9.1.5. 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.

Limit line = -27 - EUT Antenna Gain

TEST PROCEDURE

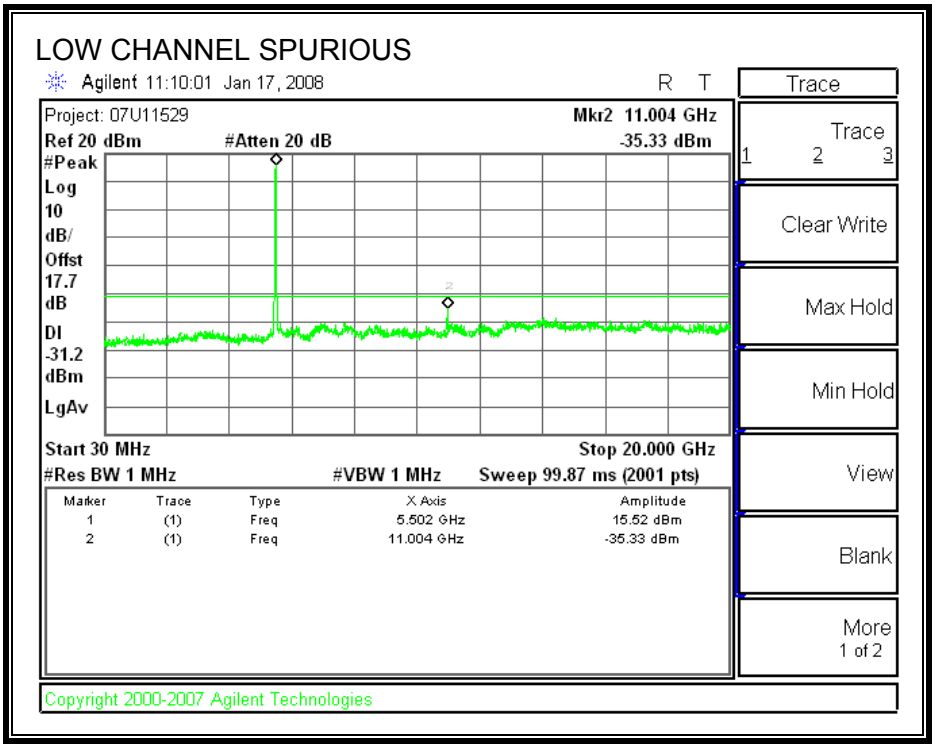
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

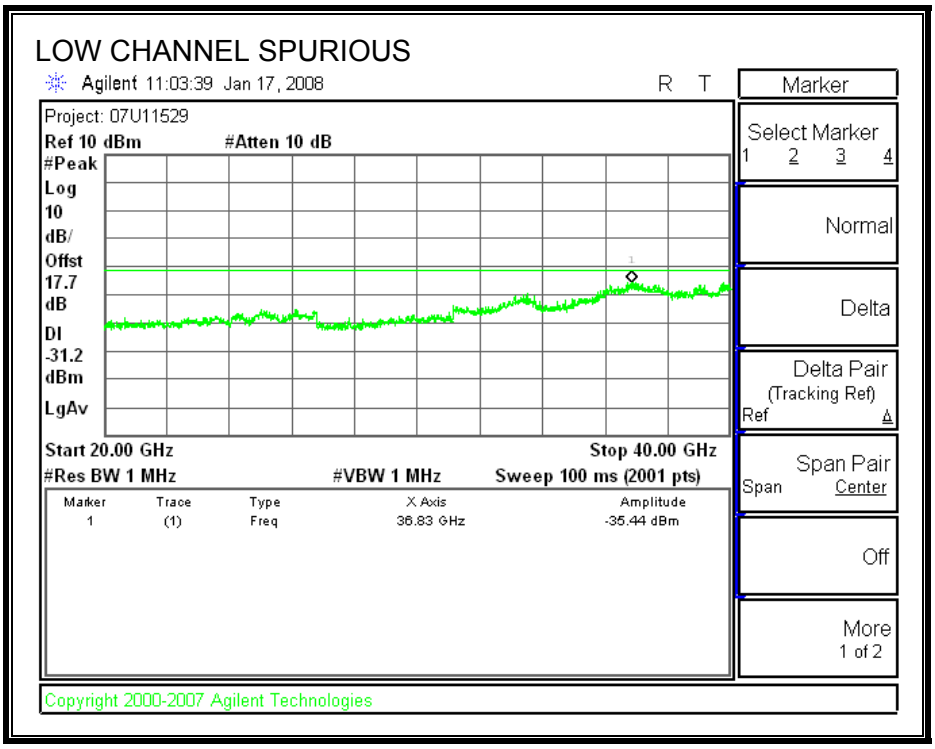
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

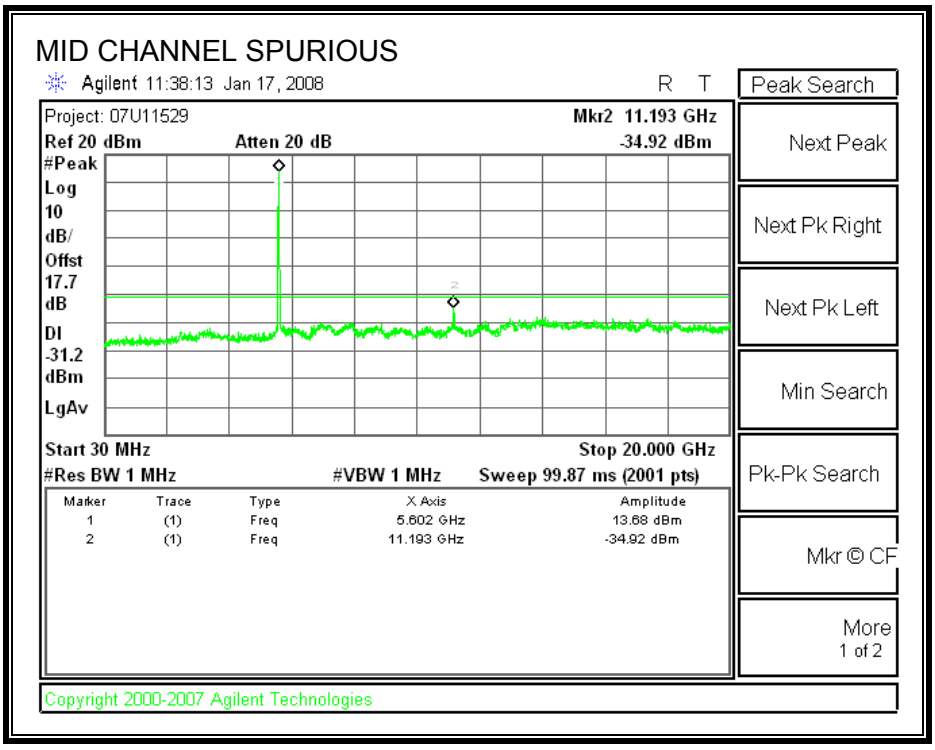
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

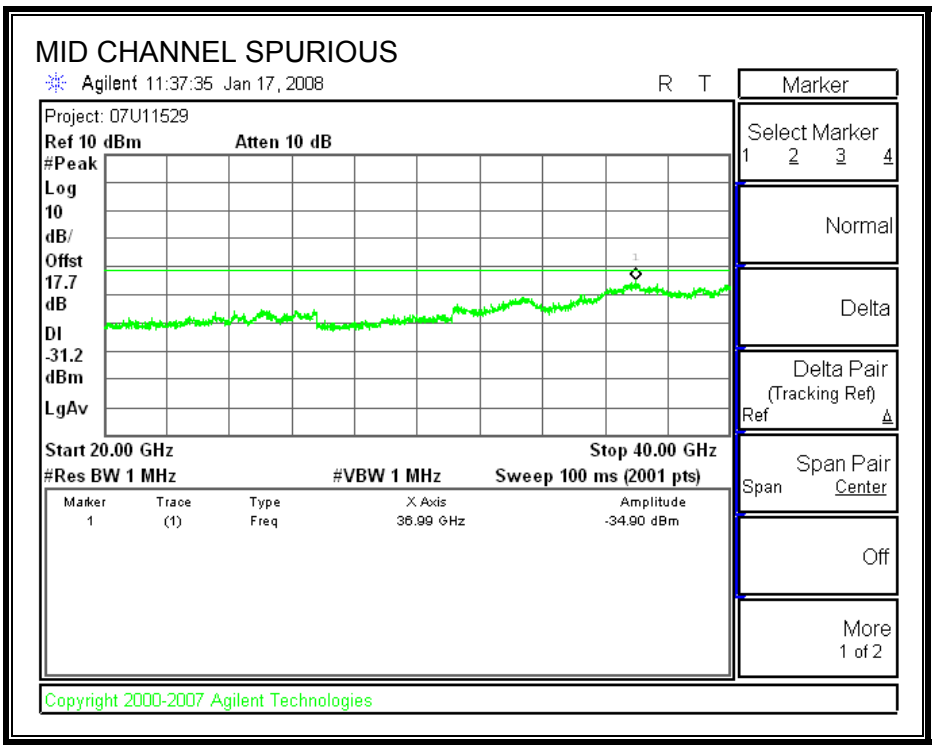
RESULTS

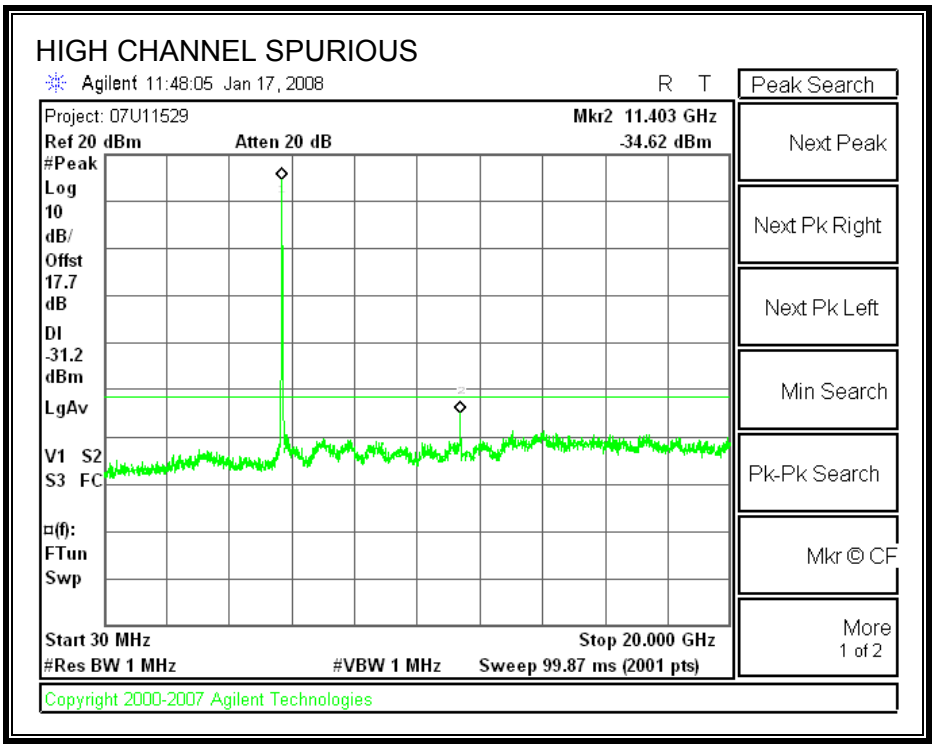
SPURIOUS EMISSIONS

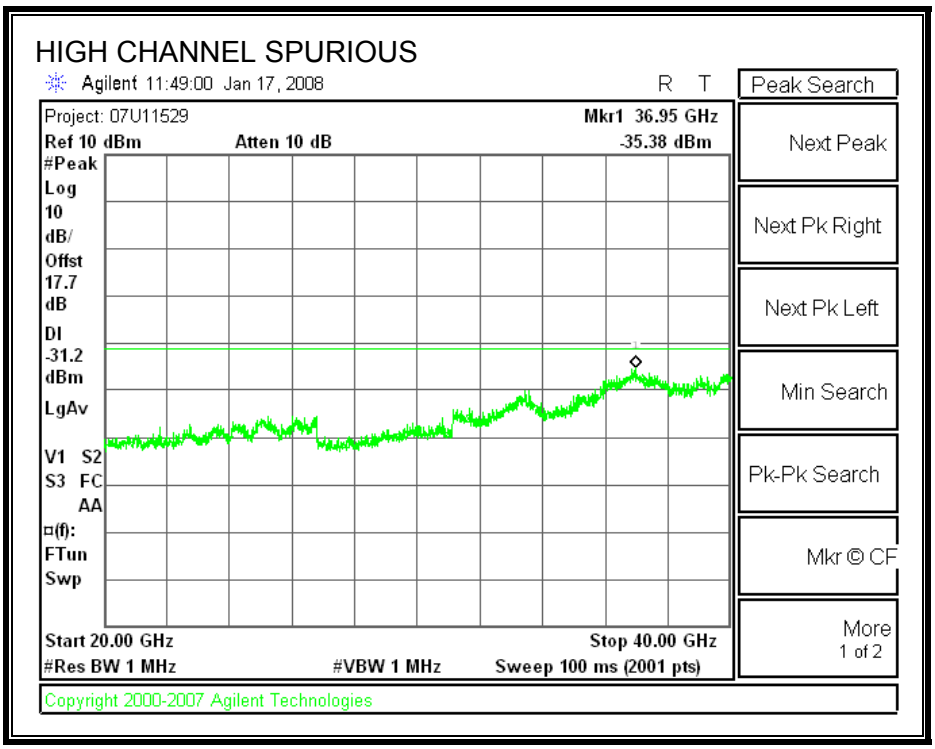












9.2. 802.11n HT20 MODE

9.2.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

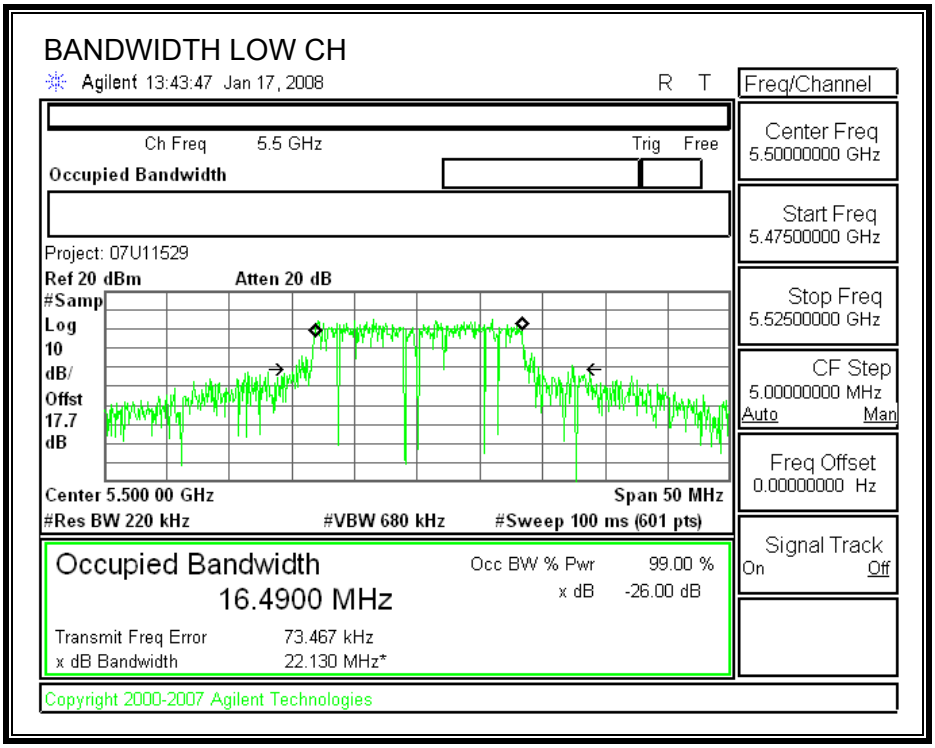
TEST PROCEDURE

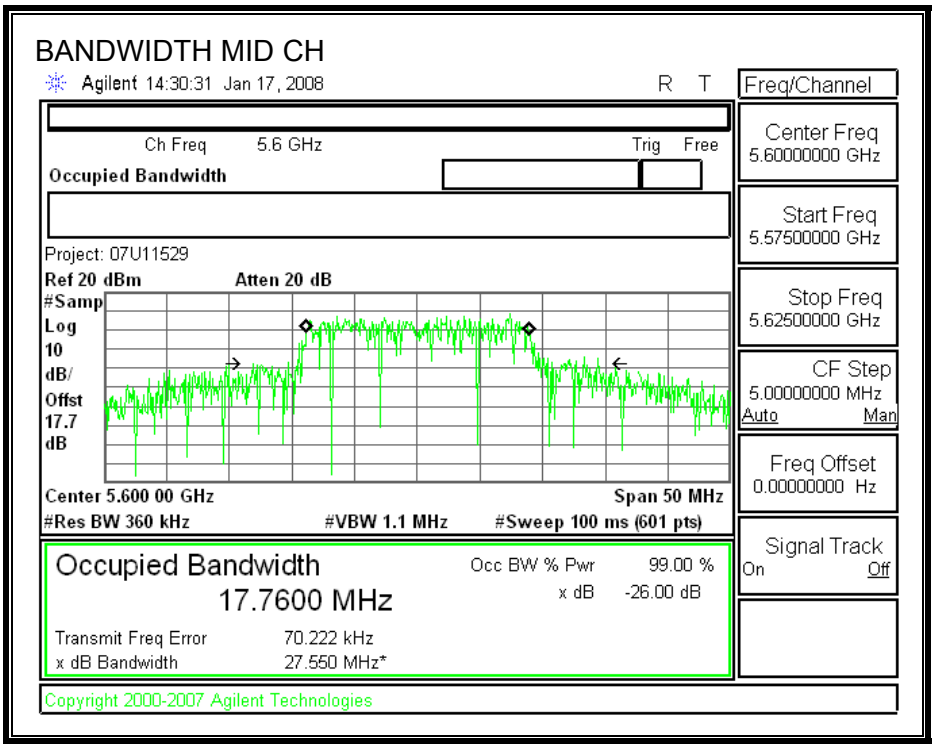
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

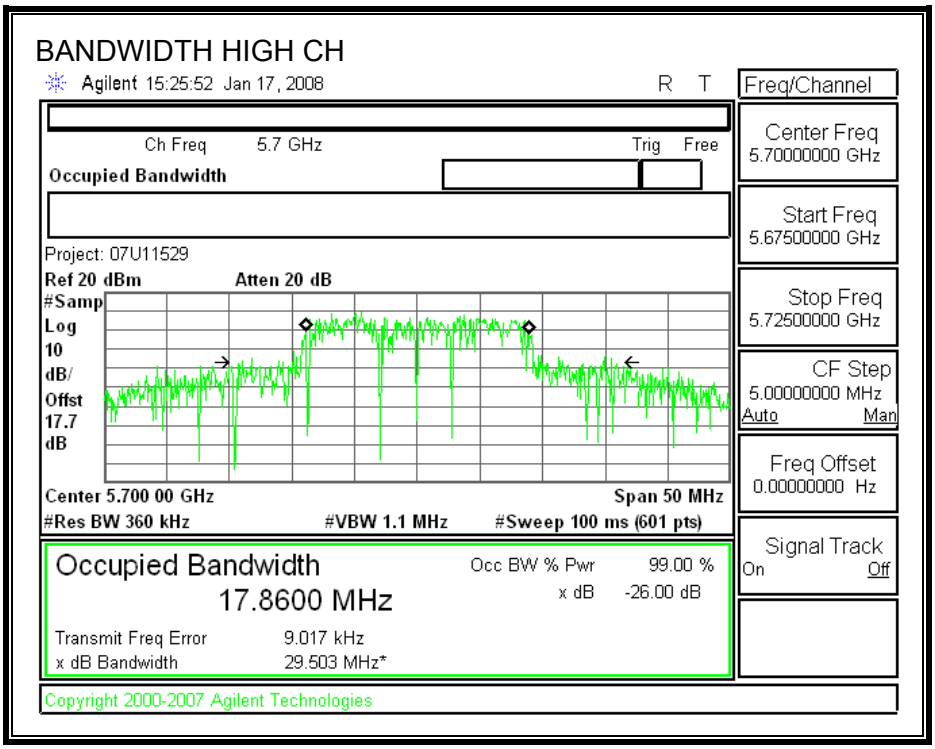
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5500	22.130	16.490
Middle	5600	27.550	17.760
High	5700	29.503	17.860

26 dB and 99% BANDWIDTH







9.2.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

6dBi Antenna Gain

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	22.130	24.45	6.00	24.00
Mid	5600	24	27.550	25.40	6.00	24.00
High	5700	24	29.503	25.70	6.00	24.00

Individual Chain Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	16.60	16.61	19.62	24.00	-4.38
Mid	5600	17.29	17.13	20.22	24.00	-3.78
High	5700	17.30	17.14	20.23	24.00	-3.77

7.21dBi Antenna Gain

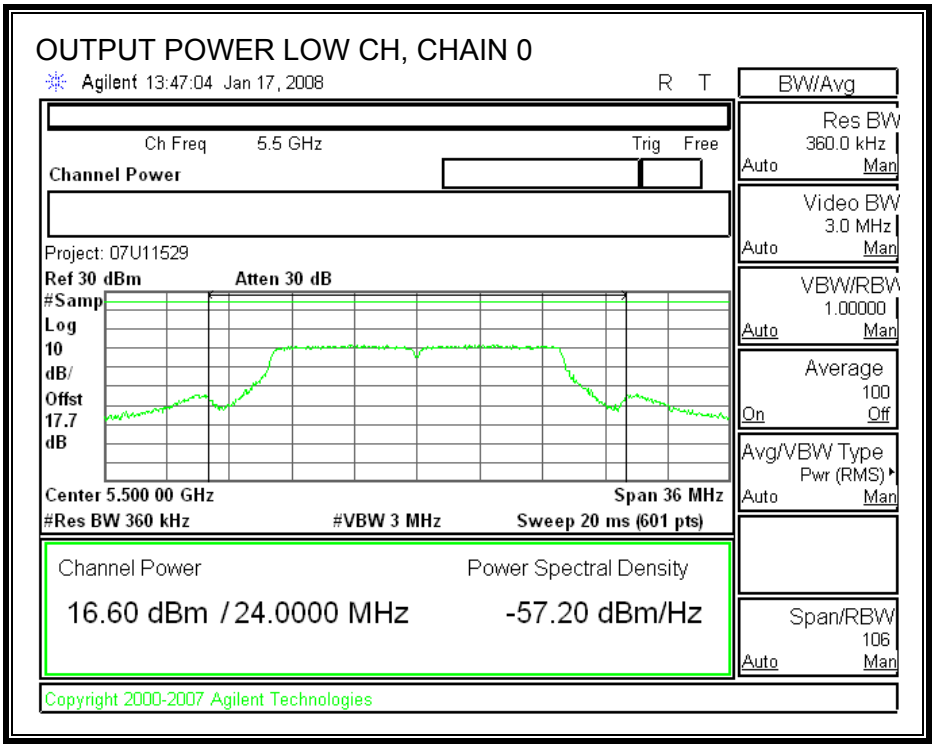
Limit

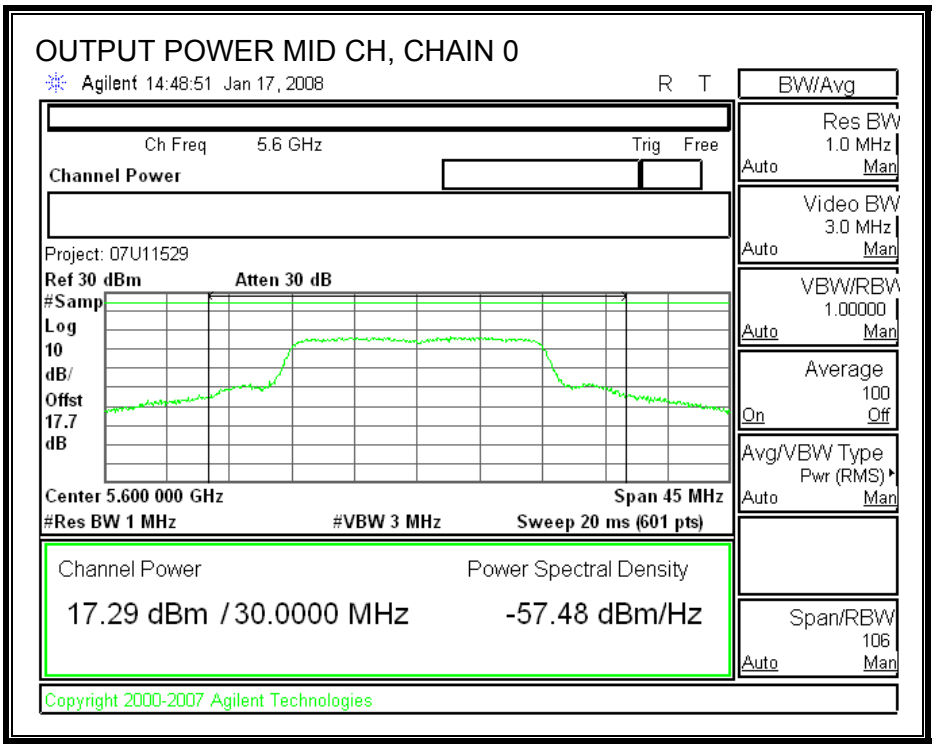
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5500	24	22.130	24.45	7.21	22.79
Mid	5600	24	27.550	25.40	7.21	22.79
High	5700	24	29.503	25.70	7.21	22.79

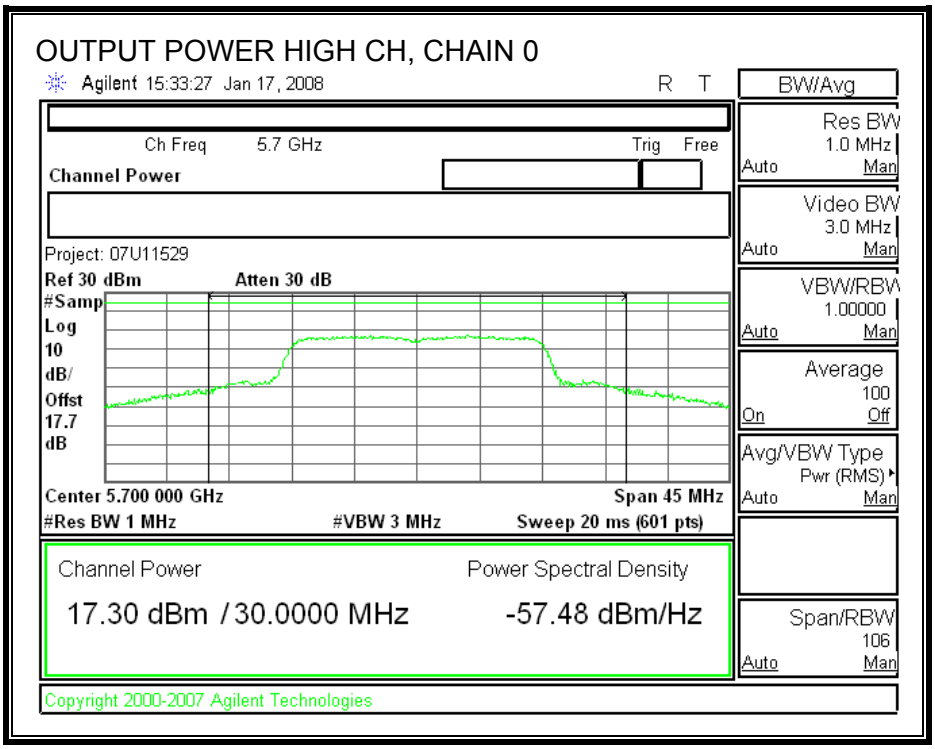
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5500	16.34	16.11	19.24	22.79	-3.55
Mid	5600	16.43	16.03	19.24	22.79	-3.55
High	5700	16.48	16.11	19.31	22.79	-3.48

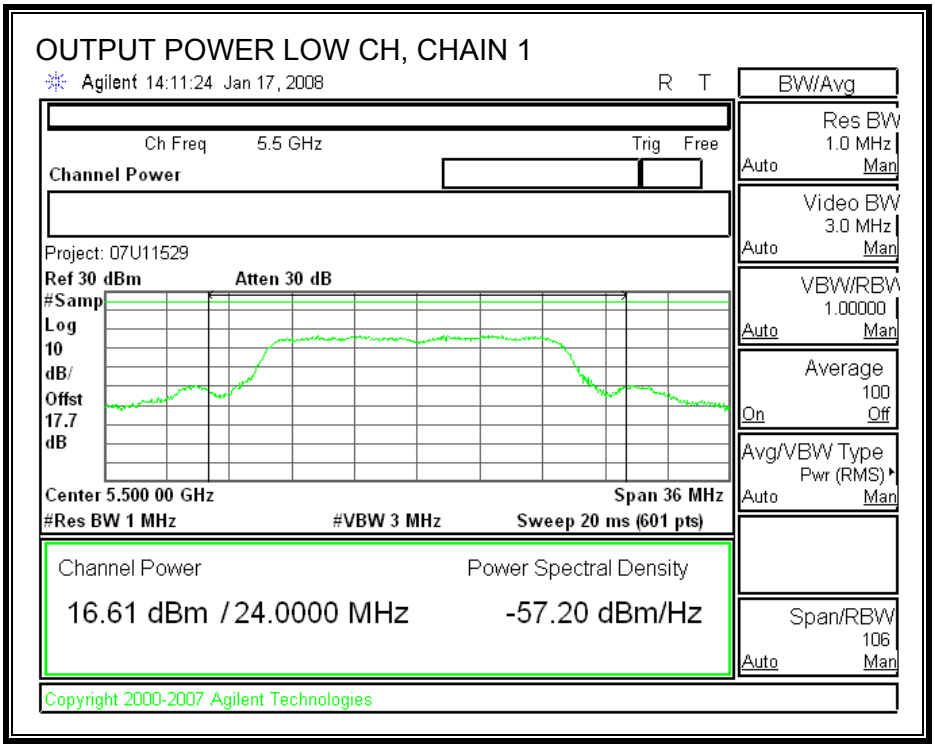
CHAIN 0 OUTPUT POWER (6 dBi Antenna Gain)

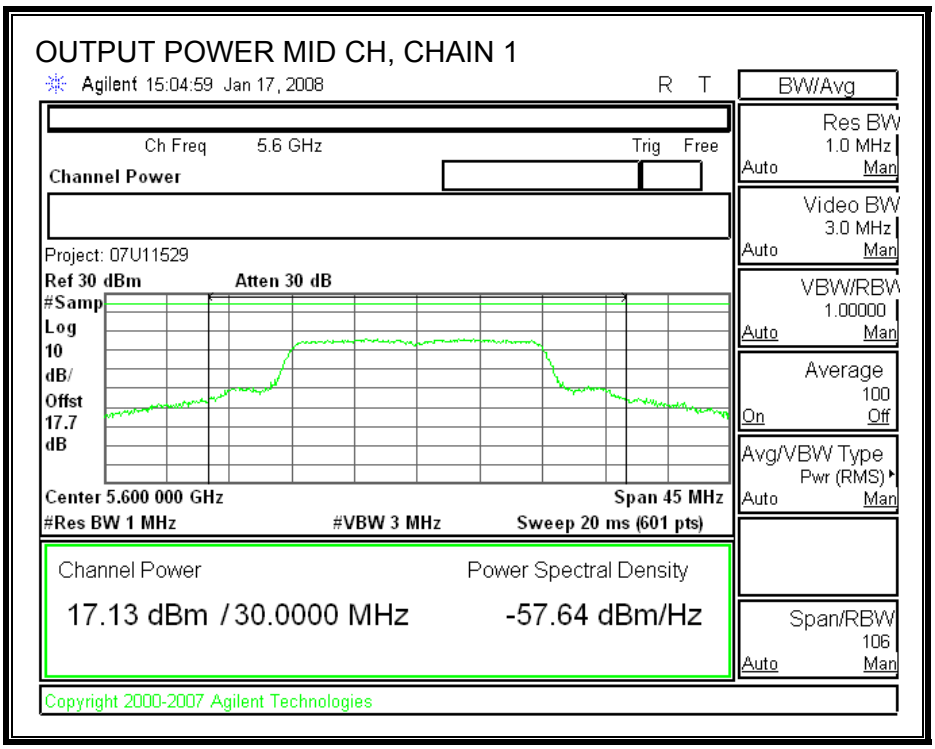


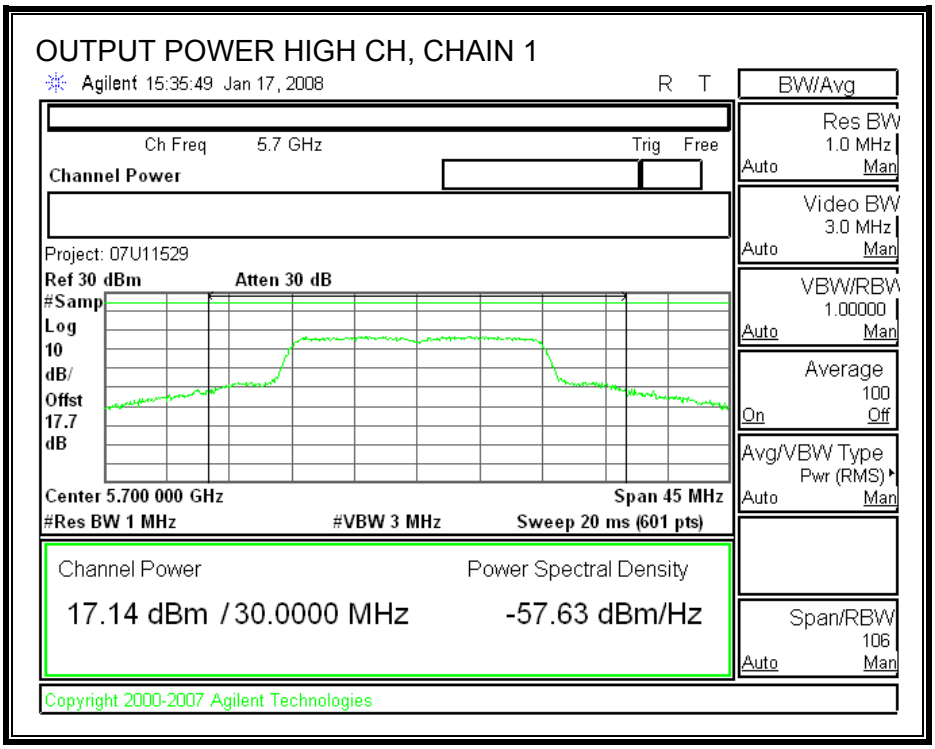




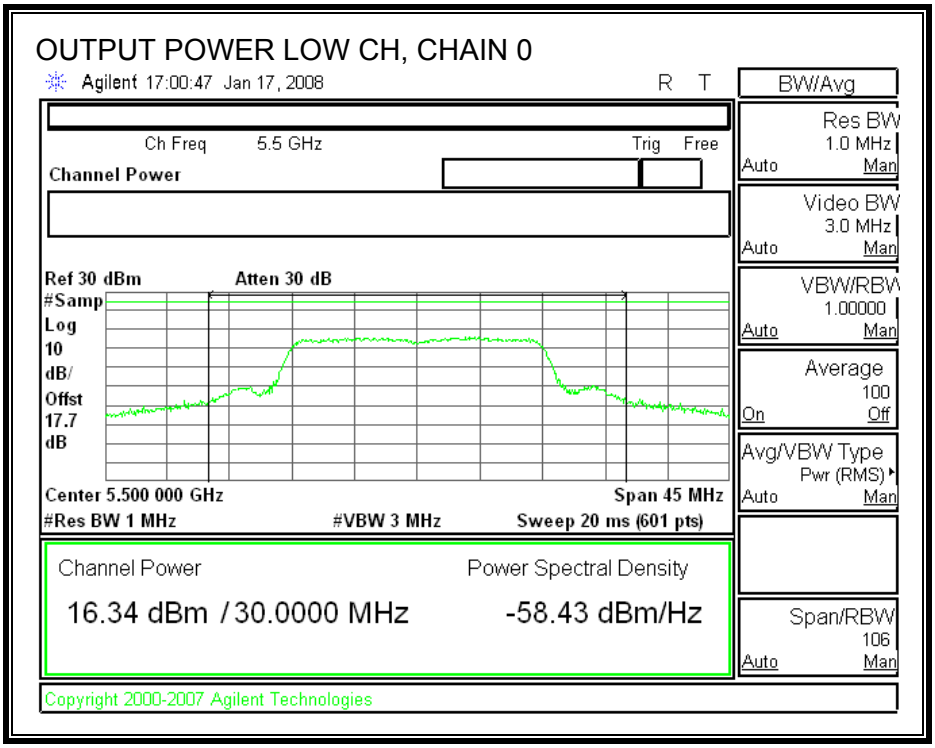
CHAIN 1 OUTPUT POWER (6 dBi Antenna Gain)

