RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	29.42	25.69	4.44	24.00	11.00
Mid	5580	24	26.17	25.18	4.44	24.00	11.00
High	5700	24	28.75	25.59	4.44	24.00	11.00

Duty Cycle CF (dB)	1.921	Included in Calculations of Corr'd Power & PPSD

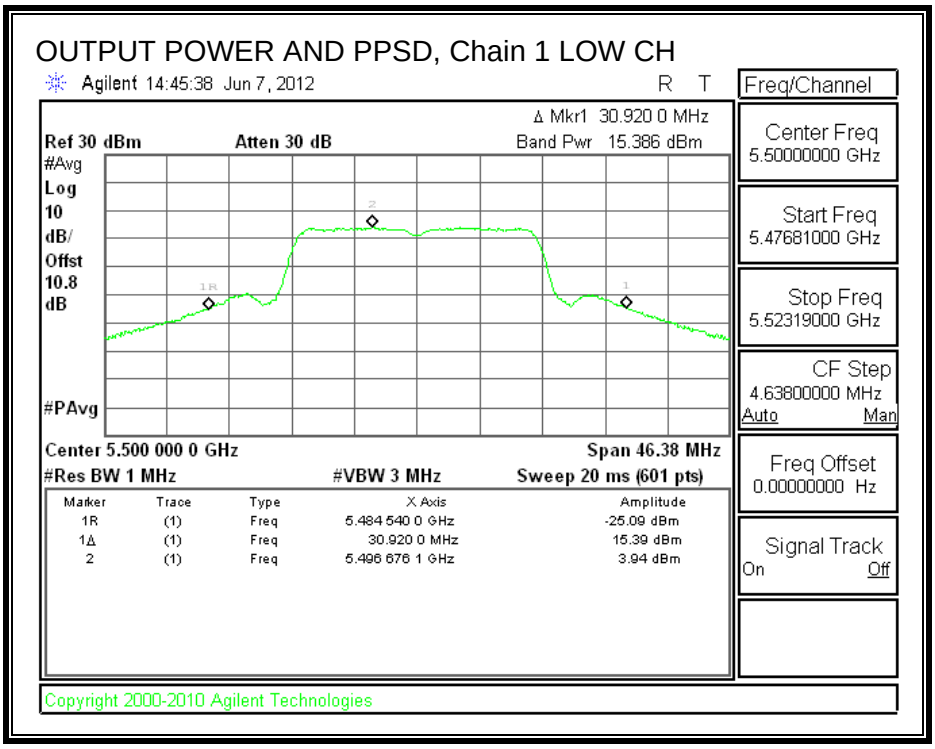
Output Power Results

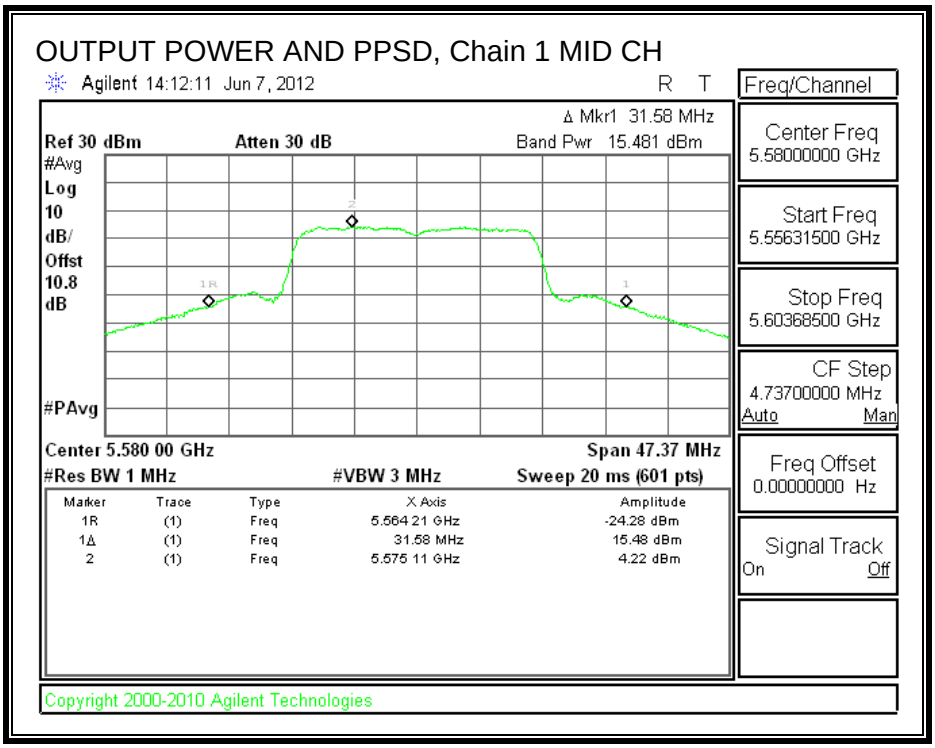
Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Chain 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	15.386	15.448	15.126	22.014	24.00	-1.986
Mid	5580	15.481	15.103	15.334	22.001	24.00	-1.999
High	5700	15.511	15.386	15.726	22.235	24.00	-1.765

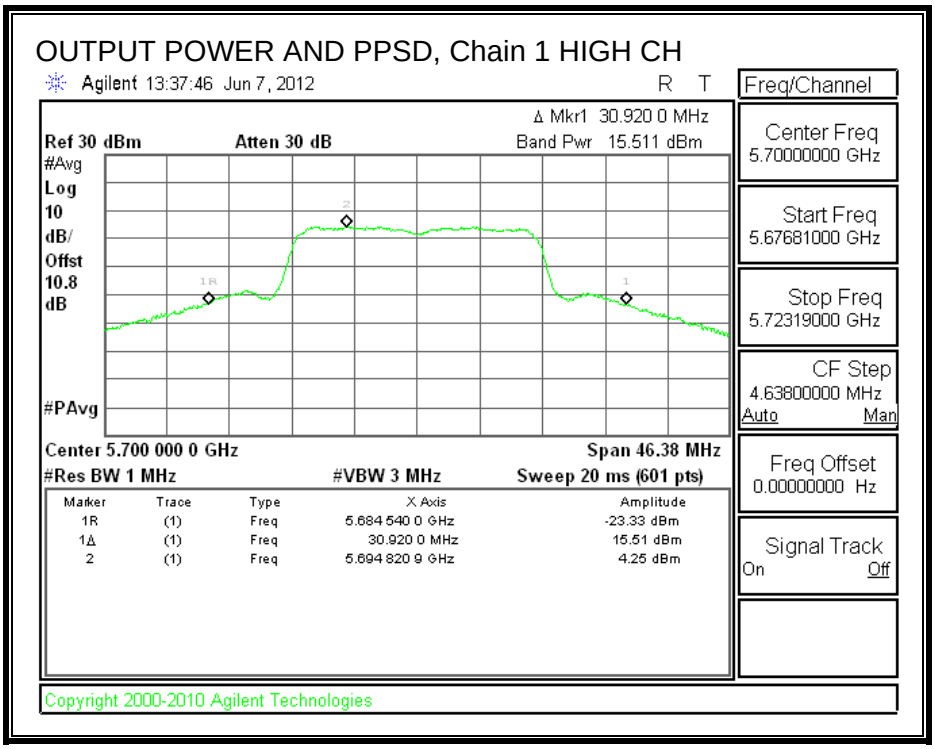
PPSD Results

Channel	Frequency (MHz)	Chain 1 Meas PPSD (dBm)	Chain 2 Meas PPSD (dBm)	Chain 3 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	3.94	4.35	4.07	10.82	11.00	-0.18
Mid	5580	4.22	3.86	4.09	10.75	11.00	-0.25
High	5700	4.25	4.27	4.29	10.96	11.00	-0.04

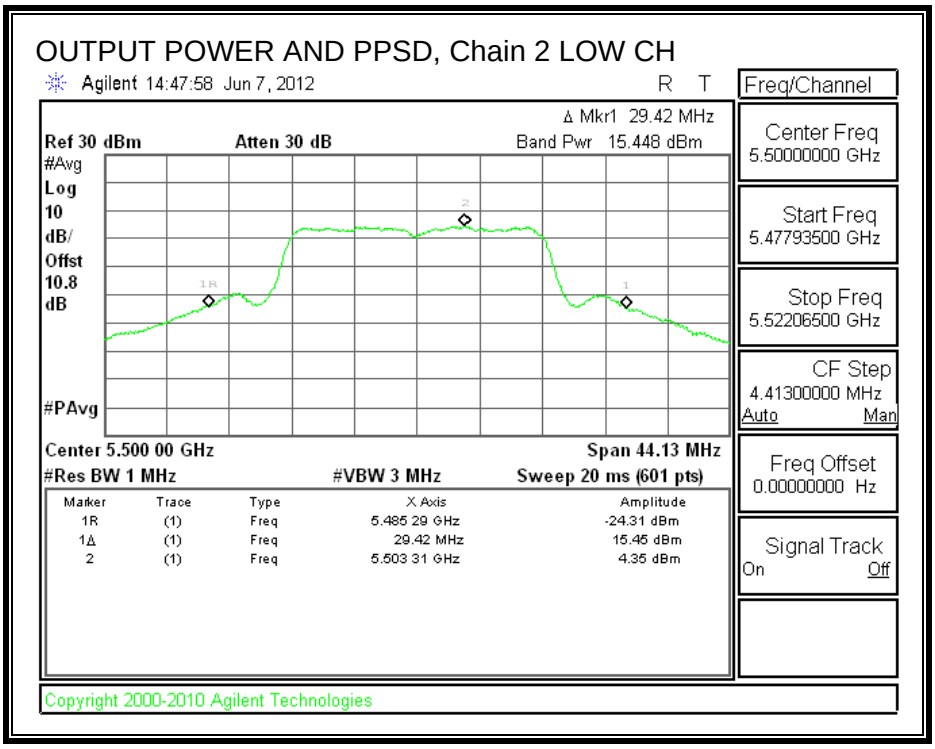
OUTPUT POWER AND PPSD, Chain 1

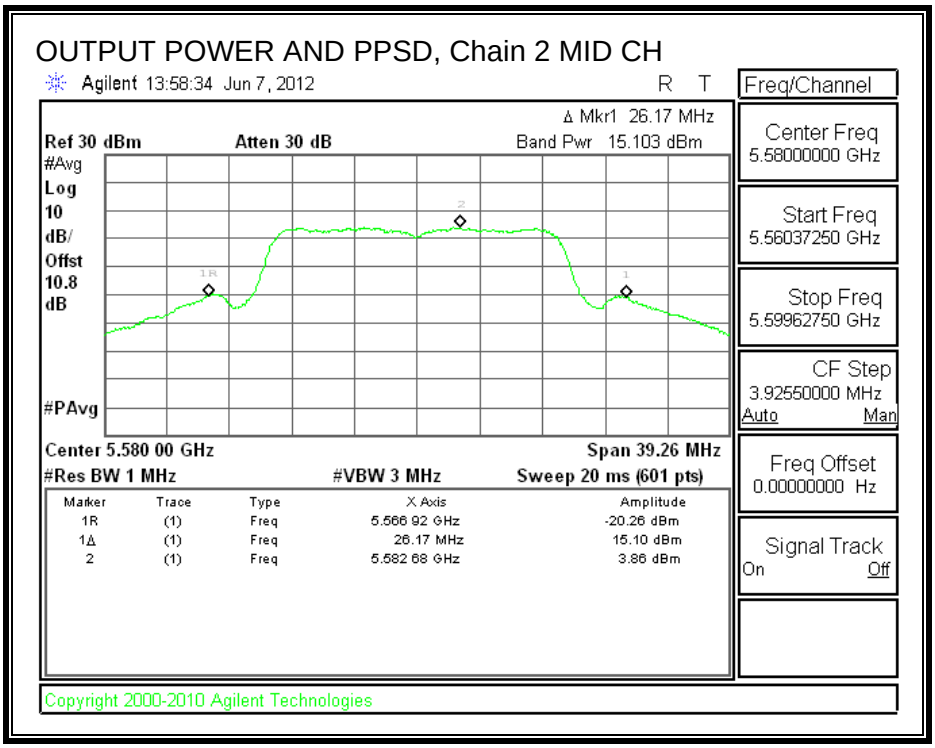




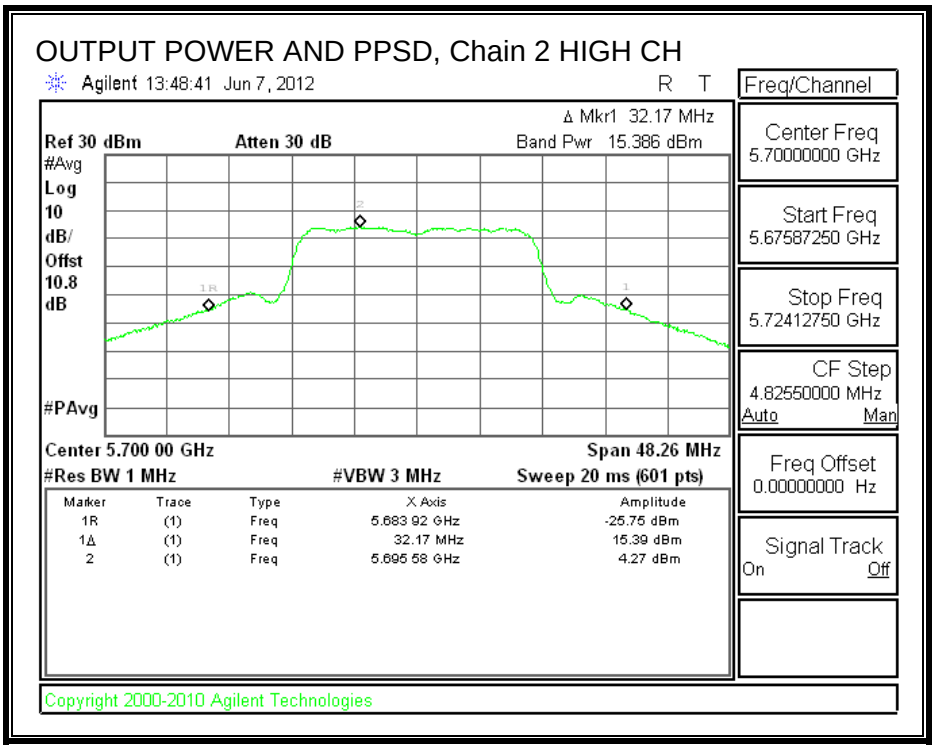


OUTPUT POWER AND PPSD, Chain 2

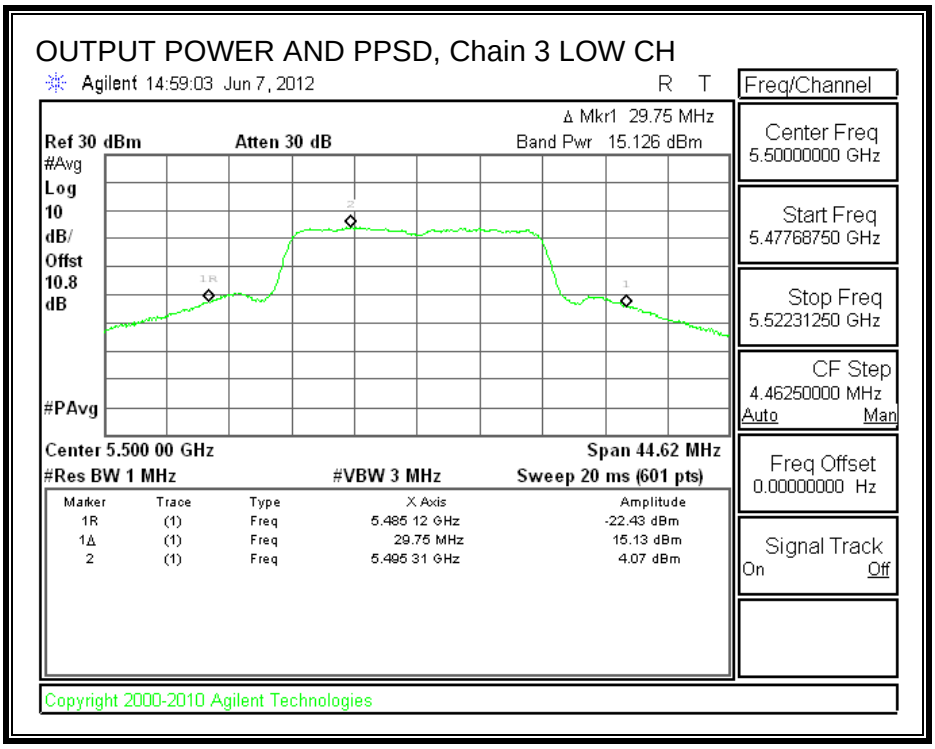


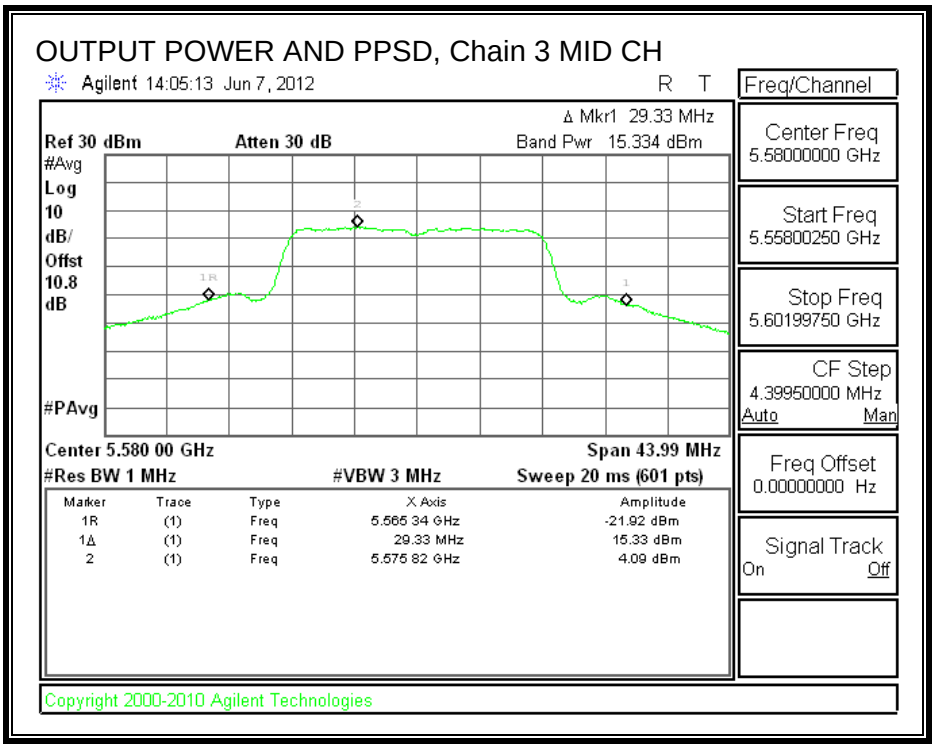


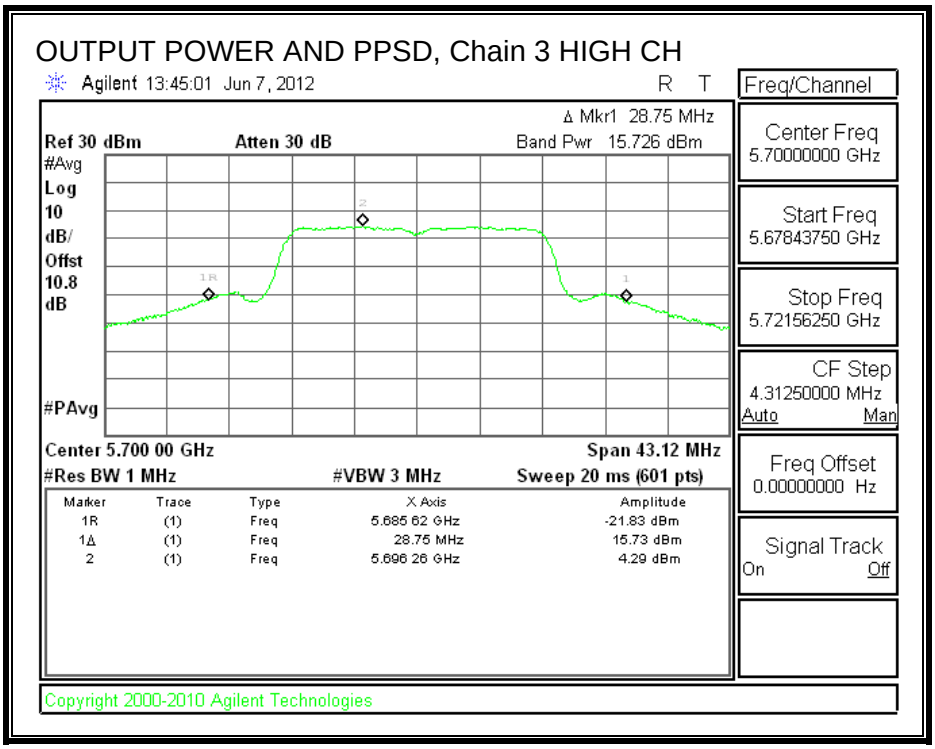
OUTPUT POWER AND PPSD, Chain 2 HIGH CH



OUTPUT POWER AND PPSD, Chain 3







8.18.5. PEAK EXCURSION

LIMITS

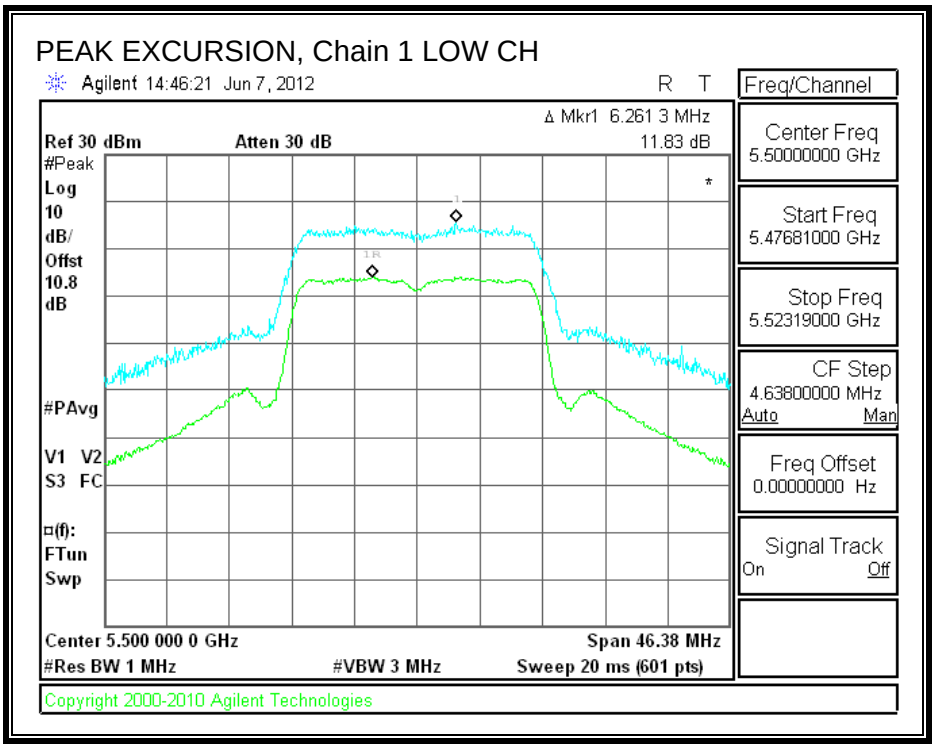
FCC §15.407 (a) (6)

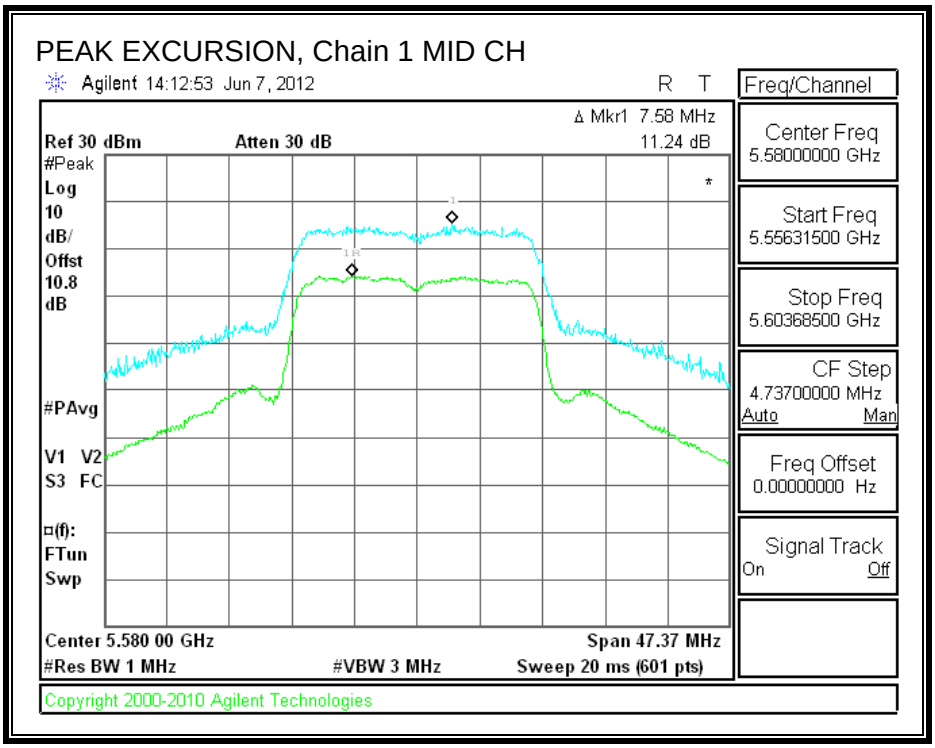
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

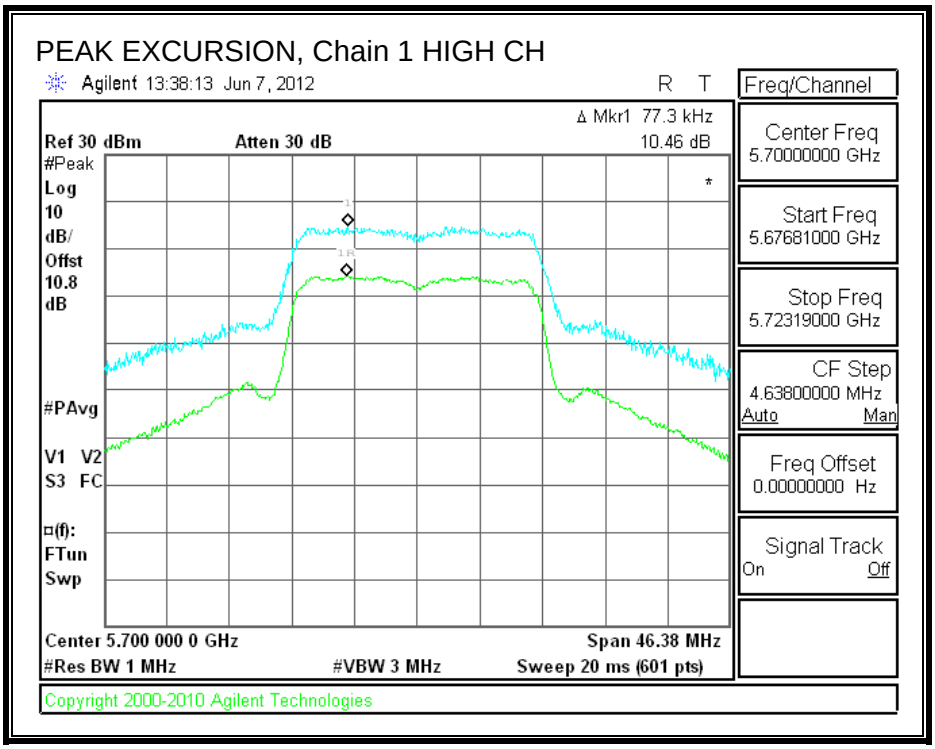
Channel	Frequency (MHz)	Pk Exc Chain 1 (dB)	Pk Exc Chain 2 (dB)	Pk Exc Chain 3 (dB)	Limit (dB)	Worst-Case Margin (dB)
Low	5500	11.83	11.12	10.62	13	-1.17
Mid	5580	11.24	11.38	11.27	13	-1.62
High	5700	10.46	10.87	11.11	13	-1.89

PEAK EXCURSION, Chain 1

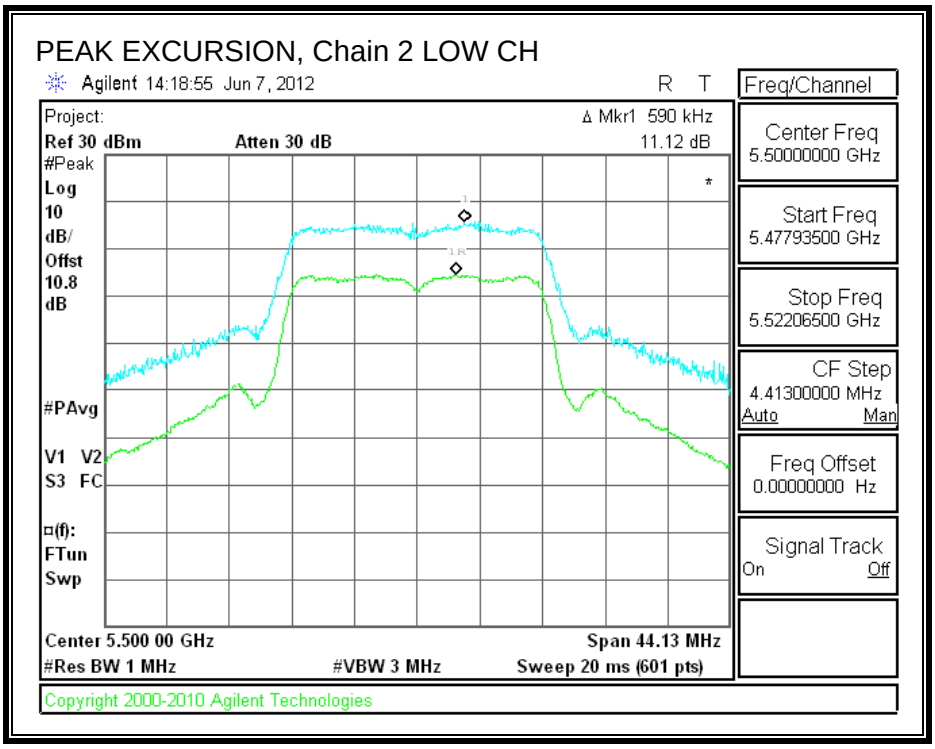


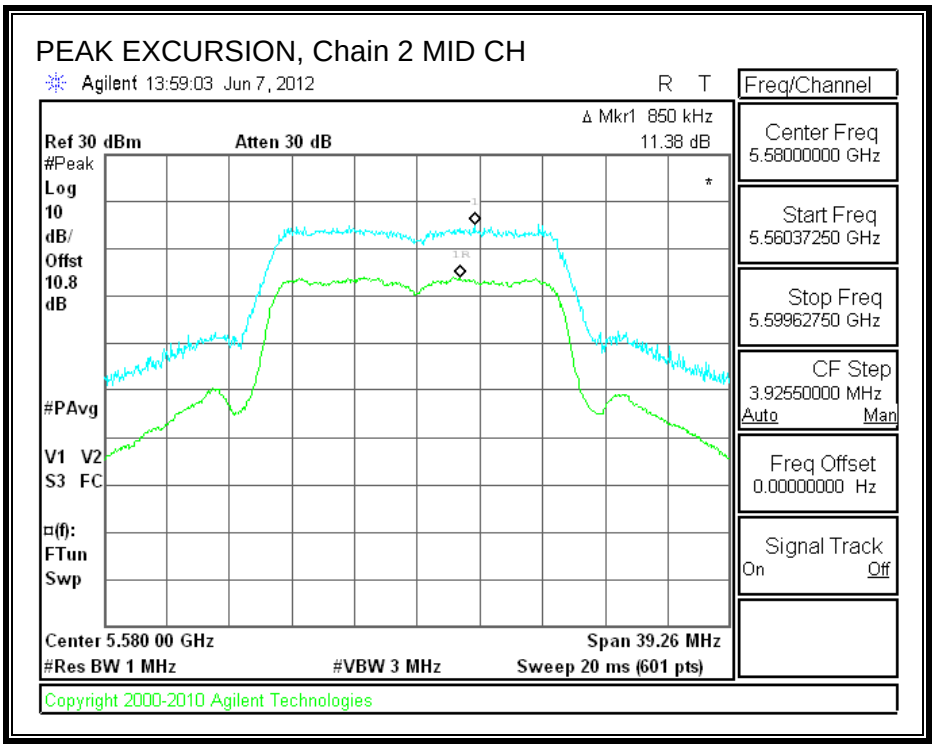


PEAK EXCURSION, Chain 1 HIGH CH

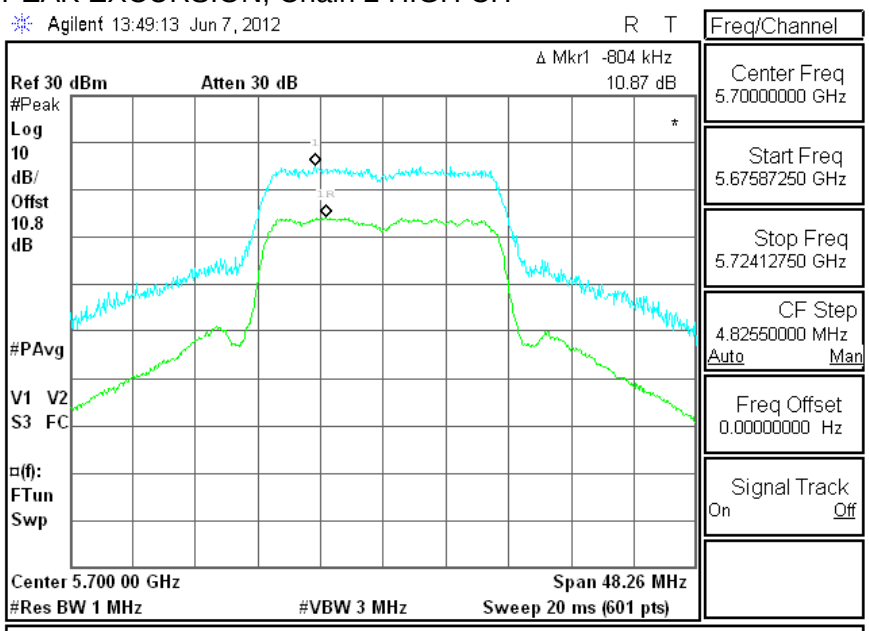


PEAK EXCURSION, Chain 2

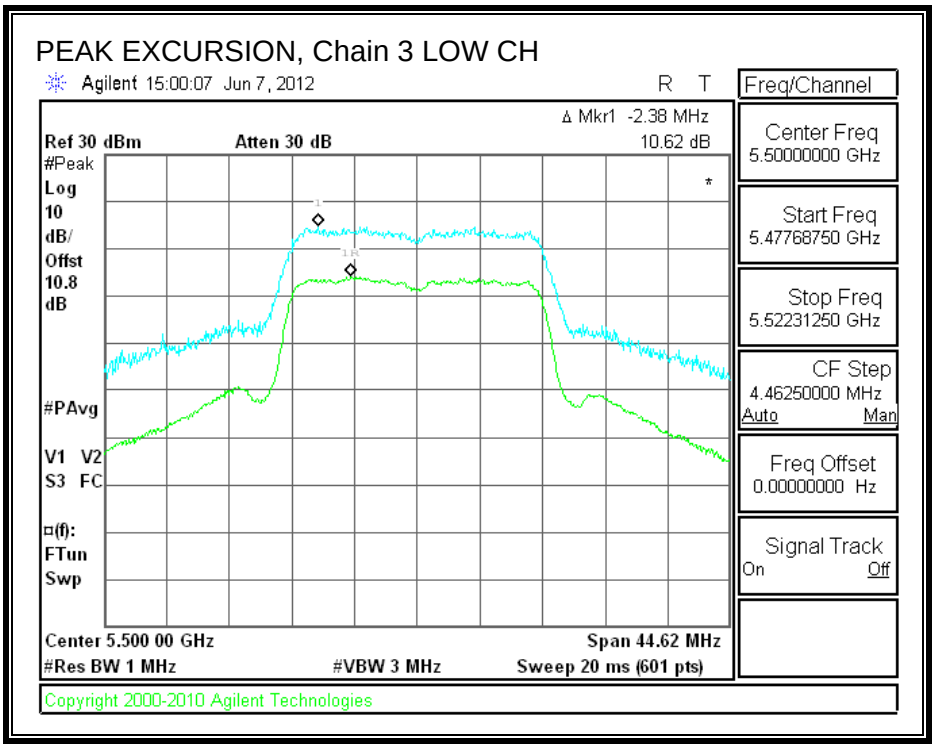


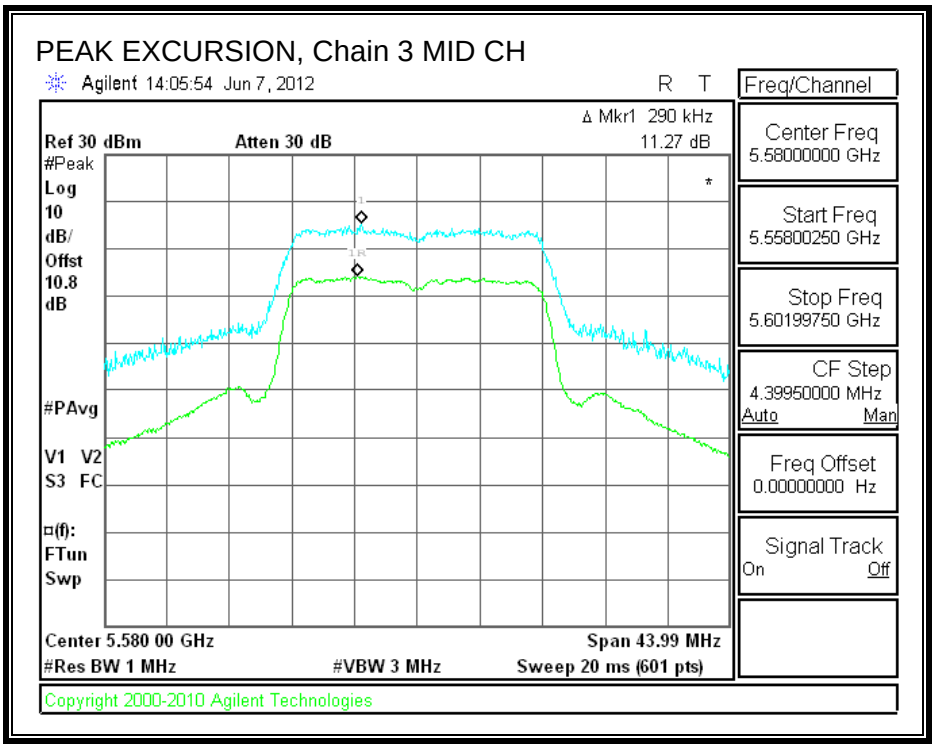


PEAK EXCURSION, Chain 2 HIGH CH

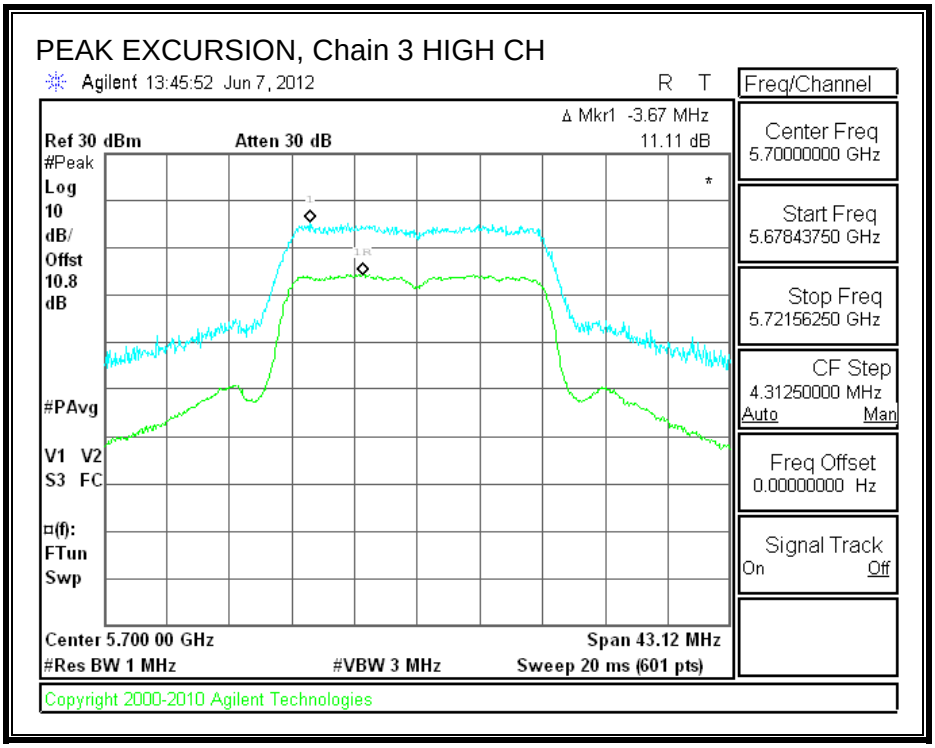


PEAK EXCURSION, Chain 3





PEAK EXCURSION, Chain 3 HIGH CH



8.19. 802.11n HT40, CDD MCS0, 1TX, 5.6 GHz BAND

8.19.1. 26 dB BANDWIDTH

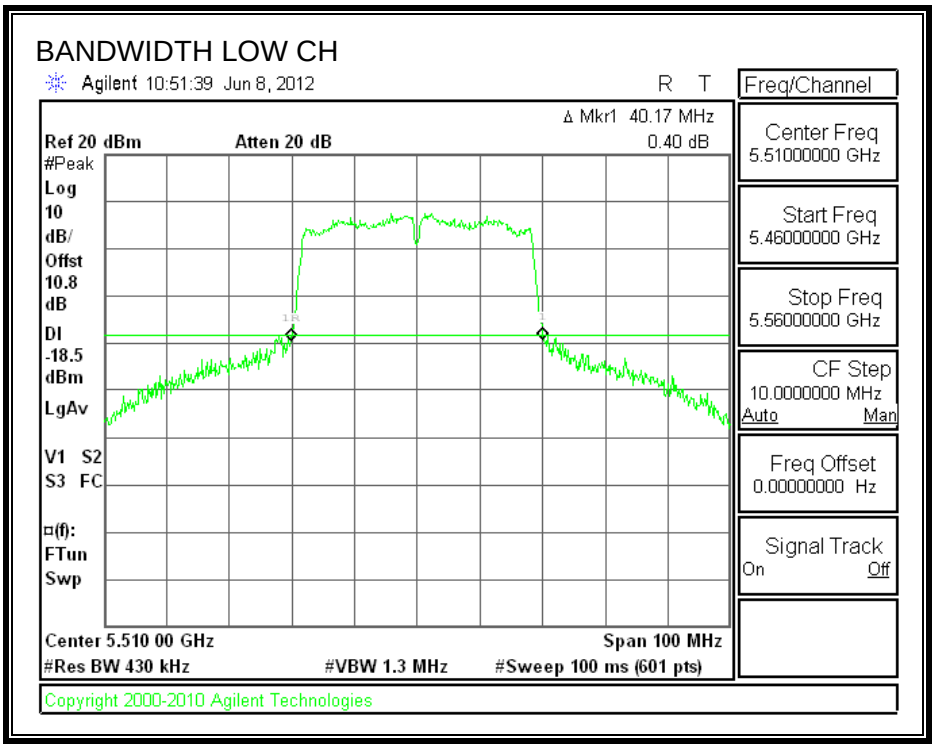
LIMITS

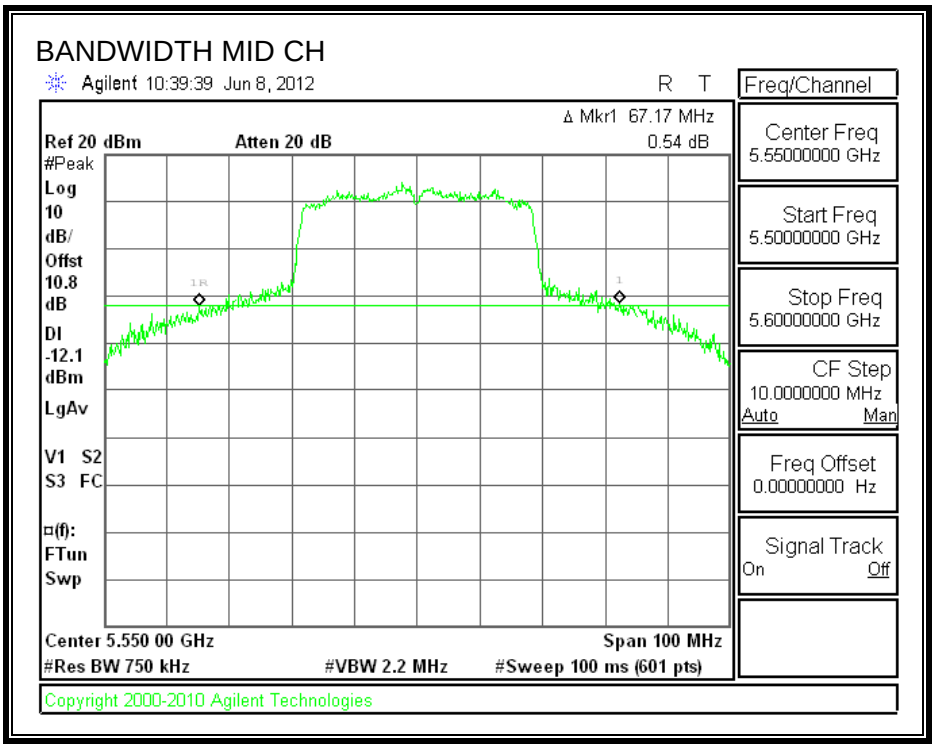
None; for reporting purposes only.

