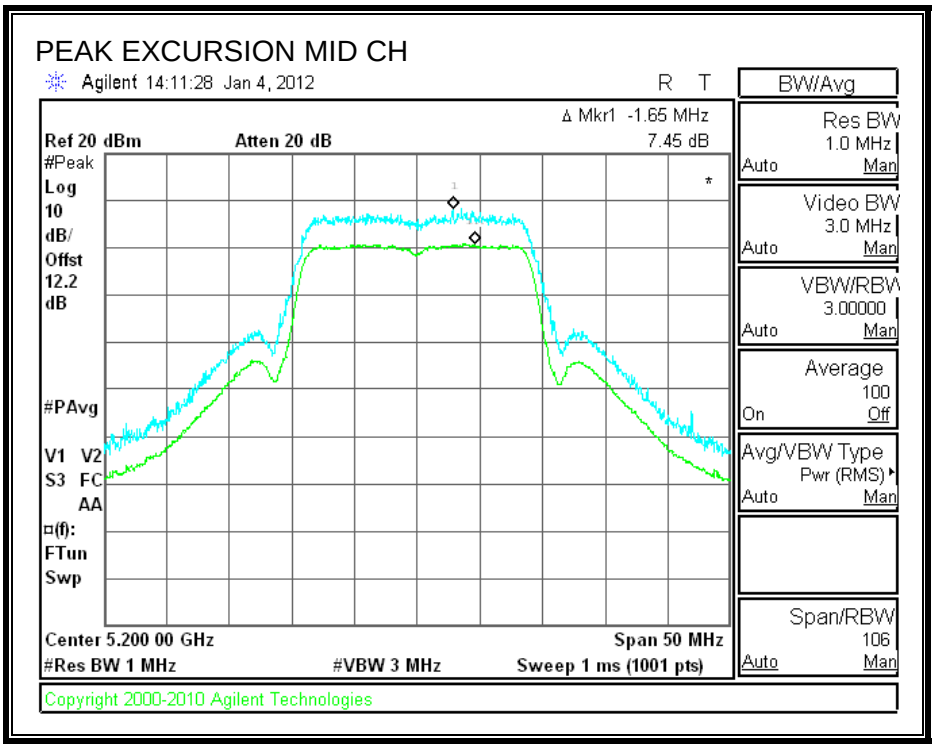
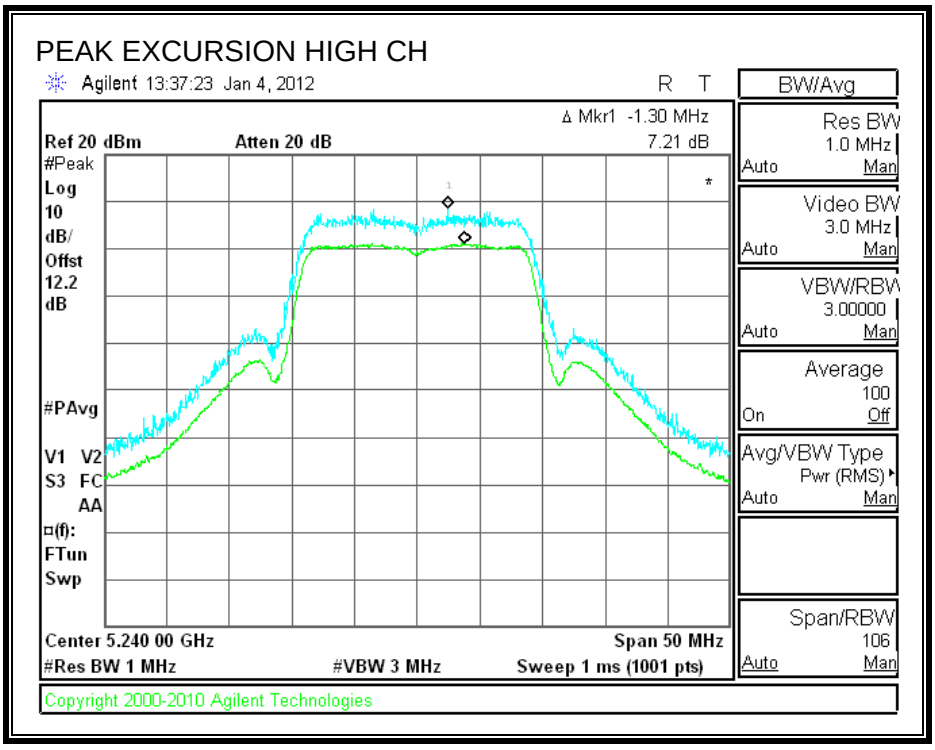
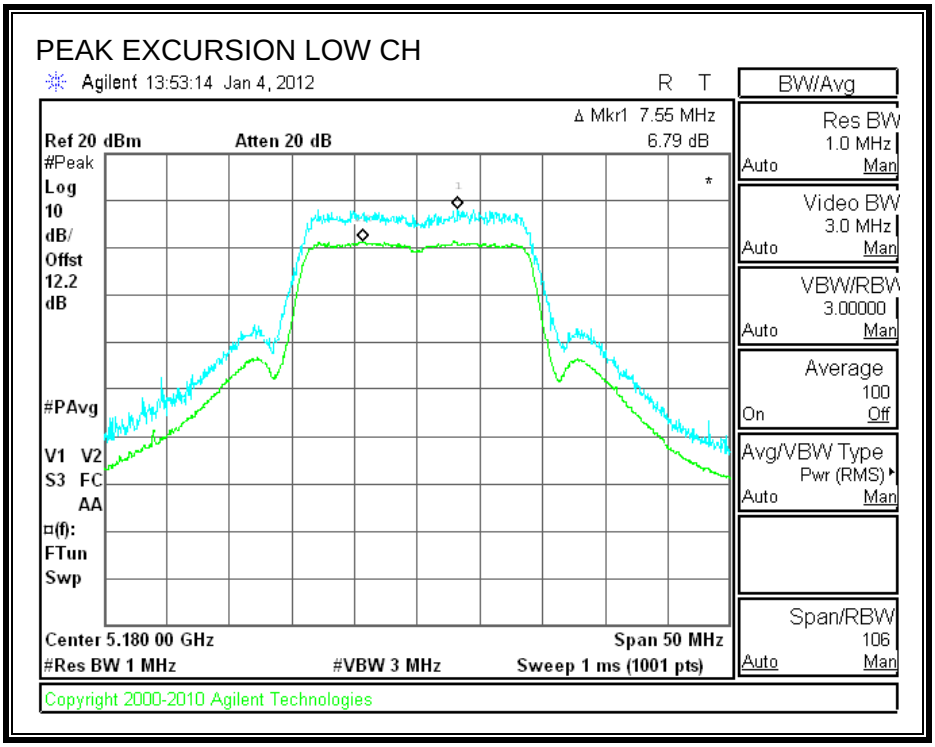
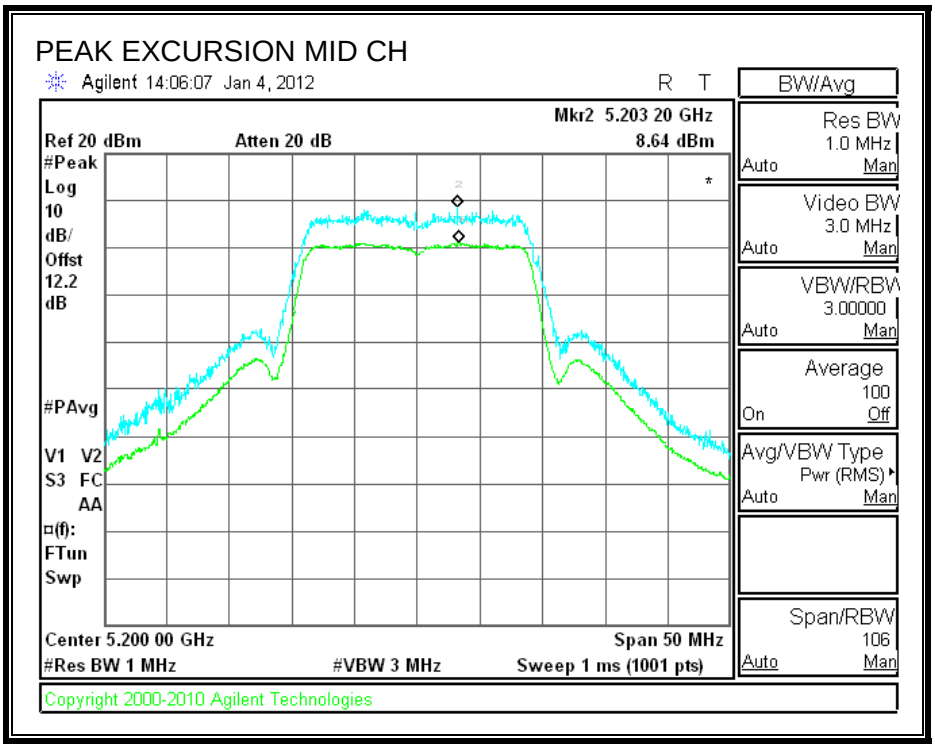




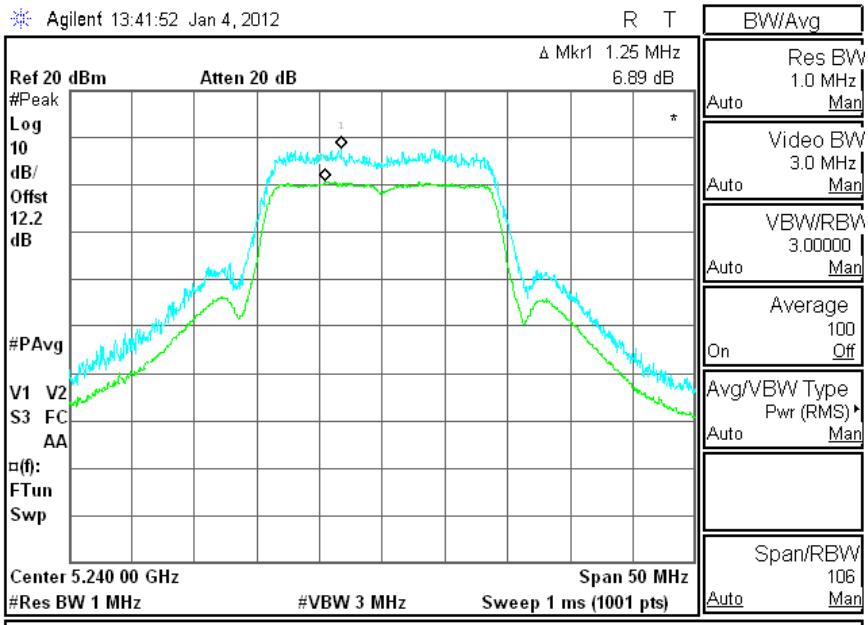
CHAIN 2

PEAK EXCURSION



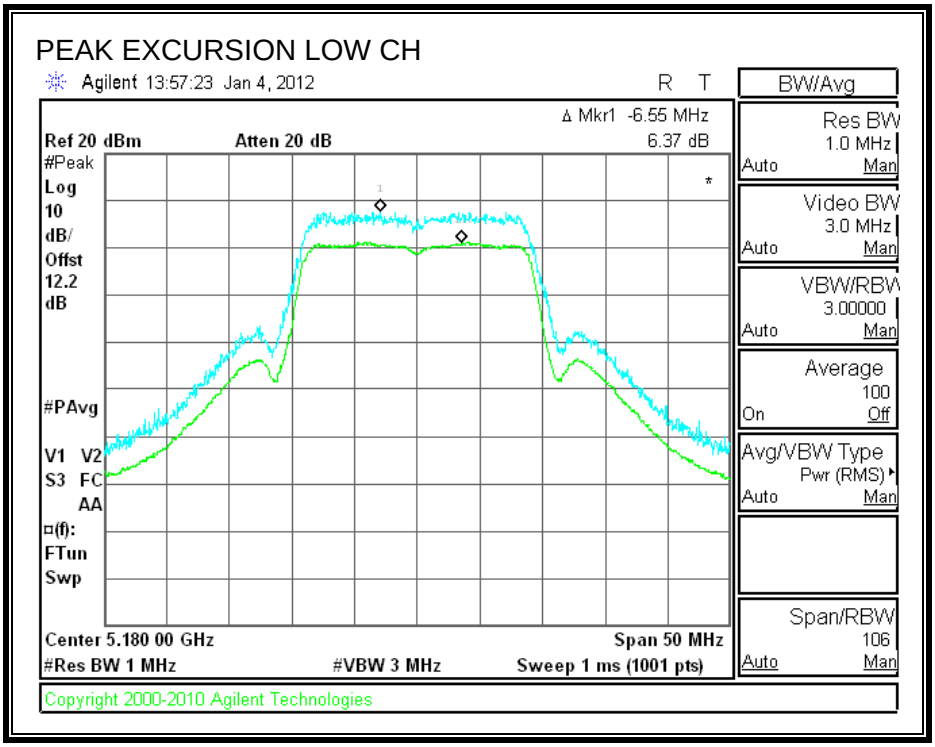


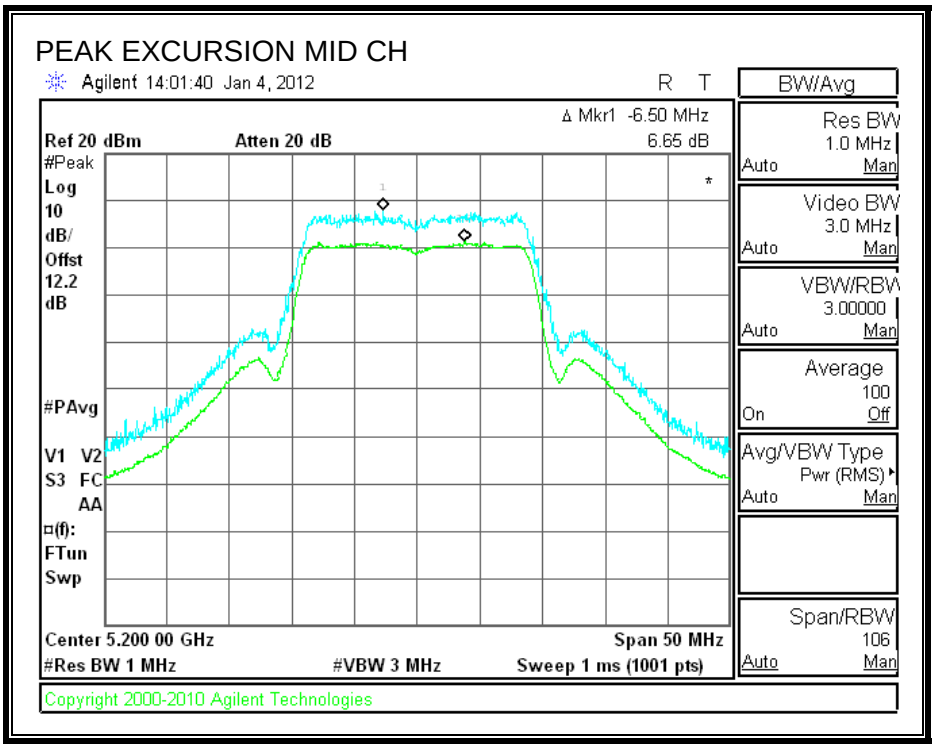
PEAK EXCURSION HIGH CH

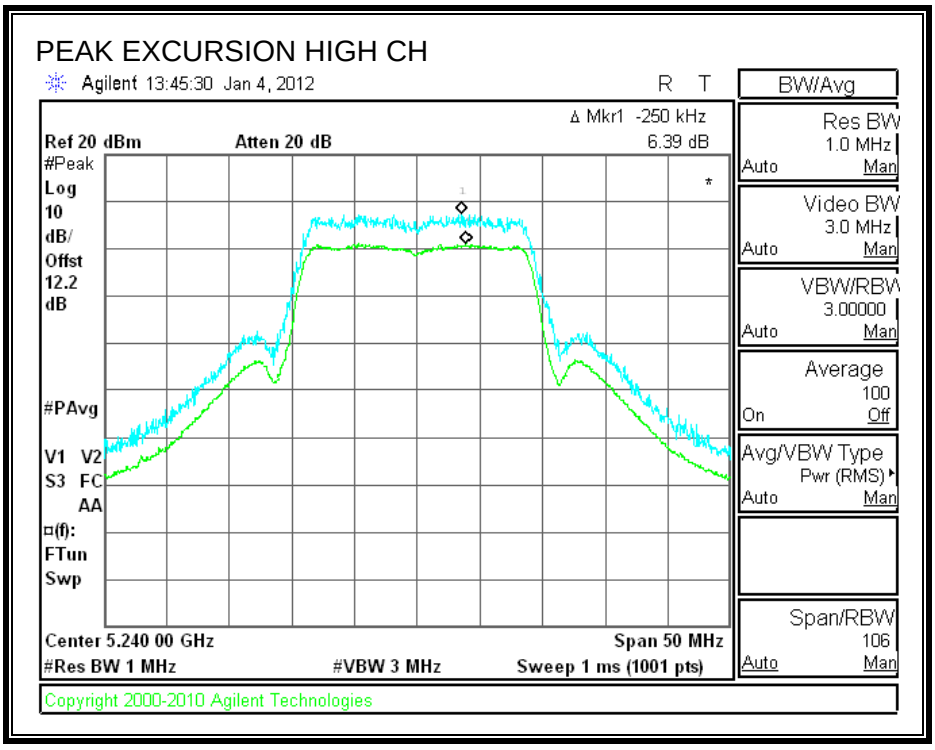


CHAIN 3

PEAK EXCURSION







7.8. 802.11n HT40 3TX MODE IN THE 5.2 GHz BAND, STBC MCS0

7.8.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	39.67	36.2286
High	5230	39.50	36.2279

CHAIN 2

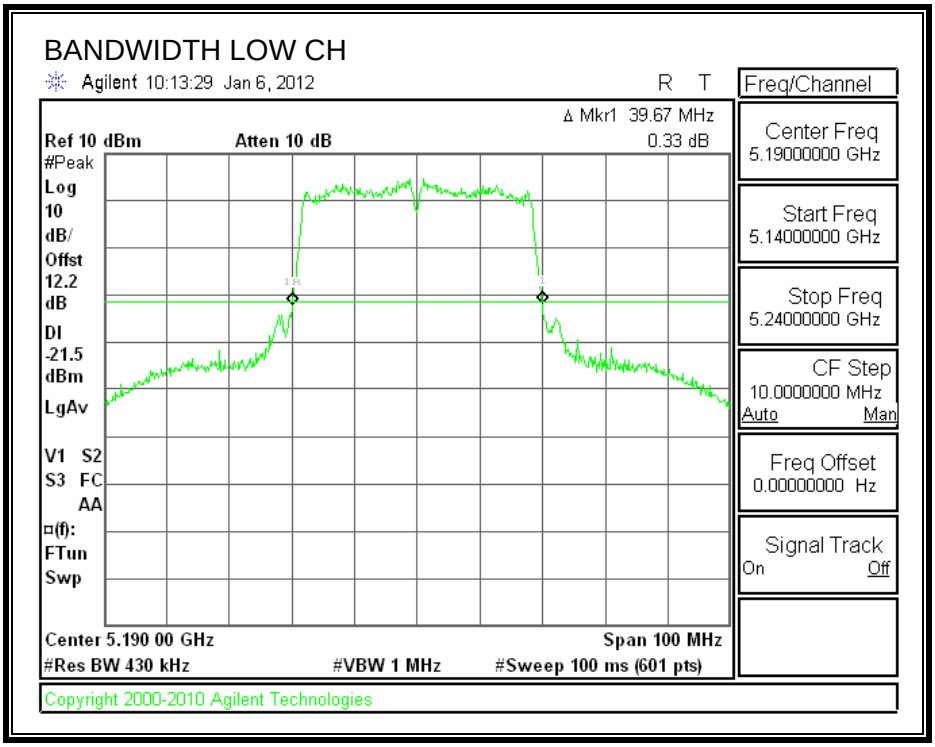
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	39.83	36.2288
High	5230	39.50	36.2468

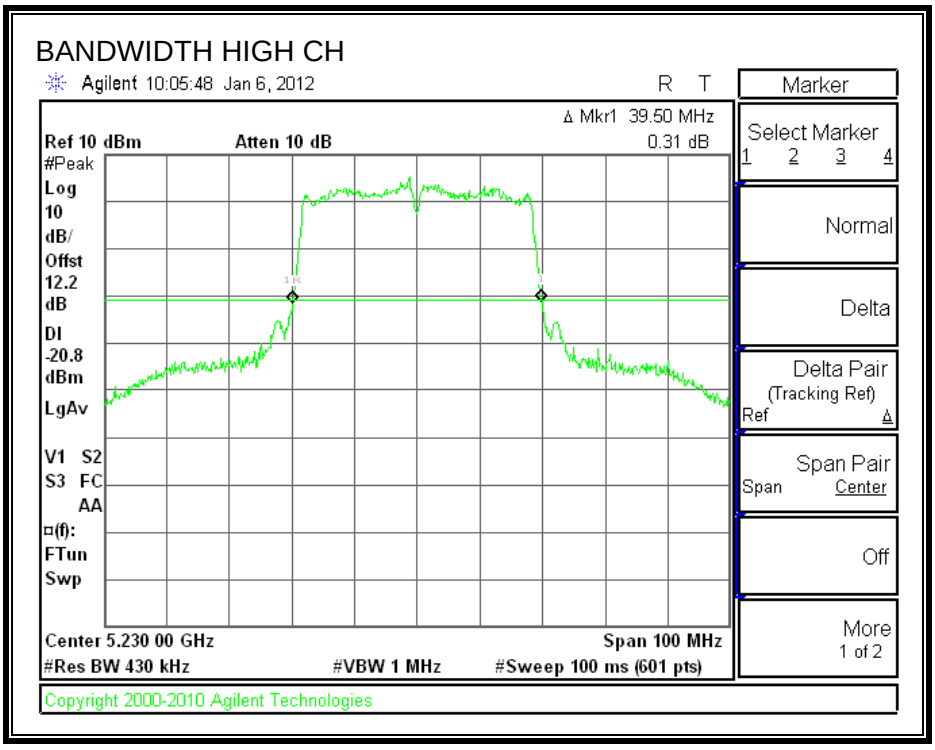
CHAIN 3

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	40.00	36.3127
High	5230	40.17	36.2411

CHAIN 1

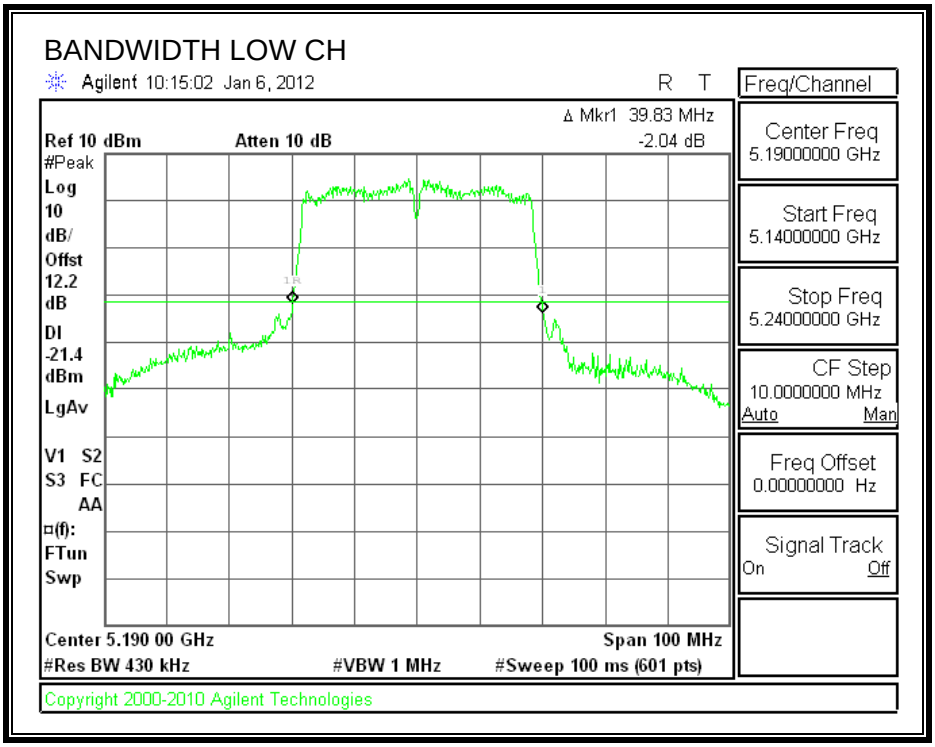
26 dB BANDWIDTH

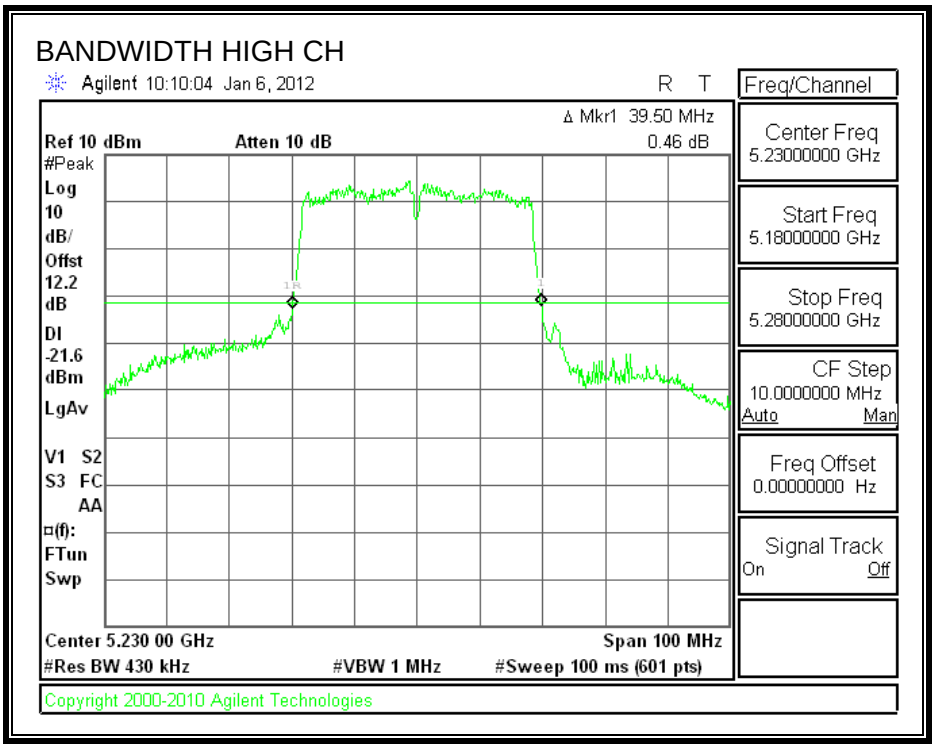




CHAIN 2

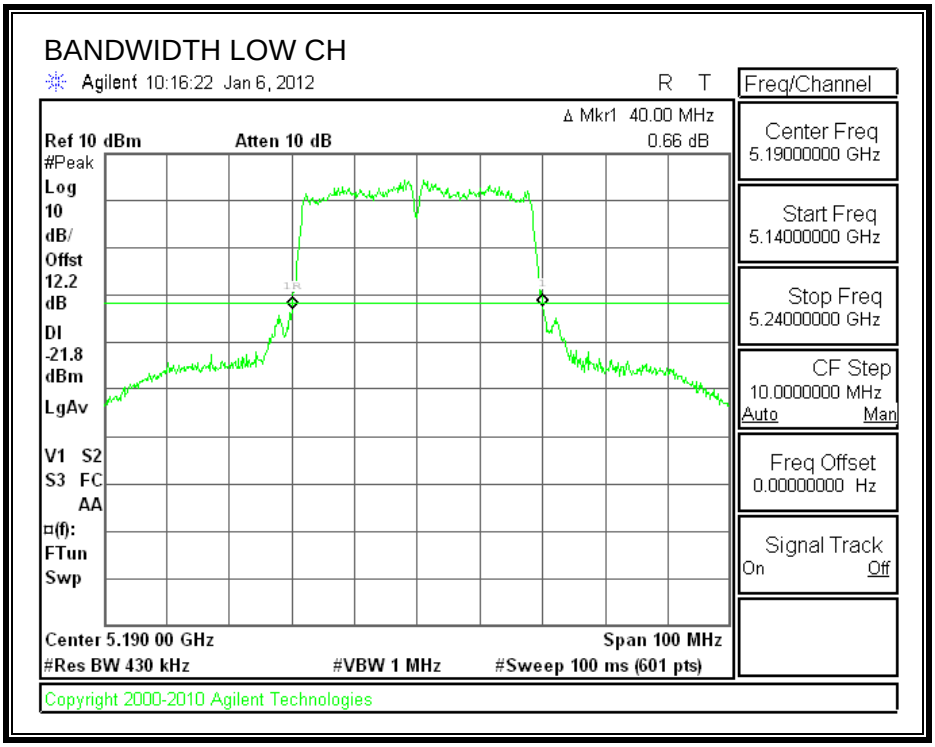
26 dB BANDWIDTH



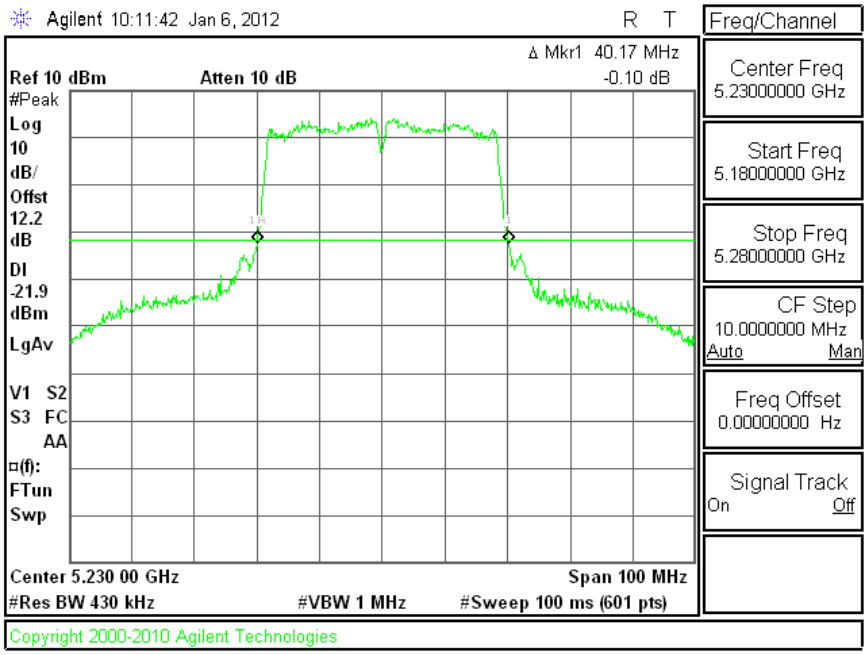


CHAIN 3

26 dB BANDWIDTH

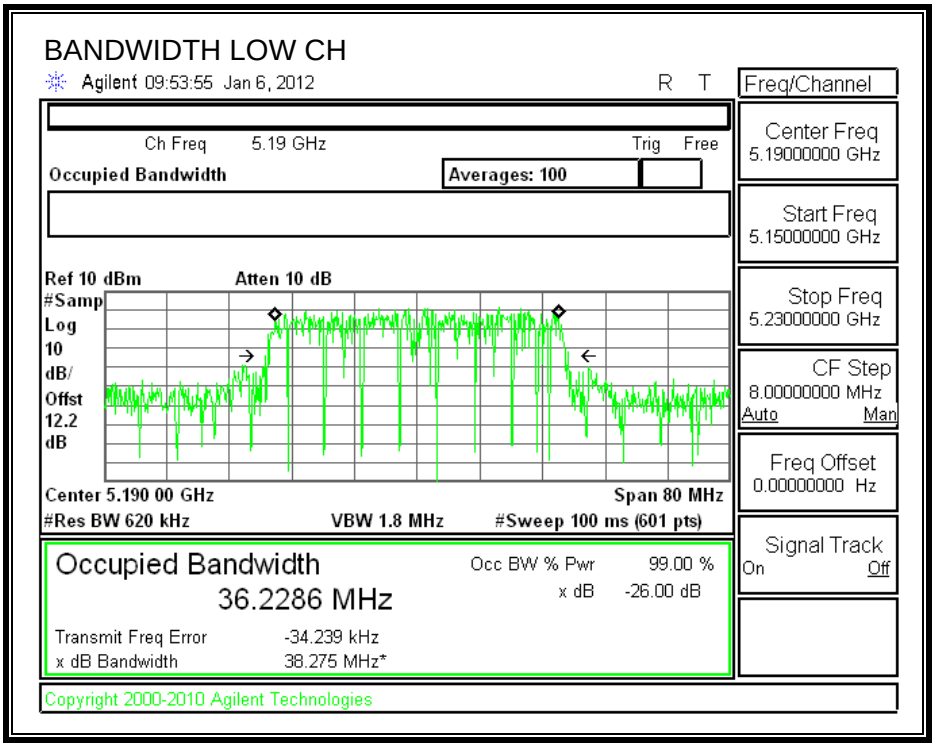


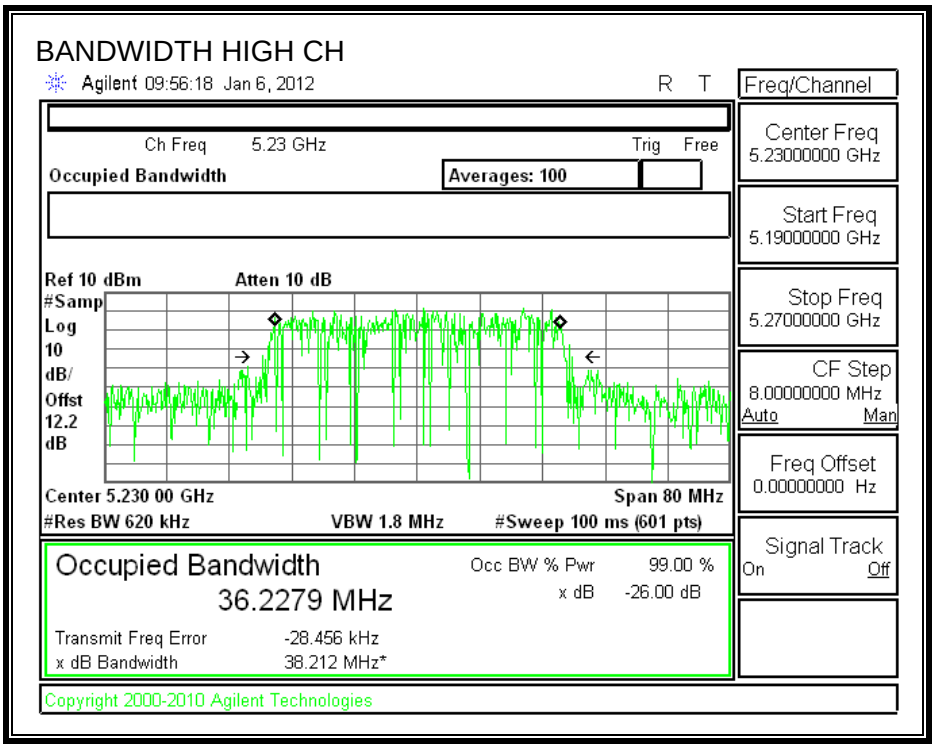
BANDWIDTH HIGH CH



CHAIN 1

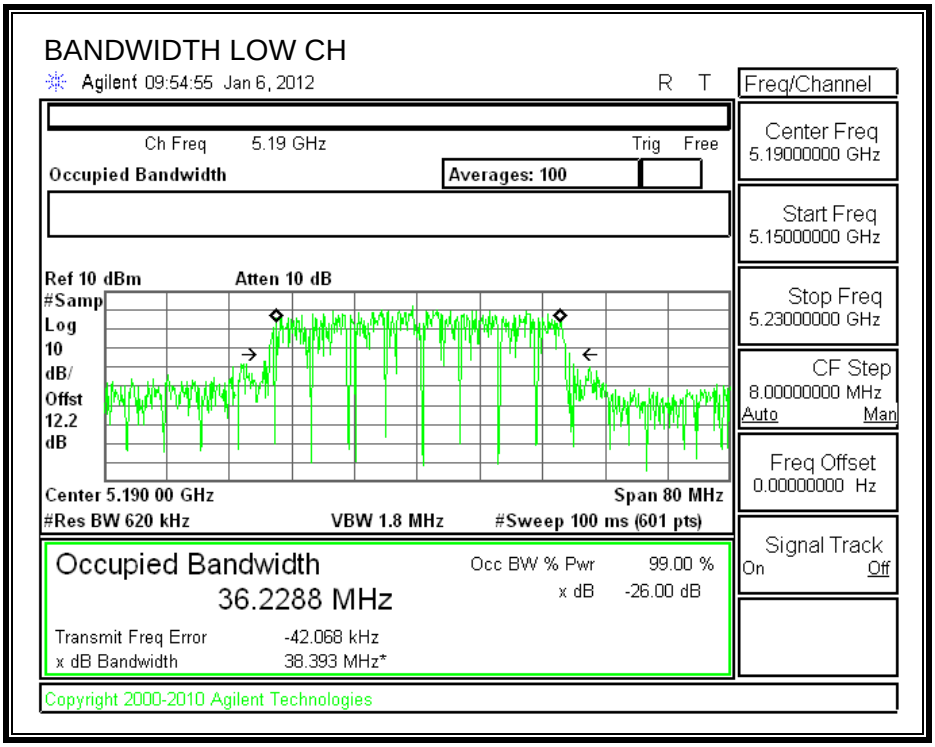
99% BANDWIDTH

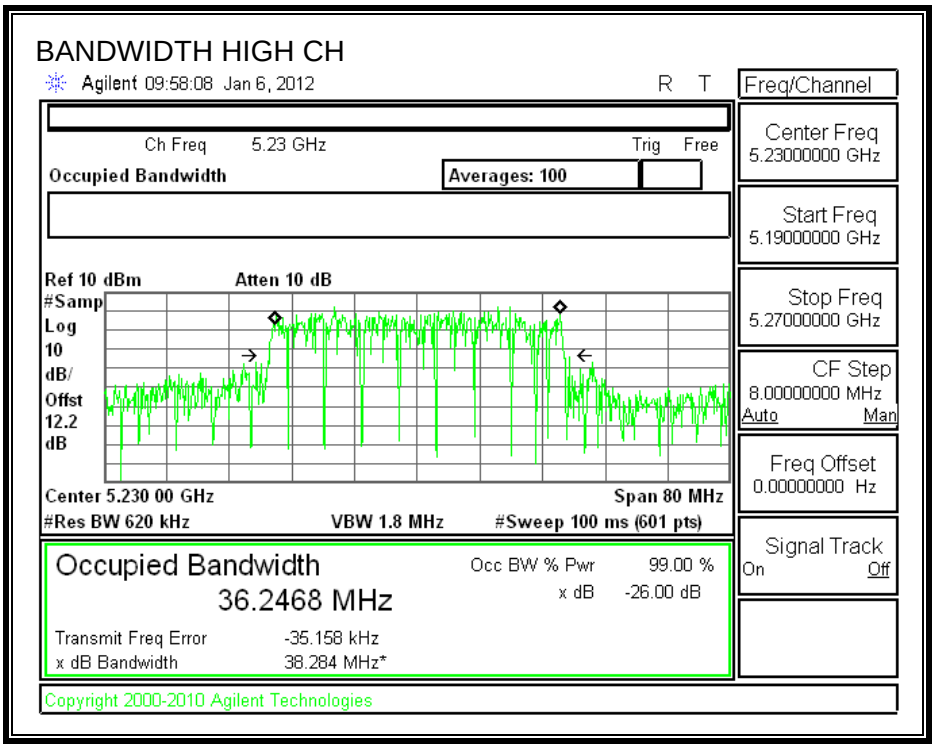




CHAIN 2

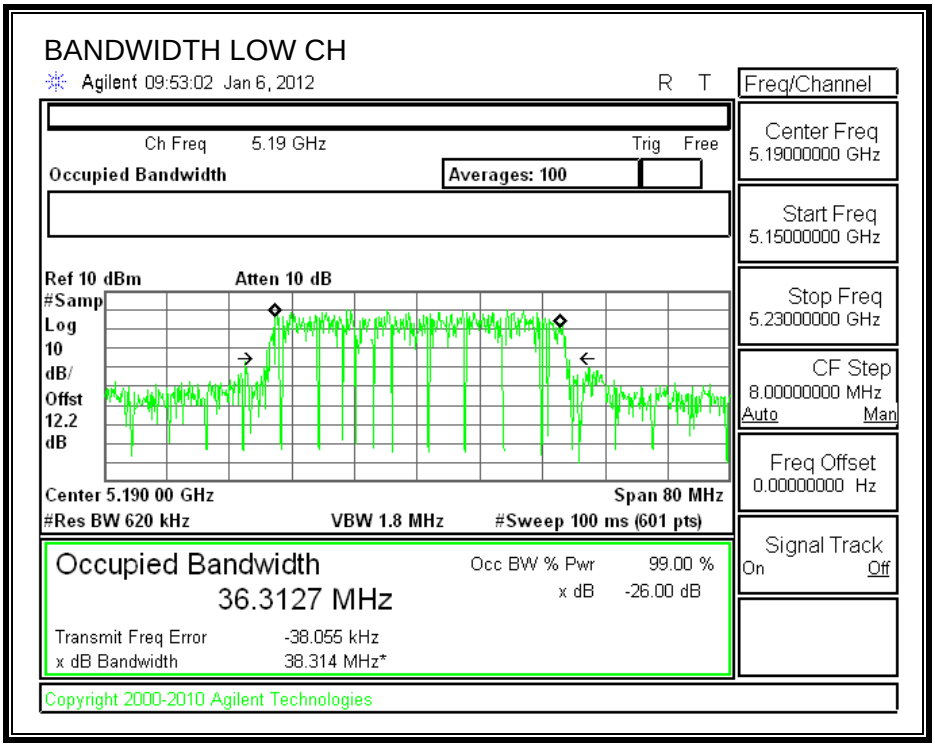
99% BANDWIDTH

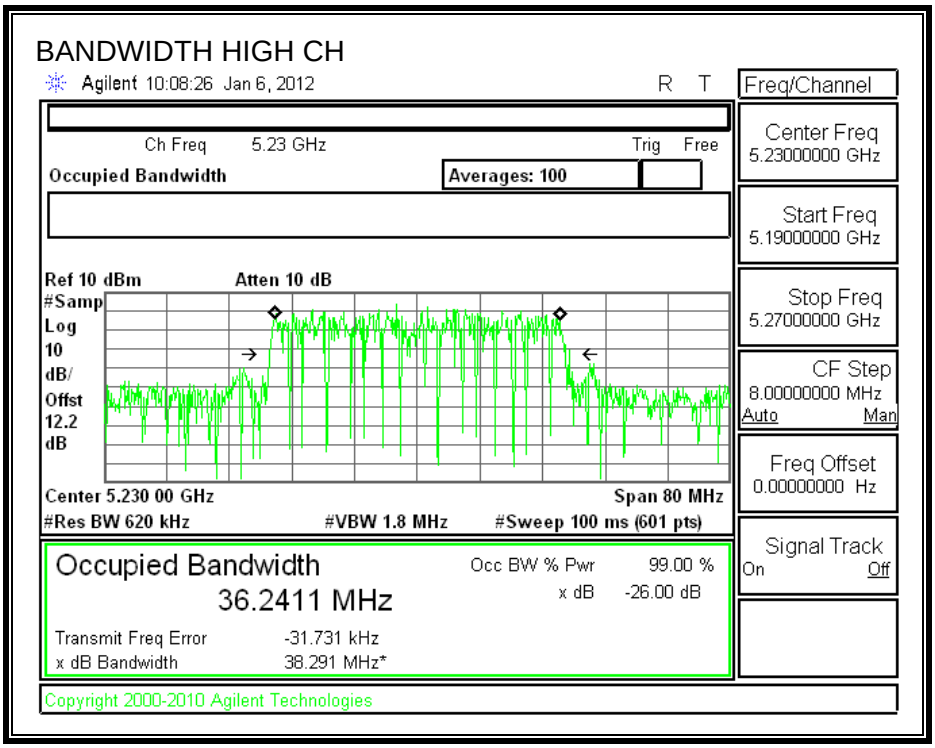




CHAIN 3

99% BANDWIDTH





7.8.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

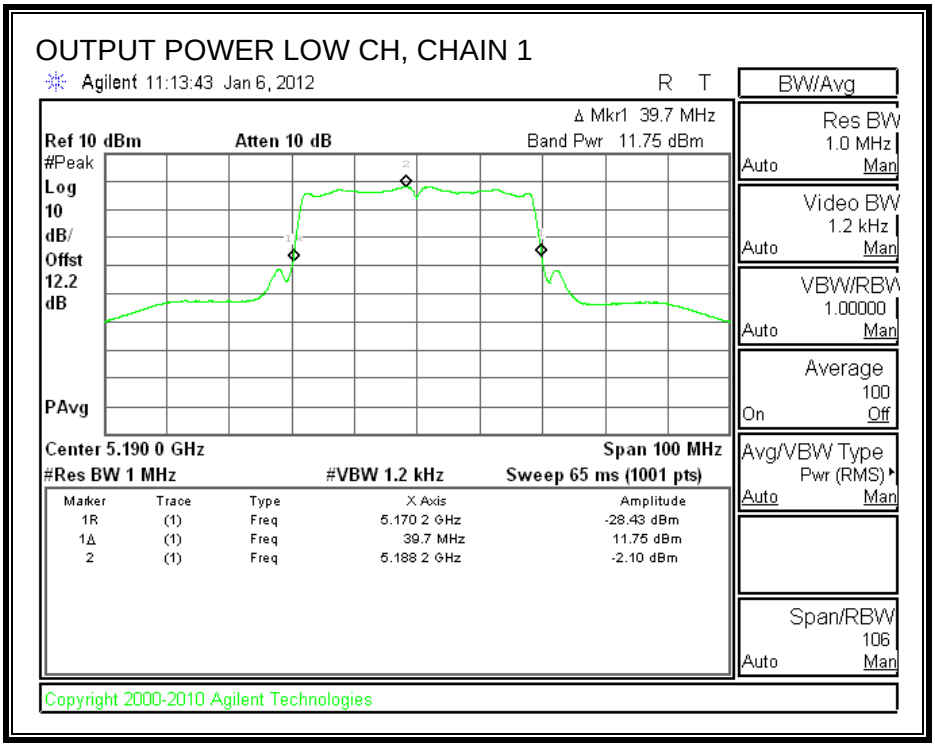
Limit

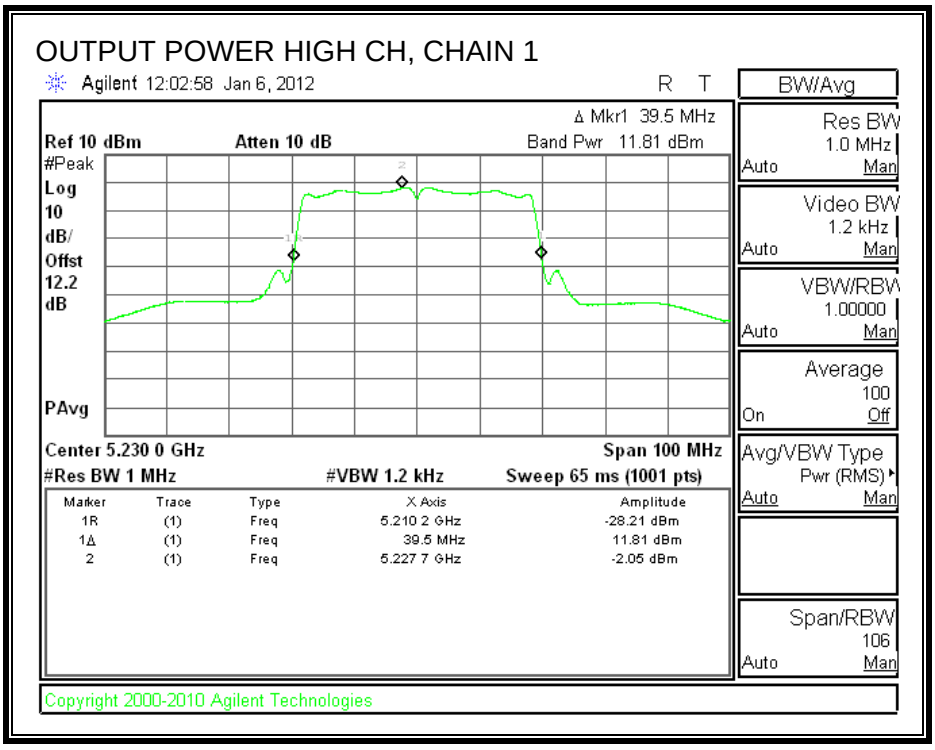
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	39.67	19.98	6.41	16.58
High	5230	16.99	39.50	19.97	6.41	16.58

Individual Chain Results

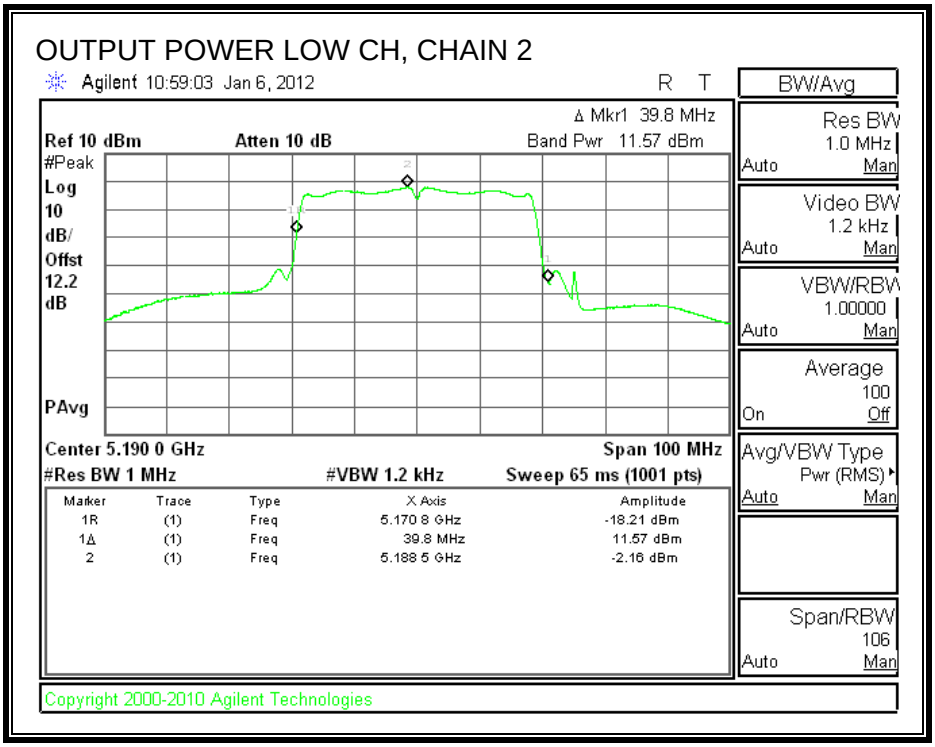
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	11.75	11.57	11.74	16.46	16.58	-0.12
High	5230	11.81	11.62	11.77	16.51	16.58	-0.07

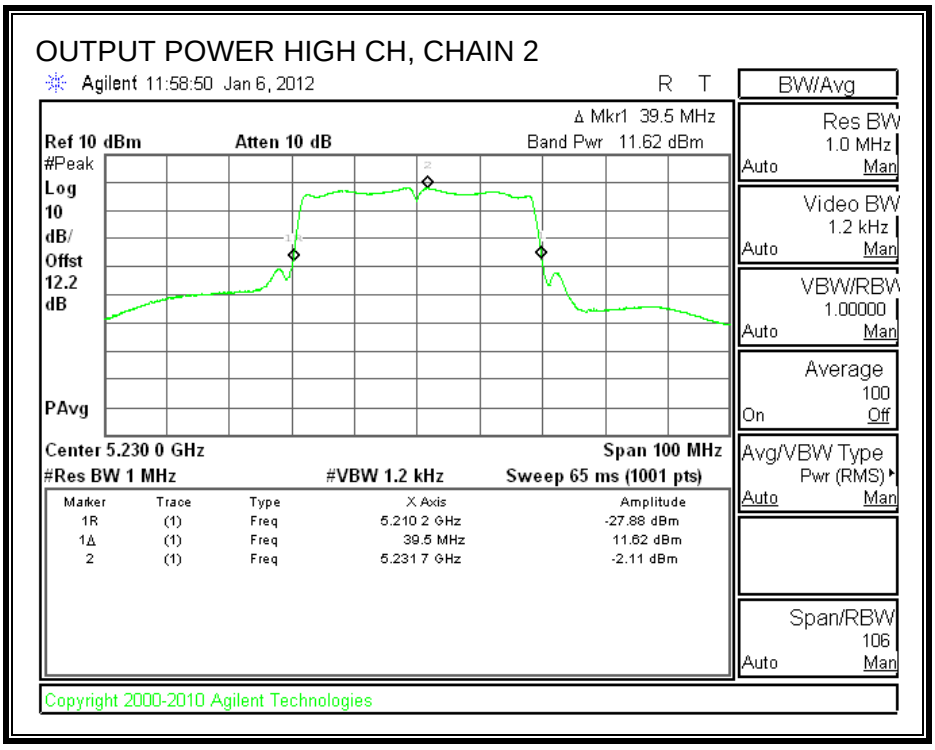
CHAIN 1 OUTPUT POWER



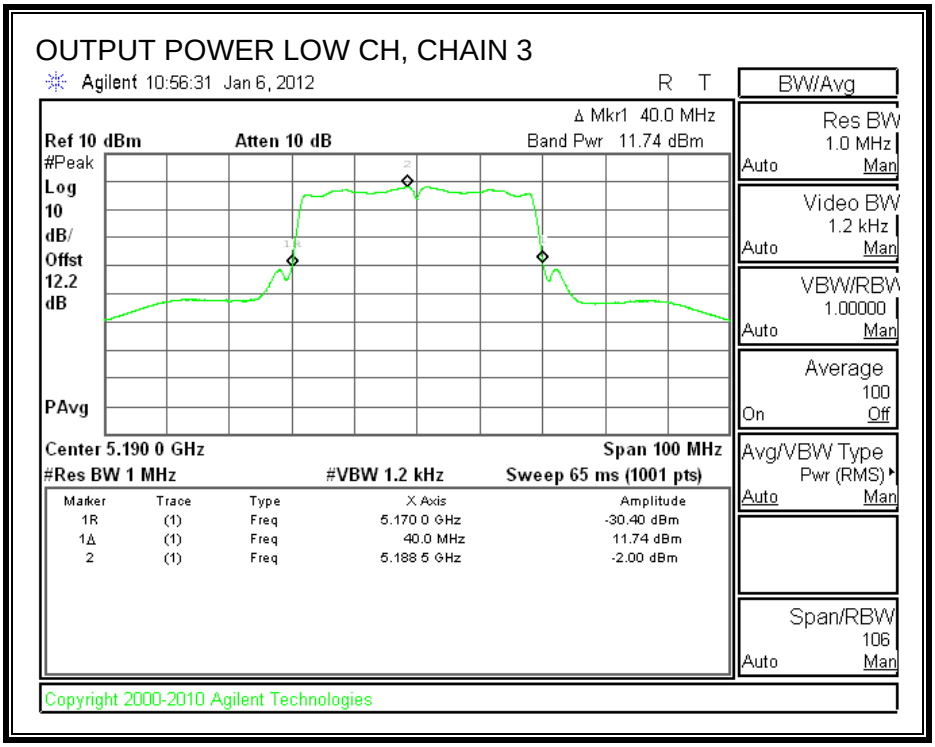


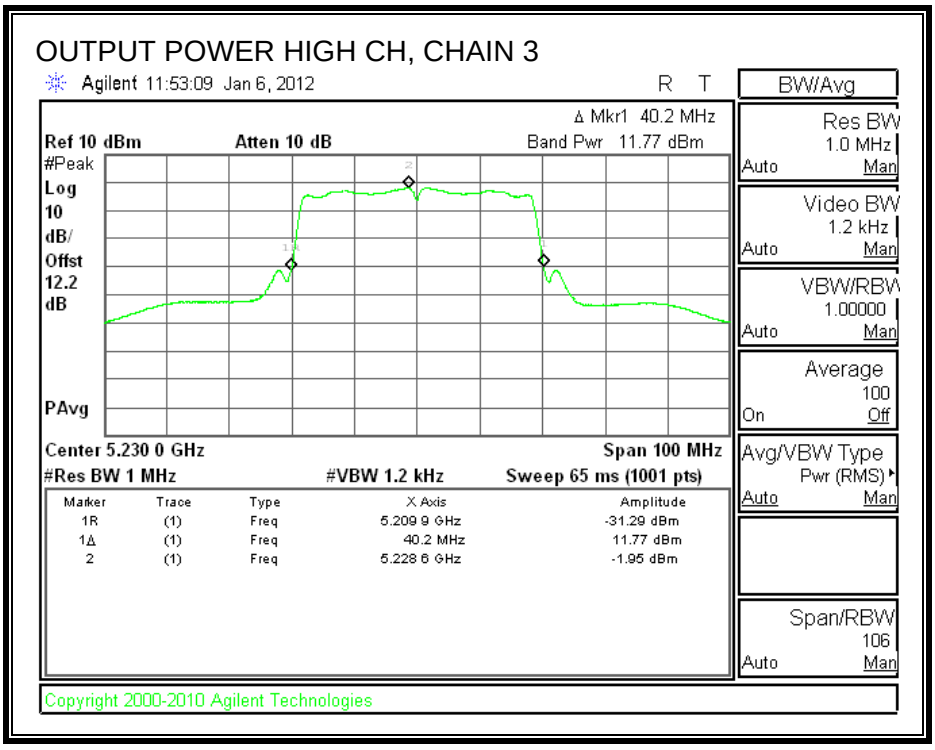
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5190	10.41	10.21	10.32	15.09
High	5230	10.33	10.03	10.53	15.07

7.8.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.41 dBi, therefore the limit is 3.59 dBm.

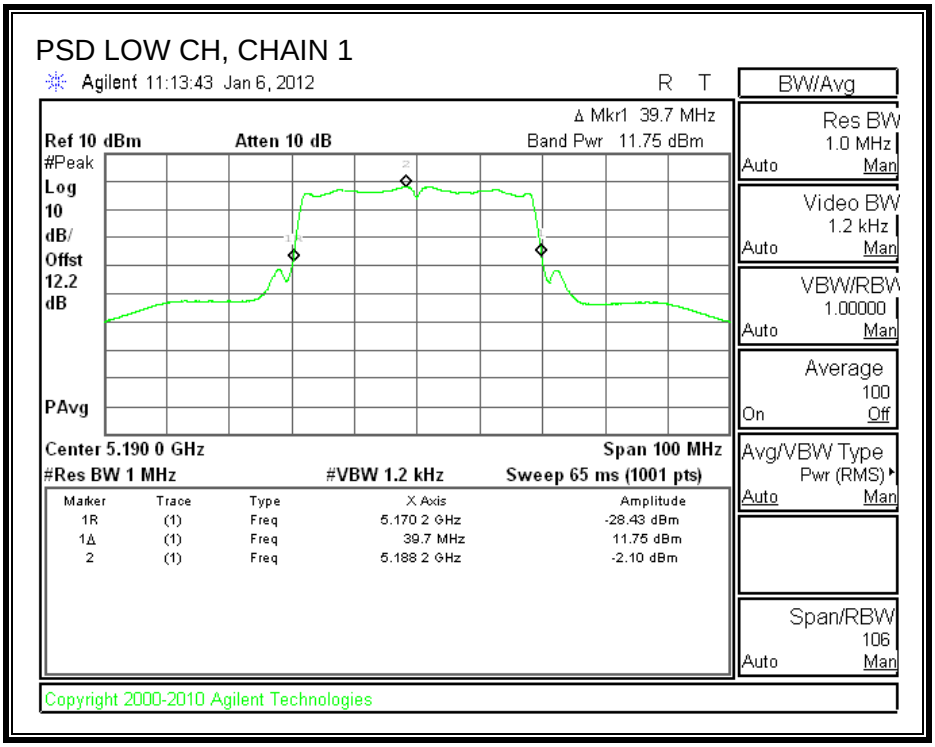
TEST PROCEDURE

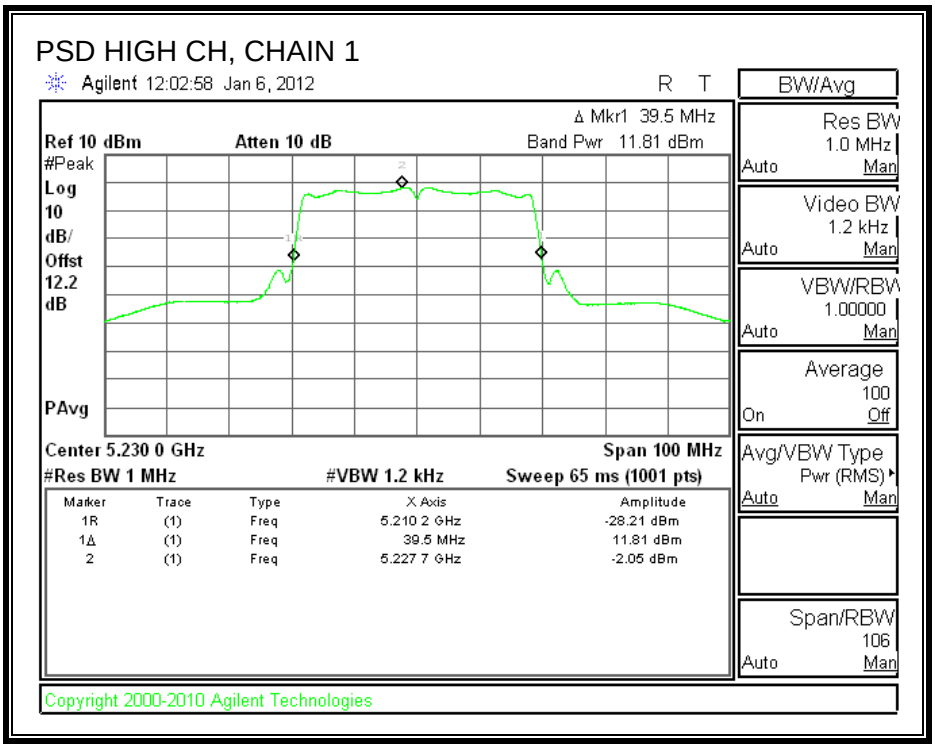
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

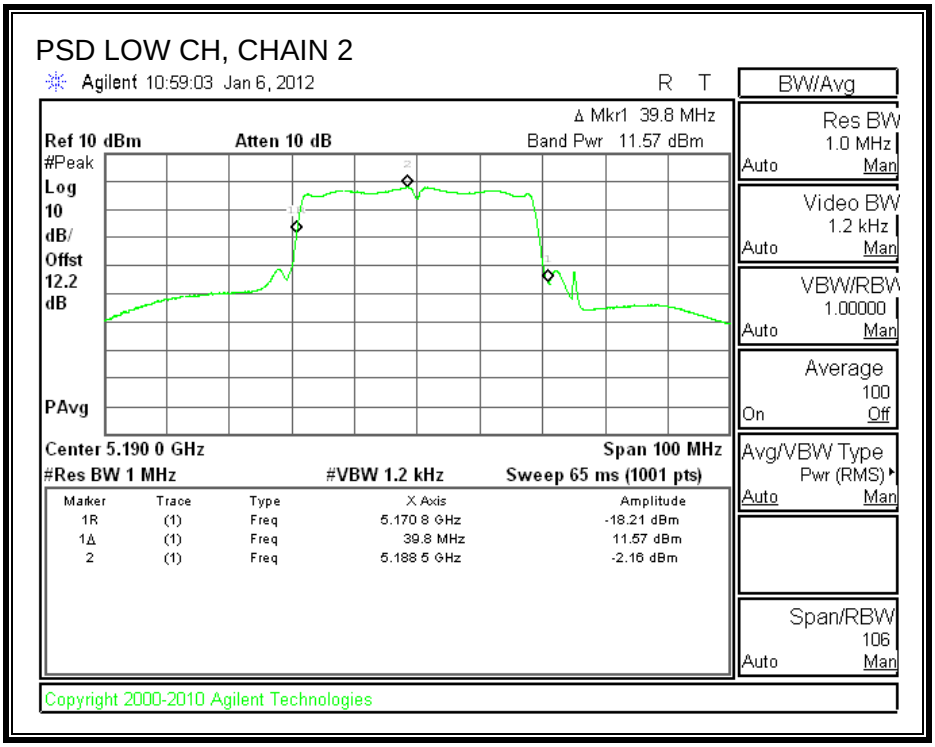
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5190	-2.10	-2.16	-2.00	2.69	3.59	-0.90
High	5230	-2.05	-2.11	-1.95	2.74	3.59	-0.85

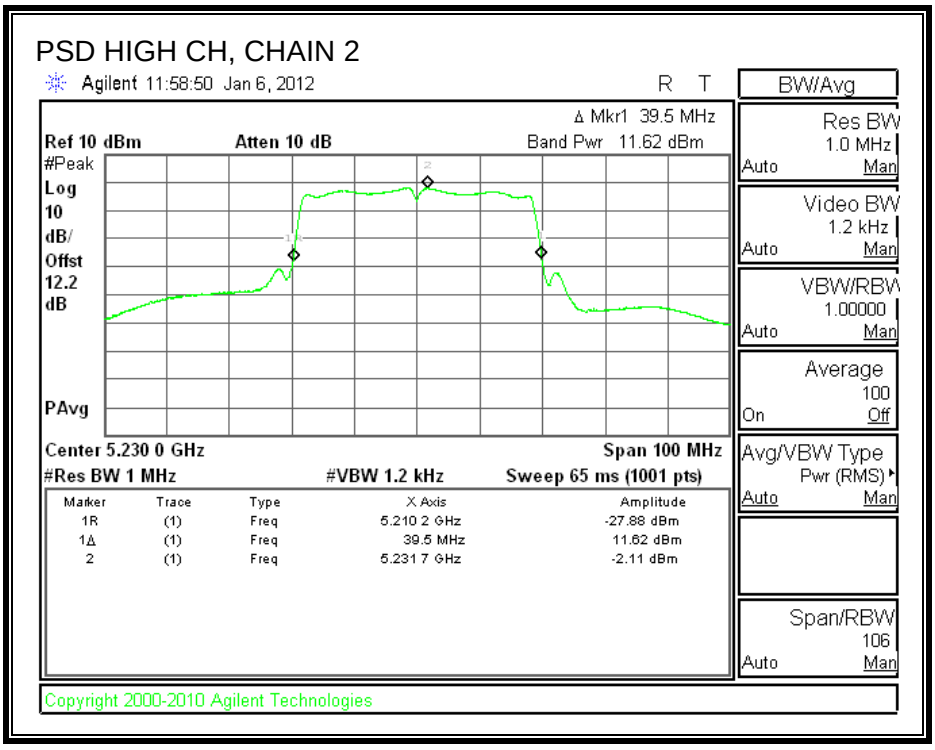
CHAIN 1 POWER SPECTRAL DENSITY



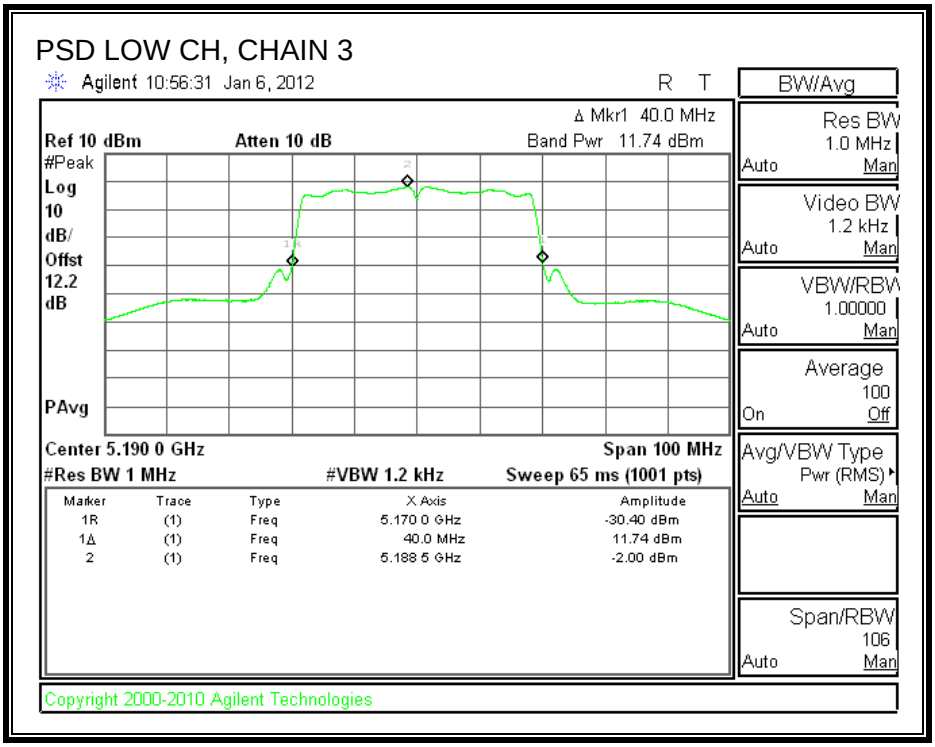


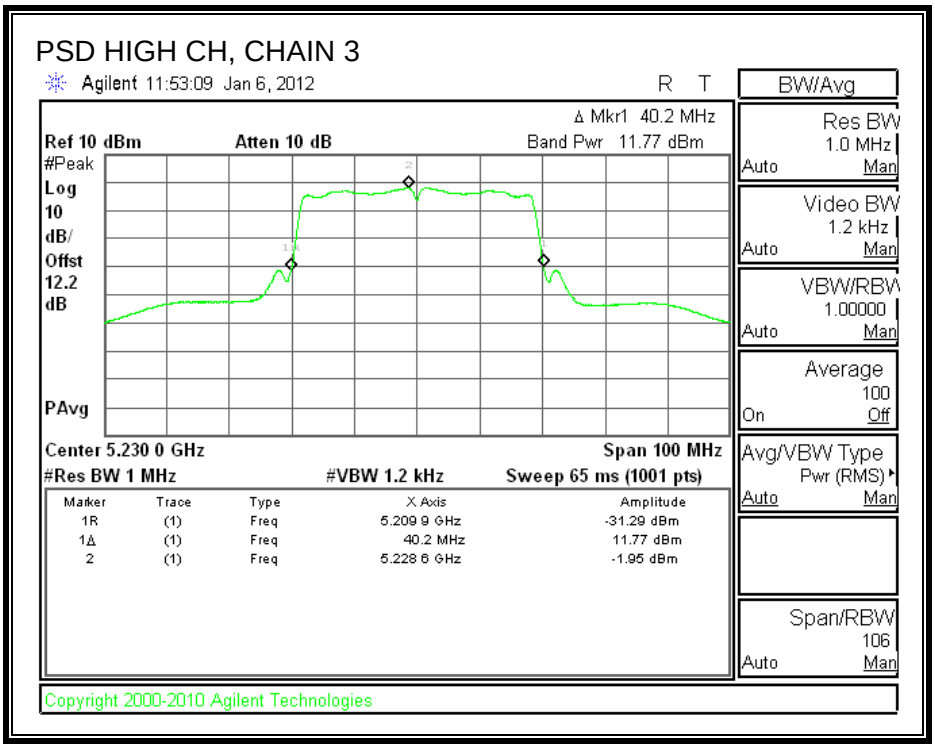
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.8.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	7.88	13	-5.12
High	5230	7.83	13	-5.17

CHAIN 2

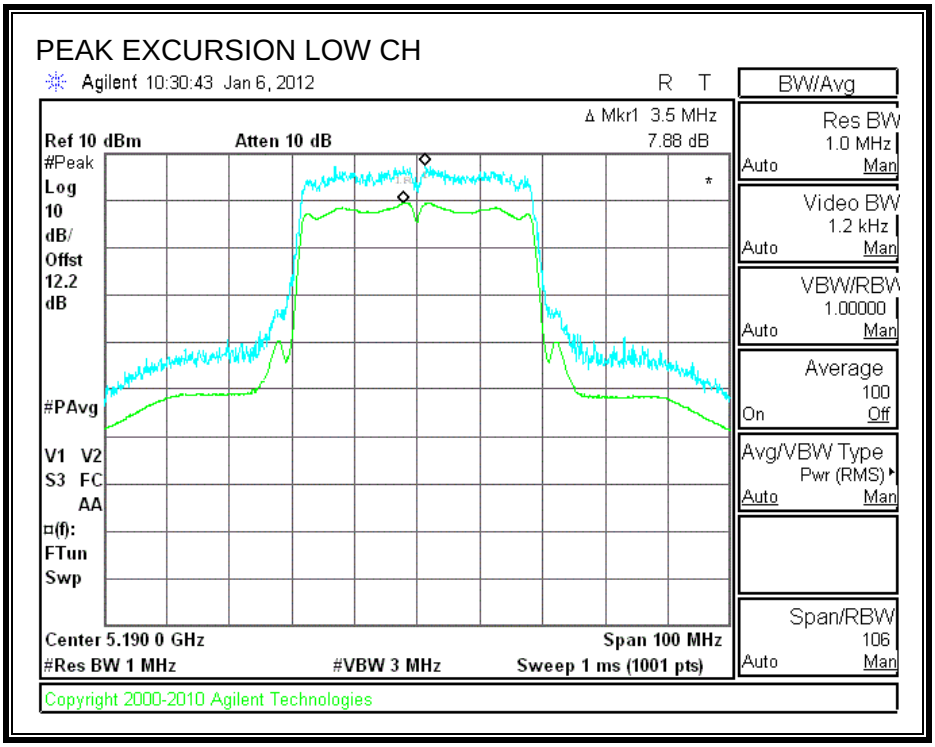
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	7.32	13	-5.68
High	5230	7.53	13	-5.47

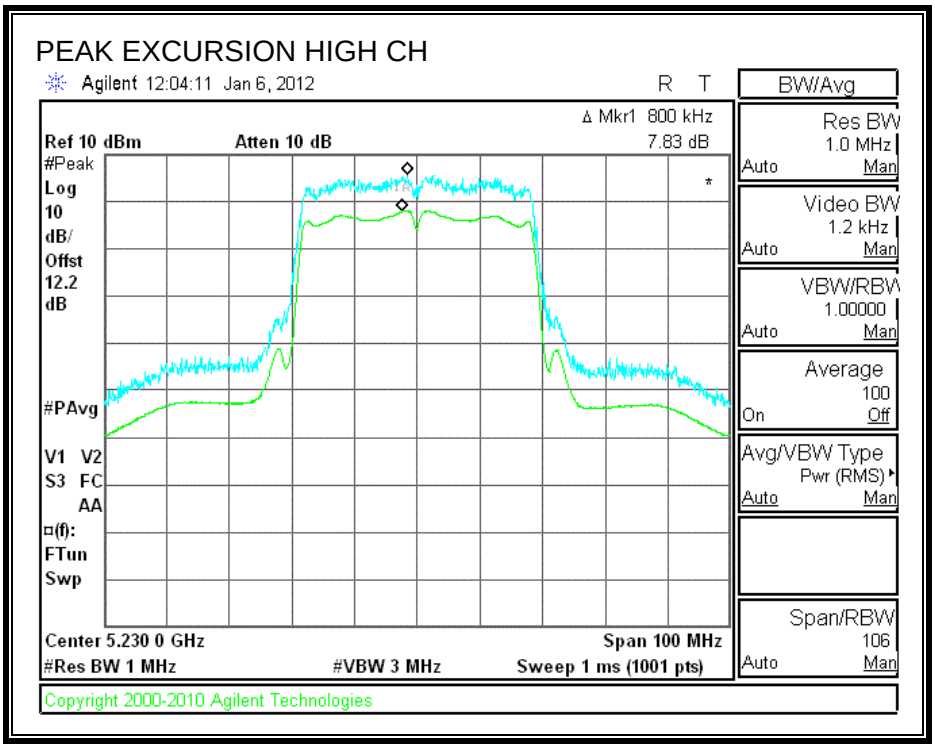
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	7.84	13	-5.16
High	5230	8.24	13	-4.76

CHAIN 1

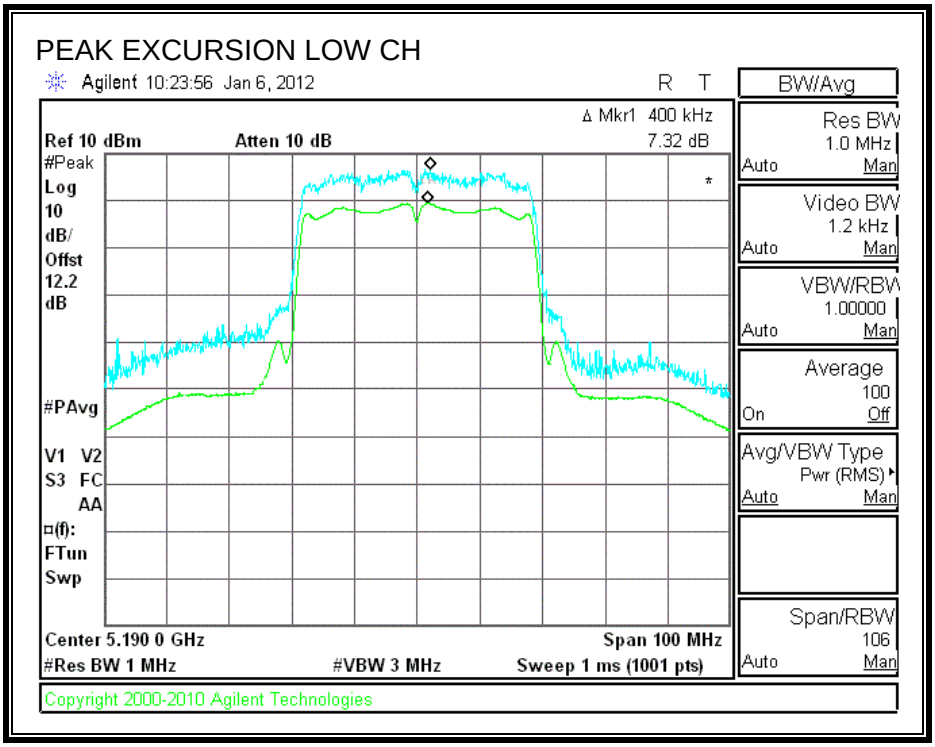
PEAK EXCURSION

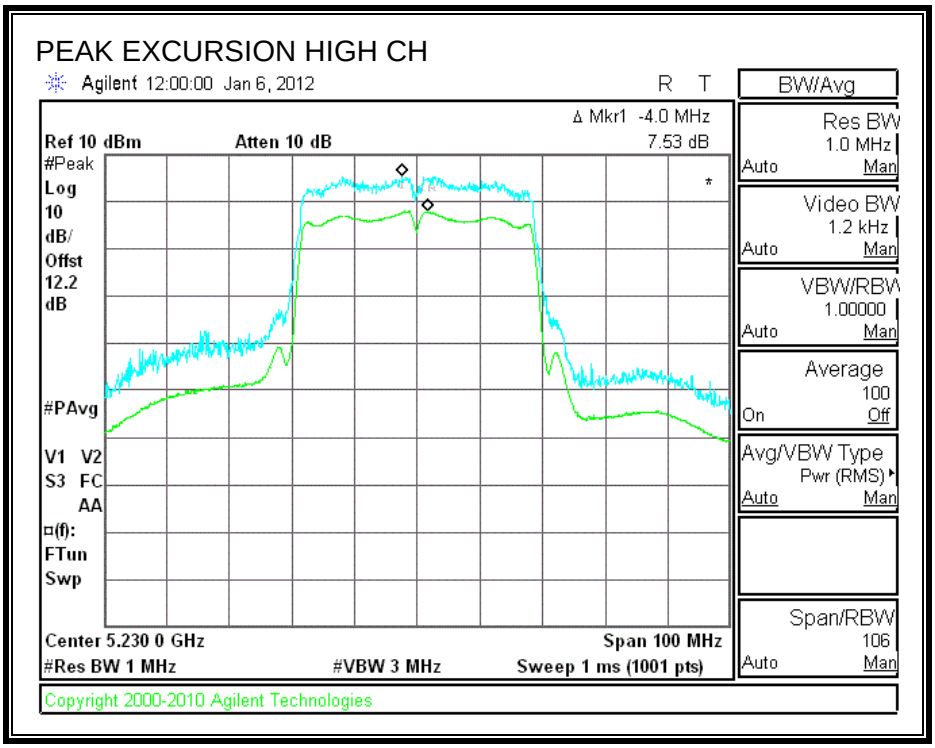




CHAIN 2

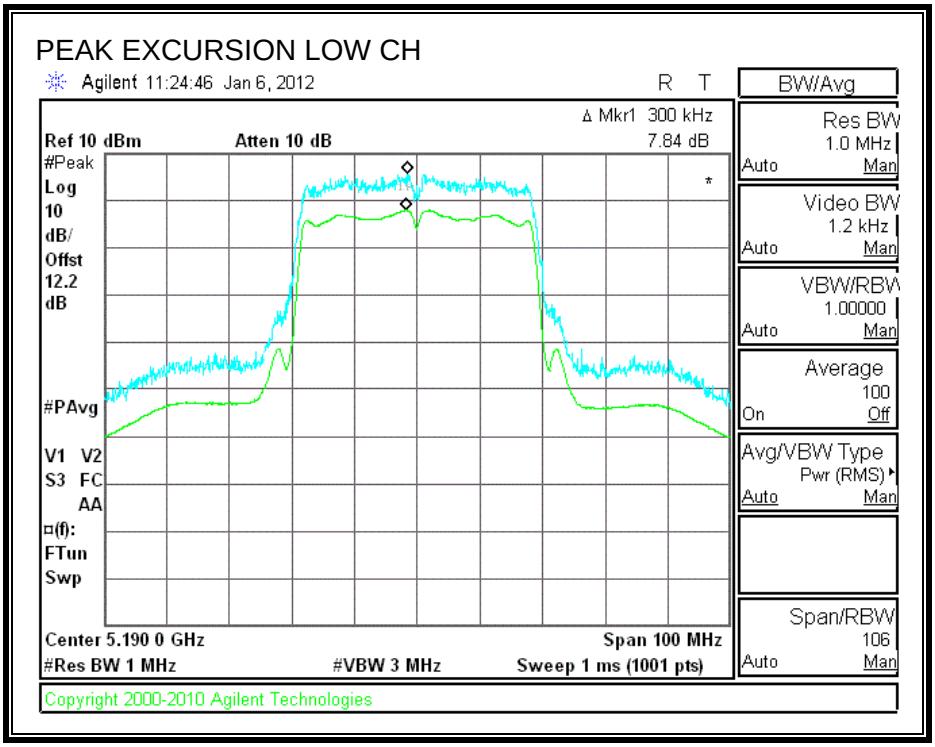
PEAK EXCURSION



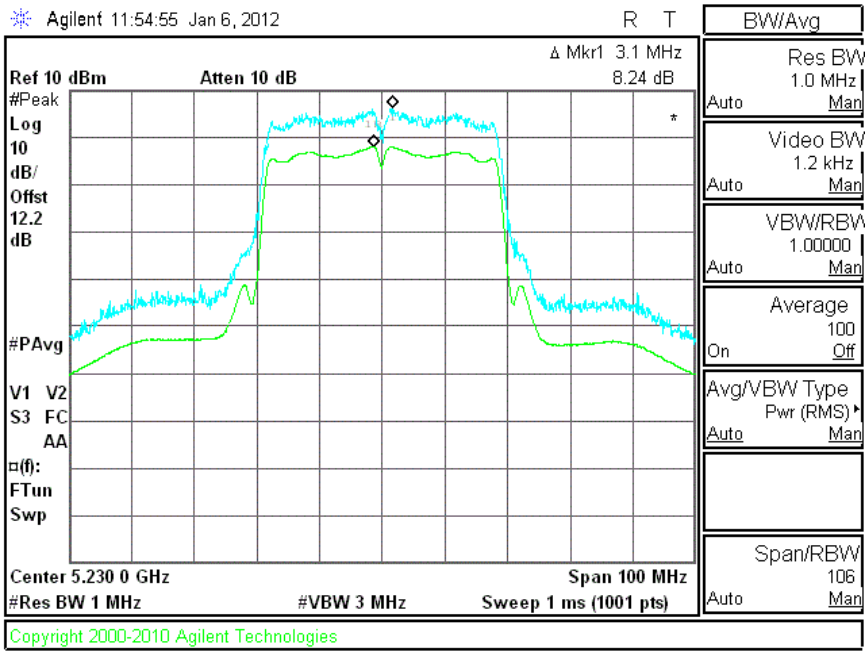


CHAIN 3

PEAK EXCURSION



PEAK EXCURSION HIGH CH



7.9. 802.11n HT40 3TX MODE IN THE 5.2 GHz BAND, SDM MCS21

7.9.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	39.5	36.2174
High	5230	39.6	36.2136

CHAIN 2

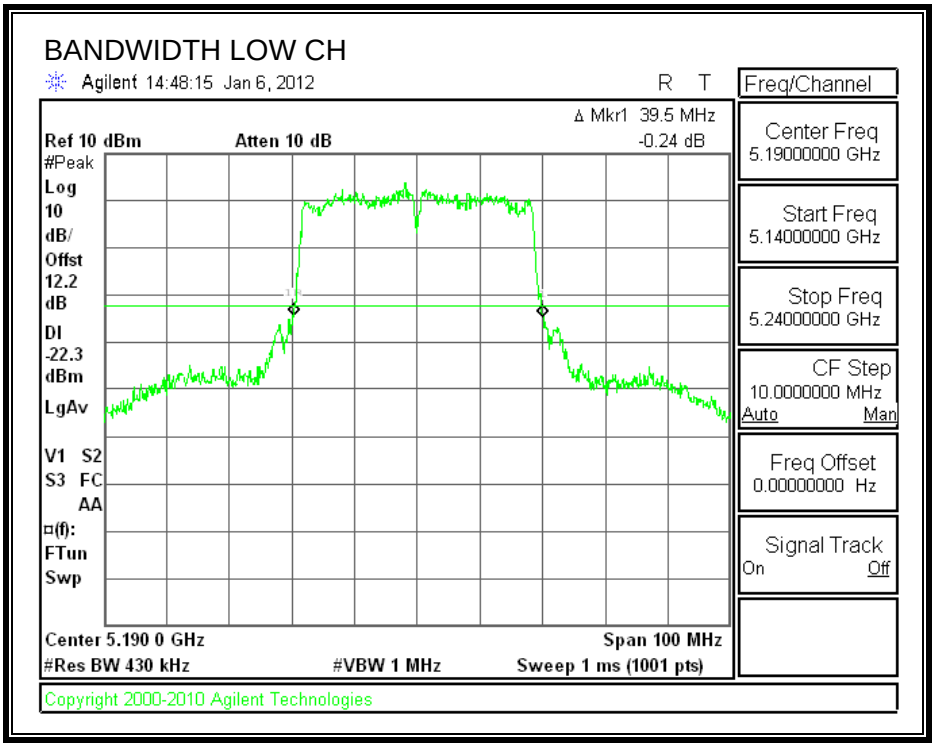
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	39.5	36.6217
High	5230	39.6	36.2514

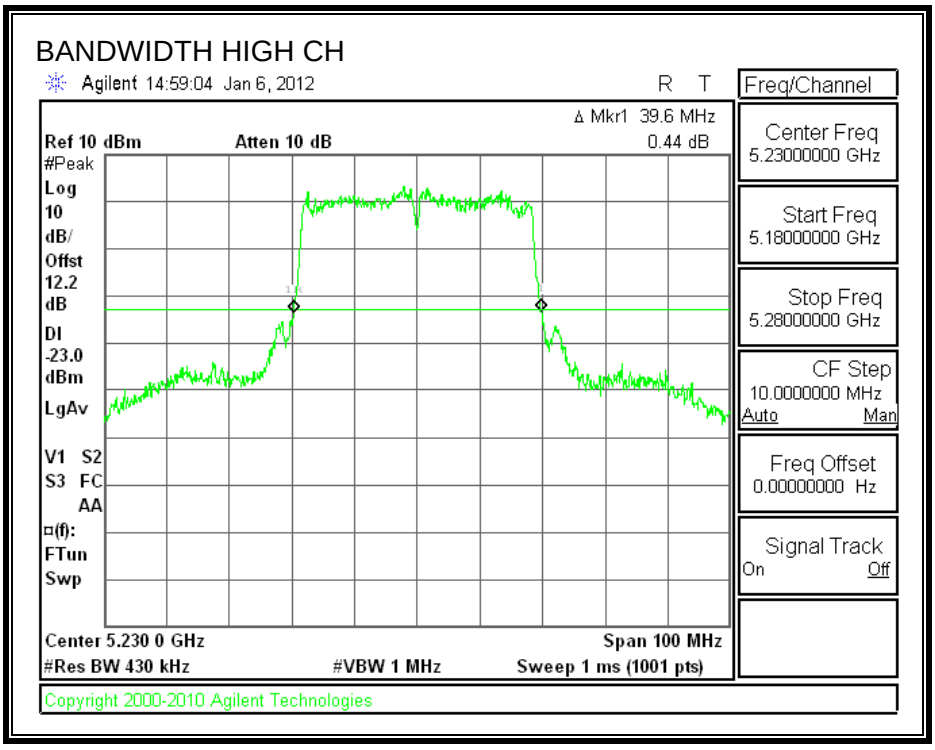
CHAIN 3

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	39.5	36.2209
High	5230	39.6	36.2012

CHAIN 1

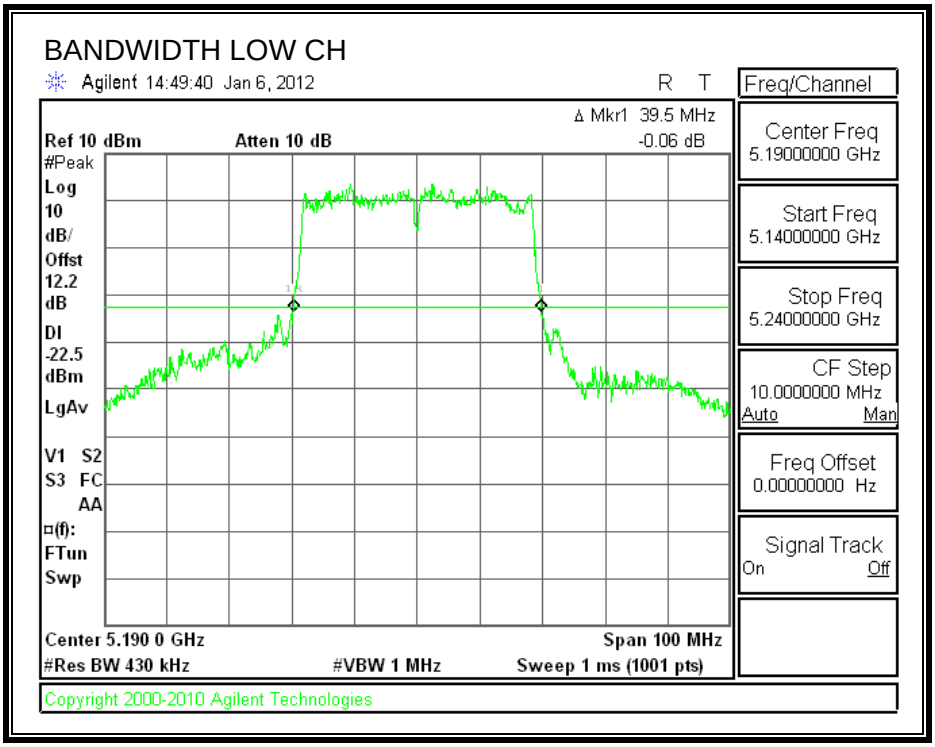
26 dB BANDWIDTH



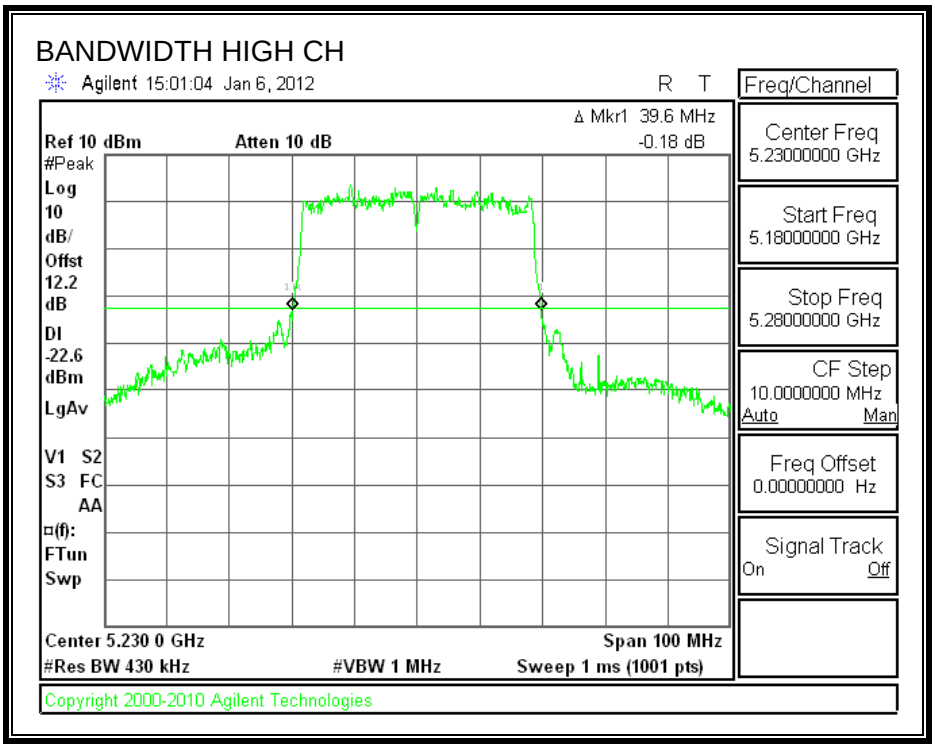


CHAIN 2

26 dB BANDWIDTH

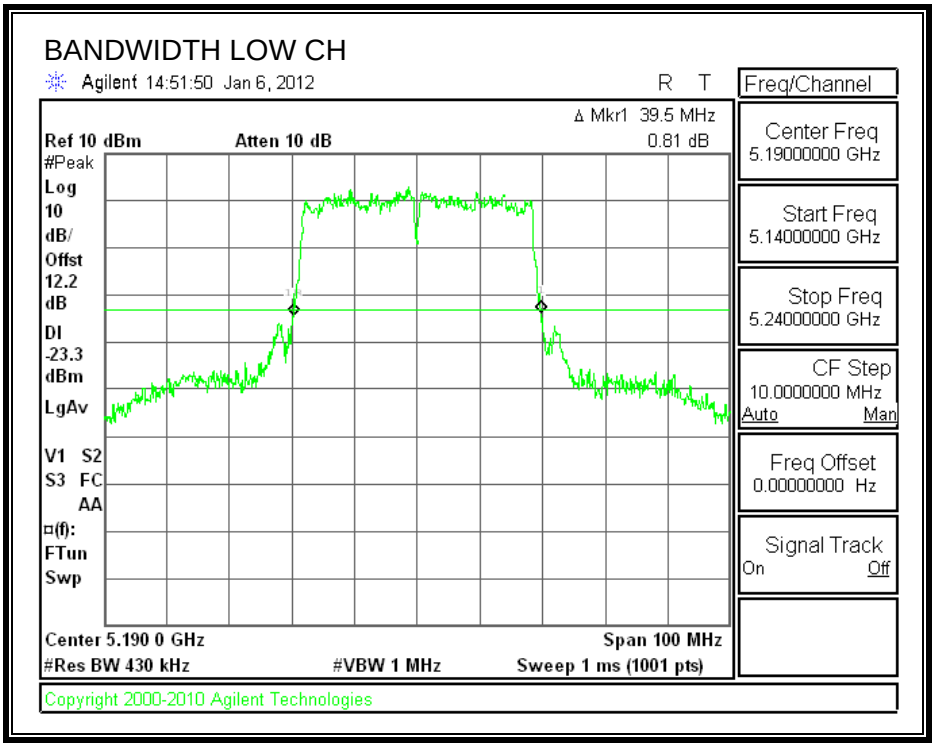


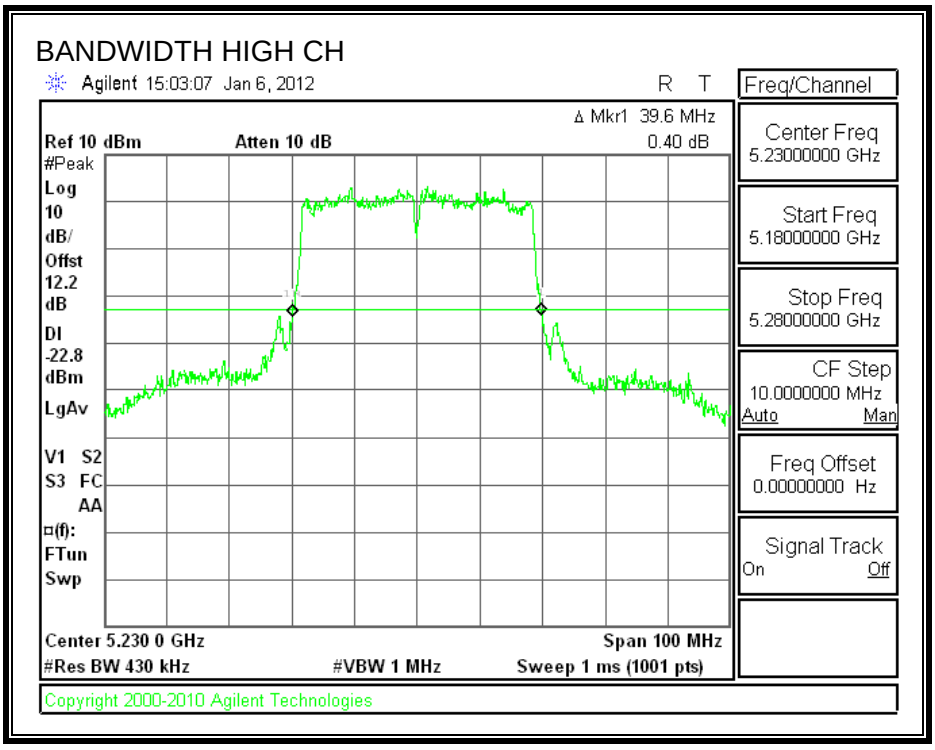
BANDWIDTH HIGH CH



CHAIN 3

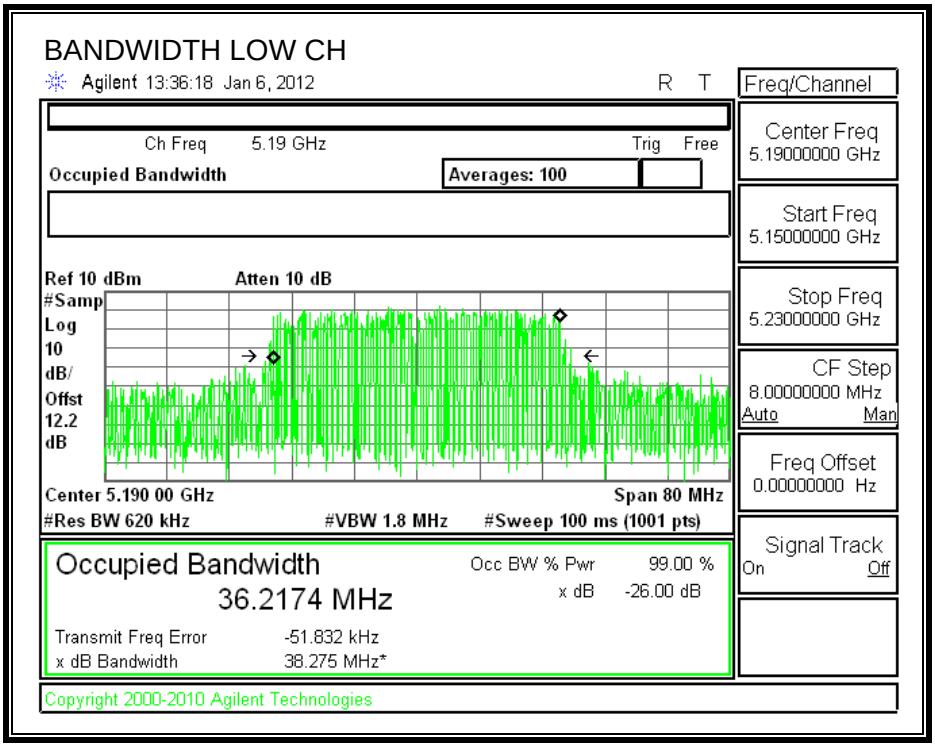
26 dB BANDWIDTH

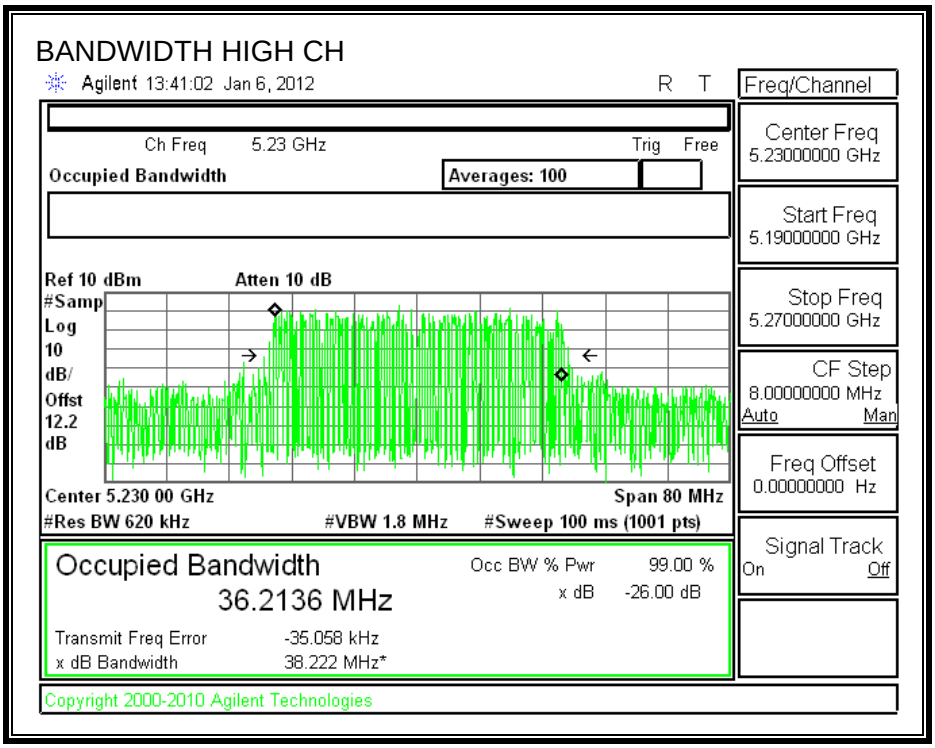




CHAIN 1

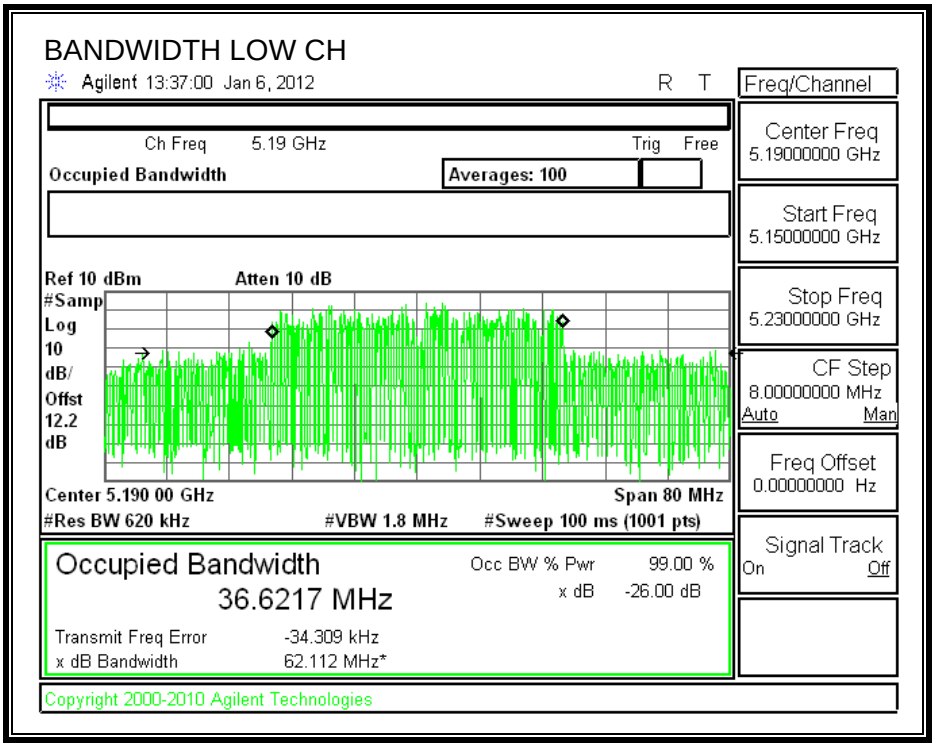
99% BANDWIDTH

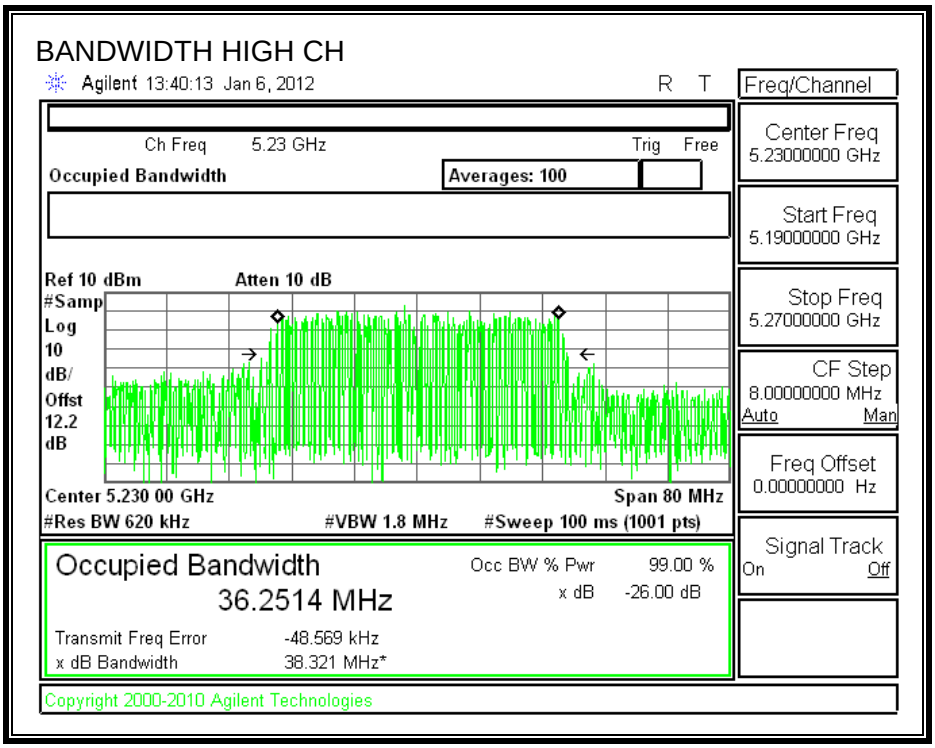




CHAIN 2

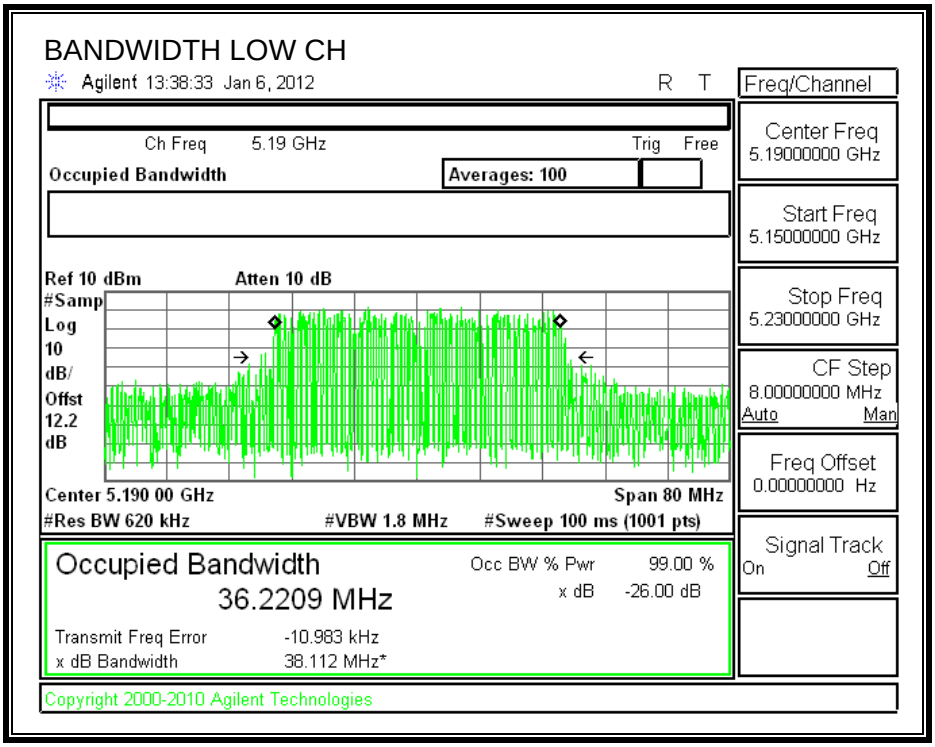
99% BANDWIDTH

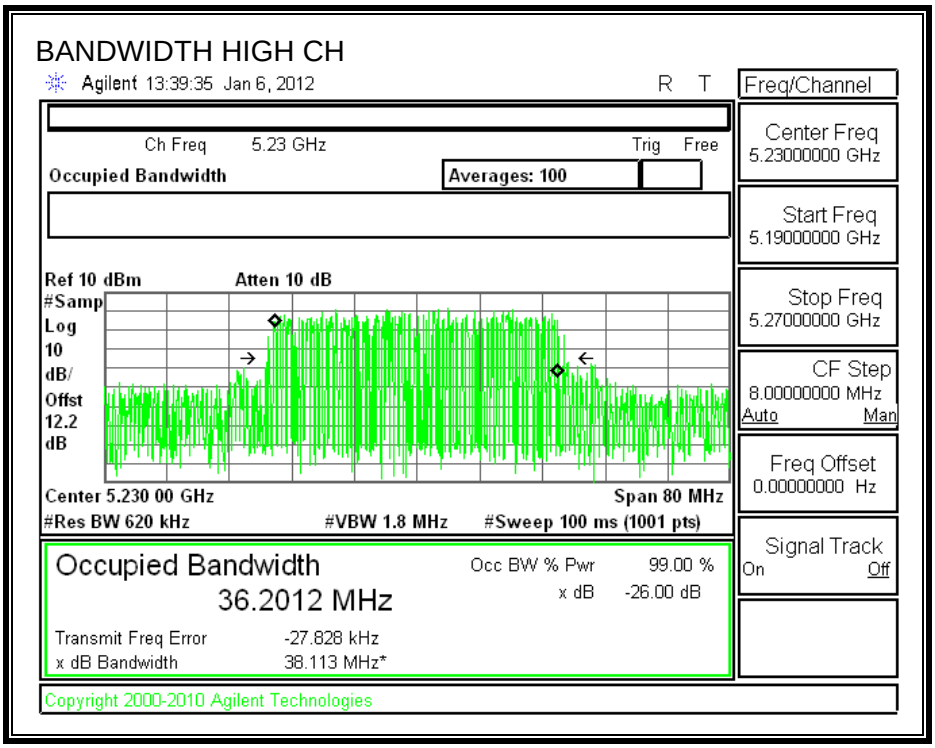




CHAIN 3

99% BANDWIDTH





7.9.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

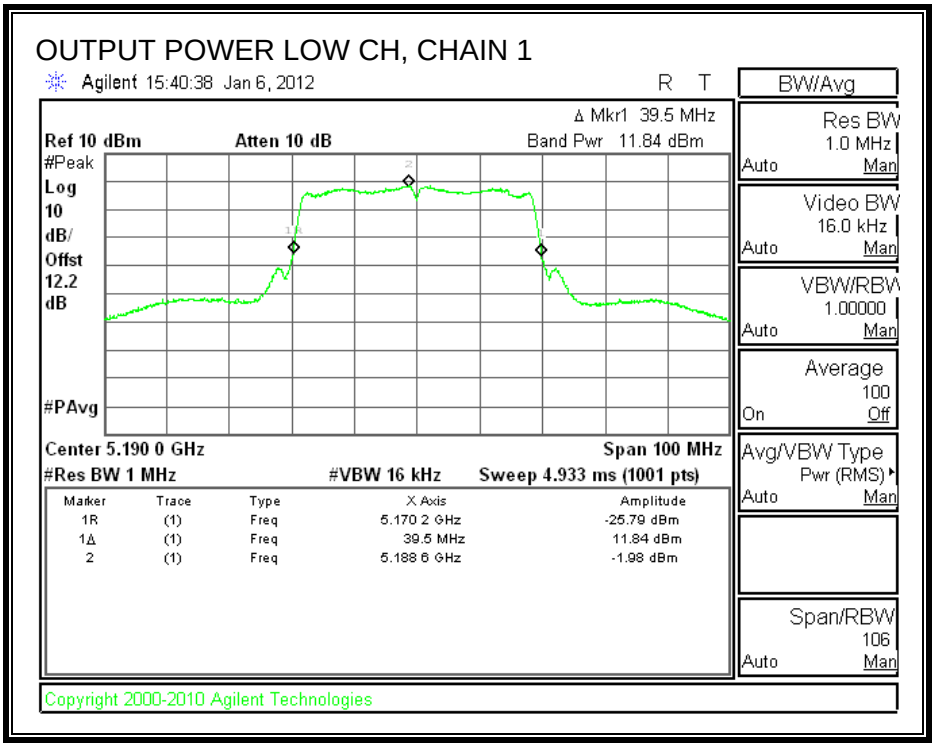
Limit

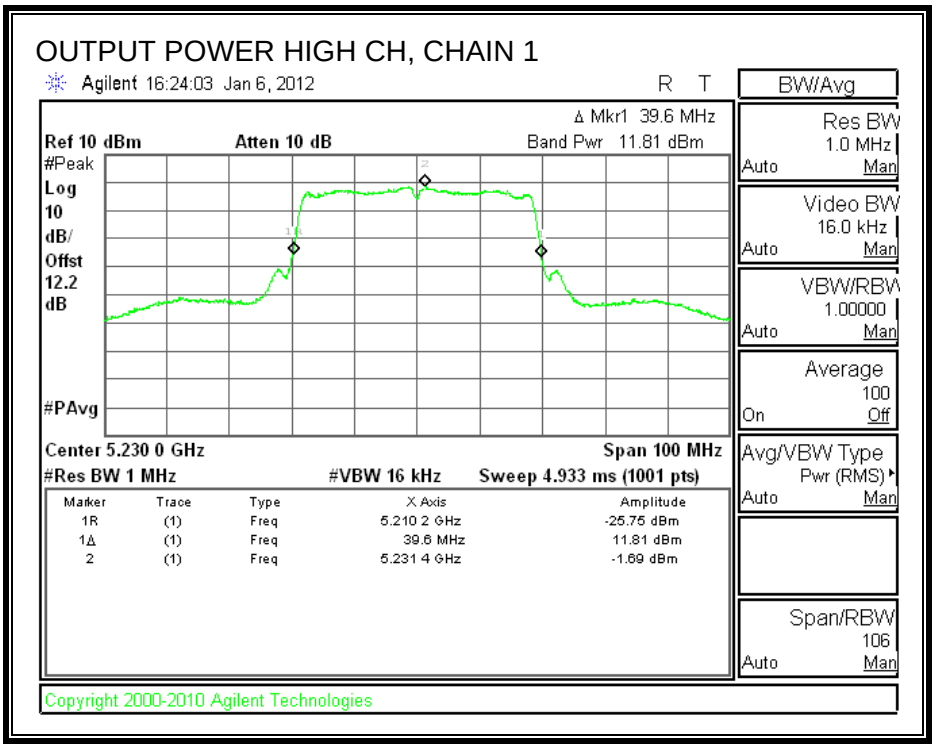
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	16.99	39.5	19.97	6.41	16.58
High	5230	16.99	39.6	19.98	6.41	16.58

Individual Chain Results

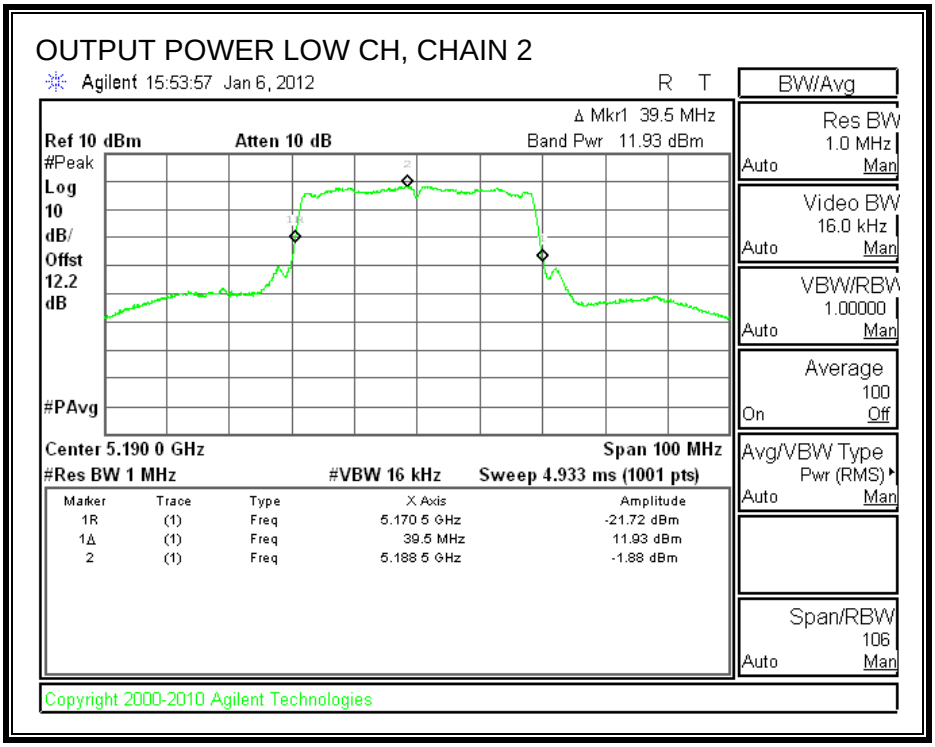
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	11.84	11.93	11.50	16.53	16.58	-0.05
High	5230	11.81	11.83	11.54	16.50	16.58	-0.08

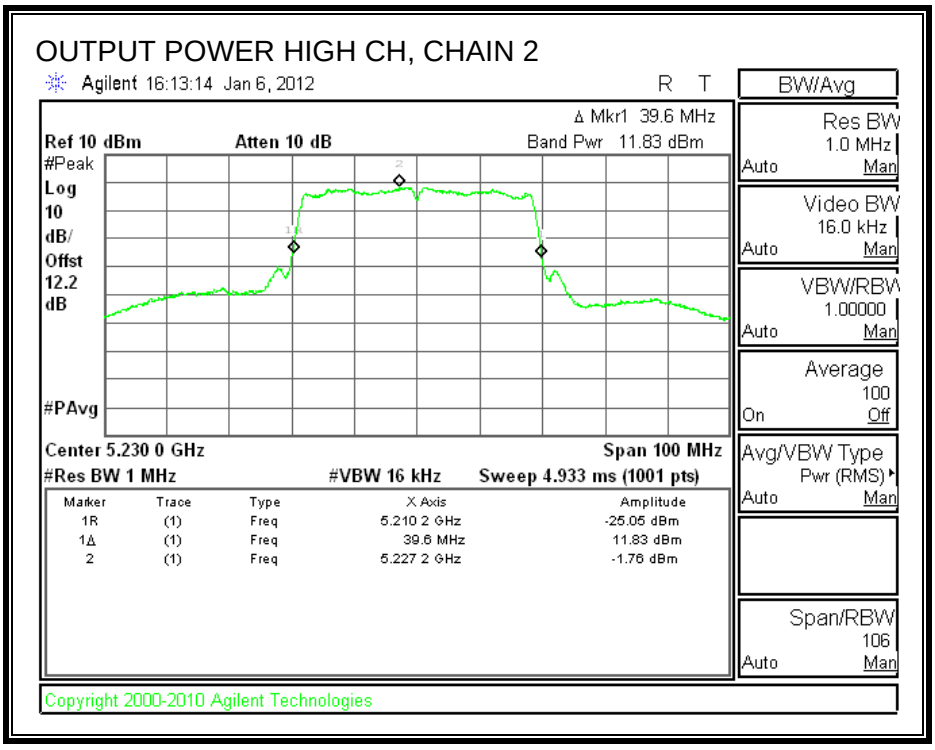
CHAIN 1 OUTPUT POWER



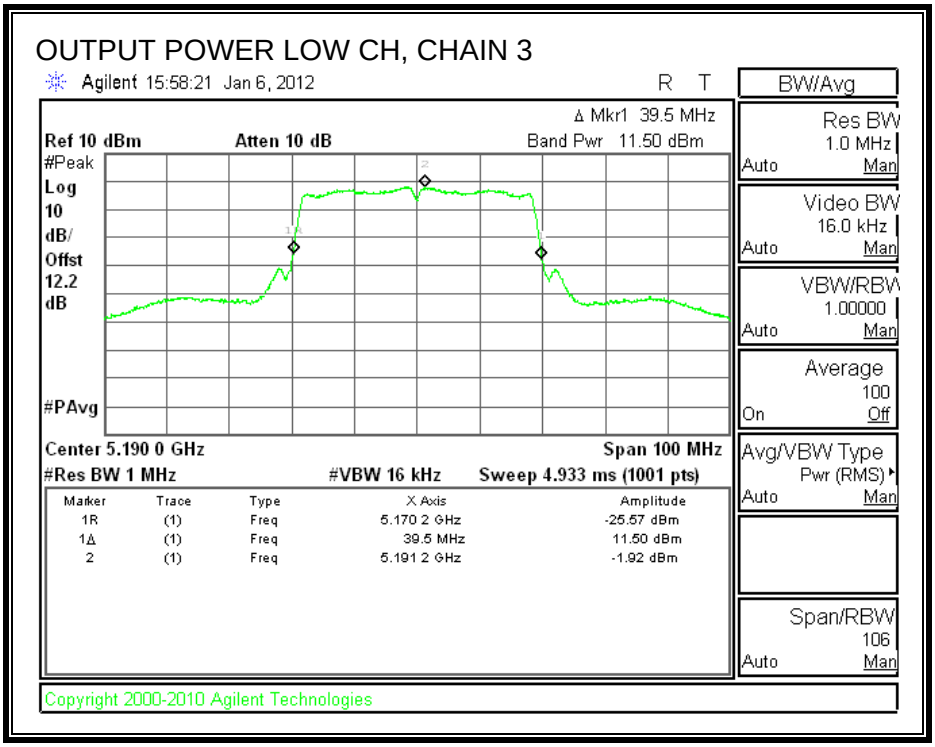


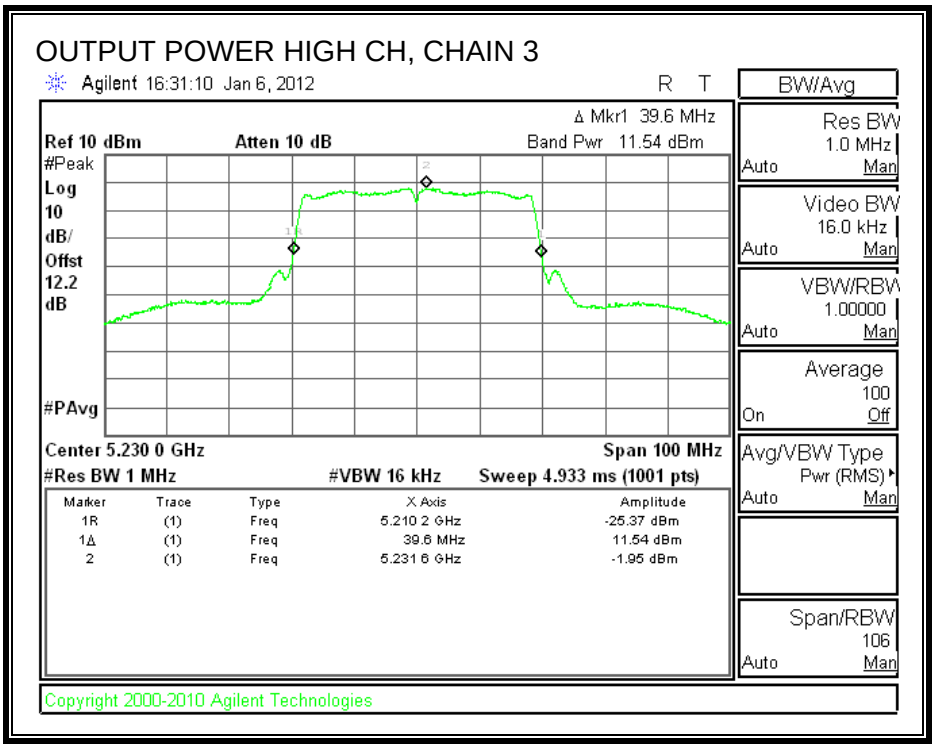
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5190	9.10	9.04	9.80	14.10
High	5230	9.26	9.22	8.94	13.91

7.9.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.41 dBi, therefore the limit is 3.59 dBm.

