



**FCC CFR47 PART 15 SUBPART E  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT**

**FOR**

**WIFI 11A/N MODULE**

**MODEL NUMBER: MIC-A2**

**FCC ID: MCLMICA2  
IC: 2878D-MICA2**

**REPORT NUMBER: 11J13871-1**

**ISSUE DATE: July 5, 2011**

*Prepared for*  
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**NVLAP LAB CODE 200065-0**

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** HON HAI PRECISION IND. CO., LTD.  
5F-1, 5 HSIN-AN ROAD  
HSINCHU SCIENCE-BASED INDUSTRIAL PARK  
TAIWAN, R.O.C.

**EUT DESCRIPTION:** WIFI 11A/N MODULE

**MODEL:** MIC-A2

**SERIAL NUMBER:** N/A

**DATE TESTED:** June 27-30, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

Tested By:



THU CHAN  
ENGINEERING MANAGER  
UL CCS

Tadaomi Yamano  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is WIFI Module with 802.11A/HT20/HT40.

The radio module is manufactured by Hon Hai Precision.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	10.94	12.42
5180 - 5240	802.11n HT20	11.06	12.76
5190 - 5230	802.11n HT40	8.37	6.87

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna for TX/RX diversity, with a maximum gain of 2.55dBi.

### 5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 4.219.124.1.  
The test utility software used during testing was BCM Internal, rev. 4.219.RC124.1.

### 5.5. WORST-CASE CONFIGURATION AND MODE

The worst port was measured, and the worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11a mode were made at 6 Mb/s.  
All final tests in the 802.11n HT20 SISO mode were made at MCS0.  
All final tests in the 802.11n HT40 SISO mode were made at MCS0.

For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

To determine the worst-position of highest emissions, the EUT's antenna was investigated for X, Y, Z positions, and the worst position was turned out to be a Y-position with long ends at left side.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	DELL	PP09S	1318770010	DOC
AC-DC Adapter(For PC)	DELL	LA65NS0-00	CN0DF26667161573K1EC0	DOC
Extended Card	Broadcom	BCM9SDIO2 CONAD	1242482	-
Evaluation Board	Broadcom	BCM9SANAD	1379054	-
AC-DC Adapter(For EUT)	V-INFINITY	EPS050250U PS-P5P-KH	-	-

### I/O CABLES

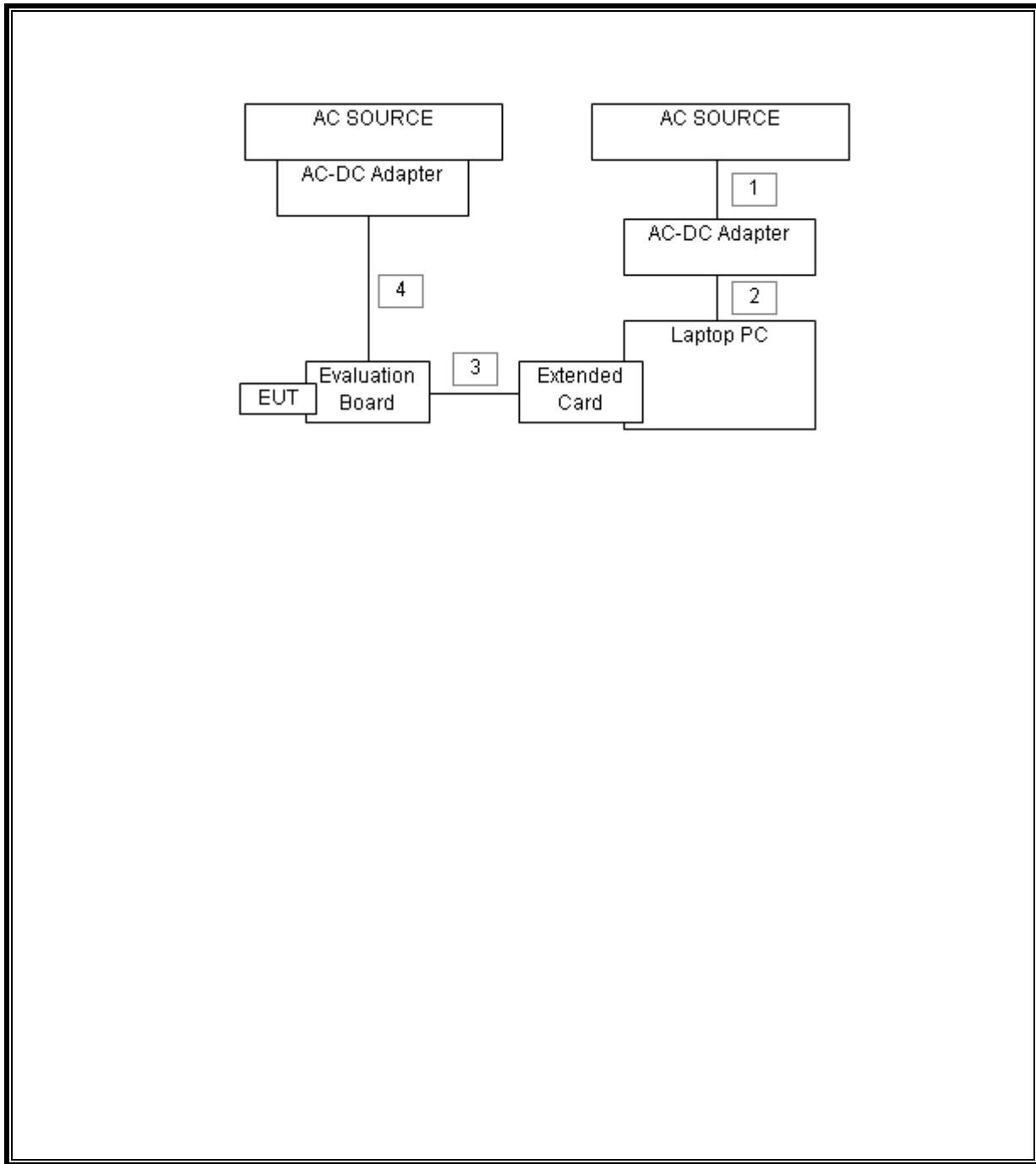
I/O CABLE LIST						
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	0.9m	-
2	DC	2	DC	Un-shielded	1.8m	-
3	I/O	3	Ribon	Un-shielded	0.5m	-
4	DC	4	US 115V	Un-shielded	1.85m	-

### TEST SETUP

The EUT is attached to a evaluation board which is installed in the SDIO slot of a host laptop computer during the tests. Test software exercised the radio card.



**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/14/11
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	07/12/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/11
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02680	CNR
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	12/17/2011
Power Meter	Agilent / HP	437B	N02778	08/11/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02784	07/28/11
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	08/10/11

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 802.11a MODE IN THE 5.2 GHz BAND

#### 7.1.1. 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 7.5 dB (including 6.5 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5180	10.52
Middle	5200	10.77
High	5240	10.74

### 7.1.2. 26 dB and 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

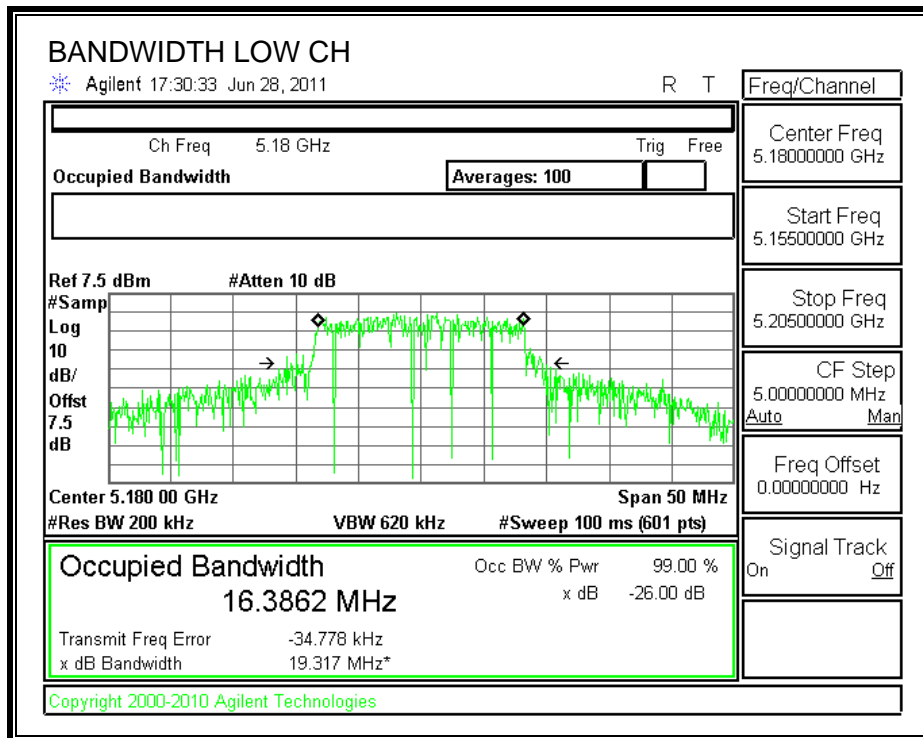
#### TEST PROCEDURE

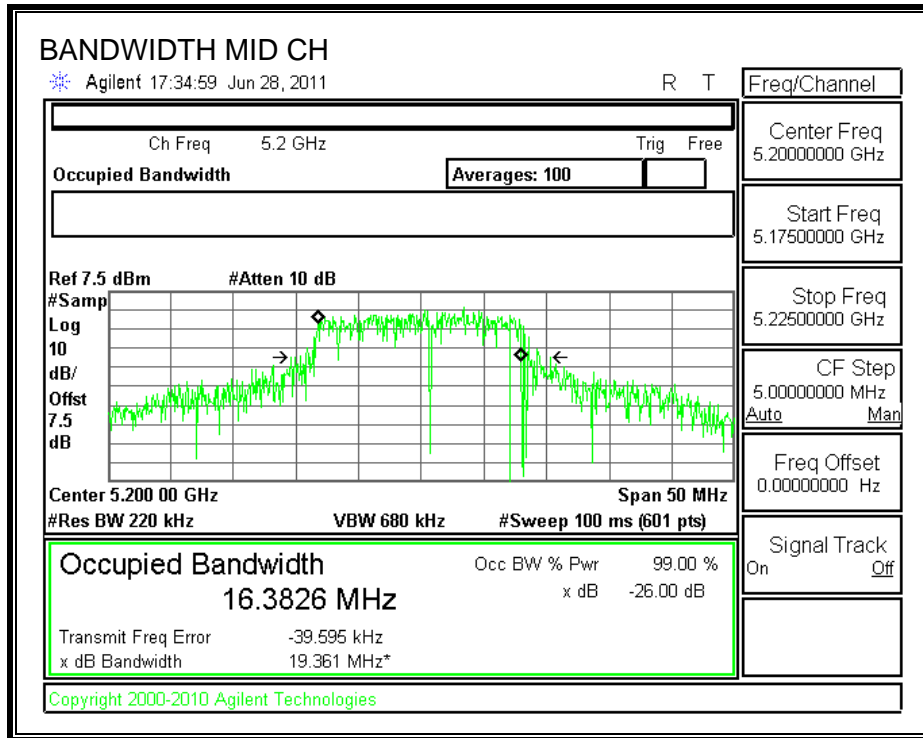
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

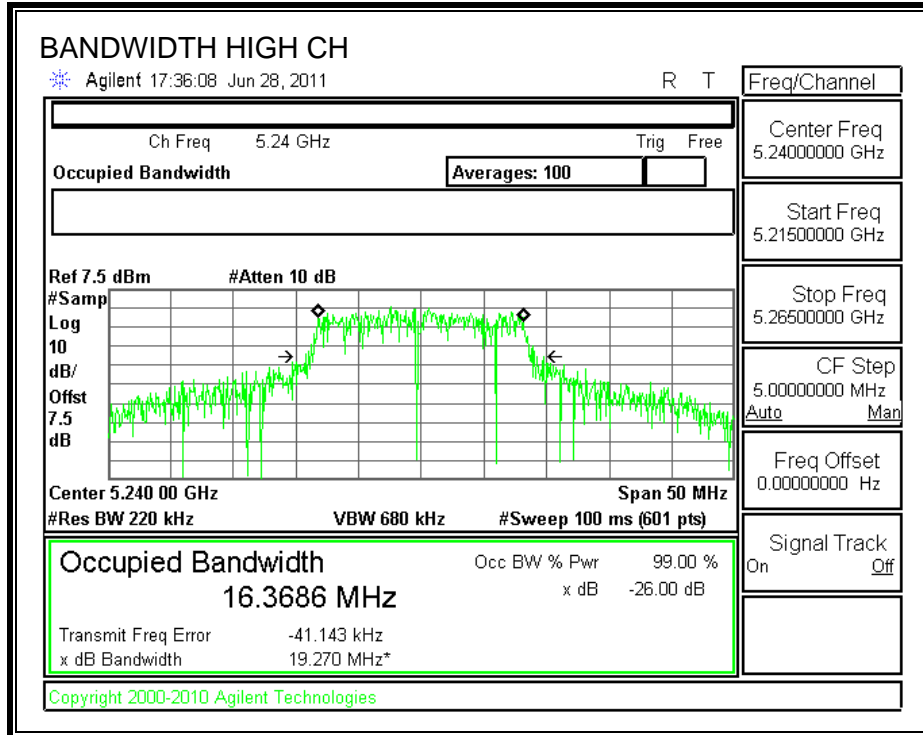
#### RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	19.317	16.3862
Middle	5200	19.361	16.3826
High	5240	19.27	16.3686

**26 dB and 99% BANDWIDTH**







### 7.1.3. OUTPUT POWER

#### LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

#### TEST PROCEDURE

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

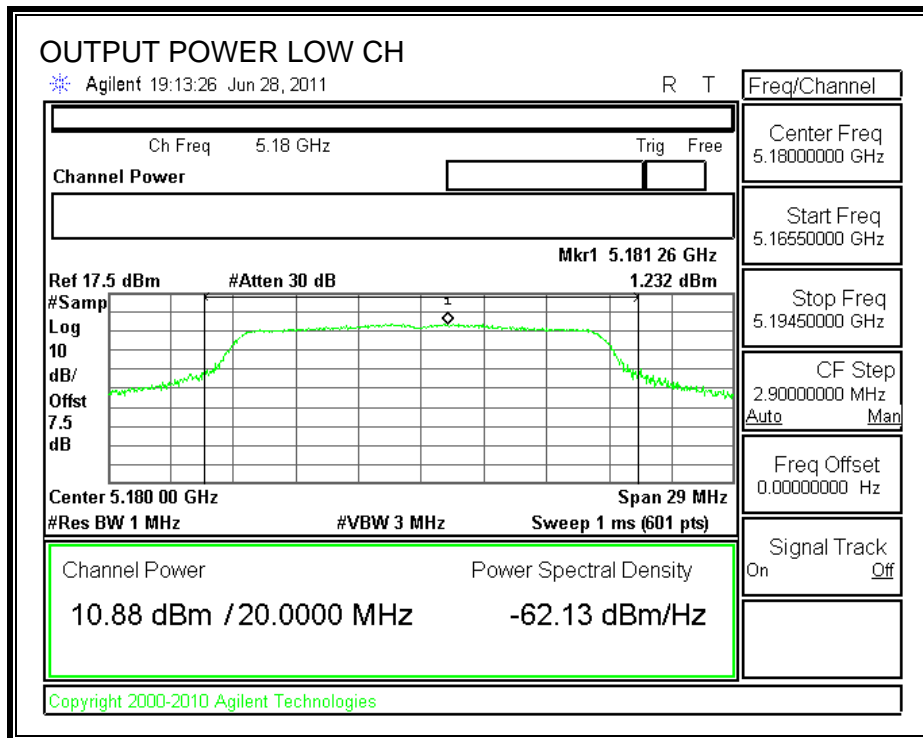
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	19.317	16.86	2.55	16.86
Mid	5200	17	19.361	16.87	2.55	16.87
High	5240	17	19.27	16.85	2.55	16.85

