



**FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 8
CLASS II PERMISSIVE CHANGE**

CERTIFICATION TEST REPORT

FOR

WIFI 11A/N MODULE

**FCC ID: MCLMICA
IC: 2878D-MICA**

REPORT NUMBER: 11J13632-1

ISSUE DATE: FEBRUARY 16, 2011

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

Prepared by
**COMPLIANCE CERTIFICATION SERVICES (UL CCS)
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

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--	2/16/2011	Initial Issue	T. Chan

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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-A

SERIAL NUMBER: N/A

DATE TESTED: FEBRUARY 15-16, 20110

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



CHIN PANG
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:

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

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 a WIFI Module with 802.11A/HT20/HT40.

The radio module is manufactured by Hon Hai Precision.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding the module to the new host.

5.3. 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	10.65	11.61
5180 - 5240	802.11n HT20	10.30	10.72
5190 - 5230	802.11n HT40	9.81	9.57

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna for TX/RX diversity, with a maximum gain of 2.3dBi.

5.5. SOFTWARE AND FIRMWARE

The EUT test utility software installed in the host computer during testing was test program Linux Driver TCL.

5.6. WORST-CASE CONFIGURATION AND MODE

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 was investigated for X, Y, Z positions, and the worst position was turned out to be a Y-position.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	DELL	PP09S	57Y1DG1	DOC
AC Adapter	Phihong	PSAA10R-050	P104800031A1	DOC
AC Adapter	DELL	LA65NS0-00	CN0DF26371615775605A	DOC

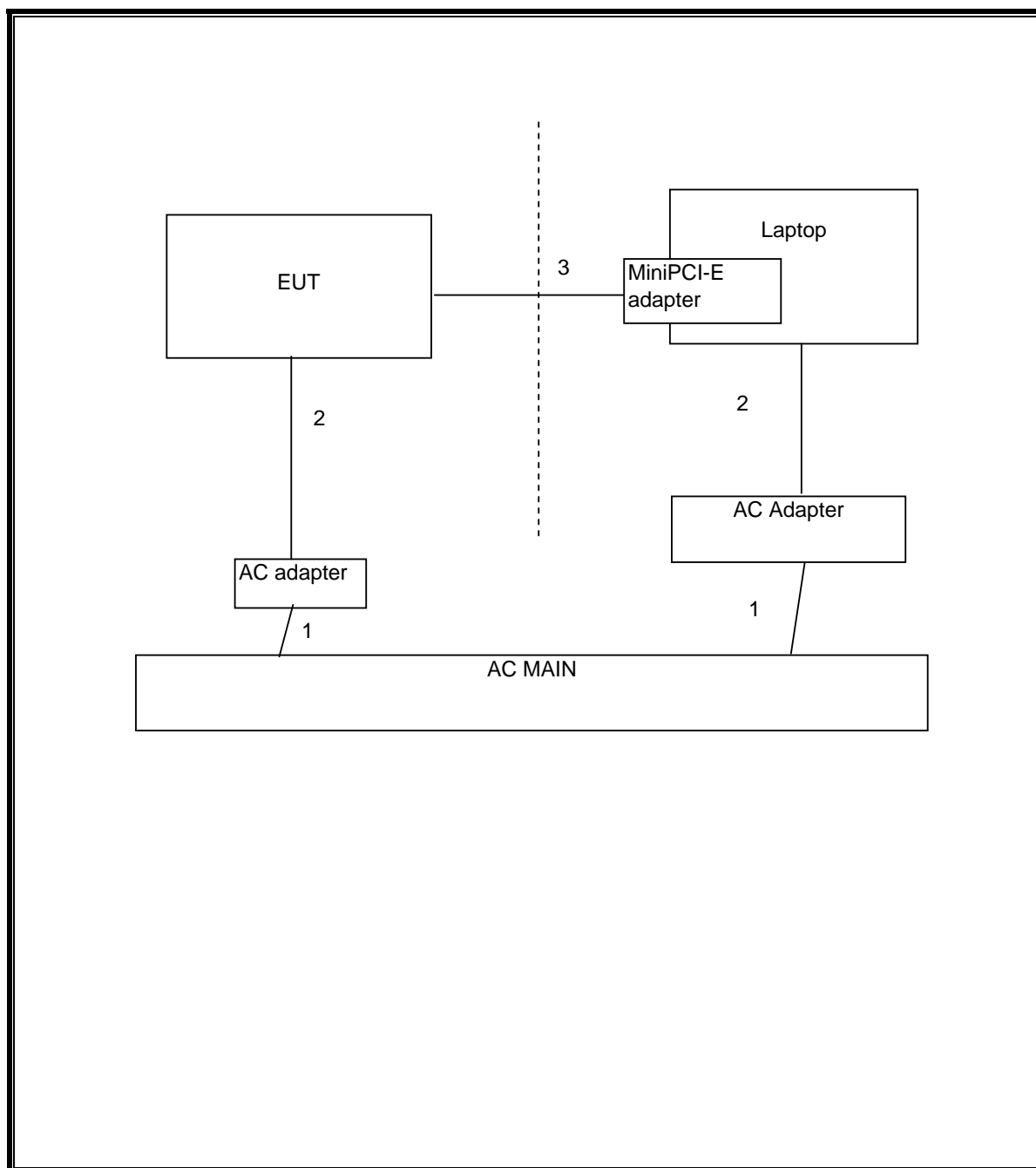
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	2	US 115V	Un-shielded	1m	NA
3	19 pins Connector	1	Ribbon Cable	Un-shielded	2m	NA

