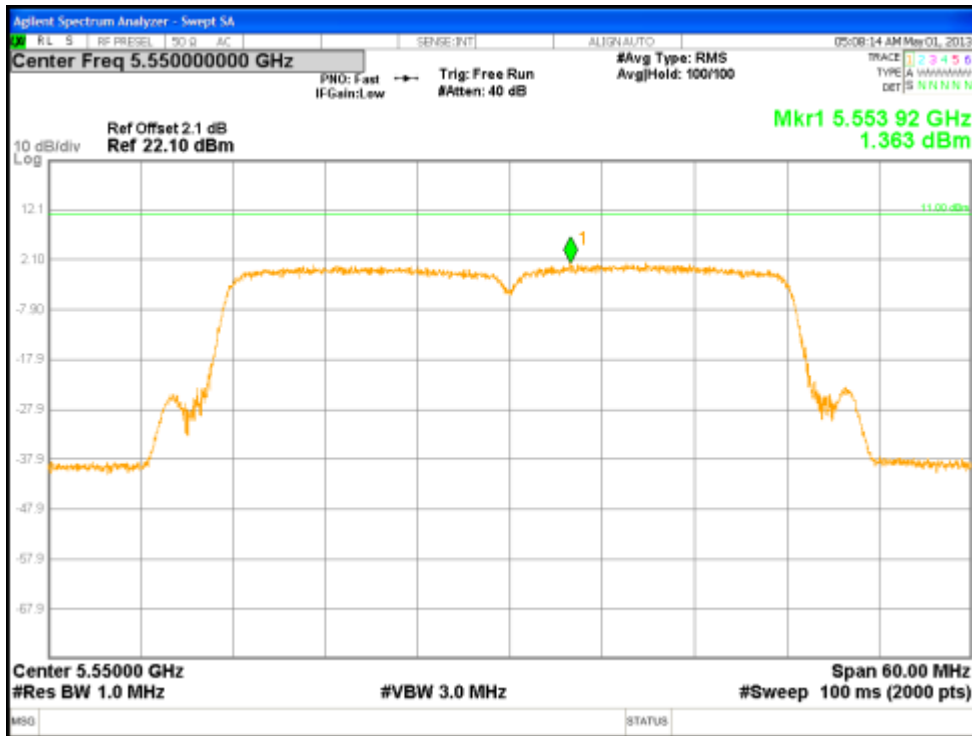


Figure 146: Power Spectral Density, 5550 MHz at 802.11n, Chain 2 – 13.5 Mbps

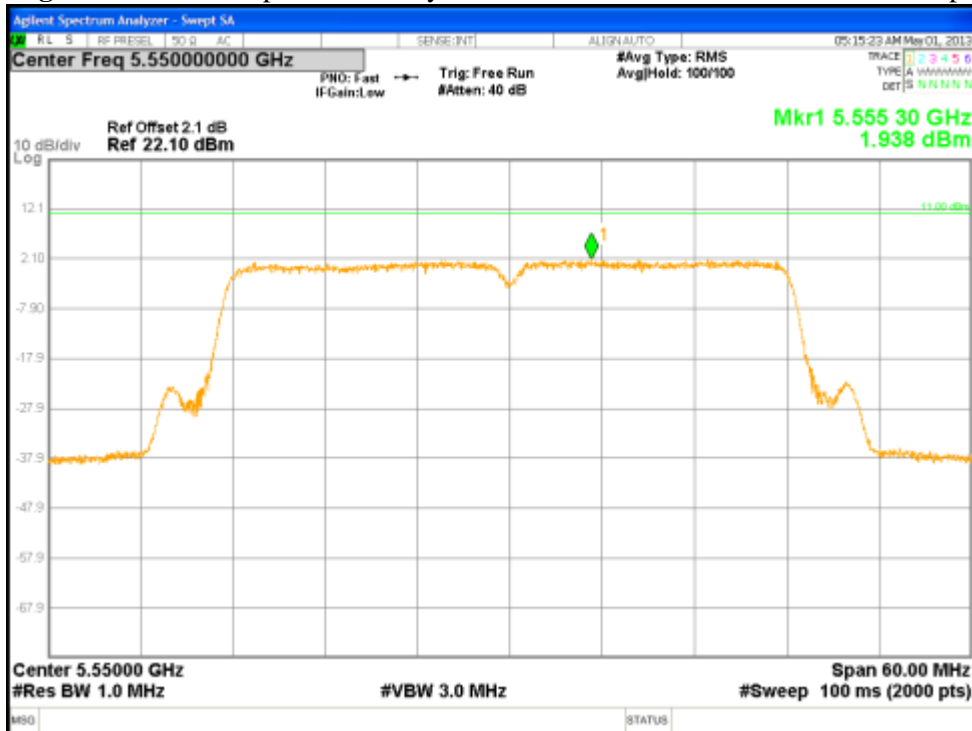


Figure 147: Power Spectral Density, 5550 MHz at 802.11n, Chain 3 – 13.5 Mbps

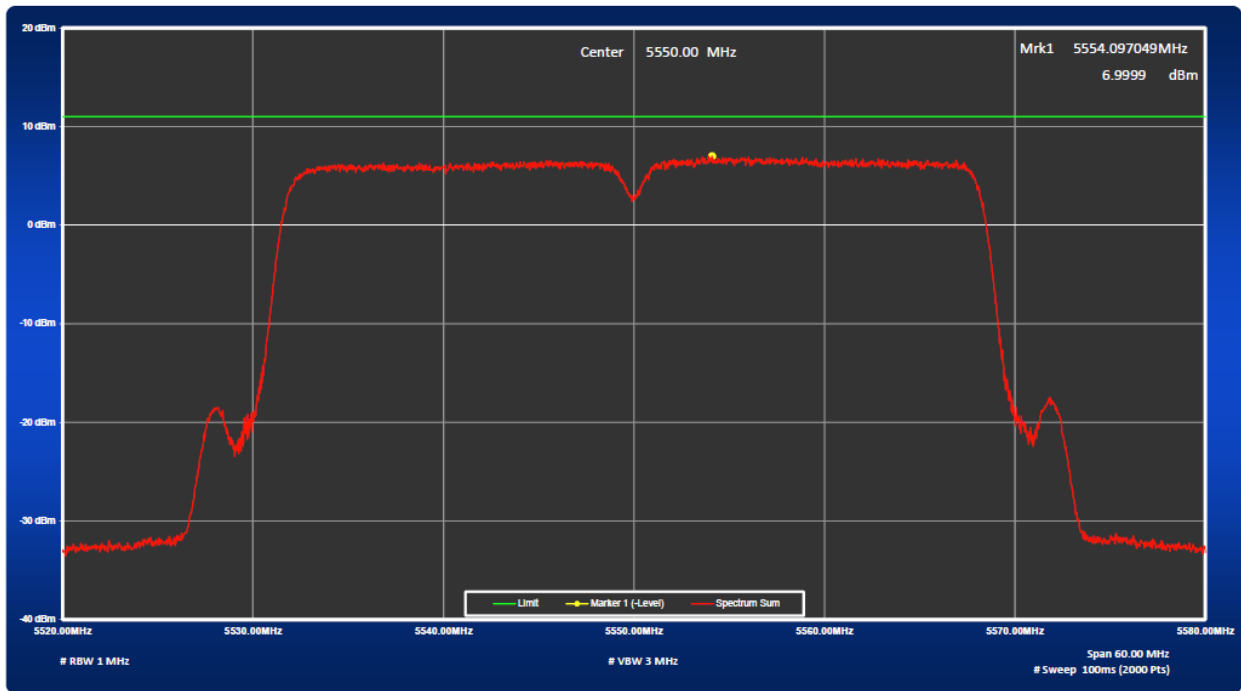


Figure 148: Total Sum of Power Spectral Density, 5550 MHz at 802.11n, 13.5 Mbps

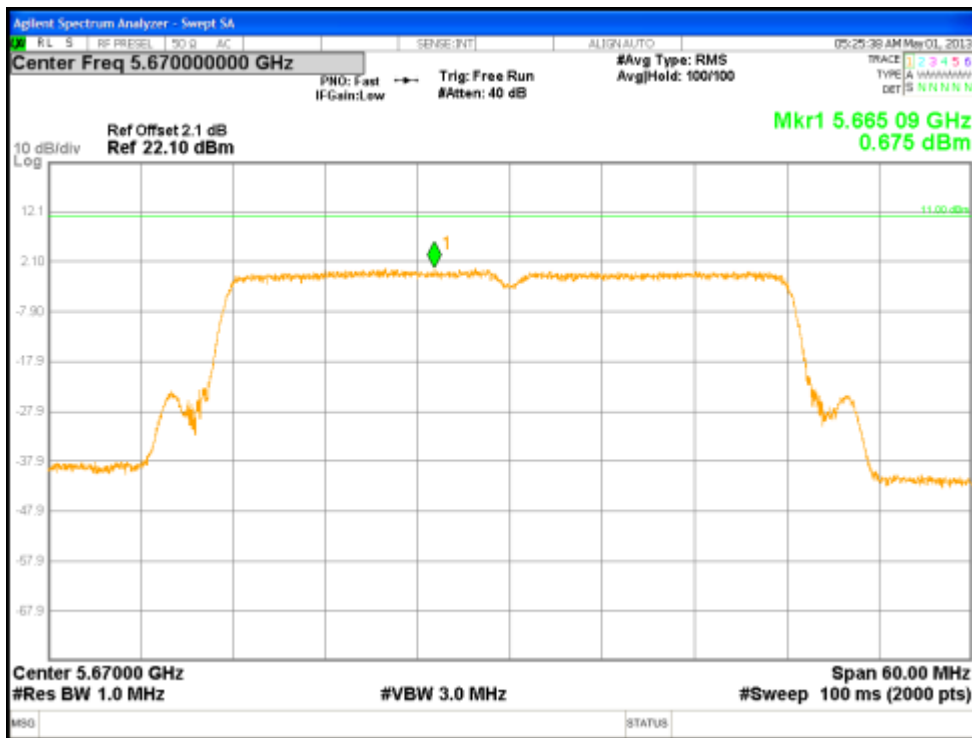


Figure 149: Power Spectral Density, 5670 MHz at 802.11n, Chain 0 – 13.5 Mbps

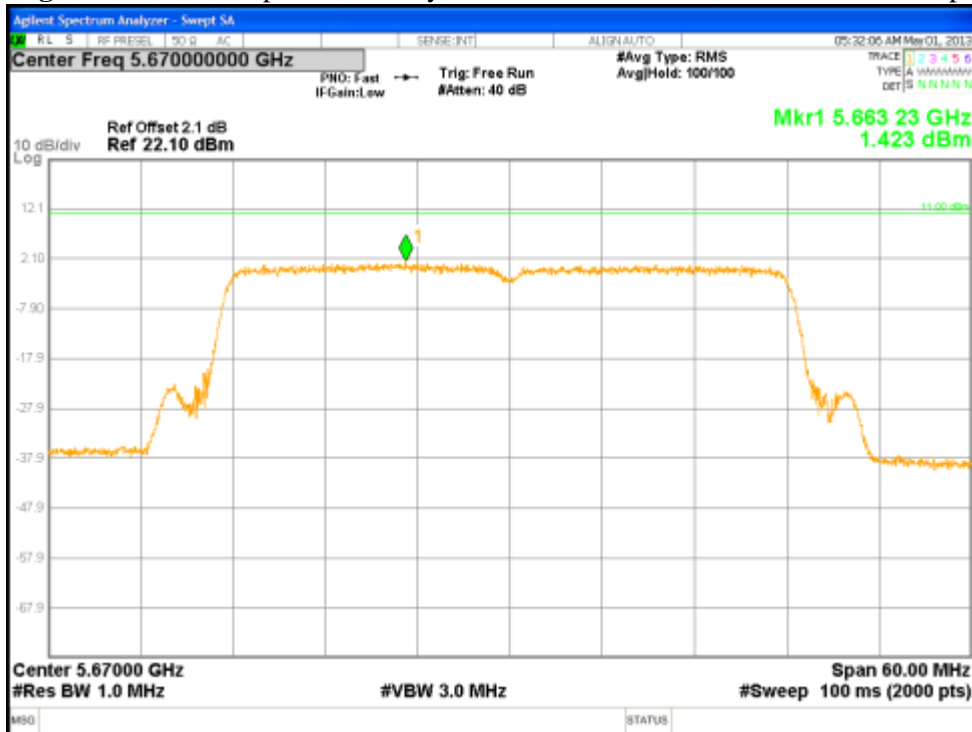


Figure 150: Power Spectral Density, 5670 MHz at 802.11n, Chain 1 – 13.5 Mbps

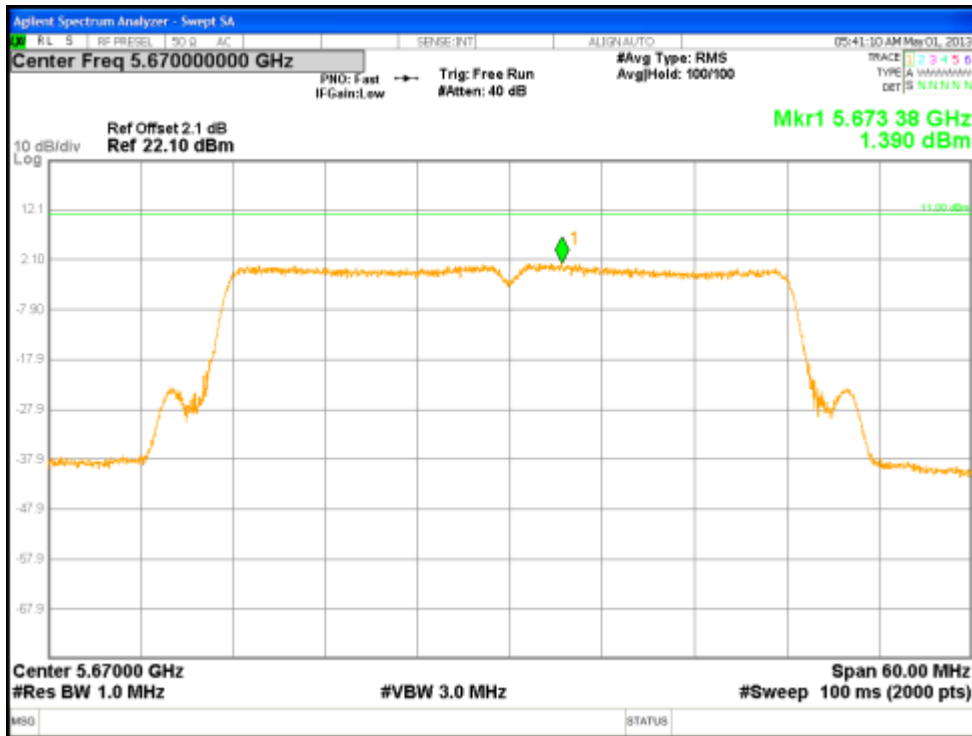


Figure 151: Power Spectral Density, 5670 MHz at 802.11n, Chain 2 – 13.5 Mbps



Figure 152: Power Spectral Density, 5670 MHz at 802.11n, Chain 3 – 13.5 Mbps

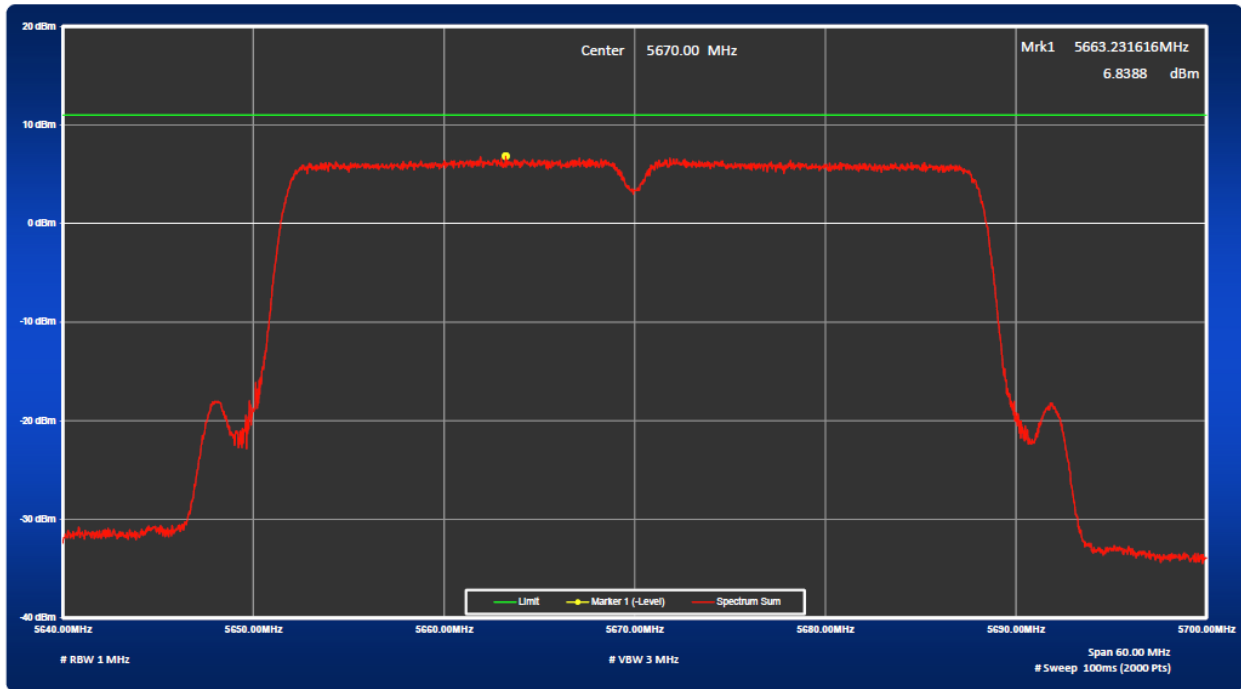


Figure 153: Total Sum of Power Spectral Density, 5670MHz at 802.11n, 13.5 Mbps

4.5 Transmitter Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.407(b), RSS 210 Sect. A.9.2

4.5.1 Test Methodology

4.5.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pres-scans were performed to determine the worst axis, data rate/ chains.

4.5.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

The final scan for 30 MHz to 1 GHz was performed at 5580 MHz, 6.5 Mbit/s .

The above 1 GHz final scans performed on the worst axis, Y-Axis, for three operating channels;

6 Mbit/s for 802.11a Mode: 5500 MHz, 5580 MHz, 5700 MHz

6.5 Mbit/s for 802.11n HT20 Mode: 5500 MHz, 5580 MHz, 5700 MHz

13.5 Mbit/s for 802.11n HT40 Mode: 5510 MHz, 5550 MHz, 5670 MHz.

4.5.1.3 Deviations

None.

4.5.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2012 and RSS 210 A1.1.2 2010.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

According to CFR47 15.407 (b), all harmonics and spurious emissions which are outside the 5150 MHz - 5250 MHz, 5250 MHz – 5350 MHz, or 5470 MHz – 5725MHz shall not exceed -27 dBm/MHz. This is equivalent to 68.2 dBuV/m at 3 meter distance.

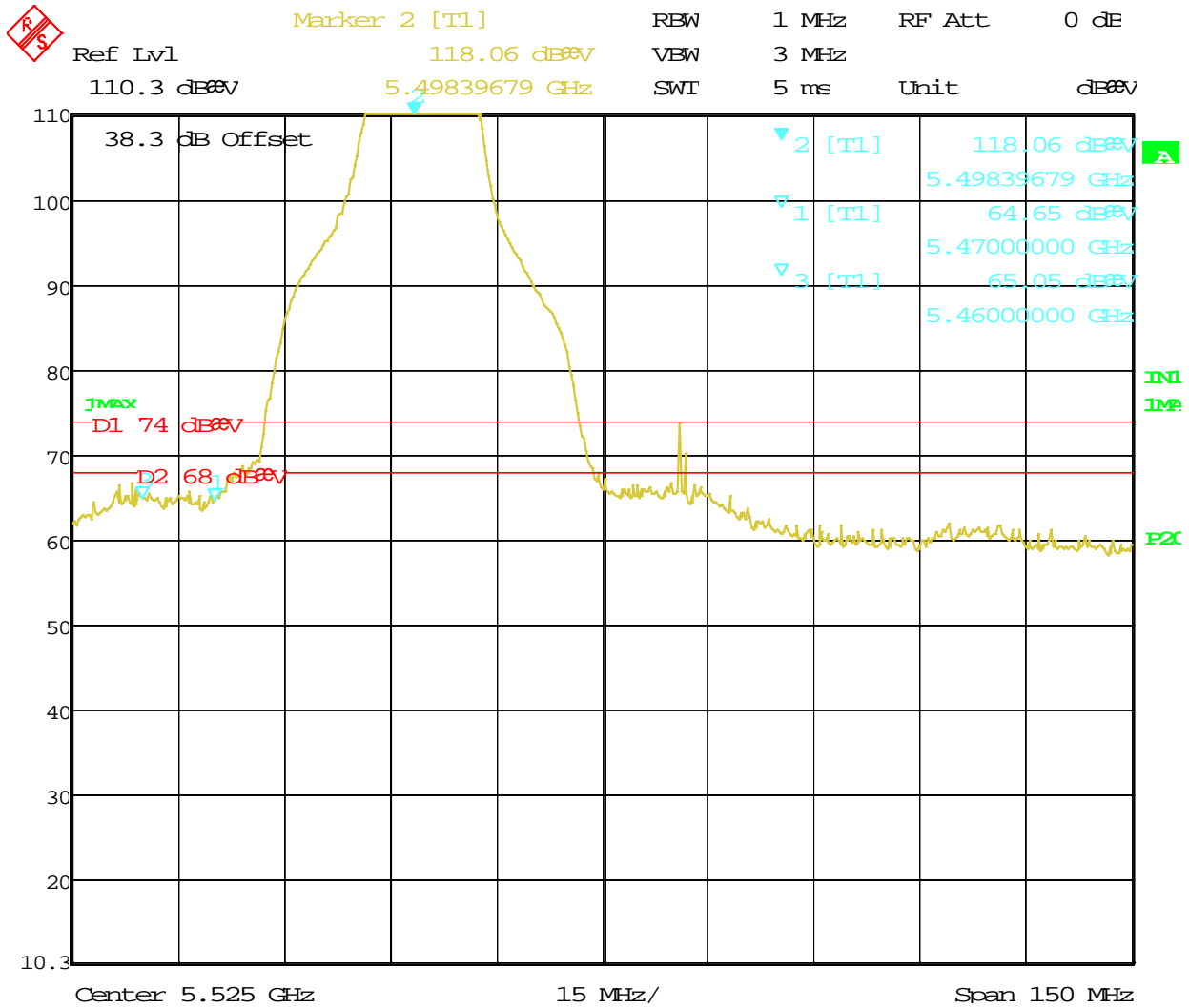
4.5.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

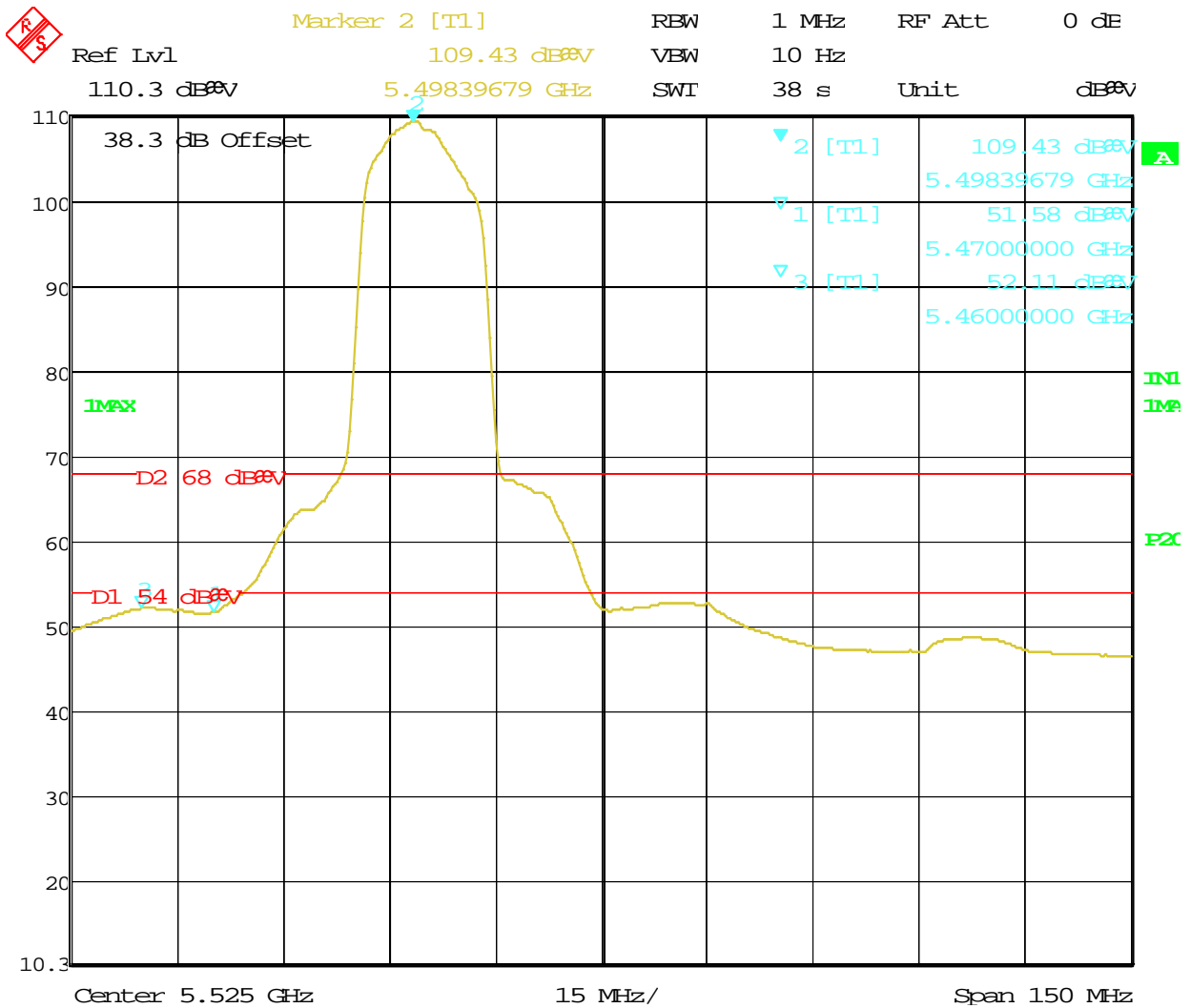
Table 7: Transmit Spurious Emission at Band-Edge Requirements

Test Conditions: Radiated Measurement, Normal Temperature and Voltage only								
Antenna Type: Integrated				Power Setting: See test plan				
Max. Directional Gain: +8.0 dBi				Signal State: Modulated at 100%				
Ambient Temp.: 23 °C				Relative Humidity: 31%				
Band-Edge Results								
Freq. (MHz)	Level (dBuV/m)	Polarity (H/V)	Limit (dBuV/m)	Margin (dB)	Det.	Table Deg.	Tower (cm)	Note
5470	64.65	H	74.00	-9.35	Pk	280	222	11a-5500 MHz-18 dBm
5470	51.58	H	54.00	-2.42	Ave	280	222	11a-5500 MHz-18 dBm
5470	69.56	V	74.00	-4.44	Pk	184	135	11a-5500 MHz-18 dBm
5470	53.60	V	54.00	-0.40	Ave	184	135	11a-5500 MHz-18 dBm
5725	68.18	V	74.00	-5.82	Pk	261	170	11a-5500 MHz-15dBm
5725	52.66	V	54.00	-1.34	Ave	261	170	11a-5500 MHz-15dBm
5725	60.57	H	74.00	-13.43	Pk	283	190	11a-5500 MHz-15dBm
5725	48.42	H	54.00	-5.58	Ave	283	190	11a-5500 MHz-15dBm
5470	69.05	V	74.00	-4.95	Pk	176	103	HT20-5500 MHz-17dBm
5470	52.99	V	54.00	-1.01	Ave	176	103	HT20-5500 MHz-17dBm
5470	65.21	H	74.00	-8.79	Pk	260	311	HT20-5500 MHz-17dBm
5470	47.36	H	54.00	-6.64	Ave	260	311	HT20-5500 MHz-17dBm
5725	64.14	H	74.00	-9.86	Pk	248	274	HT20-5700 MHz-18 dBm
5725	50.49	H	54.00	-3.51	Ave	248	274	HT20-5700 MHz-18 dBm
5725	66.18	V	74.00	-7.82	Pk	107	127	HT20-5700 MHz-18 dBm
5725	52.99	V	54.00	-1.01	Ave	107	127	HT20-5700 MHz-18 dBm
5470	67.98	V	74.00	-6.02	Pk	232	115	HT40-5510 MHz-17dBm
5470	53.61	V	54.00	-0.39	Ave	232	115	HT40-5510 MHz-17dBm
5468	69.16	H	74.00	-4.84	Pk	269	309	HT40-5510 MHz-16 dBm
5468	53.74	H	54.00	-0.26	Ave	269	309	HT40-5510 MHz-16 dBm
5725	65.64	H	74.00	-8.36	Pk	254	167	HT40-5670 MHz-18 dBm
5725	51.29	H	54.00	-2.71	Ave	254	167	HT40-5670 MHz-18 dBm
5725	65.26	V	74.00	-8.74	Pk	158	101	HT40-5670 MHz-18 dBm
5725	51.42	V	54.00	-2.58	Ave	158	101	HT40-5670 MHz-18 dBm
<p>Note:</p> <ol style="list-style-type: none"> 1. Band-edge frequency at 5460 MHz is at the restricted band. 2. All the band-edge measurements met the restricted band requirements of CFR47 15.205. 3. It is also complied with the -27 dBm/MHz (68.2 dBuV/m at 3m) requirements as stated in CFR47 15.407 (b) (1) to 15.407 (b) (3). 								