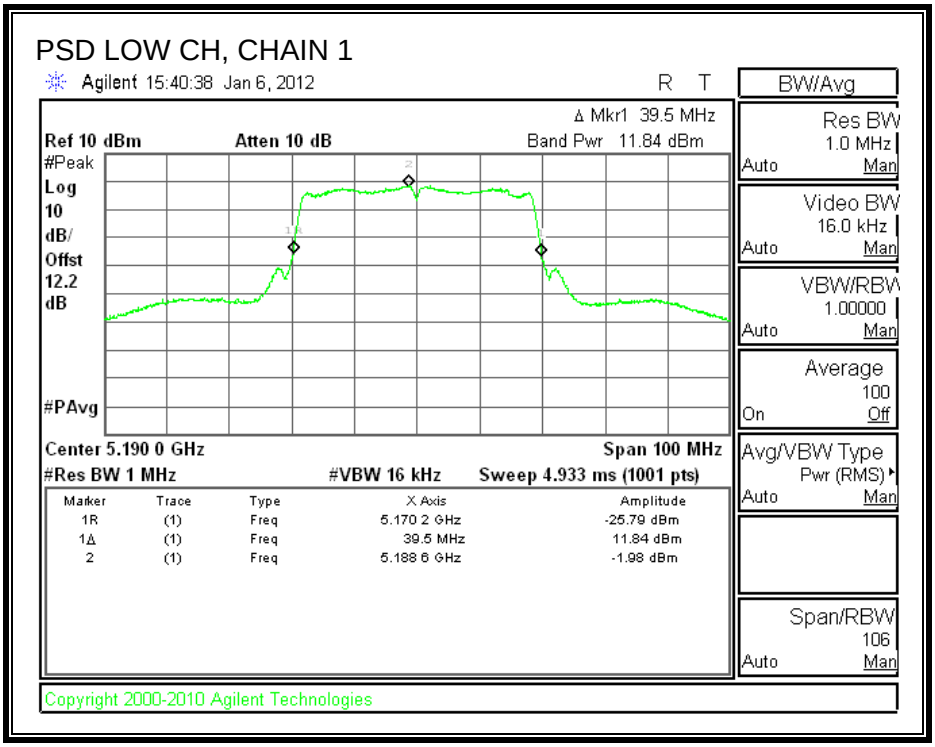
TEST PROCEDURE

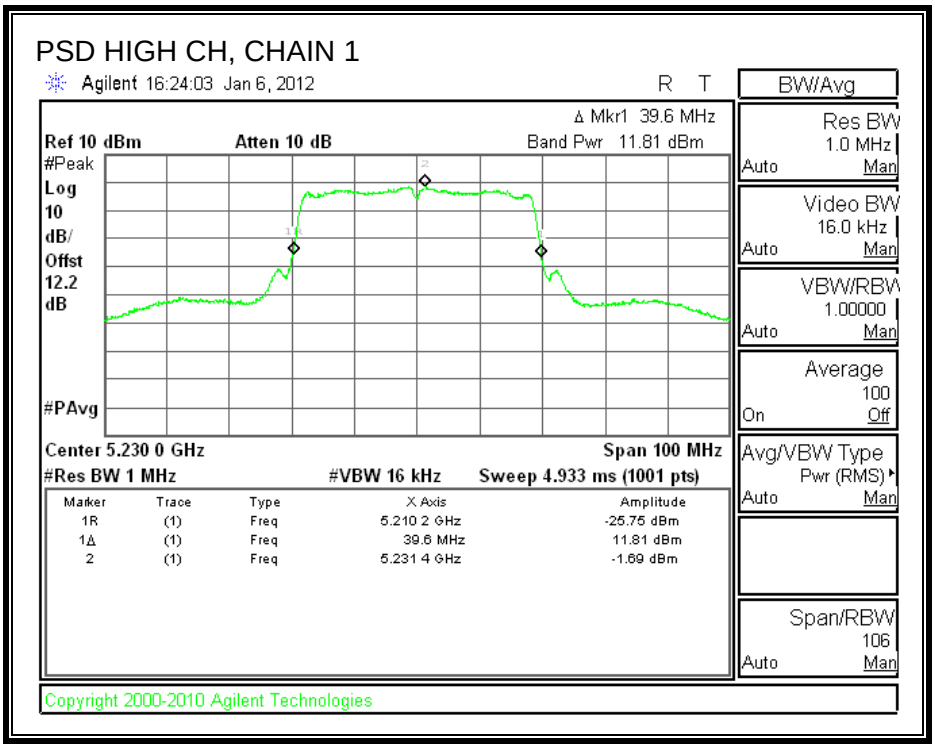
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

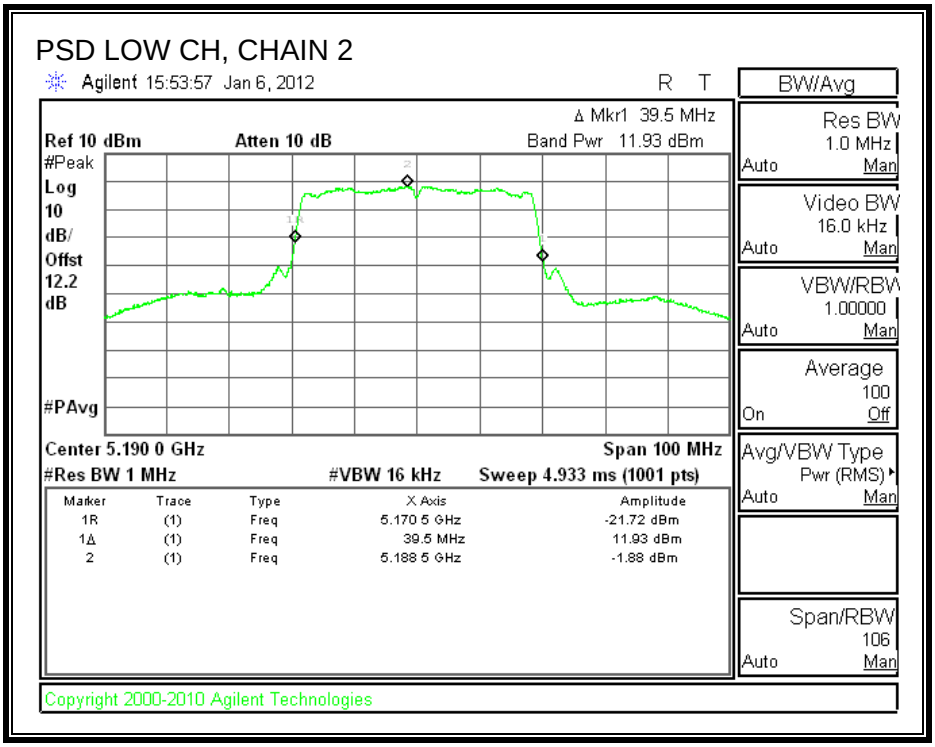
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5190	-1.98	-1.88	-1.92	2.84	3.59	-0.75
High	5230	-1.69	-1.76	-1.95	2.97	3.59	-0.62

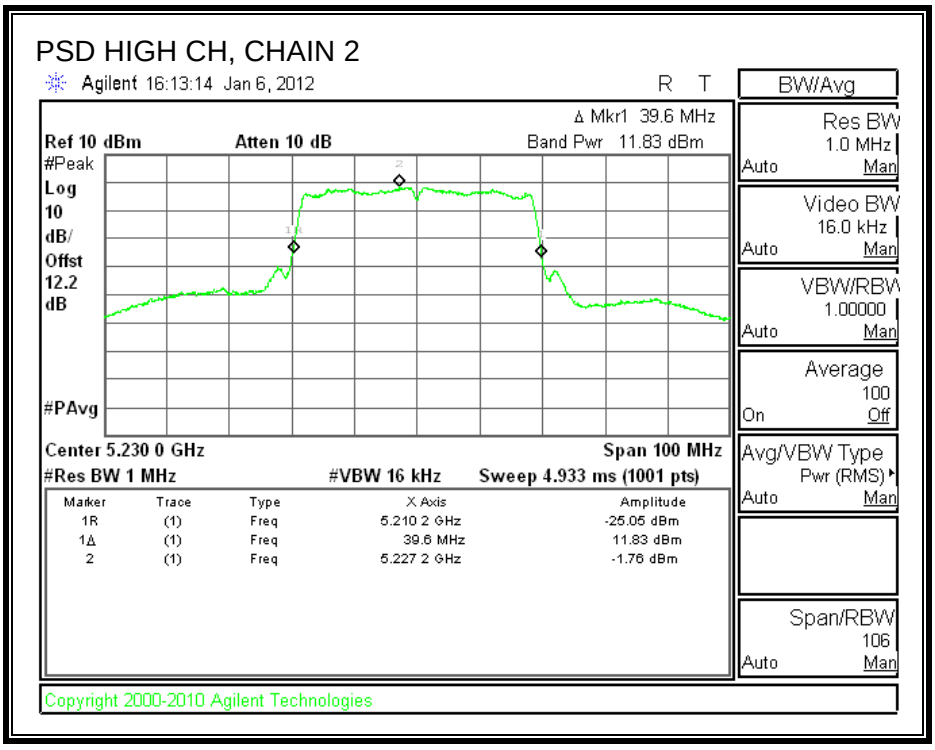
CHAIN 1 POWER SPECTRAL DENSITY



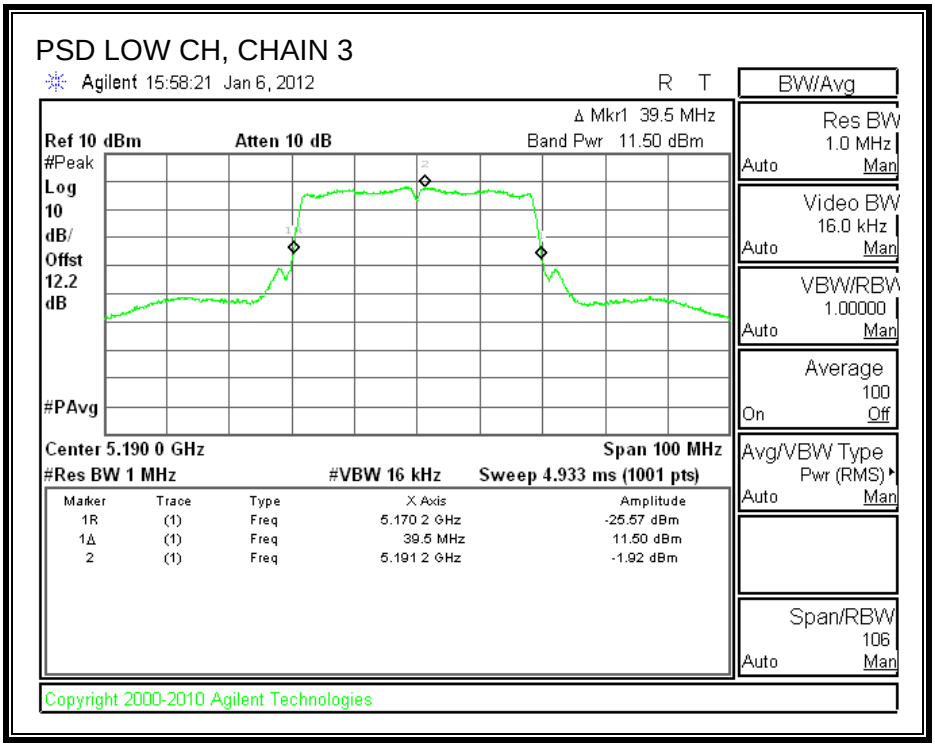


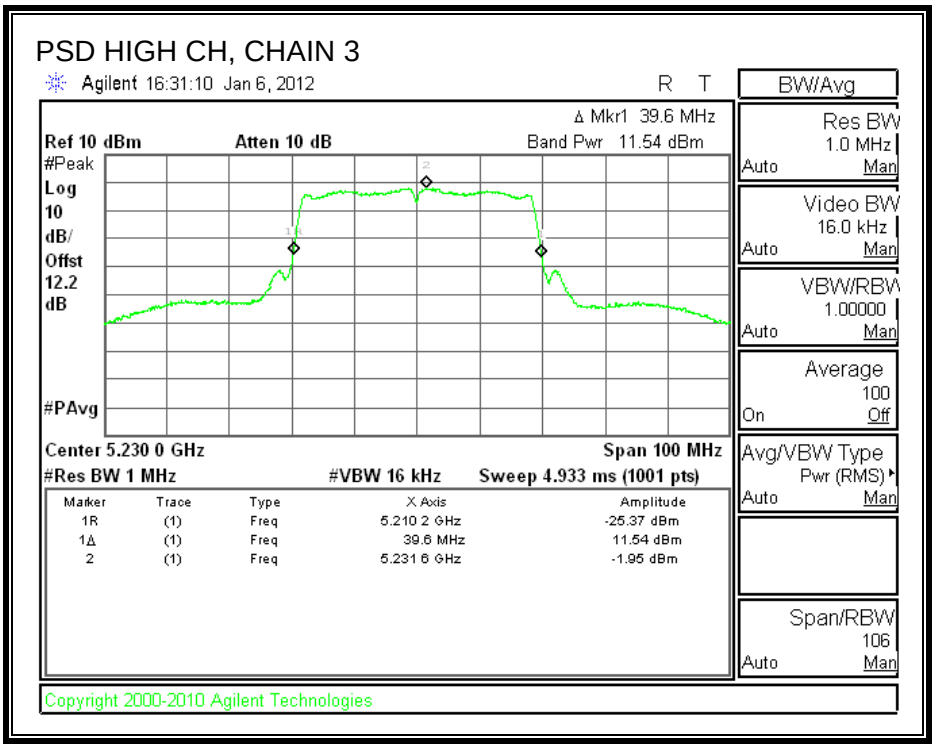
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.9.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	6.92	13	-6.08
High	5230	6.14	13	-6.86

CHAIN 2

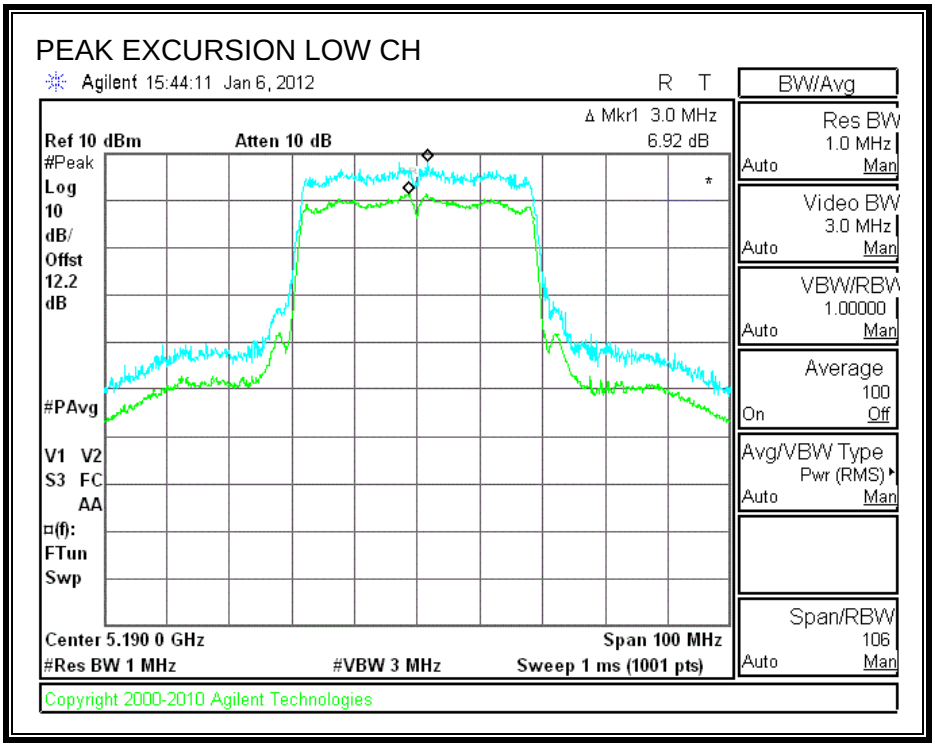
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	6.07	13	-6.93
High	5230	7.38	13	-5.62

CHAIN 3

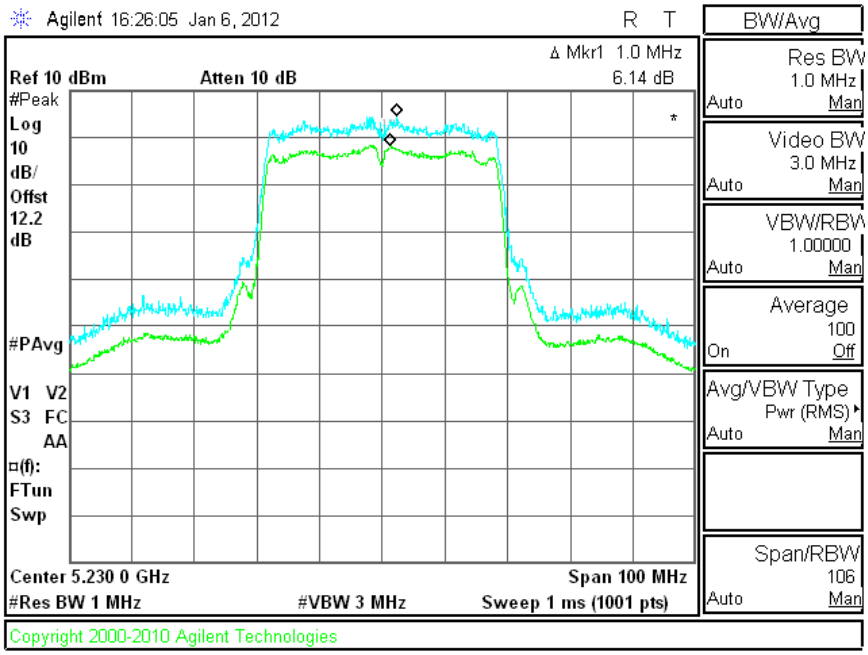
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	6.32	13	-6.68
High	5230	5.71	13	-7.29

CHAIN 1

PEAK EXCURSION

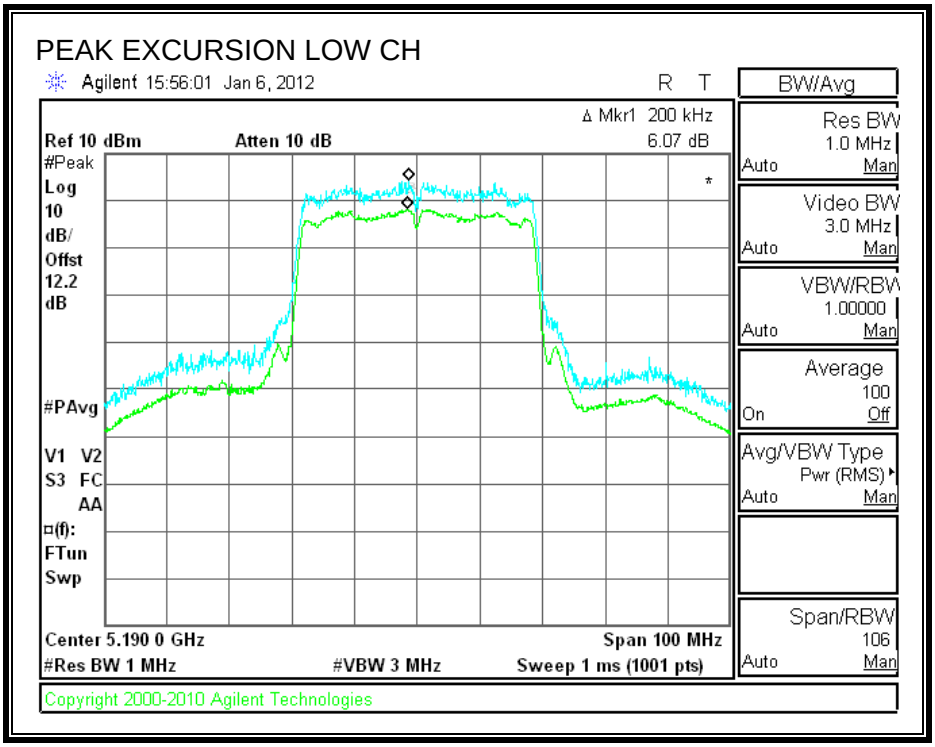


PEAK EXCURSION HIGH CH

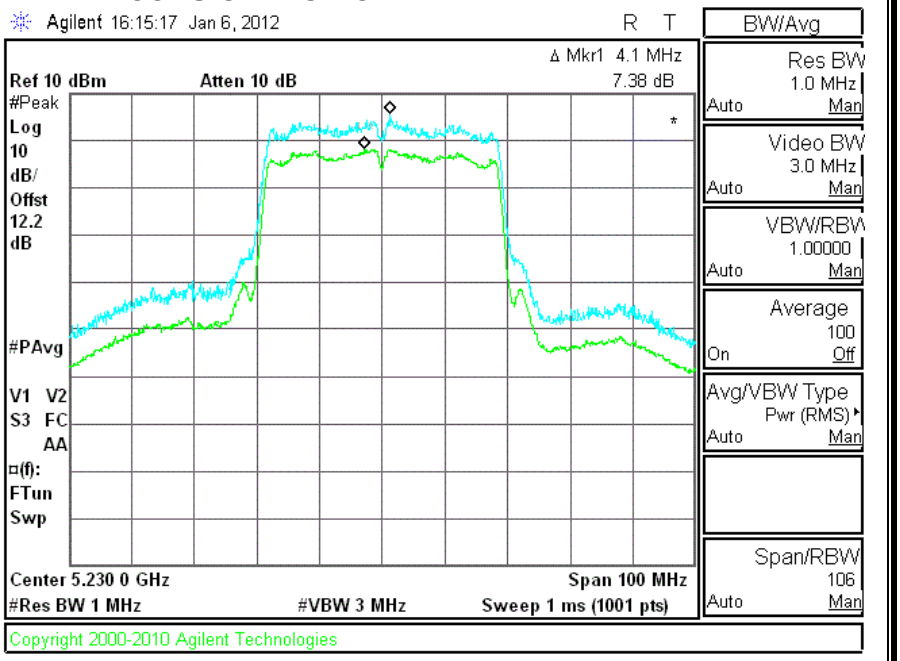


CHAIN 2

PEAK EXCURSION

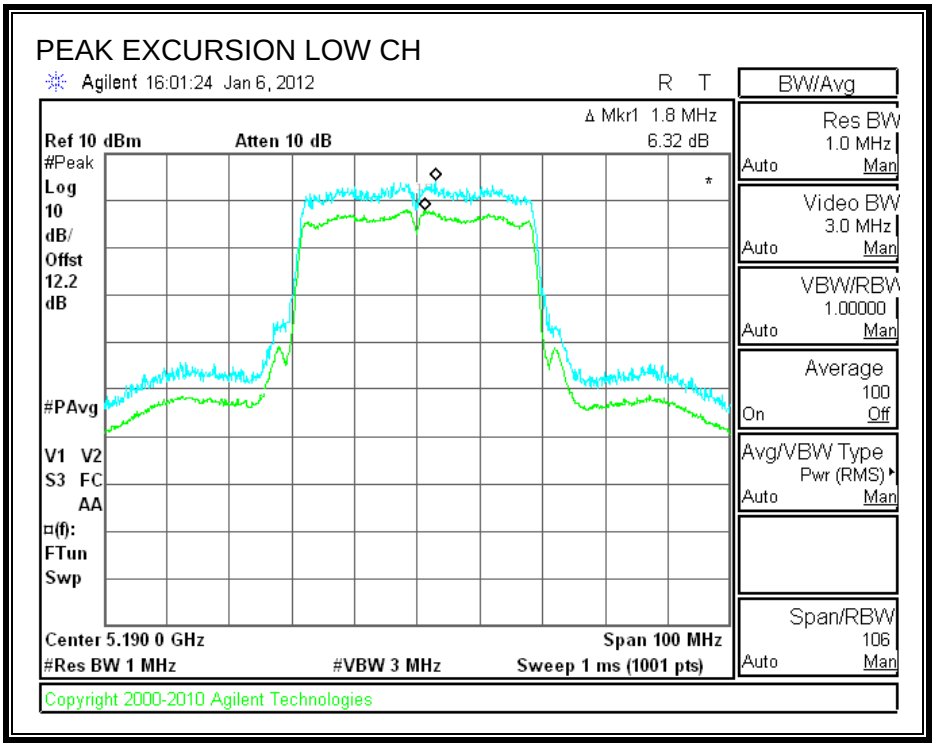


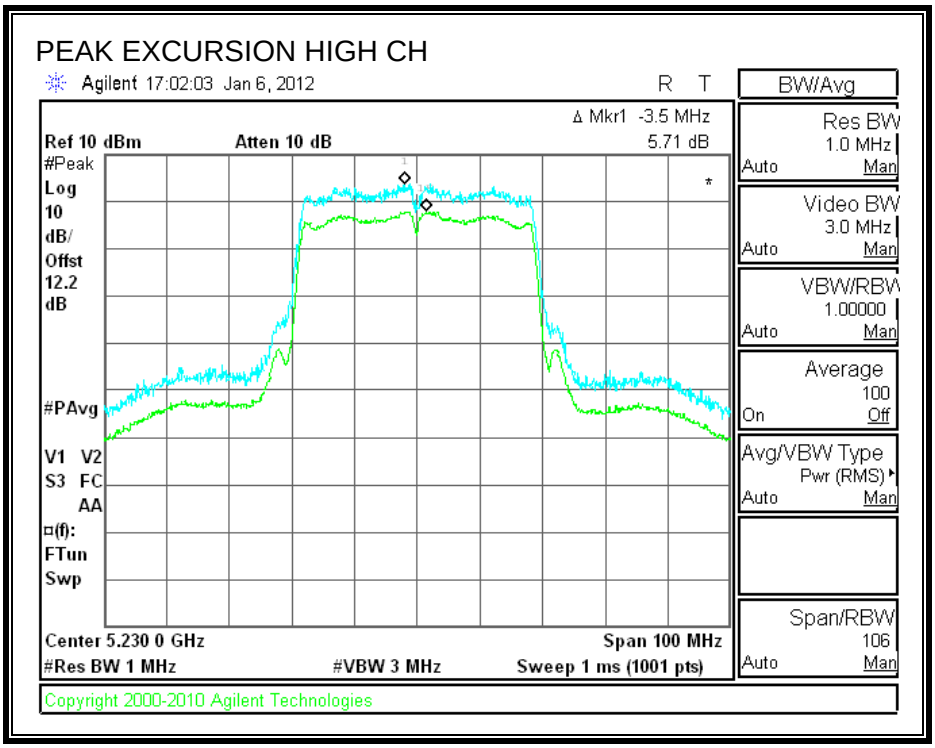
PEAK EXCURSION HIGH CH



CHAIN 3

PEAK EXCURSION





7.10. 802.11a 20MHz 1TX MODE IN THE 5.3 GHz BAND

7.10.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

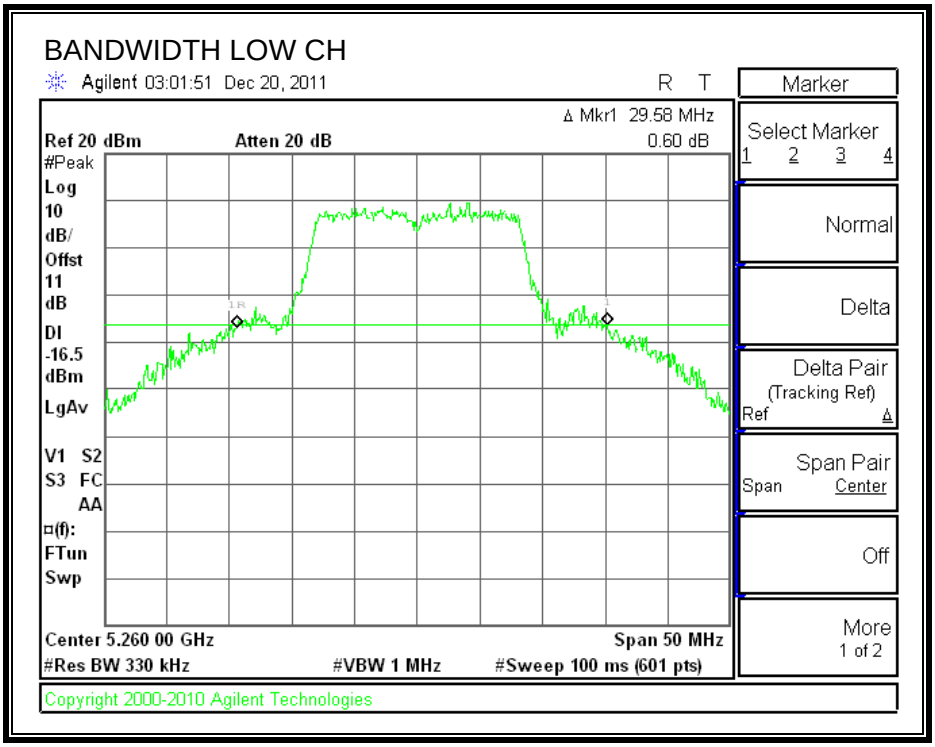
TEST PROCEDURE

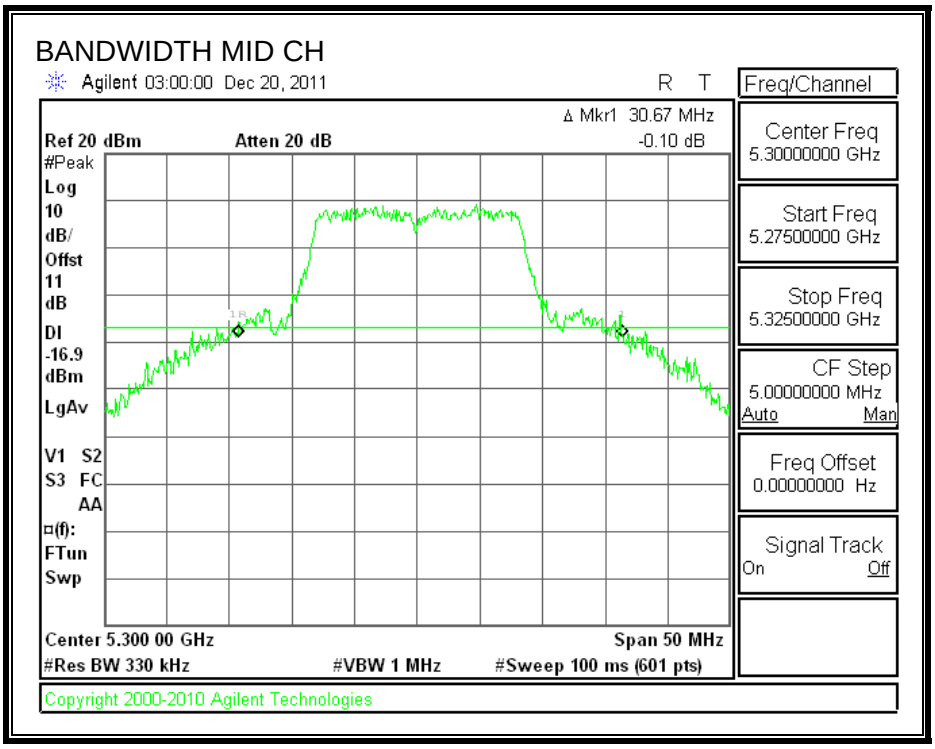
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

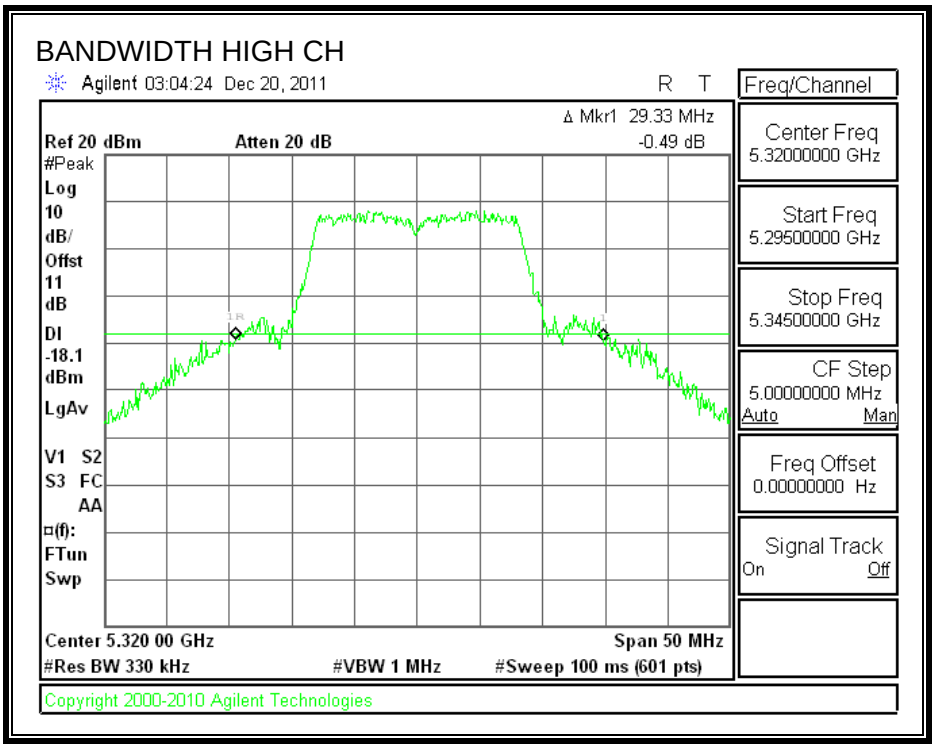
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	29.58	16.6540
Middle	5300	30.67	16.6466
High	5320	29.33	16.6009

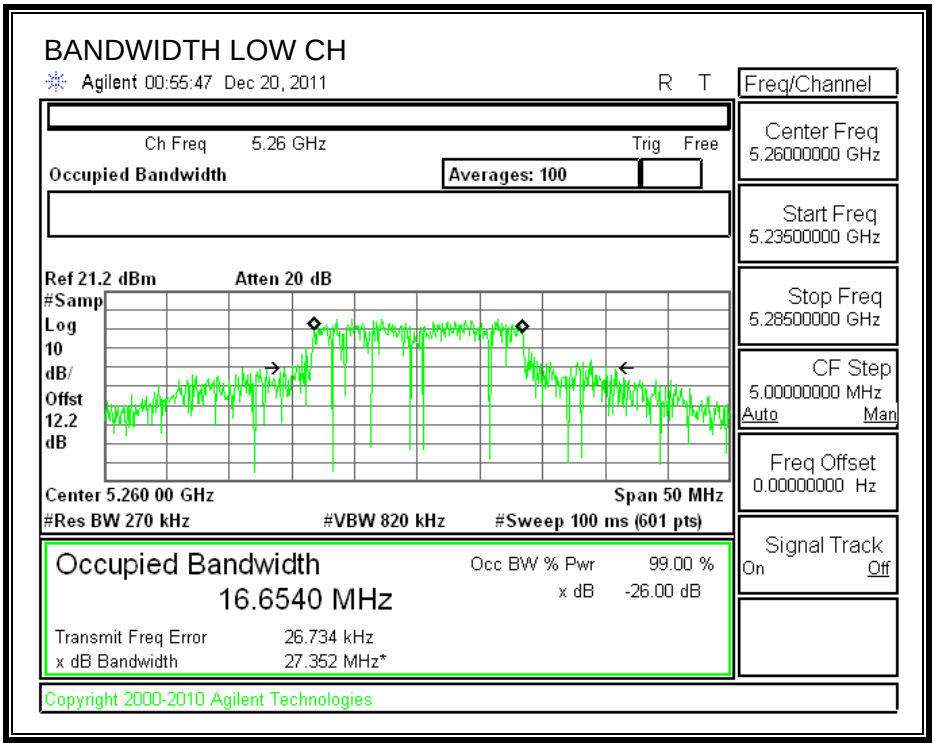
26 dB BANDWIDTH

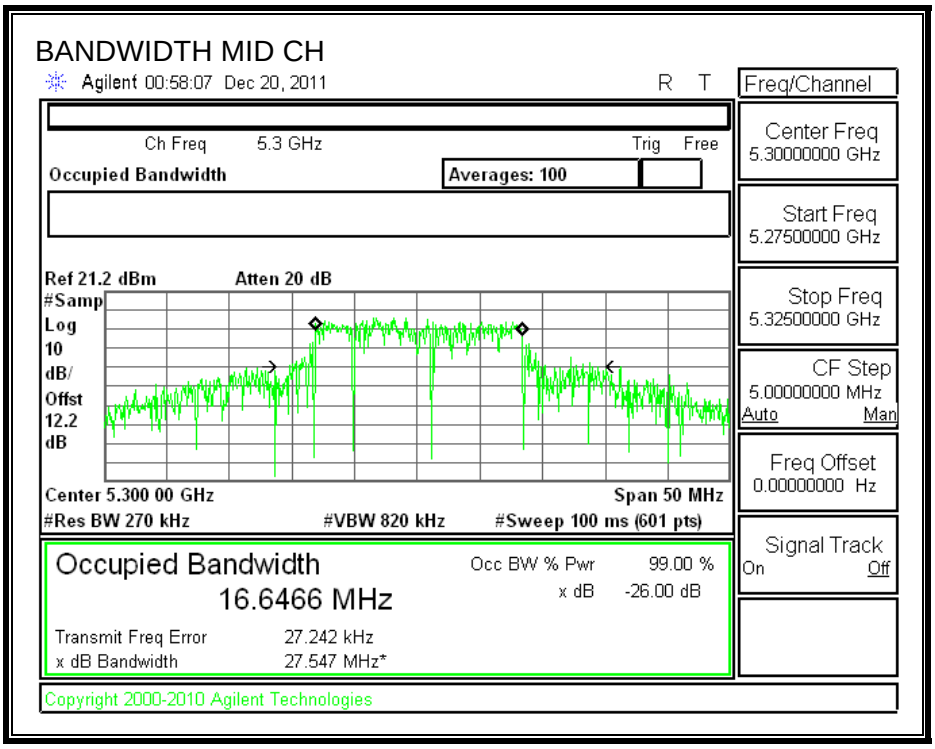


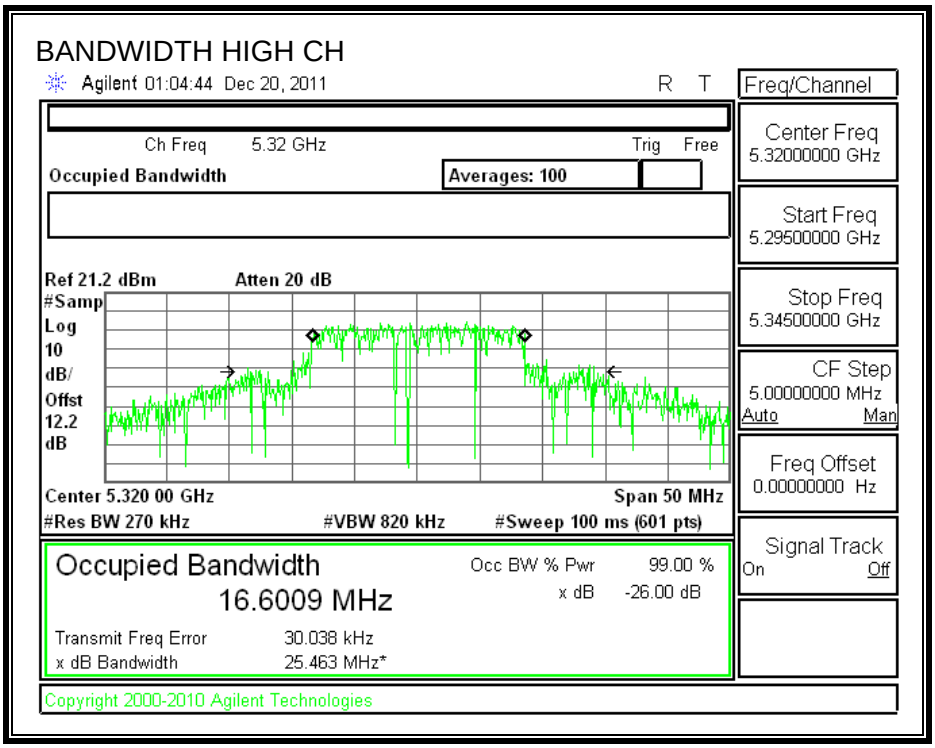




99% BANDWIDTH







7.10.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

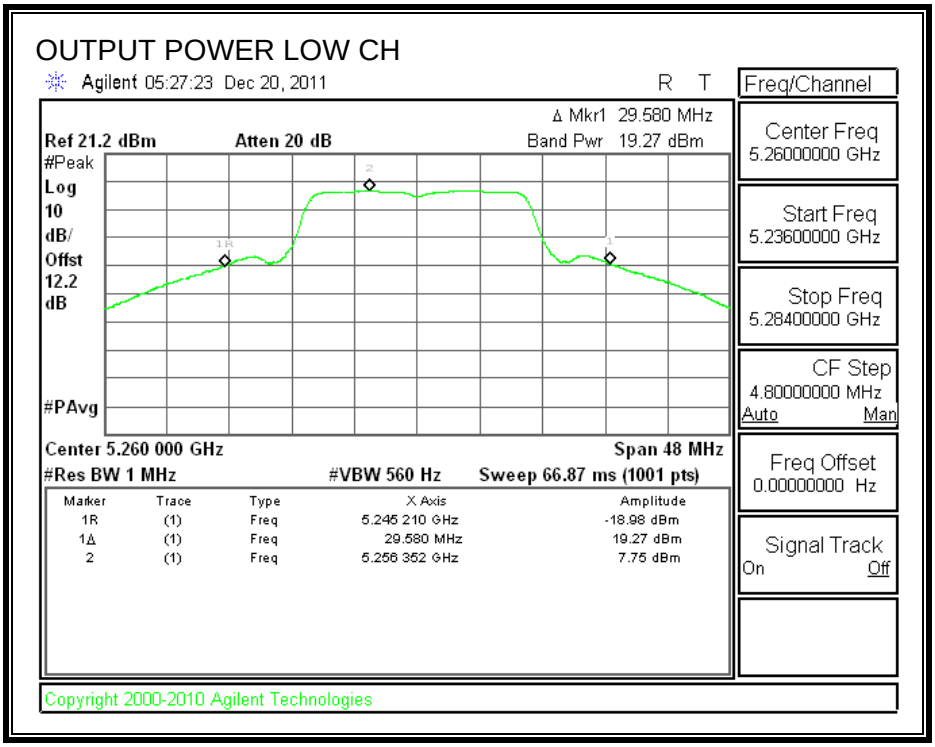
Limit

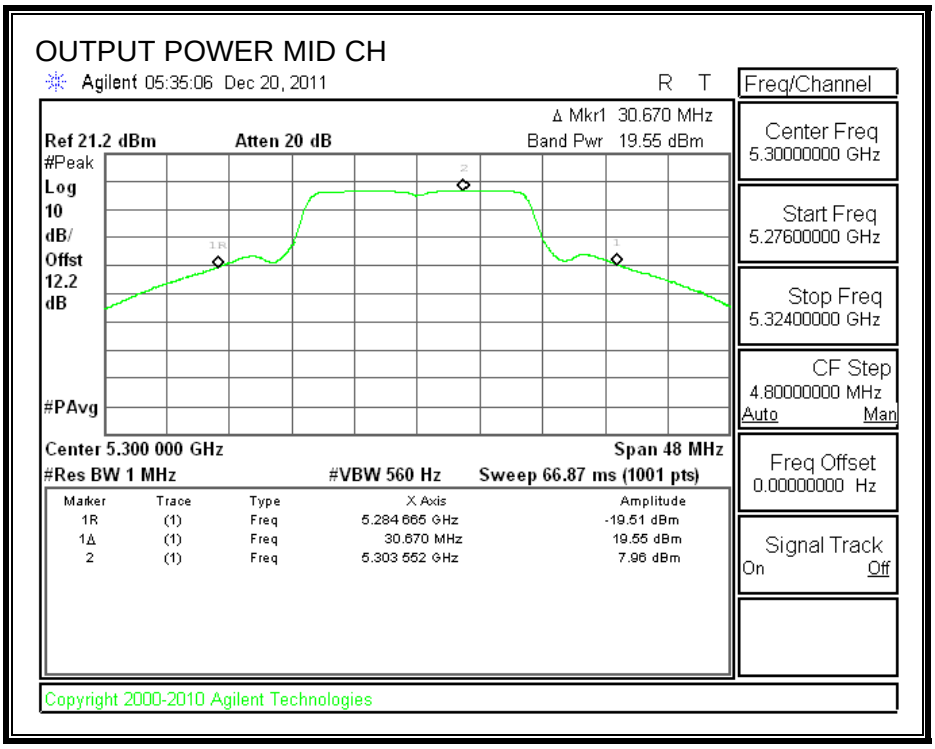
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	24	29.58	25.71	6.56	23.44
Mid	5300	24	30.67	25.87	6.56	23.44
High	5320	24	29.33	25.67	6.56	23.44

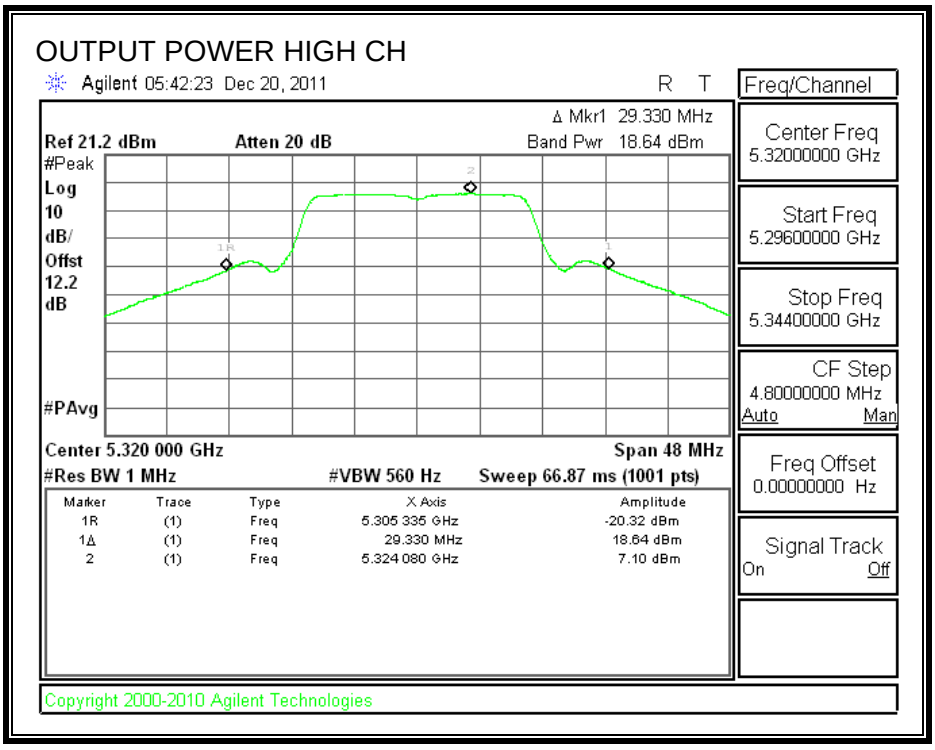
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	19.27	23.44	-4.17
Mid	5300	19.55	23.44	-3.89
High	5320	18.64	23.44	-4.80

OUTPUT POWER







7.10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5260	18.65
Middle	5300	18.73
High	5320	17.62

7.10.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.56 dBi, therefore the limit is 10.44 dBm.

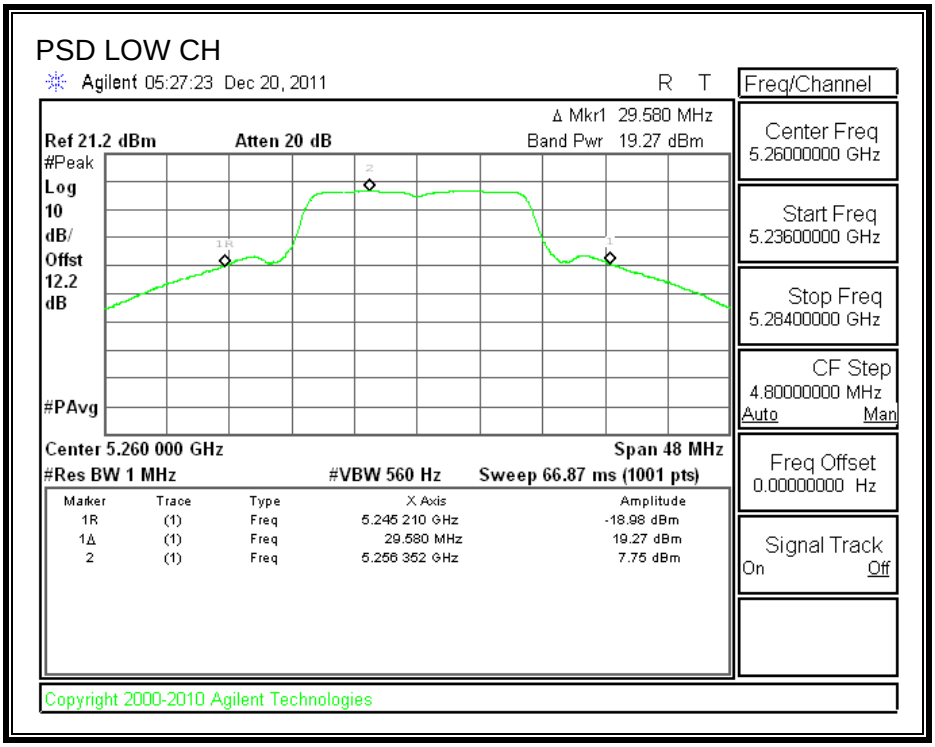
TEST PROCEDURE

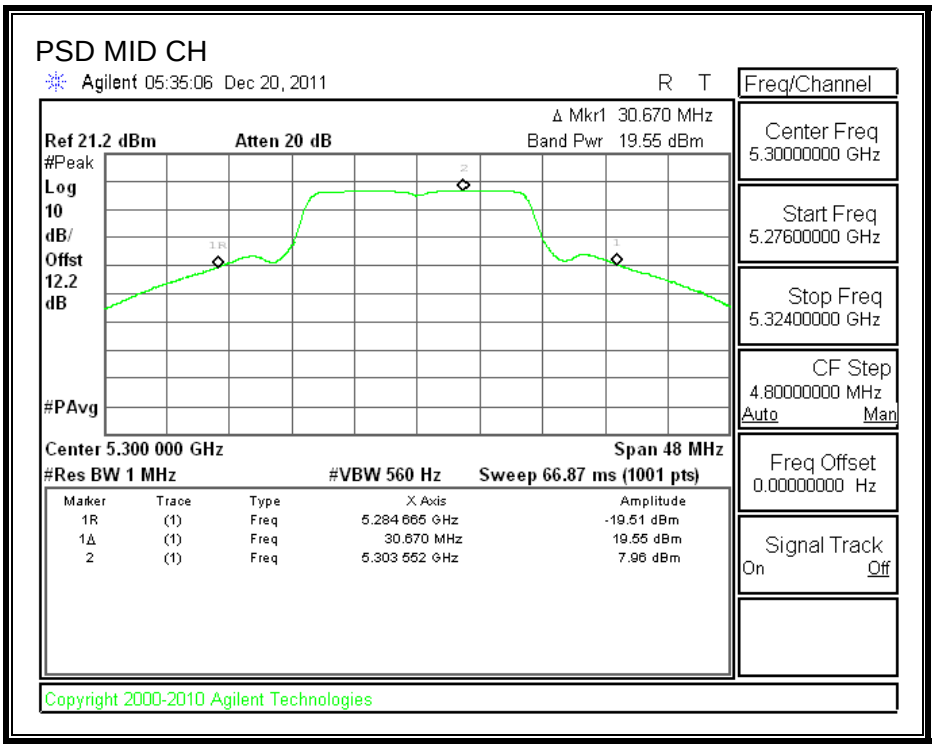
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

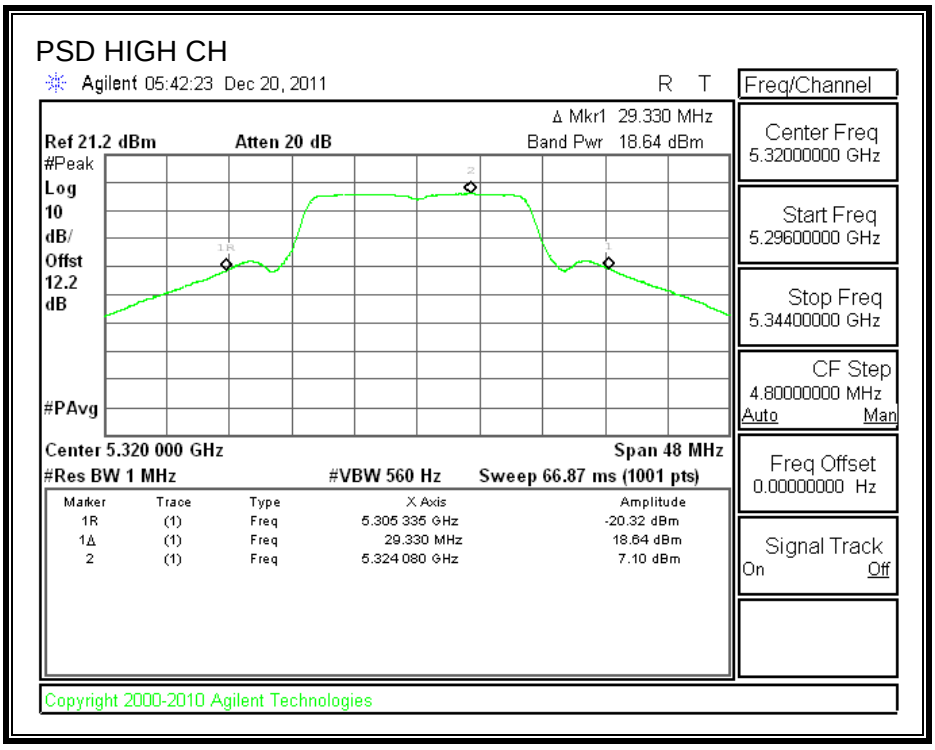
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	7.75	10.44	-2.69
Middle	5300	7.96	10.44	-2.48
High	5320	7.10	10.44	-3.34

POWER SPECTRAL DENSITY







7.10.5. 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.

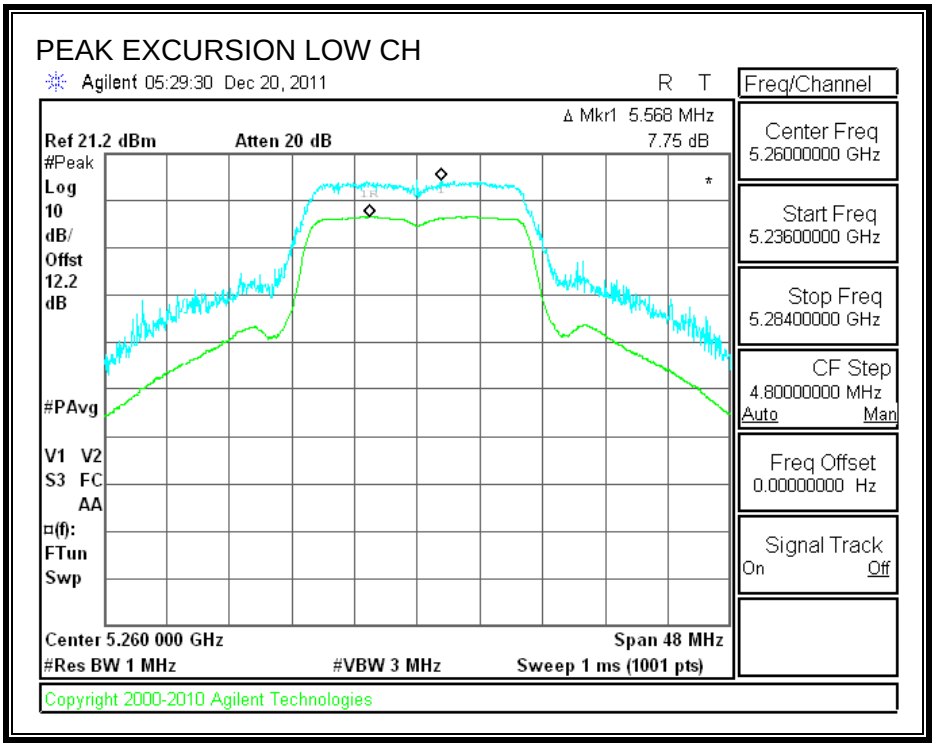
TEST PROCEDURE

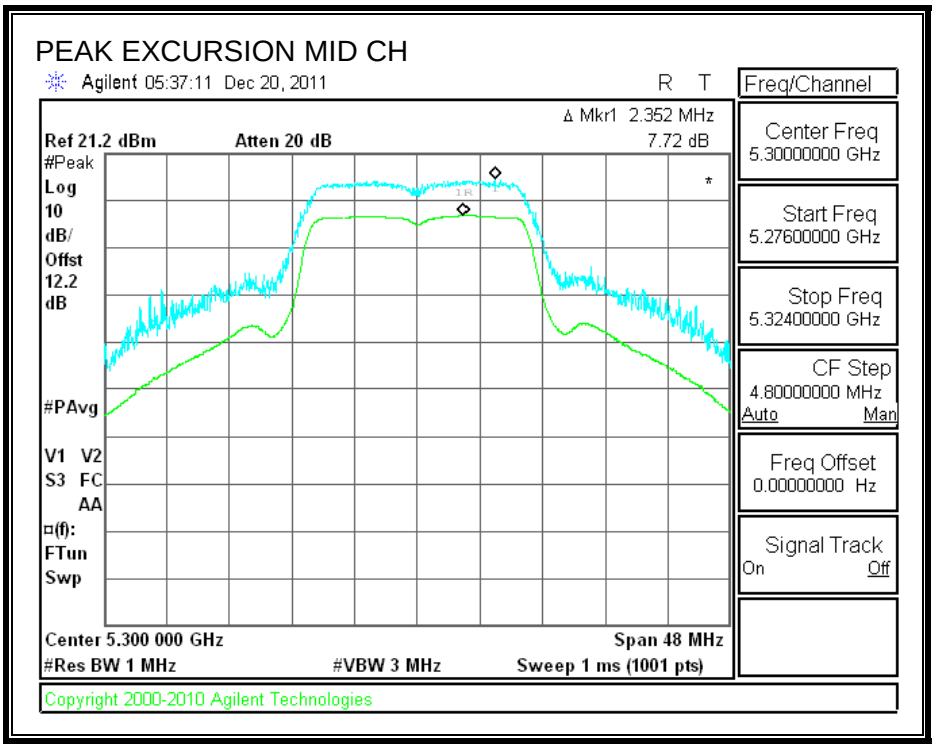
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

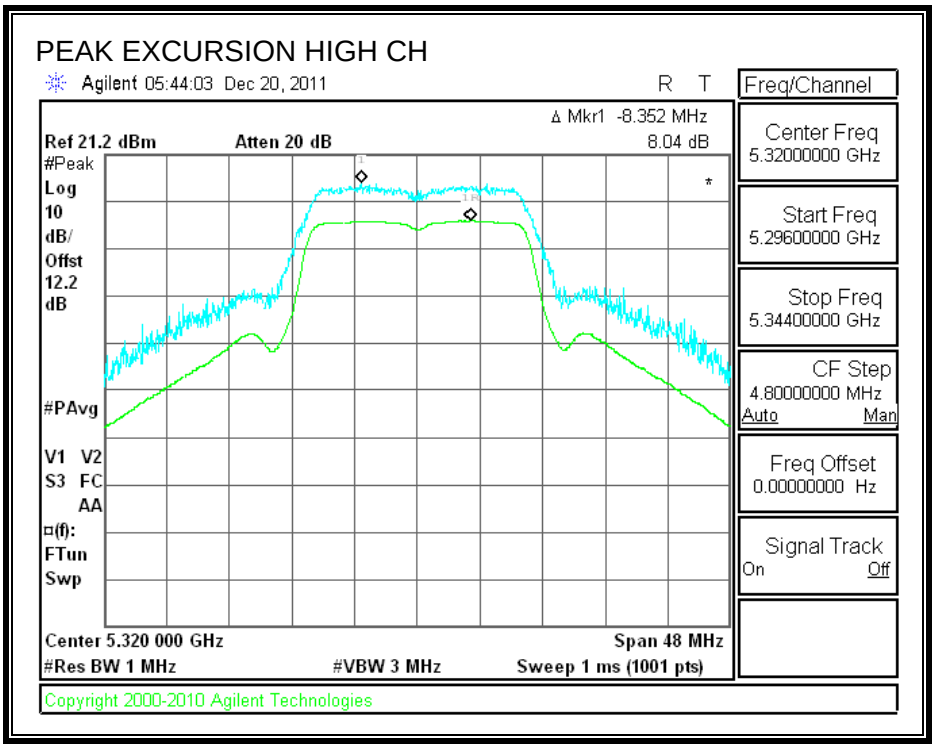
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.75	13	-5.25
Middle	5300	7.72	13	-5.28
High	5320	8.04	13	-4.96

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.11. 802.11n HT40 1TX MODE IN THE 5.3 GHz BAND

7.11.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

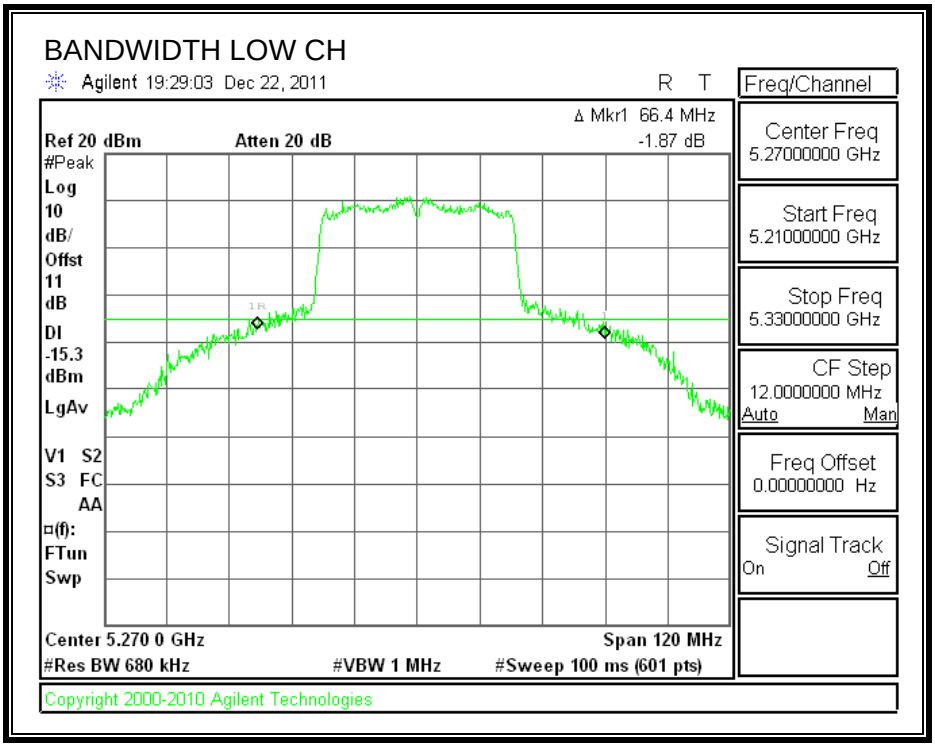
TEST PROCEDURE

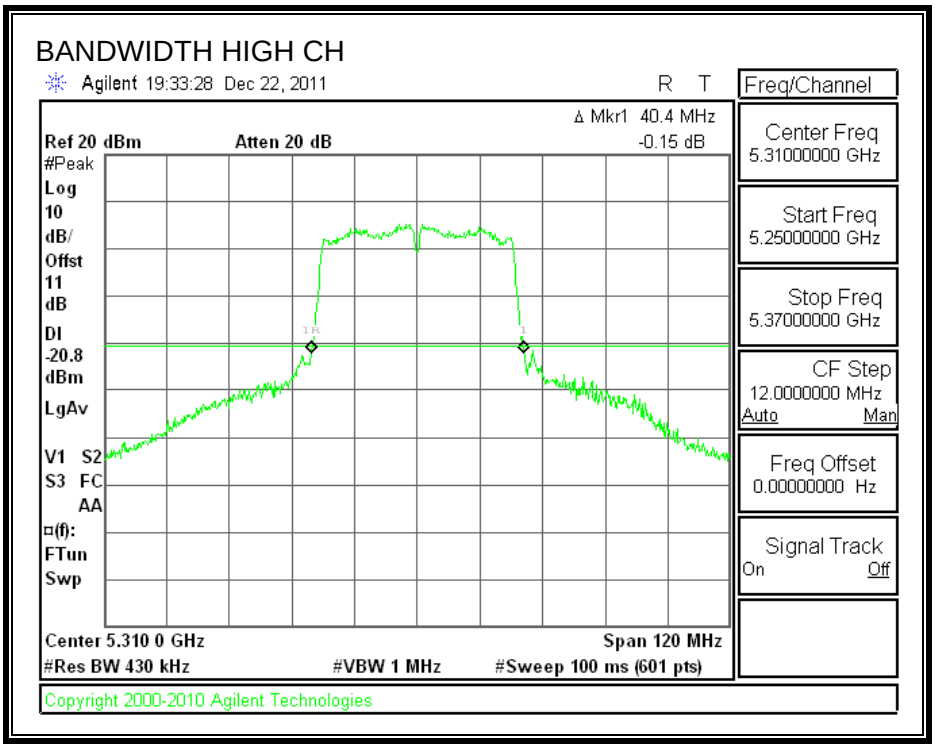
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

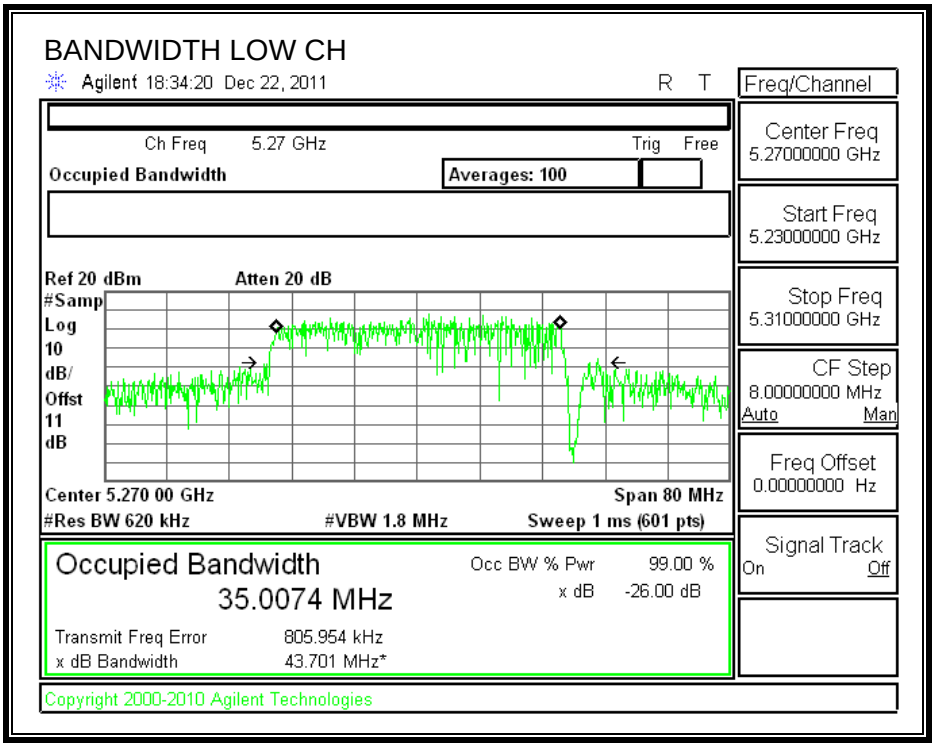
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	66.4	35.0074
High	5310	40.4	34.9837

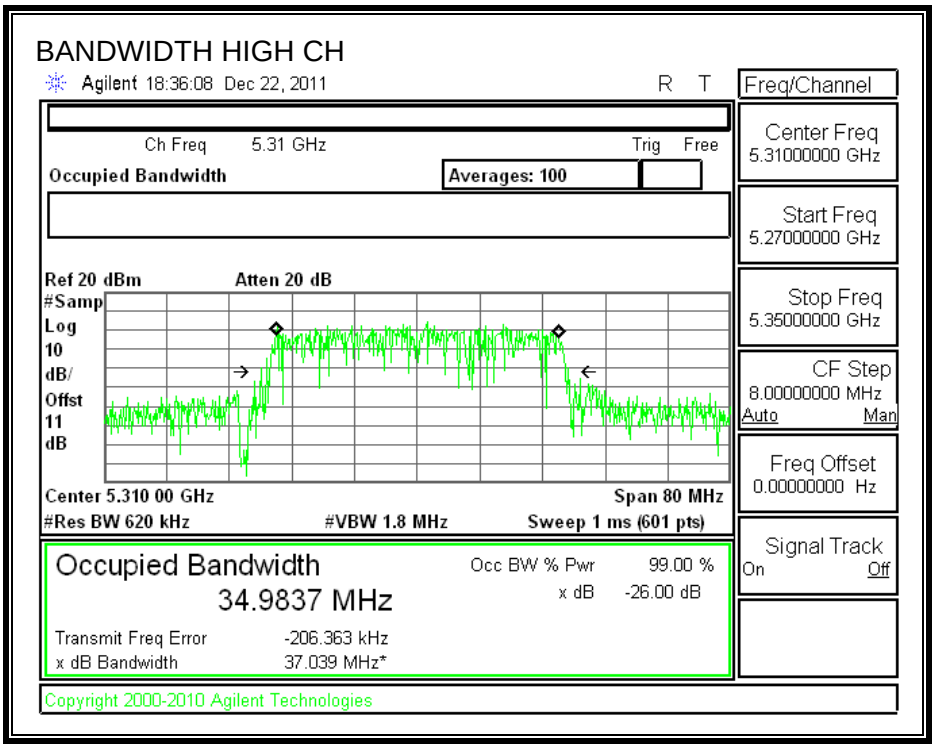
26 dB BANDWIDTH





99% BANDWIDTH





7.11.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

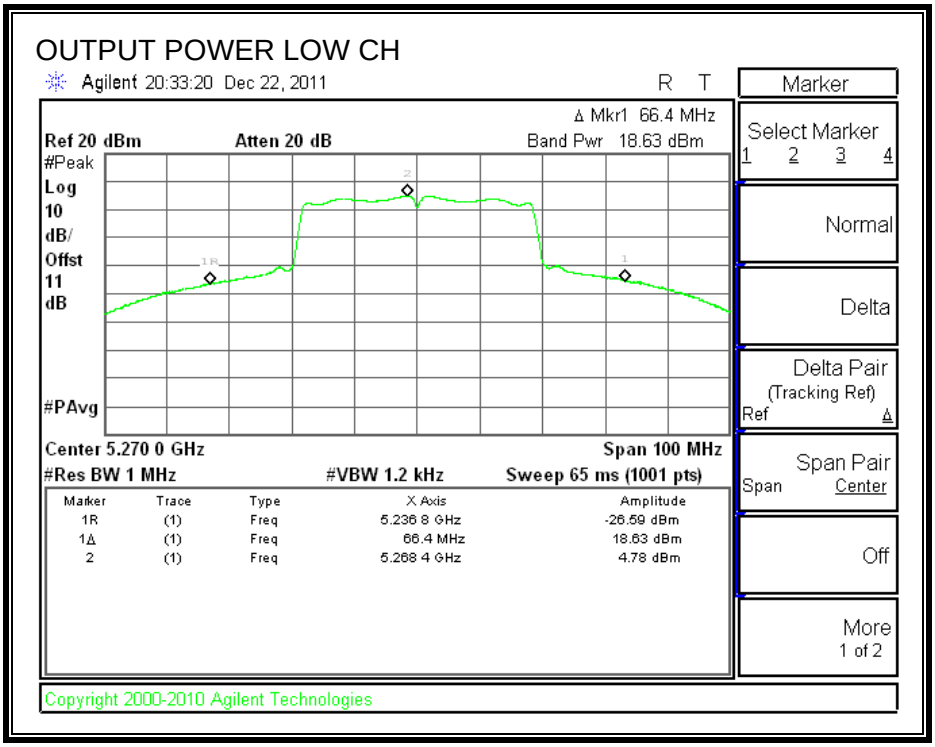
Limit

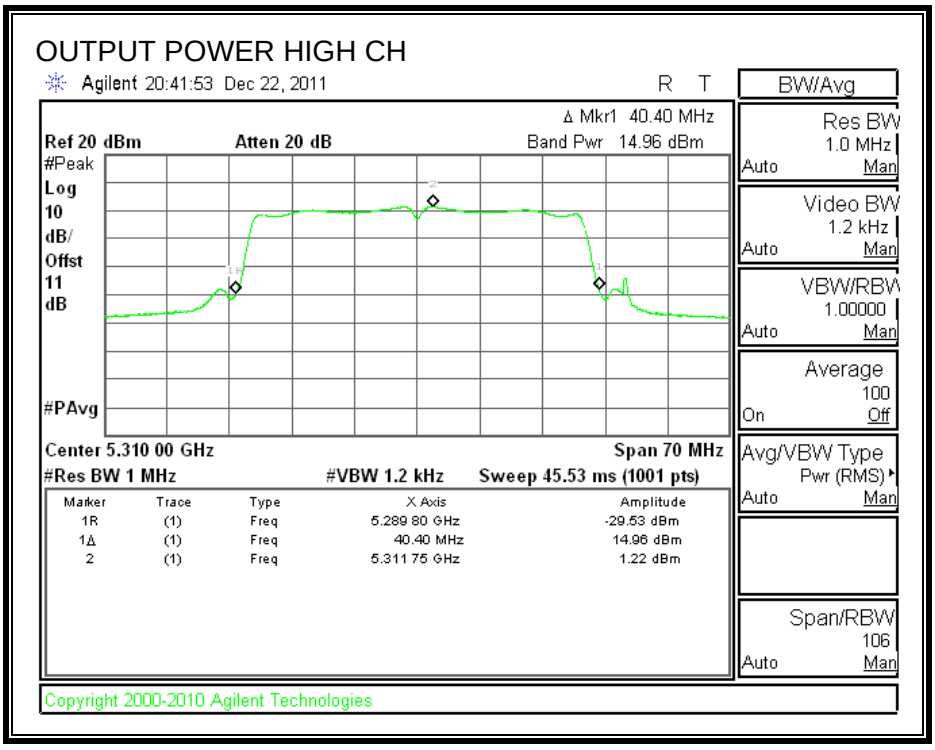
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	24	66.4	29.22	6.56	23.44
High	5310	24	40.4	27.06	6.56	23.44

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	18.63	23.44	-4.81
High	5310	14.96	23.44	-8.48

OUTPUT POWER





7.11.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5270	18.14
High	5310	14.21

7.11.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.56 dBi, therefore the limit is 10.44 dBm.

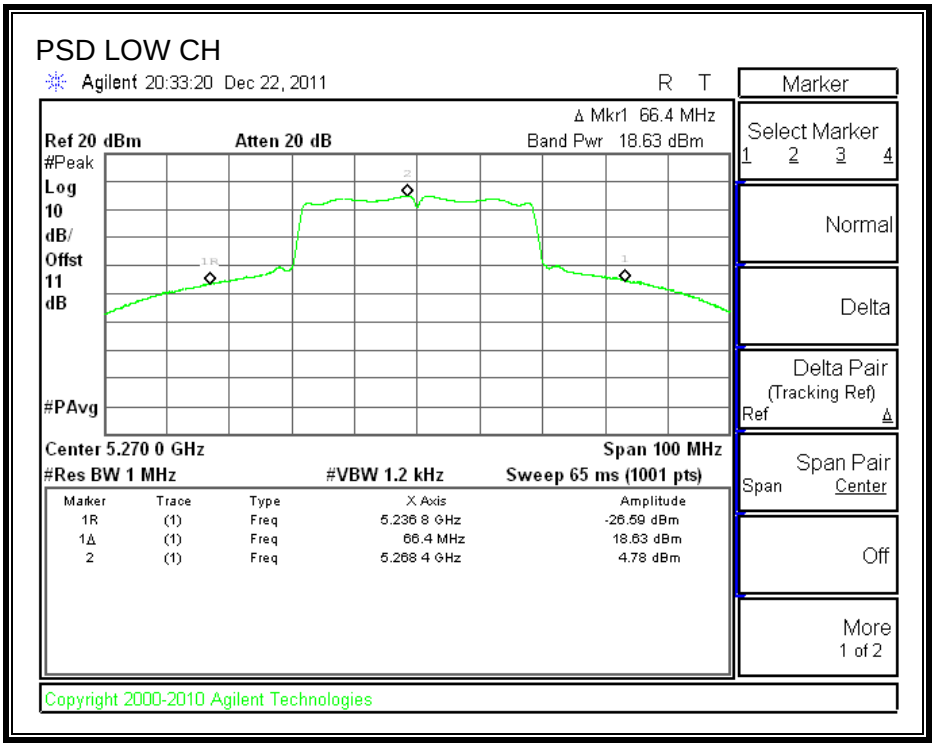
TEST PROCEDURE

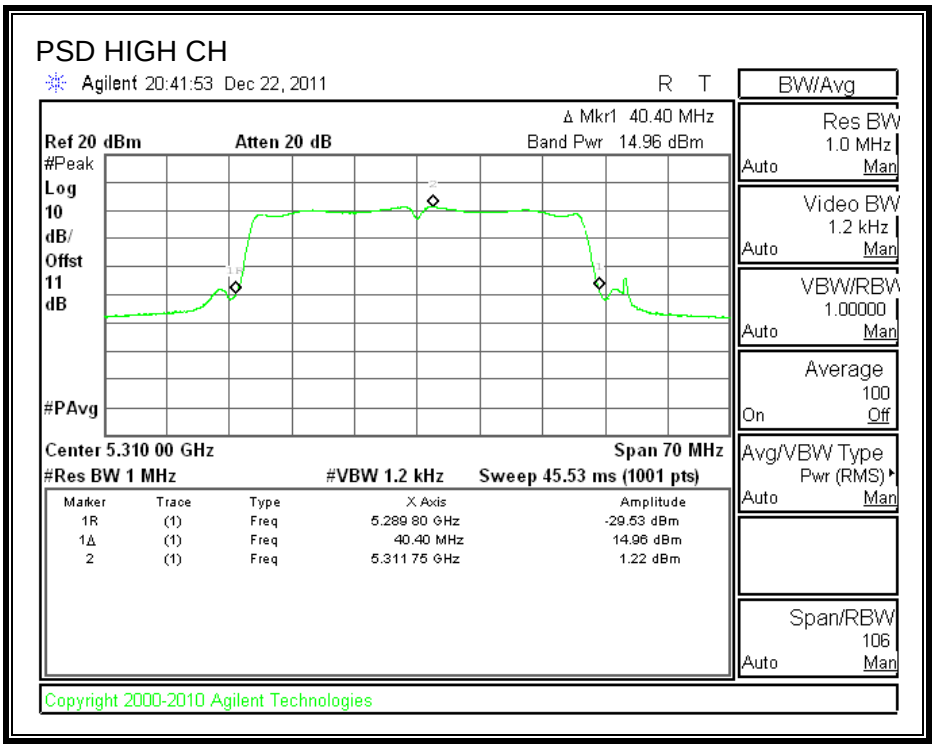
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	4.78	10.44	-5.66
High	5310	1.22	10.44	-9.22

POWER SPECTRAL DENSITY





7.11.5. 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.

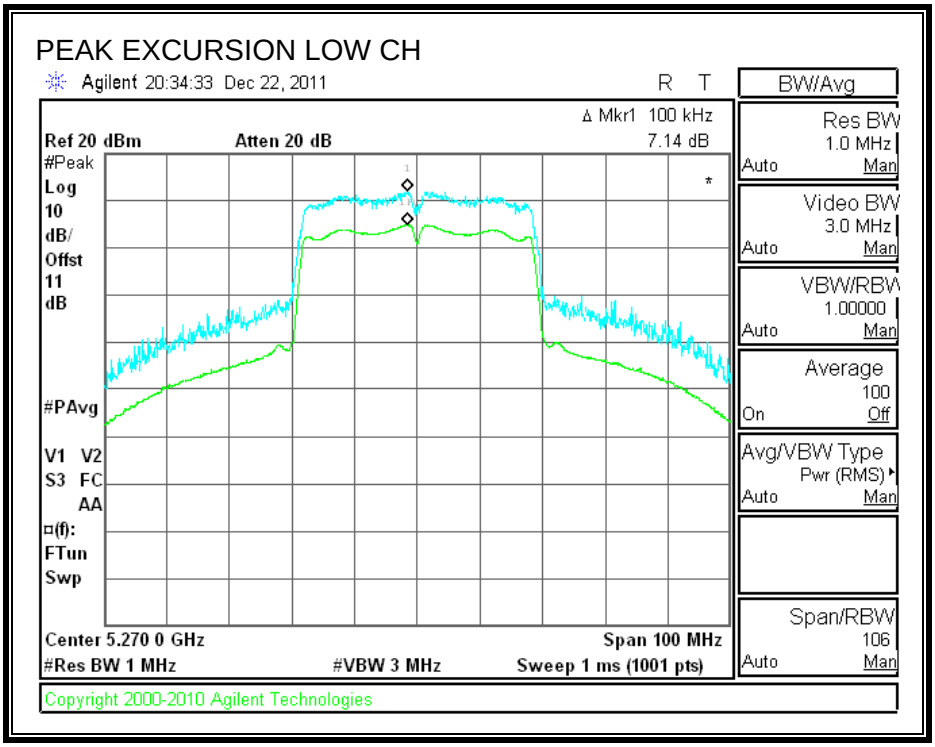
TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

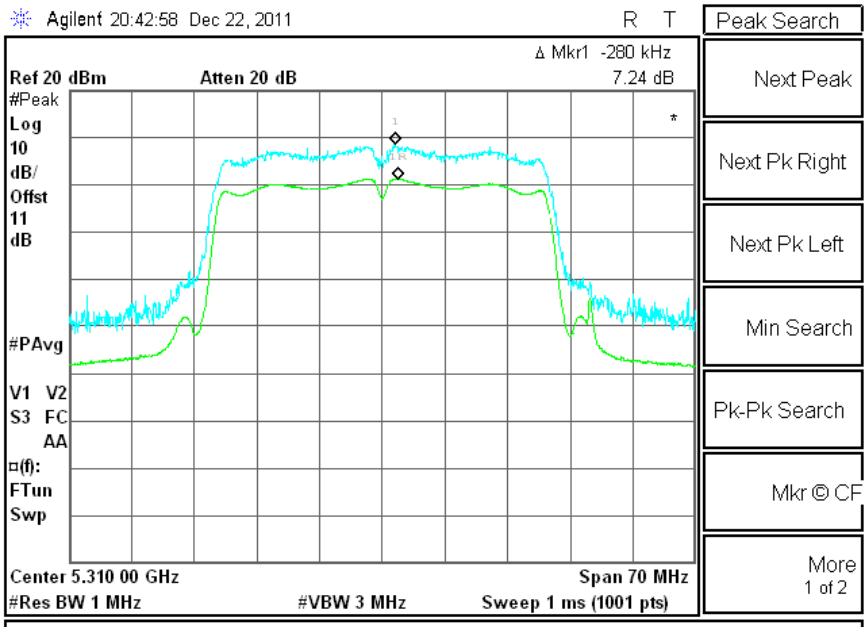
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	7.14	13	-5.86
High	5310	7.24	13	-5.76

PEAK EXCURSION



PEAK EXCURSION HIGH CH



7.12. 802.11n HT20 3 TX MODE IN THE 5.3 GHz BAND, CDD MCS0

7.12.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	26.67	17.7278
Middle	5300	26.75	17.7238
High	5320	27.17	17.7327

CHAIN 2

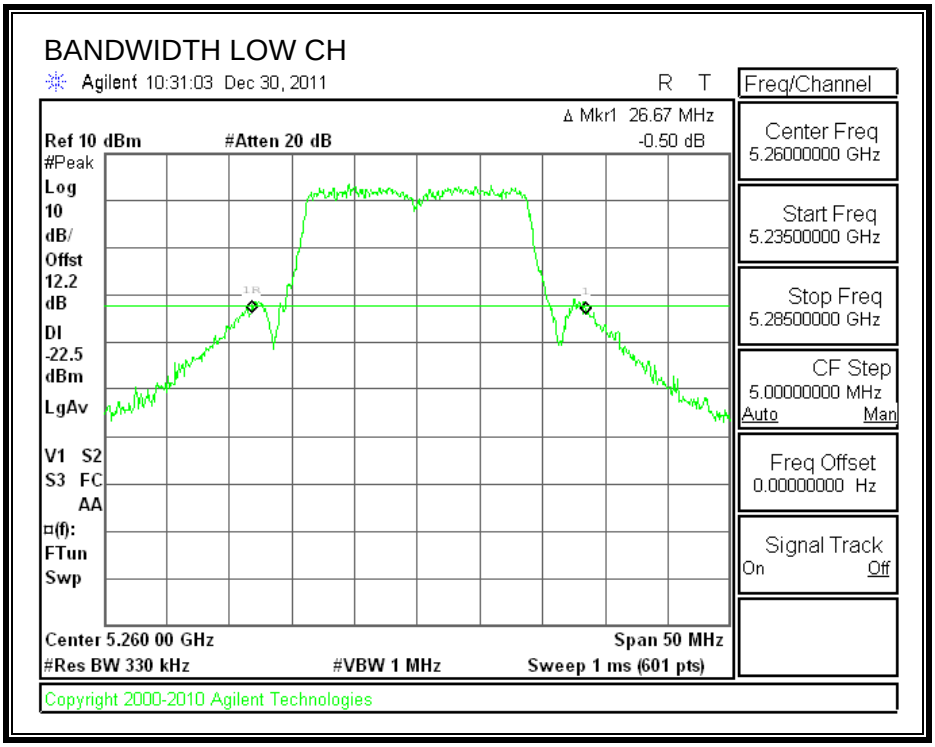
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	26.08	17.7187
Middle	5300	26.75	17.7049
High	5320	25.92	17.7088

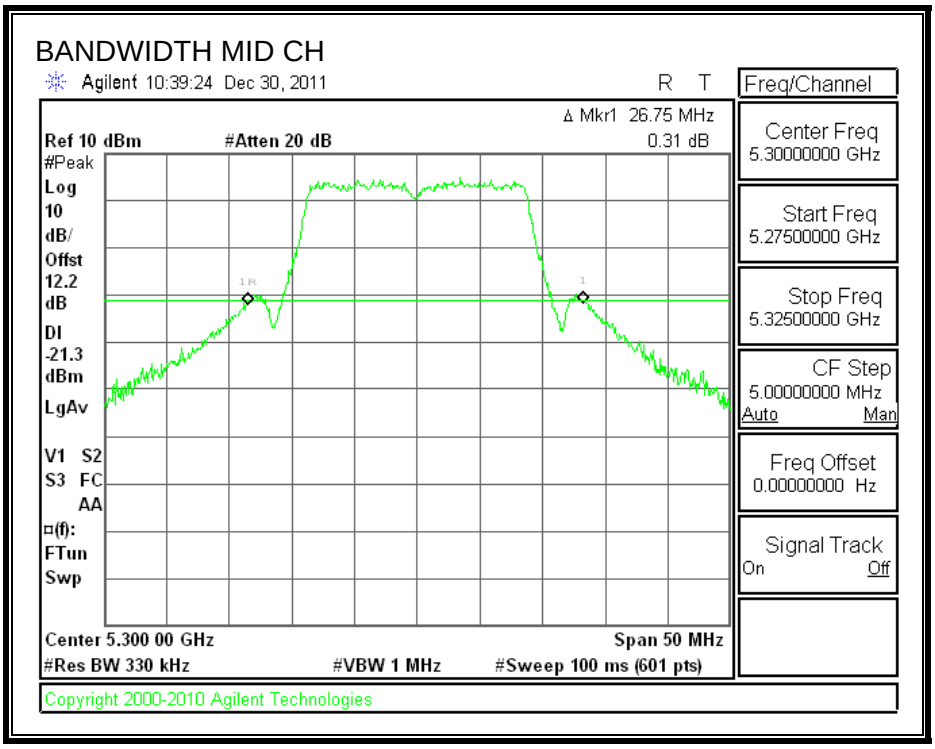
CHAIN 3

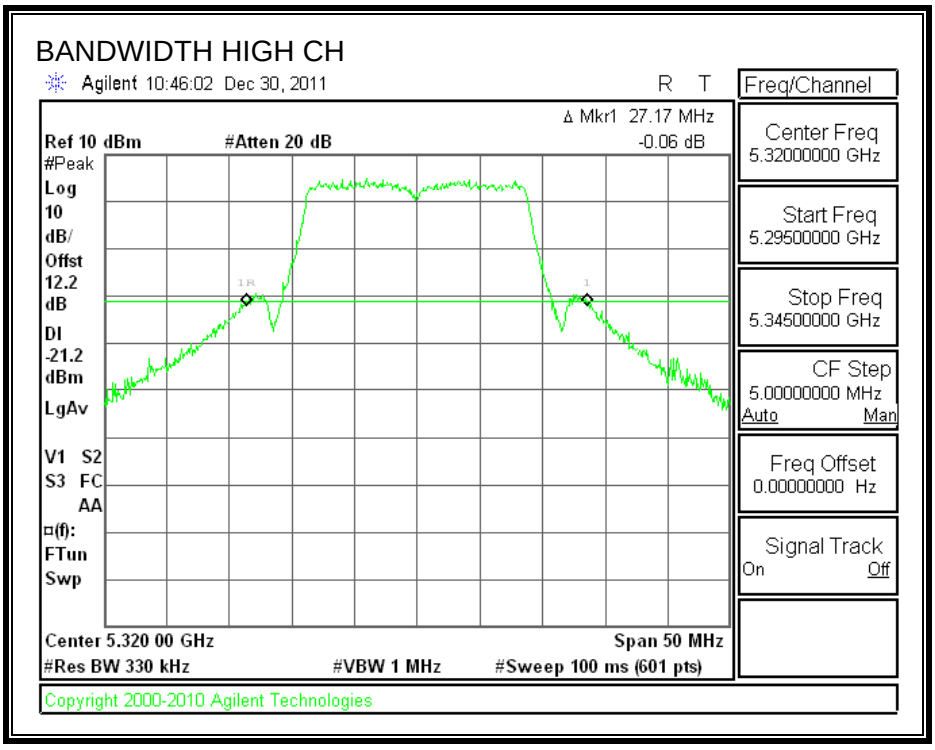
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	27.08	17.7191
Middle	5300	26.67	17.7436
High	5320	26.75	17.7331

CHAIN 1

26 dB BANDWIDTH

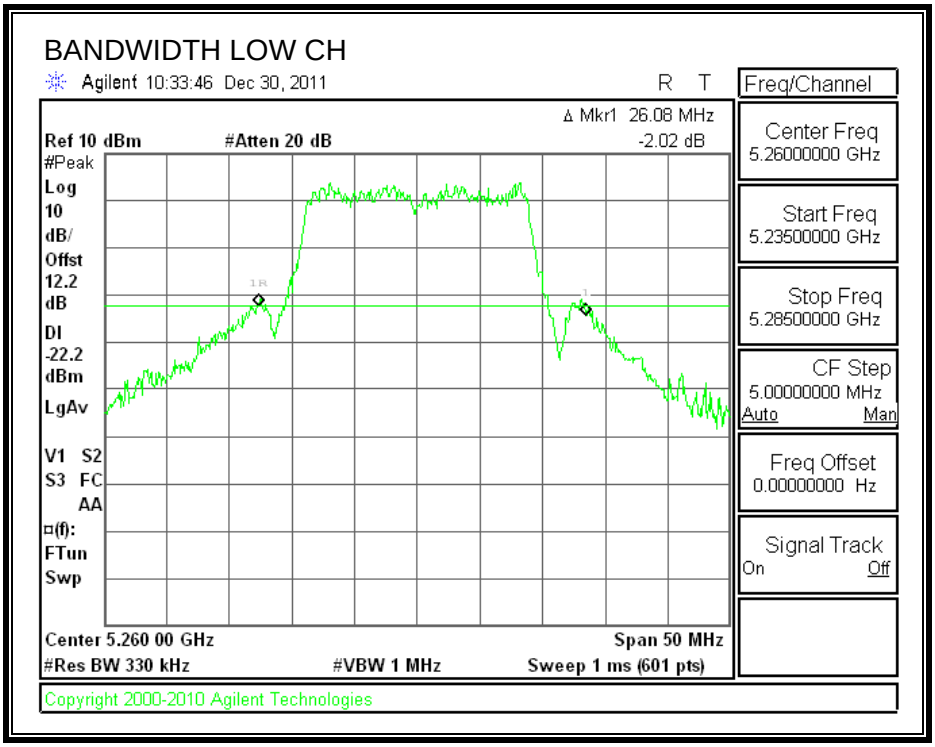


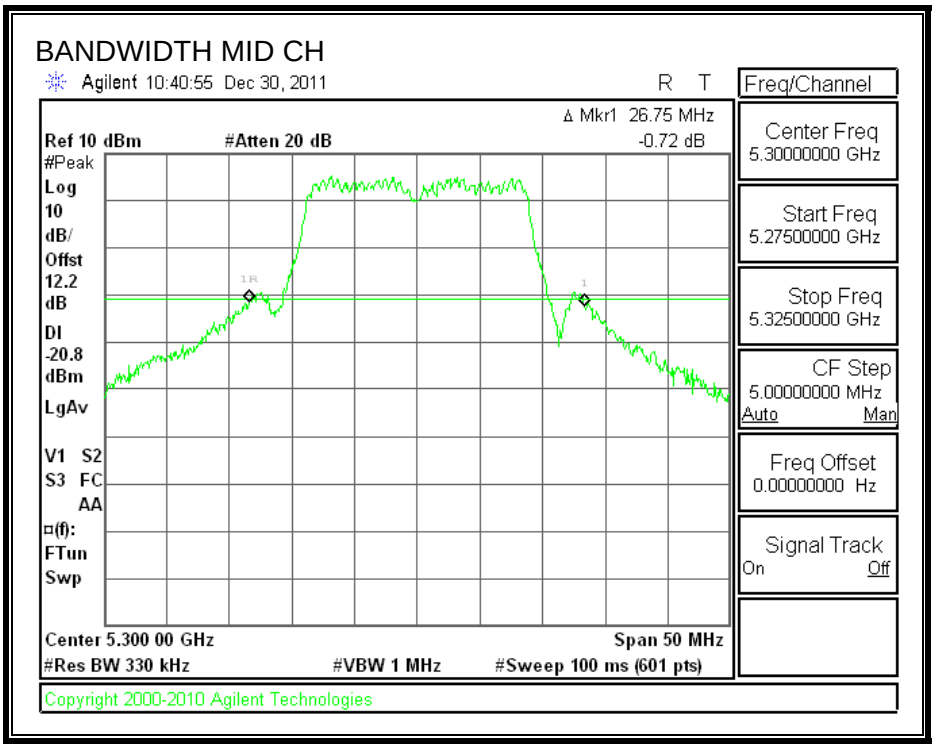


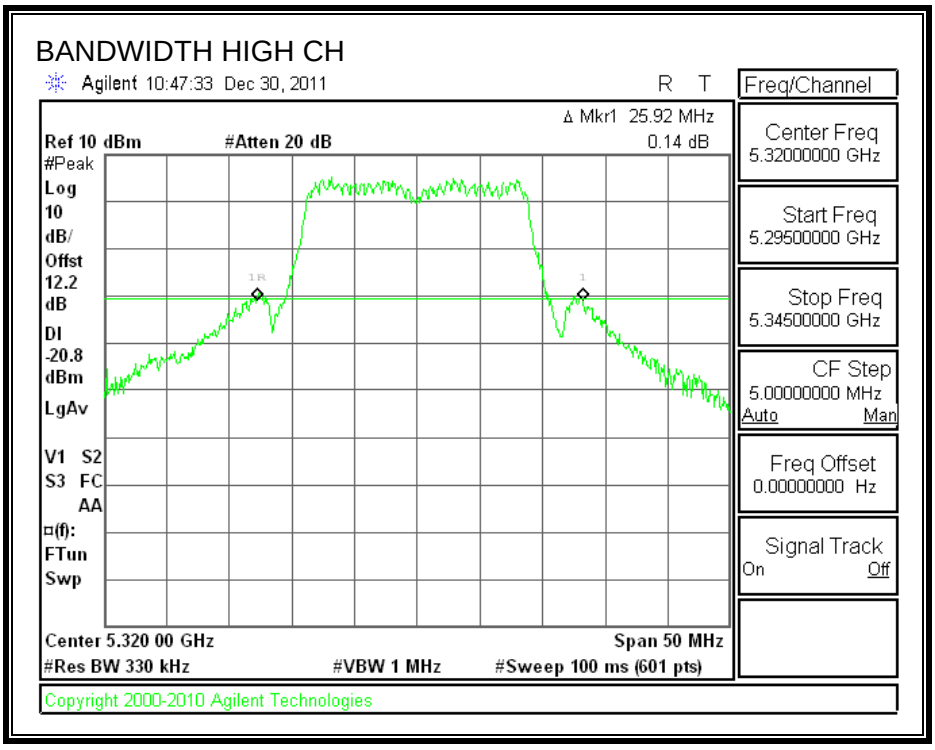


CHAIN 2

26 dB BANDWIDTH

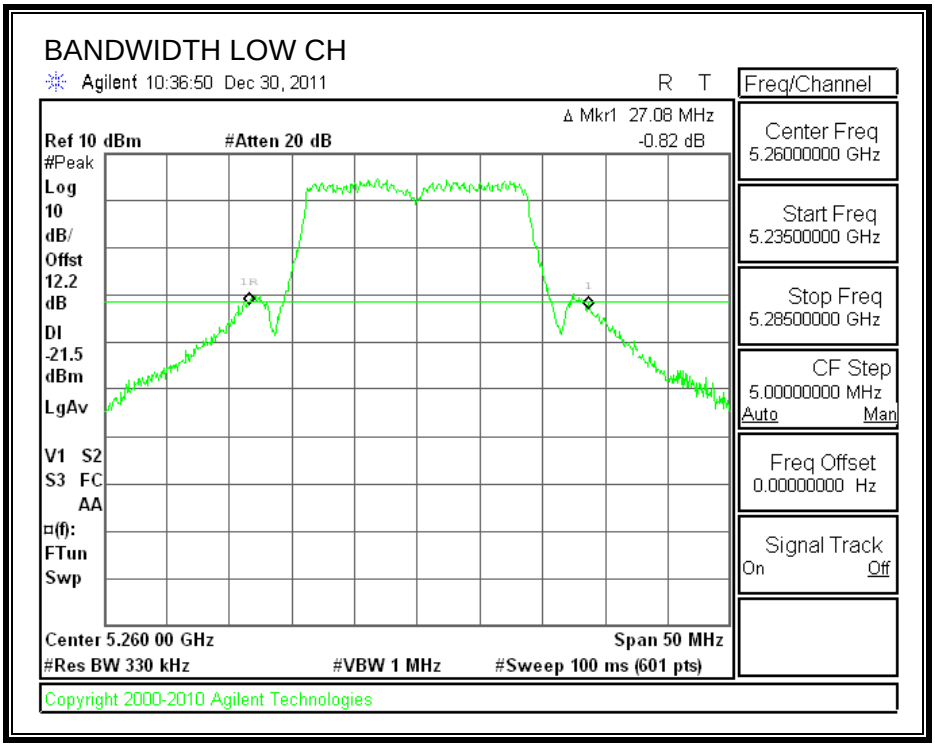


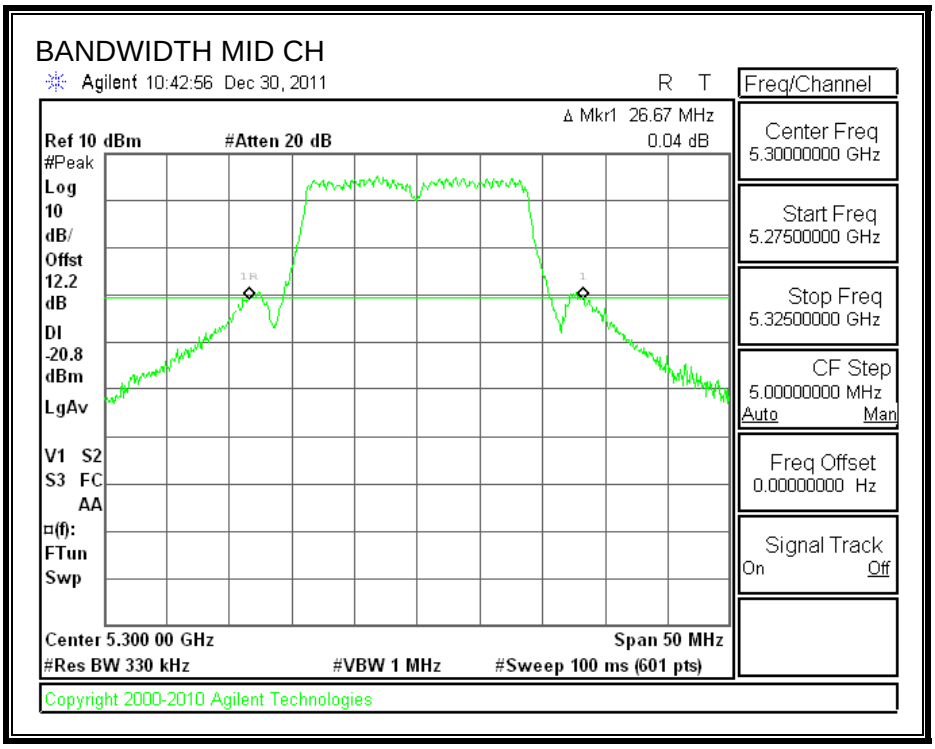




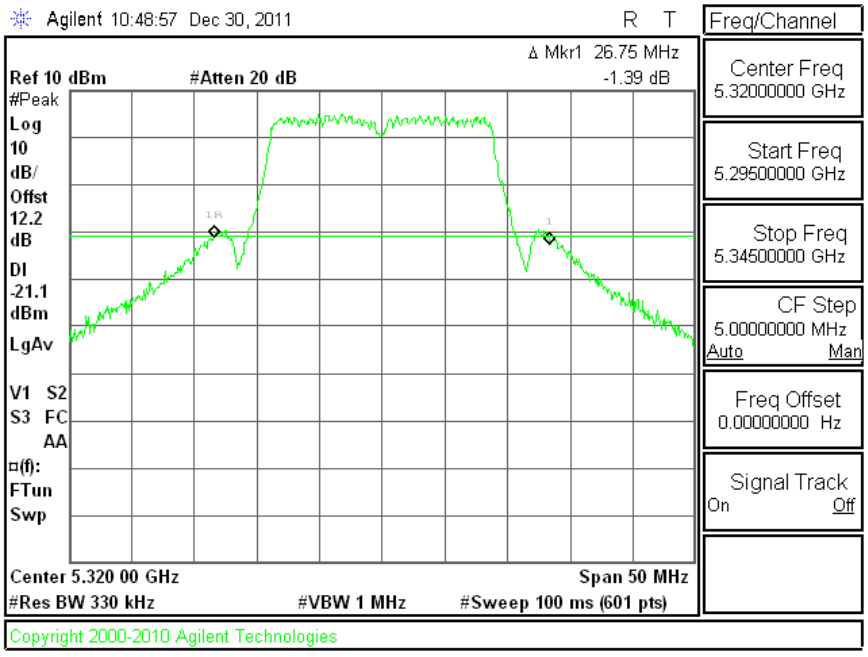
CHAIN 3

26 dB BANDWIDTH



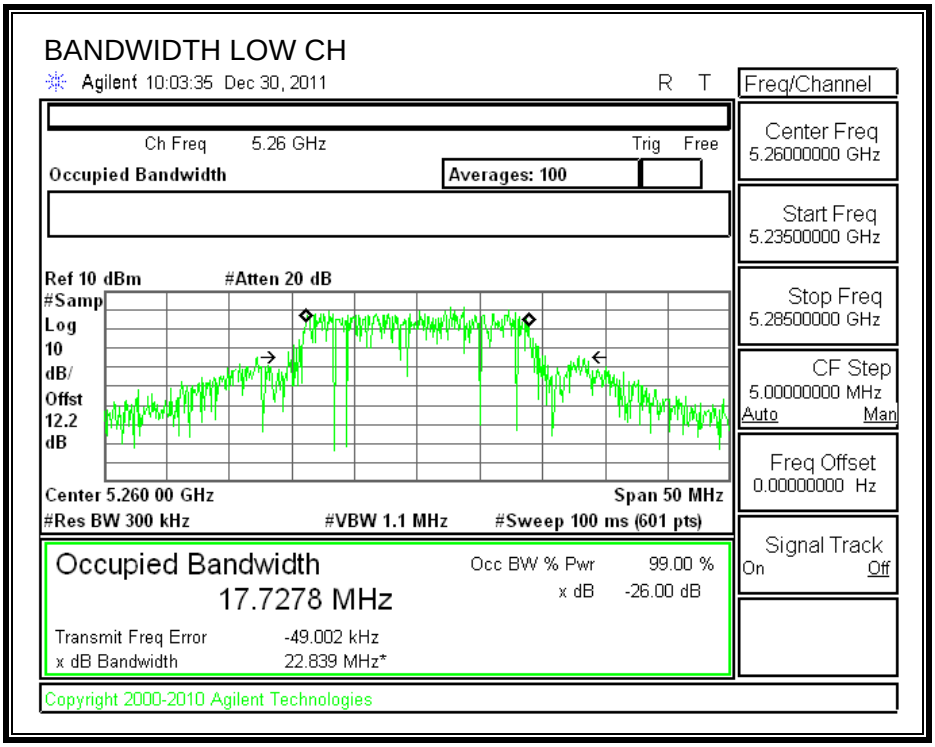


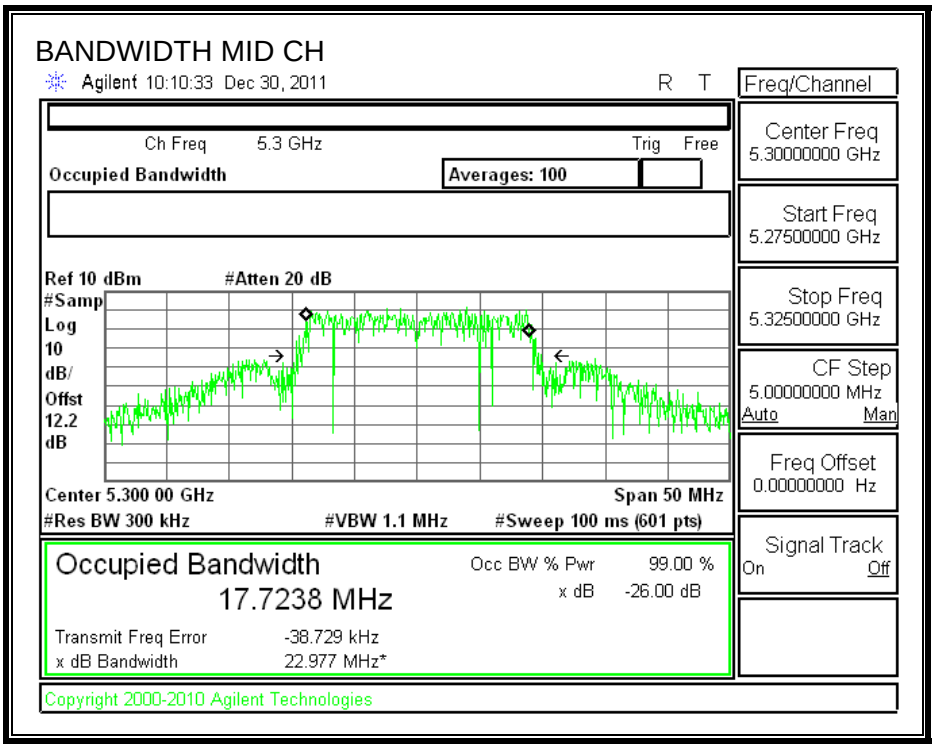
BANDWIDTH HIGH CH

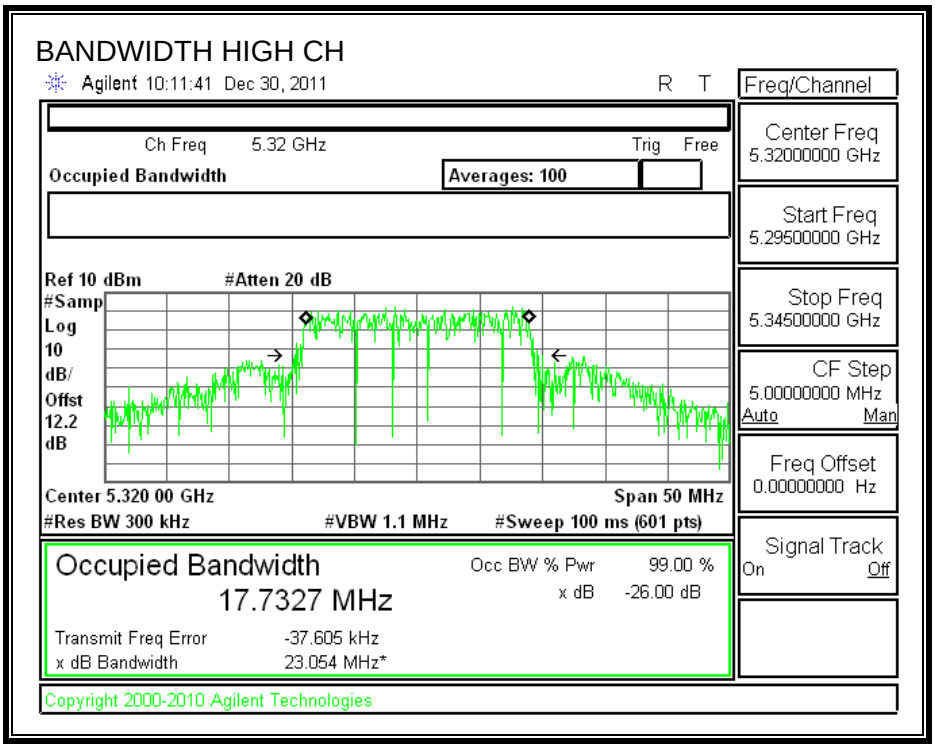


CHAIN 1

99% BANDWIDTH

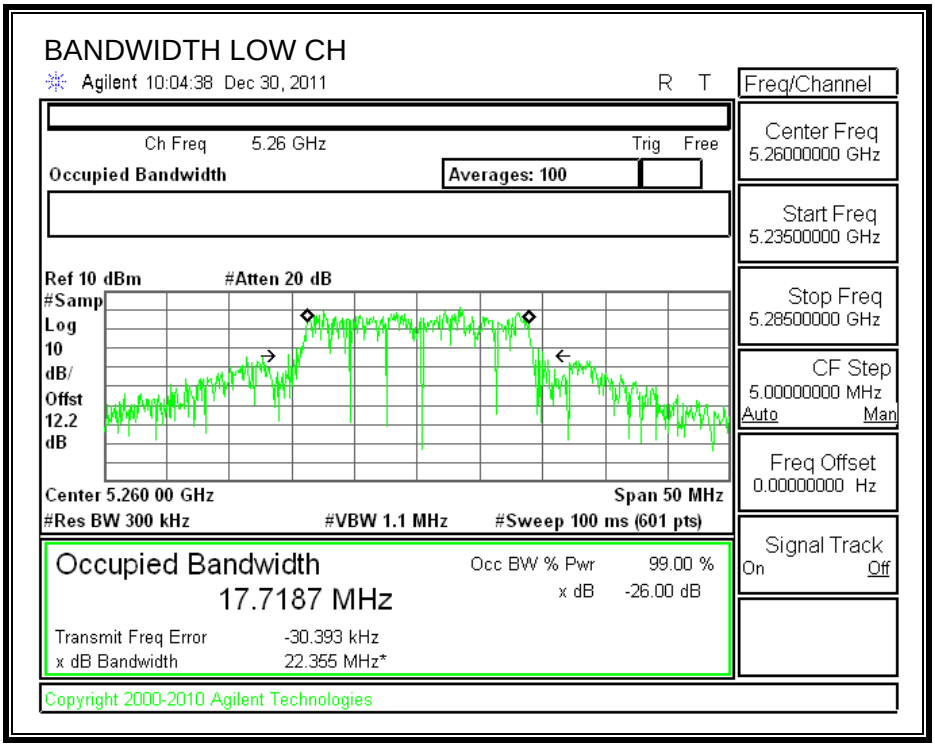


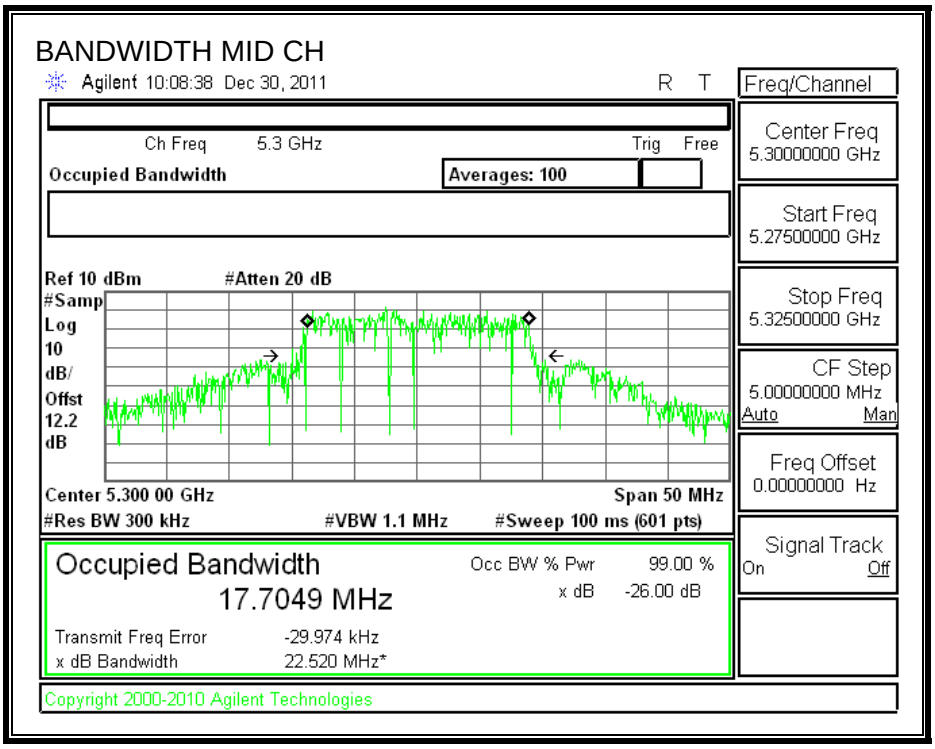


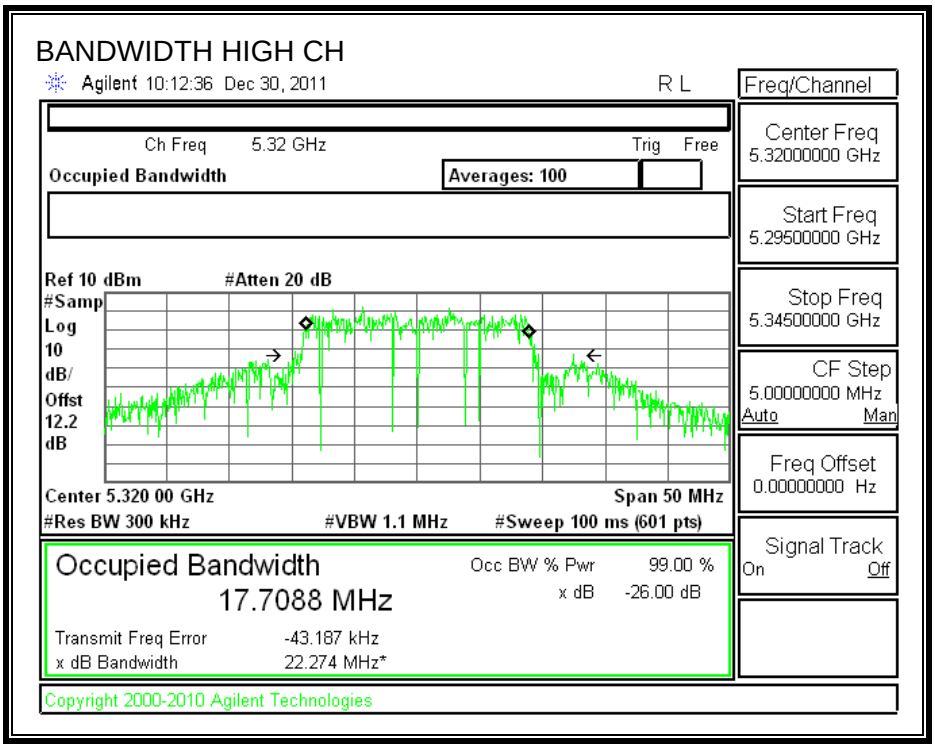


CHAIN 2

99% BANDWIDTH

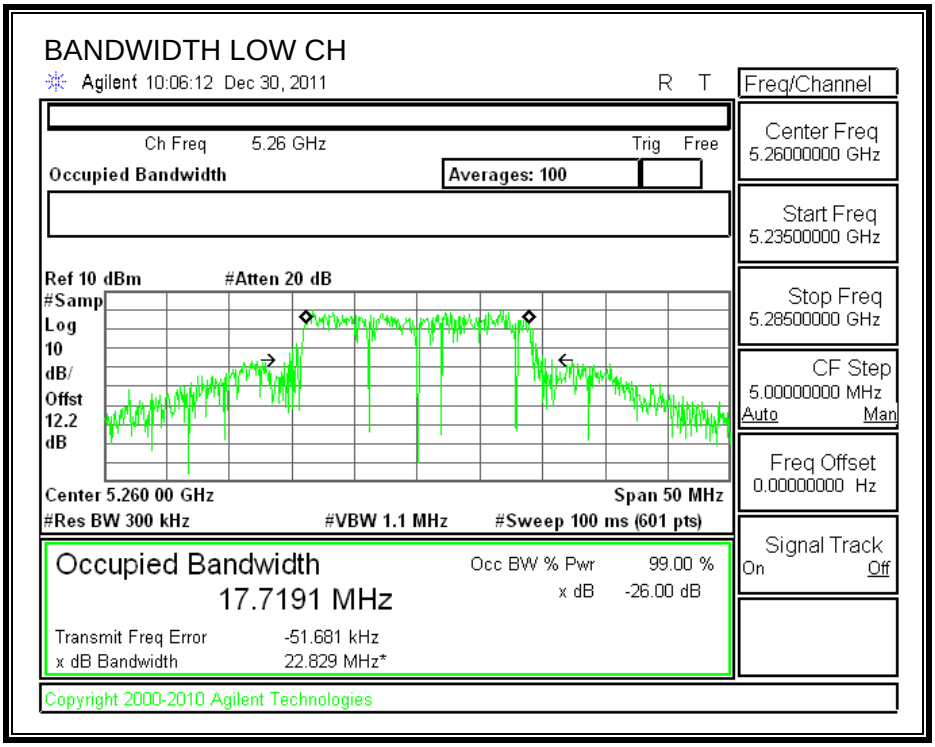


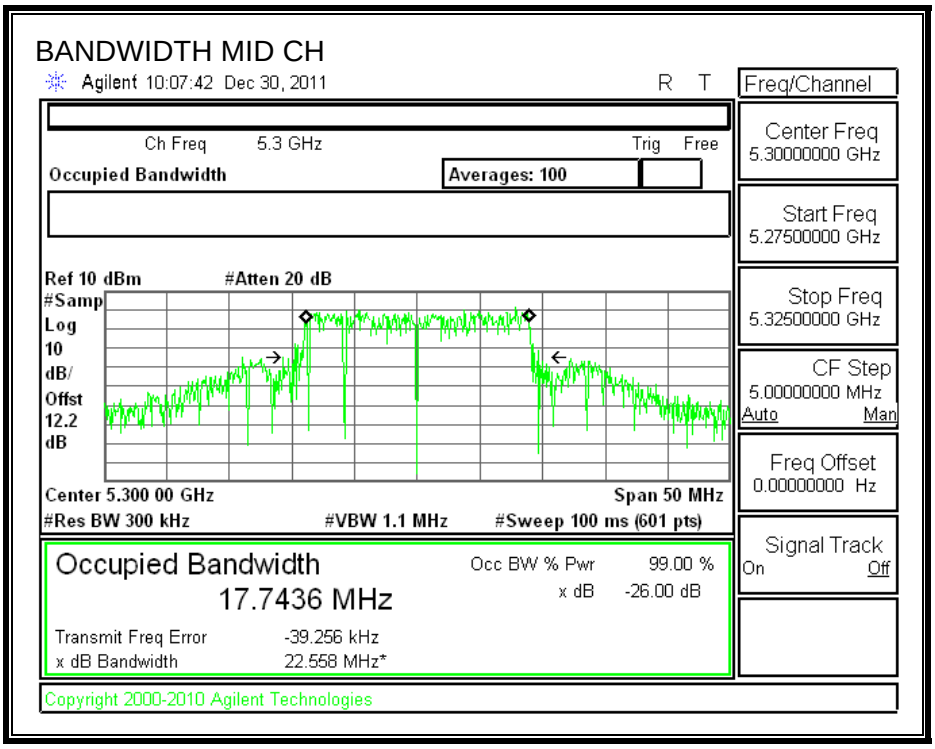


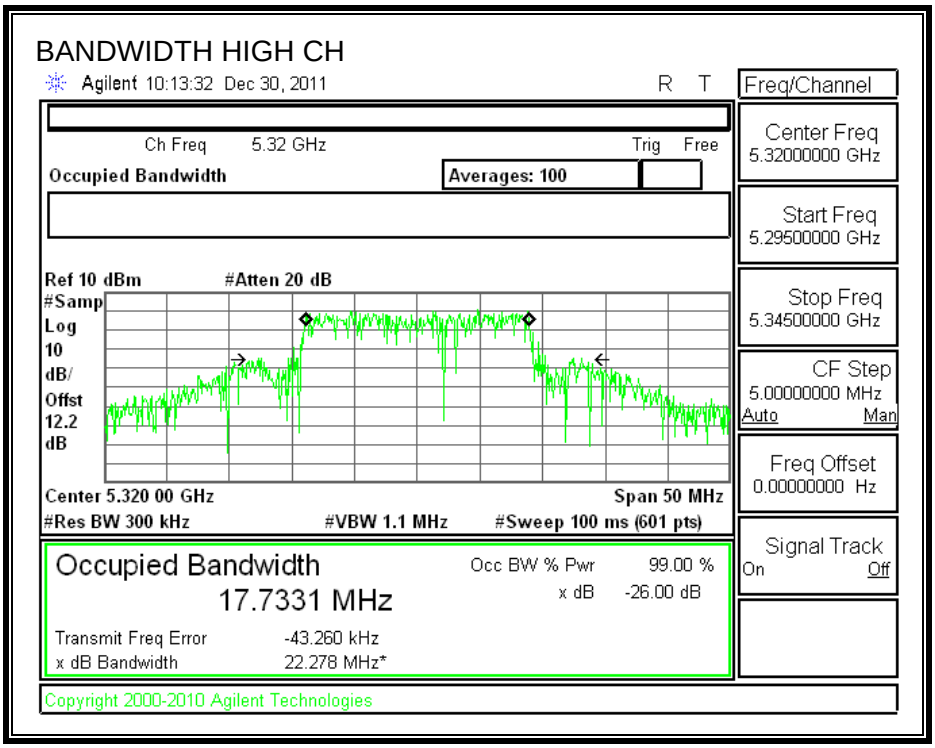


CHAIN 3

99% BANDWIDTH







7.12.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
5.05	6.56	3.01	9.88

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

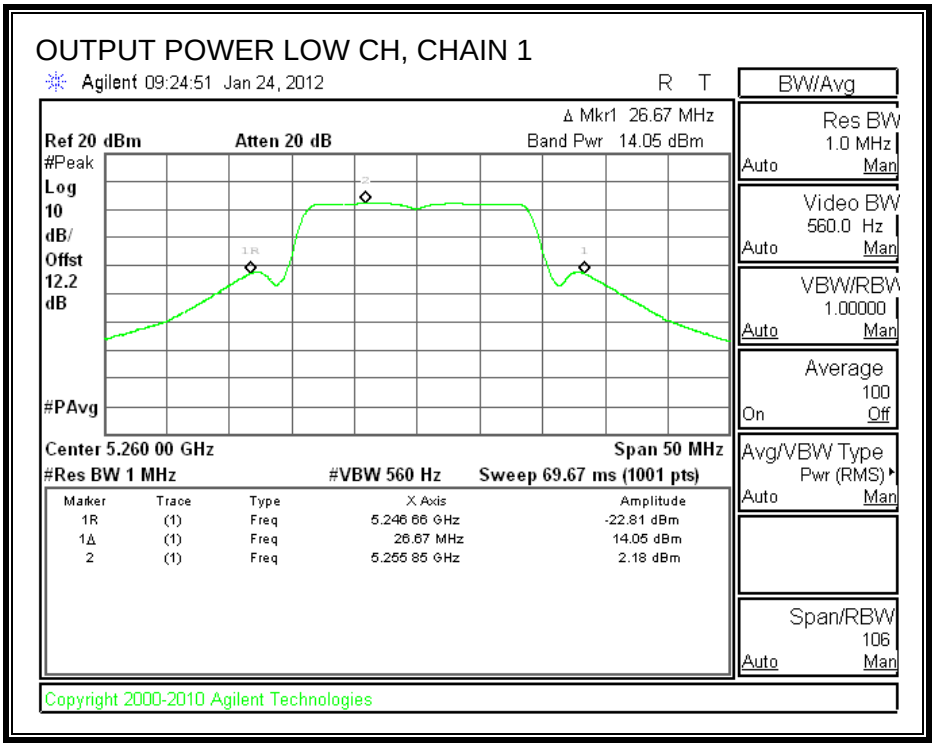
Limit

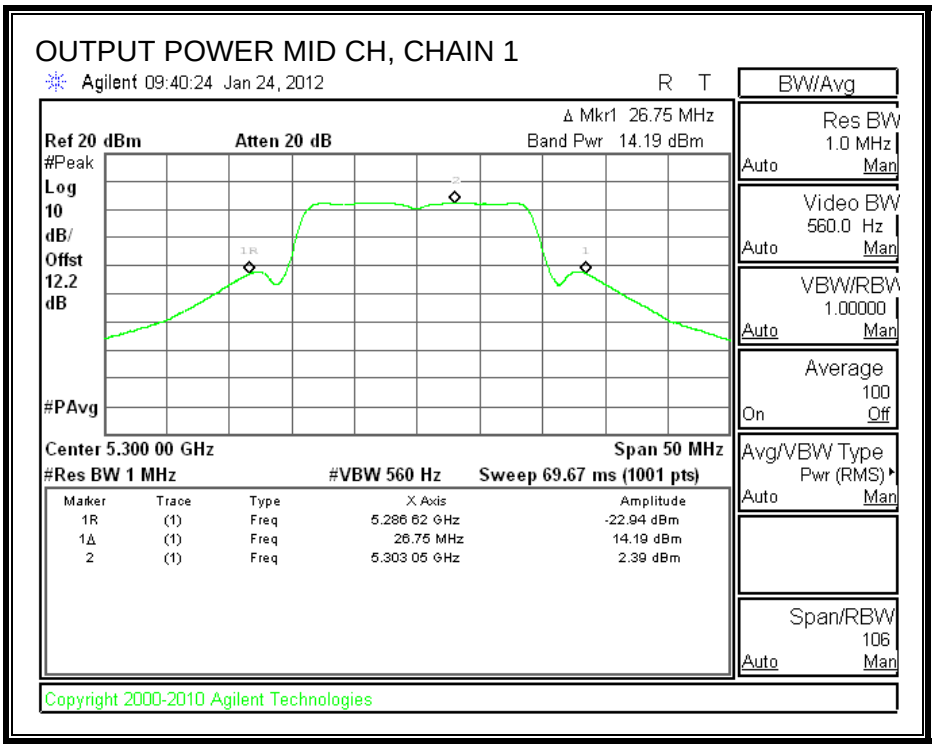
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	23.98	26.08	25.16	9.88	20.10
Mid	5300	23.98	26.67	25.26	9.88	20.10
High	5320	23.98	25.92	25.14	9.88	20.10

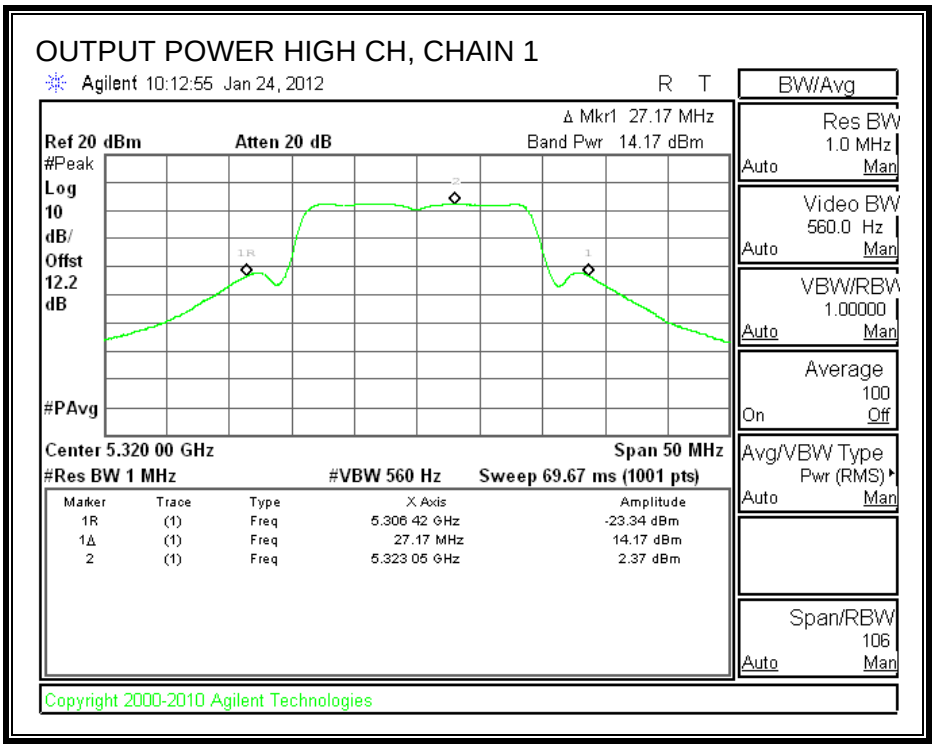
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	14.05	13.23	13.29	18.31	20.10	-1.79
Mid	5300	14.19	13.45	13.71	18.57	20.10	-1.53
High	5320	14.17	13.08	13.88	18.51	20.10	-1.59

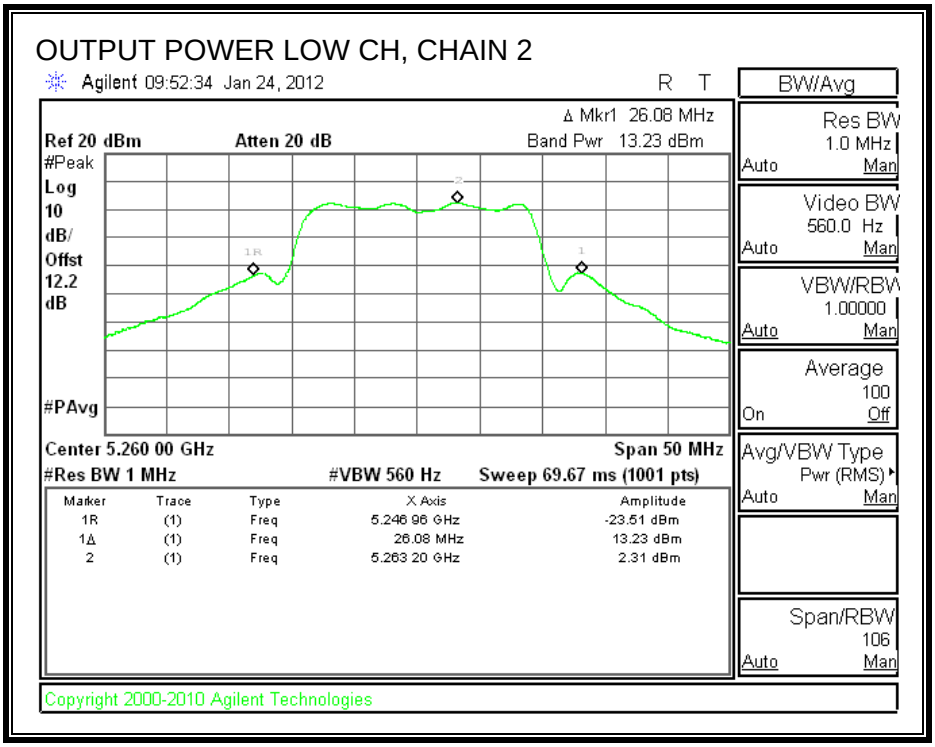
CHAIN 1 OUTPUT POWER

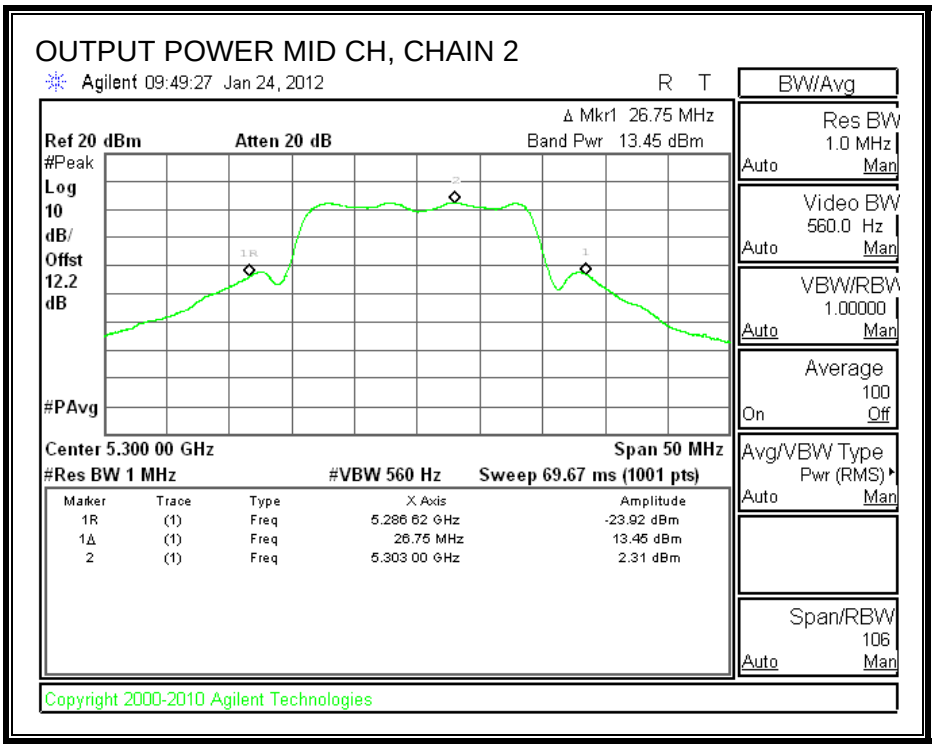


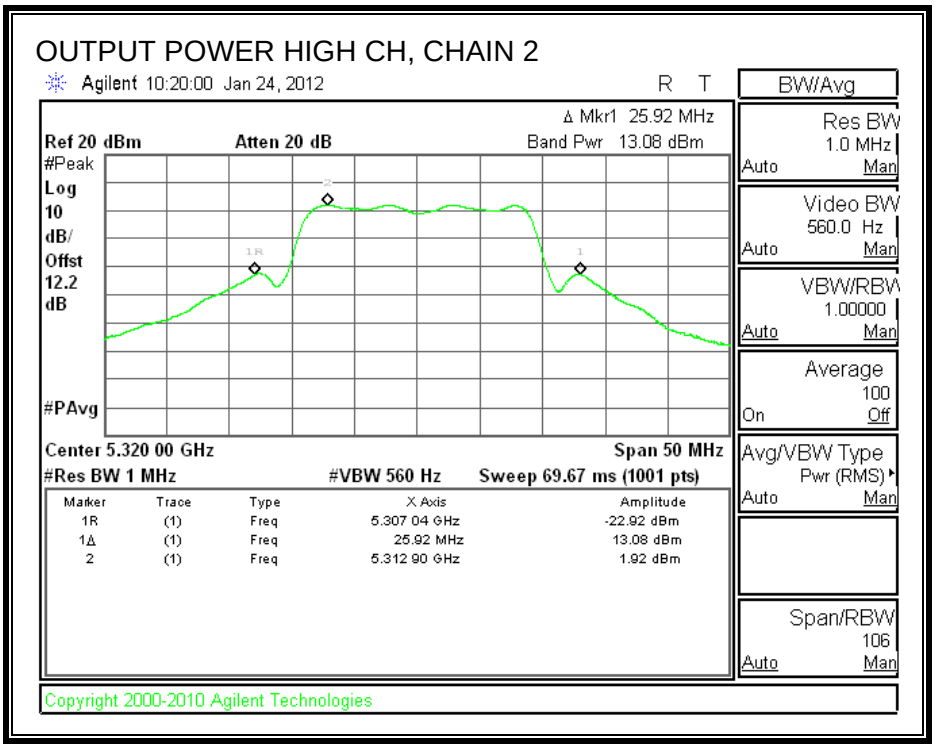




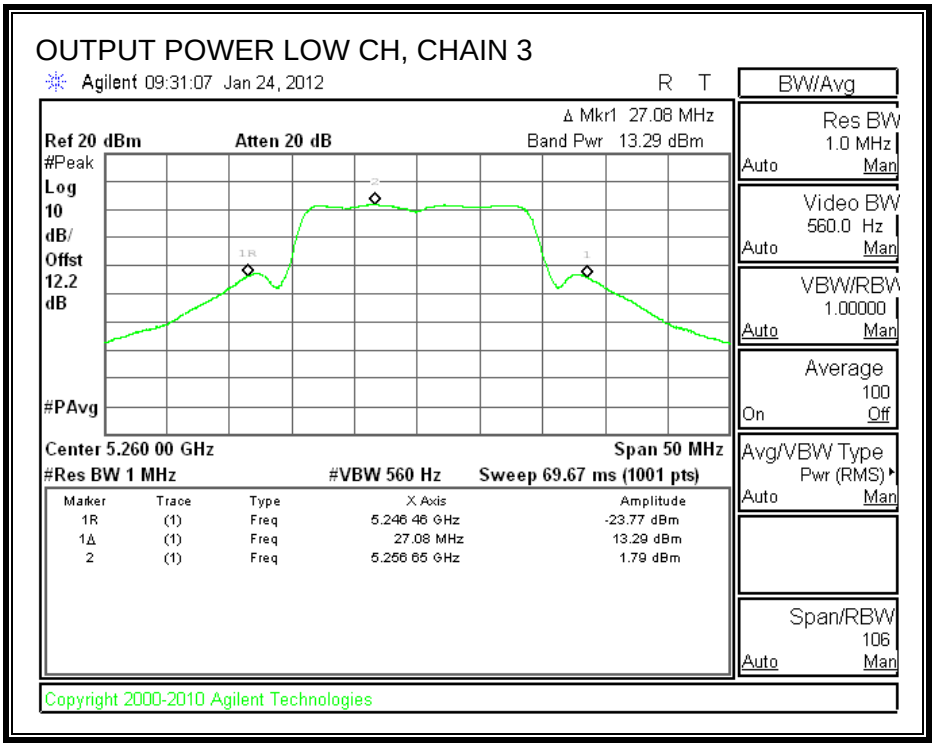
CHAIN 2 OUTPUT POWER

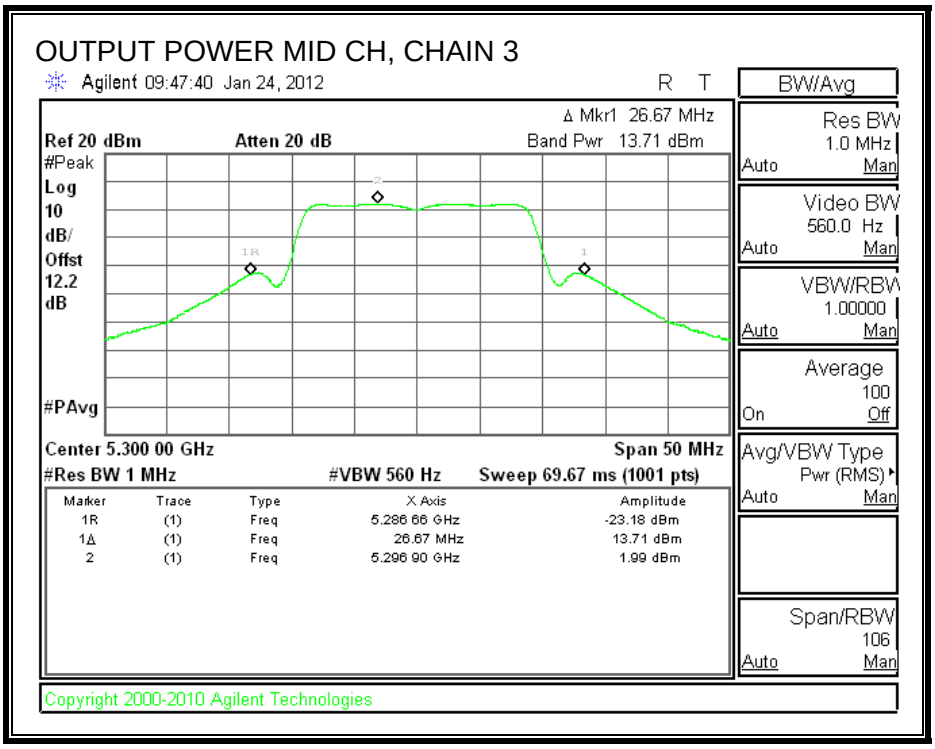


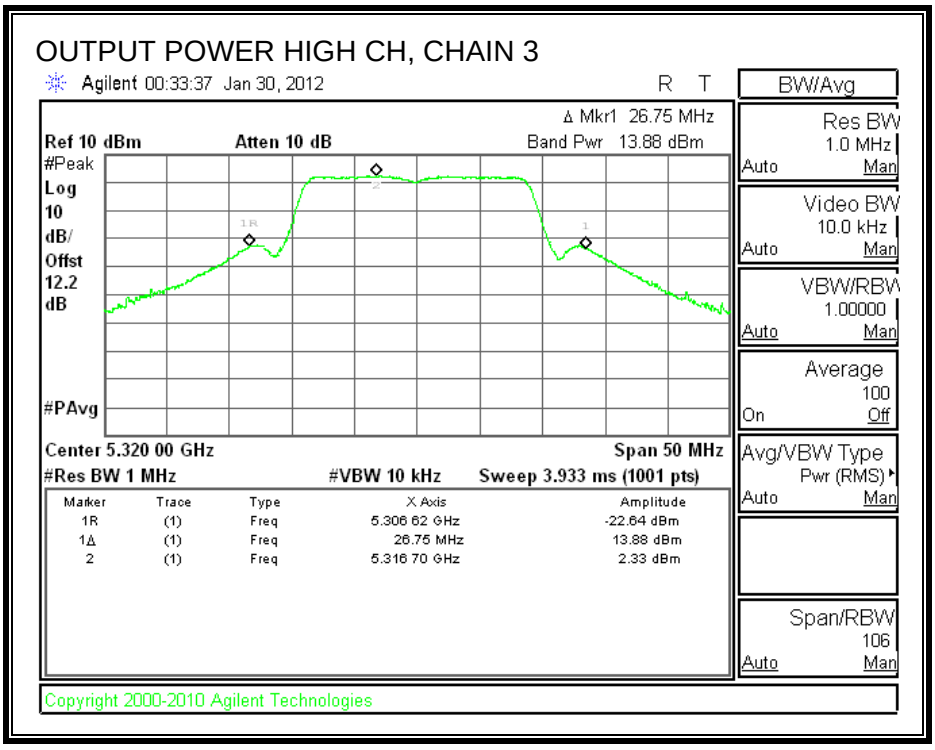




CHAIN 3 OUTPUT POWER







7.12.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5260	12.75	12.16	12.07	17.11
Middle	5300	13.03	12.09	12.89	17.46
High	5320	12.81	11.73	12.61	17.18

7.12.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
5.05	6.56	3.01	9.88

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 9.88 dBi, therefore the limit is 7.12 dBm.

