

## 7.9.802.11n HT40 MODE IN THE 5.6 GHz BAND

### 7.9.1. 26 dB and 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

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

#### RESULTS

##### CHAIN 1

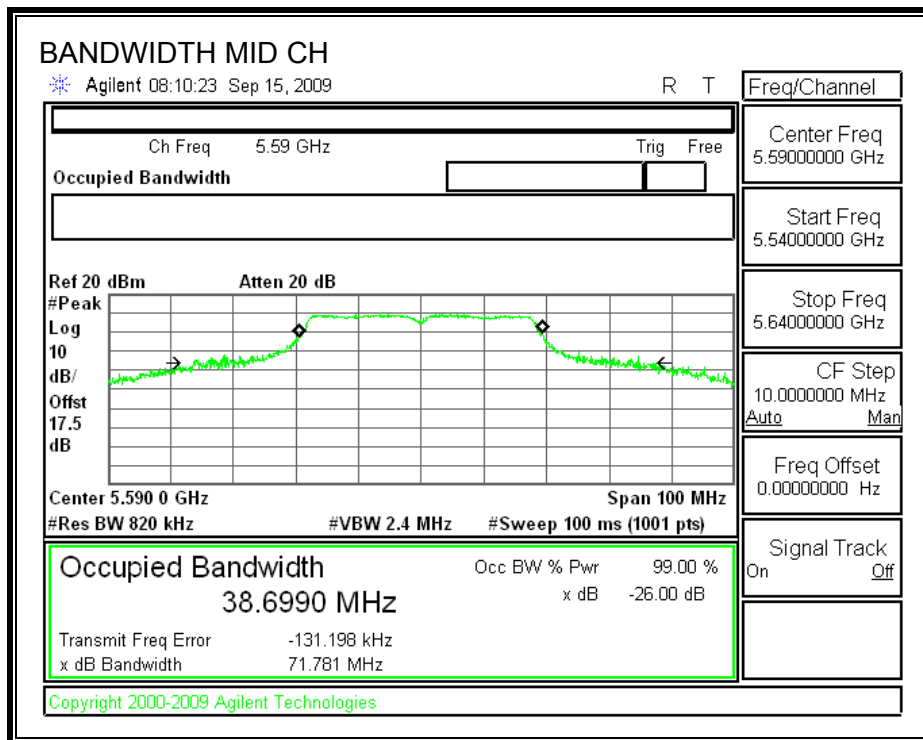
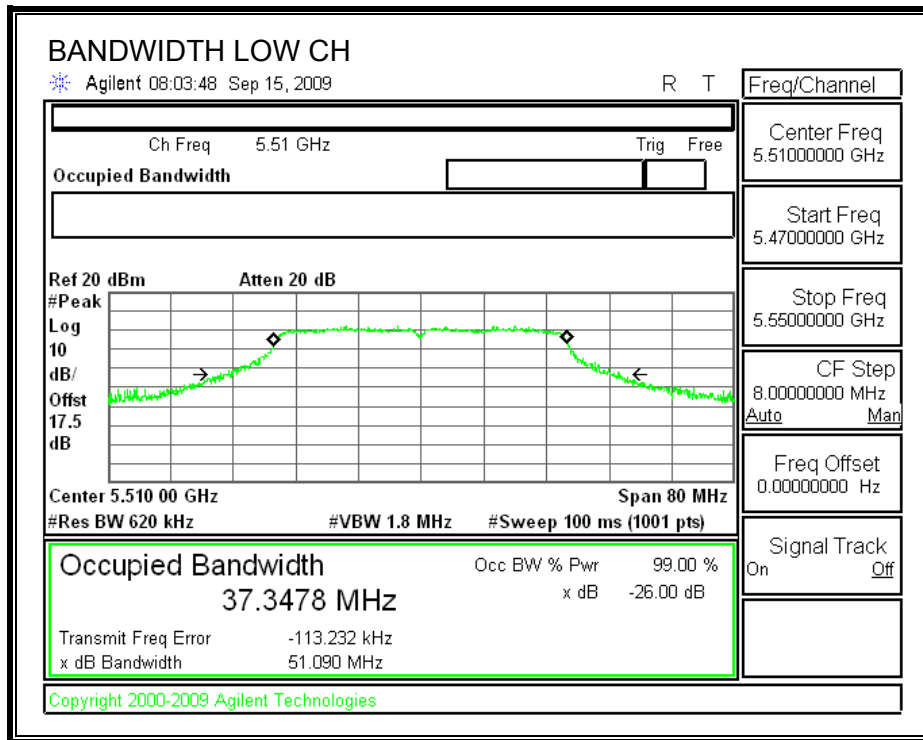
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	51.090	36.3021
Middle	5590	71.781	36.3436
High	5670	62.033	36.1709

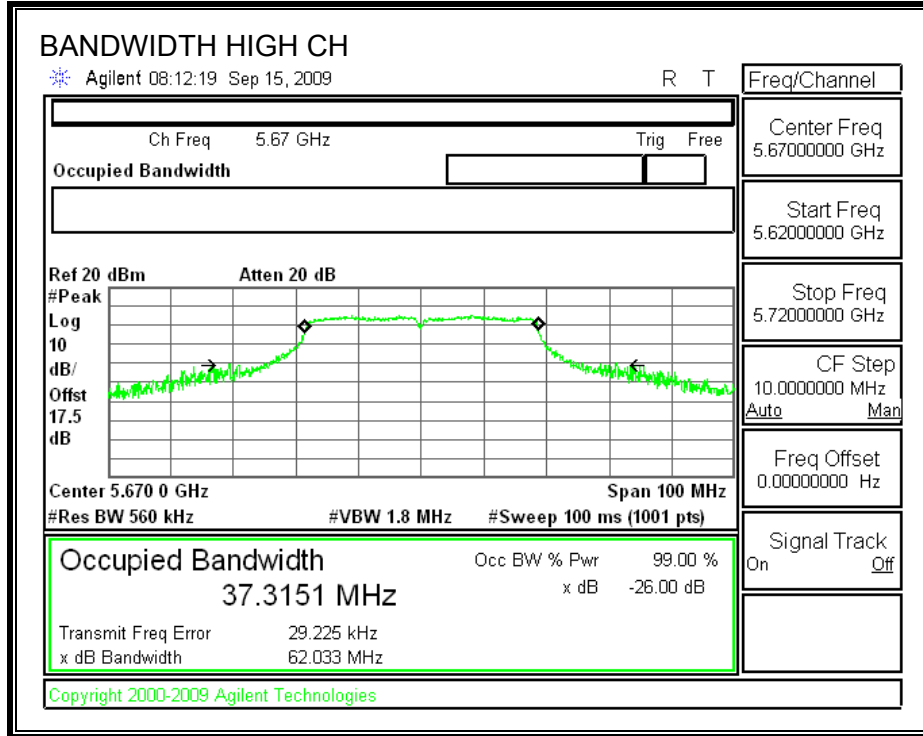
##### CHAIN 2

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5510	50.849	36.3129
Middle	5590	78.836	36.3537
High	5670	67.785	36.1777

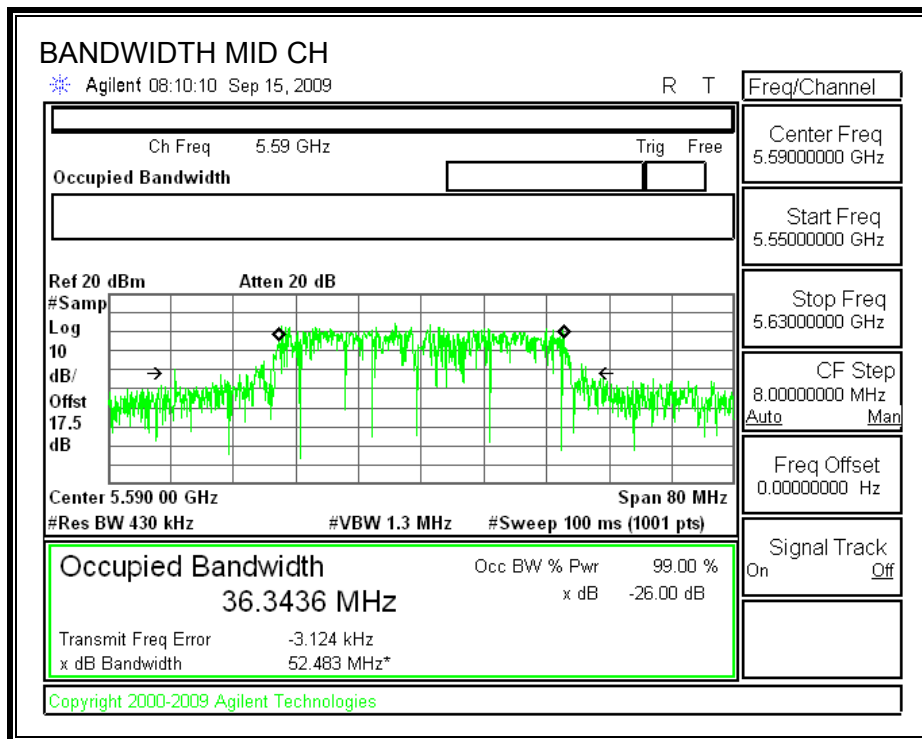
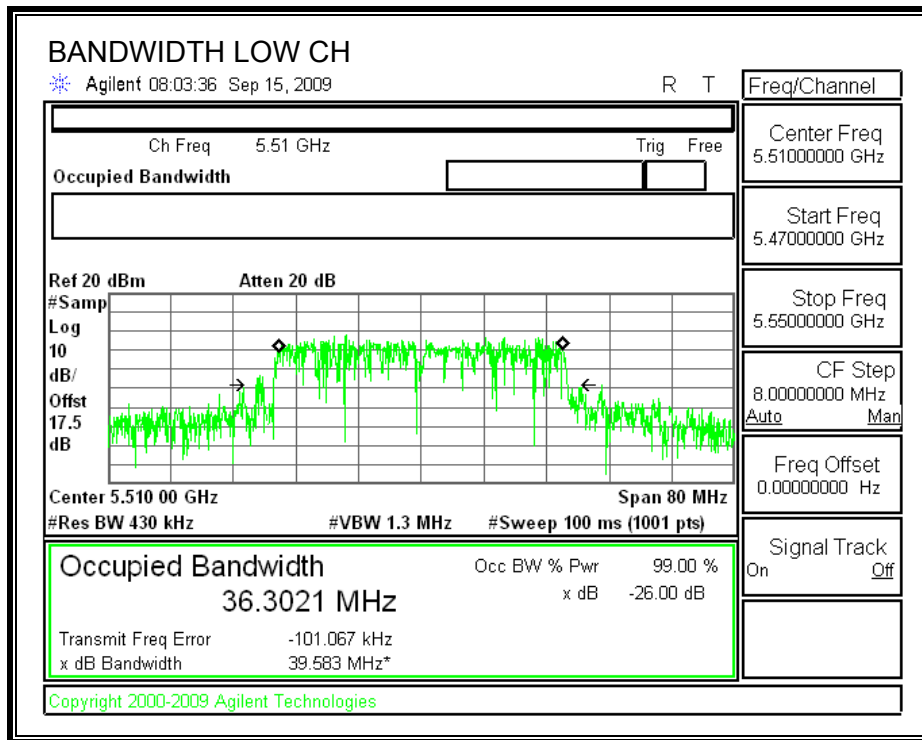
**CHAIN 1**

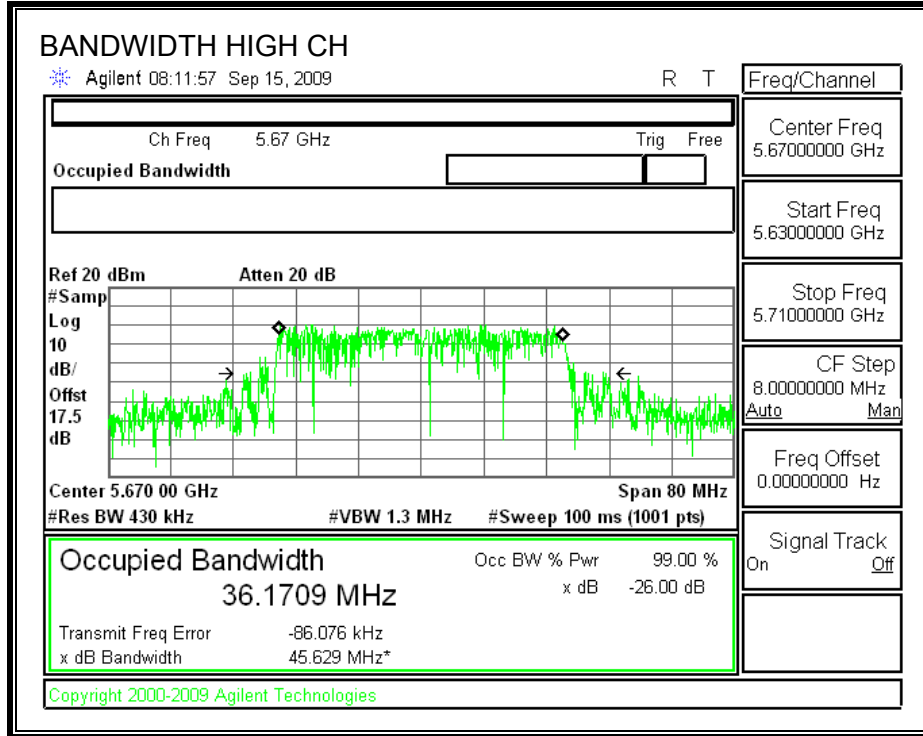
**26 dB BANDWIDTH**





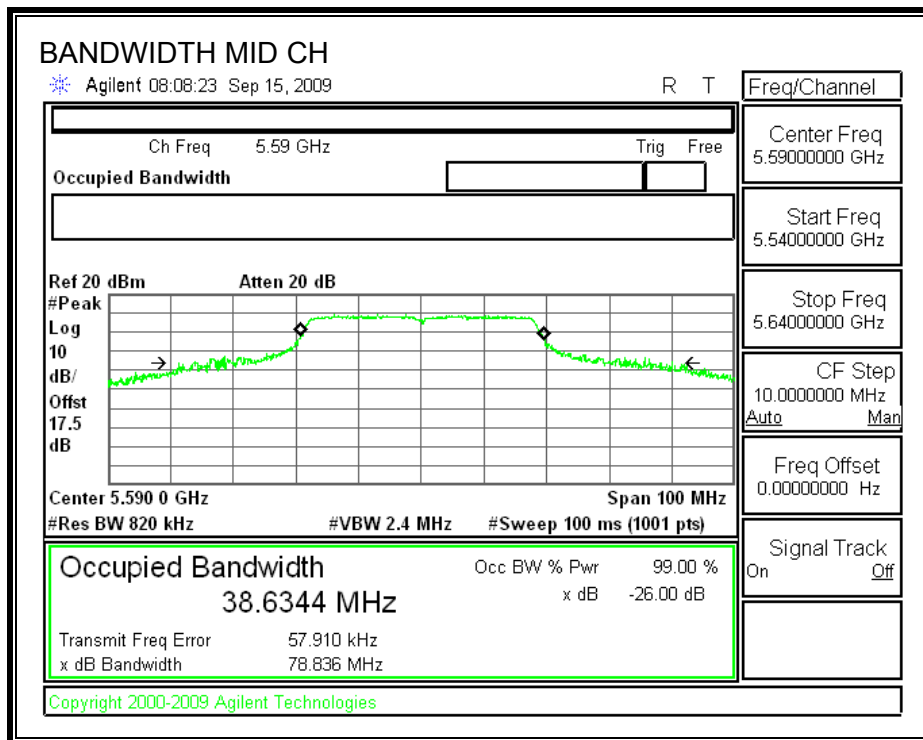
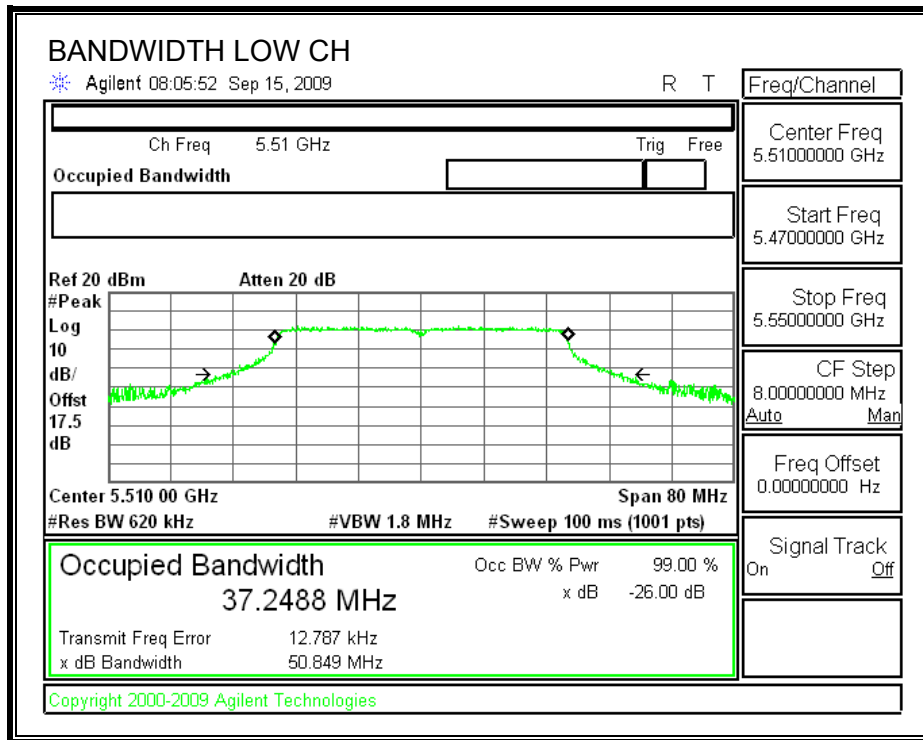
**99% BANDWIDTH**

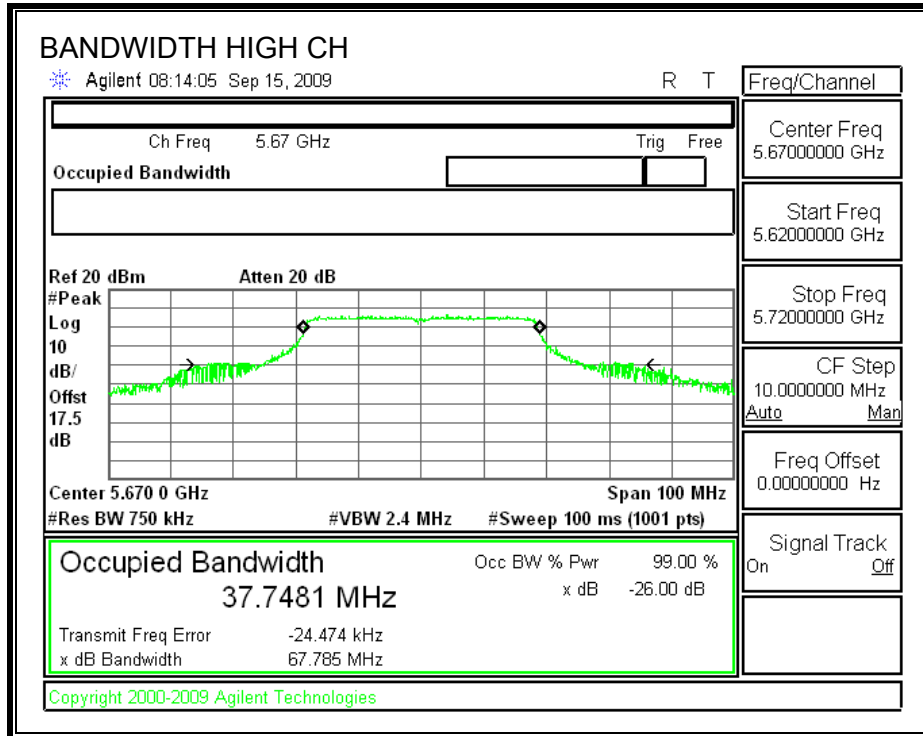




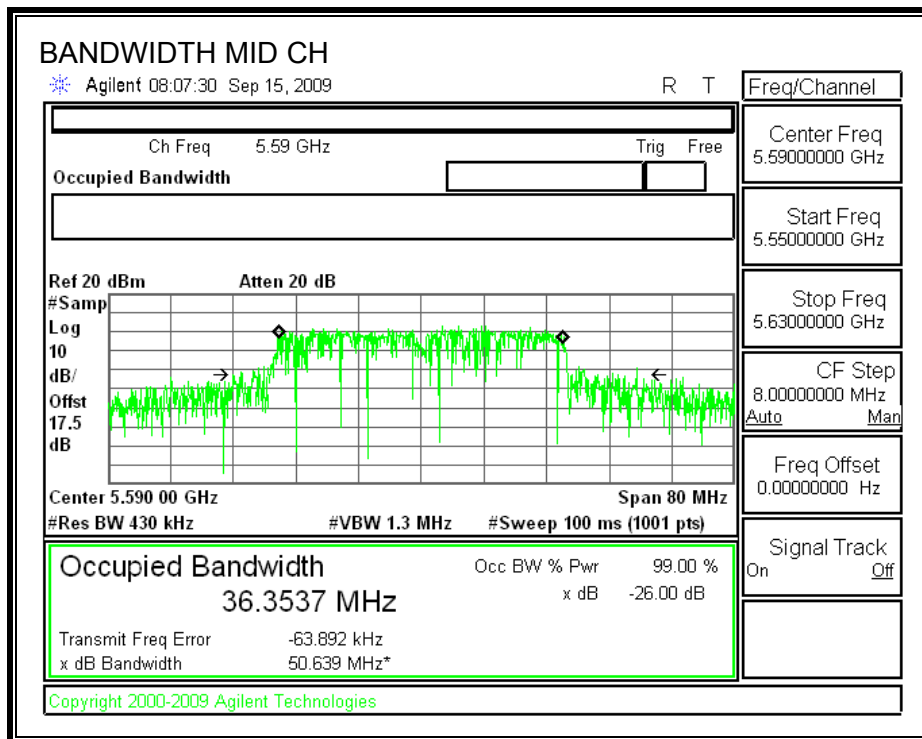
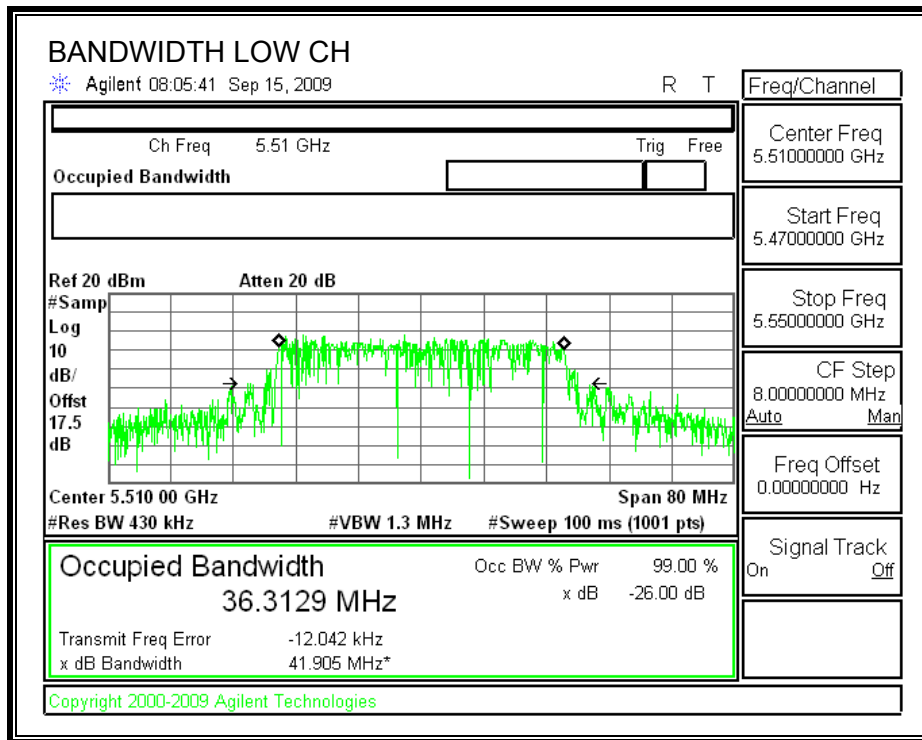
**CHAIN 2**

**26 dB BANDWIDTH**

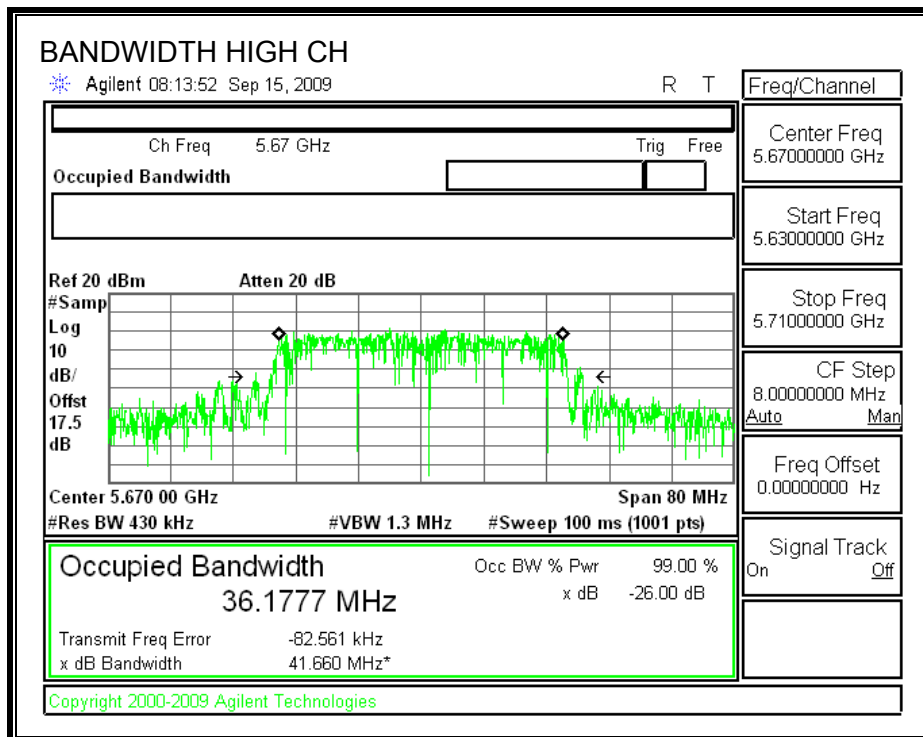




**99% BANDWIDTH**







## 7.9.2. OUTPUT POWER

### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , 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

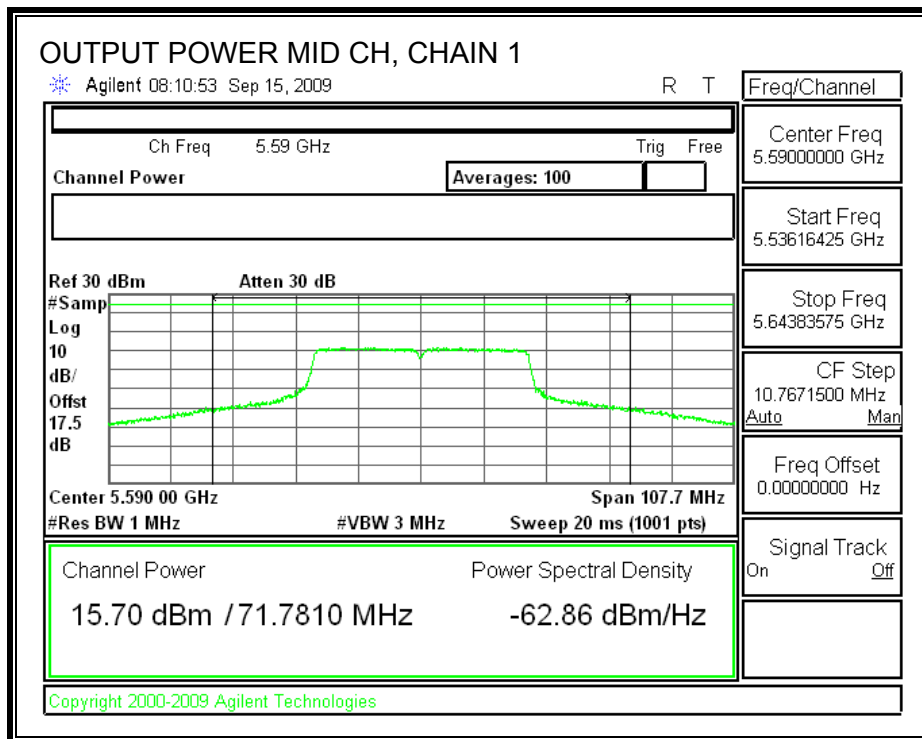
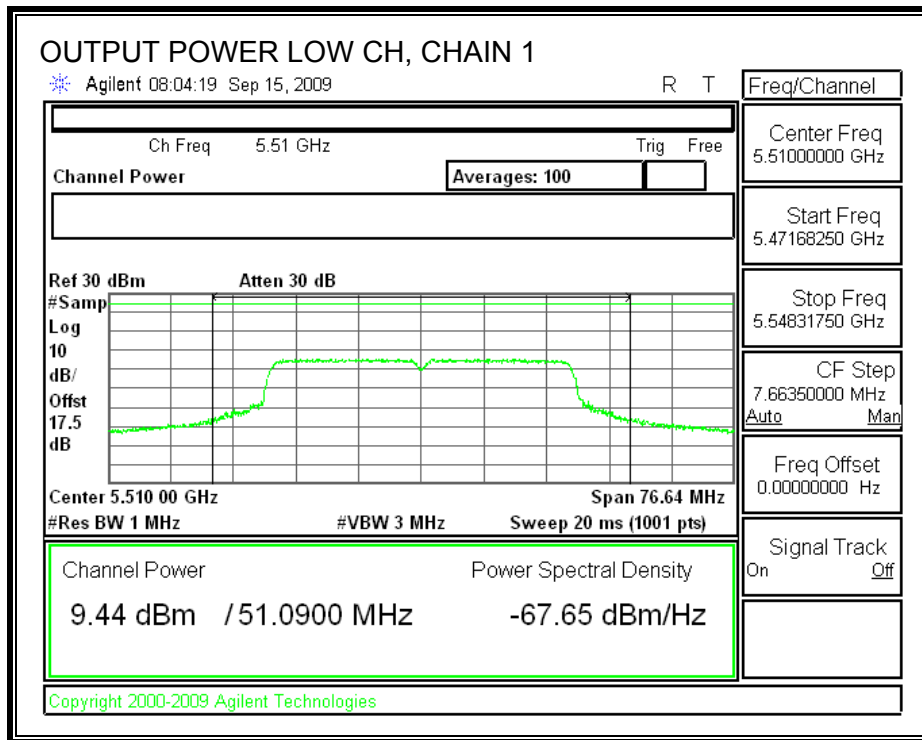
#### Limit

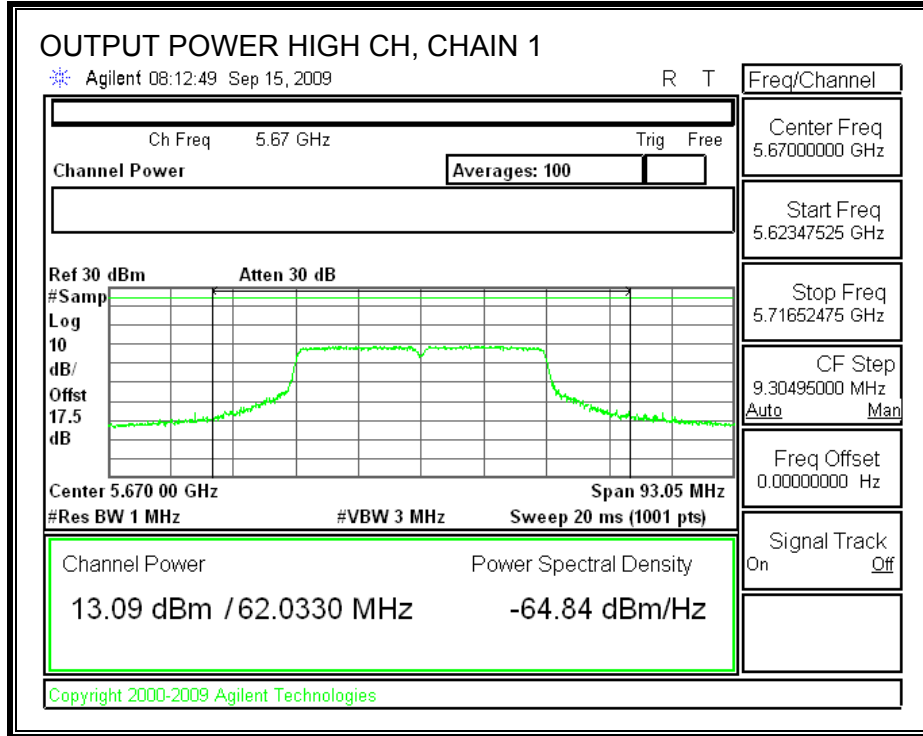
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5510	24	51.090	28.08	2.13	24.00
Mid	5590	24	71.781	29.56	2.13	24.00
High	5670	24	62.033	28.93	2.13	24.00

#### Individual Chain Results

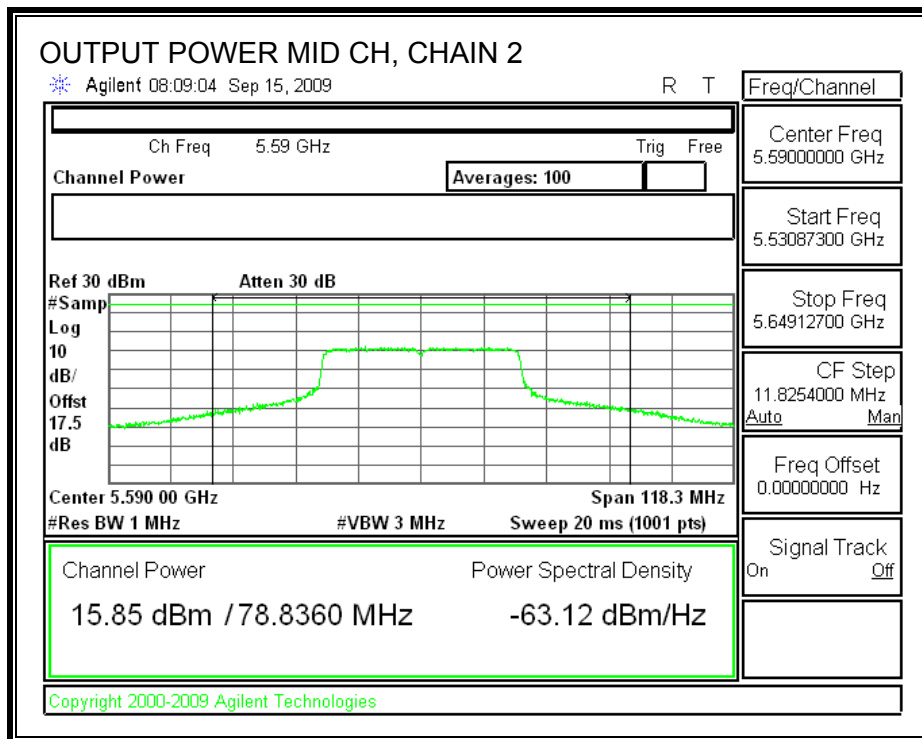
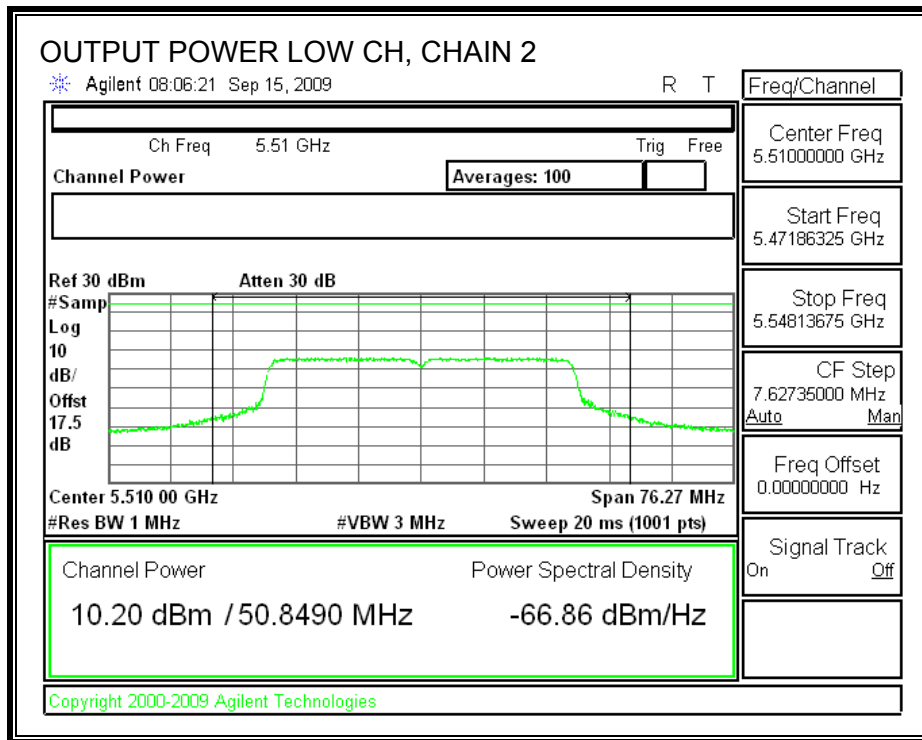
Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5510	9.44	10.20	12.85	24.00	-14.56
Mid	5590	15.70	15.85	18.79	24.00	-8.30
High	5670	13.09	13.48	16.30	24.00	-10.91

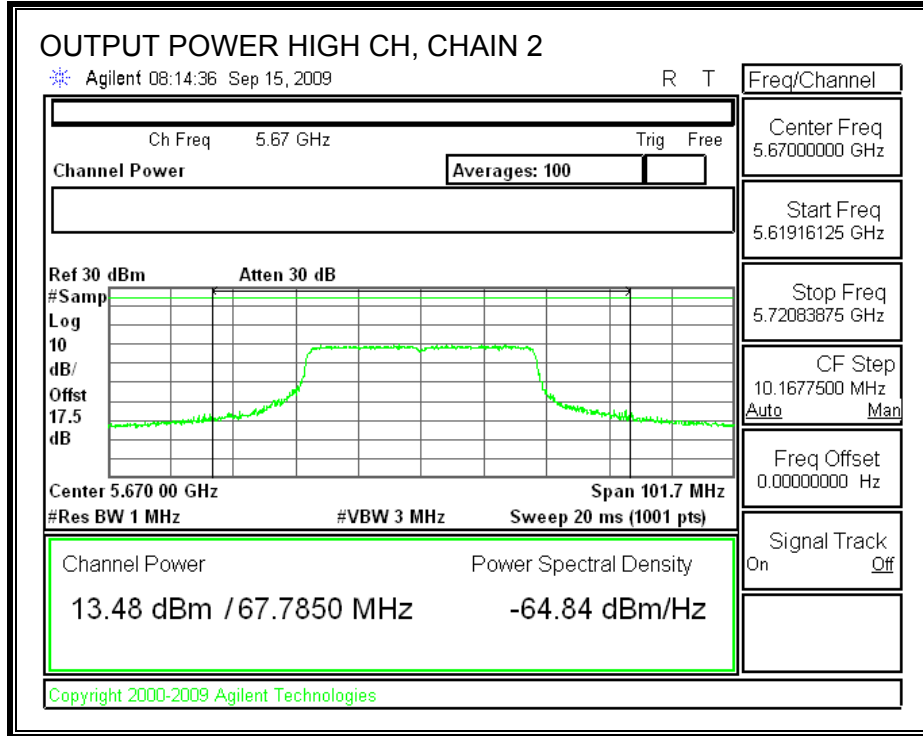
**CHAIN 1 OUTPUT POWER**





**CHAIN 2 OUTPUT POWER**





### 7.9.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 17.5 dB (including 10 dB pad and 7.5 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	5510	10.14	10.74	13.46
Middle	5590	16.03	16.41	19.23
High	5670	12.90	13.31	16.12

### 7.9.4. PEAK POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

#### TEST PROCEDURE

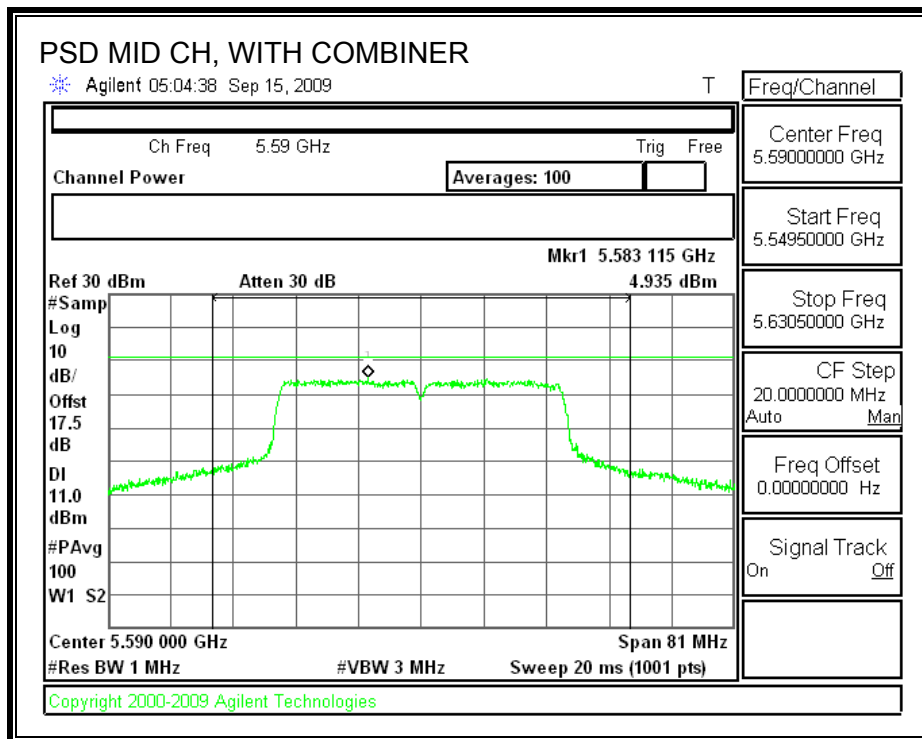
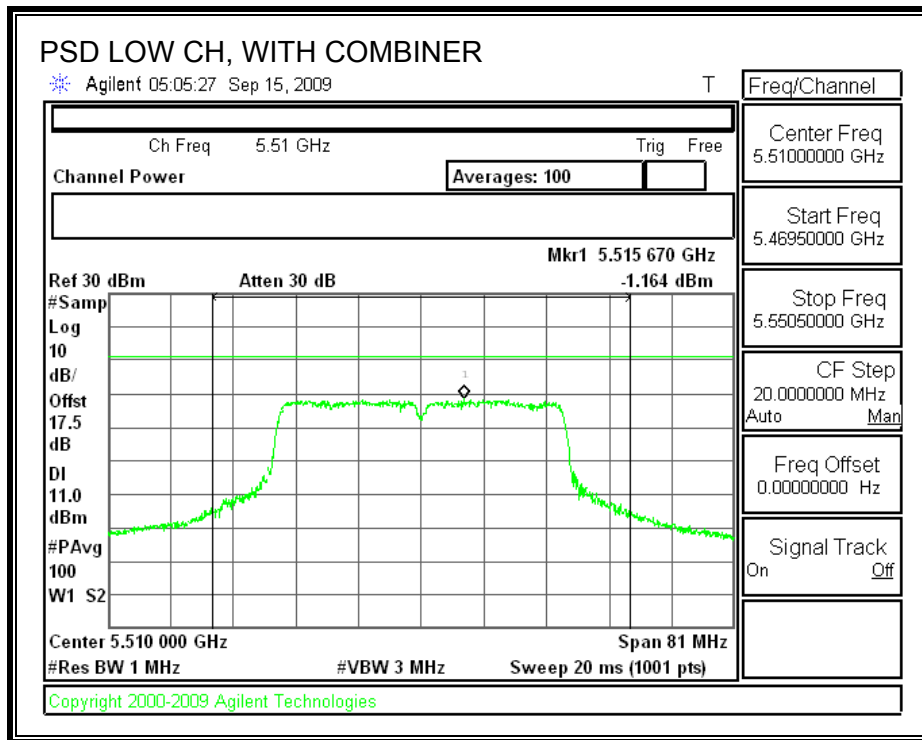
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

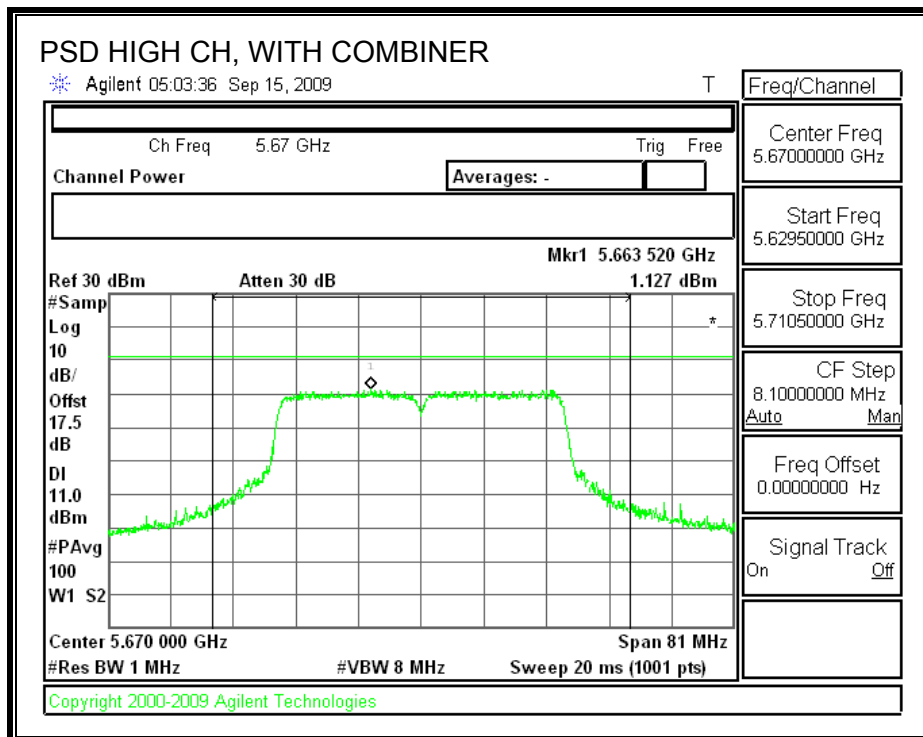
#### RESULTS

Channel	Frequency (MHz)	PPSD With Combiner (dBm)	Limit (dBm)	Margin (dB)
Low	5510	-1.16	11	-12.16
Middle	5590	4.94	11	-6.07
High	5670	1.13	11	-9.87



**POWER SPECTRAL DENSITY WITH COMBINER**





### 7.9.5. PEAK EXCURSION

#### LIMITS

FCC §15.407 (a) (6)

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

#### TEST PROCEDURE

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

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

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

#### RESULTS

##### CHAIN 1

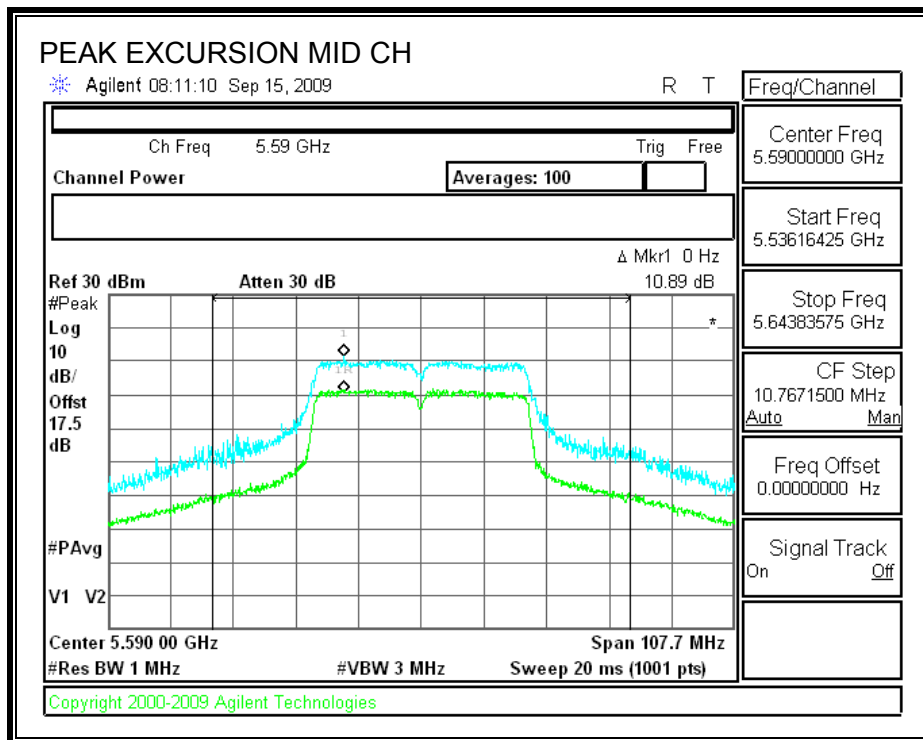
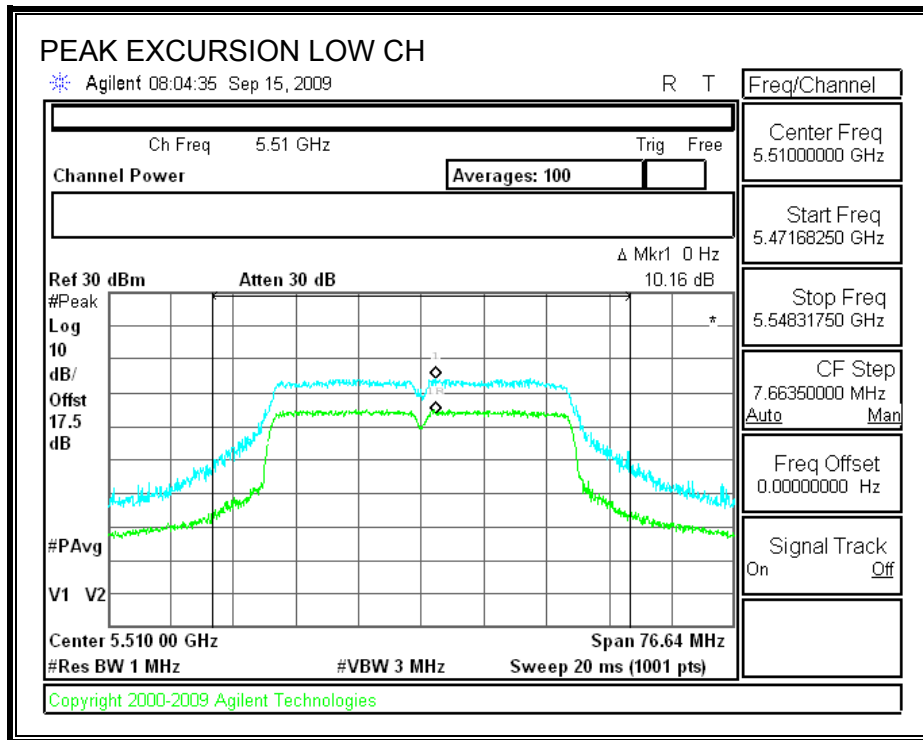
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	10.16	13	-2.84
Middle	5590	10.89	13	-2.11
High	5670	10.59	13	-2.41