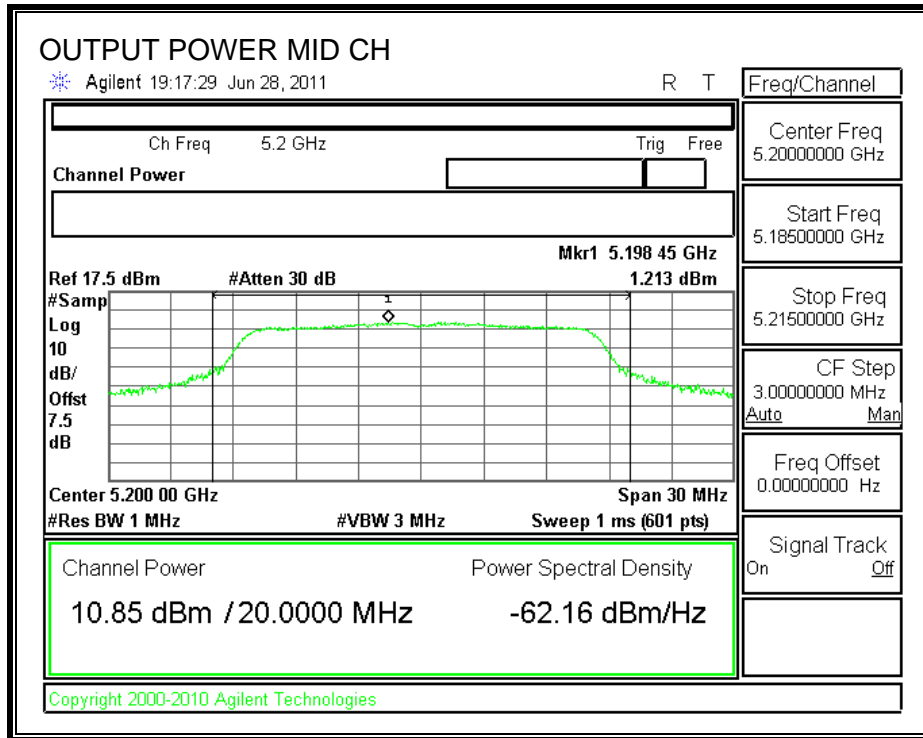
##### Results

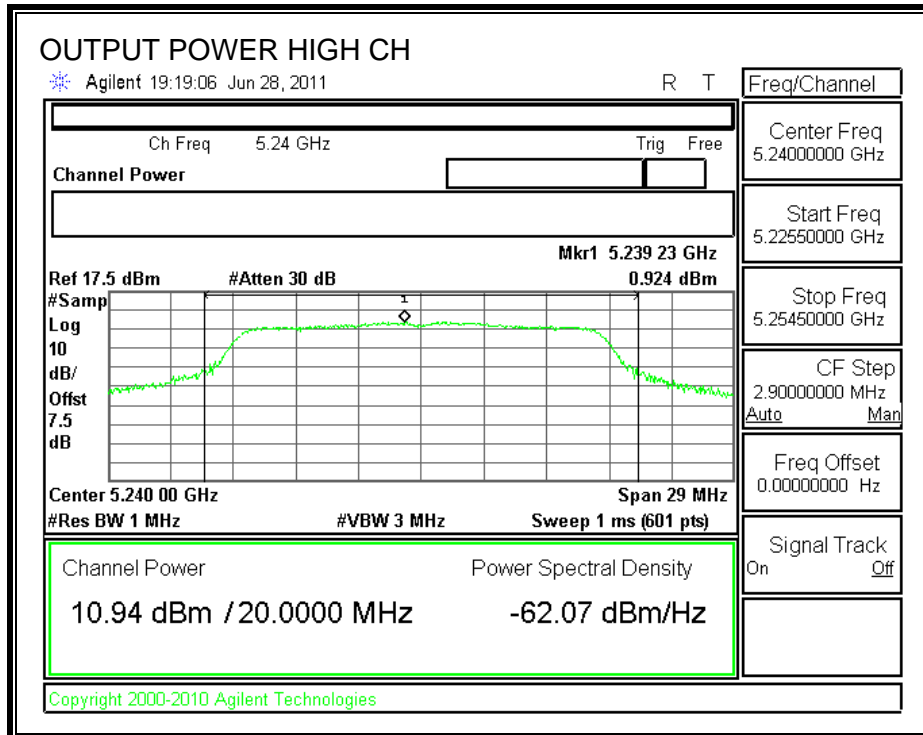
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	10.88	16.86	-5.98
Mid	5200	10.85	16.87	-6.02
High	5240	10.94	16.85	-5.91



**OUTPUT POWER**







### 7.1.4. PEAK POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

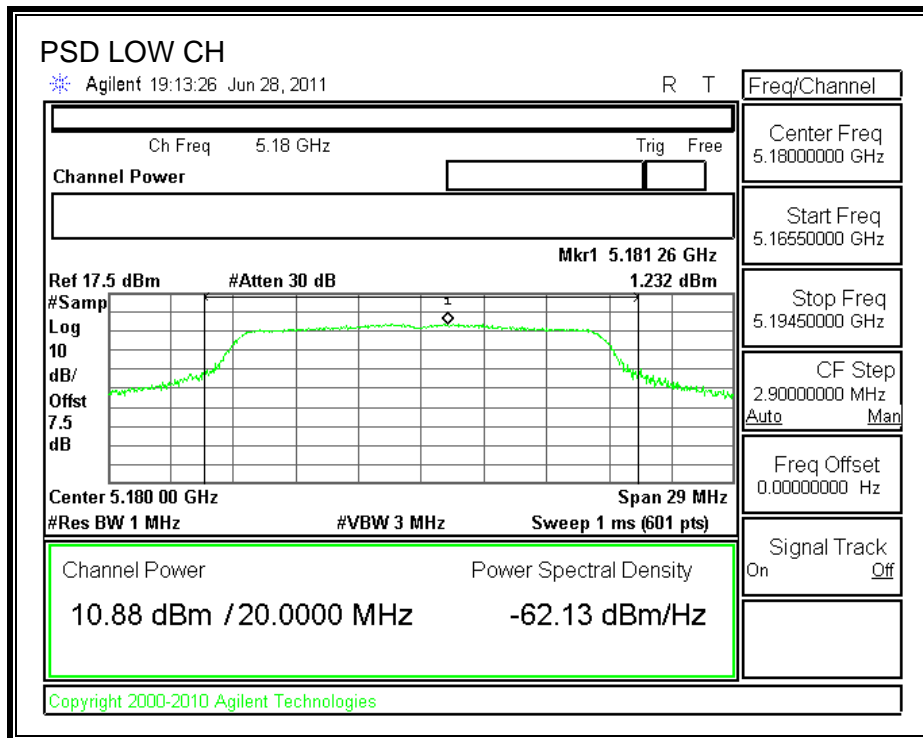
#### TEST PROCEDURE

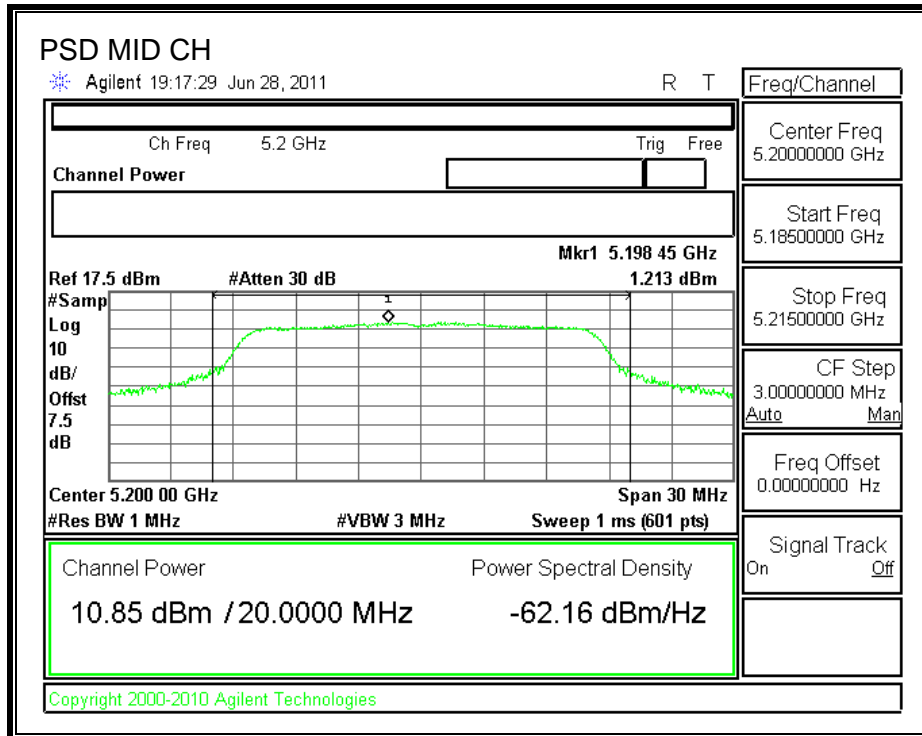
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

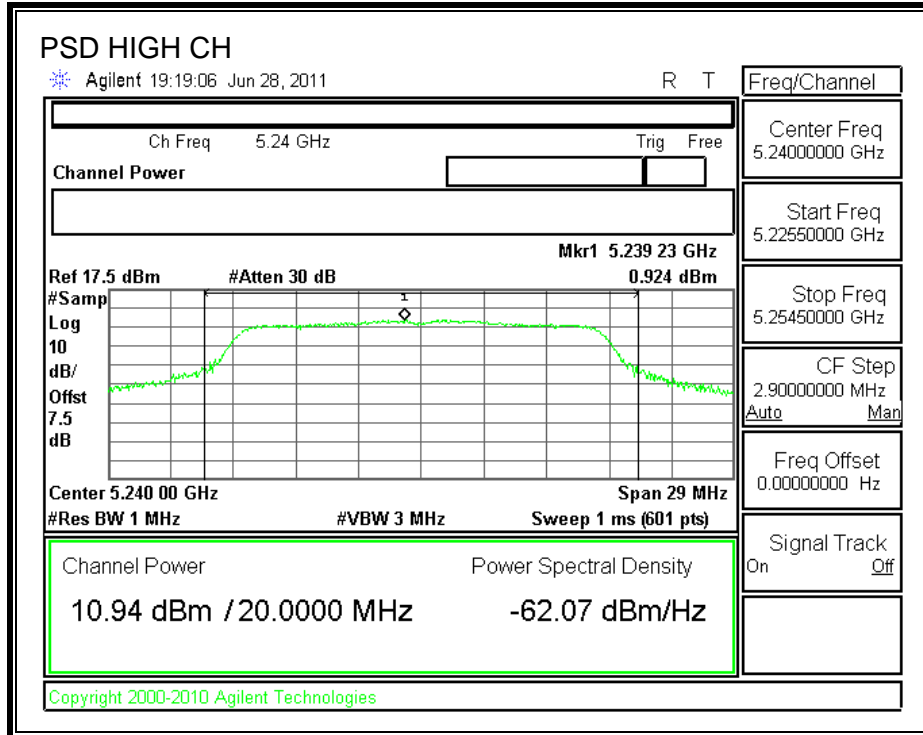
#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	1.23	4	-2.77
Middle	5200	1.21	4	-2.79
High	5240	0.92	4	-3.08

**POWER SPECTRAL DENSITY**







### 7.1.5. 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 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.

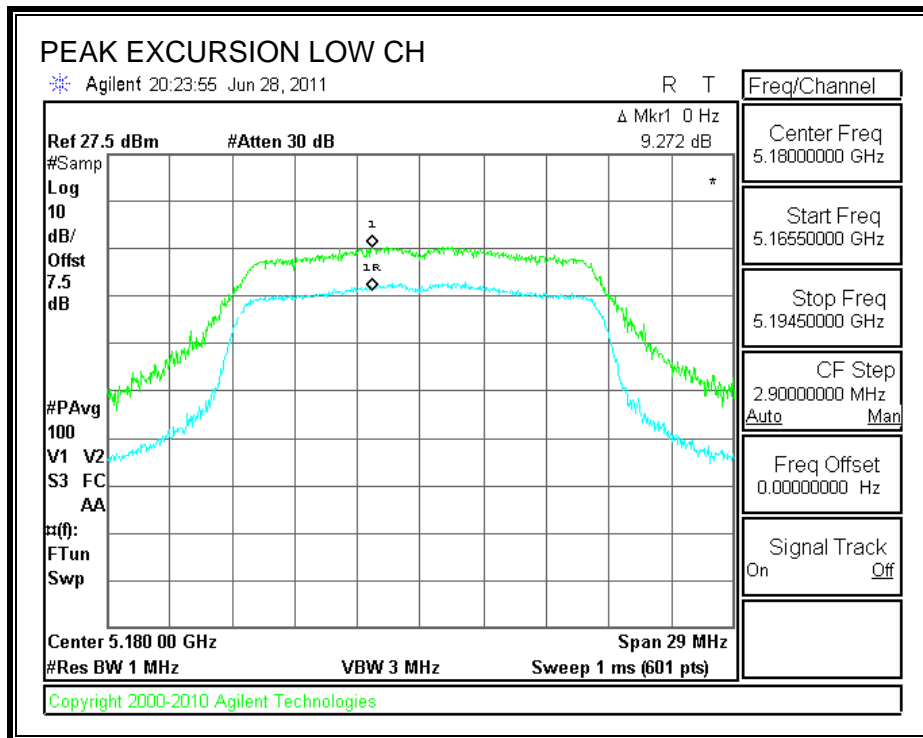
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

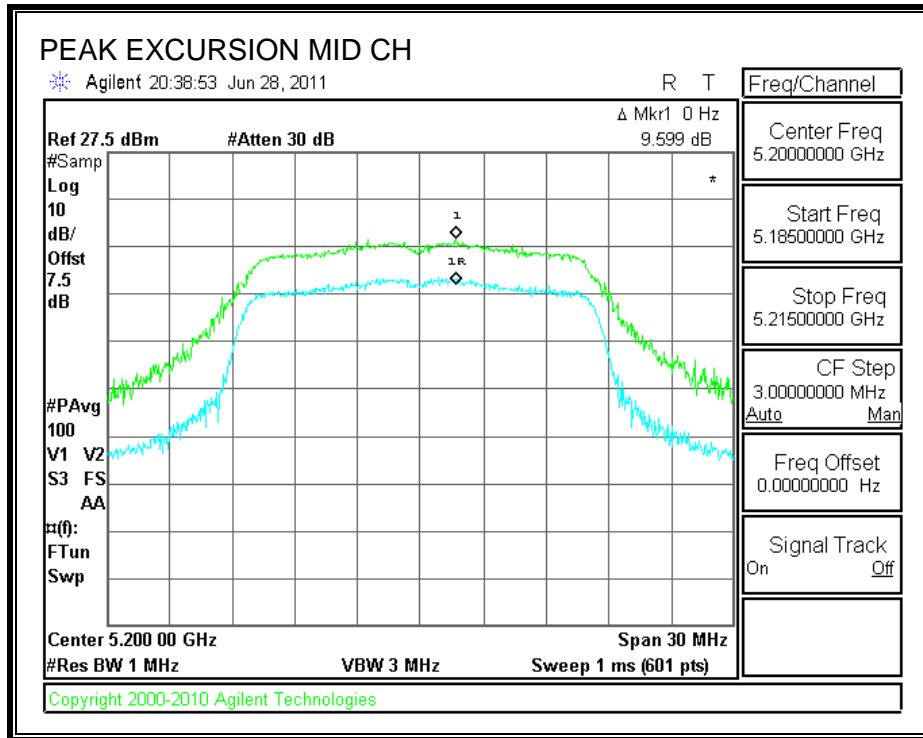
#### RESULTS

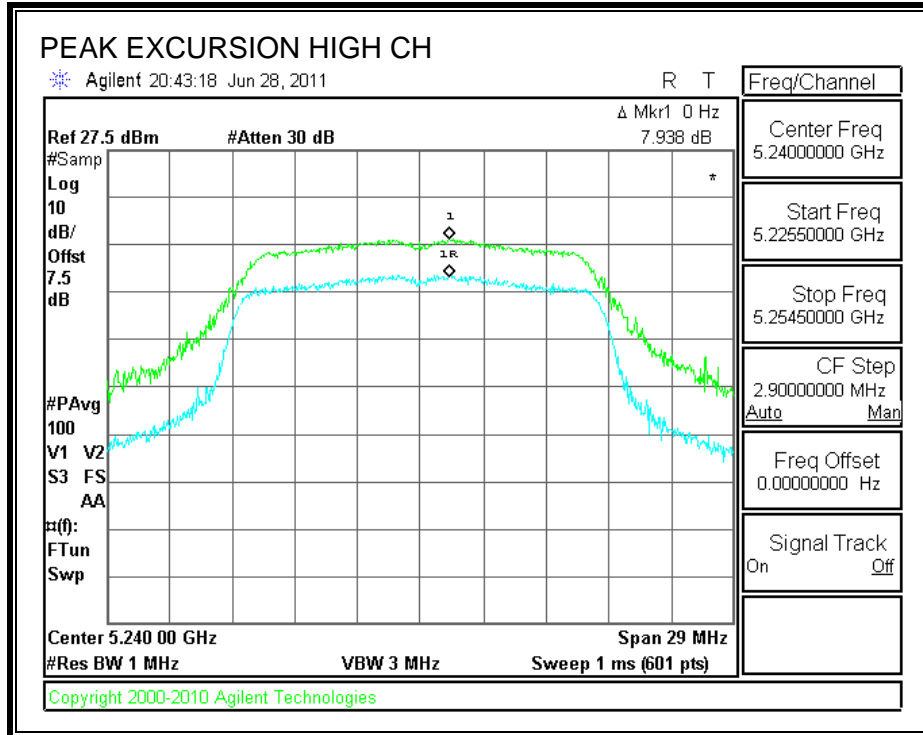
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.27	13	-3.73
Middle	5200	9.60	13	-3.40
High	5240	7.93	13	-5.07



**PEAK EXCURSION**







## **7.1.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

### **TEST PROCEDURE**

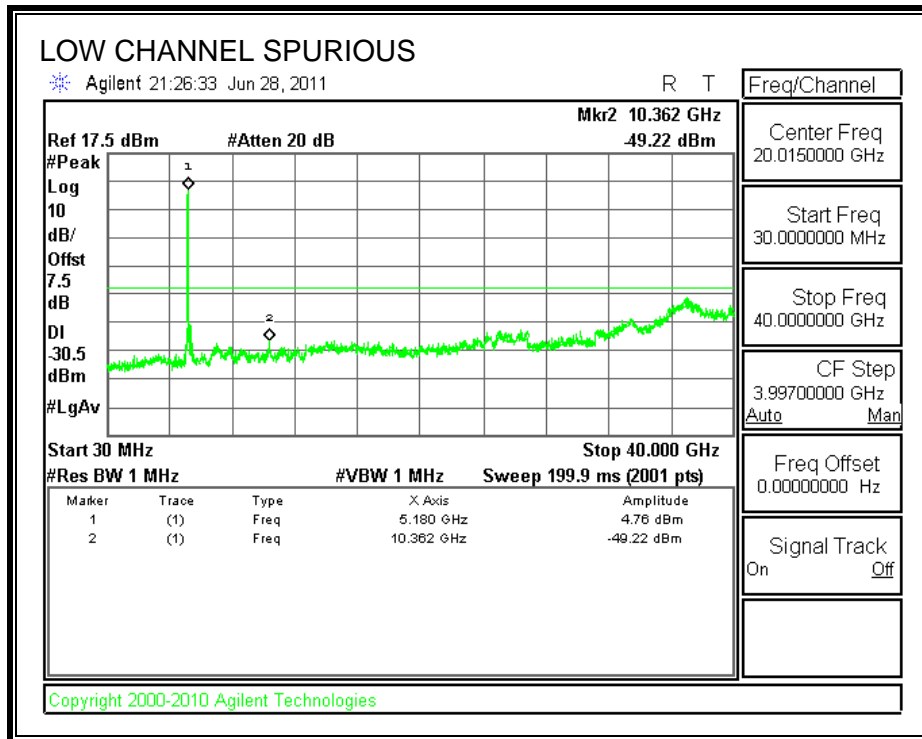
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