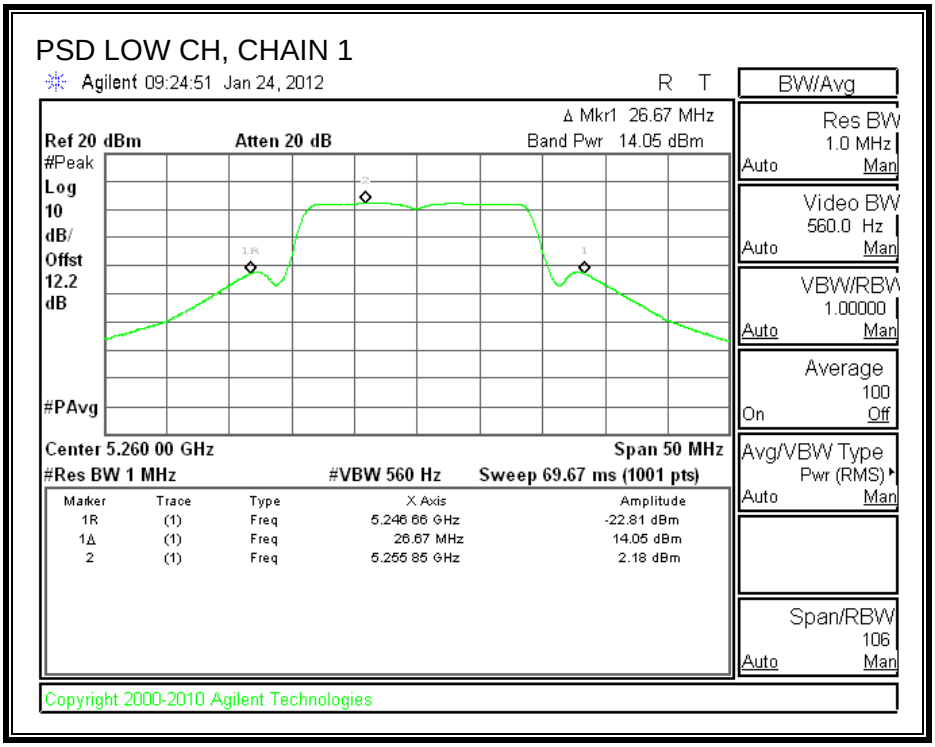
TEST PROCEDURE

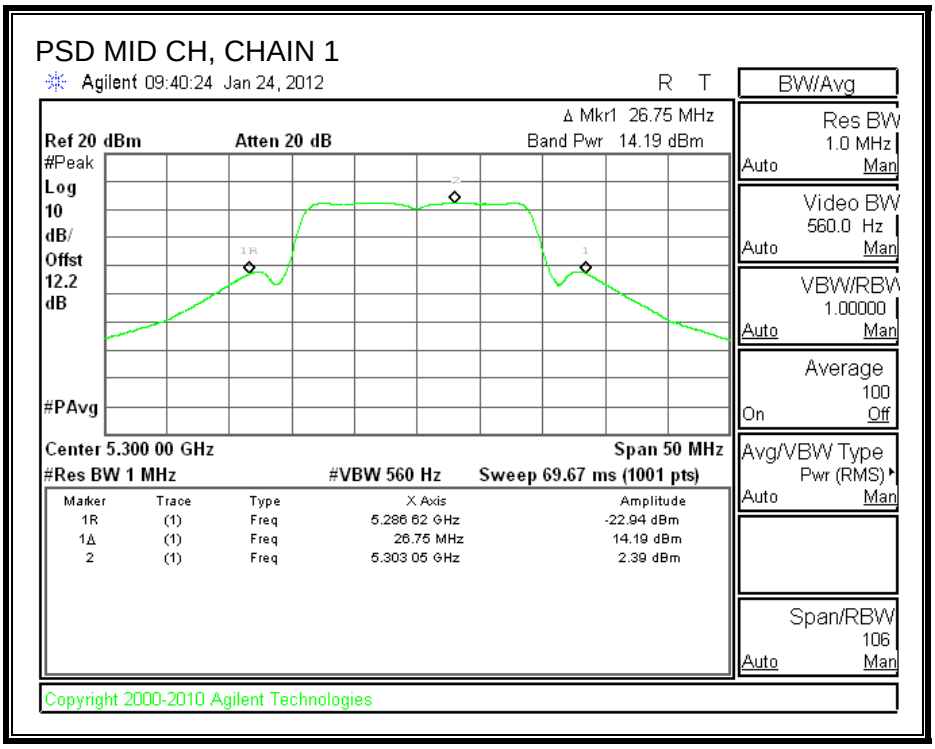
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

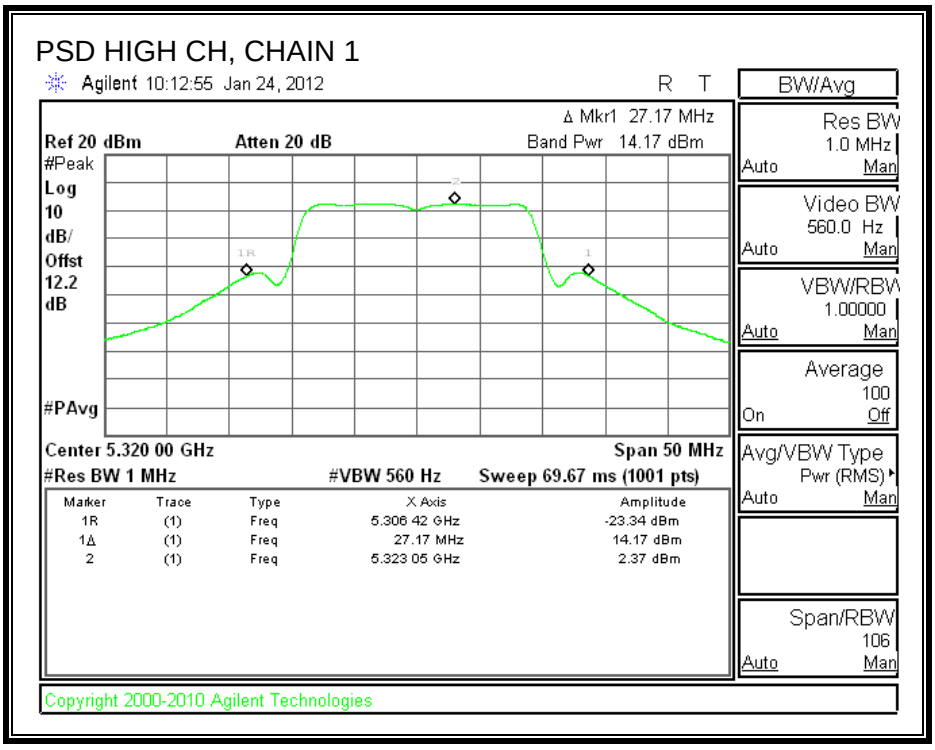
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	2.18	2.31	1.79	6.87	7.12	-0.25
Middle	5300	2.39	2.31	1.99	7.00	7.12	-0.12
High	5320	2.37	1.92	2.33	6.98	7.12	-0.14

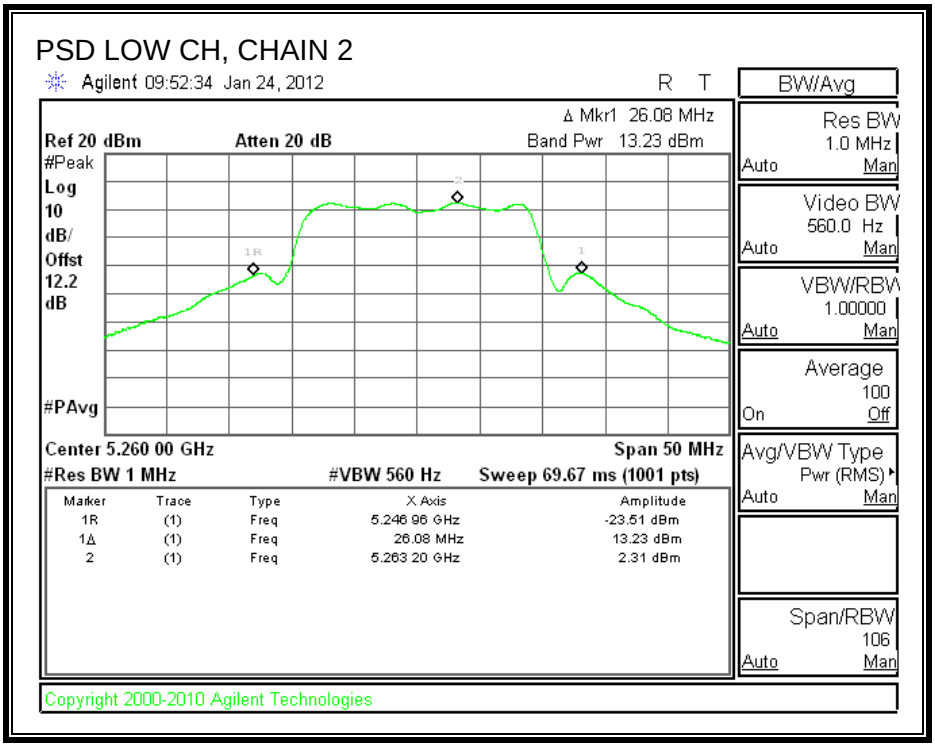
CHAIN 1 POWER SPECTRAL DENSITY

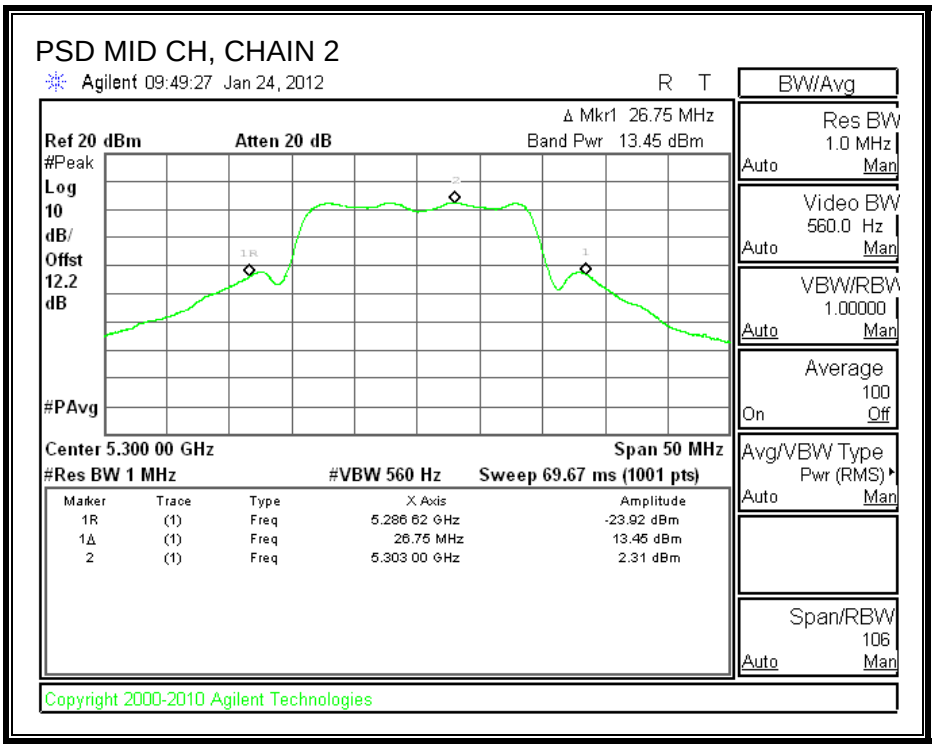


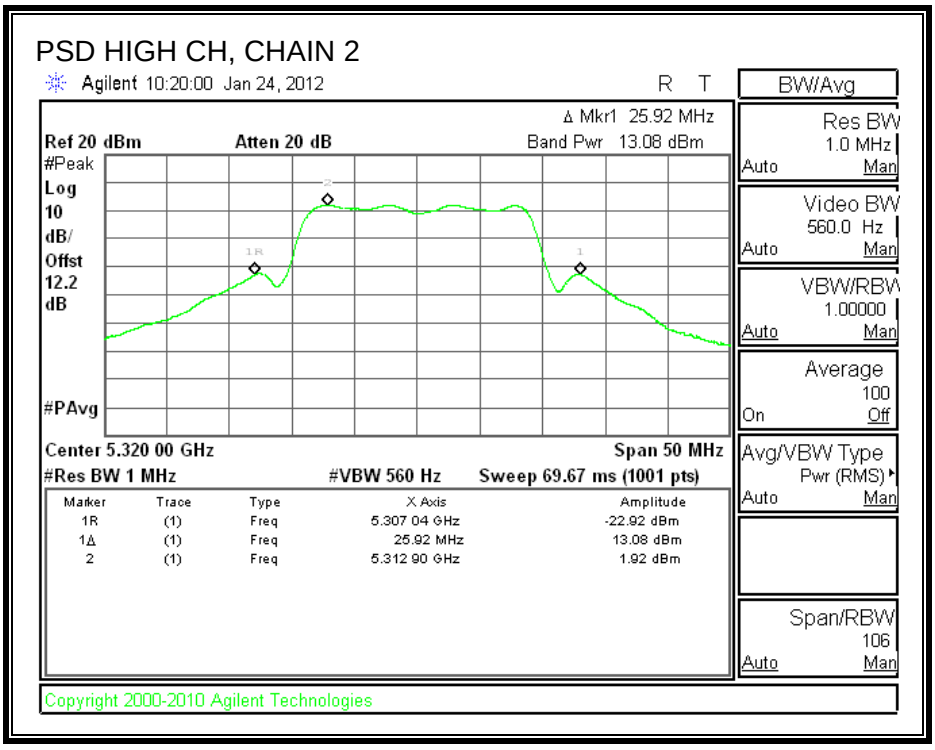




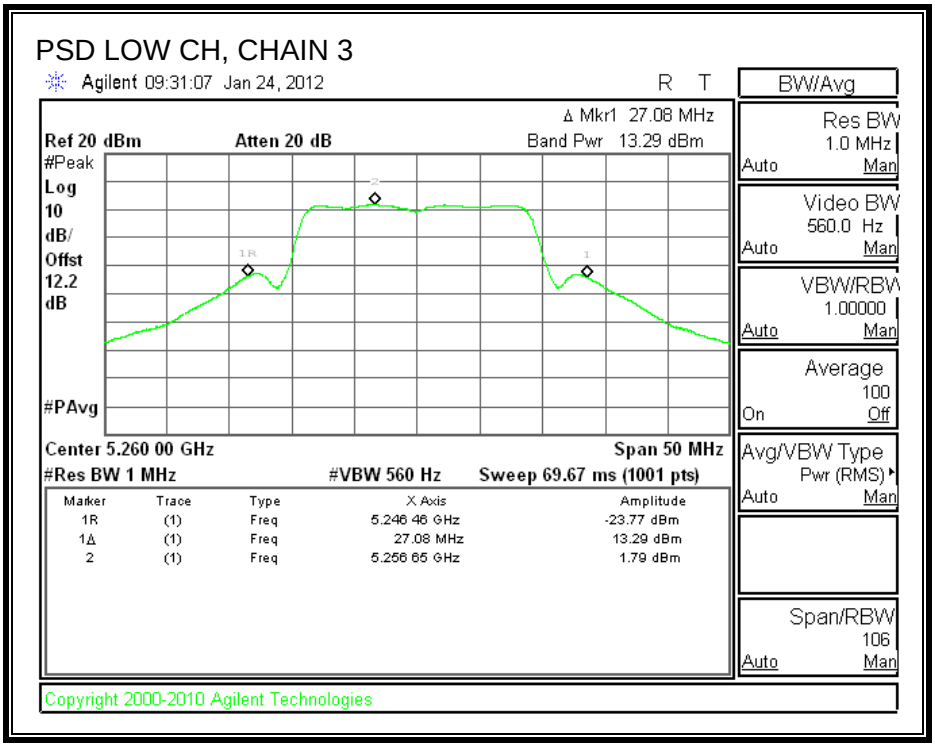
CHAIN 2 POWER SPECTRAL DENSITY

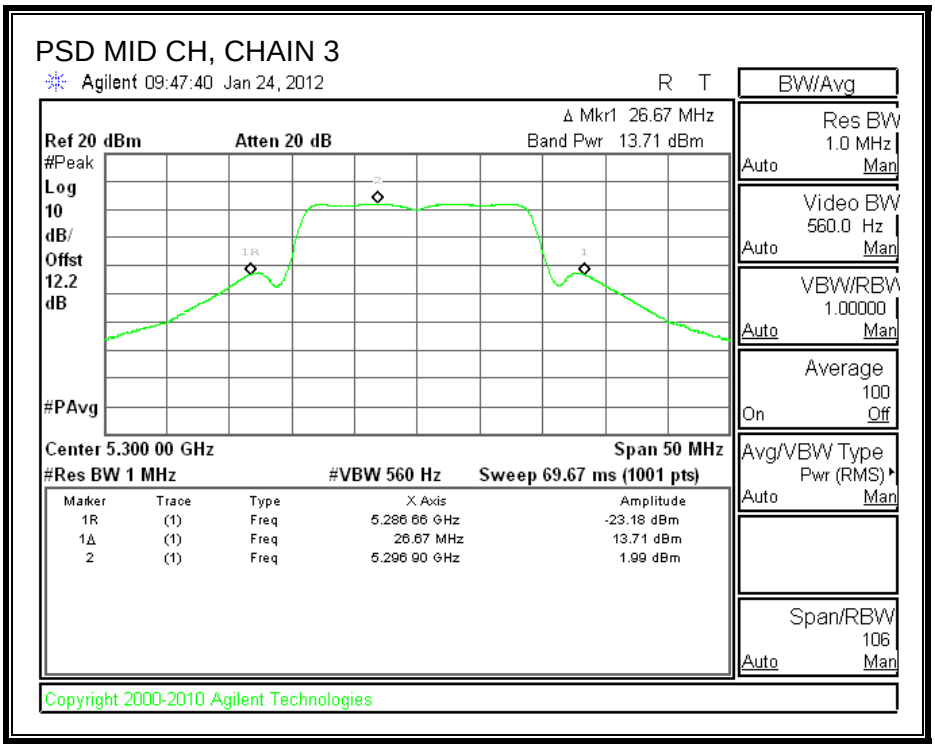


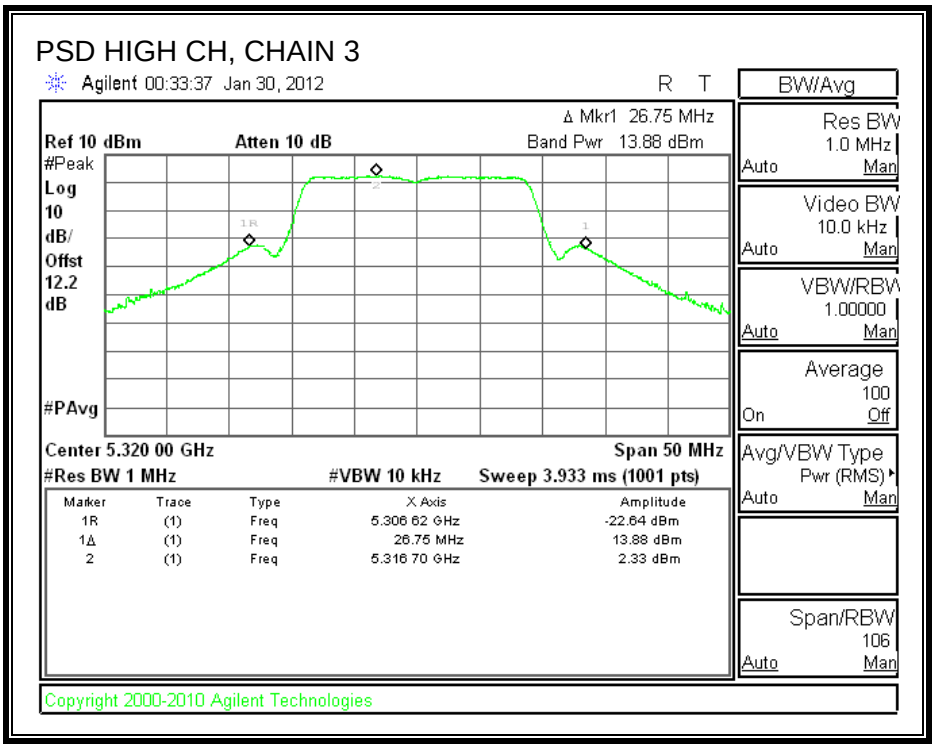




CHAIN 3 POWER SPECTRAL DENSITY







7.12.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.26	13	-5.74
Middle	5300	7.56	13	-5.44
High	5320	7.21	13	-5.79

CHAIN 2

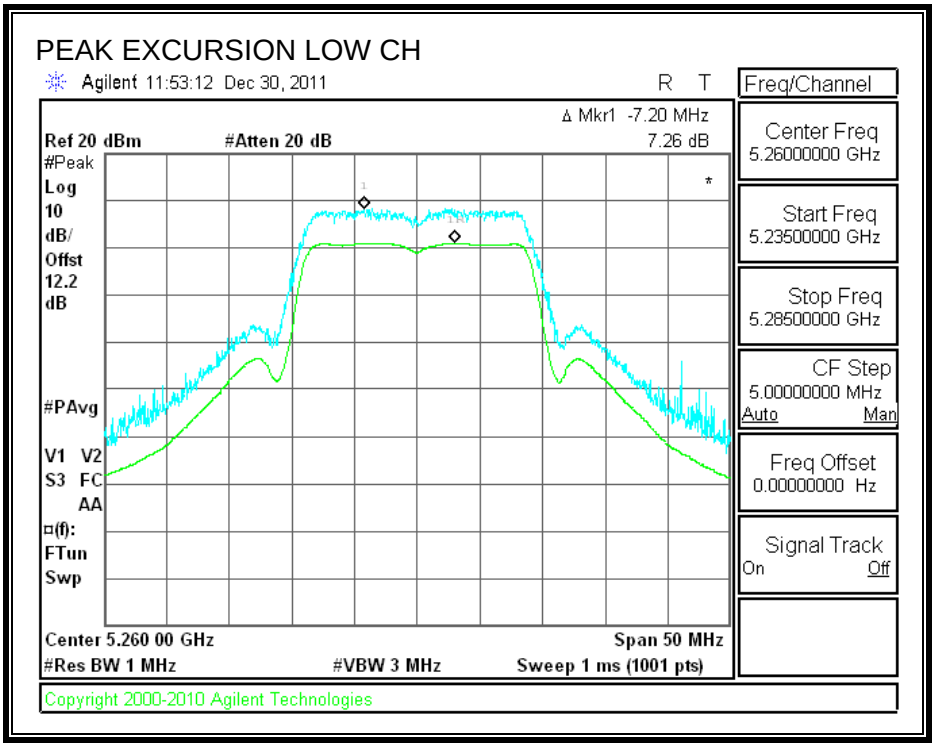
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	8.52	13	-4.48
Middle	5300	8.36	13	-4.64
High	5320	7.64	13	-5.36

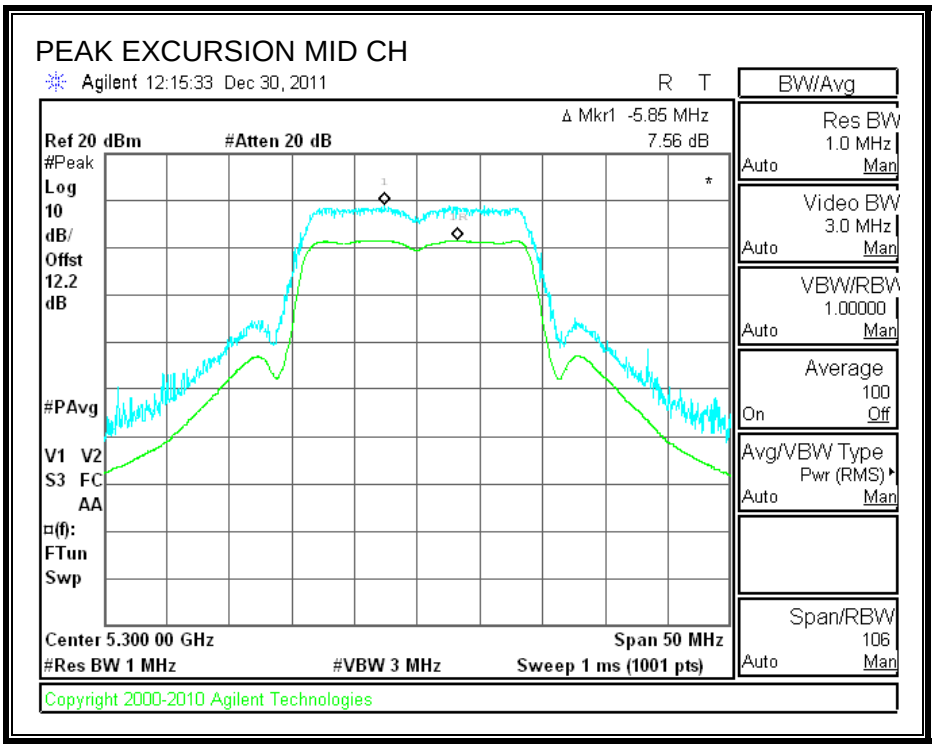
CHAIN 3

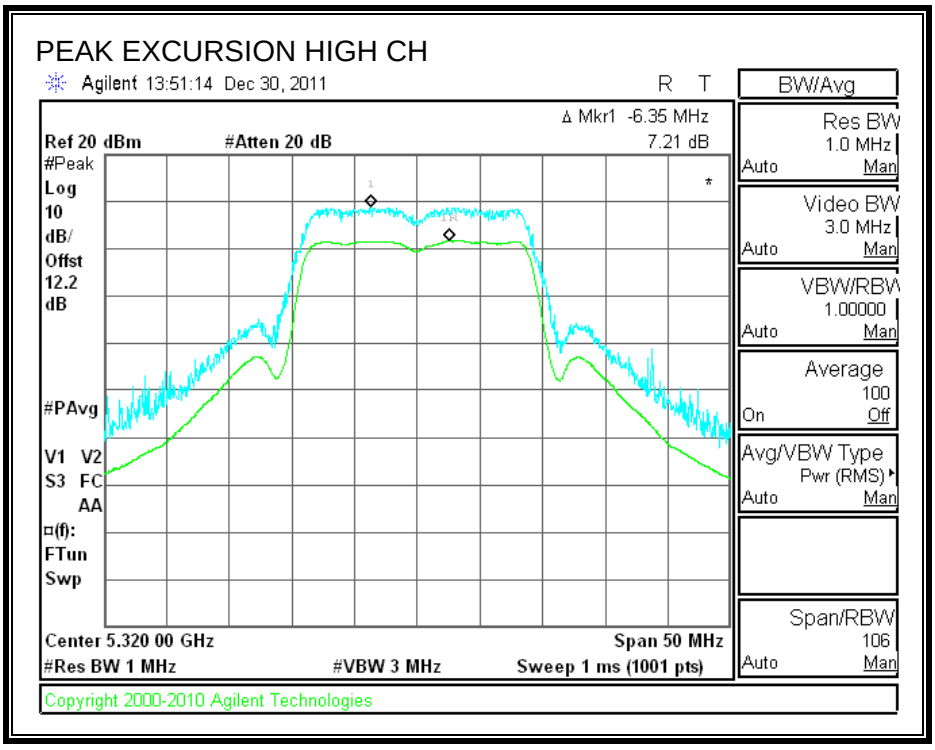
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	8.21	13	-4.79
Middle	5300	8.80	13	-4.20
High	5320	8.31	13	-4.69

CHAIN 1

PEAK EXCURSION

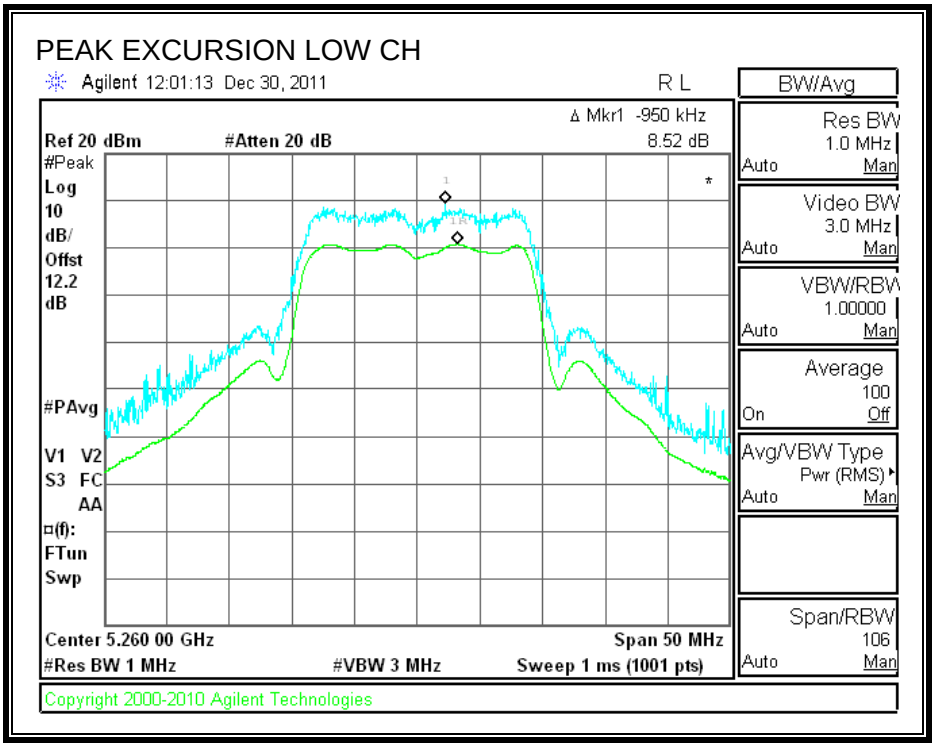


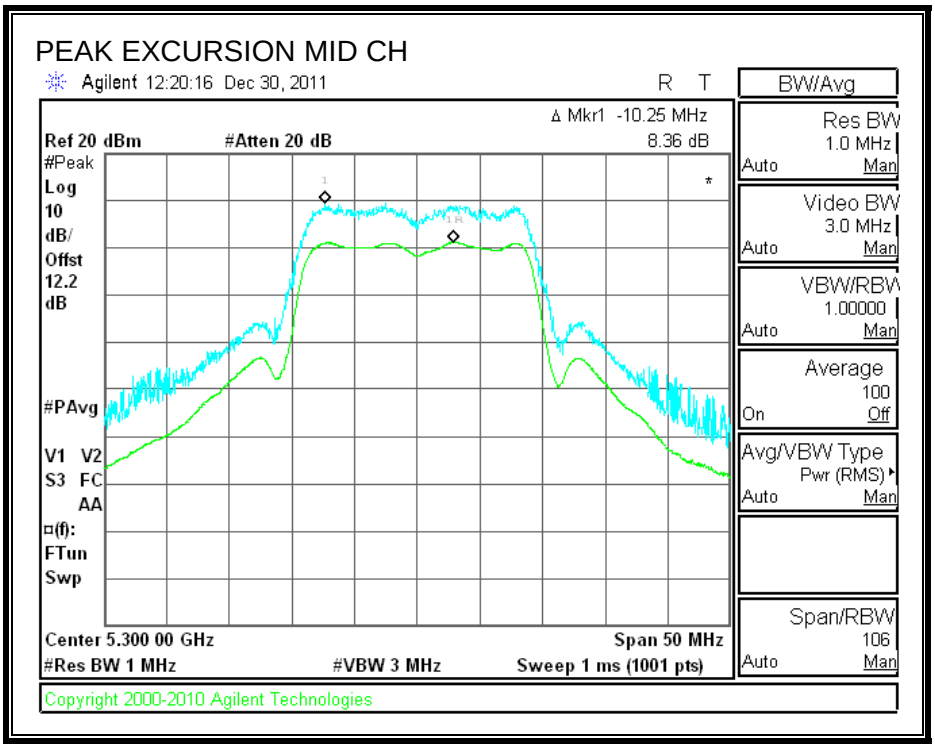


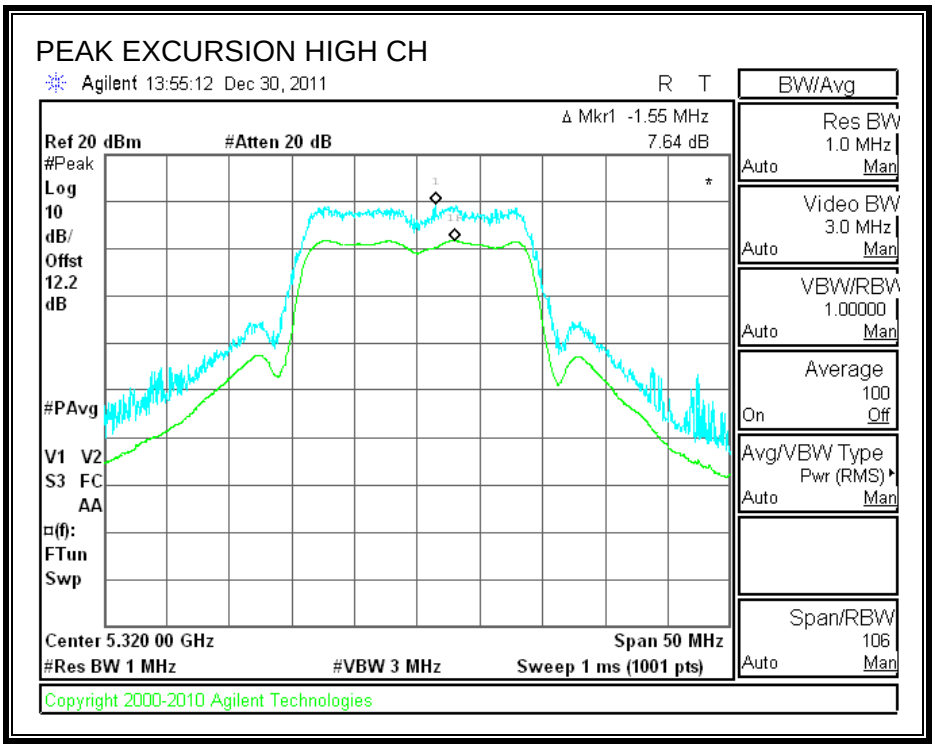


CHAIN 2

PEAK EXCURSION

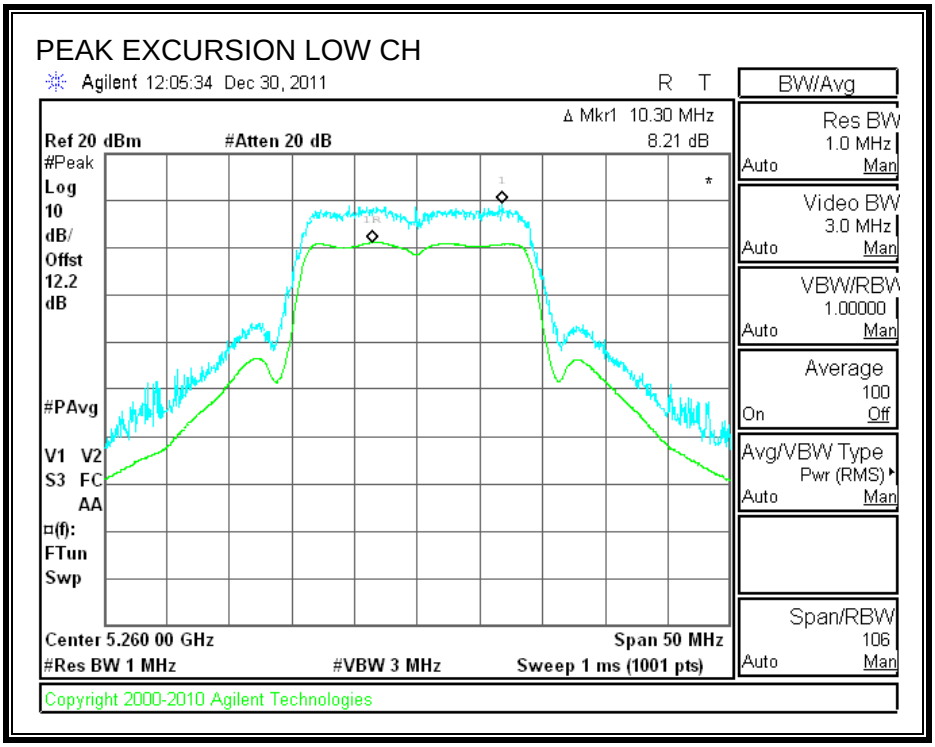


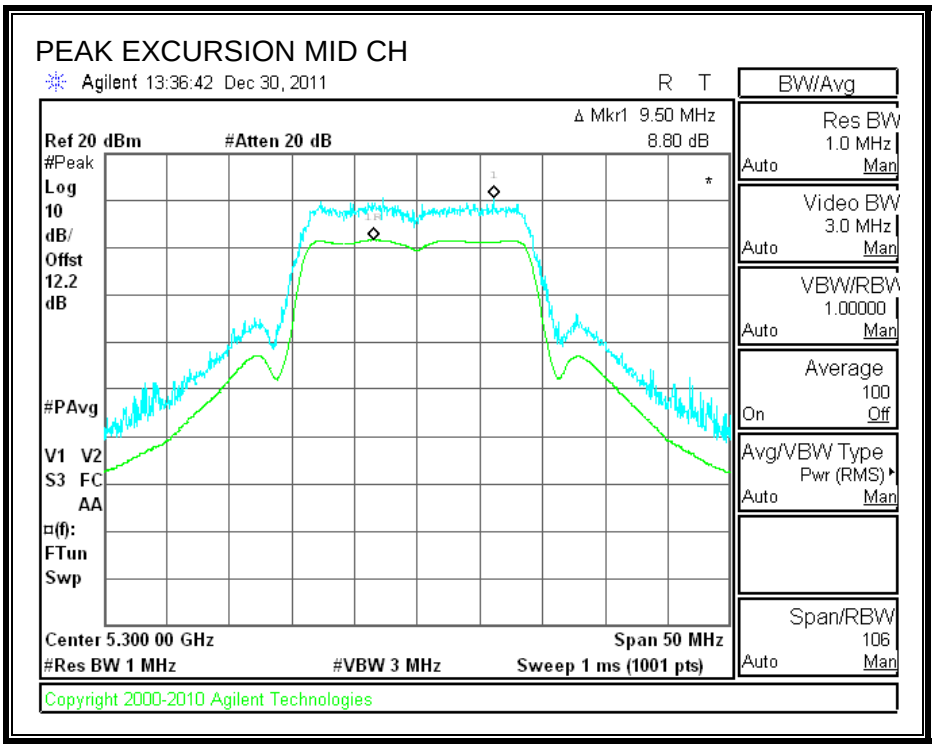


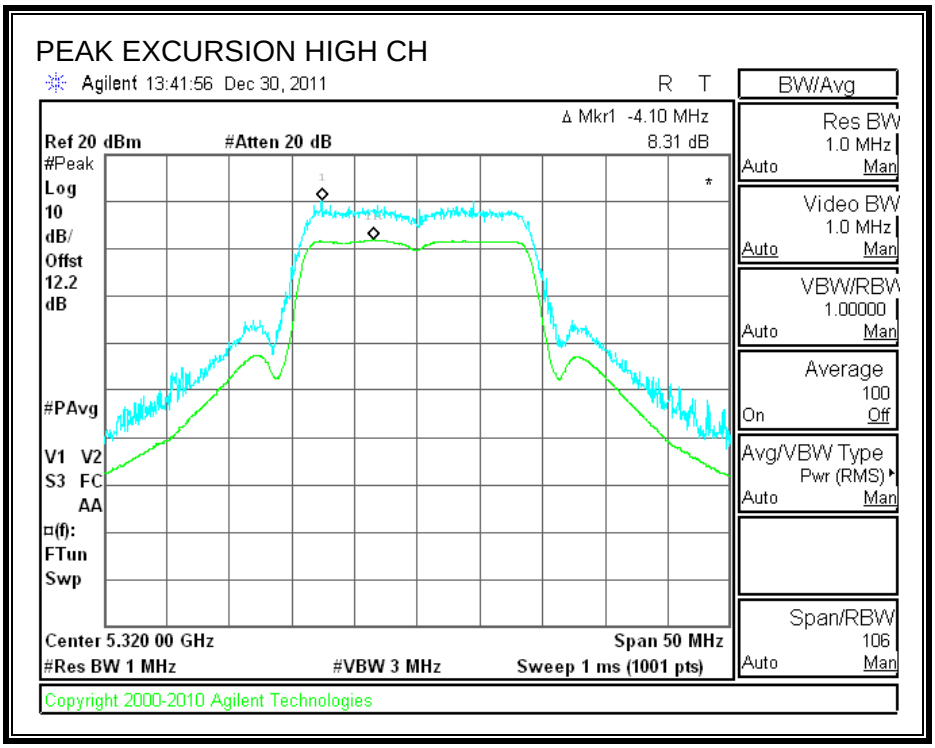


CHAIN 3

PEAK EXCURSION







7.13. 802.11n HT20 3TX MODE IN THE 5.3 GHz BAND, SDM MCS21

7.13.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	28.15	17.7908
Middle	5300	27.4	17.805
High	5320	28.6	17.7693

CHAIN 2

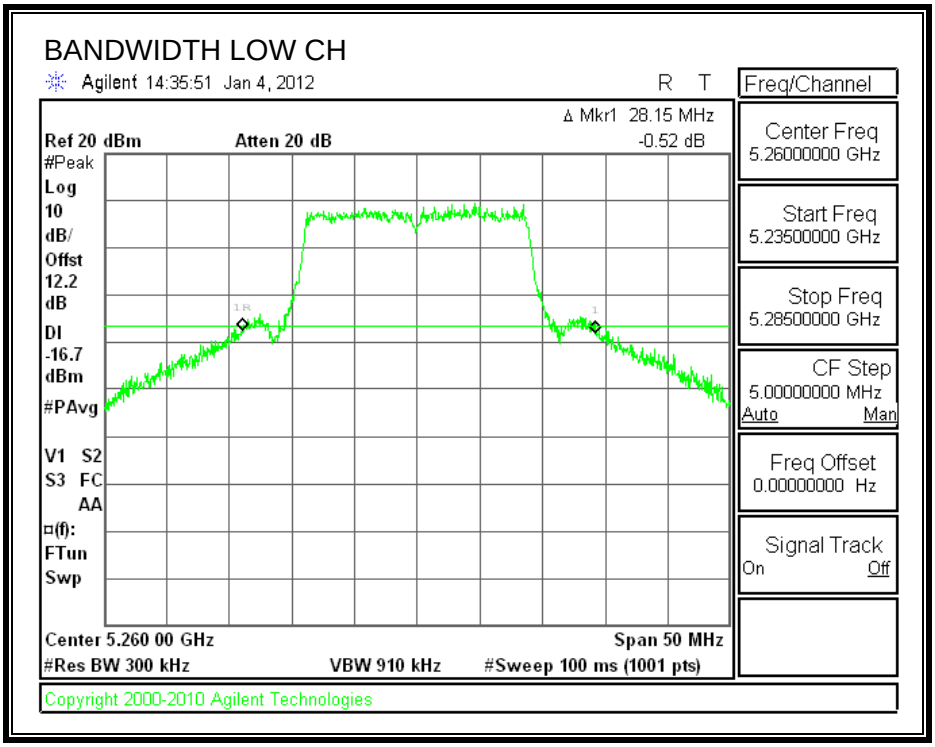
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	27.15	17.8499
Middle	5300	28.2	17.8219
High	5320	27.45	17.8395

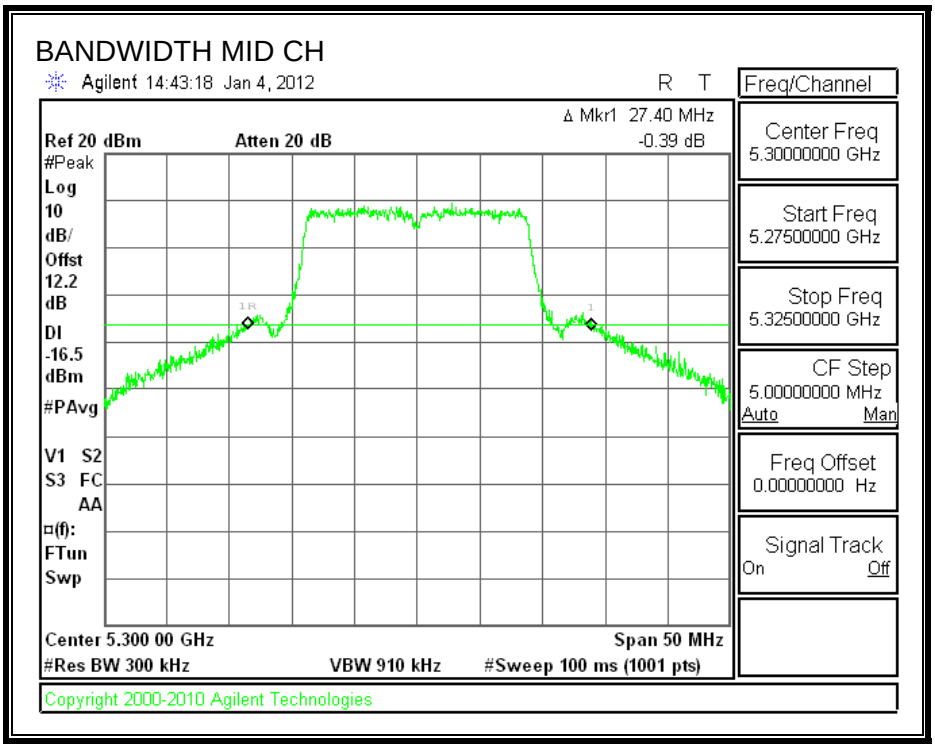
CHAIN 3

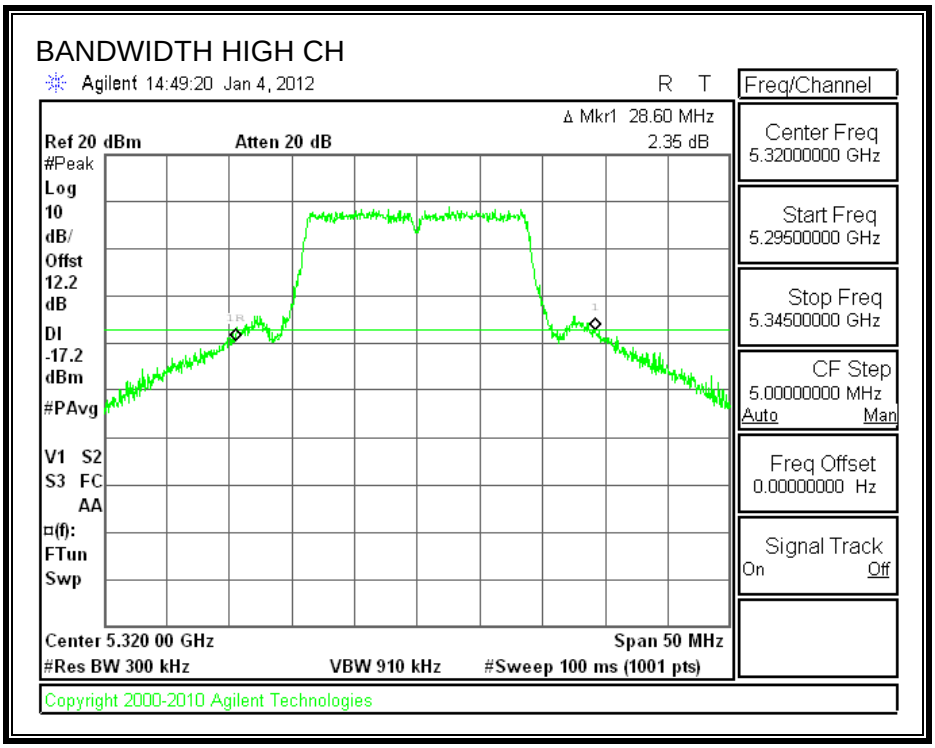
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5260	27.15	17.7981
Middle	5300	27.05	17.7925
High	5320	27.85	17.8172

CHAIN 1

26 dB BANDWIDTH

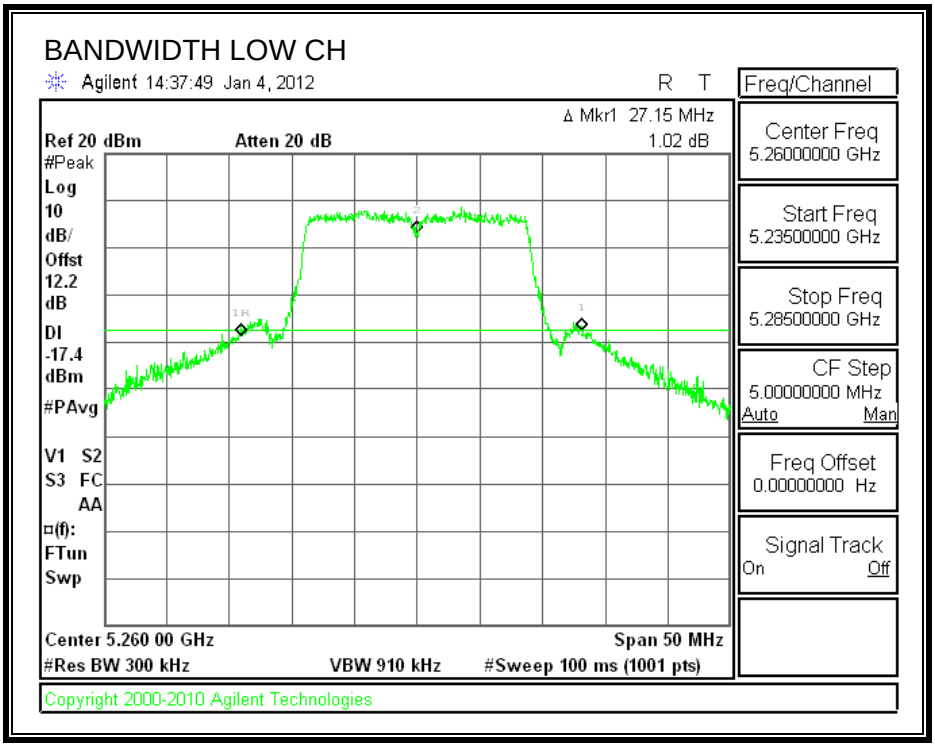


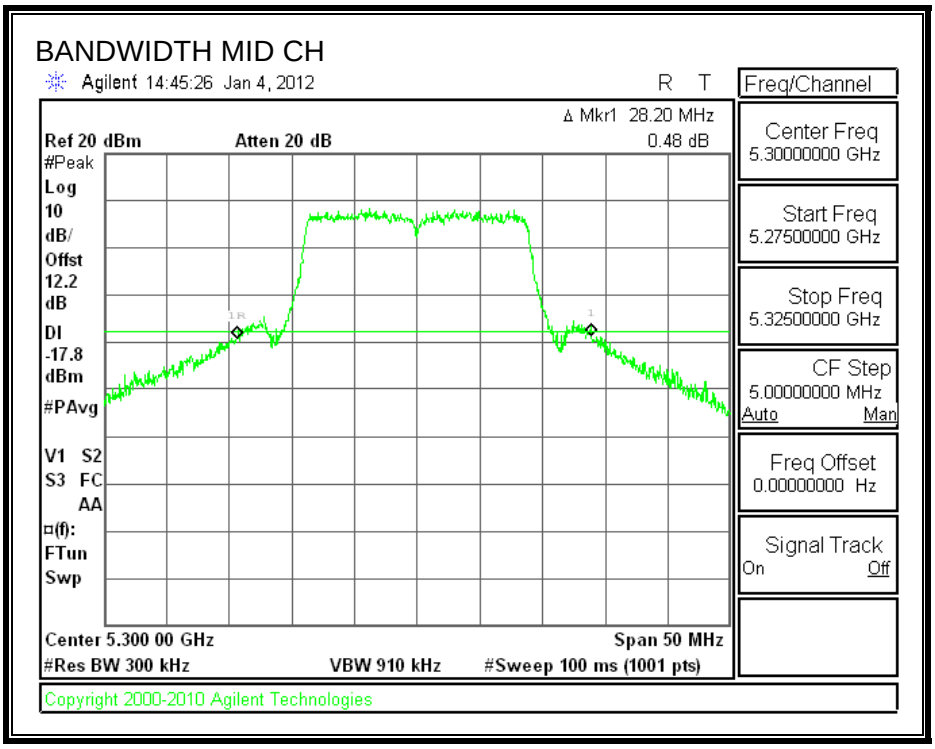


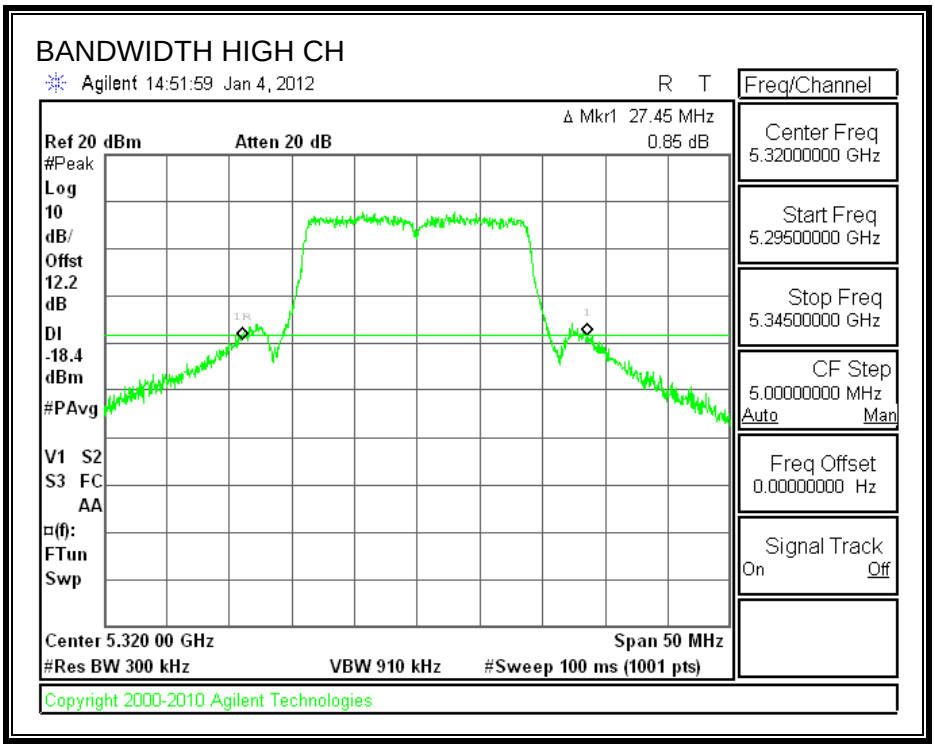


CHAIN 2

26 dB BANDWIDTH

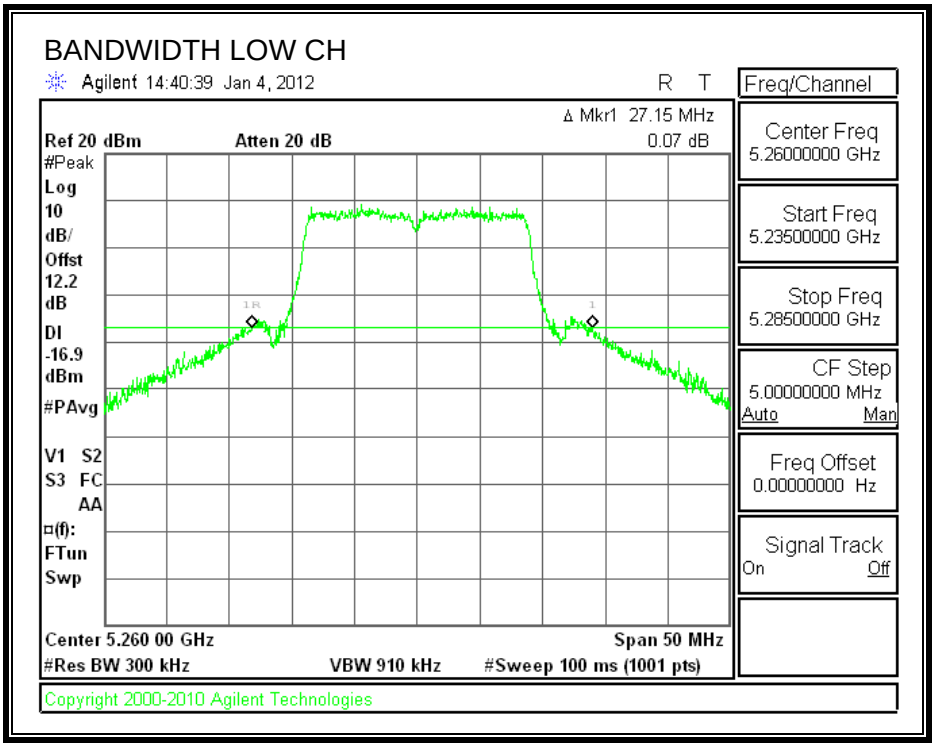


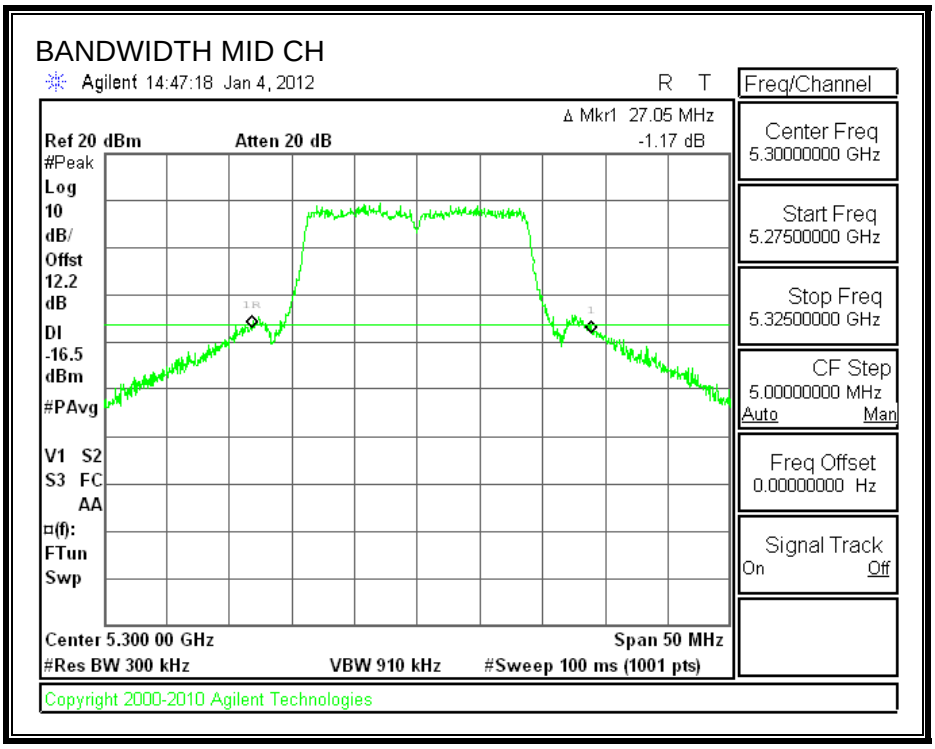


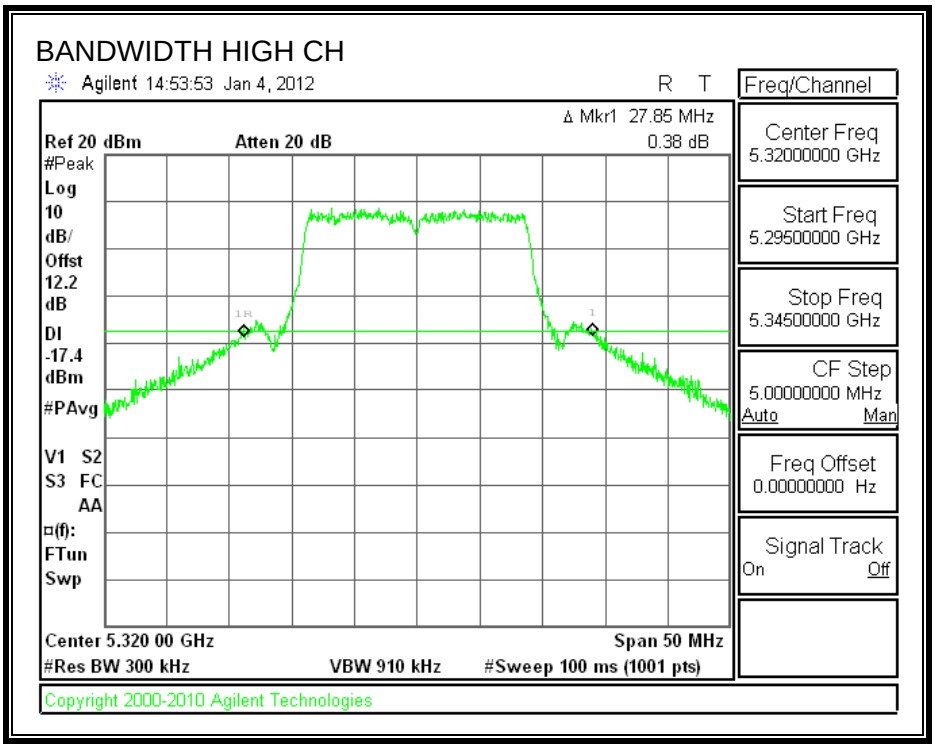


CHAIN 3

26 dB BANDWIDTH

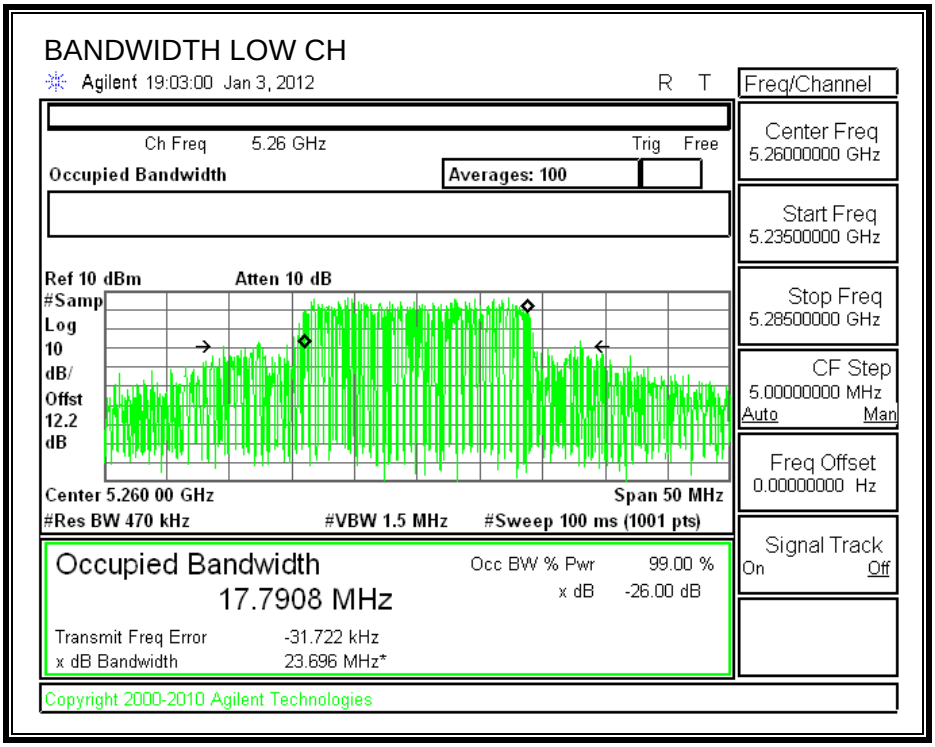


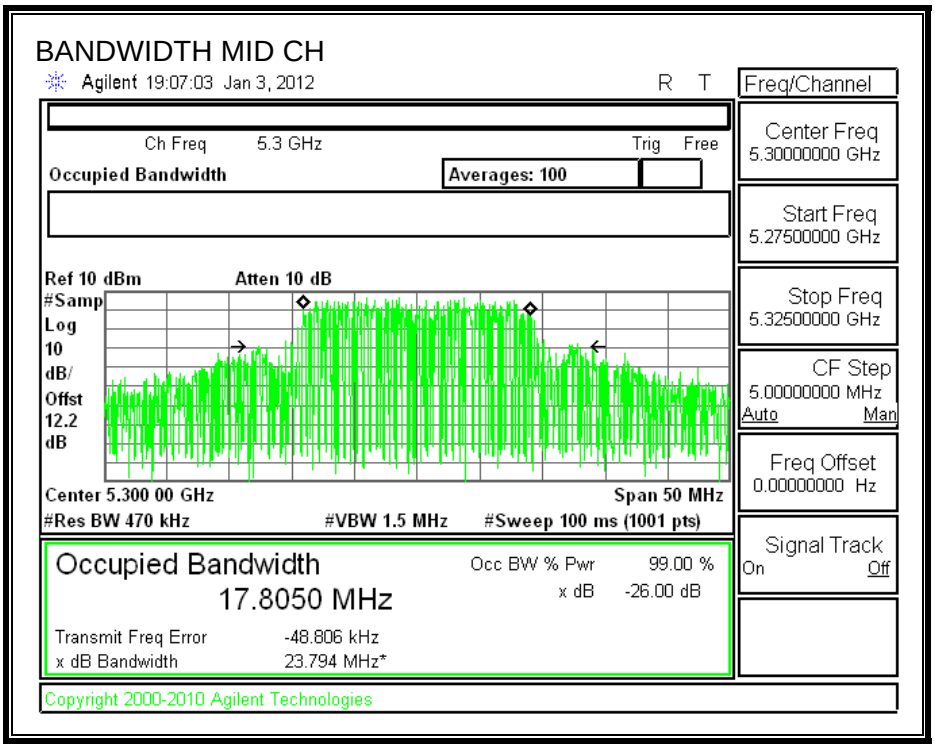


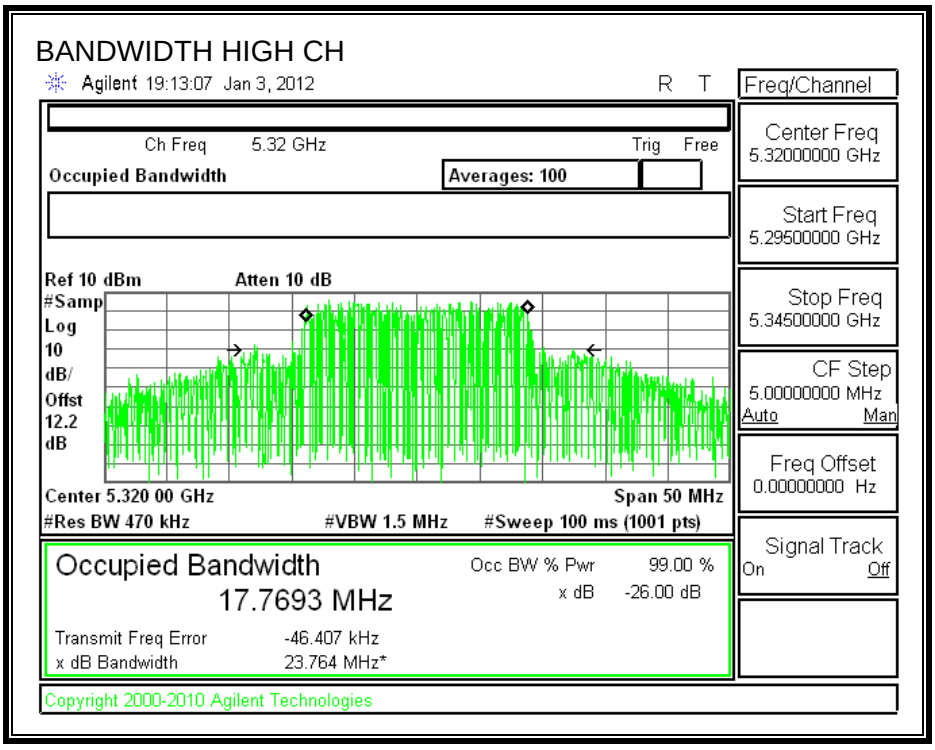


CHAIN 1

99% BANDWIDTH

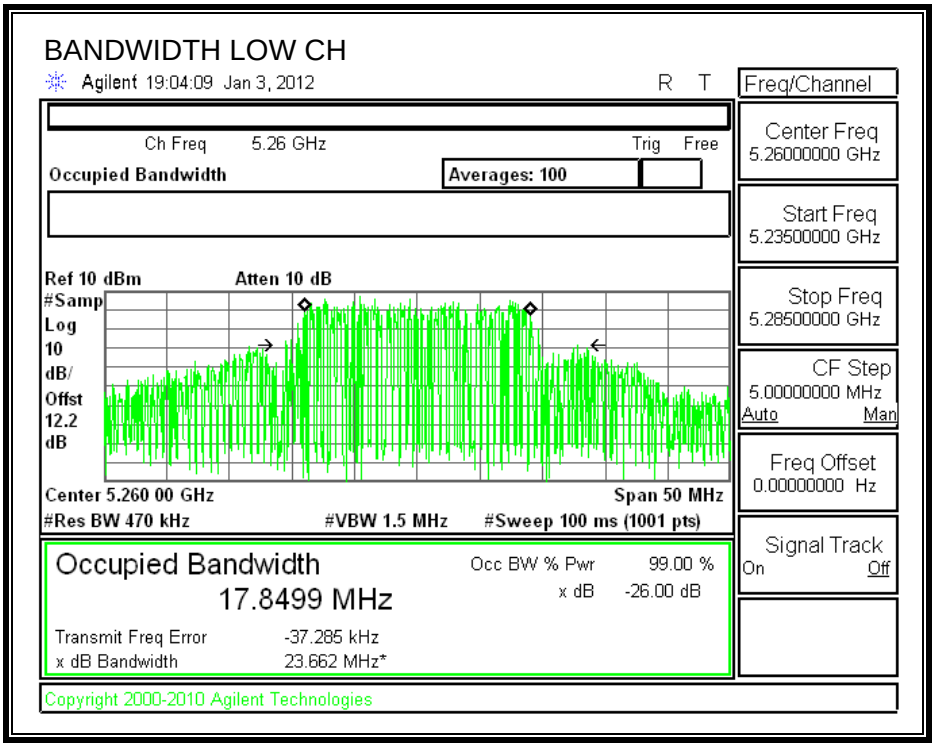


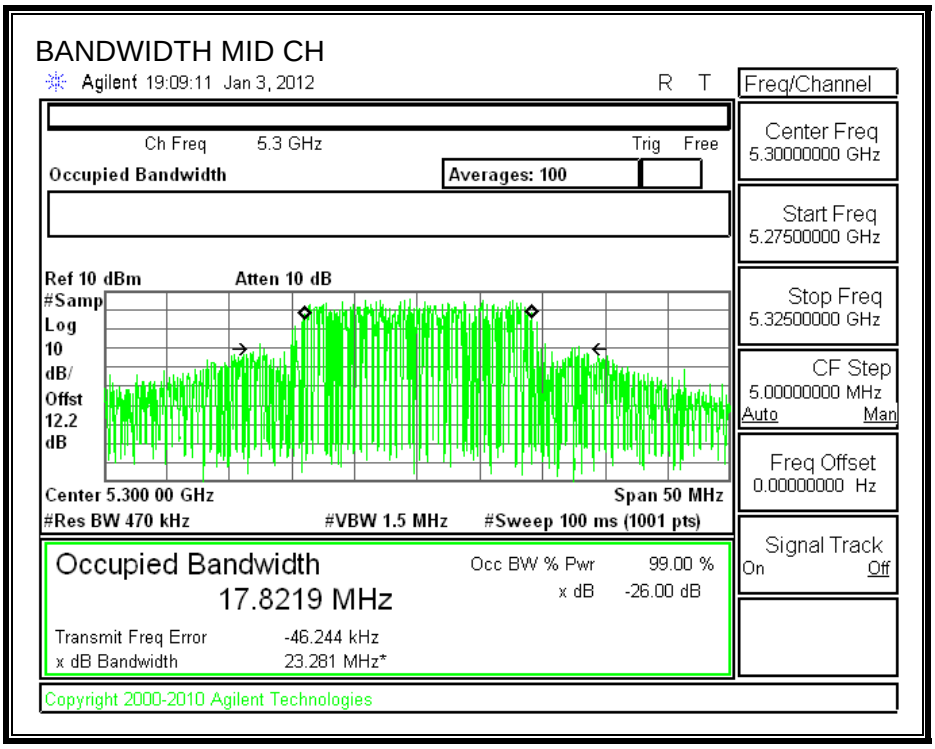


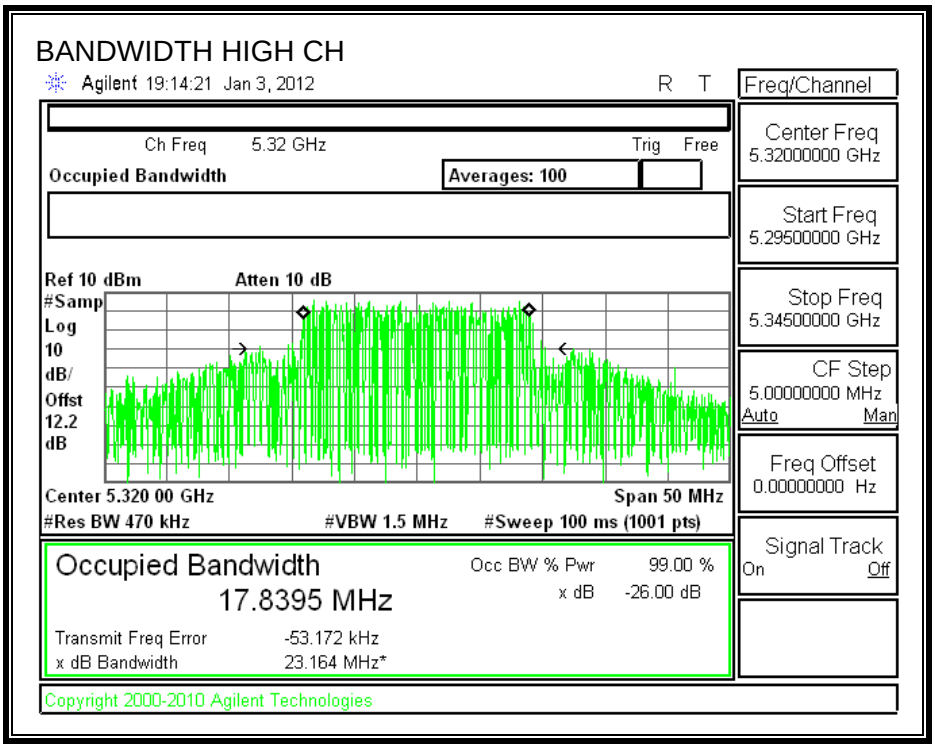


CHAIN 2

99% BANDWIDTH

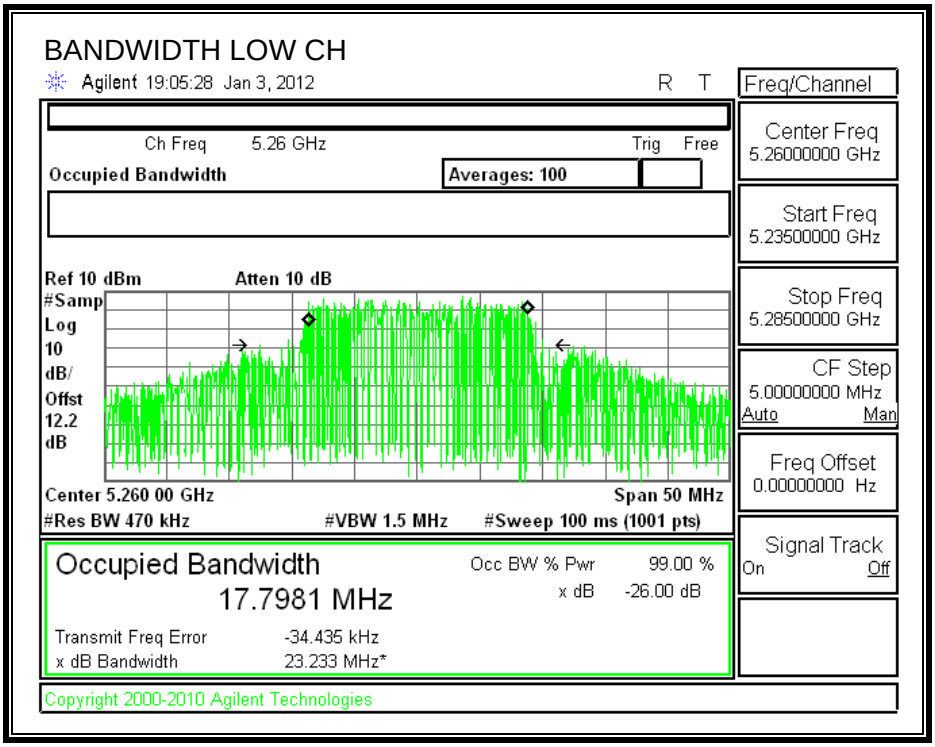


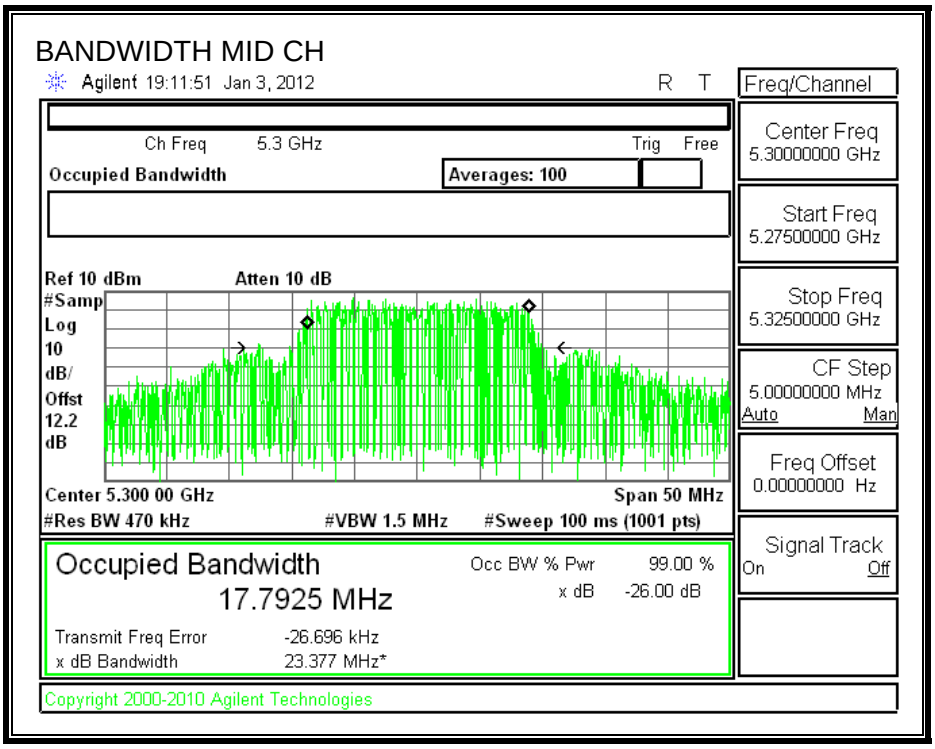


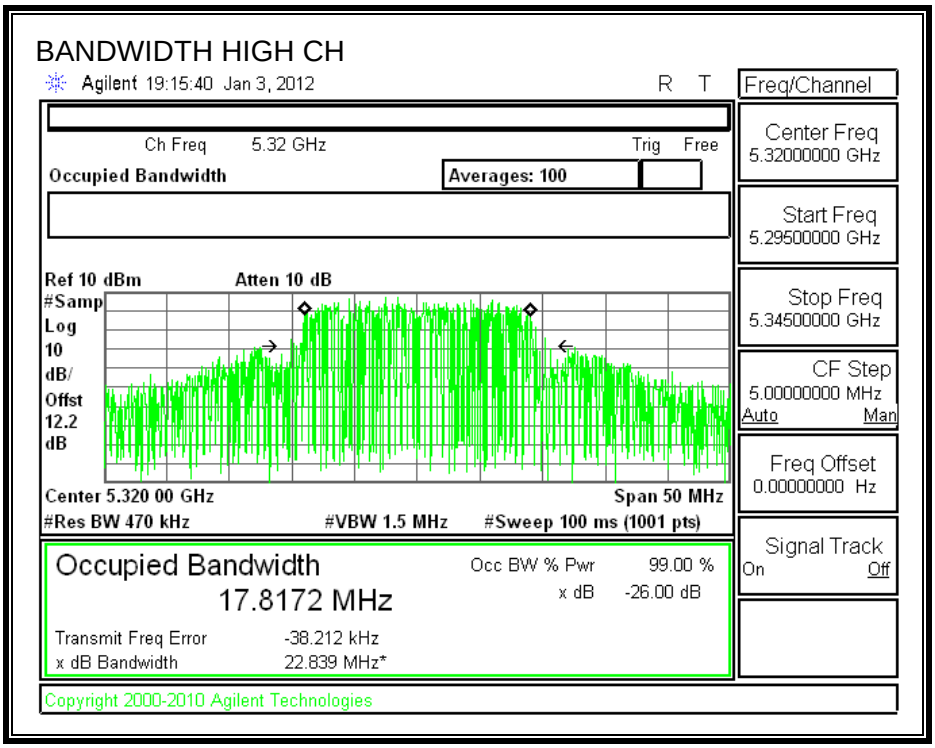


CHAIN 3

99% BANDWIDTH







7.13.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

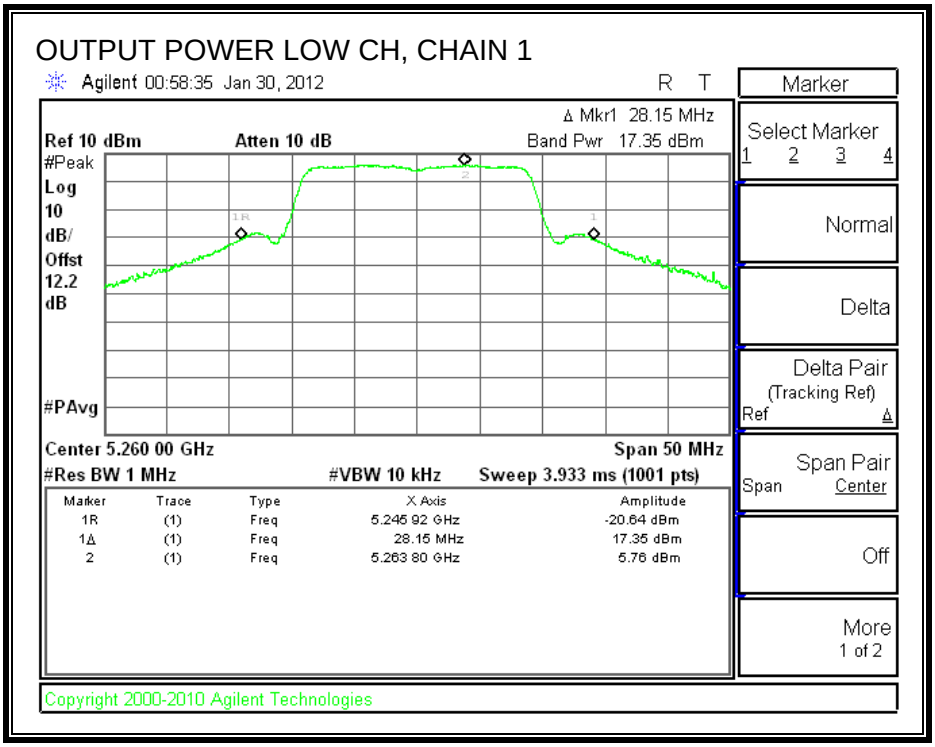
Limit

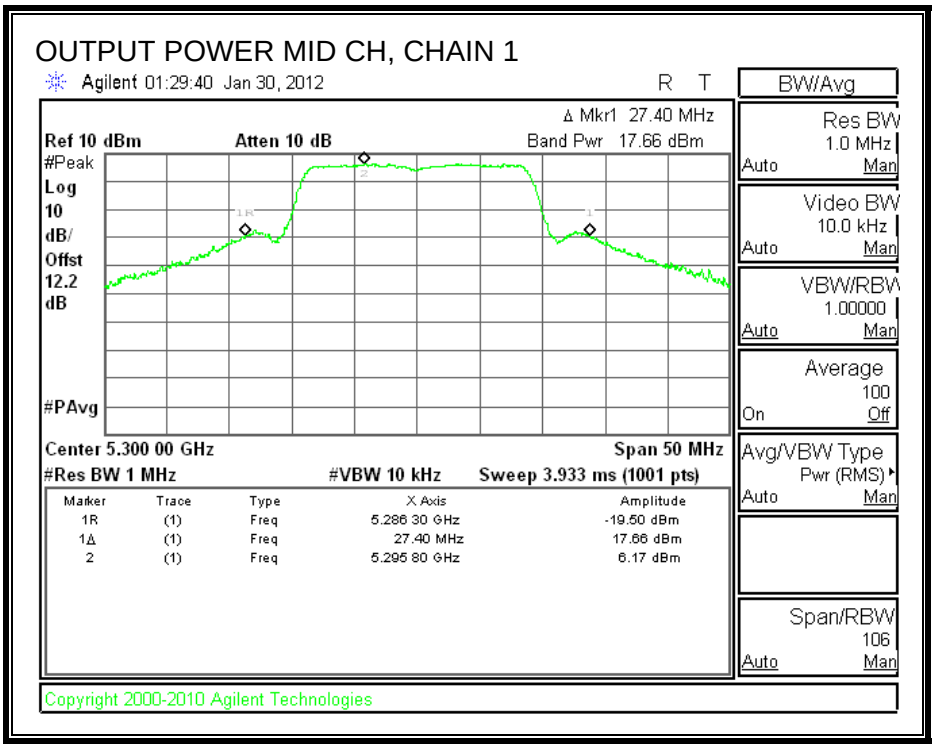
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5260	23.98	27.15	25.34	6.56	23.42
Mid	5300	23.98	27.05	25.32	6.56	23.42
High	5320	23.98	27.45	25.39	6.56	23.42

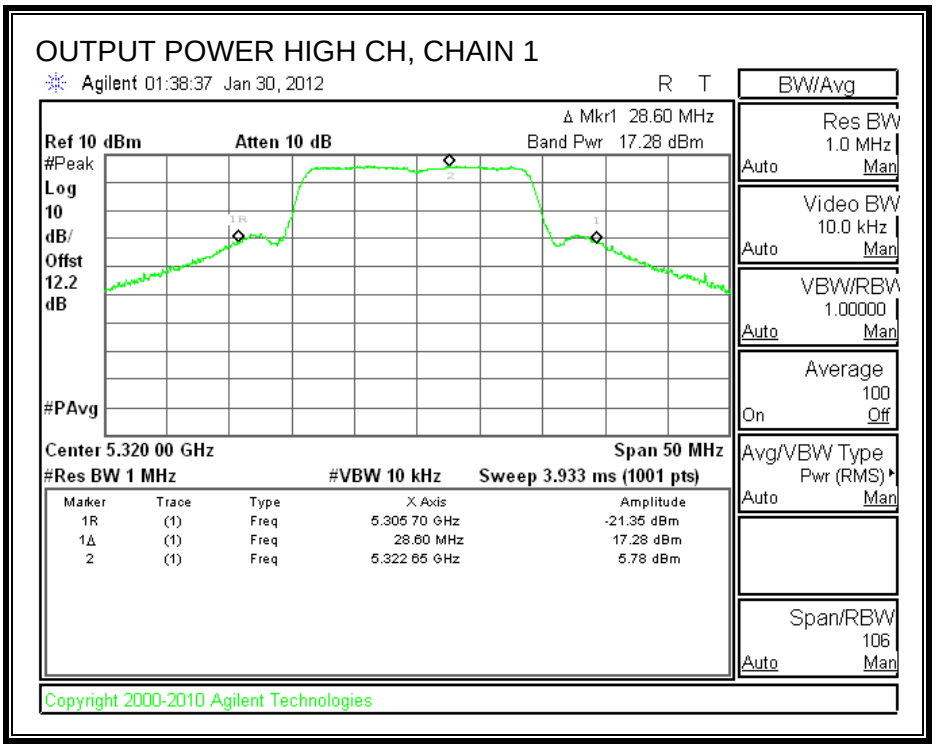
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5260	17.35	16.75	17.15	21.86	23.42	-1.56
Mid	5300	17.66	16.72	17.01	21.92	23.42	-1.50
High	5320	17.28	16.65	17.31	21.86	23.42	-1.56

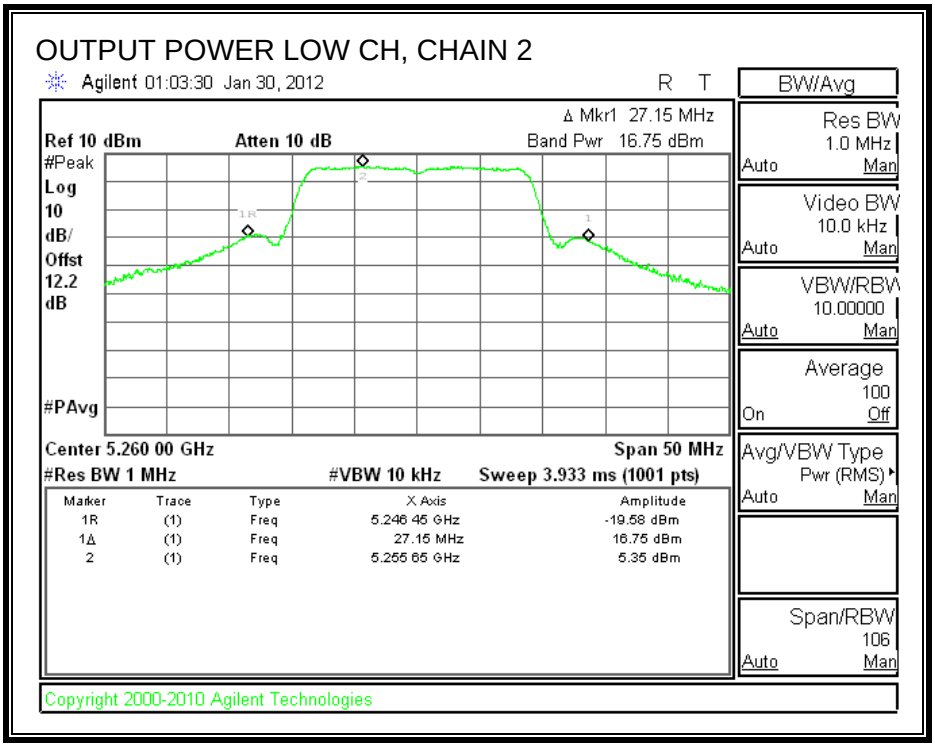
CHAIN 1 OUTPUT POWER

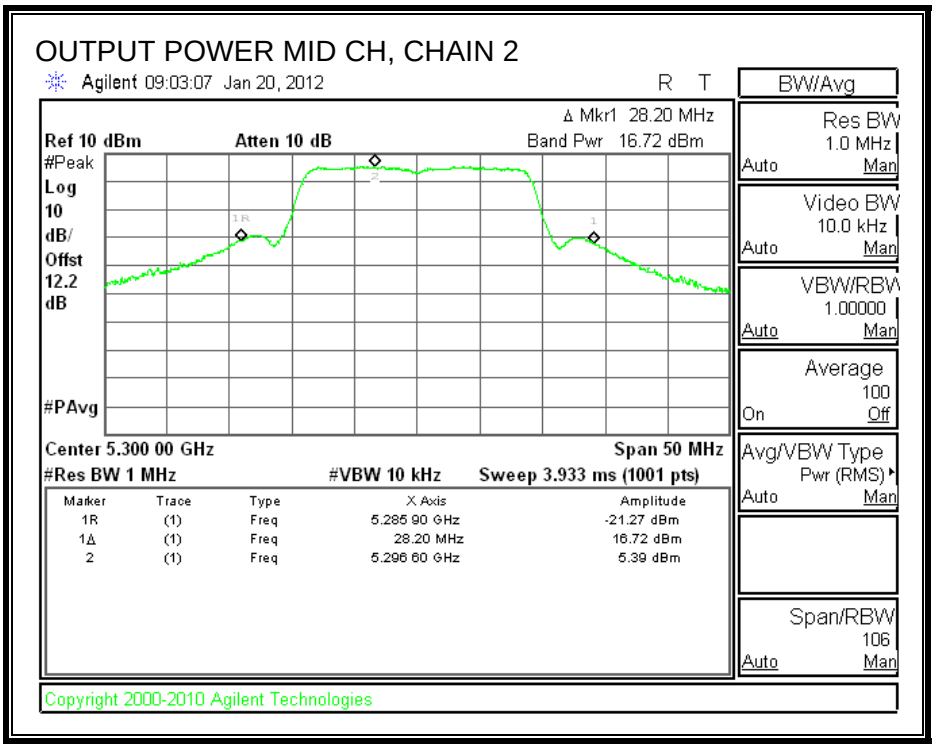


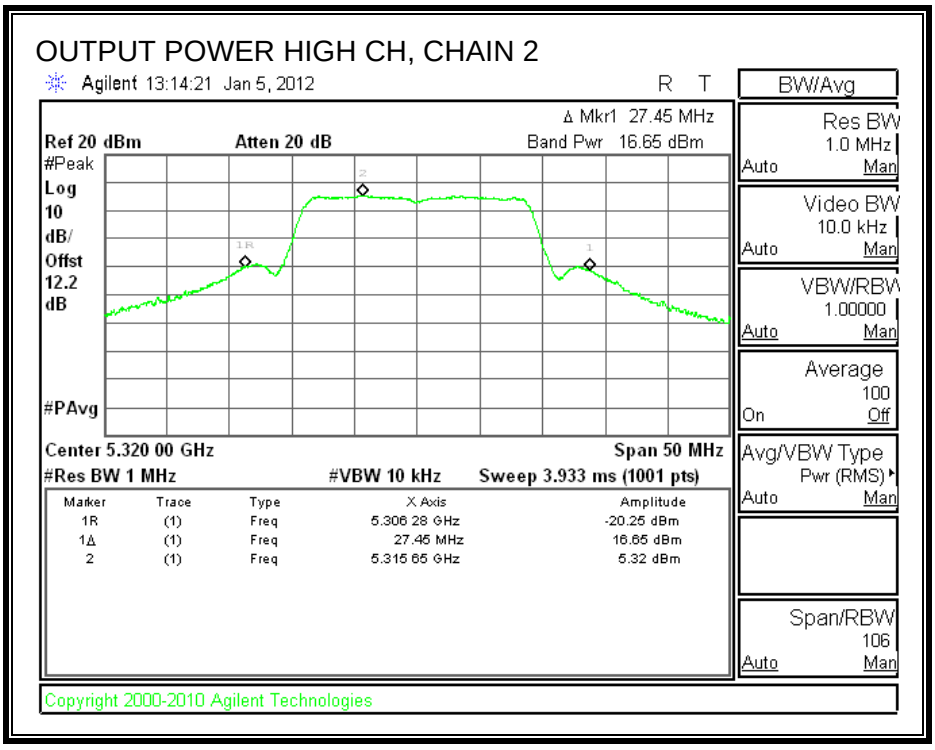




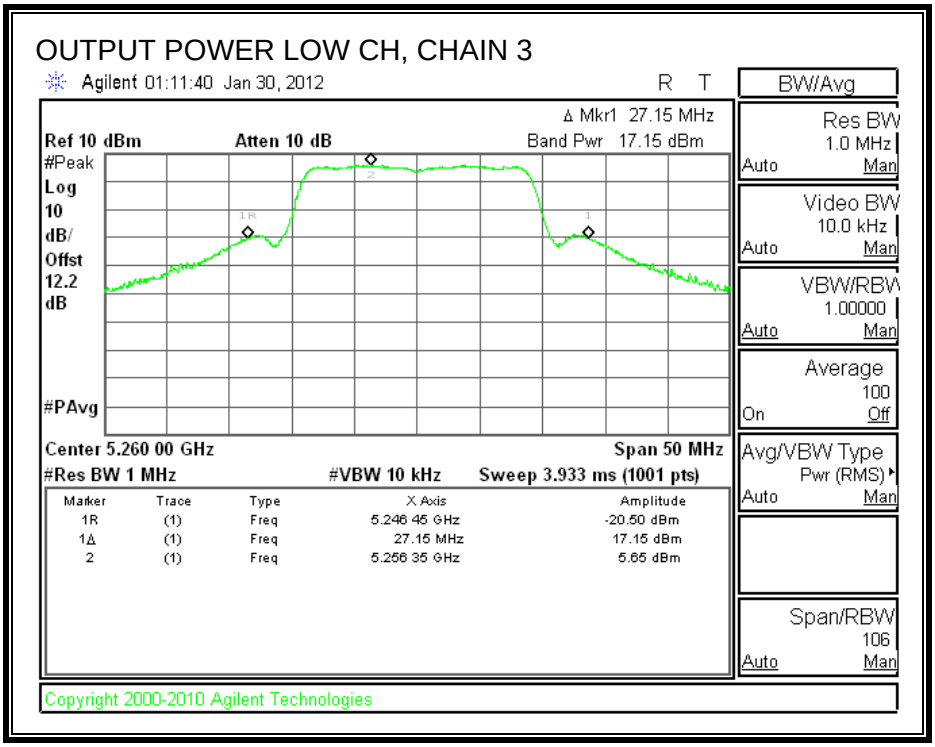
CHAIN 2 OUTPUT POWER

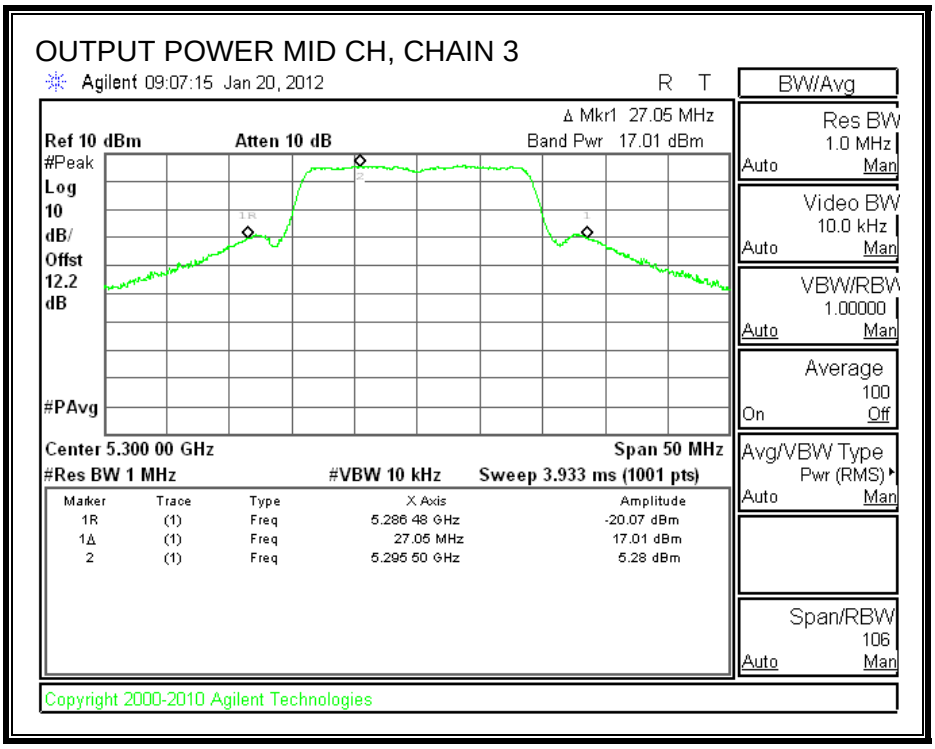


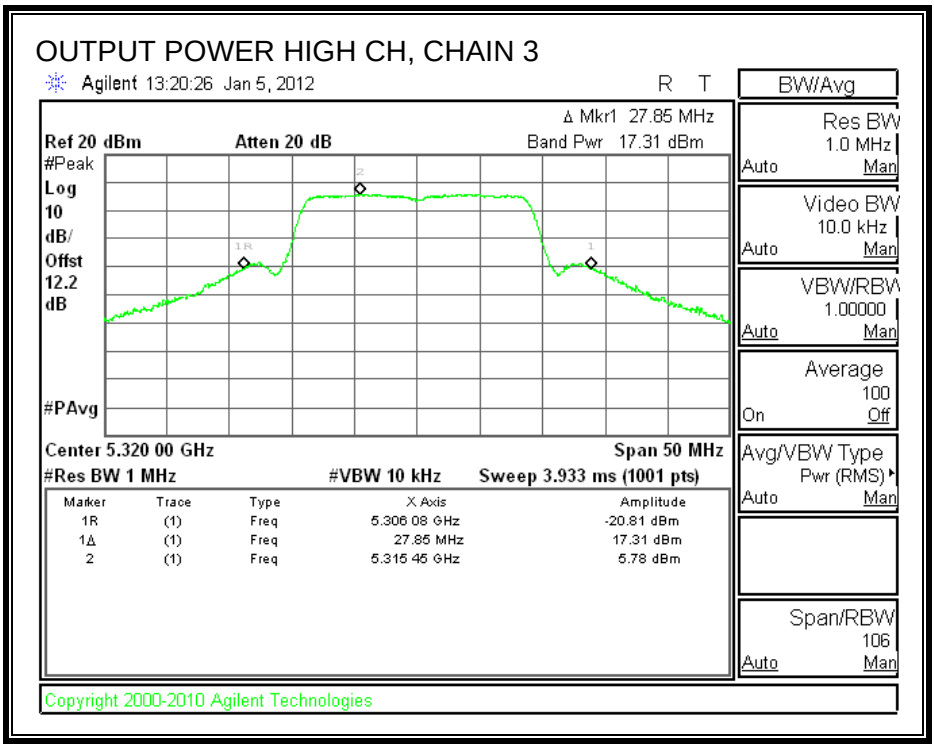




CHAIN 3 OUTPUT POWER







7.13.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 12.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5260	15.39	14.83	14.89	19.82
Middle	5300	15.41	14.44	14.82	19.68
High	5320	15.33	14.09	14.77	19.53

7.13.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.56 dBi, therefore the limit is 10.44 dBm.

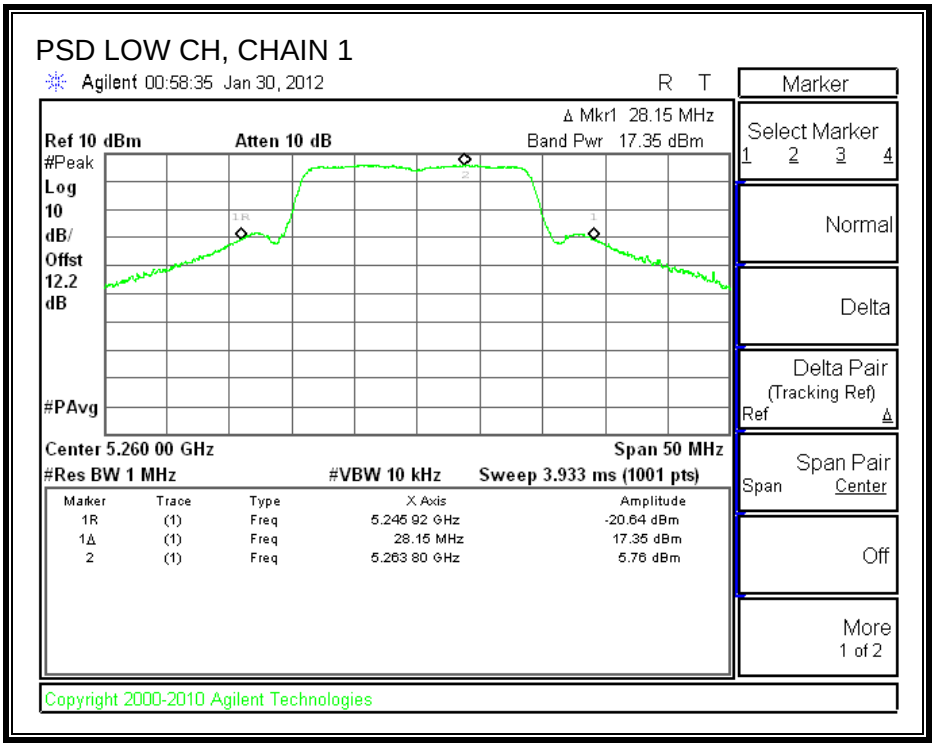
TEST PROCEDURE

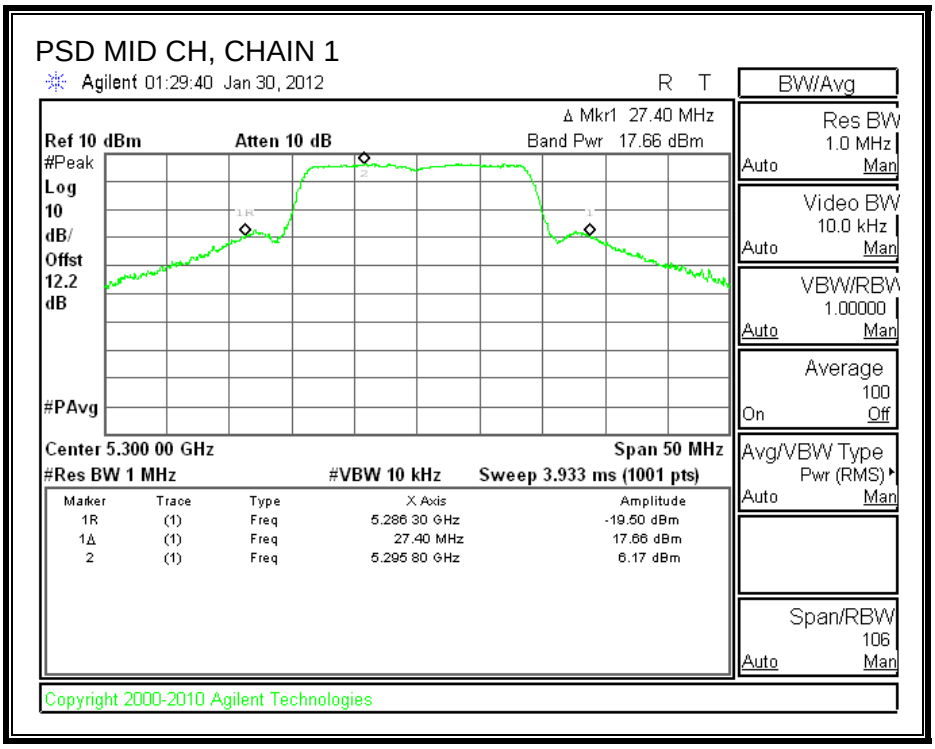
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

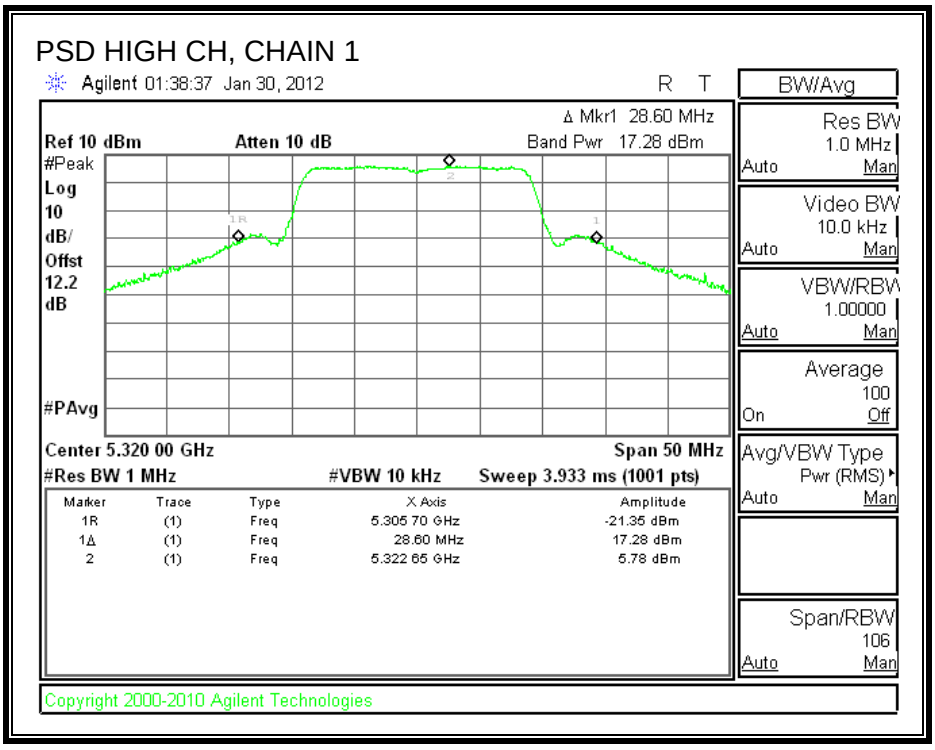
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5260	5.76	5.35	5.65	10.36	10.44	-0.08
Middle	5300	6.17	5.39	5.28	10.40	10.44	-0.04
High	5320	5.78	5.32	5.78	10.40	10.44	-0.04

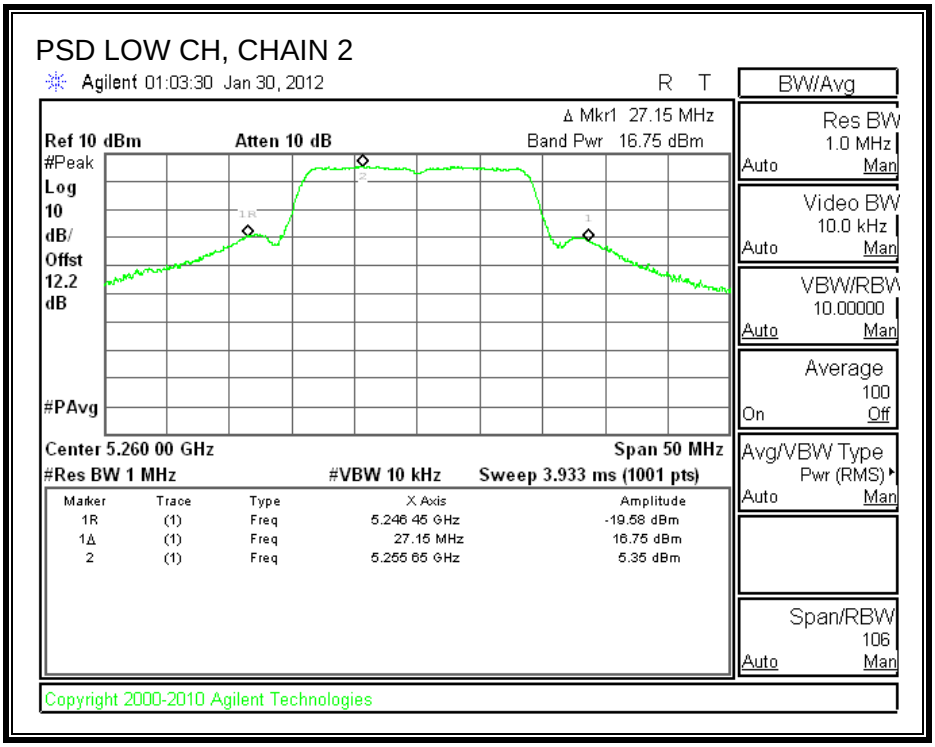
CHAIN 1 POWER SPECTRAL DENSITY

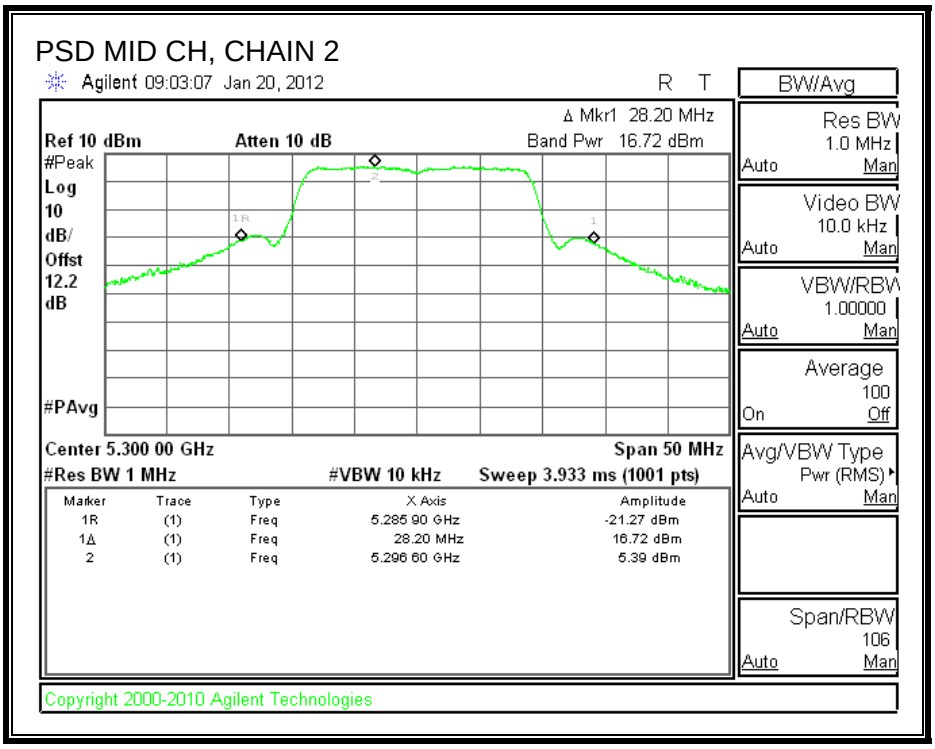


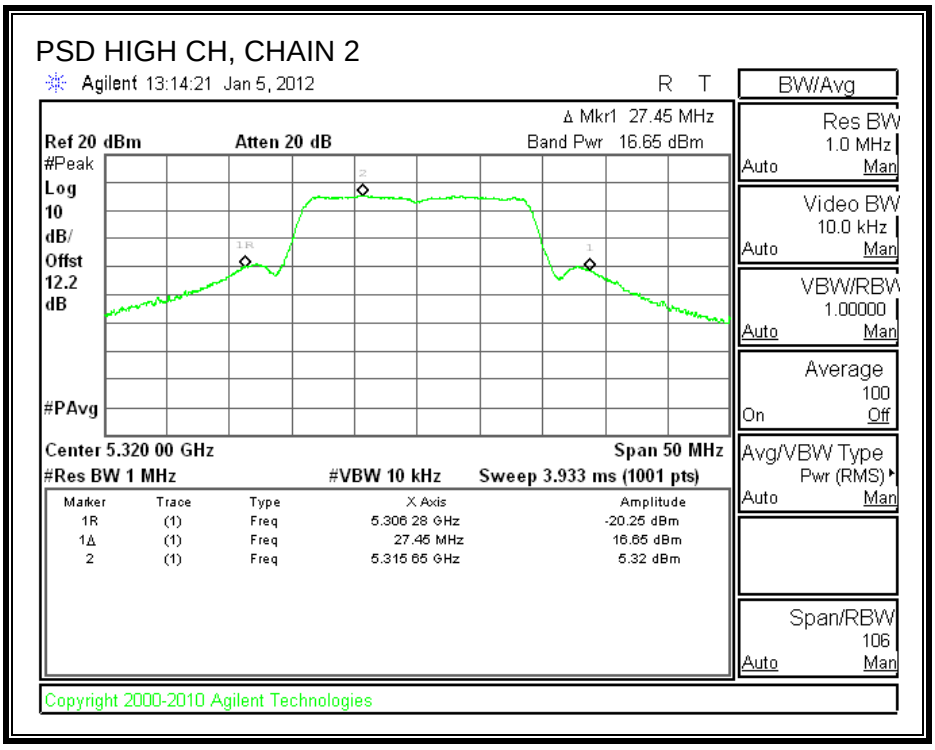




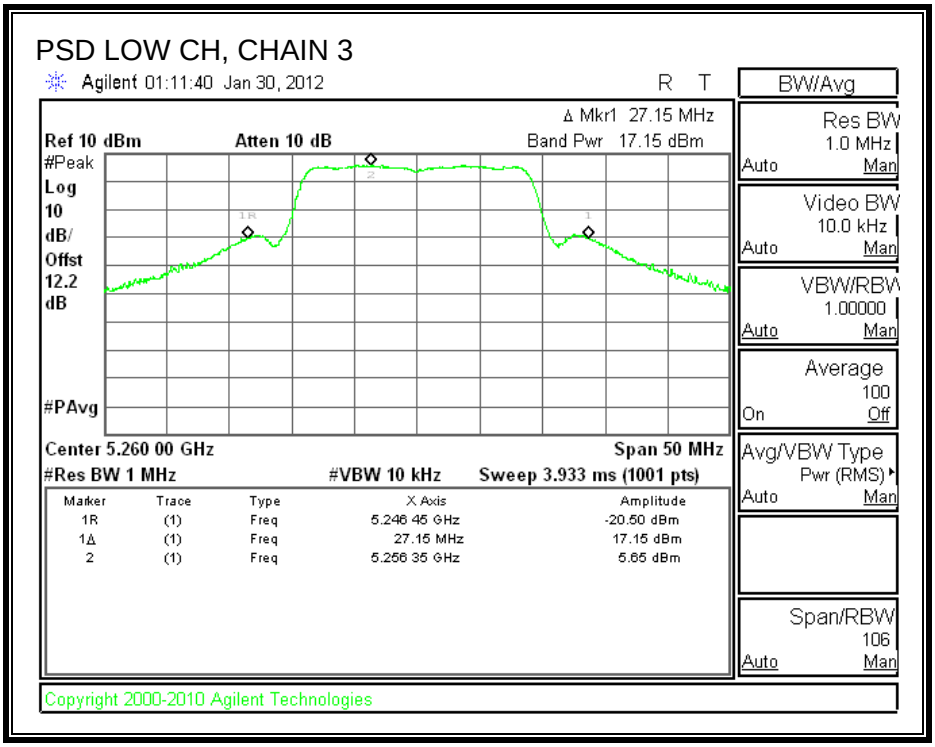
CHAIN 2 POWER SPECTRAL DENSITY

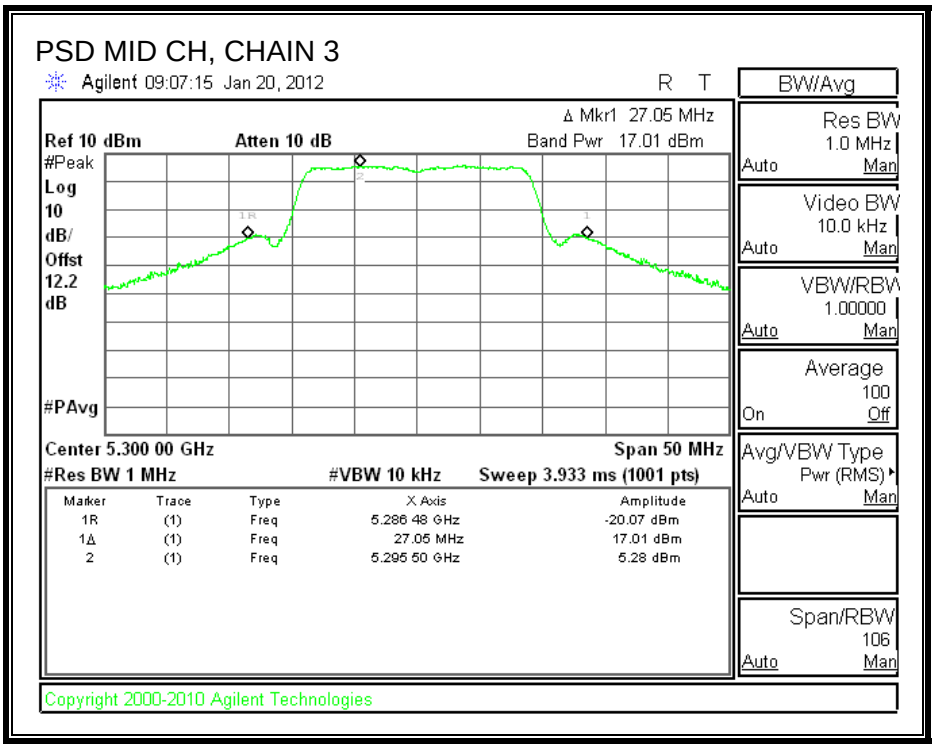


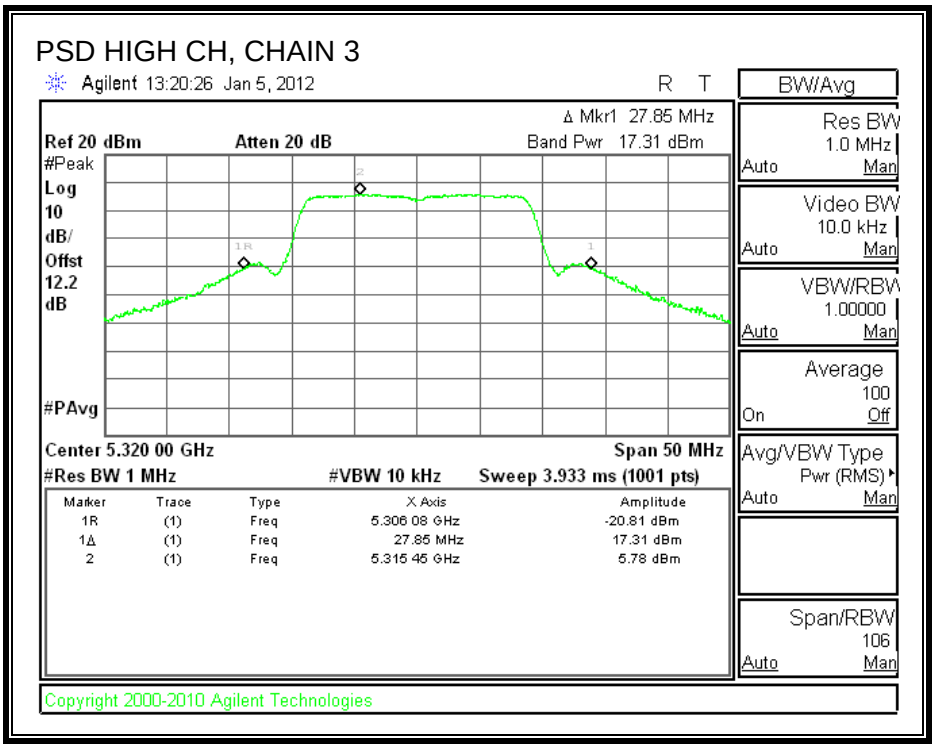




CHAIN 3 POWER SPECTRAL DENSITY







7.13.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	6.46	13	-6.54
Middle	5300	7.07	13	-5.93
High	5320	6.49	13	-6.51

CHAIN 2

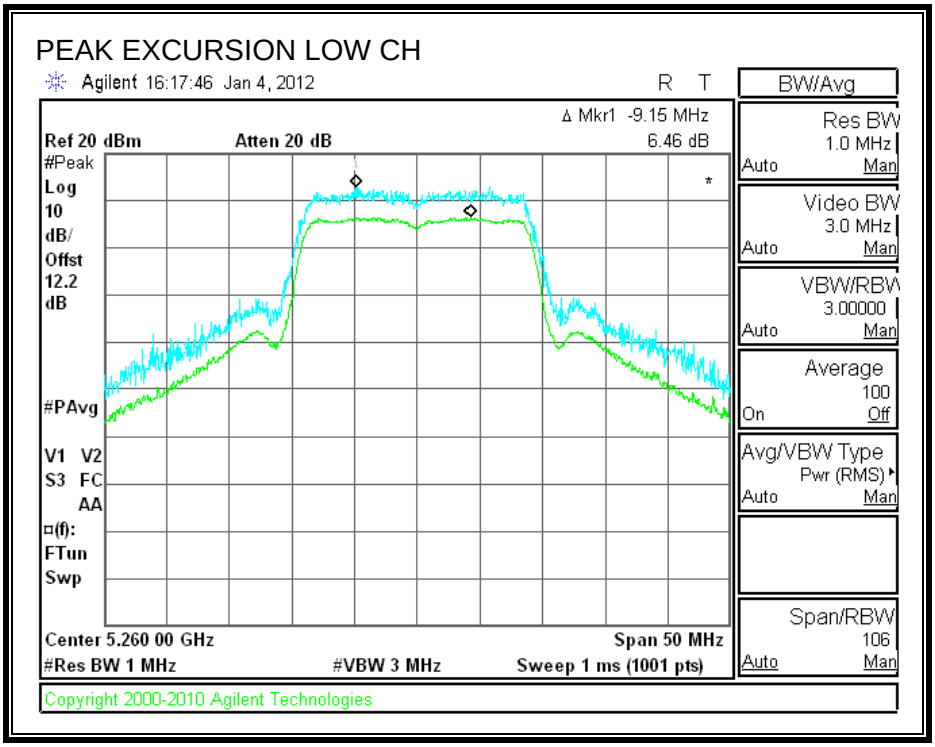
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.07	13	-5.93
Middle	5300	6.17	13	-6.83
High	5320	7.08	13	-5.92

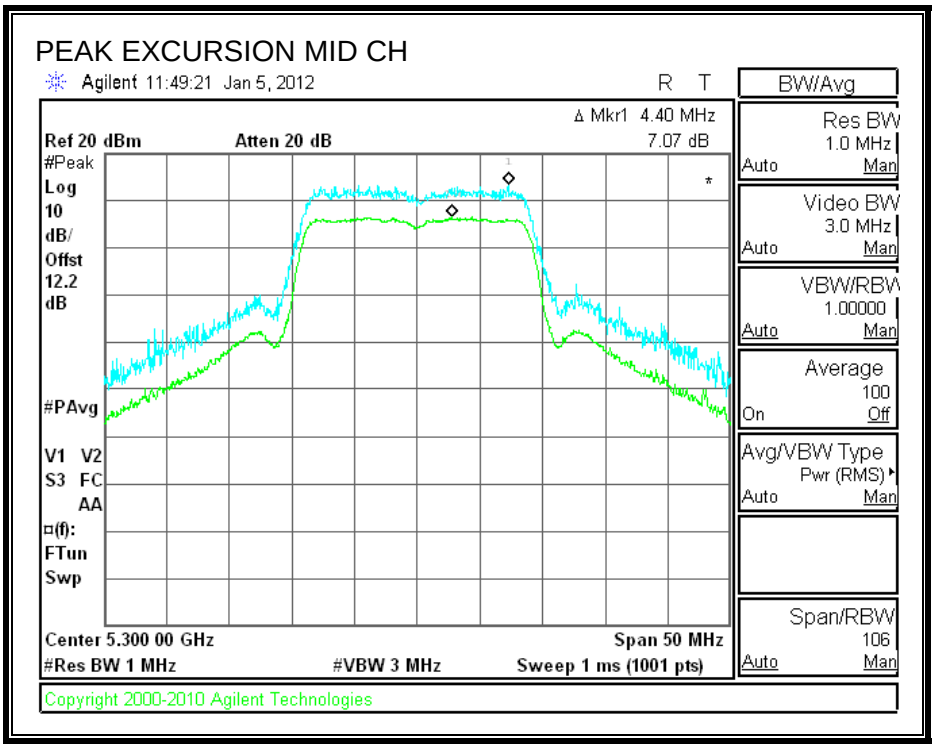
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	7.07	13	-5.93
Middle	5300	6.17	13	-6.83
High	5320	7.08	13	-5.92

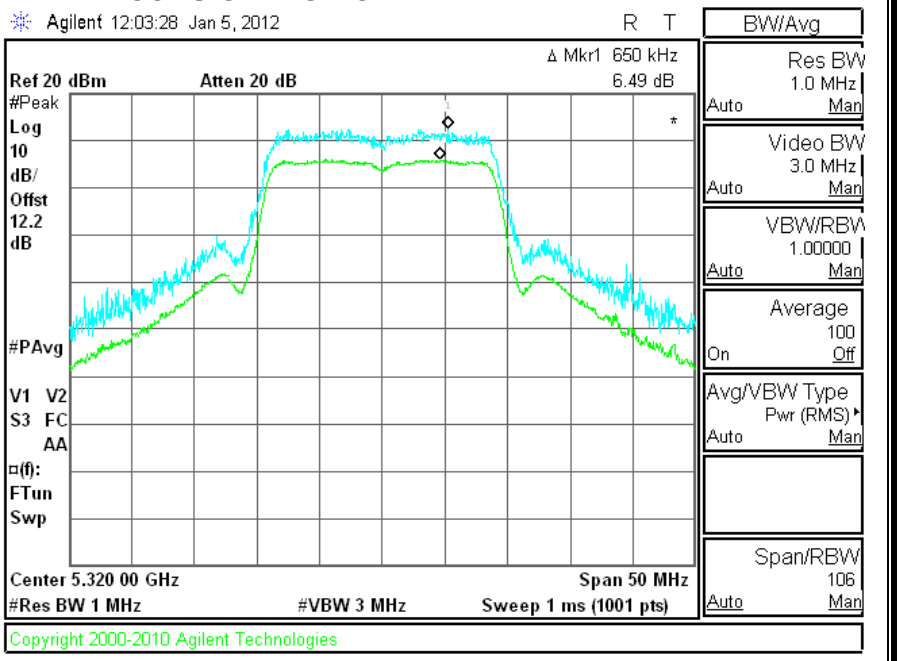
CHAIN 1

PEAK EXCURSION



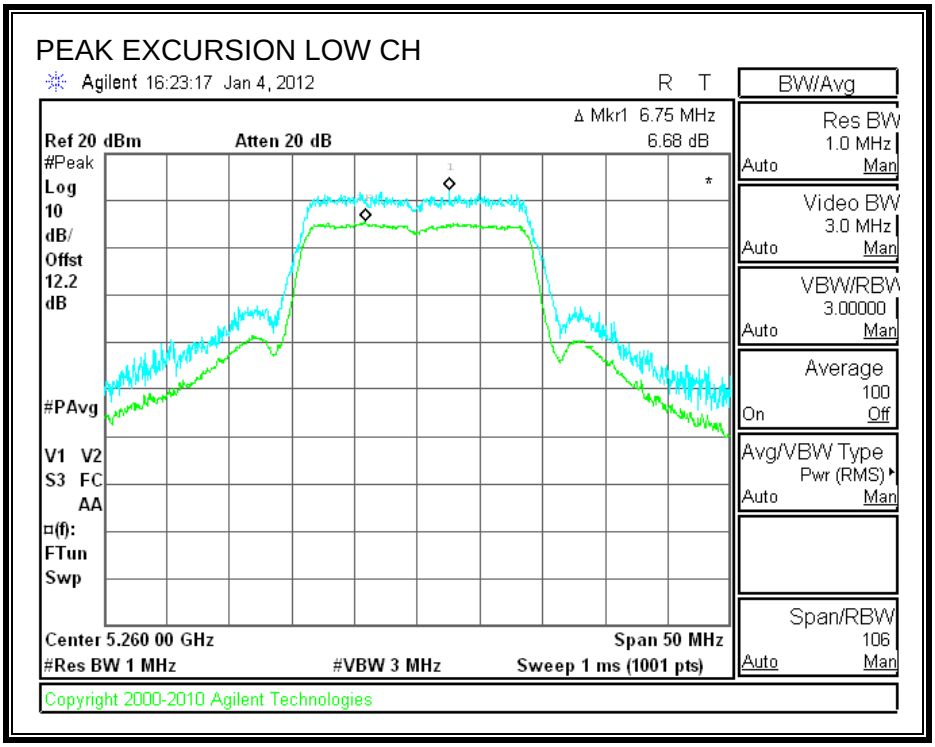


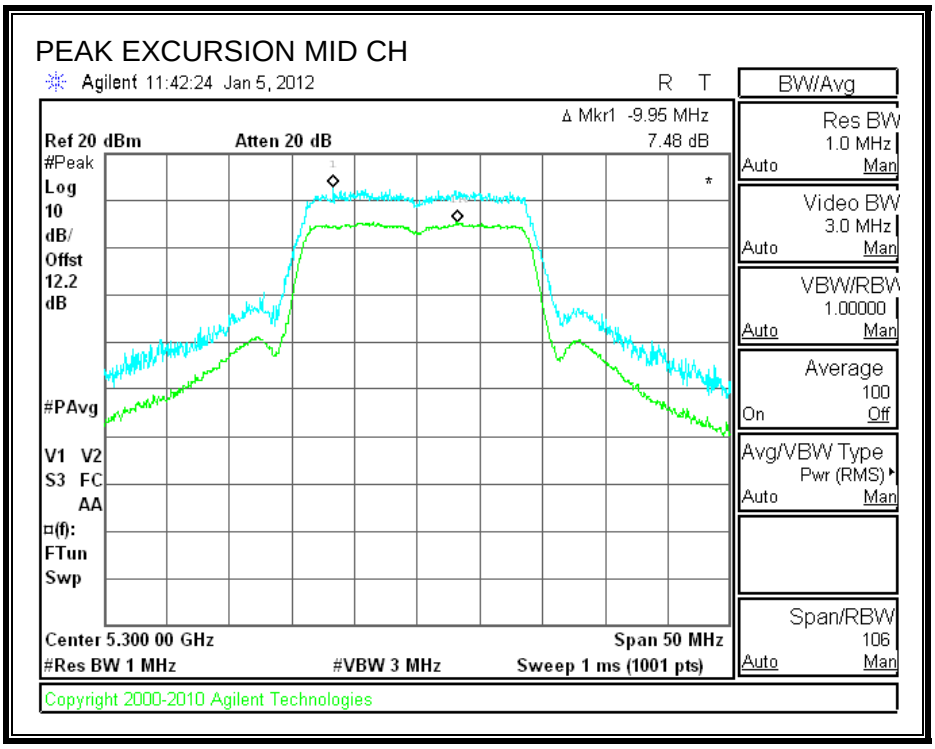
PEAK EXCURSION HIGH CH

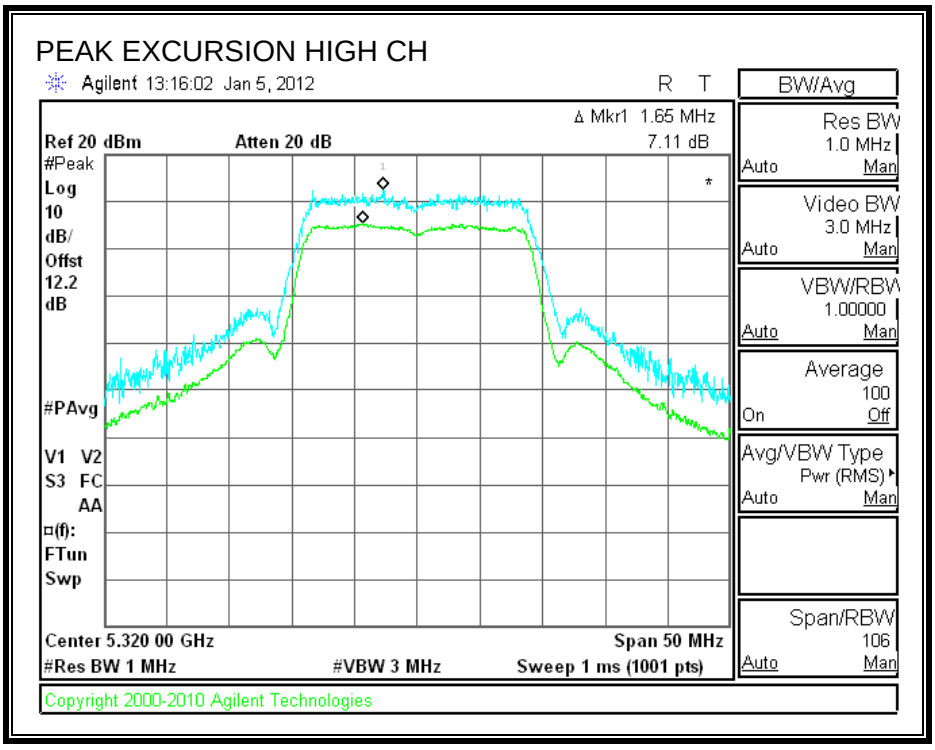


CHAIN 2

PEAK EXCURSION

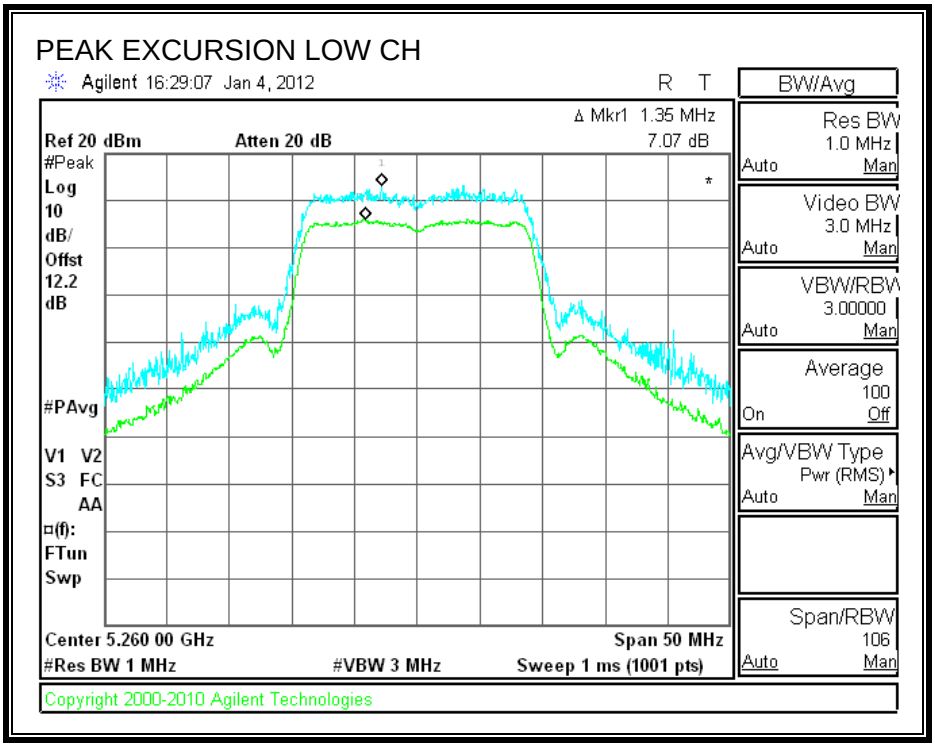


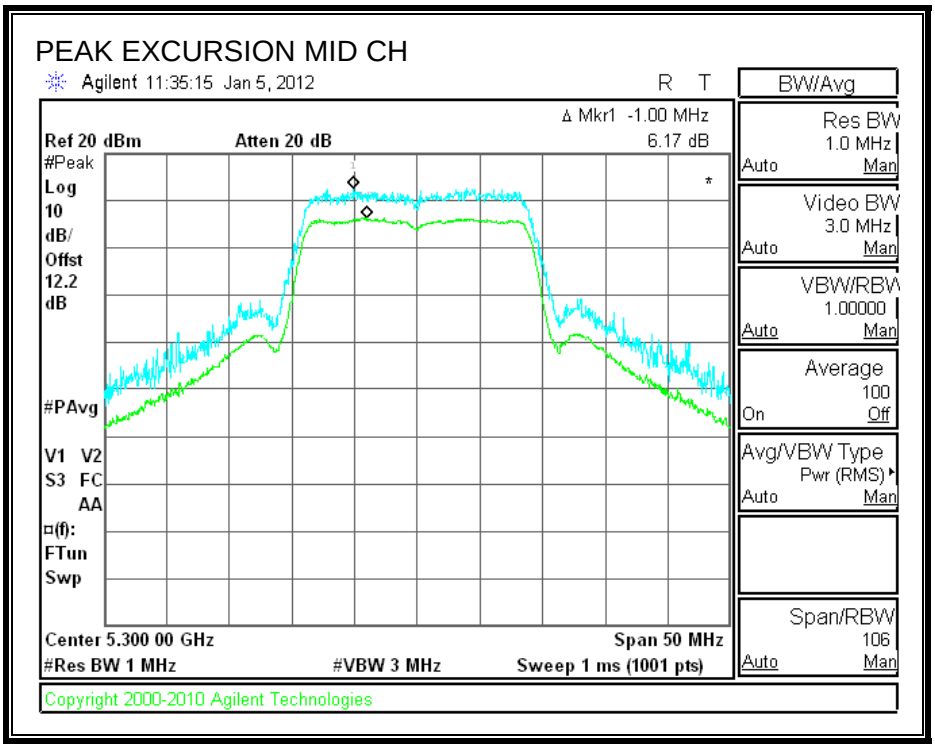




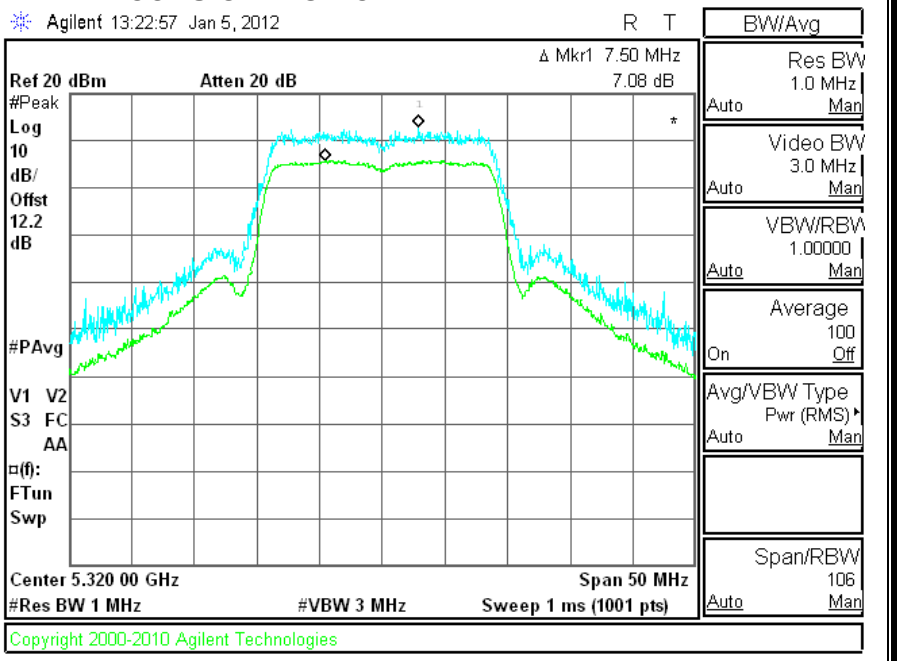
CHAIN 3

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.14. 802.11n HT40 3TX MODE IN THE 5.3 GHz BAND, CDD MCS0

7.14.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	39.67	36.2731
High	5310	40.00	36.3456

CHAIN 2

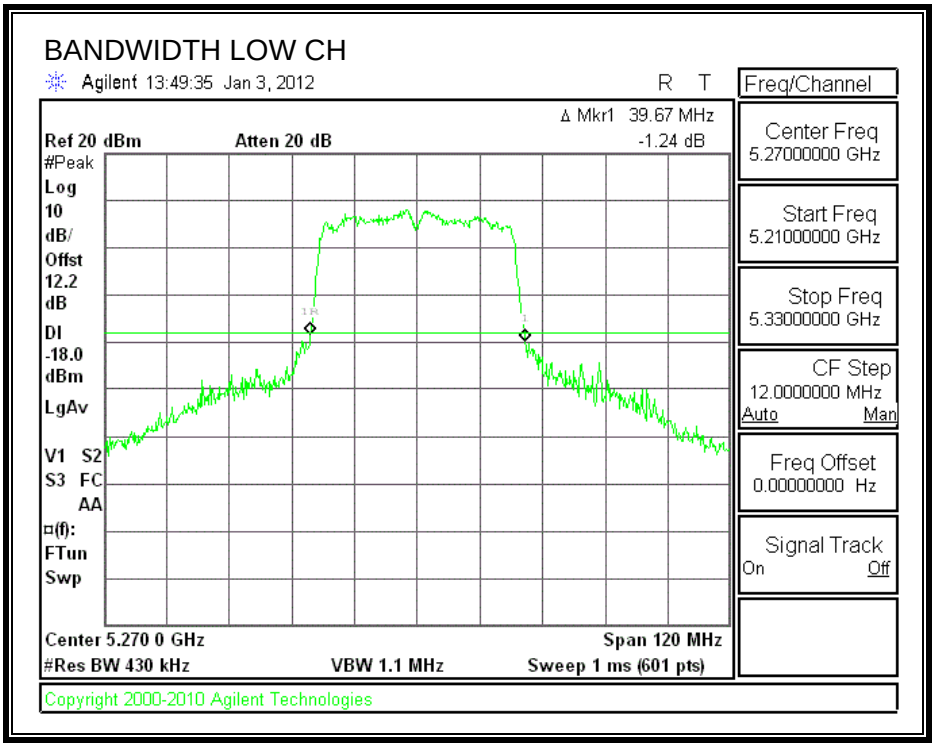
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	39.83	36.3007
High	5310	39.50	36.2828

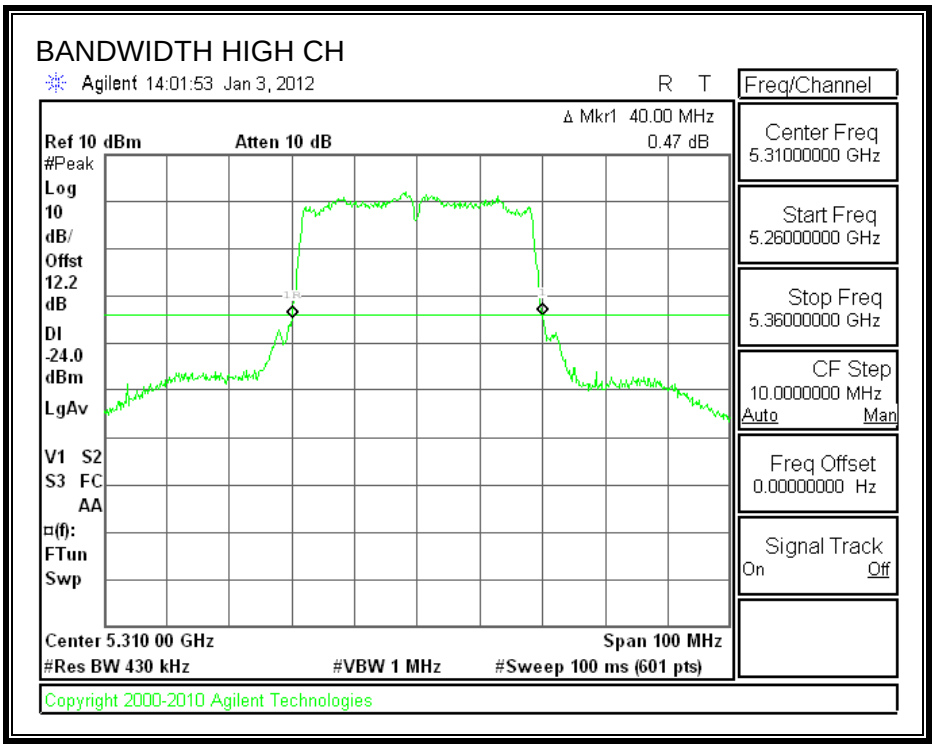
CHAIN 3

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	39.83	36.2968
High	5310	39.83	36.2918

CHAIN 1

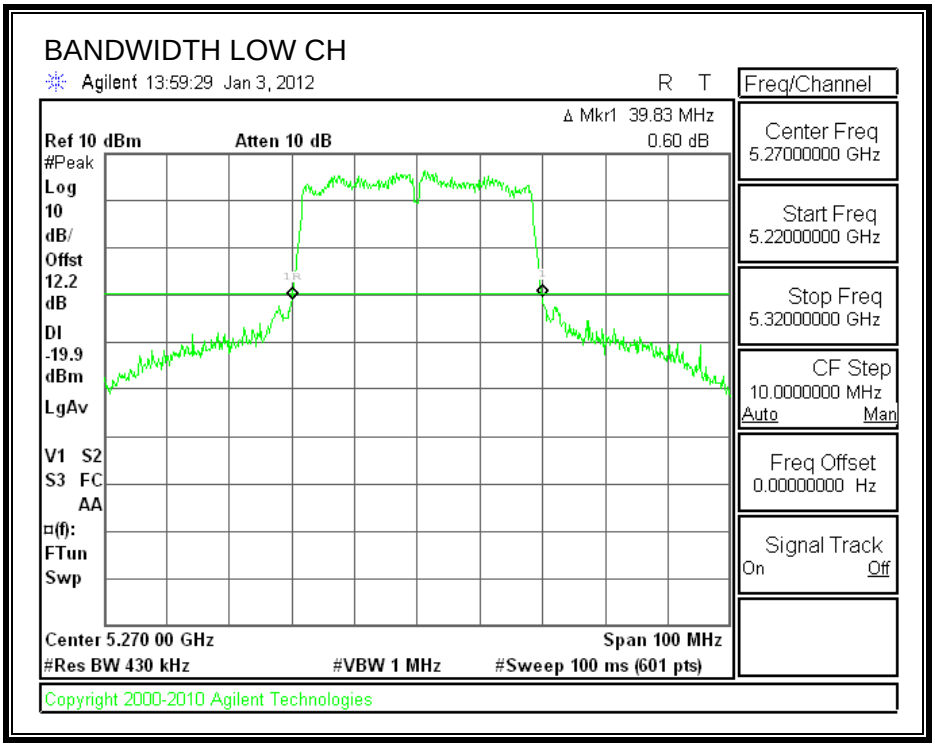
26 dB BANDWIDTH

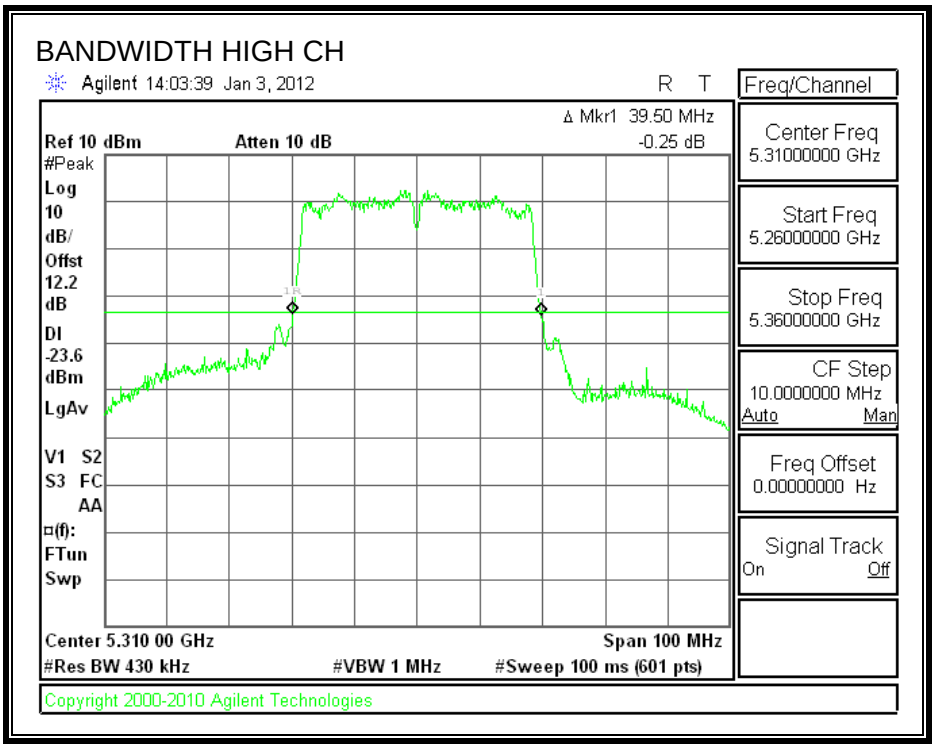




CHAIN 2

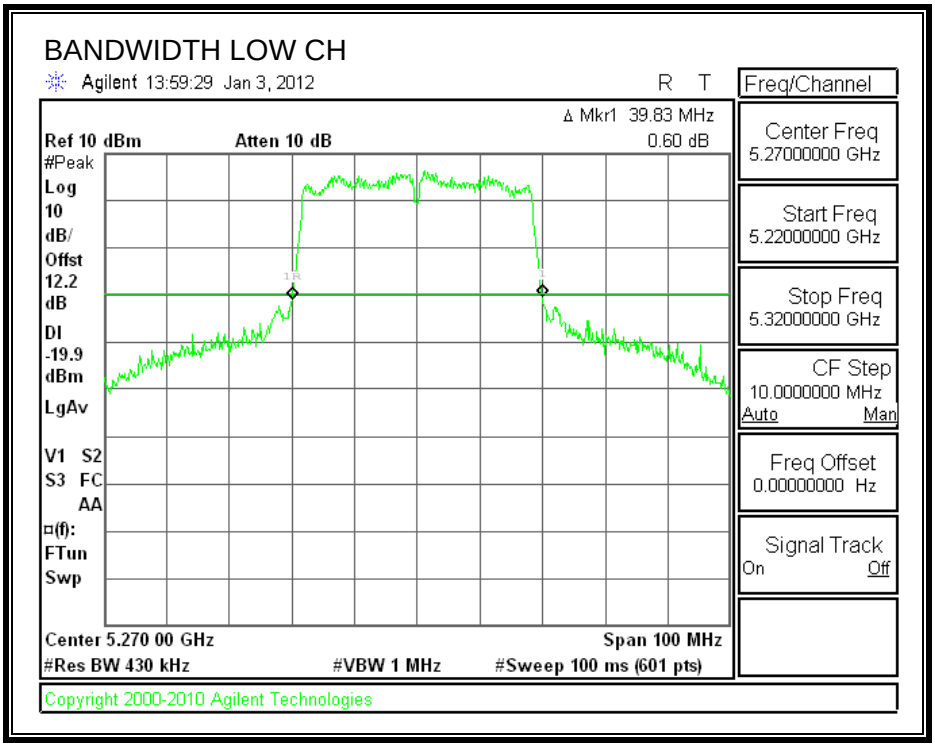
26 dB BANDWIDTH

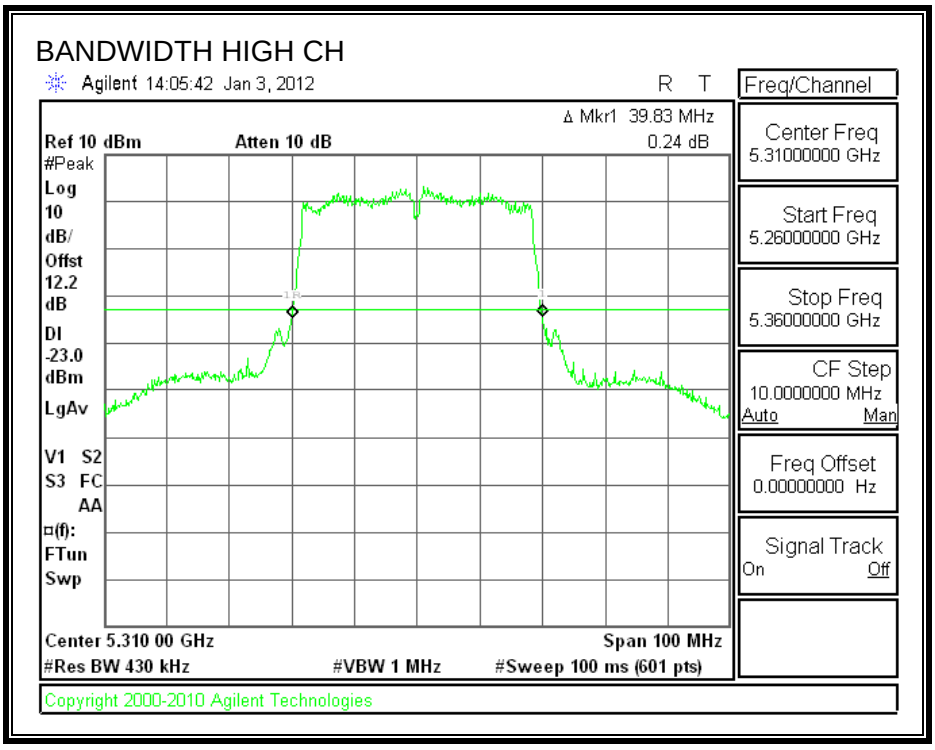




CHAIN 3

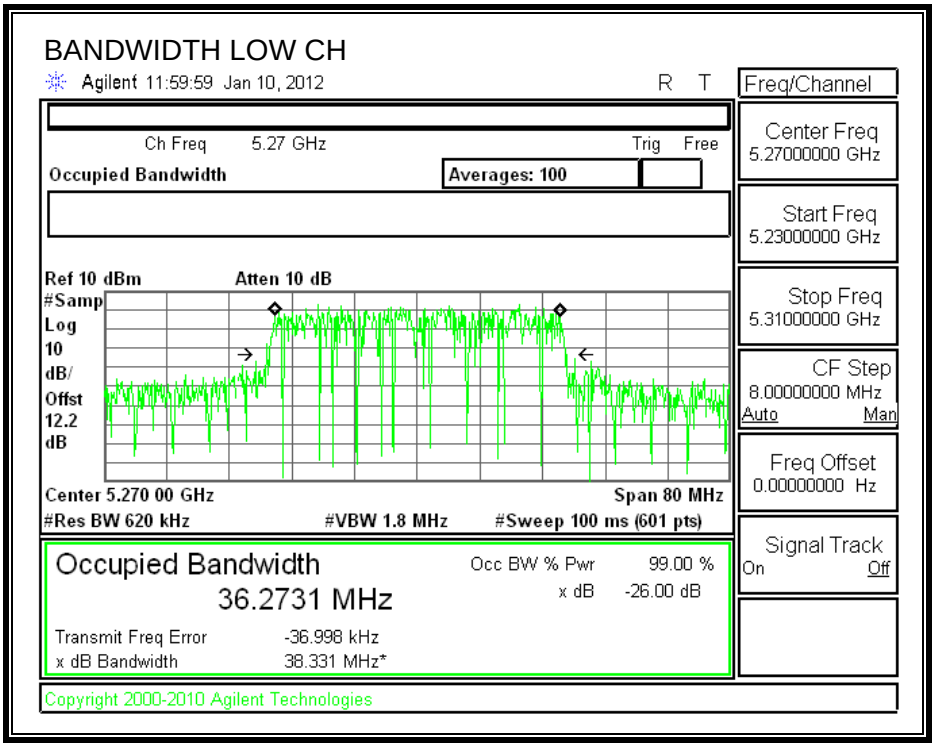
26 dB BANDWIDTH

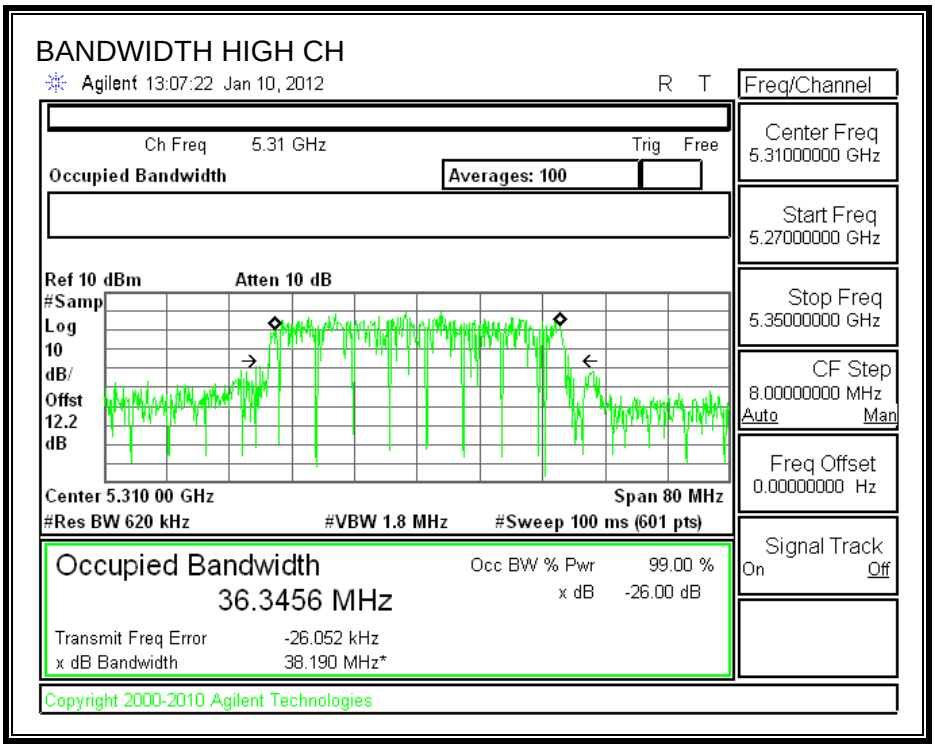




CHAIN 1

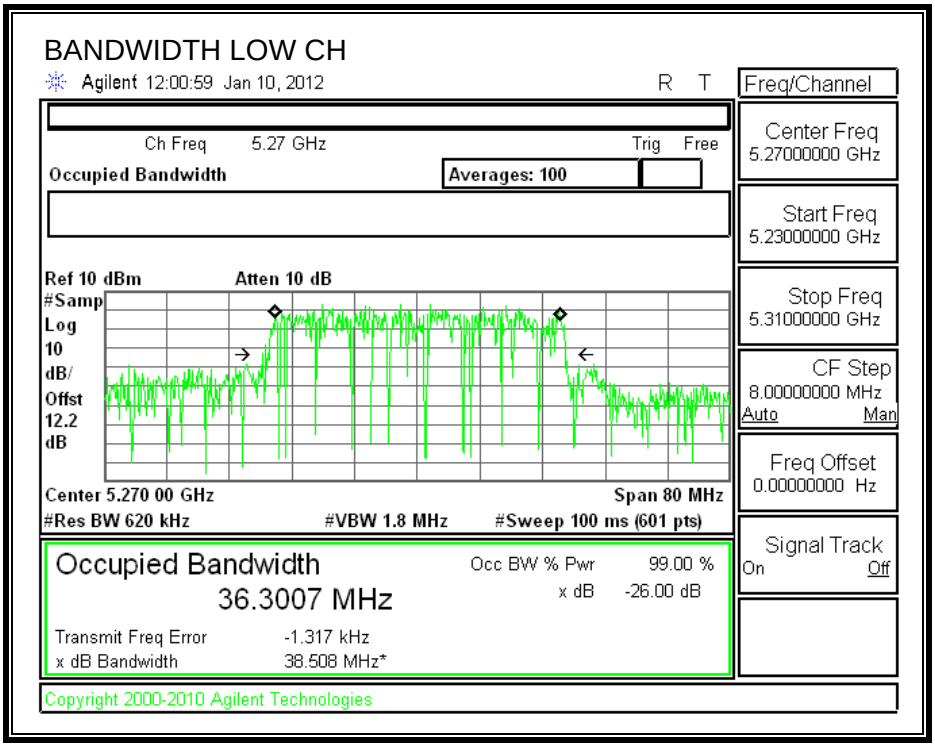
99% BANDWIDTH

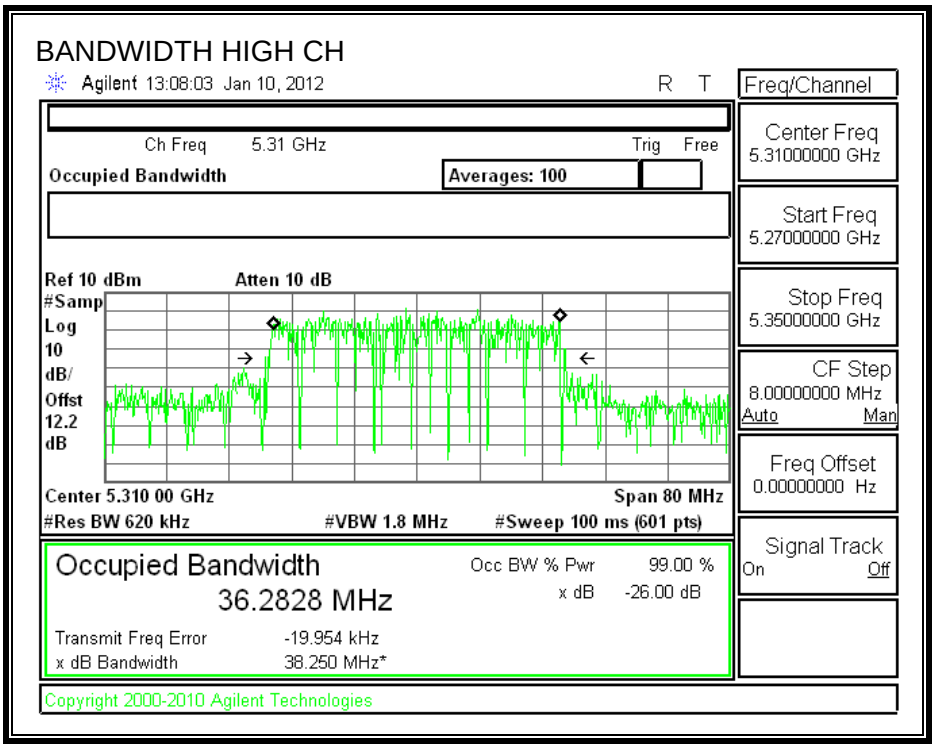




CHAIN 2

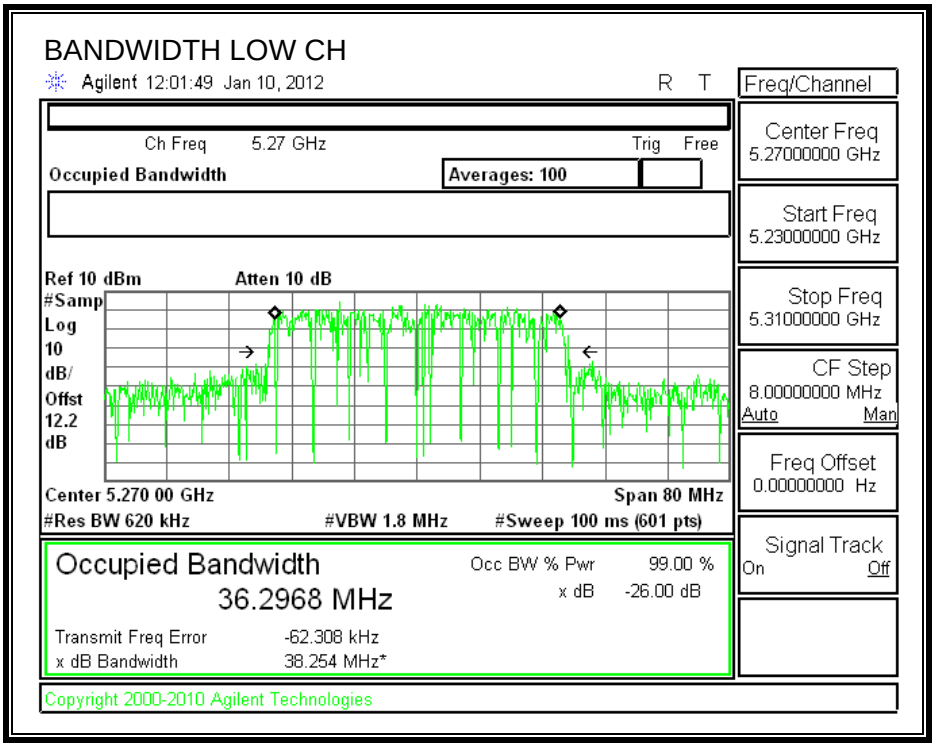
99% BANDWIDTH

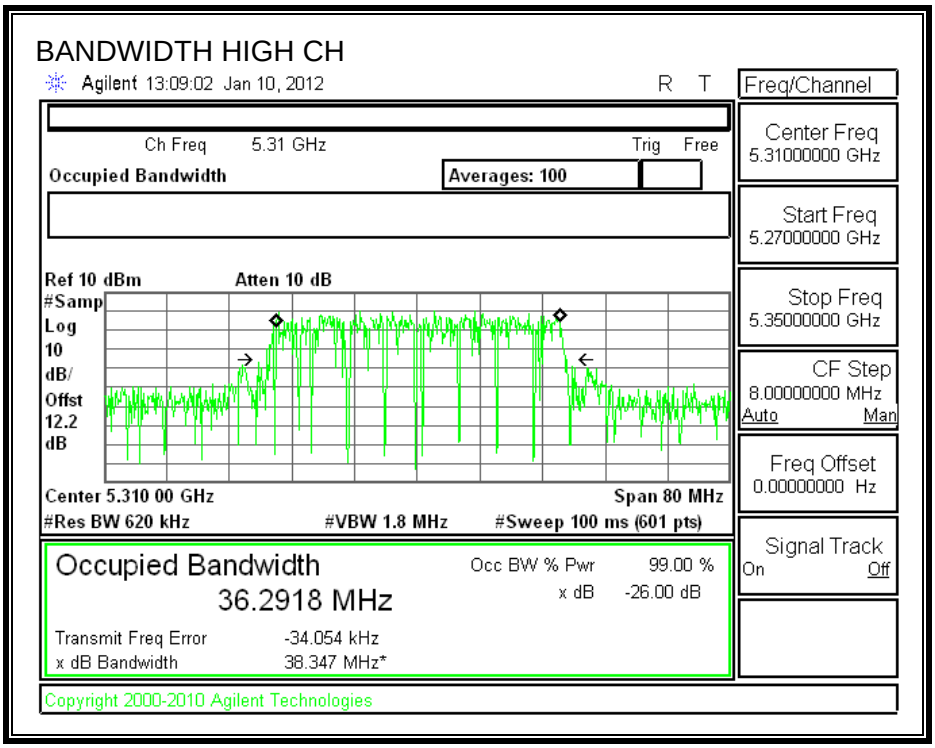




CHAIN 3

99% BANDWIDTH





7.14.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
5.05	6.56	3.01	9.88

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

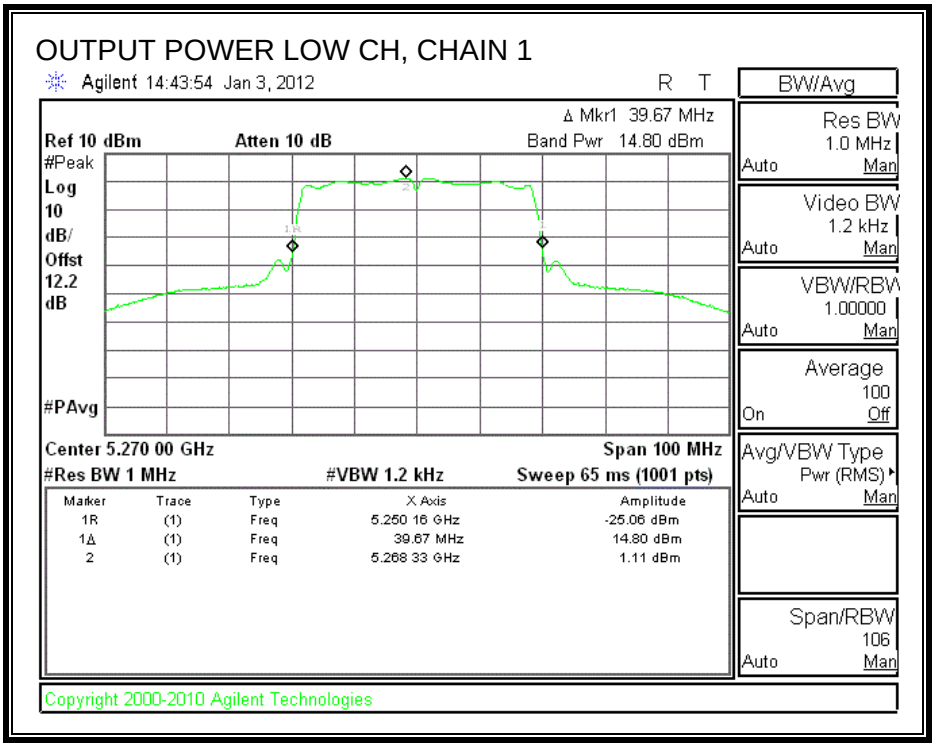
Limit

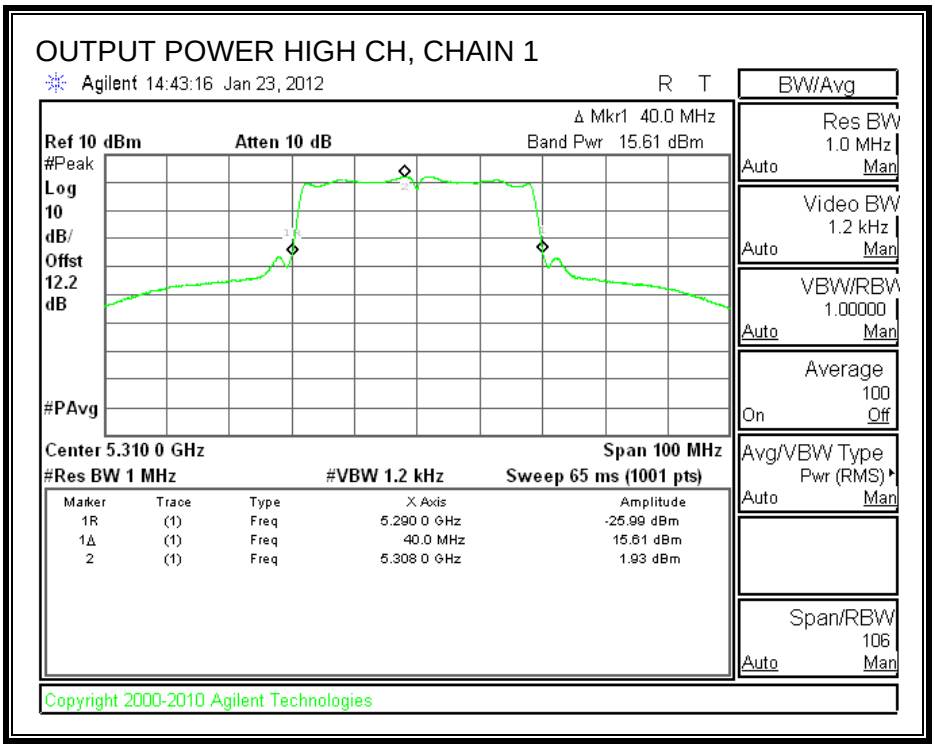
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	23.98	39.67	26.98	9.88	20.10
High	5310	23.98	39.5	26.97	9.88	20.10

Individual Chain Results

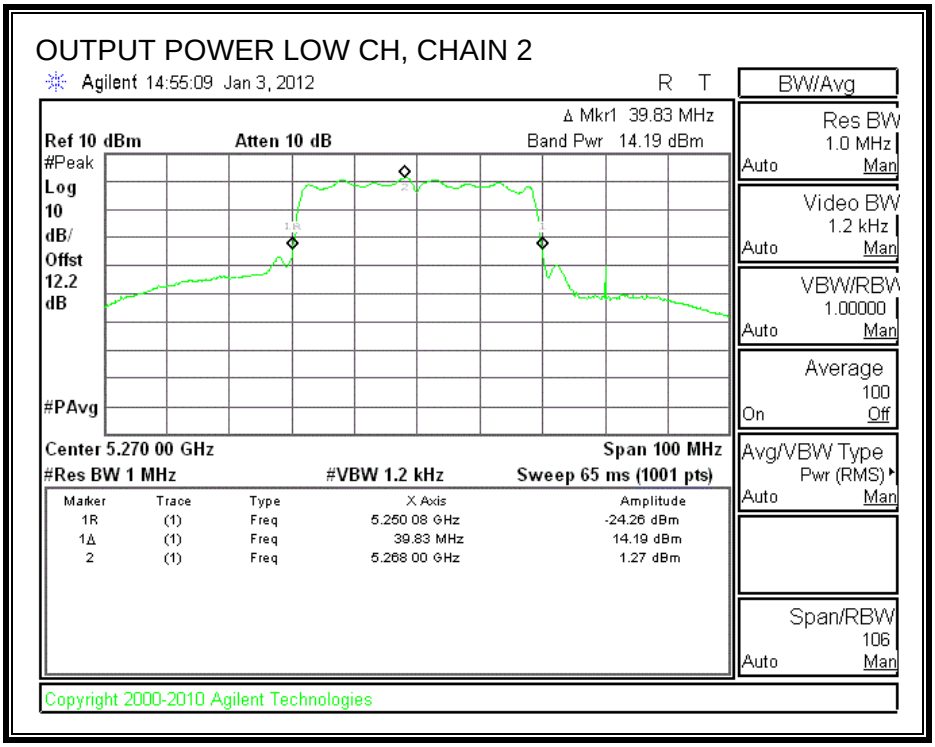
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	14.80	14.19	14.97	19.44	20.10	-0.66
High	5310	15.61	14.92	14.94	19.94	20.10	-0.16

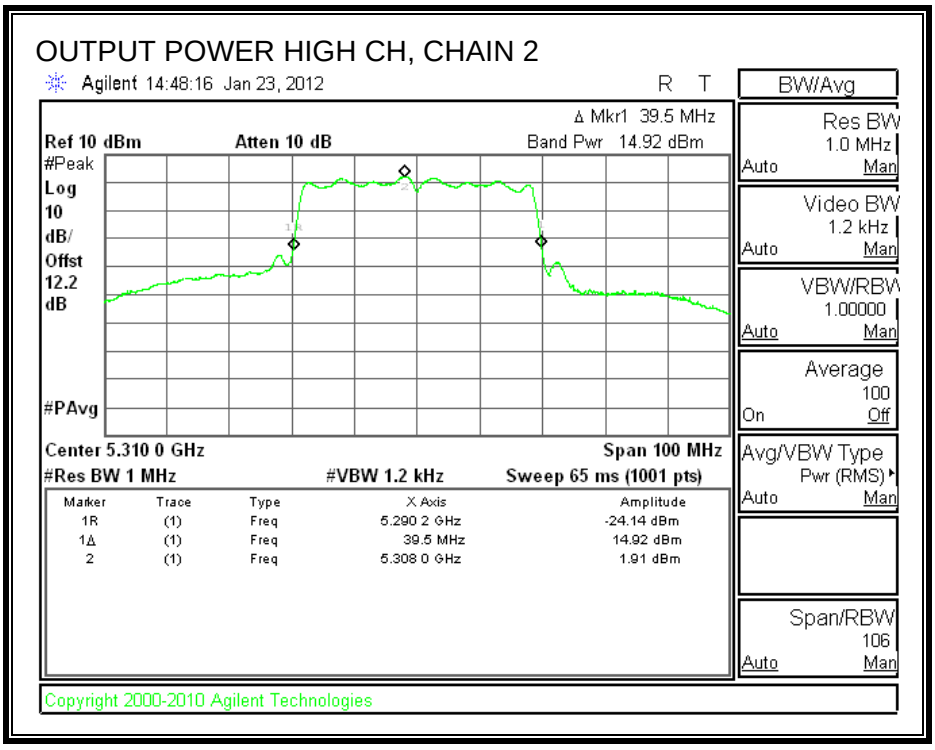
CHAIN 1 OUTPUT POWER



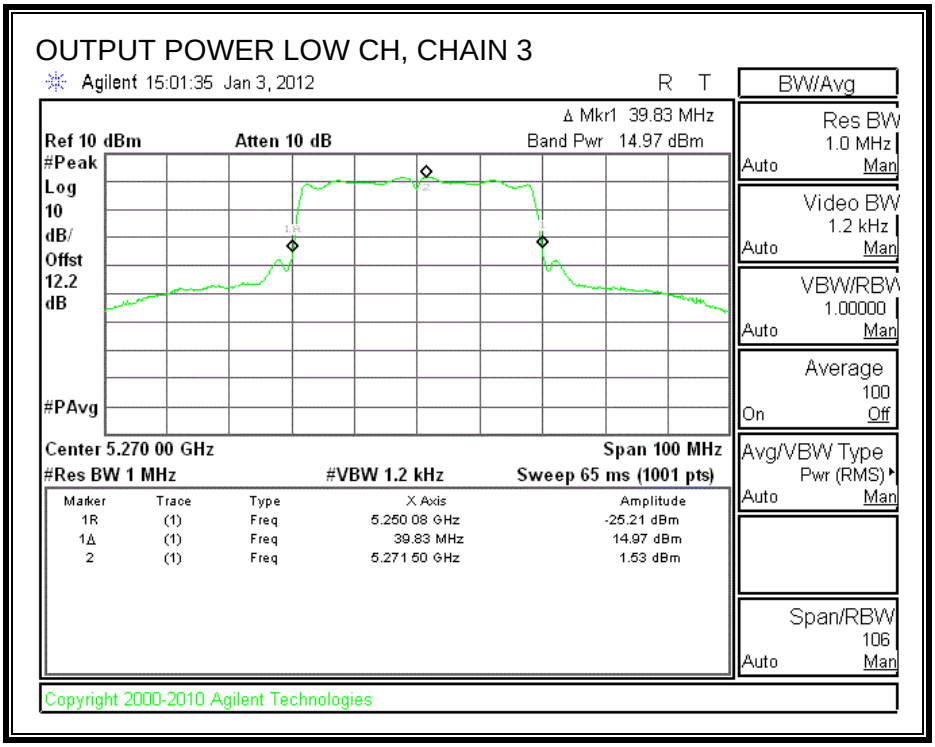


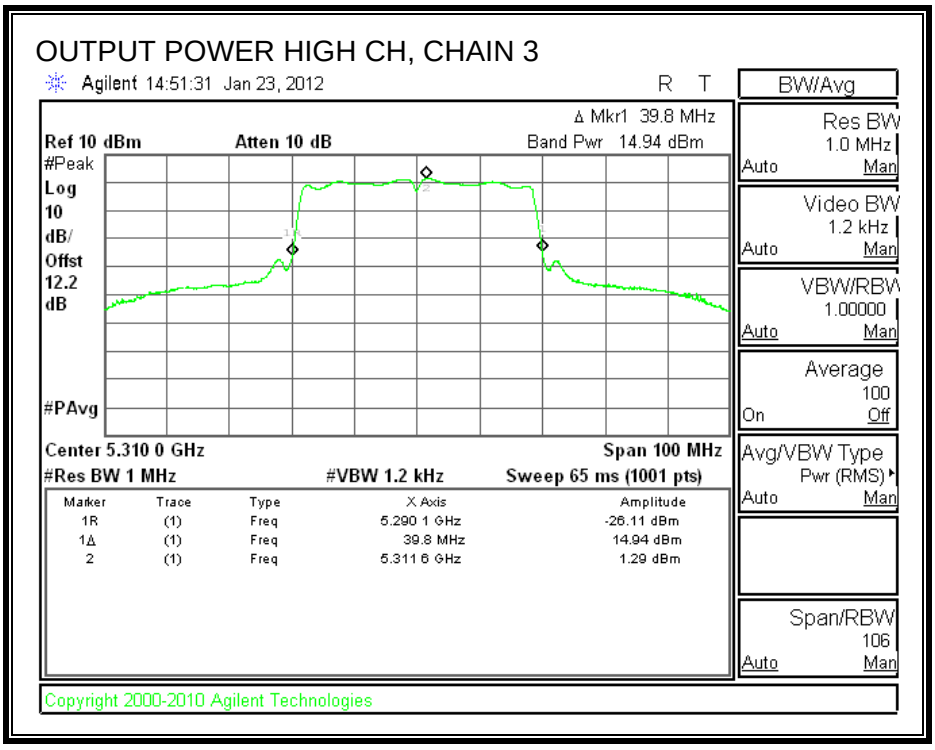
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.14.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5270	13.75	12.93	13.50	18.18
High	5310	14.34	13.55	13.76	18.67

7.14.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
5.05	6.56	3.01	9.88

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 9.88 dBi, therefore the limit is 7.12 dBm.