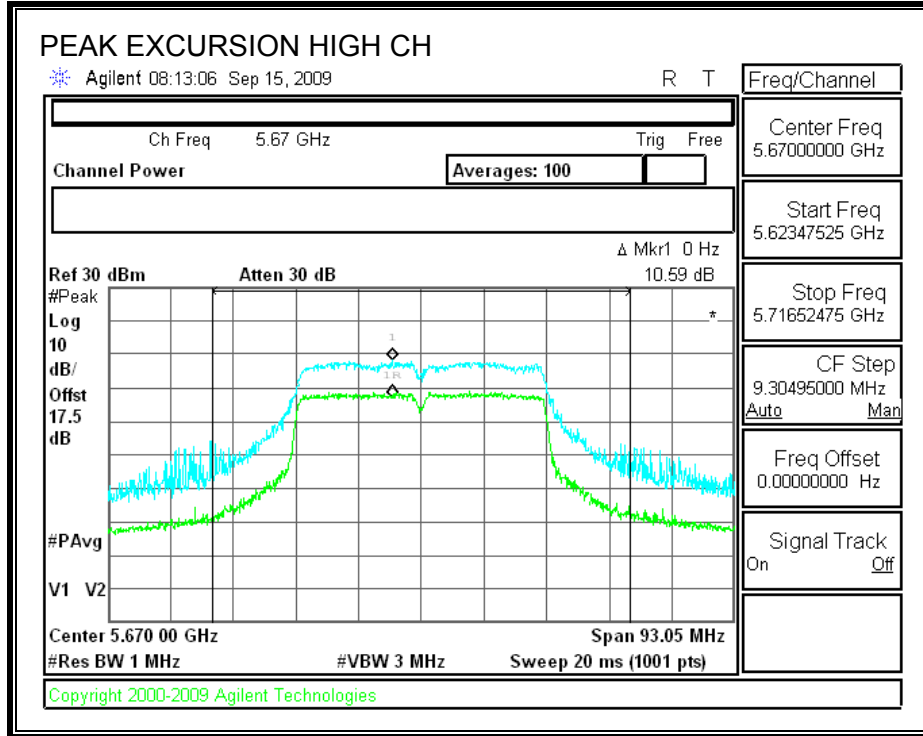
##### CHAIN 2

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	9.31	13	-3.69
Middle	5590	9.90	13	-3.10
High	5670	10.04	13	-2.96

**CHAIN 1**

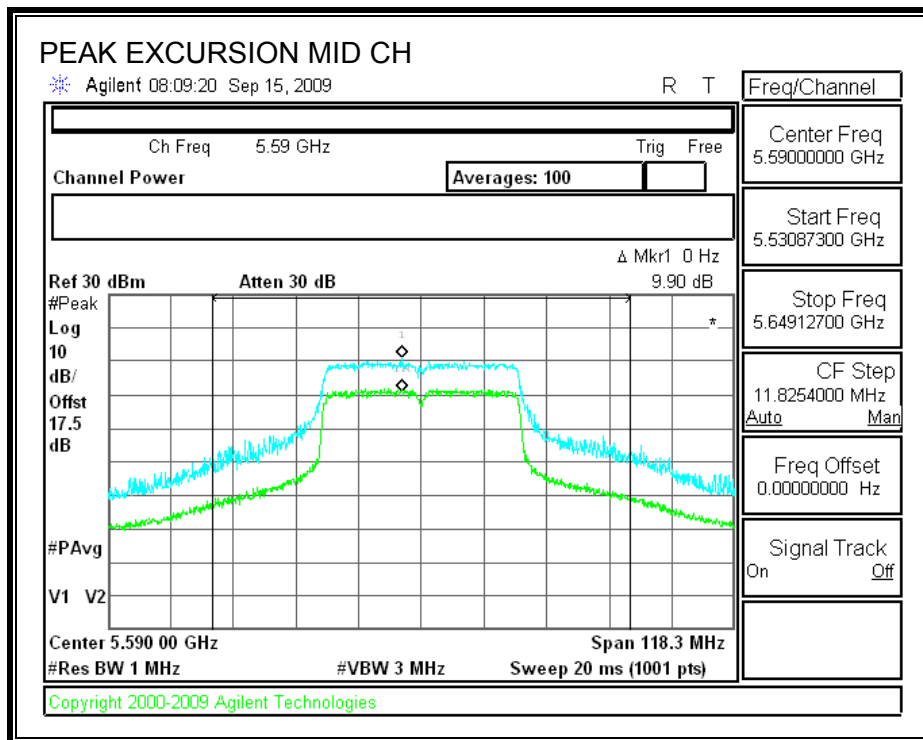
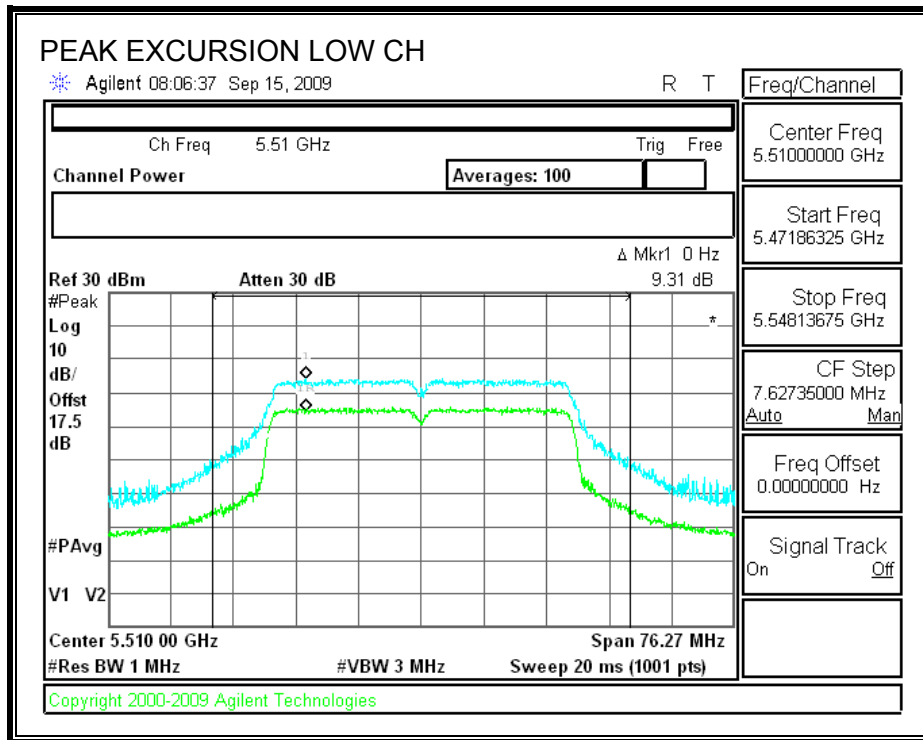
**PEAK EXCURSION**

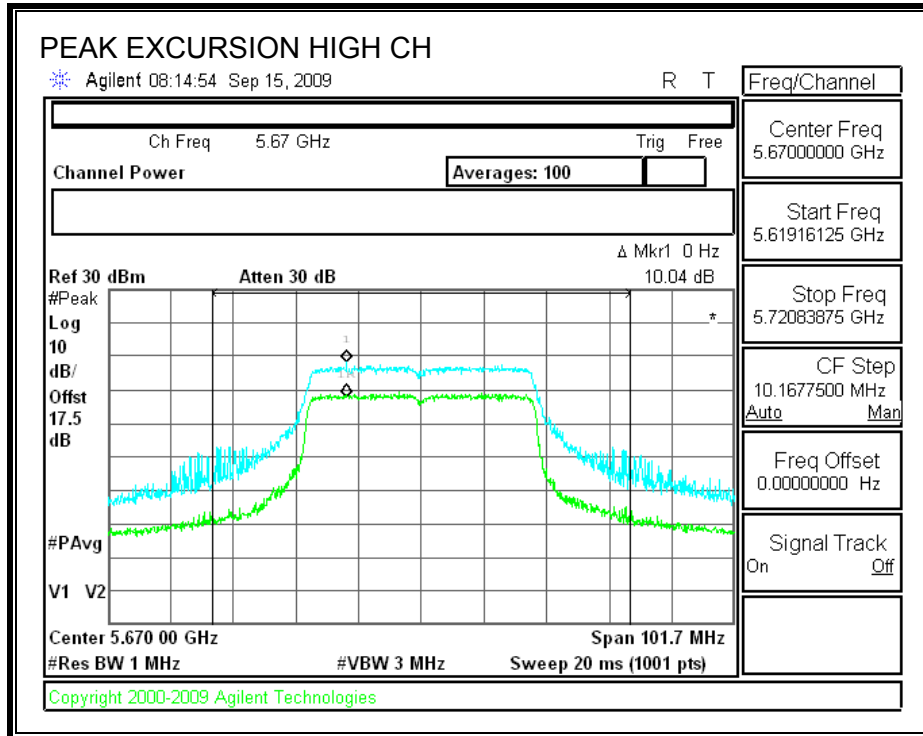




**CHAIN 2**

**PEAK EXCURSION**





## 7.9.6. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

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

### TEST PROCEDURE

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

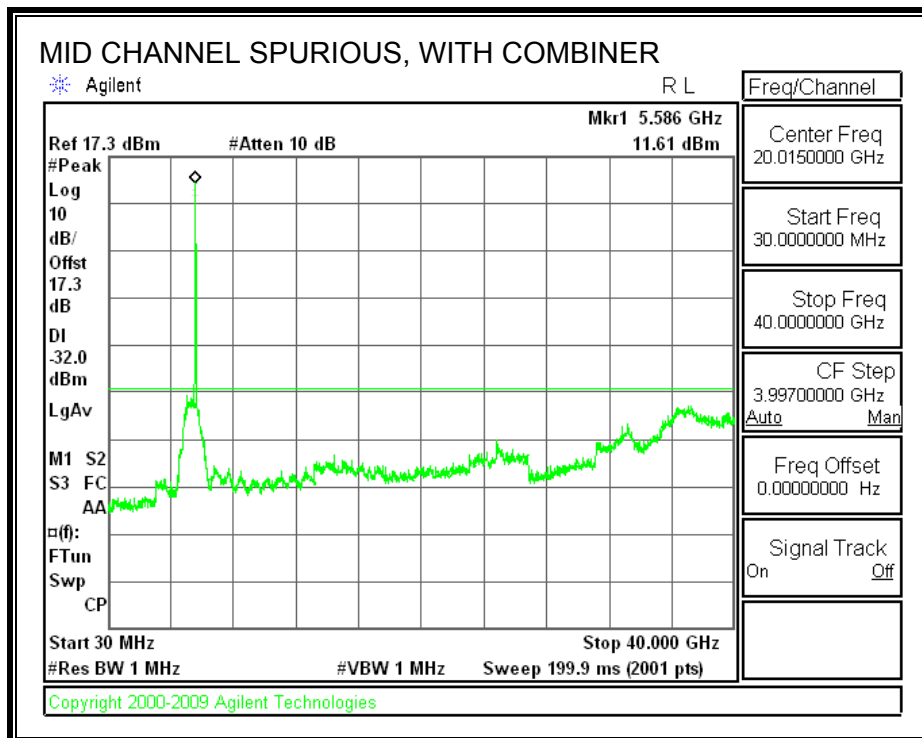
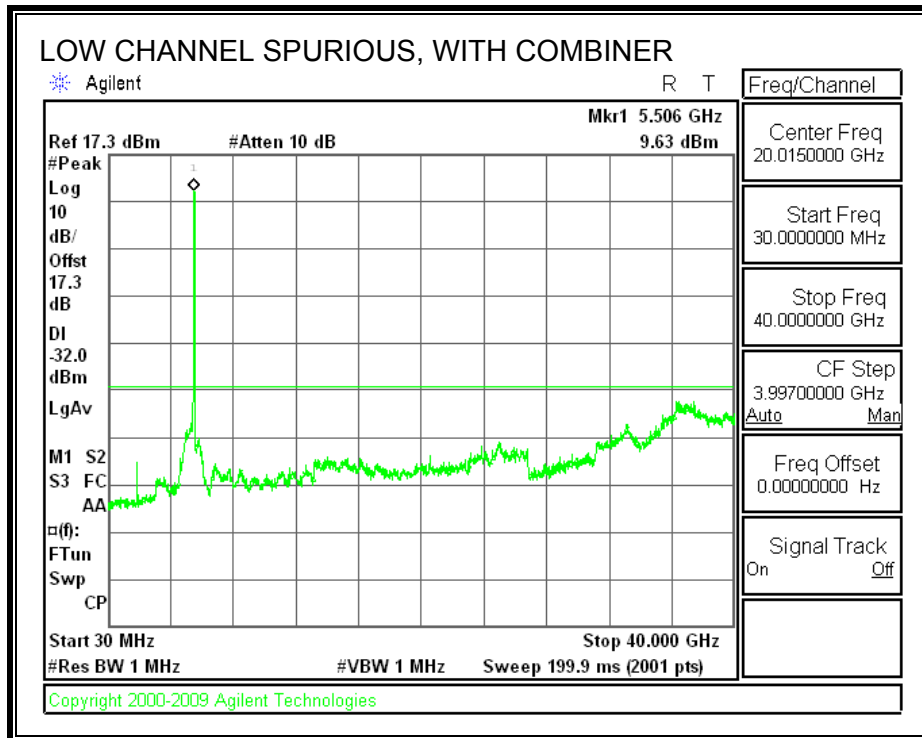
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

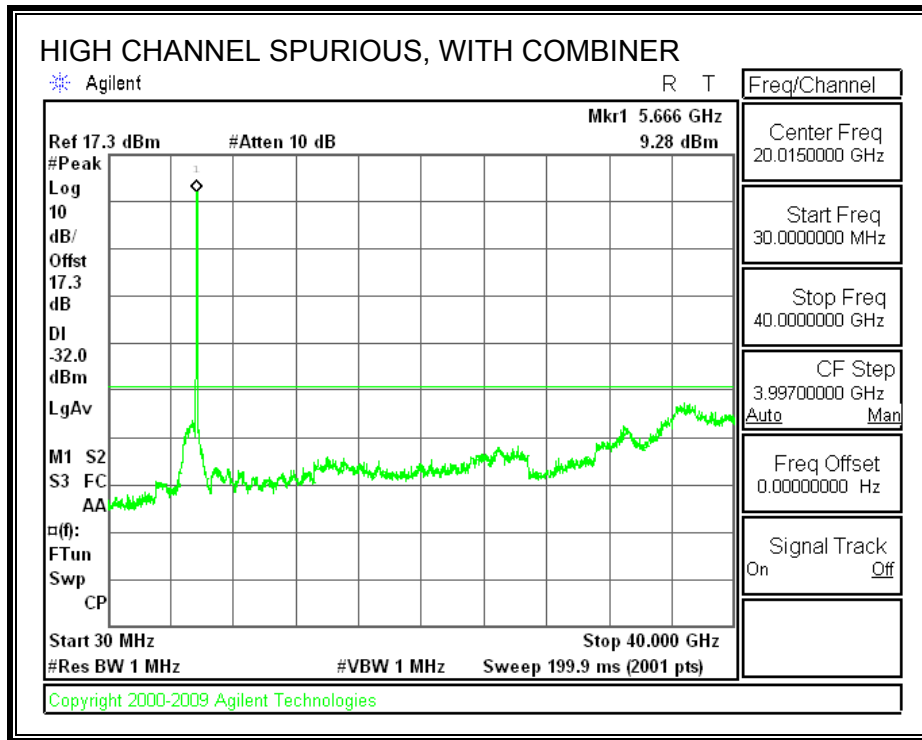
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.



**RESULTS**

**SPURIOUS EMISSIONS WITH COMBINER**





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

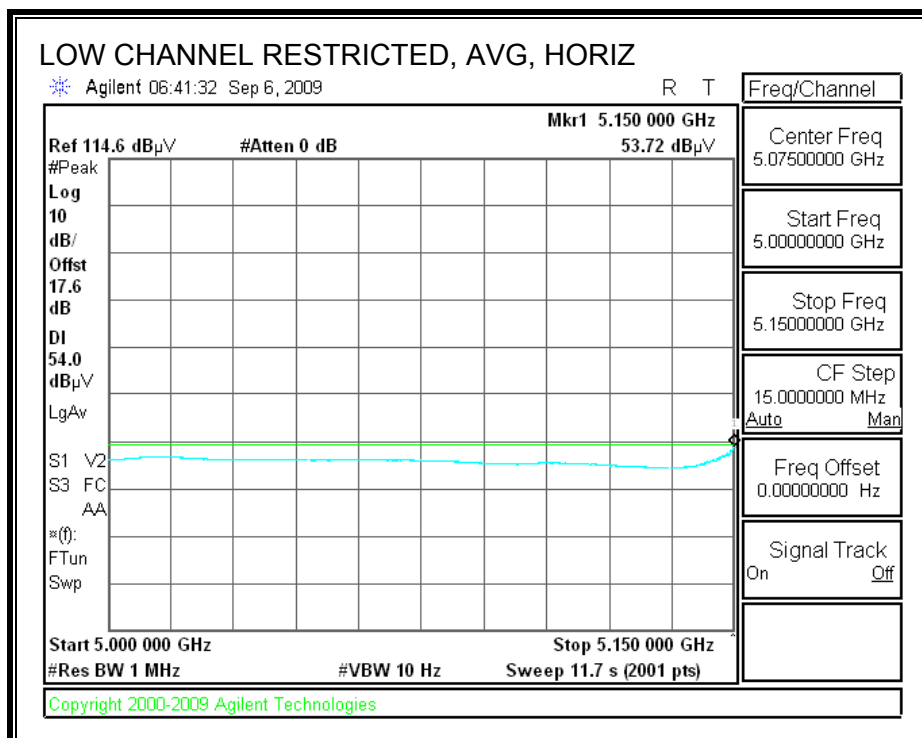
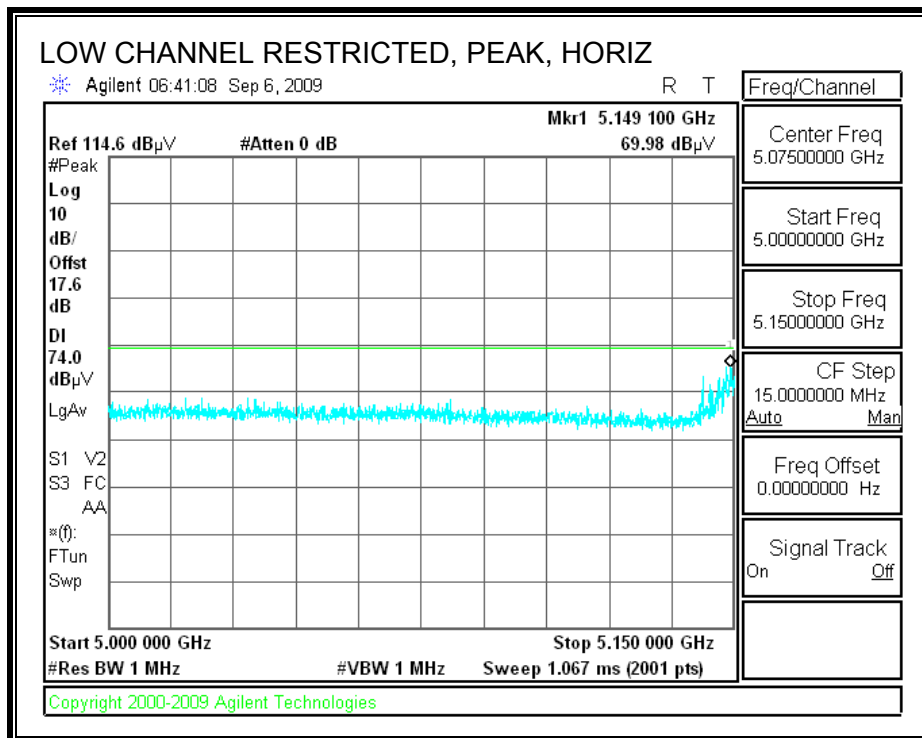
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

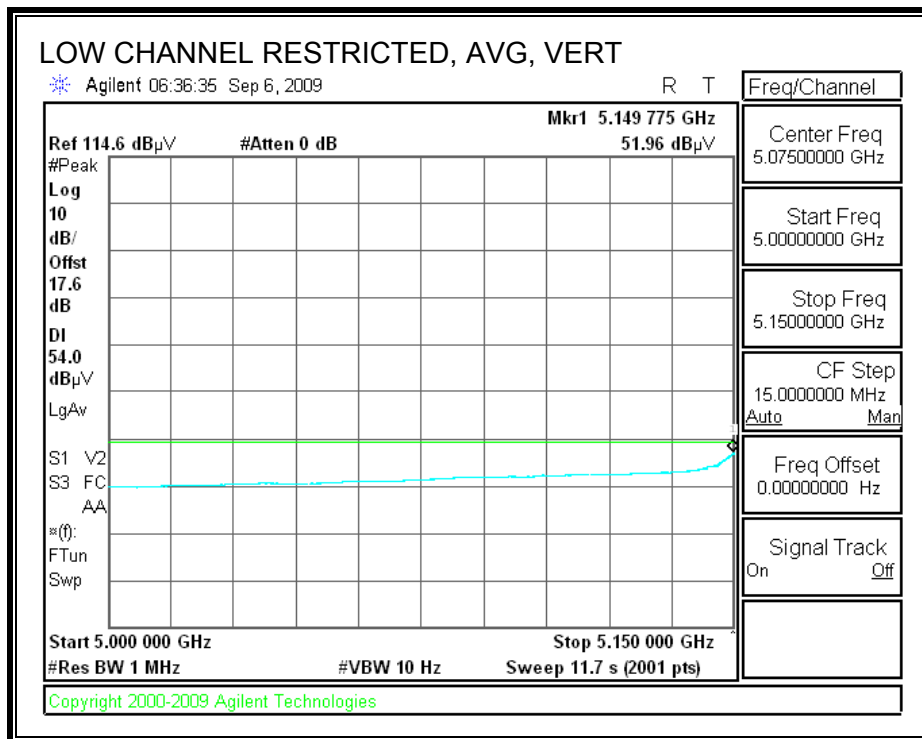
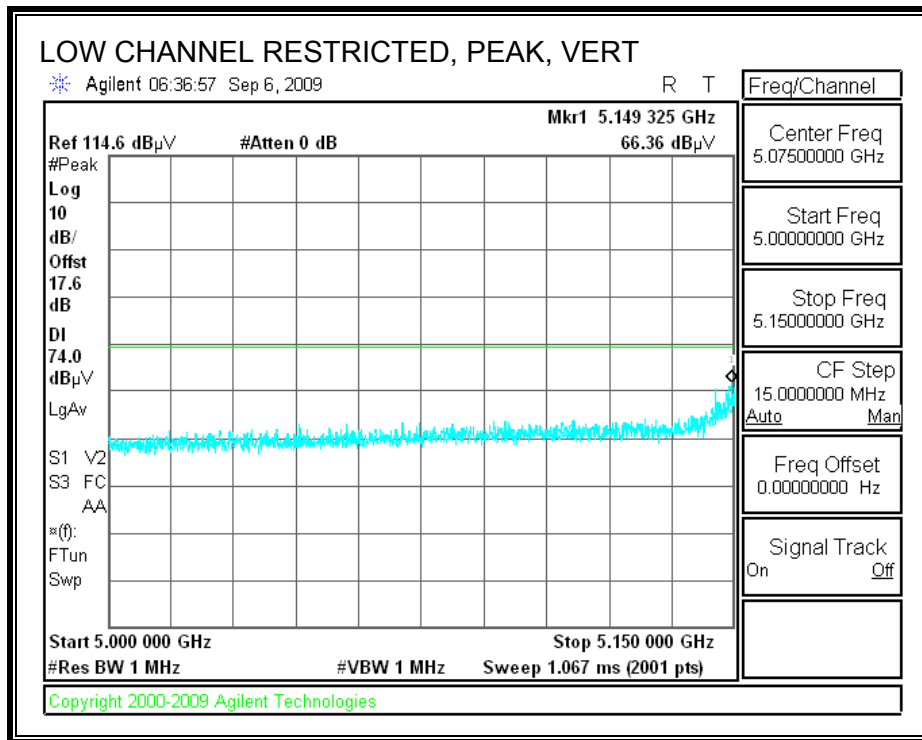
## 8.2. TRANSMITTER ABOVE 1 GHz

### 8.2.1. 802.11a DUAL CHAIN LEGACY MODE IN THE LOWER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/07/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

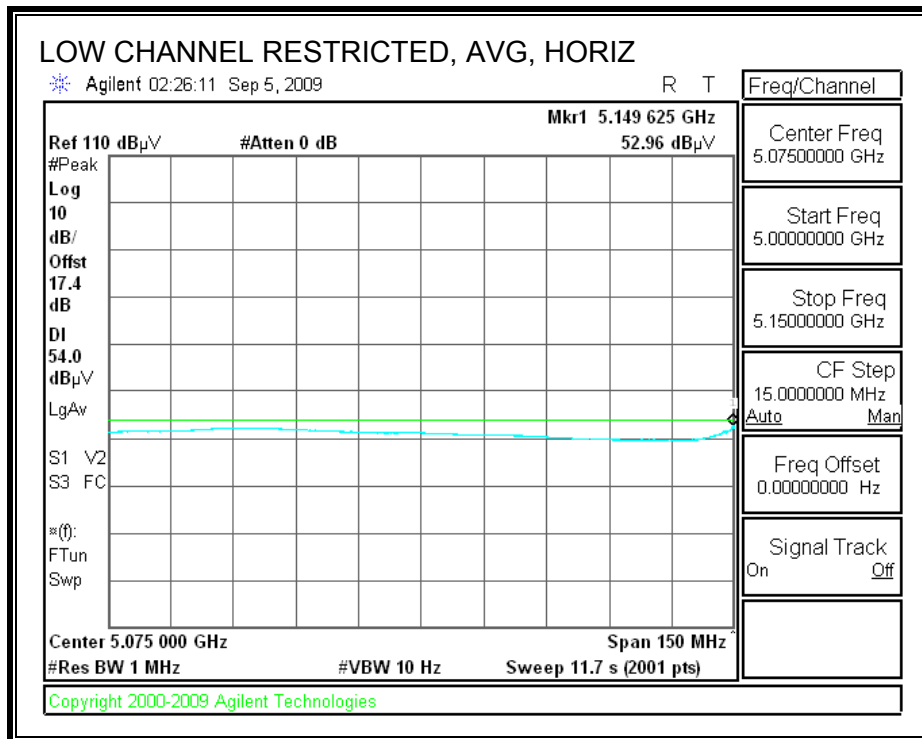
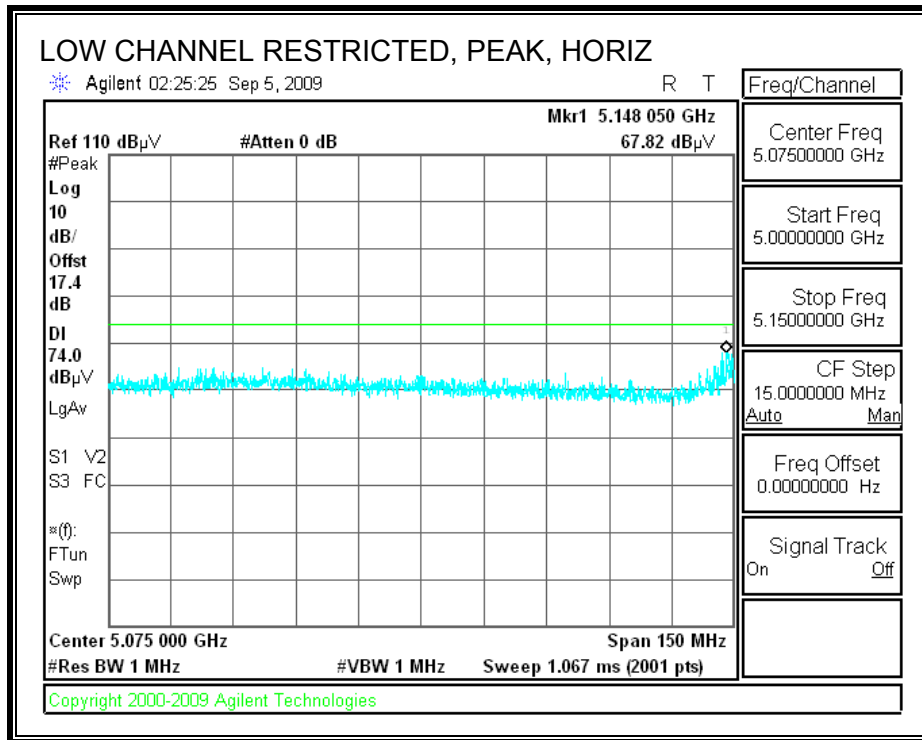
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5180MHz</b>													
10.360	3.0	44.5	37.4	8.9	-34.6	0.0	0.8	57.0	74.0	-17.0	H	P	
10.360	3.0	32.0	37.4	8.9	-34.6	0.0	0.8	44.6	54.0	-9.4	H	A	
15.540	3.0	40.8	38.9	11.3	-32.3	0.0	0.7	59.5	74.0	-14.5	H	P	
15.540	3.0	27.3	38.9	11.3	-32.3	0.0	0.7	45.9	54.0	-8.1	H	A	
10.360	3.0	49.9	37.4	8.9	-34.6	0.0	0.8	62.4	74.0	-11.6	V	P	
10.360	3.0	36.1	37.4	8.9	-34.6	0.0	0.8	48.6	54.0	-5.4	V	A	
15.540	3.0	44.3	38.9	11.3	-32.3	0.0	0.7	62.9	74.0	-11.1	V	P	
15.540	3.0	30.4	38.9	11.3	-32.3	0.0	0.7	49.1	54.0	-4.9	V	A	
<b>5200MHz</b>													
10.400	3.0	43.8	37.5	8.9	-34.6	0.0	0.8	56.4	74.0	-17.6	H	P	
10.400	3.0	32.2	37.5	8.9	-34.6	0.0	0.8	44.8	54.0	-9.2	H	A	
15.600	3.0	41.2	38.7	11.4	-32.3	0.0	0.7	59.7	74.0	-14.3	H	P	
15.600	3.0	27.8	38.7	11.4	-32.3	0.0	0.7	46.4	54.0	-7.6	H	A	
10.400	3.0	49.4	37.5	8.9	-34.6	0.0	0.8	62.0	74.0	-12.0	V	P	
10.400	3.0	35.8	37.5	8.9	-34.6	0.0	0.8	48.4	54.0	-5.6	V	A	
15.600	3.0	44.8	38.7	11.4	-32.3	0.0	0.7	63.4	74.0	-10.6	V	P	
15.600	3.0	31.2	38.7	11.4	-32.3	0.0	0.7	49.8	54.0	-4.2	V	A	
<b>5240MHz</b>													
10.480	3.0	44.8	37.5	9.0	-34.5	0.0	0.8	57.6	74.0	-16.4	H	P	
10.480	3.0	33.3	37.5	9.0	-34.5	0.0	0.8	46.0	54.0	-8.0	H	A	
15.720	3.0	41.1	38.4	11.4	-32.3	0.0	0.7	59.4	74.0	-14.6	H	P	
15.720	3.0	27.5	38.4	11.4	-32.3	0.0	0.7	45.8	54.0	-8.2	H	A	
10.480	3.0	51.2	37.5	9.0	-34.5	0.0	0.8	64.0	74.0	-10.0	V	P	
10.480	3.0	38.1	37.5	9.0	-34.5	0.0	0.8	50.9	54.0	-3.1	V	A	
15.720	3.0	42.7	38.4	11.4	-32.3	0.0	0.7	61.0	74.0	-13.0	V	P	
15.720	3.0	29.8	38.4	11.4	-32.3	0.0	0.7	48.1	54.0	-5.9	V	A	

Rev. 4.1.2.7

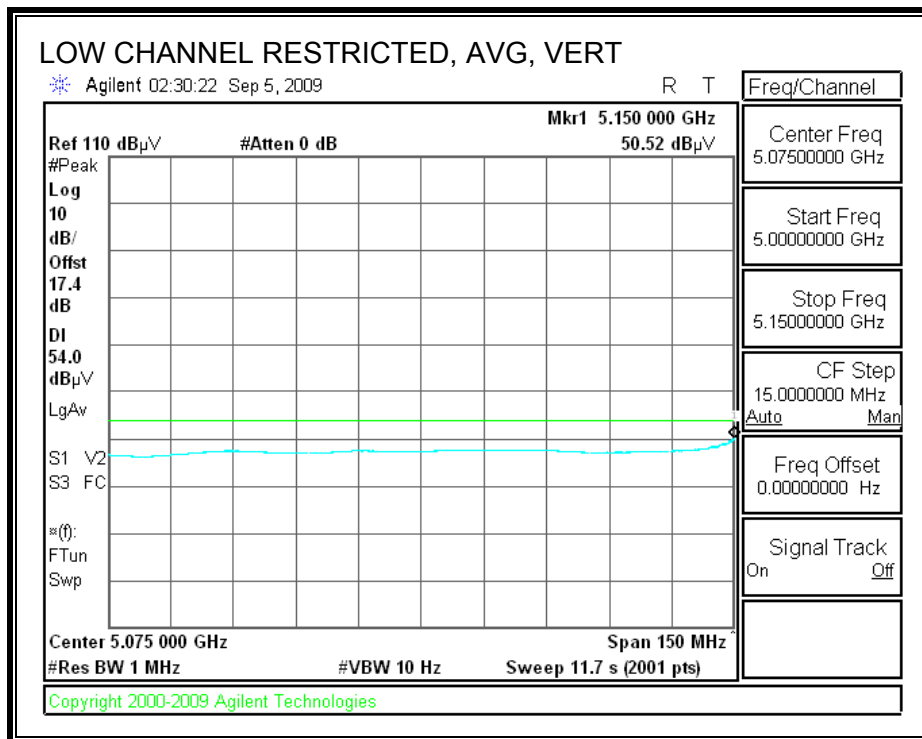
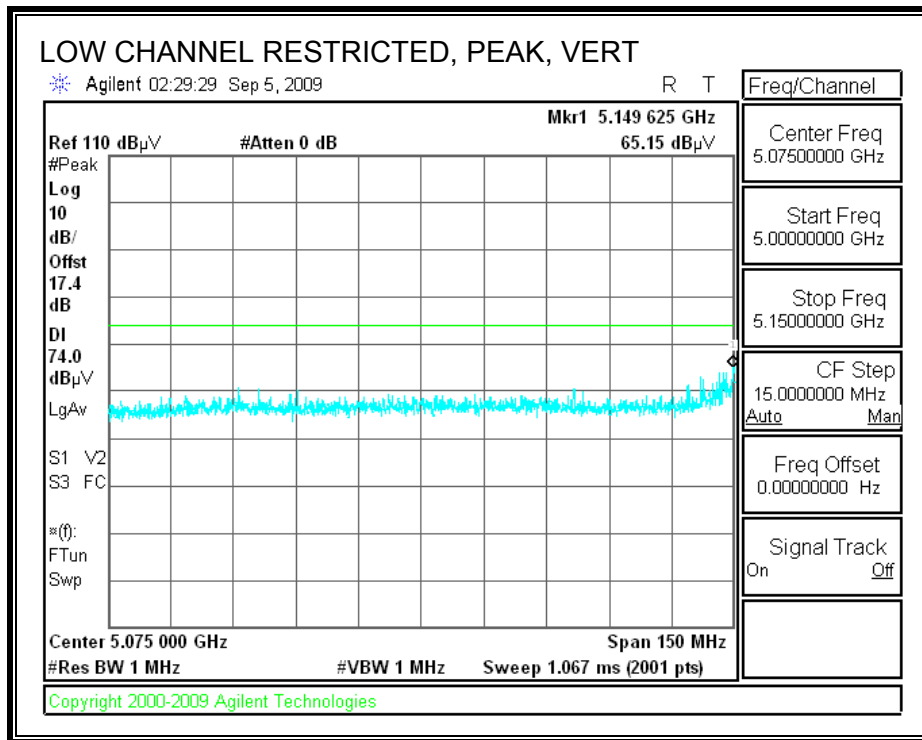
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
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 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

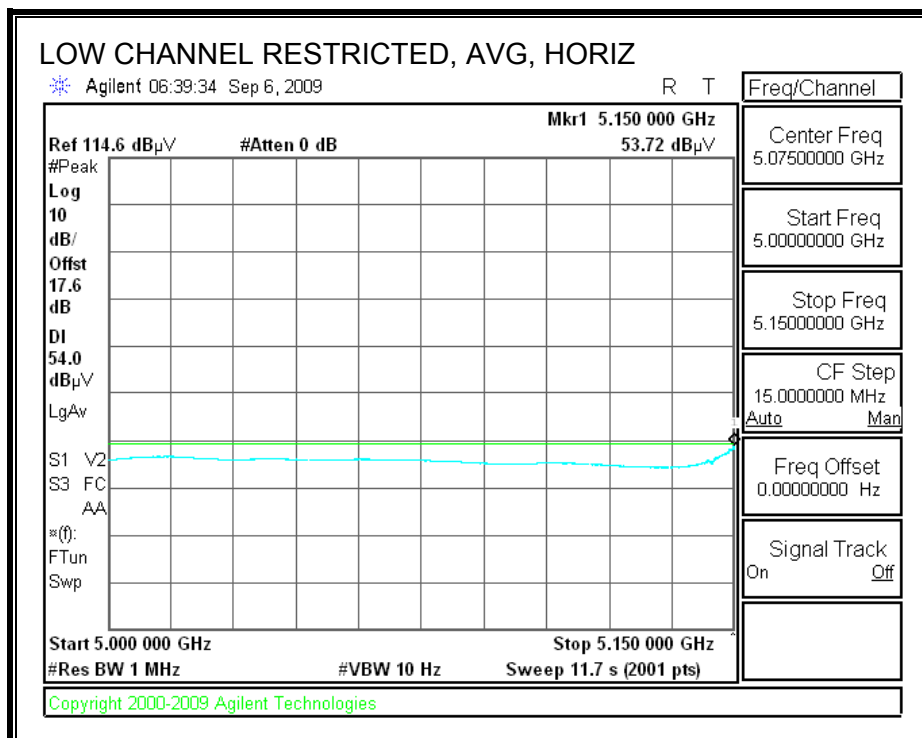
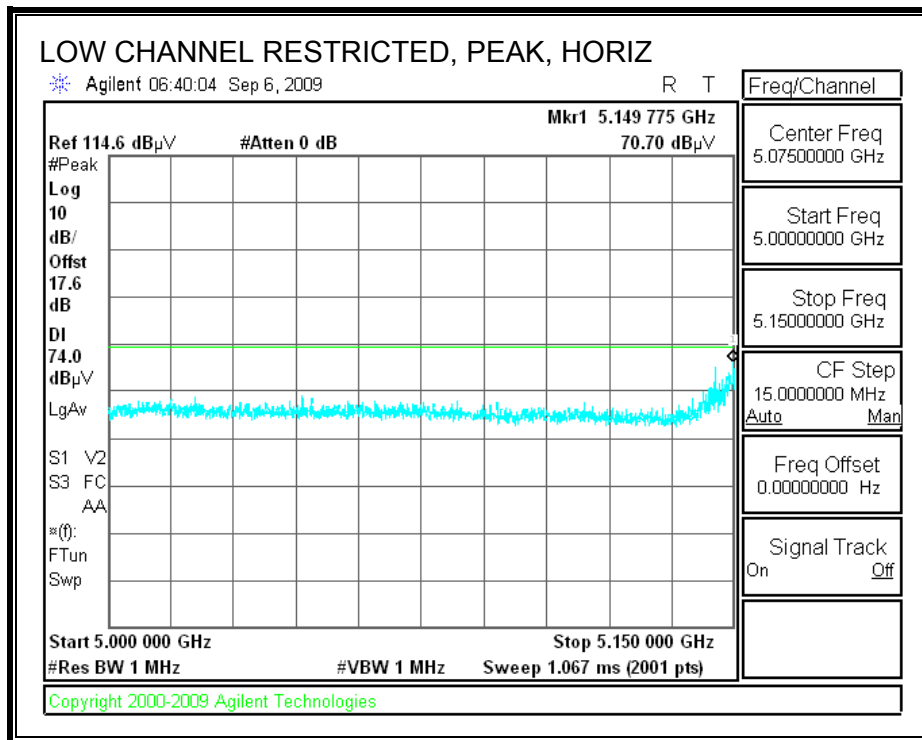
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5180MHz</b>													
10.360	3.0	41.9	37.4	8.9	-34.6	0.0	0.8	54.4	68.2	-13.8	H	P	
15.540	3.0	38.9	38.9	11.3	-32.3	0.0	0.7	57.6	74.0	-16.4	H	P	
15.540	3.0	25.8	38.9	11.3	-32.3	0.0	0.7	44.5	54.0	-9.5	H	A	
10.360	3.0	47.9	37.4	8.9	-34.6	0.0	0.8	60.4	68.2	-7.8	V	P	
15.540	3.0	42.2	38.9	11.3	-32.3	0.0	0.7	60.9	74.0	-13.1	V	P	
15.540	3.0	28.4	38.9	11.3	-32.3	0.0	0.7	47.1	54.0	-6.9	V	A	
<b>5200MHz</b>													
10.400	3.0	42.4	37.5	8.9	-34.6	0.0	0.8	55.0	68.2	-13.2	H	P	
15.600	3.0	38.3	38.7	11.4	-32.3	0.0	0.7	56.9	74.0	-17.1	H	P	
15.600	3.0	25.9	38.7	11.4	-32.3	0.0	0.7	44.4	54.0	-9.6	H	A	
10.400	3.0	47.6	37.5	8.9	-34.6	0.0	0.8	60.2	68.2	-8.0	V	P	
15.600	3.0	41.3	38.7	11.4	-32.3	0.0	0.7	59.9	74.0	-14.1	V	P	
15.600	3.0	28.2	38.7	11.4	-32.3	0.0	0.7	46.7	54.0	-7.3	V	A	
<b>5240MHz</b>													
10.480	3.0	42.2	37.5	9.0	-34.5	0.0	0.8	55.0	68.2	-13.2	H	P	
15.720	3.0	39.4	38.4	11.4	-32.3	0.0	0.7	57.7	74.0	-16.3	H	P	
15.720	3.0	26.3	38.4	11.4	-32.3	0.0	0.7	44.6	54.0	-9.4	H	A	
10.480	3.0	48.7	37.5	9.0	-34.5	0.0	0.8	61.5	68.2	-6.7	V	P	
15.720	3.0	39.4	38.4	11.4	-32.3	0.0	0.7	57.7	74.0	-16.3	V	P	
15.720	3.0	27.2	38.4	11.4	-32.3	0.0	0.7	45.5	54.0	-8.5	V	A	

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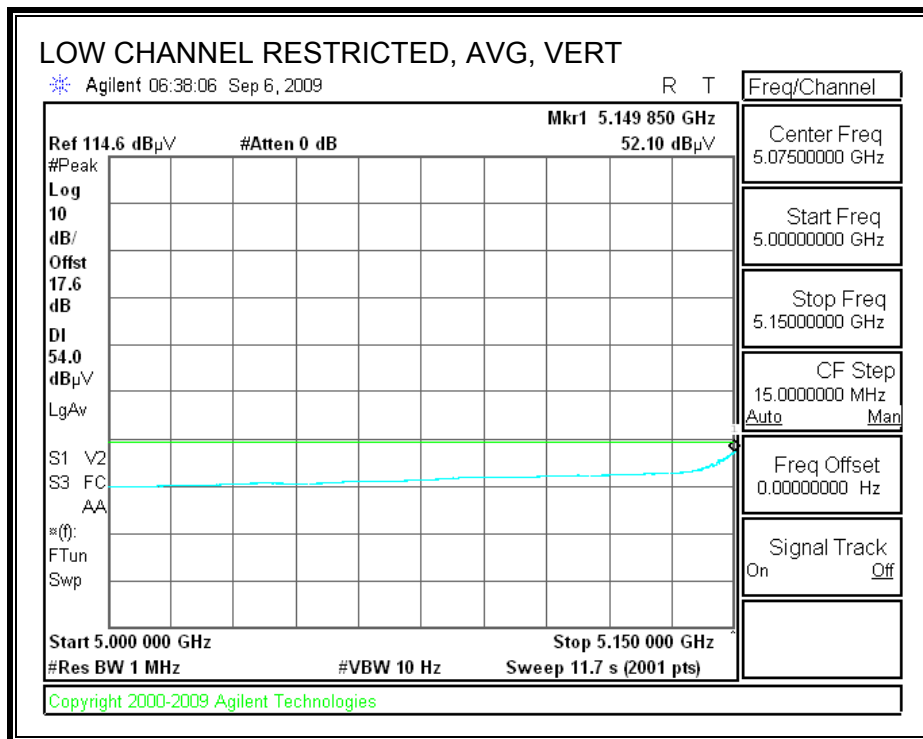
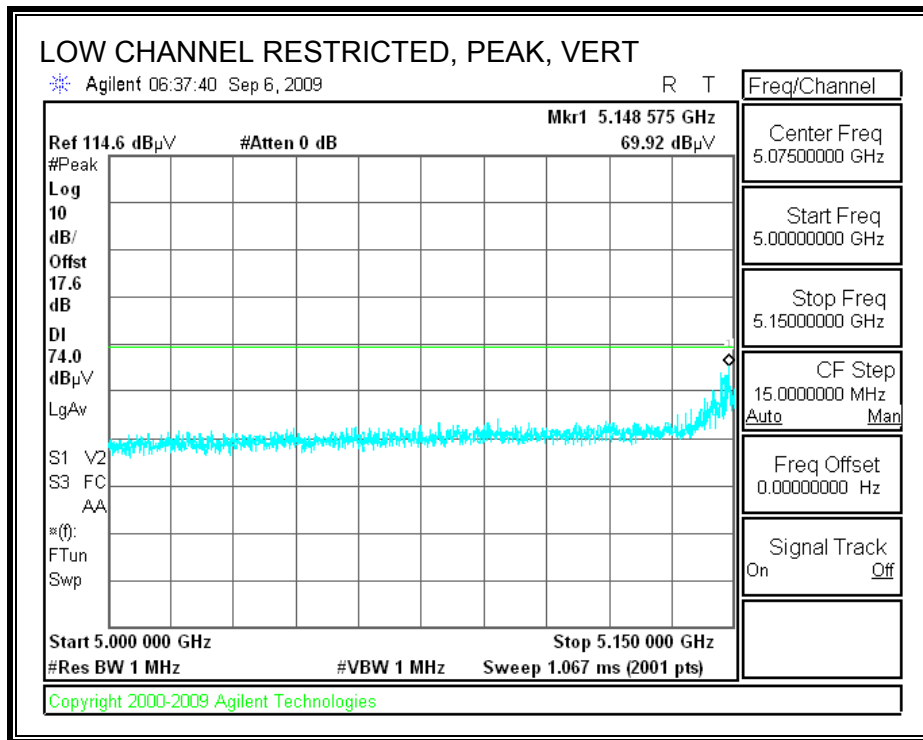
Note: No other emissions were detected above the system noise floor.