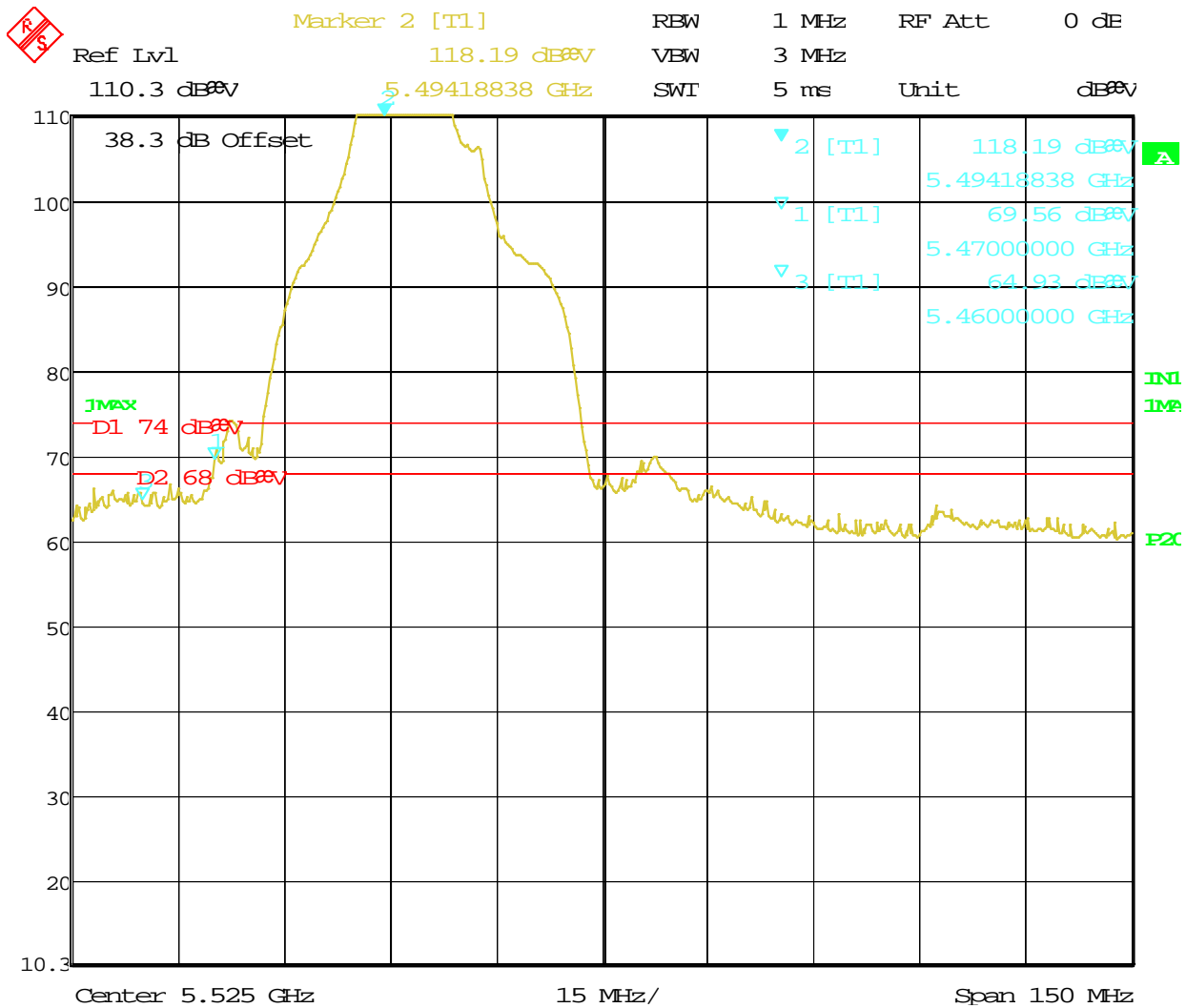
Date: 16.AUG.2013 21:18:30

Figure 154: Radiated Emission at the Edge for Channel 5500 MHz at 6Mbps – Horz. (Peak)



Date: 16.AUG.2013 21:19:42

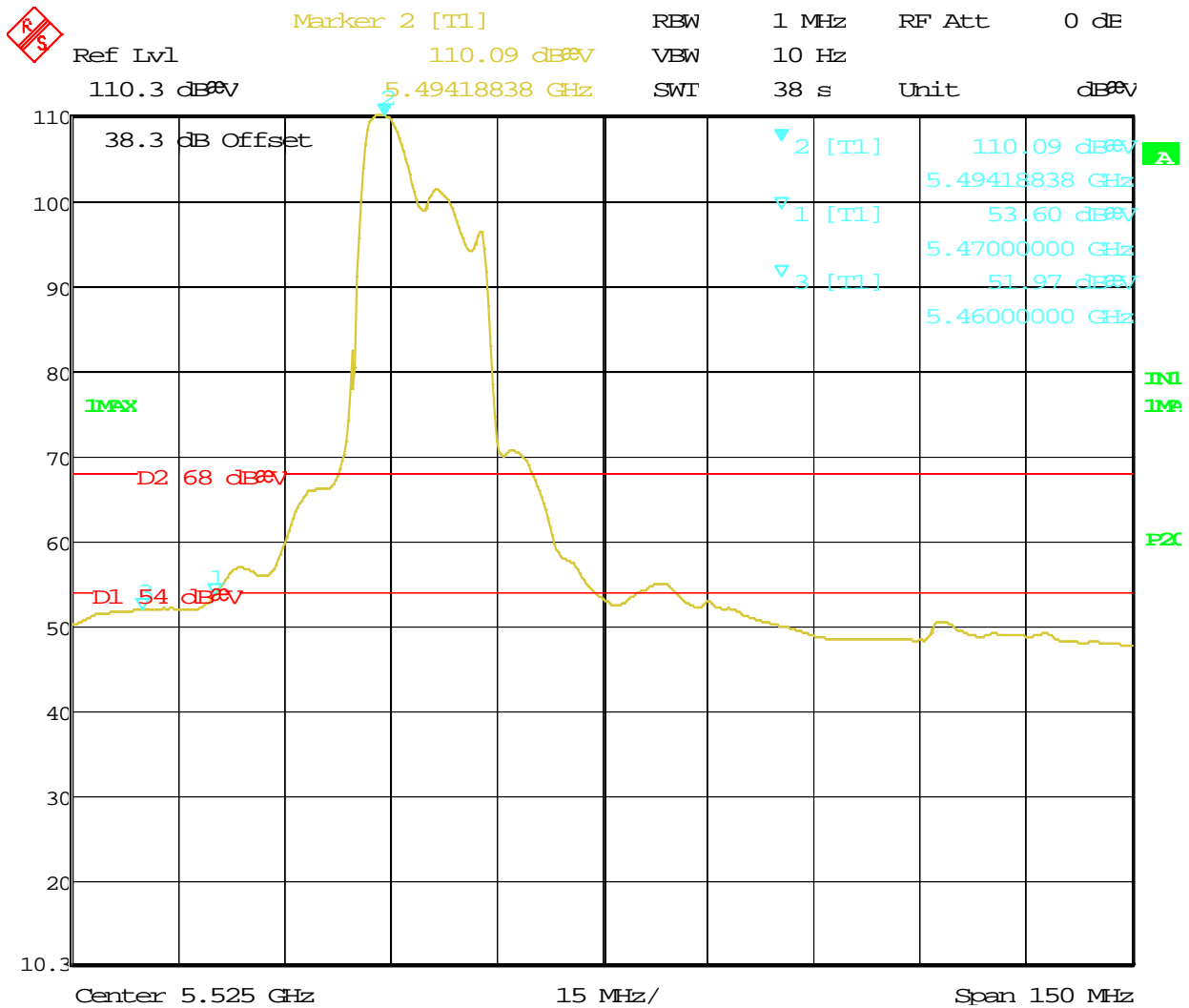
Figure 155: Radiated Emission at the Edge for Channel 5500 MHz at 6Mbps – Horz. (Ave.)



Date: 16.AUG.2013 21:13:43

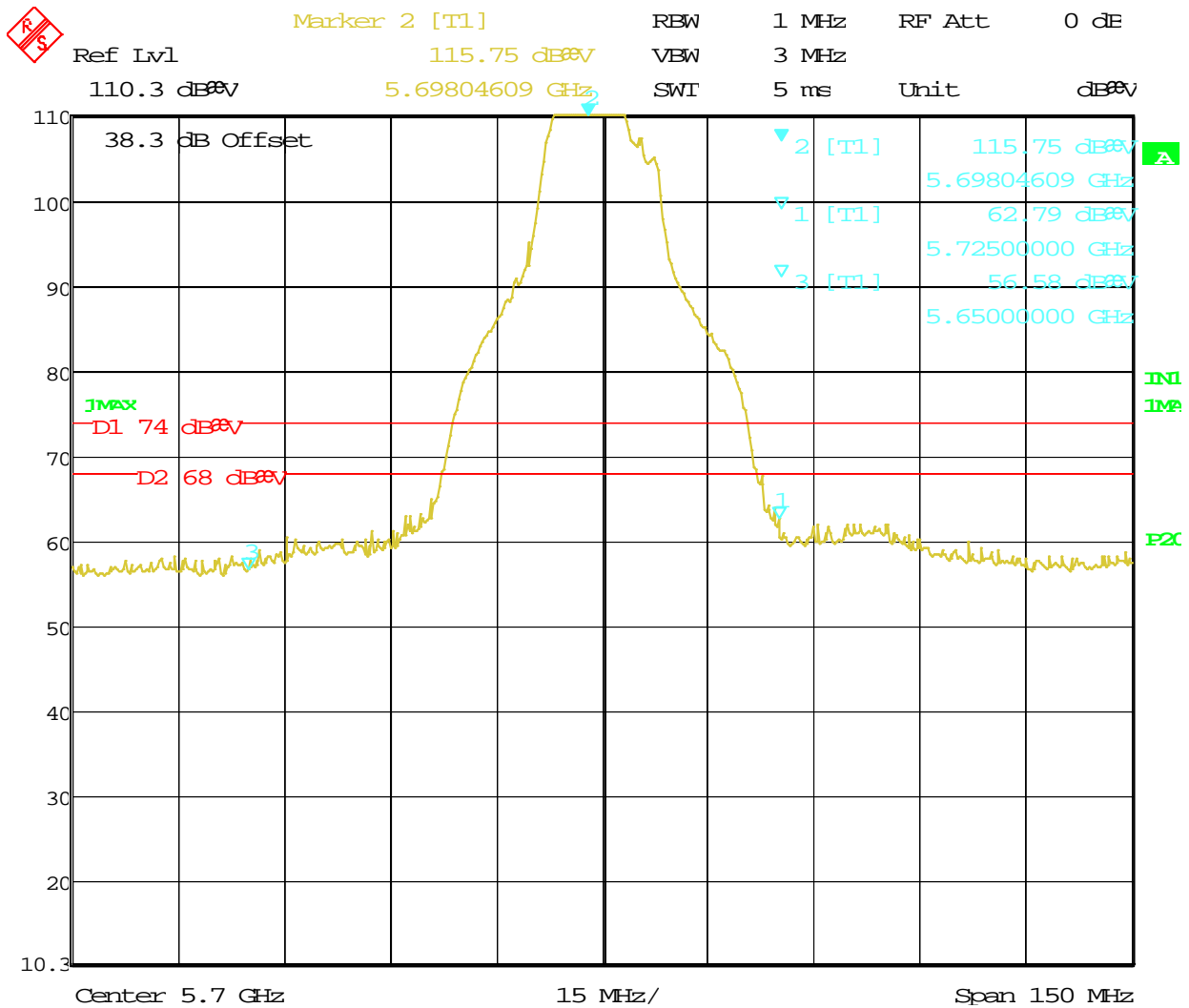
Figure 156: Radiated Emission at the Edge for Channel 5500 MHz at 6Mbps – Vert. (Peak)

Note: The bandedge at 5470 MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 156 and Fig. 157.



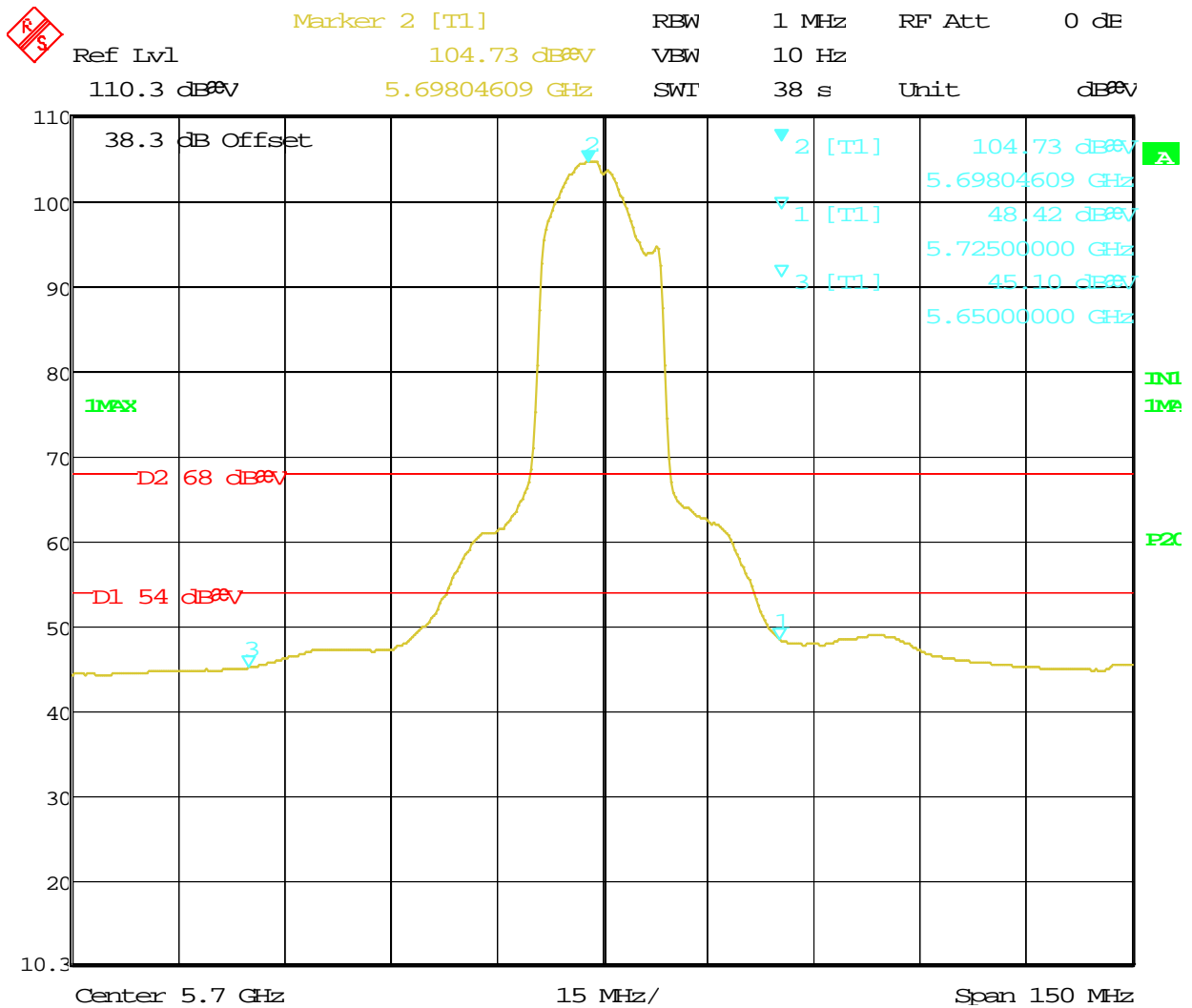
Date: 16.AUG.2013 21:14:49

Figure 157: Radiated Emission at the Edge for Channel 5500 MHz at 6Mbps – Vert. (Ave.)



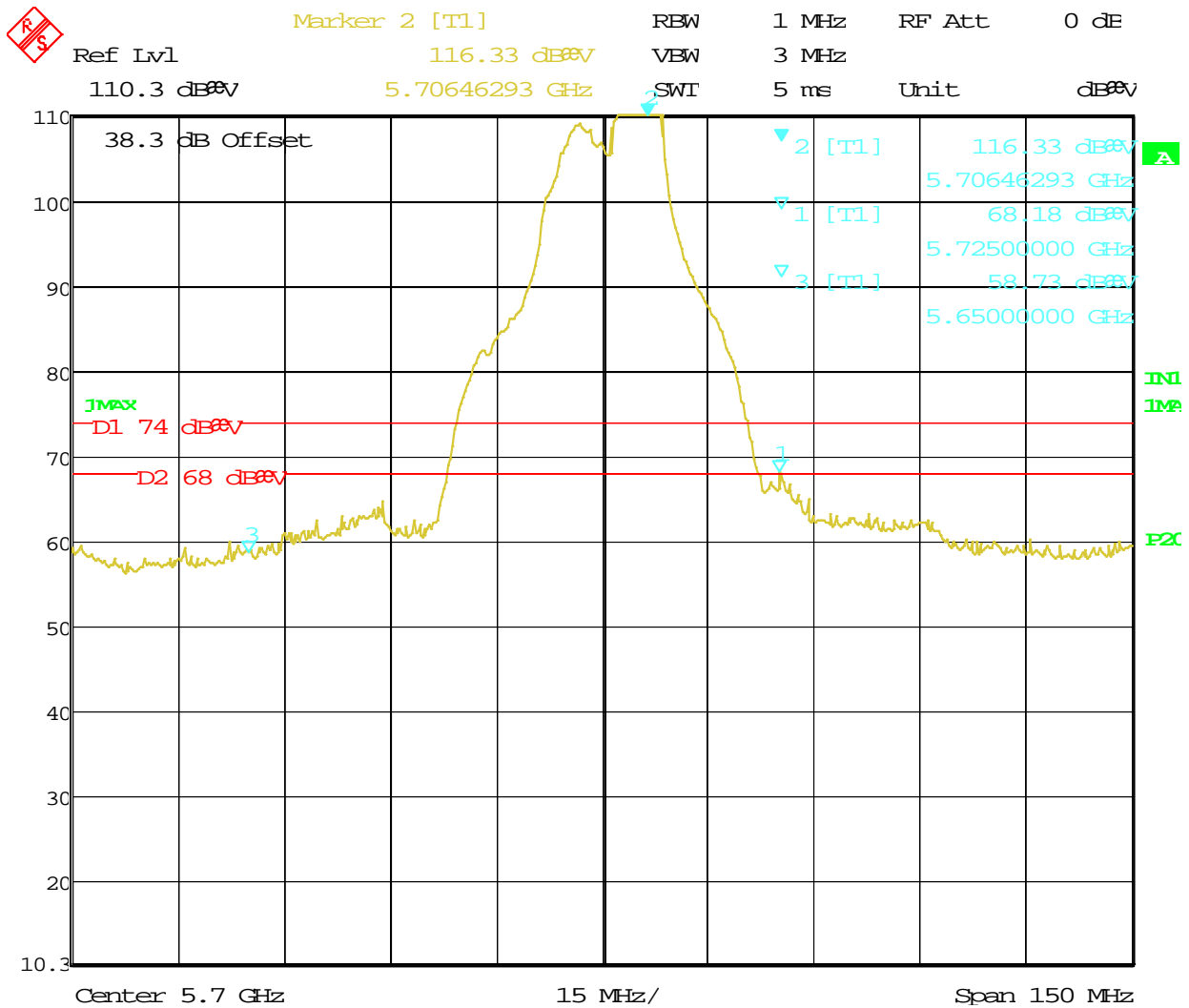
Date: 16.AUG.2013 22:28:00

Figure 158: Radiated Emission at the Edge for Channel 5700 MHz at 6Mbps – Horz. (Peak)



Date: 16.AUG.2013 22:29:33

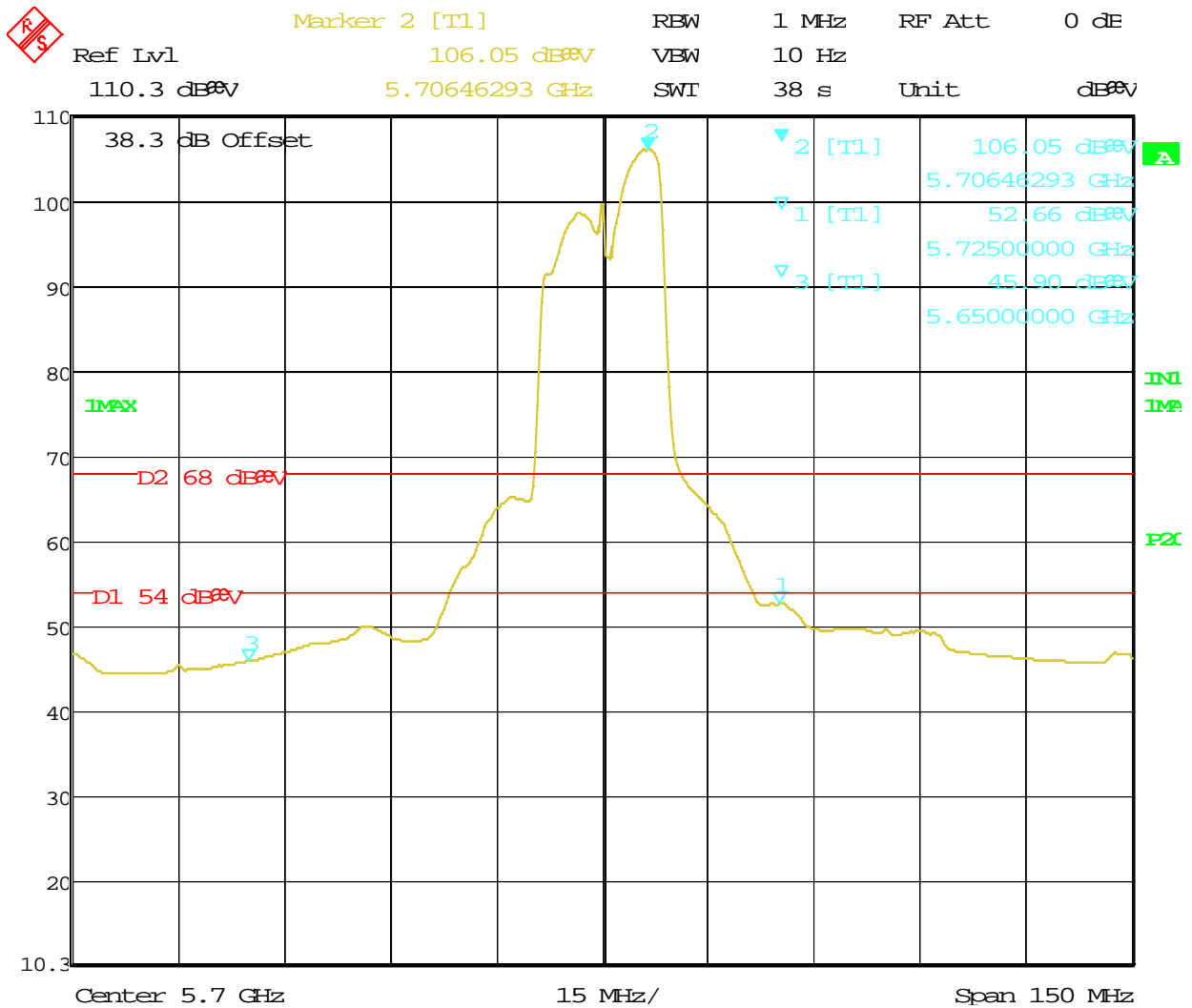
Figure 159: Radiated Emission at the Edge for Channel 5700 MHz at 6Mbps – Horz. (Ave.)



Date: 16.AUG.2013 22:13:44

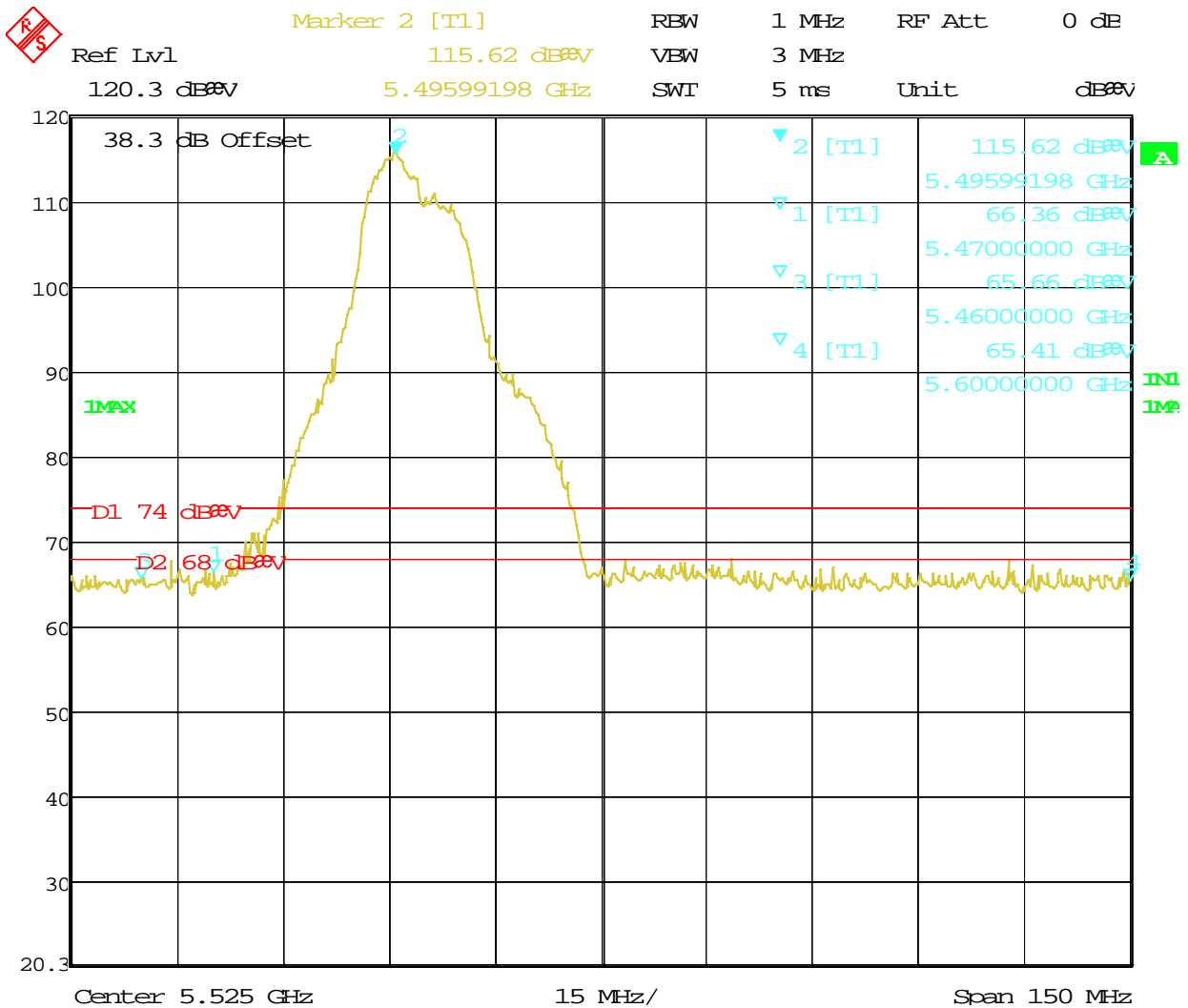
Figure 160: Radiated Emission at the Edge for Channel 5700 MHz at 6Mbps – Vert. (Peak)

Note: The bandedge at 5725MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 160 and Fig. 161.



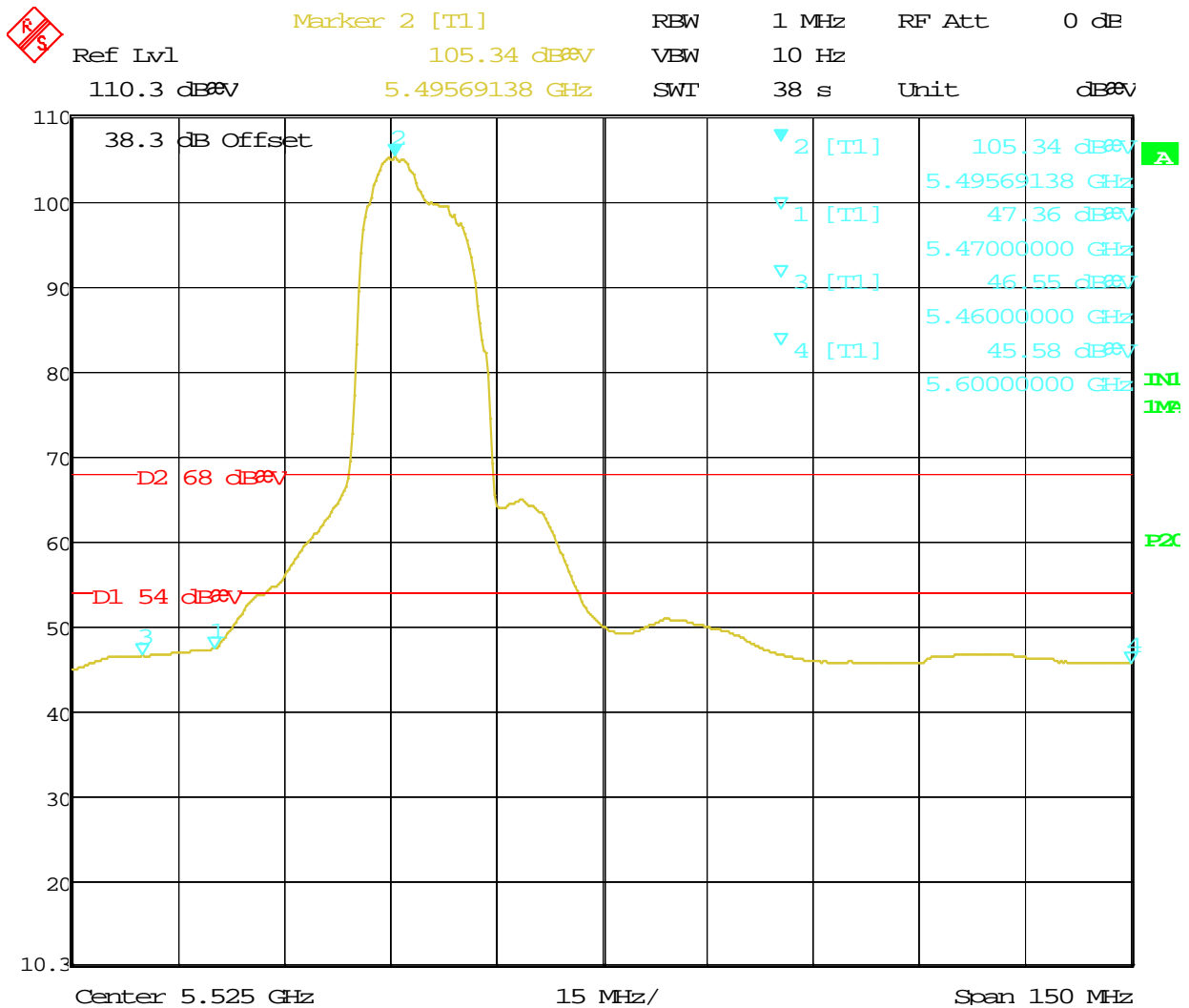
Date: 16.AUG.2013 22:13:07

Figure 161: Radiated Emission at the Edge for Channel 5700 MHz at 6Mbps – Vert. (Ave.)