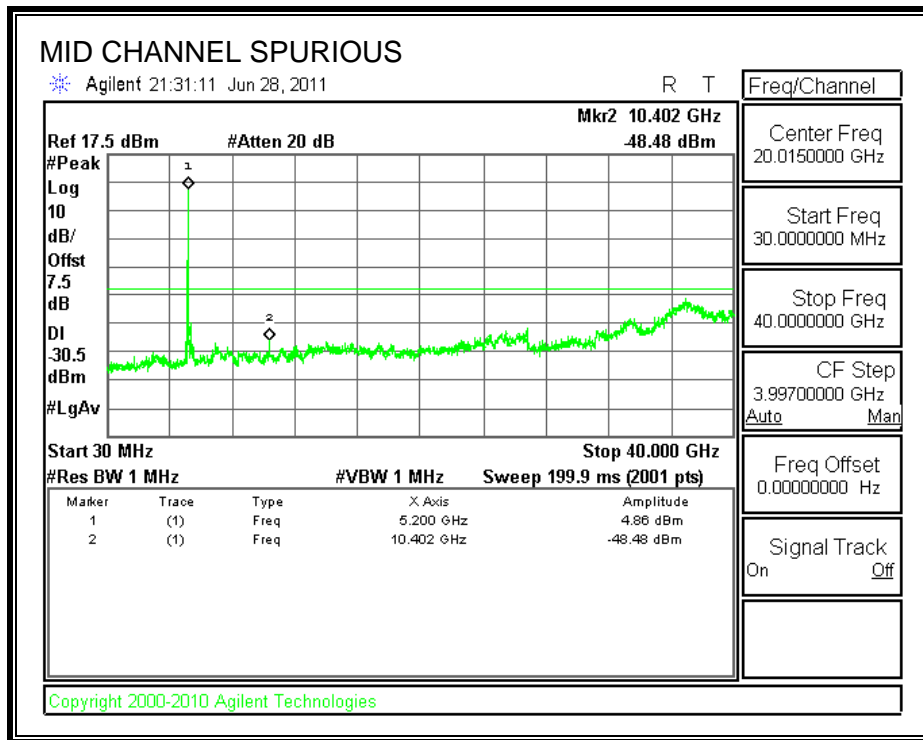
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

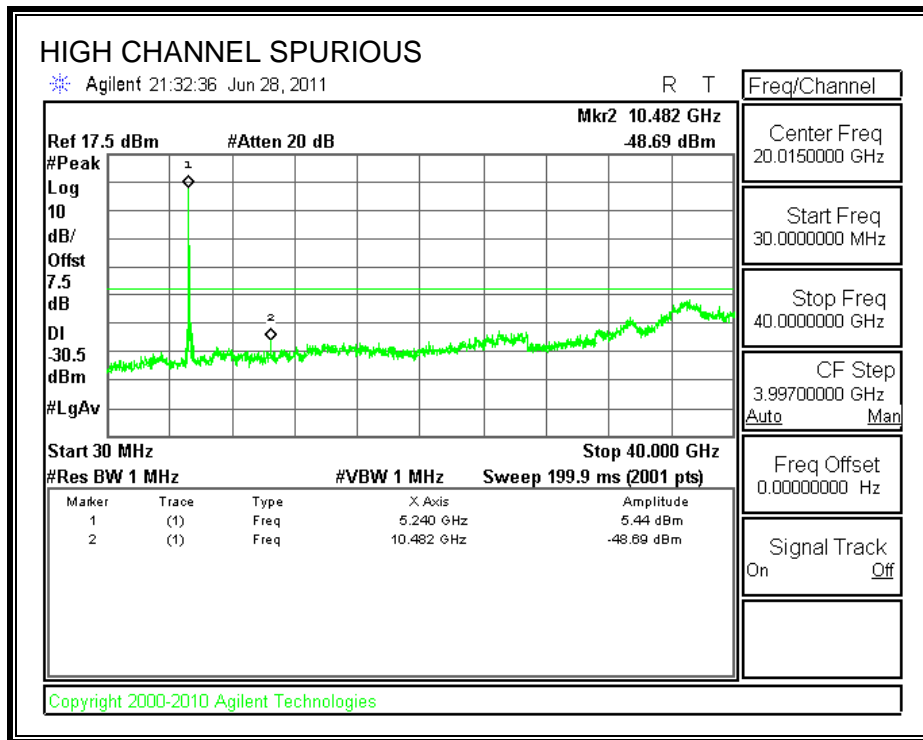
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

**RESULTS**

**SPURIOUS EMISSIONS**







## 7.2. 802.11n HT20 IN THE 5.2 GHz BAND

### 7.2.1. 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 7.5 dB (including 6.5 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5180	10.69
Middle	5200	10.83
High	5240	10.84



## 7.2.2. 26 dB and 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

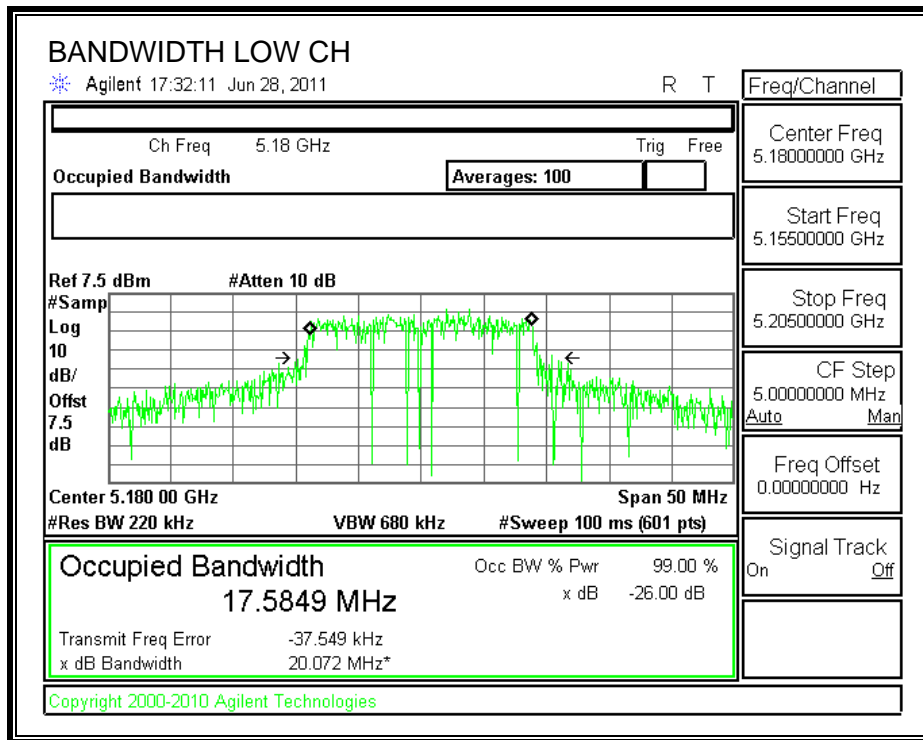
### TEST PROCEDURE

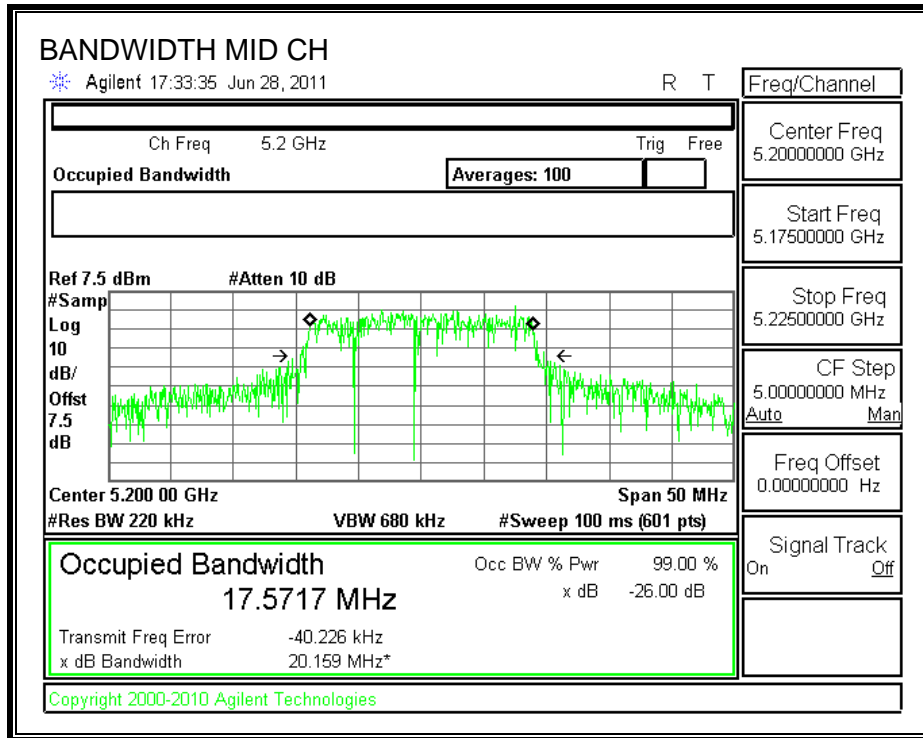
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

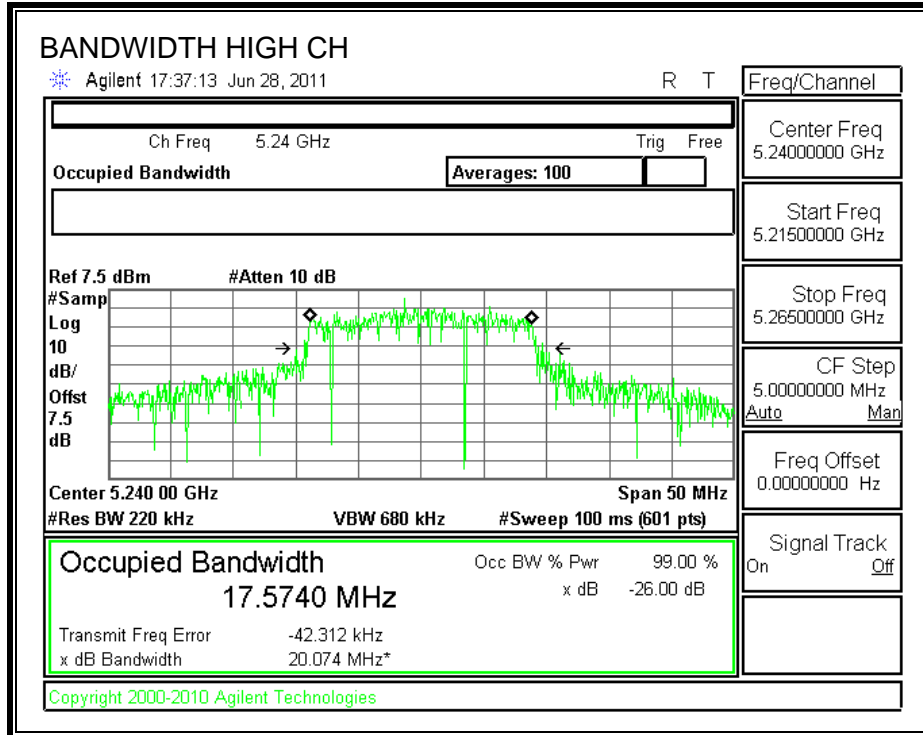
### RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5180	20.072	17.5849
Middle	5200	20.159	17.5717
High	5240	20.074	17.574

26 dB and 99% BANDWIDTH







### 7.2.3. OUTPUT POWER

#### LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

#### TEST PROCEDURE

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

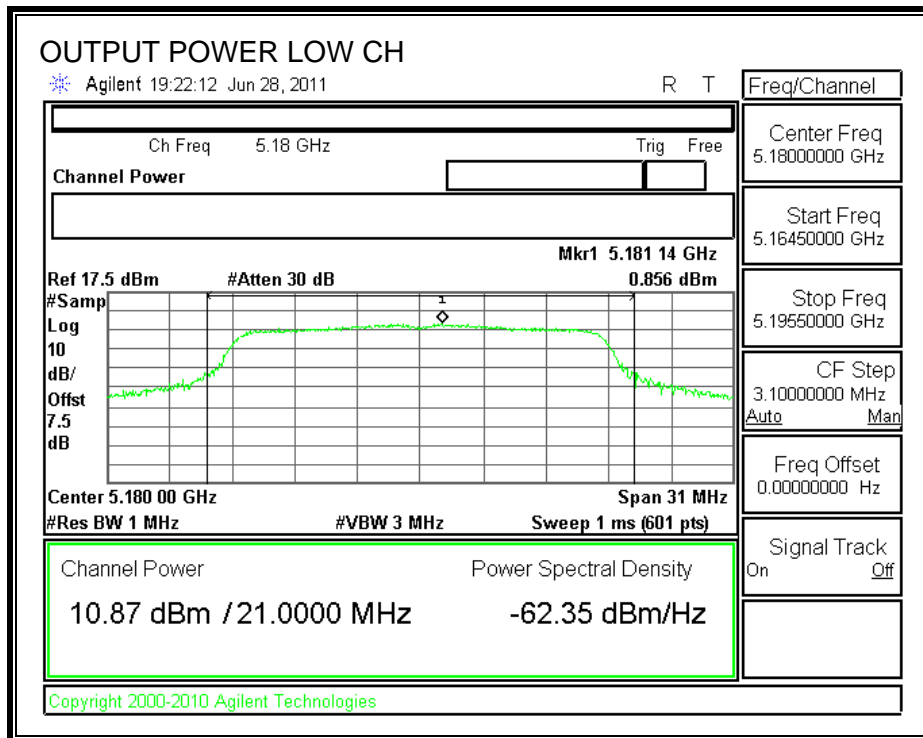
##### Limit

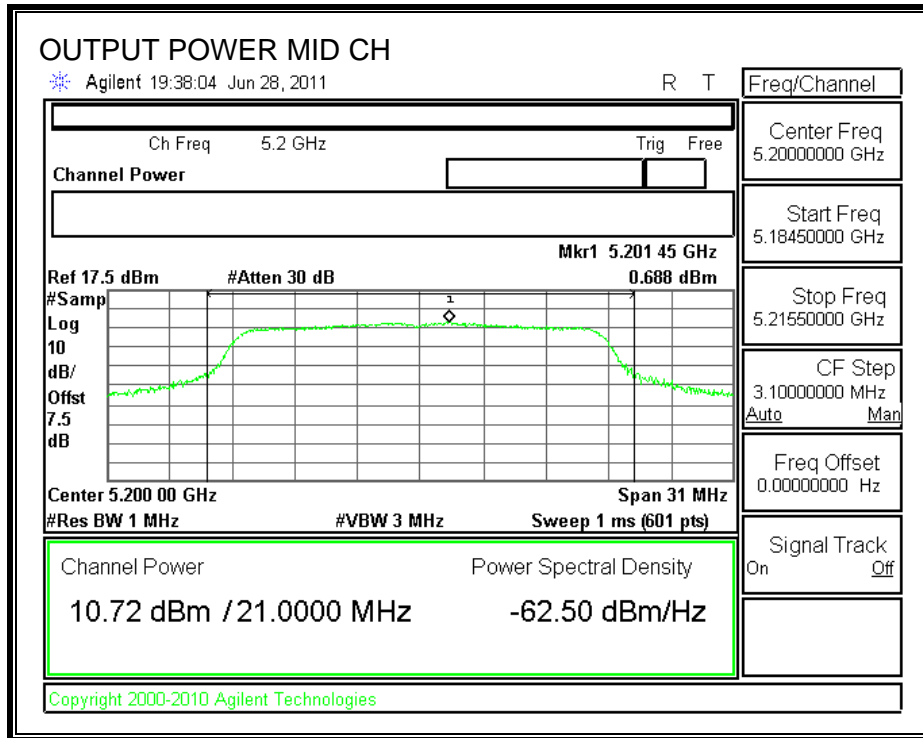
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	20.072	17.03	2.55	17.00
Mid	5200	17	20.159	17.04	2.55	17.00
High	5240	17	20.674	17.15	2.55	17.00

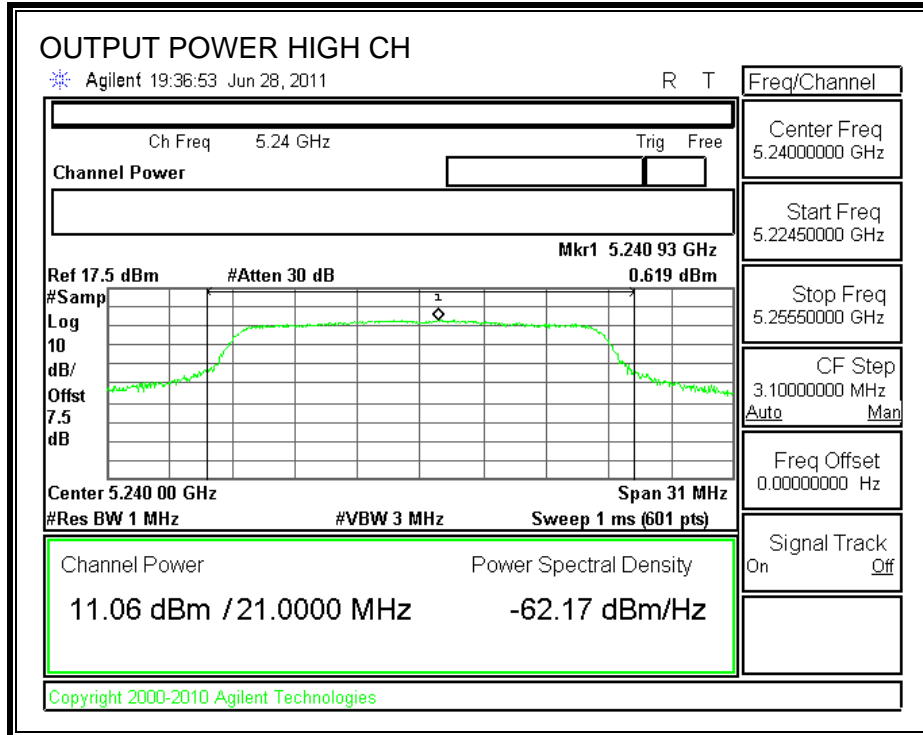
##### Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	10.87	17.00	-6.13
Mid	5200	10.72	17.00	-6.28
High	5240	11.06	17.00	-5.94