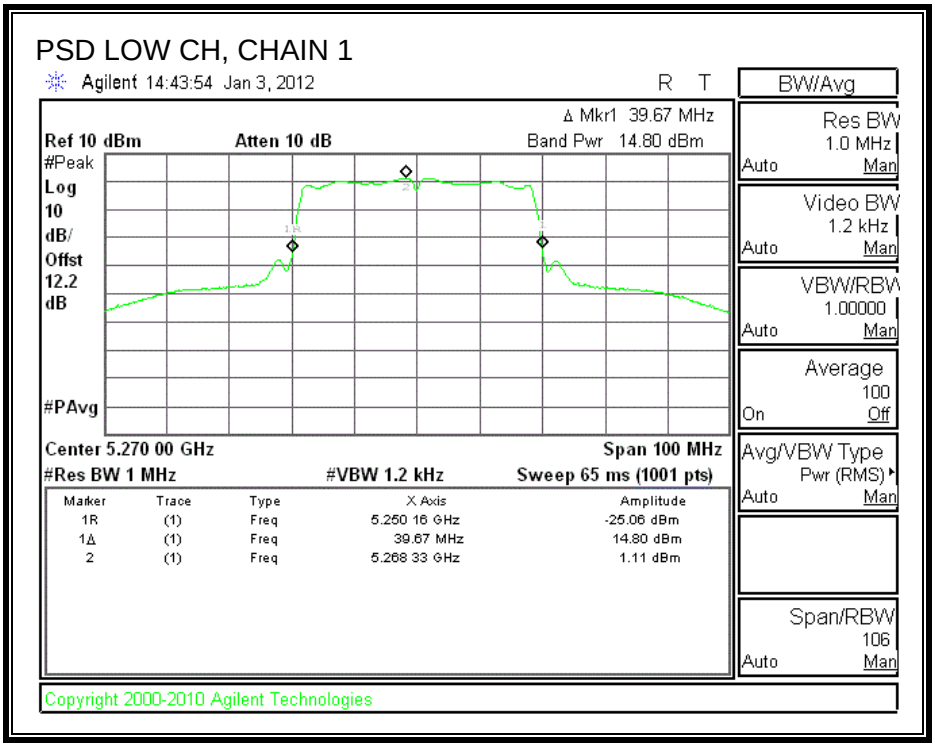
TEST PROCEDURE

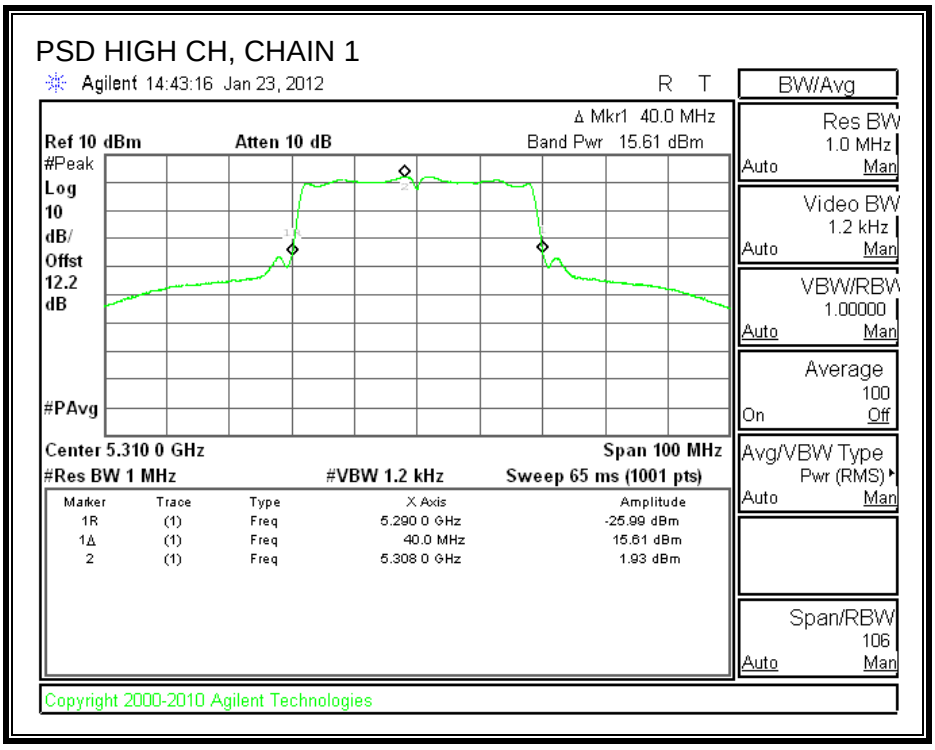
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

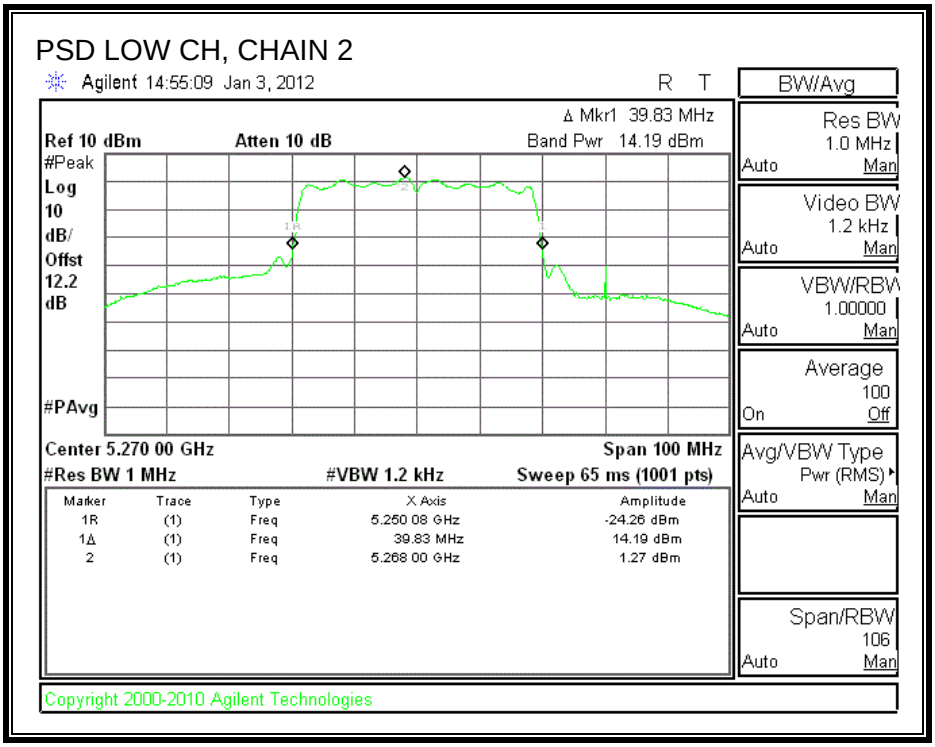
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	**5270**	**1.11**	**1.27**	**1.53**	**6.08**	**7.12**	**-1.04**
High	**5310**	**1.93**	**1.91**	**1.29**	**6.49**	**7.12**	**-0.63**

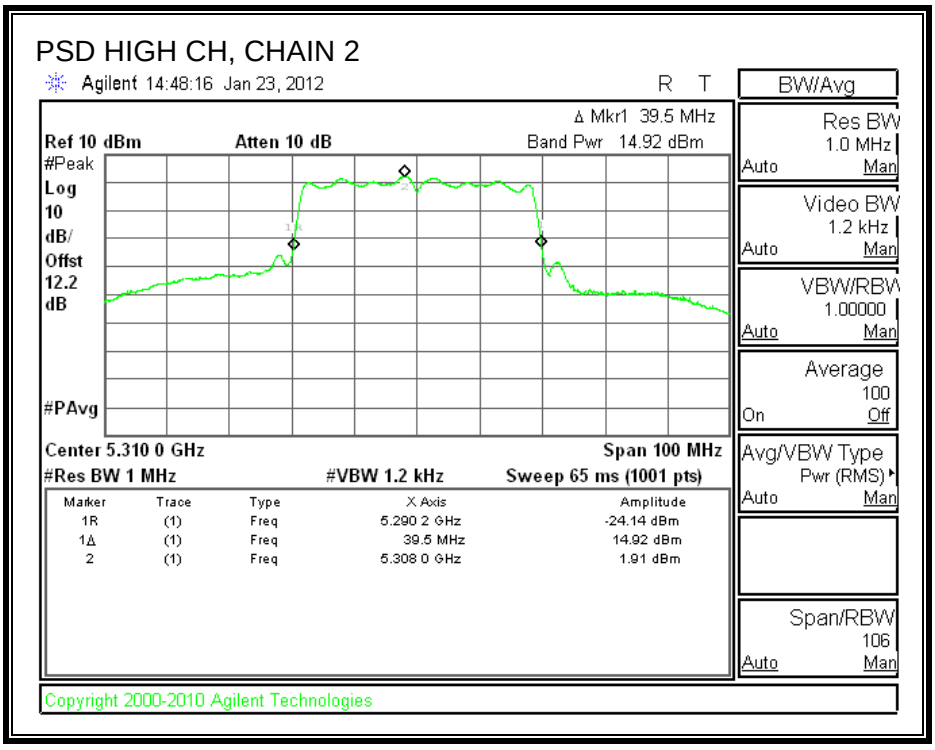
CHAIN 1 POWER SPECTRAL DENSITY



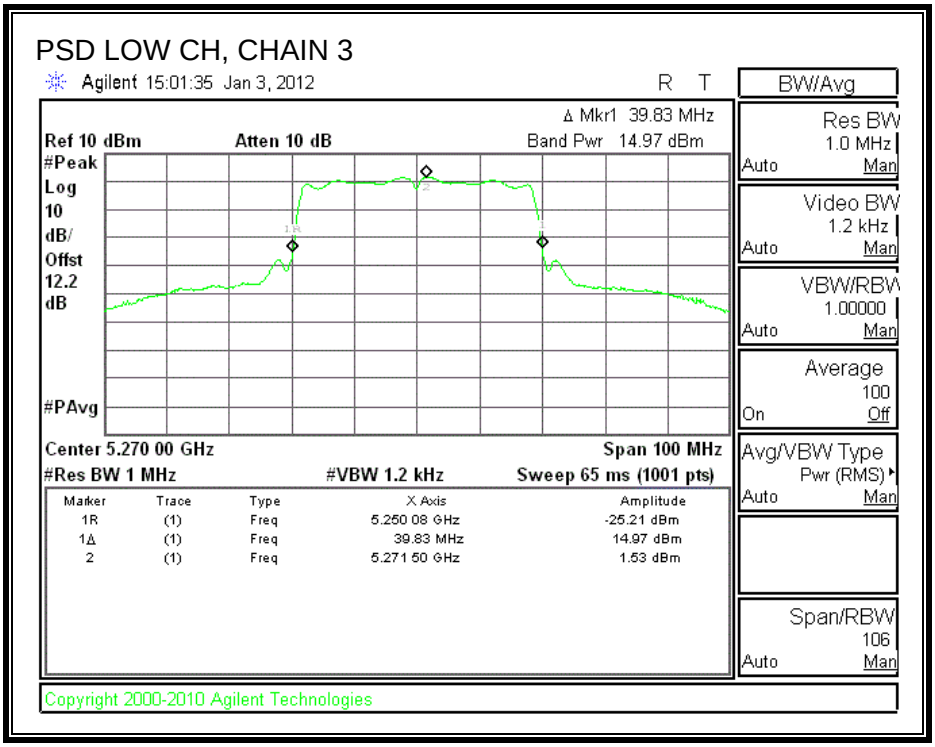


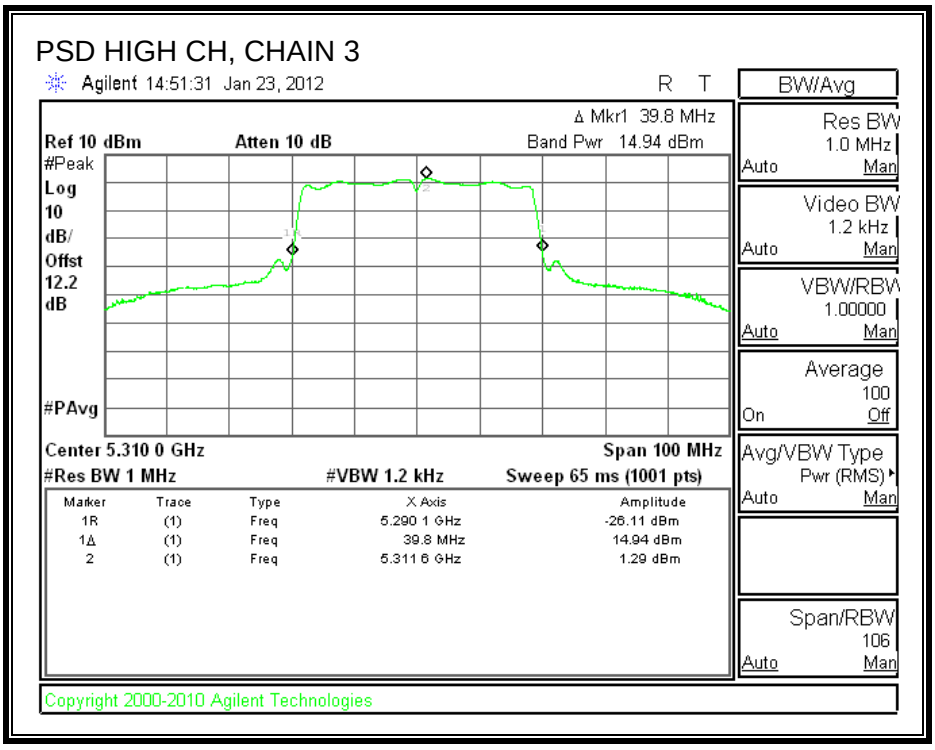
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.14.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	7.04	13	-5.96
High	5310	7.16	13	-5.84

CHAIN 2

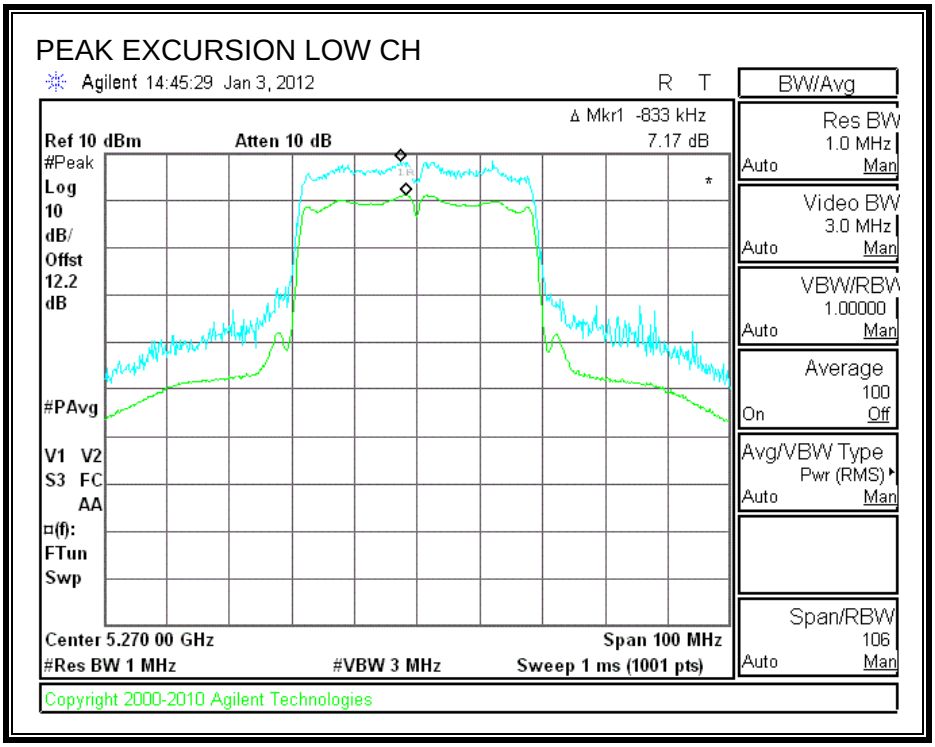
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	7.54	13	-5.46
High	5310	7.45	13	-5.55

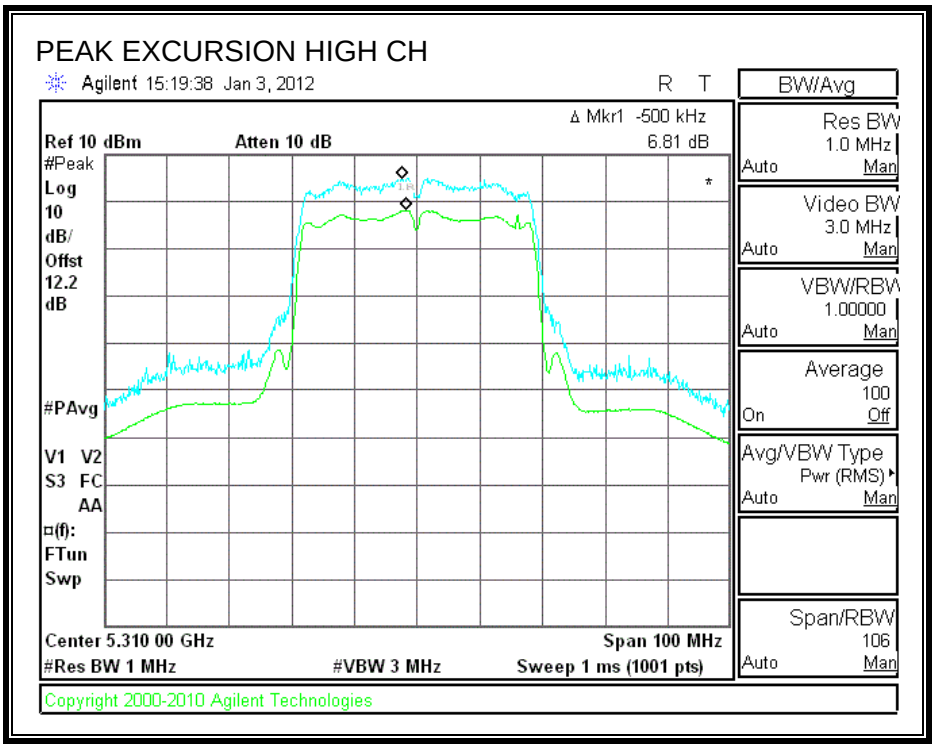
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	7.04	13	-5.96
High	5310	7.16	13	-5.84

CHAIN 1

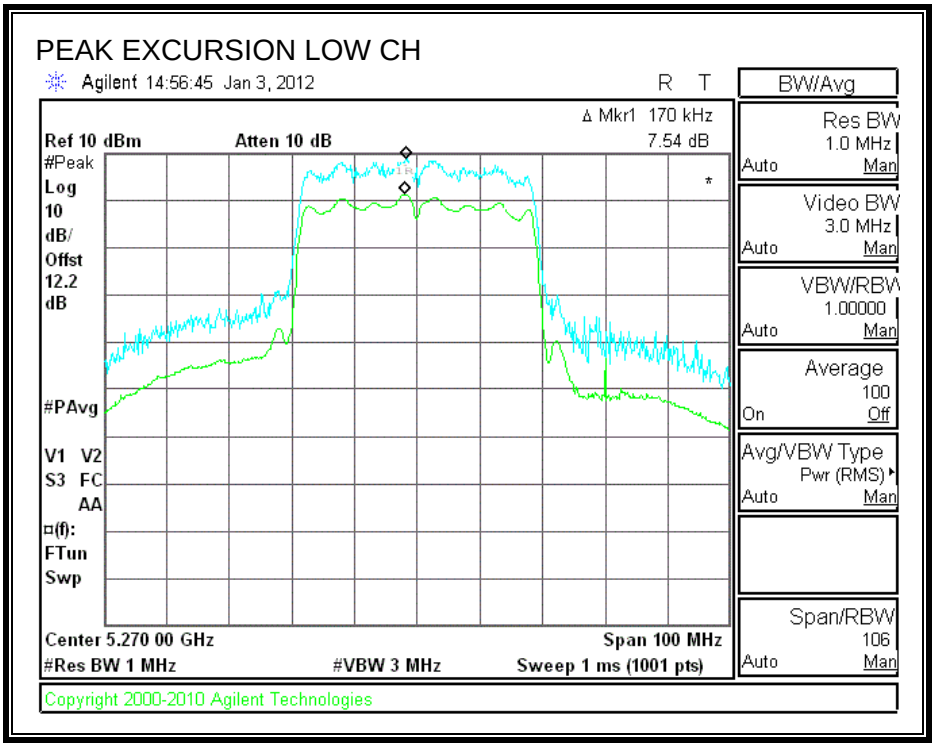
PEAK EXCURSION



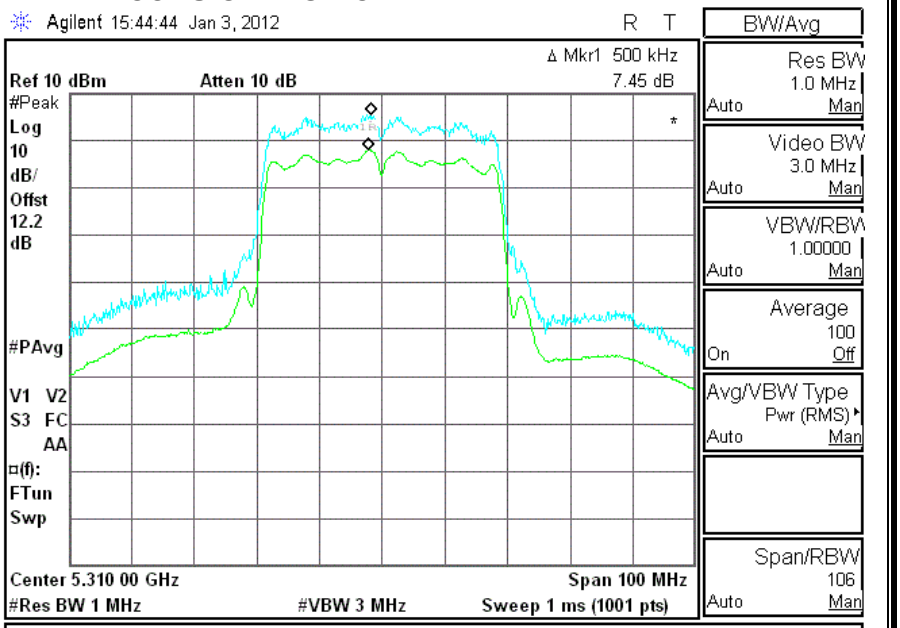


CHAIN 2

PEAK EXCURSION

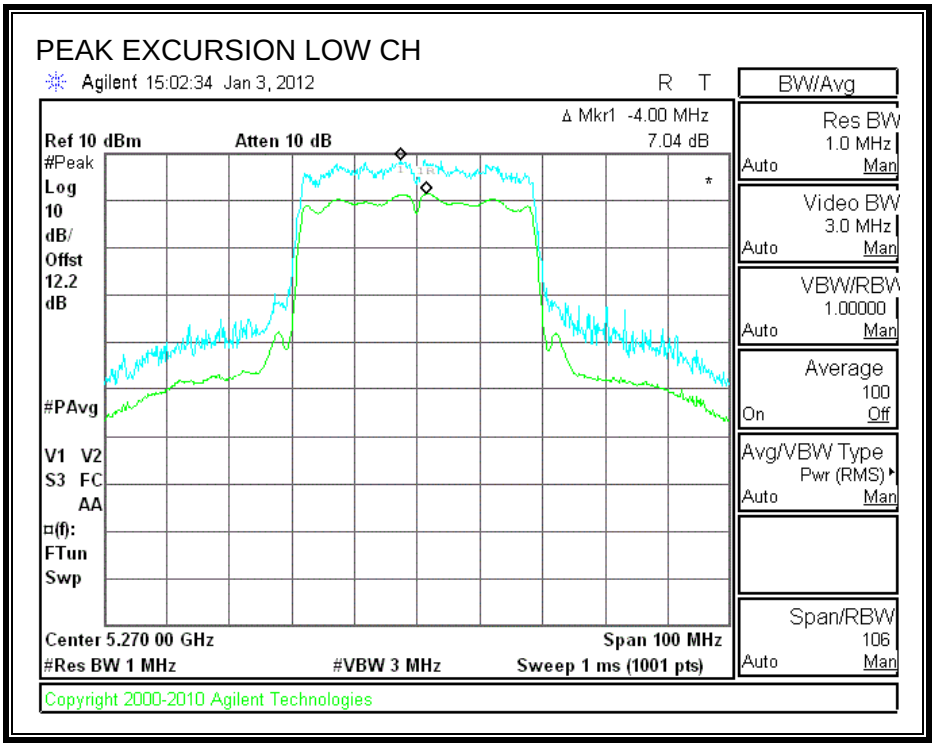


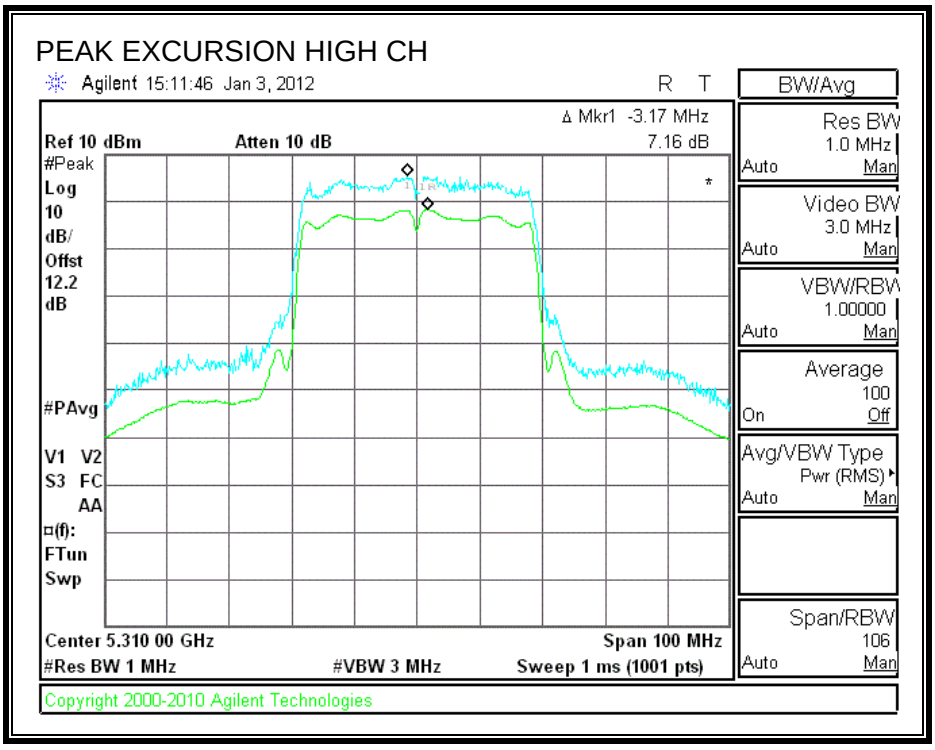
PEAK EXCURSION HIGH CH



CHAIN 3

PEAK EXCURSION





7.15. 802.11n HT40 3TX MODE IN THE 5.3 GHz BAND, SDM MCS21

7.15.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	67.4	36.3550
High	5310	39.3	36.1748

CHAIN 2

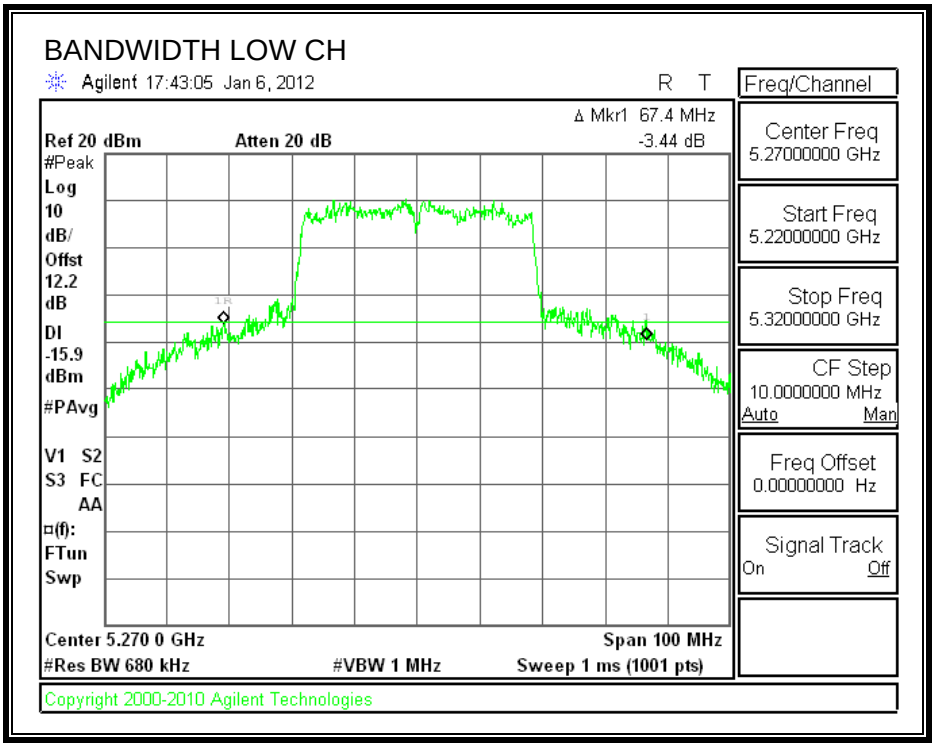
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	62.3	36.3136
High	5310	39.2	36.2651

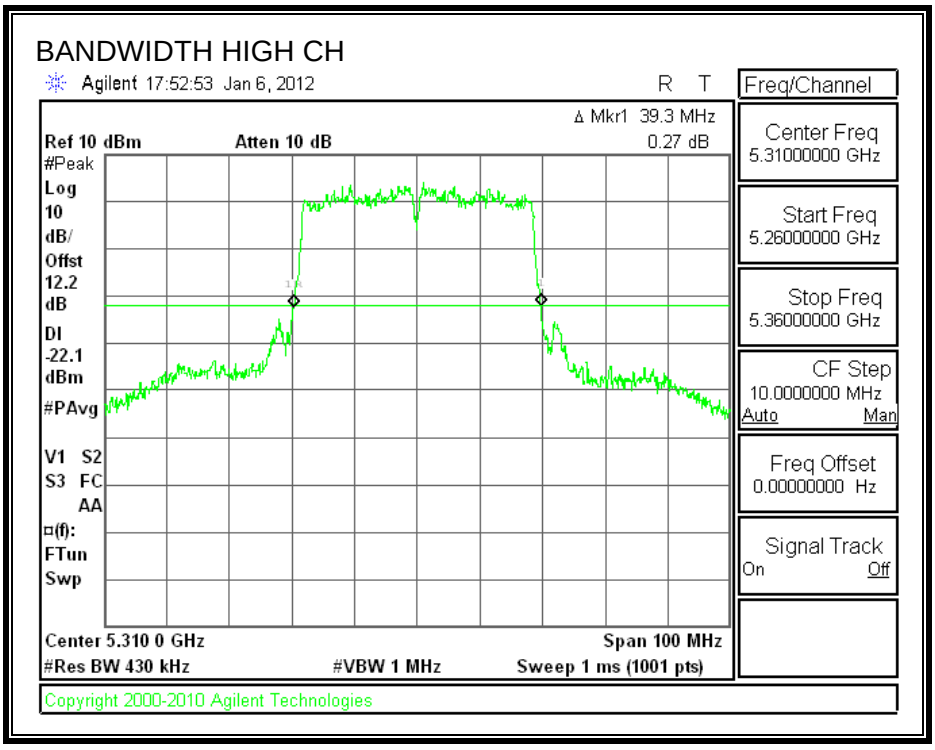
CHAIN 3

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5270	55.0	36.3103
High	5310	39.5	36.1868

CHAIN 1

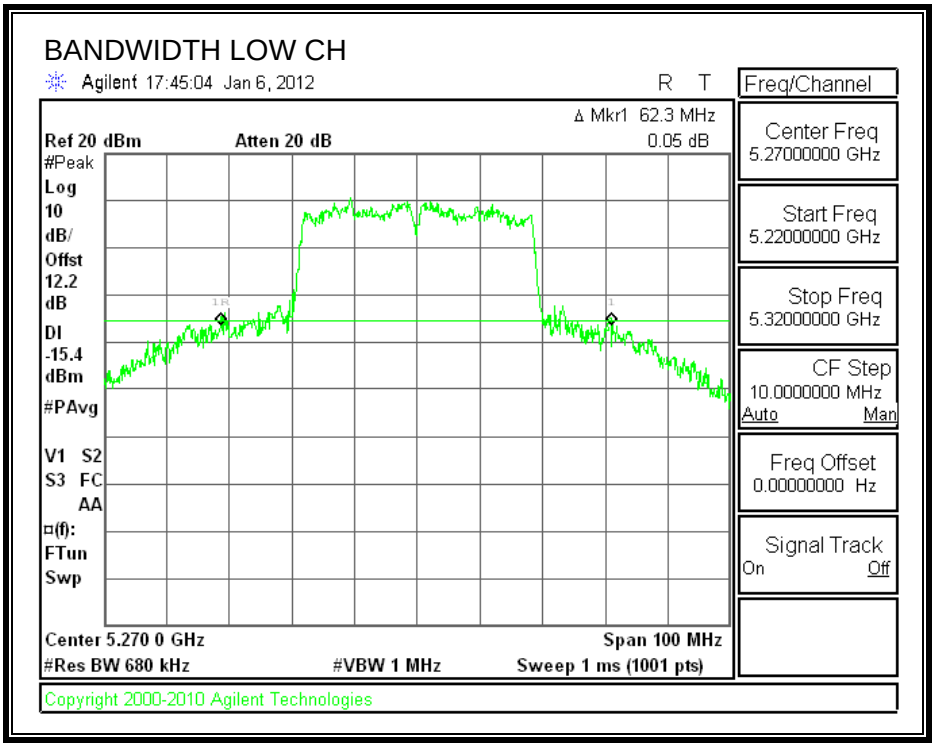
26 dB BANDWIDTH

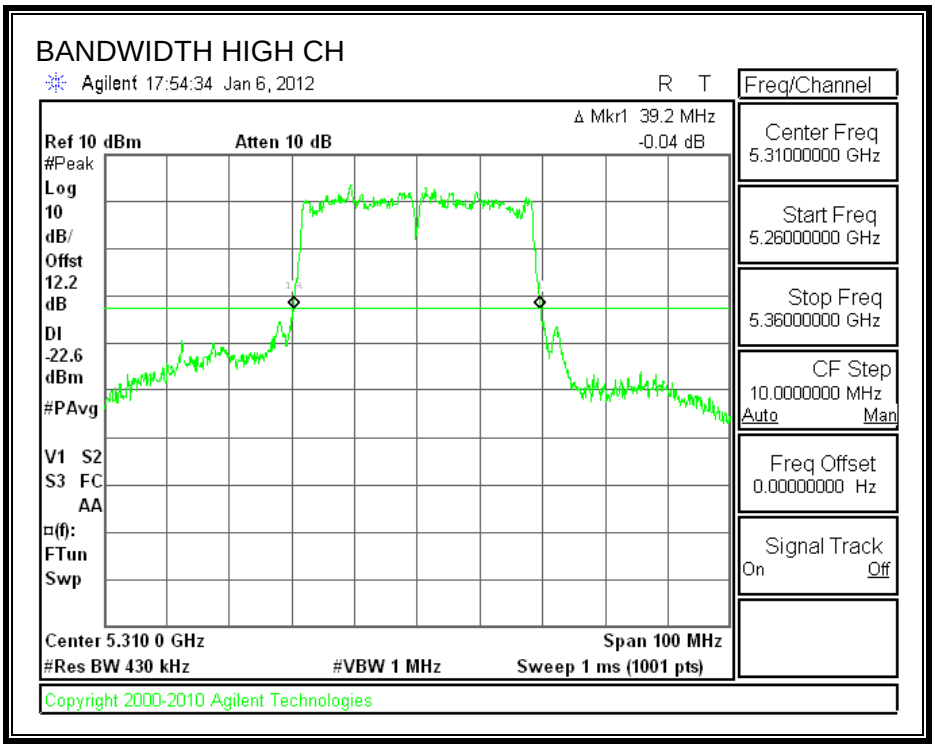




CHAIN 2

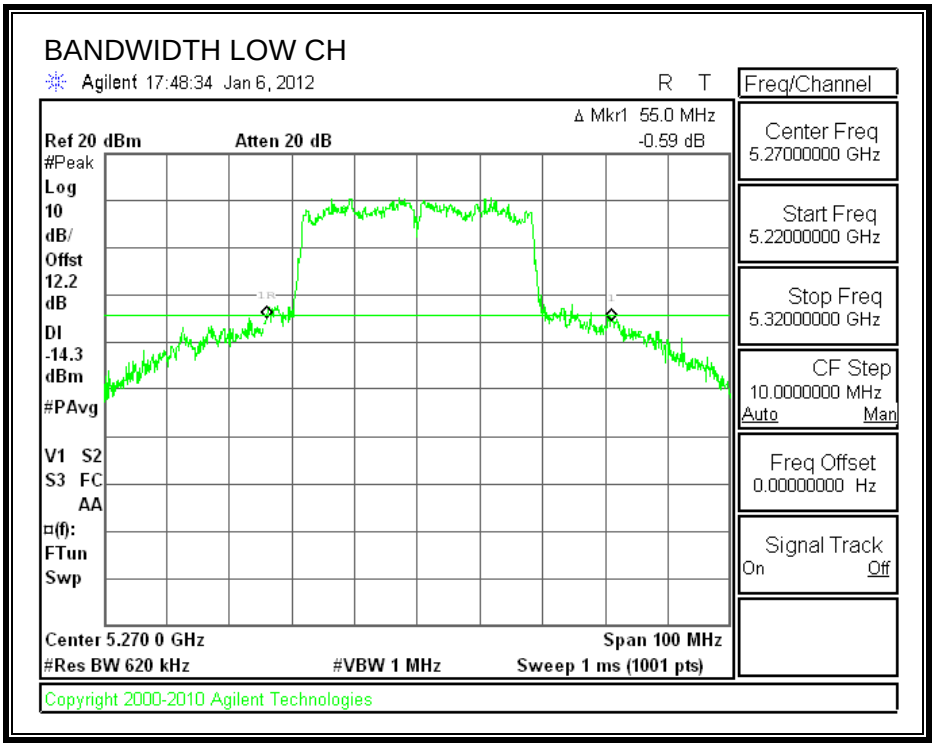
26 dB BANDWIDTH

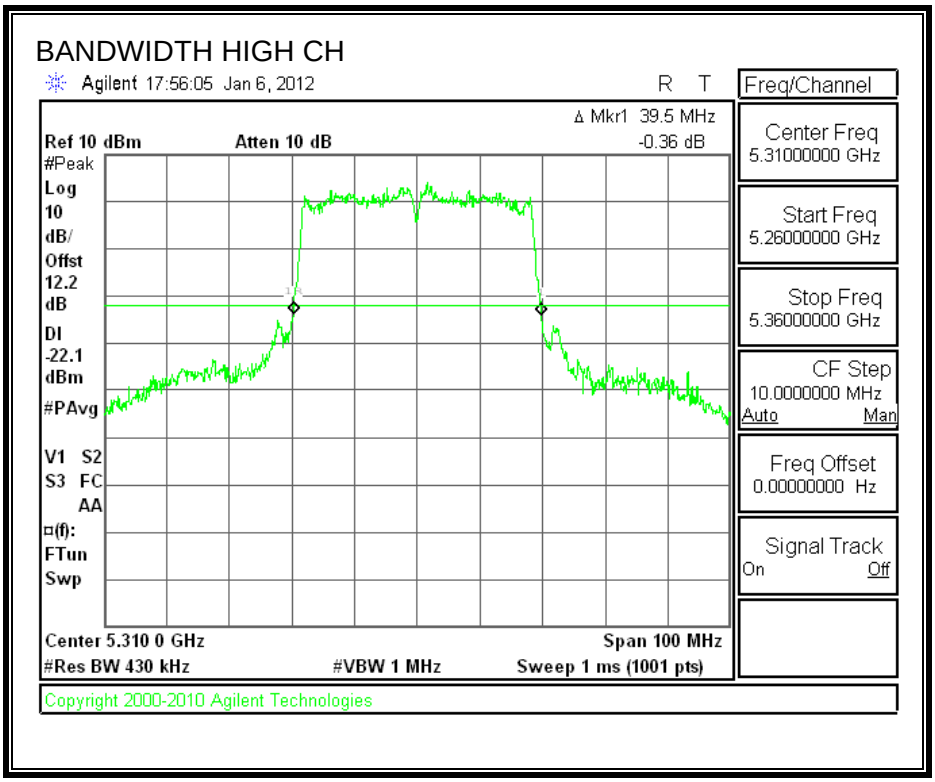




CHAIN 3

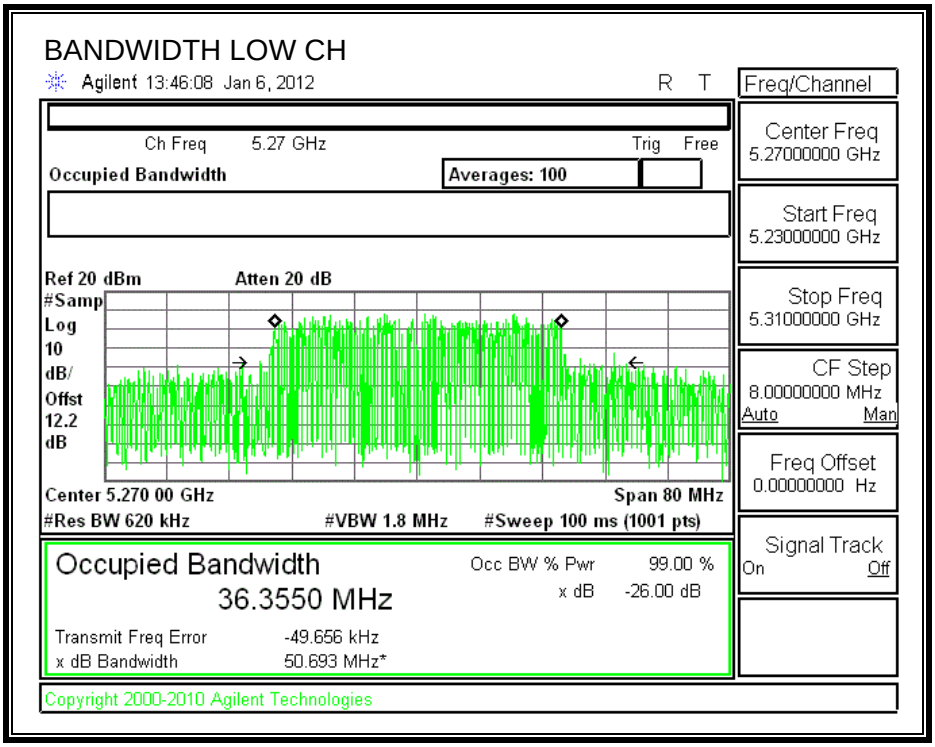
26 dB BANDWIDTH

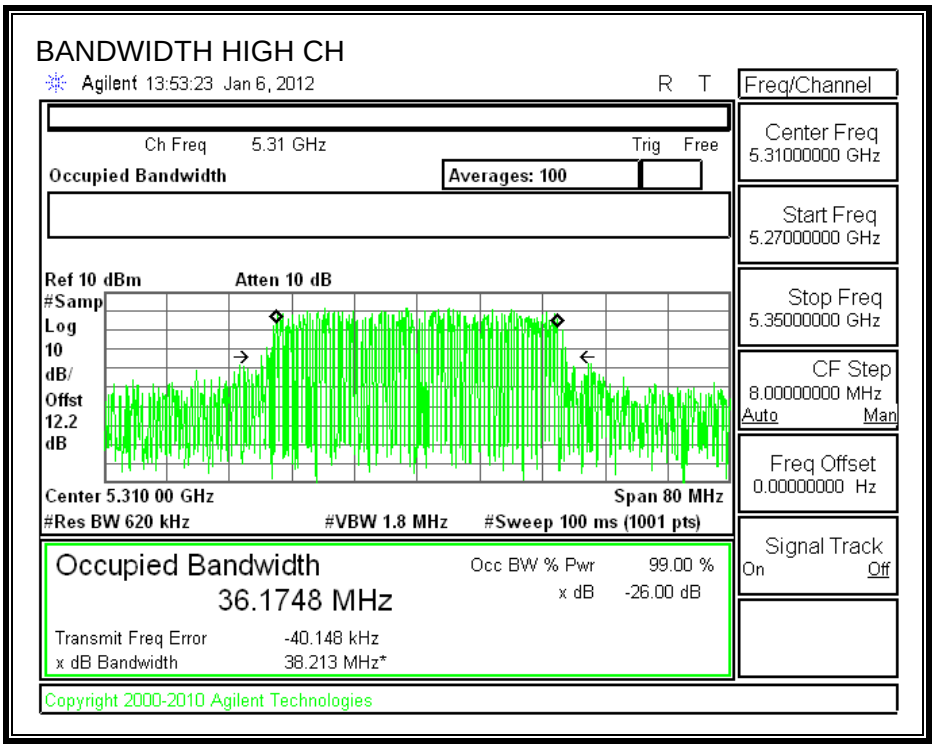




CHAIN 1

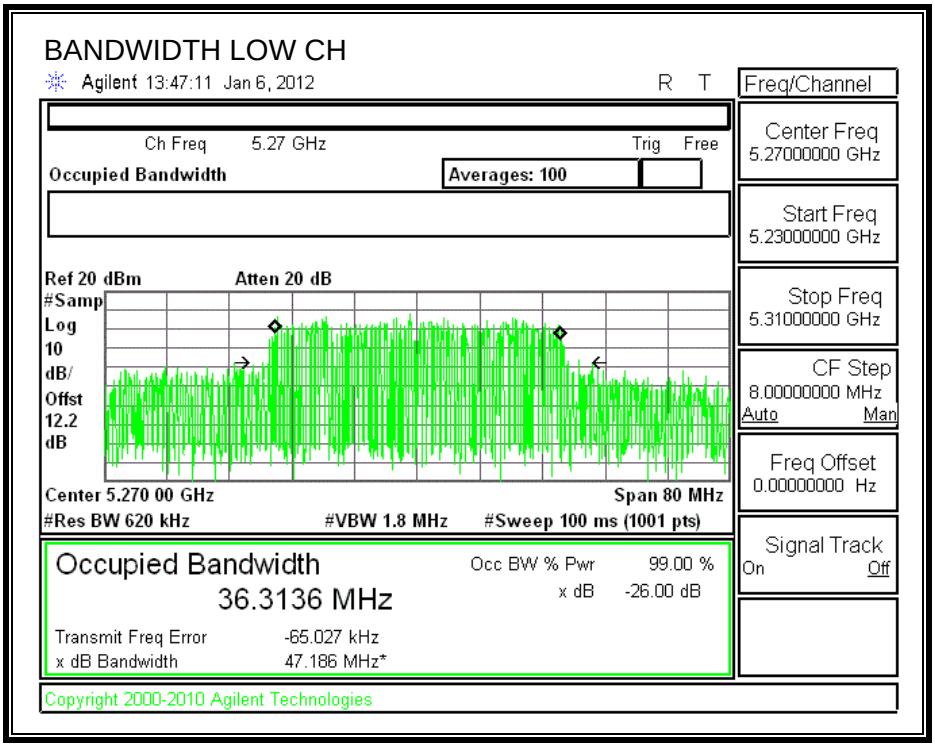
99% BANDWIDTH

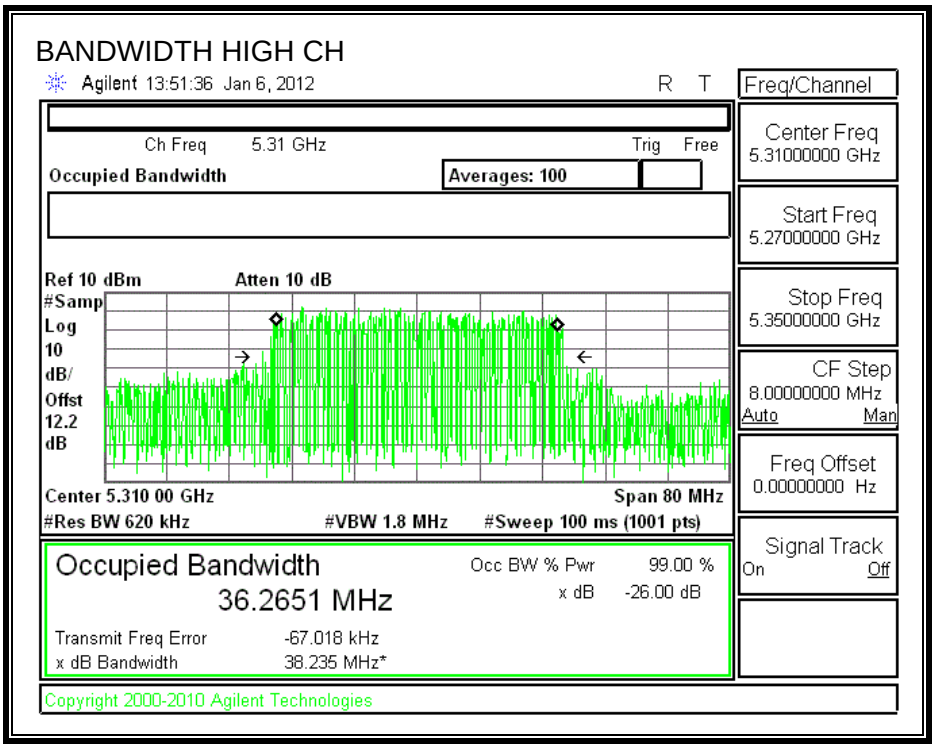




CHAIN 2

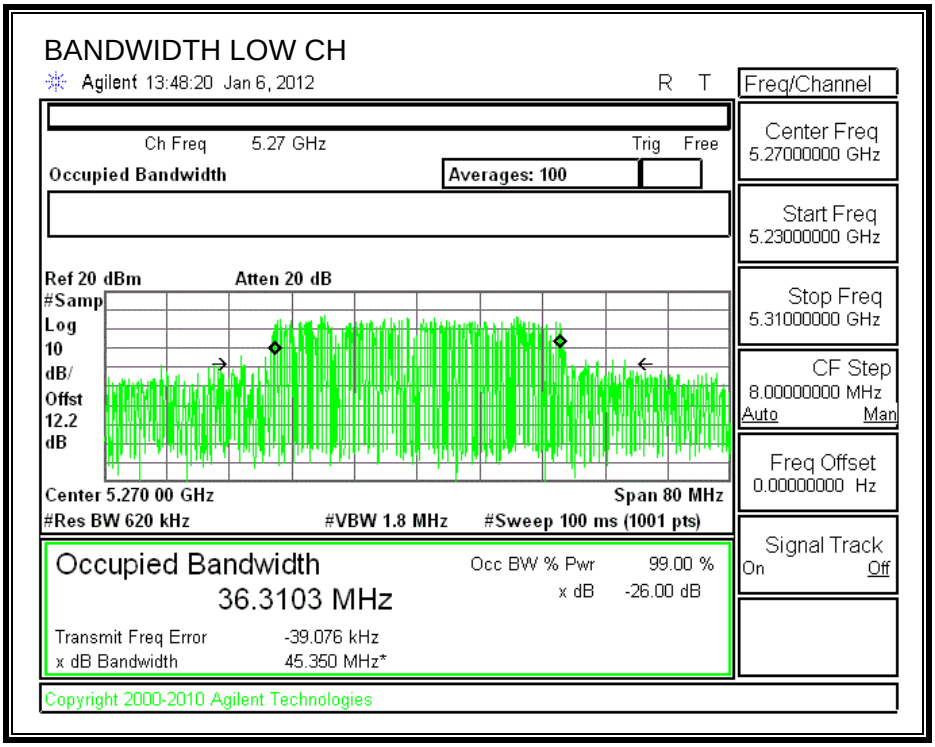
99% BANDWIDTH

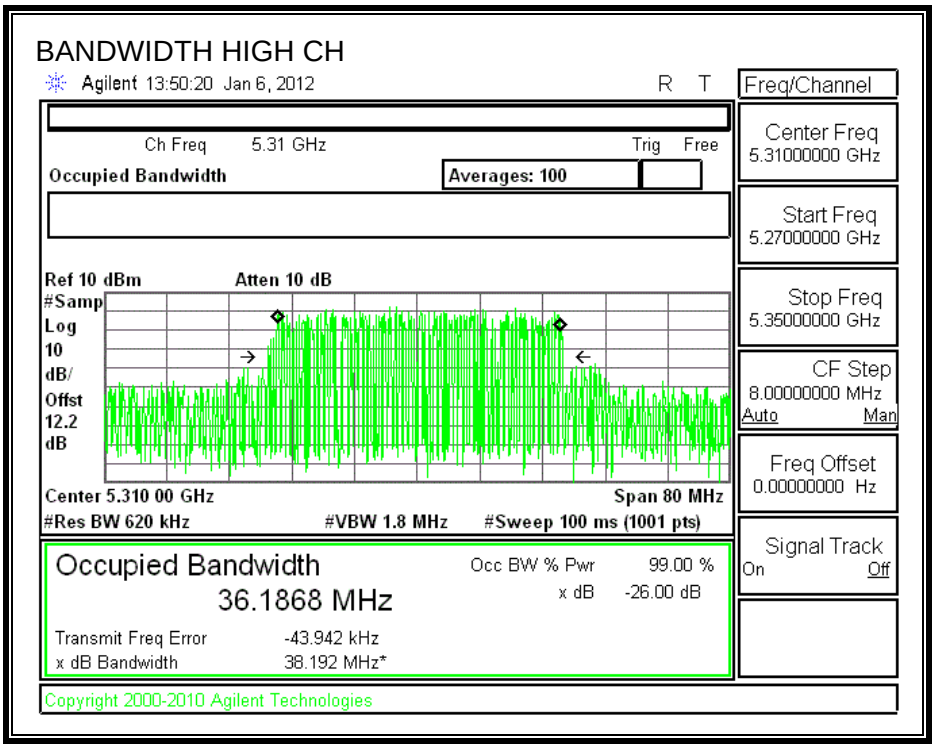




CHAIN 3

99% BANDWIDTH





7.15.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

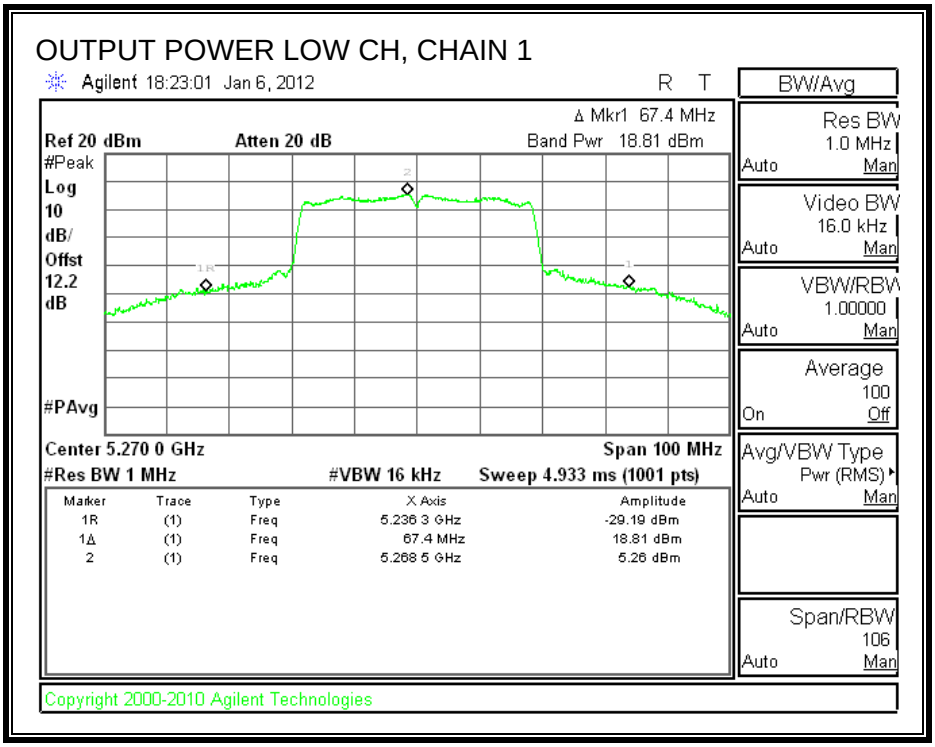
Limit

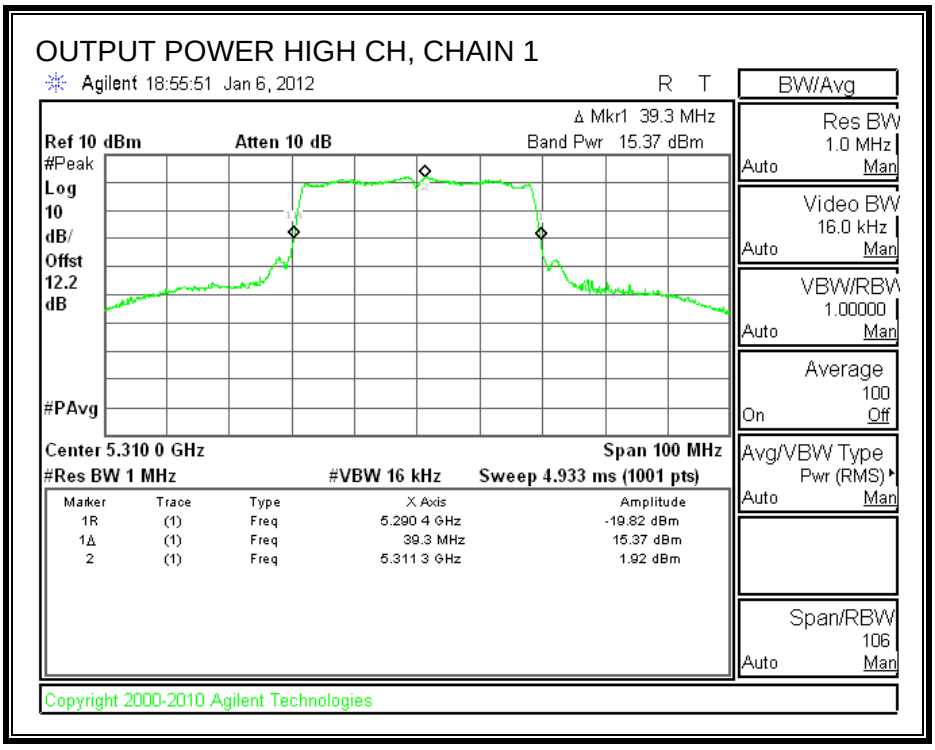
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5270	23.98	55.0	28.40	6.56	23.42
High	5310	23.98	39.2	26.93	6.56	23.42

Individual Chain Results

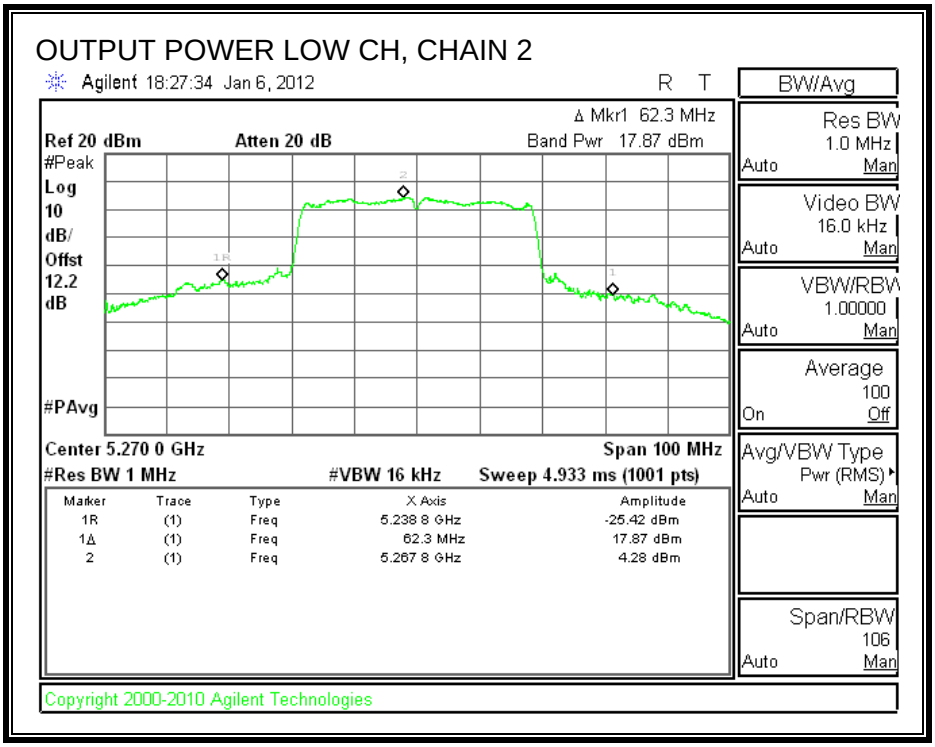
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5270	18.81	17.87	18.34	23.13	23.42	-0.29
High	5310	15.37	14.96	15.30	19.98	23.42	-3.44

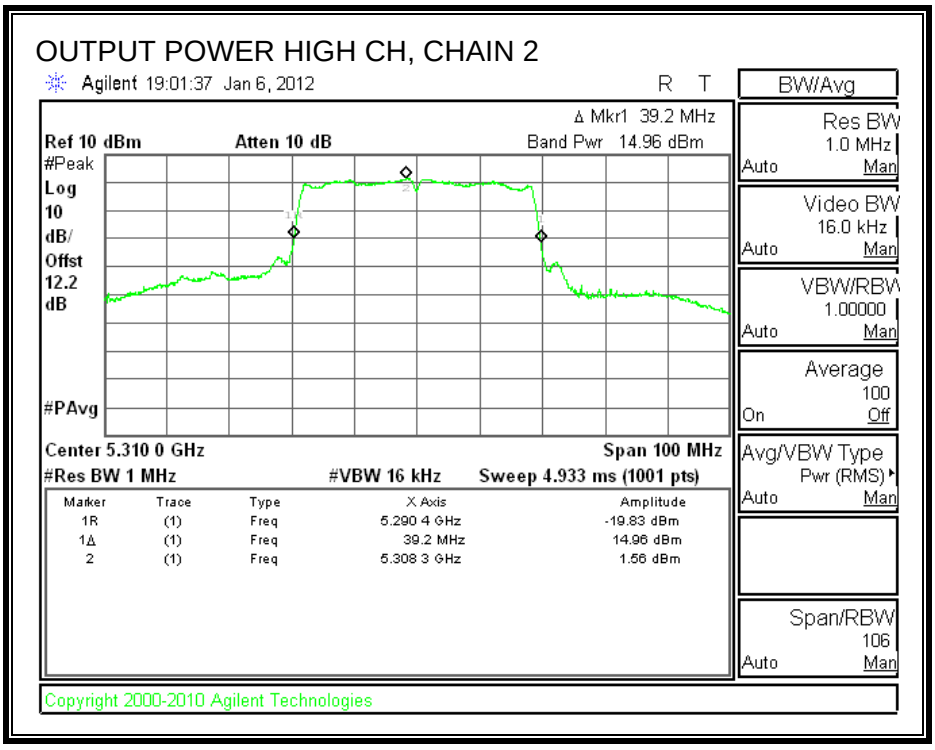
CHAIN 1 OUTPUT POWER



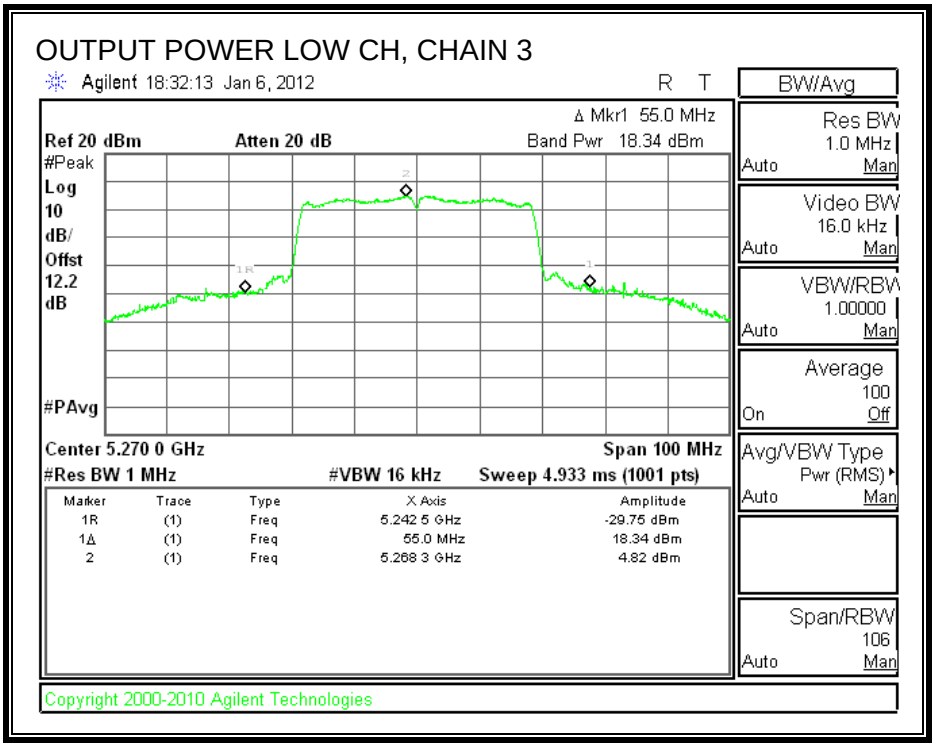


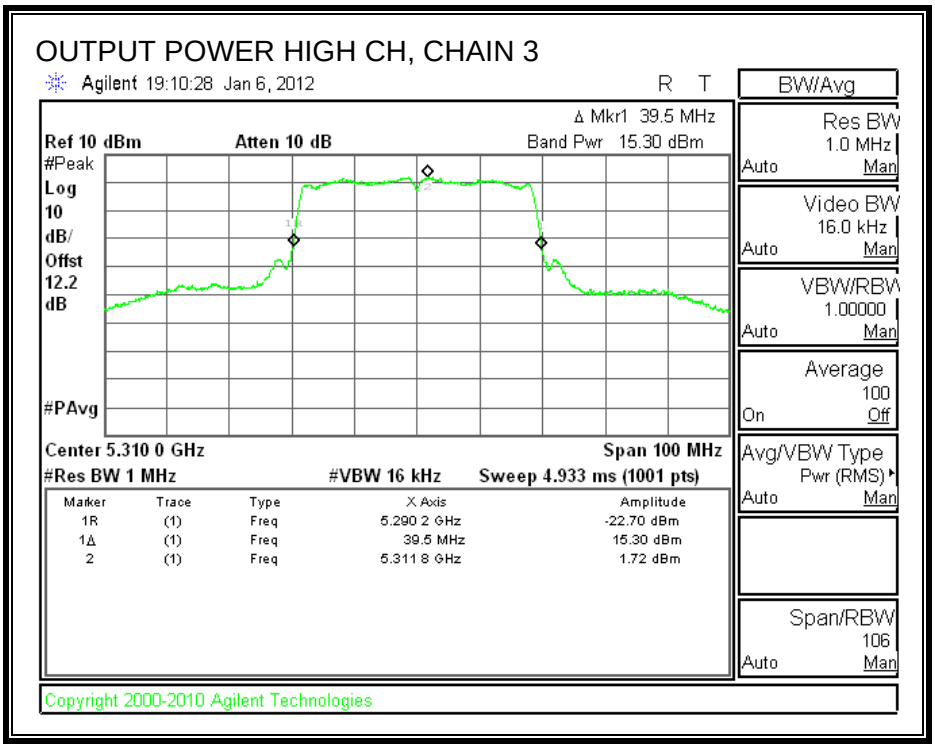
CHAIN 2 OUTPUT POWER





CHAIN 3 OUTPUT POWER





7.15.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5270	16.10	15.21	15.71	20.46
High	5310	12.55	12.28	12.65	17.27

7.15.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.56 dBi, therefore the limit is 10.44 dBm.

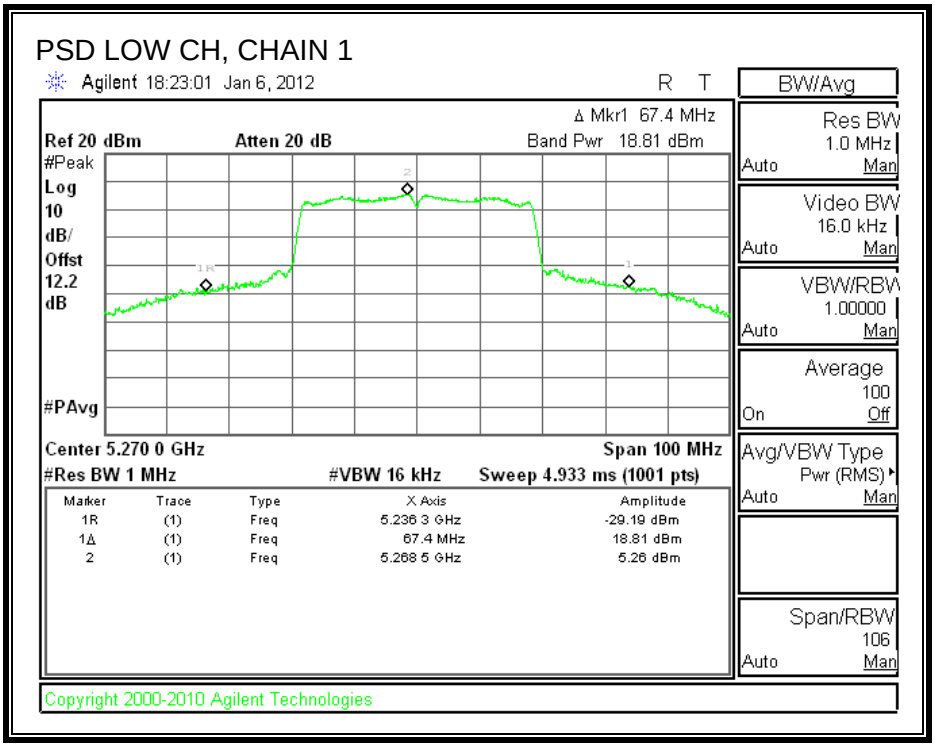
TEST PROCEDURE

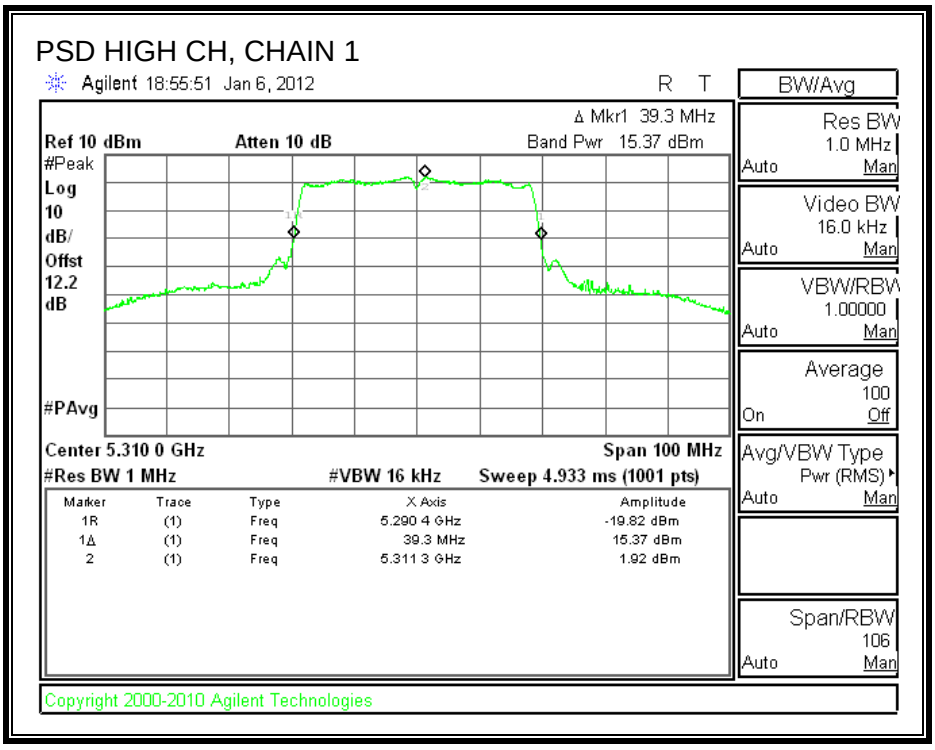
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

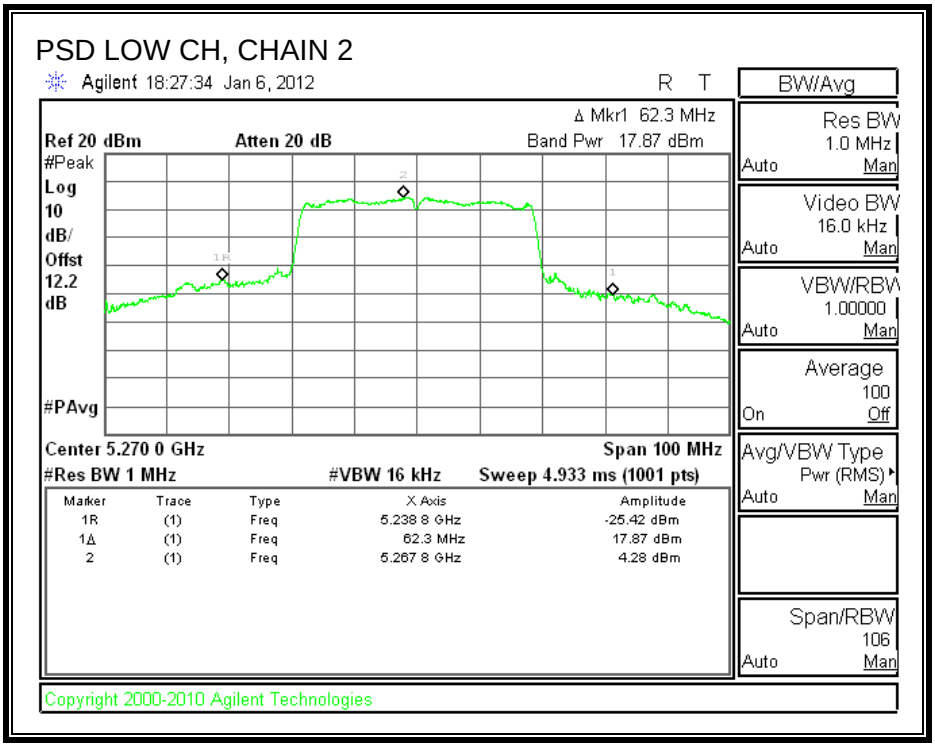
Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5270	5.26	4.28	4.82	9.58	10.44	-0.86
High	5310	1.92	1.56	1.72	6.51	10.44	-3.93

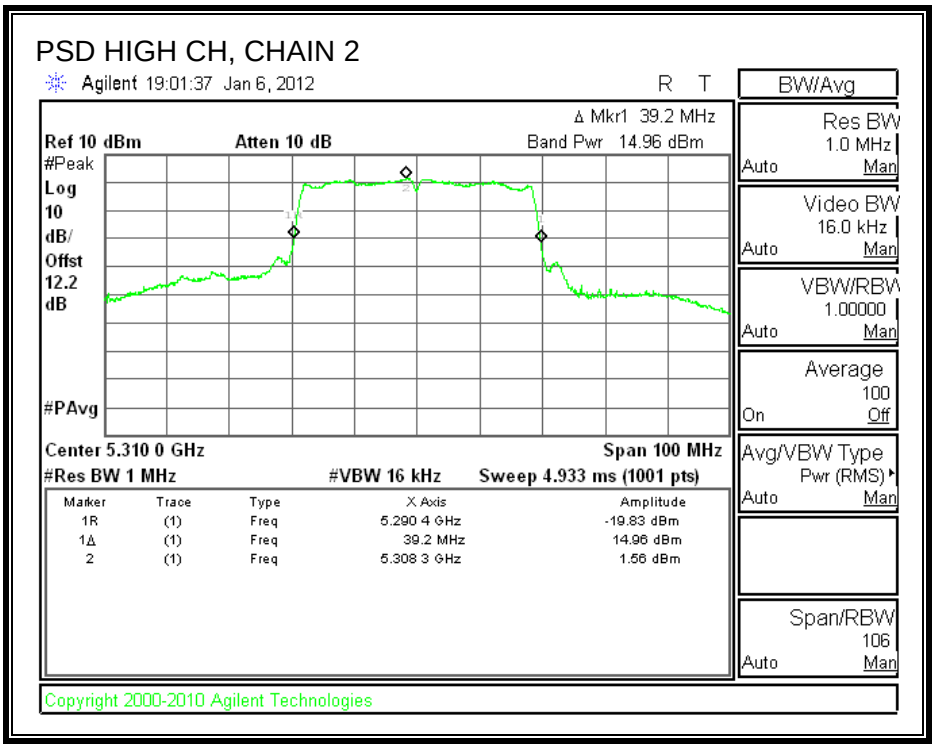
CHAIN 1 POWER SPECTRAL DENSITY



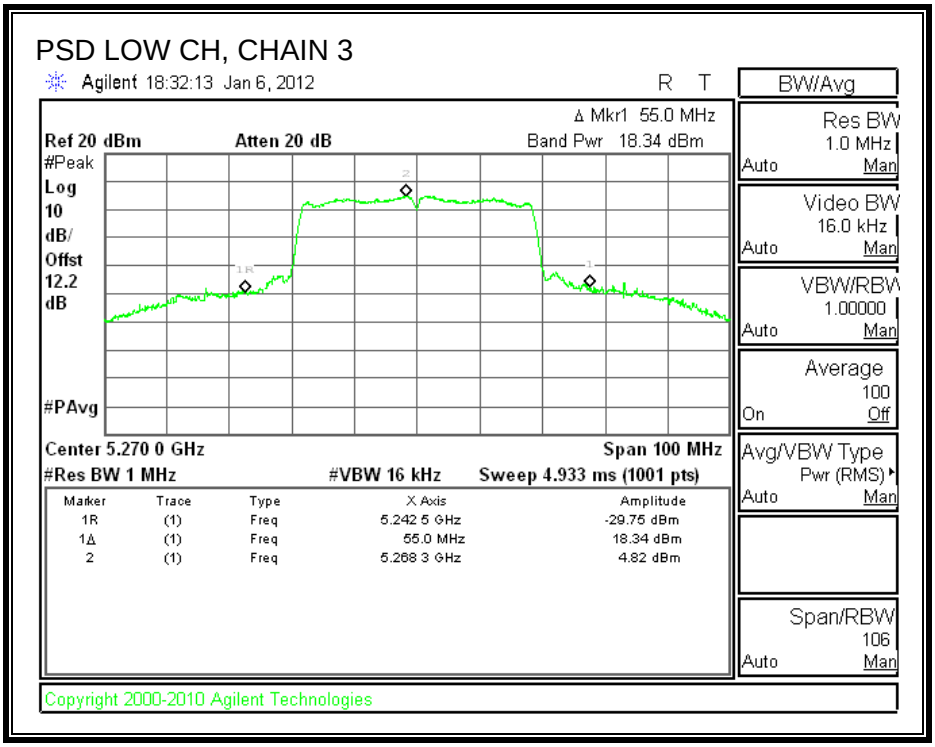


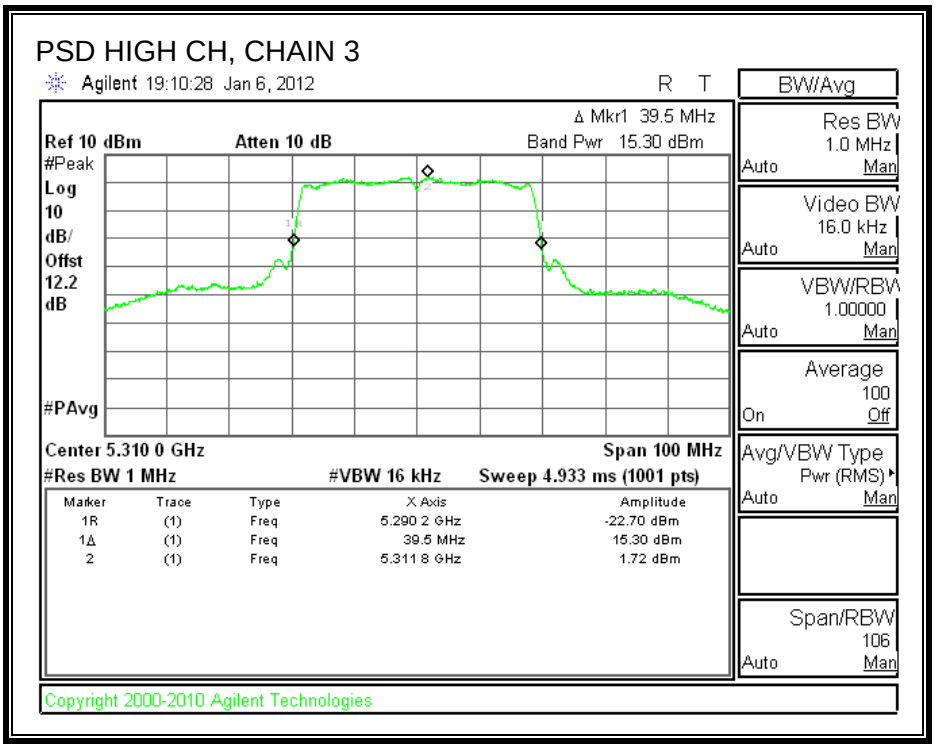
CHAIN 2 POWER SPECTRAL DENSITY





CHAIN 3 POWER SPECTRAL DENSITY





7.15.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5290	5.83	13	-7.17
High	5310	6.07	13	-6.93

CHAIN 2

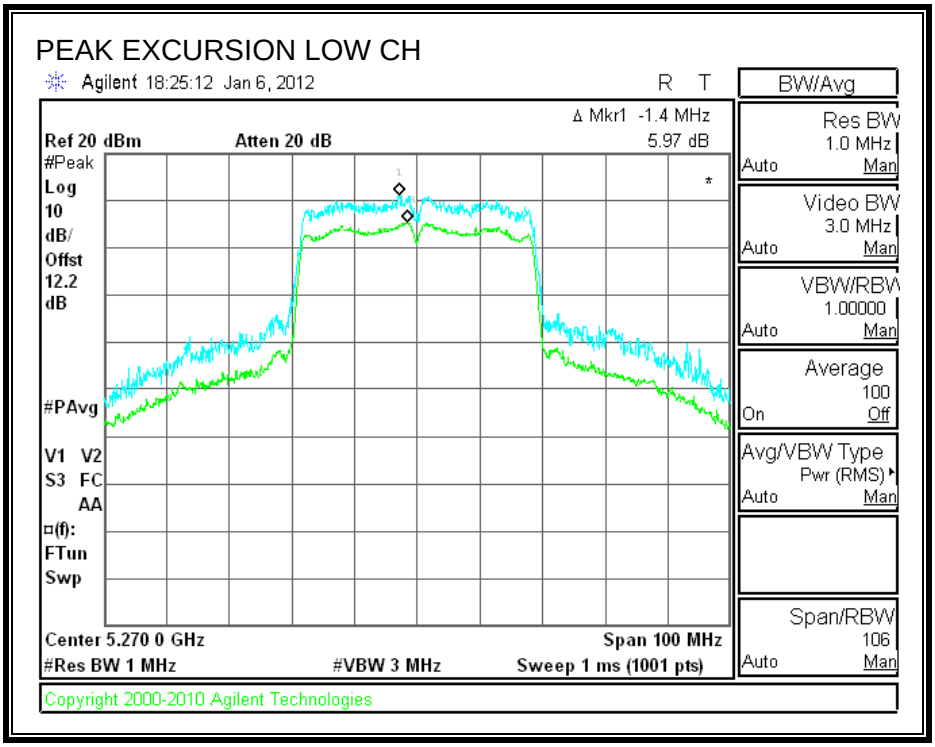
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	6.35	13	-6.65
High	5310	6.32	13	-6.68

CHAIN 3

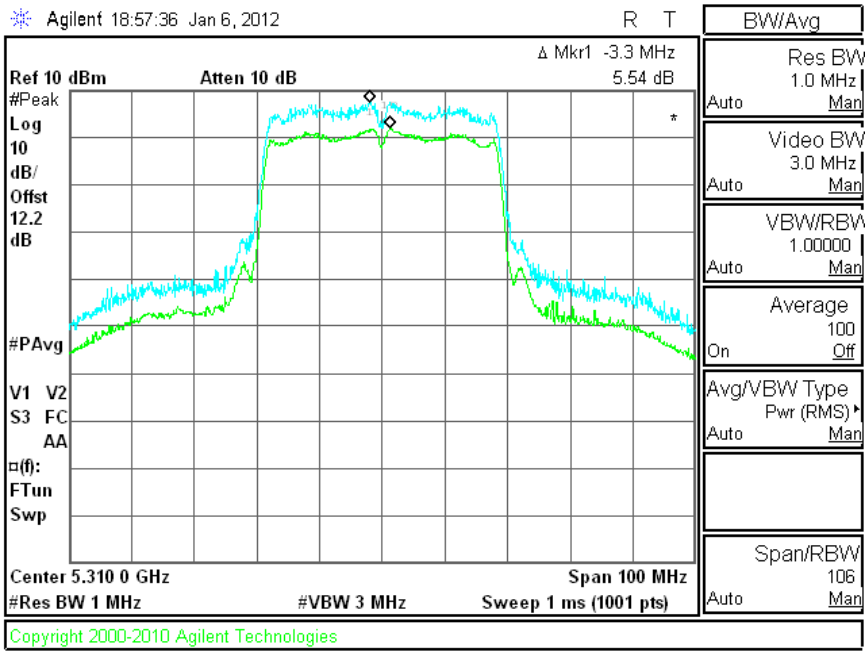
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5290	5.83	13	-7.17
High	5310	6.07	13	-6.93

CHAIN 1

PEAK EXCURSION

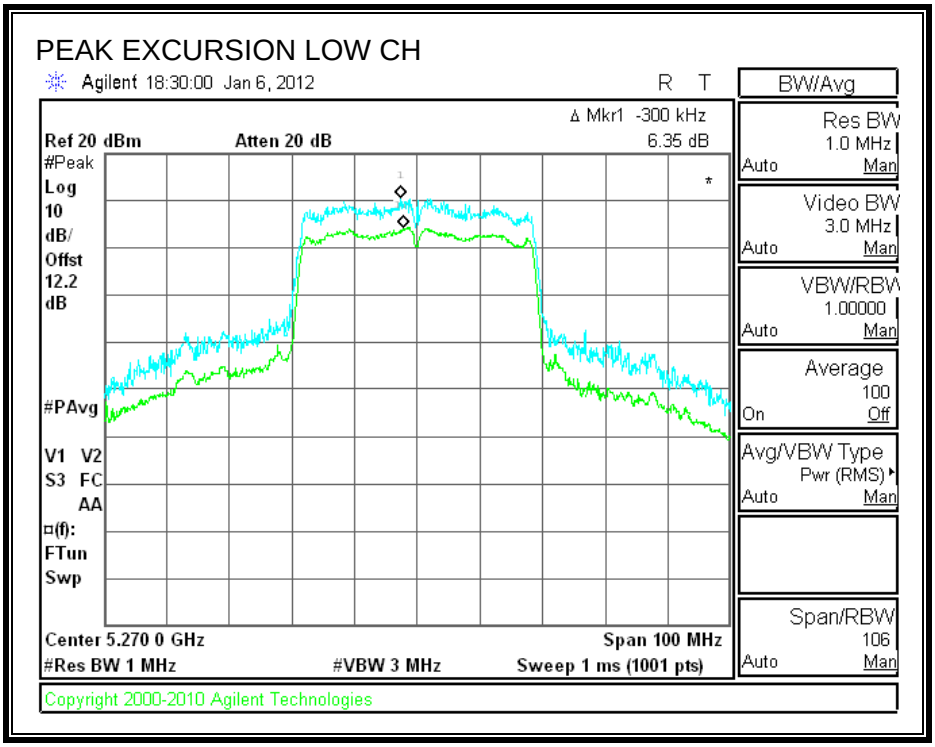


PEAK EXCURSION HIGH CH

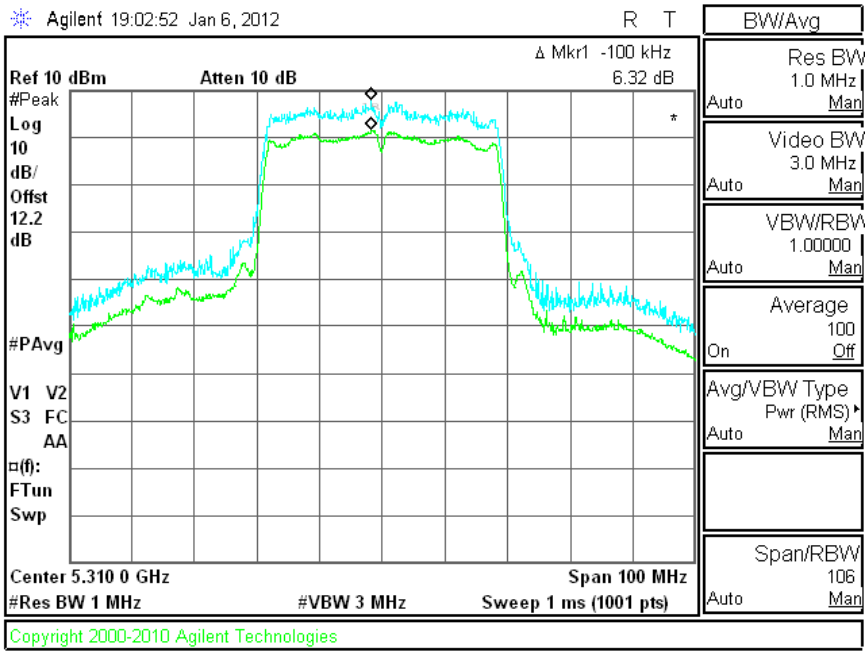


CHAIN 2

PEAK EXCURSION

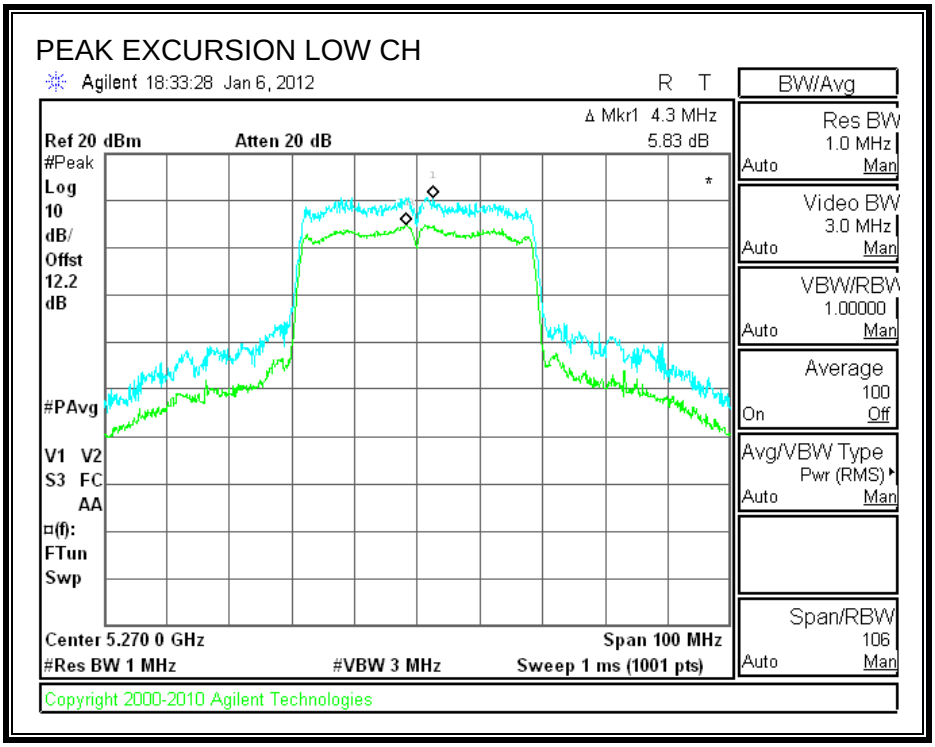


PEAK EXCURSION HIGH CH

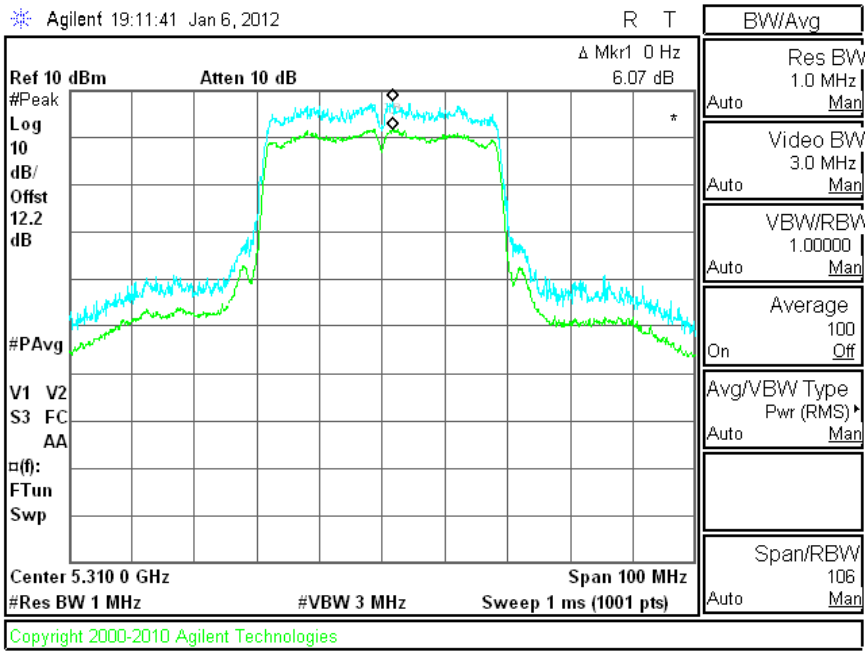


CHAIN 3

PEAK EXCURSION



PEAK EXCURSION HIGH CH



7.16. 802.11a 20MHz 1TX MODE IN THE 5.6 GHz BAND

7.16.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

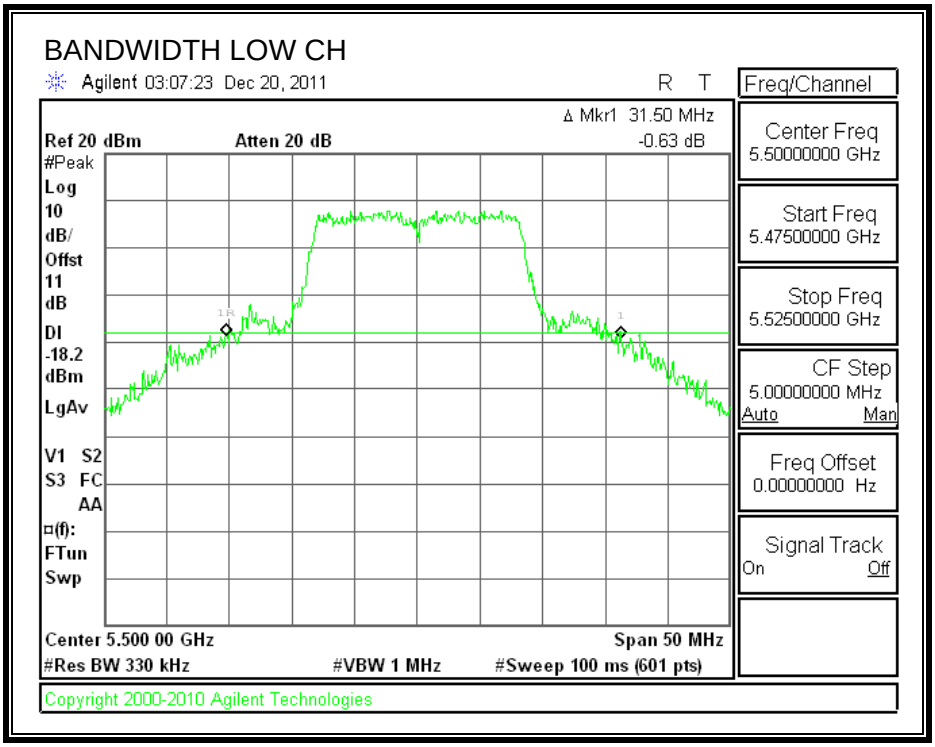
TEST PROCEDURE

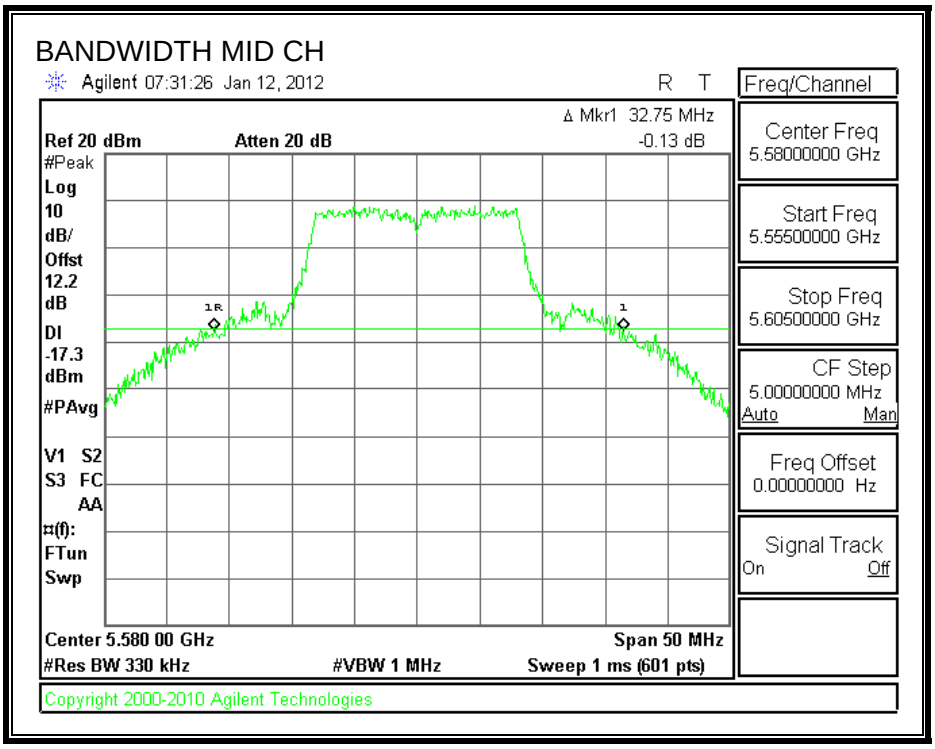
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

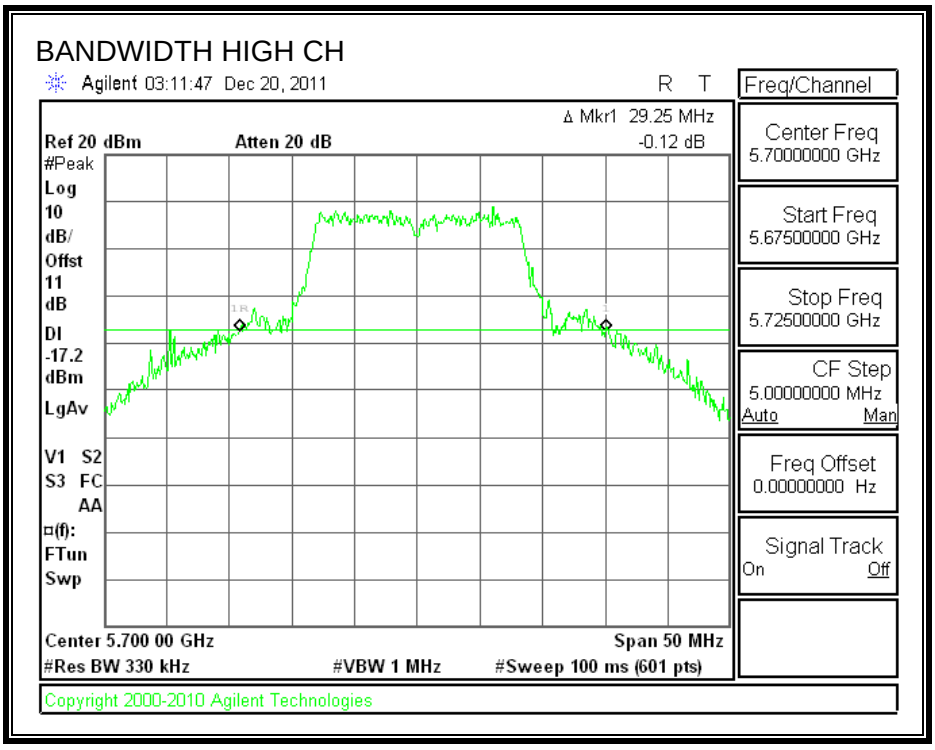
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	31.50	16.6192
Middle	5580	32.75	16.6130
High	5700	29.25	16.6615

26 dB BANDWIDTH

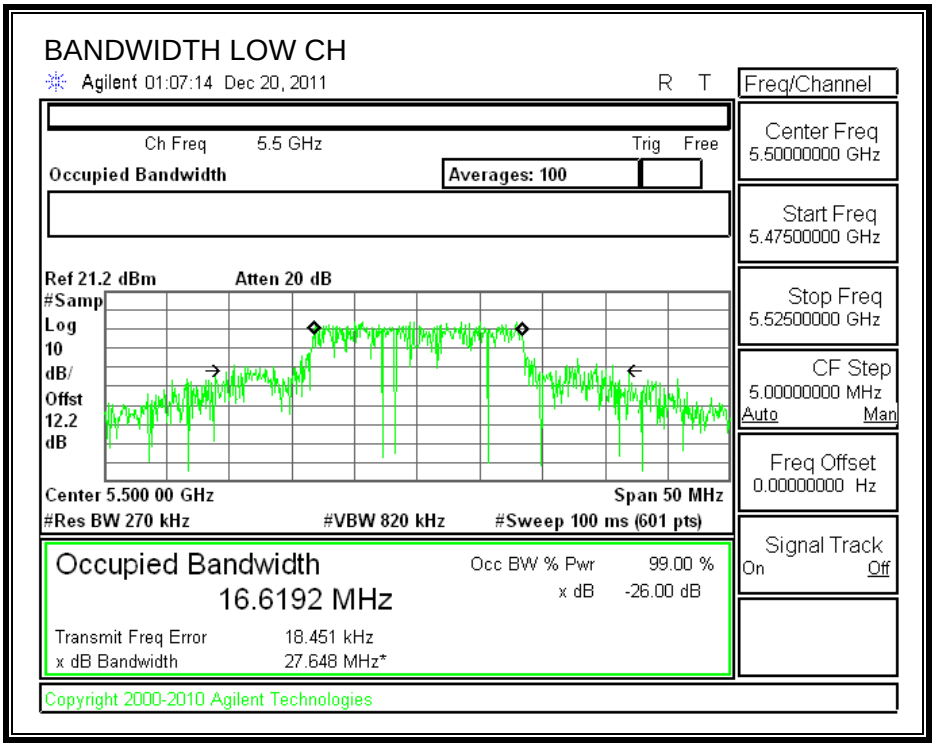


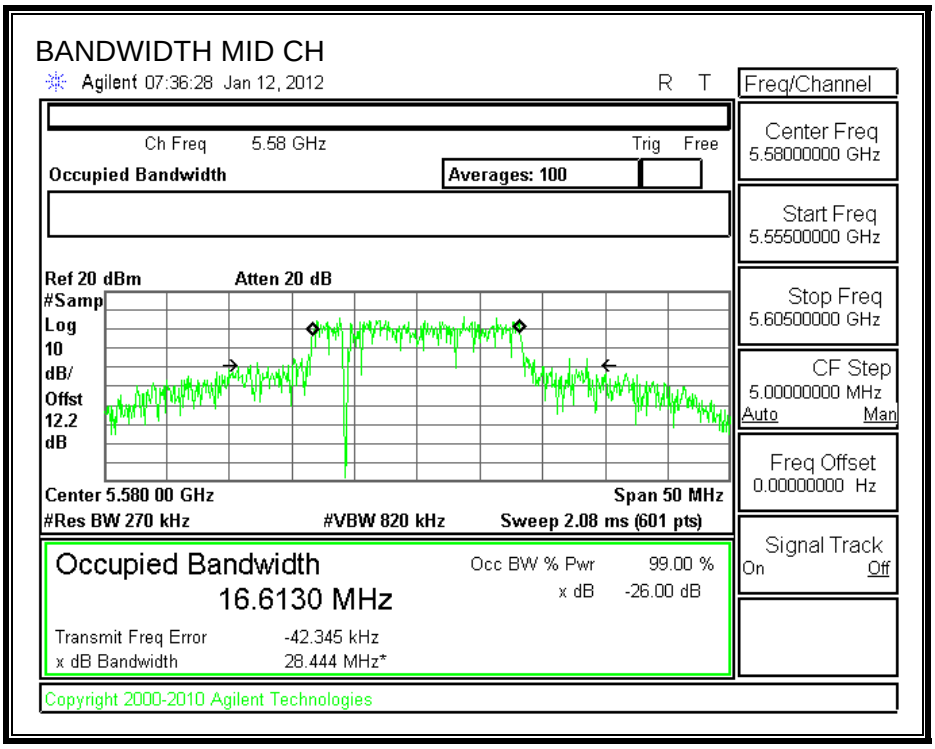


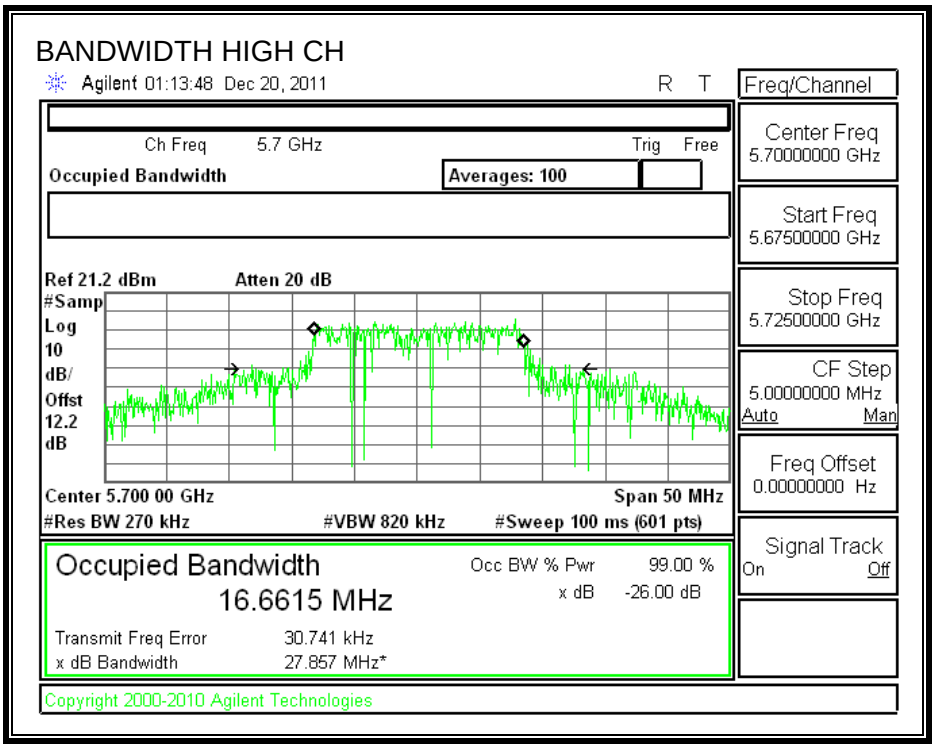
BANDWIDTH HIGH CH



99% BANDWIDTH







7.16.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

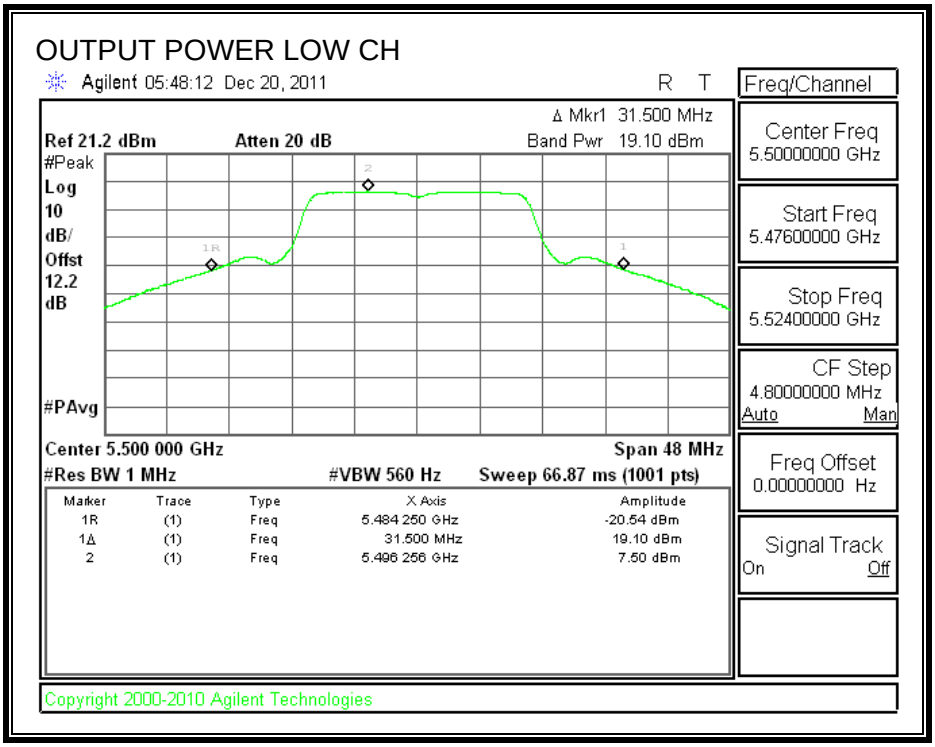
Limit

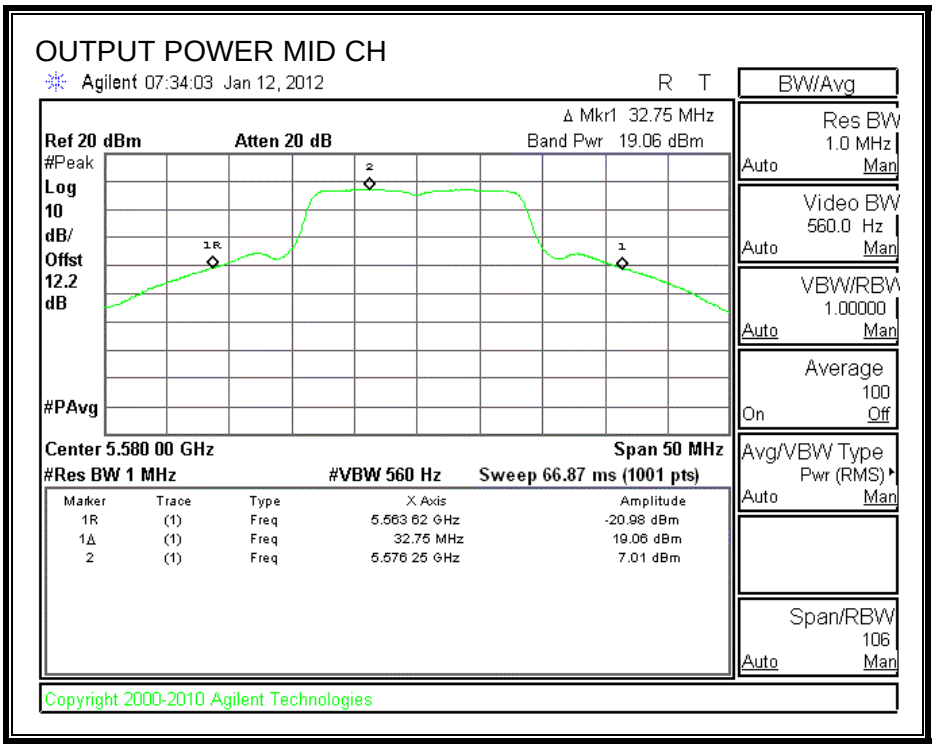
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	31.50	25.98	6.39	23.61
Mid	5580	24	32.75	26.15	6.39	23.61
High	5700	24	29.25	25.66	6.39	23.61

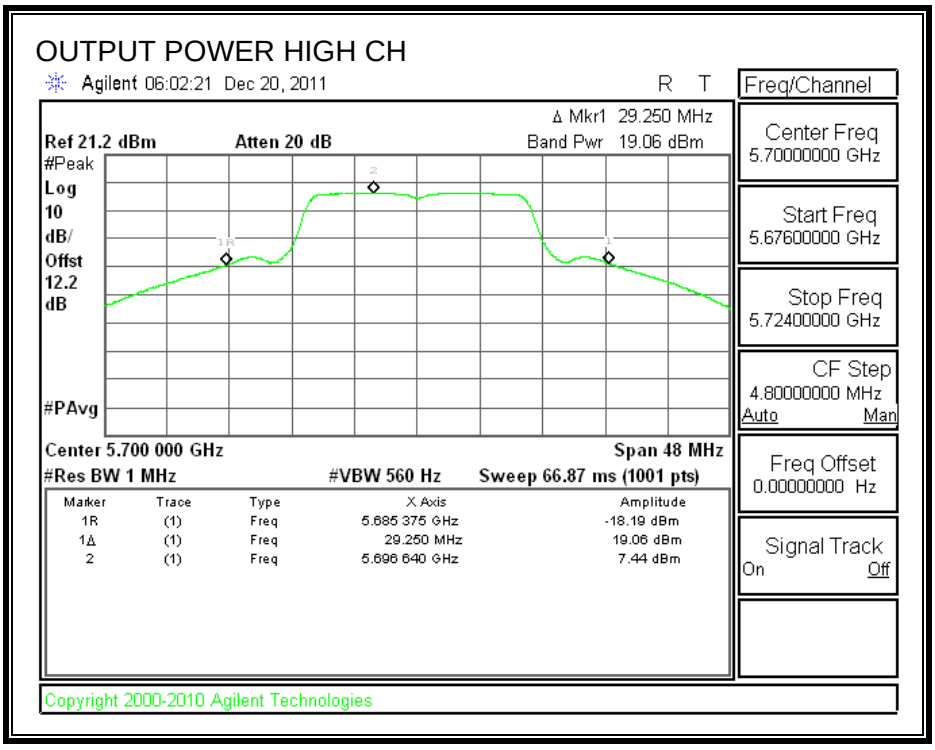
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	19.10	23.61	-4.51
Mid	5580	19.06	23.61	-4.55
High	5700	19.06	23.61	-4.55

OUTPUT POWER







7.16.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5500	18.23
Middle	5580	18.14
High	5700	18.33

7.16.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.39 dBi, therefore the limit is 10.61 dBm.

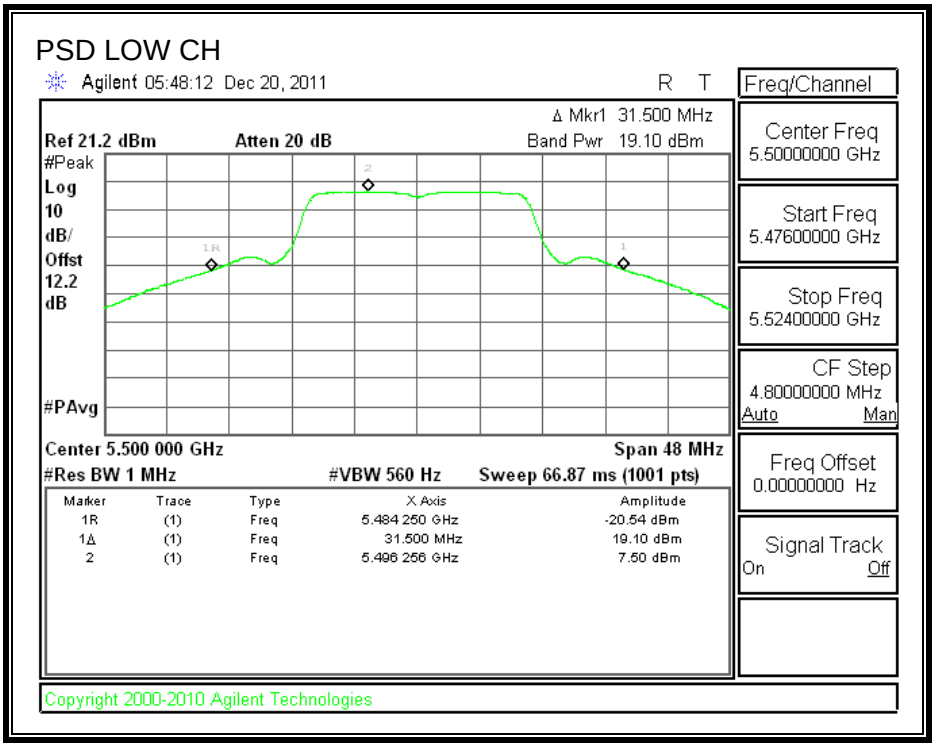
TEST PROCEDURE

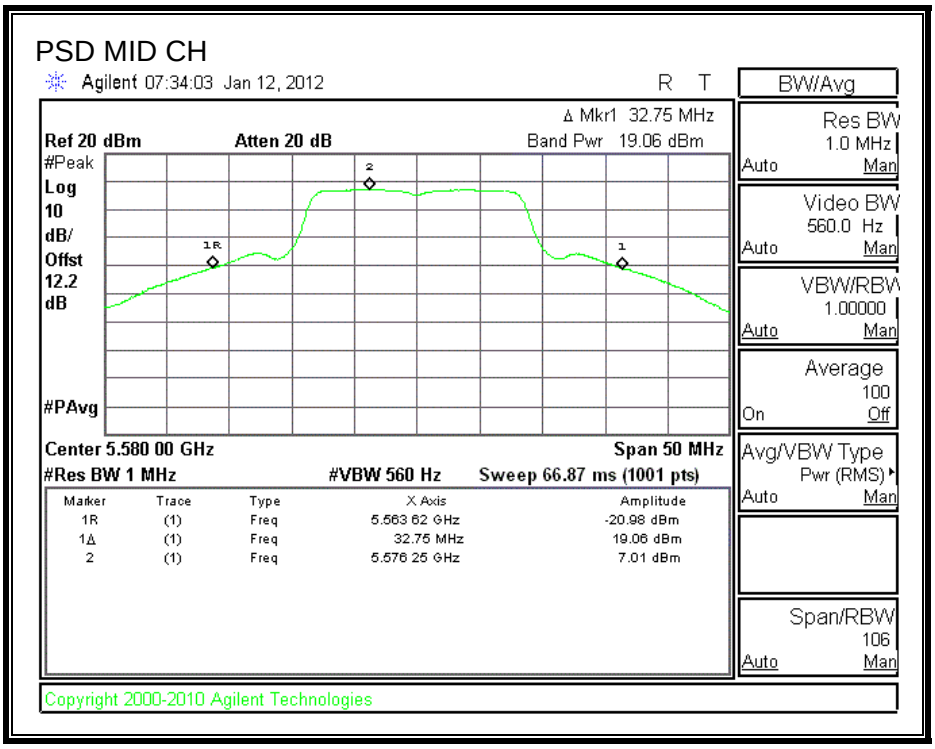
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

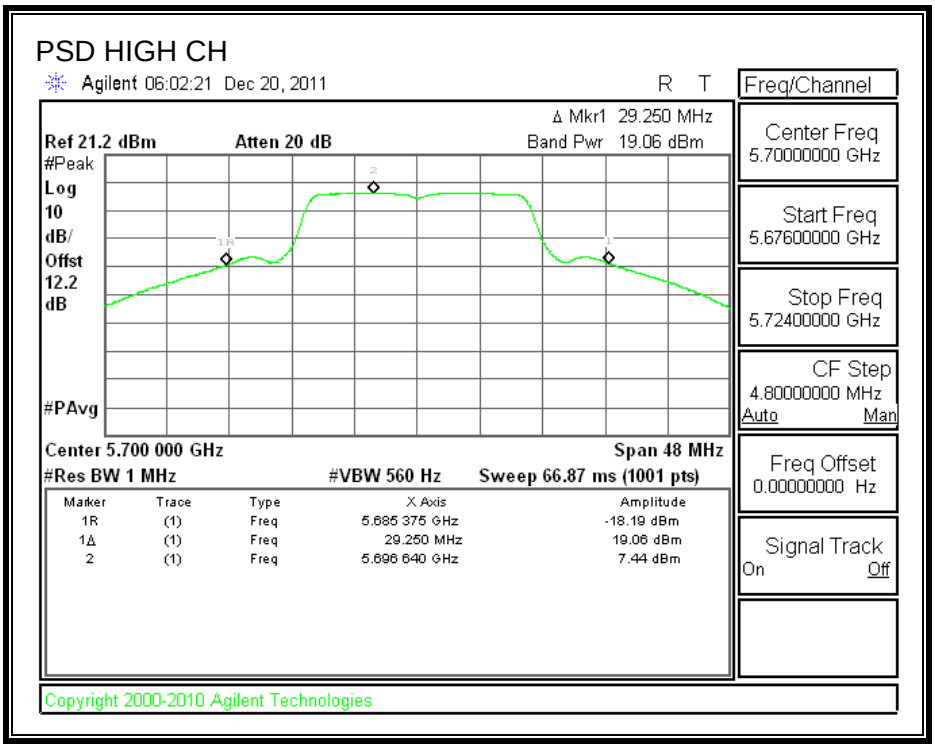
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	7.50	10.61	-3.11
Middle	5580	7.01	10.61	-3.60
High	5700	7.44	10.61	-3.17

POWER SPECTRAL DENSITY







7.16.5. 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.