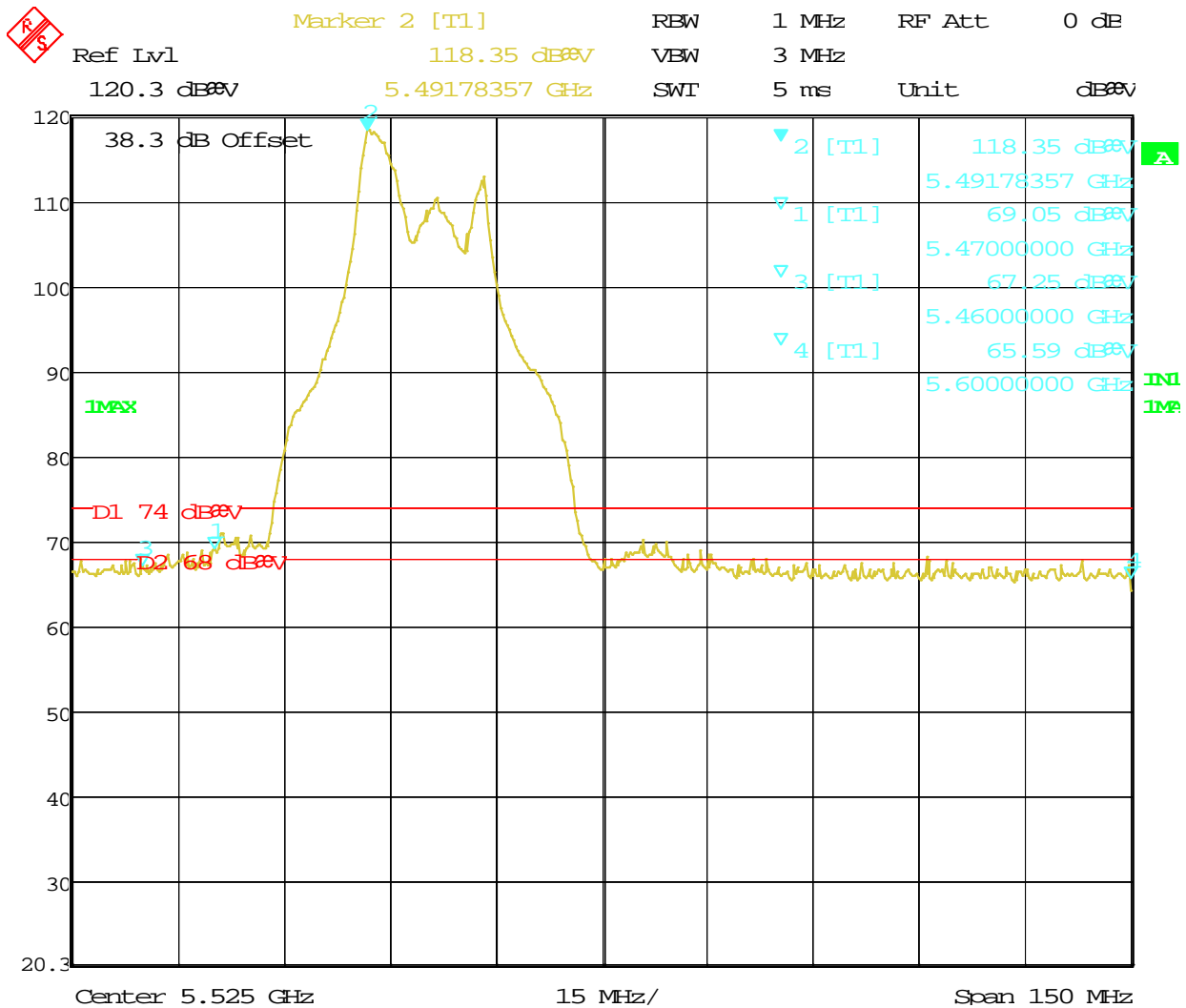
Date: 14.MAY.2013 14:31:45

Figure 162: Radiated Emission at the Edge for Channel 5500 MHz at 6.5Mbps – Horz. (Peak)



Date: 14.MAY.2013 14:33:11

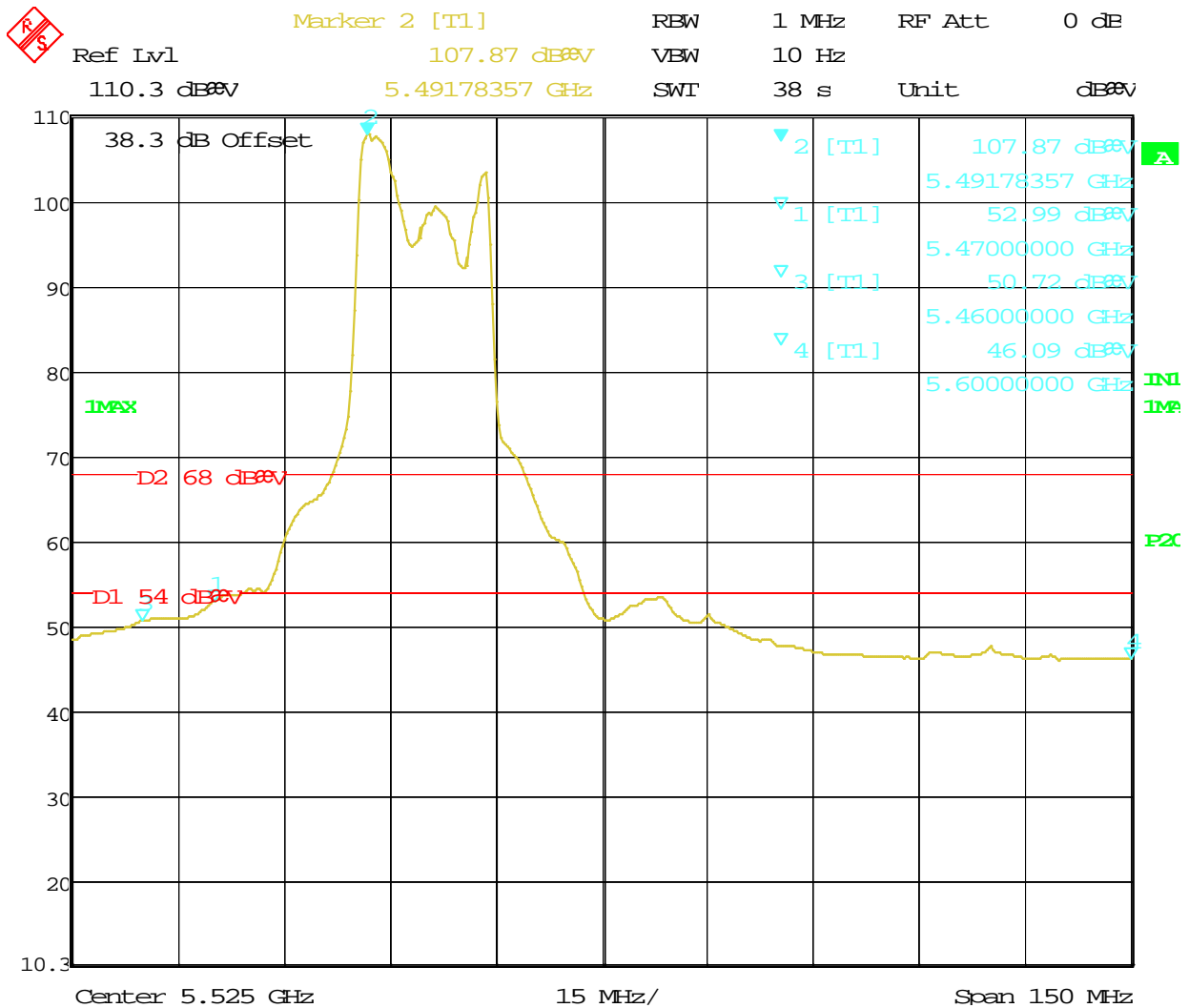
Figure 163: Radiated Emission at the Edge for Channel 5500 MHz at 6.5Mbps – Horz. (Ave.)



Date: 14.MAY.2013 14:25:44

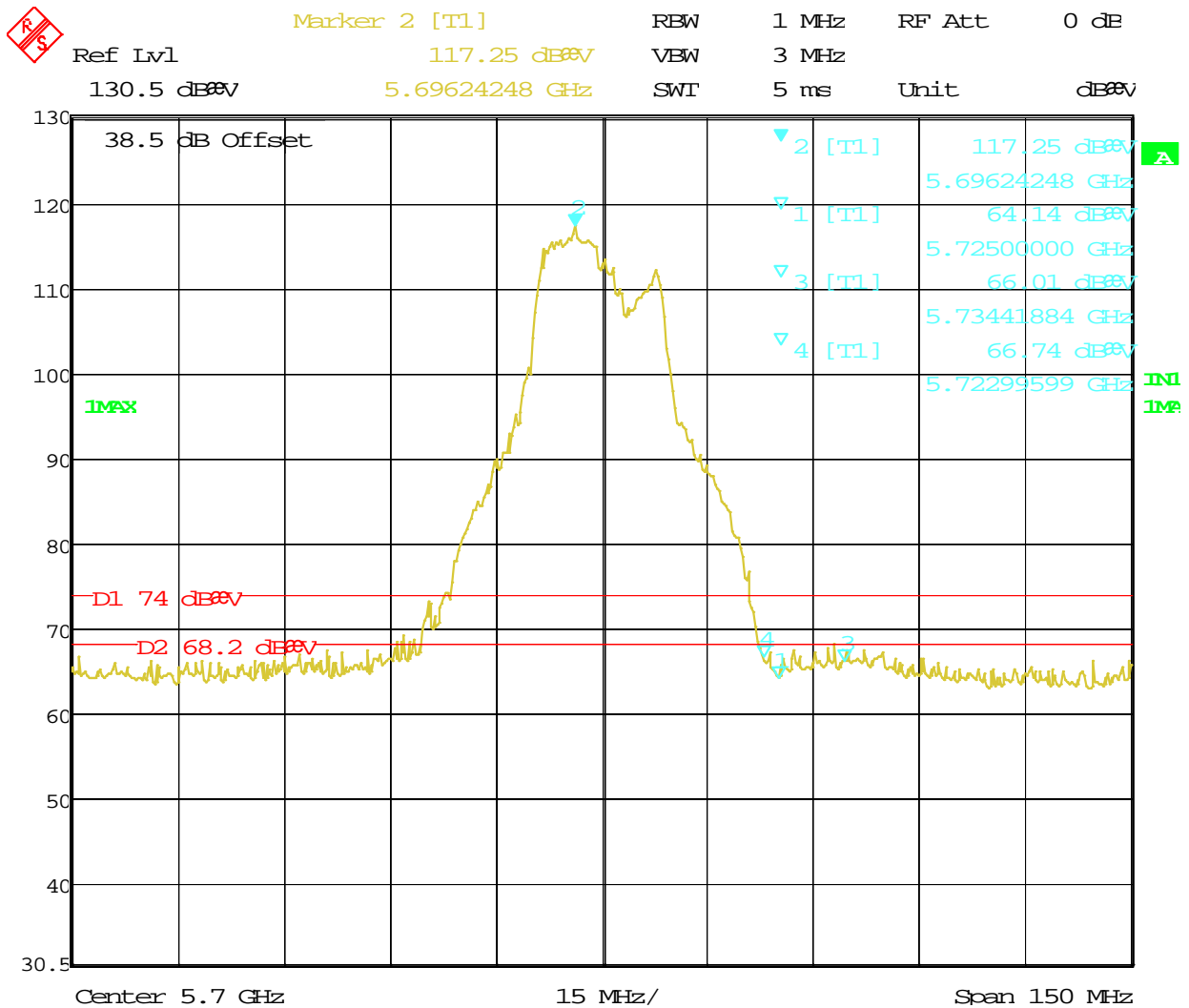
Figure 164: Radiated Emission at the Edge for Channel 5500 MHz at 6.5Mbps – Vert. (Peak)

Note: The bandedge at 5470 MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 164 and Fig. 165.



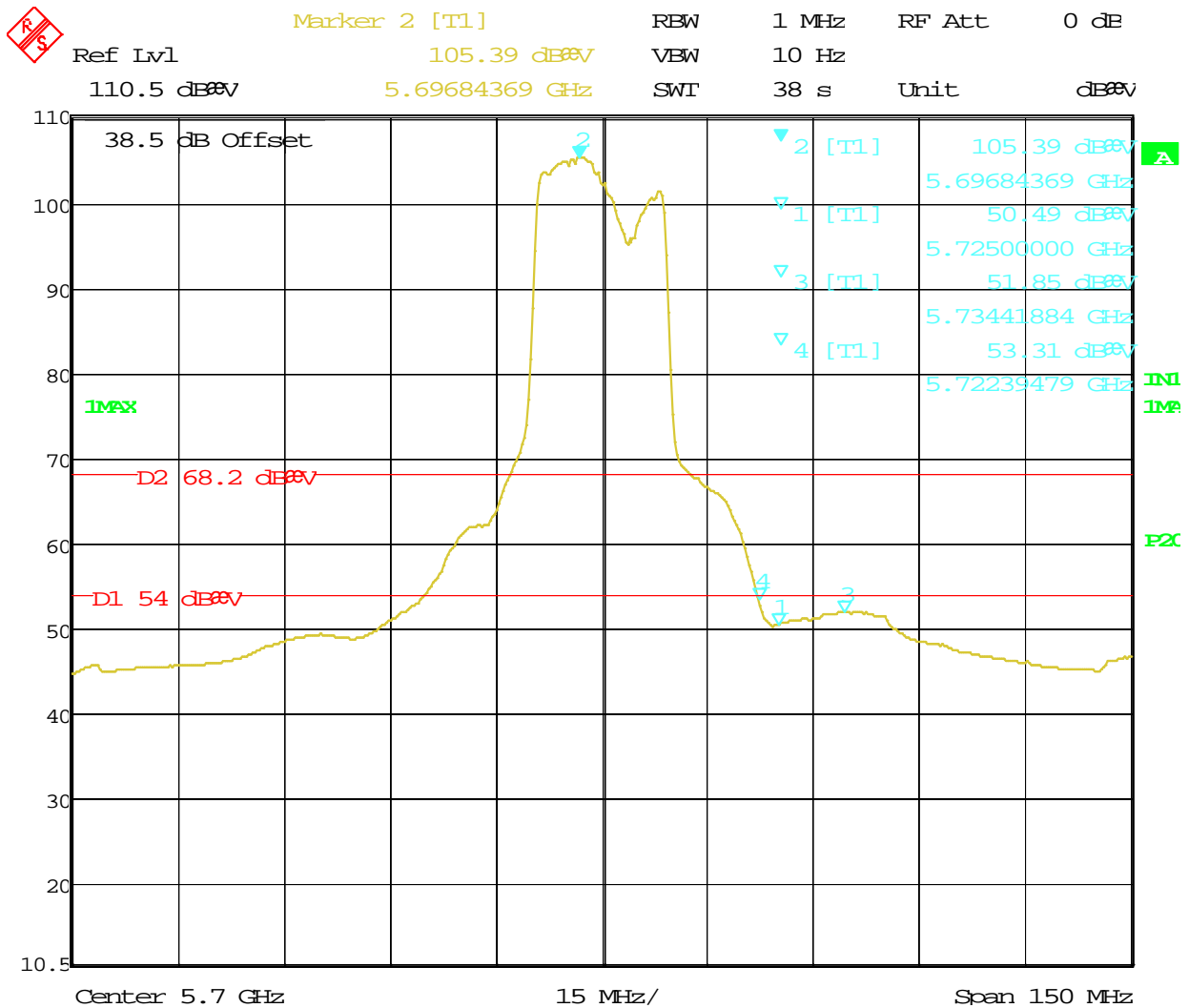
Date: 14.MAY.2013 14:24:08

Figure 165: Radiated Emission at the Edge for Channel 5500 MHz at 6.5Mbps – Vert. (Ave.)



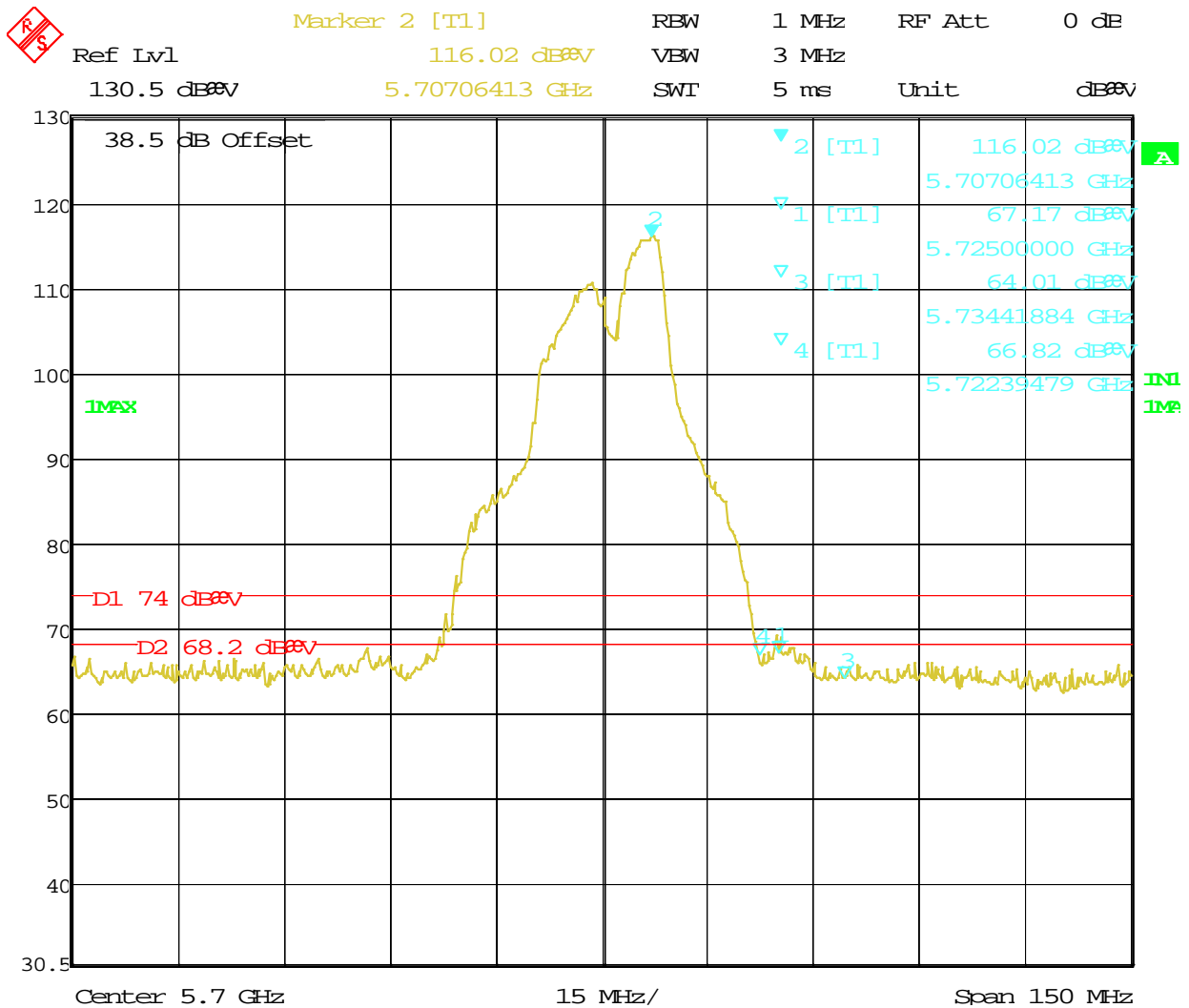
Date: 14.MAY.2013 14:43:32

Figure 166: Radiated Emission at the Edge for Channel 5700 MHz at 6.5Mbps – Horz. (Peak)



Date: 14.MAY.2013 14:45:00

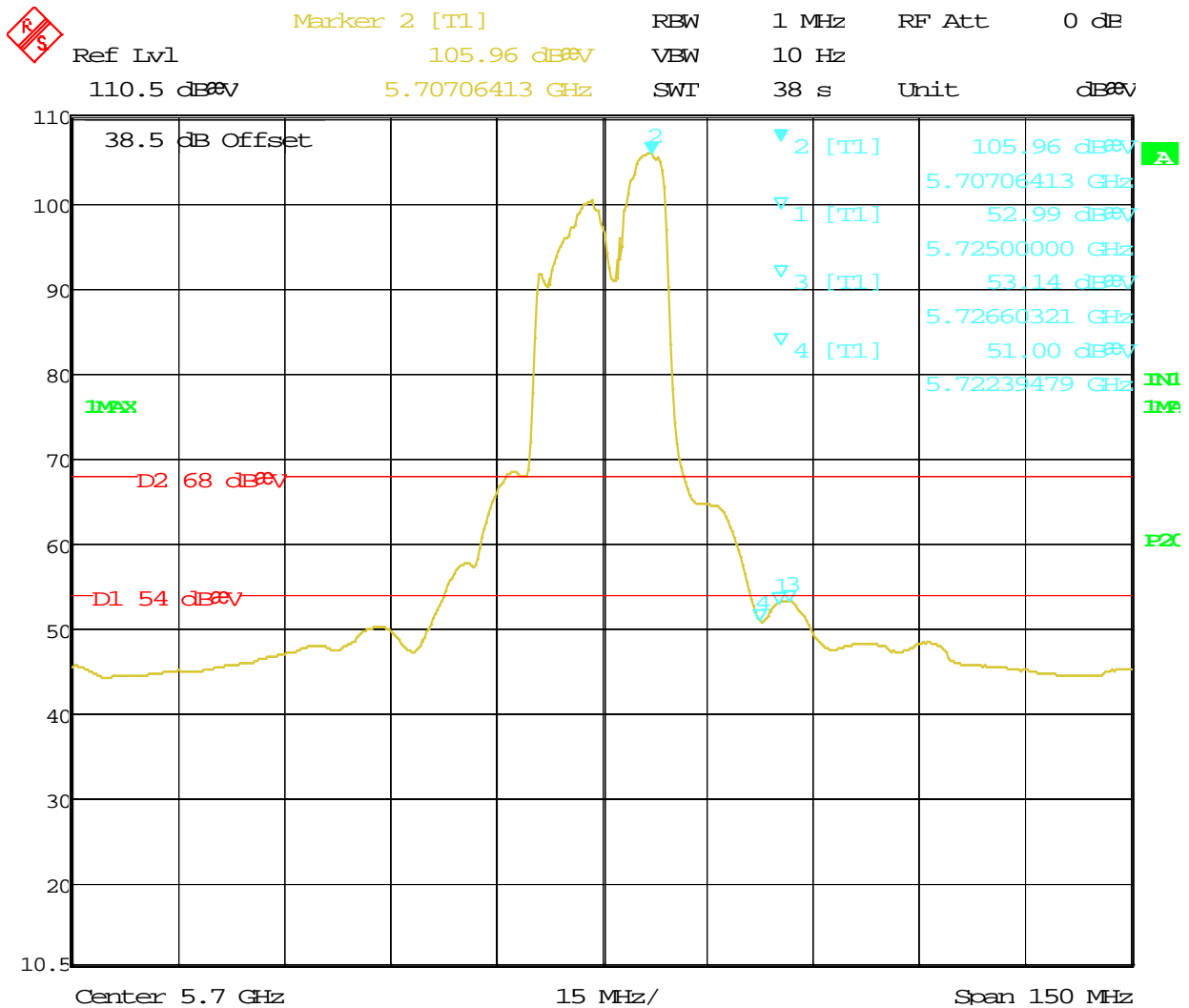
Figure 167: Radiated Emission at the Edge for Channel 5700 MHz at 6.5Mbps – Horz. (Ave.)



Date: 14.MAY.2013 14:47:59

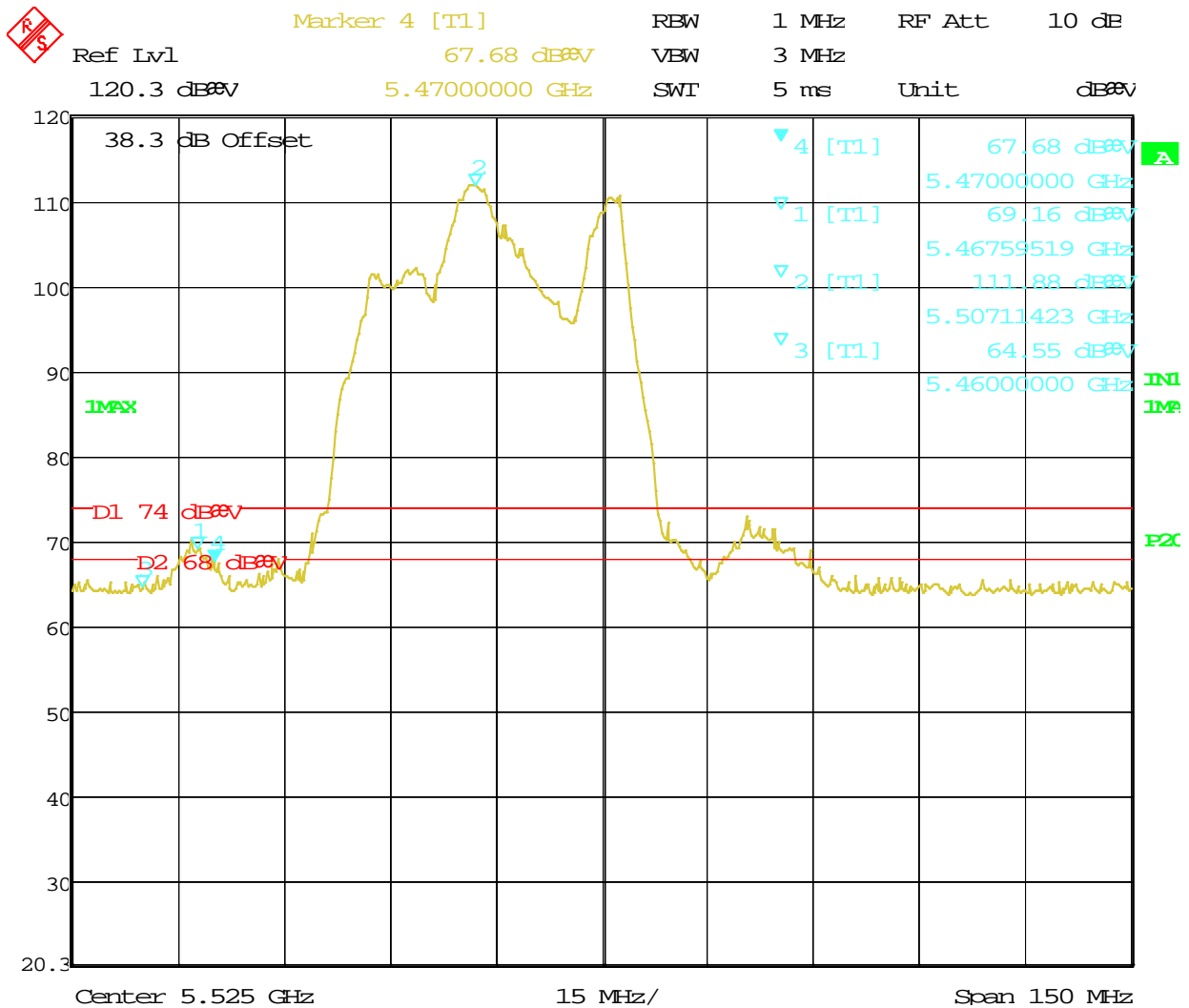
Figure 168: Radiated Emission at the Edge for Channel 5700 MHz at 6.5Mbps – Vert. (Peak)

Note: The bandedge at 5725MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 168 and Fig. 169.