**OUTPUT POWER**









## 7.2.4. PEAK POWER SPECTRAL DENSITY

### LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

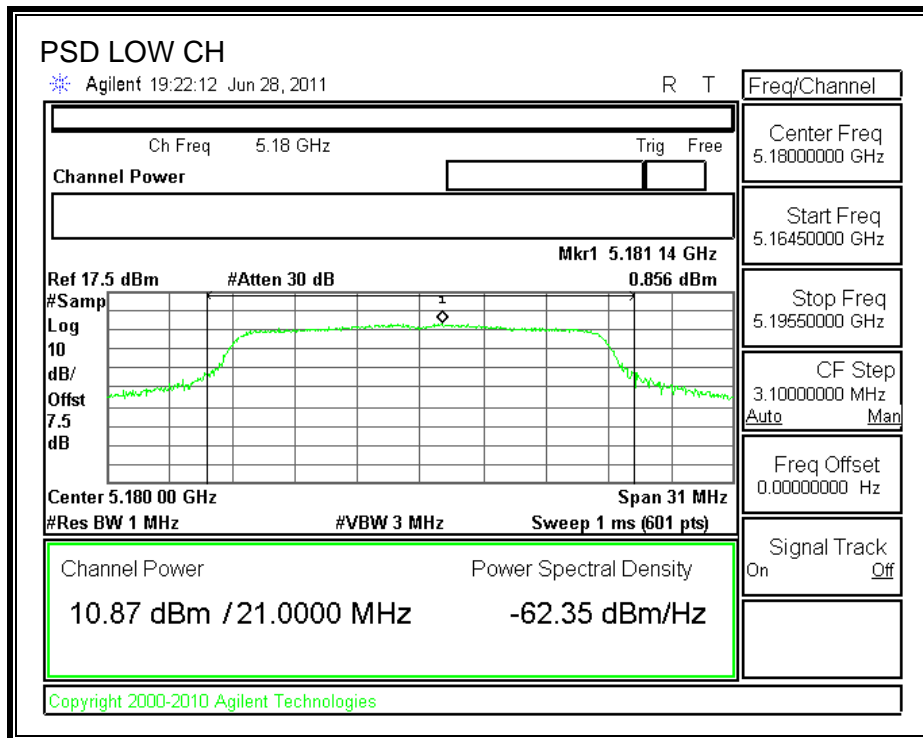
### TEST PROCEDURE

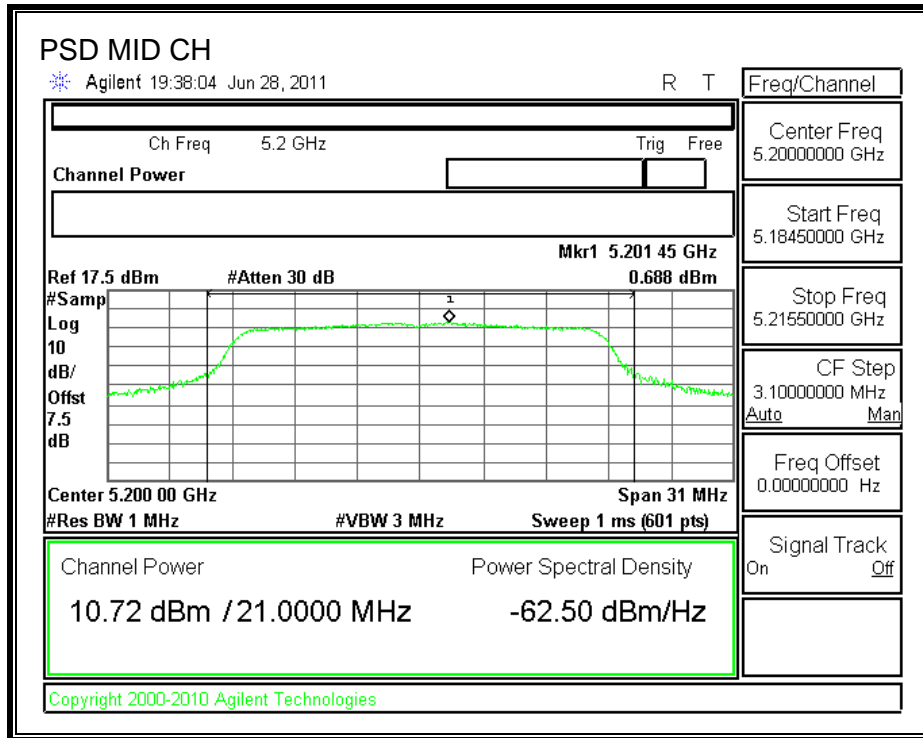
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

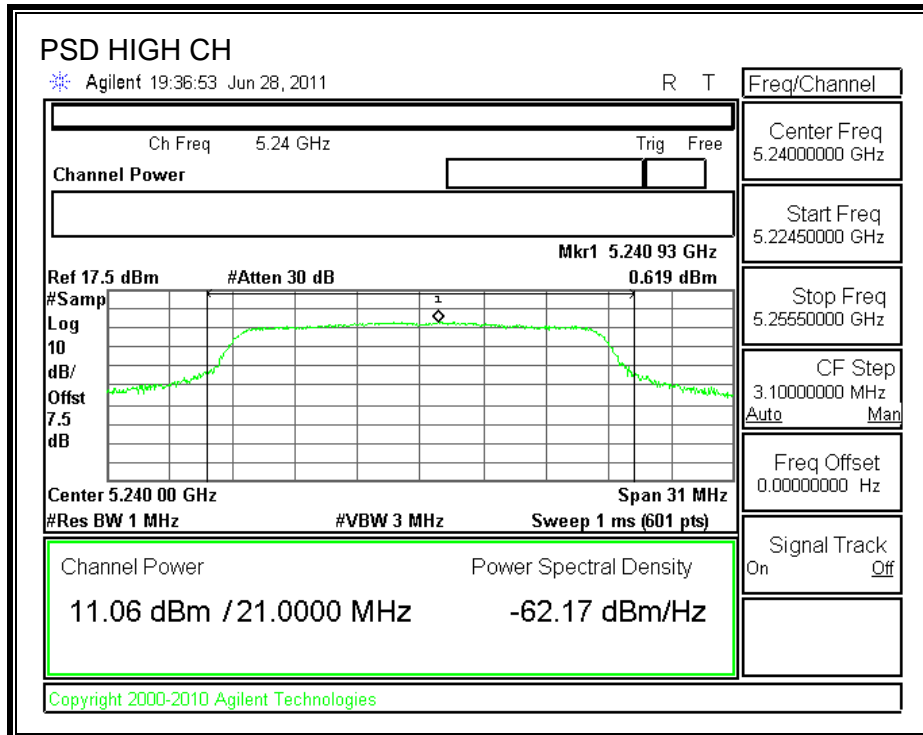
### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	0.86	4	-3.14
Middle	5200	0.69	4	-3.31
High	5240	0.62	4	-3.38

**POWER SPECTRAL DENSITY**







## 7.2.5. 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.

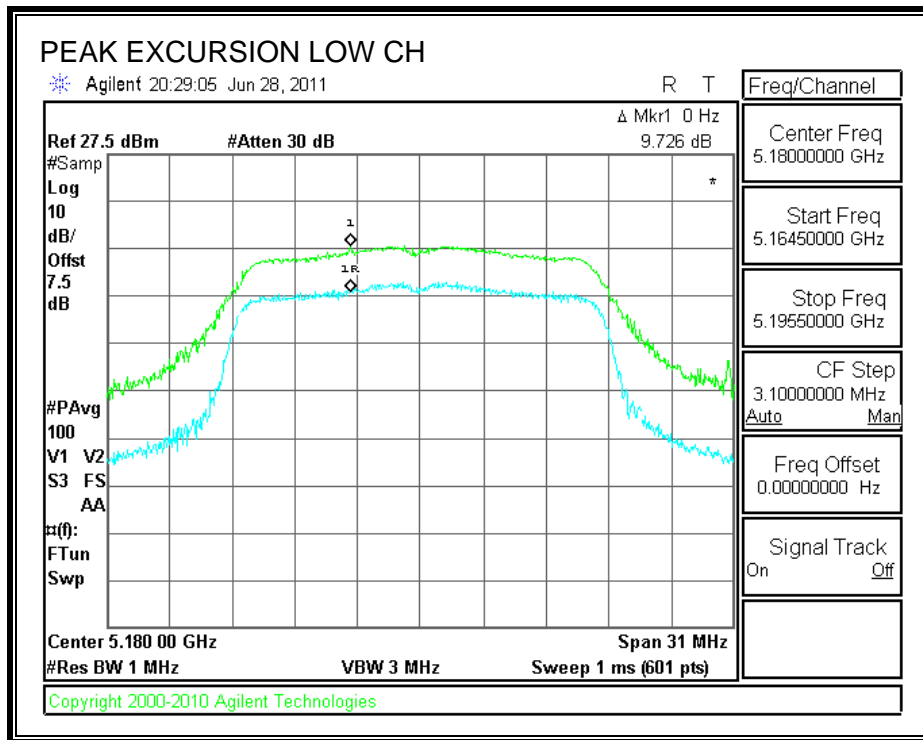
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

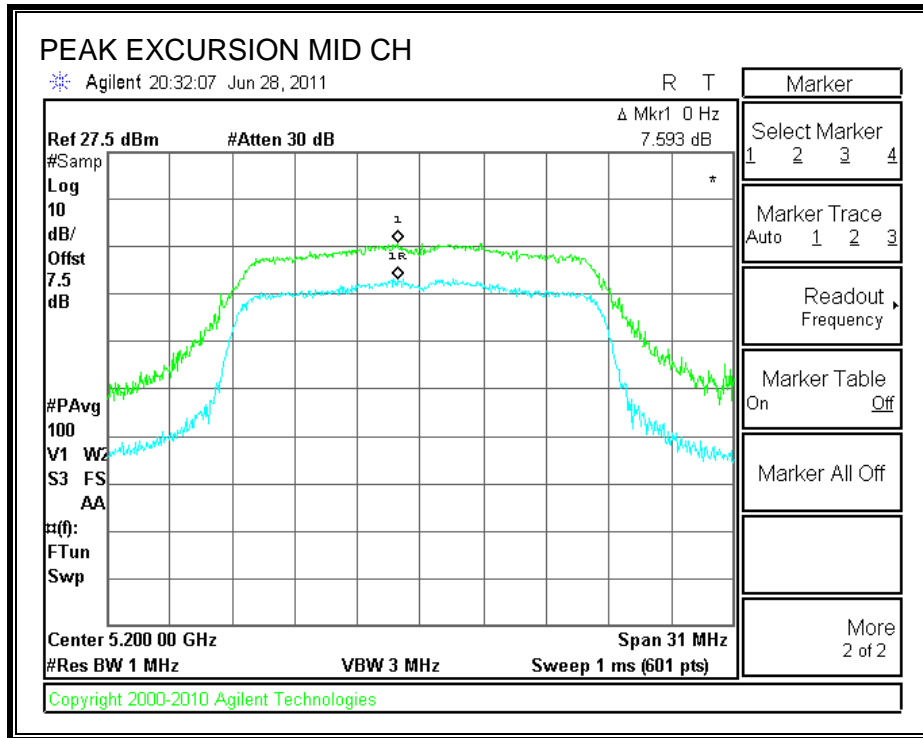
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

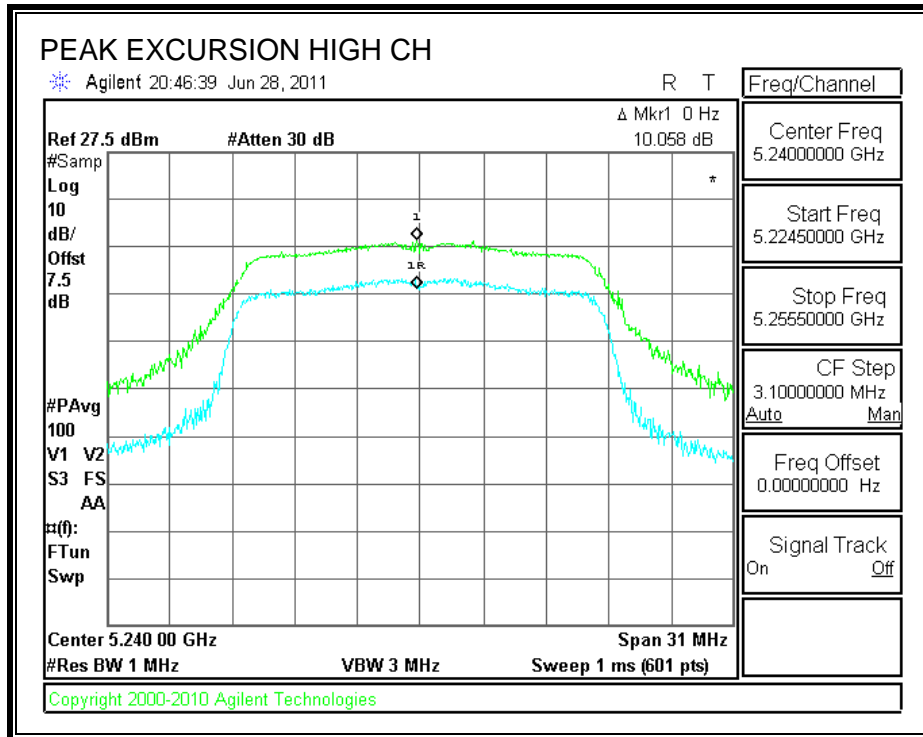
### RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.73	13	-3.27
Middle	5200	7.59	13	-5.41
High	5240	10.06	13	-2.94

PEAK EXCURSION









## 7.2.6. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

### TEST PROCEDURE

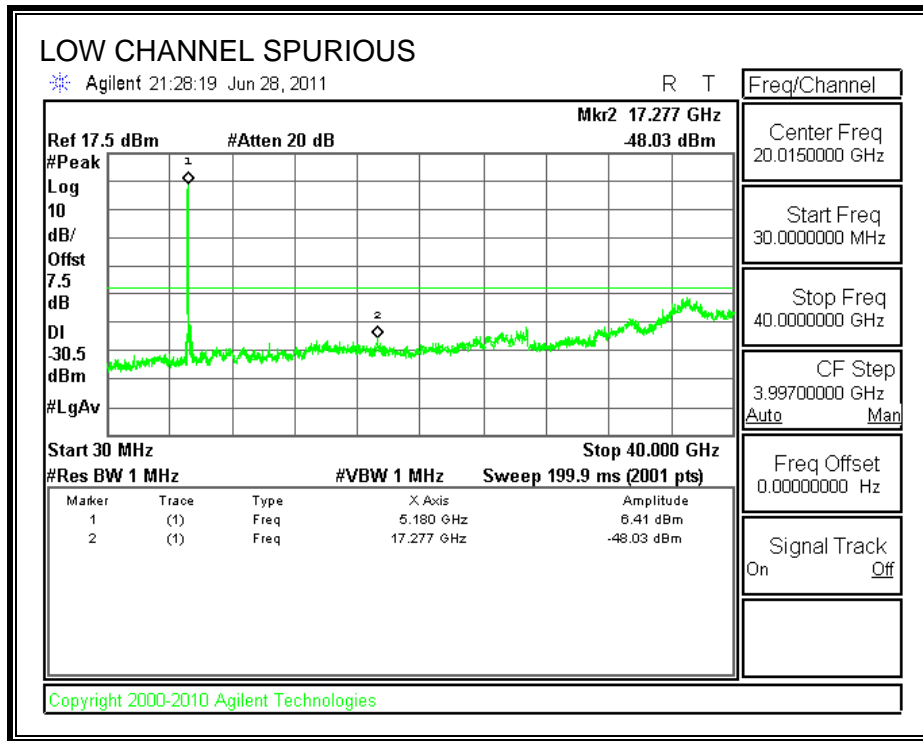
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

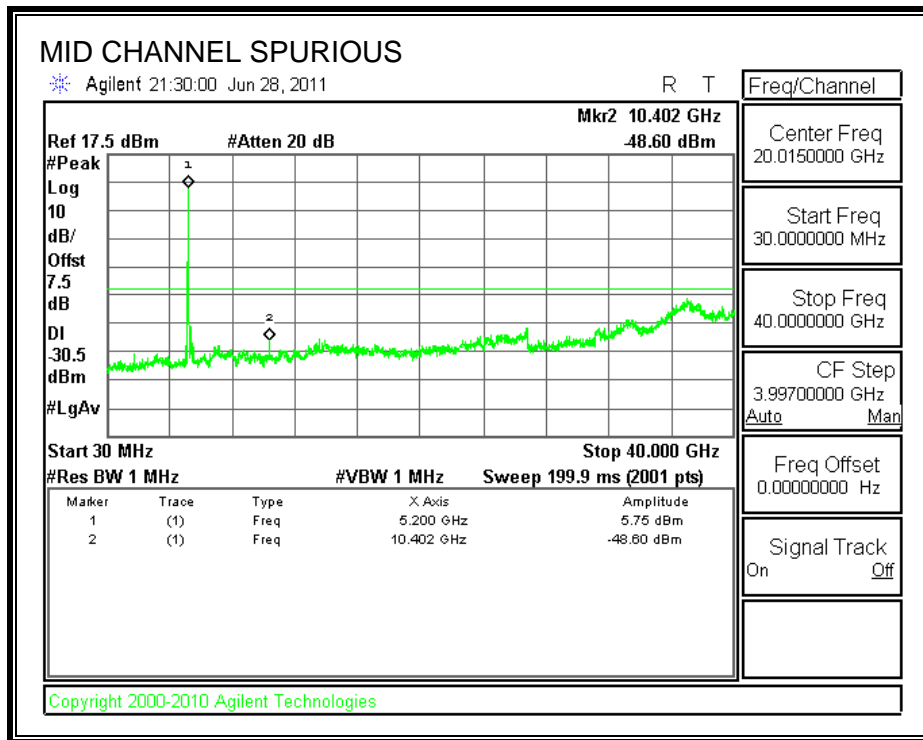
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