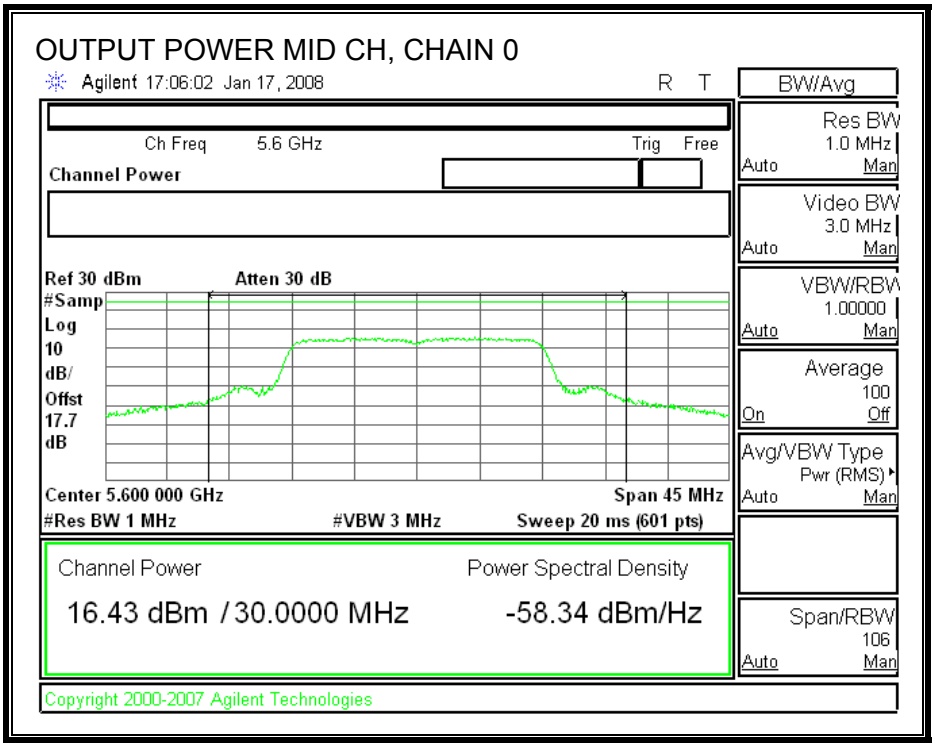


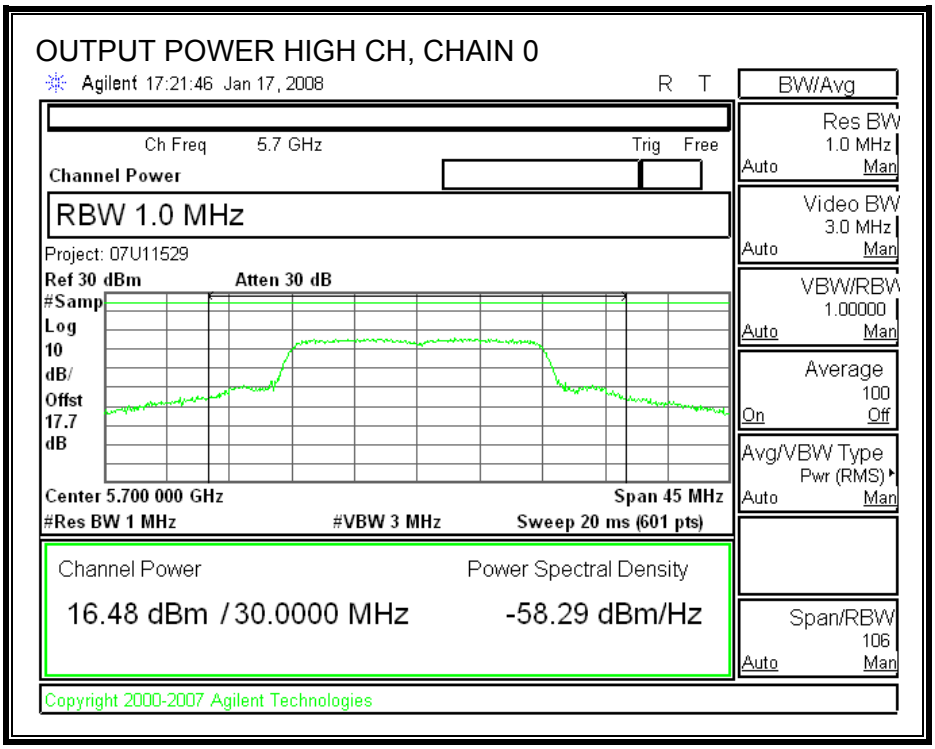




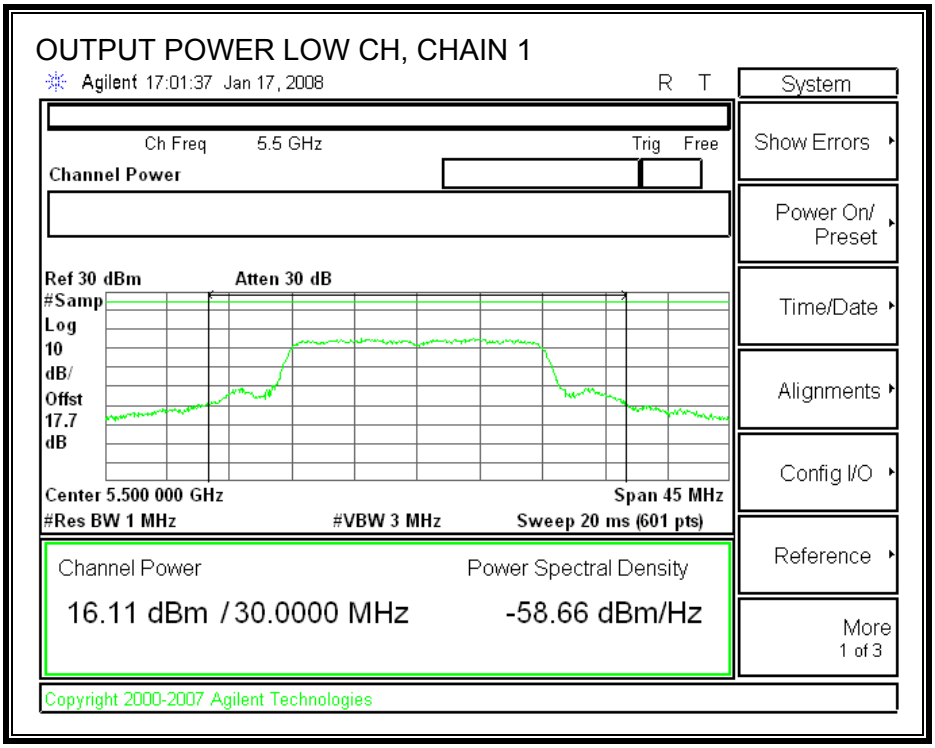
CHAIN 0 OUTPUT POWER (7.21 dBi Antenna Gain)

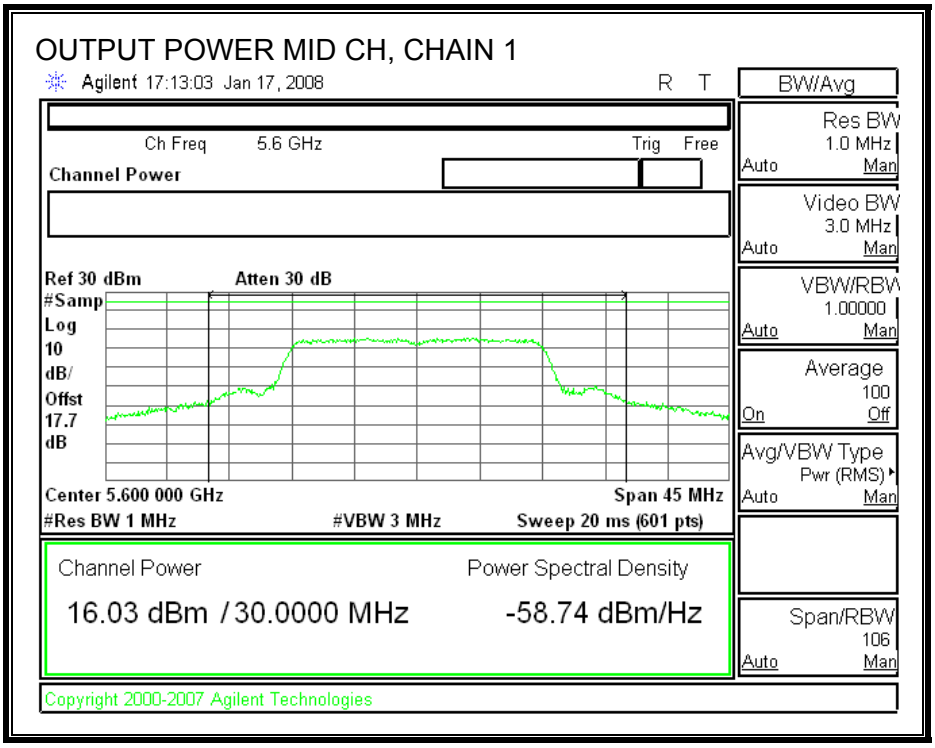


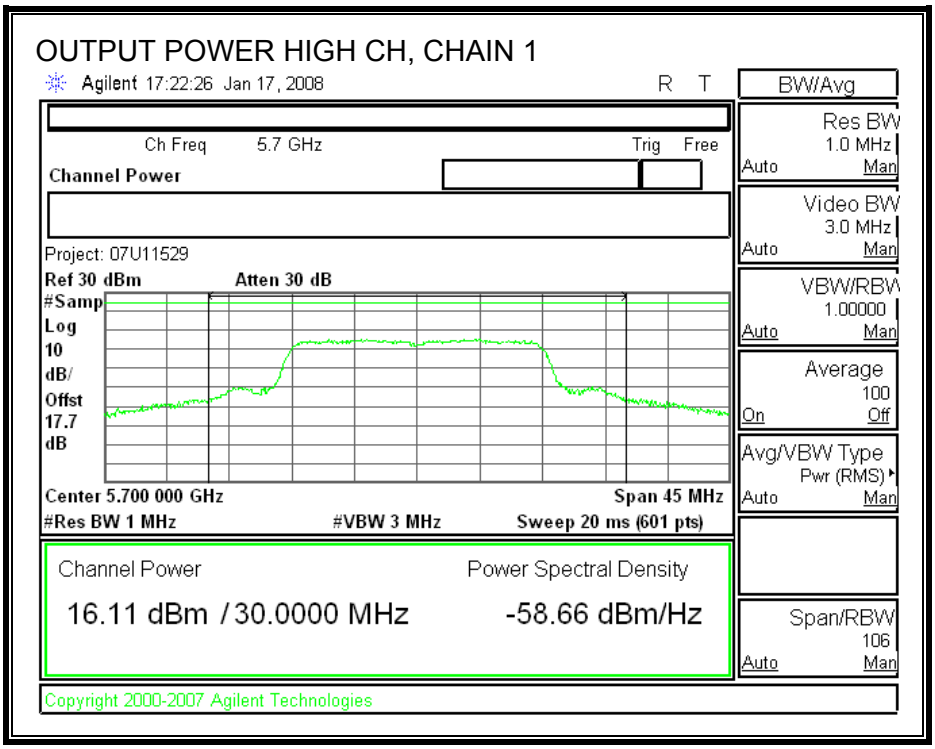




CHAIN 1 OUTPUT POWER (7.21 dBi Antenna Gain)







9.2.3. 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 or equal to 6 dBi, therefore the limit is 11 dBm.

The maximum antenna gain is 7.21 dBi, therefore the limit is 9.79 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

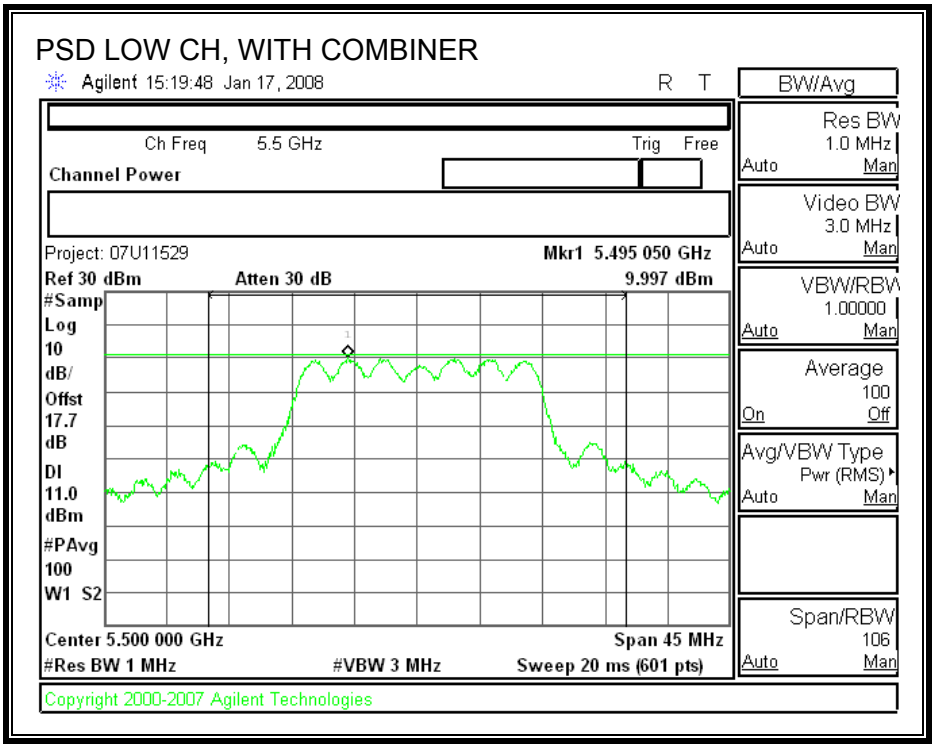
6dBi Antenna Gain

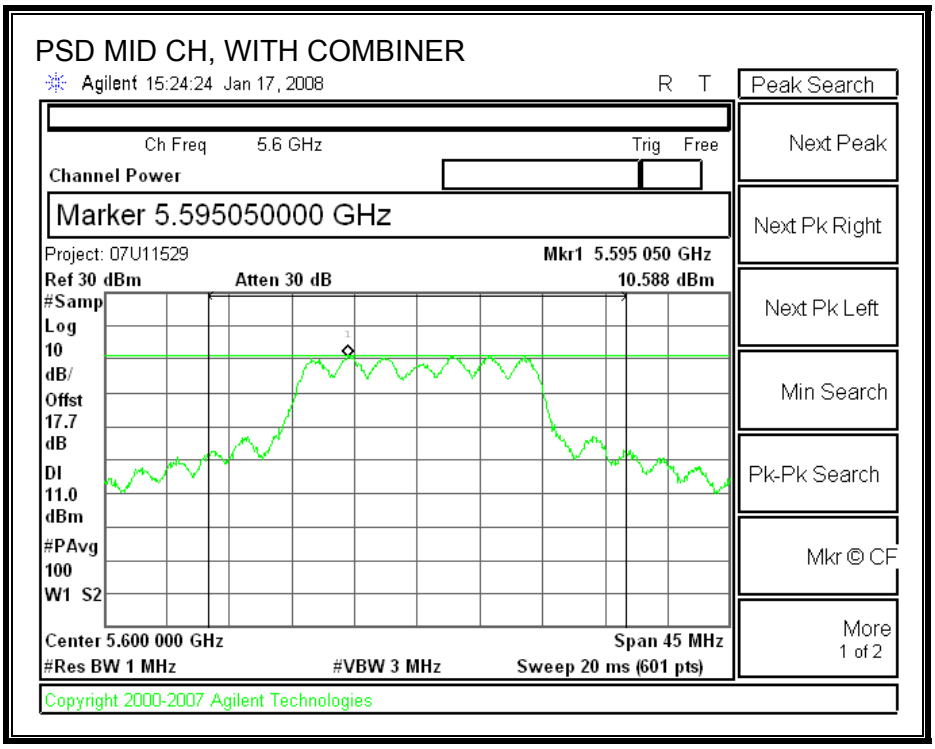
Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5500	9.997	11	-1.00
Middle	5600	10.588	11	-0.41
High	5700	10.584	11	-0.42

7.21dBi Antenna Gain

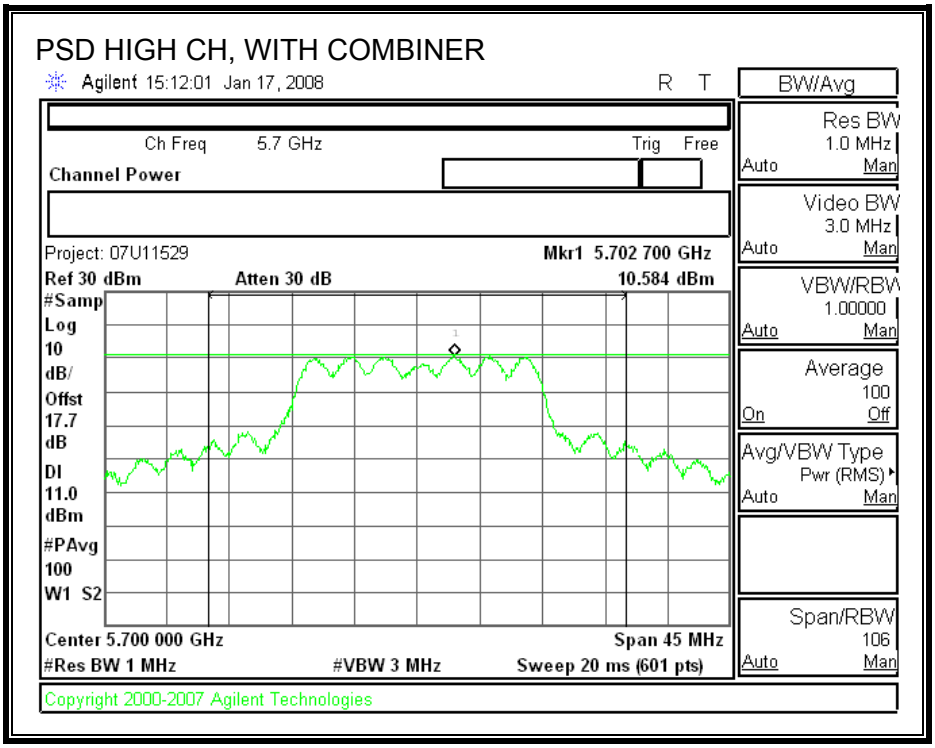
Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5500	9.554	9.79	-0.24
Middle	5600	9.521	9.79	-0.27
High	5700	9.539	9.79	-0.25

POWER SPECTRAL DENSITY WITH COMBINER (6 dBi Antenna Gain)

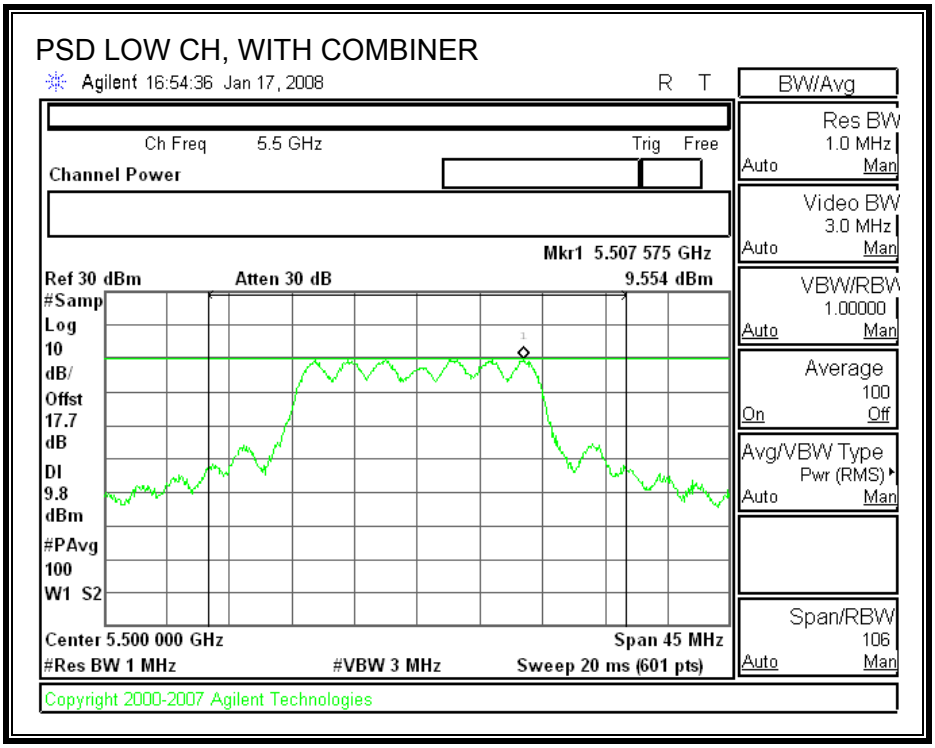


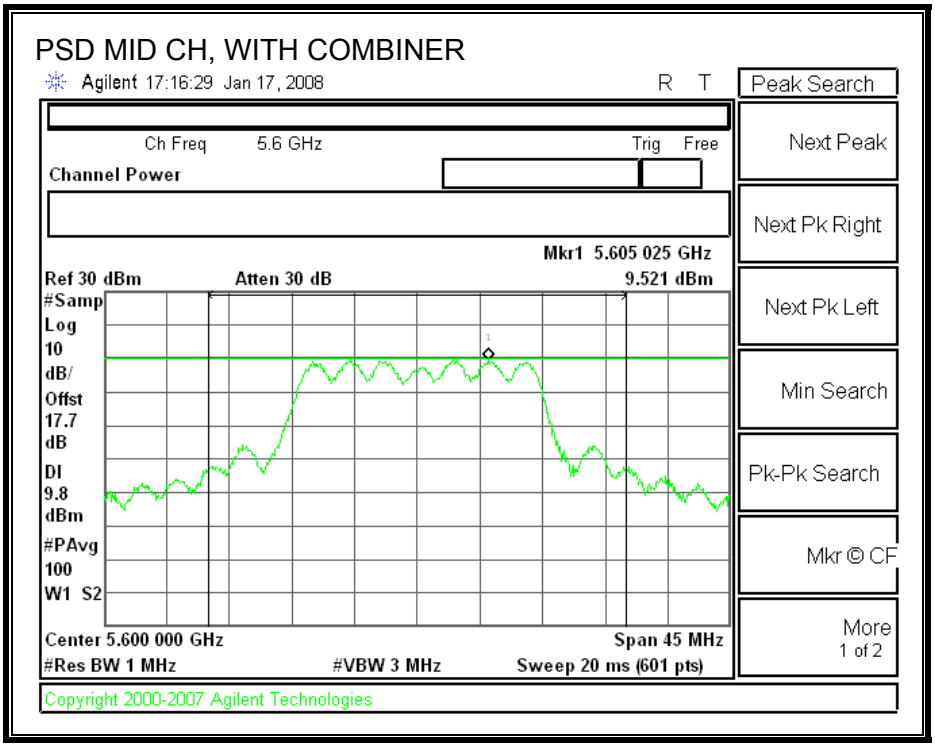


PSD HIGH CH, WITH COMBINER

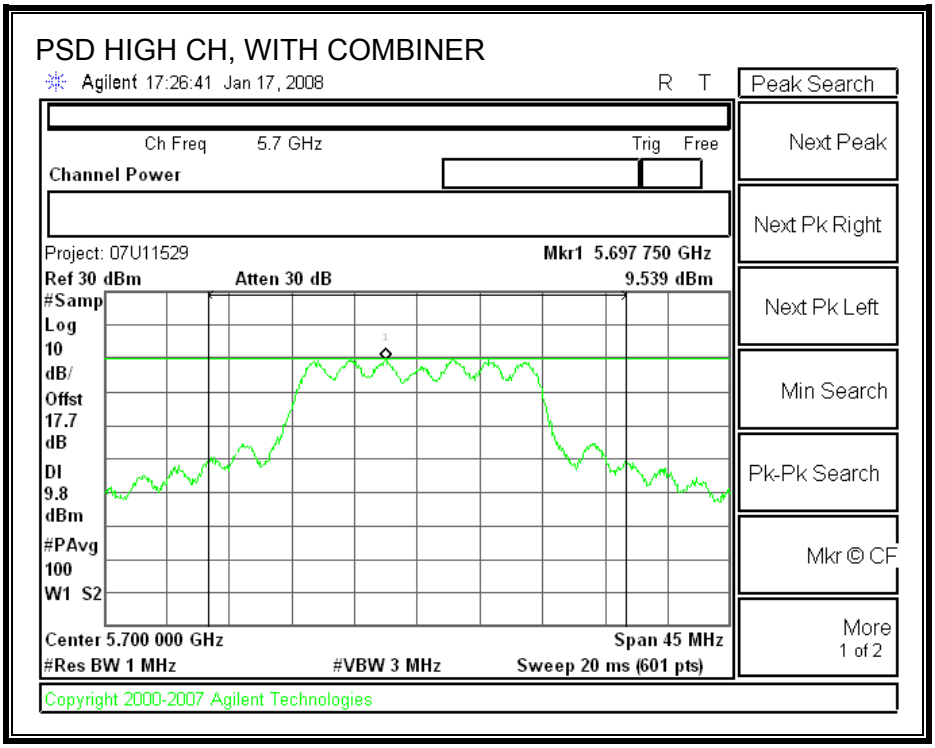


POWER SPECTRAL DENSITY WITH COMBINER (7.21 dBi Antenna Gain)





PSD HIGH CH, WITH COMBINER



9.2.4. 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

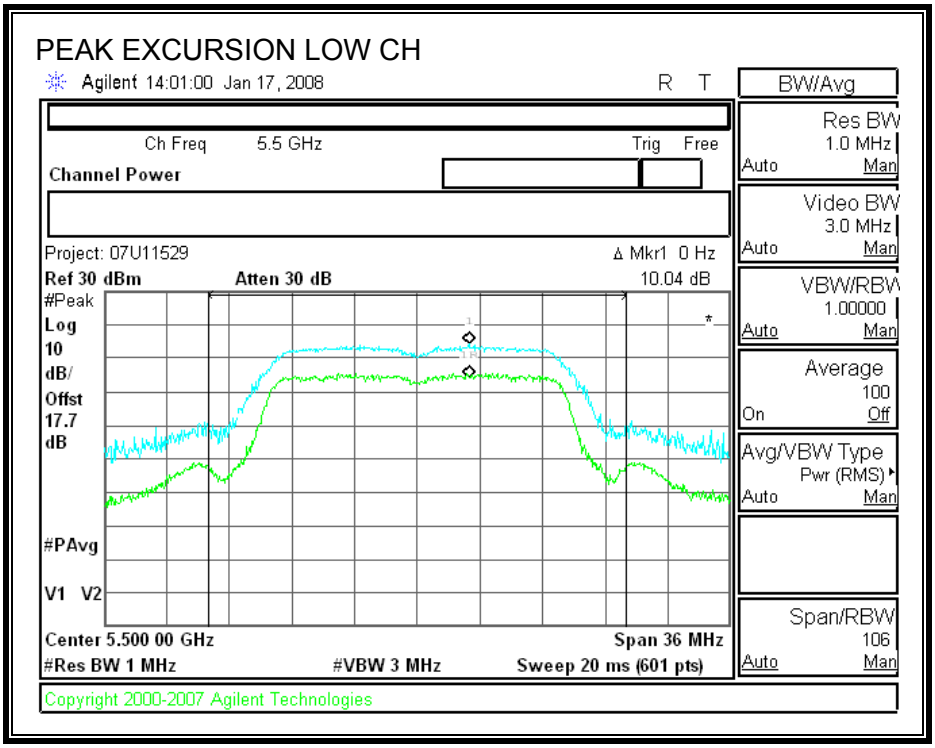
Chain 1

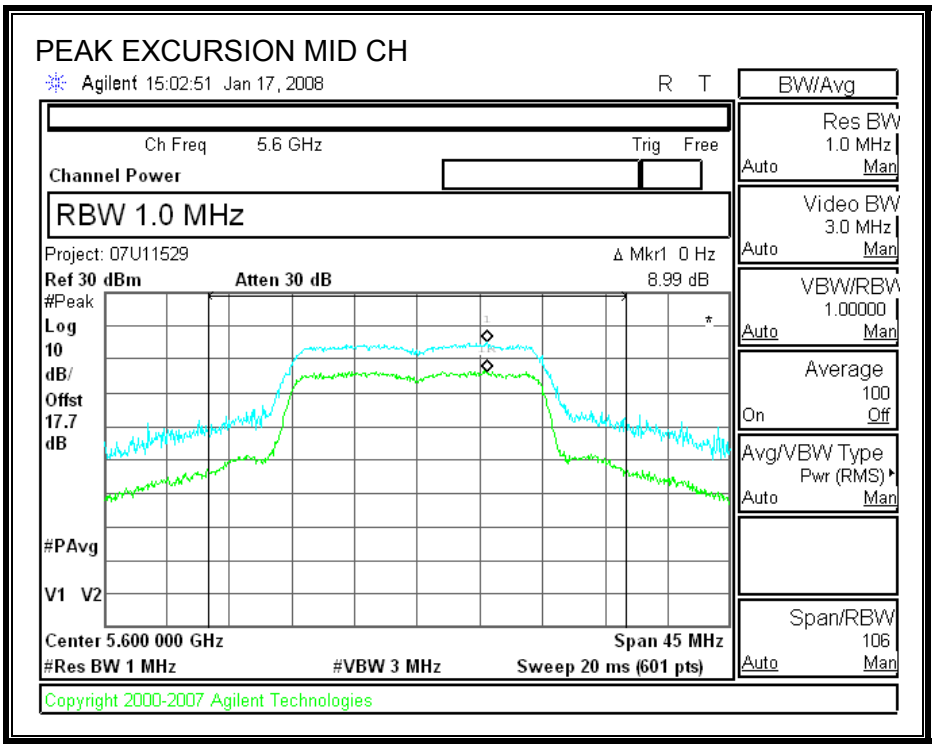
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	10.04	13	-2.96
Middle	5600	8.99	13	-4.01
High	5700	9.33	13	-3.67

Chain 2

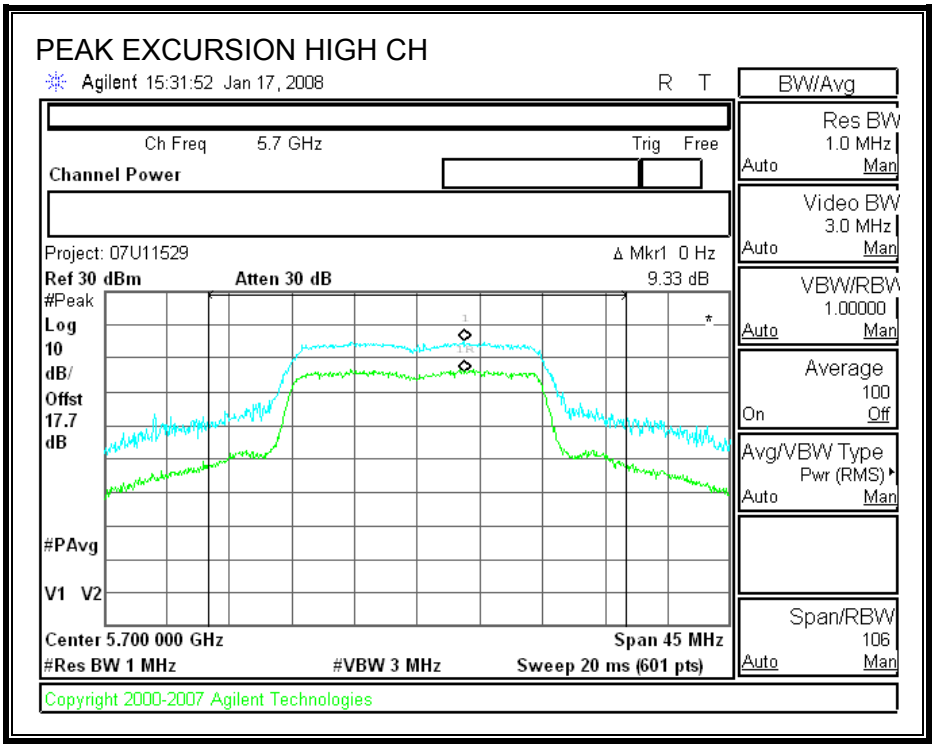
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.21	13	-3.79
Middle	5600	10.96	13	-2.04
High	5700	10.21	13	-2.79

PEAK EXCURSION (CHAIN 0)

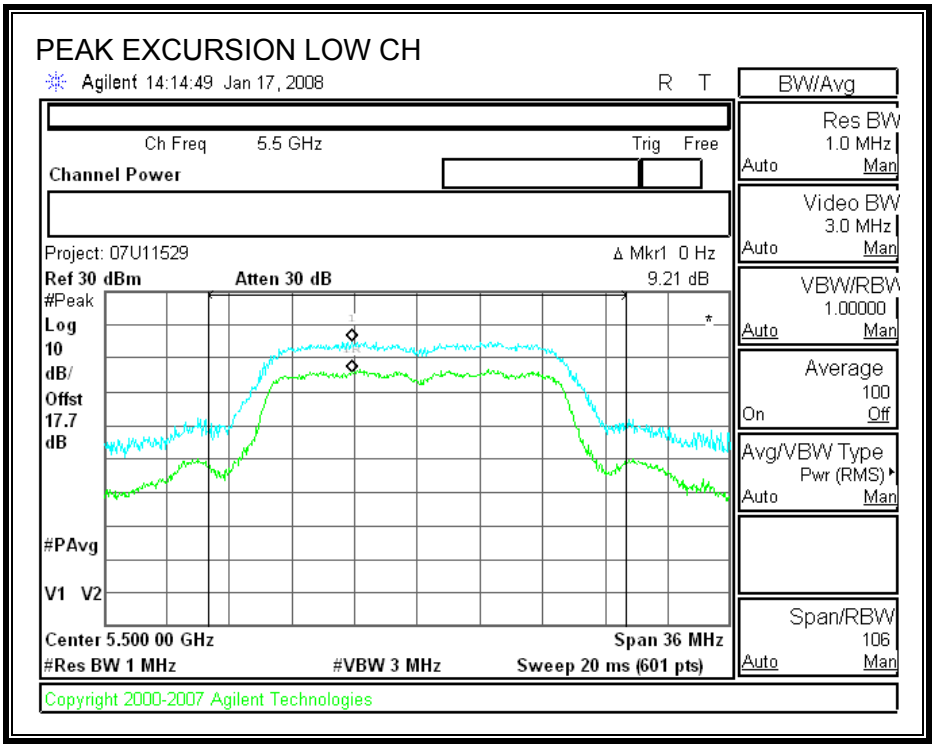


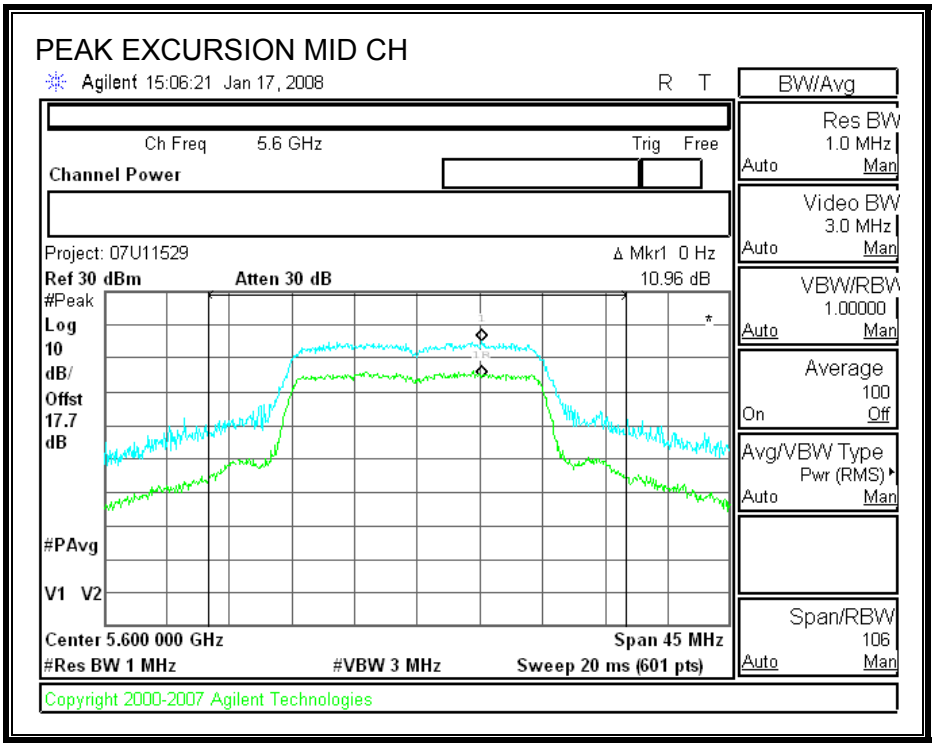


PEAK EXCURSION HIGH CH

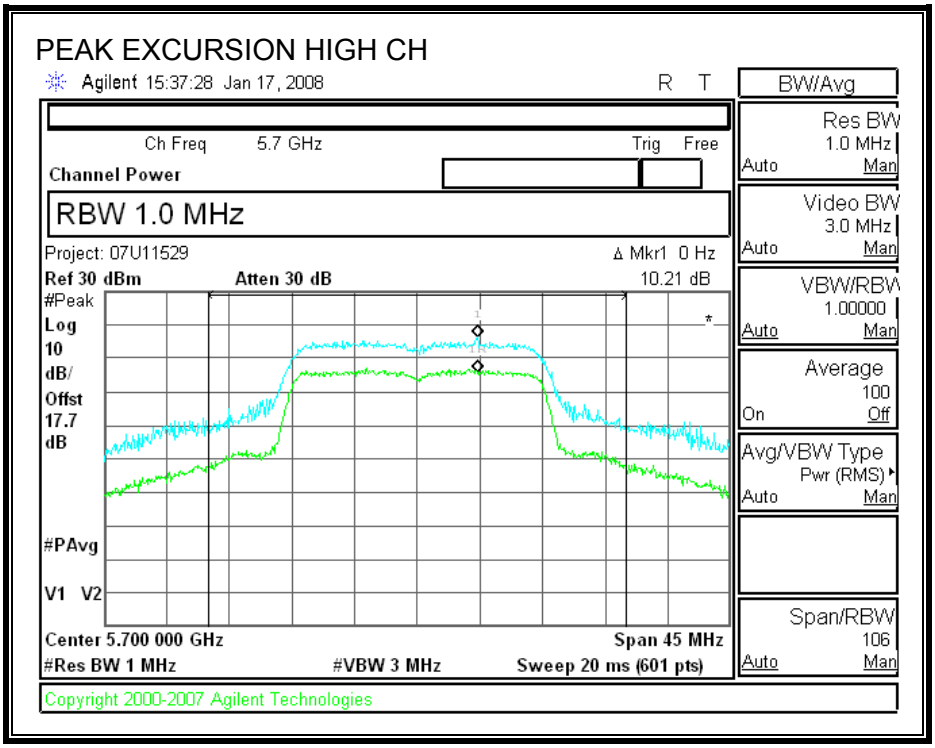


PEAK EXCURSION (CHAIN 1)





PEAK EXCURSION HIGH CH



9.2.5. 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

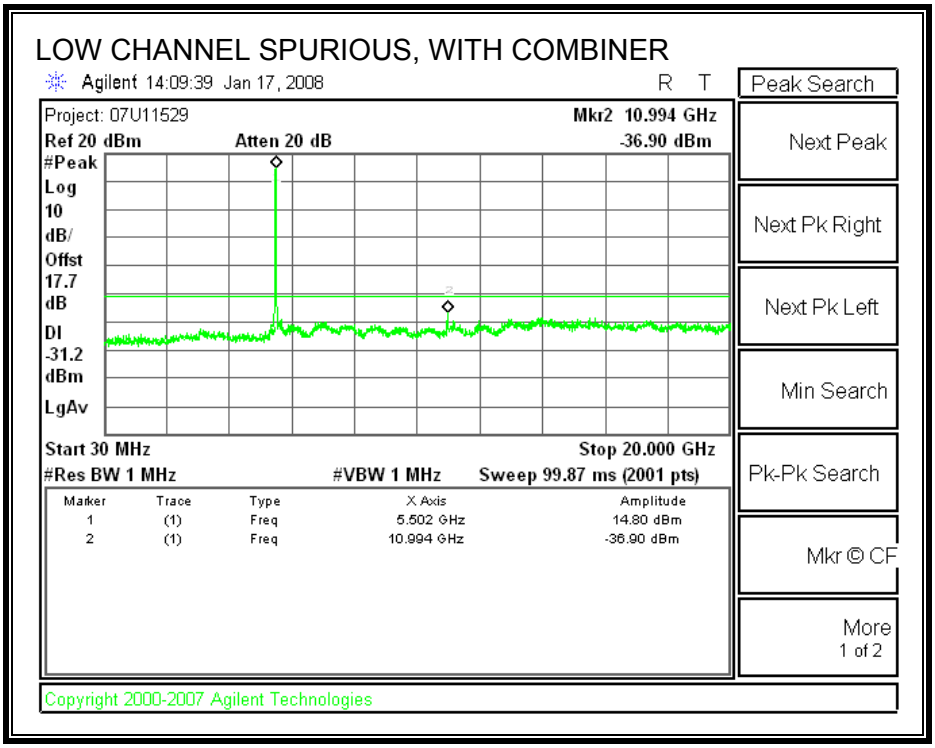
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

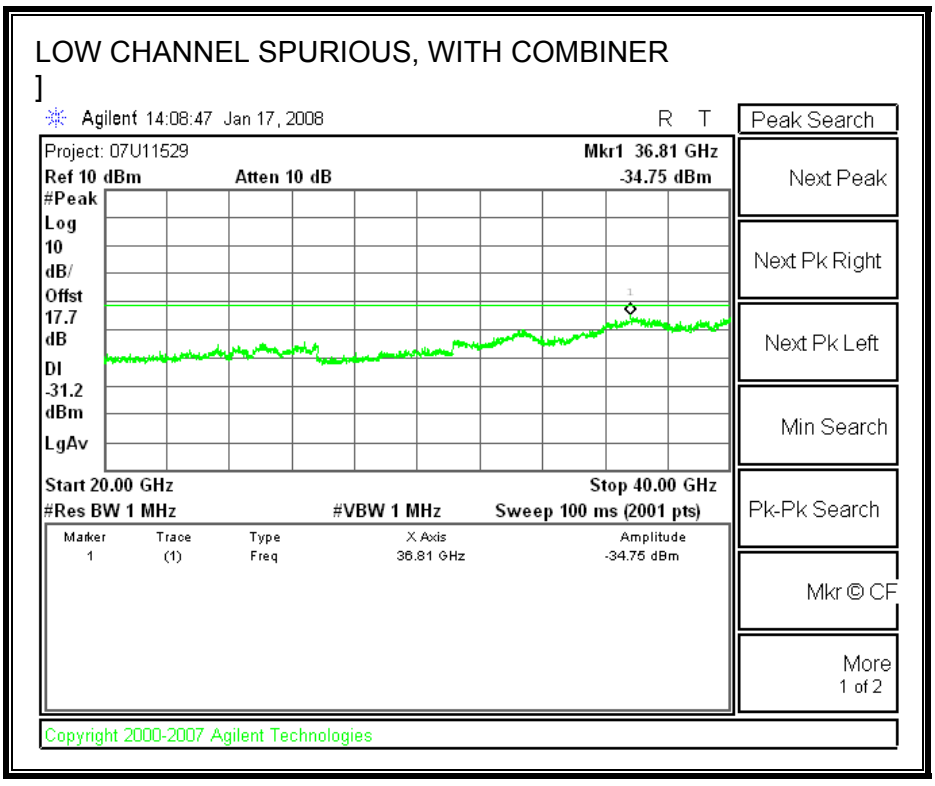
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

