

7.6. 802.11n HT20 MODE IN THE 5.8 GHZ BAND

7.6.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

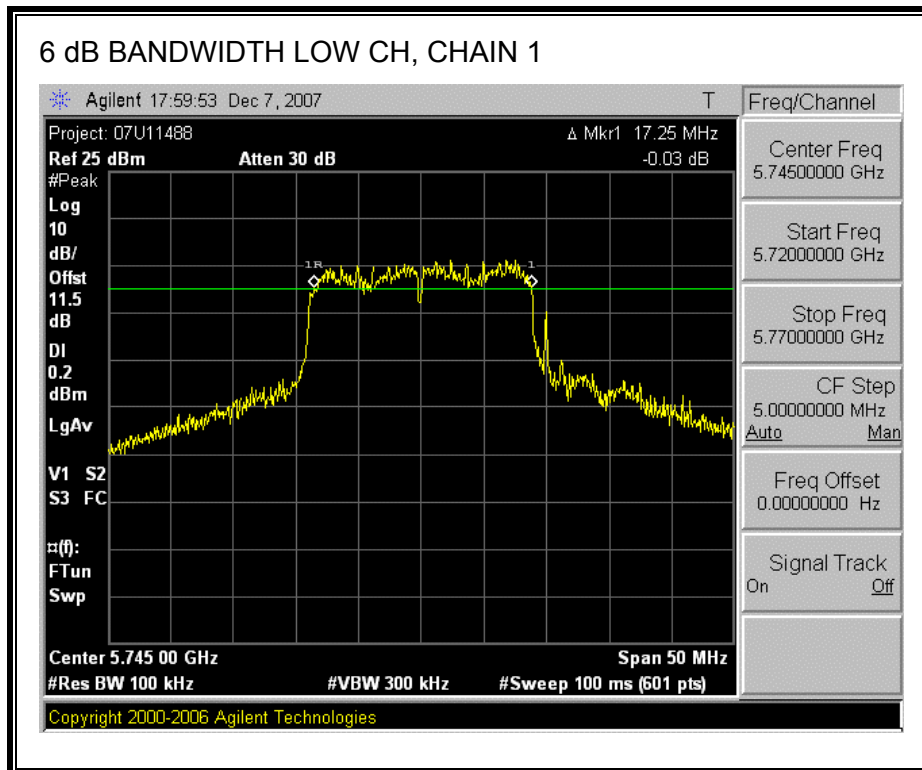
TEST PROCEDURE

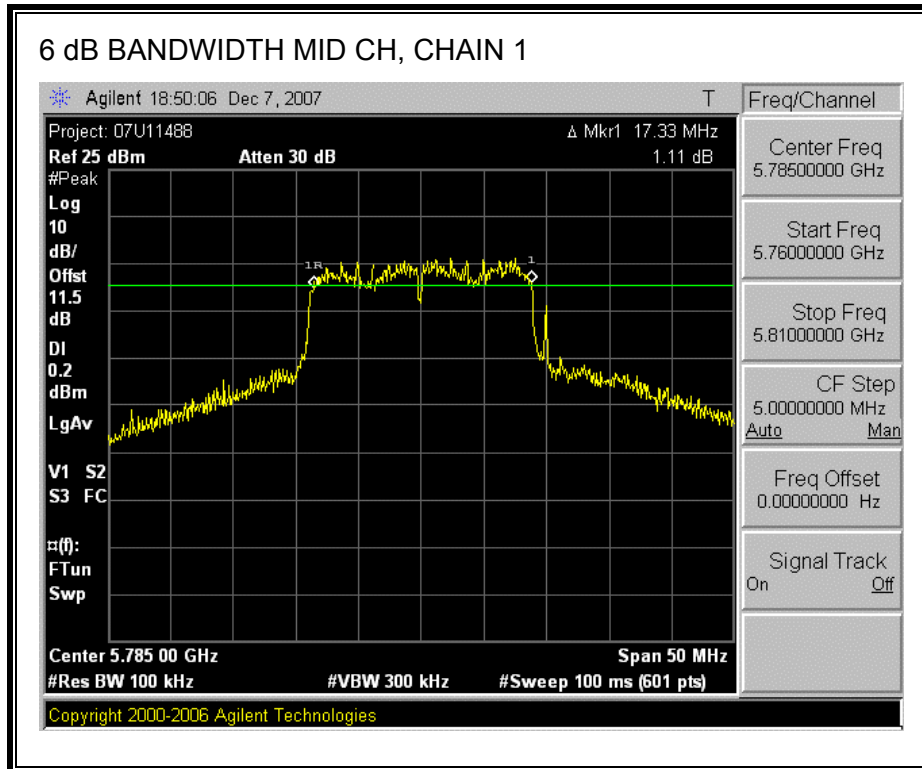
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

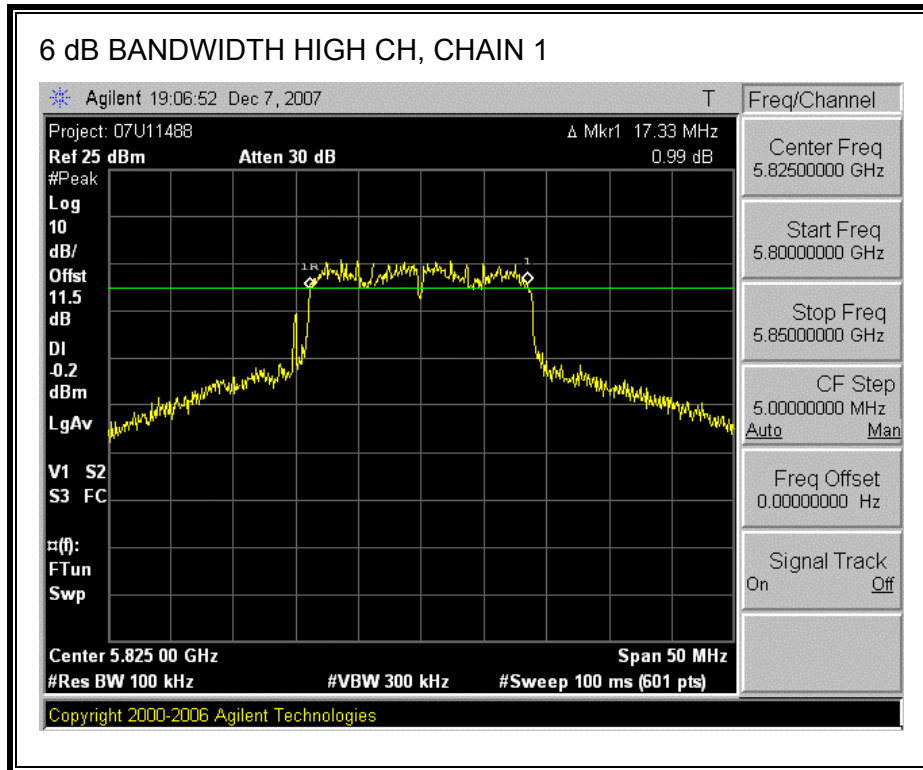
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	17.25	17.08	0.5
Middle	5785	17.33	17.33	0.5
High	5825	17.33	17.33	0.5

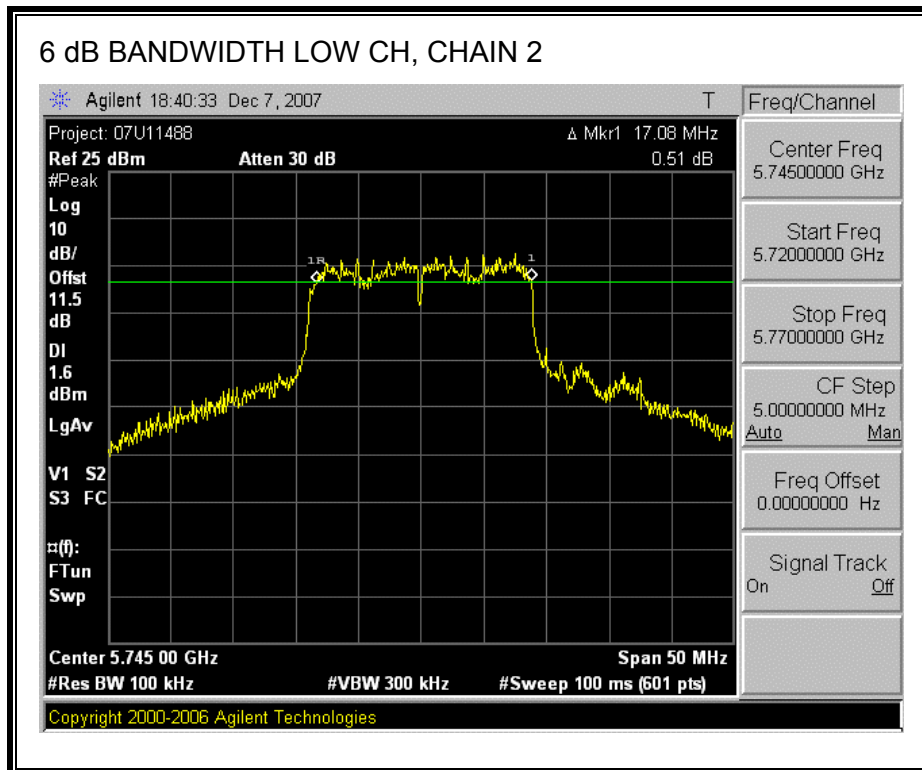
6 dB BANDWIDTH, CHAIN 1

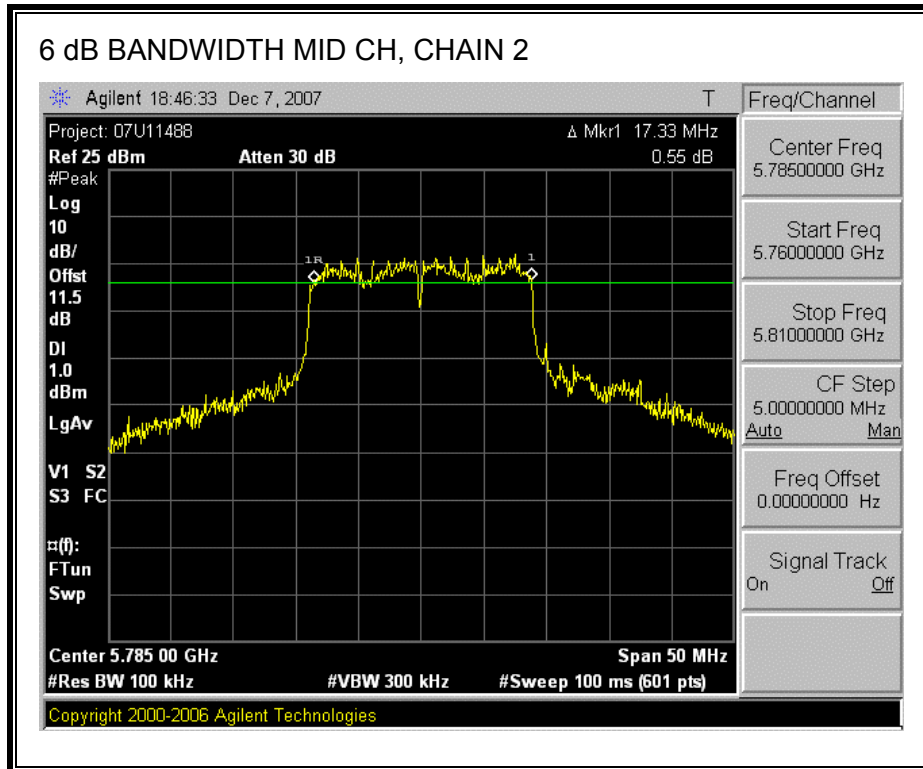


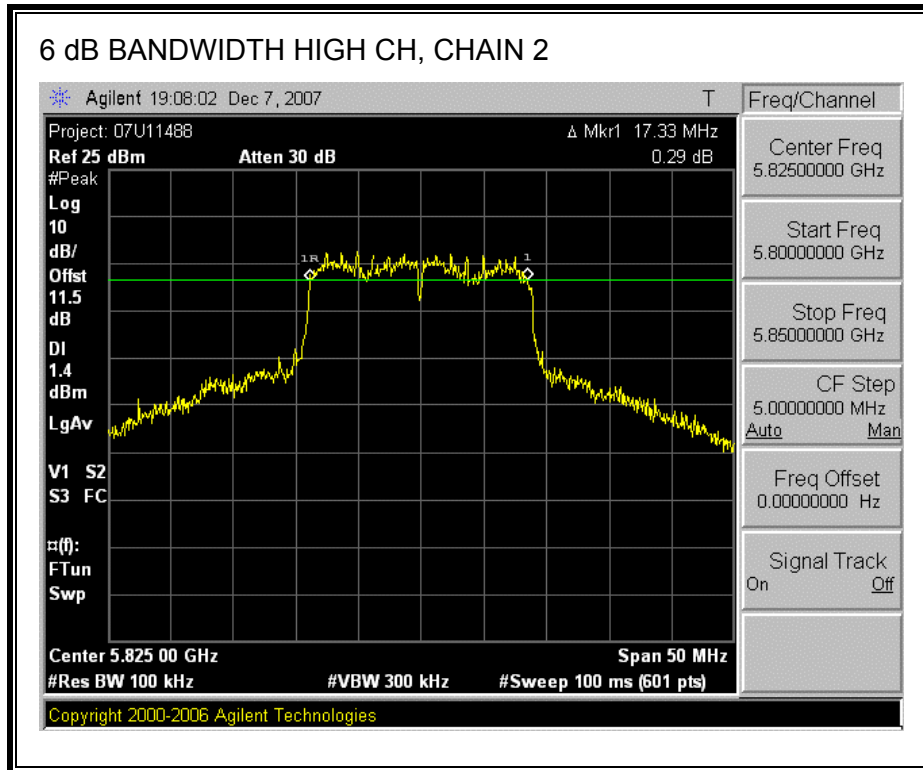




6 dB BANDWIDTH, CHAIN 2







7.6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

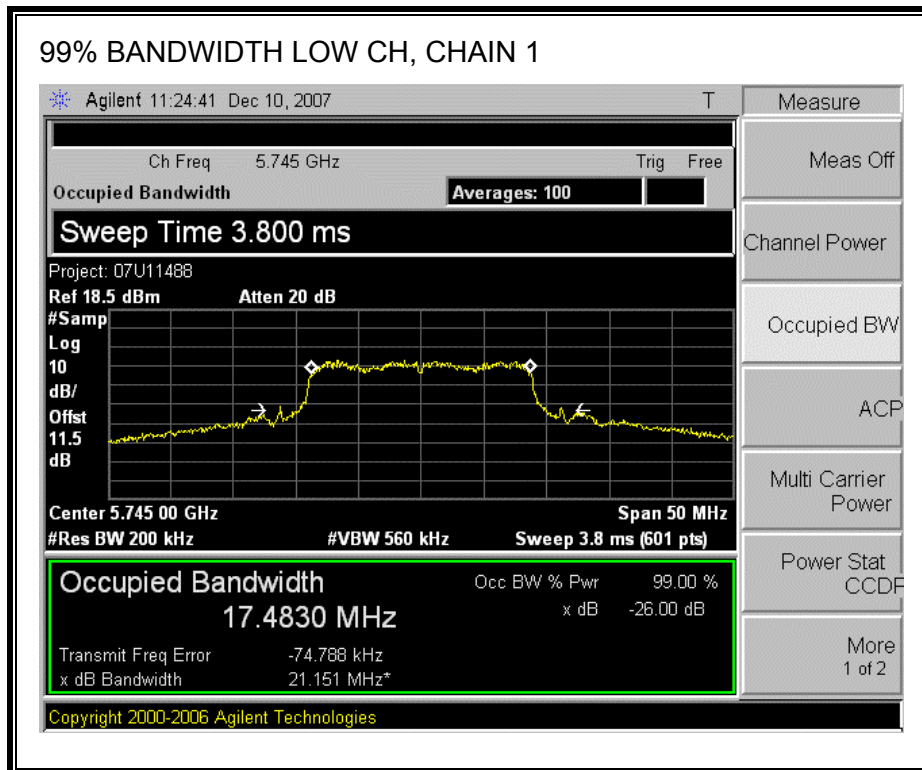
TEST PROCEDURE

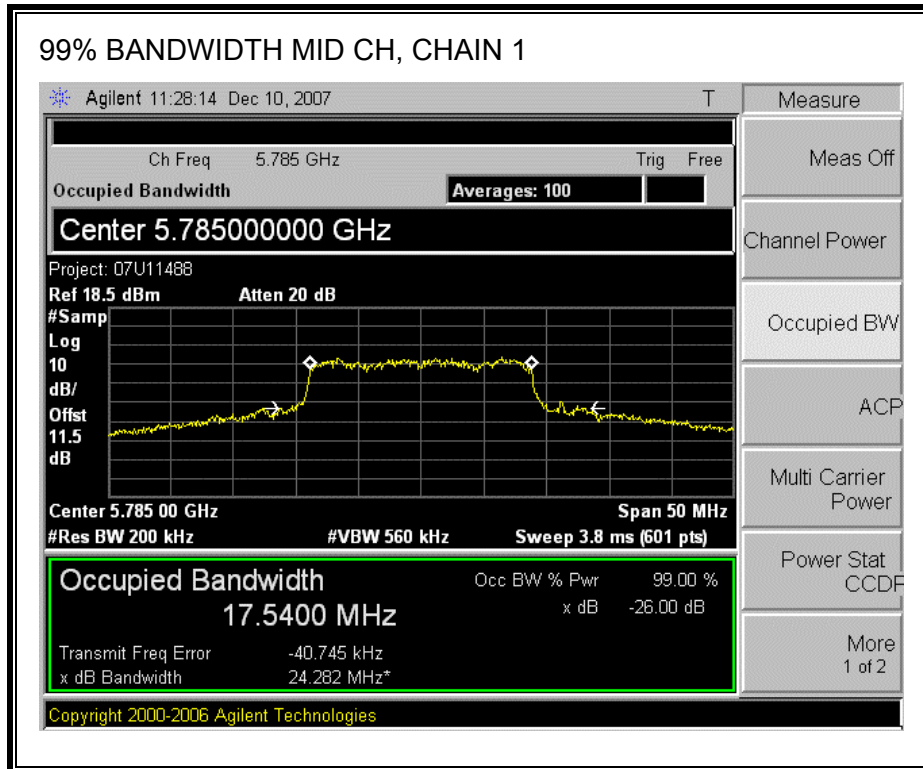
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

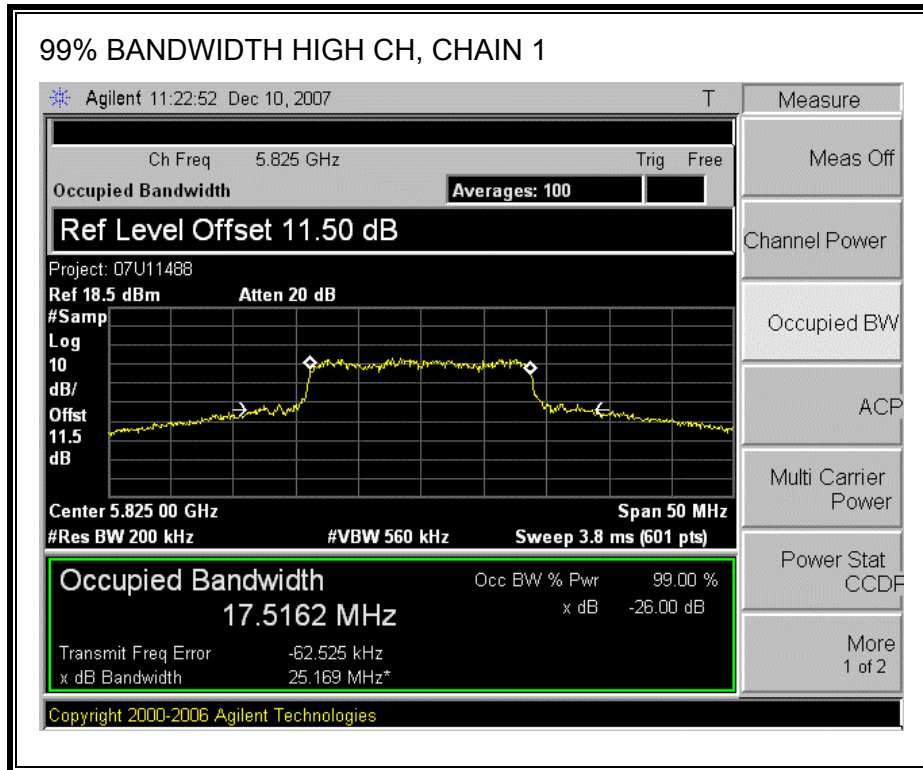
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5745	17.4830	17.5658
Middle	5785	17.5400	17.4810
High	5825	17.5162	17.5238

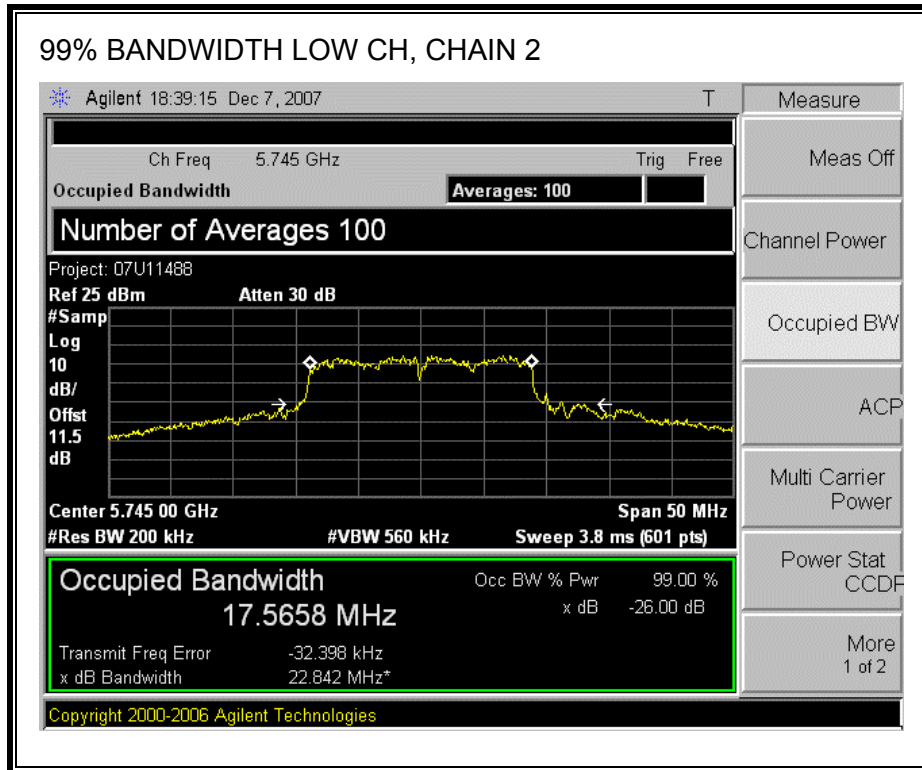
99% BANDWIDTH, CHAIN 1

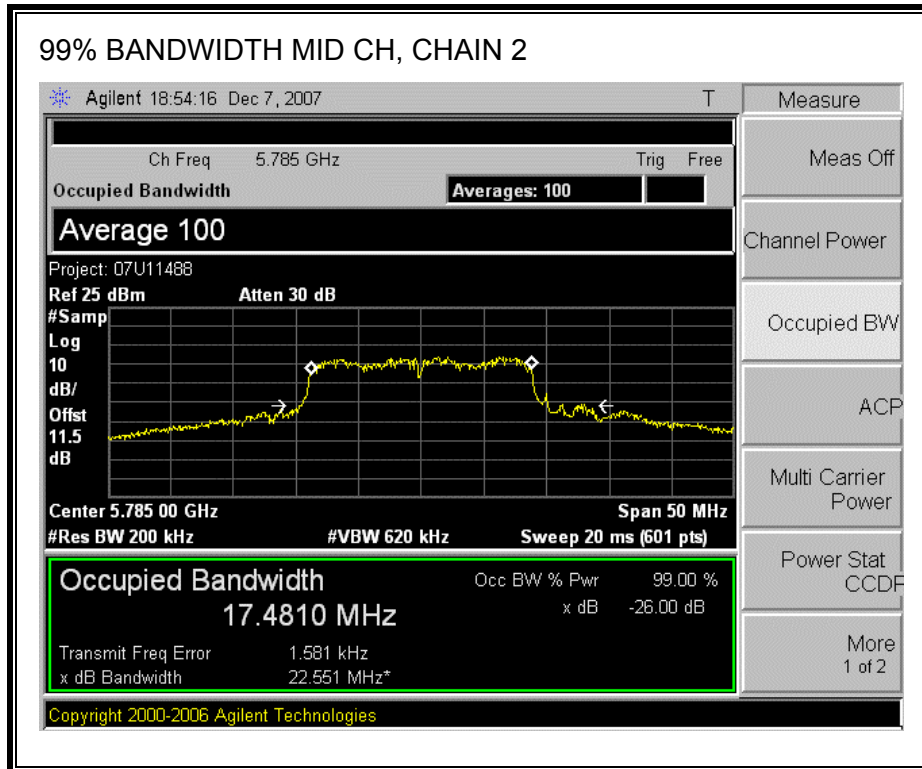


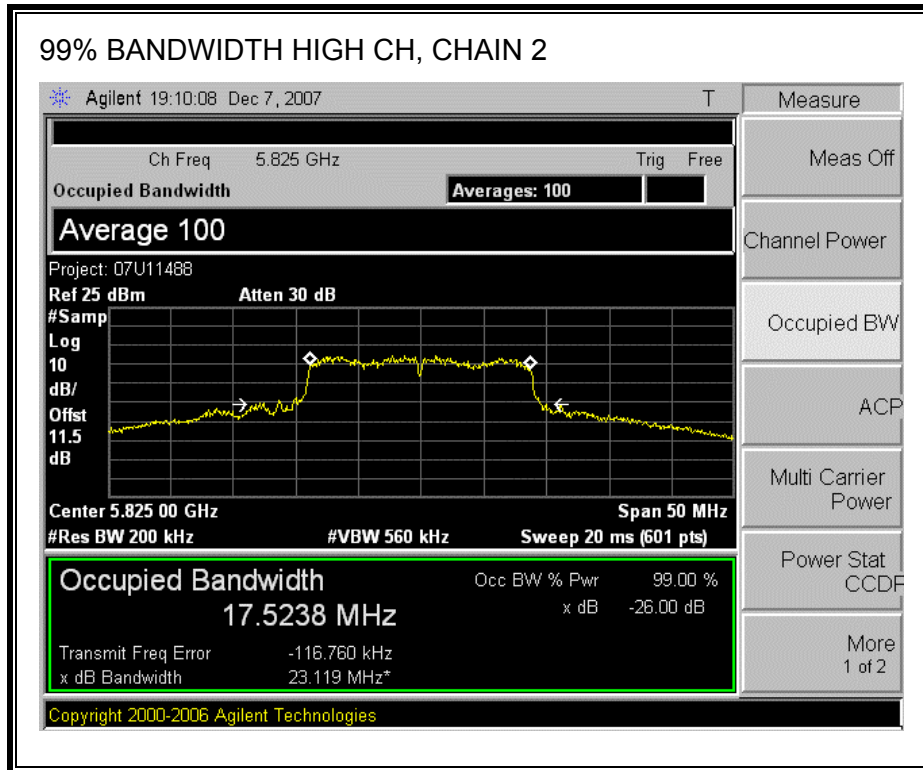




99% BANDWIDTH, CHAIN 2







7.6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

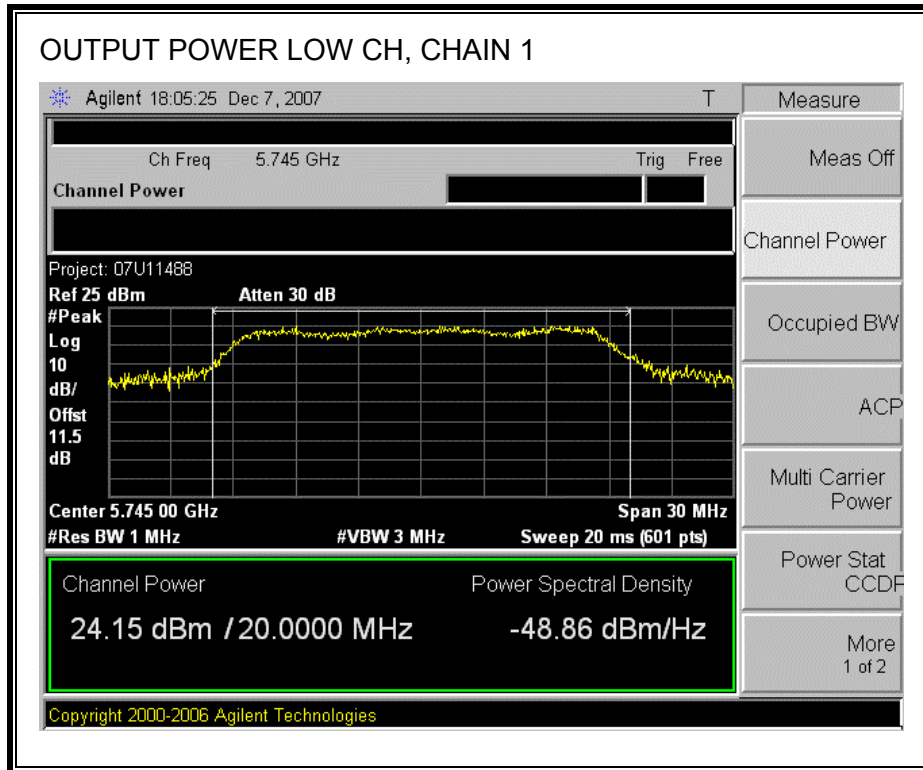
TEST PROCEDURE

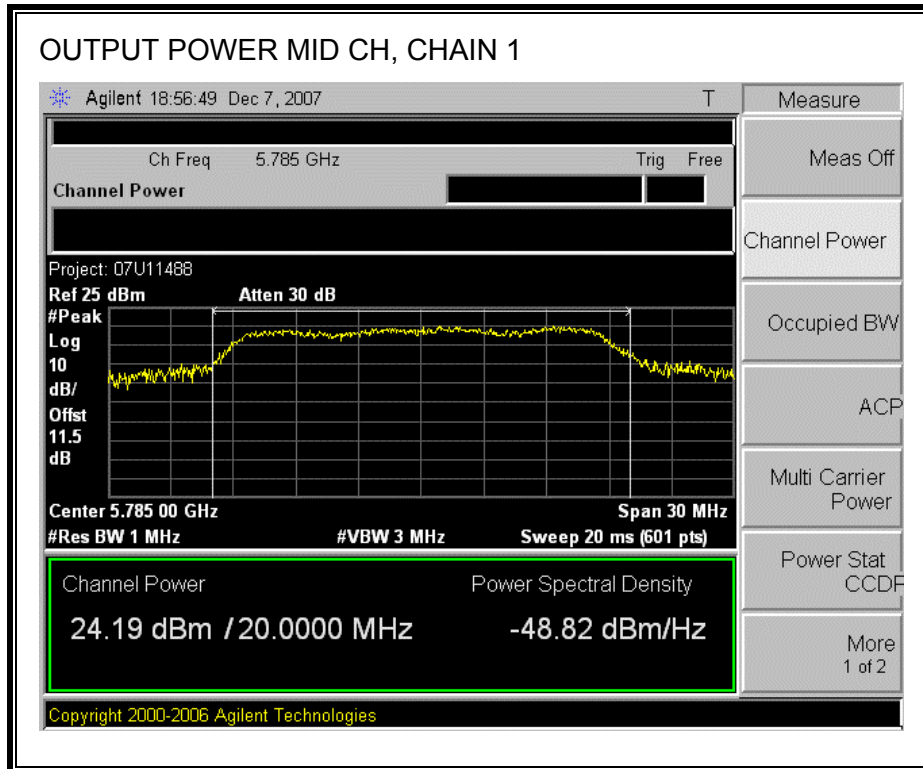
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