Date: 14.MAY.2013 14:50:23

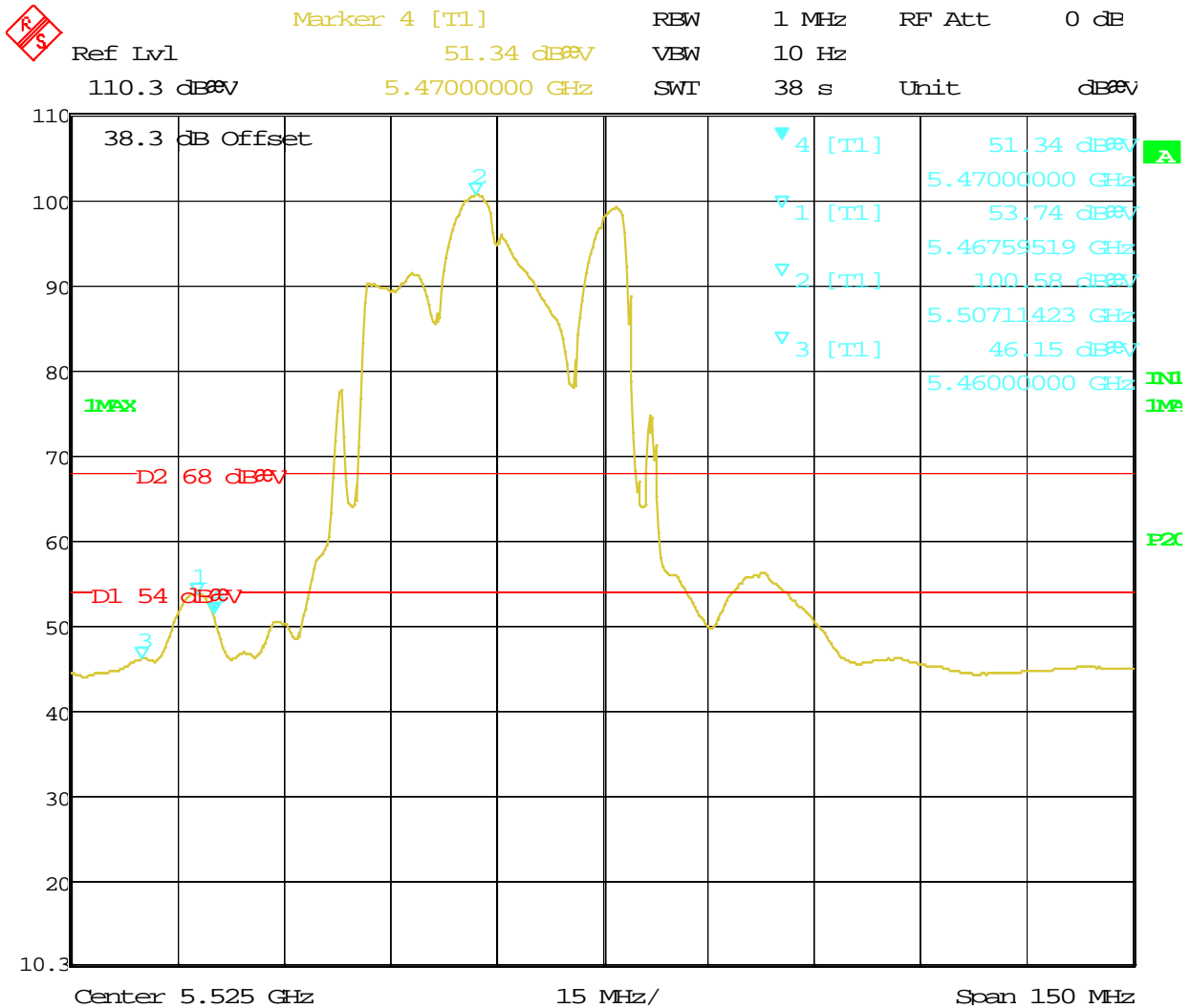
Figure 169: Radiated Emission at the Edge for Channel 5700 MHz at 6.5Mbps – Vert. (Ave.)



Date: 14.MAY.2013 15:30:31

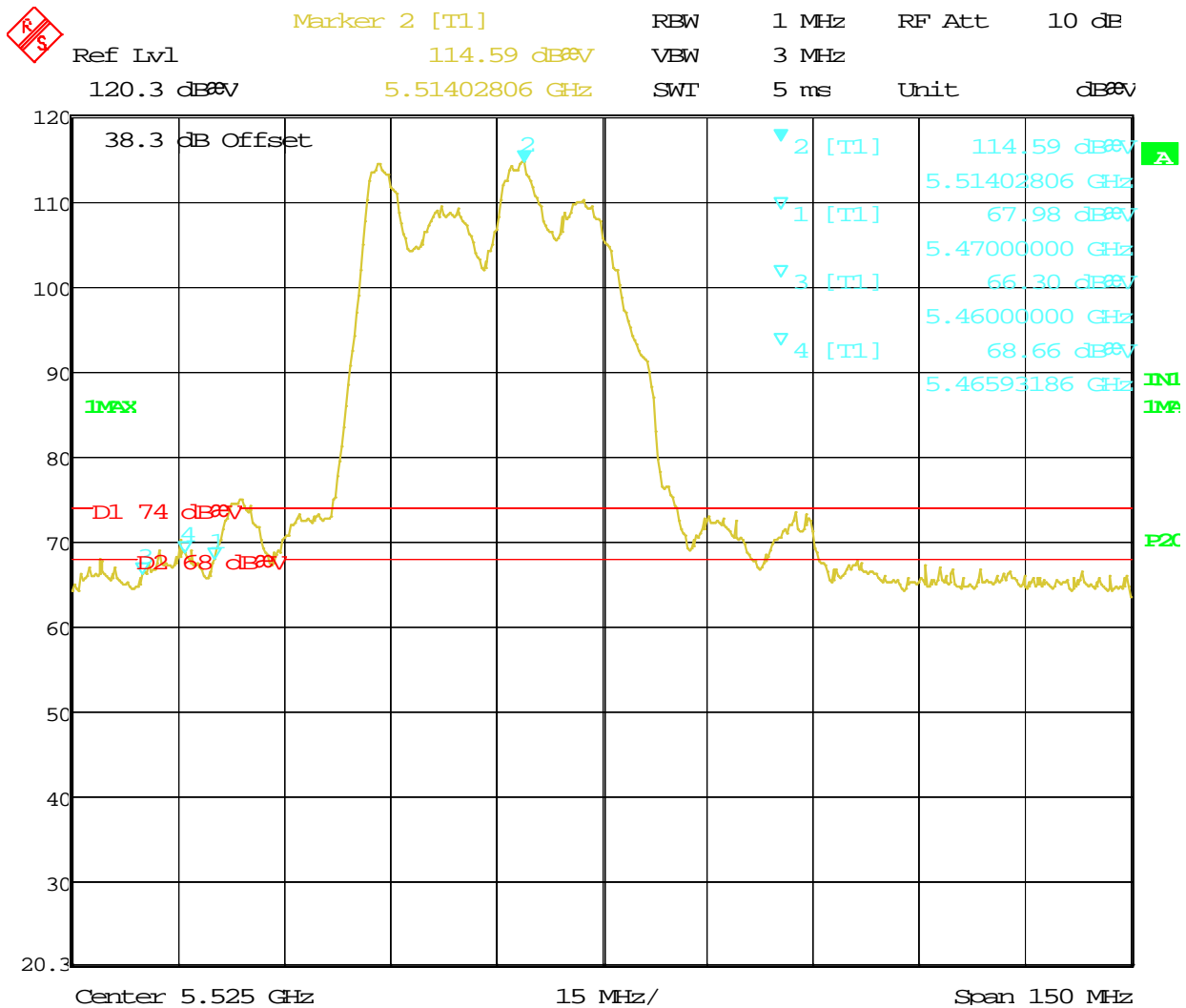
Figure 170: Radiated Emission at the Edge for Channel 5510 MHz at 13.5Mbps – Horz. (Peak)

Note: The bandedge at 5470 MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 170 and Fig. 171.



Date: 14.MAY.2013 15:26:49

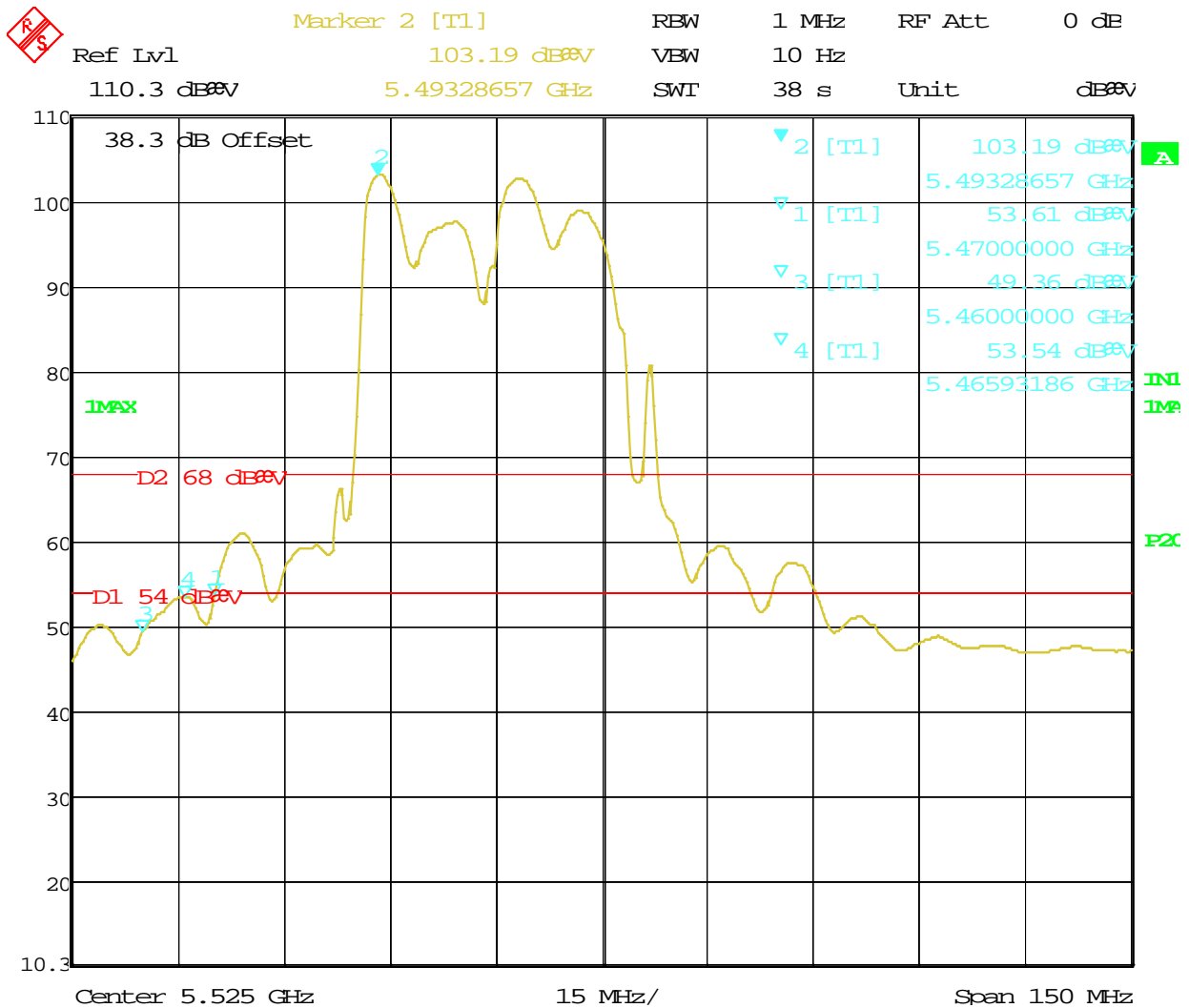
Figure 171: Radiated Emission at the Edge for Channel 5510 MHz at 13.5Mbps – Horz. (Ave.)



Date: 14.MAY.2013 15:05:31

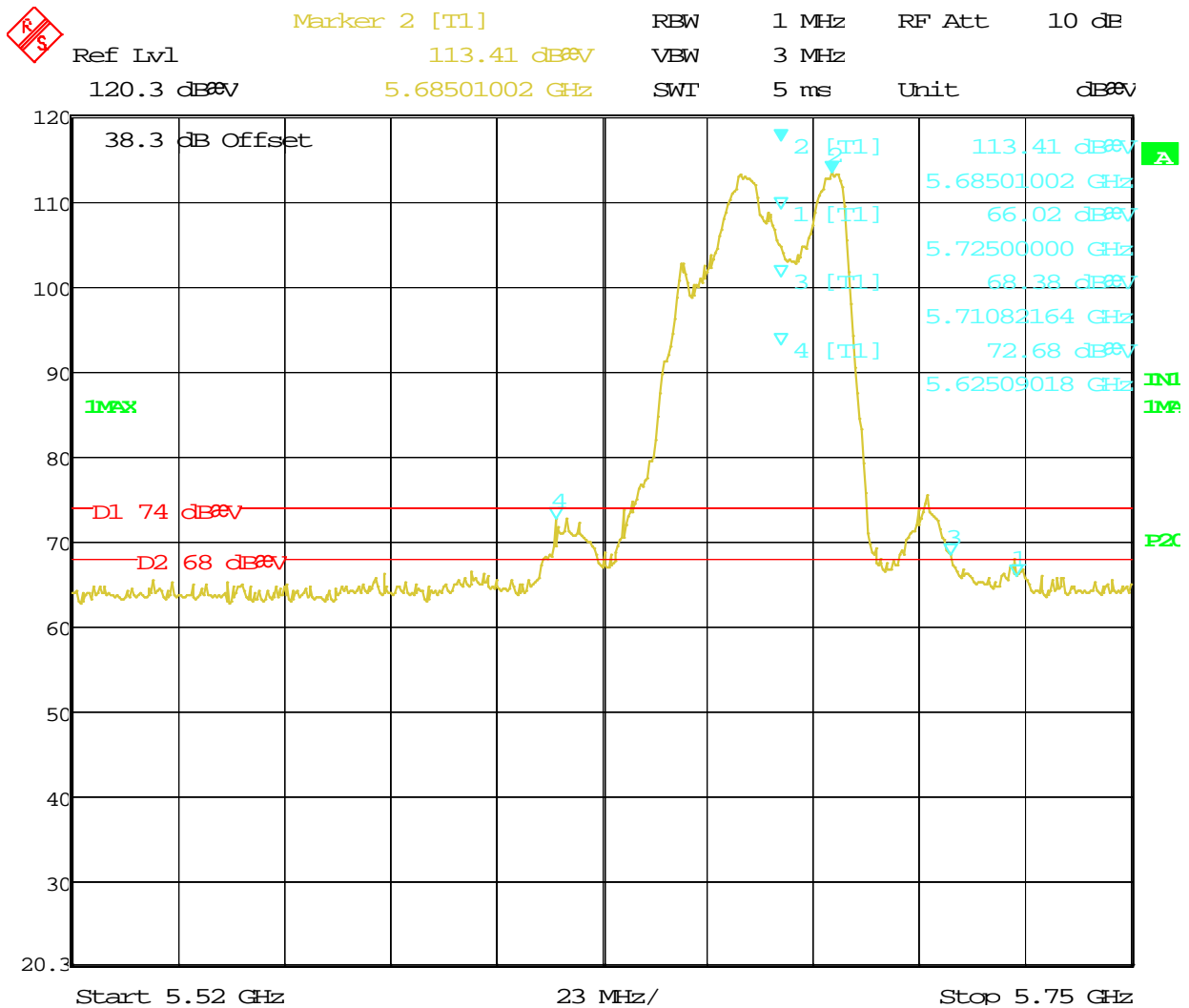
Figure 172: Radiated Emission at the Edge for Channel 5510 MHz at 13.5Mbps – Vert. (Peak)

Note: The bandedge at 5470 MHz was over 68.2 dBuV/m per CFR47 Part 15.407 (b) (1) to 15.407 (b) (3); however, it met both peak and average requirements of CFR47 Part 15.205 for the restricted band, per Fig. 172 and Fig. 173.



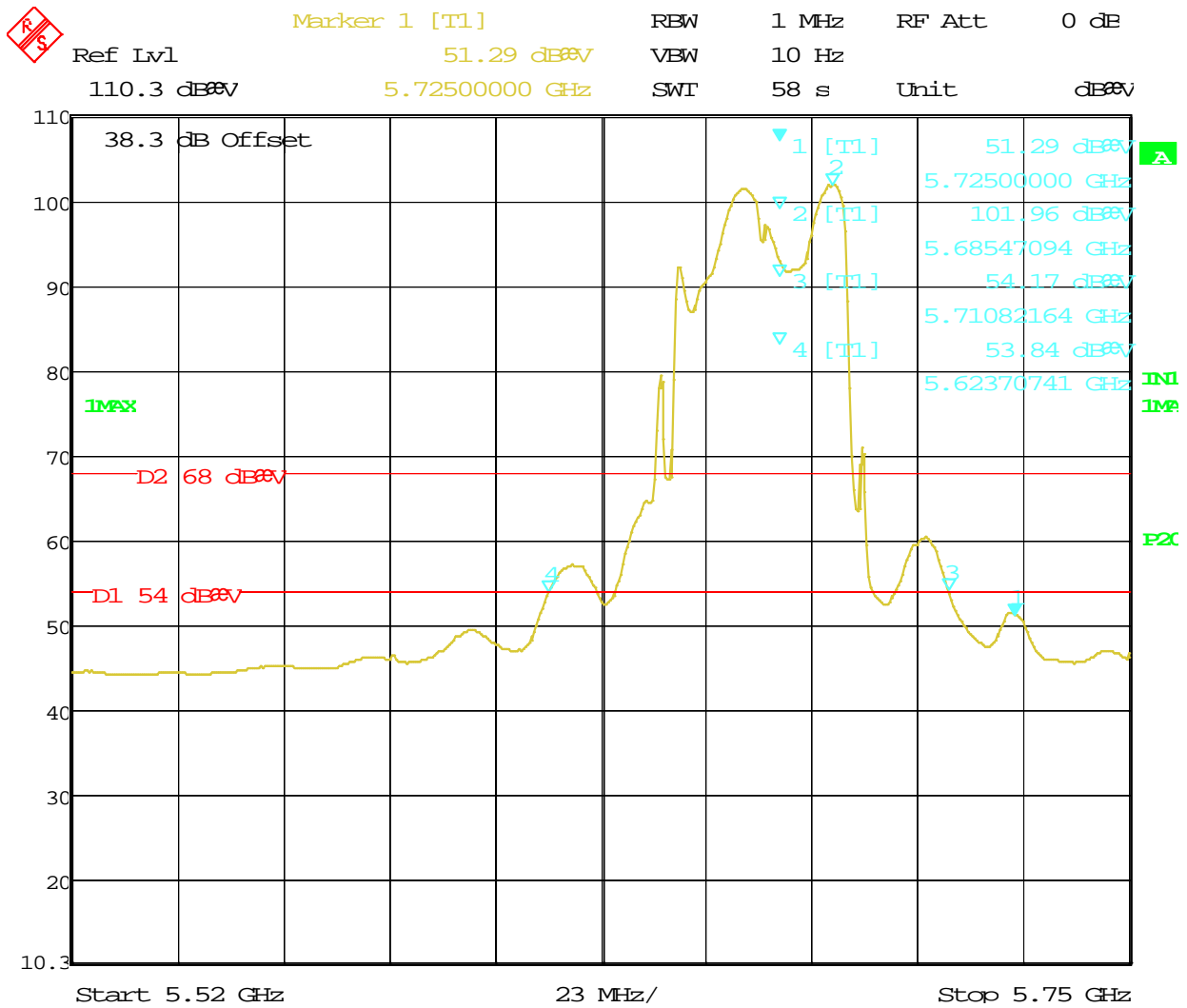
Date: 14.MAY.2013 15:04:40

Figure 173: Radiated Emission at the Edge for Channel 5510 MHz at 13.5Mbps – Vert. (Ave.)



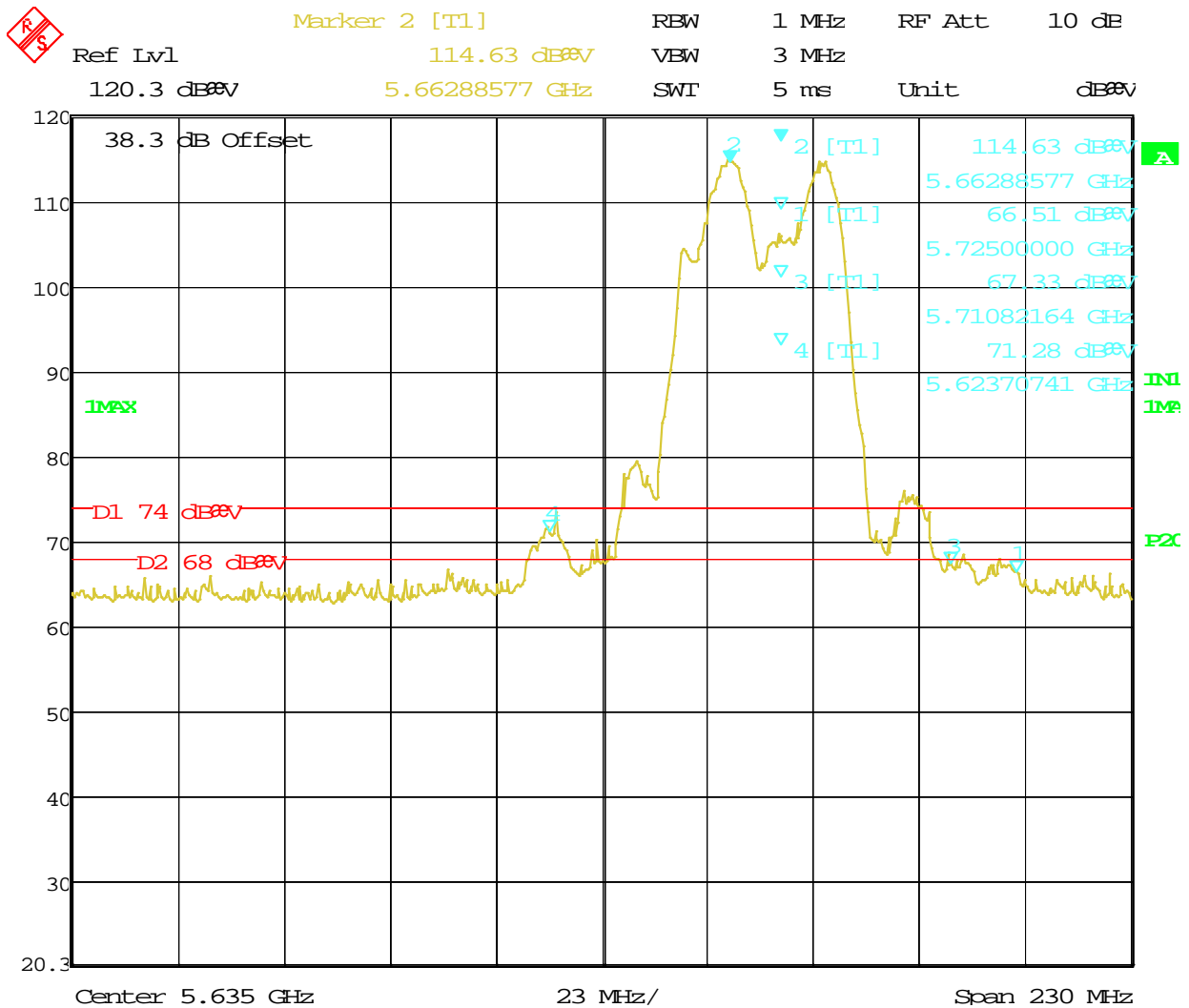
Date: 14.MAY.2013 15:54:38

Figure 174: Radiated Emission at the Edge for Channel 5670 MHz at 13.5Mbps – Horz (Peak)



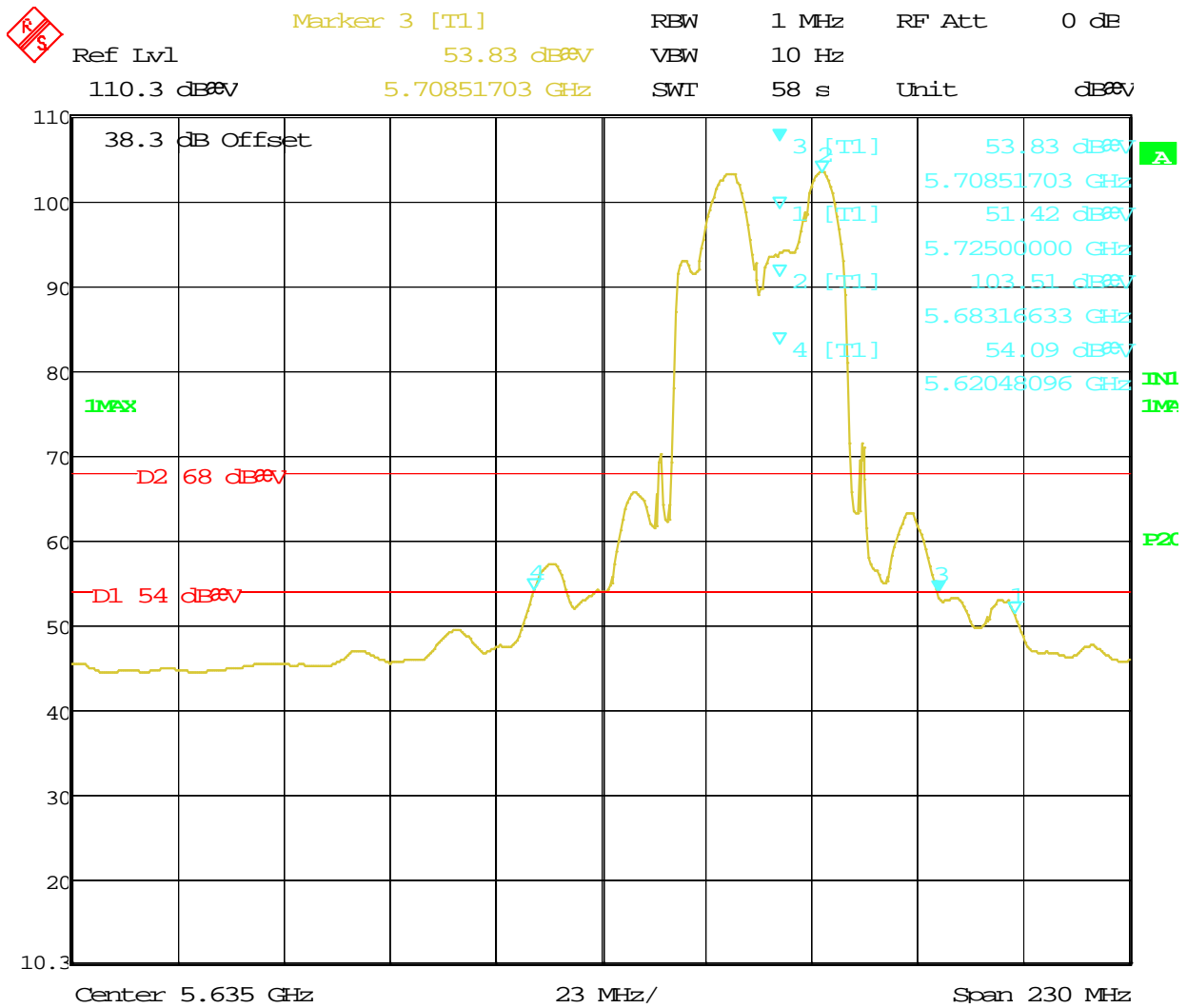
Date: 14.MAY.2013 15:56:25

Figure 175: Radiated Emission at the Edge for Channel 5670 MHz at 13.5Mbps – Horz (Ave.)



Date: 14.MAY.2013 16:00:01

Figure 176: Radiated Emission at the Edge for Channel 5670 MHz at 13.5Mbps – Vert (Peak)



Date: 14.MAY.2013 16:01:36

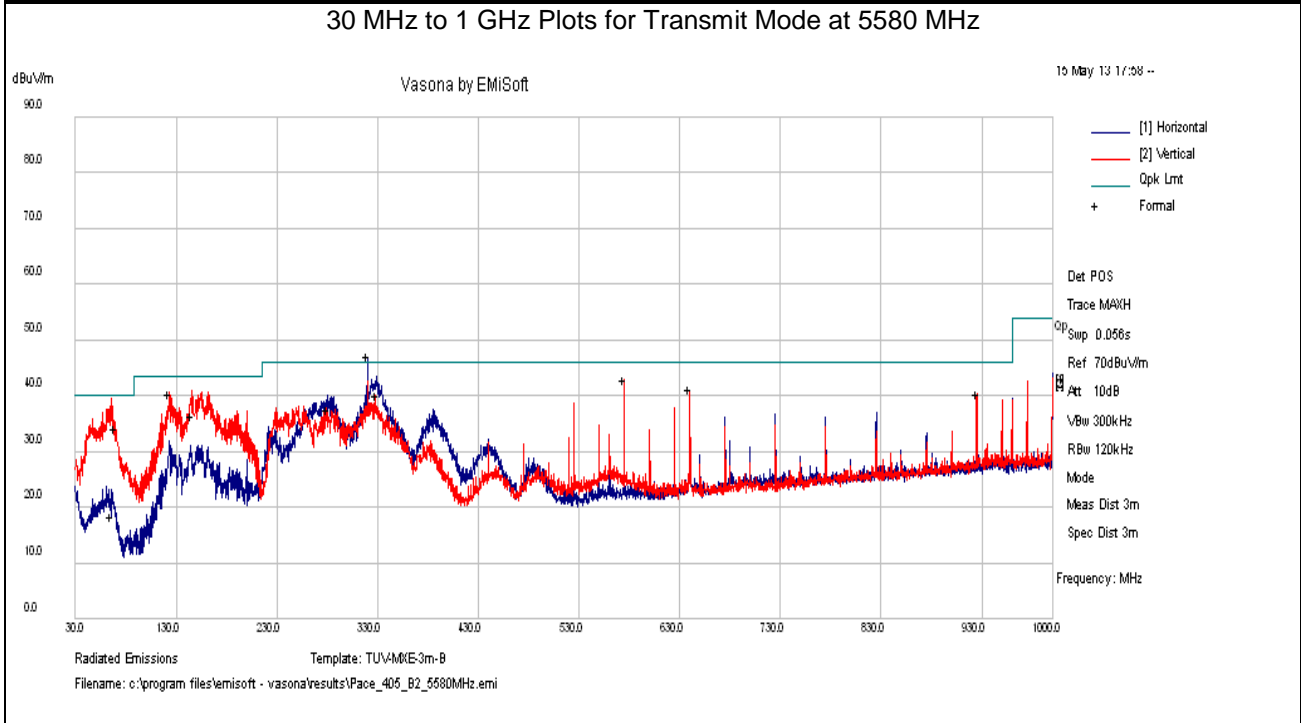
Figure 177: Radiated Emission at the Edge for Channel 5670 MHz at 13.5Mbps – Vert (Ave.)