### 8.2.2. 802.11n HT20 MODE IN THE LOWER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

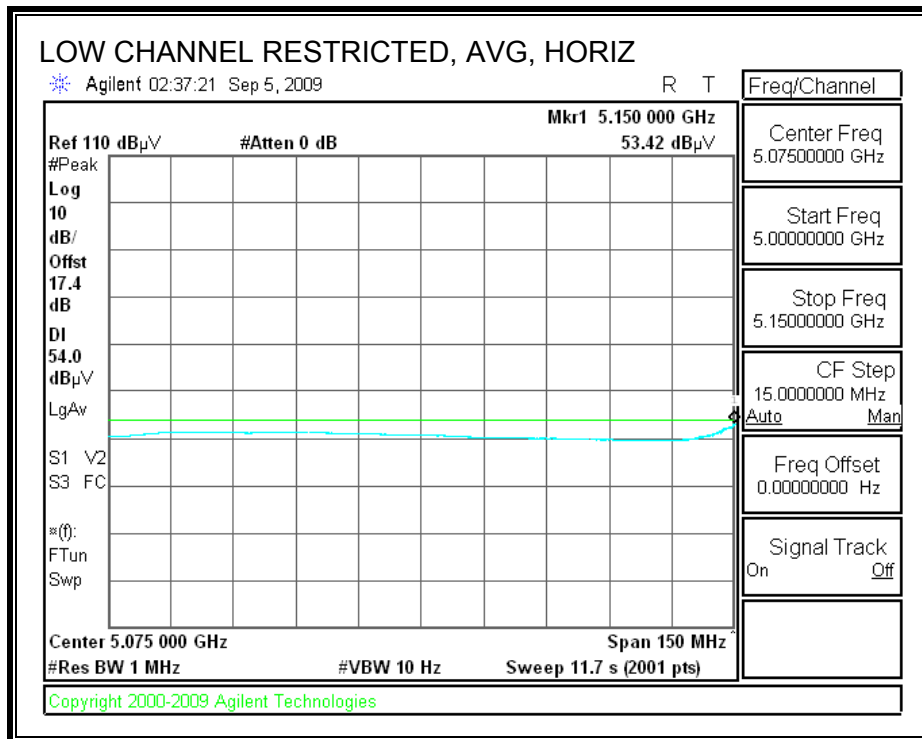
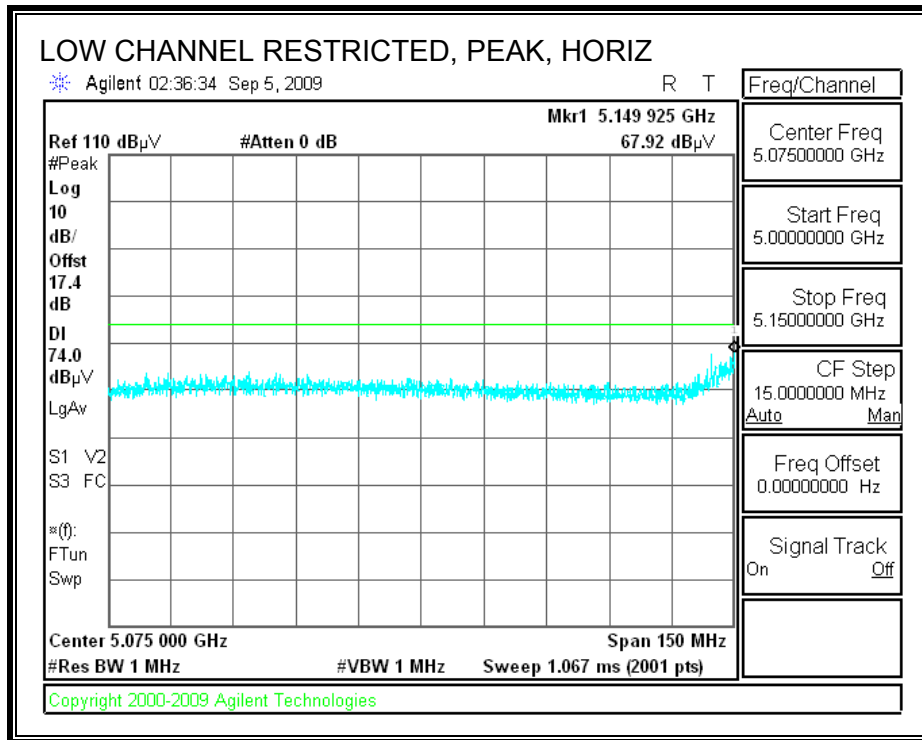
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5180MHz</b>													
10.360	3.0	44.3	37.4	8.9	-34.6	0.0	0.8	56.8	68.2	-11.4	H	P	
15.540	3.0	40.5	38.9	11.3	-32.3	0.0	0.7	59.2	74.0	-14.8	H	P	
15.540	3.0	26.8	38.9	11.3	-32.3	0.0	0.7	45.5	54.0	-8.5	H	A	
10.360	3.0	46.5	37.4	8.9	-34.6	0.0	0.8	59.0	68.2	-9.2	V	P	
15.540	3.0	41.8	38.9	11.3	-32.3	0.0	0.7	60.5	74.0	-13.5	V	P	
15.540	3.0	28.4	38.9	11.3	-32.3	0.0	0.7	47.1	54.0	-6.9	V	A	
<b>5200MHz</b>													
10.400	3.0	42.2	37.5	8.9	-34.6	0.0	0.8	54.8	68.2	-13.4	H	P	
15.600	3.0	39.4	38.7	11.4	-32.3	0.0	0.7	57.9	74.0	-16.1	H	P	
15.600	3.0	26.4	38.7	11.4	-32.3	0.0	0.7	45.0	54.0	-9.0	H	A	
10.400	3.0	46.9	37.5	8.9	-34.6	0.0	0.8	59.5	68.2	-8.7	V	P	
15.600	3.0	43.1	38.7	11.4	-32.3	0.0	0.7	61.7	74.0	-12.3	V	P	
15.600	3.0	29.9	38.7	11.4	-32.3	0.0	0.7	48.4	54.0	-5.6	V	A	
<b>5240MHz</b>													
10.480	3.0	45.6	37.5	9.0	-34.5	0.0	0.8	58.4	68.2	-9.8	H	P	
15.720	3.0	42.6	38.4	11.4	-32.3	0.0	0.7	60.9	74.0	-13.1	H	P	
15.720	3.0	28.6	38.4	11.4	-32.3	0.0	0.7	46.9	54.0	-7.1	H	A	
10.480	3.0	47.8	37.5	9.0	-34.5	0.0	0.8	60.6	68.2	-7.6	V	P	
15.720	3.0	45.5	38.4	11.4	-32.3	0.0	0.7	63.8	74.0	-10.2	V	P	
15.720	3.0	31.4	38.4	11.4	-32.3	0.0	0.7	49.6	54.0	-4.4	V	A	

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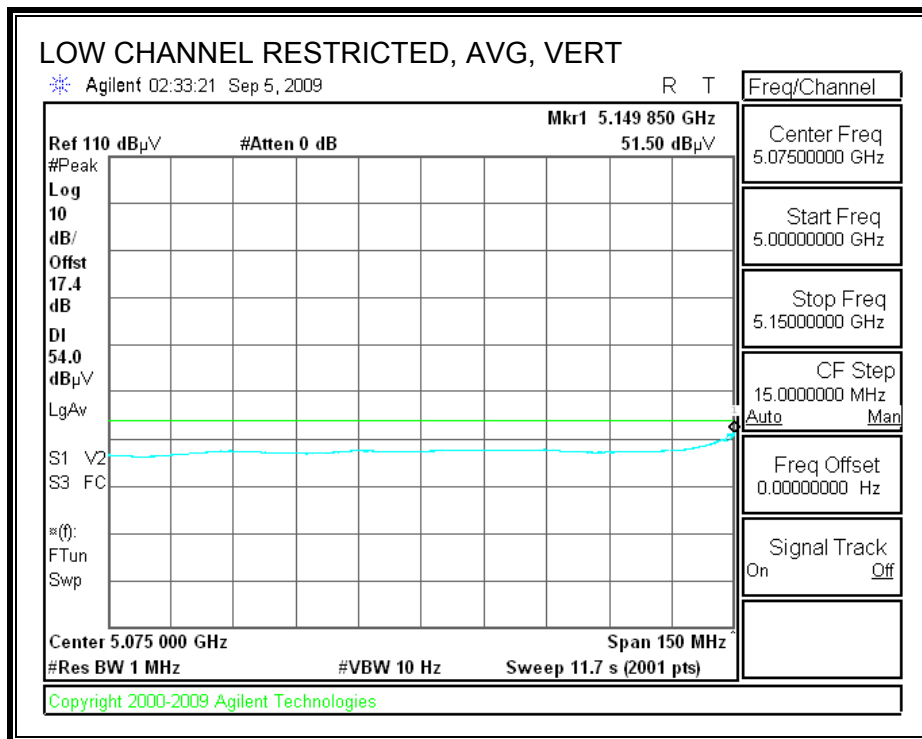
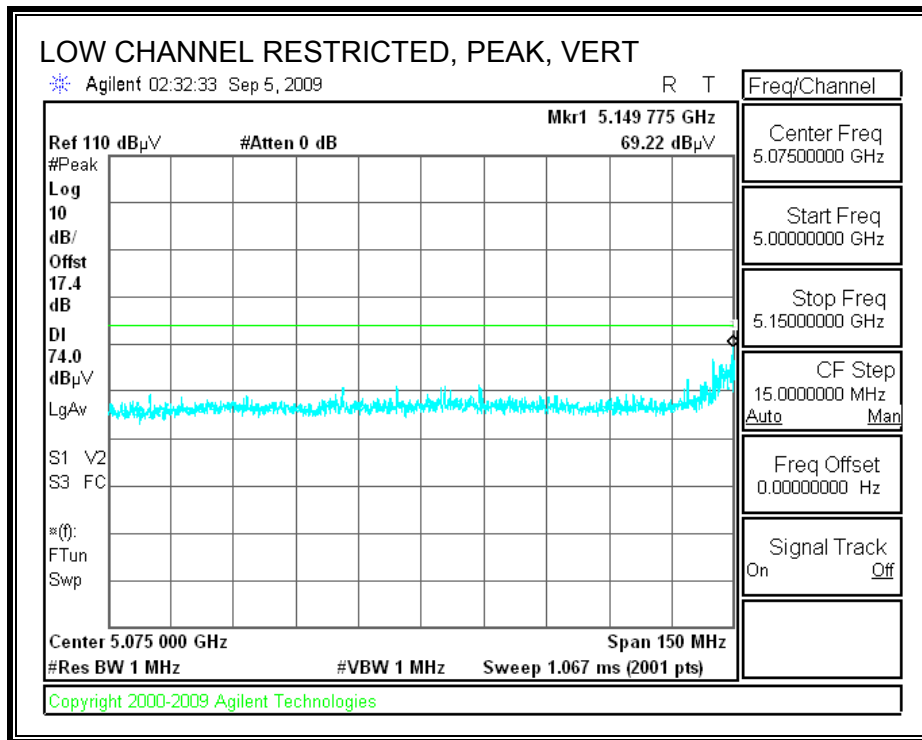
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

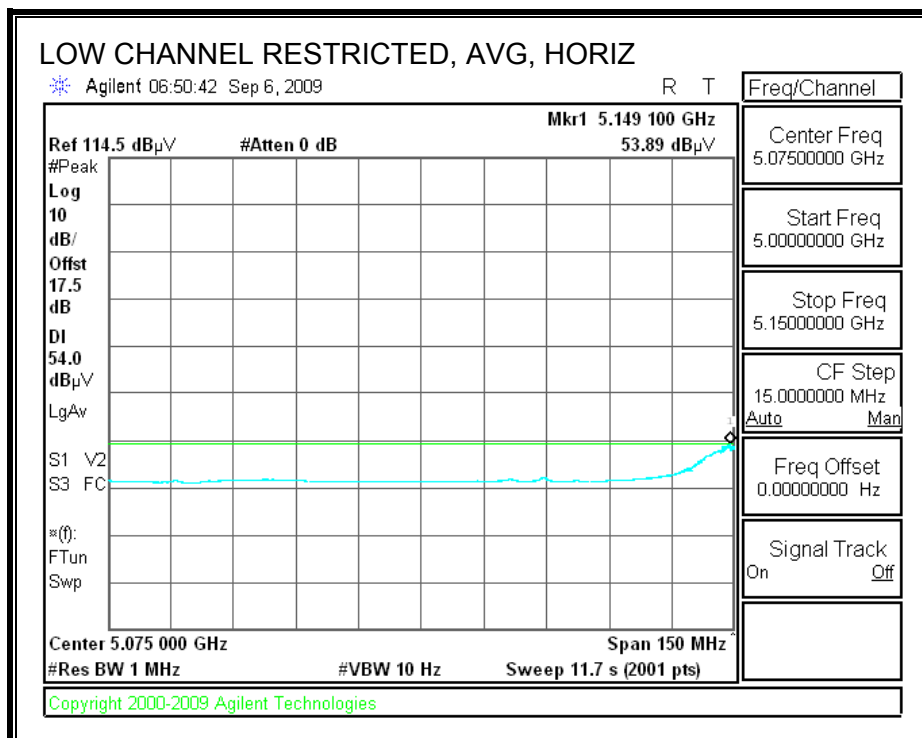
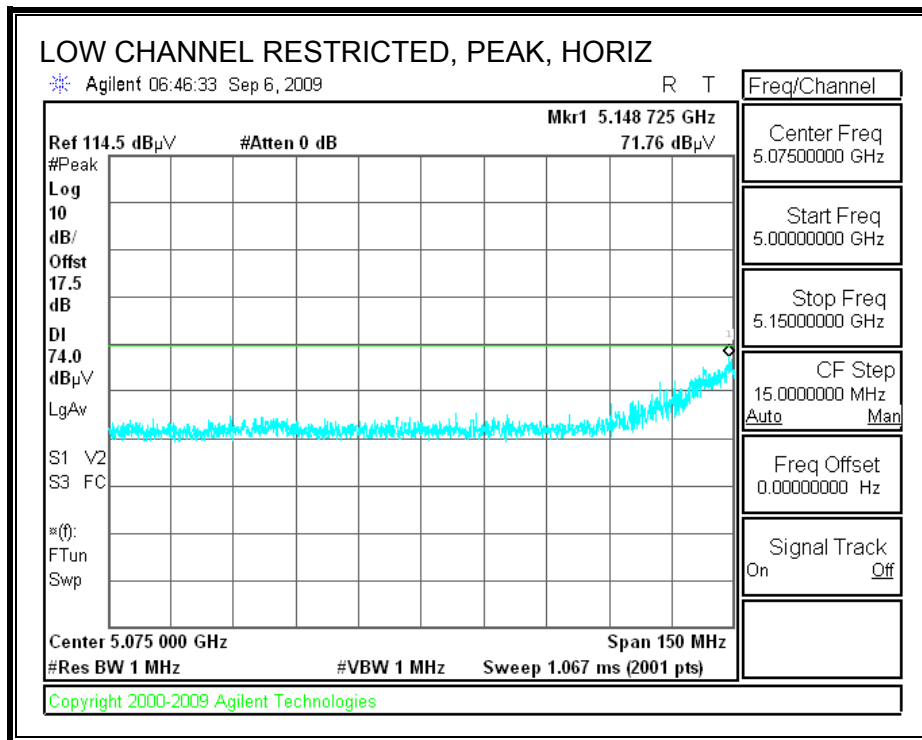
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5180MHz</b>													
10.360	3.0	39.9	37.4	8.9	-34.6	0.0	0.8	52.4	68.2	-15.8	H	P	
15.540	3.0	38.1	38.9	11.3	-32.3	0.0	0.7	56.8	74.0	-17.2	H	P	
15.540	3.0	25.6	38.9	11.3	-32.3	0.0	0.7	44.3	54.0	-9.7	H	A	
10.360	3.0	46.4	37.4	8.9	-34.6	0.0	0.8	58.9	68.2	-9.3	V	P	
15.540	3.0	43.9	38.9	11.3	-32.3	0.0	0.7	62.5	74.0	-11.5	V	P	
15.540	3.0	28.7	38.9	11.3	-32.3	0.0	0.7	47.4	54.0	-6.6	V	A	
<b>5200MHz</b>													
10.400	3.0	43.3	37.5	8.9	-34.6	0.0	0.8	55.9	68.2	-12.3	H	P	
15.600	3.0	38.0	38.7	11.4	-32.3	0.0	0.7	56.5	74.0	-17.5	H	P	
15.600	3.0	25.5	38.7	11.4	-32.3	0.0	0.7	44.0	54.0	-10.0	H	A	
10.400	3.0	47.1	37.5	8.9	-34.6	0.0	0.8	59.7	68.2	-8.5	V	P	
15.600	3.0	41.6	38.7	11.4	-32.3	0.0	0.7	60.1	74.0	-13.9	V	P	
15.600	3.0	28.6	38.7	11.4	-32.3	0.0	0.7	47.2	54.0	-6.8	V	A	
<b>5240MHz</b>													
10.480	3.0	40.7	37.5	9.0	-34.5	0.0	0.8	53.5	68.2	-14.7	H	P	
15.720	3.0	38.4	38.4	11.4	-32.3	0.0	0.7	56.7	74.0	-17.3	H	P	
15.720	3.0	25.3	38.4	11.4	-32.3	0.0	0.7	43.6	54.0	-10.4	H	A	
10.480	3.0	47.3	37.5	9.0	-34.5	0.0	0.8	60.0	68.2	-8.2	V	P	
15.720	3.0	41.2	38.4	11.4	-32.3	0.0	0.7	59.5	74.0	-14.5	V	P	
15.720	3.0	27.5	38.4	11.4	-32.3	0.0	0.7	45.8	54.0	-8.2	V	A	

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

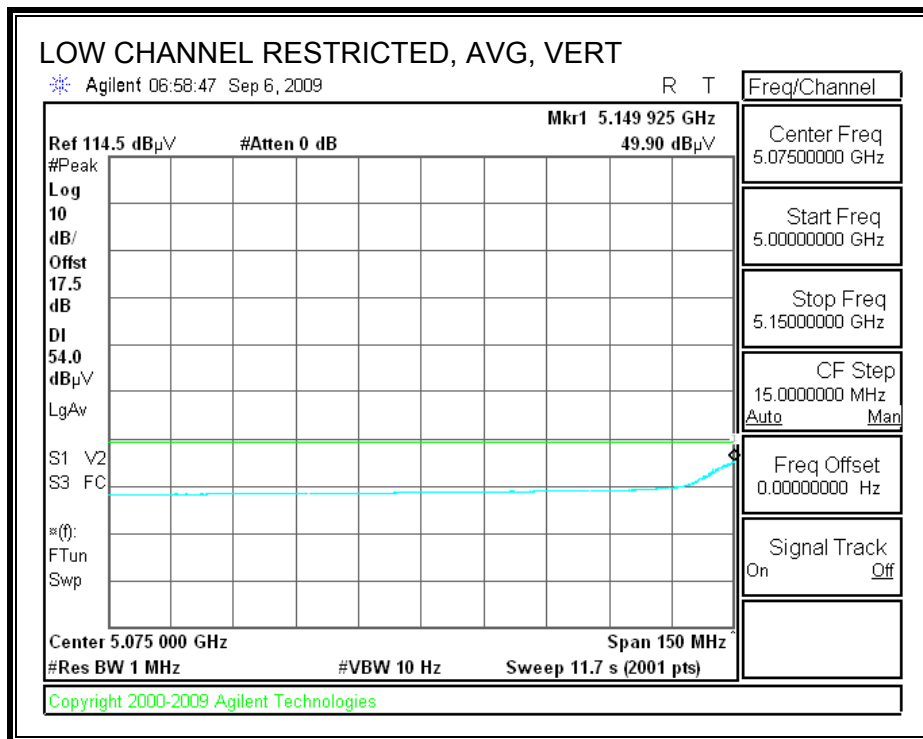
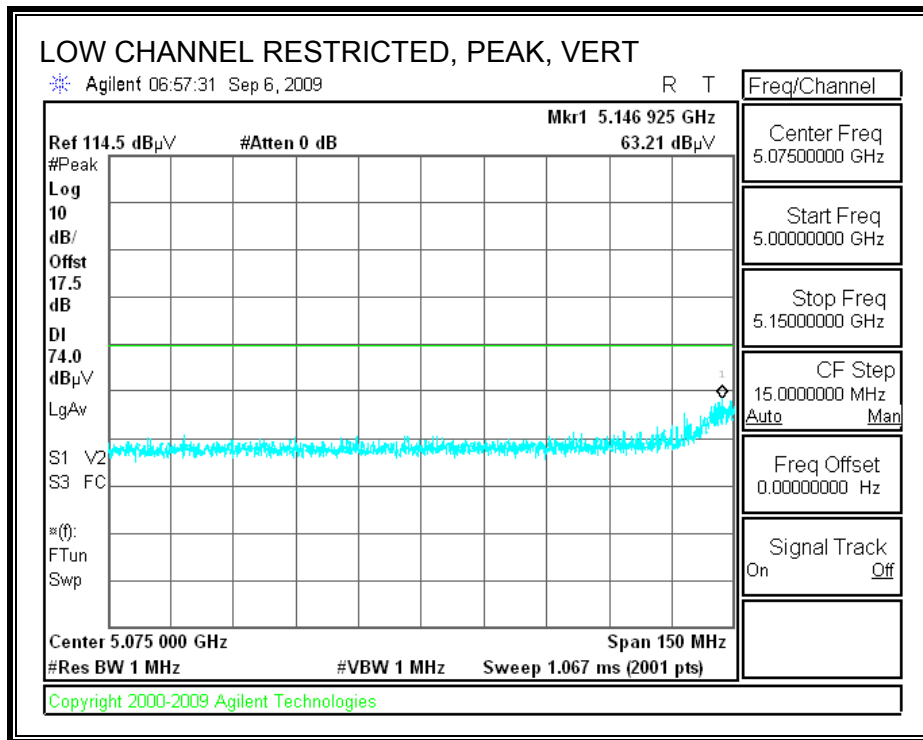
### 8.2.3. 802.11n HT40 MODE IN THE LOWER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT40

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

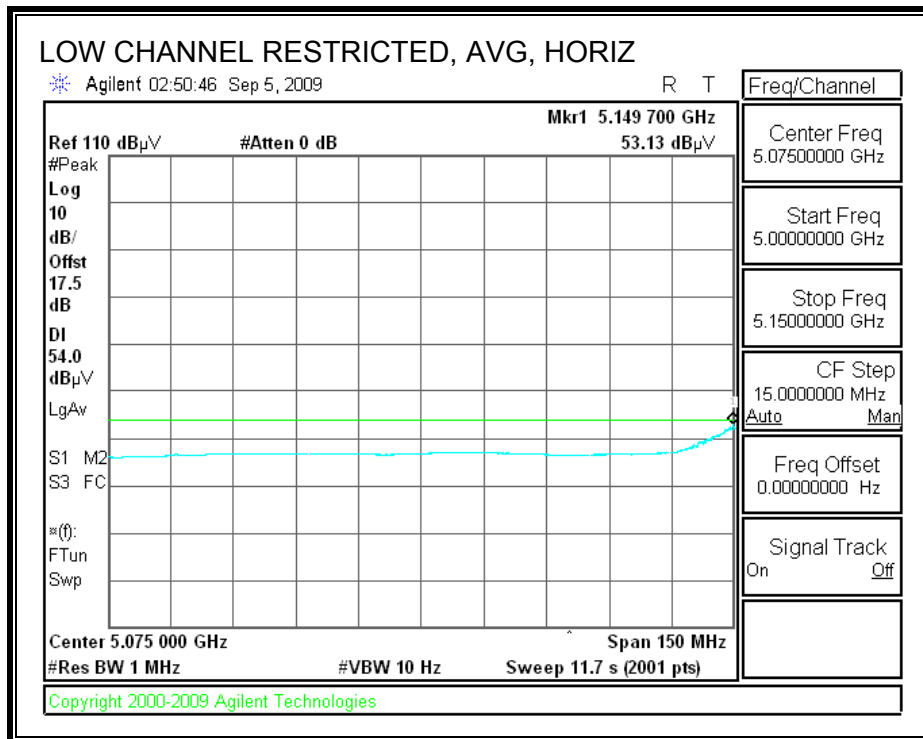
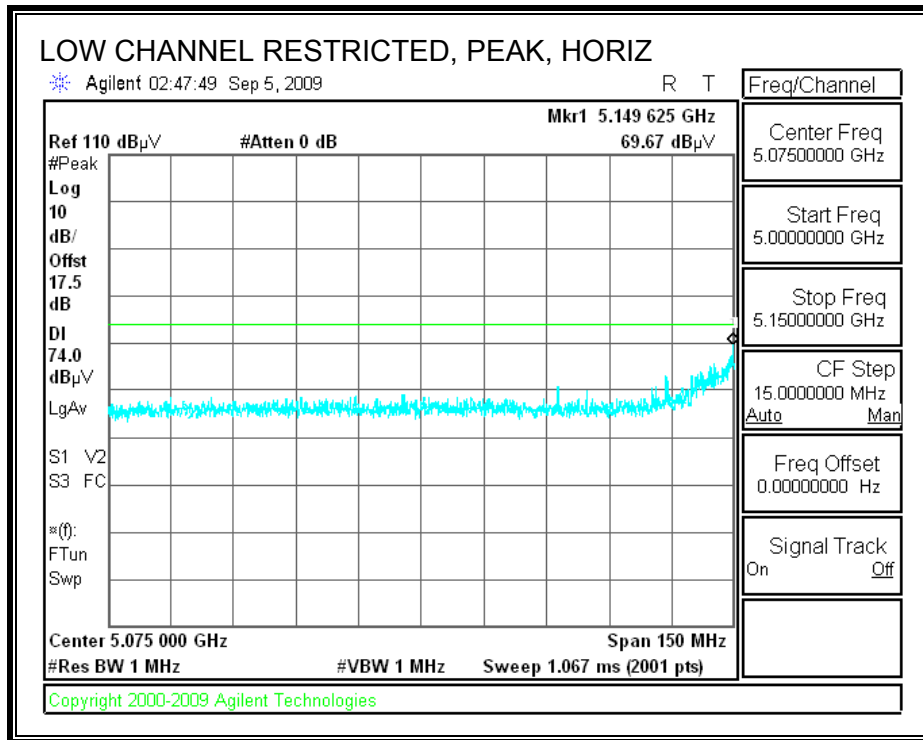
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5190MHz</b>													
10.380	3.0	38.2	37.4	8.9	-34.6	0.0	0.8	50.7	68.2	-17.5	H	P	
15.570	3.0	34.8	38.8	11.4	-32.3	0.0	0.7	53.4	74.0	-20.6	H	P	
15.570	3.0	22.4	38.8	11.4	-32.3	0.0	0.7	41.0	54.0	-13.0	H	A	
10.380	3.0	36.6	37.4	8.9	-34.6	0.0	0.8	49.1	68.2	-19.1	V	P	
15.570	3.0	35.3	38.8	11.4	-32.3	0.0	0.7	53.9	74.0	-20.1	V	P	
15.570	3.0	22.3	38.8	11.4	-32.3	0.0	0.7	40.9	54.0	-13.1	V	A	
<b>5230MHz</b>													
10.460	3.0	42.8	37.5	9.0	-34.5	0.0	0.8	55.5	68.2	-12.7	H	P	
15.690	3.0	39.0	38.5	11.4	-32.3	0.0	0.7	57.3	74.0	-16.7	H	P	
15.690	3.0	25.9	38.5	11.4	-32.3	0.0	0.7	44.3	54.0	-9.7	H	A	
10.460	3.0	45.7	37.5	9.0	-34.5	0.0	0.8	58.4	68.2	-9.8	V	P	
15.690	3.0	39.8	38.5	11.4	-32.3	0.0	0.7	58.2	74.0	-15.8	V	P	
15.690	3.0	27.7	38.5	11.4	-32.3	0.0	0.7	46.0	54.0	-8.0	V	A	

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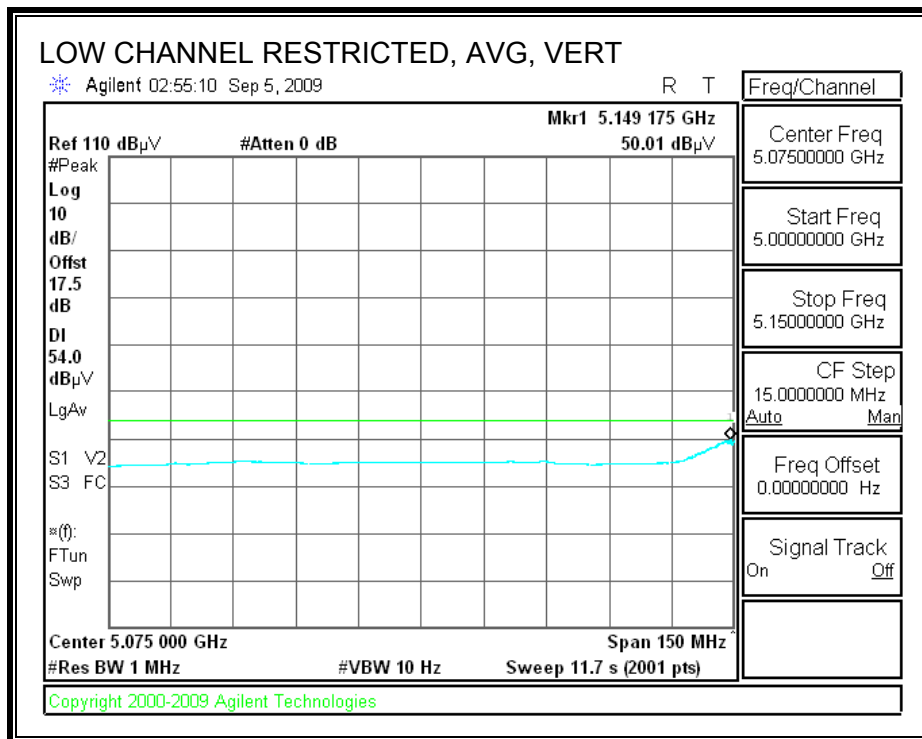
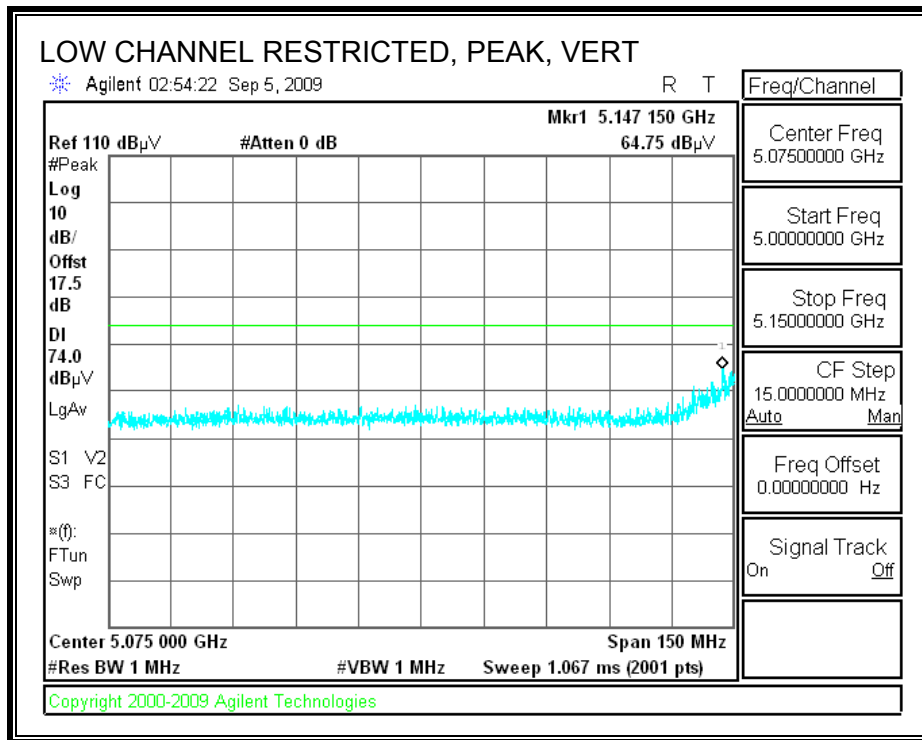
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_HT40

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

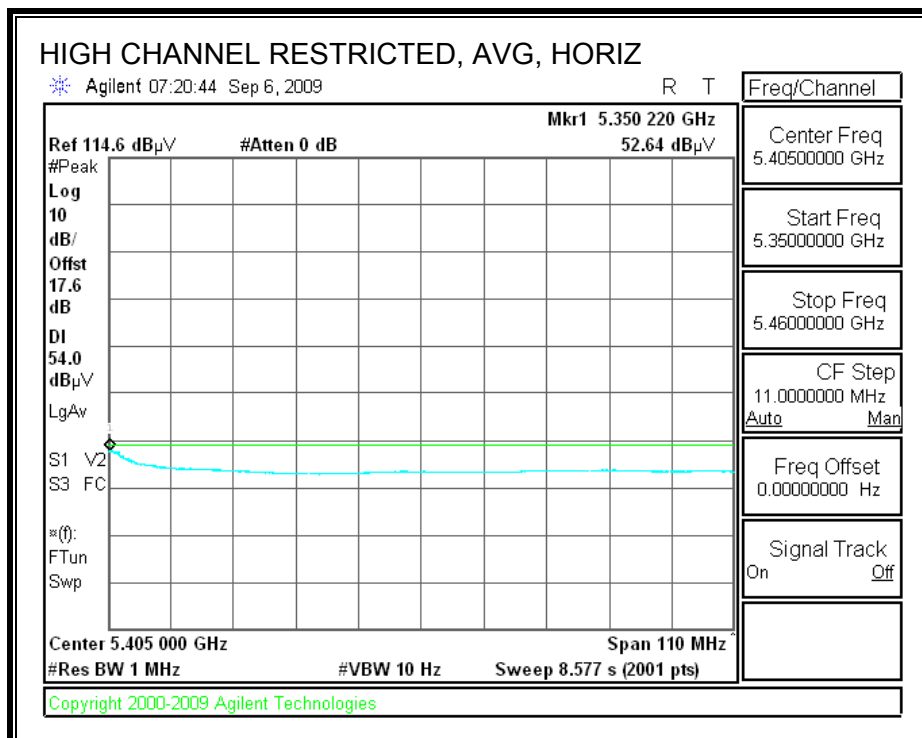
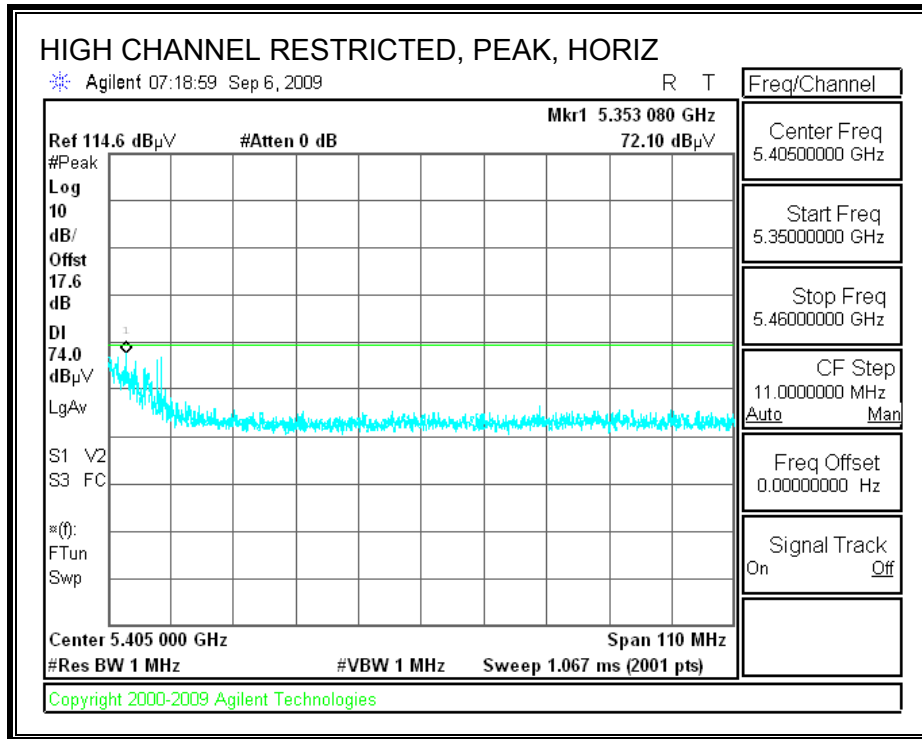
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5190MHz</b>													
10.380	3.0	39.9	37.4	8.9	-34.6	0.0	0.8	52.5	68.2	-15.7	H	P	
15.570	3.0	36.6	38.8	11.4	-32.3	0.0	0.7	55.2	74.0	-18.8	H	P	
15.570	3.0	24.6	38.8	11.4	-32.3	0.0	0.7	43.2	54.0	-10.8	H	A	
10.380	3.0	41.4	37.4	8.9	-34.6	0.0	0.8	53.9	68.2	-14.3	V	P	
15.570	3.0	38.2	38.8	11.4	-32.3	0.0	0.7	56.8	74.0	-17.2	V	P	
15.570	3.0	26.0	38.8	11.4	-32.3	0.0	0.7	44.6	54.0	-9.4	V	A	
<b>5230MHz</b>													
10.460	3.0	37.7	37.5	9.0	-34.5	0.0	0.8	50.5	68.2	-17.7	H	P	
15.690	3.0	35.7	38.5	11.4	-32.3	0.0	0.7	54.1	74.0	-19.9	H	P	
15.690	3.0	23.4	38.5	11.4	-32.3	0.0	0.7	41.8	54.0	-12.2	H	A	
10.460	3.0	44.3	37.5	9.0	-34.5	0.0	0.8	57.0	68.2	-11.2	V	P	
15.690	3.0	38.1	38.5	11.4	-32.3	0.0	0.7	56.5	74.0	-17.5	V	P	
15.690	3.0	25.1	38.5	11.4	-32.3	0.0	0.7	43.4	54.0	-10.6	V	A	

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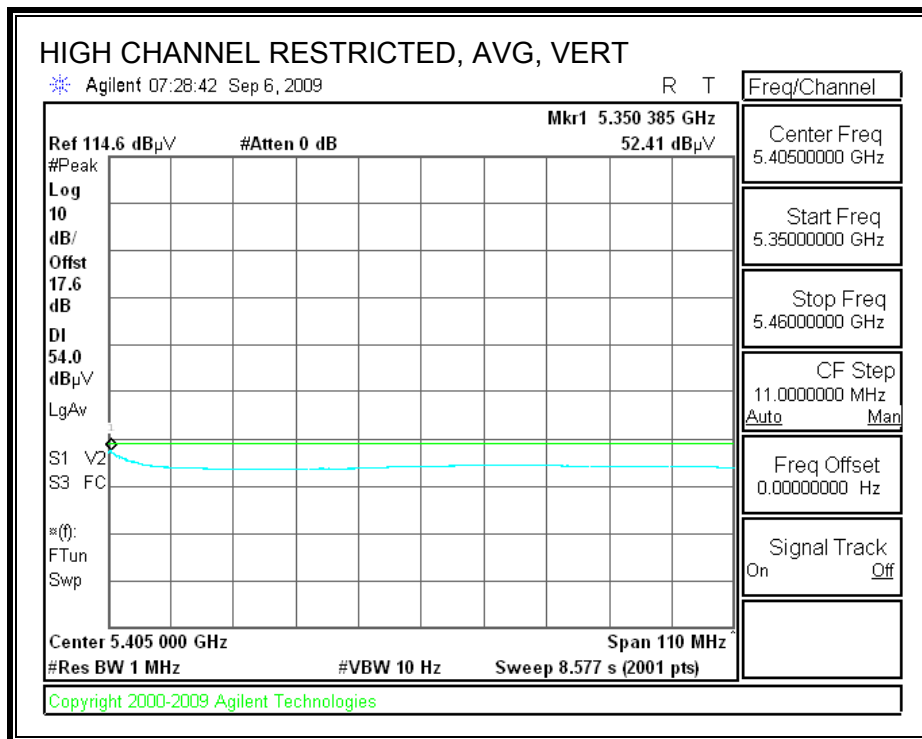
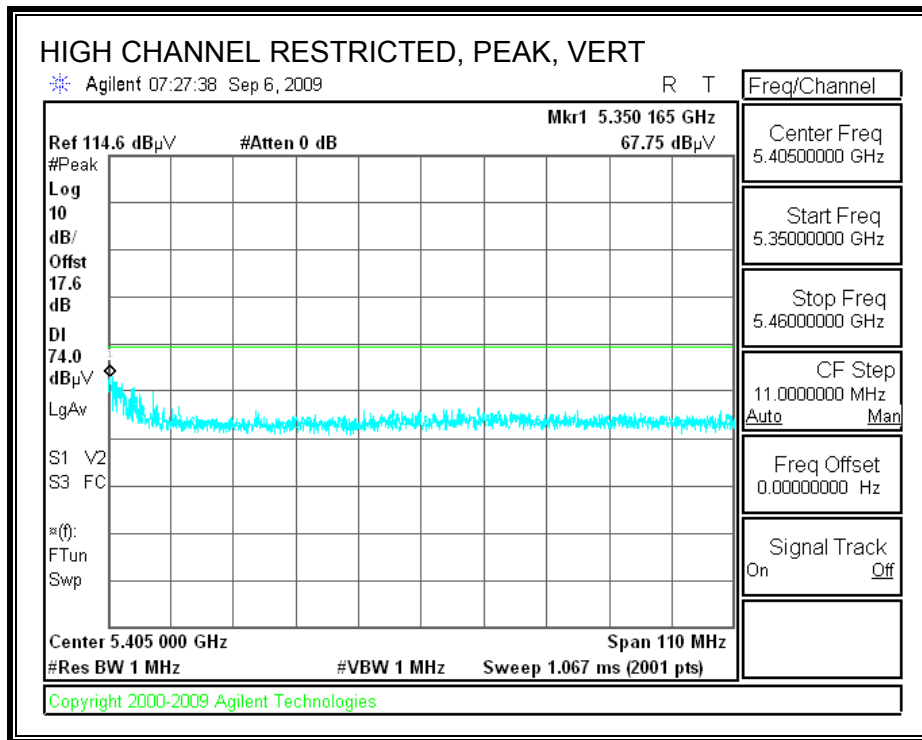
Note: No other emissions were detected above the system noise floor.

### 8.2.4. 802.11a DUAL CHAIN LEGACY MODE IN THE UPPER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5260MHz</b>													
10.520	3.0	45.2	37.5	9.0	-34.4	0.0	0.8	58.0	68.2	-10.2	H	P	
15.780	3.0	41.7	38.2	11.5	-32.2	0.0	0.7	59.9	74.0	-14.1	H	P	
15.780	3.0	28.2	38.2	11.5	-32.2	0.0	0.7	46.4	54.0	-7.6	H	A	
10.520	3.0	47.8	37.5	9.0	-34.4	0.0	0.8	60.7	68.2	-7.5	V	P	
15.780	3.0	44.2	38.2	11.5	-32.2	0.0	0.7	62.4	74.0	-11.6	V	P	
15.780	3.0	30.6	38.2	11.5	-32.2	0.0	0.7	48.8	54.0	-5.2	V	A	
<b>5300MHz</b>													
10.600	3.0	50.2	37.5	9.0	-34.3	0.0	0.8	63.2	74.0	-10.8	H	P	
10.600	3.0	37.3	37.5	9.0	-34.3	0.0	0.8	50.3	54.0	-3.7	H	A	
15.900	3.0	40.9	37.9	11.5	-32.2	0.0	0.7	58.9	74.0	-15.1	H	P	
15.900	3.0	28.0	37.9	11.5	-32.2	0.0	0.7	45.9	54.0	-8.1	H	A	
10.600	3.0	50.7	37.5	9.0	-34.3	0.0	0.8	63.7	74.0	-10.3	V	P	
10.600	3.0	37.7	37.5	9.0	-34.3	0.0	0.8	50.8	54.0	-3.2	V	A	
15.900	3.0	45.0	37.9	11.5	-32.2	0.0	0.7	62.9	74.0	-11.1	V	P	
15.900	3.0	32.0	37.9	11.5	-32.2	0.0	0.7	49.9	54.0	-4.1	V	A	
<b>5320MHz</b>													
10.640	3.0	50.5	37.6	9.1	-34.2	0.0	0.8	63.6	74.0	-10.4	H	P	
10.640	3.0	36.0	37.6	9.1	-34.2	0.0	0.8	49.1	54.0	-4.9	H	A	
15.960	3.0	41.9	37.7	11.5	-32.2	0.0	0.7	59.7	74.0	-14.3	H	P	
15.960	3.0	28.8	37.7	11.5	-32.2	0.0	0.7	46.6	54.0	-7.4	H	A	
10.640	3.0	52.8	37.6	9.1	-34.2	0.0	0.8	65.9	74.0	-8.1	V	P	
10.640	3.0	37.9	37.6	9.1	-34.2	0.0	0.8	51.0	54.0	-3.0	V	A	
15.960	3.0	47.0	37.7	11.5	-32.2	0.0	0.7	64.8	74.0	-9.2	V	P	
15.960	3.0	30.9	37.7	11.5	-32.2	0.0	0.7	48.7	54.0	-5.3	V	A	

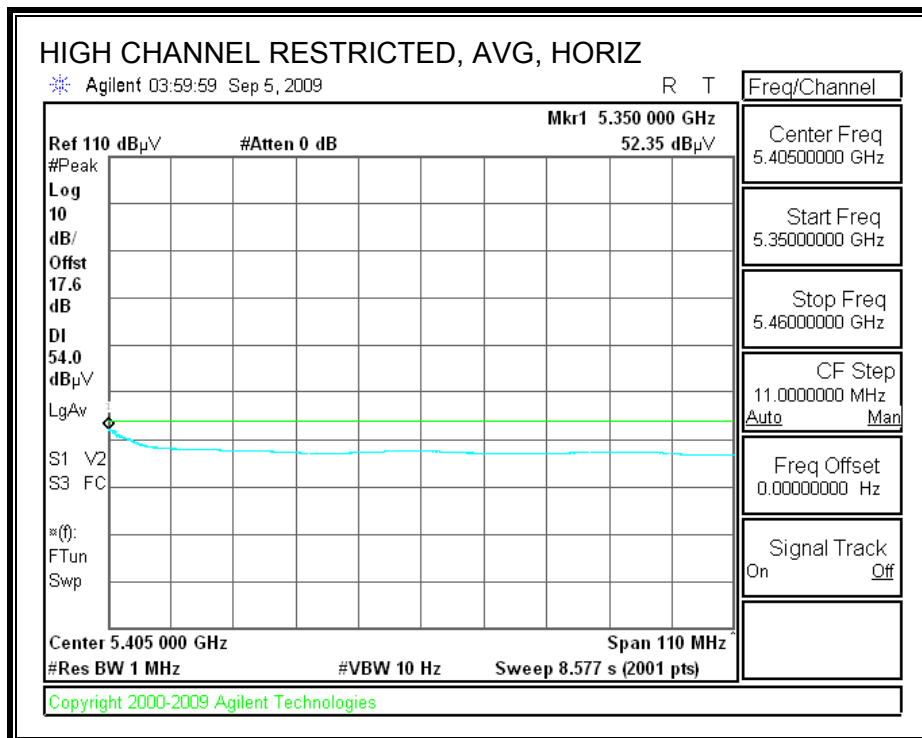
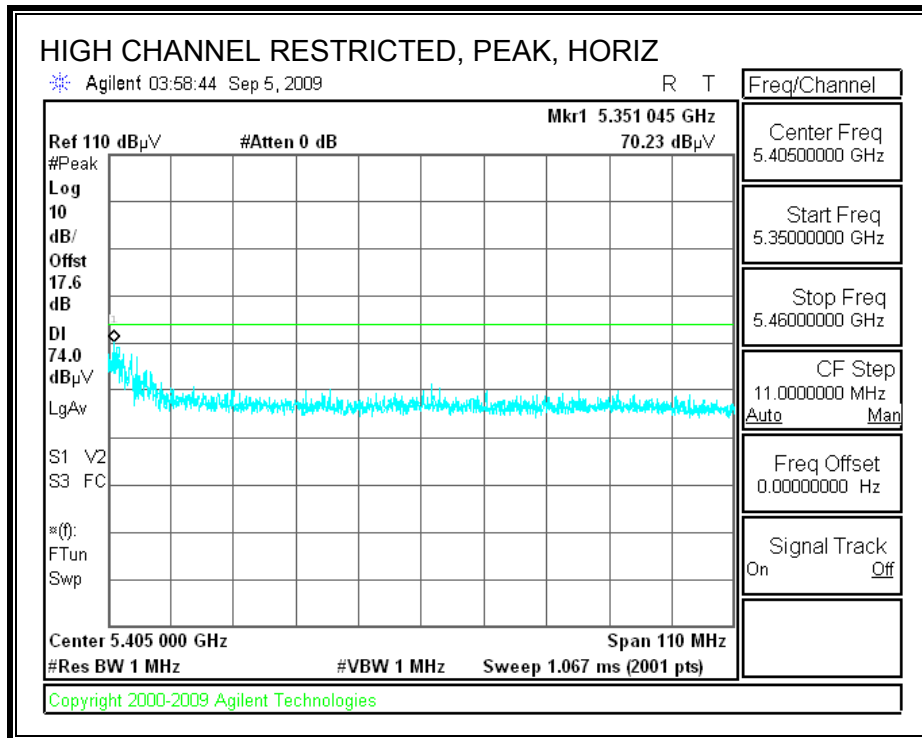
Rev. 4.1.2.7

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

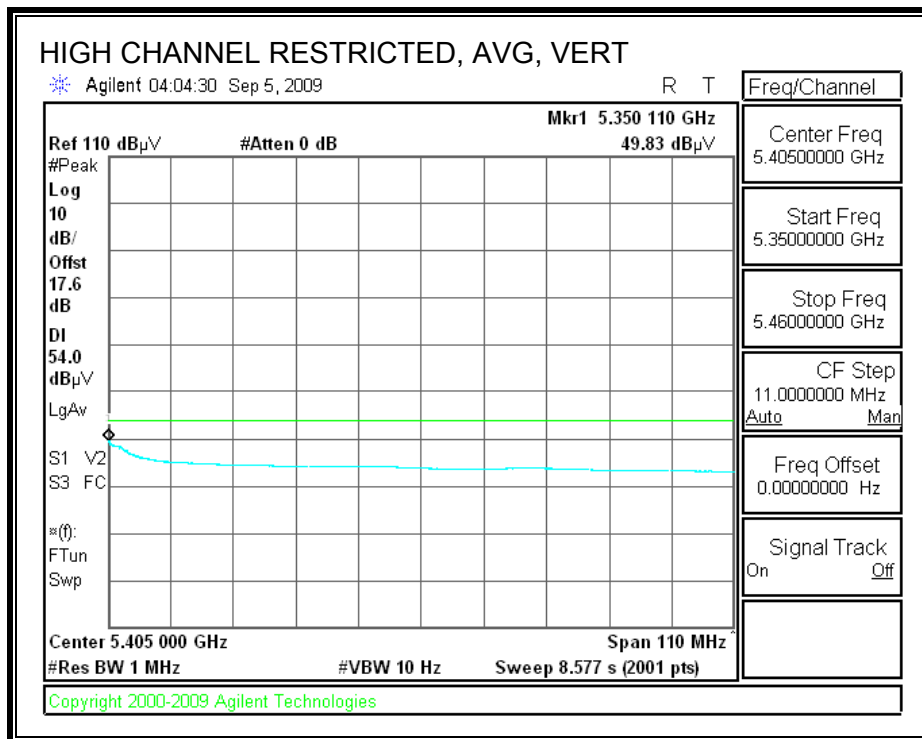
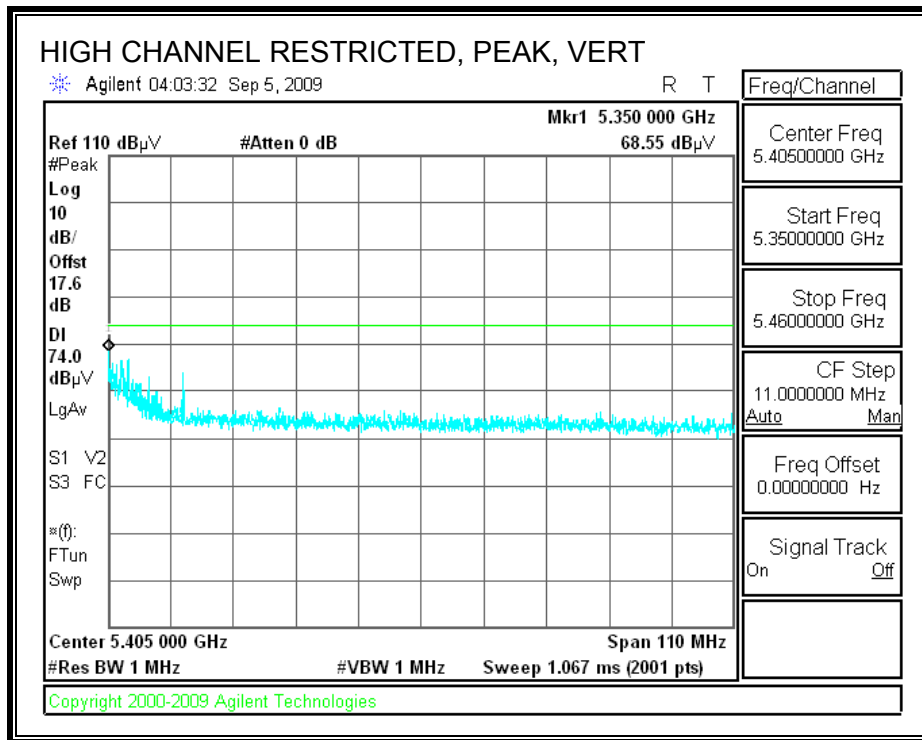


