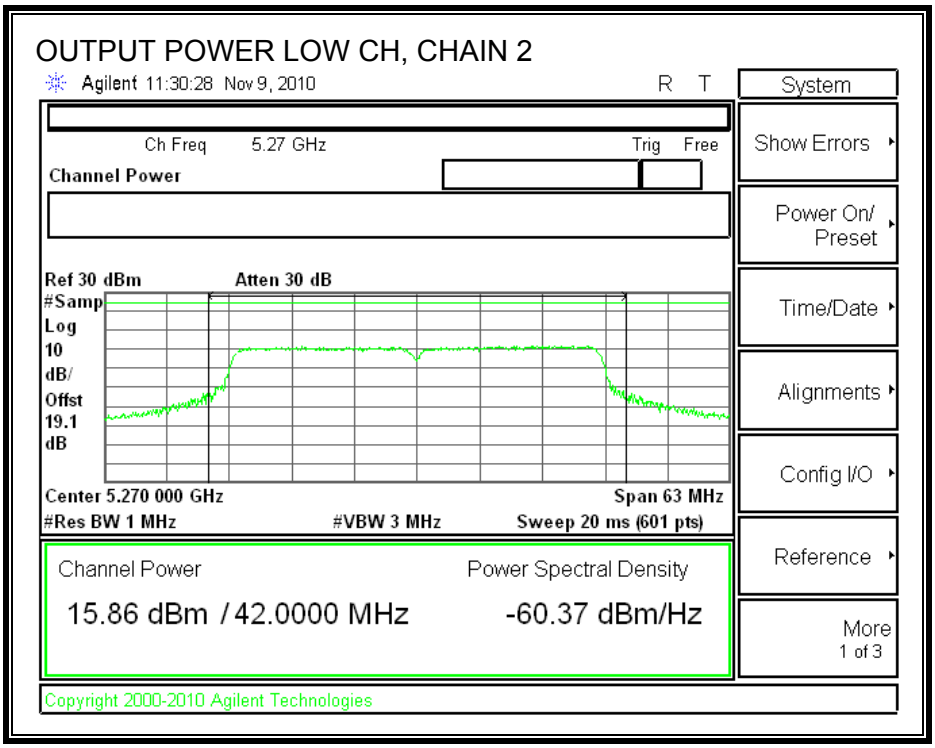
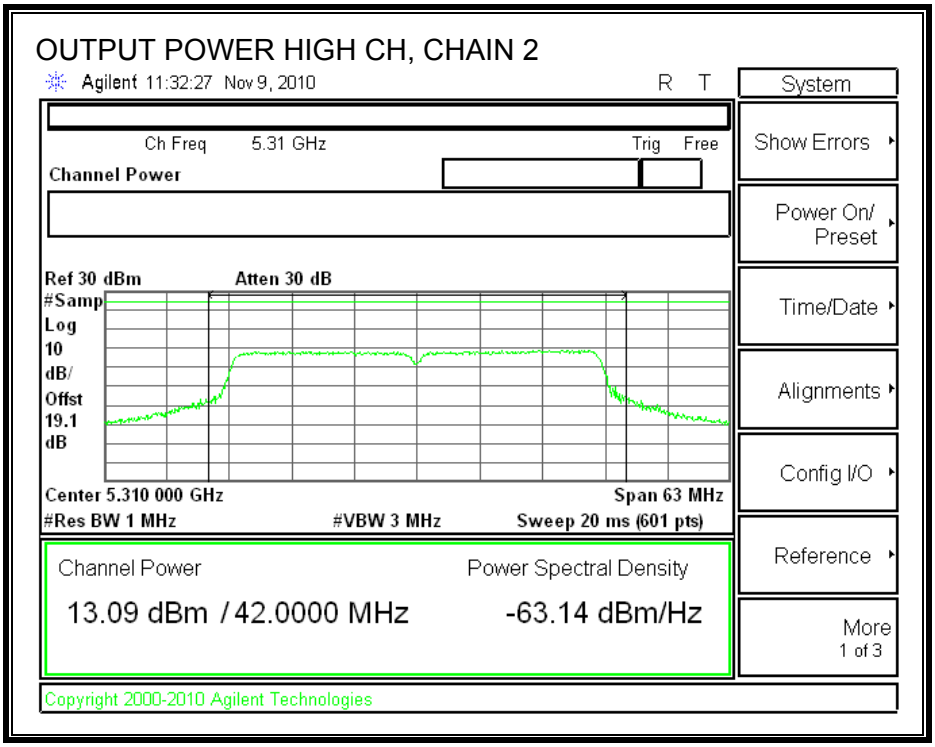
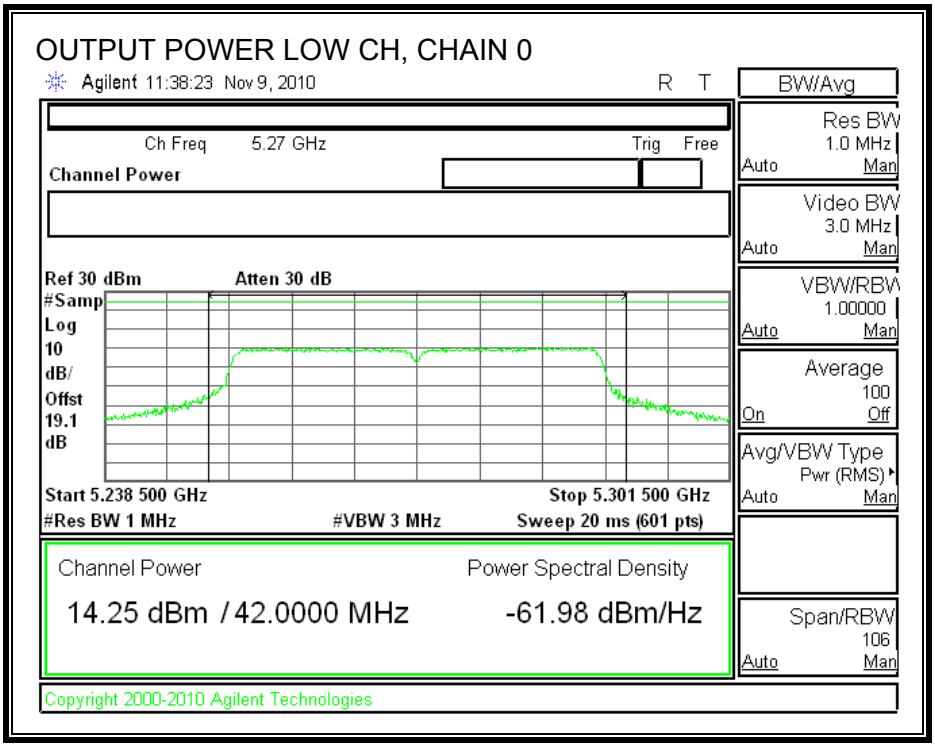
CHAIN 2 OUTPUT POWER

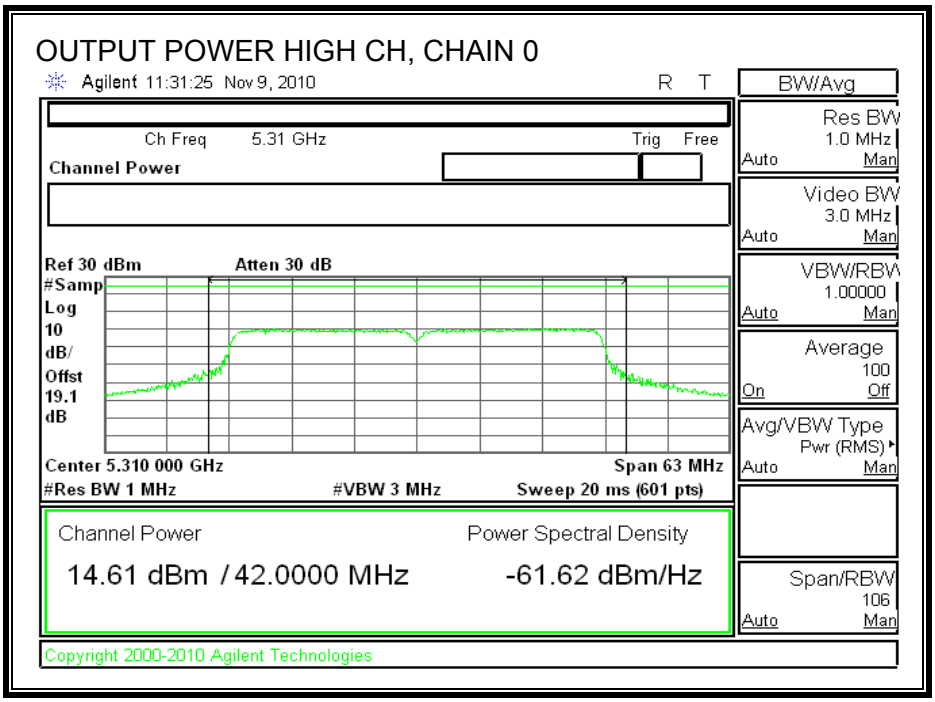




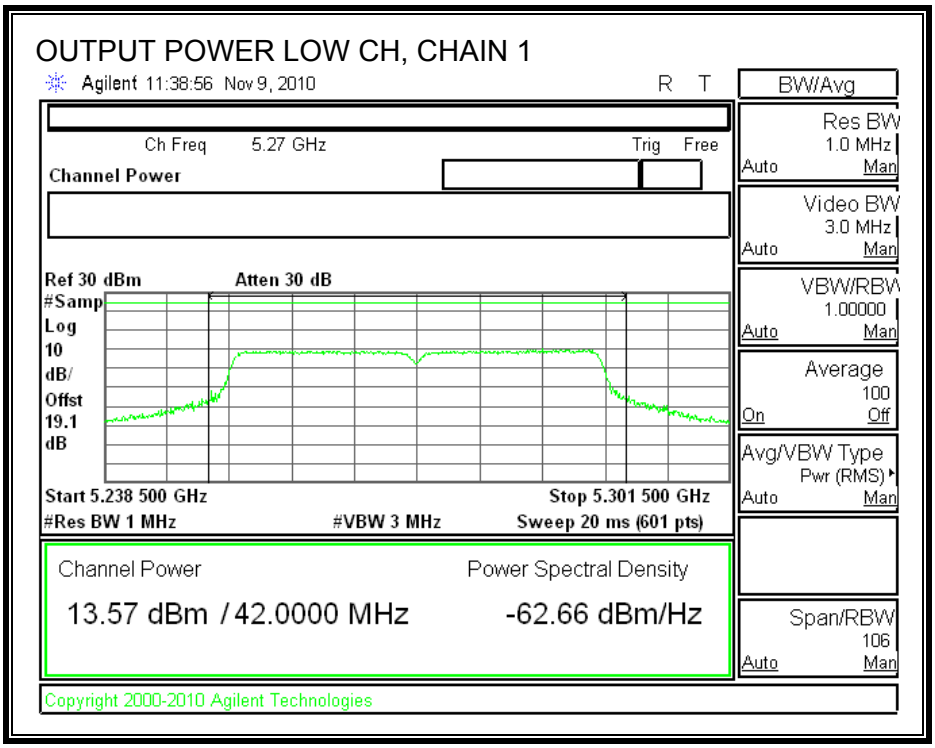
BF

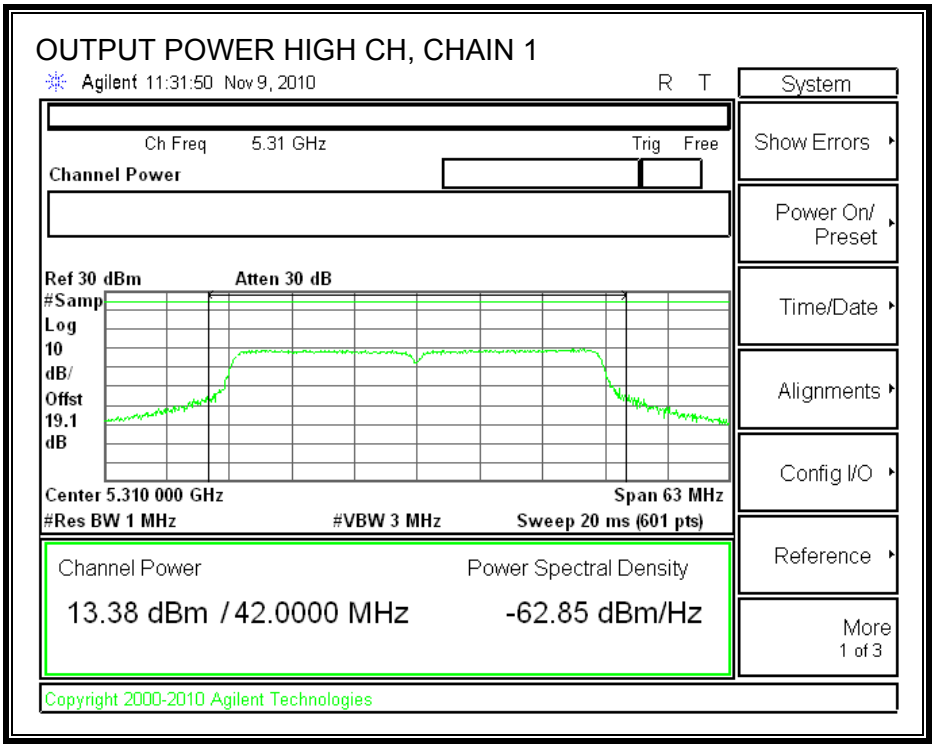
CHAIN 0 OUTPUT POWER



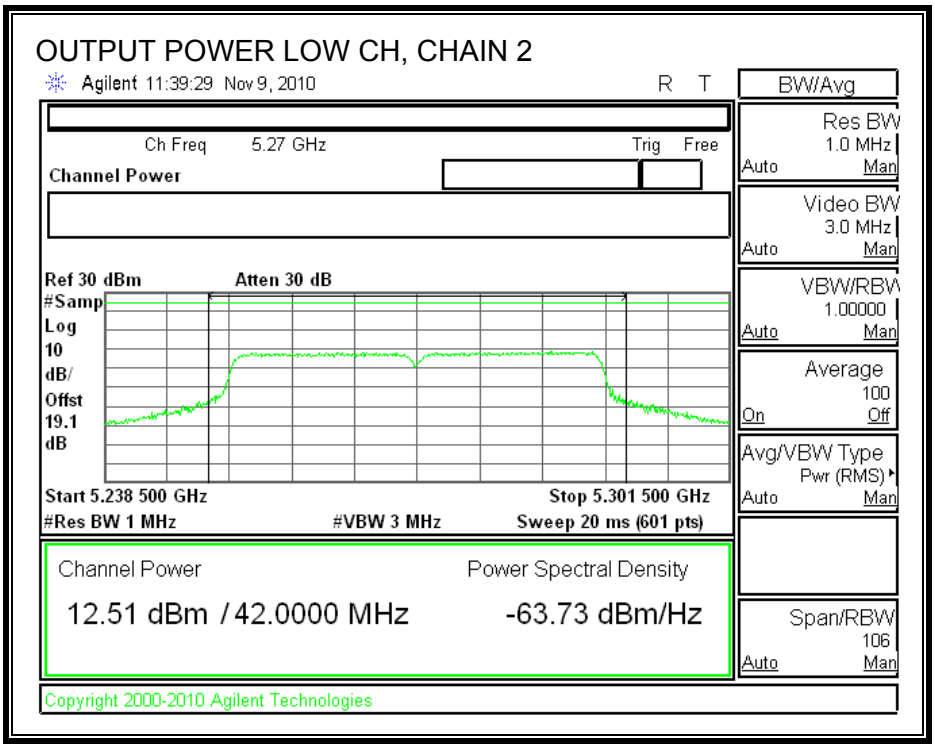


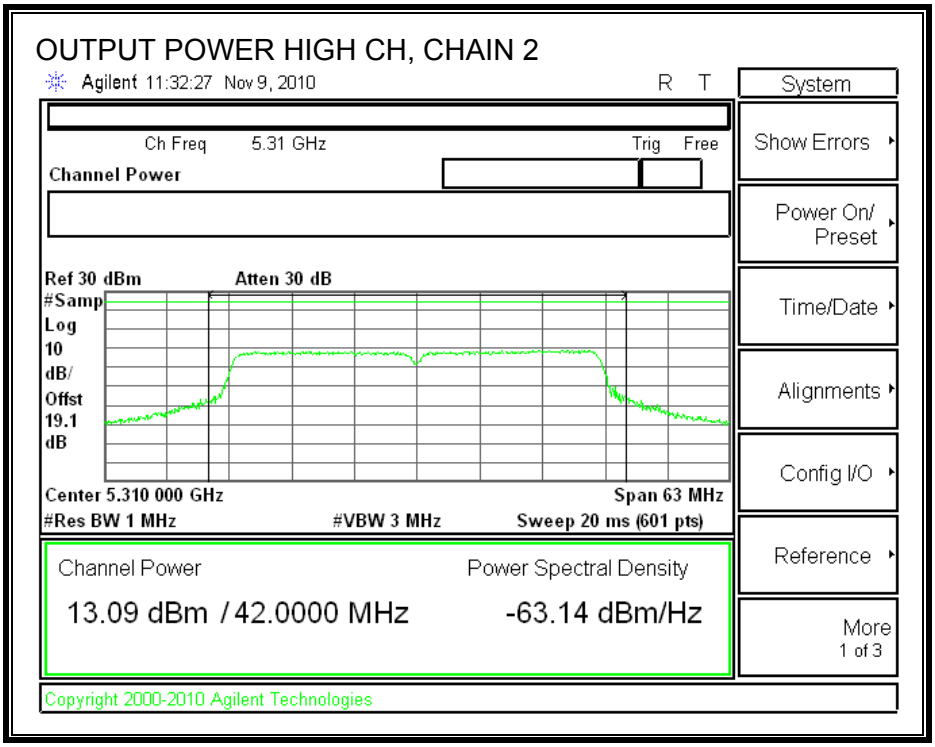
CHAIN 1 OUTPUT POWER





CHAIN 2 OUTPUT POWER





7.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

NBF

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5270	16.70	15.80	15.70	20.86
High	5310	14.50	13.25	13.00	18.41

BF

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5270	14.20	13.50	12.40	18.20
High	5310	14.50	13.25	13.00	18.41

7.6.4. 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 6.07 dBi, therefore the limit is 10.93 dBm.

The combination antenna gain is 10.24 dBi, therefore the limit is 6.76 dBm.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

RESULTS

NBF

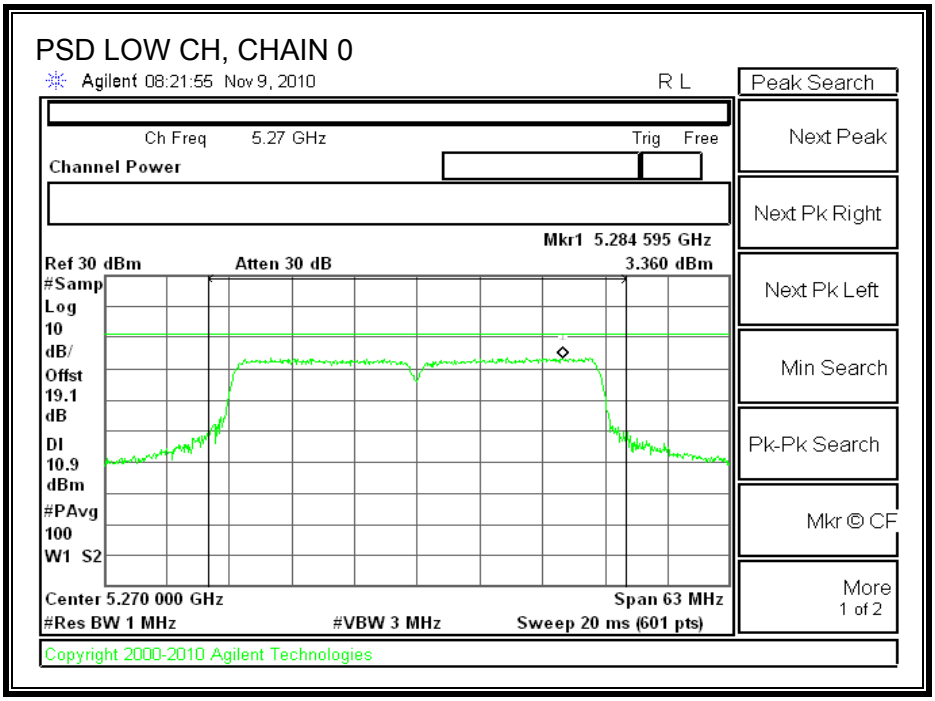
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5270	3.36	2.267	2.067	7.4	10.93	-3.56
High	5310	-0.338	-1.11	-0.963	4.0	10.93	-6.95

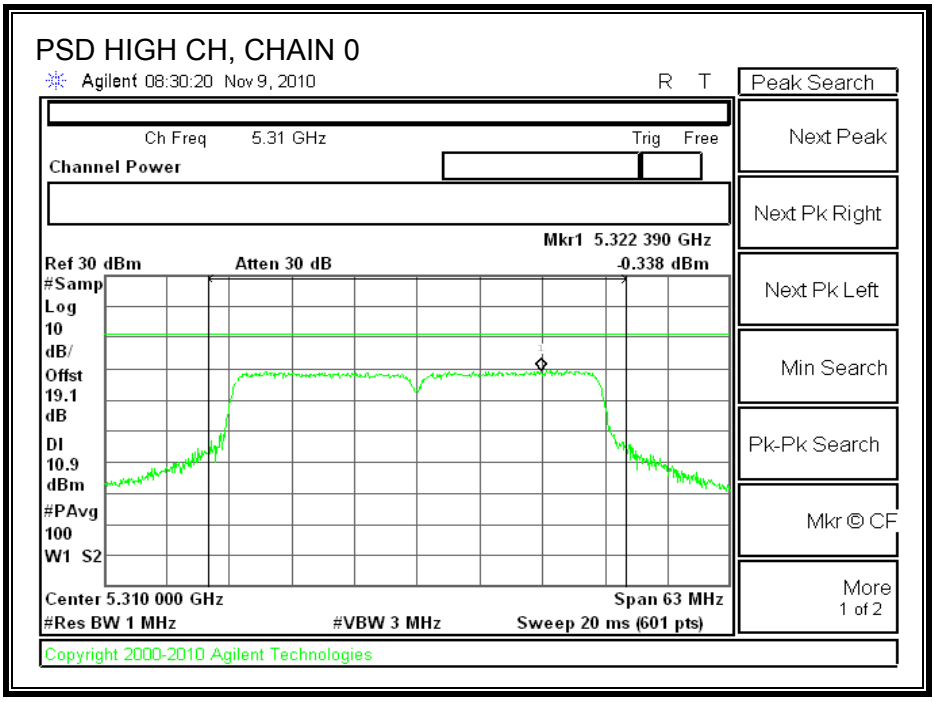
BF

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5270	2.259	1.728	1.309	6.6	6.76	-0.21
High	5310	-0.369	-0.952	-1.187	3.9	6.76	-2.81

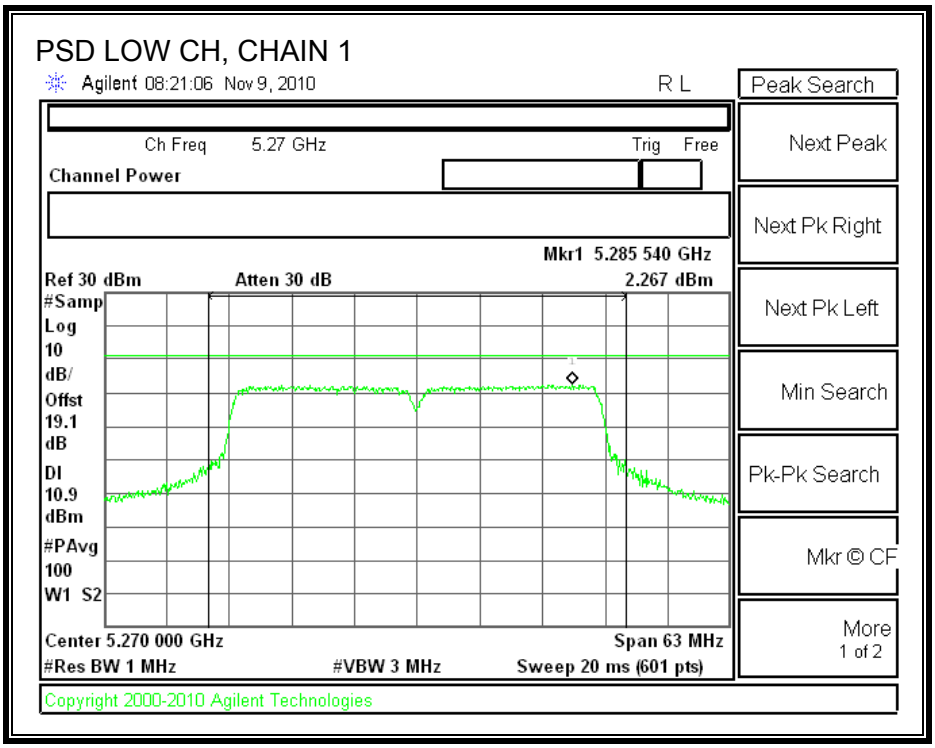
NBF

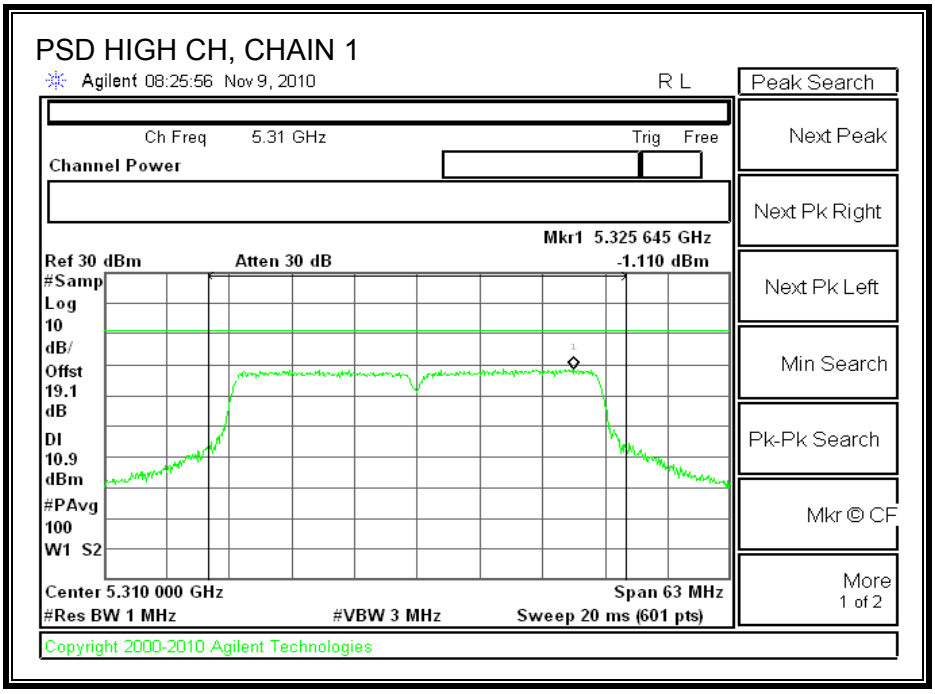
CHAIN 0 POWER SPECTRAL DENSITY



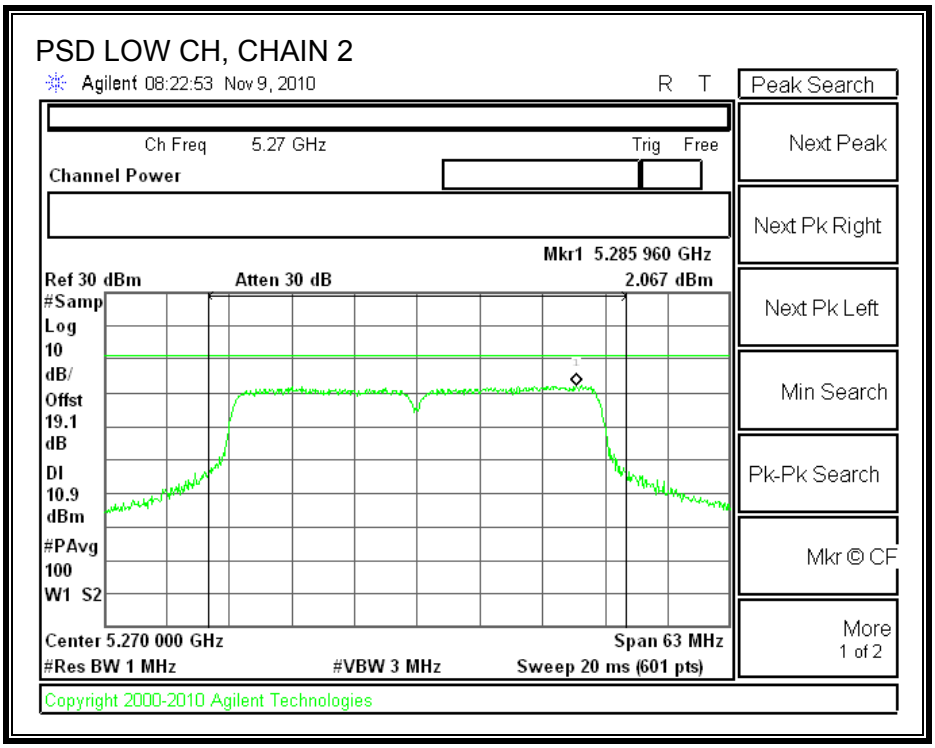


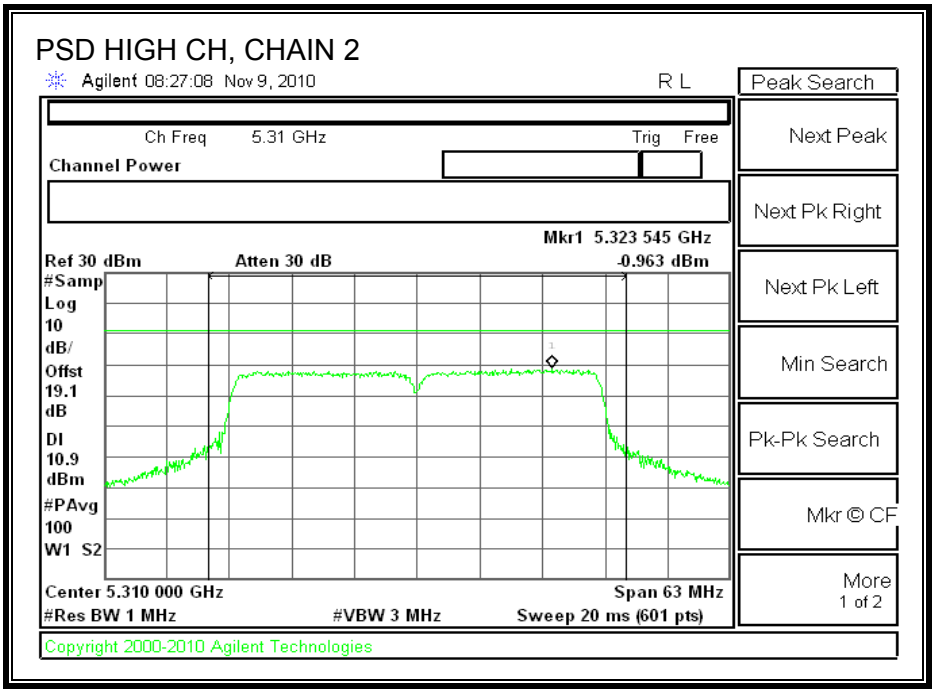
CHAIN 1 POWER SPECTRAL DENSITY





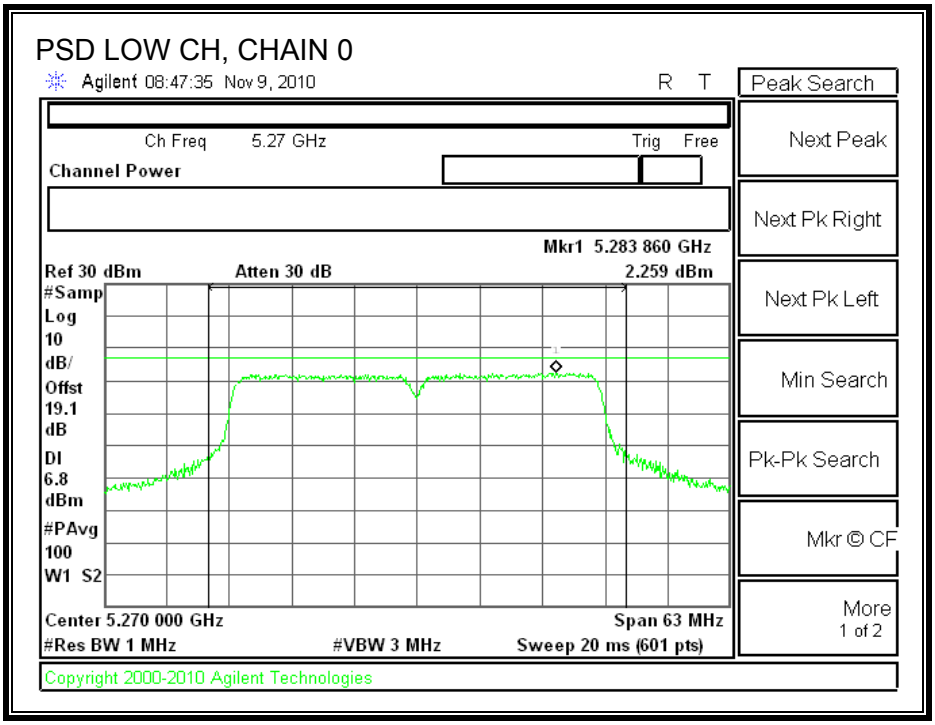
CHAIN 2 POWER SPECTRAL DENSITY

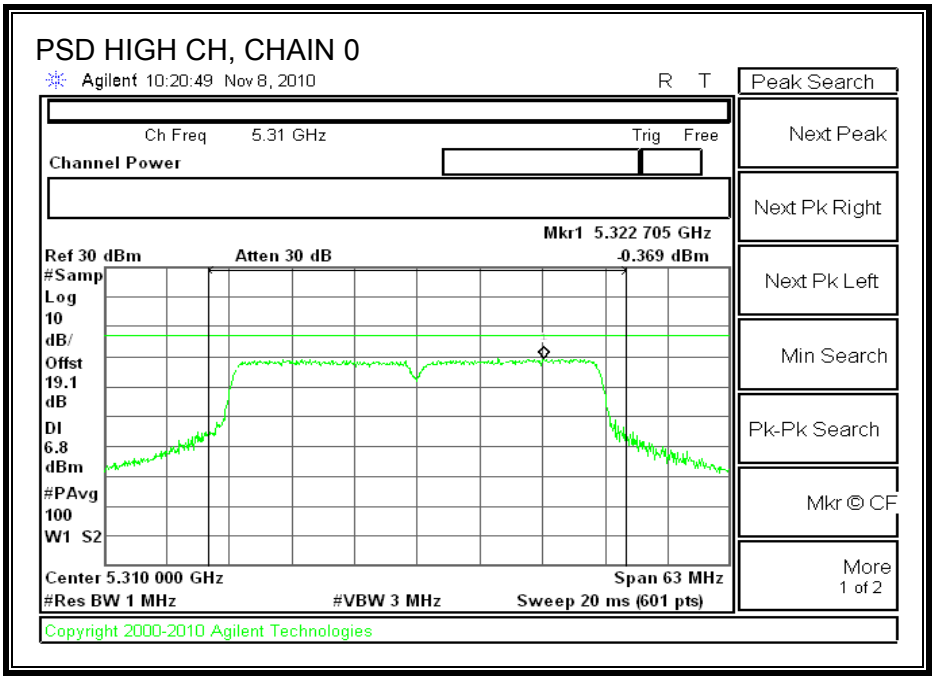




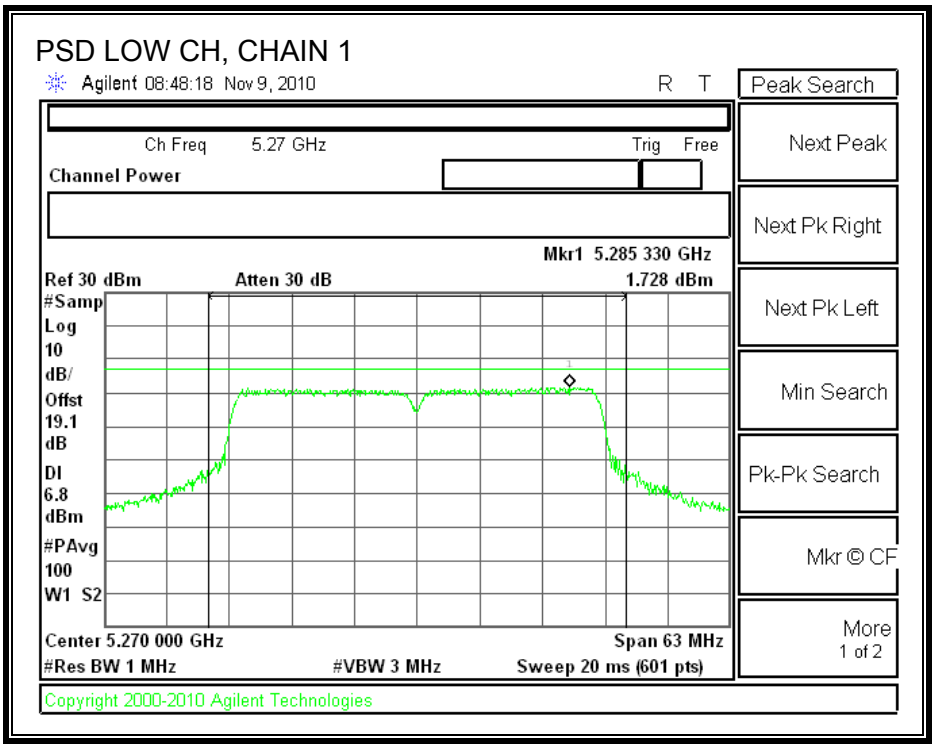
BF

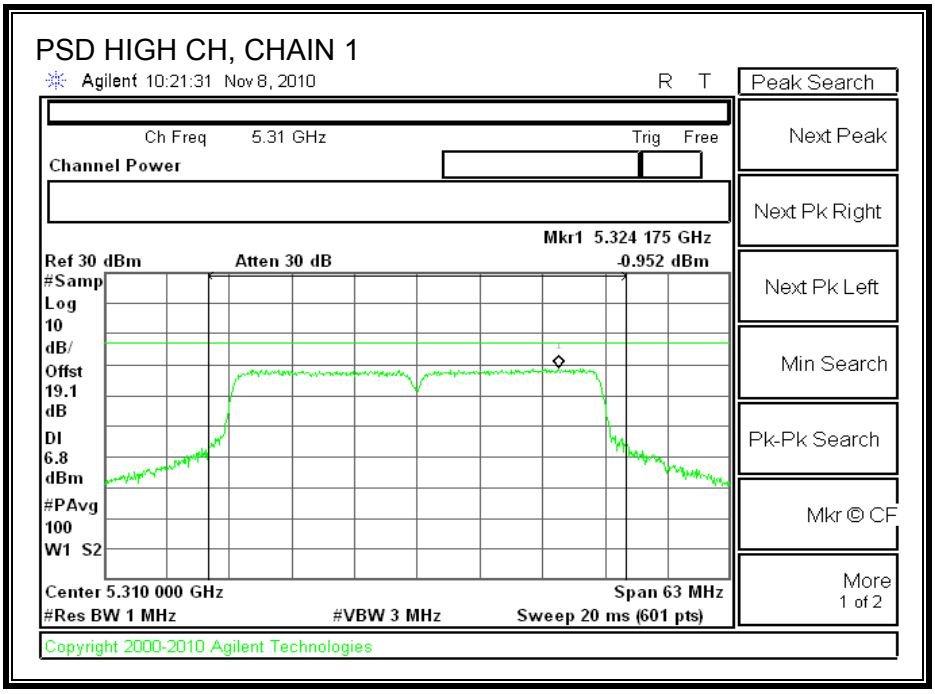
CHAIN 0 POWER SPECTRAL DENSITY



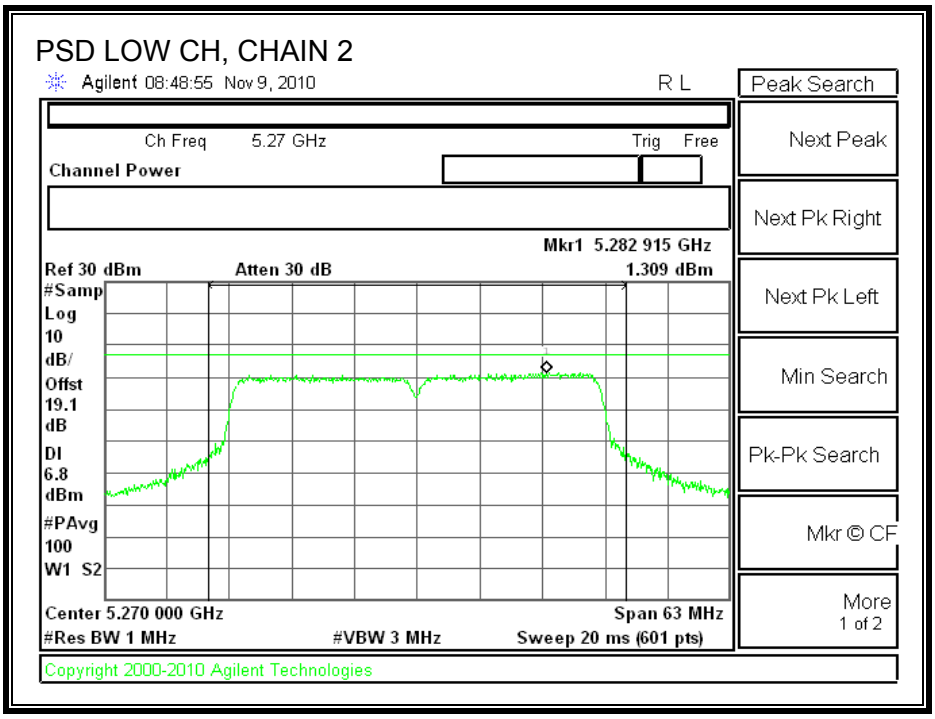


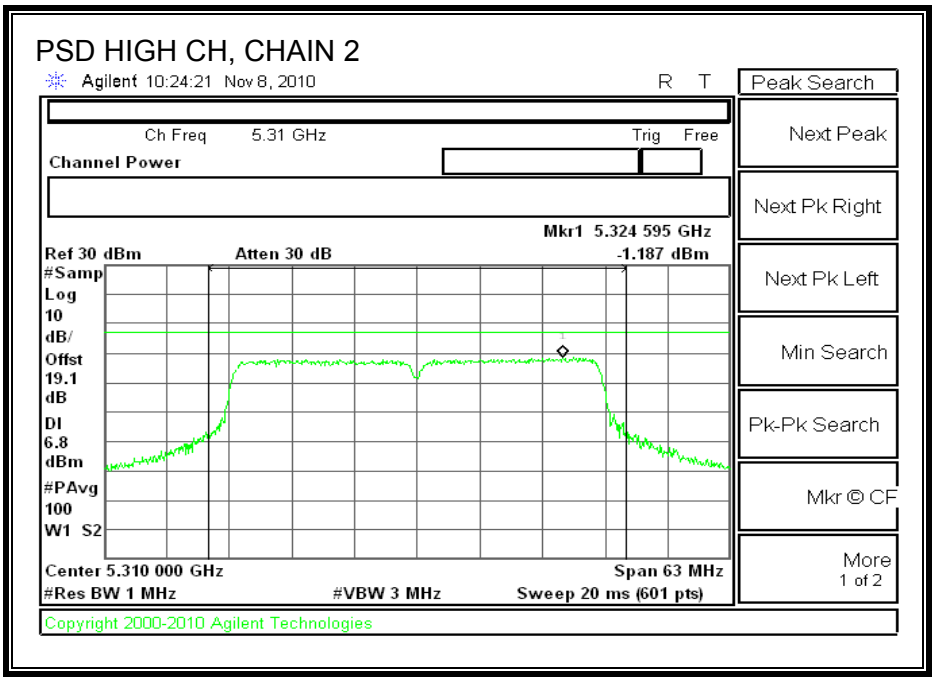
CHAIN 1 POWER SPECTRAL DENSITY





CHAIN 2 POWER SPECTRAL DENSITY





7.6.5. 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

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	9.21	13	-3.79
High	5310	10.40	13	-2.60

CHAIN 1

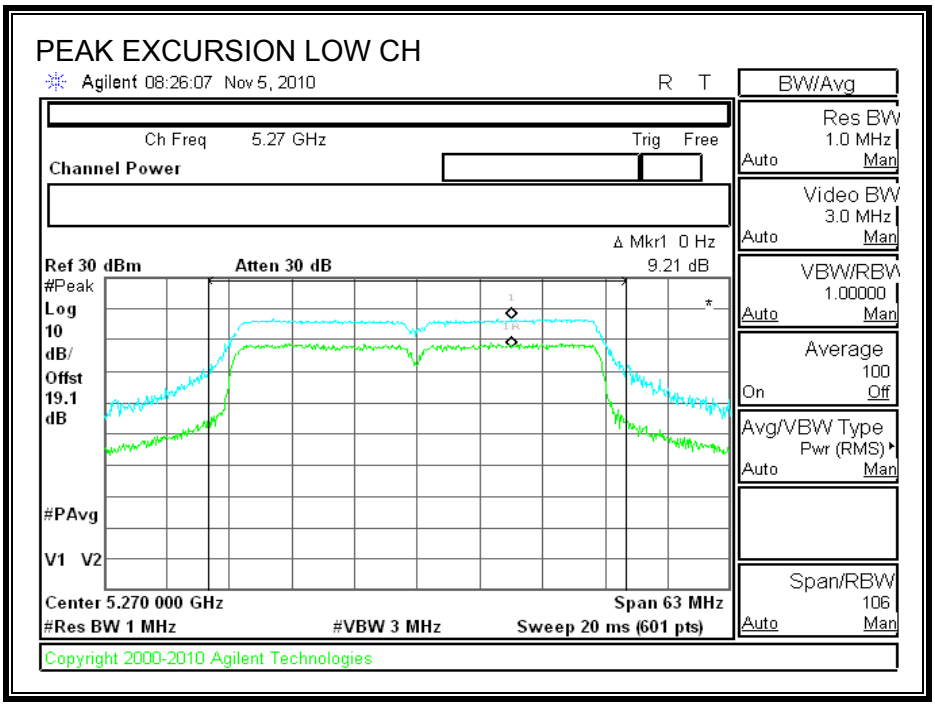
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	9.58	13	-3.42
High	5310	9.38	13	-3.62

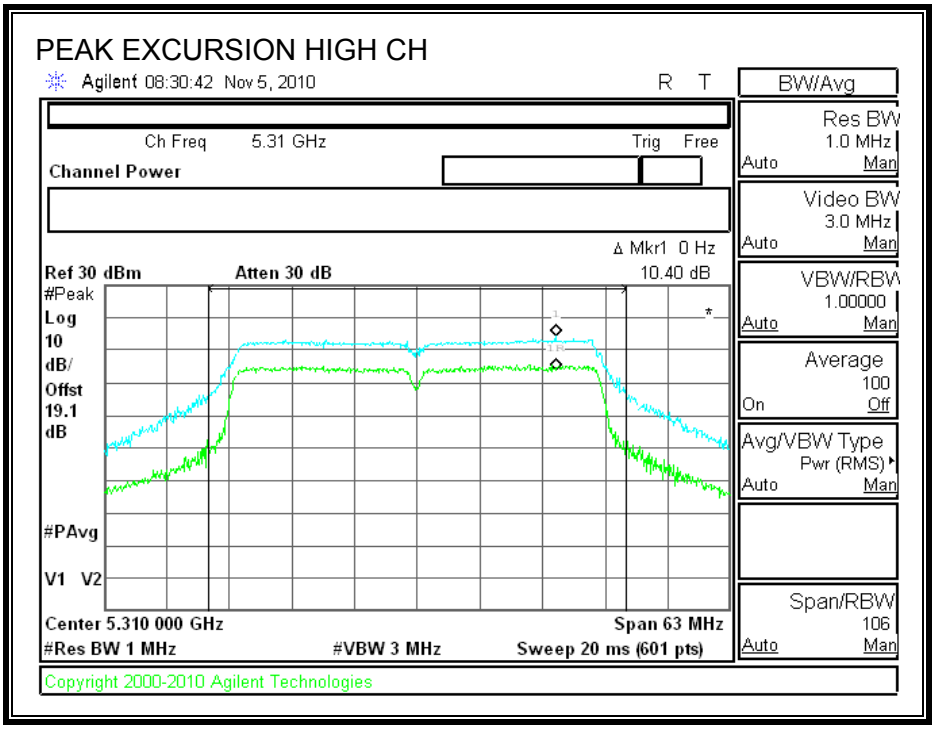
CHAIN 2

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	9.00	13	-4.00
High	5310	8.91	13	-4.09

CHAIN 0

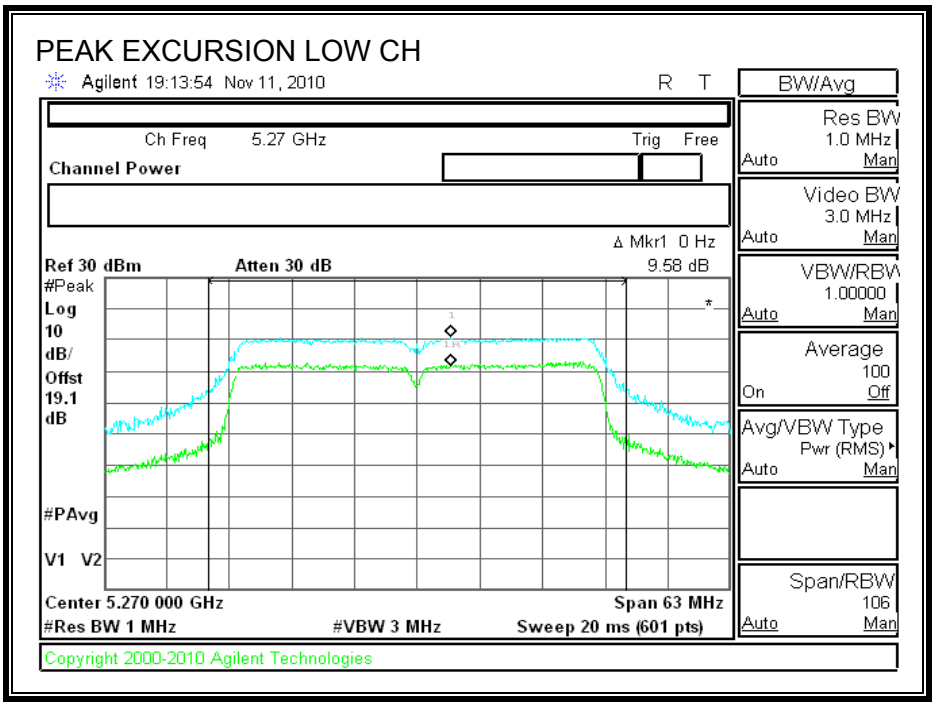
PEAK EXCURSION

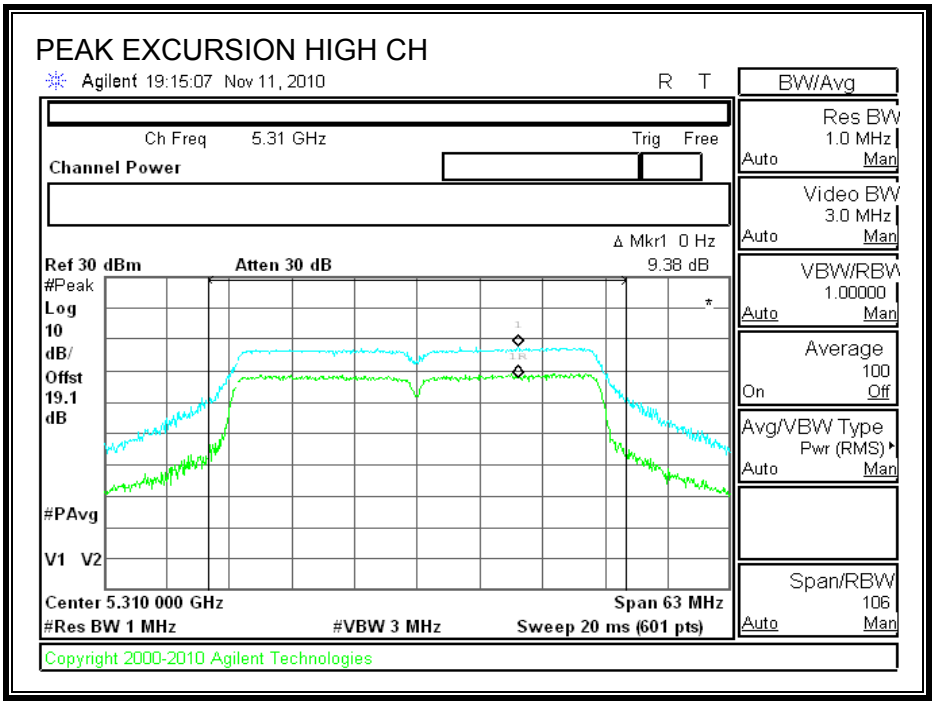




CHAIN 1

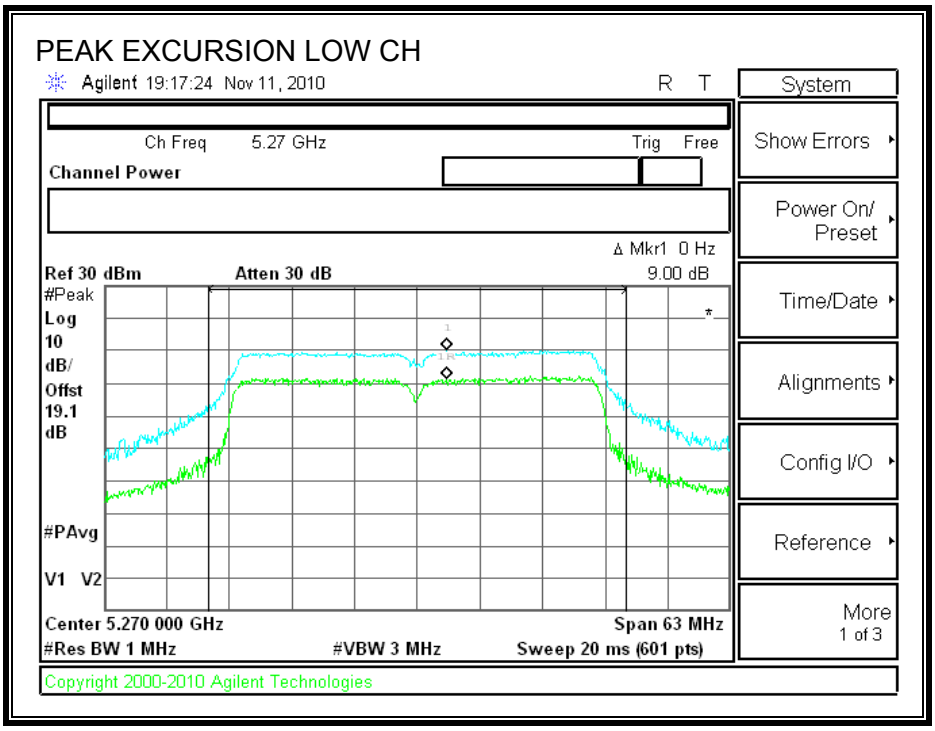
PEAK EXCURSION

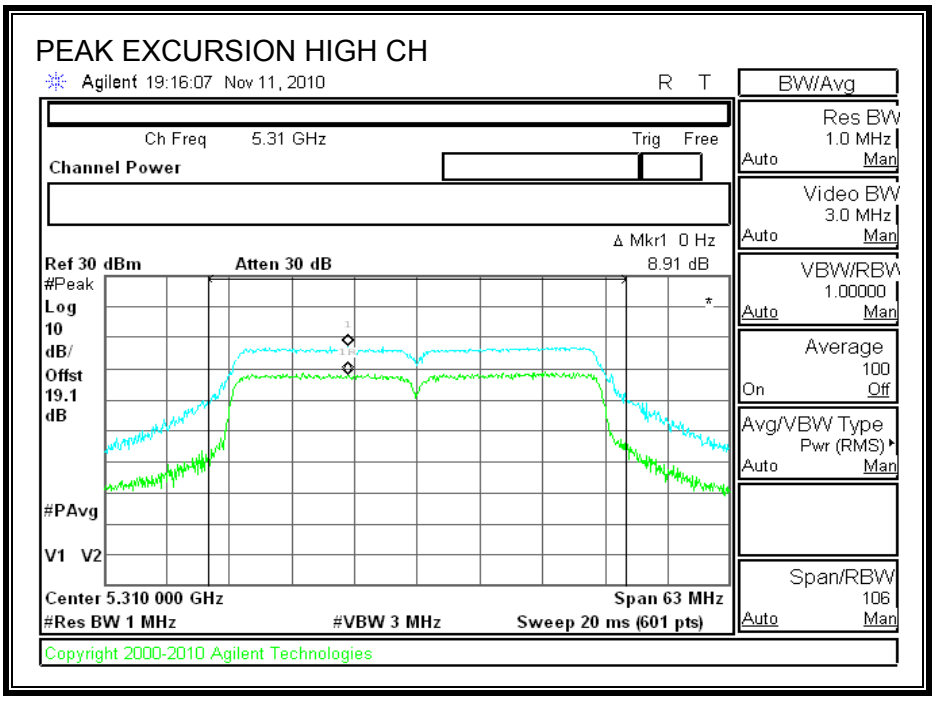




CHAIN 2

PEAK EXCURSION





7.6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

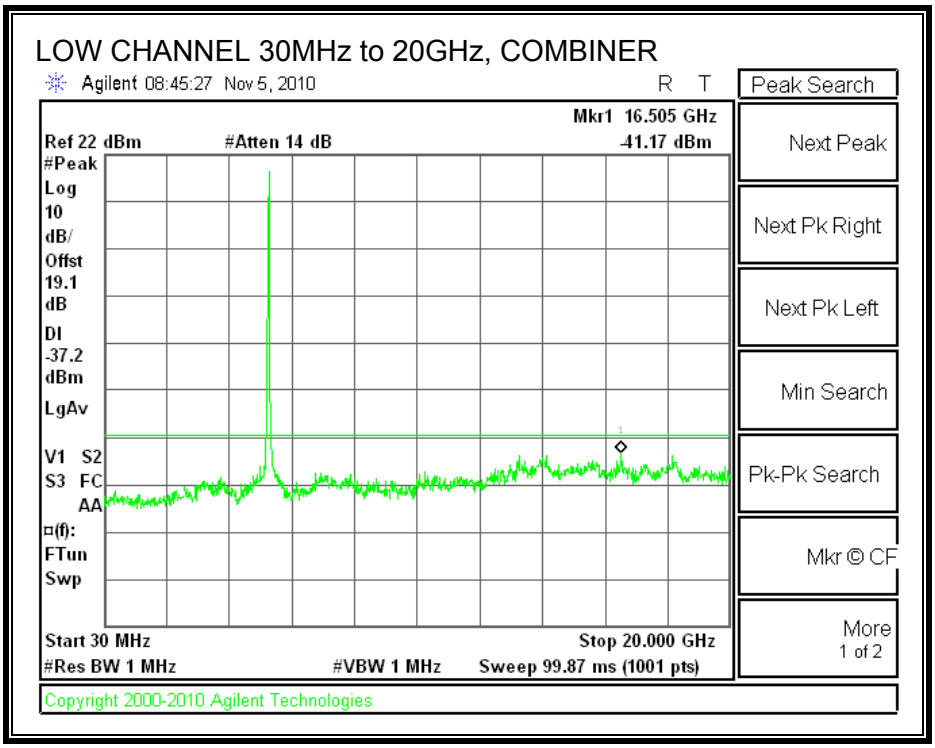
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

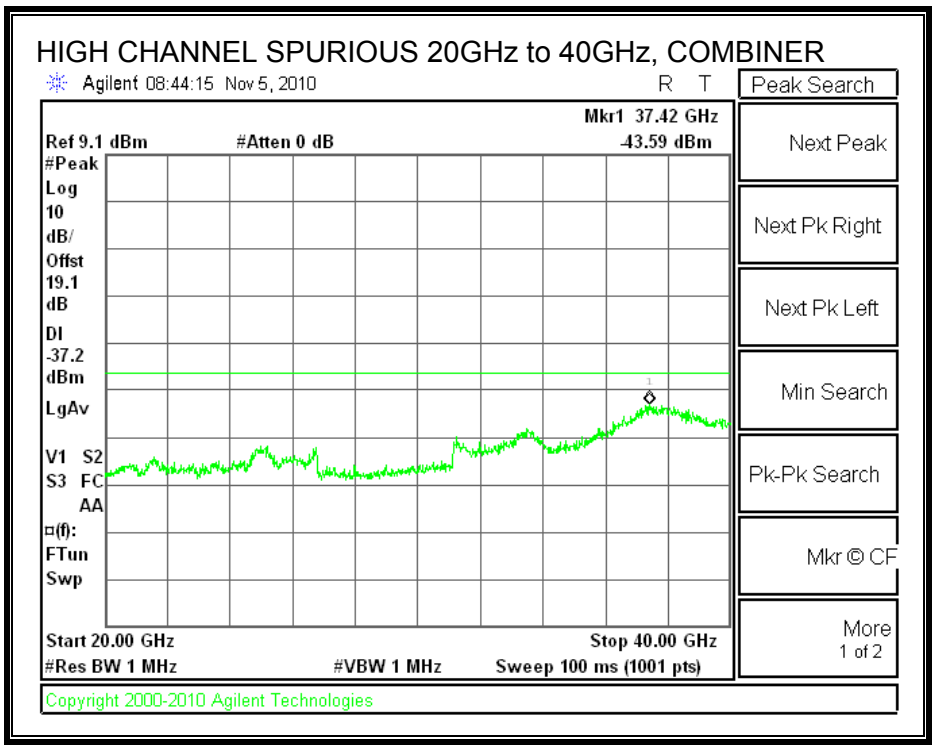
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

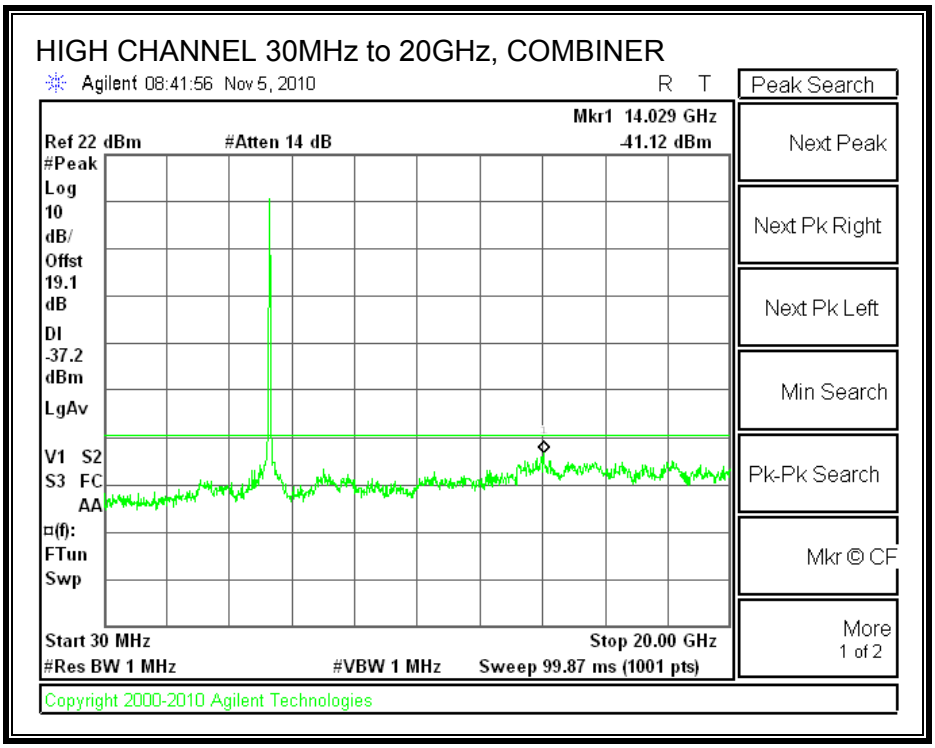
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

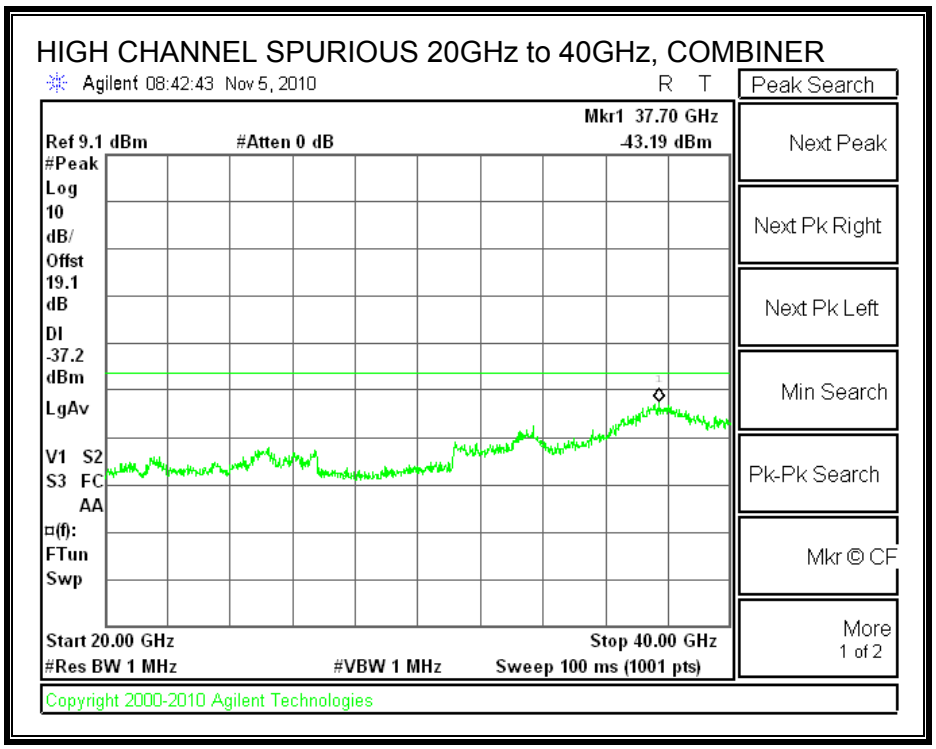
LOW CHANNEL SPURIOUS EMISSIONS





HIGH CHANNEL SPURIOUS EMISSIONS





7.7. 5.6GHz BAND CHANNEL TESTS FOR 802.11a MODE

7.7.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	20.776	16.5275
Middle	5600	20.574	16.4881
High	5700	20.15	16.5373

CHAIN 1

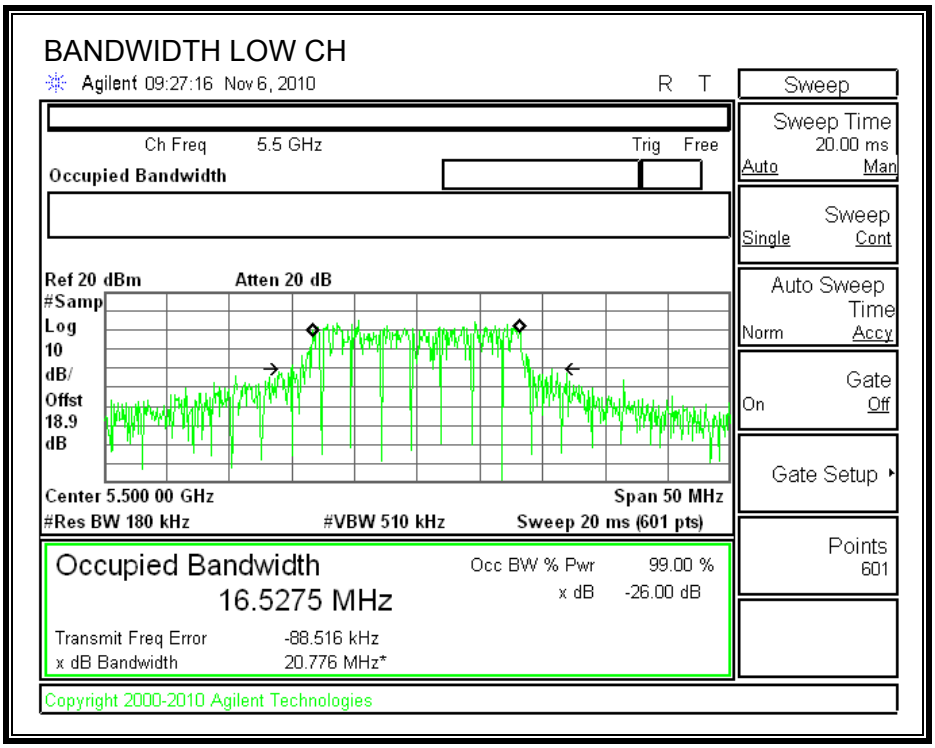
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	19.899	16.461
Middle	5600	20.388	16.4517
High	5700	20.402	16.4802

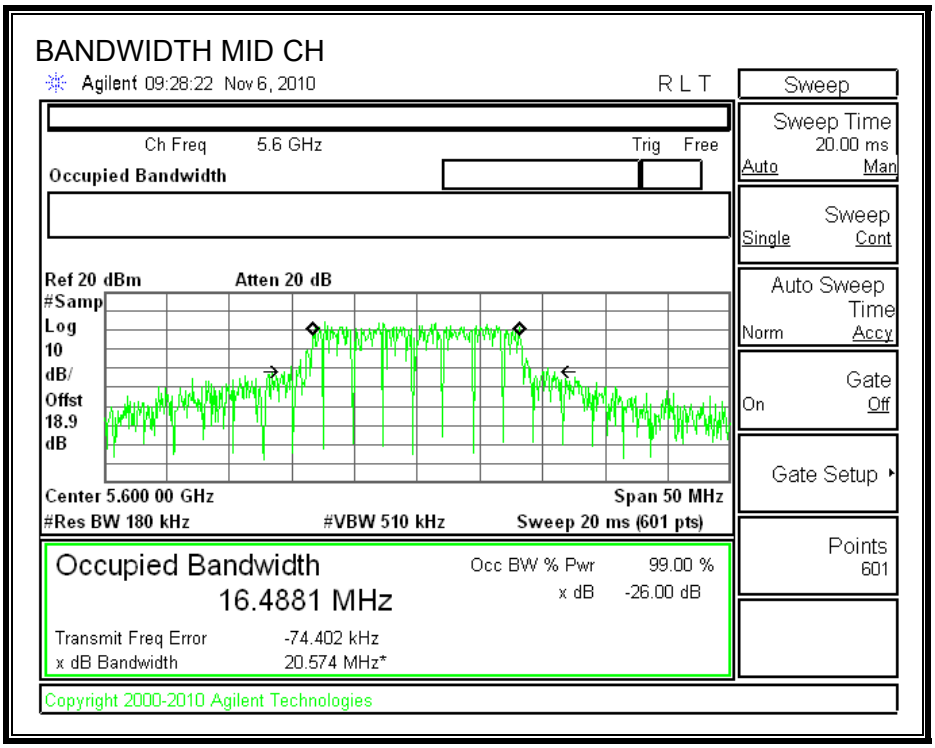
CHAIN 2

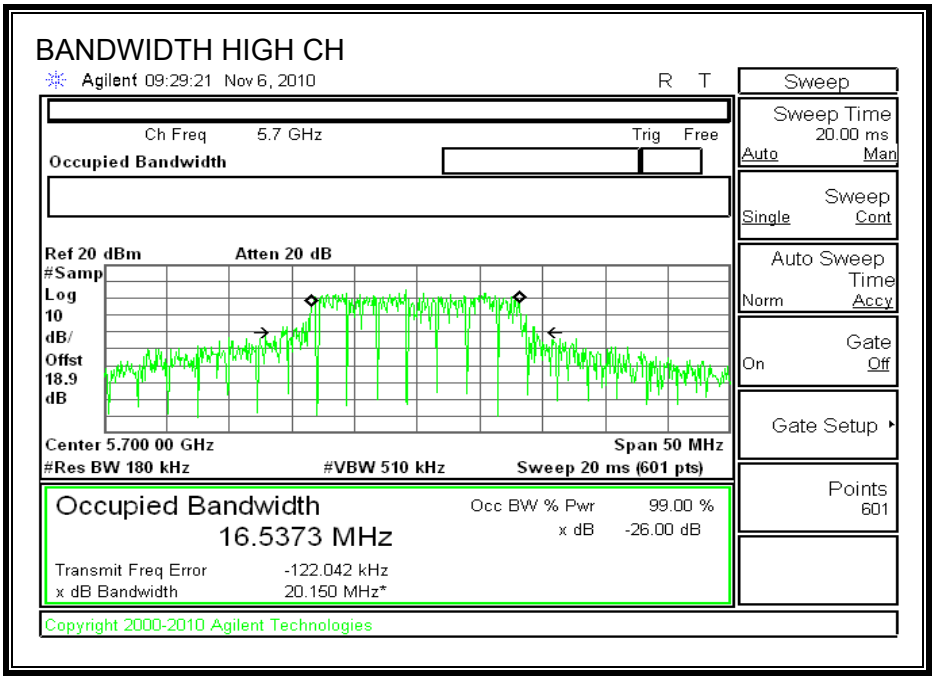
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	20.966	16.4756
Middle	5600	20.225	16.5161
High	5700	19.259	16.574

CHAIN 0

26 dB and 99% BANDWIDTH

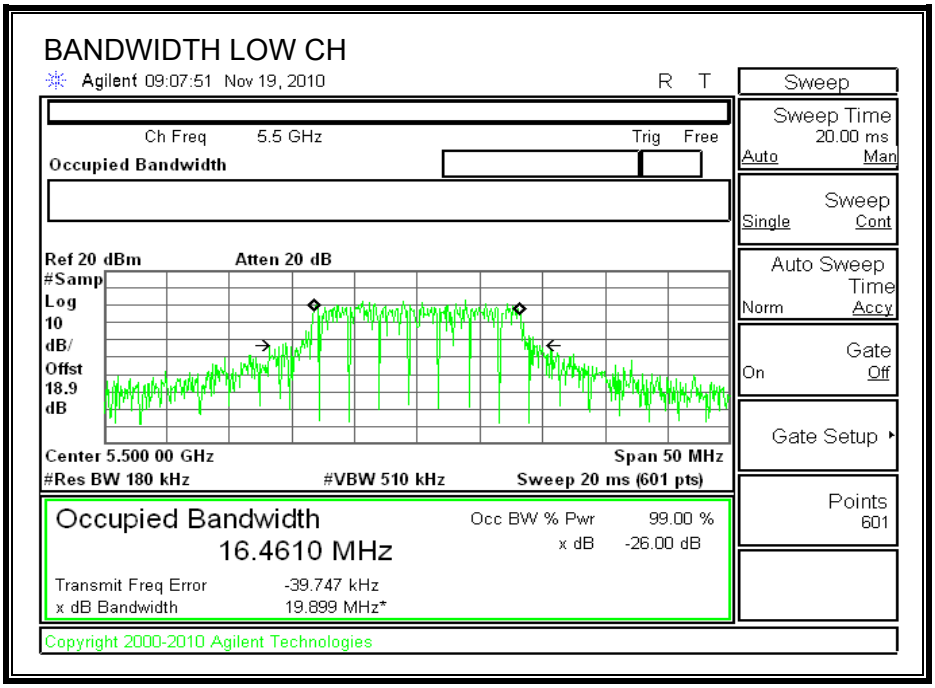




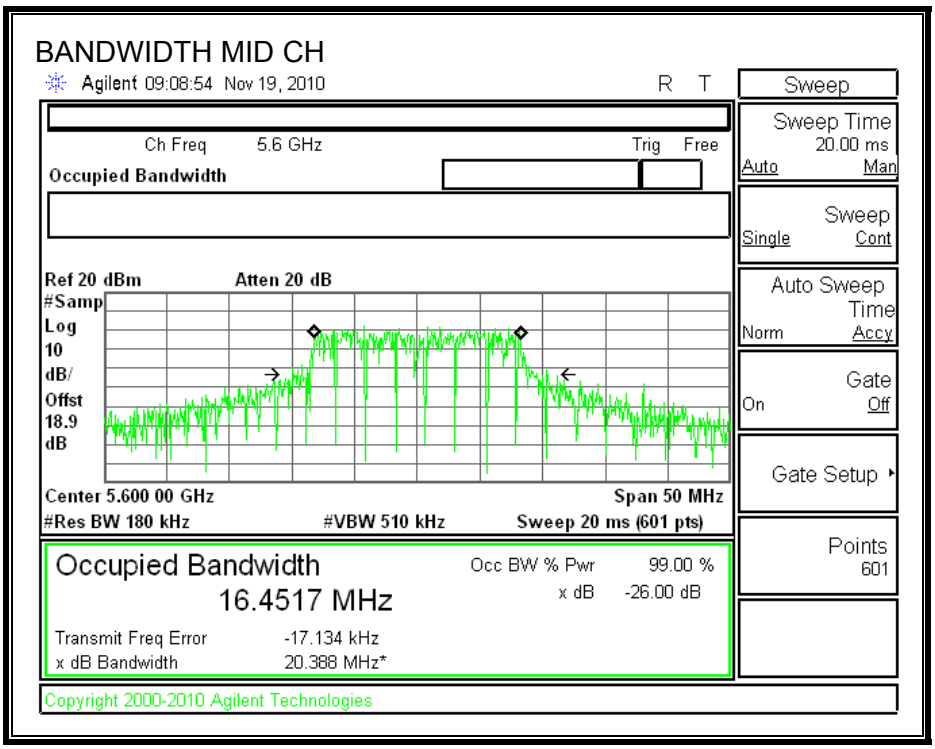


CHAIN 1

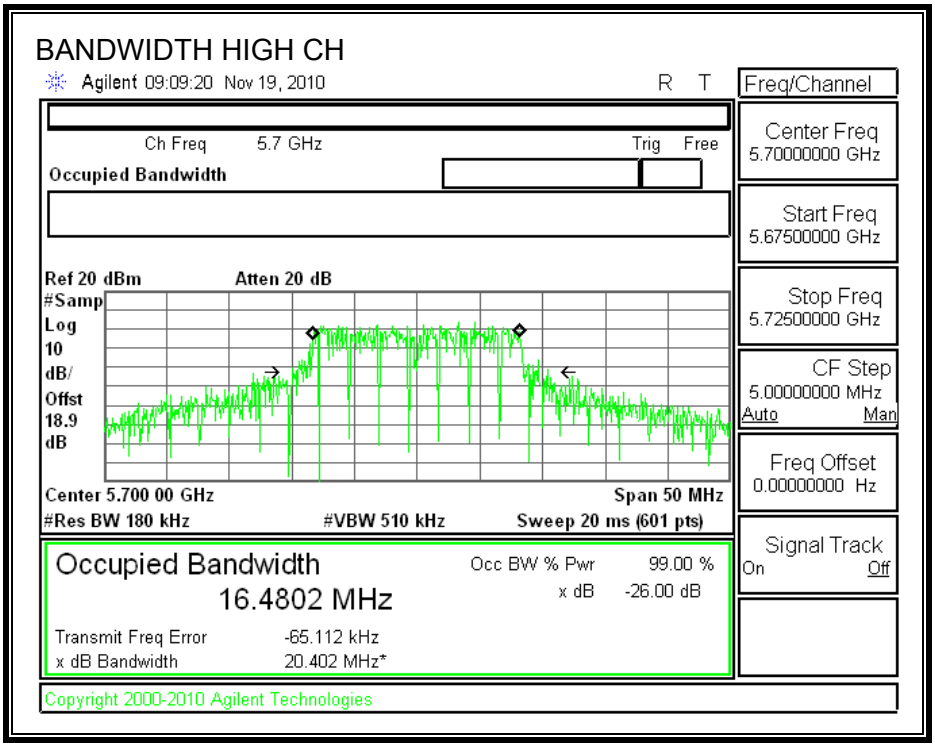
26 dB and 99% BANDWIDTH



BANDWIDTH MID CH

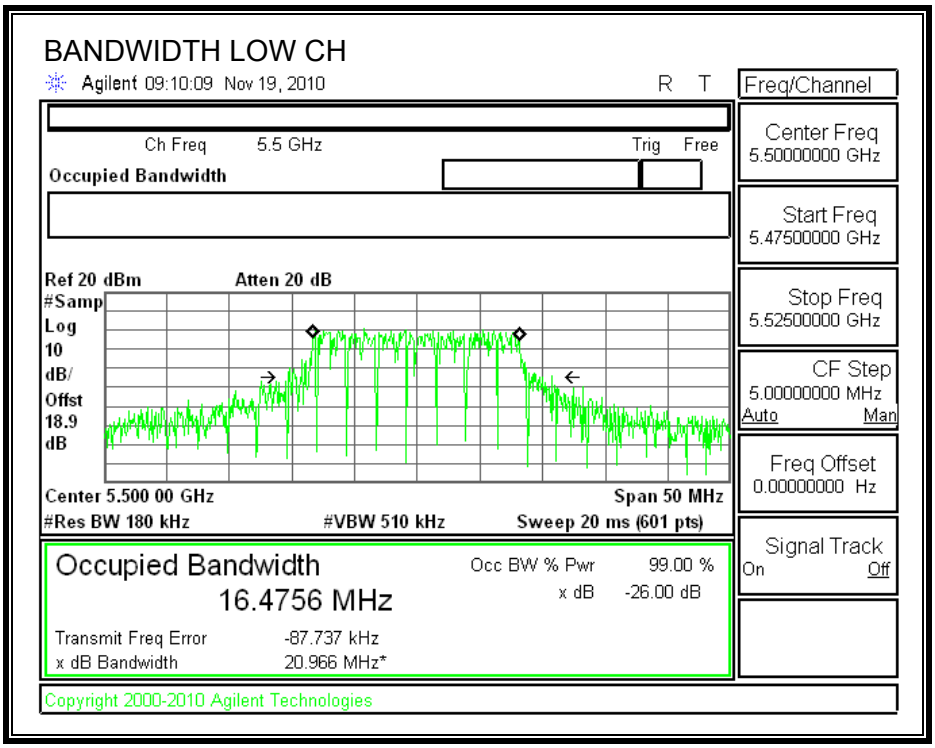


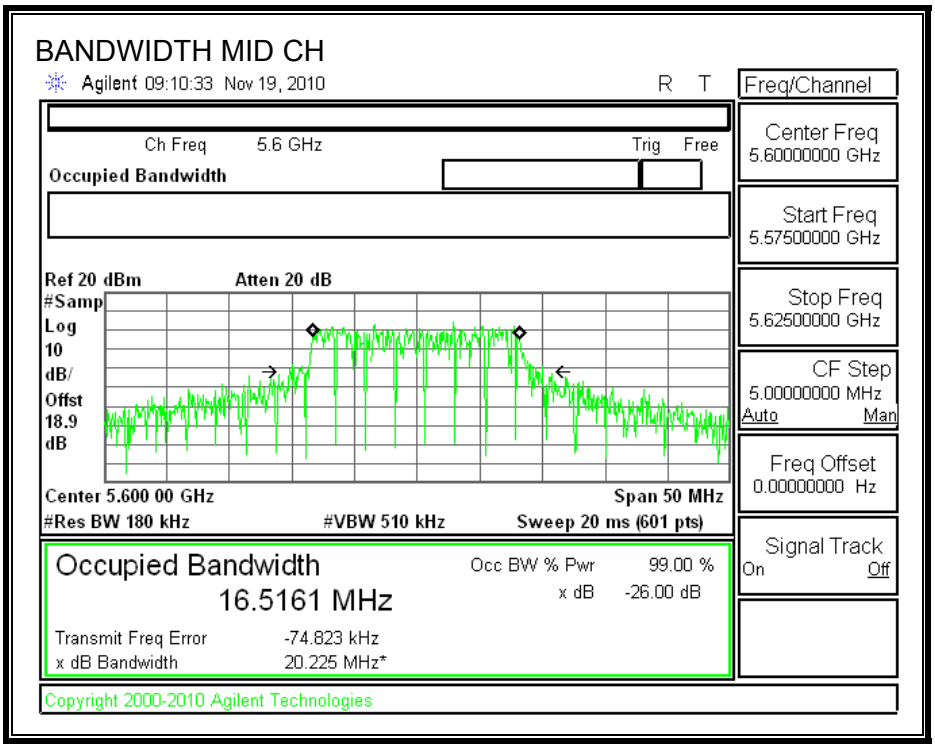
BANDWIDTH HIGH CH

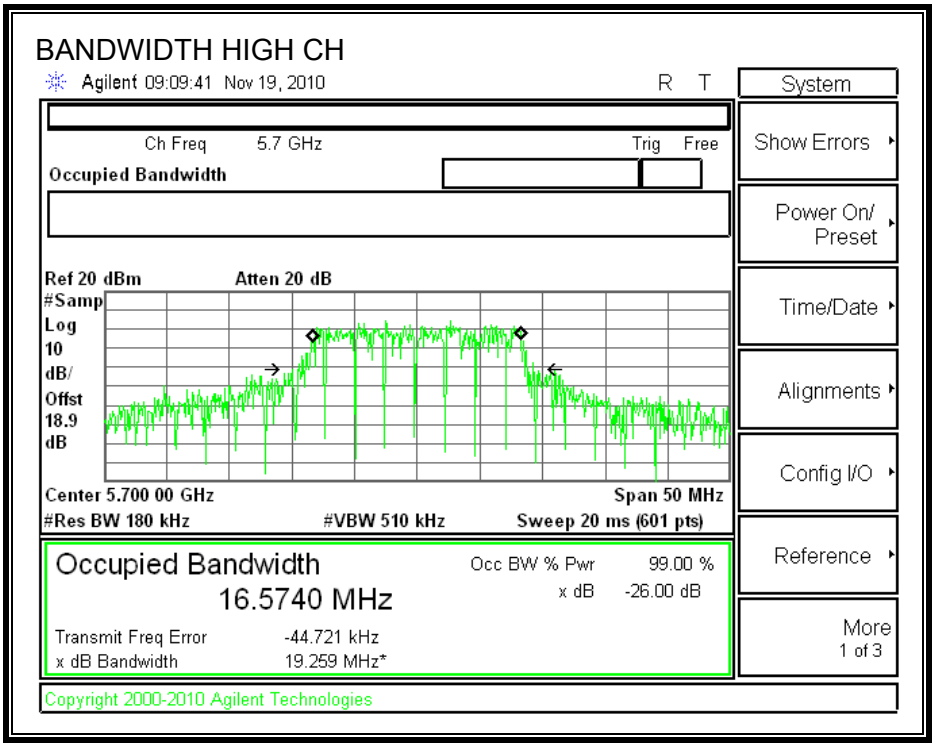


CHAIN 2

26 dB and 99% BANDWIDTH







7.7.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (1)
IC RSS-210 A9.2 (1)

Antenna gain of Chain 1 = antenna gain of Chain 2.