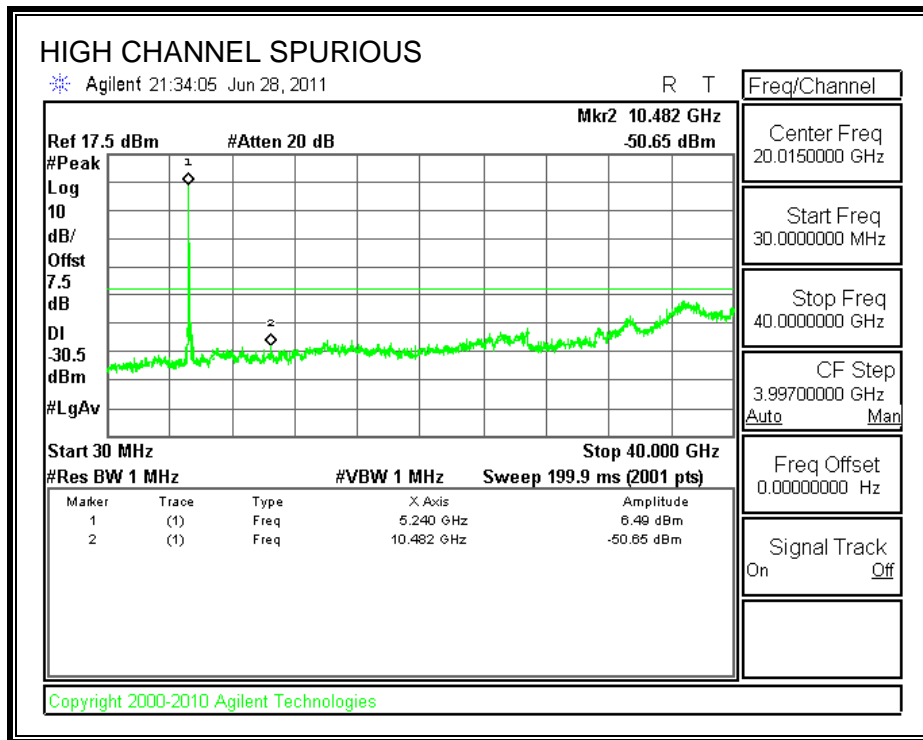
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

**RESULTS**

**SPURIOUS EMISSIONS**







### 7.3. 802.11n HT40 IN THE 5.2 GHz BAND

#### 7.3.1. 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 7.5 dB (including 6.5dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	5190	7.84
High	5230	7.82

### 7.3.2. 26 dB and 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

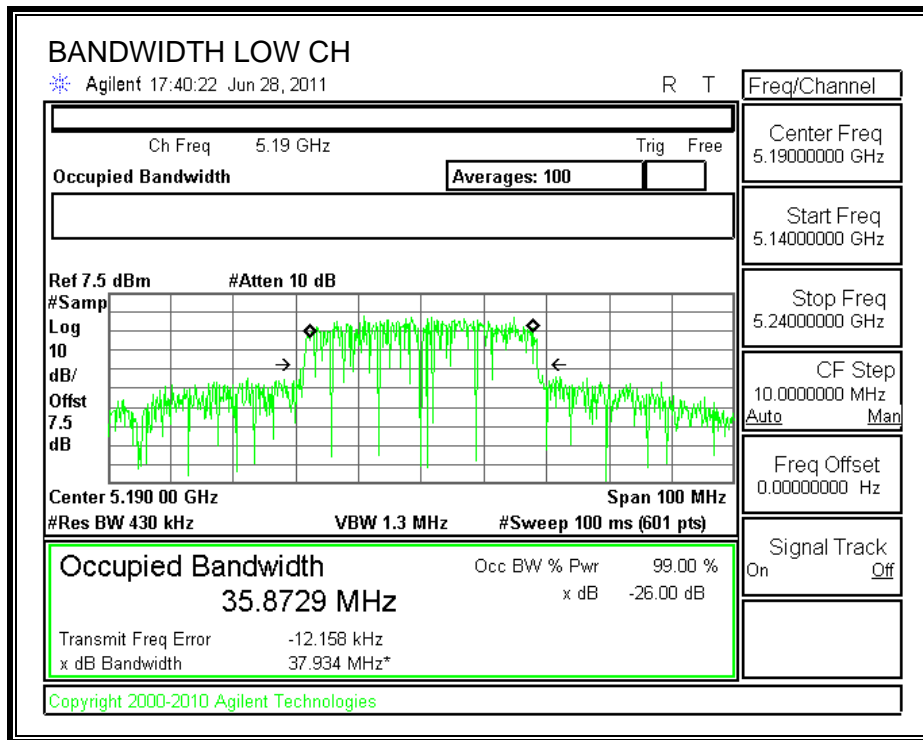
#### TEST PROCEDURE

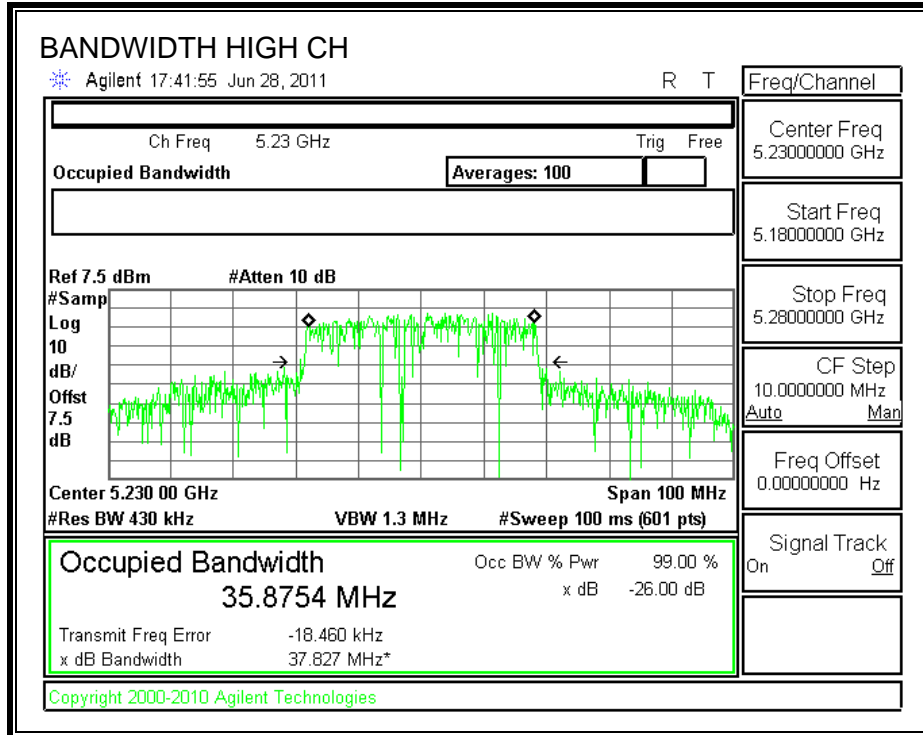
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

#### RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5190	37.934	35.8729
High	5230	37.827	35.8754

**26 dB and 99% BANDWIDTH**







### **7.3.3. OUTPUT POWER**

#### **LIMITS**

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

#### **TEST PROCEDURE**

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**

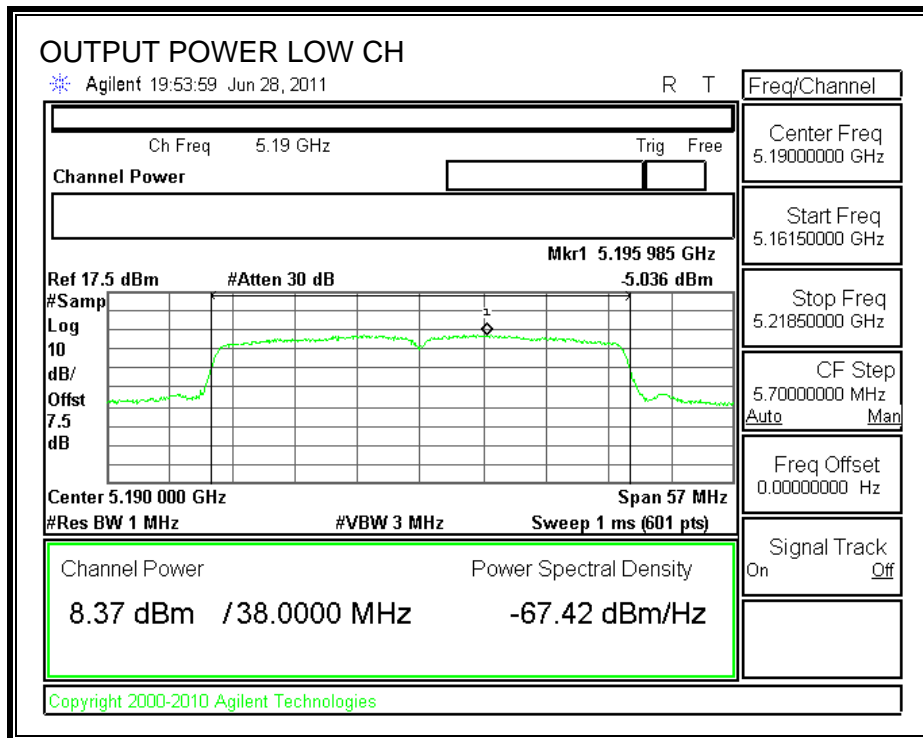
**Limit**

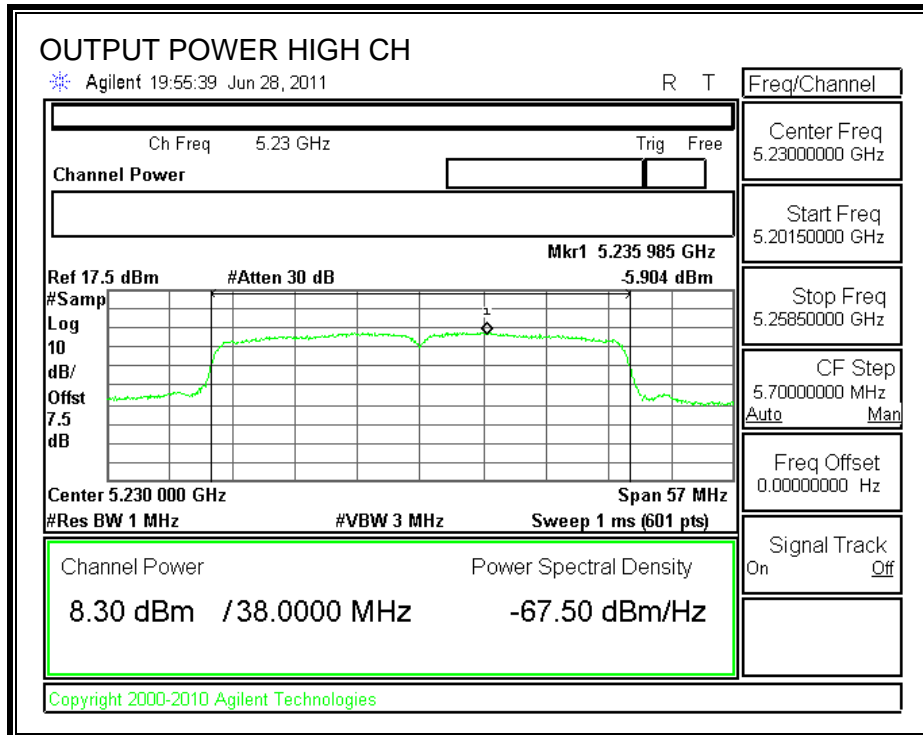
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	17	37.934	19.79	2.55	17.00
High	5230	17	37.827	19.78	2.55	17.00

**Results**

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	8.37	17.00	-8.63
High	5230	8.30	17.00	-8.70

**OUTPUT POWER**





### 7.3.4. PEAK POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

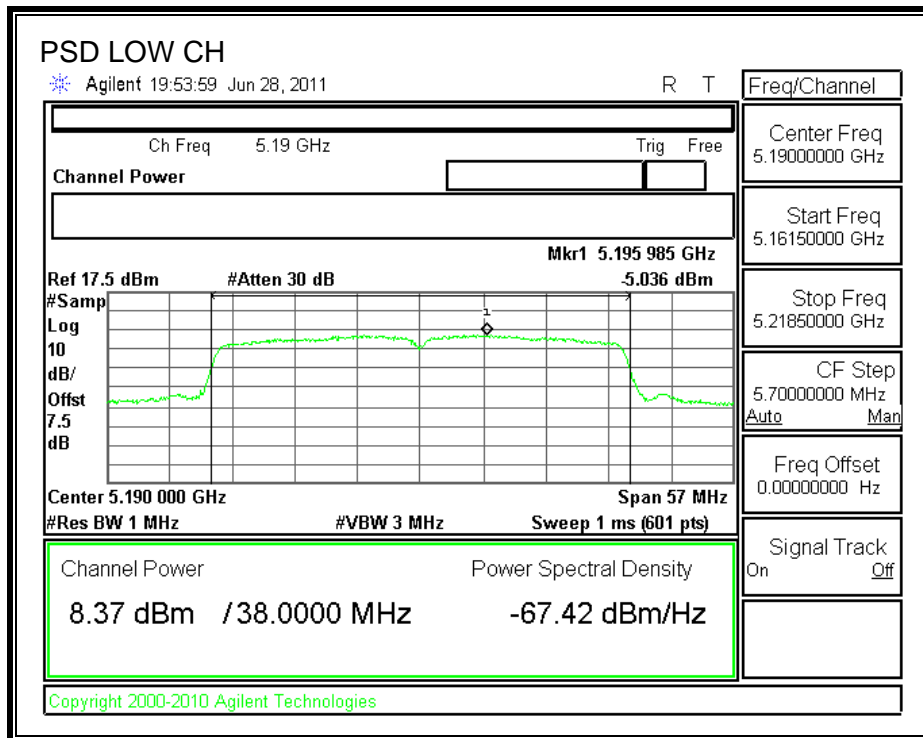
#### TEST PROCEDURE

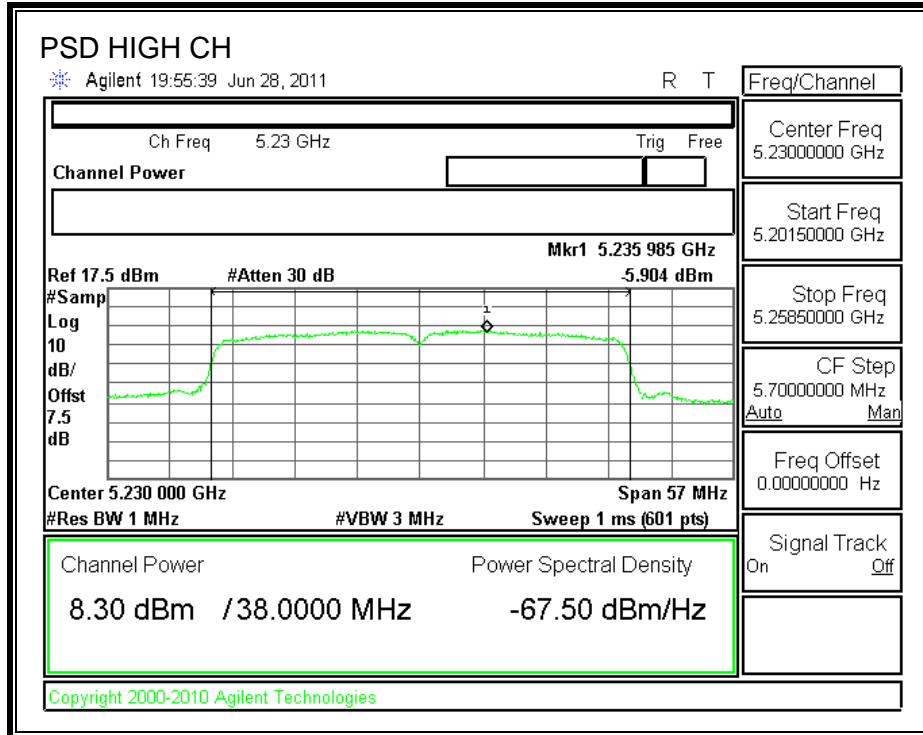
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5190	-5.04	4	-9.04
High	5230	-5.90	4	-9.90