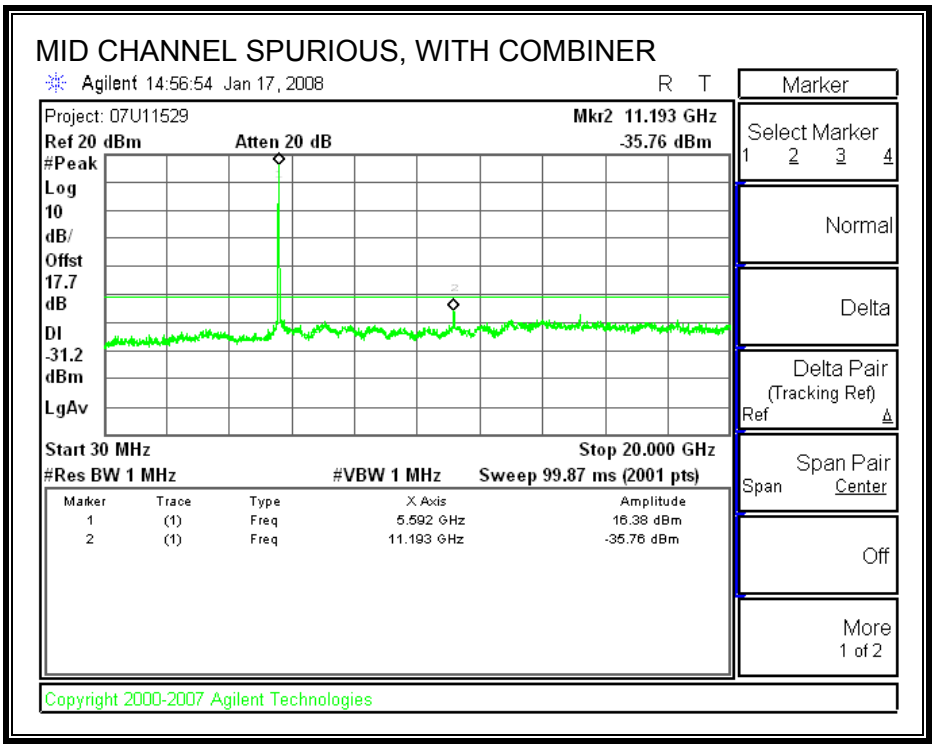
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

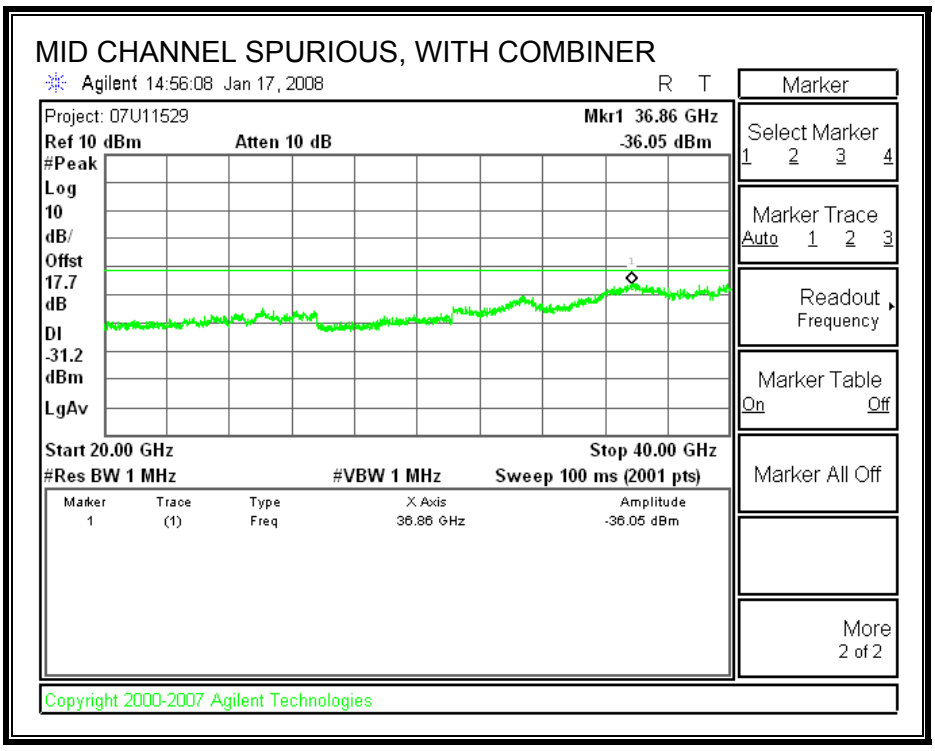
RESULTS

SPURIOUS EMISSIONS WITH COMBINER

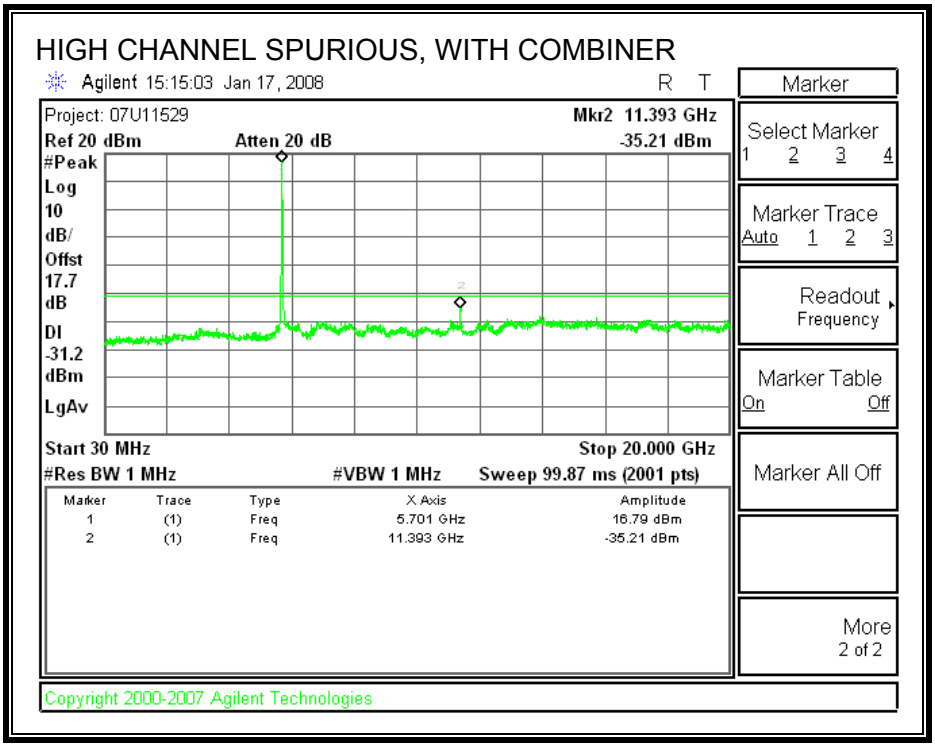




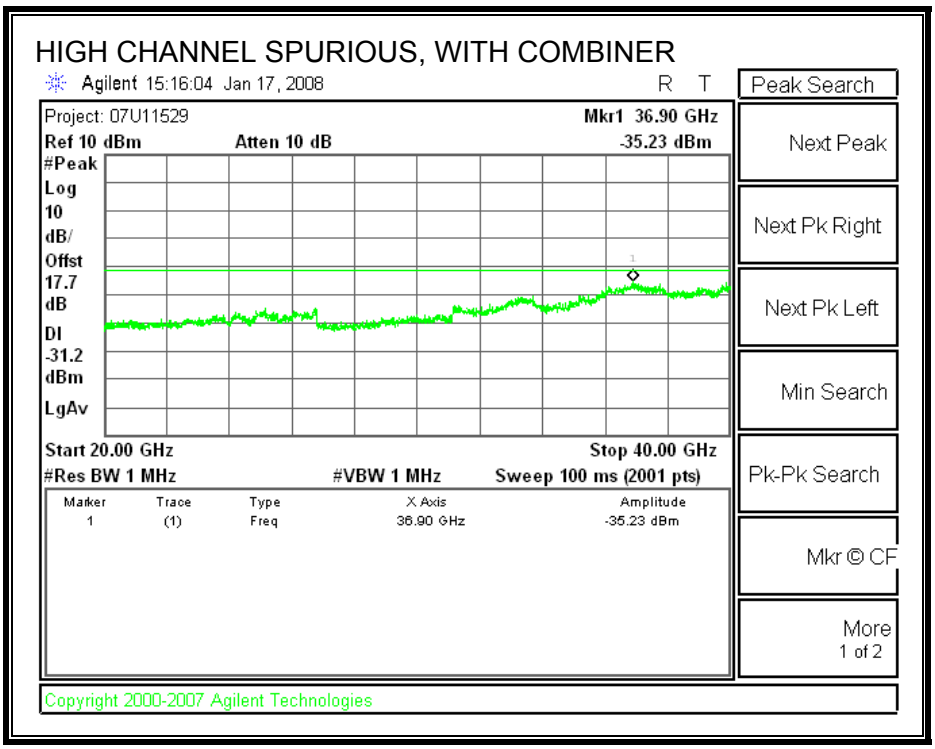




HIGH CHANNEL SPURIOUS, WITH COMBINER



HIGH CHANNEL SPURIOUS, WITH COMBINER



9.3. 802.11n HT40 MODE

9.3.1. 26 dB and 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

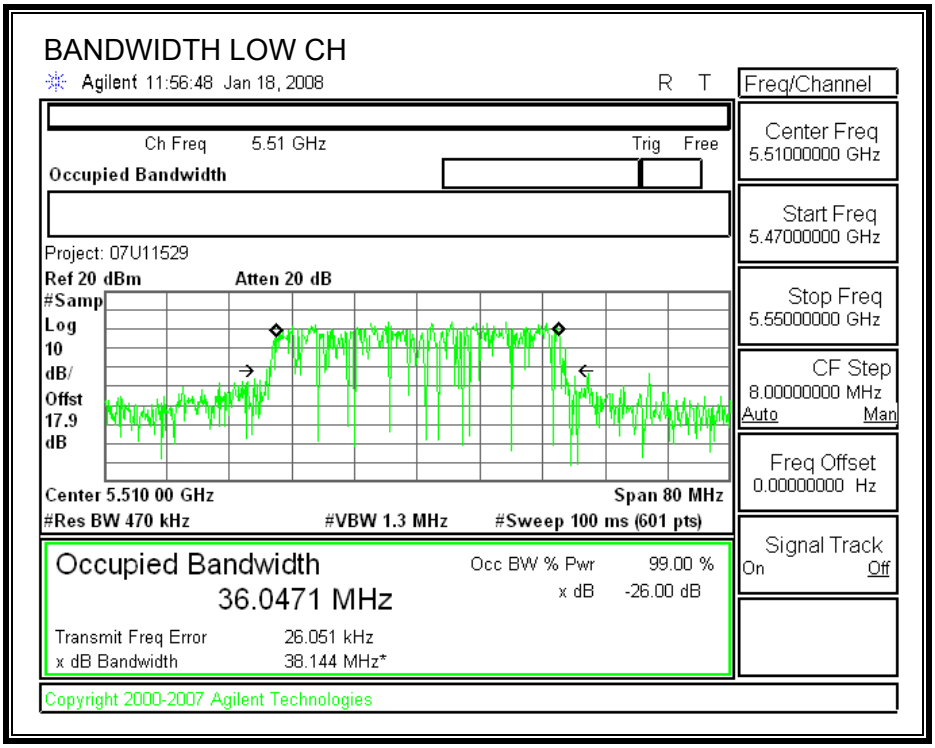
TEST PROCEDURE

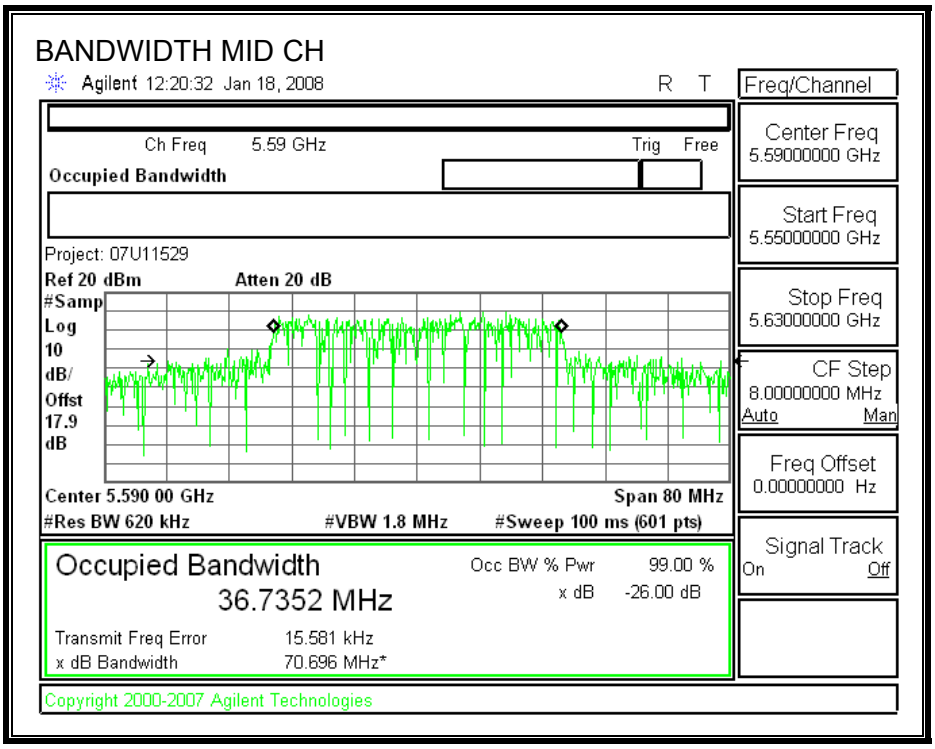
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

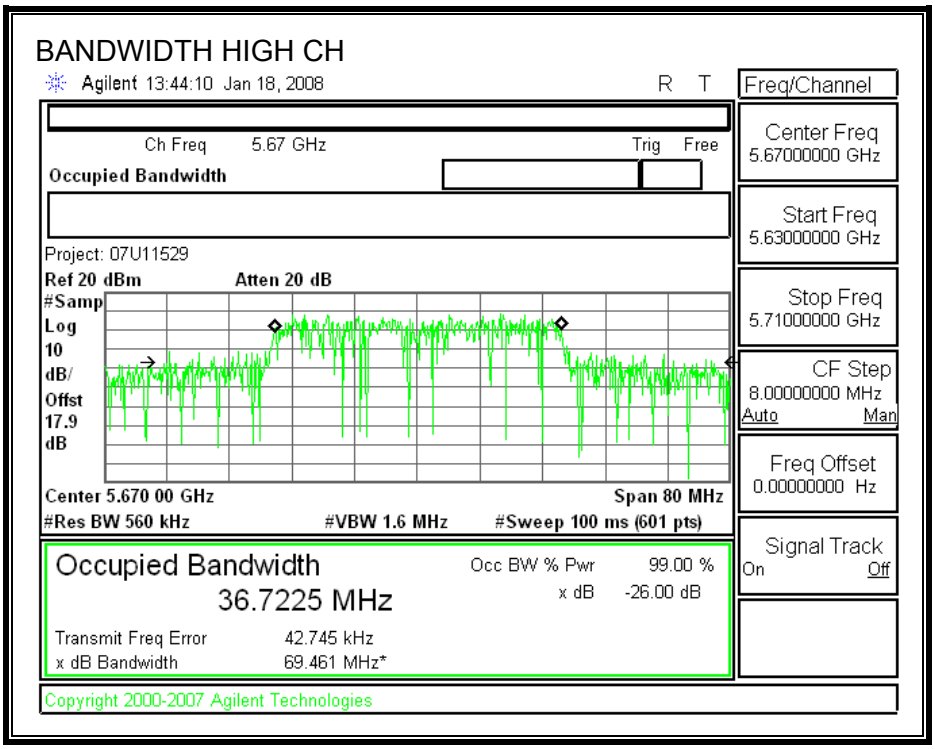
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	38.144	36.0471
Middle	5590	70.696	36.7352
High	5670	69.461	36.7225

26 dB and 99% BANDWIDTH







9.3.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

6dBi Antenna Gain

Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	24	38.144	26.81	6.00	24.00
Mid	5590	24	70.696	29.49	6.00	24.00
High	5670	24	69.461	29.42	6.00	24.00

Individual Chain Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	15.61	15.60	18.62	24.00	-5.38
Mid	5590	18.83	18.88	21.87	24.00	-2.13
High	5670	18.69	18.70	21.71	24.00	-2.29

7.21dBi Antenna Gain

Note: Low, mid & high channels still meet the Peak Power and PPSD limits of high antenna gain. These channels utilize the same power level for all antennas. The channel power data in table below is from 6dBi data

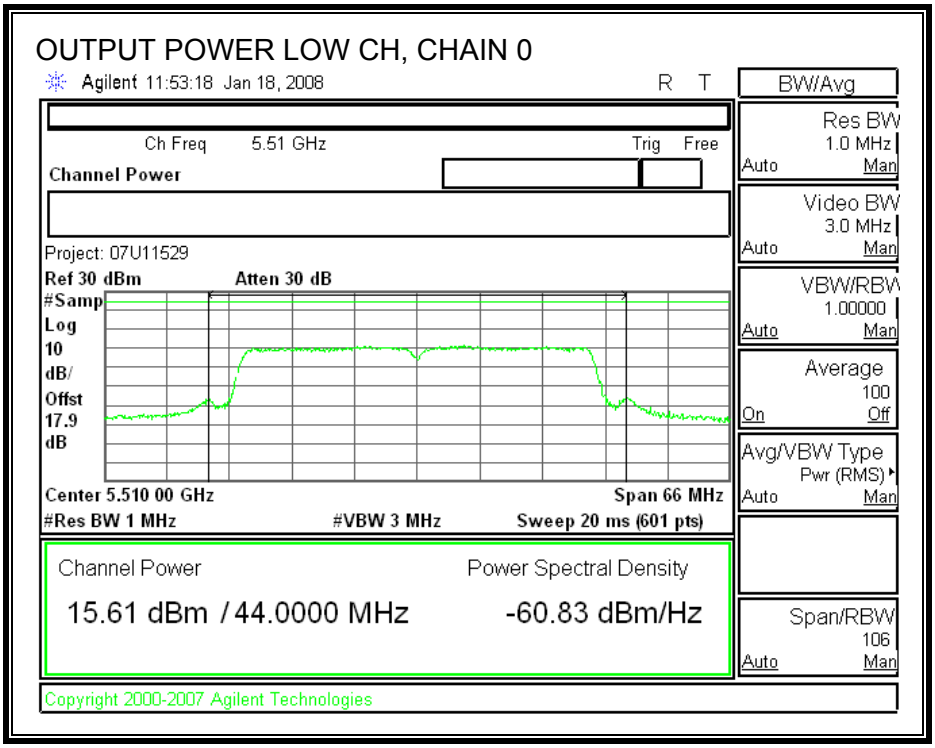
Limit

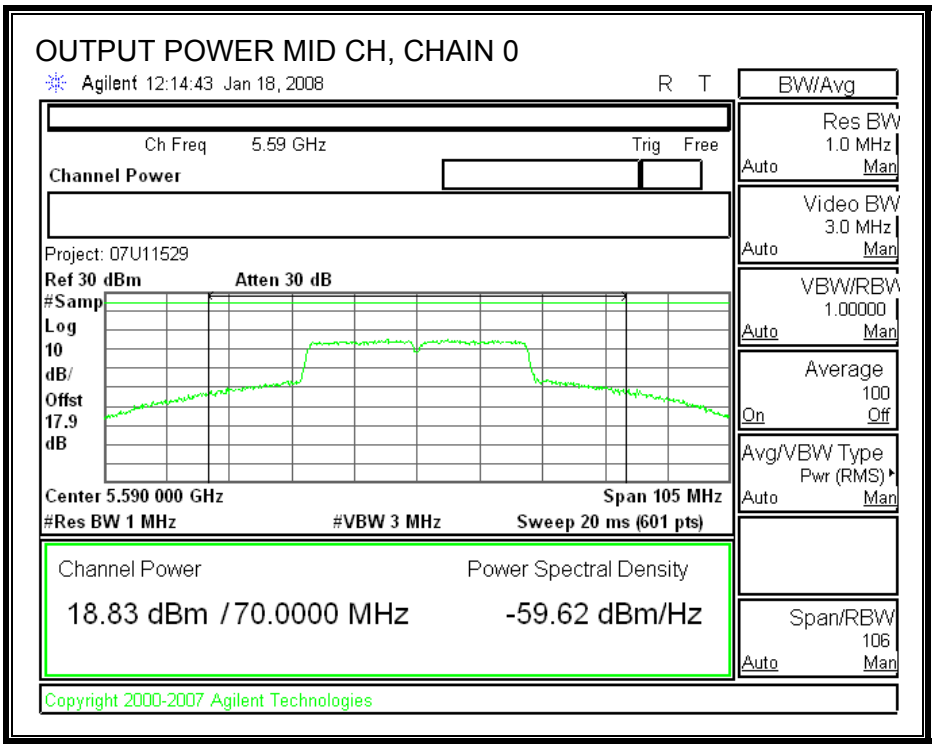
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	24	38.144	26.81	7.21	22.79
Mid	5590	24	70.696	29.49	7.21	22.79
High	5670	24	69.461	29.42	7.21	22.79

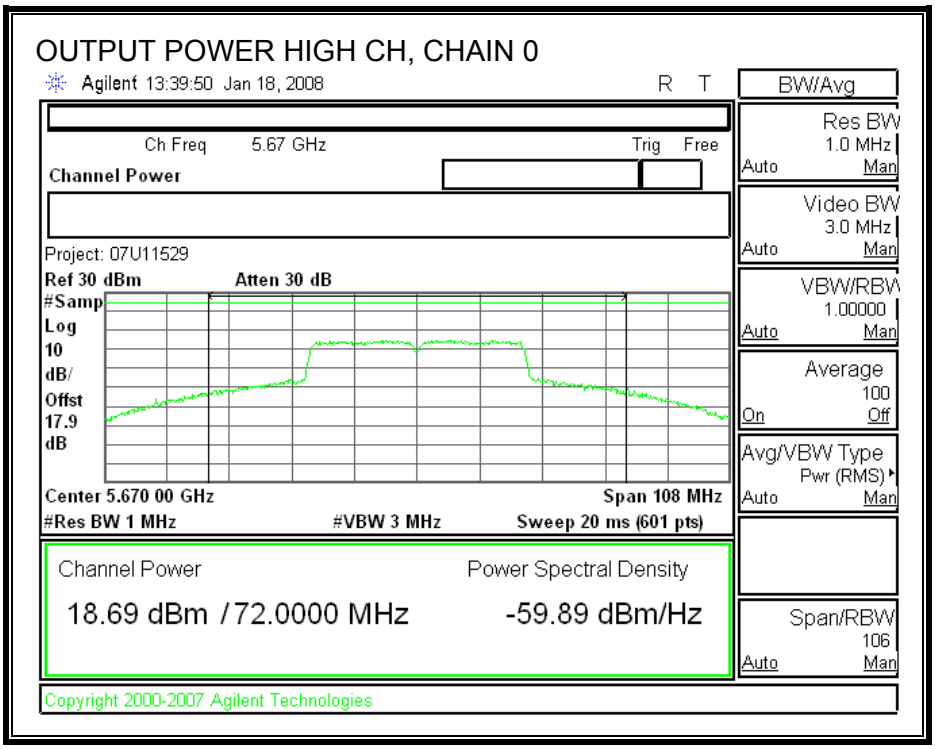
Individual Chain Results

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	15.61	15.60	18.62	22.79	-4.17
Mid	5590	18.83	18.88	21.87	22.79	-0.92
High	5670	18.69	18.70	21.71	22.79	-1.08

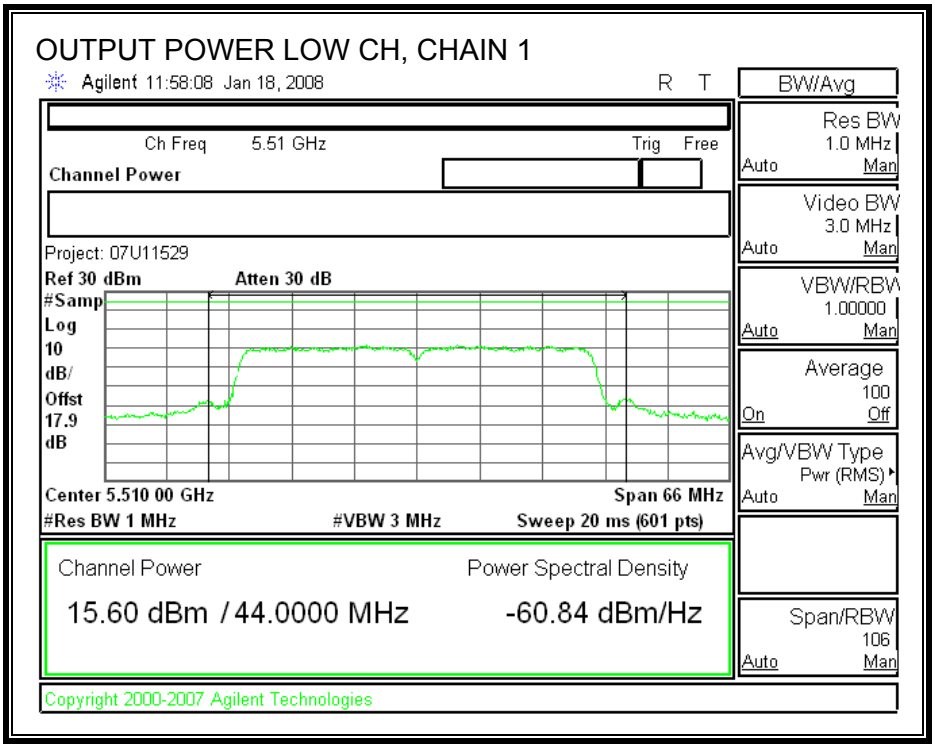
CHAIN 0 OUTPUT POWER (6dBi & 7.21dBi Antenna Gains)

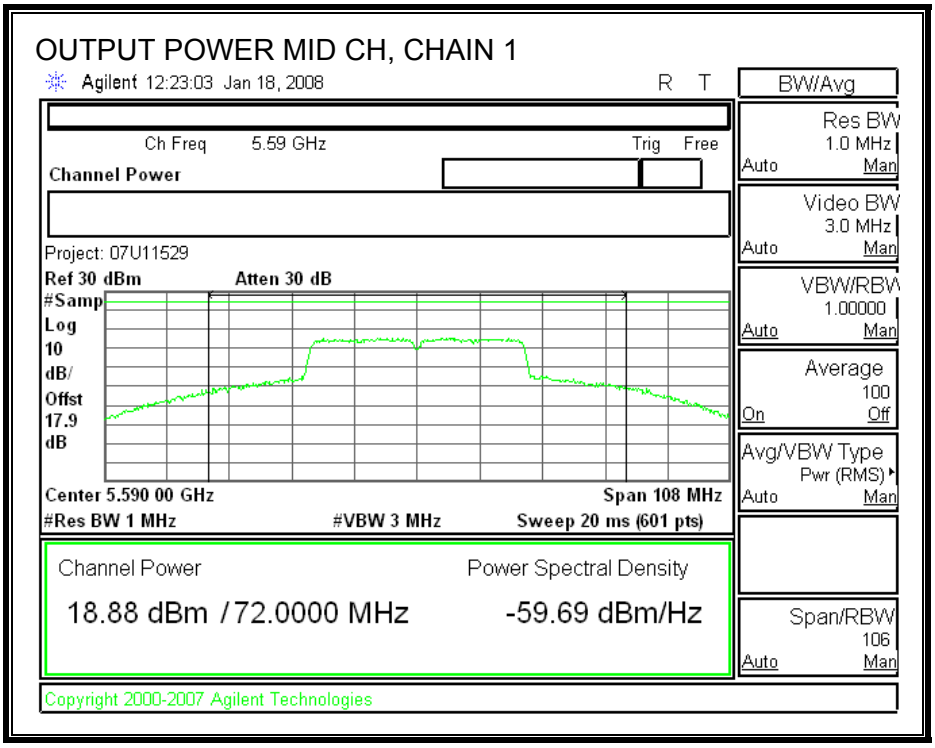


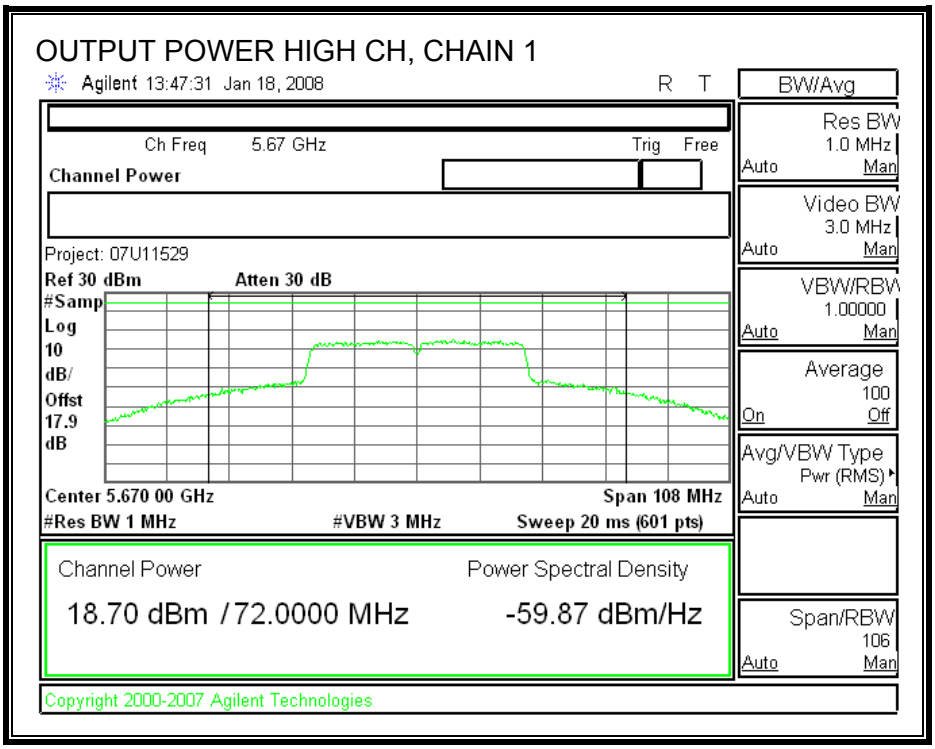




CHAIN 1 OUTPUT POWER (6dBi & 7.21dBi Antenna Gains)







9.3.3. 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 or equal to 6 dBi, therefore the limit is 11 dBm.

The maximum antenna gain is 7.21 dBi, therefore the limit is 9.79 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

6dBi Antenna Gain

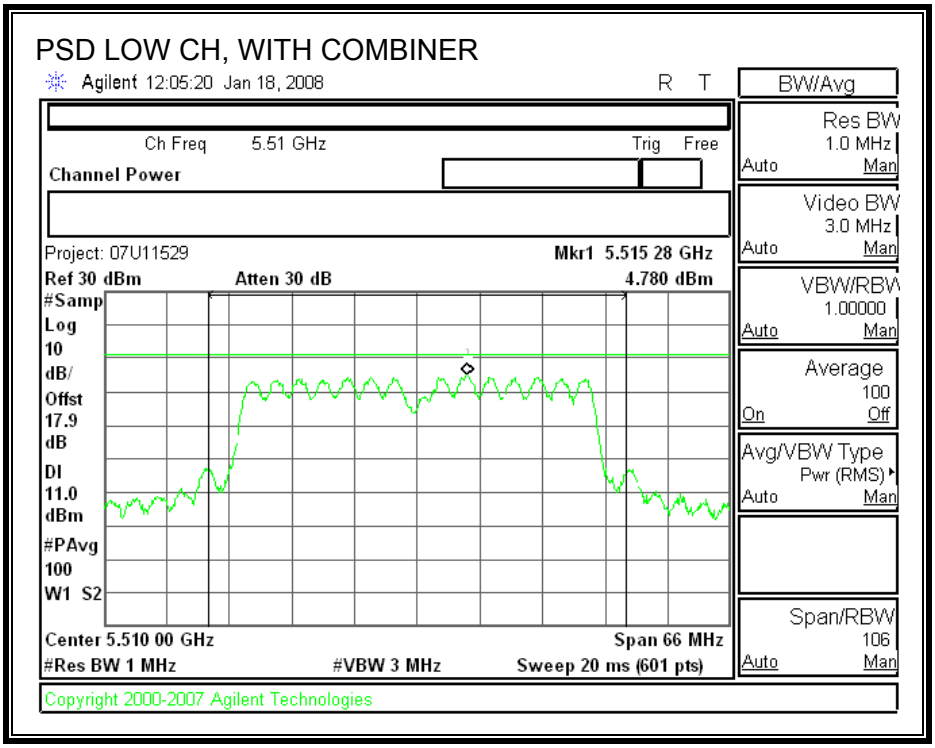
Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5510	4.780	11	-6.22
Middle	5590	8.836	11	-2.16
High	5670	8.857	11	-2.14

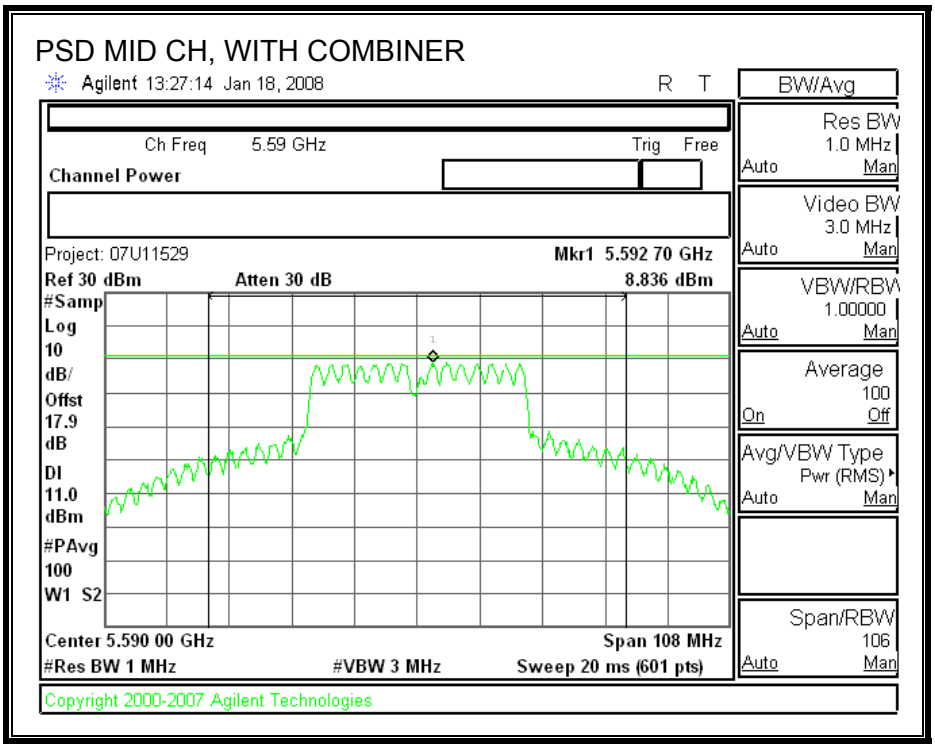
7.21dBi Antenna Gain

Note: The Low, mid & high channels still meet the PPSD limits of high antenna gain. These channels utilize the same power level for all antennas. The channel power data in table below is from 6dBi data

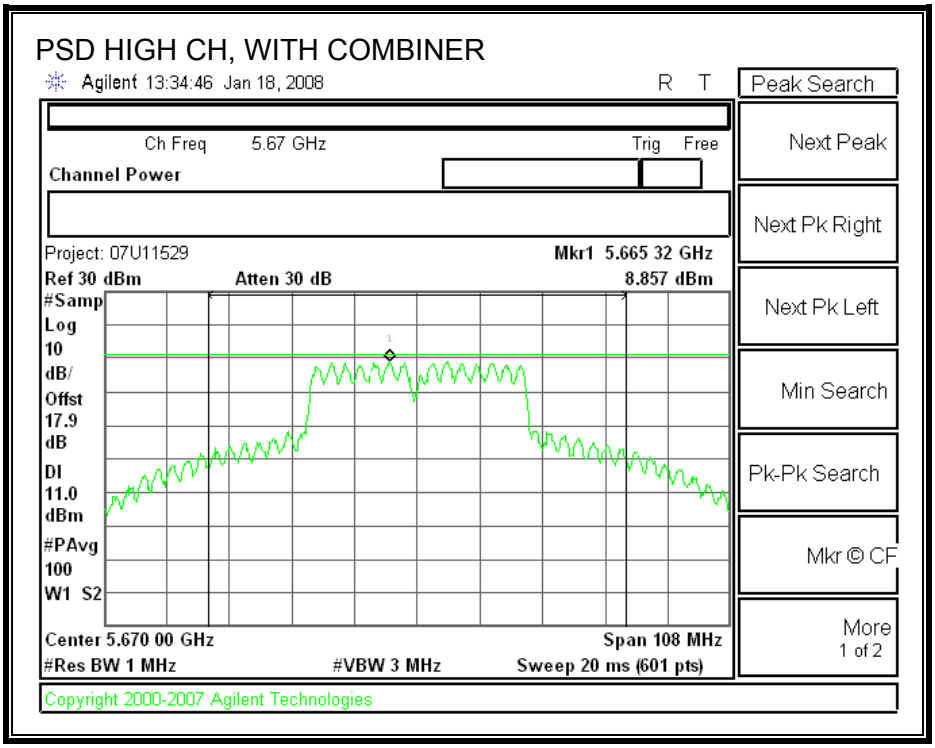
Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5510	4.78	9.79	-5.01
Middle	5590	8.84	9.79	-0.95
High	5670	8.86	9.79	-0.93

POWER SPECTRAL DENSITY WITH COMBINER (6dBi & 7.21dBi Antenna Gains)