Antenna Gain (Chain 0) (dBi)	Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Effective Legacy Gain (dBi)
4.02	4.78	4.51	9.22

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.

The combination antenna gain is 9.22 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.
The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Effective Ant. Gain (dBi)	Limit (dBm)
Low	5500	23.98	20.776	24.18	9.22	20.76
Mid	5600	23.98	20.574	24.13	9.22	20.76
High	5700	23.98	20.15	24.04	9.22	20.76

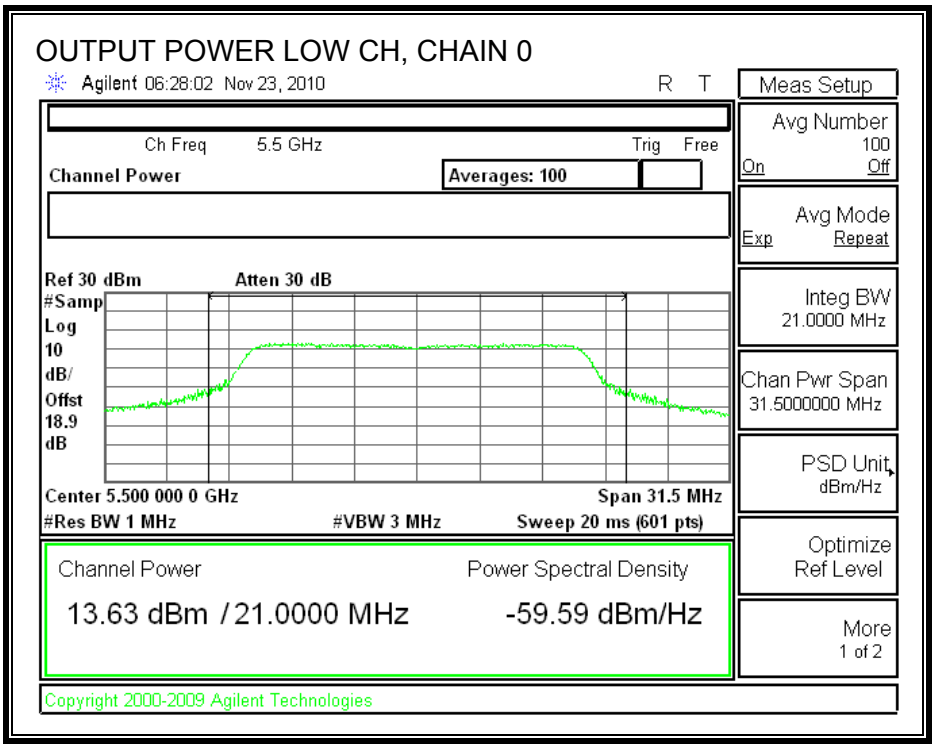
Individual Chain Results

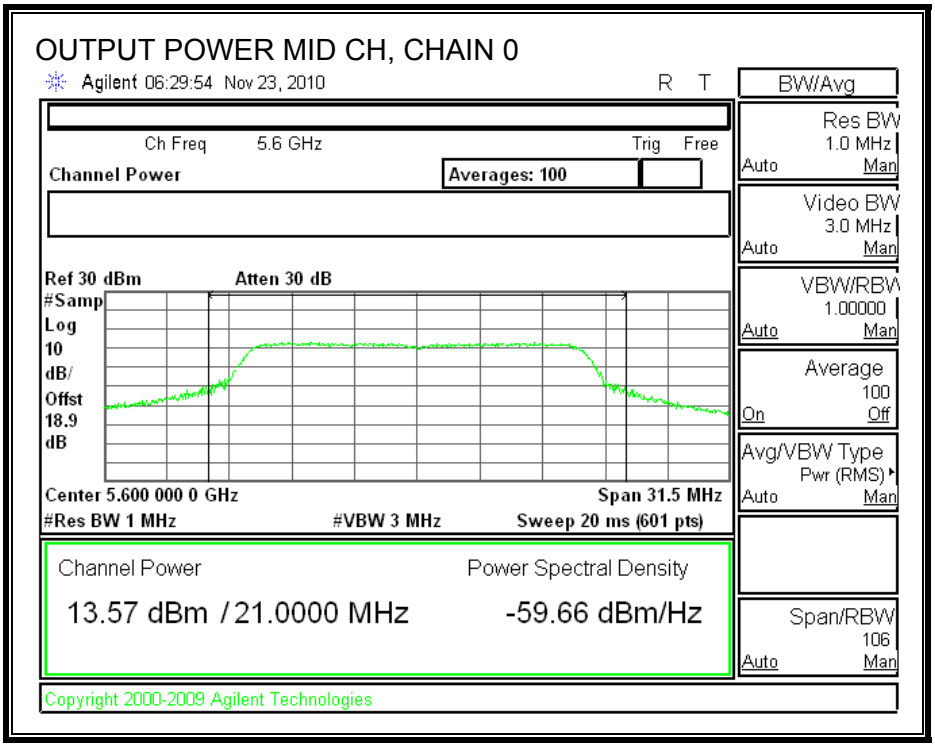
Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	13.63	13.22	13.66	18.28	20.76	-2.48
Mid	5600	13.57	13.00	13.02	17.98	20.76	-2.78
High	5700	13.36	13.07	12.84	17.87	20.76	-2.89

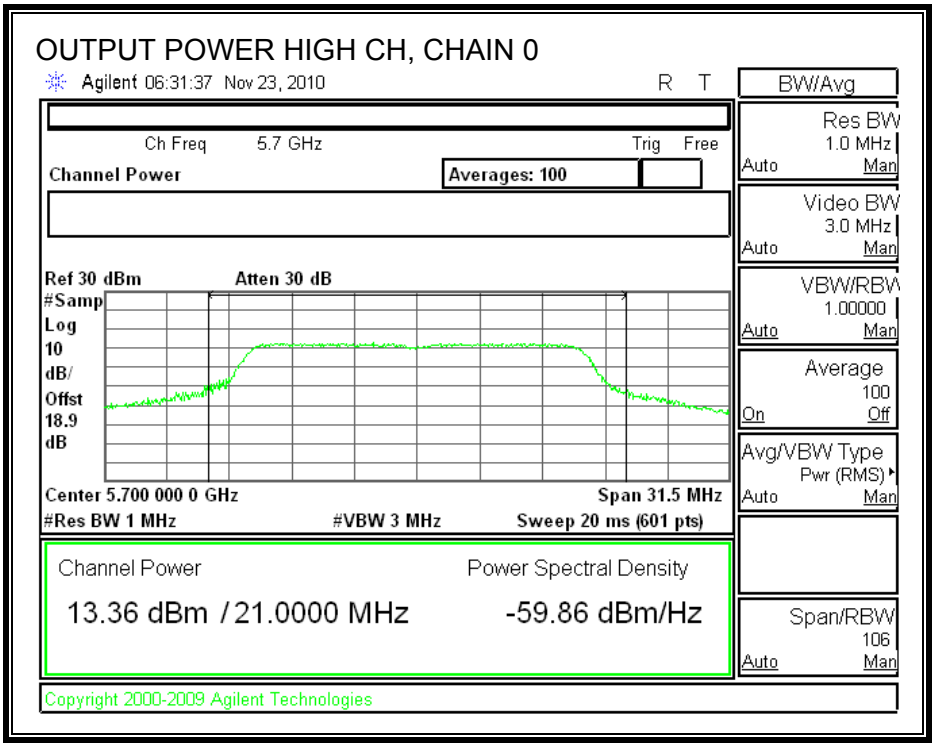
TPC Results

TPC Delta Power		Chain 0	Chain 1	Chain 2			
		3.55	3.46	5.22			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Low	5500	10.08	9.76	8.44	14.25	9.22	23.47
					TPC Limit (dBm)	24	
					Margin (dB)	-0.53	

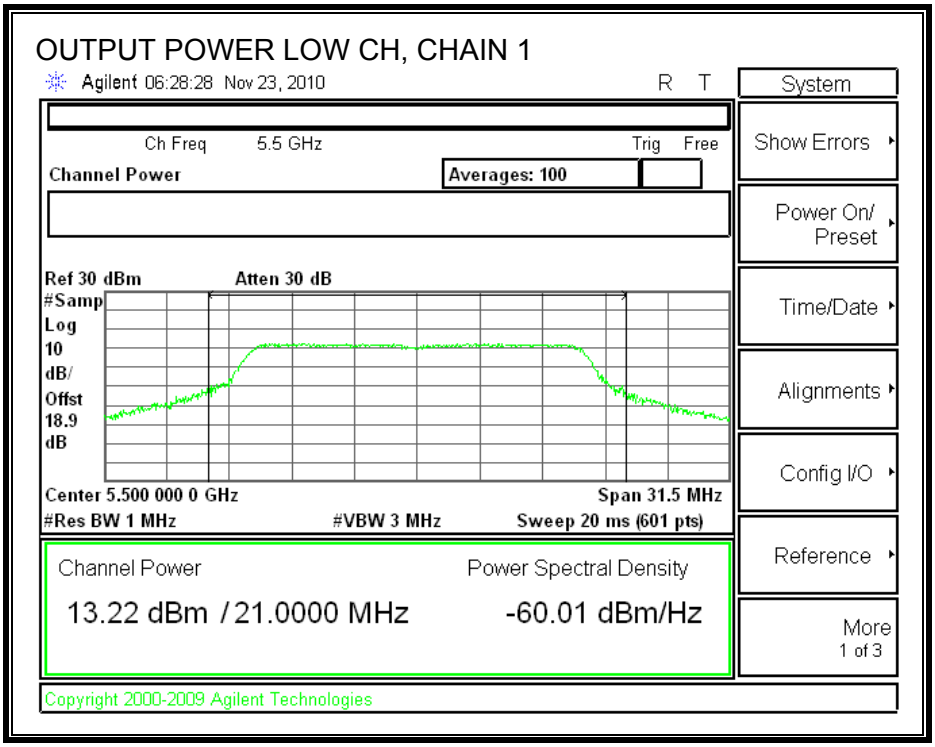
CHAIN 0 OUTPUT POWER



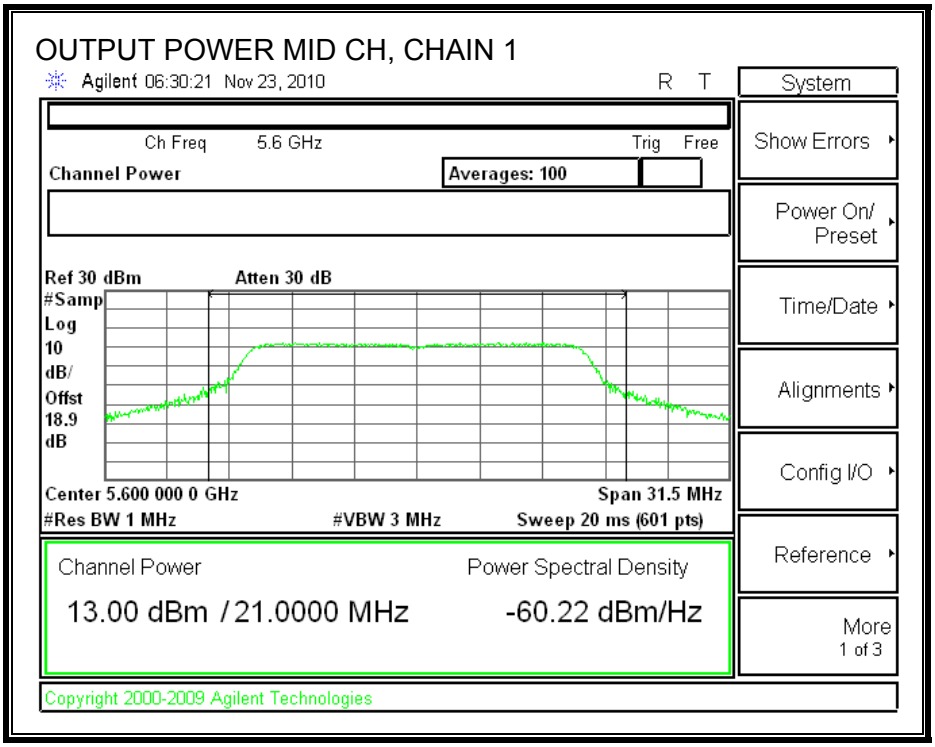




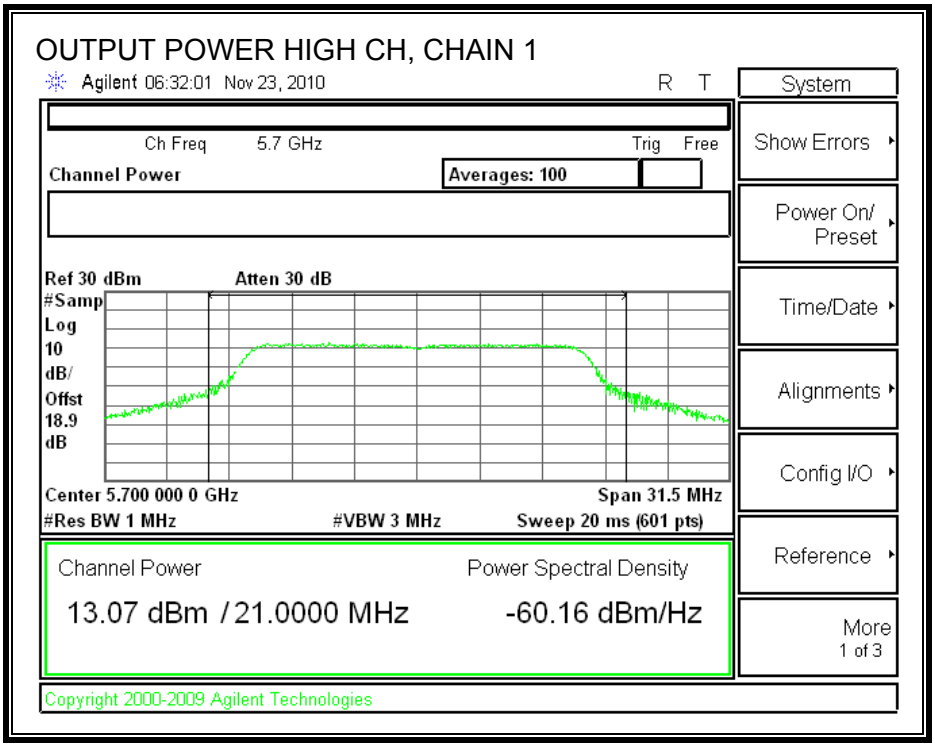
CHAIN 1 OUTPUT POWER



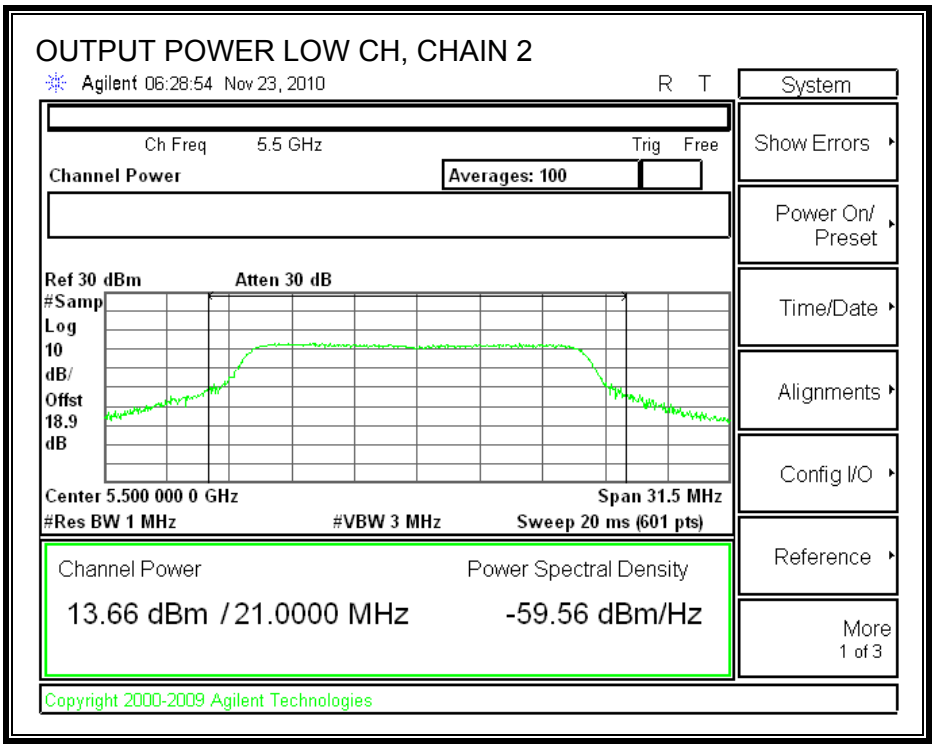
OUTPUT POWER MID CH, CHAIN 1

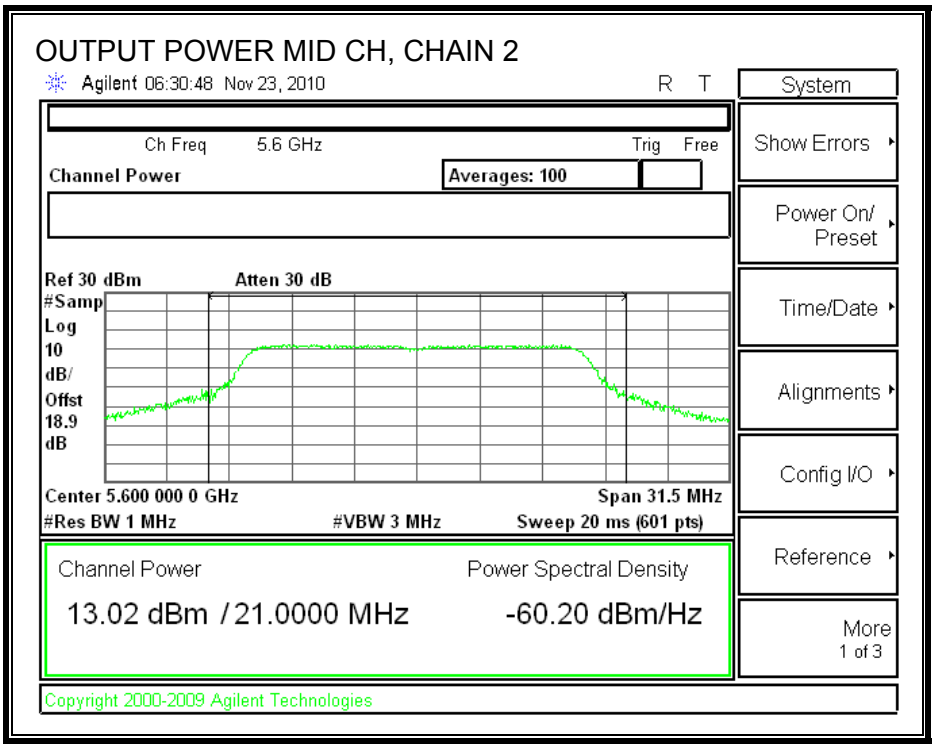


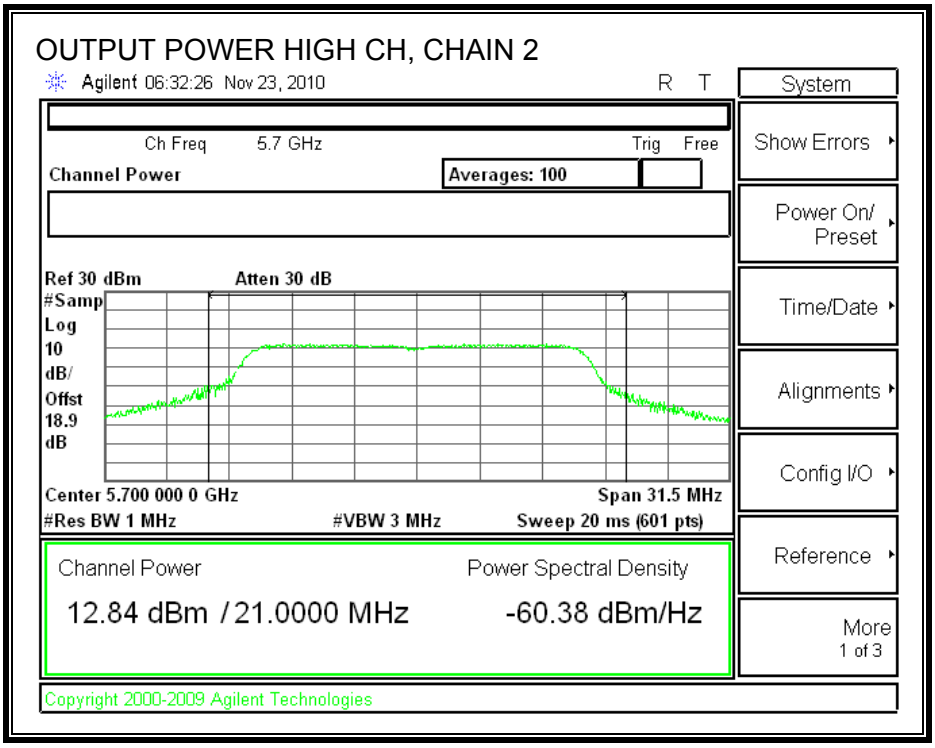
OUTPUT POWER HIGH CH, CHAIN 1



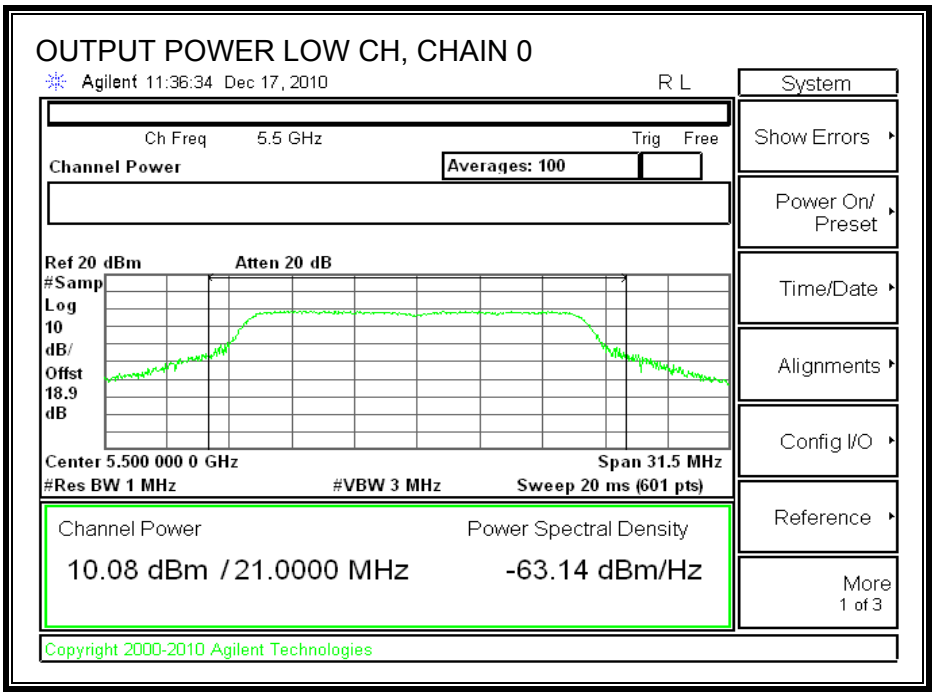
CHAIN 2 OUTPUT POWER

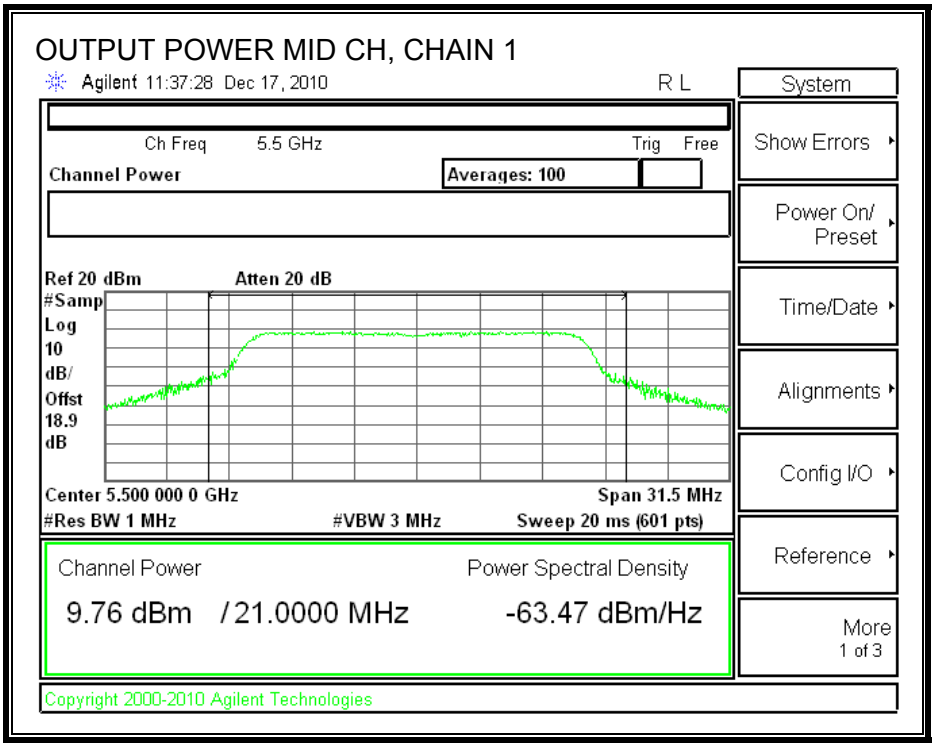


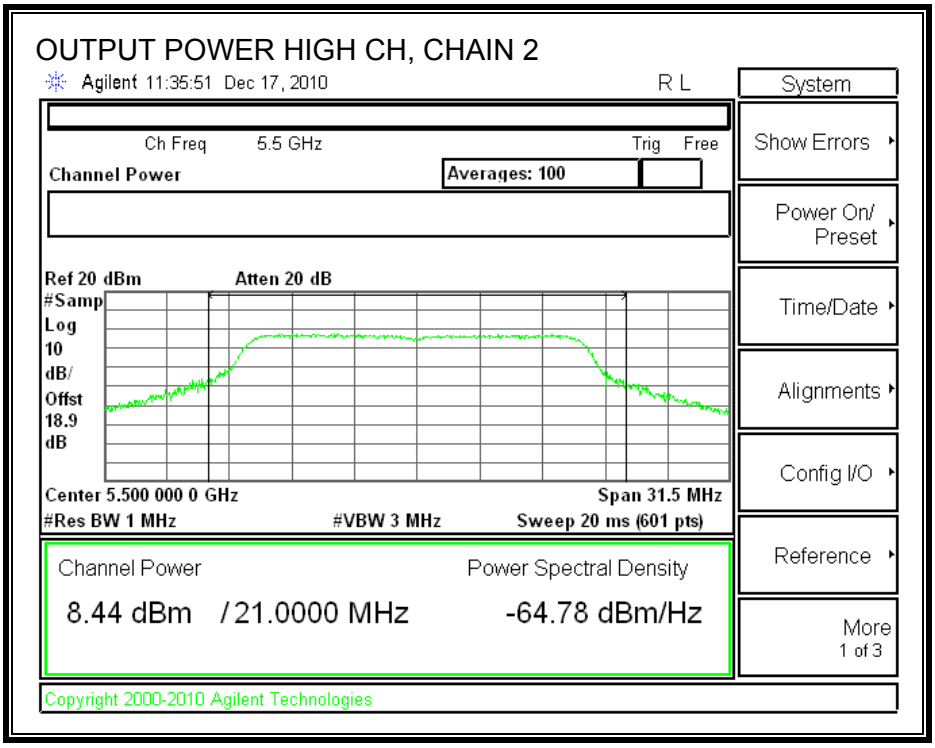




OUTPUT POWER WITH TPC (WORST CASE)







7.7.3. 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 18.9 was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5500	13.45	13.20	13.50	18.16
Middle	5600	13.50	13.00	13.00	17.94
High	5700	13.25	13.05	12.75	17.79

7.7.4. PEAK POWER SPECTRAL DENSITY

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

Antenna Gain (Chain 0) (dBi)	Antenna Gain (Chain 1) (dBi)	Antenna Gain (Chain 2) (dBi)	Effective Legacy Gain (dBi)
4.02	4.78	4.51	9.22

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 combined antenna gain is 9.22 dBi, therefore the limit is 7.78 dBm.

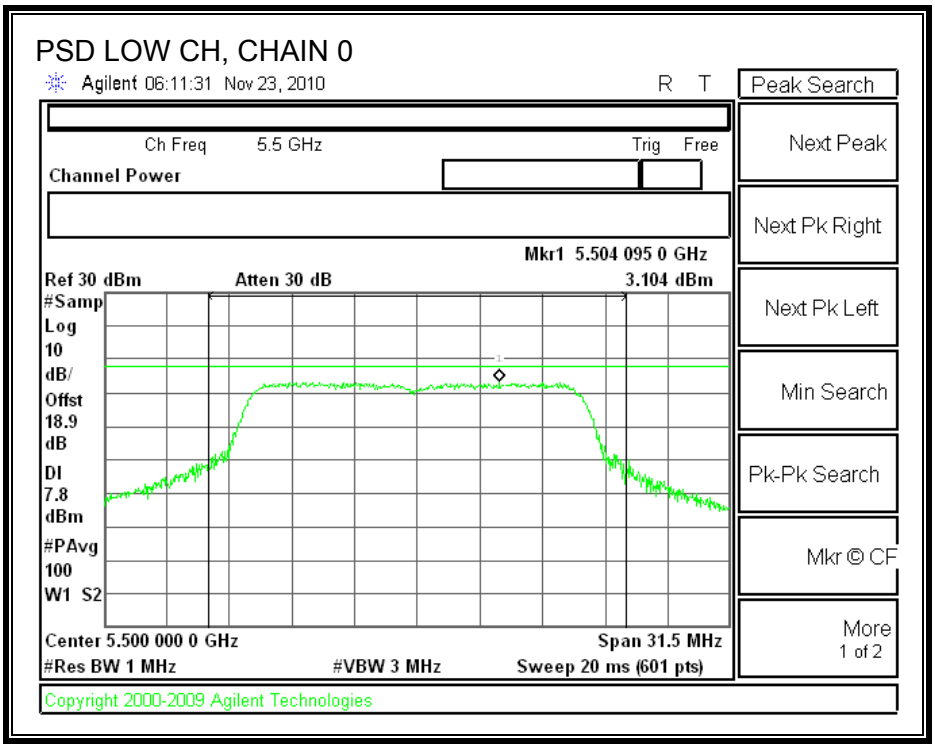
TEST PROCEDURE

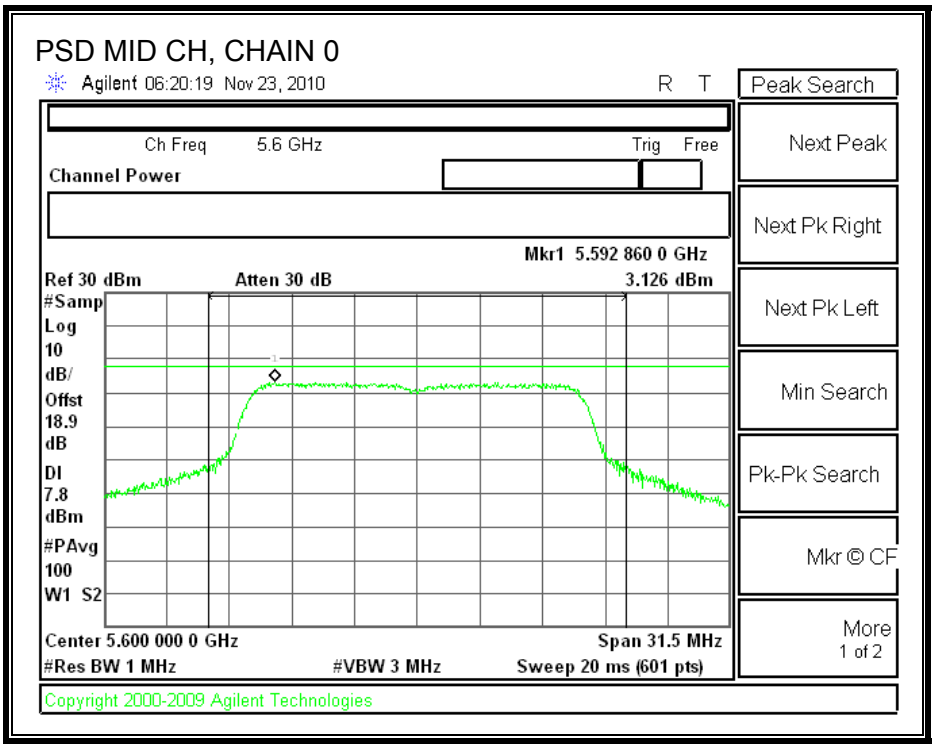
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

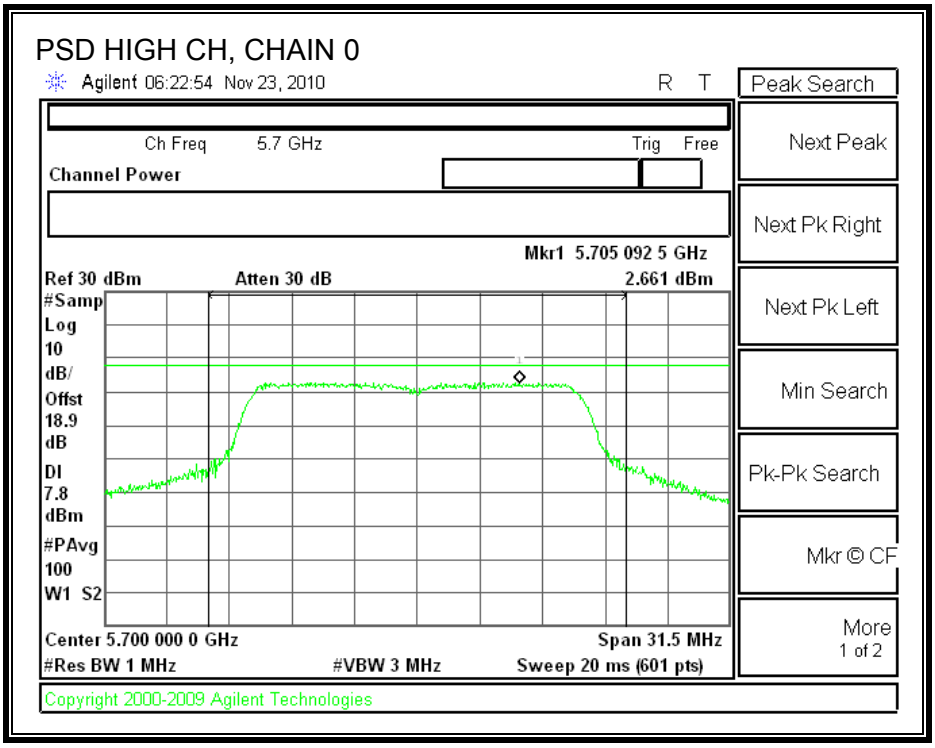
RESULTS

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5500	3.104	2.231	2.736	7.5	7.78	-0.30
Middle	5600	3.126	2.165	2.399	7.4	7.78	-0.43
High	5700	2.661	2.401	2.344	7.2	7.78	-0.54

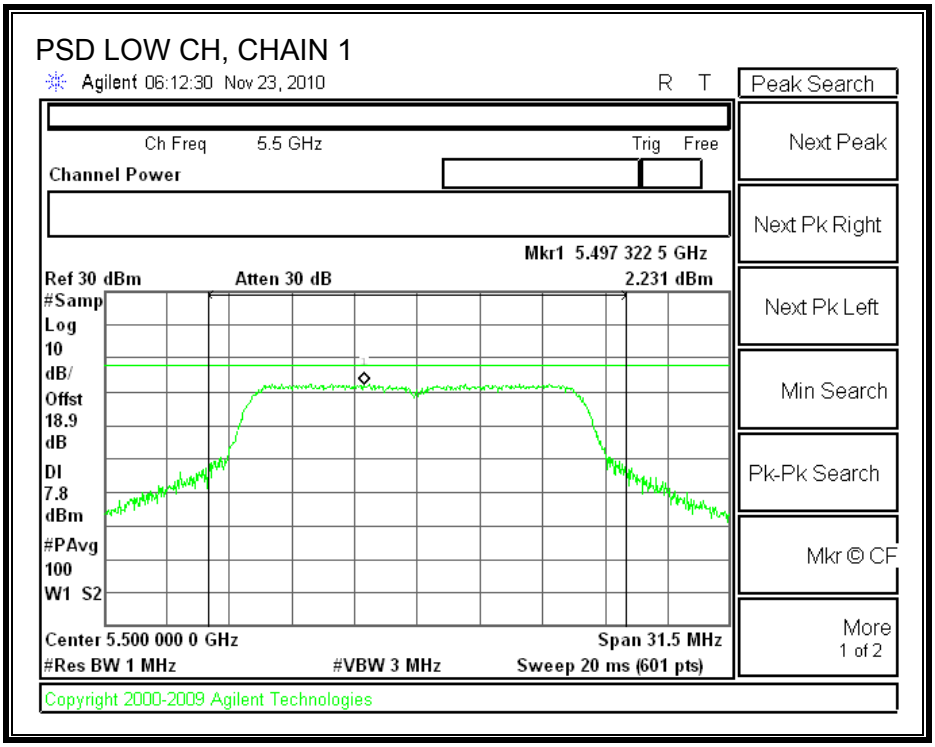
CHAIN 0 POWER SPECTRAL DENSITY

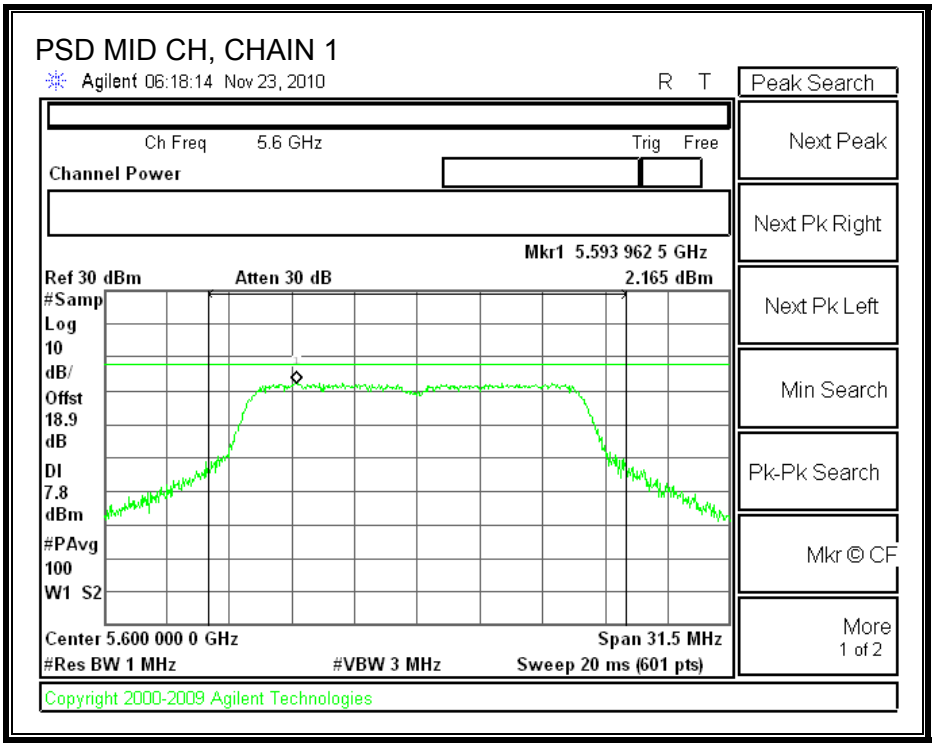


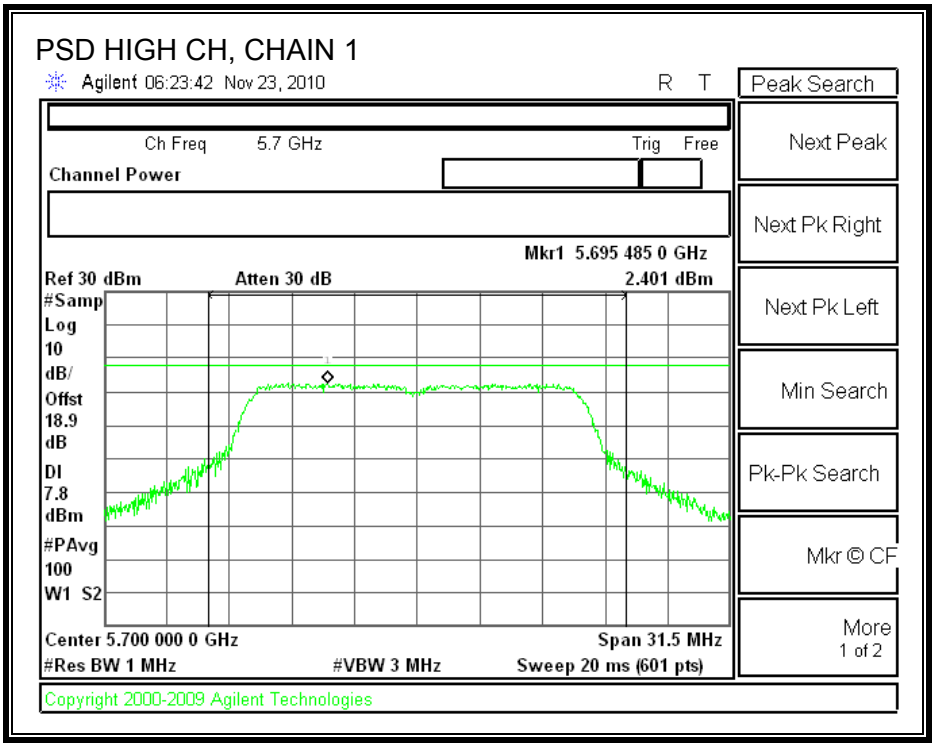




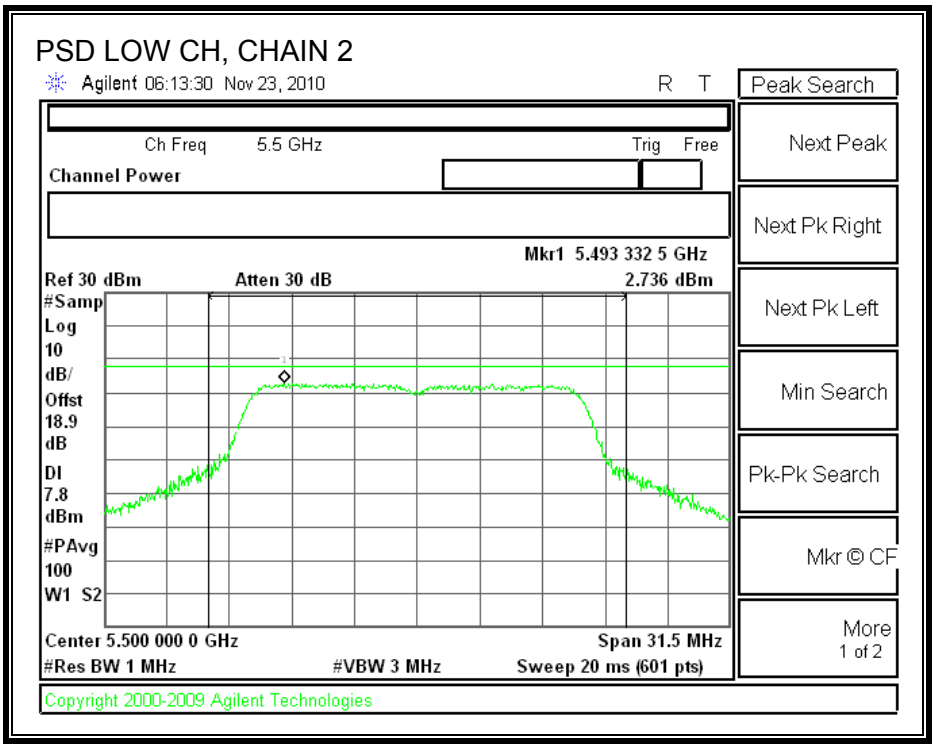
CHAIN 1 POWER SPECTRAL DENSITY

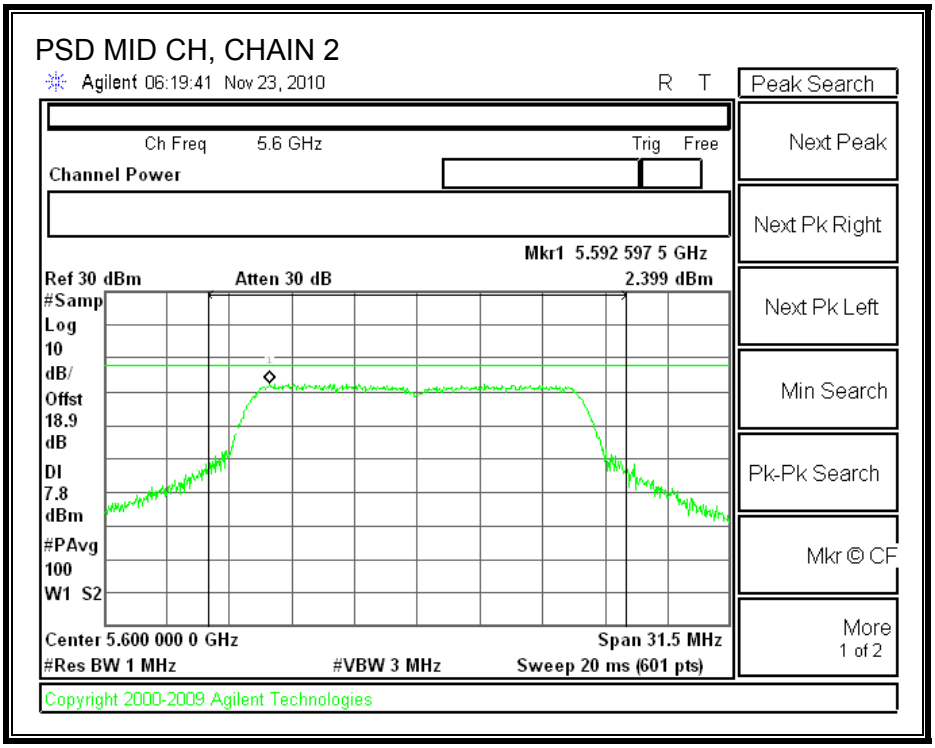


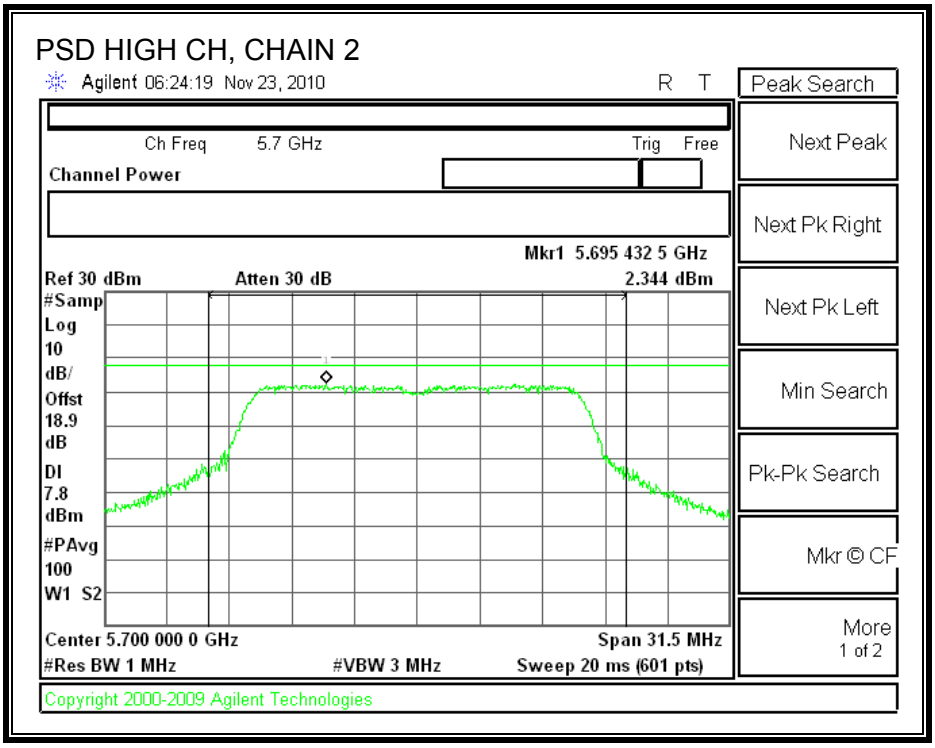




CHAIN 2 POWER SPECTRAL DENSITY







7.7.5. 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

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.54	13	-3.46
Middle	5600	9.36	13	-3.64
High	5700	8.83	13	-4.17

CHAIN 1

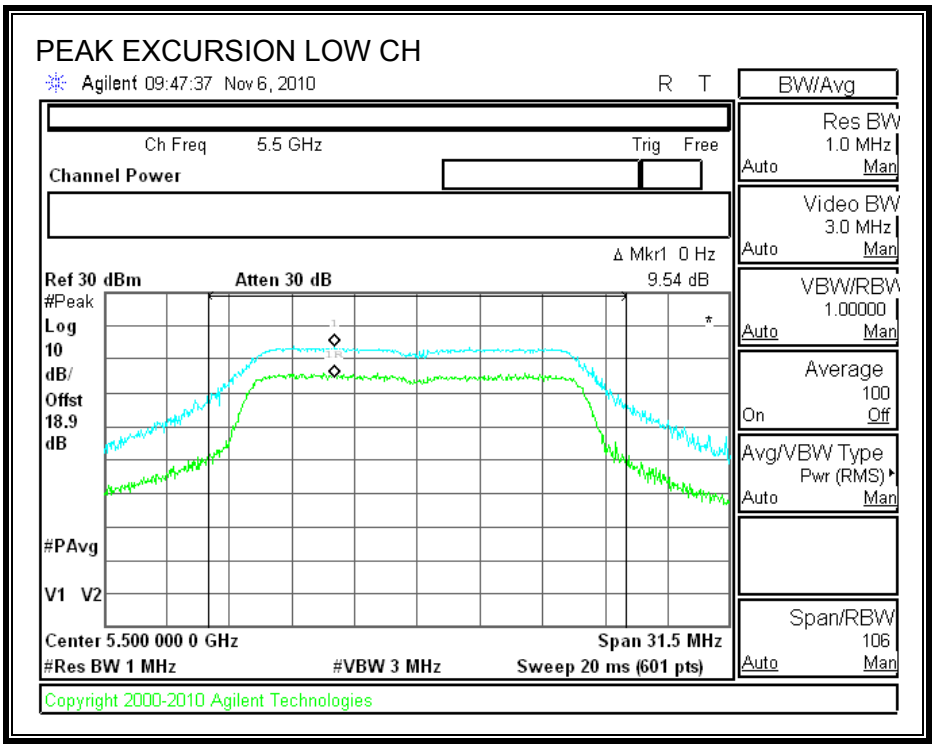
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.74	13	-4.26
Middle	5600	8.74	13	-4.26
High	5700	8.70	13	-4.30

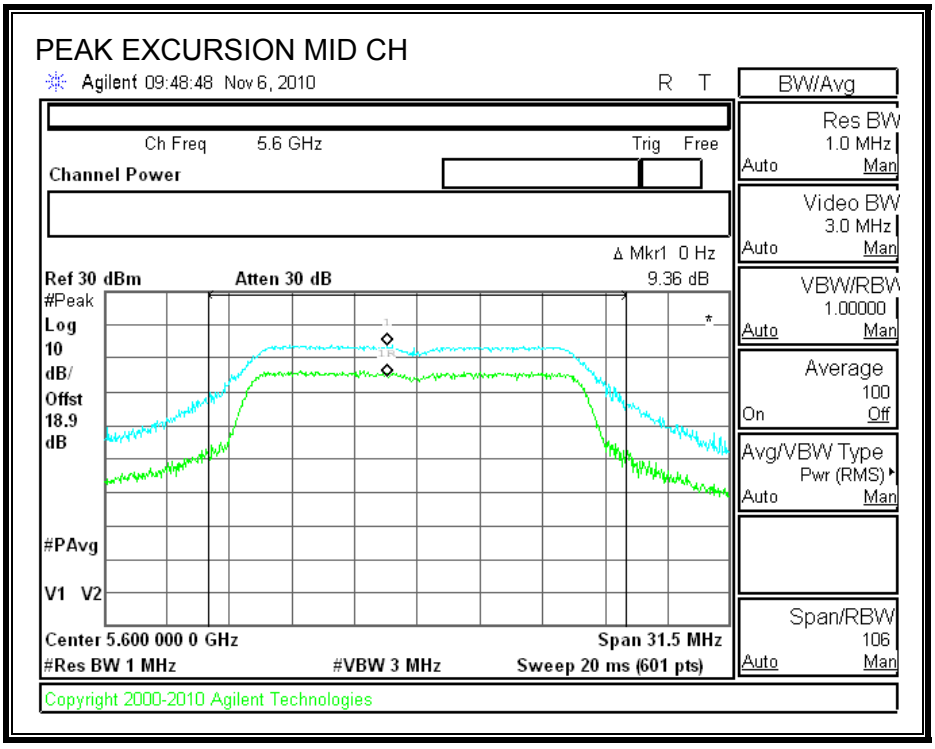
CHAIN 2

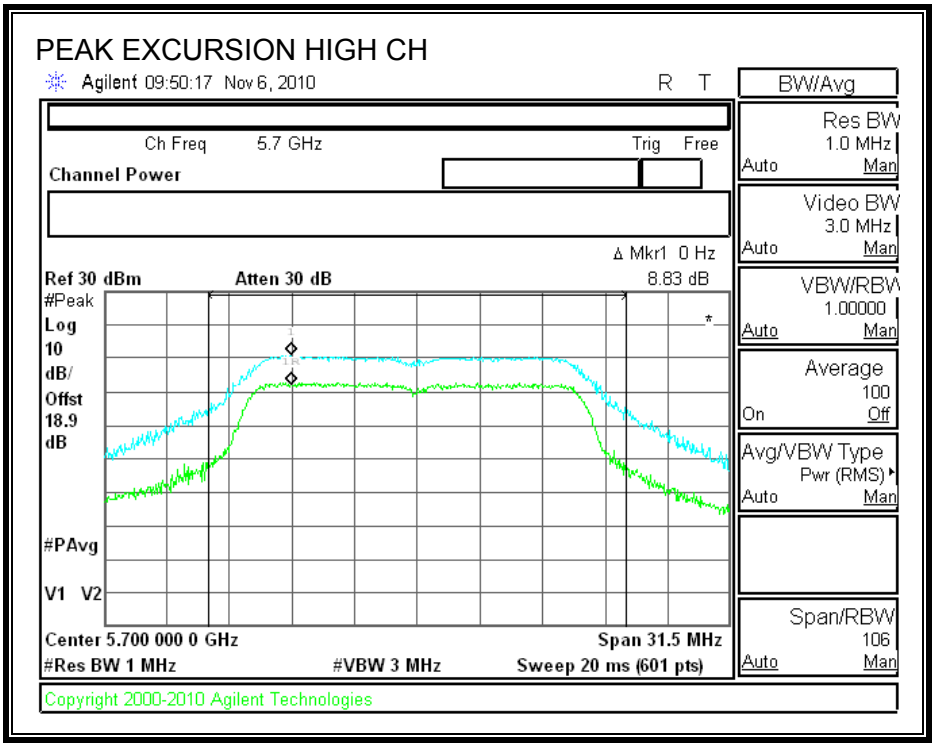
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.61	13	-4.39
Middle	5600	9.41	13	-3.59
High	5700	10.84	13	-2.16

CHAIN 0

PEAK EXCURSION

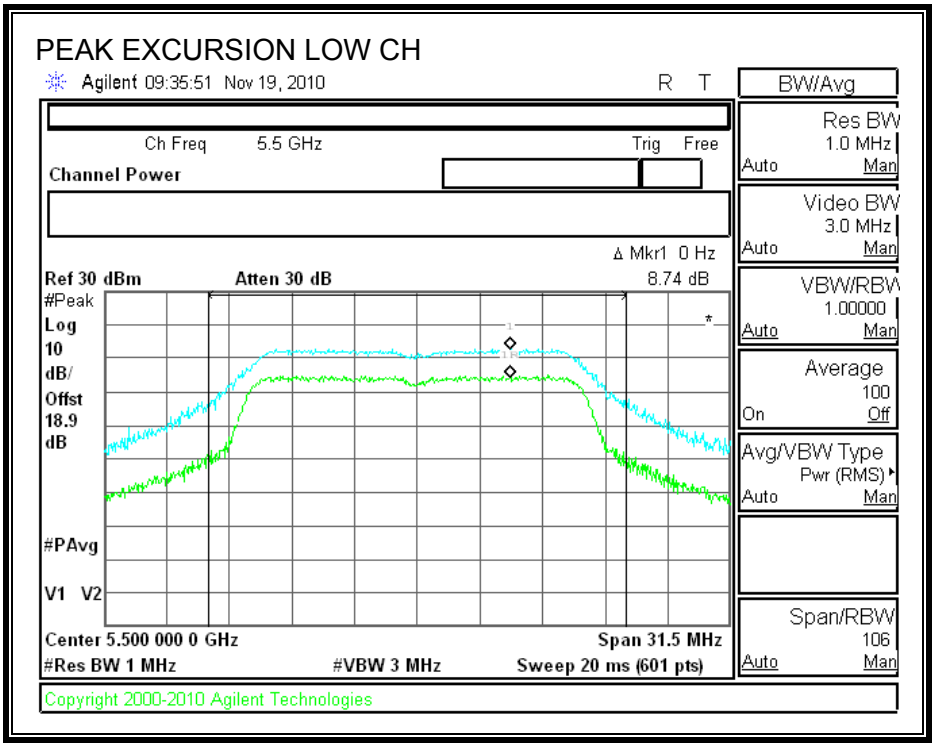




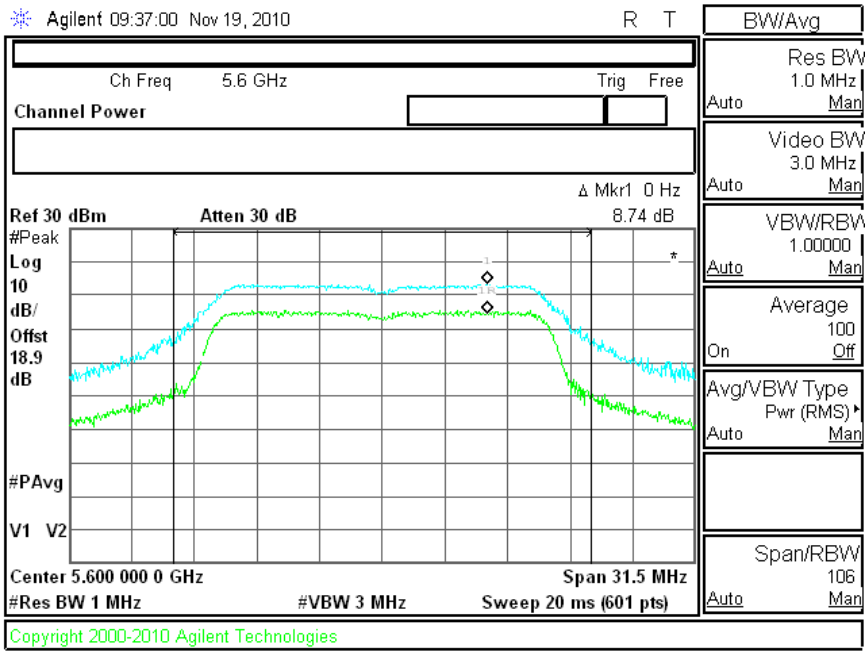


CHAIN 1

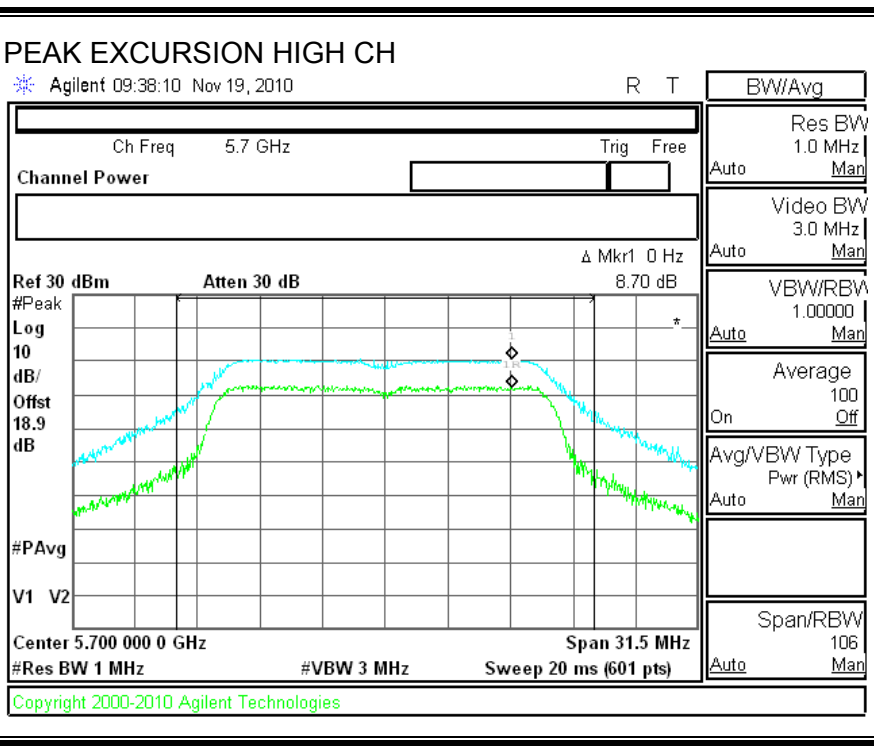
PEAK EXCURSION



PEAK EXCURSION MID CH

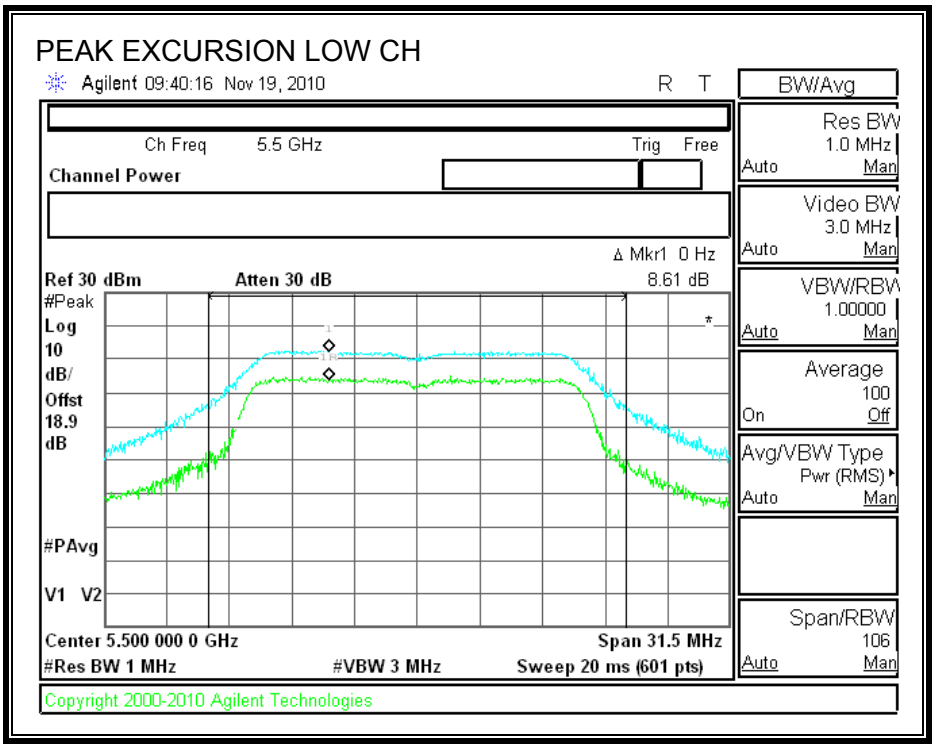


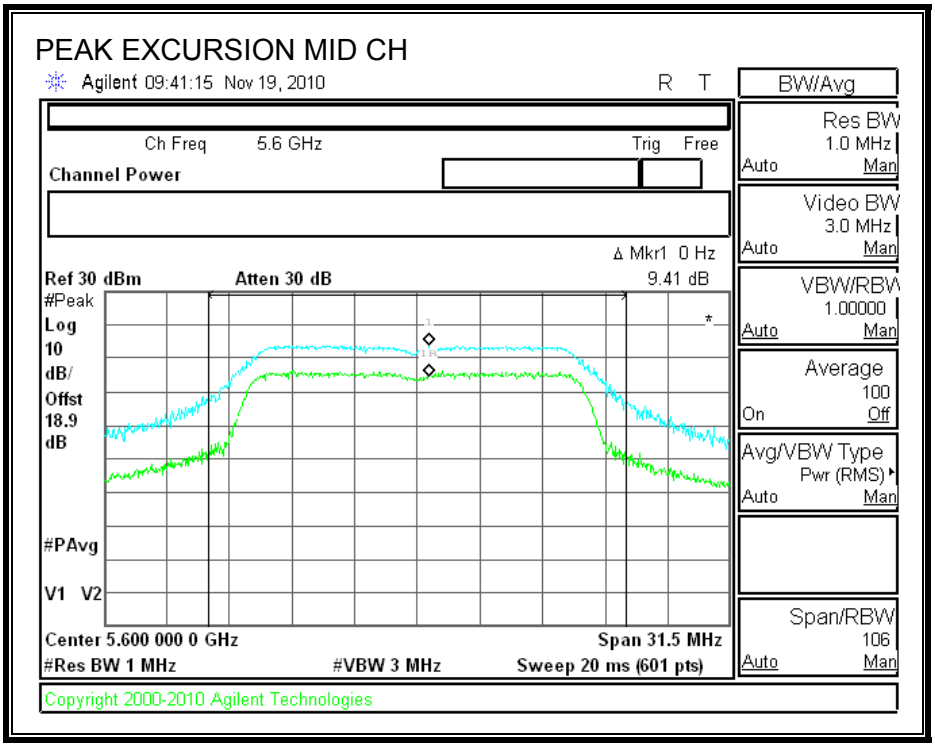
PEAK EXCURSION HIGH CH

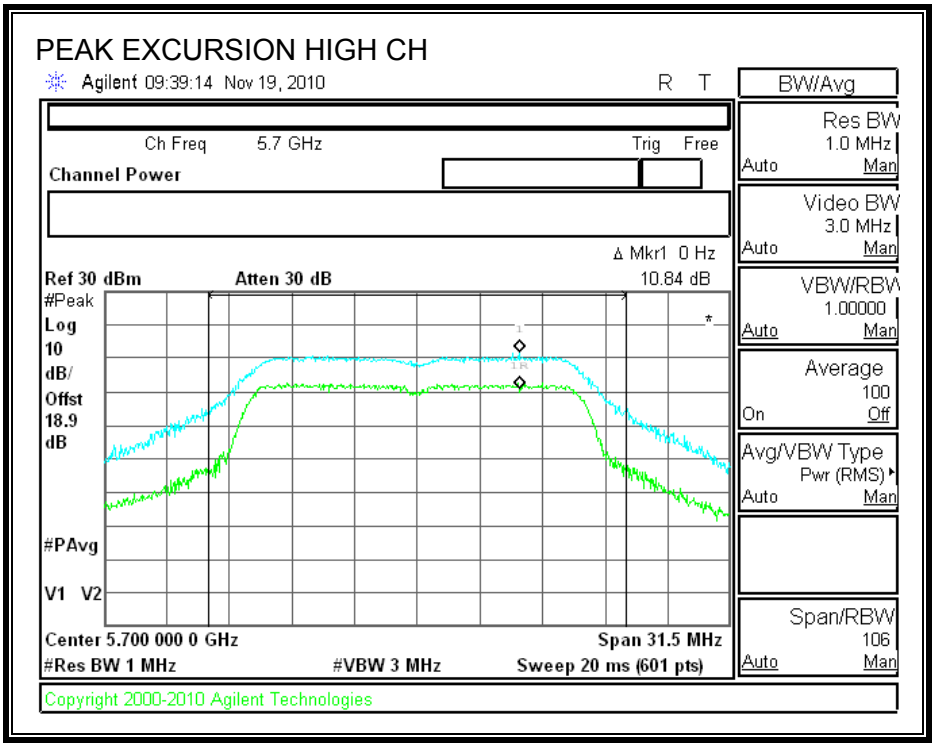


CHAIN 2

PEAK EXCURSION







7.7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

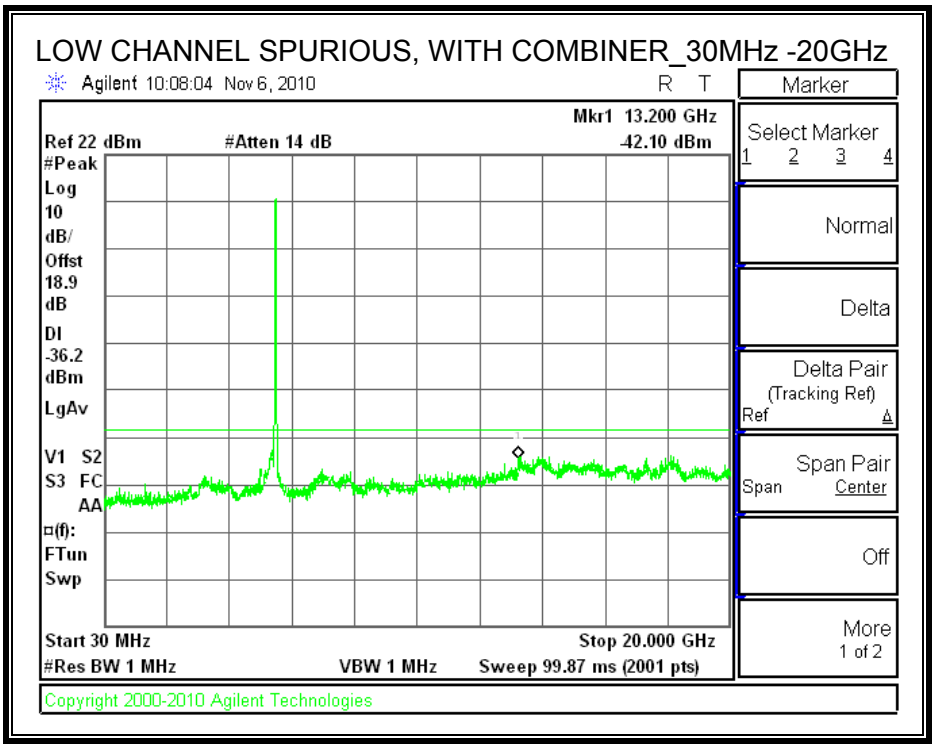
TEST PROCEDURE

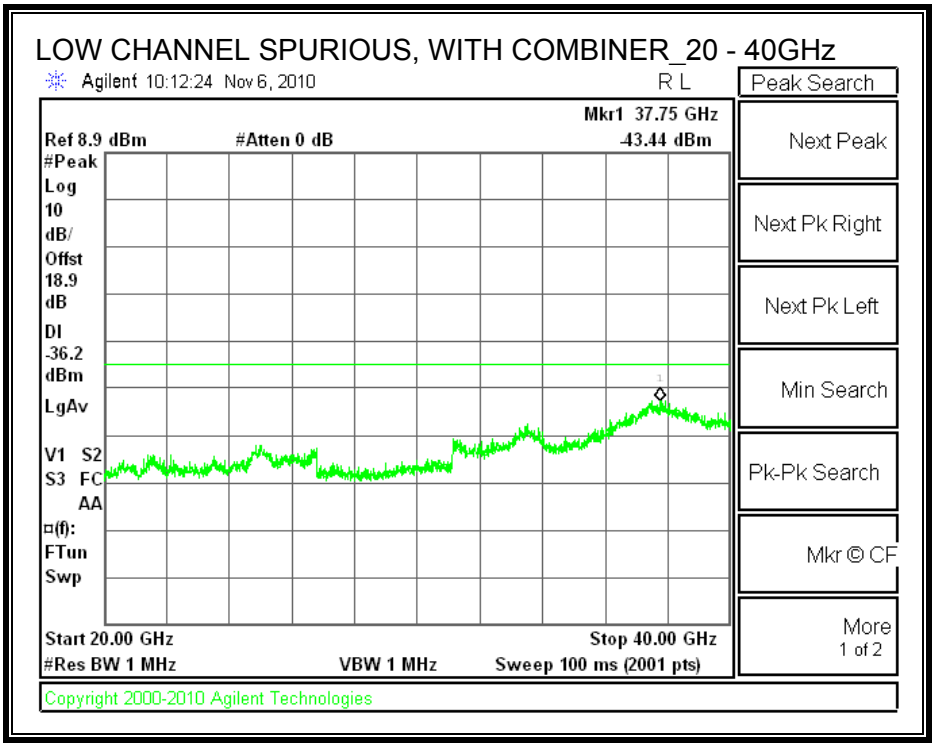
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