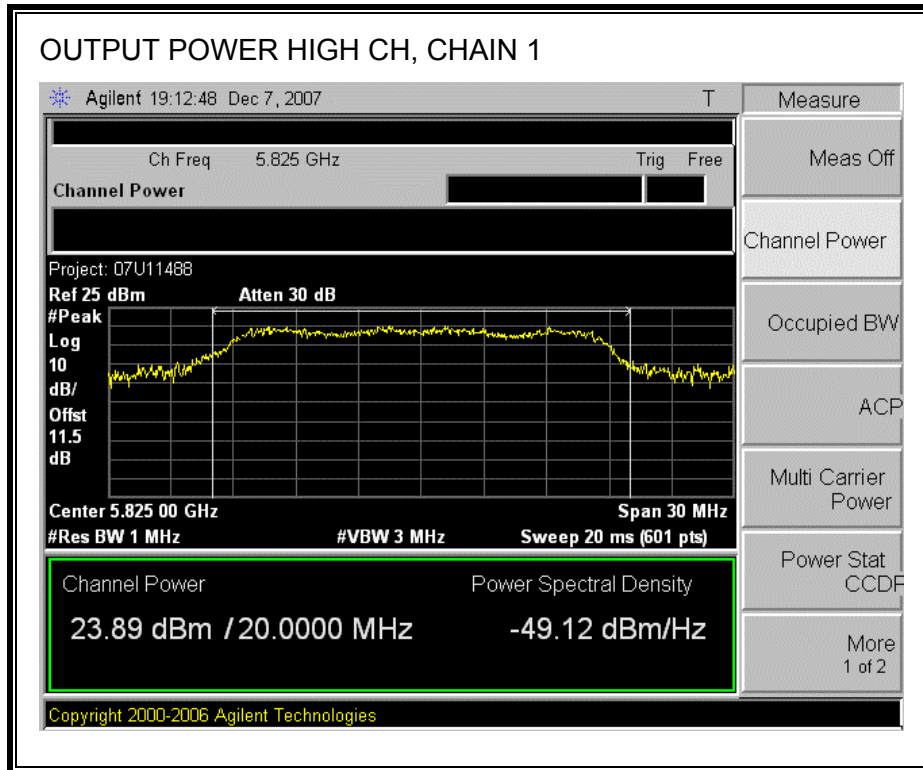
RESULTS

Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	5745	30.00	24.15	24.98	27.60	-2.40
Mid	5785	30.00	24.19	24.49	27.35	-2.65
High	5825	30.00	23.89	25.10	27.55	-2.45

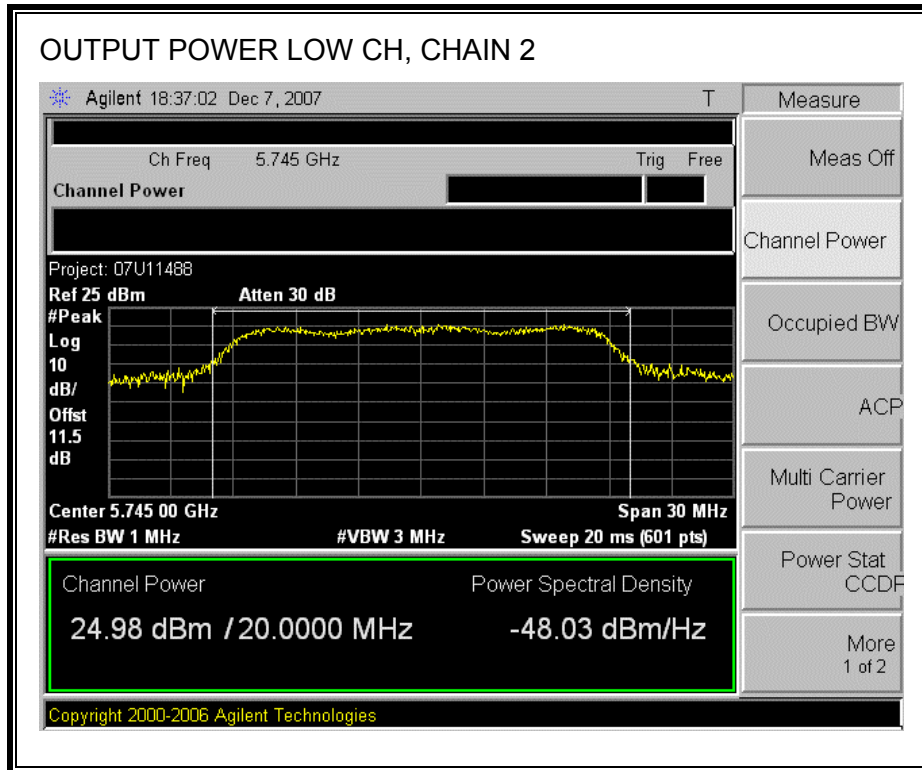
CHAIN 1 OUTPUT POWER

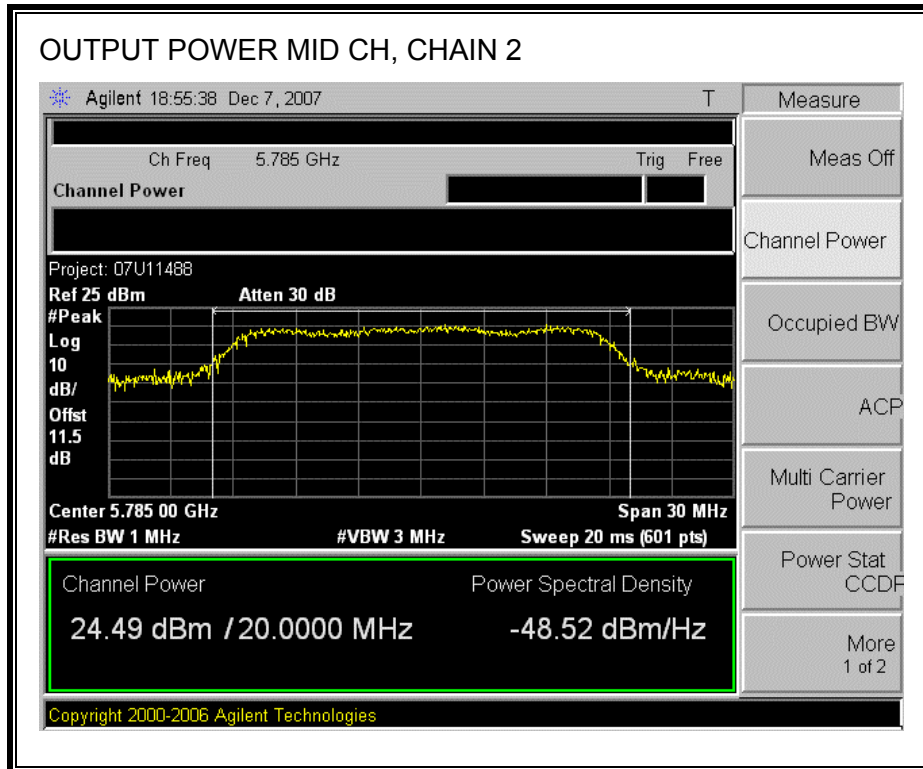


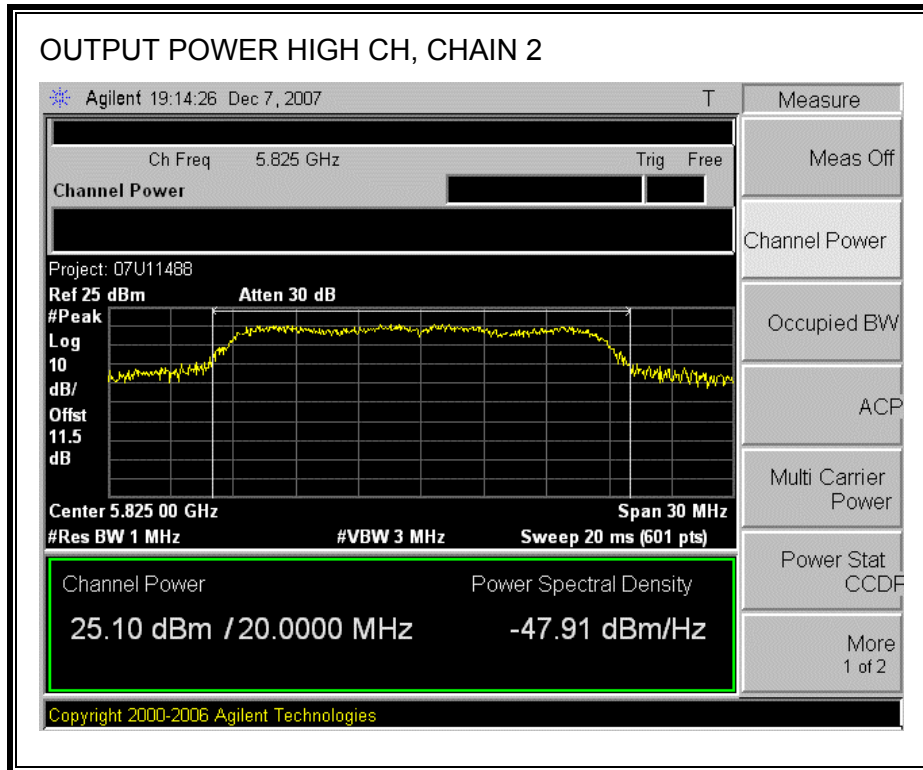




CHAIN 2 OUTPUT POWER







7.6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5745	16.98	17.69	20.36
Middle	5785	17.13	17.30	20.23
High	5825	17.15	17.80	20.50

7.6.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

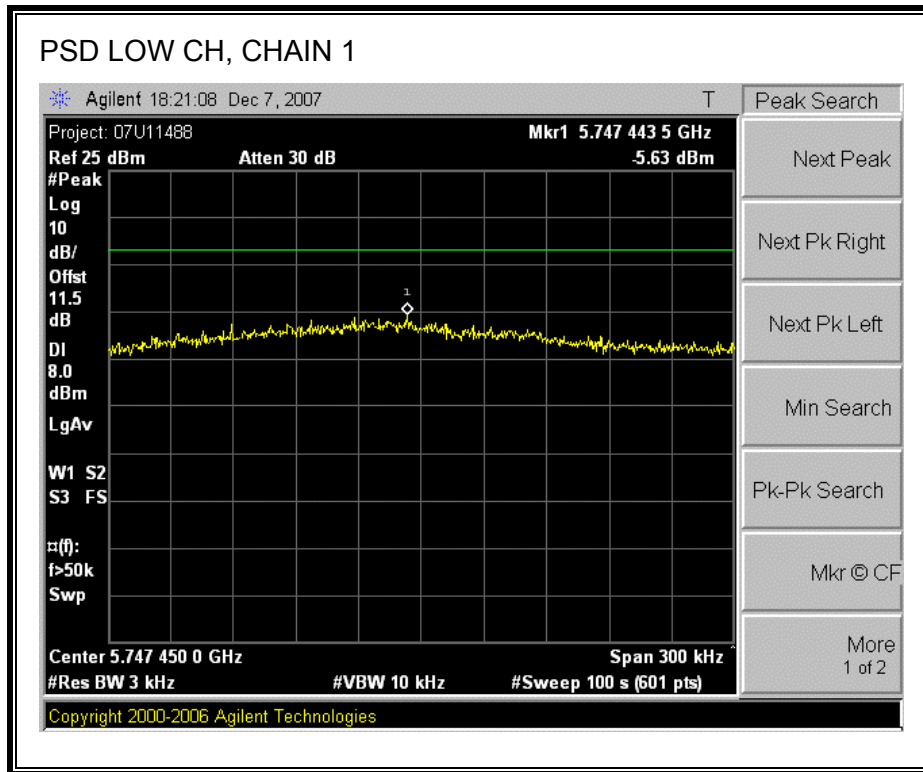
RESULTS:

Middle and High channels were measured with the combiner only, since doing so results in the worst-case compared to measuring either chain alone.

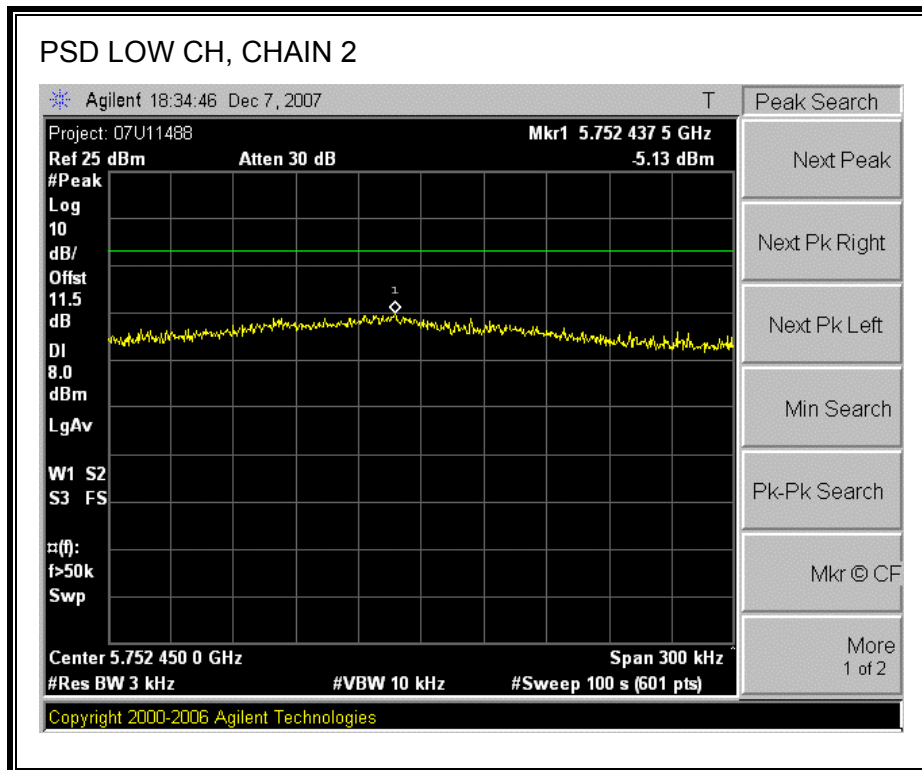
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-5.63	-5.13	-2.36	8	-10.36

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5745	0.23	8	-7.77
Middle	5785	0.07	8	-7.93
High	5825	-0.69	8	-8.69

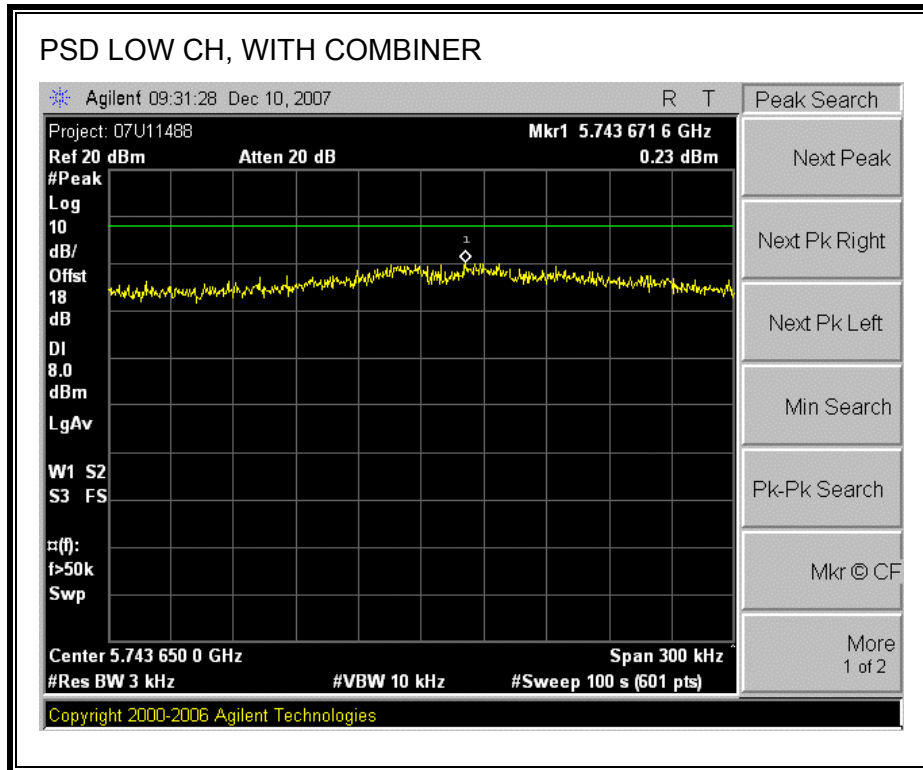
POWER SPECTRAL DENSITY, CHAIN 1

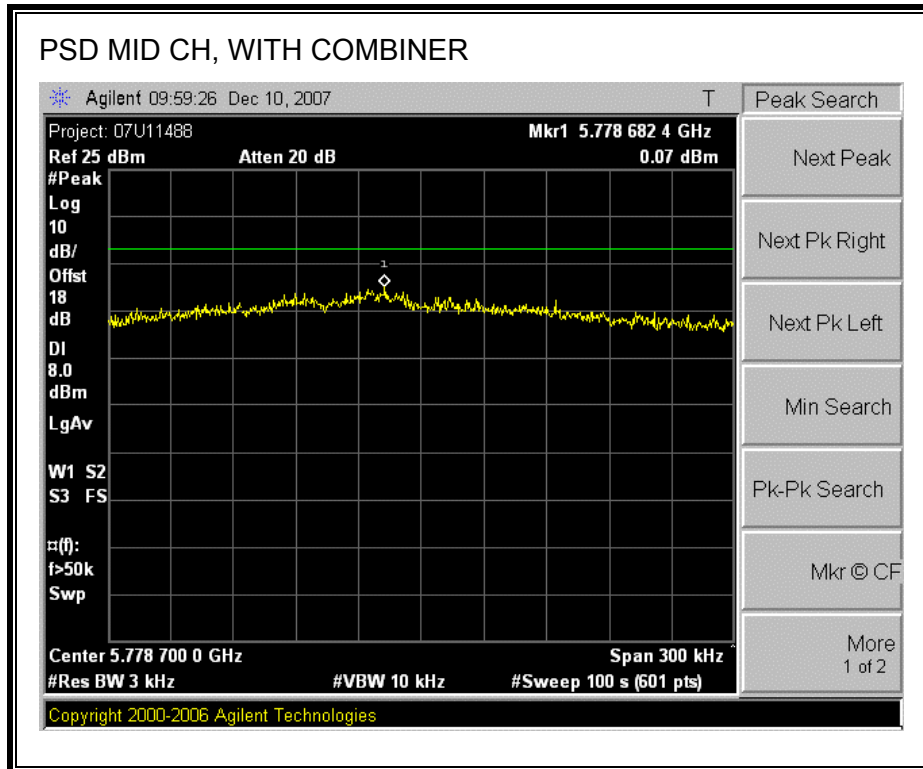


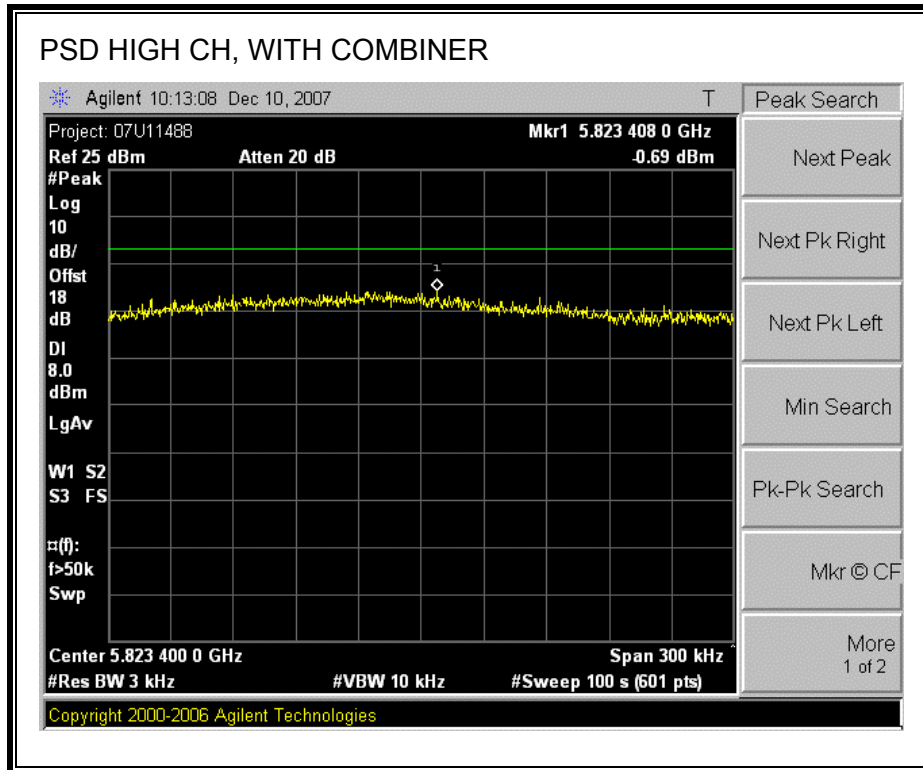
POWER SPECTRAL DENSITY, CHAIN 2



POWER SPECTRAL DENSITY, WITH COMBINER







7.6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

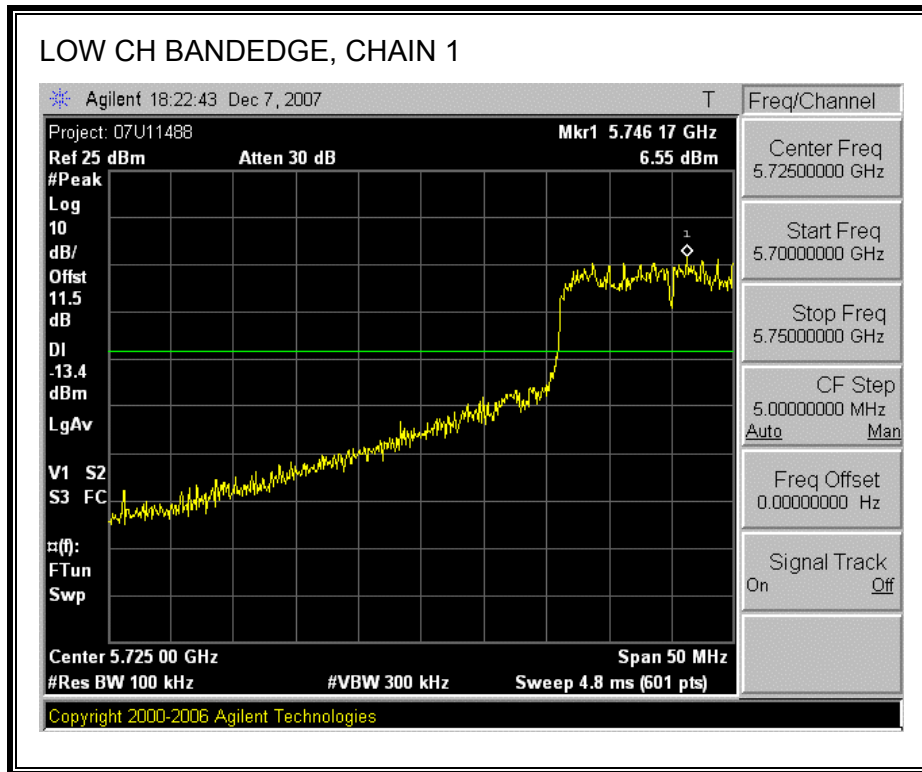
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

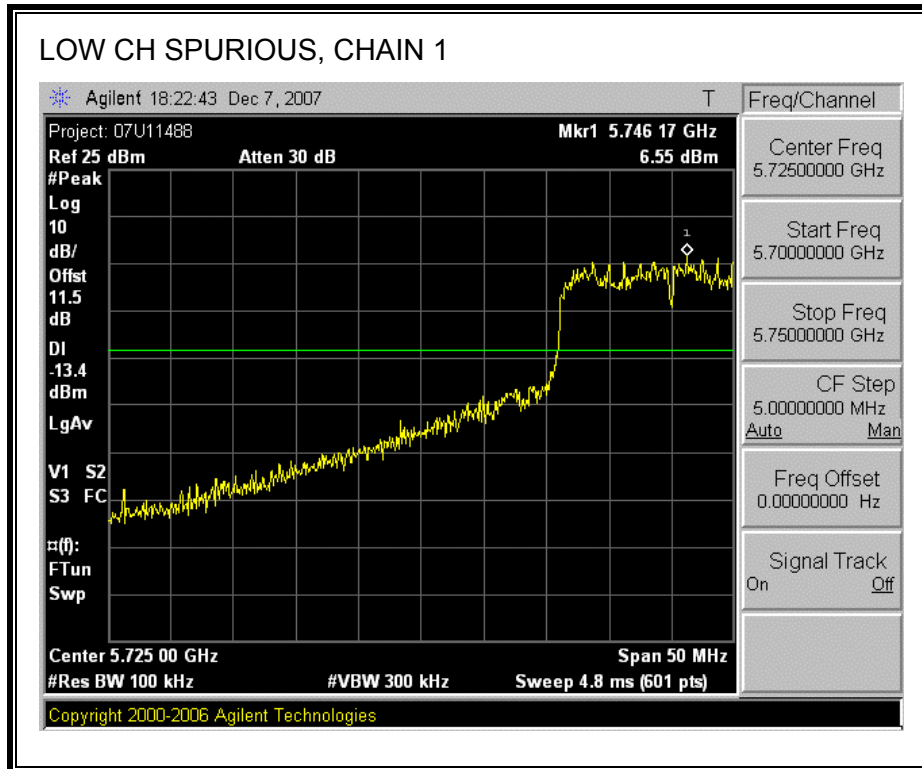
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

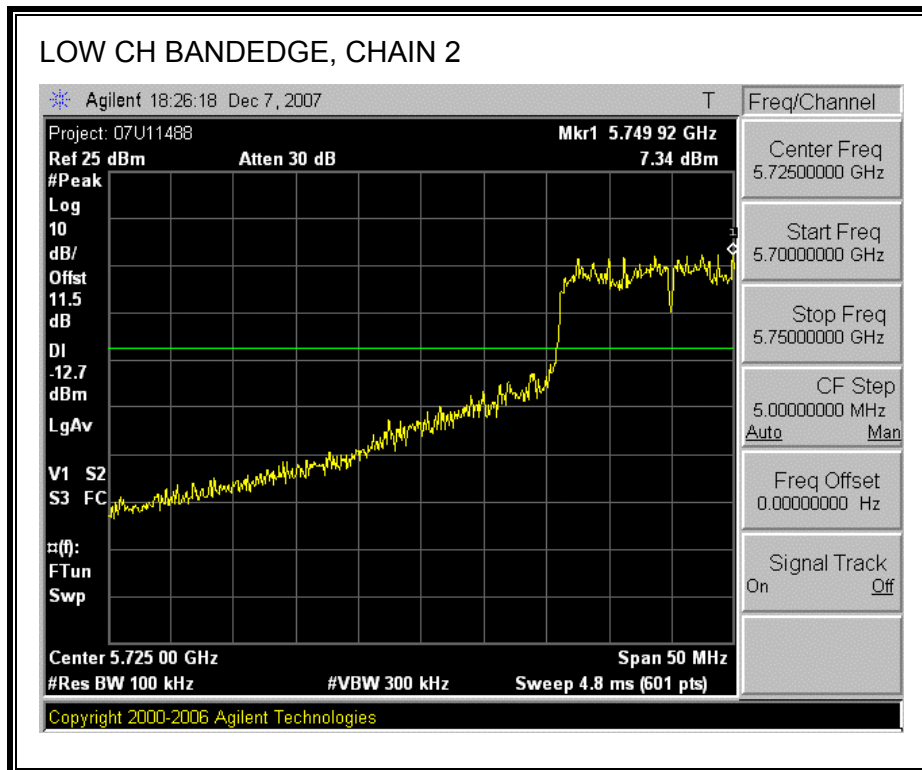
Middle and High channels were measured with the combiner only, since doing so results in the worst-case compared to measuring either chain alone.