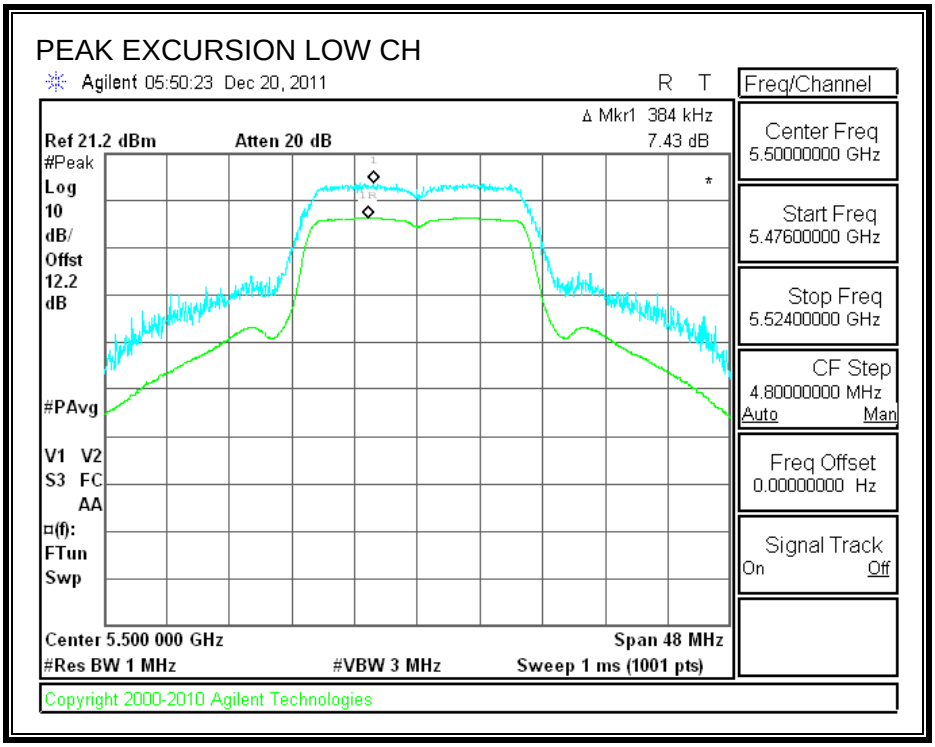
TEST PROCEDURE

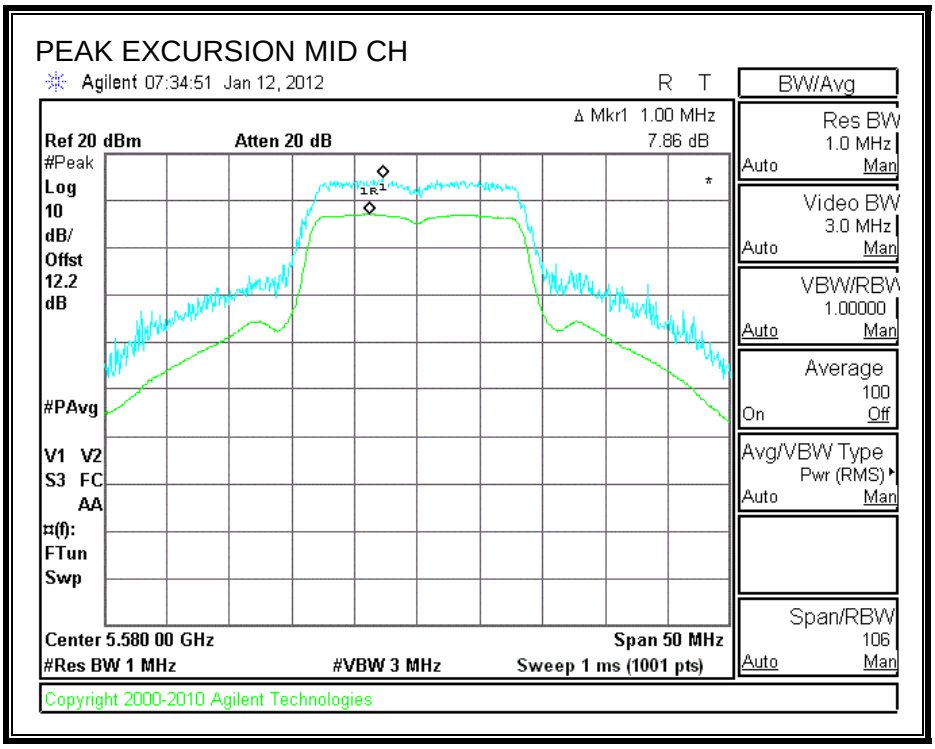
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

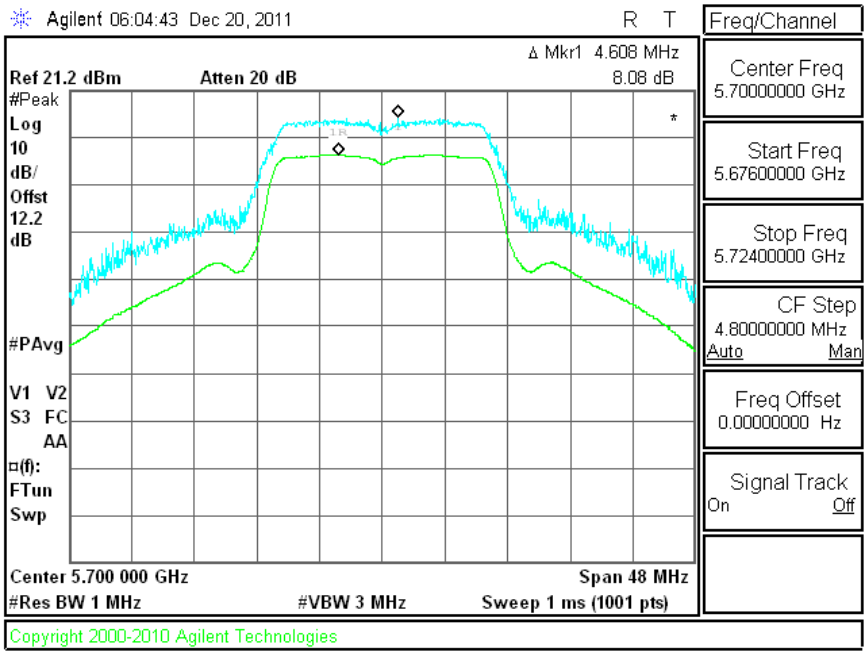
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.43	13	-5.57
Middle	5580	7.86	13	-5.14
High	5700	8.08	13	-4.92

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.17. 802.11n HT40 1TX MODE IN THE 5.6 GHz BAND

7.17.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

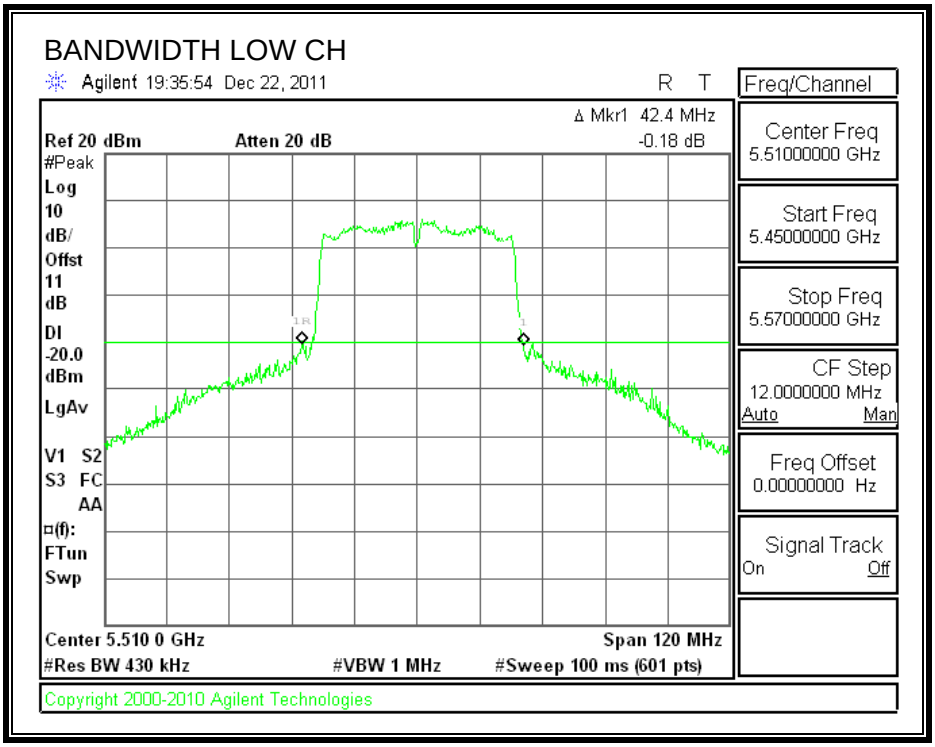
TEST PROCEDURE

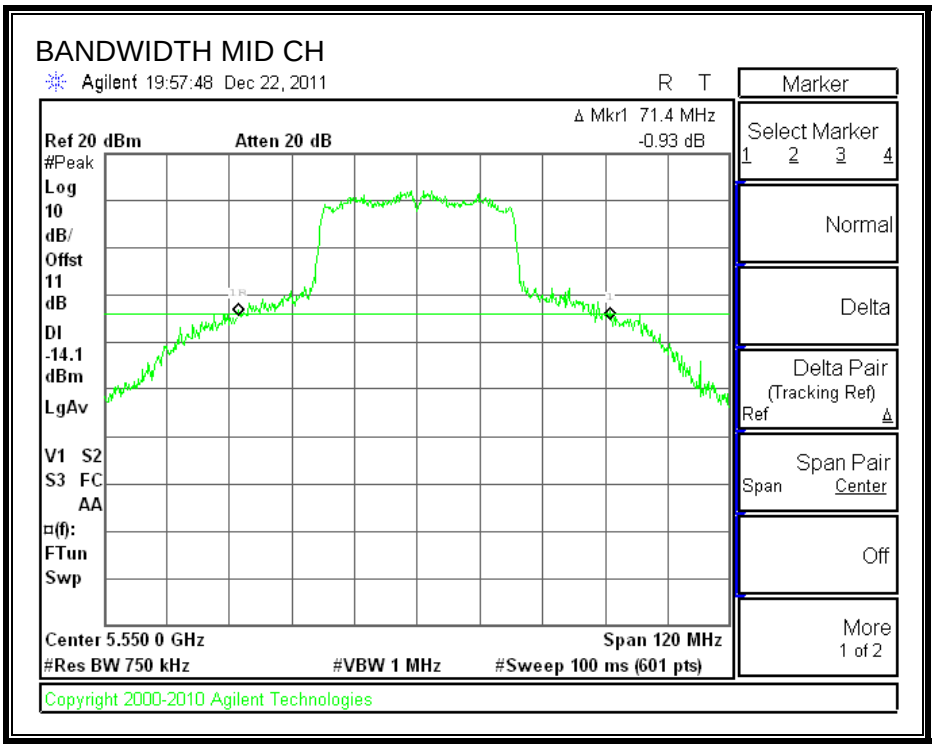
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

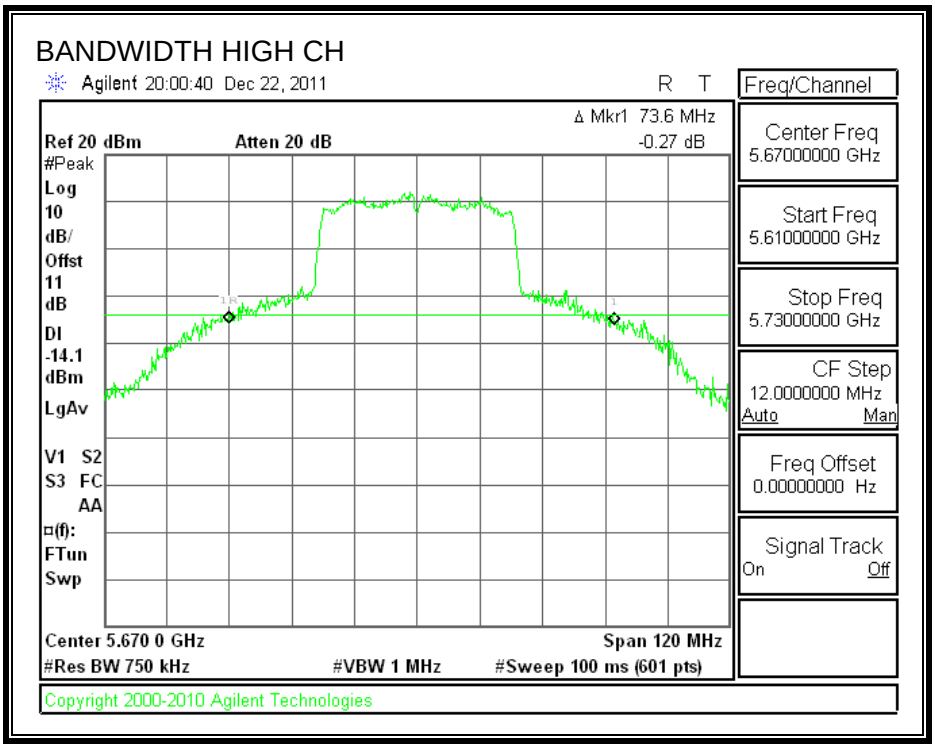
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	42.4	34.5237
Middle	5550	71.4	35.5792
High	5670	73.6	34.8651

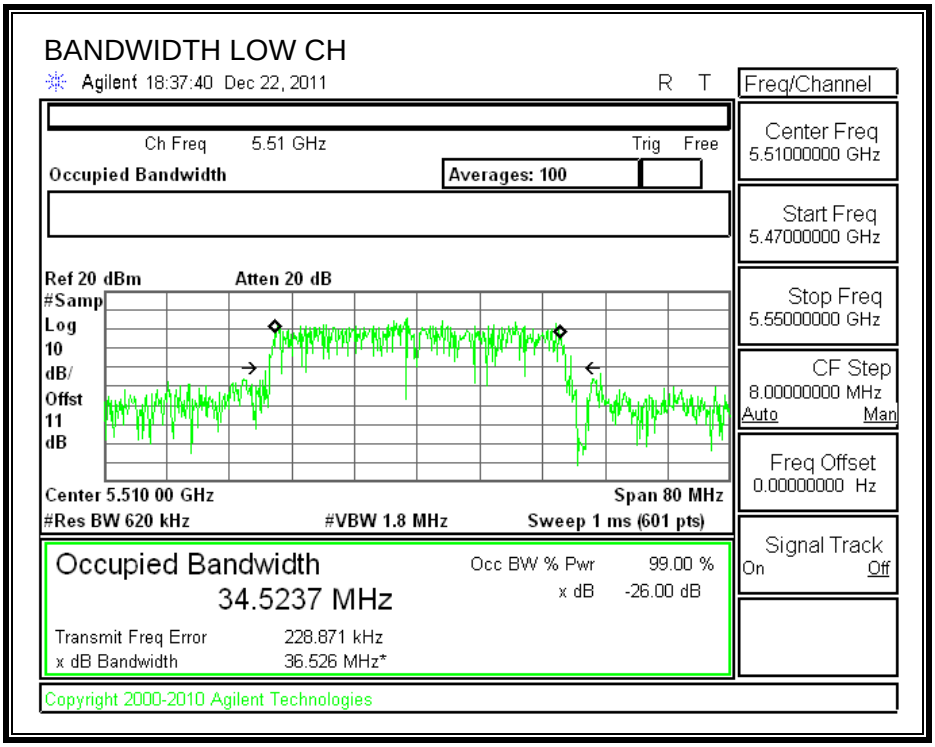
26 dB BANDWIDTH

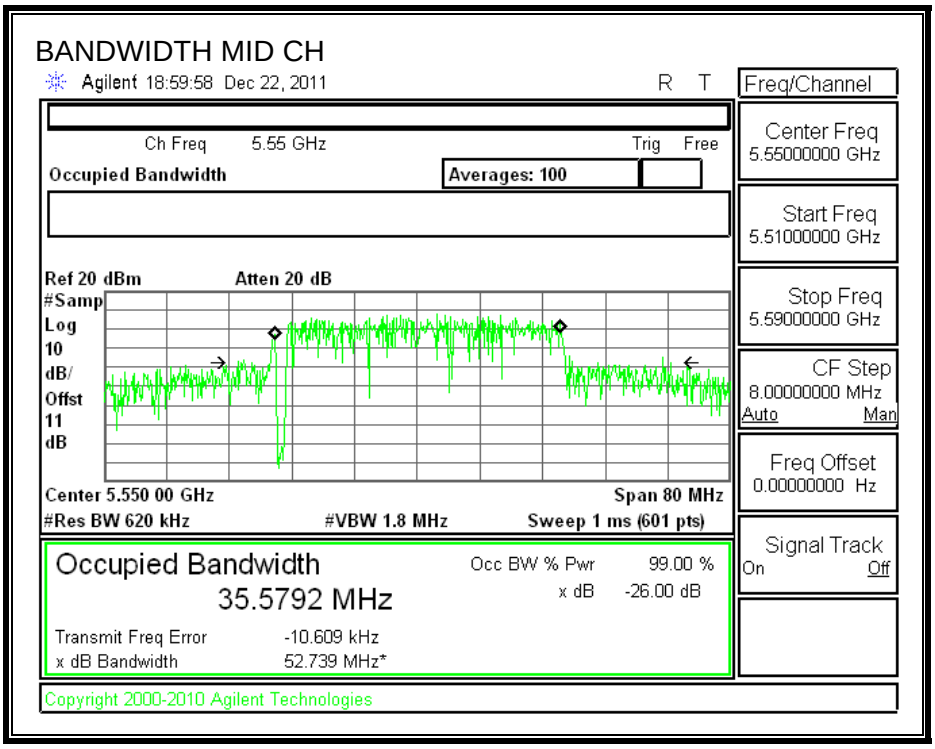


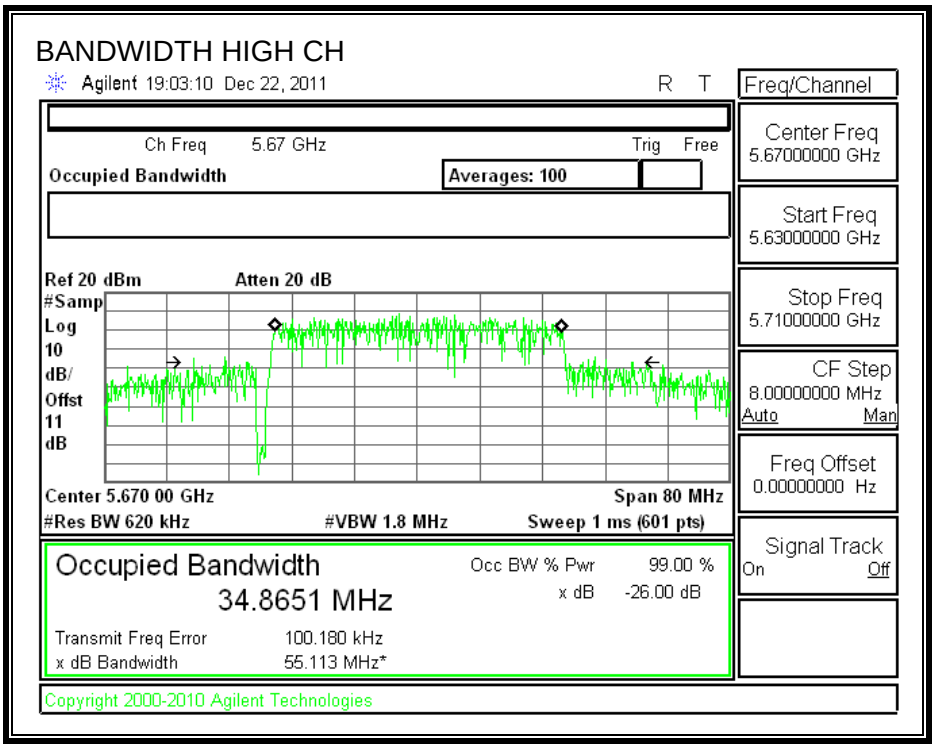




99% BANDWIDTH







7.17.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

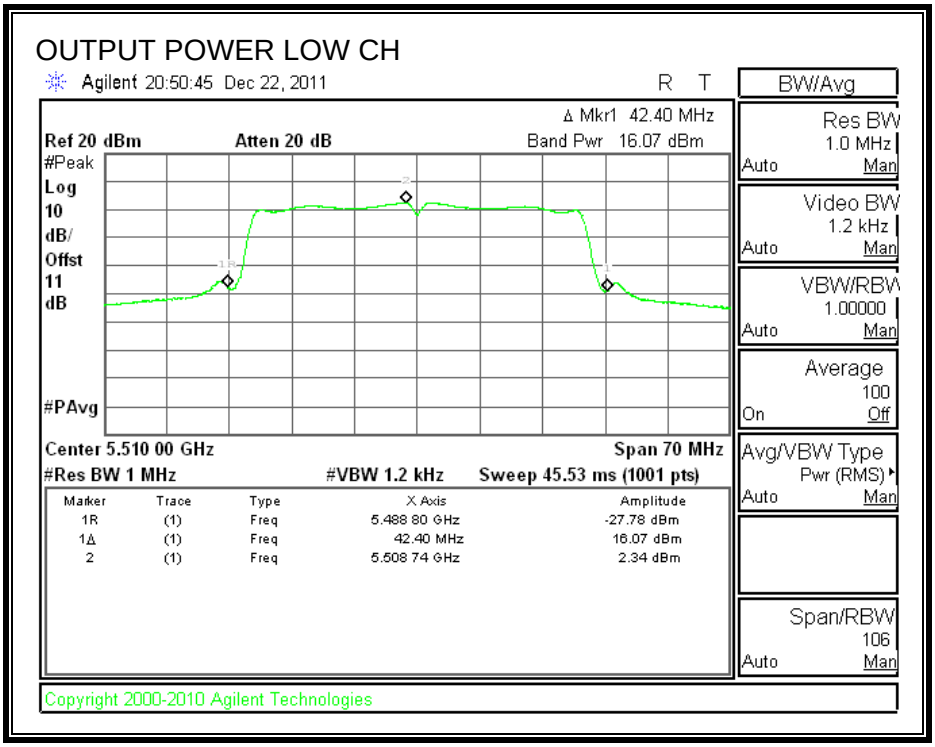
Limit

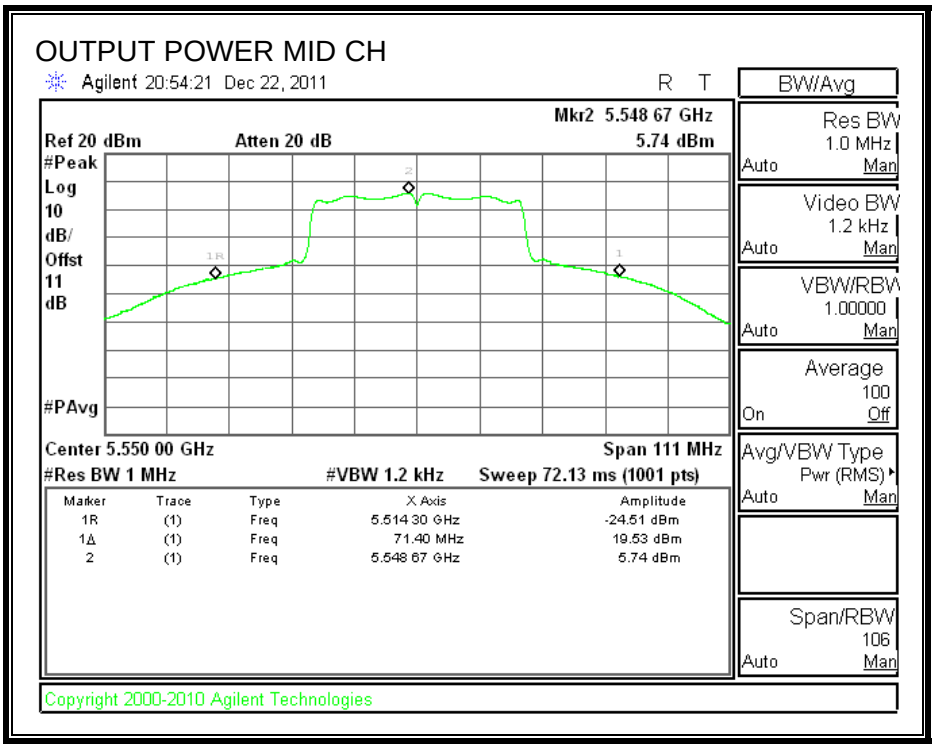
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	24	42.4	27.27	6.39	23.61
Mid	5550	24	71.4	29.54	6.39	23.61
High	5670	24	73.6	29.67	6.39	23.61

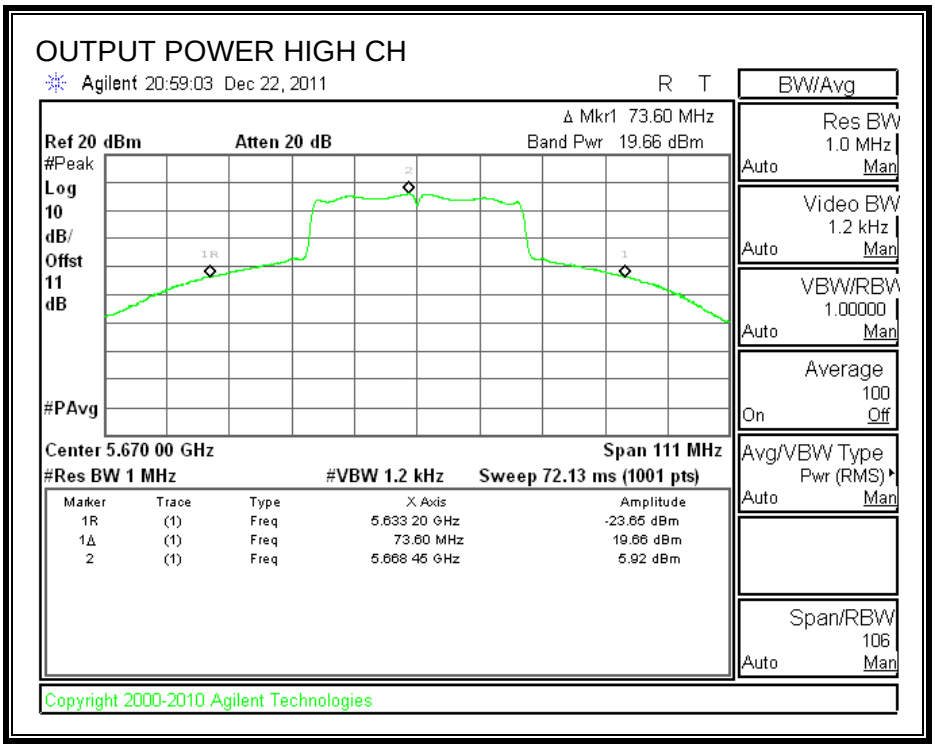
Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	16.07	23.61	-7.54
Mid	5550	19.53	23.61	-4.08
High	5670	19.66	23.61	-3.95

OUTPUT POWER







7.17.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.
Peak power for low channel is 16.07 dBm, please verify.

Channel	Frequency (MHz)	Power (dBm)
Low	5510	15.60
Middle	5550	19.19
High	5670	19.00

7.17.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.39 dBi, therefore the limit is 10.61 dBm.

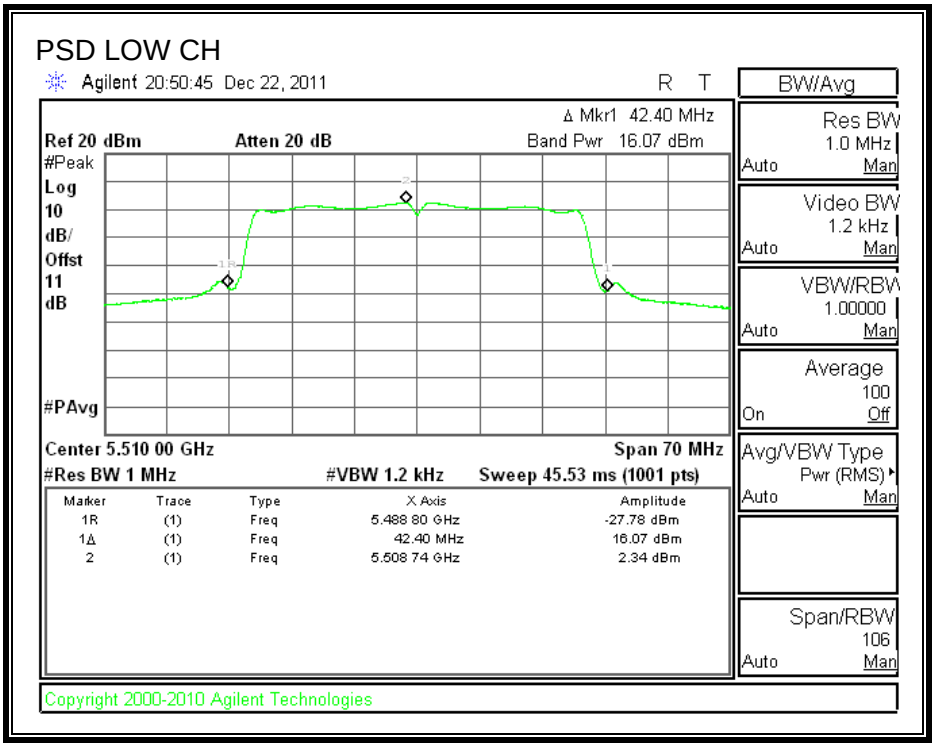
TEST PROCEDURE

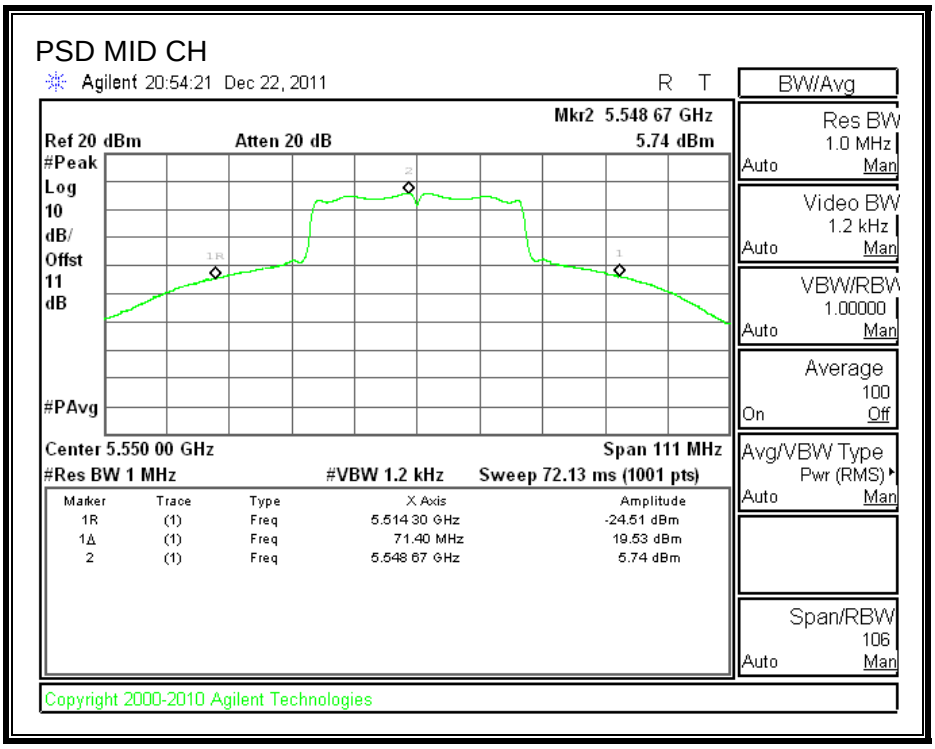
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

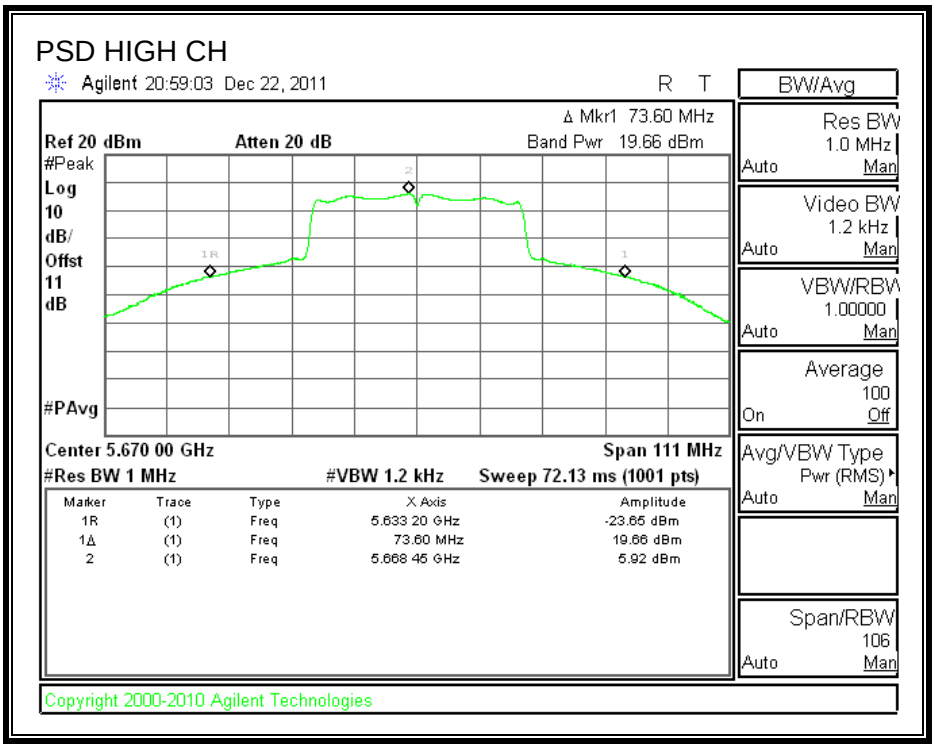
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5510	2.34	10.61	-8.27
Middle	5550	5.74	10.61	-4.87
High	5670	5.92	10.61	-4.69

POWER SPECTRAL DENSITY







7.17.5. 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.

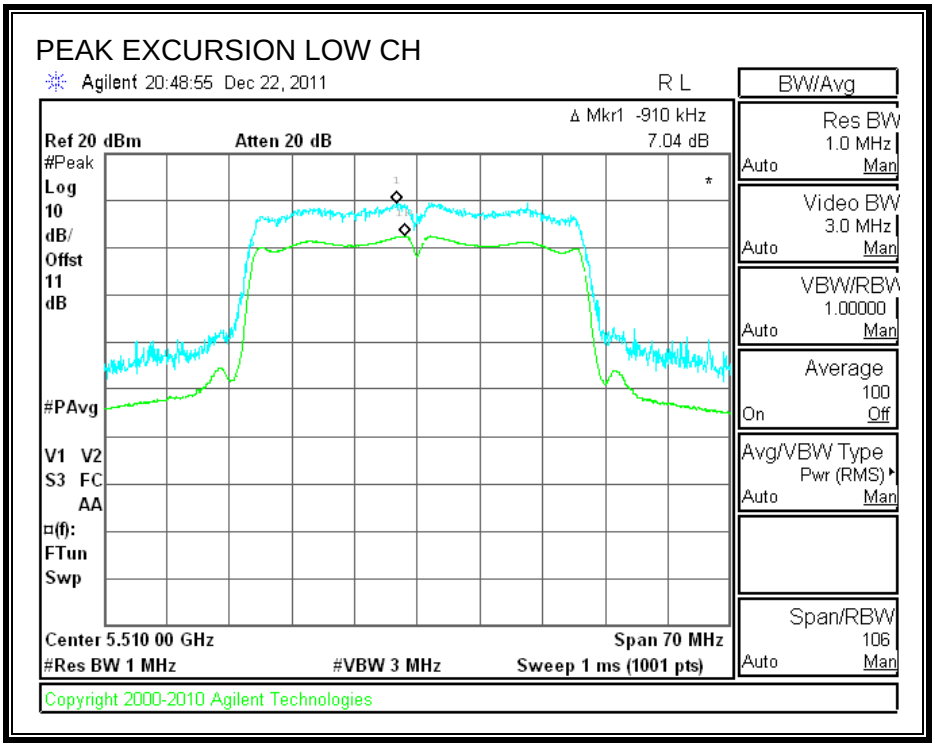
TEST PROCEDURE

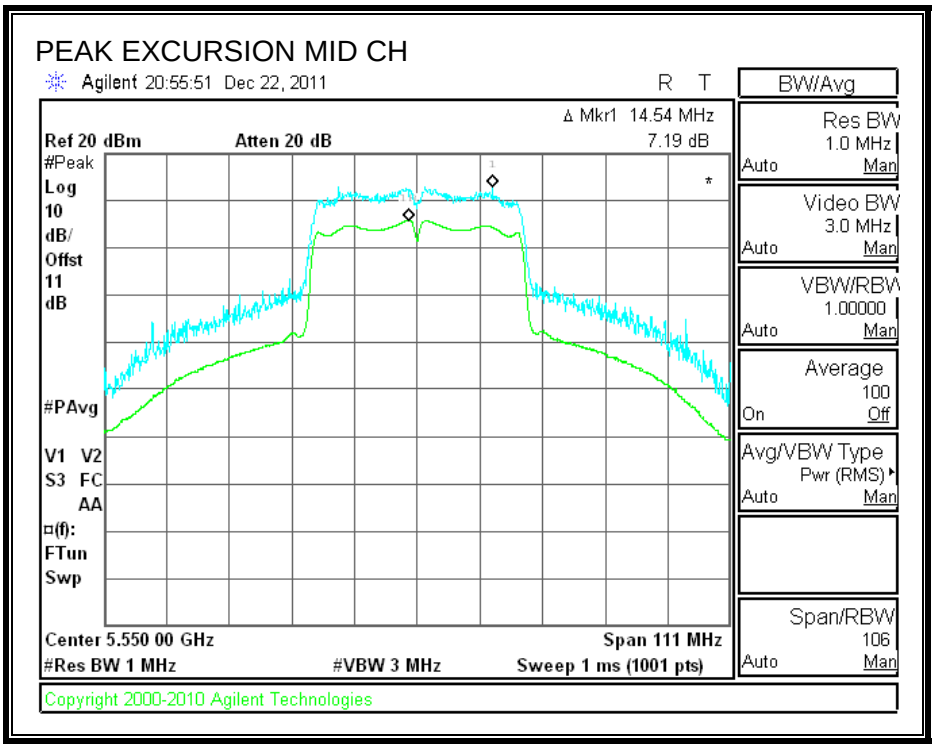
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

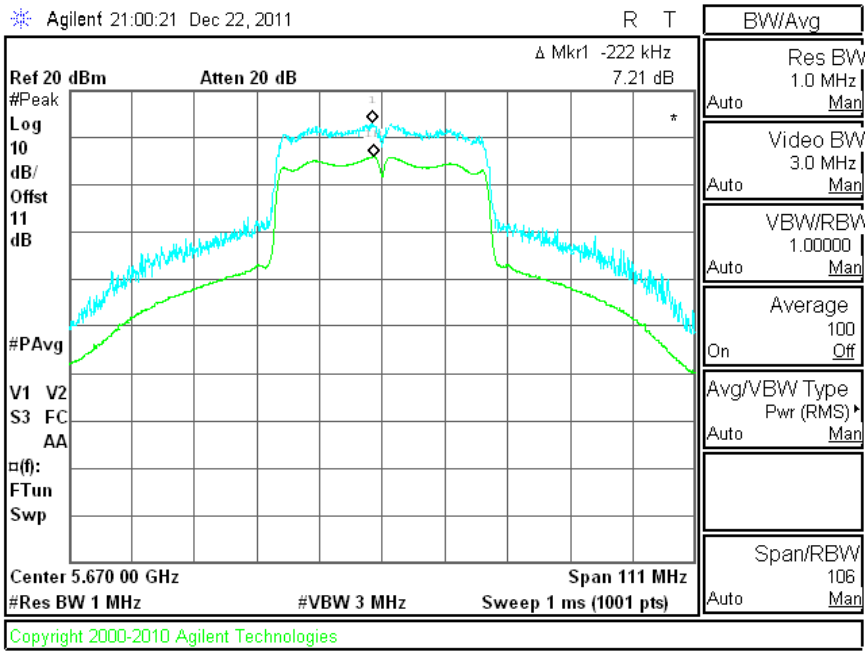
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.04	13	-5.96
Middle	5580	7.19	13	-5.81
High	5700	7.21	13	-5.79

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.18. 802.11n HT20 3TX MODE IN THE 5.6 GHz BAND, CDD MCS0

7.18.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	28.83	17.7472
Middle	5580	28.92	17.7387
High	5700	29.75	17.7494

CHAIN 2

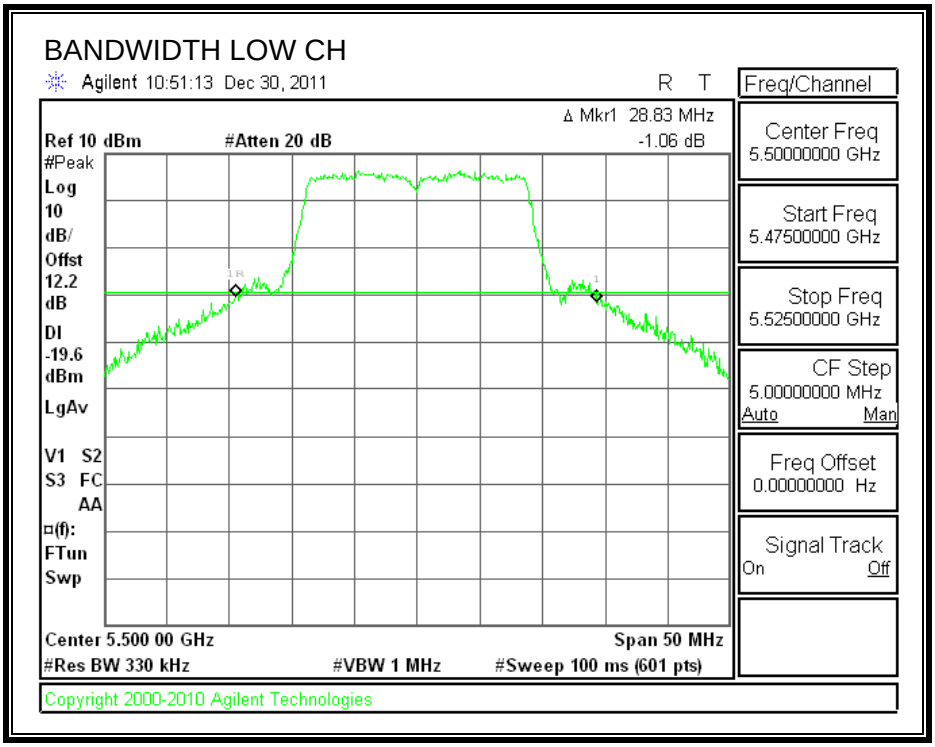
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	26.58	17.6883
Middle	5580	27.08	17.7169
High	5700	26.92	17.7215

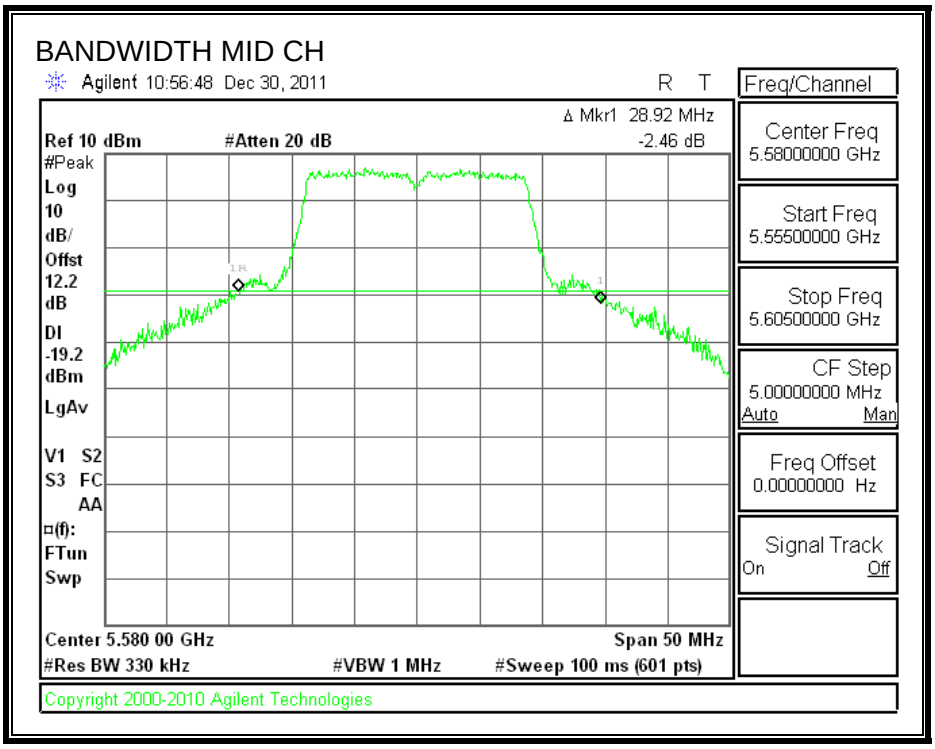
CHAIN 3

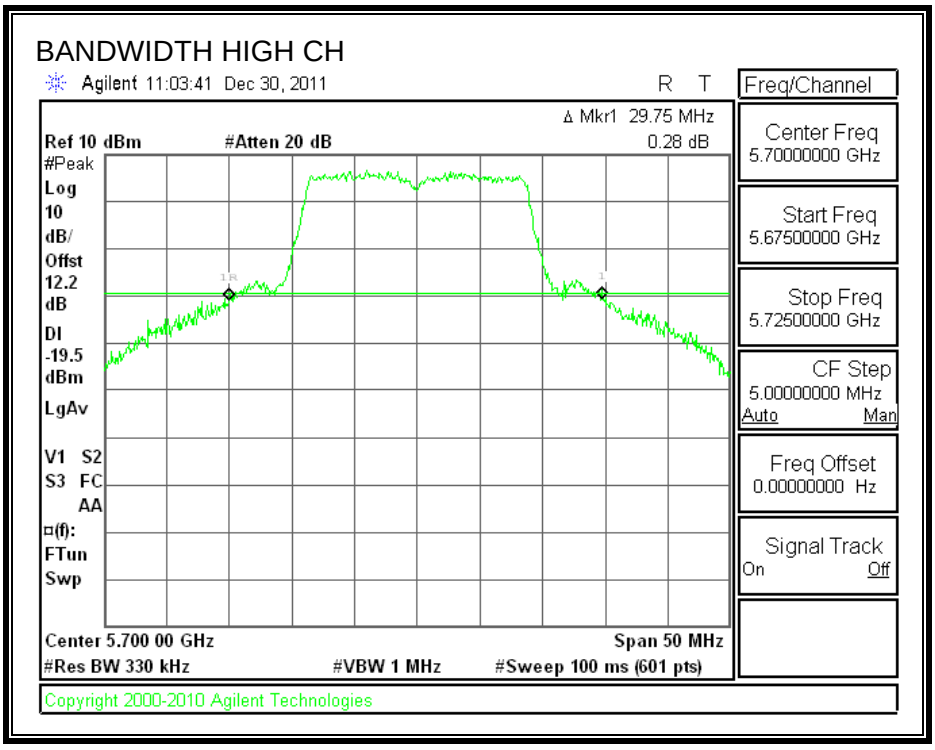
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	27.58	17.7372
Middle	5580	27.50	17.7380
High	5700	29.17	17.7517

CHAIN 1

26 dB BANDWIDTH

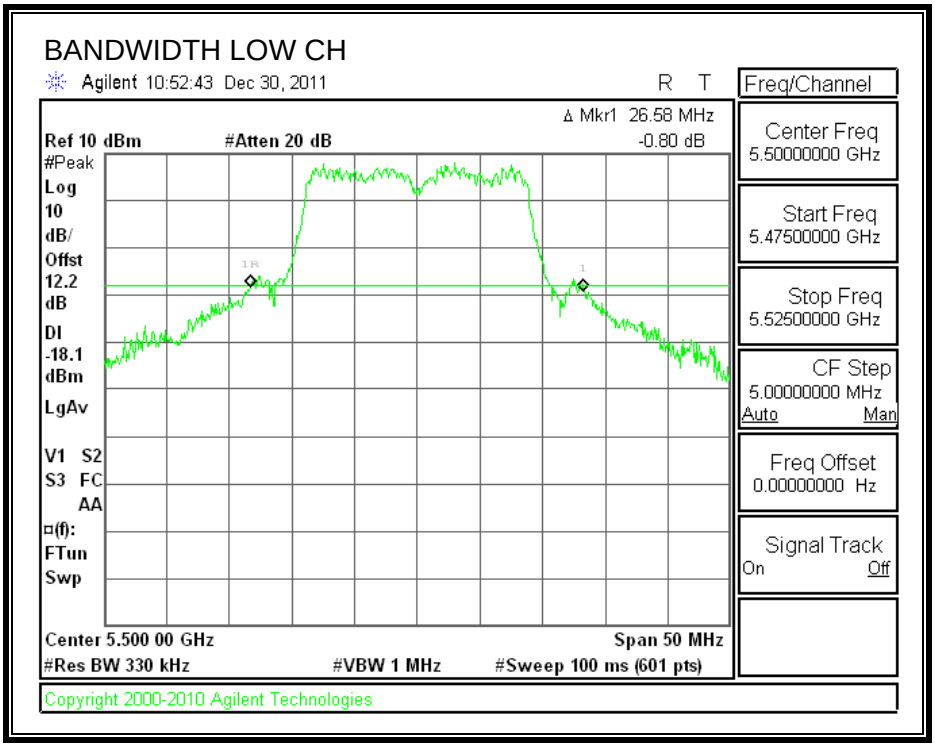


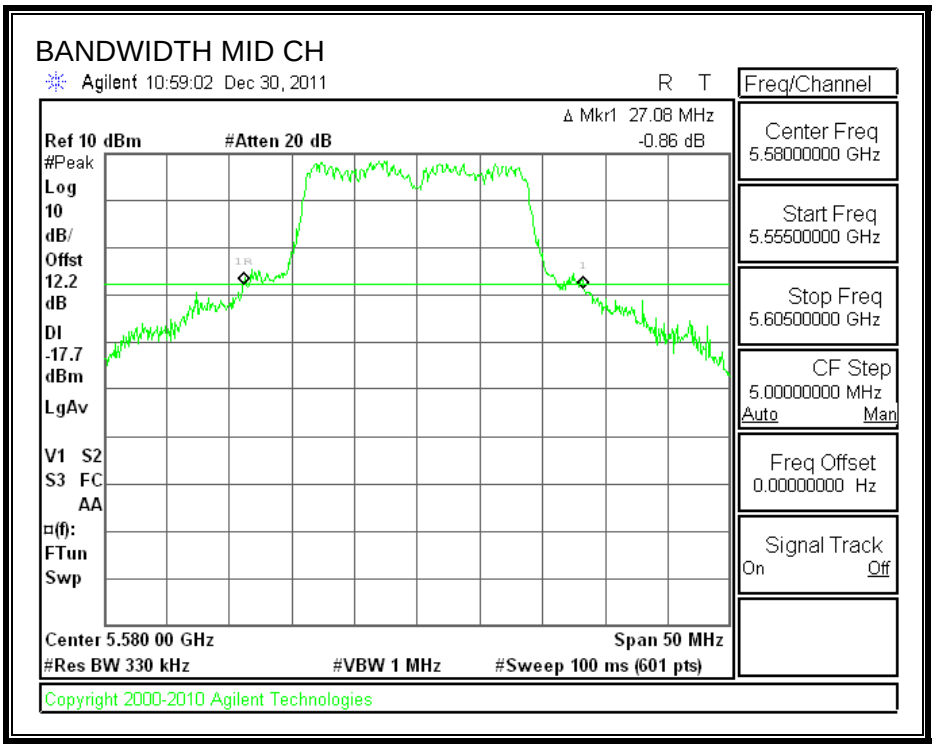


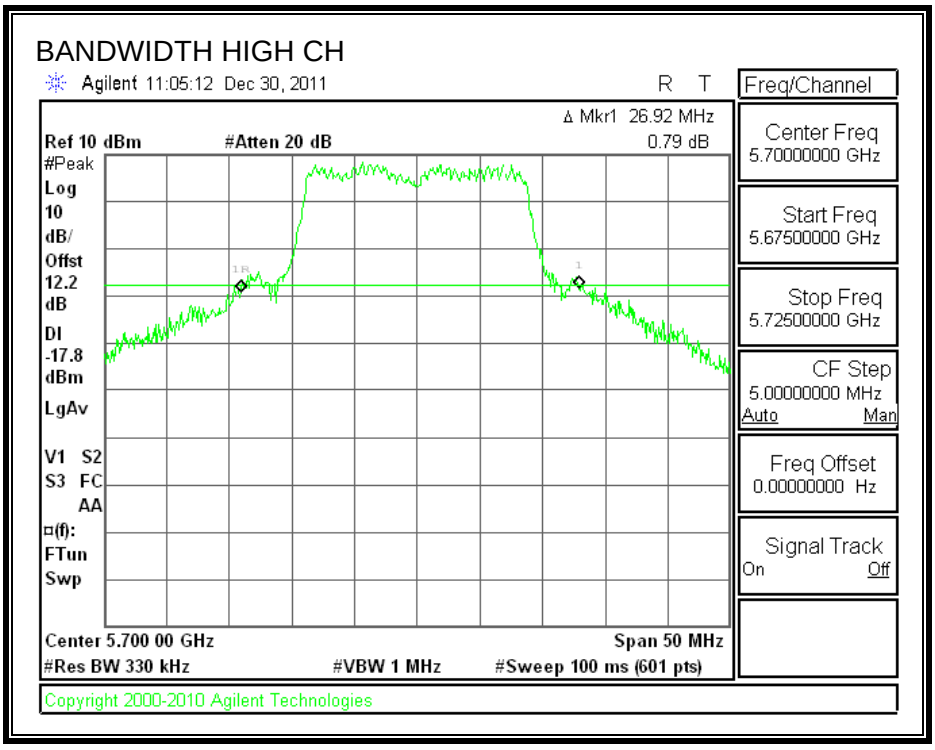


CHAIN 2

26 dB BANDWIDTH

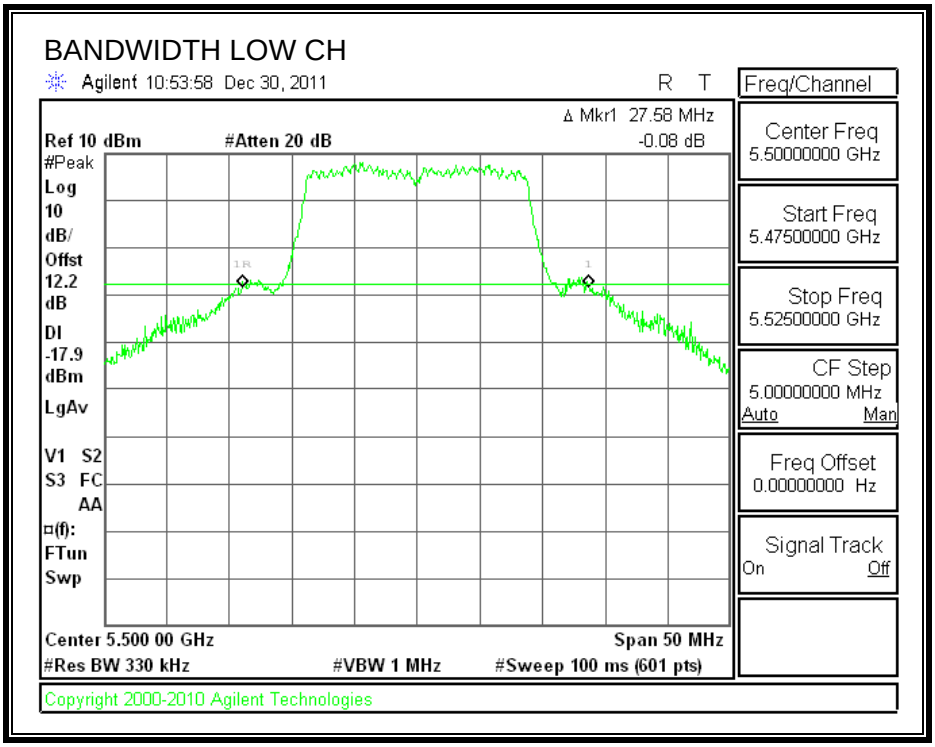


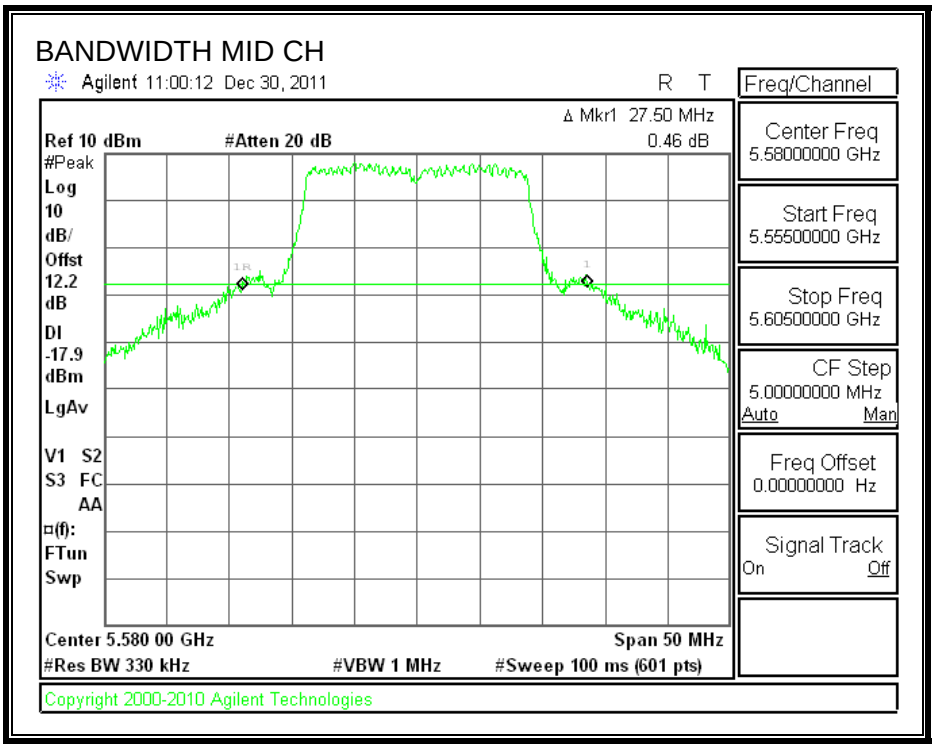


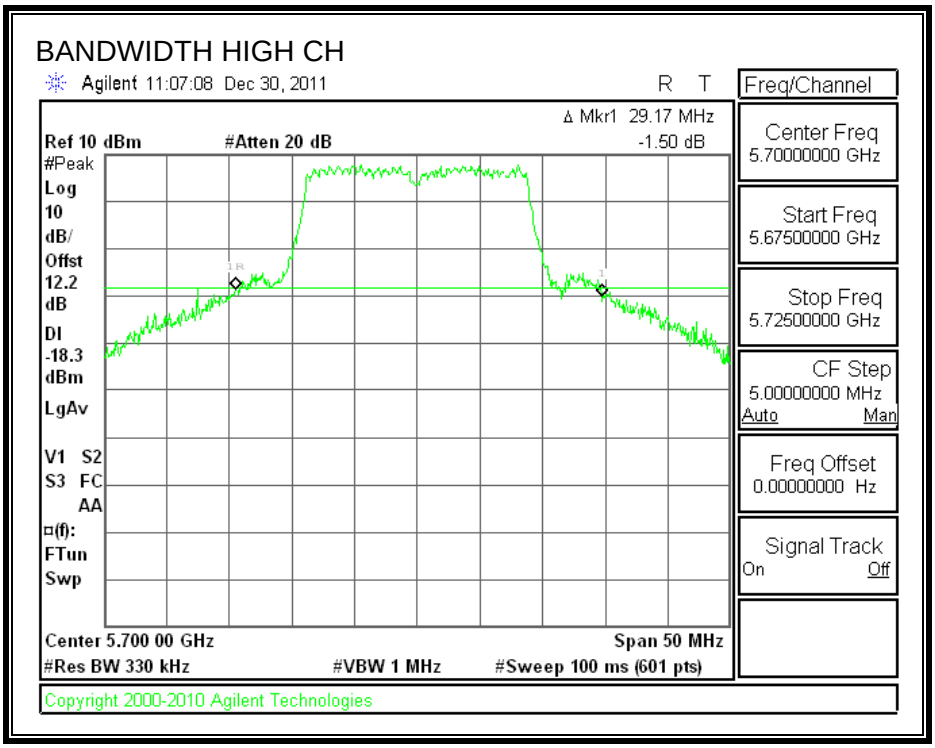


CHAIN 3

26 dB BANDWIDTH

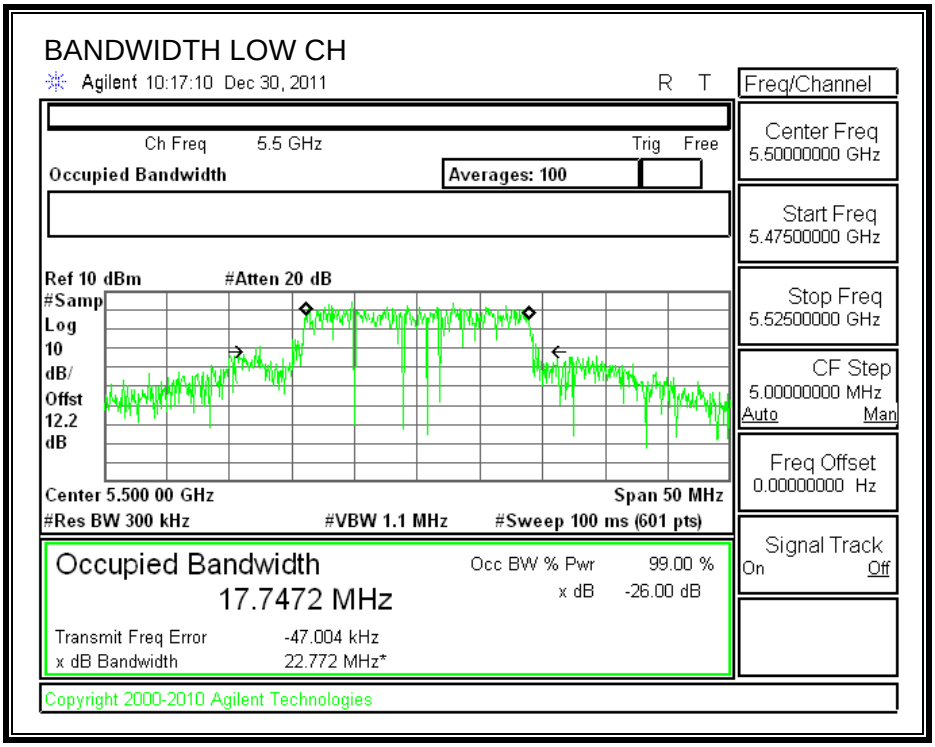


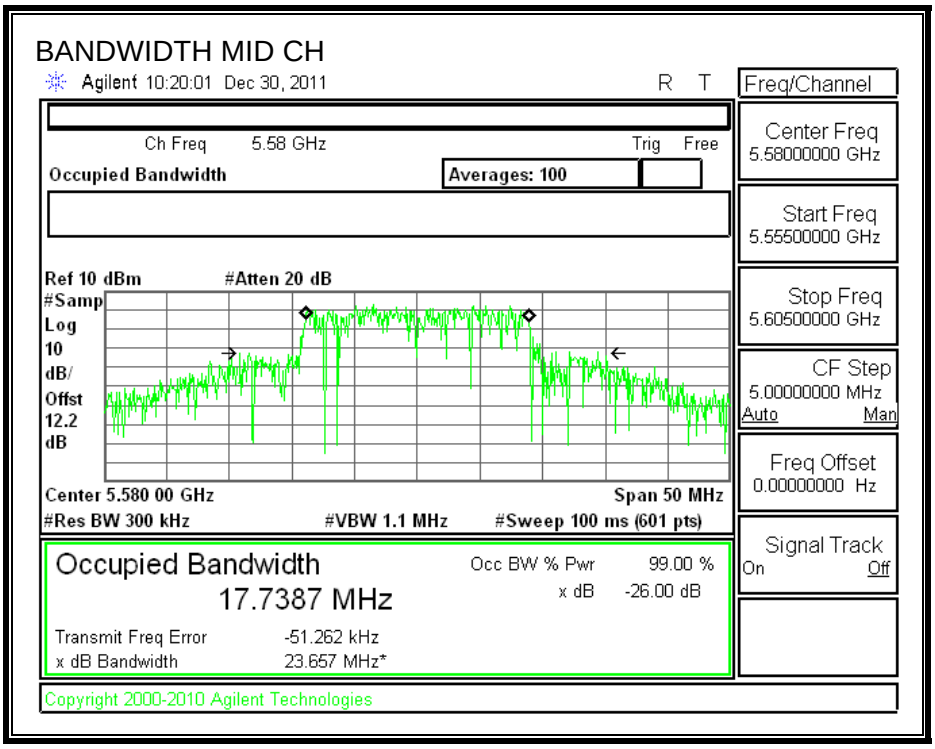


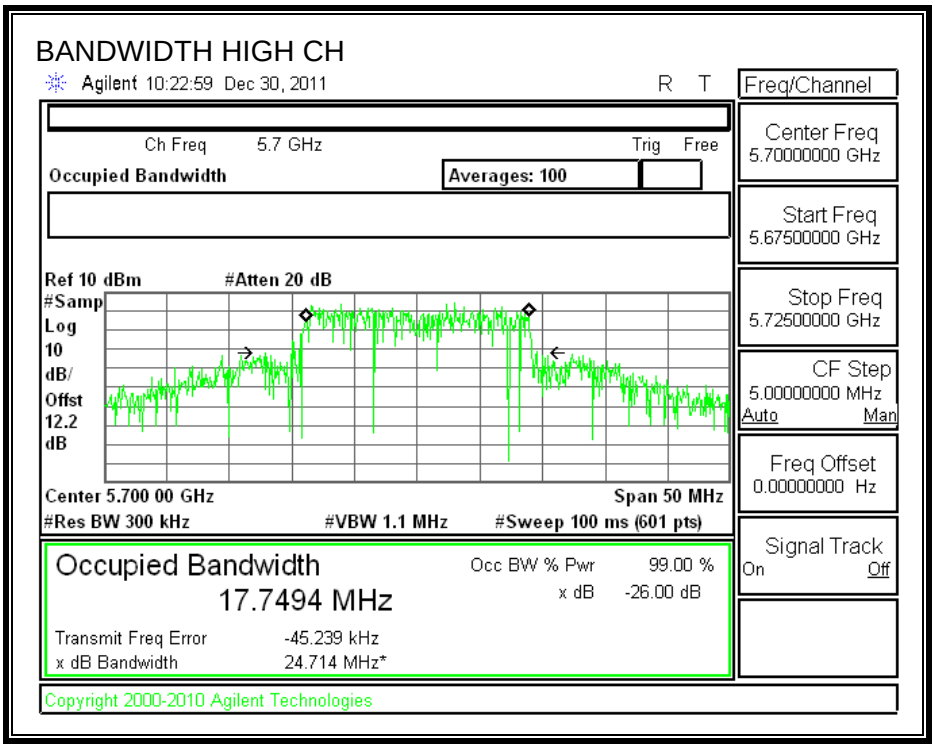


CHAIN 1

99% BANDWIDTH

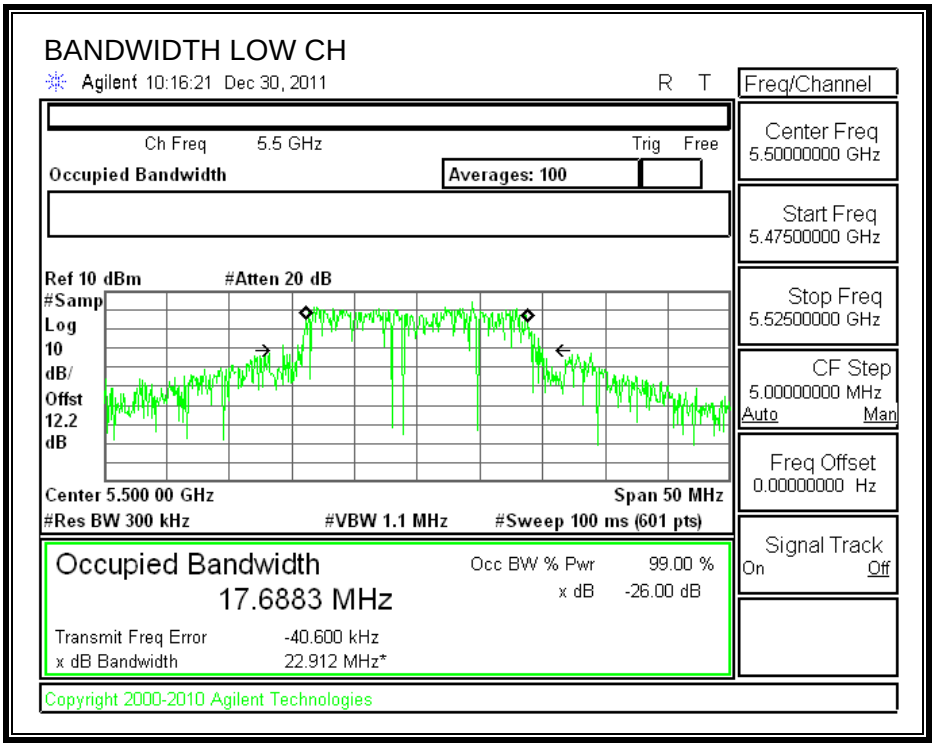


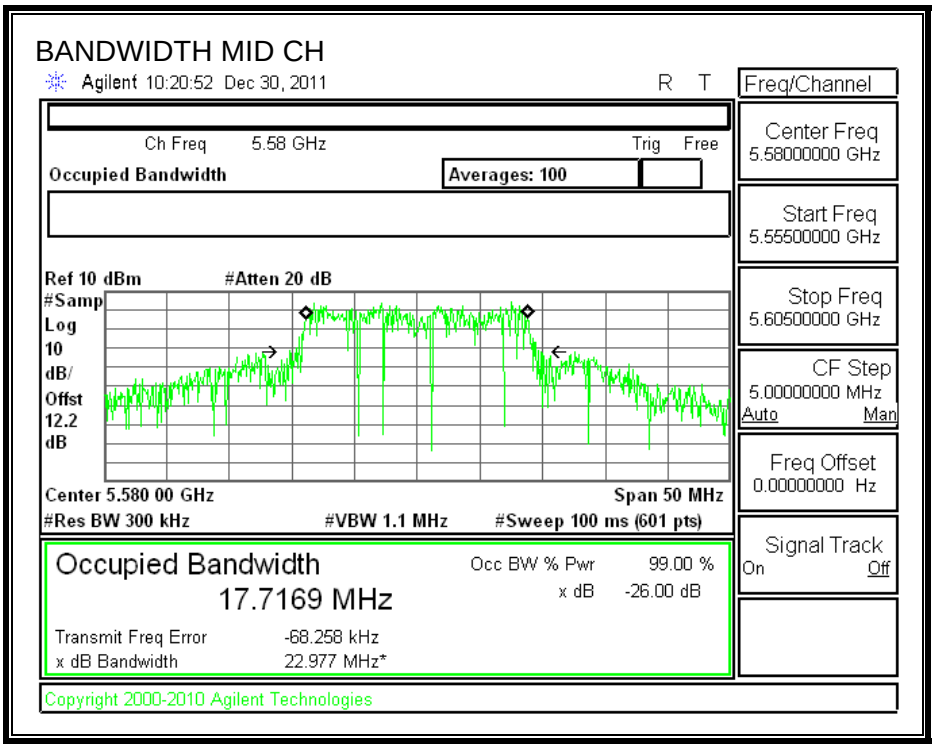


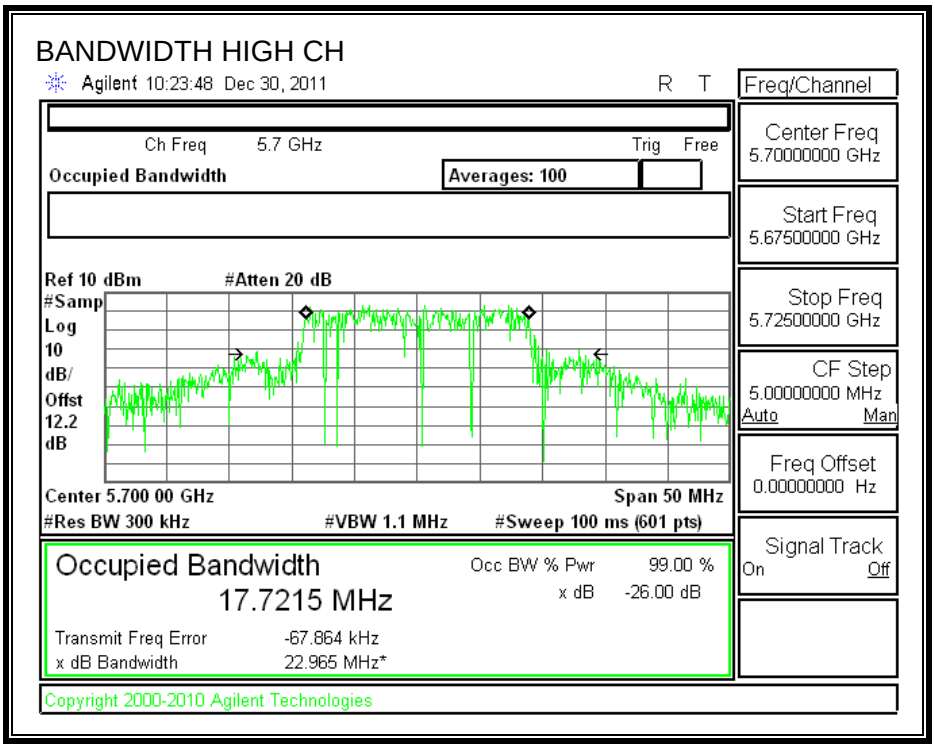


CHAIN 2

99% BANDWIDTH

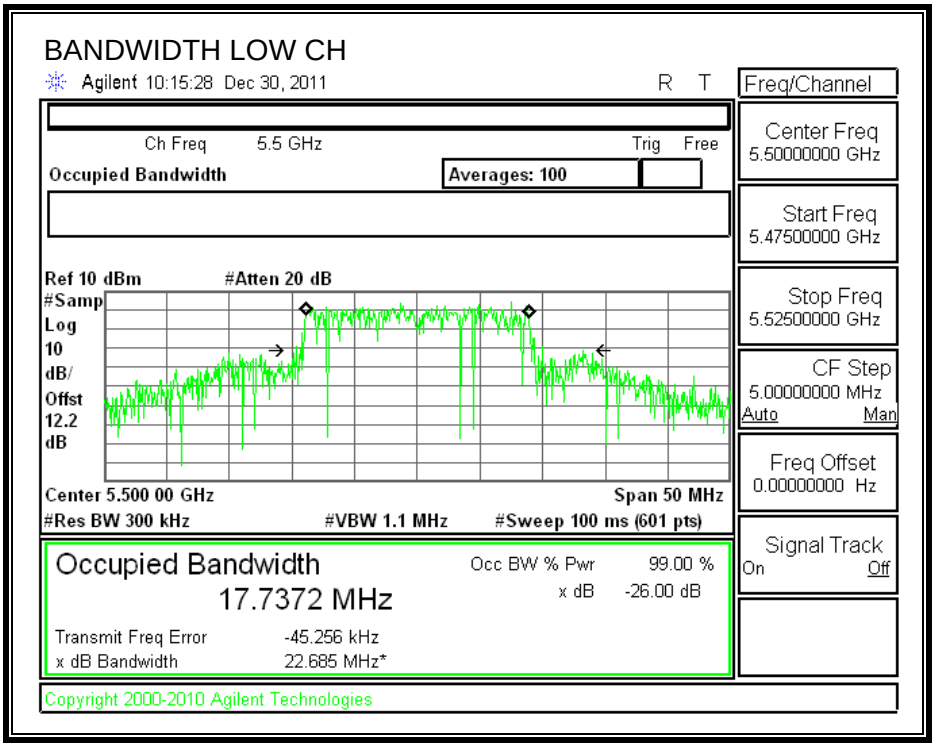


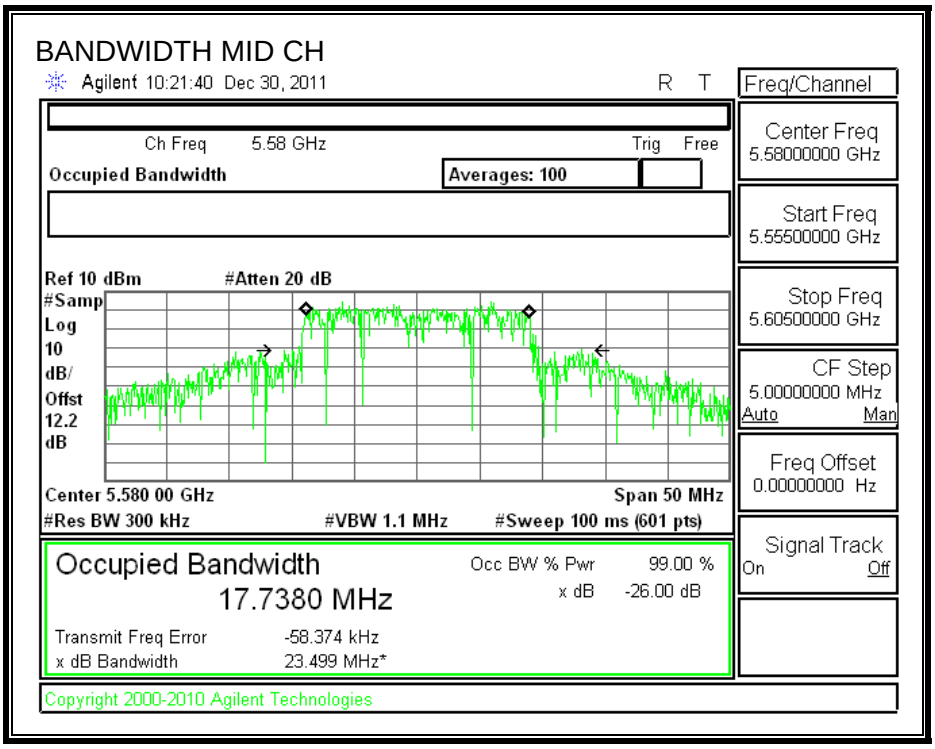


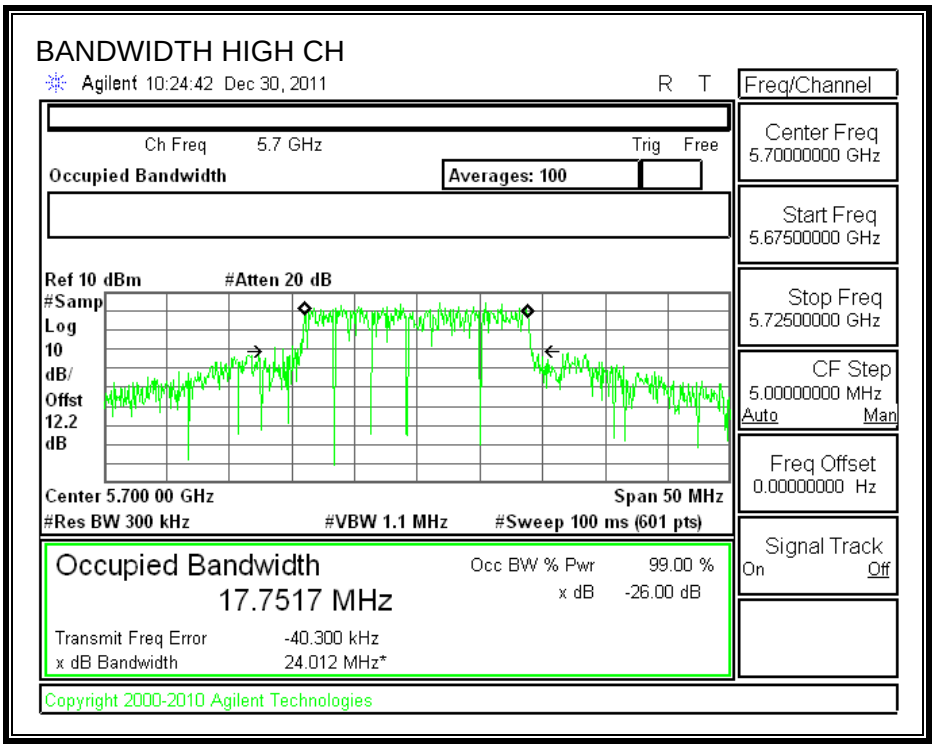


CHAIN 3

99% BANDWIDTH







7.18.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
4.07	6.39	4.09	9.76

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

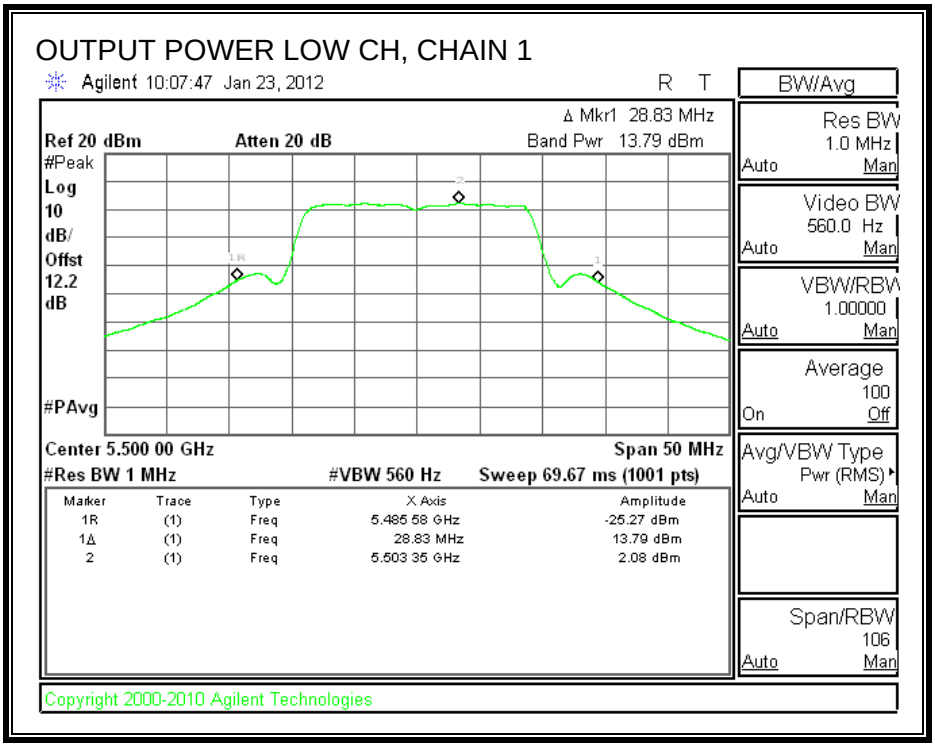
Limit

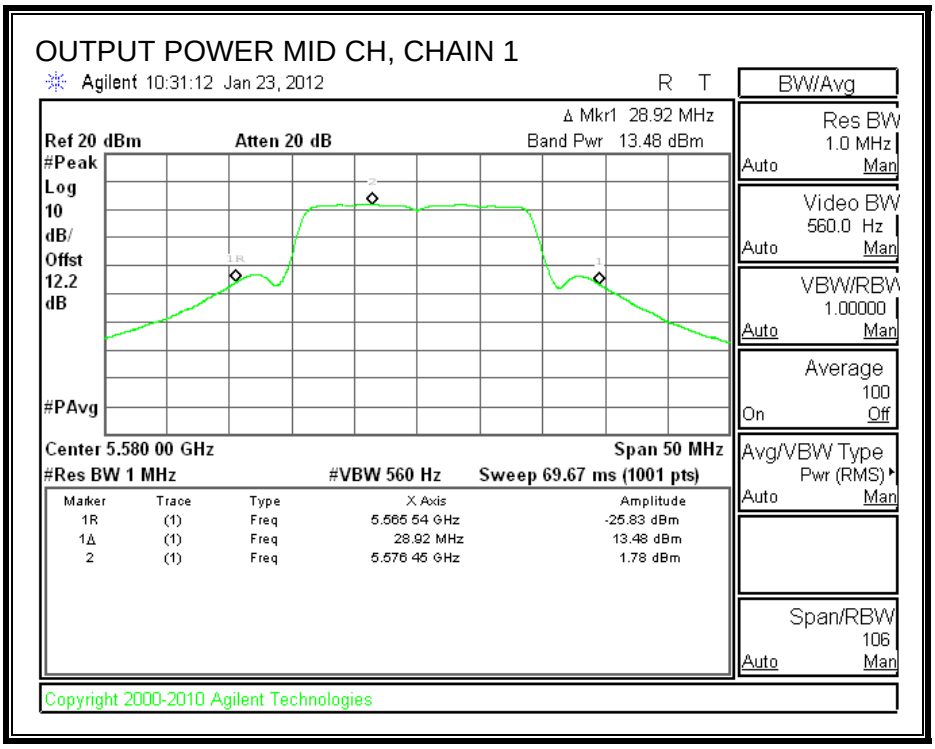
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	26.58	25.25	9.76	20.24
Mid	5580	24	27.08	25.33	9.76	20.24
High	5700	24	26.92	25.30	9.76	20.24

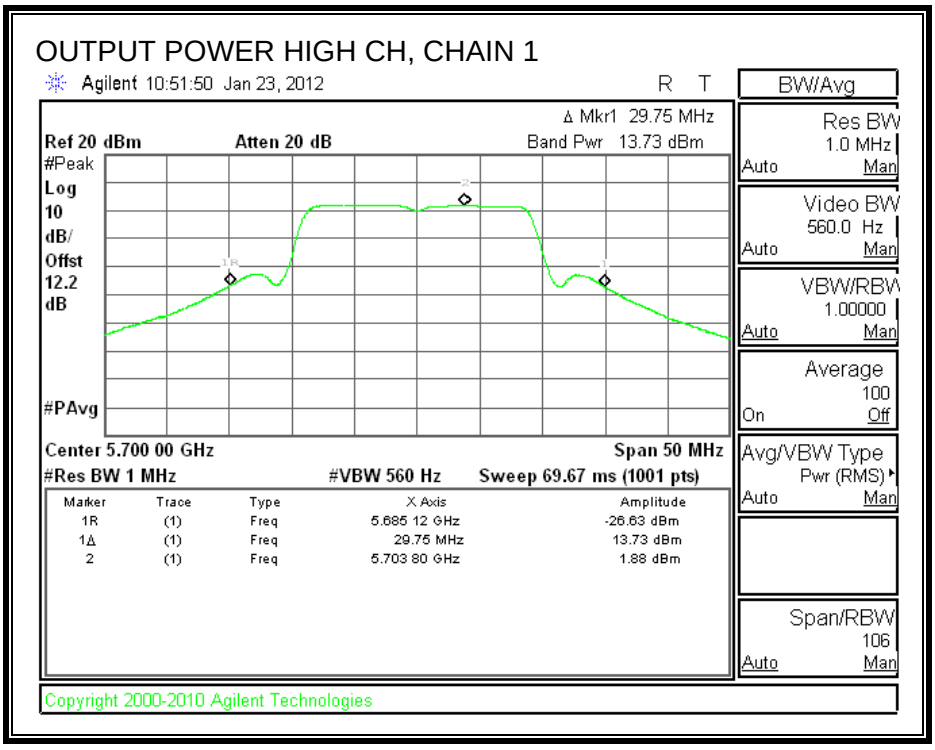
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	13.79	13.72	13.96	18.60	20.24	-1.64
Mid	5580	13.48	13.80	13.78	18.46	20.24	-1.78
High	5700	13.73	13.88	13.76	18.56	20.24	-1.68

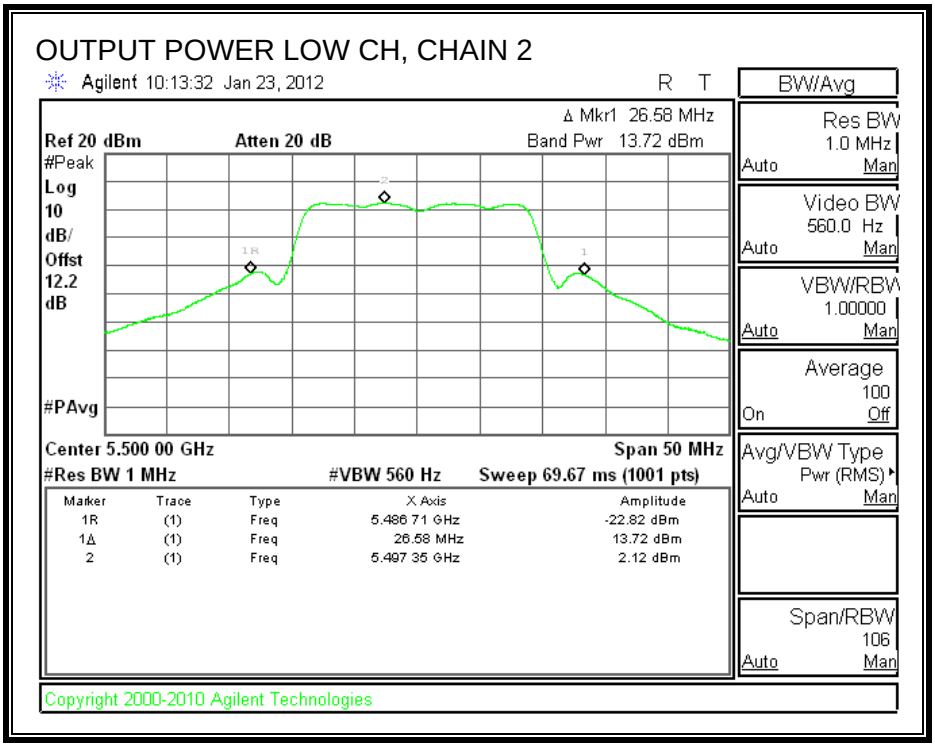
CHAIN 1 OUTPUT POWER

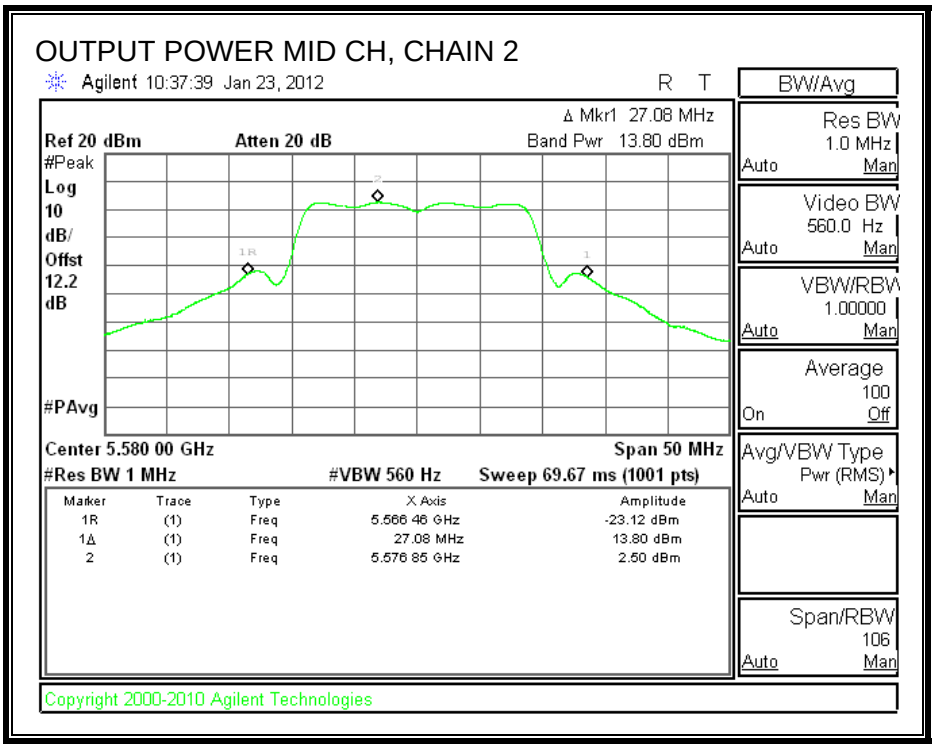


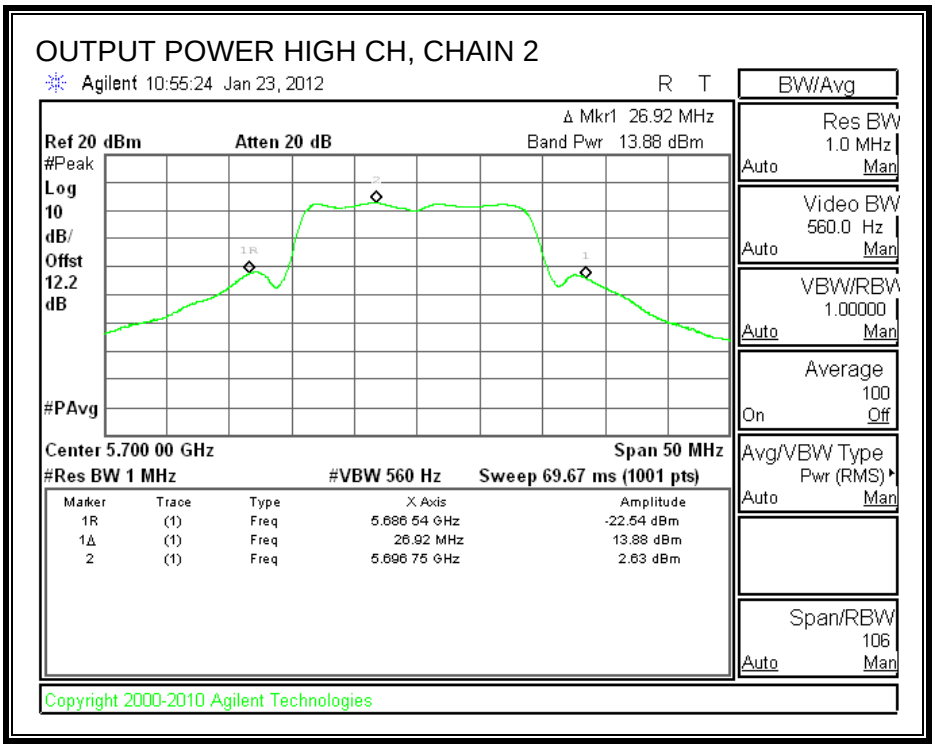




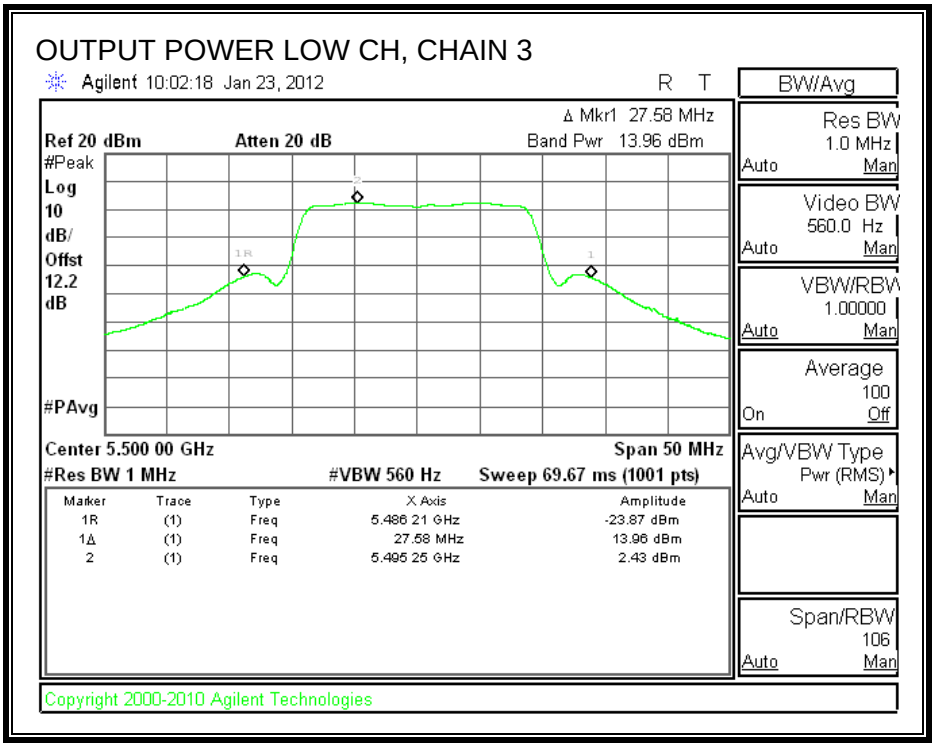
CHAIN 2 OUTPUT POWER

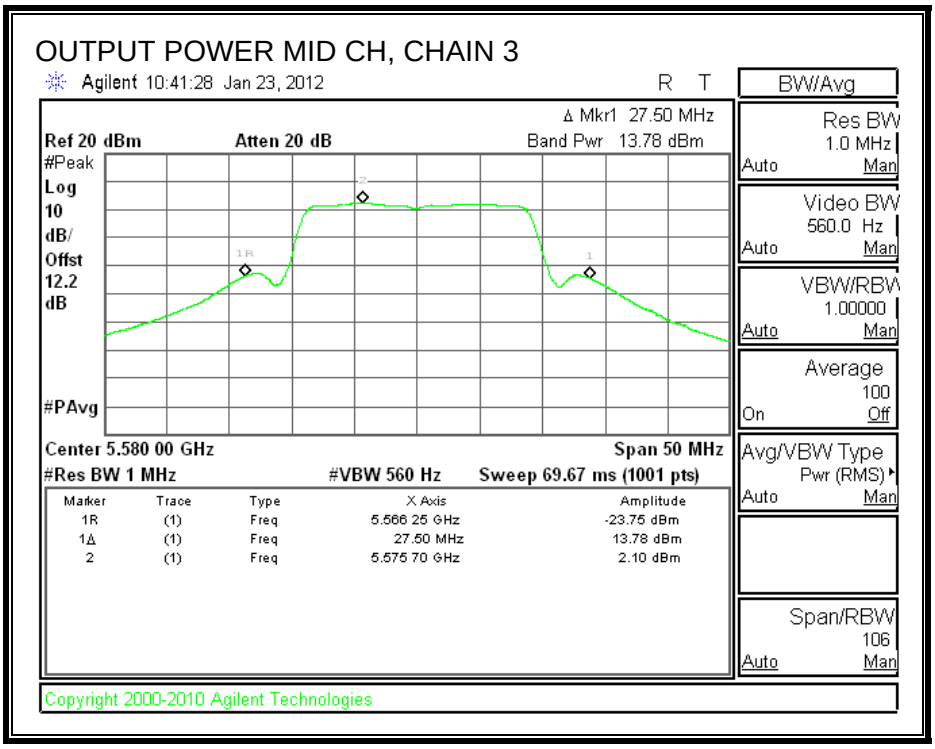


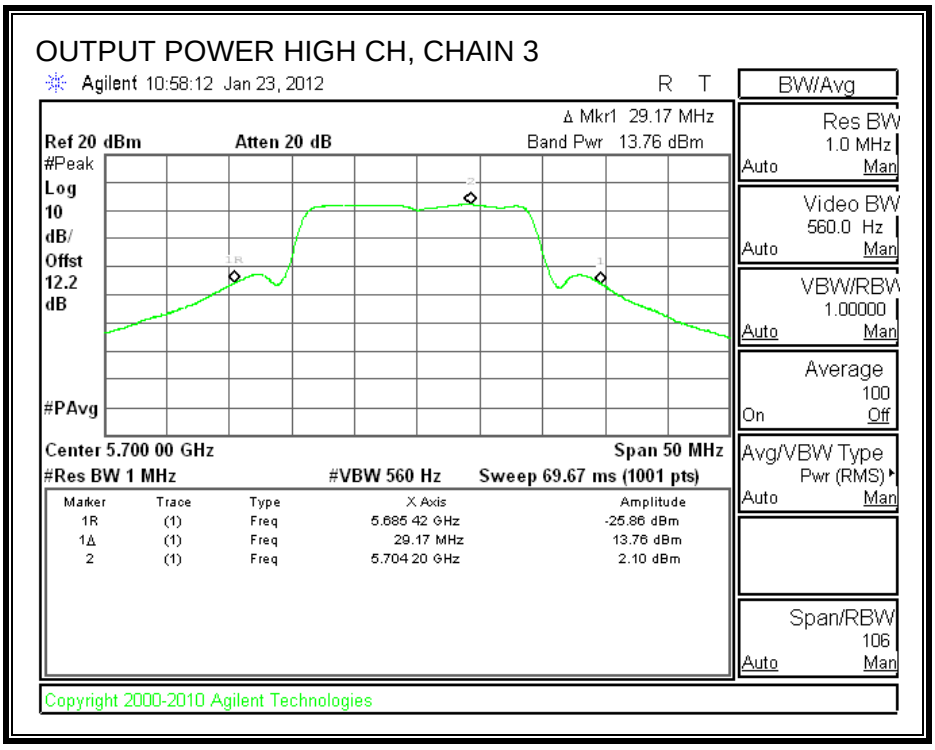




CHAIN 3 OUTPUT POWER







7.18.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5500	12.73	12.78	13.01	17.61
Middle	5580	12.35	12.74	12.58	17.33
High	5700	12.71	12.79	12.86	17.56

7.18.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
4.07	6.39	4.09	9.76

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum effective antenna gain is 9.76 dBi, therefore the limit is 7.24 dBm.

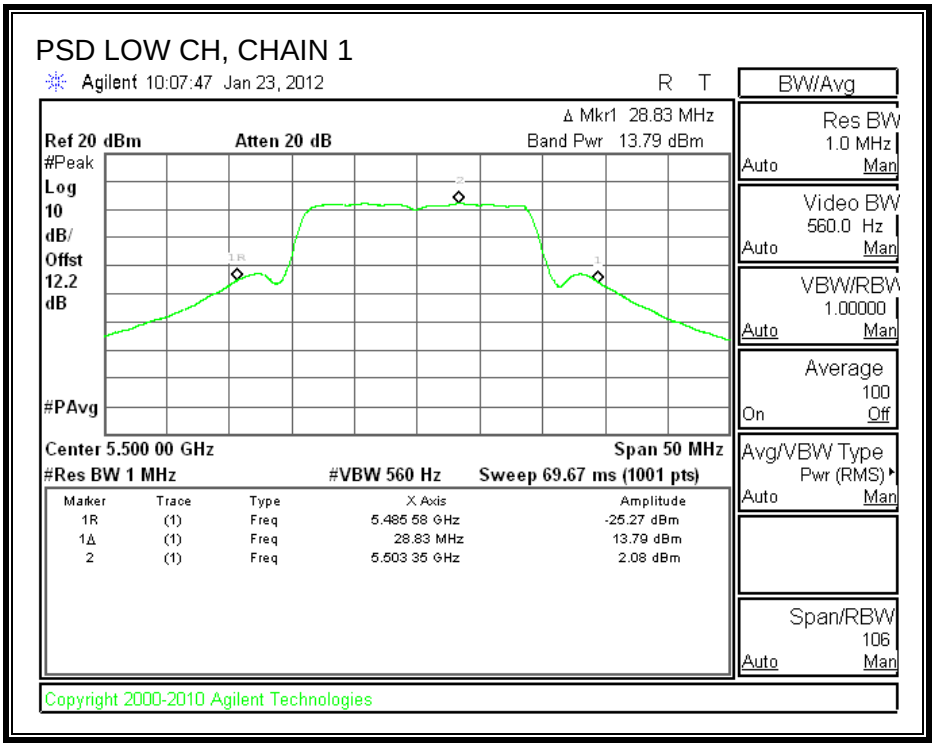
TEST PROCEDURE

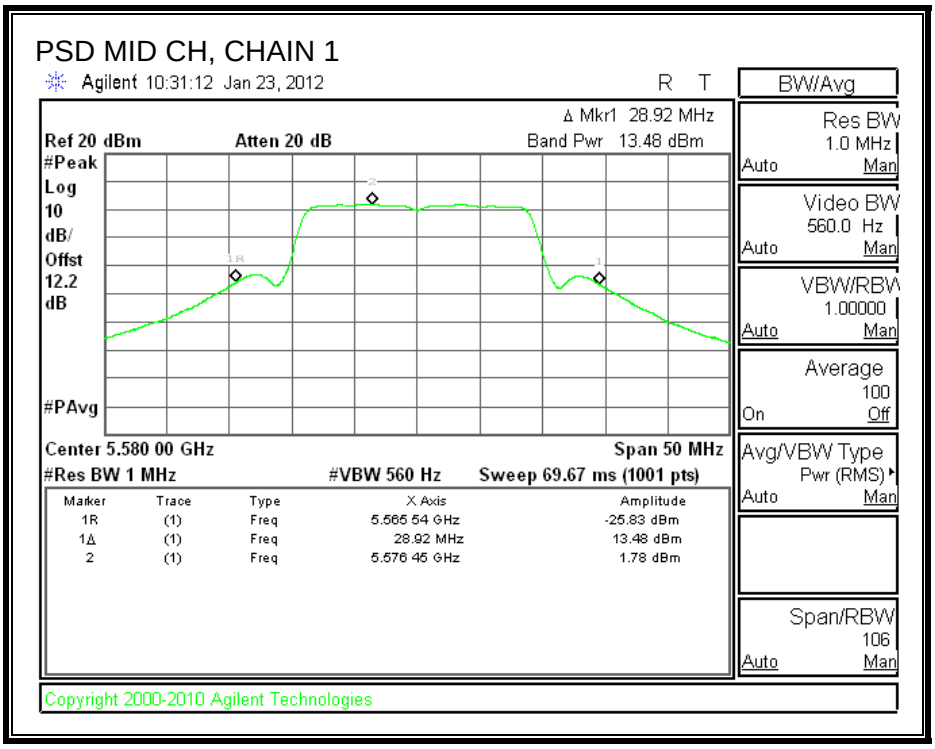
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

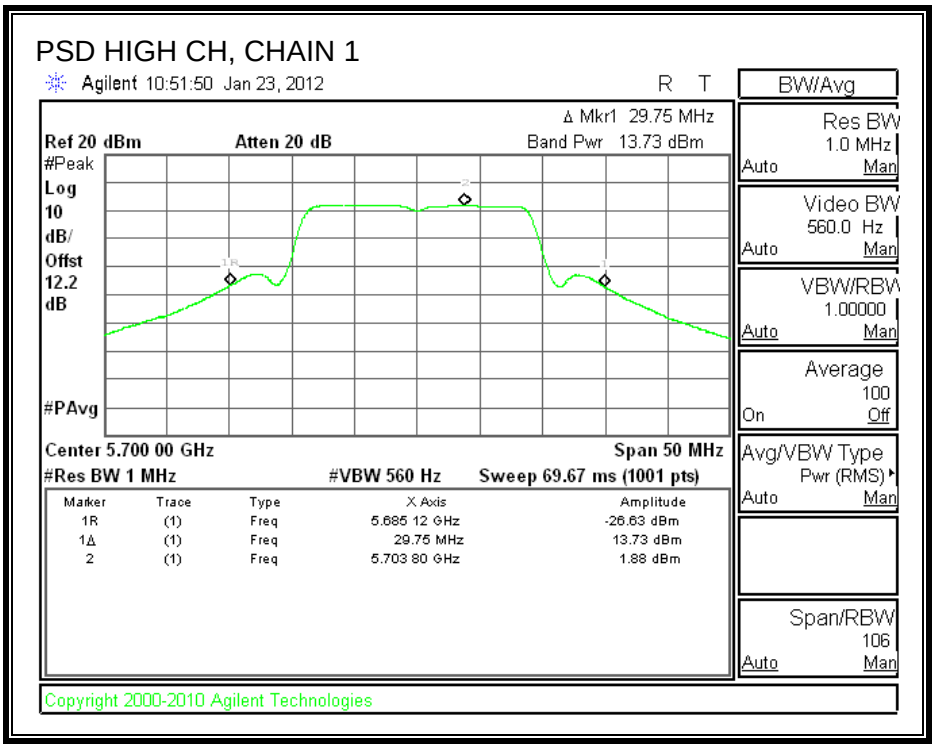
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	2.08	2.12	2.43	6.98	7.24	-0.26
Middle	5580	1.78	2.50	2.10	6.91	7.24	-0.33
High	5700	1.88	2.83	2.10	7.06	7.24	-0.18

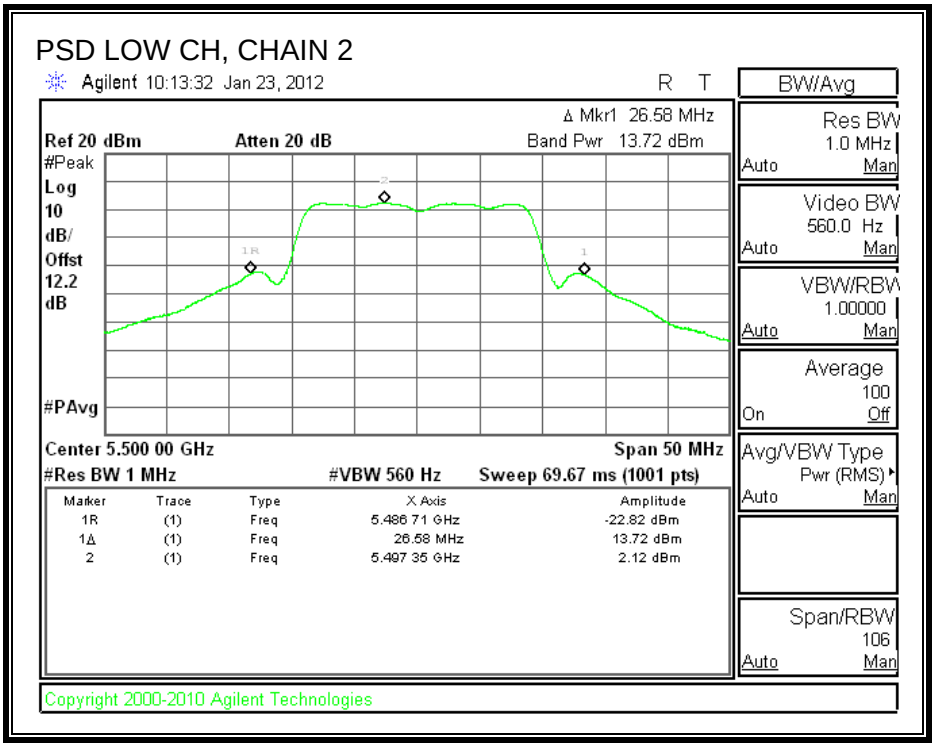
CHAIN 1 POWER SPECTRAL DENSITY

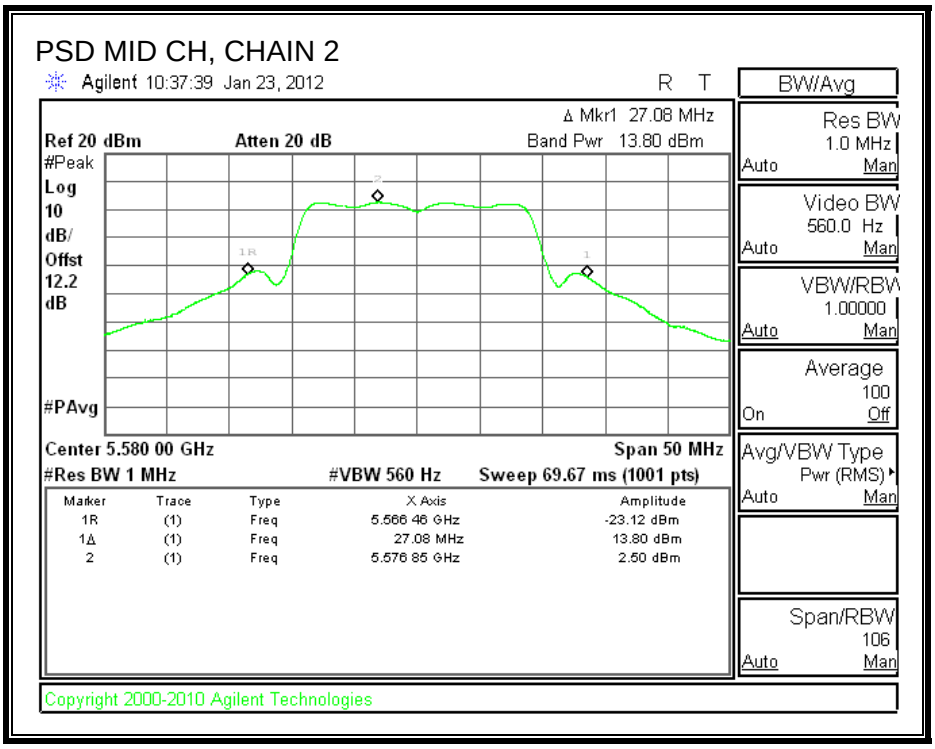


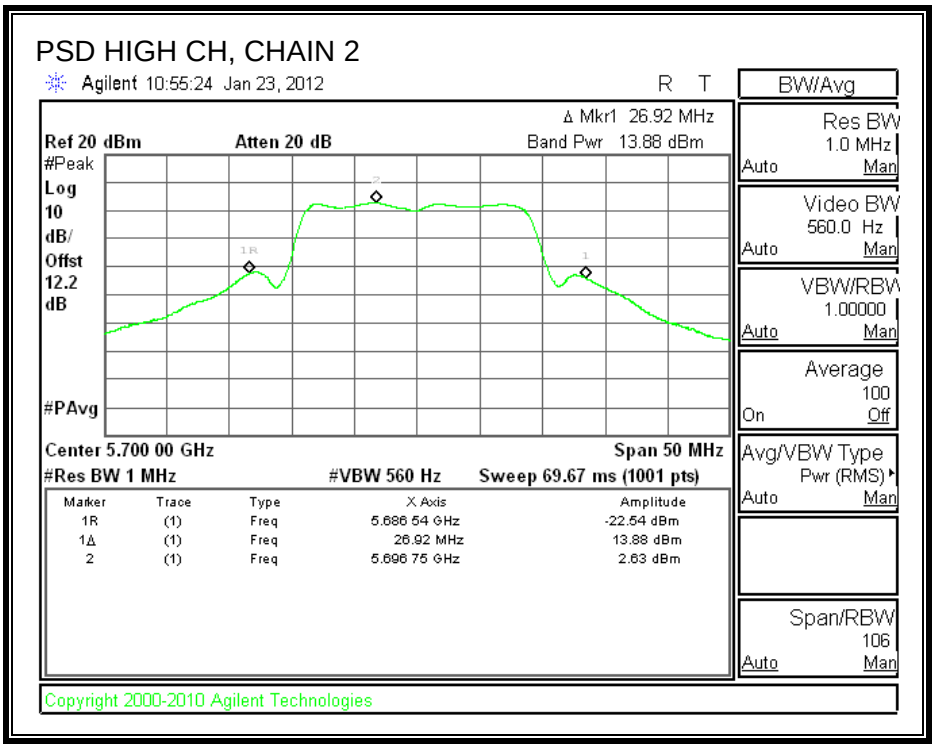




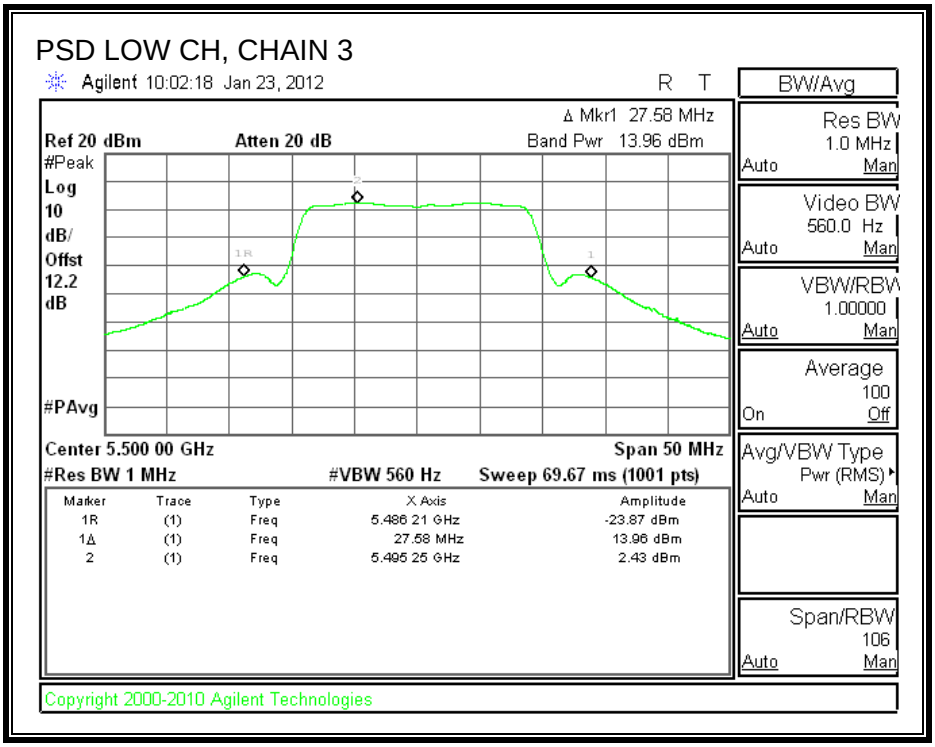
CHAIN 2 POWER SPECTRAL DENSITY

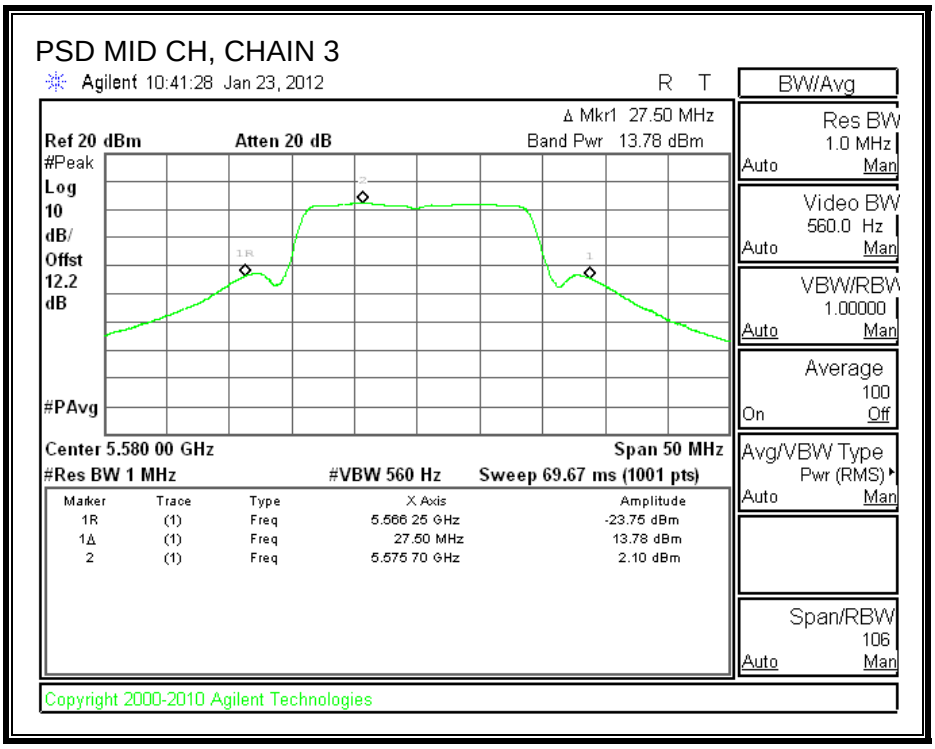


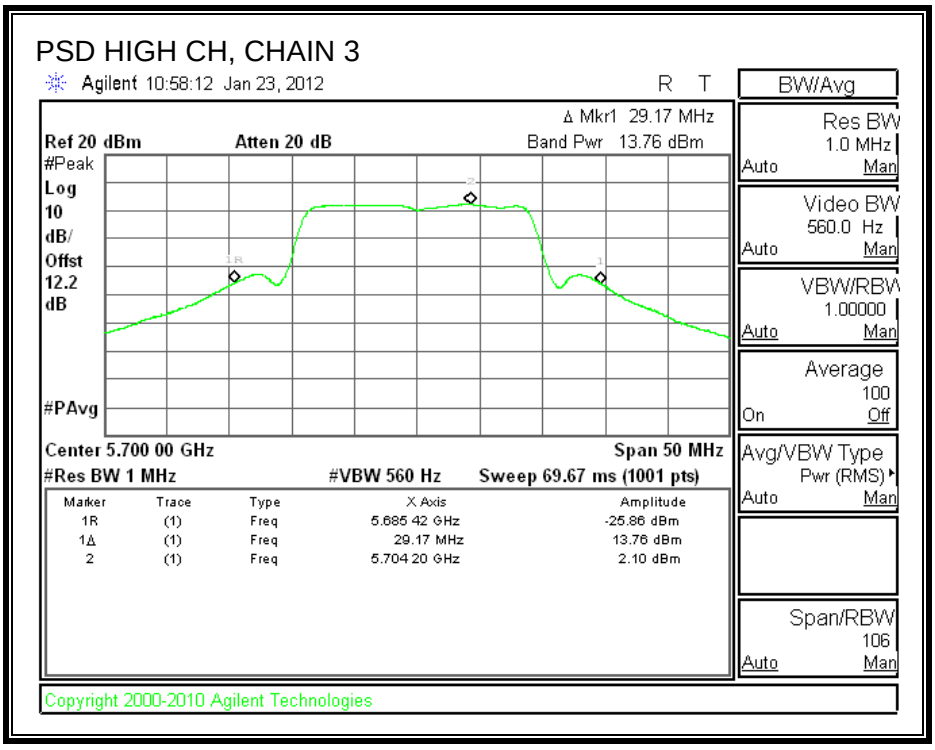




CHAIN 3 POWER SPECTRAL DENSITY







7.18.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.77	13	-5.23
Middle	5580	7.79	13	-5.21
High	5700	7.42	13	-5.58

CHAIN 2

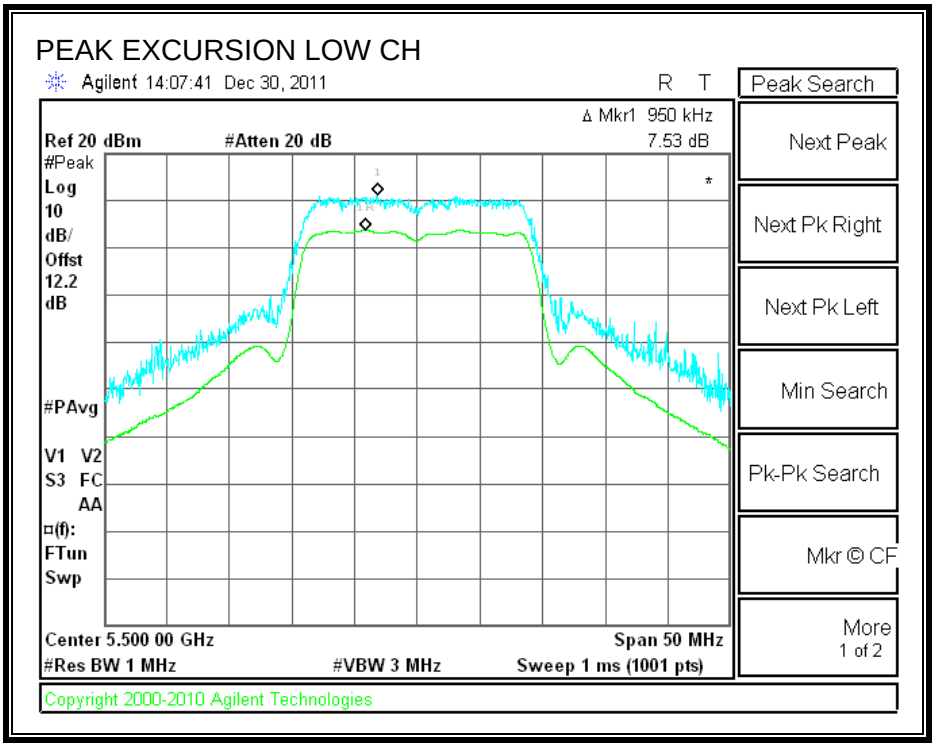
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.77	13	-5.23
Middle	5580	7.79	13	-5.21
High	5700	8.46	13	-4.54

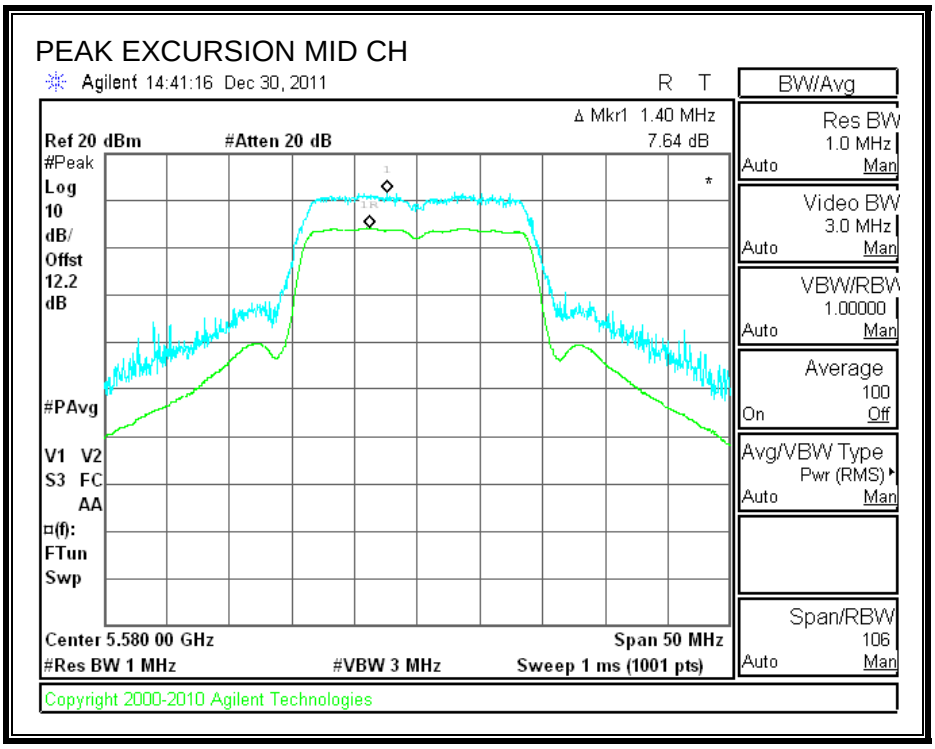
CHAIN 3

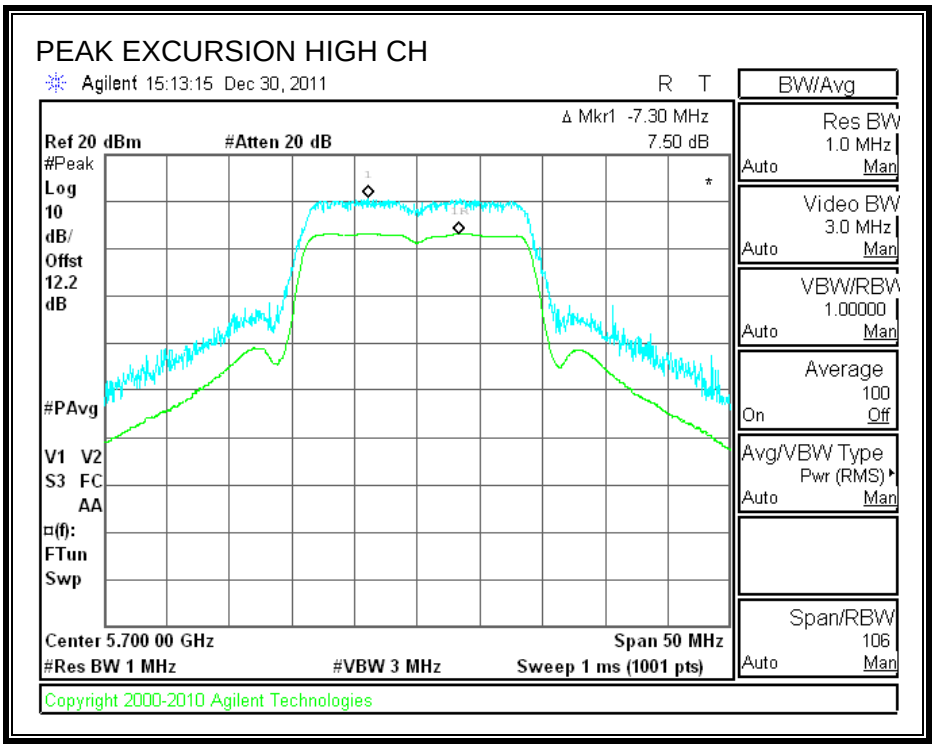
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.15	13	-4.85
Middle	5580	7.42	13	-5.58
High	5700	8.29	13	-4.71

CHAIN 1

PEAK EXCURSION

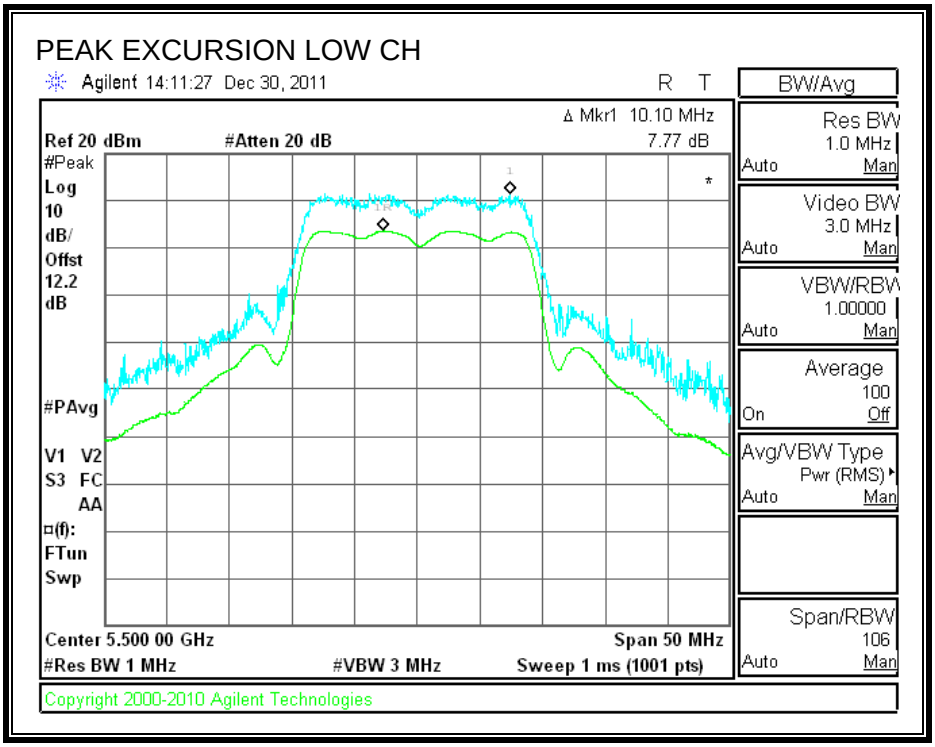


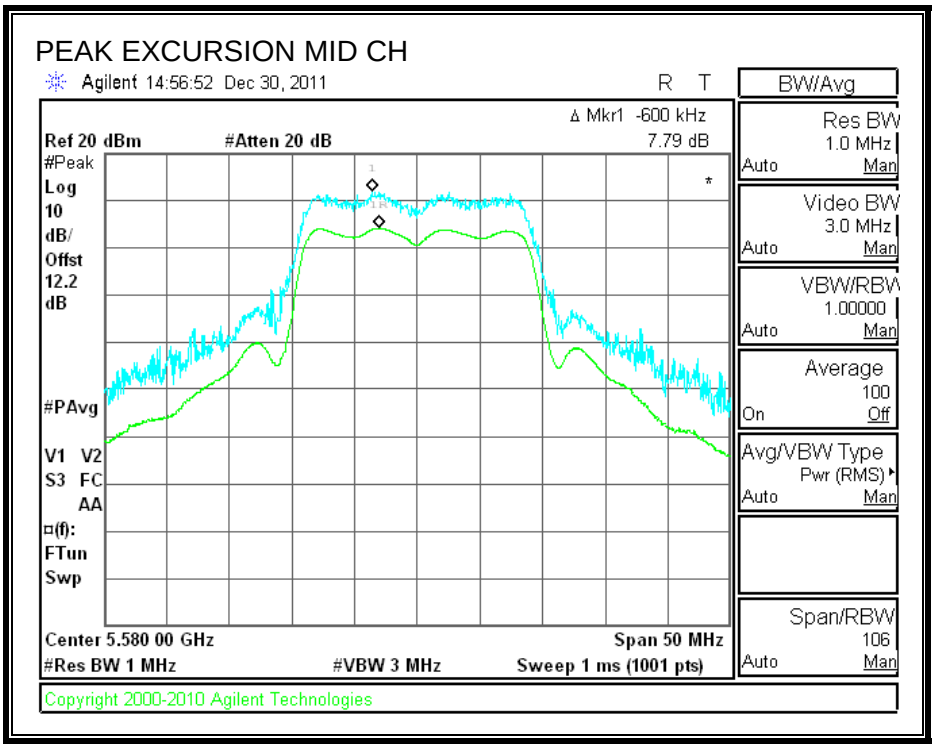


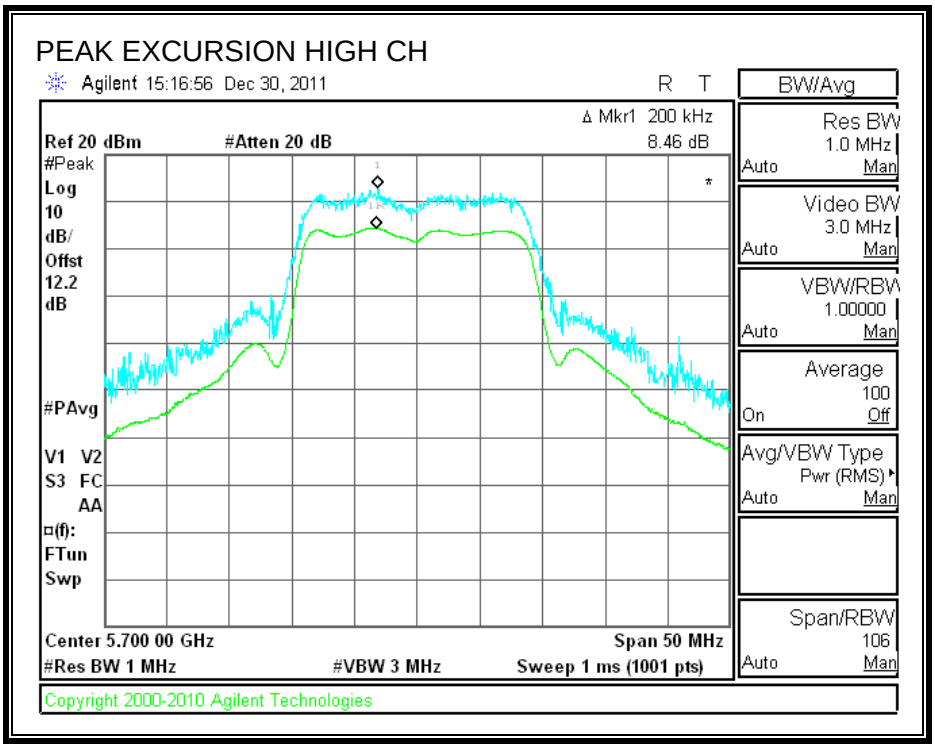


CHAIN 2

PEAK EXCURSION

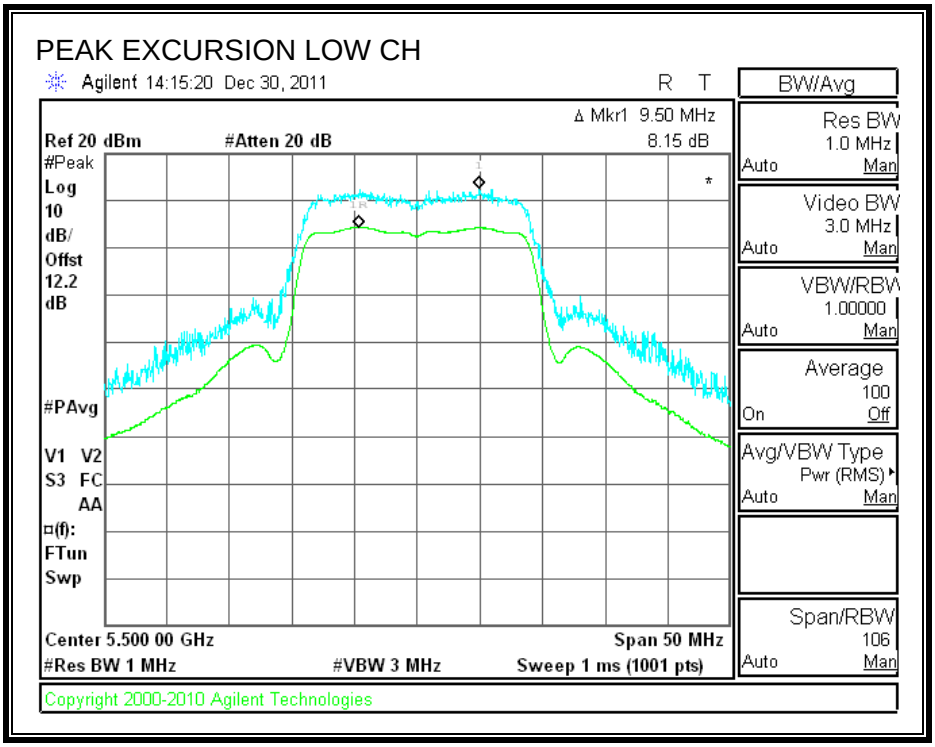


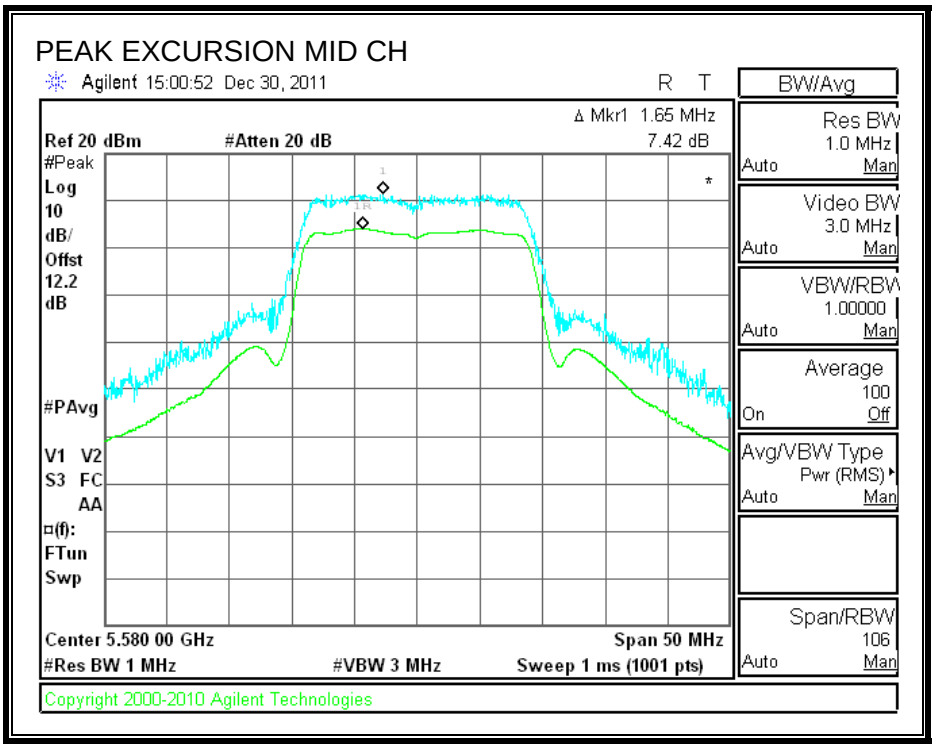




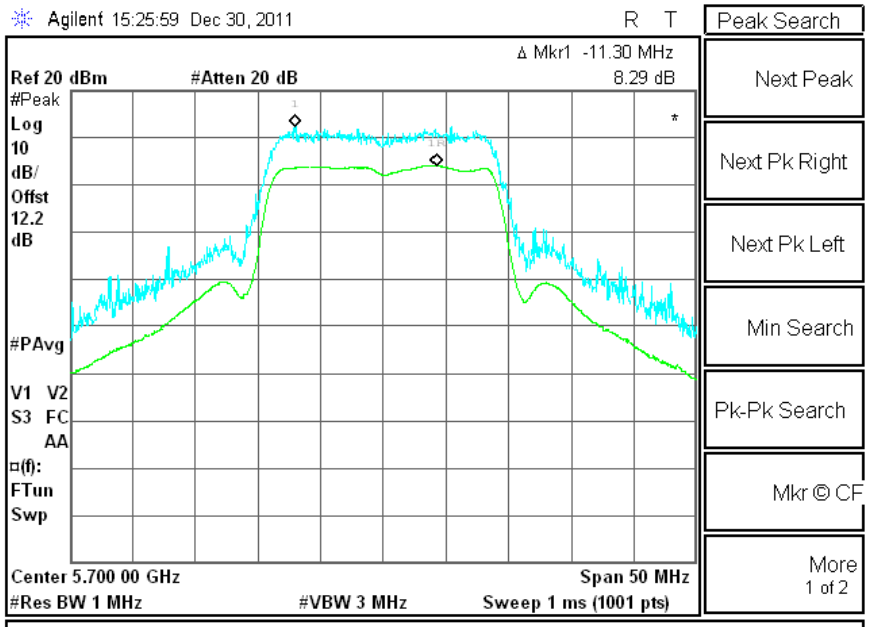
CHAIN 3

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.19. 802.11n HT20 3TX MODE IN THE 5.6 GHz BAND, SDM MCS21

7.19.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	28.00	17.9090
Middle	5580	28.95	17.8071
High	5700	29.00	17.7993

CHAIN 2

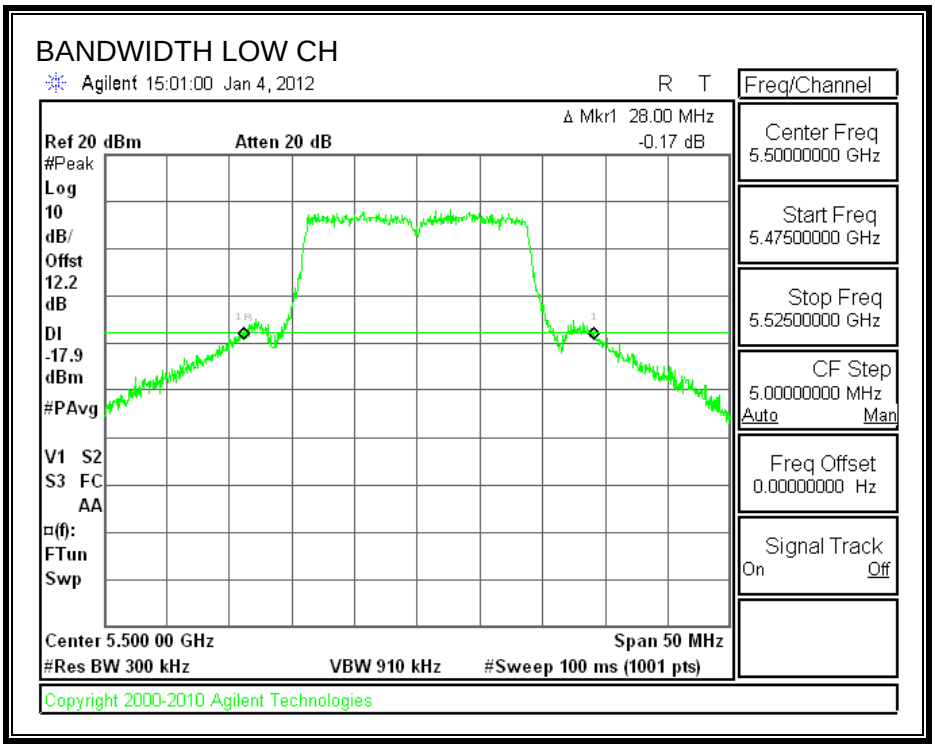
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	28.35	17.8154
Middle	5580	28.10	17.8372
High	5700	29.90	17.8328