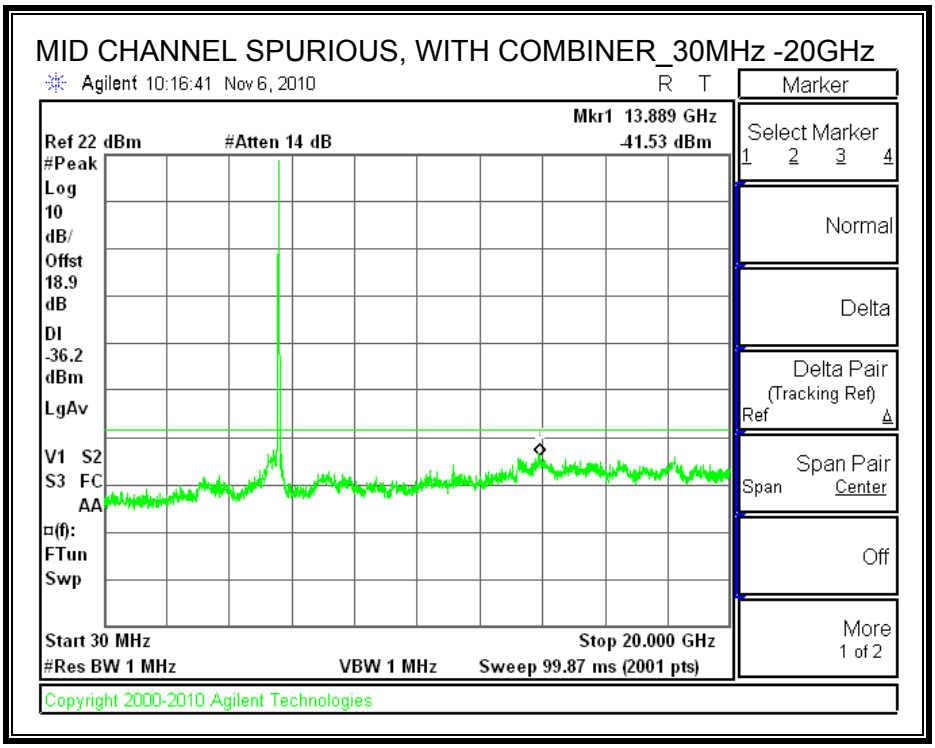
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

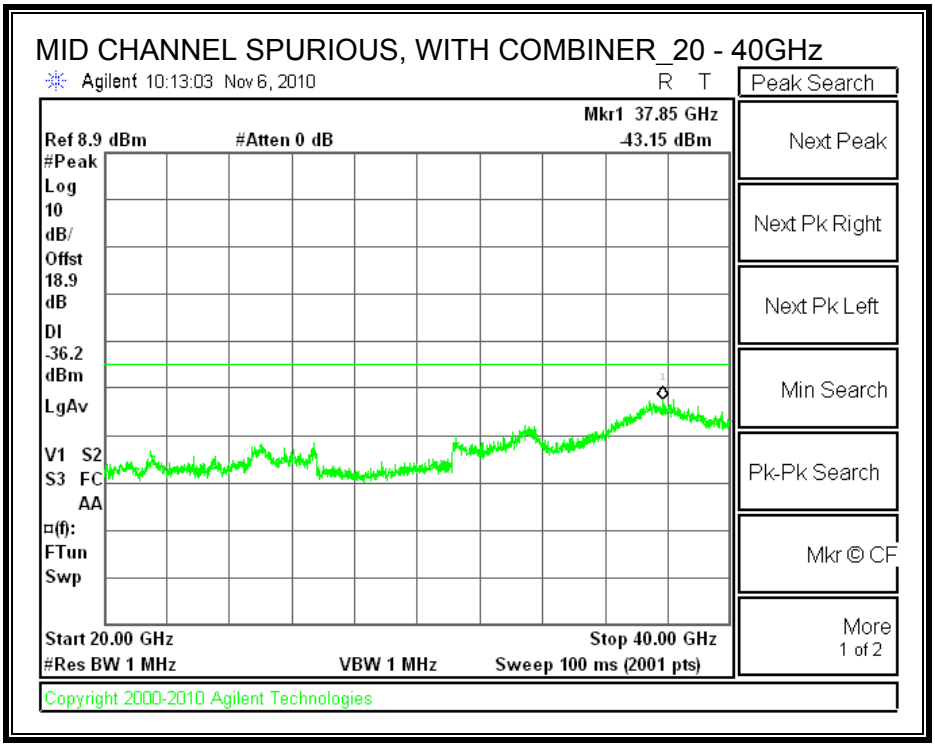
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

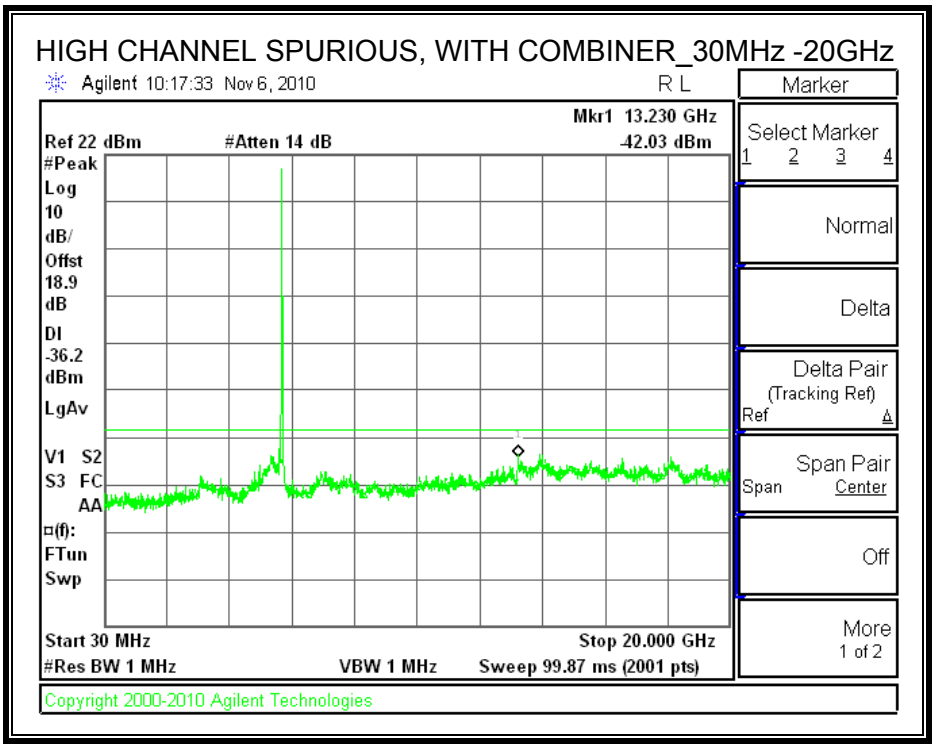
SPURIOUS EMISSIONS WITH COMBINER

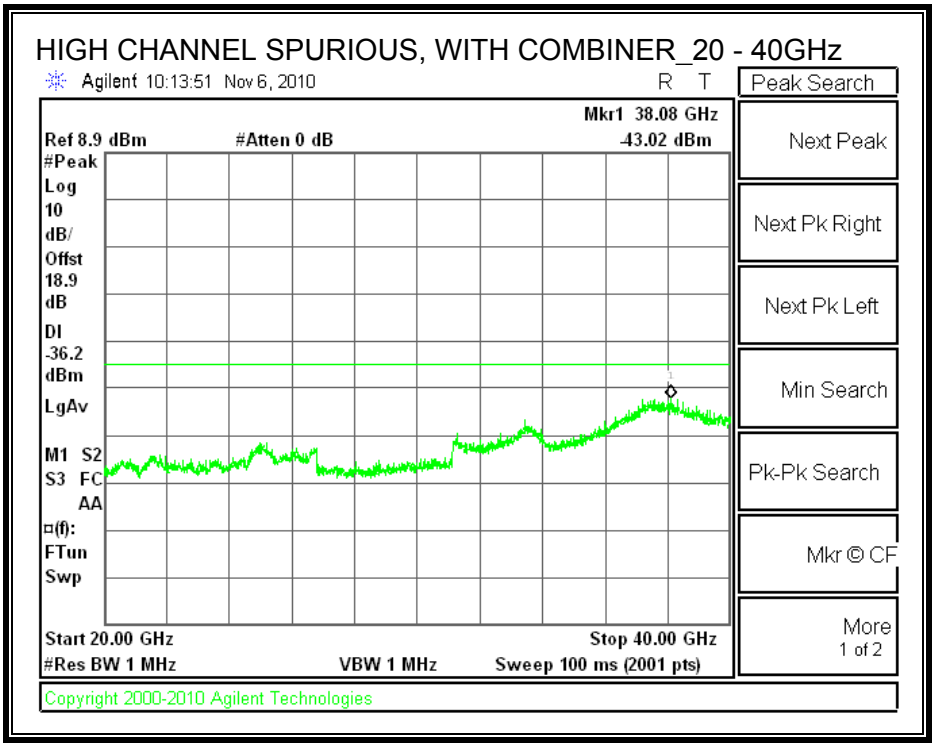












7.8. 5.6 GHz BAND CHANNEL TESTS FOR 802.11HT20 MODE

7.8.1. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	21.578	17.6769
Middle	5600	21.606	17.7103
High	5700	21.219	17.7922

CHAIN 1

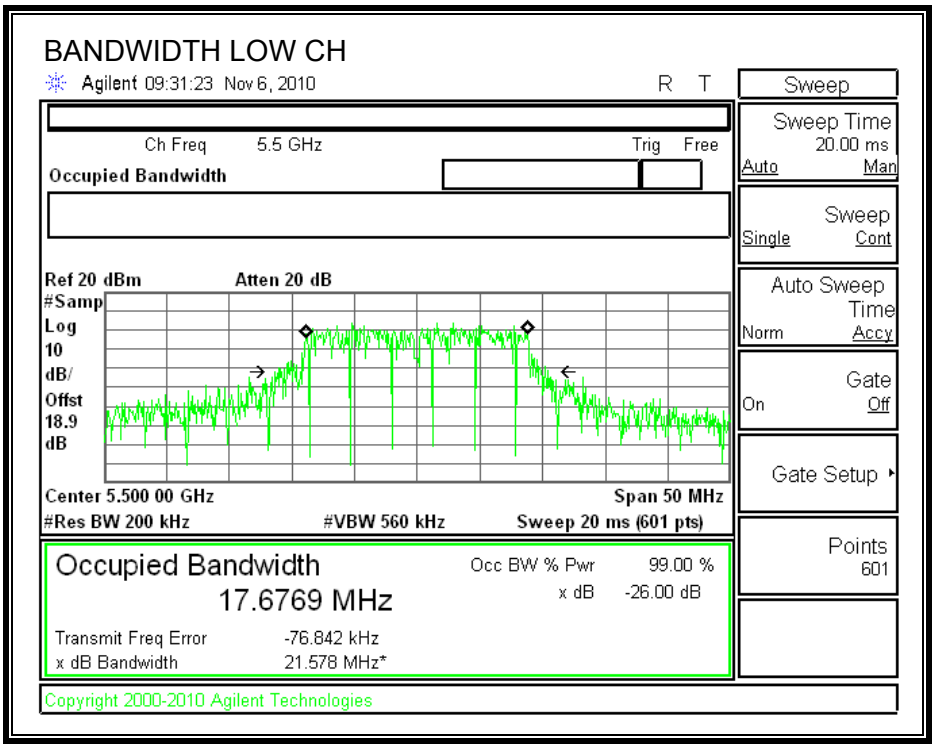
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	21.571	17.7243
Middle	5600	21.749	17.6576
High	5700	21.057	17.6888

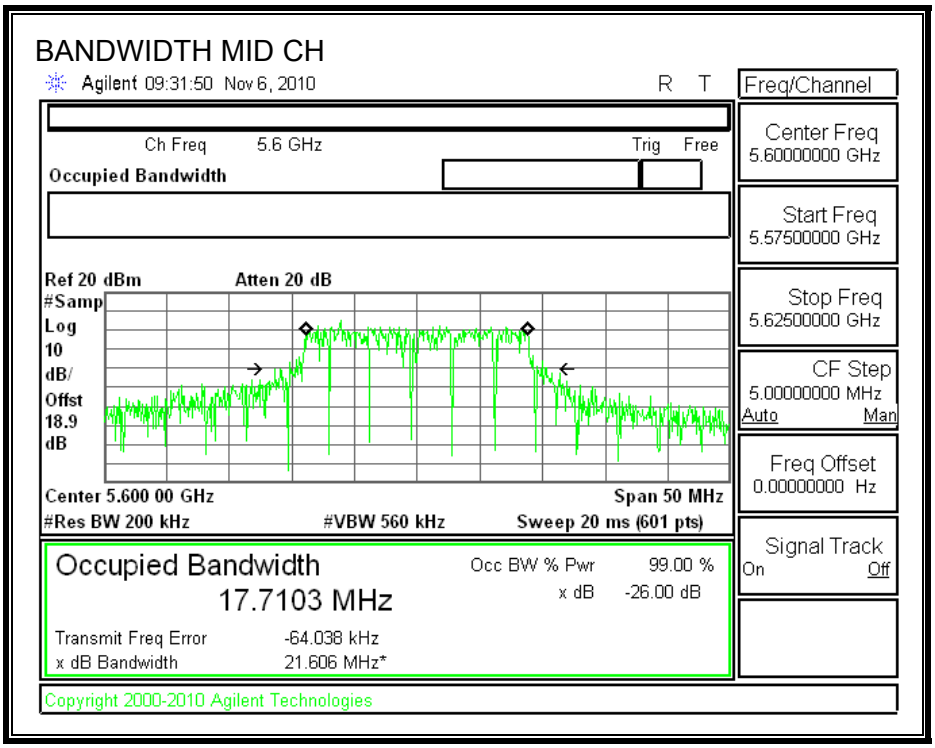
CHAIN 2

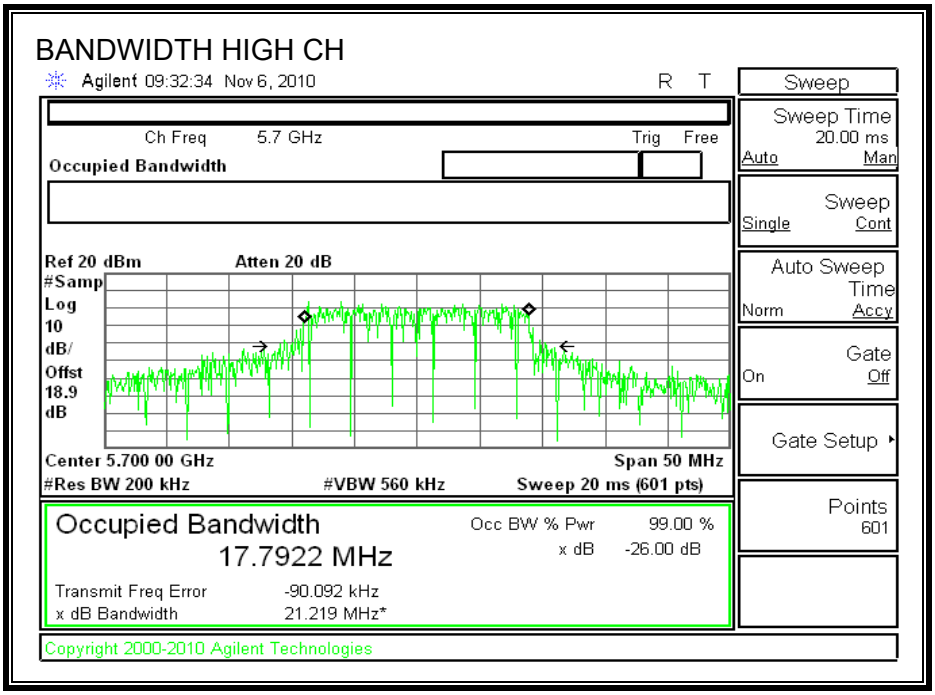
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	20.122	17.6935
Middle	5600	20.382	17.6906
High	5700	20.402	17.6869

CHAIN 0

26 dB and 99% BANDWIDTH

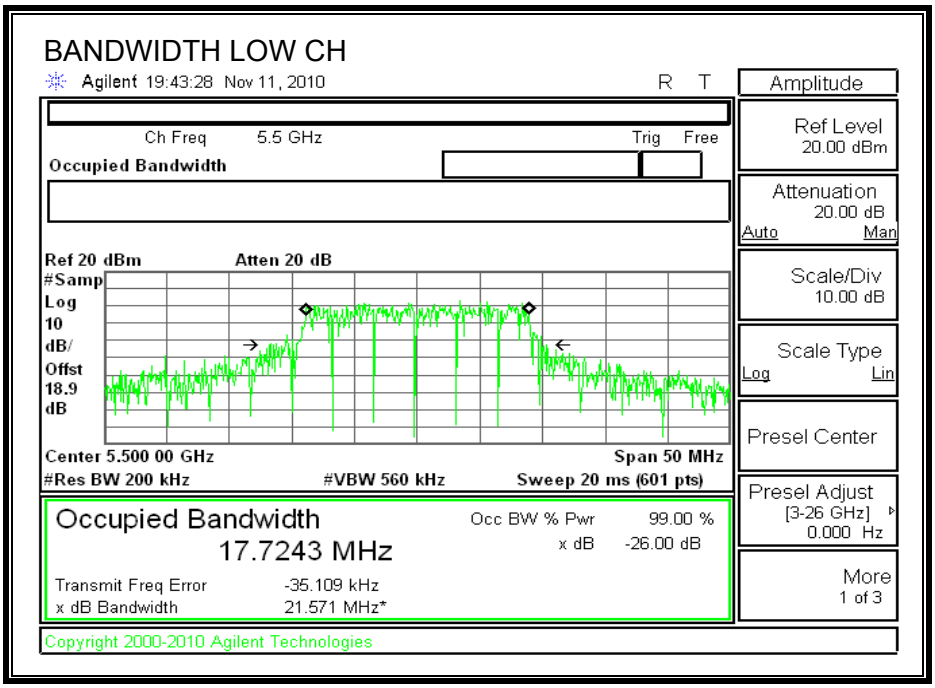


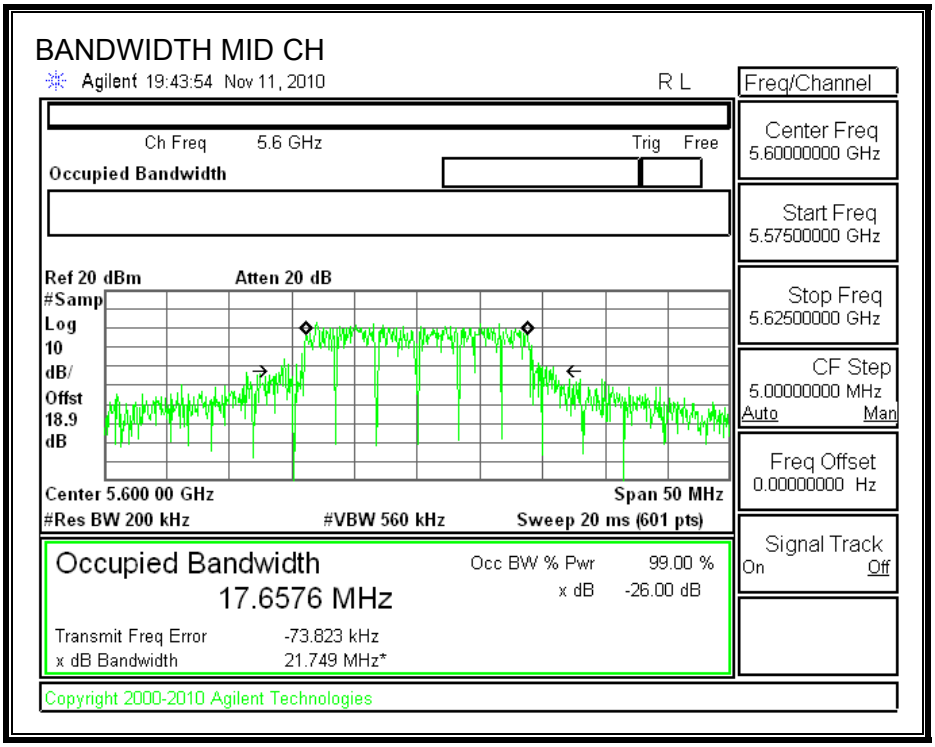


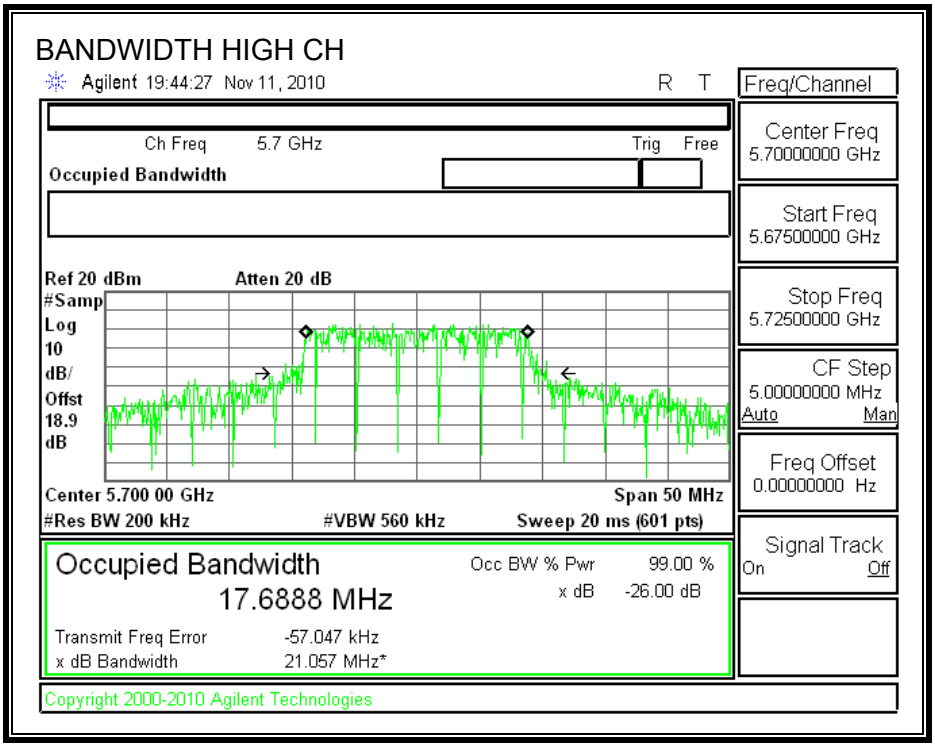


CHAIN 1

26 dB and 99% BANDWIDTH

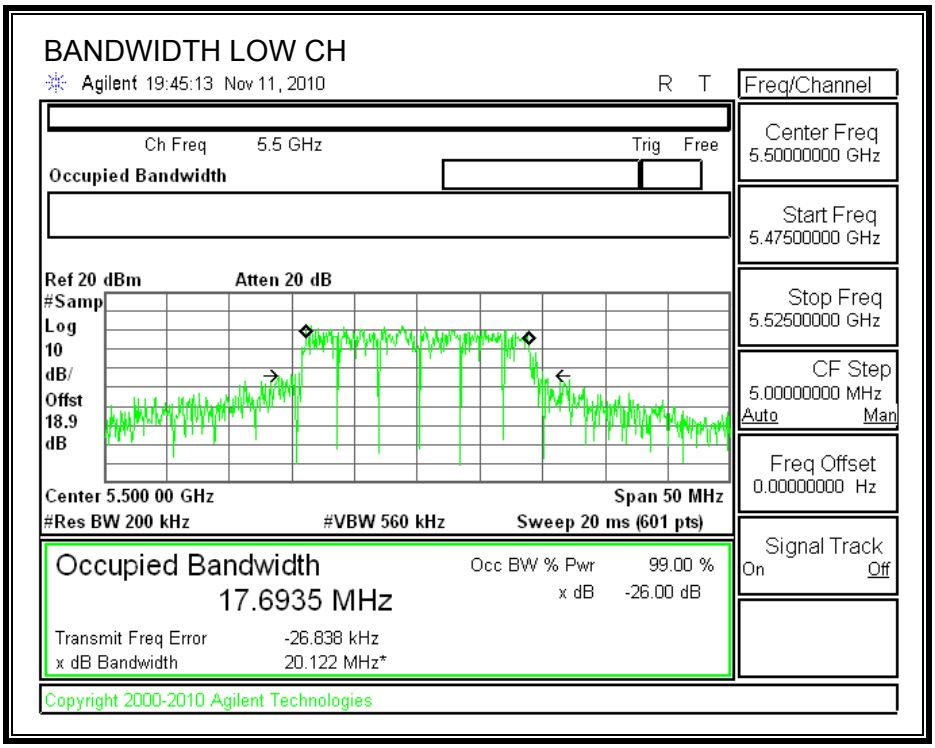


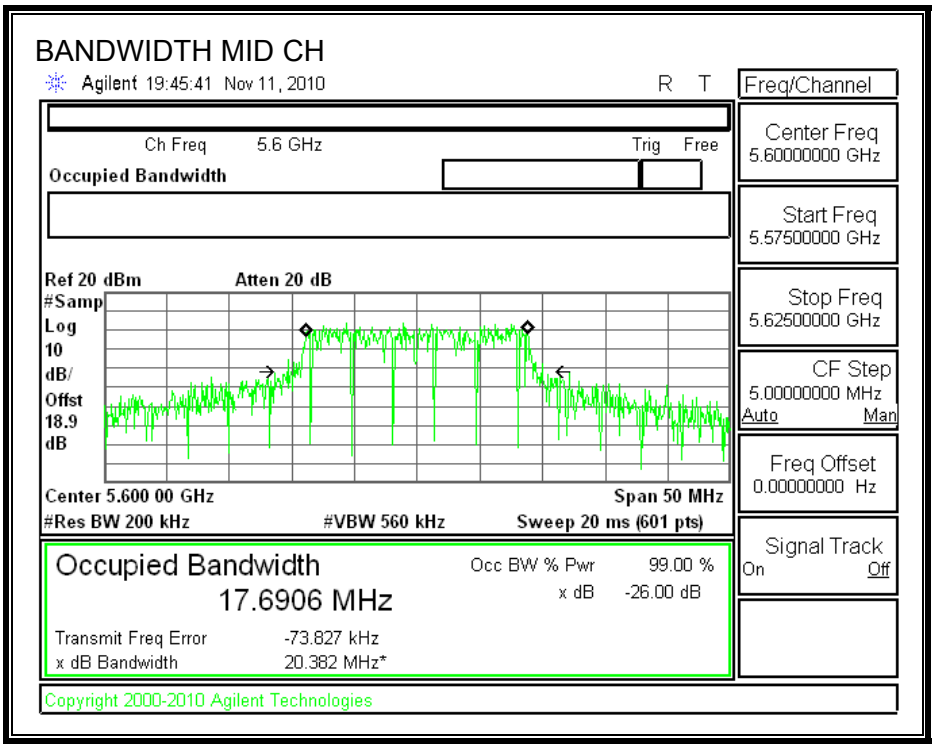


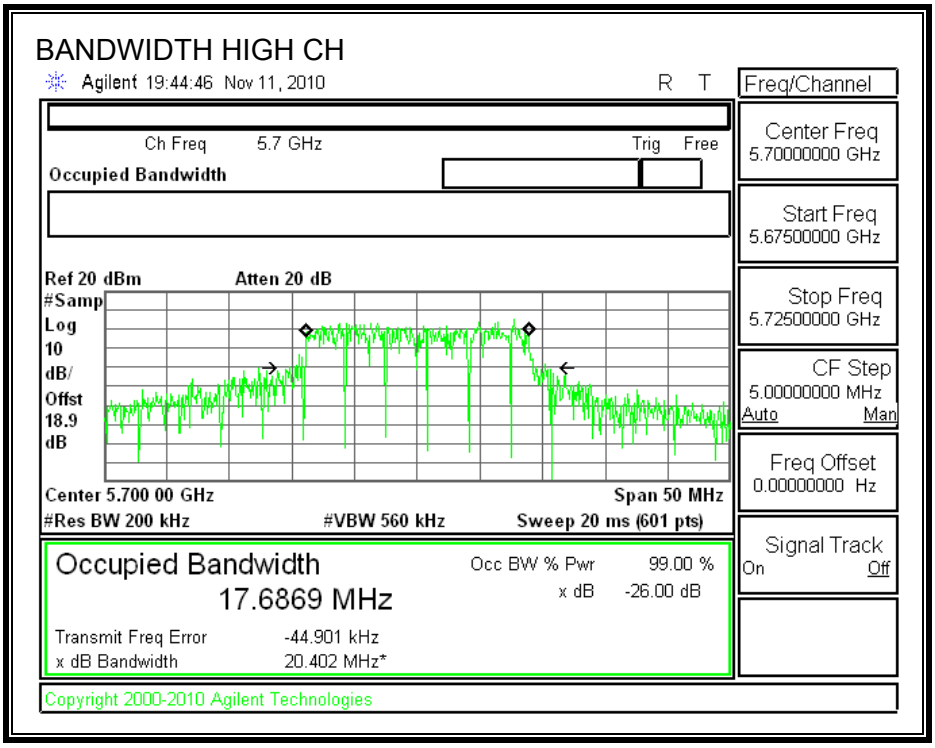


CHAIN 2

26 dB and 99% BANDWIDTH







7.8.2. 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.

The maximum antenna gain is less than 6 dBi, and the combination antenna gain is 9.22 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.
The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Non Beam-Forming

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	21.578	24.34	4.88	24.00
Mid	5600	24	21.606	24.35	4.88	24.00
High	5700	24	21.219	24.27	4.88	24.00

Individual Chain Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	15.12	14.95	14.13	19.53	24.00	-4.47
Mid	5600	16.37	15.32	15.42	20.50	24.00	-3.50
High	5700	12.72	12.62	12.33	17.33	24.00	-6.67

TPC Results

TPC Delta Power		Chain 0	Chain 1	Chain 2			
		0.33	1.36	0.37			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Mid	5600	14.79	13.59	13.76	18.85	4.88	23.73
					TPC Limit (dBm)	24	
					Margin (dB)	-0.27	

Beam-Forming

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	21.578	24.34	9.22	20.78
Mid	5600	24	21.606	24.35	9.22	20.78
High	5700	24	21.219	24.27	9.22	20.78

Individual Chain Results

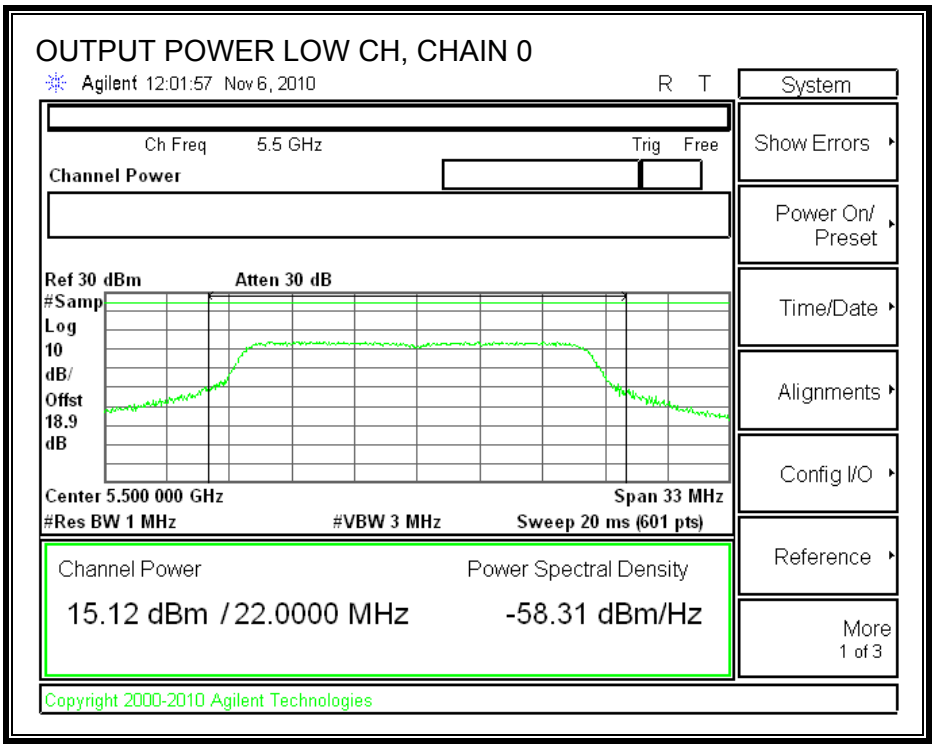
Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	14.53	14.48	12.91	18.81	20.78	-1.97
Mid	5600	14.77	13.56	14.13	18.95	20.78	-1.83
High	5700	12.72	12.62	12.33	17.33	20.78	-3.45

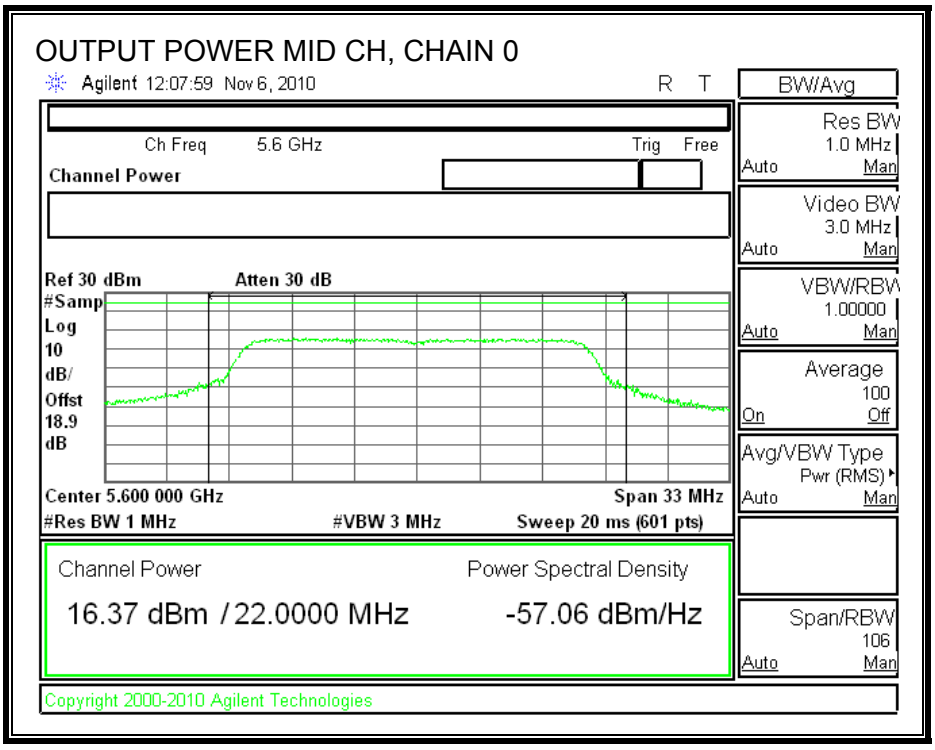
TPC Results

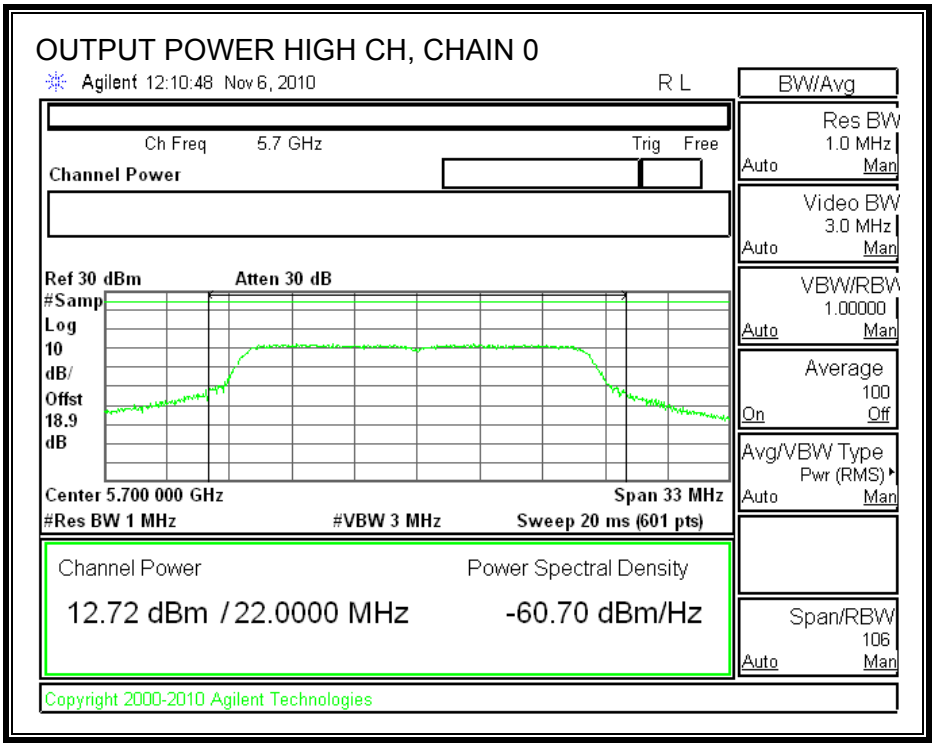
TPC Delta Power		Chain 0	Chain 1	Chain 2			
		4.80	4.82	3.84			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
Mid	5600	9.73	9.66	9.07	14.27	9.22	23.49
					TPC Limit (dBm)	24	
					Margin (dB)	-0.51	

NBF

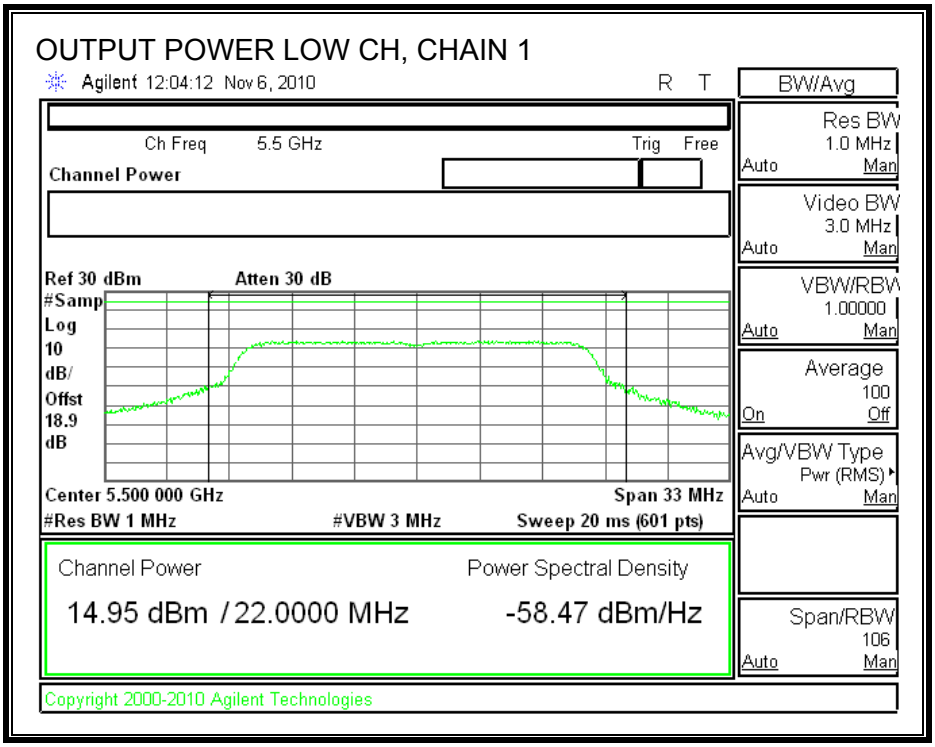
CHAIN 0 OUTPUT POWER

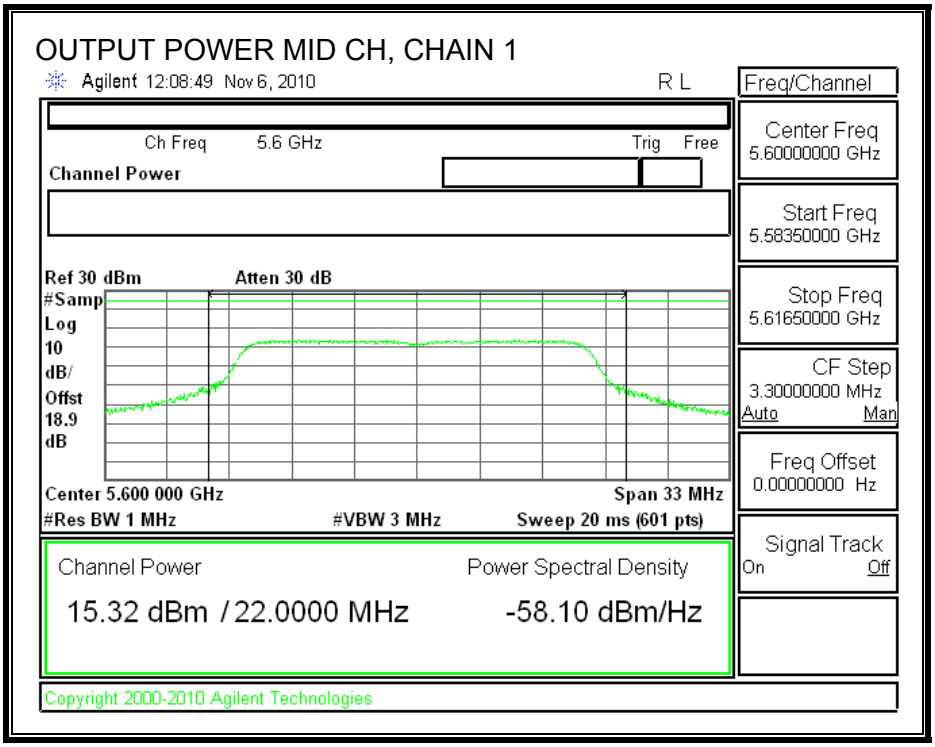


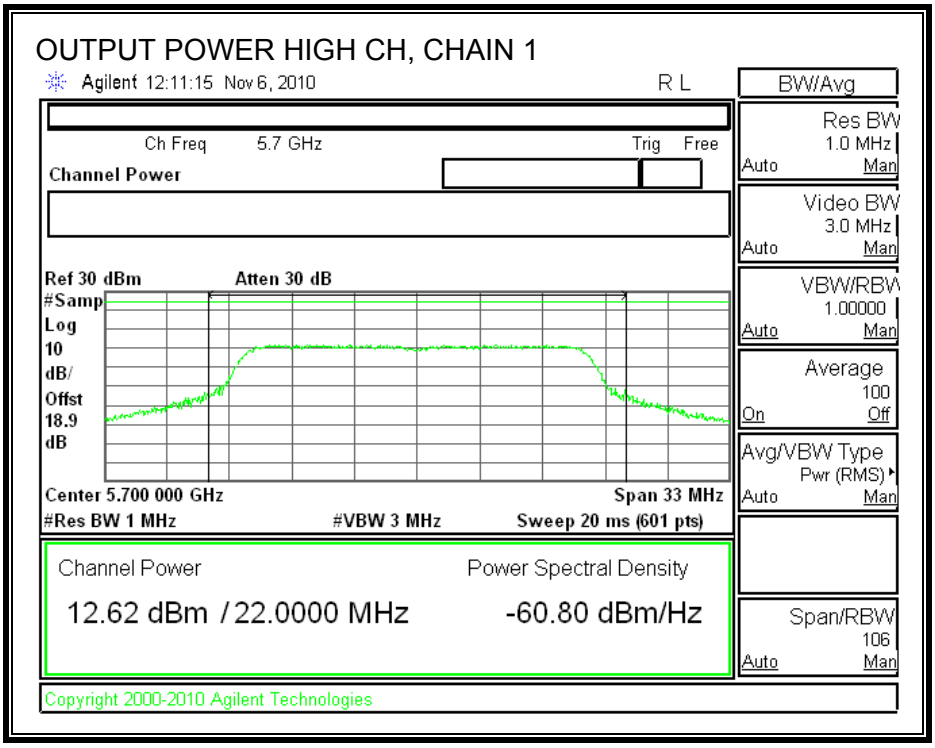




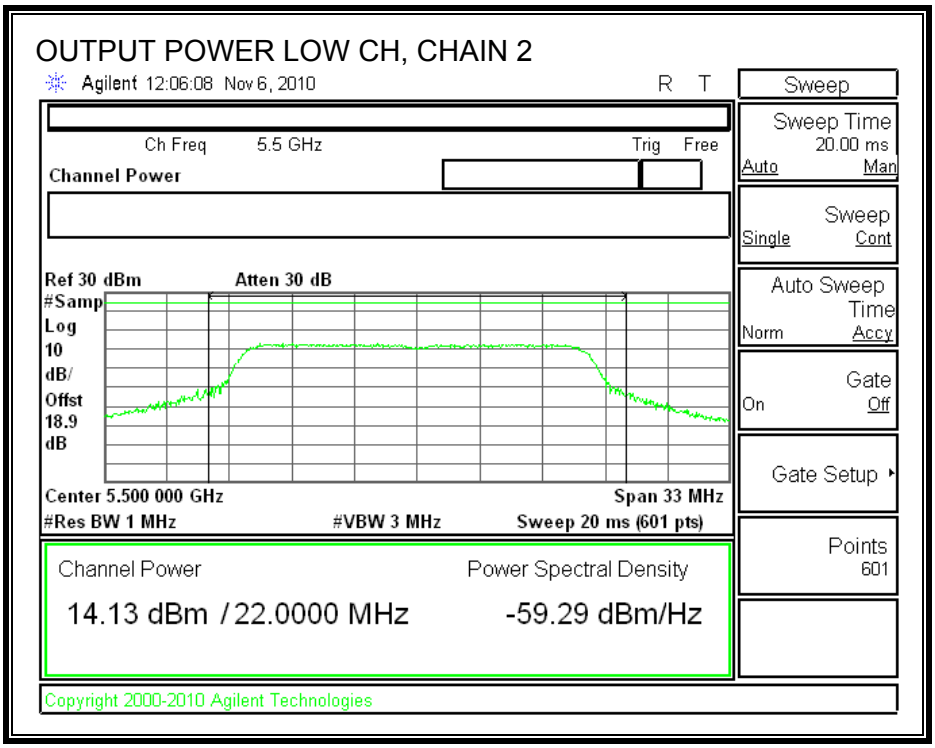
CHAIN 1 OUTPUT POWER

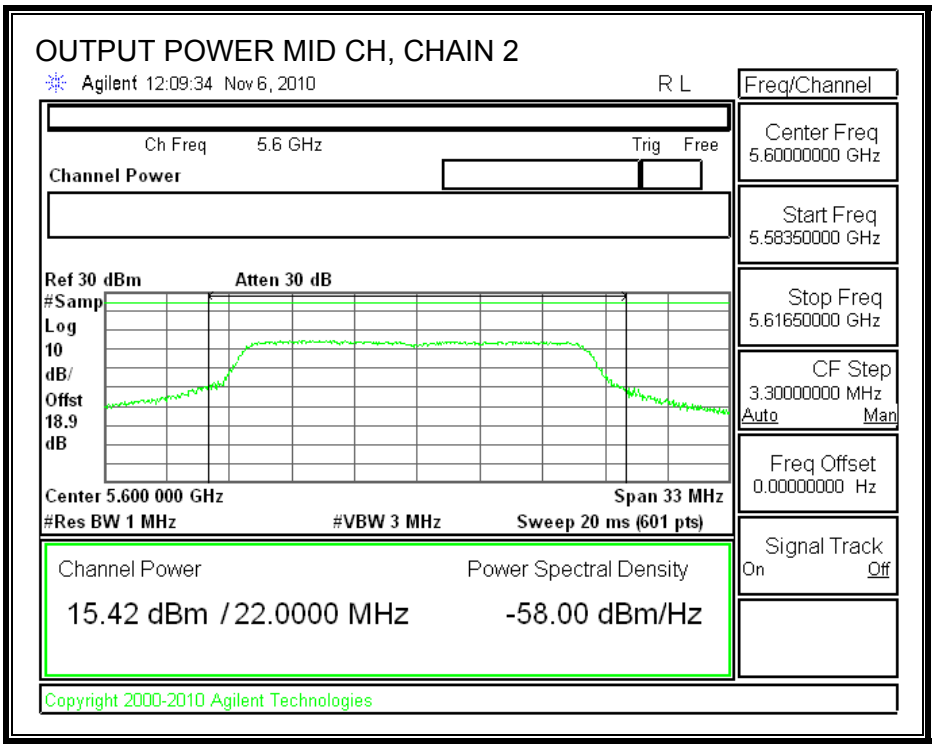


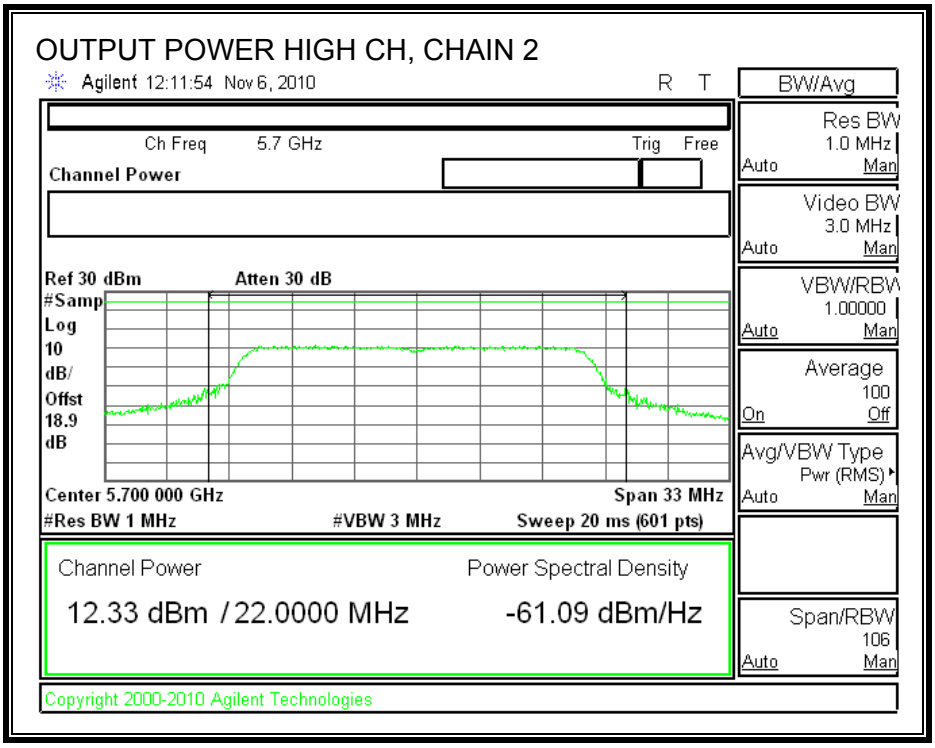




CHAIN 2 OUTPUT POWER

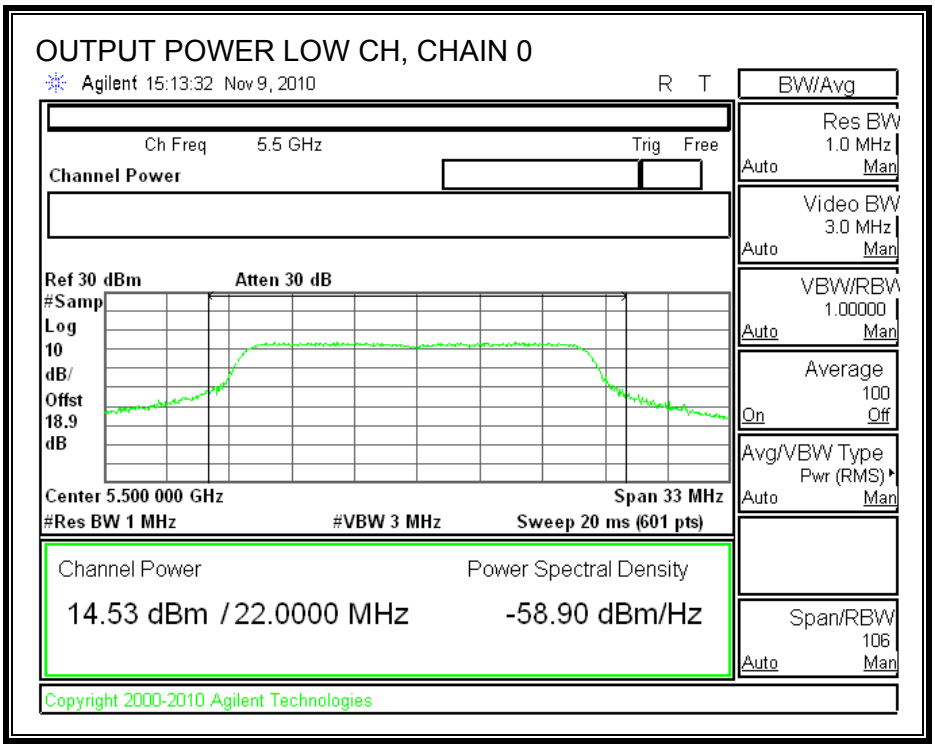


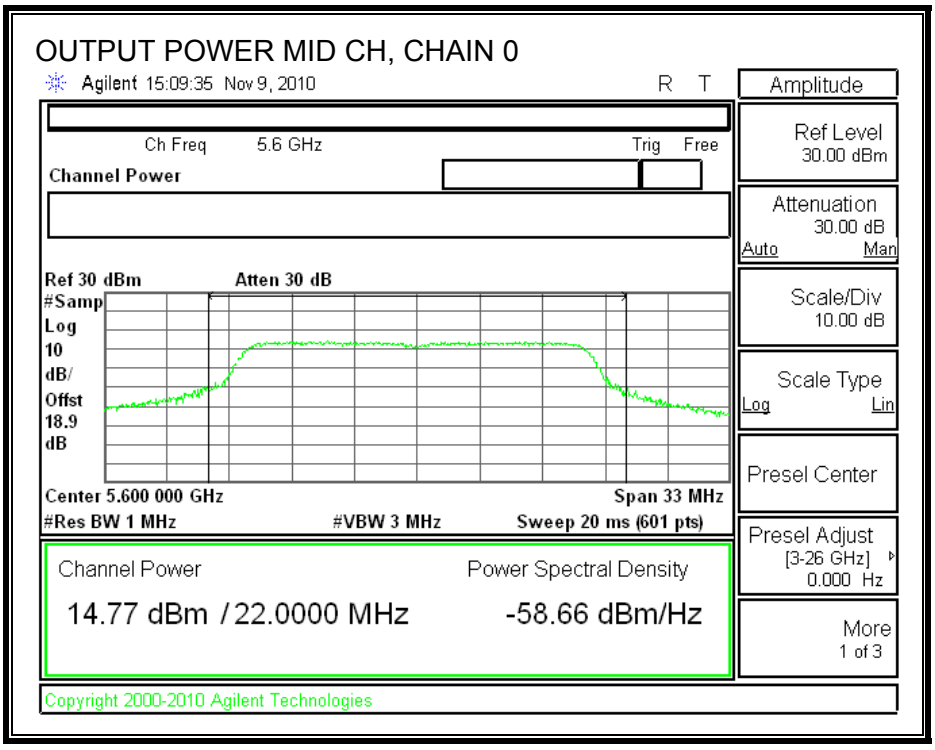


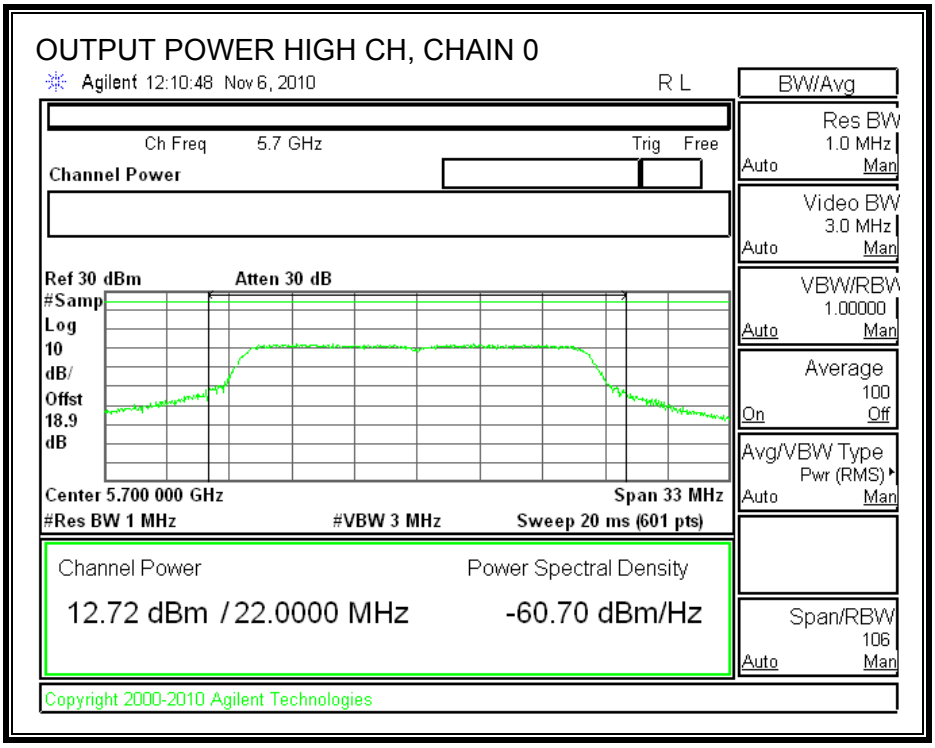


BF

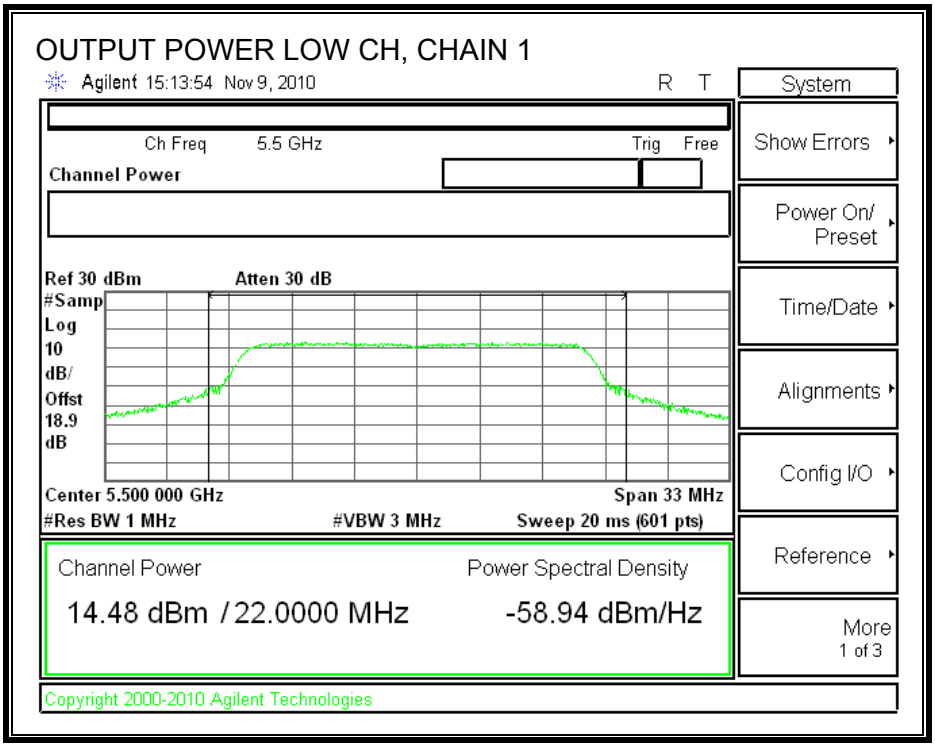
CHAIN 0 OUTPUT POWER

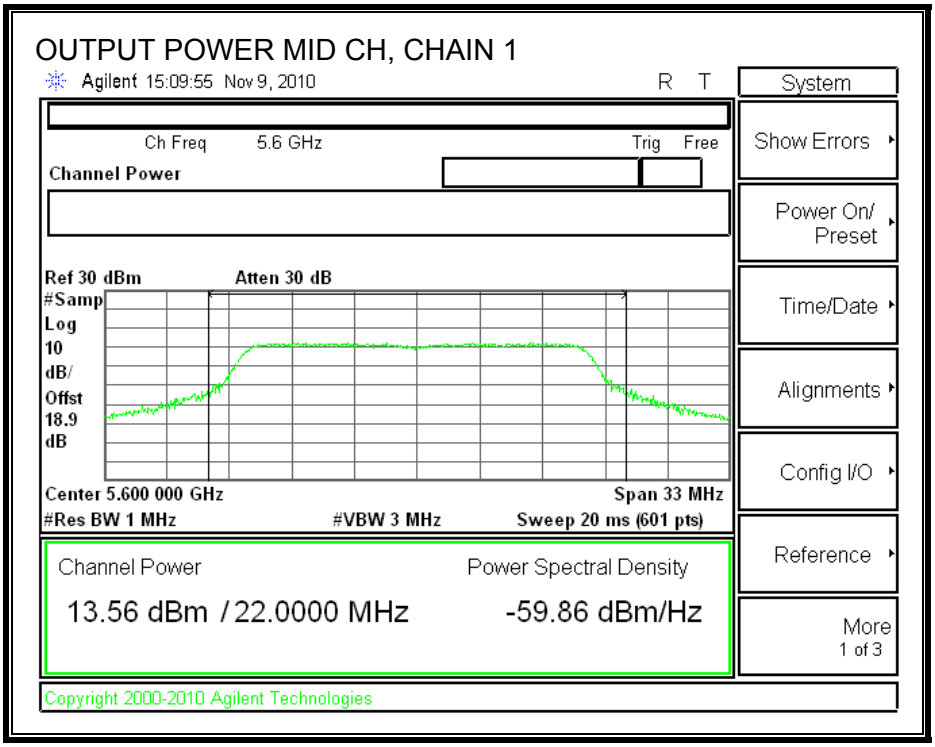


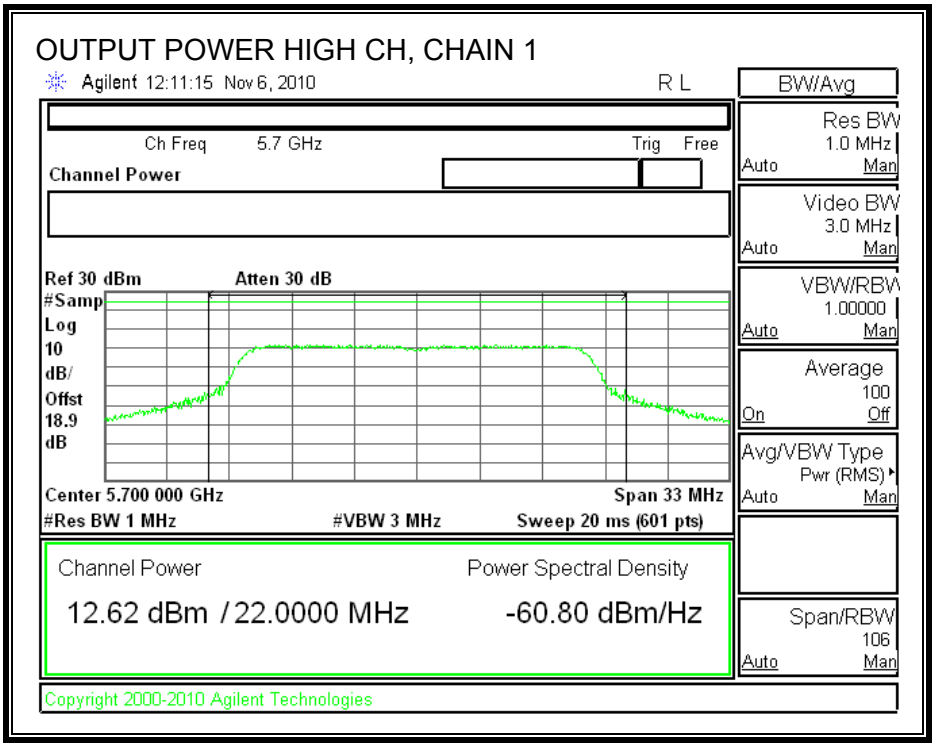




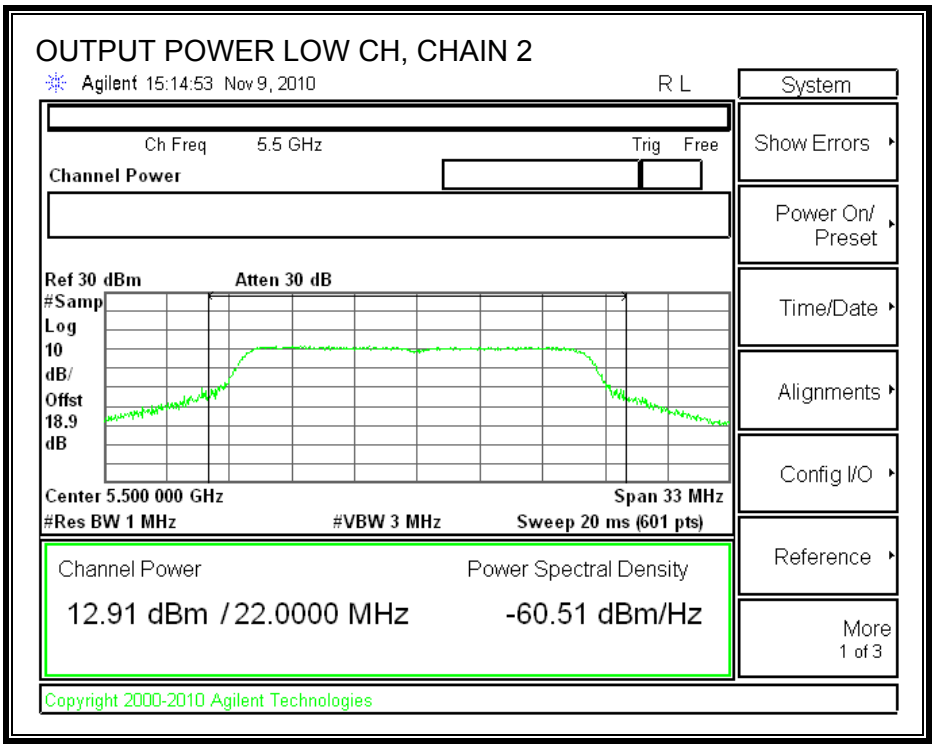
CHAIN 1 OUTPUT POWER

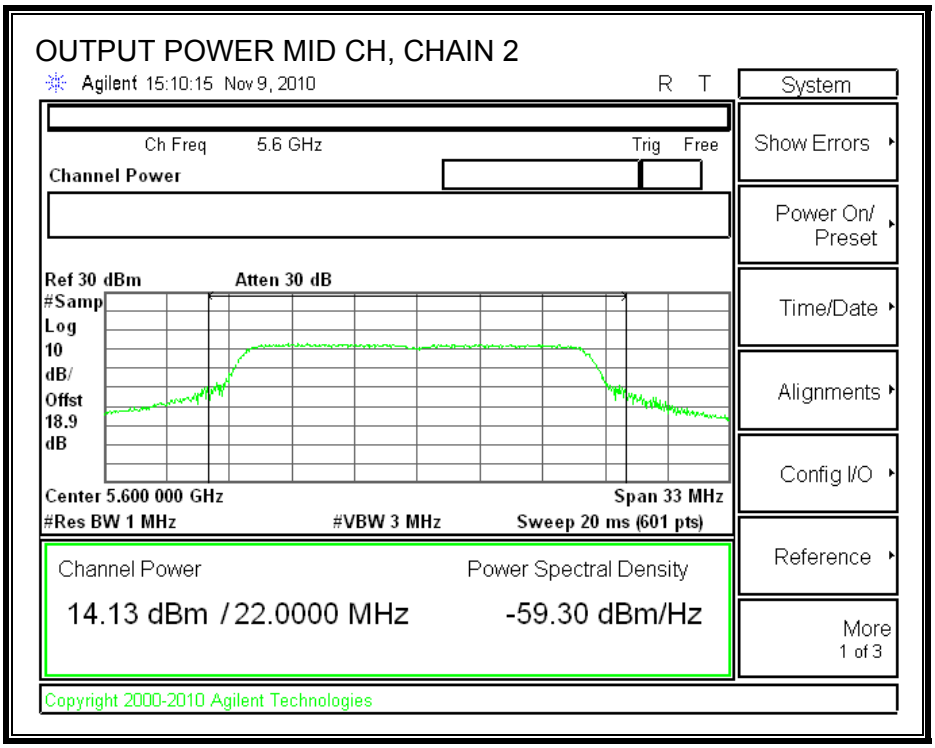


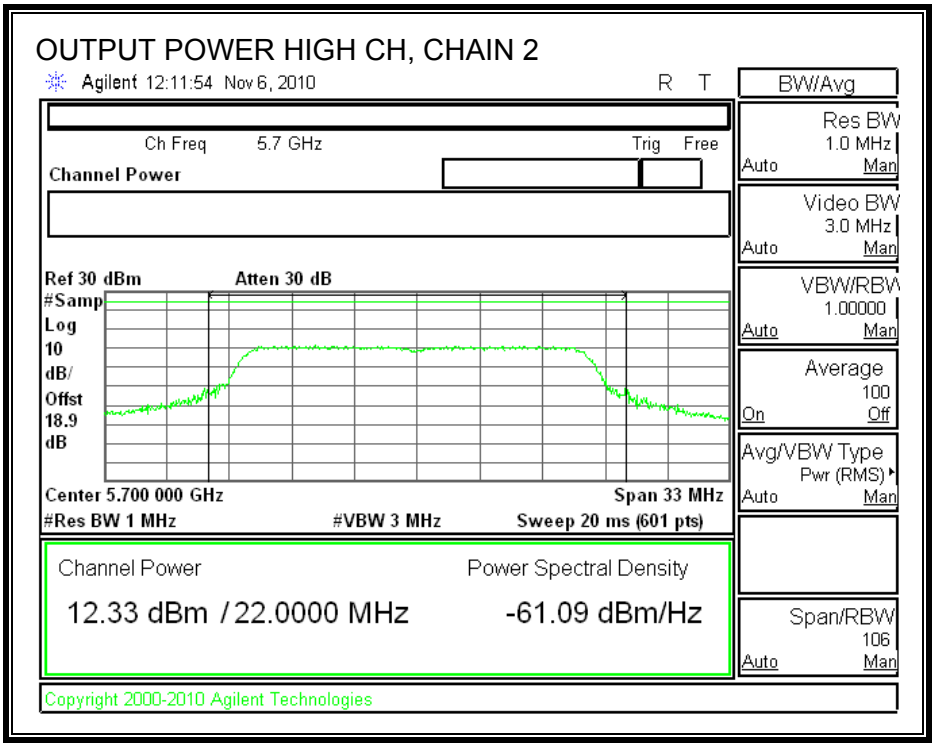




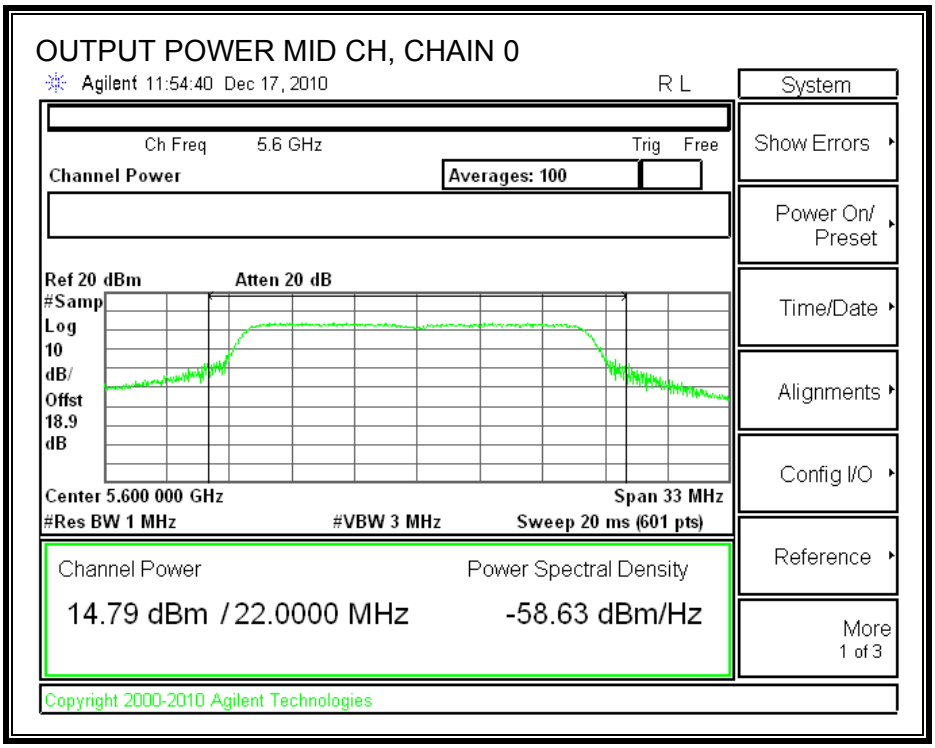
CHAIN 2 OUTPUT POWER

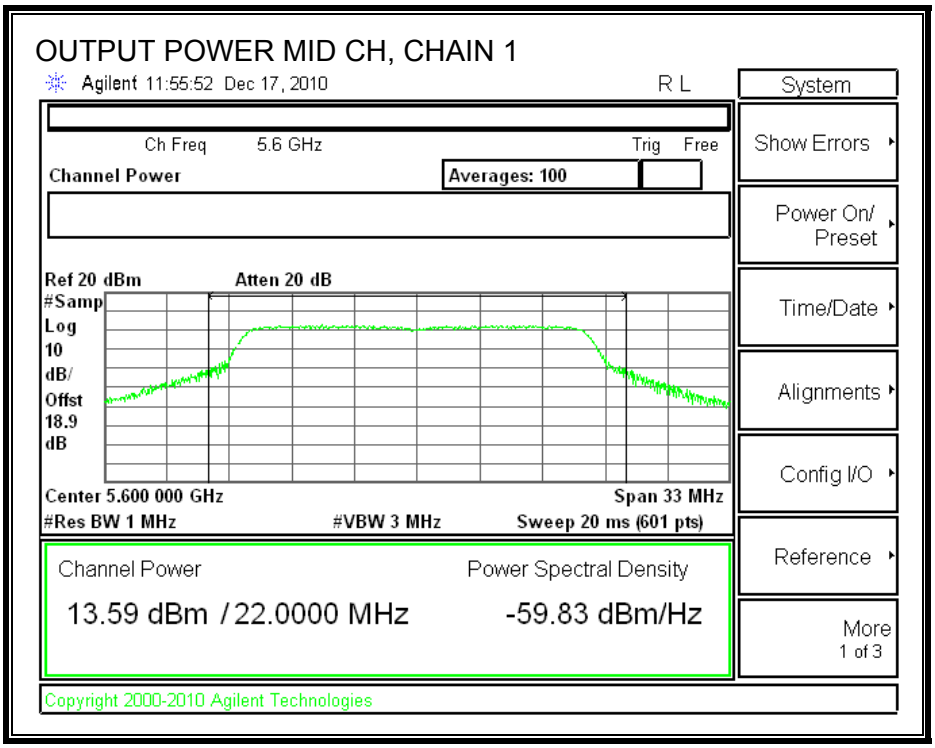


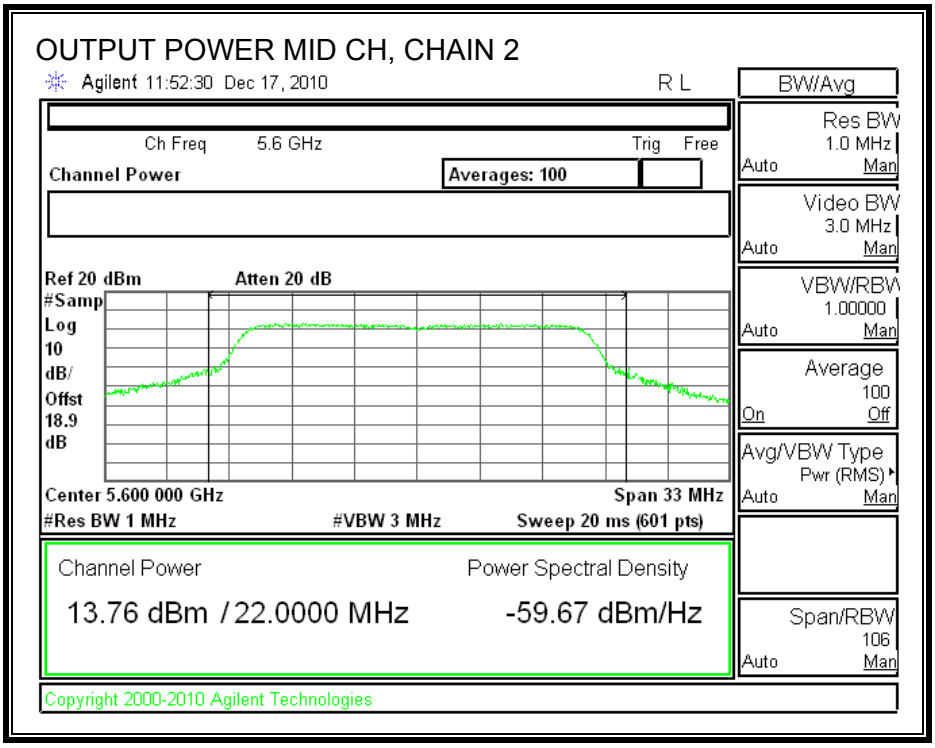




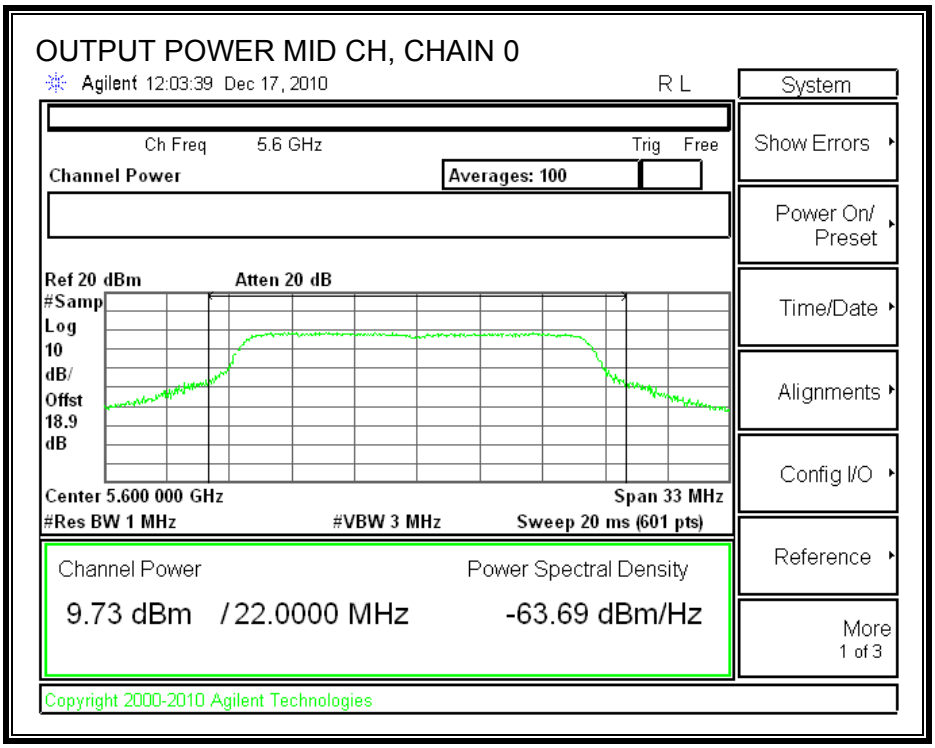
OUTPUT POWER WITH TPC AT NON-BEAM FORMING (WORST CASE)

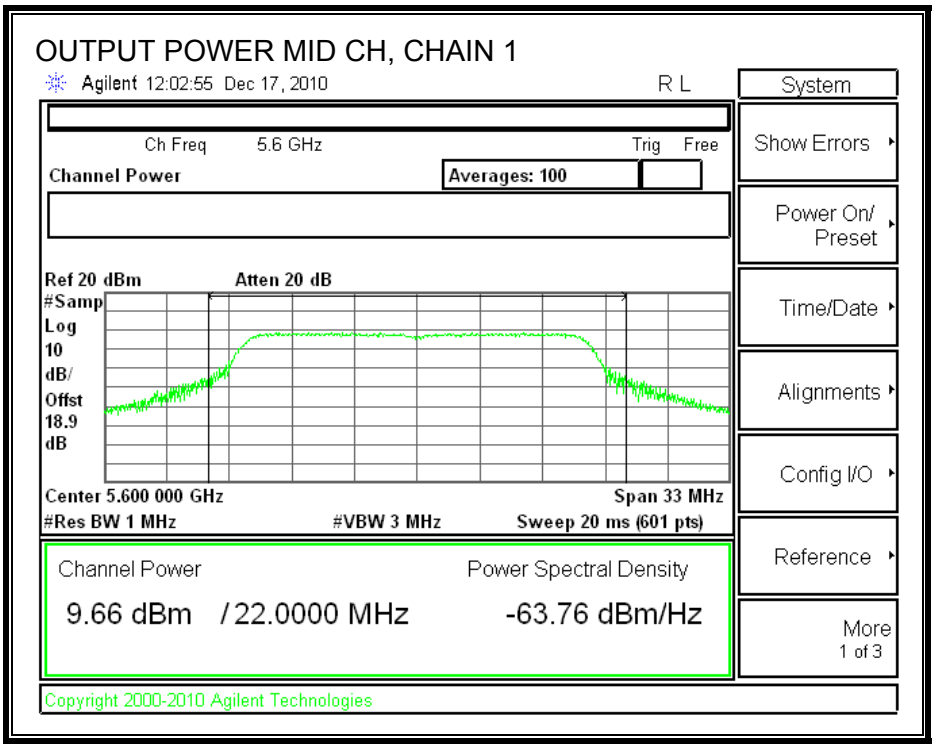


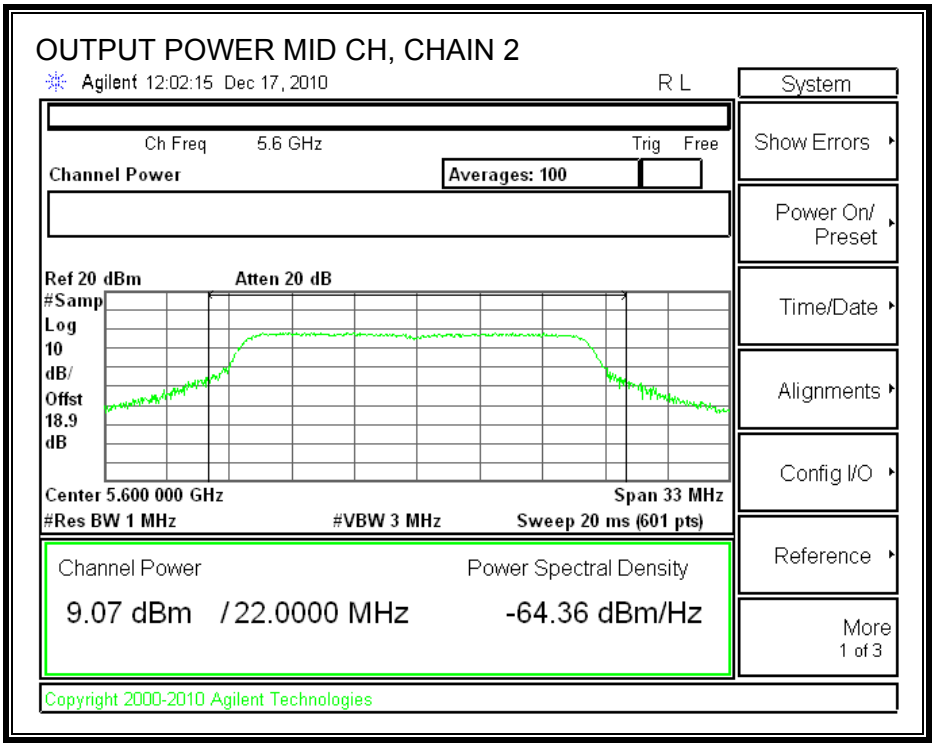




OUTPUT POWER WITH TPC AT BEAM FORMING (WORST CASE)







7.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 18.9 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Non Beam-Forming

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5500	15.10	14.90	14.00	19.46
Middle	5600	16.25	15.20	15.40	20.41
High	5700	12.70	12.50	12.20	17.24

Beam-Forming

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5500	14.40	14.45	12.85	18.73
Middle	5600	14.70	13.50	14.05	18.88
High	5700	12.70	12.60	12.30	17.31

7.8.4. 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 less than 6 dBi, therefore the limit is 11 dBm.