PSD HIGH CH, WITH COMBINER



9.3.4. 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

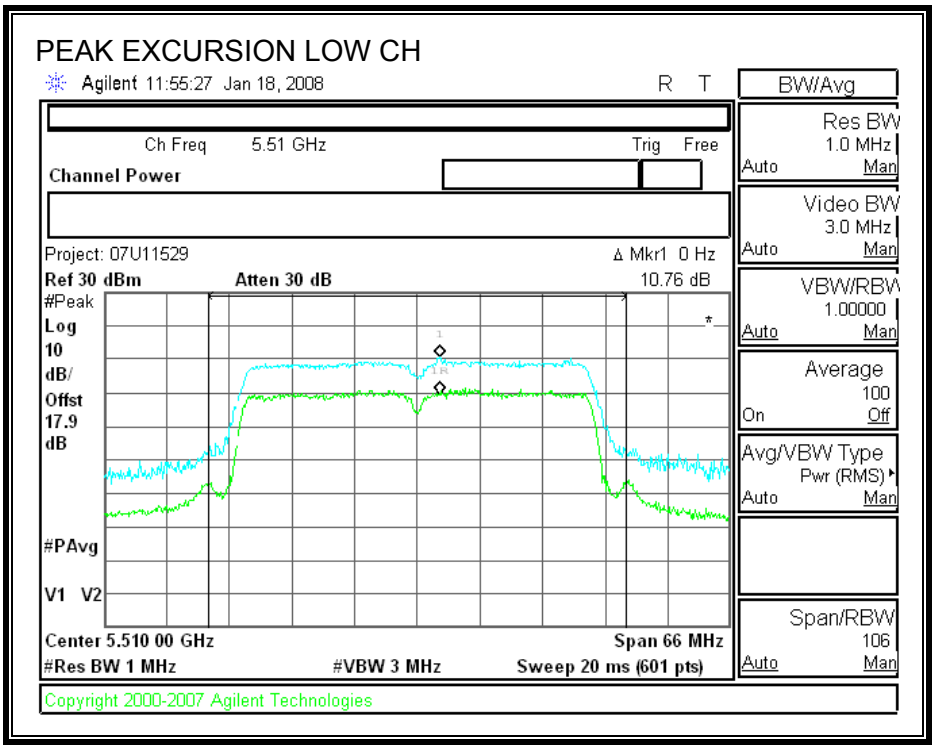
Chain 1

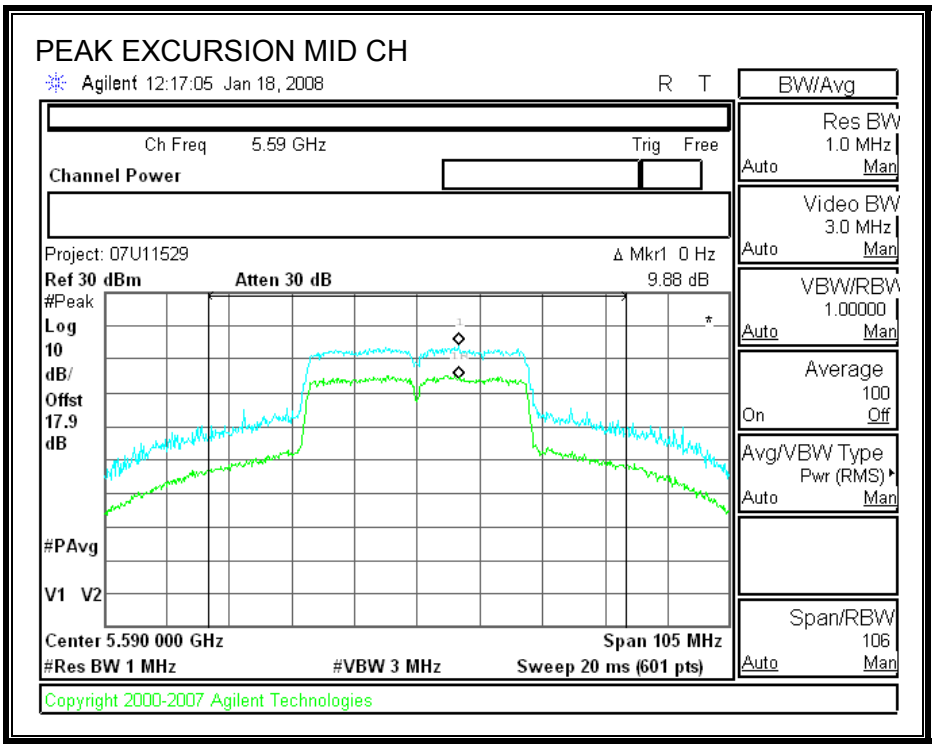
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	10.76	13	-2.24
Middle	5590	9.88	13	-3.12
High	5670	10.14	13	-2.86

Chain 2

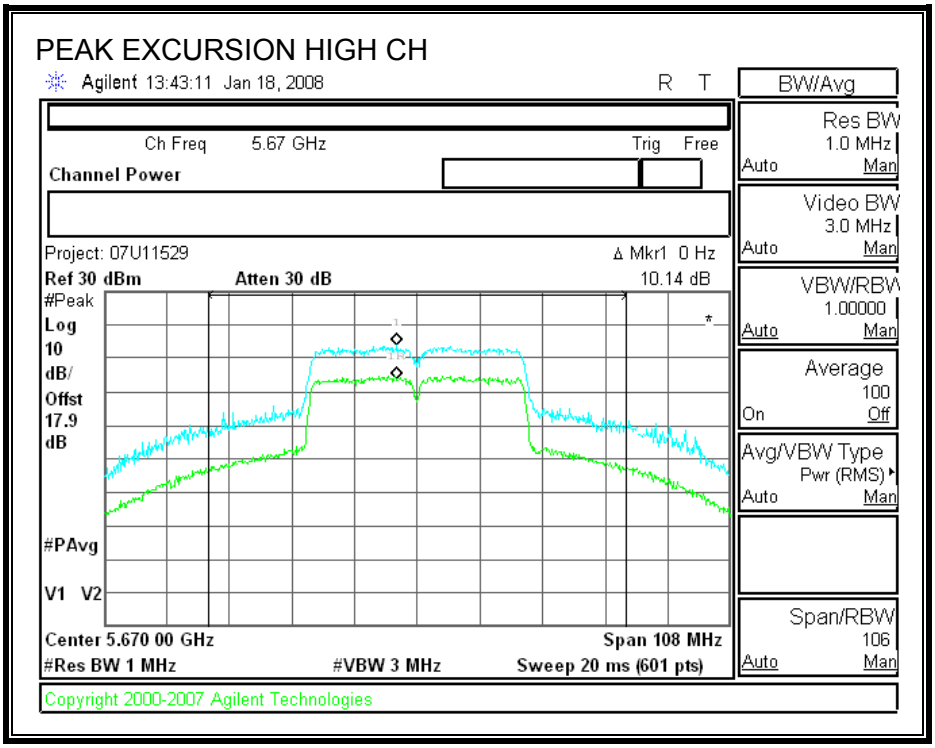
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	10.01	13	-2.99
Middle	5590	11.15	13	-1.85
High	5670	11.18	13	-1.82

PEAK EXCURSION (CHAIN 0)

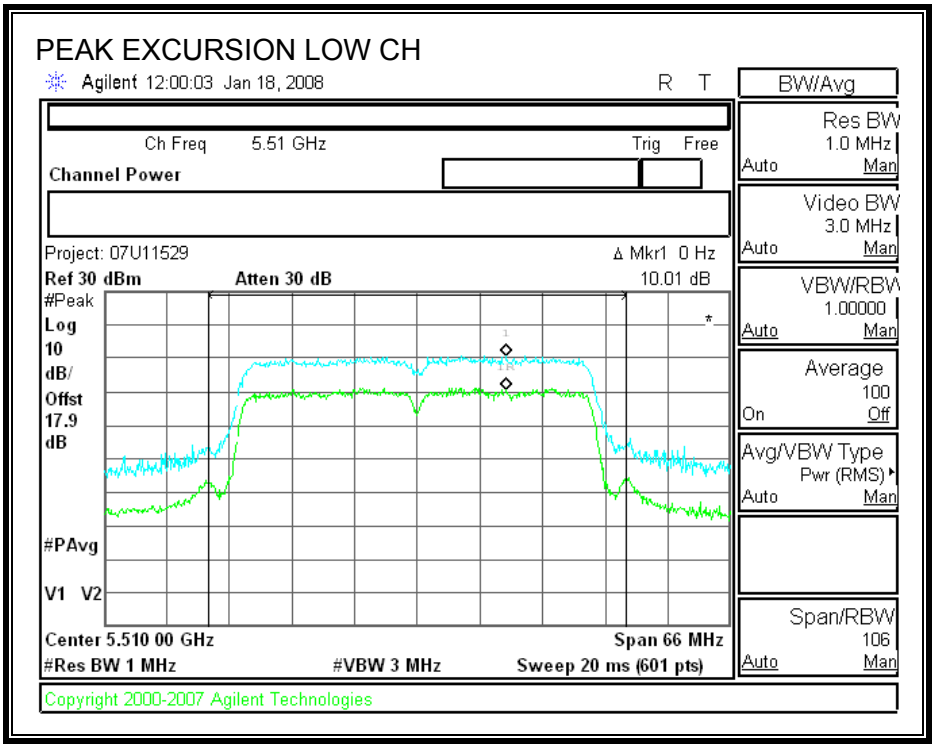


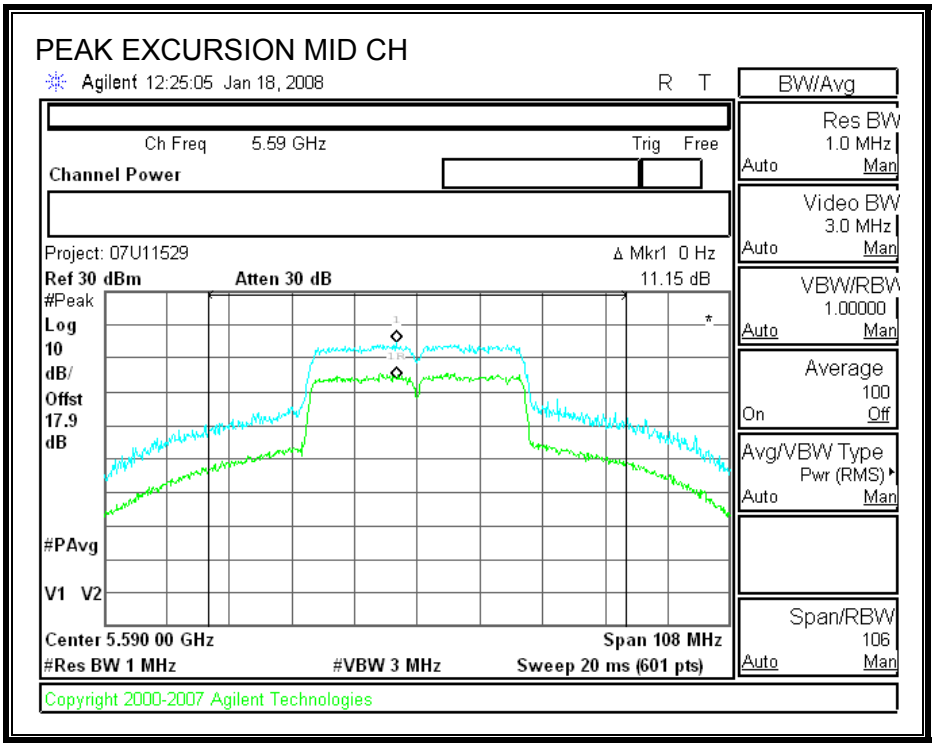


PEAK EXCURSION HIGH CH

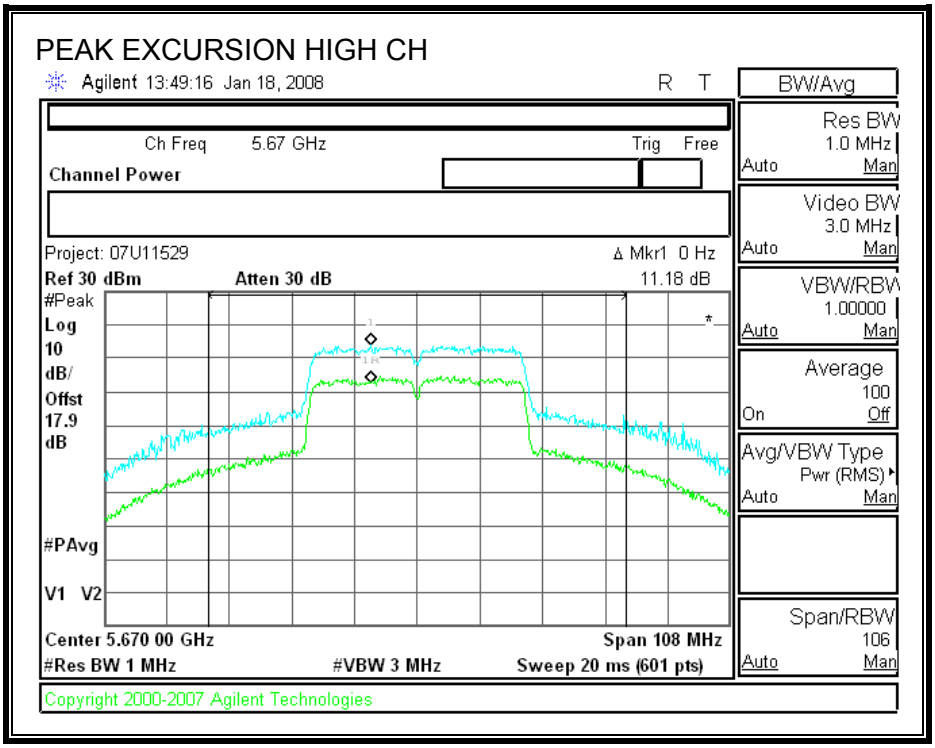


PEAK EXCURSION (CHAIN 1)





PEAK EXCURSION HIGH CH



9.3.5. 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.

Limit line = -27 - EUT Antenna Gain

TEST PROCEDURE

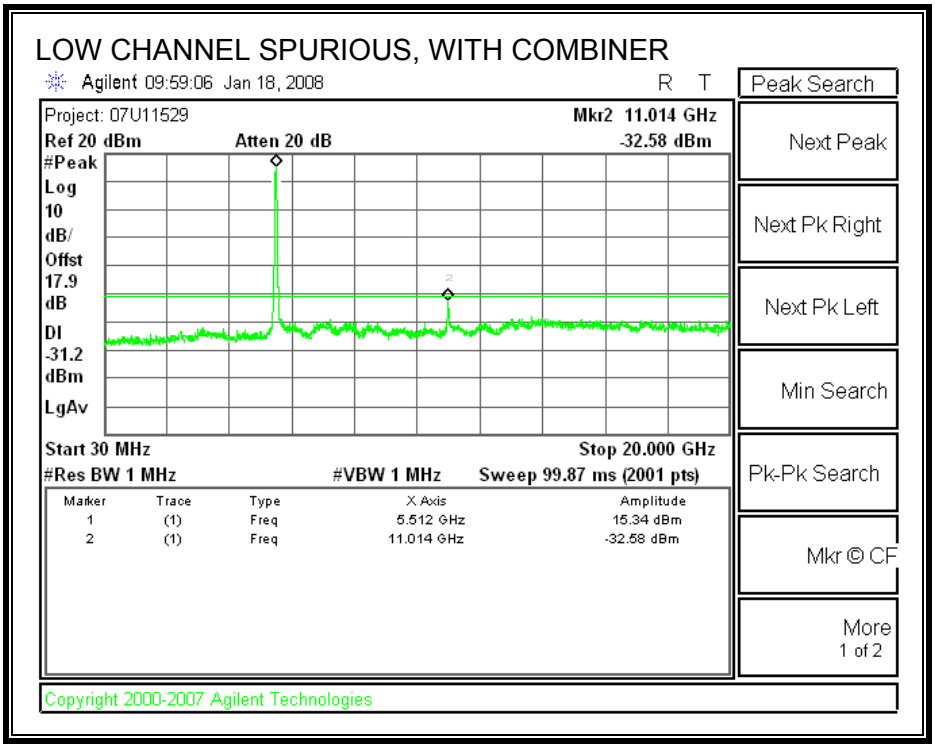
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

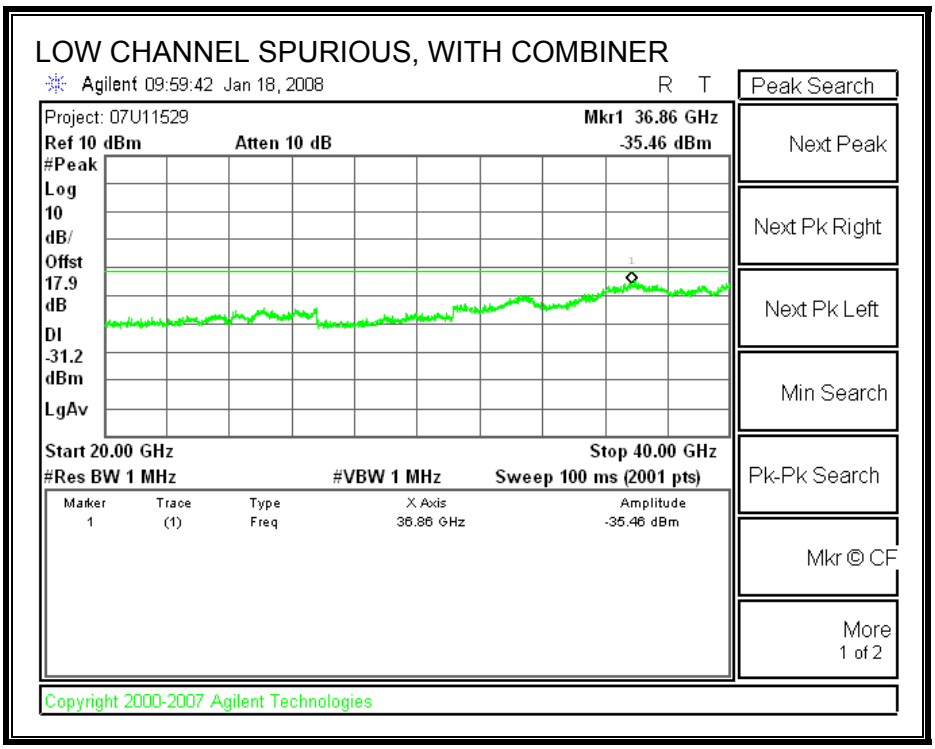
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

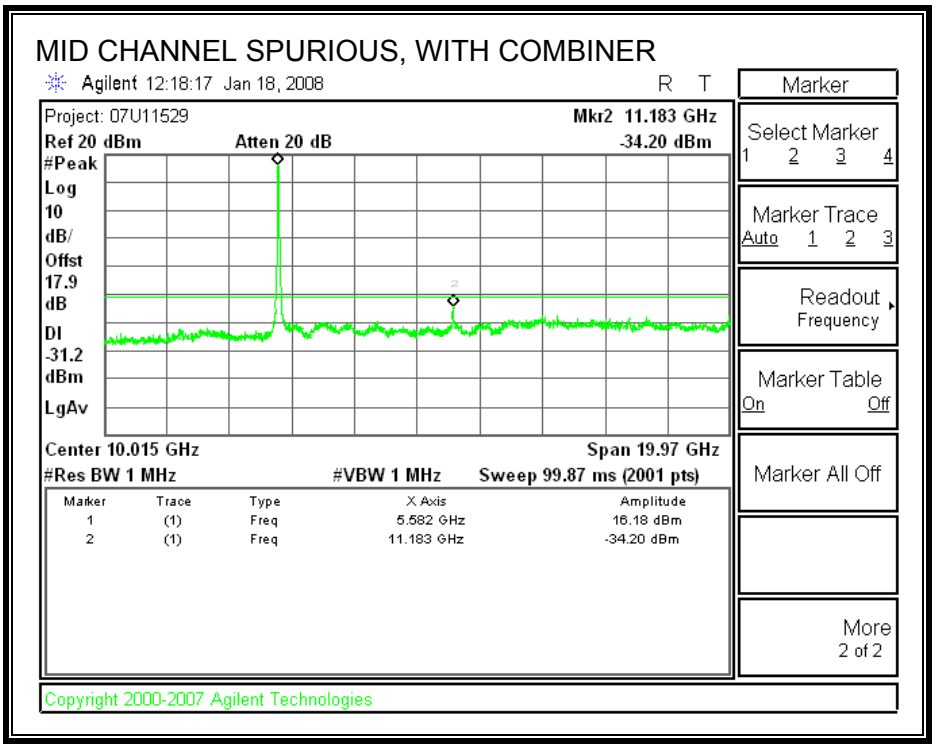
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

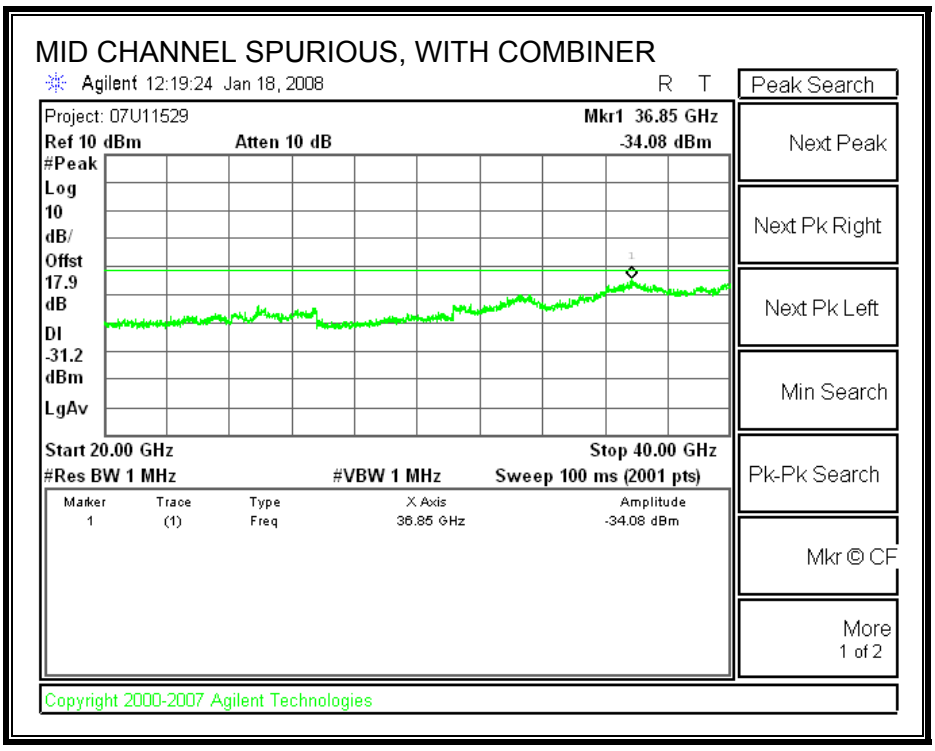
RESULTS

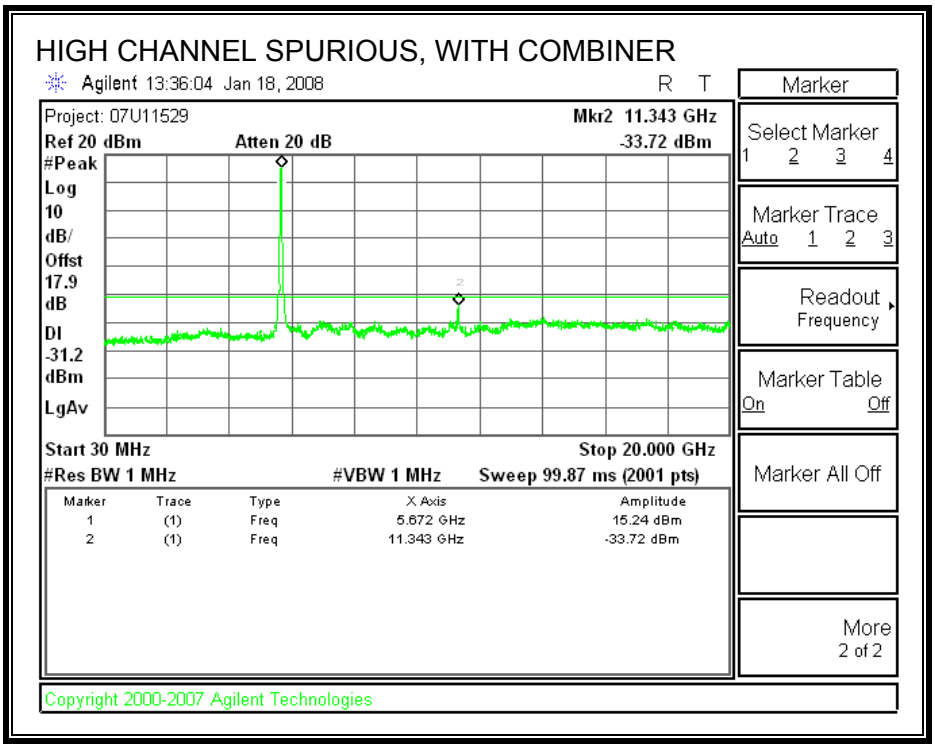
SPURIOUS EMISSIONS WITH COMBINER

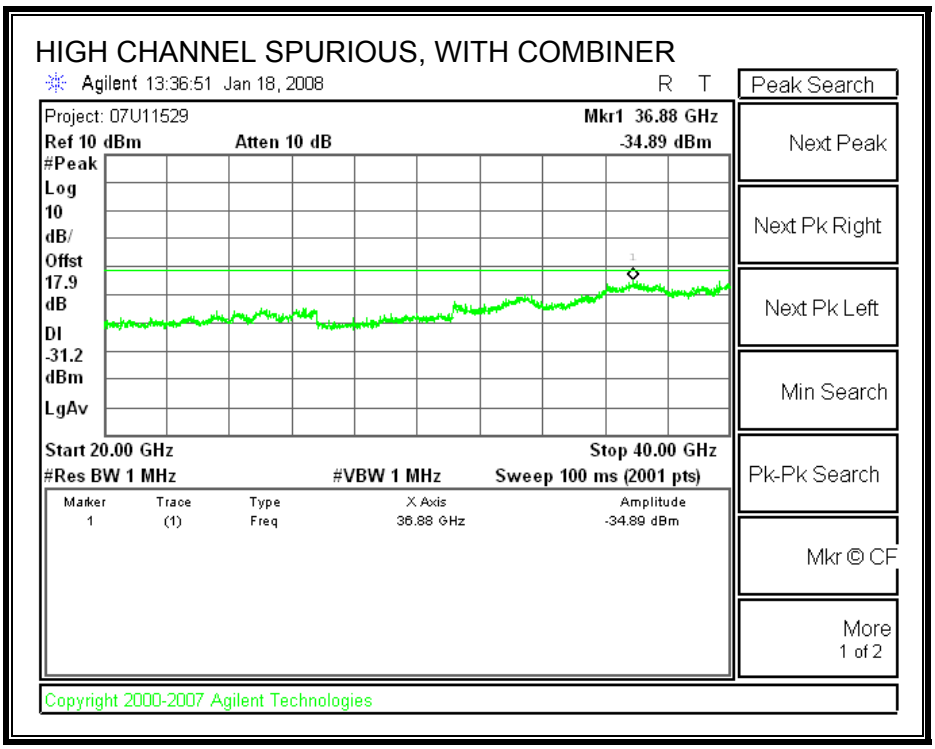












10. RADIATED TEST RESULTS

10.1. 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.

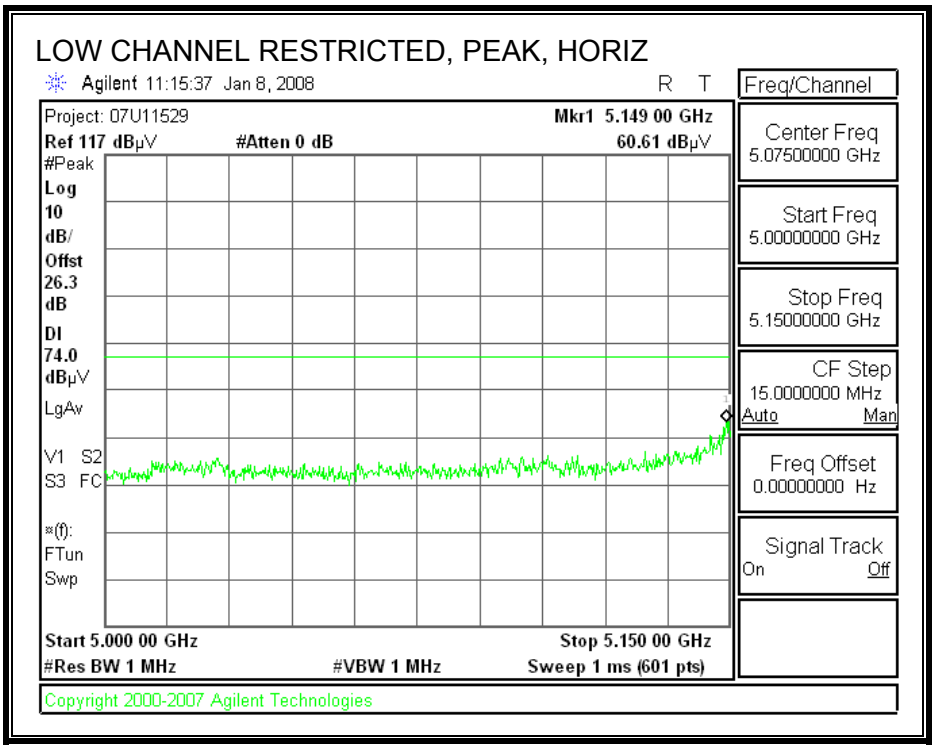
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 5 GHz band.

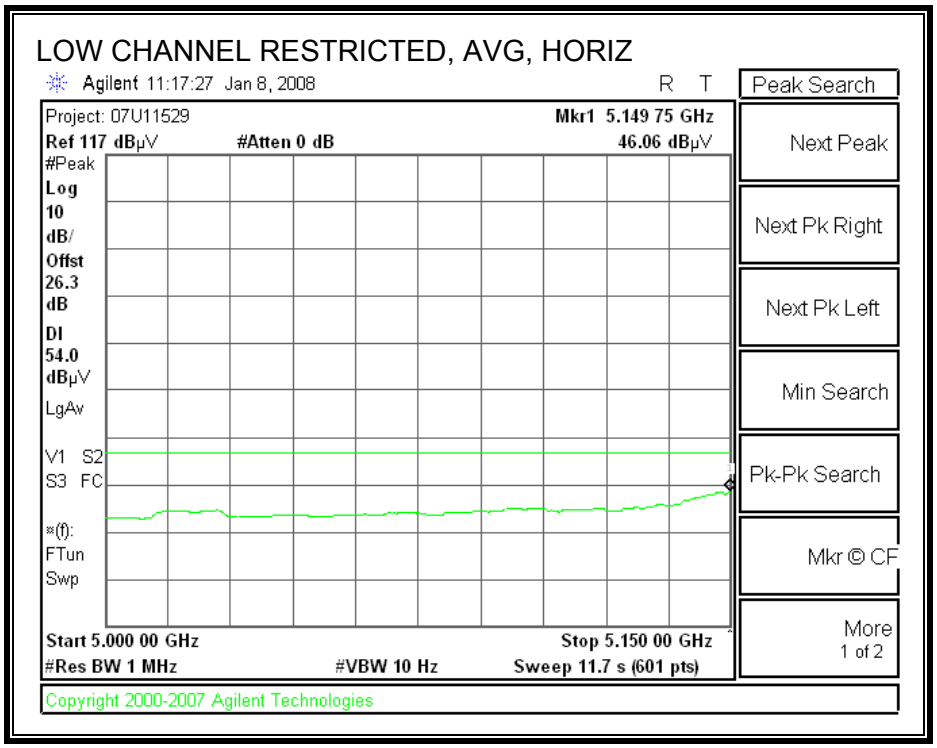
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

10.2. TRANSMITTER ABOVE 1 GHZ FOR THE BAND 5.15–5.25 GHZ

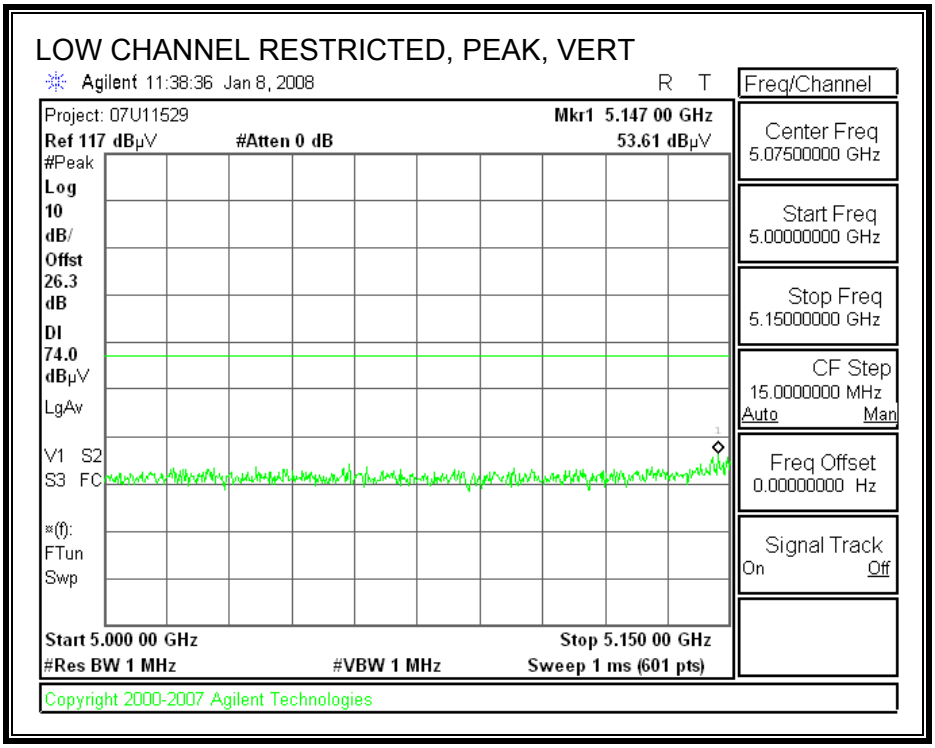
10.2.1. 802.11a MODE

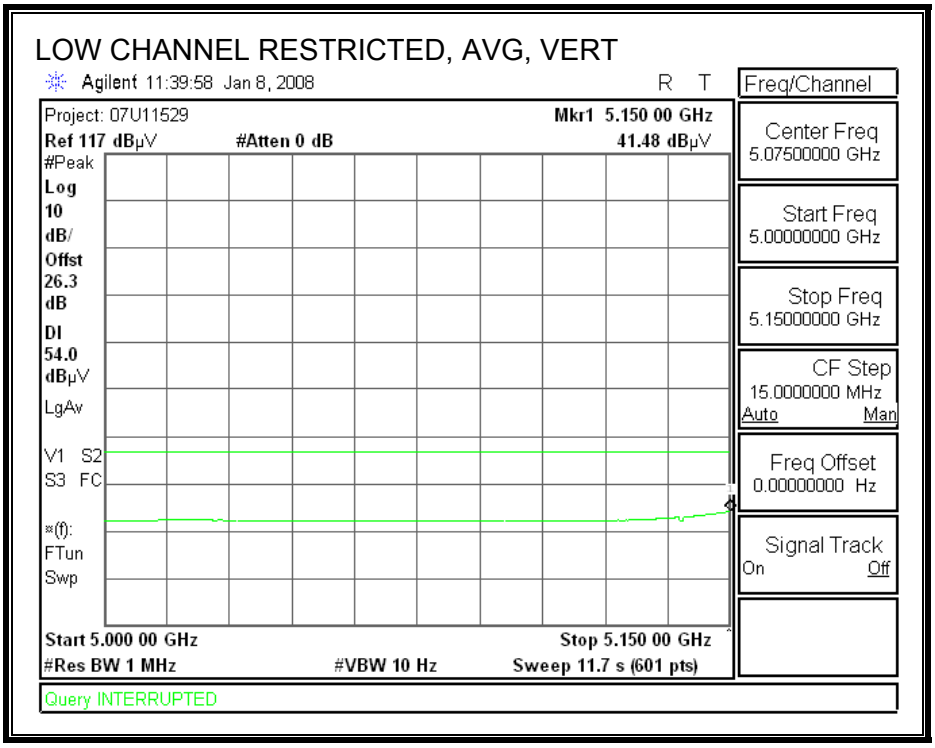
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)

The EUT passes Conducted Spurious test; therefore this test is not performed.

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/09/2008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz_5150-5250 MHz_11a Legacy

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

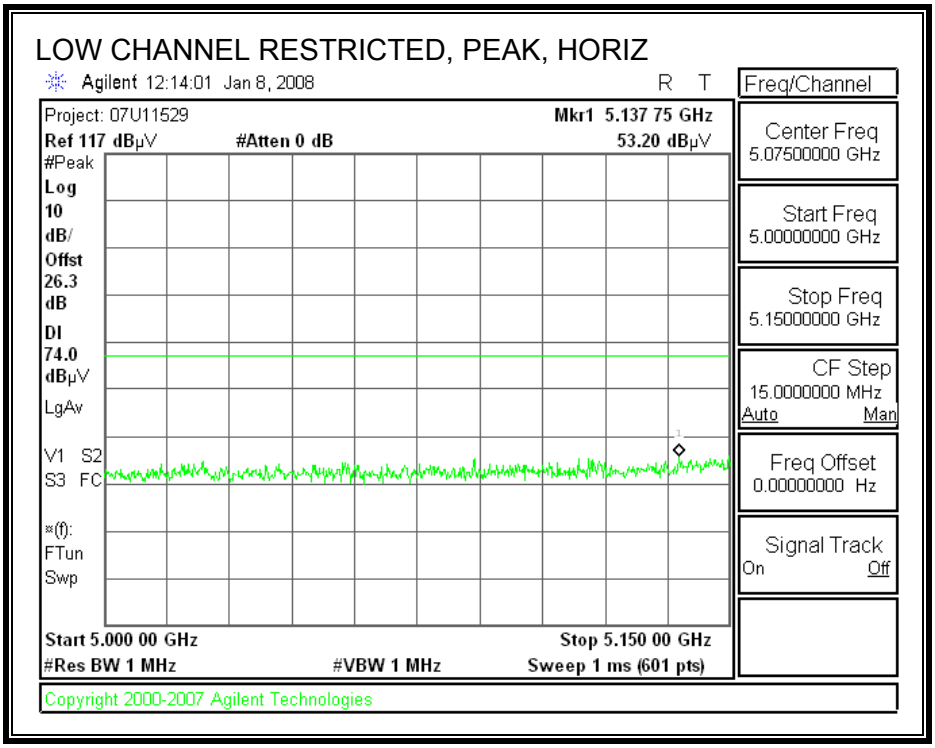
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5180 MHz															
15.540	3.0	50.4	40.8	38.0	5.1	-32.2	0.0	0.7	62.0	52.4	74	54	-12.0	-1.6	H
15.540	3.0	49.6	39.0	38.0	5.1	-32.2	0.0	0.7	61.2	50.6	74	54	-12.8	-3.4	V
MID CHANNEL, 5200 MHz															
15.600	3.0	50.9	41.1	38.0	5.1	-32.2	0.0	0.7	62.5	52.7	74	54	-11.5	-1.3	H
15.600	3.0	49.8	39.1	38.0	5.1	-32.2	0.0	0.7	61.4	50.7	74	54	-12.6	-3.3	V
HI CHANNEL, 5240 MHz															
15.720	3.0	51.3	41.5	37.9	5.1	-32.2	0.0	0.7	62.9	53.1	74	54	-11.1	-0.9	H
15.720	3.0	49.9	39.4	37.9	5.1	-32.2	0.0	0.7	61.5	51.0	74	54	-12.5	-3.0	H

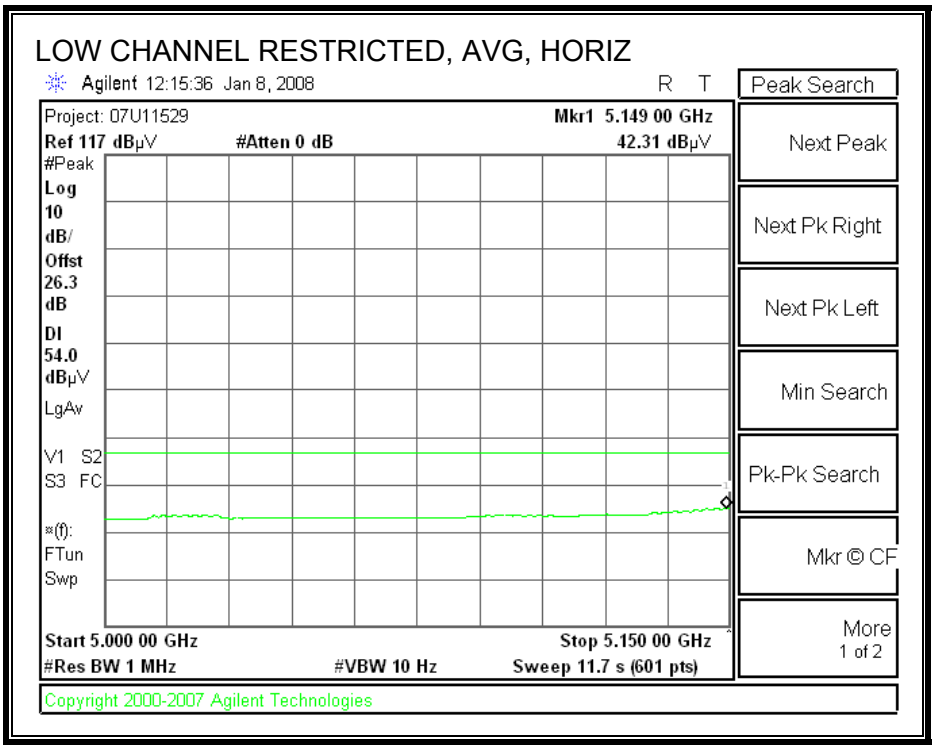
No other emissions were detected above system noise floor

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		

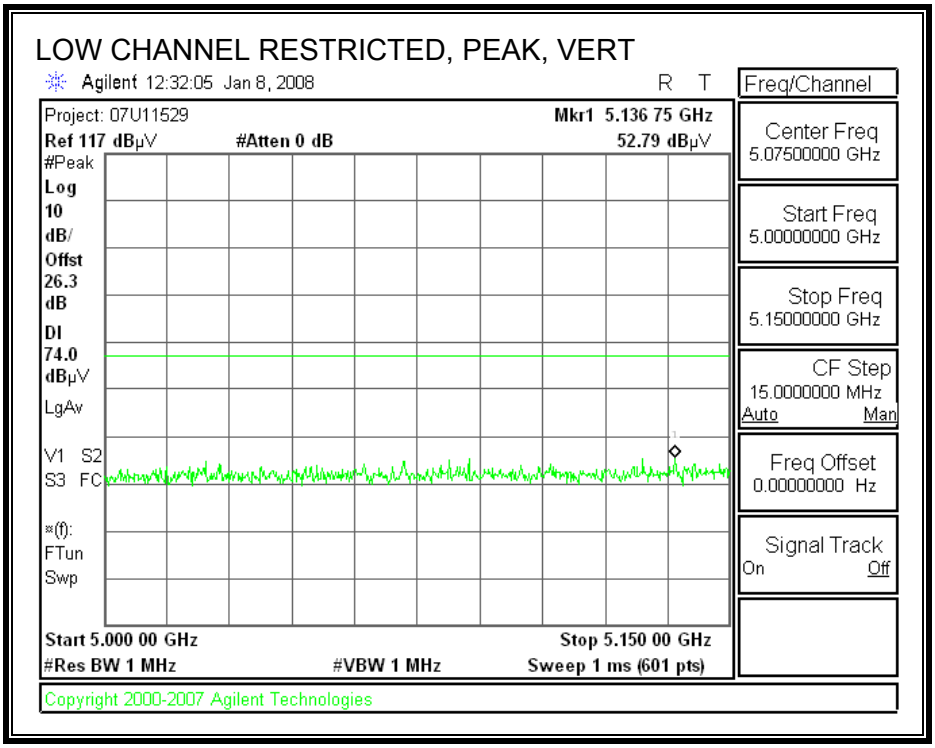
10.2.2. 802.11n HT20 MODE

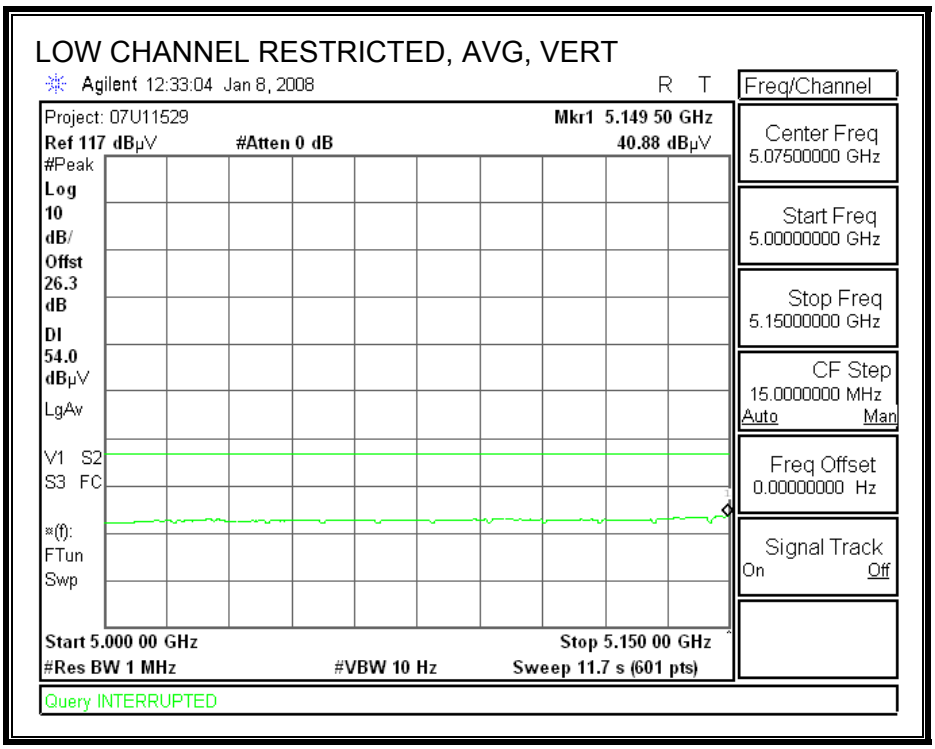
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)

The EUT passes Conducted Spurious test; therefore this test is not performed.