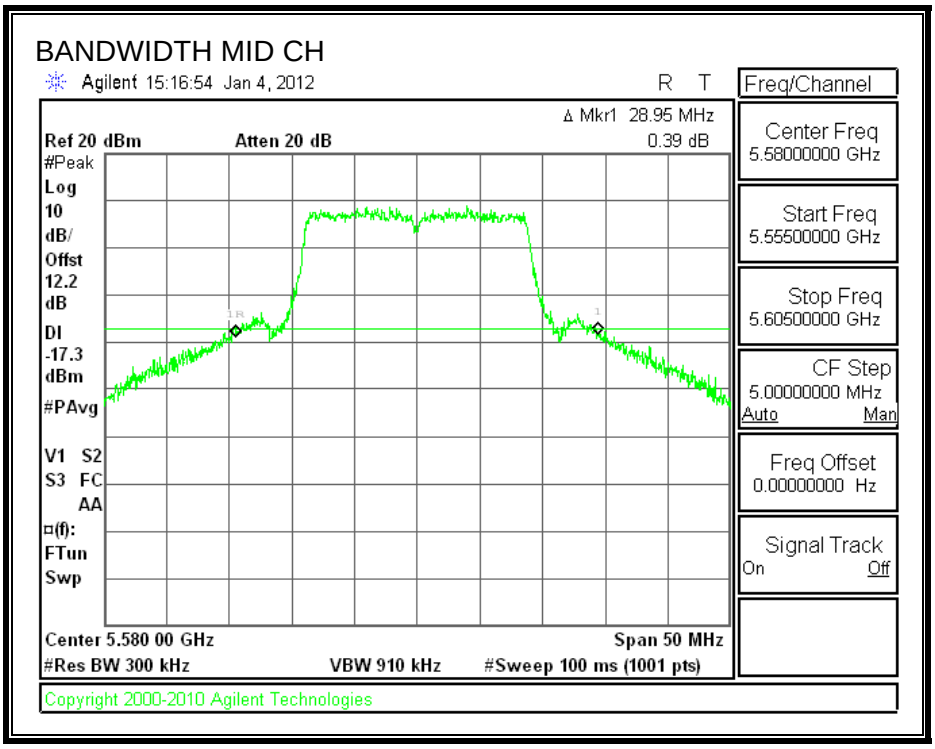
CHAIN 3

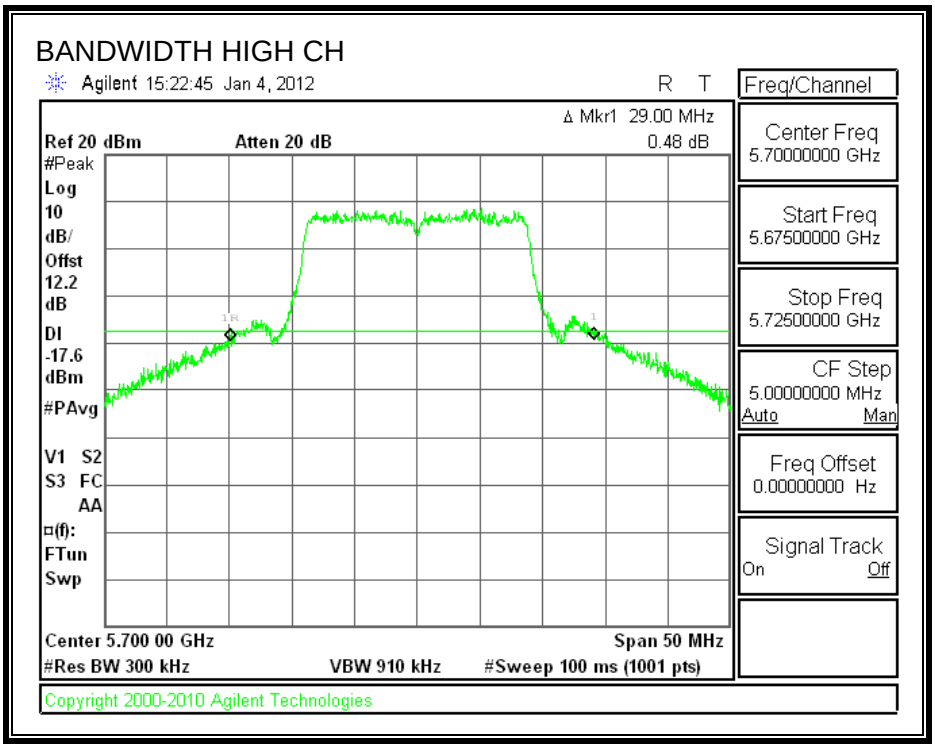
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	28.850	17.7951
Middle	5580	28.650	17.8263
High	5700	29.900	17.8280

CHAIN 1

26 dB BANDWIDTH

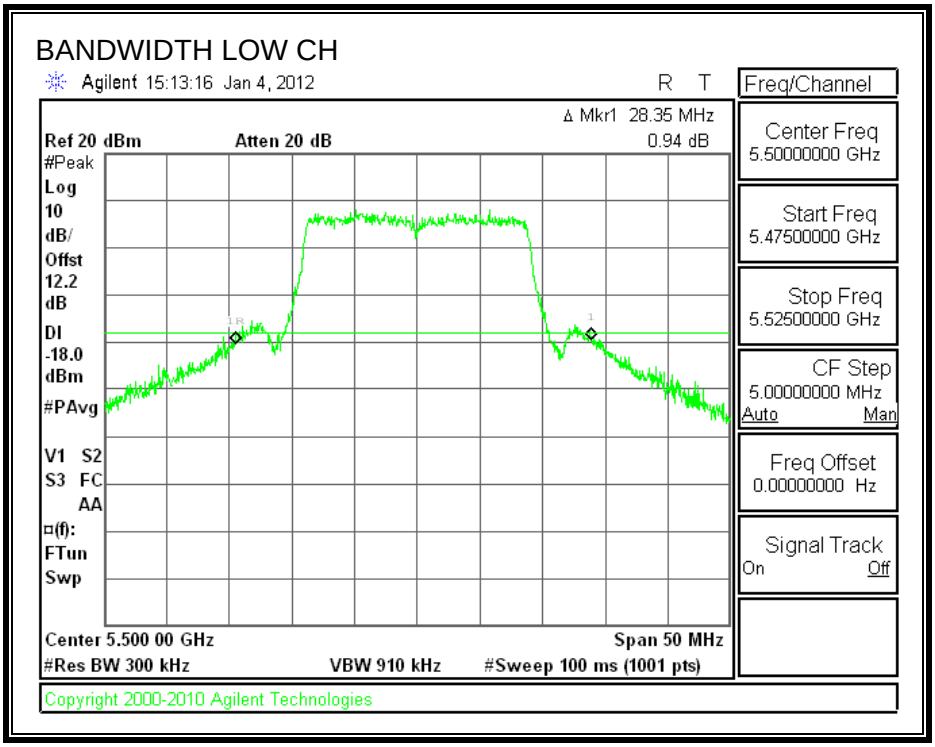


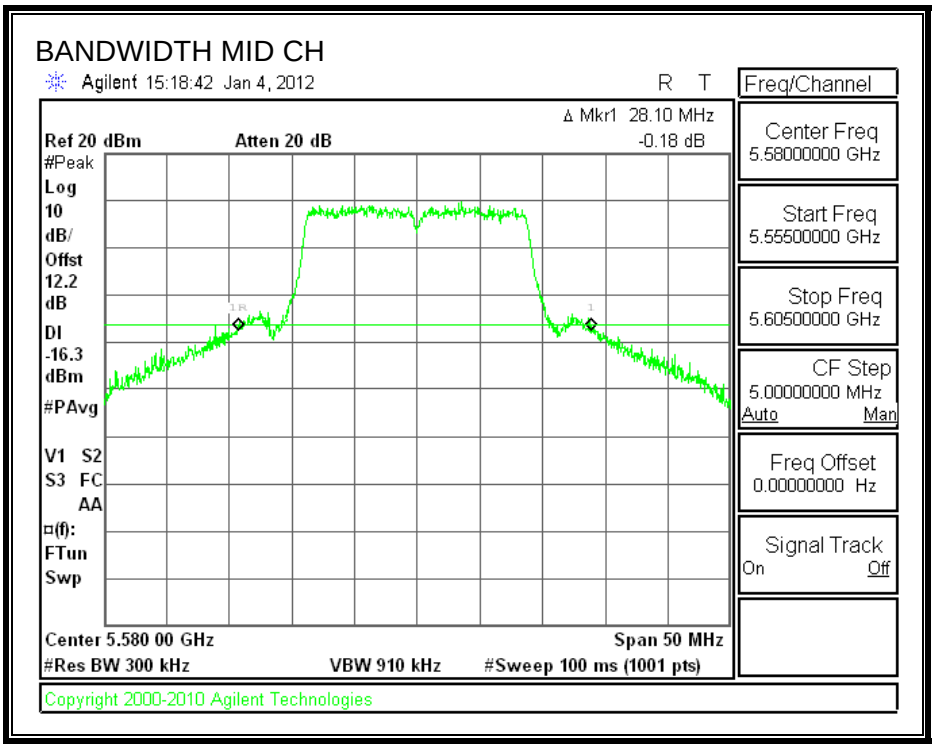


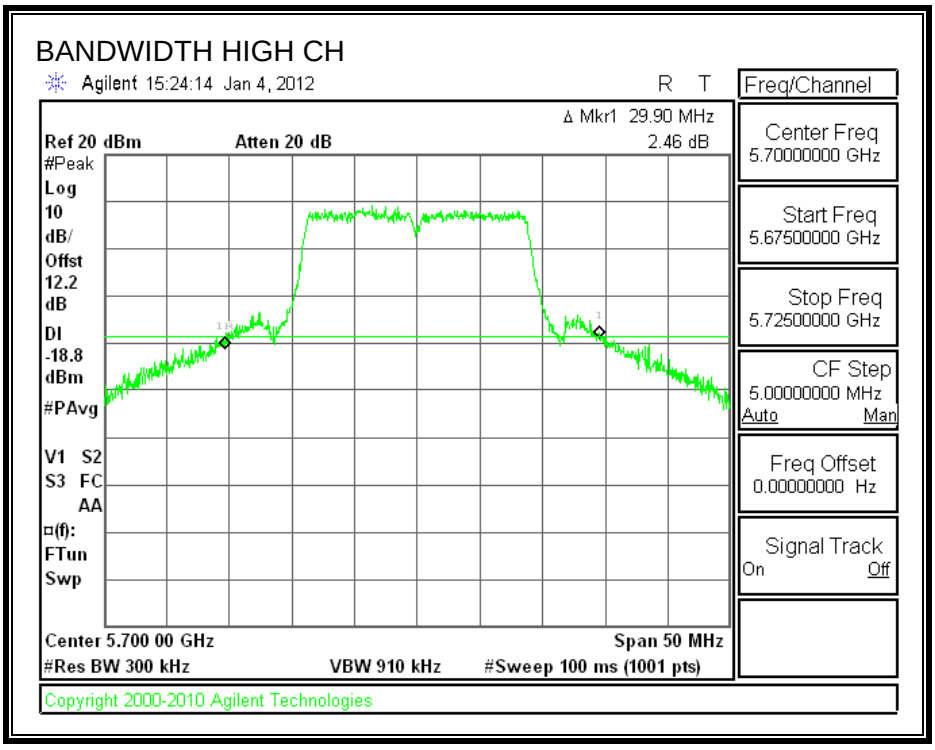


CHAIN 2

26 dB BANDWIDTH

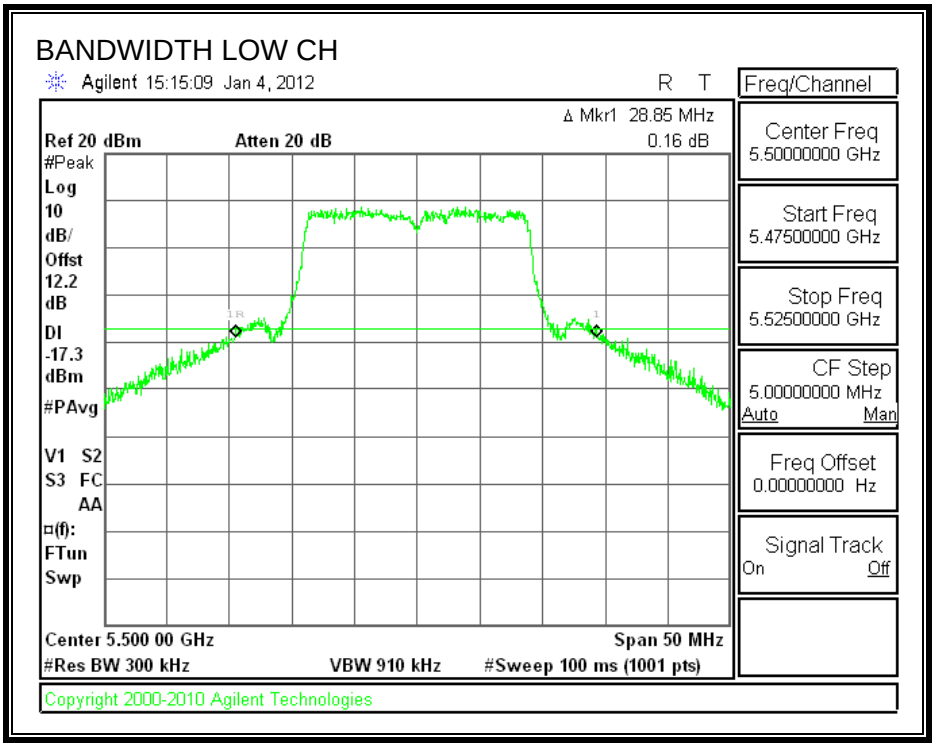


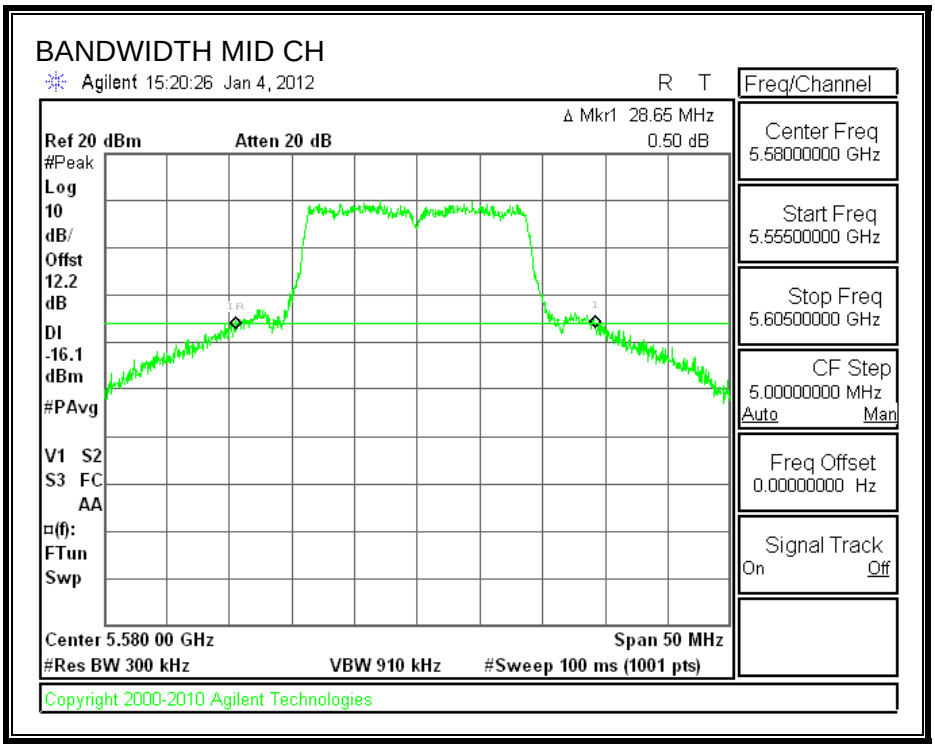


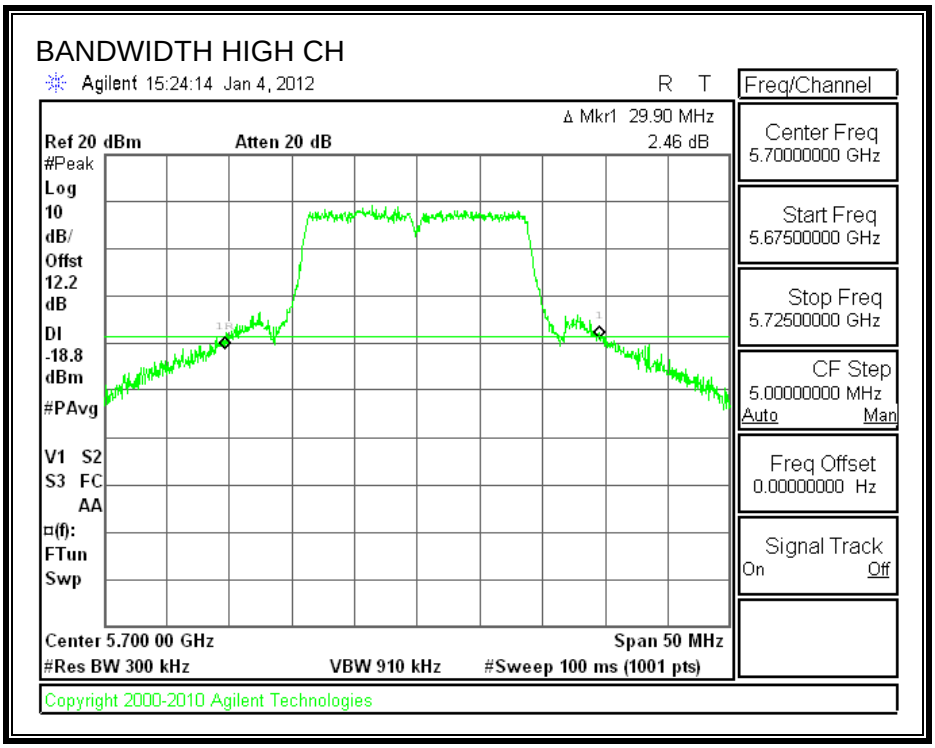


CHAIN 3

26 dB BANDWIDTH

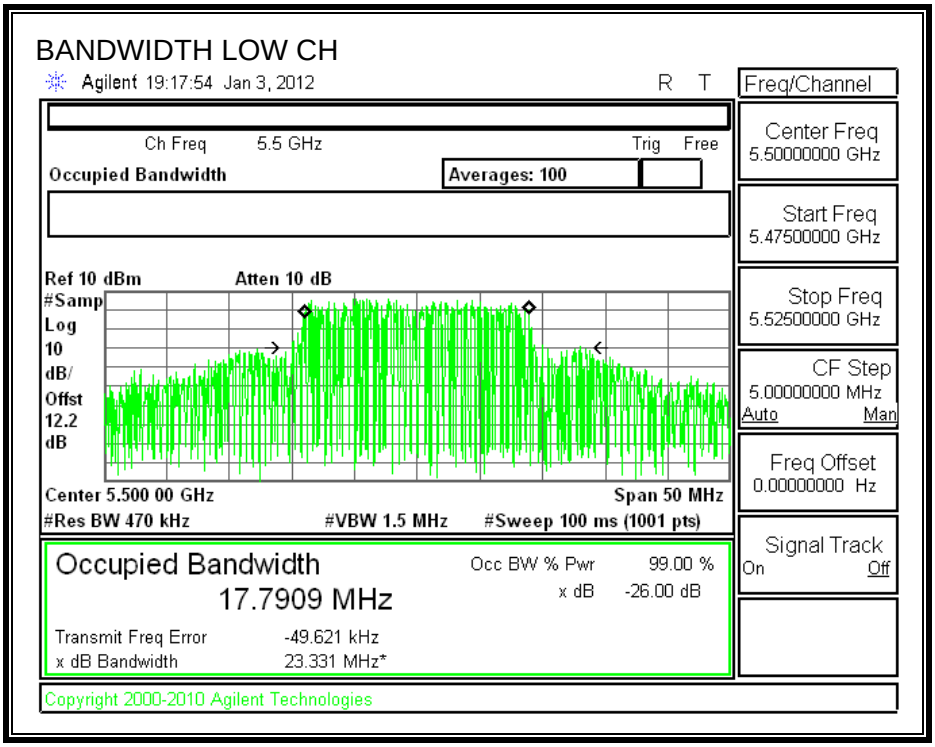


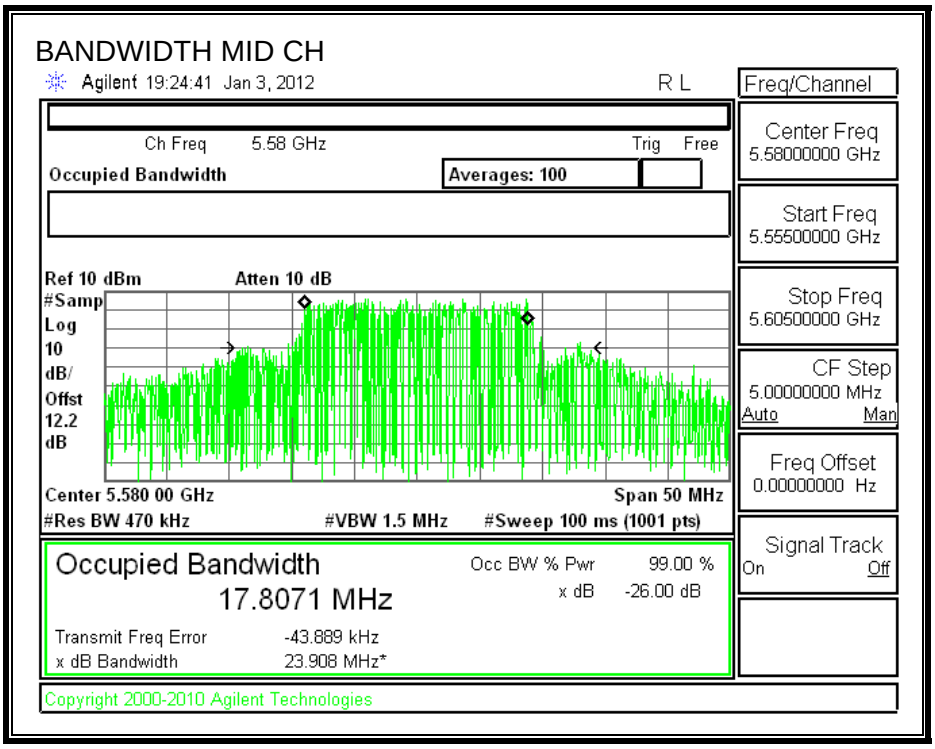


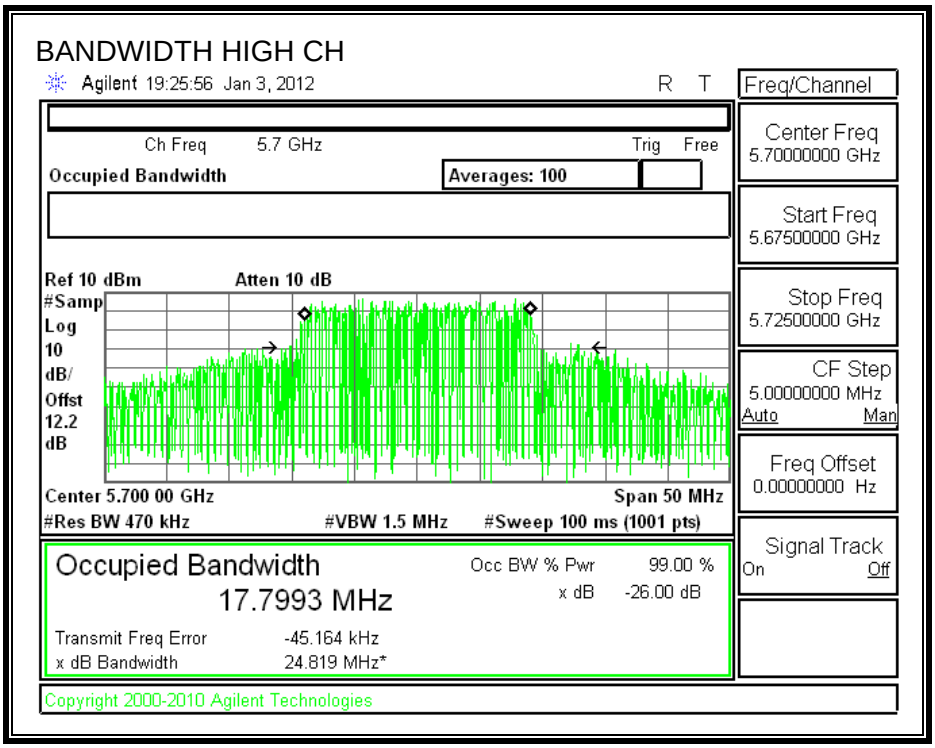


CHAIN 1

99% BANDWIDTH

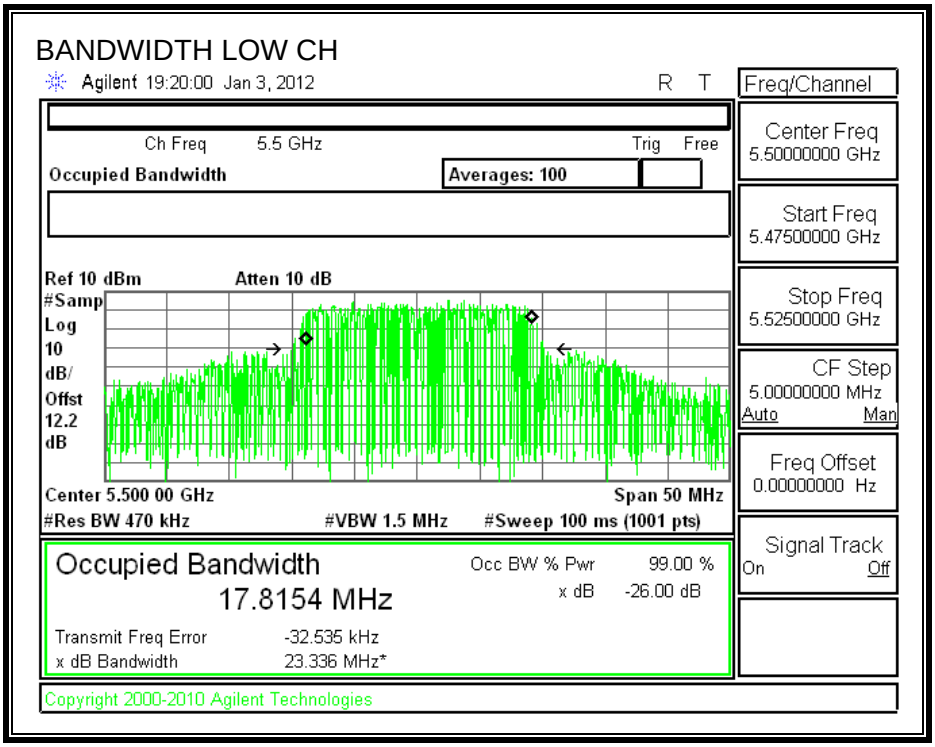


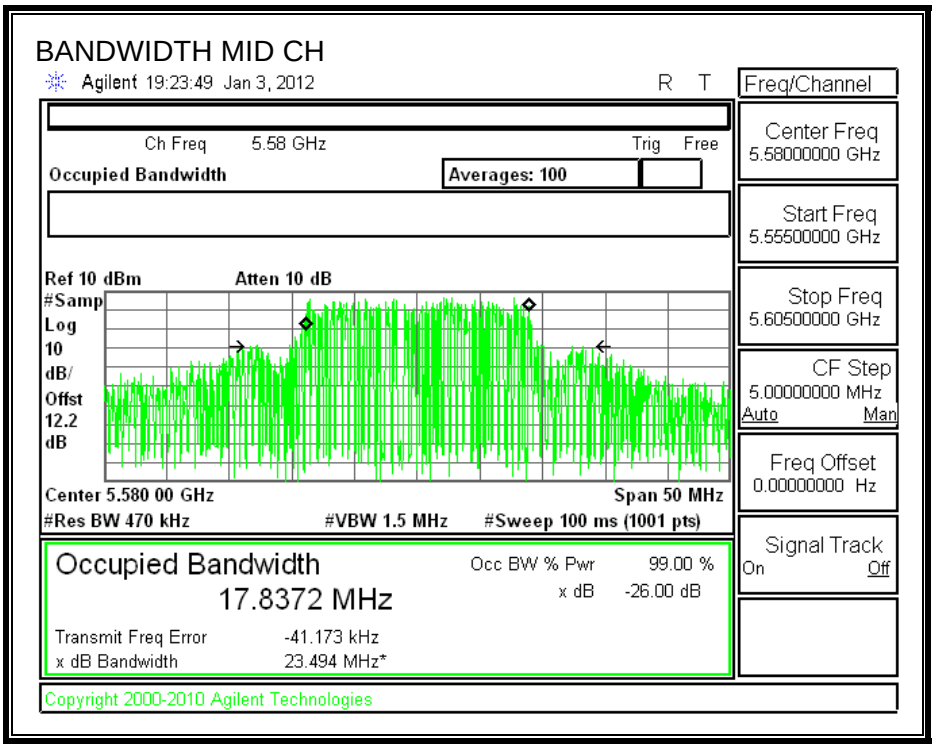


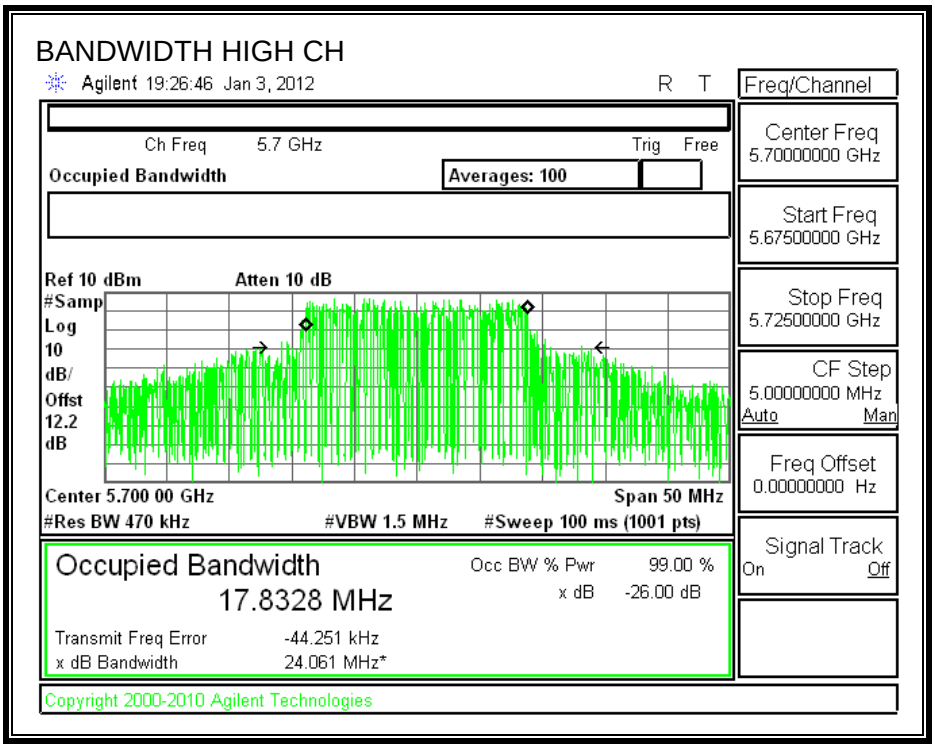


CHAIN 2

99% BANDWIDTH

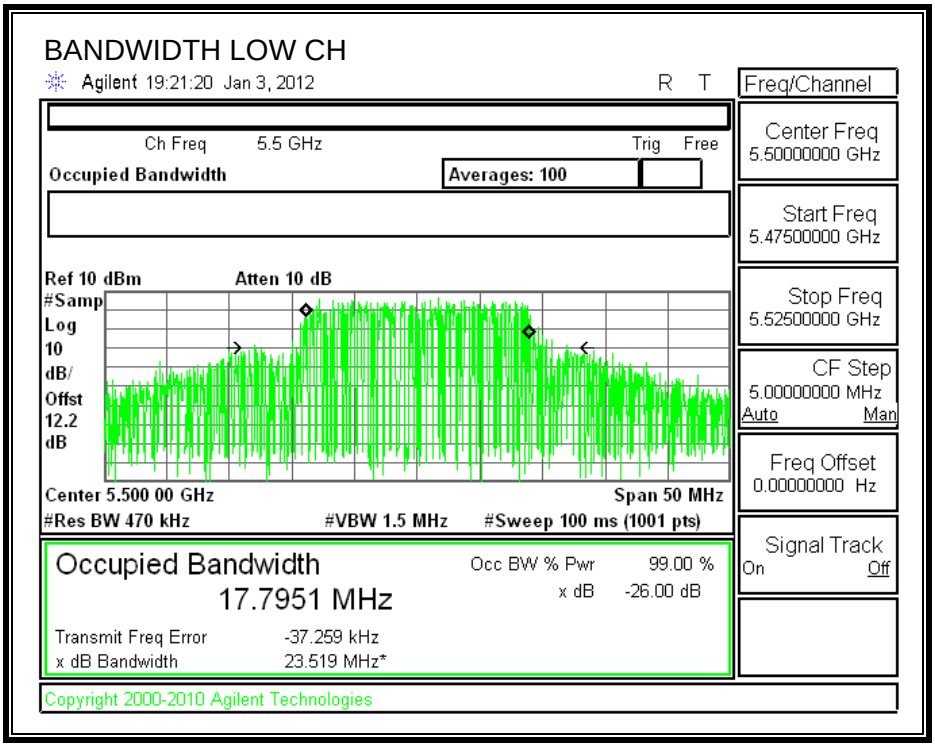


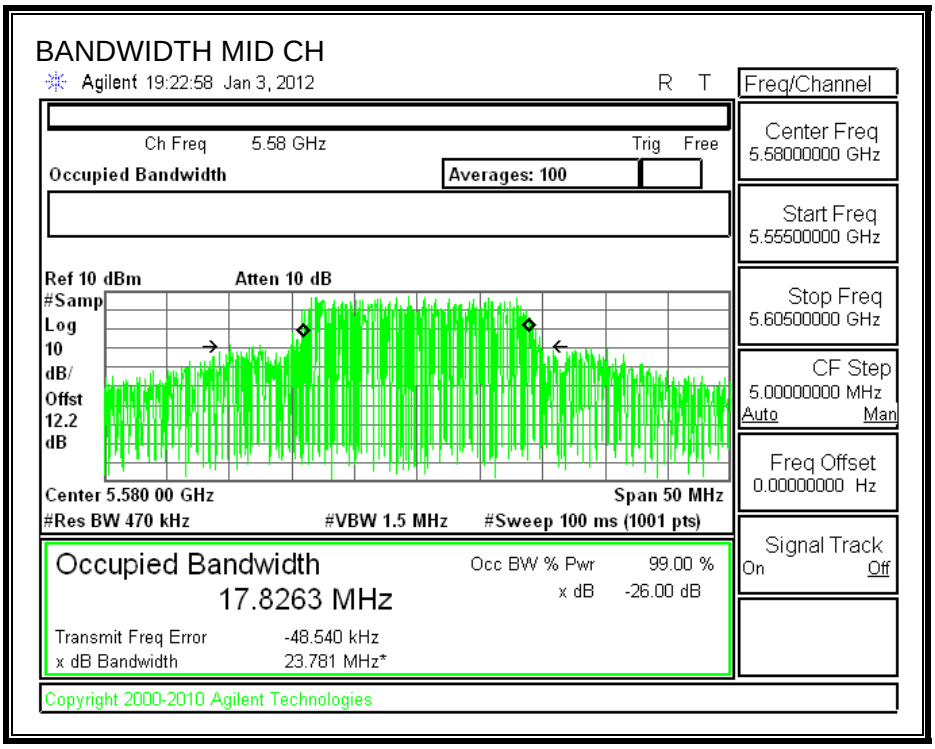


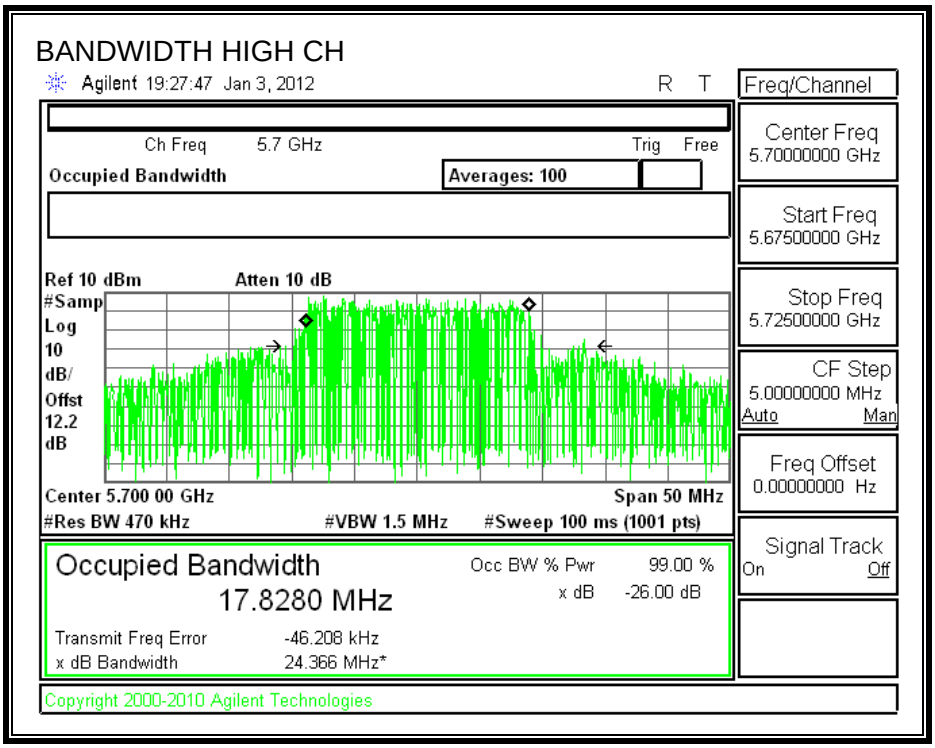


CHAIN 3

99% BANDWIDTH







7.19.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

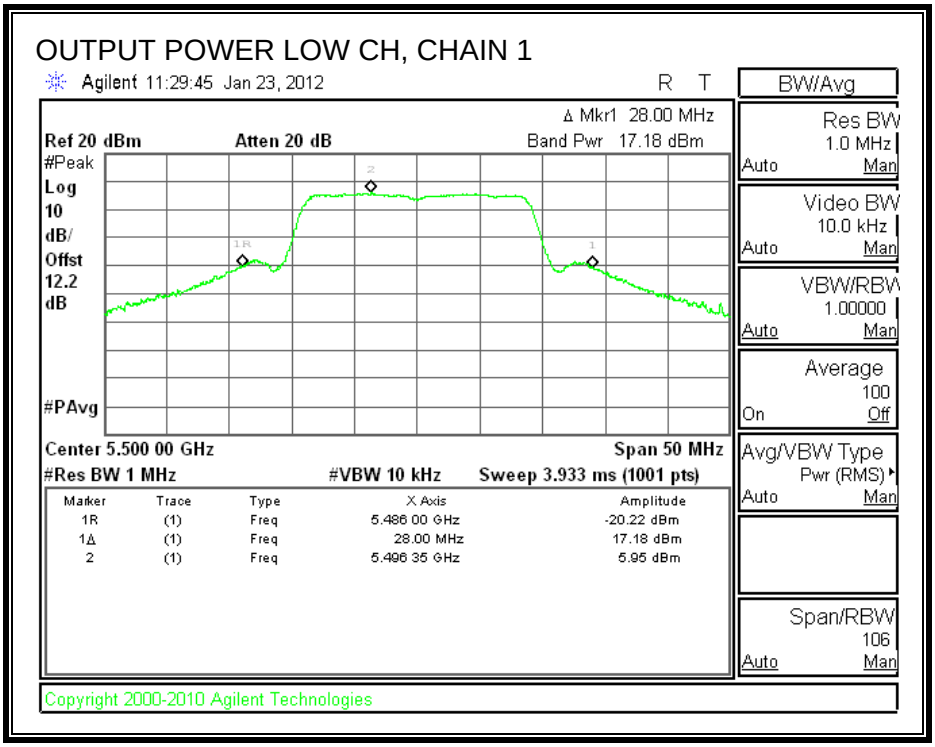
Limit

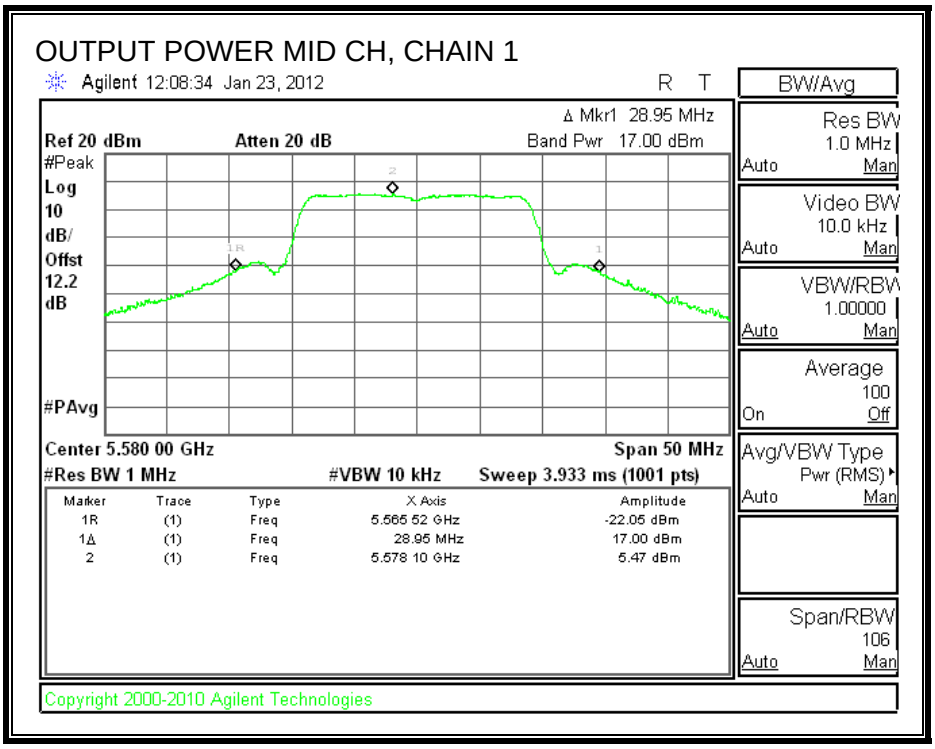
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	28.00	25.47	6.39	23.61
Mid	5580	24	28.10	25.49	6.39	23.61
High	5700	24	29.00	25.62	6.39	23.61

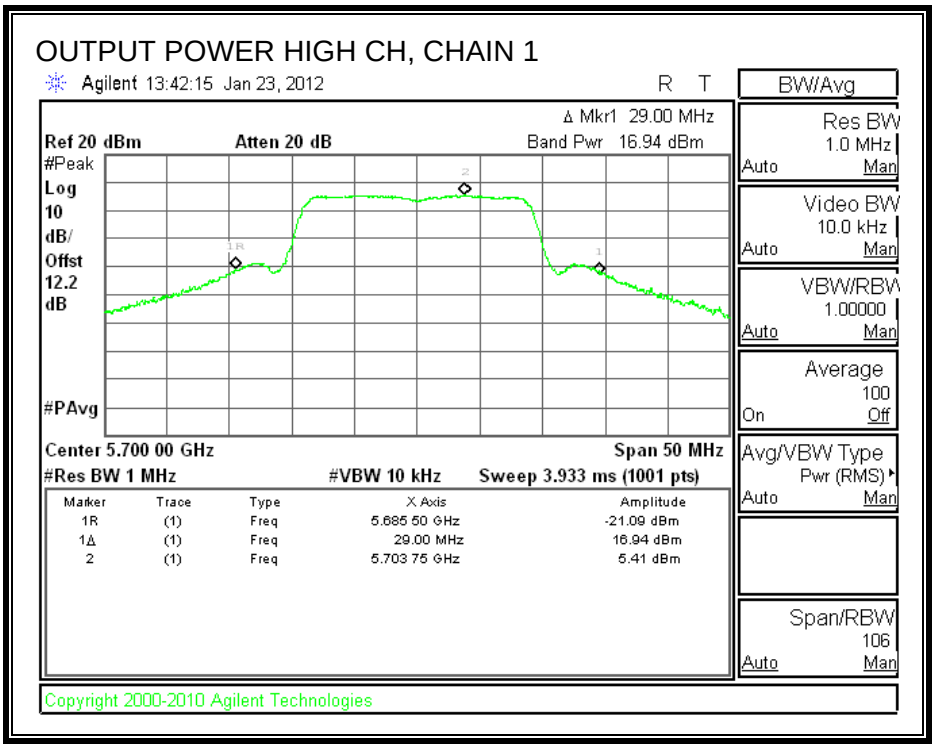
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	17.18	16.78	17.20	21.83	23.61	-1.78
Mid	5580	17.00	17.16	17.20	21.89	23.61	-1.72
High	5700	16.94	17.32	16.75	21.78	23.61	-1.83

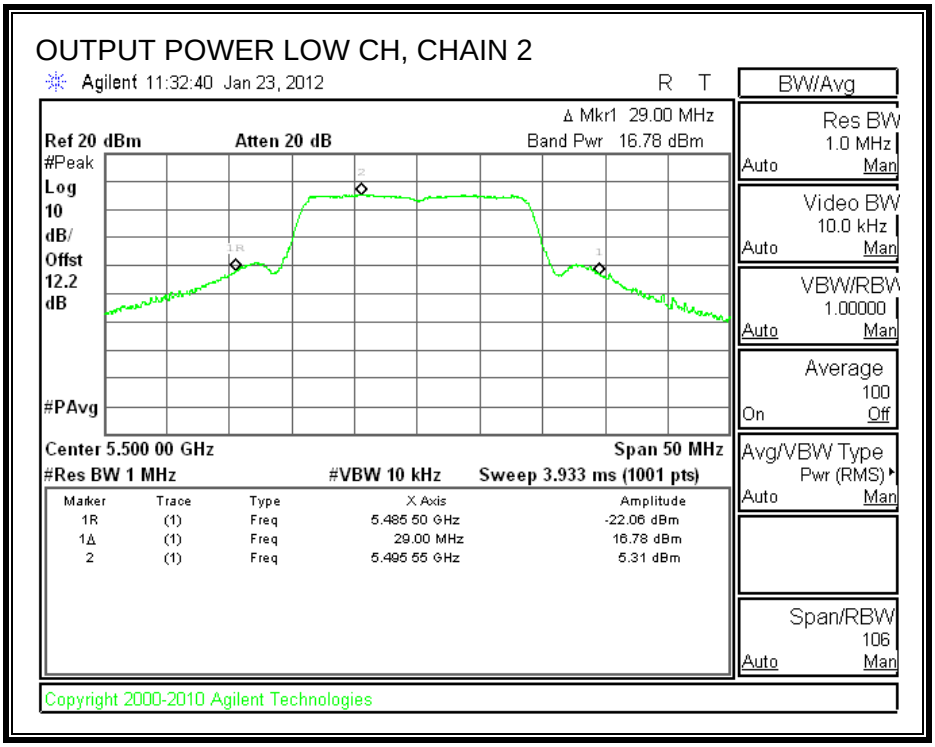
CHAIN 1 OUTPUT POWER

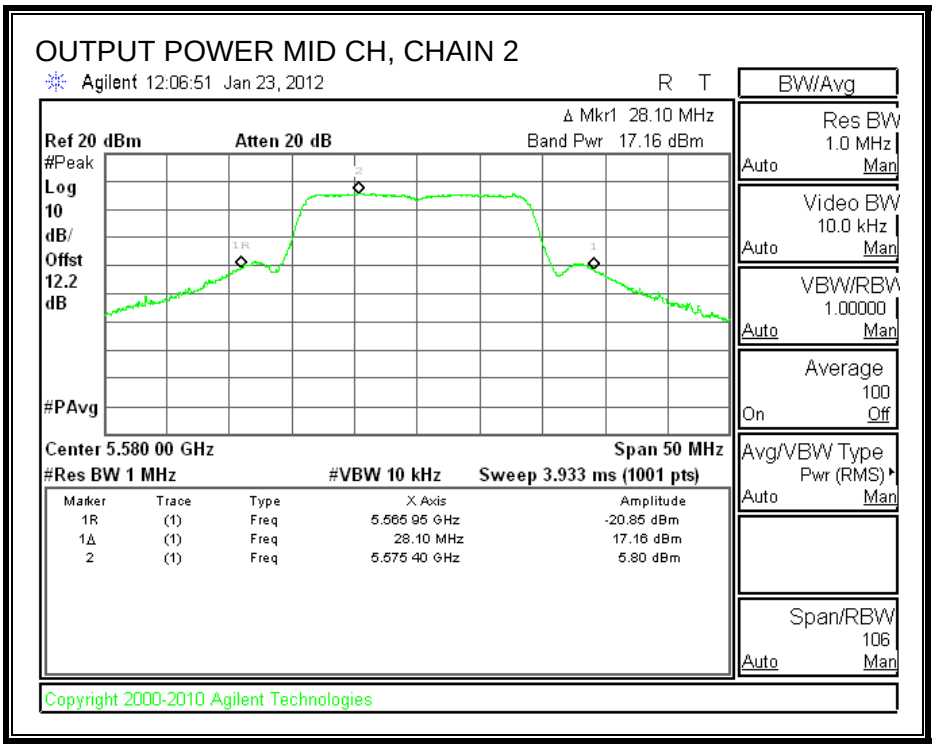


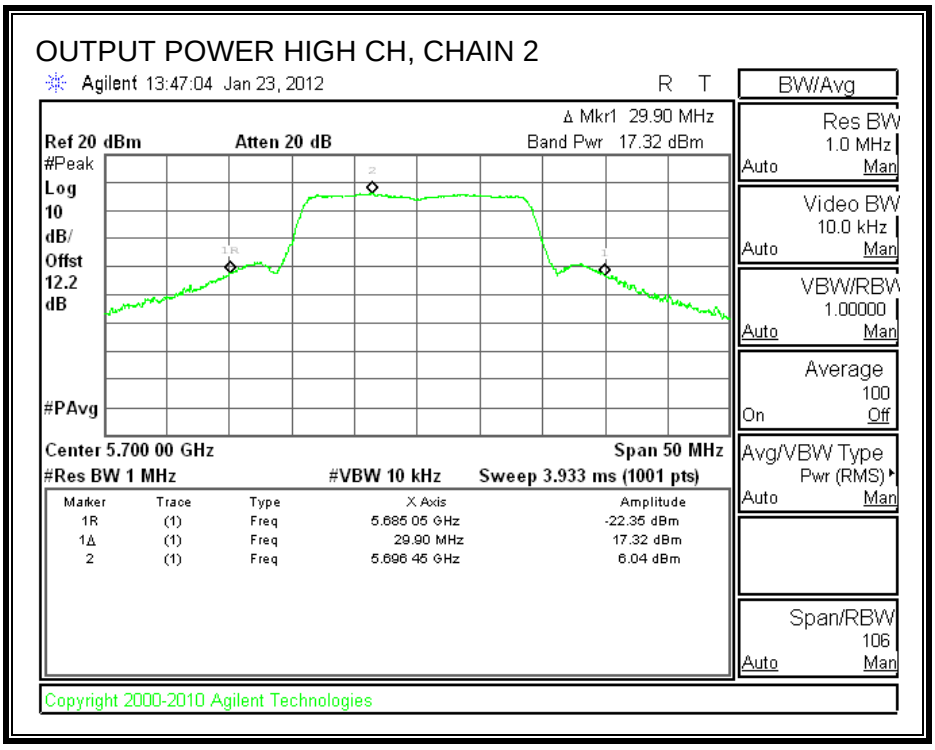




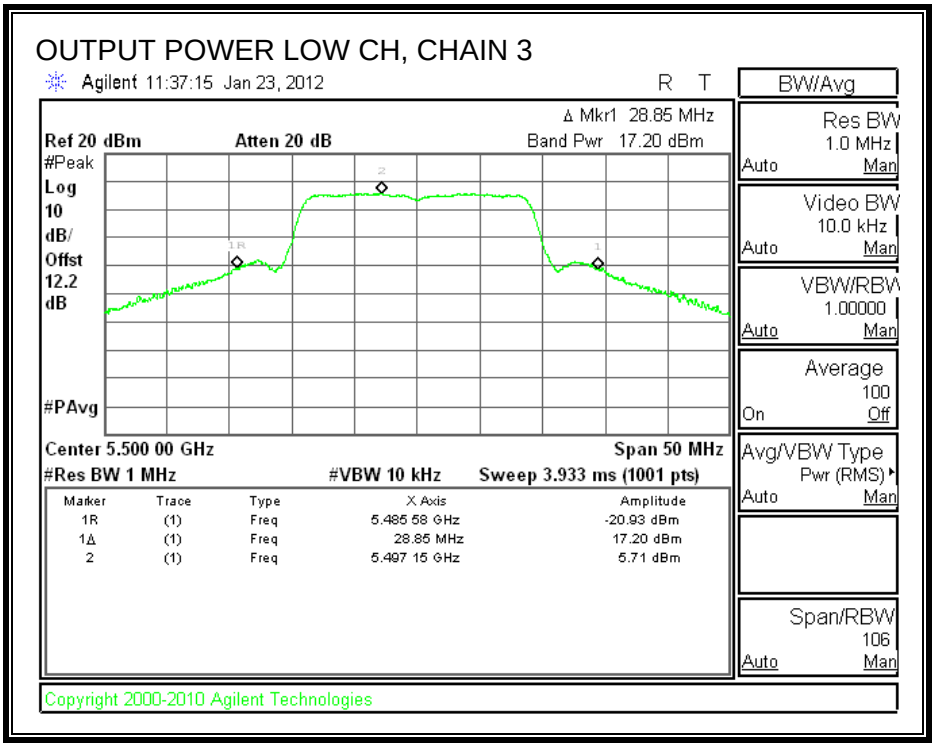
CHAIN 2 OUTPUT POWER

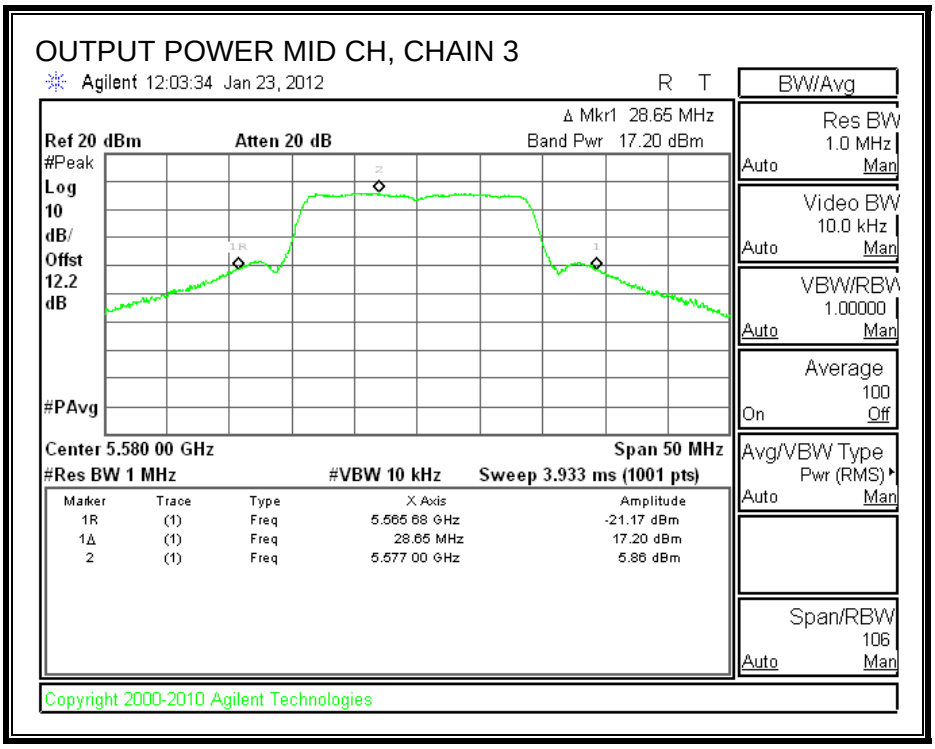


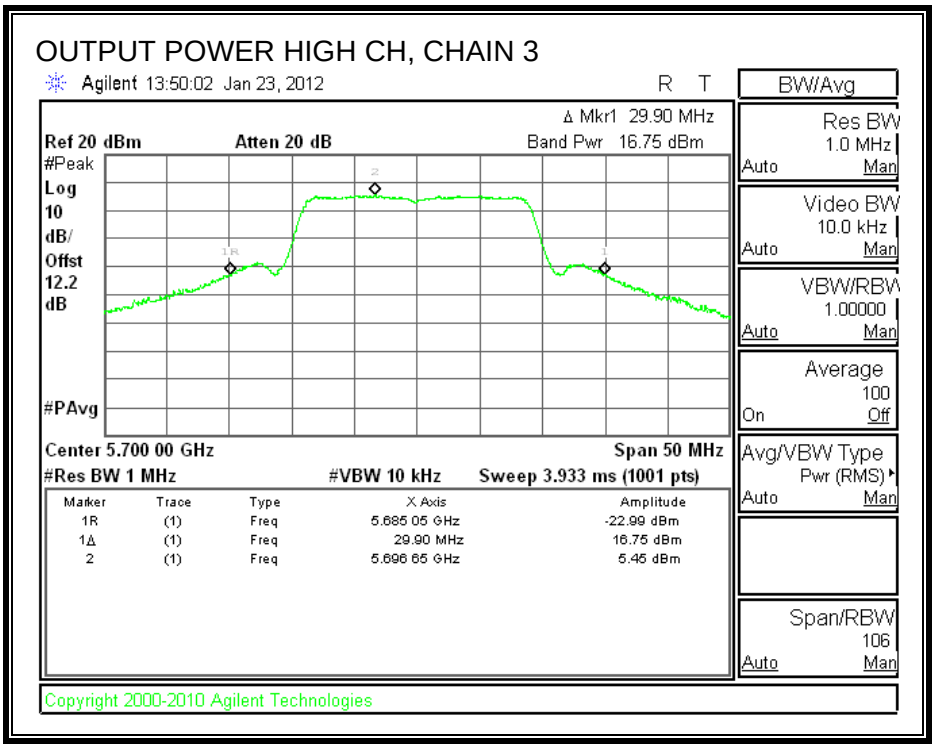




CHAIN 3 OUTPUT POWER







7.19.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5500	14.80	14.68	14.88	19.56
Middle	5580	14.68	14.74	14.72	19.48
High	5700	14.70	15.03	14.66	19.57

7.19.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.39 dBi, therefore the limit is 10.61 dBm.

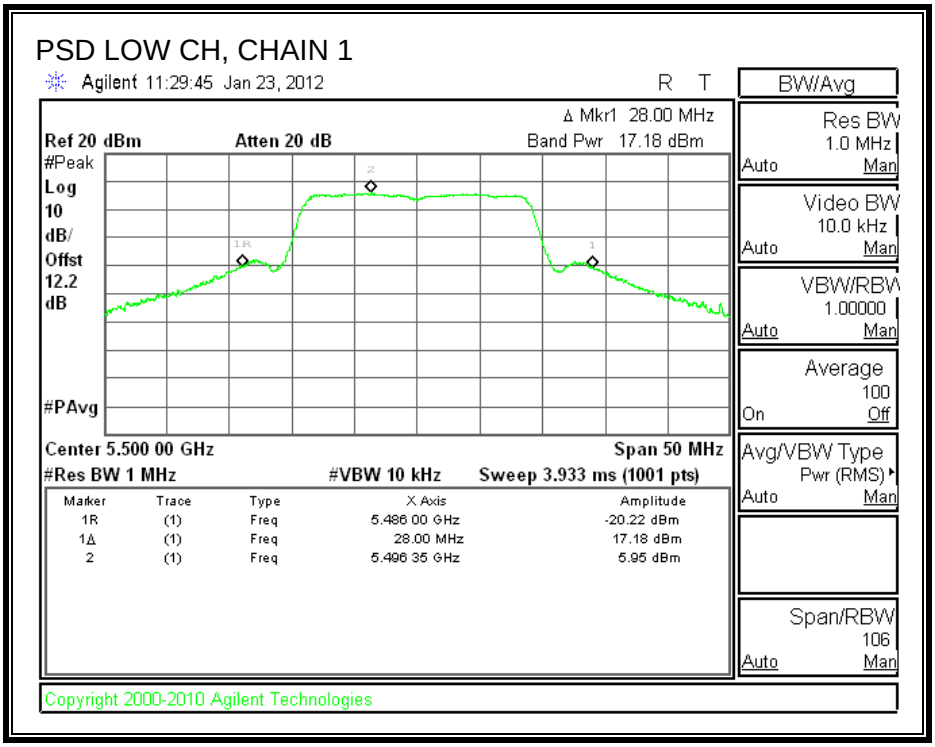
TEST PROCEDURE

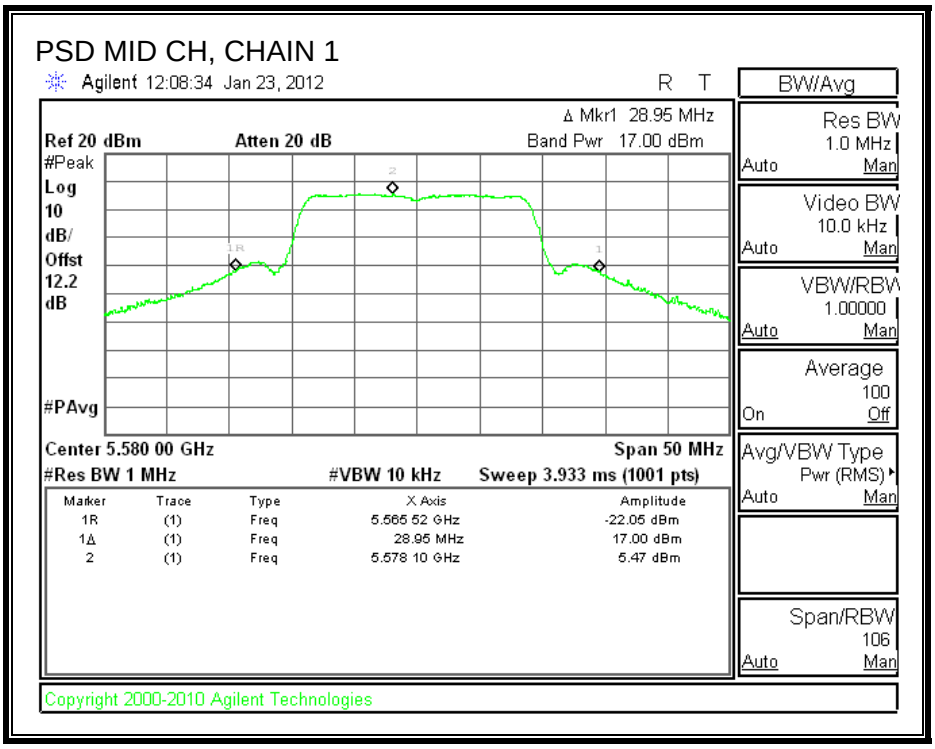
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

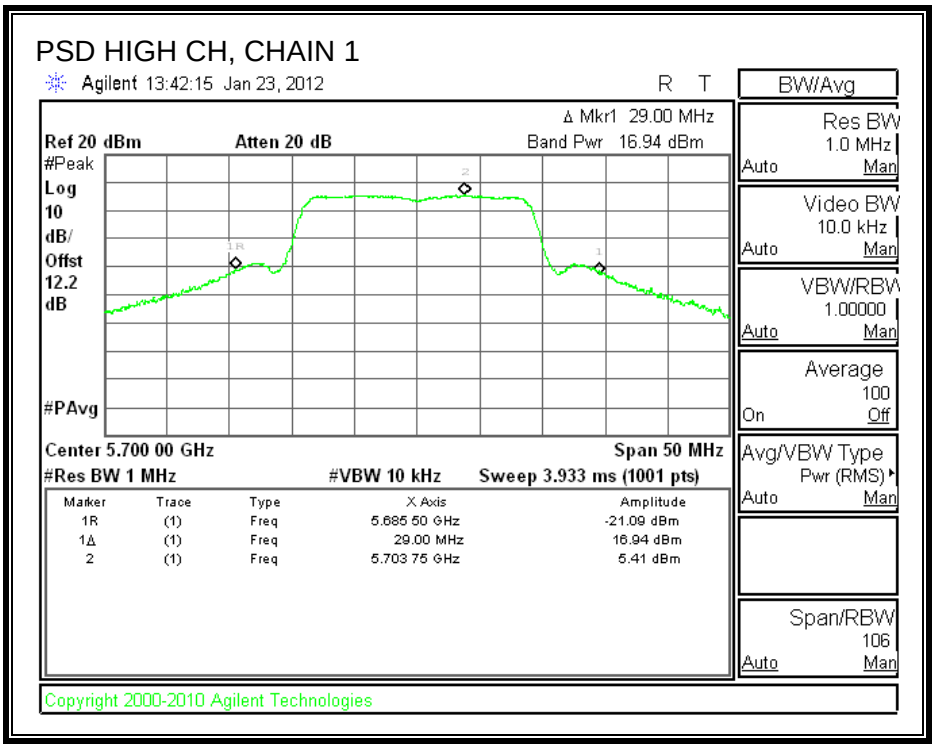
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5500	5.95	5.31	5.71	10.44	10.61	-0.17
Middle	5580	5.47	5.80	5.86	10.48	10.61	-0.13
High	5700	5.41	6.04	5.45	10.41	10.61	-0.20

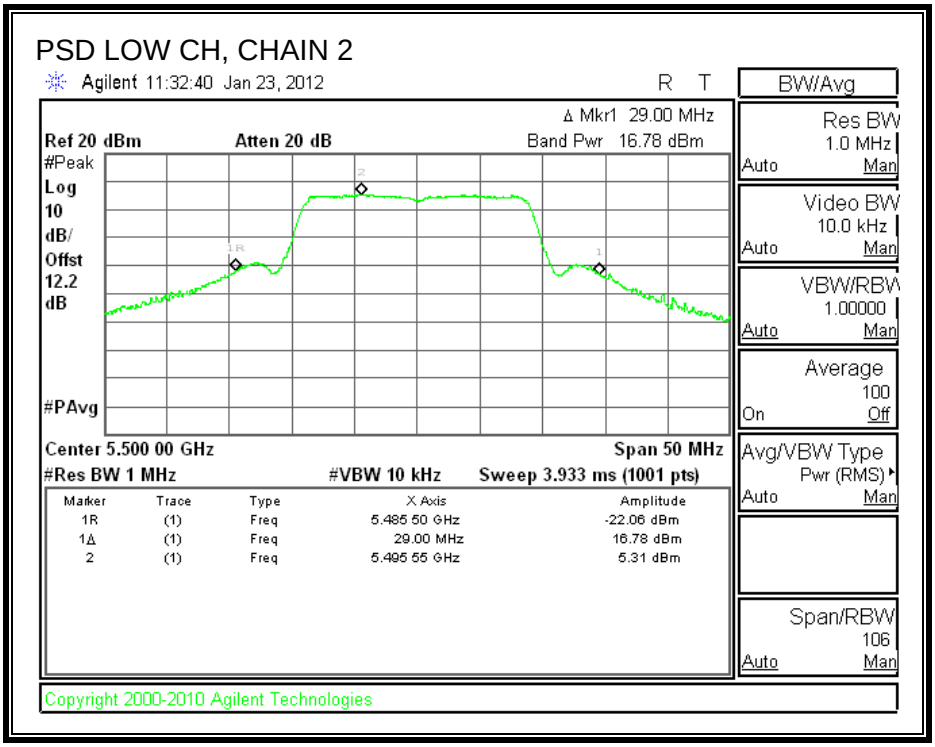
CHAIN 1 POWER SPECTRAL DENSITY

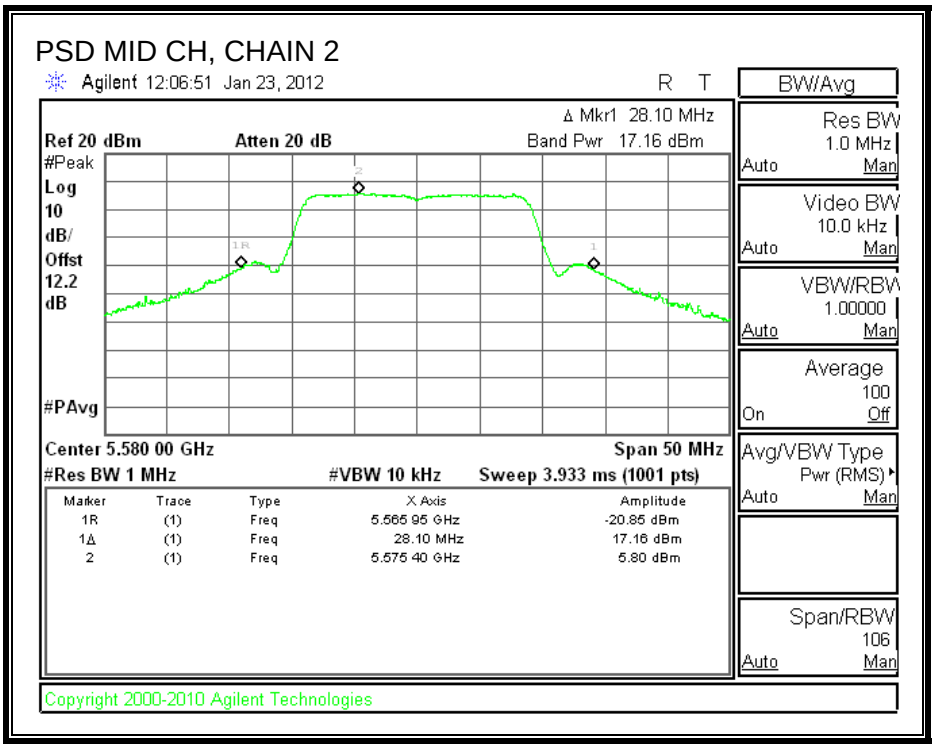


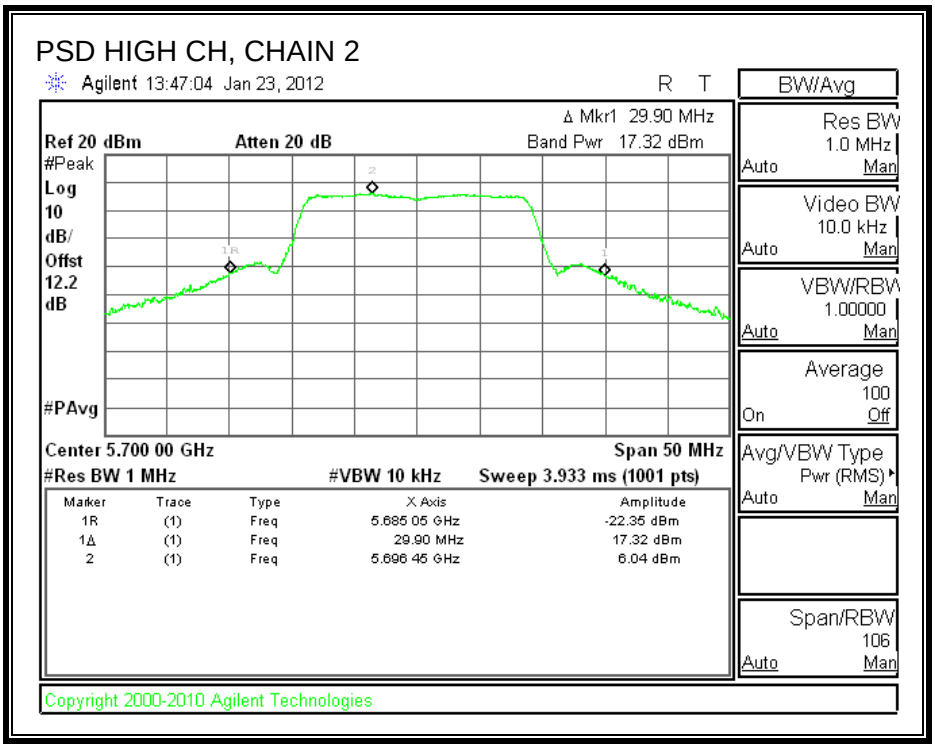




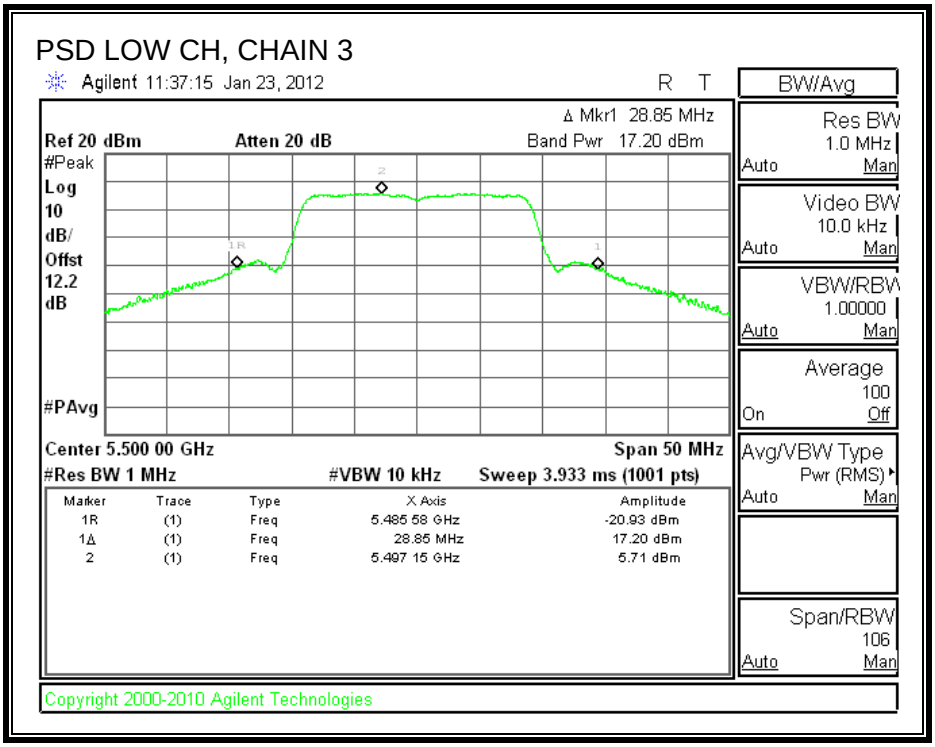
CHAIN 2 POWER SPECTRAL DENSITY

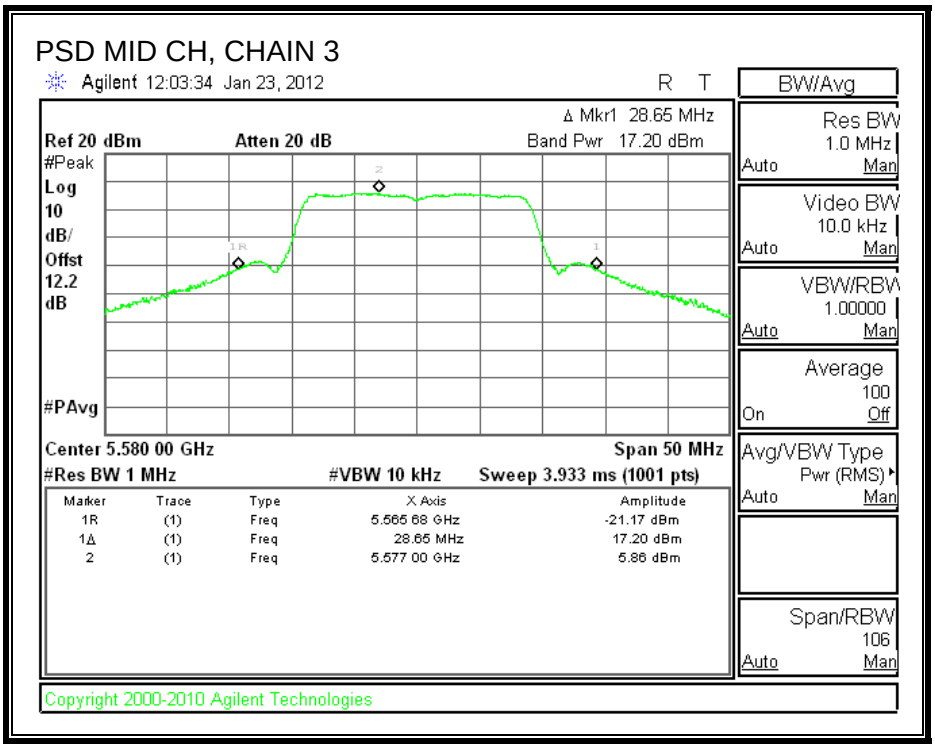


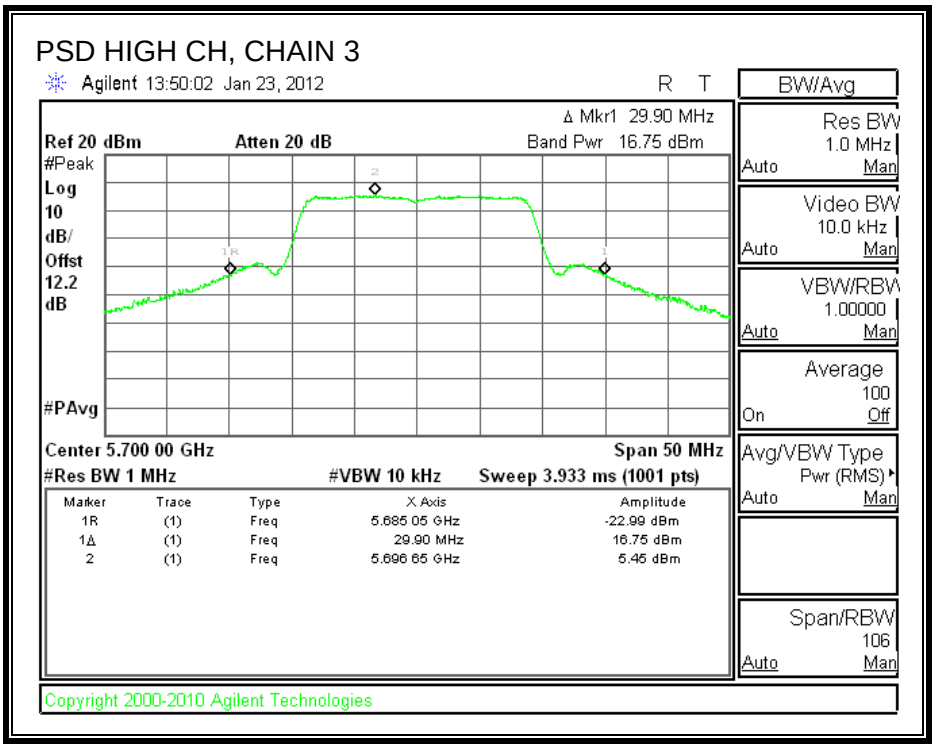




CHAIN 3 POWER SPECTRAL DENSITY







7.19.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	7.08	13	-5.92
Middle	5580	7.04	13	-5.96
High	5700	6.80	13	-6.20

CHAIN 2

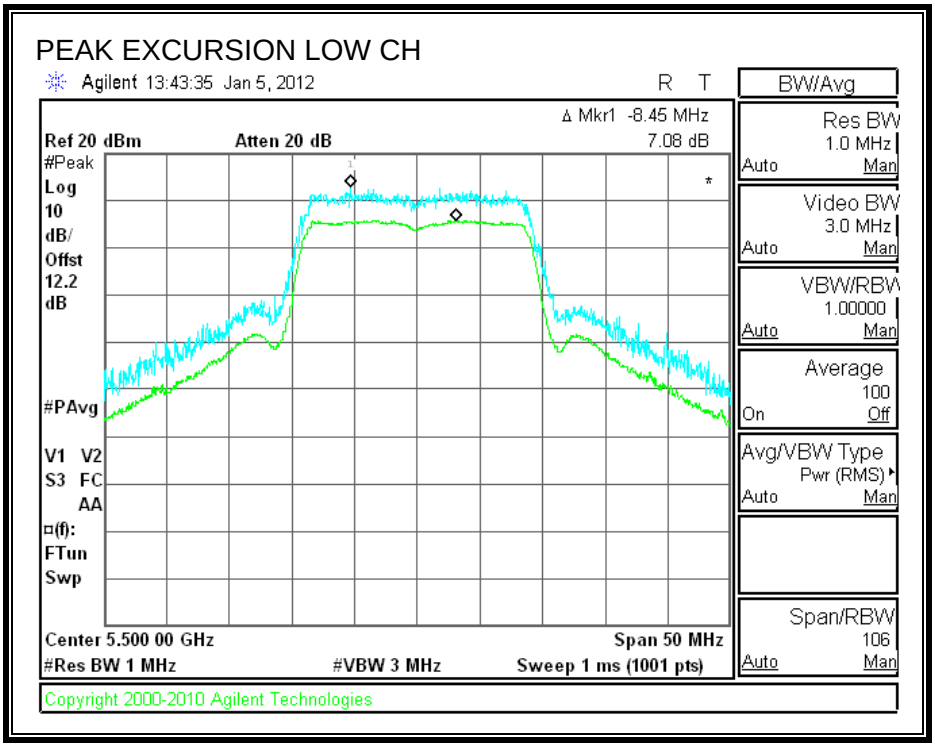
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	6.20	13	-6.80
Middle	5580	7.17	13	-5.83
High	5700	6.78	13	-6.22

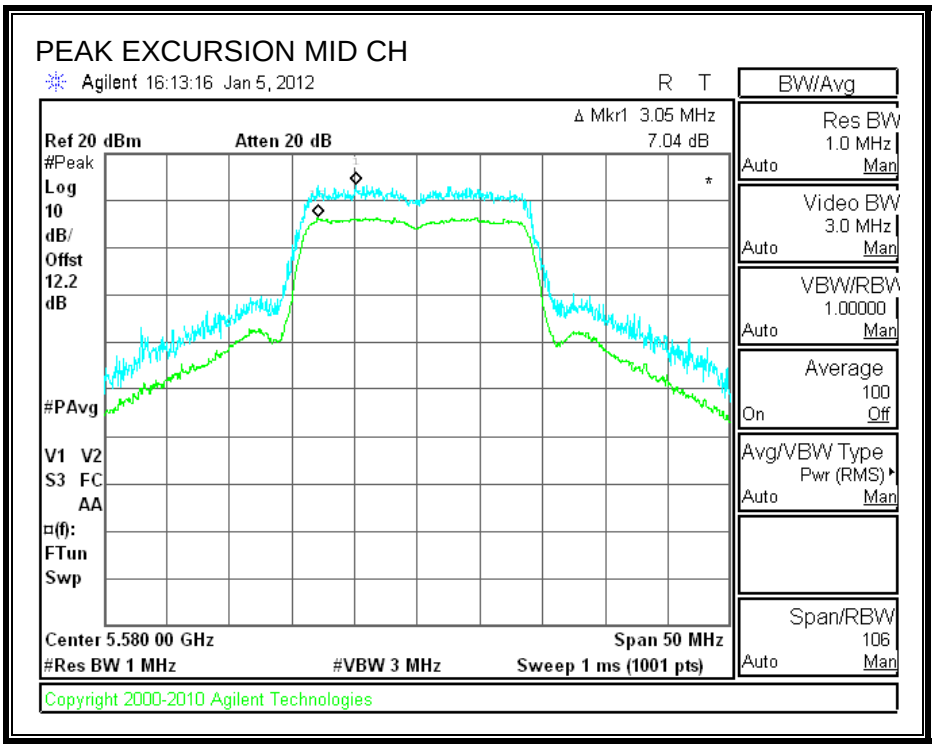
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	5.99	13	-7.01
Middle	5580	7.09	13	-5.91
High	5700	6.53	13	-6.47

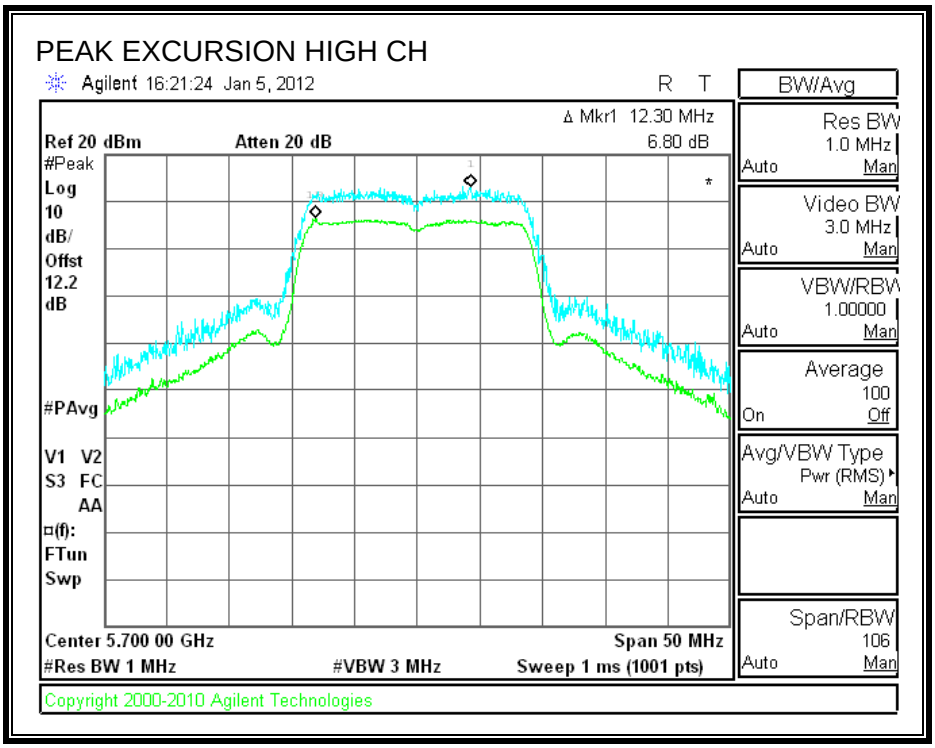
CHAIN 1

PEAK EXCURSION



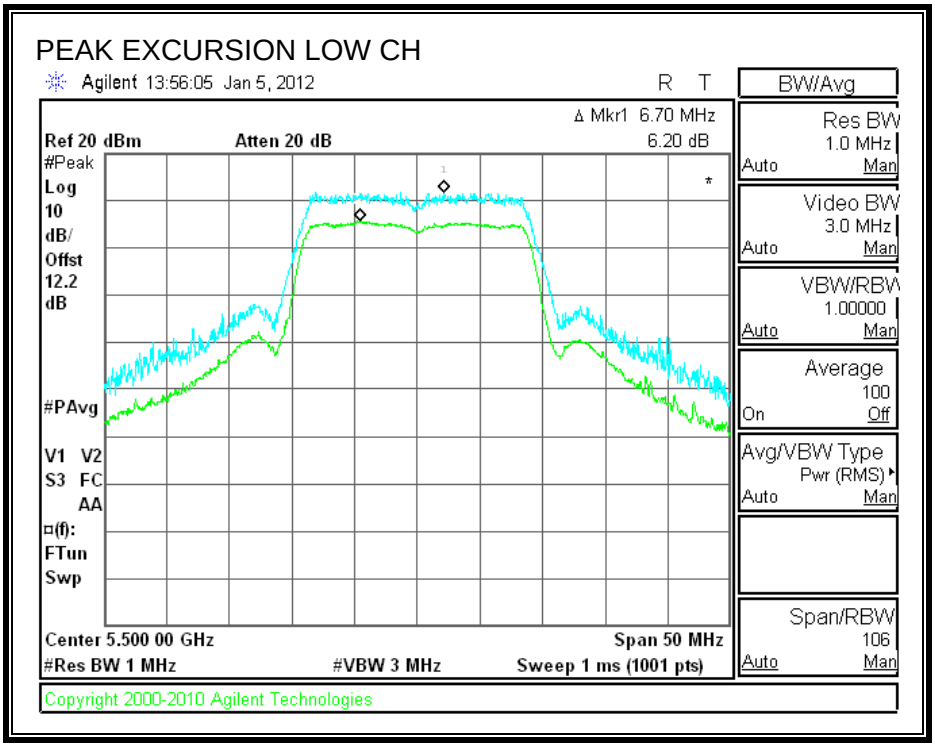


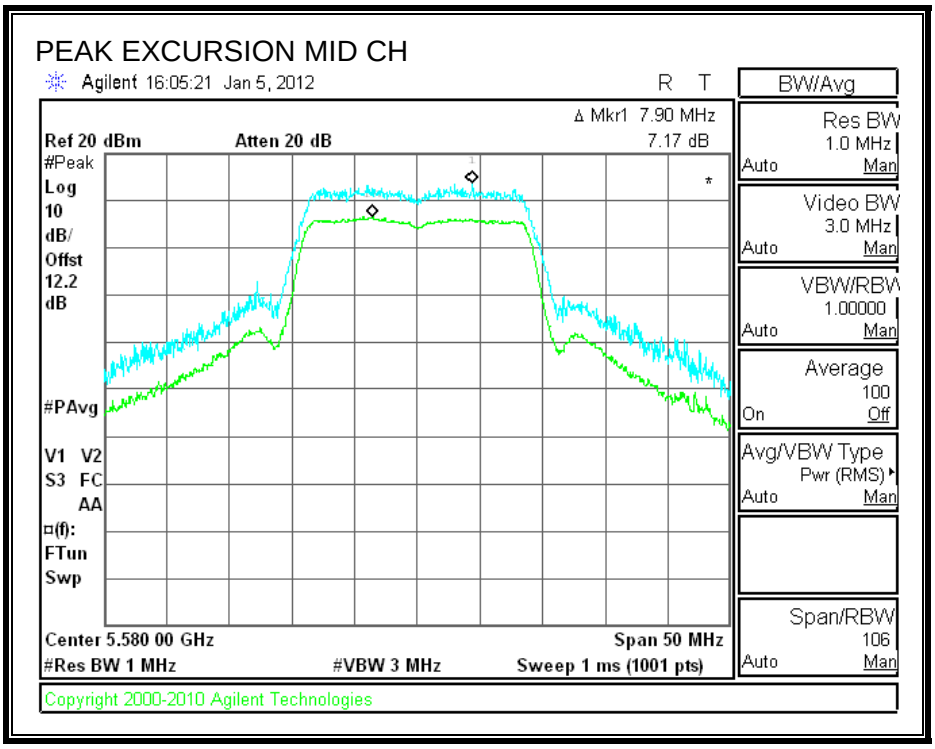
PEAK EXCURSION HIGH CH



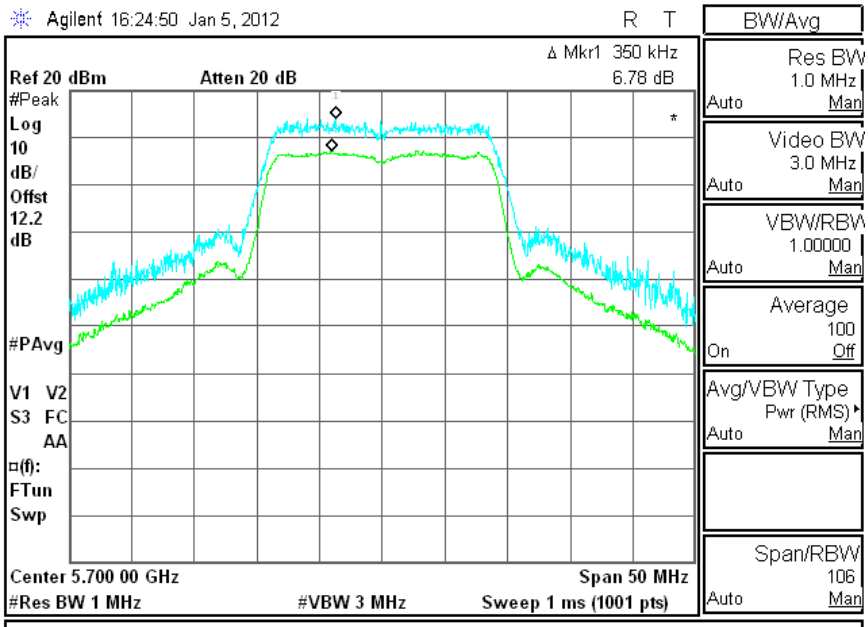
CHAIN 2

PEAK EXCURSION



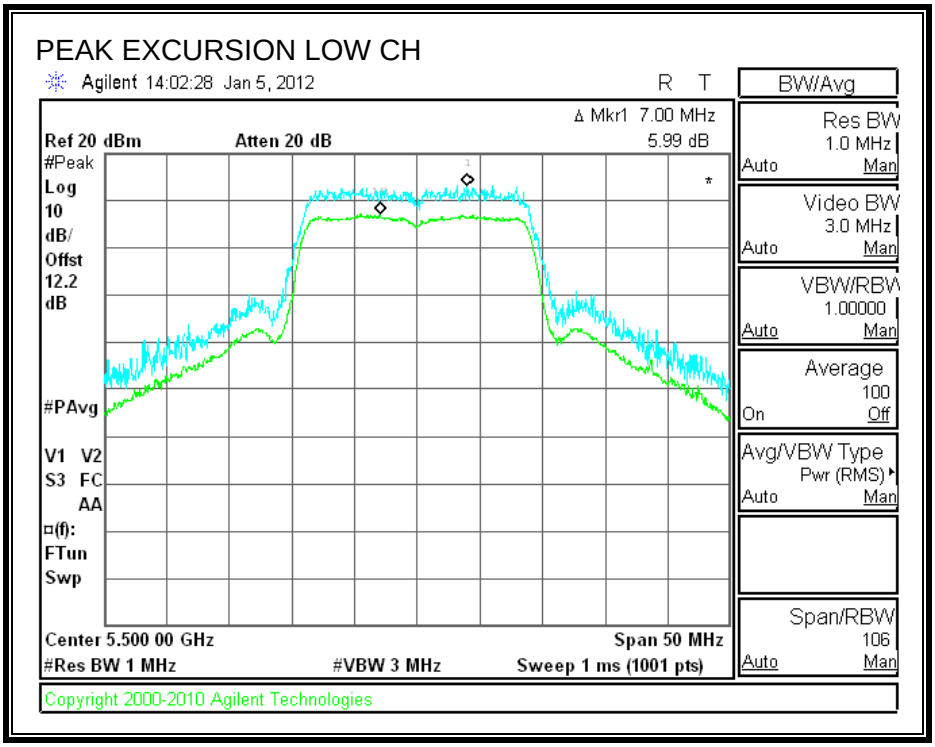


PEAK EXCURSION HIGH CH

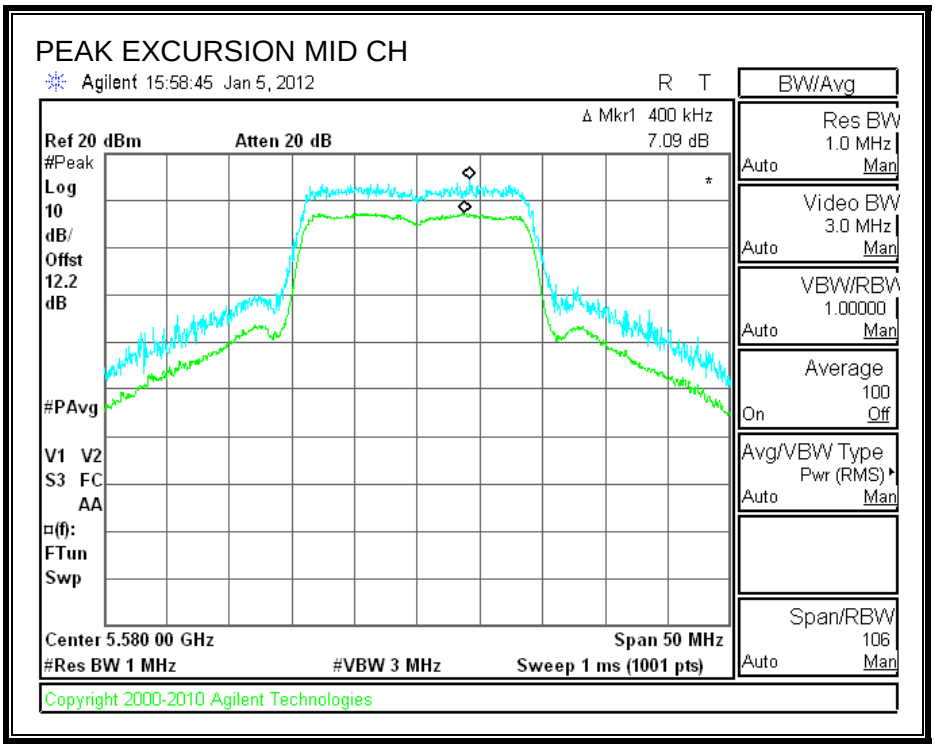


CHAIN 3

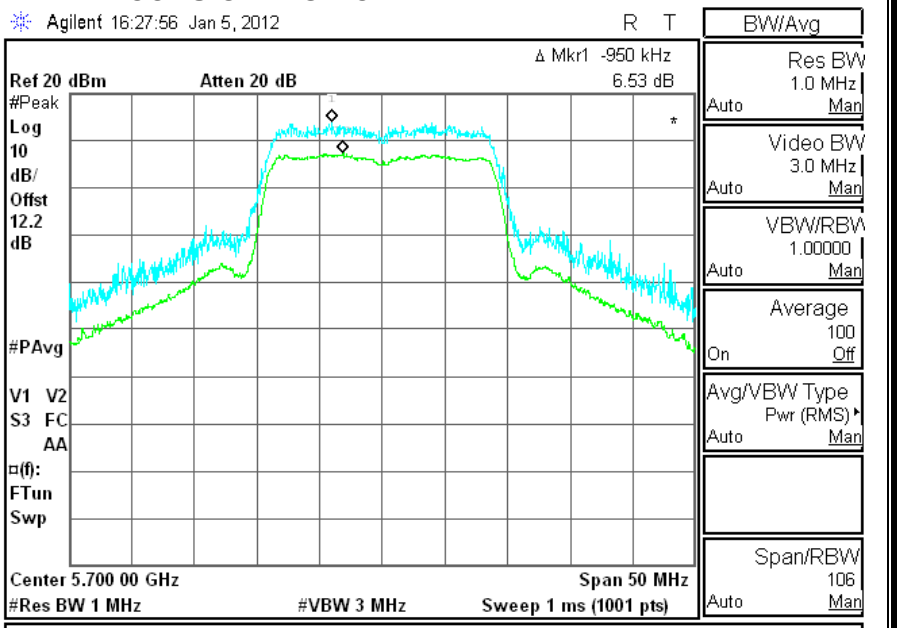
PEAK EXCURSION



PEAK EXCURSION MID CH



PEAK EXCURSION HIGH CH



7.20. 802.11n HT40 3TX MODE IN THE 5.6 GHz BAND, CDD MCS0

7.20.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	40.17	36.2118
Middle	5550	40.17	36.2082
High	5670	40.17	36.2654

CHAIN 2

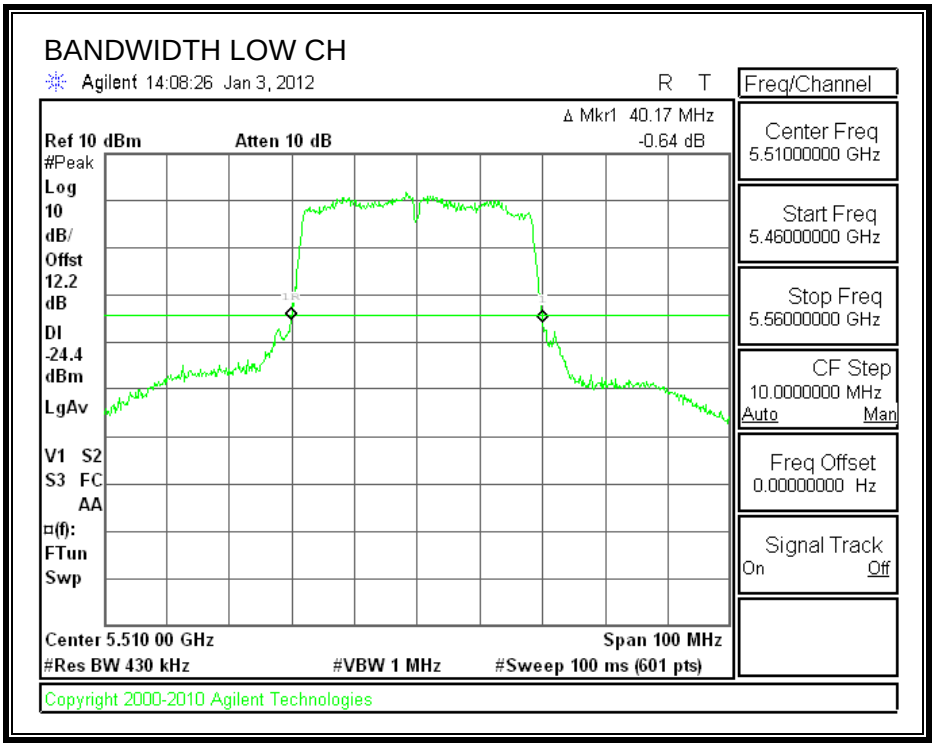
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	39.83	36.2876
Middle	5550	39.50	36.3115
High	5670	39.67	36.3077

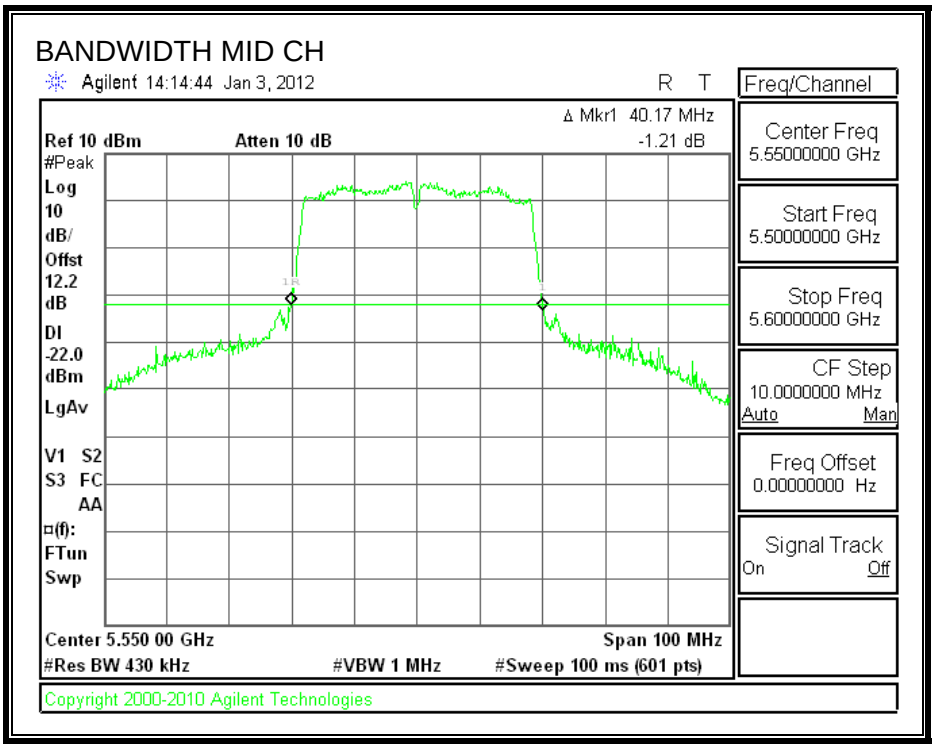
CHAIN 3

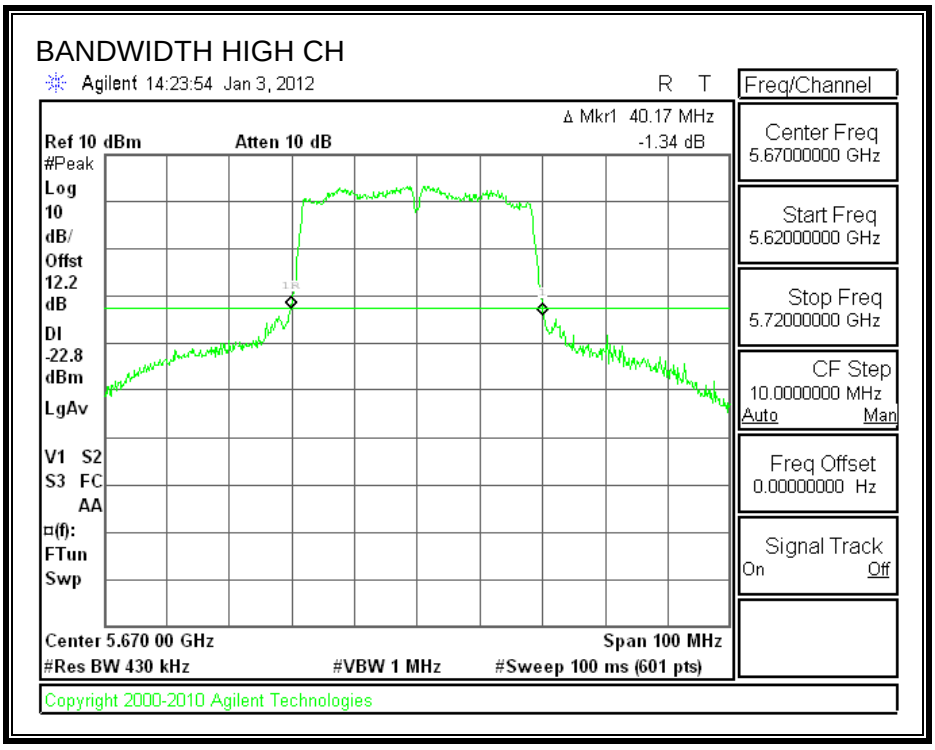
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	39.83	36.2117
Middle	5550	39.83	36.2285
High	5670	39.67	36.2619

CHAIN 1

26 dB BANDWIDTH

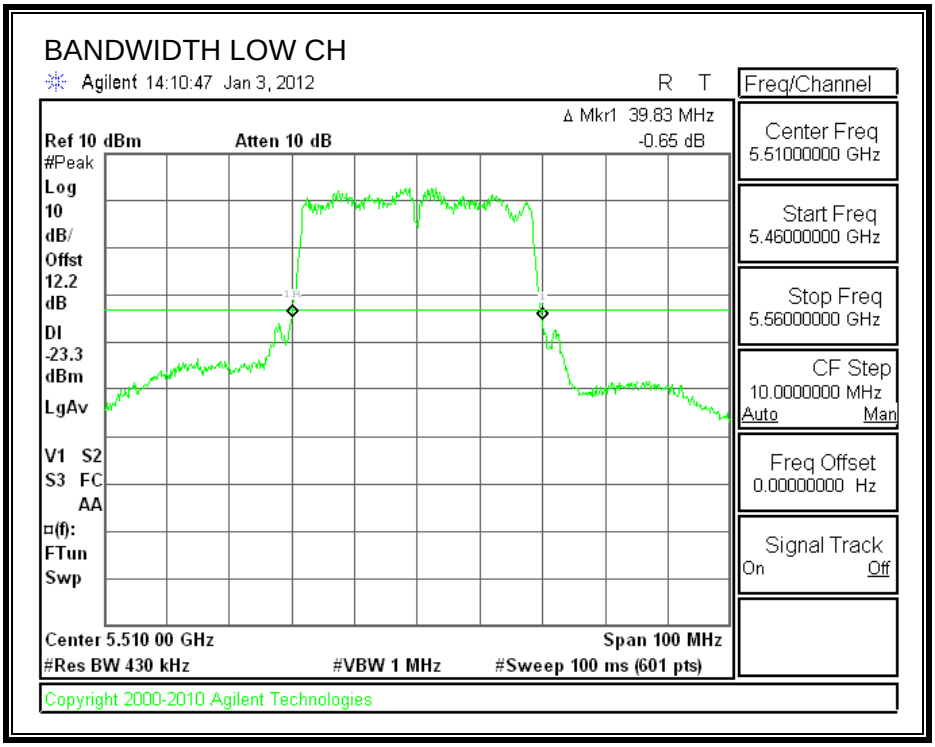


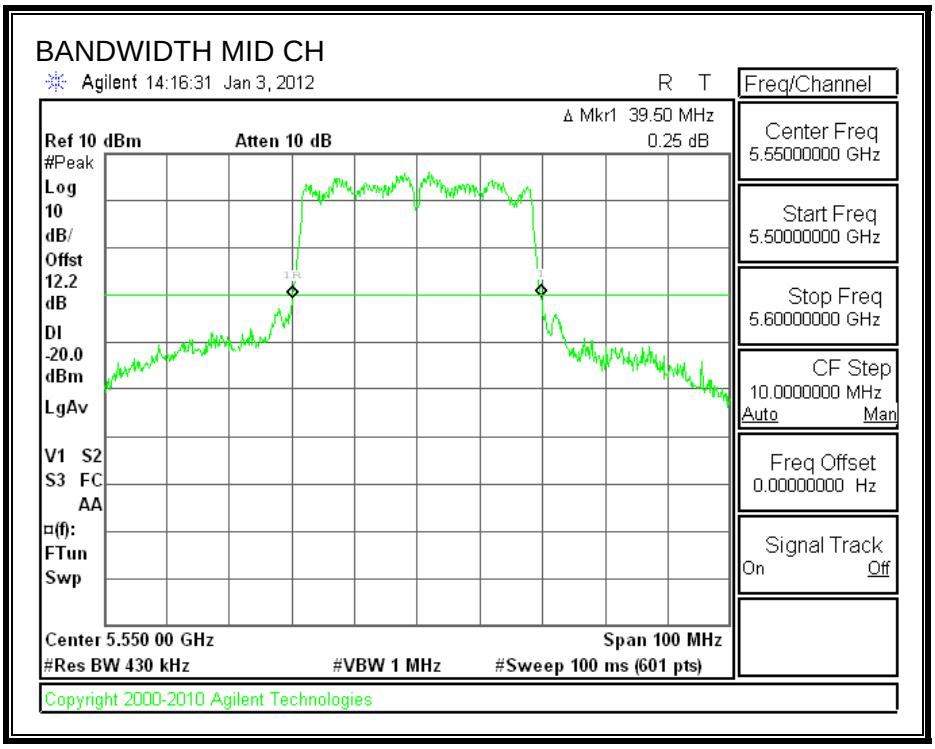




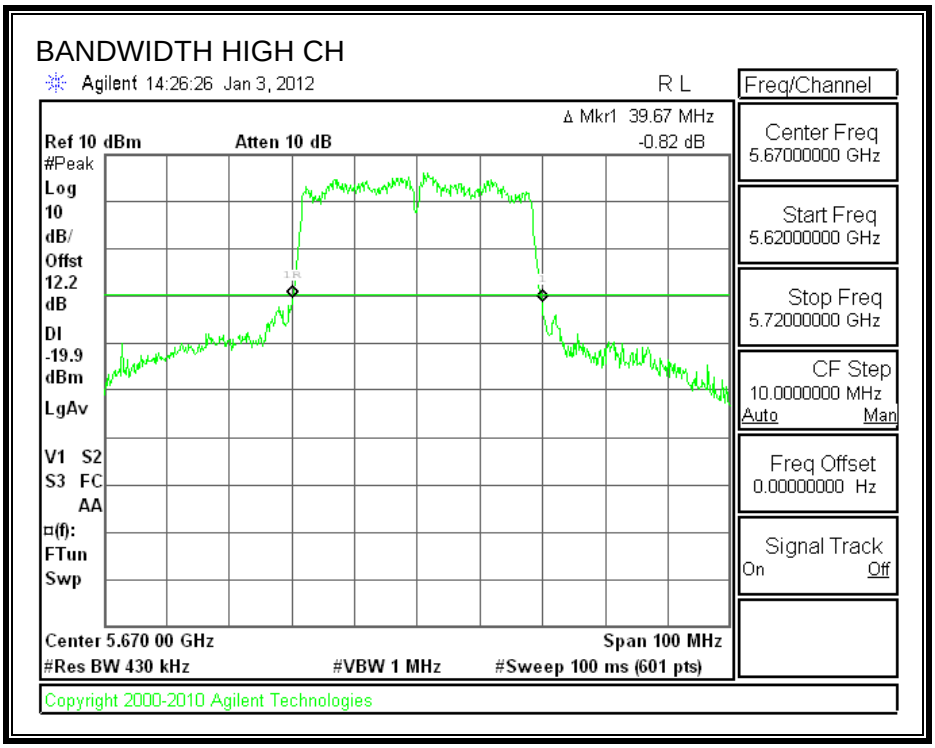
CHAIN 2

26 dB BANDWIDTH



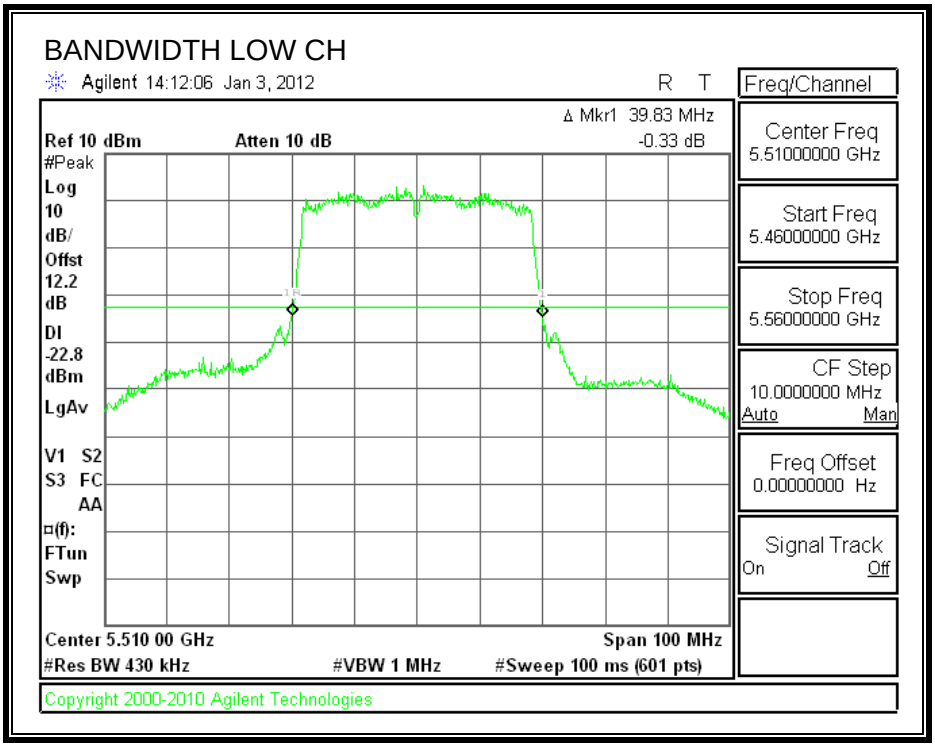


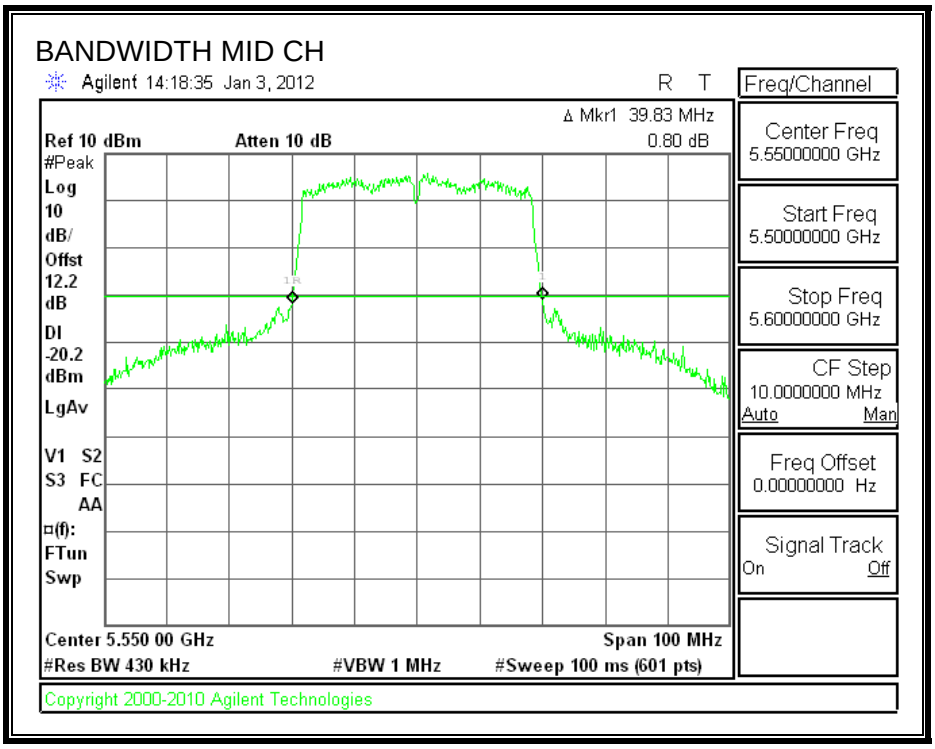
BANDWIDTH HIGH CH



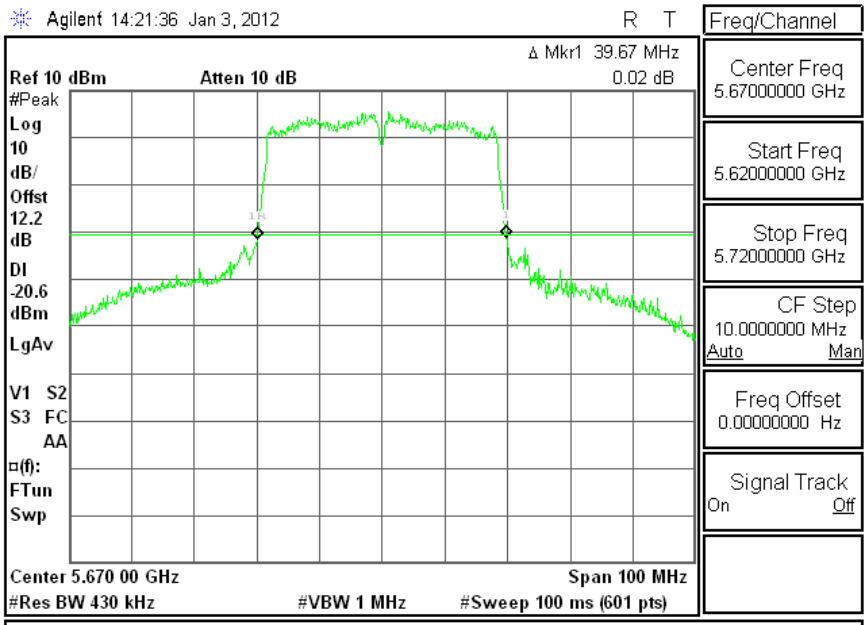
CHAIN 3

26 dB BANDWIDTH



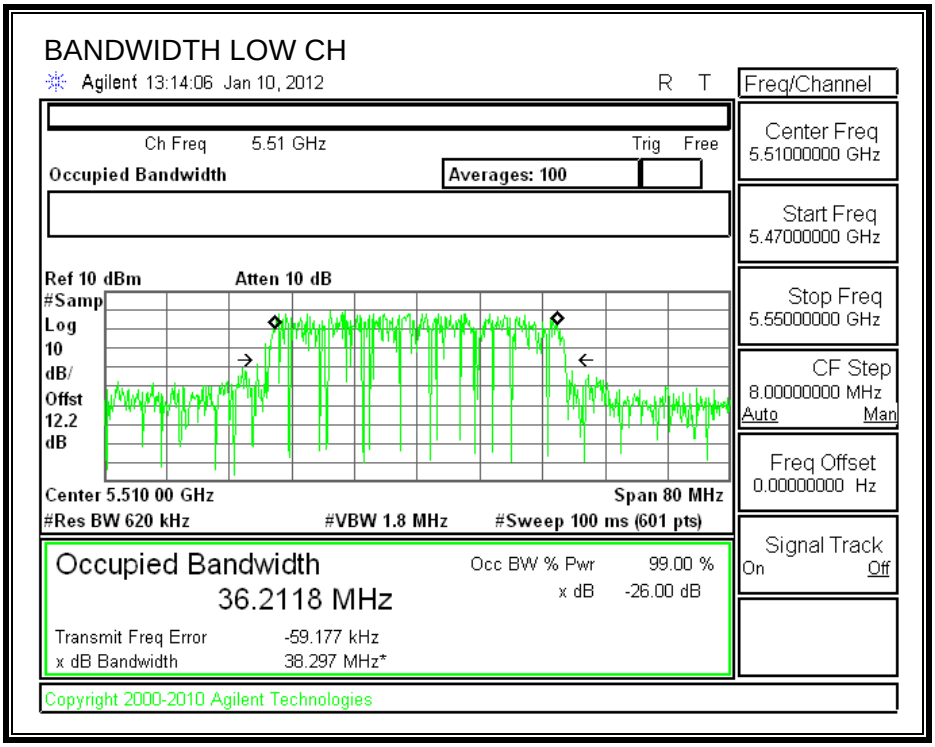


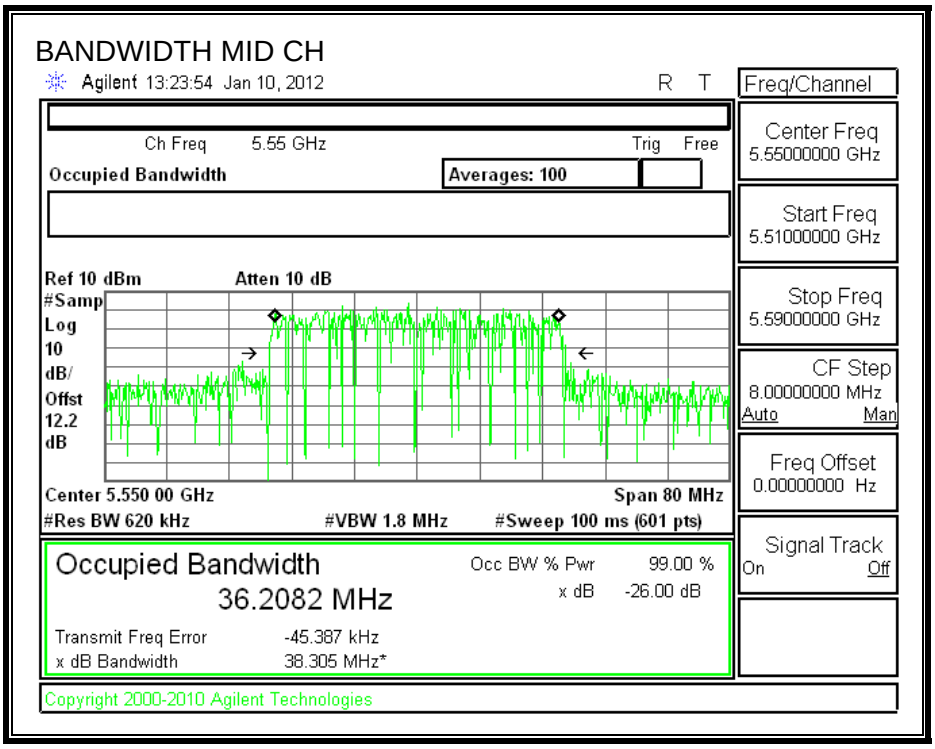
BANDWIDTH HIGH CH

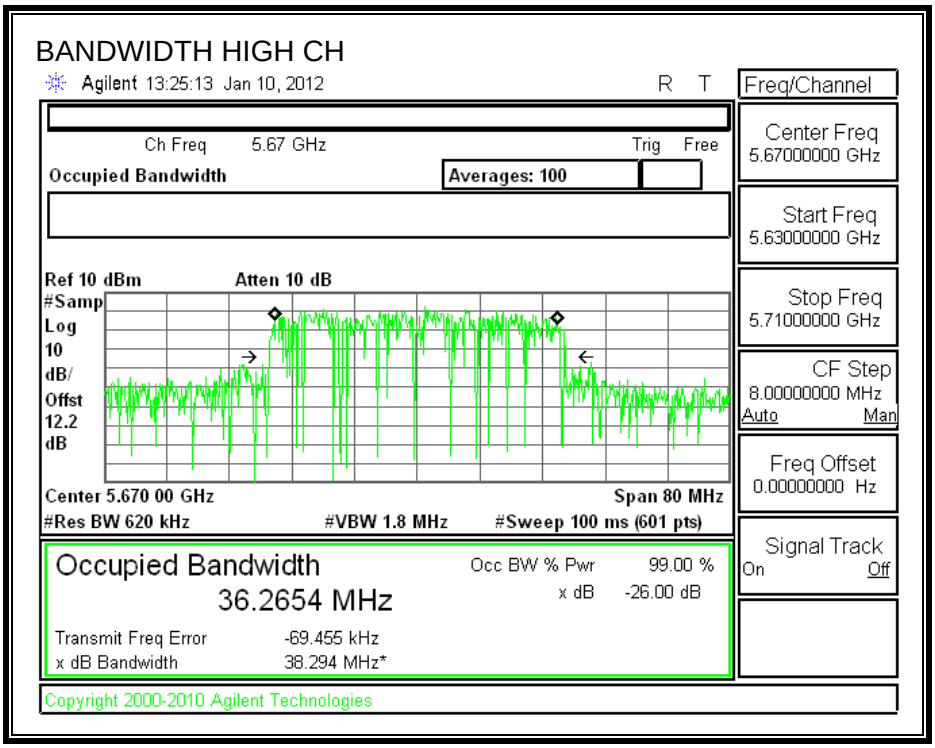


CHAIN 1

99% BANDWIDTH

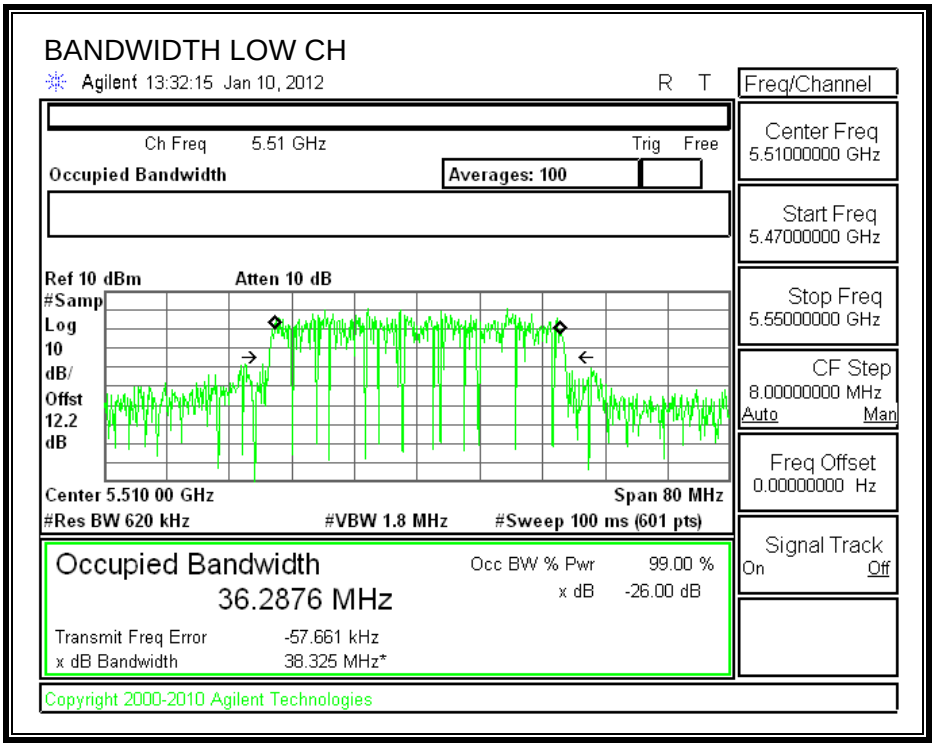


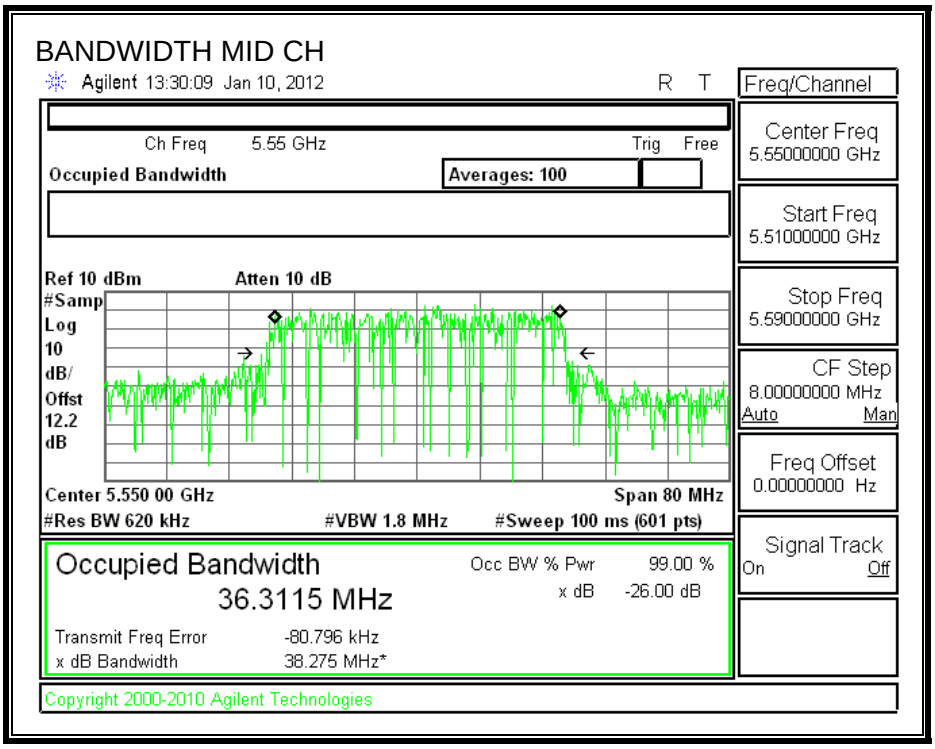


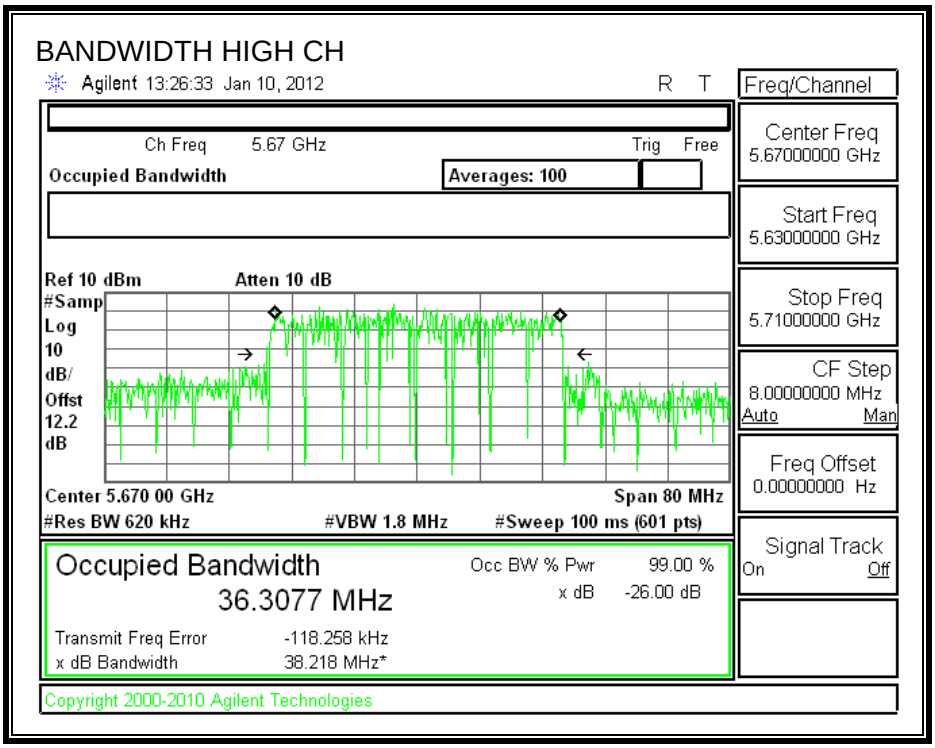


CHAIN 2

99% BANDWIDTH

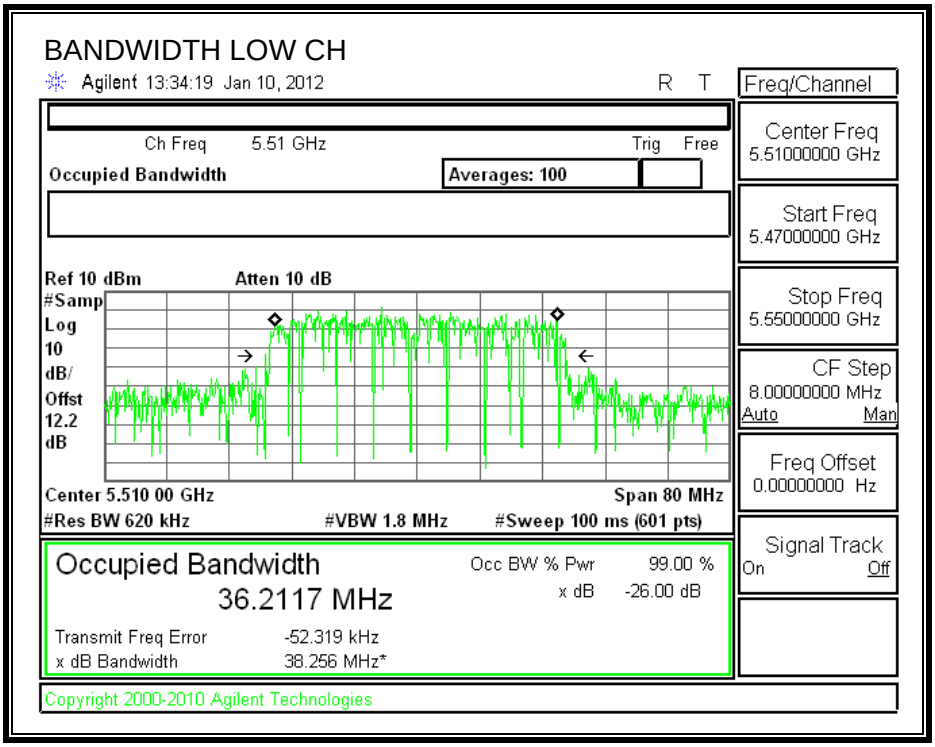


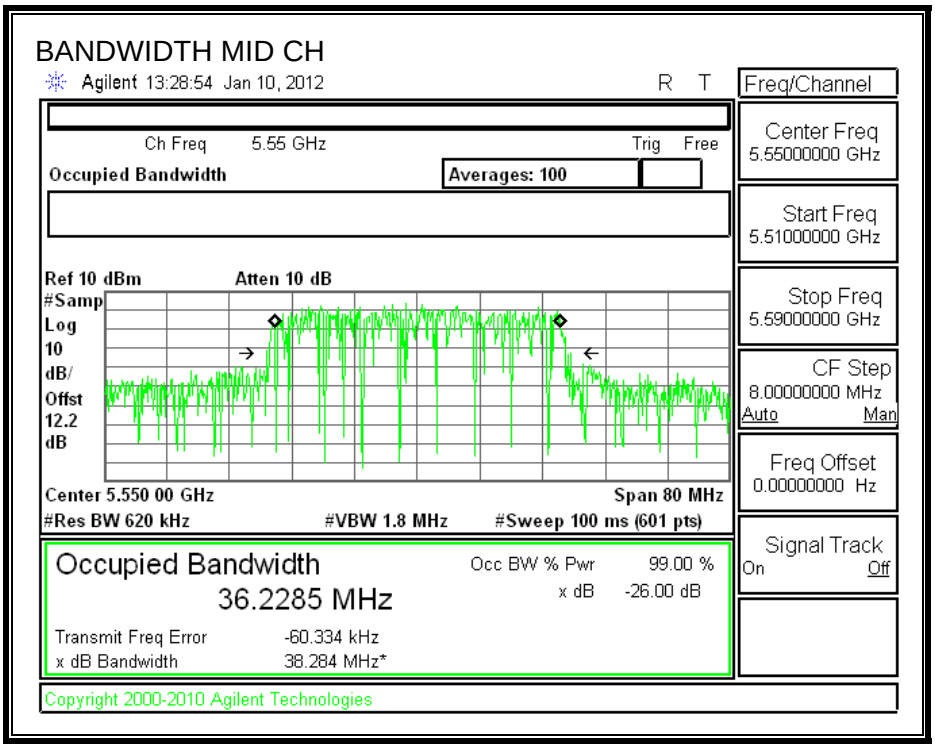


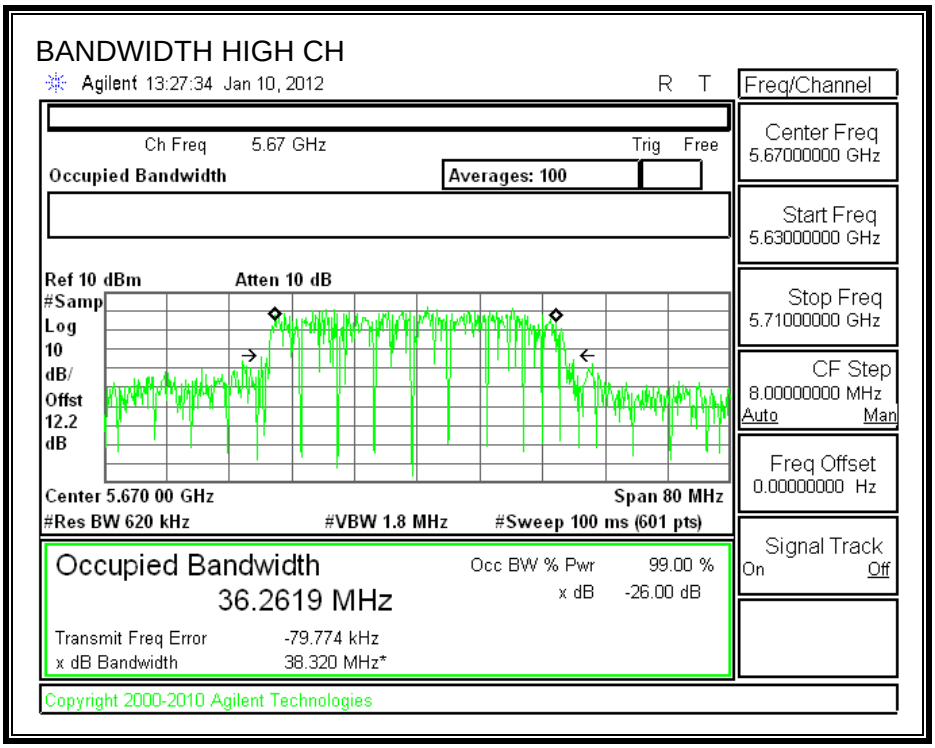


CHAIN 3

99% BANDWIDTH







7.20.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
4.07	6.39	4.09	9.76

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

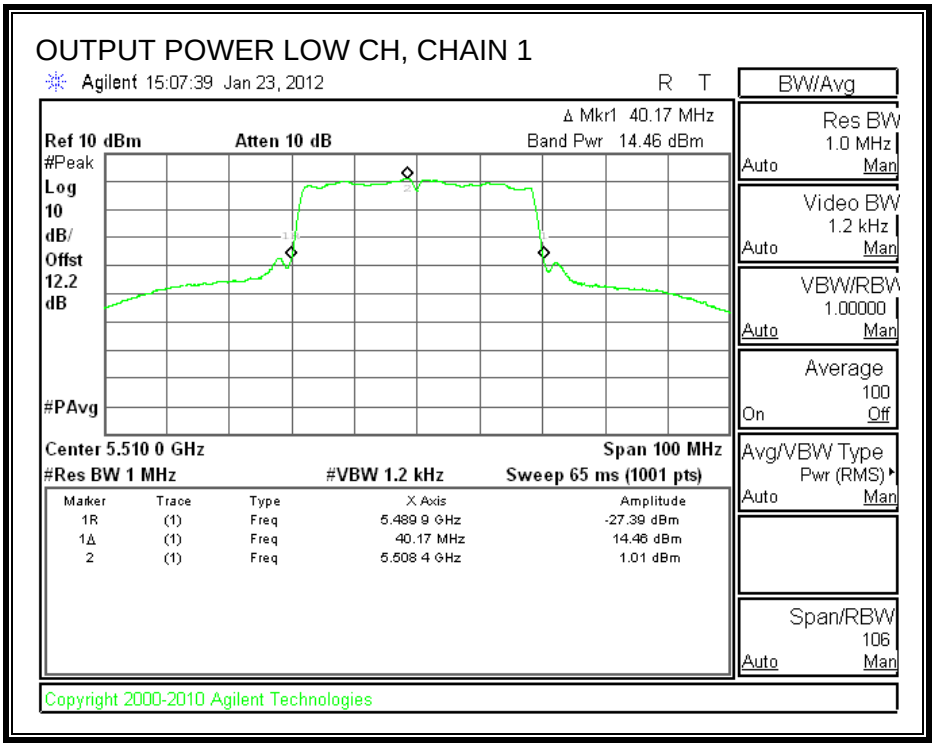
Limit

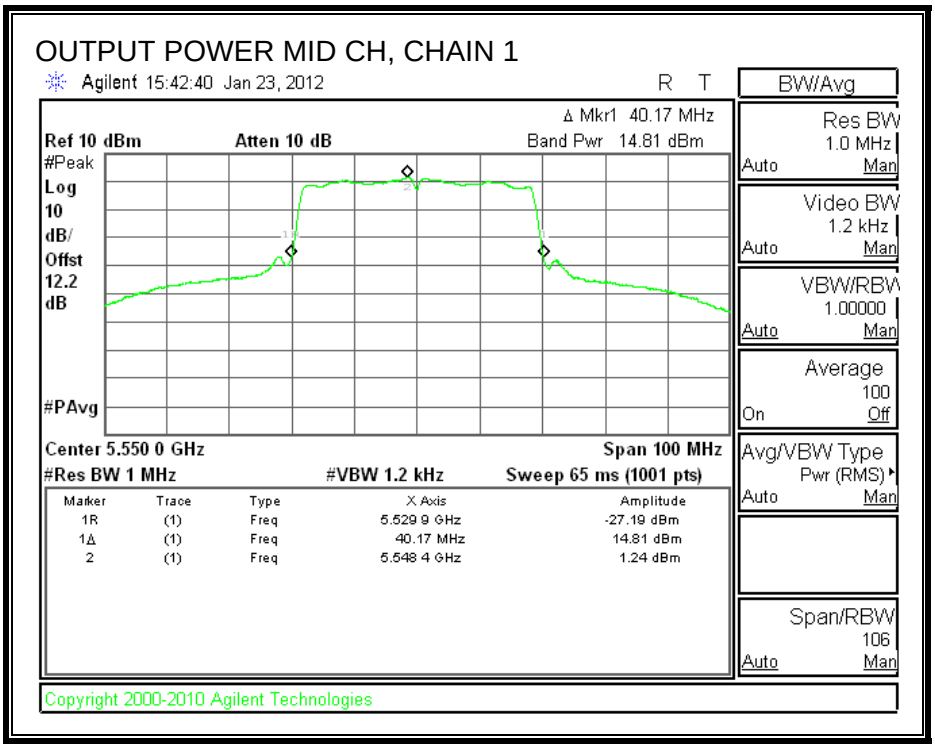
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	23.98	39.83	27.00	9.76	20.22
Mid	5550	23.98	39.50	26.97	9.76	20.22
High	5670	23.98	39.67	26.98	9.76	20.22

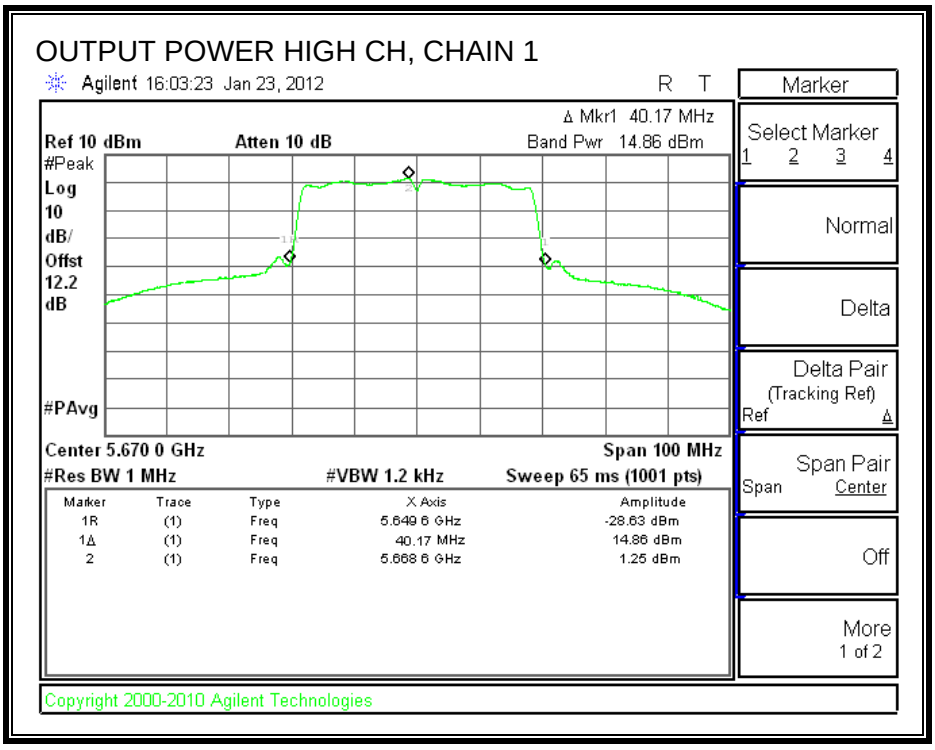
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	14.46	14.68	14.53	19.33	20.22	-0.89
Mid	5550	14.81	14.85	14.24	19.41	20.22	-0.81
High	5670	14.86	14.98	14.55	19.57	20.22	-0.65

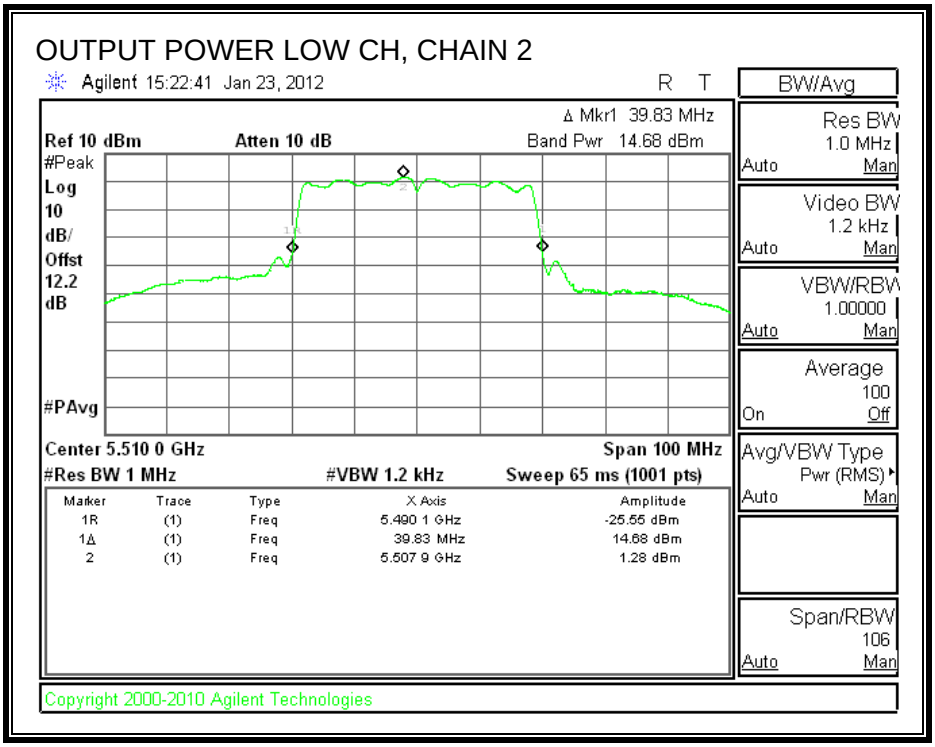
CHAIN 1 OUTPUT POWER

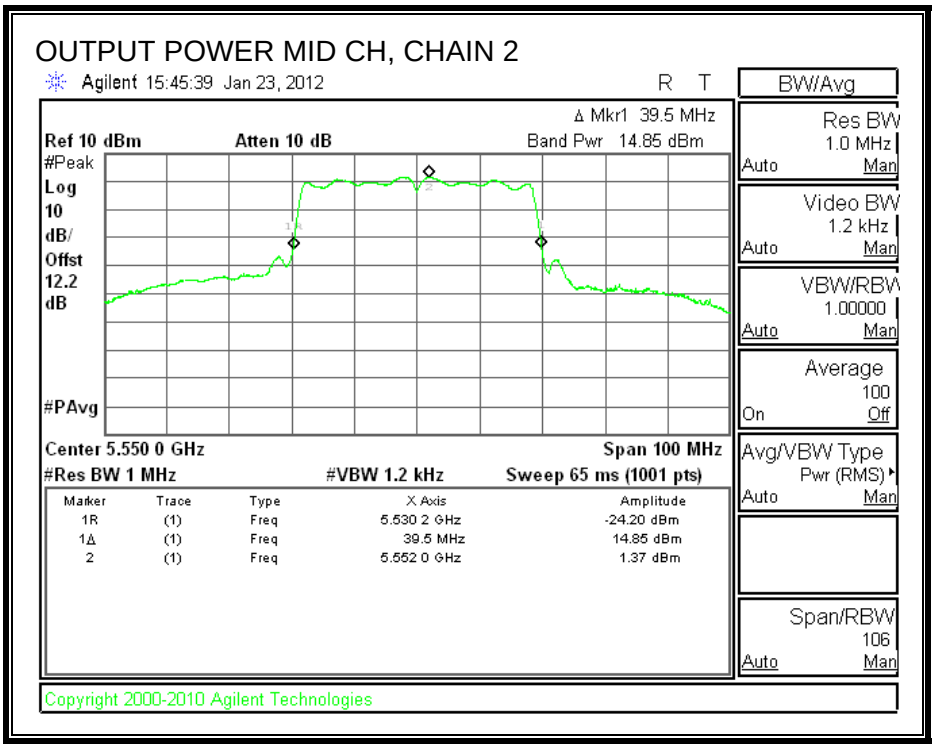


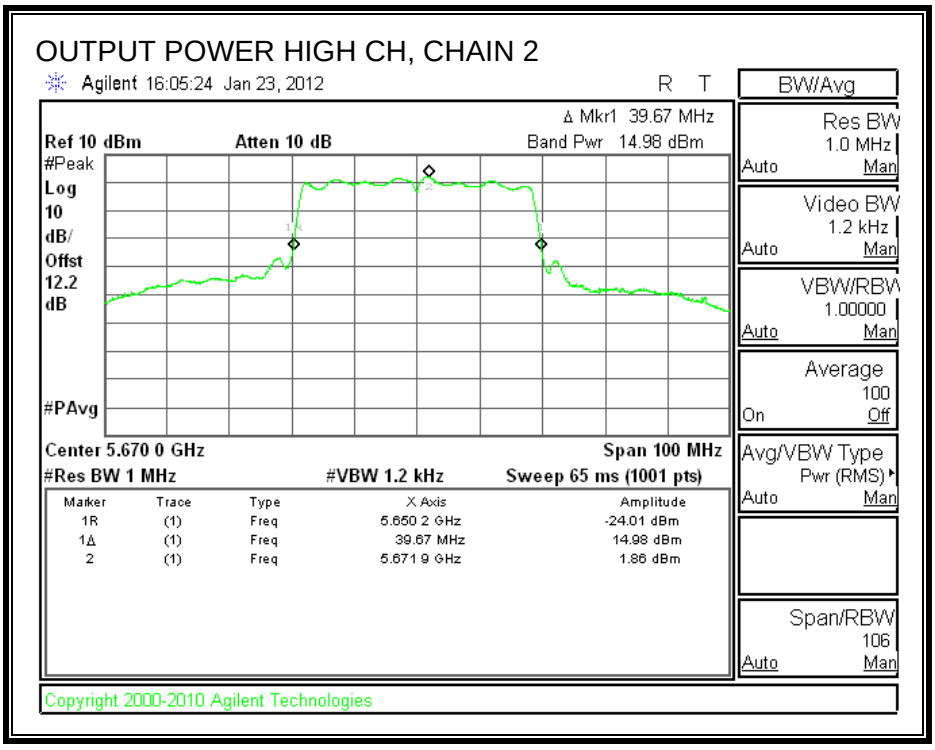




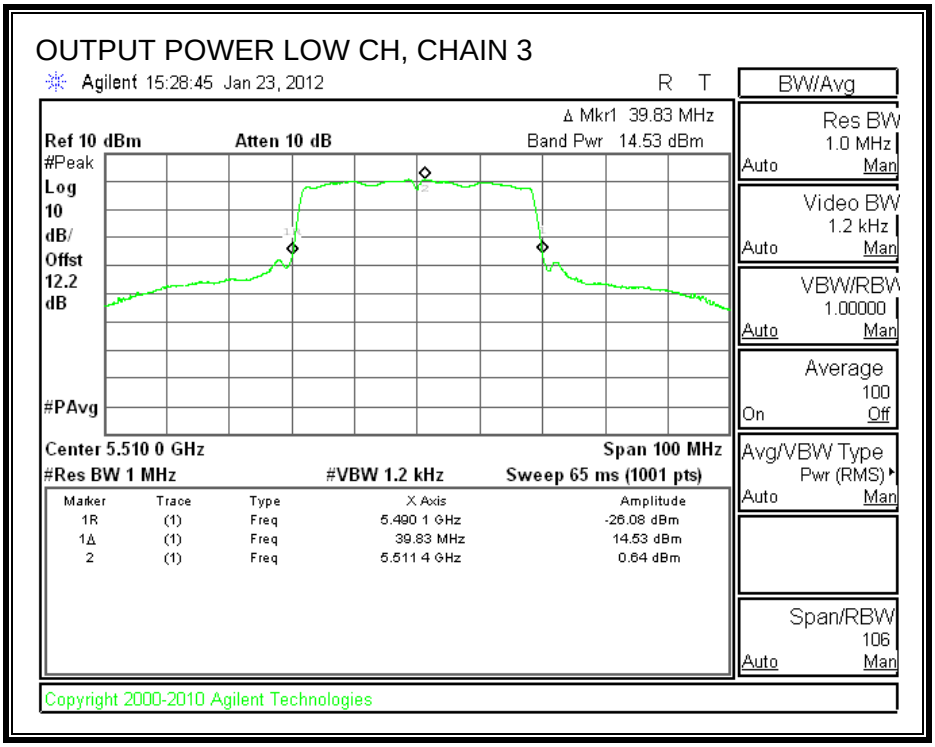
CHAIN 2 OUTPUT POWER

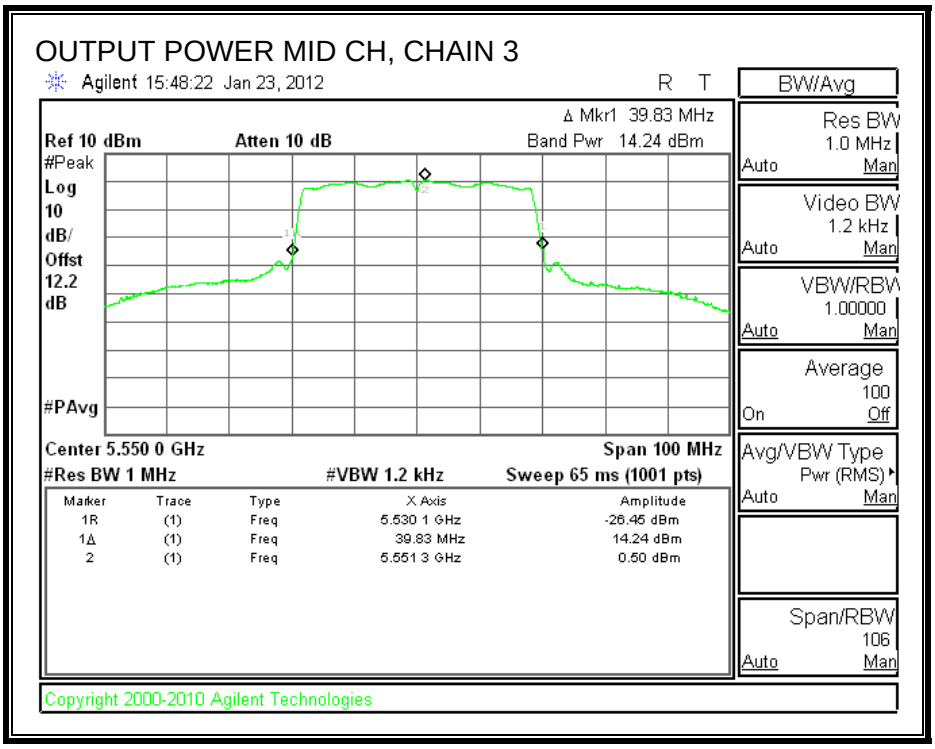


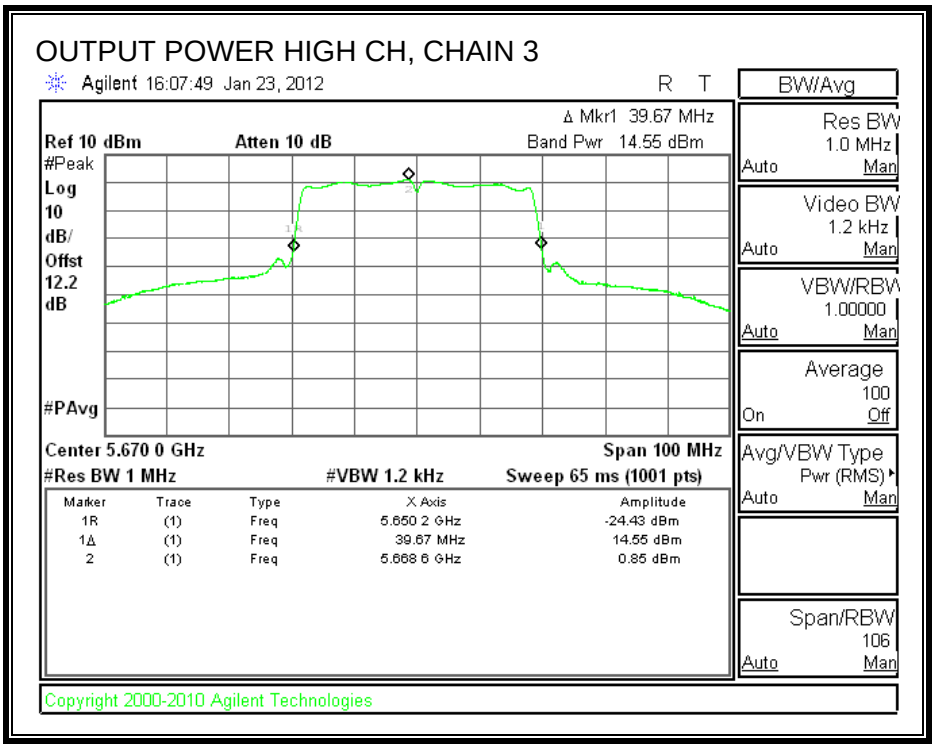




CHAIN 3 OUTPUT POWER







7.20.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5510	13.55	13.49	13.35	18.24
Middle	5550	13.83	13.61	13.42	18.39
High	5670	13.73	13.81	13.51	18.46

7.20.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Antenna Gain (Chain 3) (dBi)	Effective Legacy Gain (dBi)
4.07	6.39	4.09	9.76

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum effective antenna gain is 9.76 dBi, therefore the limit is 7.24 dBm.