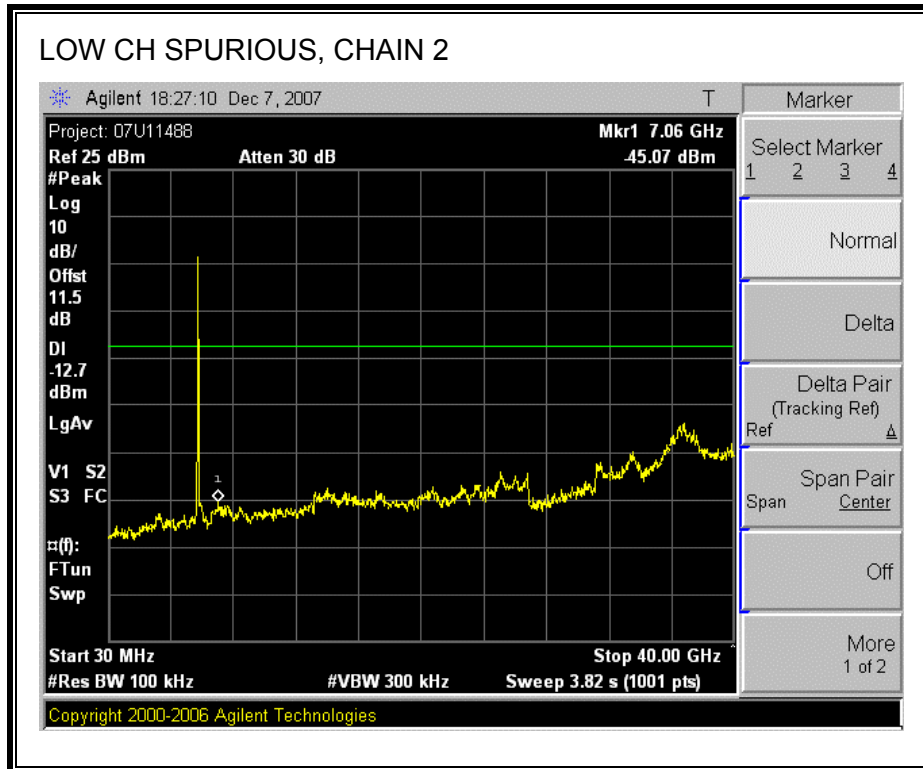
CHAIN 1 SPURIOUS EMISSIONS



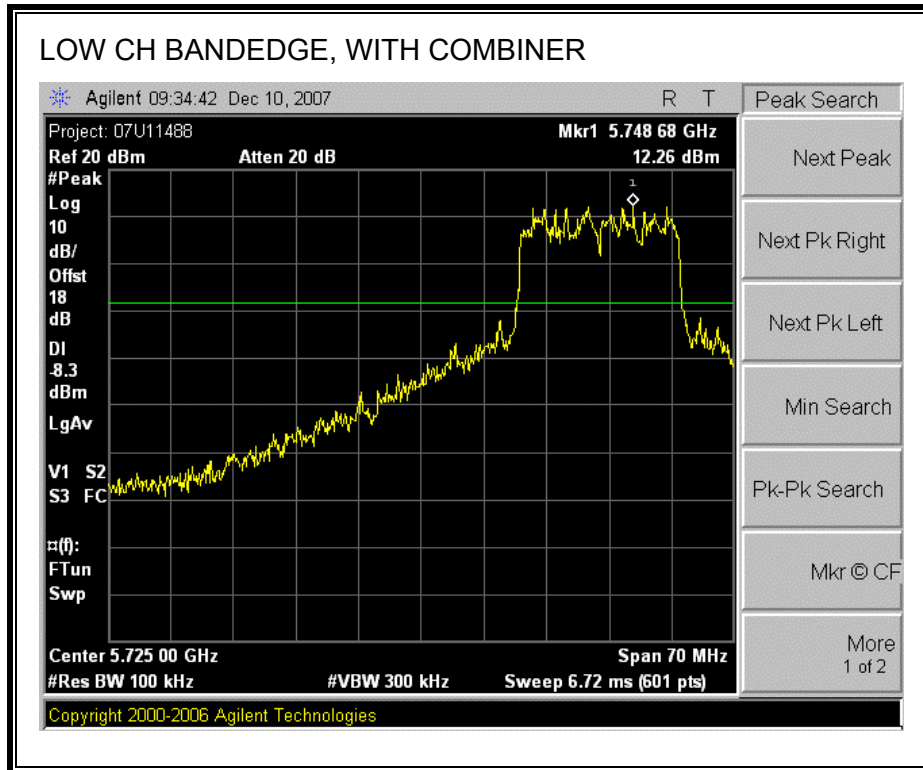


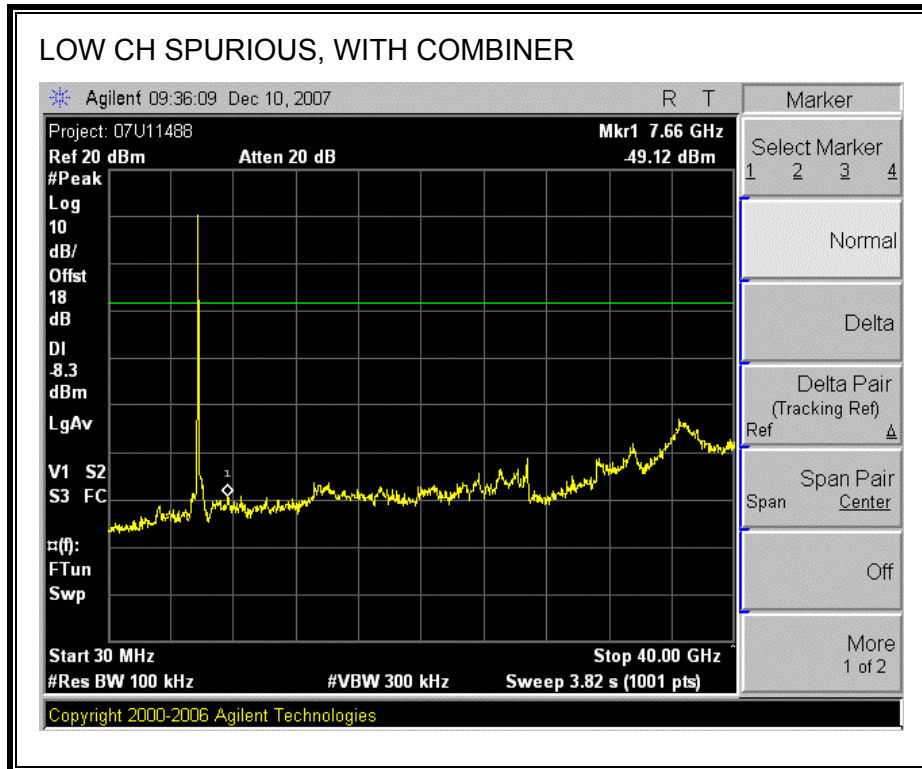
CHAIN 2 SPURIOUS EMISSIONS

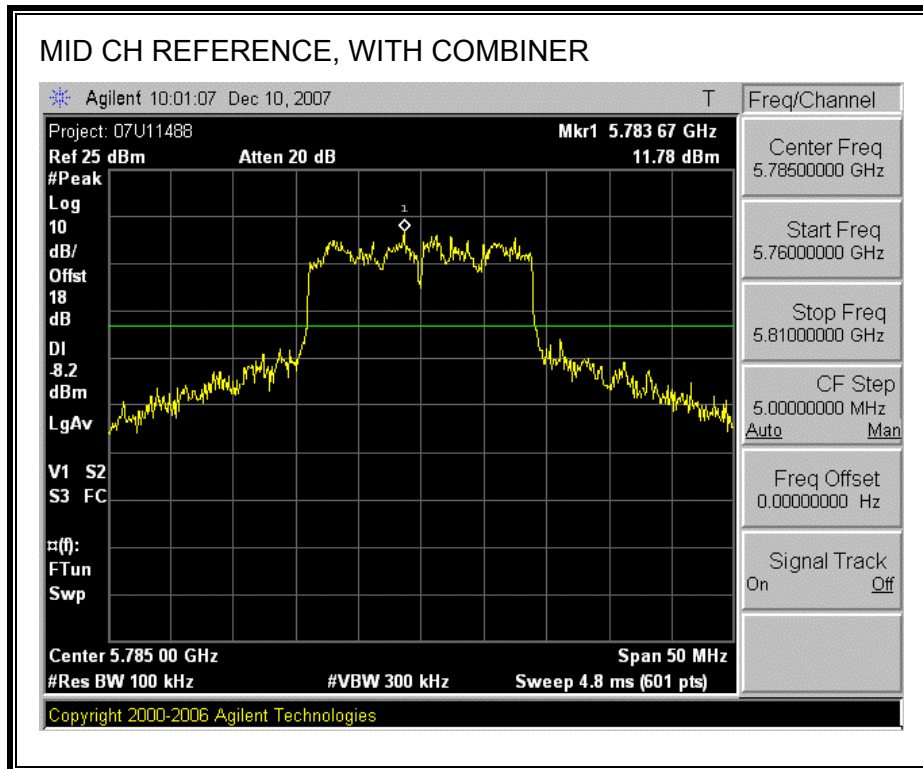


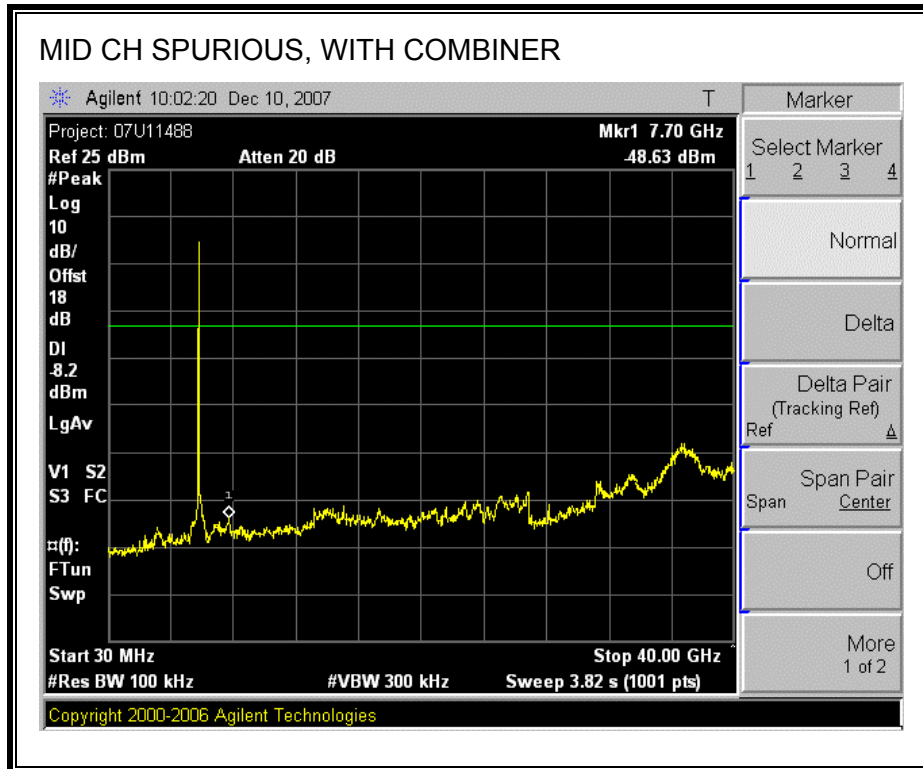


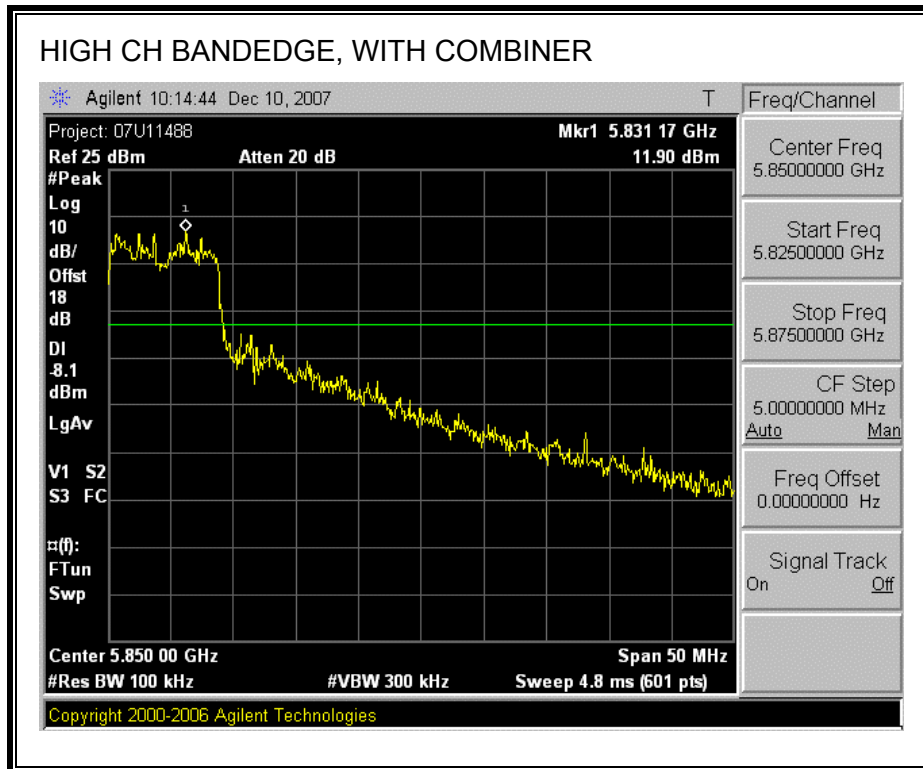
SPURIOUS EMISSIONS WITH COMBINER

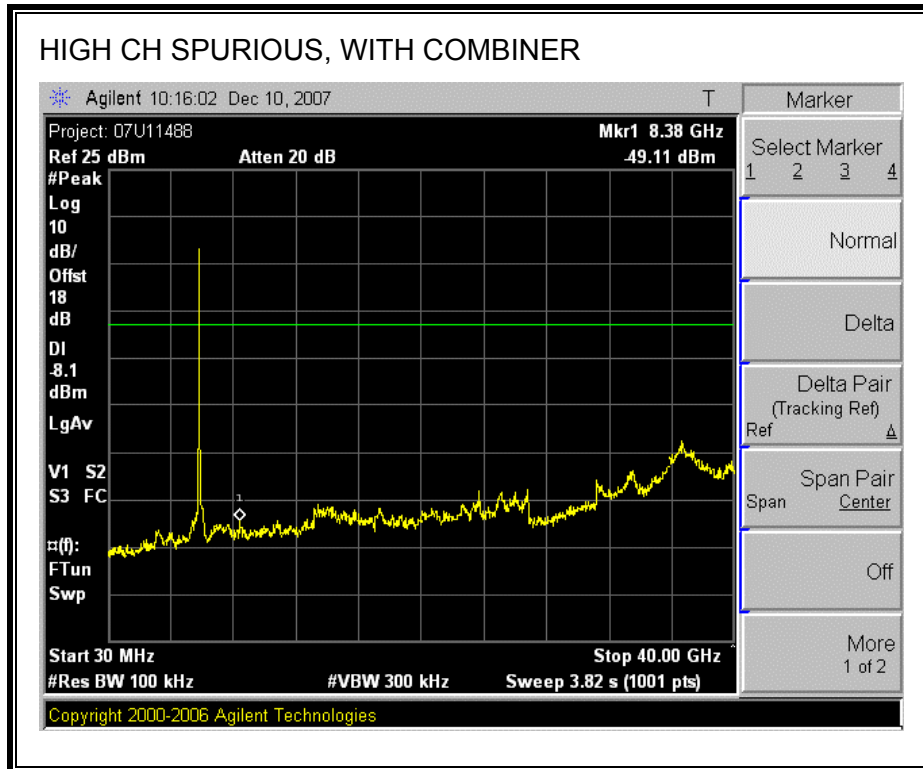












7.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

7.7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

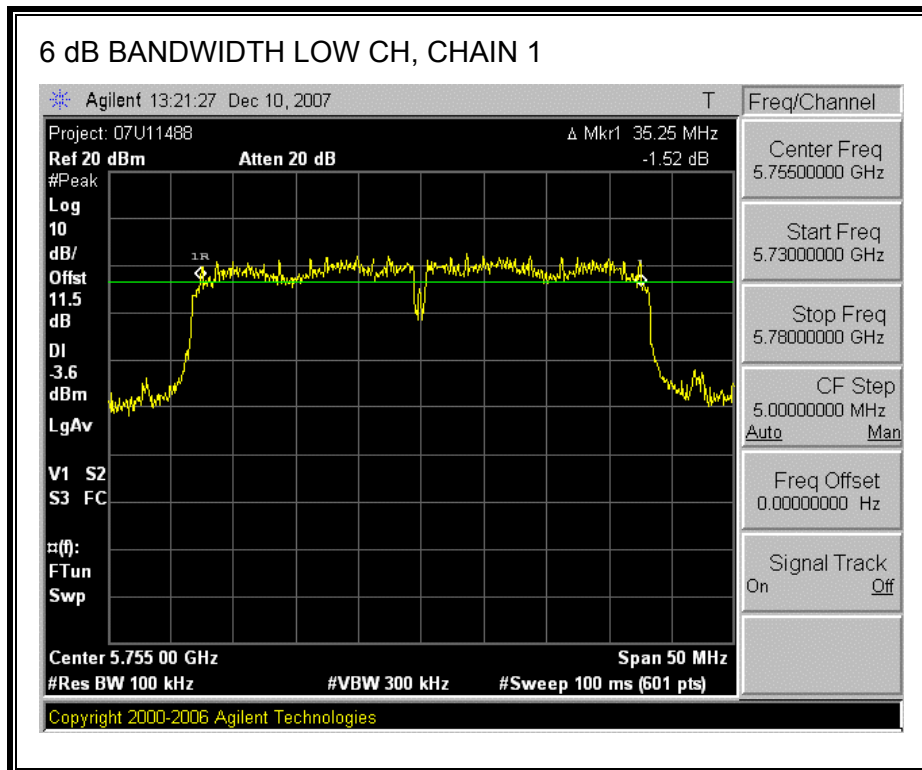
TEST PROCEDURE

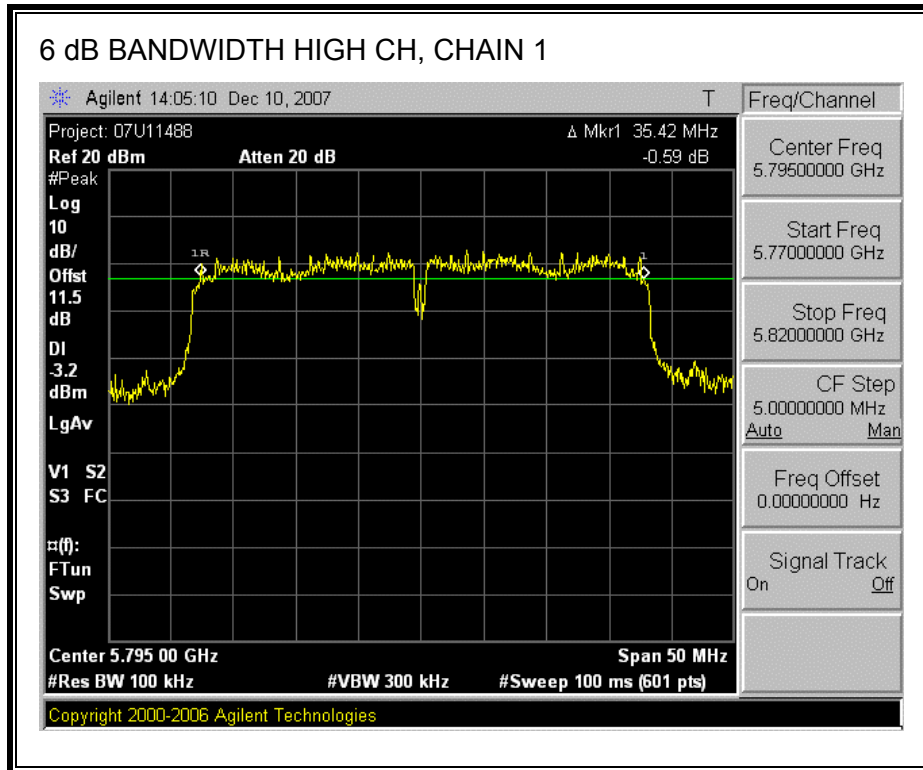
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

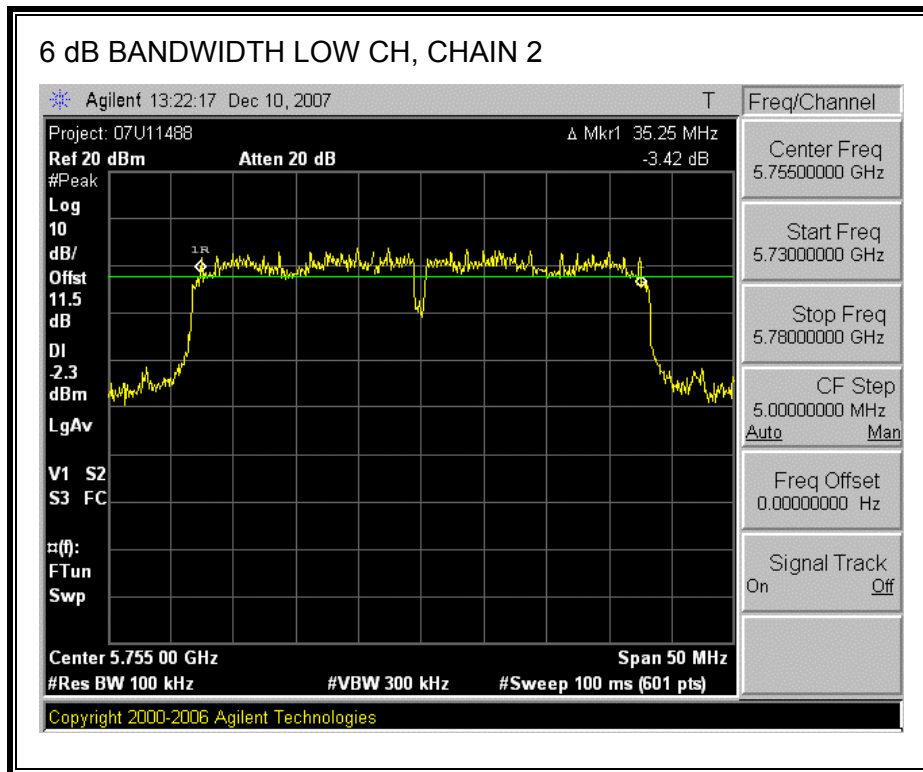
Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5755	35.25	35.25	0.5
High	5795	35.42	35.42	0.5

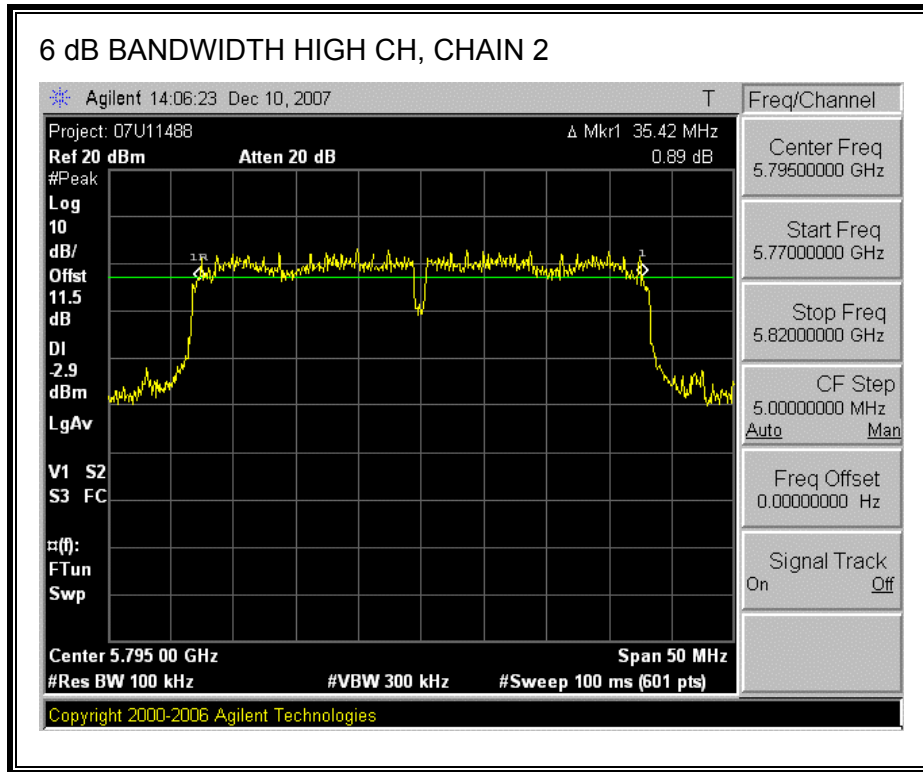
6 dB BANDWIDTH, CHAIN 1





6 dB BANDWIDTH, CHAIN 2





7.7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

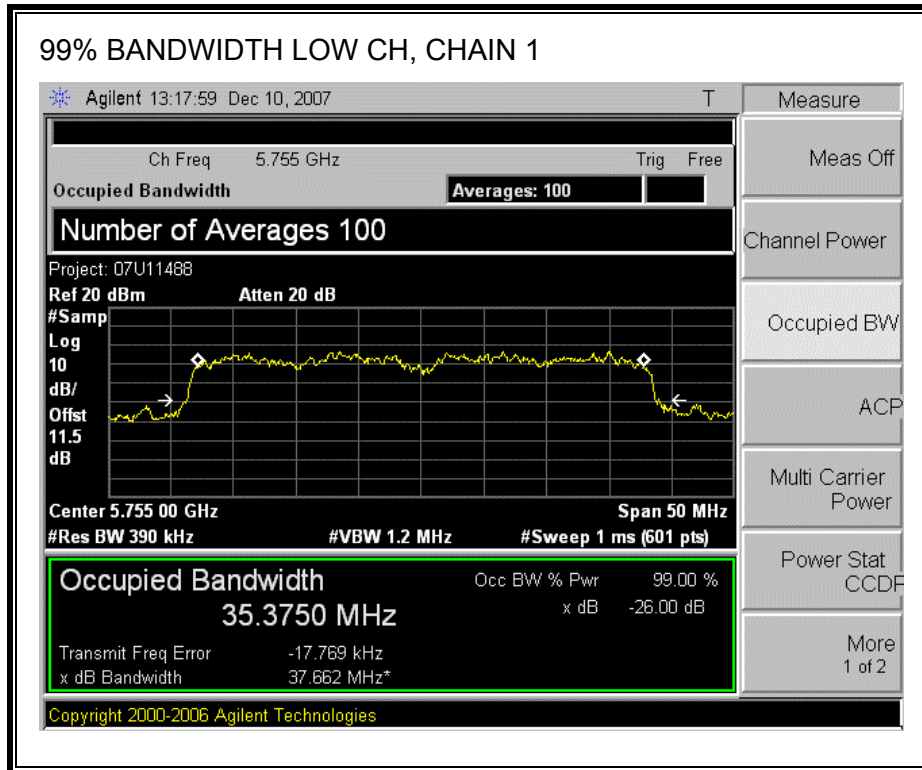
TEST PROCEDURE

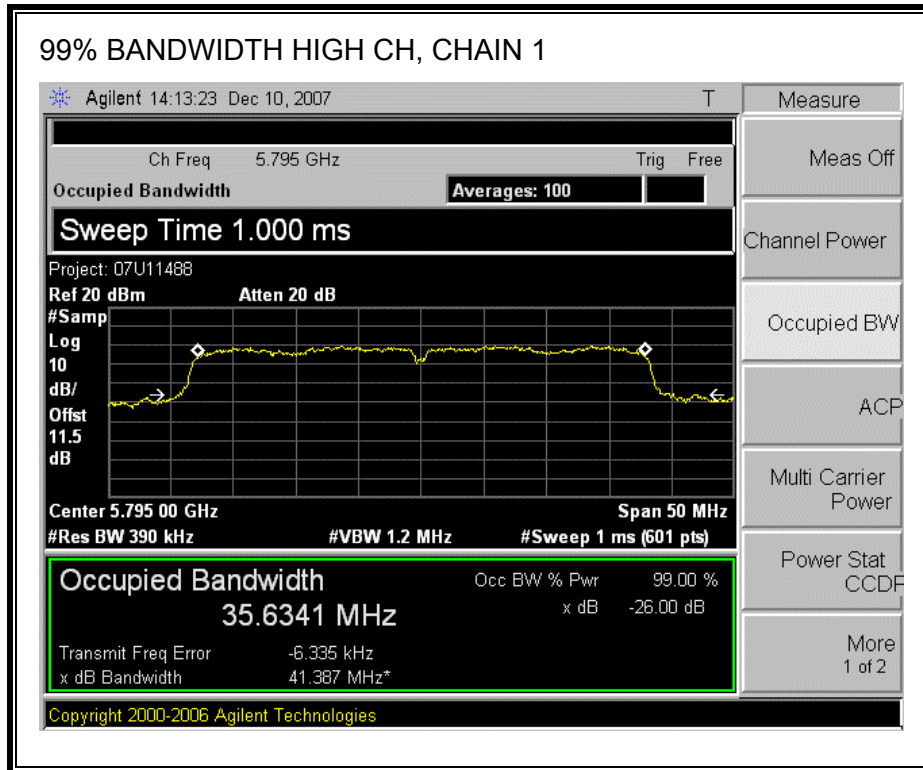
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

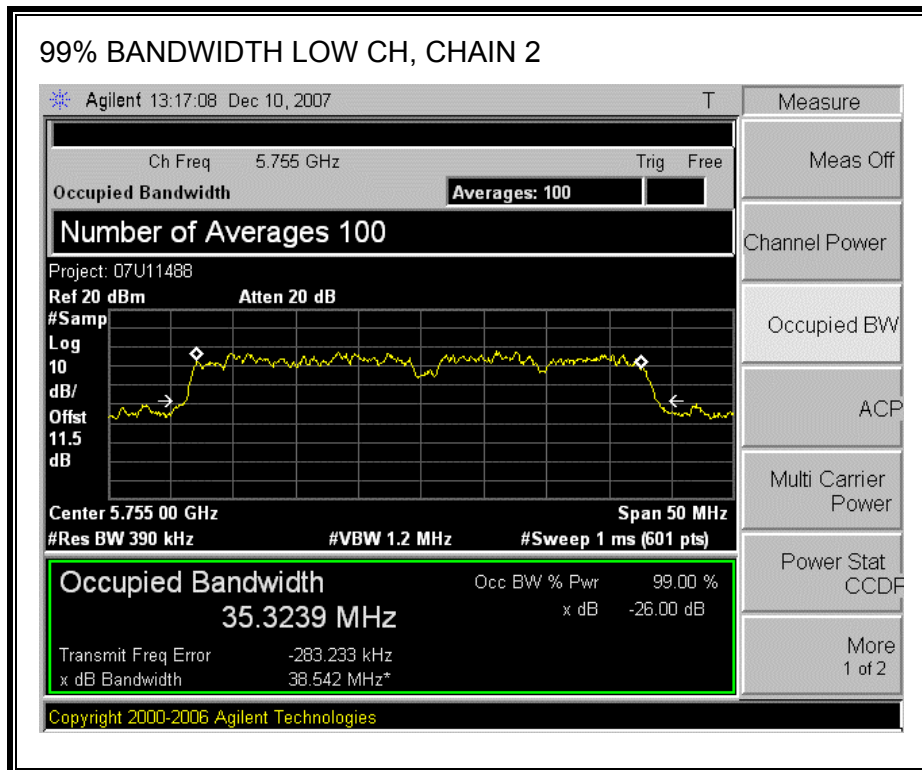
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5755	35.3750	35.3239
High	5795	35.6341	35.6187