**POWER SPECTRAL DENSITY**





### 7.3.5. 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.

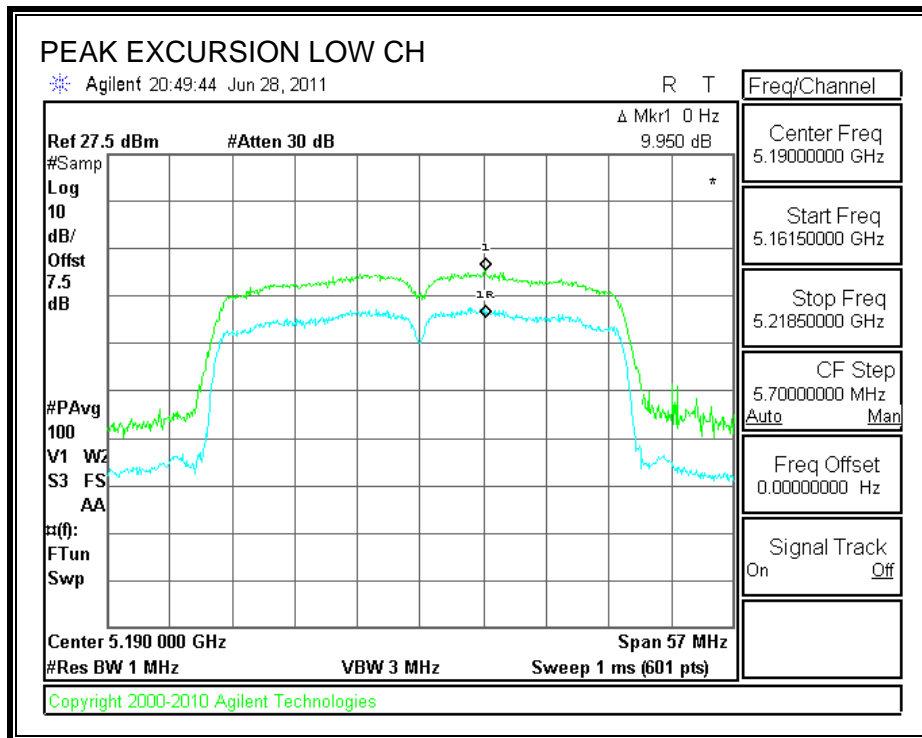
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

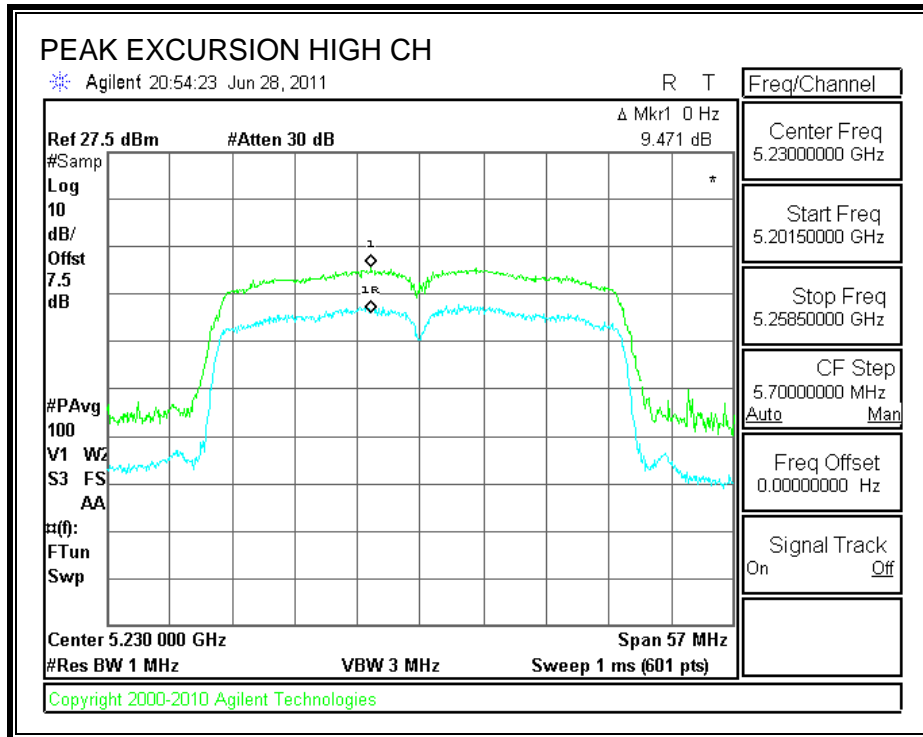
#### RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	9.95	13	-3.05
High	5230	9.47	13	-3.53



**PEAK EXCURSION**





### **7.3.6. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

#### **TEST PROCEDURE**

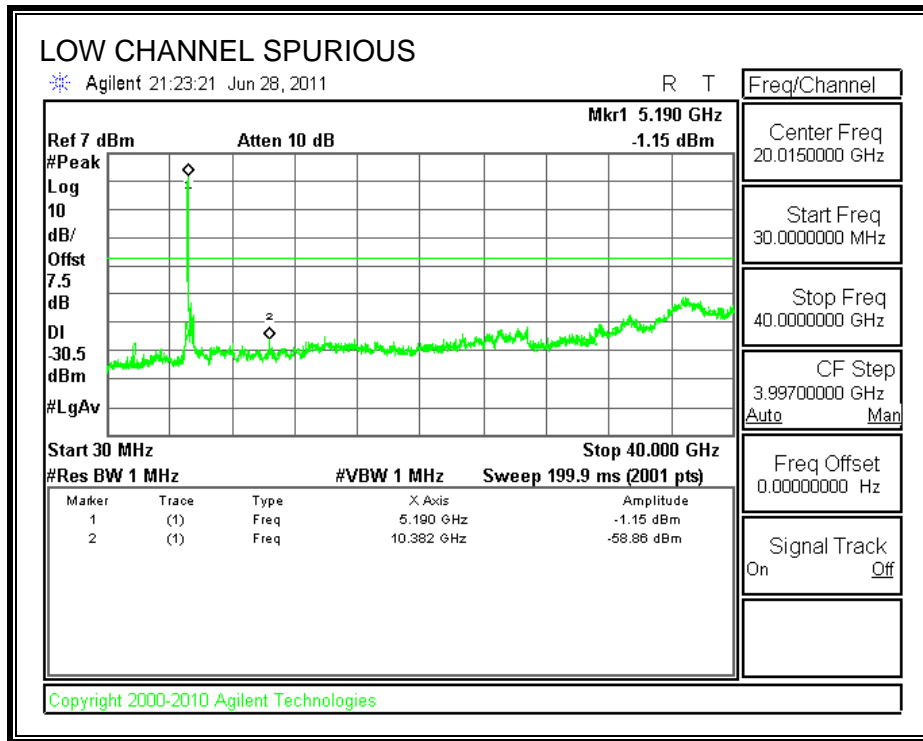
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

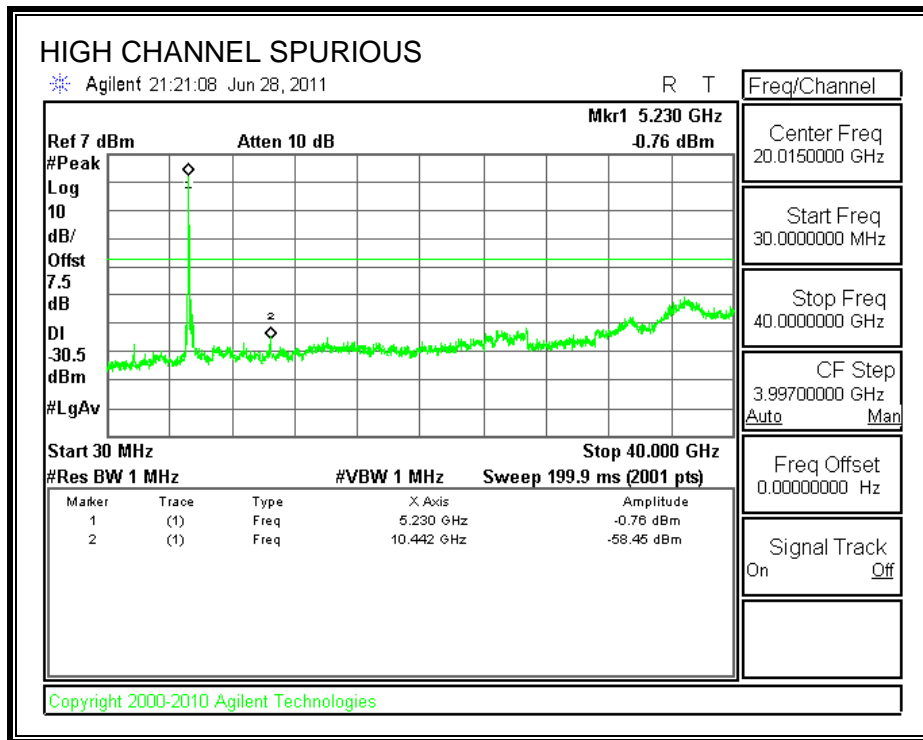
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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**





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

#### TEST PROCEDURE

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

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

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

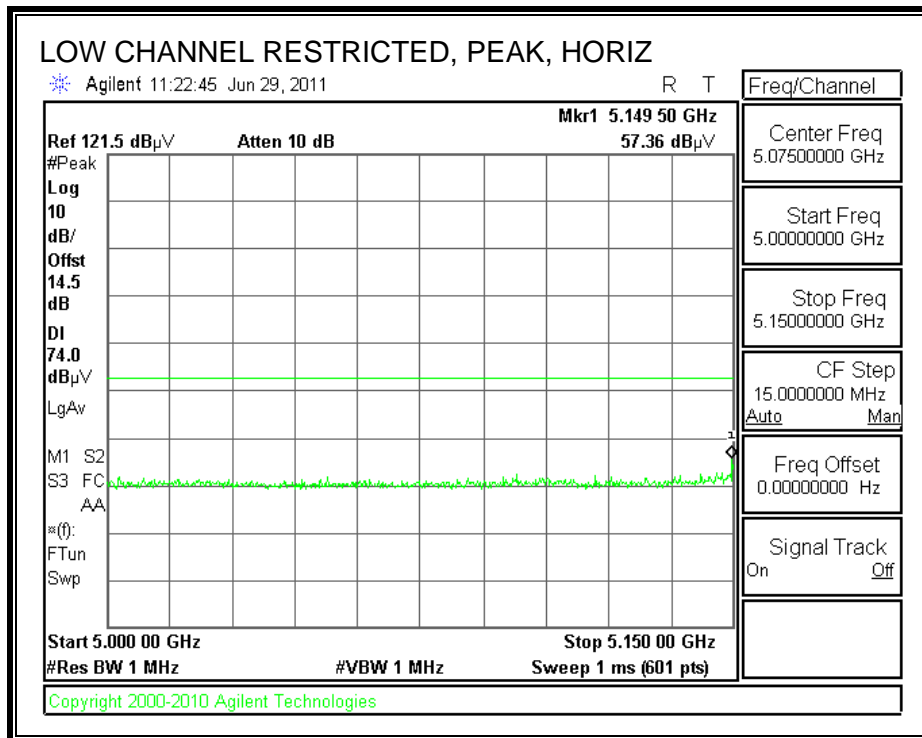
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

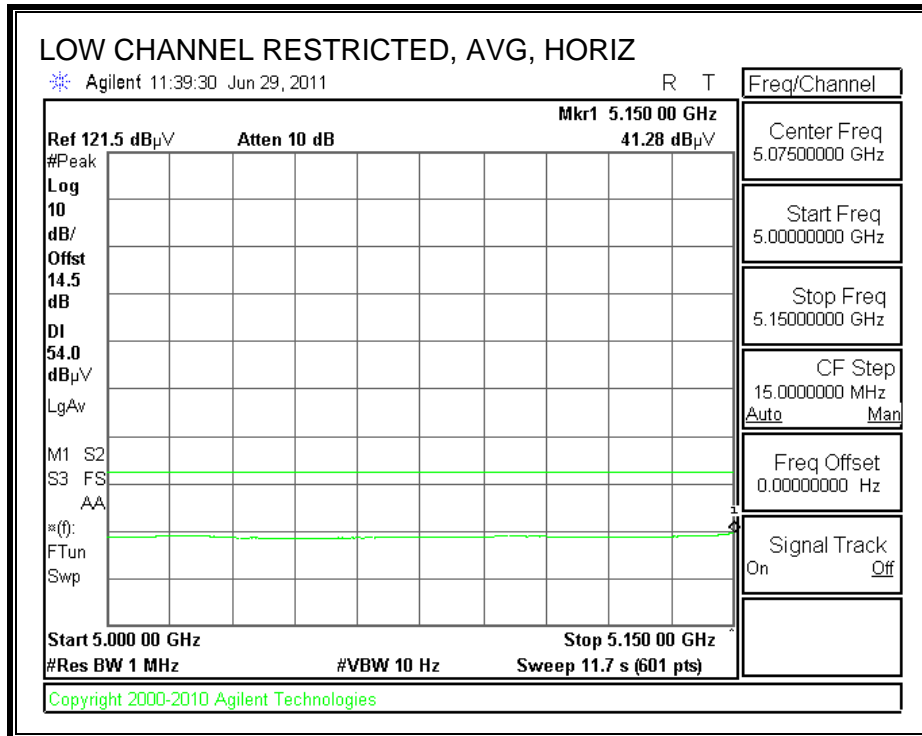
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 8.2. TRANSMITTER ABOVE 1 GHz

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

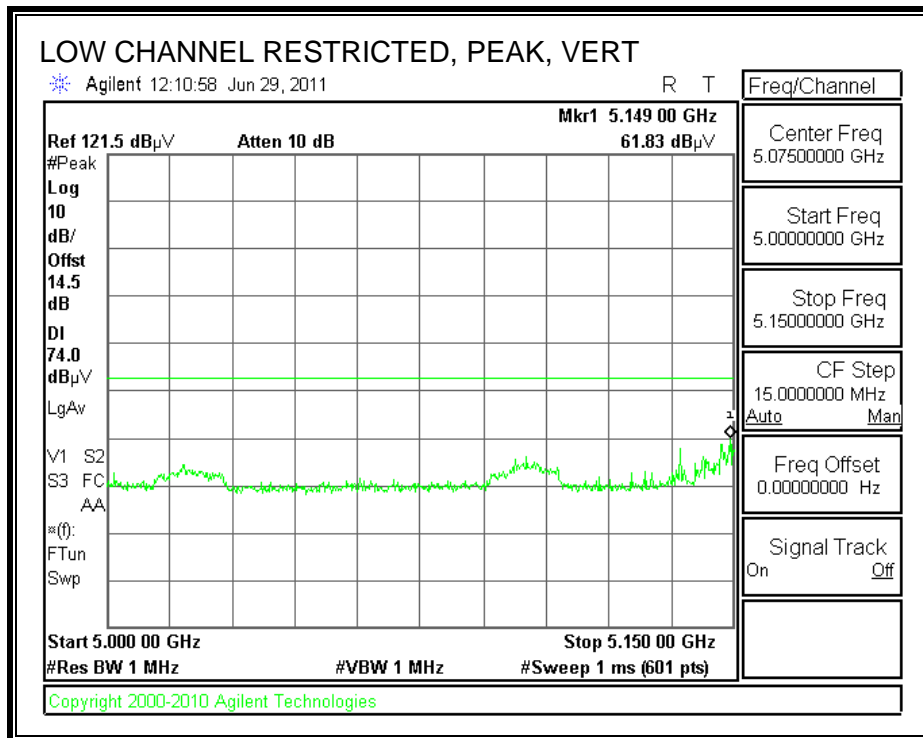
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