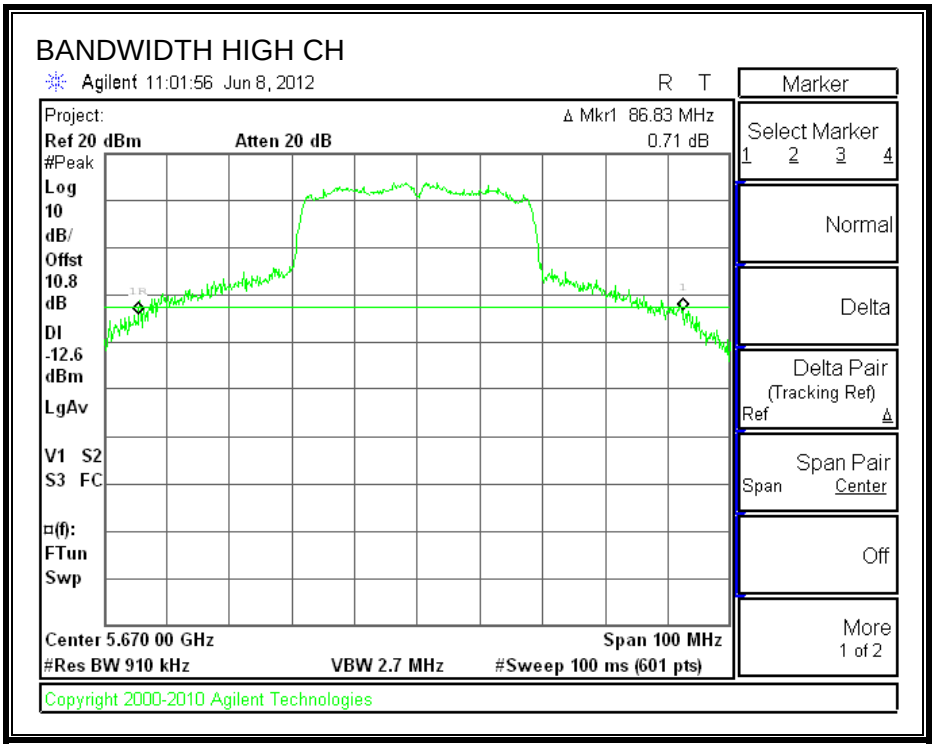
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	40.17
Mid	5550	67.17
High	5670	86.83

26 dB BANDWIDTH







8.19.2. 99% BANDWIDTH

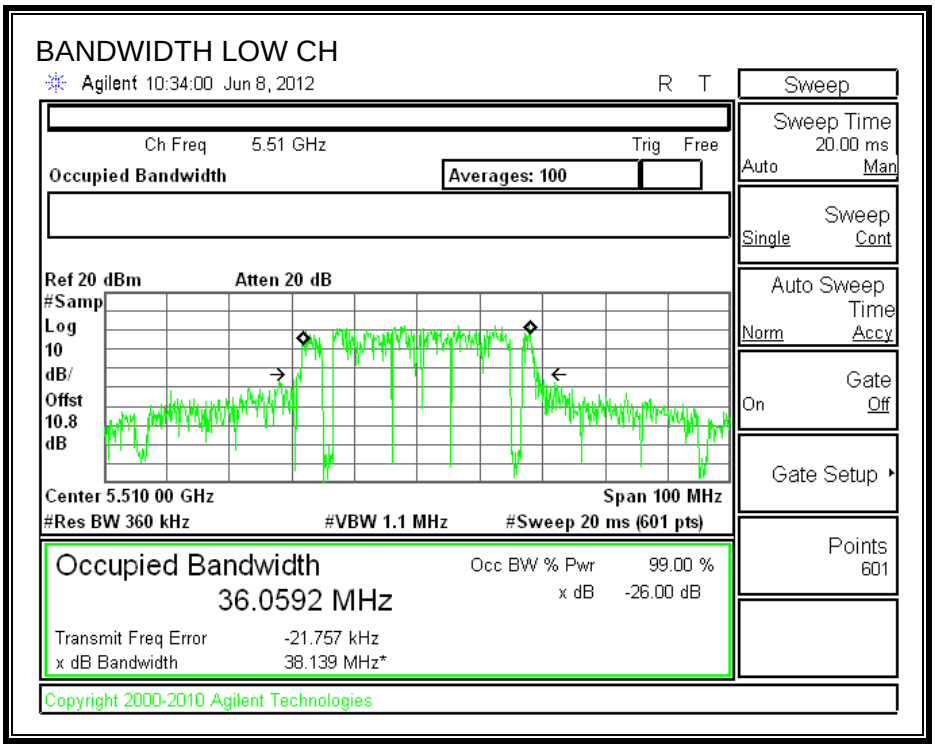
LIMITS

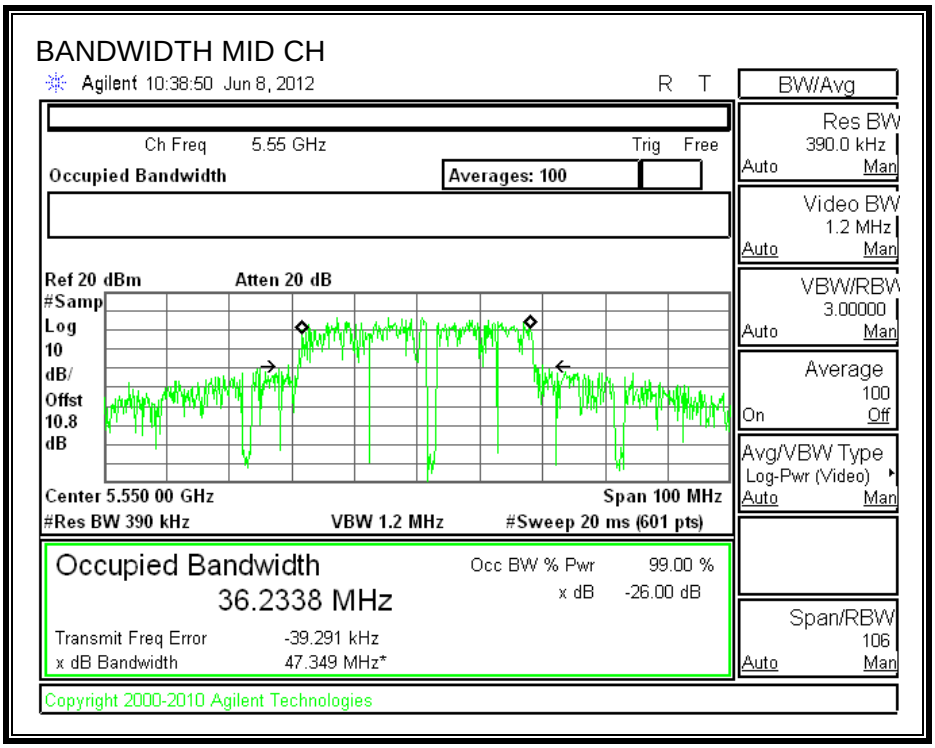
None; for reporting purposes only.

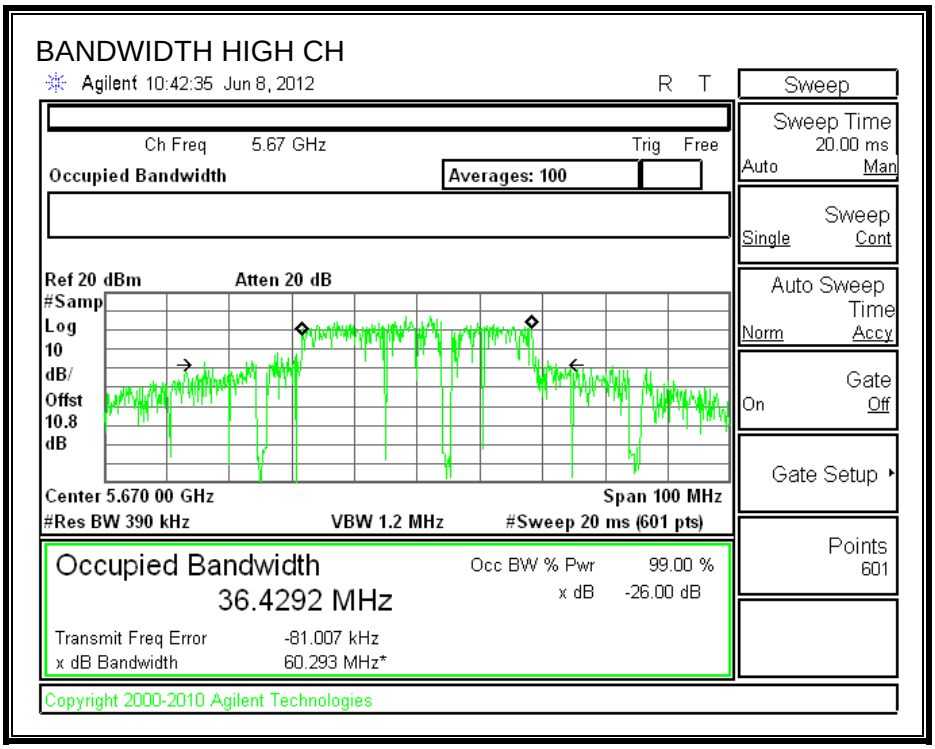
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.0592
Mid	5550	36.2338
High	5670	36.4292

99% BANDWIDTH







8.19.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.80 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5510	16.2
Mid	5550	19.1
High	5670	19.0

8.19.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5510	24	40.17	27.04	5.35	24.00	11.00
Mid	5550	24	67.17	29.27	5.35	24.00	11.00
High	5670	24	86.83	30.39	5.35	24.00	11.00

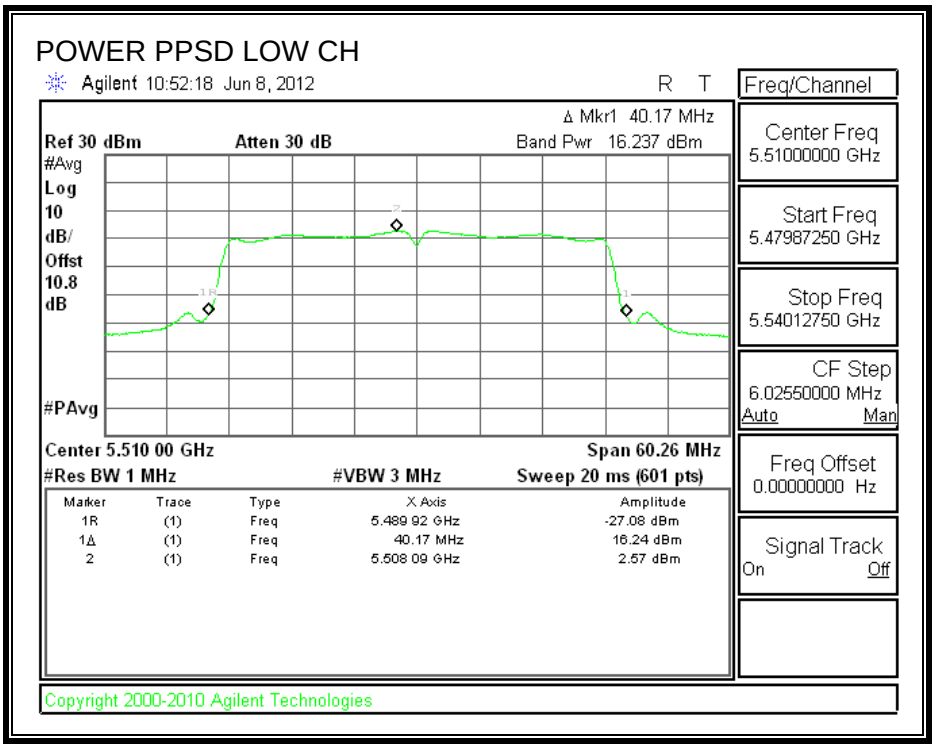
Output Power Results

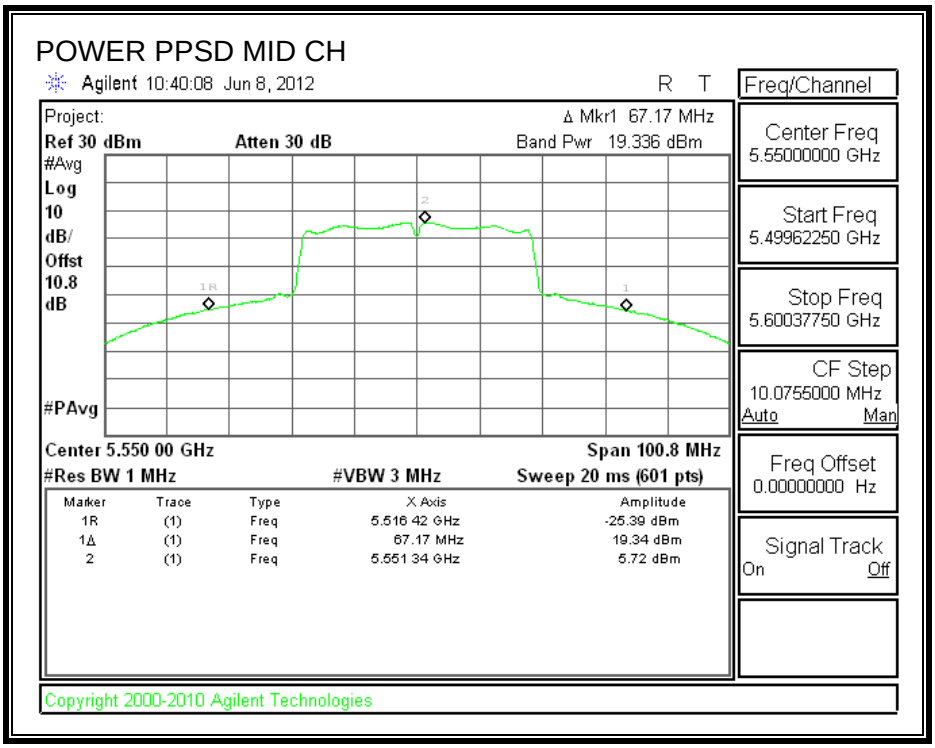
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	16.237	16.237	24.00	-7.763
Mid	5550	19.336	19.336	24.00	-4.664
High	5670	19.245	19.245	24.00	-4.755

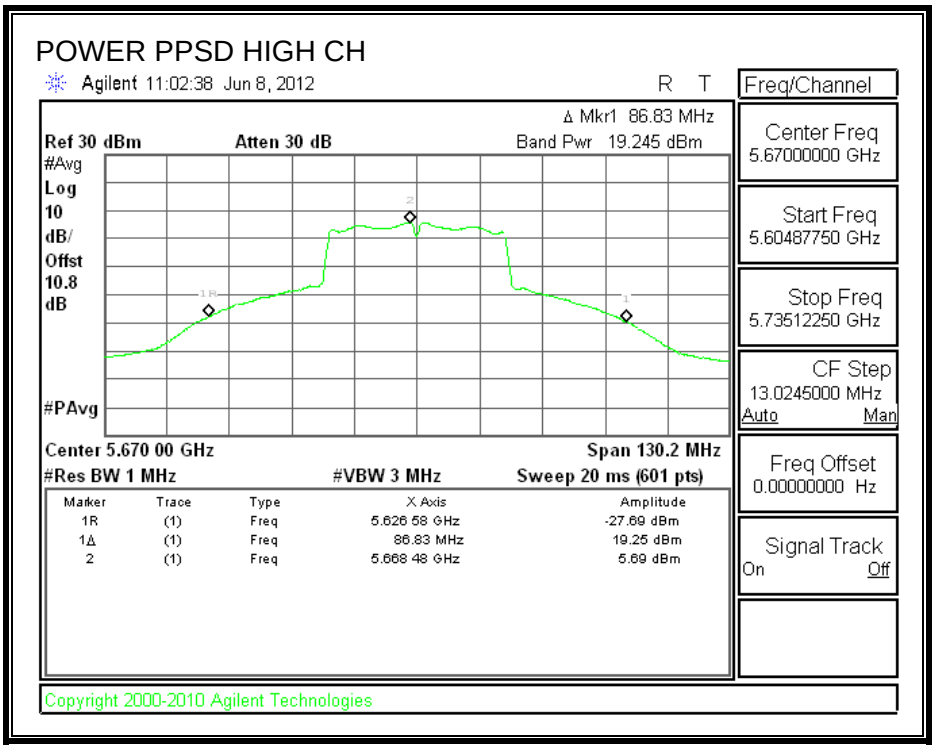
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	2.57	2.57	11.00	-8.43
Mid	5550	5.72	5.72	11.00	-5.28
High	5670	5.69	5.69	11.00	-5.31

OUTPUT POWER AND PPSD







8.19.5. PEAK EXCURSION

LIMITS

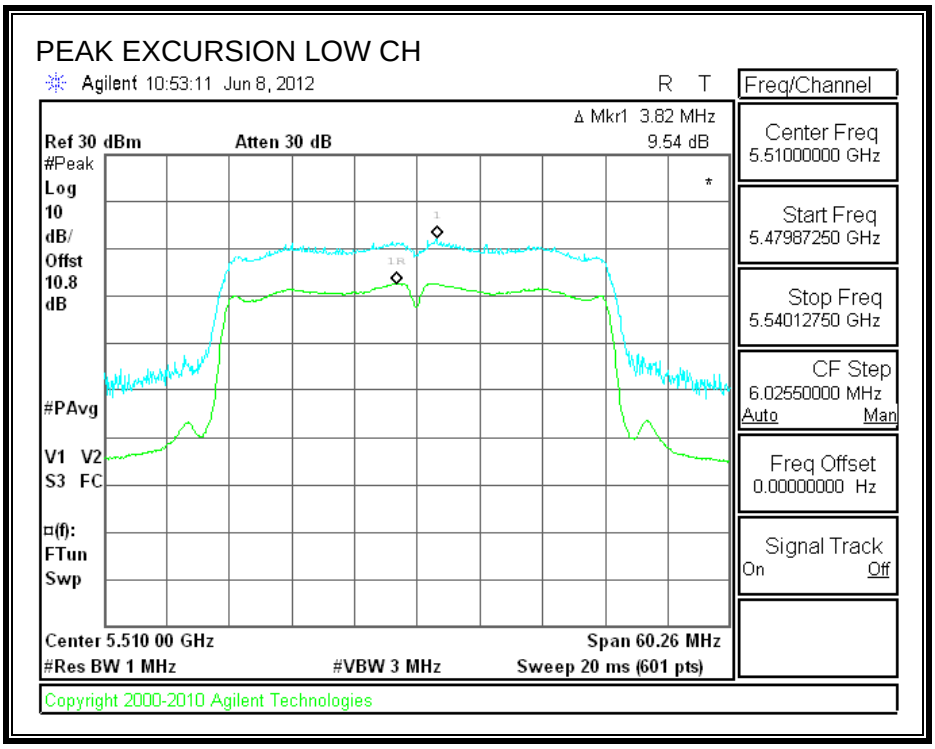
FCC §15.407 (a) (6)

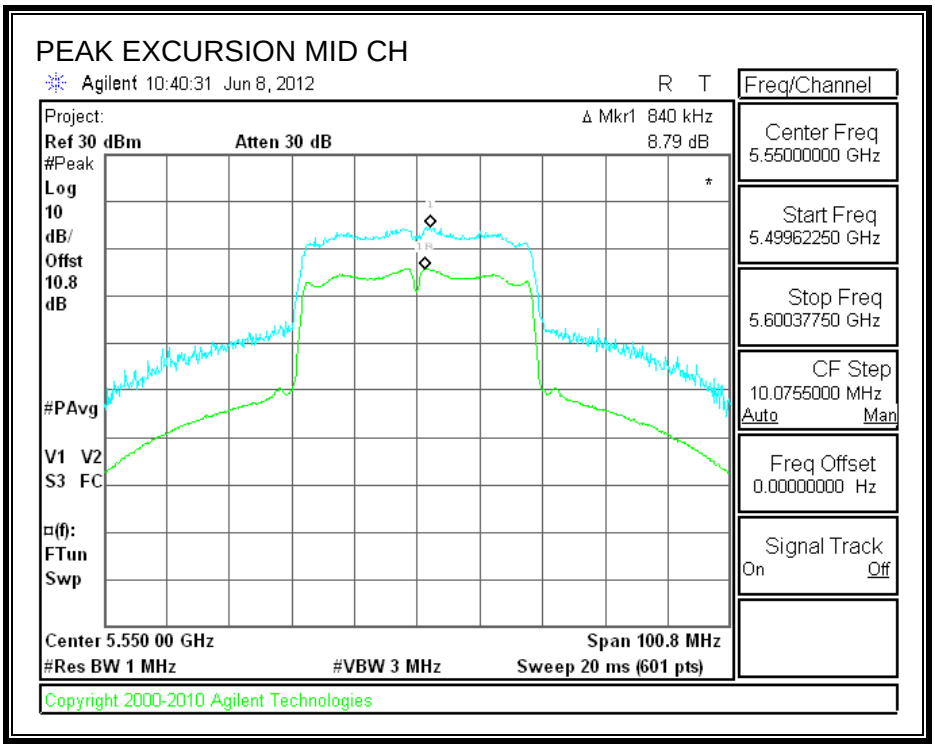
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

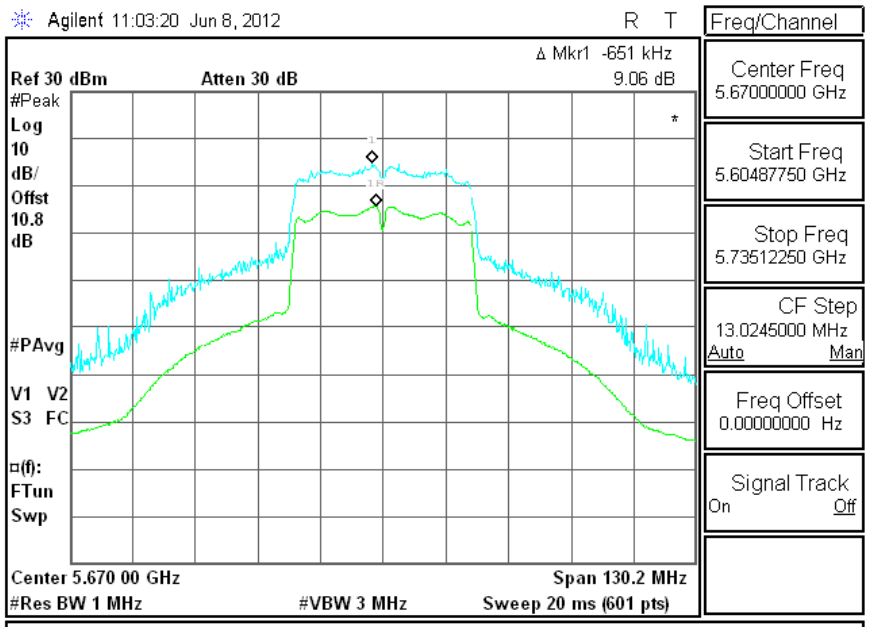
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	9.54	13	-3.46
Mid	5550	8.79	13	-4.21
High	5670	9.06	13	-3.94

PEAK EXCURSION





PEAK EXCURSION HIGH CH



8.20. 802.11n HT40, CDD MCS0, 2TX, 5.6 GHz BAND

Note: low channel is covered by testing to 11n HT40 CDD MCS0 3TX, based on client's test plan.

8.20.1. 26 dB BANDWIDTH

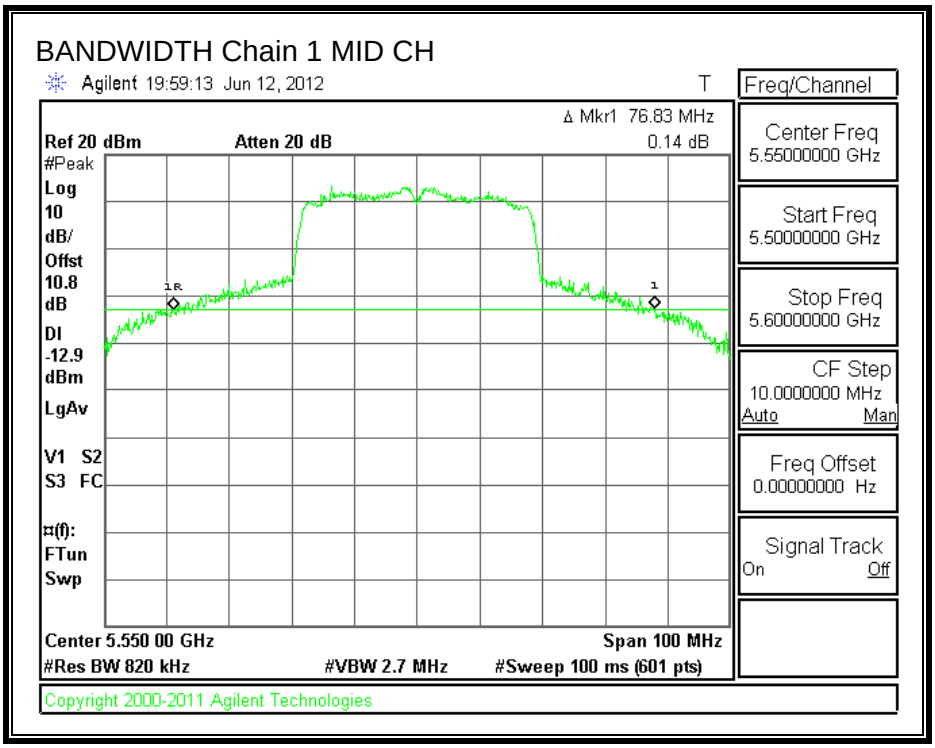
LIMITS

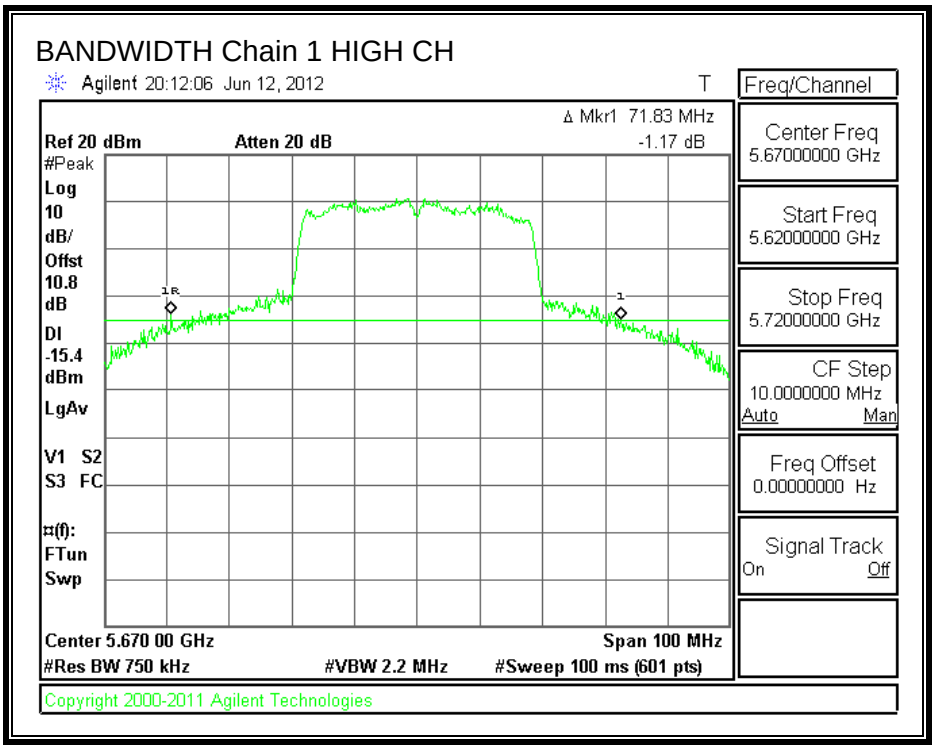
None; for reporting purposes only.

RESULTS

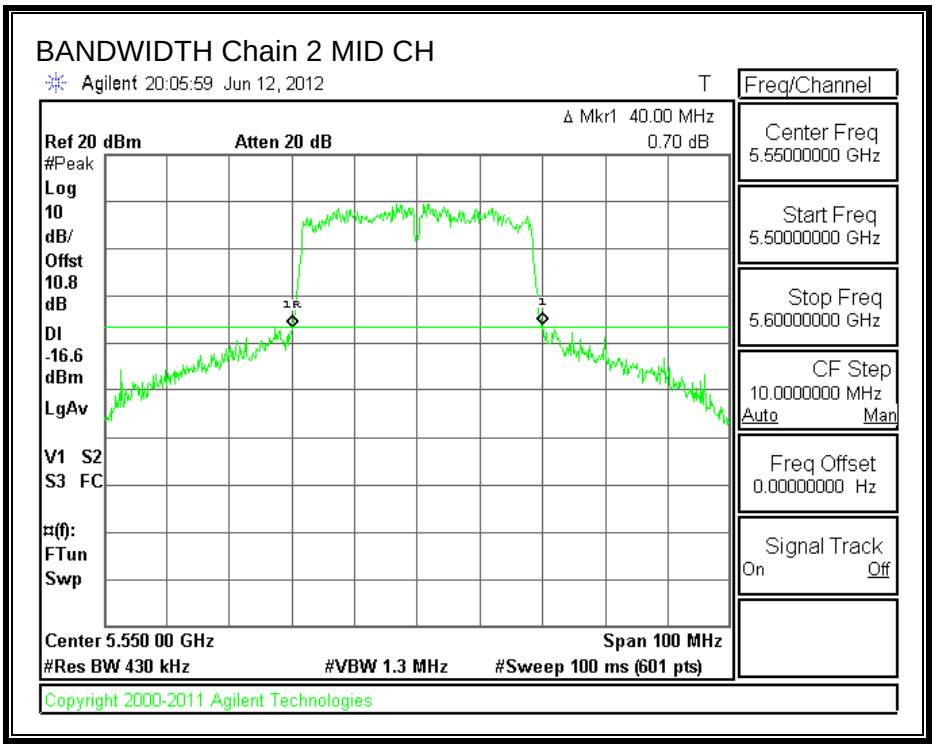
Channel	Frequency (MHz)	26 dB BW Chain 1 (MHz)	26 dB BW Chain2 (MHz)
Mid	5550	76.83	40.00
High	5670	71.83	44.83

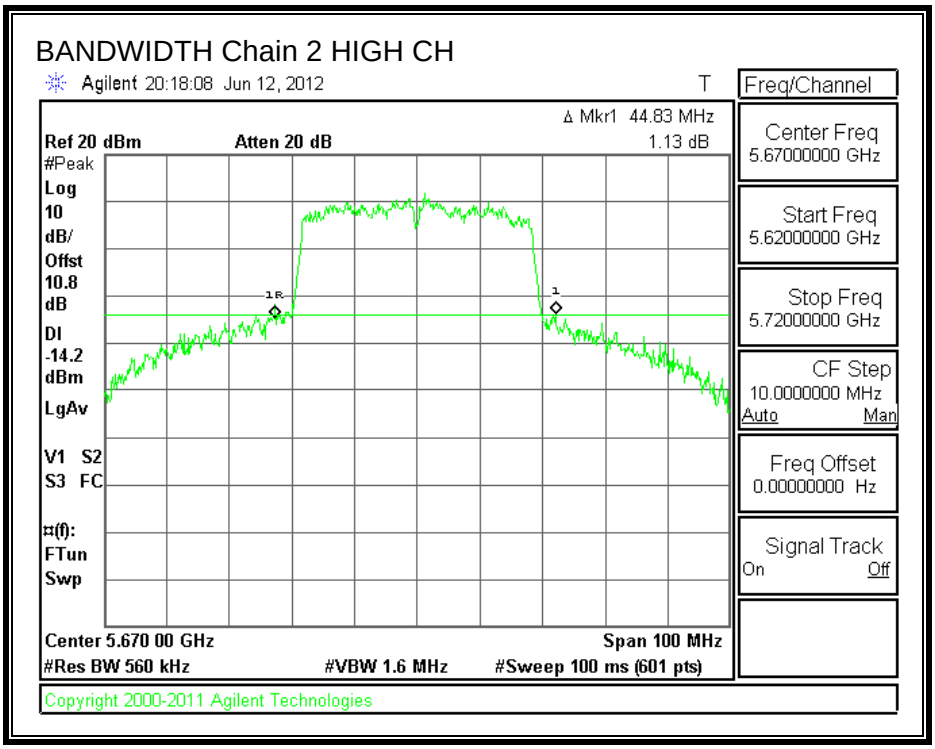
26 dB BANDWIDTH, Chain 1





26 dB BANDWIDTH, Chain 2





8.20.2. 99% BANDWIDTH

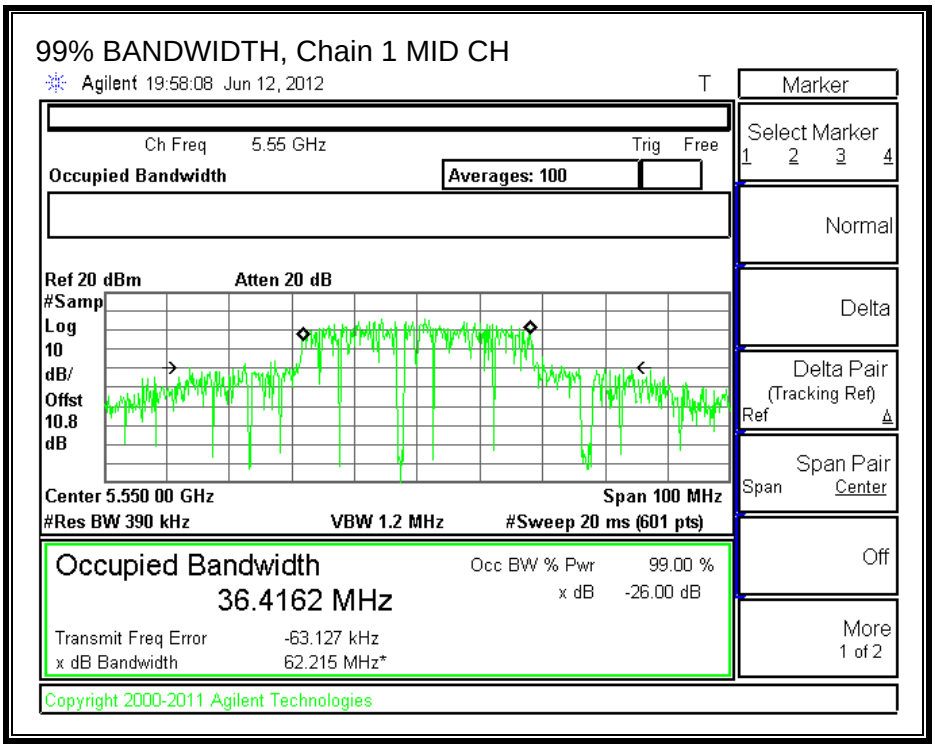
LIMITS

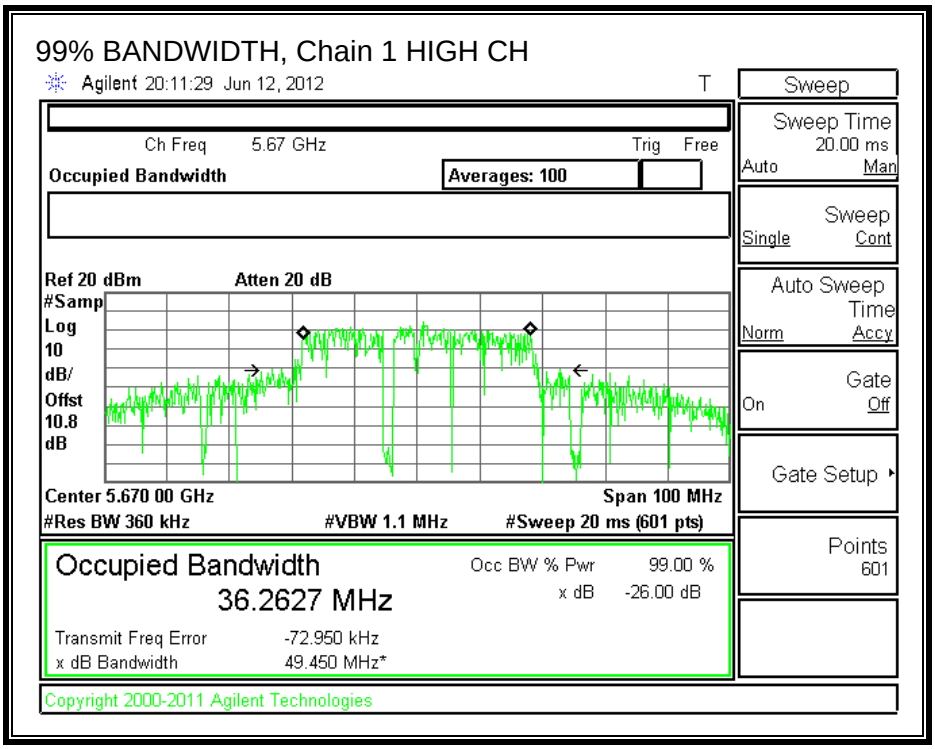
None; for reporting purposes only.

RESULTS

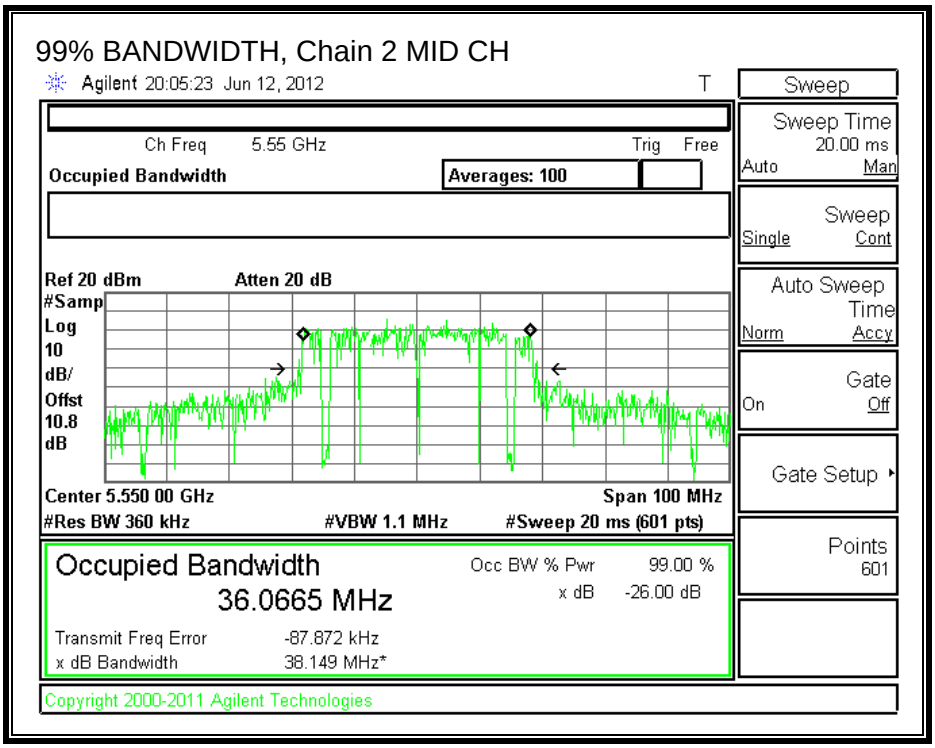
Channel	Frequency (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)
Mid	5550	36.4162	36.0665
High	5670	36.2627	36.1179

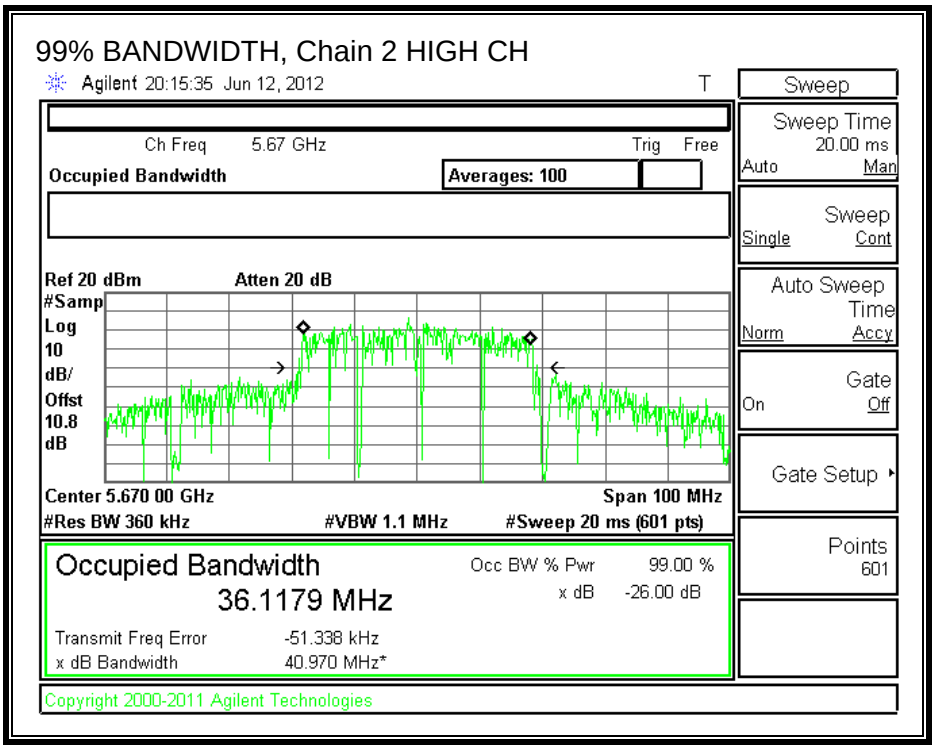
99% BANDWIDTH, Chain 1





99% BANDWIDTH, Chain 2





8.20.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.80 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Mid	5550	16.65	16.63	19.65
High	5670	16.55	16.20	19.39

8.20.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.71	5.35	8.05

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Mid	5550	24	40.00	27.02	8.05	21.95	8.95
High	5670	24	44.83	27.52	8.05	21.95	8.95

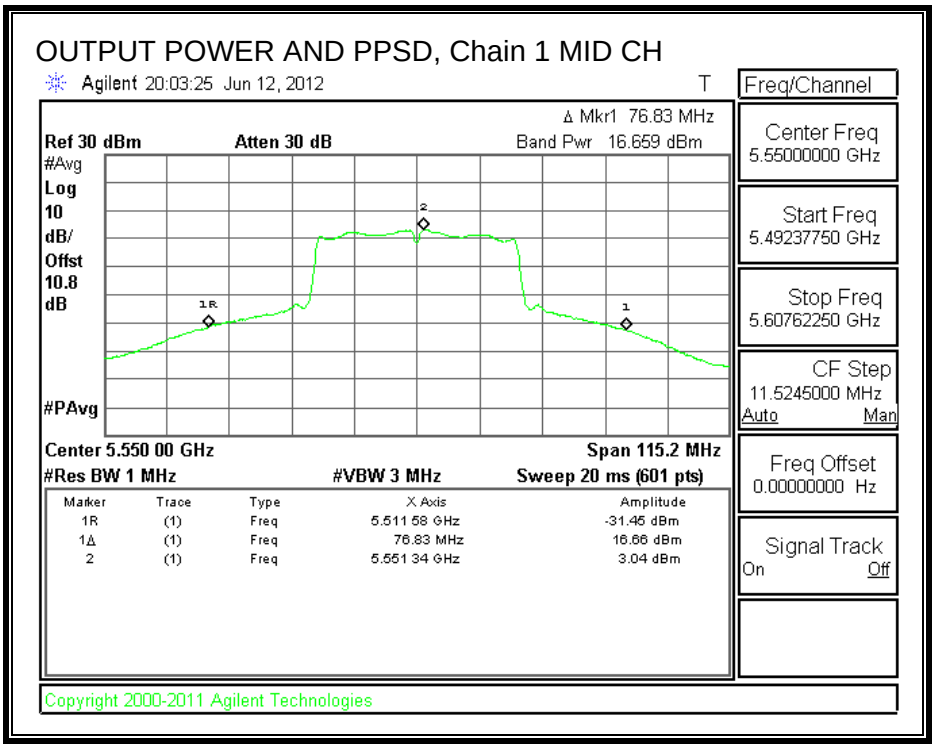
Output Power Results

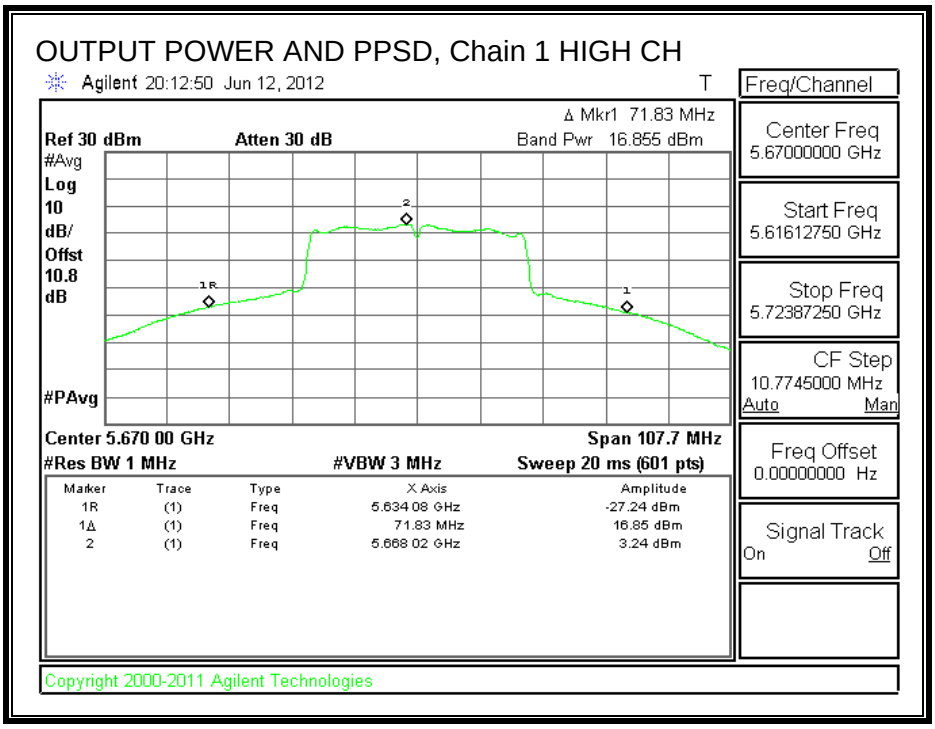
Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5550	16.659	16.703	19.691	21.95	-2.259
High	5670	16.855	16.630	19.754	21.95	-2.196

PPSD Results

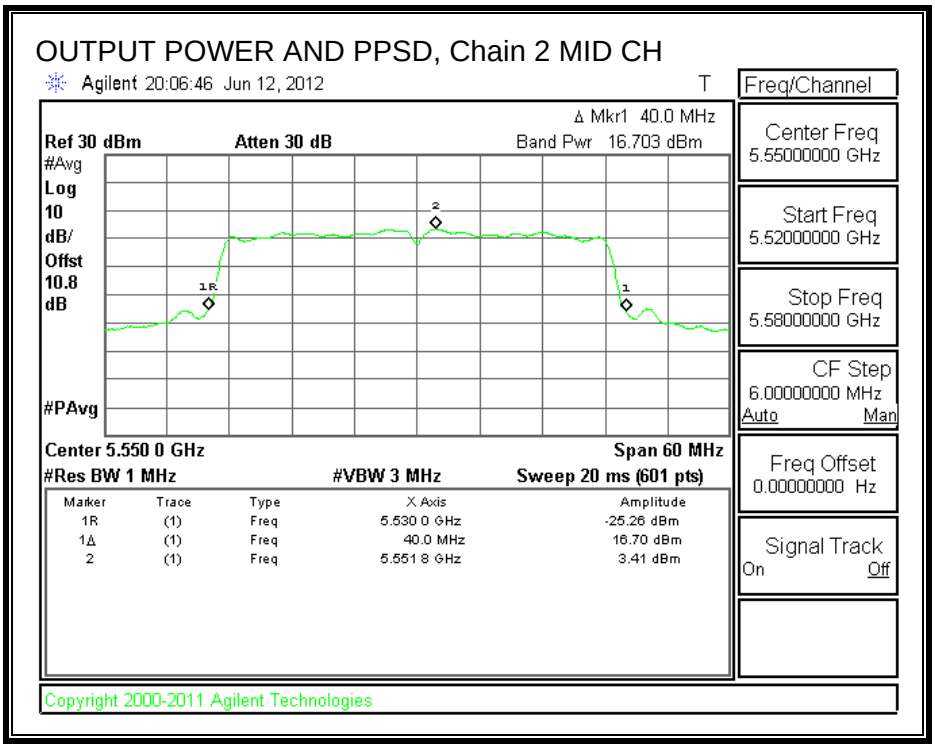
Channel	Frequency (MHz)	Chain 1 Meas PPSD (dBm)	Chain 2 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Mid	5550	3.04	3.41	6.24	8.95	-2.71
High	5670	3.24	3.58	6.42	8.95	-2.53

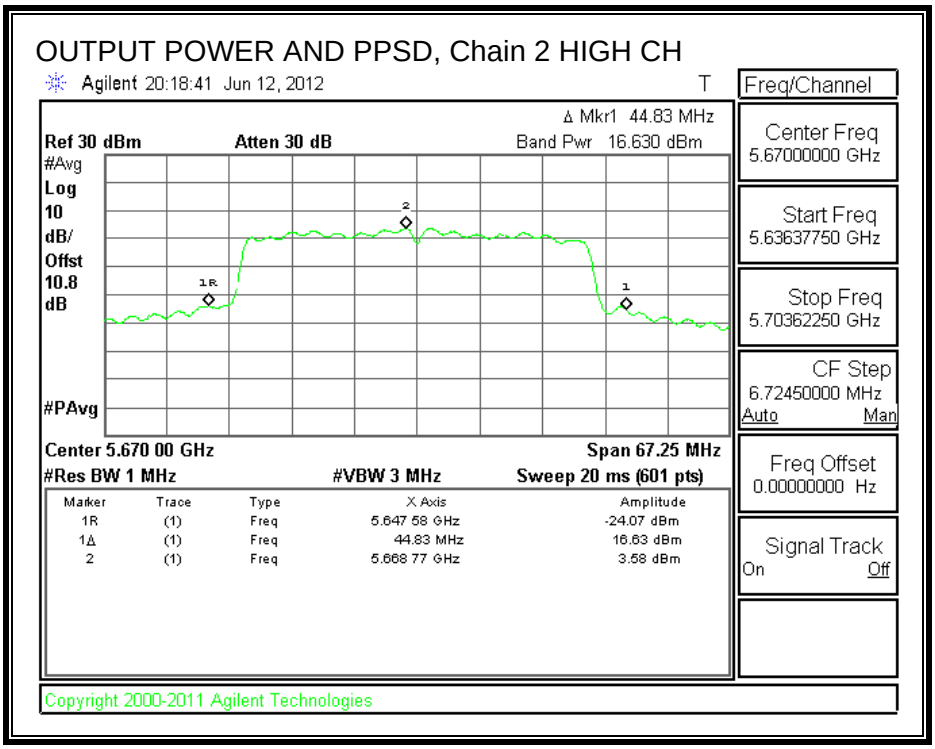
OUTPUT POWER AND PPSD, Chain 1





OUTPUT POWER AND PPSD, Chain 2





8.20.5. PEAK EXCURSION

LIMITS

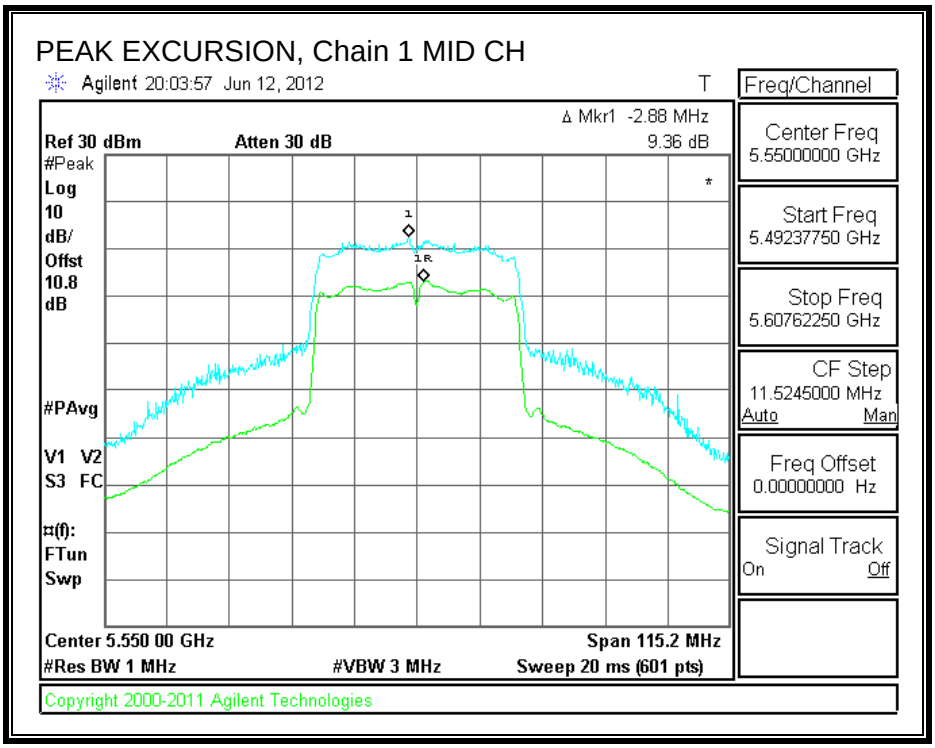
FCC §15.407 (a) (6)