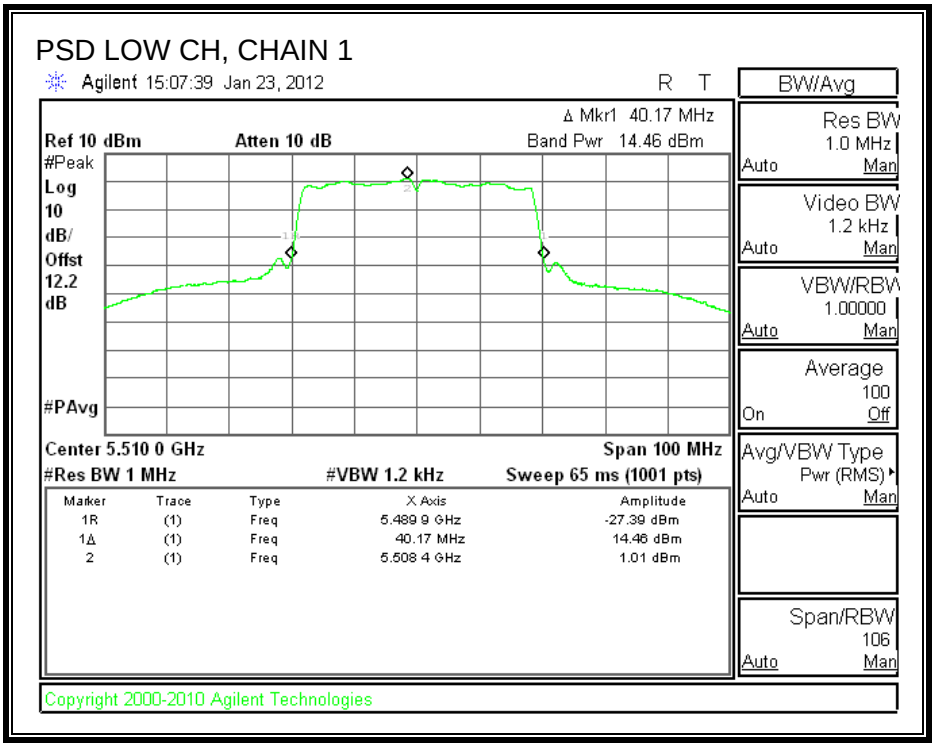
TEST PROCEDURE

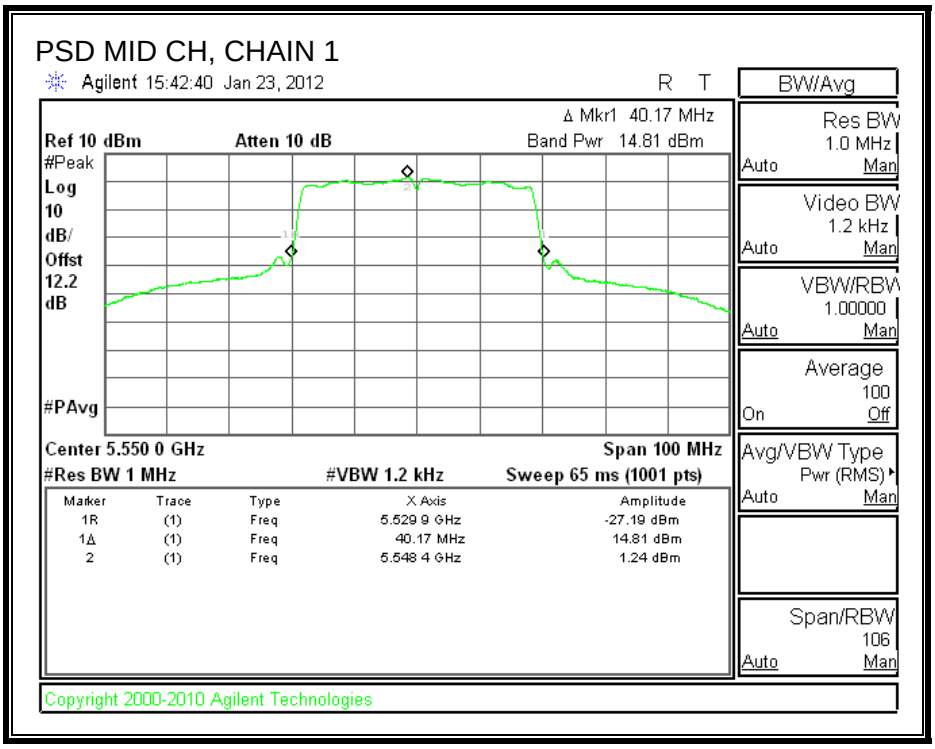
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

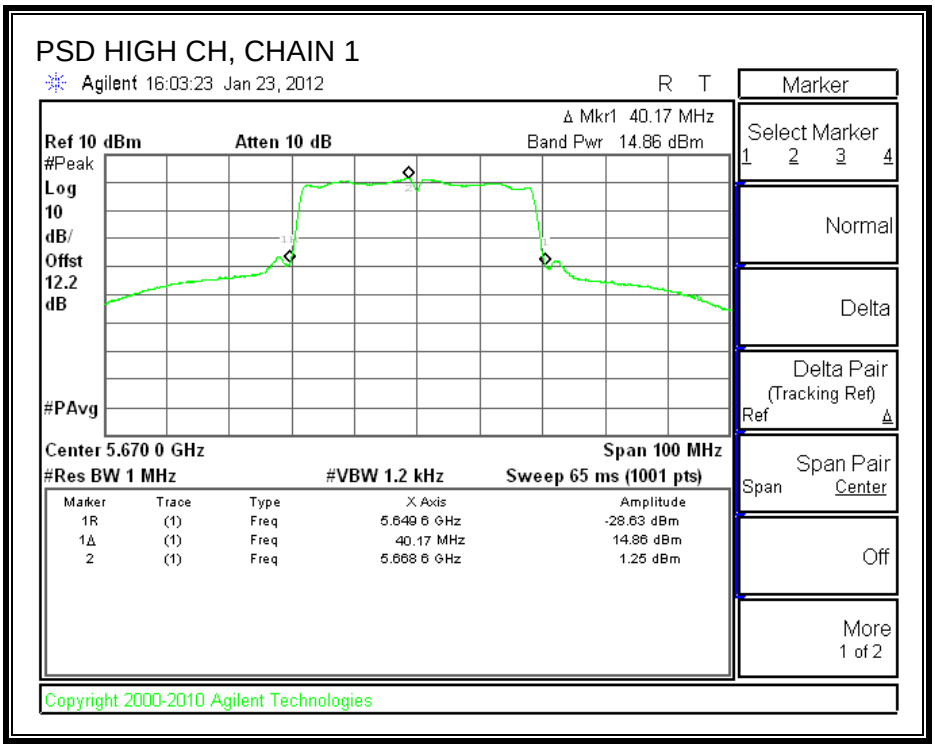
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5510	1.01	1.28	0.64	5.76	7.24	-1.48
Middle	5550	1.24	1.37	0.50	5.82	7.24	-1.42
High	5670	1.25	1.86	0.85	6.11	7.24	-1.13

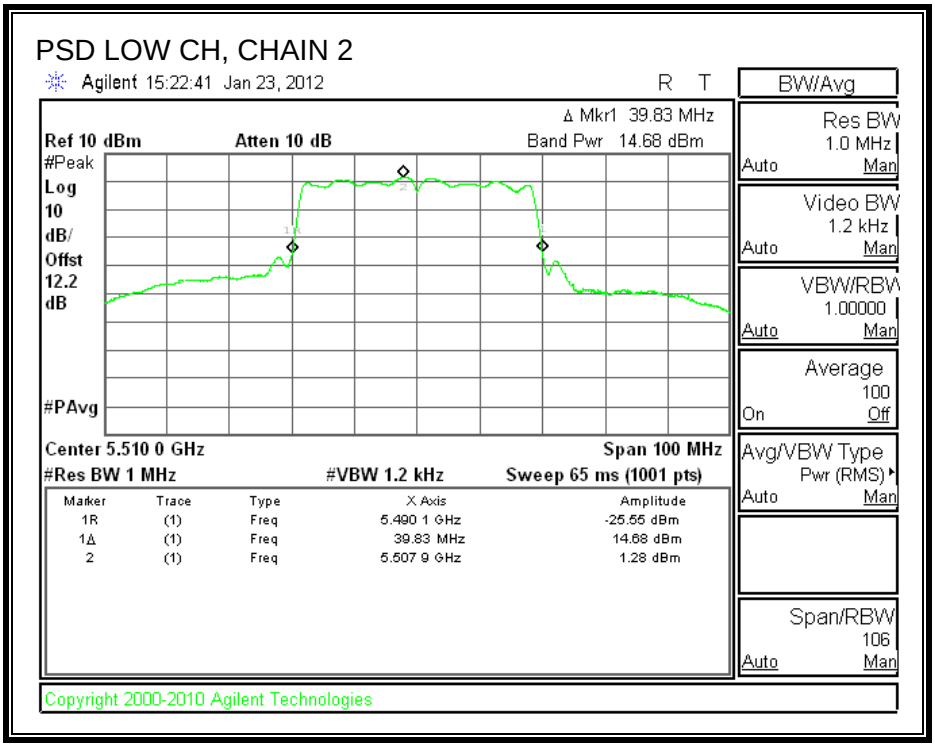
CHAIN 1 POWER SPECTRAL DENSITY

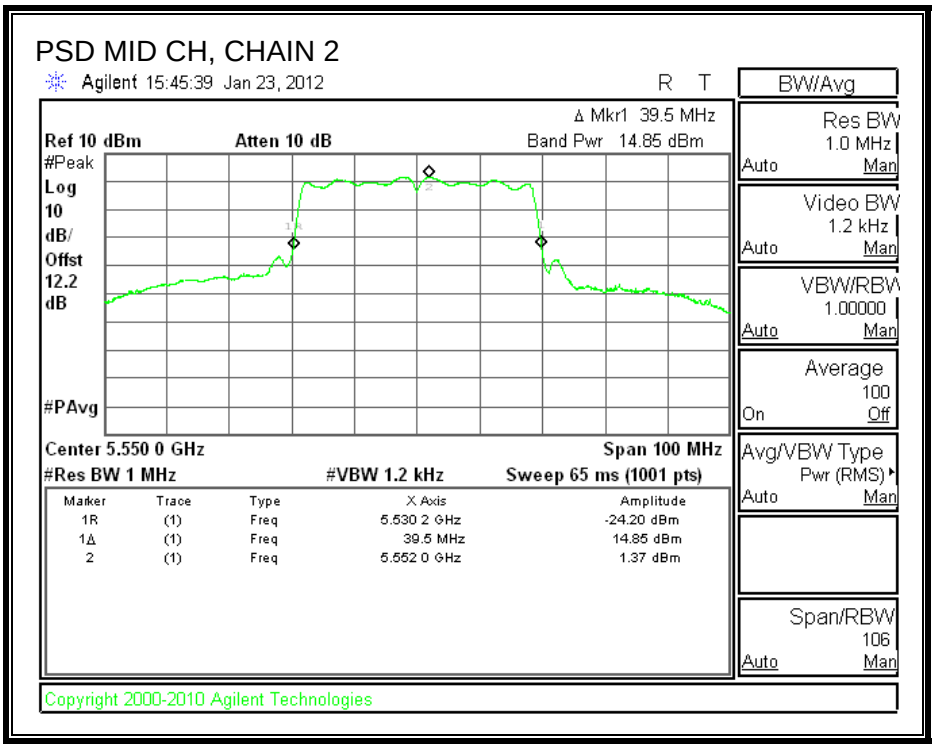


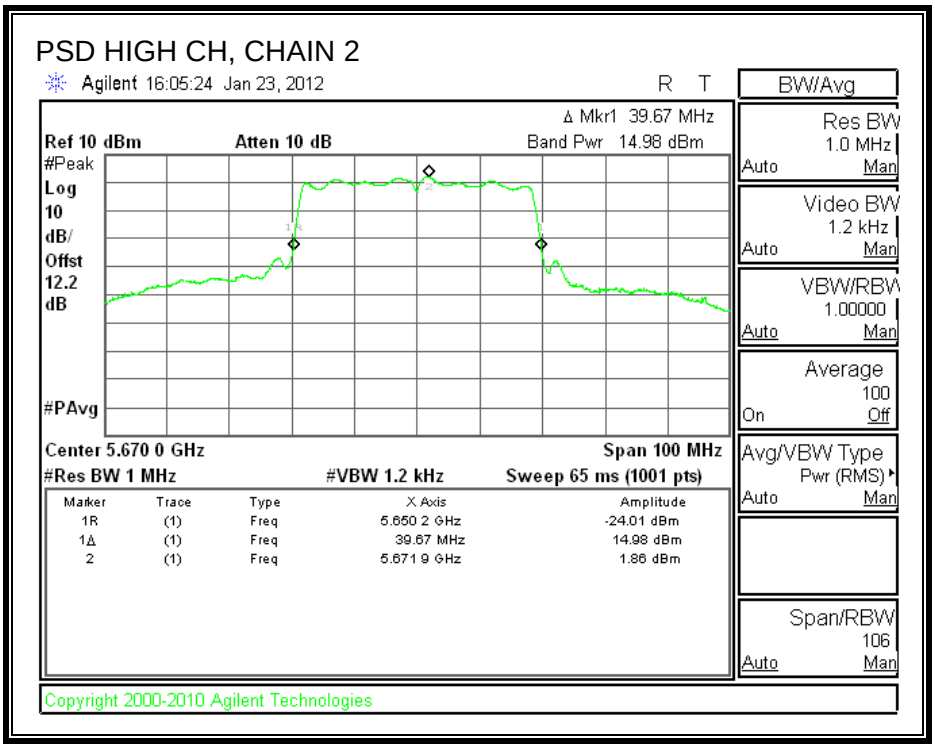




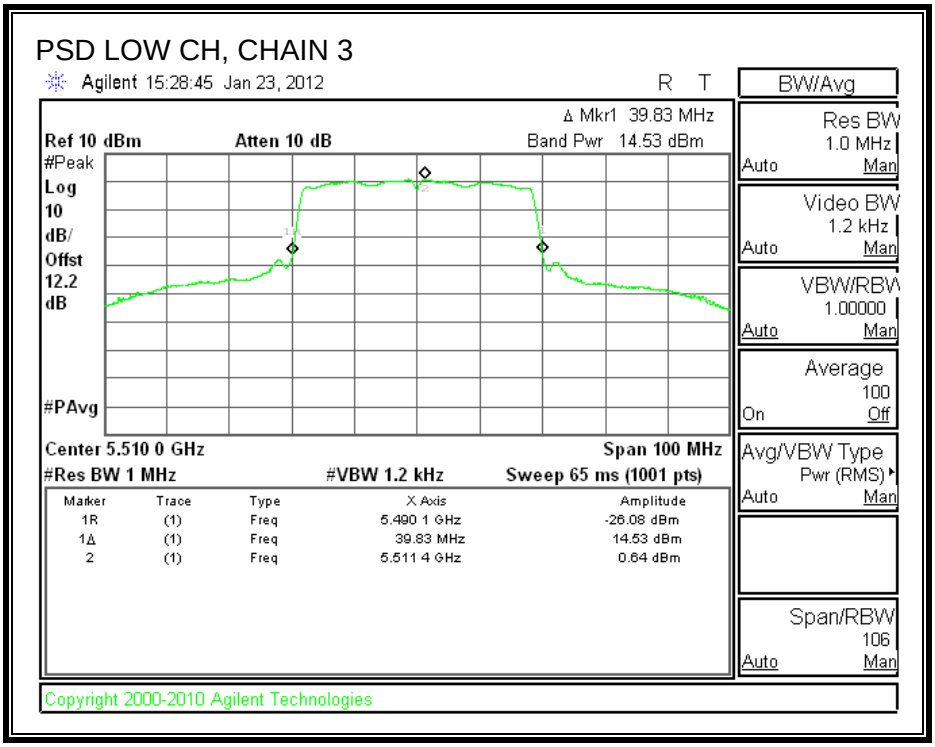
CHAIN 2 POWER SPECTRAL DENSITY

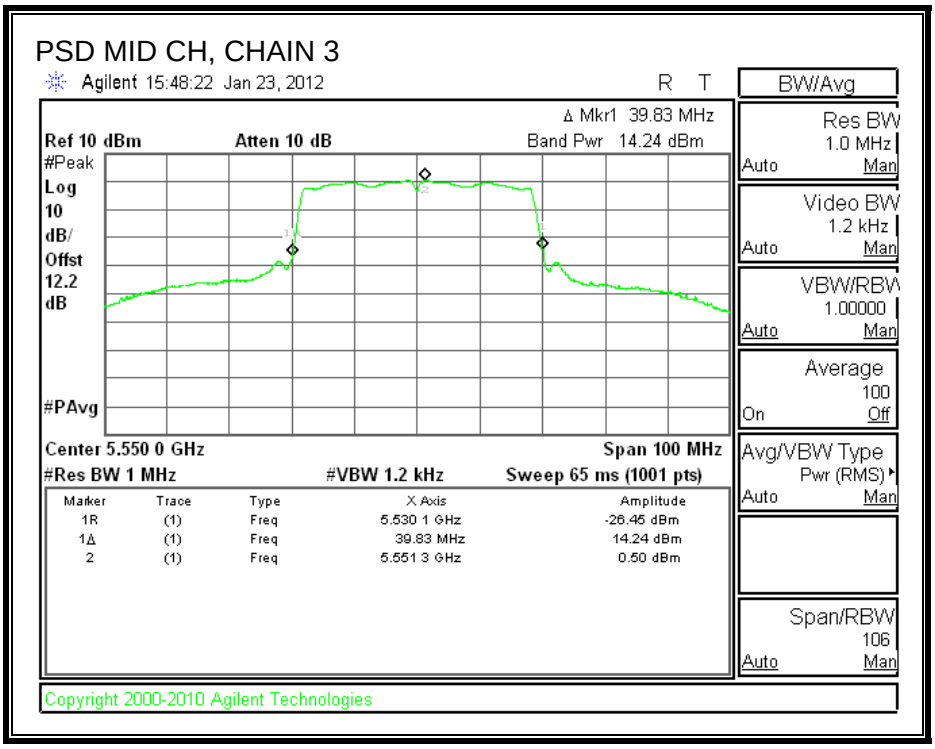


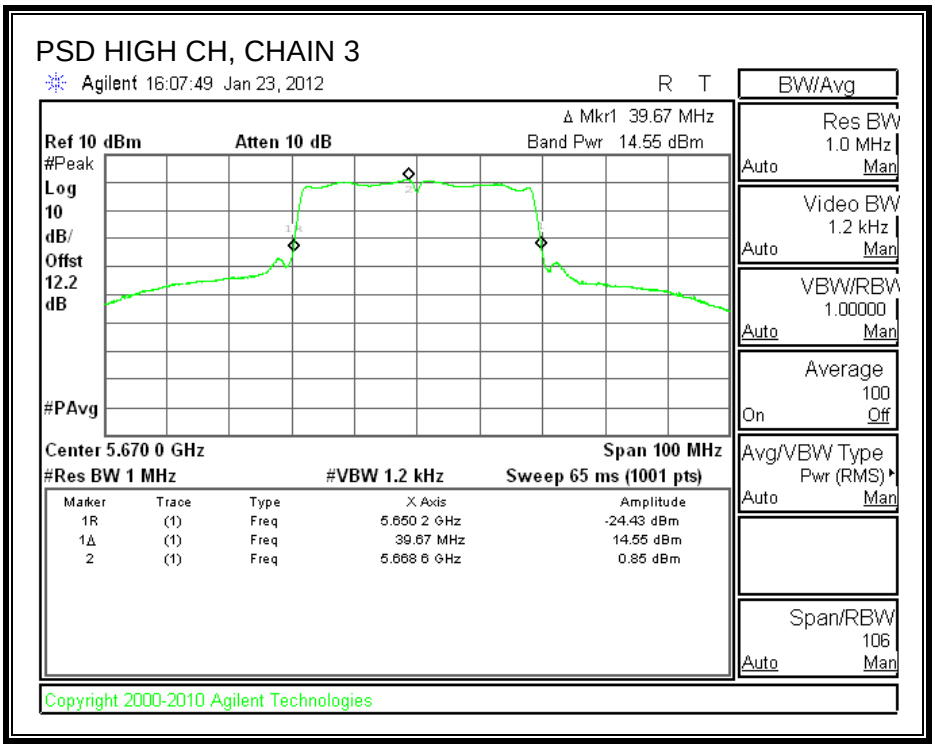




CHAIN 3 POWER SPECTRAL DENSITY







7.20.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	7.06	13	-5.94
Middle	5550	6.98	13	-6.02
High	5670	7.56	13	-5.44

CHAIN 2

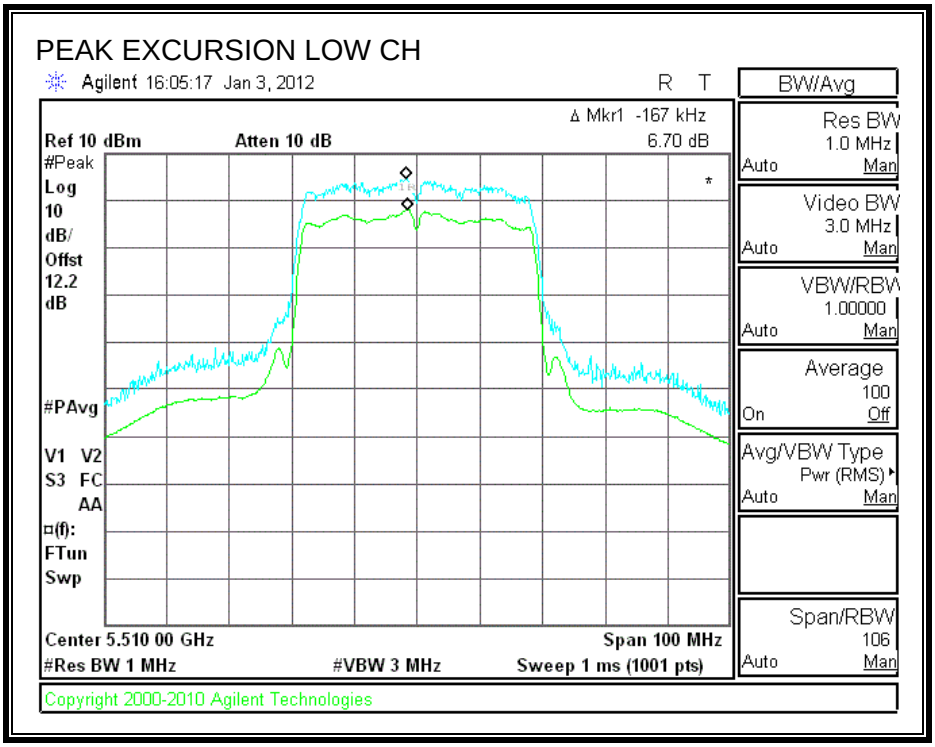
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	7.02	13	-5.98
Middle	5550	7.59	13	-5.41
High	5670	7.31	13	-5.69

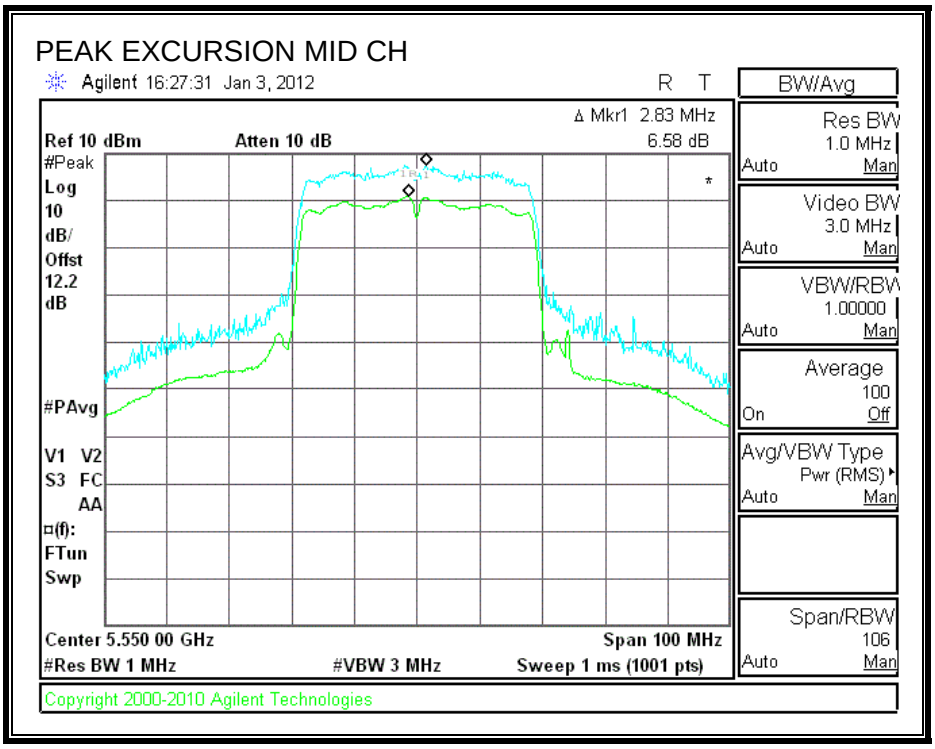
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	7.06	13	-5.94
Middle	5550	6.98	13	-6.02
High	5670	7.56	13	-5.44

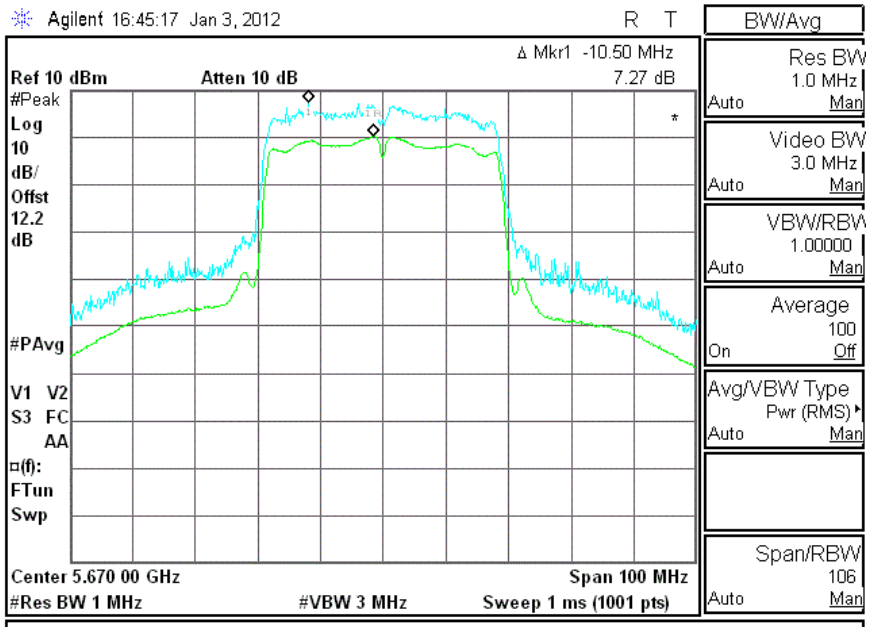
CHAIN 1

PEAK EXCURSION



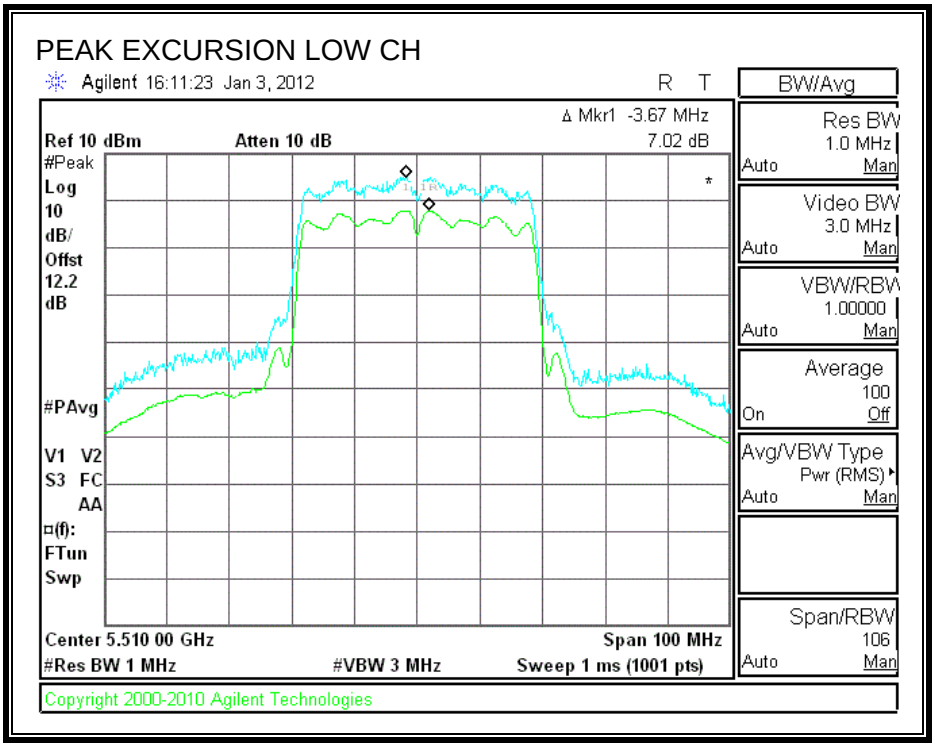


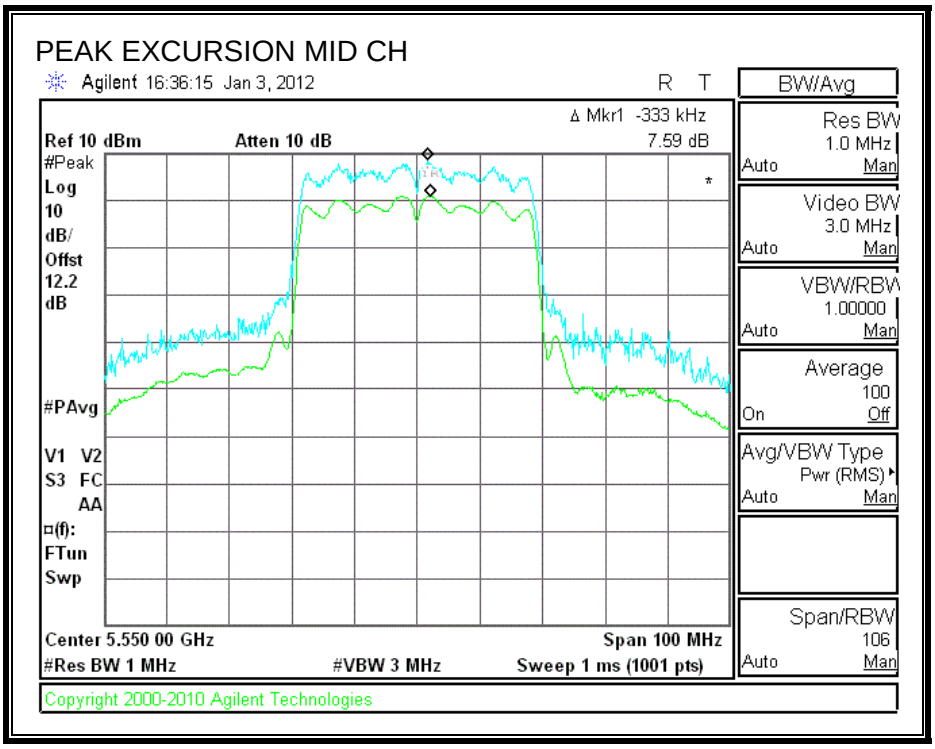
PEAK EXCURSION HIGH CH



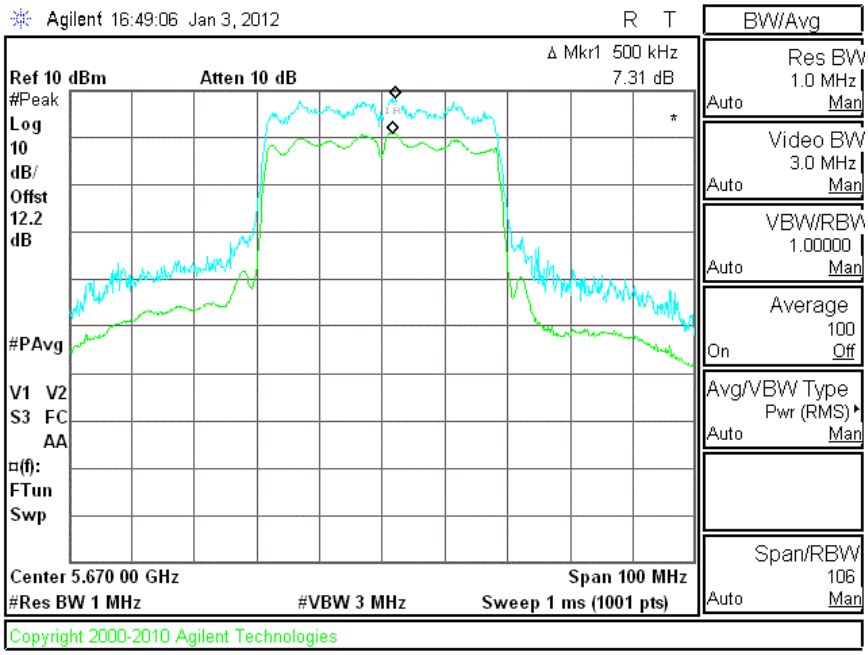
CHAIN 2

PEAK EXCURSION



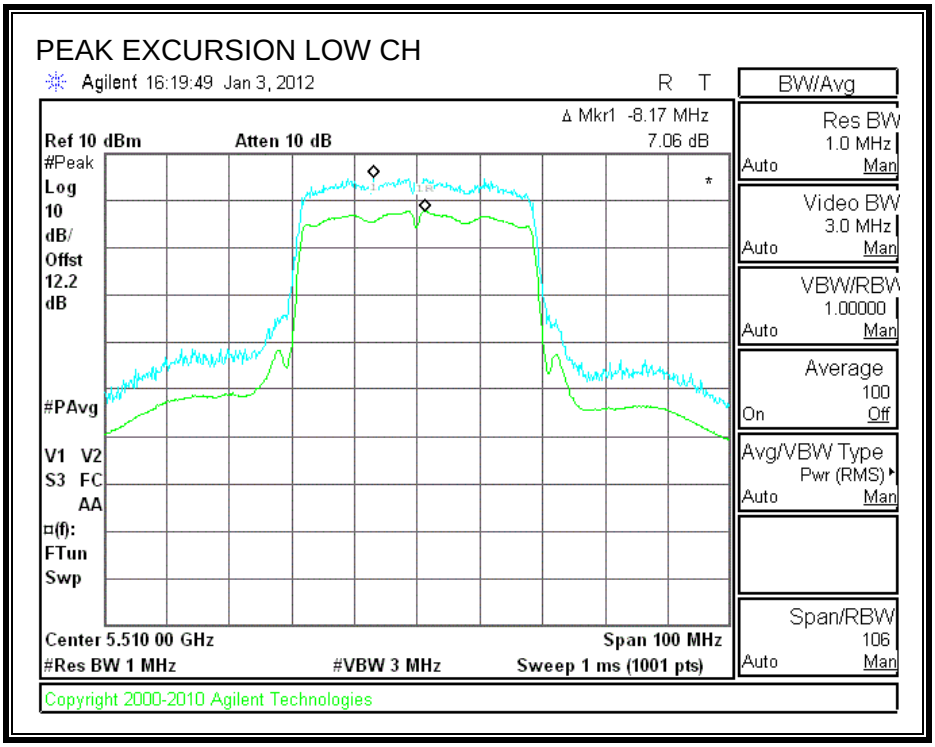


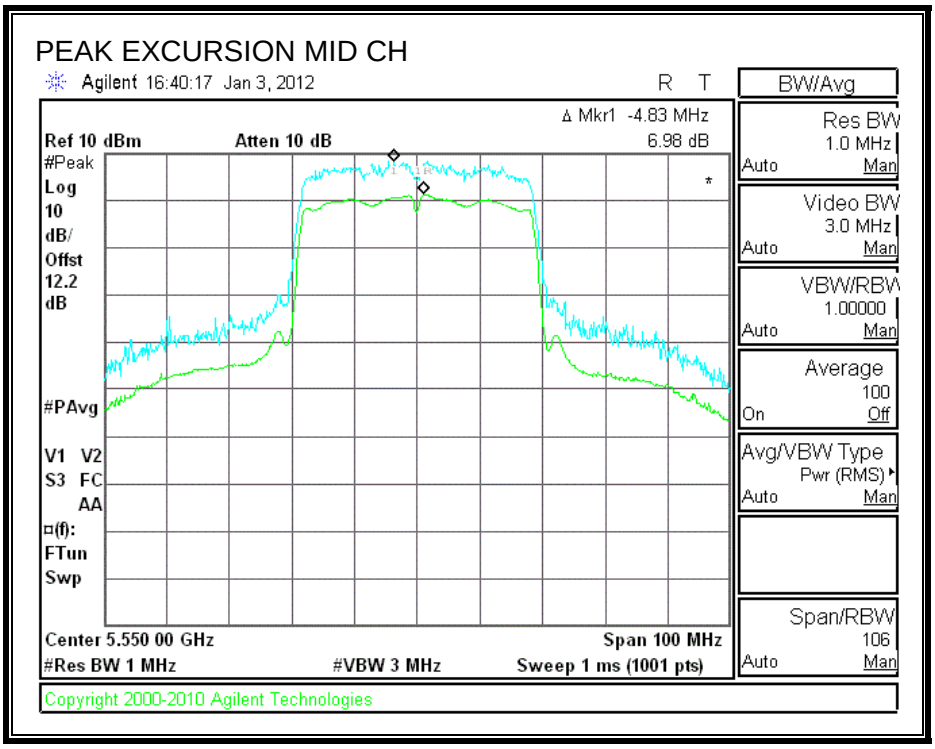
PEAK EXCURSION HIGH CH



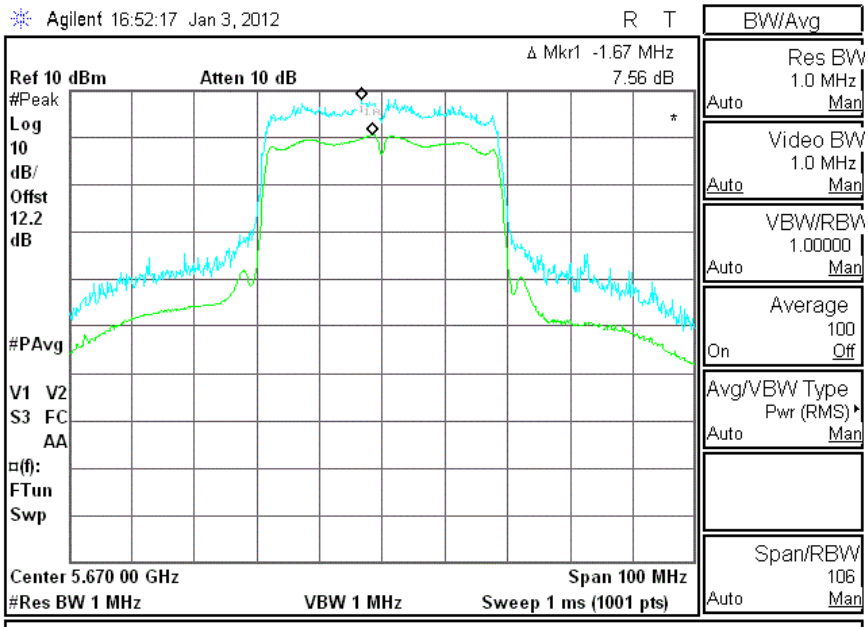
CHAIN 3

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.21. 802.11n HT40 3TX MODE IN THE 5.6 GHz BAND, SDM MCS21

7.21.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	39.70	36.1791
Middle	5550	72.00	36.3849
High	5670	73.60	36.3473

CHAIN 2

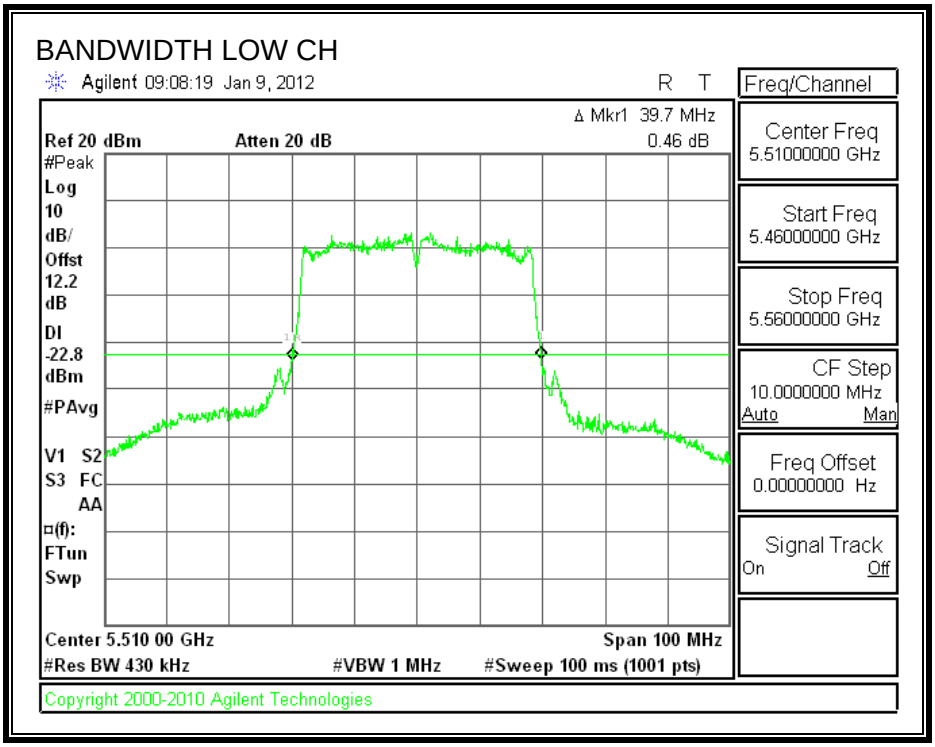
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	39.60	36.2728
Middle	5550	75.00	36.3506
High	5670	72.40	36.5005

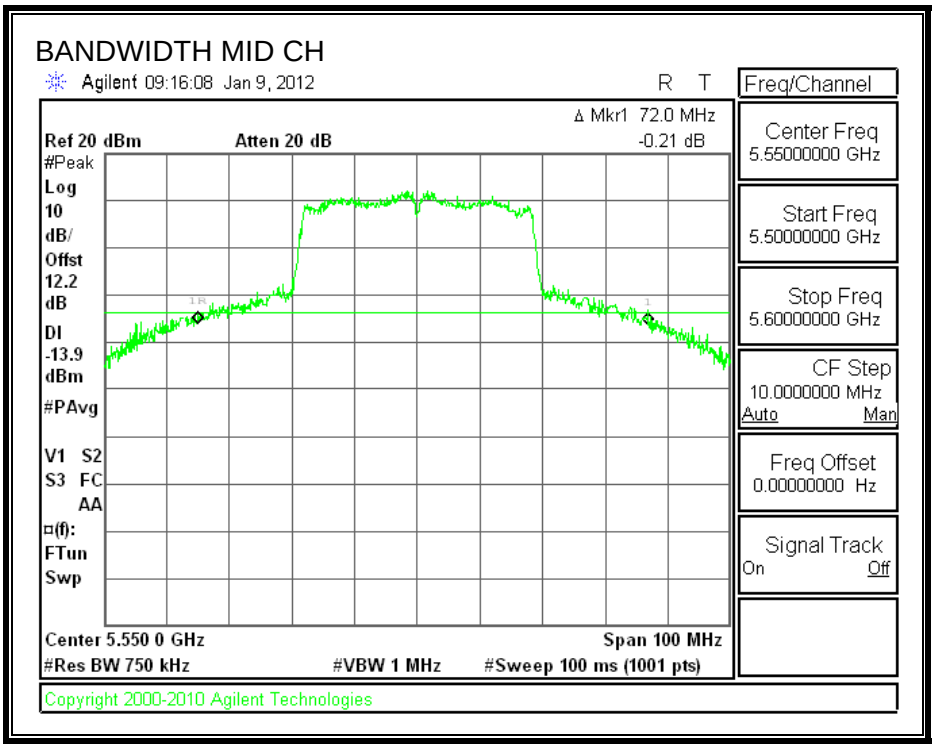
CHAIN 3

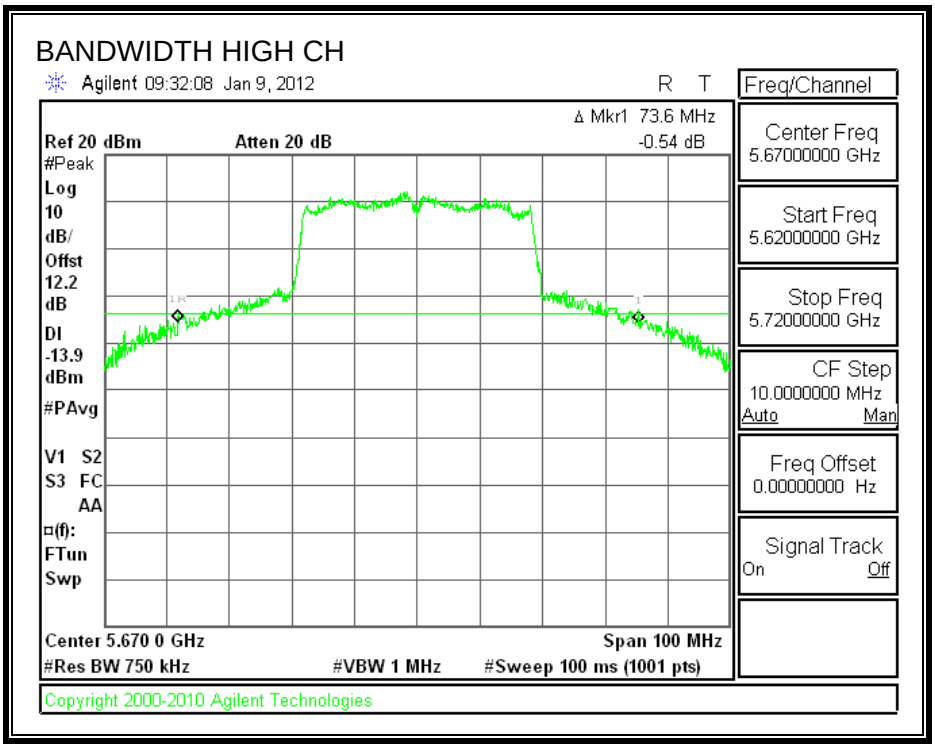
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	39.40	36.1539
Middle	5550	68.90	36.4154
High	5670	68.00	36.4478

CHAIN 1

26 dB BANDWIDTH

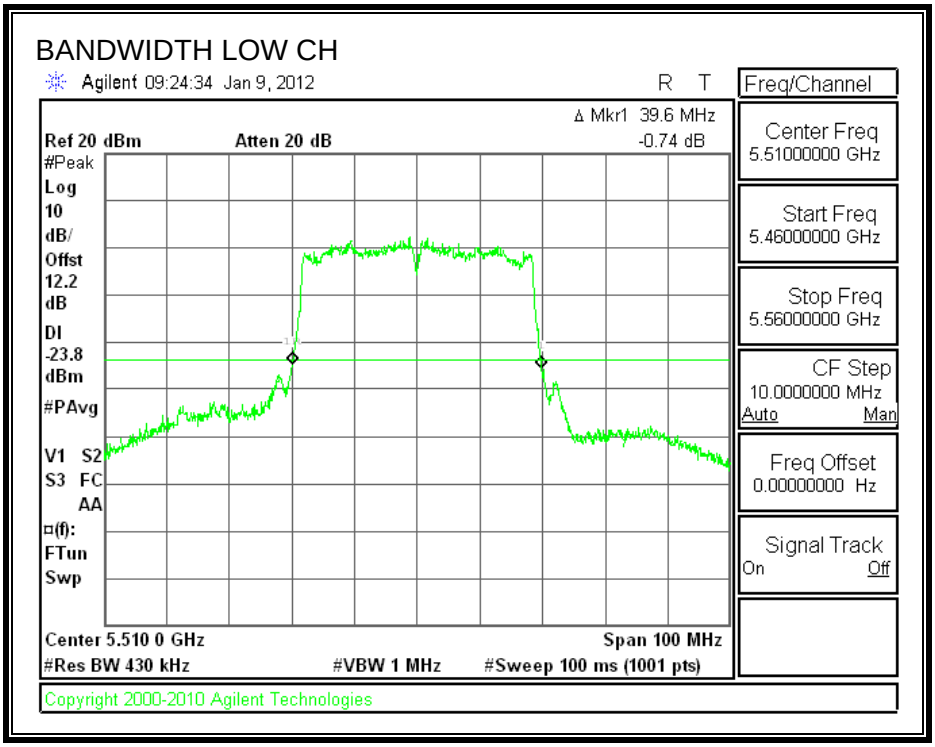


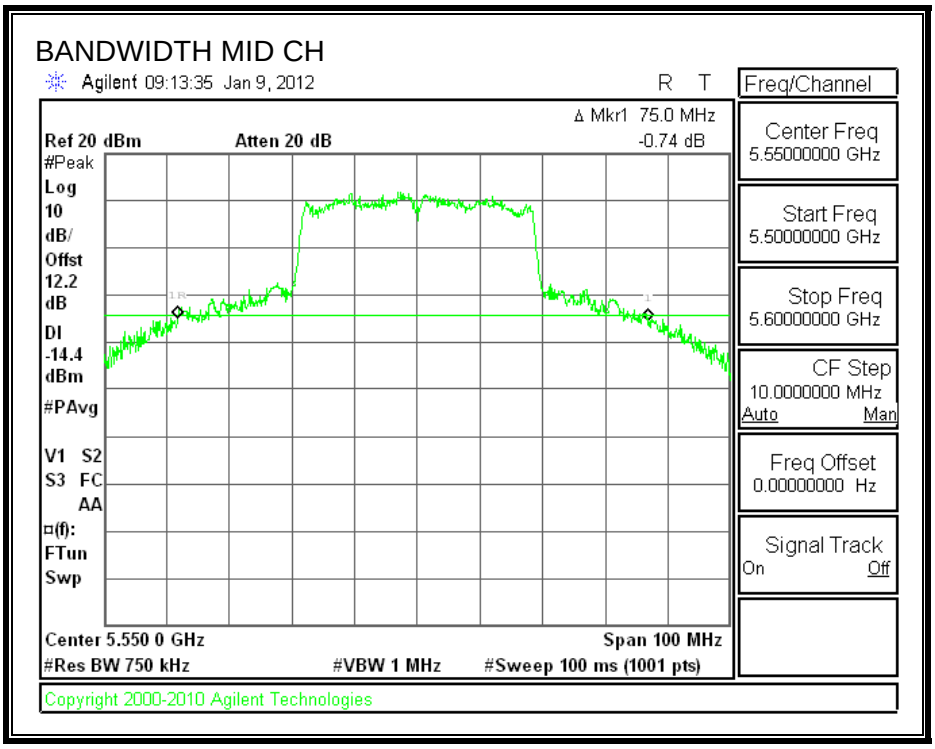


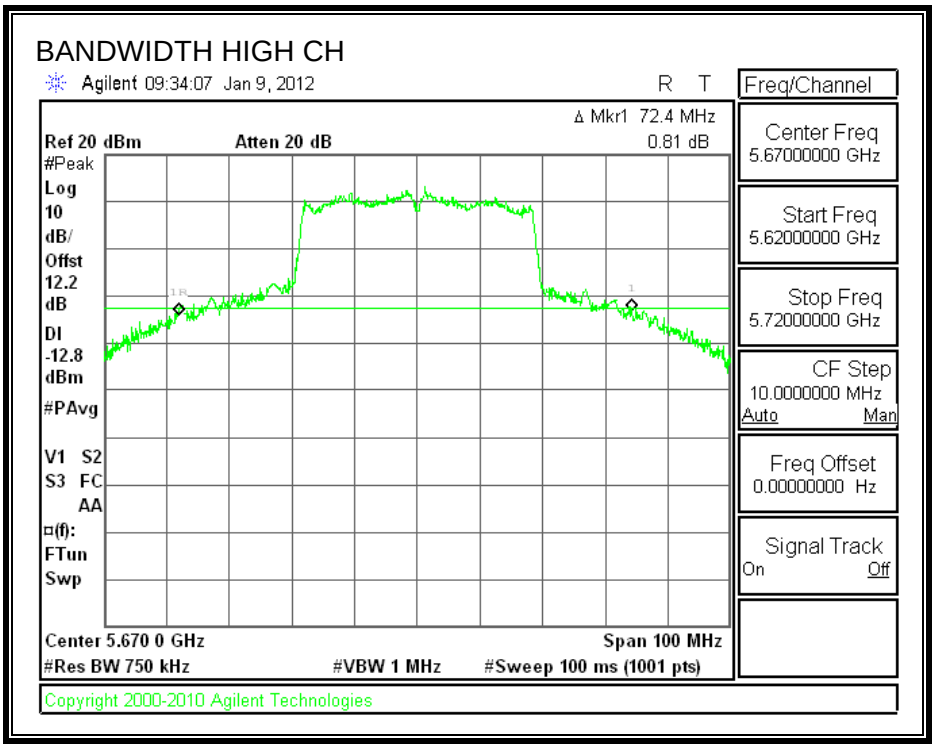


CHAIN 2

26 dB BANDWIDTH

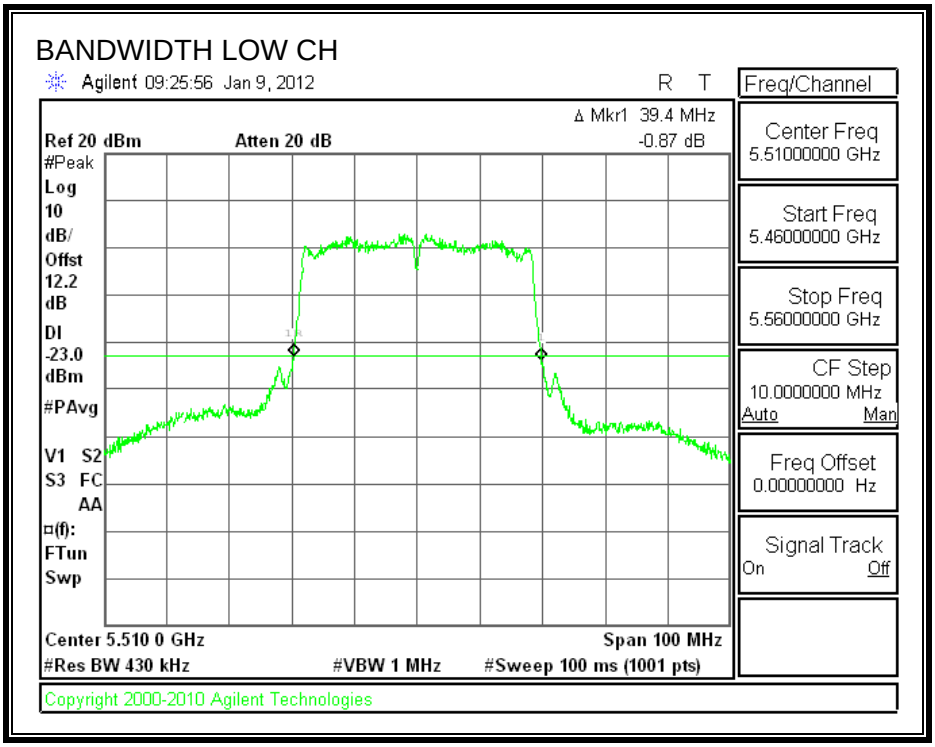


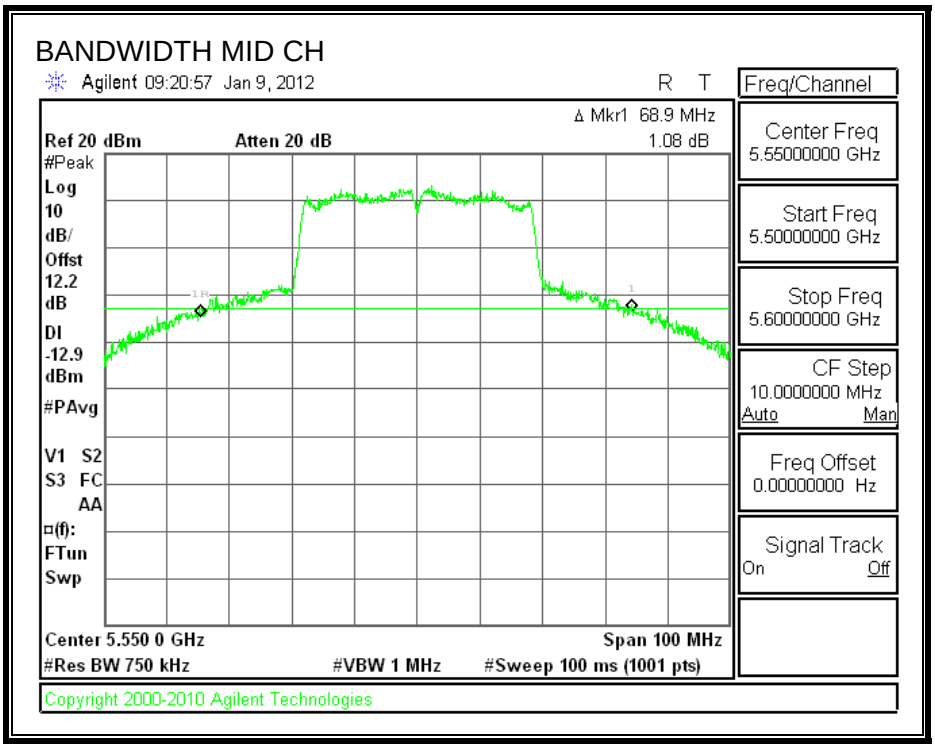


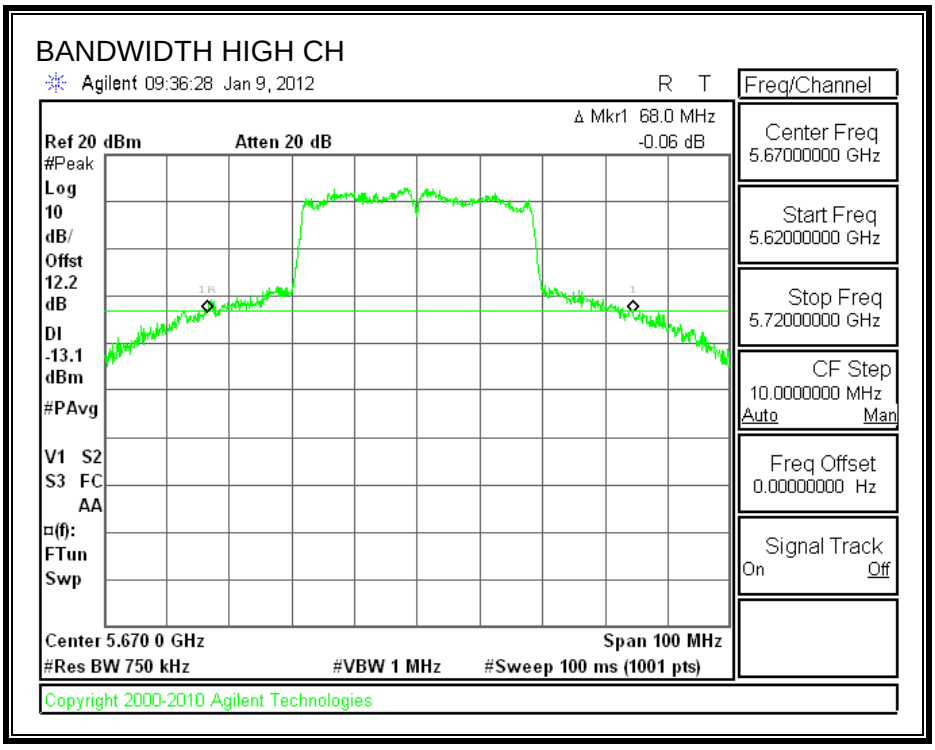


CHAIN 3

26 dB BANDWIDTH

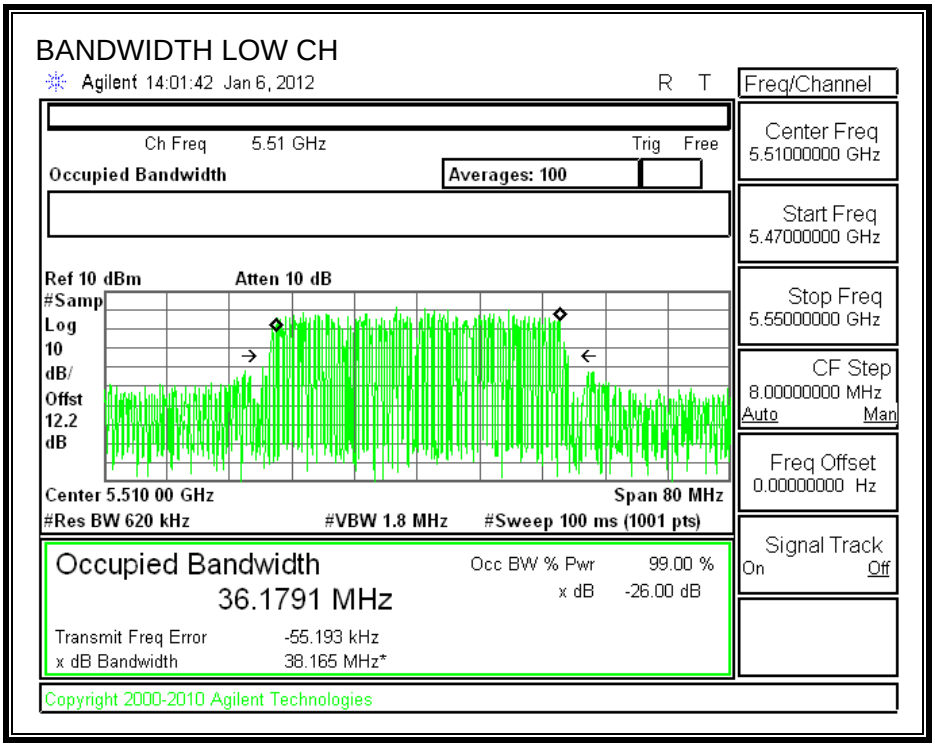


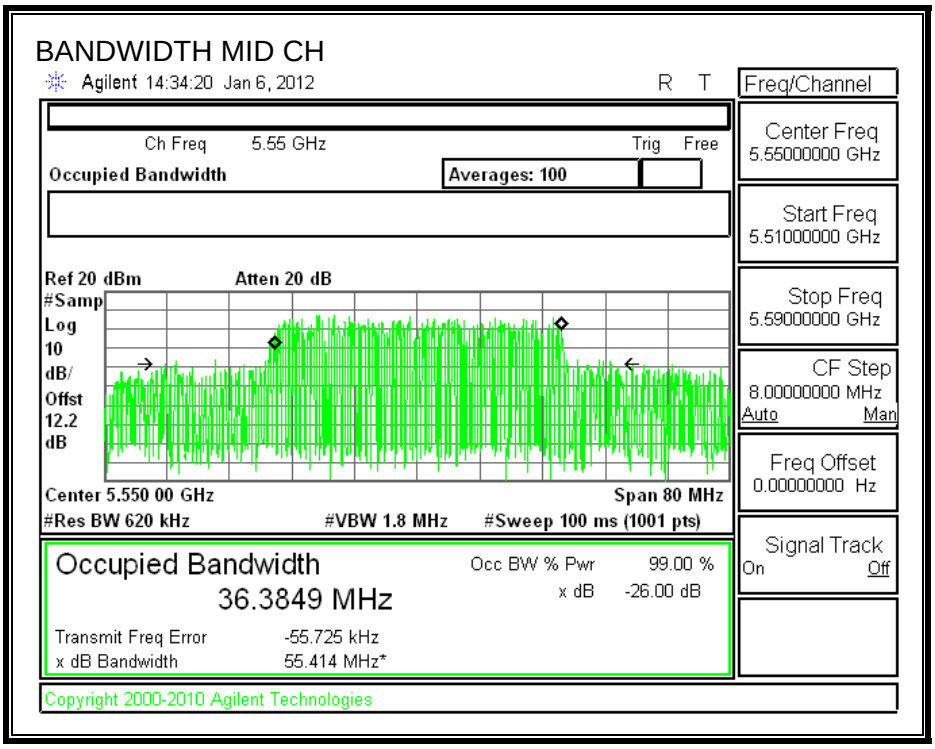


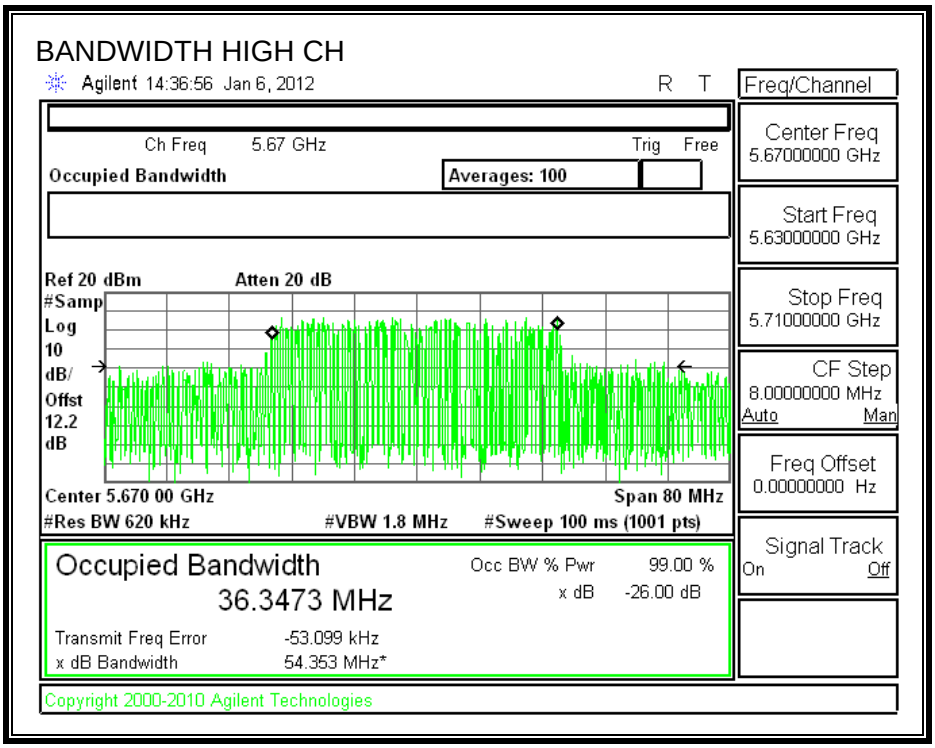


CHAIN 1

99% BANDWIDTH

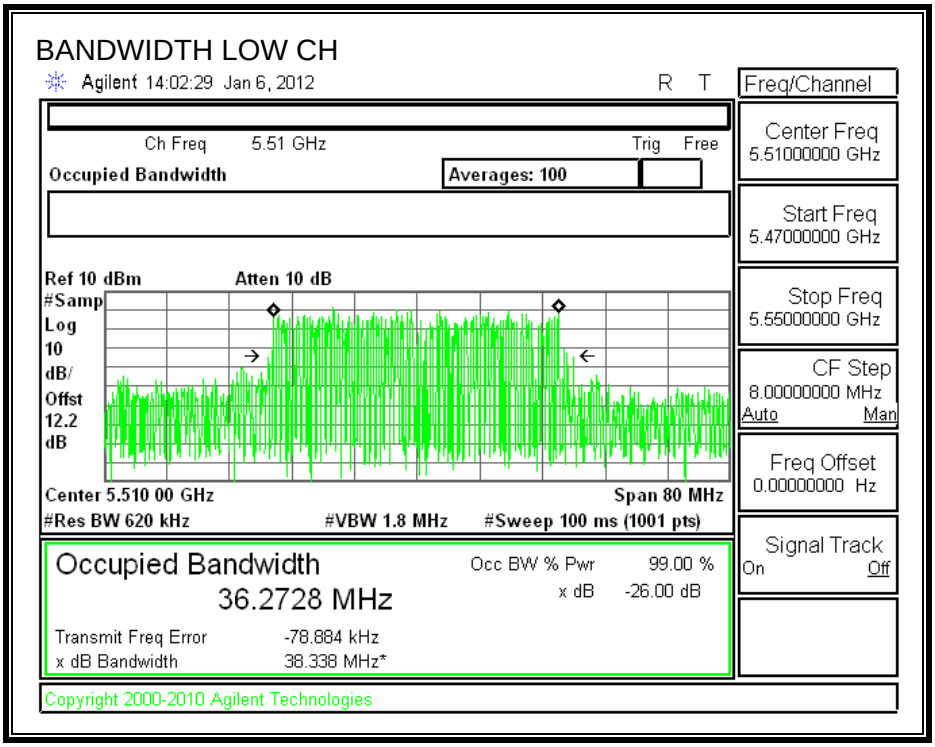


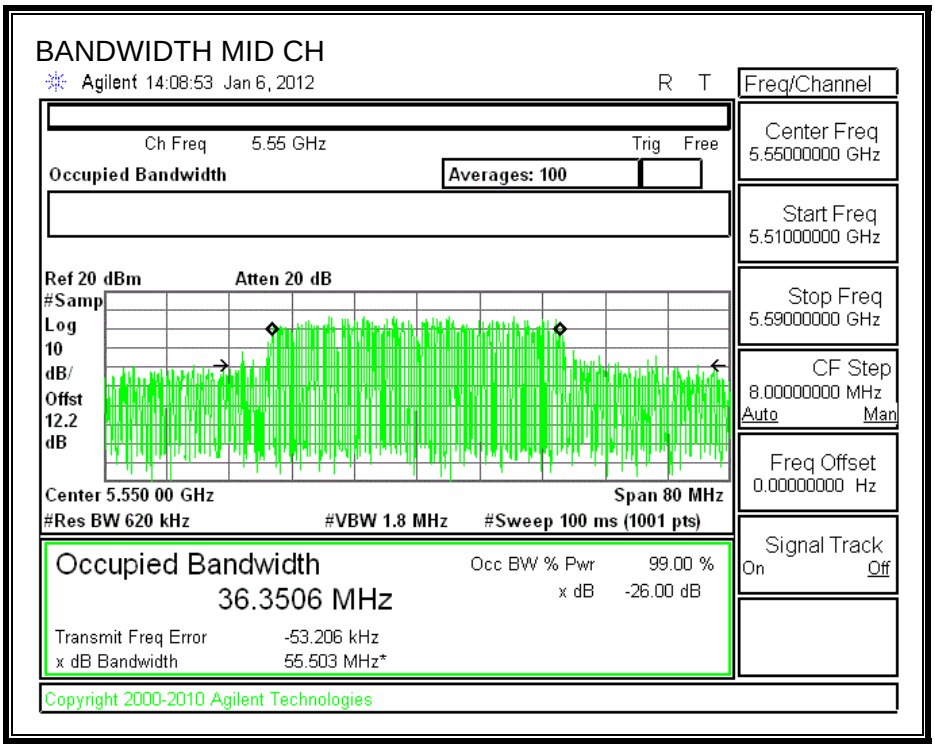


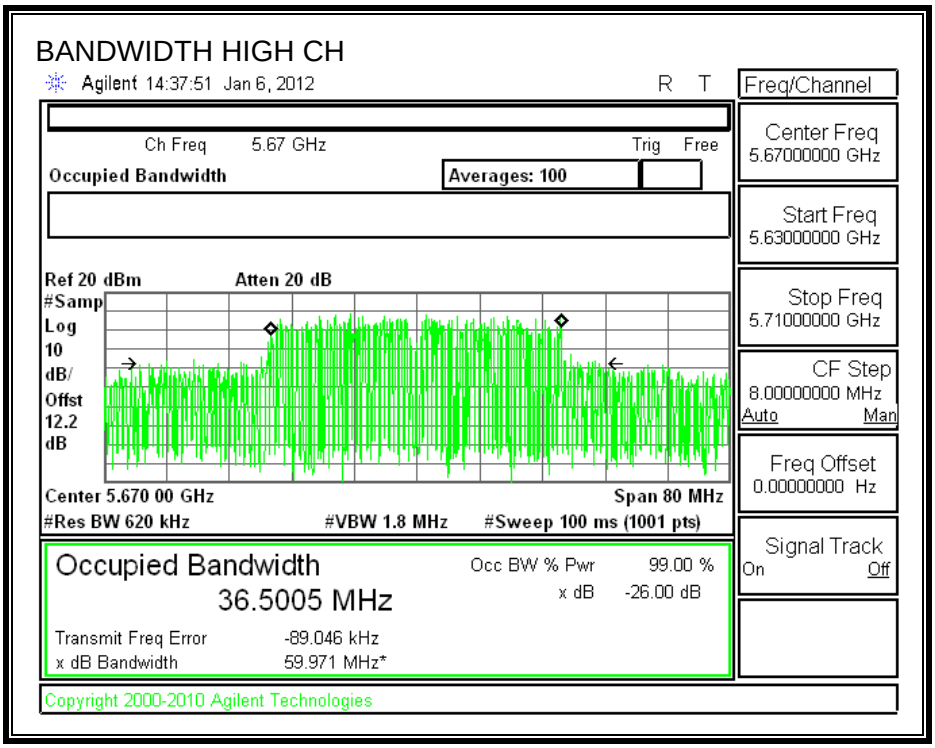


CHAIN 2

99% BANDWIDTH

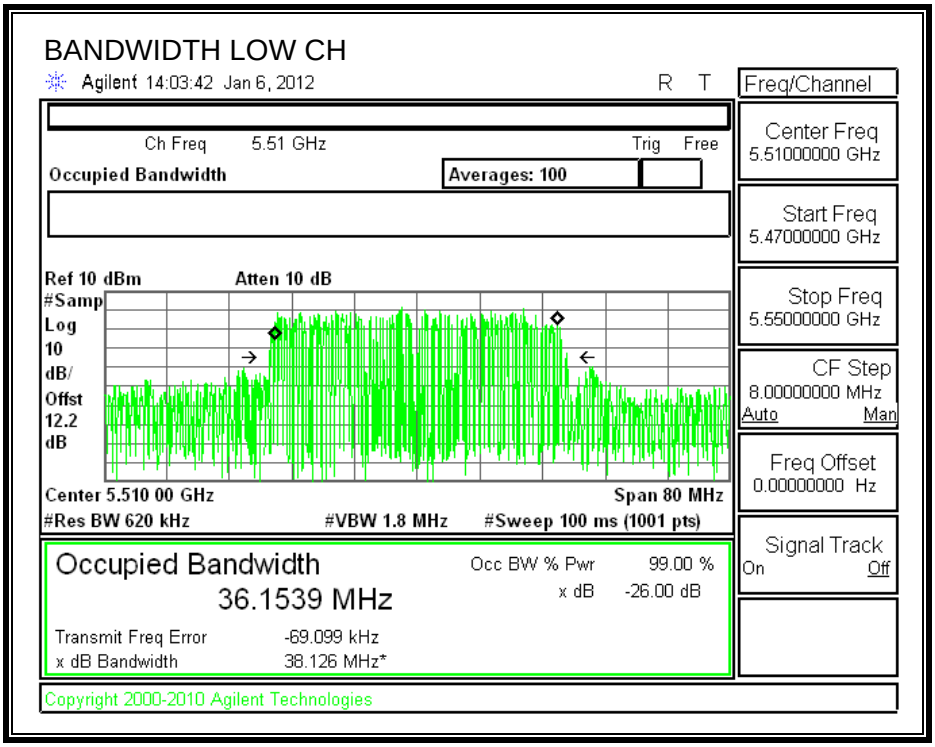


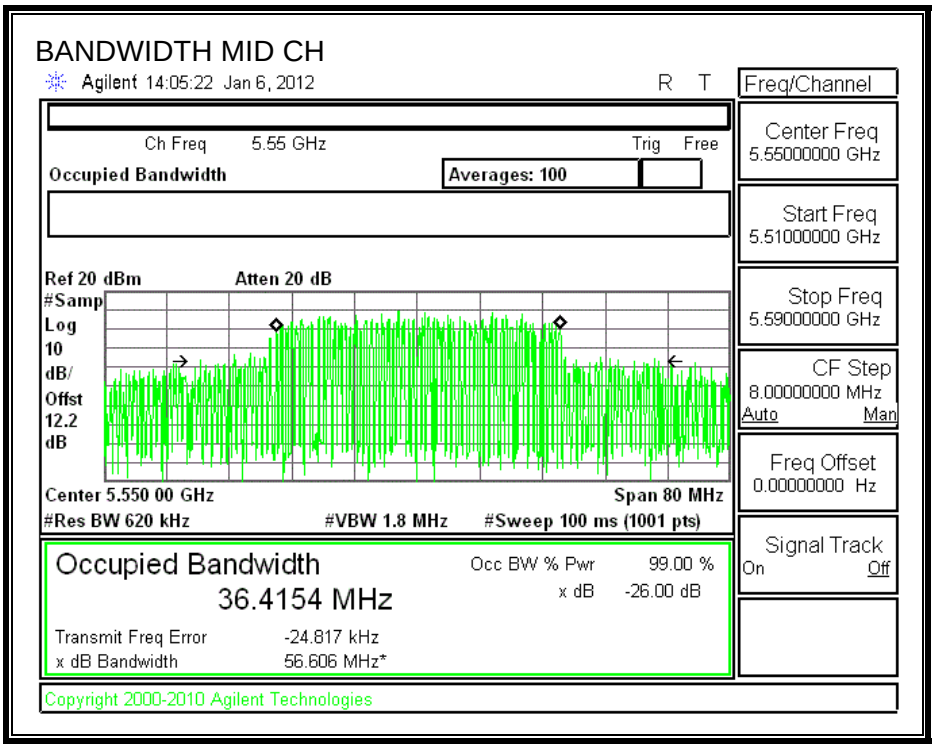


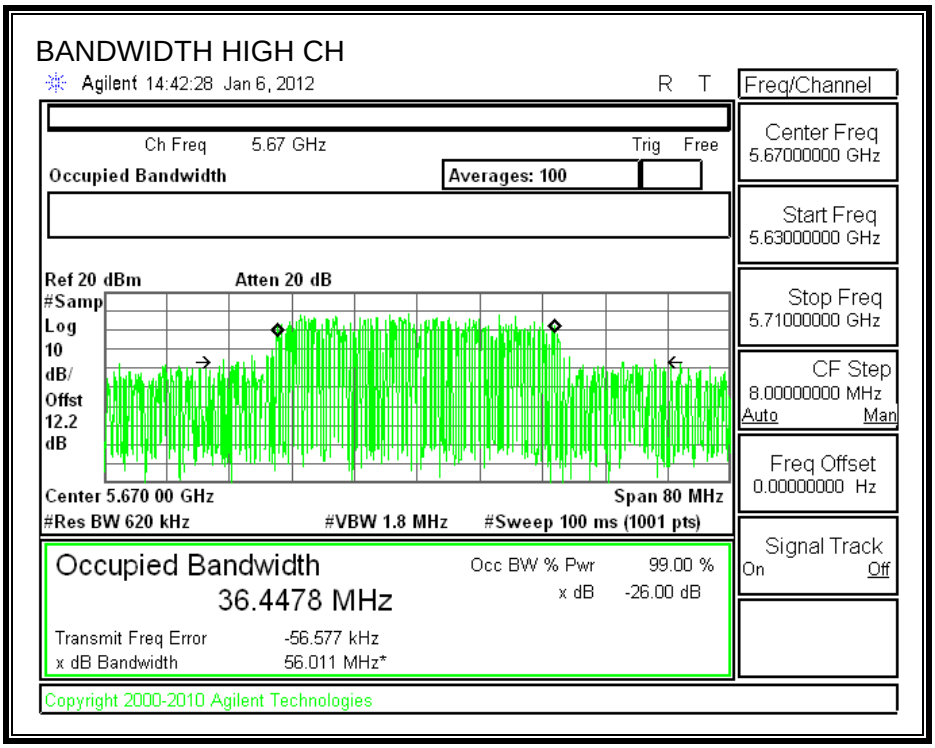


CHAIN 3

99% BANDWIDTH







7.21.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band 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 MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

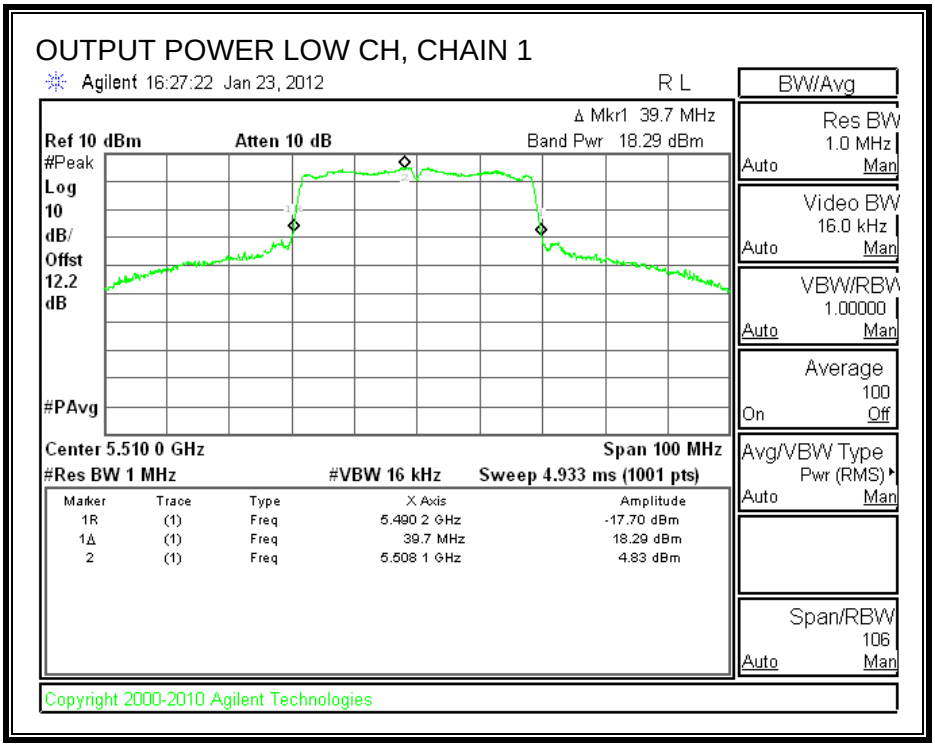
Limit

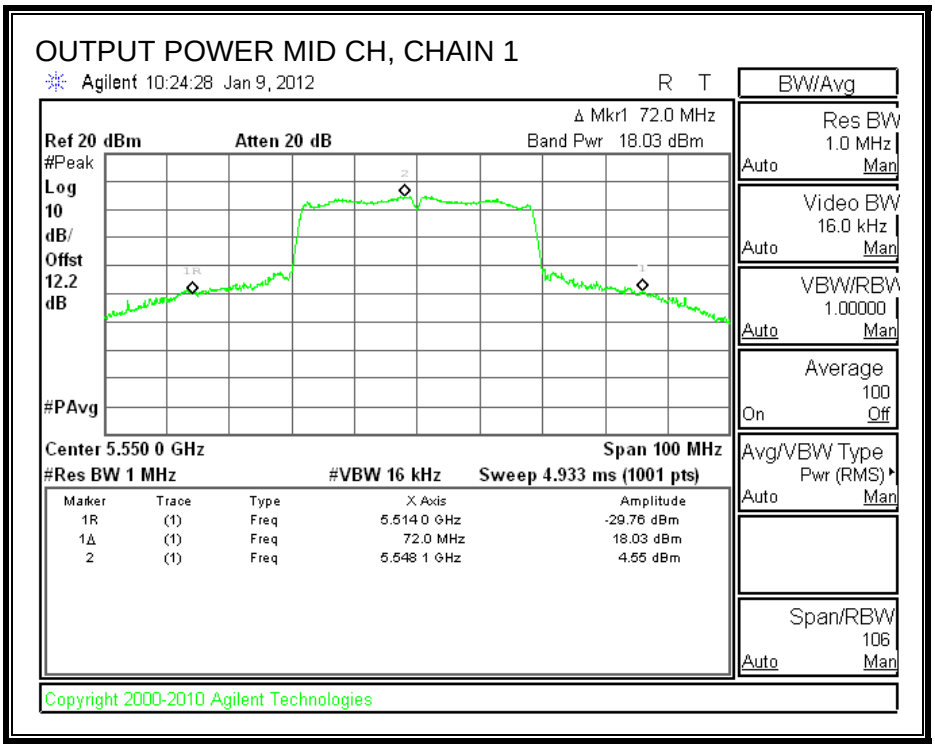
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	23.98	39.40	26.95	6.39	23.59
Mid	5550	23.98	68.90	29.38	6.39	23.59
High	5670	23.98	68.00	29.33	6.39	23.59

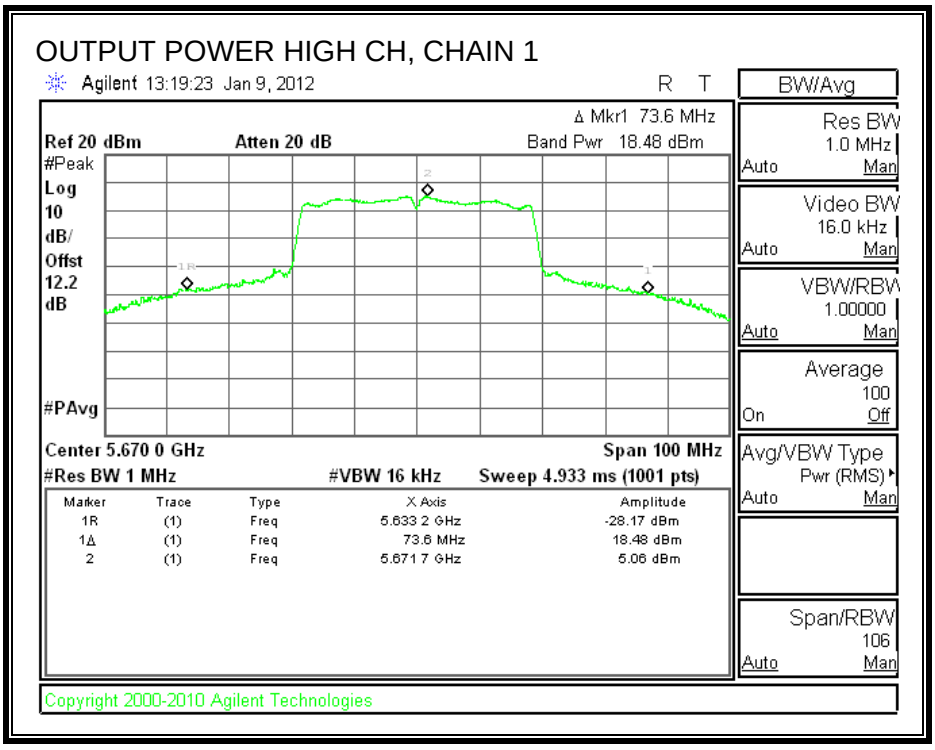
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	18.29	18.21	18.47	23.10	23.59	-0.49
Mid	5550	18.03	18.57	19.31	23.44	23.59	-0.15
High	5670	18.48	18.80	18.93	23.51	23.59	-0.08

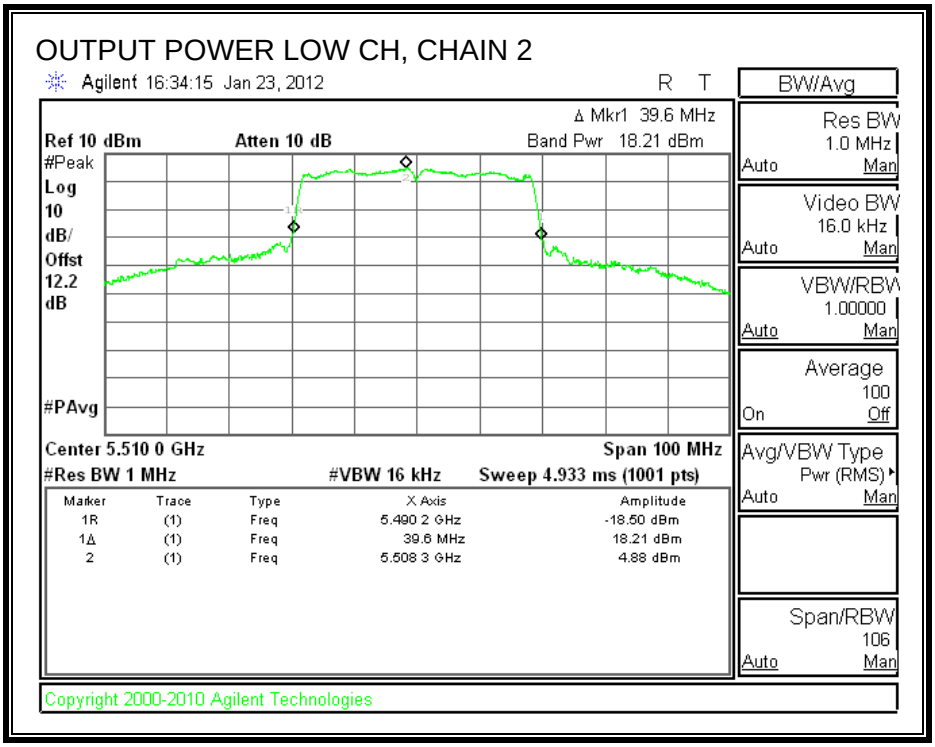
CHAIN 1 OUTPUT POWER

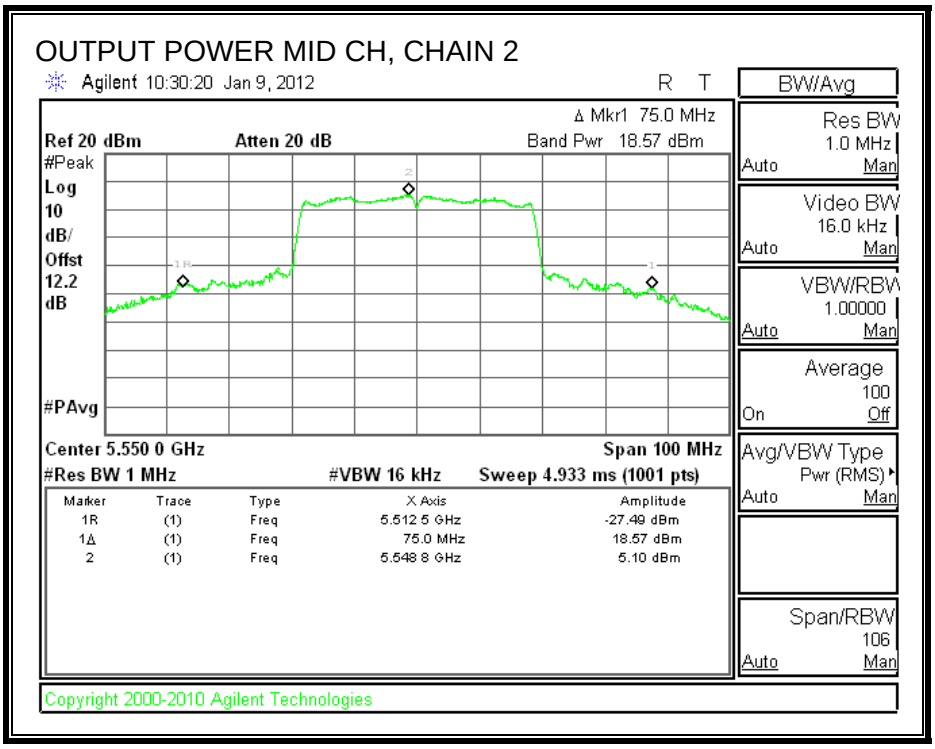


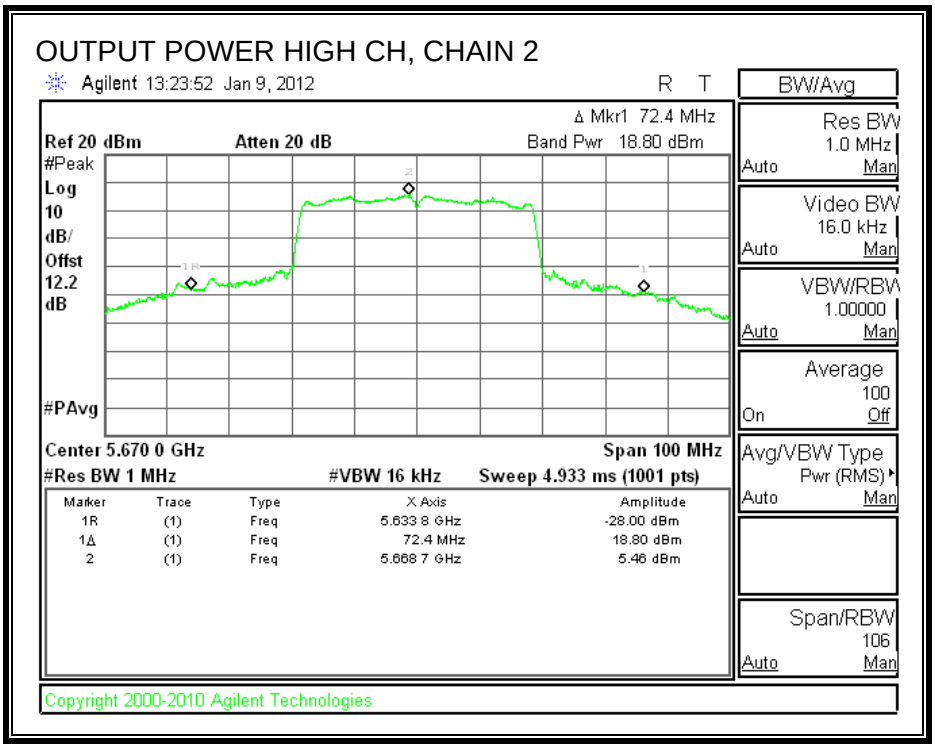




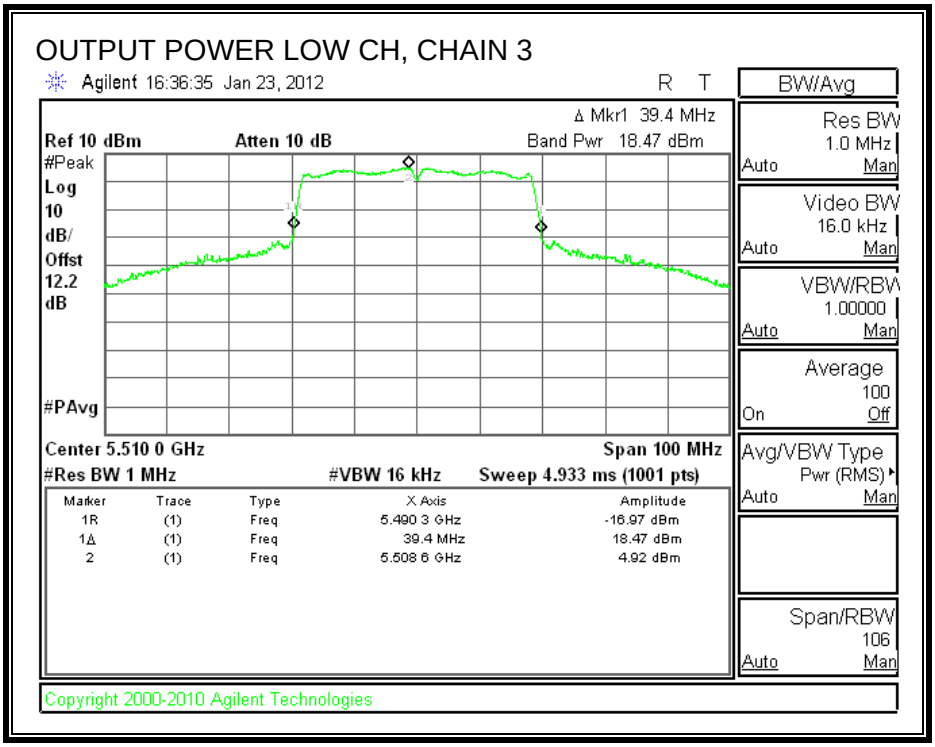
CHAIN 2 OUTPUT POWER

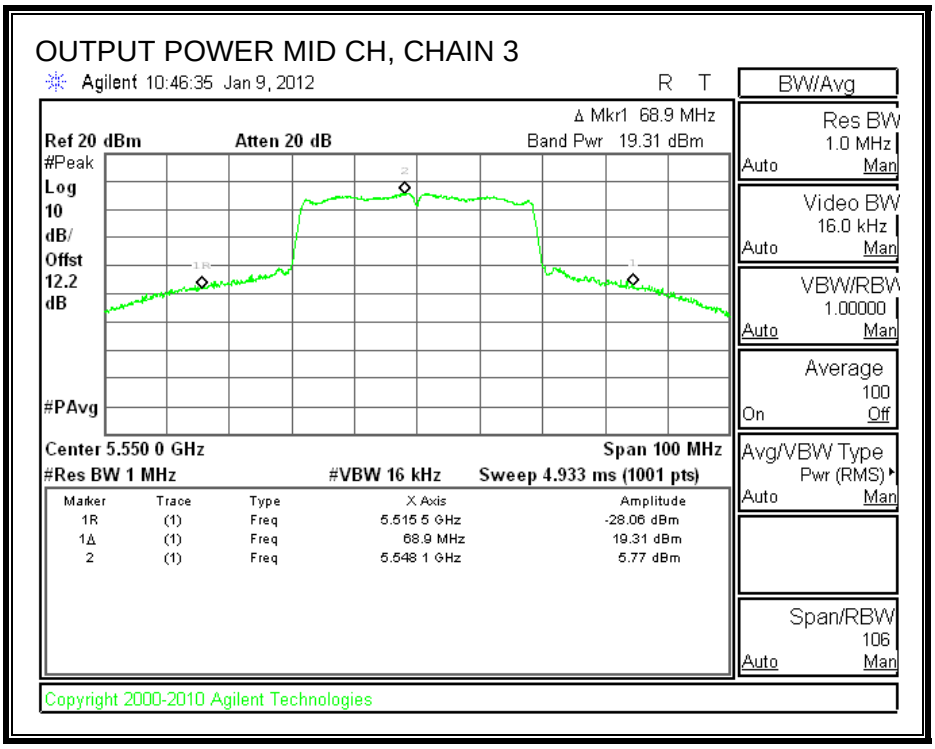


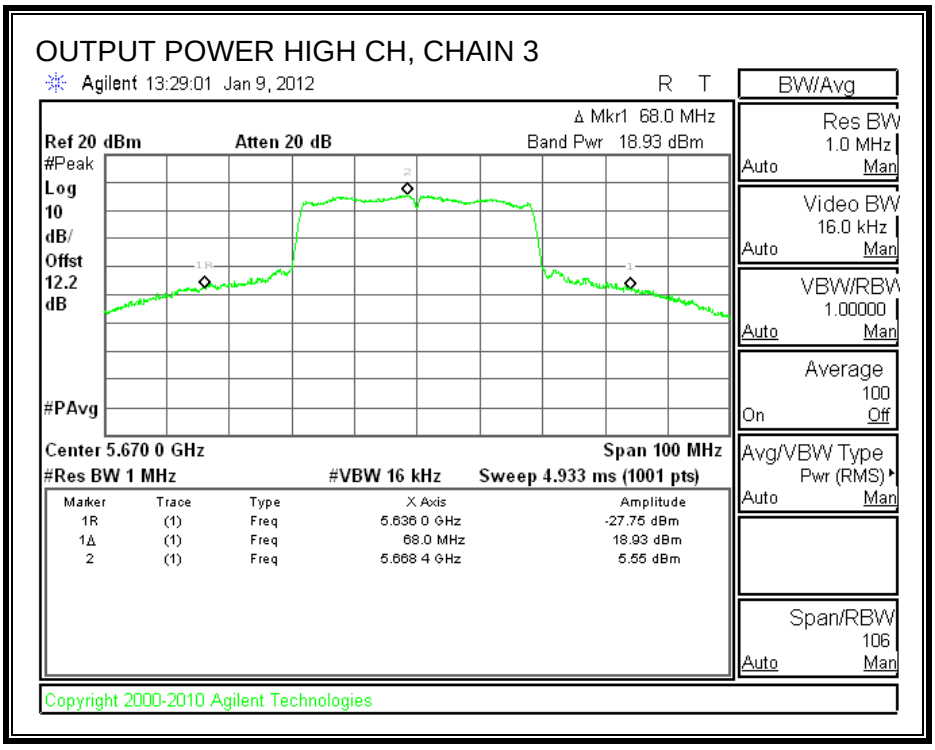




CHAIN 3 OUTPUT POWER







7.21.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	5510	15.72	15.63	15.58	20.41
Middle	5550	15.84	15.53	16.41	20.71
High	5670	15.58	15.88	16.11	20.63

7.21.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit 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 maximum antenna gain is 6.39 dBi, therefore the limit is 10.61 dBm.

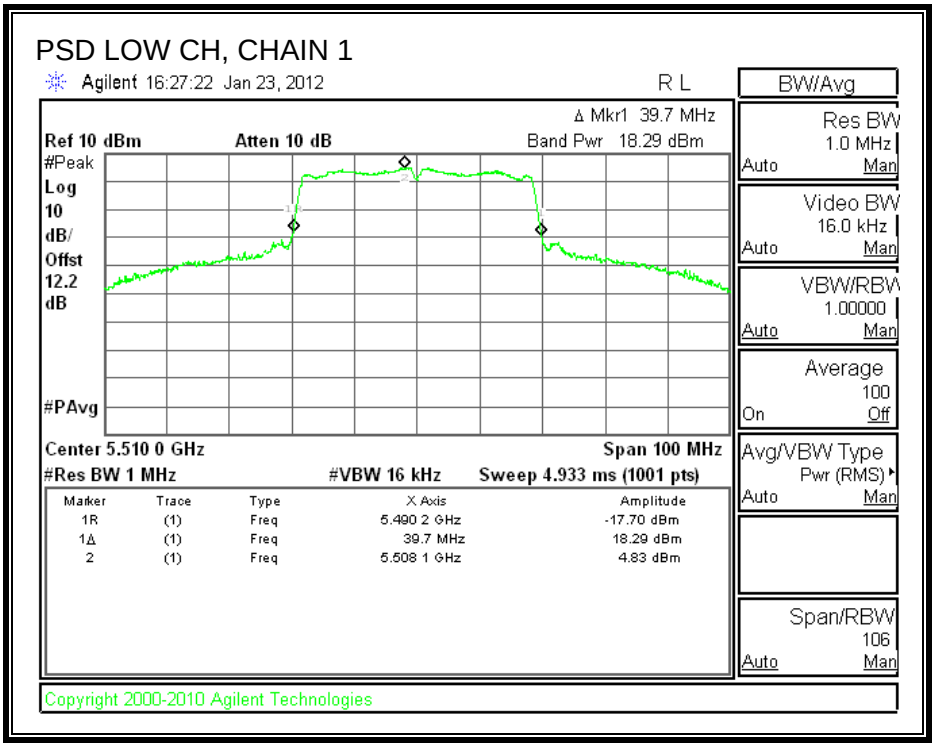
TEST PROCEDURE

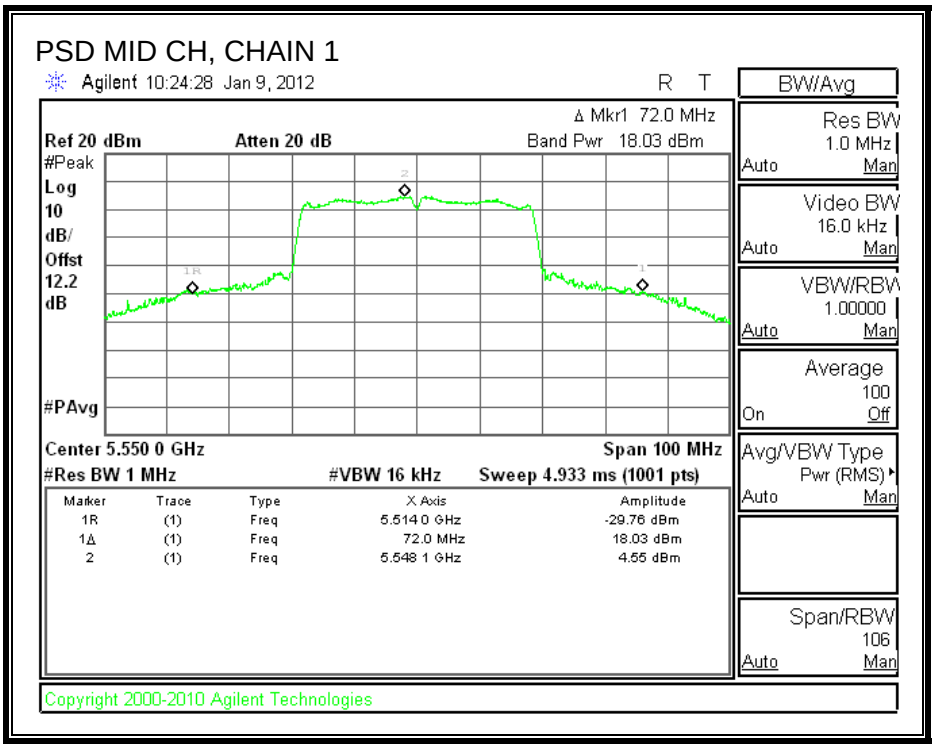
Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

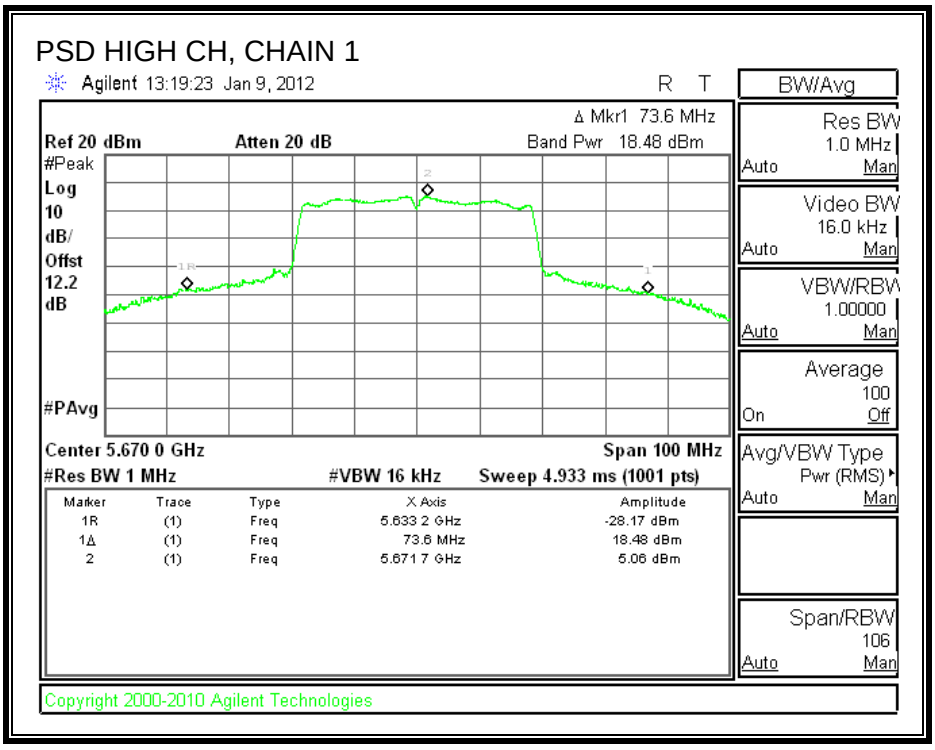
RESULTS

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Chain 3 PPSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5510	4.83	4.88	4.92	9.65	10.61	-0.96
Middle	5550	4.55	5.10	5.77	9.94	10.61	-0.67
High	5670	5.06	5.46	5.55	10.13	10.61	-0.48

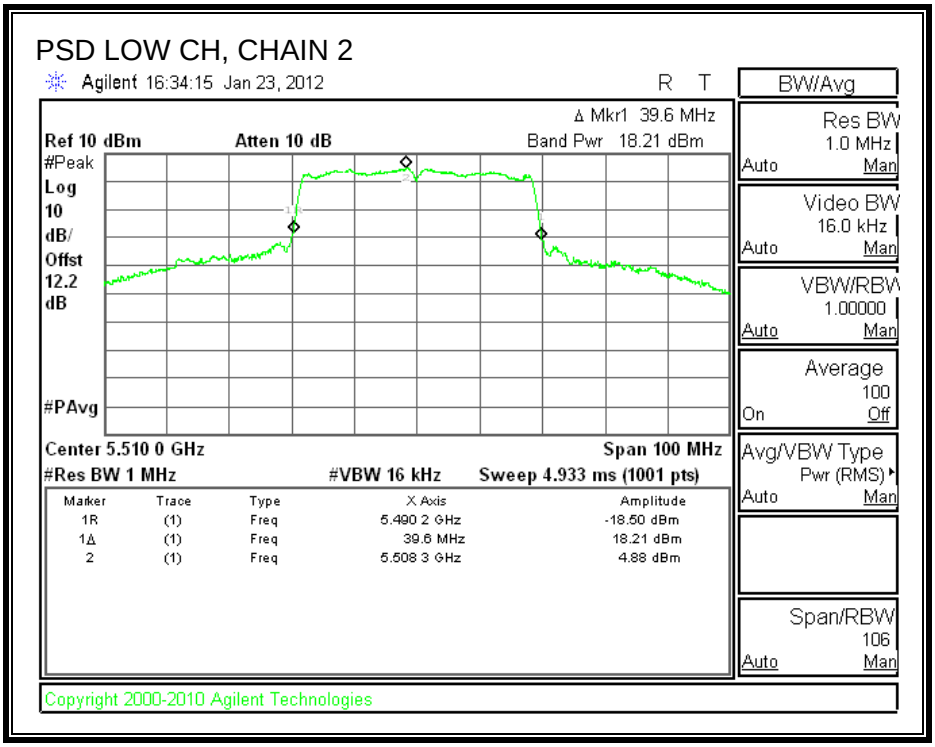
CHAIN 1 POWER SPECTRAL DENSITY

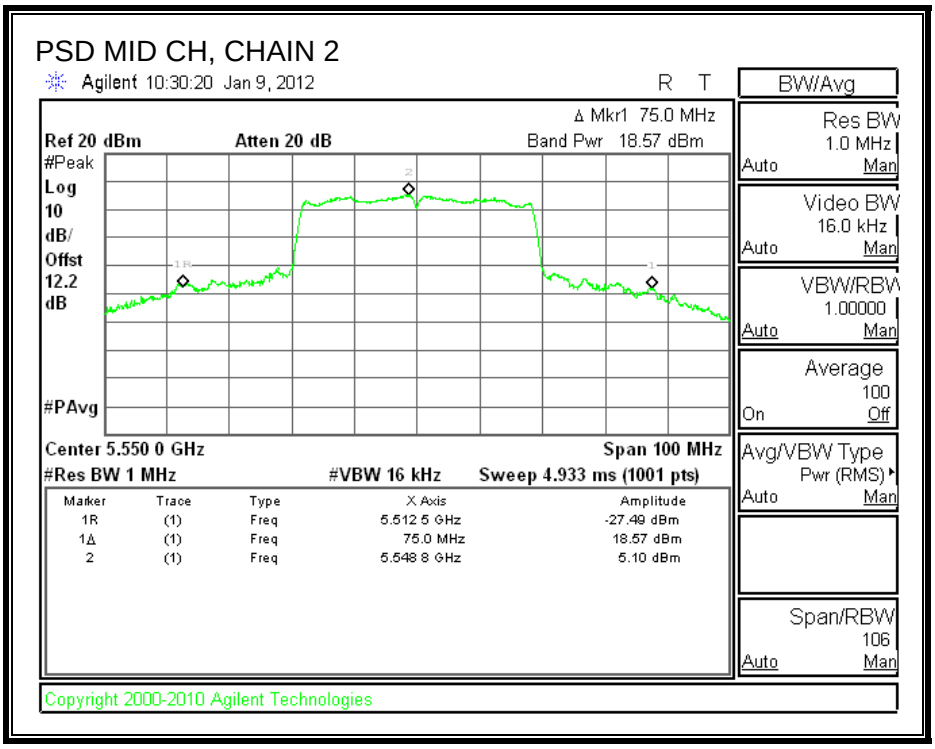


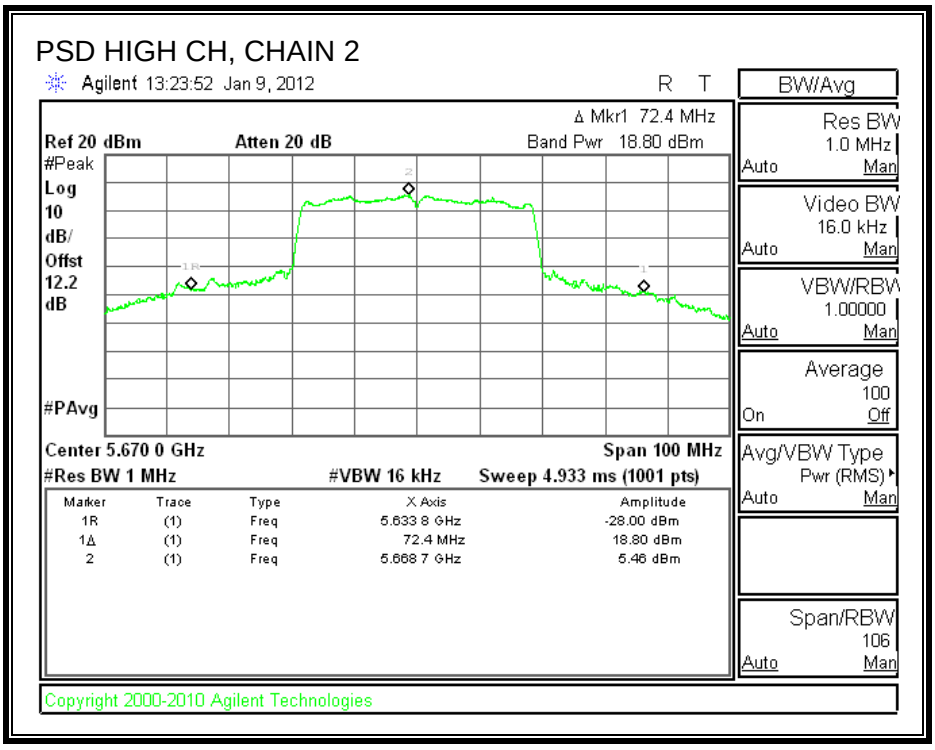




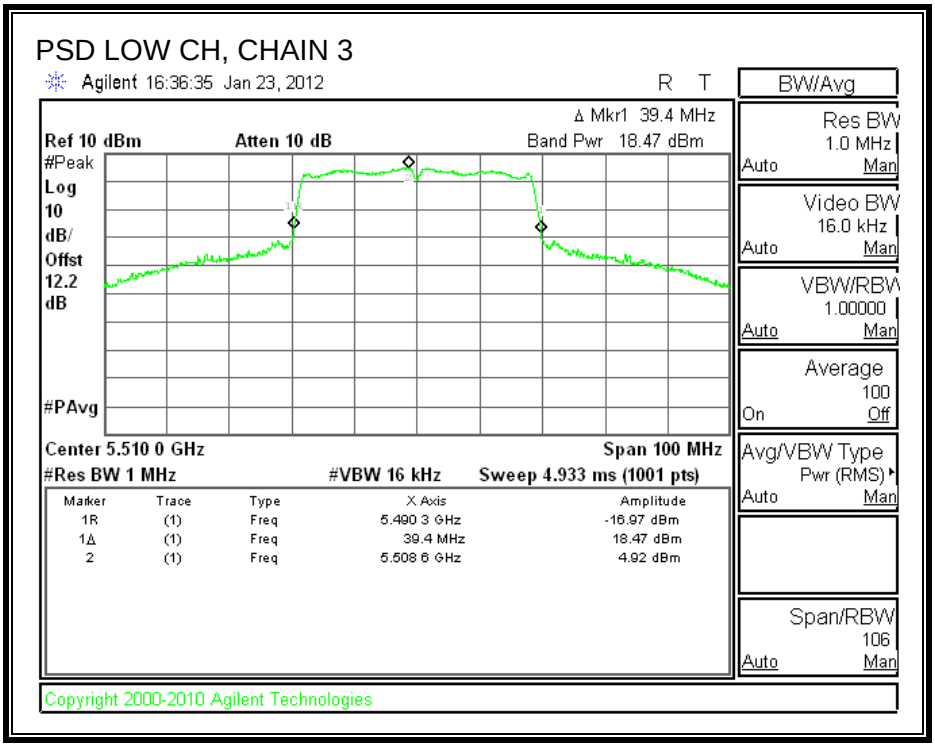
CHAIN 2 POWER SPECTRAL DENSITY

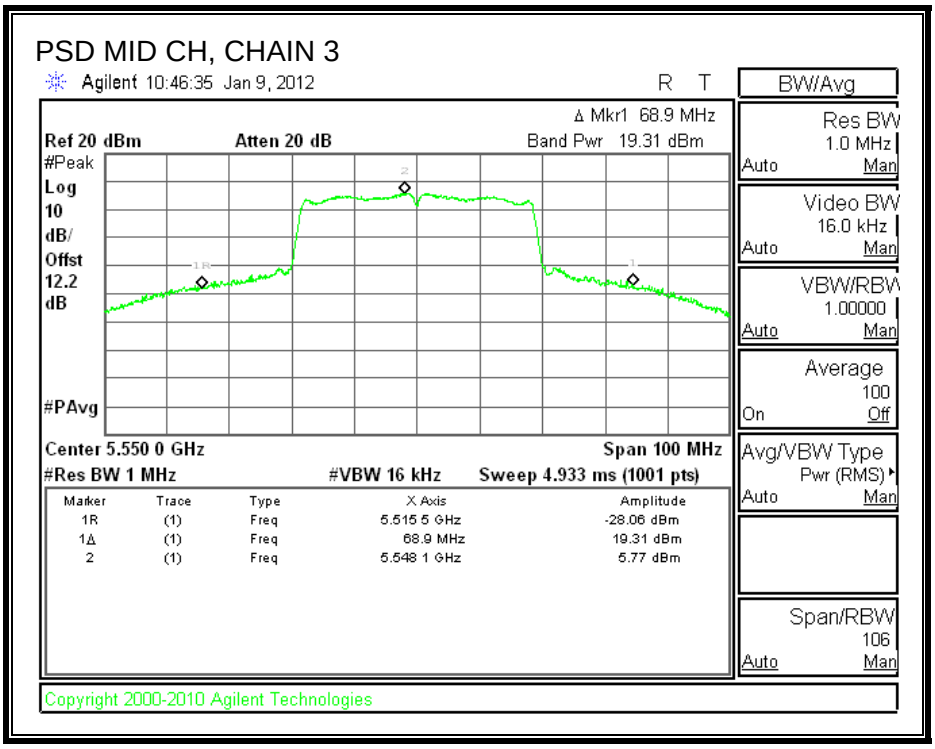


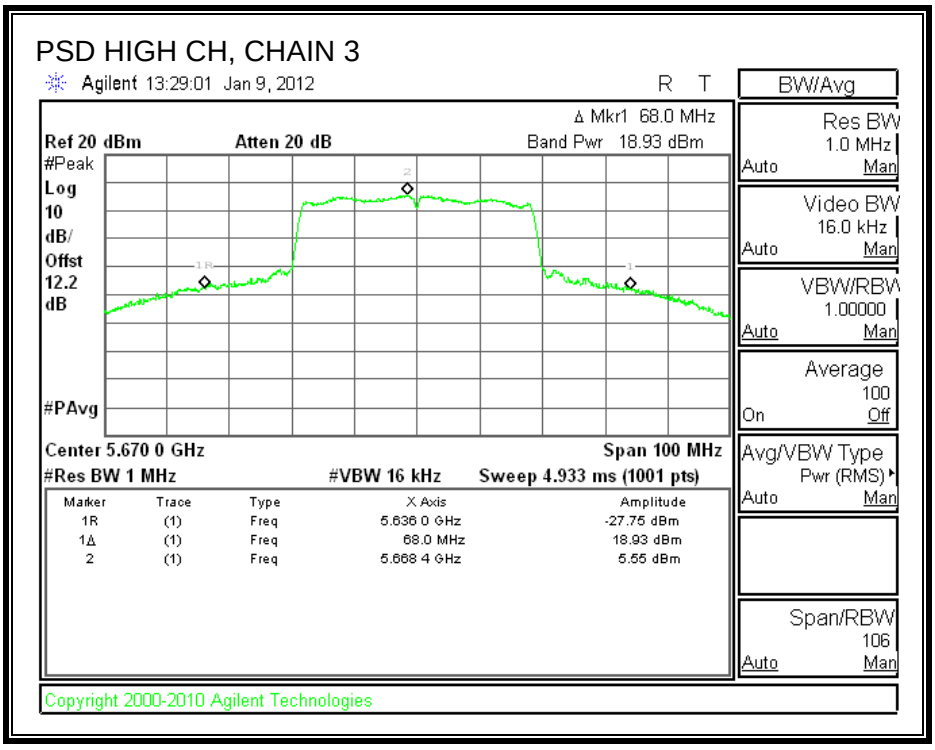




CHAIN 3 POWER SPECTRAL DENSITY







7.21.5. 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.

TEST PROCEDURE

Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, dated 10/25/2011.