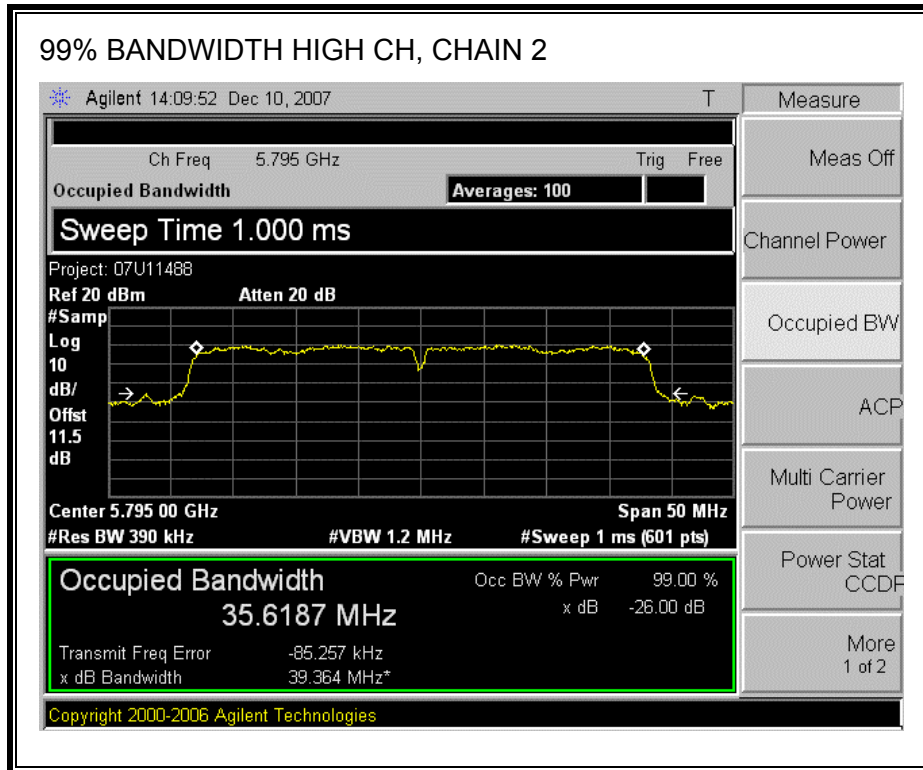
99% BANDWIDTH, CHAIN 1





99% BANDWIDTH, CHAIN 2





7.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

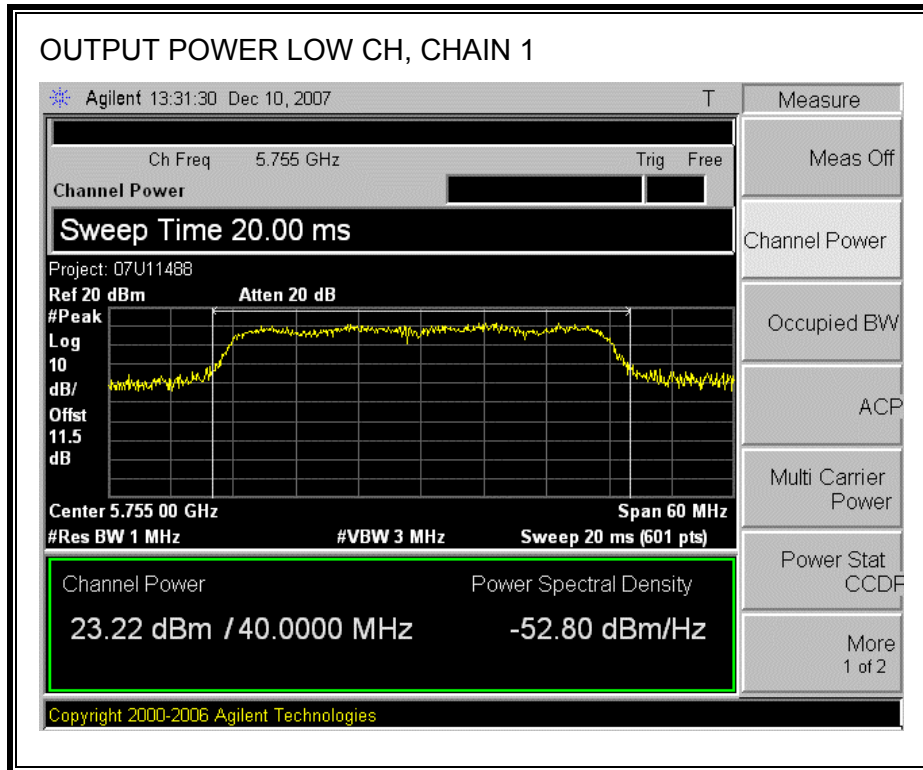
TEST PROCEDURE

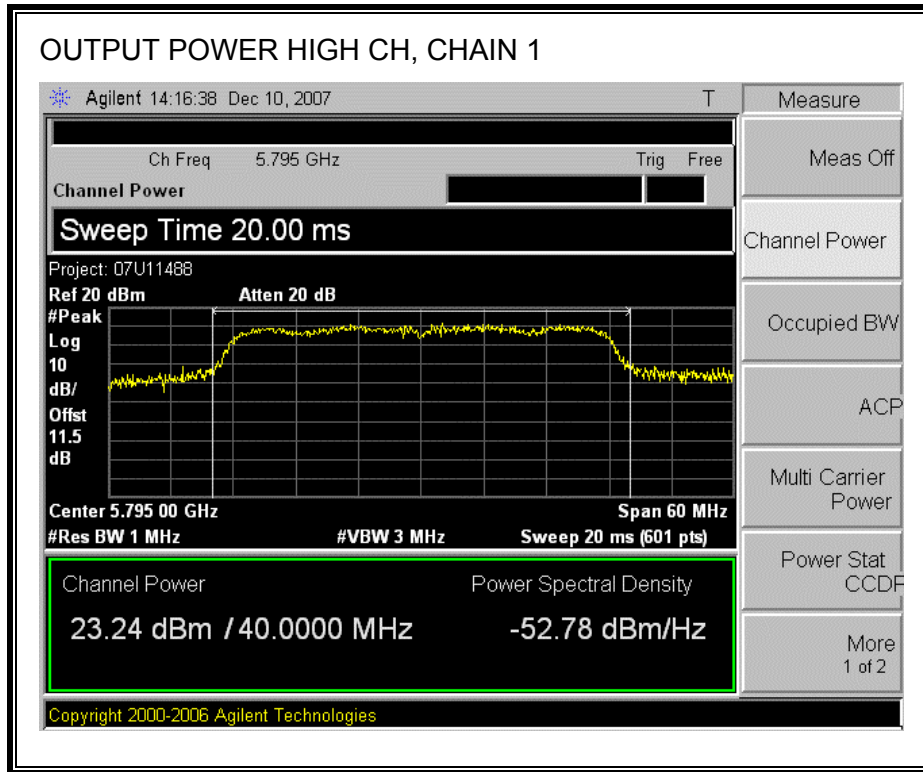
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

RESULTS

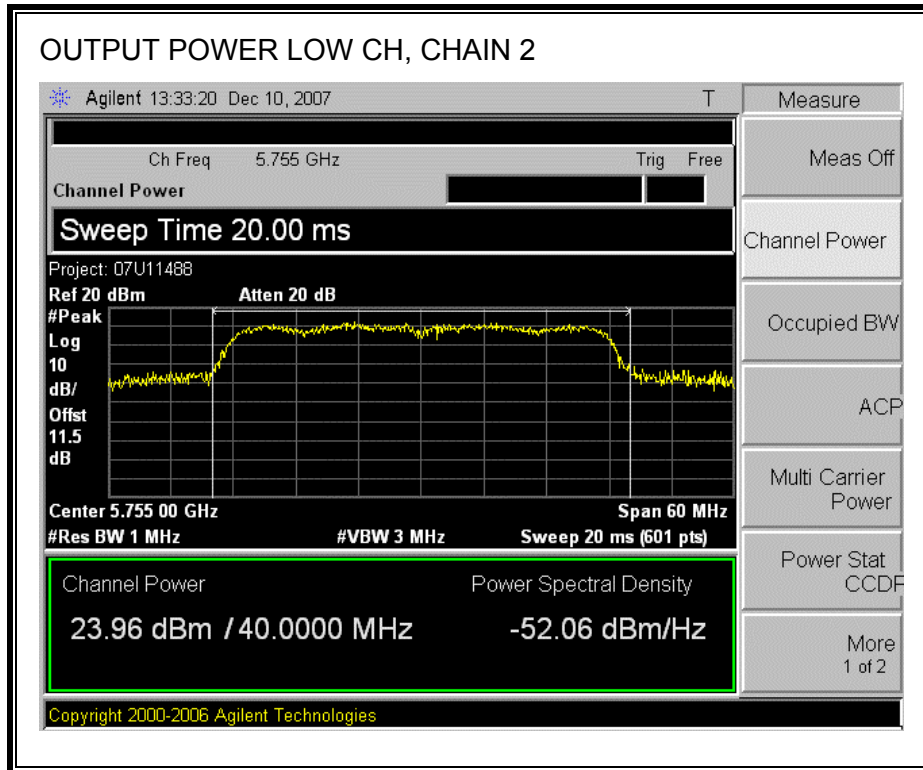
Channel	Frequency (MHz)	Limit (dBm)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Margin (dB)
Low	5755	30.00	23.22	23.96	26.62	-3.38
High	5795	30.00	23.24	23.67	26.47	-3.53

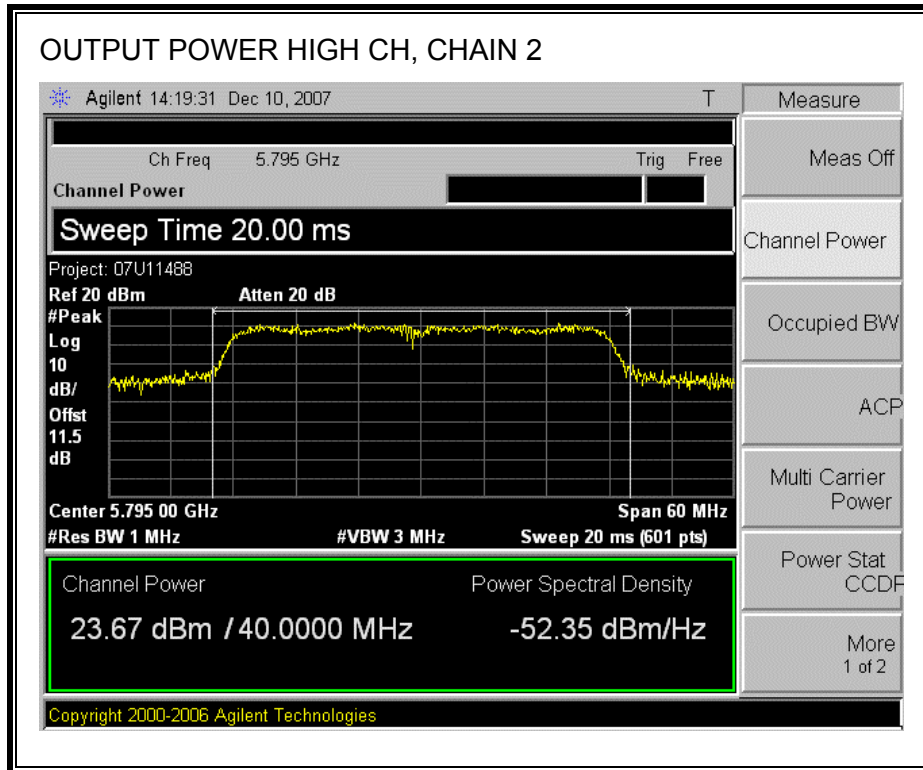
CHAIN 1 OUTPUT POWER





CHAIN 2 OUTPUT POWER





7.7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5755	17.73	17.82	20.79
High	5795	17.46	17.63	20.56

7.7.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

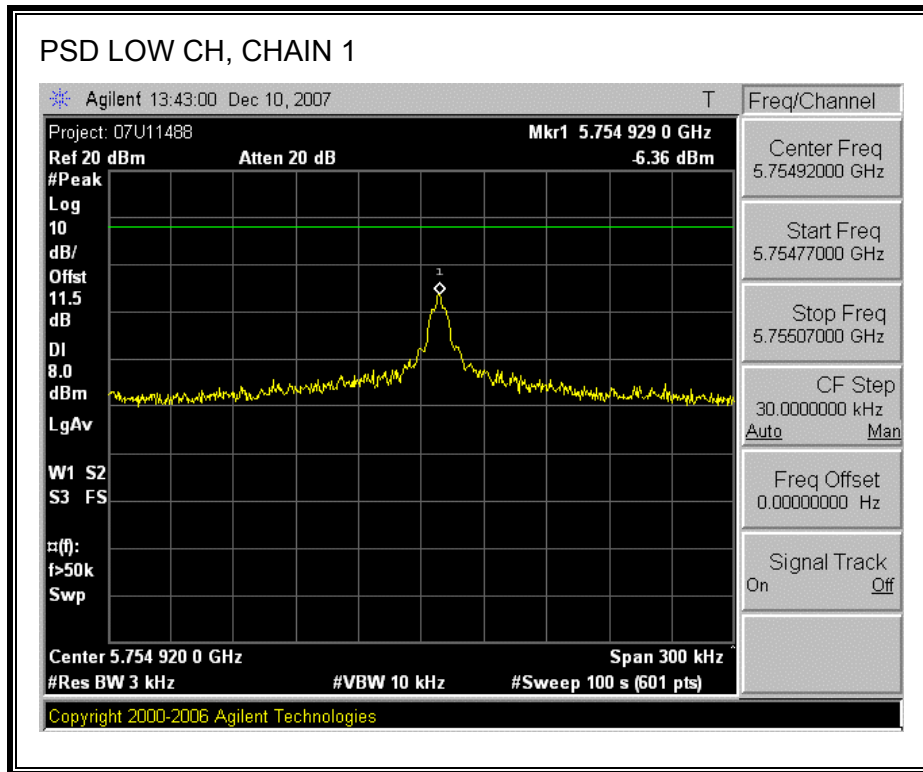
RESULTS:

High channel was measured with the combiner only, since doing so results in the worst-case compared to measuring either chain alone.

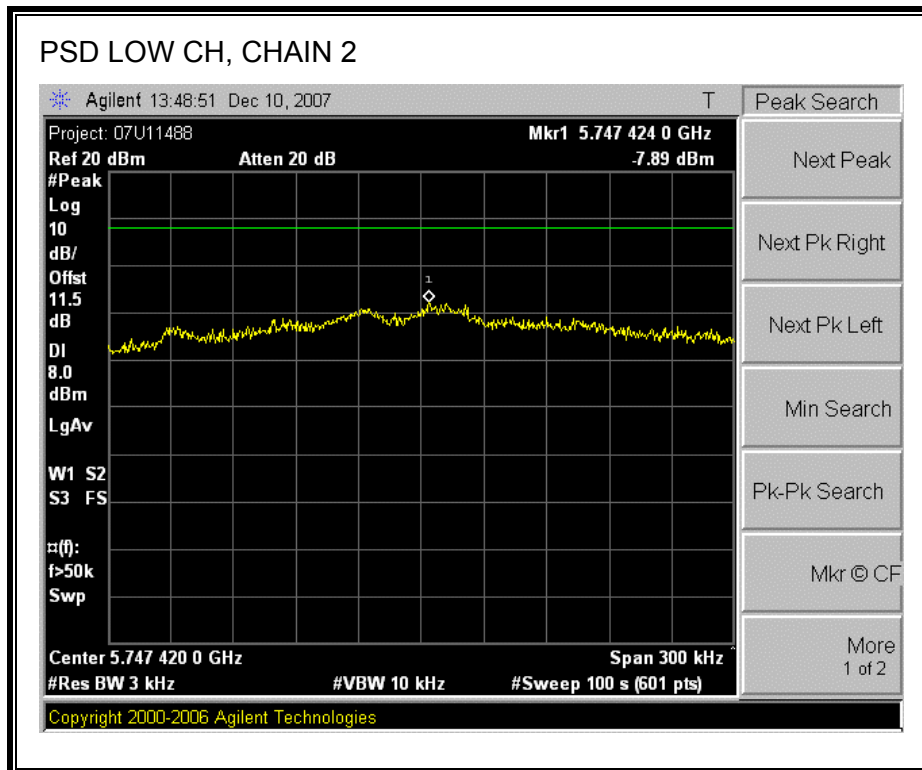
Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-6.36	-7.89	-4.05	8	-12.05

Channel	Frequency (MHz)	PSD with Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5755	-4.48	8	-12.48
High	5795	-5.37	8	-13.37

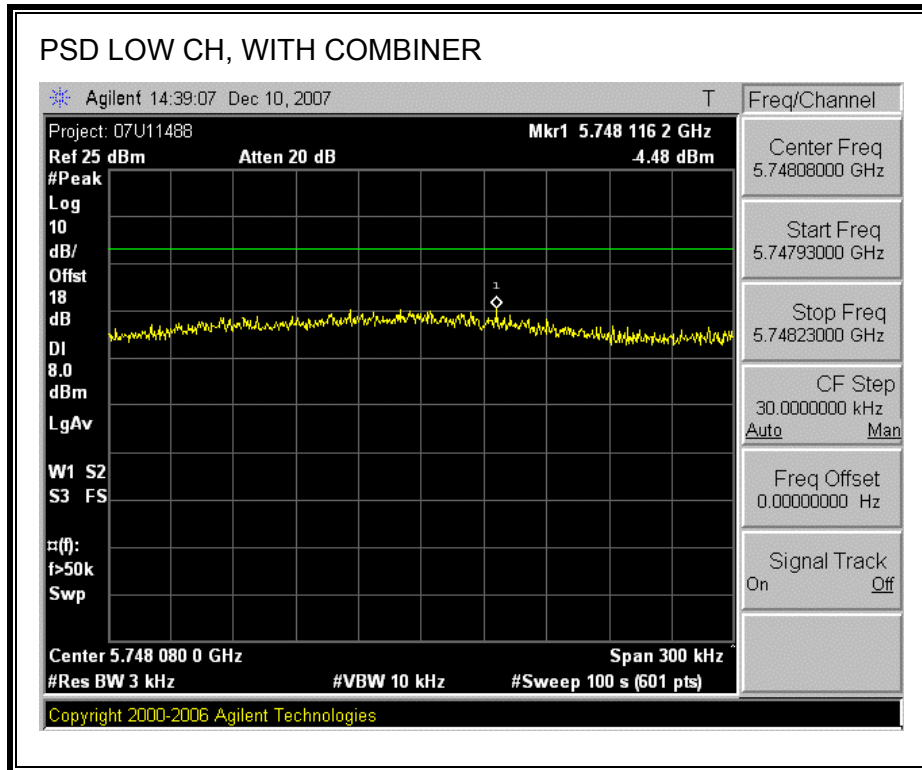
POWER SPECTRAL DENSITY, CHAIN 1

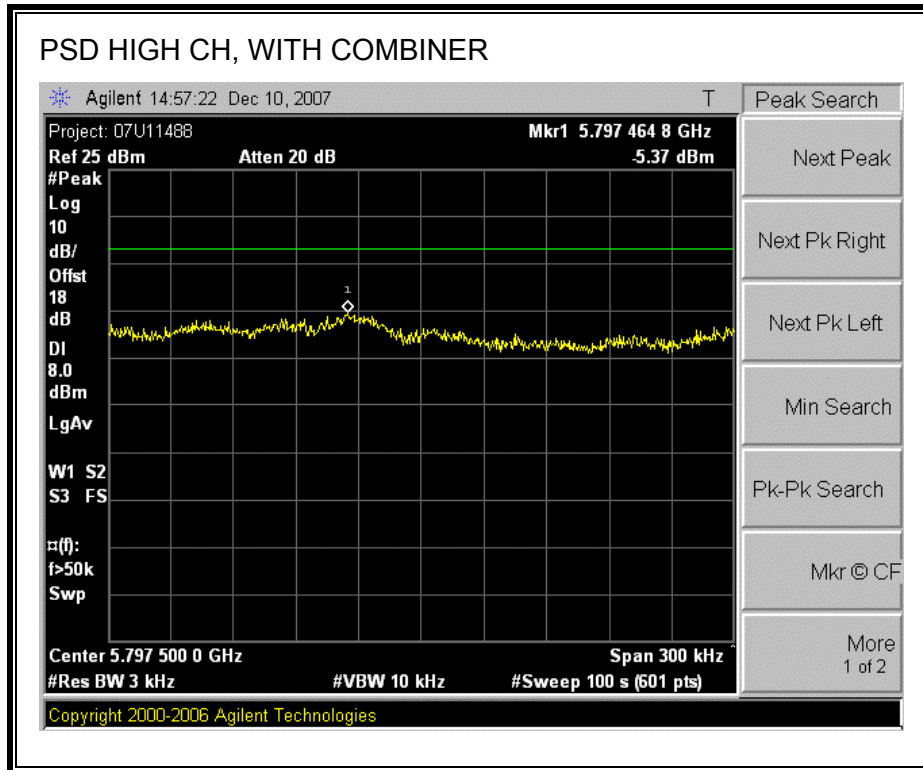


POWER SPECTRAL DENSITY, CHAIN 2



POWER SPECTRAL DENSITY, WITH COMBINER





7.7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

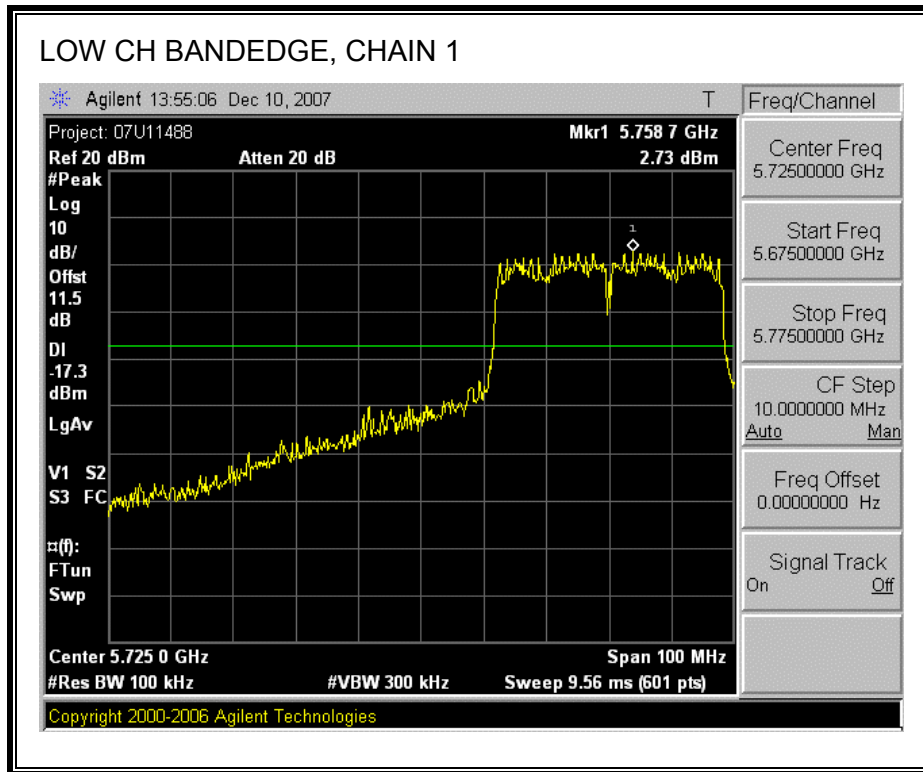
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

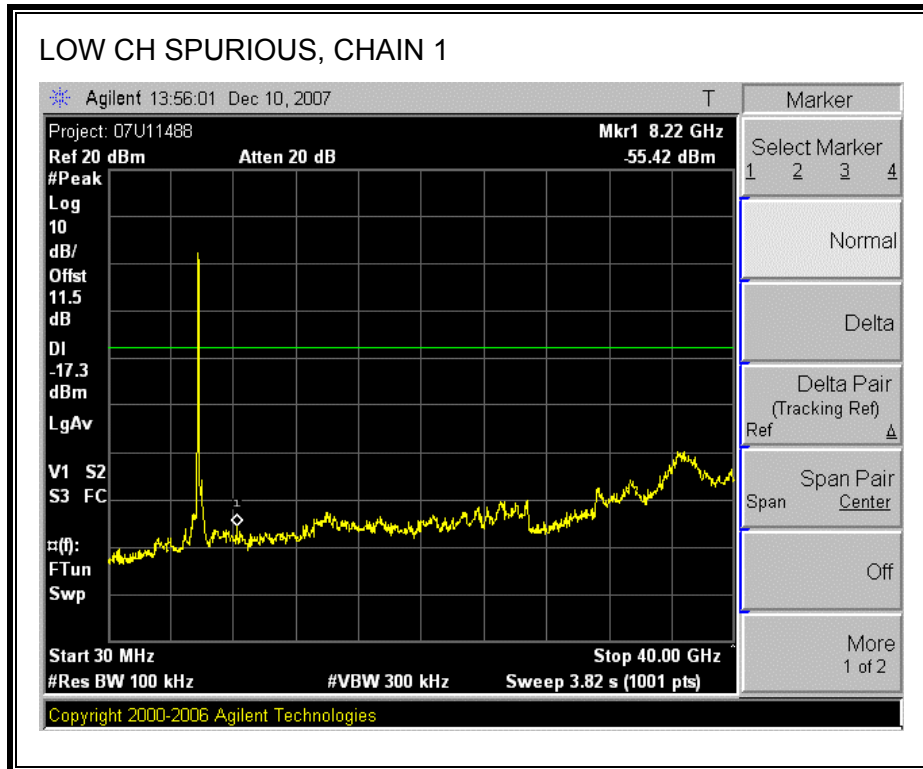
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest and highest channels.

RESULTS

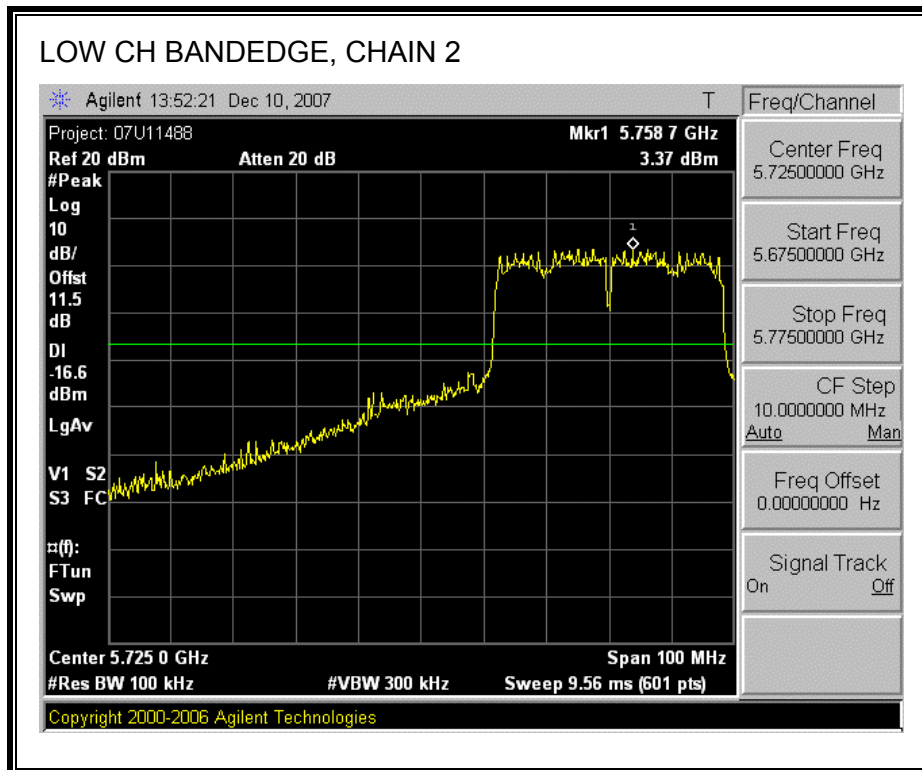
High channel was measured only with the combiner, since doing so results in the worst-case compared to measuring either chain alone.