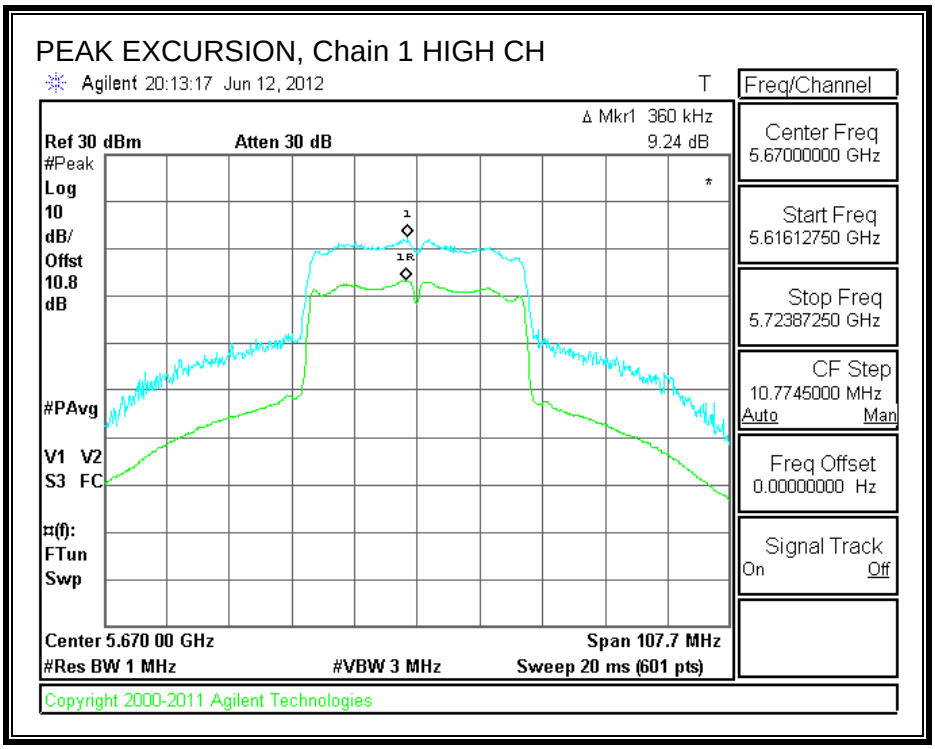
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

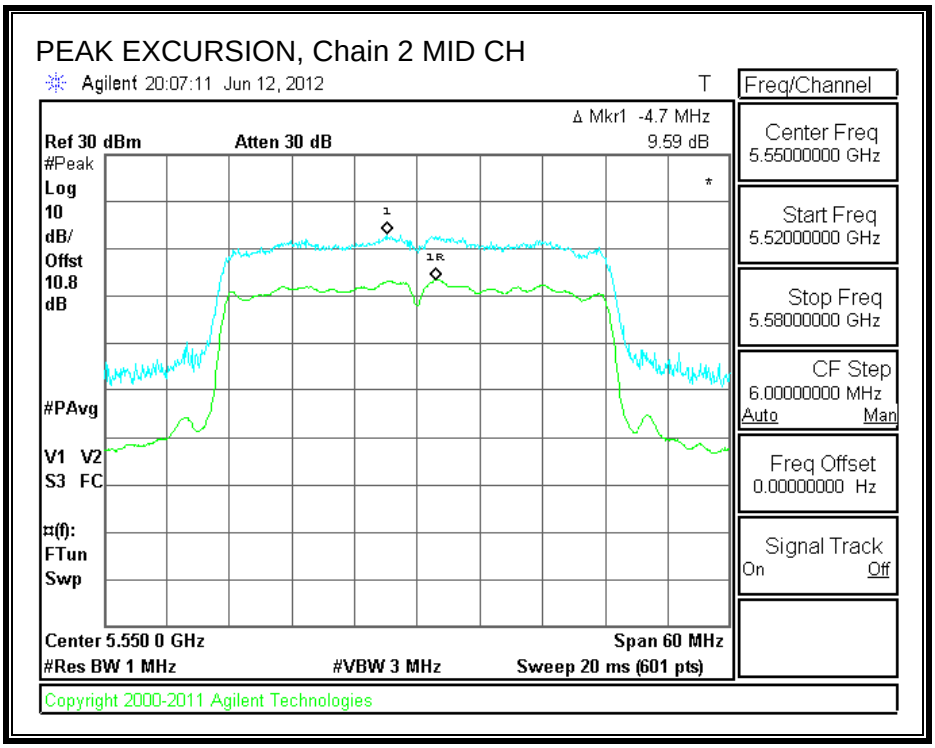
Channel	Frequency (MHz)	Pk Exc Chain 1 (dB)	Pk Exc Chain 2 (dB)	Limit (dB)	Worst-Case Margin (dB)
High	5550	9.36	9.59	13	-3.4
High	5670	9.24	9.16	13	-3.8

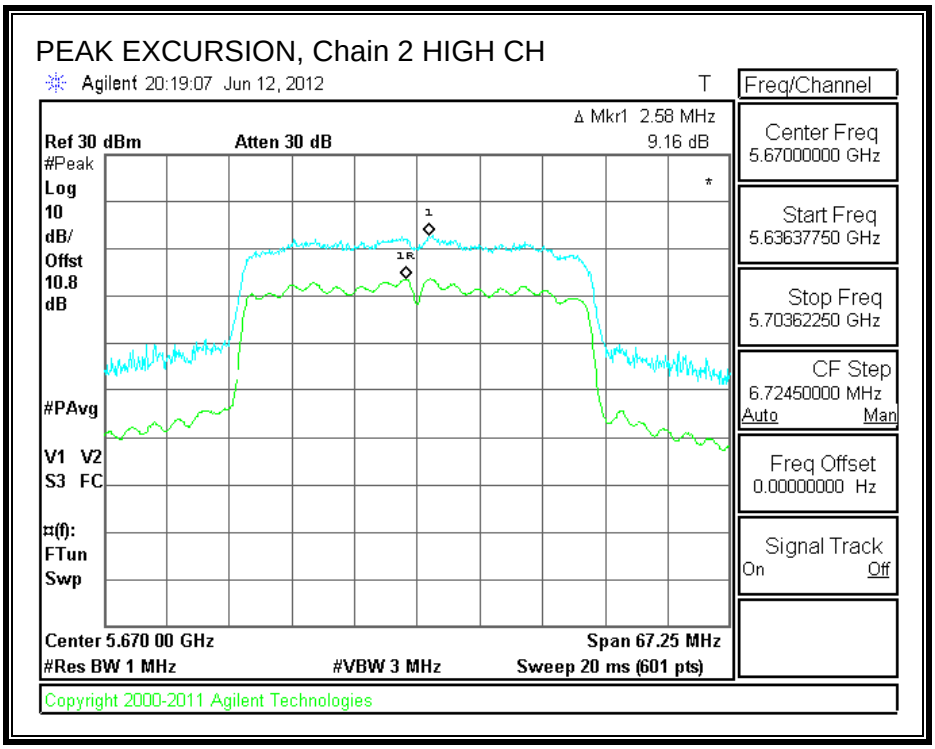
PEAK EXCURSION, Chain 1





PEAK EXCURSION, Chain 2





8.21. 802.11n HT40, CDD MCS0, 3TX, 5.6 GHz BAND

8.21.1. 26 dB BANDWIDTH

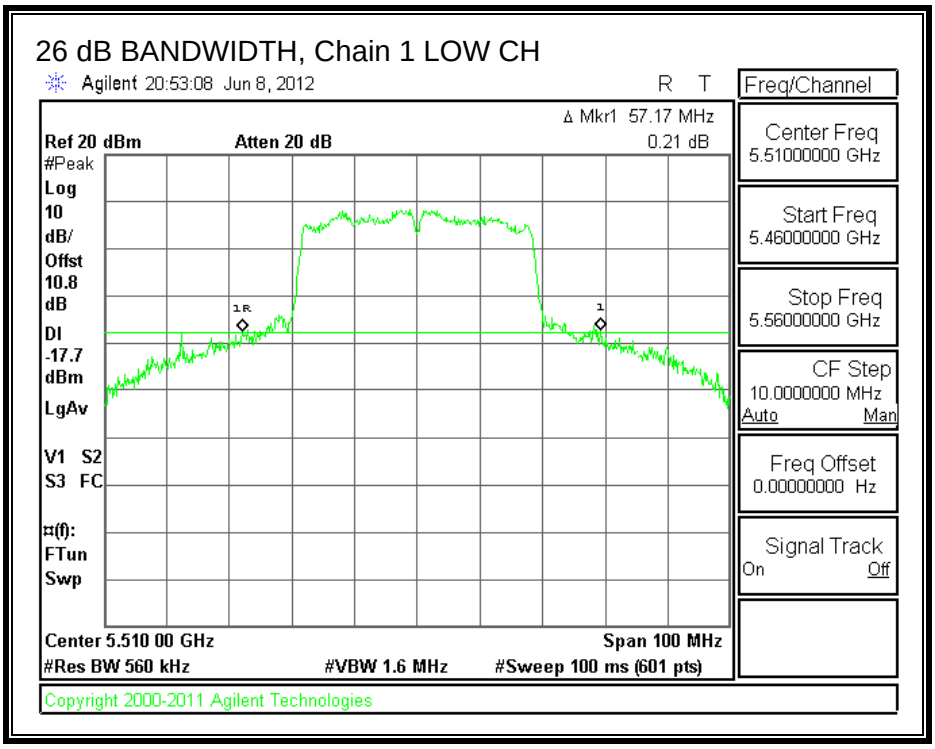
LIMITS

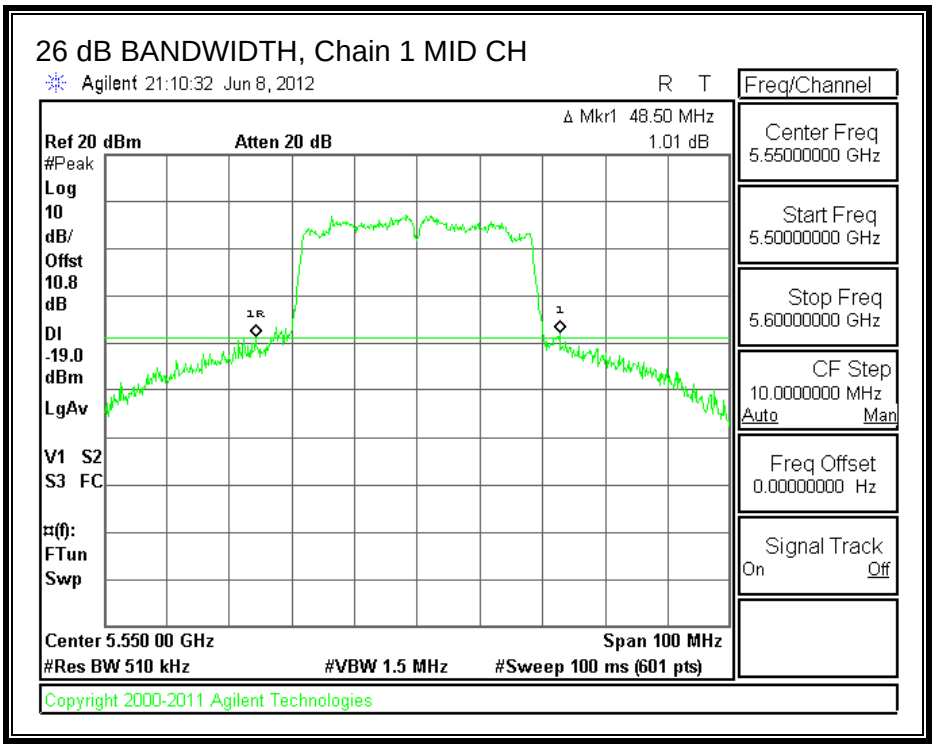
None; for reporting purposes only.

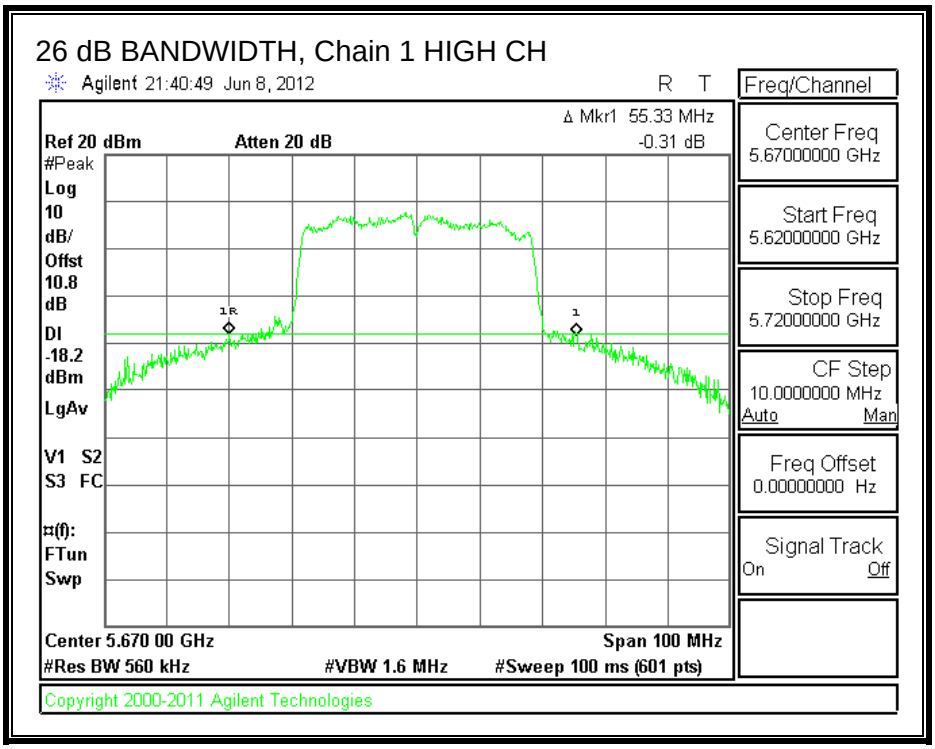
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 1 (MHz)	26 dB BW Chain 2 (MHz)	26 dB BW Chain 3 (MHz)
Low	5510	57.17	41.50	49.50
Mid	5550	48.50	42.33	42.50
High	5670	55.33	50.33	47.50

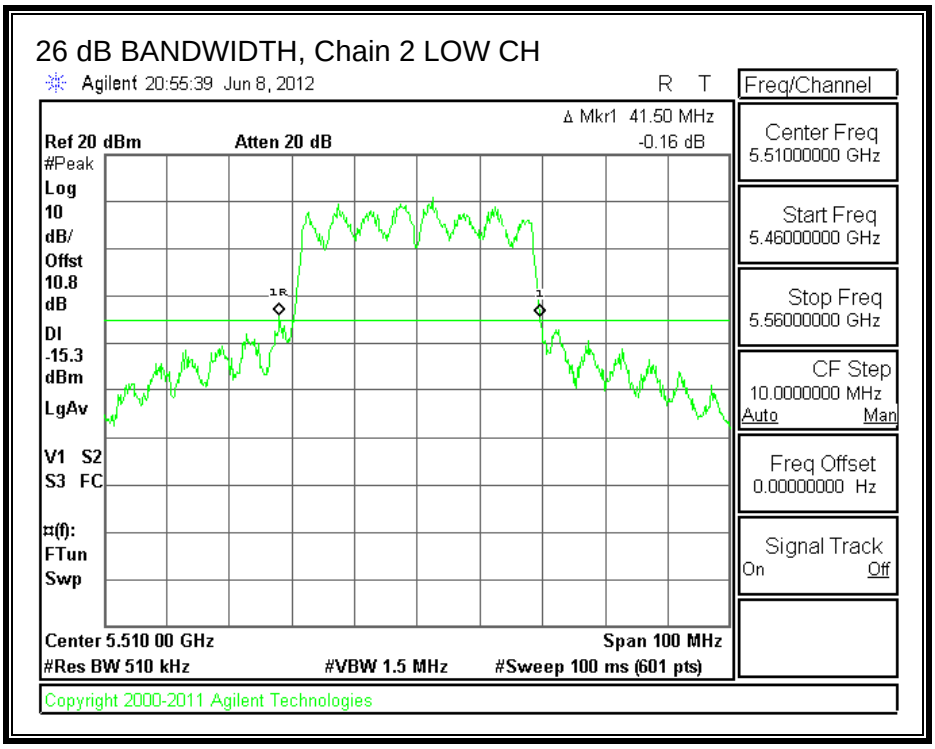
26 dB BANDWIDTH, Chain 1

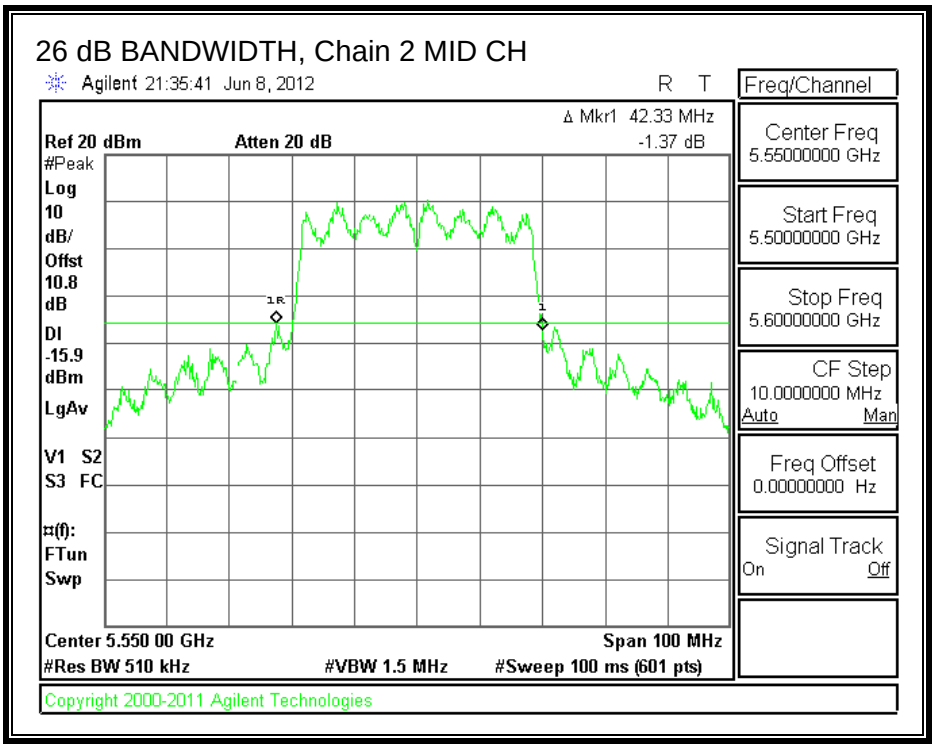




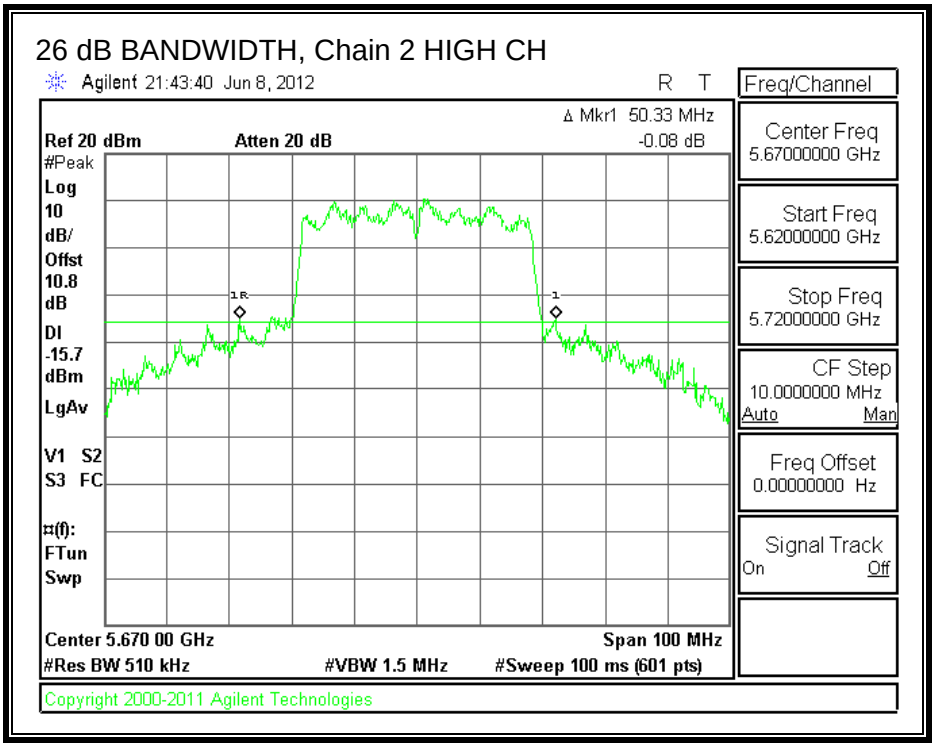


26 dB BANDWIDTH, Chain 2

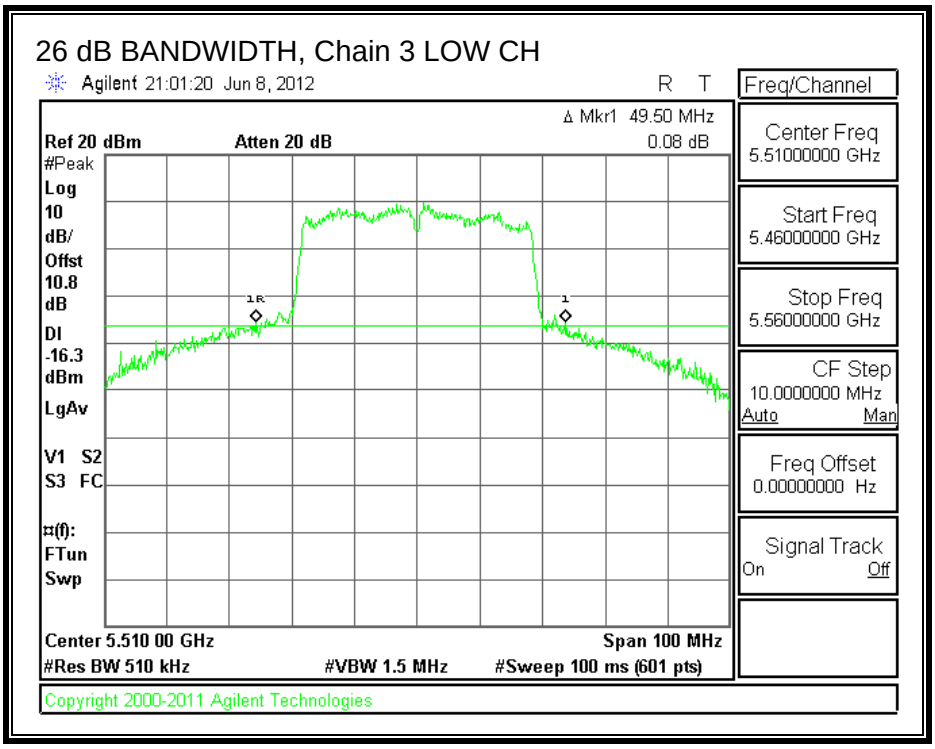


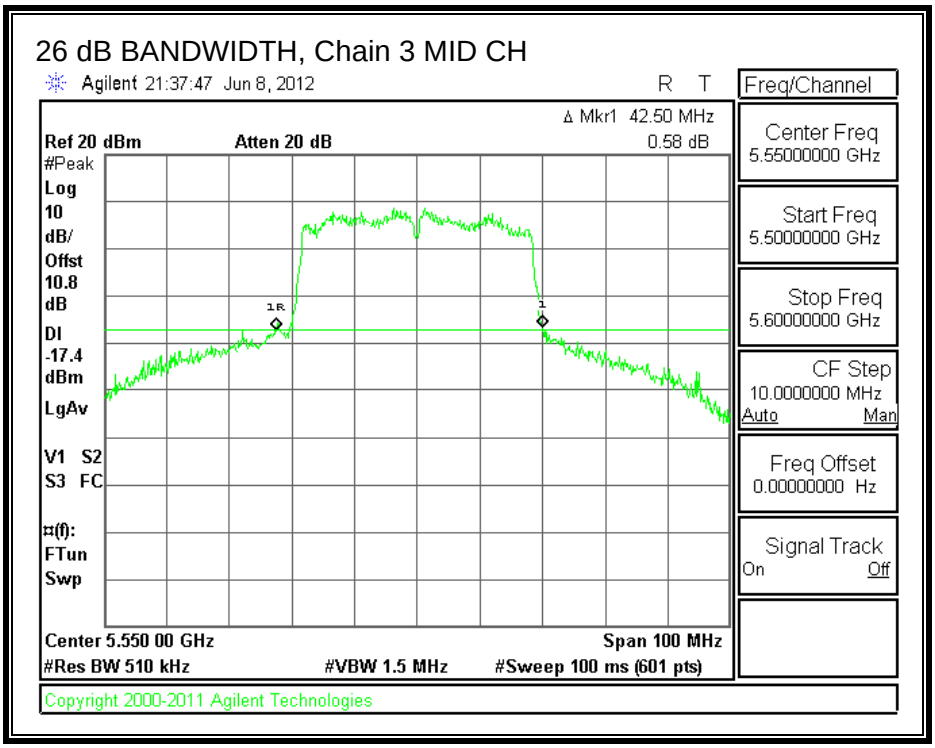


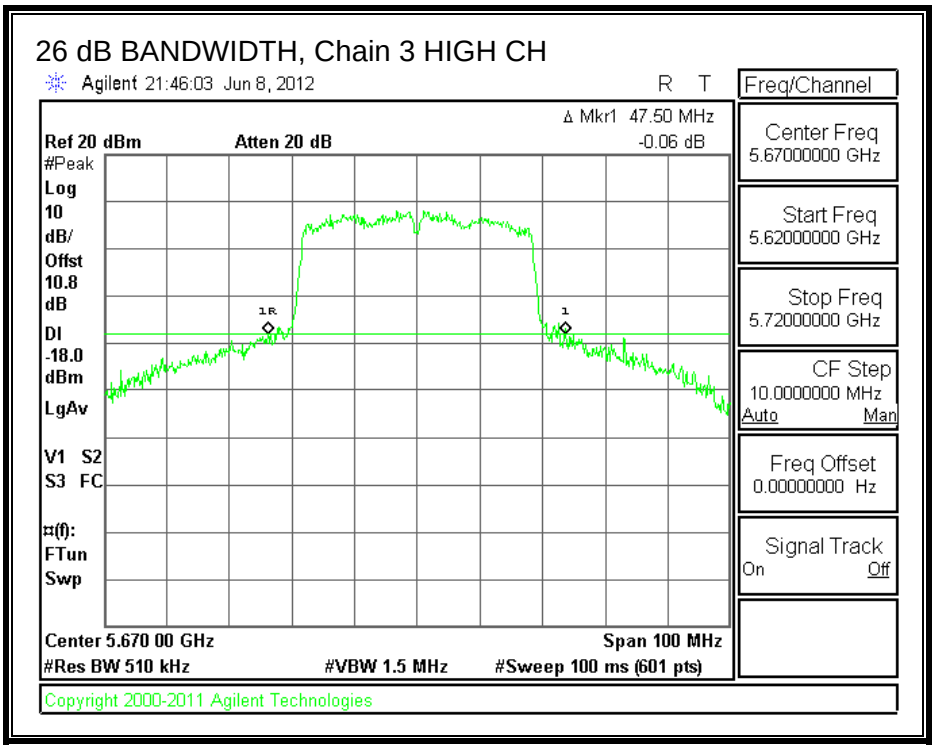
26 dB BANDWIDTH, Chain 2 HIGH CH



26 dB BANDWIDTH, Chain 3







8.21.2. 99% BANDWIDTH

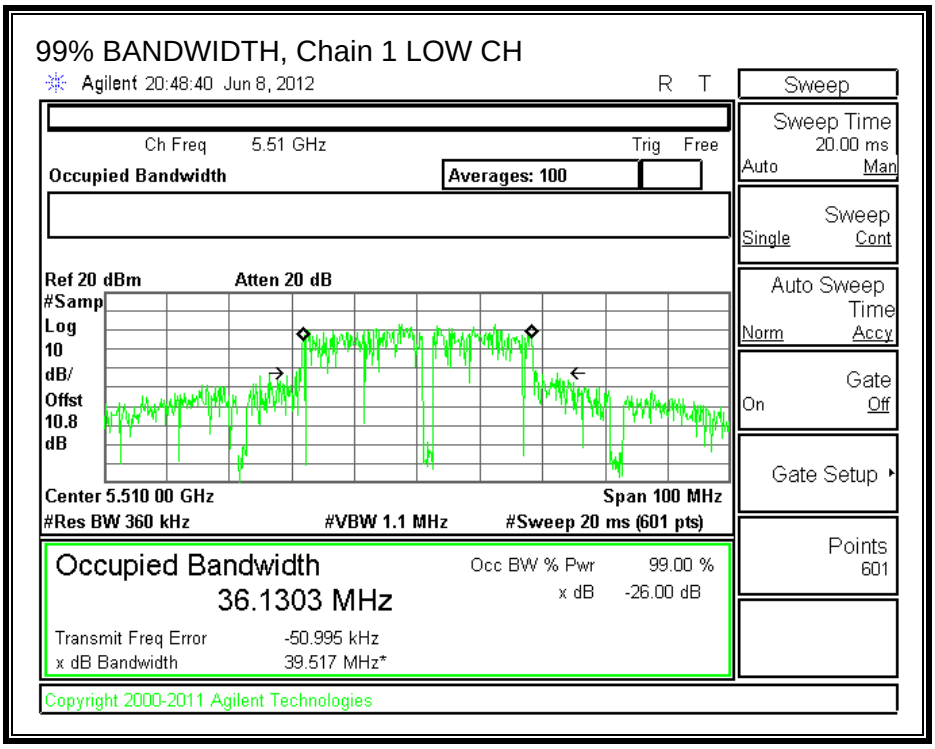
LIMITS

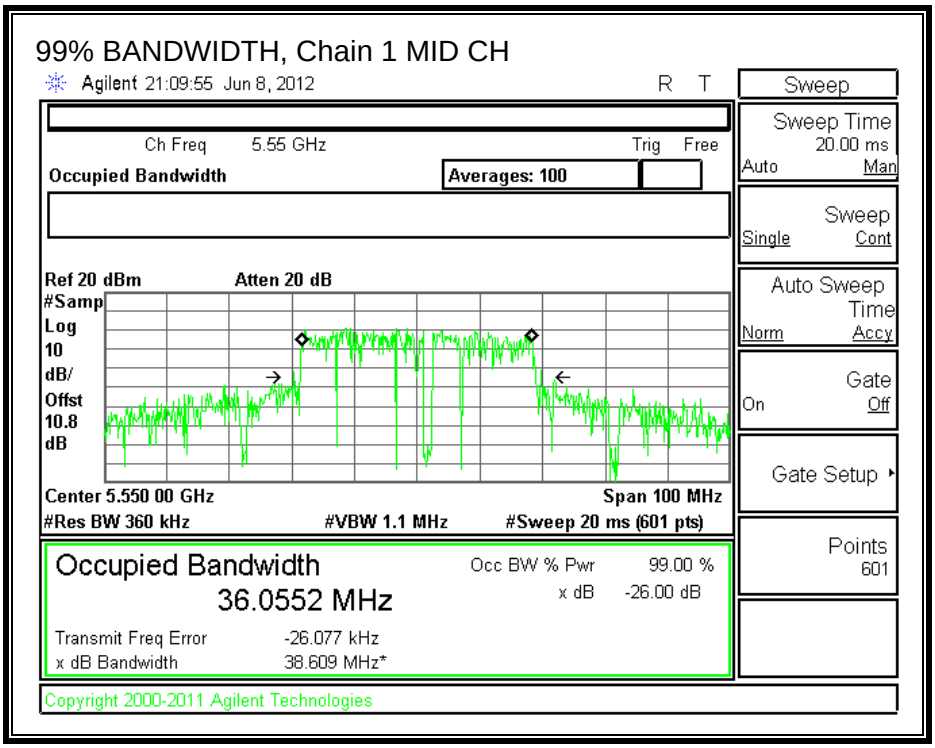
None; for reporting purposes only.

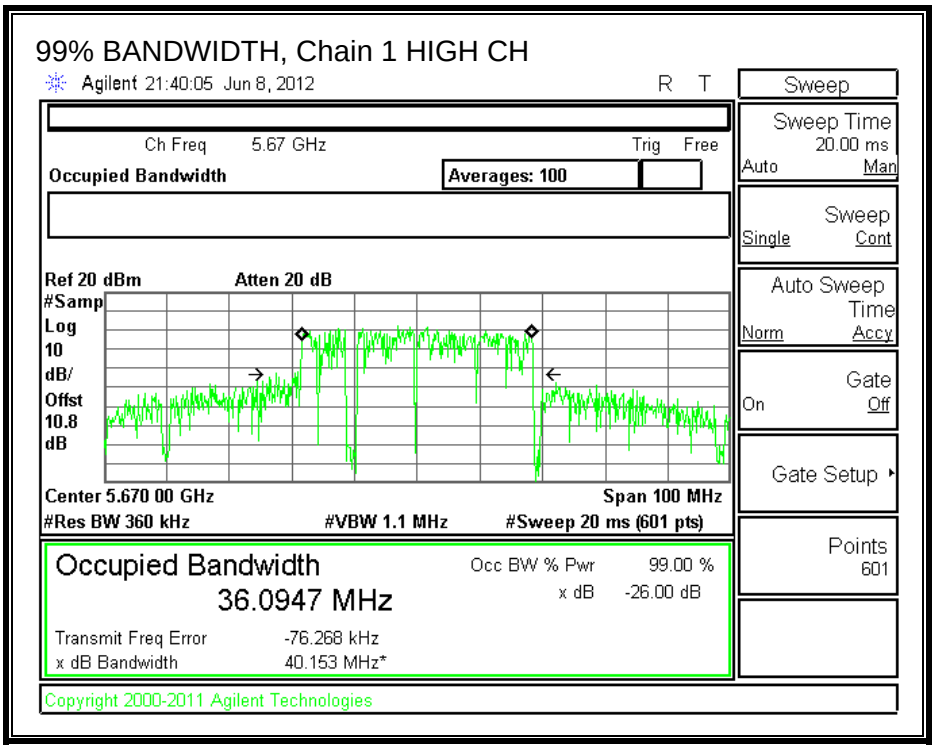
RESULTS

Channel	Frequency (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)	99% BW Chain 3 (MHz)
Low	5510	36.1303	36.1908	36.1128
Mid	5550	36.0552	36.1640	36.1345
High	5670	36.0947	36.1786	35.9964

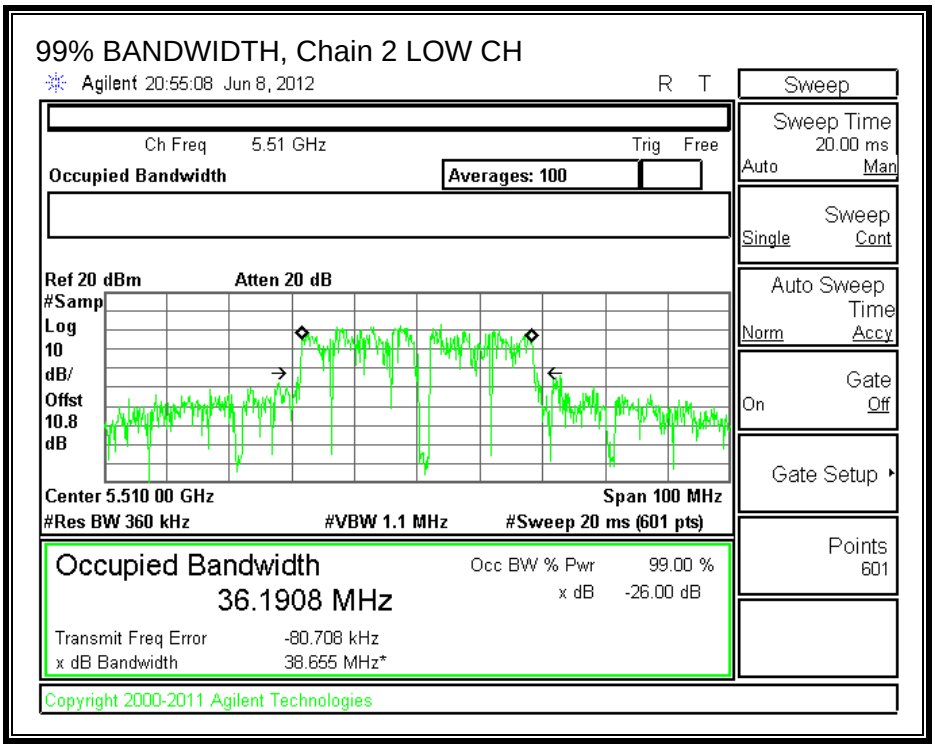
99% BANDWIDTH, Chain 1

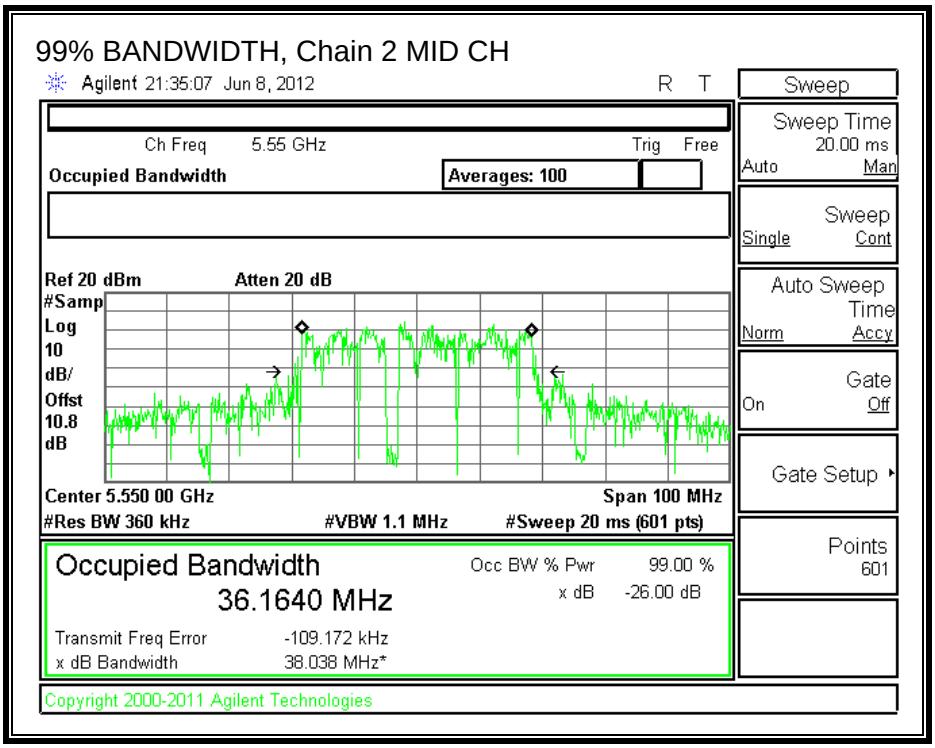


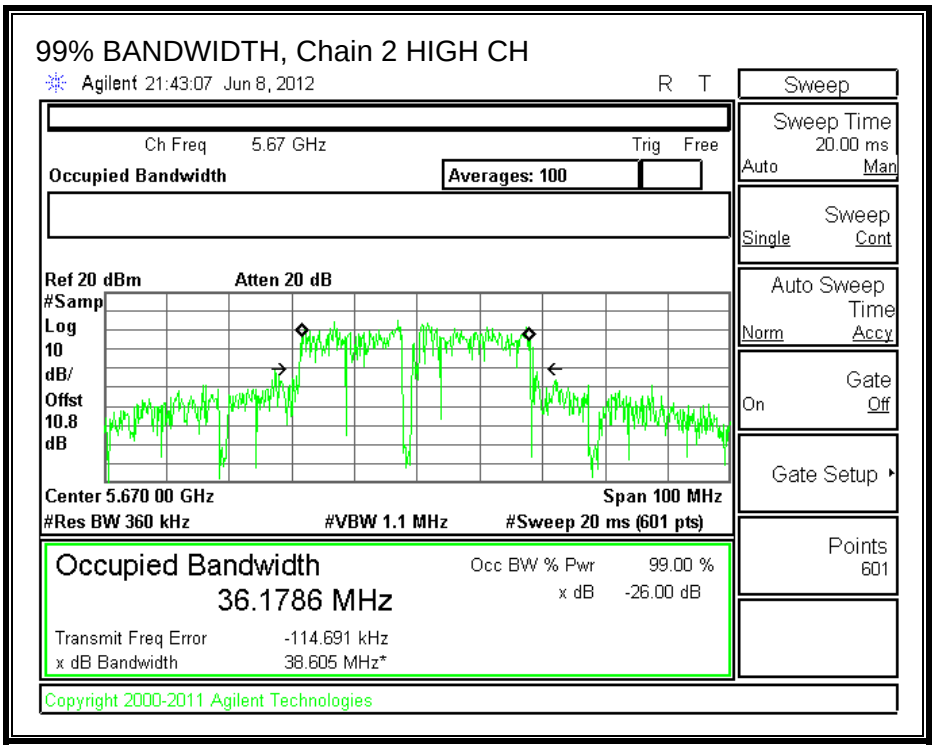




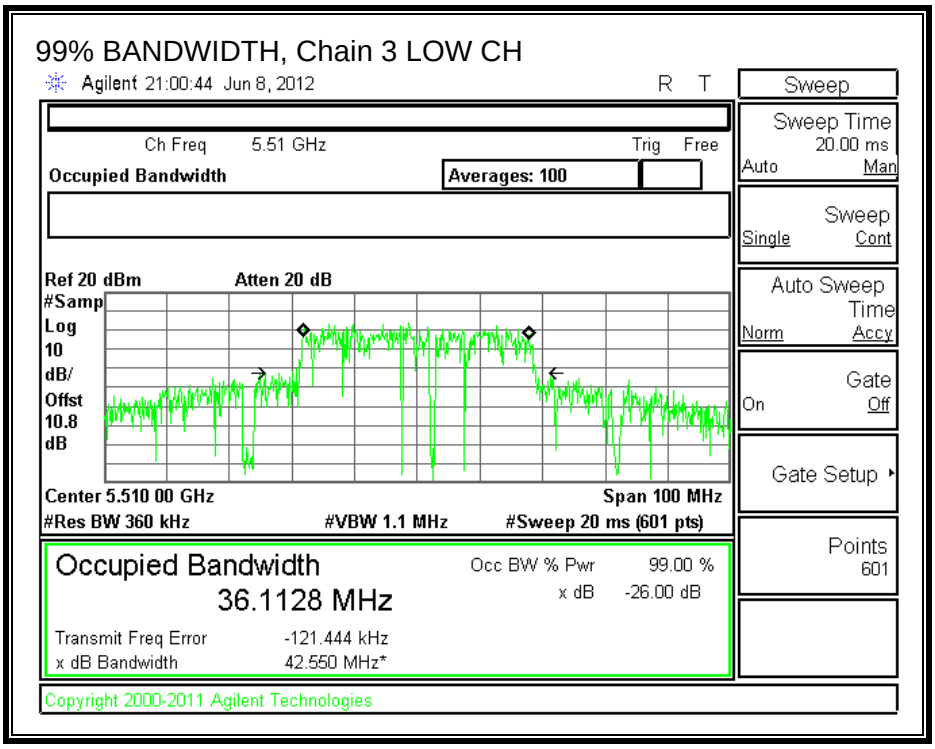
99% BANDWIDTH, Chain 2

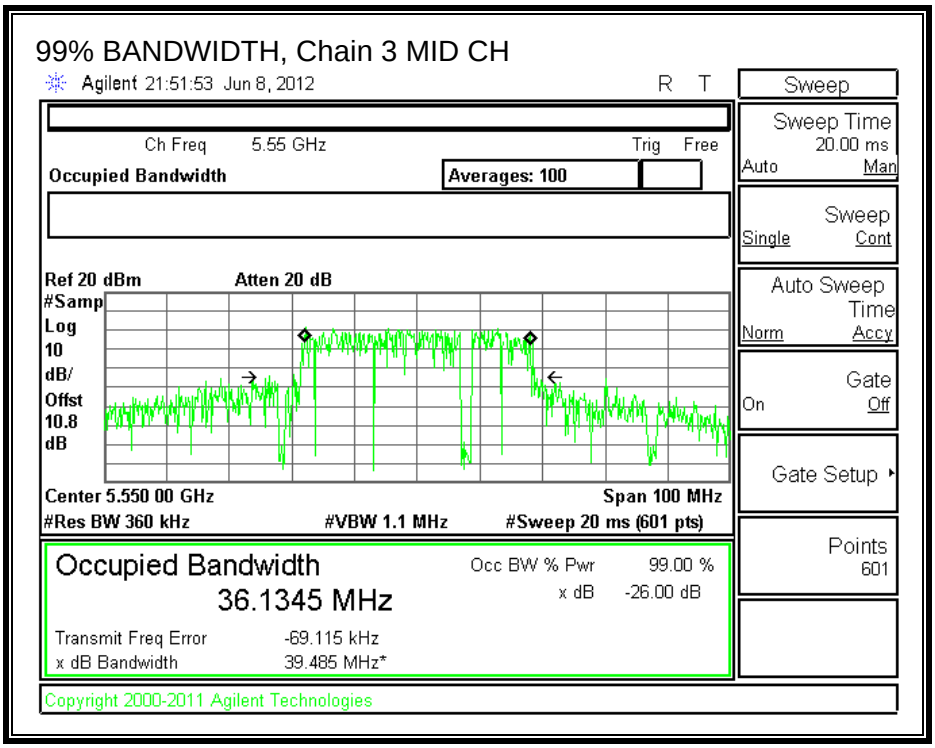


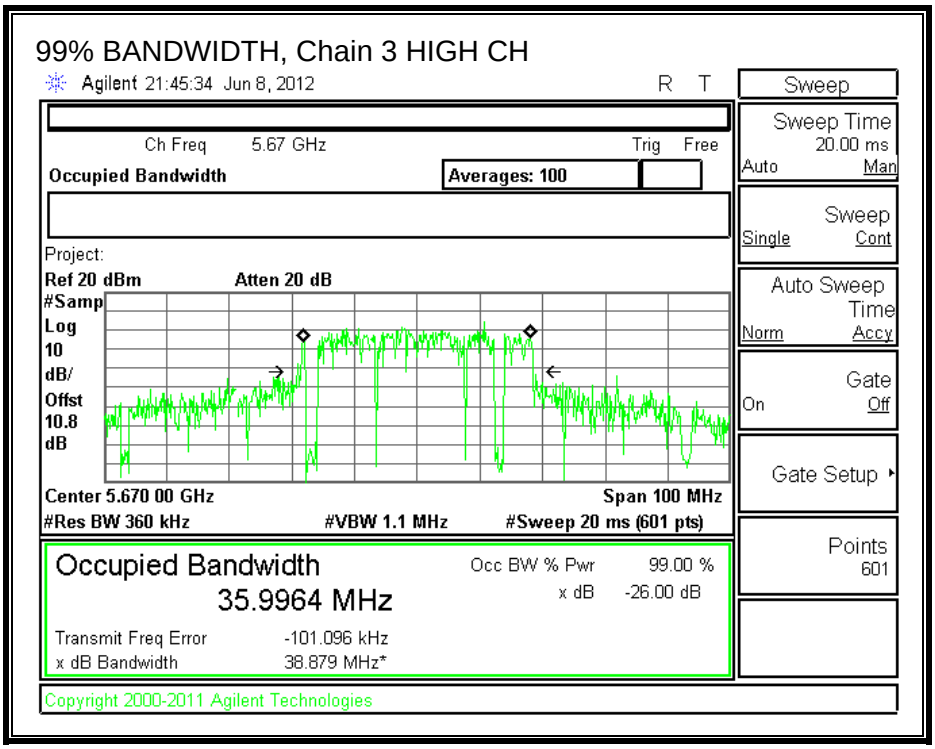




99% BANDWIDTH, Chain 3







8.21.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.80 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5510	15.10	15.19	15.40	20.00
Mid	5550	15.18	15.23	15.10	19.94
High	5670	15.10	15.20	15.13	19.91