**PIFA ANTENNA**

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

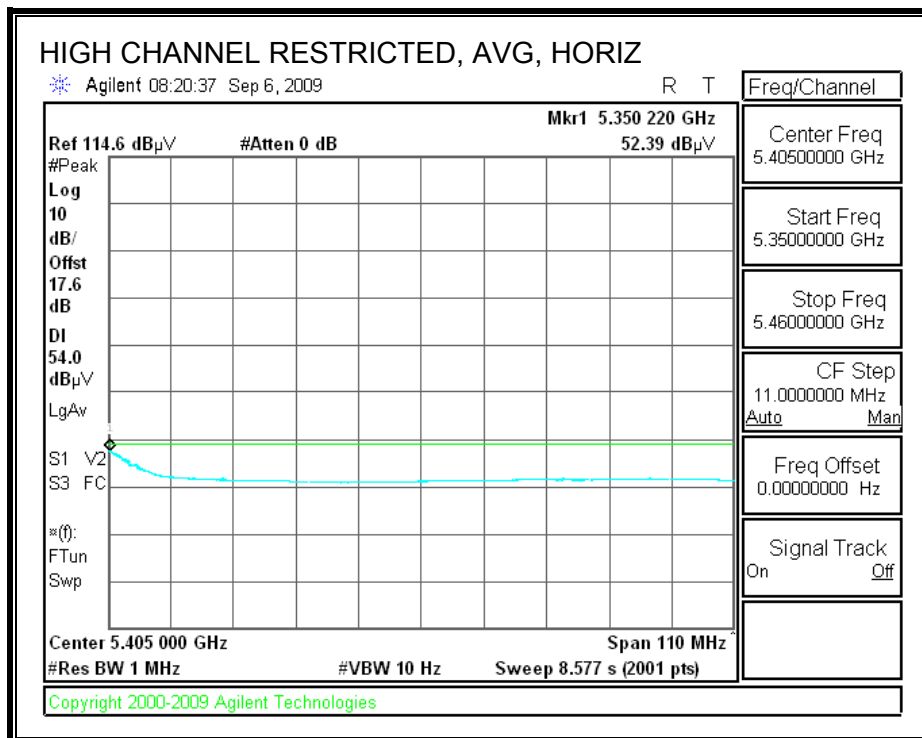
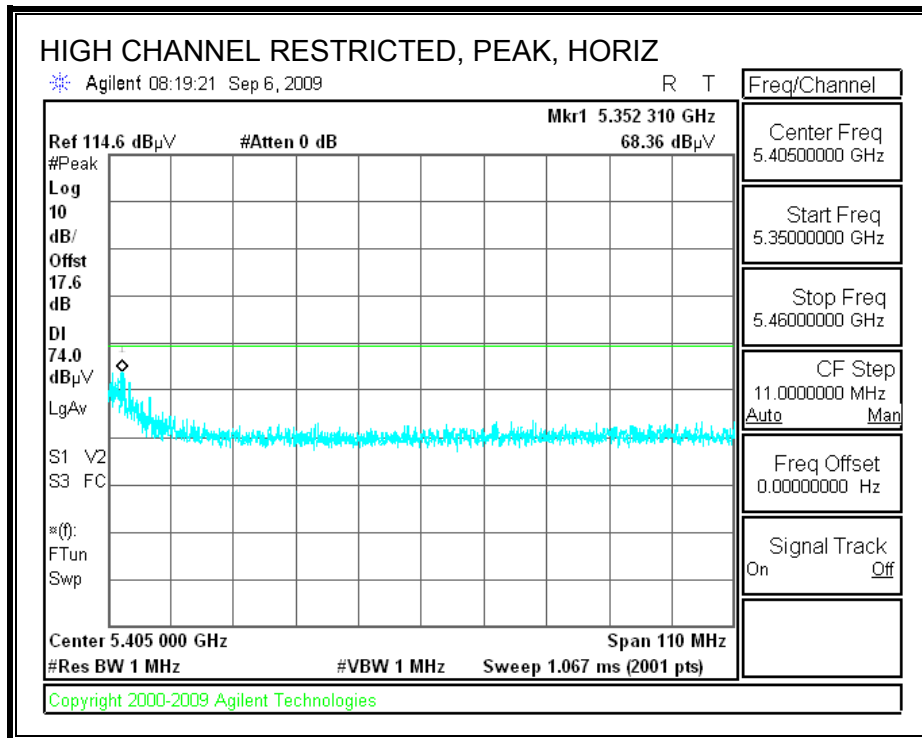
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5260MHz</b>													
10.520	3.0	39.9	37.5	9.0	-34.4	0.0	0.8	52.7	68.2	-15.5	H	P	
15.780	3.0	37.7	38.2	11.5	-32.2	0.0	0.7	55.9	74.0	-18.1	H	P	
15.780	3.0	25.8	38.2	11.5	-32.2	0.0	0.7	44.0	54.0	-10.0	H	A	
10.520	3.0	47.7	37.5	9.0	-34.4	0.0	0.8	60.5	68.2	-7.7	V	P	
15.780	3.0	39.7	38.2	11.5	-32.2	0.0	0.7	57.9	74.0	-16.1	V	P	
15.780	3.0	26.8	38.2	11.5	-32.2	0.0	0.7	45.0	54.0	-9.0	V	A	
<b>5300MHz</b>													
10.600	3.0	44.8	37.5	9.0	-34.3	0.0	0.8	57.9	74.0	-16.1	H	P	
10.600	3.0	32.7	37.5	9.0	-34.3	0.0	0.8	45.7	54.0	-8.3	H	A	
15.900	3.0	36.6	37.9	11.5	-32.2	0.0	0.7	54.5	74.0	-19.5	H	P	
15.900	3.0	24.4	37.9	11.5	-32.2	0.0	0.7	42.3	54.0	-11.7	H	A	
10.600	3.0	50.1	37.5	9.0	-34.3	0.0	0.8	63.1	74.0	-10.9	V	P	
10.600	3.0	38.5	37.5	9.0	-34.3	0.0	0.8	51.6	54.0	-2.4	V	A	
15.900	3.0	39.8	37.9	11.5	-32.2	0.0	0.7	57.7	74.0	-16.3	V	P	
15.900	3.0	26.6	37.9	11.5	-32.2	0.0	0.7	44.5	54.0	-9.5	V	A	
<b>5320MHz</b>													
10.640	3.0	45.7	37.6	9.1	-34.2	0.0	0.8	58.9	74.0	-15.1	H	P	
10.640	3.0	33.5	37.6	9.1	-34.2	0.0	0.8	46.7	54.0	-7.3	H	A	
15.960	3.0	39.2	37.7	11.5	-32.2	0.0	0.7	57.0	74.0	-17.0	H	P	
15.960	3.0	26.2	37.7	11.5	-32.2	0.0	0.7	44.0	54.0	-10.0	H	A	
10.640	3.0	50.2	37.6	9.1	-34.2	0.0	0.8	63.3	74.0	-10.7	V	P	
10.640	3.0	38.2	37.6	9.1	-34.2	0.0	0.8	51.3	54.0	-2.7	V	A	
15.960	3.0	42.3	37.7	11.5	-32.2	0.0	0.7	60.1	74.0	-13.9	V	P	
15.960	3.0	28.5	37.7	11.5	-32.2	0.0	0.7	46.3	54.0	-7.7	V	A	

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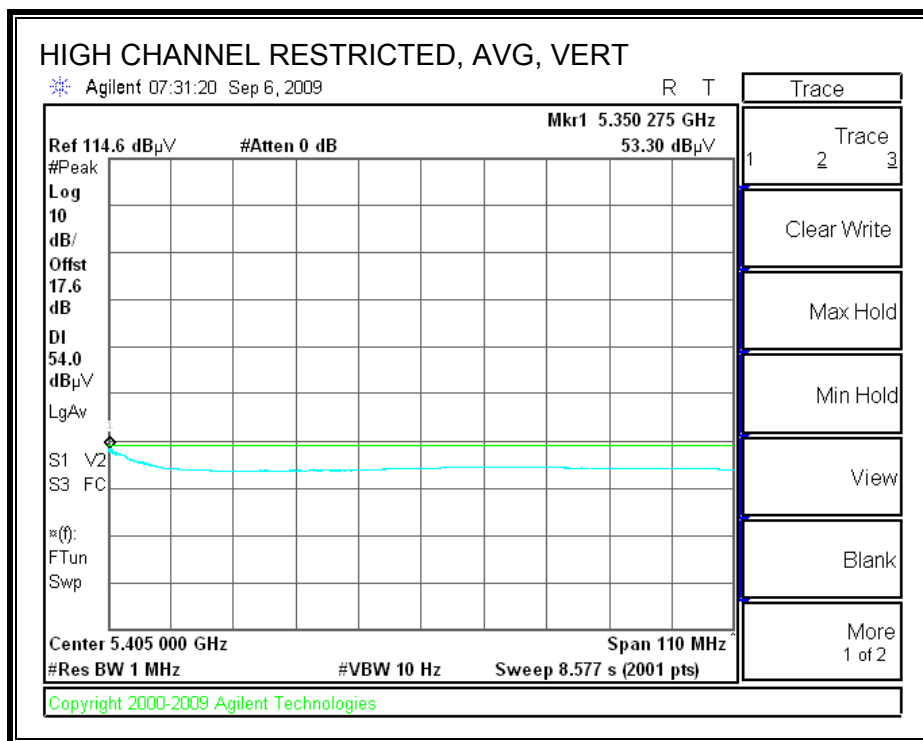
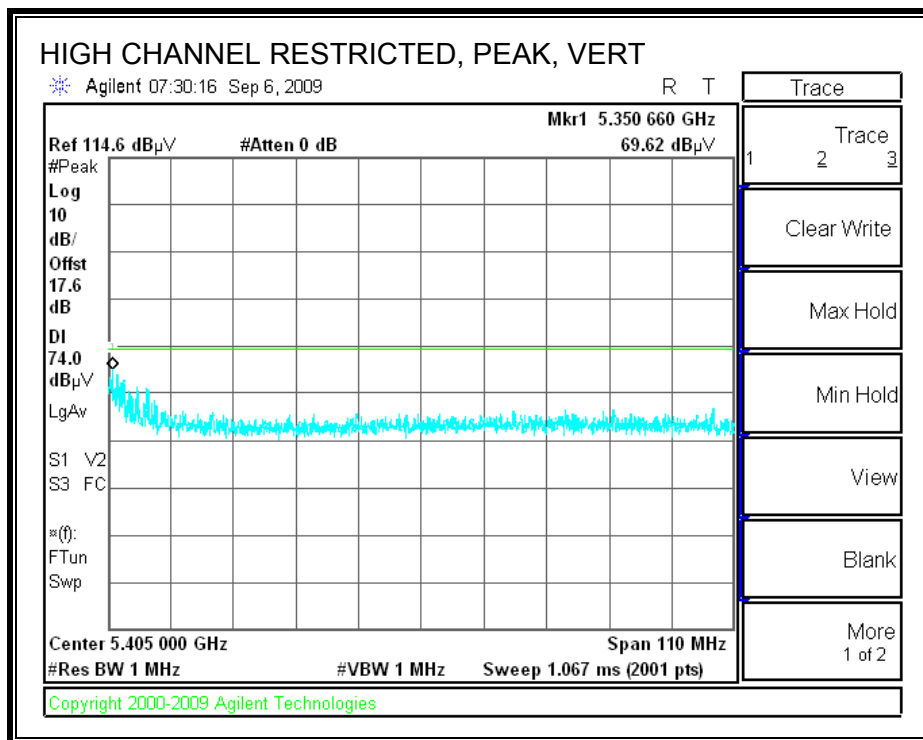
Note: No other emissions were detected above the system noise floor.

### 8.2.5. 802.11n HT20 MODE IN THE UPPER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

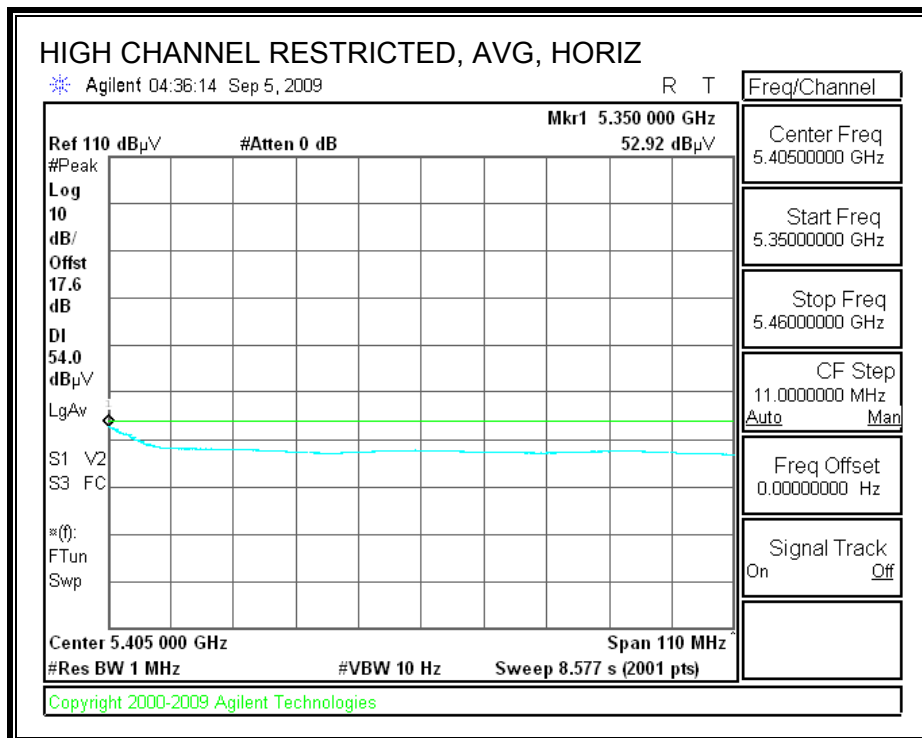
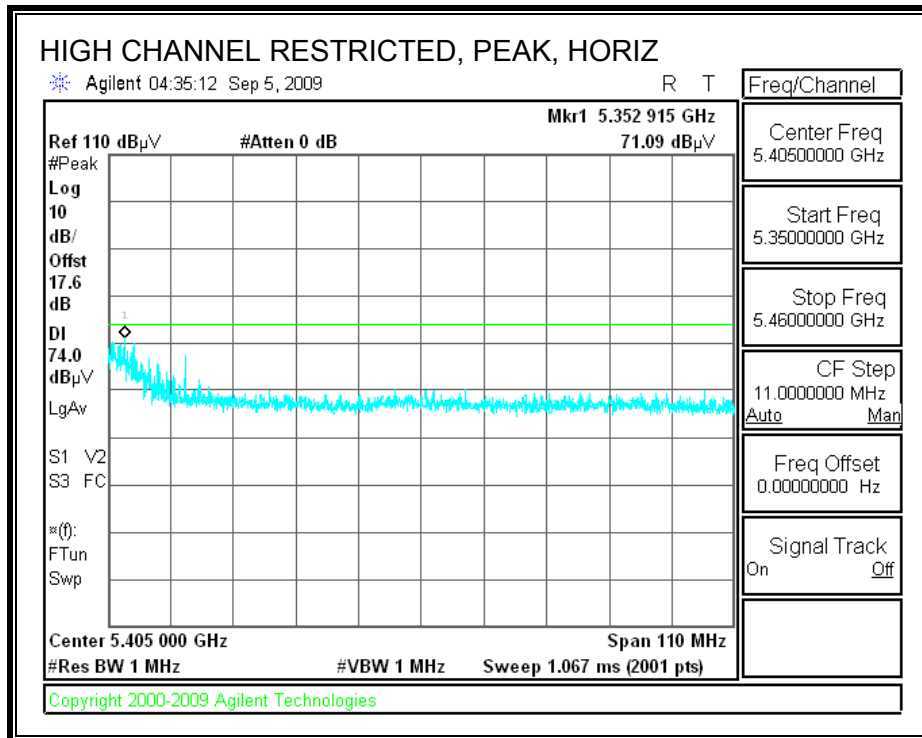
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5260MHz</b>													
10.520	3.0	44.7	37.5	9.0	-34.4	0.0	0.8	57.6	68.2	-10.6	H	P	
15.780	3.0	41.2	38.2	11.5	-32.2	0.0	0.7	59.4	74.0	-14.6	H	P	
15.780	3.0	27.7	38.2	11.5	-32.2	0.0	0.7	45.9	54.0	-8.1	H	A	
10.520	3.0	48.3	37.5	9.0	-34.4	0.0	0.8	61.2	68.2	-7.0	V	P	
15.780	3.0	44.8	38.2	11.5	-32.2	0.0	0.7	63.0	74.0	-11.0	V	P	
15.780	3.0	31.5	38.2	11.5	-32.2	0.0	0.7	49.6	54.0	-4.4	V	A	
<b>5300MHz</b>													
10.600	3.0	47.9	37.5	9.0	-34.3	0.0	0.8	61.0	74.0	-13.0	H	P	
10.600	3.0	35.7	37.5	9.0	-34.3	0.0	0.8	48.8	54.0	-5.2	H	A	
15.900	3.0	40.6	37.9	11.5	-32.2	0.0	0.7	58.5	74.0	-15.5	H	P	
15.900	3.0	27.7	37.9	11.5	-32.2	0.0	0.7	45.6	54.0	-8.4	H	A	
10.600	3.0	52.1	37.5	9.0	-34.3	0.0	0.8	65.1	74.0	-8.9	V	P	
10.600	3.0	37.8	37.5	9.0	-34.3	0.0	0.8	50.8	54.0	-3.2	V	A	
15.900	3.0	45.8	37.9	11.5	-32.2	0.0	0.7	63.7	74.0	-10.3	V	P	
15.900	3.0	31.7	37.9	11.5	-32.2	0.0	0.7	49.7	54.0	-4.3	V	A	
<b>5320MHz</b>													
10.640	3.0	47.6	37.6	9.1	-34.2	0.0	0.8	60.7	74.0	-13.3	H	P	
10.640	3.0	34.6	37.6	9.1	-34.2	0.0	0.8	47.7	54.0	-6.3	H	A	
15.960	3.0	38.2	37.7	11.5	-32.2	0.0	0.7	56.0	74.0	-18.0	H	P	
15.960	3.0	25.0	37.7	11.5	-32.2	0.0	0.7	42.8	54.0	-11.2	H	A	
10.640	3.0	50.4	37.6	9.1	-34.2	0.0	0.8	63.6	74.0	-10.4	V	P	
10.640	3.0	37.7	37.6	9.1	-34.2	0.0	0.8	50.9	54.0	-3.1	V	A	
15.960	3.0	42.9	37.7	11.5	-32.2	0.0	0.7	60.7	74.0	-13.3	V	P	
15.960	3.0	29.1	37.7	11.5	-32.2	0.0	0.7	46.9	54.0	-7.1	V	A	

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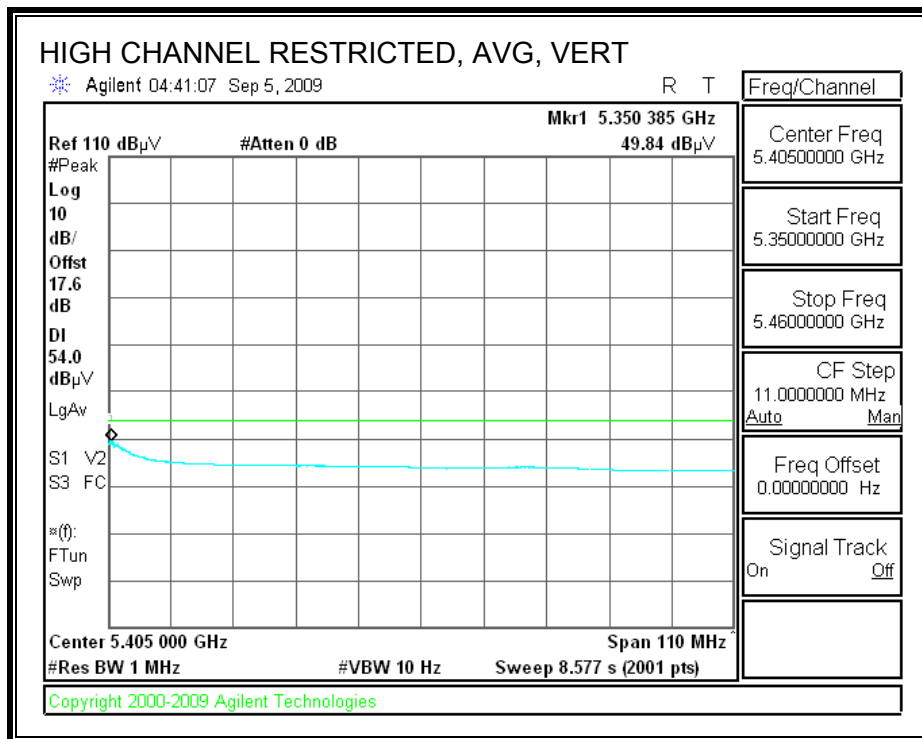
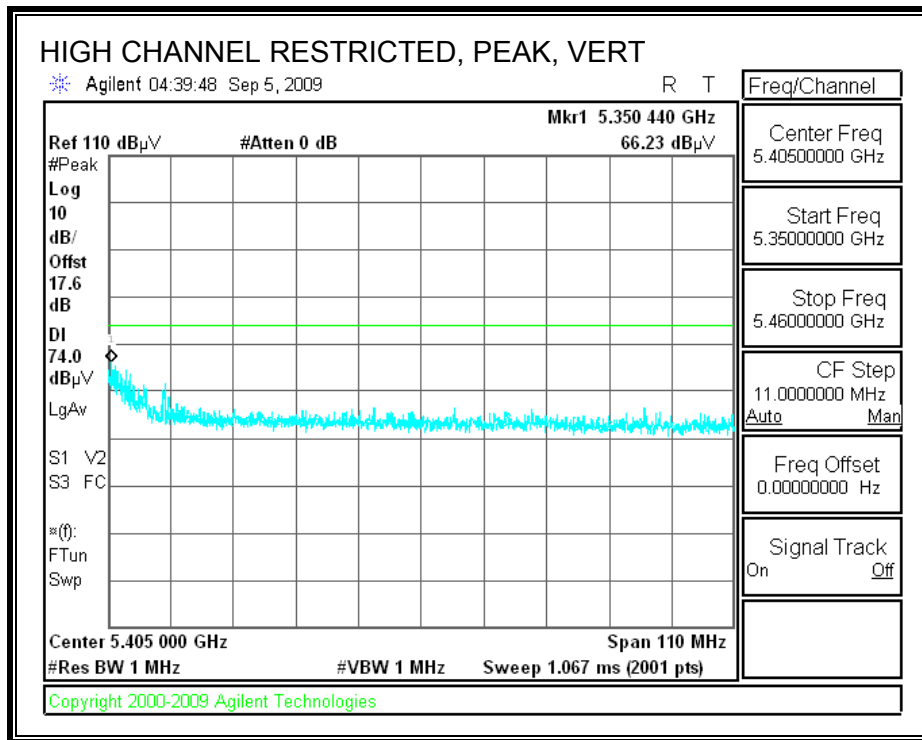
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**





**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

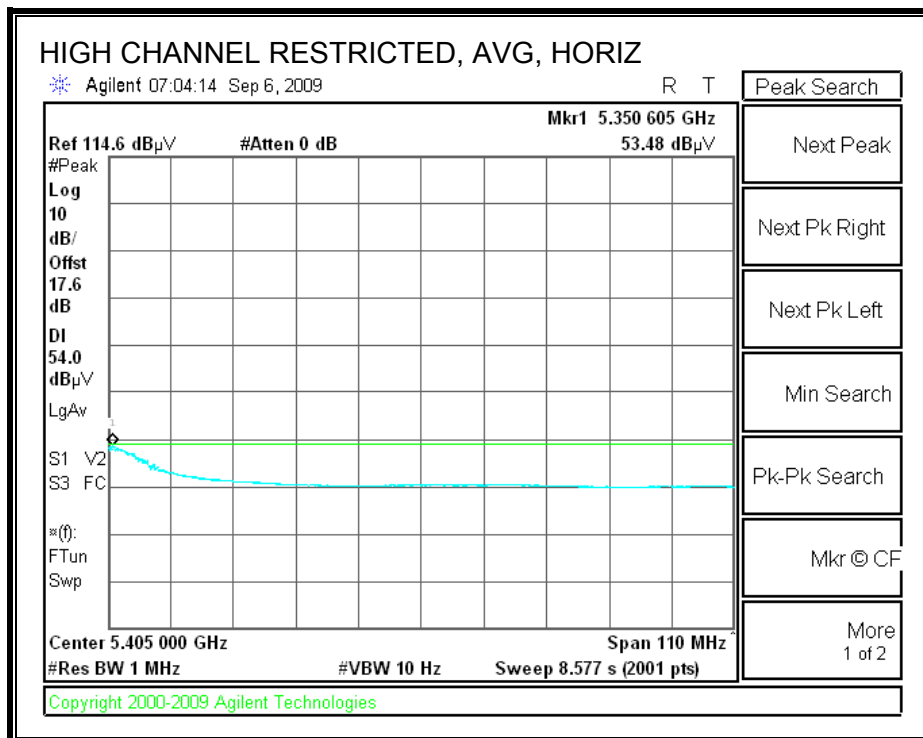
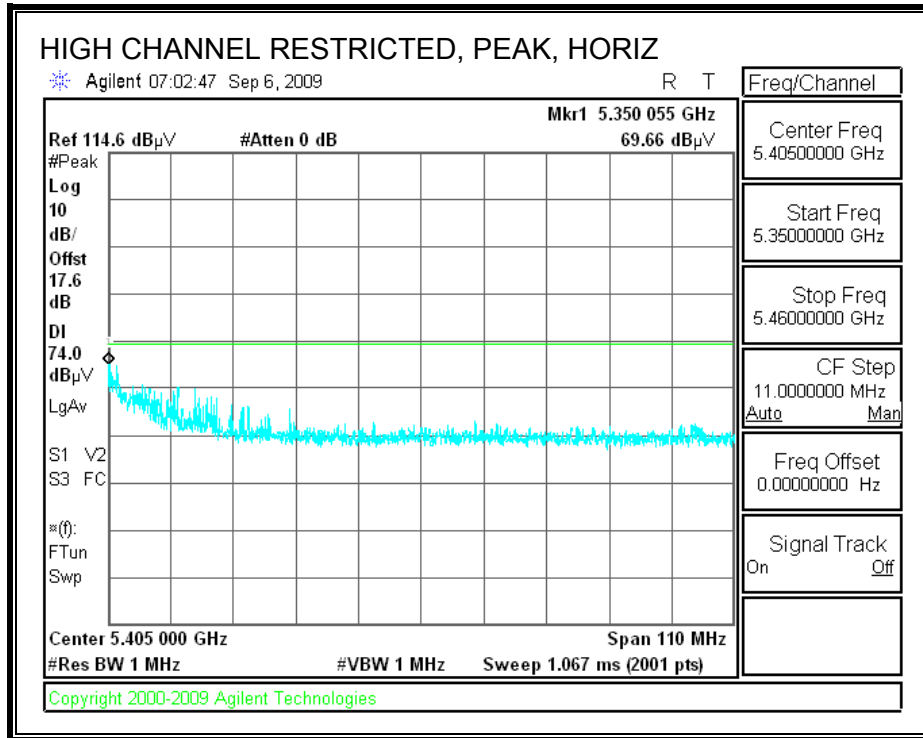
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5260MHz</b>													
10.520	3.0	39.8	37.5	9.0	-34.4	0.0	0.8	52.6	68.2	-15.6	H	P	
15.780	3.0	37.4	38.2	11.5	-32.2	0.0	0.7	55.5	74.0	-18.5	H	P	
15.780	3.0	24.8	38.2	11.5	-32.2	0.0	0.7	43.0	54.0	-11.0	H	A	
10.520	3.0	46.5	37.5	9.0	-34.4	0.0	0.8	59.4	68.2	-8.8	V	P	
15.780	3.0	39.1	38.2	11.5	-32.2	0.0	0.7	57.3	74.0	-16.7	V	P	
15.780	3.0	26.7	38.2	11.5	-32.2	0.0	0.7	44.9	54.0	-9.1	V	A	
<b>5300MHz</b>													
10.600	3.0	45.1	37.5	9.0	-34.3	0.0	0.8	58.1	74.0	-15.9	H	P	
10.600	3.0	33.6	37.5	9.0	-34.3	0.0	0.8	46.7	54.0	-7.3	H	A	
15.900	3.0	36.5	37.9	11.5	-32.2	0.0	0.7	54.5	74.0	-19.6	H	P	
15.900	3.0	24.0	37.9	11.5	-32.2	0.0	0.7	41.9	54.0	-12.1	H	A	
10.600	3.0	49.2	37.5	9.0	-34.3	0.0	0.8	62.3	74.0	-11.7	V	P	
10.600	3.0	37.0	37.5	9.0	-34.3	0.0	0.8	50.0	54.0	-4.0	V	A	
15.900	3.0	40.9	37.9	11.5	-32.2	0.0	0.7	58.8	74.0	-15.2	V	P	
15.900	3.0	27.4	37.9	11.5	-32.2	0.0	0.7	45.3	54.0	-8.7	V	A	
<b>5320MHz</b>													
10.640	3.0	45.6	37.6	9.1	-34.2	0.0	0.8	58.7	74.0	-15.3	H	P	
10.640	3.0	33.4	37.6	9.1	-34.2	0.0	0.8	46.5	54.0	-7.5	H	A	
15.960	3.0	37.8	37.7	11.5	-32.2	0.0	0.7	55.6	74.0	-18.4	H	P	
15.960	3.0	24.7	37.7	11.5	-32.2	0.0	0.7	42.5	54.0	-11.5	H	A	
10.640	3.0	48.4	37.6	9.1	-34.2	0.0	0.8	61.6	74.0	-12.4	V	P	
10.640	3.0	35.4	37.6	9.1	-34.2	0.0	0.8	48.5	54.0	-5.5	V	A	
15.960	3.0	42.5	37.7	11.5	-32.2	0.0	0.7	60.3	74.0	-13.7	V	P	
15.960	3.0	28.3	37.7	11.5	-32.2	0.0	0.7	46.1	54.0	-7.9	V	A	

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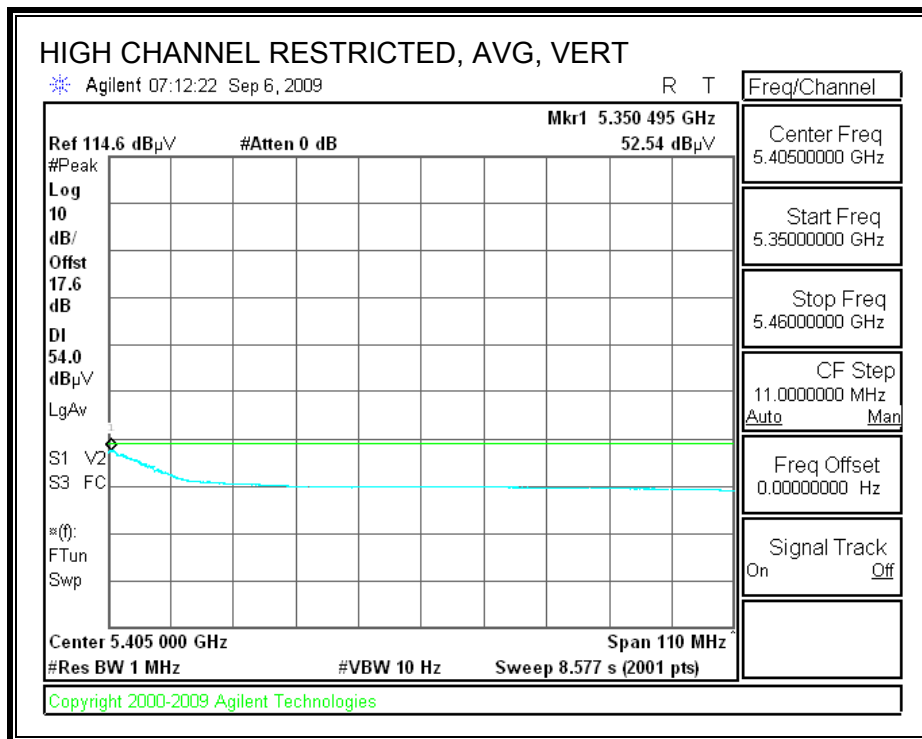
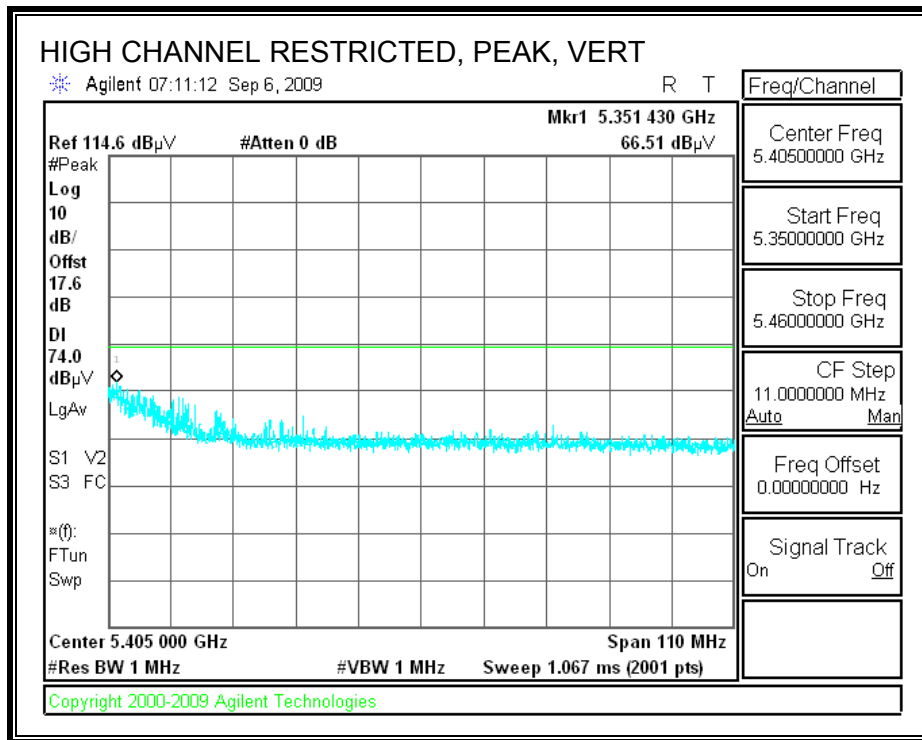
Note: No other emissions were detected above the system noise floor.

### 8.2.6. 802.11n HT40 MODE IN THE UPPER 5.2 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT40

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

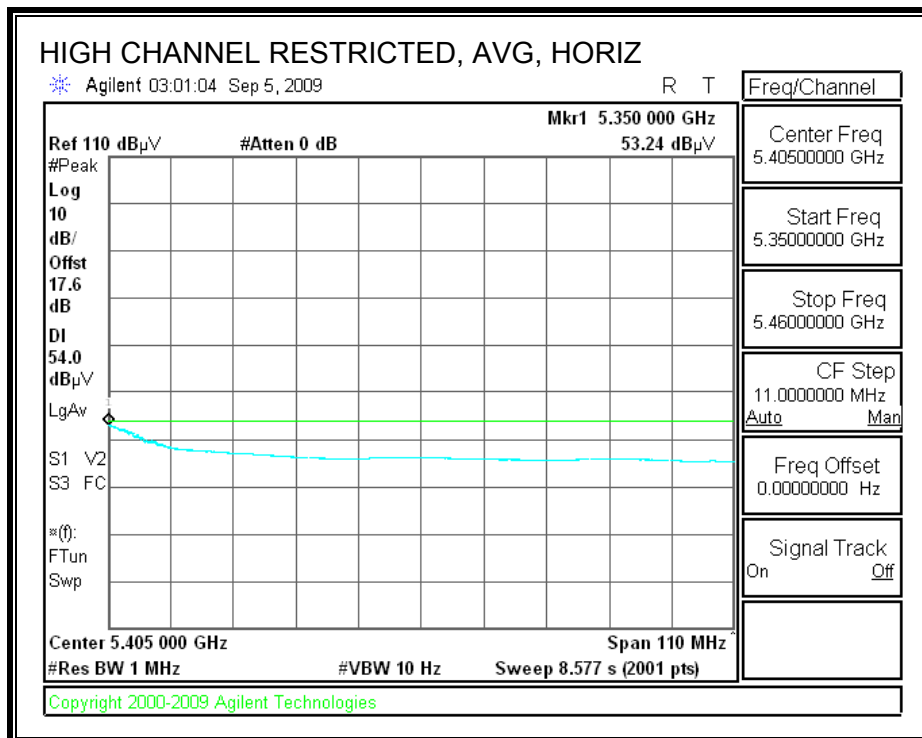
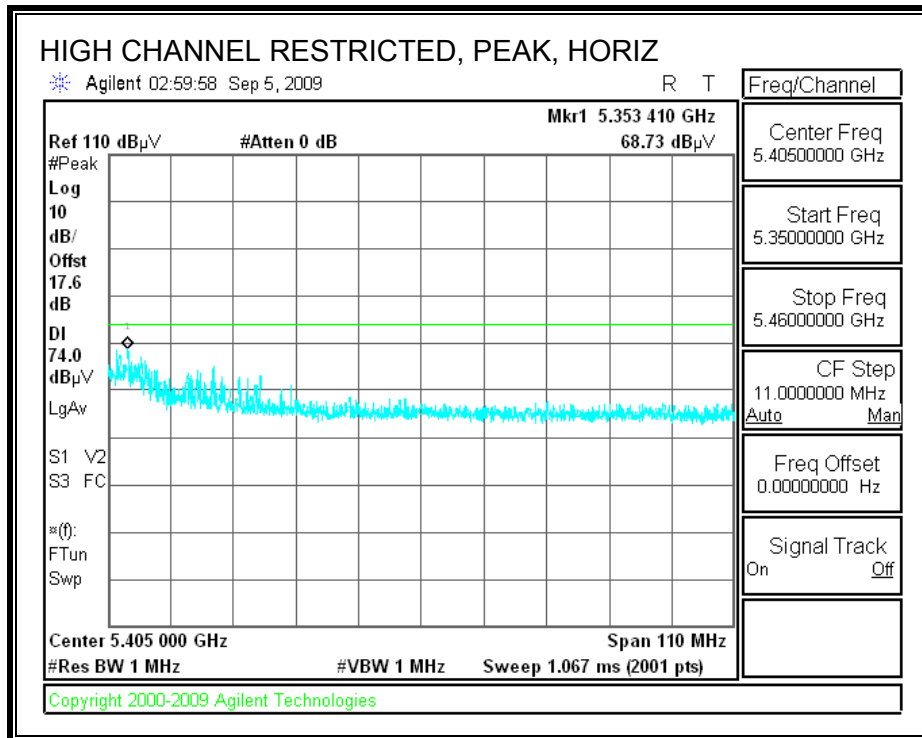
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5270MHz</b>													
10.540	3.0	43.5	37.5	9.0	-34.4	0.0	0.8	56.5	68.2	-11.7	H	P	
15.810	3.0	37.2	38.2	11.5	-32.2	0.0	0.7	55.4	74.0	-18.6	H	P	
15.810	3.0	24.8	38.2	11.5	-32.2	0.0	0.7	42.9	54.0	-11.1	H	A	
10.540	3.0	42.6	37.5	9.0	-34.4	0.0	0.8	55.6	68.2	-12.7	V	P	
15.810	3.0	43.2	38.2	11.5	-32.2	0.0	0.7	61.3	74.0	-12.7	V	P	
15.810	3.0	29.6	38.2	11.5	-32.2	0.0	0.7	47.7	54.0	-6.3	V	A	
<b>5310MHz</b>													
10.620	3.0	40.8	37.5	9.1	-34.3	0.0	0.8	53.9	74.0	-20.1	H	P	
10.620	3.0	28.5	37.5	9.1	-34.3	0.0	0.8	41.5	54.0	-12.5	H	A	
15.930	3.0	35.1	37.8	11.5	-32.2	0.0	0.7	53.0	74.0	-21.0	H	P	
15.930	3.0	22.2	37.8	11.5	-32.2	0.0	0.7	40.1	54.0	-13.9	H	A	
10.620	3.0	42.4	37.5	9.1	-34.3	0.0	0.8	55.5	74.0	-18.5	V	P	
10.620	3.0	29.4	37.5	9.1	-34.3	0.0	0.8	42.5	54.0	-11.5	V	A	
15.930	3.0	35.0	37.8	11.5	-32.2	0.0	0.7	52.8	74.0	-21.2	V	P	
15.930	3.0	23.0	37.8	11.5	-32.2	0.0	0.7	40.8	54.0	-13.2	V	A	

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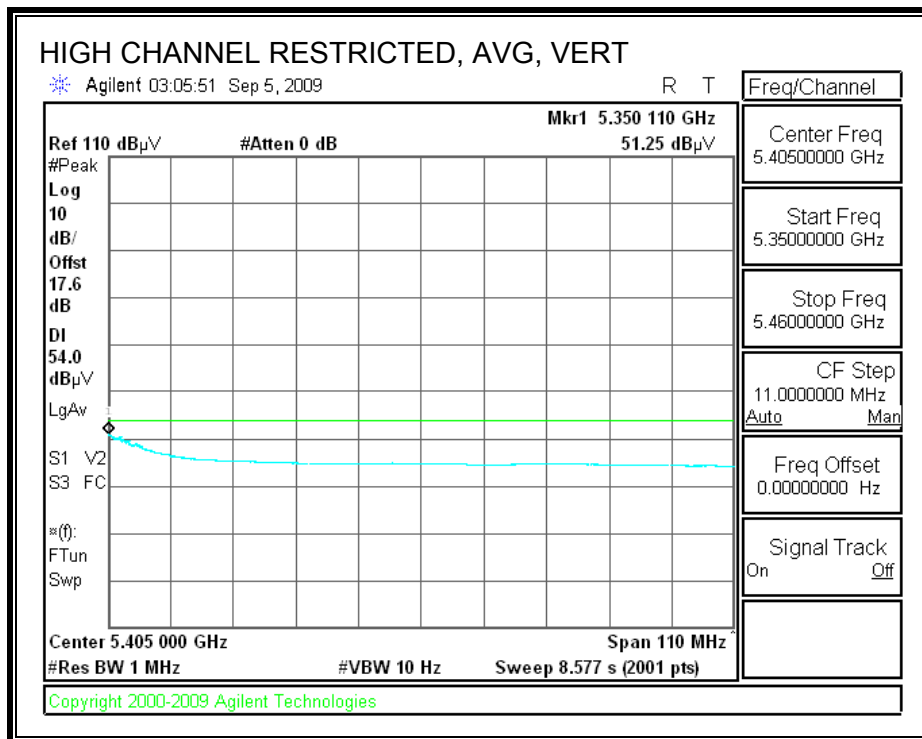
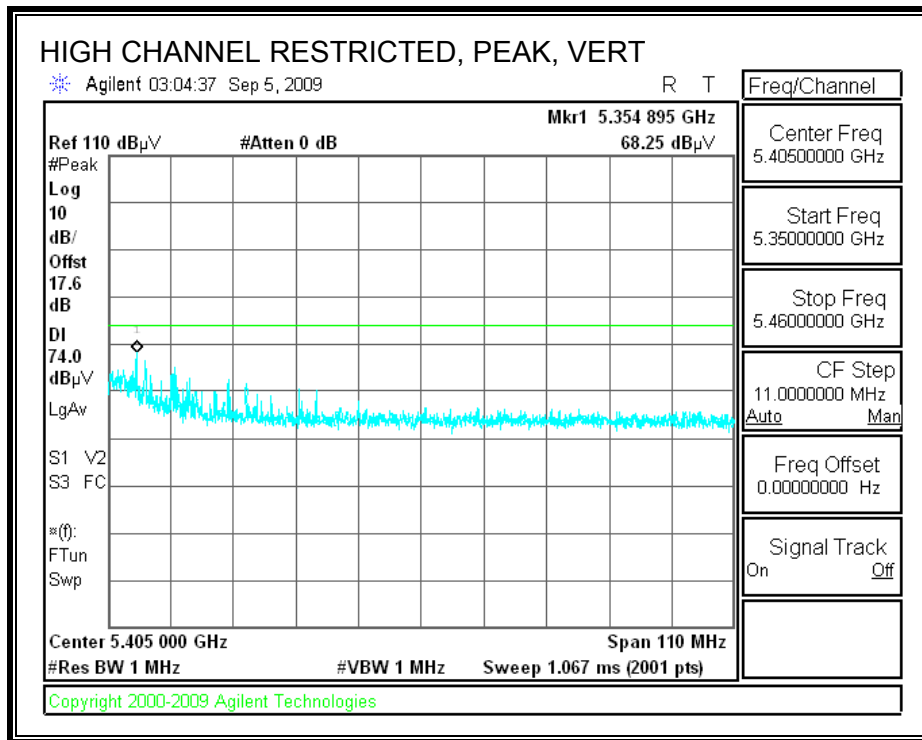
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/09/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_HT40

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

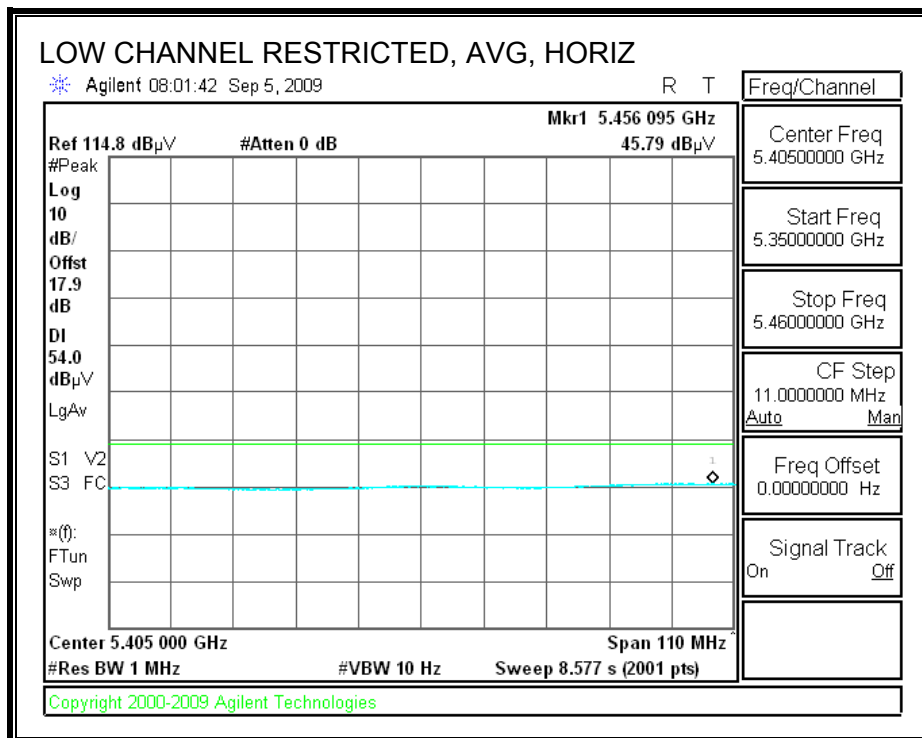
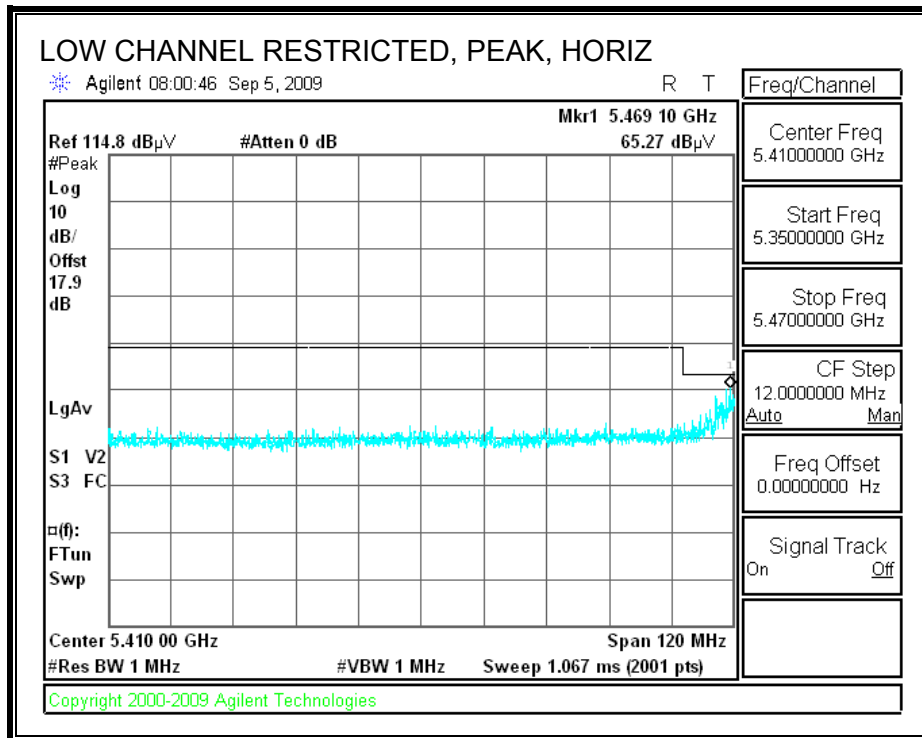
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5270MHz</b>													
10.540	3.0	42.5	37.5	9.0	-34.4	0.0	0.8	55.4	68.2	-12.8	H	P	
15.810	3.0	36.7	38.2	11.5	-32.2	0.0	0.7	54.8	74.0	-19.2	H	P	
15.810	3.0	23.5	38.2	11.5	-32.2	0.0	0.7	41.6	54.0	-12.4	H	A	
10.540	3.0	43.3	37.5	9.0	-34.4	0.0	0.8	56.3	68.2	-11.9	V	P	
15.810	3.0	37.5	38.2	11.5	-32.2	0.0	0.7	55.6	74.0	-18.4	V	P	
15.810	3.0	24.6	38.2	11.5	-32.2	0.0	0.7	42.7	54.0	-11.3	V	A	
<b>5310MHz</b>													
10.620	3.0	43.6	37.5	9.1	-34.3	0.0	0.8	56.7	74.0	-17.3	H	P	
10.620	3.0	30.7	37.5	9.1	-34.3	0.0	0.8	43.8	54.0	-10.2	H	A	
15.930	3.0	37.3	37.8	11.5	-32.2	0.0	0.7	55.1	74.0	-18.9	H	P	
15.930	3.0	23.7	37.8	11.5	-32.2	0.0	0.7	41.5	54.0	-12.5	H	A	
10.620	3.0	46.5	37.5	9.1	-34.3	0.0	0.8	59.6	74.0	-14.4	V	P	
10.620	3.0	32.9	37.5	9.1	-34.3	0.0	0.8	46.0	54.0	-8.0	V	A	
15.930	3.0	38.8	37.8	11.5	-32.2	0.0	0.7	56.6	74.0	-17.4	V	P	
15.930	3.0	25.5	37.8	11.5	-32.2	0.0	0.7	43.4	54.0	-10.6	V	A	