The combination antenna gain is 9.22 dBi, therefore the limit is 7.78 dBm.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

RESULTS

Non Beam-Forming

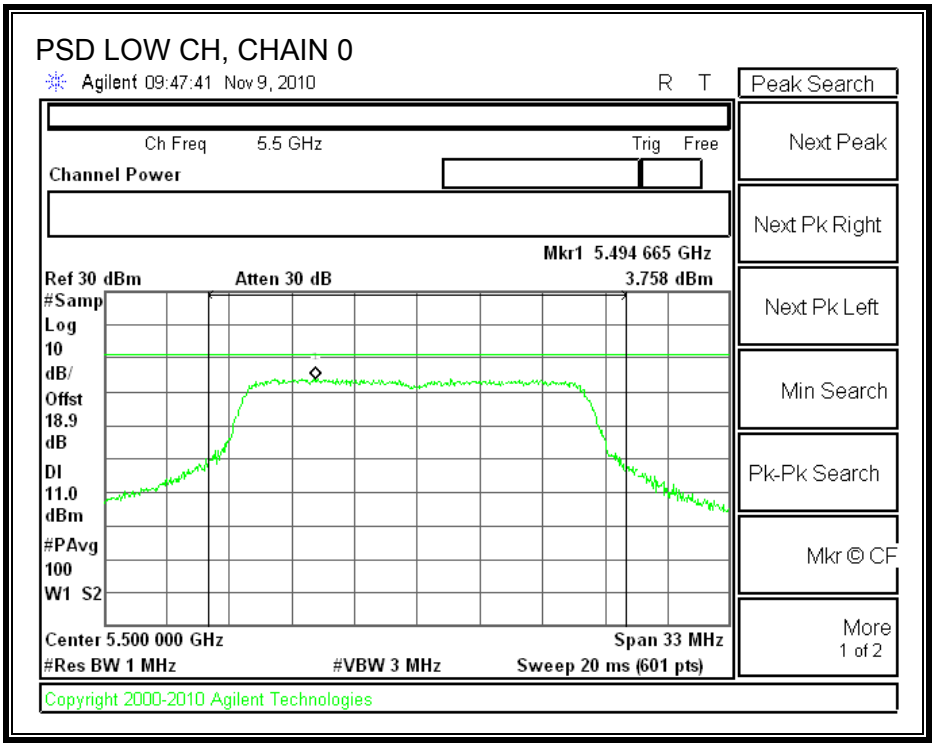
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5500	3.758	3.142	2.035	7.8	11.00	-3.19
Middle	5600	5.165	3.688	4.409	9.2	11.00	-1.77
High	5700	2.697	2.449	1.696	7.1	11.00	-3.93

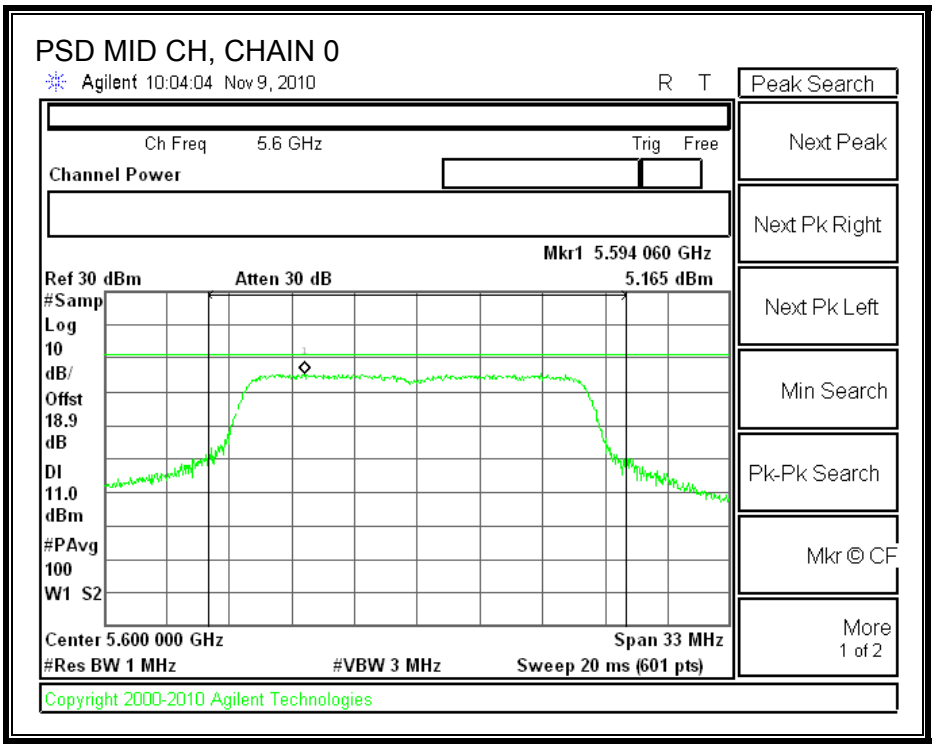
Beam-Forming

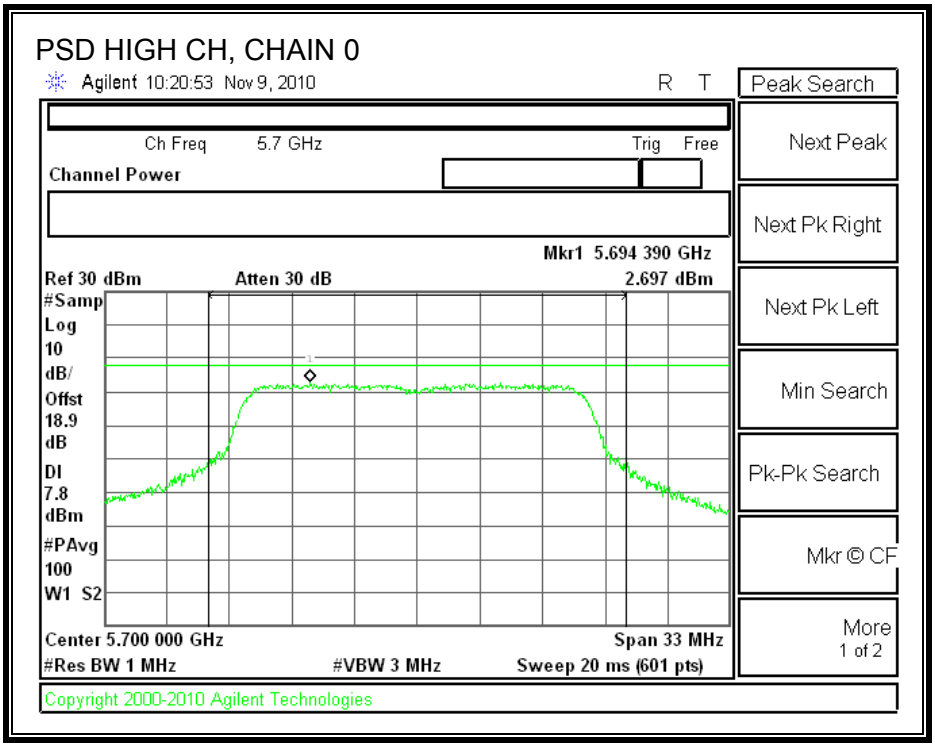
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5500	3.414	2.811	1.8	7.5	7.78	-0.28
Middle	5600	3.555	1.778	2.748	7.5	7.78	-0.25
High	5700	2.697	2.449	1.696	7.1	7.78	-0.71

NBF

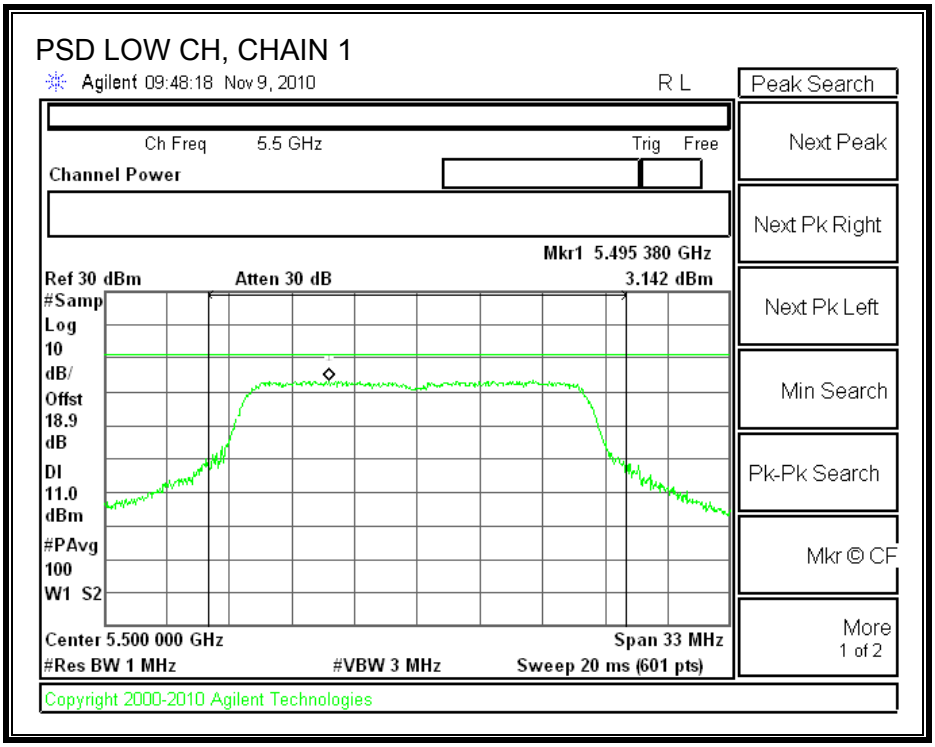
CHAIN 0 POWER SPECTRAL DENSITY

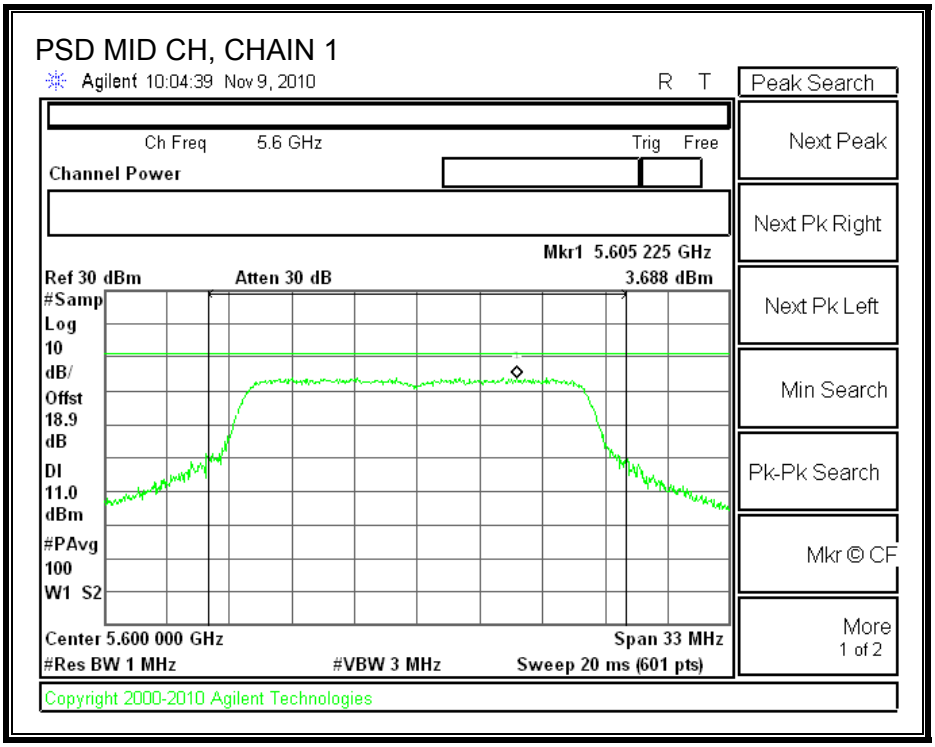


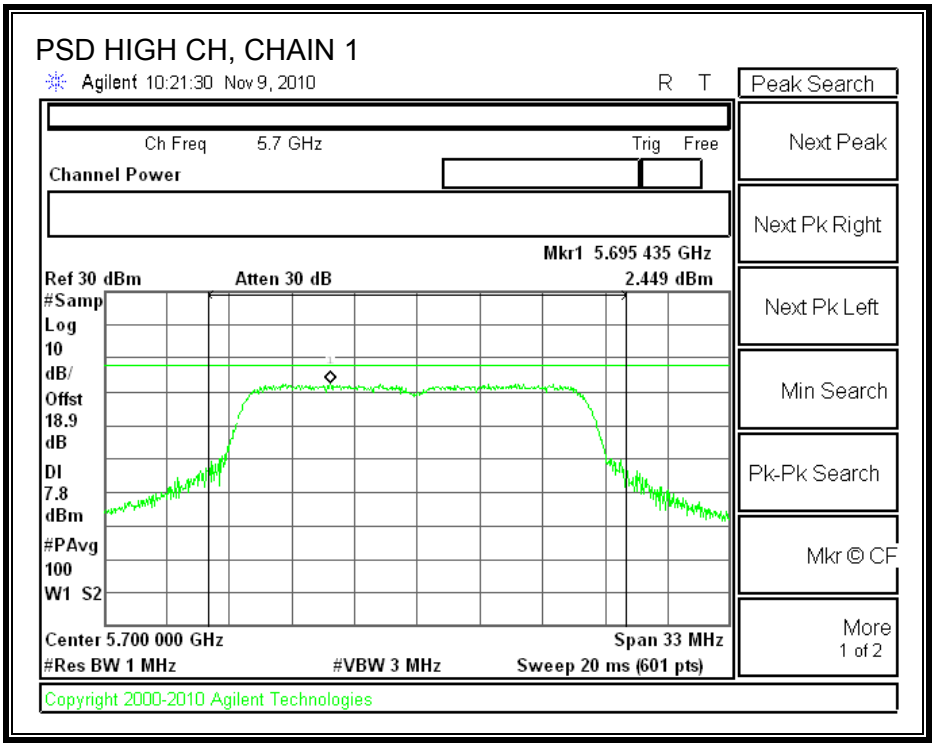




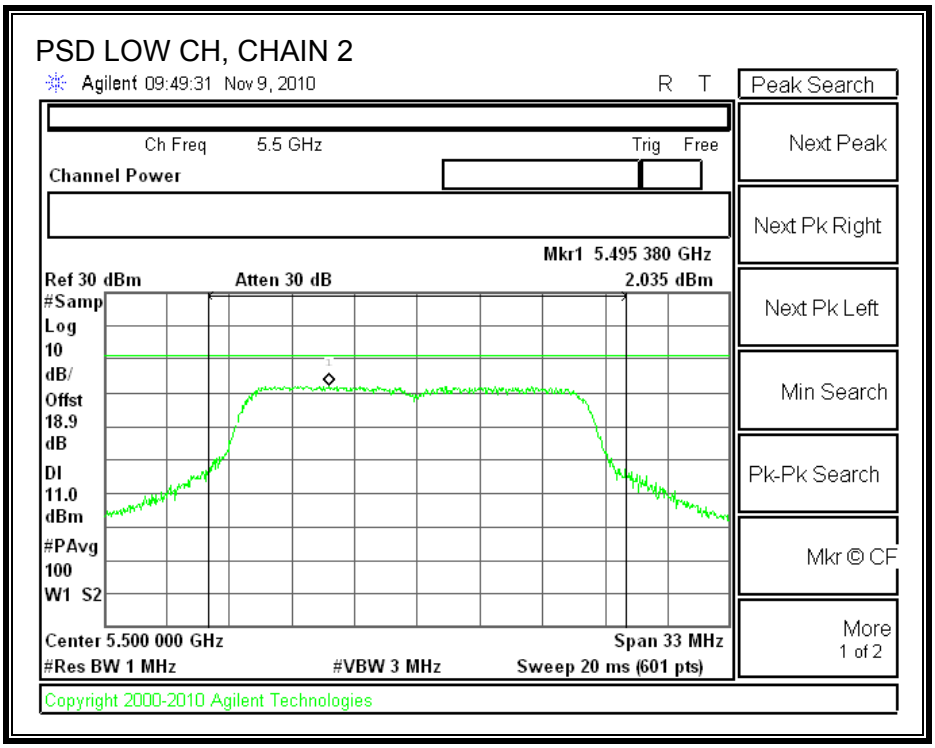
CHAIN 1 POWER SPECTRAL DENSITY

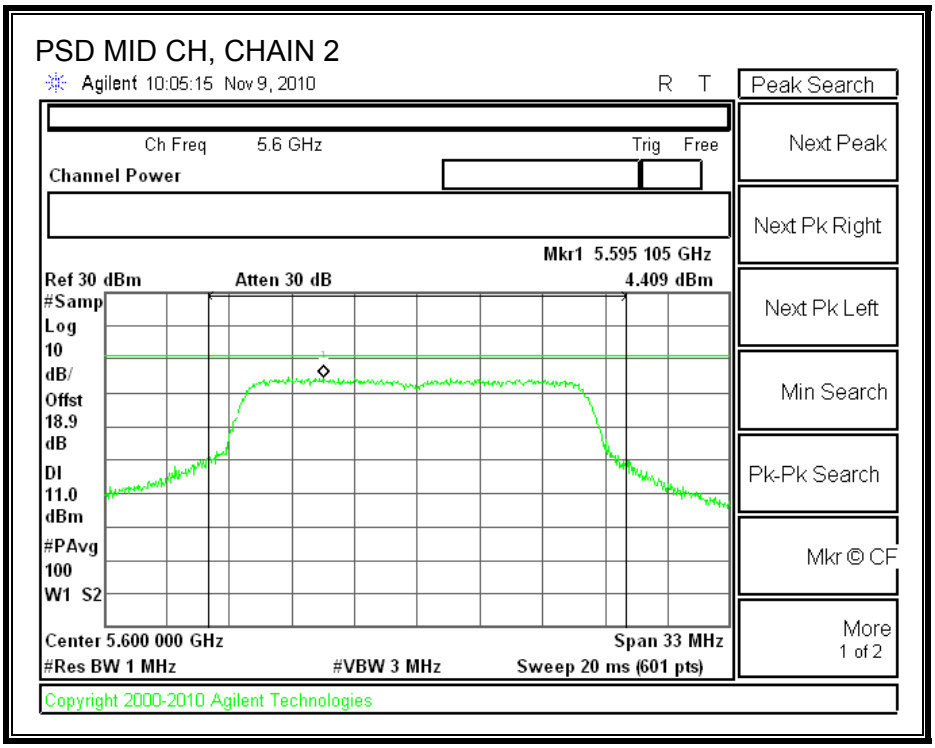


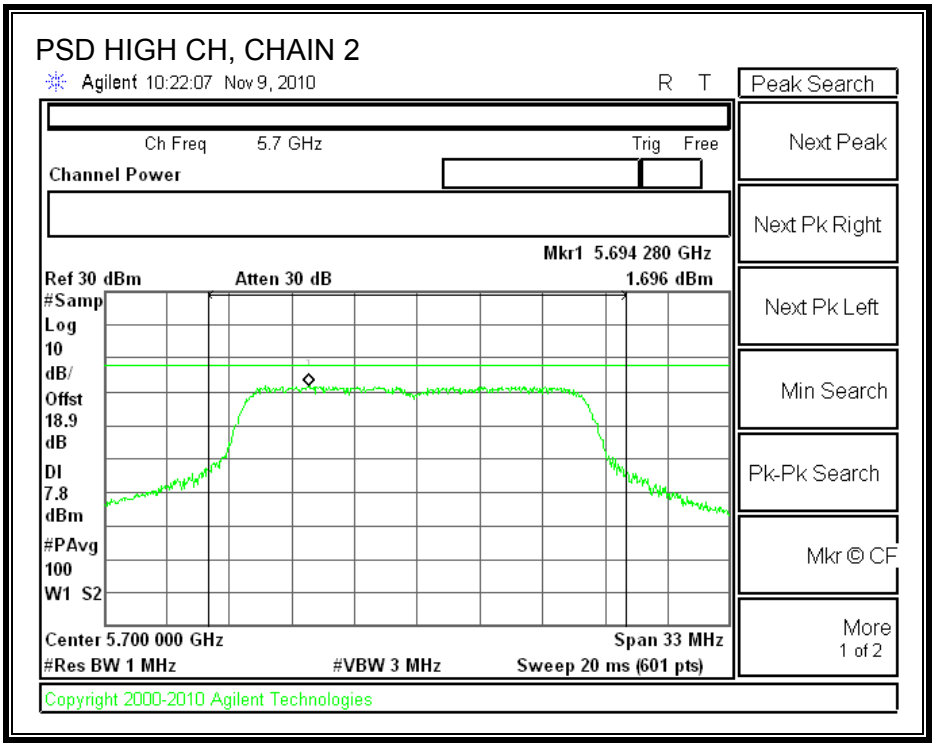




CHAIN 2 POWER SPECTRAL DENSITY







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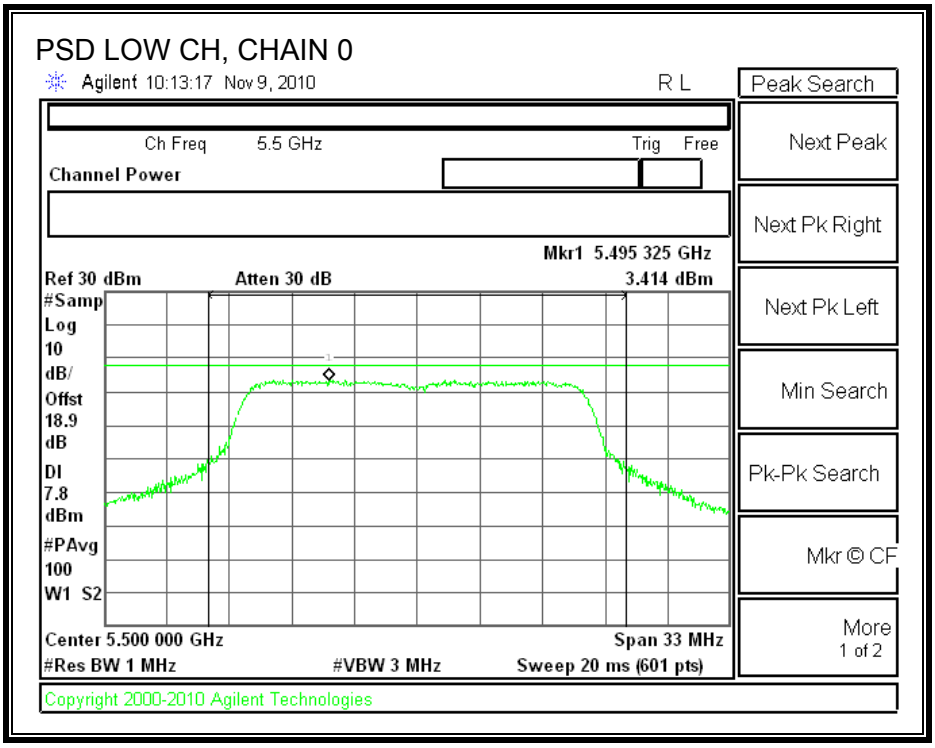
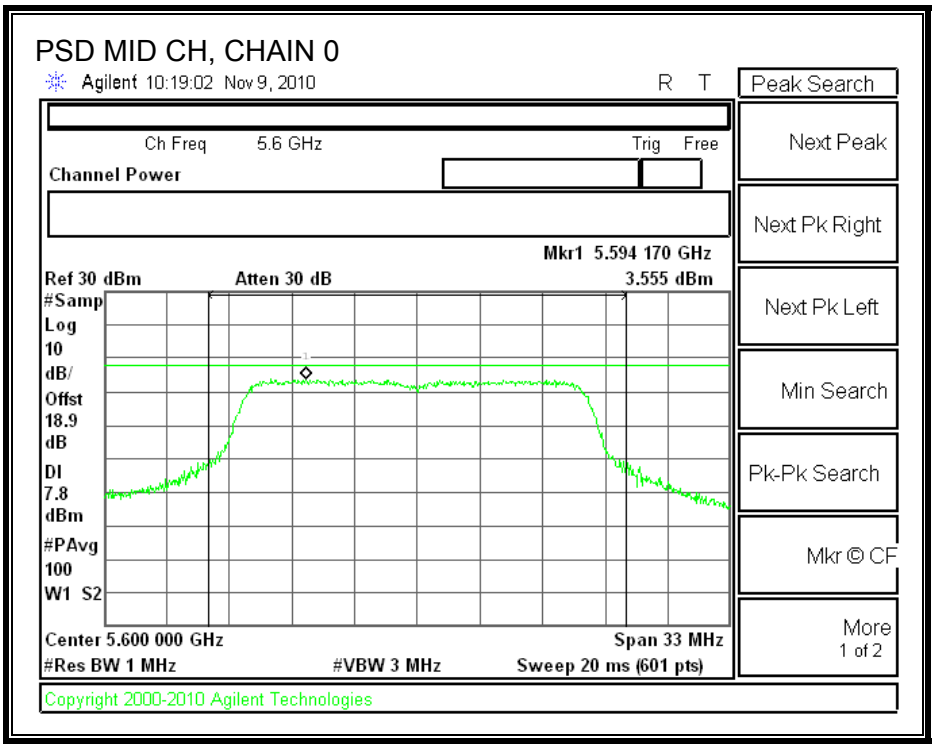
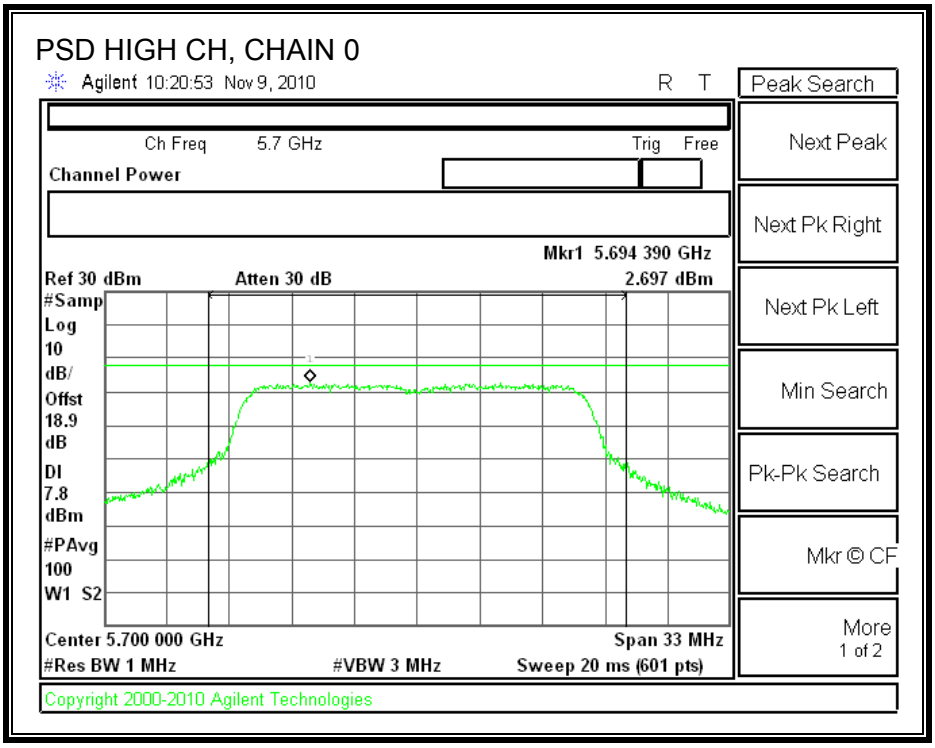
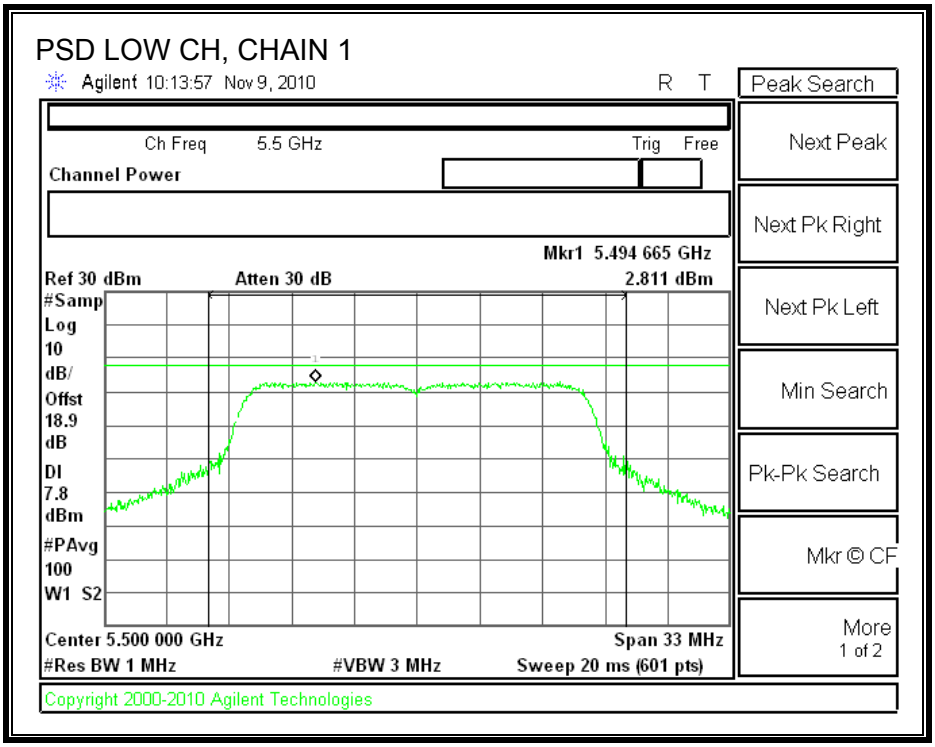
CHAIN 0 POWER SPECTRAL DENSITY



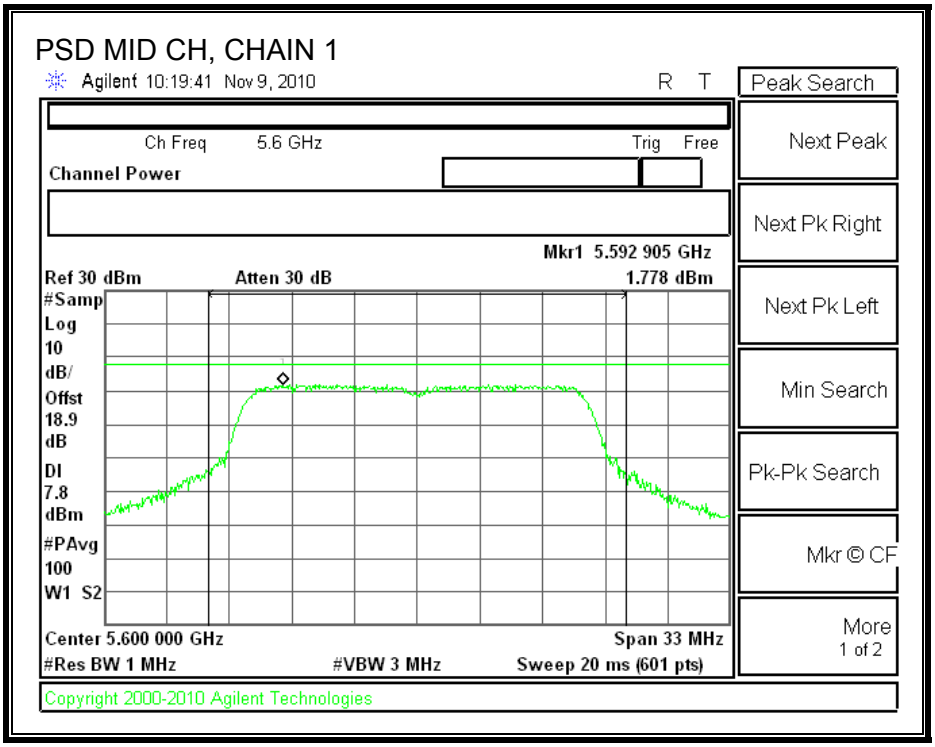




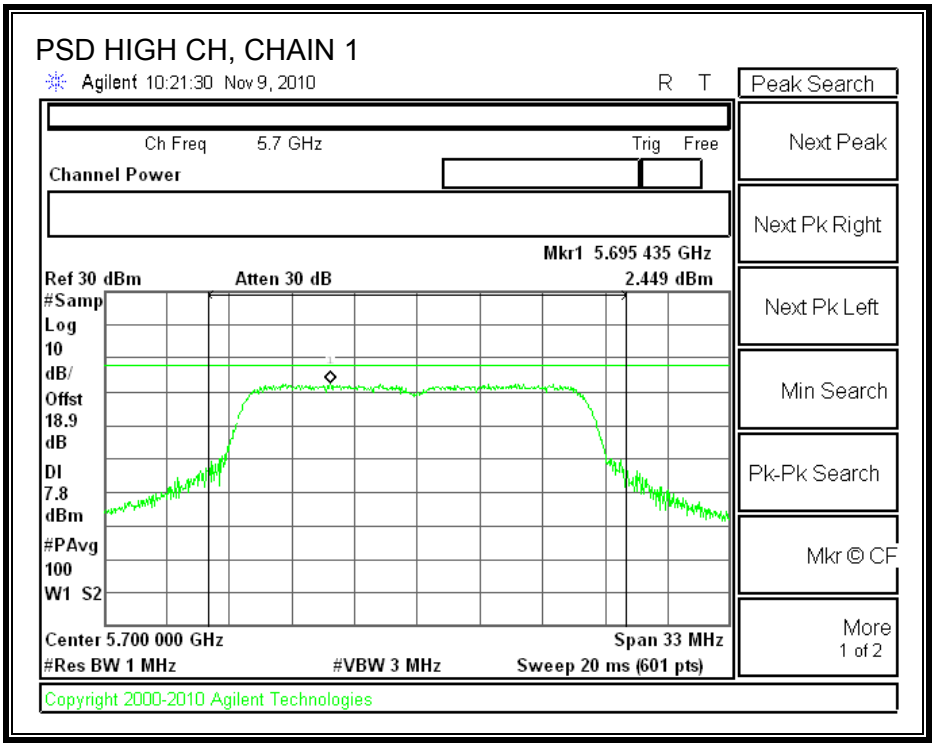
CHAIN 1 POWER SPECTRAL DENSITY



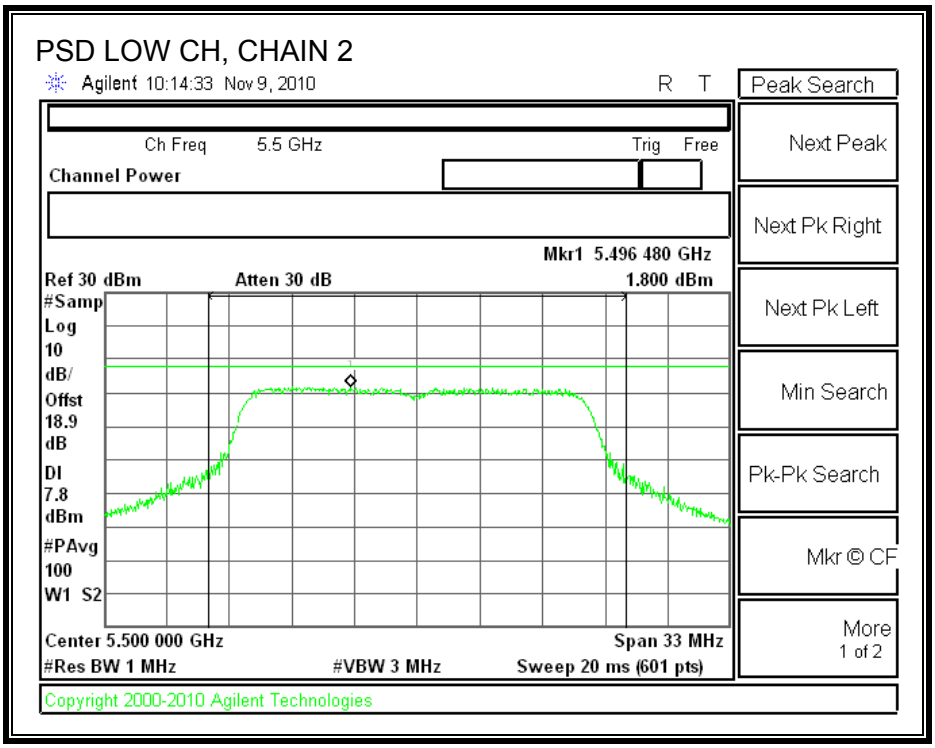
PSD MID CH, CHAIN 1

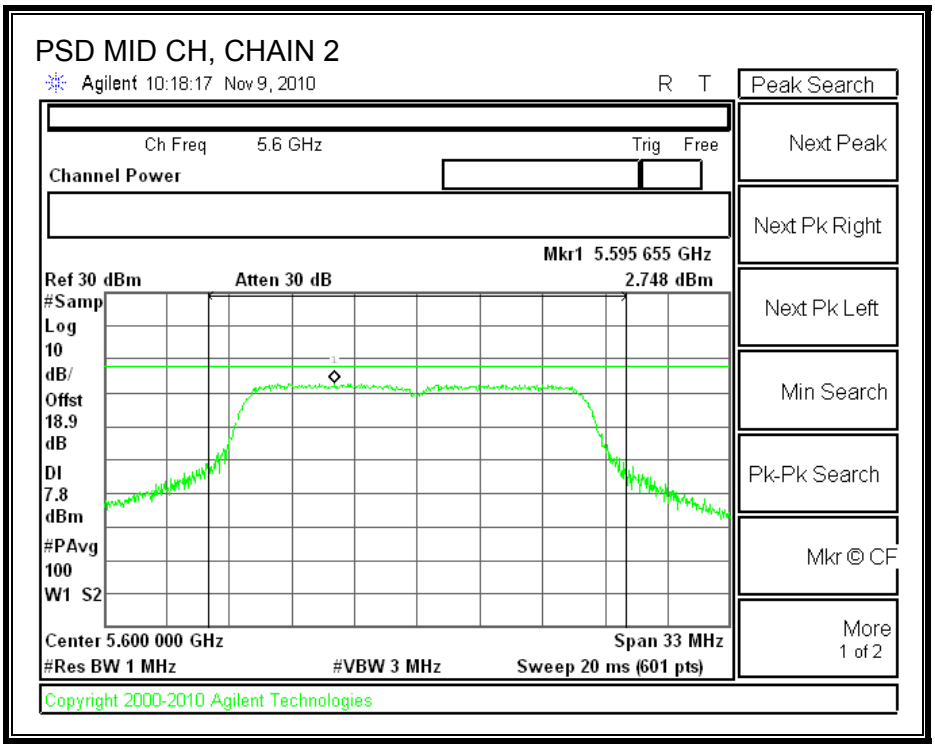


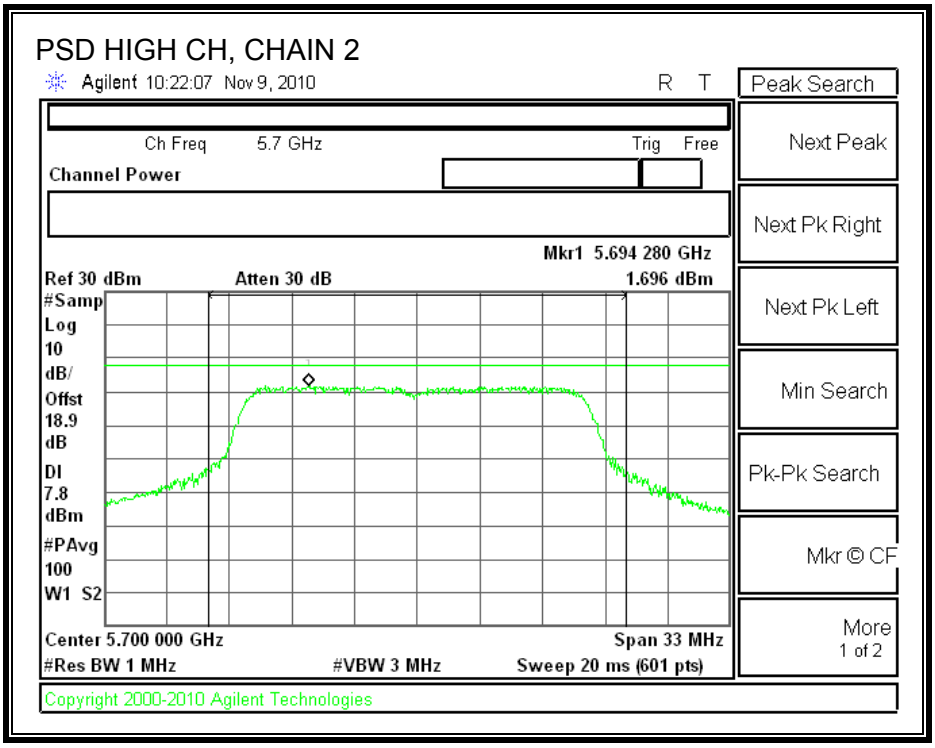
PSD HIGH CH, CHAIN 1



CHAIN 2 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

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.27	13	-3.73
Middle	5600	8.85	13	-4.15
High	5700	9.87	13	-3.13

CHAIN 1

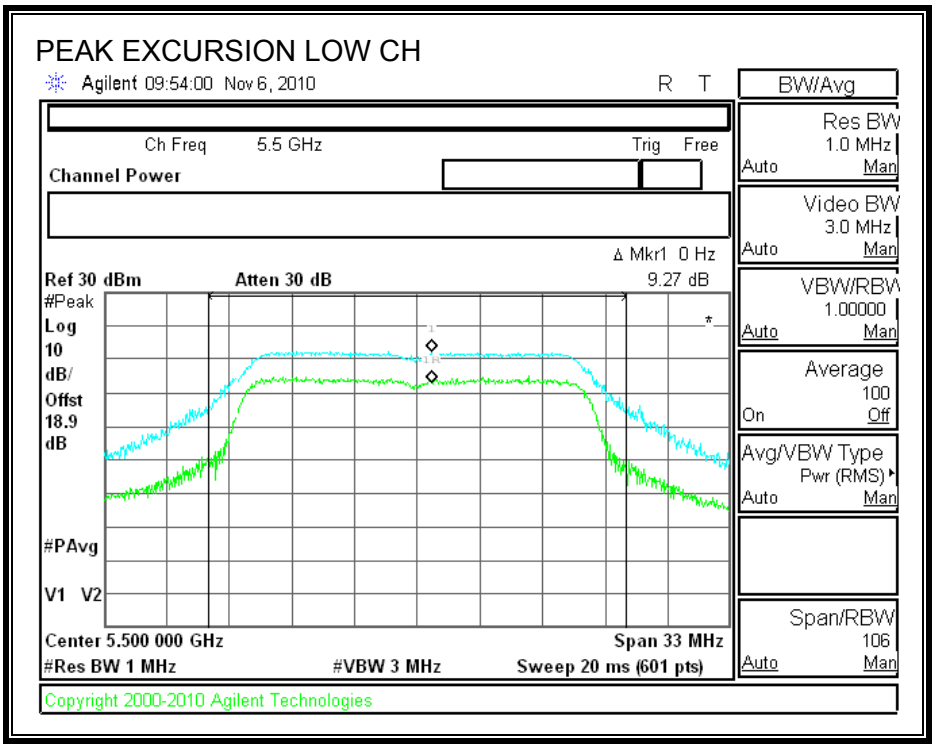
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.66	13	-3.34
Middle	5600	9.75	13	-3.25
High	5700	9.53	13	-3.47

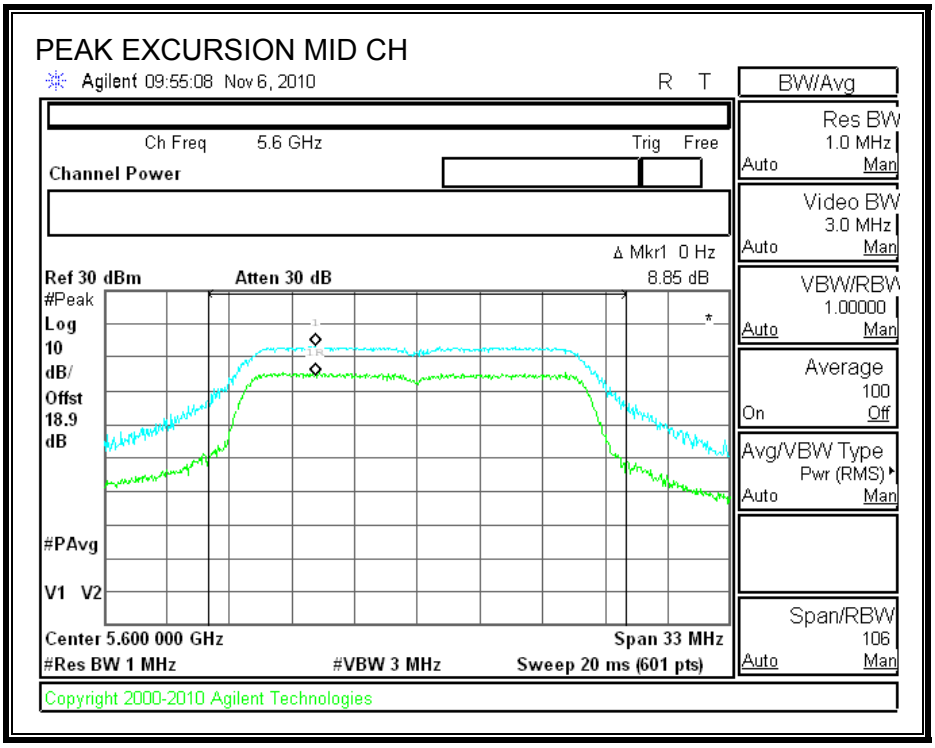
CHAIN 2

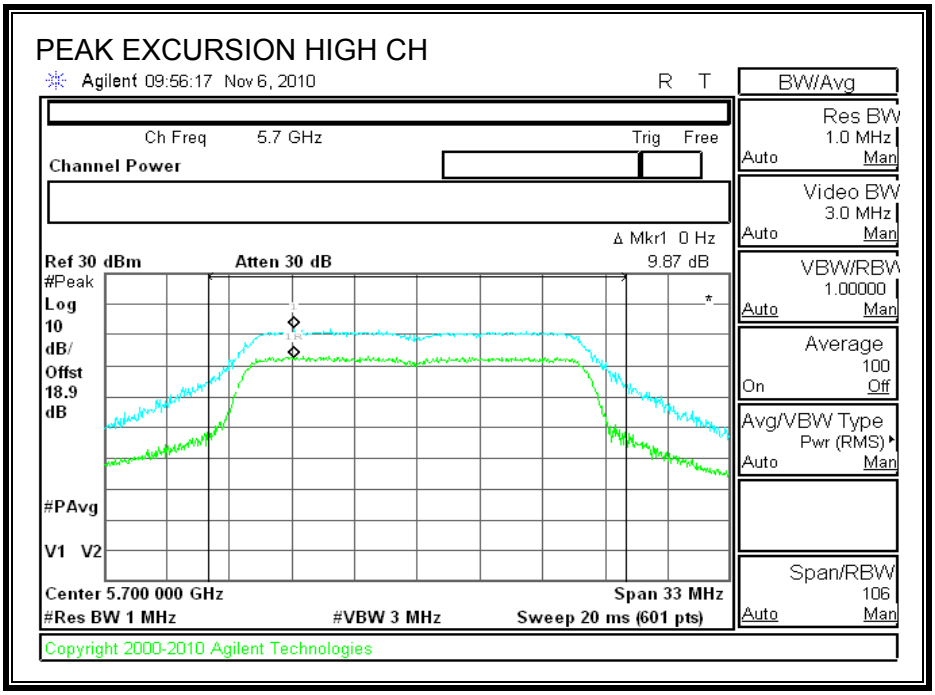
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.28	13	-3.72
Middle	5600	8.82	13	-4.18
High	5700	8.74	13	-4.26

CHAIN 0

PEAK EXCURSION

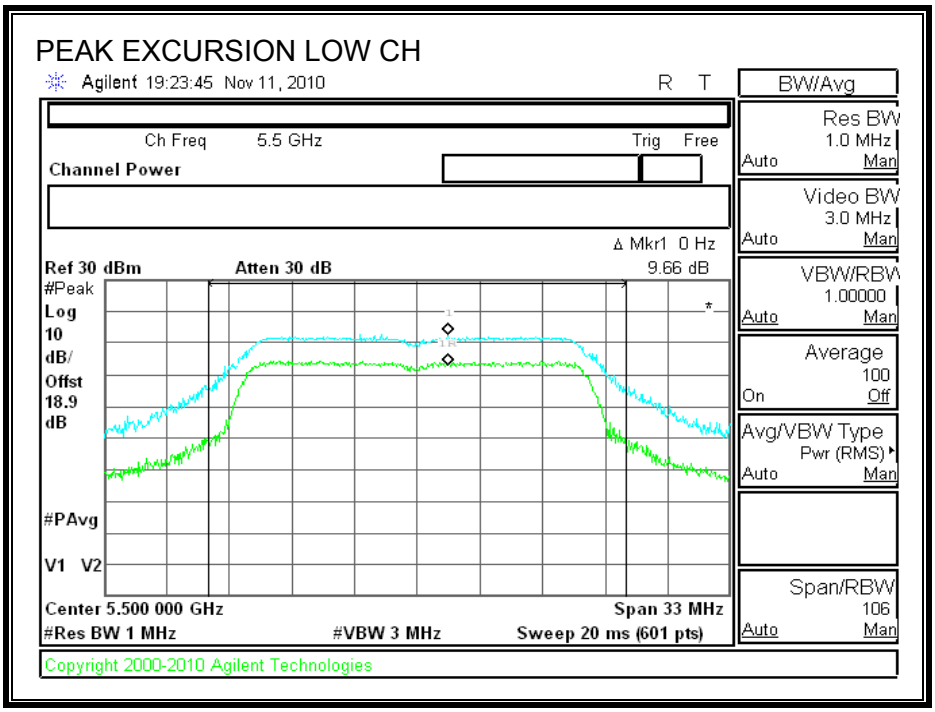




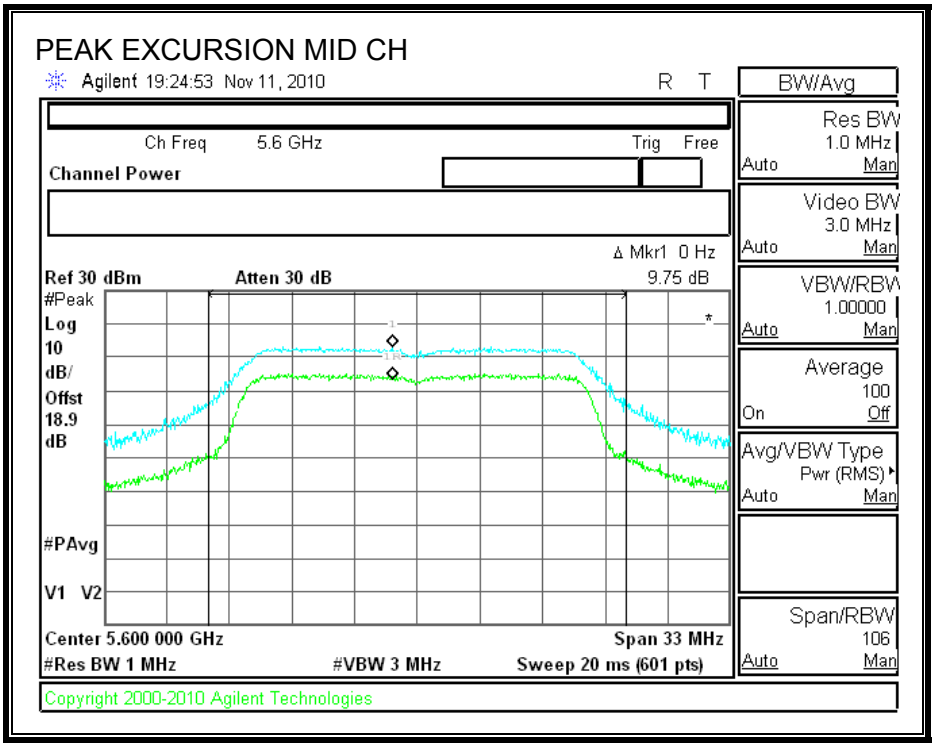


CHAIN 1

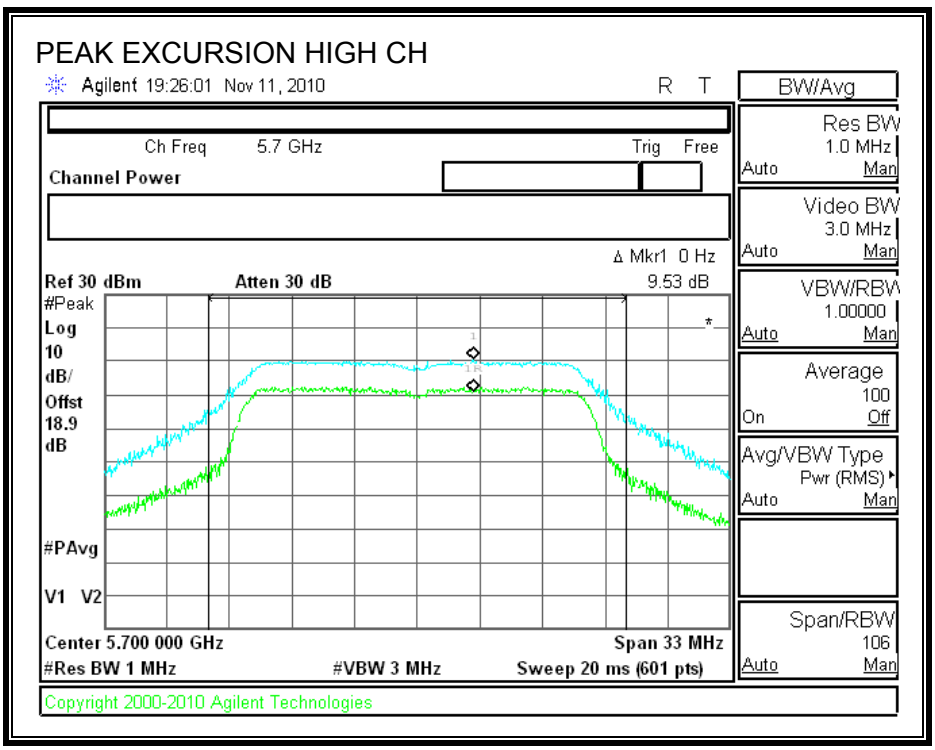
PEAK EXCURSION



PEAK EXCURSION MID CH

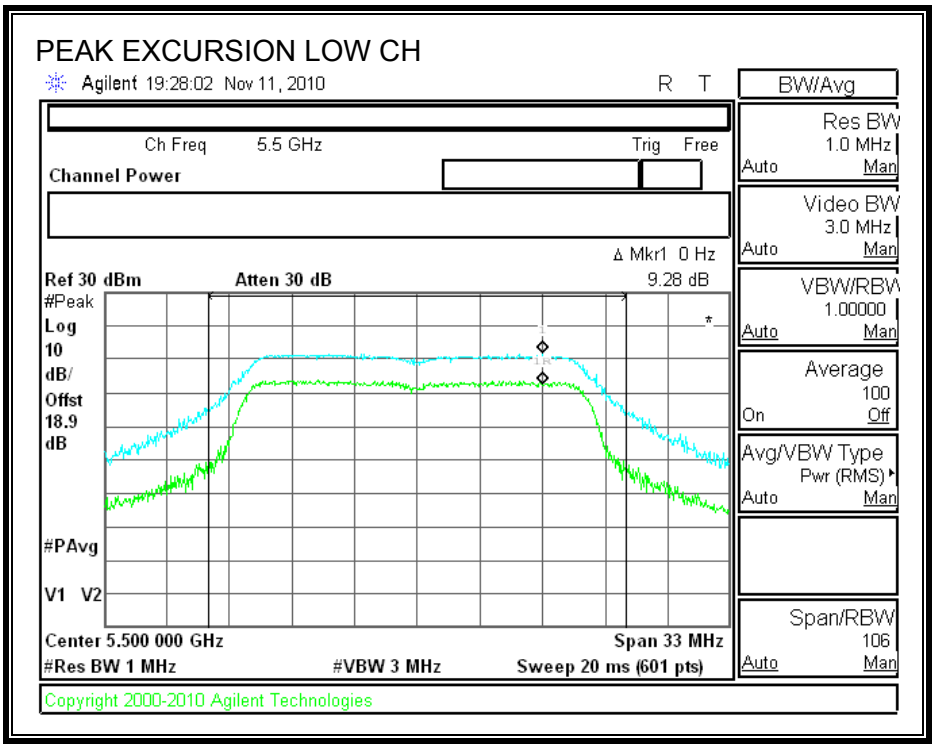


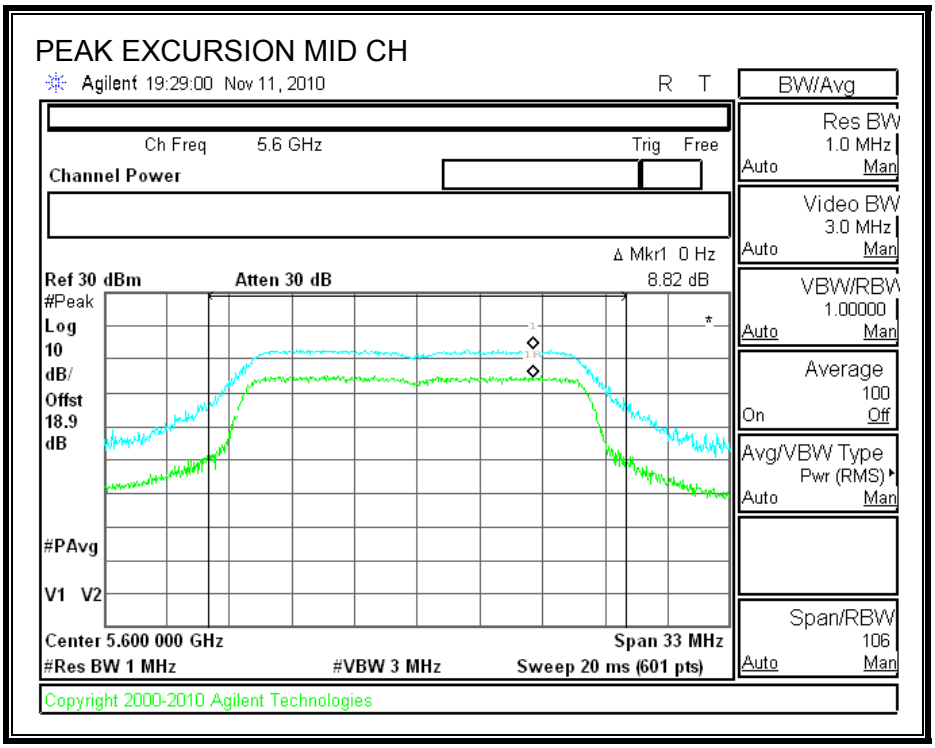
PEAK EXCURSION HIGH CH

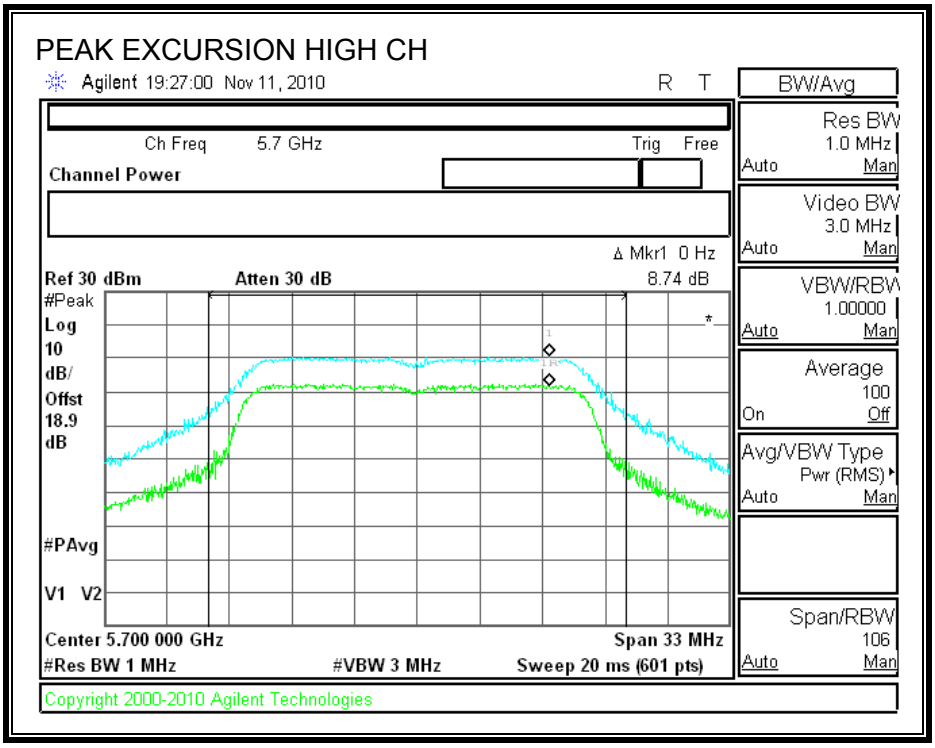


CHAIN 2

PEAK EXCURSION







7.8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

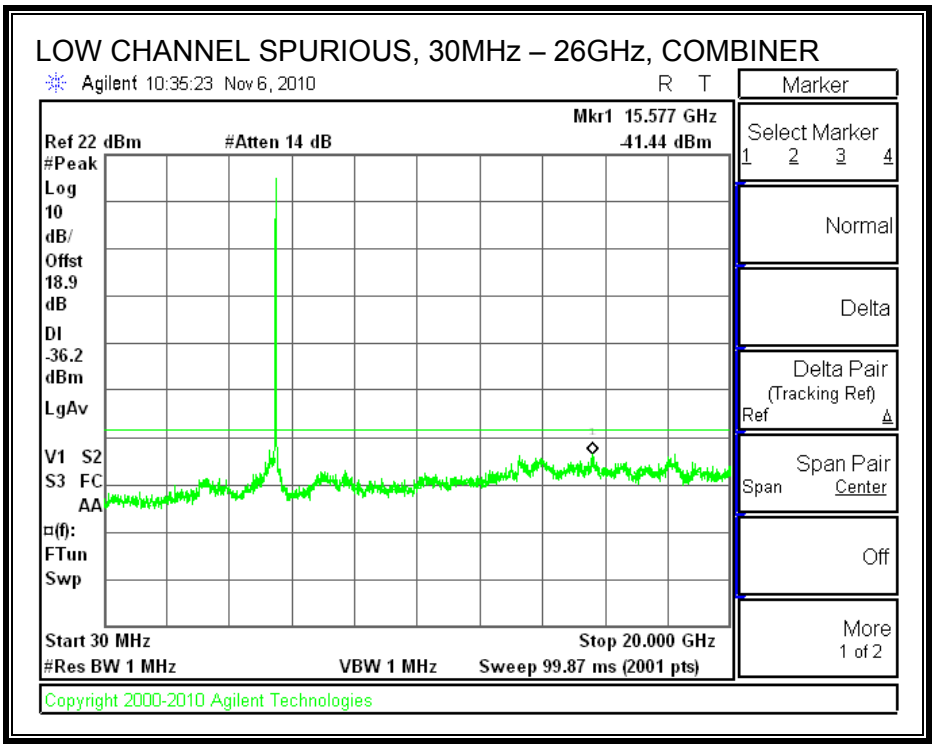
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

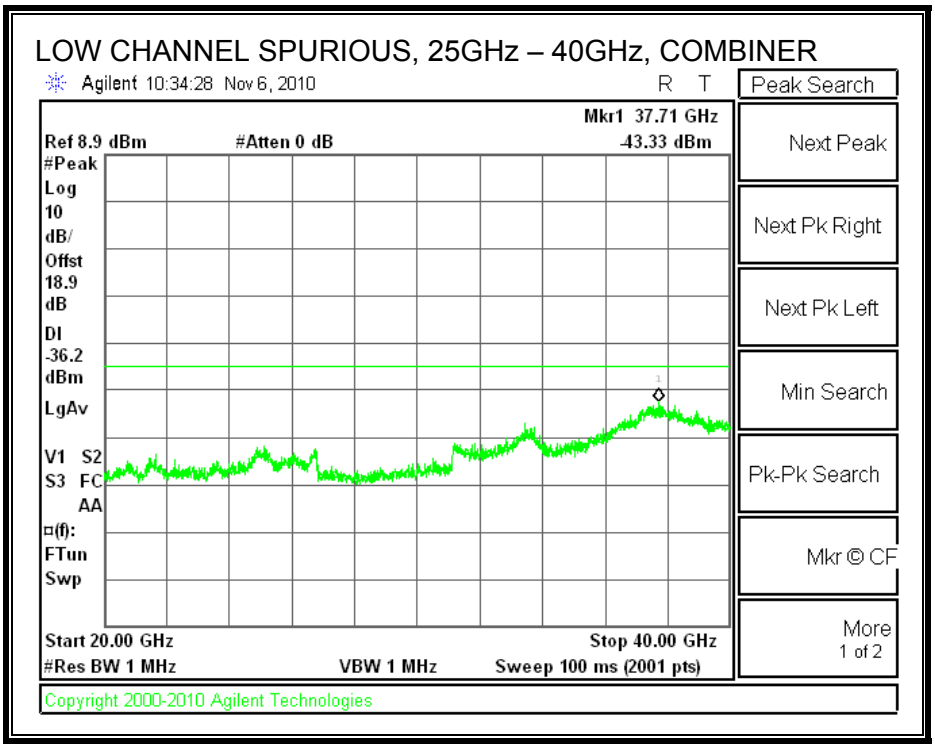
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

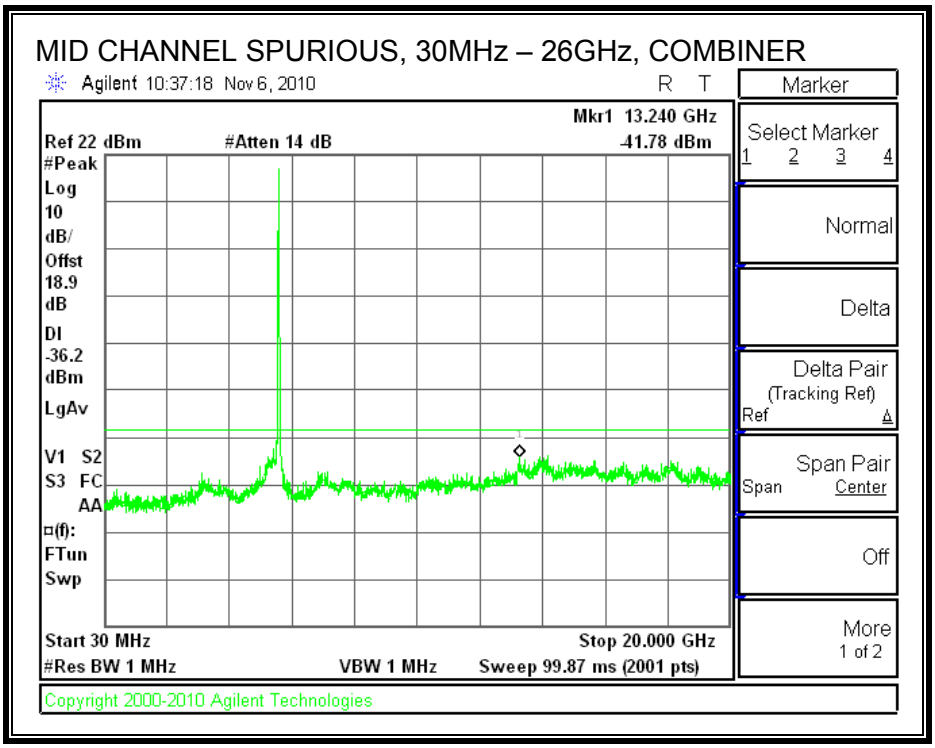
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