8.21.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5510	24	41.50	27.18	9.16	20.84	7.84
Mid	5550	24	42.33	27.27	9.16	20.84	7.84
High	5670	24	47.50	27.77	9.16	20.84	7.84

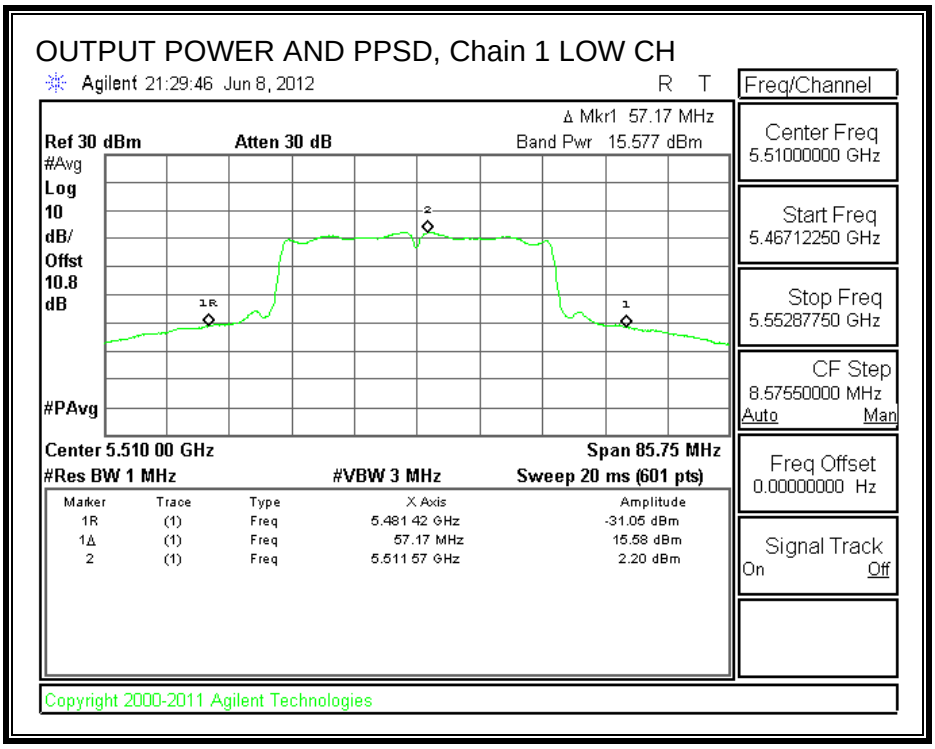
Output Power Results

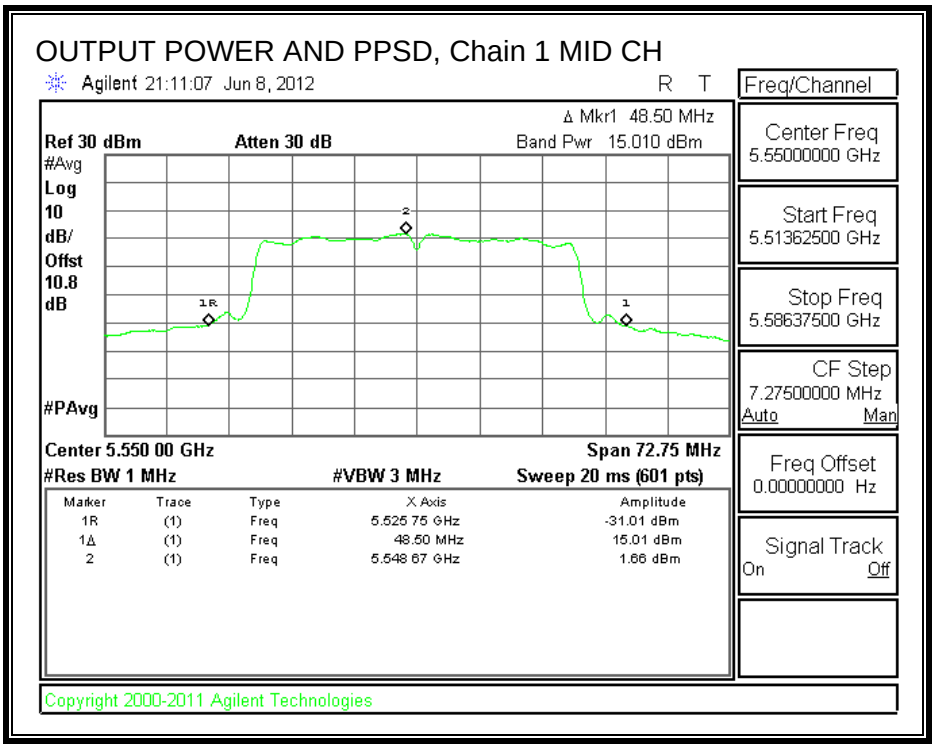
Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Chain 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	15.577	15.216	15.229	20.115	20.84	-0.725
Mid	5550	15.010	15.015	15.065	19.801	20.84	-1.039
High	5670	15.173	15.888	15.082	20.167	20.84	-0.673

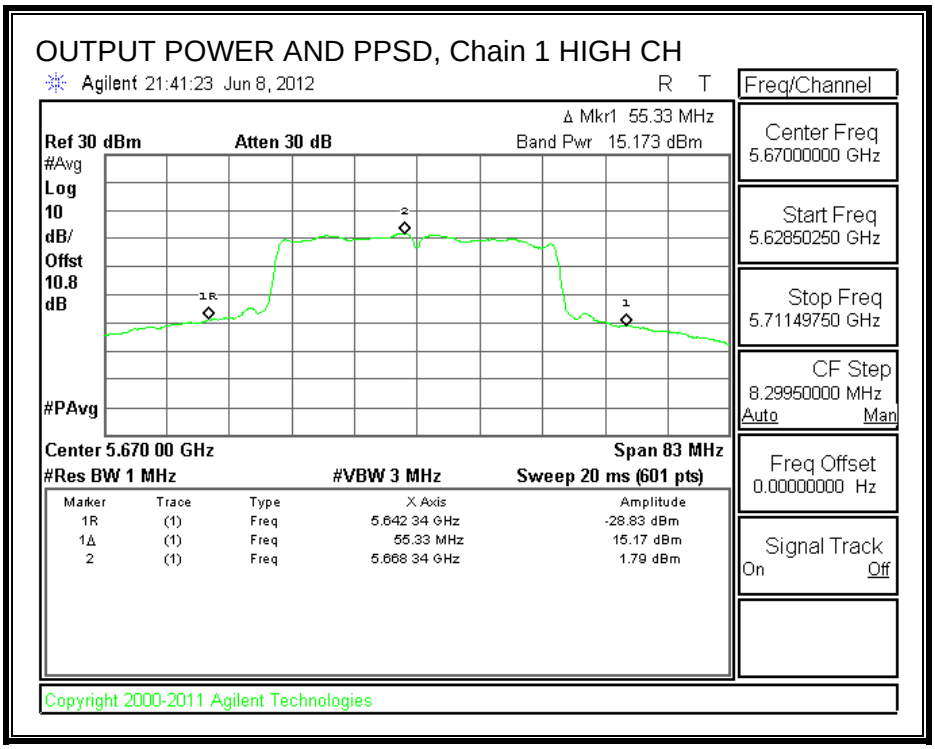
PPSD Results

Channel	Frequency (MHz)	Chain 1 Meas PPSD (dBm)	Chain 2 Meas PPSD (dBm)	Chain 3 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	2.20	3.25	1.87	7.25	7.84	-0.59
Mid	5550	1.66	3.19	1.85	7.06	7.84	-0.78
High	5670	1.79	3.69	1.64	7.25	7.84	-0.59

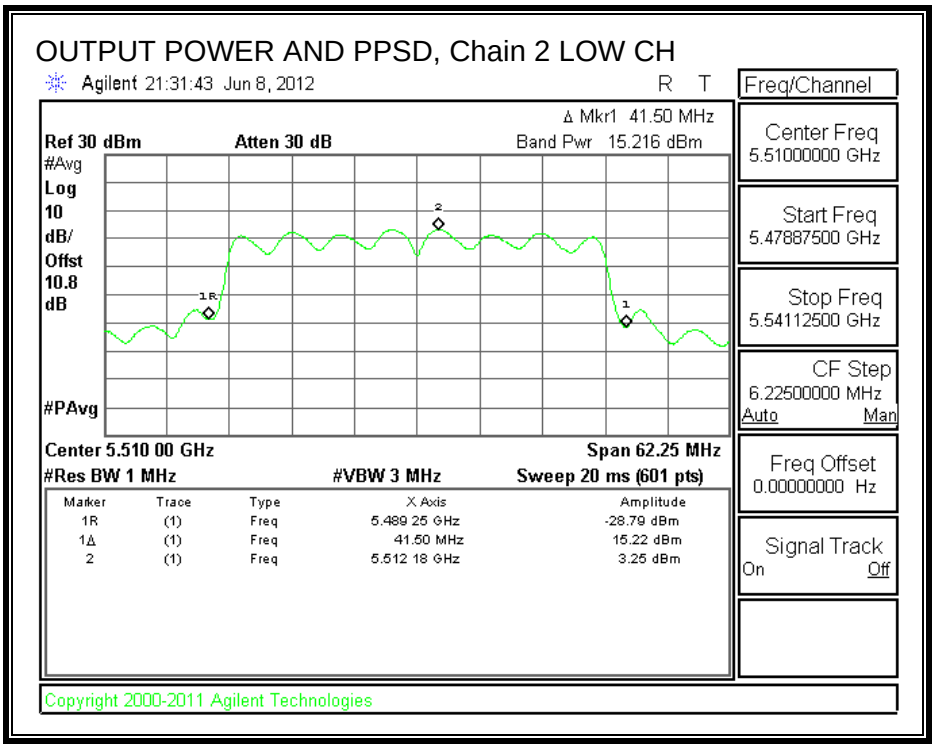
OUTPUT POWER AND PPSD, Chain 1

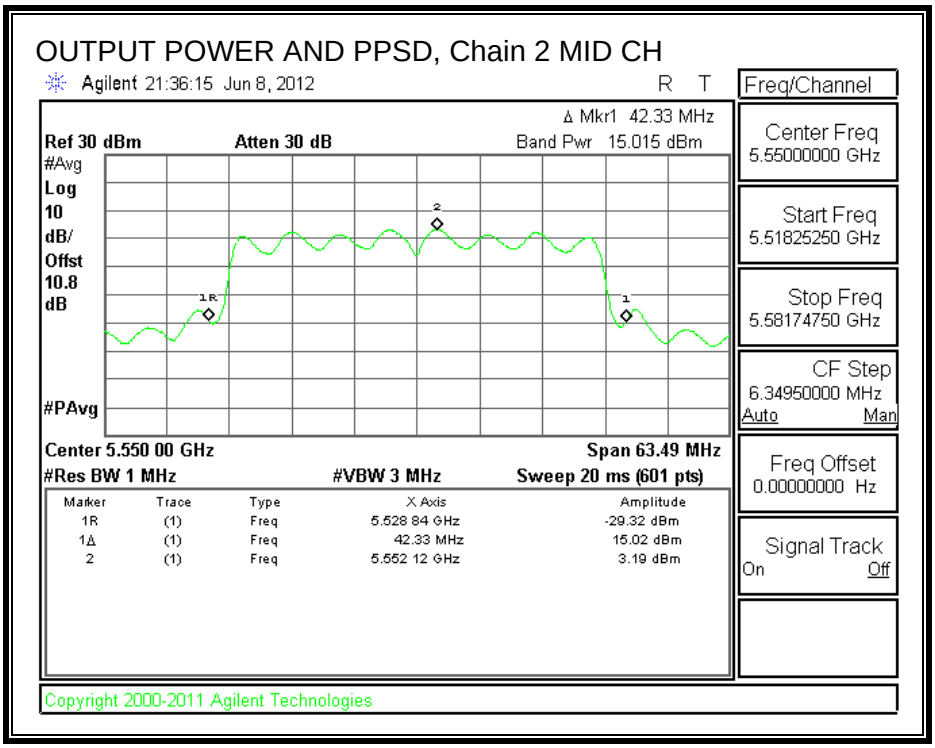


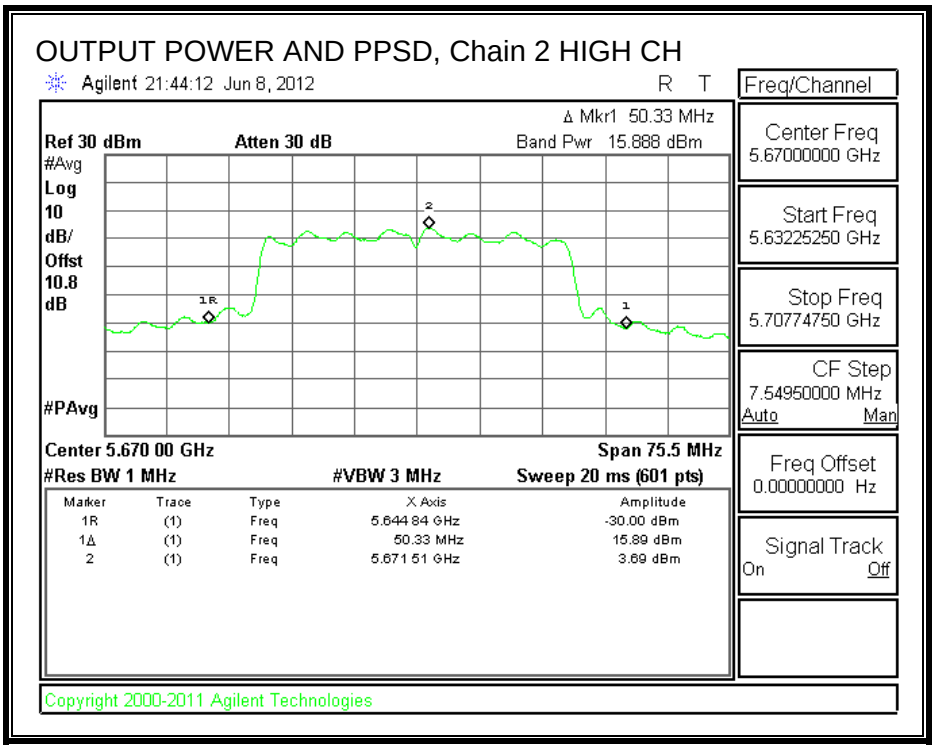




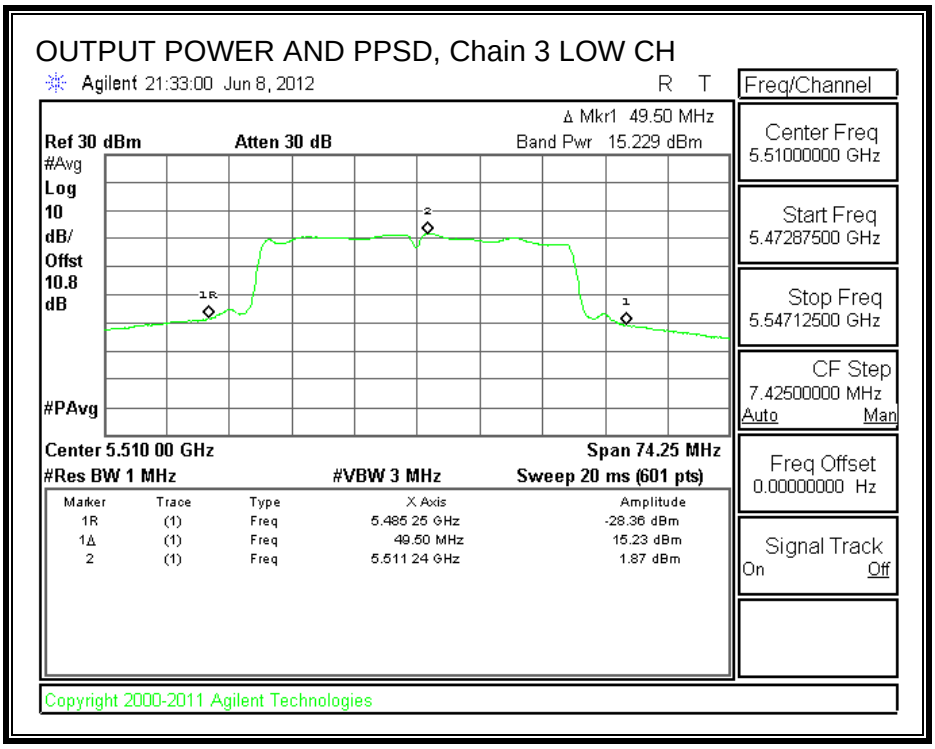
OUTPUT POWER AND PPSD, Chain 2

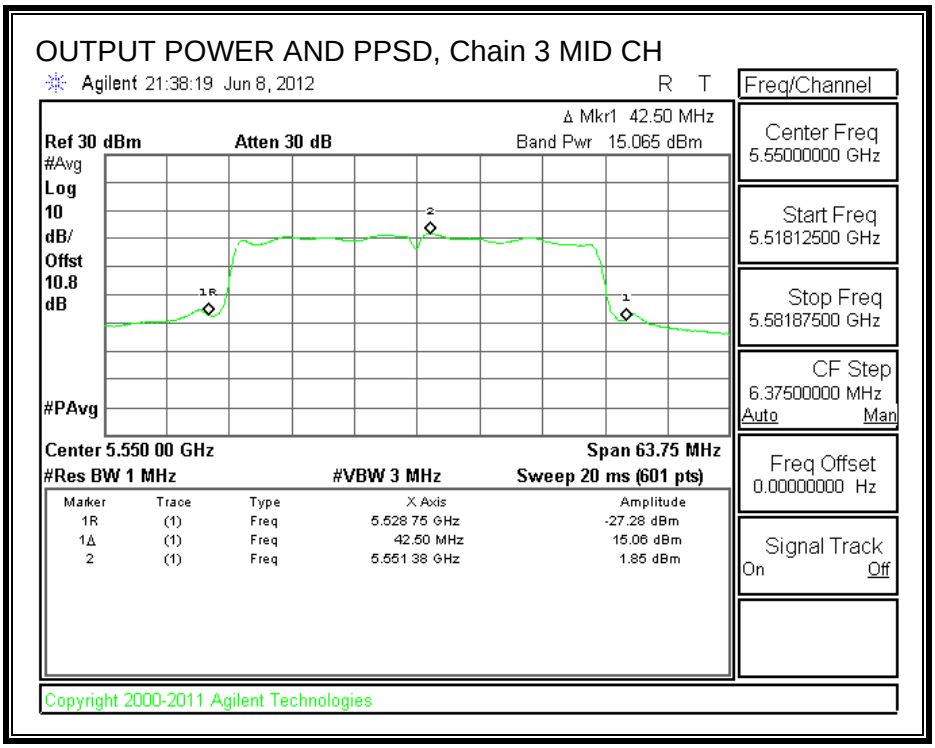


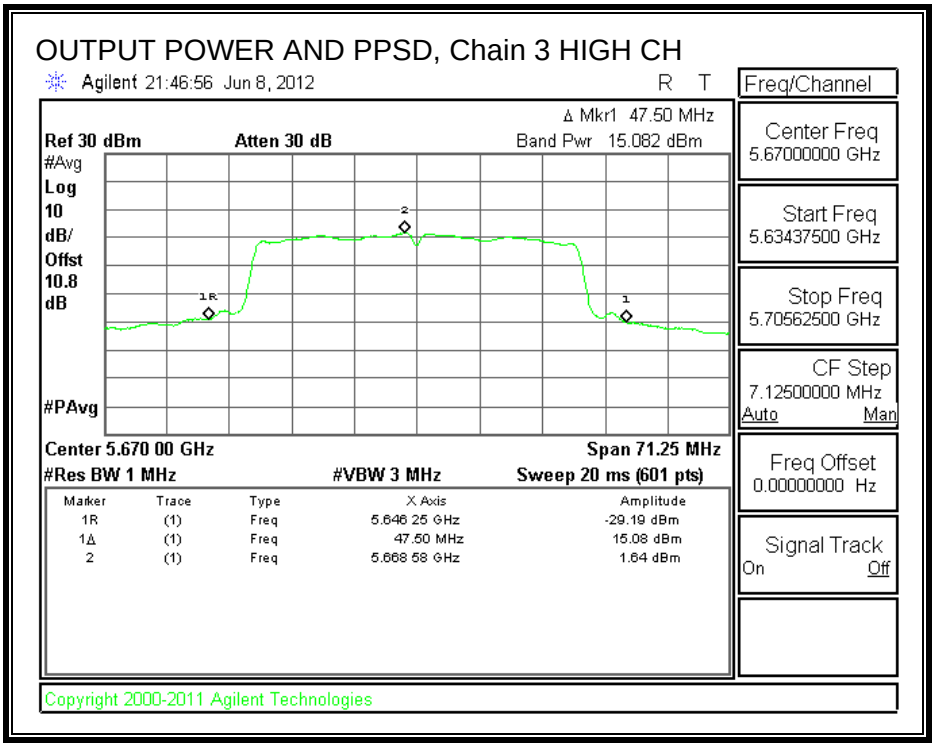




OUTPUT POWER AND PPSD, Chain 3







8.21.5. PEAK EXCURSION

LIMITS

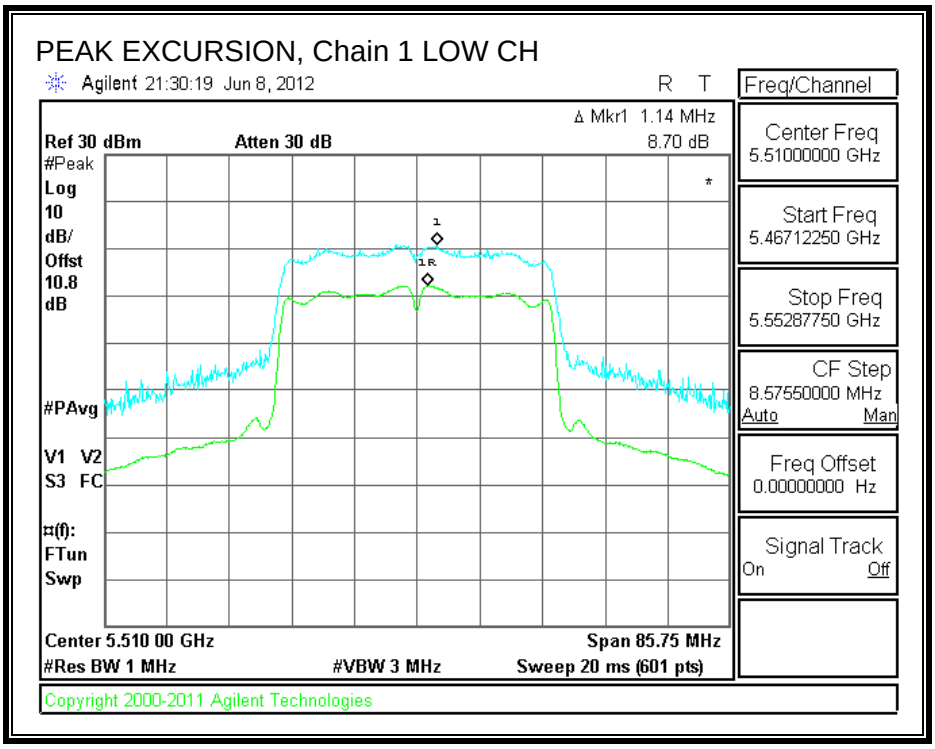
FCC §15.407 (a) (6)

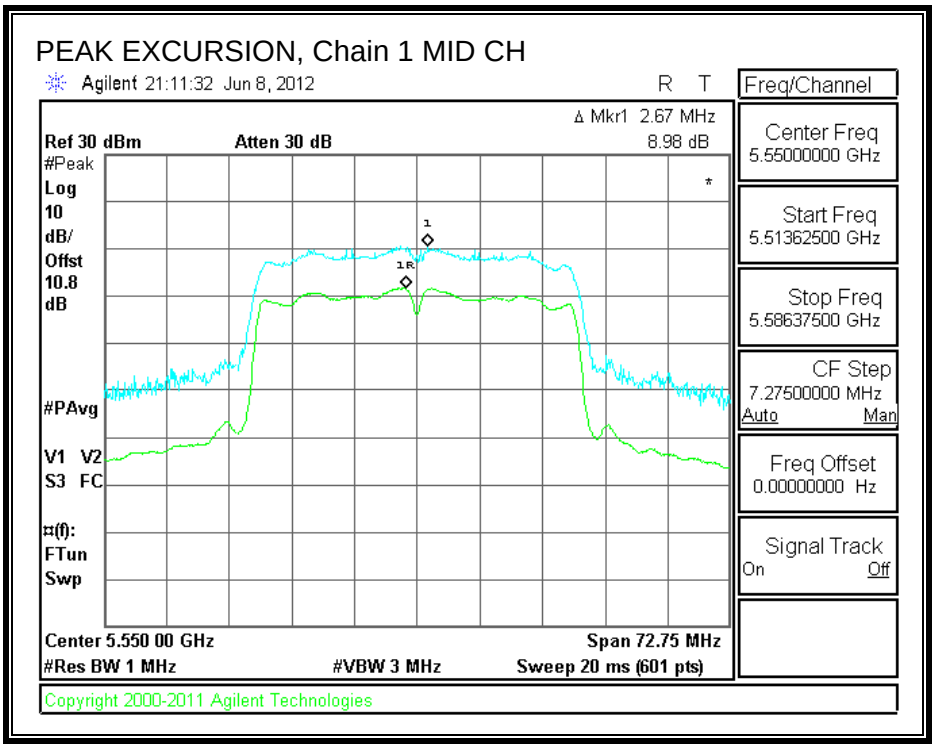
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

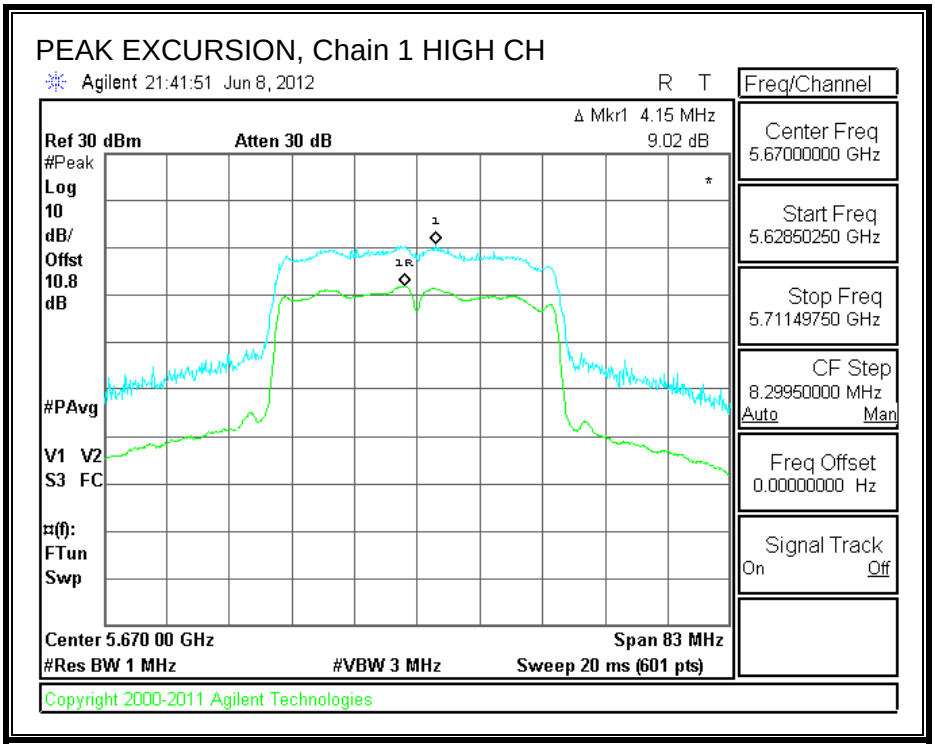
Channel	Frequency (MHz)	Pk Exc Chain 1 (dB)	Pk Exc Chain 2 (dB)	Pk Exc Chain 3 (dB)	Limit (dB)	Worst-Case Margin (dB)
Low	5510	8.70	8.94	10.11	13	-2.89
Mid	5550	8.98	9.20	10.01	13	-2.99
High	5670	9.02	8.86	10.18	13	-2.82

PEAK EXCURSION, Chain 1

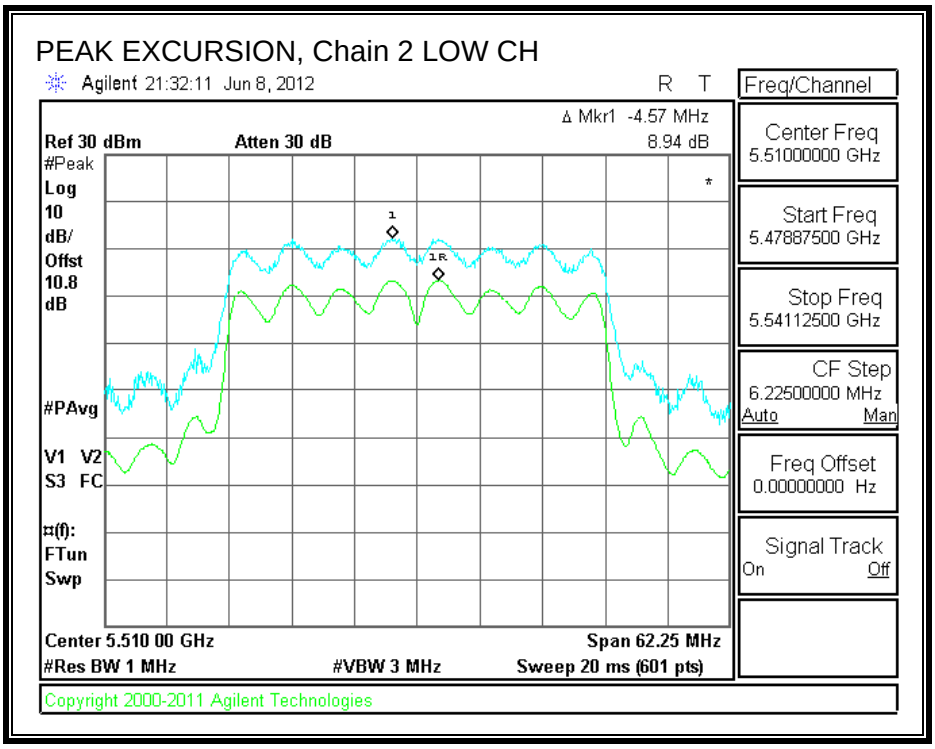


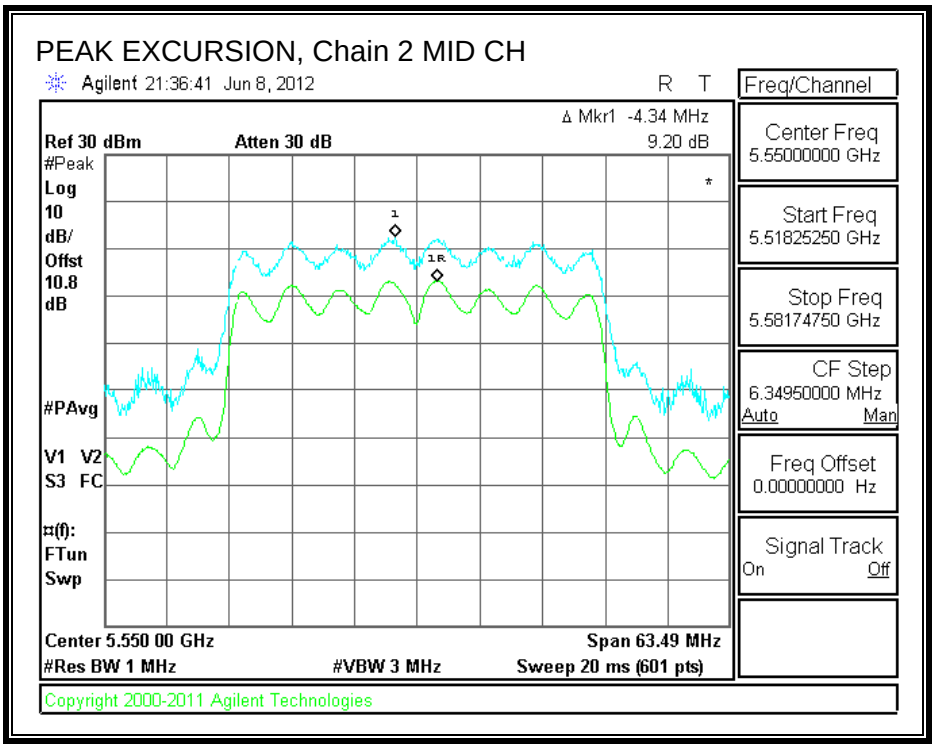


PEAK EXCURSION, Chain 1 HIGH CH

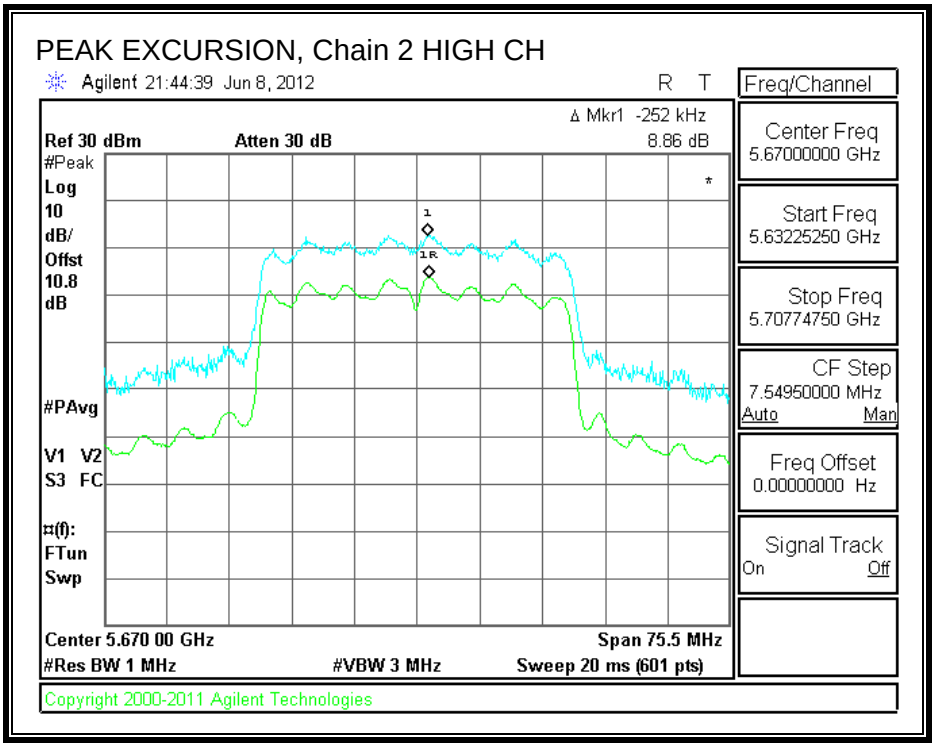


PEAK EXCURSION, Chain 2

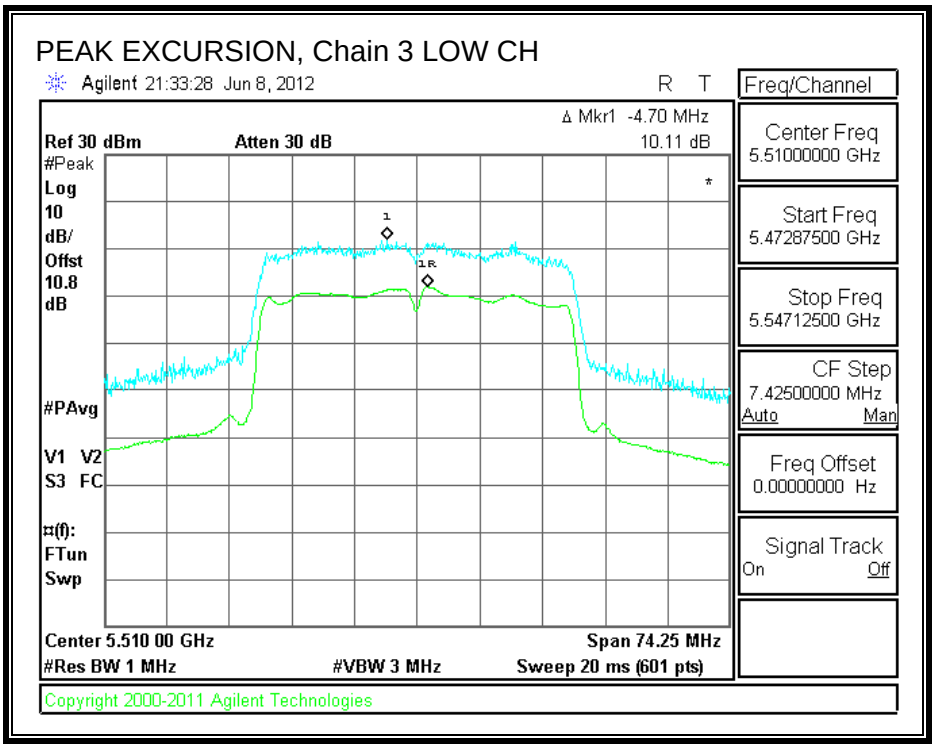


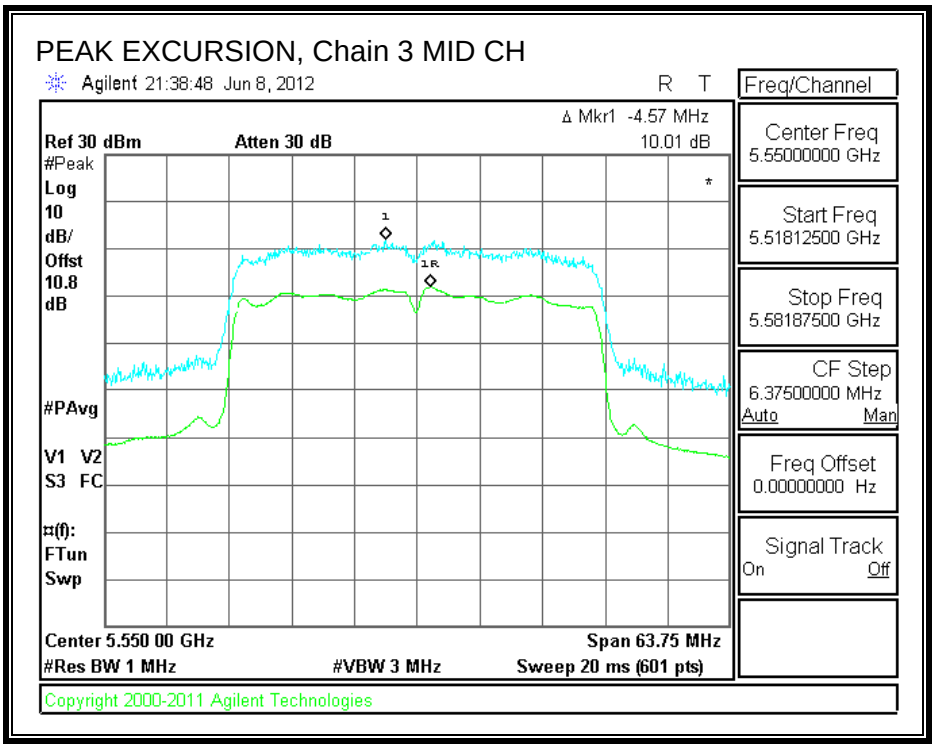


PEAK EXCURSION, Chain 2 HIGH CH

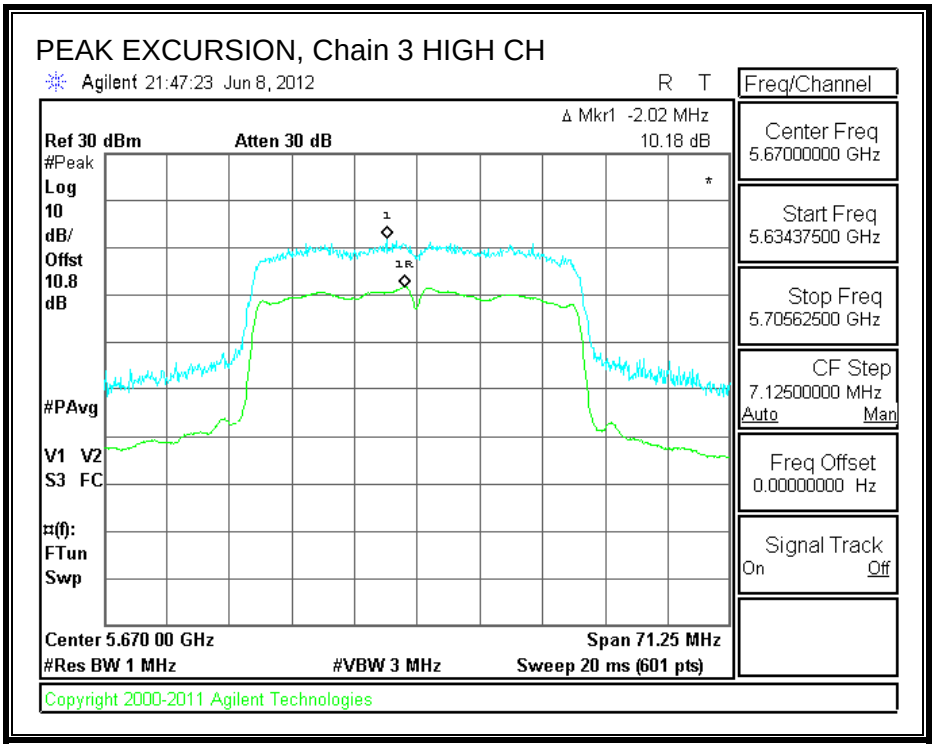


PEAK EXCURSION, Chain 3





PEAK EXCURSION, Chain 3 HIGH CH



8.22. 802.11n HT40, SDM MCS21, 3TX, 5.6 GHz BAND

8.22.1. 26 dB BANDWIDTH

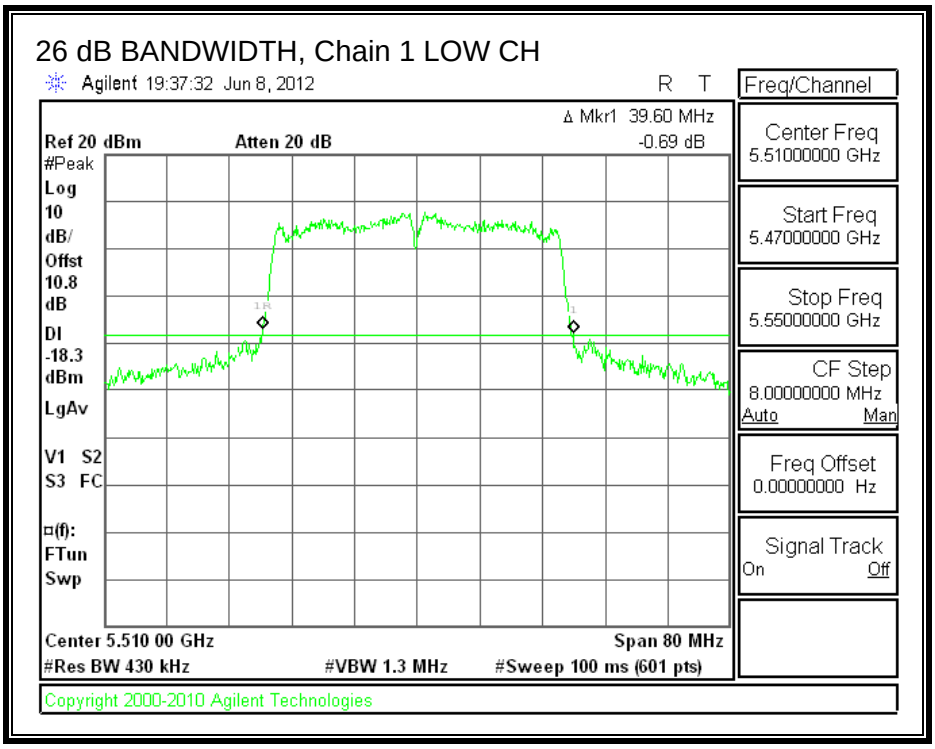
LIMITS

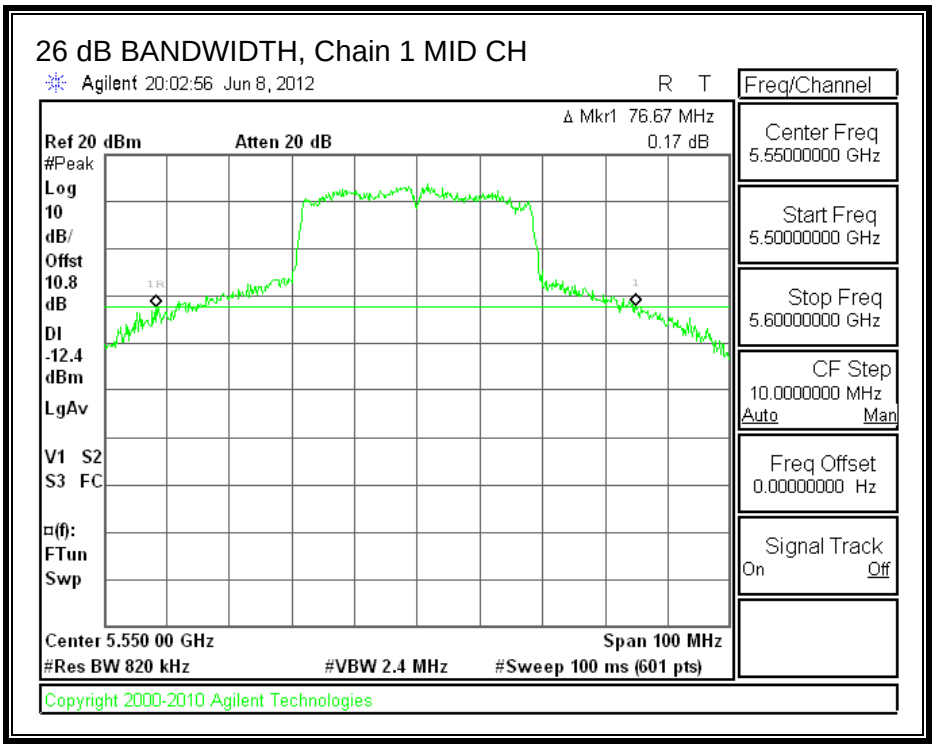
None; for reporting purposes only.