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

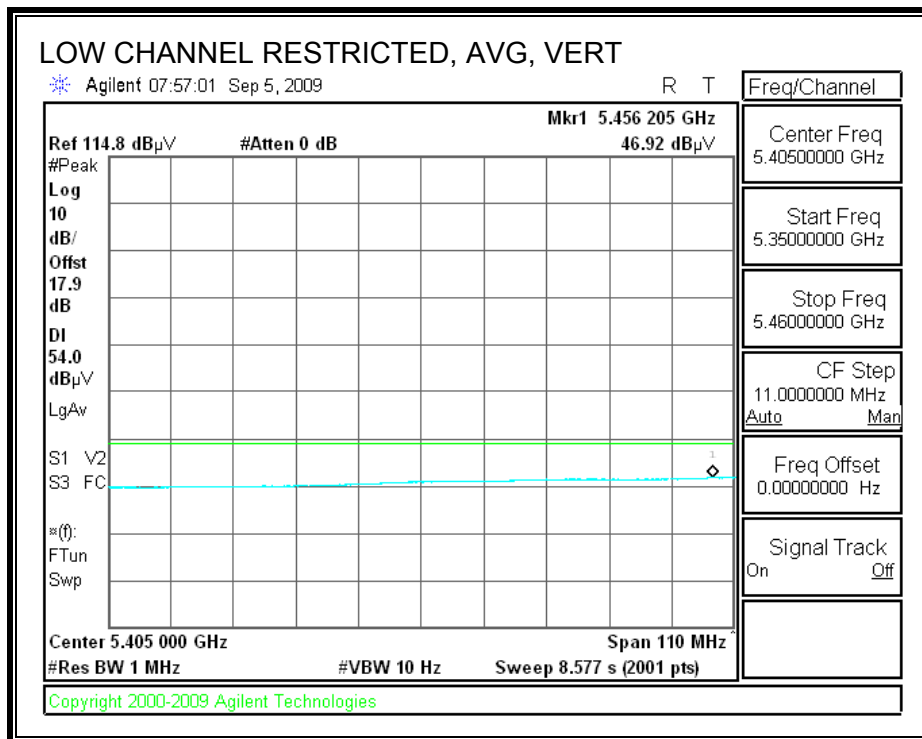
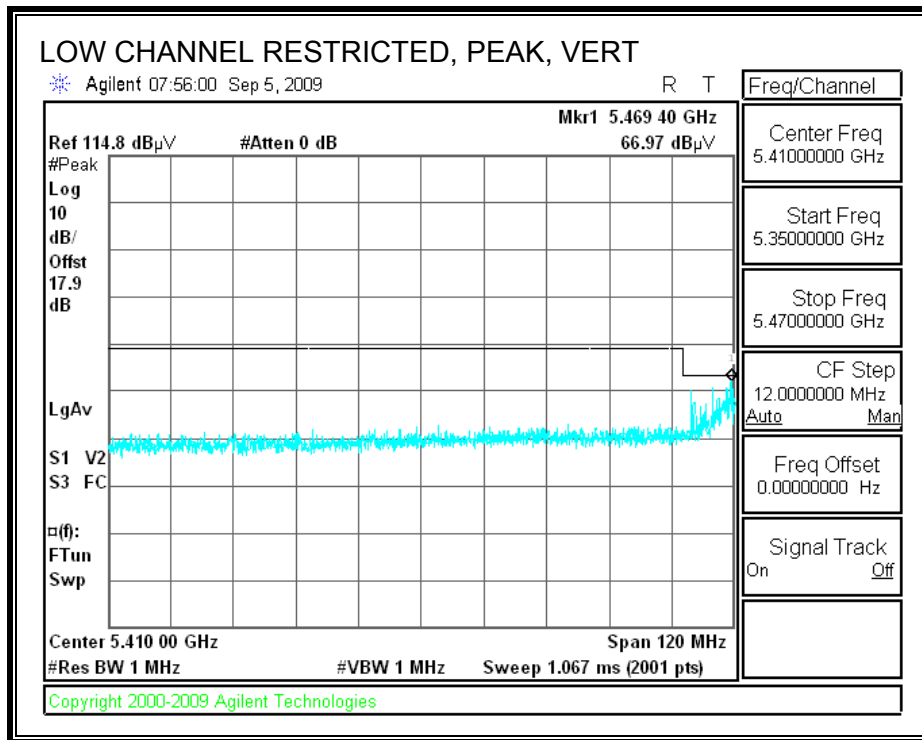
### 8.2.7. 802.11a DUAL CHAIN LEGACY MODE IN THE 5.6 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

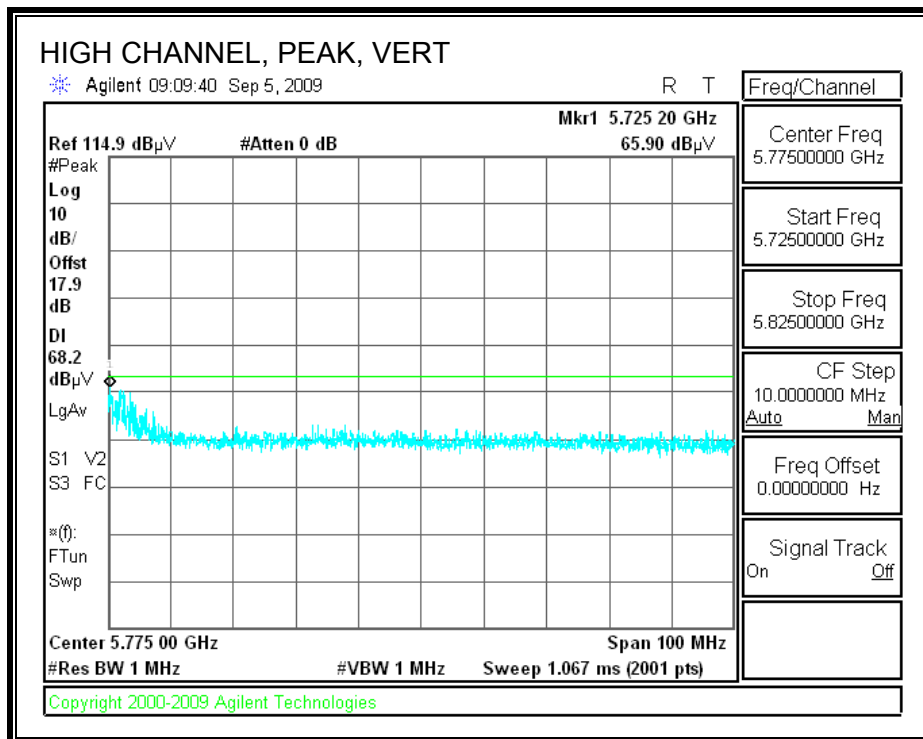
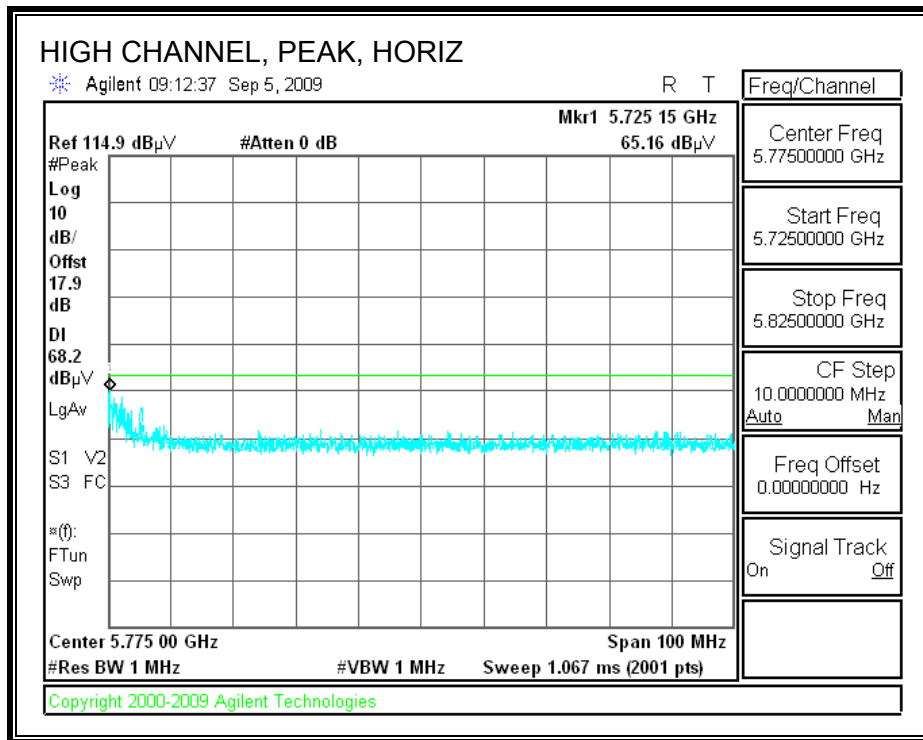




**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

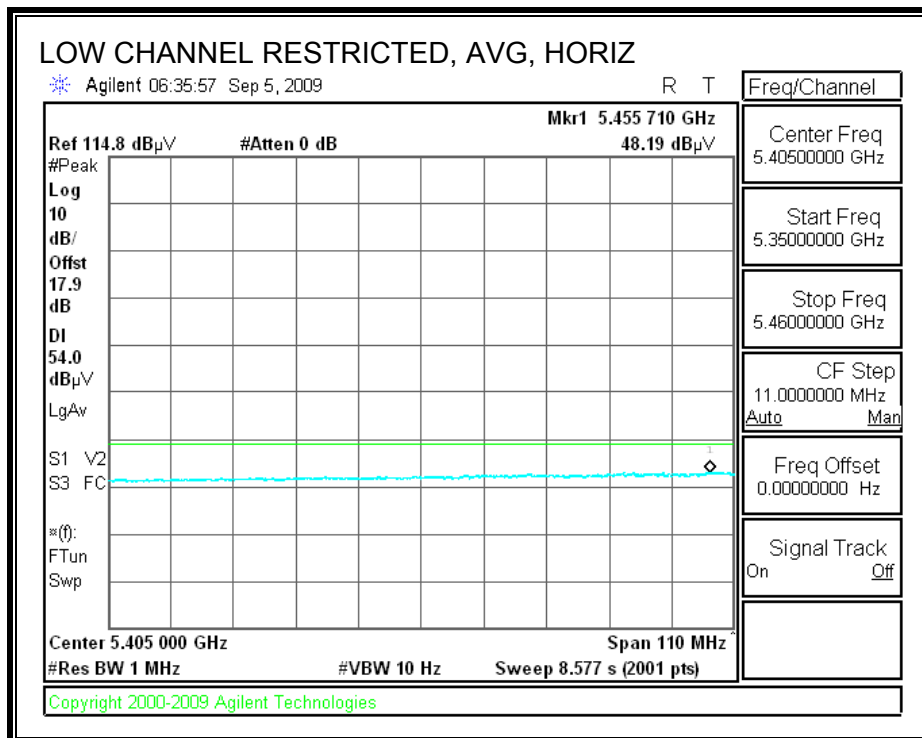
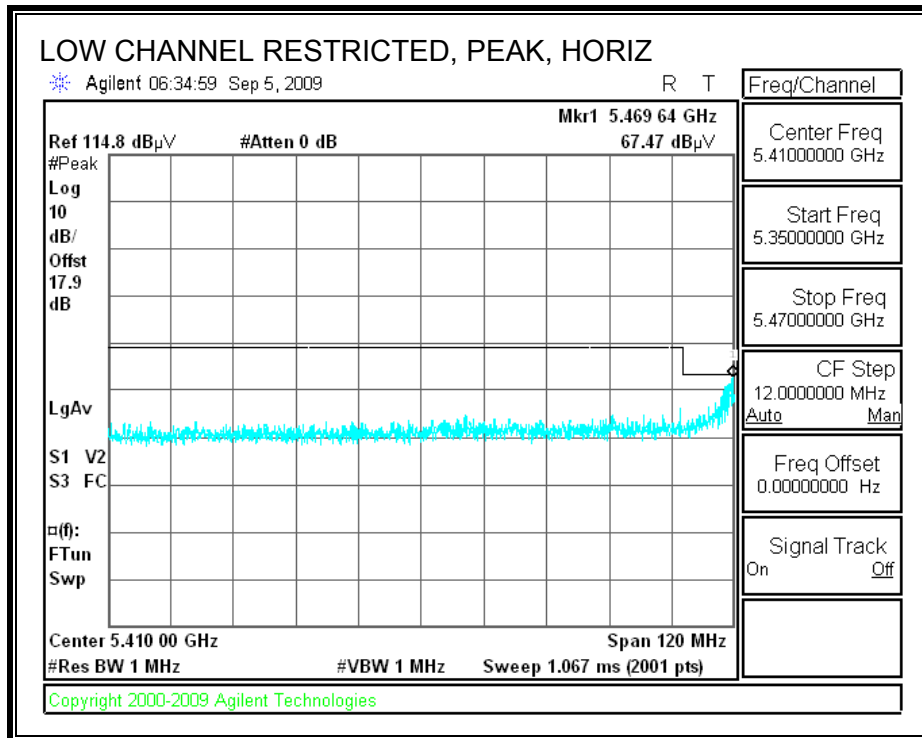
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5500MHz</b>													
11.000	3.0	43.8	37.7	9.2	-33.8	0.0	0.7	57.7	74.0	-16.3	H	P	
11.000	3.0	31.3	37.7	9.2	-33.8	0.0	0.7	45.2	54.0	-8.8	H	A	
16.500	3.0	35.4	39.7	11.8	-32.1	0.0	0.7	55.5	68.2	-12.7	H	P	
11.000	3.0	46.4	37.7	9.2	-33.8	0.0	0.7	60.3	74.0	-13.7	V	P	
11.000	3.0	34.2	37.7	9.2	-33.8	0.0	0.7	48.1	54.0	-5.9	V	A	
16.500	3.0	37.2	39.7	11.8	-32.1	0.0	0.7	57.3	68.2	-10.9	V	P	
<b>5600MHz</b>													
11.200	3.0	45.2	37.9	9.3	-33.5	0.0	0.7	59.6	74.0	-14.4	H	P	
11.200	3.0	33.7	37.9	9.3	-33.5	0.0	0.7	48.1	54.0	-5.9	H	A	
16.800	3.0	36.7	40.9	12.0	-32.0	0.0	0.7	58.2	68.2	-10.0	H	P	
11.200	3.0	46.5	37.9	9.3	-33.5	0.0	0.7	60.9	74.0	-13.1	V	P	
11.200	3.0	35.5	37.9	9.3	-33.5	0.0	0.7	49.9	54.0	-4.1	V	A	
16.800	3.0	37.0	40.9	12.0	-32.0	0.0	0.7	58.5	68.2	-9.7	V	P	
<b>5700MHz</b>													
11.400	3.0	36.8	38.0	9.4	-33.2	0.0	0.7	51.8	74.0	-22.2	H	P	
11.400	3.0	25.7	38.0	9.4	-33.2	0.0	0.7	40.6	54.0	-13.4	H	A	
17.100	3.0	33.9	42.2	12.1	-32.0	0.0	0.7	56.8	68.2	-11.4	H	P	
11.400	3.0	40.0	38.0	9.4	-33.2	0.0	0.7	54.9	74.0	-19.1	V	P	
11.400	3.0	26.9	38.0	9.4	-33.2	0.0	0.7	41.8	54.0	-12.2	V	A	
17.100	3.0	33.3	42.2	12.1	-32.0	0.0	0.7	56.2	68.2	-12.0	V	P	

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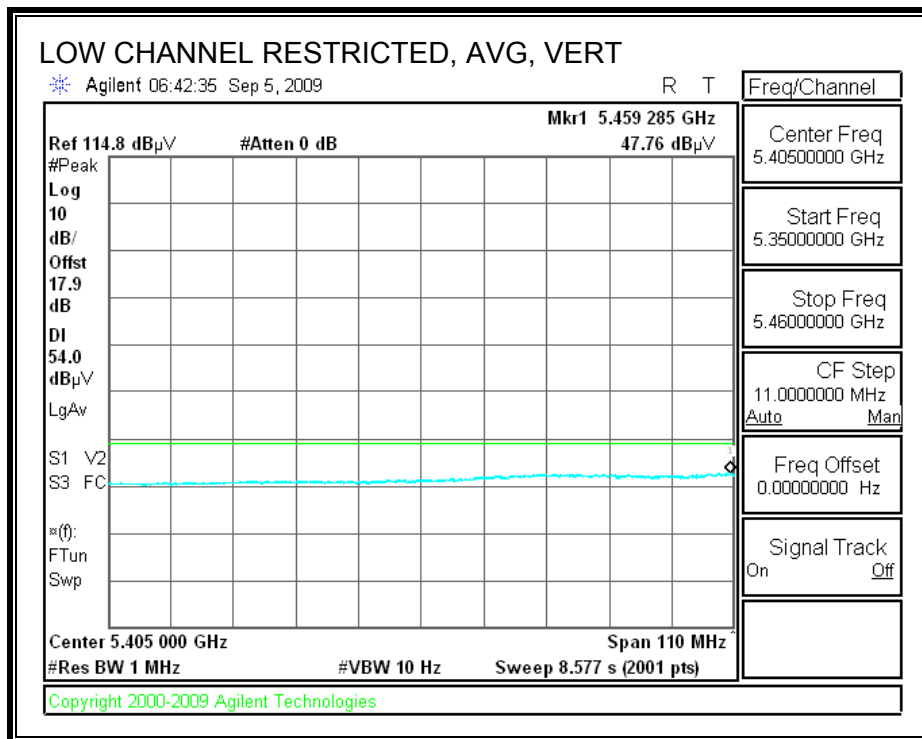
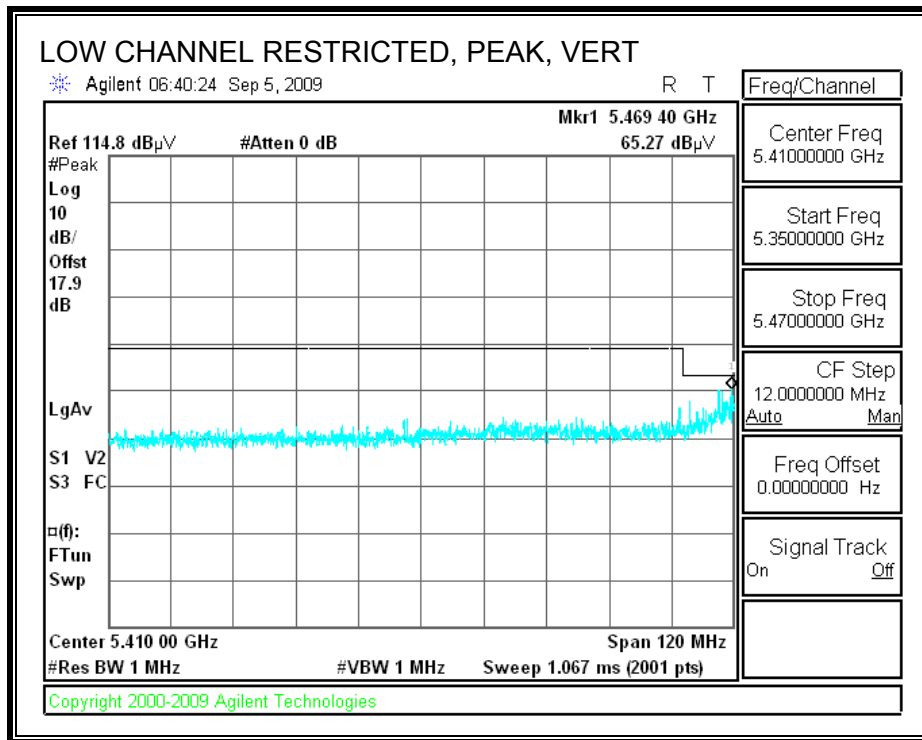
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

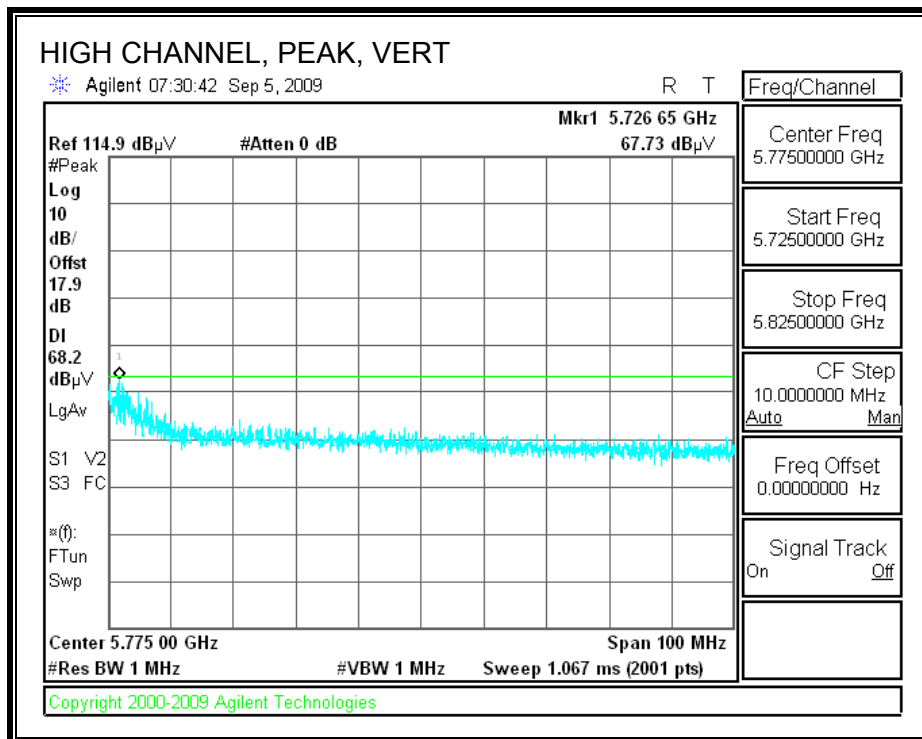
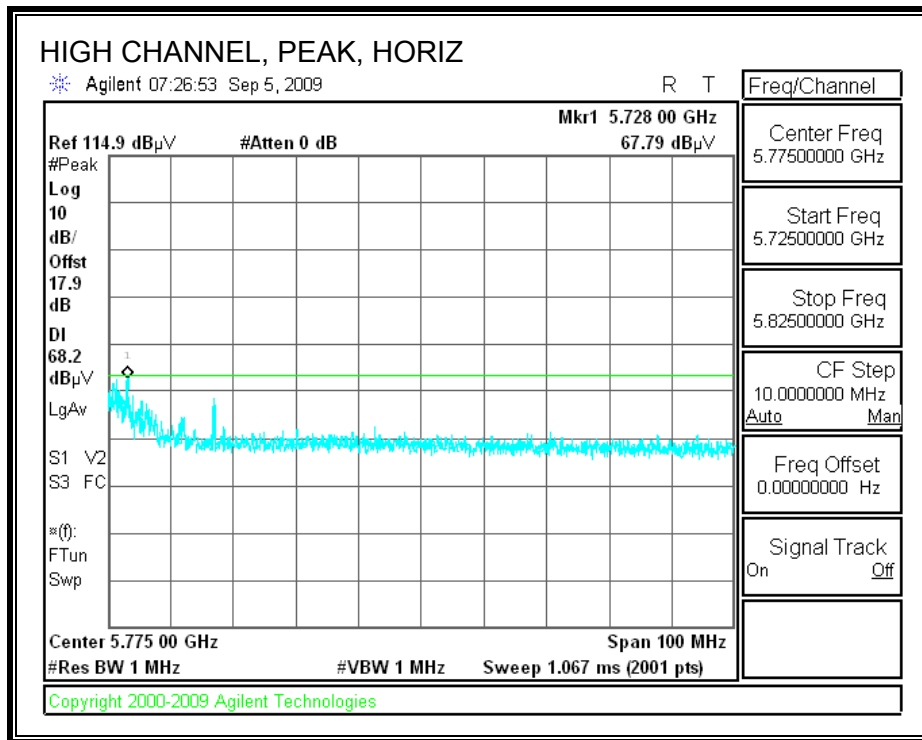
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_a mode

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

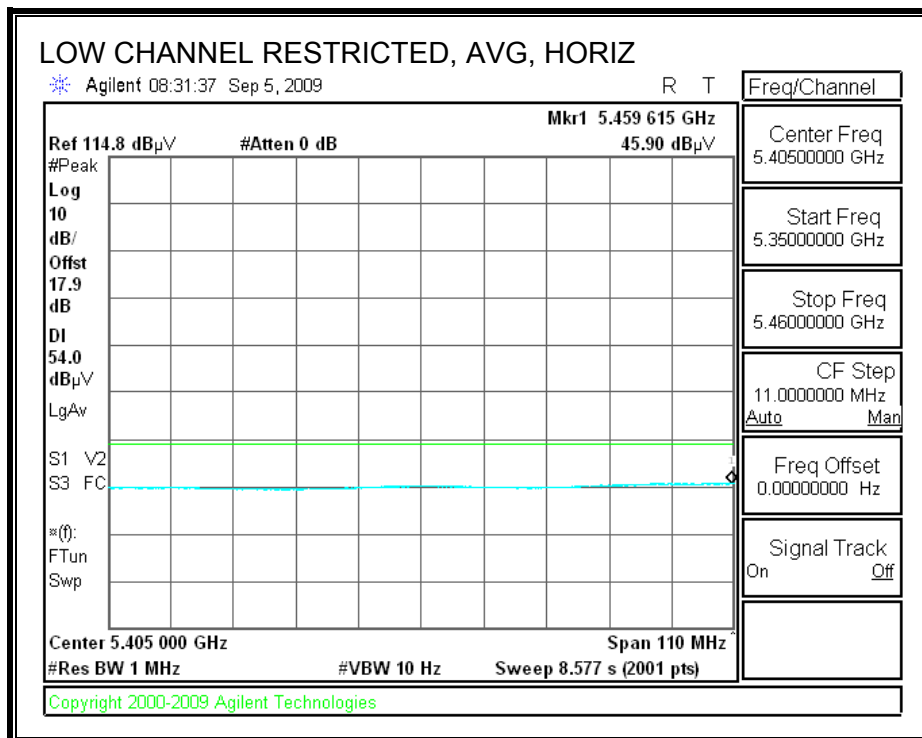
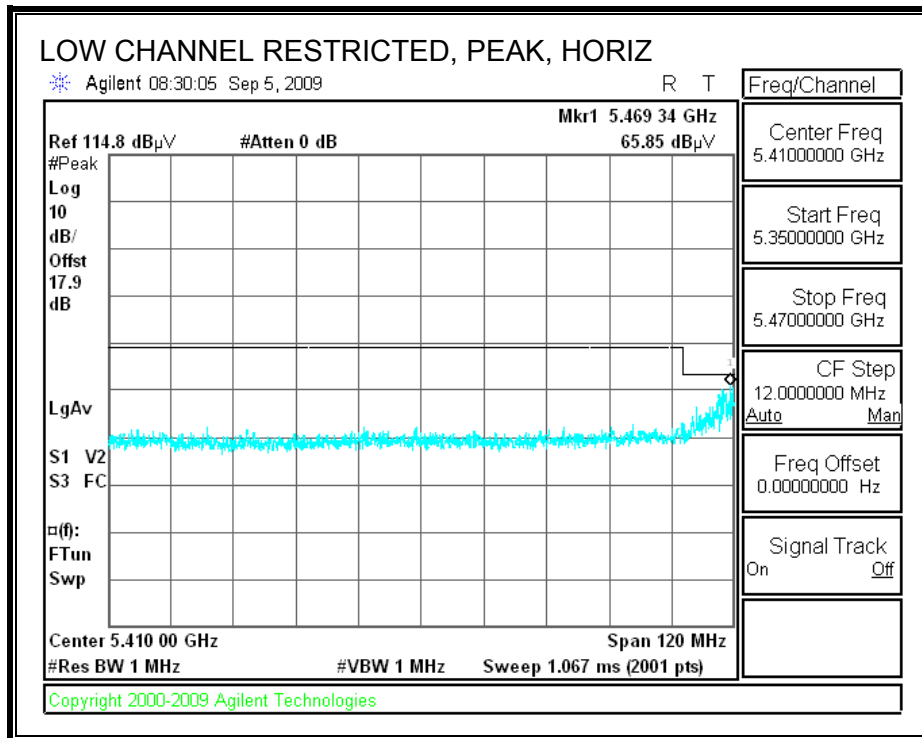
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5500MHz</b>													
11.000	3.0	40.2	37.7	9.2	-33.8	0.0	0.7	54.1	74.0	-19.9	H	P	
11.000	3.0	28.7	37.7	9.2	-33.8	0.0	0.7	42.7	54.0	-11.3	H	A	
16.500	3.0	34.7	39.7	11.8	-32.1	0.0	0.7	54.8	68.2	-13.4	H	P	
11.000	3.0	45.6	37.7	9.2	-33.8	0.0	0.7	59.6	74.0	-14.4	V	P	
11.000	3.0	32.7	37.7	9.2	-33.8	0.0	0.7	46.7	54.0	-7.3	V	A	
16.500	3.0	37.9	39.7	11.8	-32.1	0.0	0.7	58.0	68.2	-10.2	V	P	
<b>5600MHz</b>													
11.200	3.0	45.6	37.9	9.3	-33.5	0.0	0.7	60.0	74.0	-14.0	H	P	
11.200	3.0	31.6	37.9	9.3	-33.5	0.0	0.7	46.1	54.0	-7.9	H	A	
16.800	3.0	35.3	40.9	12.0	-32.0	0.0	0.7	56.8	68.2	-11.4	H	P	
11.200	3.0	44.7	37.9	9.3	-33.5	0.0	0.7	59.2	74.0	-14.8	V	P	
11.200	3.0	32.9	37.9	9.3	-33.5	0.0	0.7	47.3	54.0	-6.7	V	A	
16.800	3.0	36.1	40.9	12.0	-32.0	0.0	0.7	57.6	68.2	-10.6	V	P	
<b>5700MHz</b>													
11.400	3.0	36.3	38.0	9.4	-33.2	0.0	0.7	51.2	74.0	-22.8	H	P	
11.400	3.0	24.8	38.0	9.4	-33.2	0.0	0.7	39.7	54.0	-14.3	H	A	
17.100	3.0	33.9	42.2	12.1	-32.0	0.0	0.7	56.9	68.2	-11.3	H	P	
11.400	3.0	39.9	38.0	9.4	-33.2	0.0	0.7	54.8	74.0	-19.2	V	P	
11.400	3.0	28.4	38.0	9.4	-33.2	0.0	0.7	43.3	54.0	-10.7	V	A	
17.100	3.0	33.6	42.2	12.1	-32.0	0.0	0.7	56.6	68.2	-11.6	V	P	

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

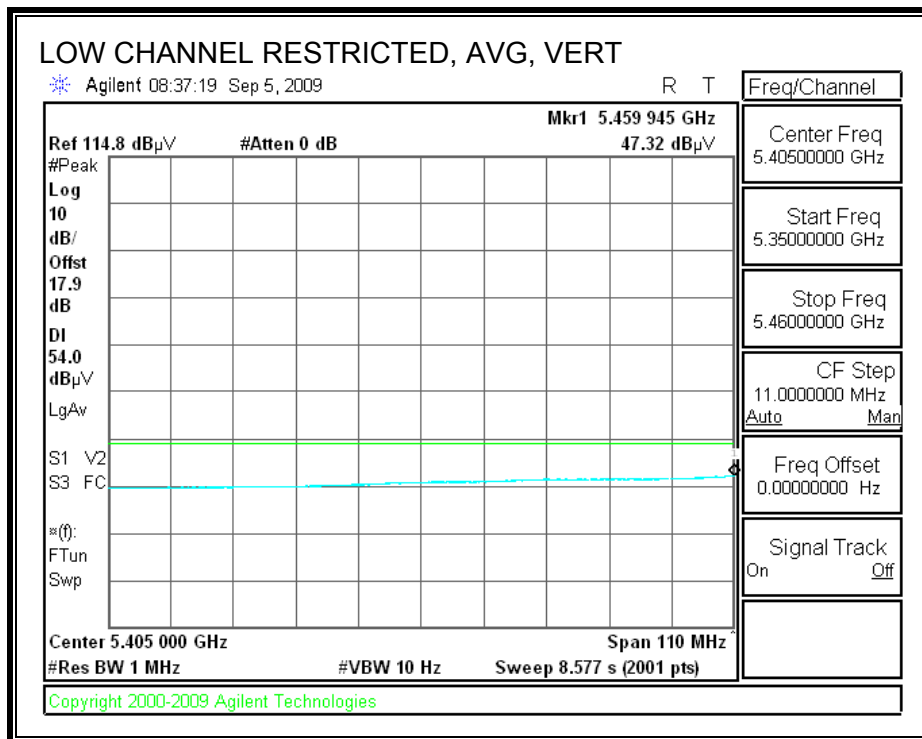
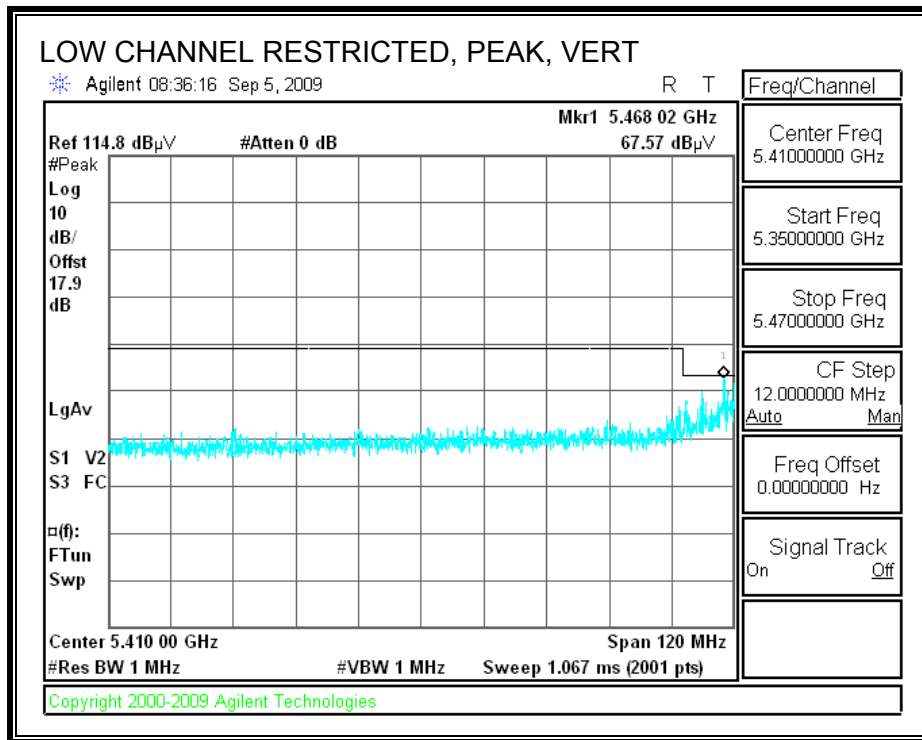
### 8.2.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

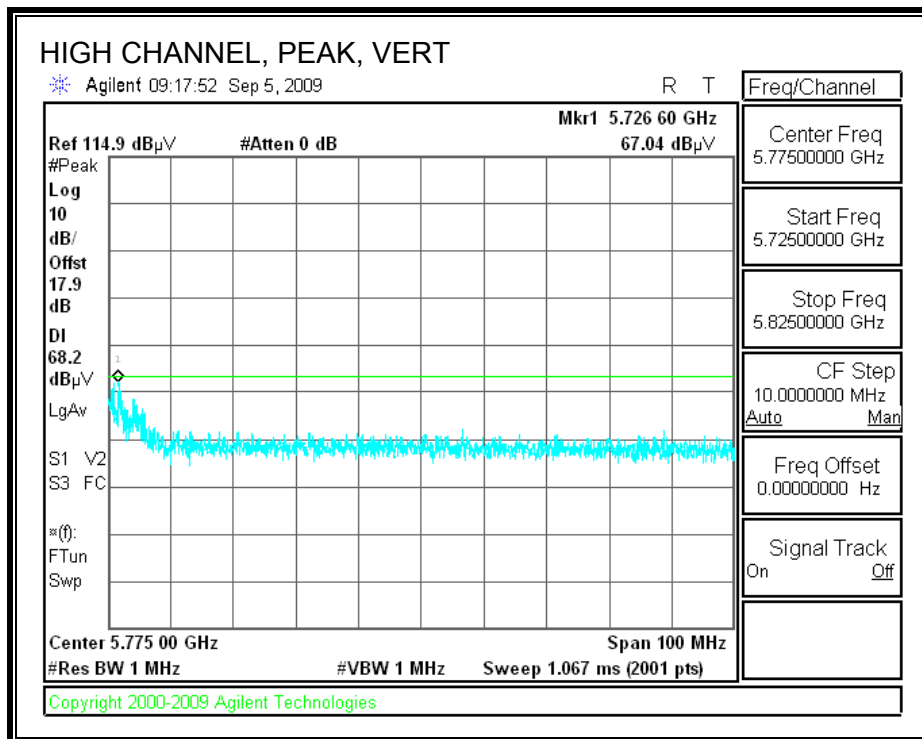
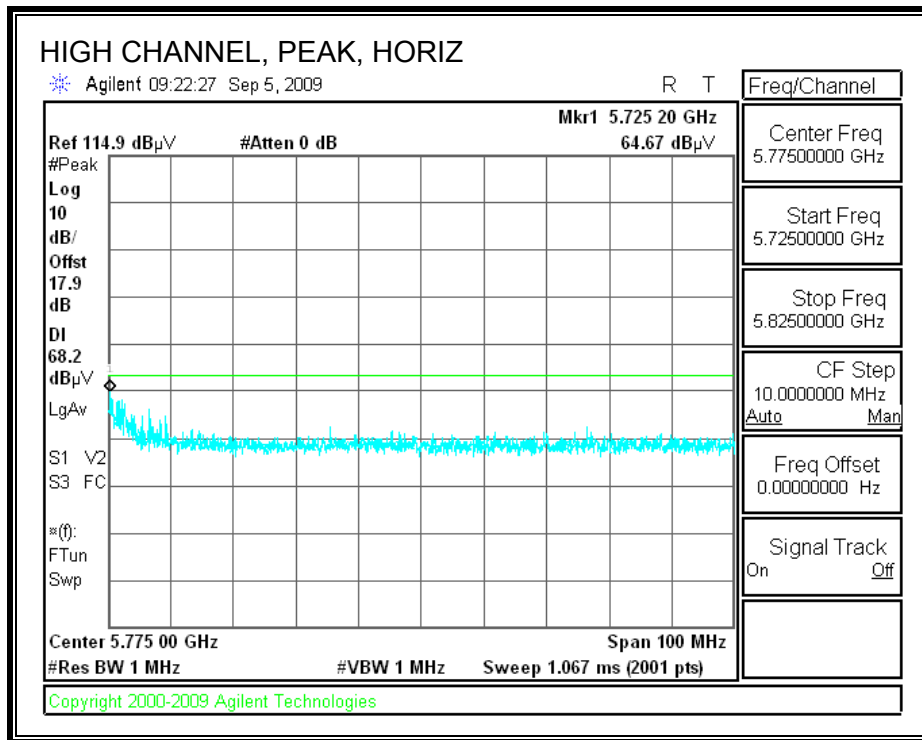




**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

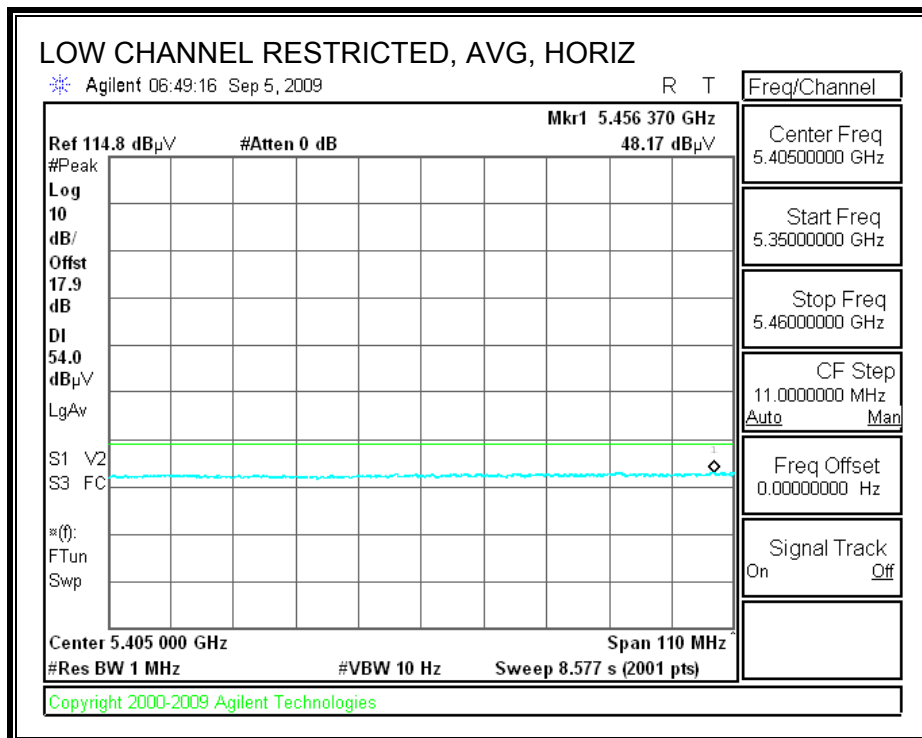
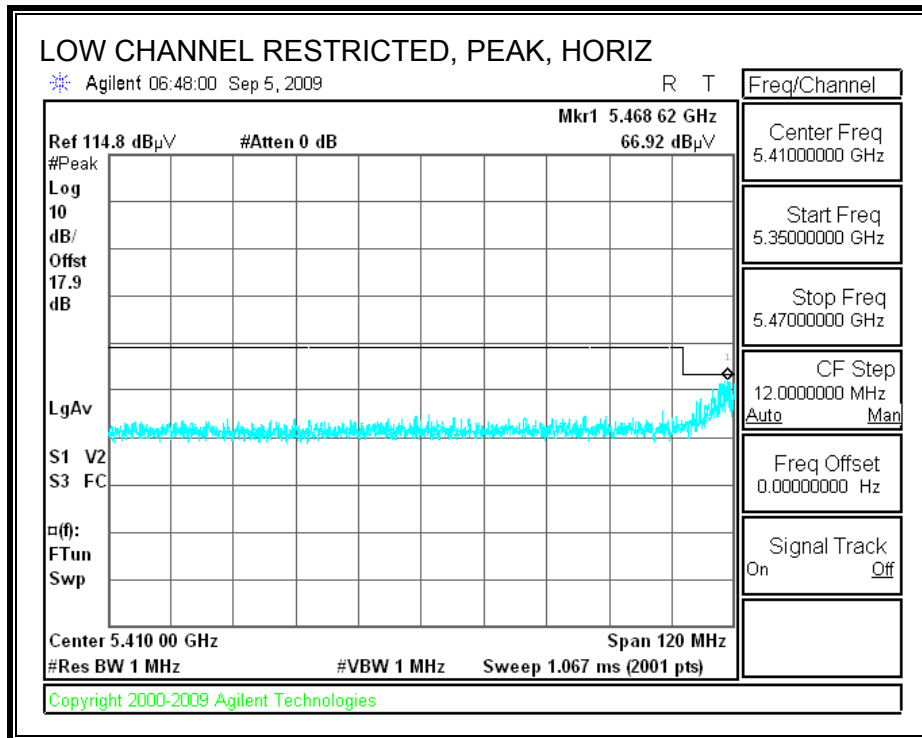
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5500MHz</b>													
11.000	3.0	39.1	37.7	9.2	-33.8	0.0	0.7	53.0	74.0	-21.0	H	P	
11.000	3.0	27.2	37.7	9.2	-33.8	0.0	0.7	41.2	54.0	-12.8	H	A	
16.500	3.0	33.8	39.7	11.8	-32.1	0.0	0.7	53.9	68.2	-14.3	H	P	
11.000	3.0	44.7	37.7	9.2	-33.8	0.0	0.7	58.6	74.0	-15.4	V	P	
11.000	3.0	32.3	37.7	9.2	-33.8	0.0	0.7	46.2	54.0	-7.8	V	A	
16.500	3.0	36.6	39.7	11.8	-32.1	0.0	0.7	56.7	68.2	-11.5	V	P	
<b>5600MHz</b>													
11.200	3.0	46.1	37.9	9.3	-33.5	0.0	0.7	60.5	74.0	-13.5	H	P	
11.200	3.0	33.6	37.9	9.3	-33.5	0.0	0.7	48.1	54.0	-5.9	H	A	
16.800	3.0	36.5	40.9	12.0	-32.0	0.0	0.7	58.1	68.2	-10.1	H	P	
11.200	3.0	46.1	37.9	9.3	-33.5	0.0	0.7	60.5	74.0	-13.5	V	P	
11.200	3.0	34.5	37.9	9.3	-33.5	0.0	0.7	48.9	54.0	-5.1	V	A	
16.800	3.0	37.8	40.9	12.0	-32.0	0.0	0.7	59.3	68.2	-8.9	V	P	
<b>5700MHz</b>													
11.400	3.0	39.4	38.0	9.4	-33.2	0.0	0.7	54.3	74.0	-19.7	H	P	
11.400	3.0	27.0	38.0	9.4	-33.2	0.0	0.7	42.0	54.0	-12.0	H	A	
17.100	3.0	33.1	42.2	12.1	-32.0	0.0	0.7	56.1	68.2	-12.1	H	P	
11.400	3.0	38.7	38.0	9.4	-33.2	0.0	0.7	53.6	74.0	-20.4	V	P	
11.400	3.0	26.7	38.0	9.4	-33.2	0.0	0.7	41.7	54.0	-12.3	V	A	
17.100	3.0	33.3	42.2	12.1	-32.0	0.0	0.7	56.3	68.2	-11.9	V	P	

Rev. 4.1.2.7

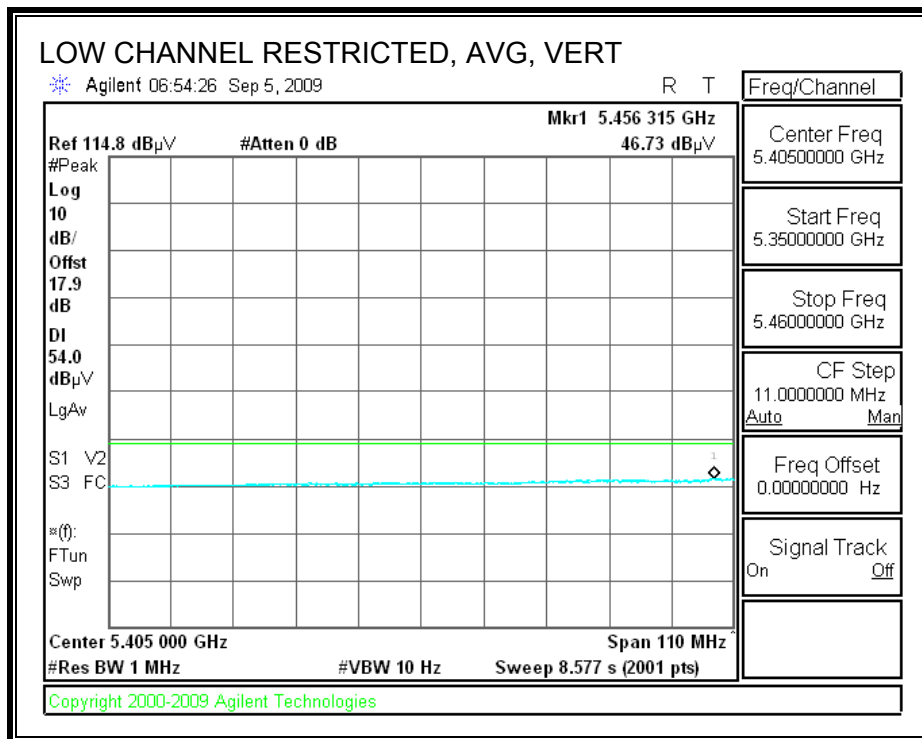
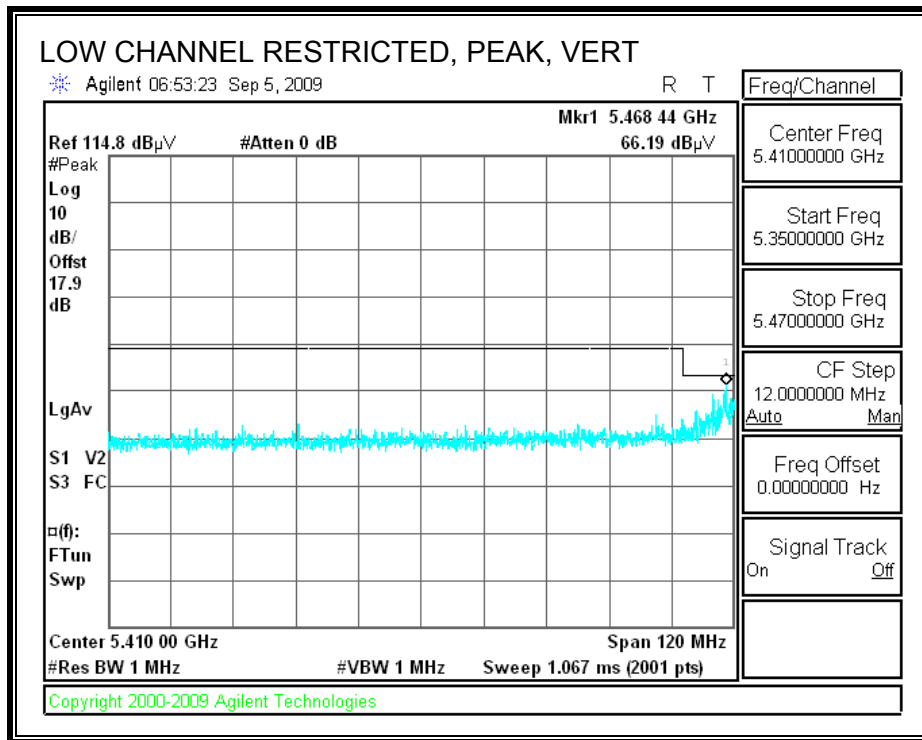
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