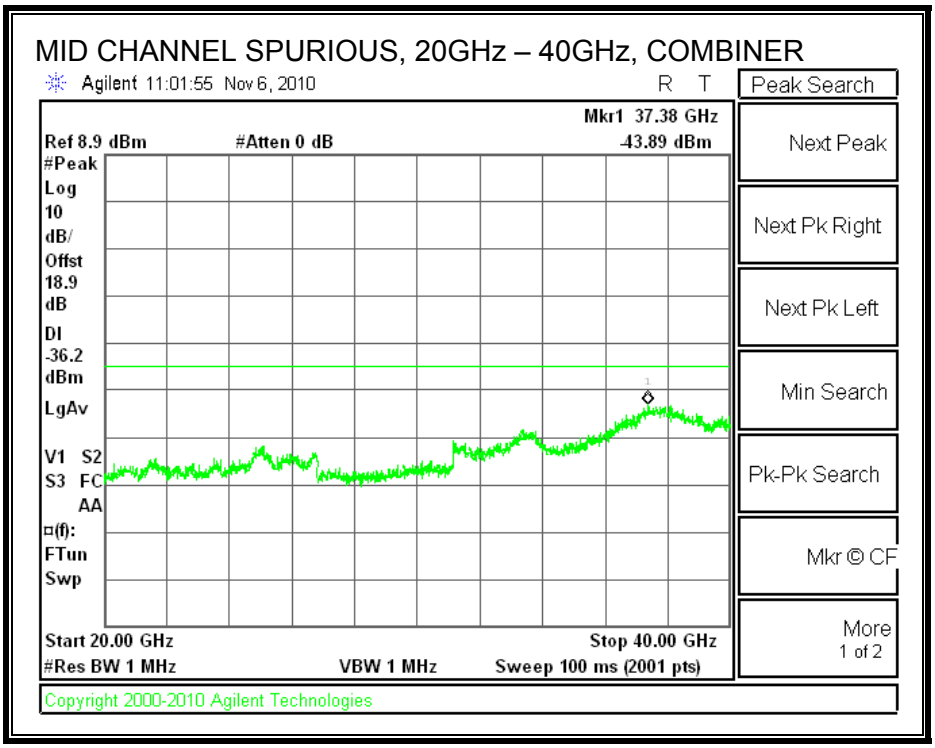
LOW CHANNEL SPURIOUS EMISSIONS



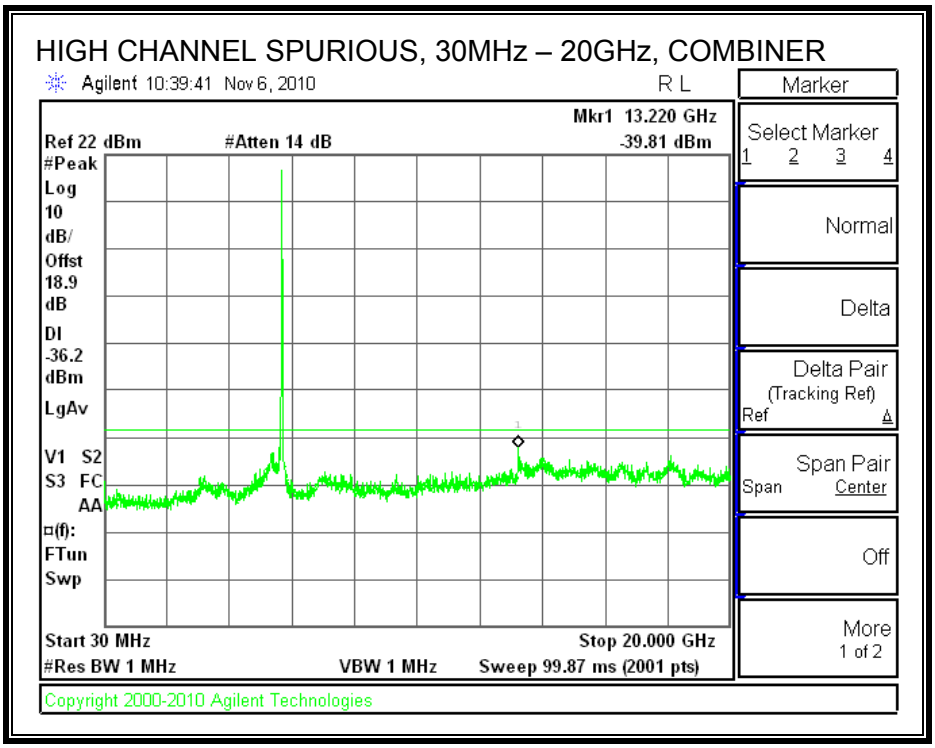


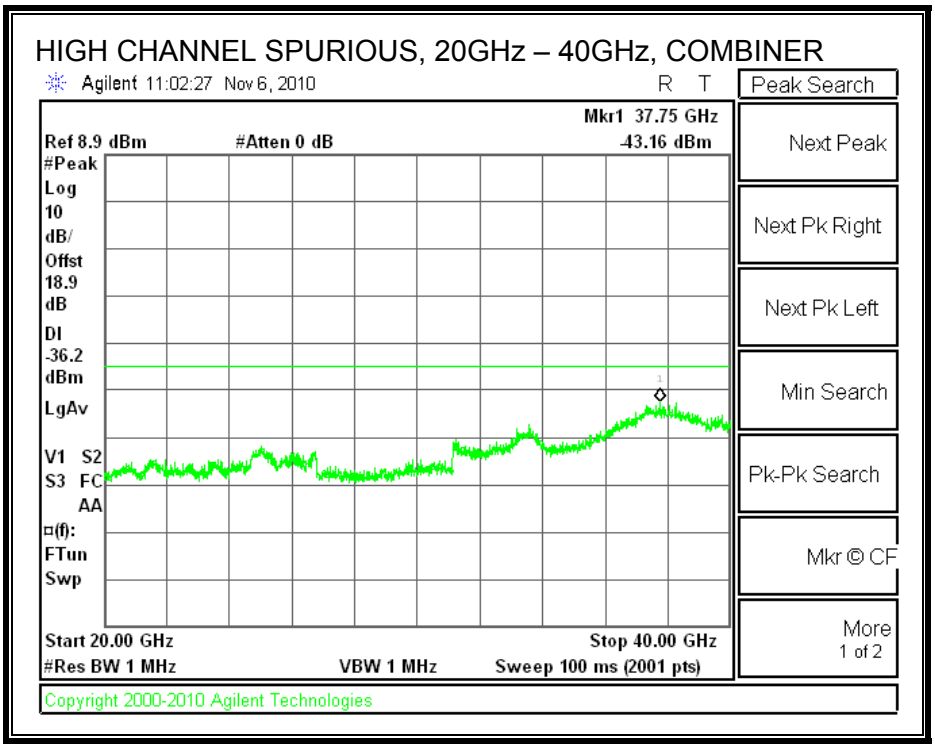
MID CHANNEL SPURIOUS EMISSIONS





HIGH CHANNEL SPURIOUS EMISSIONS





7.9. 5.6 GHz BAND CHANNEL TESTS FOR 802.11HT40 MODE

7.9.1. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

RESULTS

CHAIN 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	41.371	36.3528
Middle	5590	41.208	36.3445
High	5670	40.509	36.3413

CHAIN 1

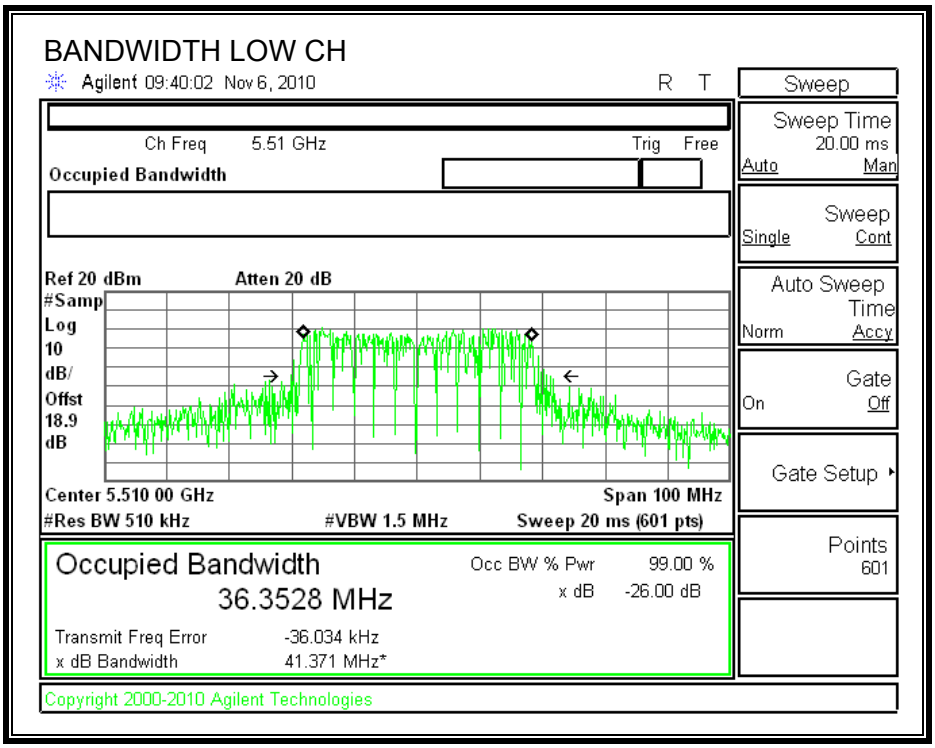
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	41.955	36.2148
Middle	5590	40.668	36.1549
High	5670	41.858	36.3841

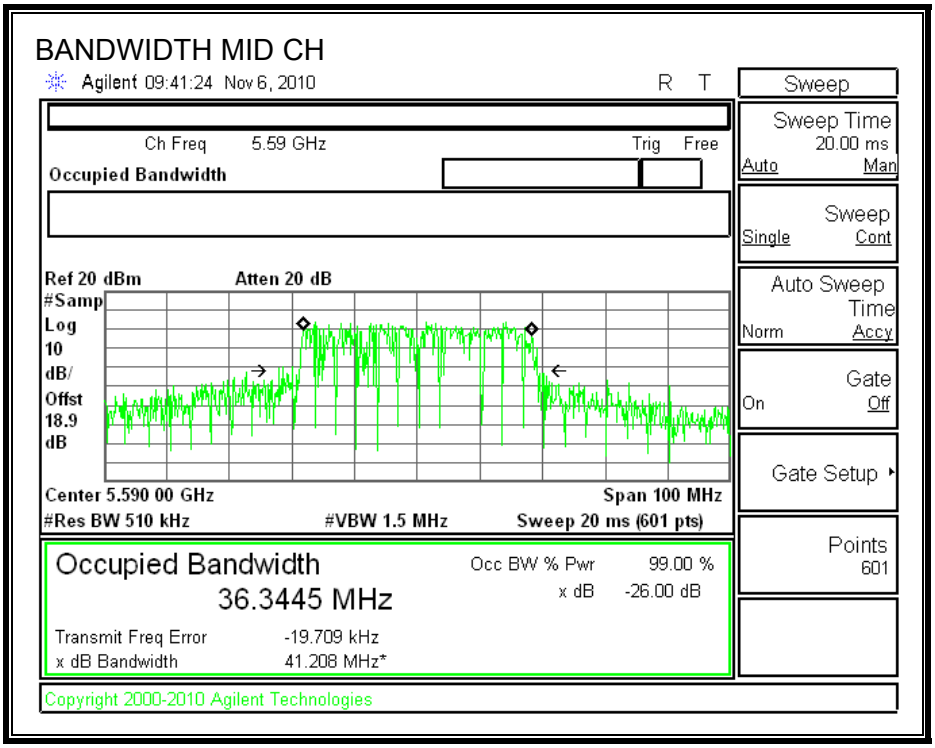
CHAIN 2

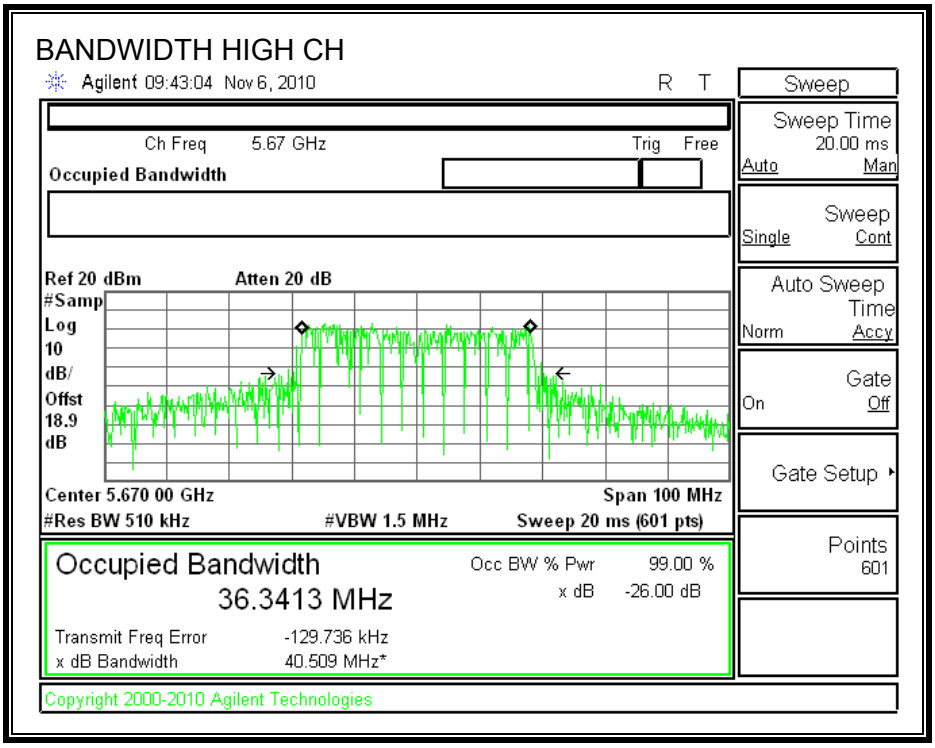
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	40.407	36.3979
Middle	5590	40.606	36.524
High	5670	39.872	36.2204

CHAIN 0

26 dB and 99% BANDWIDTH

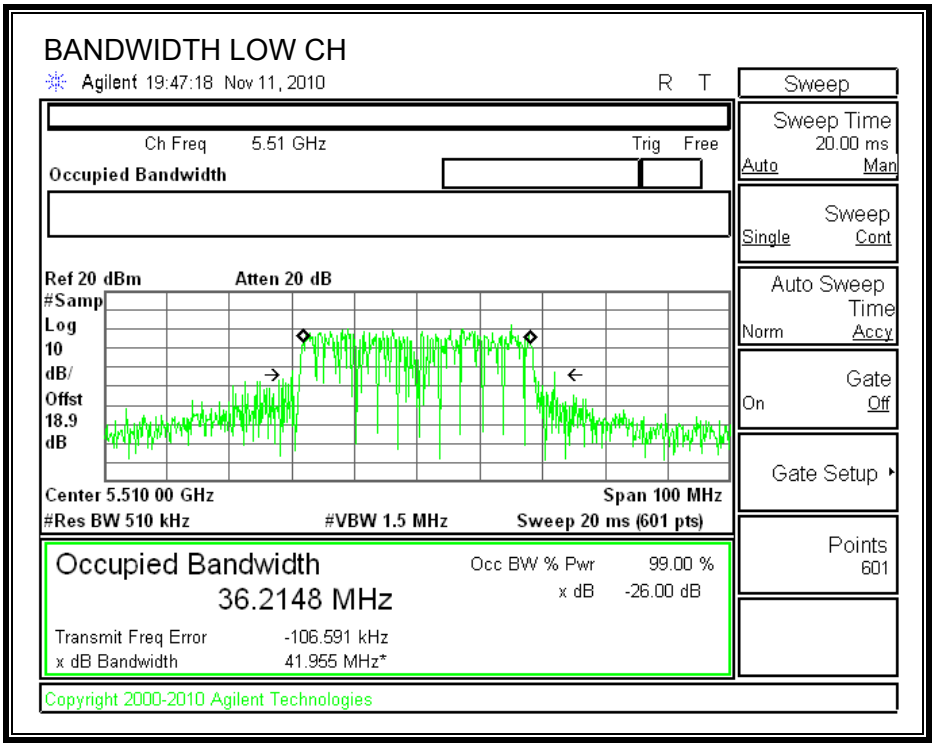


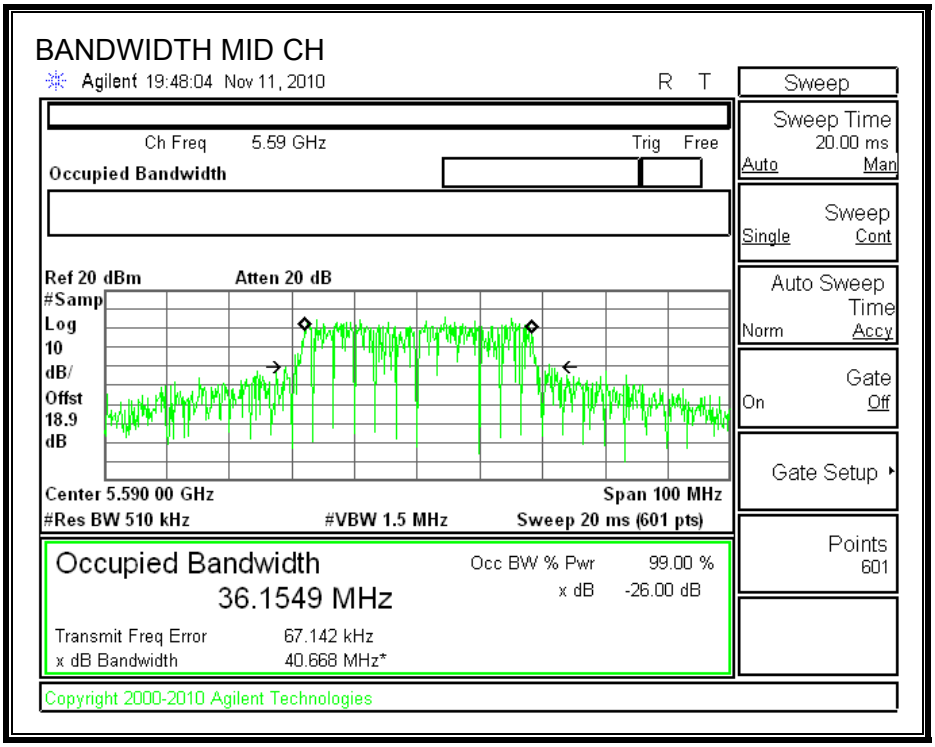


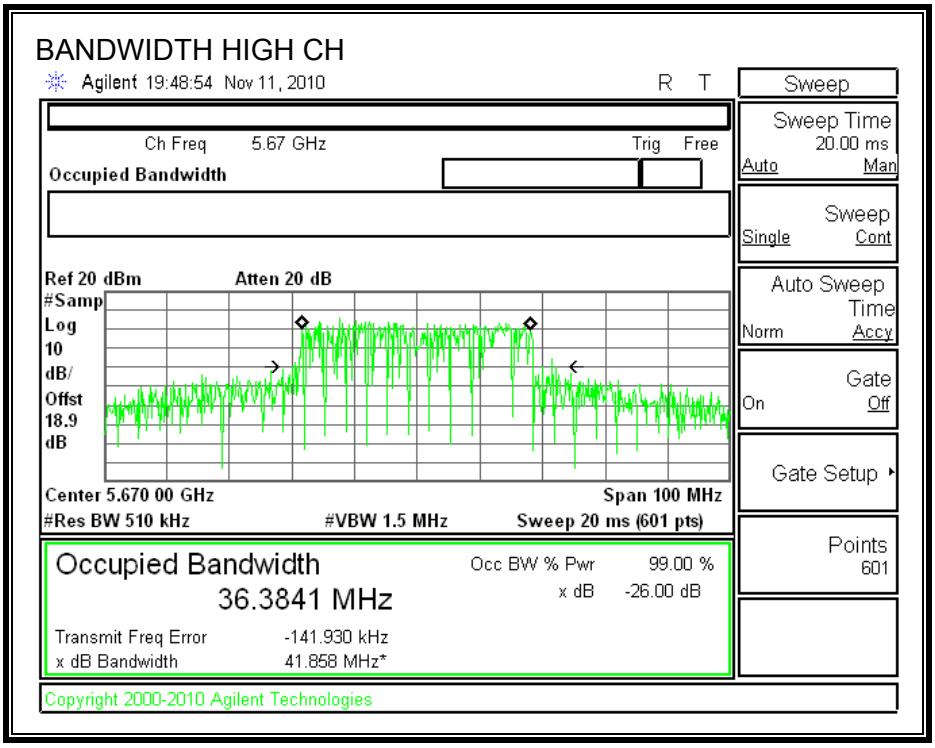


CHAIN 1

26 dB and 99% BANDWIDTH

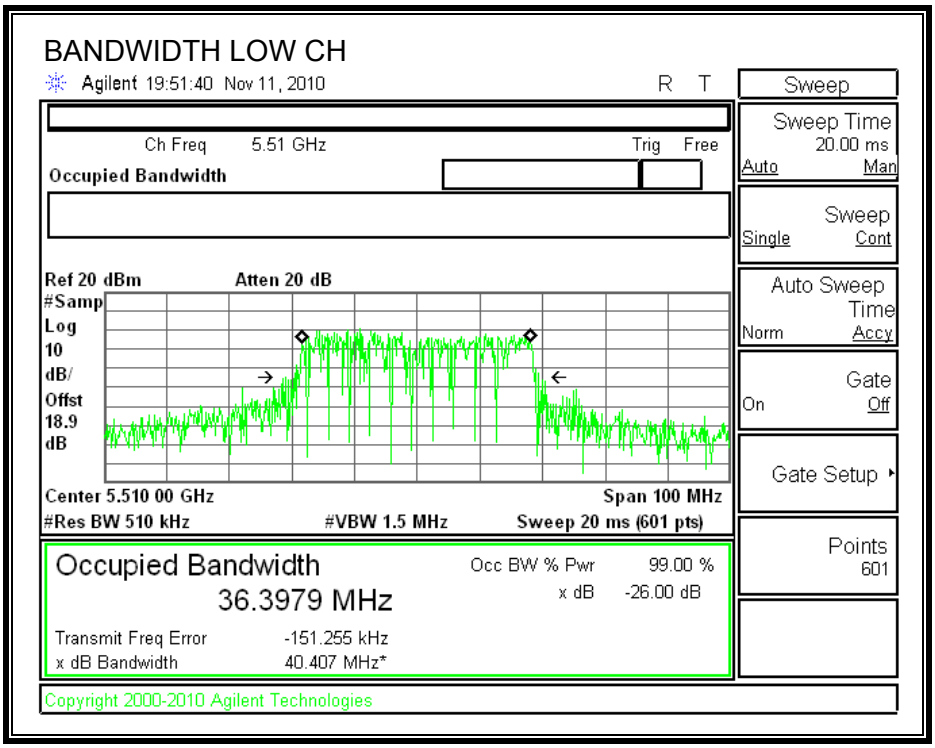


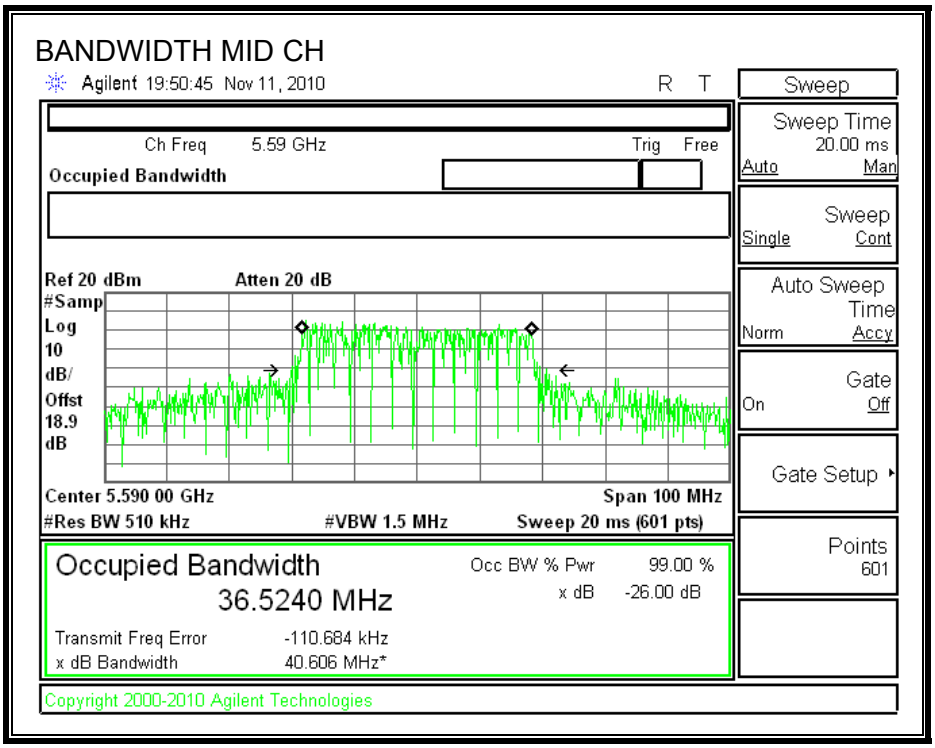


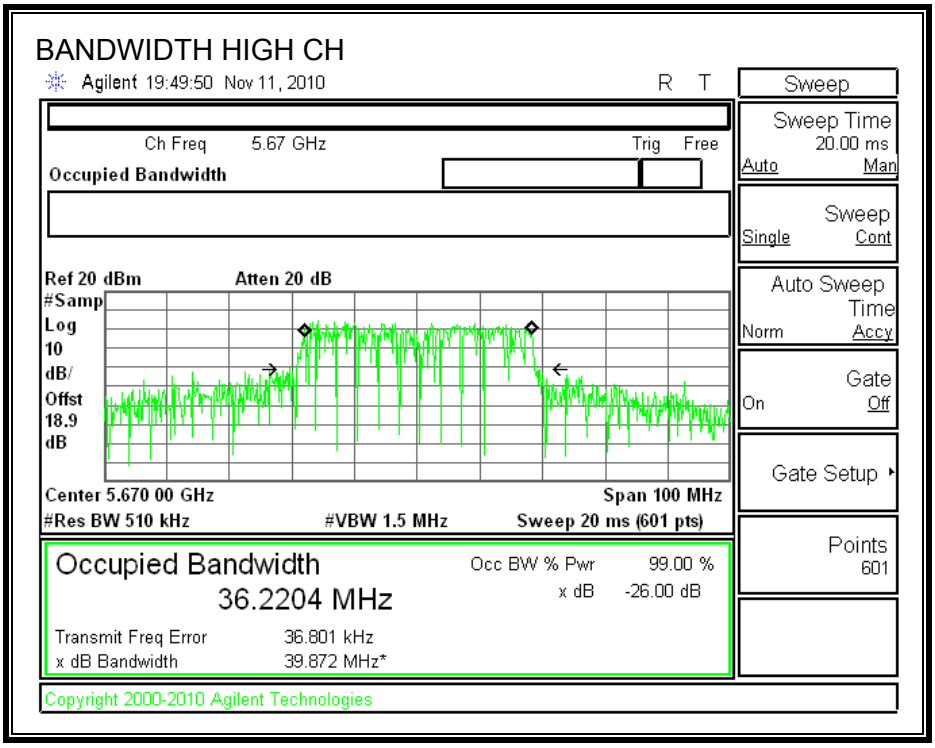


CHAIN 2

26 dB and 99% BANDWIDTH







7.9.2. 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.

The maximum antenna gain is less than 6 dBi, and the combination antenna gain is 9.22 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.
The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

NBF

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	23.98	41.371	27.17	4.88	23.98
Mid	5590	23.98	41.208	27.15	4.88	23.98
High	5670	23.98	40.509	27.08	4.88	23.98

Individual Chain Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	12.31	12.18	11.16	16.68	23.98	-7.30
Mid	5590	16.42	15.49	15.50	20.60	23.98	-3.38
High	5670	16.23	15.78	15.76	20.70	23.98	-3.28

TPC Results

TPC Delta Power		Chain 0	Chain 1	Chain 2			
		-2.10	-1.59	-2.31			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
High	5670	14.41	13.77	13.47	18.67	4.88	23.55
					TPC Limit (dBm)	24	
					Margin (dB)	-0.45	

BF

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	23.98	41.371	27.17	9.22	20.76
Mid	5590	23.98	41.208	27.15	9.22	20.76
High	5670	23.98	40.509	27.08	9.22	20.76

Individual Chain Results

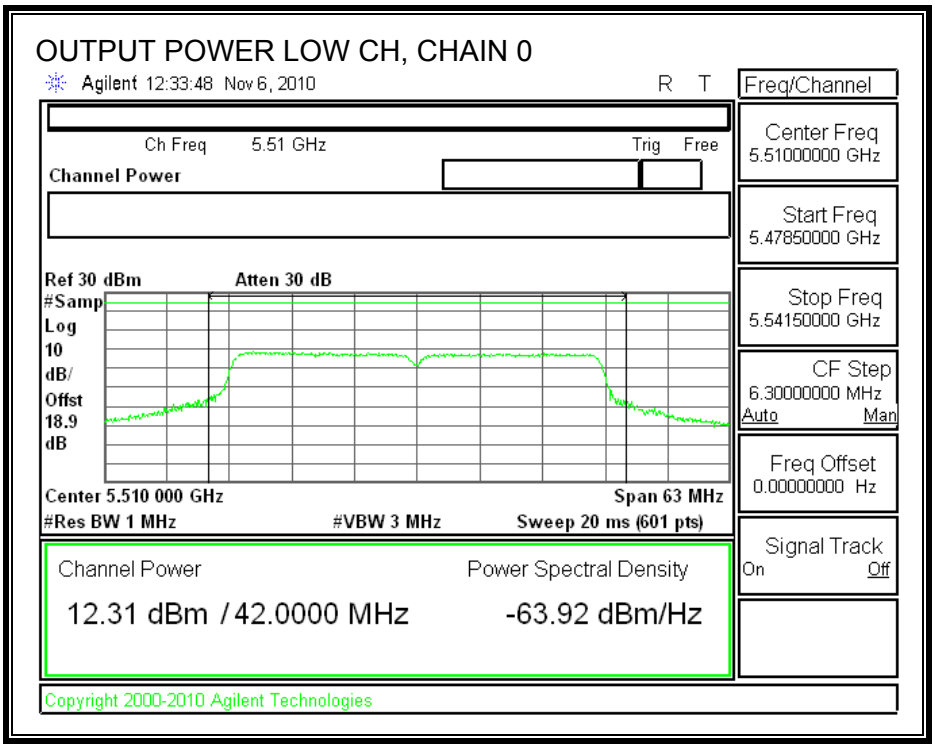
Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	12.31	12.18	11.16	16.68	20.76	-4.08
Mid	5590	16.42	15.49	15.50	20.60	20.76	-0.16
High	5670	16.23	15.78	15.76	20.70	20.76	-0.06

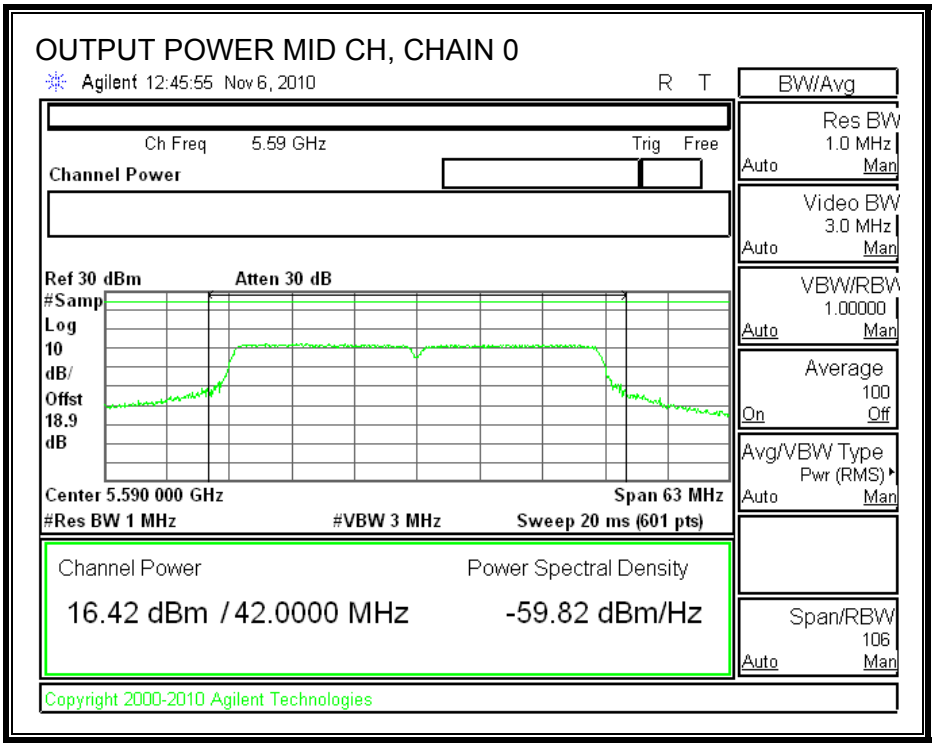
TPC Results

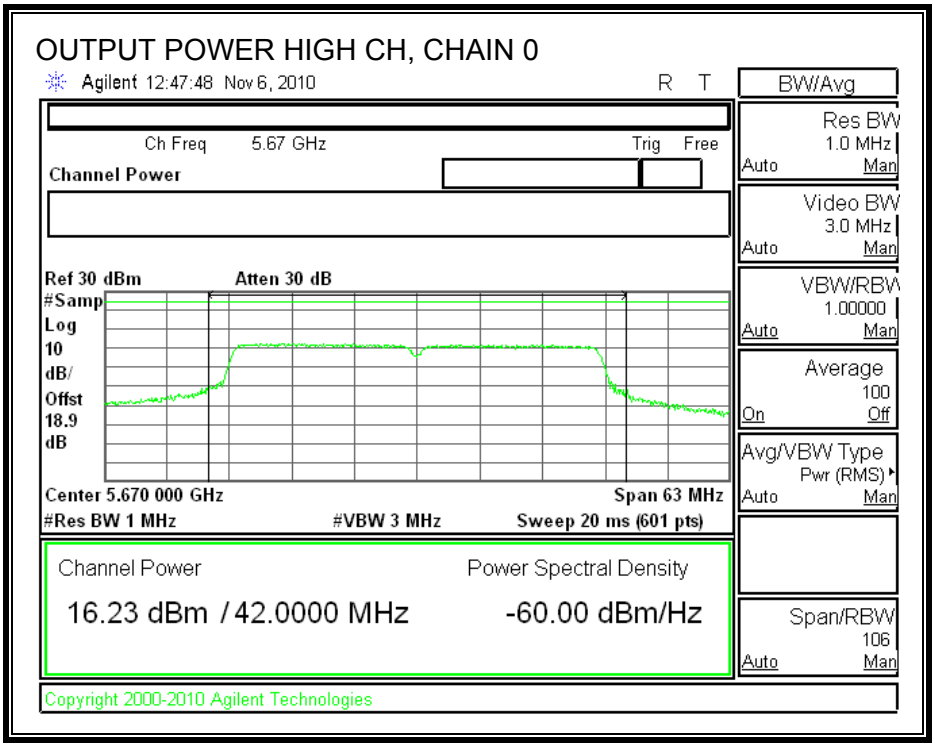
TPC Delta Power		Chain 0	Chain 1	Chain 2			
		2.16	2.16	2.36			
Worst-case TPC Power		Chain 0	Chain 1	Chain 2	Total Power	Ant Gain	EIRP
High	5670	10.15	10.02	8.80	14.47	9.22	23.69
					TPC Limit (dBm)	24	
					Margin (dB)	-0.31	

NBF

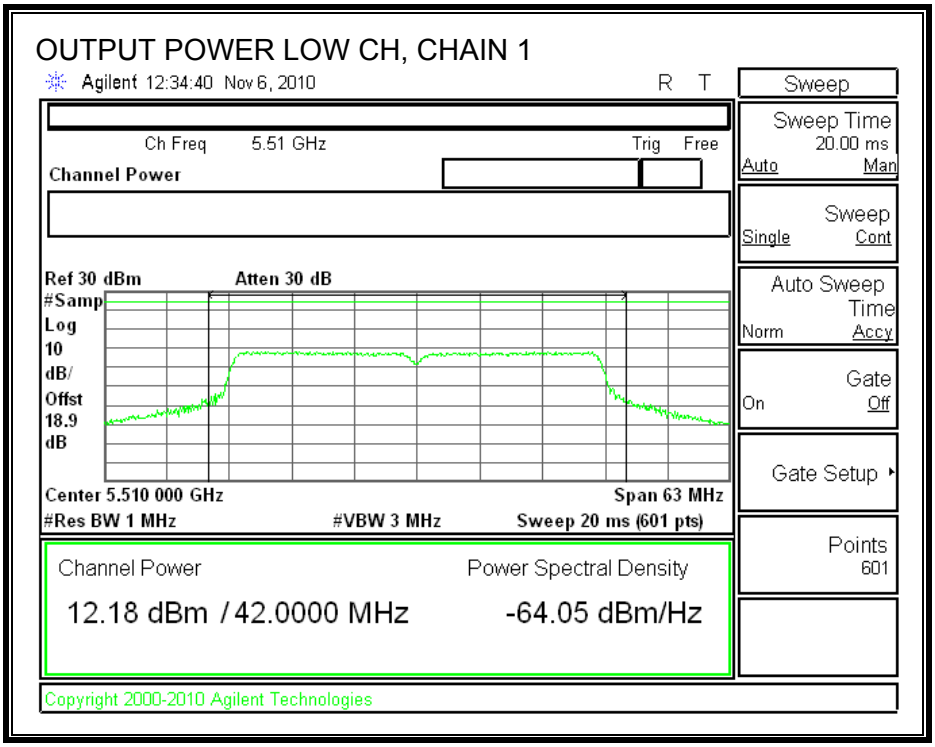
CHAIN 0 OUTPUT POWER



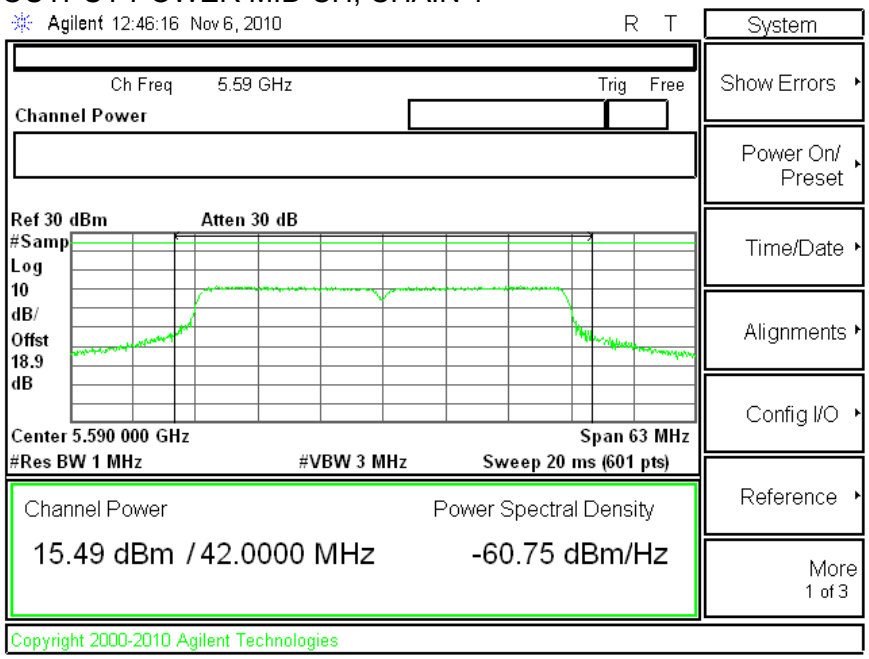




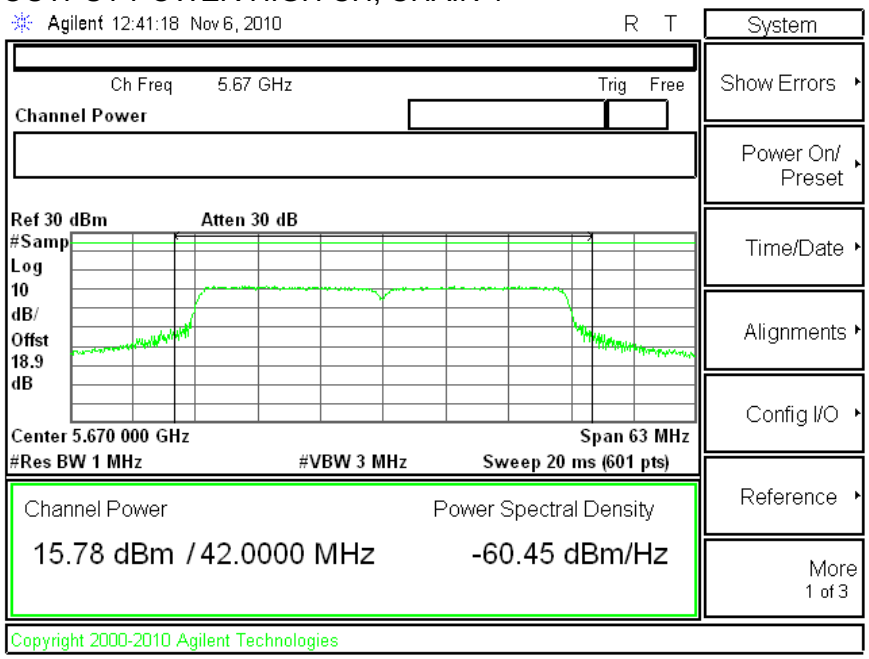
CHAIN 1 OUTPUT POWER



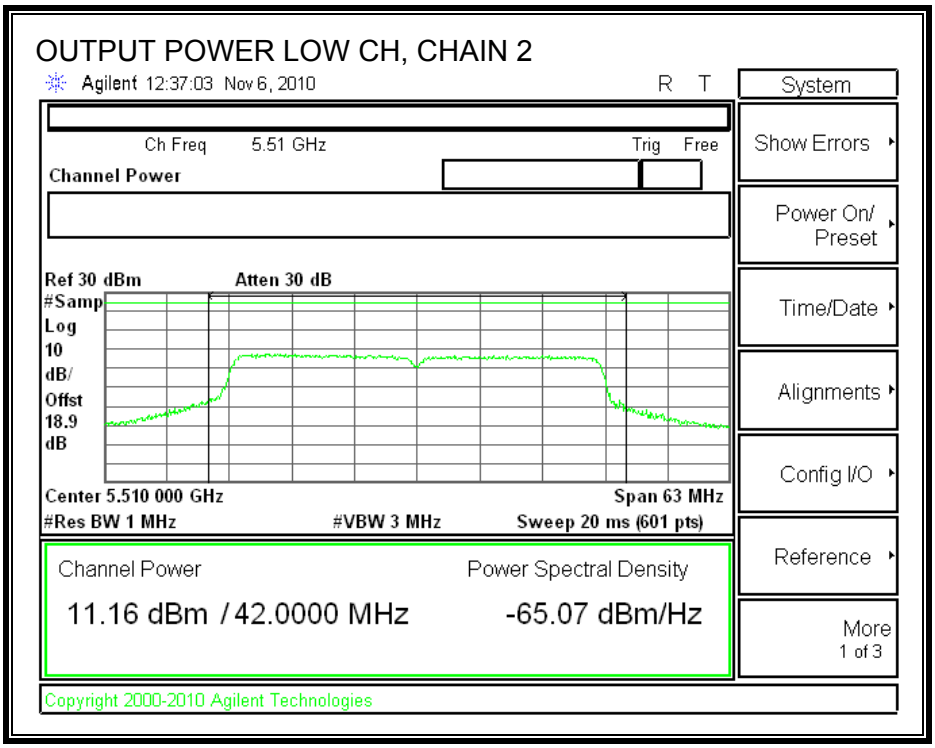
OUTPUT POWER MID CH, CHAIN 1

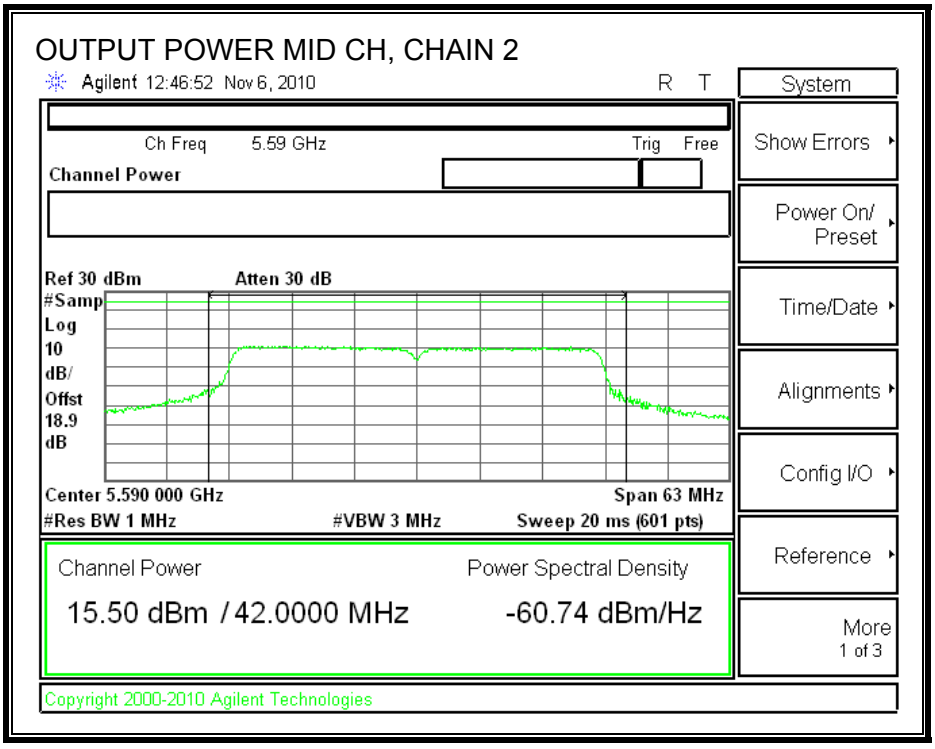


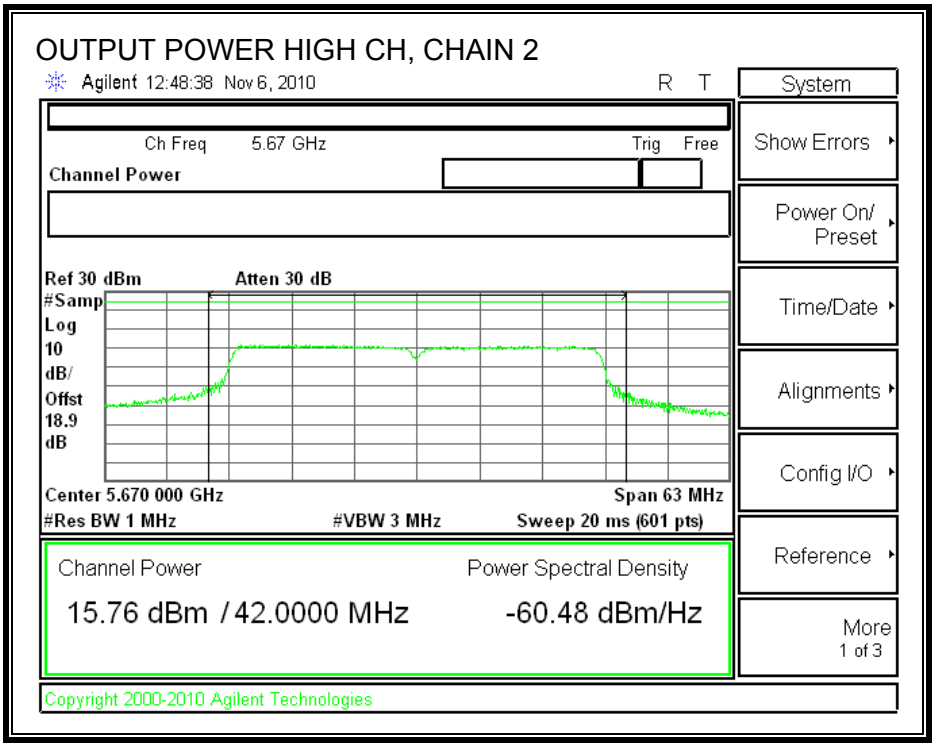
OUTPUT POWER HIGH CH, CHAIN 1



CHAIN 2 OUTPUT POWER

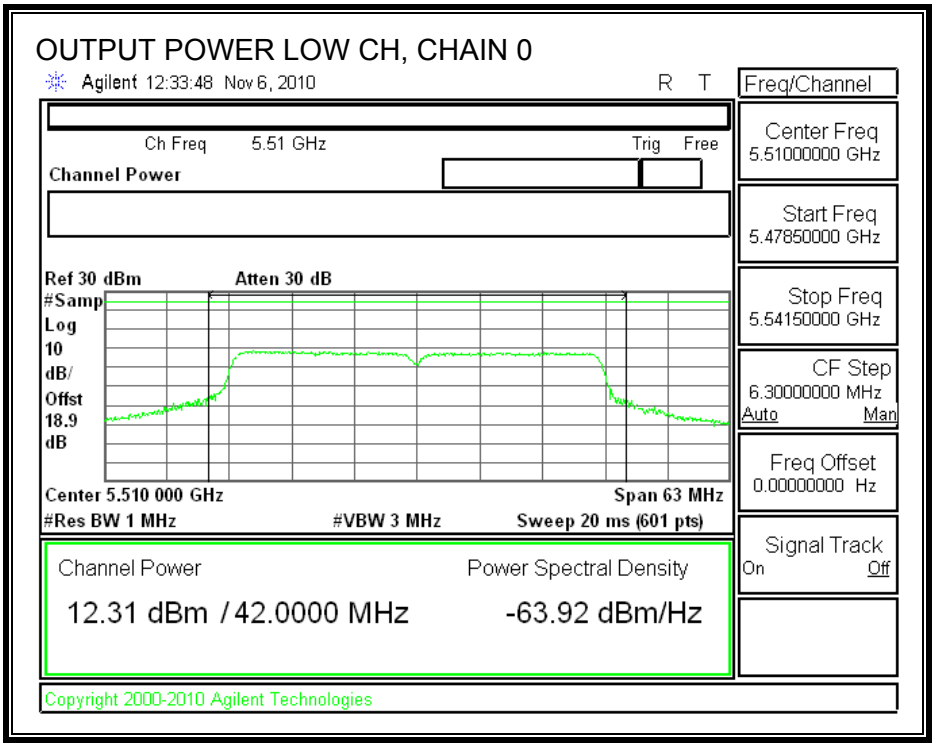


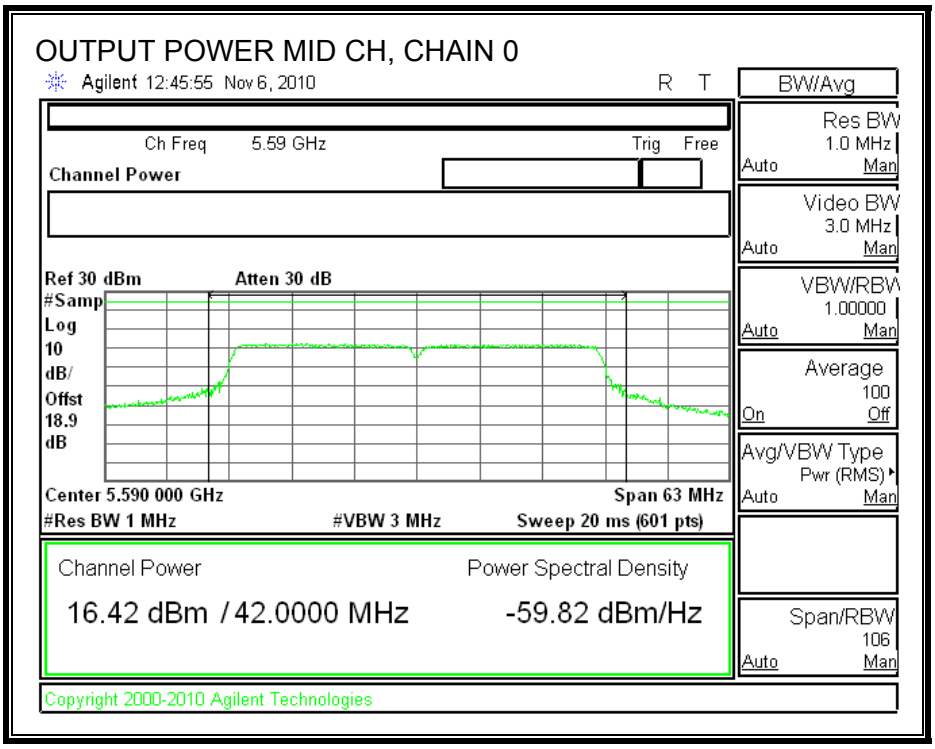


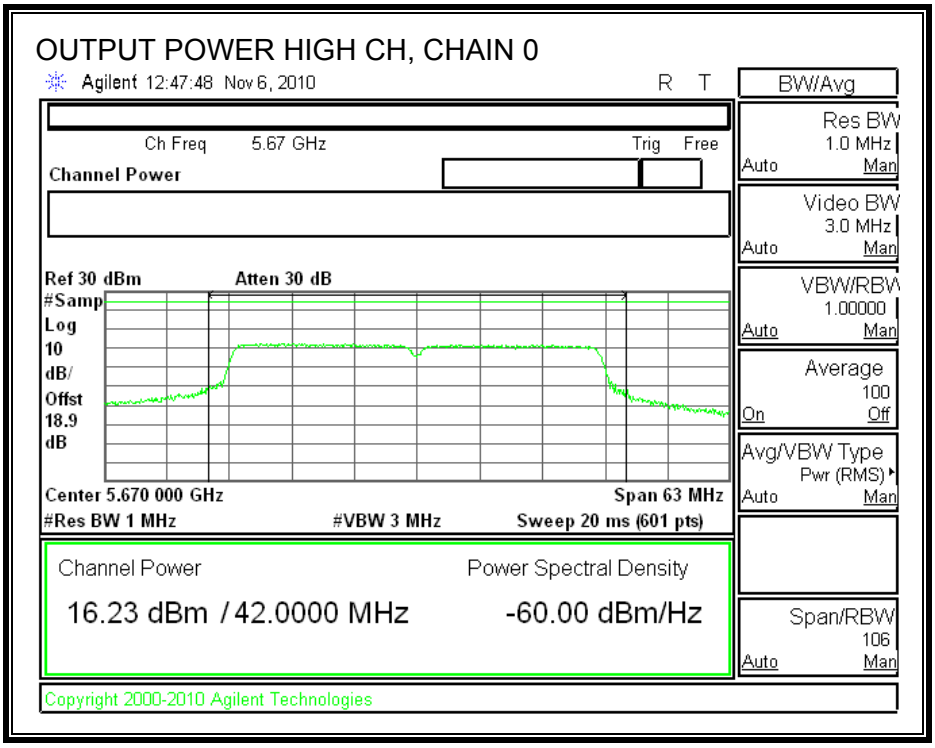


BF

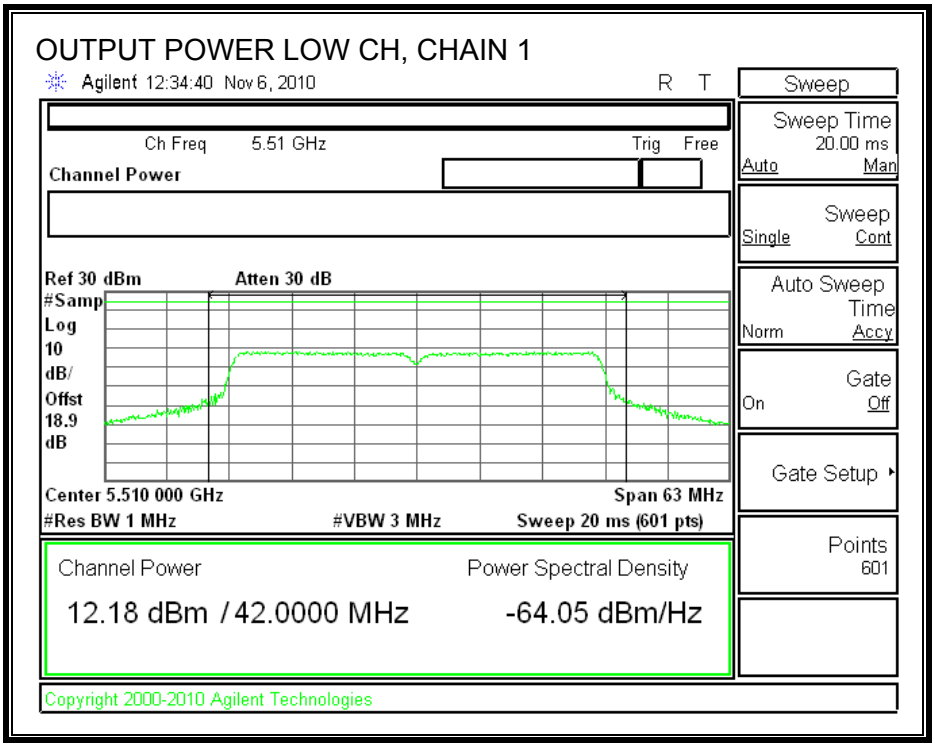
CHAIN 0 OUTPUT POWER



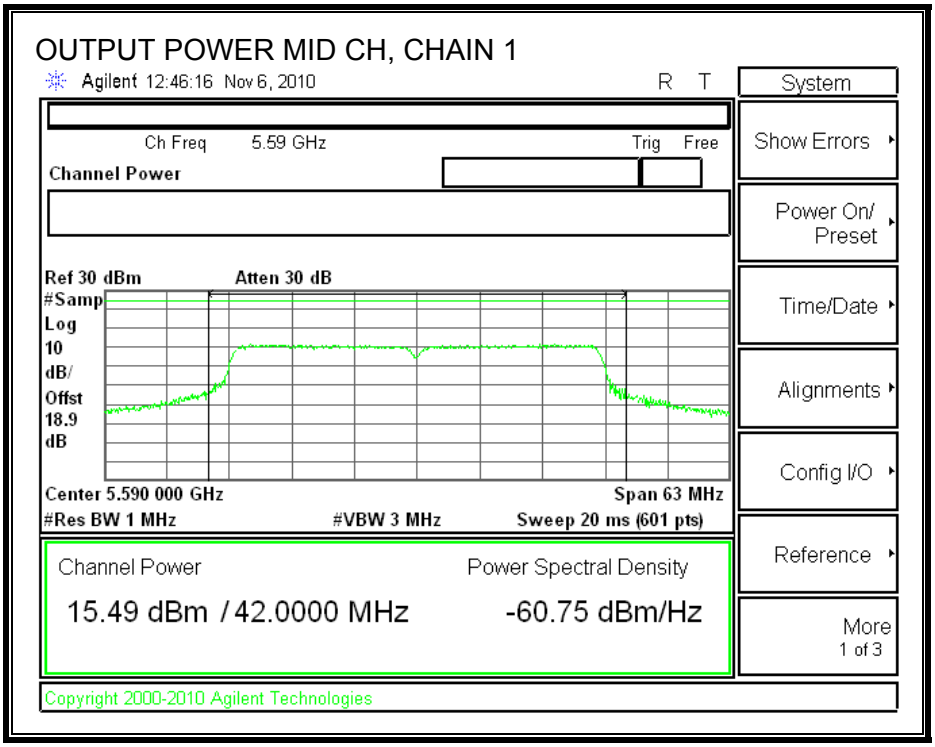




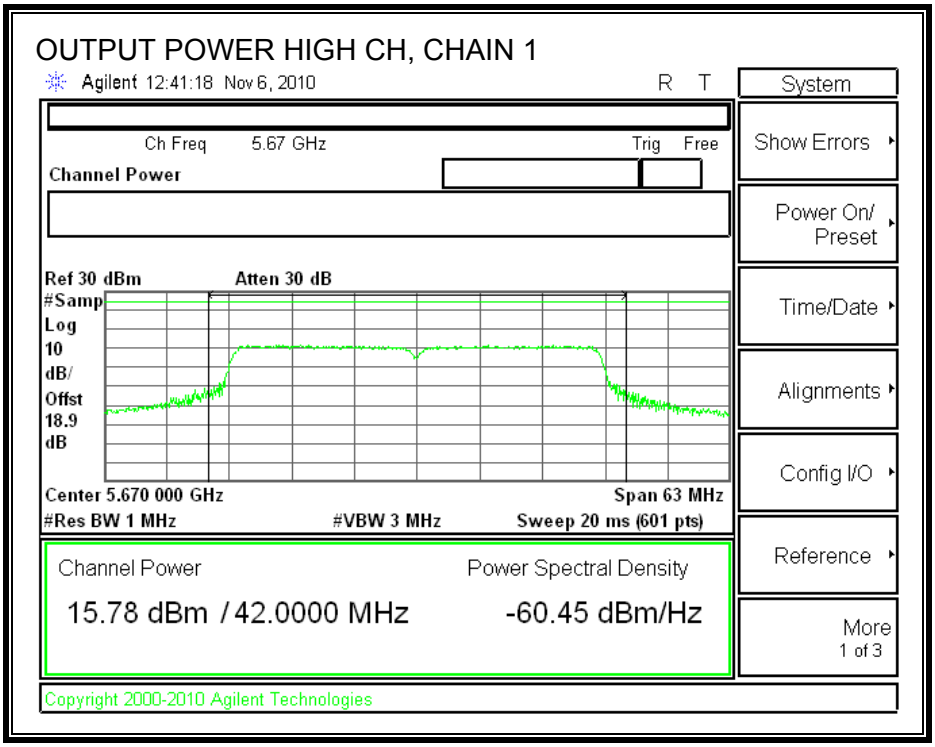
CHAIN 1 OUTPUT POWER



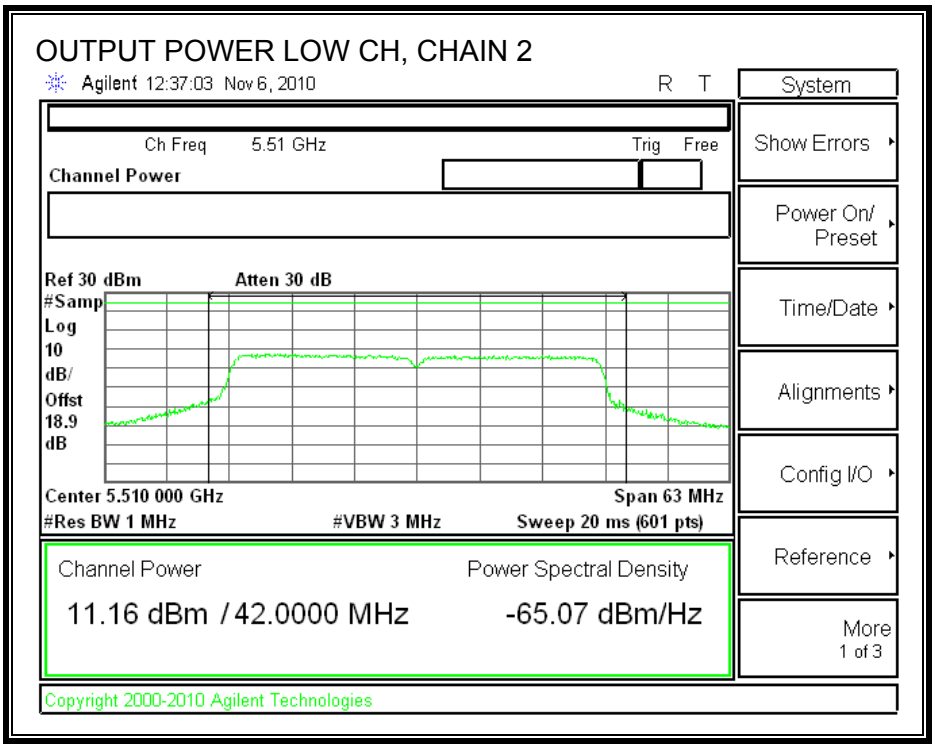
OUTPUT POWER MID CH, CHAIN 1

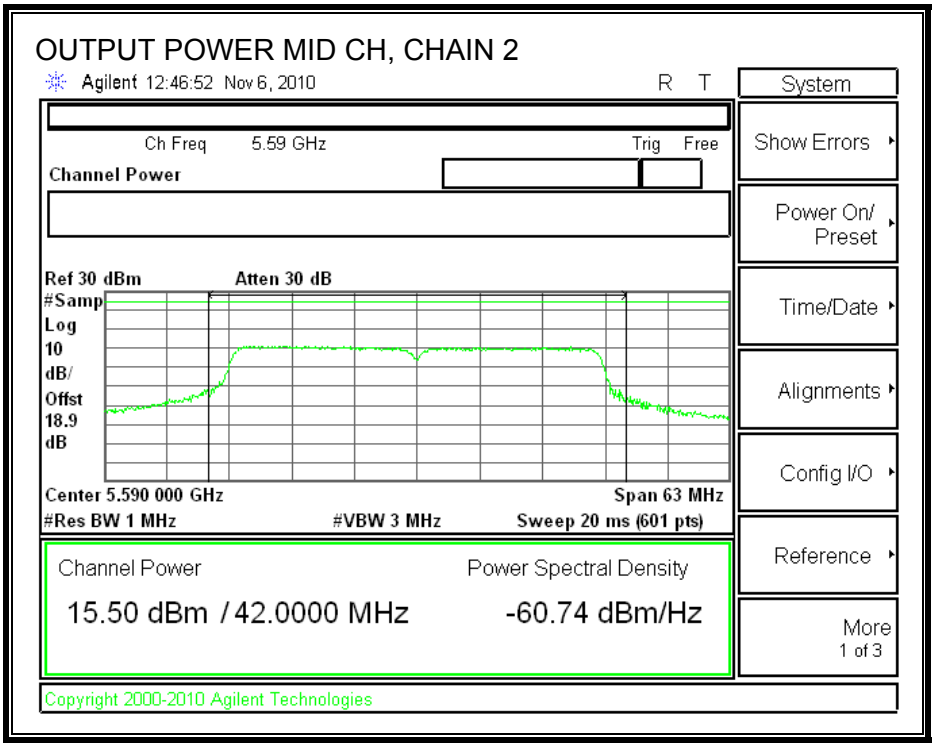


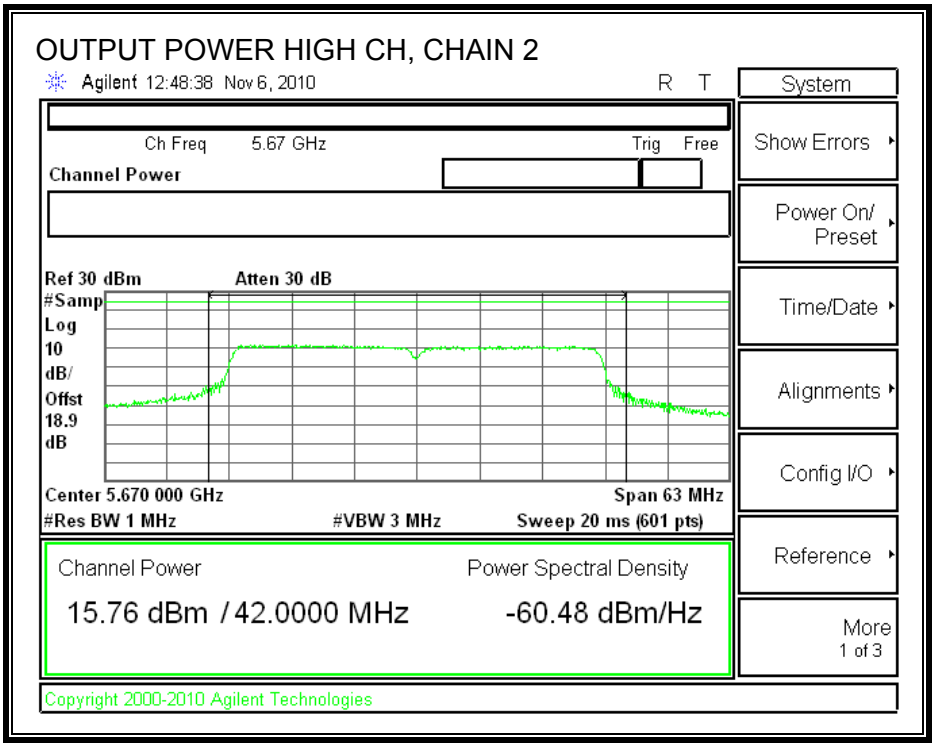
OUTPUT POWER HIGH CH, CHAIN 1



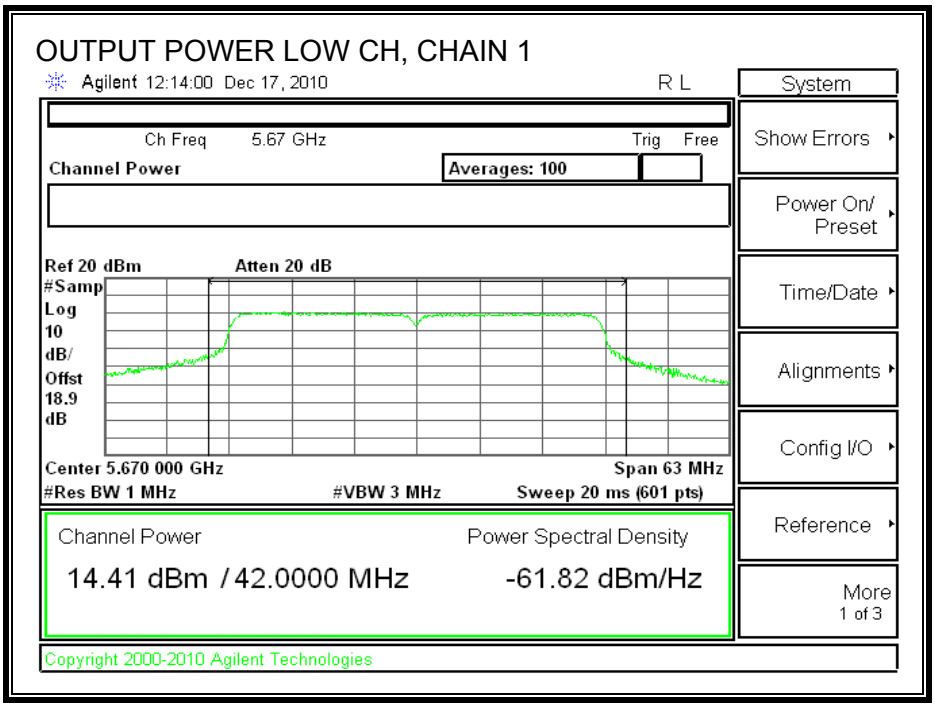
CHAIN 2 OUTPUT POWER

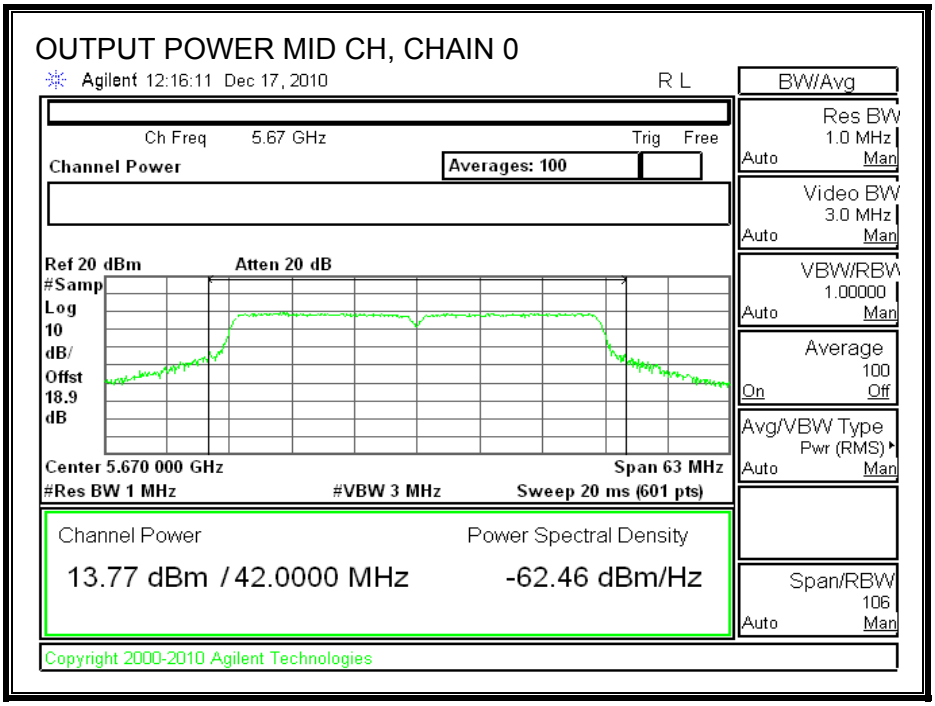


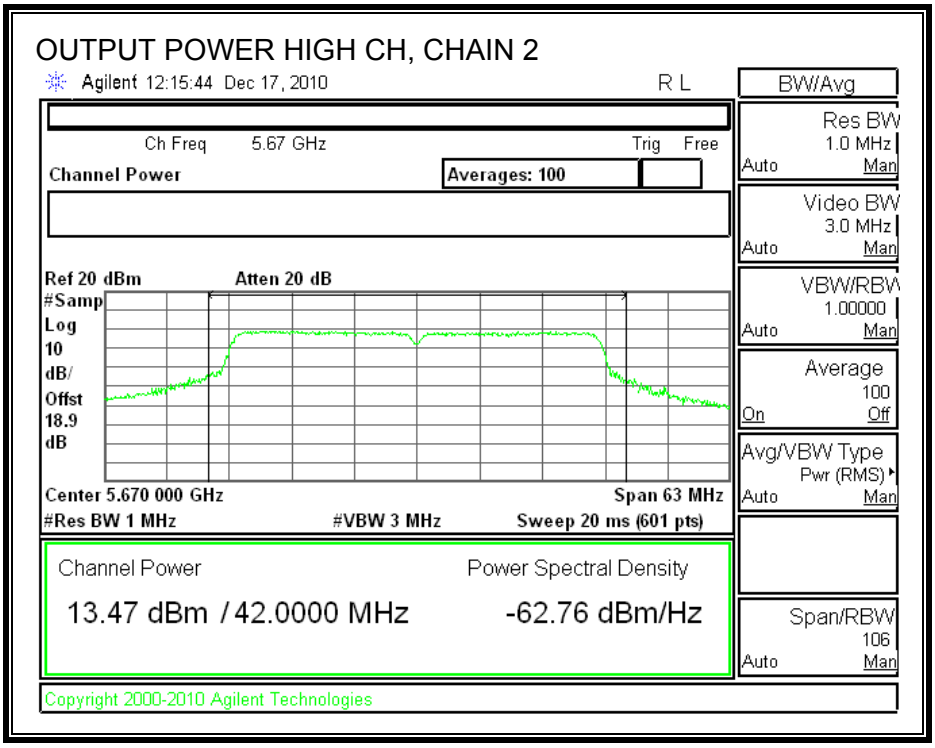




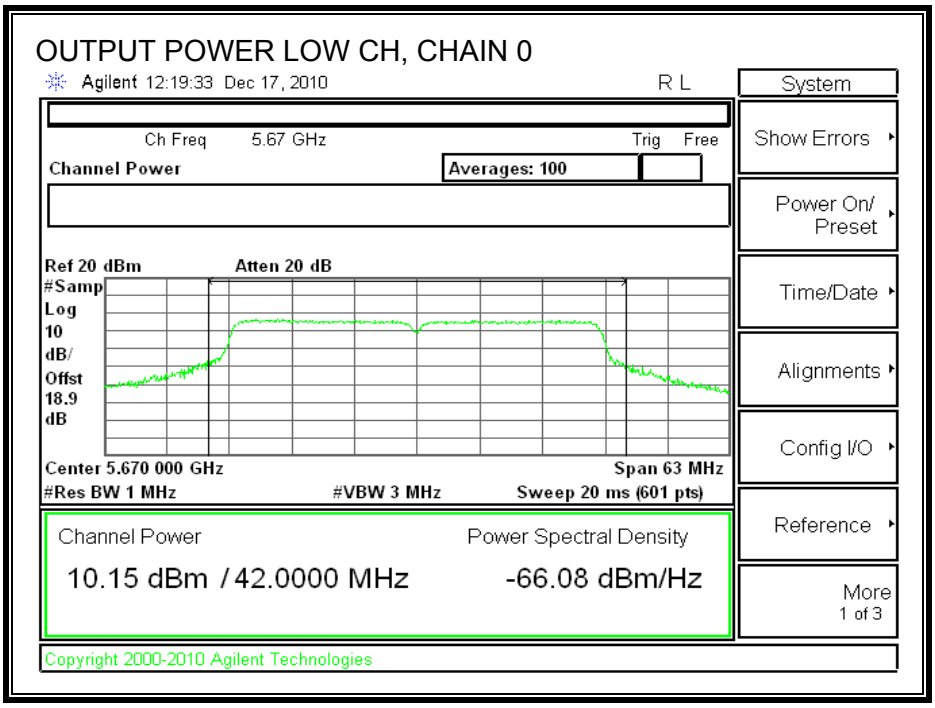
OUTPUT POWER WITH TPC AT NON-BEAM FORMING (WORST CASE)

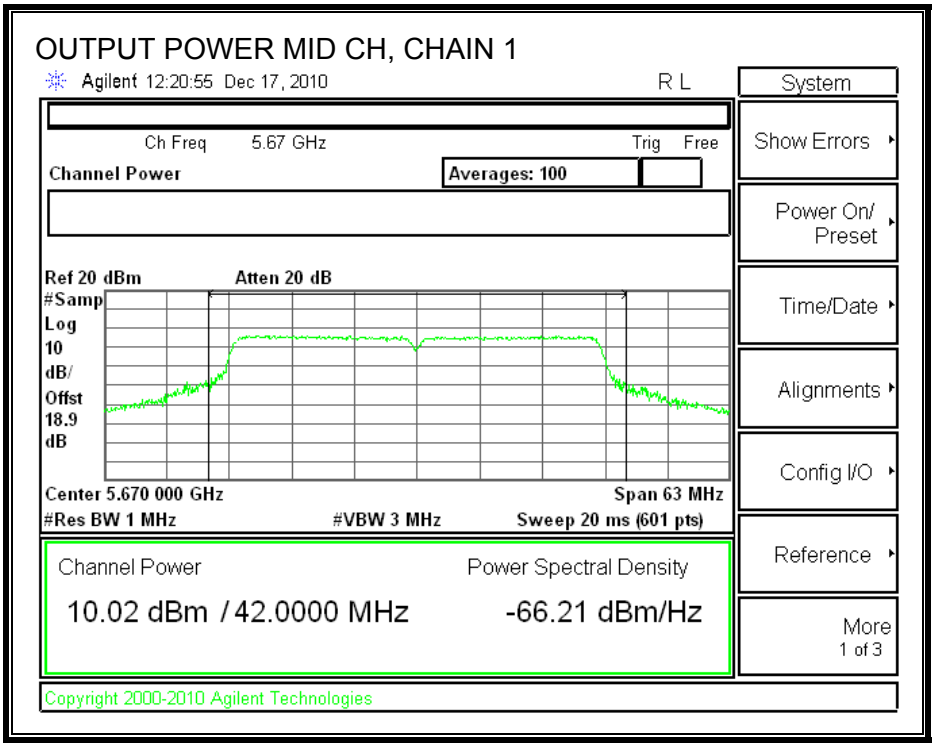


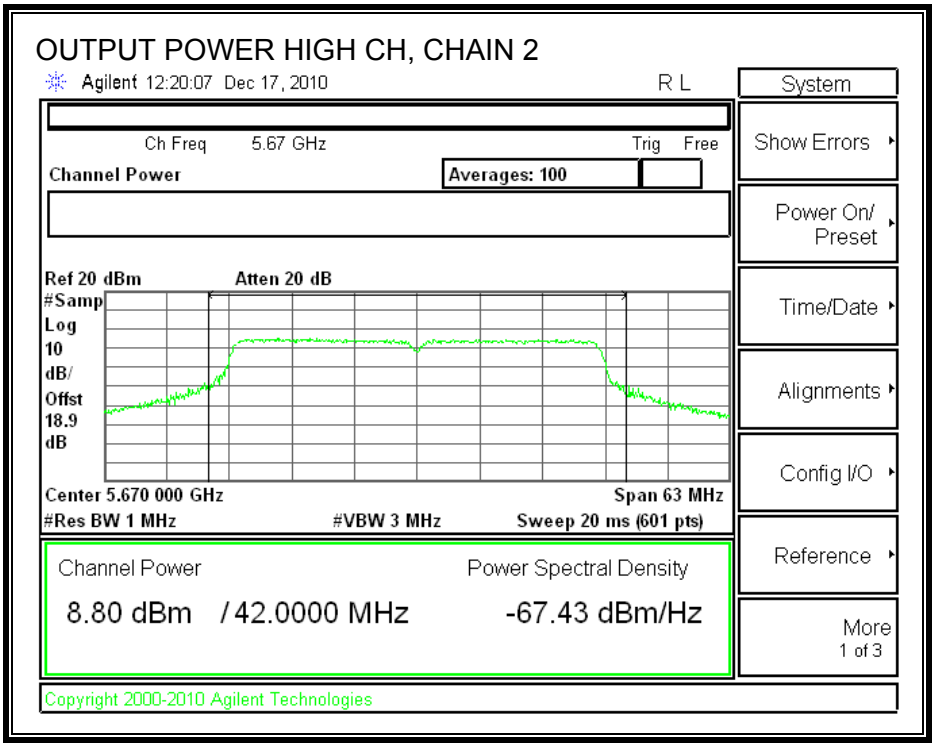




OUTPUT POWER WITH TPC AT BEAM FORMING (WORST CASE)







7.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 18.9 dB was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Non Beam-Forming

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5510	12.25	12.10	11.05	16.60
Middle	5590	15.45	15.40	15.40	20.19
High	5670	16.20	15.70	15.70	20.64

Beam-Forming

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5510	12.25	12.10	11.05	16.60
Middle	5590	15.45	15.40	15.40	20.19
High	5670	16.20	15.70	15.70	20.64

7.9.4. 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 less than 6 dBi, therefore the limit is 11 dBm.