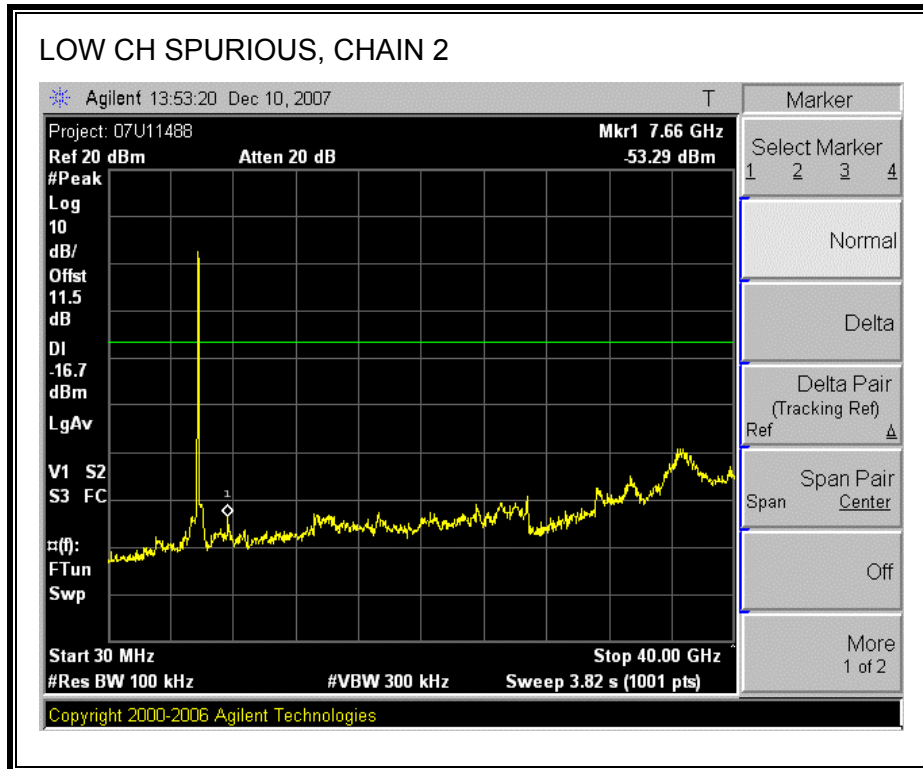
CHAIN 1 SPURIOUS EMISSIONS



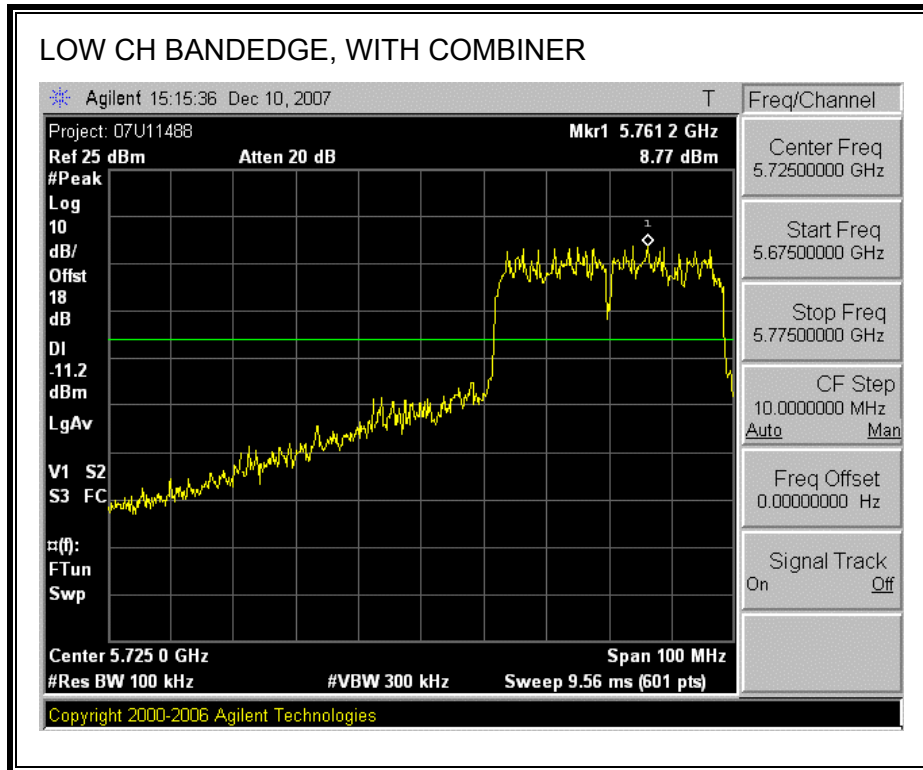


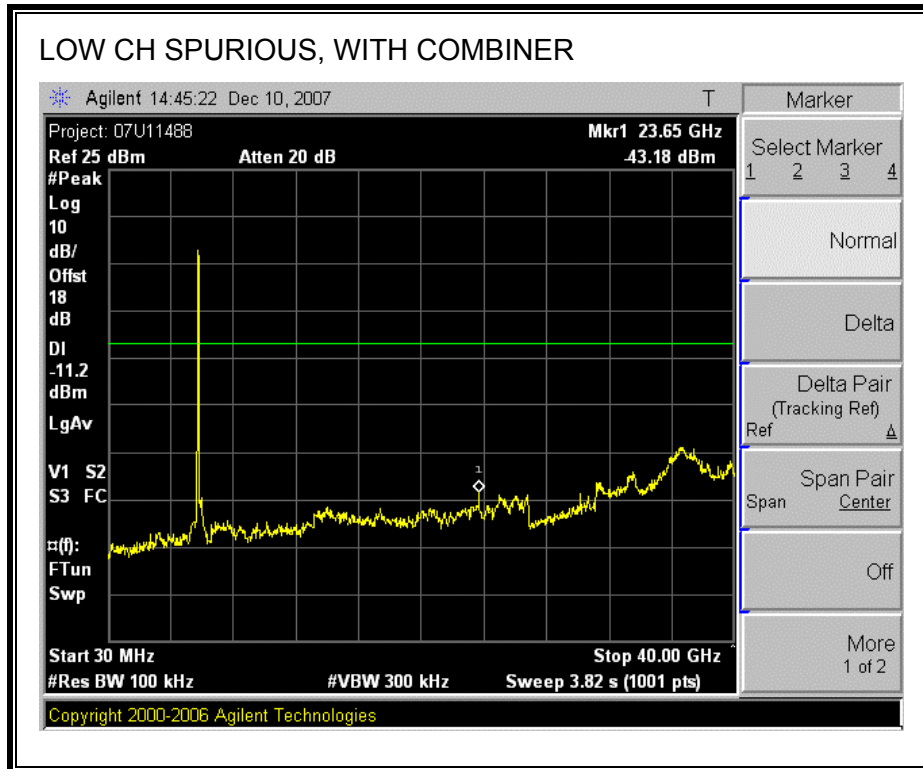
CHAIN 2 SPURIOUS EMISSIONS

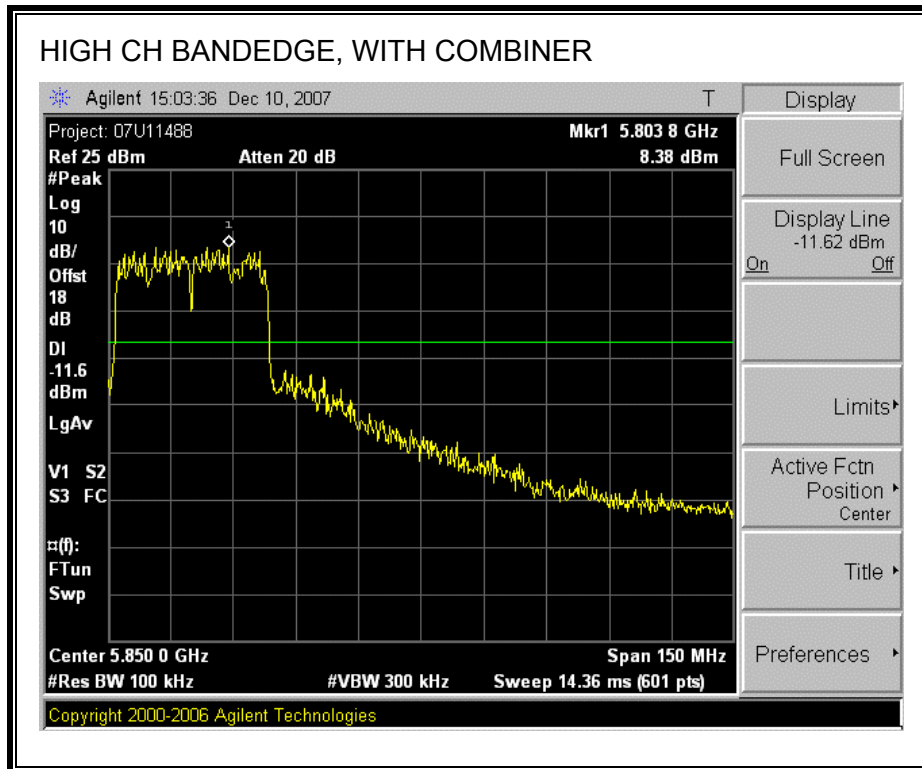


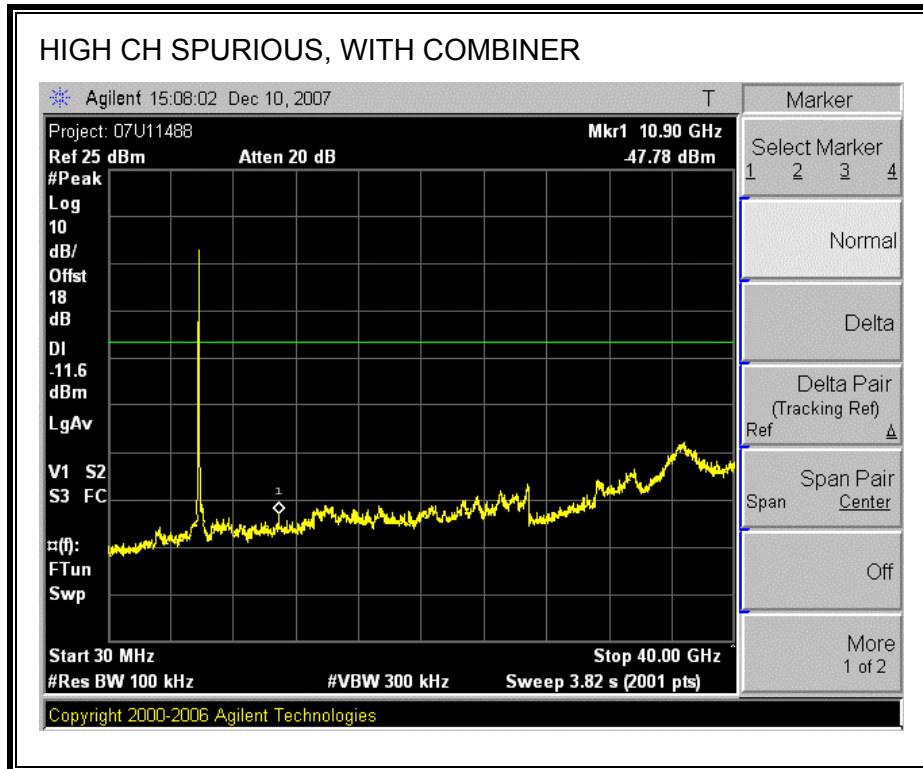


SPURIOUS EMISSIONS WITH COMBINER









7.8. RADIATED EMISSIONS

7.8.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At

frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

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.

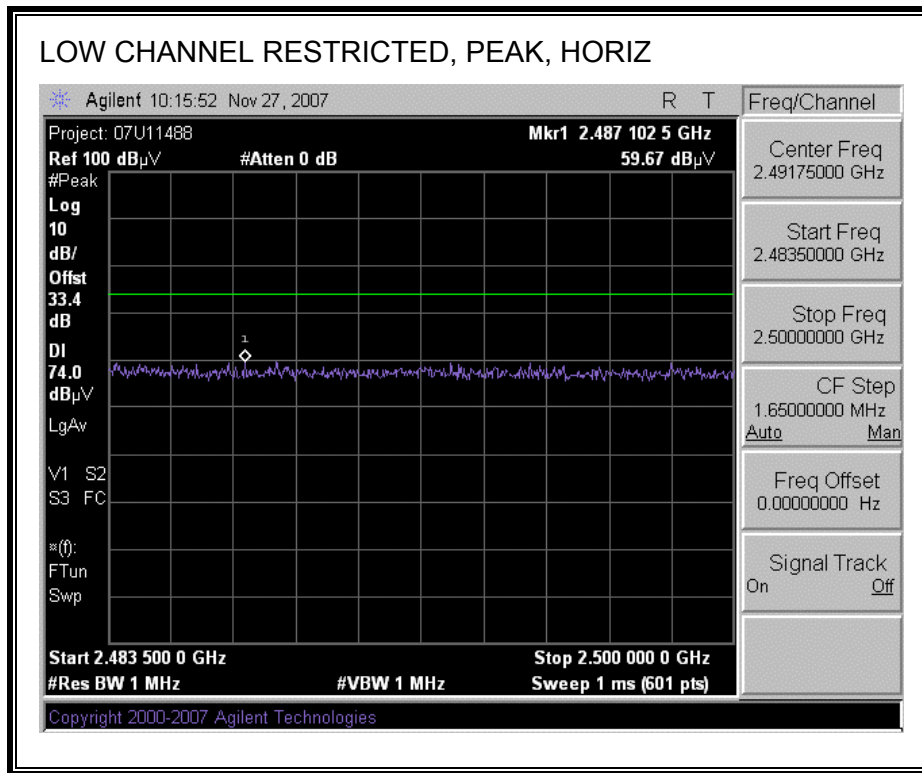
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

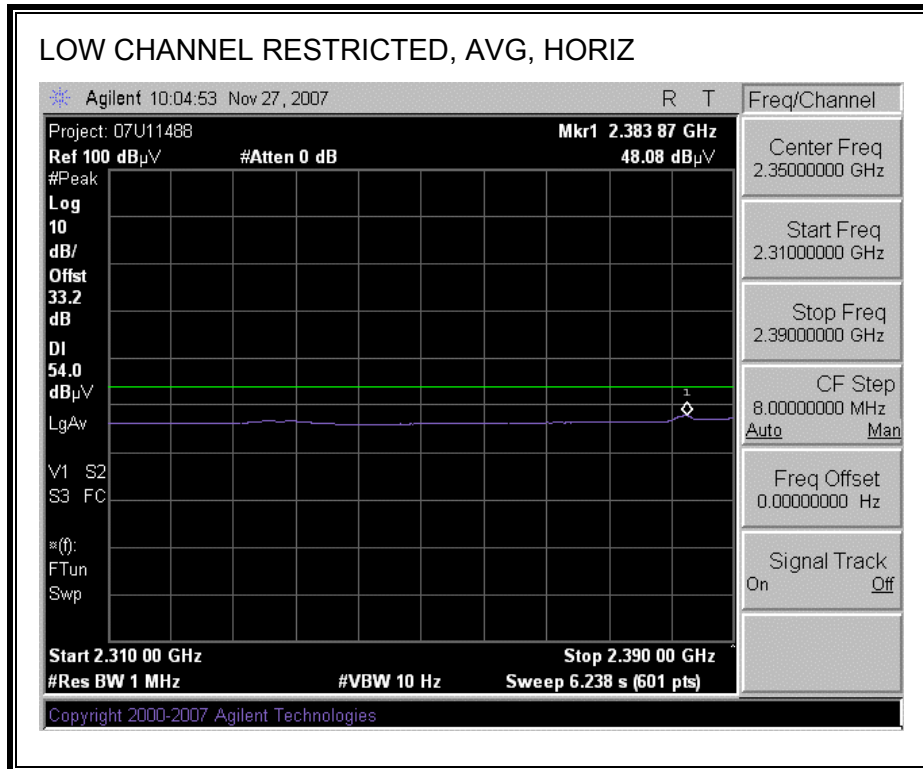
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

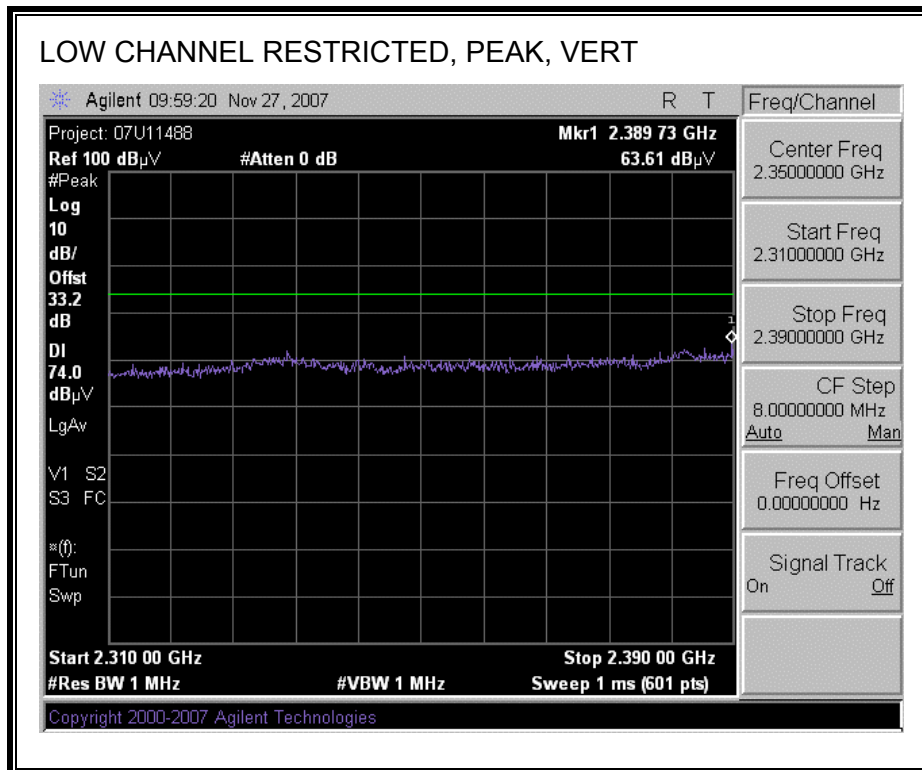
7.8.2. TRANSMITTER ABOVE 1 GHz FOR 802.11b DUAL CHAIN LEGACY MODE IN THE 2.4 GHz BAND

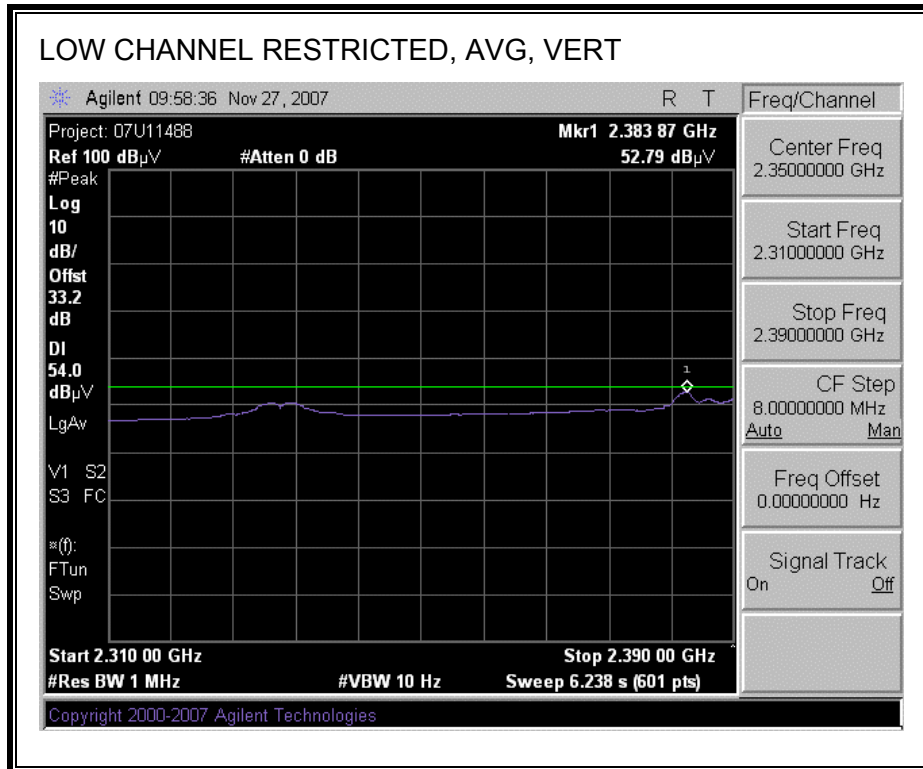
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



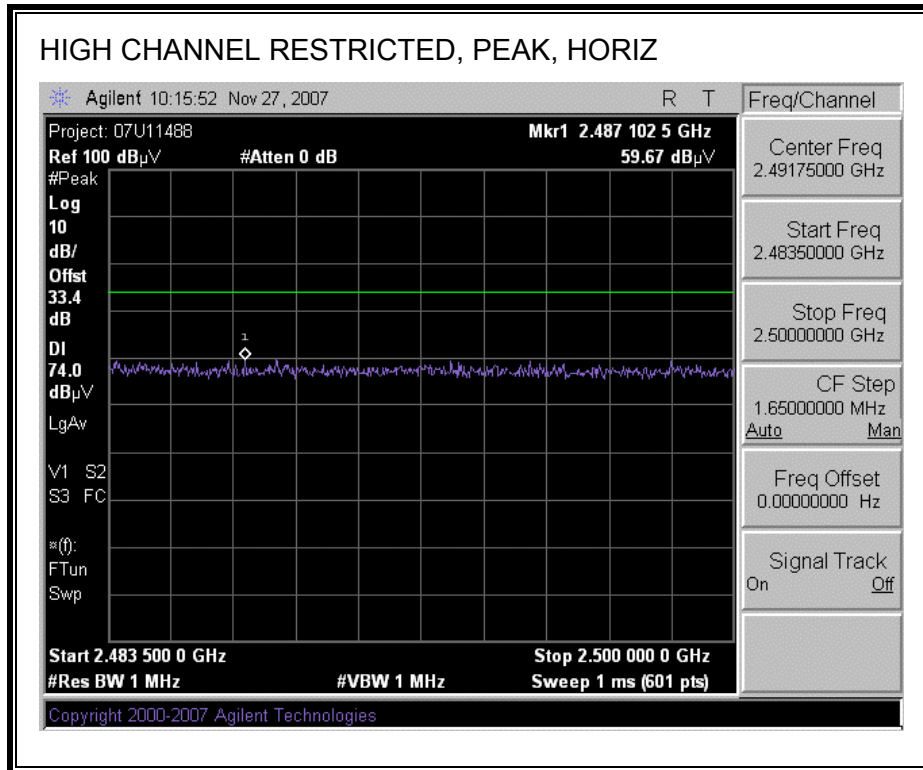


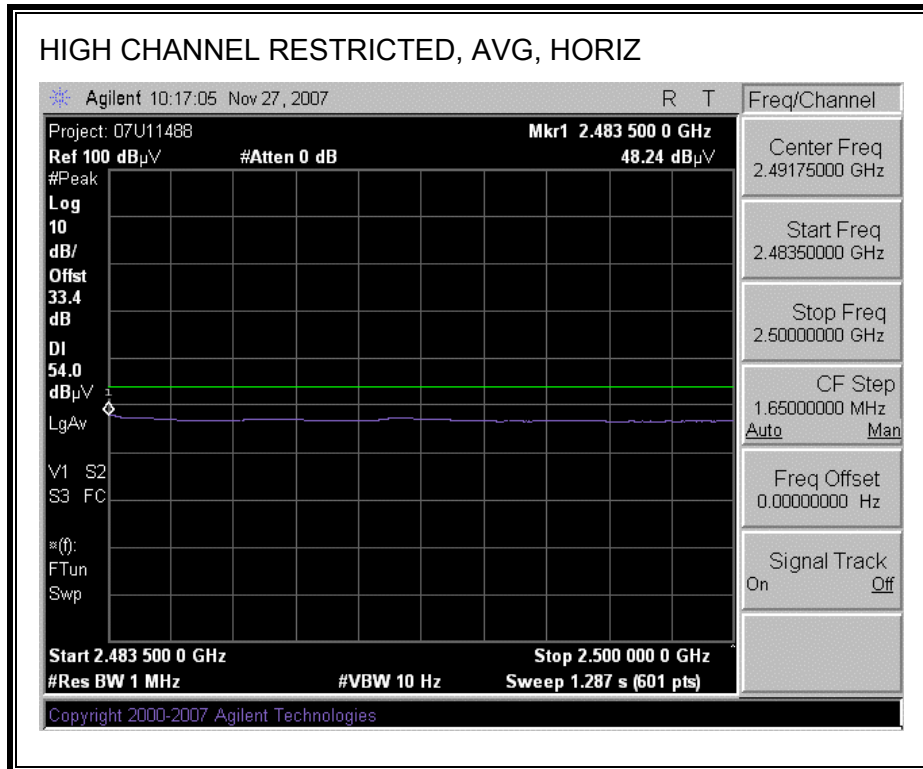
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



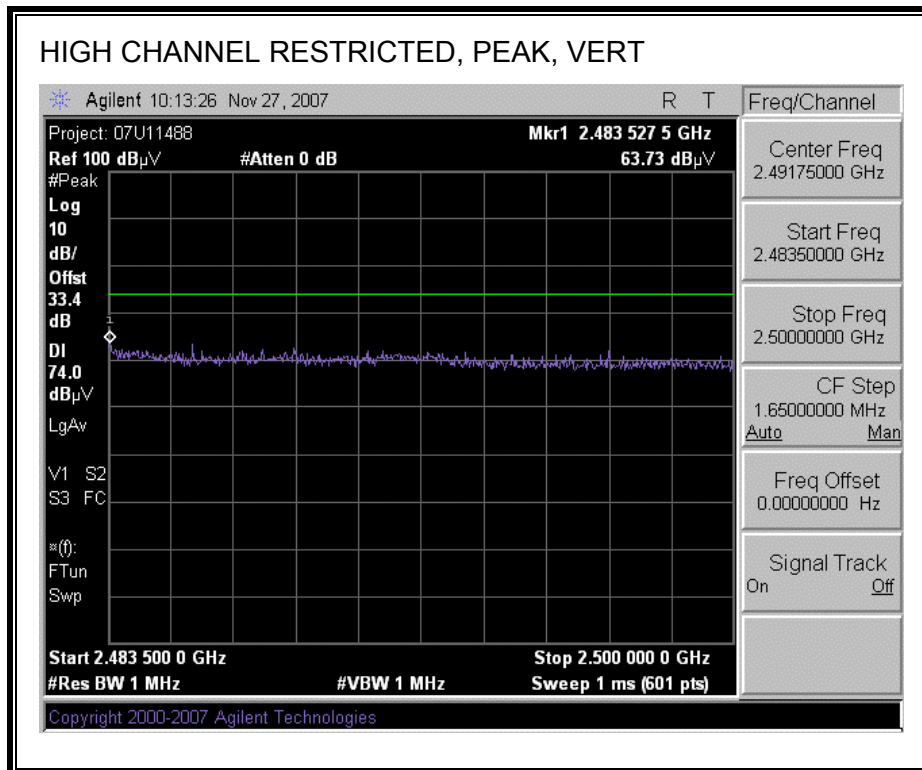


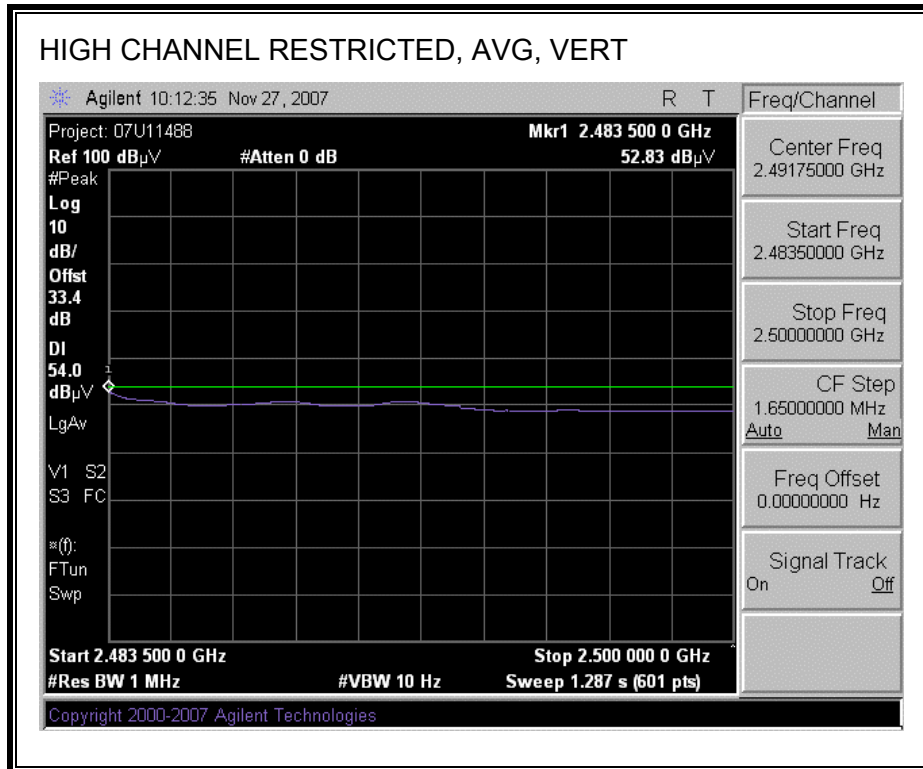
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QualCom Inc.
 Project #: 07U11488
 Date: 11-27-2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Ext. card, Laptop
 Mode: Transmit b mode (19.5dBm power)

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	
		A-5m Chamber		R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz