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services

Company: Broadcom
Project #: 07U11529
Date: 01/09/008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz Band_5150-5250 MHz_11n 20MHz CDD

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

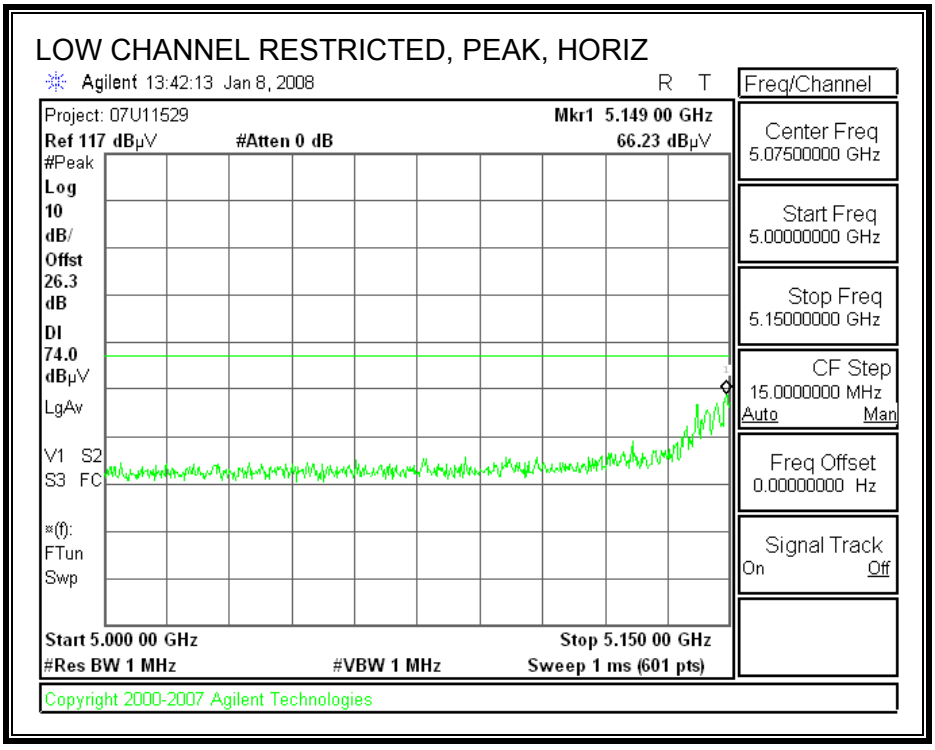
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5180 MHz															
15.540	3.0	50.3	39.6	38.0	5.1	-32.2	0.0	0.7	61.9	51.2	74	54	-12.1	-2.8	H
15.540	3.0	49.7	38.8	38.0	5.1	-32.2	0.0	0.7	61.3	50.4	74	54	-12.7	-3.6	V
MID CHANNEL, 5200 MHz															
15.600	3.0	51.1	40.8	38.0	5.1	-32.2	0.0	0.7	62.7	52.4	74	54	-11.3	-1.6	H
15.600	3.0	49.6	39.3	38.0	5.1	-32.2	0.0	0.7	61.2	50.9	74	54	-12.8	-3.1	V
HI CHANNEL, 5240 MHz															
15.720	3.0	51.4	41.2	37.9	5.1	-32.2	0.0	0.7	63.0	52.8	74	54	-11.0	-1.2	V
15.720	3.0	50.0	39.6	37.9	5.1	-32.2	0.0	0.7	61.6	51.2	74	54	-12.4	-2.8	V

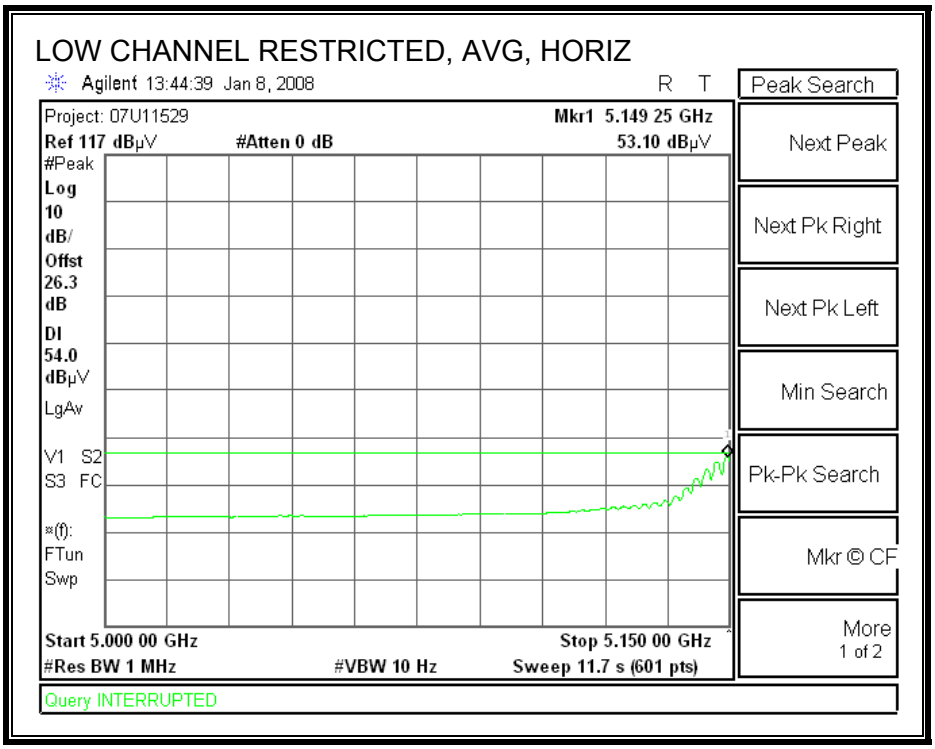
No other emissions were detected above system noise floor

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		

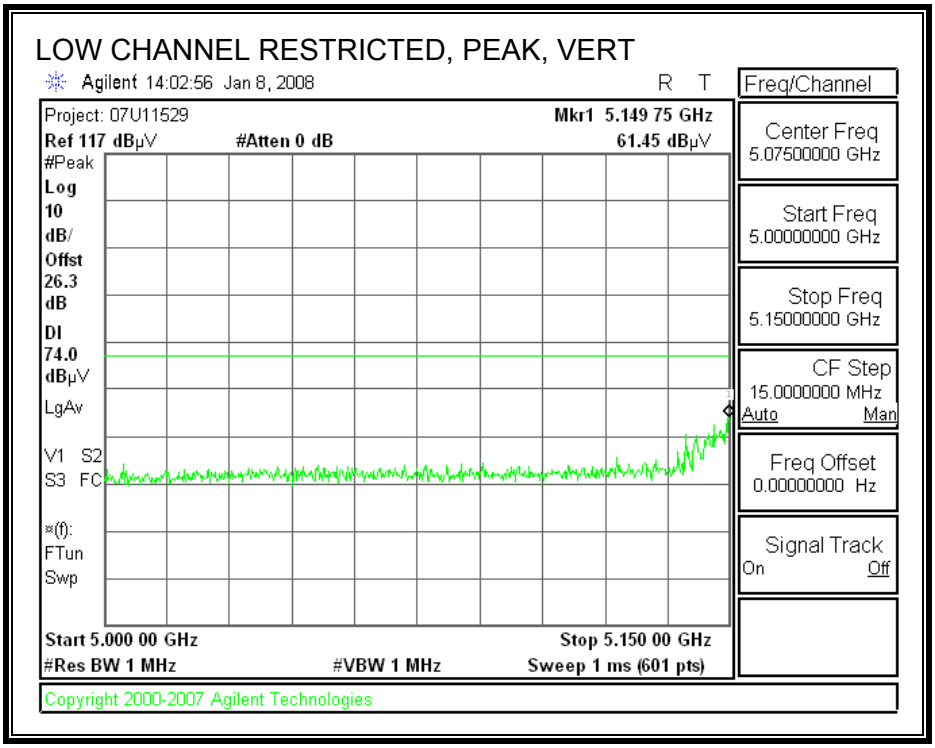
10.2.3. 802.11n HT40 MODE

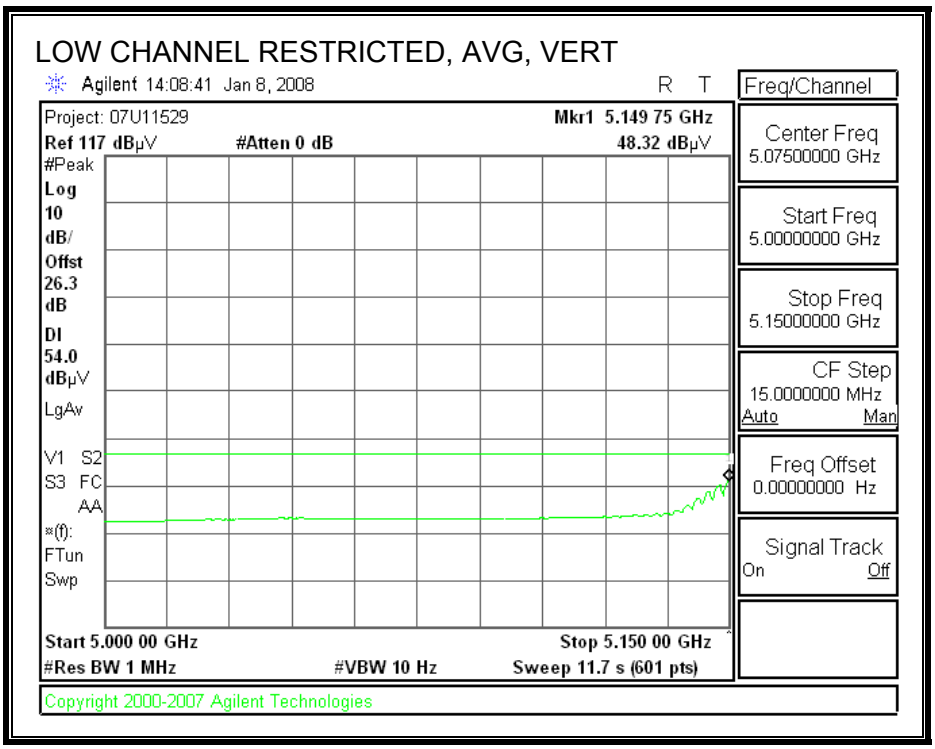
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)

The EUT passes Conducted Spurious test; therefore this test is not performed.

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/09/008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz Band_5150-5250MHz_11n 40MHz CDD

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5190 MHz															
15.570	3.0	50.7	39.9	38.0	5.1	-32.2	0.0	0.7	62.3	51.5	74	54	-11.7	-2.5	H
15.570	3.0	47.5	37.8	38.0	5.1	-32.2	0.0	0.7	59.1	49.4	74	54	-14.9	-4.6	V
MID CHANNEL, 5230 MHz															
15.960	3.0	51.1	40.3	37.8	5.2	-32.1	0.0	0.7	62.7	52.0	74	54	-11.3	-2.0	H
15.960	3.0	48.4	38.7	37.8	5.2	-32.1	0.0	0.7	60.0	50.3	74	54	-14.0	-3.7	V

No other emissions were detected above 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		

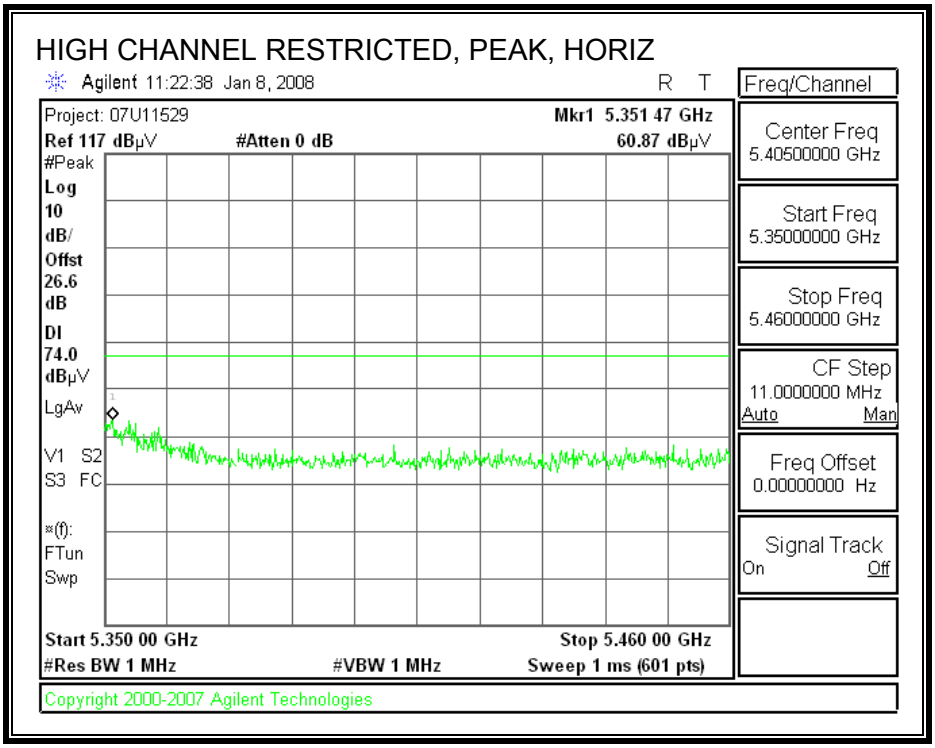
10.3. TRANSMITTER ABOVE 1 GHZ FOR THE BAND 5.25–5.35 GHZ

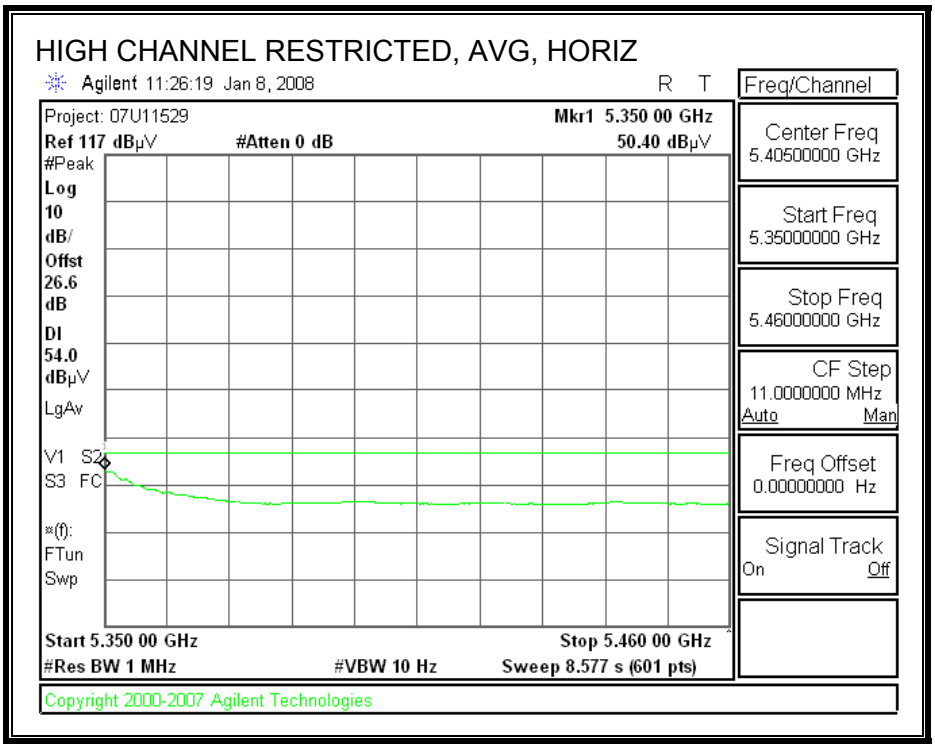
10.3.1. 802.11a MODE

AUTHORIZED BANDEDGE (LOW CHANNEL)

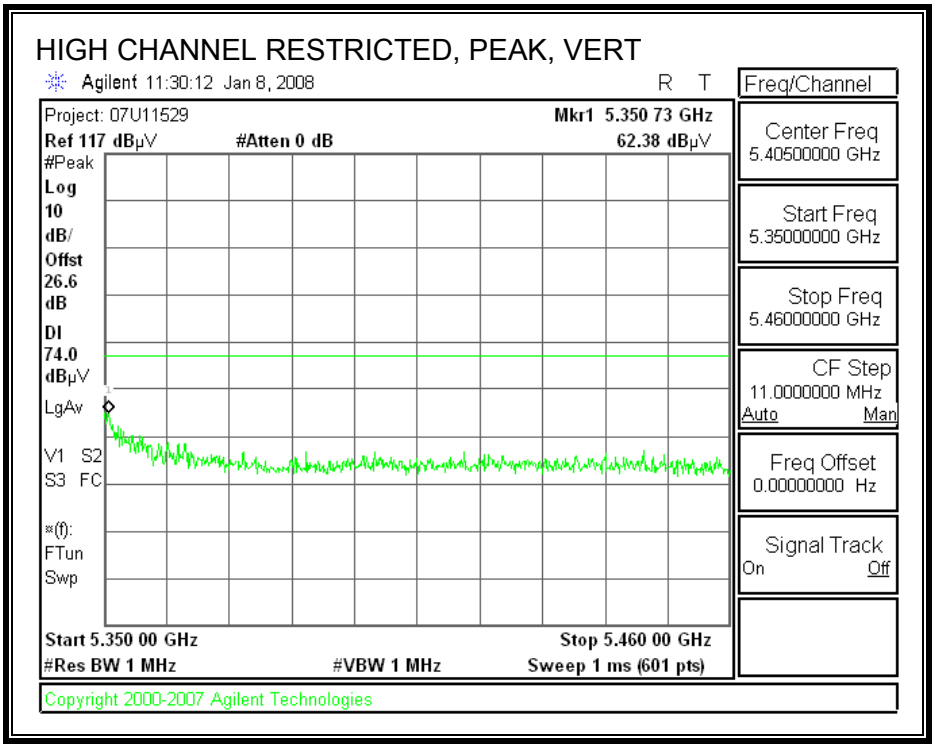
The EUT passes Conducted Spurious test; therefore this test is not performed.

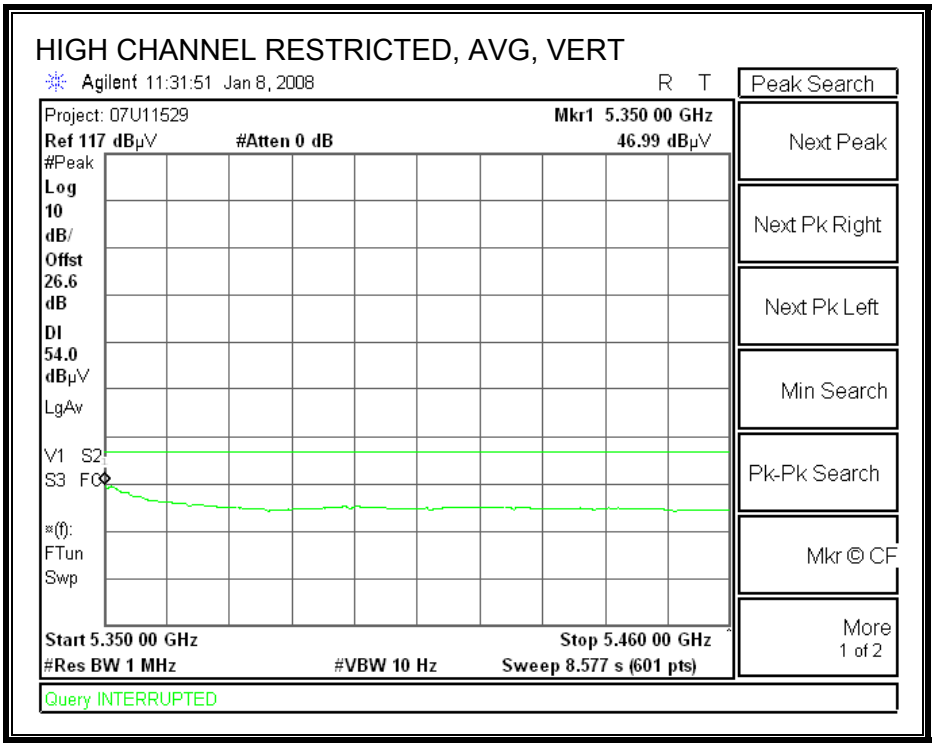
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/09/2008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz Band_5250-5350 MHz_11a Legacy

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5260 MHz															
15.780	3.0	50.4	40.2	37.9	5.1	-32.2	0.0	0.7	62.0	51.8	74	54	-12.0	-2.2	H
15.780	3.0	49.6	39.0	37.9	5.1	-32.2	0.0	0.7	61.2	50.6	74	54	-12.8	-3.4	V
MID CHANNEL, 5300 MHz															
10.600	3.0	46.3	33.8	37.4	3.9	-32.6	0.0	0.8	55.8	43.3	74	54	-18.2	-10.7	H
15.900	3.0	51.1	41.3	37.9	5.2	-32.1	0.0	0.7	62.7	52.9	74	54	-11.3	-1.1	H
10.600	3.0	43.4	32.2	37.4	3.9	-32.6	0.0	0.8	52.9	41.7	74	54	-21.1	-12.3	V
15.900	3.0	48.5	39.5	37.9	5.2	-32.1	0.0	0.7	60.1	51.1	74	54	-13.9	-2.9	V
HI CHANNEL, 5320 MHz															
10.640	3.0	44.5	32.5	37.3	3.9	-32.6	0.0	0.8	54.0	42.0	74	54	-20.0	-12.0	H
15.960	3.0	50.4	41.1	37.8	5.2	-32.1	0.0	0.7	62.0	52.7	74	54	-12.0	-1.3	H
10.640	3.0	43.3	31.6	37.3	3.9	-32.6	0.0	0.8	52.8	41.1	74	54	-21.2	-12.9	V
15.960	3.0	49.3	39.4	37.8	5.2	-32.1	0.0	0.7	60.9	51.0	74	54	-13.1	-3.0	V

No other emissions were detected above system noise floor

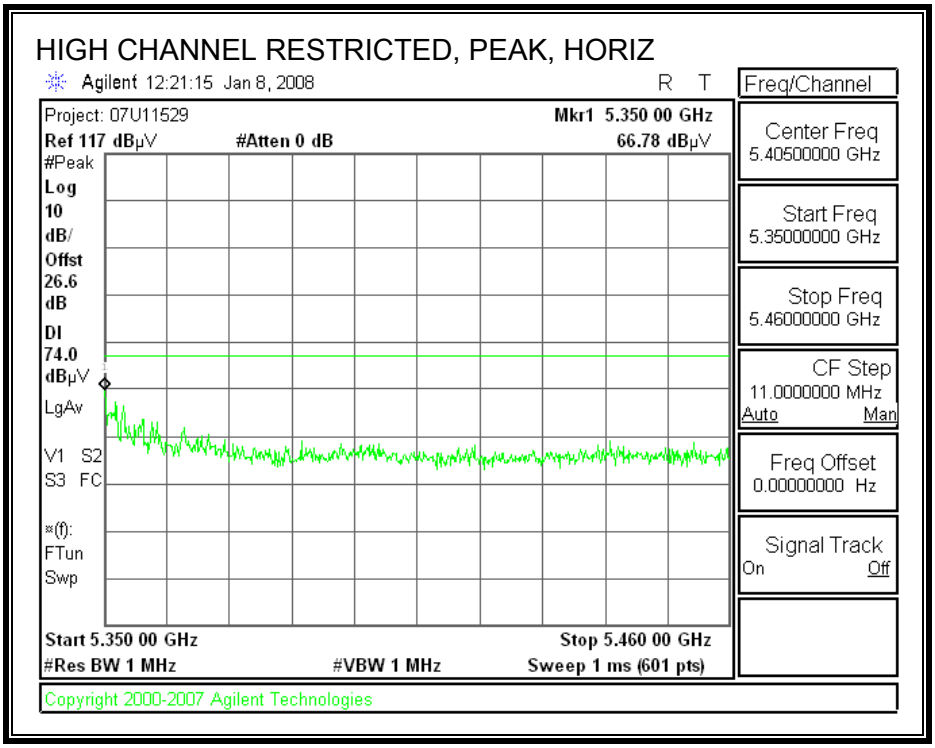
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

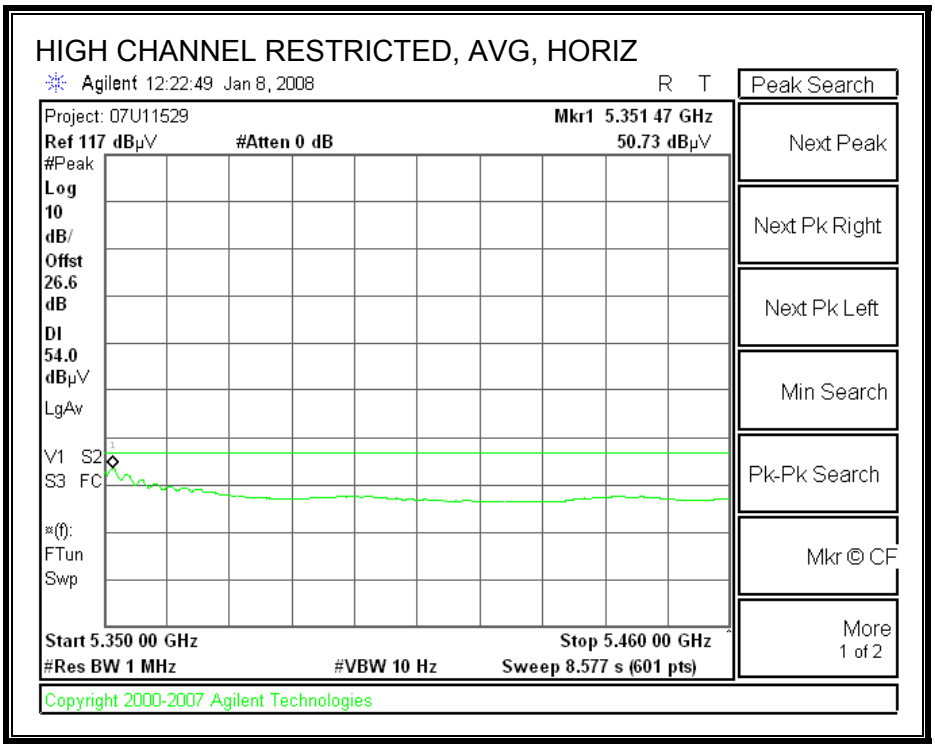
10.3.2. 802.11n HT20 MODE

AUTHORIZED BANDEDGE (LOW CHANNEL)

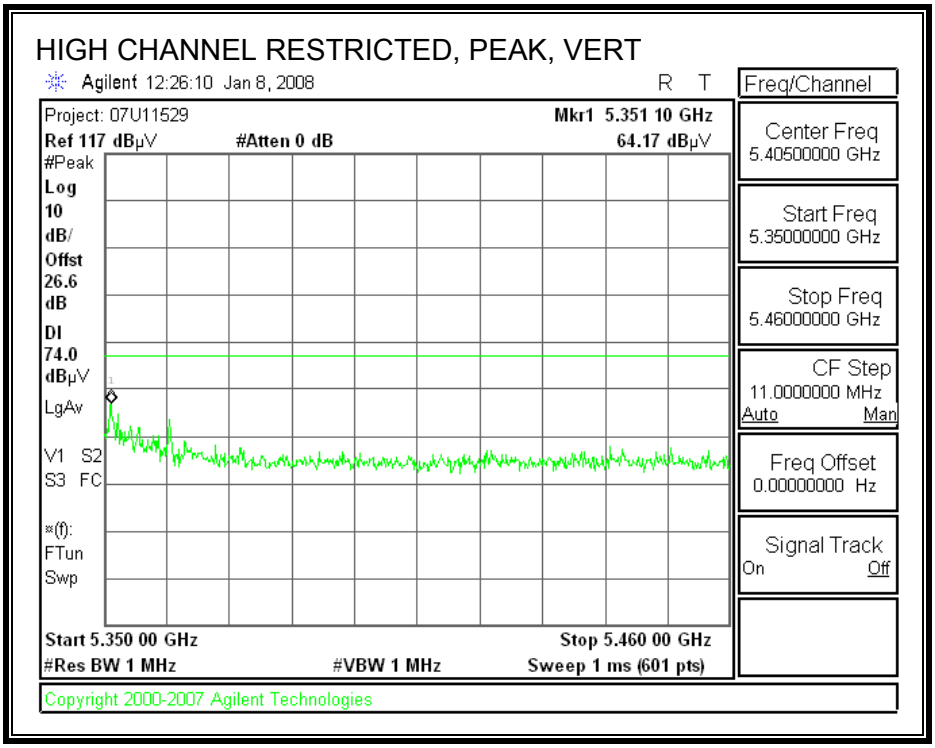
The EUT passes Conducted Spurious test; therefore this test is not performed.

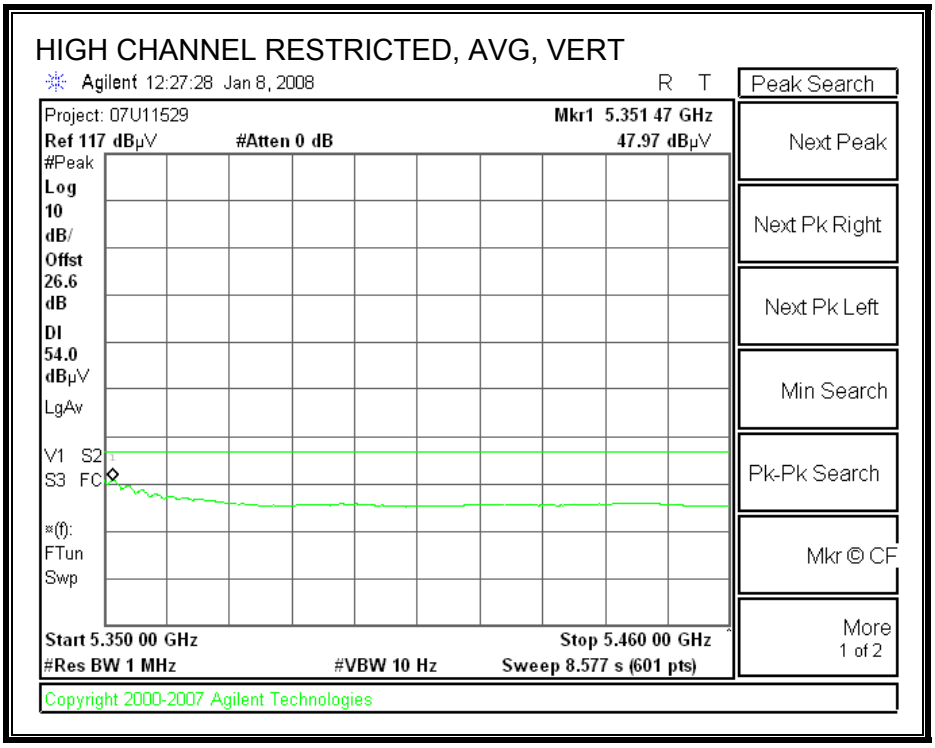
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/09/008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz Band_5250-5350 MHz_11n 20MHz CDD

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5260 MHz															
15.780	3.0	51.4	39.9	37.9	5.1	-32.2	0.0	0.7	63.0	51.5	74	54	-11.0	-2.5	H
15.780	3.0	49.6	38.9	37.9	5.1	-32.2	0.0	0.7	61.2	50.5	74	54	-12.8	-3.5	V
MID CHANNEL, 5300 MHz															
10.600	3.0	46.5	33.7	37.4	3.9	-32.6	0.0	0.8	56.0	43.2	74	54	-18.0	-10.8	H
15.780	3.0	51.5	40.9	37.9	5.1	-32.2	0.0	0.7	63.1	52.5	74	54	-10.9	-1.5	H
10.600	3.0	43.1	32.1	37.4	3.9	-32.6	0.0	0.8	52.6	41.6	74	54	-21.4	-12.4	V
15.780	3.0	48.5	39.5	37.9	5.1	-32.2	0.0	0.7	60.1	51.1	74	54	-13.9	-2.9	V
HI CHANNEL, 5320 MHz															
10.640	3.0	44.3	33.0	37.3	3.9	-32.6	0.0	0.8	53.8	42.5	74	54	-20.2	-11.5	H
15.960	3.0	50.9	40.4	37.8	5.2	-32.1	0.0	0.7	62.5	52.0	74	54	-11.5	-2.0	H
10.640	3.0	43.9	32.3	37.3	3.9	-32.6	0.0	0.8	53.4	41.8	74	54	-20.6	-12.2	V
15.960	3.0	49.4	38.8	37.8	5.2	-32.1	0.0	0.7	61.0	50.4	74	54	-13.0	-3.6	V

No other emissions were detected above system noise floor

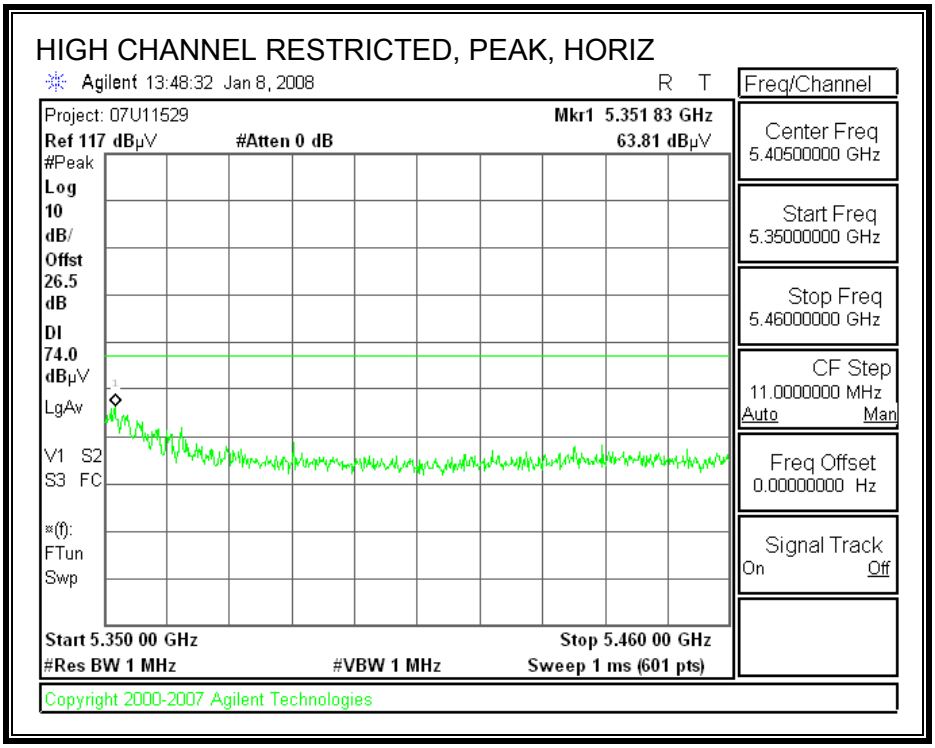
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

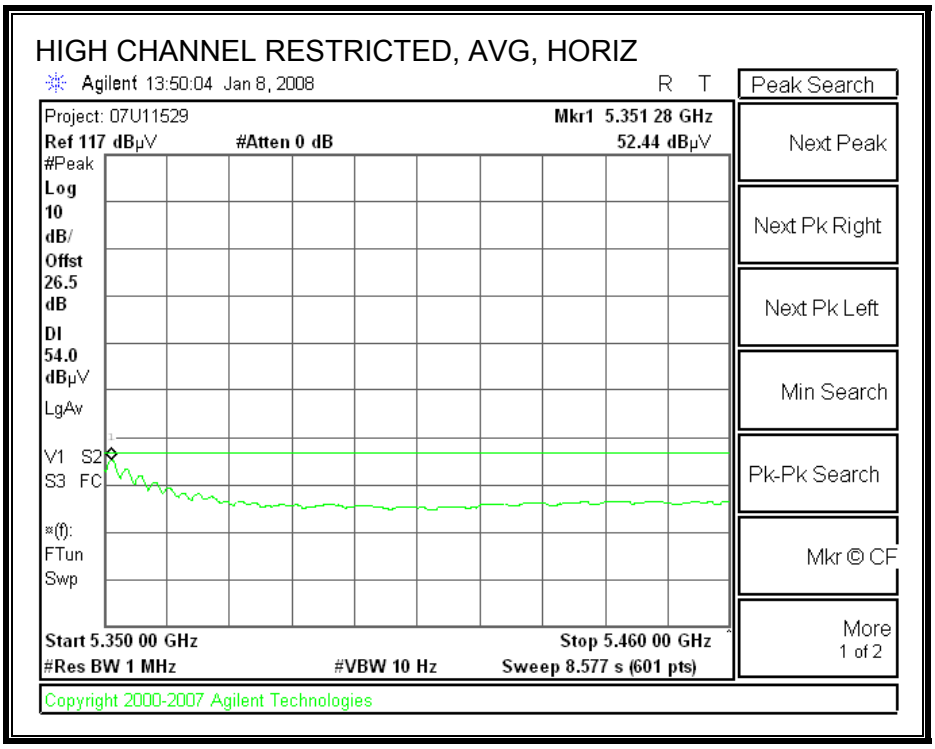
10.3.3. 802.11n HT40 MODE

AUTHORIZED BANDEDGE (LOW CHANNEL)

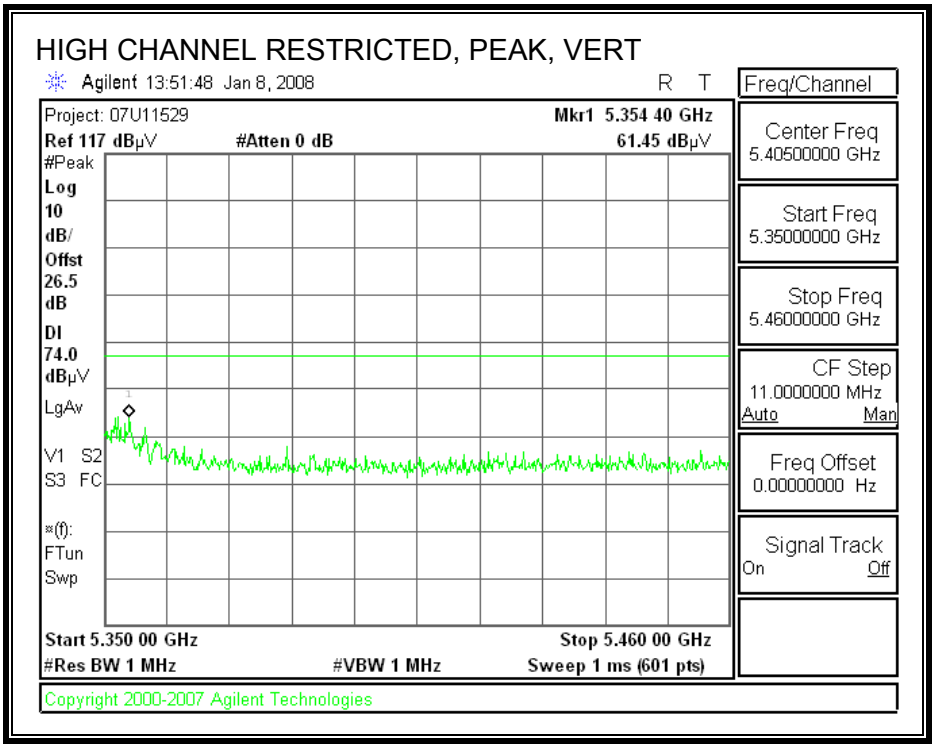
The EUT passes Conducted Spurious test; therefore this test is not performed.