SOP 1 Radiated Emissions						Tracking # 31360999.004 Page 1 of 23			
EUT Name			Wireless Video Access Point			Date		May 13, 2013	
EUT Model			405			Temp / Hum in		23°C / 29%rh	
EUT Serial			09130M000104			Temp / Hum out		N/A	
EUT Config.			Y-Axis, 802.11n HT20 at 6.5 Mbps/ chain			Line AC / Freq		120 Vac/60 Hz	
Standard			CFR47 Part 15 Subpart C			RBW / VBW		120 kHz/ 300 kHz	
Dist/Ant Used			3m / JB3			Performed by		Jeremy Luong	
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (cm)	Table Pos (deg)	FIM QP (dBuV/m)	Total CF (dBuV)	E-Field QP (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	Type
30 MHz to 1 GHz Transmitted at 802.11n HT20, 5300 MHz 6.5 Mbps/chain									
69.49	V	106	318	52.38	-18.16	34.22	40.00	-5.78	Spurious
123.25	V	103	332	52.51	-11.91	40.59	43.50	-2.91	Spurious
145.13	V	123	308	49.34	-12.89	36.45	43.50	-7.05	Spurious
279.85	H	108	174	48.49	-10.88	37.60	46.00	-8.40	Spurious
328.86	H	120	194	50.07	-9.94	40.13	46.00	-5.88	Spurious
574.99	V	99	264	48.80	-5.84	42.96	46.00	-3.04	Spurious
640.00	V	100	82	45.94	-4.75	41.19	46.00	-4.81	Spurious
924.99	V	103	12	40.75	-0.42	40.33	46.00	-5.67	Spurious
Spec Margin = E-Field QP - Limit, E-Field QP = FIM QP+ Total CF ± Uncertainty									
Total CF= Amp Gain + Cable Loss + ANT Factor									
Combined Standard Uncertainty $u_c(y) = \pm 3.2$ dB Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence									
Notes: Worst case was observed on Y-axis at 802.11n HT20, 5580 MHz 6.5 Mbps. All other emissions passed Class B limit.									

SOP 1 Radiated Emissions

Tracking # 31360999.004 Page 2 of 23

EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 29%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps/ chain	Line AC	120 Vac/60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	120 kHz/ 300 kHz
Dist/Ant Used	3m – JB3	Performed by	Jeremy Luong



Notes: FCC Class B Limit. The emission 320 MHz was not over the limit, however, it was not radio-related.

SOP 1 Radiated Emissions						Tracking # 31360999.004 Page 3 of 23					
EUT Name	Wireless Video Access Point					Date	August 18, 2013				
EUT Model	405					Temp / Hum in	23°C / 45%rh				
EUT Serial	09130M000104					Temp / Hum out	N/A				
EUT Config.	Y-Axis, 802.11a at 6 Mbps					Line AC / Freq	120 Vac/60 Hz				
Standard	CFR47 Part 15 Subpart C					RBW / VBW	1 MHz/ 3 MHz				
Dist/Ant Used	3m / EMCO3115 / 1m - RA42-K-F-4B-C					Performed by	Jeremy Luong				

Transmitted Data at 5500 MHz @ 18 dBm

Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1025.06	52.29	-7.93	44.36	Ave	H	158	54	54.00	-9.65	Spurious
1279.92	54.85	-6.71	48.14	Ave	H	105	60	54.00	-5.86	Spurious
3199.99	37.89	0.90	38.79	Ave	H	278	135	54.00	-15.21	Spurious
10996.12	28.10	11.70	39.80	Ave	H	246	118	54.00	-14.20	Harmonic
5061.31	39.20	3.60	42.80	Ave	V	264	272	54.00	-11.20	Spurious
5260.75	43.14	4.37	47.51	Ave	V	161	252	54.00	-6.49	Spurious
5903.18	34.78	5.38	40.16	Ave	V	246	276	54.00	-13.84	Spurious
7333.34	32.87	8.71	41.59	Ave	V	289	230	54.00	-12.41	Spurious
21999.90	50.12	10.71	60.83	Ave	H	109	105	64.00	-3.17	Harmonic
21999.90	46.23	10.71	56.94	Ave	V	108	148	64.00	-7.06	Harmonic
27499.80	61.95	-12.36	49.59	Ave	V	101	146	64.00	-14.41	Harmonic
27499.80	55.29	-12.36	42.93	Ave	H	89.4	76.5	64.00	-21.07	Harmonic
32999.80	45.40	-4.57	40.83	Ave	V	104	48.3	64.00	-23.17	Harmonic
38499.70	42.95	0.19	43.14	Ave	H	103	163	64.00	-20.87	Harmonic
38499.70	41.11	0.19	41.30	Ave	V	93	438	64.00	-22.71	Harmonic

Transmitted Data at 5580 MHz @ 18 dBm

Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1024.99	52.30	-7.93	44.37	Ave	H	250	302	54.00	-9.63	Spurious
1280.12	55.02	-6.71	48.31	Ave	H	104	312	54.00	-5.69	Spurious
3199.94	37.69	0.90	38.59	Ave	H	278	136	54.00	-15.41	Spurious
5111.60	38.94	3.81	42.75	Ave	H	224	290	54.00	-11.25	Spurious
5906.43	35.42	5.40	40.81	Ave	V	121	242	54.00	-13.19	Spurious
7439.92	34.70	8.78	43.48	Ave	V	266	246	54.00	-10.52	Spurious
8688.53	24.40	10.30	34.60	Ave	V	207	252	54.00	-19.40	Spurious
11161.80	28.60	11.90	40.60	Ave	V	153	75	54.00	-13.40	Harmonic
22319.80	45.16	10.61	55.77	Ave	V	106	105	64.00	-8.23	Harmonic
22319.90	51.50	10.61	62.11	Ave	H	96	118	64.00	-1.89	Harmonic
27899.80	62.14	-12.76	49.38	Ave	V	100	156	64.00	-14.63	Harmonic
33479.60	48.48	-4.08	44.40	Ave	H	99	78	64.00	-19.60	Harmonic
33479.80	48.04	-4.08	43.96	Ave	V	89	122	64.00	-20.04	Harmonic

Transmitted Data at 5700 MHz @ 18 dBm										
Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1279.99	55.23	-6.71	48.52	Ave	H	115	308	54.00	-5.48	Spurious
3199.98	37.61	0.90	38.51	Ave	H	279	137	54.00	-15.49	Spurious
14767.84	18.23	18.10	36.33	Ave	H	296	250	54.00	-17.67	Spurious
1025.04	52.03	-7.93	44.10	Ave	V	103	348	54.00	-9.91	Spurious
5021.16	36.75	3.43	40.19	Ave	V	133	310	54.00	-13.82	Spurious
5866.00	36.96	5.29	42.25	Ave	V	101	0	54.00	-11.75	Spurious
5942.49	35.92	5.53	41.46	Ave	V	146	264	54.00	-12.54	Spurious
11396.21	26.90	12.40	39.30	Ave	V	135	98	54.00	-14.70	Harmonic
22799.80	43.37	10.48	53.85	Ave	V	111	121	64.00	-10.15	Harmonic
22799.80	51.50	10.48	61.98	Ave	H	109	97	64.00	-2.02	Harmonic
34199.80	45.07	-3.59	41.48	Ave	V	89	162	64.00	-22.02	Harmonic
Spec Margin = E-Field Average - Limit, E-Field Average = Field Meas.+ Total CF ± Uncertainty										
Total CF= Amp Gain + Cable Loss + ANT Factor										
Combined Standard Uncertainty $u_c(y) = \pm 3.2$ dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence										
Notes: Worst case was observed on Y-axis, 6 Mbps. The frequency range 18 GHz to 40 GHz was measured at 1 meter distance; limit was extrapolated.										

SOP 1 Radiated Emissions						Tracking # 31360999.004 Page 4 of 23					
EUT Name	Wireless Video Access Point					Date	May 13, 2013				
EUT Model	405					Temp / Hum in	23°C / 28%rh				
EUT Serial	09130M000104					Temp / Hum out	N/A				
EUT Config.	Y-Axis, 802.11 HT20 at 6.5 Mbps					Line AC / Freq	120 Vac/60 Hz				
Standard	CFR47 Part 15 Subpart C					RBW / VBW	1 MHz/ 3 MHz				
Dist/Ant Used	3m / EMCO3115 / 1m - RA42-K-F-4B-C					Performed by	Jeremy Luong				
Transmitted Data at 5500 MHz @ 18 dBm											
Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type	
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB		
1279.71	55.12	-6.71	48.41	Ave	H	108	310	54.00	-5.59	Spurious	
1288.53	26.36	-6.71	19.64	Ave	V	256	32	54.00	-34.36	Spurious	
2428.38	28.12	-1.71	26.41	Ave	V	102	212	54.00	-27.59	Spurious	
5092.14	41.04	3.72	44.76	Ave	H	200	272	54.00	-9.25	Spurious	
5252.51	42.90	4.35	47.26	Ave	V	149	172	54.00	-6.75	Spurious	
5307.09	33.33	4.44	37.77	Ave	H	190	288	54.00	-16.23	Spurious	
5940.89	34.54	5.53	40.07	Ave	H	205	256	54.00	-13.93	Spurious	
7333.31	38.30	8.71	47.02	Ave	V	206	296	54.00	-6.99	Spurious	
10998.45	28.47	11.70	40.17	Ave	H	252	128	54.00	-13.83	Harmonic	
14713.74	17.04	18.22	35.26	Ave	V	281	118	54.00	-18.74	Harmonic	
21999.80	44.75	10.71	55.46	Ave	V	104	85	64.00	-8.54	Harmonic	
21999.80	45.00	10.71	55.71	Ave	H	133	103	64.00	-8.29	Harmonic	
27499.70	59.43	-12.36	47.07	Ave	V	97	102	64.00	-16.93	Harmonic	
27499.90	60.90	-12.36	48.54	Ave	H	106	93	64.00	-15.46	Harmonic	
32999.70	47.41	-4.57	42.84	Ave	H	113	92	64.00	-21.16	Harmonic	
38499.70	47.02	0.19	47.21	Ave	V	112	22	64.00	-16.80	Harmonic	
Transmitted Data at 5580 MHz @ 18 dBm											
Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type	
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB		
1131.77	26.87	-7.13	19.74	Ave	H	265	104	54.00	-34.26	Spurious	
1279.54	56.87	-6.71	50.17	Ave	H	102	304	54.00	-3.84	Spurious	
1347.00	26.12	-6.66	19.46	Ave	H	209	354	54.00	-34.54	Spurious	
5096.02	42.08	3.73	45.81	Ave	V	167	284	54.00	-8.19	Spurious	
5152.96	39.27	4.00	43.27	Ave	H	259	266	54.00	-10.73	Spurious	
5905.89	36.87	5.39	42.26	Ave	V	135	234	54.00	-11.74	Spurious	
6104.77	30.94	5.88	36.83	Ave	V	238	252	54.00	-17.17	Spurious	
7439.87	37.34	8.78	46.12	Ave	V	262	268	54.00	-7.88	Spurious	
11161.33	27.74	11.97	39.71	Ave	V	99	64	54.00	-14.30	Harmonic	
22319.80	42.54	10.61	53.15	Ave	V	130	104	64.00	-10.85	Harmonic	
22319.90	49.37	10.61	59.98	Ave	H	105	76	64.00	-4.02	Harmonic	
27899.80	59.05	-12.76	46.29	Ave	H	122	92	64.00	-17.72	Harmonic	
27899.80	59.73	-12.76	46.97	Ave	V	100	154	64.00	-17.04	Harmonic	
33479.70	51.91	-4.08	47.83	Ave	H	106	24	64.00	-16.17	Harmonic	
33479.80	51.32	-4.08	47.24	Ave	V	111	70	64.00	-16.76	Harmonic	

Transmitted Data at 5700 MHz @ 18 dBm										
Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1170.76	26.02	-6.85	19.18	Ave	V	292	192	54.00	-34.83	Spurious
1280.01	53.28	-6.71	46.58	Ave	H	101	304	54.00	-7.42	Spurious
5035.13	39.31	3.49	42.80	Ave	V	182	310	54.00	-11.20	Spurious
5866.34	42.03	5.29	47.33	Ave	V	168	244	54.00	-6.68	Spurious
5944.61	45.17	5.54	50.72	Ave	V	166	240	54.00	-3.28	Spurious
5981.49	35.34	5.69	41.02	Ave	V	102	290	54.00	-12.98	Spurious
7600.04	31.35	8.67	40.03	Ave	H	193	292	54.00	-13.97	Spurious
11396.41	30.29	12.38	42.67	Ave	H	237	104	54.00	-11.34	Harmonic
17960.59	17.63	25.35	42.98	Ave	V	164	226	54.00	-11.02	Harmonic
22799.80	43.26	10.48	53.74	Ave	H	139	115	64.00	-10.26	Harmonic
22799.80	47.77	10.48	58.25	Ave	V	157	91	64.00	-5.75	Harmonic
28499.70	59.32	-12.29	47.03	Ave	V	131	89	64.00	-16.97	Harmonic
28499.80	55.27	-12.29	42.98	Ave	H	142	50	64.00	-21.02	Harmonic
34199.70	51.09	-3.59	47.50	Ave	V	145	30	64.00	-16.50	Harmonic
39899.80	45.19	1.89	47.08	Ave	H	141	68	64.00	-16.92	Harmonic
Spec Margin = E-Field Average - Limit, E-Field Average = Field Meas.+ Total CF ± Uncertainty										
Total CF= Amp Gain + Cable Loss + ANT Factor										
Combined Standard Uncertainty $u_c(y) = \pm 3.2$ dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence										
Notes: Worst case was observed on Y-axis, 6.5 Mbps. The frequency range 18 GHz to 40 GHz was measured at 1 meter distance; limit was extrapolated.										

SOP 1 Radiated Emissions				Tracking # 31360999.004 Page 5 of 23			
EUT Name	Wireless Video Access Point			Date	May 13, 2013		
EUT Model	405			Temp / Hum in	23°C / 28%rh		
EUT Serial	09130M000104			Temp / Hum out	N/A		
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps			Line AC / Freq	120 Vac/60 Hz		
Standard	CFR47 Part 15 Subpart C			RBW / VBW	1 MHz/ 3 MHz		
Dist/Ant Used	3m / EMCO3115 / 1m - RA42-K-F-4B-C			Performed by	Jeremy Luong		

Transmitted Data at 5510 MHz @ 18 dBm

Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1263.45	26.22	-6.70	19.52	Ave	H	217	178	54.00	-34.48	Spurious
1281.18	51.40	-6.71	44.69	Ave	H	104	316	54.00	-9.31	Spurious
5113.16	40.43	3.82	44.24	Ave	H	263	270	54.00	-9.76	Spurious
5300.84	36.22	4.42	40.65	Ave	H	271	262	54.00	-13.36	Spurious
5925.45	35.05	5.48	40.52	Ave	V	250	240	54.00	-13.48	Spurious
7346.64	36.09	8.74	44.84	Ave	V	209	264	54.00	-9.16	Spurious
11204.32	17.97	12.04	30.02	Ave	H	108	338	54.00	-23.98	Spurious
17961.59	17.64	25.36	43.00	Ave	H	175	322	54.00	-11.00	Harmonic
22039.90	43.78	10.86	54.64	Ave	V	129	103	64.00	-9.36	Harmonic
22039.90	48.87	10.86	59.73	Ave	H	140	83	64.00	-4.27	Harmonic
27549.70	60.06	-12.40	47.66	Ave	V	103	142	64.00	-16.34	Harmonic
27549.80	59.58	-12.40	47.18	Ave	H	135	129	64.00	-16.82	Harmonic
33059.80	50.80	-4.45	46.35	Ave	V	133	22	64.00	-17.65	Harmonic
33059.80	51.23	-4.45	46.78	Ave	H	129	126	64.00	-17.22	Harmonic

Transmitted Data at 5550 MHz @ 18 dBm

Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1094.23	26.65	3.77	19.26	Ave	H	206	336	54.00	-34.74	Spurious
1279.69	56.59	25.26	49.89	Ave	H	105	320	54.00	-4.11	Spurious
1356.92	25.89	4.31	19.23	Ave	V	237	170	54.00	-34.77	Spurious
5103.71	40.99	-6.65	44.76	Ave	H	284	268	54.00	-9.24	Spurious
5235.20	36.96	5.48	41.27	Ave	V	137	176	54.00	-12.73	Spurious
5927.05	33.68	18.08	39.16	Ave	V	192	216	54.00	-14.84	Spurious
7399.95	33.86	-6.71	42.66	Ave	H	245	202	54.00	-11.34	Spurious
11100.29	24.00	-7.39	35.86	Ave	H	223	36	54.00	-18.14	Harmonic
14783.94	17.82	8.80	35.90	Ave	H	197	194	54.00	-18.10	Harmonic
17949.88	17.28	11.86	42.55	Ave	V	247	102	54.00	-11.45	Harmonic
22199.80	44.58	10.79	55.37	Ave	V	148	147	64.00	-8.63	Harmonic
22199.90	49.31	10.79	60.10	Ave	H	140	84	64.00	-3.90	Harmonic
27749.80	58.51	-12.58	45.93	Ave	H	111	137	64.00	-18.07	Harmonic
27749.80	58.87	-12.58	46.29	Ave	V	136	17	64.00	-17.71	Harmonic
33299.80	49.25	-4.12	45.13	Ave	H	143	26	64.00	-18.87	Harmonic
38849.70	46.09	0.09	46.18	Ave	H	111	40	64.00	-17.82	Harmonic

Transmitted Data at 5670 MHz @ 18 dBm										
Freq.	Raw	Total CF	Level	Det.	Pol	Hgt	Azt.	Limit	Margin	Type
MHz	dBuV/m	dB	dBuV/m		H/V	cm	deg.	dB	dB	
1279.92	57.25	-6.71	50.55	Ave	H	105	312	54.00	-3.45	Spurious
5012.45	38.22	3.40	41.62	Ave	V	188	276	54.00	-12.38	Spurious
5297.87	32.23	4.42	36.65	Ave	H	106	278	54.00	-17.35	Spurious
5913.13	37.01	5.42	42.44	Ave	V	110	170	54.00	-11.56	Spurious
6082.70	33.49	5.85	39.33	Ave	V	100	166	54.00	-14.67	Spurious
7560.03	33.12	8.72	41.85	Ave	H	176	238	54.00	-12.16	Spurious
11339.30	30.22	12.29	42.51	Ave	H	169	42	54.00	-11.49	Spurious
14792.37	17.90	18.08	35.97	Ave	V	178	56	54.00	-18.03	Harmonic
17988.41	17.16	25.63	42.80	Ave	H	204	112	54.00	-11.20	Harmonic
22679.80	45.52	10.33	55.85	Ave	V	114	74	64.00	-8.15	Harmonic
22679.90	36.26	10.33	46.59	Ave	H	113	134	64.00	-17.41	Harmonic
28349.90	54.28	-12.46	41.82	Ave	V	126	91	64.00	-22.18	Harmonic
34019.70	51.32	-3.24	48.08	Ave	H	139	121	64.00	-15.92	Harmonic
34019.80	50.28	-3.24	47.04	Ave	V	134	61	64.00	-16.96	Harmonic

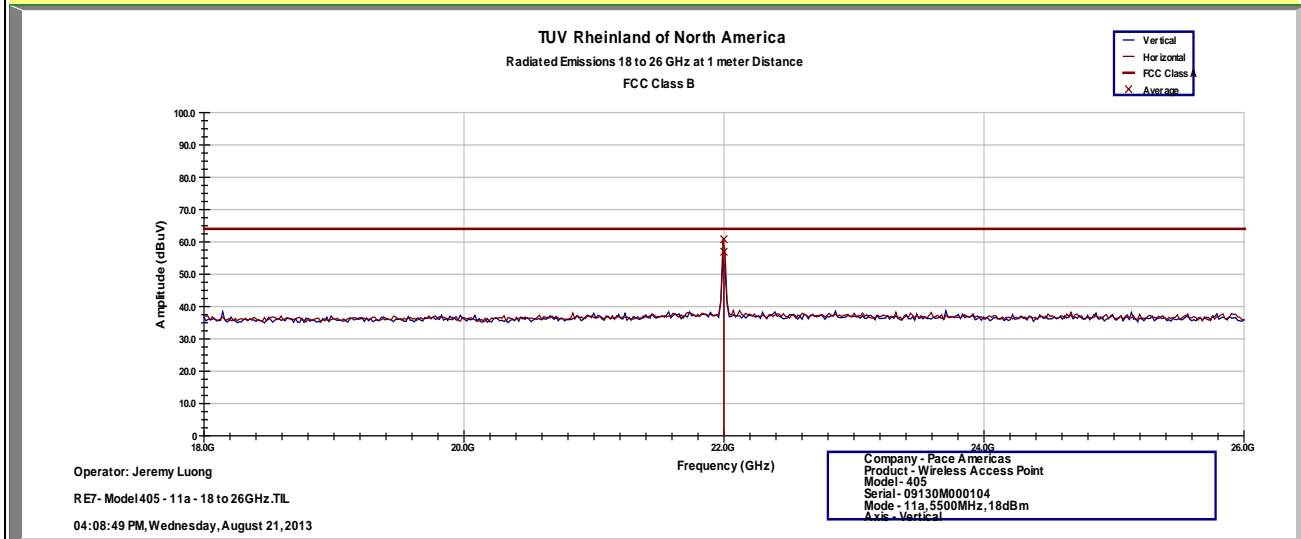
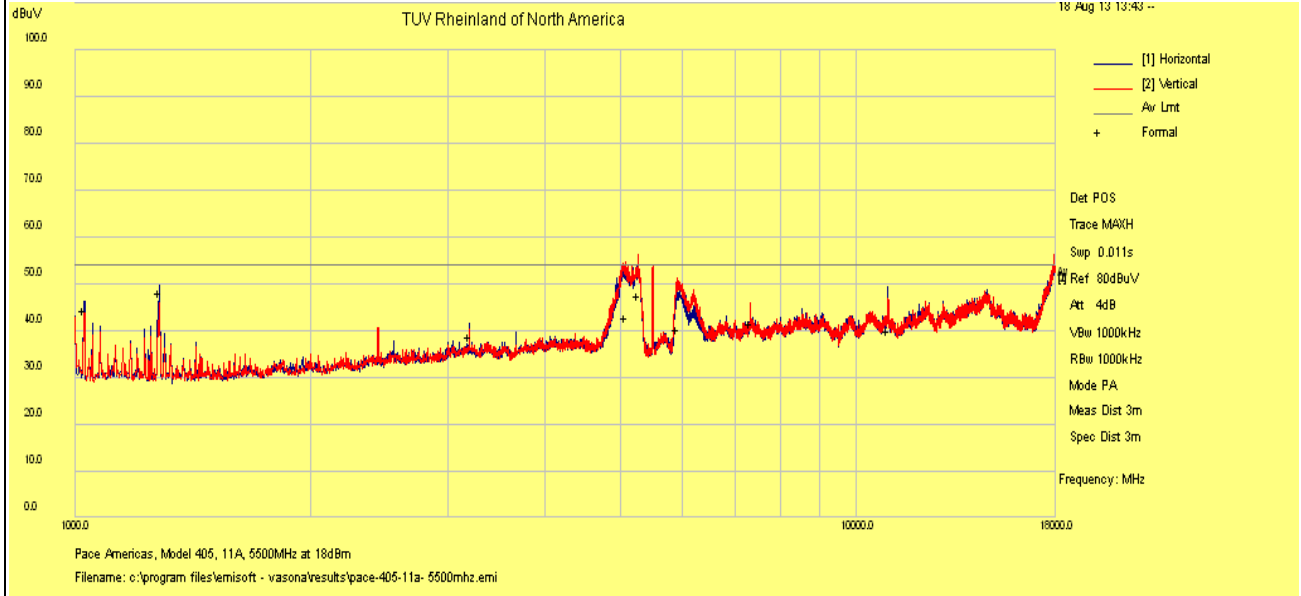
Spec Margin = E-Field Average - Limit, E-Field Average = Field Meas.+ Total CF ± Uncertainty
 Total CF= Amp Gain + Cable Loss + ANT Factor
 Combined Standard Uncertainty $u_c(y) = \pm 3.2$ dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence
 Notes: Worst case was observed on Y-axis, 13.5 Mbps.
 The frequency range 18 GHz to 40 GHz was measured at 1 meter distance; limit was extrapolated.

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EUT Name	Wireless Video Access Point	Date	August 18 & 21, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz



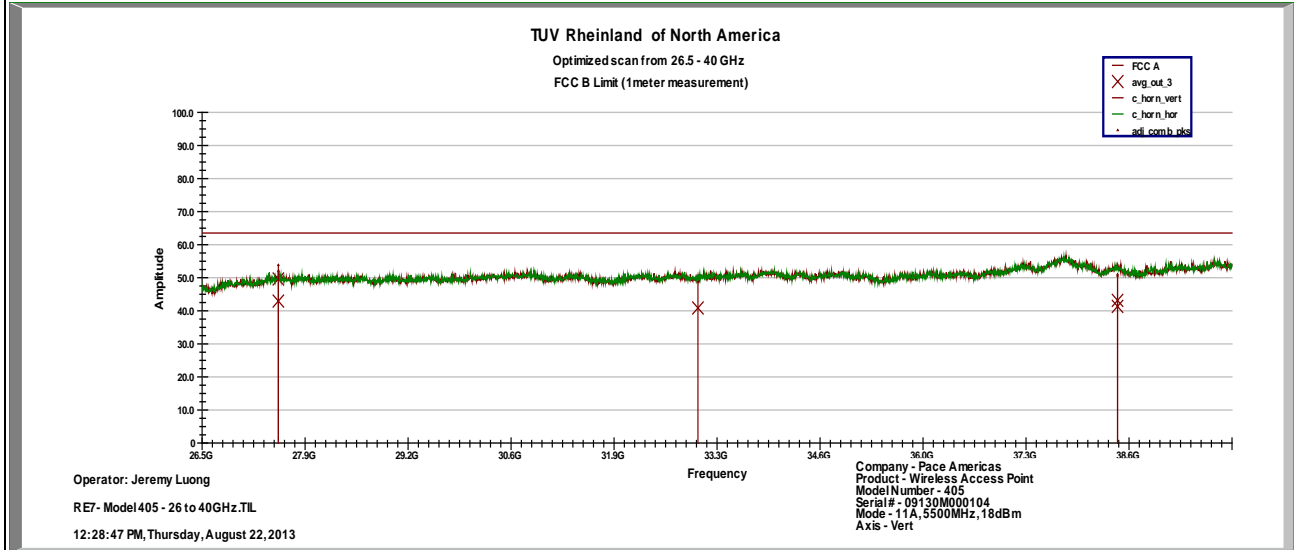
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

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EUT Name	Wireless Video Access Point	Date	August 22, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz



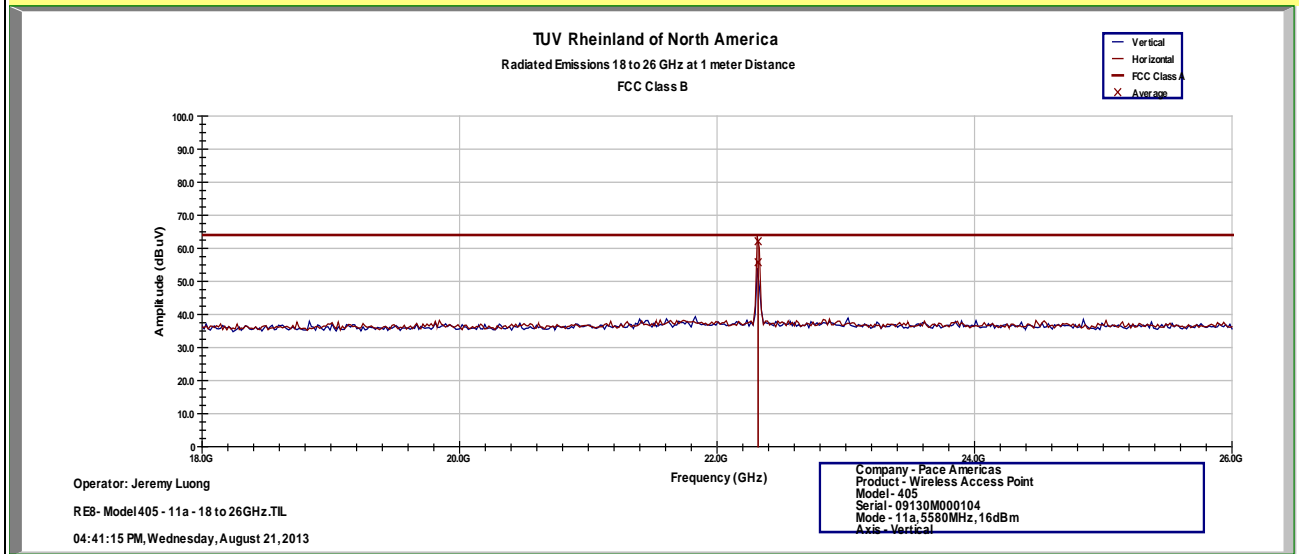
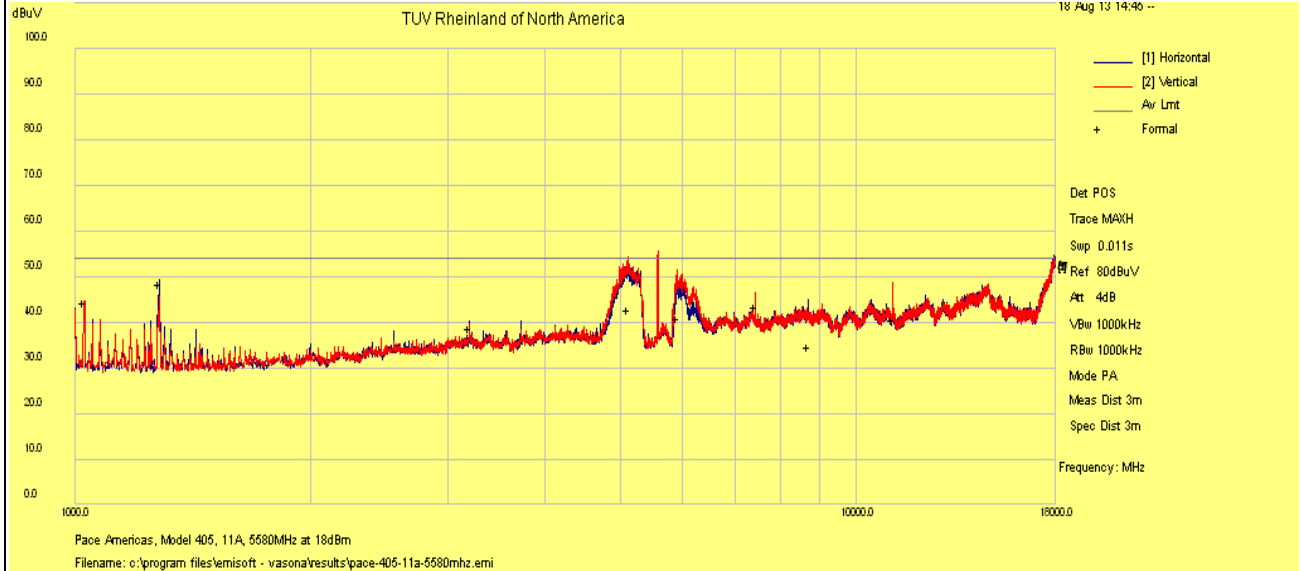
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	August 18 & 21, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