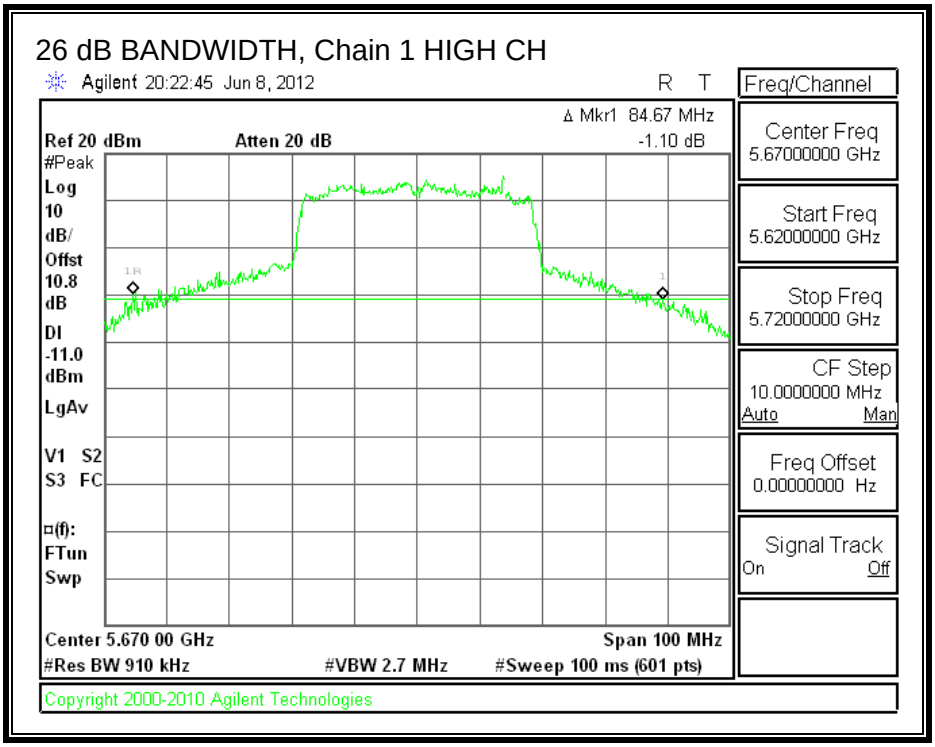
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 1 (MHz)	26 dB BW Chain 2 (MHz)	26 dB BW Chain 3 (MHz)
Low	5510	39.60	41.73	46.40
Mid	5550	76.67	70.67	85.50
High	5670	84.67	75.00	82.67

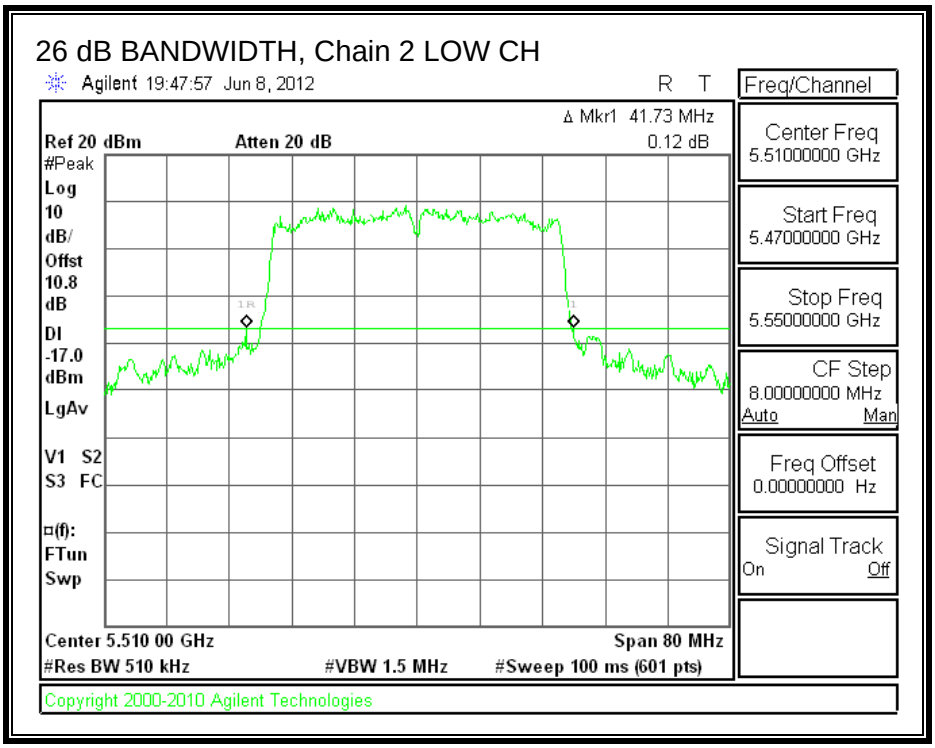
26 dB BANDWIDTH, Chain 1



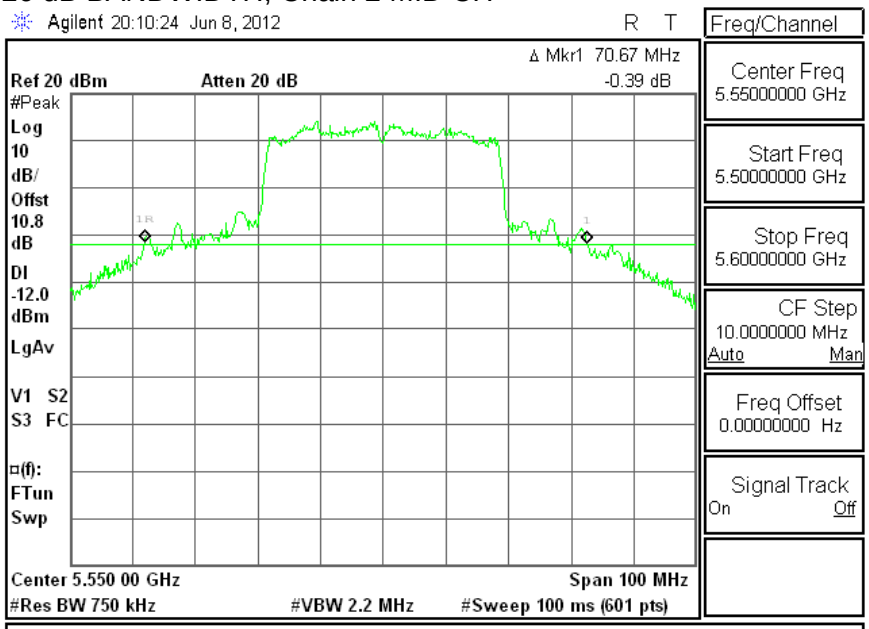




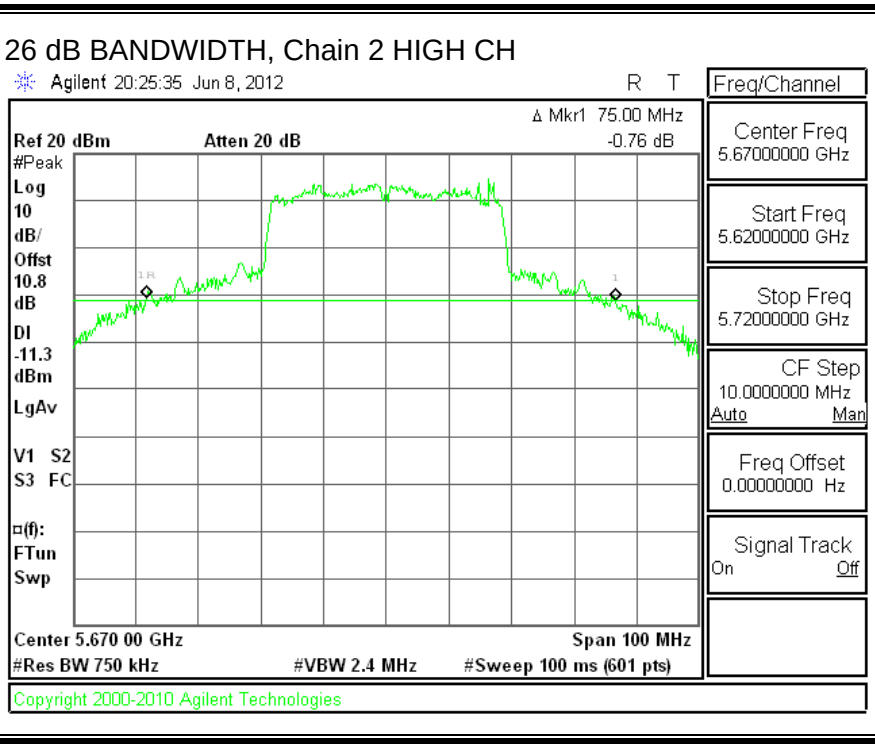
26 dB BANDWIDTH, Chain 2



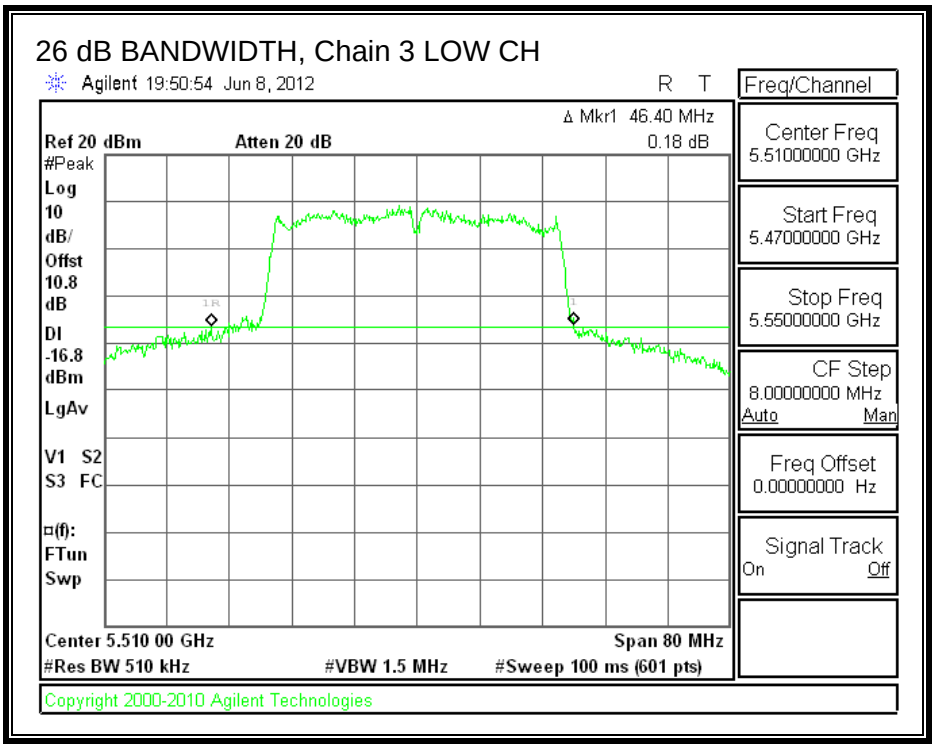
26 dB BANDWIDTH, Chain 2 MID CH

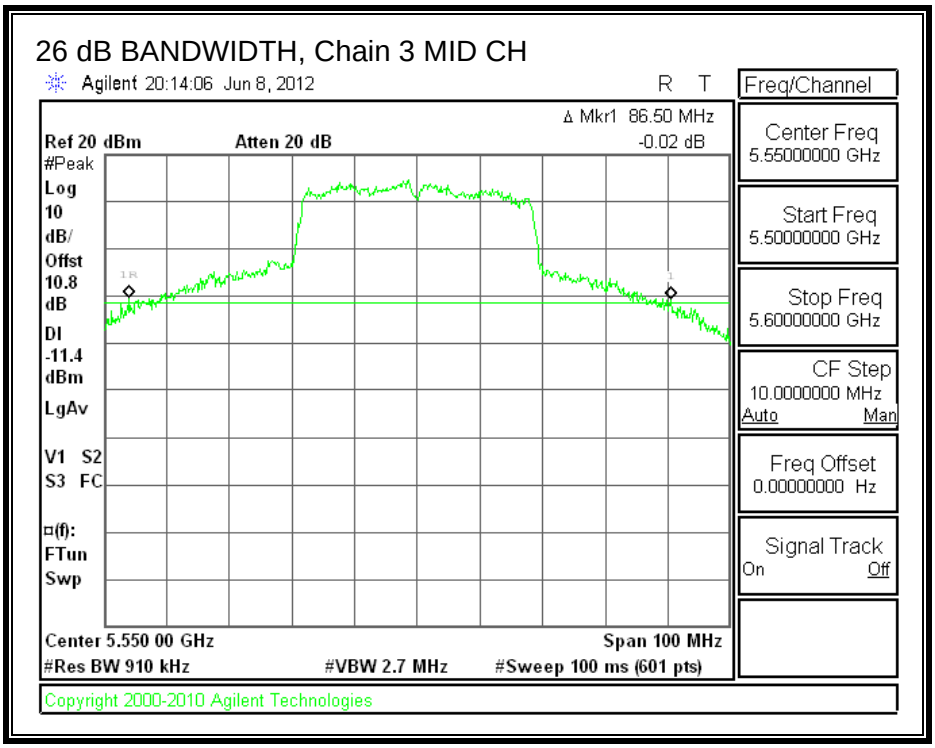


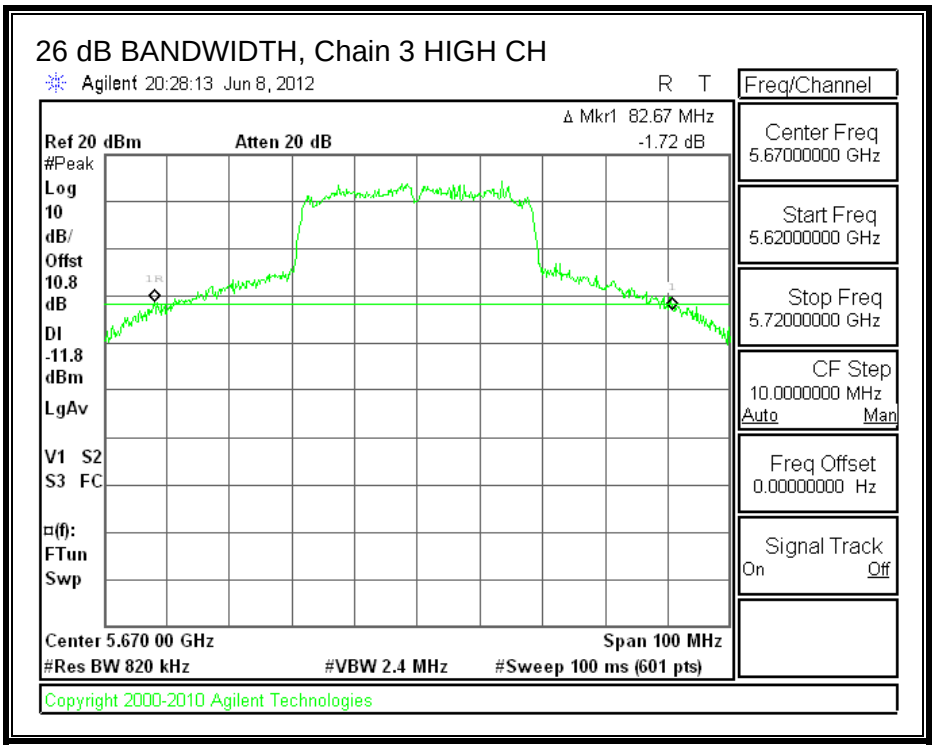
26 dB BANDWIDTH, Chain 2 HIGH CH



26 dB BANDWIDTH, Chain 3







8.22.2. 99% BANDWIDTH

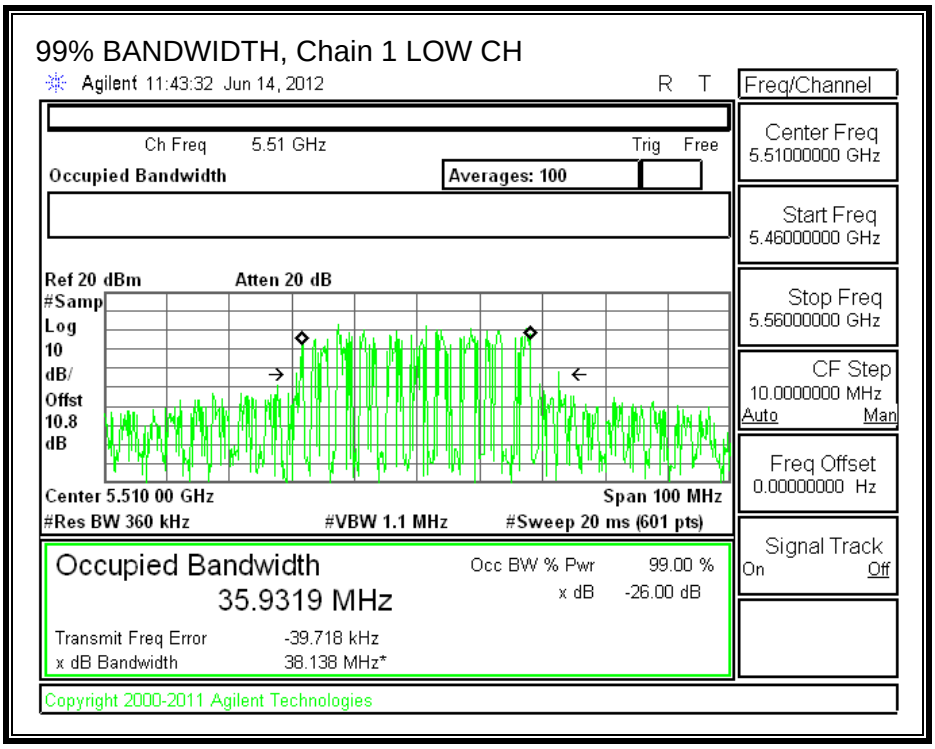
LIMITS

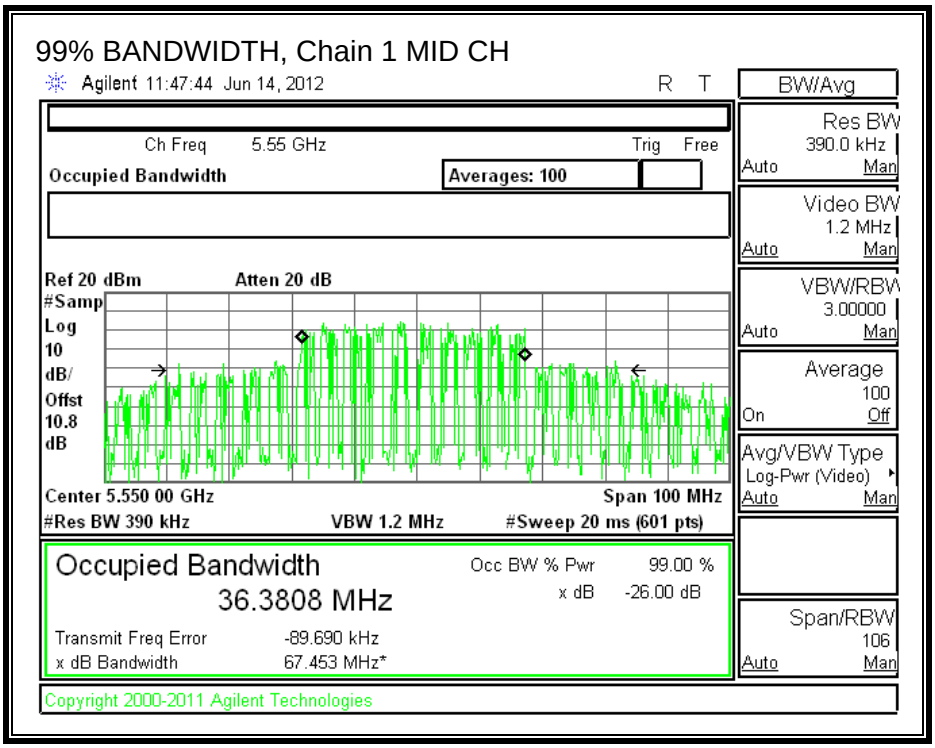
None; for reporting purposes only.

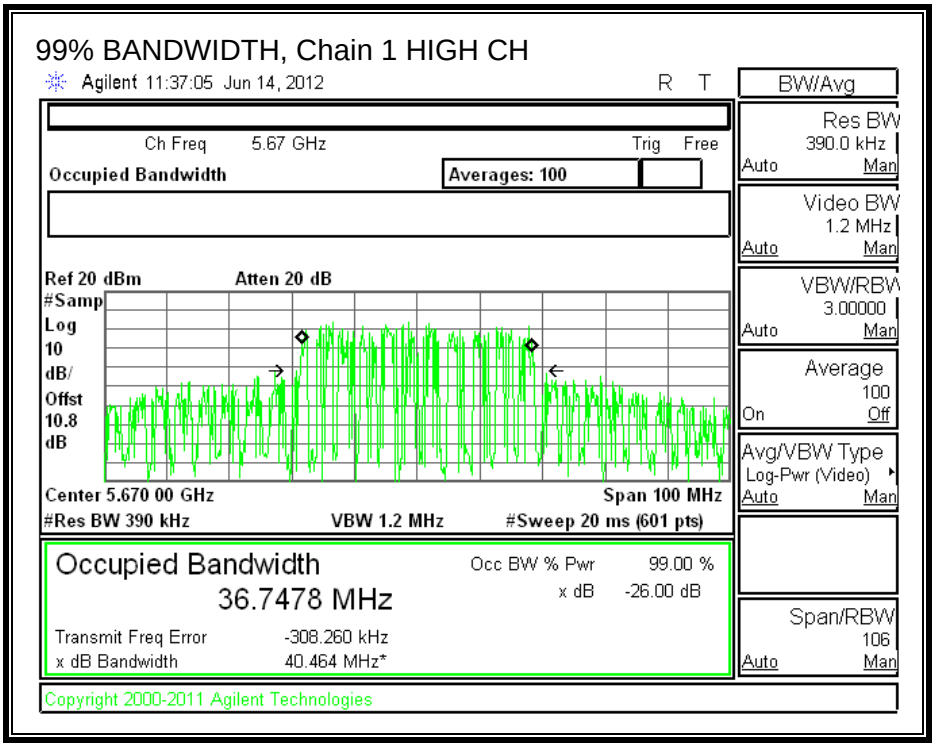
RESULTS

Channel	Frequency (MHz)	99% BW Chain 1 (MHz)	99% BW Chain 2 (MHz)	99% BW Chain 3 (MHz)
Low	5510	35.9319	35.8229	35.7970
Mid	5550	36.3808	36.4095	36.3798
High	5670	36.7478	36.0293	35.9838

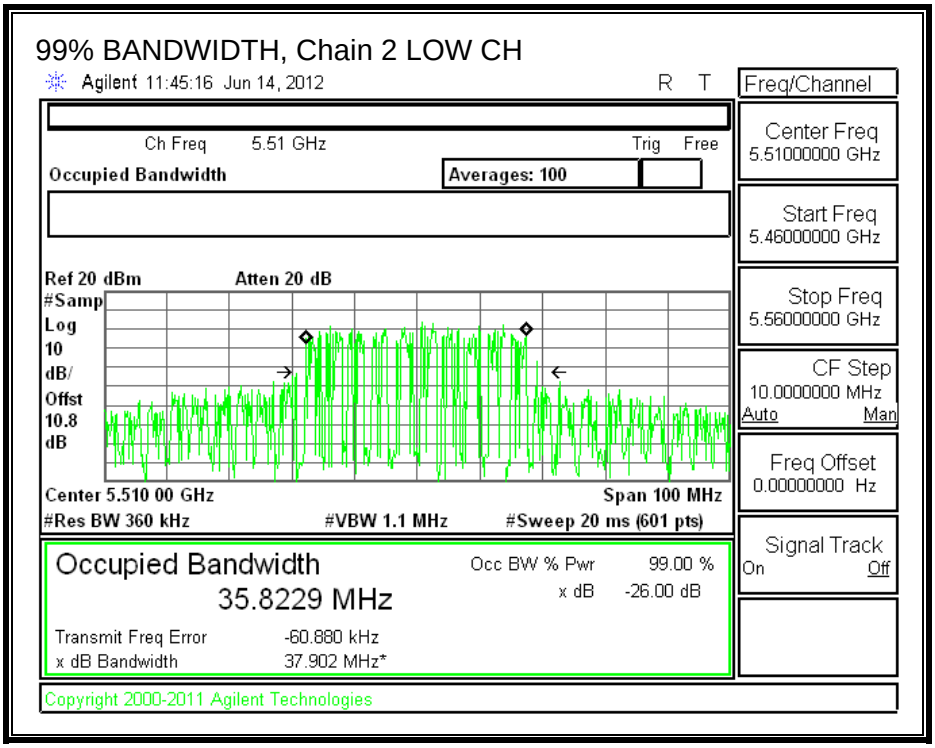
99% BANDWIDTH, Chain 1

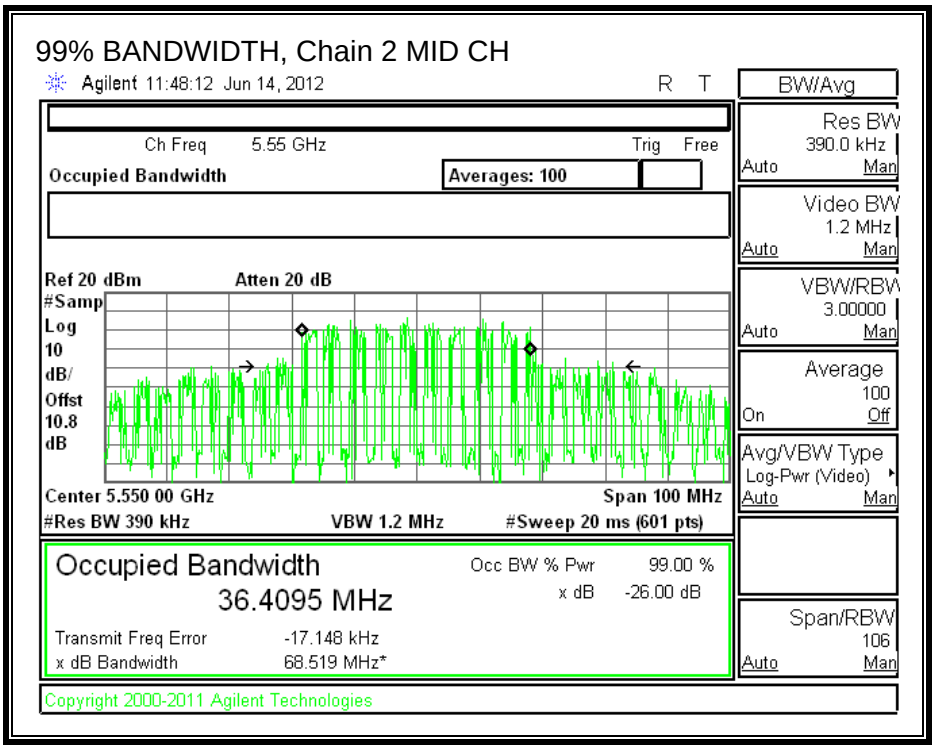


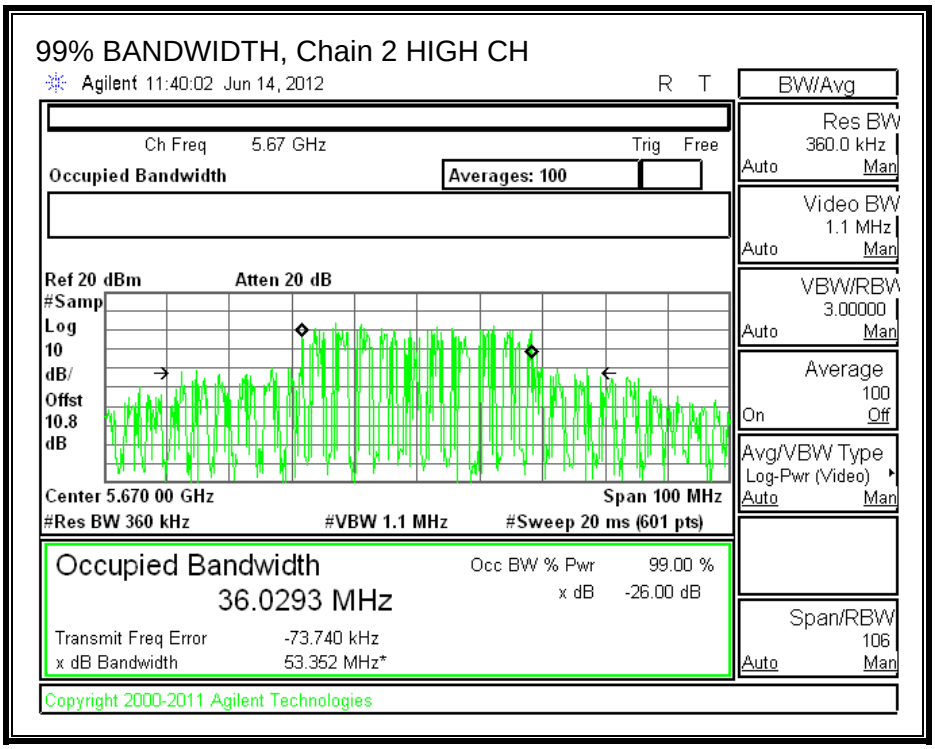




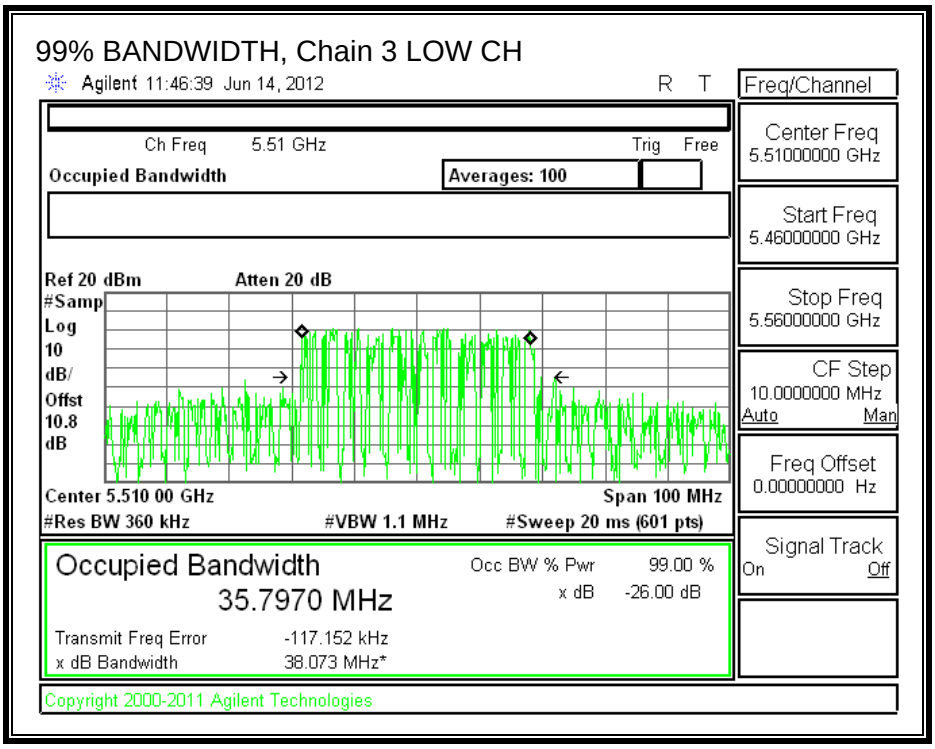
99% BANDWIDTH, Chain 2

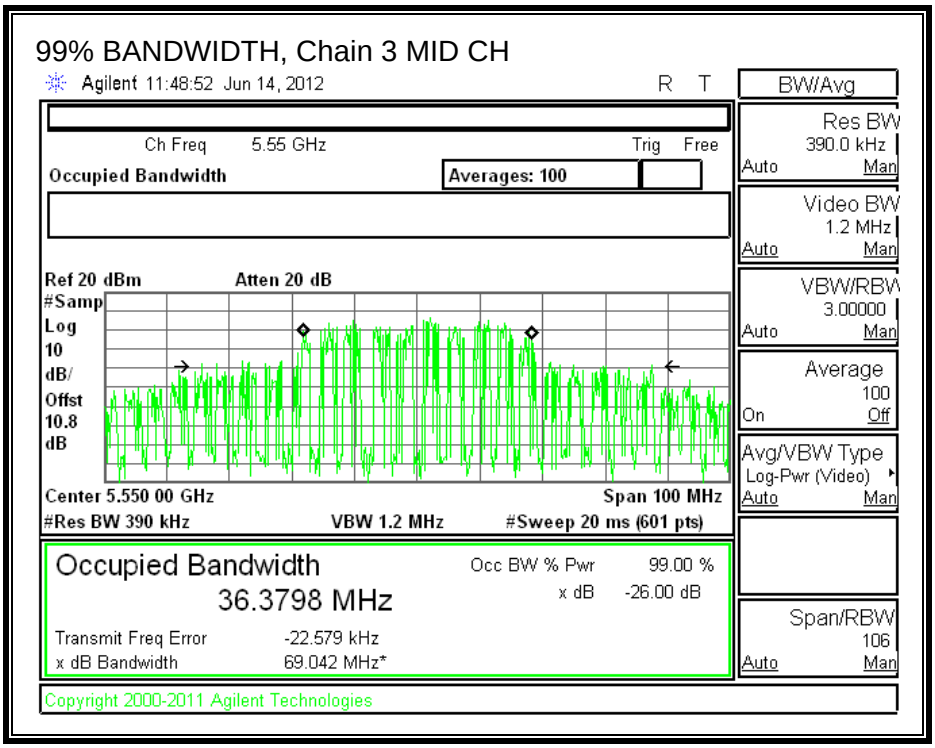


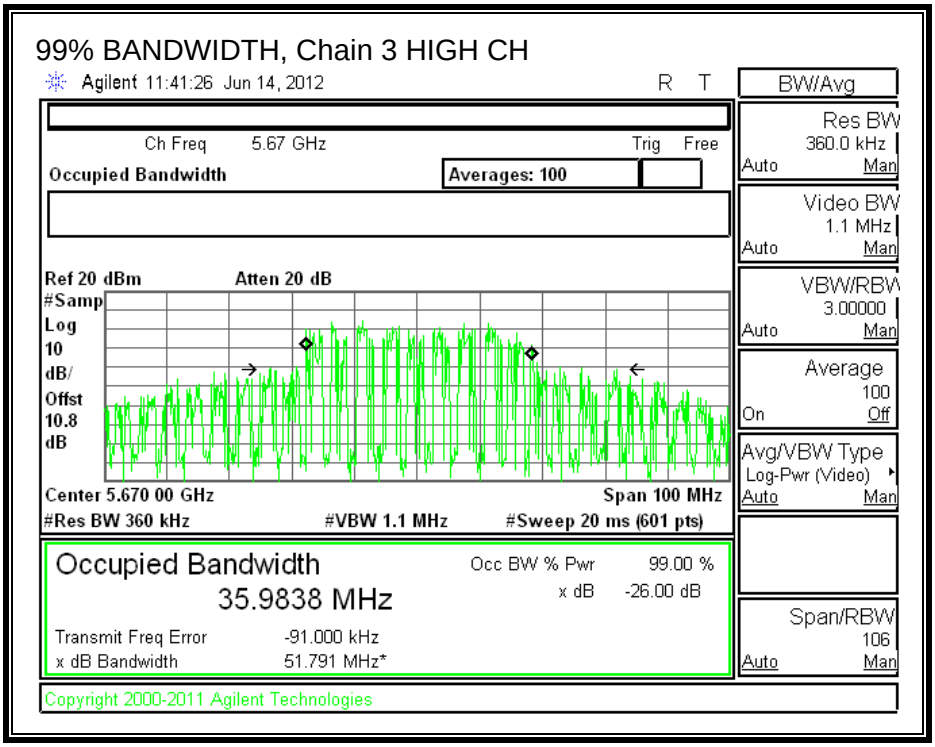




99% BANDWIDTH, Chain 3







8.22.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.80 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5510	15.40	15.60	15.60	20.31
Mid	5550	19.00	19.00	19.00	23.77
High	5670	19.00	19.00	19.10	23.80

8.22.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Chain 3 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.92	4.71	5.35	4.44

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5510	24	39.60	26.98	4.44	24.00	11.00
Mid	5550	24	70.67	29.49	4.44	24.00	11.00
High	5670	24	75.00	29.75	4.44	24.00	11.00

Duty Cycle CF (dB)	2.042	Included in Calculations of Corr'd Power & PPSD

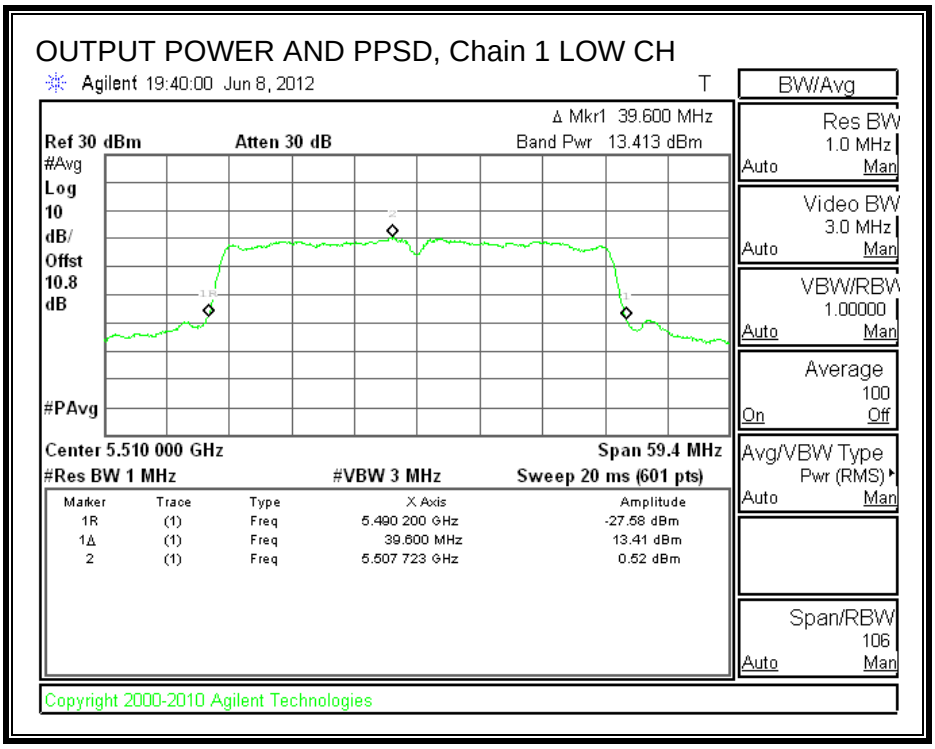
Output Power Results

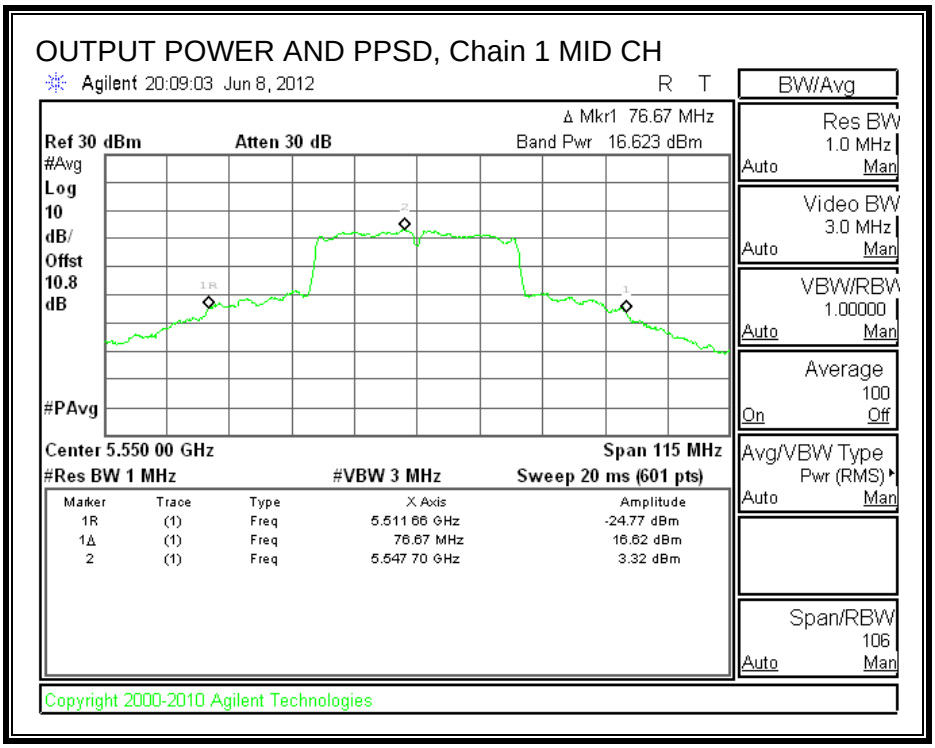
Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Chain 3 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	13.413	13.892	14.085	20.619	24.00	-3.381
Mid	5550	16.623	17.231	17.117	23.811	24.00	-0.189
High	5670	16.953	17.135	16.892	23.808	24.00	-0.192

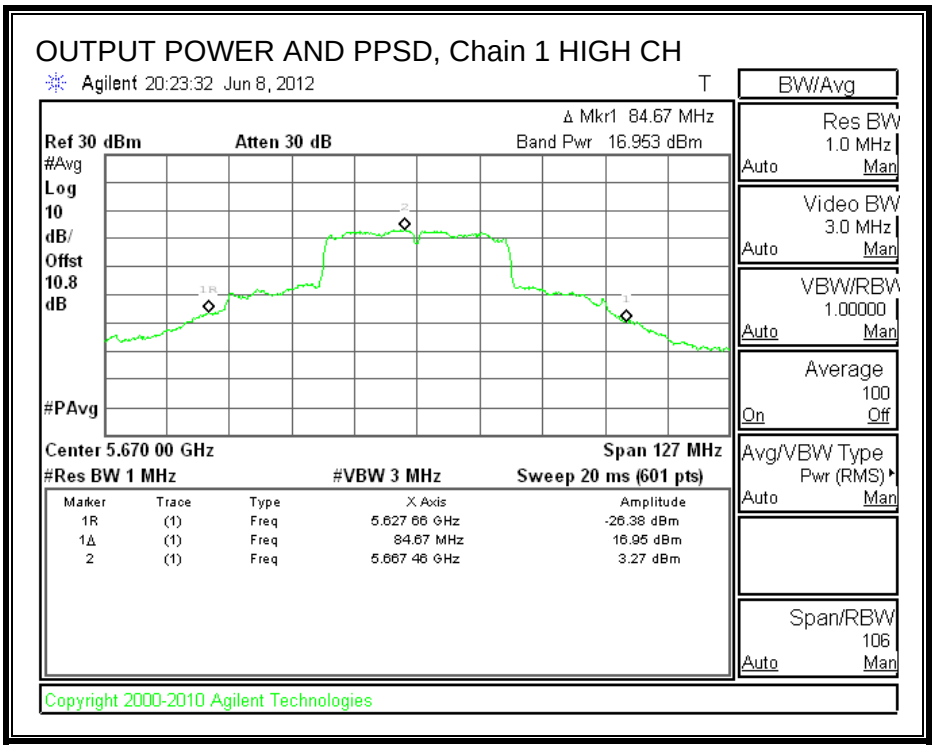
PPSD Results

Channel	Frequency (MHz)	Chain 1 Meas PPSD (dBm)	Chain 2 Meas PPSD (dBm)	Chain 3 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	0.52	0.97	0.74	7.56	11.00	-3.44
Mid	5550	3.32	4.65	3.78	10.77	11.00	-0.23
High	5670	3.27	3.98	3.17	10.30	11.00	-0.70