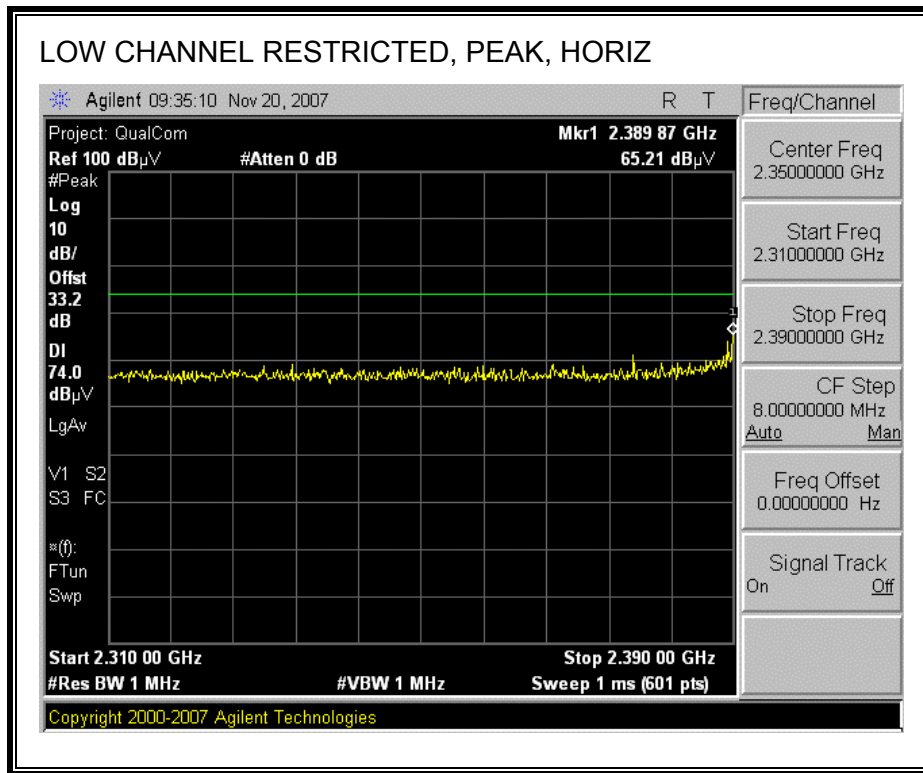
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 2412MHz															
4.824	3.0	44.2	38.3	33.3	6.9	-36.5	0.0	0.0	48.0	42.0	74	54	-26.0	-12.0	V
7.236	3.0	41.9	33.4	34.9	8.4	-36.2	0.0	0.0	49.1	40.5	74	54	-24.9	-13.5	V
9.648	3.0	38.2	26.3	36.7	9.7	-37.0	0.0	0.0	47.6	35.7	74	54	-26.4	-18.3	Noise Floor
4.824	3.0	41.4	28.6	33.3	6.9	-36.5	0.0	0.0	45.1	32.3	74	54	-28.9	-21.7	H
7.236	3.0	38.0	25.9	34.9	8.4	-36.2	0.0	0.0	45.1	33.0	74	54	-28.9	-21.0	Noise Floor
Mid Ch 2437MHz (set 214Bm)															
4.874	3.0	39.8	26.6	33.4	6.9	-36.5	0.0	0.0	43.6	30.4	74	54	-30.4	-23.6	H
7.311	3.0	38.1	26.0	35.0	8.4	-36.2	0.0	0.0	45.3	33.1	74	54	-28.7	-20.9	H
9.748	3.0	37.9	25.2	36.8	9.8	-37.0	0.0	0.0	47.4	34.8	74	54	-26.6	-19.2	Noise Floor
4.874	3.0	44.1	39.2	33.4	6.9	-36.5	0.0	0.0	47.9	43.0	74	54	-26.1	-11.0	V
7.311	3.0	44.5	39.1	35.0	8.4	-36.2	0.0	0.0	51.7	46.3	74	54	-22.3	-7.7	V
9.748	3.0	39.4	32.6	36.8	9.8	-37.0	0.0	0.0	48.9	42.2	74	54	-25.1	-11.8	V
12.185	3.0	38.0	27.5	37.6	12.2	-35.4	0.0	0.0	52.3	41.9	74	54	-21.7	-12.1	V
14.622	3.0	24.0	27.5	38.7	12.5	-35.3	0.0	0.0	39.9	43.3	74	54	-34.1	-10.7	Noise Floor
High Ch 2462MHz															
4.924	3.0	43.4	36.4	33.4	7.0	-36.5	0.0	0.0	47.3	40.3	74	54	-26.7	-13.7	V
7.386	3.0	41.4	33.1	35.0	8.4	-36.2	0.0	0.0	48.6	40.4	74	54	-25.4	-13.6	V
9.848	3.0	38.8	26.8	36.8	9.9	-37.0	0.0	0.0	48.5	36.4	74	54	-25.5	-17.6	V
12.310	3.0	36.6	25.5	37.6	12.2	-35.4	0.0	0.0	50.9	39.8	74	54	-23.1	-14.2	V
14.722	3.0	38.0	28.2	38.9	12.5	-35.3	0.0	0.0	54.1	44.2	74	54	-19.9	-9.8	V
17.234	3.0	35.5	24.0	41.7	13.3	-33.8	0.0	0.0	56.7	45.2	74	54	-17.3	-8.8	Noise Floor
4.924	3.0	40.2	28.7	33.4	7.0	-36.5	0.0	0.0	44.1	32.6	74	54	-29.9	-21.4	H
7.386	3.0	38.2	26.1	35.0	8.4	-36.2	0.0	0.0	45.5	33.3	74	54	-28.5	-20.7	Noise Floor
No other emissions were detected above noise floor															

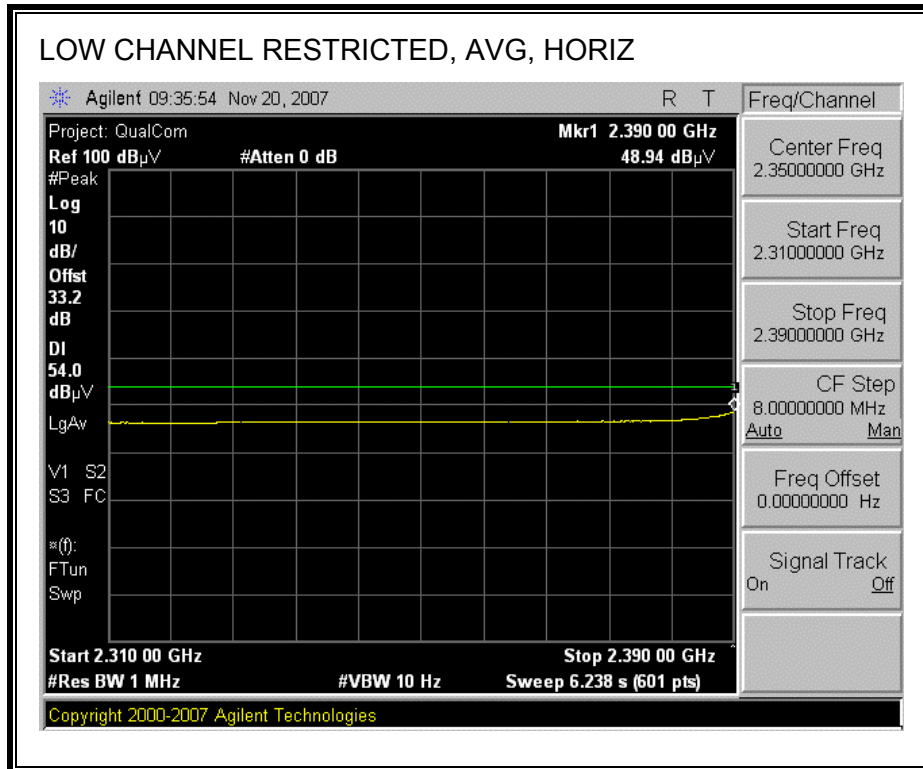
Rev. 4.12.7

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		

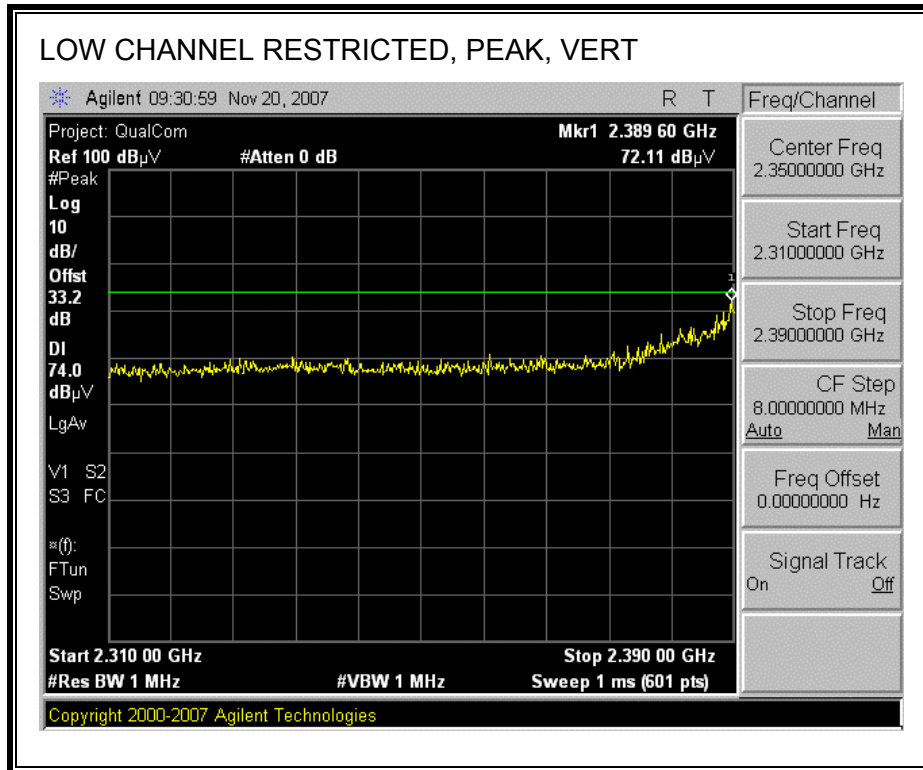
7.8.3. TRANSMITTER ABOVE 1 GHz FOR 802.11g DUAL CHAIN LEGACY MODE IN THE 2.4 GHz BAND

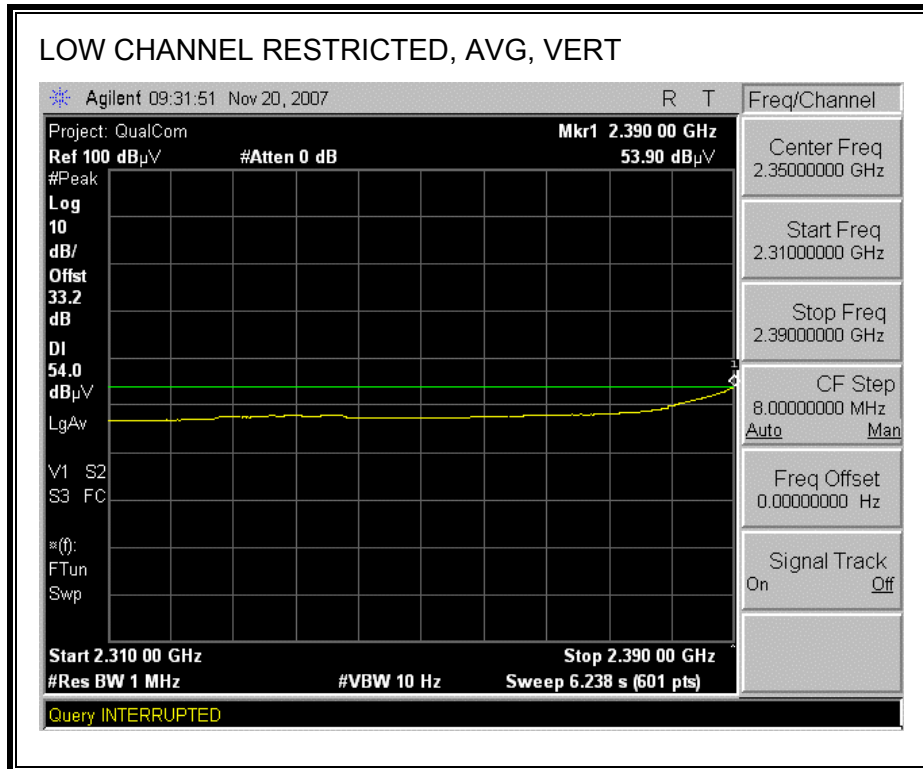
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



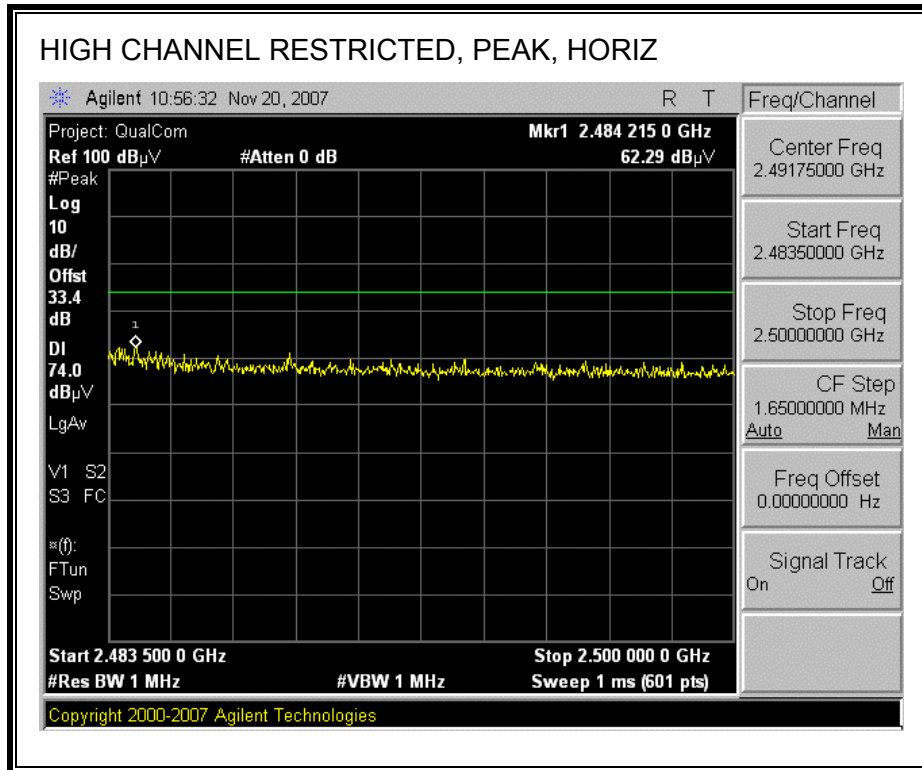


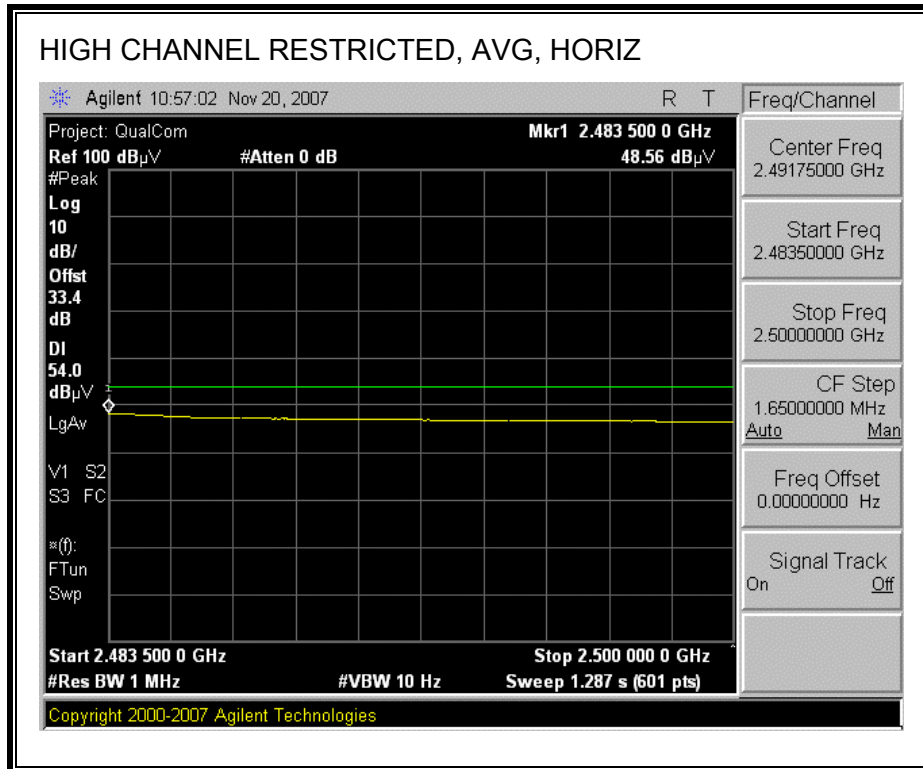
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



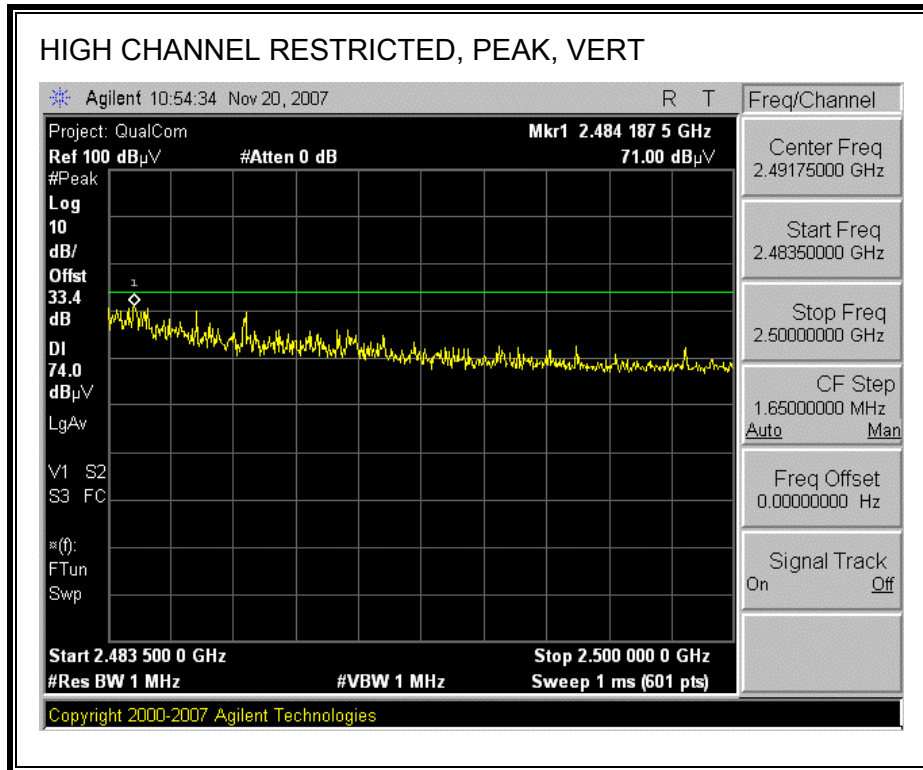


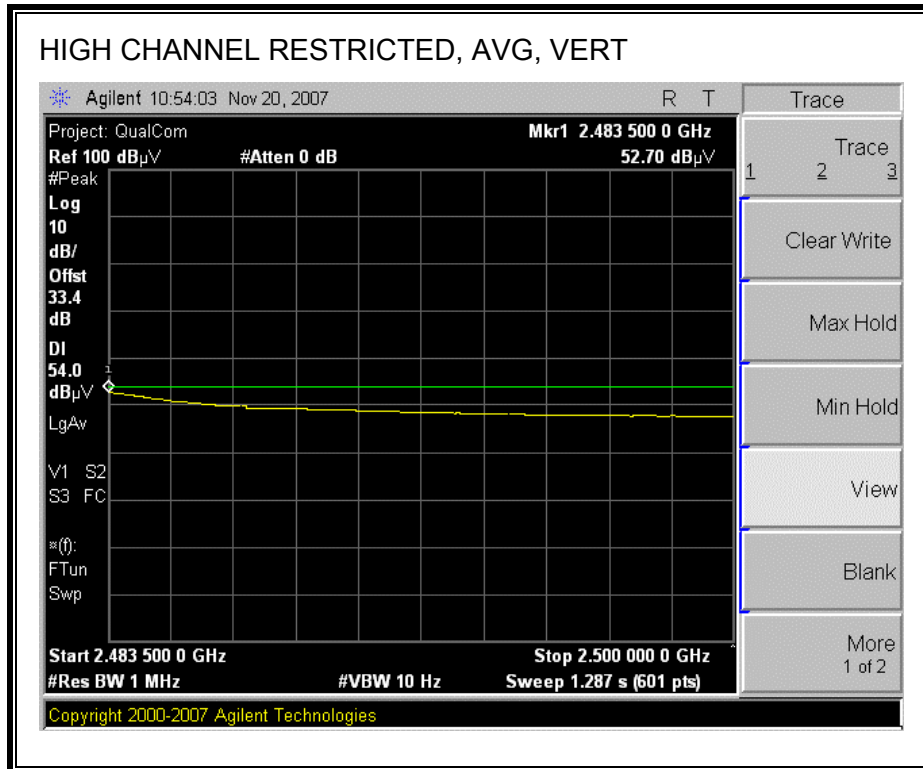
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QualCom Inc.
 Project #: 07U11488
 Date: 11-27-2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Ext. card, Laptop
 Mode: Transmit g mode (21dBm power)

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A-5m Chamber		R_001

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

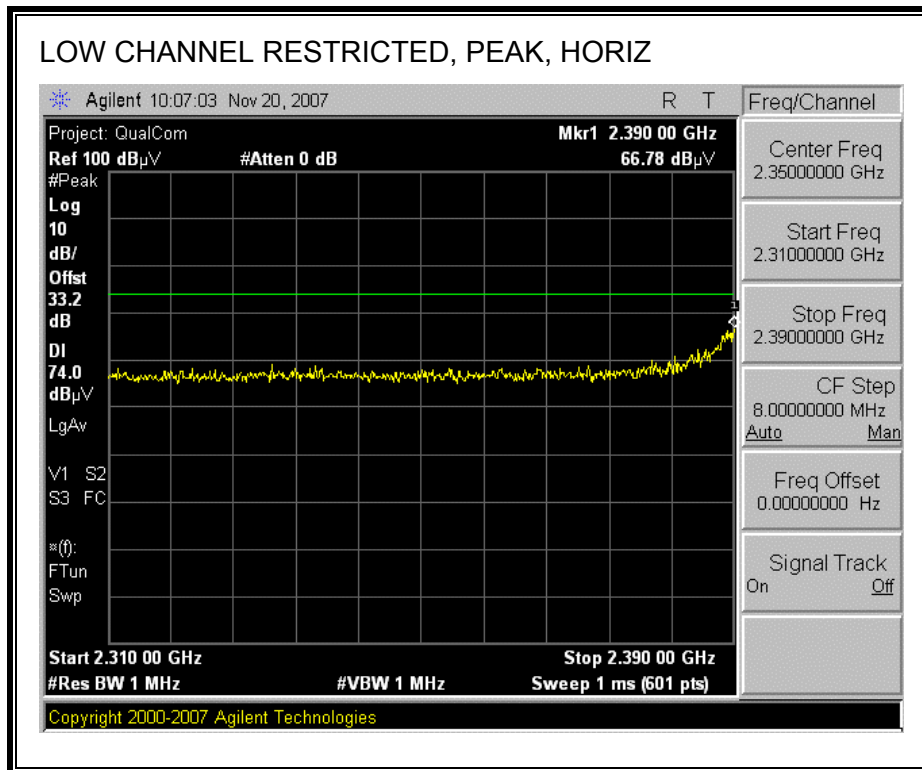
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 2412MHz															
4.824	3.0	39.2	26.3	33.3	6.9	-36.5	0.0	0.0	42.9	30.0	74	54	-31.1	-24.0	V
7.236	3.0	38.1	26.9	34.9	8.4	-36.2	0.0	0.0	45.2	34.0	74	54	-28.8	-20.0	Noise Floor
4.824	3.0	39.2	27.3	33.3	6.9	-36.5	0.0	0.0	42.9	31.0	74	54	-31.1	-23.0	H
7.236	3.0	36.7	25.5	34.9	8.4	-36.2	0.0	0.0	43.8	32.6	74	54	-30.2	-21.4	Noise Floor
Mid Ch 2437MHz(set 21dBm)															
4.874	3.0	39.6	26.5	33.4	6.9	-36.5	0.0	0.0	43.4	30.3	74	54	-30.6	-23.7	H
7.311	3.0	37.4	25.2	35.0	8.4	-36.2	0.0	0.0	44.6	32.4	74	54	-29.4	-21.6	Noise Floor
4.874	3.0	41.5	28.6	33.4	6.9	-36.5	0.0	0.0	45.3	32.4	74	54	-28.7	-21.6	V
7.311	3.0	41.5	29.9	35.0	8.4	-36.2	0.0	0.0	48.6	37.0	74	54	-25.4	-17.0	V
9.748	3.0	39.2	25.4	36.8	9.8	-37.0	0.0	0.0	48.7	34.9	74	54	-25.3	-19.1	Noise Floor
High Ch 2462MHz															
4.924	3.0	39.3	27.4	33.4	7.0	-36.5	0.0	0.0	43.2	31.3	74	54	-30.8	-22.7	V
7.386	3.0	37.0	25.3	35.0	8.4	-36.2	0.0	0.0	44.3	32.6	74	54	-29.7	-21.4	Noise Floor
4.924	3.0	39.4	28.3	33.4	7.0	-36.5	0.0	0.0	43.3	32.2	74	54	-30.7	-21.8	H
7.386	3.0	38.6	26.4	35.0	8.4	-36.2	0.0	0.0	45.9	33.7	74	54	-28.1	-20.3	Noise Floor
No other emissions were detected above noise floor															

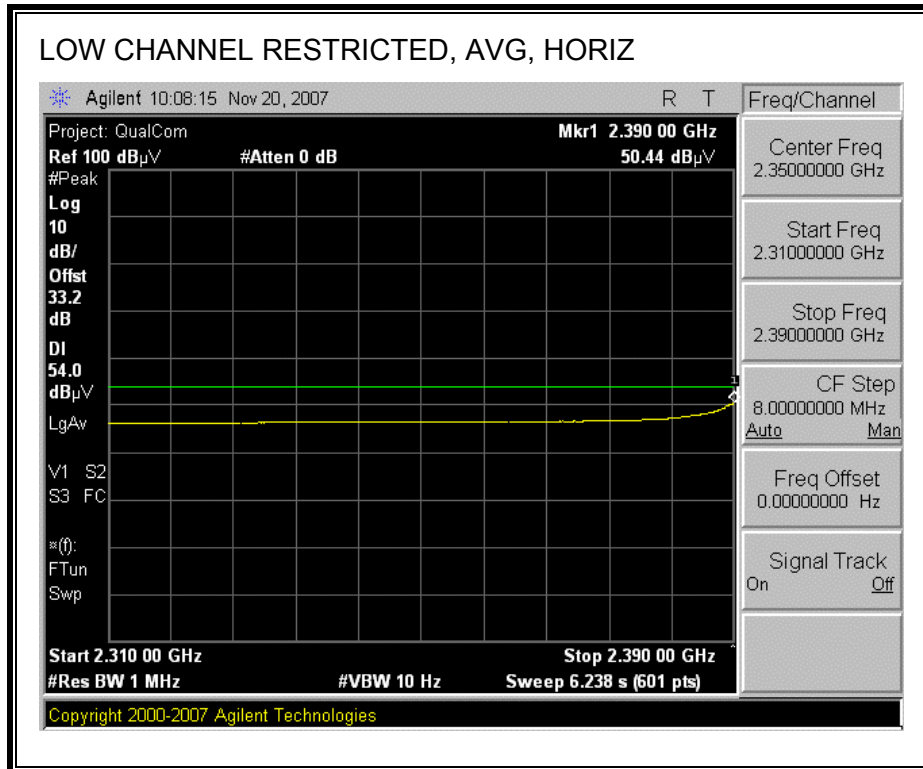
Rev. 412.7

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		

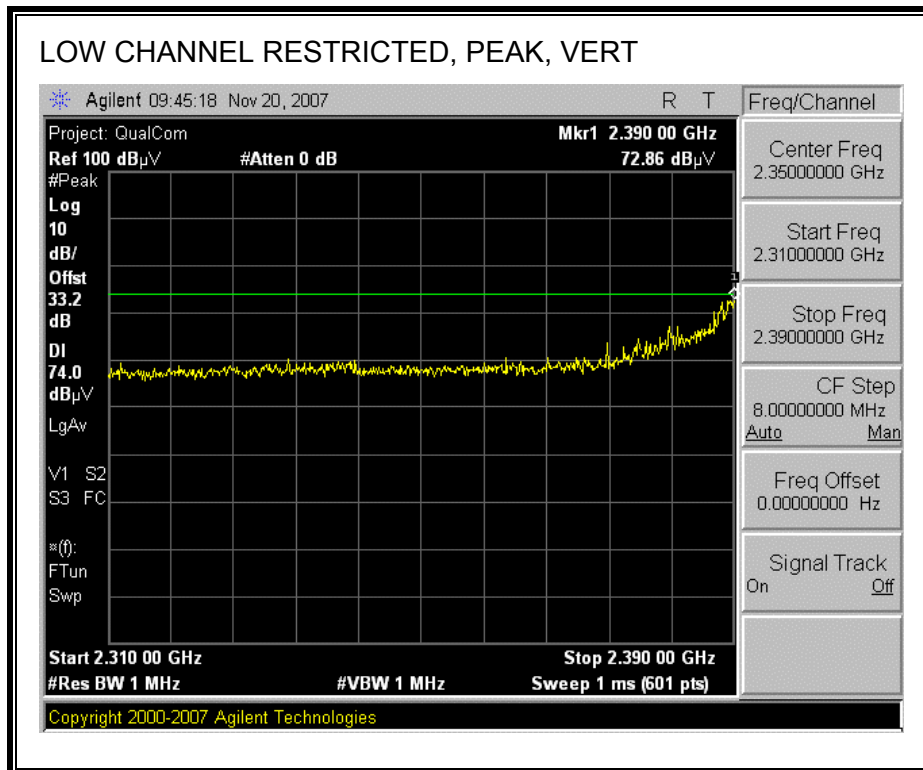
7.8.4. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND

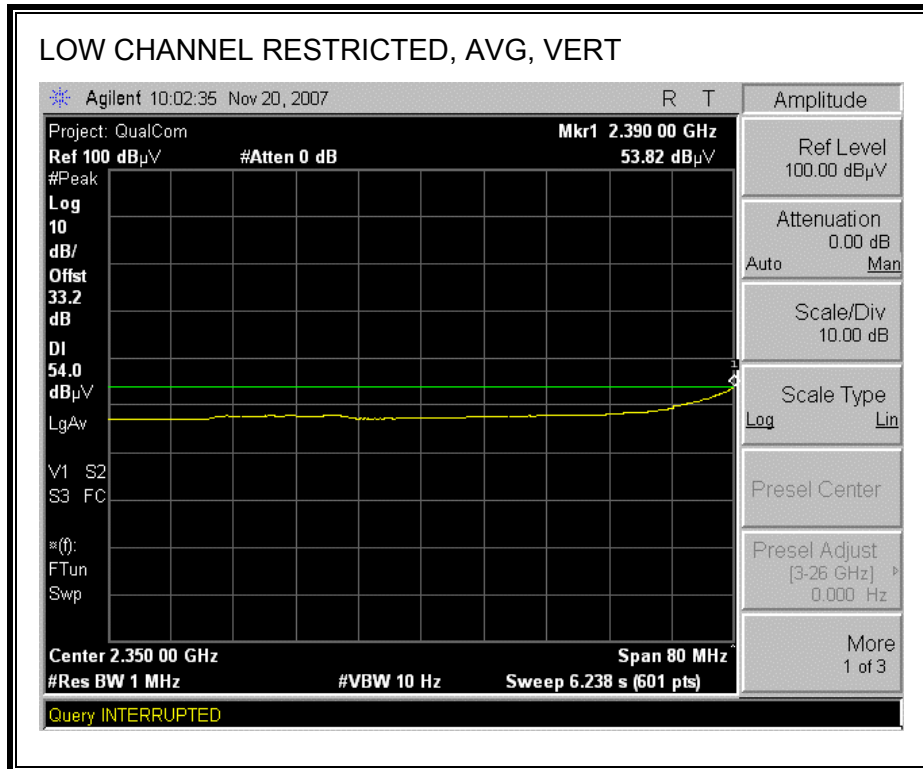
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