The combination antenna gain is 9.22 dBi, therefore the limit is 7.78 dBm.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

RESULTS

Non Beam-Forming

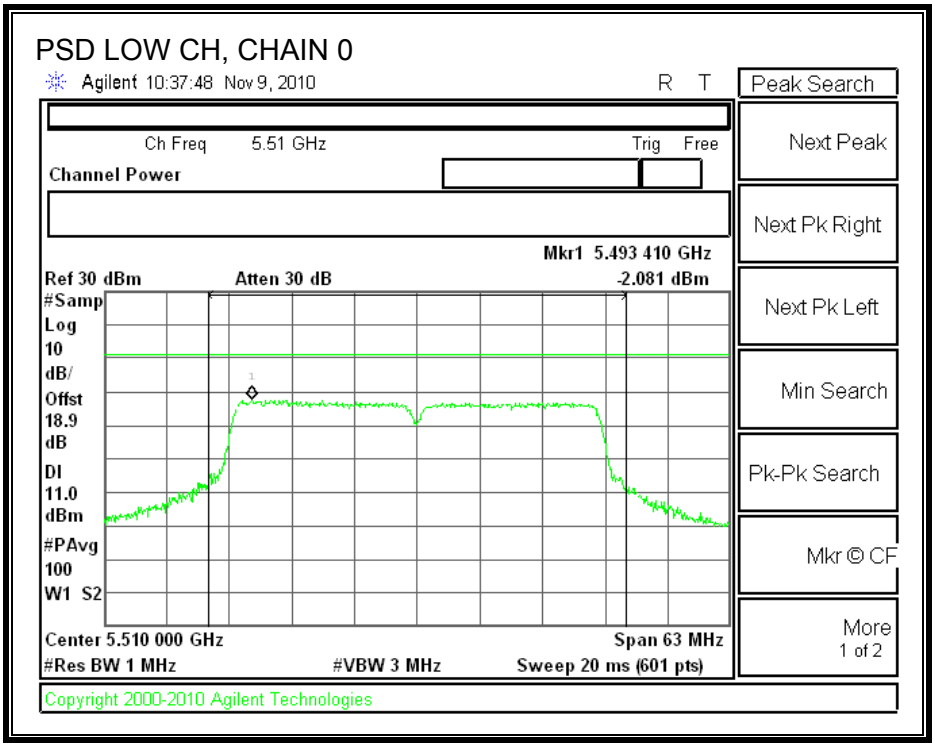
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5510	-2.081	-2.676	-3.182	2.1	11.00	-8.85
Middle	5590	3.469	2.908	1.958	7.6	11.00	-3.41
High	5670	3.098	1.718	1.841	7.0	11.00	-3.96

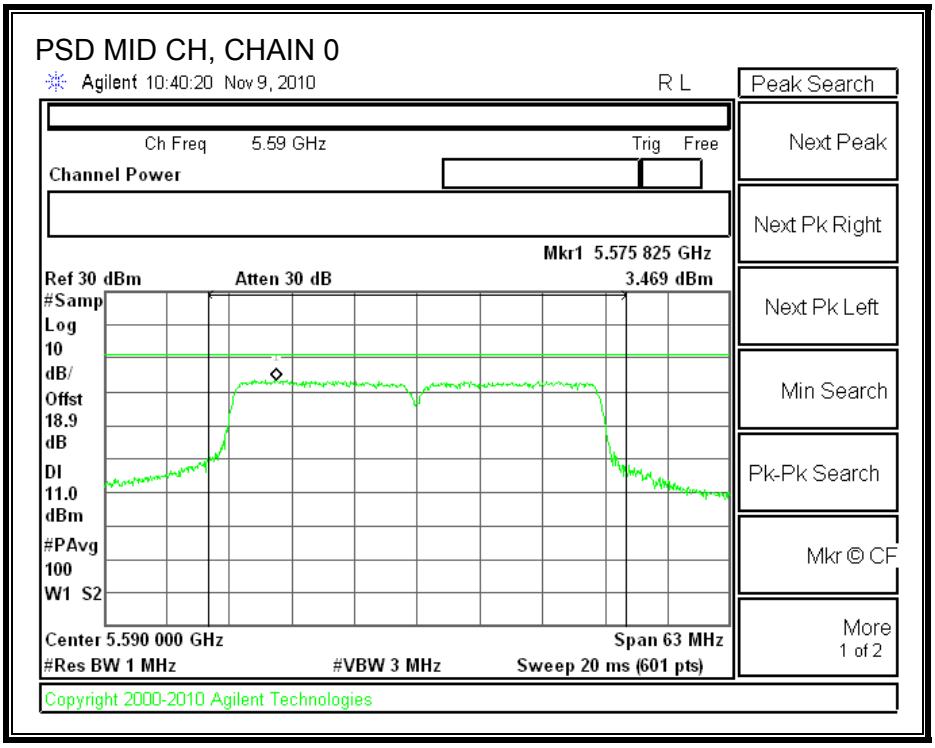
Beam-Forming

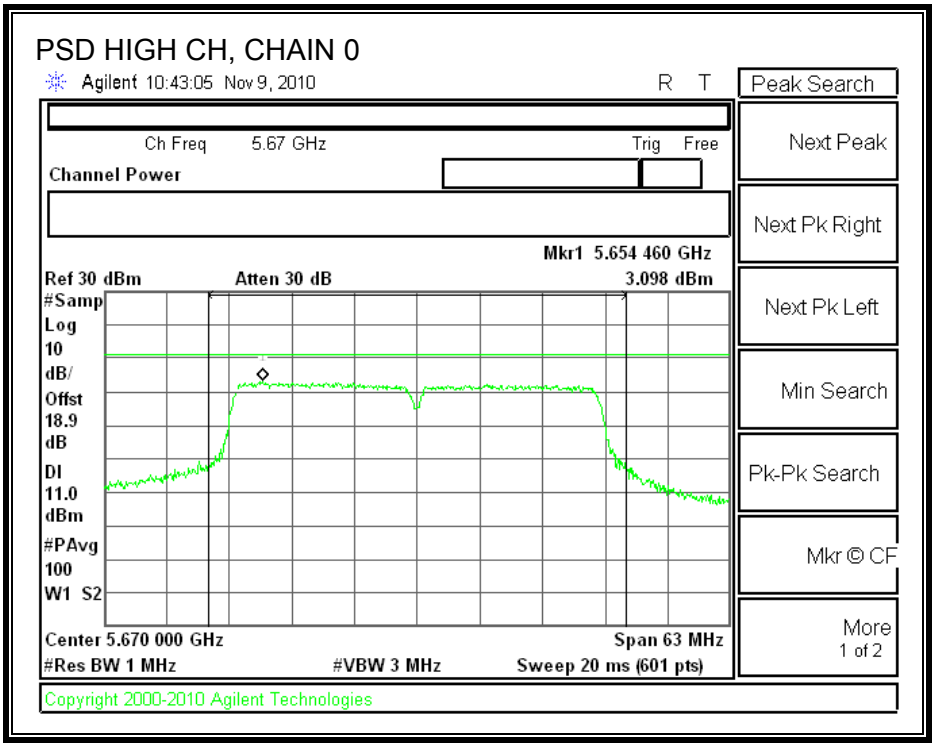
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	Total (dBm)	Limit (dBm)	Margin (dB)
Low	5510	-2.081	-2.676	-3.182	2.1	7.78	-5.63
Middle	5590	3.469	2.908	1.958	7.6	7.78	-0.19
High	5670	3.098	1.718	1.841	7.0	7.78	-0.74

NBF

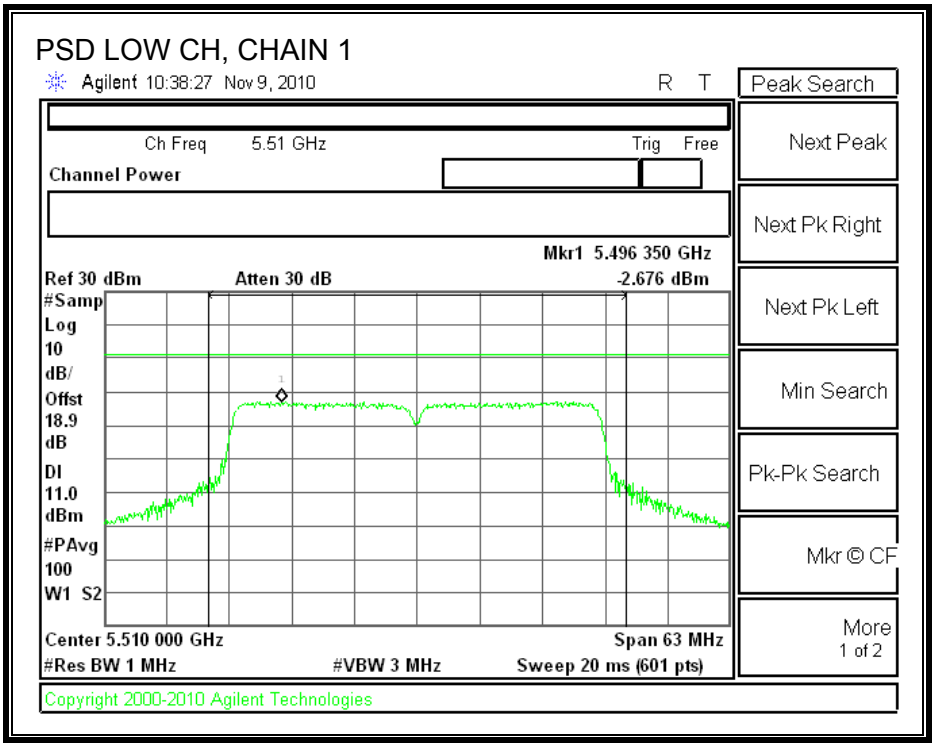
CHAIN 0 POWER SPECTRAL DENSITY



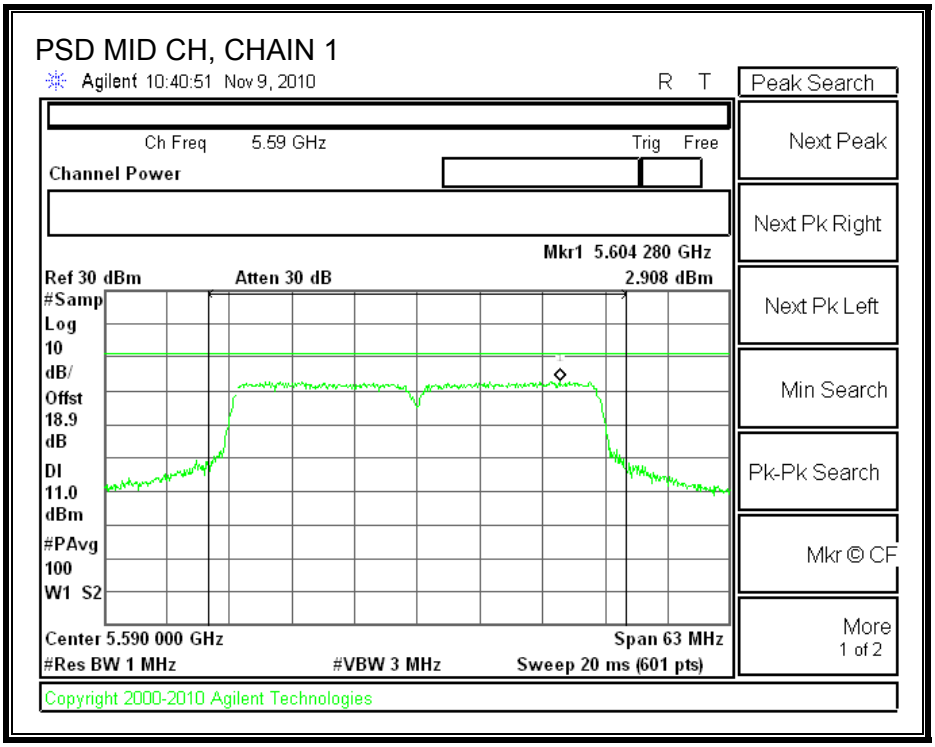




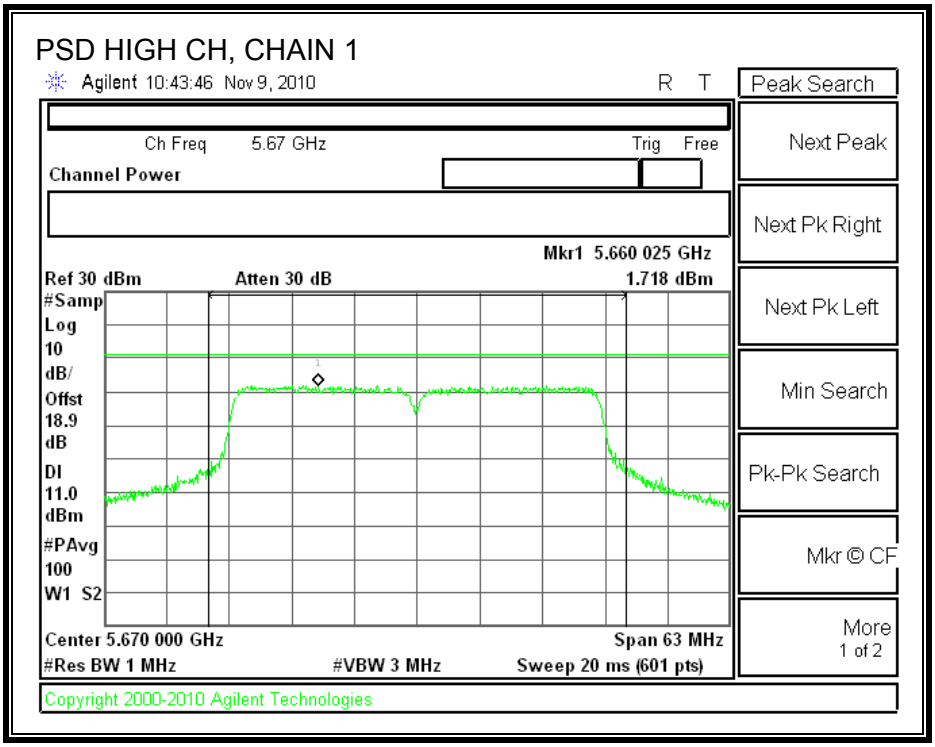
CHAIN 1 POWER SPECTRAL DENSITY



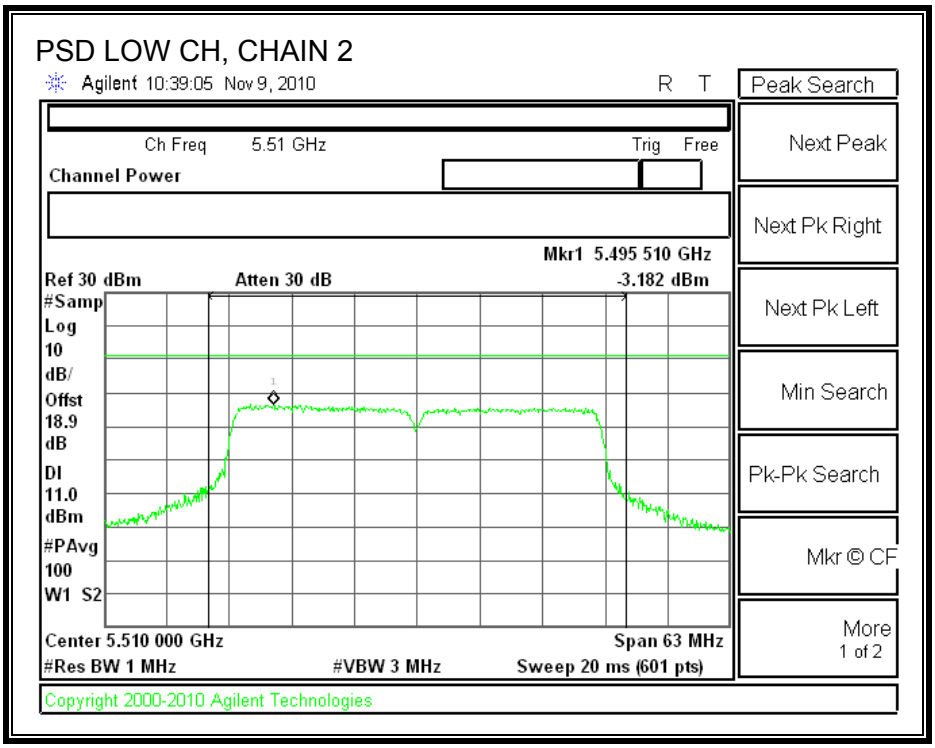
PSD MID CH, CHAIN 1

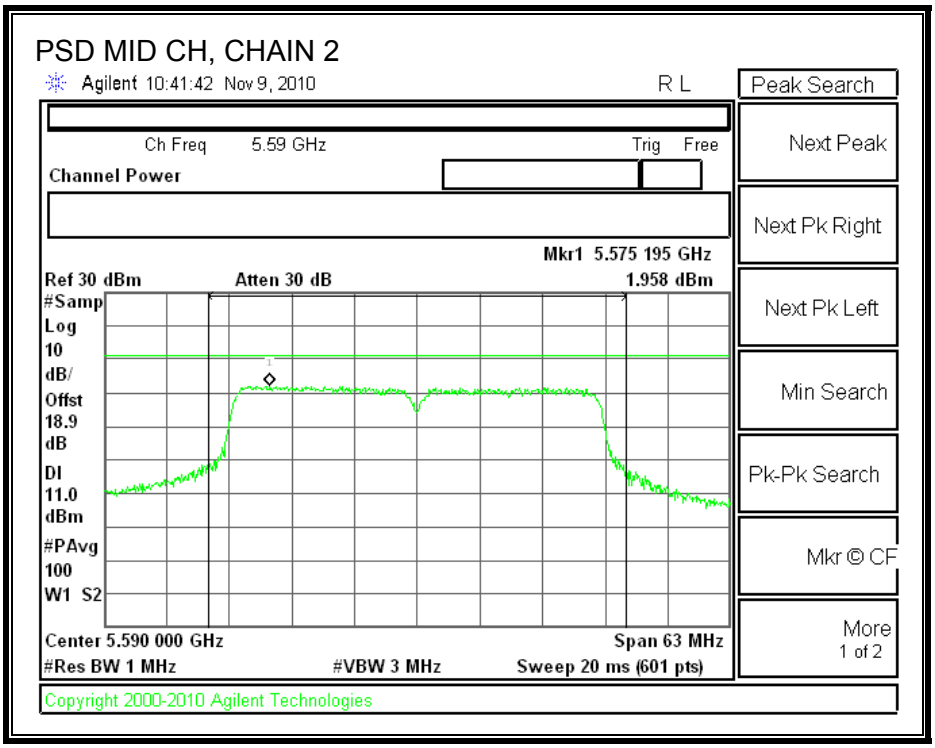


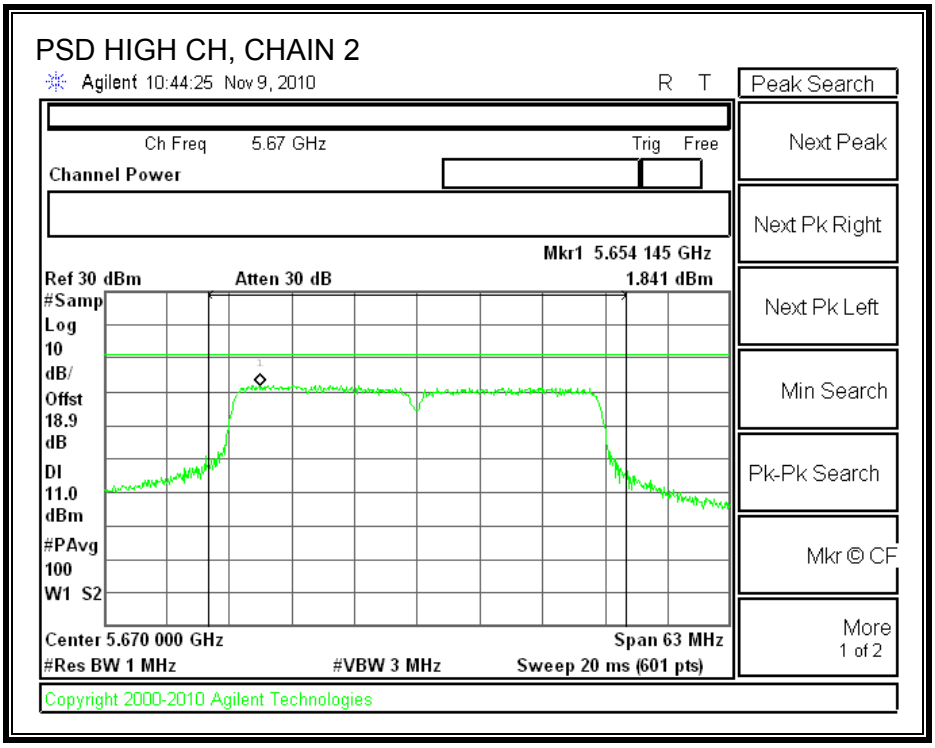
PSD HIGH CH, CHAIN 1



CHAIN 2 POWER SPECTRAL DENSITY

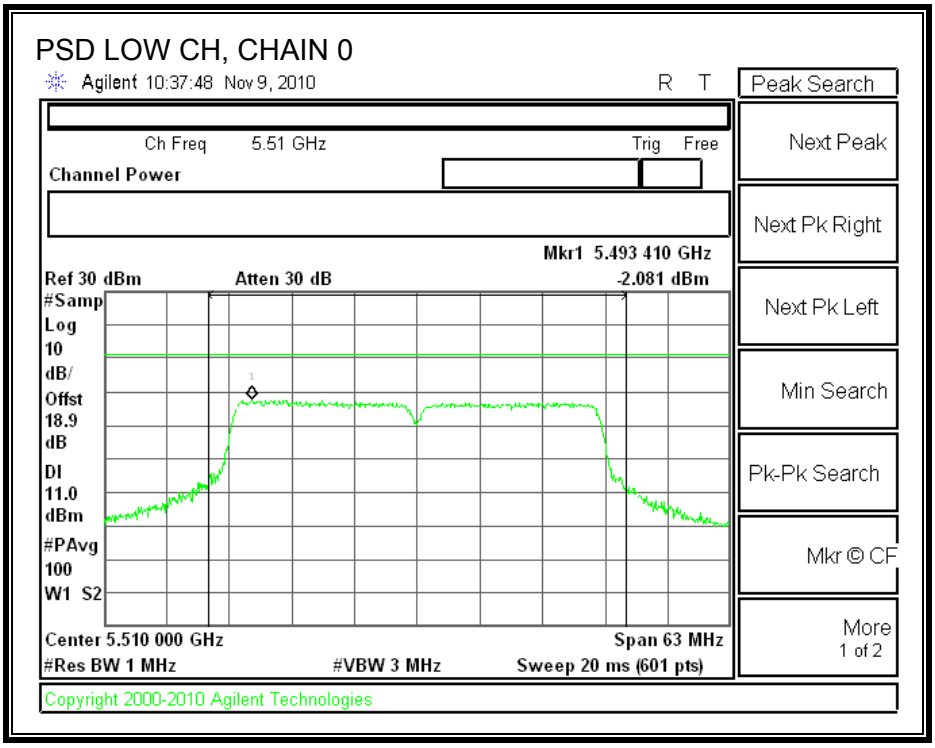


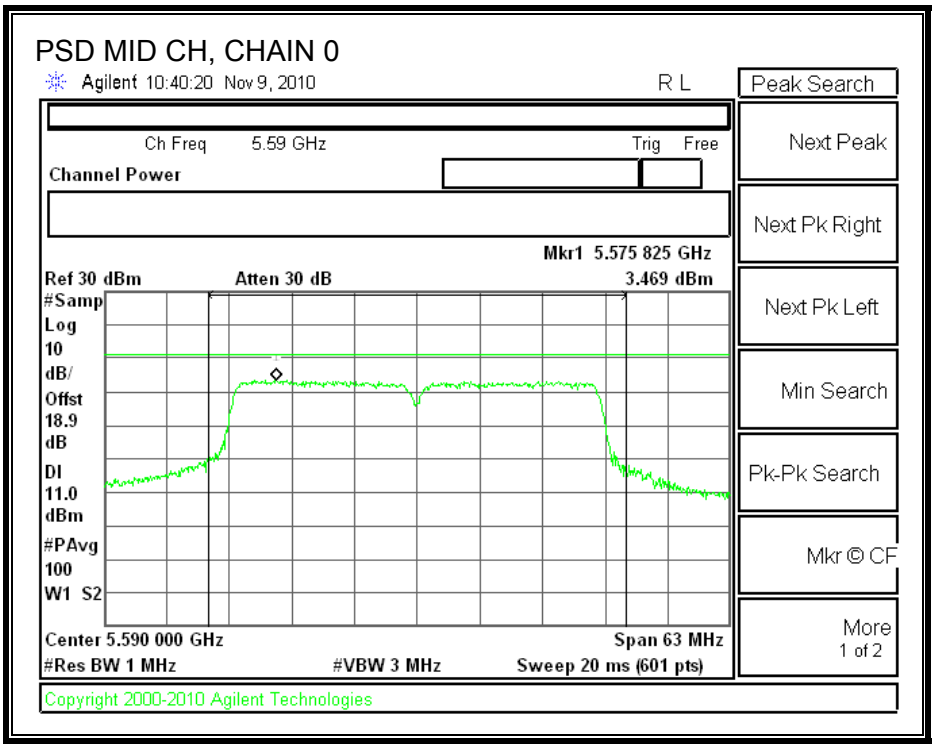


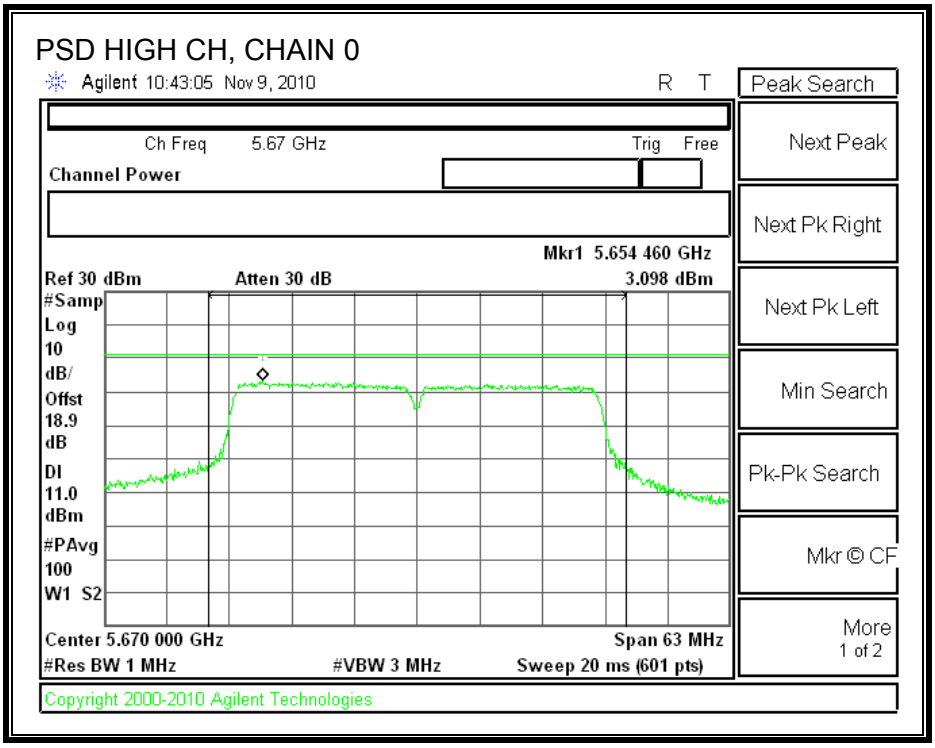


BF

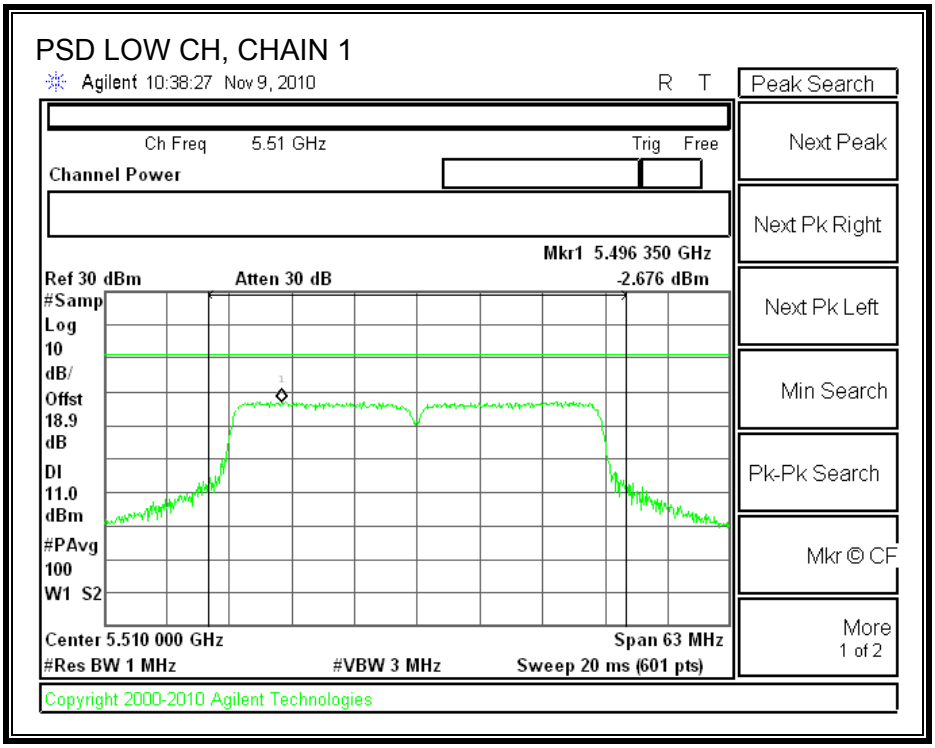
CHAIN 0 POWER SPECTRAL DENSITY



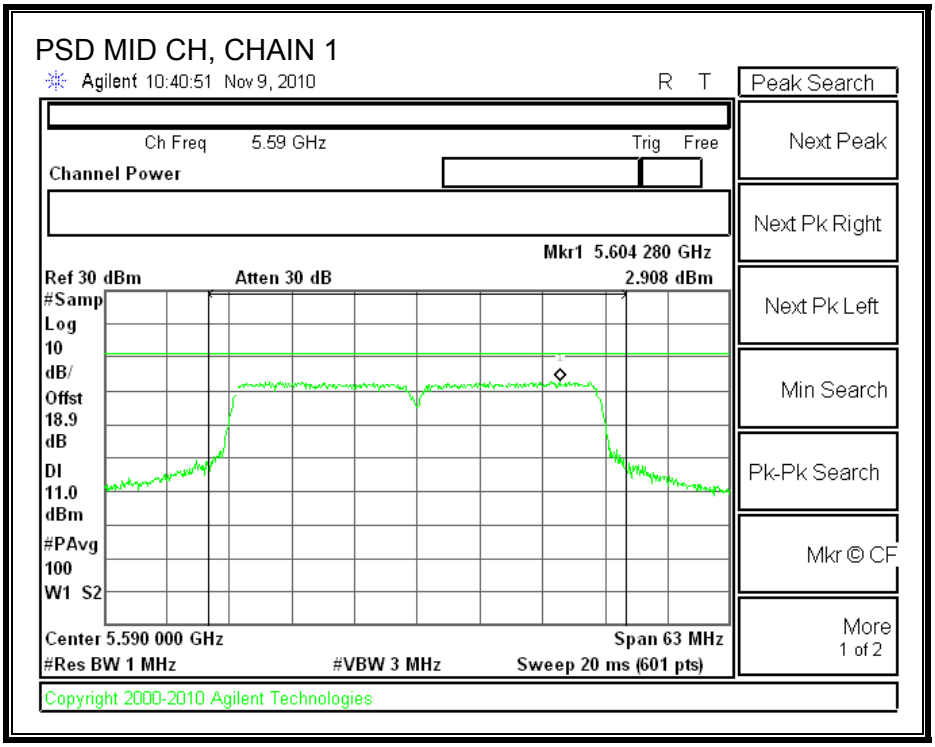




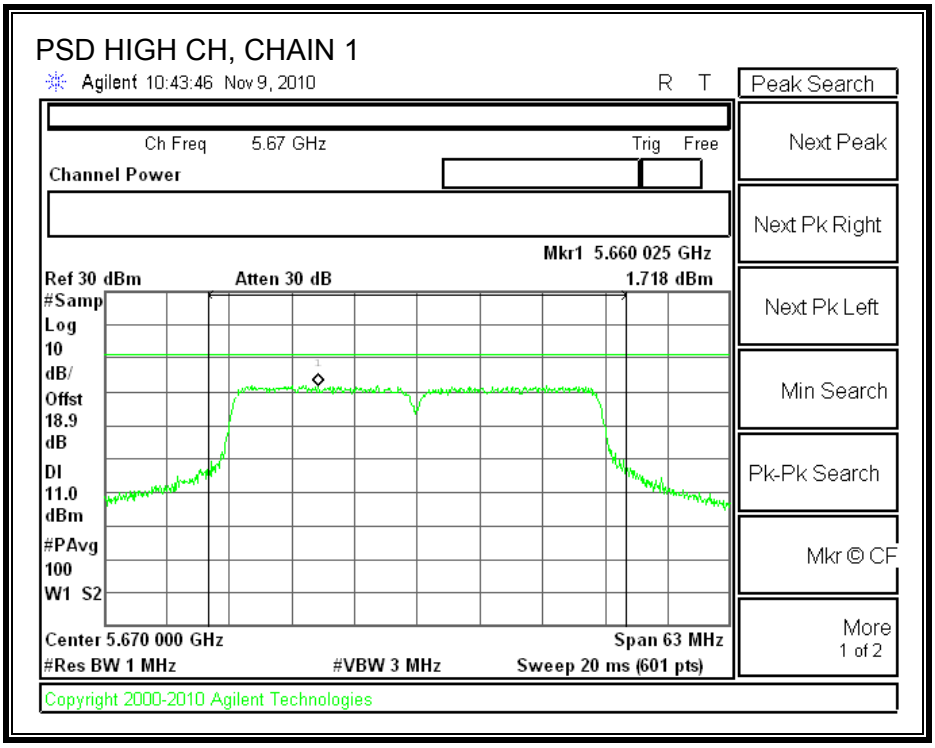
CHAIN 1 POWER SPECTRAL DENSITY



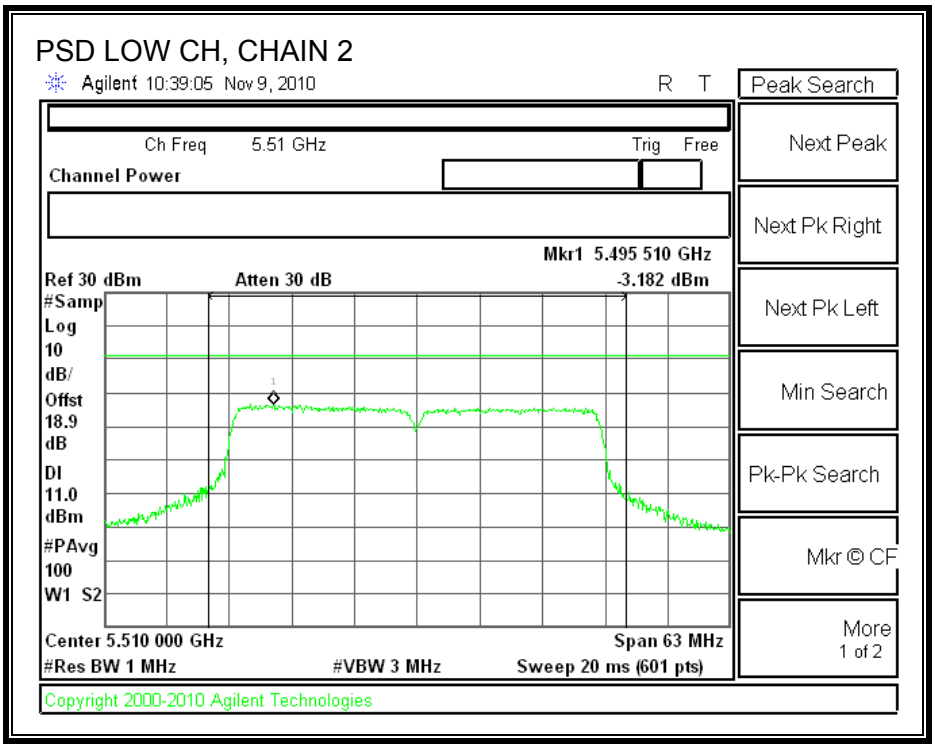
PSD MID CH, CHAIN 1

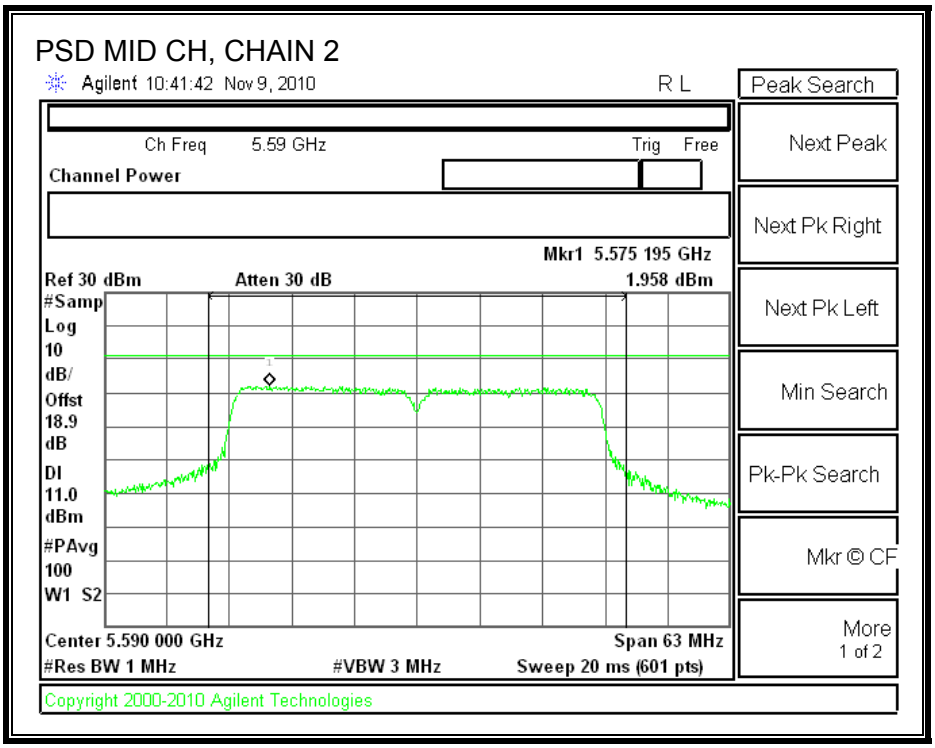


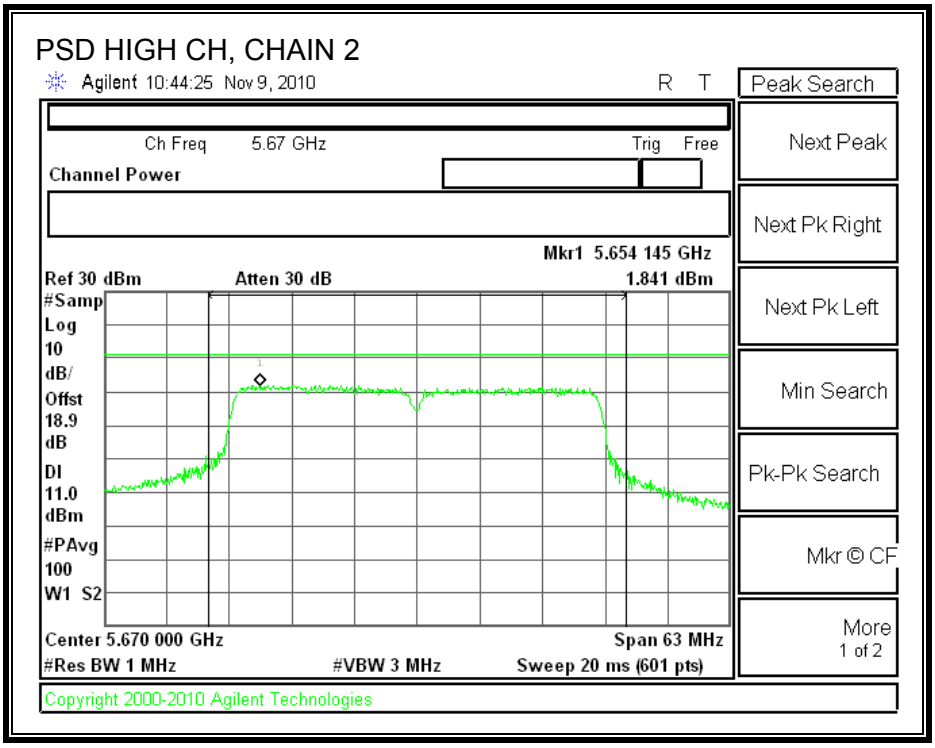
PSD HIGH CH, CHAIN 1



CHAIN 2 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

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

RESULTS

CHAIN 0

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	8.31	13	-4.69
Middle	5590	9.26	13	-3.74
High	5670	9.02	13	-3.98

CHAIN 1

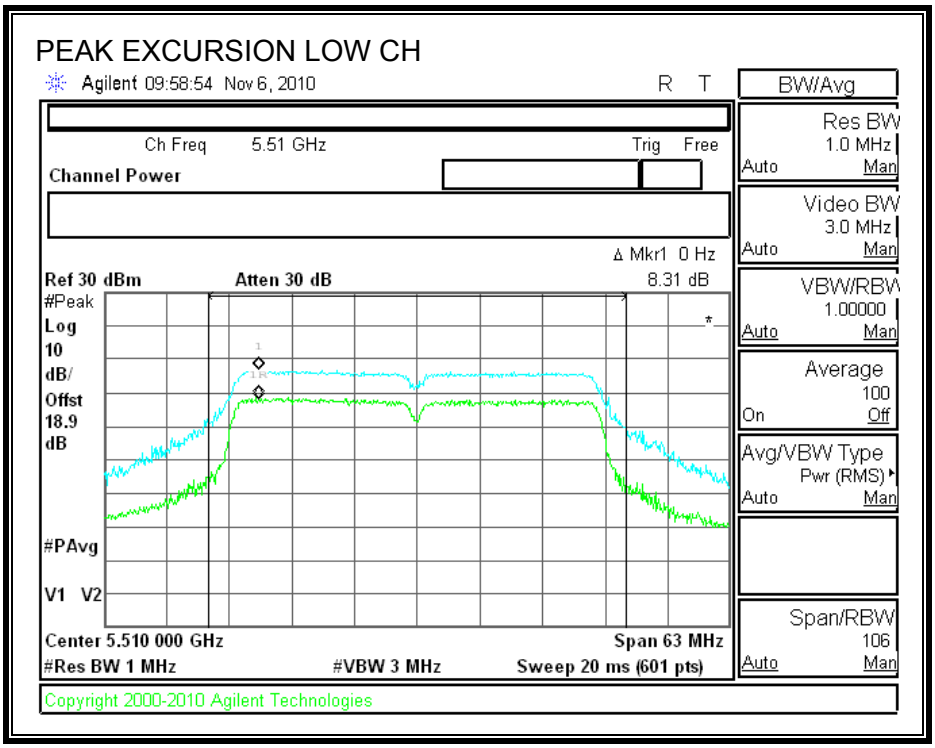
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	9.85	13	-3.15
Middle	5590	8.97	13	-4.03
High	5670	7.76	13	-5.24

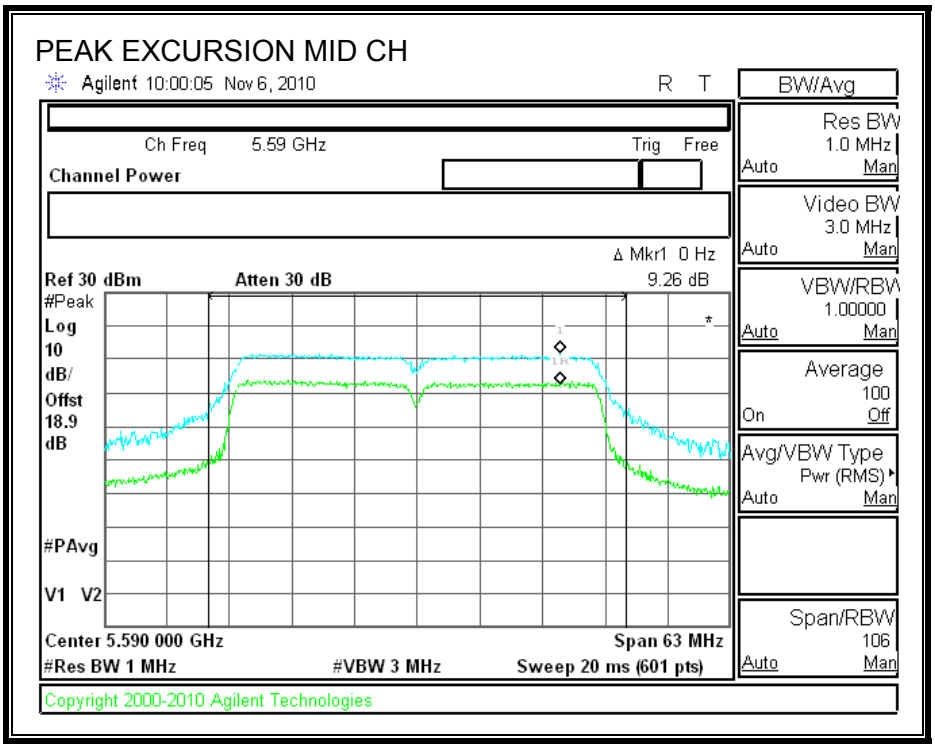
CHAIN 2

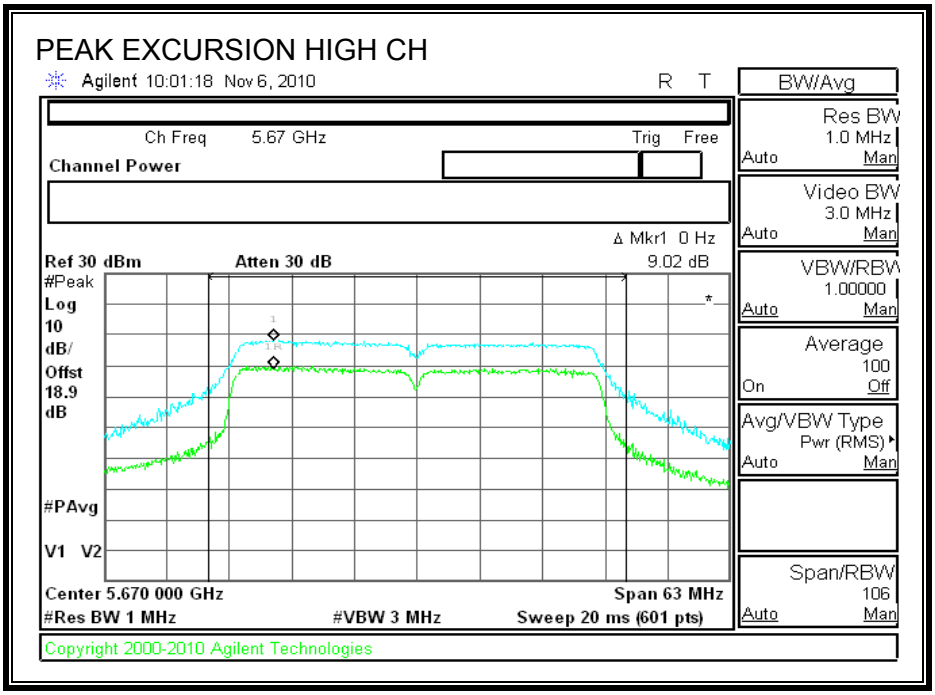
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	9.91	13	-3.09
Middle	5590	10.64	13	-2.36
High	5670	9.72	13	-3.28

CHAIN 0

PEAK EXCURSION

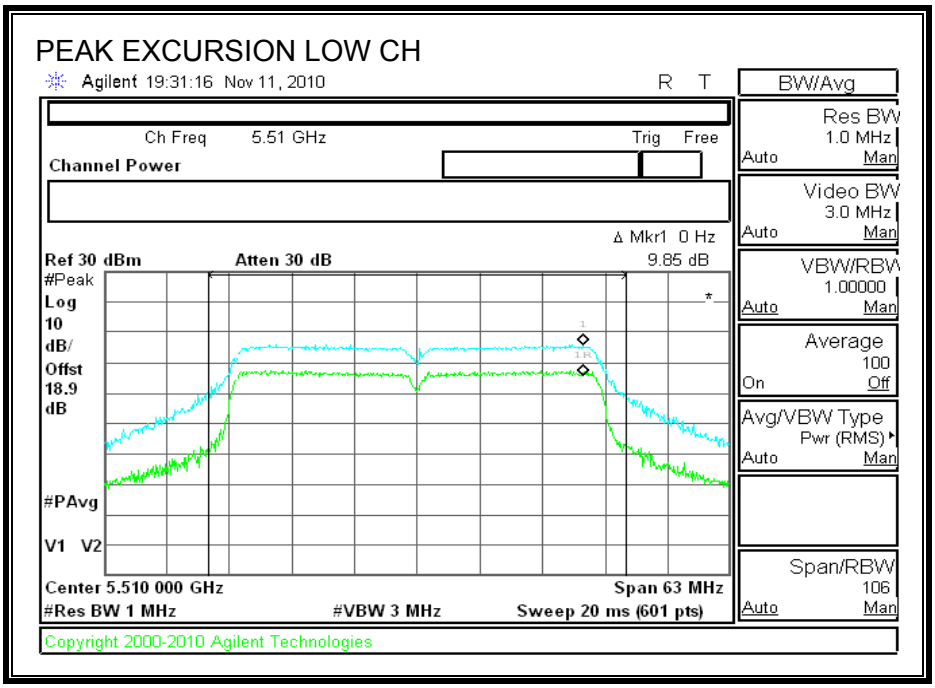




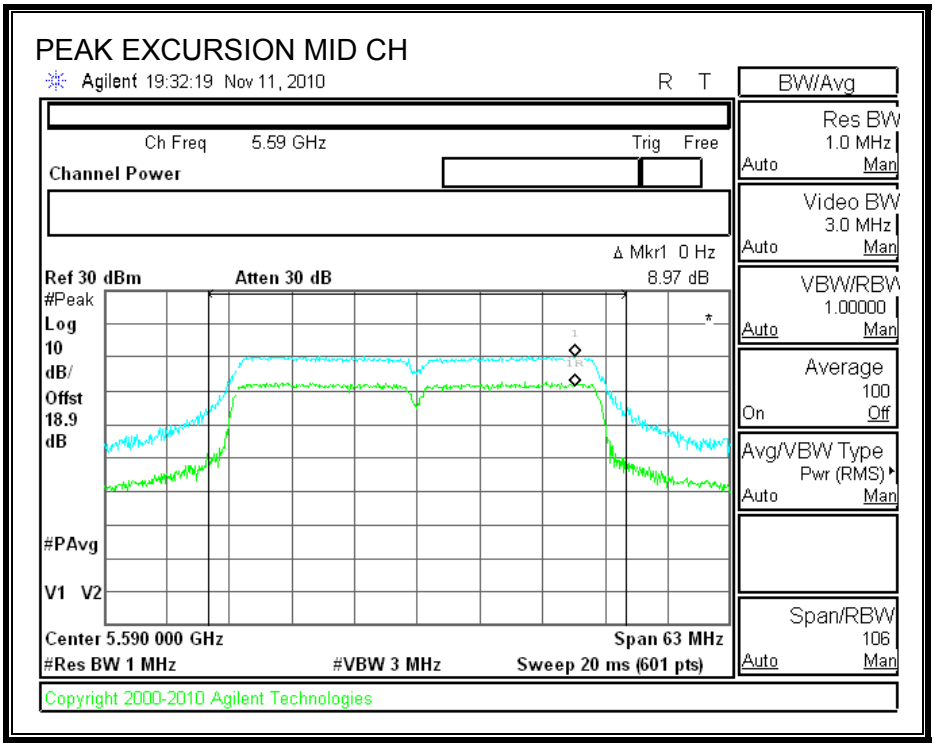


CHAIN 1

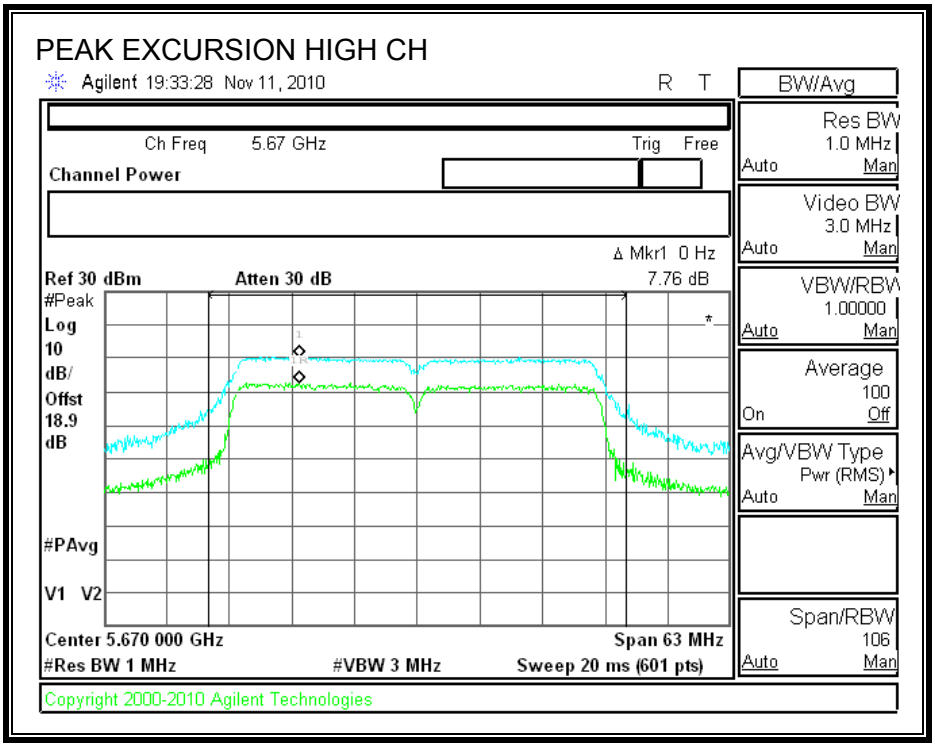
PEAK EXCURSION



PEAK EXCURSION MID CH

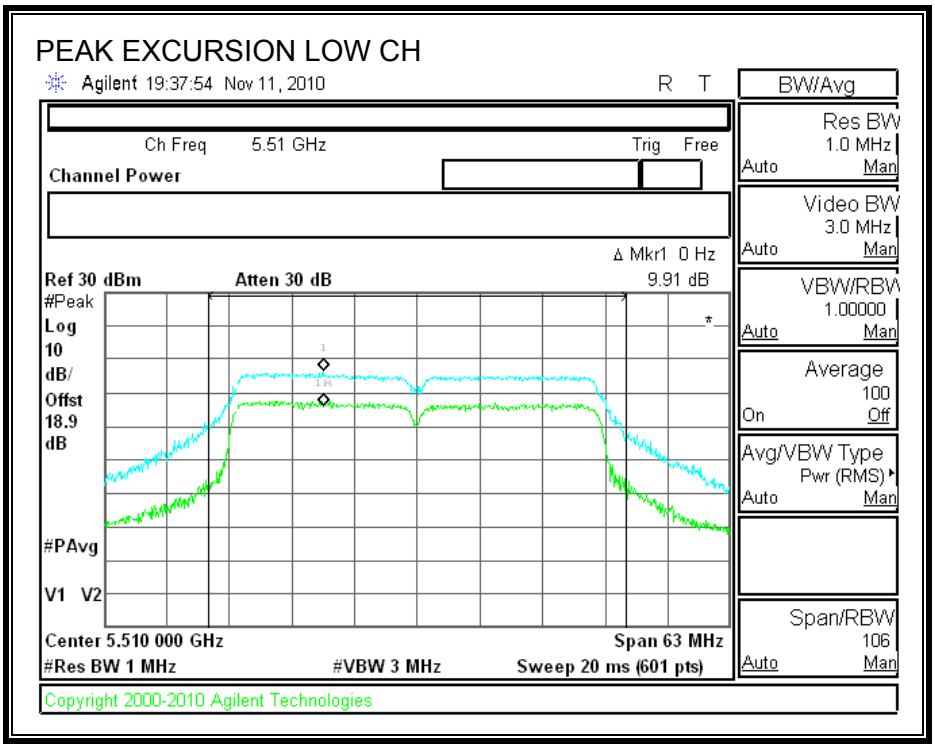


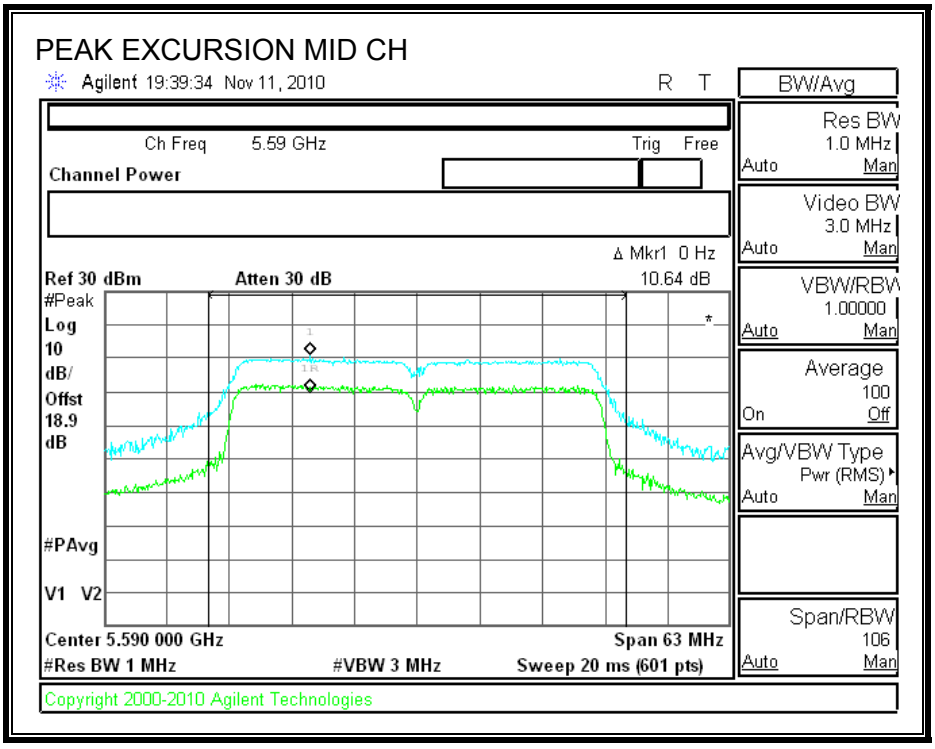
PEAK EXCURSION HIGH CH

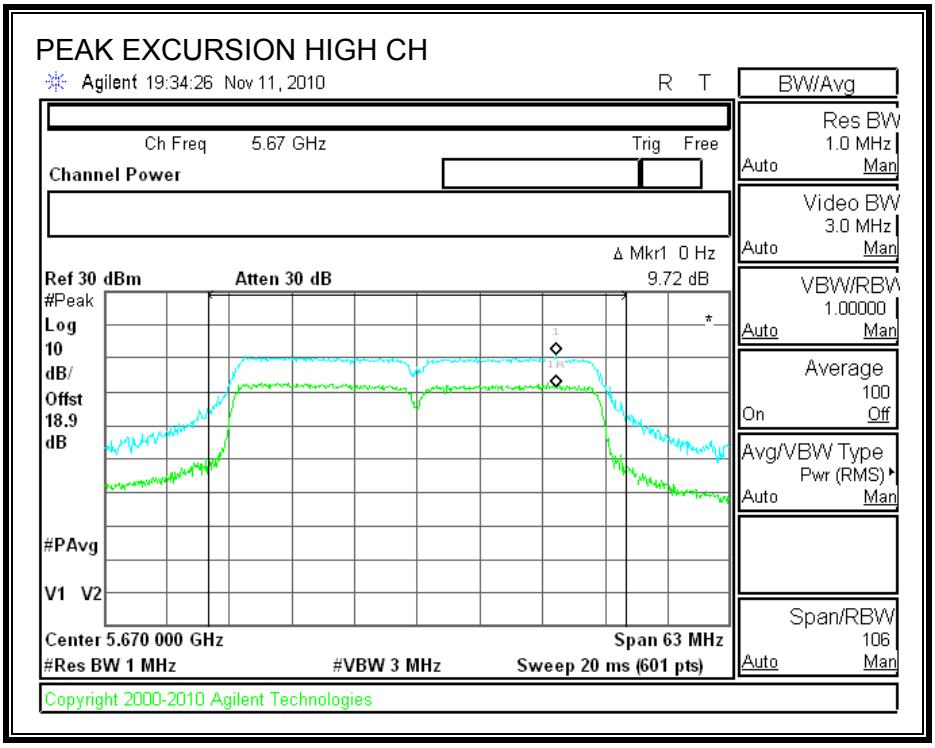


CHAIN 2

PEAK EXCURSION







7.9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

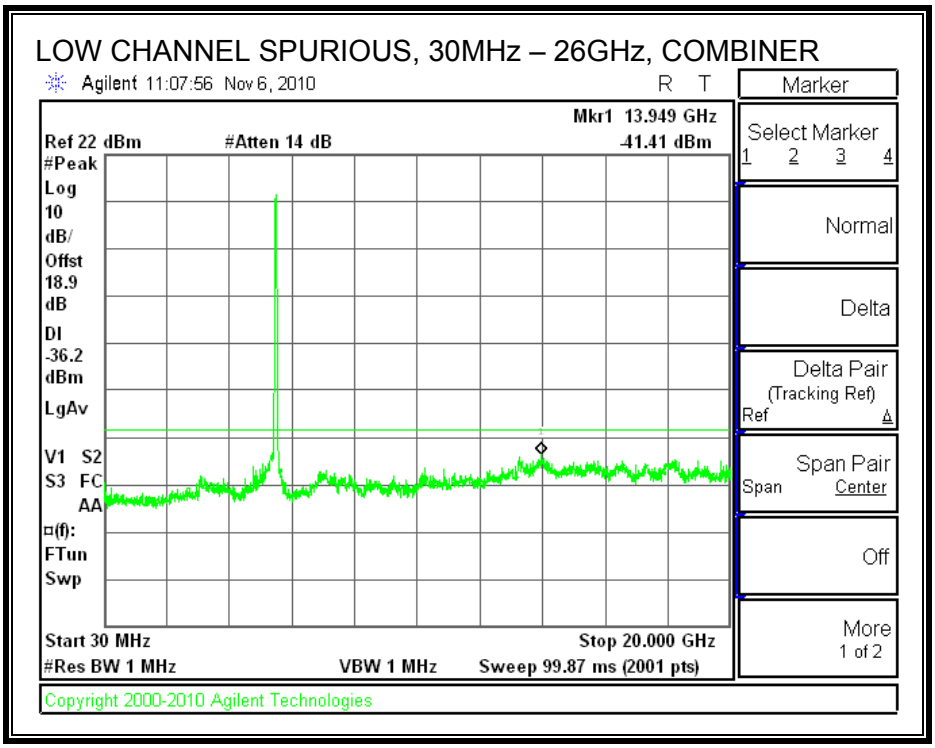
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

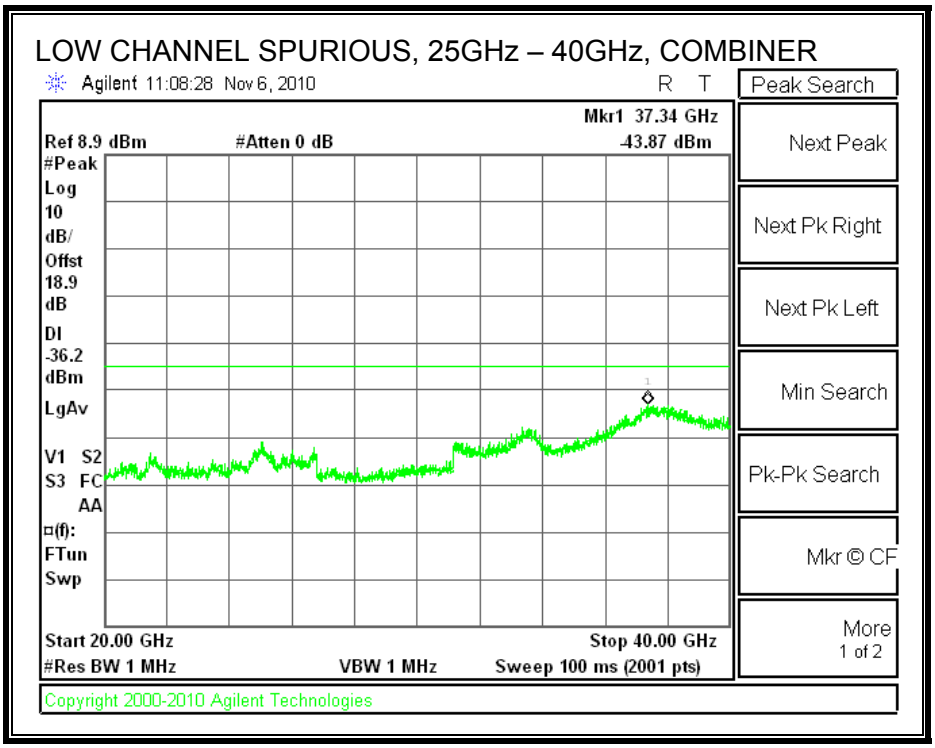
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

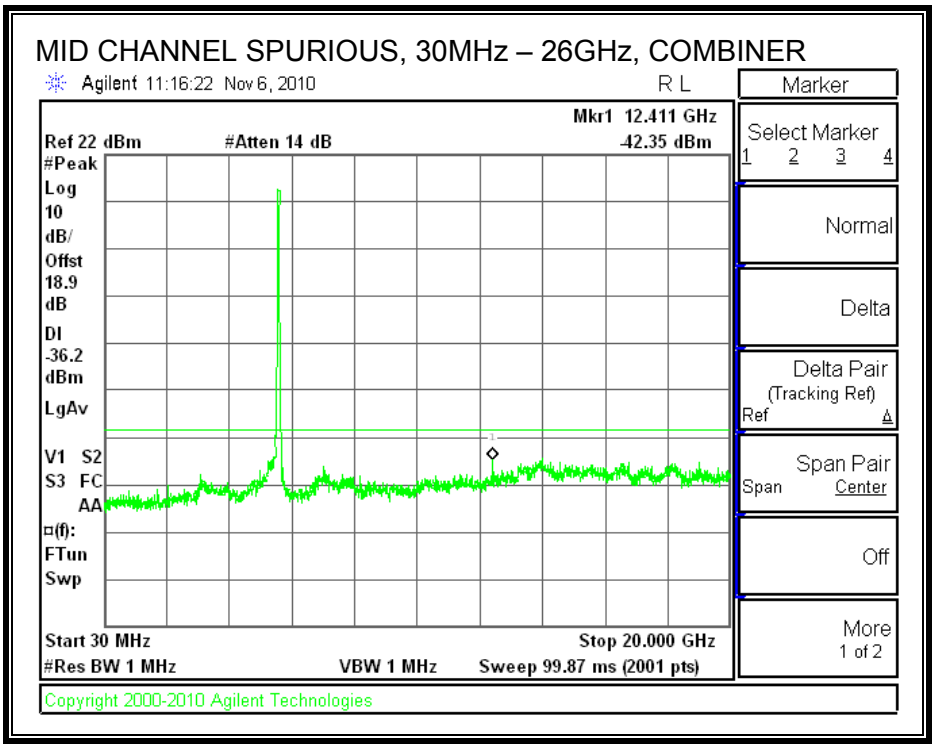
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

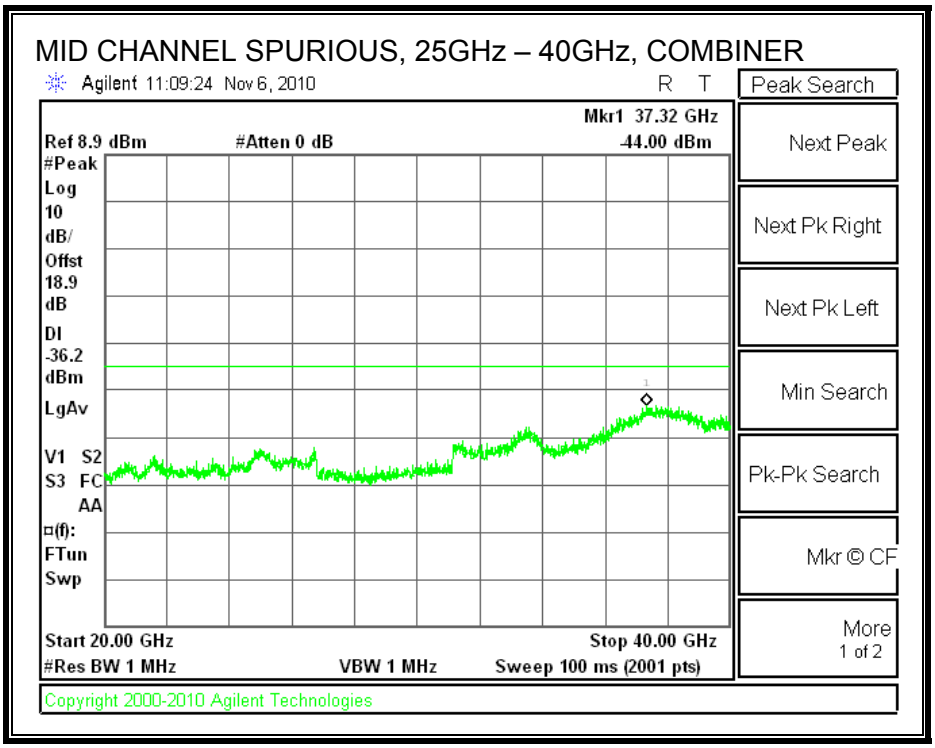
LOW CHANNEL SPURIOUS EMISSIONS



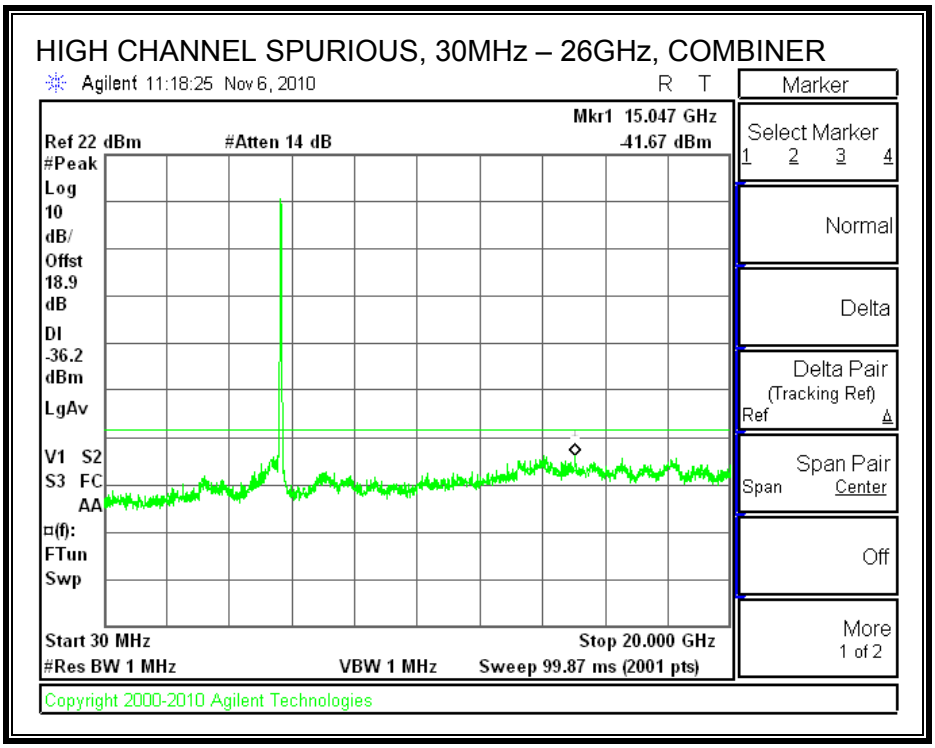


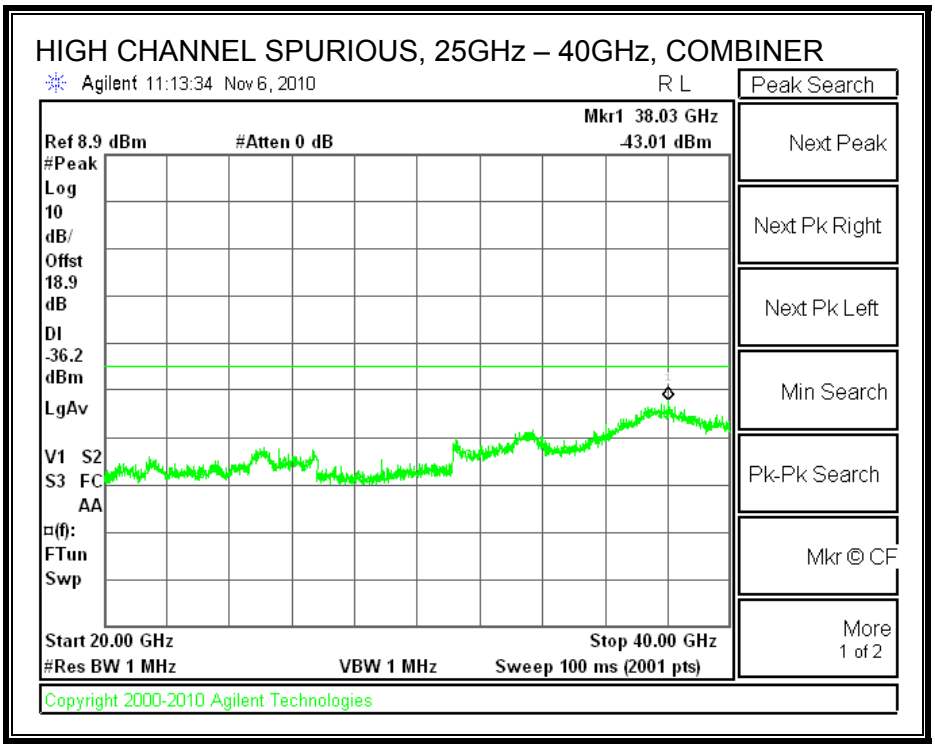
MID CHANNEL SPURIOUS EMISSIONS





HIGH CHANNEL SPURIOUS EMISSIONS





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.

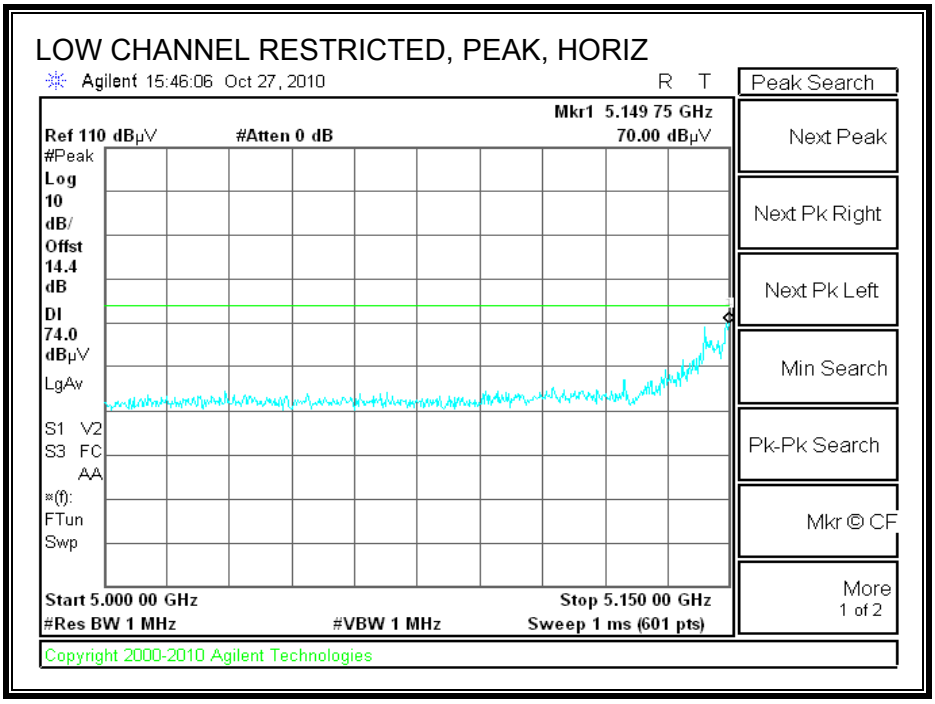
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each appplicable band.