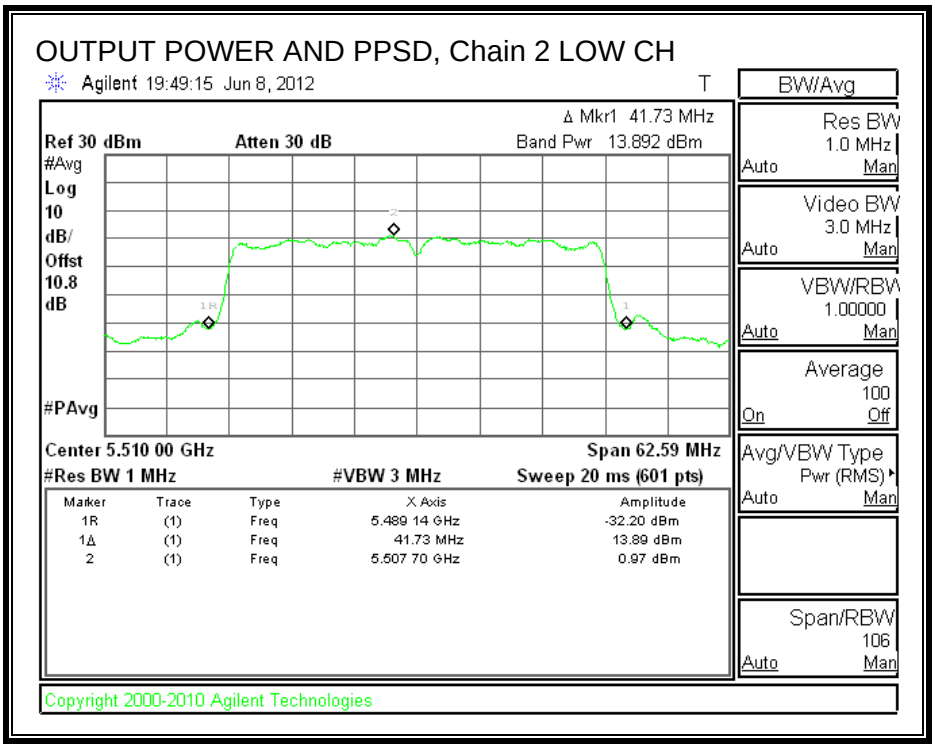
OUTPUT POWER AND PPSD, Chain 1

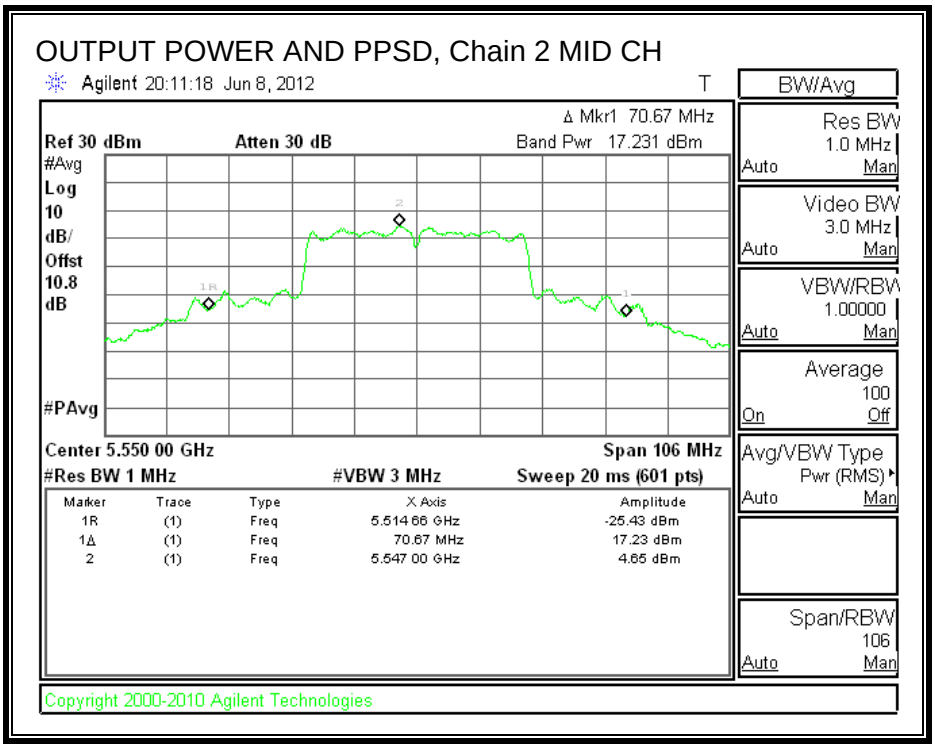


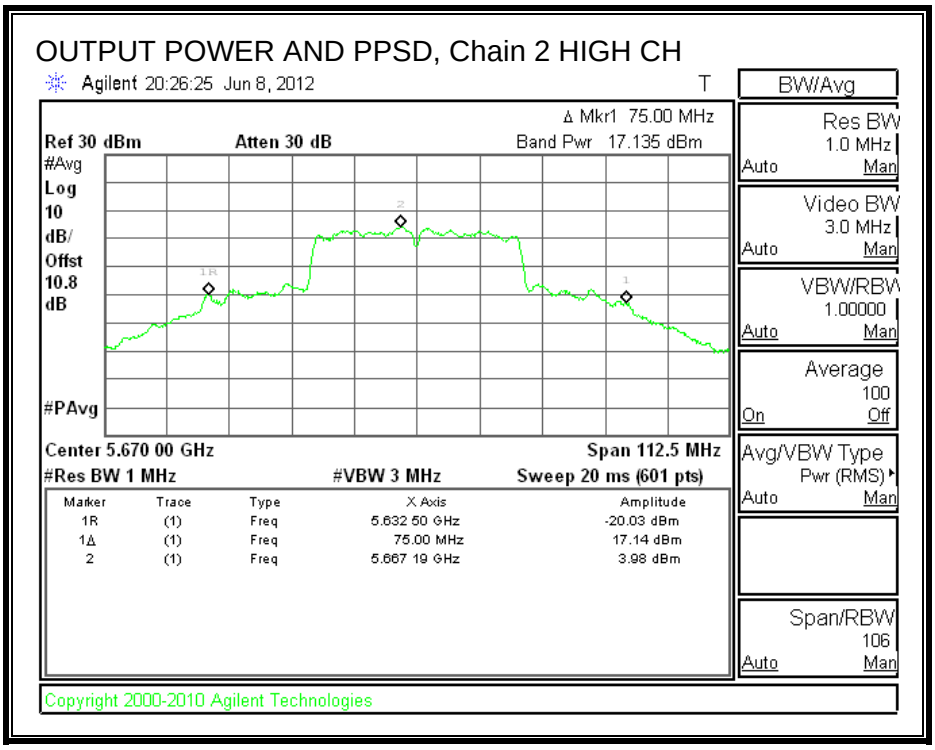




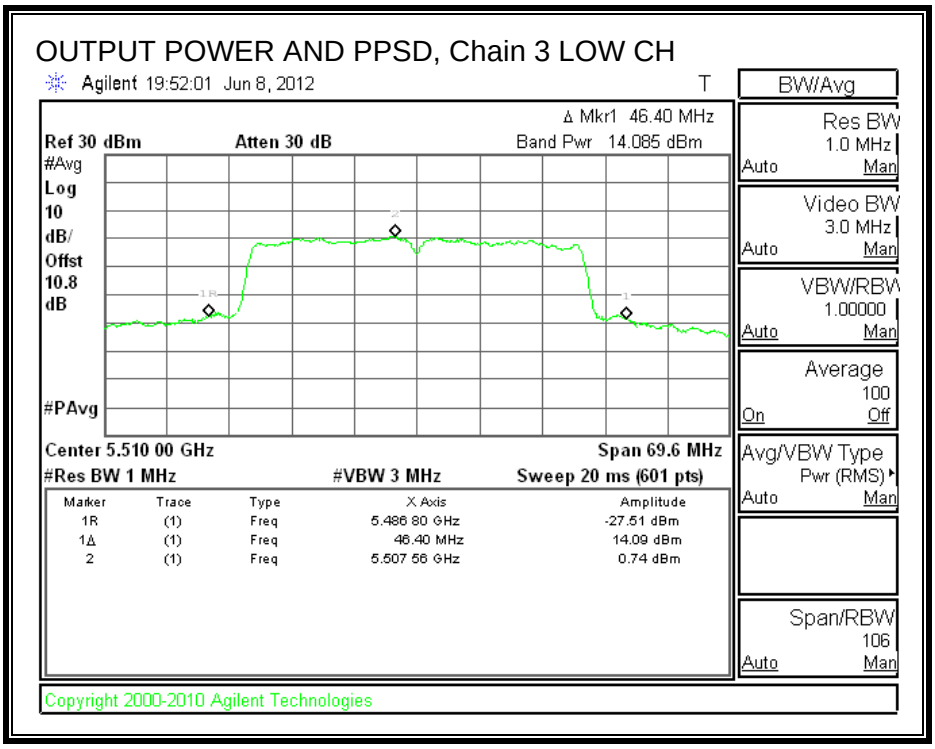
OUTPUT POWER AND PPSD, Chain 2

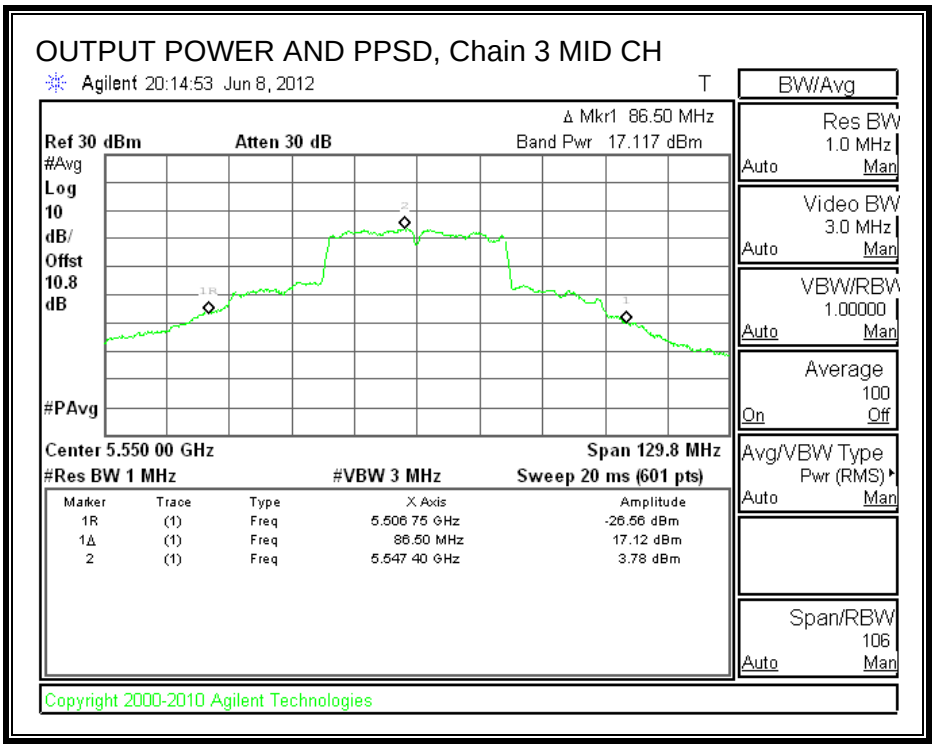


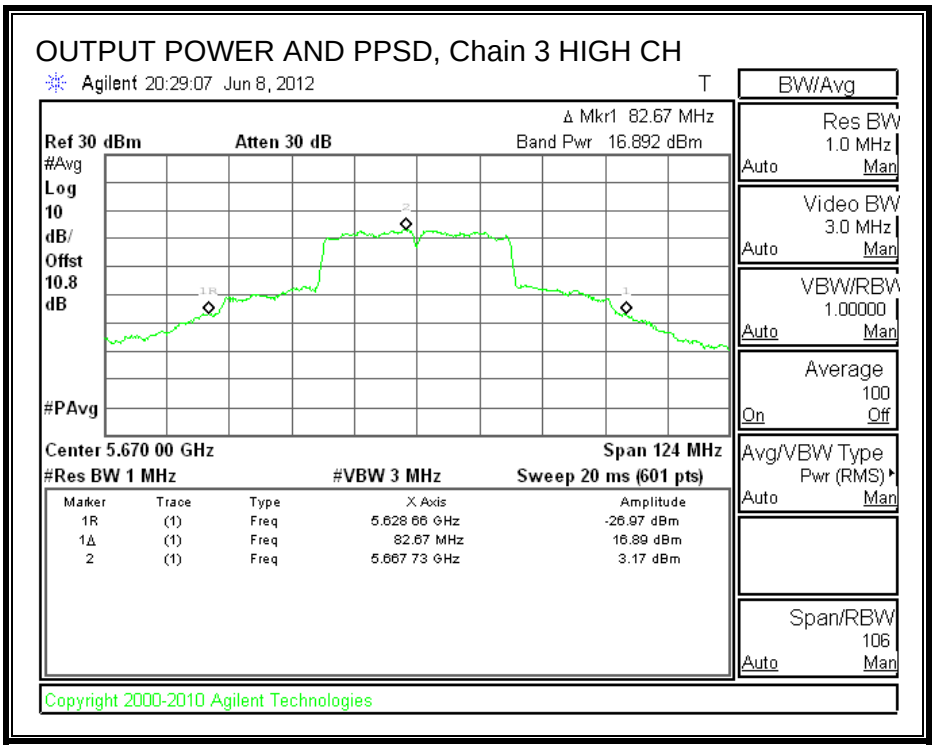




OUTPUT POWER AND PPSD, Chain 3







8.22.5. PEAK EXCURSION

LIMITS

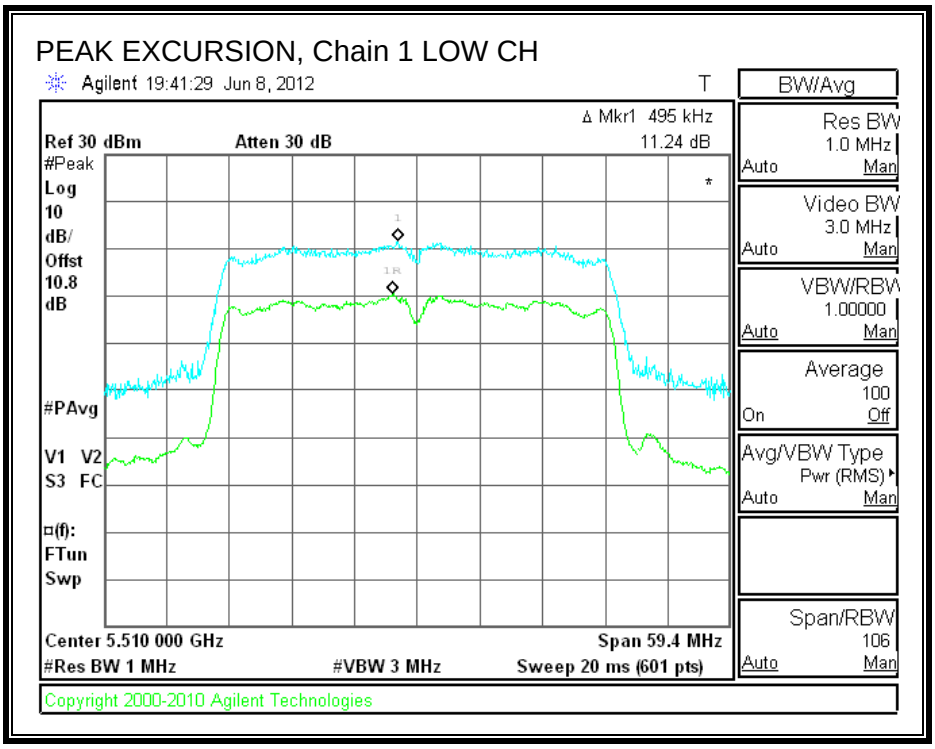
FCC §15.407 (a) (6)

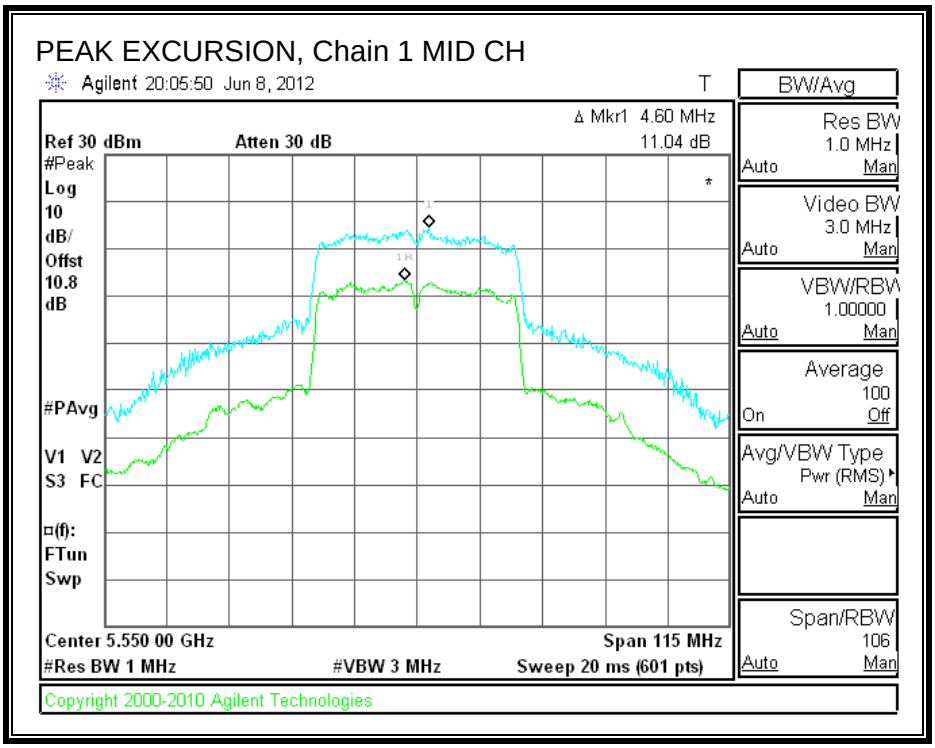
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

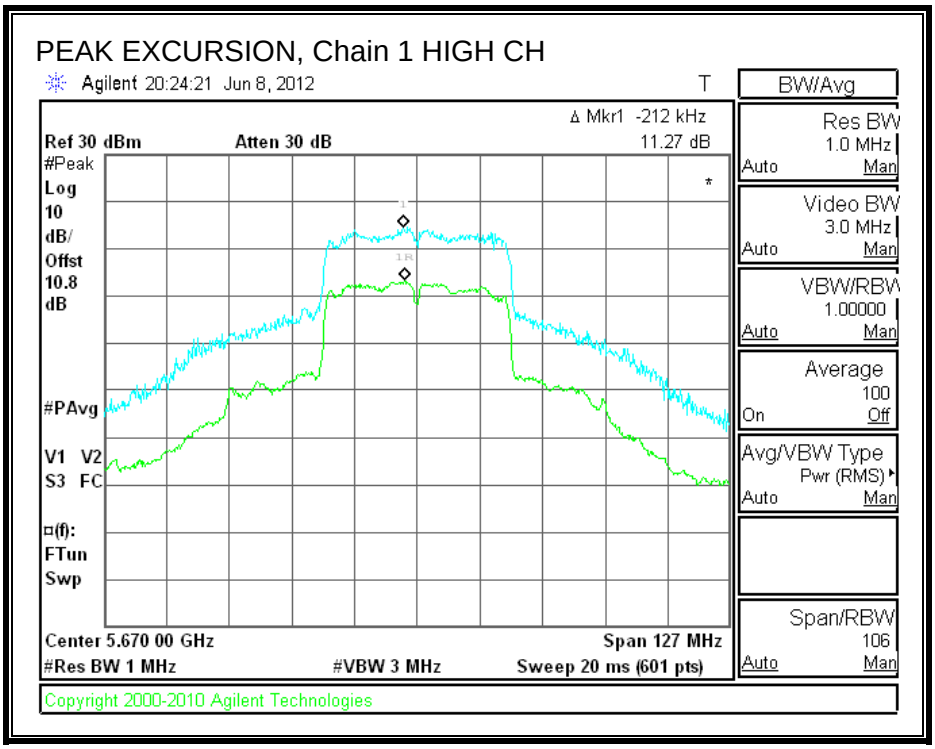
RESULTS

Channel	Frequency (MHz)	Pk Exc Chain 1 (dB)	Pk Exc Chain 2 (dB)	Pk Exc Chain 3 (dB)	Limit (dB)	Worst-Case Margin (dB)
Mid	5510	11.24	11.39	11.07	13	-1.61
Mid	5550	11.04	10.39	11.05	13	-1.95
High	5670	11.27	11.93	12.47	13	-0.53

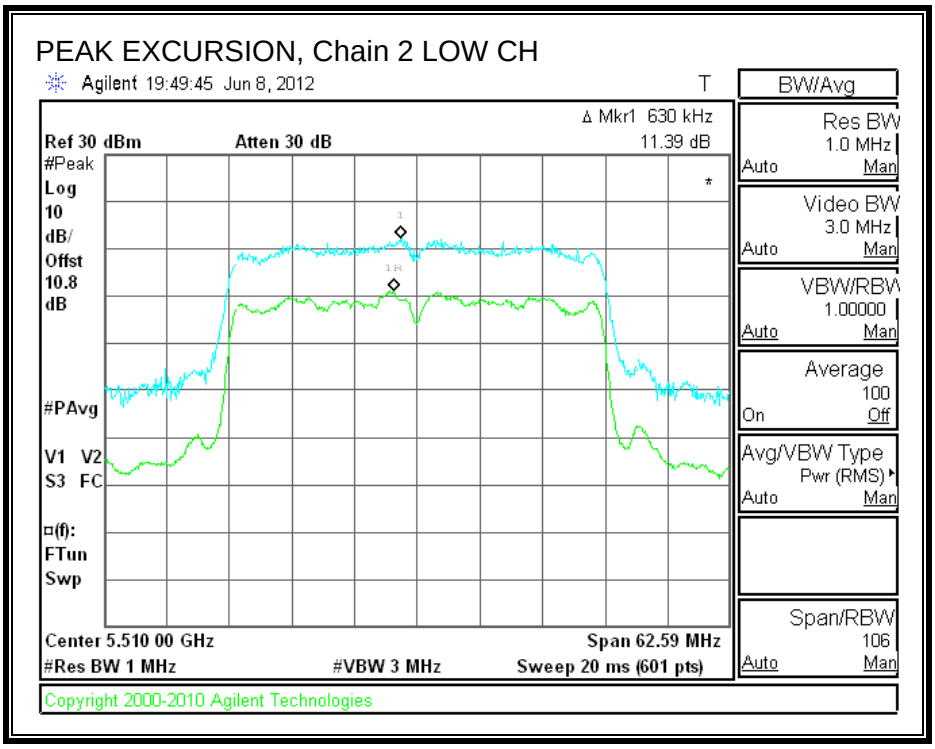
PEAK EXCURSION, Chain 1

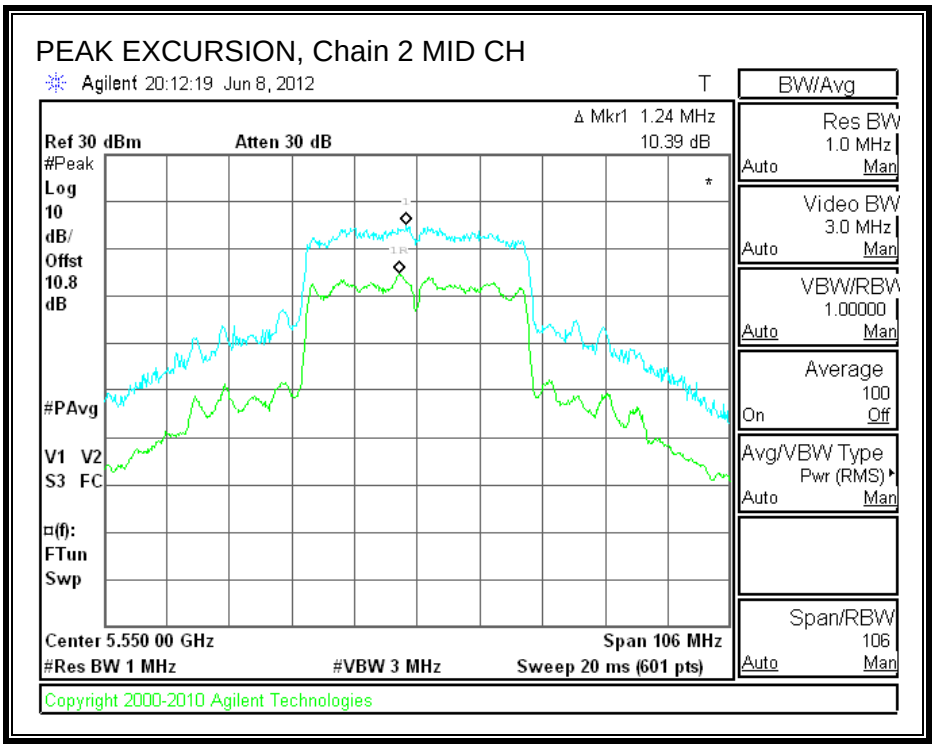




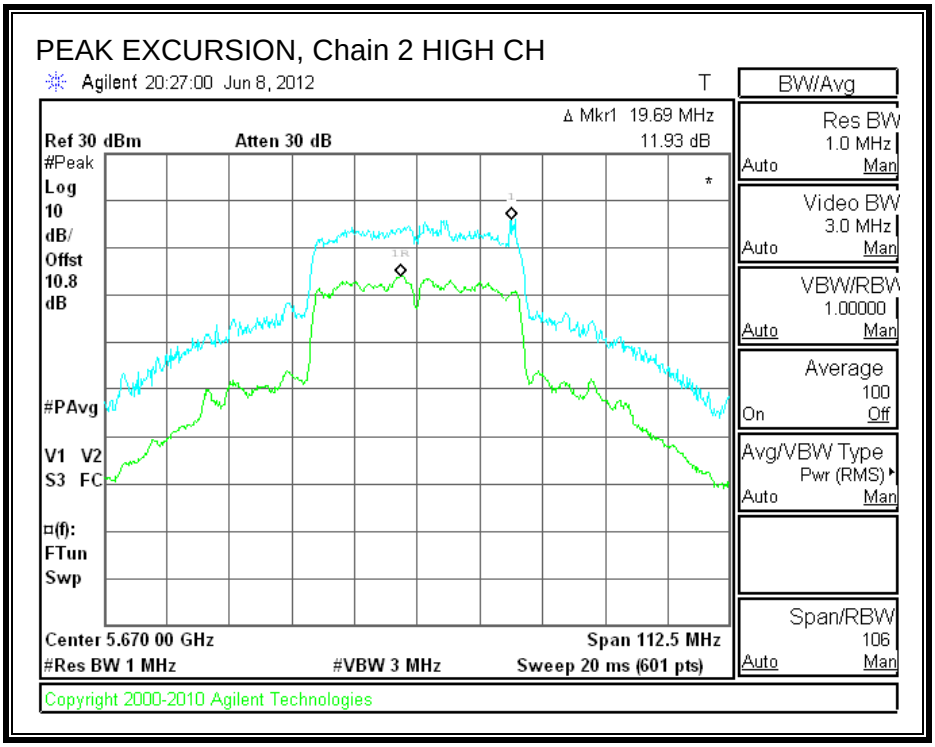


PEAK EXCURSION, Chain 2

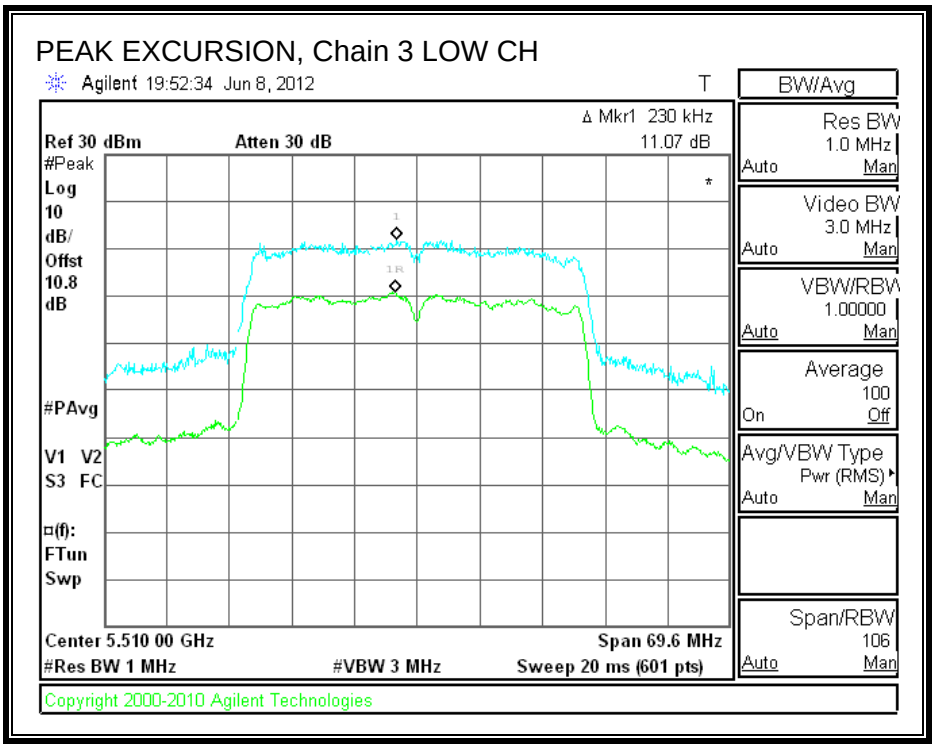


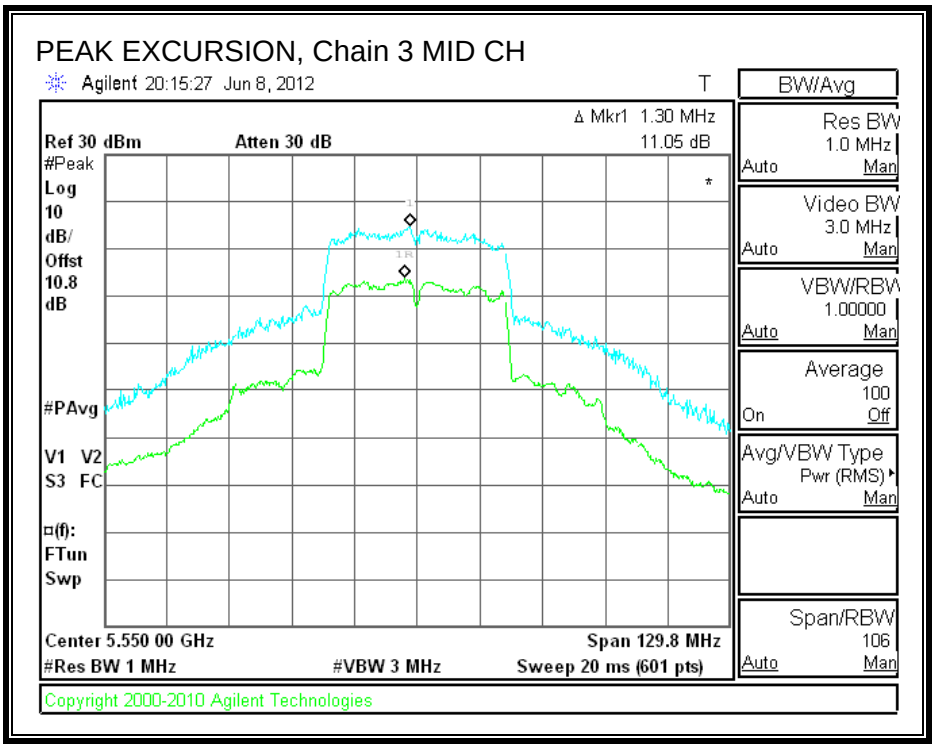


PEAK EXCURSION, Chain 2 HIGH CH

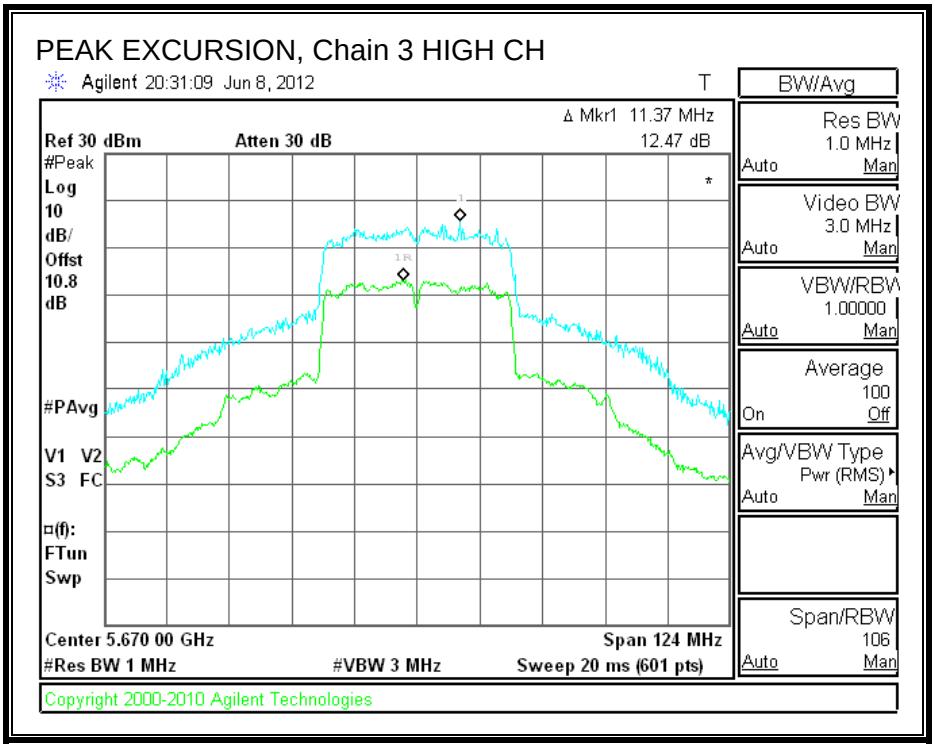


PEAK EXCURSION, Chain 3





PEAK EXCURSION, Chain 3 HIGH CH



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

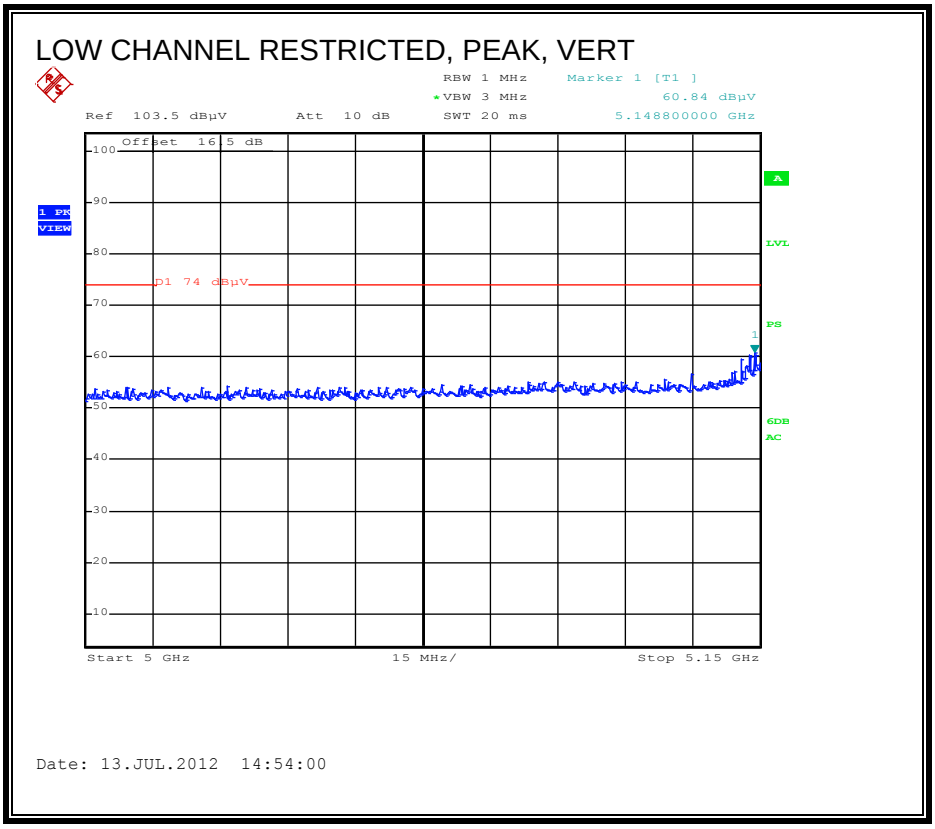
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

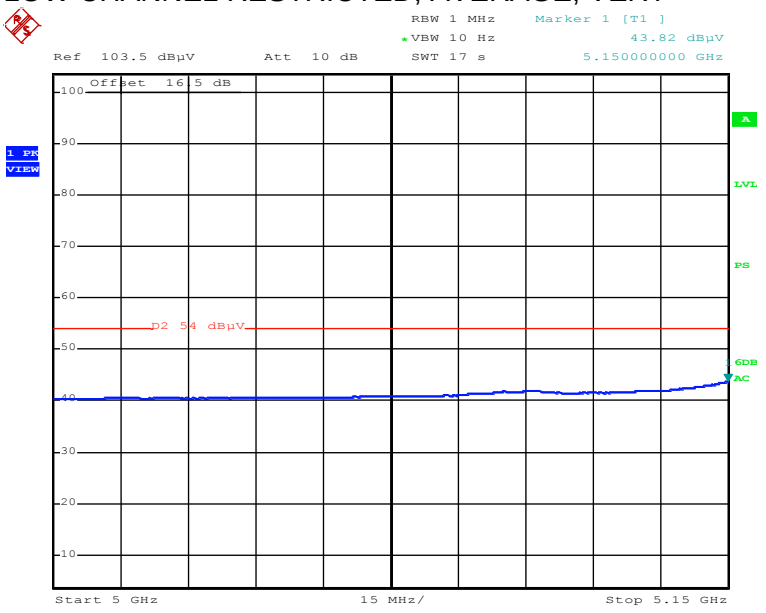
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. 802.11a, LEGACY, 1TX, 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



LOW CHANNEL RESTRICTED, AVERAGE, VERT



Date: 13.JUL.2012 14:52:13

HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT20, CCD MCS0, 3TX

9.2.2. 802.11n HT20, CDD MCS0, 2TX, 5.2 GHz BAND

Covered by testing to 11n HT20, CDD MCS0, 3TX

9.2.3. 802.11n HT20, STBS MCS0, 2TX, 5.2 GHz BAND

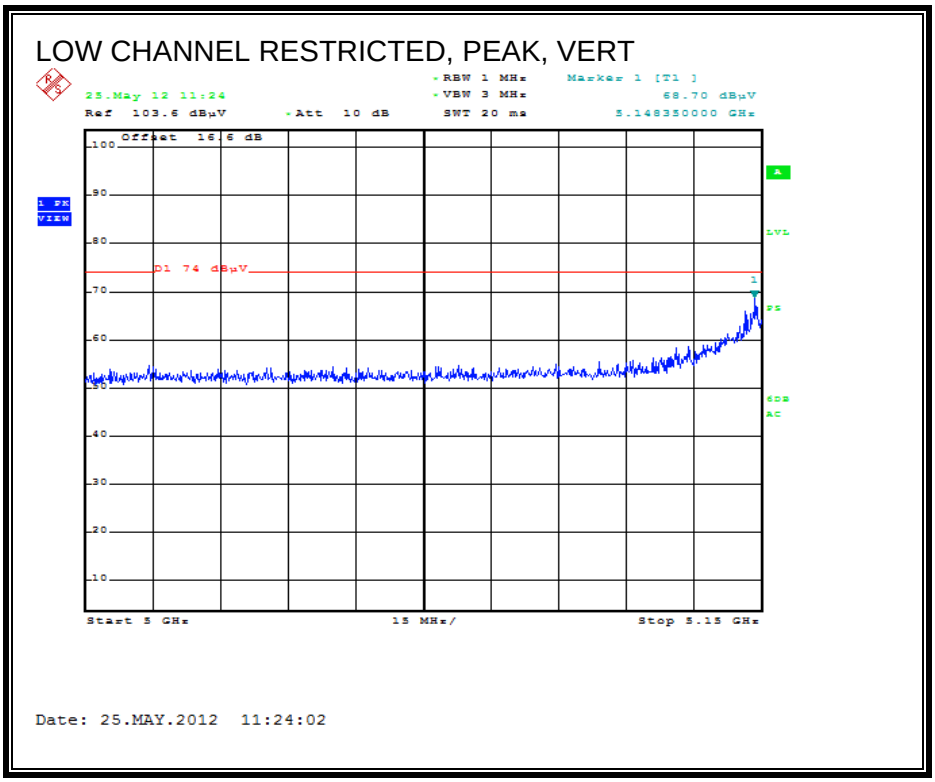
Covered by testing to 11n HT20, CDD MCS0, 3TX

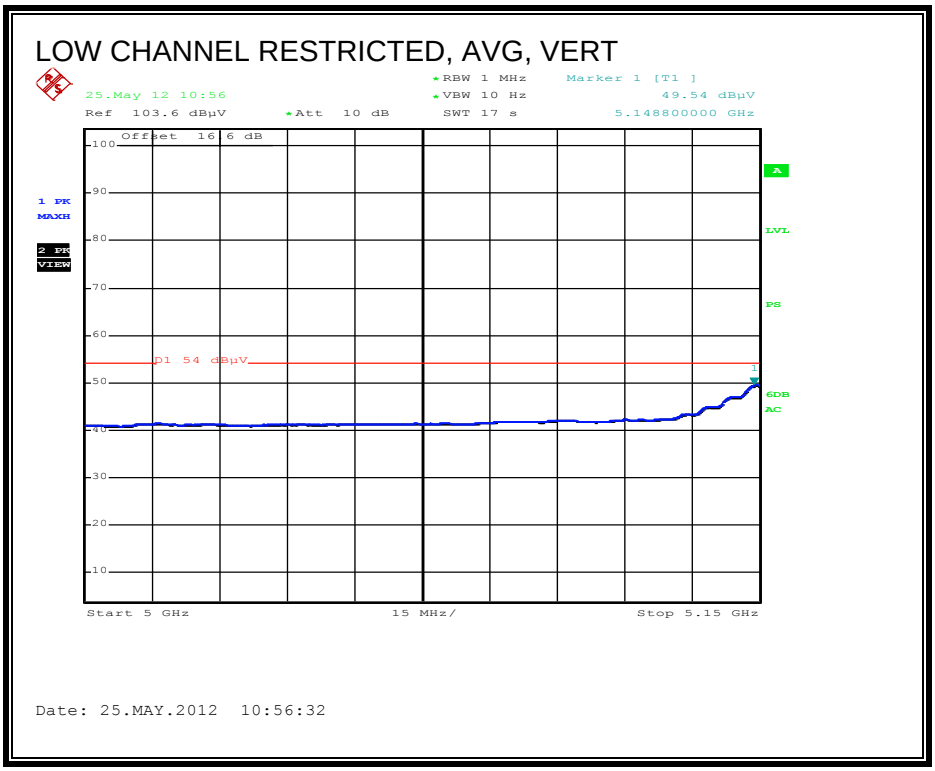
9.2.4. 802.11n HT20, CDD MCS0, 3TX, 5.2 GHz BAND

This mode is not implemented in the 5.2 GHz band and will be disabled in production devices.

This mode is tested for harmonic / band edge / spurious emissions @ 18dBm average power per chain at worst case mode / power to cover all 1TX & 2TX modes.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/25/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.407
Mode Oper: Tx in 5.2GHz Band_ HT20 3x3 MCS0 CDD

f	Measurement Frequency	Amp	Preamp Gain
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m
AF	Antenna Factor	Peak	Calculated Peak Field Strength
CL	Cable Loss	HPF	High Pass Filter

Average Field Strength Limit
Peak Field Strength Limit
Margin vs. Average Limit
Margin vs. Peak Limit

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5180MHz															
15.540	3.0	36.6	39.1	13.0	-32.2	0.0	0.7	56.5	74.0	-17.5	V	P	141.0	137.0	
15.540	3.0	23.3	39.1	13.0	-32.2	0.0	0.7	43.1	54.0	-10.9	V	A	141.0	137.0	
15.540	3.0	36.4	39.1	13.0	-32.2	0.0	0.7	56.2	74.0	-17.8	H	P	158.0	92.0	
15.540	3.0	23.1	39.1	13.0	-32.2	0.0	0.7	42.9	54.0	-11.1	H	A	158.0	92.0	
MID CHANNEL, 5200MHz															
15.600	3.0	36.5	38.8	13.0	-32.2	0.0	0.7	56.1	74.0	-17.9	V	P	158.0	339.0	
15.600	3.0	22.6	38.8	13.0	-32.2	0.0	0.7	42.3	54.0	-11.7	V	A	158.0	339.0	
15.600	3.0	36.2	38.8	13.0	-32.2	0.0	0.7	55.9	74.0	-18.1	H	P	98.0	254.0	
15.600	3.0	22.0	38.8	13.0	-32.2	0.0	0.7	41.6	54.0	-12.4	H	A	98.0	254.0	
HIGH CHANNEL, 5240MHz															
15.720	3.0	39.7	38.4	13.1	-32.2	0.0	0.7	59.1	74.0	-15.0	V	P	158.0	304.0	
15.720	3.0	27.7	38.4	13.1	-32.2	0.0	0.7	47.0	54.0	-7.0	V	A	158.0	304.0	
15.720	3.0	37.6	38.4	13.1	-32.2	0.0	0.7	56.9	74.0	-17.1	H	P	177.0	196.0	
15.720	3.0	24.6	38.4	13.1	-32.2	0.0	0.7	43.9	54.0	-10.1	H	A	177.0	196.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

Note: tested with highest output powers at 18 dBm.

9.2.5. 802.11n HT20, SDM MCS21, 3TX, 5.2 GHz BAND

Covered by testing to 11n HT20, CDD MCS0, 3TX

9.2.6. 802.11n HT20, STBC MCS0, 3TX, 5.2 GHz BAND

Covered by testing to 11n HT20, CDD MCS0, 3TX

9.2.7. 802.11n HT40 SISO, CDD MCS0, 1TX, 5.2 GHz BAND

Covered by testing to 11n HT40, CDD MCS0, 3TX

9.2.8. 802.11n HT40, CDD MCS0, 2TX, 5.2 GHz BAND

Covered by testing to 11n HT40, CDD MCS0, 3TX

9.2.9. 802.11n HT40, STBC MCS0, 2TX, 5.2 GHz BAND

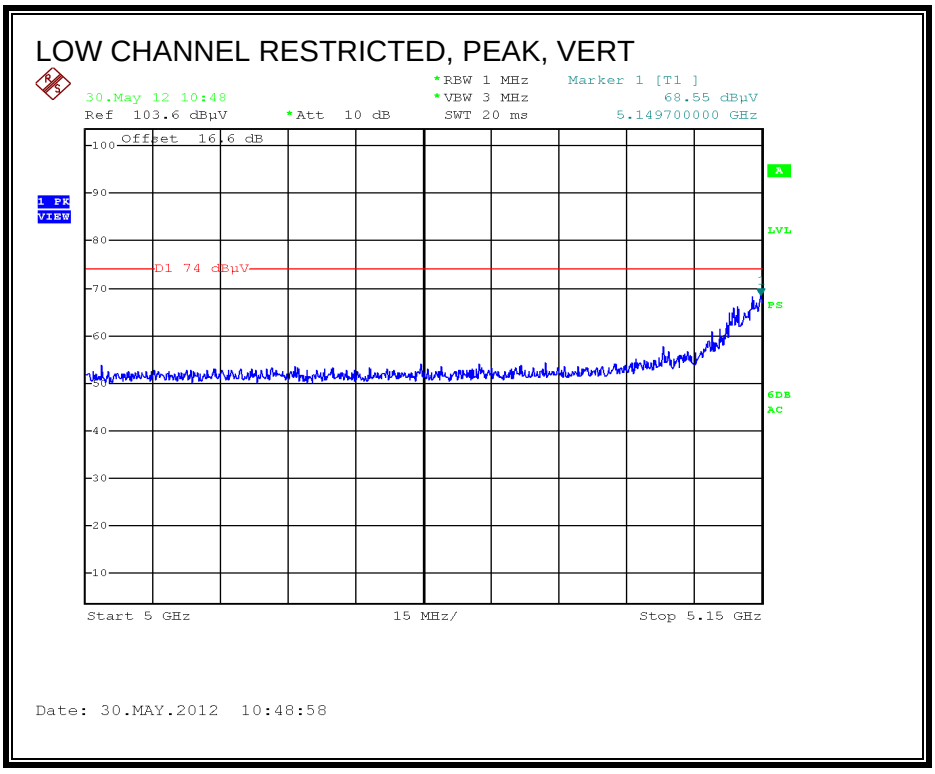
Covered by testing to 11n HT40, CDD MCS0, 3TX

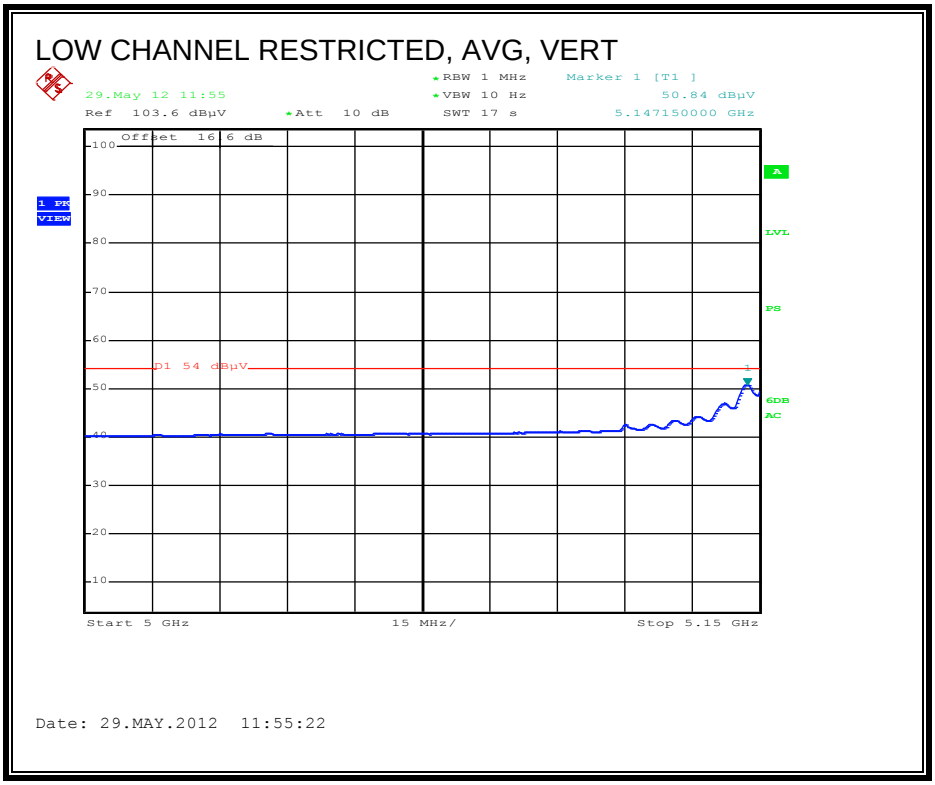
9.2.10. 802.11n HT40, CDD MCS0, 3TX, GHz BAND

This mode is not implemented in the 5.2 GHz band and will be disabled in production devices.

This mode is tested for harmonic / spurious emissions @ 18dBm average power per chain at worst case mode / power to cover all 1TX & 2TX modes.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/30/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.247
Mode Oper: TX HT40 3x3 MCS0 CDD Mode In 5.2GHz Band

f	Measurement Frequency	Amp	Preamp Gain
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m
AF	Antenna Factor	Peak	Calculated Peak Field Strength
CL	Cable Loss	HPF	High Pass Filter

Average Field Strength Limit
Peak Field Strength Limit
Margin vs. Average Limit
Margin vs. Peak Limit

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5190MHz															
15.570	3.0	36.0	38.9	13.0	-31.9	0.0	0.0	56.0	74.0	-18.0	V	P	100.0	312.0	
15.570	3.0	24.1	38.9	13.0	-31.9	0.0	0.0	44.1	54.0	-9.9	V	A	100.0	312.0	
15.570	3.0	36.5	38.9	13.0	-31.9	0.0	0.0	56.5	74.0	-17.5	H	P	113.0	257.0	
15.570	3.0	23.9	38.9	13.0	-31.9	0.0	0.0	43.9	54.0	-10.1	H	A	113.0	257.0	
HIGH CHANNEL, 5230MHz															
15.690	3.0	36.6	38.5	13.0	-31.9	0.0	0.0	56.3	74.0	-17.7	H	P	130.0	228.0	
15.690	3.0	24.3	38.5	13.0	-31.9	0.0	0.0	44.0	54.0	-10.0	H	A	130.0	228.0	
15.690	3.0	36.2	38.5	13.0	-31.9	0.0	0.0	55.9	74.0	-18.1	V	P	100.0	287.0	
15.690	3.0	24.1	38.5	13.0	-31.9	0.0	0.0	43.8	54.0	-10.2	V	A	100.0	287.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

Note: tested with highest output powers at 18 dBm.