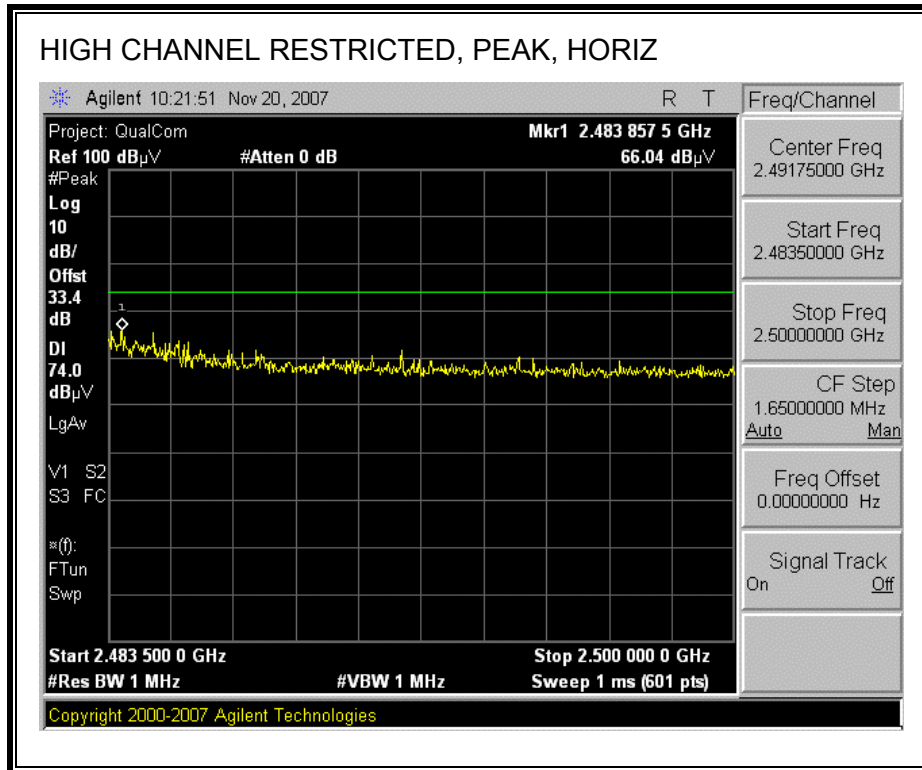


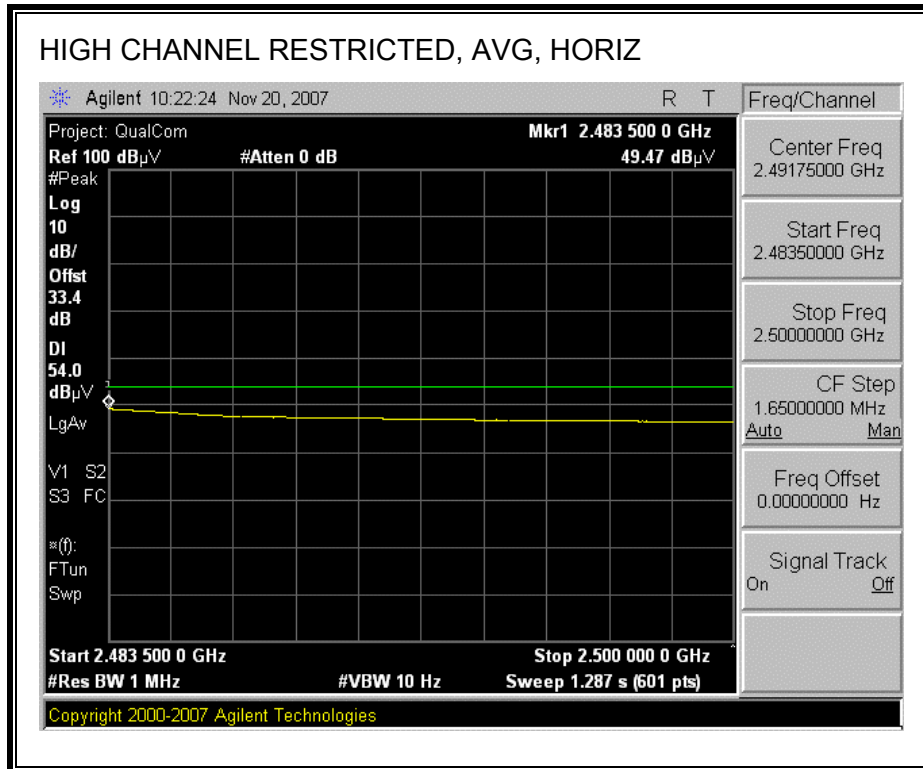
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



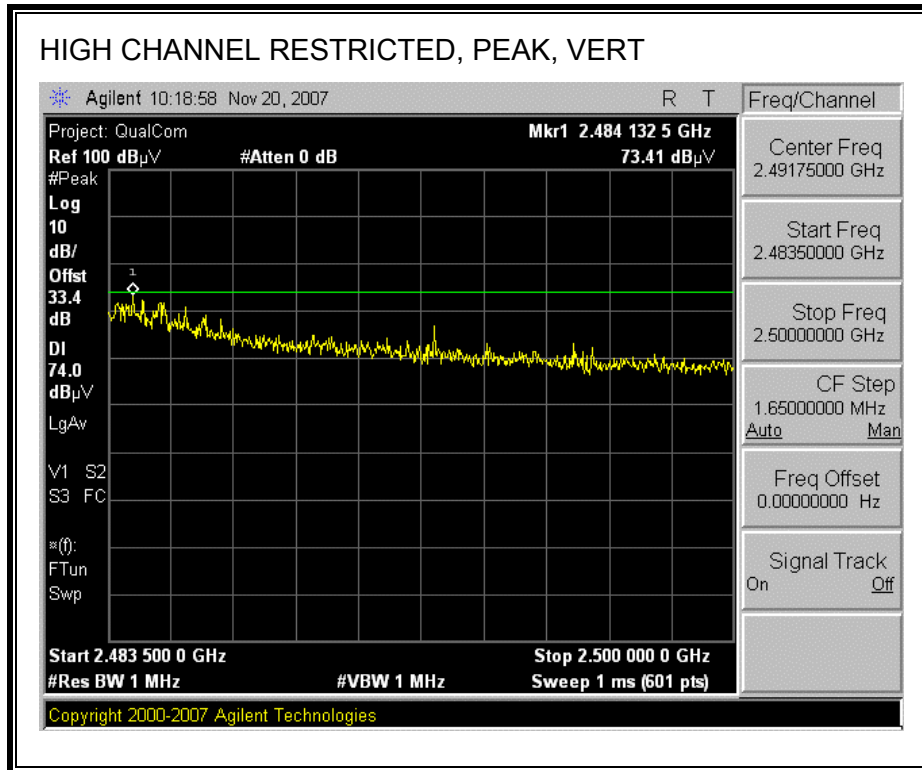


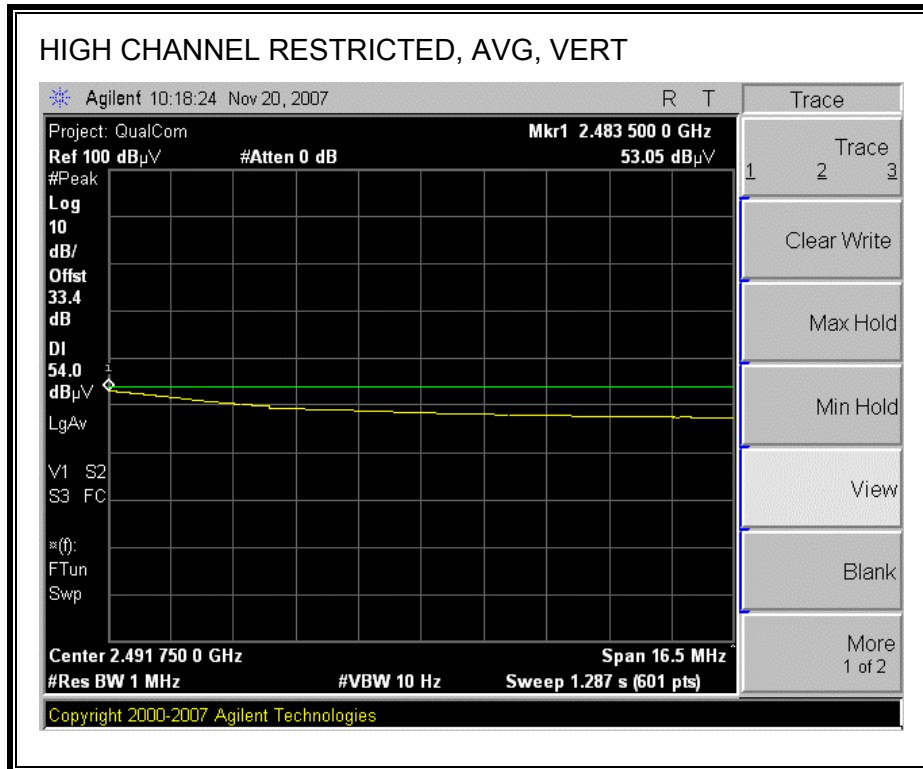
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QualCom Inc.
 Project #: 07U11488
 Date: 11-27-2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Ext. card, Laptop
 Mode: Transmit HT20 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	
		A-5m Chamber		R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz

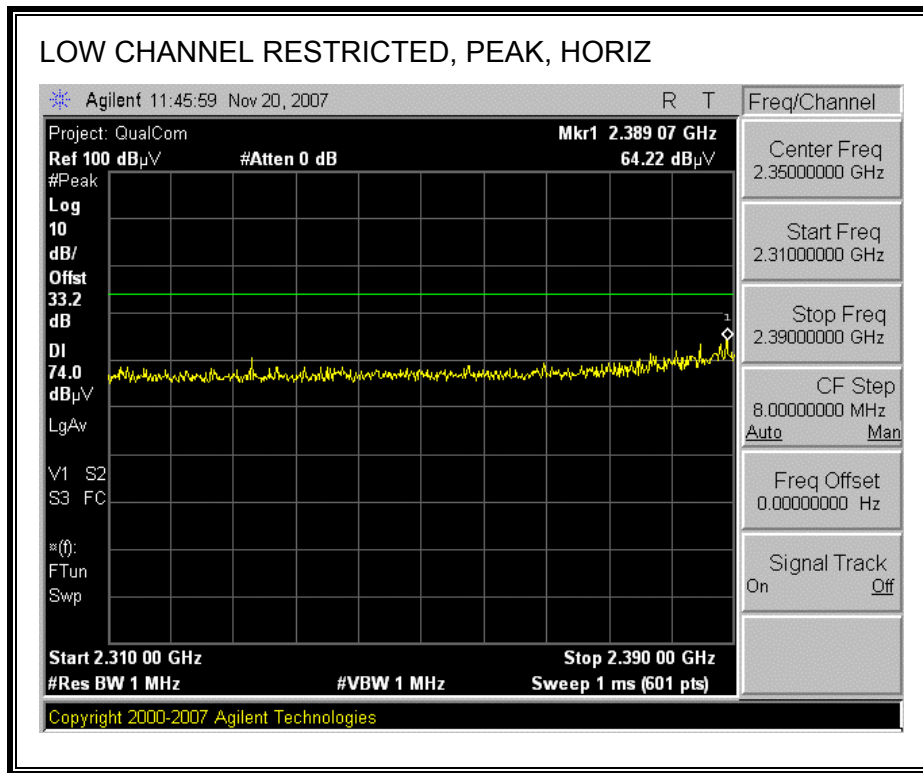
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 2412MHz															
4.824	3.0	39.1	26.1	33.3	6.9	-36.5	0.0	0.0	42.8	29.8	74	54	-31.2	-24.2	V
7.236	3.0	38.3	25.9	34.9	8.4	-36.2	0.0	0.0	45.4	33.0	74	54	-28.6	-21.0	Noise Floor
4.824	3.0	38.4	26.6	33.3	6.9	-36.5	0.0	0.0	42.1	30.3	74	54	-31.9	-23.7	H
7.236	3.0	38.7	26.6	34.9	8.4	-36.2	0.0	0.0	45.8	33.7	74	54	-28.2	-20.3	Noise Floor
Mid Ch 2437MHz(set 21dBm power)															
4.874	3.0	40.4	28.6	33.4	6.9	-36.5	0.0	0.0	44.2	32.4	74	54	-29.8	-21.6	H
7.311	3.0	37.4	25.1	35.0	8.4	-36.2	0.0	0.0	44.6	32.3	74	54	-29.4	-21.7	Noise Floor
4.874	3.0	42.6	29.2	33.4	6.9	-36.5	0.0	0.0	46.4	33.0	74	54	-27.6	-21.0	V
7.311	3.0	40.2	28.4	35.0	8.4	-36.2	0.0	0.0	47.3	35.6	74	54	-26.7	-18.4	V
9.748	3.0	38.7	25.3	36.8	9.8	-37.0	0.0	0.0	48.3	34.8	74	54	-25.7	-19.2	Noise Floor
High Ch 2462MHz															
4.924	3.0	39.5	27.5	33.4	7.0	-36.5	0.0	0.0	43.4	31.4	74	54	-30.6	-22.6	V
7.386	3.0	38.4	26.2	35.0	8.4	-36.2	0.0	0.0	45.6	33.5	74	54	-28.4	-20.5	Noise Floor
4.924	3.0	39.4	28.3	33.4	7.0	-36.5	0.0	0.0	43.3	32.2	74	54	-30.7	-21.8	H
7.386	3.0	38.7	26.8	35.0	8.4	-36.2	0.0	0.0	45.9	34.0	74	54	-28.1	-20.0	Noise Floor
No other emissions were detected above noise floor															

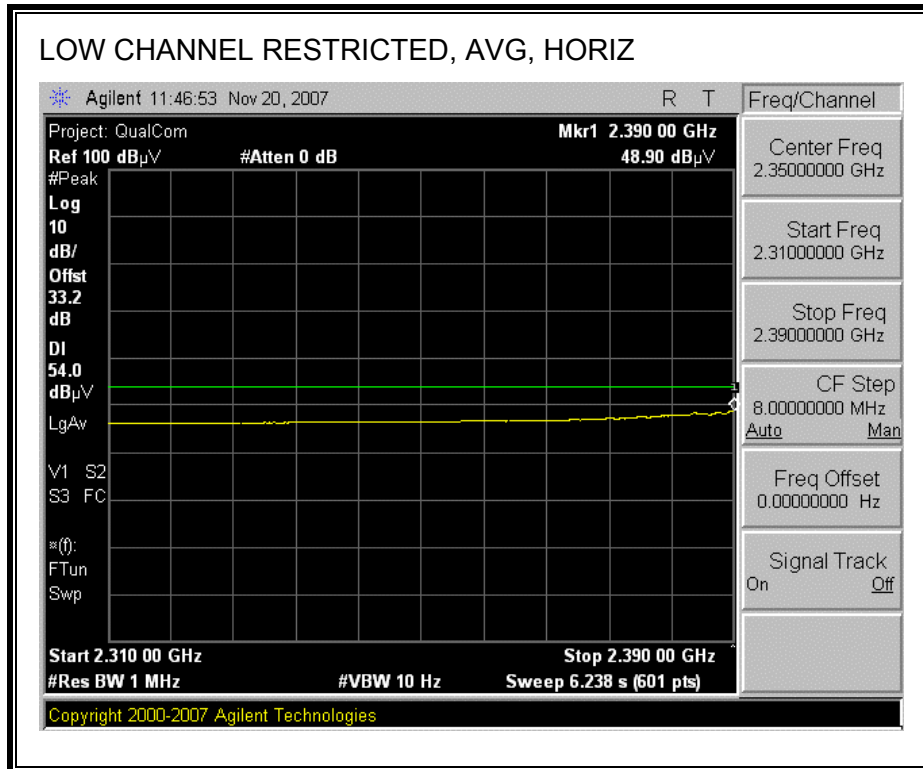
Rev. 4.12.7

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		

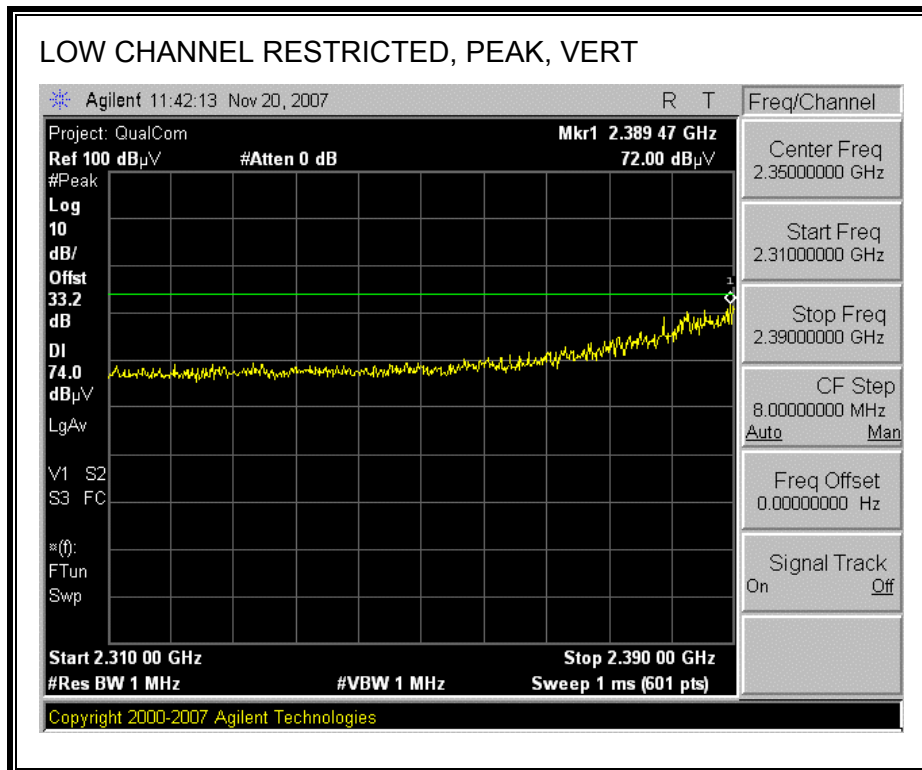
7.8.5. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 2.4 GHz BAND

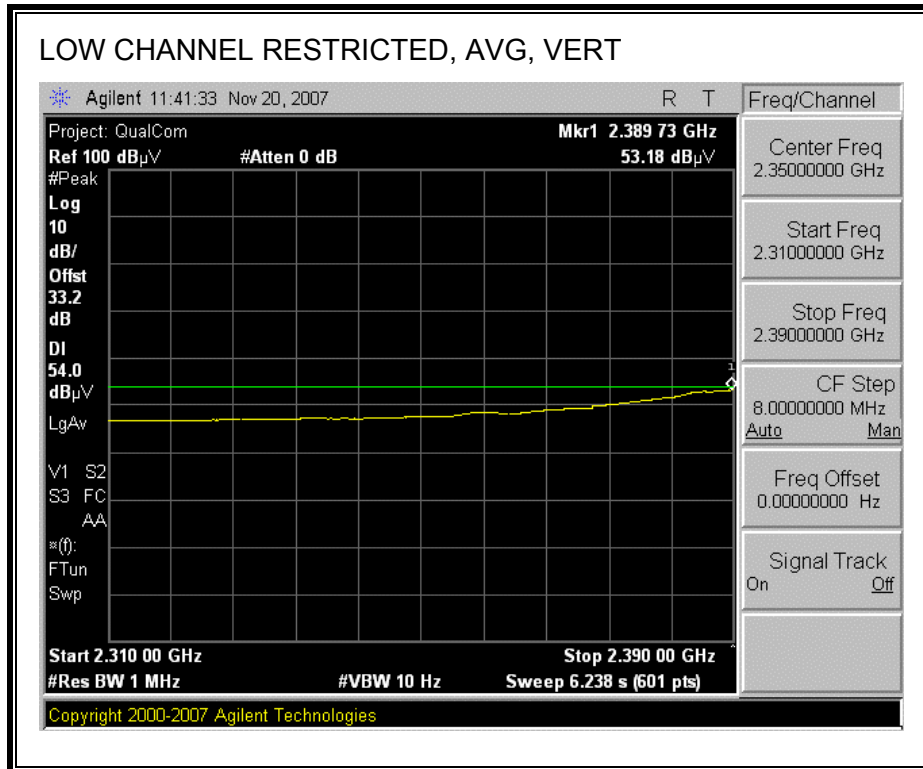
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



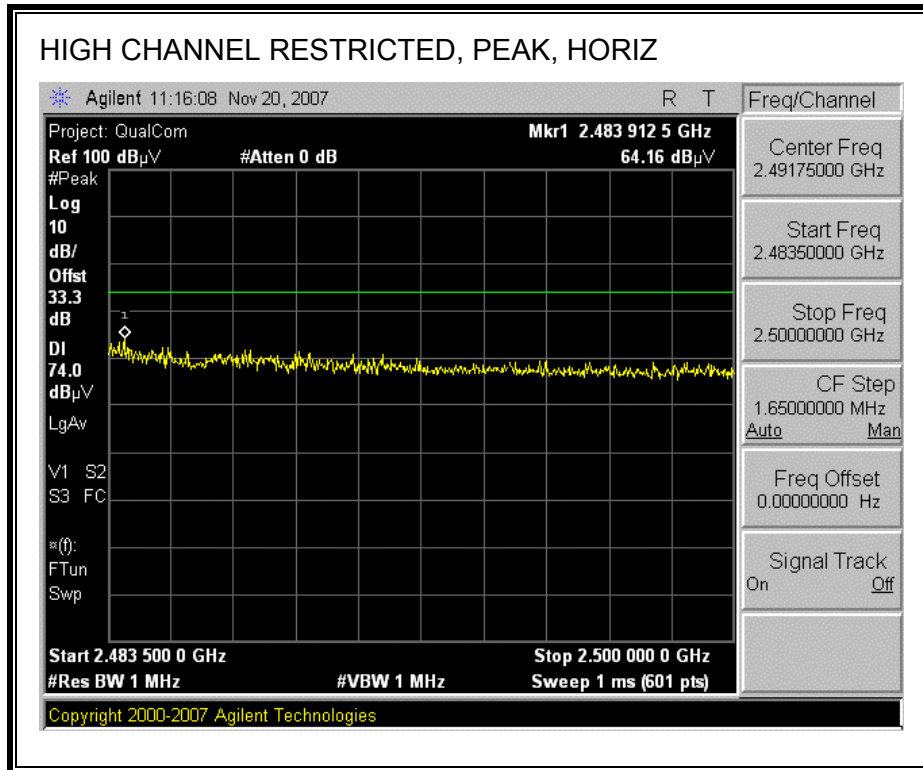


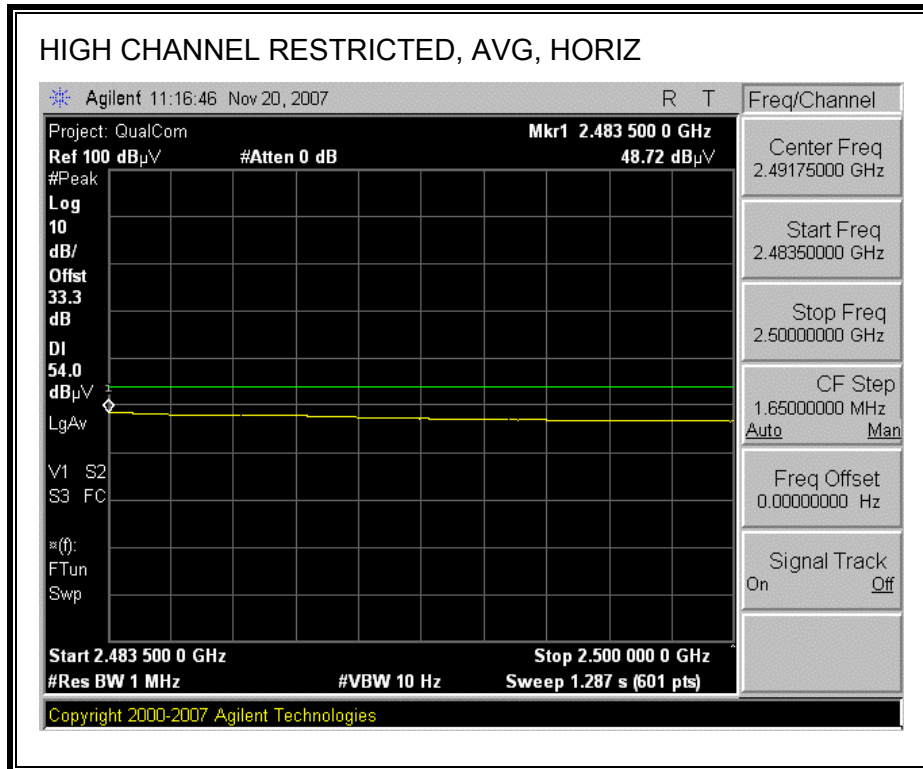
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



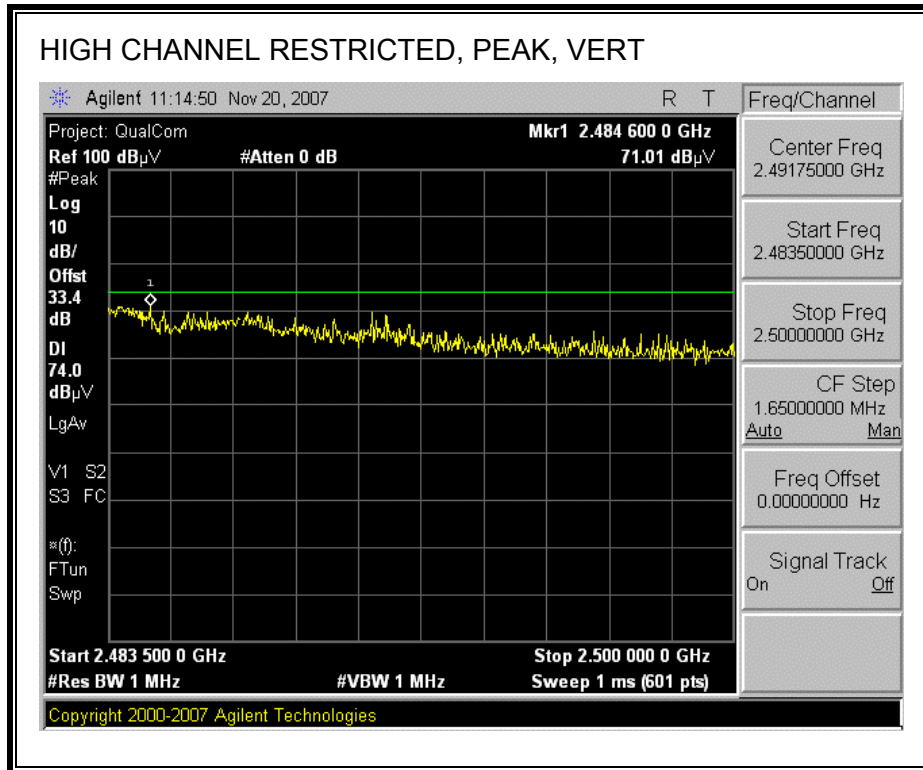


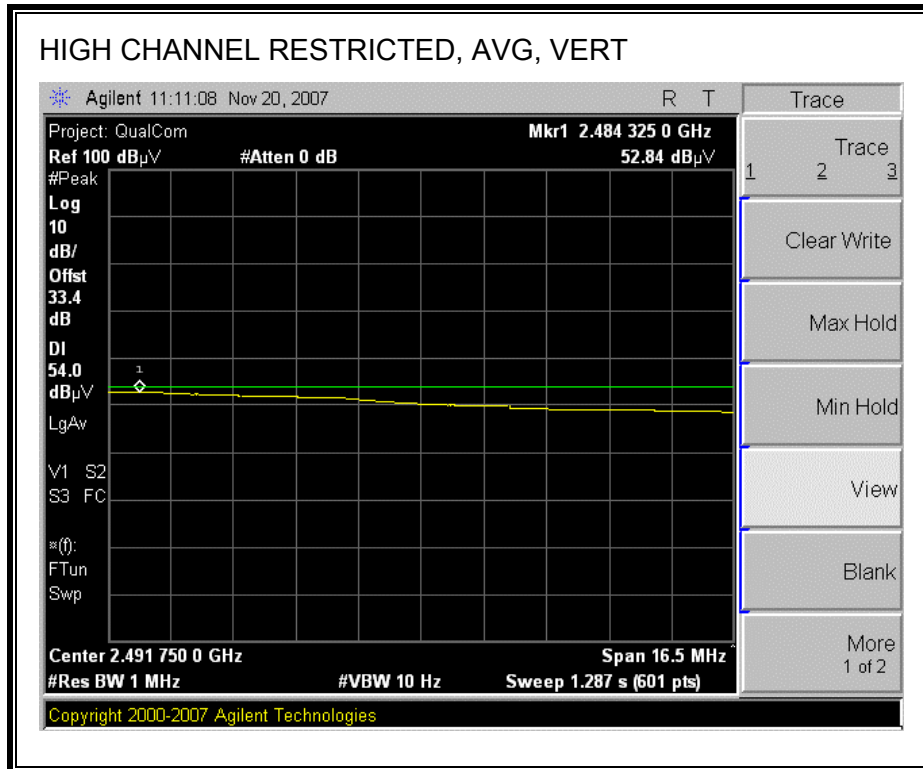
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QualCom Inc.
 Project #: 07U11488
 Date: 11-27-2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Ext. card, Laptop
 Mode: Transmit HT40 mode

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
		A-5m Chamber	HPF_4.0GHz		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	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 2422MHz															
4.844	3.0	39.3	26.3	33.3	6.9	-36.5	0.0	0.6	43.7	30.6	74	54	-30.3	-23.4	V
7.266	3.0	37.9	26.7	35.0	8.4	-36.2	0.0	0.6	45.6	34.5	74	54	-28.4	-19.5	Noise Floor
4.844	3.0	39.6	27.6	33.3	6.9	-36.5	0.0	0.6	44.0	31.9	74	54	-30.0	-22.1	H
7.266	3.0	37.6	26.1	35.0	8.4	-36.2	0.0	0.6	45.4	33.9	74	54	-28.6	-20.1	Noise Floor
Mid Ch 2437MHz (set power 21 dBm)															
4.874	3.0	40.4	28.4	33.4	6.9	-36.5	0.0	0.6	44.8	32.8	74	54	-29.2	-21.2	H
7.311	3.0	37.2	25.9	35.0	8.4	-36.2	0.0	0.6	45.0	33.7	74	54	-29.0	-20.3	Noise Floor
4.874	3.0	43.6	30.3	33.4	6.9	-36.5	0.0	0.6	48.0	34.7	74	54	-26.0	-19.3	V
7.311	3.0	41.0	29.4	35.0	8.4	-36.2	0.0	0.6	48.8	37.3	74	54	-25.2	-16.7	V
9.728	3.0	37.3	25.6	36.8	9.8	-37.0	0.0	0.8	47.6	35.9	74	54	-26.4	-18.1	Noise Floor
High Ch 2452MHz															
4.904	3.0	39.1	27.4	33.4	7.0	-36.5	0.0	0.6	43.6	31.9	74	54	-30.4	-22.1	V
7.386	3.0	36.9	25.2	35.0	8.4	-36.2	0.0	0.6	44.8	33.1	74	54	-29.2	-20.9	Noise Floor
4.904	3.0	39.6	28.4	33.4	7.0	-36.5	0.0	0.6	44.1	32.9	74	54	-29.9	-21.1	H
7.386	3.0	38.6	26.4	35.0	8.4	-36.2	0.0	0.6	46.5	34.3	74	54	-27.5	-19.7	Noise Floor
No other emissions were detected above noise floor															

Rev. 4.12.7

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		

7.8.6. TRANSMITTER ABOVE 1 GHz FOR 802.11a DUAL CHAIN LEGACY MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QualComm Inc.
 Project #: 07U11488-1
 Date: 11-19-2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Ext. card, Laptop
 Mode: Transmit.