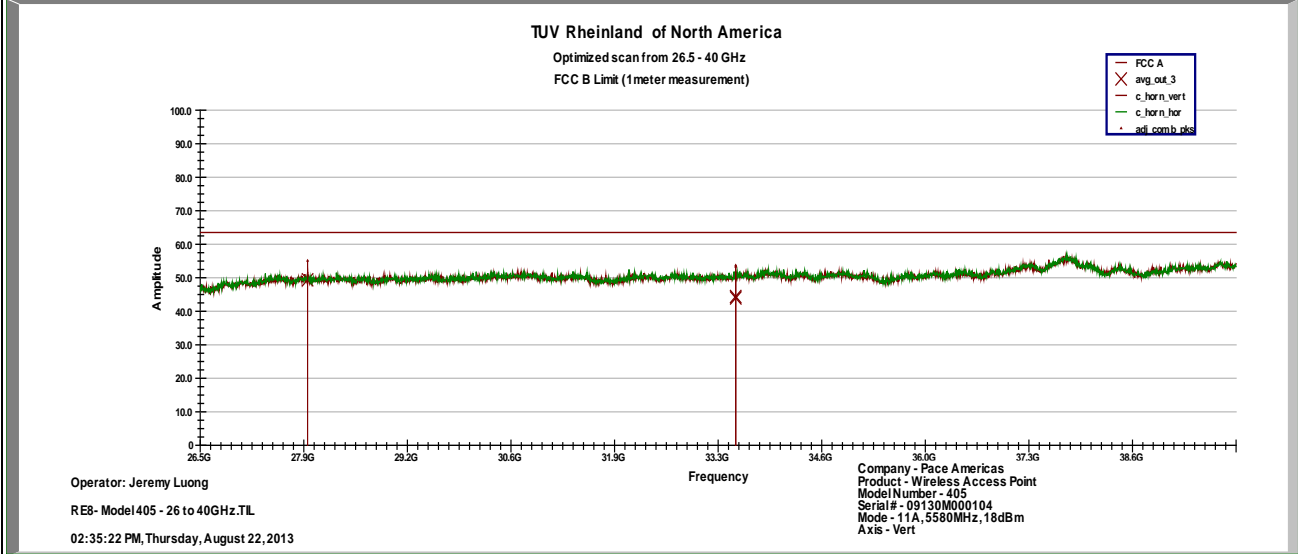
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	August 22, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



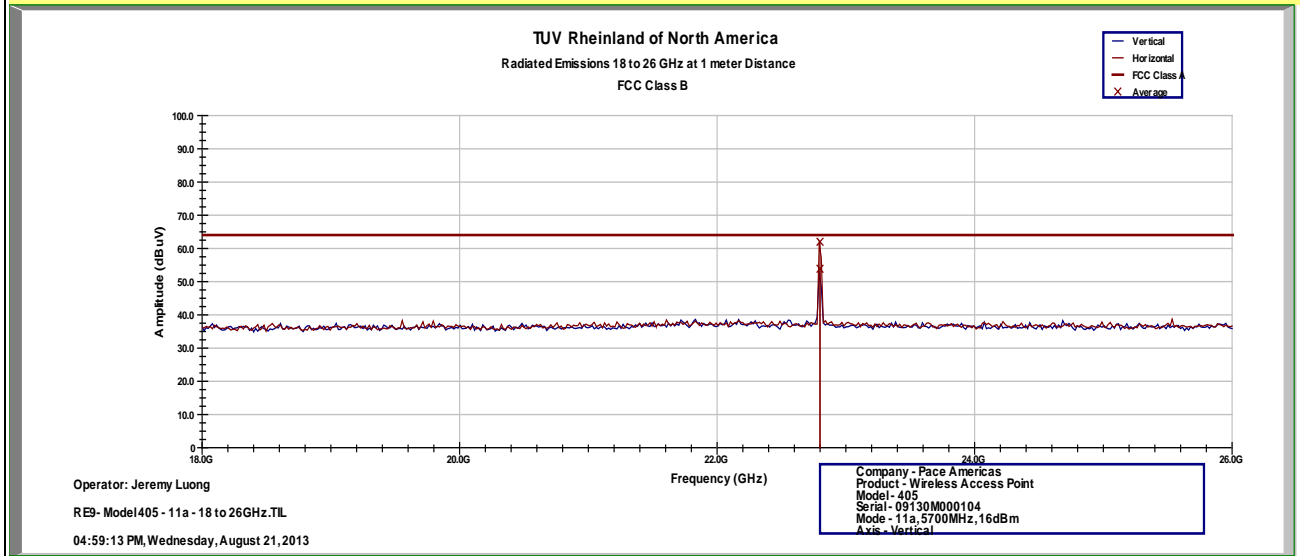
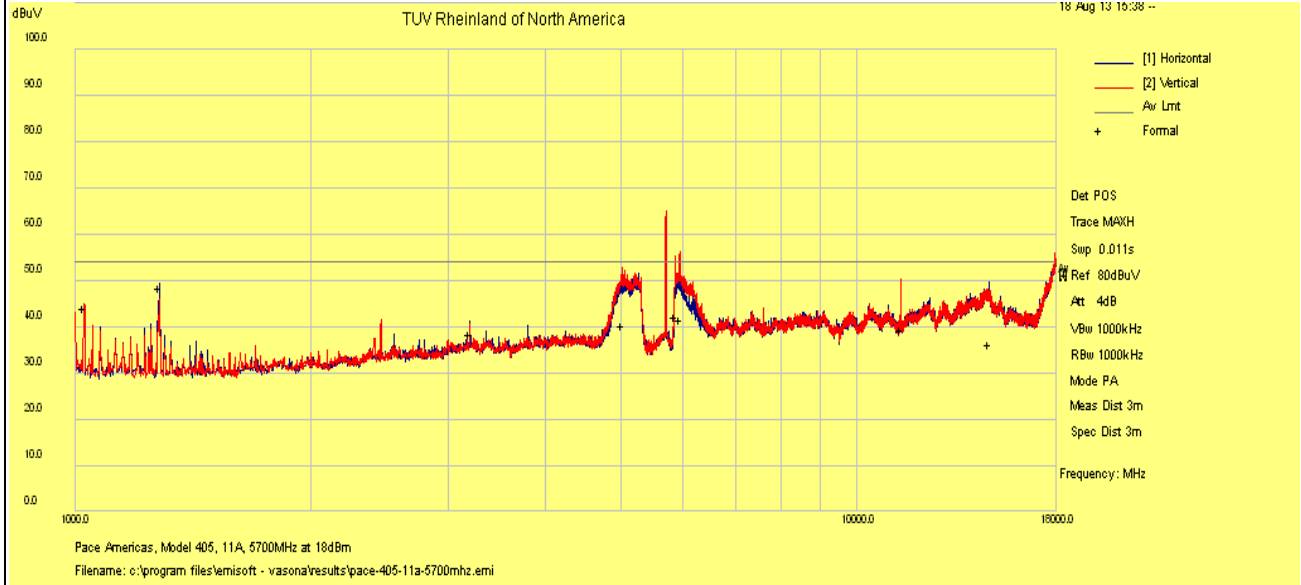
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	August 18 & 21, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz



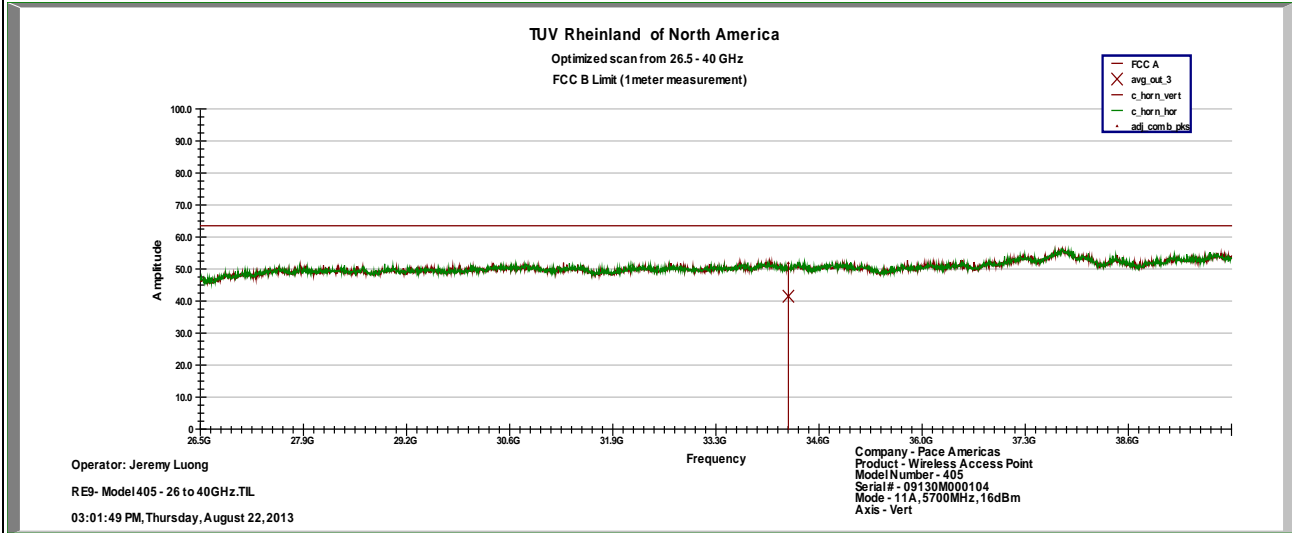
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

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EUT Name	Wireless Video Access Point	Date	August 22, 2013
EUT Model	405	Temp / Hum in	23°C / 45%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11a at 6 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz



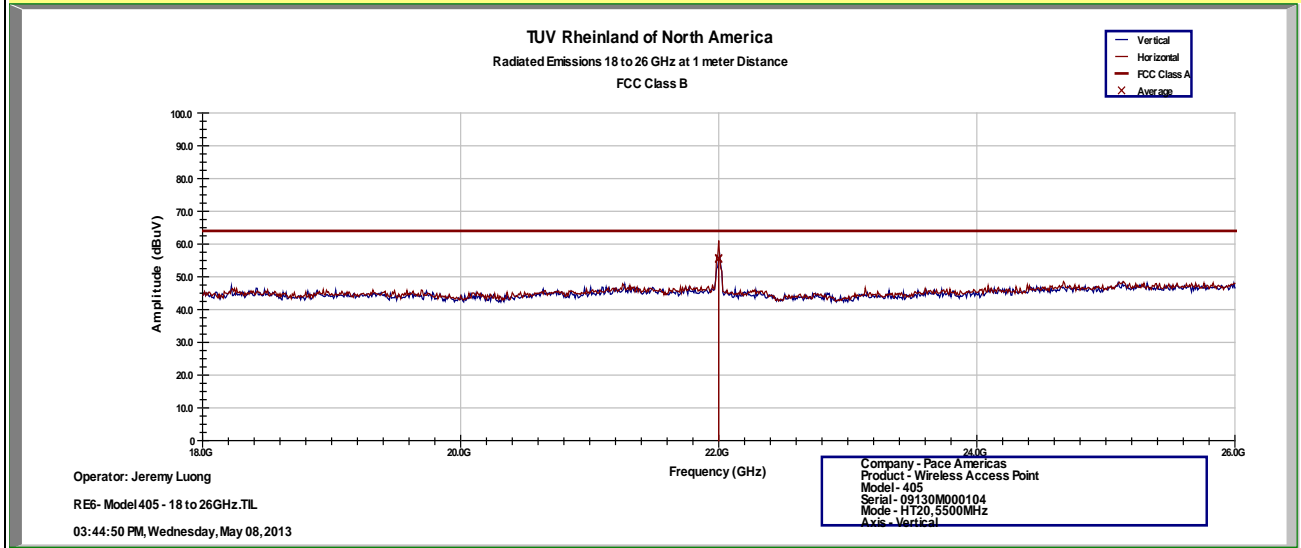
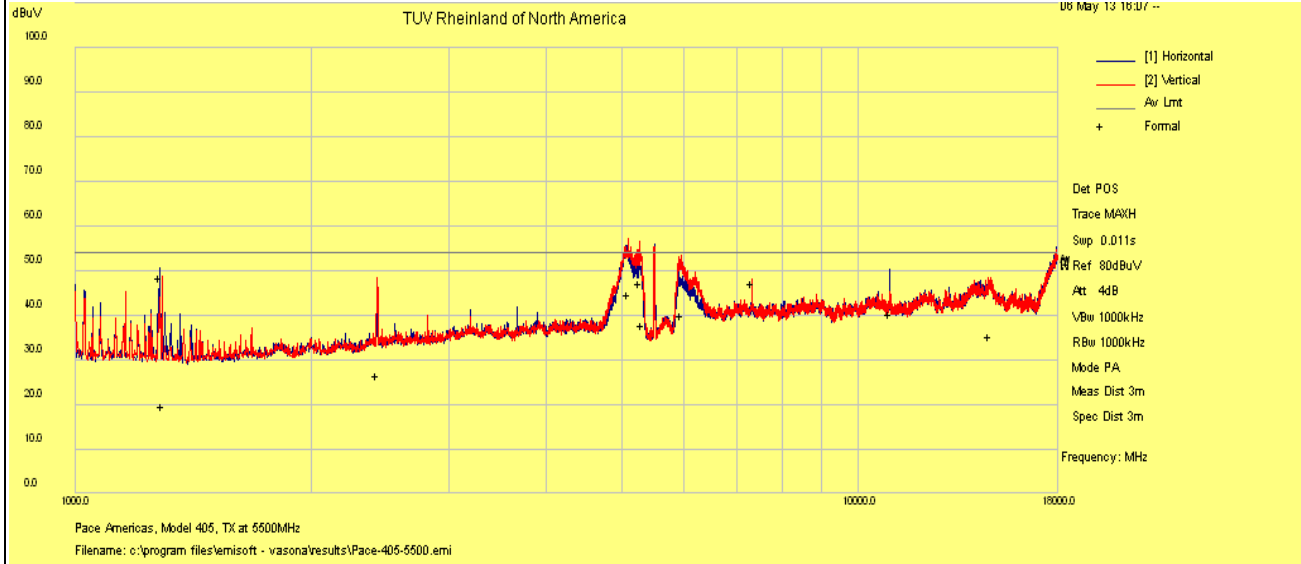
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 8, 2013
EUT Model	405	Temp / Hum in	23°C / 30%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz



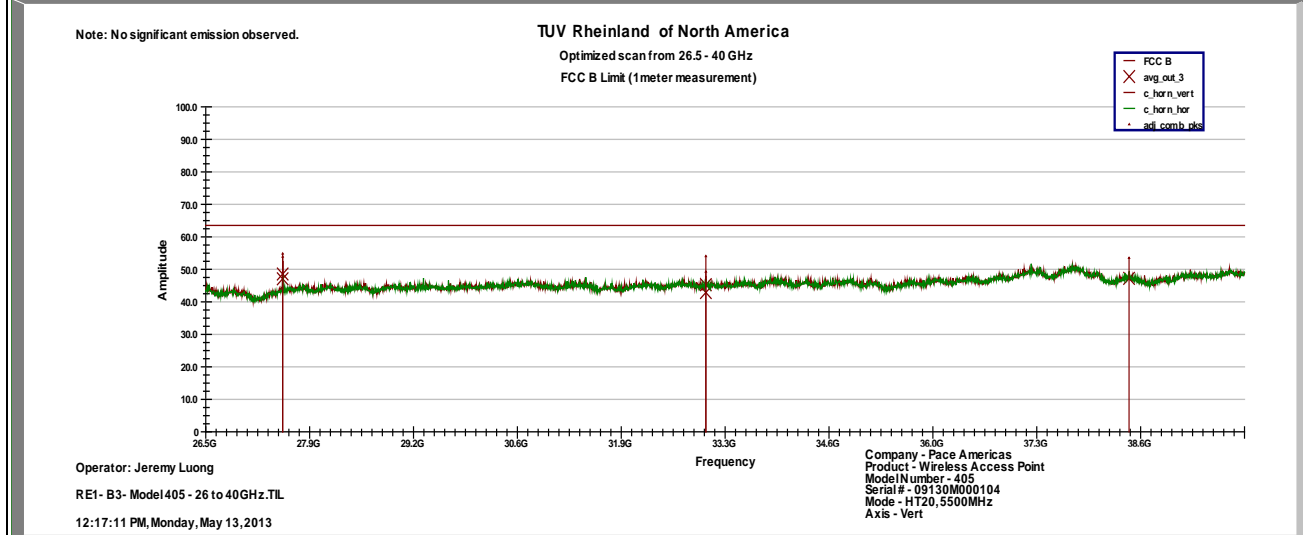
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5500 MHz



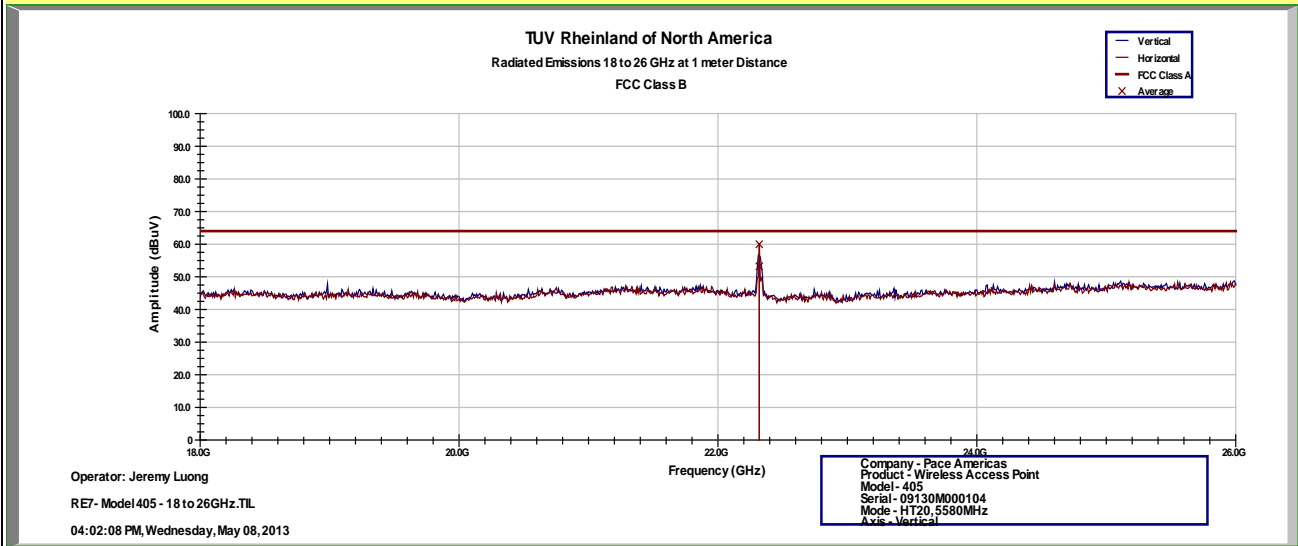
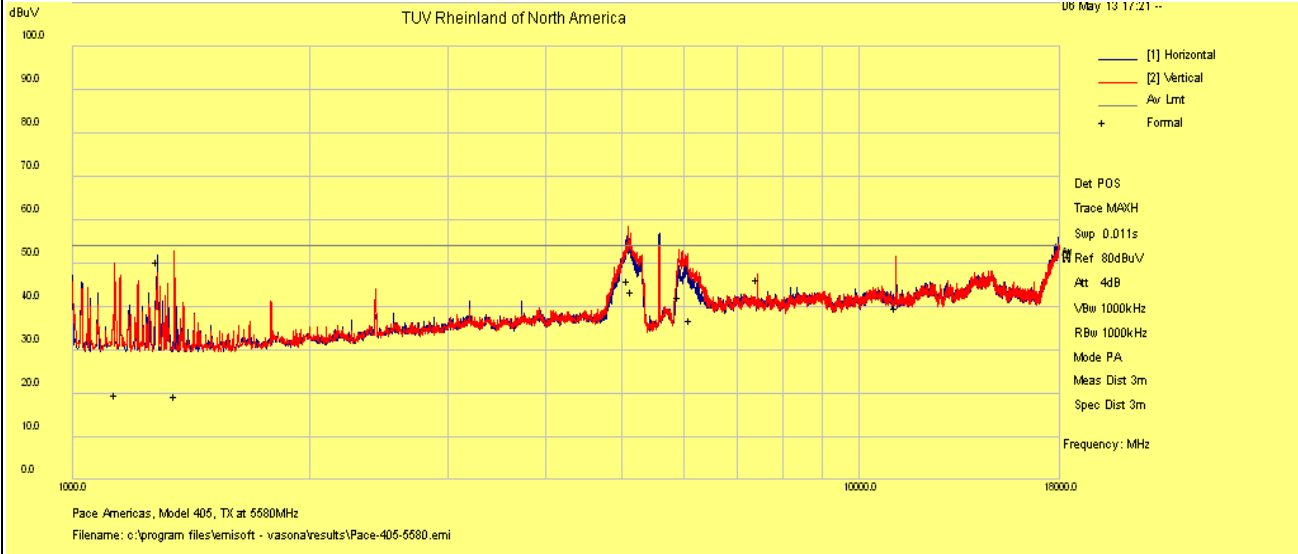
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 8, 2013
EUT Model	405	Temp / Hum in	23°C / 30%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



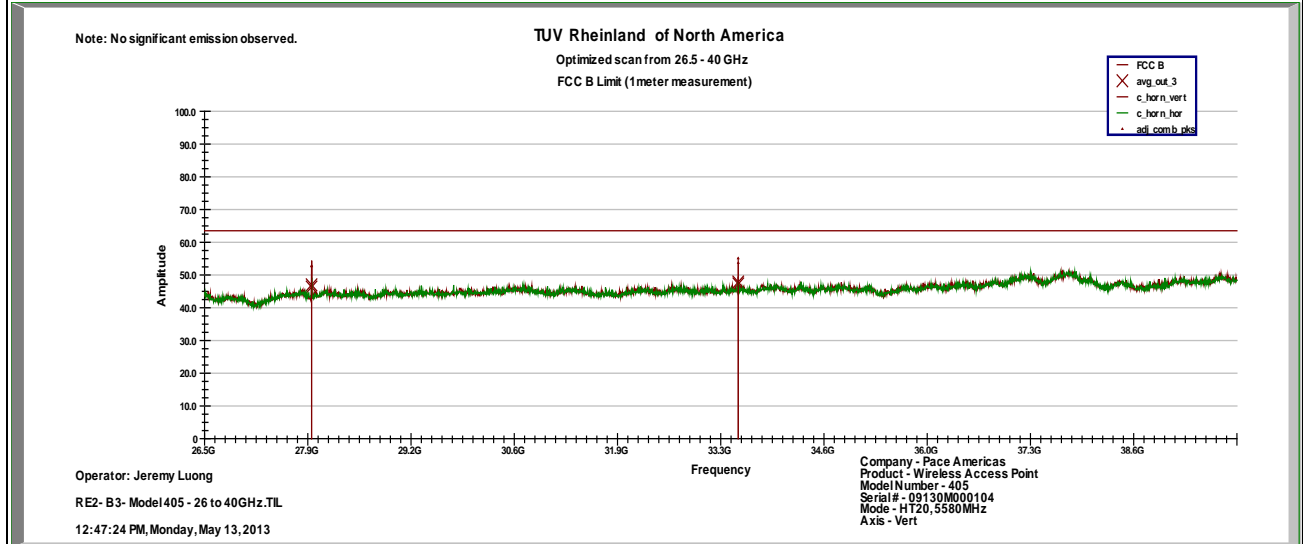
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5580 MHz



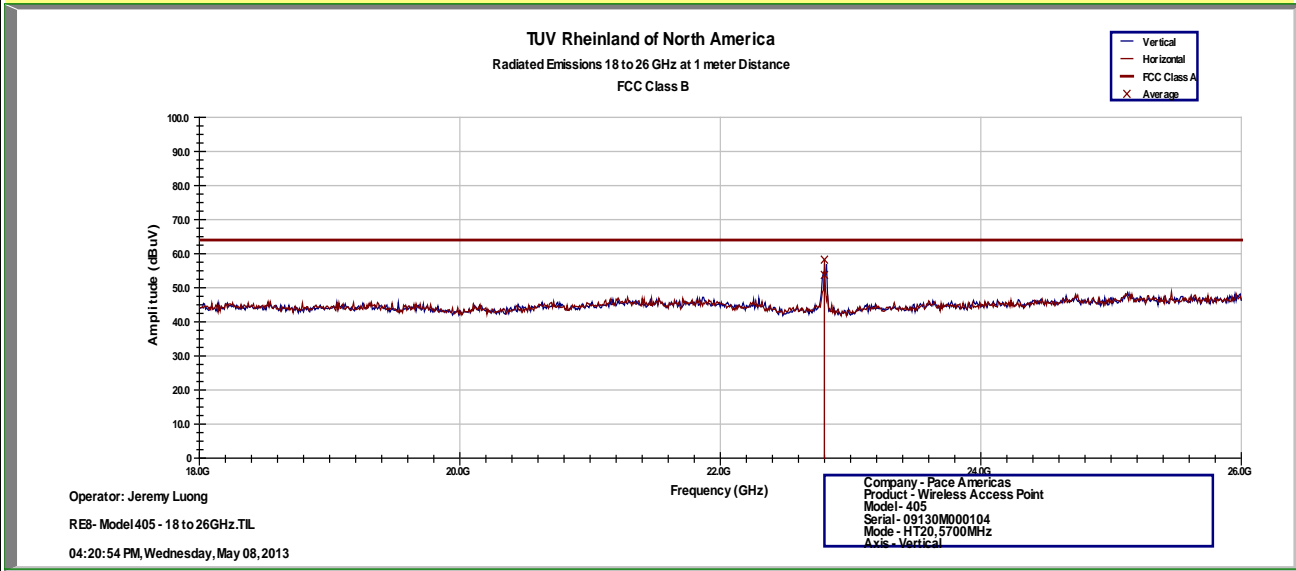
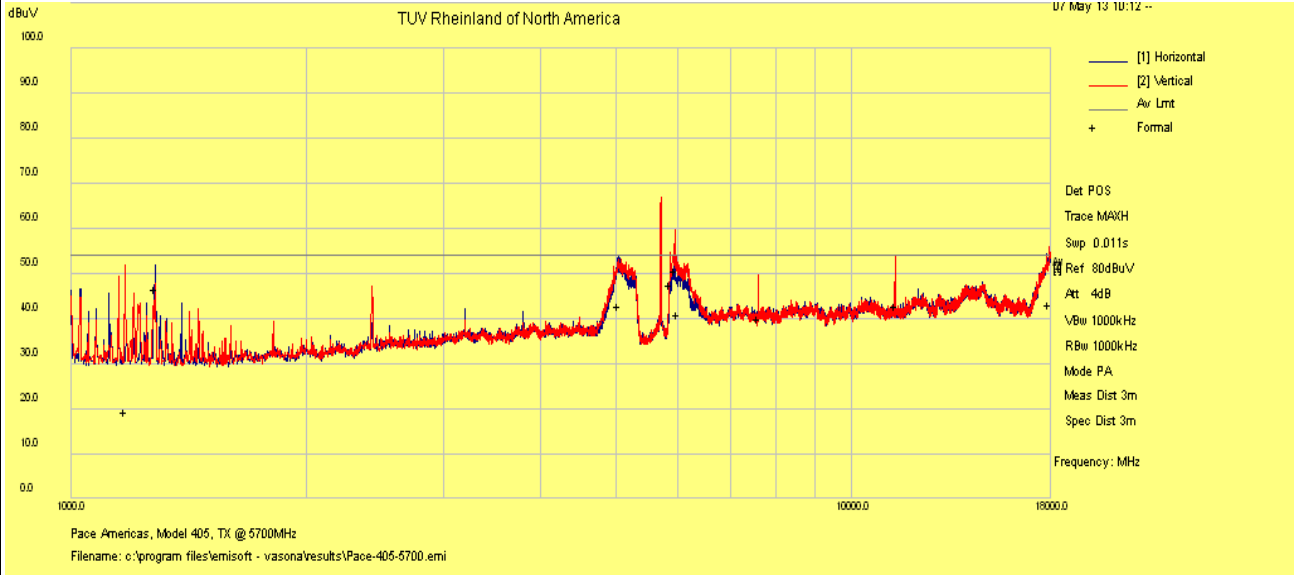
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 7 & 8, 2013
EUT Model	405	Temp / Hum in	23°C / 23%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz