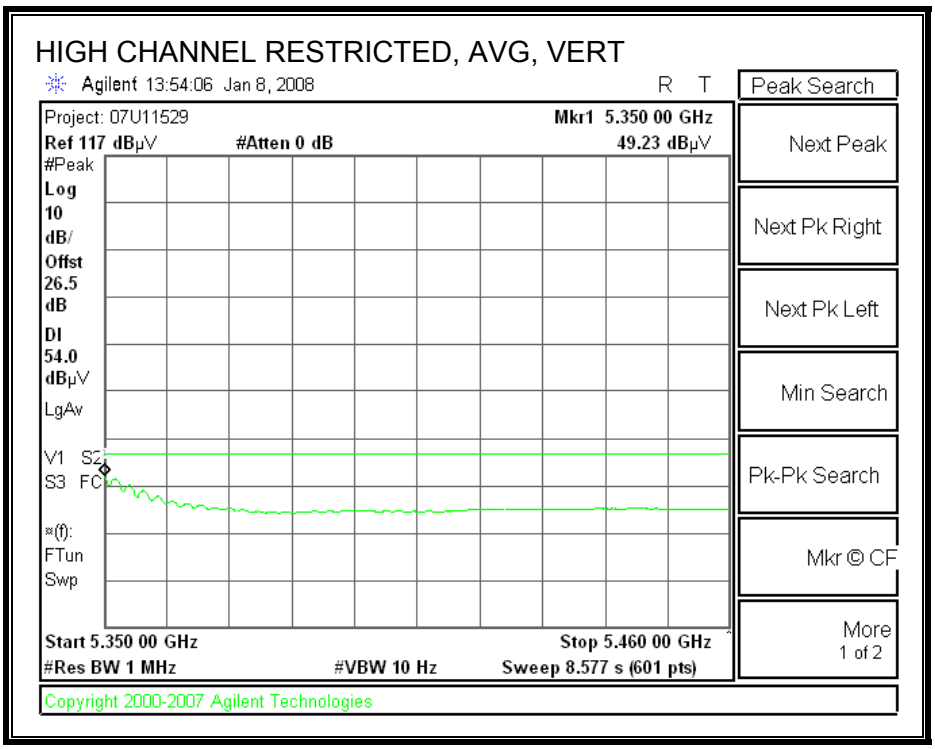
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/09/008
Test Engineer: Vien Tran
Configuration: EUT with 5.6dBi Antenna
Mode: Tx 5.2 GHz Band_5250-5350MHz_11n 40MHz CDD

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5270 MHz															
15.810	3.0	51.6	40.9	37.9	5.2	-32.2	0.0	0.7	63.2	52.5	74	54	-10.8	-1.5	H
15.810	3.0	50.7	40.0	37.9	5.2	-32.2	0.0	0.7	62.3	51.6	74	54	-11.7	-2.4	V
HI CHANNEL, 5310 MHz															
10.620	3.0	47.3	37.3	37.4	3.9	-32.6	0.0	0.8	56.8	46.8	74	54	-17.2	-7.2	H
15.930	3.0	50.8	40.4	37.8	5.2	-32.1	0.0	0.7	62.4	52.0	74	54	-11.6	-2.0	H
10.620	3.0	46.8	36.6	37.4	3.9	-32.6	0.0	0.8	56.3	46.1	74	54	-17.7	-7.9	V
15.930	3.0	49.6	38.7	37.8	5.2	-32.1	0.0	0.7	61.2	50.3	74	54	-12.8	-3.7	V

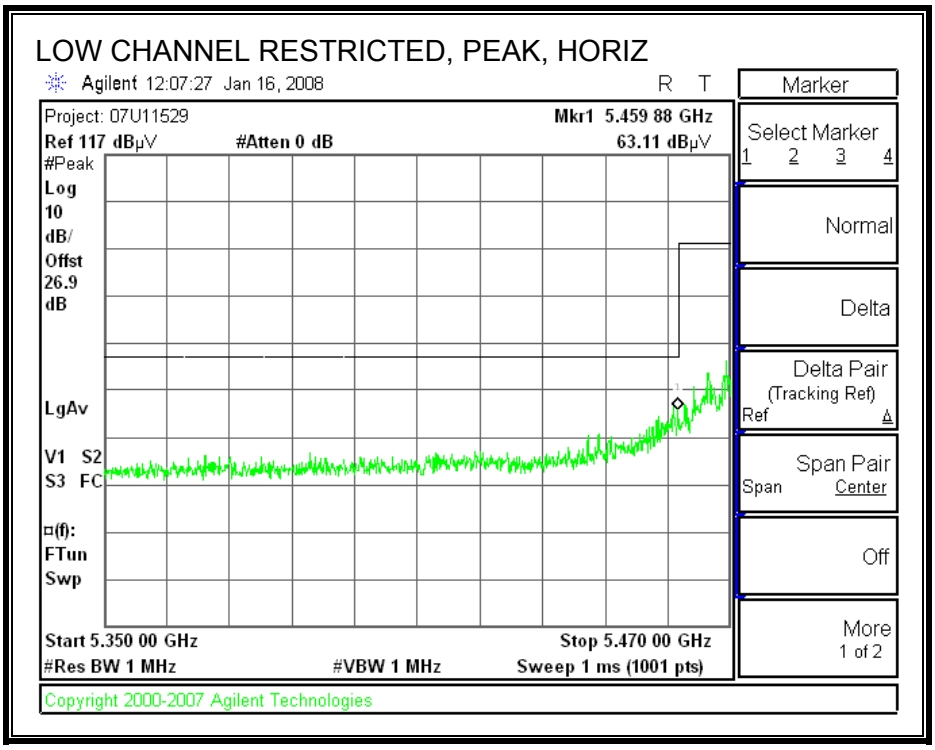
No other emissions were detected above system noise floor

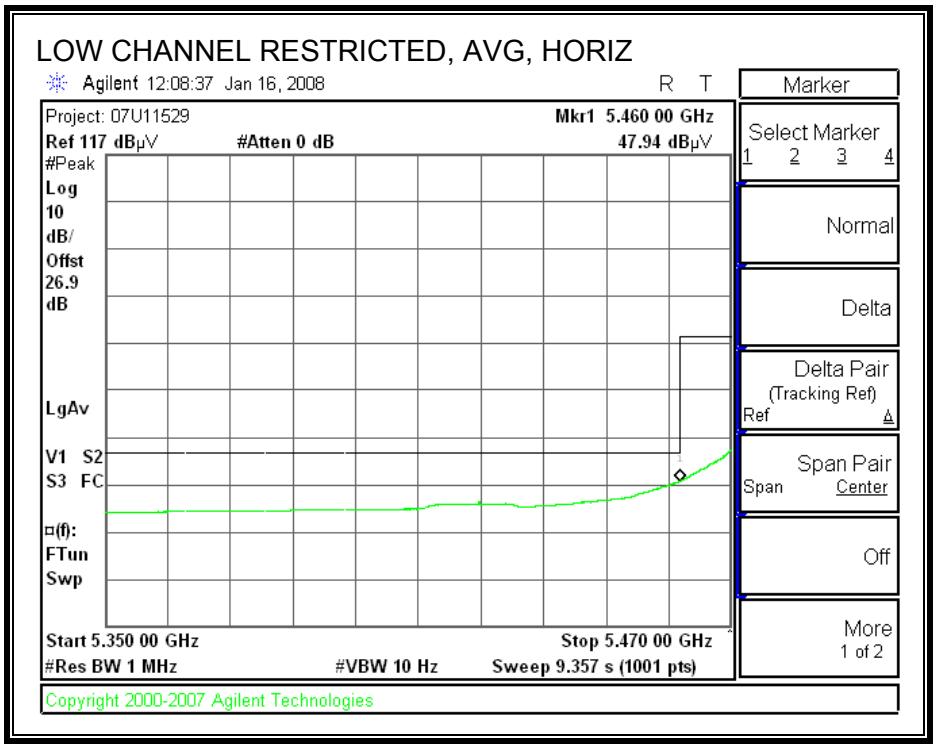
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

10.4. TRANSMITTER ABOVE 1 GHZ FOR 5.47–5.725 GHZ BAND

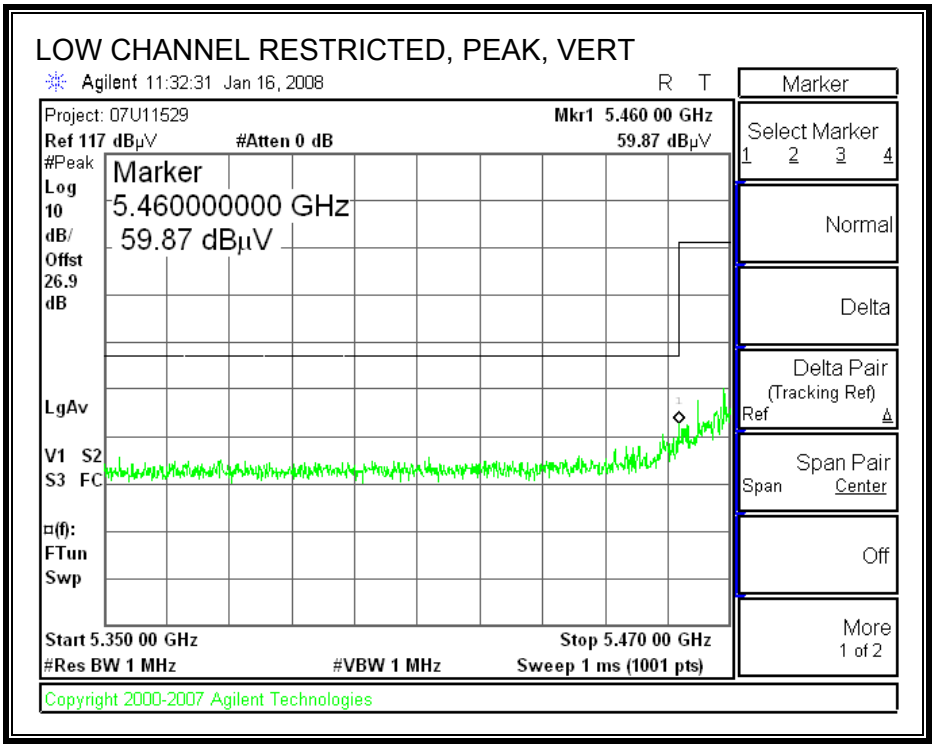
10.4.1. 802.11a MODE

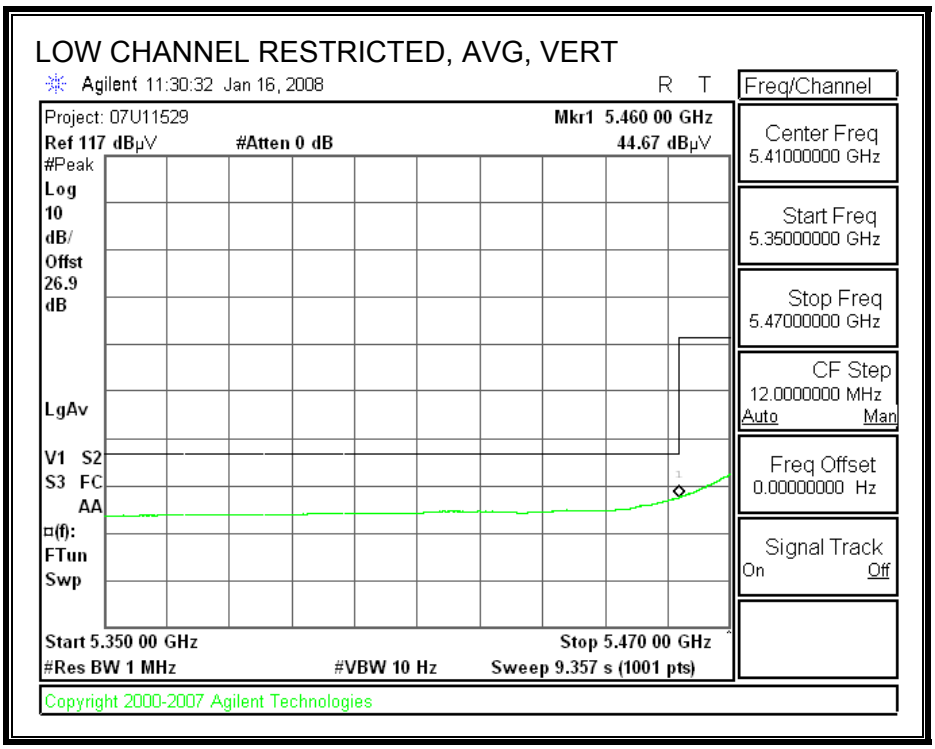
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



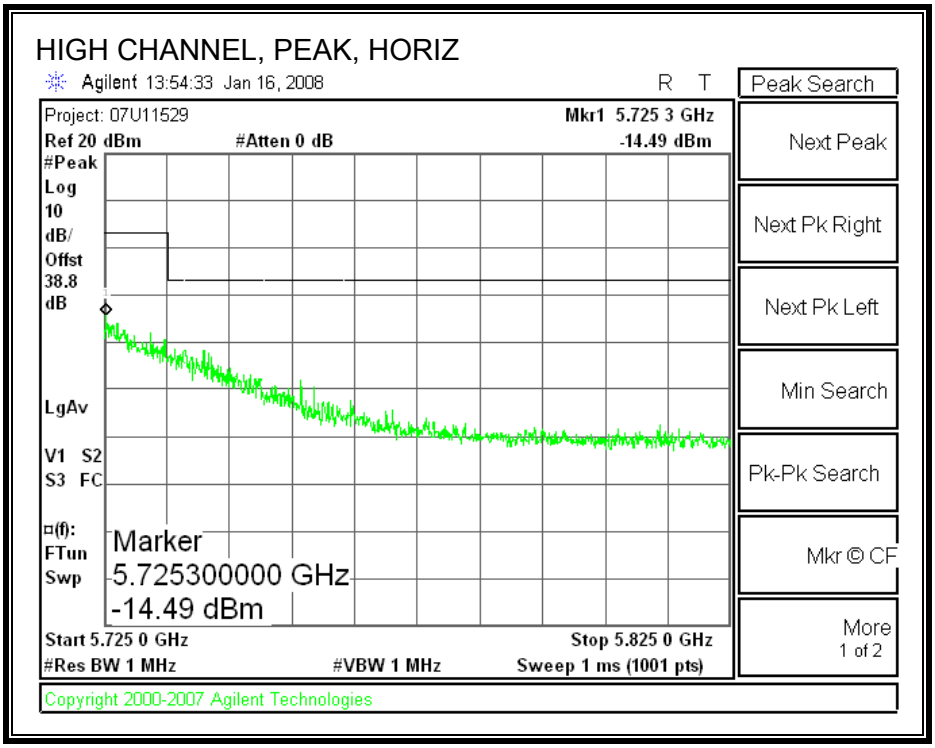


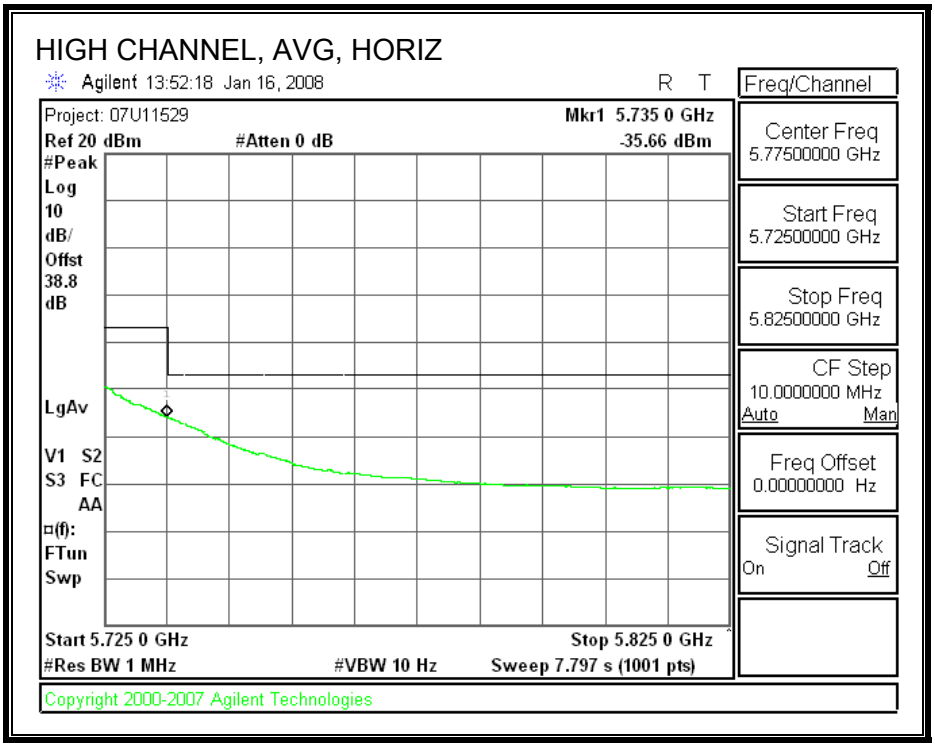
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



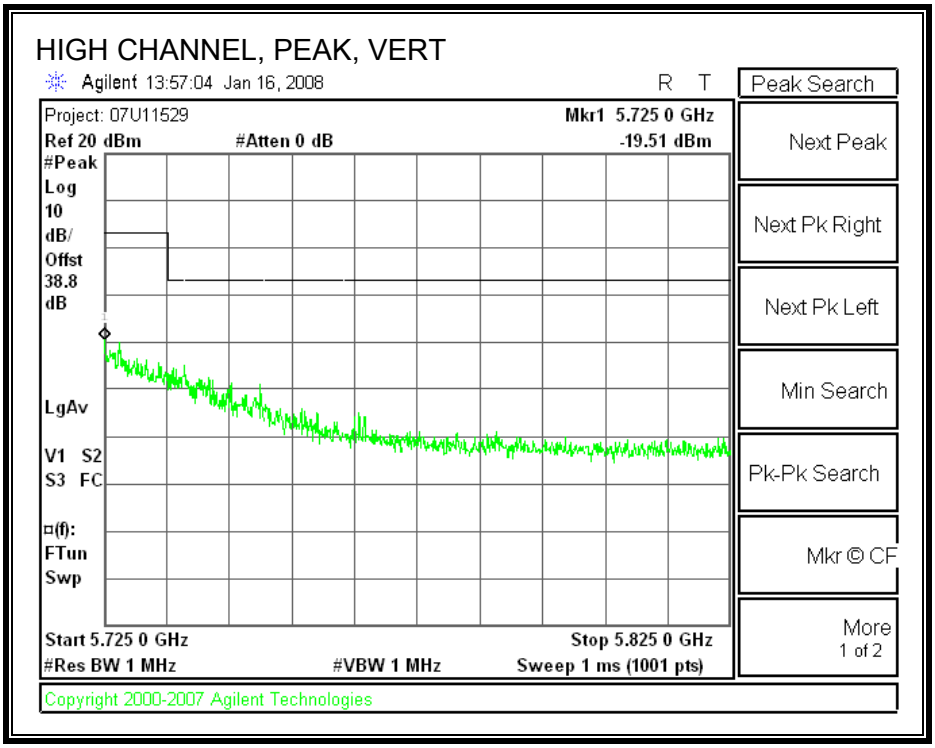


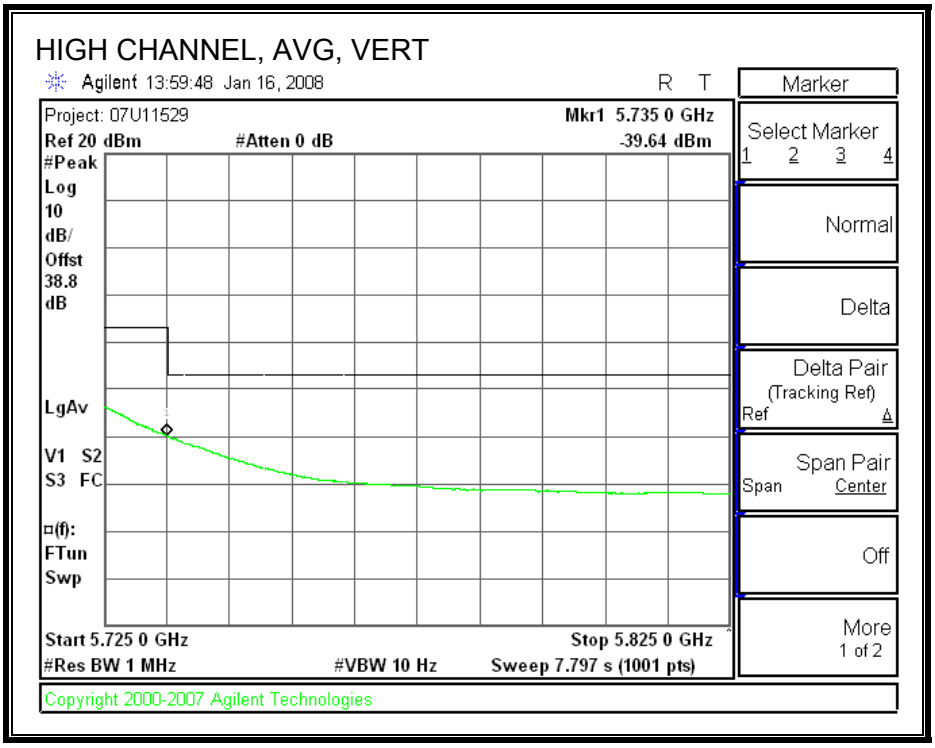
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/16/2008
Test Engineer: Vien Tran
Configuration: EUT with 4.2dBi Antenna
Mode: Tx 5.6 GHz Band_11a Legacy

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

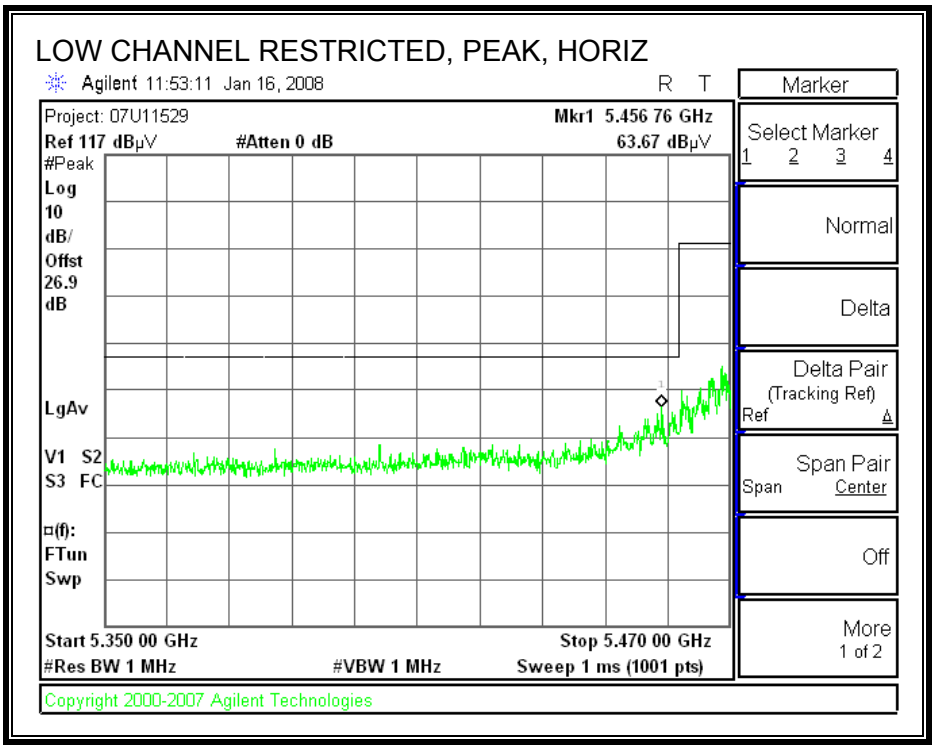
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5500 MHz															
11.000	3.0	56.6	44.3	37.3	3.9	-32.6	0.0	0.7	66.0	53.7	74	54	-8.0	-0.3	H
11.000	3.0	55.2	43.4	37.3	3.9	-32.6	0.0	0.7	64.6	52.8	74	54	-9.4	-1.2	V
MID CHANNEL, 5600 MHz															
11.200	3.0	55.9	43.6	37.3	3.9	-32.6	0.0	0.7	65.4	53.1	74	54	-8.6	-0.9	H
11.200	3.0	54.4	42.6	37.3	3.9	-32.6	0.0	0.7	63.9	52.1	74	54	-10.1	-1.9	V
HI CHANNEL, 5700 MHz															
11.400	3.0	51.9	40.6	37.4	3.9	-32.5	0.0	0.7	61.4	50.1	74	54	-12.6	-3.9	H
11.400	3.0	53.8	42.5	37.4	3.9	-32.5	0.0	0.7	63.3	52.0	74	54	-10.7	-2.0	V

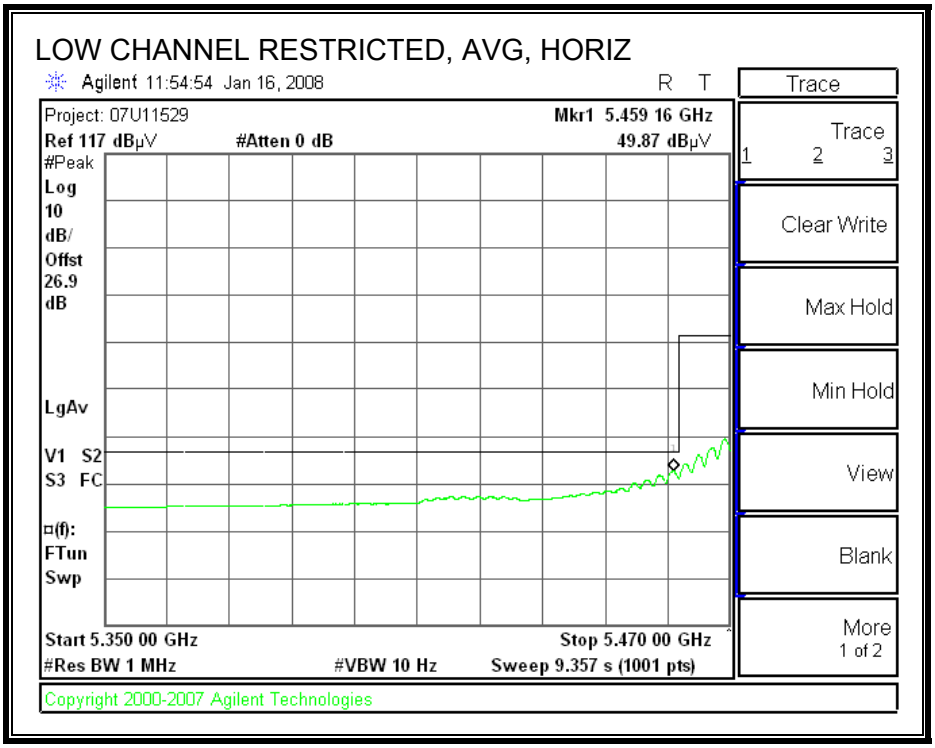
No other emissions were detected above system noise floor

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		

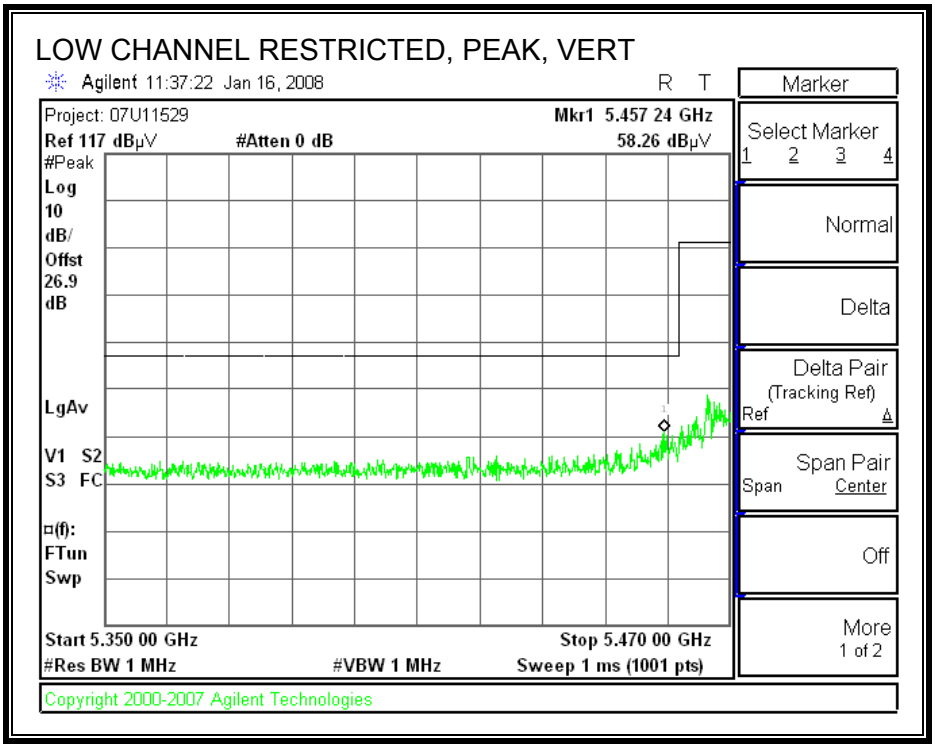
10.4.2. 802.11n HT20 MODE

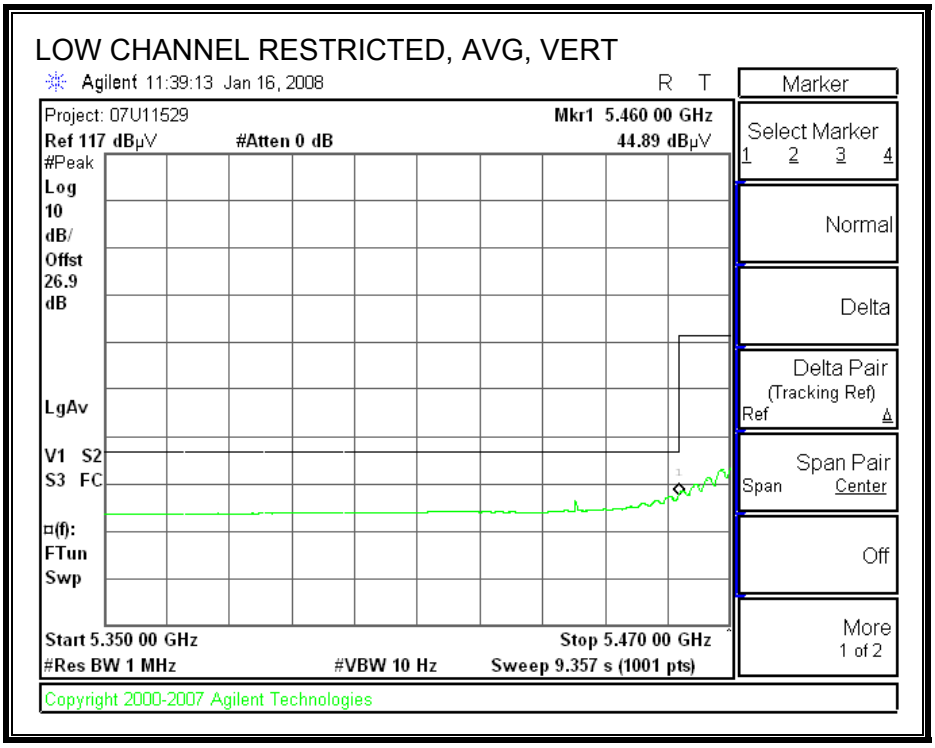
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



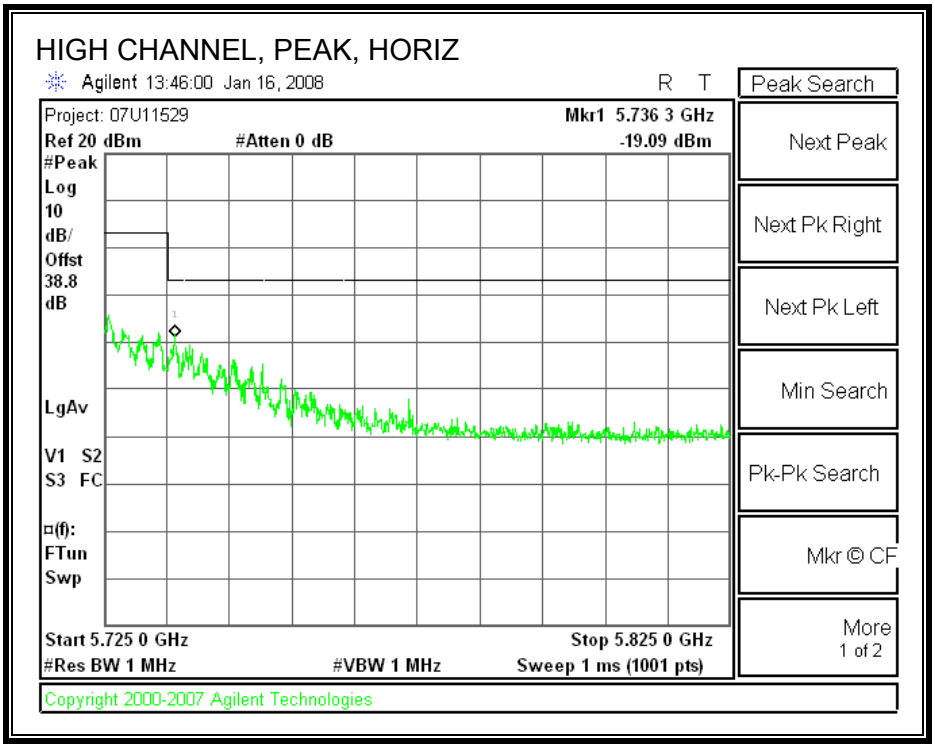


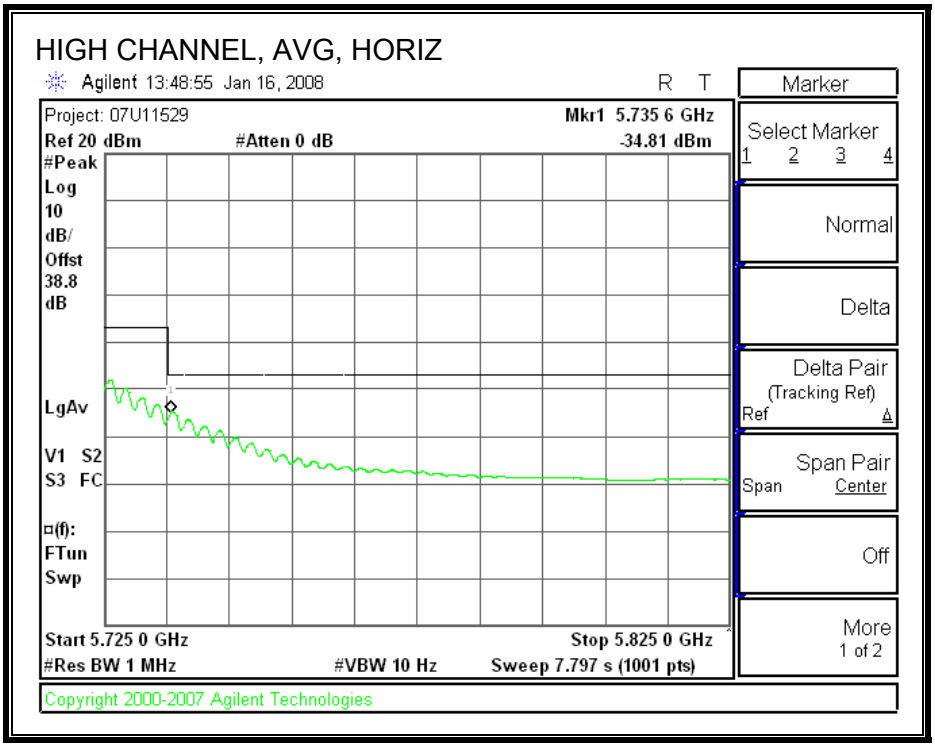
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