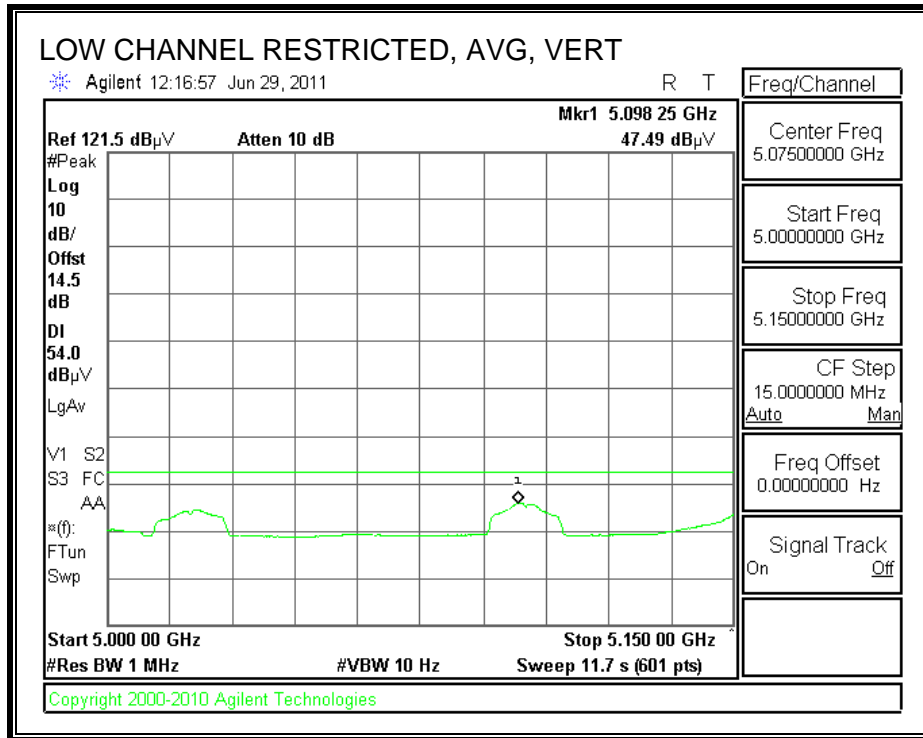






**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



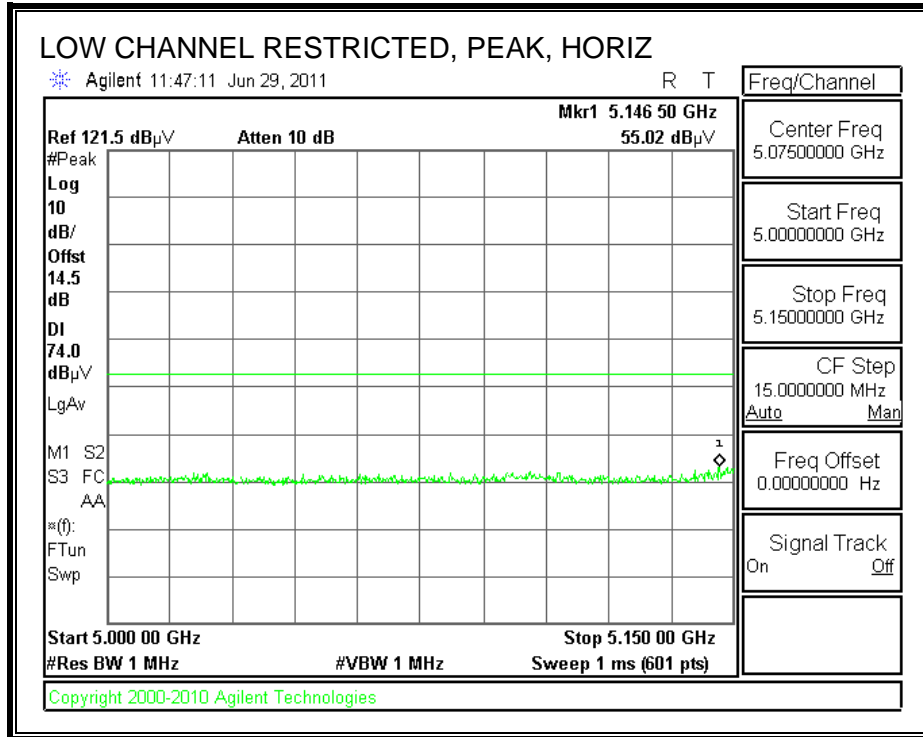


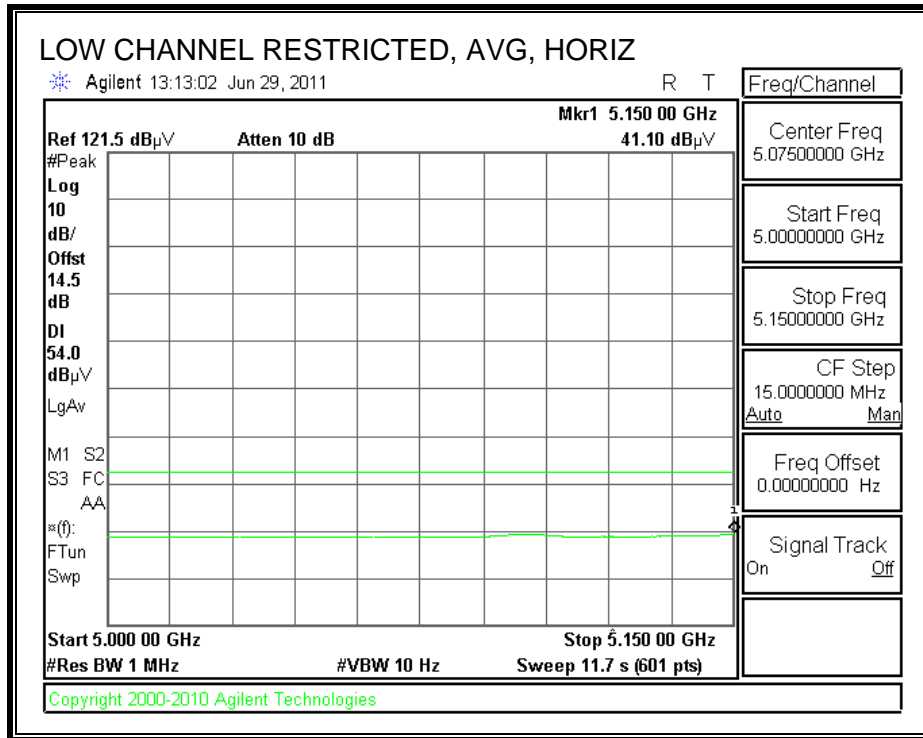
**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Hon Hai															
Project #:		11J13781															
Date:		2011/6/29															
Test Engineer:		Tadaomi Yamano															
Configuration:		Antenna-Y Axis															
Mode:		Tx mode															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz			
3' cable 22807700			12' cable 22807600			20' cable 22807500											
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
5180MHz Low CH																	
10.360	3.0	37.6	24.8	37.6	8.9	-32.6	0.0	0.0	51.5	38.7	74	54	-22.5	-15.3	H		
5180MHz Low CH																	
10.360	3.0	37.2	24.9	37.6	8.9	-32.6	0.0	0.0	51.1	38.8	74	54	-22.9	-15.2	V		
5200MHz Mid CH																	
10.400	3.0	35.4	23.7	37.6	8.9	-32.6	0.0	0.0	49.3	37.6	74	54	-24.7	-16.4	H		
5200MHz Mid CH																	
10.400	3.0	35.7	25.5	37.6	8.9	-32.6	0.0	0.0	49.6	39.4	74	54	-24.4	-14.6	V		
5240MHz High CH																	
10.480	3.0	36.8	24.5	37.6	9.0	-32.6	0.0	0.0	50.7	38.4	74	54	-23.3	-15.6	H		
5240MHz High CH																	
10.480	3.0	36.2	24.7	37.6	9.0	-32.6	0.0	0.0	50.1	38.6	74	54	-23.9	-15.4	V		
Rev. 07.22.09																	
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit		Pk Lim	Peak Field Strength Limit		Avg Mar	Margin vs. Average Limit		Pk Mar	Margin vs. Peak Limit	
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters													
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m													
AF	Antenna Factor		Peak	Calculated Peak Field Strength													
CL	Cable Loss		HPF	High Pass Filter													

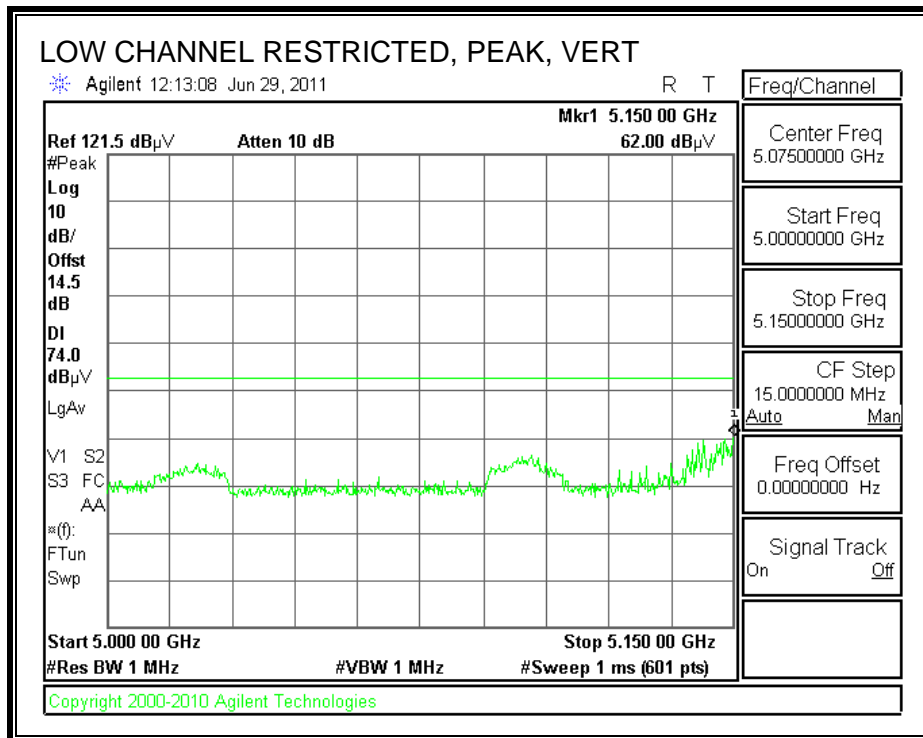
### 8.2.2. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE LOWER 5.2 GHz BAND

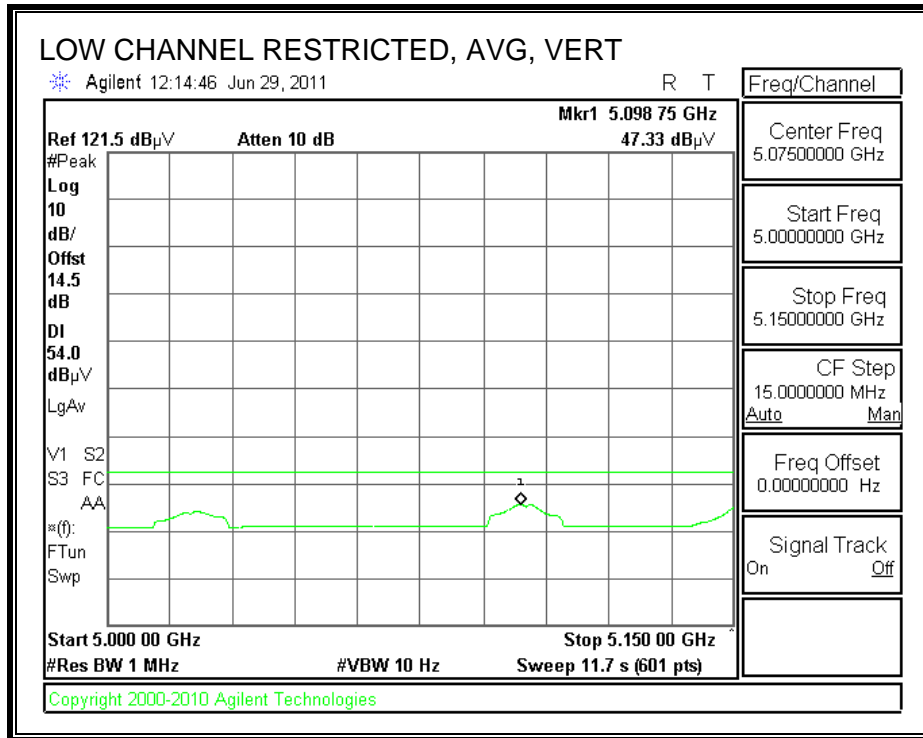
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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





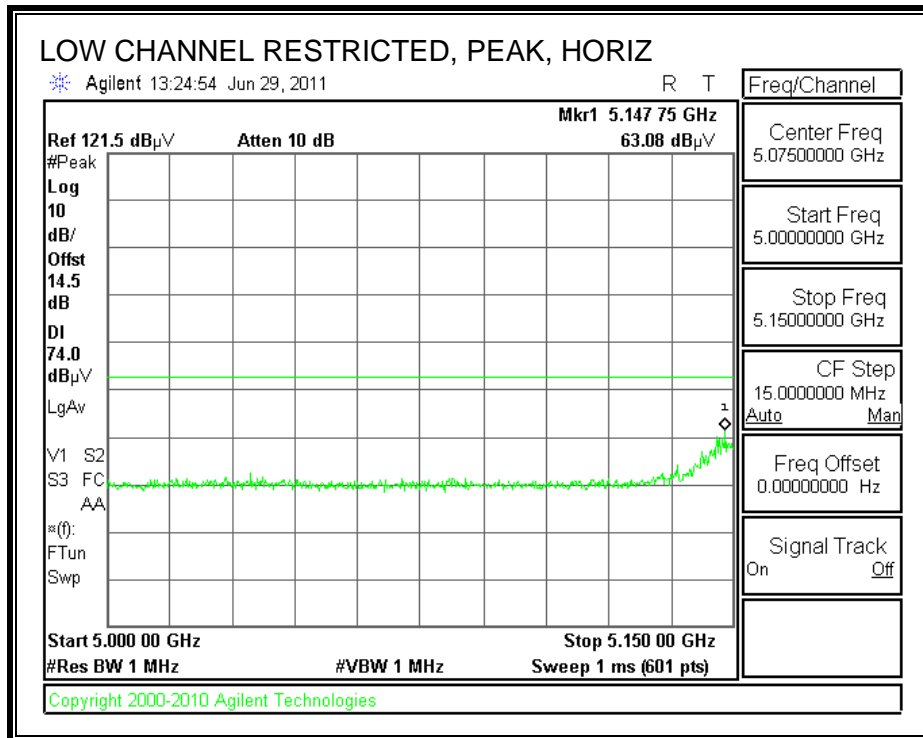
**HARMONICS AND SPURIOUS EMISSIONS**

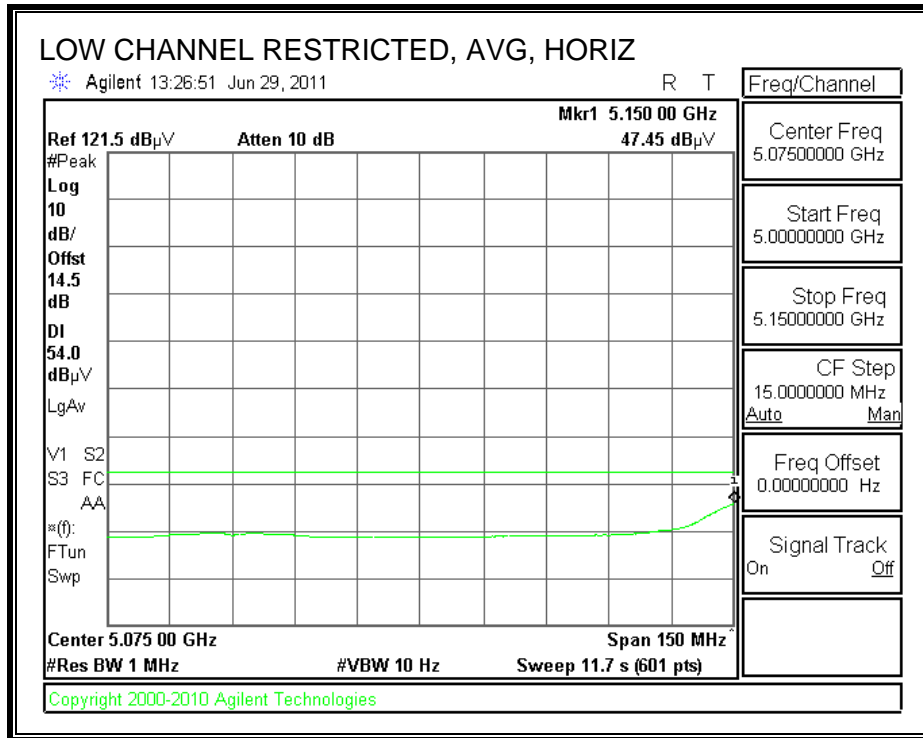
High Frequency Measurement																			
Compliance Certification Services, Fremont 3m Chamber																			
Company:		Hon Hai																	
Project #:		11J13781																	
Date:		2011/6/29																	
Test Engineer:		Tadaomi Yamano																	
Configuration:		Antenna-Y Axis																	
Mode:		Tx mode																	
<b>Test Equipment:</b>																			
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit							
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209							
Hi Frequency Cables																			
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz				
3' cable 22807700			12' cable 22807600			20' cable 22807500													
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)				
<b>5180MHz Low CH</b>																			
10.360	3.0	36.8	25.3	37.6	8.9	-32.6	0.0	0.0	50.7	39.2	74	54	-23.3	-14.8	H				
<b>5180MHz Low CH</b>																			
10.360	3.0	36.8	25.7	37.6	8.9	-32.6	0.0	0.0	50.7	39.6	74	54	-23.3	-14.4	V				
<b>5200MHz Mid CH</b>																			
10.400	3.0	37.5	24.1	37.6	8.9	-32.6	0.0	0.0	51.4	38.0	74	54	-22.6	-16.0	H				
<b>5200MHz Mid CH</b>																			
10.400	3.0	36.4	24.6	37.6	8.9	-32.6	0.0	0.0	50.3	38.5	74	54	-23.7	-15.5	V				
<b>5240MHz High CH</b>																			
10.480	3.0	35.8	25.6	37.6	9.0	-32.6	0.0	0.0	49.7	39.5	74	54	-24.3	-14.5	H				
<b>5240MHz High CH</b>																			
10.480	3.0	35.4	24.6	37.6	9.0	-32.6	0.0	0.0	49.3	38.5	74	54	-24.7	-15.5	V				
Rev. 07.22.09																			
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit												
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit												
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit												
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit												
CL	Cable Loss		HPF	High Pass Filter															



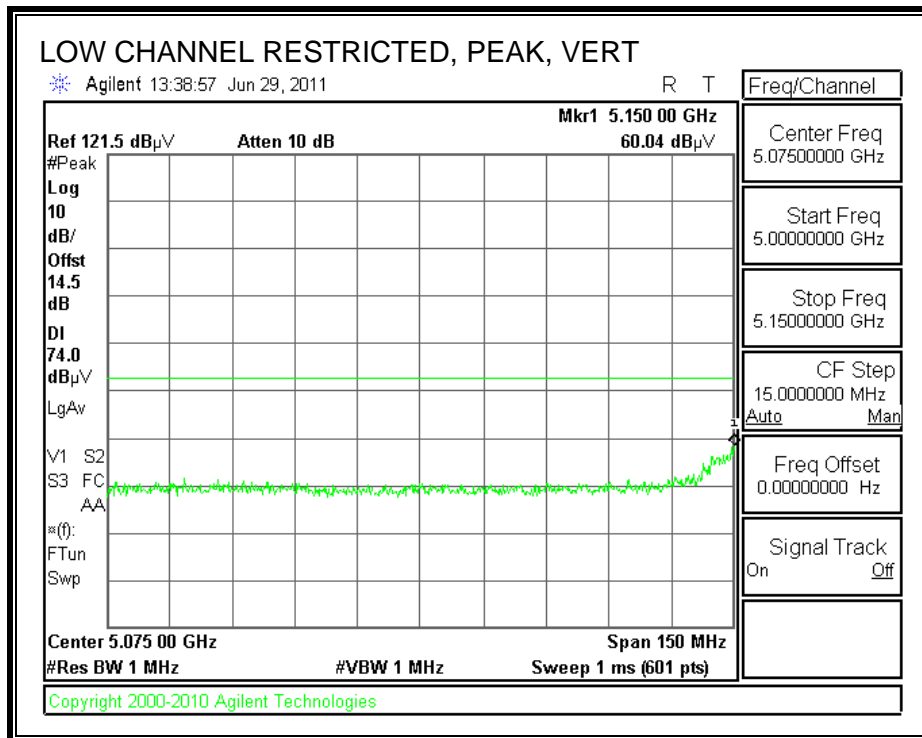
### 8.2.3. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE LOWER 5.2 GHz BAND