RESULTS

CHAIN 1

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	6.87	13	-6.13
Middle	5550	5.55	13	-7.45
High	5670	5.25	13	-7.75

CHAIN 2

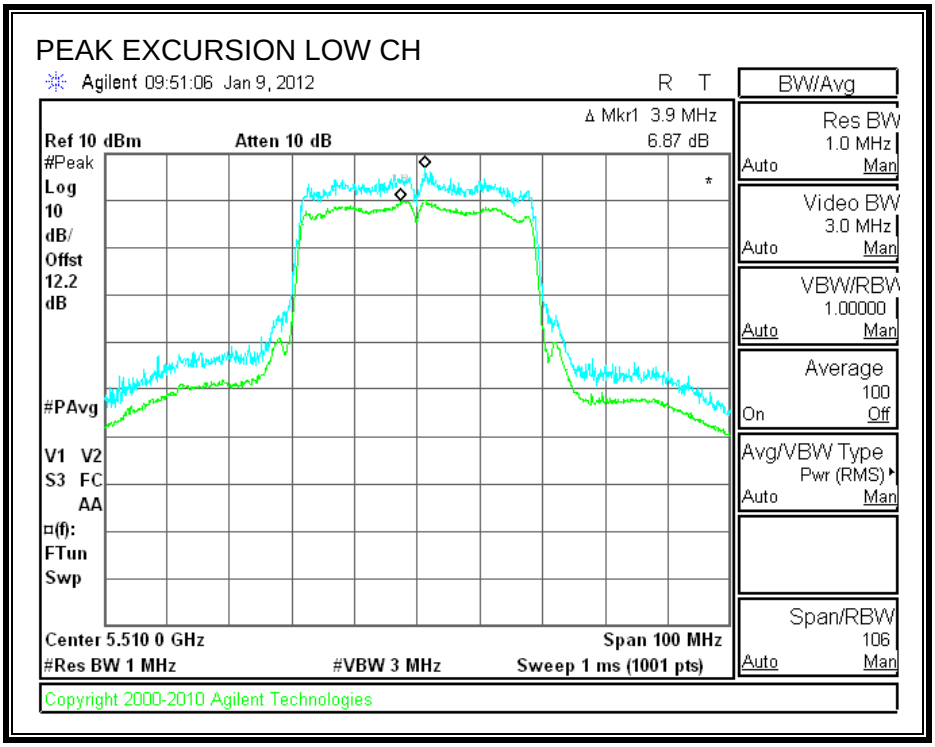
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	4.76	13	-8.24
Middle	5550	5.66	13	-7.34
High	5670	5.06	13	-7.94

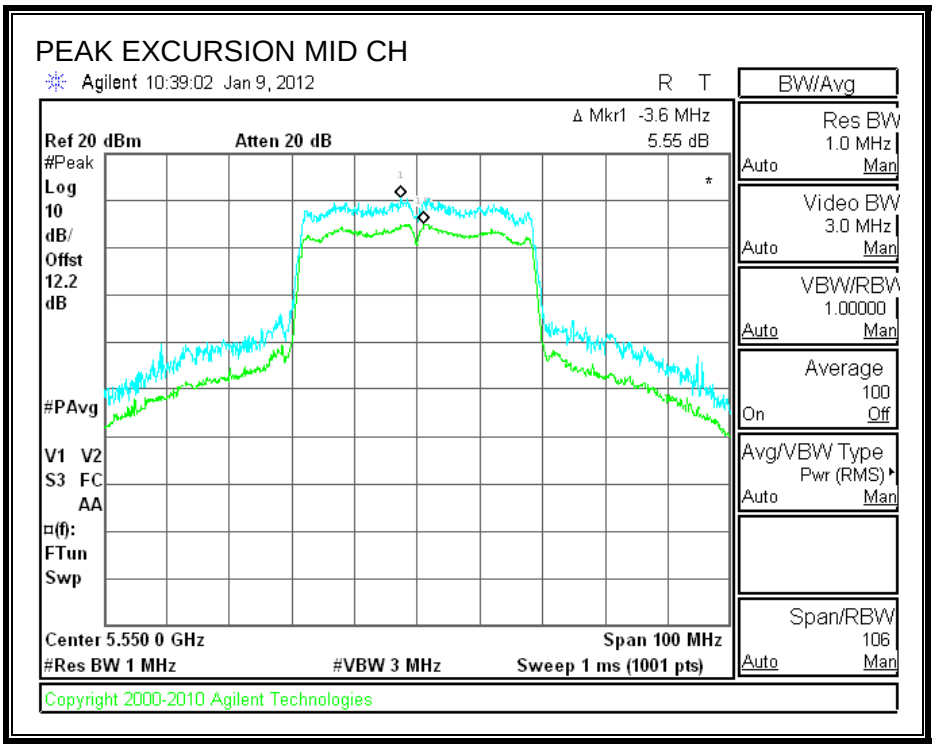
CHAIN 3

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	5.71	13	-7.29
Middle	5550	6.03	13	-6.97
High	5670	5.77	13	-7.23

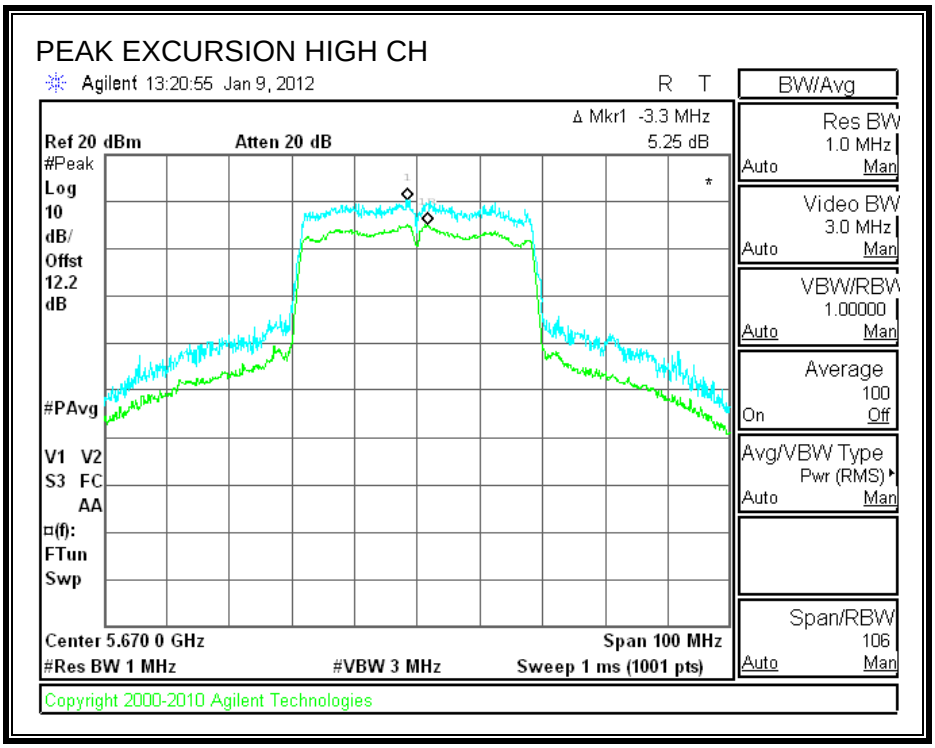
CHAIN 1

PEAK EXCURSION



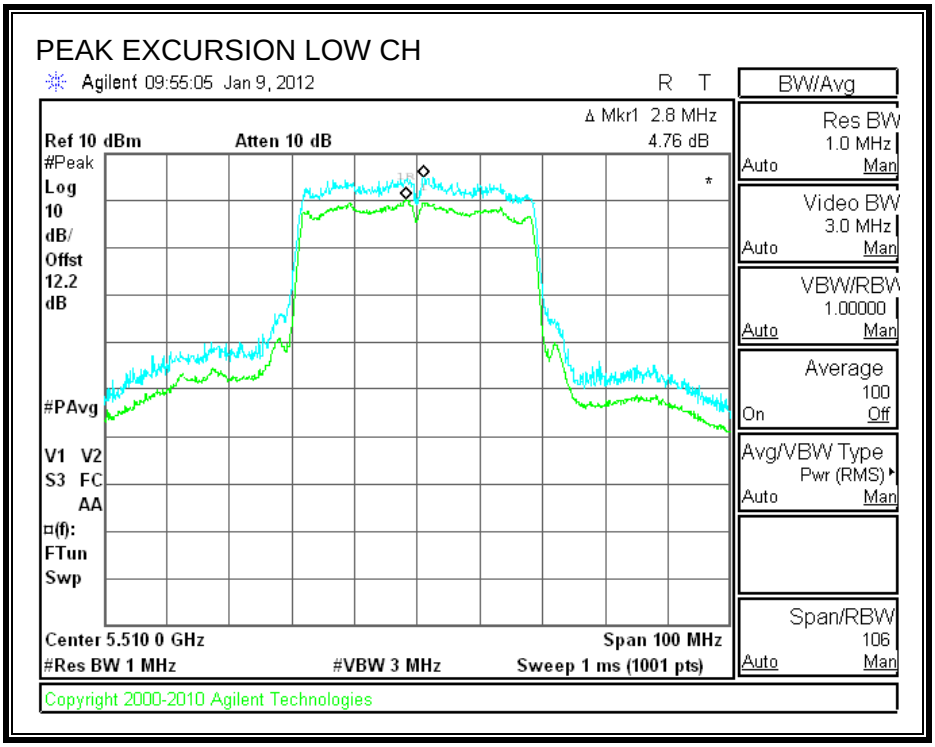


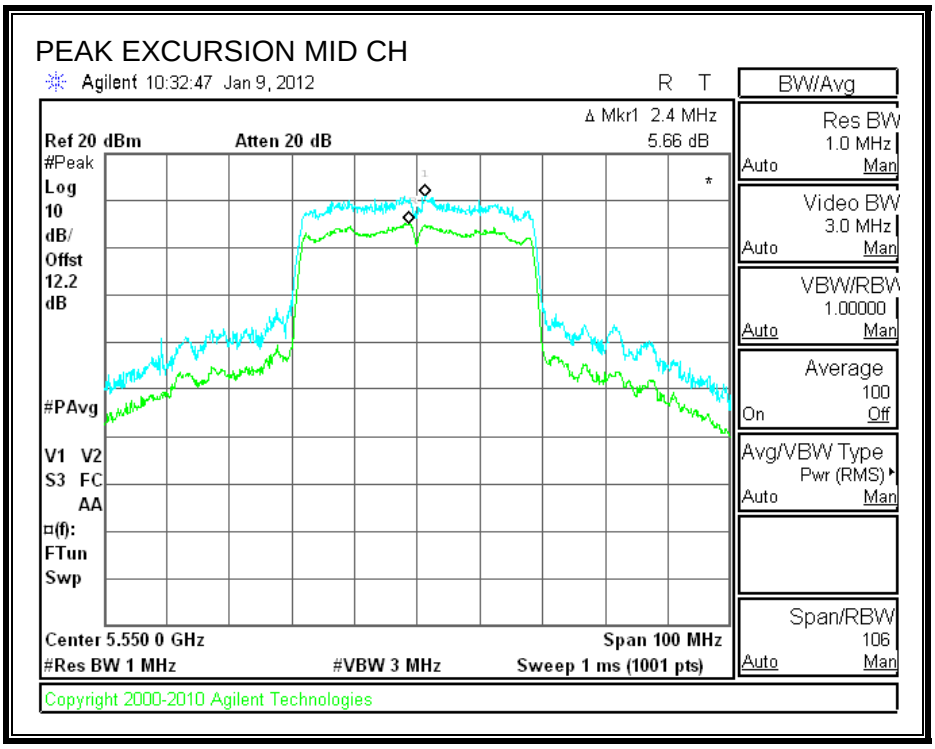
PEAK EXCURSION HIGH CH



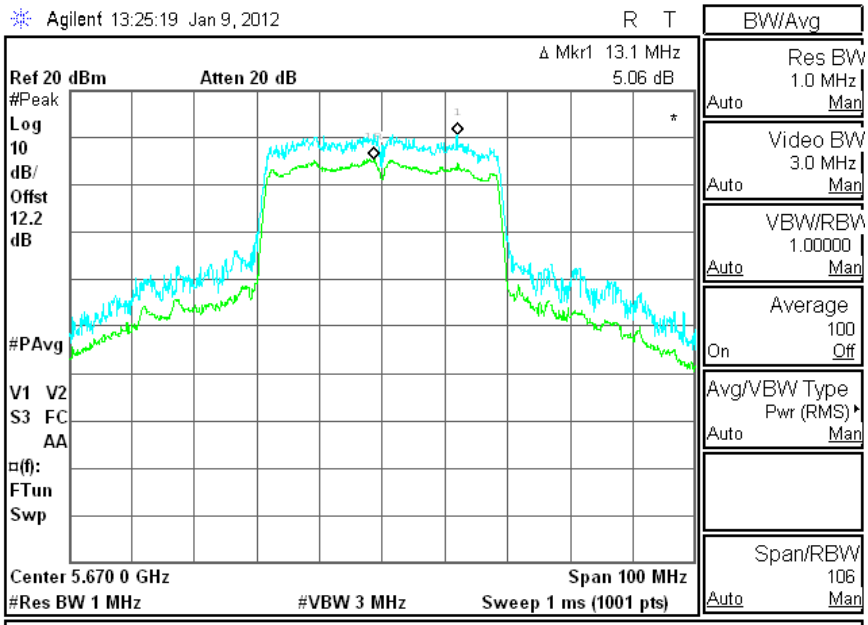
CHAIN 2

PEAK EXCURSION



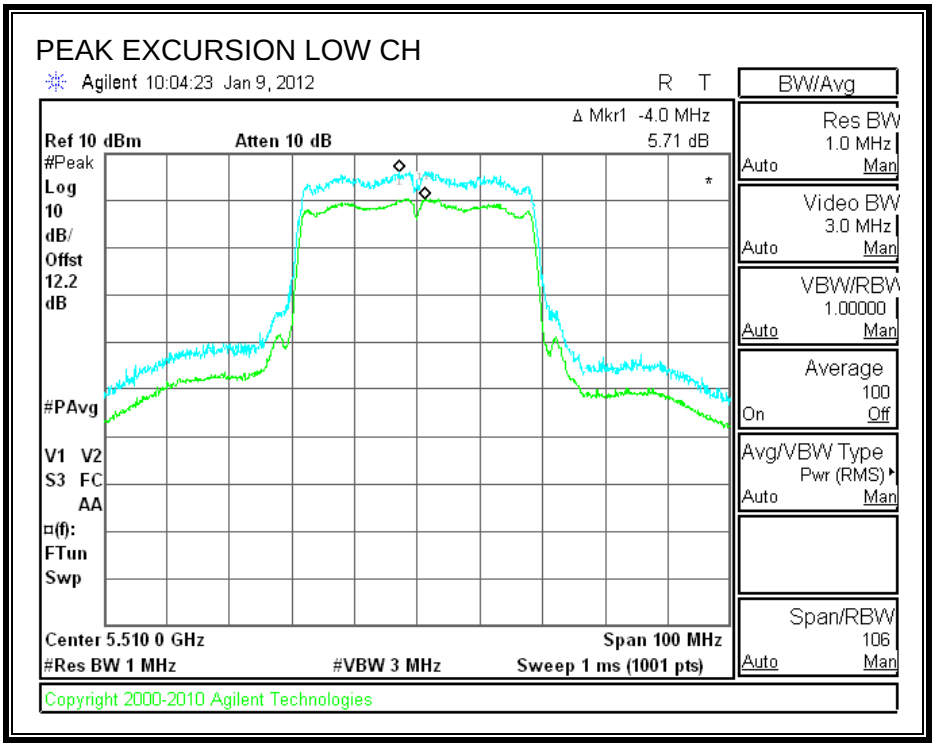


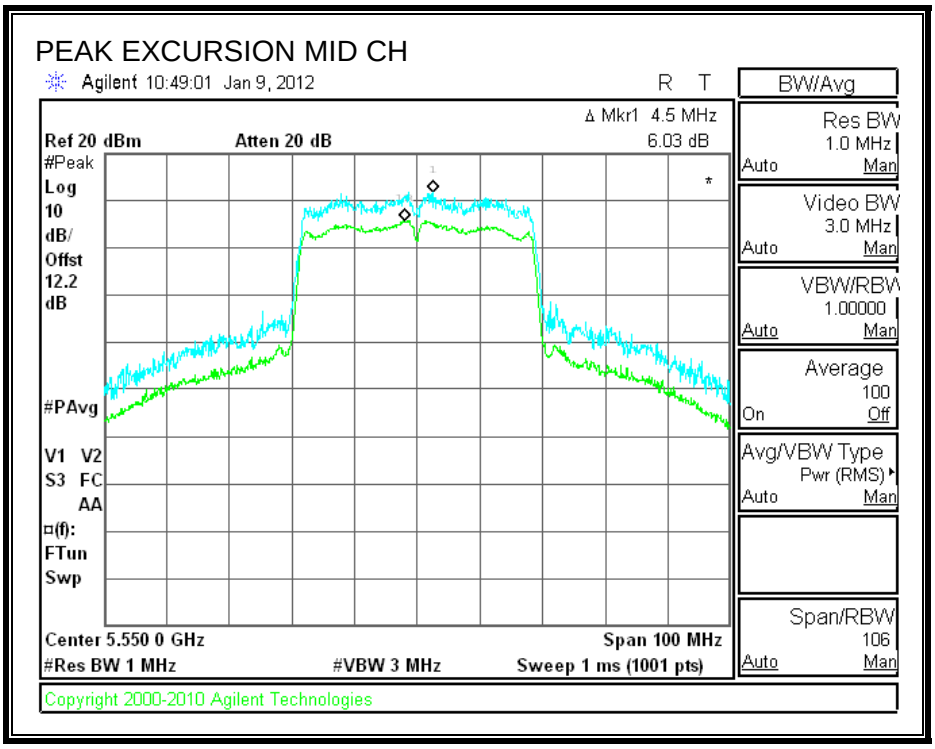
PEAK EXCURSION HIGH CH



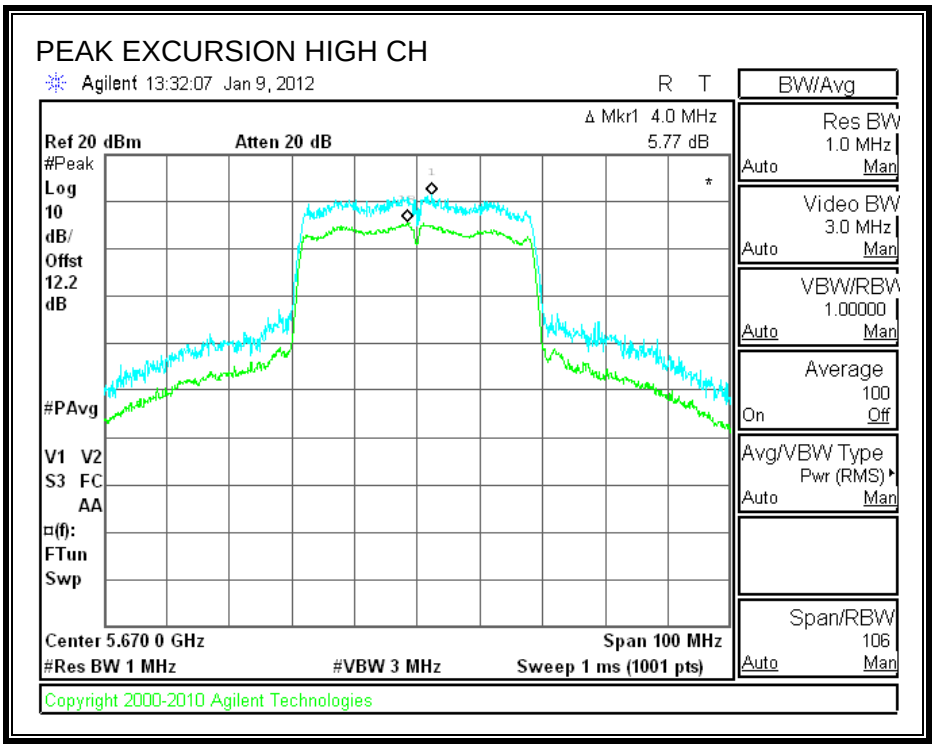
CHAIN 3

PEAK EXCURSION





PEAK EXCURSION HIGH CH



8. RADIATED TEST RESULTS

8.1. 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. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

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, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz 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.

8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. TX ABOVE 1 GHz FOR 802.11a 1TX MODE IN THE 5.2 GHz BAND

LEGACY

Covered by testing to 11n HT20 3x3 CCD MCS0

8.2.2. TX ABOVE 1 GHz FOR 802.11a 2TX MODE IN THE 5.2 GHz BAND

STBC MCS0

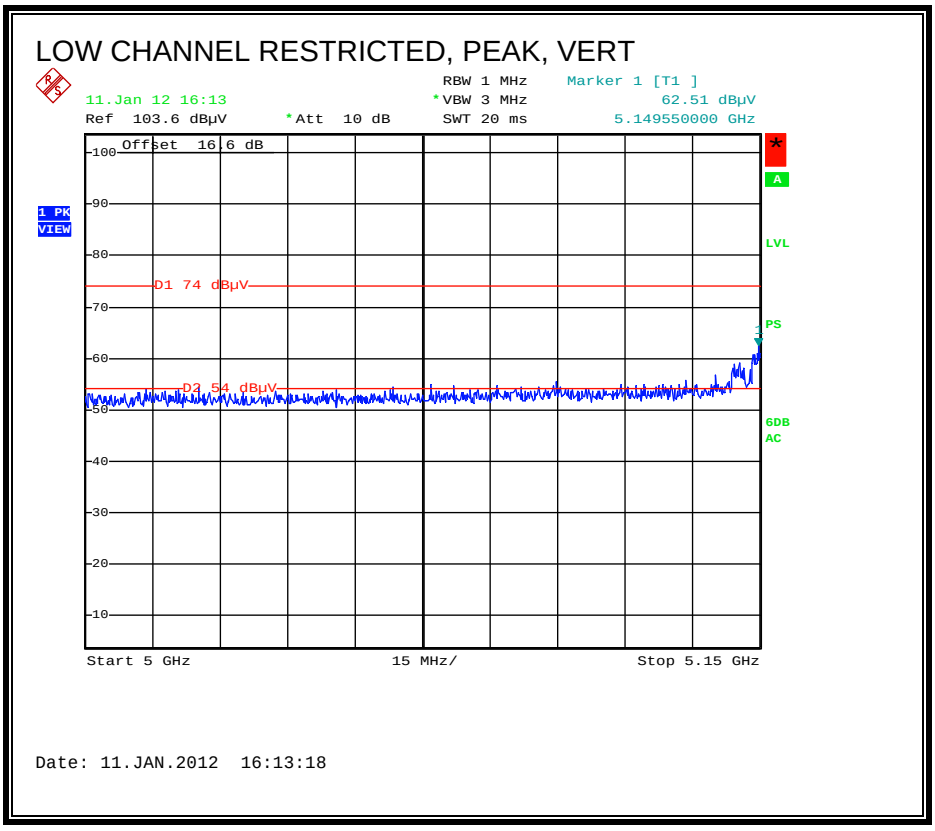
Covered by testing to 11n HT20 3x3 CCD MCS0

8.2.3. TX ABOVE 1 GHz FOR 802.11n 3TX HT20 MODE IN THE 5.2 GHz BAND

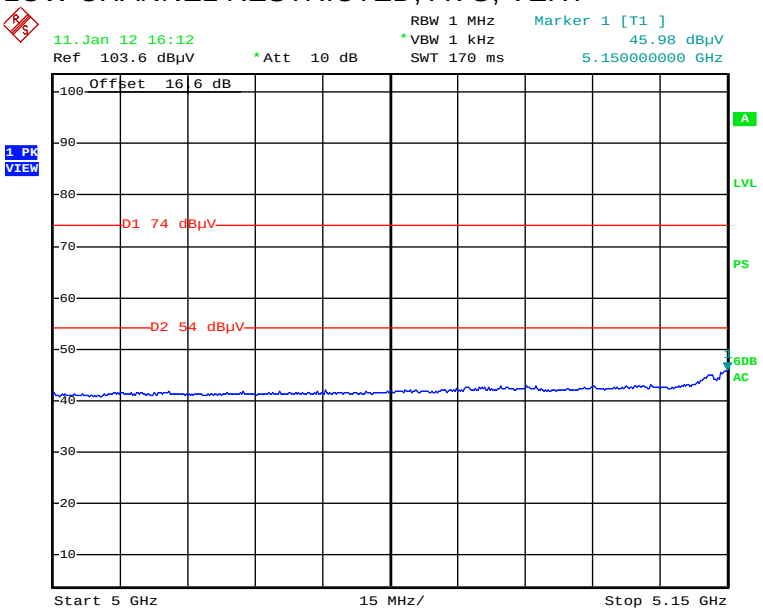
CDD MCS0

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 @ 14 dBm average power per chain at worst case mode / power to cover all 1x3 & 2x2 modes.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



Date: 11.JAN.2012 16:12:38

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 12/29/11
Project #: 11U14154
Company: Broadcom
Test Target: FCC 15.205
Mode Oper: HT20 3x3 MCS0 CDD, 5.2GHz Band

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		

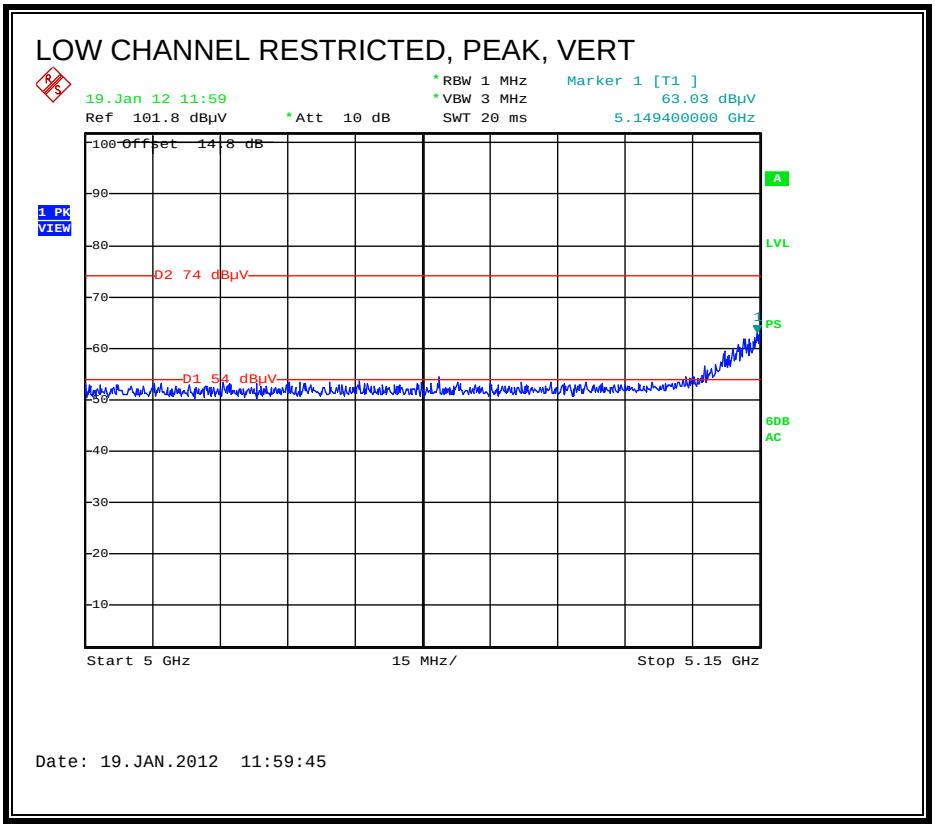
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel: 5180 MHz															
15.540	3.0	34.8	39.1	13.0	-32.2	0.0	0.7	55.4	74.0	-18.6	H	P	158.0	92.0	
15.540	3.0	21.9	39.1	13.0	-32.2	0.0	0.7	42.4	54.0	-11.6	H	A	158.0	92.0	
15.540	3.0	34.6	39.1	13.0	-32.2	0.0	0.7	55.2	74.0	-18.8	V	P	141.0	137.0	
15.540	3.0	21.9	39.1	13.0	-32.2	0.0	0.7	42.4	54.0	-11.6	V	A	141.0	137.0	
Mid Channel: 5200 MHz															
15.600	3.0	33.9	38.8	13.0	-32.2	0.0	0.7	54.2	74.0	-19.8	V	P	158.0	339.0	
15.600	3.0	21.8	38.8	13.0	-32.2	0.0	0.7	42.2	54.0	-11.8	V	A	158.0	339.0	
15.600	3.0	34.2	38.8	13.0	-32.2	0.0	0.7	54.6	74.0	-19.4	H	P	98.0	254.0	
15.600	3.0	21.8	38.8	13.0	-32.2	0.0	0.7	42.2	54.0	-11.8	H	A	98.0	254.0	
High ch 5240															
15.720	3.0	33.6	38.4	13.1	-32.2	0.0	0.7	53.6	74.0	-20.4	H	P	177.0	196.0	
15.720	3.0	21.6	38.4	13.1	-32.2	0.0	0.7	41.6	54.0	-12.4	H	A	177.0	196.0	
15.720	3.0	33.7	38.4	13.1	-32.2	0.0	0.7	53.8	74.0	-20.2	V	P	158.0	304.0	
15.720	3.0	21.7	38.4	13.1	-32.2	0.0	0.7	41.7	54.0	-12.3	V	A	158.0	304.0	

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

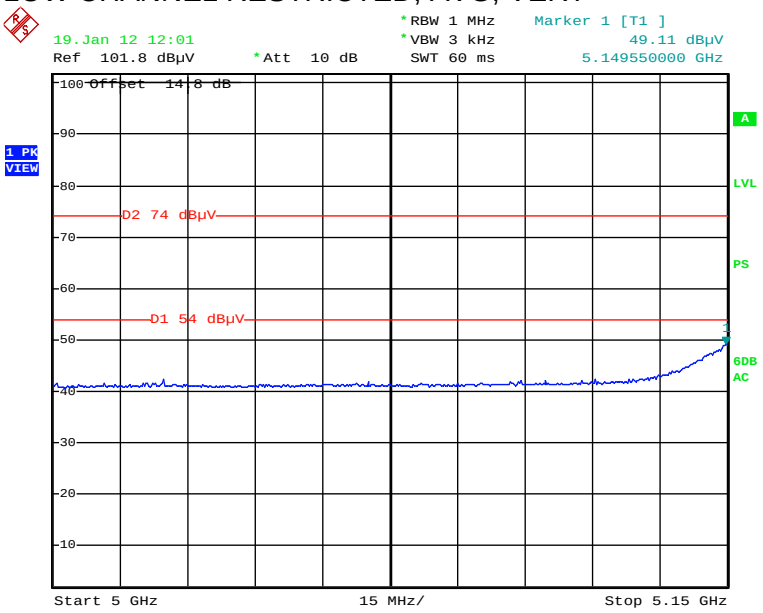
8.2.4. TX ABOVE 1 GHz FOR 802.11n HT40 1TX MODE IN THE 5.2 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



Date: 19.JAN.2012 12:01:43

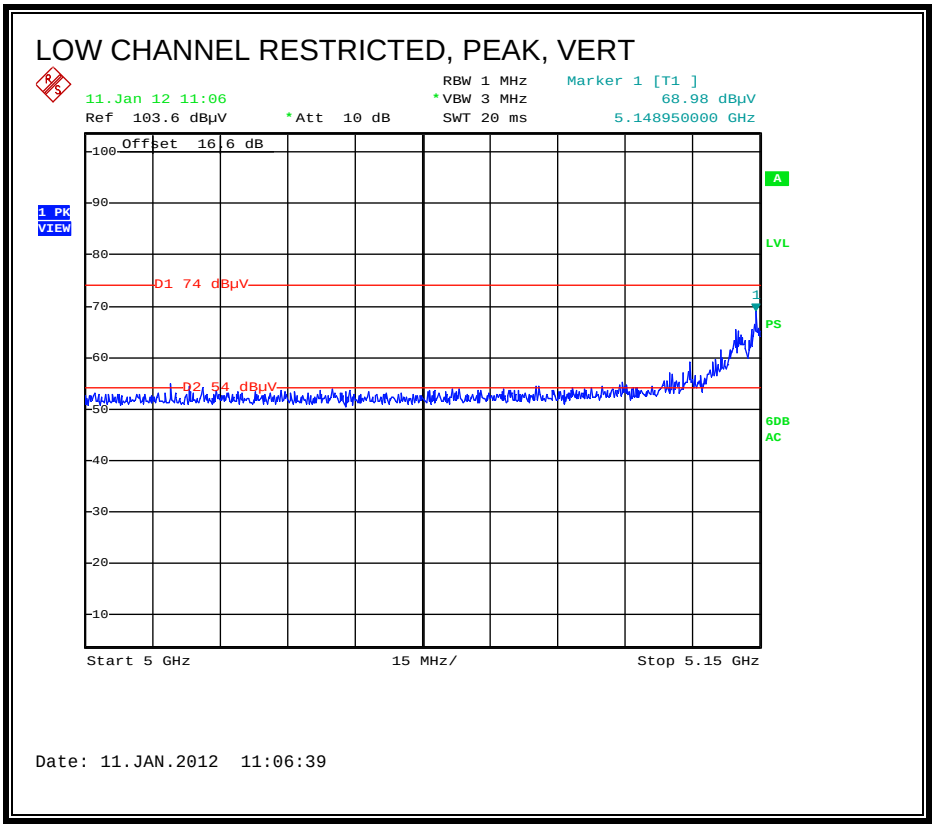
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT40 CDD MCS0

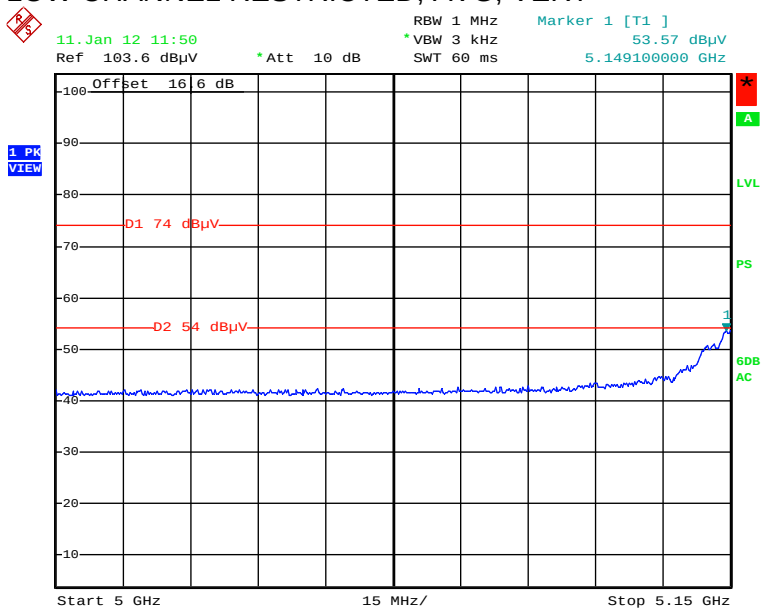
8.2.5. TX ABOVE 1 GHz FOR 802.11n HT40 3TX MODE IN THE 5.2 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



Date: 11.JAN.2012 11:50:07

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: BROADCOM
Project #: 11U14154
Date: 12/29/2011
Test Engineer: Thanh Nguyen
Configuration: EUT, Support Laptop, Antenna
Mode: HT40 3x3 MCS0 CDD, 5.2GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low ch 5190															
15.545	3.0	34.6	22.1	39.0	13.0	-31.9	0.0	0.7	55.4	43.0	74	54	-18.6	-11.0	H/noise floor
15.545	3.0	33.9	21.9	39.0	13.0	-31.9	0.0	0.7	54.8	42.7	74	54	-19.2	-11.3	V/noise floor
High ch 5230															
15.690	3.0	35.0	22.1	38.5	13.0	-31.9	0.0	0.7	55.4	42.5	74	54	-18.6	-11.5	V/noise floor
15.690	3.0	35.6	22.0	38.5	13.0	-31.9	0.0	0.7	56.0	42.4	74	54	-18.0	-11.6	H/noise floor

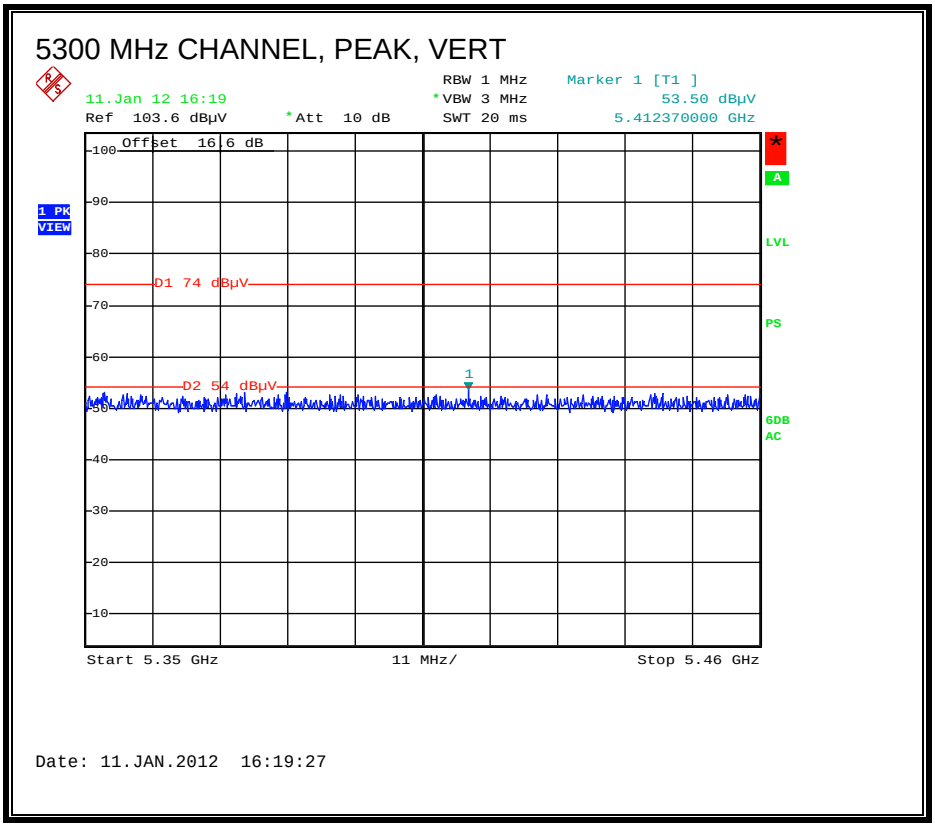
Rev. 07.08.11

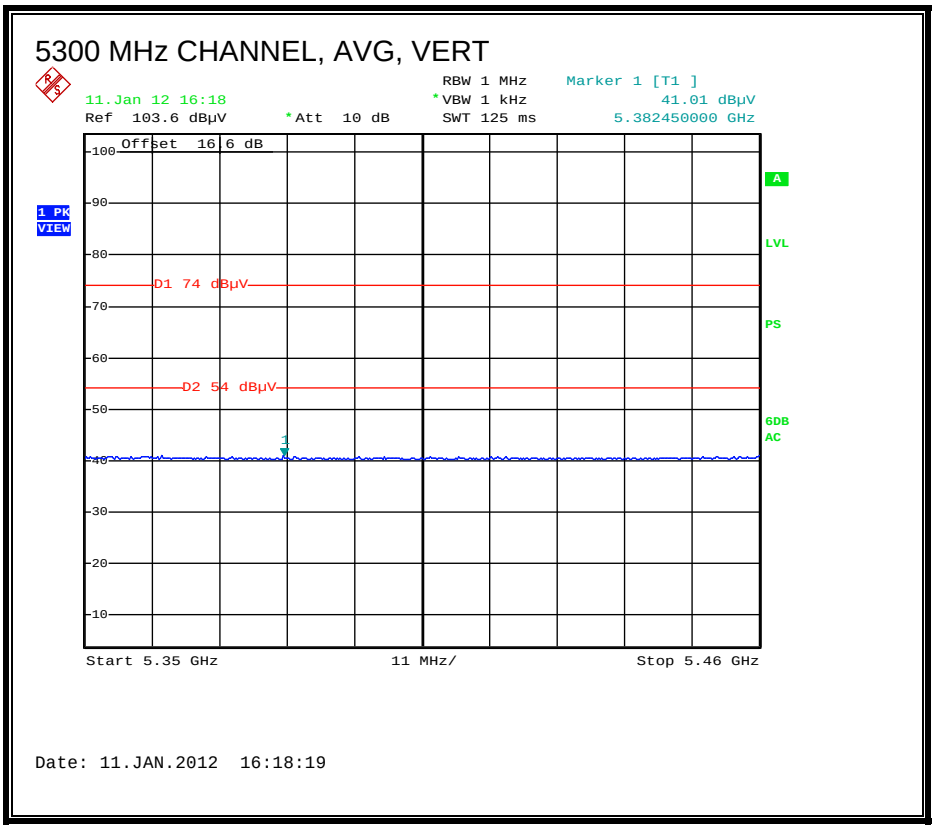
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

8.2.6. TX ABOVE 1 GHz FOR 802.11a 1TX MODE IN THE 5.3 GHz BAND

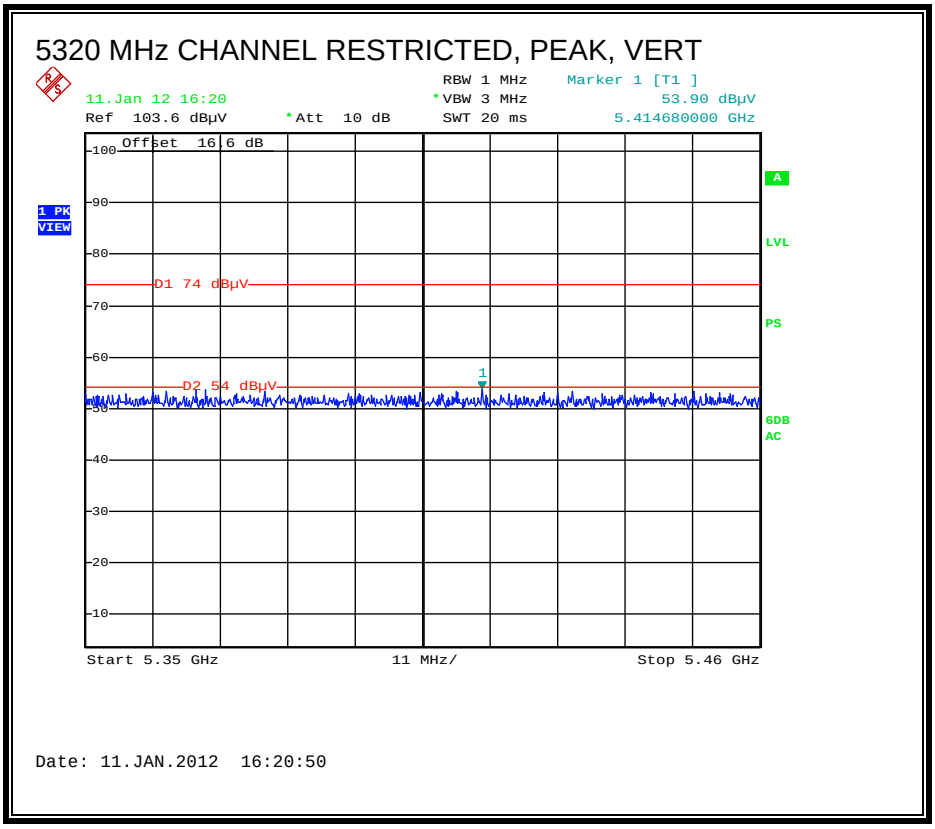
LEGACY

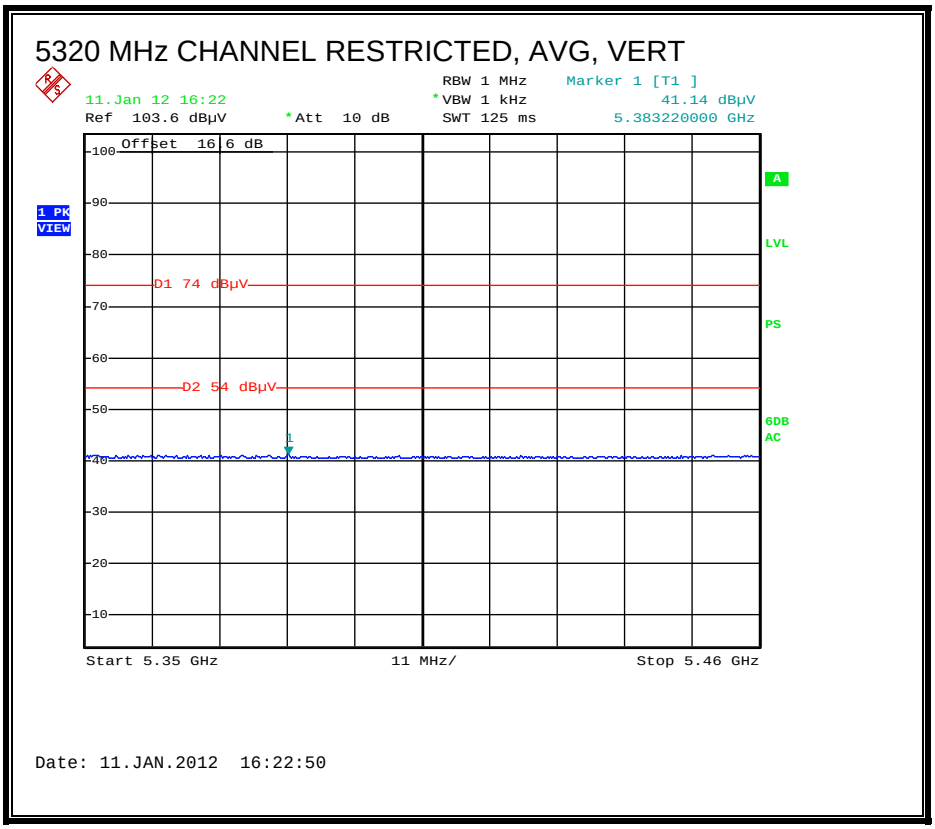
AUTHORIZED BANDEDGE (5300 MHz CHANNEL, VERTICAL)





RESTRICTED BANDEDGE (5320 MHz CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n 3x3 HT20 CDD MCS0

8.2.7. TX ABOVE 1 GHz FOR 802.11a 2TX MODE IN THE 5.3 GHz BAND

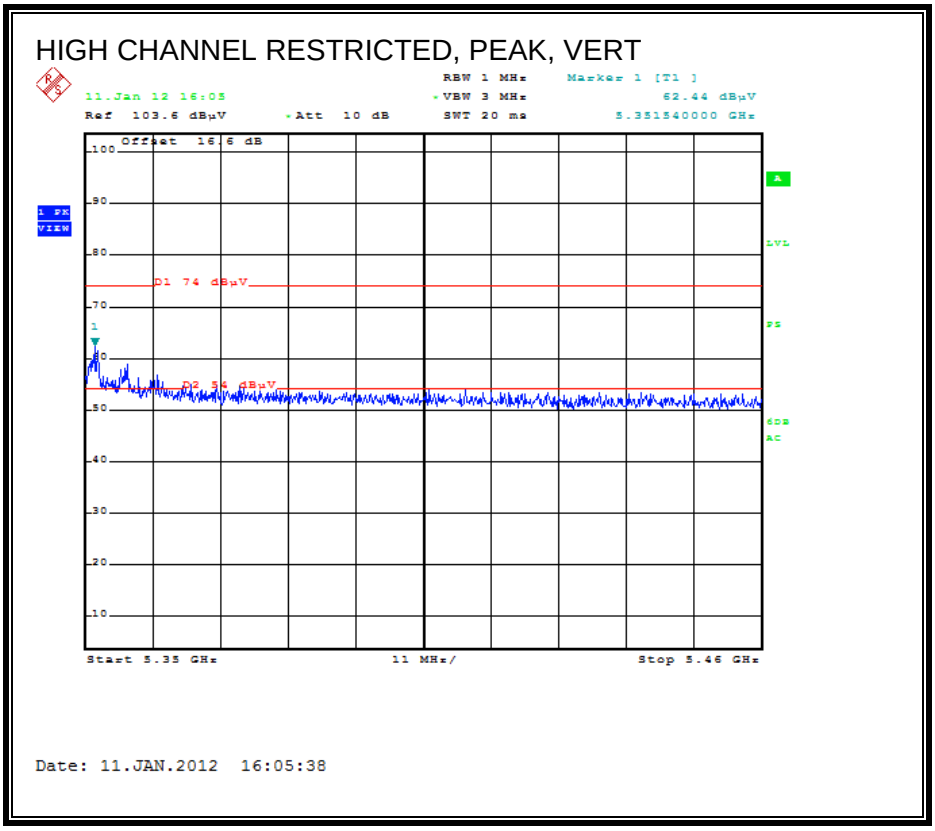
STBC MCS0

Covered by testing to 11n HT20 3x3 CCD MCS0

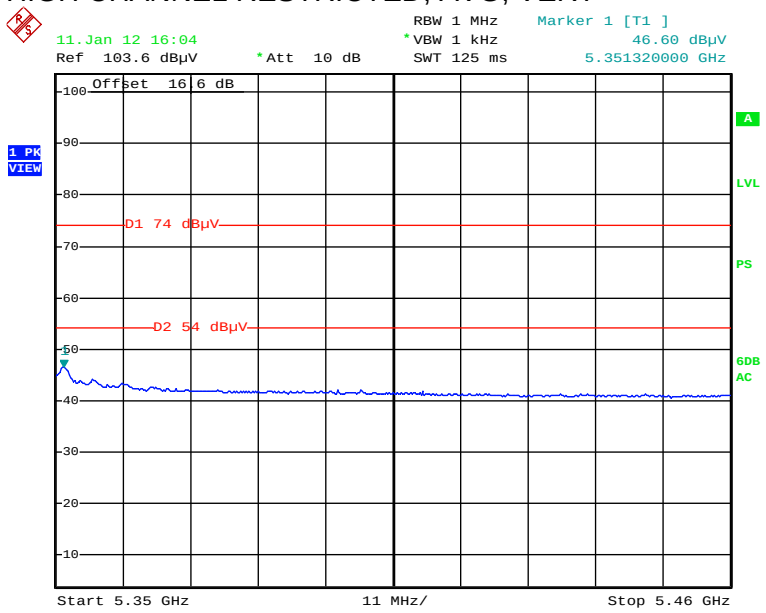
8.2.8. TX ABOVE 1 GHz FOR 802.11n HT20 3TX MODE IN THE 5.3 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



Date: 11.JAN.2012 16:04:44

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Thanh Nguyen
Date: 12/29/11
Project #: 11U14154
Company: Broadcom
Test Target: FCC 15.205
Mode Oper: HT20 3x3 MCS0 CDD, 5.2GHz Band

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		

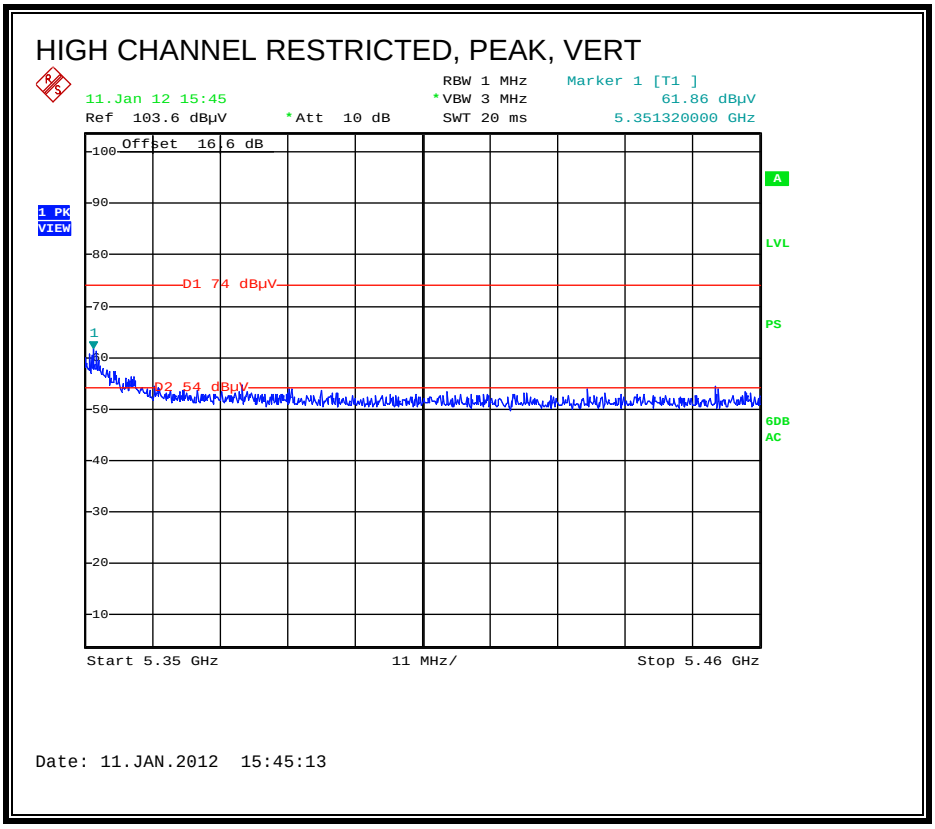
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low ch 5260															
10.520	3.0	38.6	38.4	9.8	-32.6	0.0	0.8	54.9	74.0	-19.1	V	P	98.0	20.0	
10.520	3.0	25.3	38.4	9.8	-32.6	0.0	0.8	41.7	54.0	-12.3	V	A	98.0	20.0	
15.780	3.0	38.0	38.2	13.1	-32.2	0.0	0.7	57.9	74.0	-16.1	V	P	110.0	289.0	
15.780	3.0	26.0	38.2	13.1	-32.2	0.0	0.7	45.9	54.0	-8.1	V	A	110.0	289.0	
10.520	3.0	34.6	38.4	9.8	-32.6	0.0	0.8	50.9	74.0	-23.1	H	P	105.0	252.0	
10.520	3.0	22.8	38.4	9.8	-32.6	0.0	0.8	39.1	54.0	-14.9	H	A	105.0	252.0	
15.780	3.0	34.8	38.2	13.1	-32.2	0.0	0.7	54.6	74.0	-19.4	H	P	127.0	275.0	
15.780	3.0	22.5	38.2	13.1	-32.2	0.0	0.7	42.3	54.0	-11.7	H	A	127.0	275.0	
MidCh 5300															
10.600	3.0	39.3	38.4	9.9	-32.6	0.0	0.8	55.8	74.0	-18.2	V	P	145.0	10.0	
10.600	3.0	26.7	38.4	9.9	-32.6	0.0	0.8	43.1	54.0	-10.9	V	A	145.0	10.0	
15.900	3.0	35.4	37.8	13.2	-32.1	0.0	0.7	54.9	74.0	-19.1	V	P	98.0	287.0	
15.900	3.0	24.0	37.8	13.2	-32.1	0.0	0.7	43.5	54.0	-10.5	V	A	98.0	287.0	
10.600	3.0	38.7	38.4	9.9	-32.6	0.0	0.8	55.2	74.0	-18.8	H	P	143.0	247.0	
10.600	3.0	25.7	38.4	9.9	-32.6	0.0	0.8	42.2	54.0	-11.8	H	A	143.0	247.0	
15.900	3.0	34.7	37.8	13.2	-32.1	0.0	0.7	54.2	74.0	-19.8	H	P	128.0	286.0	
15.900	3.0	22.7	37.8	13.2	-32.1	0.0	0.7	42.2	54.0	-11.8	H	A	128.0	286.0	
High Ch 5320															
10.640	3.0	37.9	38.4	10.0	-32.6	0.0	0.8	54.4	74.0	-19.6	H	P	127.0	234.0	
10.640	3.0	25.7	38.4	10.0	-32.6	0.0	0.8	42.2	54.0	-11.8	H	A	127.0	234.0	
15.960	3.0	36.3	37.6	13.2	-32.1	0.0	0.7	55.6	74.0	-18.4	H	P	132.0	287.0	
15.960	3.0	23.6	37.6	13.2	-32.1	0.0	0.7	42.9	54.0	-11.1	H	A	132.0	287.0	
10.640	3.0	38.8	38.4	10.0	-32.6	0.0	0.8	55.3	74.0	-18.7	V	P	98.0	28.0	
10.640	3.0	24.9	38.4	10.0	-32.6	0.0	0.8	41.4	54.0	-12.6	V	A	98.0	28.0	
15.960	3.0	37.6	37.6	13.2	-32.1	0.0	0.7	57.0	74.0	-17.0	V	P	131.0	289.0	
15.960	3.0	25.5	37.6	13.2	-32.1	0.0	0.7	44.8	54.0	-9.2	V	A	131.0	289.0	

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

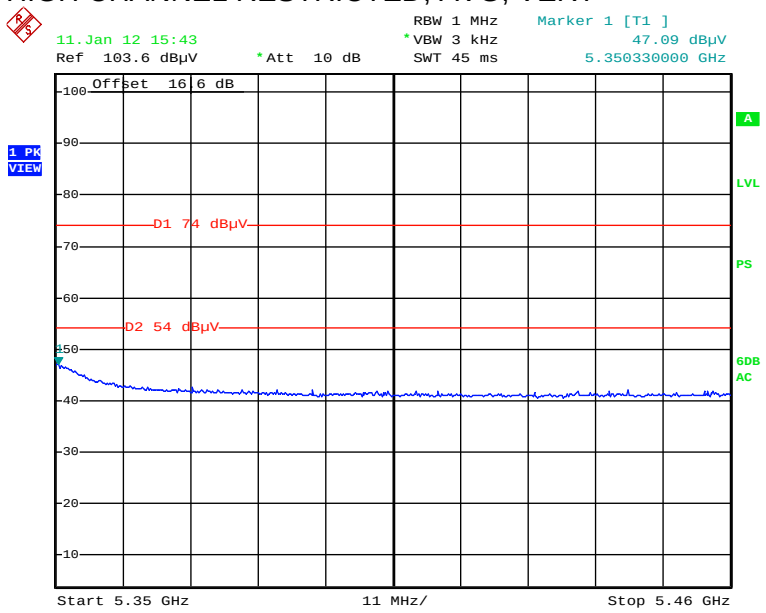
8.2.9. TX ABOVE 1 GHz FOR 802.11n HT40 1TX MODE IN THE 5.3 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



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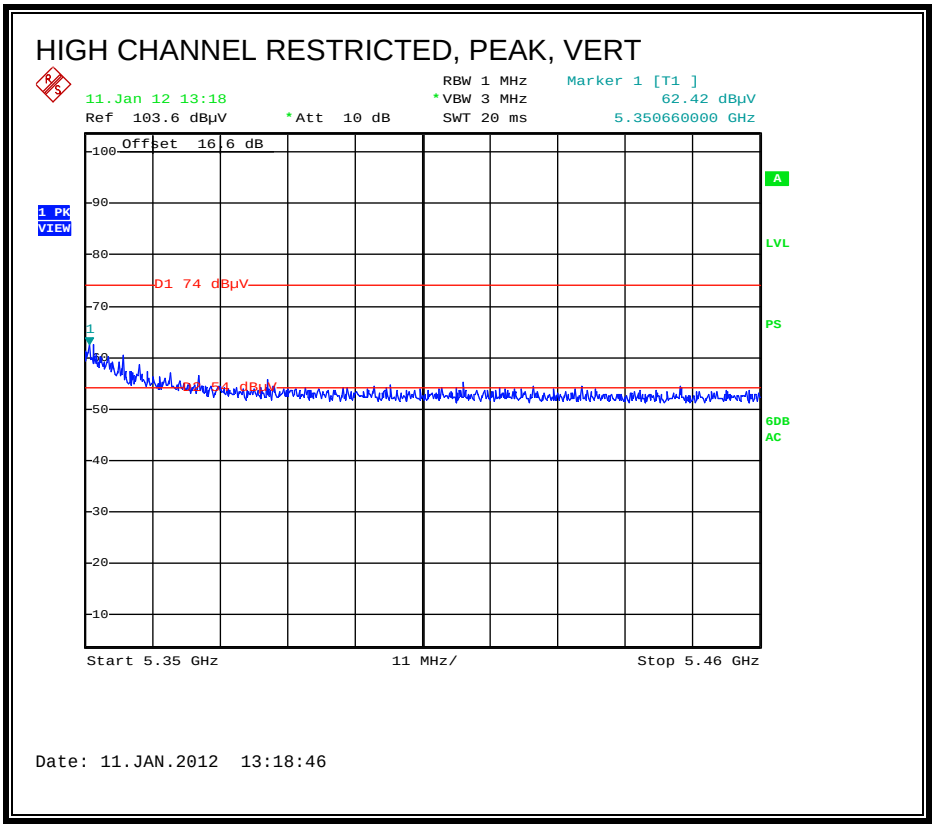
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT40 3x3 CDD MCS0

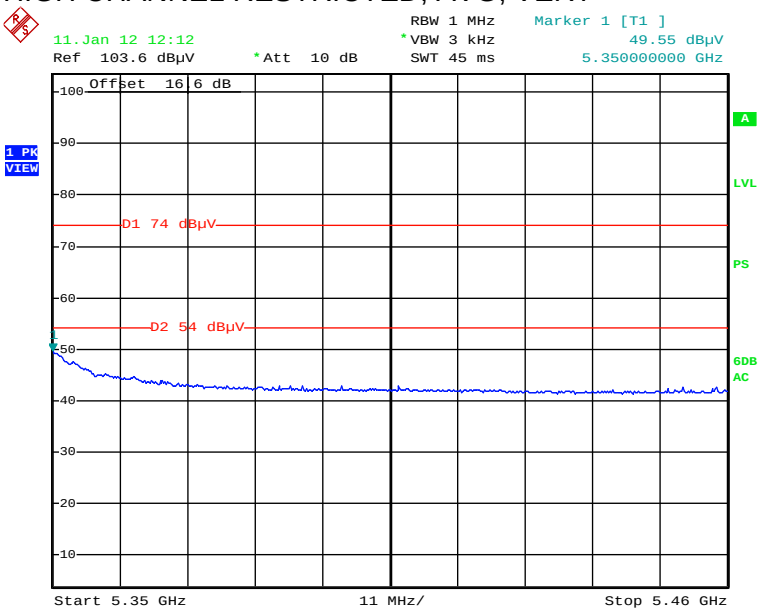
8.2.10. TX ABOVE 1 GHz FOR 802.11n HT40 3TX MODE IN THE 5.3 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



Date: 11.JAN.2012 12:12:36

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: BROADCOM
Project #: 11U14154
Date: 11/10/2011
Test Engineer: Thanh Nguyen
Configuration: EUT, Support Laptop, Antenna
Mode: HT40 3x3 MCS0 CDD, 5.3GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low ch 5270															
15.810	3.0	33.9	22.0	38.1	13.1	-31.9	0.0	0.7	54.0	42.0	74	54	-20.0	-12.0	H
15.810	3.0	34.2	21.9	38.1	13.1	-31.9	0.0	0.7	54.2	41.9	74	54	-19.8	-12.1	V
High ch 5310															
10.620	3.0	35.8	23.2	38.4	9.9	-32.5	0.0	0.8	52.4	39.8	74	54	-21.6	-14.2	V
15.930	3.0	34.1	22.0	37.7	13.2	-31.8	0.0	0.7	53.8	41.8	74	54	-20.2	-12.2	V
10.620	3.0	37.0	23.8	38.4	9.9	-32.5	0.0	0.8	53.6	40.4	74	54	-20.4	-13.6	H
15.930	3.0	35.6	22.1	37.7	13.2	-31.8	0.0	0.7	55.3	41.8	74	54	-18.7	-12.2	H

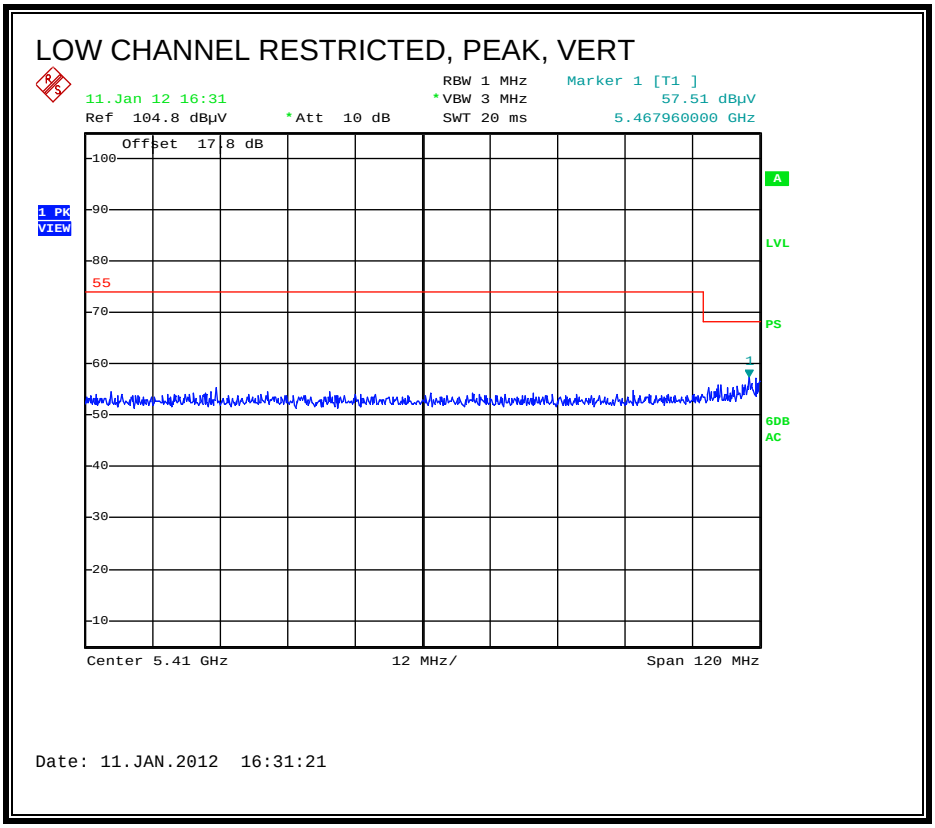
Rev. 07.08.11

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

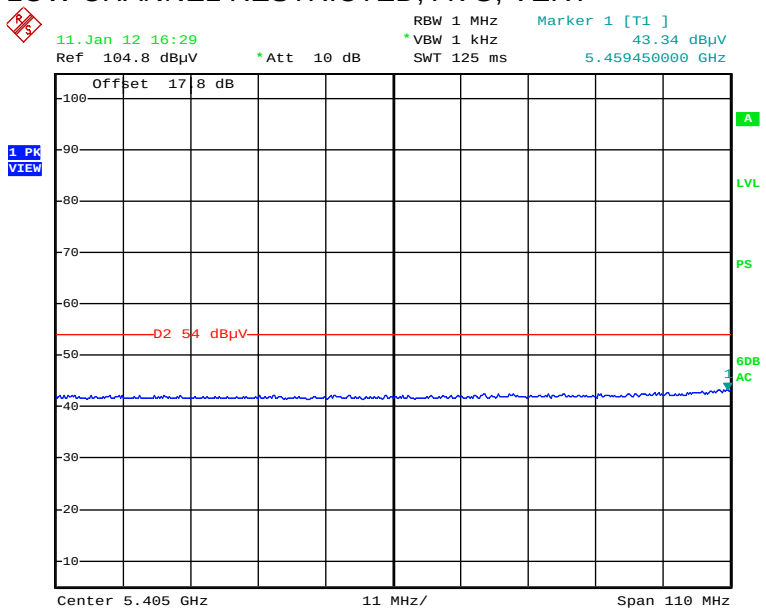
8.2.11. TX ABOVE 1 GHz FOR 802.11a 1TX MODE IN THE 5.6 GHz BAND

LEGACY

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



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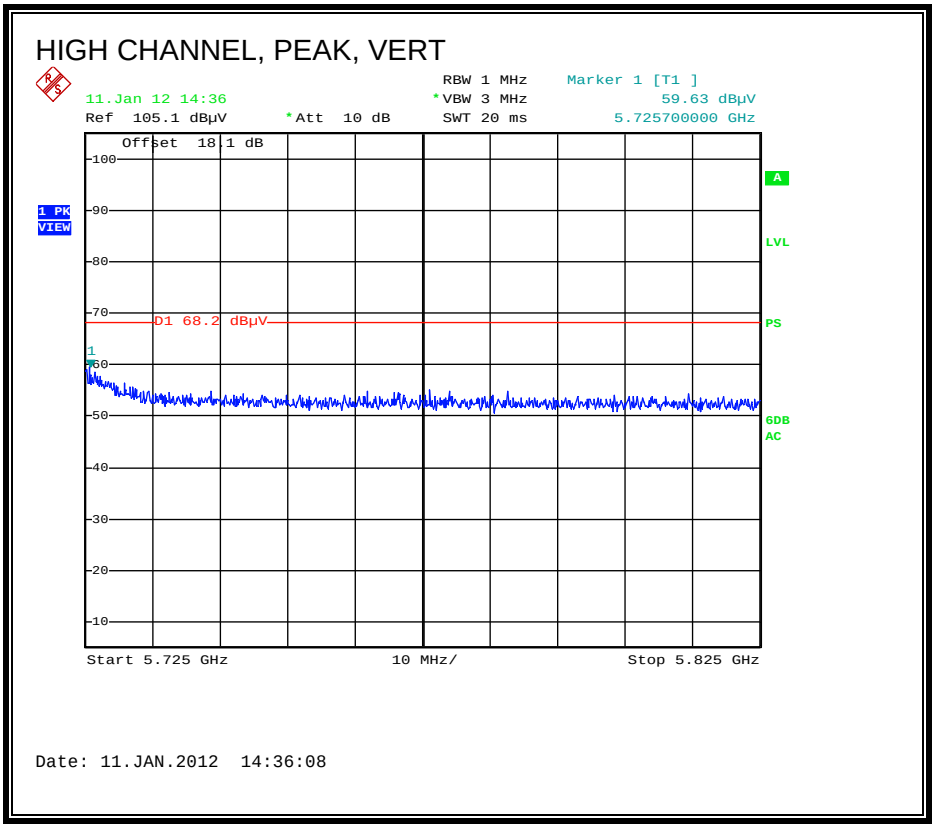
AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT20 3x3 CDD MCS0

8.2.12. TX ABOVE 1 GHz FOR 802.11a 2TX MODE IN THE 5.6 GHz BAND

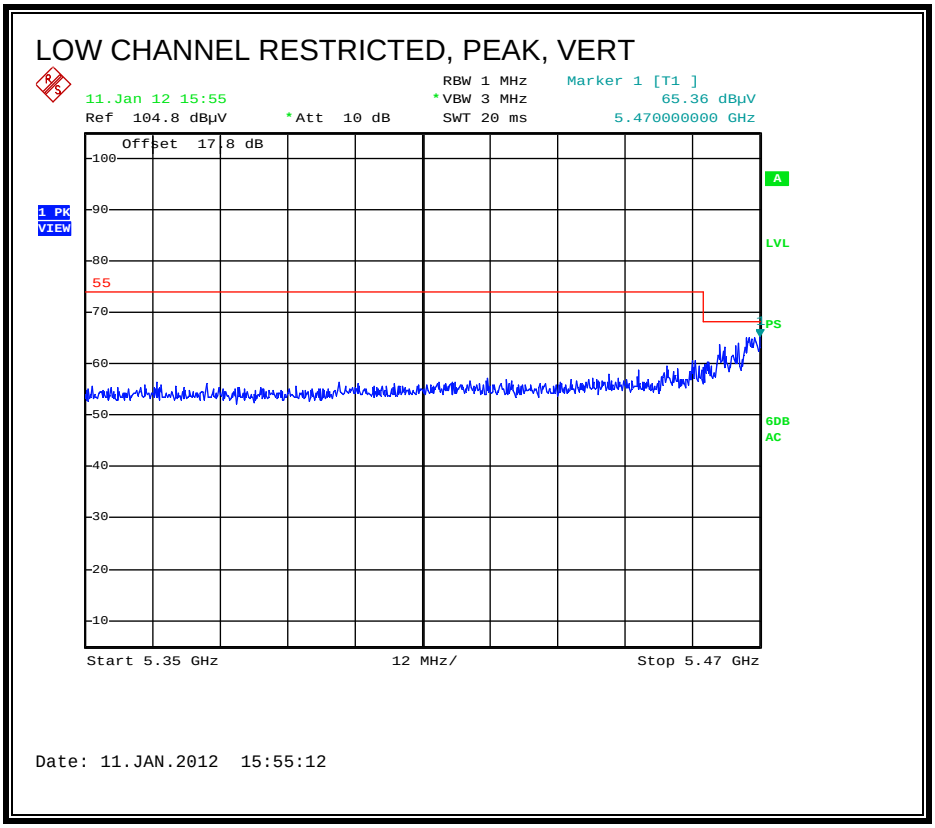
CDD MCS0, STBC MCS0

Covered by testing to 11n HT20 3x3 CDD MCS0

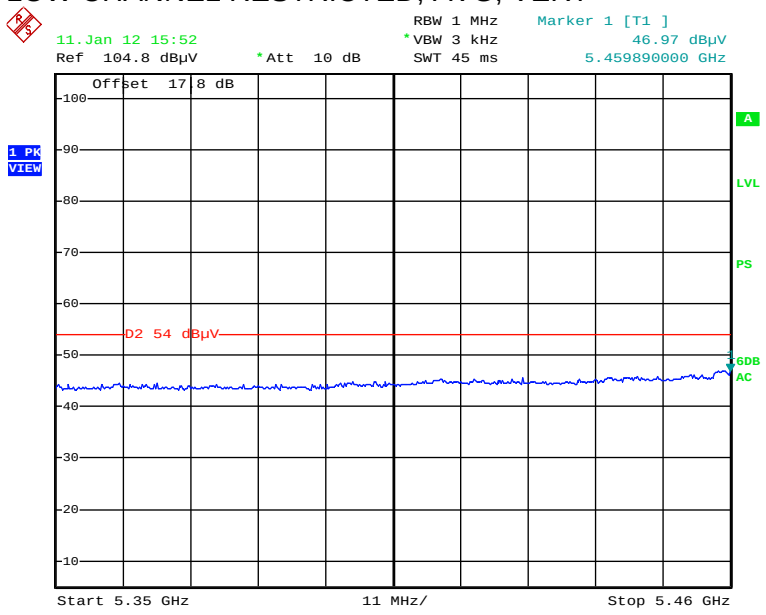
8.2.13. TX ABOVE 1 GHz FOR 802.11n HT20 3TX MODE IN THE 5.6 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

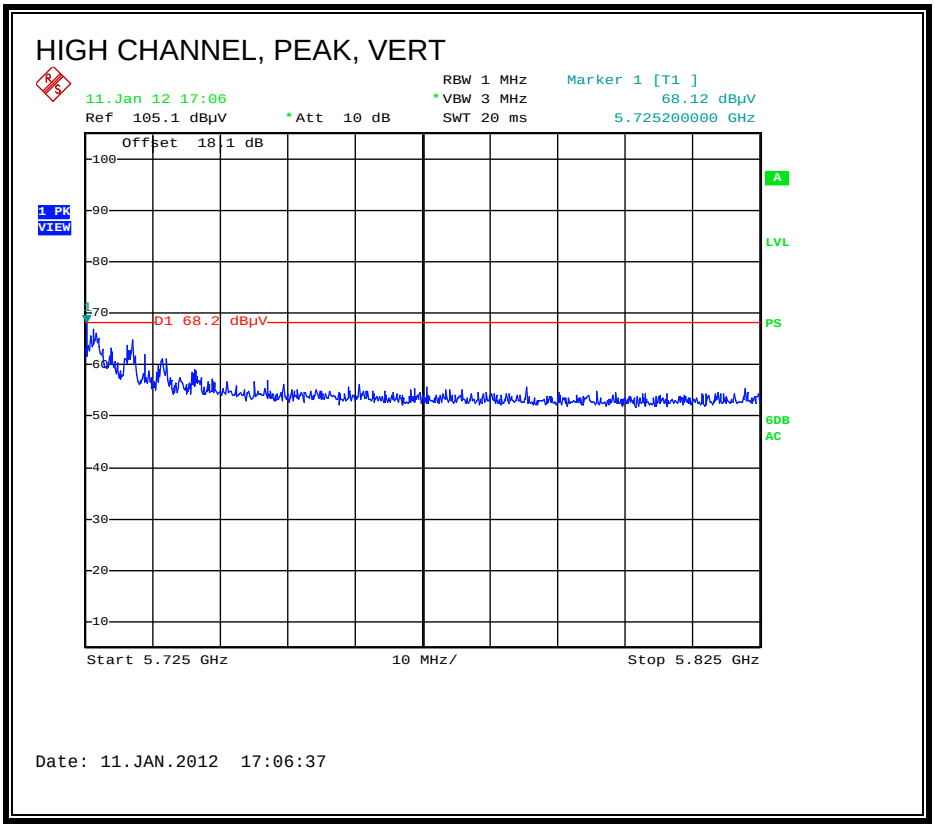


LOW CHANNEL RESTRICTED, AVG, VERT



Date: 11.JAN.2012 15:52:36

AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: BROADCOM
Project #: 11U14154
Date: 12/29/2011
Test Engineer: Thanh Nguyen
Configuration: EUT, Support Laptop, Antenna
Mode: HT20 3x3 MCS0 CDD, 5.5GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low ch 5500															
11.000	3.0	40.5	28.4	38.4	10.5	-32.4	0.0	0.7	57.7	45.5	74	54	-16.3	-8.5	V
11.000	3.0	42.2	28.3	38.4	10.5	-32.4	0.0	0.7	59.3	45.4	74	54	-14.7	-8.6	H
Mid ch 5580															
11.160	3.0	41.4	28.2	38.5	10.7	-32.4	0.0	0.7	59.0	45.8	74	54	-15.0	-8.2	H
11.160	3.0	40.7	28.2	38.5	10.7	-32.4	0.0	0.7	58.3	45.8	74	54	-15.7	-8.2	V
High Ch 5700															
11.400	3.0	41.1	27.8	38.8	11.1	-32.4	0.0	0.7	59.3	45.9	74	54	-14.7	-8.1	V
11.400	3.0	40.4	27.5	38.8	11.1	-32.4	0.0	0.7	58.6	45.7	74	54	-15.4	-8.3	H

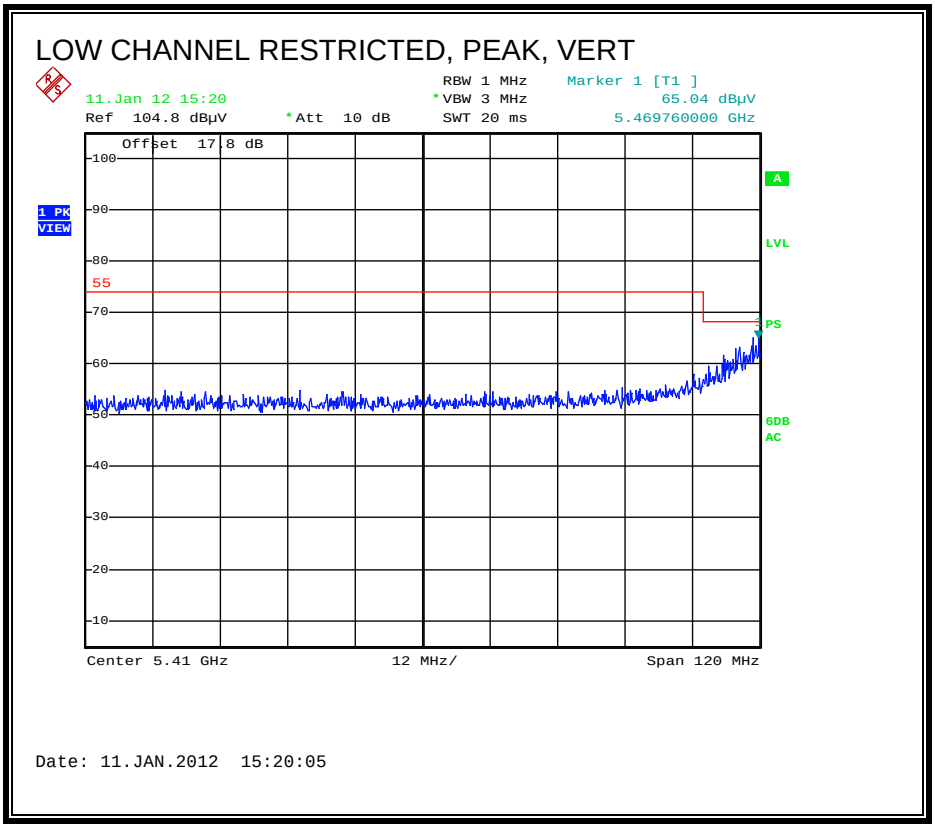
Rev. 07.08.11

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

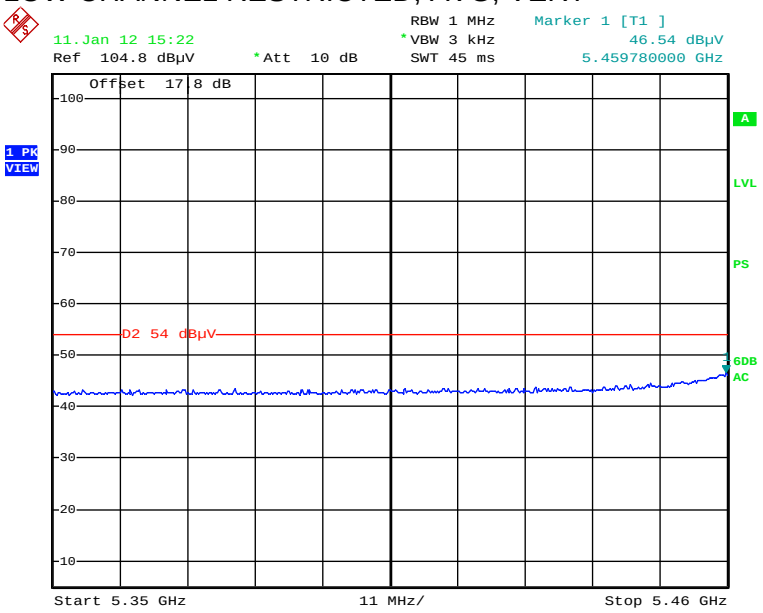
8.2.14. TX ABOVE 1 GHz FOR 802.11n HT40 1TX MODE IN THE 5.6 GHz BAND

CDD MCS0

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



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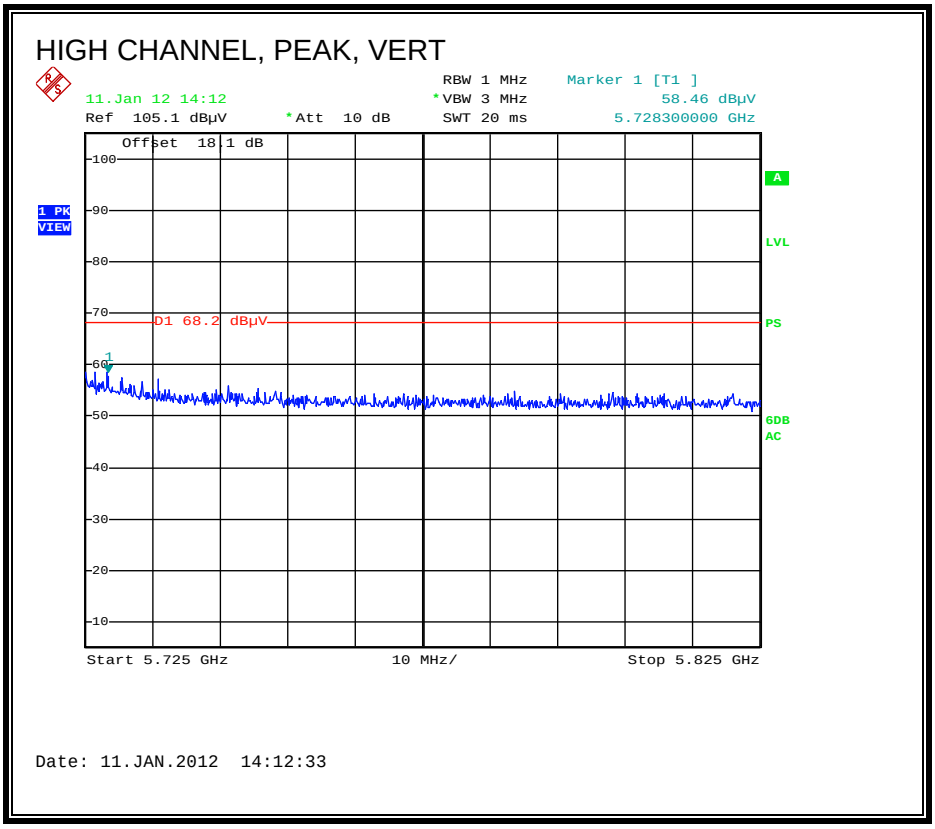
AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



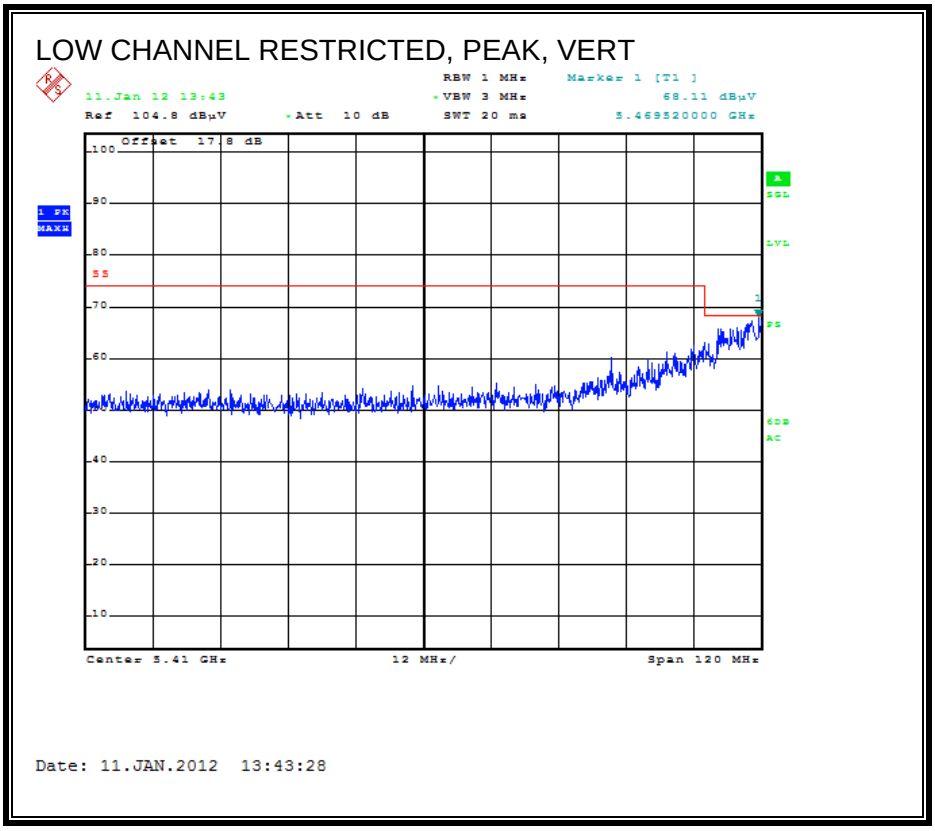
HARMONICS AND SPURIOUS EMISSIONS

Covered by testing to 11n HT40 3x3 CDD MCS0

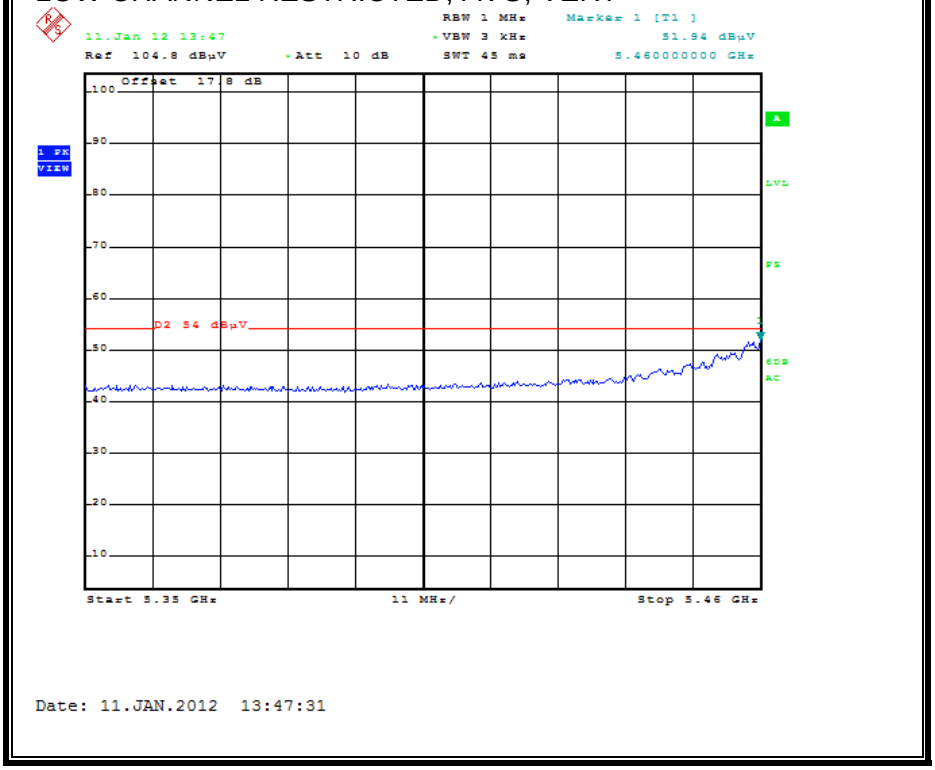
8.2.15. TX ABOVE 1 GHz FOR 802.11n HT40 3TX MODE IN THE 5.6 GHz BAND

CDD MCS0

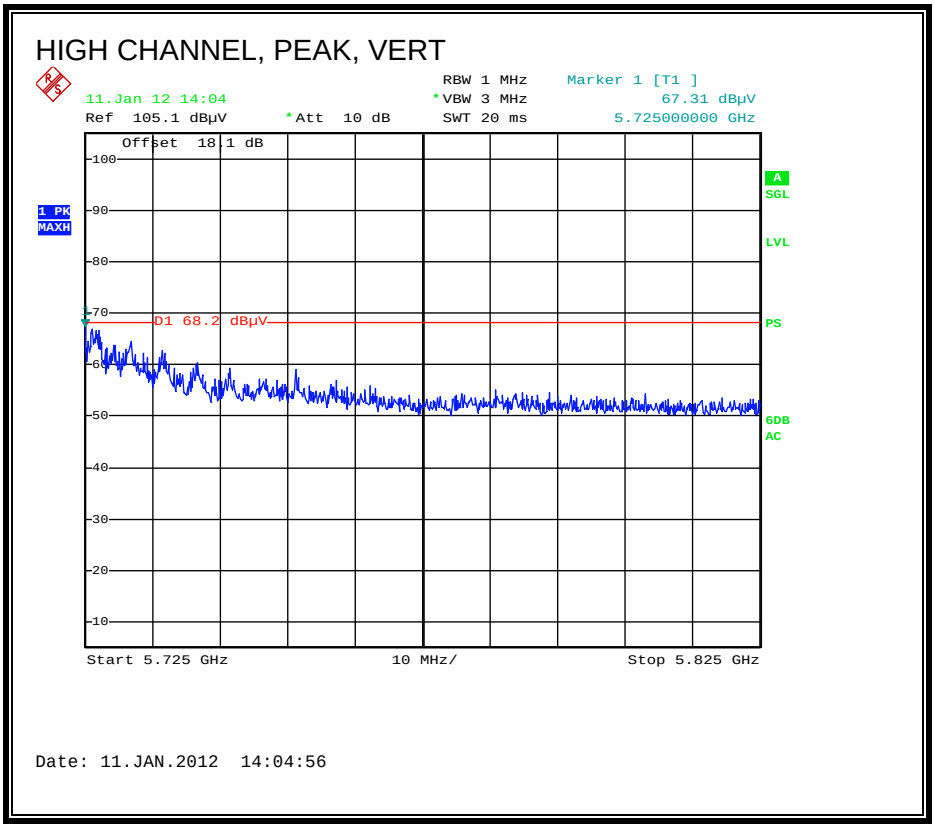
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



LOW CHANNEL RESTRICTED, AVG, VERT



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: BROADCOM
Project #: 11U14154
Date: 12/29/2011
Test Engineer: Thanh Nguyen
Configuration: EUT, Support Laptop, Antenna
Mode: HT40 3x3 MCS0 CDD, 5.5GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T125; ARA 18-26GHz; S/N:1007	FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF_7.6GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low ch 5510															
11.020	3.0	39.1	26.6	38.4	10.5	-32.4	0.0	0.7	56.3	43.8	74	54	-17.7	-10.2	H
11.020	3.0	36.1	22.9	38.4	10.5	-32.4	0.0	0.7	53.3	40.1	74	54	-20.7	-13.9	noise floor
Mid ch 5550															
11.100	3.0	35.0	22.8	38.5	10.6	-32.4	0.0	0.7	52.4	40.2	74	54	-21.6	-13.8	V
11.100	3.0	35.7	22.9	38.5	10.6	-32.4	0.0	0.7	53.1	40.3	74	54	-20.9	-13.7	H
High ch 5670															
11.340	3.0	34.7	21.2	38.7	11.0	-32.4	0.0	0.7	52.7	39.2	74	54	-21.3	-14.8	V
11.340	3.0	36.8	23.3	38.7	11.0	-32.4	0.0	0.7	54.8	41.3	74	54	-19.2	-12.7	H

Rev. 07.08.11

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz FOR 20 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 11U14154
Date: 11/30/2011
Test Engineer: David Garcia
Configuration: EUT / Laptop
Mode: Rx Mode_20MHz Bandwidth in 5 GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.621	3.0	56.3	40.9	26.8	3.6	-36.9	0.0	0.0	49.8	34.4	74	54	-24.2	-19.6	H
1.786	3.0	55.7	38.2	27.4	3.8	-36.6	0.0	0.0	50.2	32.7	74	54	-23.8	-21.3	H
2.501	3.0	57.3	36.3	28.8	4.6	-35.6	0.0	0.0	55.1	34.1	74	54	-18.9	-19.9	H
5.000	3.0	51.1	29.6	33.2	6.9	-34.0	0.0	0.0	57.2	35.8	74	54	-16.8	-18.2	H
1.198	3.0	60.2	44.0	25.5	3.0	-37.5	0.0	0.0	51.2	35.0	74	54	-22.8	-19.0	V
1.798	3.0	55.4	37.4	27.4	3.8	-36.6	0.0	0.0	50.0	32.0	74	54	-24.0	-22.0	V
2.501	3.0	58.3	36.0	28.8	4.6	-35.6	0.0	0.0	56.1	33.8	74	54	-17.9	-20.2	V
5.000	3.0	54.2	30.9	33.2	6.9	-34.0	0.0	0.0	60.3	37.0	74	54	-13.7	-17.0	V
															V

Rev. 07.08.11

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

8.3.2. RECEIVER ABOVE 1 GHz FOR 40 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 11U14154
Date: 11/30/2011
Test Engineer: David Garcia
Configuration: EUT / Laptop
Mode: Rx Mode_40MHz Bandwidth in 5 GHz Band

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.600	3.0	57.7	42.2	26.8	3.5	-36.9	0.0	0.0	51.1	35.6	74	54	-22.9	-18.4	H
1.795	3.0	56.5	38.8	27.4	3.8	-36.6	0.0	0.0	51.0	33.3	74	54	-23.0	-20.7	H
2.490	3.0	58.1	37.8	28.8	4.6	-35.6	0.0	0.0	55.9	35.6	74	54	-18.1	-18.4	H
5.000	3.0	51.0	32.4	33.2	6.9	-34.0	0.0	0.0	57.1	38.5	74	54	-16.9	-15.5	H
1.655	3.0	59.3	42.0	27.0	3.6	-36.8	0.0	0.0	53.0	35.7	74	54	-21.0	-18.3	V
2.125	3.0	60.4	39.1	28.2	4.2	-36.1	0.0	0.0	56.6	35.3	74	54	-17.4	-18.7	V
2.490	3.0	59.0	37.3	28.8	4.6	-35.6	0.0	0.0	56.8	35.1	74	54	-17.2	-18.9	V
5.000	3.0	55.4	37.7	33.2	6.9	-34.0	0.0	0.0	61.5	43.8	74	54	-12.5	-10.2	V
															V

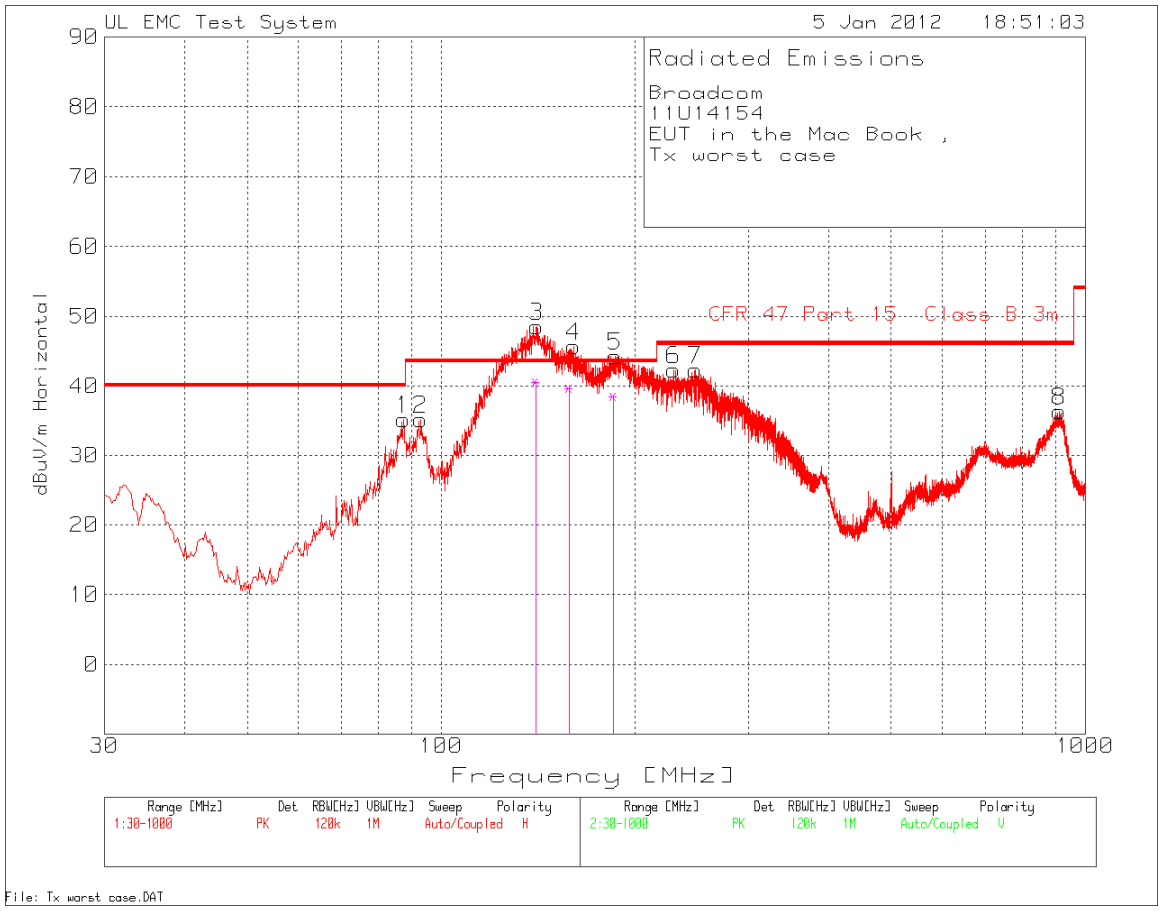
Rev. 07.08.11

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

8.4. WORST-CASE BELOW 1 GHz

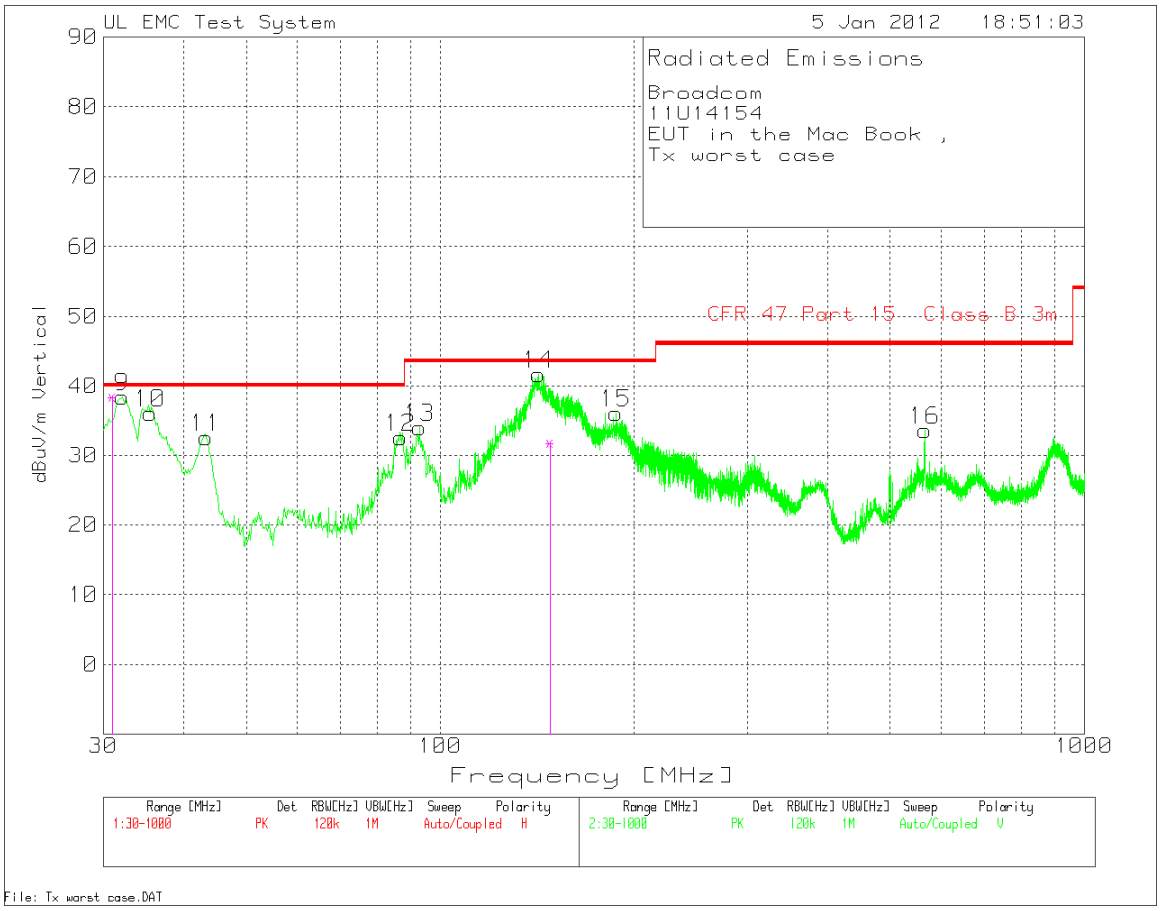
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Company:	Broadcom
Project No.:	11U14154
Test Date:	1/5/2012
Test Setup:	EUT in the Mac Book
Mode:	Tx worst case
Test Engineer:	Thanh Nguyen

Range: 1 30 - 1000MHz									
Test Frequency	Meter	Detector	Amplifier Factor	Ant, Cable factor	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
87.3781	54.75	PK	-27	7.5	35.25	40	-4.75	251	Horz
92.9996	54.18	PK	-26.9	7.9	35.18	43.5	-8.32	251	Horz
140.8793	61.9	PK	-26.4	13.1	48.6	43.5	5.1	251	Horz
140.2957	53.92	QP	-26.5	13.1	40.52	43.5	-2.98	245	Horz
160.6515	58.82	PK	-26.2	13.1	45.72	43.5	2.22	176	Horz
158.2391	52.74	QP	-26.2	13.1	39.64	43.5	-3.86	181	Horz
186.6267	59.1	PK	-25.9	11.1	44.3	43.5	0.8	176	Horz
185.3917	53.38	QP	-26	11.1	38.48	43.5	-5.02	115	Horz
229.8541	56.19	PK	-25.6	11.8	42.39	46	-3.61	100	Horz
248.4632	55.98	PK	-25.4	11.8	42.38	46	-3.62	100	Horz
911.6067	38.09	PK	-23.9	22.2	36.39	46	-9.61	100	Horz

Range: 2 30 - 1000MHz									
Test Frequency	Meter	Detector	Amplifier Factor	Ant, Cable factor	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
32.1323	46.92	PK	-27.5	19	38.42	40	-1.58	101	Vert
31.0368	46.39	QP	-27.5	19.5	38.39	40	-1.61	107	Vert
35.4277	46.42	PK	-27.5	17.2	36.12	40	-3.88	101	Vert
43.3753	47.71	PK	-27.4	12.3	32.61	40	-7.39	101	Vert
86.9904	52.2	PK	-27	7.5	32.7	40	-7.3	176	Vert
92.8058	53.11	PK	-26.9	7.9	34.11	43.5	-9.39	176	Vert
142.2362	55.06	PK	-26.4	13	41.66	43.5	-1.84	251	Vert
148.3681	45.5	QP	-26.4	12.7	31.8	43.5	-11.7	250	Vert
187.5959	50.99	PK	-25.9	11.1	36.19	43.5	-7.31	176	Vert
566.3689	41.57	PK	-25.8	17.9	33.67	46	-12.33	101	Vert

9. DYNAMIC FREQUENCY SELECTION

9.1. OVERVIEW

9.1.1. 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

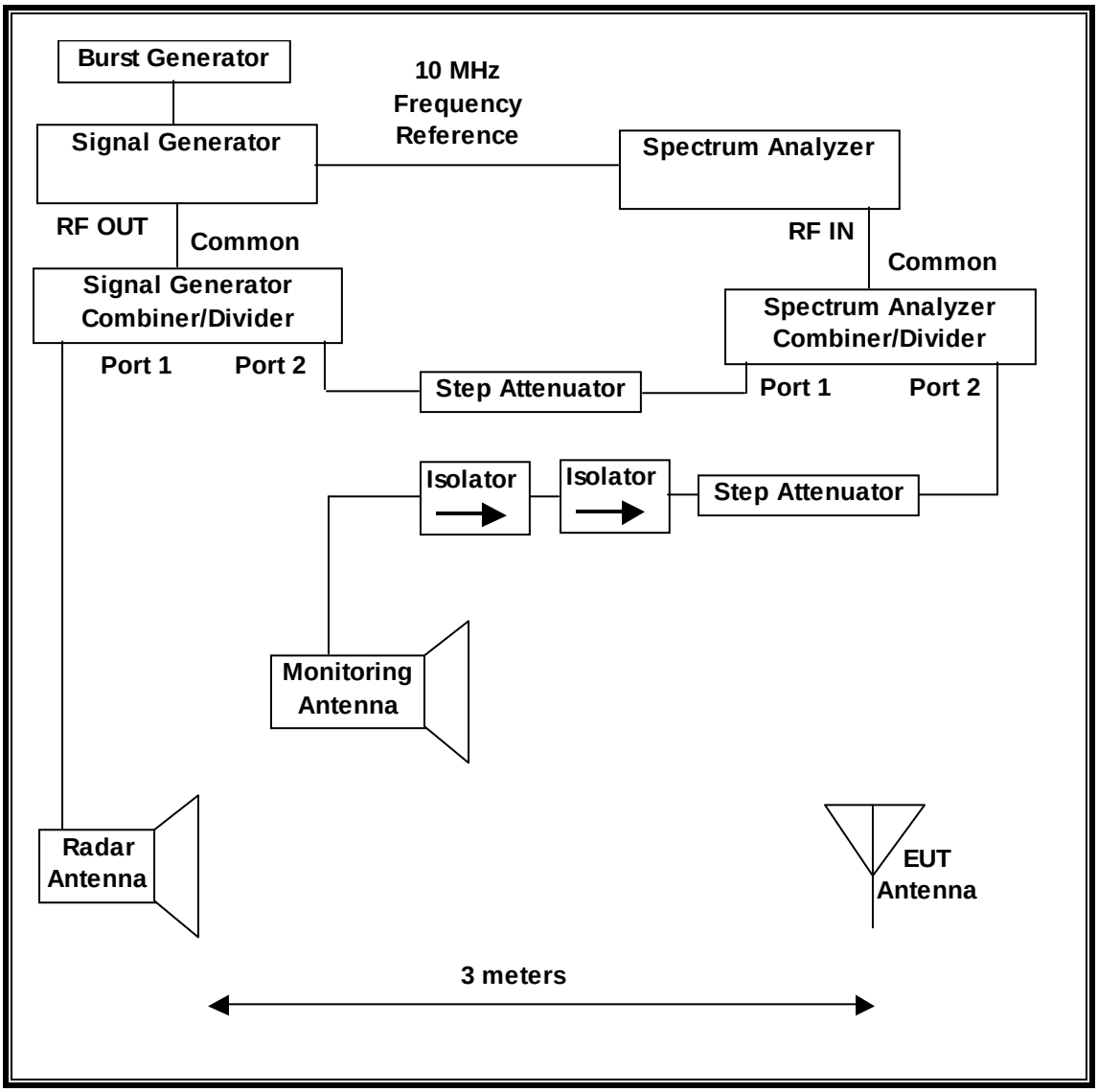
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

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

9.1.2. 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.

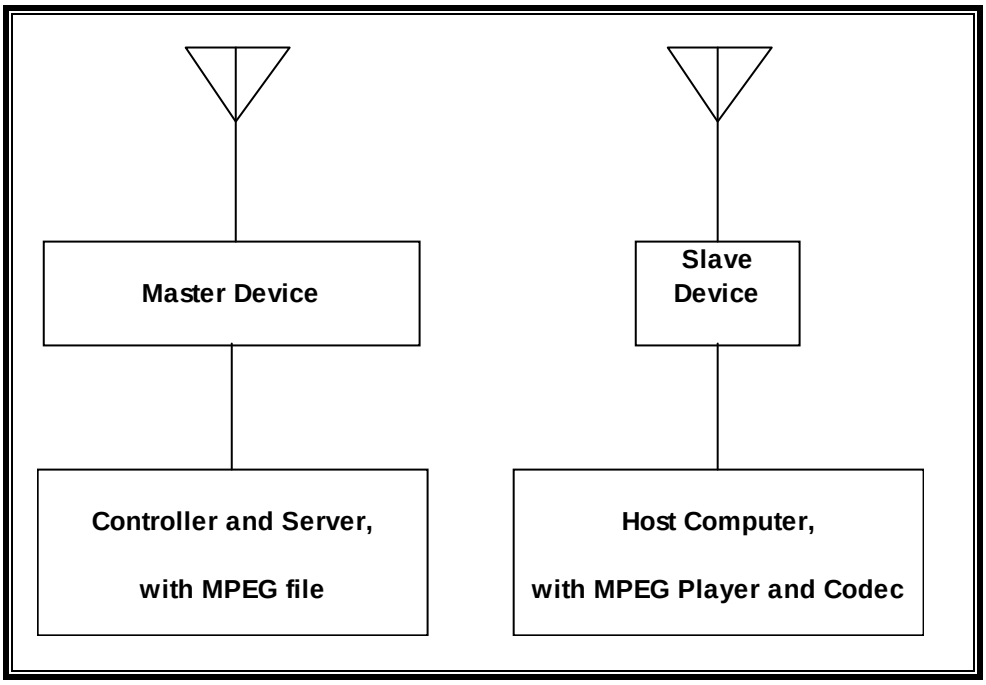
TEST AND MEASUREMENT EQUIPMENT

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, 44 GHz	Agilent / HP	E4446A	C00169	12/15/12
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12

9.1.3. 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**
Notebook PC (Host)	Lenovo	0679	CBU4495771	DoC
AC Adapter (Host PC)	Lite On Technology	PA-1650-56LC	11S36001651ZZ400BKCM8	DoC
N600 Wireless Dual Band Router	Netgear	WNDR3400	2BK311730FF6B	PY309300116
AC Adapter (AP)	Netgear	FA-1201500SJA / FA-1201500SUA	4F105116T10209045B	DoC
Notebook PC (Server/Controller)	HP	Pavilion zv6000	CND5290401	DoC
AC Adapter (Server/Controller PC)	HP	PA-1121-12HD	58B240ALLRK0HU	DoC

9.1.4. 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 33.01 dBm EIRP in the 5250-5350 MHz band and 33.27 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 9.88 dBi in the 5250-5350 MHz band and 9.76 dBi in the 5470-5725 MHz band.

Three identical 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 is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

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 Falcon revision 5.106.98.42.

UNIFORM CHANNEL SPREADING

This is not applicable to Slave 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.

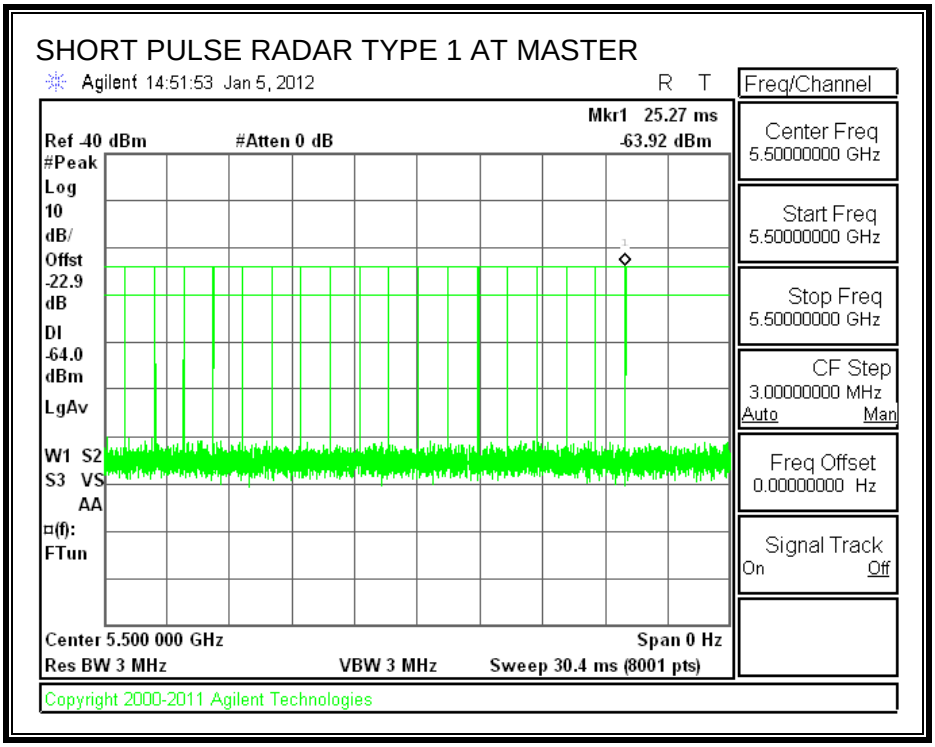
9.2. RESULTS FOR 20 MHz BANDWIDTH

9.2.1. TEST CHANNEL

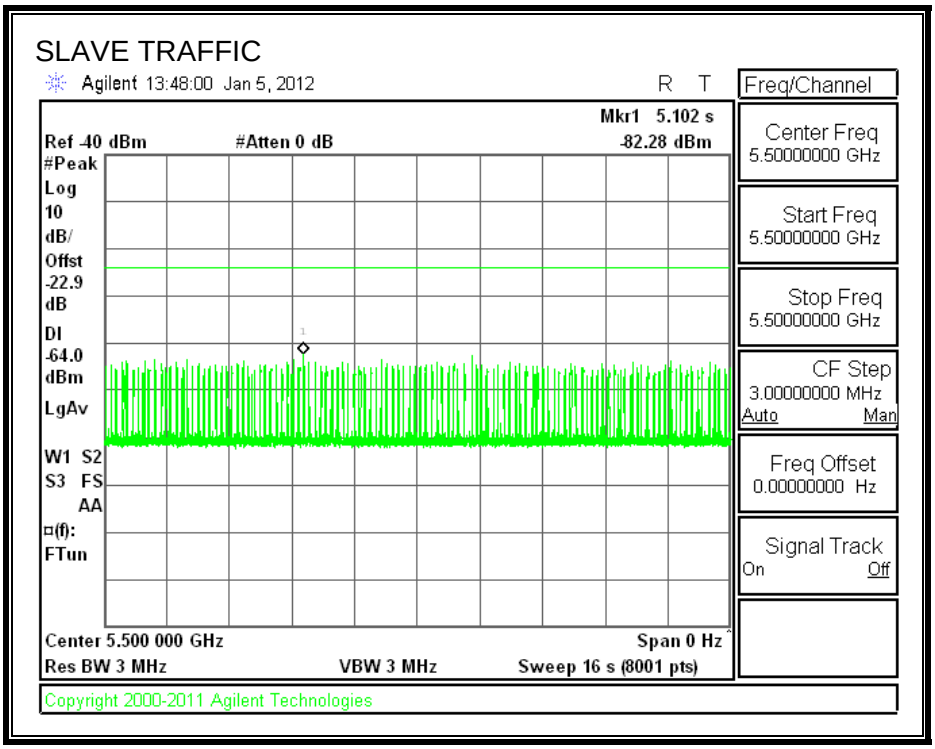
All tests were performed at a channel center frequency of 5500 MHz.

9.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



9.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

9.2.4. 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).

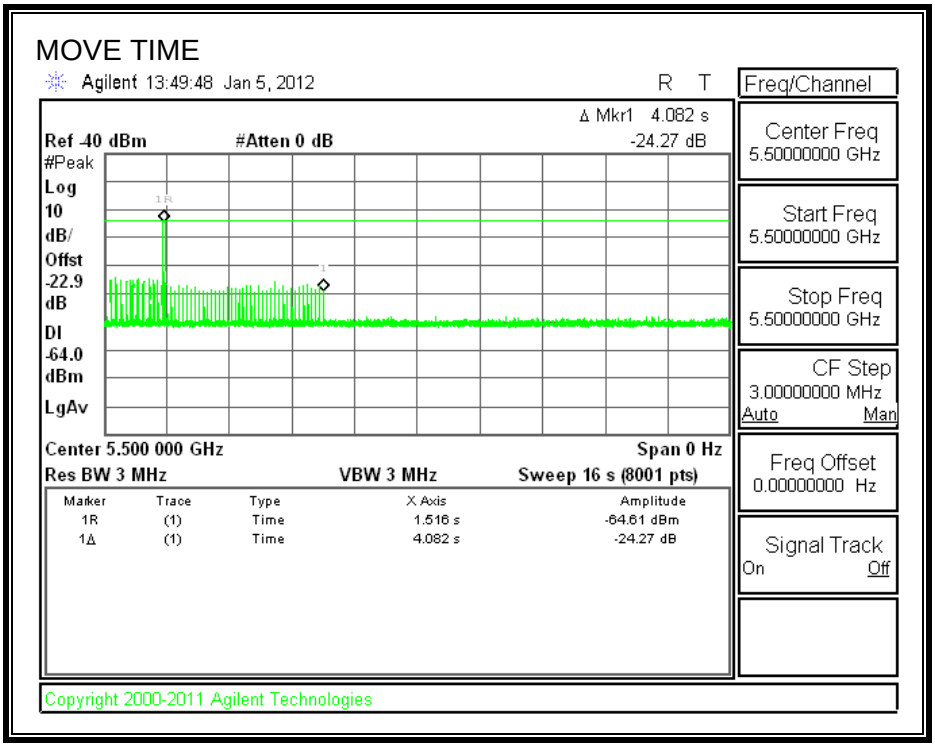
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

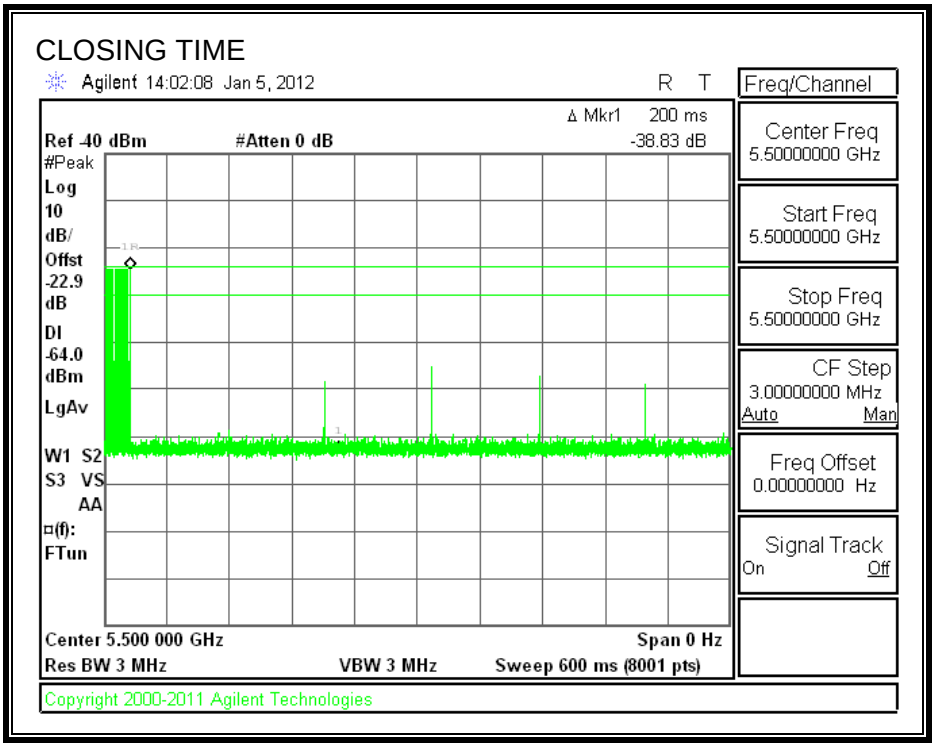
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	4.082	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	22.5	60
IC	31.3	260

MOVE TIME



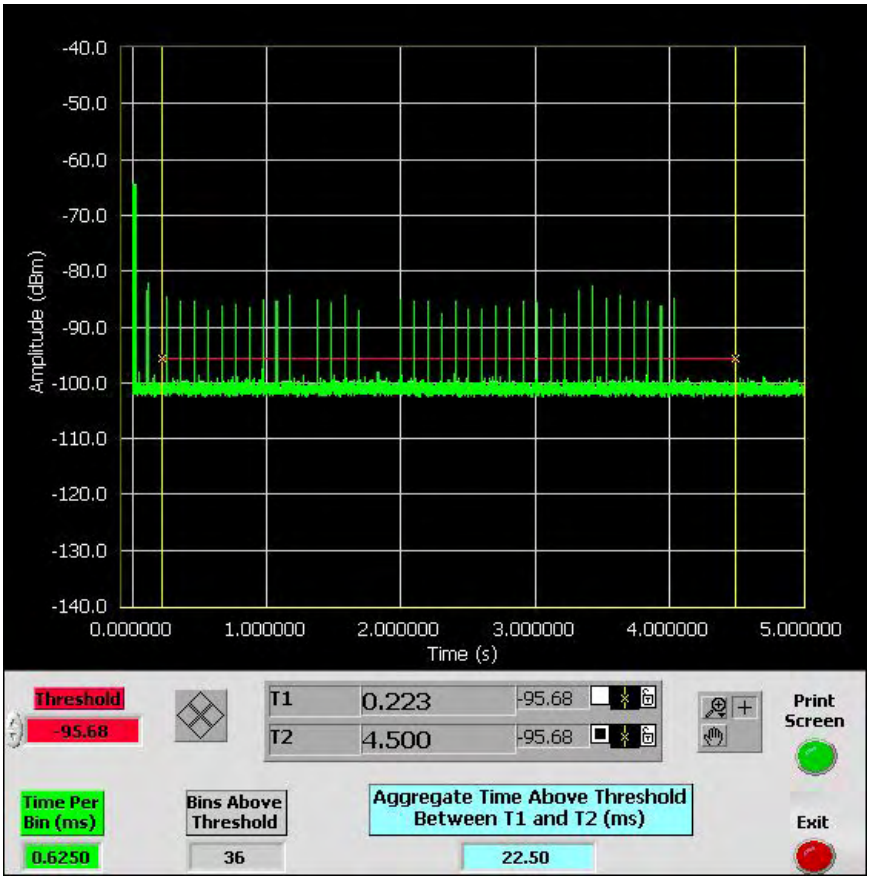
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

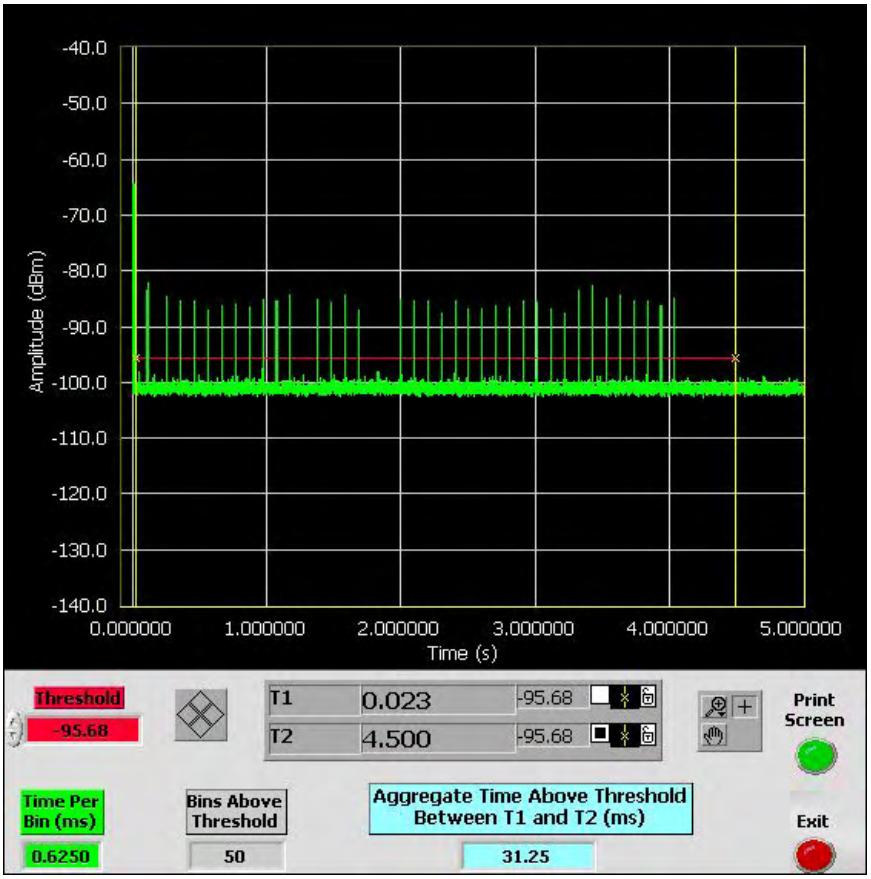
Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



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

IC AGGREGATE CLOSING TIME



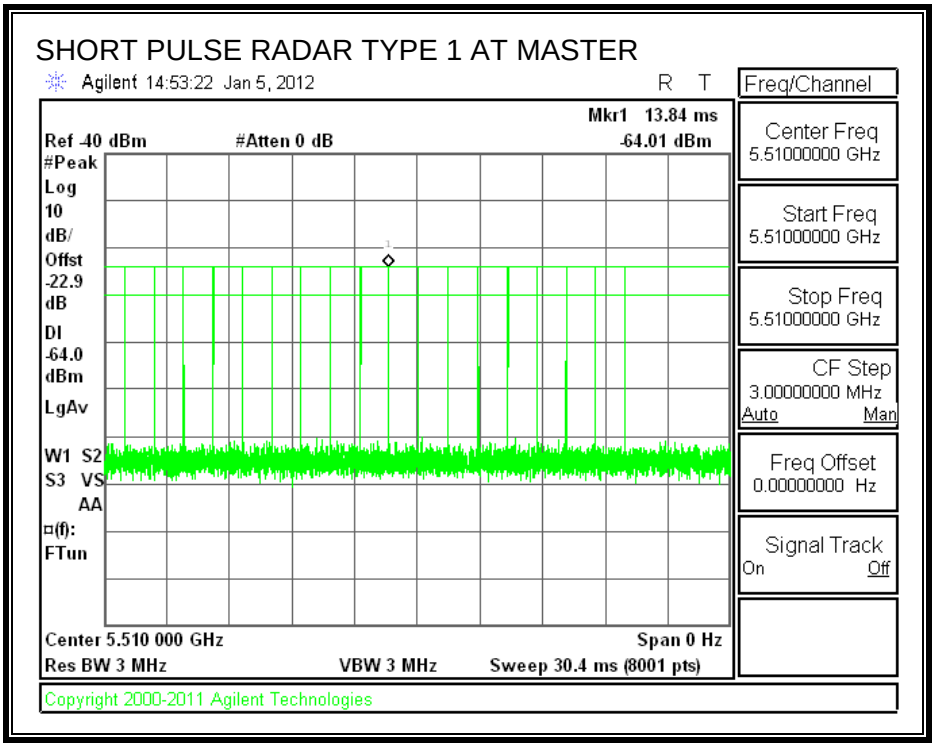
9.3. RESULTS FOR 40 MHz BANDWIDTH

9.3.1. TEST CHANNEL

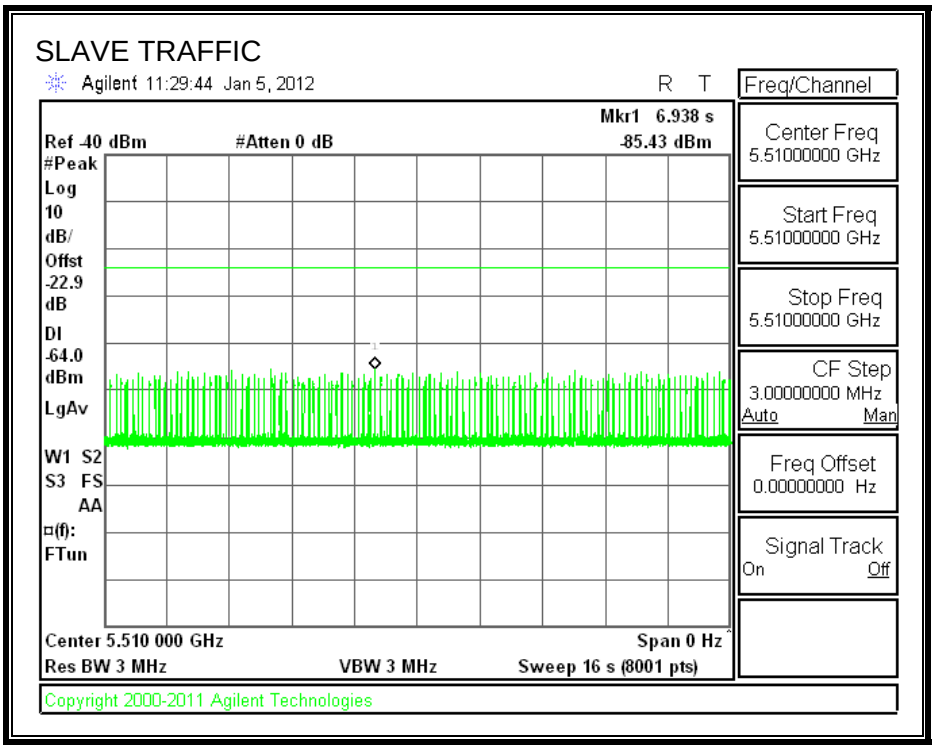
All tests were performed at a channel center frequency of 5510 MHz.

9.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



9.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

9.3.4. 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).

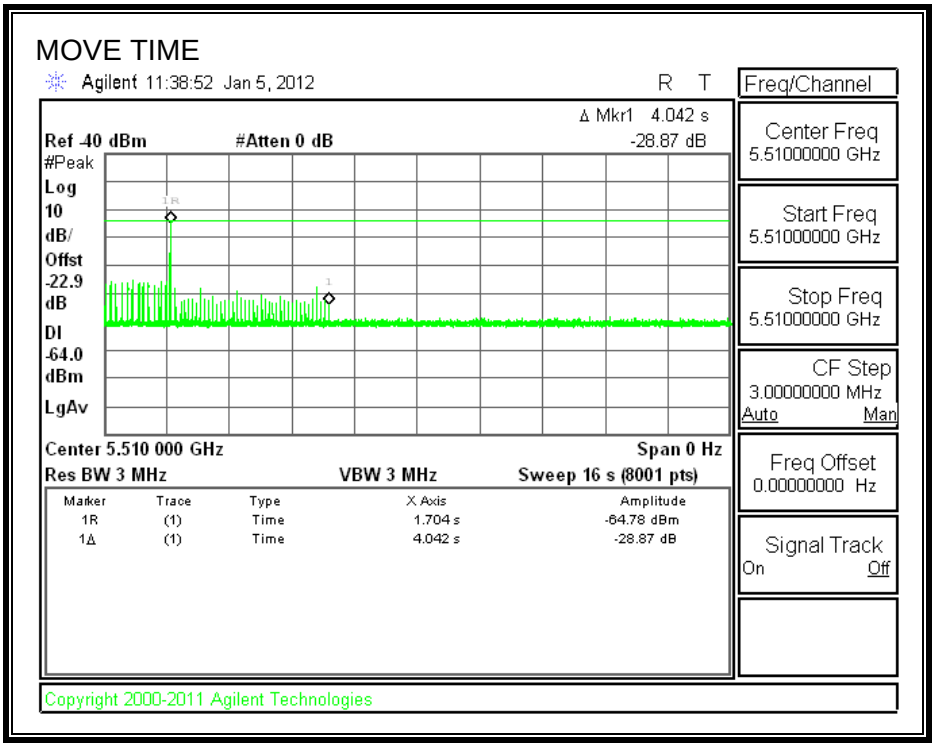
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

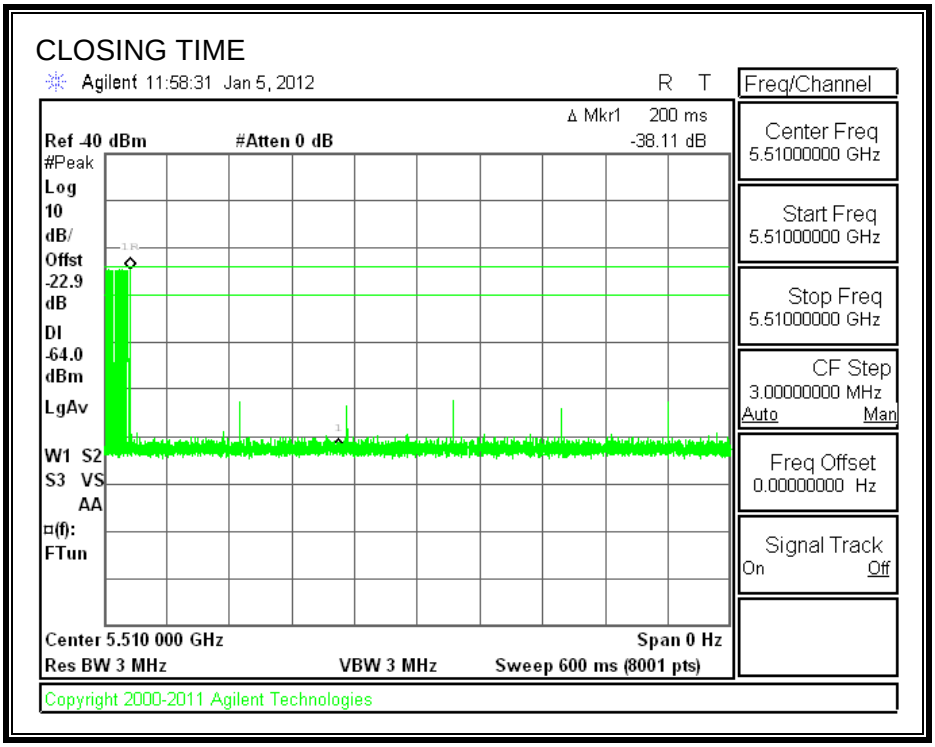
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	4.042	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	16.25	60
IC	16.25	260

MOVE TIME



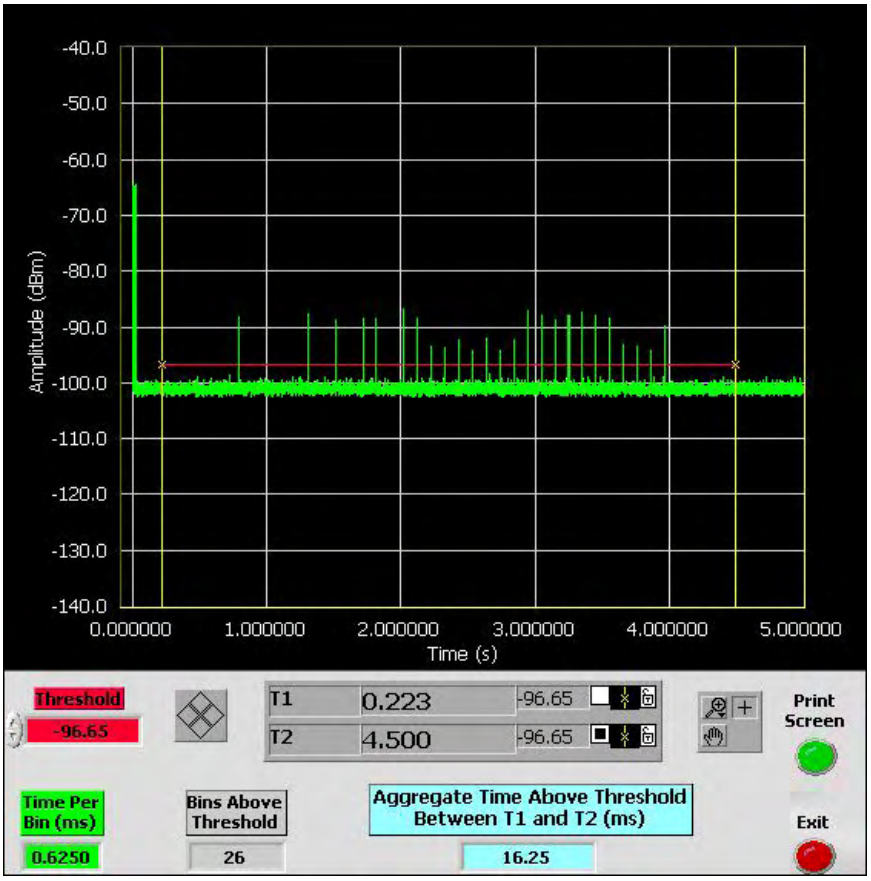
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

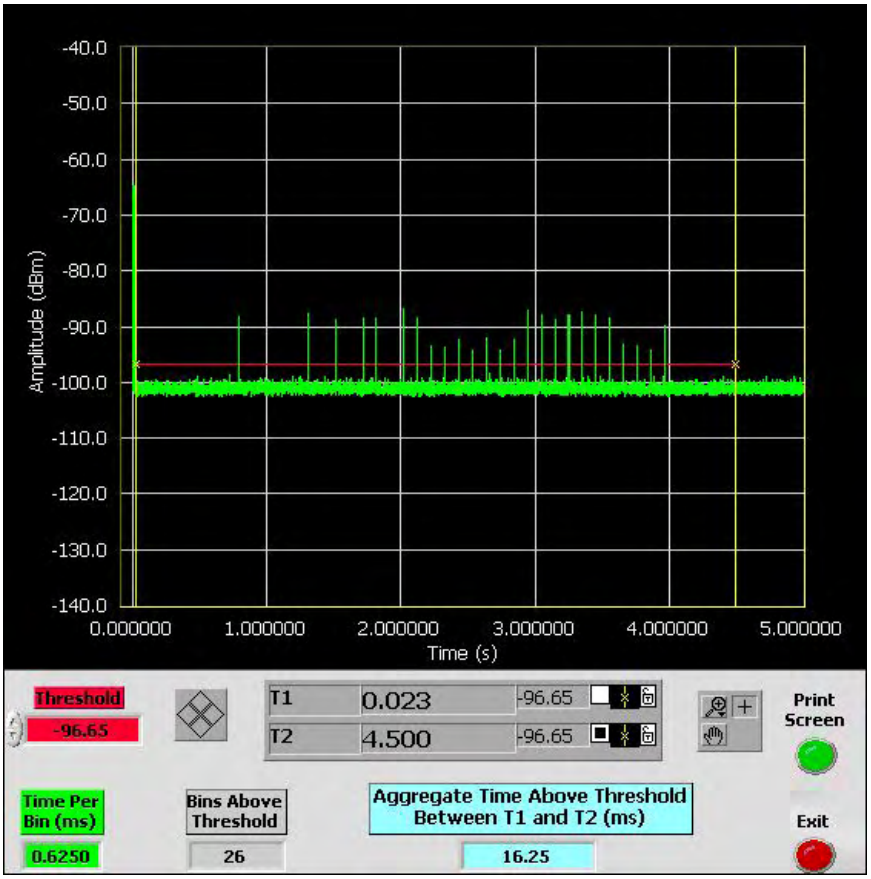
Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



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

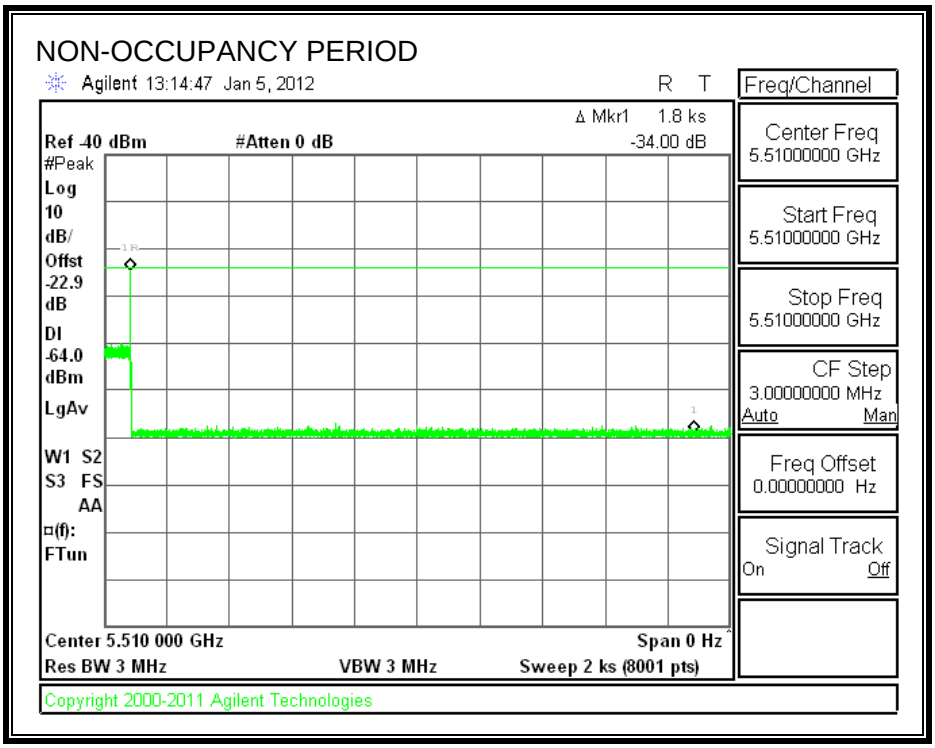
IC AGGREGATE CLOSING TIME



9.3.5. NON-OCCUPANCY PERIOD

RESULTS

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



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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

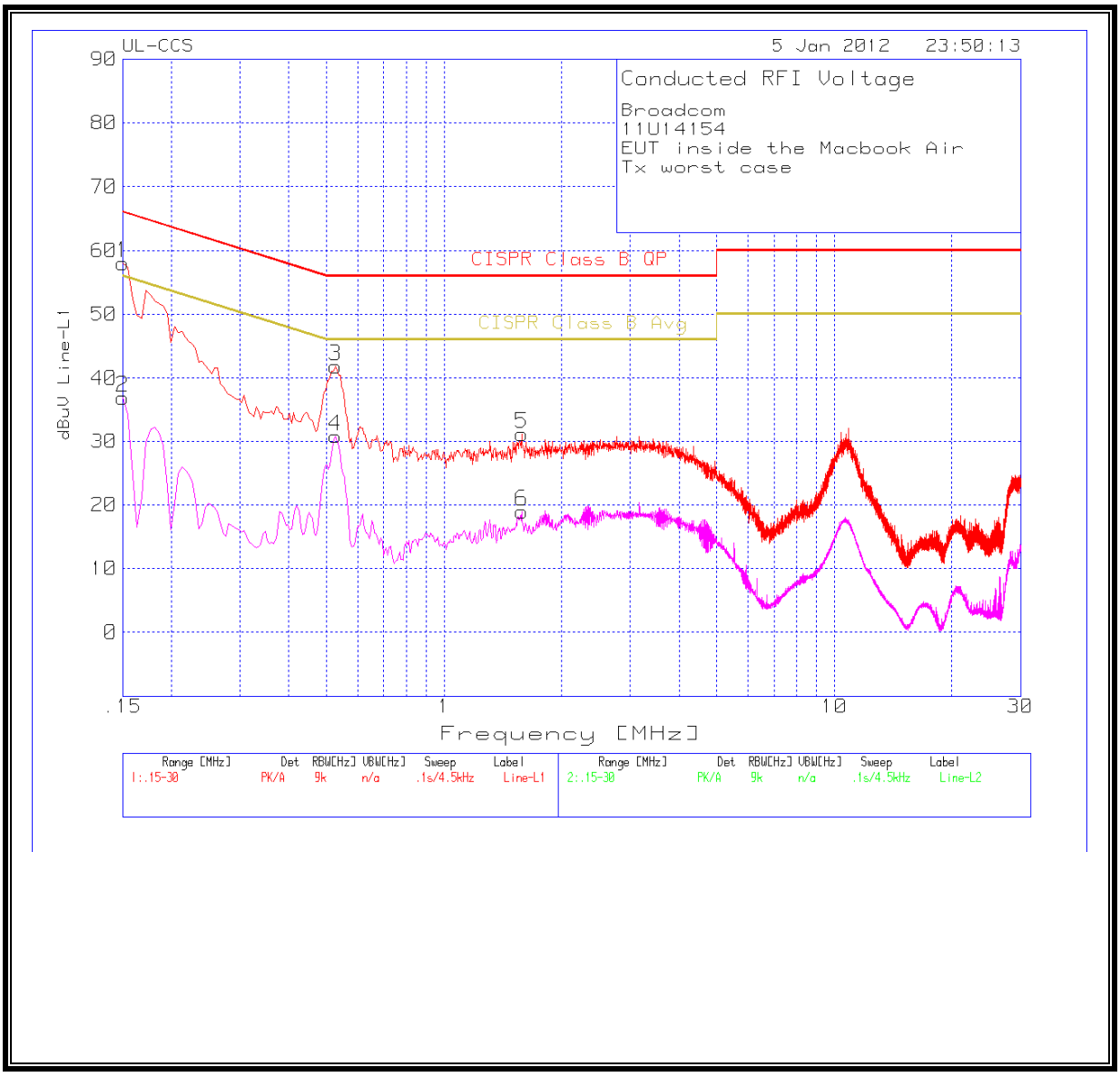
RESULTS

6 WORST EMISSIONS

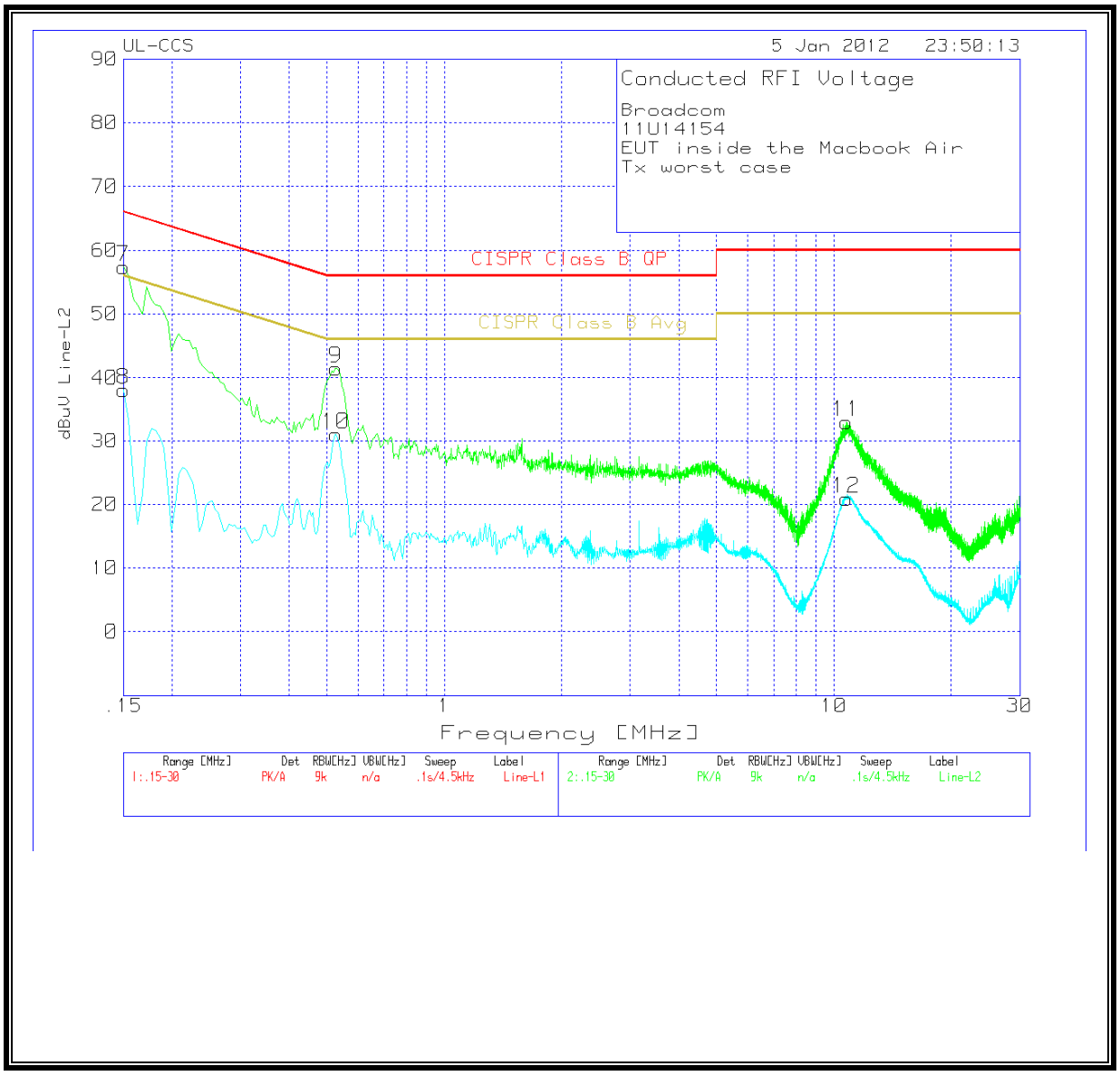
Company:	Broadcom
Project No.:	11U14154
Test Configuration:	EUT inside the Macbook Air
Mode:	Tx worst case
Test Date:	1/5/2012
Test Engineer:	Thanh Nguyen

Line-L1 .15 - 30MHz									
Test	Meter	Detector	T24 IL	LC Cables	dBuV	CISPR	Margin	CISPR Class	Margin
Frequency	Reading		L1.TXT [dB]			Class B QP		B Avg	
0.15	57.88	PK	0.1	0	57.98	66	-8.02	-	-
0.15	36.86	Av	0.1	0	36.96	-	-	56	-19.04
0.528	41.72	PK	0.1	0	41.82	56	-14.18	-	-
0.528	30.73	Av	0.1	0	30.83	-	-	46	-15.17
1.581	31.05	PK	0.1	0.1	31.25	56	-24.75	-	-
1.581	18.77	Av	0.1	0.1	18.97	-	-	46	-27.03
Line-L2 .15 - 30MHz									
Test	Meter	Detector	T24 IL	LC Cables	dBuV	CISPR	Margin	CISPR Class	Margin
Frequency	Reading		L1.TXT [dB]			Class B QP		B Avg	
0.15	57.24	PK	0.1	0	57.34	66	-8.66	-	-
0.15	38.03	Av	0.1	0	38.13	-	-	56	-17.87
0.528	41.41	PK	0.1	0	41.51	56	-14.49	-	-
0.528	31.06	Av	0.1	0	31.16	-	-	46	-14.84
10.7475	32.65	PK	0.2	0.2	33.05	60	-26.95	-	-
10.7475	20.46	Av	0.2	0.2	20.86	-	-	50	-29.14

LINE 1 RESULTS



LINE 2 RESULTS



11. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

where

D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

where

DC = Duty Cycle in %, as applicable
EIRP = Equivalent Isotropic Radiated Power in W

For multiple chain devices, and colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

Total EIRP = (P1 * G1) + (P2 * G2) + ... + (Pn * Pn)

where

Px = Power of transmitter x
Gx = Numeric gain of antenna x

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply, a fraction of the exposure limit is established for each band, such that the sum of the fractions is less than or equal to one.

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

For mobile radio equipment operating in the cellular phone band, the lowest power density limit is calculated using the lowest frequency, as 824 MHz / 1500 = 0.55 mW/cm^2 (FCC) and 824 MHz / 150 = 5.5 W/m^2 (IC).

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

RESULTS

Multiple chain or colocated transmitters								
Band	**Mode**	**Chain for MIMO**	**Separation Distance (m)**	**Output AV Power (dBm)**	**Antenna Gain (dBi)**	**Duty Cycle (%)**	**IC Power Density (W/m^2)**	**FCC Power Density (mW/cm^2)**
2.4 GHz	Bluetooth	N/A		7.89	1.11	100		
5 GHz	WLAN	1		19.19	6.56	98		
5 GHz	WLAN	2		15.88	6.56	98		
5 GHz	WLAN	3		20.71	6.56	98		
Combined			0.20				2.14	0.214