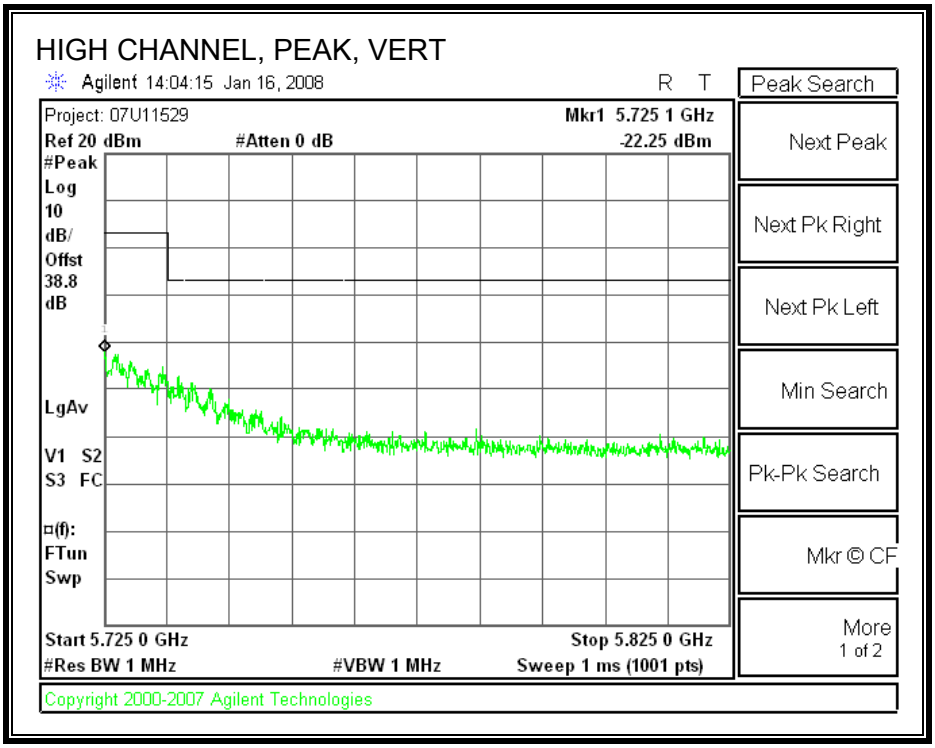


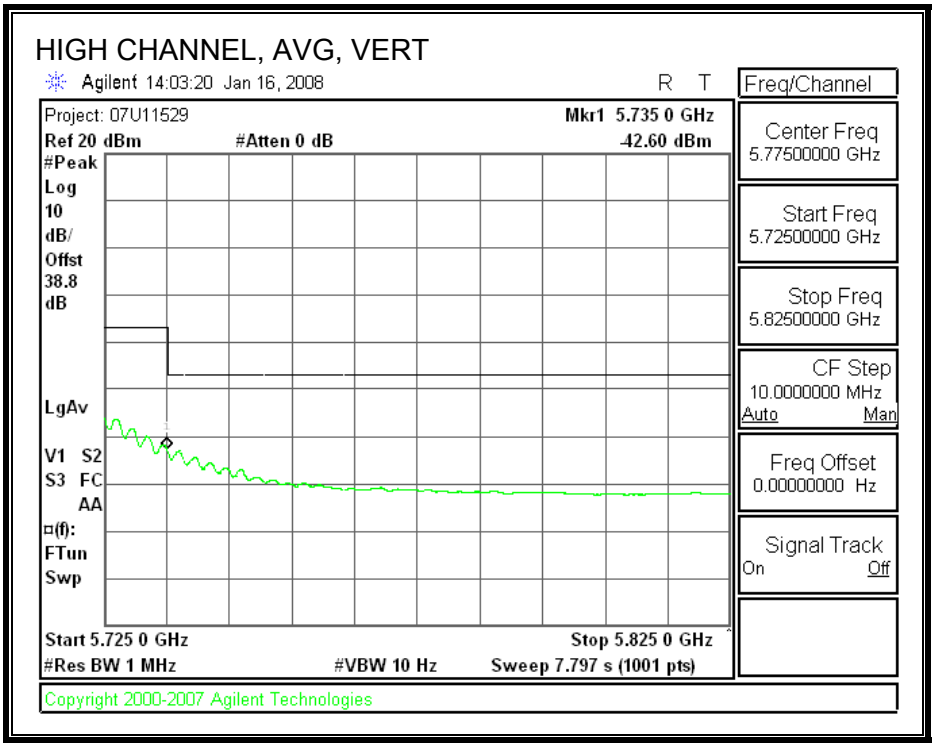
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/16/2008
Test Engineer: Vien Tran
Configuration: EUT with 4.2dBi Antenna
Mode: Tx 5.6 GHz Band_11n 20 MHz

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

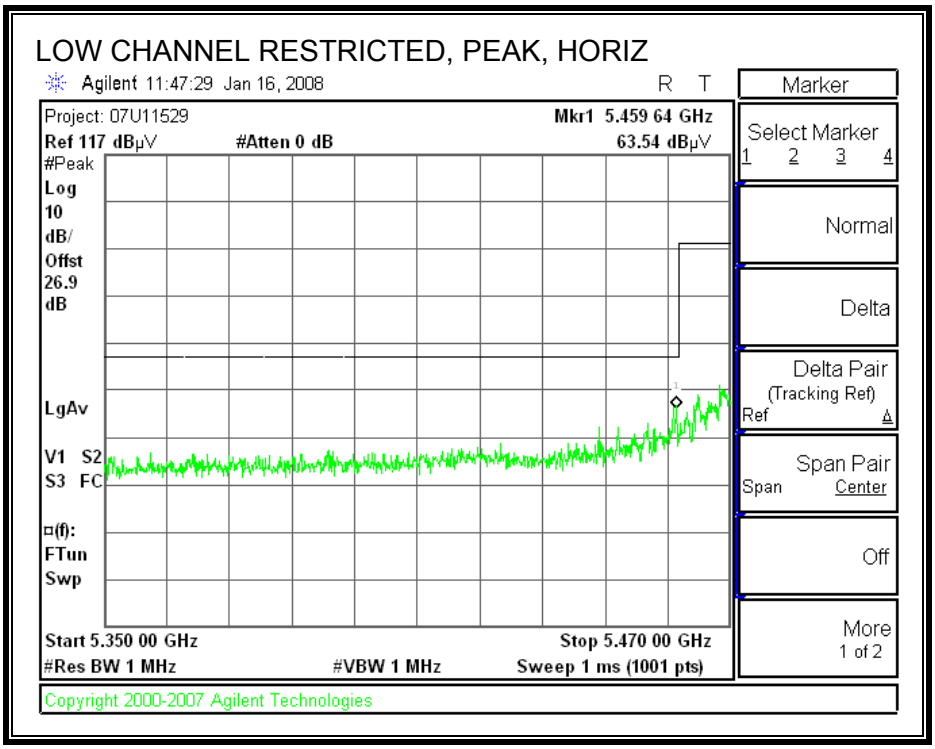
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5500 MHz															
11.000	3.0	51.7	39.6	37.3	3.9	-32.6	0.0	0.7	61.1	49.0	74	54	-12.9	-5.0	H
11.000	3.0	53.8	41.7	37.3	3.9	-32.6	0.0	0.7	63.2	51.1	74	54	-10.8	-2.9	V
MID CHANNEL, 5600 MHz															
11.200	3.0	50.4	38.6	37.3	3.9	-32.6	0.0	0.7	59.9	48.1	74	54	-14.1	-5.9	H
11.200	3.0	51.3	39.9	37.3	3.9	-32.6	0.0	0.7	60.8	49.4	74	54	-13.2	-4.6	V
HI CHANNEL, 5700 MHz															
11.400	3.0	48.3	37.9	37.4	3.9	-32.5	0.0	0.7	57.8	47.4	74	54	-16.2	-6.6	H
11.400	3.0	51.2	39.7	37.4	3.9	-32.5	0.0	0.7	60.7	49.2	74	54	-13.3	-4.8	V

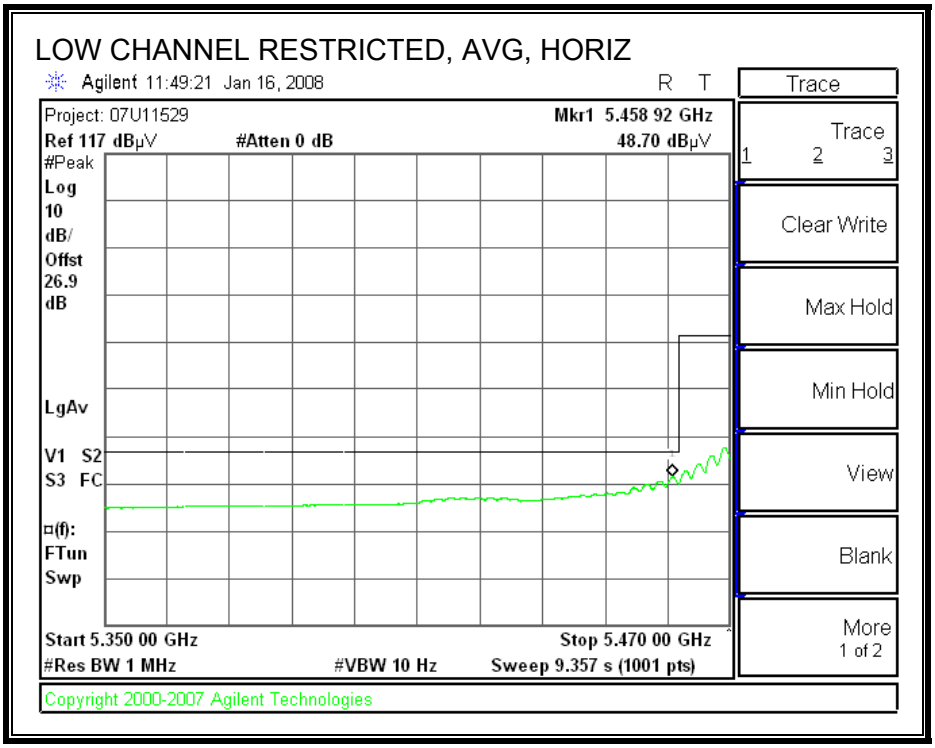
No other emissions were detected above system noise floor

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		

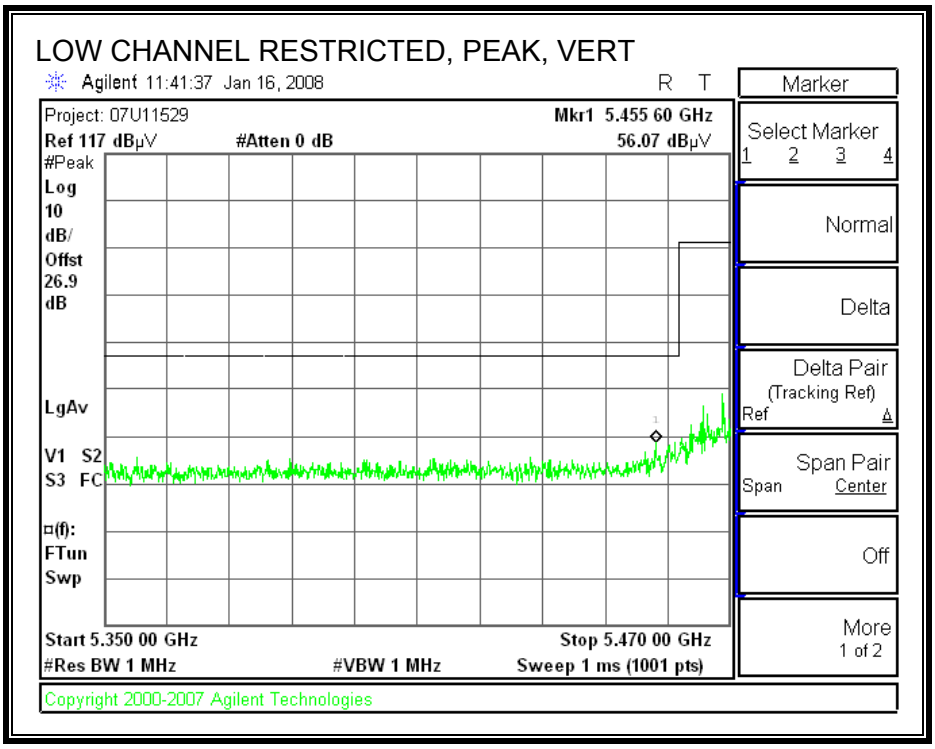
10.4.3. 802.11n HT40 MODE

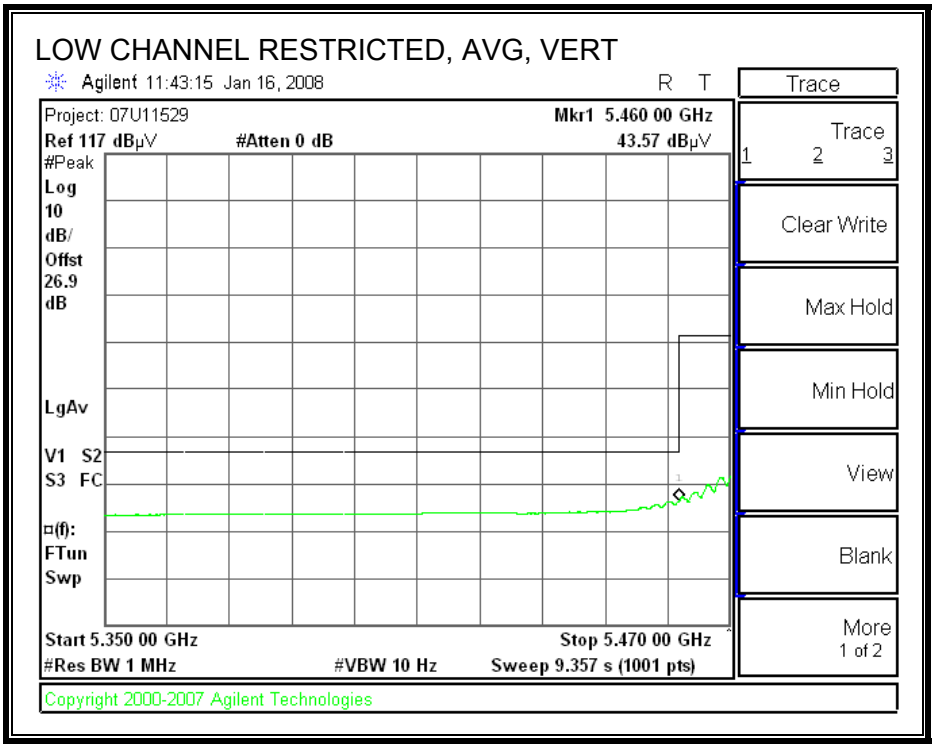
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



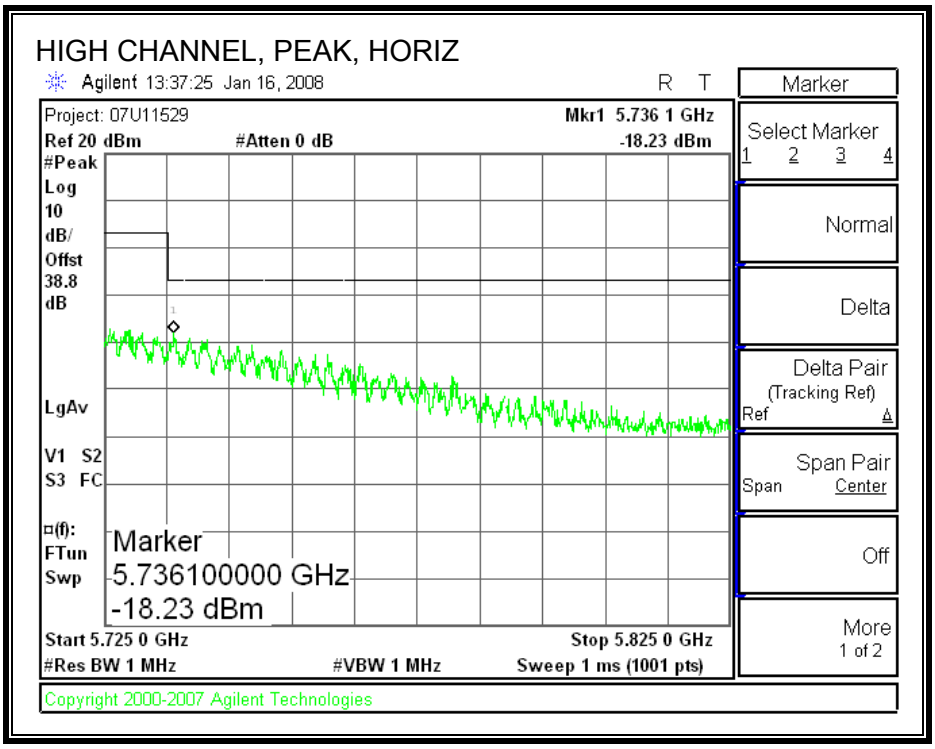


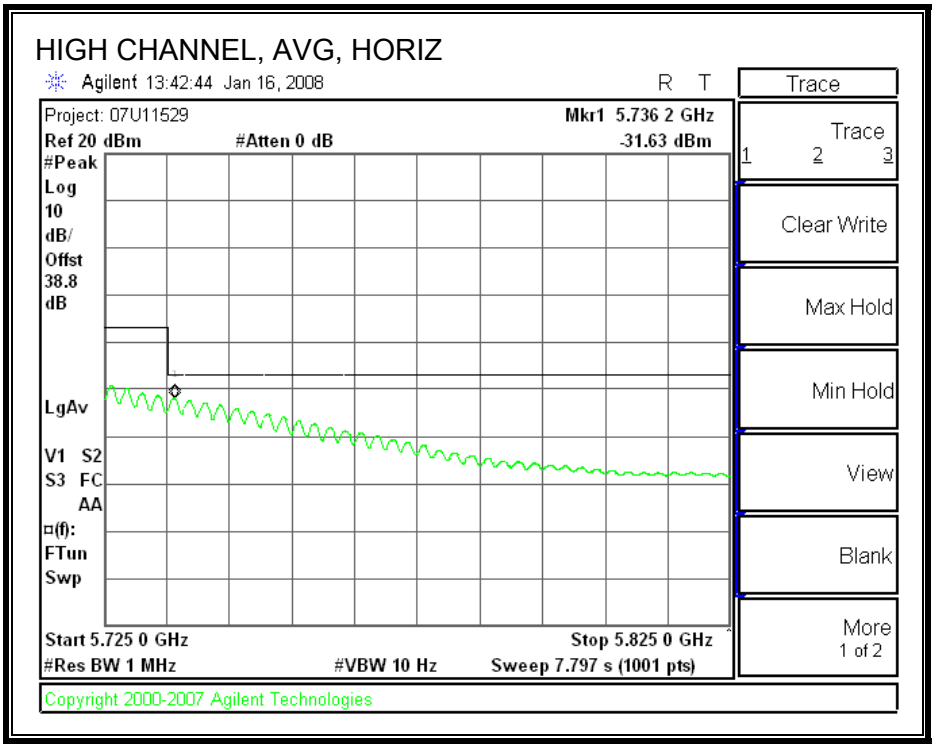
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



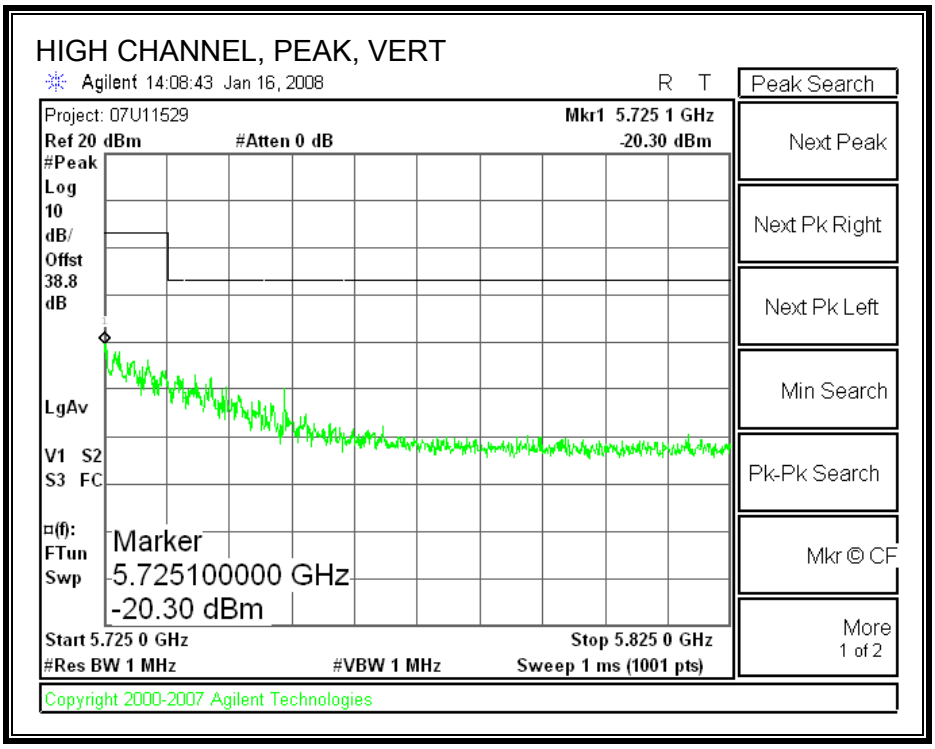


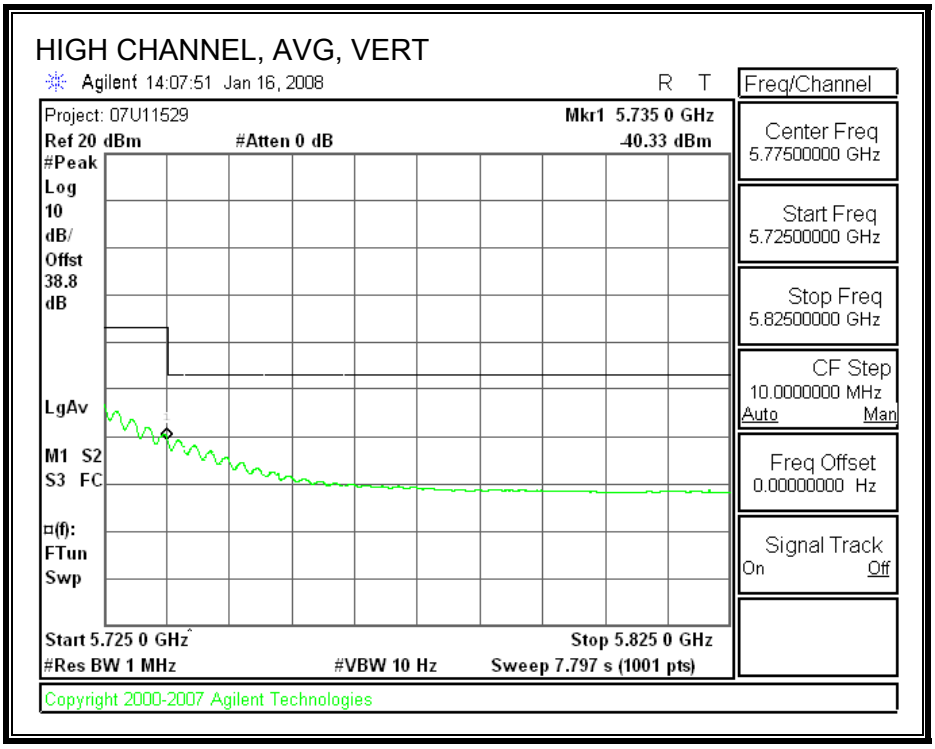
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 3m Chamber

Company: Broadcom
Project #: 07U11529
Date: 01/16/2008
Test Engineer: Vien Tran
Configuration: EUT with 4.2dBi Antenna
Mode: Tx 5.6 GHz Band_11n 40 MHz

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Vien 187215002	Ninous 208946002	HPF_7.6GHz	

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

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5510 MHz															
11.020	3.0	51.7	39.5	37.3	3.9	-32.6	0.0	0.7	61.1	48.9	74	54	-12.9	-5.1	H
11.020	3.0	52.6	41.2	37.3	3.9	-32.6	0.0	0.7	62.0	50.6	74	54	-12.0	-3.4	V
MID CHANNEL, 5590 MHz															
11.180	3.0	41.1	38.8	37.3	3.9	-32.6	0.0	0.7	50.6	48.3	74	54	-23.4	-5.7	H
11.180	3.0	50.9	39.9	37.3	3.9	-32.6	0.0	0.7	60.4	49.4	74	54	-13.6	-4.6	V
HI CHANNEL, 5670 MHz															
11.340	3.0	48.3	37.3	37.4	3.9	-32.6	0.0	0.7	57.8	46.8	74	54	-16.2	-7.2	H
11.340	3.0	48.5	37.9	37.4	3.9	-32.6	0.0	0.7	58.0	47.4	74	54	-16.0	-6.6	V

No other emissions were detected above 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		

10.5. RECEIVER ABOVE 1 GHZ

10.5.1. 20 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services

Company: Broadcom
Project #: 07U11529
Date: 12/20/2007
Test Engineer: Vien Tran
Configuration: EUT with 3.9dBi Antenna
Mode: Rx 5.2 GHz Band_20 MHz BW Worst-Case

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
William 177079009		Ninous 208946002		

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)
1.988	3.0	68.4	43.7	27.9	2.1	-36.9	0.0	0.0	61.5	36.8	74	54	-12.5	-17.2	H
2.490	3.0	59.2	39.8	28.8	2.3	-36.3	0.0	0.0	54.1	34.6	74	54	-19.9	-19.4	H
1.298	3.0	58.8	40.6	26.2	1.8	-37.8	0.0	0.0	48.9	30.7	74	54	-25.1	-23.3	H
1.988	3.0	70.9	46.1	27.9	2.1	-36.9	0.0	0.0	64.0	39.2	74	54	-10.0	-14.8	V
2.490	3.0	61.6	42.2	28.8	2.3	-36.3	0.0	0.0	56.5	37.1	74	54	-17.5	-16.9	V
1.298	3.0	61.2	43.0	26.2	1.8	-37.8	0.0	0.0	51.3	33.1	74	54	-22.7	-20.9	V

No other emissions were detected above sytem 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		

10.5.2. 40 MHz BANDWIDTH

High Frequency Measurement
Compliance Certification Services

Company: Broadcom
Project #: 07U11529
Date: 12/20/2007
Test Engineer: Vien Tran
Configuration: EUT with 3.9dBi Antenna
Mode: Rx 5.2 GHz Band_40 MHz BW Worst-Case

Test Equipment:

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

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
William 177079009		Ninous 208946002		

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)
1.988	3.0	67.0	41.1	27.9	2.1	-36.9	0.0	0.0	60.1	34.2	74	54	-13.9	-19.8	H
2.490	3.0	61.1	44.2	28.8	2.3	-36.3	0.0	0.0	56.0	39.1	74	54	-18.0	-14.9	H
1.298	3.0	59.4	45.3	26.2	1.8	-37.8	0.0	0.0	49.5	35.4	74	54	-24.5	-18.6	H
1.988	3.0	72.0	41.9	27.9	2.1	-36.9	0.0	0.0	65.1	35.0	74	54	-8.9	-19.0	V
2.490	3.0	63.3	47.4	28.8	2.3	-36.3	0.0	0.0	58.2	42.3	74	54	-15.8	-11.7	V
1.298	3.0	53.4	37.3	26.2	1.8	-37.8	0.0	0.0	43.5	27.4	74	54	-30.5	-26.6	V

No other emissions were detected above sytem 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		

10.6. WORST-CASE BELOW 1 GHz

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

HORIZONTAL DATA

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

Data#: 20 File#: 30-1000M.EMI Date: 01-09-2008 Time: 13:06:04

Condition: FCC CLASS-B HORIZONTAL
Test Operator: Vien Tran
Project # : 07U11529
Company : Broadcom
Config : EUT on extended card
Mode : Tx, 5 GHz Band (worst case)
Target : FCC CLASS B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	138.640	48.75	-13.21	35.53	43.50	-7.97	Peak
2	342.340	53.09	-11.22	41.87	46.00	-4.13	Peak
3	455.830	46.73	-8.40	38.33	46.00	-7.67	Peak
4	633.340	44.44	-4.77	39.67	46.00	-6.33	Peak
5	906.880	40.22	-1.05	39.17	46.00	-6.83	Peak

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

VERTICAL DATA

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

Data#: 22 File#: 30-1000M.EMI Date: 01-09-2008 Time: 12:56:01

Condition: FCC CLASS-B VERTICAL
Test Operator: Vien Tran
Project # : 07U11529
Company : Broadcom
Config : EUT on extended card
Mode : Tx, 5 GHz Band (worst case)
Target : FCC CLASS B

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	124.090	43.57	-13.05	30.52	43.50	-12.98	Peak
2	148.340	44.20	-13.74	30.46	43.50	-13.04	Peak
3	368.530	44.55	-10.59	33.96	46.00	-12.04	Peak
4	552.830	46.73	-6.30	40.43	46.00	-5.57	Peak
5	906.880	40.03	-1.05	38.98	46.00	-7.02	Peak

11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. LIMITS

INDUSTRY CANADA

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

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

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

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

FCC

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

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

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

Table 2: Applicability of DFS requirements during normal operation

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

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

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

Table 4: DFS Response requirement values

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

Table 5 – Short Pulse Radar Test Waveforms

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

Table 6 – Long Pulse Radar Test Signal

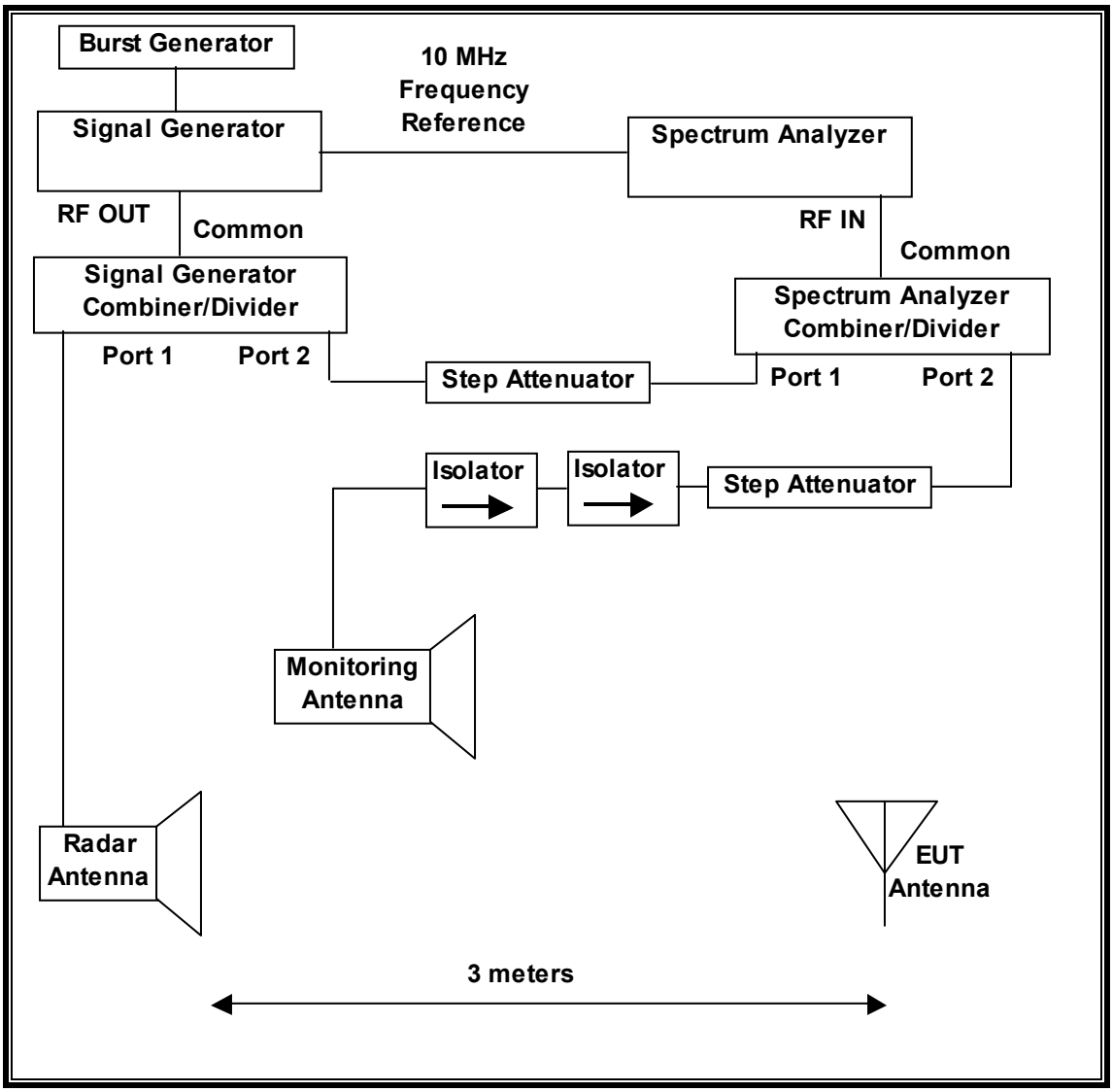
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

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

11.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

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

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

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

The signal monitoring equipment consists of a spectrum analyzer set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. 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.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads are utilized such that there is one pad at each RF port on each EUT.

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 analyer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

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.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

Establish a link between the Master and Slave, adjusting the distance between the units as needed to provide a suitable received level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic.

If a different setting of the Step Attenuators are required to meet the above conditions, perform a new System Calibration for the new Step Attenuator settings.

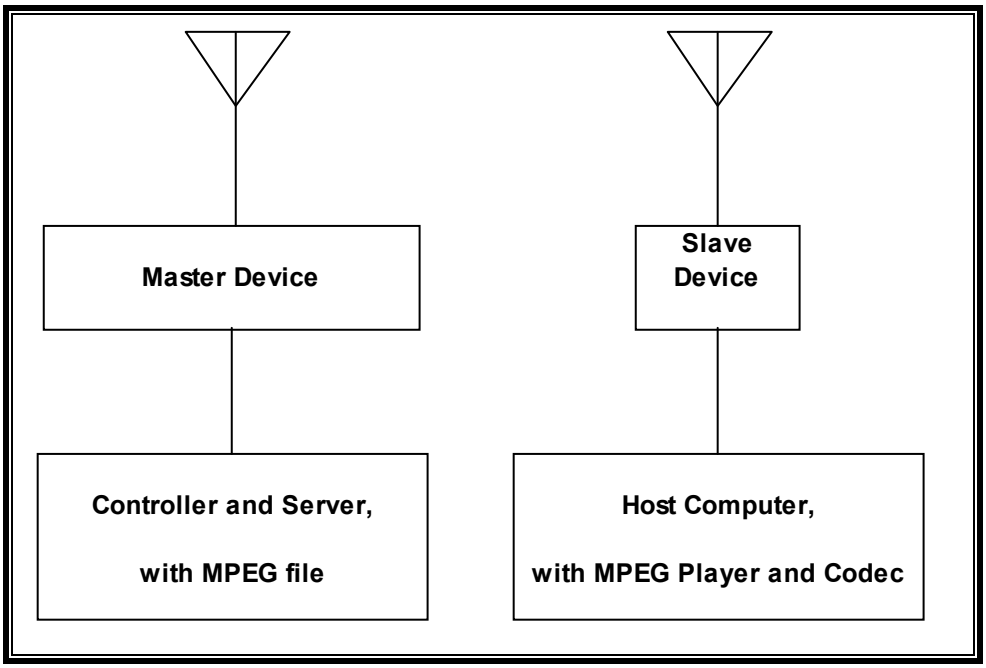
TEST AND MEASUREMENT EQUIPMENT

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**	**C00986**	**05/30/09**
Vector Signal Generator 250kHz-20GHz	**Agilent / HP**	**E8267C**	**C01066**	**11/16/2009**

11.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the 20 MHz bandwidth DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	DELL	Dell Inspiron 4150	CN-04P449-48643-2CH-2011	DoC
AC Adapter	DELL	ADP-70EB	TH-09364U-17971-248-8PDP	DoC
Laptop	Compaq	Presario 3000	CNU327025L	DoC
AC Adapter	Compaq	PA-1900-05H	3300371601	DoC
Access Point	CISCO	AIR-AP1242AG-A-K9	FTX1042B5E0	LDK102056
AC Adapter	Delta	ADP-18PB	PZT0628359656	DoC

The following support equipment was utilized for the 40 MHz bandwidth DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	HP	PA-1121-12HD	PPP017L	DoC
AC Adapter	HP	HP Pavilion zv6000	CND52904s1	DoC
Laptop	DELL	ADP-70EB	TH-09364U-17971-248-8PDP	DoC
AC Adapter	DELL	Dell Inspiron 4150	CN-04P449-48643-2CH-2011	DoC
Access Point	Broadcom	BCM94705LMP	Prototype	QDS-BRCM1025
AC Adapter	Bothhand	M1-10S05	R00031106975B	DoC

11.1.4. DESCRIPTION OF EUT

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

The EUT is a Slave Device without radar detection.

The highest power level within these bands is 28.86 dBm EIRP in the 5250-5350 MHz band and 29.08 dBm EIRP in the 5470-5725 MHz band based on the maximum array gain.

Each antenna assembly utilized with the EUT has a gain of 5.6 dBi for the 5250-5350 MHz band and 4.2 dBi in the 5470-5725 MHz band.

All antennas are integral. Two identical antennas are utilized to meet the MIMO transmit diversity operational requirements.

The EUT uses two transmitters, each connected to their respective antenna. The system is set up 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 / 802.11Draft n architecture. Two nominal channel bandwidths, 20 MHz and 40 MHz, are implemented.

DESCRIPTION OF TPC FUNCTION

The power level can be reduced to a conducted level of 15 dBm, which yields a maximum EIRP of 23.6 dBm based on the maximum array gain, which is less than the 24 dBm EIRP limit for TPC level.

OVERVIEW OF MASTER DEVICE UTILIZED FOR 20 MHz BANDWIDTH TESTS WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102056. The DFS software installed in the Master Device is revision 6.00.1. 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 antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –64 + 2 + 1 = -61 dBm.

The calibrated conducted 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.

OVERVIEW OF MASTER DEVICE UTILIZED FOR 40 MHz BANDWIDTH TESTS WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Broadcom Access Point, FCC ID: QDS-BRCM1025. The DFS software installed in the Master Device is revision PO_4_100_22_2. The minimum antenna gain for the Master Device is 3 dBi.

The rated output power of the Master unit is < 23 dBm (EIRP). Therefore the required interference threshold level is –62 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –62 + 3 + 1 = -58dBm.

The calibrated conducted 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.