TEST SETUP

The EUT is connected to a host laptop computer via MiniPCI-E adapter board for setup and was tested as a standalone device during the test.

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, 1300 MHz	Agilent / HP	8447D	C00885	01/27/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/11
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/14/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/11
High Pass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/30/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/11
Peak Power Meter	Boonton	4541	C01186	03/01/11
Peak Power Sensor	Boonton	57318	C01202	02/23/11

7. ANTENNA PORT TEST RESULTS

7.1. 802.11a MODE IN THE 5.2 GHz BAND

7.1.1. 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 $4 \text{ dBm} + 10 \log B$, 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

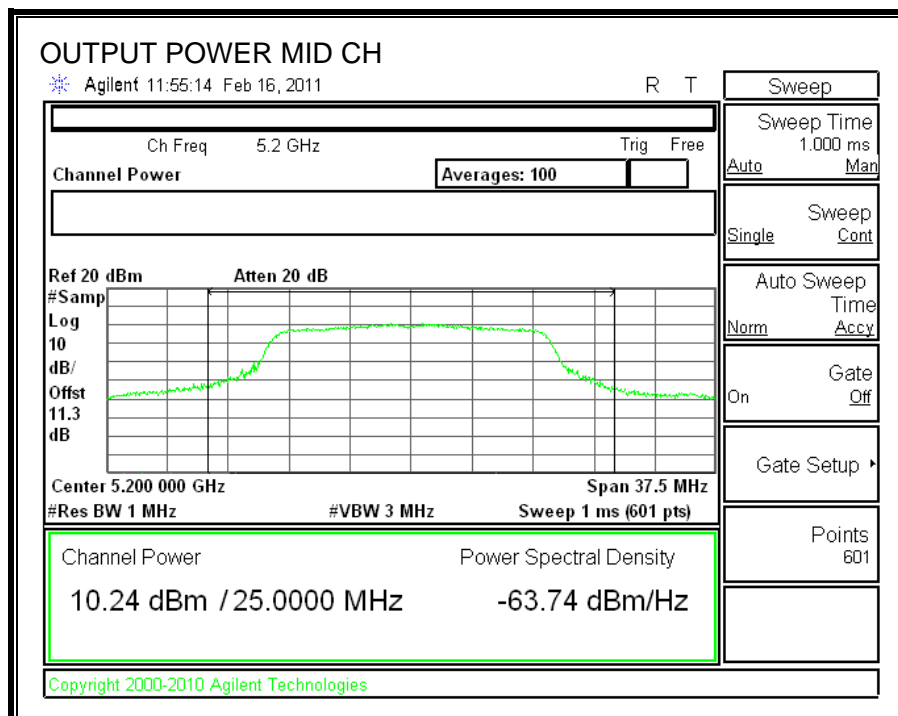
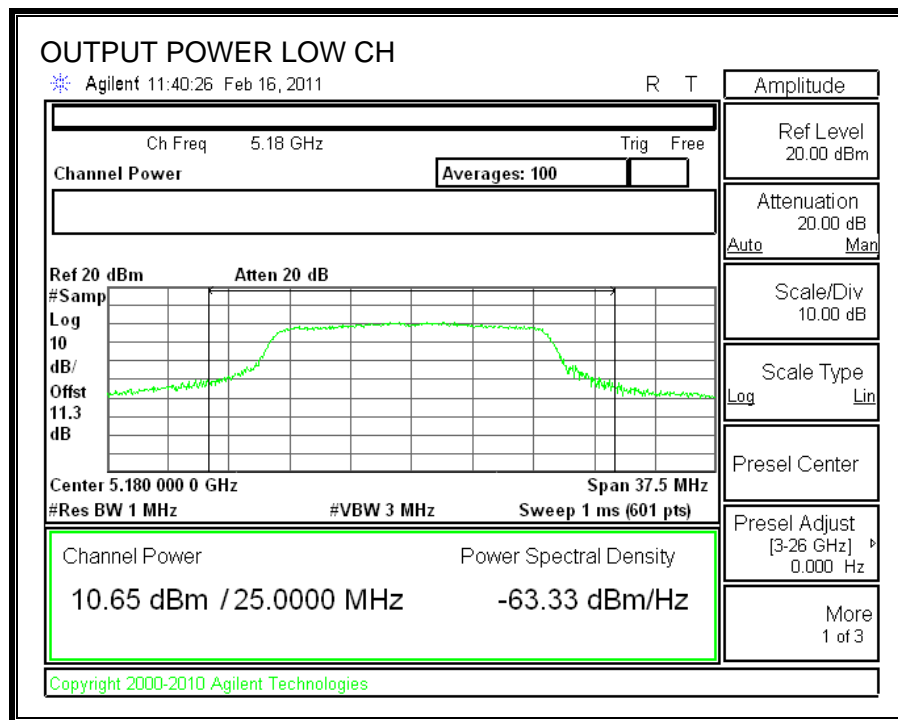
Limit

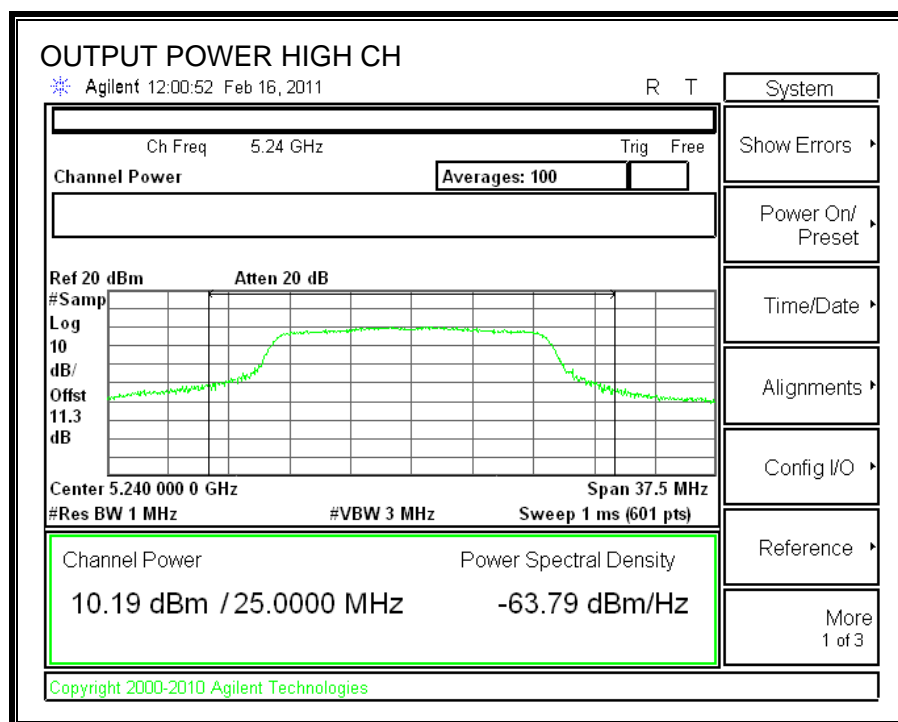
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	23.60	17.73	2.30	17.00
Mid	5200	17	22.10	17.44	2.30	17.00
High	5240	17	23.43	17.70	2.30	17.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	10.65	17.00	-6.35
Mid	5200	10.24	17.00	-6.76
High	5240	10.19	17.00	-6.81