9.2.11. 802.11n HT40, STBC MCS0, 3TX, 5.2 GHz BAND

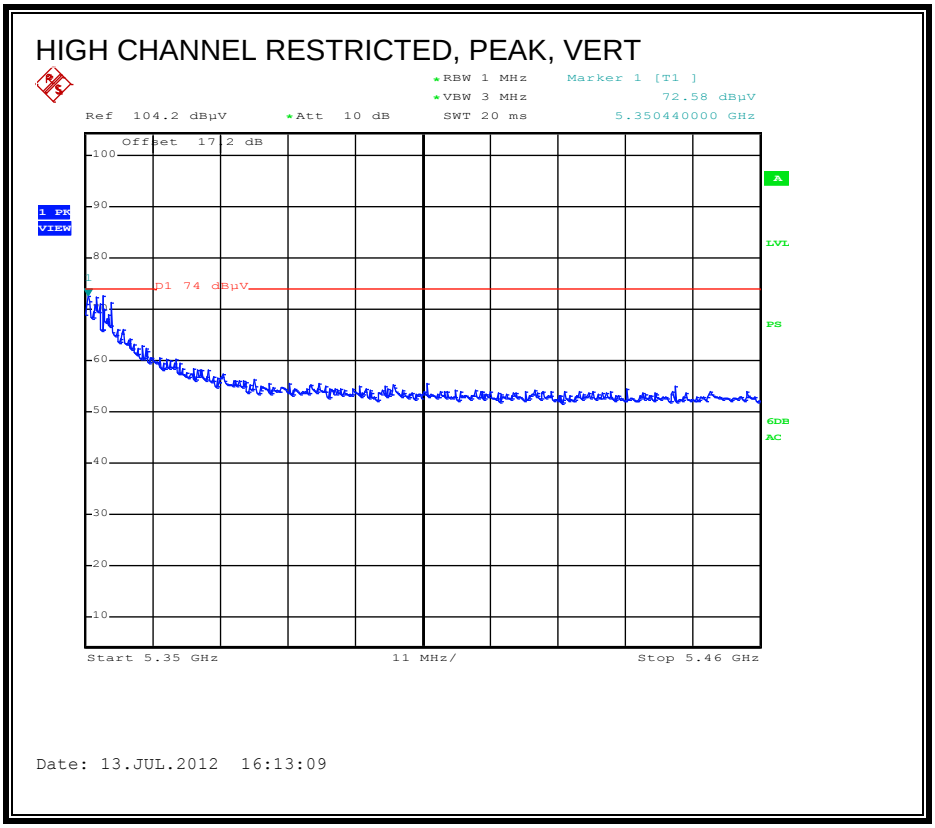
Covered by testing to 11n HT40, CDD MCS0, 3TX

9.2.12. 802.11n HT40, SDM MCS21, 3TX, 5.2 GHz BAND

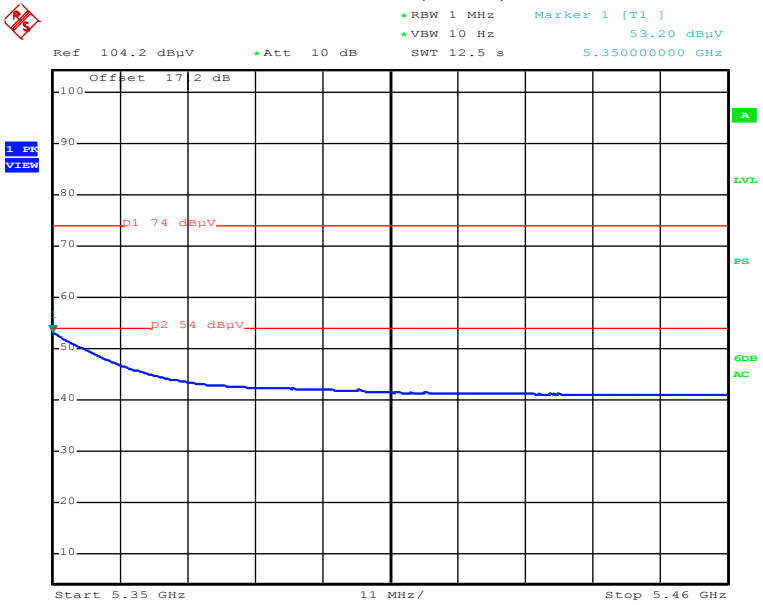
Covered by testing to 11n HT40, CDD MCS0, 3TX

9.2.13. 802.11a, 1TX, LEGACY, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



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HARMONICS AND SPURIOUS EMISSIONS

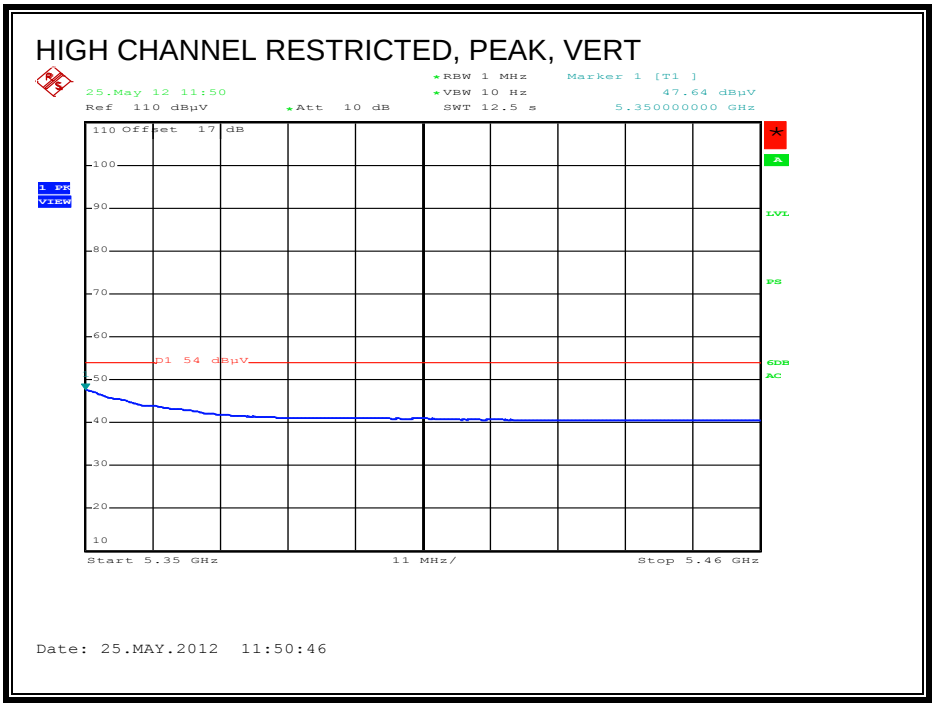
Covered by testing to 11n HT20, CDD MCS0, 3TX

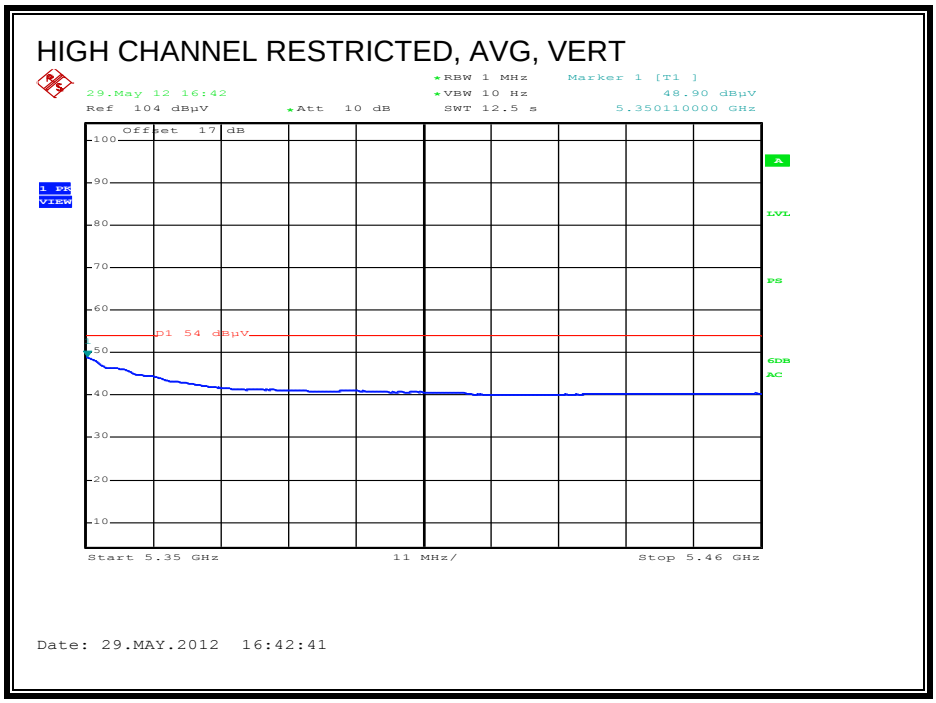
9.2.14. 802.11n HT20, 2TX, 5.3 GHz BAND

This mode is not implemented in the 5.3 GHz band and will be disabled in production devices.

9.2.15. 802.11n HT20, CDD MCS0, 3TX, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/25/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.407
Mode Oper: Tx in 5.3GHz Band_ HT20 3x3 MCS0 CDD

f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5260MHz															
15.780	3.0	40.2	38.2	13.1	-31.9	0.0	0.0	59.6	74.0	-14.4	V	P	98.0	216.0	
15.780	3.0	27.2	38.2	13.1	-31.9	0.0	0.0	46.7	54.0	-7.3	V	A	98.0	216.0	
15.780	3.0	37.9	38.2	13.1	-31.9	0.0	0.0	57.3	74.0	-16.7	H	P	99.0	288.0	
15.780	3.0	24.9	38.2	13.1	-31.9	0.0	0.0	44.3	54.0	-9.7	H	A	99.0	288.0	
MID CHANNEL, 5300MHz															
10.600	3.0	43.5	38.4	9.9	-34.0	0.0	0.0	57.8	74.0	-16.2	V	P	117.0	235.0	
10.600	3.0	31.2	38.4	9.9	-34.0	0.0	0.0	45.5	54.0	-8.5	V	A	117.0	235.0	
15.900	3.0	39.2	37.8	13.2	-31.8	0.0	0.0	58.3	74.0	-15.7	V	P	100.0	318.0	
15.900	3.0	24.4	37.8	13.2	-31.8	0.0	0.0	43.5	54.0	-10.5	V	A	100.0	318.0	
10.600	3.0	43.6	38.4	9.9	-34.0	0.0	0.0	57.9	74.0	-16.1	H	P	123.0	261.0	
10.600	3.0	31.8	38.4	9.9	-34.0	0.0	0.0	46.1	54.0	-7.9	H	A	123.0	261.0	
15.900	3.0	34.7	37.8	13.2	-31.8	0.0	0.0	53.8	74.0	-20.2	H	P	101.0	283.0	
15.900	3.0	23.0	37.8	13.2	-31.8	0.0	0.0	42.1	54.0	-11.9	H	A	101.0	283.0	
HIGH CHANNEL, 5320MHz															
10.640	3.0	45.4	38.4	10.0	-34.0	0.0	0.0	59.8	74.0	-14.2	V	P	131.0	292.0	
10.640	3.0	32.3	38.4	10.0	-34.0	0.0	0.0	46.7	54.0	-7.3	V	A	131.0	292.0	
15.960	3.0	36.1	37.6	13.2	-31.8	0.0	0.0	55.0	74.0	-19.0	V	P	100.0	343.0	
15.960	3.0	24.5	37.6	13.2	-31.8	0.0	0.0	43.4	54.0	-10.6	V	A	100.0	343.0	
10.640	3.0	42.5	38.4	10.0	-34.0	0.0	0.0	56.9	74.0	-17.1	H	P	132.0	263.0	
10.640	3.0	30.6	38.4	10.0	-34.0	0.0	0.0	45.0	54.0	-9.0	H	A	132.0	263.0	
15.960	3.0	35.0	37.6	13.2	-31.8	0.0	0.0	53.9	74.0	-20.1	H	P	99.0	262.0	
15.960	3.0	22.8	37.6	13.2	-31.8	0.0	0.0	41.7	54.0	-12.3	H	A	99.0	262.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

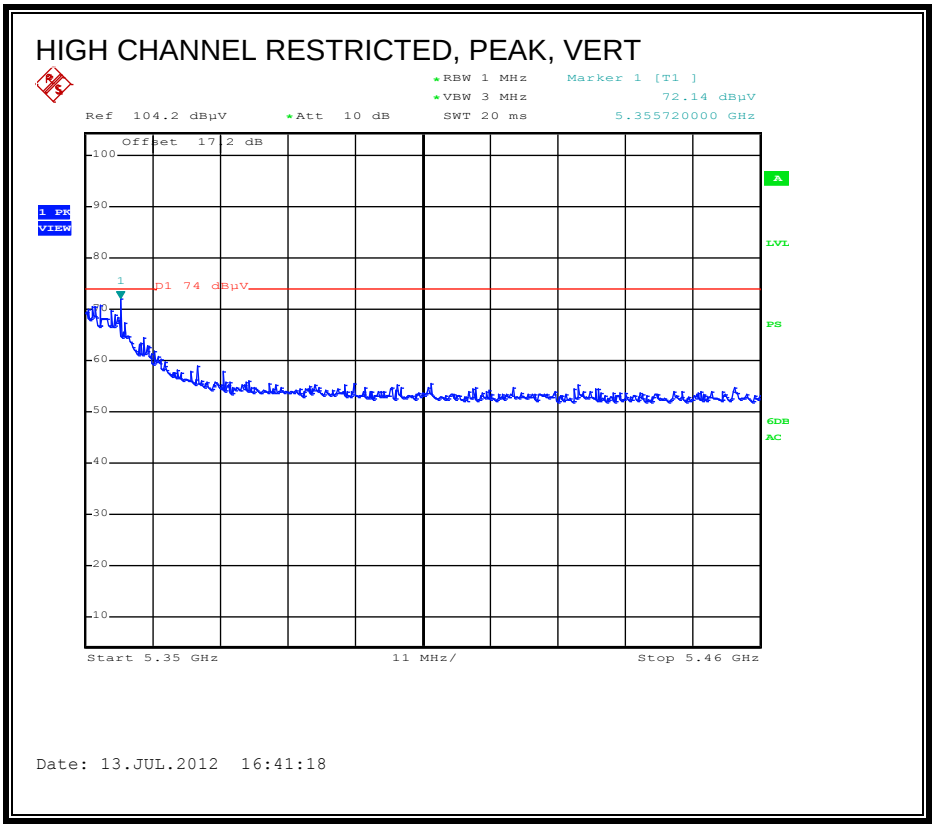
Note: tested with highest output powers at 19 dBm.

9.2.16. 802.11n HT20, SDM MCS21, 3TX, 5.3 GHz BAND

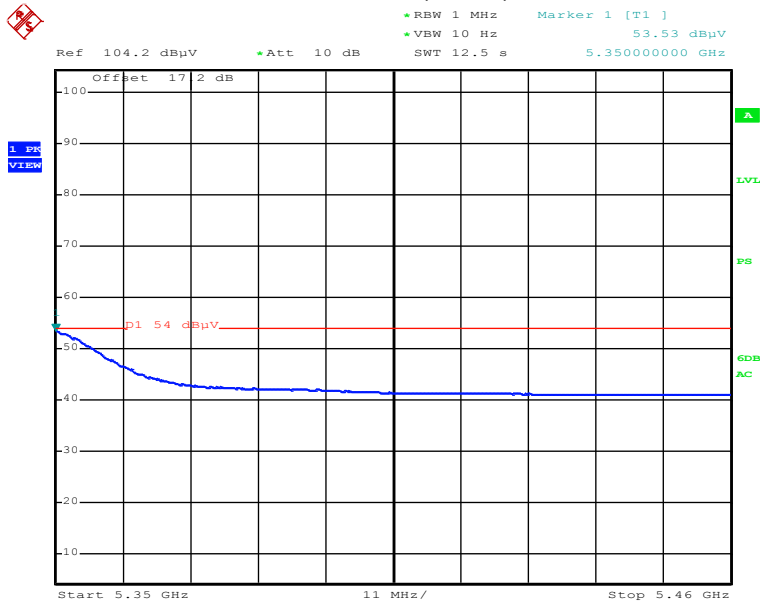
Covered by testing to 11n HT20, CDD MCS0, 3TX,

9.2.17. 802.11n HT40 SISO, CDD MCS0, 1TX, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



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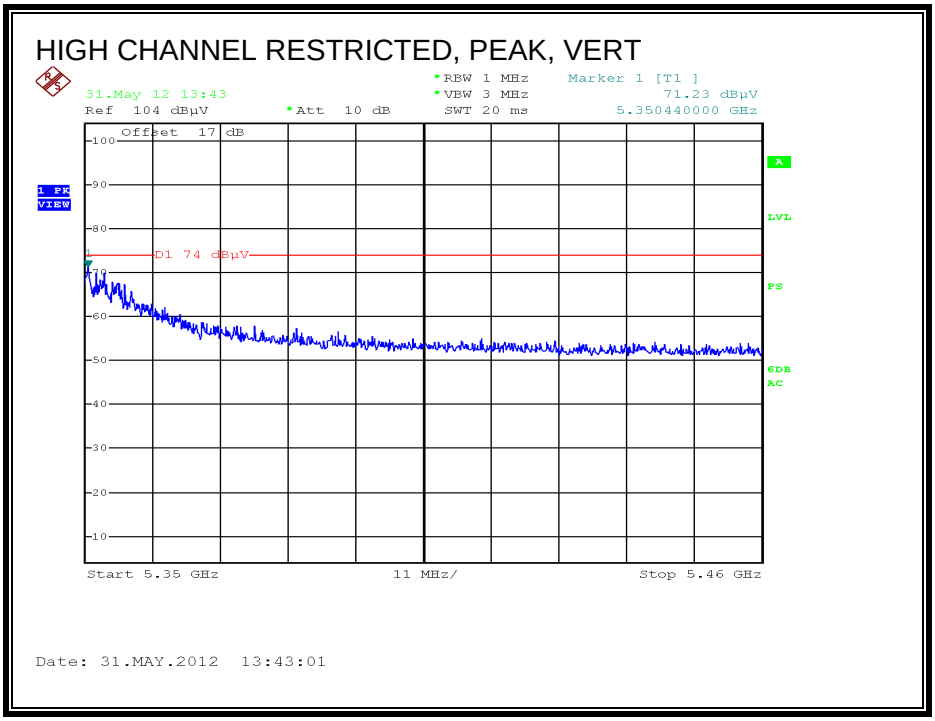
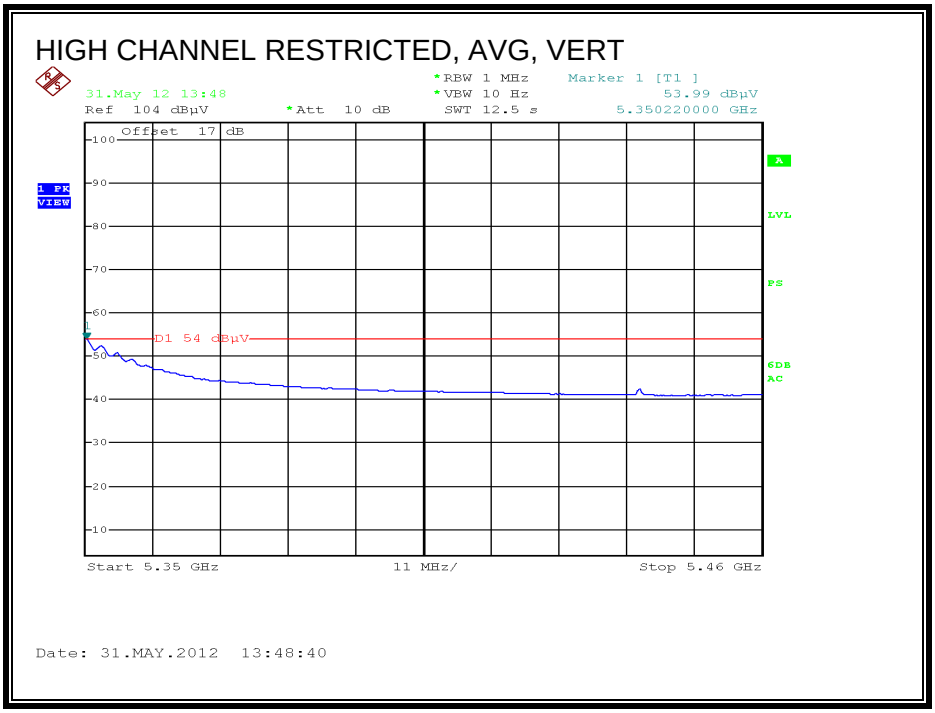
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT 40, CDD MCS0, 3TX

9.2.18. 802.11n HT40, CDD MCS0, 2TX, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





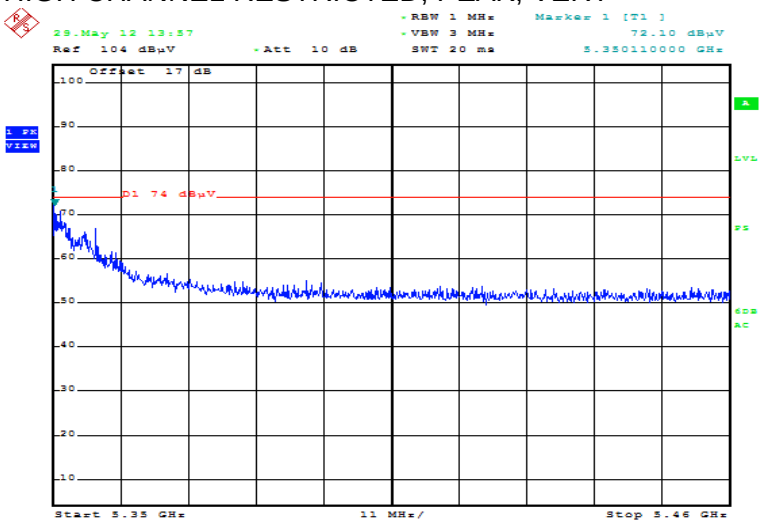
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT 40, CDD MCS0, 3TX

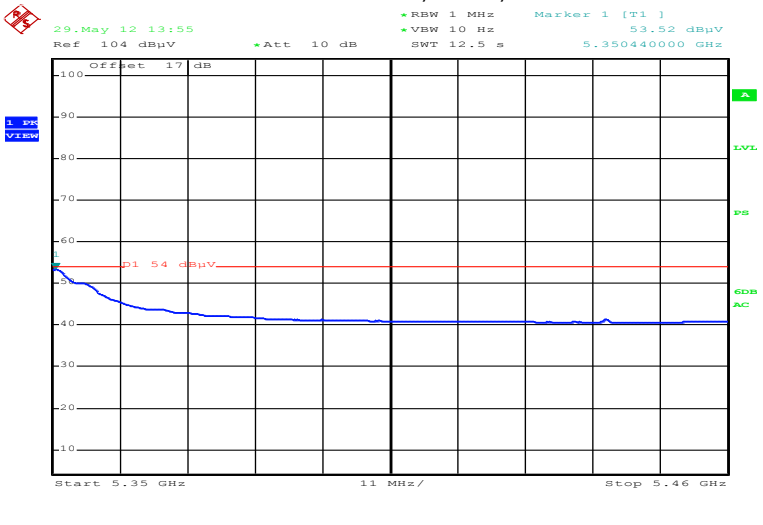
9.2.19. 802.11n HT40, CDD MCS0, 3TX, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL RESTRICTED, PEAK, VERT



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/30/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.247
Mode Oper: TX HT40 3x3 MCS0 CDD Mode In 5.3GHz Band

f	Measurement Frequency	Amp	Preamp Gain
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m
AF	Antenna Factor	Peak	Calculated Peak Field Strength
CL	Cable Loss	HPF	High Pass Filter

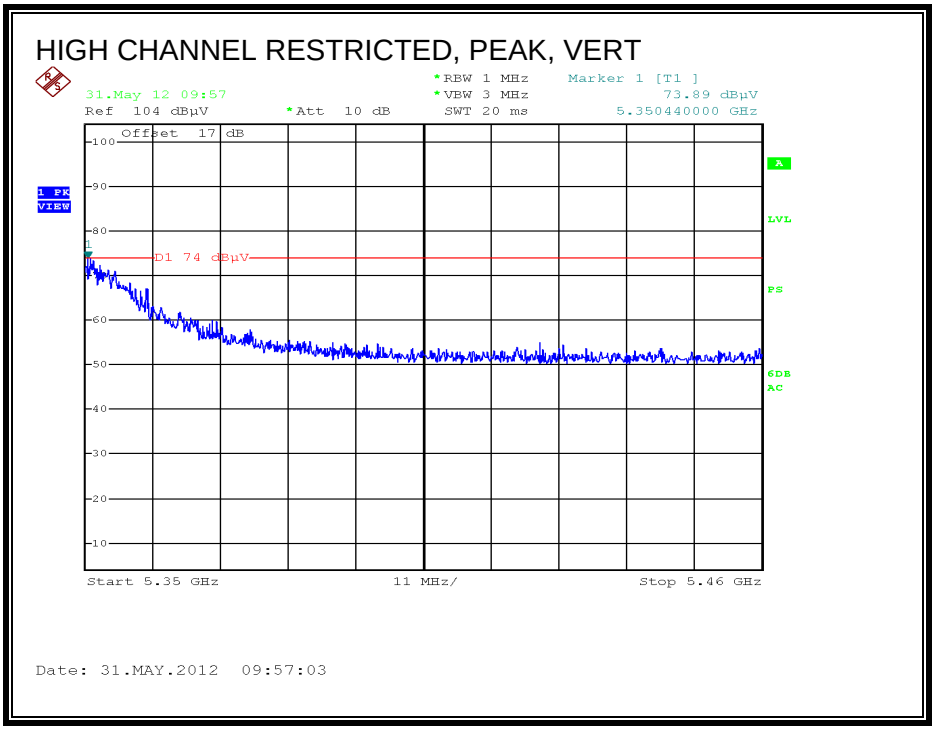
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5270MHz															
15.810	3.0	37.9	38.1	13.1	-31.9	0.0	0.0	57.2	74.0	-16.8	V	P	146.0	36.0	
15.810	3.0	25.0	38.1	13.1	-31.9	0.0	0.0	44.3	54.0	-9.7	V	A	146.0	36.0	
15.810	3.0	38.2	38.1	13.1	-31.9	0.0	0.0	57.5	74.0	-16.5	H	P	180.0	304.0	
15.810	3.0	24.9	38.1	13.1	-31.9	0.0	0.0	44.2	54.0	-9.8	H	A	180.0	304.0	
HIGH CHANNEL, 5310MHz															
15.930	3.0	37.9	37.7	13.2	-31.8	0.0	0.0	56.9	74.0	-17.1	V	P	104.0	219.0	
15.930	3.0	26.0	37.7	13.2	-31.8	0.0	0.0	45.0	54.0	-9.0	V	A	104.0	219.0	
15.930	3.0	38.0	37.7	13.2	-31.8	0.0	0.0	57.0	74.0	-17.0	H	P	161.0	200.0	
15.930	3.0	25.6	37.7	13.2	-31.8	0.0	0.0	44.6	54.0	-9.4	H	A	161.0	200.0	

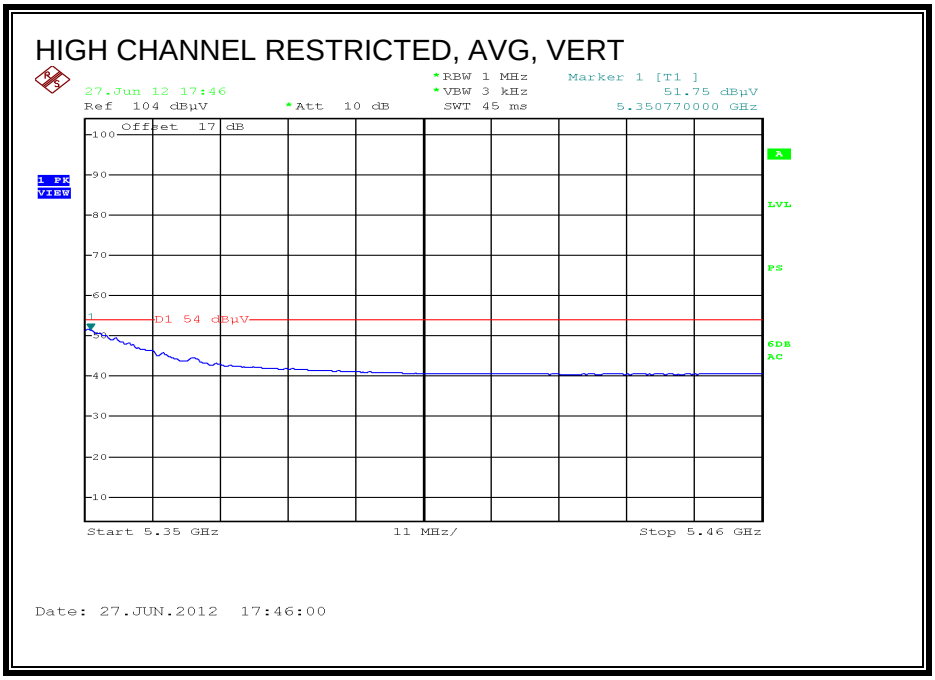
Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

Note: tested with highest output powers at 19 dBm.

9.2.20. 802.11n HT40, SDM MCS21, 3TX, 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



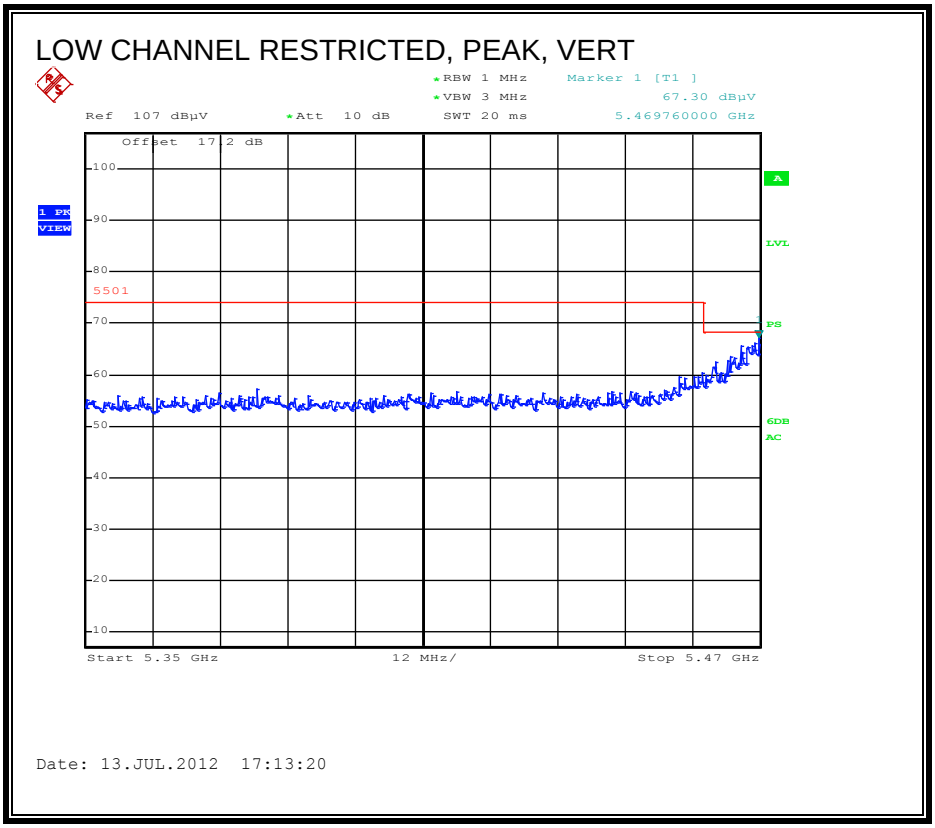


HARMONICS AND SPURIOUS EMISSIONS

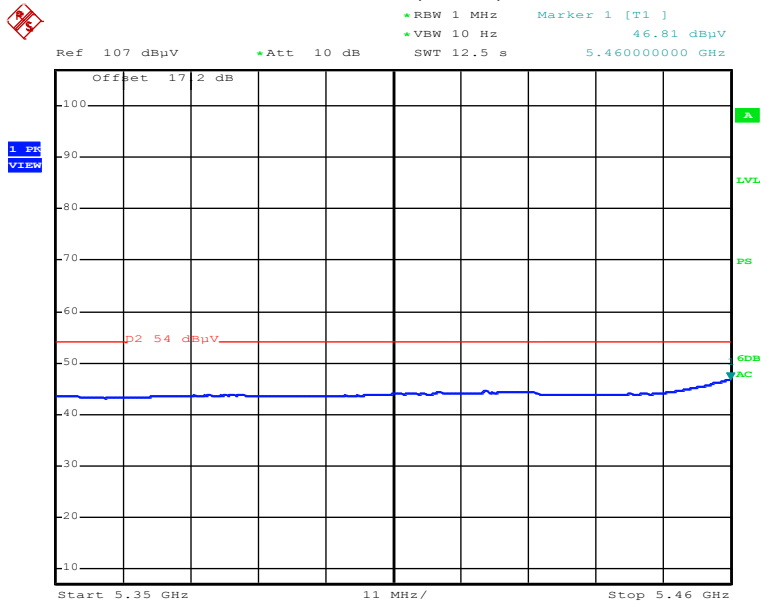
Covered by testing to 11n HT 40, CDD MCS0, 3TX

9.2.21. 802.11a, 1TX, LEGACY, 5.6 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



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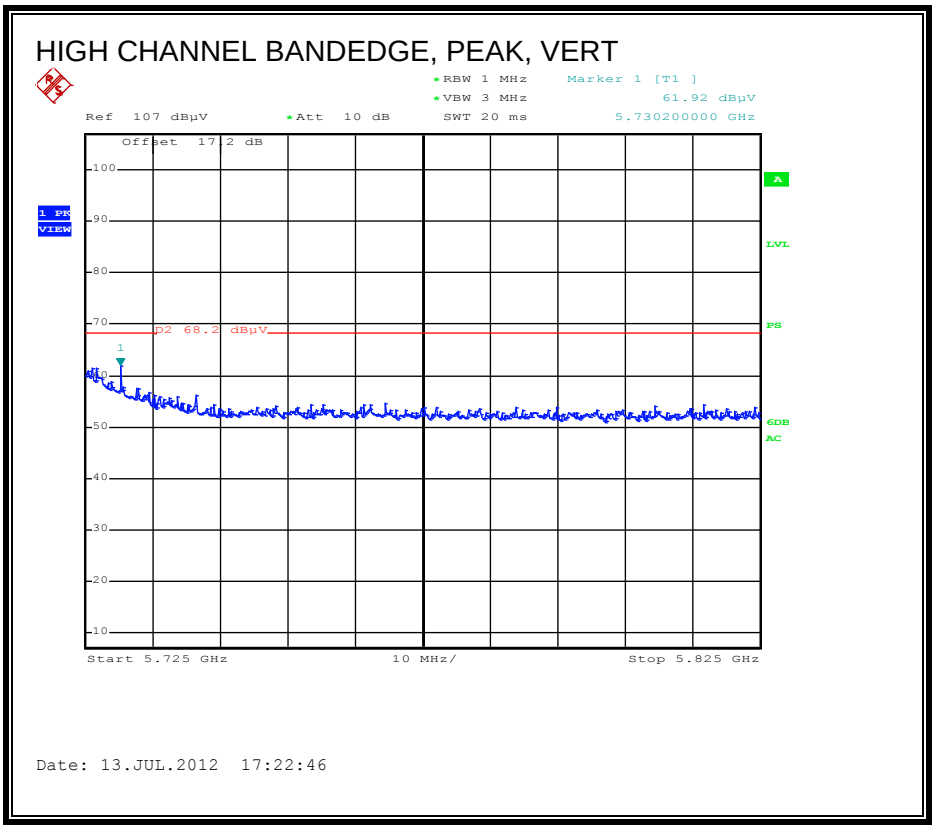
AUTHORIZED BANDEDGE (HIGH CHANNEL)



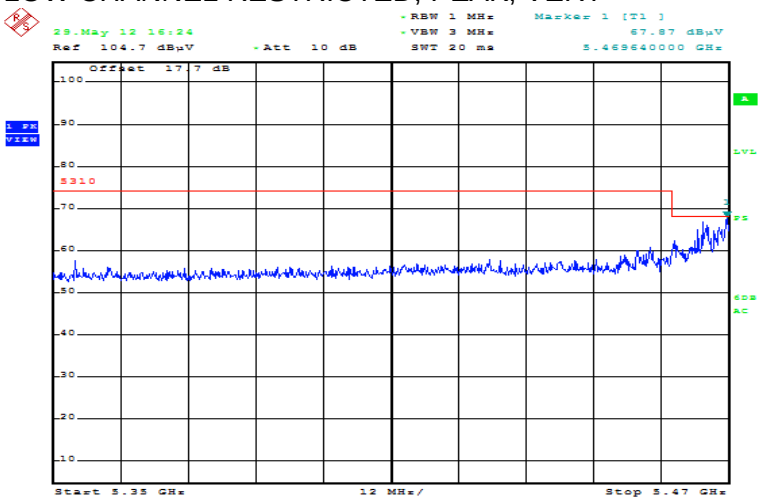
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT20, CDD MCS0, 3TX

9.2.22. 802.11n HT20, CDD MCS0, 3TX, 5.6 GHz BAND

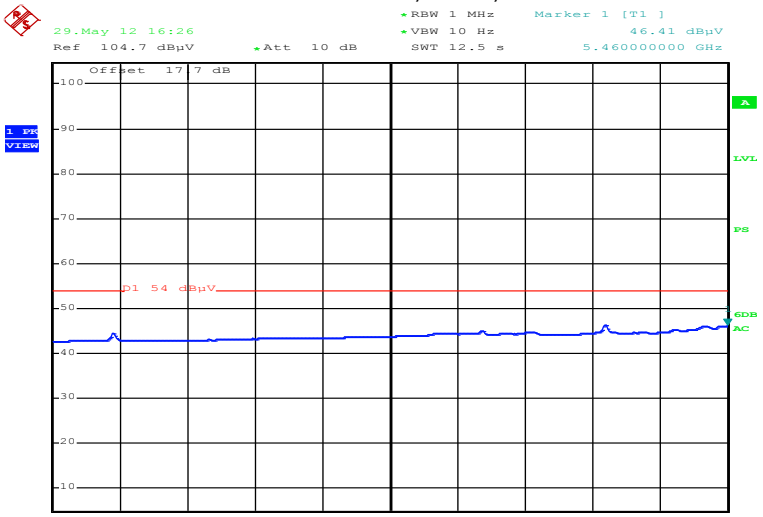
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL RESTRICTED, PEAK, VERT



Date: 29.MAY.2012 16:24:59

LOW CHANNEL RESTRICTED, AVG, VERT



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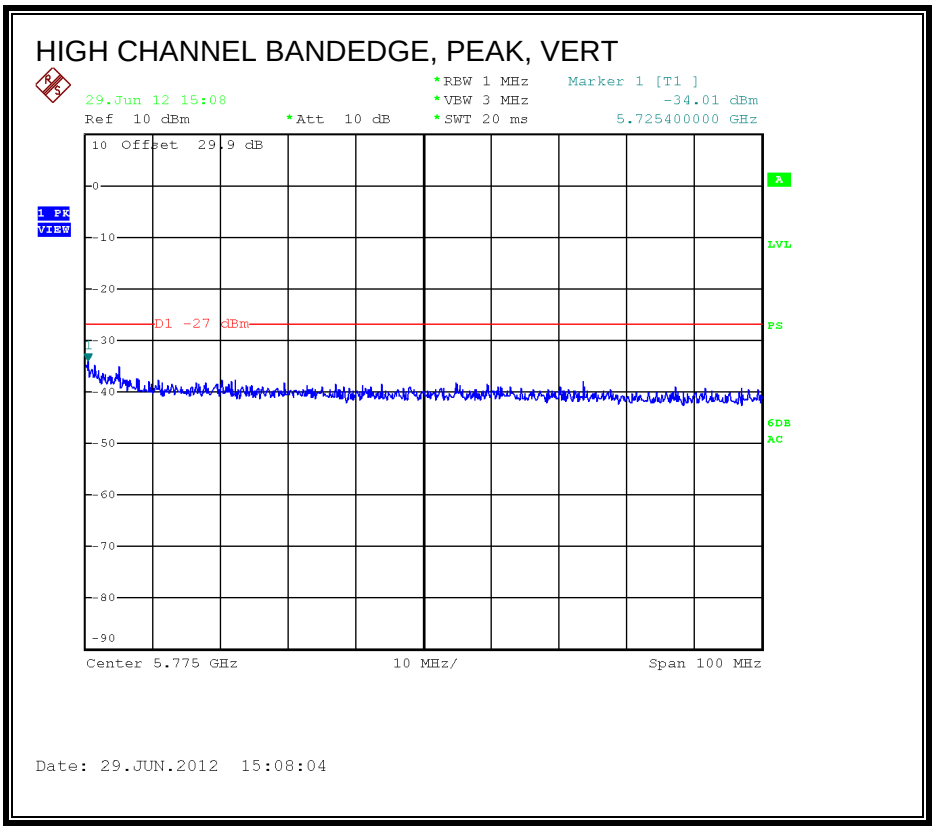
AUTHORIZED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/25/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.407
Mode Oper: Tx in 5.5GHz Band_ HT20 3x3 MCS0 CDD

f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5500MHz															
11.000	3.0	50.6	38.4	10.5	-33.6	0.0	0.0	65.9	74.0	-8.1	V	P	124.0	300.0	
11.000	3.0	38.7	38.4	10.5	-33.6	0.0	0.0	54.0	54.0	0.0	V	A	124.0	300.0	
11.000	3.0	45.5	38.4	10.5	-33.6	0.0	0.0	60.8	74.0	-13.2	H	P	120.0	228.0	
11.000	3.0	32.5	38.4	10.5	-33.6	0.0	0.0	47.8	54.0	-6.2	H	A	120.0	228.0	
MID CHANNEL, 5580MHz															
11.160	3.0	39.2	38.6	10.8	-33.4	0.0	0.0	55.2	74.0	-18.8	V	P	127.0	315.0	
11.160	3.0	27.9	38.6	10.8	-33.4	0.0	0.0	43.9	54.0	-10.1	V	A	127.0	315.0	
11.160	3.0	43.1	38.6	10.8	-33.4	0.0	0.0	59.1	74.0	-14.9	H	P	121.0	276.0	
11.160	3.0	31.0	38.6	10.8	-33.4	0.0	0.0	47.0	54.0	-7.0	H	A	121.0	276.0	
HIGH CHANNEL, 5700MHz															
11.400	3.0	37.4	38.8	11.1	-33.2	0.0	0.0	54.1	74.0	-19.9	V	P	111.0	282.0	
11.400	3.0	25.9	38.8	11.1	-33.2	0.0	0.0	42.6	54.0	-11.4	V	A	111.0	282.0	
11.400	3.0	41.7	38.8	11.1	-33.2	0.0	0.0	58.4	74.0	-15.6	H	P	126.0	278.0	
11.400	3.0	28.4	38.8	11.1	-33.2	0.0	0.0	45.1	54.0	-8.9	H	A	126.0	278.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

Note: tested with highest output powers at 19 dBm.

9.2.23. 802.11n HT20, SDM MCS21, 3TX, 5.6 GHz BAND

Covered by testing to 11n HT20, CDD MCS0, 3TX

9.2.24. 802.11n HT40, CDD MCS0, 1TX, 5.6 GHz BAND

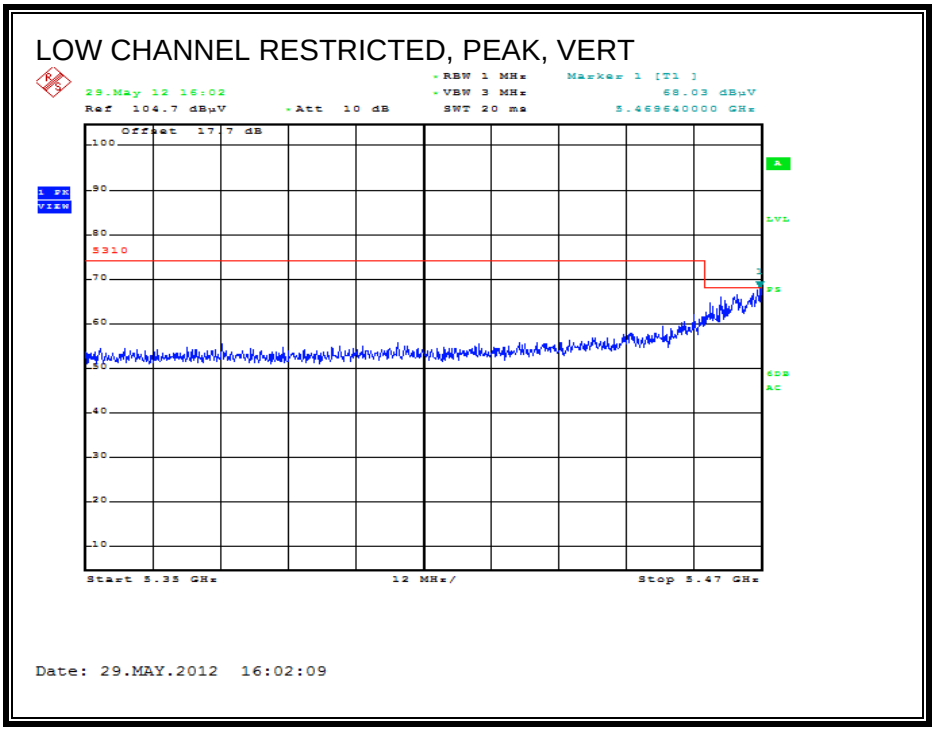
Covered by testing 11n HT40, CDD MCS0, 3TX

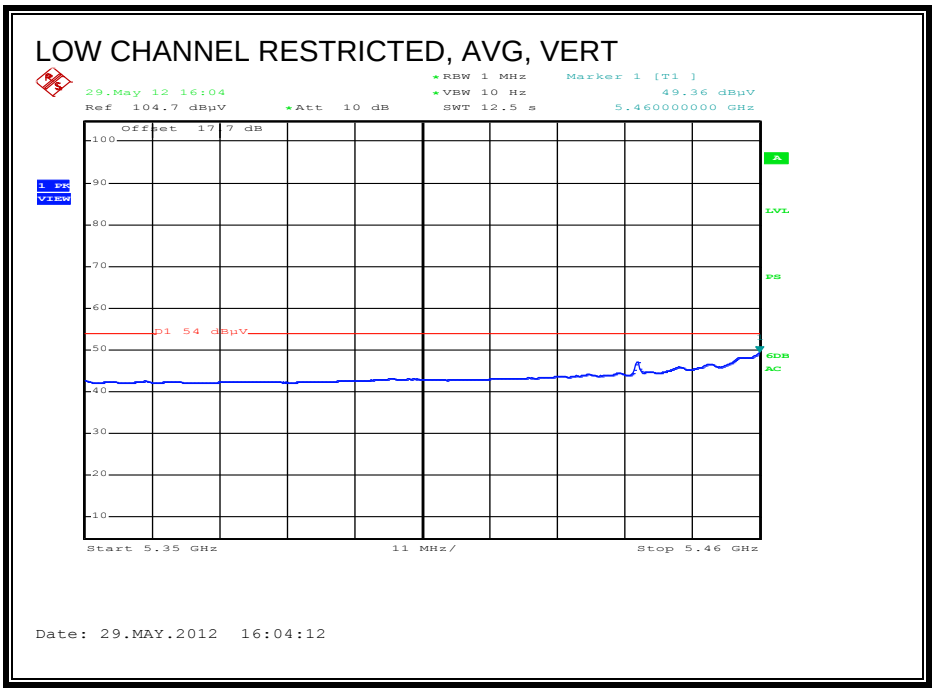
9.2.25. 802.11n HT40, CDD MCS0, 2TX, 5.6 GHz BAND

Covered by testing 11n HT40, CDD MCS0, 3TX

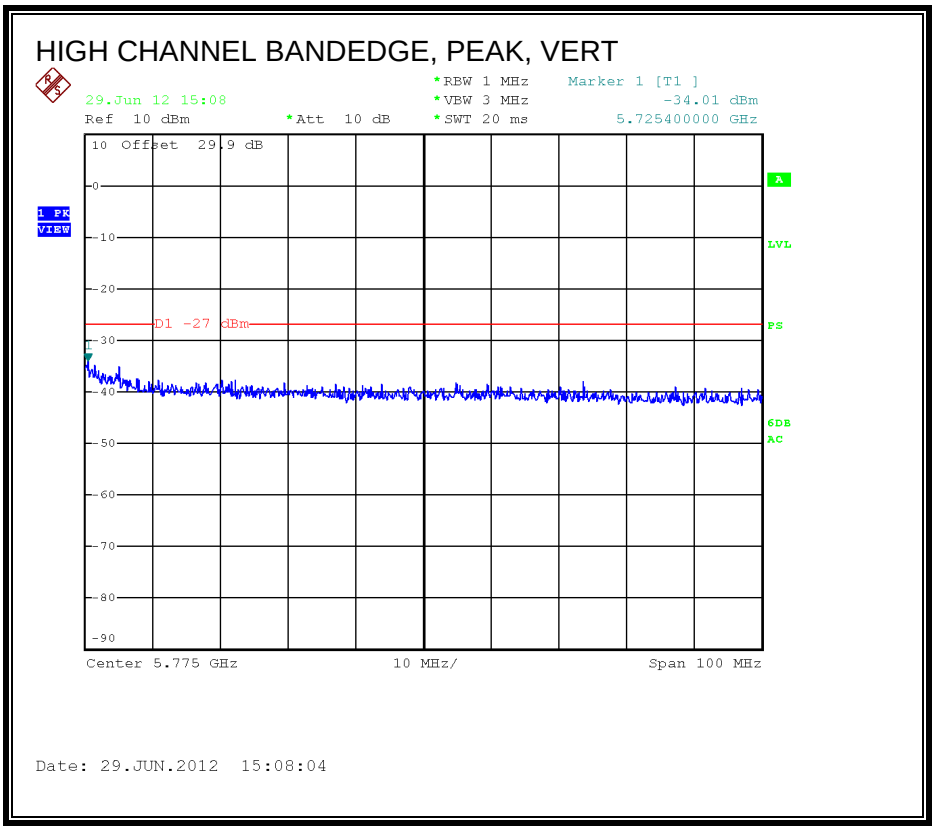
9.2.26. 802.11n HT40, CDD MCS0, 3TX, 5.6 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Vien Tran
Date: 05/30/12
Project #: 12U14373
Company: Broadcom
Test Target: FCC 15.407
Mode Oper: Tx in 5.5GHz Band_ HT40 3x3 MCS0 CDD

f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
LOW CHANNEL, 5510MHz															
11.020	3.0	45.7	38.4	10.5	-33.6	0.0	0.0	61.1	74.0	-12.9	V	P	112.0	289.0	
11.020	3.0	33.3	38.4	10.5	-33.6	0.0	0.0	48.7	54.0	-5.3	V	A	112.0	289.0	
11.020	3.0	43.6	38.4	10.5	-33.6	0.0	0.0	58.9	74.0	-15.1	H	P	115.0	288.0	
11.020	3.0	30.6	38.4	10.5	-33.6	0.0	0.0	46.0	54.0	-8.0	H	A	115.0	288.0	
MID CHANNEL, 5550MHz															
11.100	3.0	38.9	38.6	10.8	-33.4	0.0	0.0	54.8	74.0	-19.2	V	P	110.0	285.0	
11.100	3.0	26.8	38.6	10.8	-33.4	0.0	0.0	42.7	54.0	-11.3	V	A	110.0	285.0	
11.100	3.0	41.8	38.6	10.8	-33.4	0.0	0.0	57.7	74.0	-16.3	H	P	133.0	283.0	
11.100	3.0	30.1	38.6	10.8	-33.4	0.0	0.0	46.0	54.0	-8.0	H	A	133.0	283.0	
HIGH CHANNEL, 5670MHz															
11.340	3.0	33.0	38.7	11.0	-33.2	0.0	0.0	49.5	74.0	-24.5	V	P	182.0	281.0	
11.340	3.0	20.8	38.7	11.0	-33.2	0.0	0.0	37.3	54.0	-16.7	V	A	182.0	281.0	
11.340	3.0	36.9	38.7	11.0	-33.2	0.0	0.0	53.4	74.0	-20.7	H	P	113.0	264.0	
11.340	3.0	24.8	38.7	11.0	-33.2	0.0	0.0	41.3	54.0	-12.7	H	A	113.0	264.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

Note: tested with highest output powers at 19 dBm.