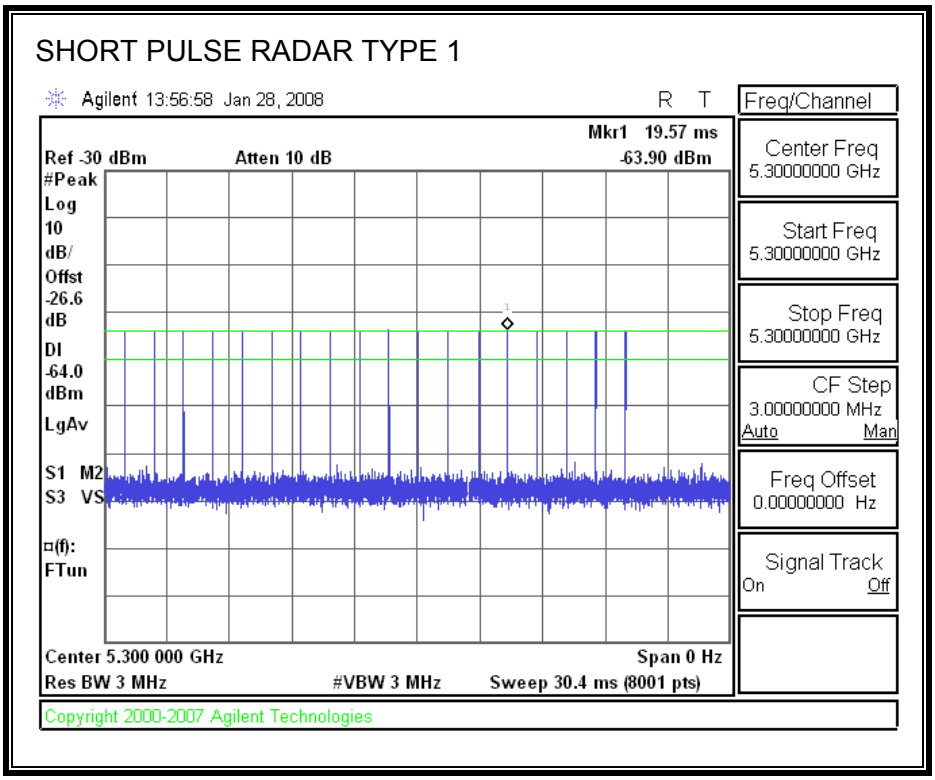
11.2. RESULTS FOR 20 MHz BANDWIDTH

11.2.1. TEST CHANNEL

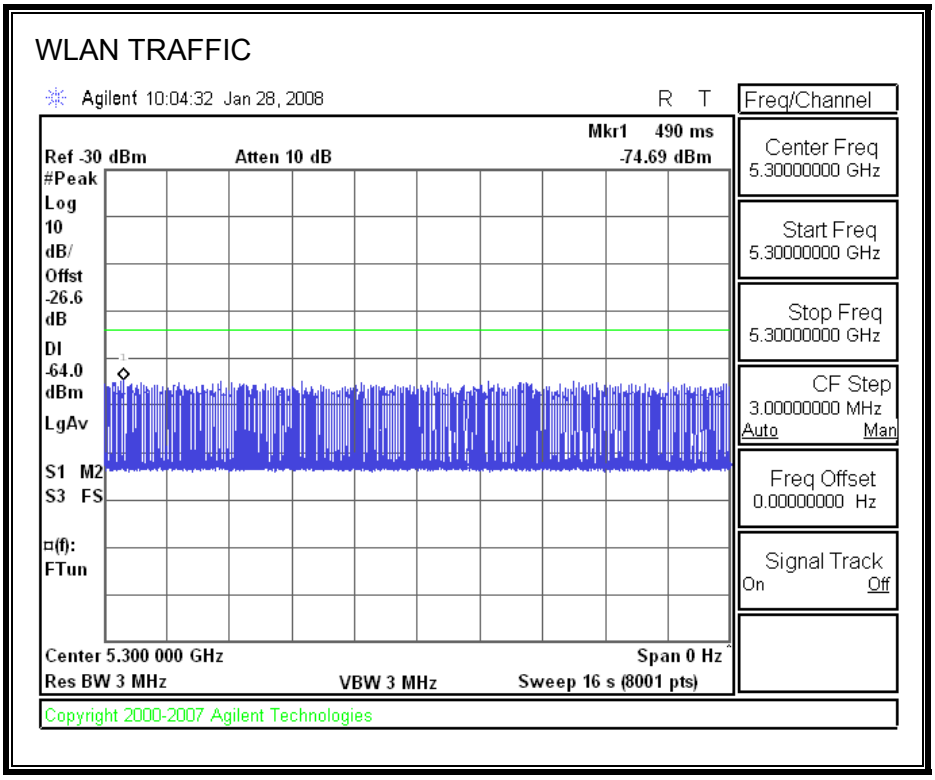
All tests were performed at a channel center frequency of 5300 MHz. Measurements were performed using conducted test methods.

11.2.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



11.2.3. 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).

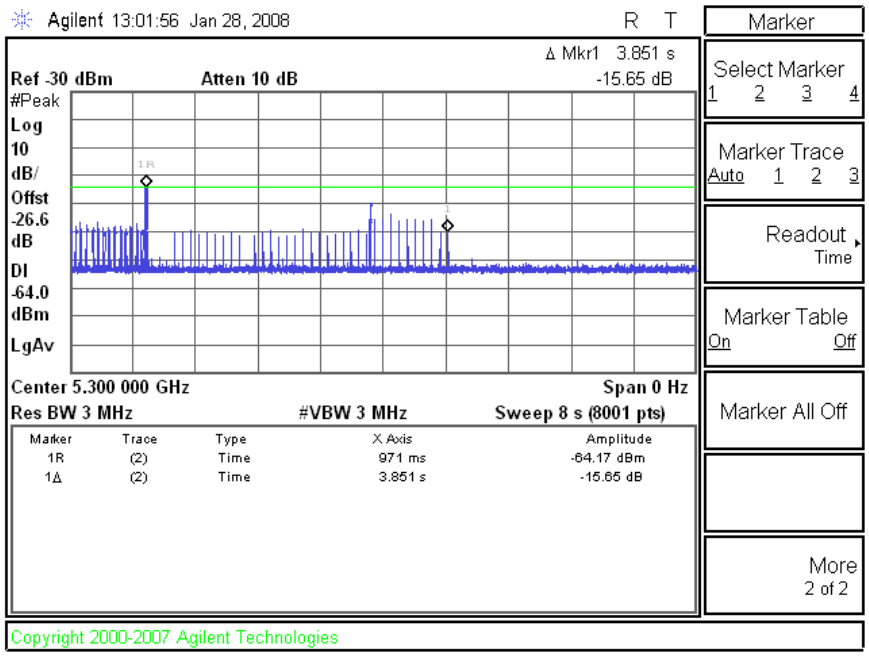
RESULTS

Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	3.9	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	56.0	60
IC	57.0	260

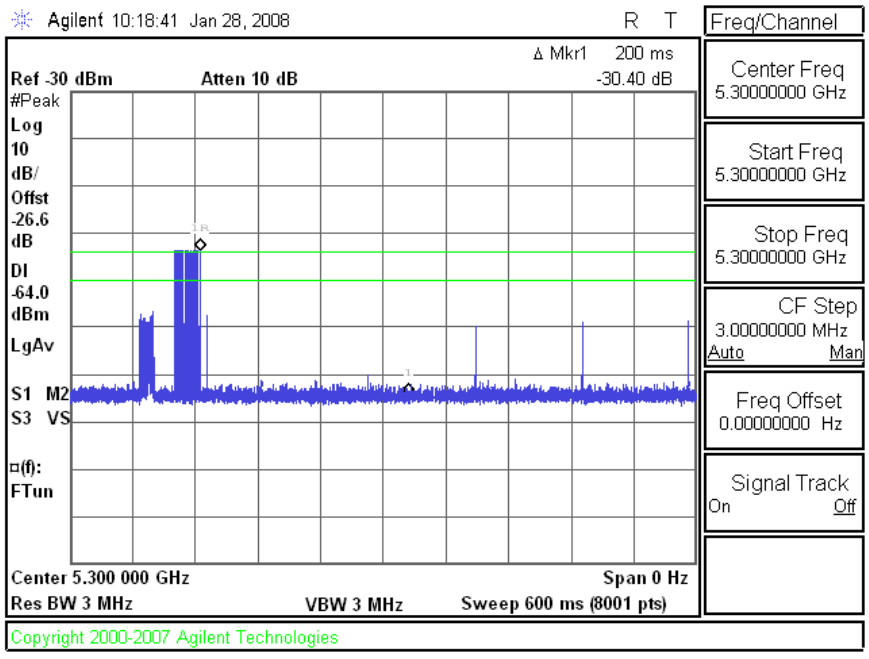
MOVE TIME

MOVE TIME PLOT



CHANNEL CLOSING TIME

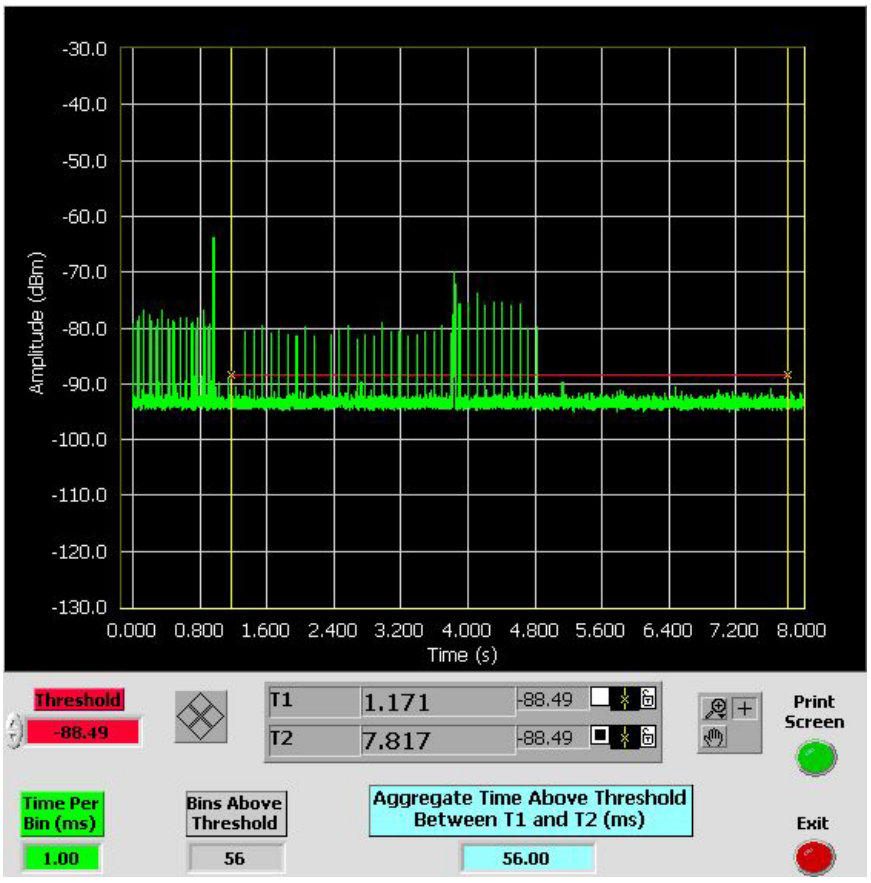
CLOSING TIME PLOT



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

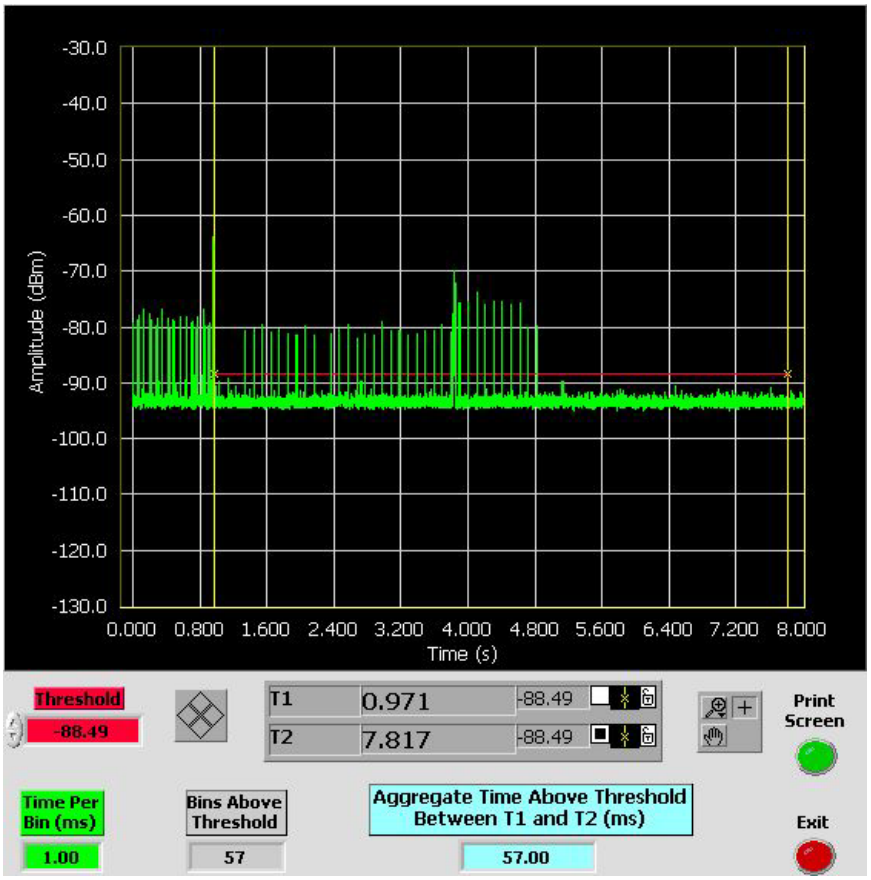
Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME PLOT



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

IC AGGREGATE CLOSING TIME PLOT



11.2.4. SLAVE NON-OCCUPANCY

TEST PROCEDURE

The spectrum analyzer is monitoring the emissions from the Slave.

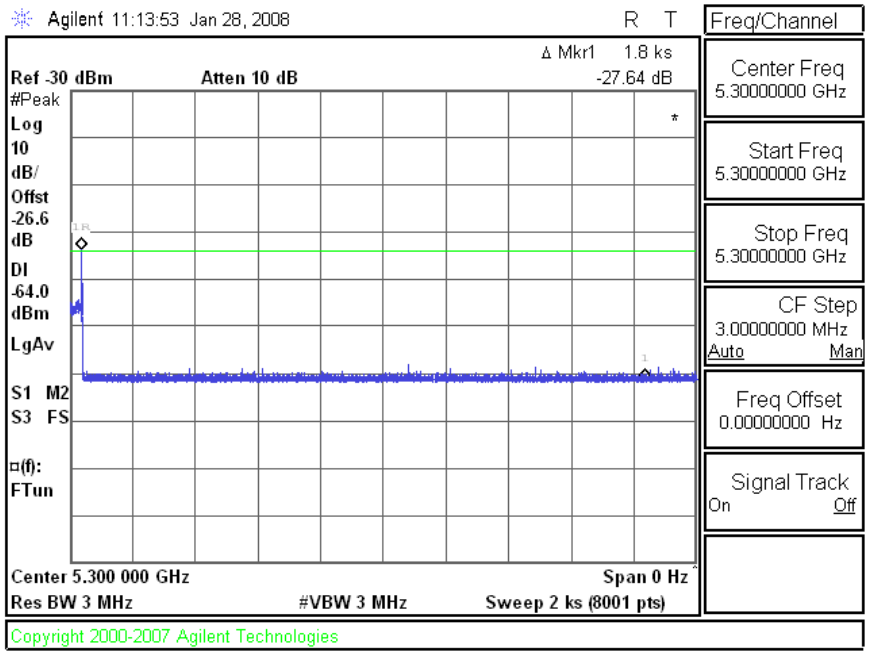
The AP and Slave are linked in a 20 MHz bandwidth mode, with streaming video. The spectrum analyzer trace is started, then the radar is triggered, and the channel is monitored for > 30 minutes.

Then the AP is powered down. The spectrum analyzer trace is started, then the Slave is rebooted, and the channel is monitored for > 30 minutes.

ASSOCIATED TEST RESULTS

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

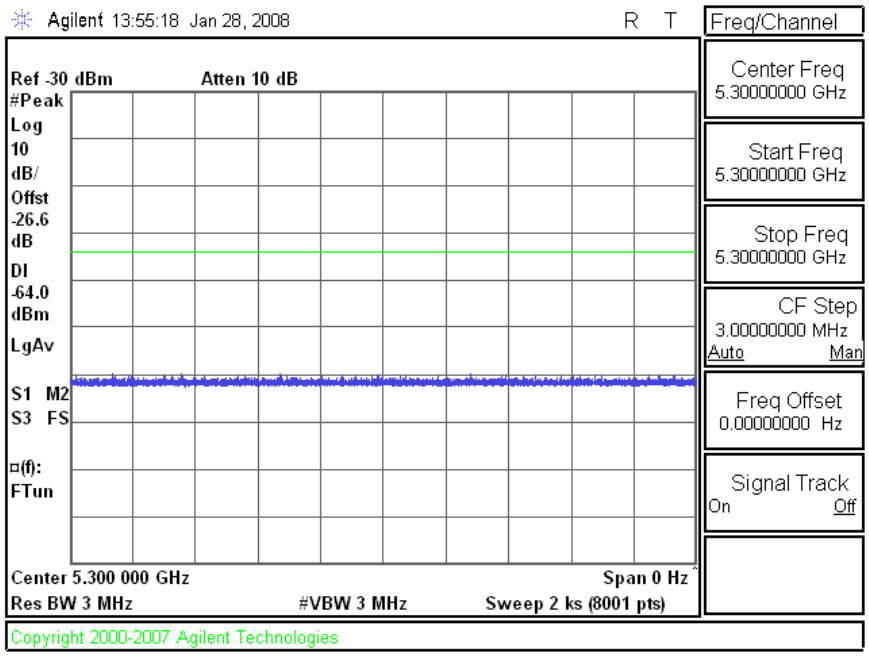
NON-OCCUPANCY PERIOD, ASSOCIATED PLOT



NON-ASSOCIATED TEST RESULTS

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

NON-OCCUPANCY PERIOD, NON-ASSOCIATED PLOT



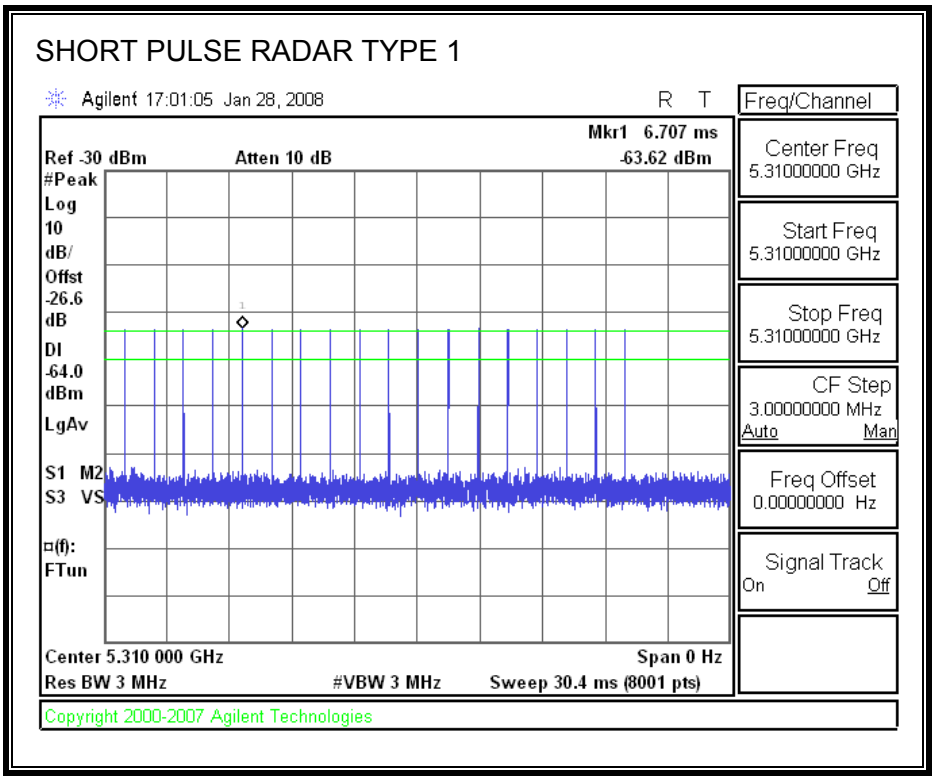
11.3. RESULTS FOR 40 MHz BANDWIDTH

11.3.1. TEST CHANNEL

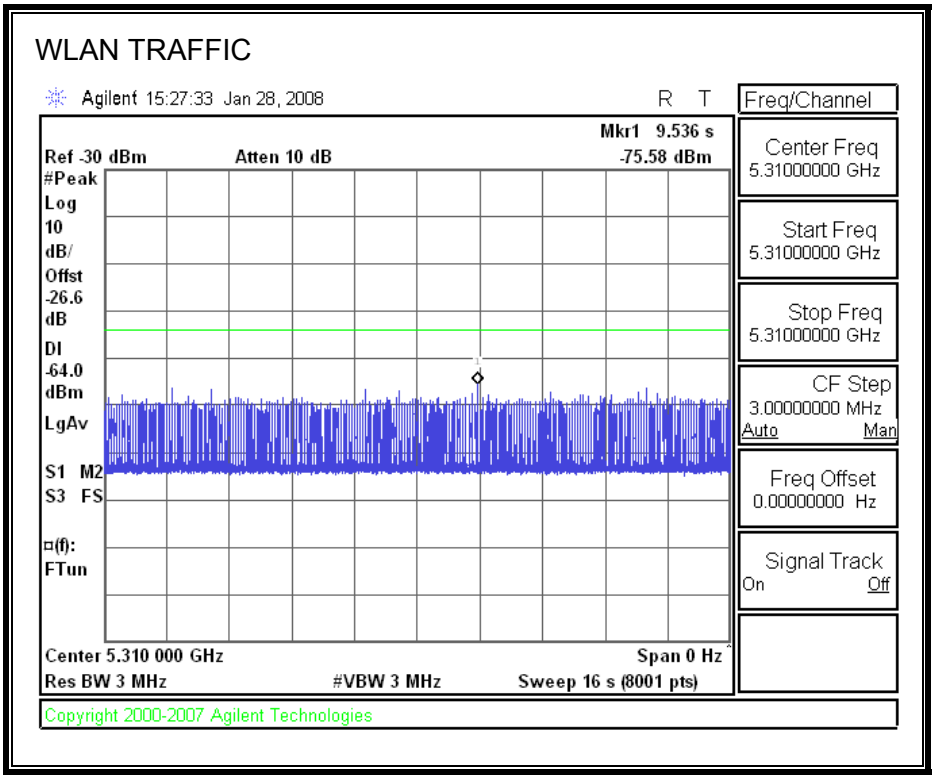
All tests were performed at a channel center frequency of 5310 MHz. Measurements were performed using conducted test methods.

11.3.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



PLOT OF WLAN TRAFFIC



11.3.3. 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).

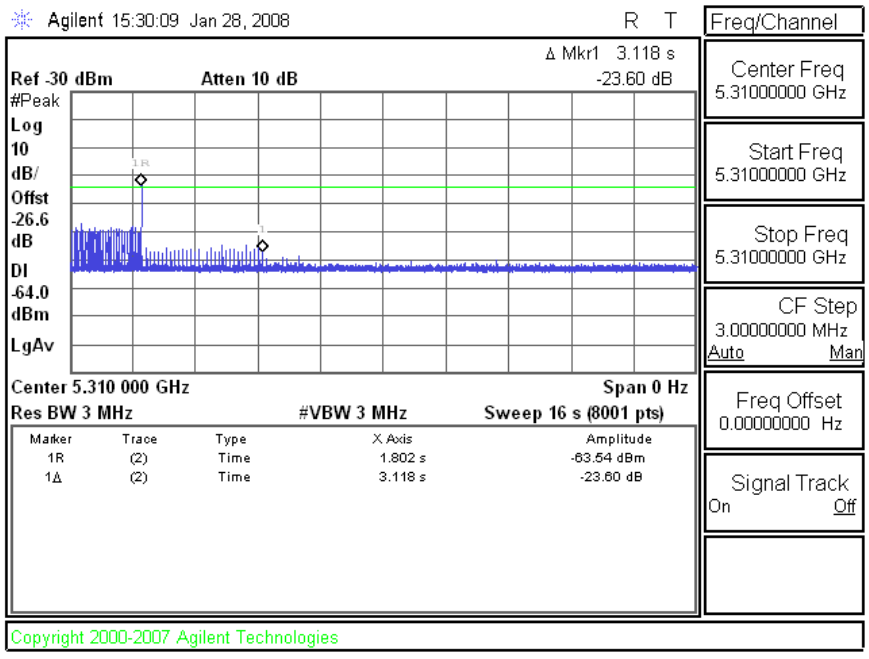
RESULTS

Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	3.1	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	56.0	60
IC	72.0	260

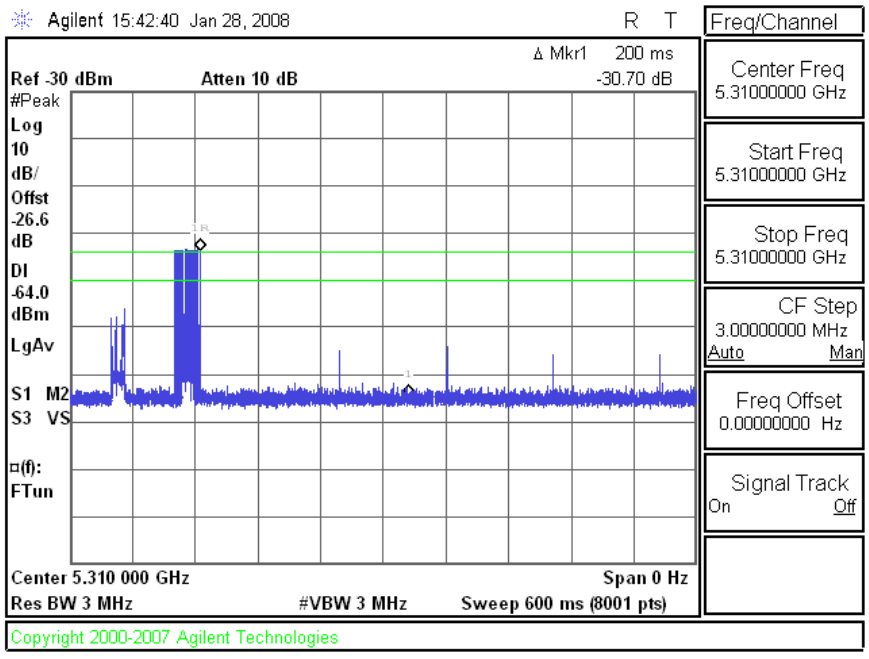
MOVE TIME

MOVE TIME PLOT



CHANNEL CLOSING TIME

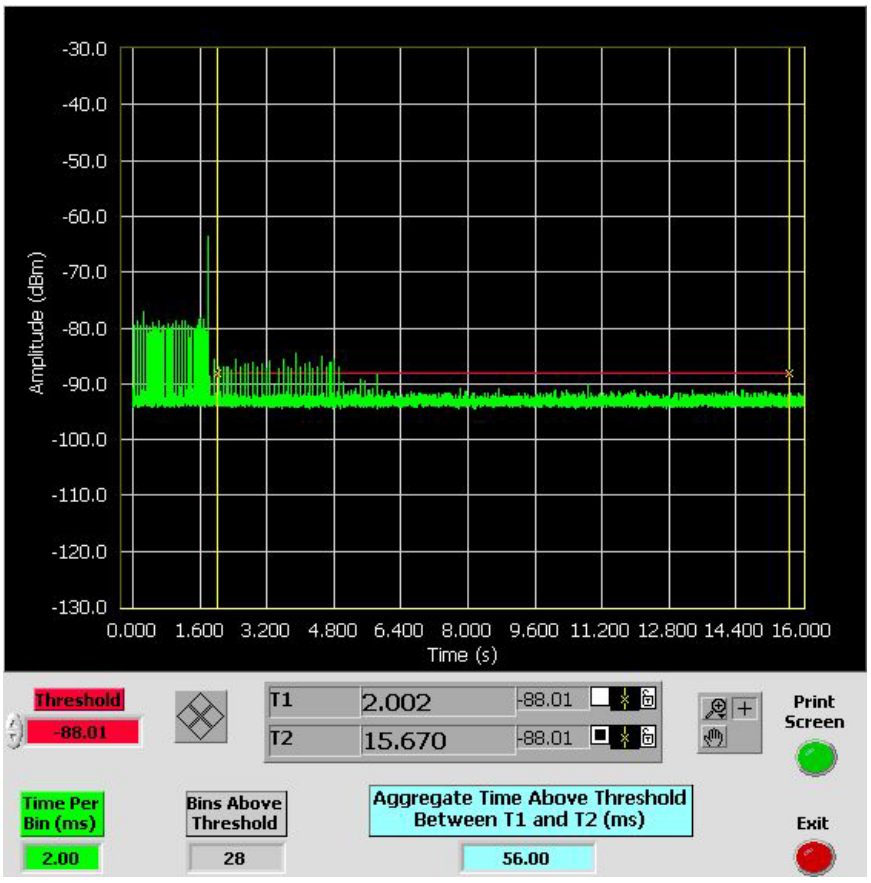
CLOSING TIME PLOT



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

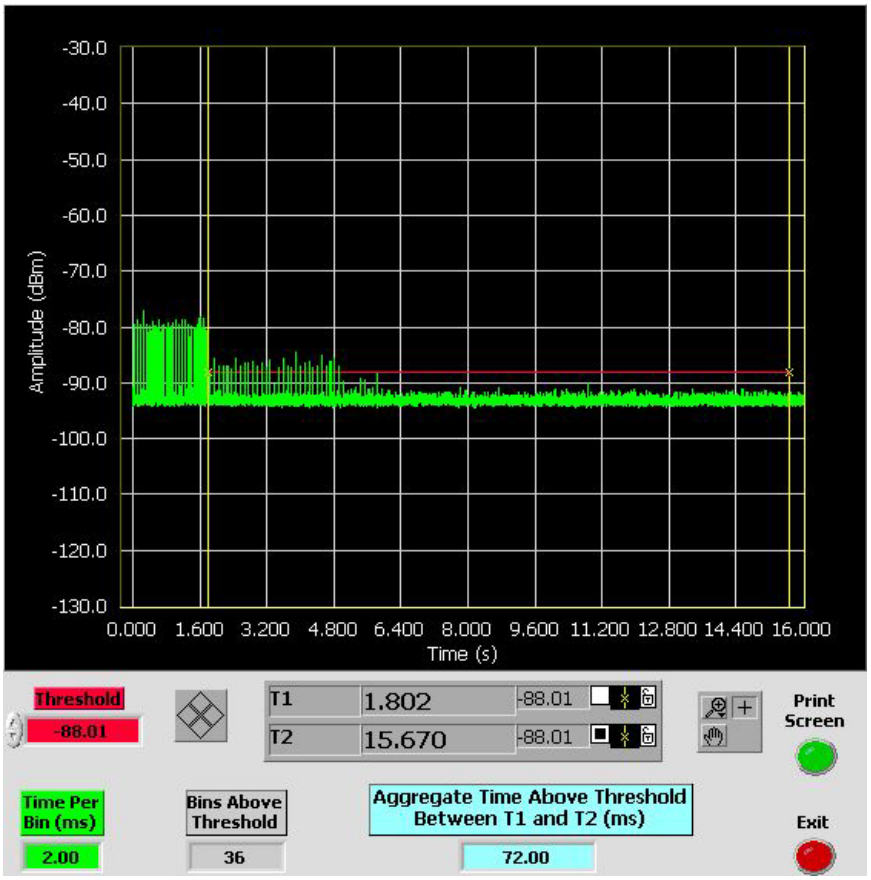
Only intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME PLOT



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

IC AGGREGATE CLOSING TIME PLOT



11.3.4. SLAVE NON-OCCUPANCY

TEST PROCEDURE

The spectrum analyzer is monitoring the emissions from the Slave.

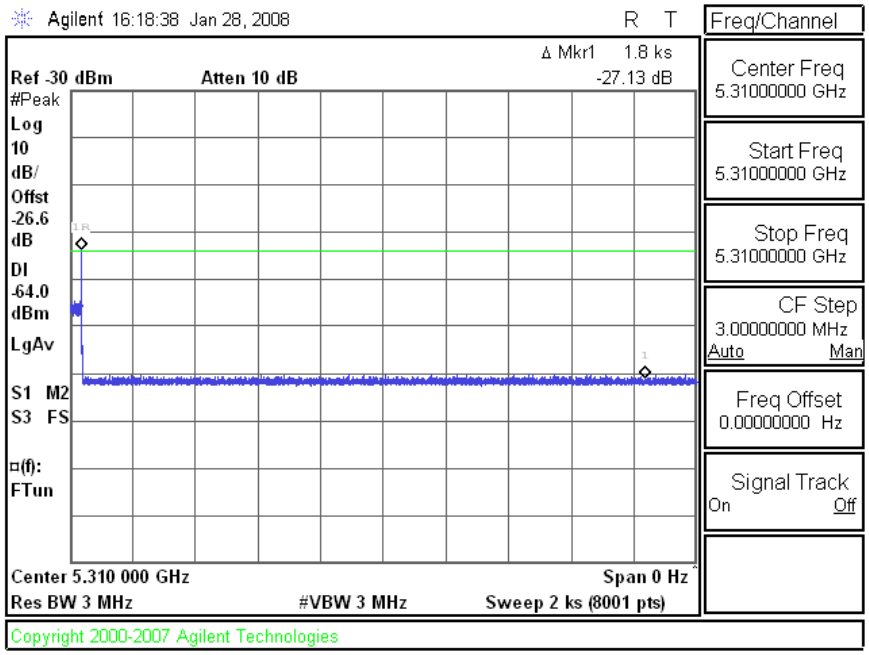
The AP and Slave are linked in a 40 MHz bandwidth mode, with streaming video. The spectrum analyzer trace is started, then the radar is triggered, and the channel is monitored for > 30 minutes.

Then the AP is powered down. The spectrum analyzer trace is started, then the Slave is rebooted, and the channel is monitored for > 30 minutes.

ASSOCIATED TEST RESULTS

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

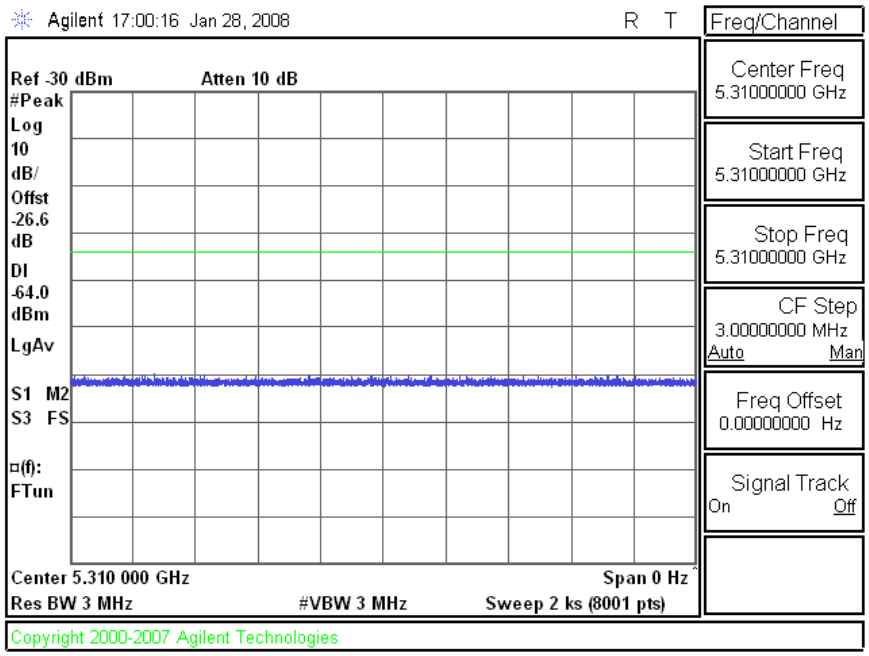
NON-OCCUPANCY PERIOD, ASSOCIATED PLOT



NON-ASSOCIATED TEST RESULTS

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

NON-OCCUPANCY PERIOD, NON-ASSOCIATED PLOT



12. 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

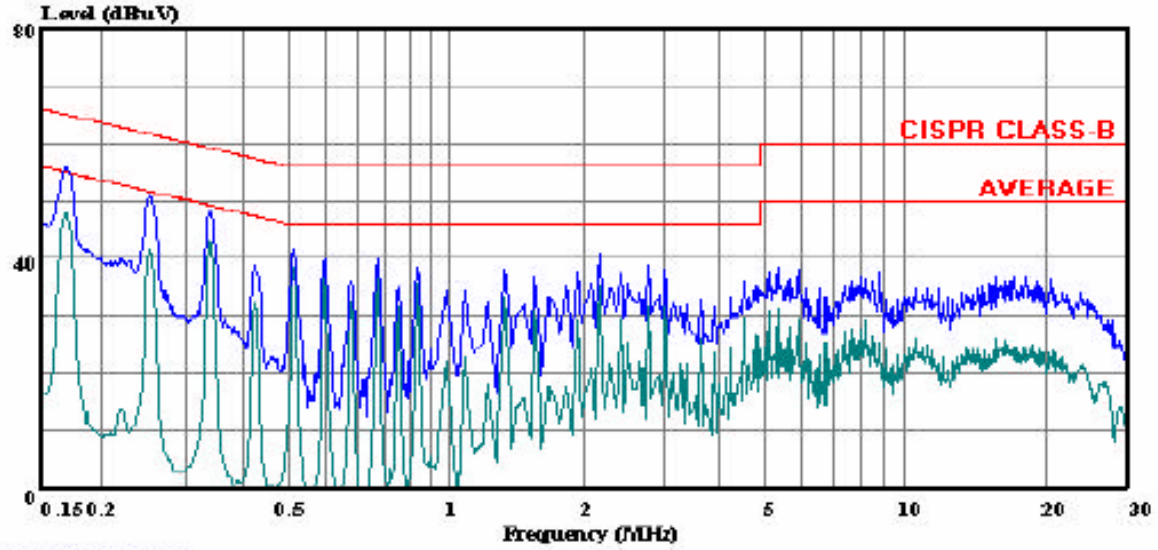
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit		Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	55.90	--	47.70	0.00	65.01	55.01	-9.11	-7.31	L1
0.25	50.83	--	41.10	0.00	61.66	51.66	-10.83	-10.56	L1
0.34	48.18	--	43.10	0.00	59.23	49.23	-11.05	-6.13	L1
0.17	55.83	--	47.36	0.00	65.01	55.01	-9.18	-7.65	L2
0.25	51.98	--	43.03	0.00	61.66	51.66	-9.68	-8.63	L2
0.34	48.25	--	42.10	0.00	59.23	49.23	-10.98	-7.13	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#: 7 File#: 115V.EMI Date: 12-20-2007 Time: 13:33:18



(Line Conduction)

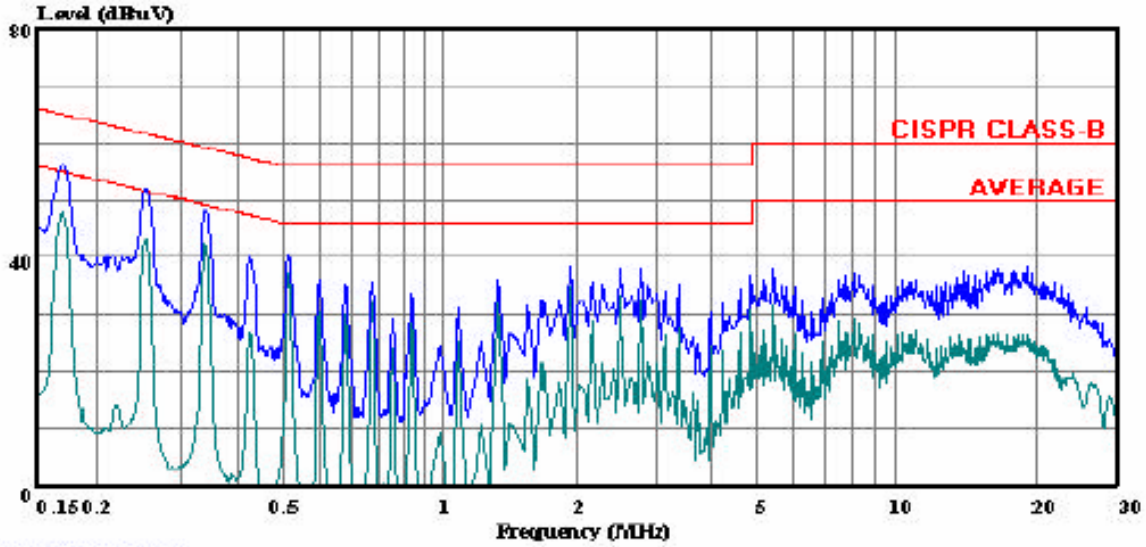
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tran
Project #: : 07U11529
Company: : Broadcom
Configuration:: EUT & 3.9dBi antenna
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: L1: Peak (Blue); Average (Green)

LINE 2 RESULTS

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

Data#: 14 File#: 115V.EMI Date: 12-20-2007 Time: 13:44:12



(Line Conduction)

Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tran
Project #: : 07U11529
Company: : Broadcom
Configuration:: EUT & 3.9dBi antenna
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: L2: Peak (Blue); Average (Green)

13. 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

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 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.

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).

CALCULATIONS

Given

$E = \sqrt{(30 * P * G)} / d$

and

$S = E ^ 2 / 3770$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

$S = 0.0795 * 10 ^ ((P + G) / 10) / (d^2)$

The power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by a factor of 10.

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)

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
WLAN	5 GHz	20.0	21.87	7.21	0.16	1.61