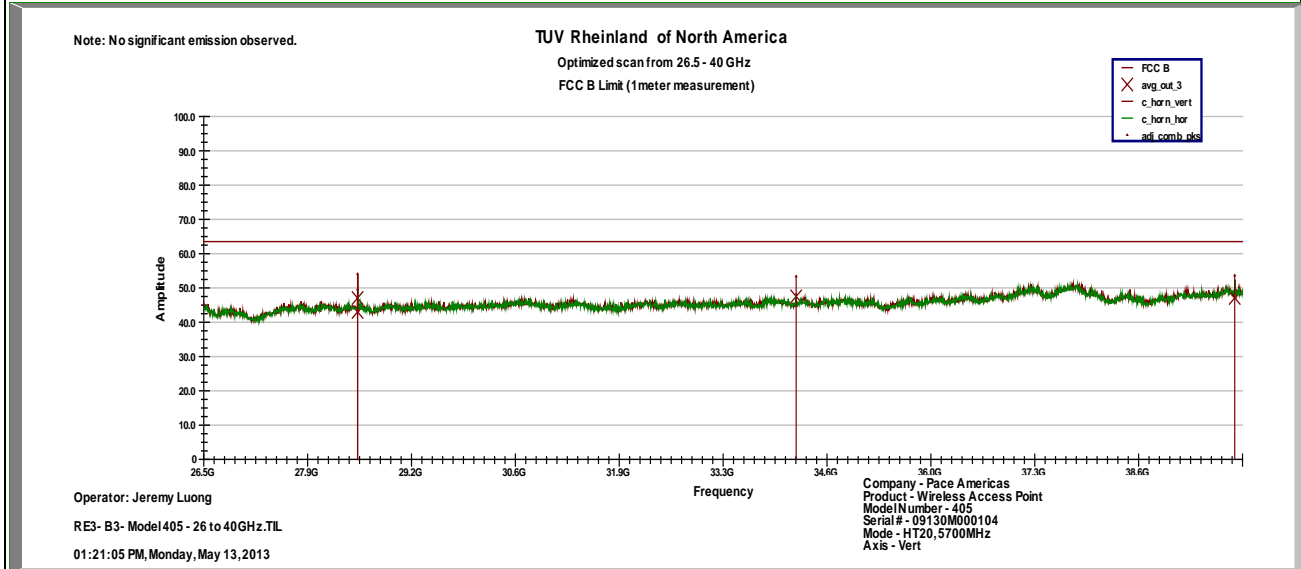
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11n HT20 at 6.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5700 MHz



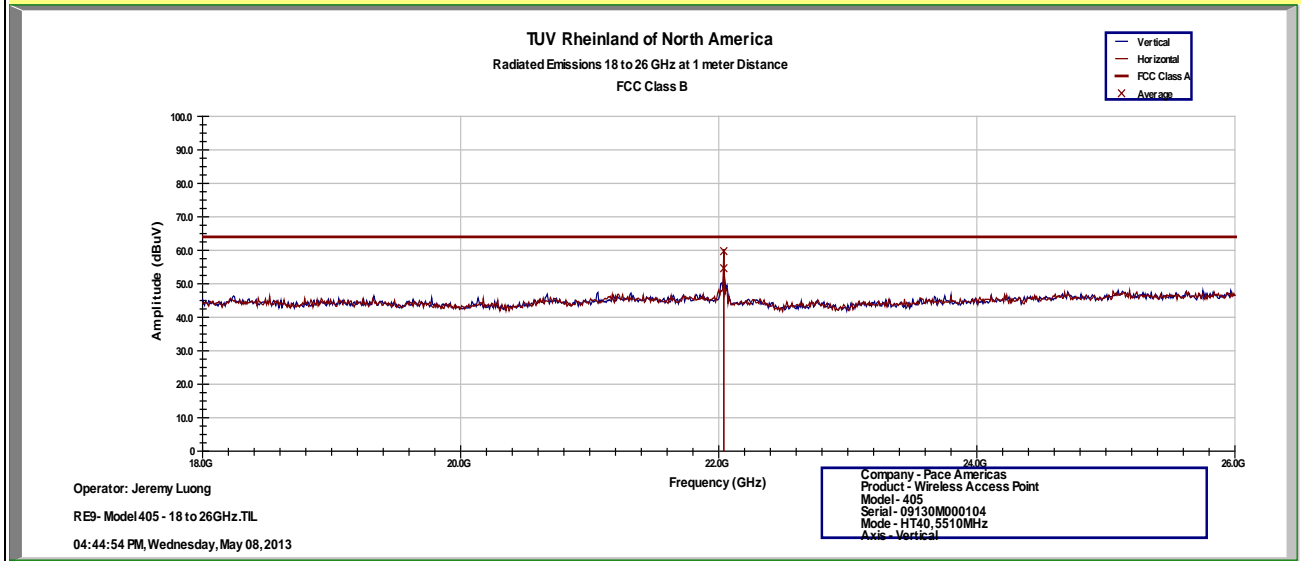
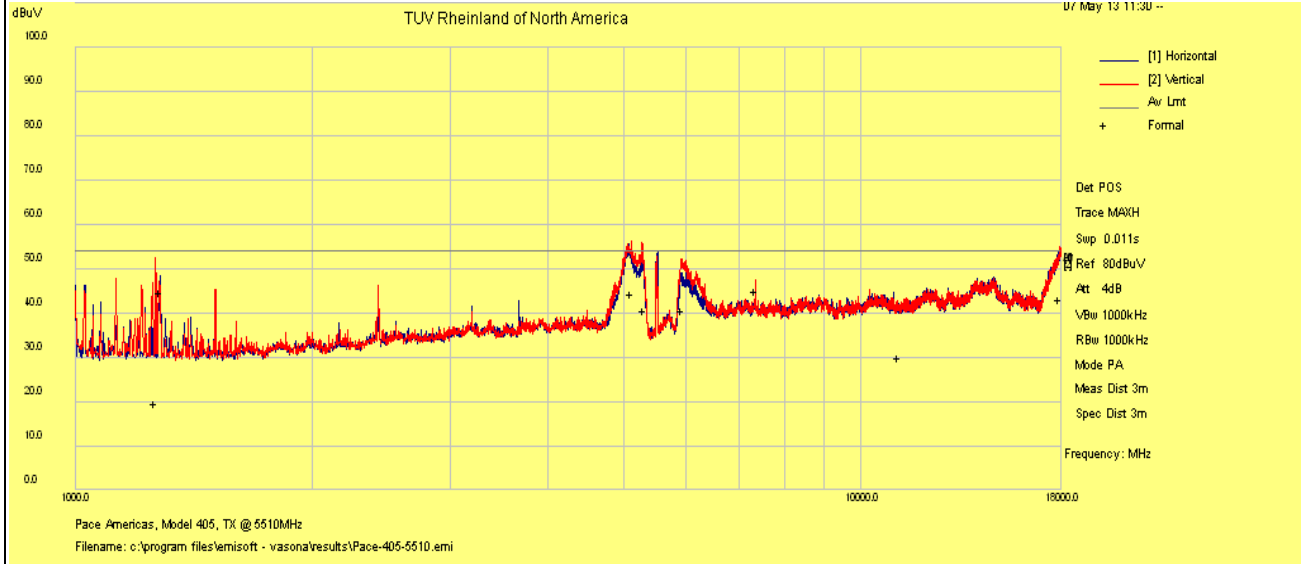
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

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EUT Name	Wireless Video Access Point	Date	May 7 & 8, 2013
EUT Model	405	Temp / Hum in	23°C / 30%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5510 MHz



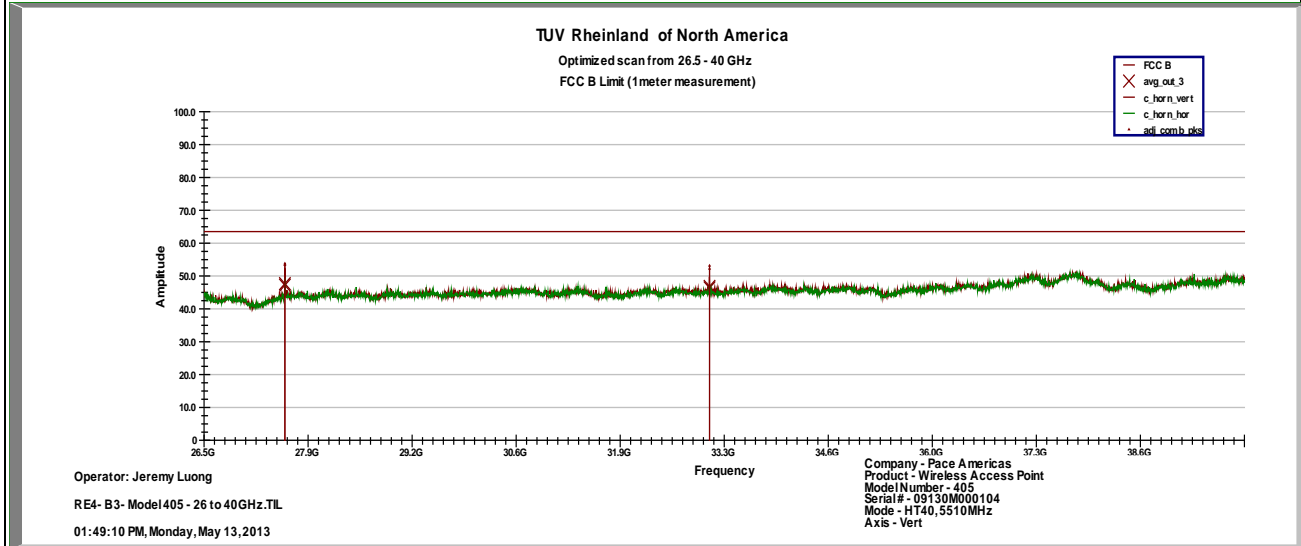
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5510 MHz



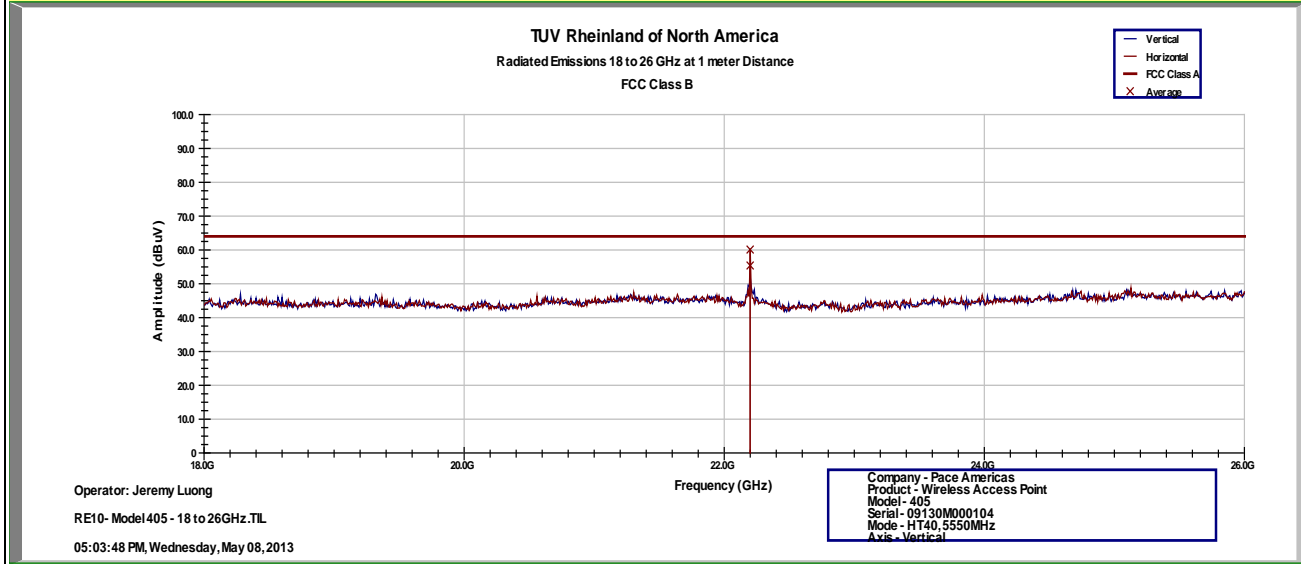
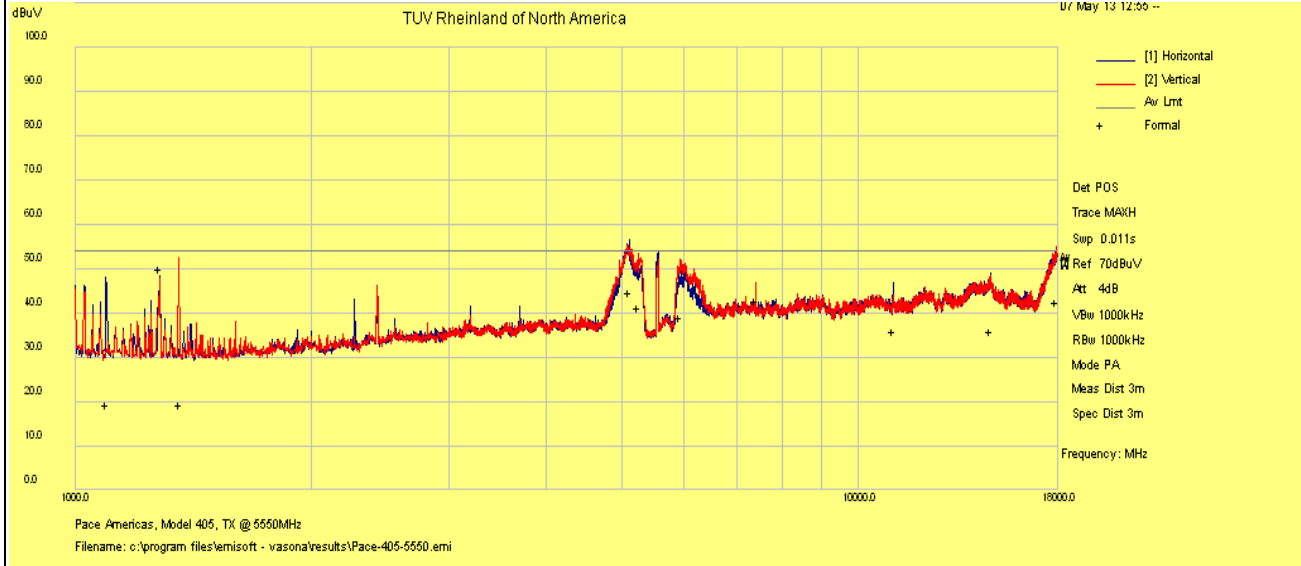
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 7 & 8, 2013
EUT Model	405	Temp / Hum in	23°C / 30%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5550 MHz



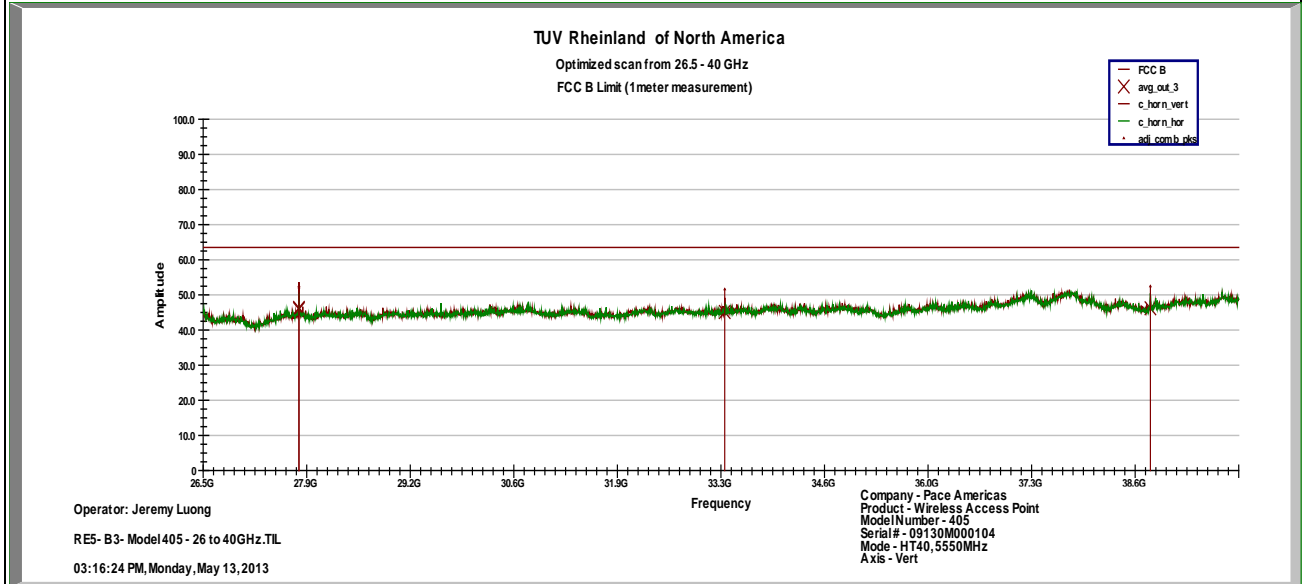
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.
 1 GHz – 26 GHz Setting: RBW = 1 MHz/ VBW = 3 MHz

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5550 MHz



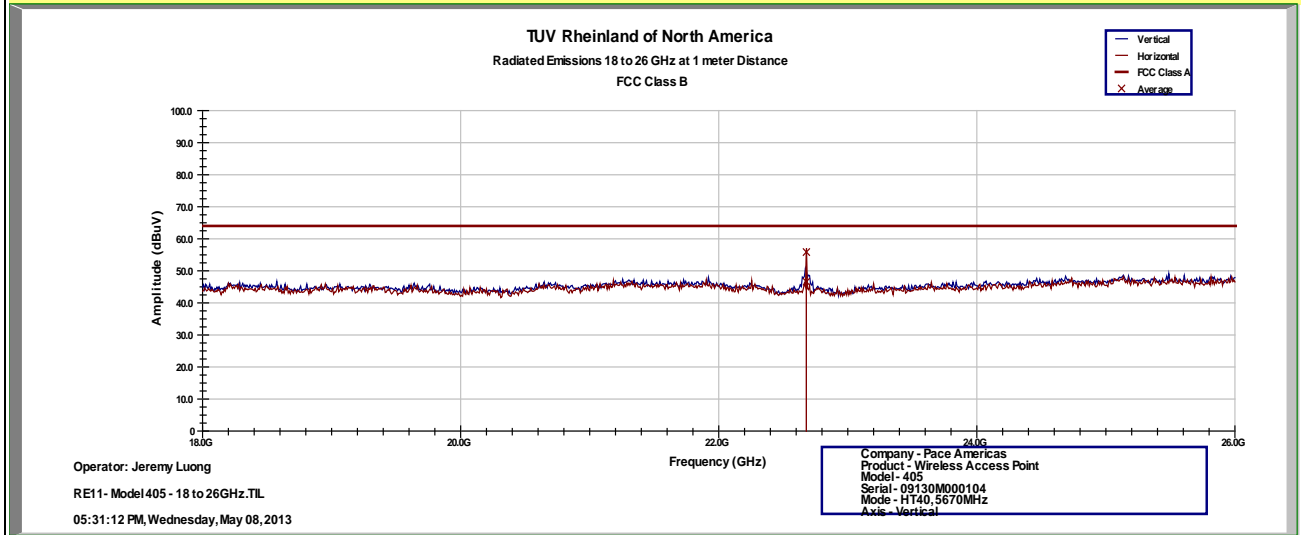
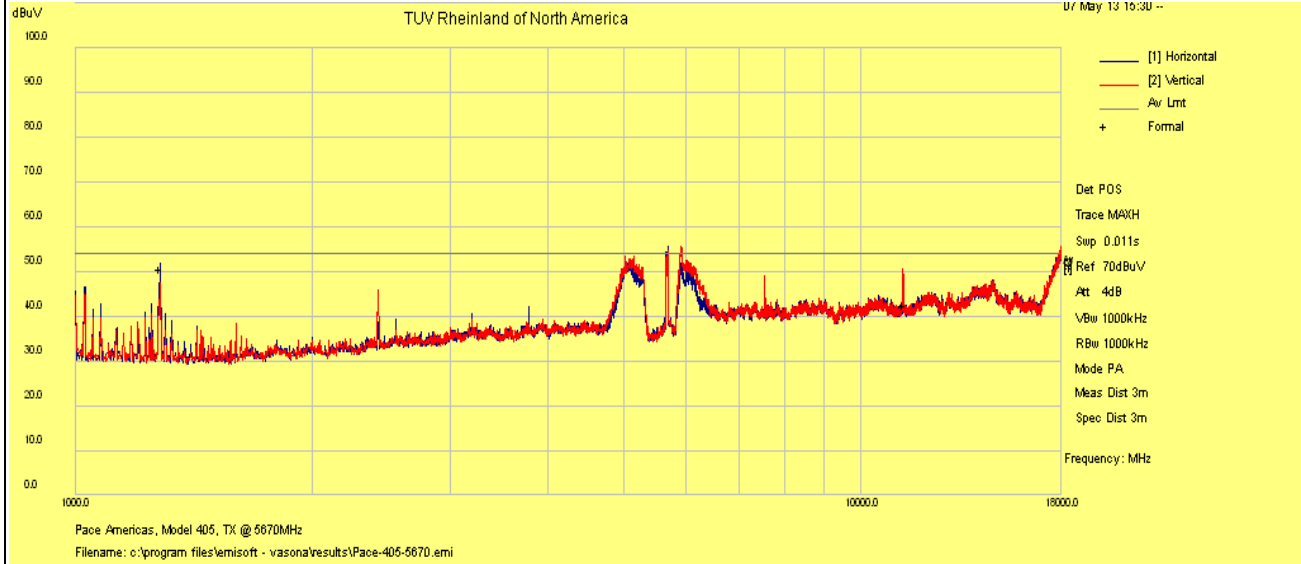
Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 7 & 8, 2013
EUT Model	405	Temp / Hum in	23°C / 30%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5670 MHz



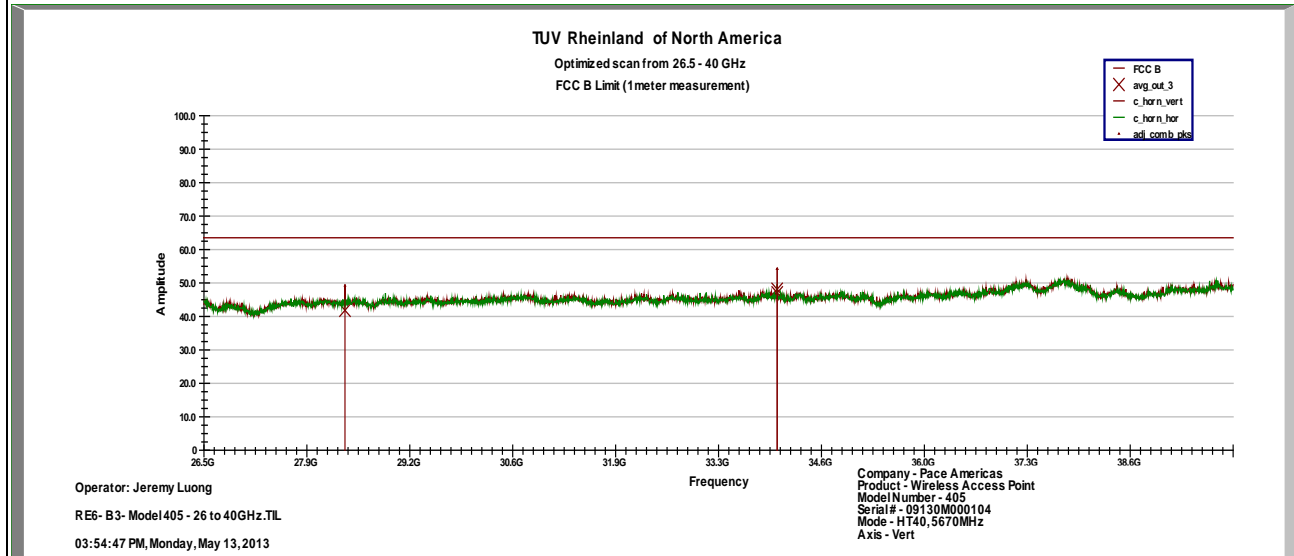
Notes: Limit was extrapolated to 1m distance for 18 GHz – 26 GHz range.
 1 GHz – 26 GHz Setting: RBW = 1 MHz/ VBW = 3 MHz

SOP 1 Radiated Emissions

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EUT Name	Wireless Video Access Point	Date	May 13, 2013
EUT Model	405	Temp / Hum in	23°C / 28%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Y-Axis, 802.11 HT40 at 13.5 Mbps	Line AC	120 Vac 60 Hz
Standard	CFR47 Part 15 Subpart C	RBW / VBW	1 MHz / 3 MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	Performed by	Jeremy Luong

Above 1 GHz Plots for Transmit Mode at 5670 MHz



Notes: Limit was extrapolated to 1m distance for 26.5 GHz – 40 GHz range.

4.5.4 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{FIM} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: FIM = Field Intensity Meter (dBμV)
 AMP = Amplifier Gain (dB)
 CBL = Cable Loss (dB)
 ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V} / \text{m}}{20}}$$

4.6 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.4: 2010. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207: 2012 and RSS 210: 2010.

4.6.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50µH / 50Ω LISNs.

Testing is performed in Lab 5. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.6.1.1 Deviations

There were no deviations from this test methodology.

4.6.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 8: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only		
Antenna Type: Attached		Power Level: See Test Plan
AC Power: 120 Vac/60 Hz		Configuration: Tabletop
Ambient Temperature: 23° C		Relative Humidity: 31% RH
Configuration	Frequency Range	Test Result
Line 1 (Hot)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

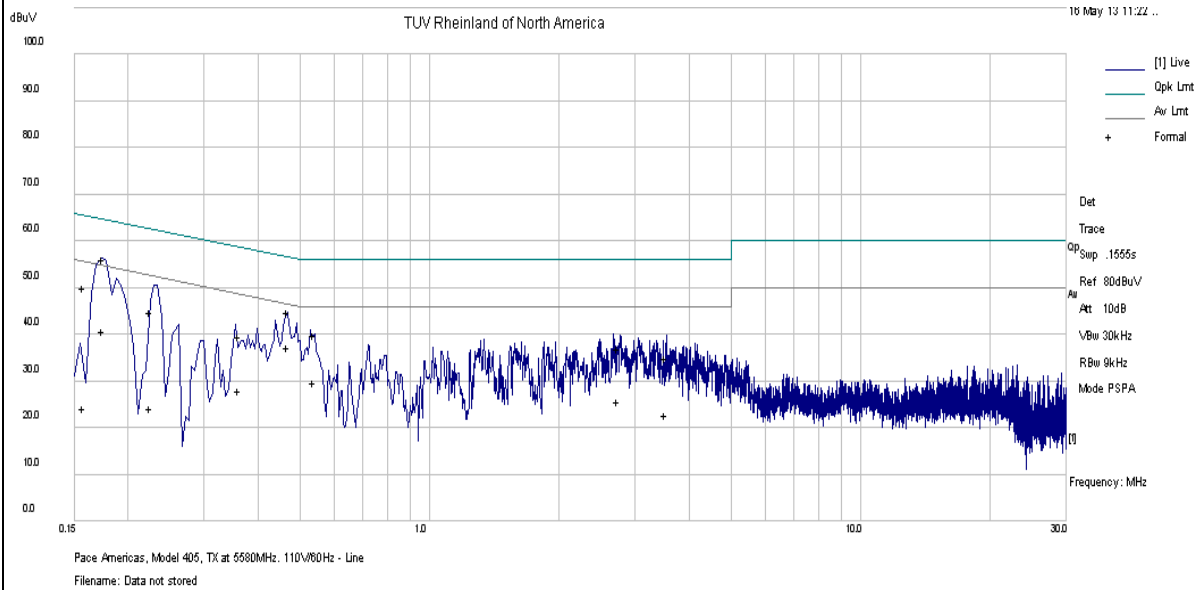
SOP 2 Conducted Emissions						Tracking # 31360999.004 Page 1 of 4				
EUT Name	Wireless Video Access Point					Date	May 16, 2013			
EUT Model	405					Temp / Hum in	23°C / 32%rh			
EUT Serial	09130M000104					Temp / Hum out	N/A			
EUT Config.	Attached Antenna					Line AC / Freq	120 Vac/60 Hz			
Standard	CFR47 Part 15.207					RBW / VBW	9kHz / 30 kHz			
Lab/LISN	Lab #2 /Com-Power, Line 1					Performed by	Jeremy Luong			
Frequency	Raw	Cable Loss	Ins. Loss	Level	Detector	Line	Limit	Margin	Result	
MHz	dBuV	dB	dB	dBuV			dBuV	dB		
0.158	50.20	0.02	-0.10	50.12	QP	Line	65.57	-15.45	Pass	
0.158	24.13	0.02	-0.10	24.05	Ave	Line	55.57	-31.52	Pass	
0.175	56.18	0.02	-0.09	56.11	QP	Line	64.73	-8.62	Pass	
0.175	40.83	0.02	-0.09	40.76	Ave	Line	54.73	-13.97	Pass	
0.225	44.79	0.02	-0.07	44.74	QP	Line	62.63	-17.89	Pass	
0.225	24.08	0.02	-0.07	24.03	Ave	Line	52.63	-28.60	Pass	
0.361	39.52	0.03	-0.05	39.50	QP	Line	58.70	-19.20	Pass	
0.361	27.85	0.03	-0.05	27.83	Ave	Line	48.70	-20.87	Pass	
0.470	44.67	0.03	-0.05	44.65	QP	Line	56.51	-11.86	Pass	
0.470	37.34	0.03	-0.05	37.32	Ave	Line	46.51	-9.19	Pass	
0.540	39.81	0.03	-0.04	39.80	QP	Line	56.00	-16.20	Pass	
0.540	29.82	0.03	-0.04	29.81	Ave	Line	46.00	-16.19	Pass	
2.746	36.76	0.08	-0.04	36.80	QP	Line	56.00	-19.20	Pass	
2.746	25.65	0.08	-0.04	25.69	Ave	Line	46.00	-20.31	Pass	
3.532	34.92	0.09	-0.03	34.98	QP	Line	56.00	-21.02	Pass	
3.532	22.61	0.09	-0.03	22.67	Ave	Line	46.00	-23.33	Pass	
Spec Margin = QP./Ave. - Limit, ± Uncertainty										
Combined Standard Uncertainty $u_c(y) = \pm 1.2$ dB Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence										
Notes: EUT was setup as table top equipment and transmitted at 5580 MHz in HT20 at 6.5 Mbps										

SOP 2 Conducted Emissions

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EUT Name	Wireless Video Access Point	Date	May 16, 2013
EUT Model	405	Temp / Hum in	23°C / 32%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Attached Antenna	Line AC	120 Vac/60 Hz
Standard	CFR47 Part 15.207	RBW / VBW	9kHz / 30 kHz
Lab/LISN	Lab #2 /Com-Power, Line 1	Performed by	Jeremy Luong

150 kHz to 30 MHz Plot for Line 1 (Hot)



Notes: Meet FCC Class B limit.