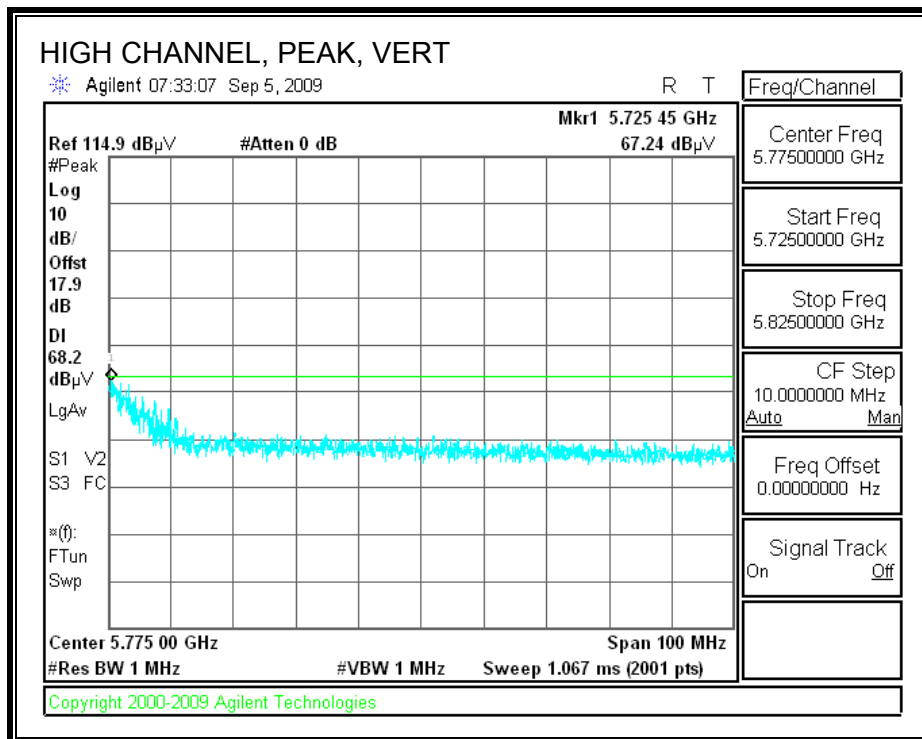
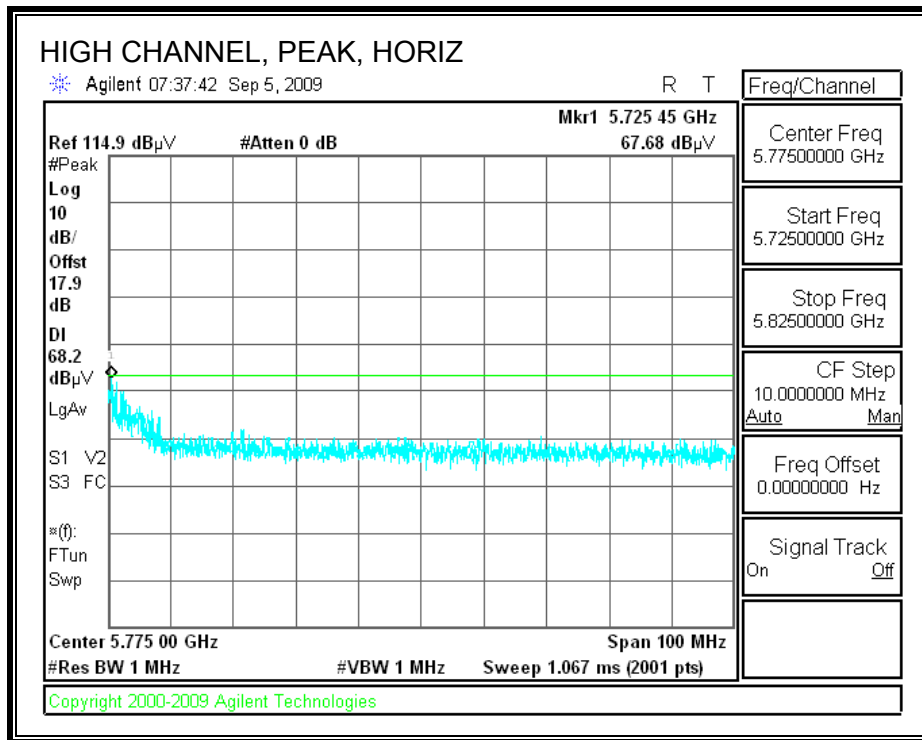
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(PIFA antenna) with Laptop  
 Mode Oper: Tx\_HT20

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

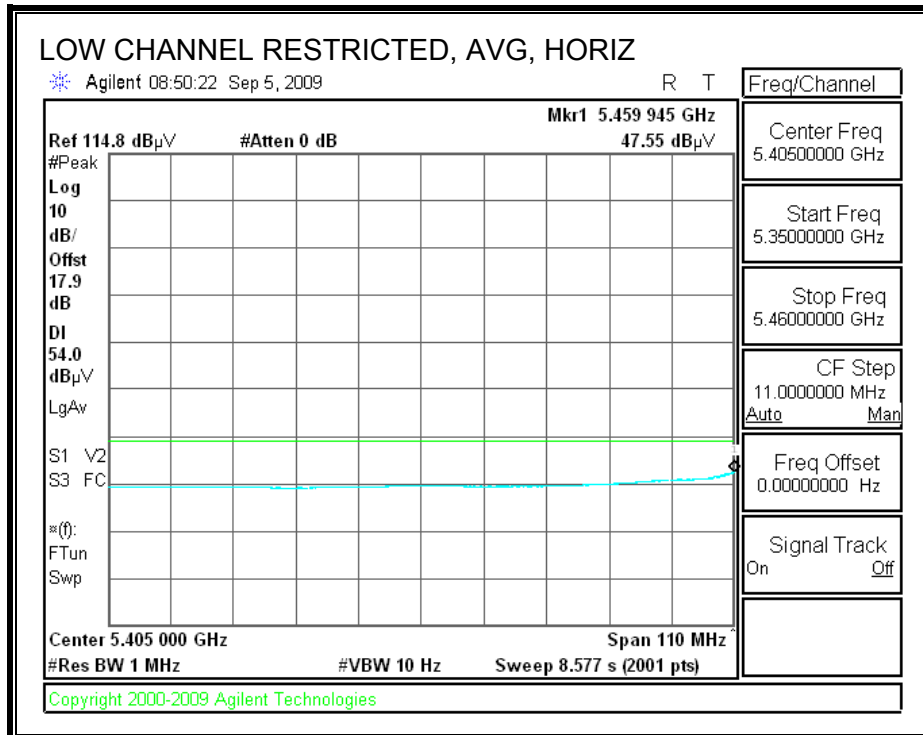
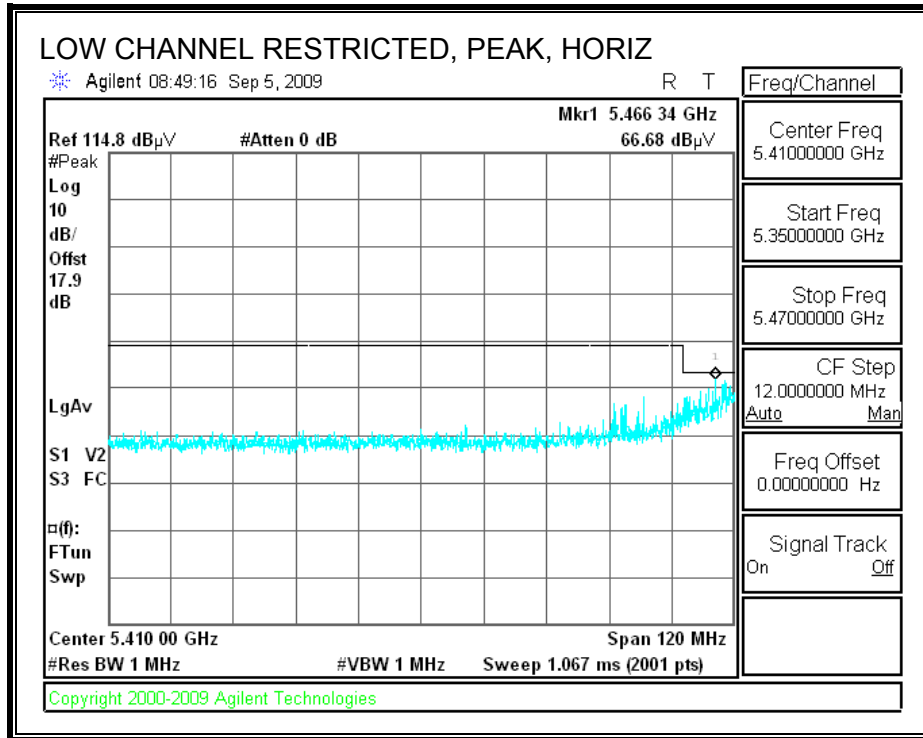
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5500MHz</b>													
11.000	3.0	41.4	37.7	9.2	-33.8	0.0	0.7	55.3	74.0	-18.7	H	P	
11.000	3.0	29.3	37.7	9.2	-33.8	0.0	0.7	43.2	54.0	-10.8	H	A	
16.500	3.0	35.5	39.7	11.8	-32.1	0.0	0.7	55.6	68.2	-12.6	H	P	
11.000	3.0	44.4	37.7	9.2	-33.8	0.0	0.7	58.3	74.0	-15.7	V	P	
11.000	3.0	32.1	37.7	9.2	-33.8	0.0	0.7	46.0	54.0	-8.0	V	A	
16.500	3.0	36.9	39.7	11.8	-32.1	0.0	0.7	57.0	68.2	-11.2	V	P	
<b>5600MHz</b>													
11.200	3.0	43.6	37.9	9.3	-33.5	0.0	0.7	58.0	74.0	-16.0	H	P	
11.200	3.0	30.1	37.9	9.3	-33.5	0.0	0.7	44.5	54.0	-9.5	H	A	
16.800	3.0	35.4	40.9	12.0	-32.0	0.0	0.7	57.0	68.2	-11.2	H	P	
11.200	3.0	42.9	37.9	9.3	-33.5	0.0	0.7	57.3	74.0	-16.7	V	P	
11.200	3.0	30.4	37.9	9.3	-33.5	0.0	0.7	44.8	54.0	-9.2	V	A	
16.800	3.0	35.4	40.9	12.0	-32.0	0.0	0.7	56.9	68.2	-11.3	V	P	
<b>5700MHz</b>													
11.400	3.0	36.3	38.0	9.4	-33.2	0.0	0.7	51.2	74.0	-22.8	H	P	
11.400	3.0	24.2	38.0	9.4	-33.2	0.0	0.7	39.2	54.0	-14.8	H	A	
17.100	3.0	32.5	42.2	12.1	-32.0	0.0	0.7	55.4	68.2	-12.8	H	P	
11.400	3.0	39.3	38.0	9.4	-33.2	0.0	0.7	54.2	74.0	-19.8	V	P	
11.400	3.0	27.4	38.0	9.4	-33.2	0.0	0.7	42.3	54.0	-11.7	V	A	
17.100	3.0	33.3	42.2	12.1	-32.0	0.0	0.7	56.2	68.2	-12.0	V	P	

Rev. 4.1.2.7

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

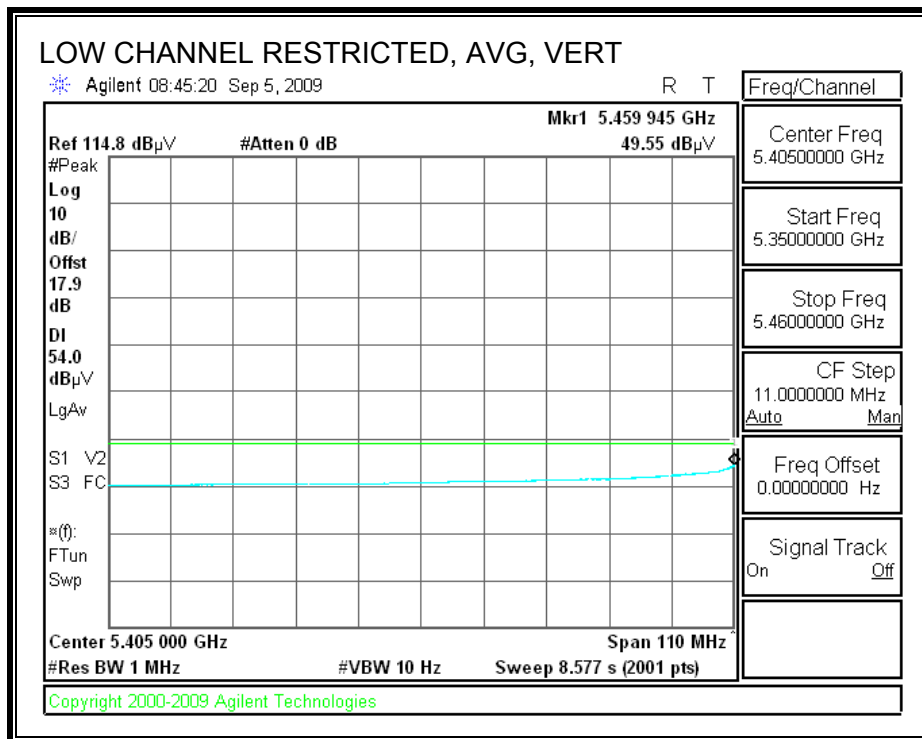
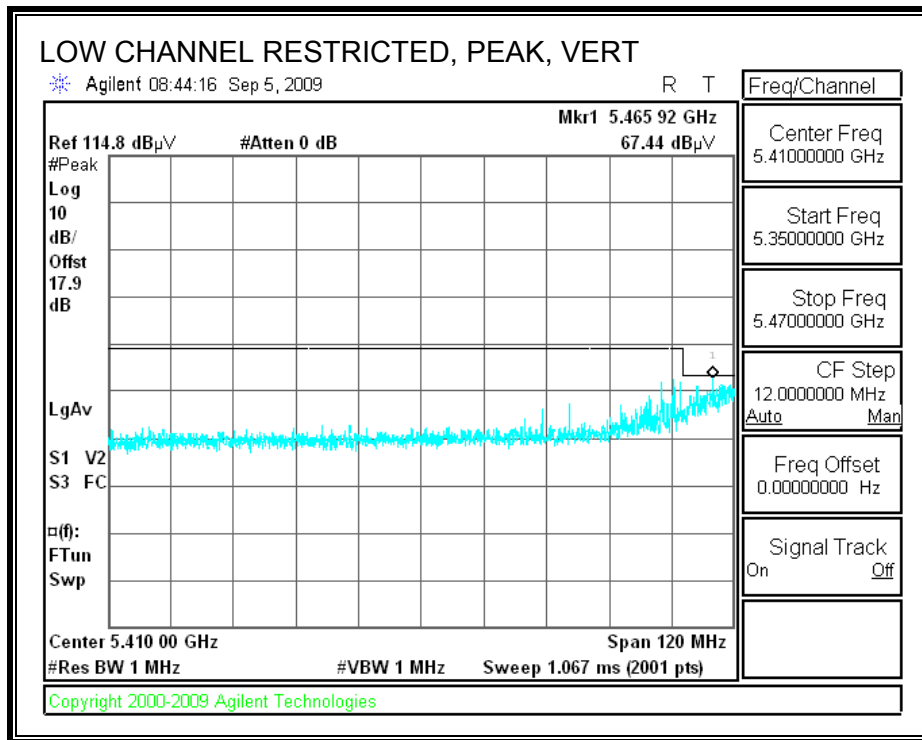
### 8.2.9. 802.11n HT40 MODE IN THE 5.6 GHz BAND

#### DIPOLE ANTENNA - RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

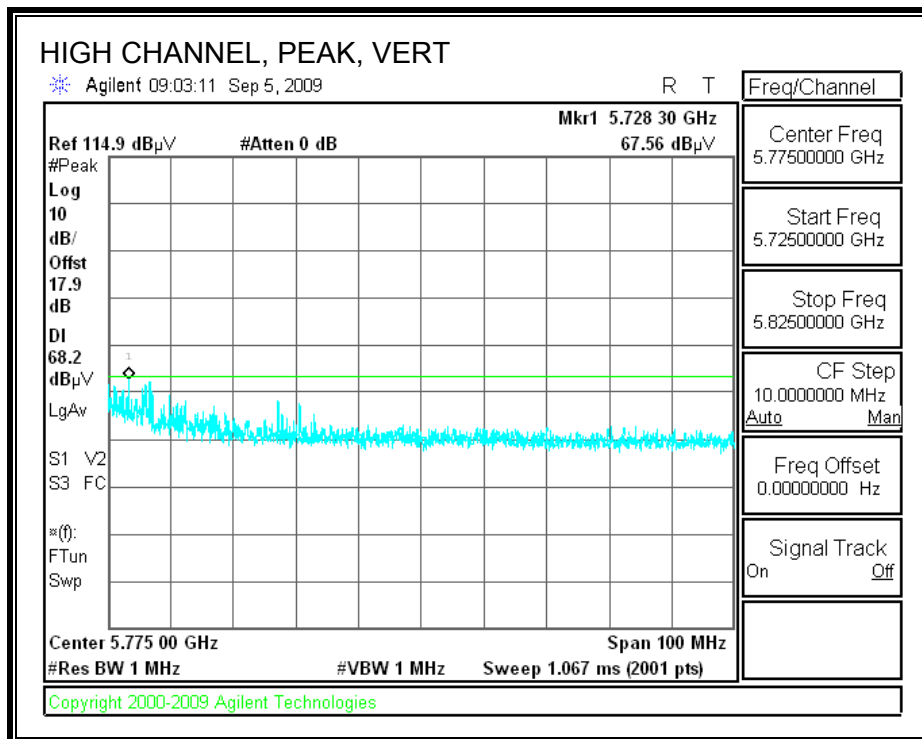
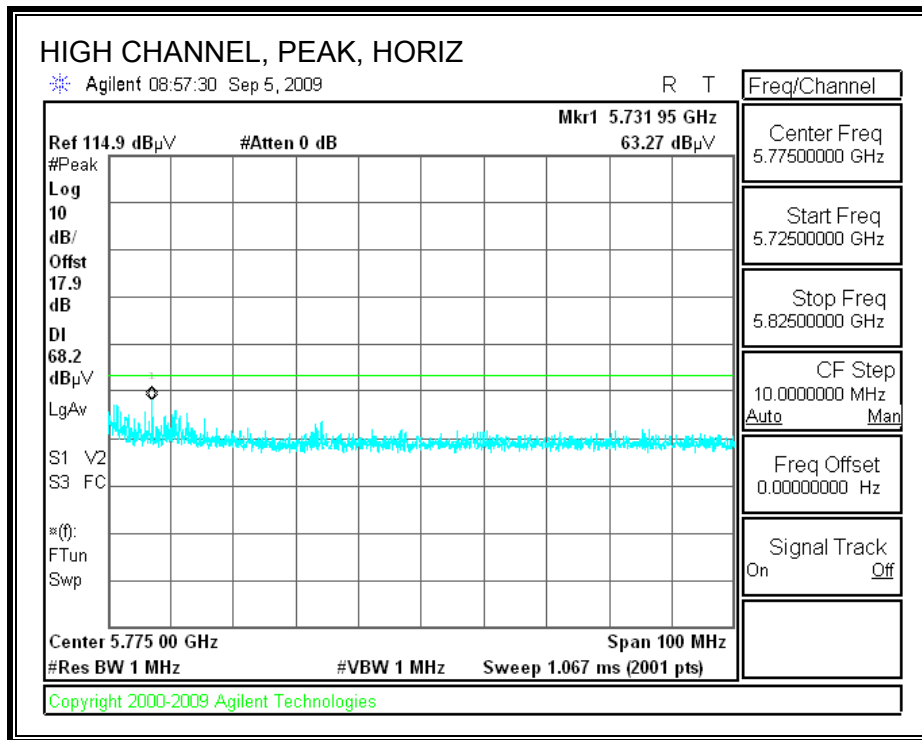




**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Devin Chang  
 Date: 09/13/08  
 Project #: 09J12784  
 Company: Mitsumi  
 EUT Description: EUT(Dipole antenna) with Laptop  
 Mode Oper: Tx\_HT40

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

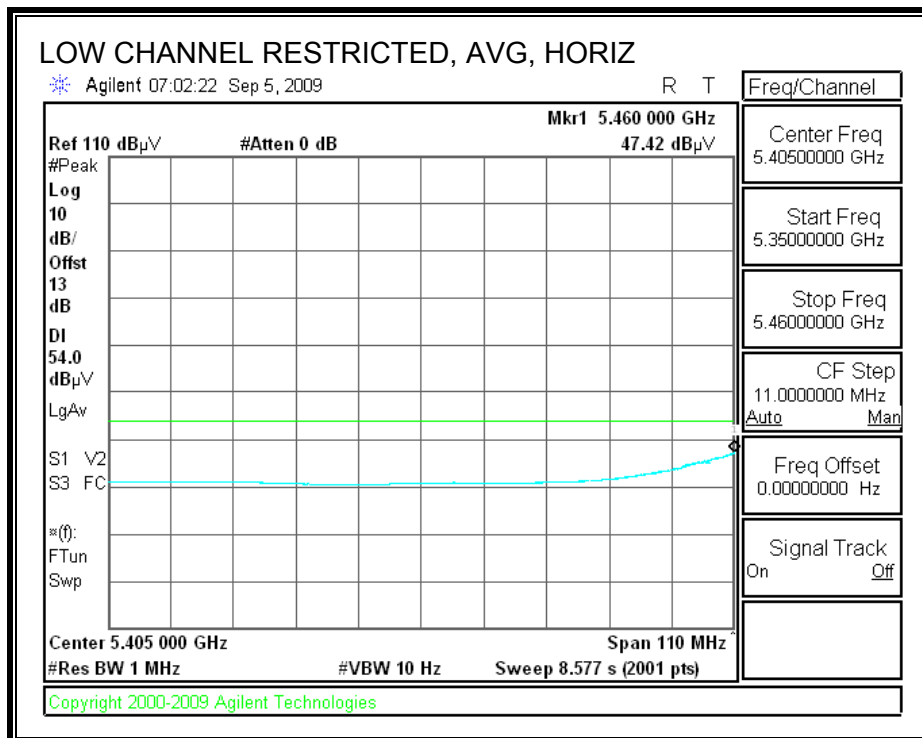
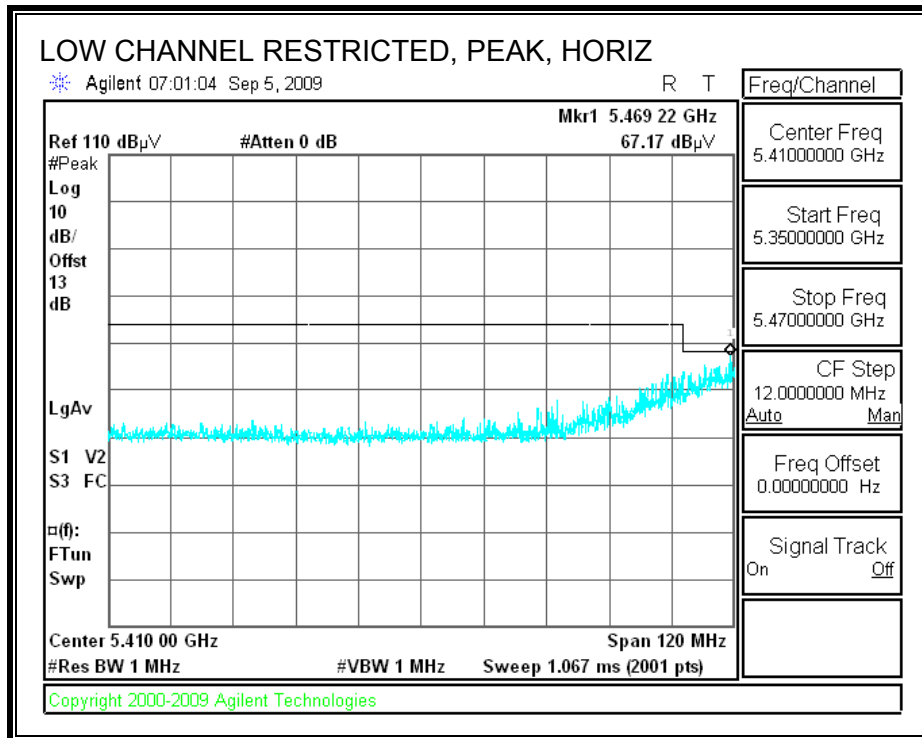
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5510MHz</b>													
11.020	3.0	44.6	37.7	9.2	-33.7	0.0	0.7	58.6	74.0	-15.4	H	P	
11.020	3.0	32.5	37.7	9.2	-33.7	0.0	0.7	46.5	54.0	-7.5	H	A	
16.530	3.0	33.7	39.8	11.8	-32.1	0.0	0.7	53.9	68.2	-14.3	H	P	
11.020	3.0	45.7	37.7	9.2	-33.7	0.0	0.7	59.7	74.0	-14.3	V	P	
11.020	3.0	34.2	37.7	9.2	-33.7	0.0	0.7	48.2	54.0	-5.8	V	A	
16.530	3.0	38.3	39.8	11.8	-32.1	0.0	0.7	58.6	68.2	-9.7	V	P	
<b>5590MHz</b>													
11.180	3.0	44.4	37.8	9.3	-33.5	0.0	0.7	58.8	74.0	-15.2	H	P	
11.180	3.0	32.2	37.8	9.3	-33.5	0.0	0.7	46.6	54.0	-7.4	H	A	
16.770	3.0	36.1	40.8	11.9	-32.1	0.0	0.7	57.5	68.2	-10.7	H	P	
11.180	3.0	41.8	37.8	9.3	-33.5	0.0	0.7	56.2	74.0	-17.8	V	P	
11.180	3.0	28.4	37.8	9.3	-33.5	0.0	0.7	42.8	54.0	-11.2	V	A	
16.770	3.0	36.4	40.8	11.9	-32.1	0.0	0.7	57.7	68.2	-10.5	V	P	
<b>5670MHz</b>													
11.340	3.0	37.4	38.0	9.4	-33.3	0.0	0.7	52.1	74.0	-21.9	H	P	
11.340	3.0	25.2	38.0	9.4	-33.3	0.0	0.7	40.0	54.0	-14.0	H	A	
17.010	3.0	34.0	41.8	12.1	-32.0	0.0	0.7	56.6	68.2	-11.6	H	P	
11.340	3.0	37.7	38.0	9.4	-33.3	0.0	0.7	52.5	74.0	-21.5	V	P	
11.340	3.0	25.1	38.0	9.4	-33.3	0.0	0.7	39.8	54.0	-14.2	V	A	
17.010	3.0	33.9	41.8	12.1	-32.0	0.0	0.7	56.4	68.2	-11.8	V	P	

Rev. 4.1.2.7

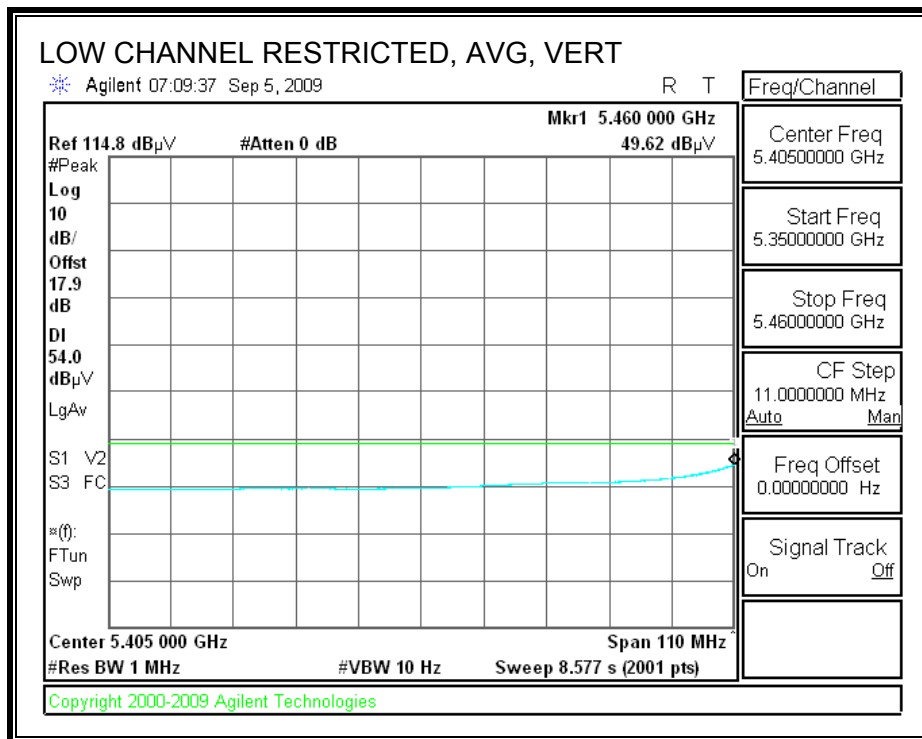
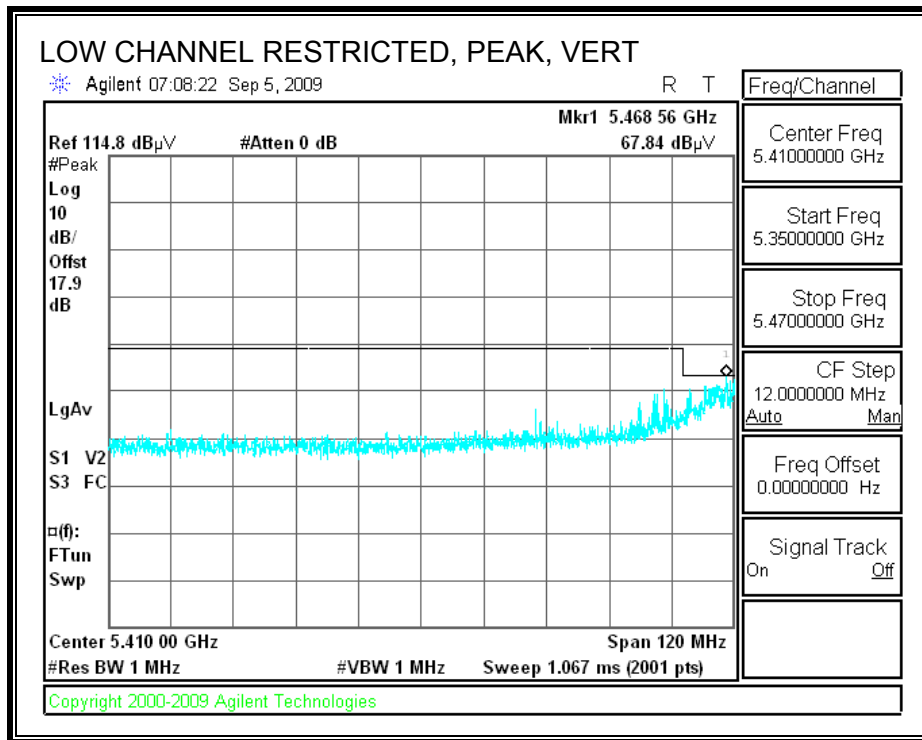
Note: No other emissions were detected above the system noise floor.

**PIFA ANTENNA**

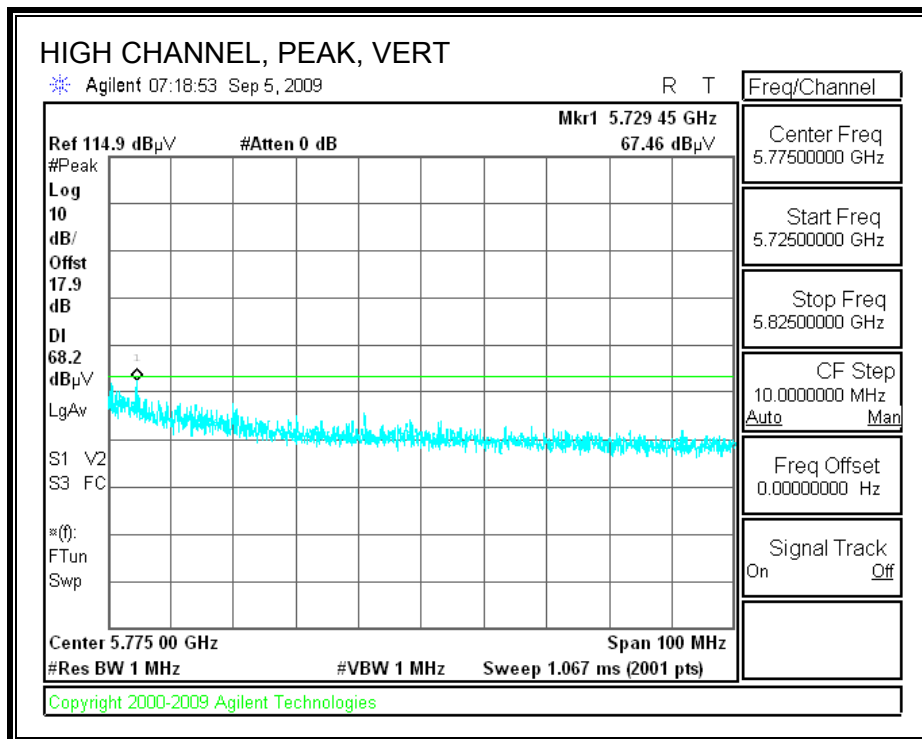
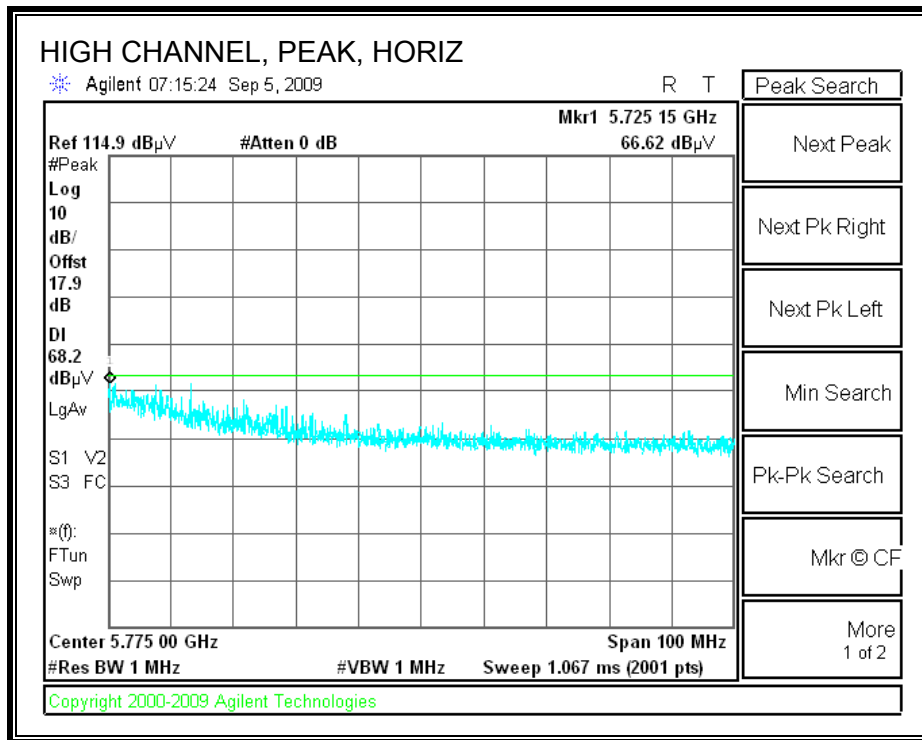
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Devin Chang											
Date:		09/13/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(PIFA antenna) with Laptop											
Mode Oper:		Tx_HT40											
f	Measurement Frequency		Amp	Preamp Gain		Average Field Strength Limit							
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Peak Field Strength Limit							
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Margin vs. Average Limit							
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Margin vs. Peak Limit							
CL	Cable Loss		HPF	High Pass Filter									
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>5670MHz</b>													
11.340	3.0	36.4	38.0	9.4	-33.3	0.0	0.7	51.2	74.0	-22.8	H	P	
11.340	3.0	23.7	38.0	9.4	-33.3	0.0	0.7	38.5	54.0	-15.5	H	A	
17.010	3.0	33.1	41.8	12.1	-32.0	0.0	0.7	55.7	68.2	-12.5	H	P	
11.340	3.0	38.5	38.0	9.4	-33.3	0.0	0.7	53.3	74.0	-20.7	V	P	
11.340	3.0	26.2	38.0	9.4	-33.3	0.0	0.7	41.0	54.0	-13.0	V	A	
17.010	3.0	34.0	41.8	12.1	-32.0	0.0	0.7	56.6	68.2	-11.6	V	P	
<b>5510MHz</b>													
11.020	3.0	39.2	37.7	9.2	-33.7	0.0	0.7	53.1	74.0	-20.9	H	P	
11.020	3.0	26.4	37.7	9.2	-33.7	0.0	0.7	40.4	54.0	-13.6	H	A	
16.530	3.0	33.9	39.8	11.8	-32.1	0.0	0.7	54.2	68.2	-14.0	H	P	
11.020	3.0	42.0	37.7	9.2	-33.7	0.0	0.7	56.0	74.0	-18.0	V	P	
11.020	3.0	29.9	37.7	9.2	-33.7	0.0	0.7	43.8	54.0	-10.2	V	A	
16.530	3.0	33.9	39.8	11.8	-32.1	0.0	0.7	54.2	68.2	-14.0	V	P	
<b>5590MHz</b>													
11.180	3.0	42.1	37.8	9.3	-33.5	0.0	0.7	56.5	74.0	-17.5	H	P	
11.180	3.0	29.8	37.8	9.3	-33.5	0.0	0.7	44.2	54.0	-9.8	H	A	
16.770	3.0	33.6	40.8	11.9	-32.1	0.0	0.7	55.0	68.2	-13.2	H	P	
11.180	3.0	42.5	37.8	9.3	-33.5	0.0	0.7	56.9	74.0	-17.1	V	P	
11.180	3.0	30.2	37.8	9.3	-33.5	0.0	0.7	44.6	54.0	-9.4	V	A	
16.770	3.0	34.3	40.8	11.9	-32.1	0.0	0.7	55.7	68.2	-12.5	V	P	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

### 8.3. RECEIVER ABOVE 1 GHz

#### 8.3.1. 20 MHz BANDWIDTH IN THE 5.2 GHz BAND

DIPOLE ANTENNA

High Frequency Measurement														
Compliance Certification Services, Fremont 5m Chamber														
Test Engr:		Devin Chang												
Date:		09/04/08												
Project #:		09J12784												
Company:		Mitsumi												
EUT Description:		EUT(Dipole antenna) with Laptop												
Mode Oper:		Rx_BW=20MHz												
f	Measurement Frequency	Amp	Prsamp	Gain										Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters											Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m											Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength											Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter											
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes	
1.330	3.0	57.6	25.2	2.7	-35.9	0.0	0.0	49.6	74.0	-24.4	V	P		
1.330	3.0	44.1	25.2	2.7	-35.9	0.0	0.0	36.1	54.0	-17.9	V	A		
1.662	3.0	59.4	26.4	3.1	-35.6	0.0	0.0	53.3	74.0	-20.7	V	P		
1.662	3.0	43.4	26.4	3.1	-35.6	0.0	0.0	37.3	54.0	-16.7	V	A		
1.994	3.0	54.1	27.6	3.5	-35.4	0.0	0.0	49.8	74.0	-24.2	V	P		
1.994	3.0	37.3	27.6	3.5	-35.4	0.0	0.0	33.0	54.0	-21.0	V	A		
1.330	3.0	55.5	25.2	2.7	-35.9	0.0	0.0	47.5	74.0	-26.5	H	P		
1.330	3.0	42.2	25.2	2.7	-35.9	0.0	0.0	34.2	54.0	-19.8	H	A		
1.662	3.0	55.5	26.4	3.1	-35.6	0.0	0.0	49.4	74.0	-24.6	H	P		
1.662	3.0	40.2	26.4	3.1	-35.6	0.0	0.0	34.0	54.0	-20.0	H	A		
1.994	3.0	49.3	27.6	3.5	-35.4	0.0	0.0	44.9	74.0	-29.1	H	P		
1.994	3.0	34.0	27.6	3.5	-35.4	0.0	0.0	29.7	54.0	-24.3	H	A		
Rev. 4.1.2.7														
Note: No other emissions were detected above the system noise floor.														



### 8.3.2. 20 MHz BANDWIDTH IN THE 5.2 GHz BAND

#### PIFA ANTENNA

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Devin Chang											
Date:		09/04/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(PIFA antenna) with Laptop											
Mode Oper:		Rx_BW=20MHz											
f	Measurement Frequency		Amp	Prsamp Gain		Average Field Strength Limit							
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Peak Field Strength Limit							
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Margin vs. Average Limit							
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Margin vs. Peak Limit							
CL	Cable Loss		HPF	High Pass Filter									
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
1.330	3.0	57.6	25.2	2.7	-35.9	0.0	0.0	49.6	74.0	-24.4	V	P	
1.330	3.0	44.0	25.2	2.7	-35.9	0.0	0.0	36.0	54.0	-18.0	V	A	
1.662	3.0	59.0	26.4	3.1	-35.6	0.0	0.0	52.8	74.0	-21.2	V	P	
1.662	3.0	43.1	26.4	3.1	-35.6	0.0	0.0	36.9	54.0	-17.1	V	A	
1.994	3.0	52.5	27.6	3.5	-35.4	0.0	0.0	48.1	74.0	-25.9	V	P	
1.994	3.0	36.4	27.6	3.5	-35.4	0.0	0.0	32.0	54.0	-22.0	V	A	
1.330	3.0	54.2	25.2	2.7	-35.9	0.0	0.0	46.2	74.0	-27.8	H	P	
1.330	3.0	41.0	25.2	2.7	-35.9	0.0	0.0	33.0	54.0	-21.0	H	A	
1.662	3.0	54.9	26.4	3.1	-35.6	0.0	0.0	48.8	74.0	-25.2	H	P	
1.662	3.0	39.7	26.4	3.1	-35.6	0.0	0.0	33.5	54.0	-20.5	H	A	
1.994	3.0	50.3	27.6	3.5	-35.4	0.0	0.0	46.0	74.0	-28.0	H	P	
1.994	3.0	34.9	27.6	3.5	-35.4	0.0	0.0	30.5	54.0	-23.5	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

### 8.3.3. 40 MHz BANDWIDTH IN THE 5.2 GHz BAND

#### DIPOLE ANTENNA

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Devin Chang											
Date:		09/04/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(Dipole antenna) with Laptop											
Mode Oper:		Rx_BW=40MHz											
f	Measurement Frequency	Amp	Pramp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
1.330	3.0	58.6	25.2	2.7	-35.9	0.0	0.0	50.6	74.0	-23.4	V	P	
1.330	3.0	44.1	25.2	2.7	-35.9	0.0	0.0	36.1	54.0	-17.9	V	A	
1.662	3.0	59.3	26.4	3.1	-35.6	0.0	0.0	53.2	74.0	-20.8	V	P	
1.662	3.0	43.2	26.4	3.1	-35.6	0.0	0.0	37.1	54.0	-16.9	V	A	
1.994	3.0	53.7	27.6	3.5	-35.4	0.0	0.0	49.4	74.0	-24.6	V	P	
1.994	3.0	37.1	27.6	3.5	-35.4	0.0	0.0	32.8	54.0	-21.2	V	A	
1.330	3.0	55.6	25.2	2.7	-35.9	0.0	0.0	47.6	74.0	-26.4	H	P	
1.330	3.0	42.2	25.2	2.7	-35.9	0.0	0.0	34.2	54.0	-19.8	H	A	
1.662	3.0	55.5	26.4	3.1	-35.6	0.0	0.0	49.3	74.0	-24.7	H	P	
1.662	3.0	40.1	26.4	3.1	-35.6	0.0	0.0	33.9	54.0	-20.1	H	A	
1.994	3.0	49.9	27.6	3.5	-35.4	0.0	0.0	45.5	74.0	-28.5	H	P	
1.994	3.0	34.6	27.6	3.5	-35.4	0.0	0.0	30.2	54.0	-23.8	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

### 8.3.4. 40 MHz BANDWIDTH IN THE 5.2 GHz BAND

#### PIFA ANTENNA

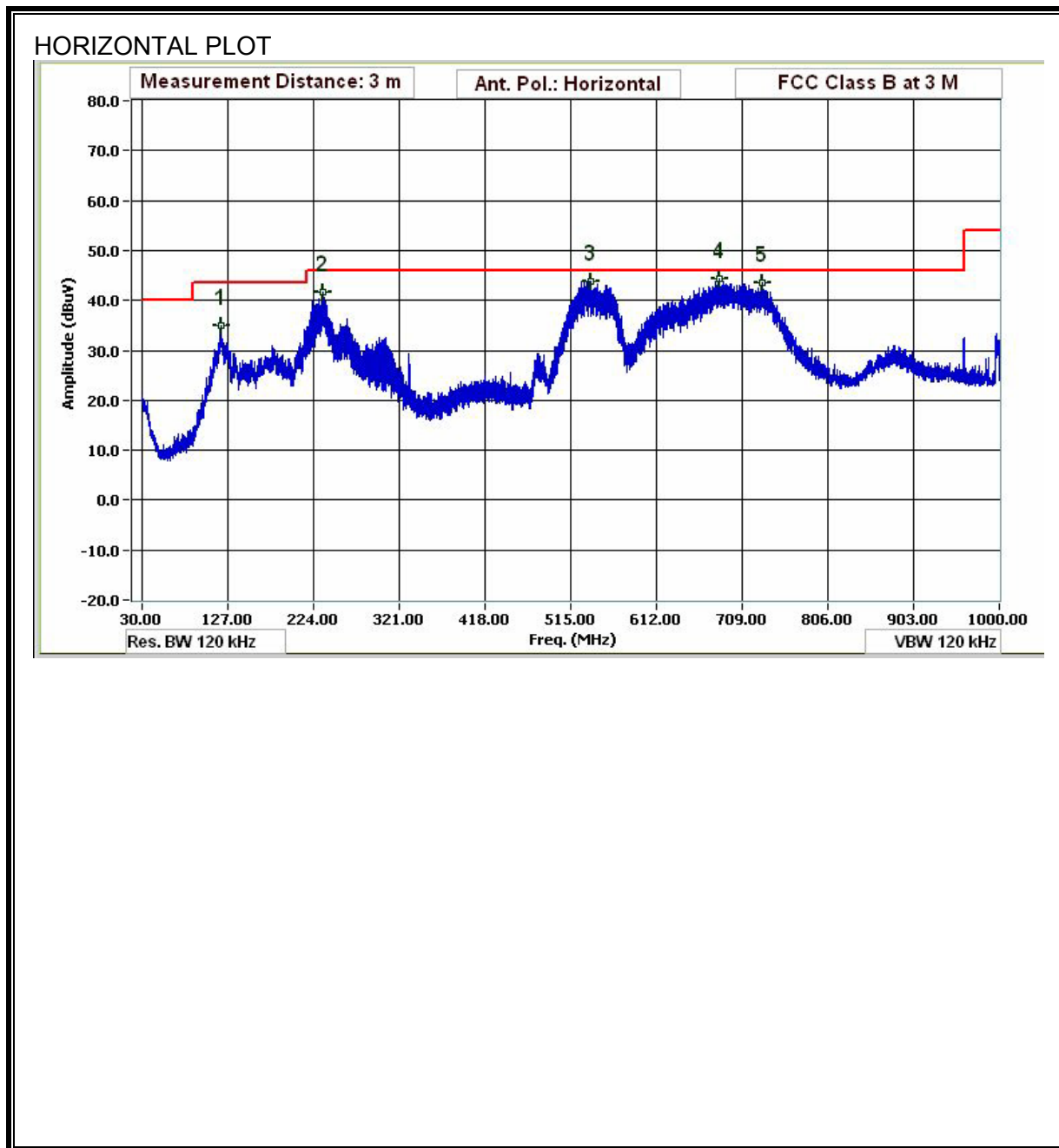
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Devin Chang											
Date:		09/04/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(PIFA antenna) with Laptop											
Mode Oper:		Rx_BW=40MHz											
f	Measurement Frequency	Amp	Prsmp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
1.330	3.0	57.7	25.2	2.7	-35.9	0.0	0.0	49.7	74.0	-24.3	V	P	
1.330	3.0	43.9	25.2	2.7	-35.9	0.0	0.0	35.9	54.0	-18.1	V	A	
1.662	3.0	59.2	26.4	3.1	-35.6	0.0	0.0	53.0	74.0	-21.0	V	P	
1.662	3.0	43.1	26.4	3.1	-35.6	0.0	0.0	37.0	54.0	-17.0	V	A	
1.994	3.0	53.3	27.6	3.5	-35.4	0.0	0.0	48.9	74.0	-25.1	V	P	
1.994	3.0	36.9	27.6	3.5	-35.4	0.0	0.0	32.5	54.0	-21.5	V	A	
1.330	3.0	55.3	25.2	2.7	-35.9	0.0	0.0	47.3	74.0	-26.7	H	P	
1.330	3.0	41.9	25.2	2.7	-35.9	0.0	0.0	33.9	54.0	-20.1	H	A	
1.662	3.0	54.3	26.4	3.1	-35.6	0.0	0.0	48.1	74.0	-25.9	H	P	
1.662	3.0	39.3	26.4	3.1	-35.6	0.0	0.0	33.1	54.0	-20.9	H	A	
1.994	3.0	50.2	27.6	3.5	-35.4	0.0	0.0	45.9	74.0	-28.1	H	P	
1.994	3.0	34.7	27.6	3.5	-35.4	0.0	0.0	30.4	54.0	-23.6	H	A	