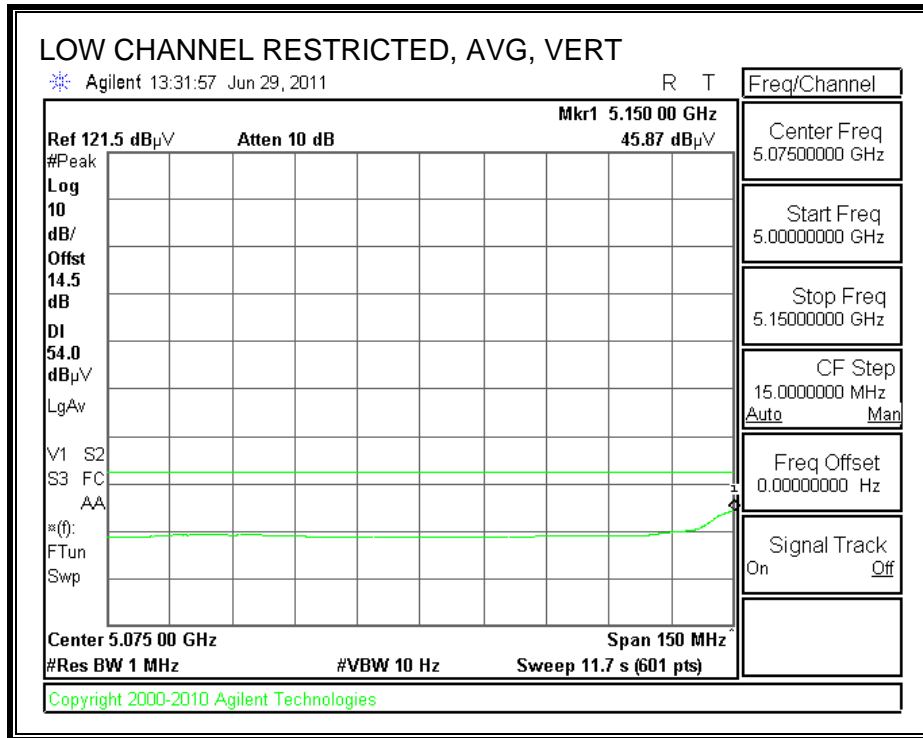
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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





**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																
Compliance Certification Services, Fremont 3m Chamber																
Company:		Hon Hai														
Project #:		11J13781														
Date:		2011/6/29														
Test Engineer:		Tadaomi Yamano														
Configuration:		Antenna-Y Axis														
Mode:		Tx mode														
<b>Test Equipment:</b>																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209				
Hi Frequency Cables																
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements			
3' cable 22807700			12' cable 22807600			20' cable 22807500							RBW=VBW=1MHz			
Average Measurements																
RBW=1MHz ; VBW=10Hz																
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
<b>5190MHz Low CH</b>																
10.380	3.0	36.6	24.2	37.6	8.9	-32.6	0.0	0.0	50.5	38.1	74	54	-23.5	-15.9	H	
<b>5190MHz Low CH</b>																
10.380	3.0	37.1	24.8	37.6	8.9	-32.6	0.0	0.0	51.0	38.7	74	54	-23.0	-15.3	V	
<b>5230MHz High CH</b>																
10.460	3.0	35.8	23.4	37.6	9.0	-32.6	0.0	0.0	49.7	37.3	74	54	-24.3	-16.7	H	
<b>5230MHz High CH</b>																
10.460	3.0	35.1	24.5	37.6	9.0	-32.6	0.0	0.0	49.0	38.4	74	54	-25.0	-15.6	V	
Rev. 07.22.09																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

### 8.3. RECEIVER ABOVE 1 GHz

#### 8.3.1. RECEIVER ABOVE 1 GHz FOR 20 MHz BANDWIDTH IN THE 5.2 GHz BAND

High Frequency Measurement																
Compliance Certification Services, Fremont 3m Chamber																
Company:		Hon Hai														
Project #:		11J13781														
Date:		2011/6/29														
Test Engineer:		Tadaomi Yamano														
Configuration:		Antenna-Y Axis														
Mode:		Rx mode														
<b>Test Equipment:</b>																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209				
Hi Frequency Cables																
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz			
3' cable 22807700			12' cable 22807600			20' cable 22807500							Average Measurements RBW=1MHz ; VBW=10Hz			
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
1.329	3.0	50.8	33.5	25.6	2.7	-37.8	0.0	0.0	41.3	24.0	74	54	-32.7	-30.0	H	
1.329	3.0	52.3	35.2	25.6	2.7	-37.8	0.0	0.0	42.8	25.7	74	54	-31.2	-28.3	V	
1.598	3.0	51.6	31.0	26.5	3.0	-37.4	0.0	0.0	43.7	23.0	74	54	-30.3	-31.0	H	
1.598	3.0	54.4	33.2	26.5	3.0	-37.4	0.0	0.0	46.5	25.3	74	54	-27.5	-28.7	V	
1.861	3.0	43.2	30.9	27.3	3.3	-37.1	0.0	0.0	36.8	24.5	74	54	-37.2	-29.5	H	
1.861	3.0	46.3	30.2	27.3	3.3	-37.1	0.0	0.0	39.9	23.8	74	54	-34.1	-30.2	H	
Rev. 07.22.09																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

### 8.3.2. RECEIVER ABOVE 1 GHz FOR 40 MHz BANDWIDTH IN THE 5.2 GHz BAND

High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Hon Hai															
Project #:		11J13781															
Date:		2011/6/29															
Test Engineer:		Tadaomi Yamano															
Configuration:		Antenna-Y Axis															
Mode:		Rx mode															
Test Equipment:																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T34 HP 8449B									FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter					
3' cable 22807700			12' cable 22807600			20' cable 22807500											
<u>Peak Measurements</u> RBW=VBW=1MHz <u>Average Measurements</u> RBW=1MHz ; VBW=10Hz																	
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
1.329	3.0	54.3	34.2	25.6	2.7	-37.8	0.0	0.0	44.8	24.7	74	54	-29.2	-29.3	H		
1.329	3.0	54.3	36.5	25.6	2.7	-37.8	0.0	0.0	44.8	27.0	74	54	-29.2	-27.0	V		
1.598	3.0	52.4	32.5	26.5	3.0	-37.4	0.0	0.0	44.5	24.6	74	54	-29.5	-29.4	H		
1.598	3.0	55.2	32.4	26.5	3.0	-37.4	0.0	0.0	47.3	24.5	74	54	-26.7	-29.5	V		
1.861	3.0	42.5	29.8	27.3	3.3	-37.1	0.0	0.0	36.1	23.4	74	54	-37.9	-30.6	H		
1.861	3.0	45.7	32.5	27.3	3.3	-37.1	0.0	0.0	39.3	26.1	74	54	-34.7	-27.9	H		
Rev. 07.22.09																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

### 8.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL AND VERTICAL DATA													
30-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 3m Chamber													
Company:		Hon Hai											
Project #:		11J13781											
Date:		6/30/11											
Test Engineer:		Tadaomi Yamano											
Test Target		FCC15B ClassB											
Mode:		Tx Continuously											
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	Dist	Read	AF	CL	Amp	D Corr	Pad	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>Horizontal</b>													
303.842	3.0	36.6	13.2	2.4	24.3	0.0	0.0	14.7	46.0	-31.3	H	P	
502.471	3.0	23.4	16.4	3.1	19.9	0.0	0.0	6.6	46.0	-39.4	H	P	
802.325	3.0	22.1	20.4	3.7	26.4	0.0	0.0	-0.6	46.0	-46.6	H	P	
<b>Vertical</b>													
303.842	3.0	36.4	13.2	2.4	24.3	0.0	0.0	14.5	46.0	-31.5	V	P	
502.471	3.0	23.1	16.4	3.1	19.9	0.0	0.0	6.3	46.0	-39.7	V	P	
802.325	3.0	21.8	20.4	3.7	26.4	0.0	0.0	-0.9	46.0	-46.9	V	P	

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

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

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

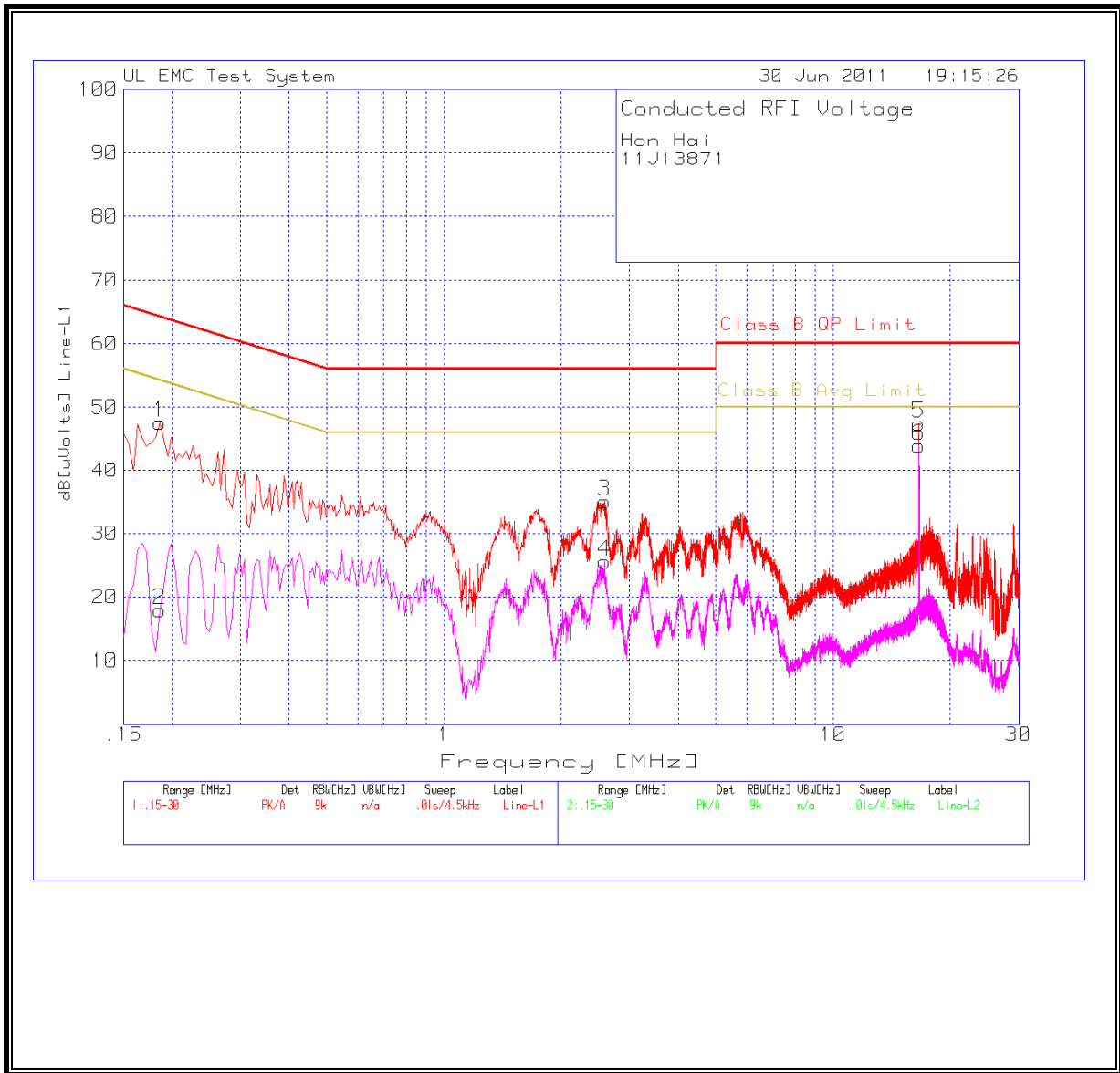
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

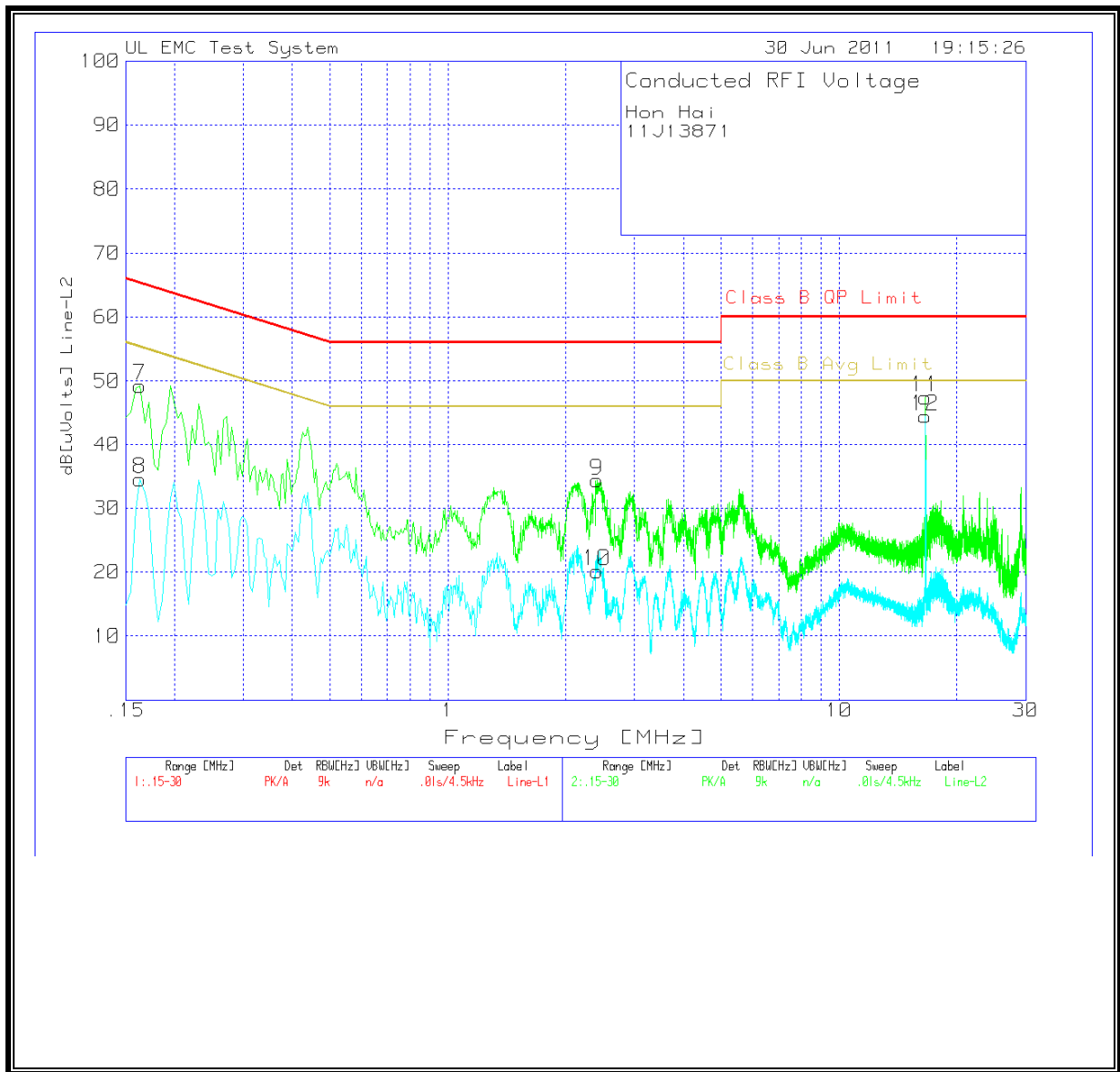
**6 WORST EMISSIONS**

<b>Hon Hai</b>							
<b>11J13871</b>							
<b>Line-L1 .15 - 30MHz</b>							
<b>Test</b>	<b>Meter</b>	<b>Detector</b>	<b>dB[uVolts]</b>	<b>Class B</b>	<b>Margin</b>	<b>Class B</b>	<b>Margin</b>
<b>Frequenc</b>	<b>Reading</b>			<b>QP Limit</b>		<b>Avg Limit</b>	
0.186	47.54	PK	47.54	64.2	-16.66	54.2	-6.66
0.186	17.94	Av	17.94	64.2	-46.26	54.2	-36.26
2.5845	35.04	PK	35.04	56	-20.96	46	-10.96
2.5845	25.58	Av	25.58	56	-30.42	46	-20.42
16.6245	47.41	PK	47.41	60	-12.59	50	-2.59
16.6245	43.9	Av	43.9	60	-16.1	50	-6.1
<b>Line-L2 .15 - 30MHz</b>							
<b>Test</b>	<b>Meter</b>	<b>Detector</b>	<b>dB[uVolts]</b>	<b>Class B</b>	<b>Margin</b>	<b>Class B</b>	<b>Margin</b>
<b>Frequenc</b>	<b>Reading</b>			<b>QP Limit</b>		<b>Avg Limit</b>	
0.1635	49.31	PK	49.31	65.3	-15.99	55.3	-5.99
0.1635	34.52	Av	34.52	65.3	-30.78	55.3	-20.78
2.4	34.31	PK	34.31	56	-21.69	46	-11.69
2.4	20.16	Av	20.16	56	-35.84	46	-25.84
16.6245	47.43	PK	47.43	60	-12.57	50	-2.57
16.6245	44.53	Av	44.53	60	-15.47	50	-5.47

**LINE 1 RESULTS**



**LINE 2 RESULTS**



## 10. 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 Classed As RF and Microwave Exposed Workers (Including the General Public)**

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m <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> )
5 GHz	WLAN	0.20	10.84	2.55	0.04	0.004