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
		A-5m Chamber		R_002	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	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 5745MHz															
11.490	3.0	40.2	29.6	37.5	11.6	-35.9	0.0	0.0	53.5	42.8	74	54	-20.5	-11.2	V
17.235	3.0	36.8	23.8	41.7	13.3	-33.8	0.0	0.0	58.1	45.1	74	54	-15.9	-8.9	Noise Floor
11.490	3.0	37.0	24.0	37.5	11.6	-35.9	0.0	0.0	50.2	37.2	74	54	-23.8	-16.8	H
17.235	3.0	36.0	23.9	41.7	13.3	-33.8	0.0	0.0	57.3	45.1	74	54	-16.7	-8.9	Noise Floor
Mid Ch 5785MHz															
11.570	3.0	37.0	23.5	37.5	11.7	-35.8	0.0	0.0	50.4	37.0	74	54	-23.6	-17.0	H
17.355	3.0	35.9	23.6	42.2	13.3	-33.8	0.0	0.0	57.7	45.4	74	54	-16.3	-8.6	Noise Floor
11.570	3.0	41.6	29.8	37.5	11.7	-35.8	0.0	0.0	55.0	43.2	74	54	-19.0	-10.8	V
17.355	3.0	36.1	23.6	42.2	13.3	-33.8	0.0	0.0	57.8	45.4	74	54	-16.2	-8.6	Noise Floor
High Ch 5825MHz															
11.650	3.0	42.0	30.9	37.5	11.8	-35.7	0.0	0.0	55.6	44.5	74	54	-18.4	-9.5	V
17.475	3.0	34.6	23.5	42.7	13.4	-33.8	0.0	0.0	56.8	45.6	74	54	-17.2	-8.4	Noise Floor
11.650	3.0	37.0	24.1	37.5	11.8	-35.7	0.0	0.0	50.6	37.7	74	54	-23.4	-16.3	H
17.475	3.0	35.4	23.1	42.7	13.4	-33.8	0.0	0.0	57.6	45.2	74	54	-16.4	-8.8	Noise Floor
Spurious Emissions															
1.003	3.0	51.2	35.7	23.8	3.0	-39.5	0.0	0.0	38.5	23.0	74	54	-35.5	-31.0	H
1.250	3.0	50.3	34.3	24.7	3.3	-39.1	0.0	0.0	39.1	23.2	74	54	-34.9	-30.8	H
1.329	3.0	51.1	37.5	25.0	3.4	-39.0	0.0	0.0	40.5	26.9	74	54	-33.5	-27.1	V
2.500	3.0	43.7	31.0	28.6	4.9	-37.5	0.0	0.0	39.7	27.0	74	54	-34.3	-27.0	V
No other emissions were detected above noise floor															

Rev. 4.12.7

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		

7.8.7. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QUALCOM INC.
 Project #: 07U11488
 Date: 11/22/2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Extender Card/ Laptop
 Mode: Transmit 5.8GHz HT 20 Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
		A-3m Chamber	HPF_7.6GHz		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	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 5745MHz															
11.490	1.0	49.8	36.5	37.2	7.1	-32.5	-9.5	0.7	52.7	39.3	74	54	-21.3	-14.7	V
17.235	1.0	52.8	38.5	40.2	8.1	-32.0	-9.5	0.6	60.3	46.0	74	54	-13.7	-8.0	V
22.980	1.0	45.2	31.5	34.3	8.6	-32.9	-9.5	0.0	45.6	32.0	74	54	-28.4	-22.0	Noise Floor
11.490	1.0	45.7	34.3	37.2	7.1	-32.5	-9.5	0.7	48.5	37.1	74	54	-25.5	-16.9	H
17.235	1.0	48.3	34.3	40.2	8.1	-32.0	-9.5	0.6	55.8	41.8	74	54	-18.2	-12.2	H
22.980	1.0	44.3	31.5	34.3	8.6	-32.9	-9.5	0.0	44.8	32.0	74	54	-29.2	-22.0	Noise Floor
Mid Ch 5785MHz															
11.570	1.0	45.9	32.8	37.2	7.2	-32.5	-9.5	0.7	49.0	35.9	74	54	-25.0	-18.1	H
17.355	1.0	46.8	33.8	40.3	8.3	-32.1	-9.5	0.6	54.4	41.4	74	54	-19.6	-12.6	H
23.140	1.0	45.8	31.2	34.3	8.6	-32.9	-9.5	0.0	46.3	31.7	74	54	-27.7	-22.3	Noise Floor
11.570	1.0	48.5	36.0	37.2	7.2	-32.5	-9.5	0.7	51.5	39.0	74	54	-22.5	-15.0	V
17.355	1.0	50.2	36.3	40.3	8.3	-32.1	-9.5	0.6	57.8	43.9	74	54	-16.2	-10.1	V
23.140	1.0	45.7	31.3	34.3	8.6	-32.9	-9.5	0.0	46.2	31.8	74	54	-27.8	-22.2	Noise Floor
High Ch 5825MHz															
11.650	1.0	49.3	37.2	37.2	7.1	-32.5	-9.5	0.7	52.3	40.1	74	54	-21.7	-13.9	V
17.475	1.0	50.8	38.2	40.3	8.1	-32.1	-9.5	0.6	58.3	45.6	74	54	-15.7	-8.4	V
23.300	1.0	46.2	31.8	34.3	8.6	-32.8	-9.5	0.6	47.3	33.0	74	54	-26.7	-21.0	Noise Floor
11.650	1.0	46.4	33.6	37.2	7.1	-32.5	-9.5	0.7	49.4	36.5	74	54	-24.6	-17.5	H
17.475	1.0	48.3	37.7	40.3	8.1	-32.1	-9.5	0.6	55.8	45.1	74	54	-18.2	-8.9	H
23.300	1.0	45.7	31.8	34.3	8.6	-32.8	-9.5	0.0	46.2	32.4	74	54	-27.8	-21.6	Noise Floor
No other emissions were detected above noise floor															

Rev. 412.7

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		

7.8.8. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: QUALCOM INC.
 Project #: 07U11488
 Date: 11/22/2007
 Test Engineer: Thanh Nguyen
 Configuration: EUT, Extender Card/ Laptop
 Mode: Transmit 5.8GHz HT 40 Mode

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
		A-3m Chamber	HPF_7.6GHz		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	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics emissions															
Low Ch 5755MHz															
11.510	1.0	48.7	35.5	37.2	7.1	-32.5	-9.5	0.7	51.5	38.3	74	54	-22.5	-15.7	V
17.235	1.0	49.7	35.3	40.2	8.1	-32.0	-9.5	0.6	57.1	42.8	74	54	-16.9	-11.2	V
23.020	1.0	44.3	31.5	34.3	8.6	-32.9	-9.5	0.0	44.8	32.0	74	54	-29.2	-22.0	Noise Floor
11.510	1.0	45.2	31.3	37.2	7.1	-32.5	-9.5	0.7	48.0	34.2	74	54	-26.0	-19.8	H
17.235	1.0	46.8	32.7	40.2	8.1	-32.0	-9.5	0.6	54.3	40.1	74	54	-19.7	-13.9	H
23.020	1.0	44.4	31.5	34.3	8.6	-32.9	-9.5	0.0	44.9	32.0	74	54	-29.1	-22.0	Noise Floor
Mid Ch 5795MHz															
11.590	1.0	44.8	31.8	37.2	7.2	-32.5	-9.5	0.7	47.9	34.9	74	54	-26.1	-19.1	H
17.385	1.0	45.8	32.2	40.3	8.3	-32.1	-9.5	0.6	53.4	39.8	74	54	-20.6	-14.2	H
23.180	1.0	44.5	30.9	34.3	8.6	-32.9	-9.5	0.0	45.0	31.4	74	54	-29.0	-22.6	Noise Floor
11.590	1.0	46.3	34.8	37.2	7.2	-32.5	-9.5	0.7	49.4	37.8	74	54	-24.6	-16.2	V
17.385	1.0	49.7	35.2	40.3	8.3	-32.1	-9.5	0.6	57.3	42.8	74	54	-16.7	-11.2	V
23.180	1.0	44.7	30.3	34.3	8.6	-32.9	-9.5	0.0	45.2	30.8	74	54	-28.8	-23.2	Noise Floor
No other emissions were detected above noise floor															

Rev. 4.12.7

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		

7.8.9. WORST-CASE BELOW 1 GHz

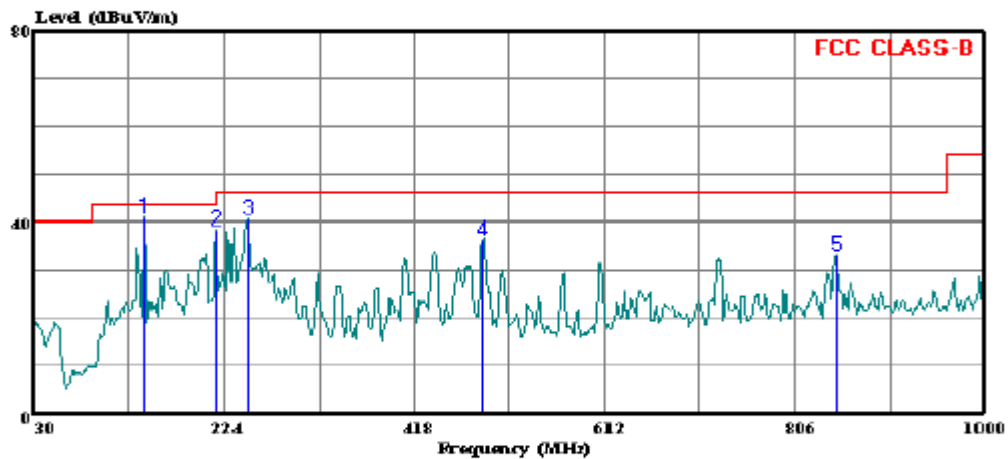
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

Data#: 6 File#: EMI below 1GHZ.EMI Date: 11-20-2007 Time: 16:10:09



Trace: 5

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: : 07U11488
Company: : Qualcomm Inc.
Model : MA423D_H
Configuration: : BUT/Extender Card/Laptop
Mode : : Transmit 2.4GHz Worst Case
Target: : FCC Class B

HORIZONTAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	143.490	57.79	40.83	-16.96	43.50	-2.67	Peak
2	216.240	57.20	38.46	-18.74	46.00	-7.54	Peak
3	247.280	58.51	40.57	-17.94	46.00	-5.43	Peak
4	486.870	47.71	36.24	-11.47	46.00	-9.76	Peak
5	848.680	39.18	33.08	-6.10	46.00	-12.92	Peak

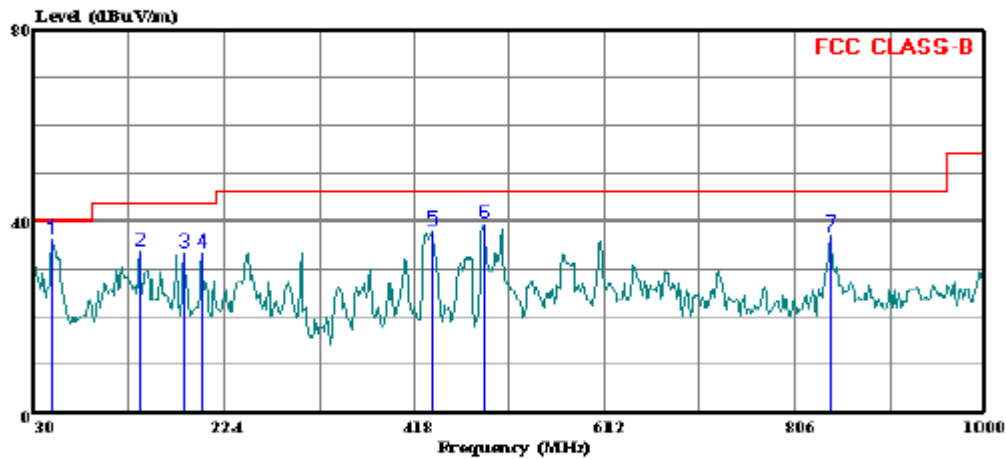
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



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

Data#: 2 File#: EMI below 1GHz.EMI Date: 11-20-2007 Time: 15:23:22



Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: Thanh Nguyen
Project #: 07U11488
Company: Qualcomm Inc.
Model: MA423D_H
Configuration: BUT/Extender Card/Laptop
Mode: Transmit 2.4GHz Worst Case
Target: FCC Class B

VERTICAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	48.430	57.39	36.24	-21.15	40.00	-3.76	Peak
2	138.640	50.59	33.85	-16.73	43.50	-9.65	Peak
3	182.290	52.18	33.68	-18.50	43.50	-9.82	Peak
4	201.690	50.93	33.74	-17.19	43.50	-9.76	Peak
5	436.430	50.80	38.18	-12.62	46.00	-7.82	Peak
6	487.840	50.85	39.42	-11.43	46.00	-6.58	Peak
7	841.890	43.24	37.15	-6.09	46.00	-8.85	Peak

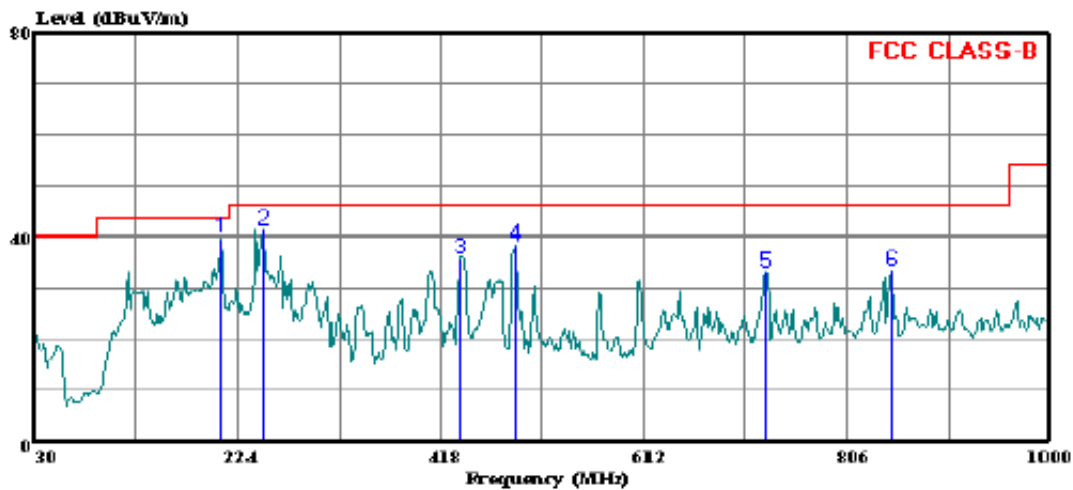
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

Data#: 8 File#: EMI below 1GHz.EMI Date: 11-20-2007 Time: 16:19:29



Trace: 7 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: : 07U12XXX
Company: : Qualcomm Inc.
Model : MA423D_H
Configuration:: EUT/Extender Card/Laptop
Mode : Transmit 5Ghz Worst Case
Target: : FCC Class B
: Module testing, close LID

HORIZONTAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	208.480	58.20	39.78	-18.42	43.50	-3.72	Peak
2	247.280	59.25	41.31	-17.94	46.00	-4.69	Peak
3	436.430	48.75	36.13	-12.62	46.00	-9.87	Peak
4	487.840	49.79	38.36	-11.43	46.00	-7.64	Peak
5	727.430	41.35	33.36	-8.00	46.00	-12.65	Peak
6	848.680	39.65	33.55	-6.10	46.00	-12.45	Peak

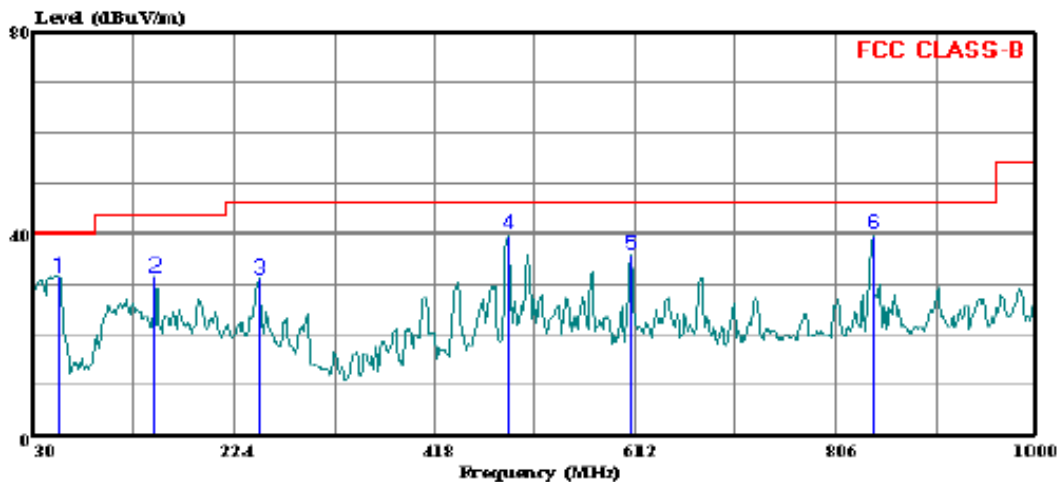
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



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

Data#: 10 File#: EMI below 1GHz.EMI Date: 11-20-2007 Time: 16:22:23



Trace: 9

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Thanh Nguyen
Project #: : 07U12XXX
Company: : QualComm Inc.
Model : MA423D_H
Configuration:: EUT/Extender Card/Laptop
Mode : : Transmit 5Ghz Worst Case
Target: : FCC Class B
: Module testing, close LID

VERTICAL DATA

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	55.220	54.19	31.35	-22.83	40.00	-8.65	Peak
2	148.340	48.91	31.68	-17.23	43.50	-11.82	Peak
3	247.280	48.98	31.04	-17.94	46.00	-14.96	Peak
4	487.840	51.13	39.70	-11.43	46.00	-6.30	Peak
5	609.090	45.82	36.07	-9.75	46.00	-9.93	Peak
6	841.890	45.93	39.84	-6.09	46.00	-6.16	Peak

8. 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.

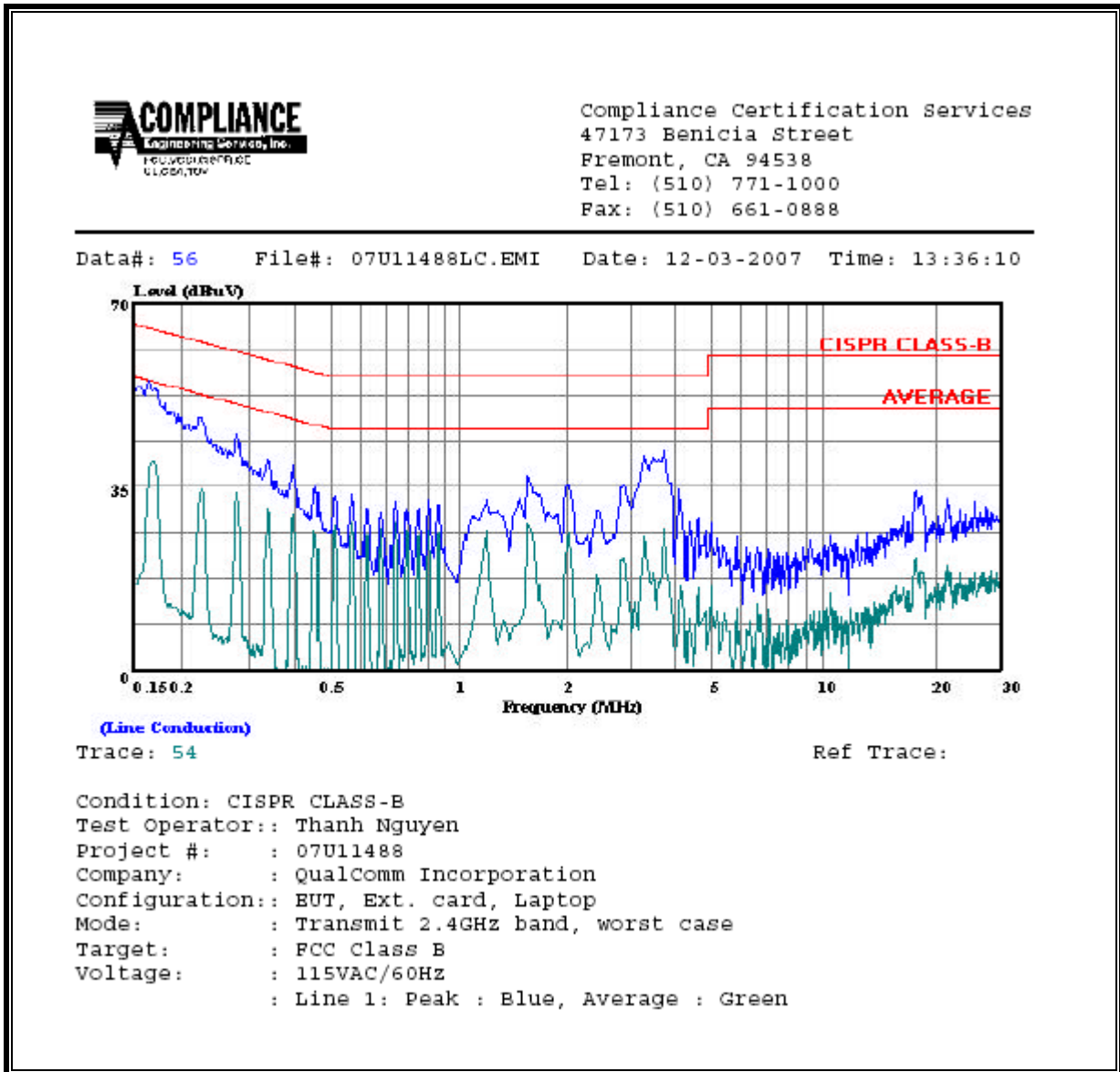
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

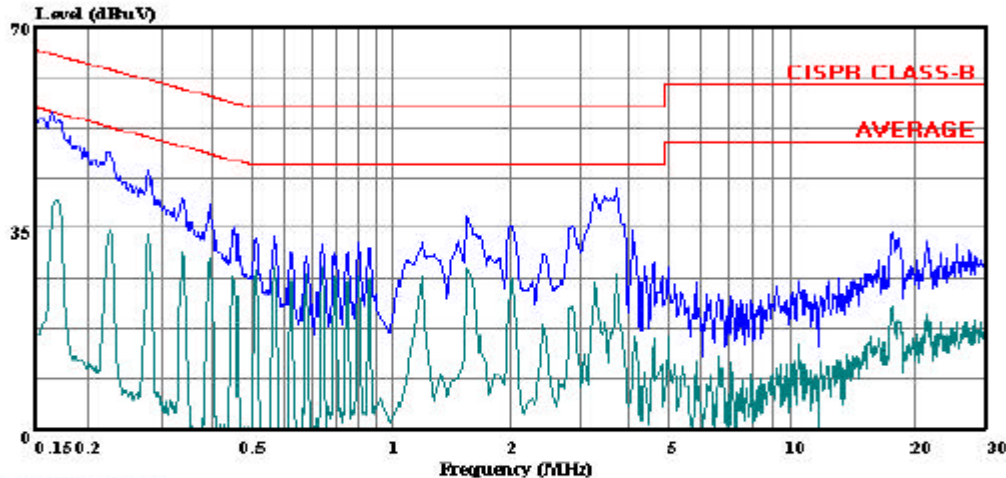
CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B		Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)			AV	QP (dB)	AV (dB)		
0.16	54.81	--	39.89	0.00	65.26	55.26	-10.45	-15.37	L1	
1.66	37.02	--	27.83	0.00	56.00	46.00	-18.98	-18.17	L1	
3.82	41.72	--	27.83	0.00	56.00	46.00	-14.28	-18.17	L1	
0.17	53.74	--	38.46	0.00	65.01	55.01	-11.27	-16.55	L2	
1.73	37.14	--	27.56	0.00	56.00	46.00	-18.86	-18.44	L2	
3.38	42.90	--	28.79	0.00	56.00	46.00	-13.10	-17.21	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#: 56 File#: 07U11488LC.EMI Date: 12-03-2007 Time: 13:36:10

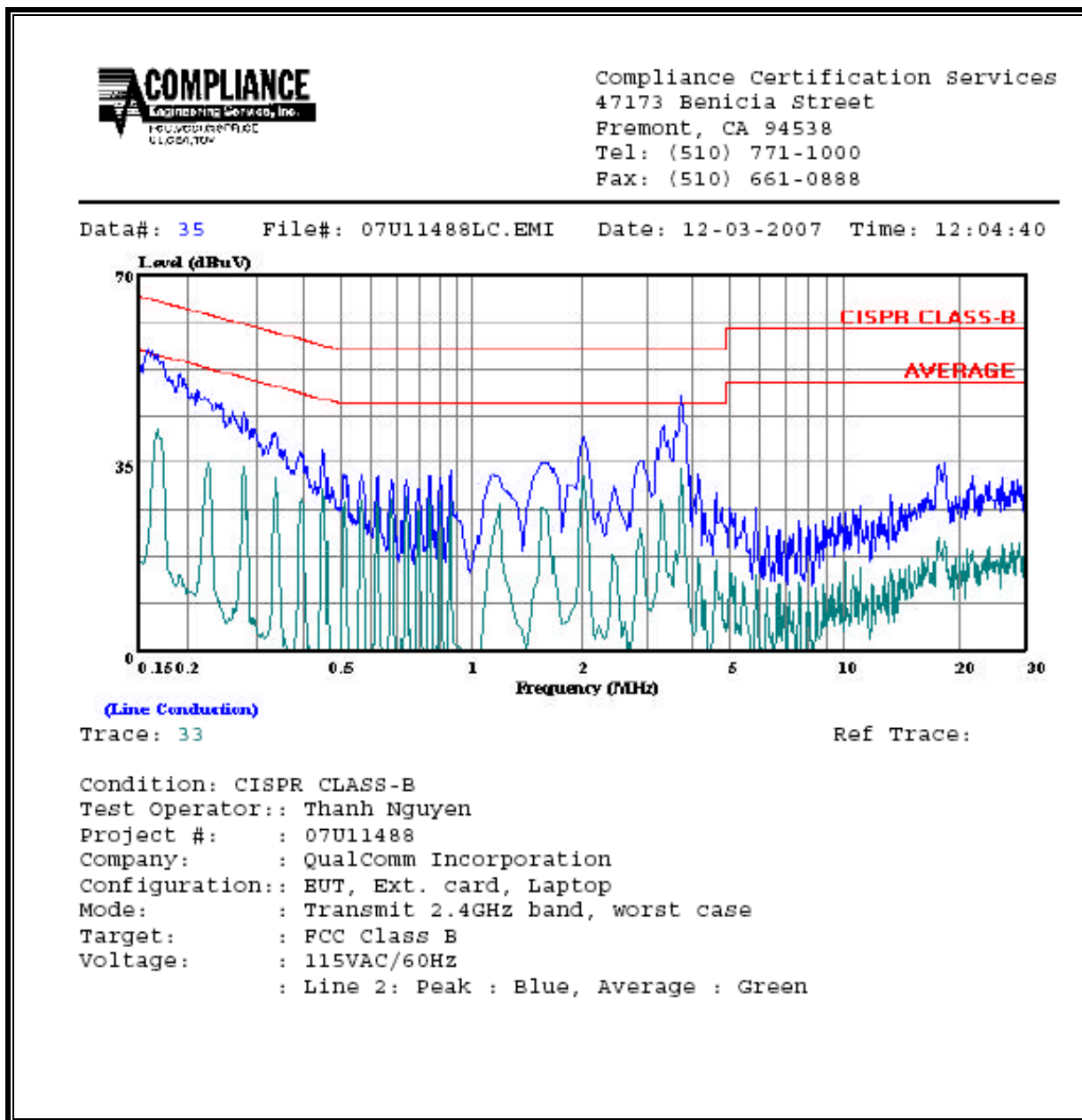


(Line Conduction)
Trace: 54

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 07U11488
Company: : Qualcomm Incorporation
Configuration:: EUT, Ext. card, Laptop
Mode: : Transmit 2.4GHz band, worst case
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: Line 1: Peak : Blue, Average : Green

LINE 2 RESULTS



9. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

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

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

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

IC RULES

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

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

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{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/m² is equivalent to 1 mW/cm².
 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/cm²

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/cm² is converted to units of W/m² by multiplying by a factor of 10.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm ²)	IC Power Density (W/m ²)
WLAN	2.4 GHz	20.0	28.96	2.00	0.25	2.48
WLAN	5 GHz	20.0	27.60	3.00	0.23	2.28

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.