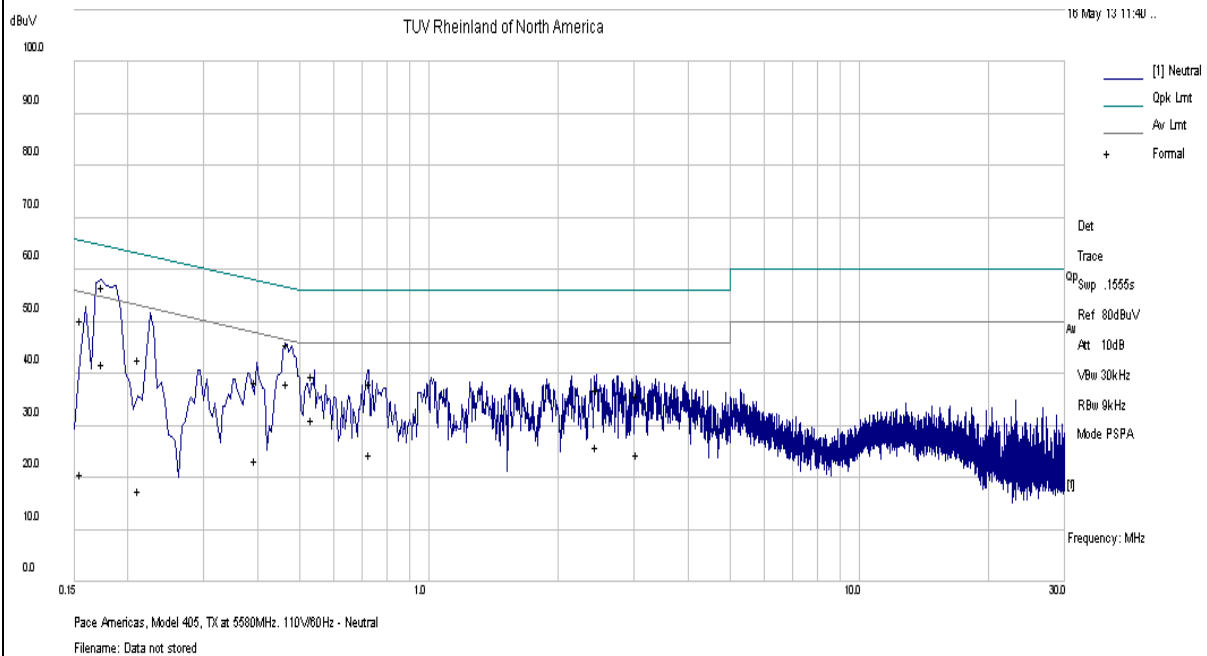
SOP 2 Conducted Emissions						Tracking # 31360999.004 Page 3 of 4			
EUT Name		Wireless Video Access Point				Date		May 16, 2013	
EUT Model		405				Temp / Hum in		23°C / 32%rh	
EUT Serial		09130M000104				Temp / Hum out		N/A	
EUT Config.		Attached Antenna				Line AC / Freq		120 Vac/60 Hz	
Standard		CFR47 Part 15.207				RBW / VBW		9kHz / 30 kHz	
Lab/LISN		Lab #2 /Com-Power, Line 2				Performed by		Jeremy Luong	
Frequency	Raw	Cable Loss	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.156	50.46	0.02	-0.10	50.38	QP	Neutral	65.69	-15.31	Pass
0.156	20.75	0.02	-0.10	20.67	Ave	Neutral	55.69	-35.02	Pass
0.175	56.60	0.02	-0.09	56.53	QP	Neutral	64.72	-8.19	Pass
0.175	41.85	0.02	-0.09	41.78	Ave	Neutral	54.72	-12.94	Pass
0.212	42.70	0.02	-0.07	42.65	QP	Neutral	63.11	-20.46	Pass
0.212	17.62	0.02	-0.07	17.57	Ave	Neutral	53.11	-35.54	Pass
0.396	38.36	0.03	-0.05	38.34	QP	Neutral	57.94	-19.60	Pass
0.396	23.37	0.03	-0.05	23.35	Ave	Neutral	47.94	-24.59	Pass
0.469	45.70	0.03	-0.05	45.68	QP	Neutral	56.52	-10.84	Pass
0.469	37.97	0.03	-0.05	37.95	Ave	Neutral	46.52	-8.57	Pass
0.536	39.48	0.03	-0.04	39.47	QP	Neutral	56.00	-16.53	Pass
0.536	31.15	0.03	-0.04	31.14	Ave	Neutral	46.00	-14.86	Pass
0.729	38.18	0.04	-0.04	38.18	QP	Neutral	56.00	-17.82	Pass
0.729	24.57	0.04	-0.04	24.57	Ave	Neutral	46.00	-21.43	Pass
2.456	36.90	0.07	-0.04	36.93	QP	Neutral	56.00	-19.07	Pass
2.456	25.86	0.07	-0.04	25.89	Ave	Neutral	46.00	-20.11	Pass
3.051	35.69	0.08	-0.04	35.73	QP	Neutral	56.00	-20.27	Pass
3.051	24.27	0.08	-0.04	24.31	Ave	Neutral	46.00	-21.69	Pass
Spec Margin = QP./Ave. - Limit, ± Uncertainty									
Combined Standard Uncertainty $u_c(y) = \pm 1.2$ dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence									
Notes: EUT was setup as table top equipment and transmitted at 5580 MHz in HT20 at 6.5 Mbps									

SOP 2 Conducted Emissions

Tracking # 31360999.004 Page 4 of 4

EUT Name	Wireless Video Access Point	Date	May 16, 2013
EUT Model	405	Temp / Hum in	23°C / 32%rh
EUT Serial	09130M000104	Temp / Hum out	N/A
EUT Config.	Attached Antenna	Line AC	120 Vac/60 Hz
Standard	CFR47 Part 15.107	RBW / VBW	9kHz / 30 kHz
Lab/LISN	Lab #2 /Com-Power, Line 2	Performed by	Jeremy Luong

150 kHz to 30 MHz Plot for Line 2 (Neutral)



Note: Meet FCC Class B Limit.

4.7 Frequency Stability

In accordance with 47 CFR Part 15.407(g) the frequency stability of U-NII devices must be such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual. The Manufacturer calls out operating temperature ranges of +0° to +40° C

4.7.1 Test Methodology

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions. This test performs according to ANSI C63.10-2009 Section 6.8

4.7.2 Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signal should have ± 20 ppm stability.

This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

Worst case:

5.200 GHz - ± 20 ppm/104 kHz

± 20 ppm at 5 GHz translates to a maximum frequency shift of ± 103 kHz. As the edge of the channels are at least one MHz from either of the band edges, ± 103 kHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the radio.

4.7.3 Limit

CFR47 Part 407(g) - Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

4.7.4 Test results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s) since the maximum frequency drift was 6.84 ppm.

Table 9: Frequency Stability – Test Results

Temperature	Time	-6 dB Lower Edge (MHz)	+6 dB Upper Edge (MHz)	Center Frequency (MHz)	PPM
40°C	Start	5198.93220	5201.01530	5199.97375	5.05
	2 Min.	5198.94570	5200.98520	5199.96545	6.64
	5 Min	5198.88210	5201.04680	5199.96445	6.84
	10 min	5198.88210	5201.04930	5199.96570	6.60
30°C	Start	5198.93220	5201.04080	5199.98650	2.60
	2 Min.	5198.93070	5201.01830	5199.97450	4.90
	5 Min	5198.93220	5201.01080	5199.97150	5.48
	10 min	5198.93220	5201.00780	5199.97000	5.77
20°C	Start	5198.93970	5201.06180	5200.00075	0.14
	2 Min.	5198.93670	5201.03780	5199.98725	2.45
	5 Min	5198.93520	5201.03180	5199.98350	3.17
	10 min	5198.93520	5201.02880	5199.98200	3.46
10°C	Start	5198.94420	5201.08130	5200.01275	2.45
	2 Min.	5198.93820	5201.06030	5199.99925	0.14
	5 Min	5198.93670	5201.05580	5199.99625	0.72
	10 min	5198.93670	5201.05430	5199.99550	0.87
0°C	Start	5198.94420	5201.09030	5200.01725	3.32
	2 Min.	5198.94420	5201.08130	5200.01275	2.45
	5 Min	5198.94420	5201.07680	5200.01050	2.02
	10 min	5198.94420	5201.07680	5200.01050	2.02

Note: 1. All frequency drifts were less than ± 20 ppm. The worst frequency drift was 6.84ppm/35.55kHz.
 2. Channel 5200 MHz was selected to frequency stability.

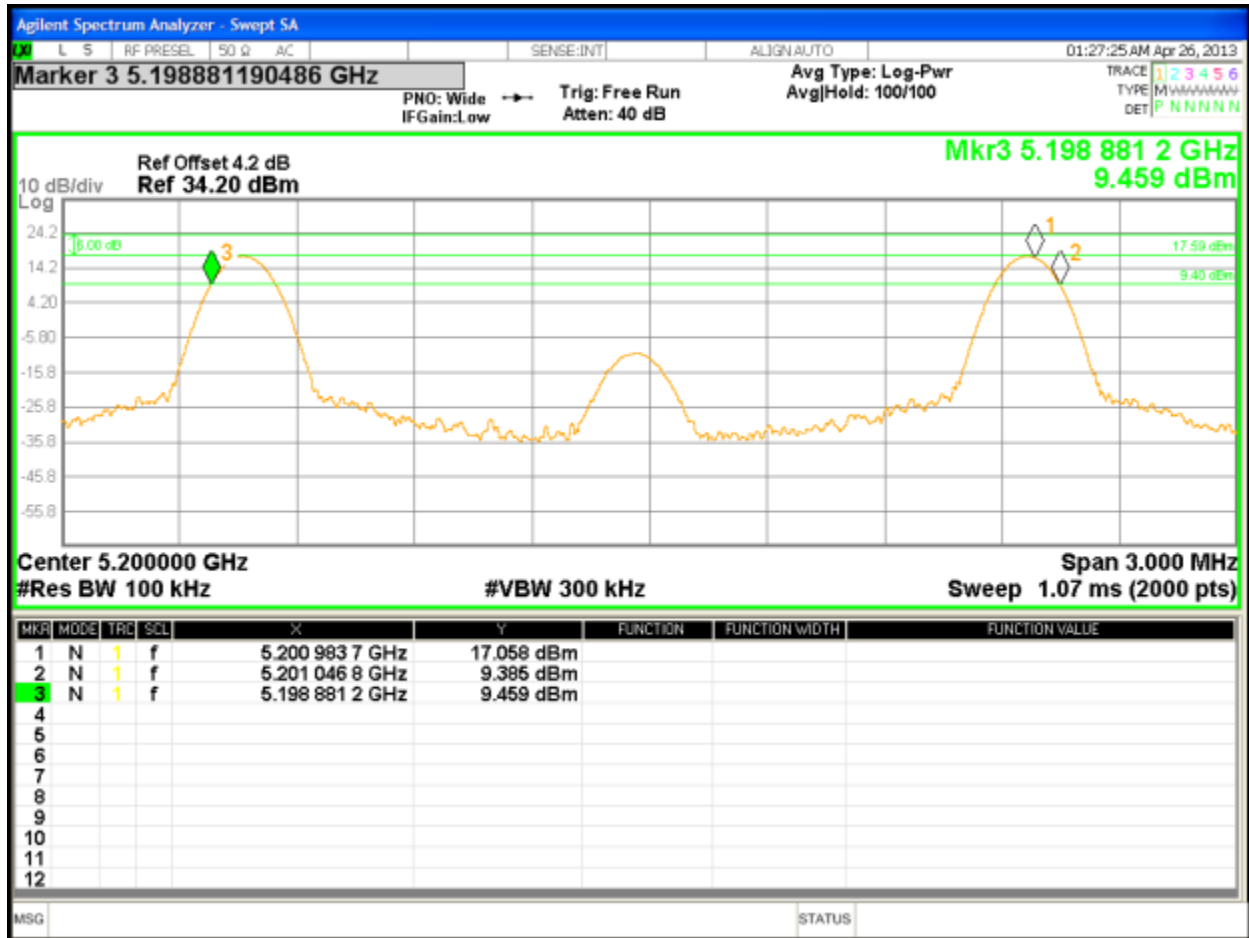


Figure 178: Frequency Stability – Worst Case

4.8 Voltage Variation

In accordance with 47 CFR Part 15.31 (e) intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.8.1 Test Methodology

The ac supply voltage was varied between 85% and 115% of the nominal rated supply voltage. The fundamental frequency was observed during the variation. The access point was powered 120 V/60 Hz by programmable power supply. The voltage was varied from 102 Vac to 138 Vac mean while the fundamental frequencies were observed and record for the maximum drift in ppm; part per millions.

4.8.2 Test results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s). The fundamental frequencies drifted less than ± 20 ppm.

Table 10: Voltage Variation – Test Results

Frequency MHz	Nominal (120 Vac) MHz	Low Voltage (102 Vac) MHz	High Voltage (138 Vac) MHz	Max Drift ppm
5500	5499.9640	5499.9675	5499.9634	6.66
5580	5579.9604	5579.9606	5579.9634	7.10
5700	5699.9589	5699.9595	5699.9584	7.31

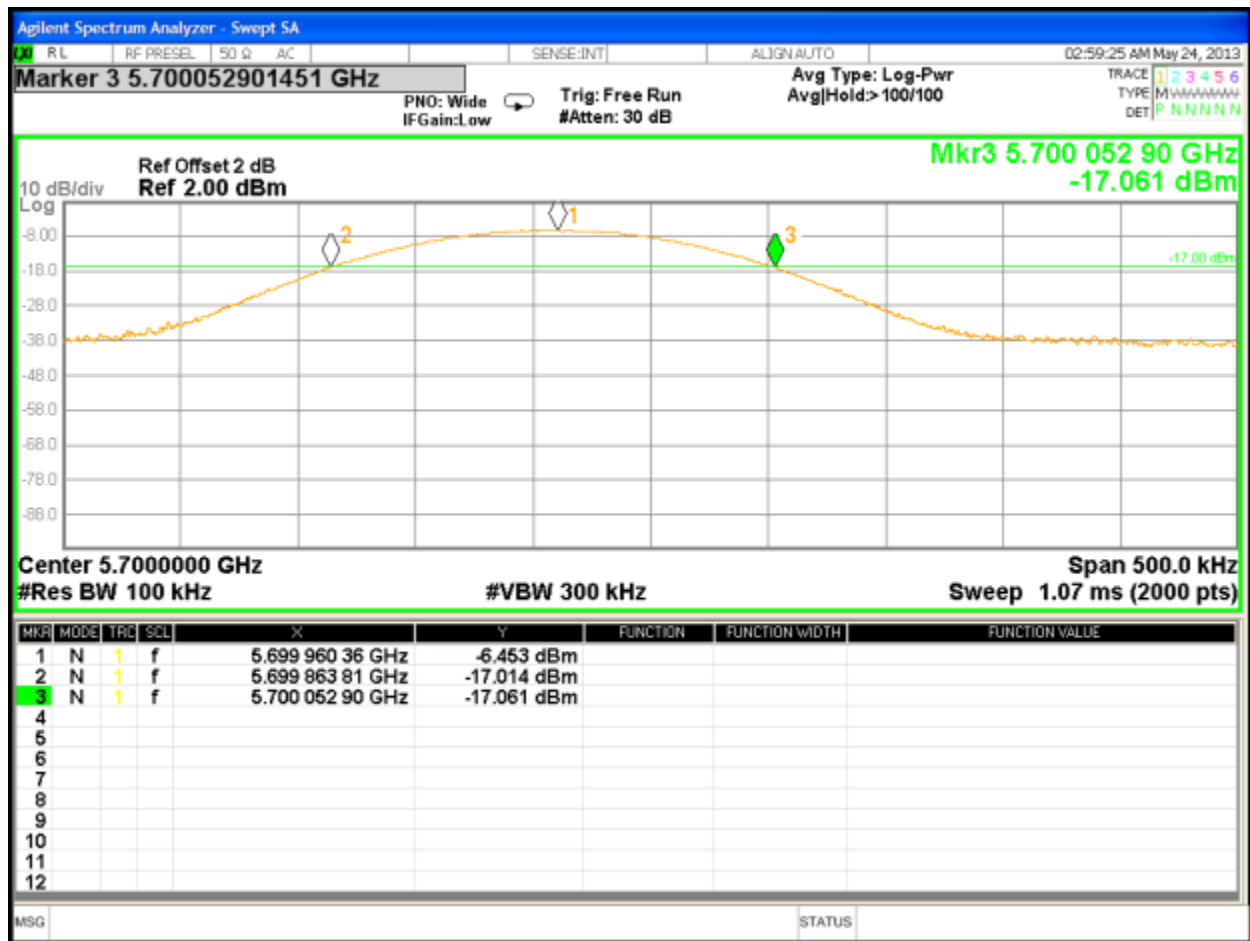


Figure 179: Voltage Variation – Worst Case

4.9 Maximum Permissible Exposure

4.9.1 Test Methodology

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this calculation is declared by the manufacturer, and the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

4.9.2 RF Exposure Limit

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	...	...	1.0	6
300 - 1500	...	...	f/300	6
1500 - 100,000	...	...	5	6
(B)Limits For General Population / Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/ f ²)	30
30–300	27.5	0.037	0.2	30
300 - 1500	...	...	f/1500	30
1500 - 100,000	...	...	1.0	30

F = Frequency in MHz

* = Plane-wave equivalent power density

4.9.3 EUT Operating Condition

The software provided by Manufacturer enabled the EUT to transmit data at lowest, middle and highest channel individually.

4.9.4 Classification

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in user's manual. So, this device is classified as a **Mobile Device**.

4.9.5 Test Results

4.9.5.1 Antenna Gain

The transmitting antenna was integrated. The directional antenna gain was +8.00 dBi or 6.31 (numeric).

4.9.5.2 Output Power into Antenna & RF Exposure value at distance 20cm:

Calculations for this report are based on highest power measurement.

Limit for MPE (from FCC part 1.1310 table1) is 1.0 mW/cm²

The highest measured total power is +21.81 dBm or 151.705mW

Using the Friss transmission formula, the EIRP is Pout*G, and R is 20cm.

$Pd = (151.705 * 6.31) / (1600\pi) = 0.1905 \text{ mW/cm}^2$, which is 0.80946 mW/cm² below to the limit.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.9.6 Sample Calculation

The Friss transmission formula: $Pd = (Pout * G) / (4 * \pi * R^2)$

Where;

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

$\pi \approx 3.1416$

R = distance between observation point and center of the radiator in cm

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

5 Test Equipment Use List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yy	Next Cal mm/dd/yy
Bilog Antenna	Sunol Sciences	JB3	A102606	05/15/2012	05/15/2014
Horn Antenna	Sunol Sciences	DRH-118	A040806	11/05/2012	11/05/2014
Antenna (18-26GHz)	CMT	RA42-K-F-4B-C	020131-004	03/05/2013	03/05/2014
Antenna (26-40 GHz)	CMT	RA28-K-F-4B-C	011469R-003	11/20/2012	11/20/2014
EMI Receiver	Hewlett Packard	8546A	3807A00445	01/18/2013	01/18/2014
Preselector	Hewlett Packard	85460A	3704A00407	01/18/2013	01/18/2014
Amplifier	Hewlett Packard	8447D	2944A07996	01/16/2013	01/16/2014
Spectrum Analyzer	Rohde & Schwarz	ESIB	832427/002	01/16/2013	01/16/2014
Amplifier	Rohde & Schwarz	TS-PR18	3545.7008.03	01/16/2013	01/16/2014
Amplifier	Rohde & Schwarz	TS-PR26	100011	03/05/2013	03/05/2014
Amplifier	Rohde & Schwarz	TS-PR40	100012	11/20/2012	11/20/2014
Signal Generator	Anritsu	MG3694A	42803	01/19/2013	01/19/2014
Notch Filter	Micro-Tronics	BRM50702	37	01/16/2013	01/16/2014
Notch Filter	Micro-Tronics	BRC50703	11	01/16/2013	01/16/2014
Notch Filter	Micro-Tronics	BRC50704	8	01/16/2013	01/16/2014
Notch Filter	Micro-Tronics	BRC50705	9	01/16/2013	01/16/2014
High Pass Filter (3.5 GHz)	Hewlett Packard	84300-80038	820004	01/16/2013	01/16/2014
High Pass Filter (8.5 GHz)	Micro-Tronics	HPM50107	4	01/16/2013	01/16/2014
Power Supplier	Kikusui	PCR8000W	CM000912	01/17/2013	01/17/2014
Digital Multimeter	Fluke	177	92780314	01/17/2013	01/17/2014
Power Meter	Agilent	E4418B	MY45103902	01/19/2013	01/19/2014
Power Sensor	Hewlett Packard	8482A	55-5131	01/19/2013	01/19/2014
EMI Receiver	Hewlett Packard	8546A	3942A00514	07/02/2012	07/02/2013
Preselector	Hewlett Packard	85460A	3704A00485	07/02/2012	07/02/2013
LISN	Com-Power	LI-215	12100	01/16/2013	01/16/2014
Transient Limiter	Com-Power	LIT-930	531582	01/16/2013	01/16/2014
Thermometer	Fluke	52II	88650033	07/26/2012	07/26/2013
Thermo Chamber	Espec	BTZ-133	0613436	03/11/2013	03/11/2014
Spectrum Analyzer	Rohde & Schwarz	FSL6	100169	02/07/2013	02/07/2014
Spectrum Analyzer	Agilent	N9038A	MY51210195	01/19/2013	01/19/2014
Vector Signal Generator	Rohde & Schwarz	SMU 200A	1141.2005.02	11/24/2011	11/24/2013
Amplifier	Hewlett Packard	8449B	30008A01014	01/17/2013	01/17/2014

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 11: Customer Information

Company Name	Pace Americas
Address	310 Providence Mine Road, Ste. 200
City, State, Zip	Nevada City, CA 95959
Country	USA
Phone	(530) 274-5440
Fax	(530) 273-6340

Table 12: Technical Contact Information

Name	Mark Rieger
E-mail	Mark.Rieger@pace.com
Phone	(530) 274-5440
Fax	(530) 273-6340

6.3 Equipment Under Test (EUT)

Table 13: EUT Specifications

EUT Specification	
Dimensions	6.0" x 5.6" x 1.3"
AC Adapter (Pace M/N:T018WA1225, S/N:810611302000003156)	Input Voltage: 120 Vac 50-60 Hz Input Current: 680 mA Output Voltage: 12 Vdc Output Current: 1.5 A
Environment	Indoor and Outdoor
Operating Temperature Range:	0 to 40 degrees C
Multiple Feeds:	<input type="checkbox"/> Yes and how many <input checked="" type="checkbox"/> No
Hardware Version	Rev. A1C
Part Number	297T1001700
RF Software Version	Busy Box V1.10.3
802.11-radio modules	
Operating Mode	802.11n HT20 and HT40
Transmitter Frequency Band	5.15 GHz to 5.25 GHz (Indoor Use) 5.25 GHz to 5.35 GHz 5.47 GHz to 5.725 GHz (excludes 5600 MHz to 5650 MHz) 5.725 GHz to 5.85 GHz
Max. Rated Power Output	See Channel Planning Table.
Power Setting @ Operating Channel	See Channel Planning Table.
Antenna Type	3 integrated PCB dipole antenna and 1 attached stamped loop antenna
Antenna Gain	+2 dBi per antenna. (Same for both antenna type) +8 dBi max directional gain
Modulation Type	<input type="checkbox"/> AM <input type="checkbox"/> FM <input checked="" type="checkbox"/> DSSS <input checked="" type="checkbox"/> OFDM <input type="checkbox"/> Other describe:
Data Rate	802.11a: 4 Spatial Streams: 6, 9,12, 18, 24, 36, 48, 54 Mbps 802.11n HT20: 4 Spatial Streams: 26, 52, 78, 104, 156, 208, 234, 260 Mbps 802.11n HT40: 4 Spatial Streams: 54, 108, 162, 216, 324, 432, 486, 540 Mbps
TX/RX Chain (s)	MIMO (4x4)

EUT Specification	
Directional Gain Type	<input checked="" type="checkbox"/> Correlated <input checked="" type="checkbox"/> Beam-Forming <input type="checkbox"/> Other describe:
Type of Equipment	<input checked="" type="checkbox"/> Table Top <input type="checkbox"/> Wall-mount <input type="checkbox"/> Floor standing cabinet <input type="checkbox"/> Other
Note: 1. All four chains will be on / transmitted at all time. 2. This report only documents the radio characteristics for 5470 – 5725 MHz band	

Table 14: EUT Channel Power Specifications

No.	Frequency (MHz)	Target Power Value				
		802.11b	802.11g	802.11a	802.11n HT20	802.11n HT40
36	5180			10.0	10.0	11.0
40	5200			9.0	9.0	
44	5220			9.0	9.0	11.0
48	5240			9.0	9.0	
52	5260			15.0	15.0	17.0
56	5280			15.0	15.0	
60	5300			15.0	15.0	14.0
64	5320			15.0	15.0	
100	5500			16.0	16.0	16.0
104	5520			16.0	16.0	
108	5540			16.0	16.0	18.0
112	5560			16.0	16.0	
116	5580			16.0	16.0	
120	5600					
124	5620					
128	5640					
132	5660			16.0	16.0	18.0
136	5680			16.0	16.0	
140	5700			15.0	15.0	
149	5745			22.0	22.0	22.0
153	5765			22.0	22.0	
157	5785			22.0	22.0	22.0
159	5795			22.0	22.0	
161	5805			22.0	22.0	
165	5825			22.0	22.0	

Note: 1. The center operating frequency is shifted upward by 10 MHz for HT40.
 2. The final adjusted power targets are updated at the above indicated frequencies.

Table 15: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
RJ45	CAT-5 Ethernet	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Metric: 10 m	<input checked="" type="checkbox"/> M

Table 16: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
Laptop	Dell	PP23LB	9271001233	Setup EUT operating channel
Note: None.				

Table 17: Description of Sample used for Testing

Device	Serial	RF Connection	CFR47 Part 15.407
405	09130M000104	Integrated Antenna	TX Emission, AC Conducted Emission
		Direct via Murada Connection	Transmitted Output Power, Power Spectral Density, Peak Excursion Ratio Occupied Bandwidth Frequency Stability Voltage Variation

Table 18: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Photo (X-Axis)	Setup Photo (Y-Axis)	Setup Photo (Z-Axis)
405	Integrated	Transmit	EUT laid flat.	EUT stood upright	Na.
Note: Pre-scans were performed in 2 supporting axis, and Y-axis was worst.					

Table 19: Final Test Mode for 5470 - 5725 Band

Test	802.11a	802.11n HT20	802.11n HT40
Occupied Bandwidth FCC Part 15.407(a)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6 Mbps/ stream	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6.5 Mbps/ stream	Band 3: 5510, 5550, 5670 MHz 4 Streams – 13.5 Mbps/ stream
Output Power FCC Part 15.407(a)(1-2)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6 Mbps/ stream	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6.5 Mbps/ stream	Band 3: 5510, 5550, 5670 MHz 4 Streams – 13.5 Mbps/ stream
Peak Excursion Ratio FCC Part 15.407(a)(6)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6 Mbps/ stream	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6.5 Mbps/ stream	Band 3: 5510, 5550, 5670 MHz 4 Streams – 13.5 Mbps/ stream

Test	802.11a	802.11n HT20	802.11n HT40
Power Spectral Density FCC Part 15.407(a)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6 Mbps/ stream	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6.5 Mbps/ stream	Band 3: 5510, 5550, 5670 MHz 4 Streams – 13.5 Mbps/ stream
Band-Edge (Radiated) FCC Part 15.205, 15.209, 15.407(b)	Band 3: 5500 , 5700 MHz 4 Streams – 6 Mbps/ stream	Band 3: 5500 , 5700 MHz 4 Streams – 6.5 Mbps/ stream	Band 3: 5510, 5670 MHz 4 Streams – 13.5 Mbps/ stream
Transmitted Spurious Emission (30 MHz – 1 GHz) FCC Part 15.205, 15.209, 15.407(b)		Worst Case: 5580 MHz 4 Streams – 6.5 Mbps/ stream (Y-Axis)	
Transmitted Spurious Emission (Above 1 GHz) FCC Part 15.205, 15.209, 15.407(b)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6 Mbps/ stream (Y-Axis)	Band 3: 5500, 5580, 5700 MHz 4 Streams – 6.5 Mbps/ stream (Y-Axis)	Band 3: 5510, 5550, 5670 MHz 4 Streams – 13.5 Mbps/ stream (Y-Axis)
Conducted Spurious Emission (antenna port). FCC Part 15.407 (b)	According to CFR47 15.407 (b) EIPR shall not exceed -27 dBm/MHz. This is equivalent to the field strength of 68.2 dBuV/m at 3 meter distance. The EUT is satisfied the requirement by meeting the limit under CFR47 Part 15.209.		
AC Conducted Emission FCC Part 15.207		5580 MHz at 4 Data Stream: 6.5Mbps	
Frequency Stability FCC Part 15.407 (g)	CW Tone at 5200 MHz, (Send_cw_signal 40 0 0 3 1 0).		
Voltage Variation FCC Part 15.31 (e)	Continuous wave at 5500, 5580, 5700 MHz, (Send_cw_signal 40 0 0 3 1 0)		
Dynamic Frequency Selection FCC Part 15.407 (h)	5470 – 5725 MHz band supports DFS. See DFS test report.		
<p>Note: 1. All radiated emission performed on Y-Axis. 2. All four chains will be on at all time. 3. All tests were pre-scanned for worst case before final testing.</p>			

6.4 Test Specifications

Testing requirements

Table 20: Test Specifications

Emissions and Immunity	
Standard	Requirement
CFR 47 Part 15.407: 2012	All
RSS 210 Issue 8, 2010	All

END OF REPORT