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

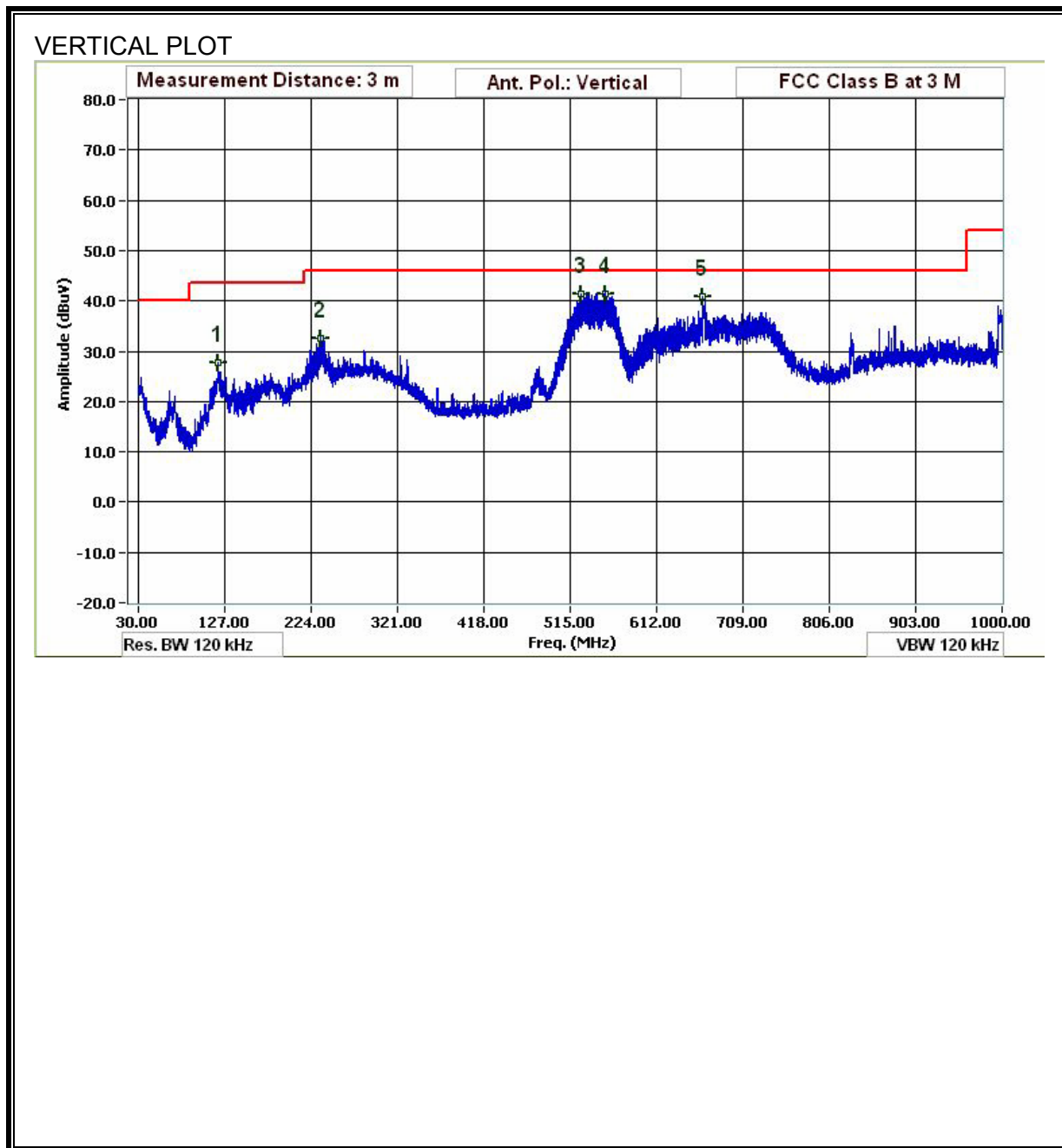
### 8.4. WORST-CASE BELOW 1 GHz

#### DIPOLE ANTENNA

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



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

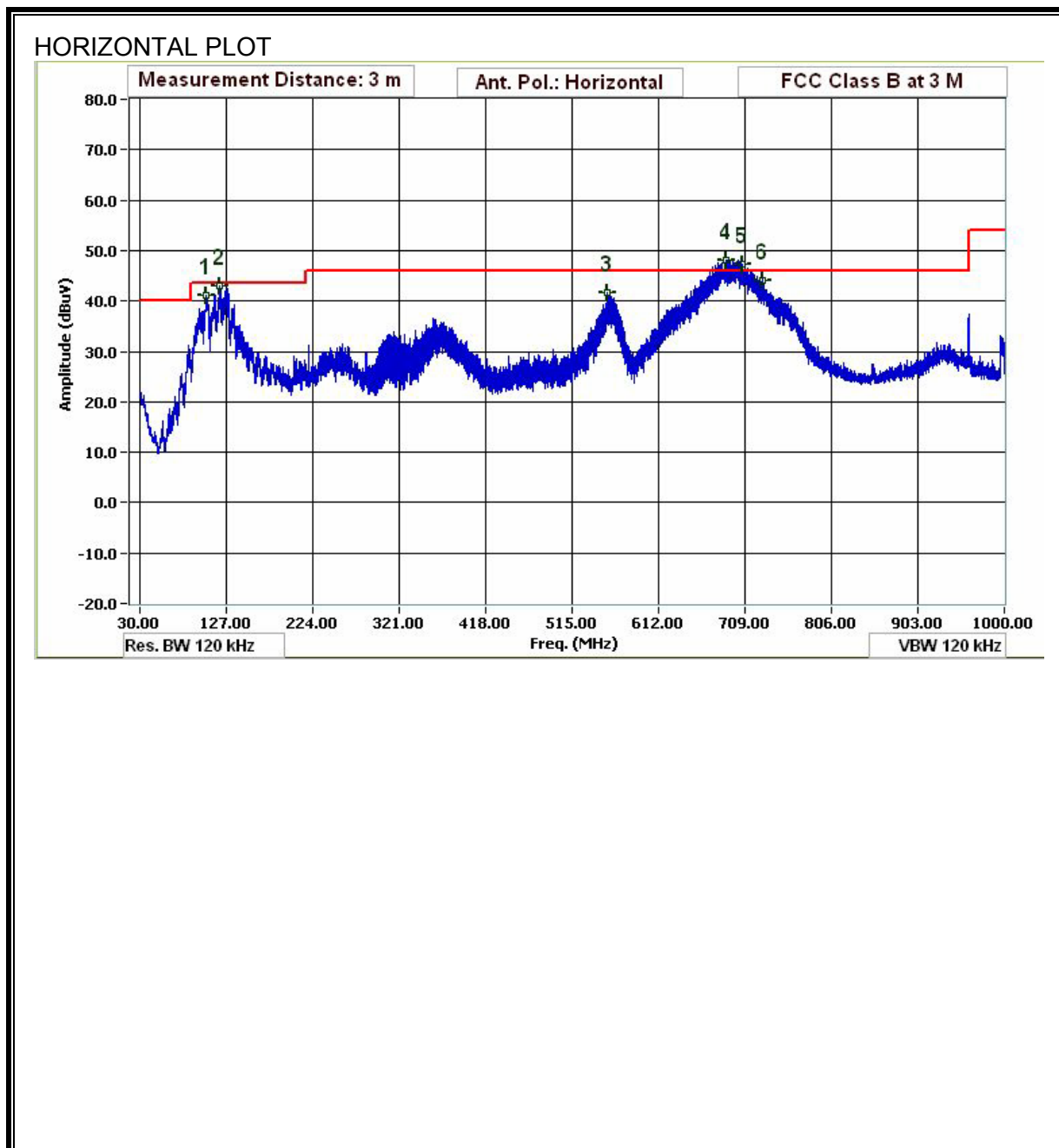


DATA

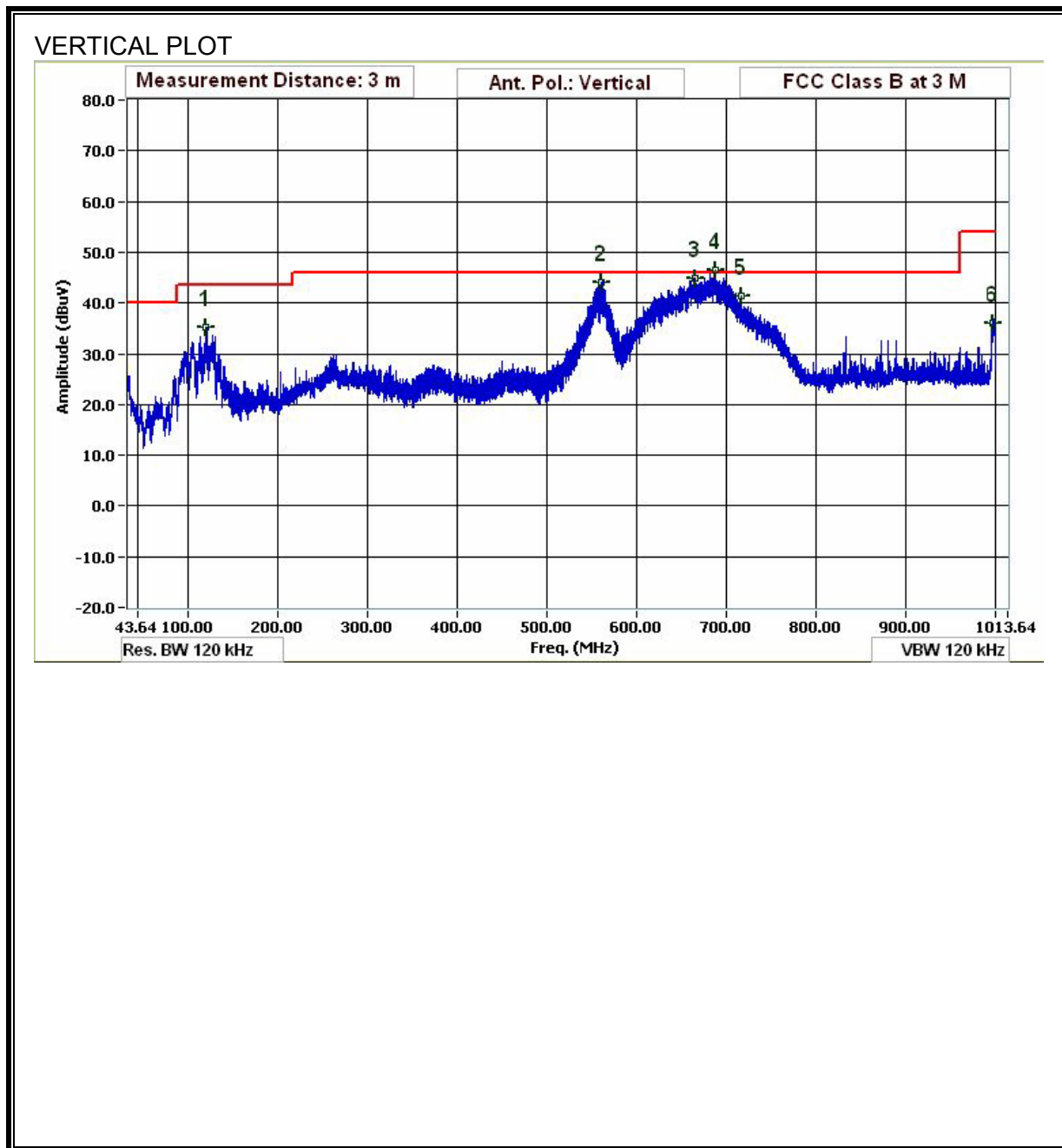
30-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Ekta Budhbhatti											
Date:		09/20/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(Dipole antenna) with Laptop											
Mode Oper:		Tx mode											
f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit								
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters										
Read	Analyzer Reading	Filter	Filter Insert Loss										
AF	Antenna Factor	Corr.	Calculated Field Strength										
CL	Cable Loss	Limit	Field Strength Limit										
f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
120.004	3.0	48.5	13.6	1.0	28.3	0.0	0.0	34.9	43.5	-8.6	H	P	
234.848	3.0	56.8	11.9	1.3	28.2	0.0	0.0	41.8	46.0	-4.2	H	P	
537.021	3.0	50.0	17.4	2.1	27.7	0.0	0.0	41.7	46.0	-4.3	H	QP	
683.547	3.0	49.9	19.4	2.4	27.2	0.0	0.0	42.0	46.0	-4.0	H	QP	
731.309	3.0	46.1	20.0	2.5	27.3	0.0	0.0	41.4	46.0	-4.6	H	QP	
120.004	3.0	41.3	13.6	1.0	28.3	0.0	0.0	27.7	43.5	-15.8	V	P	
234.608	3.0	47.5	11.9	1.3	28.2	0.0	0.0	32.5	46.0	-13.5	V	P	
526.700	3.0	50.0	17.2	2.1	27.7	0.0	0.0	41.5	46.0	-4.5	V	P	
554.062	3.0	49.2	17.6	2.1	27.7	0.0	0.0	41.3	46.0	-4.7	V	P	
663.866	3.0	46.6	19.2	2.4	27.3	0.0	0.0	40.9	46.0	-5.1	V	P	
Rev. 1.27.09													
Note: No other emissions were detected above the system noise floor.													

**PIFA ANTENNA**

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



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





DATA

30-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Elta Budhbhatti											
Date:		09/20/08											
Project #:		09J12784											
Company:		Mitsumi											
EUT Description:		EUT(PIFA antenna) with Laptop											
Mode Oper:		Tx mode											
f	Measurement Frequency	Amp	Preamp Gain		Margin	Margin vs. Limit							
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters										
Read	Analyzer Reading	Filter	Filter Insert Loss										
AF	Antenna Factor	Corr.	Calculated Field Strength										
CL	Cable Loss	Limit	Field Strength Limit										
f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det P/A/QP	Notes
103.803	3.0	50.7	10.6	0.9	28.3	0.0	0.0	34.0	43.5	-9.5	H	QP	
120.004	3.0	50.1	13.6	1.0	28.3	0.0	0.0	36.5	43.5	-7.0	H	QP	
554.302	3.0	49.5	17.6	2.1	27.7	0.0	0.0	41.6	46.0	-4.4	H	EP	
688.347	3.0	48.3	19.4	2.4	27.2	0.0	0.0	42.9	46.0	-3.1	H	QP	
706.108	3.0	47.8	19.7	2.5	27.2	0.0	0.0	42.7	46.0	-3.3	H	QP	
728.669	3.0	46.5	20.0	2.5	27.3	0.0	0.0	41.7	46.0	-4.3	H	QP	
120.004	3.0	48.9	13.6	1.0	28.3	0.0	0.0	35.3	43.5	-8.2	V	EP	
560.182	3.0	46.5	17.7	2.2	27.6	0.0	0.0	37.8	46.0	-8.2	V	QP	
665.186	3.0	47.1	19.2	2.4	27.3	0.0	0.0	41.3	46.0	-4.7	V	QP	
688.107	3.0	48.1	19.4	2.4	27.2	0.0	0.0	42.7	46.0	-3.3	V	QP	
716.548	3.0	46.3	19.8	2.5	27.2	0.0	0.0	41.4	46.0	-4.6	V	EP	
997.000	3.0	38.5	22.4	3.0	27.9	0.0	0.0	36.0	46.0	-10.0	V	EP	

Rev. 1.27.09

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

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

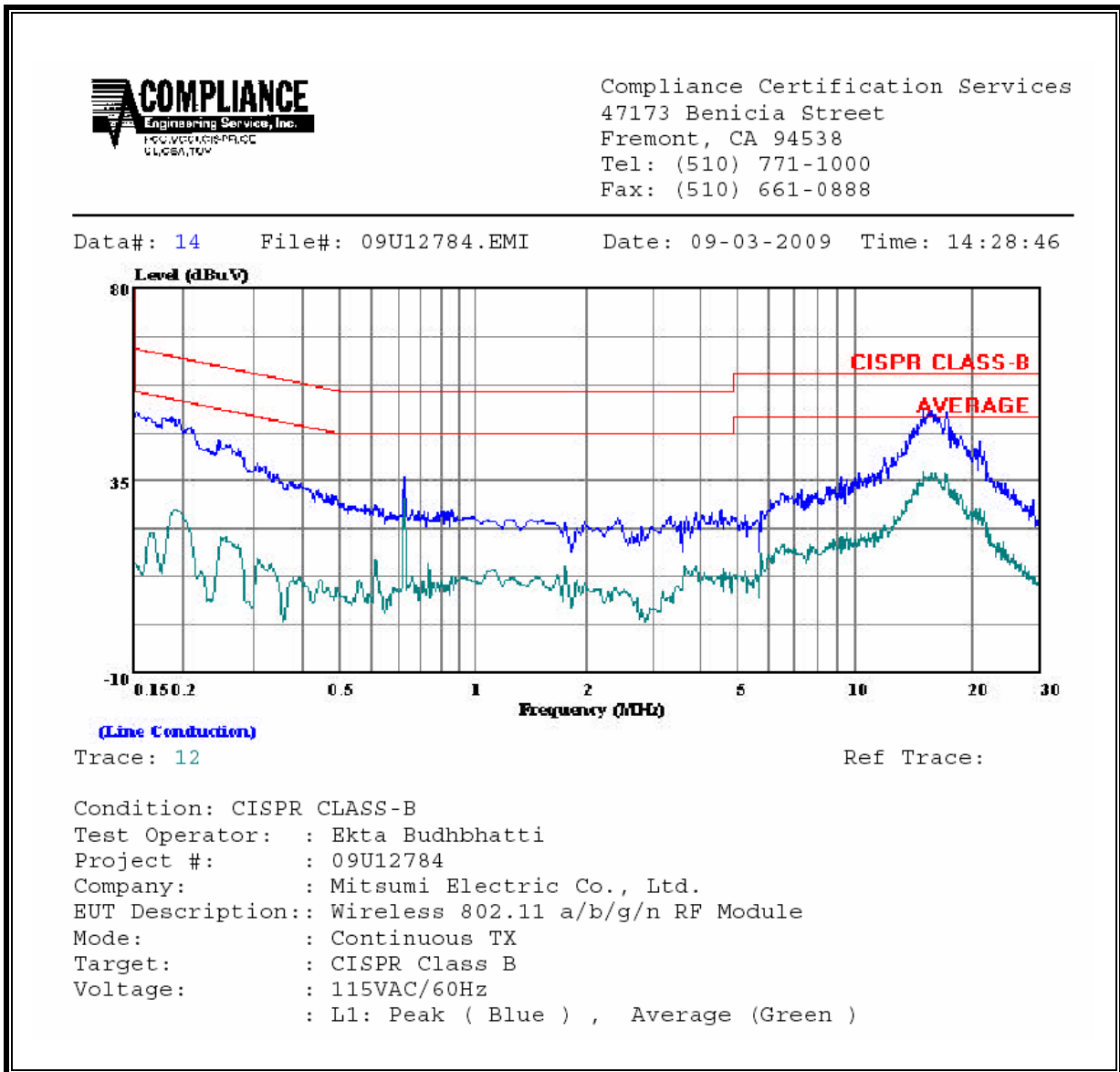
ANSI C63.4

### RESULTS

#### 6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.19	49.81	--	27.03	0.00	64.26	54.26	-14.45	-27.23	L1
15.89	51.70	--	36.13	0.00	60.00	50.00	-8.30	-13.87	L1
17.38	51.20	--	31.38	0.00	60.00	50.00	-8.80	-18.62	L1
0.19	50.29	--	27.99	0.00	64.26	54.26	-13.97	-26.27	L2
0.25	45.37	--	23.92	0.00	61.66	51.66	-16.29	-27.74	L2
16.75	50.71	--	35.62	0.00	60.00	50.00	-9.29	-14.38	L2
6 Worst Data									

**LINE 1 RESULTS**

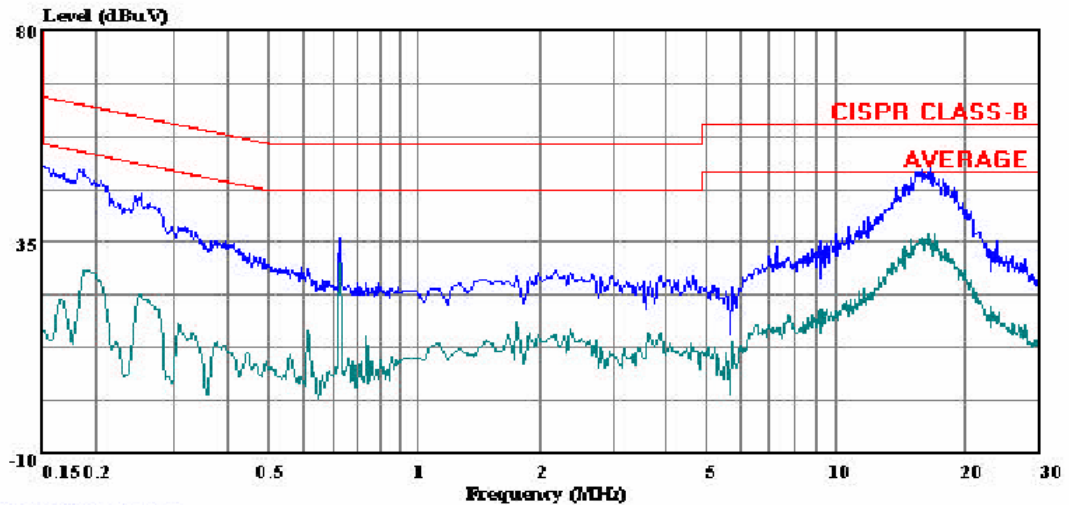


**LINE 2 RESULTS**



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

Data#: 7 File#: 09U12784.EMI Date: 09-03-2009 Time: 14:10:59



(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: : Ekta Budhbhatti  
Project #: : 09U12784  
Company: : Mitsumi Electric Co., Ltd.  
EUT Description: : Wireless 802.11 a/b/g/n RF Module  
Mode: : Continuous TX  
Target: : CISPR Class B  
Voltage: : 115VAC/60Hz  
: L2: Peak ( Blue ) , Average (Green )

## 10. DYNAMIC FREQUENCY SELECTION

### 10.1. OVERVIEW

#### 10.1.1. LIMITS

##### INDUSTRY CANADA

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

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

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

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

##### FCC

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

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

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

**Table 2: Applicability of DFS requirements during normal operation**

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

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

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
<p>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.</p>	

**Table 4: DFS Response requirement values**

Parameter	Value
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
<p>The instant that the <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> begins is as follows:            For the Short pulse radar Test Signals this instant is the end of the <i>Burst</i>.            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.</p>	

**Table 5 – Short Pulse Radar Test Waveforms**

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

**Table 6 – Long Pulse Radar Test Signal**

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

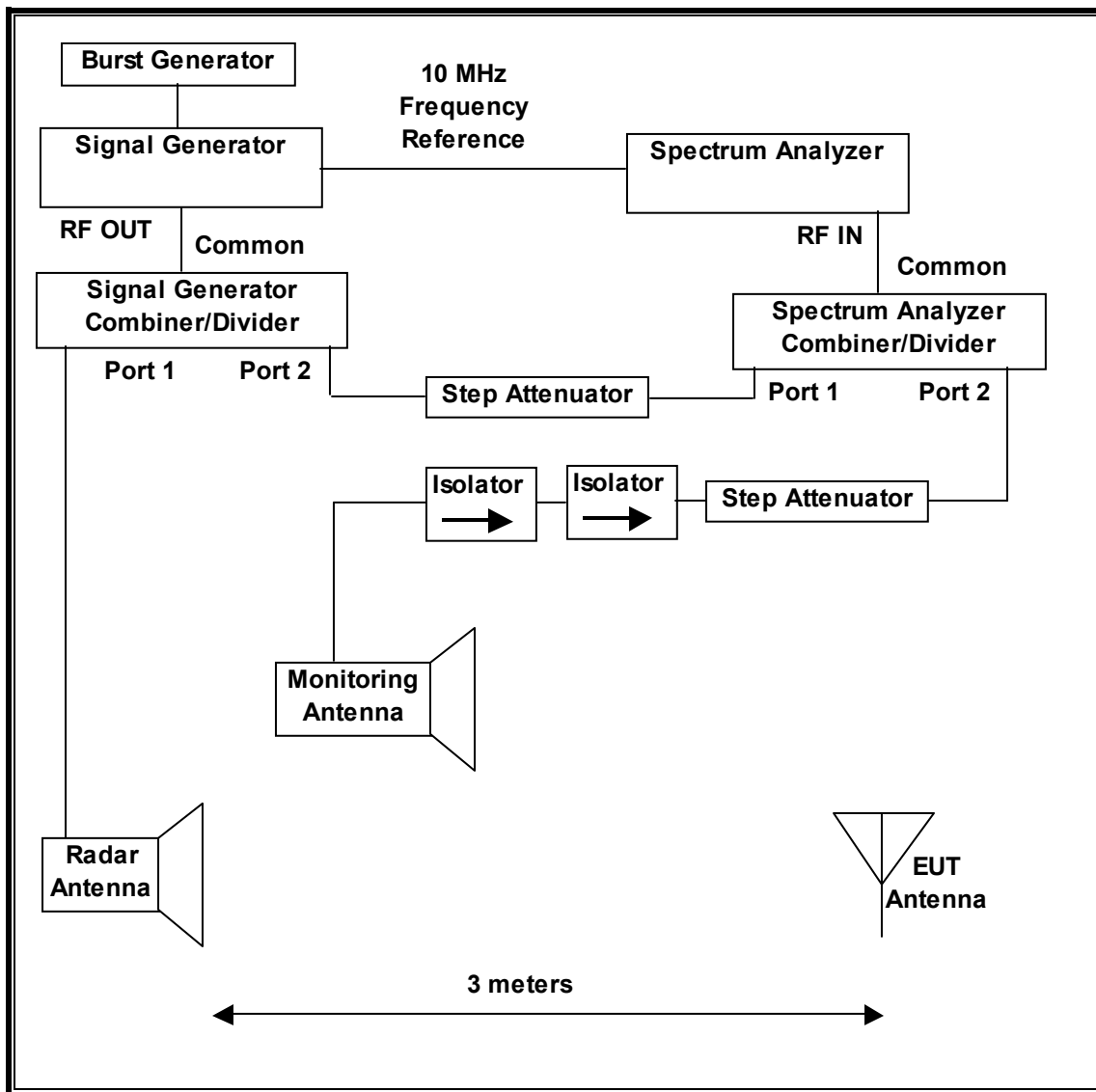
**Table 7 – Frequency Hopping Radar Test Signal**

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



### 10.1.2. TEST AND MEASUREMENT SYSTEM

#### RADIATED METHOD SYSTEM BLOCK DIAGRAM



## **SYSTEM OVERVIEW**

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

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

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

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

## **SYSTEM CALIBRATION**

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

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

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

**ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL**

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.

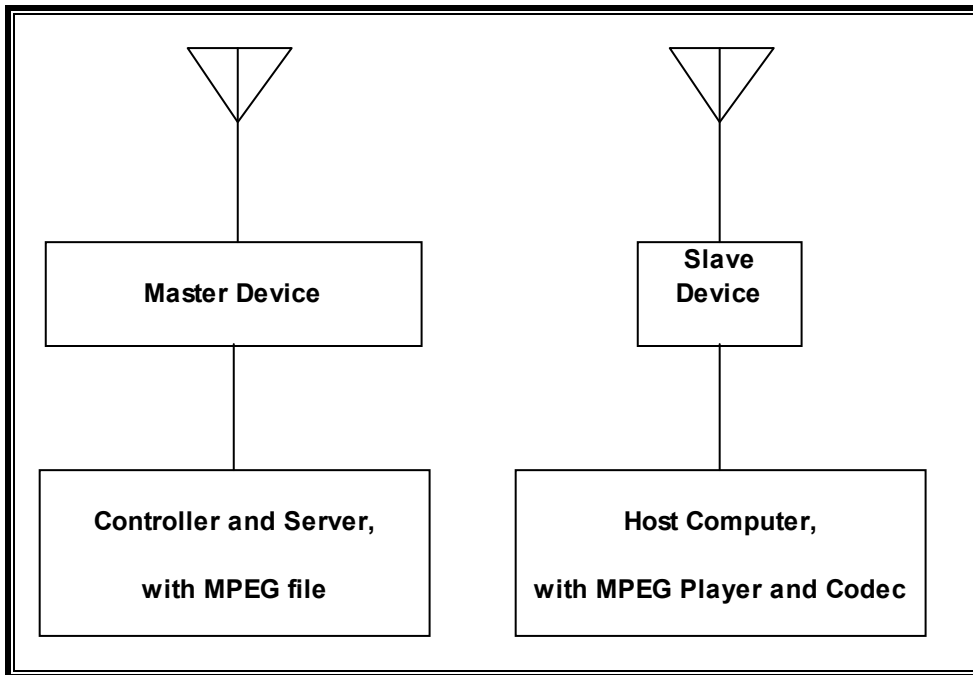
**TEST AND MEASUREMENT EQUIPMENT**

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/20/10
Vector signal generator, 20GHz	Agilent / HP	E8267C	C01066	11/16/09

**10.1.3. SETUP OF EUT**

**RADIATED METHOD EUT TEST SETUP**



**SUPPORT EQUIPMENT**

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Wireless Access Point (Master Device)	Cisco	AIR-AP1252AG-A-K9	FTX120690N2	LDK102061
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH112490BD	DoC
Notebook PC (Host)	Dell	PP18L	10657517255	DoC
AC Adapter (Host PC)	Lite On Technology Corp.	LA65SN0-00	CN-ODF263-71615-687-49E	DoC
Notebook PC (Client)	HP	Presario F700	CNF7458G3Q	DoC
AC Adapter (Client PC)	Hipro Electronics	PPP009H	F3-07091411250E	DoC

#### **10.1.4. DESCRIPTION OF EUT**

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

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 24.44 dBm EIRP in the 5250-5350 MHz band and 24.28 dBm EIRP in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has a gain of 1.98 dBi in the 5250-5350 MHz band and 2.13 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has a gain of -8.62 dBi in the 5250-5350 MHz band and -7.76 dBi in the 5470-5725 MHz band.

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

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. All antenna ports are connected to antennas 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 not required since the maximum EIRP is less than 500 mW (27 dBm).

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

The driver installed in the EUT when configured for a Linux Operating System is 2.6.15-CR-LSDK-2.0.0.107.

The driver installed in the EUT when configured for a Windows Operating System is 7.7.0.62 date code 09/09/2009.

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

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

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

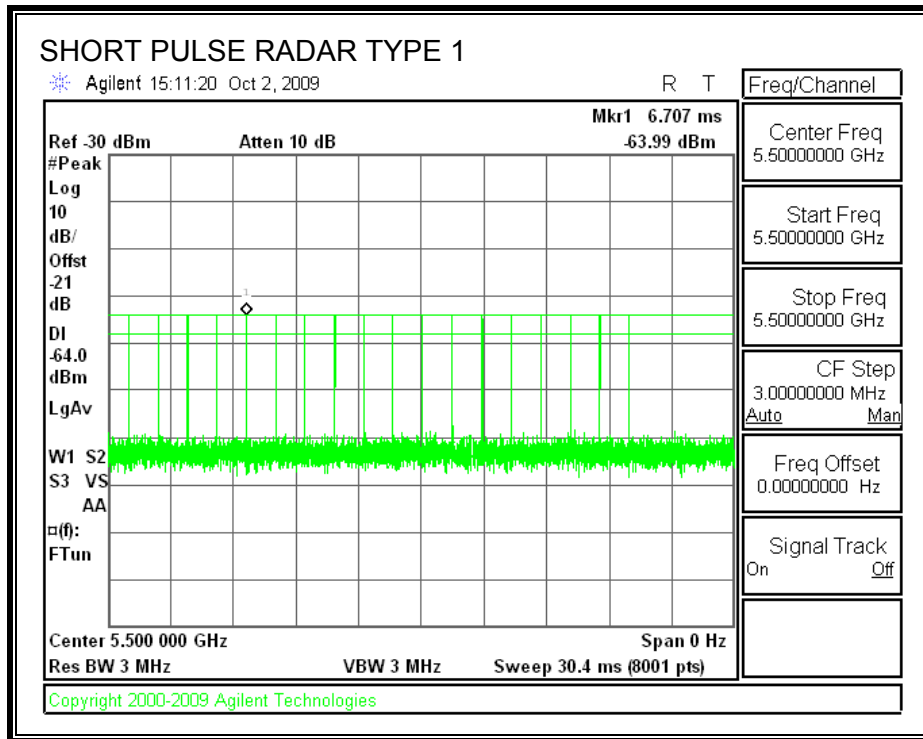
The calibrated radiated DFS Detection Threshold level is set to -64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

### 10.2. RESULTS FOR 20 MHz BANDWIDTH

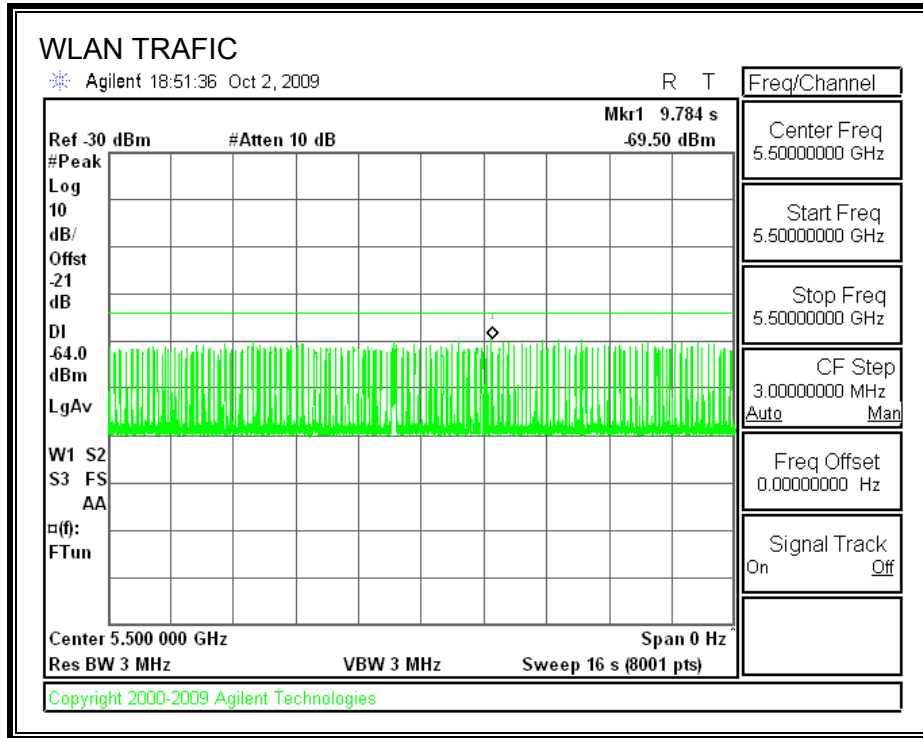
#### 10.2.1. TEST CHANNEL AND RADAR WAVEFORM

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

#### PLOT OF RADAR WAVEFORM



**10.2.2. WLAN TRAFFIC WITH LINUX OPERATING SYSTEM**



**10.2.3. MOVE AND CLOSING TIME WITH LINUX OPERATING SYSTEM**

**REPORTING NOTES**

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

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

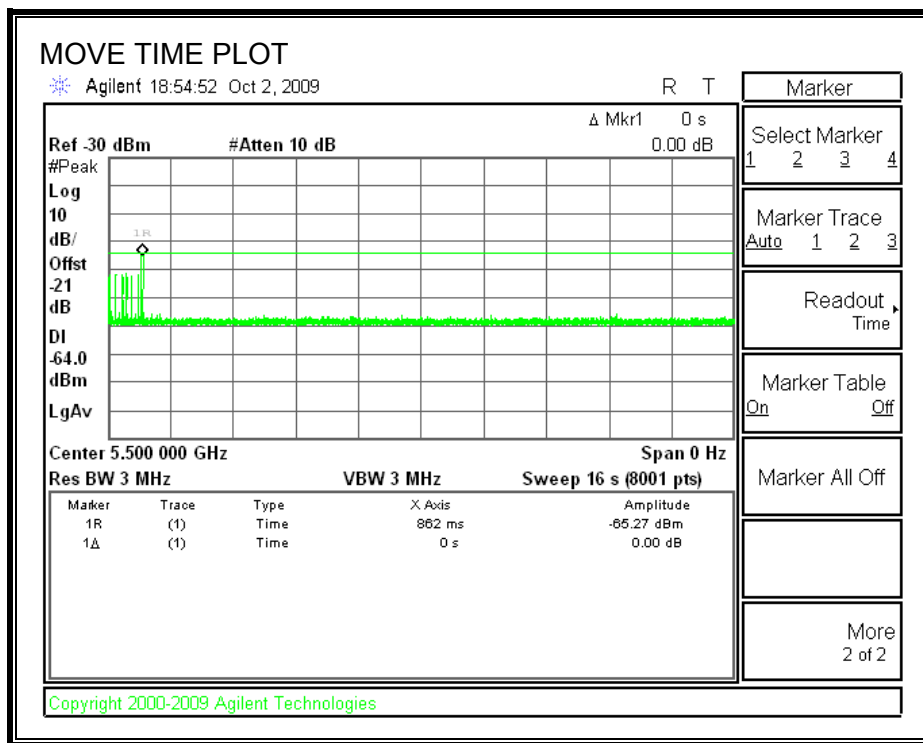
**RESULTS**

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

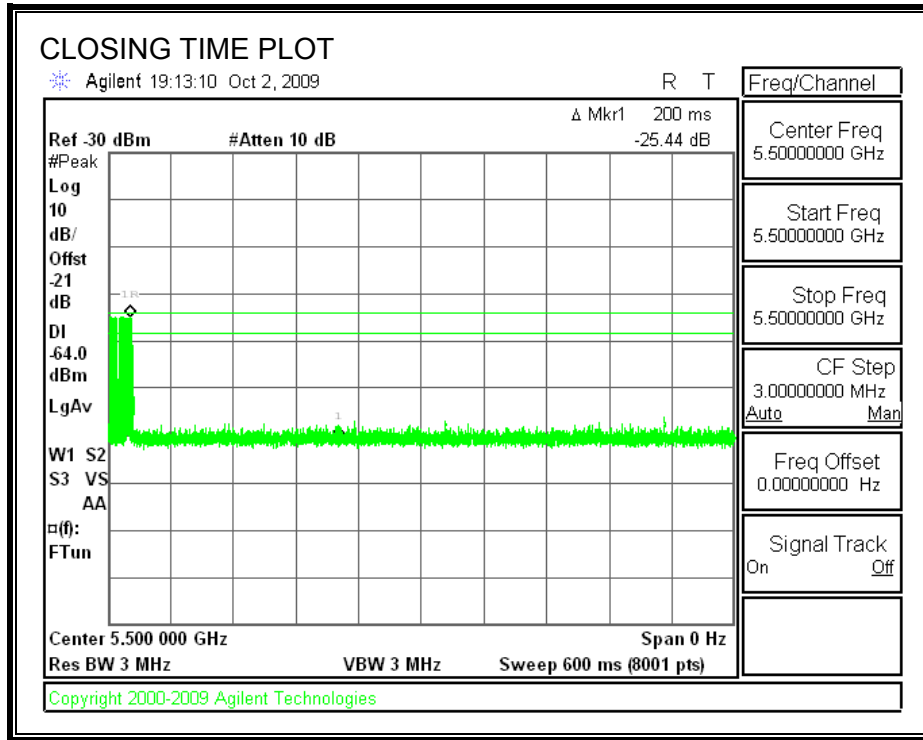
Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260



**MOVE TIME**

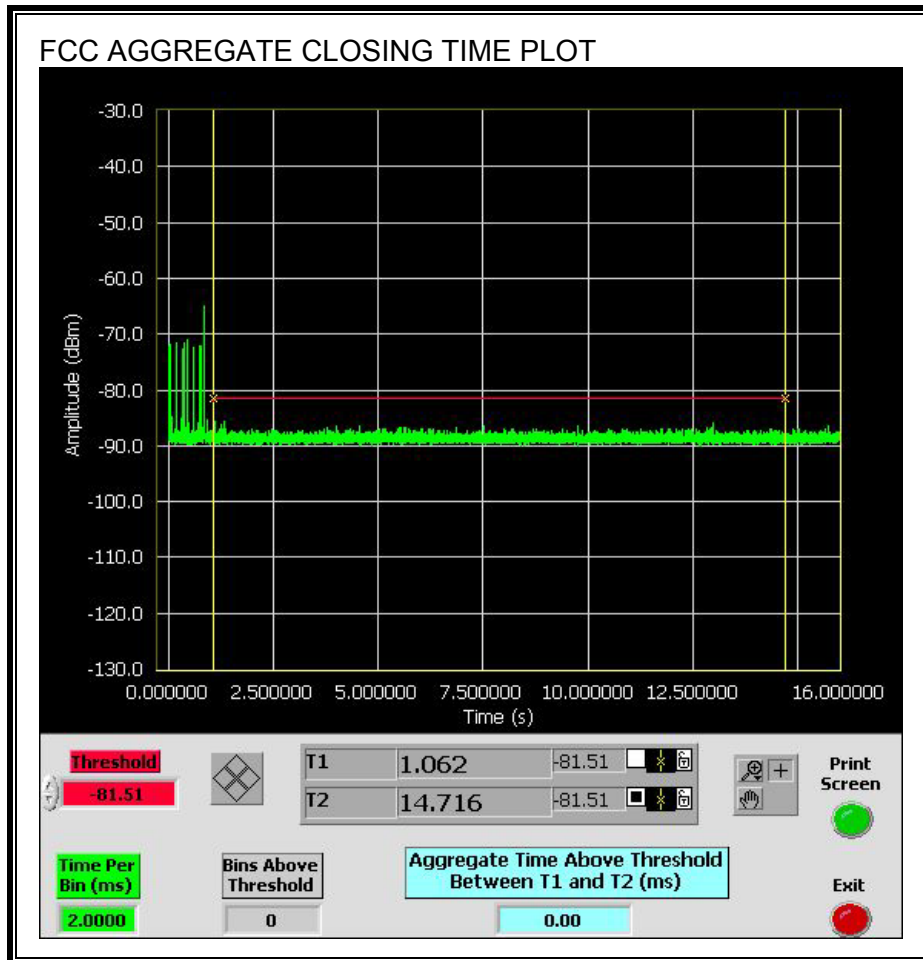


**CHANNEL CLOSING TIME**

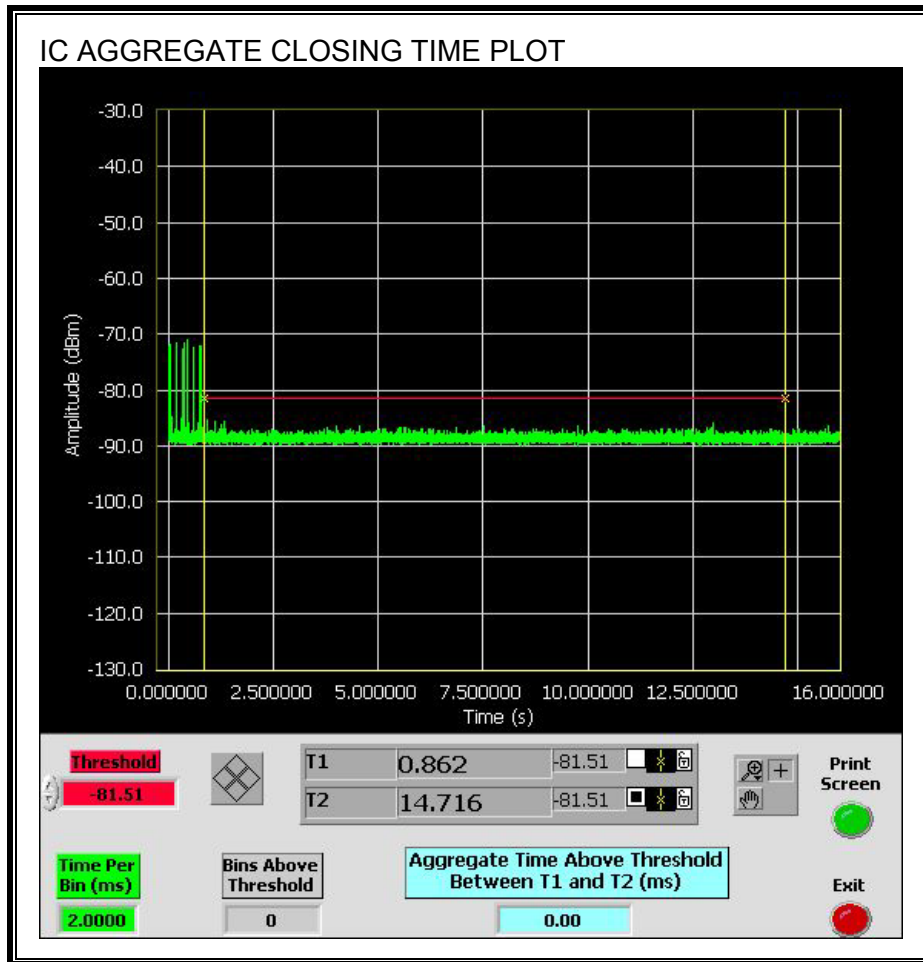


**AGGREGATE CHANNEL CLOSING TRANSMISSION TIME**

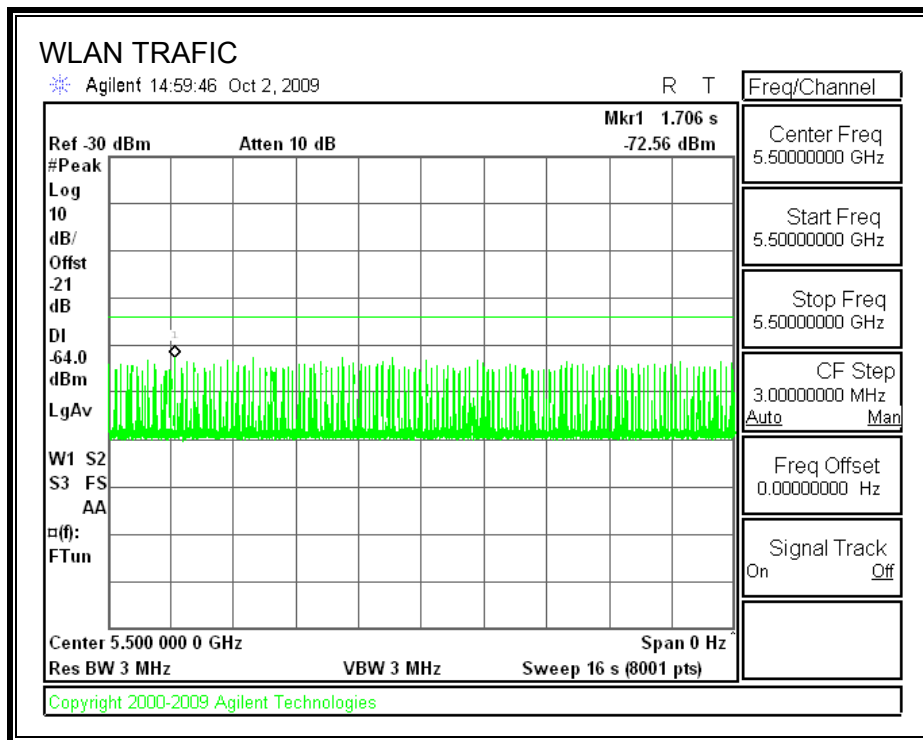
Only intermittent transmissions are observed during the FCC aggregate monitoring period.