OUTPUT POWER





7.2. 802.11n HT20 SISO MODE IN THE 5.2 GHz BAND

7.2.1. 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 $4 \text{ dBm} + 10 \log B$, 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

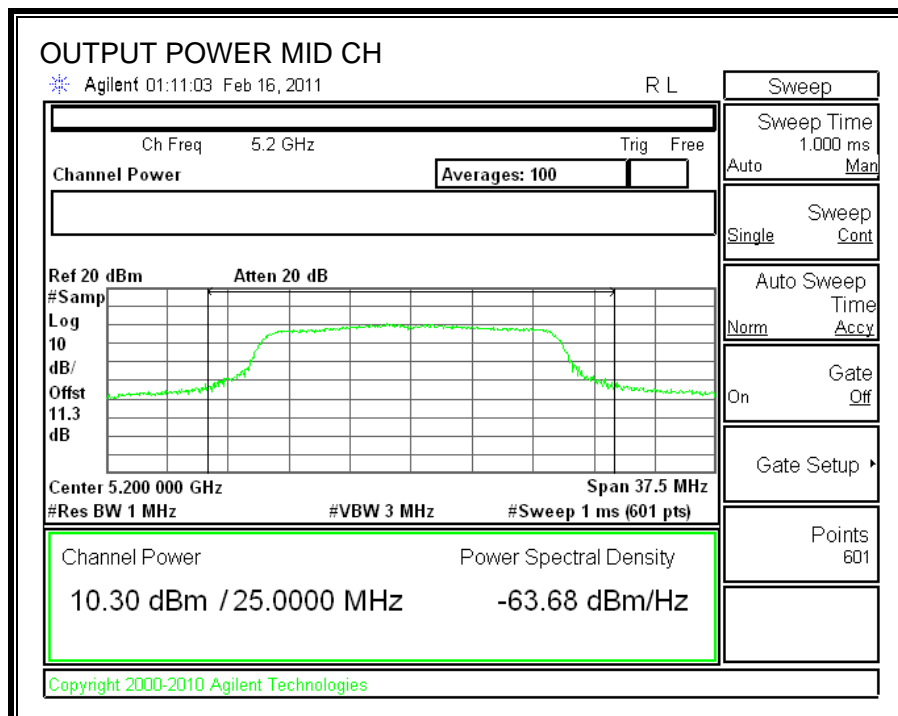
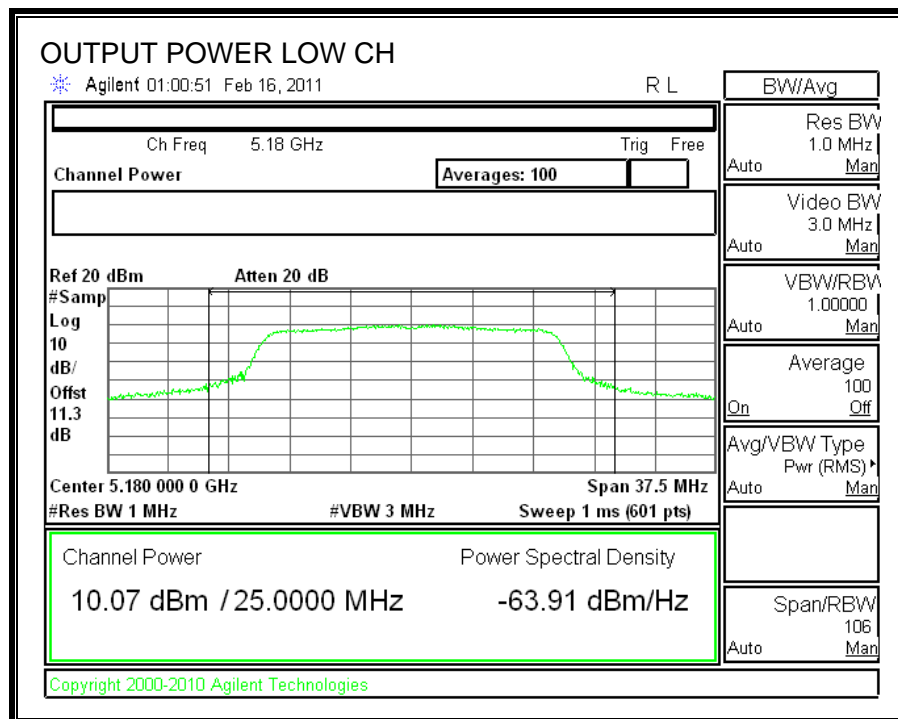
Limit