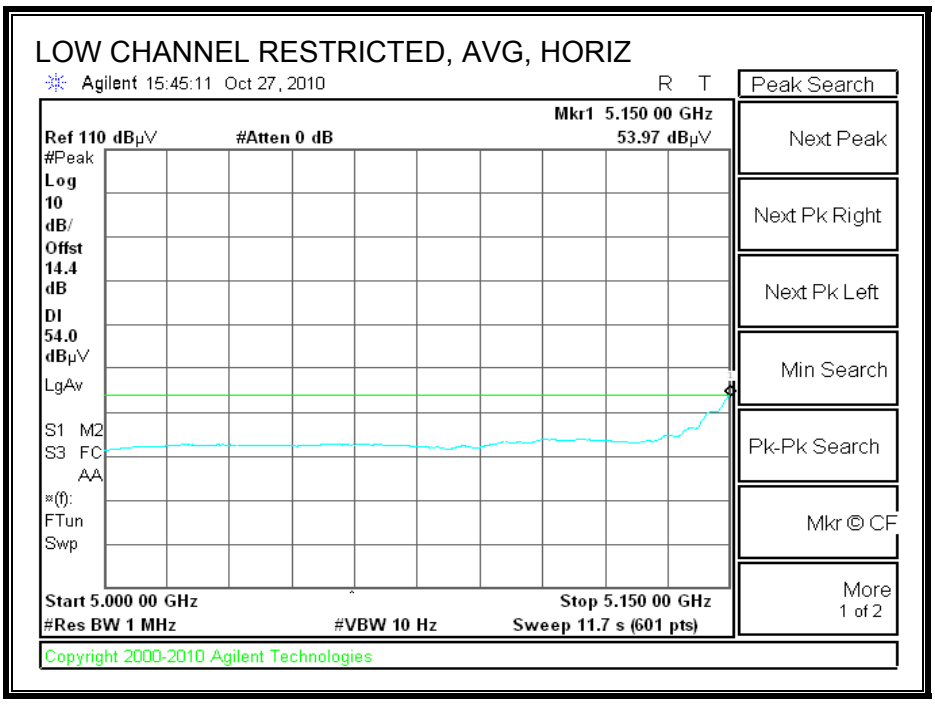
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

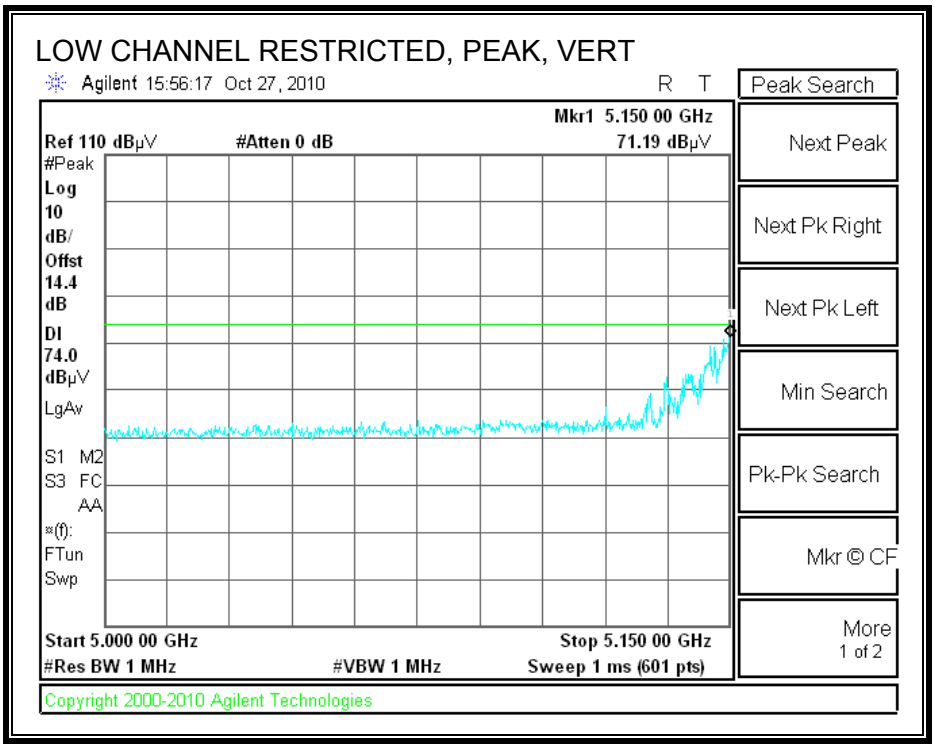
8.2.1. 802.11a MODE IN THE LOWER 5.2 GHz BAND

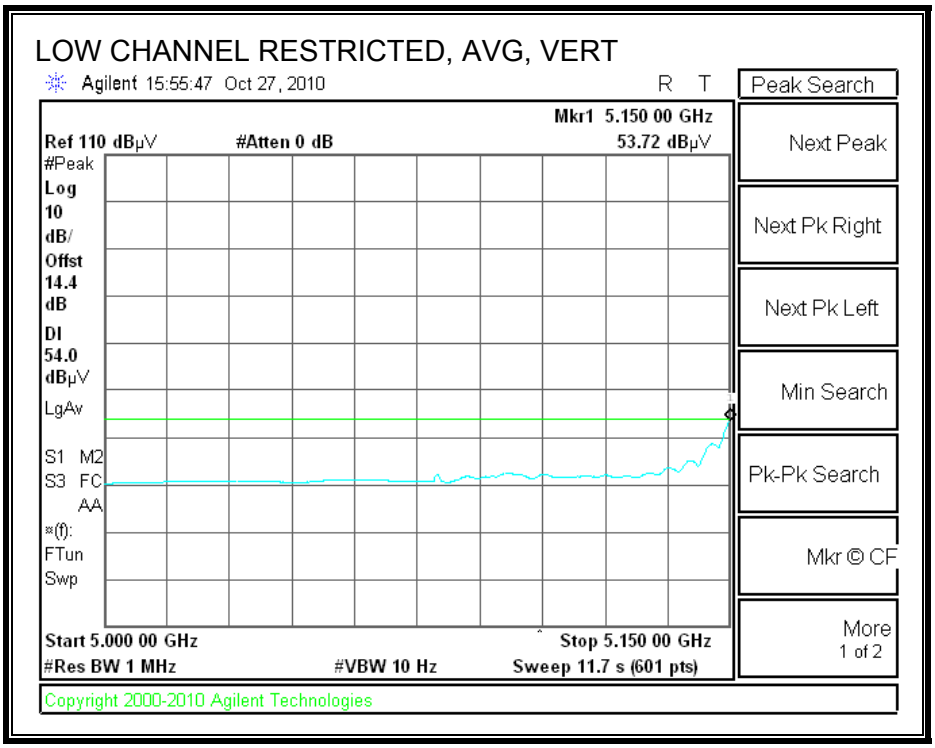
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/28/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.2GHz Band, Legacy

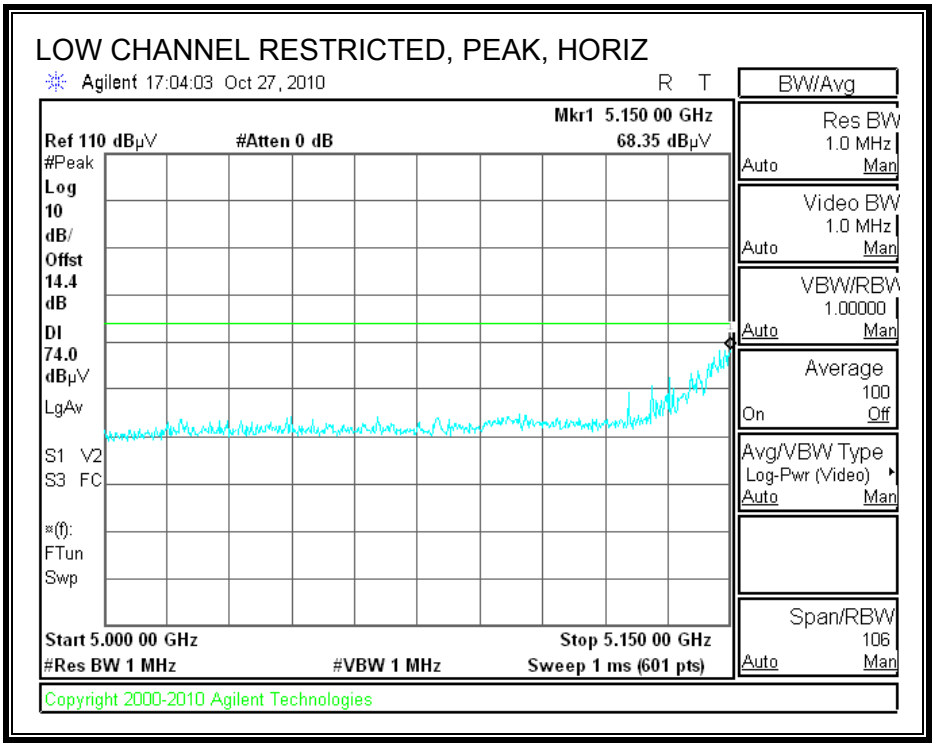
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

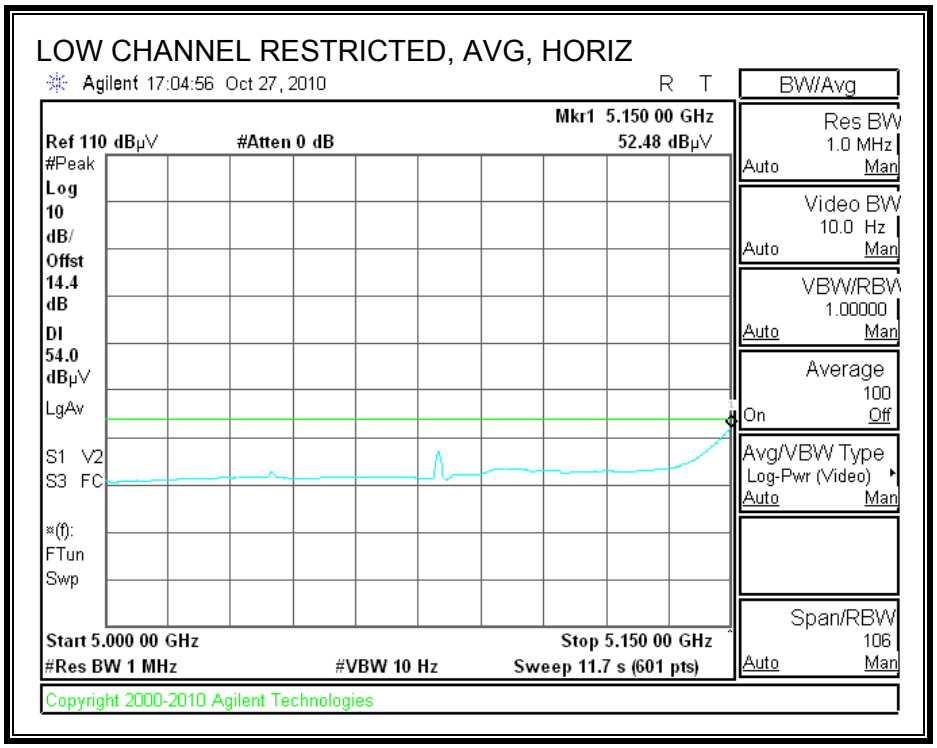
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5180MHz													
15.540	3.0	35.0	38.9	11.3	-32.3	0.0	0.0	52.9	74.0	-21.1	H	P	
15.540	3.0	23.1	38.9	11.3	-32.3	0.0	0.0	41.1	54.0	-12.9	H	A	
15.540	3.0	35.0	38.9	11.3	-32.3	0.0	0.0	52.9	74.0	-21.1	V	P	
15.540	3.0	23.1	38.9	11.3	-32.3	0.0	0.0	41.0	54.0	-13.0	V	A	
Mid Ch, 5200MHz													
15.600	3.0	35.7	38.6	11.4	-32.3	0.0	0.0	53.4	74.0	-20.6	V	P	
15.600	3.0	23.4	38.6	11.4	-32.3	0.0	0.0	41.1	54.0	-12.9	V	A	
15.600	3.0	35.6	38.6	11.4	-32.3	0.0	0.0	53.3	74.0	-20.7	H	P	
15.600	3.0	23.4	38.6	11.4	-32.3	0.0	0.0	41.1	54.0	-12.9	H	A	
High Ch, 5240MHz													
15.720	3.0	36.1	38.4	11.4	-32.3	0.0	0.0	53.6	74.0	-20.4	H	P	
15.720	3.0	23.3	38.4	11.4	-32.3	0.0	0.0	40.8	54.0	-13.2	H	A	
15.720	3.0	36.3	38.4	11.4	-32.3	0.0	0.0	53.9	74.0	-20.1	V	P	
15.720	3.0	23.4	38.4	11.4	-32.3	0.0	0.0	40.9	54.0	-13.1	V	A	

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

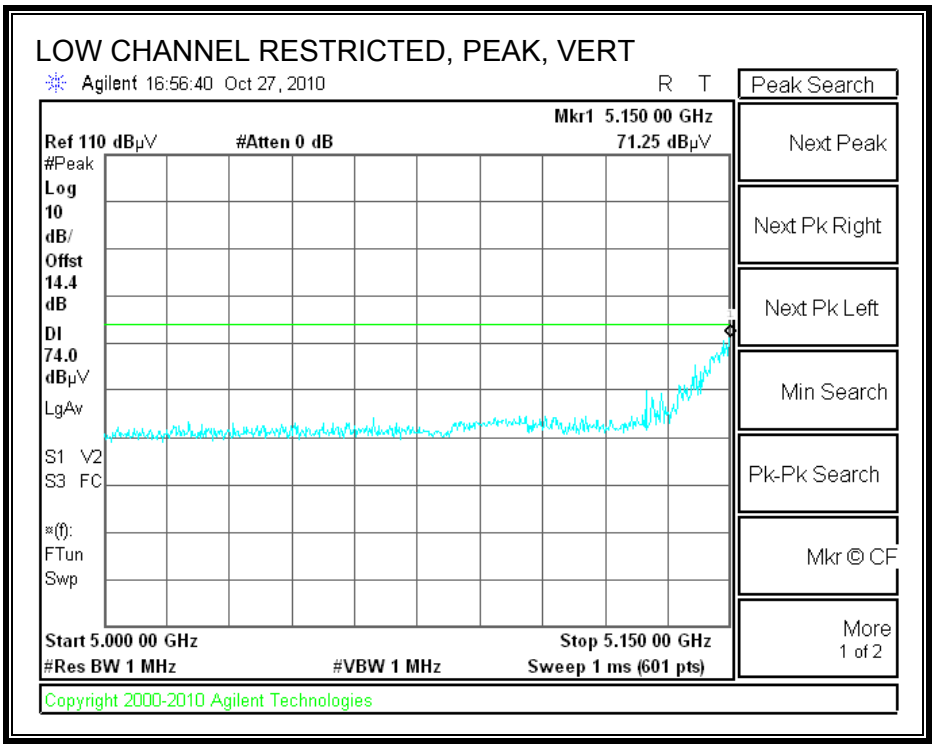
8.2.2. 802.11n HT20 MODE IN 5.2 GHz BAND

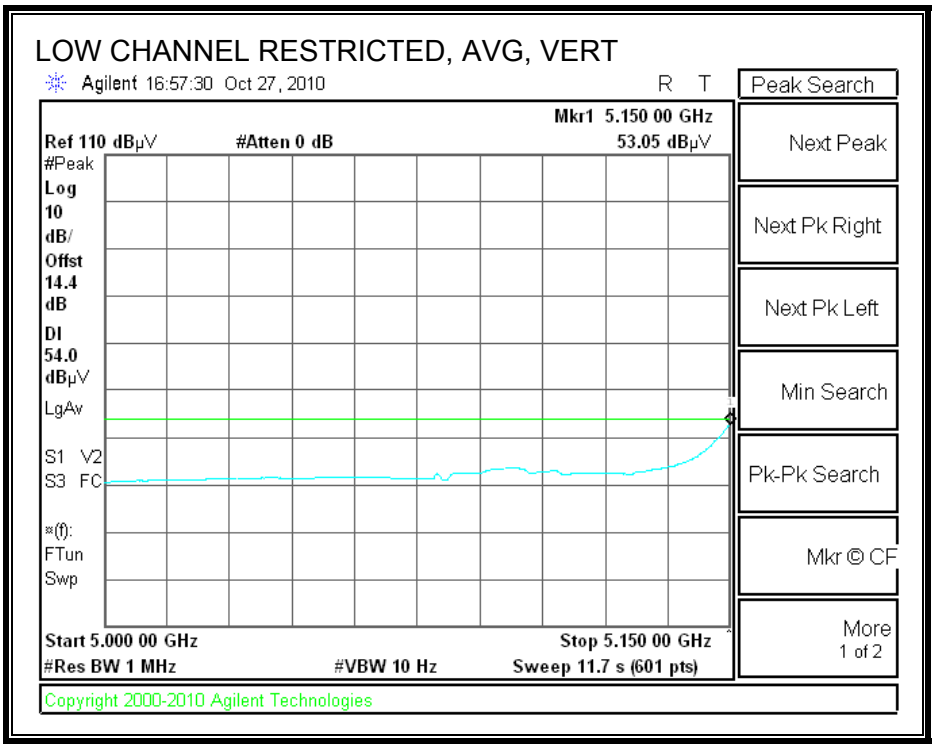
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/28/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.3GHz Band, HT20 Mode

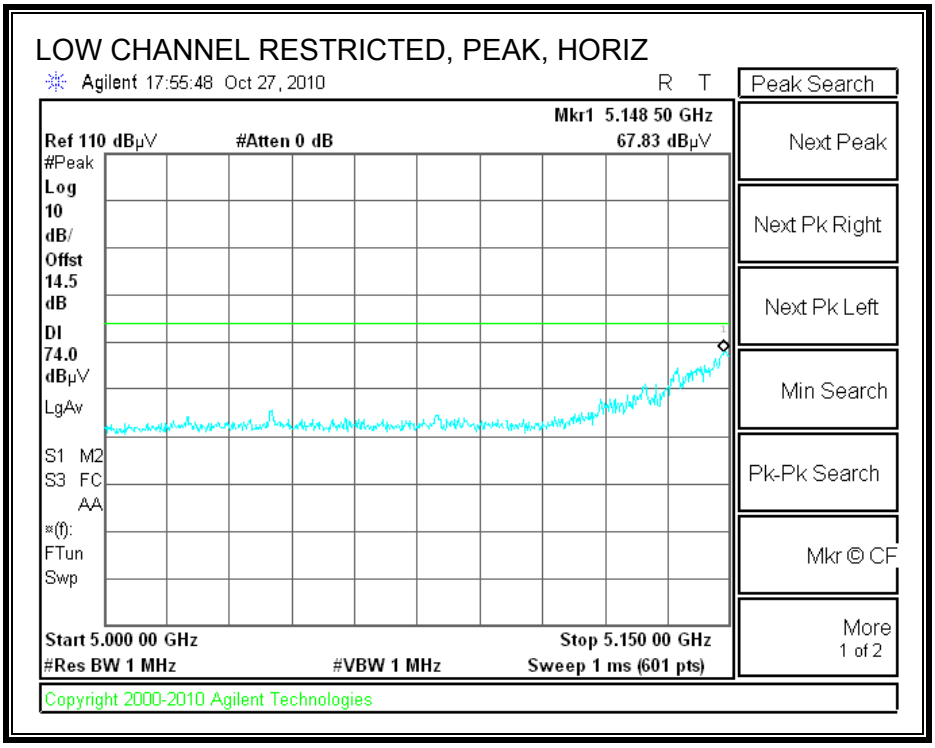
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

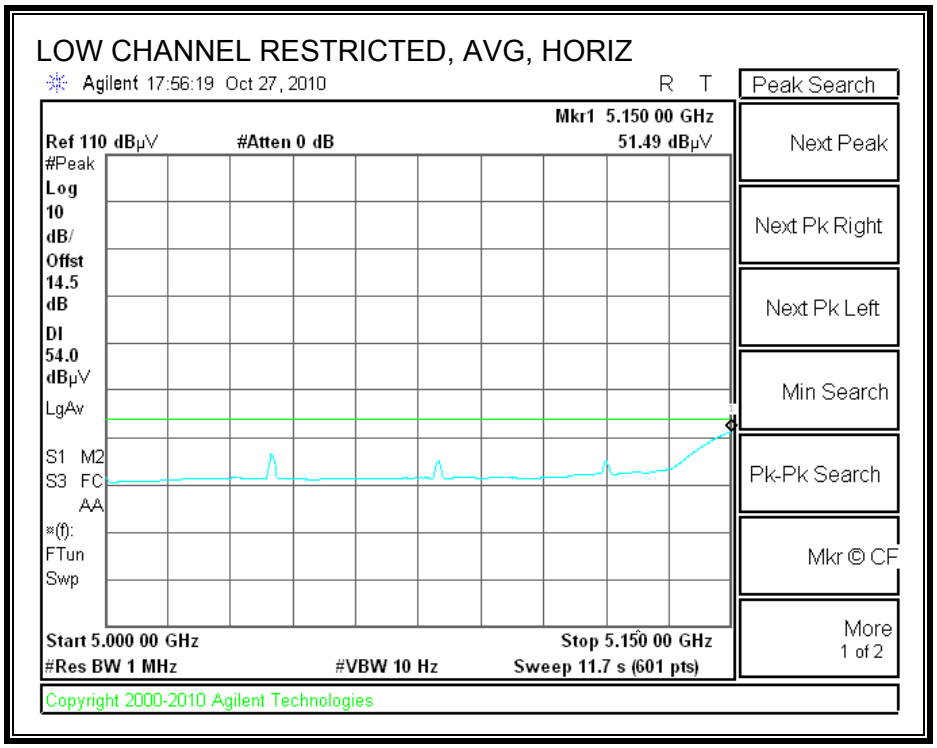
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5180MHz													
15.540	3.0	35.8	38.9	11.3	-32.3	0.0	0.0	53.7	74.0	-20.3	H	P	
15.540	3.0	23.1	38.9	11.3	-32.3	0.0	0.0	41.0	54.0	-13.0	H	A	
15.540	3.0	35.9	38.9	11.3	-32.3	0.0	0.0	53.8	74.0	-20.2	V	P	
15.540	3.0	23.1	38.9	11.3	-32.3	0.0	0.0	41.0	54.0	-13.0	V	A	
Mid Ch, 5200MHz													
15.600	3.0	36.3	38.6	11.4	-32.3	0.0	0.0	54.0	74.0	-20.0	V	P	
15.600	3.0	23.4	38.6	11.4	-32.3	0.0	0.0	41.1	54.0	-12.9	V	A	
15.600	3.0	36.4	38.6	11.4	-32.3	0.0	0.0	54.1	74.0	-19.9	H	P	
15.600	3.0	23.4	38.6	11.4	-32.3	0.0	0.0	41.1	54.0	-12.9	H	A	
High Ch, 5240MHz													
15.720	3.0	35.3	38.4	11.4	-32.3	0.0	0.0	52.9	74.0	-21.1	H	P	
15.720	3.0	23.4	38.4	11.4	-32.3	0.0	0.0	40.9	54.0	-13.1	H	A	
15.720	3.0	35.6	38.4	11.4	-32.3	0.0	0.0	53.2	74.0	-20.8	V	P	
15.720	3.0	23.4	38.4	11.4	-32.3	0.0	0.0	41.0	54.0	-13.0	V	A	

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

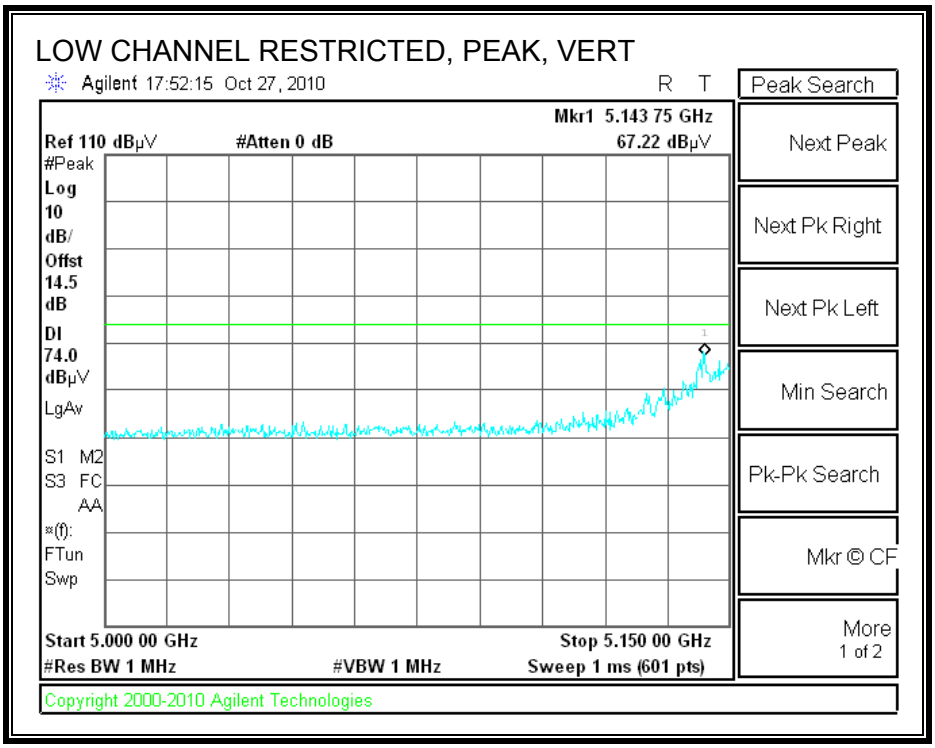
8.2.3. 802.11n HT40 MODE IN 5.2 GHz BAND

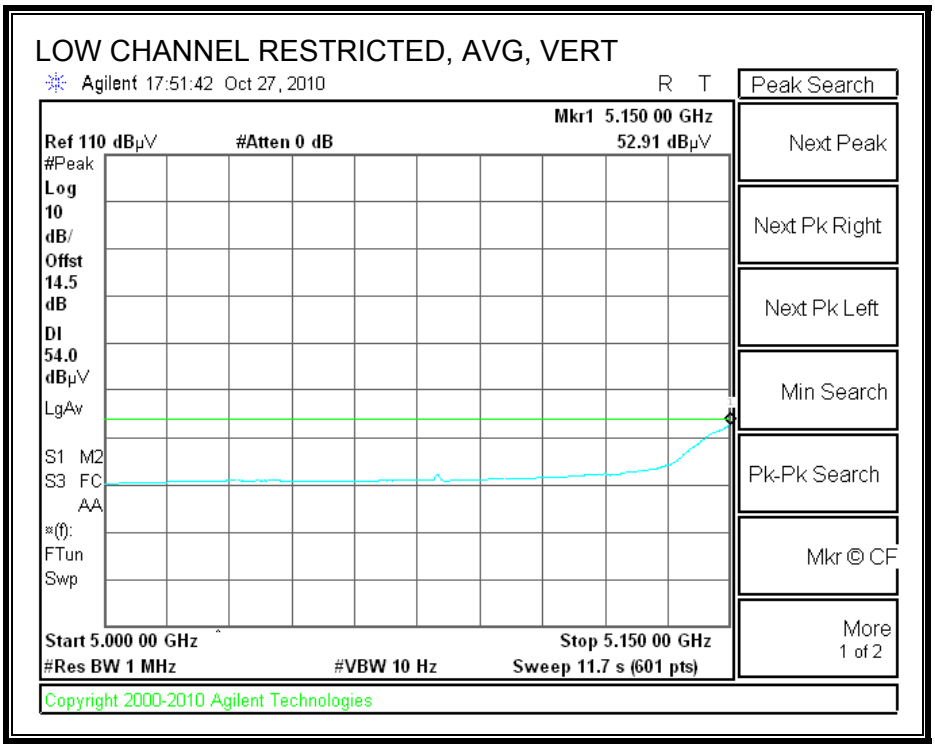
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.2GHz Band, HT40

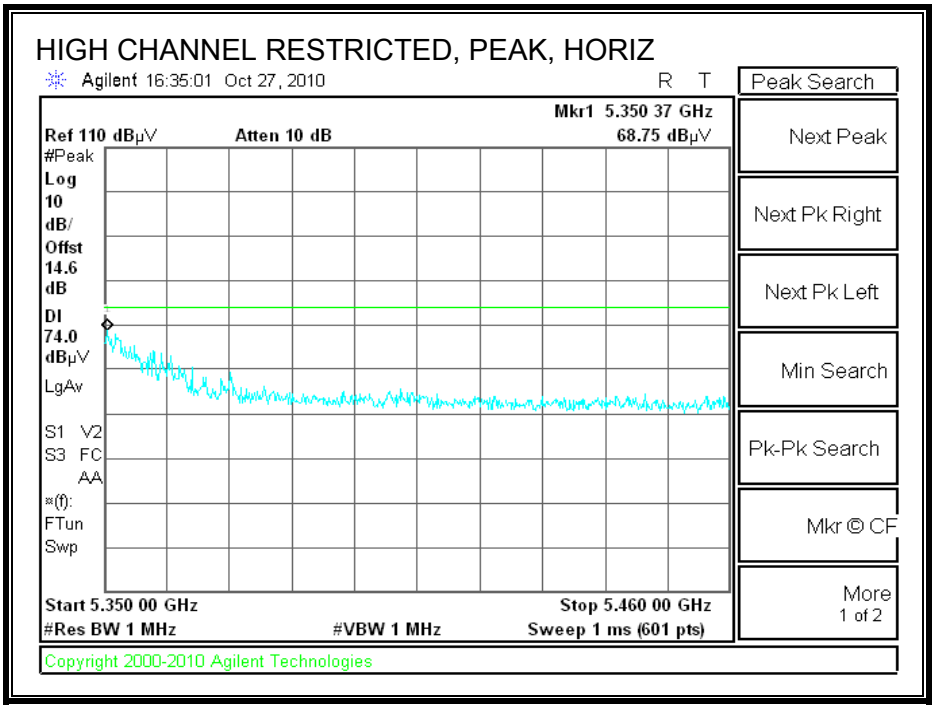
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

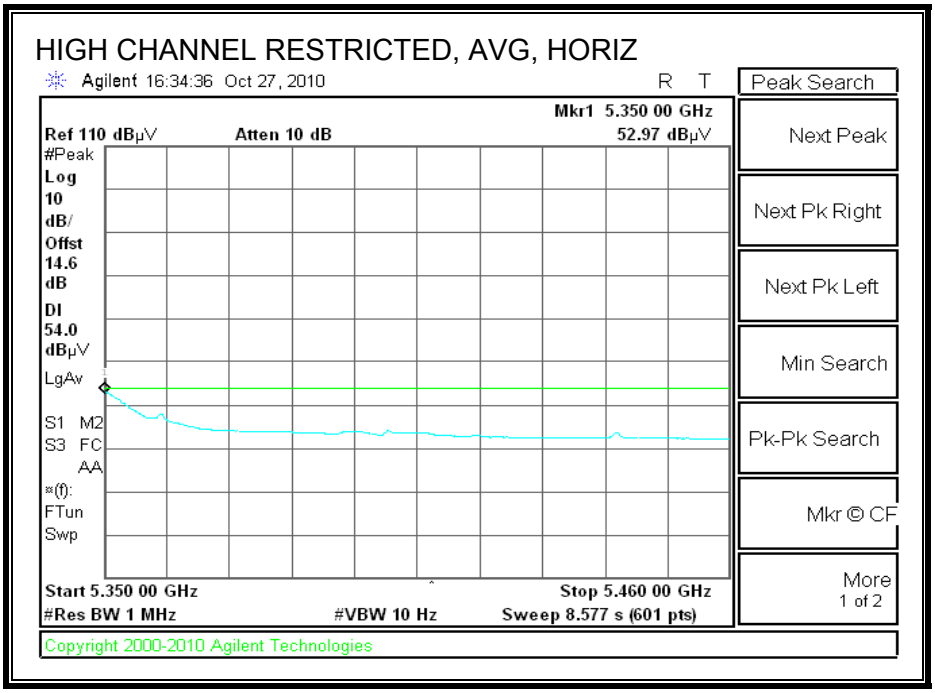
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5190MHz													
15.570	3.0	35.1	38.8	11.4	-32.3	0.0	0.7	53.7	74.0	-20.3	H	P	
15.570	3.0	23.4	38.8	11.4	-32.3	0.0	0.7	42.0	54.0	-12.0	H	A	
15.570	3.0	36.7	38.8	11.4	-32.3	0.0	0.7	55.3	74.0	-18.7	V	P	
15.570	3.0	25.1	38.8	11.4	-32.3	0.0	0.7	43.8	54.0	-10.2	V	A	
High Ch, 5230MHz													
15.690	3.0	36.1	38.5	11.4	-32.3	0.0	0.7	54.5	74.0	-19.5	V	P	
15.690	3.0	24.0	38.5	11.4	-32.3	0.0	0.7	42.4	54.0	-11.6	V	A	
15.690	3.0	35.5	38.5	11.4	-32.3	0.0	0.7	53.9	74.0	-20.1	H	P	
15.690	3.0	23.4	38.5	11.4	-32.3	0.0	0.7	41.8	54.0	-12.2	H	A	

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

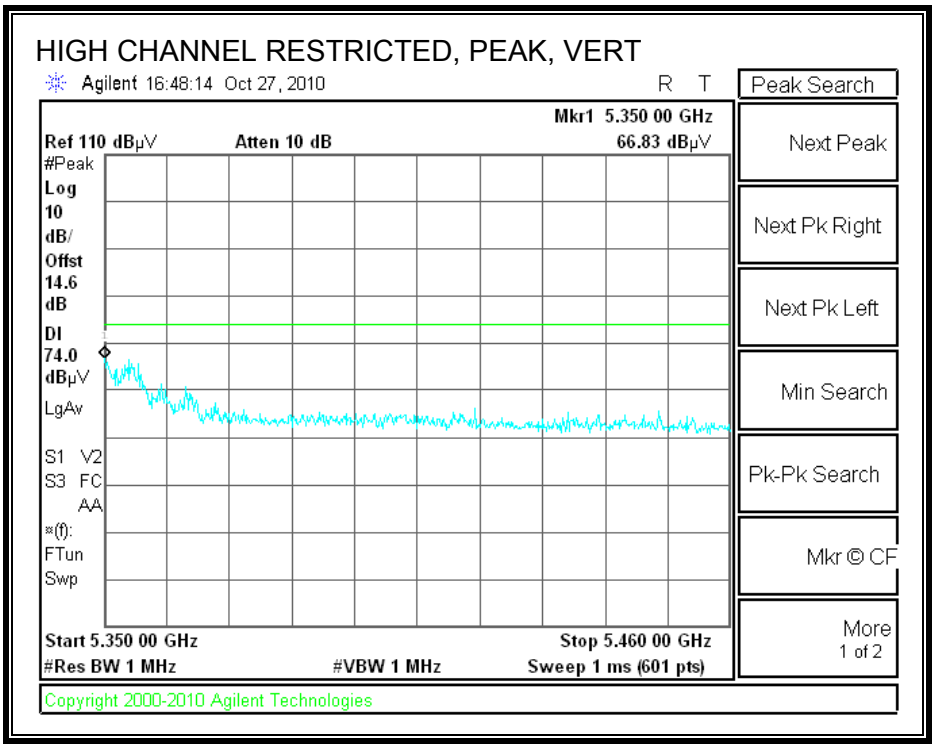
8.2.4. 802.11a MODE IN 5.3 GHz BAND

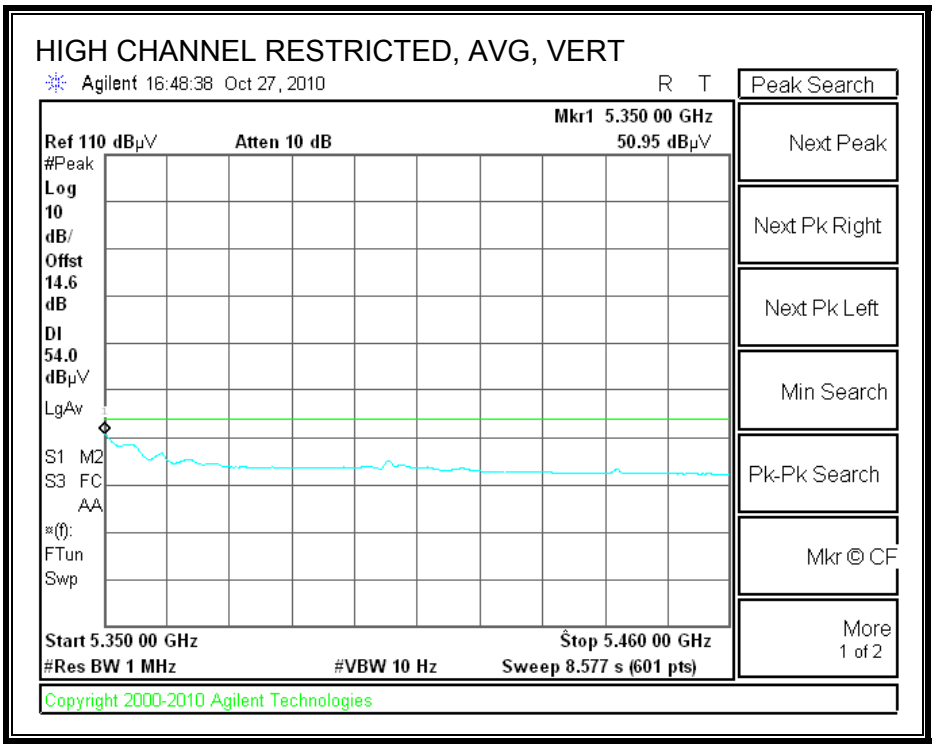
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/28/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.3GHz Band, Legacy

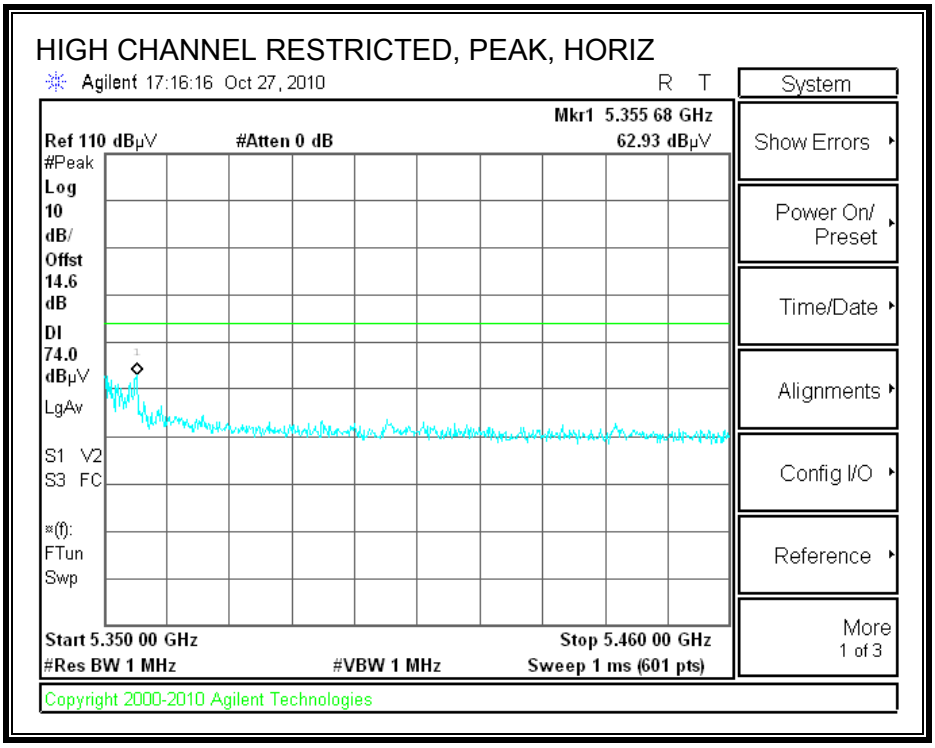
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

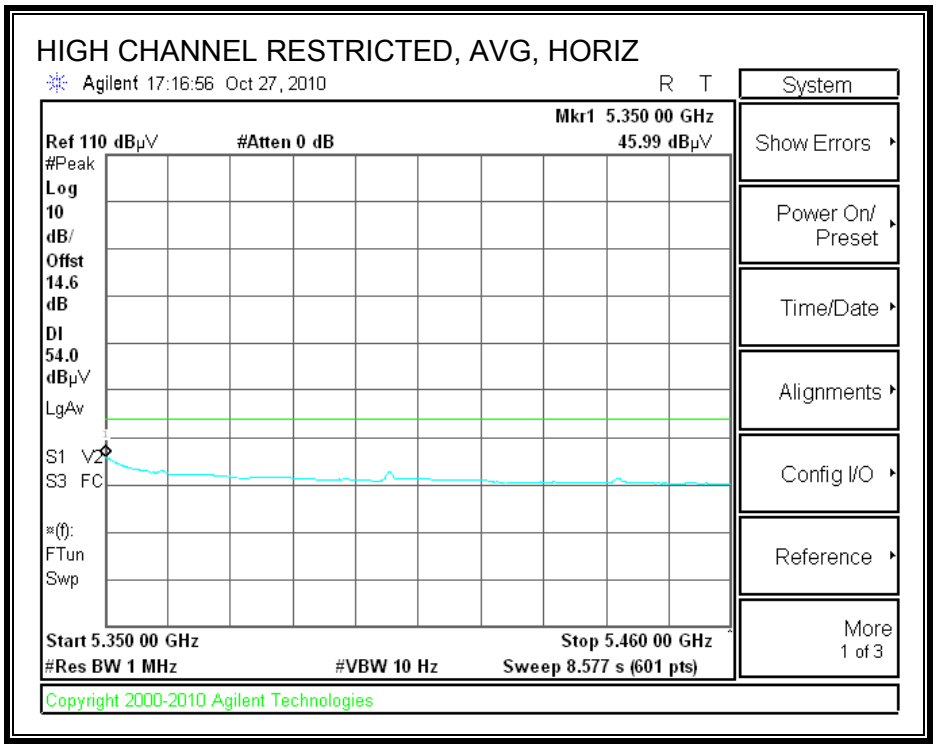
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5260MHz													
15.780	3.0	35.9	38.2	11.5	-32.2	0.0	0.7	54.1	74.0	-19.9	H	P	
15.780	3.0	23.2	38.2	11.5	-32.2	0.0	0.7	41.4	54.0	-12.6	H	A	
15.780	3.0	38.2	38.2	11.5	-32.2	0.0	0.7	56.4	74.0	-17.6	V	P	
15.780	3.0	26.2	38.2	11.5	-32.2	0.0	0.7	44.4	54.0	-9.6	V	A	
Mid Ch, 5300MHz													
10.600	3.0	39.3	37.5	9.0	-34.3	0.0	0.0	51.5	74.0	-22.5	H	P	
10.600	3.0	26.8	37.5	9.0	-34.3	0.0	0.0	39.1	54.0	-15.0	H	A	
15.900	3.0	34.9	37.9	11.5	-32.2	0.0	0.0	52.1	74.0	-21.9	H	P	
15.900	3.0	22.6	37.9	11.5	-32.2	0.0	0.0	39.8	54.0	-14.2	H	A	
10.600	3.0	41.6	37.5	9.0	-34.3	0.0	0.0	53.9	74.0	-20.1	V	P	
10.600	3.0	28.4	37.5	9.0	-34.3	0.0	0.0	40.7	54.0	-13.3	V	A	
15.900	3.0	35.7	37.9	11.5	-32.2	0.0	0.0	52.9	74.0	-21.1	V	P	
15.900	3.0	22.6	37.9	11.5	-32.2	0.0	0.0	39.8	54.0	-14.2	V	A	
High Ch, 5320MHz													
10.640	3.0	42.2	37.6	9.1	-34.2	0.0	0.0	54.6	74.0	-19.4	V	P	
10.640	3.0	30.0	37.6	9.1	-34.2	0.0	0.0	42.3	54.0	-11.7	V	A	
15.960	3.0	34.9	37.7	11.5	-32.2	0.0	0.0	52.0	74.0	-22.0	V	P	
15.960	3.0	22.6	37.7	11.5	-32.2	0.0	0.0	39.7	54.0	-14.3	V	A	
10.640	3.0	39.8	37.6	9.1	-34.2	0.0	0.0	52.1	74.0	-21.9	H	P	
10.640	3.0	26.8	37.6	9.1	-34.2	0.0	0.0	39.2	54.0	-14.8	H	A	
15.960	3.0	35.3	37.7	11.5	-32.2	0.0	0.0	52.3	74.0	-21.7	H	P	
15.960	3.0	22.6	37.7	11.5	-32.2	0.0	0.0	39.7	54.0	-14.3	H	A	

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

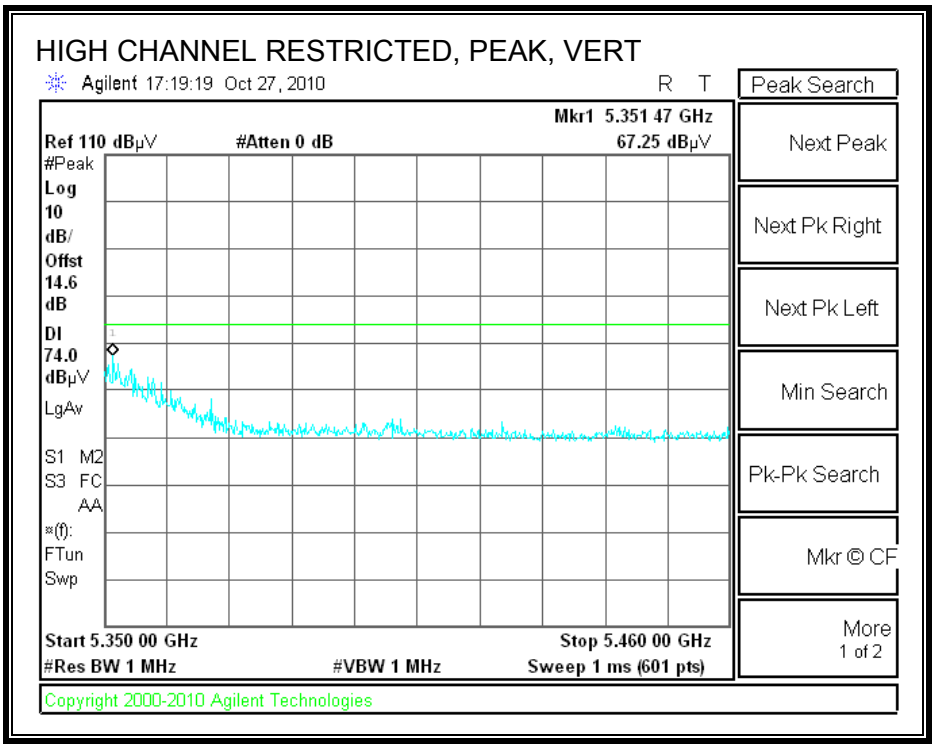
8.2.5. 802.11n HT20 MODE IN 5.3GHz BAND

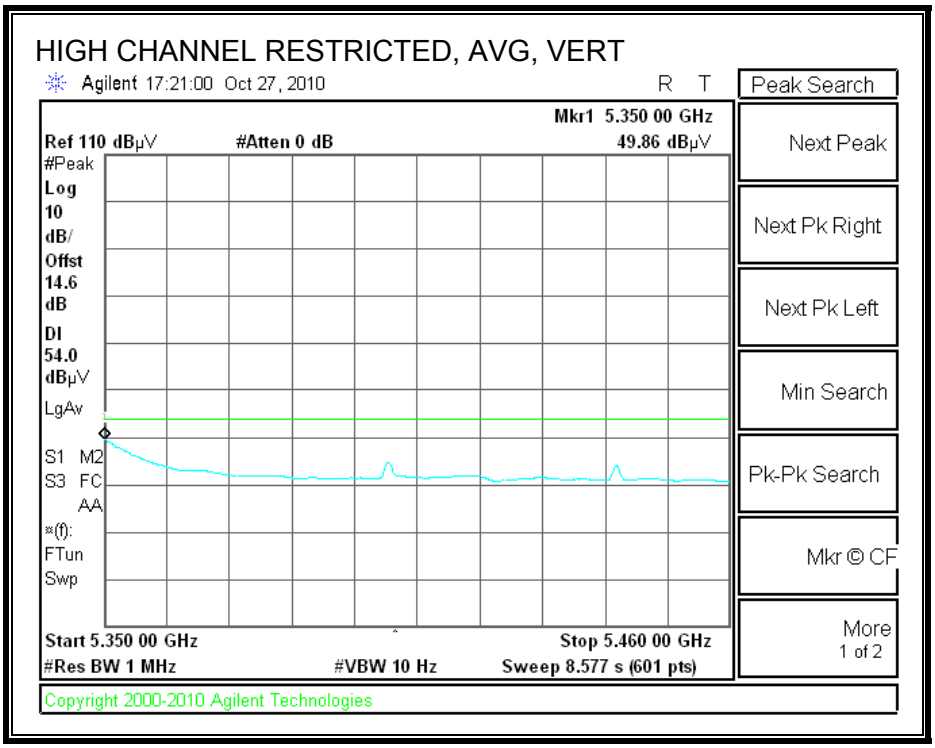
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.3GHz Band, HT20 Mode

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

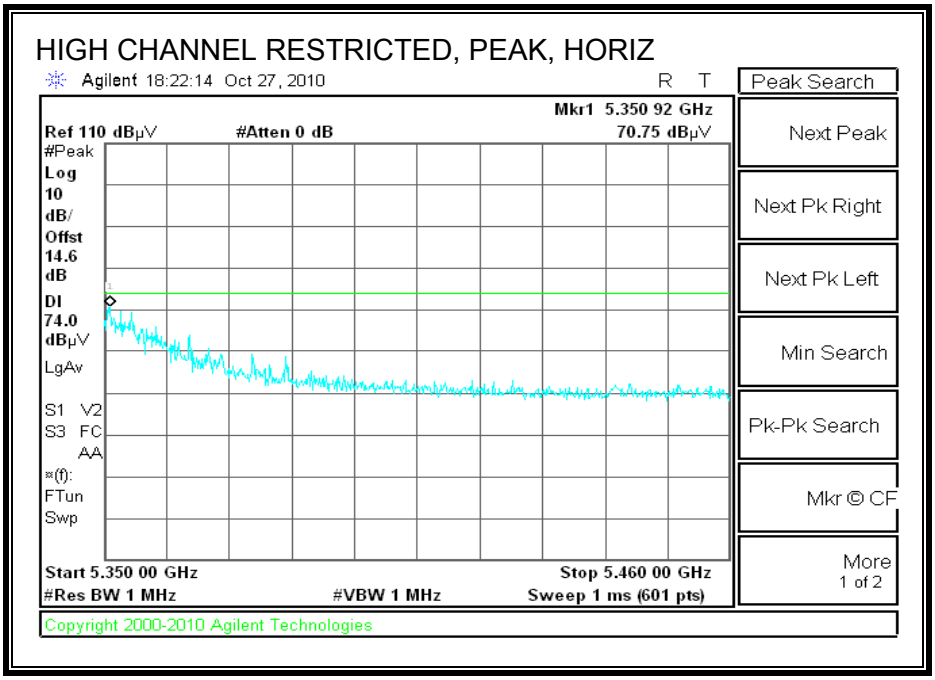
Average Field Strength Limit
Peak Field Strength Limit
Margin vs. Average Limit
Margin vs. Peak Limit

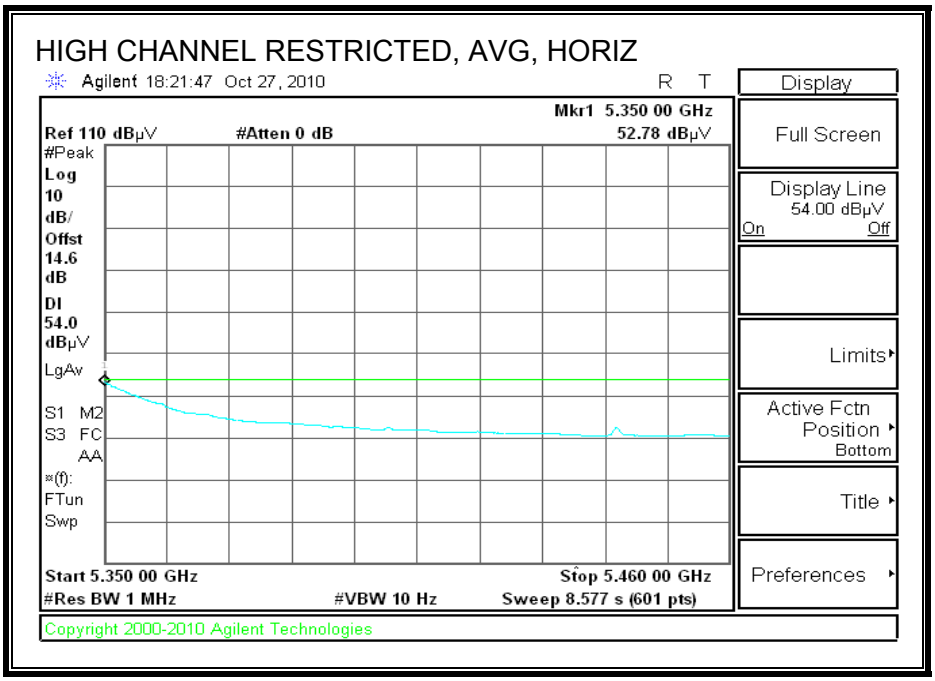
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5260MHz													
15.780	3.0	35.7	38.2	11.5	-32.2	0.0	0.7	53.9	74.0	-20.1	V	P	
15.780	3.0	23.3	38.2	11.5	-32.2	0.0	0.7	41.5	54.0	-12.5	V	A	
15.780	3.0	35.9	38.2	11.5	-32.2	0.0	0.7	54.1	74.0	-19.9	H	P	
15.780	3.0	23.1	38.2	11.5	-32.2	0.0	0.7	41.3	54.0	-12.7	H	A	
Mid Ch, 5300MHz													
10.600	3.0	40.4	37.5	9.0	-34.3	0.0	0.8	53.4	74.0	-20.6	H	P	
10.600	3.0	26.8	37.5	9.0	-34.3	0.0	0.8	39.9	54.0	-14.1	H	A	
15.900	3.0	34.7	37.9	11.5	-32.2	0.0	0.7	52.6	74.0	-21.4	H	P	
15.900	3.0	23.0	37.9	11.5	-32.2	0.0	0.7	40.9	54.0	-13.1	H	A	
10.600	3.0	39.6	37.5	9.0	-34.3	0.0	0.8	52.7	74.0	-21.3	V	P	
10.600	3.0	26.7	37.5	9.0	-34.3	0.0	0.8	39.7	54.0	-14.3	V	A	
15.900	3.0	34.9	37.9	11.5	-32.2	0.0	0.7	52.8	74.0	-21.2	V	P	
15.900	3.0	23.1	37.9	11.5	-32.2	0.0	0.7	41.0	54.0	-13.0	V	A	
High Ch, 5320MHz													
10.640	3.0	39.9	37.6	9.1	-34.2	0.0	0.8	53.1	74.0	-20.9	V	P	
10.640	3.0	26.8	37.6	9.1	-34.2	0.0	0.8	39.9	54.0	-14.1	V	A	
15.960	3.0	35.9	37.7	11.5	-32.2	0.0	0.7	53.7	74.0	-20.3	V	P	
15.960	3.0	22.6	37.7	11.5	-32.2	0.0	0.7	40.4	54.0	-13.6	V	A	
10.640	3.0	38.9	37.6	9.1	-34.2	0.0	0.8	52.1	74.0	-21.9	H	P	
10.640	3.0	26.1	37.6	9.1	-34.2	0.0	0.8	39.2	54.0	-14.8	H	A	
15.960	3.0	35.0	37.7	11.5	-32.2	0.0	0.7	52.8	74.0	-21.2	H	P	
15.960	3.0	22.7	37.7	11.5	-32.2	0.0	0.7	40.5	54.0	-13.5	H	A	

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

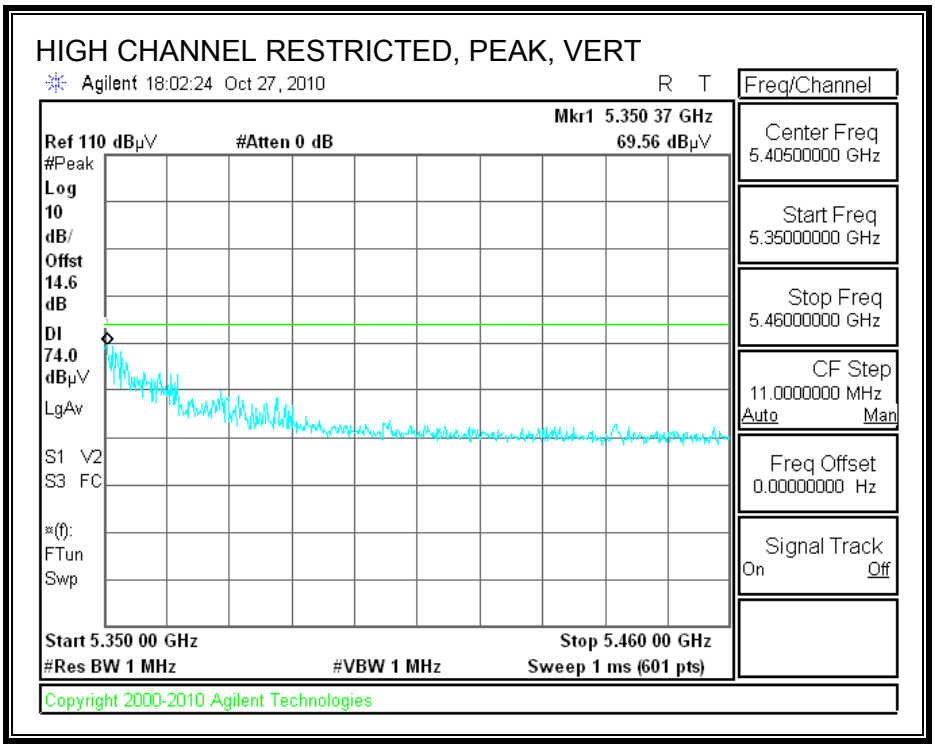
8.2.6. 802.11n HT40 MODE IN 5.3GHz BAND

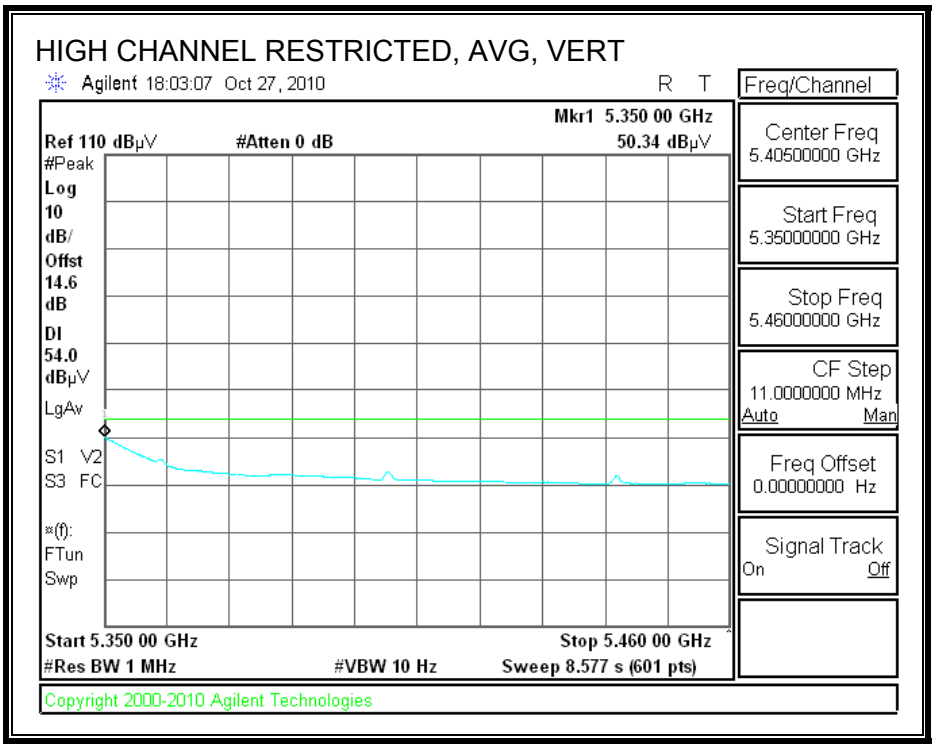
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.3GHz Band, HT40 Mode

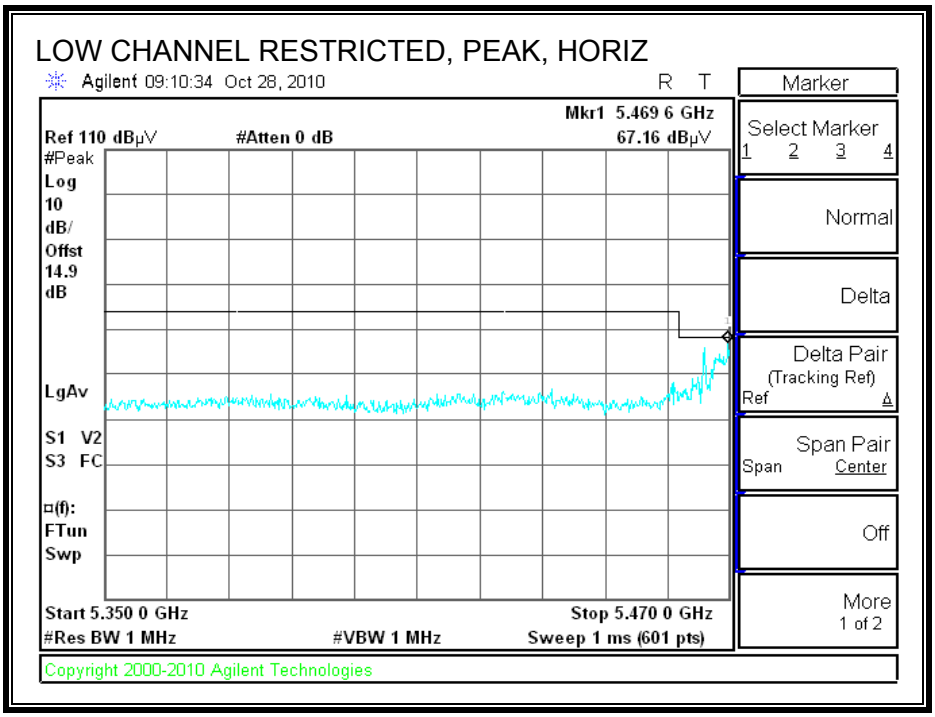
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

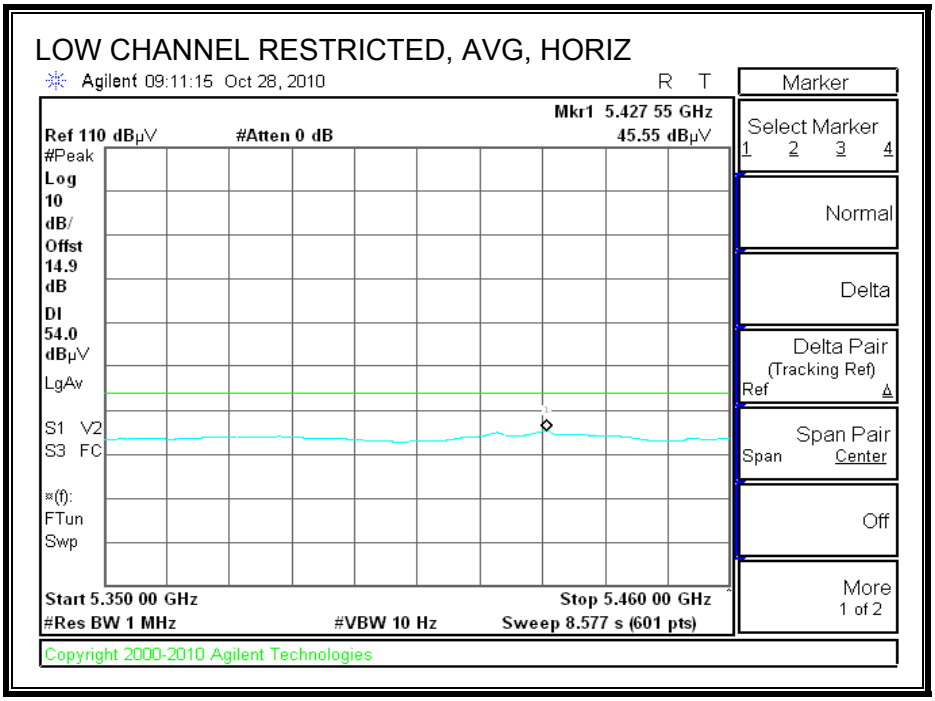
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5270MHz													
15.810	3.0	35.4	38.2	11.5	-32.2	0.0	0.7	53.5	74.0	-20.5	H	P	
15.810	3.0	23.3	38.2	11.5	-32.2	0.0	0.7	41.4	54.0	-12.6	H	A	
15.810	3.0	36.7	38.2	11.5	-32.2	0.0	0.7	54.8	74.0	-19.2	V	P	
15.810	3.0	24.5	38.2	11.5	-32.2	0.0	0.7	42.6	54.0	-11.4	V	A	
High Ch, 5310MHz													
10.620	3.0	40.5	37.5	9.1	-34.3	0.0	0.8	53.6	74.0	-20.4	V	P	
10.620	3.0	25.1	37.5	9.1	-34.3	0.0	0.8	38.2	54.0	-15.8	V	A	
15.930	3.0	34.7	37.8	11.5	-32.2	0.0	0.7	52.6	74.0	-21.4	V	P	
15.930	3.0	22.8	37.8	11.5	-32.2	0.0	0.7	40.7	54.0	-13.3	V	A	
10.620	3.0	37.5	37.5	9.1	-34.3	0.0	0.8	50.6	74.0	-23.4	H	P	
10.620	3.0	25.2	37.5	9.1	-34.3	0.0	0.8	38.3	54.0	-15.7	H	A	
15.930	3.0	34.7	37.8	11.5	-32.2	0.0	0.7	52.6	74.0	-21.5	H	P	
15.930	3.0	22.8	37.8	11.5	-32.2	0.0	0.7	40.7	54.0	-13.3	H	A	

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

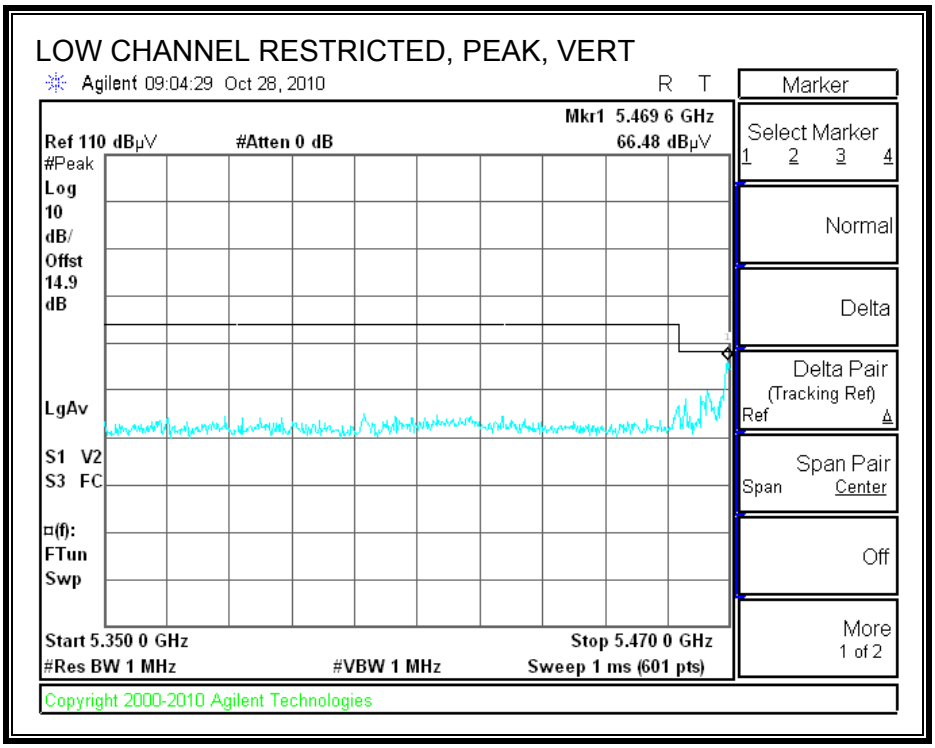
8.2.7. 802.11a MODE IN 5.6 GHz BAND

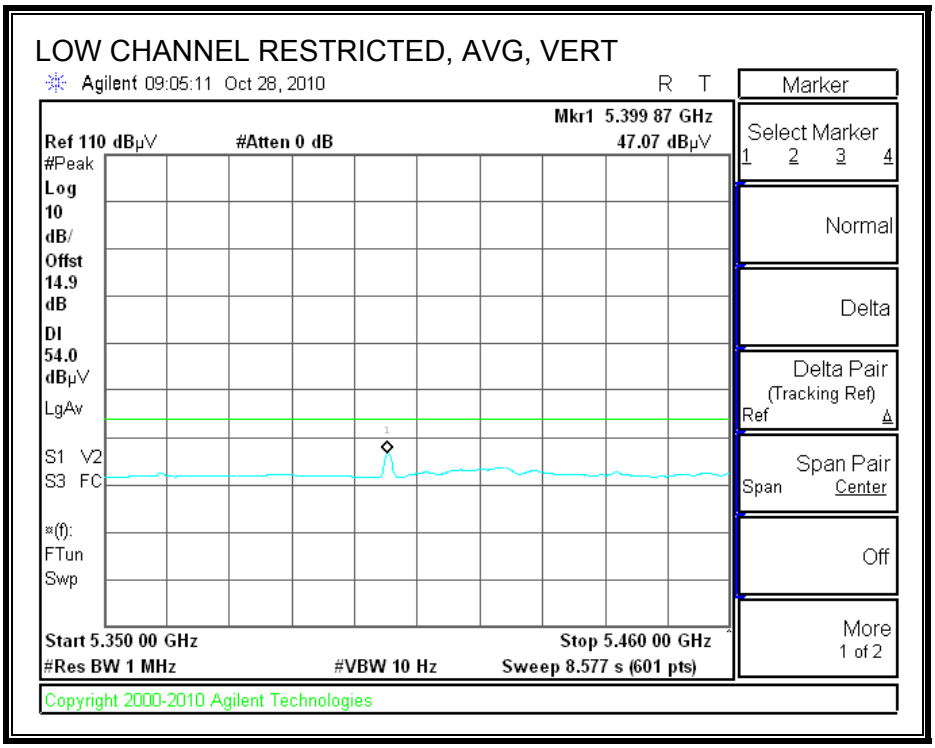
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



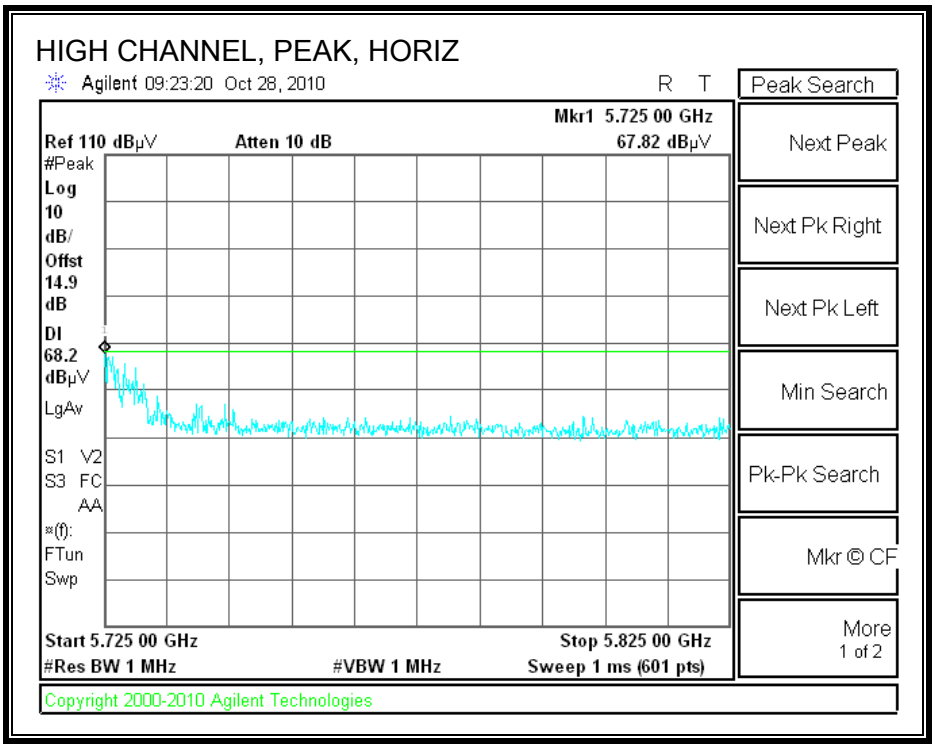


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

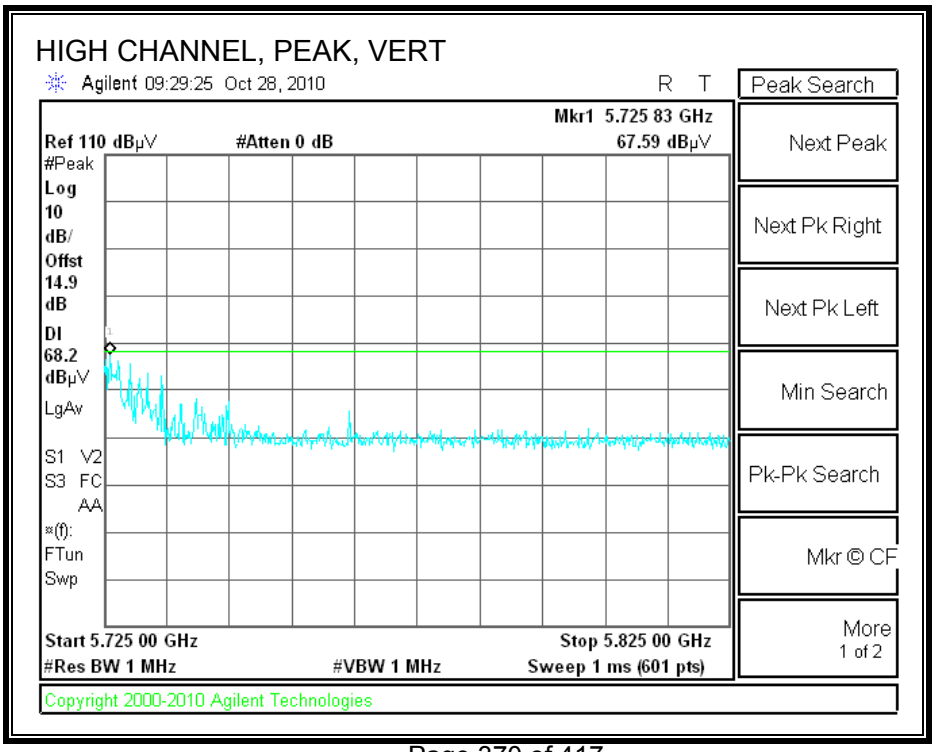




AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.6GHz Band, Legacy Mode

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

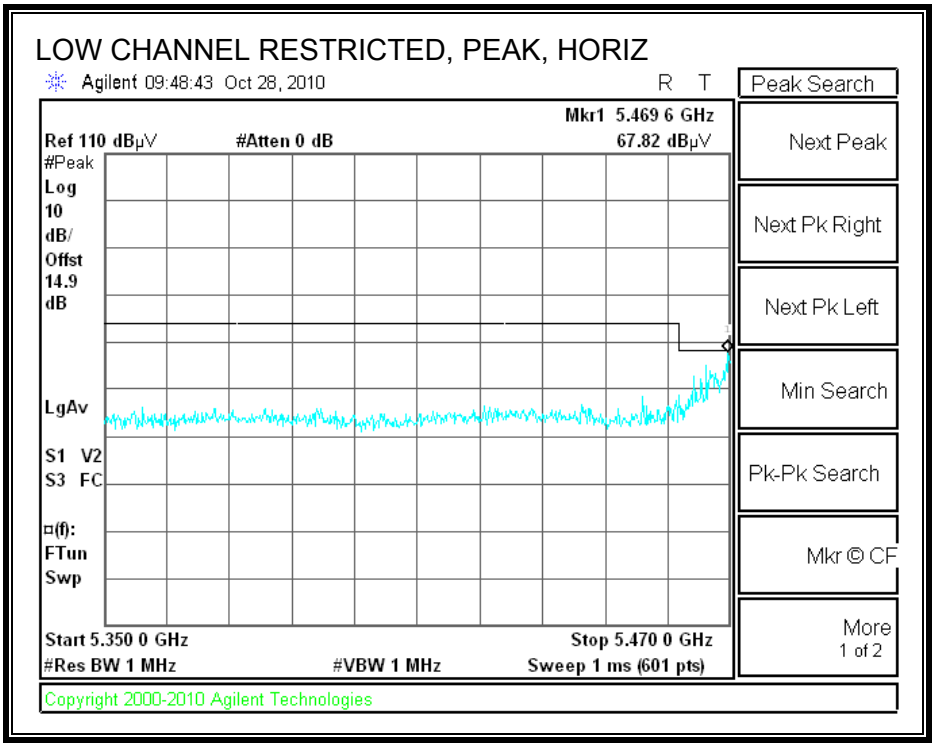
Average Field Strength Limit
Peak Field Strength Limit
Margin vs. Average Limit
Margin vs. Peak Limit