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



### 10.2.4. WLAN TRAFFIC WITH WINDOWS OPERATING SYSTEM



### 10.2.5. MOVE AND CLOSING TIME WITH WINDOWS OPERATING SYSTEM

#### REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

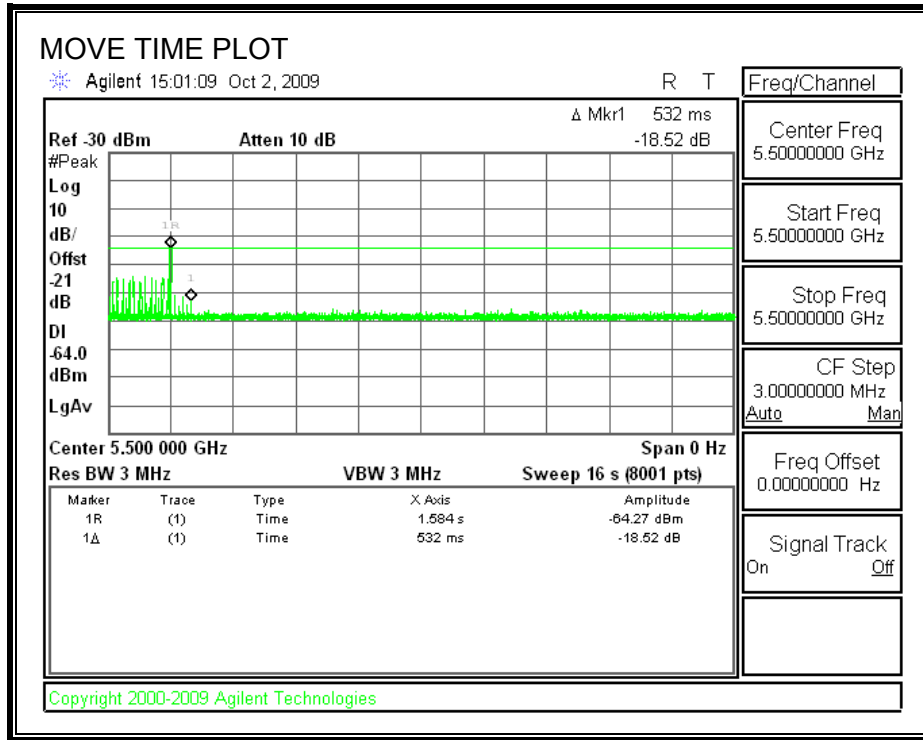
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

#### RESULTS

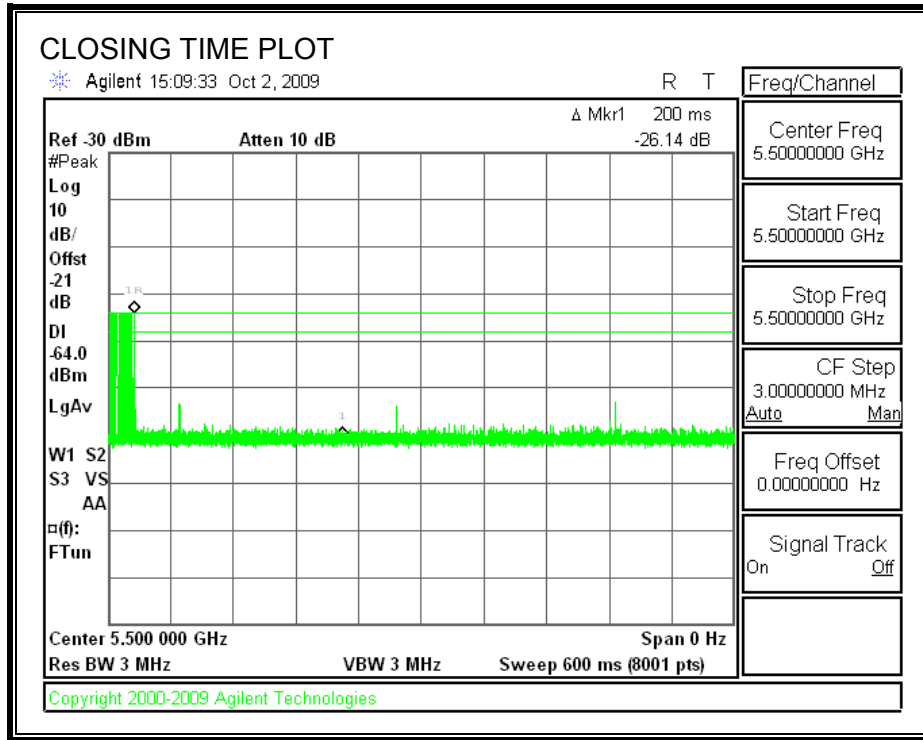
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.532	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	8.0	60
IC	14.0	260

**MOVE TIME**



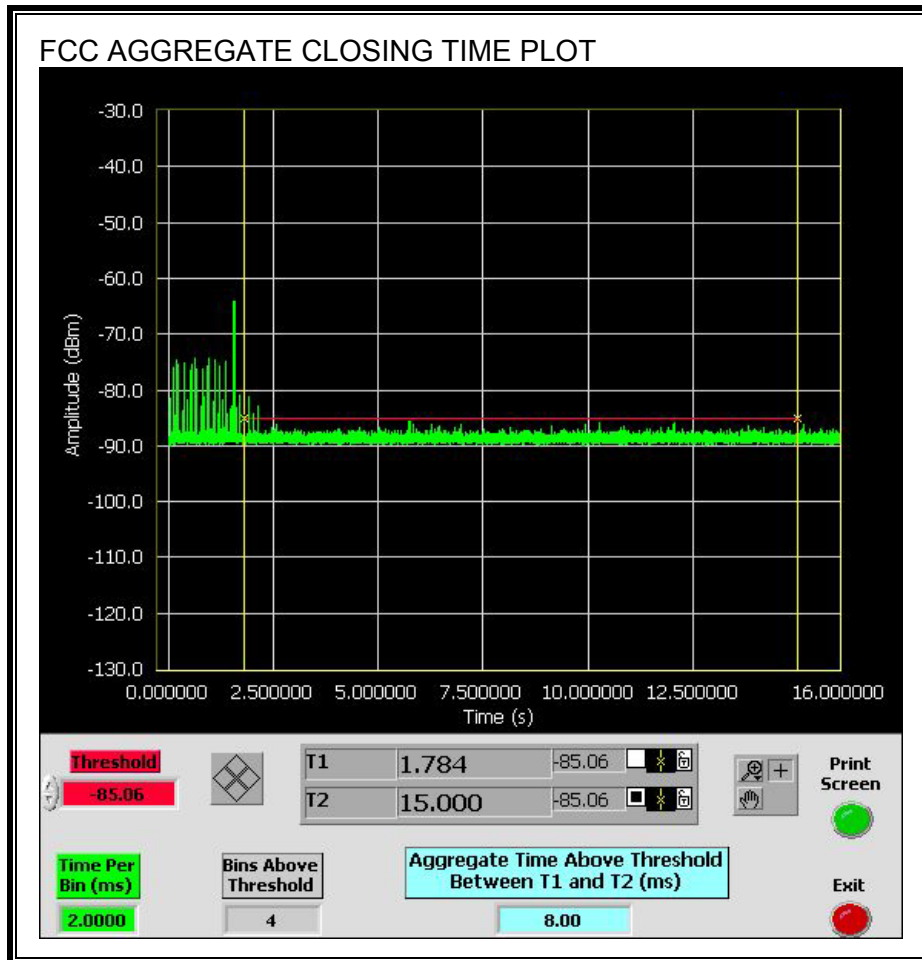
**CHANNEL CLOSING TIME**



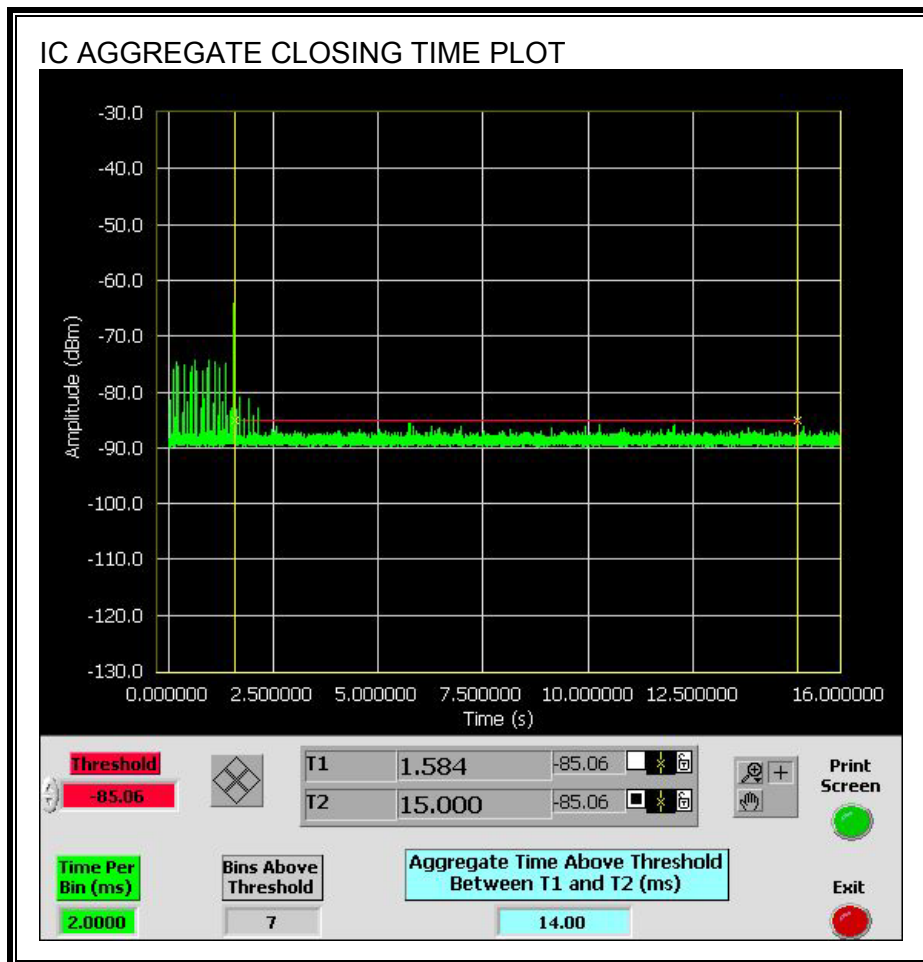


**AGGREGATE CHANNEL CLOSING TRANSMISSION TIME**

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



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

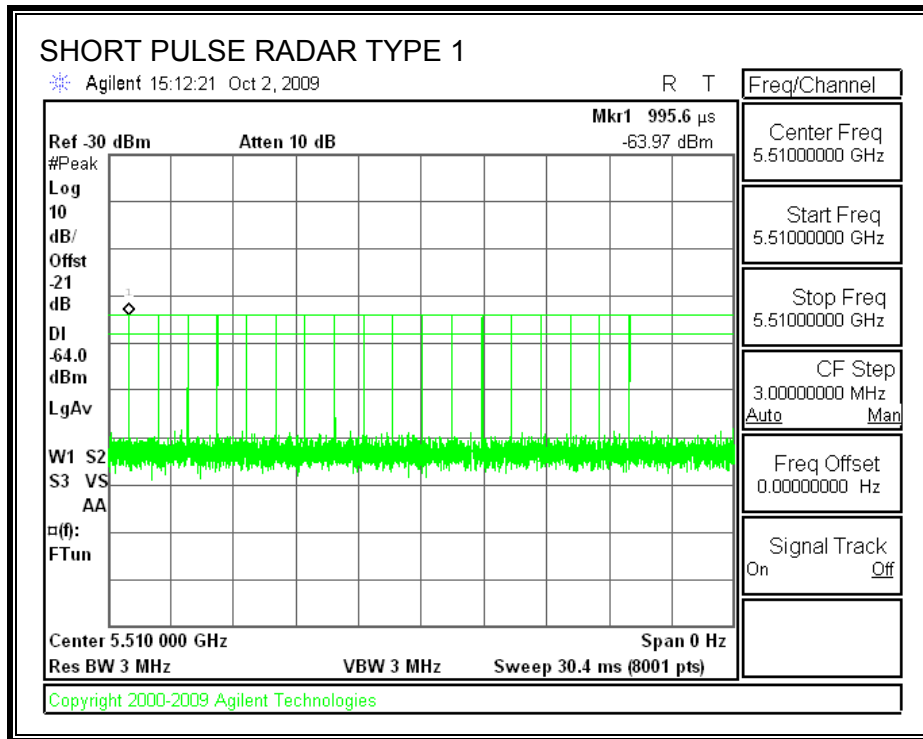


### 10.3. RESULTS FOR 40 MHz BANDWIDTH

#### 10.3.1. TEST CHANNEL AND RADAR WAVEFORM

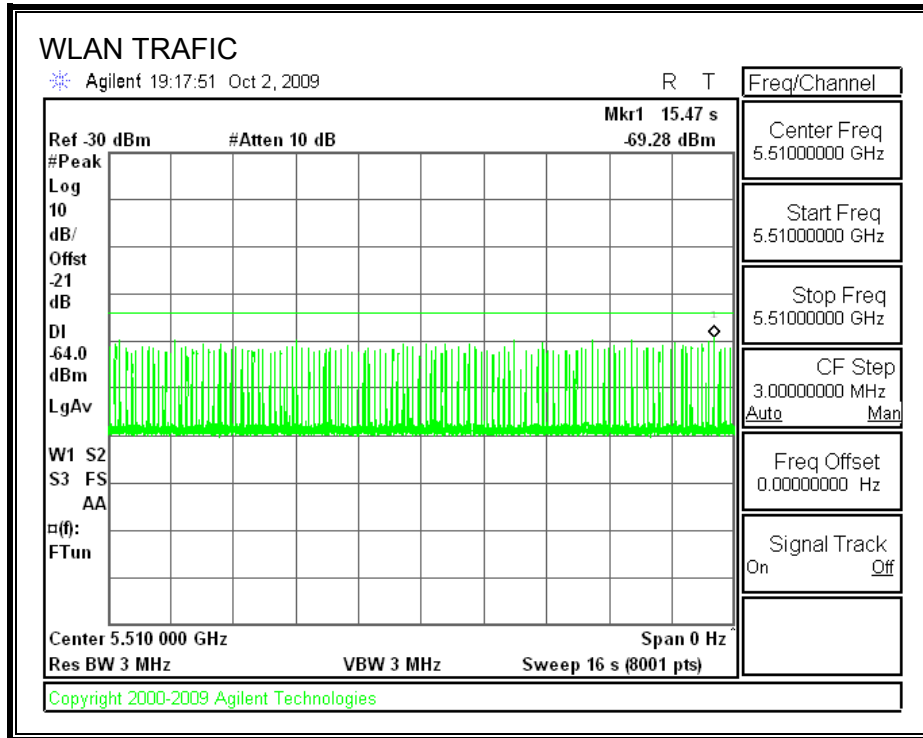
All tests were performed at a channel center frequency of 5510 MHz.

#### PLOTS OF RADAR WAVEFORM



### 10.3.2. WLAN TRAFFIC WITH LINUX OPERATING SYSTEM

#### PLOT OF WLAN TRAFFIC



**10.3.3. MOVE AND CLOSING TIME WITH LINUX OPERATING SYSTEM**

**REPORTING NOTES**

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

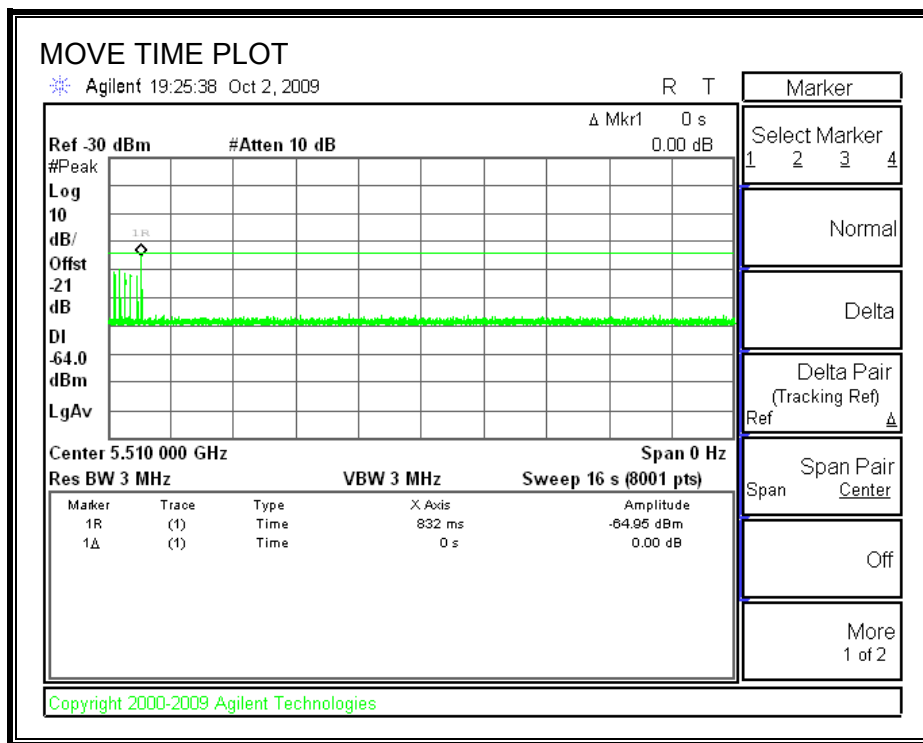
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

**RESULTS**

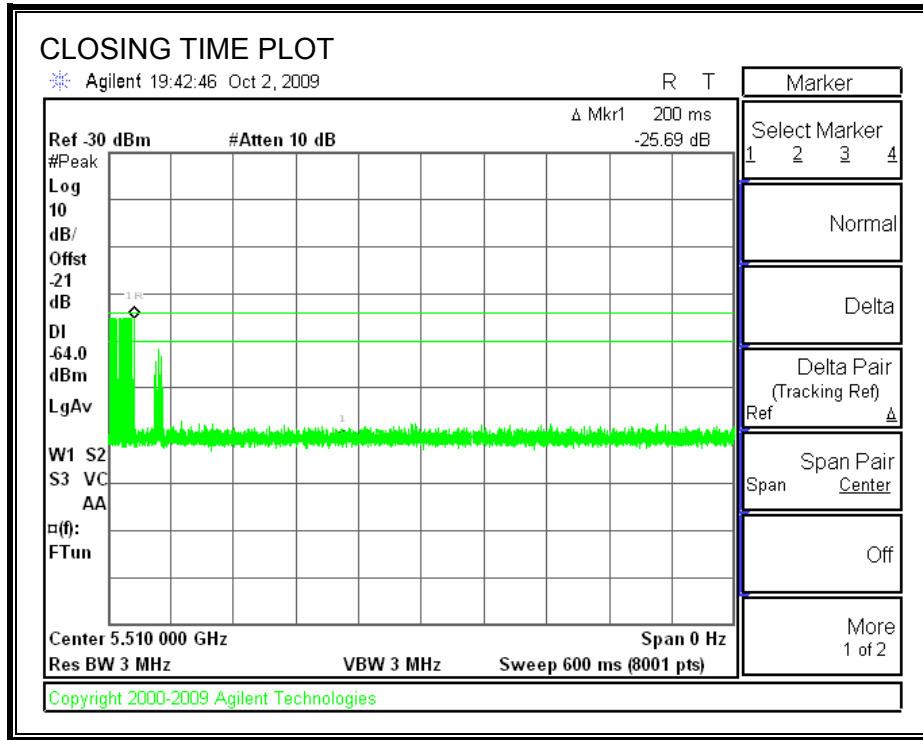
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

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

**MOVE TIME**

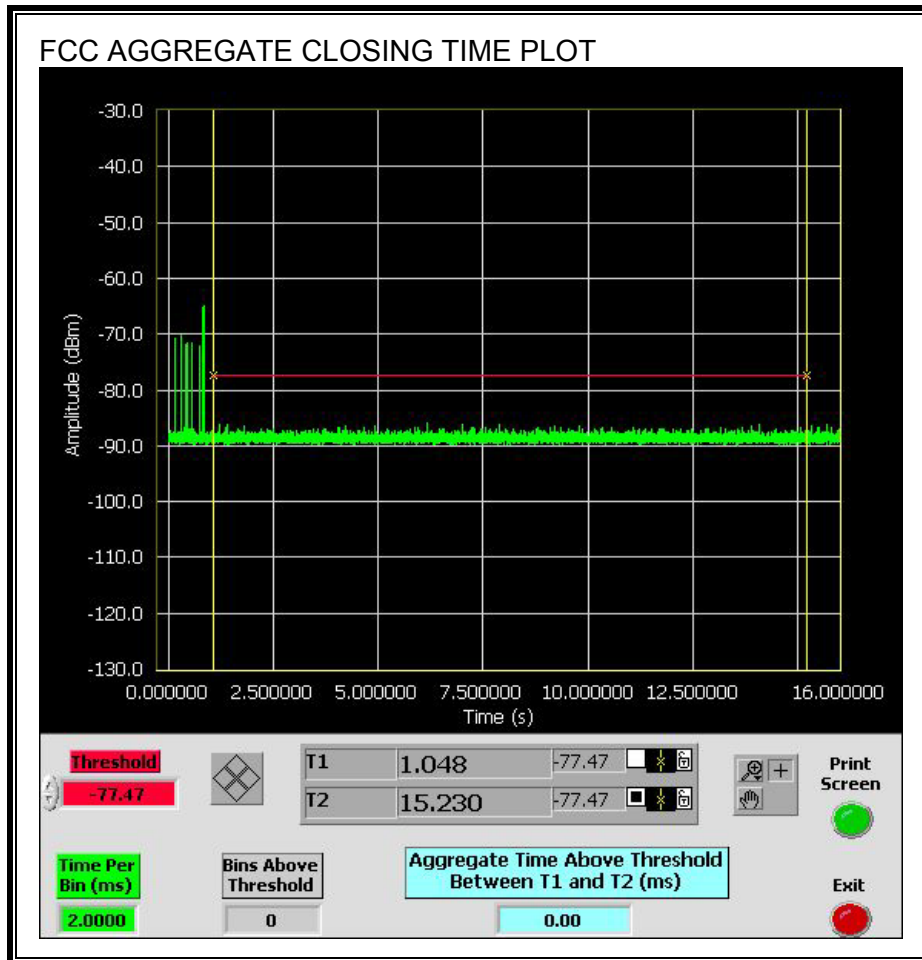


**CHANNEL CLOSING TIME**



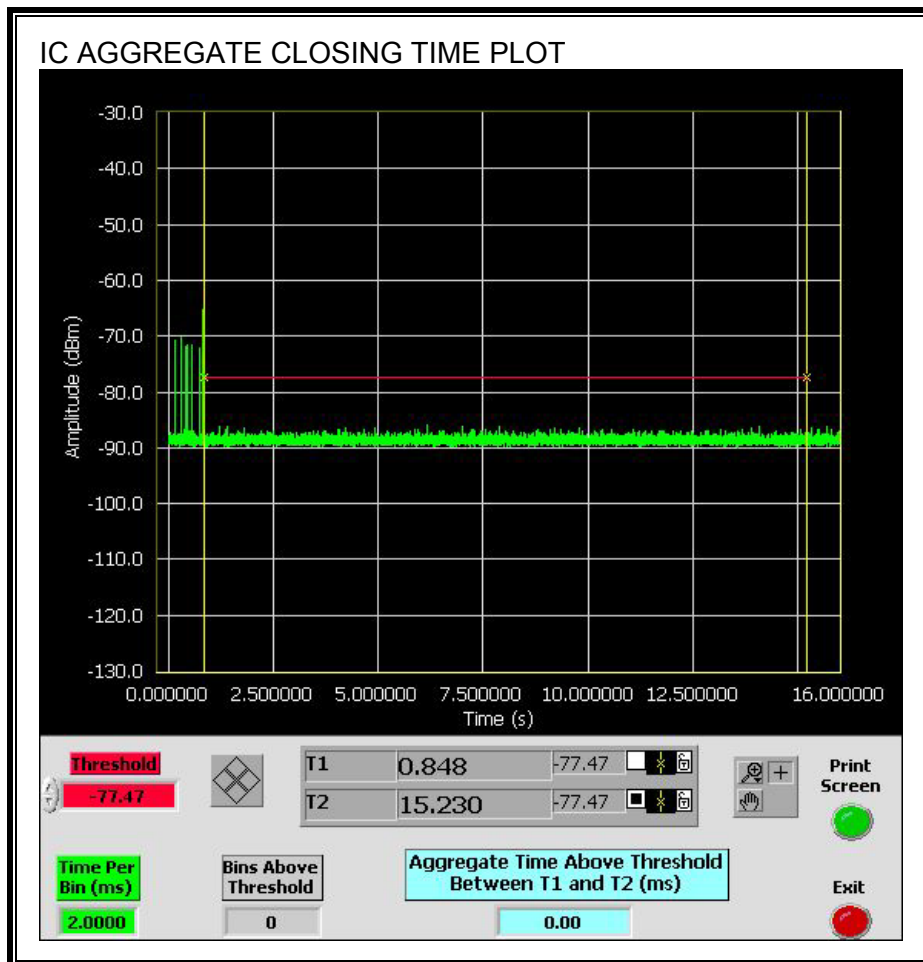
**AGGREGATE CHANNEL CLOSING TRANSMISSION TIME**

No transmissions are observed during the FCC aggregate monitoring period.





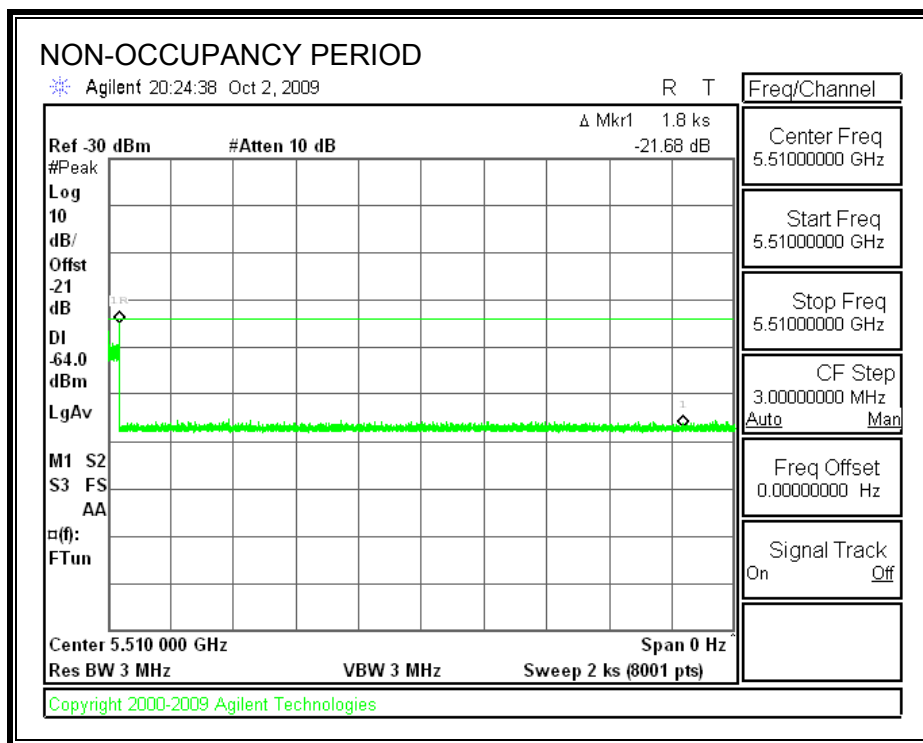
Only intermittent transmissions are observed during the IC aggregate monitoring period.



### 10.3.4. NON-OCCUPANCY WITH LINUX OPERATING SYSTEM

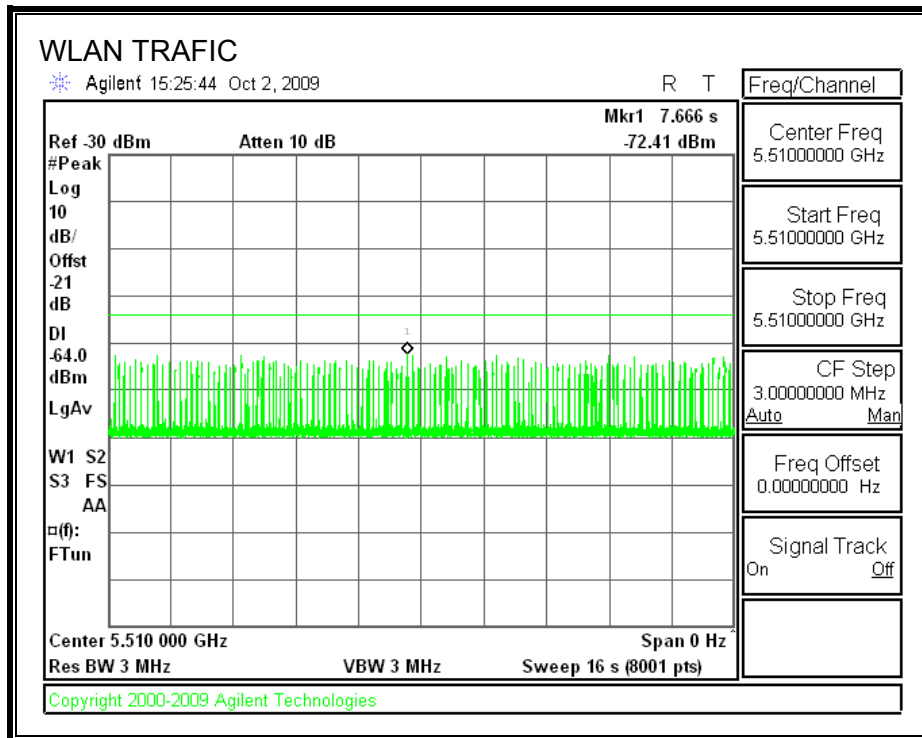
#### TEST RESULTS

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



### 10.3.5. WLAN TRAFFIC WITH WINDOWS OPERATING SYSTEM

#### PLOT OF WLAN TRAFFIC



**10.3.6. MOVE AND CLOSING TIME WITH WINDOWS OPERATING SYSTEM**

**REPORTING NOTES**

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

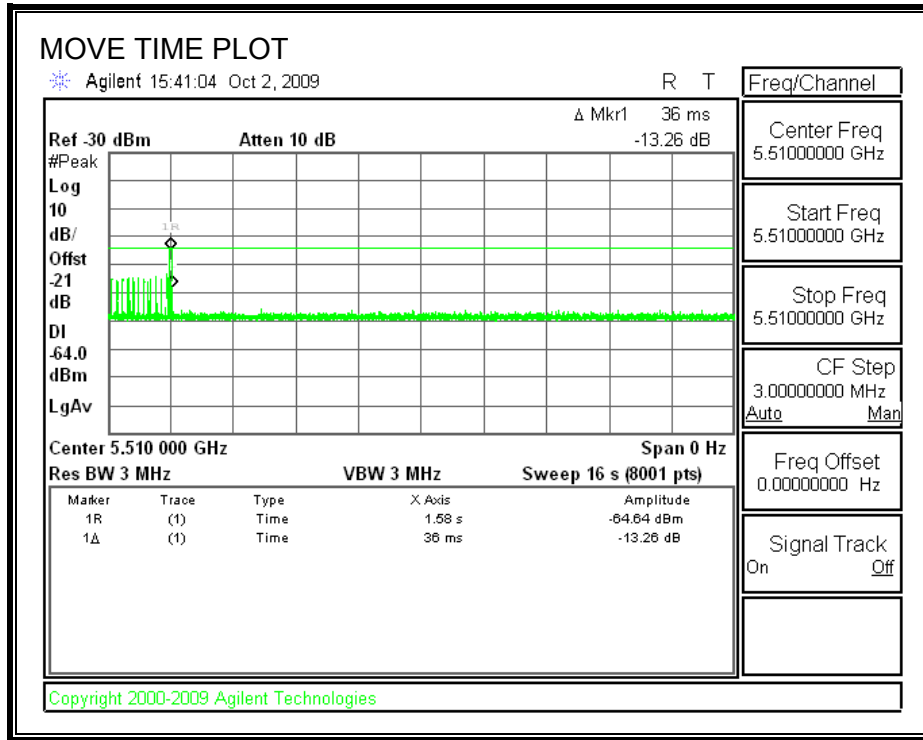
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

**RESULTS**

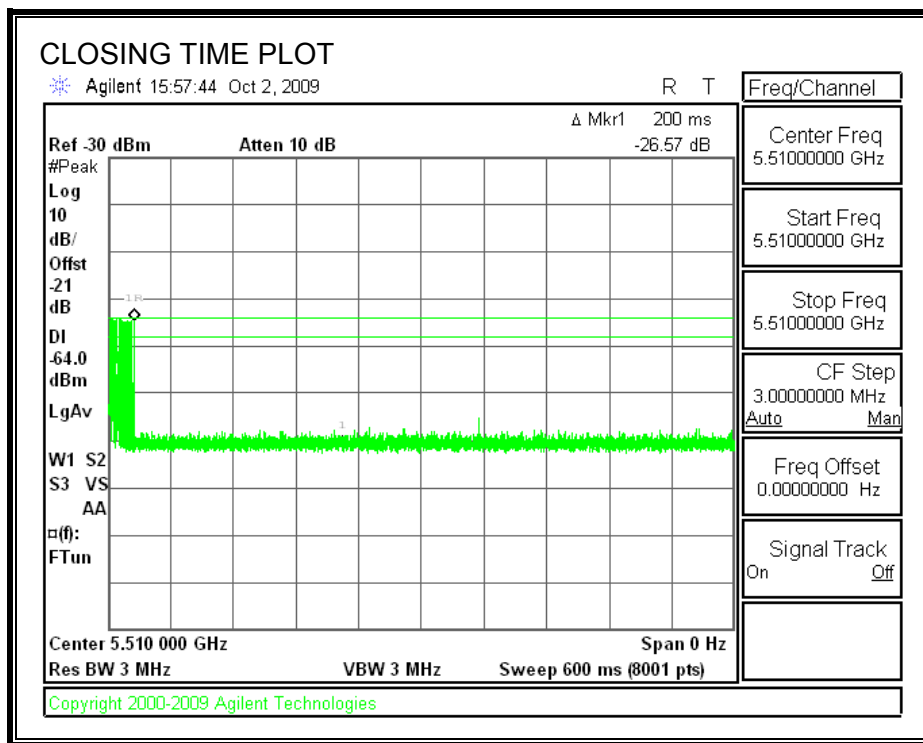
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.035	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	2.0	260

**MOVE TIME**

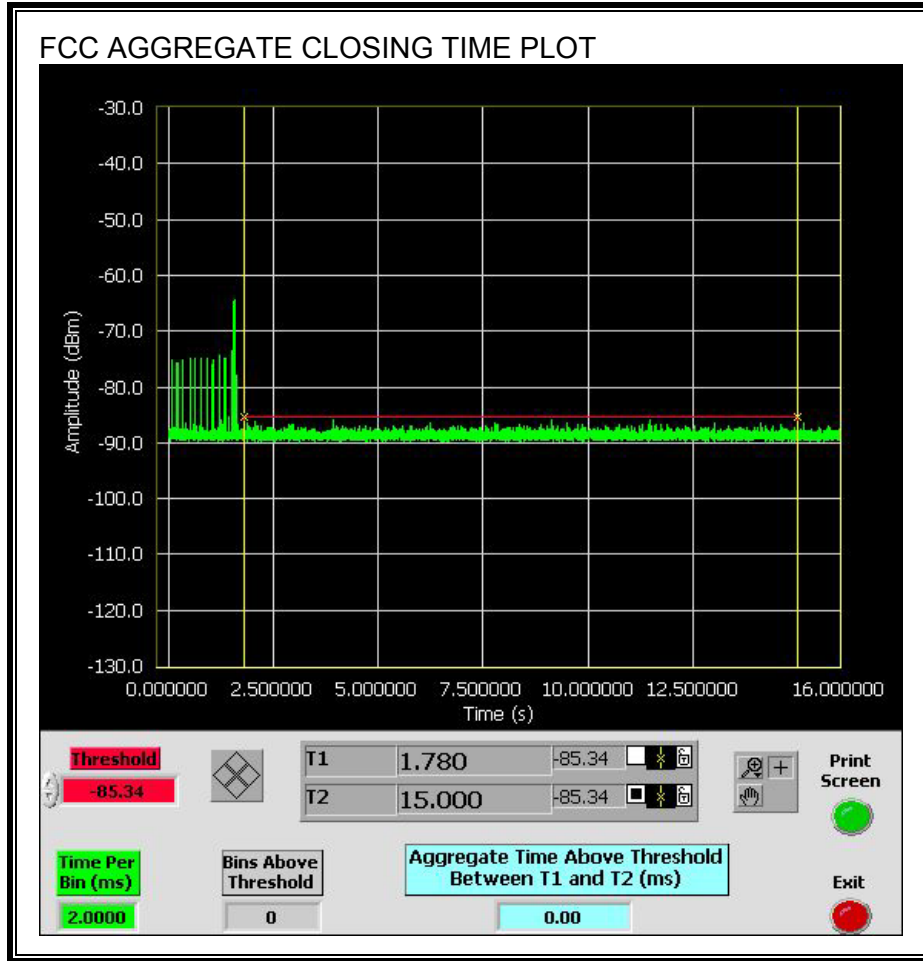


**CHANNEL CLOSING TIME**

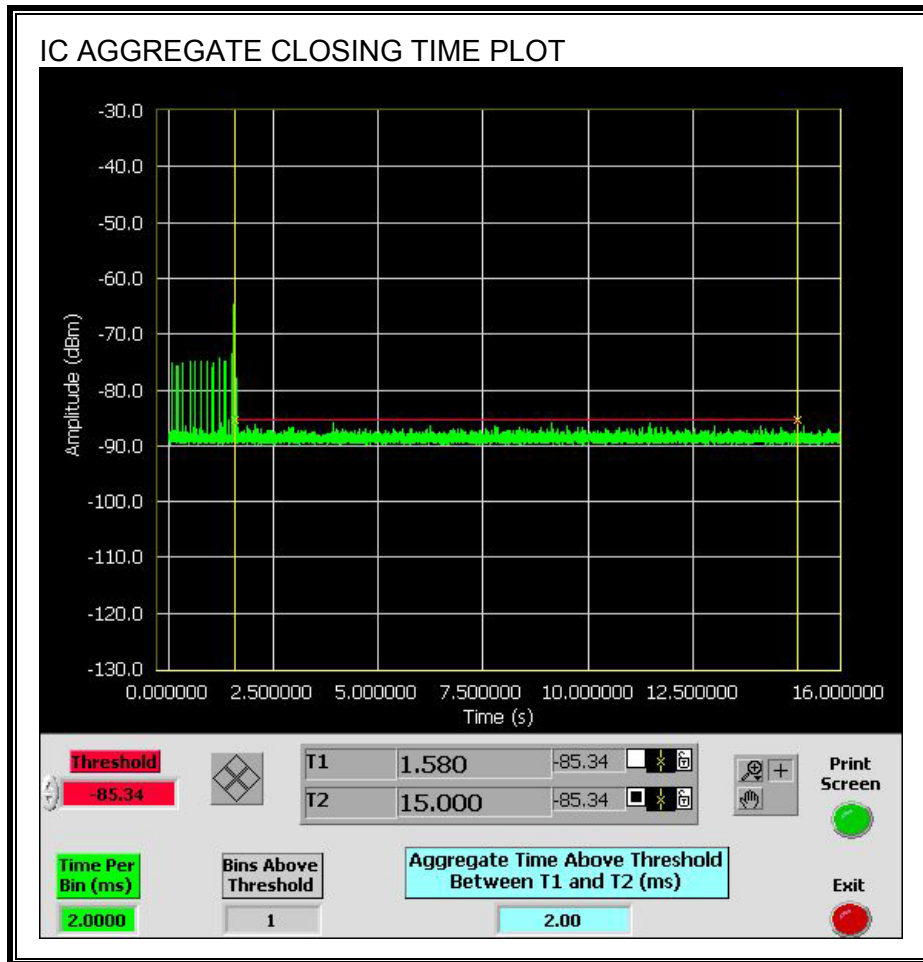


**AGGREGATE CHANNEL CLOSING TRANSMISSION TIME**

No transmissions are observed during the FCC aggregate monitoring period.



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

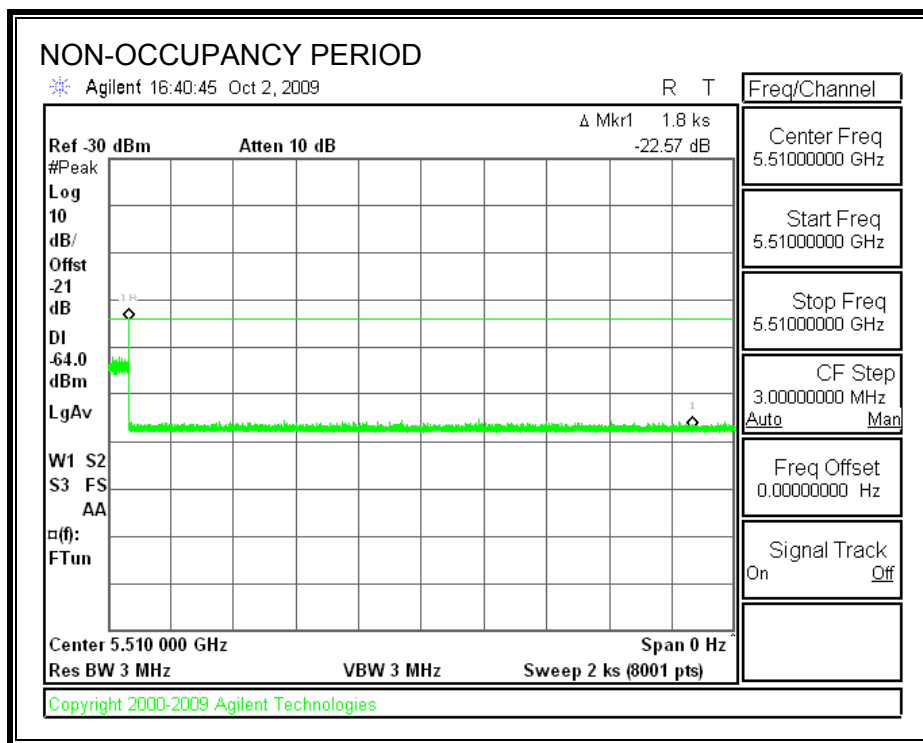




### 10.3.7. NON-OCCUPANCY WITH WINDOWS OPERATING SYSTEM

#### TEST RESULTS

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



# 11. MAXIMUM PERMISSIBLE EXPOSURE

## FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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 Classified 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 <sup>2</sup> )	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> <sup>0.5</sup>	0.0042 <i>f</i> <sup>0.5</sup>	<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> <sup>1.2</sup>
150 000–300 000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616 000 / <i>f</i> <sup>1.2</sup>

\* 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<sup>2</sup> is equivalent to 1 mW/cm<sup>2</sup>.
  3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

**EQUATIONS**

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * \text{D}^2)$$

where

- S = Power density in W/m<sup>2</sup>
- EIRP = Equivalent Isotropic Radiated Power in W
- D = Separation distance in m

Power density in units of W/m<sup>2</sup> is converted to units of mW/cm<sup>2</sup> by dividing by 10.

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

**LIMITS**

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

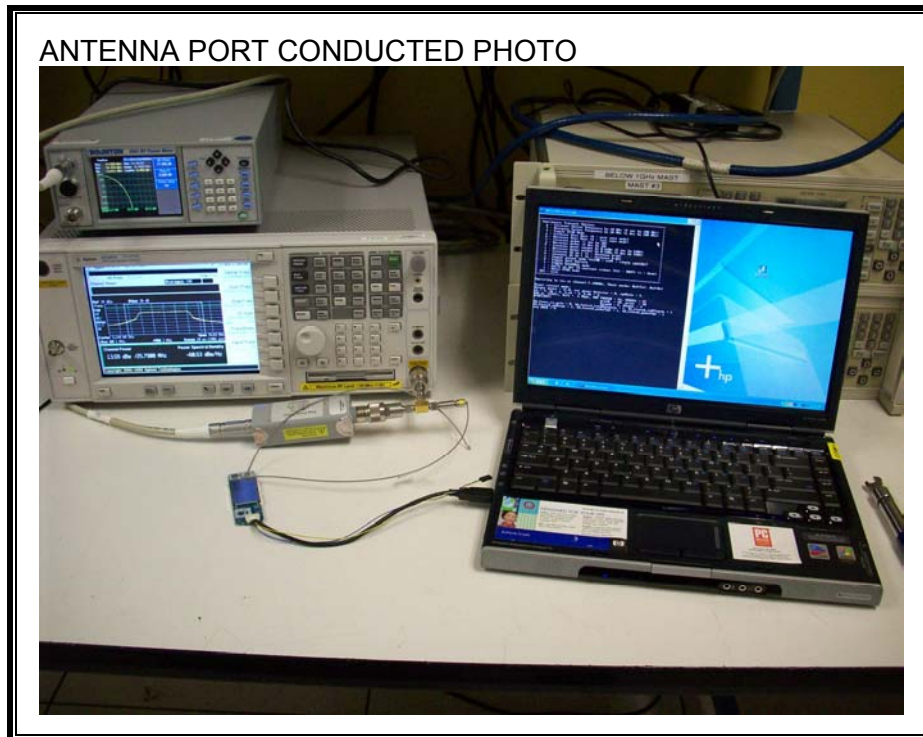
From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

**RESULTS**

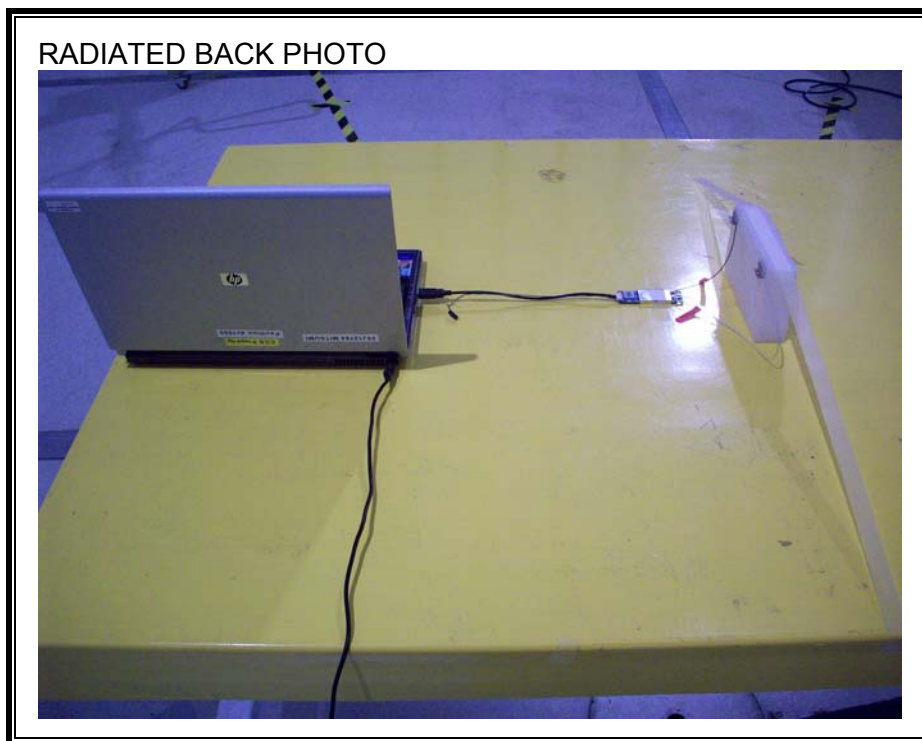
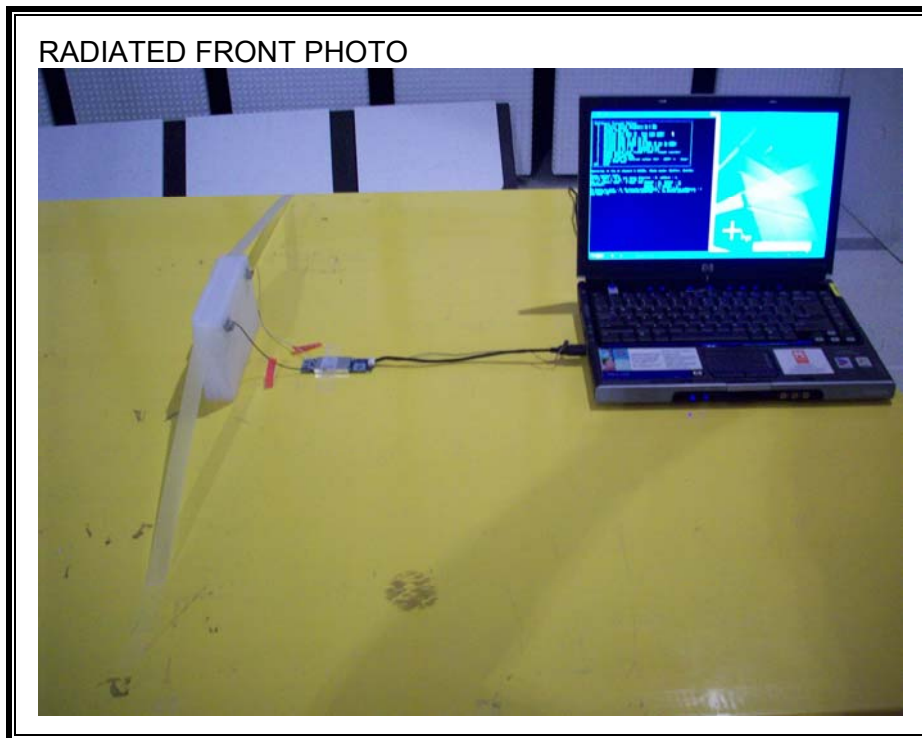
Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m <sup>2</sup> )	FCC Power Density (mW/cm <sup>2</sup> )
5180 - 5240	a mode	0.20	13.87	4.96	0.15	0.015
5180 - 5240	HT20	0.20	14.28	2.05	0.09	0.009
5190 - 5230	HT40	0.20	16.95	2.05	0.16	0.016
5260 - 5320	a mode	0.20	19.48	4.96	0.55	0.055
5260 - 5320	HT20	0.20	19.44	1.98	0.28	0.028
5270 - 5310	HT40	0.20	19.08	1.98	0.25	0.025
5500 - 5700	a mode	0.20	19.28	5.00	0.53	0.053
5500 - 5700	HT20	0.20	19.28	2.13	0.28	0.028
5510 - 5670	HT40	0.20	18.79	2.13	0.25	0.025

## 12. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP**



**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**

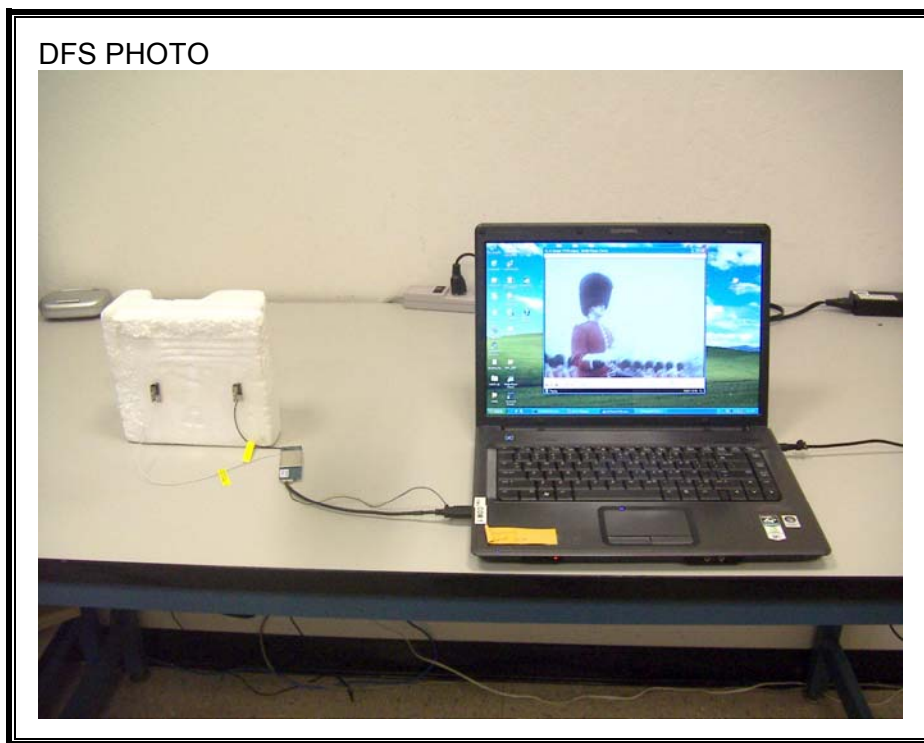
LINE CONDUCTED FRONT PHOTO



LINE CONDUCTED BACK PHOTO



**DYNAMIC FREQUENCY SELECTION**



**END OF REPORT**