9.2.27. 802.11n HT40, SDM MCS21, 3TX, 5.6 GHz BAND

Covered by testing to 11n HT40, CDD MCS0, 3TX

9.3. WORST-CASE BELOW 1 GHz

RESULTS

HORIZONTAL AND VERTICAL DATA

Project No:12U14373
Client Name:BROADCOM
Model / Device:X28B
Config / Other:WORST CASE
Test By:John Nguyen

Horizontal 30 - 1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
152.3161	39.36	PK	-26.6	12.1	24.86	43.5	-18.64	200	Horz
213.02	47.25	PK	-26.1	10.6	31.75	46	-14.25	100	Horz
300.755	39.8	PK	-25.8	13.3	27.30	46	-18.70	100	Horz
497.06	44.0	PK	-24.8	17.5	36.70	46	-9.30	100	Horz
530.929	40.29	QP	-24.9	18.2	33.59	46	-12.41	100	Horz
896.034	45.04	QP	-23.3	22.1	43.84	46	-2.16	115	Horz

Vertical 30 - 1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
152.51	52.82	PK	-26.6	12	38.22	43.5	-5.28	200	Vert
223.6511	53.47	PK	-26.0	10.6	38.07	46	-7.93	200	Vert
300.755	38.00	PK	-25.8	13.3	25.50	46	-20.5	100	Vert
433.0036	47.21	PK	-25.1	16.6	38.71	46	-7.29	100	Vert
497.06	44.00	PK	-24.8	17.5	36.70	46	-9.30	100	Vert
899.7822	41.92	PK	-23.4	22.2	40.72	46	-5.28	200	Vert

PK - Peak detector
QP - Quasi-Peak detector
LnAv - Linear Average detector
LgAv - Log Average detector
Av - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection
Text File: X28B_UL-EMC_2nd_Test.TXT
File: X28B_UL-EMC_2nd_Test.DAT

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

6 WORST EMISSIONS

LINE CONDUCTED DATA

Project No:12U14373
Client Name:BROADCOM
Model/Device:X28B
Test Volt/Freq:120AC/60Hz
Test By:John Nguyen

Line-L1 .15 - 30MHz

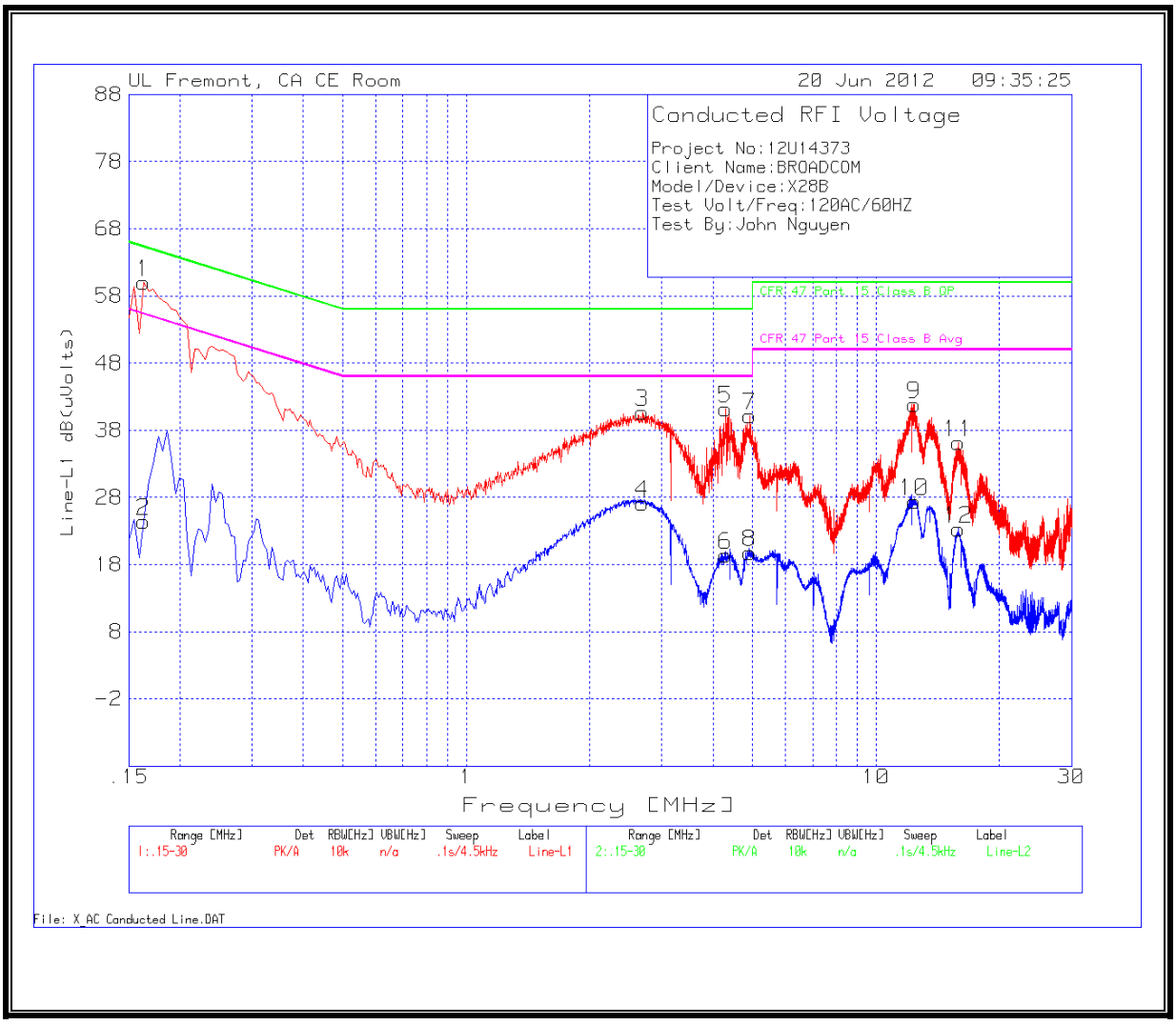
Test Freq. MHz	Meter Reading dB(µV)	Detector Type	LISN Factor dB	Path Loss (dB)	Corrected Reading dB(µV)	Class B Quasi-Peak Limit dB(µV)	Quasi-Peak Margin dB	Class B Average Limit dB(µV)	Average Margin dB
0.1635	59.96	PK	0.1	0	60.06	65.3	-5.24	-	-
0.1635	24.35	Av	0.1	0	24.45	-	-	55.3	-30.85
2.6925	40.50	PK	0.1	0.1	40.70	56	-15.3	-	-
2.6925	26.96	Av	0.1	0.1	27.16	-	-	46	-18.84
4.299	41.04	PK	0.1	0.1	41.24	56	-14.76	-	-
4.299	19.20	Av	0.1	0.1	19.40	-	-	46	-26.6
4.9155	39.99	PK	0.1	0.1	40.19	56	-15.81	-	-
4.9155	19.65	Av	0.1	0.1	19.85	-	-	46	-26.15
12.3675	41.44	PK	0.2	0.2	41.84	60	-18.16	-	-
12.3675	27.03	Av	0.2	0.2	27.43	-	-	50	-22.57
15.8595	35.78	PK	0.2	0.2	36.18	60	-23.82	-	-
15.8595	22.91	Av	0.2	0.2	23.31	-	-	50	-26.69

Line-L2 .15 - 30MHz

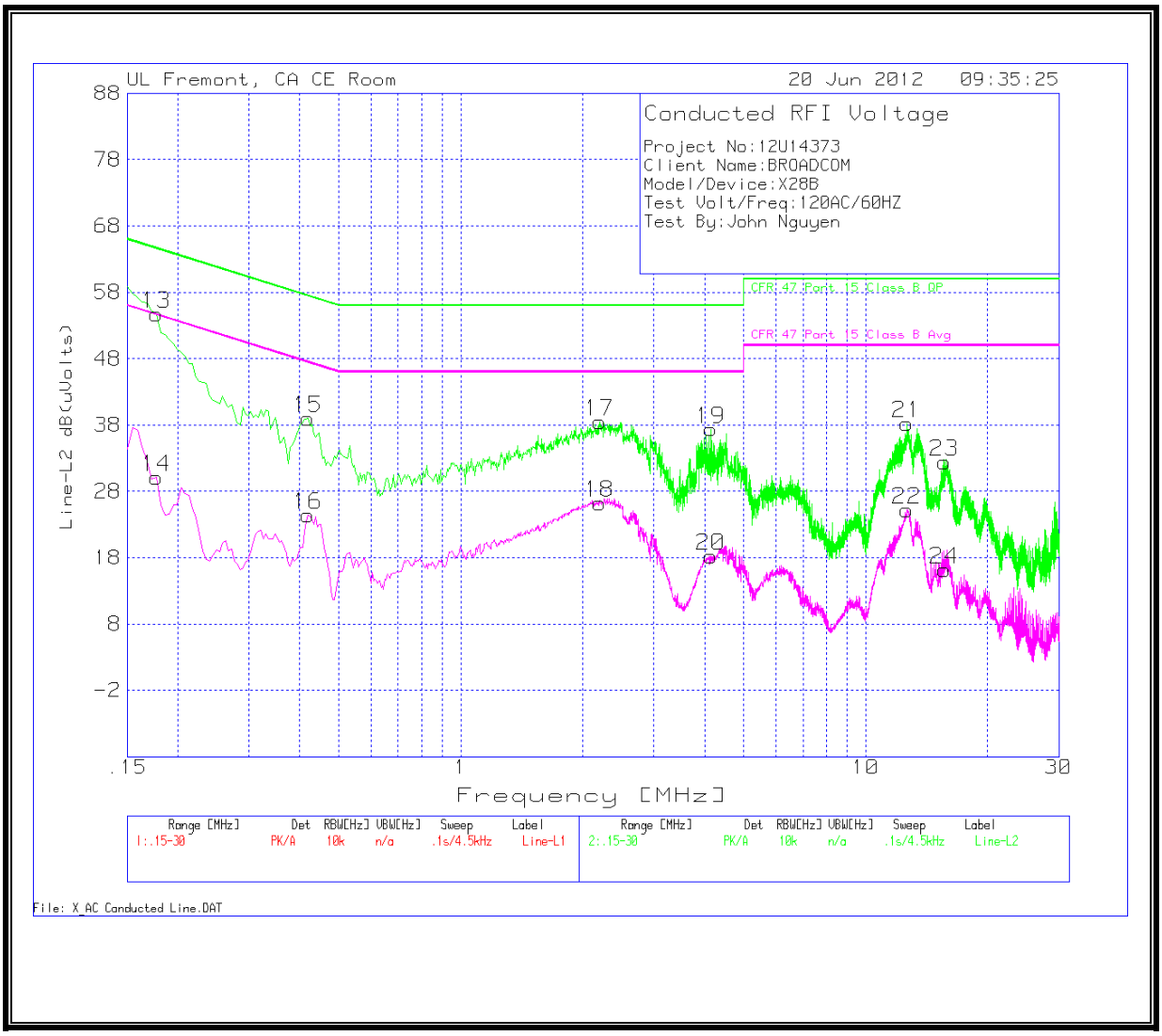
Test Freq. MHz	Meter Reading dB(µV)	Detector Type	LISN Factor dB	Path Loss (dB)	Corrected Reading dB(µV)	Class B Quasi-Peak Limit dB(µV)	Quasi-Peak Margin dB	Class B Average Limit dB(µV)	Average Margin dB
0.177	54.67	PK	0.1	0	54.77	64.6	-9.83	-	-
0.177	30.00	Av	0.1	0	30.10	-	-	54.6	-24.5
0.42	38.92	PK	0.1	0	39.02	57.4	-18.38	-	-
0.42	24.35	Av	0.1	0	24.45	-	-	47.4	-22.95
2.2065	38.30	PK	0.1	0.1	38.50	56	-17.5	-	-
2.2065	25.99	Av	0.1	0.1	26.19	-	-	46	-19.81
4.155	37.19	PK	0.1	0.1	37.39	56	-18.61	-	-
4.155	18.03	Av	0.1	0.1	18.23	-	-	46	-27.77
12.6645	37.85	PK	0.2	0.2	38.25	60	-21.75	-	-
12.6645	24.77	Av	0.2	0.2	25.17	-	-	50	-24.83
15.657	32.00	PK	0.2	0.2	32.40	60	-27.6	-	-
15.657	15.76	Av	0.2	0.2	16.16	-	-	50	-33.84

PK - Peak detector
QP - Quasi-Peak detector
Av - Average detector

LINE 1 RESULTS



LINE 2 RESULTS



11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) **Channel Availability Check Time:** …

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

FCC

§15.407 (h) and FCC 06-96 APPENDIX “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION”.

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.		

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: For the Short pulse radar Test Signals this instant is the end of the *Burst*. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

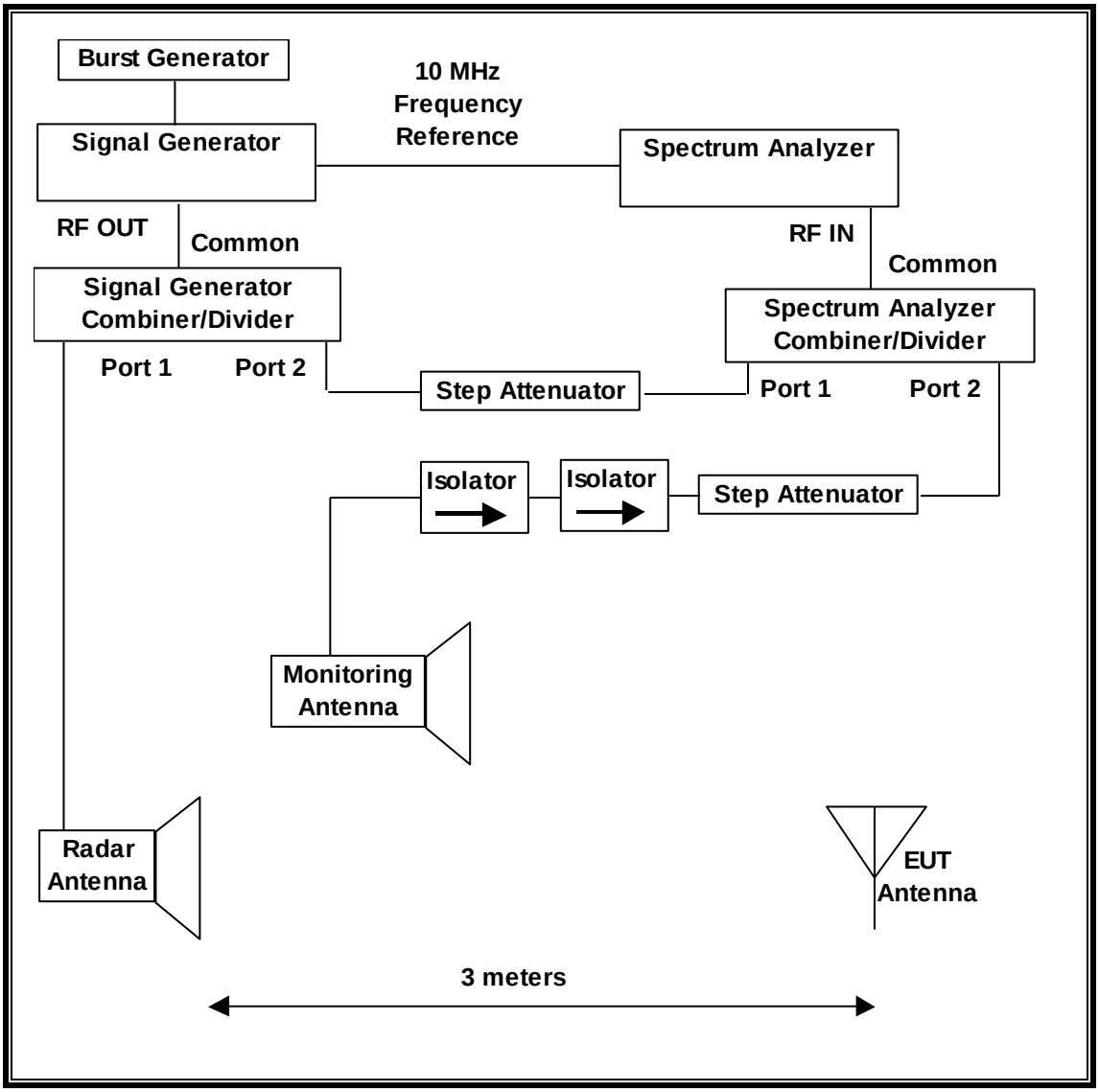
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

11.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Freqeuncy Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

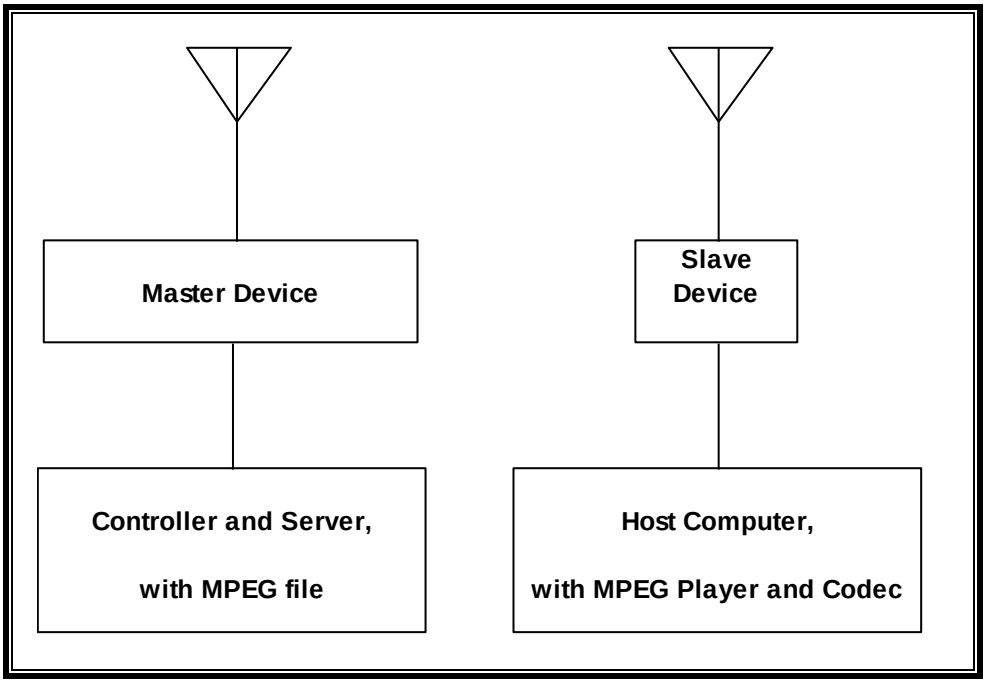
TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/12
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12

11.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
N600 Wireless Dual Band Router	Netgear	WNDR3400	2BK311730FF6B	PY309300116
AC Adapter (AP)	Netgear	FA-1201500SJA / FA-1201500SUA	4F105116T10209045B	DoC
Notebook PC (Controller/Server)	HP	Pavilion zv6000	CND5290401	DoC
AC Adapter (Controller PC)	HP	PA-1121-12HD	58B240ALLRK0HU	DoC
Notebook PC (Host)	Dell	Inspirion B120 (Prototype)	CN-901003-70166-57K-01JS	DoC
AC Adapter (Host PC)	Lite On Technology	PA-1600-06D1	CN-0F9710-71615-56R-4F8C	DoC

11.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 27.79 dBm EIRP in the 5250-5350 MHz band and 29.16 dBm EIRP in the 5470-5725 MHz band.

The lowest gain antenna assembly utilized with the EUT has a gain of 3.16 dBi in the 5250-5350 MHz band and 2.92 dBi in the 5470-5725 MHz band. The highest antenna gain neglecting legacy mode array gain factor, utilized with the EUT has a gain of 5.61 dBi in the 5250-5350 MHz band and 5.35 dBi in the 5470-5725 MHz band.

Three antennas are utilized to meet the diversity and MIMO operational requirements.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses three transmitter/receiver chains, each connected to an antenna to perform radiated tests.

WLAN traffic exceeding the transmitter minimum activity ratio of 30% is generated by streaming the compressed video file “6 ½ Magic Hours” from the Master to the Slave in full motion video.

TPC is required since the maximum EIRP is greater than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

The software installed in the access point is Linux revision 5.22.84.0.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Netgear N600 Dual Band Router, FCC ID: PY309300116. The DFS software installed in the Master Device is Linux revision 5.22.84.0. The minimum antenna gain for the Master Device is 2.73 dBi.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm.

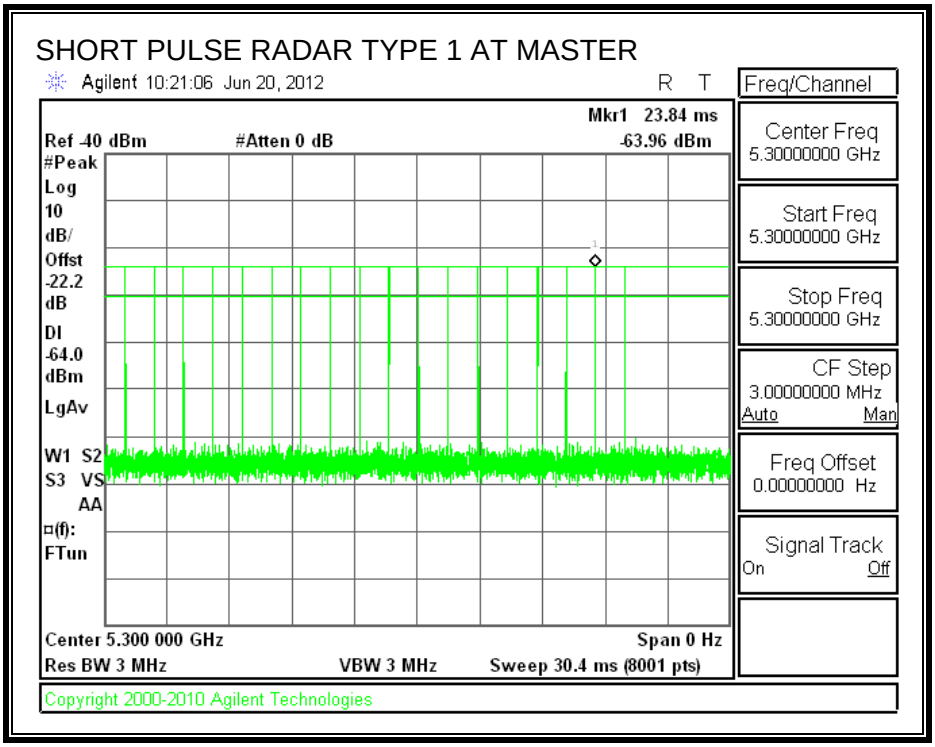
11.2. RESULTS FOR 20 MHz BANDWIDTH

11.2.1. TEST CHANNEL

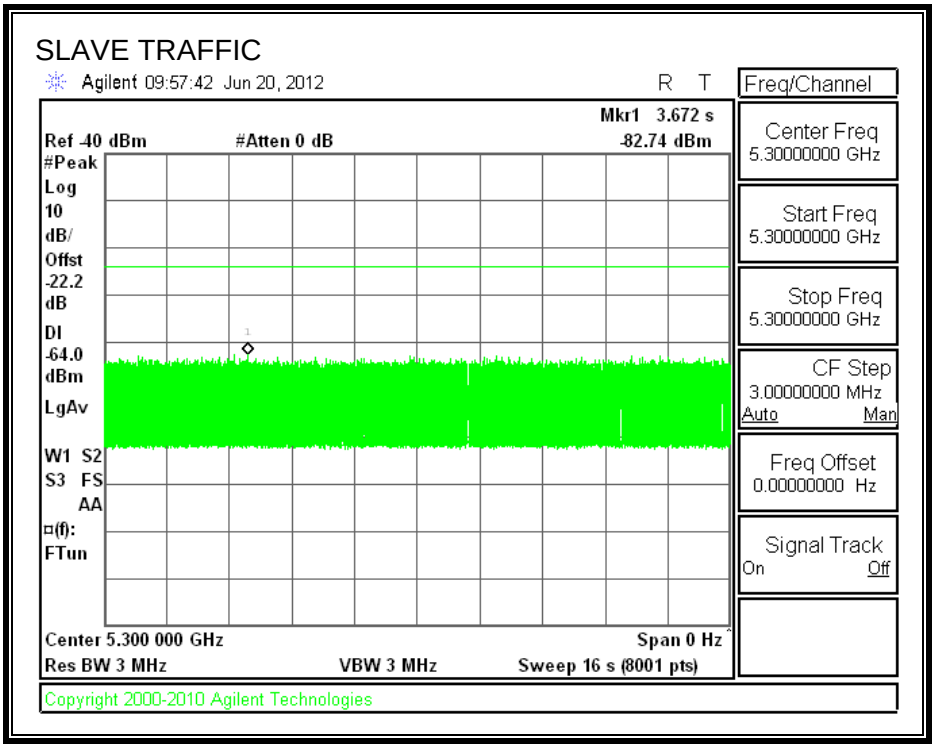
All tests were performed at a channel center frequency of 5300 MHz.

11.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



11.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

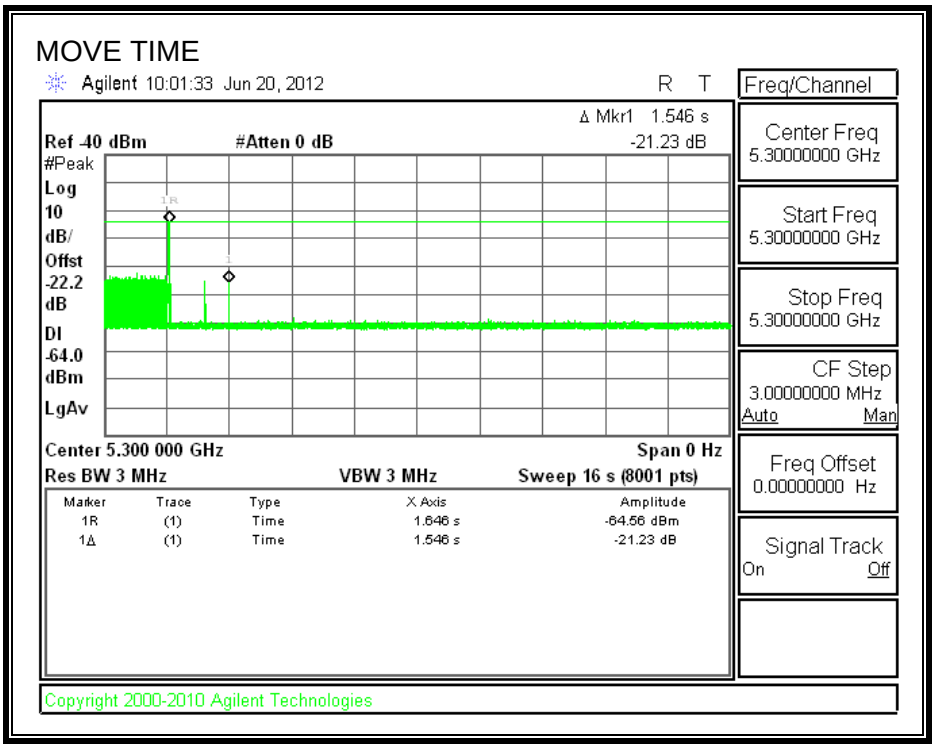
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

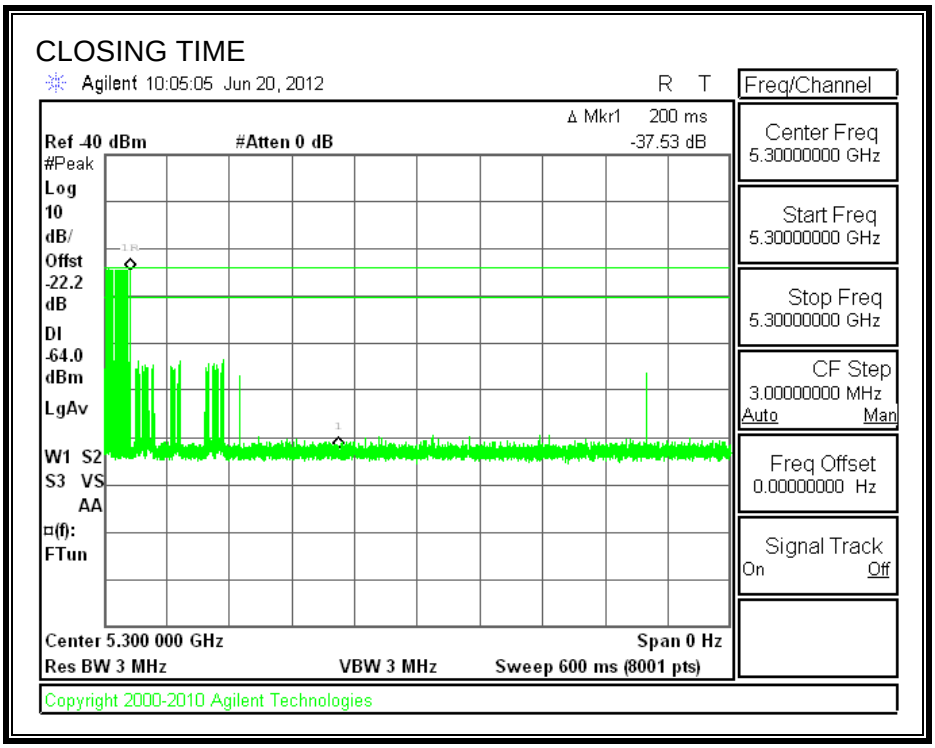
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	1.546	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	4.0	60
IC	14.0	260

MOVE TIME



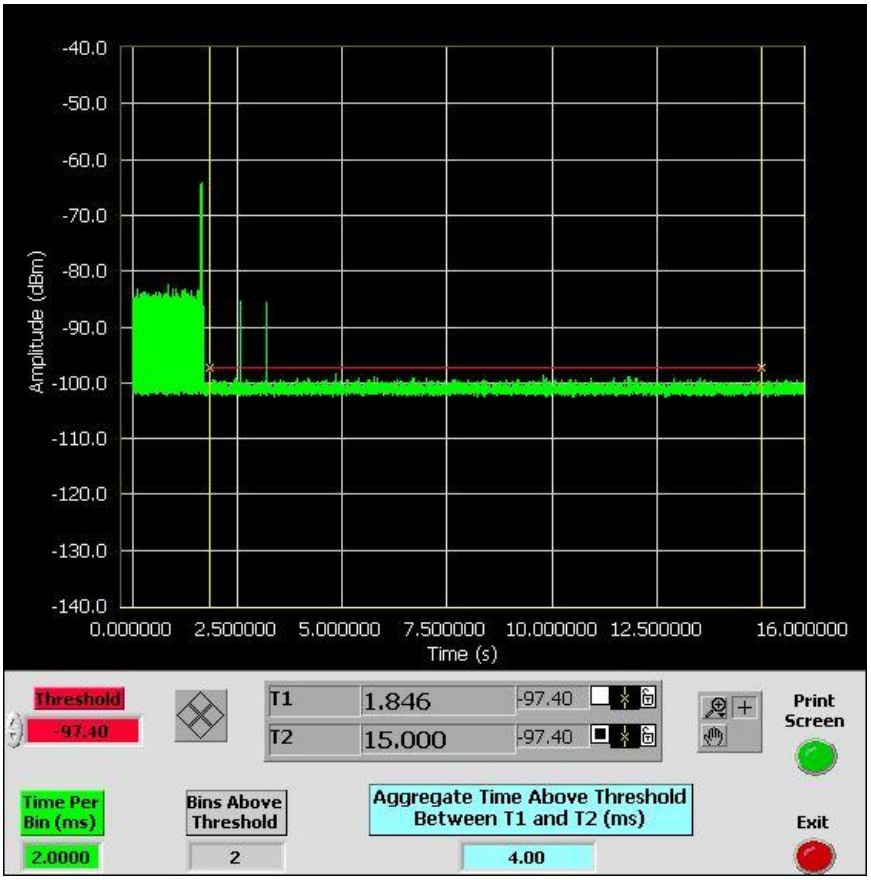
CHANNEL CLOSING TIME



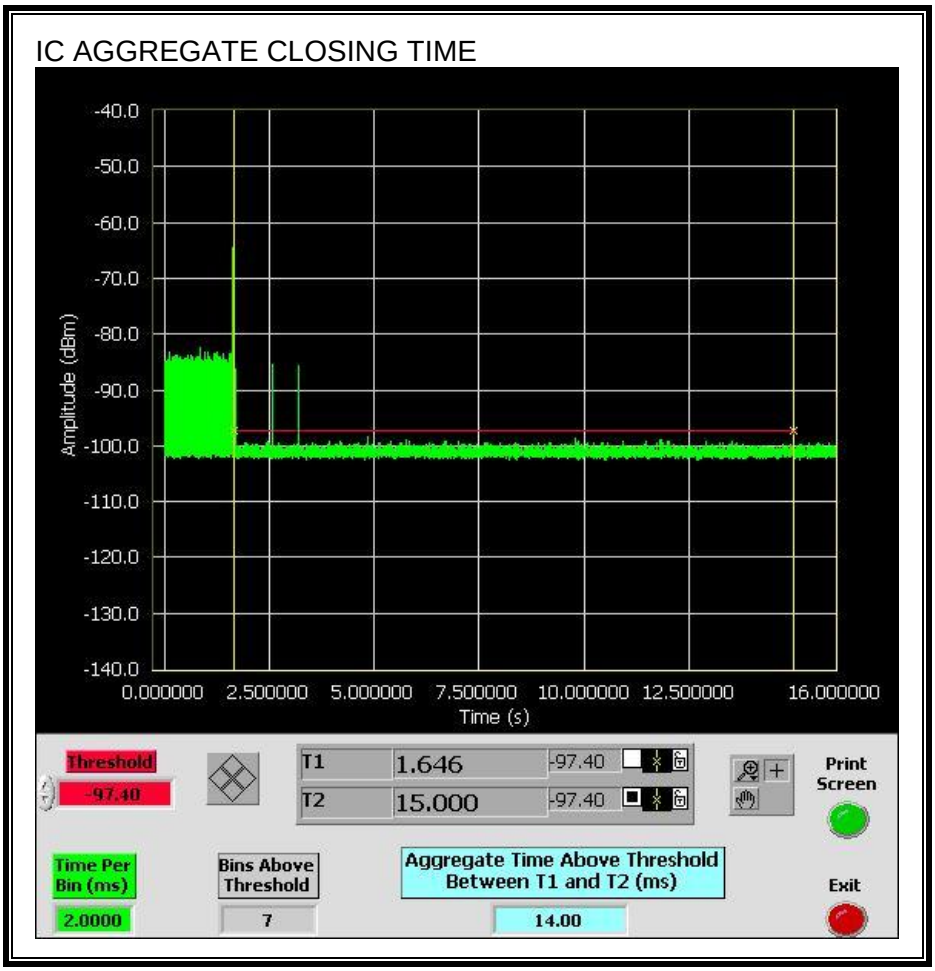
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



Only intermittent transmissions are observed during the IC aggregate monitoring period.



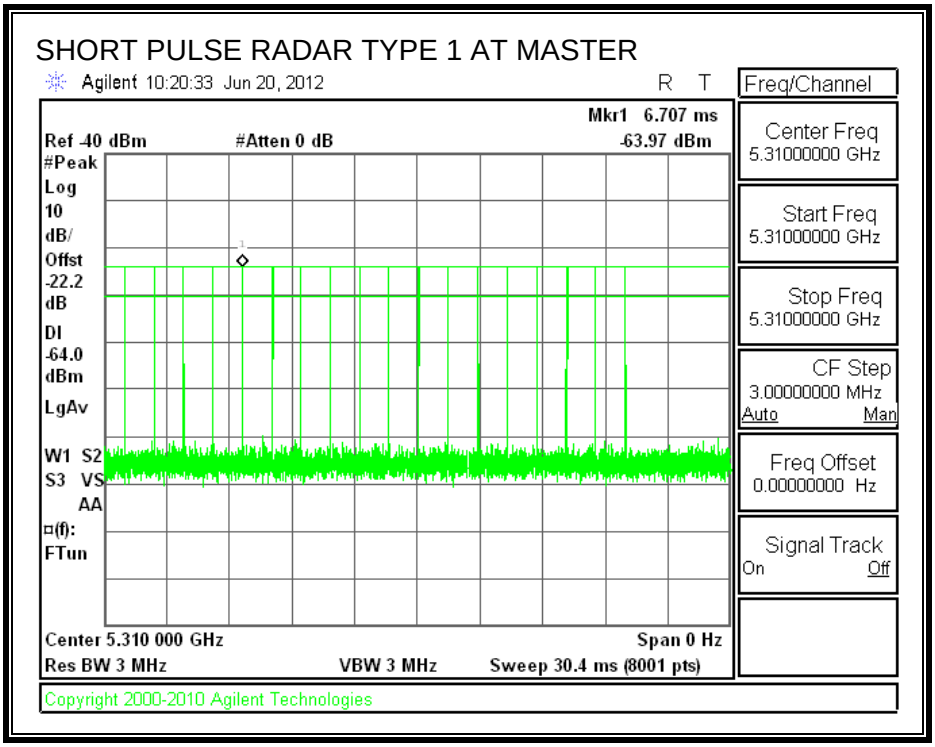
11.3. RESULTS FOR 40 MHz BANDWIDTH

11.3.1. TEST CHANNEL

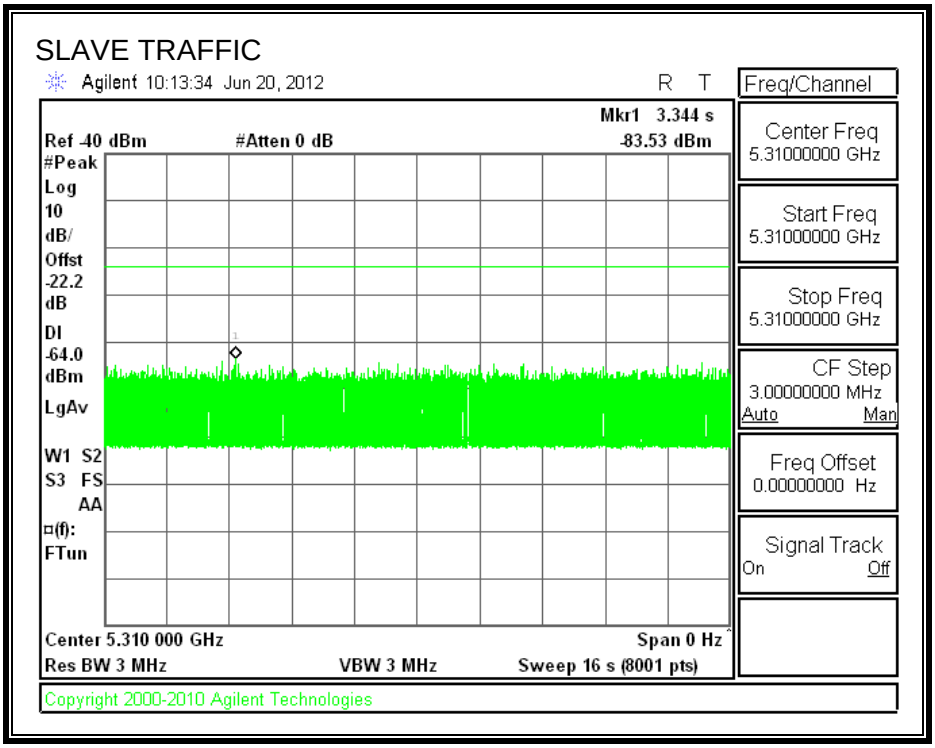
All tests were performed at a channel center frequency of 5510 MHz.

11.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



11.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

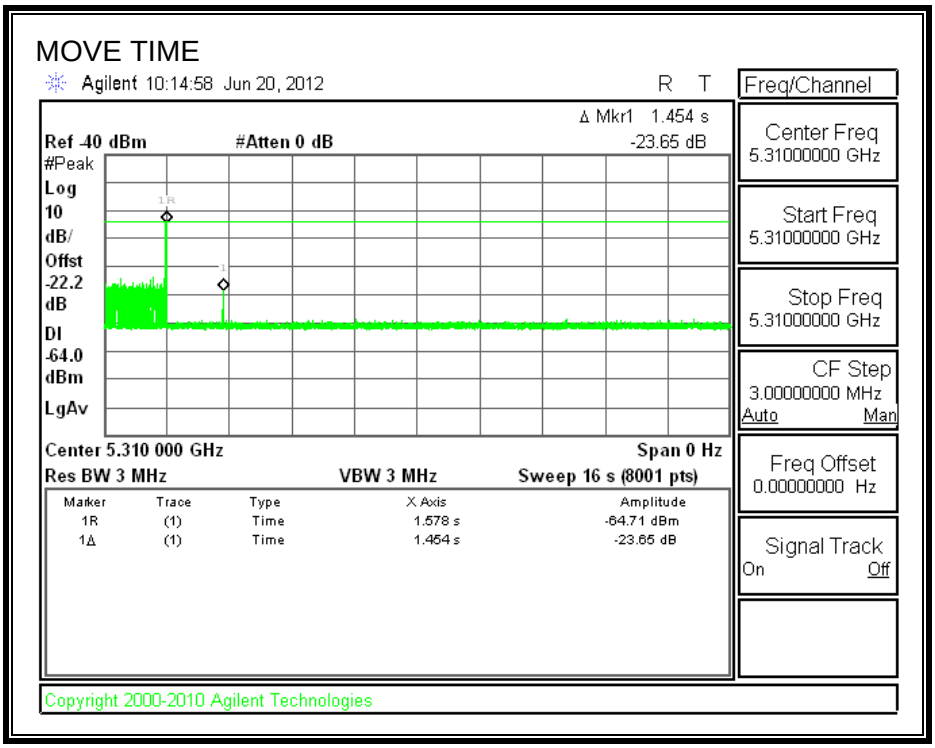
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

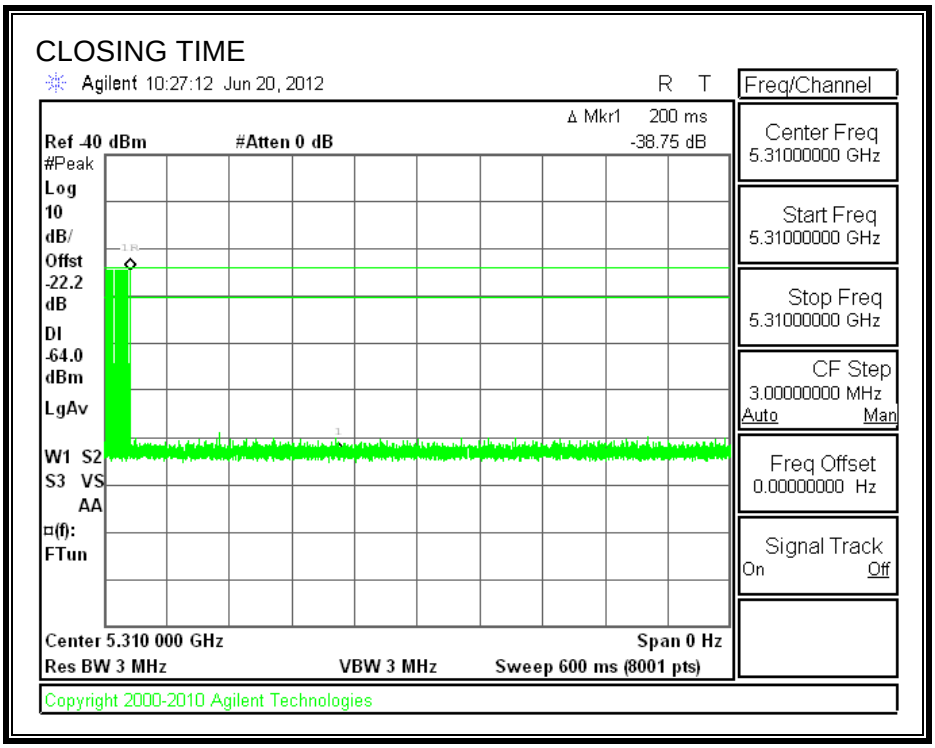
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	1.454	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	2.0	60
IC	4.0	260

MOVE TIME



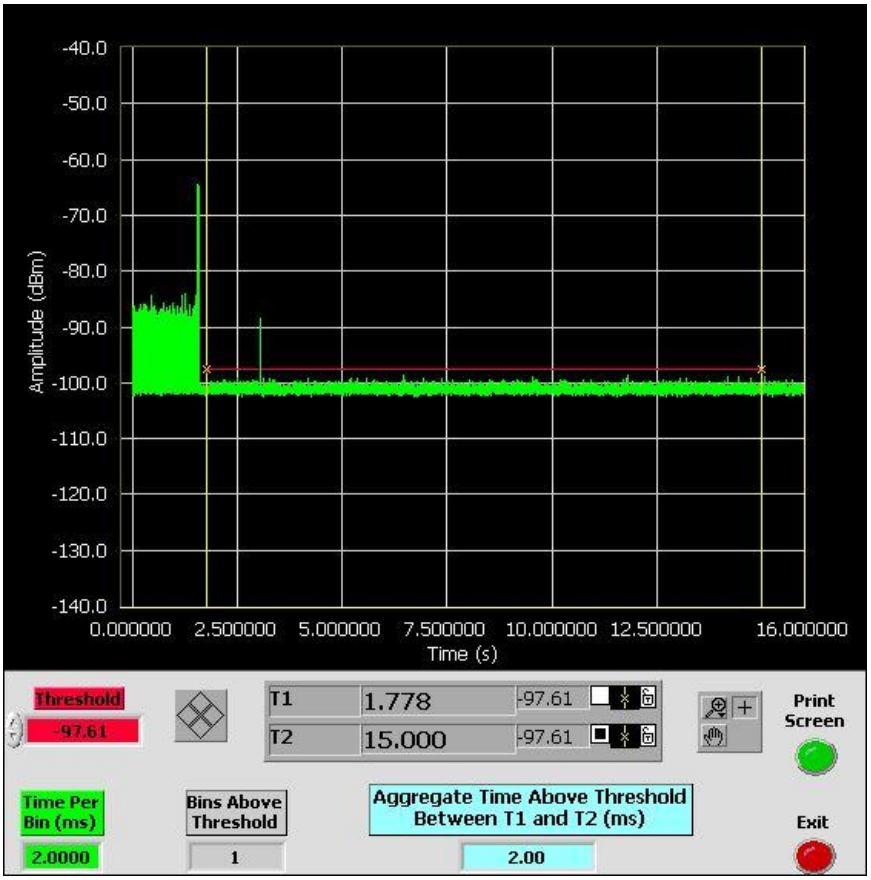
CHANNEL CLOSING TIME



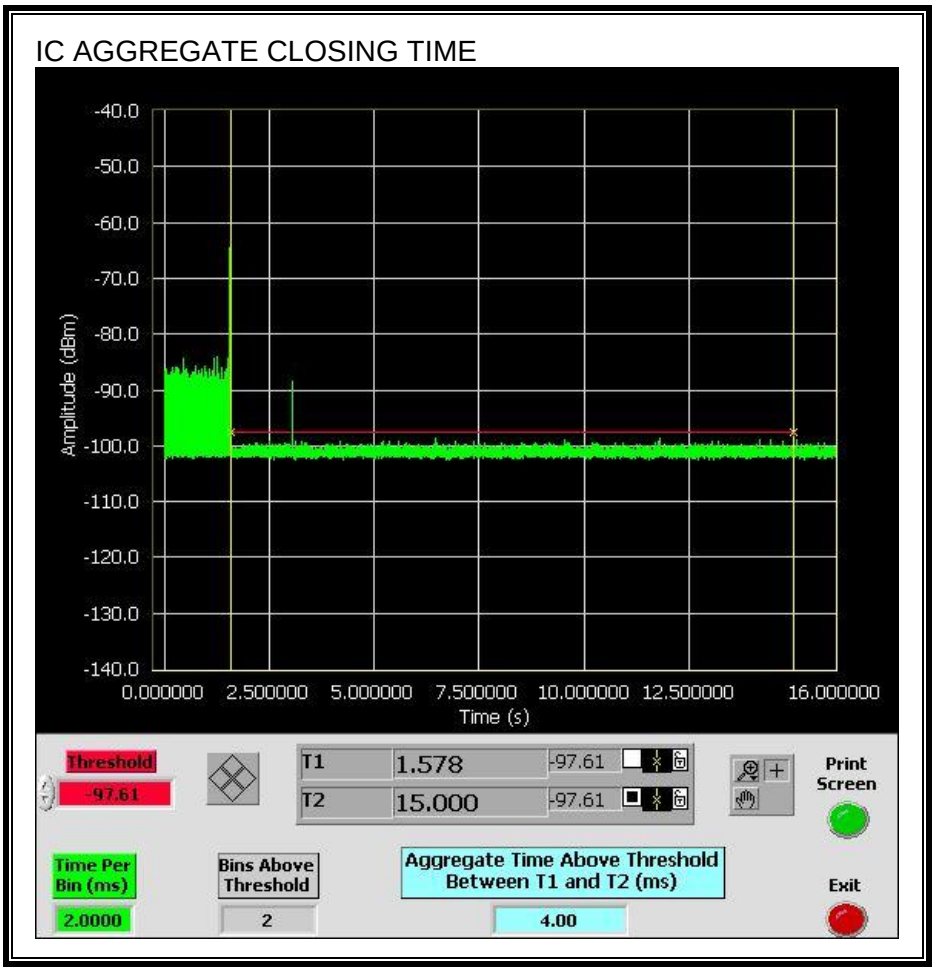
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



Only intermittent transmissions are observed during the IC aggregate monitoring period.



11.3.5. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.