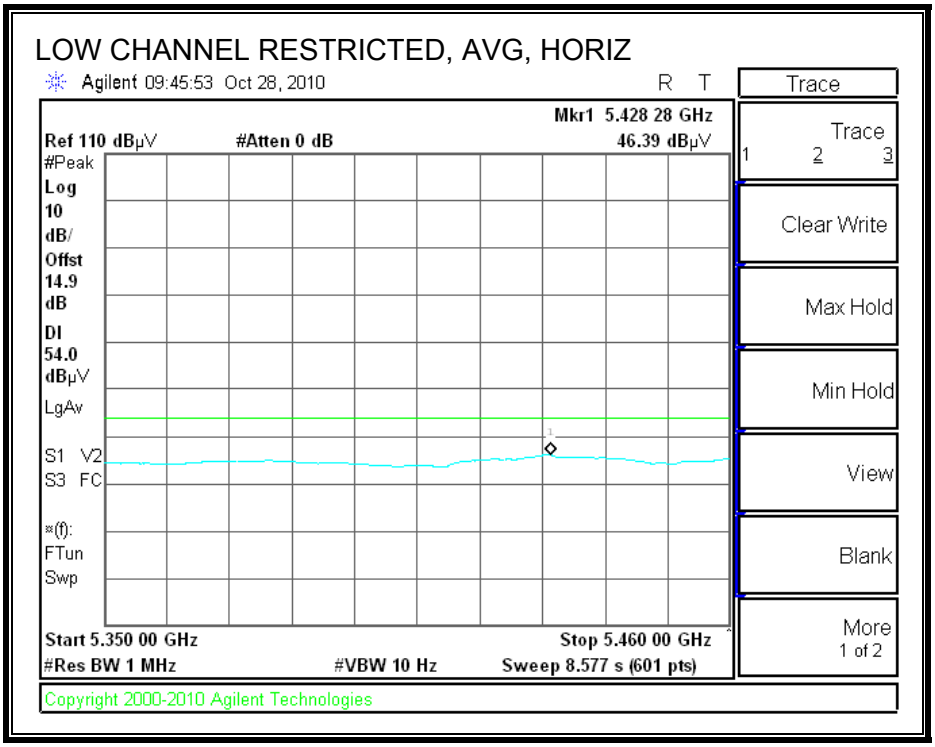
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5500MHz													
11.000	3.0	46.5	37.7	9.2	-33.8	0.0	0.7	60.4	74.0	-13.6	V	P	
11.000	3.0	33.2	37.7	9.2	-33.8	0.0	0.7	47.1	54.0	-6.9	V	A	
11.000	3.0	41.5	37.7	9.2	-33.8	0.0	0.7	55.4	74.0	-18.6	H	P	
11.000	3.0	27.8	37.7	9.2	-33.8	0.0	0.7	41.7	54.0	-12.3	H	A	
Mid Ch, 5600MHz													
11.200	3.0	46.1	37.9	9.3	-33.5	0.0	0.7	60.5	74.0	-13.5	V	P	
11.200	3.0	33.1	37.9	9.3	-33.5	0.0	0.7	47.5	54.0	-6.5	V	A	
11.200	3.0	41.8	37.9	9.3	-33.5	0.0	0.7	56.3	74.0	-17.7	H	P	
11.200	3.0	29.9	37.9	9.3	-33.5	0.0	0.7	44.3	54.0	-9.7	H	A	
High Ch, 5700MHz													
11.400	3.0	48.2	38.0	9.4	-33.2	0.0	0.7	63.1	74.0	-10.9	H	P	
11.400	3.0	34.8	38.0	9.4	-33.2	0.0	0.7	49.8	54.0	-4.2	H	A	
11.400	3.0	48.4	38.0	9.4	-33.2	0.0	0.7	63.4	74.0	-10.6	V	P	
11.400	3.0	33.8	38.0	9.4	-33.2	0.0	0.7	48.8	54.0	-5.2	V	A	

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

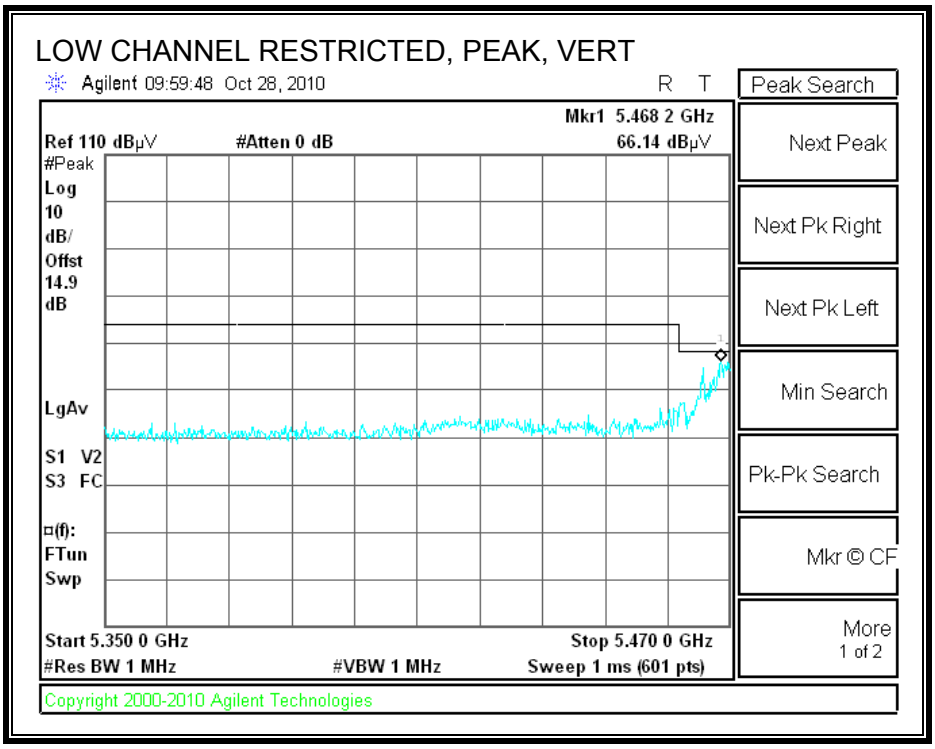
8.2.8. 802.11n HT20 MODE 5.6 GHz BAND

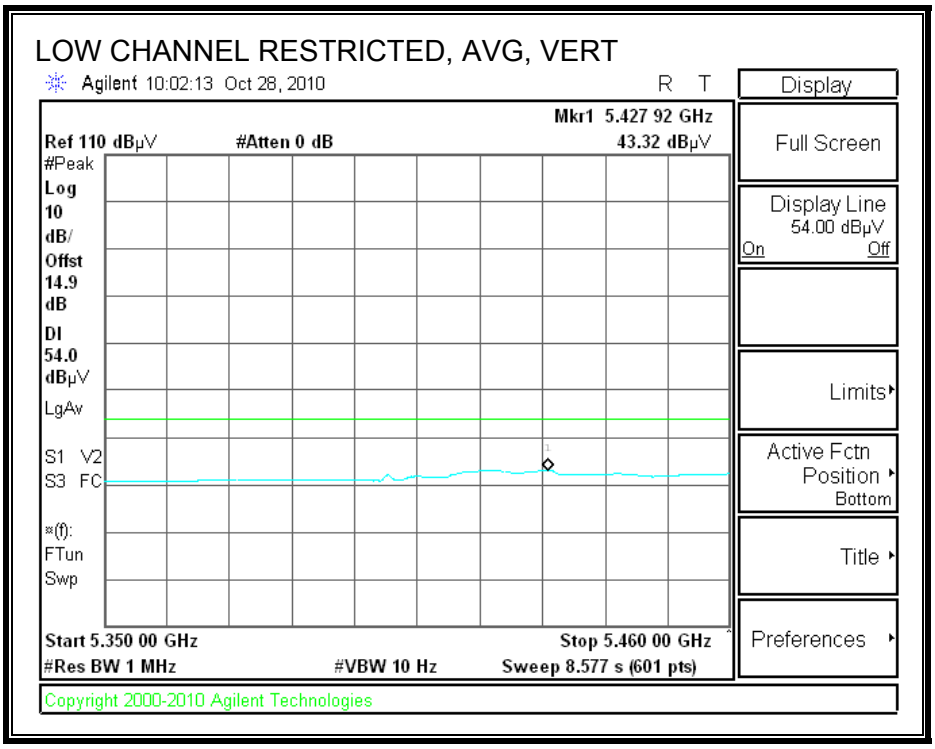
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



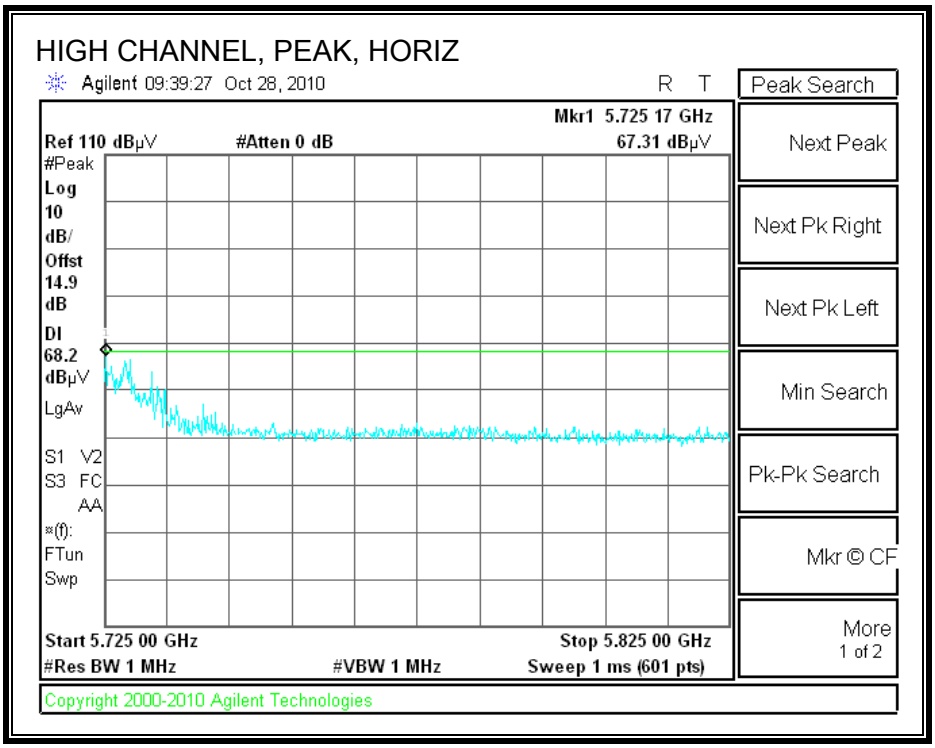


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

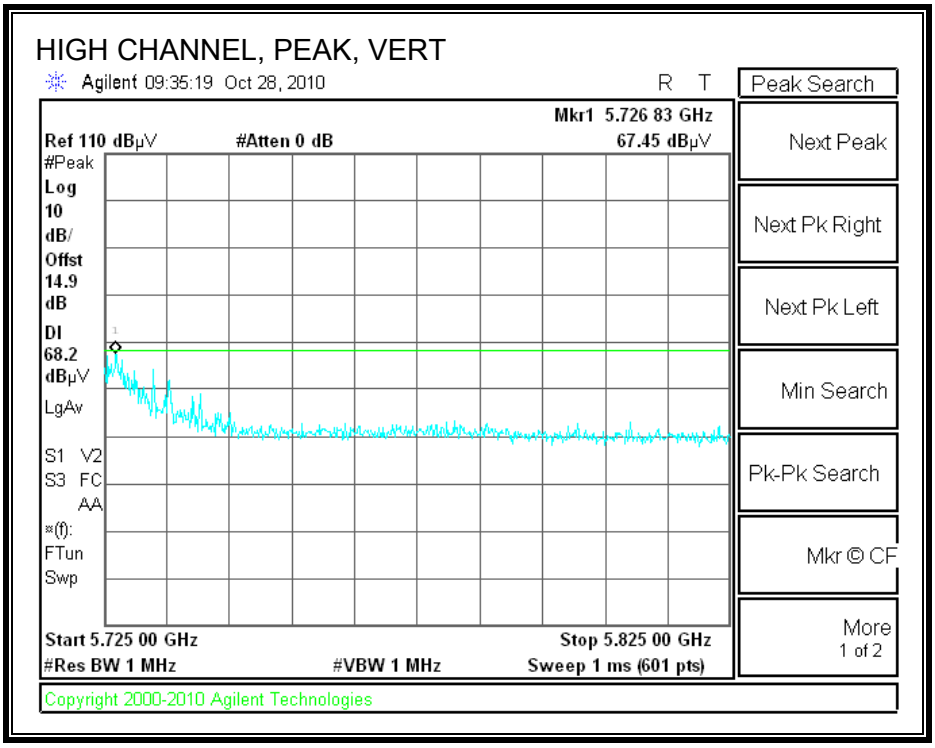




AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.6GHz Band, HT20 Mode

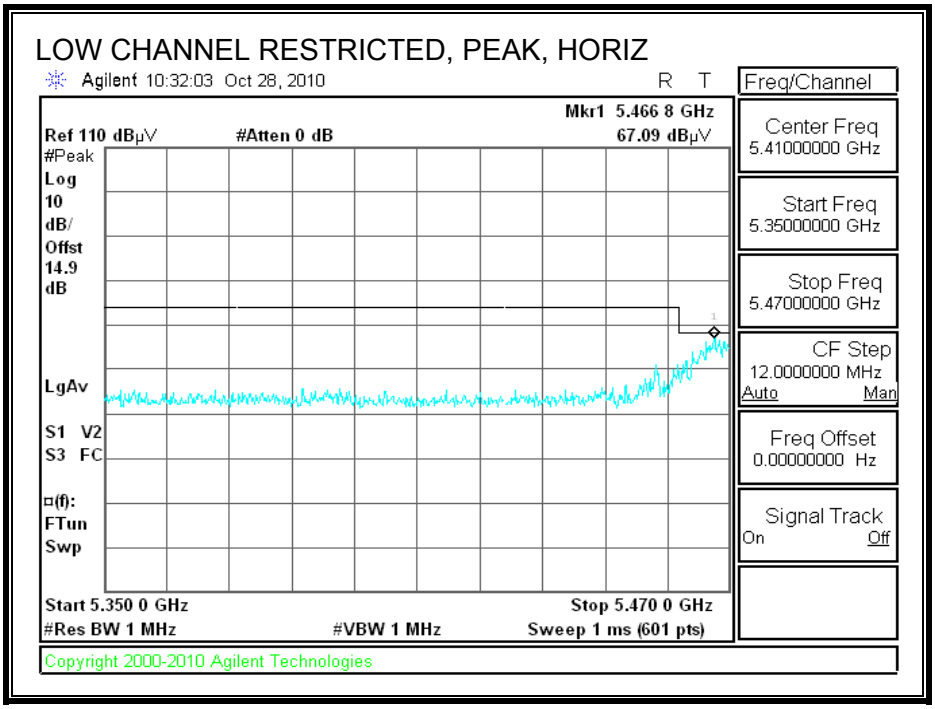
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

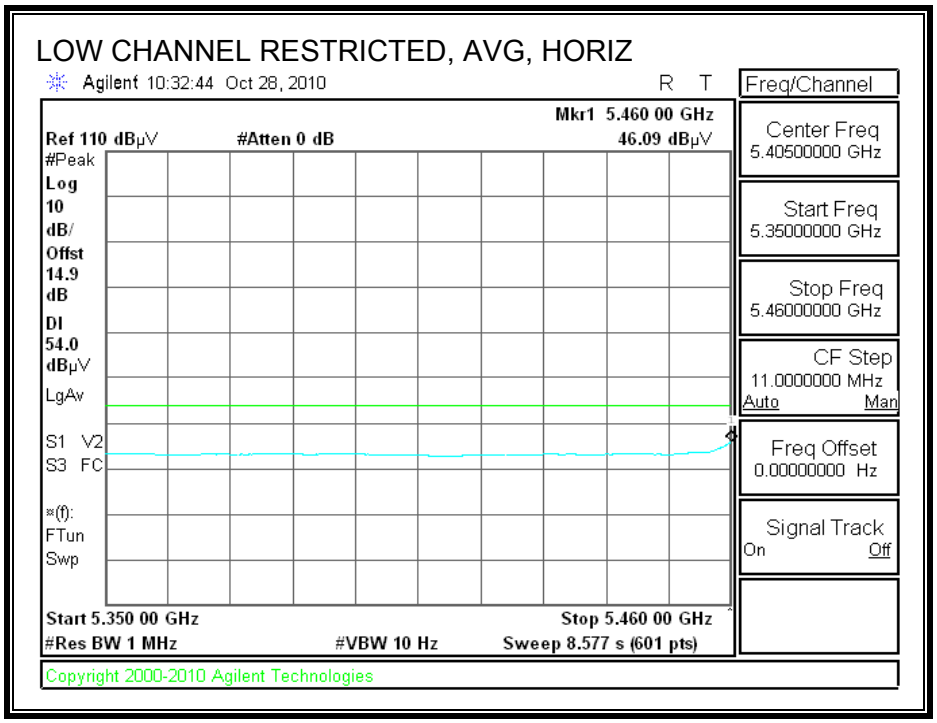
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5500MHz													
11.000	3.0	39.0	37.7	9.2	-33.8	0.0	0.7	53.0	74.0	-21.0	V	P	
11.000	3.0	25.5	37.7	9.2	-33.8	0.0	0.7	39.4	54.0	-14.6	V	A	
11.000	3.0	39.1	37.7	9.2	-33.8	0.0	0.7	53.1	74.0	-20.9	H	P	
11.000	3.0	26.3	37.7	9.2	-33.8	0.0	0.7	40.2	54.0	-13.8	H	A	
Mid Ch, 5600MHz													
11.200	3.0	44.7	37.9	9.3	-33.5	0.0	0.7	59.2	74.0	-14.8	H	P	
11.200	3.0	31.3	37.9	9.3	-33.5	0.0	0.7	45.7	54.0	-8.3	H	A	
11.200	3.0	48.1	37.9	9.3	-33.5	0.0	0.7	62.5	74.0	-11.5	V	P	
11.200	3.0	27.6	37.9	9.3	-33.5	0.0	0.7	42.0	54.0	-12.0	V	A	
High Ch, 5700MHz													
11.400	3.0	46.1	38.0	9.4	-33.2	0.0	0.7	61.1	74.0	-13.0	V	P	
11.400	3.0	33.0	38.0	9.4	-33.2	0.0	0.7	48.0	54.0	-6.0	V	A	
11.400	3.0	49.5	38.0	9.4	-33.2	0.0	0.7	64.5	74.0	-9.5	H	P	
11.400	3.0	34.6	38.0	9.4	-33.2	0.0	0.7	49.6	54.0	-4.4	H	A	

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

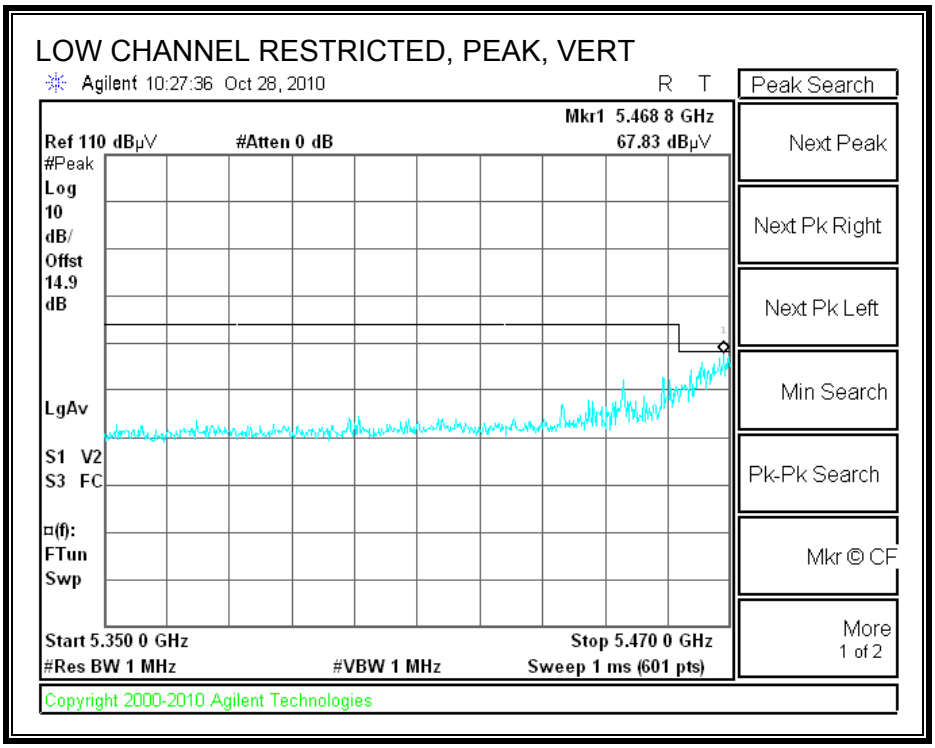
8.2.9. 802.11n HT40 MODE 5.6 GHz BAND

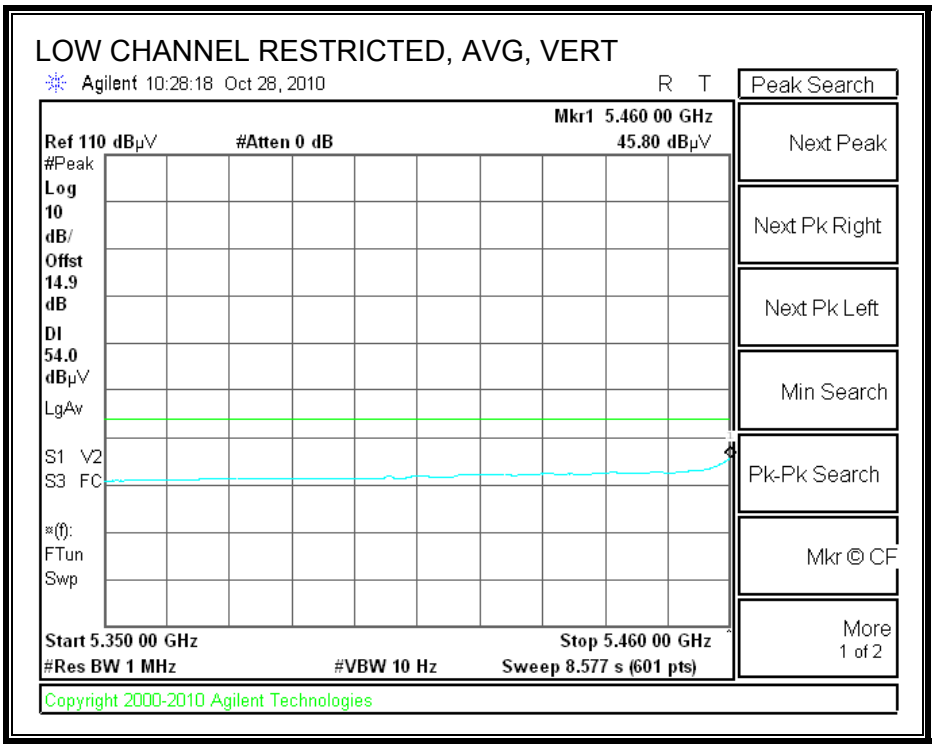
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



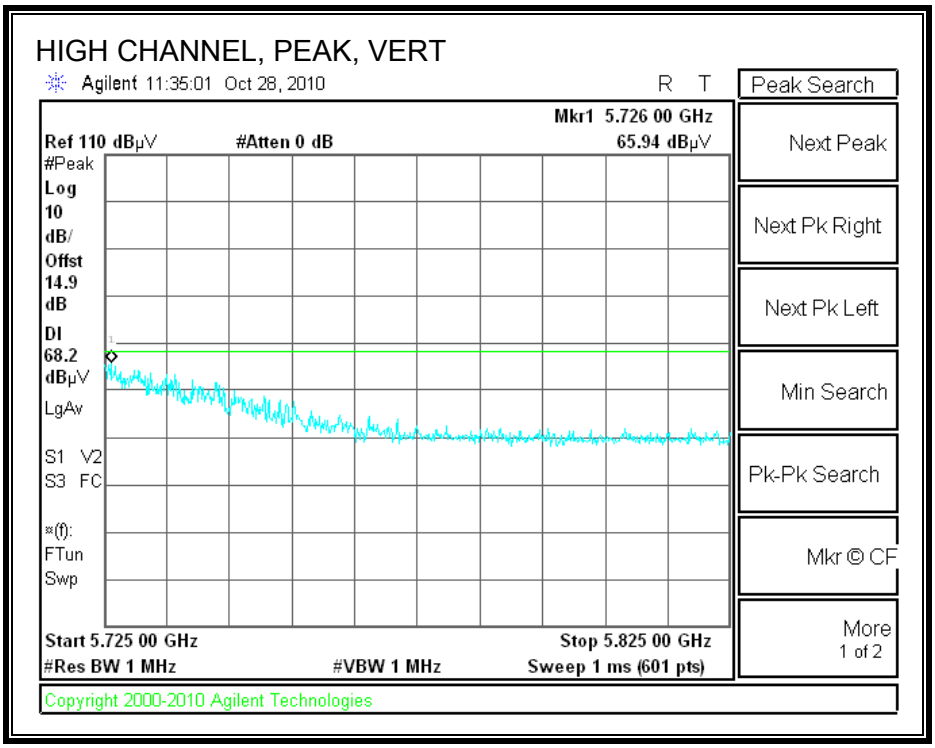


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

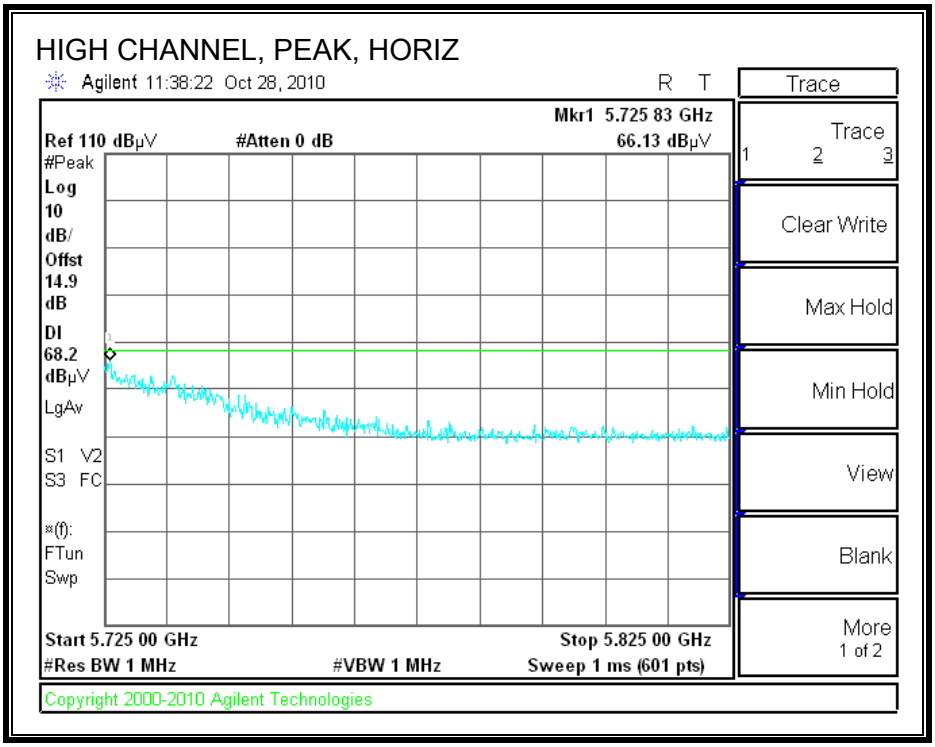




AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/29/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.407
Mode Oper: TX, 5.6GHz Band, HT40

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	Notes
Low Ch, 5510MHz													
11.020	3.0	36.9	37.7	9.2	-33.7	0.0	0.7	50.9	74.0	-23.1	H	P	
11.020	3.0	24.0	37.7	9.2	-33.7	0.0	0.7	37.9	54.0	-16.1	H	A	
11.020	3.0	43.7	37.7	9.2	-33.7	0.0	0.7	57.7	74.0	-16.3	V	P	
11.020	3.0	27.6	37.7	9.2	-33.7	0.0	0.7	41.6	54.0	-12.4	V	A	
Mid Ch, 5590MHz													
11.180	3.0	42.7	37.8	9.3	-33.5	0.0	0.7	57.0	74.0	-17.0	V	P	
11.180	3.0	27.8	37.8	9.3	-33.5	0.0	0.7	42.2	54.0	-11.8	V	A	
11.180	3.0	40.9	37.8	9.3	-33.5	0.0	0.7	55.2	74.0	-18.8	H	P	
11.180	3.0	23.8	37.8	9.3	-33.5	0.0	0.7	38.2	54.0	-15.8	H	A	
High Ch, 5670MHz													
11.340	3.0	37.4	38.0	9.4	-33.3	0.0	0.7	52.1	74.0	-21.9	H	P	
11.340	3.0	25.5	38.0	9.4	-33.3	0.0	0.7	40.2	54.0	-13.8	H	A	
11.340	3.0	46.9	38.0	9.4	-33.3	0.0	0.7	61.7	74.0	-12.3	V	P	
11.340	3.0	29.9	38.0	9.4	-33.3	0.0	0.7	44.7	54.0	-9.3	V	A	

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. FOR 20 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Atheros
Project #: 10U13467
Date: 11/18/2010
Test Engineer: Chin Pang
Configuration: EUT with Antenna / Laptop
Mode: RX mode, 20MHz BW

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056			FCC 15.209

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)
1.193	3.0	53.9	39.8	24.6	2.6	-36.0	0.0	0.0	45.1	31.0	74	54	-28.9	-23.0	H
2.130	3.0	53.8	35.4	27.8	3.6	-35.3	0.0	0.0	49.9	31.5	74	54	-24.1	-22.5	H
4.983	3.0	42.5	28.3	32.9	5.9	-34.9	0.0	0.0	46.4	32.2	74	54	-27.6	-21.8	H
1.193	3.0	54.8	40.7	24.6	2.6	-36.0	0.0	0.0	46.0	31.9	74	54	-28.0	-22.1	V
2.130	3.0	54.7	35.6	27.8	3.6	-35.3	0.0	0.0	50.8	31.7	74	54	-23.2	-22.3	V
4.983	3.0	43.0	28.5	32.9	5.9	-34.9	0.0	0.0	46.9	32.4	74	54	-27.1	-21.6	V

Rev. 07.22.09

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. FOR 40 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engineer: Chin Pang
Company: Atheros
Project #: 10U13467
Date: 11/12/2010
Configuration: EUT with Antenna / Laptop
Mode: RX mode, 40MHz BW

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056			FCC 15.209

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)
1.297	3.0	52.0	35.7	25.0	2.7	-35.9	0.0	0.0	43.8	27.5	74	54	-30.2	-26.5	H
2.127	3.0	56.0	37.0	27.8	3.6	-35.3	0.0	0.0	52.1	33.1	74	54	-21.9	-20.9	H
4.995	3.0	45.0	30.0	32.9	5.9	-34.9	0.0	0.0	49.0	34.0	74	54	-25.0	-20.0	H
1.193	3.0	54.5	36.0	24.6	2.6	-36.0	0.0	0.0	45.7	27.2	74	54	-28.3	-26.8	V
2.127	3.0	55.0	36.5	27.8	3.6	-35.3	0.0	0.0	51.1	32.6	74	54	-22.9	-21.4	V
4.995	3.0	43.7	28.6	32.9	5.9	-34.9	0.0	0.0	47.7	32.6	74	54	-26.3	-21.4	V

Rev. 07.22.09
Note: No other emissions were detected above the system noise floor.

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)

VERTICAL AND HORIZONTAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 10/30/10
Project #: 10U13467
Company: Atheros
Test Target: FCC 15.209
Mode Oper: TX (Worst Case), 5GHz Band

f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		
Read	Analyzer Reading	Filter	Filter Insert Loss		
AF	Antenna Factor	Corr.	Calculated Field Strength		
CL	Cable Loss	Limit	Field Strength Limit		

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Pad dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
vert													
41.52	3.0	46.4	13.2	0.6	29.6	0.0	0.0	30.4	40.0	-9.6	V	P	
83.042	3.0	53.2	7.6	0.8	29.6	0.0	0.0	32.0	40.0	-8.0	V	P	
142.085	3.0	43.6	13.1	1.1	29.4	0.0	0.0	28.4	43.5	-15.1	V	P	
151.325	3.0	42.0	12.4	1.1	29.3	0.0	0.0	26.1	43.5	-17.4	V	P	
336.013	3.0	39.3	13.9	1.7	29.0	0.0	0.0	25.9	46.0	-20.1	V	P	
432.017	3.0	39.9	15.6	2.0	29.4	0.0	0.0	28.0	46.0	-18.0	V	P	
124.804	3.0	46.7	13.8	1.0	29.4	0.0	0.0	32.2	43.5	-11.3	H	P	
151.685	3.0	51.4	12.3	1.1	29.3	0.0	0.0	35.5	43.5	-8.0	H	P	
173.886	3.0	46.0	9.9	1.2	29.2	0.0	0.0	27.9	43.5	-15.6	H	P	
192.007	3.0	47.8	11.4	1.2	29.0	0.0	0.0	31.4	43.5	-12.1	H	P	
336.013	3.0	39.5	13.9	1.7	29.0	0.0	0.0	26.2	46.0	-19.8	H	P	
528.021	3.0	35.1	17.2	2.2	29.7	0.0	0.0	24.8	46.0	-21.2	H	P	

9. 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

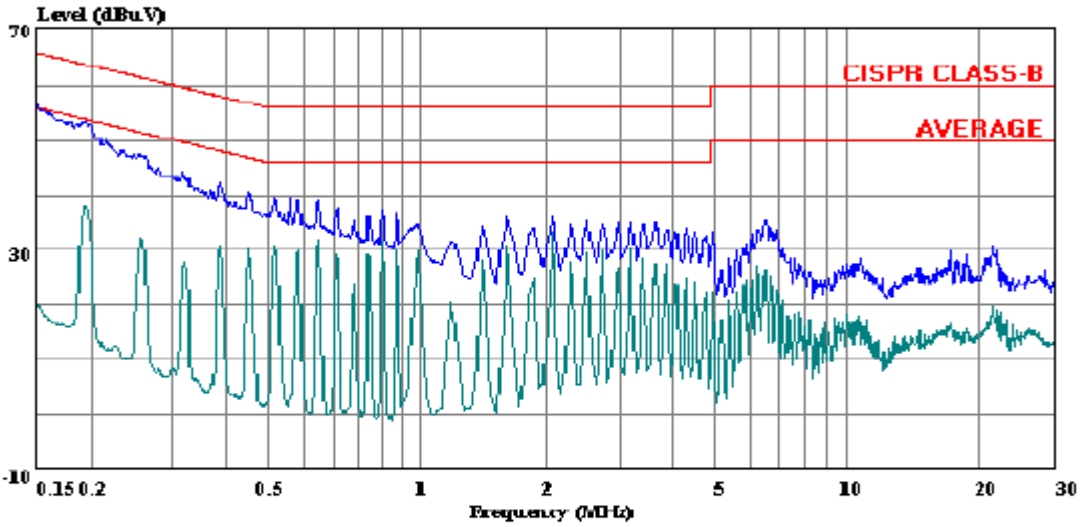
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	53.29	--	38.11	0.00	63.91	53.91	-10.62	-15.80	L1
0.65	39.25	--	31.75	0.00	56.00	46.00	-16.75	-14.25	L1
2.19	36.09	--	33.44	0.00	56.00	46.00	-19.91	-12.56	L1
0.19	53.27	--	35.97	0.00	63.91	53.91	-10.64	-17.94	L2
0.52	40.65	--	31.70	0.00	56.00	46.00	-15.35	-14.30	L2
2.19	33.50	--	28.88	0.00	56.00	46.00	-22.50	-17.12	L2
6 Worst Data									

LINE 1 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

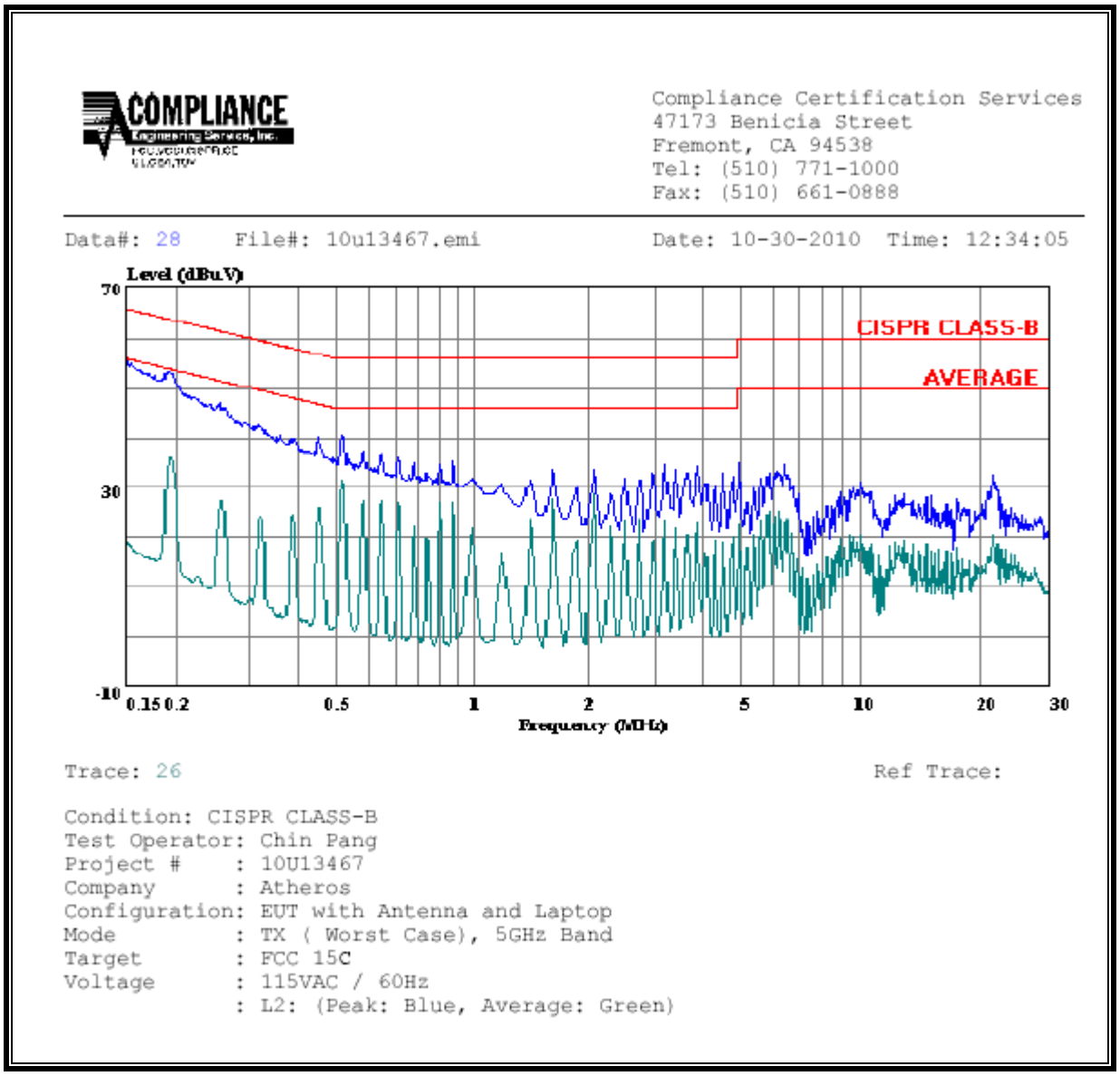
Data#: 21 File#: 10u13467.emi Date: 10-30-2010 Time: 12:11:05



Trace: 19 Ref Trace:

Condition: CISPR CLASS-B
Test Operator: Chin Pang
Project # : 10U13467
Company : Atheros
Configuration: EUT with Antenna and Laptop
Mode : TX (Worst Case), 5GHz Band
Target : FCC 15C
Voltage : 115VAC / 60Hz
: L1: (Peak: Blue, Average: Green)

LINE 2 RESULTS



10. DYNAMIC FREQUENCY SELECTION

10.1. OVERVIEW

10.1.1. 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

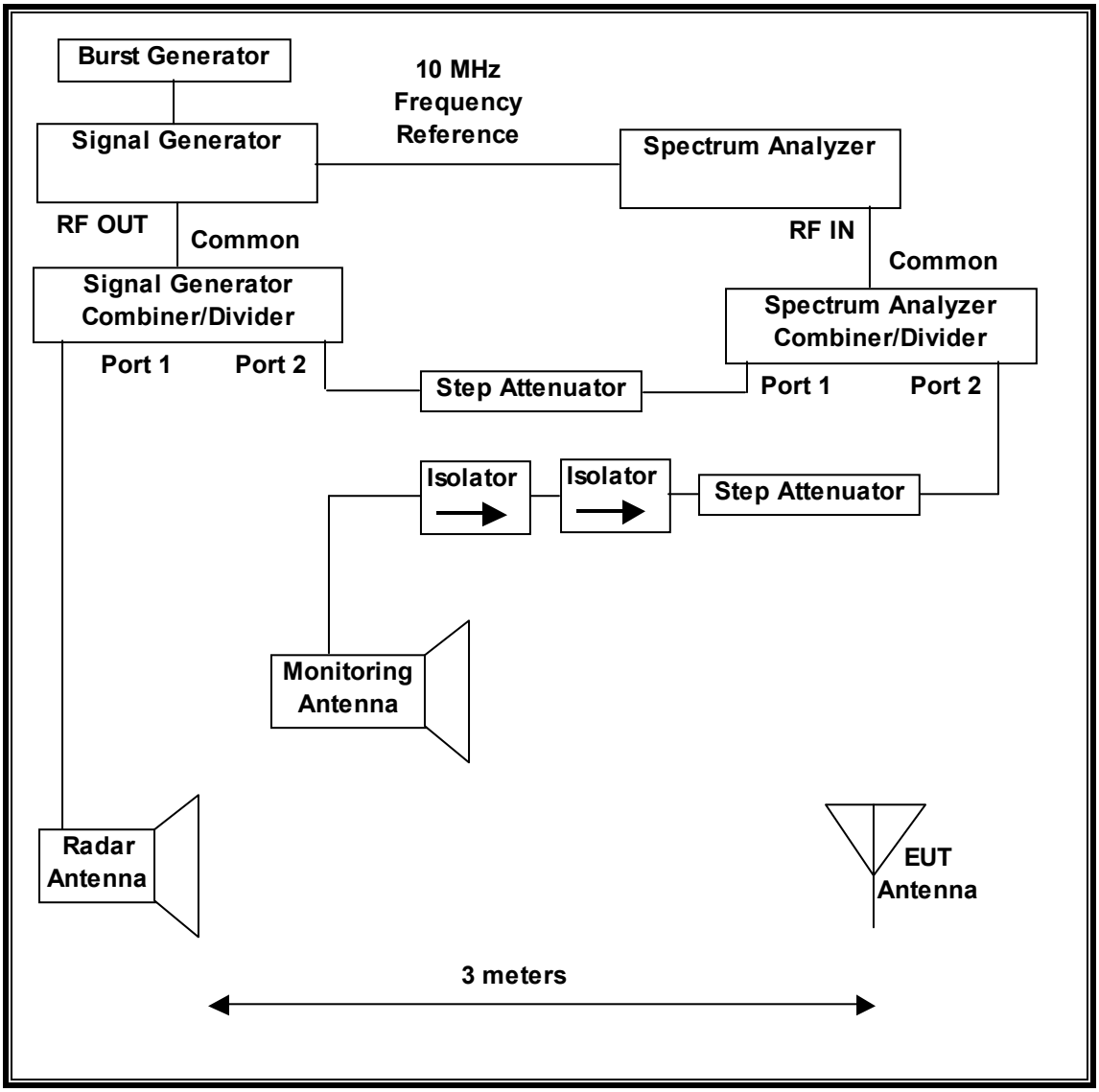
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

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

10.1.2. 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.

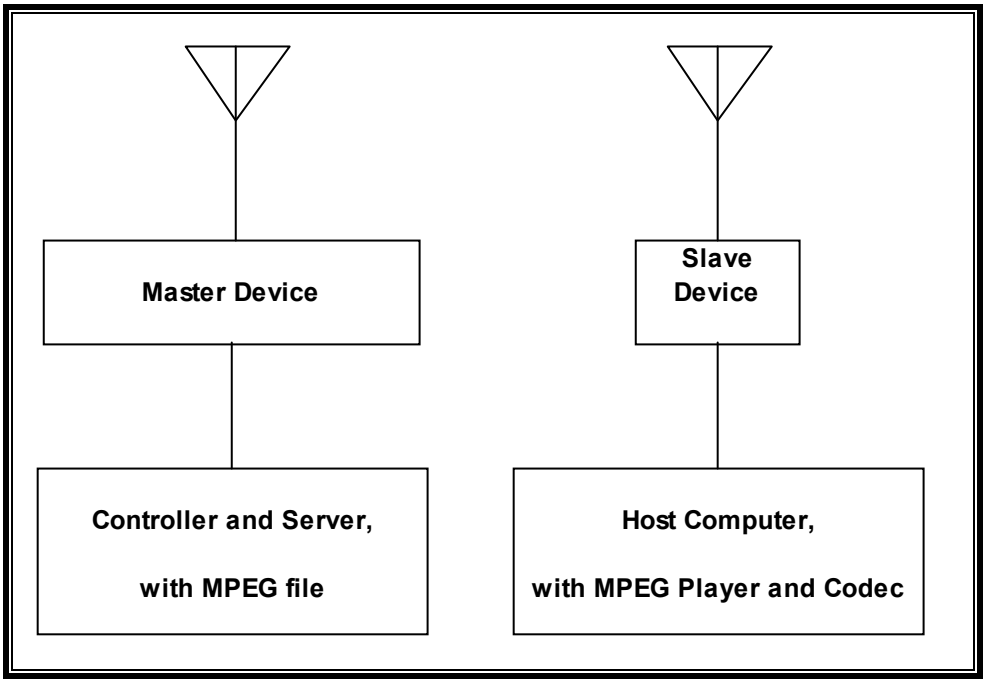
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00996	10/29/11
Vector signal generator, 20GHz	Agilent / HP	E8267C	C01066	02/12/12

10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Wireless Access Point	Cisco	AIR-AP1252AG-A-K9	FTX120690N2	LDK102061
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH112490BD	DoC
Notebook PC (Host)	Dell	PP18L	10657517255	DoC
AC Adapter (Host PC)	Dell	LA65SN0-00	CN-ODF263-71615-6AU-1019	DoC
Notebook PC (Client)	Lenovo	Type 0769-AUU	L3-BA660 08/01	DoC
AC Adapter (Client PC)	Lenovo	92P1156	11S92P1156Z1ZDXN99HDS5	DoC

10.1.4. 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 28.7 dBm EIRP in the 5250-5350 MHz band and 29.9 dBm EIRP in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has an array gain of 10.24 dBi in the 5250-5350 MHz band and 9.22 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has an array gain of 10.17 dBi in the 5250-5350 MHz band and 9.11 dBi in the 5470-5725 MHz band.

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

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 revision 9.2.0.118.

MANUFACTURER’S STATEMENT REGARDING UNIFORM CHANNEL SPREADING

Not Applicable for Slave Devices.

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

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

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.

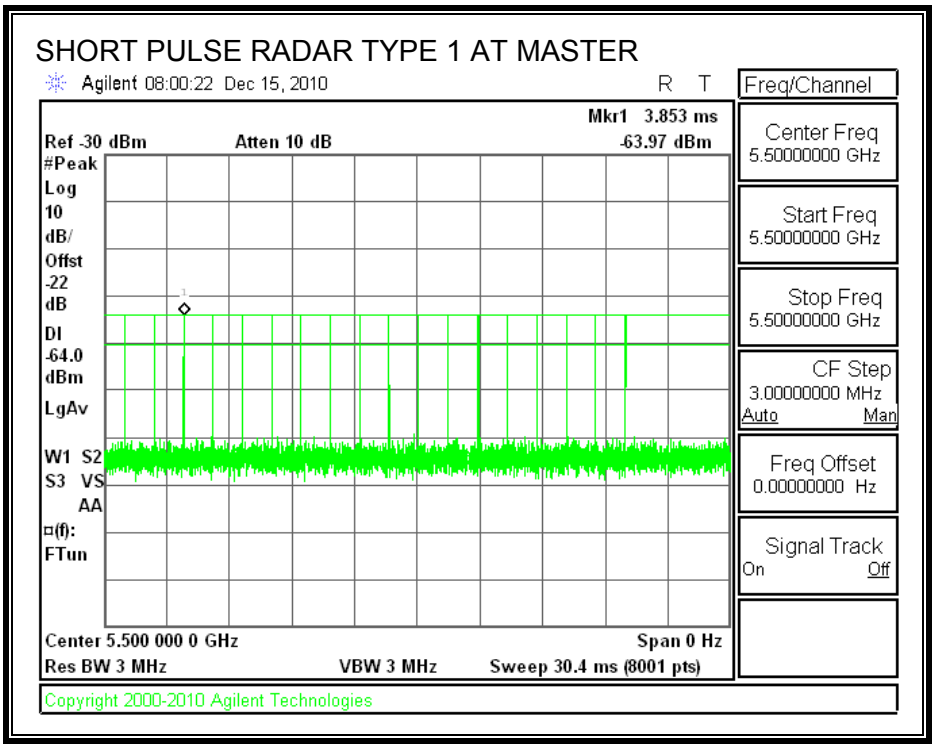
10.2. RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

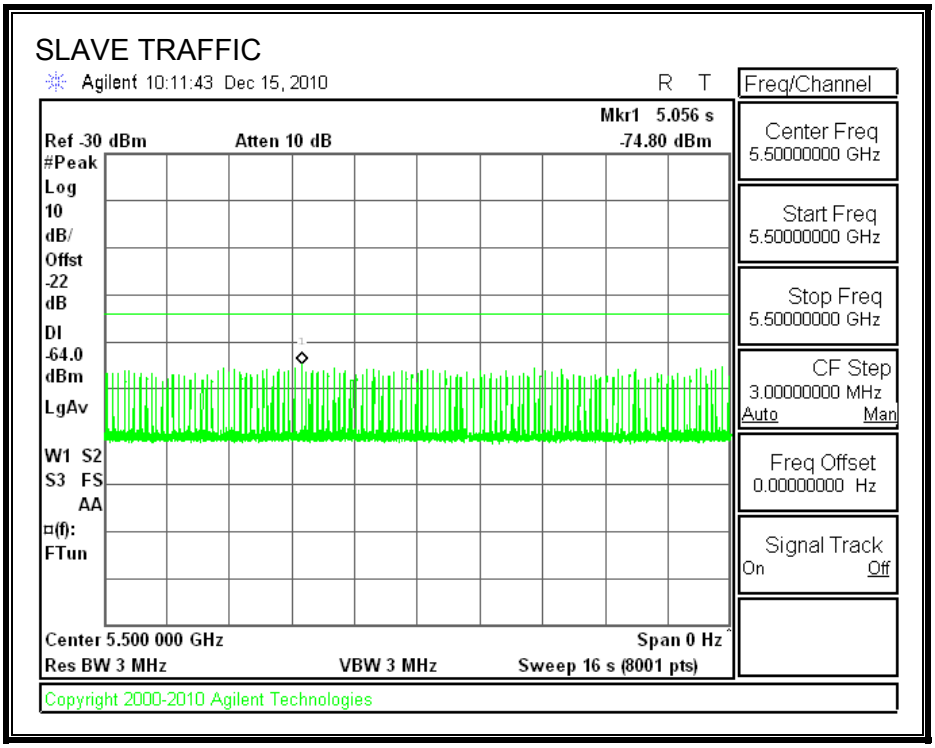
All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.2.4. 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).

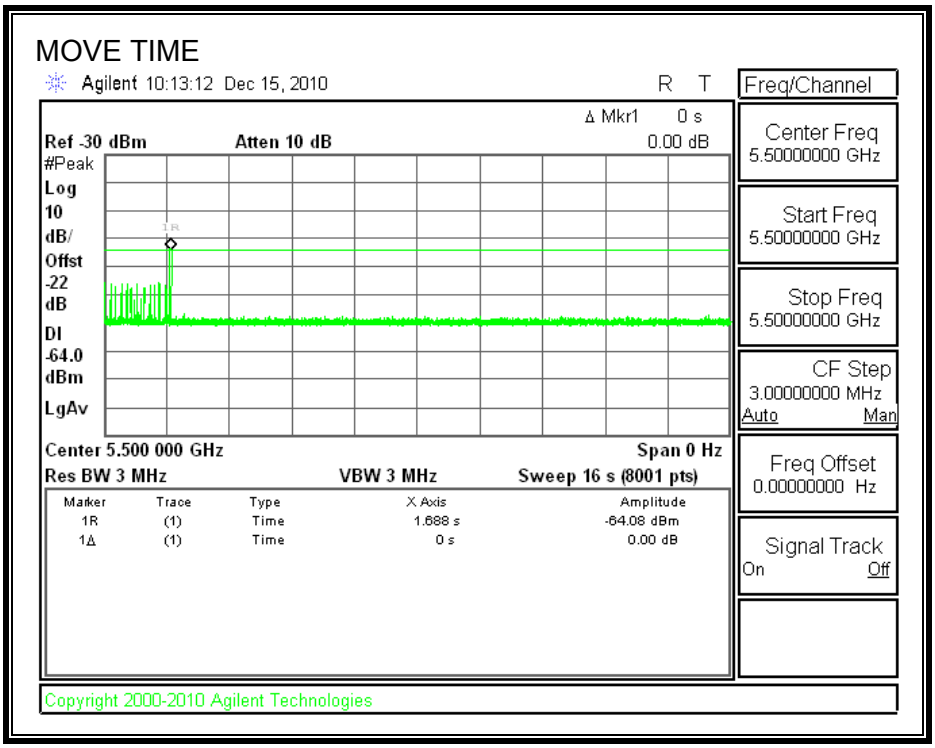
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

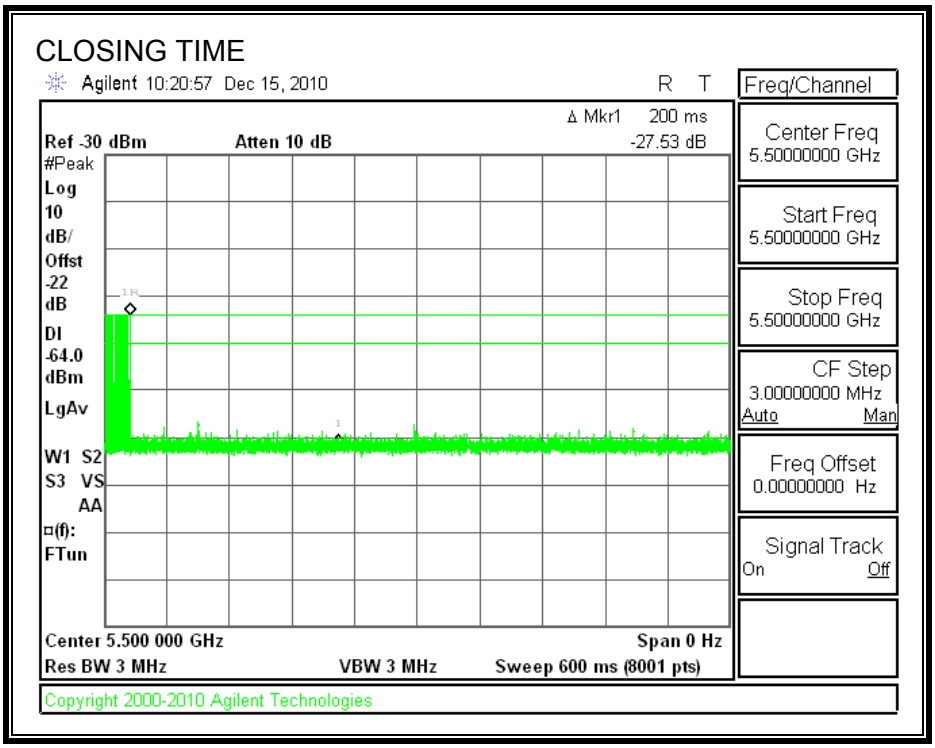
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260

MOVE TIME

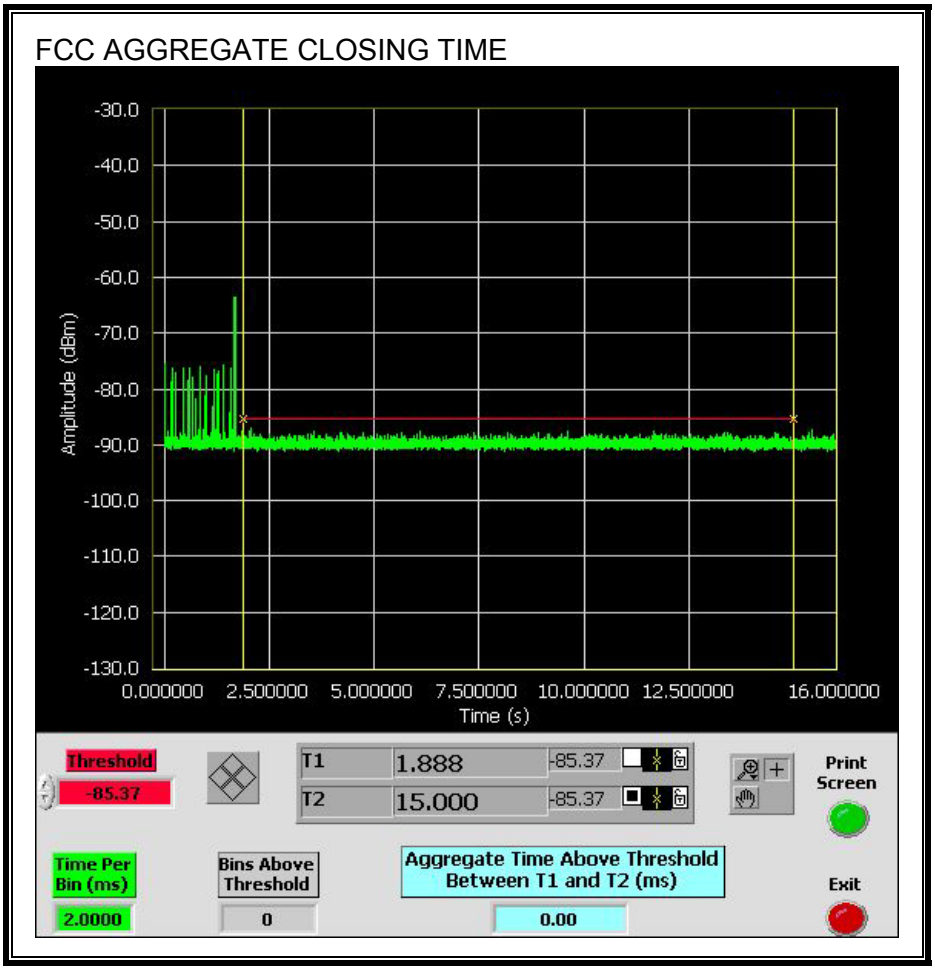


CHANNEL CLOSING TIME

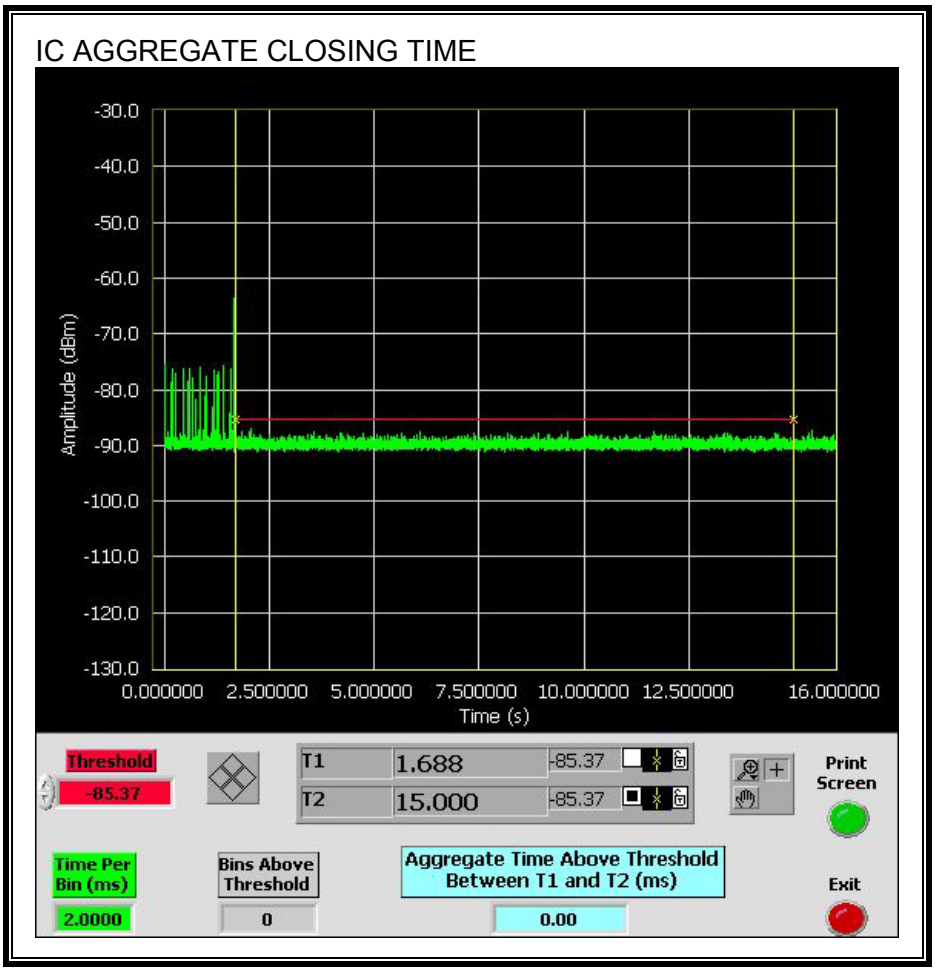


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



No transmissions are observed during the IC aggregate monitoring period.



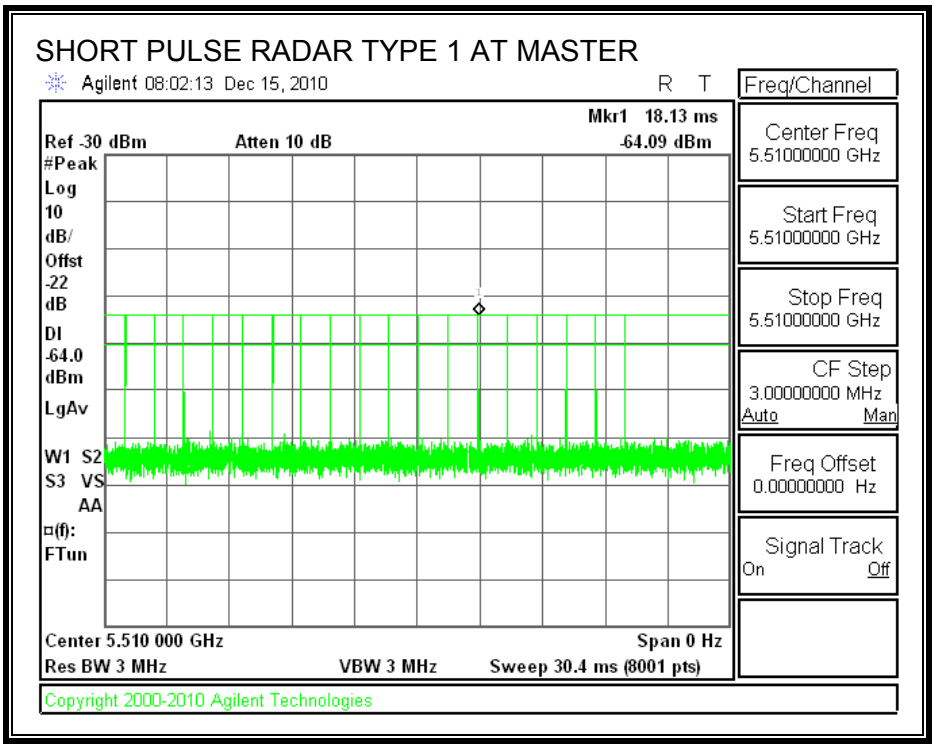
10.3. RESULTS FOR 40 MHz BANDWIDTH

10.3.1. TEST CHANNEL

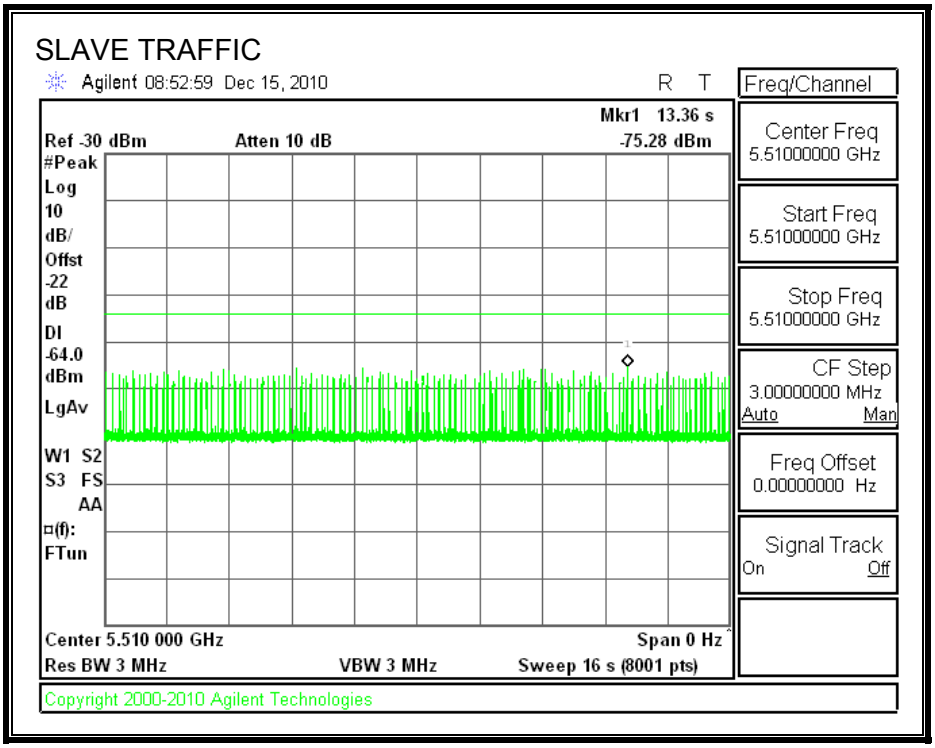
All tests were performed at a channel center frequency of 5510 MHz.

10.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.3.4. 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).

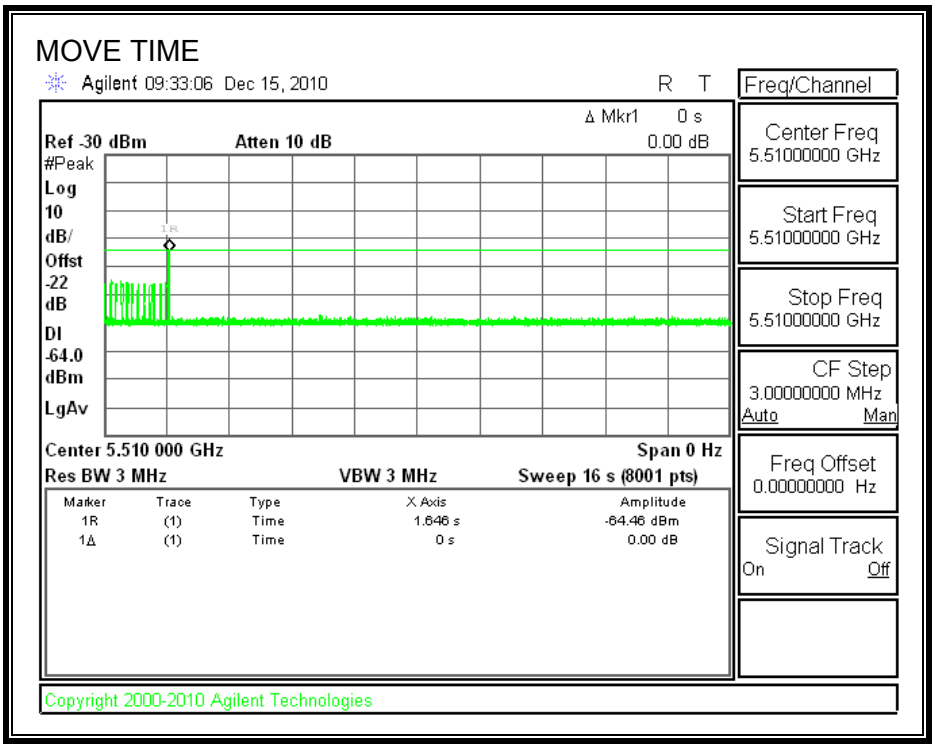
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

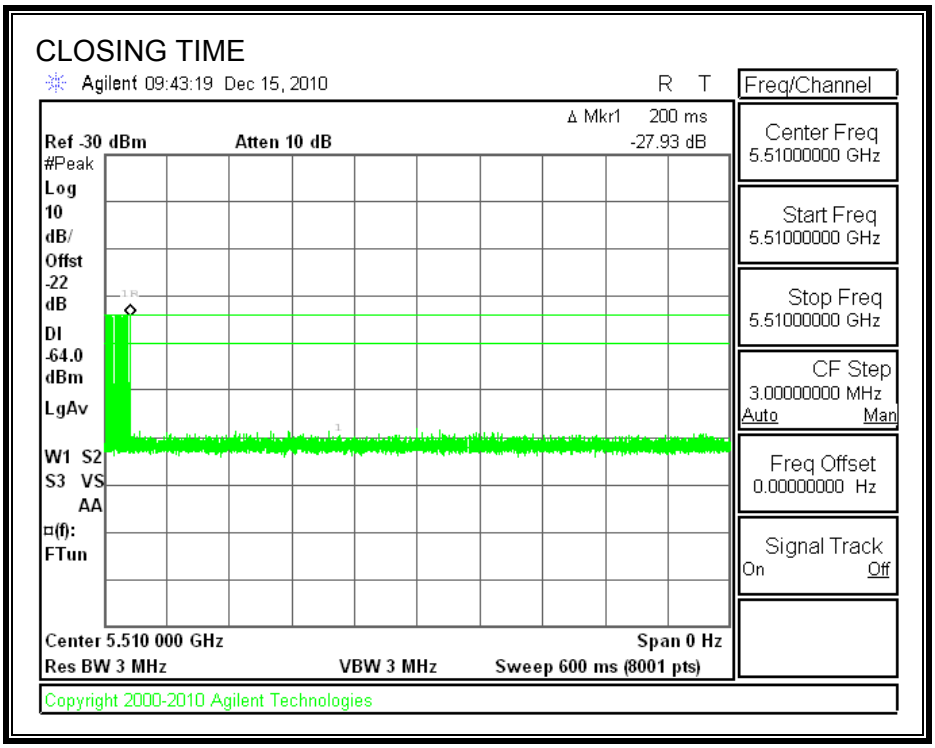
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260

MOVE TIME

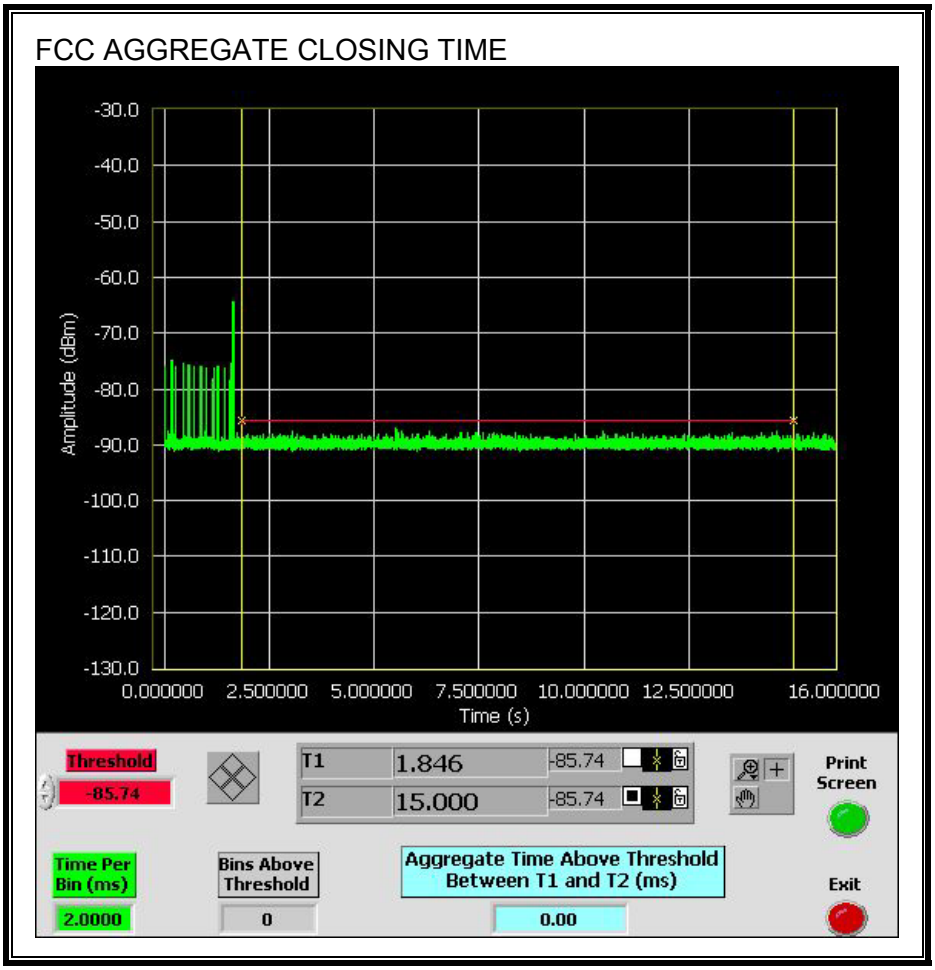


CHANNEL CLOSING TIME

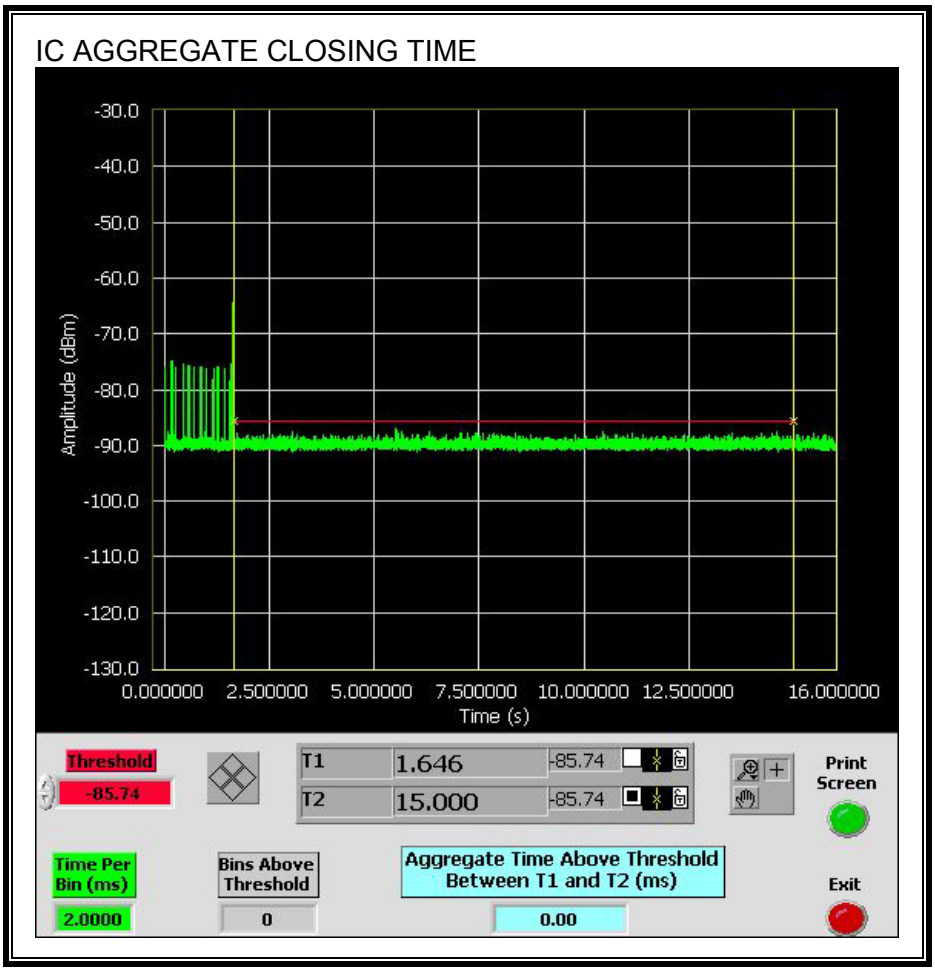


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



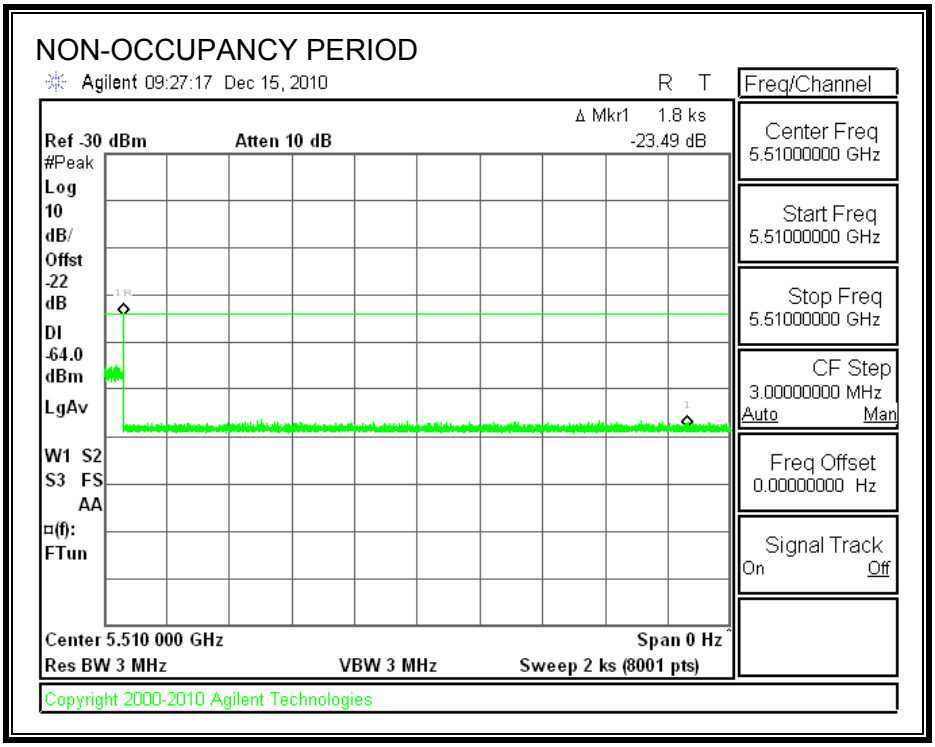
No transmissions are observed during the IC aggregate monitoring period.



10.3.5. NON-OCCUPANCY PERIOD

RESULTS

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



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

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

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

(MPE distance equals 20 cm)

Band	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m^2)	FCC Power Density (mW/cm^2)
5.2 GHz	0.20	16.86	5.97	0.38	0.038
5.2 GHz	0.20	12.40	10.28	0.37	0.037
5.3 GHz	0.20	21.47	6.07	1.13	0.113
5.3 GHz	0.20	18.52	10.24	1.50	0.150
5.6 GHz	0.20	20.71	4.88	0.72	0.072
5.6 GHz	0.20	20.70	9.22	1.95	0.195