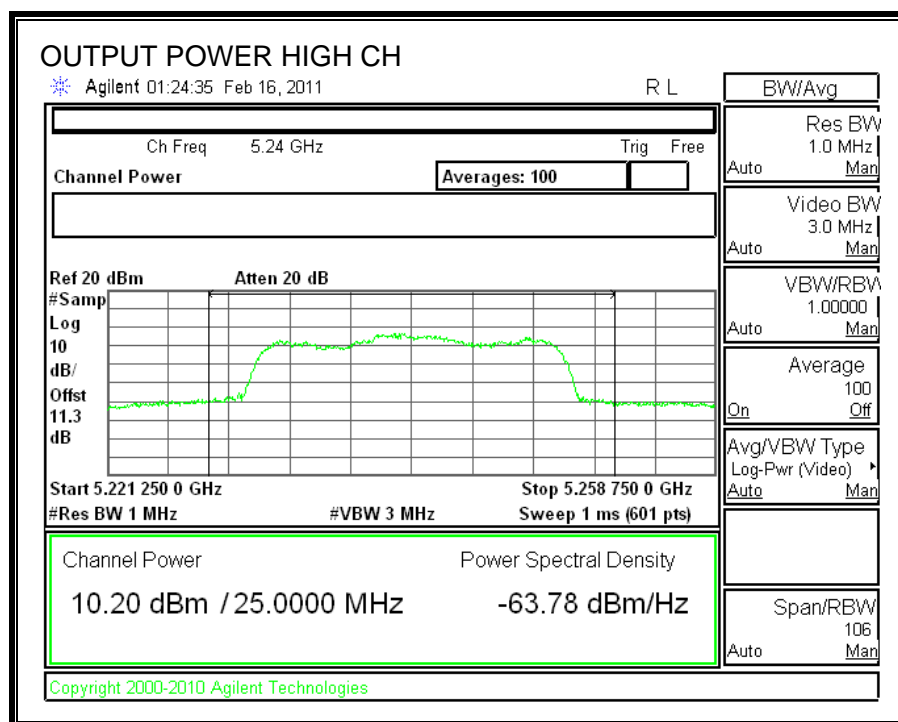
Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5180	17	22.51	17.52	2.30	17.00
Mid	5200	17	23.74	17.75	2.30	17.00
High	5240	17	23.96	17.79	2.30	17.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	10.07	17.00	-6.93
Mid	5200	10.30	17.00	-6.70
High	5240	10.20	17.00	-6.80

OUTPUT POWER





7.3. 802.11n HT40 SISO MODE IN THE 5.2 GHz BAND

7.3.1. 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 $4 \text{ dBm} + 10 \log B$, 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

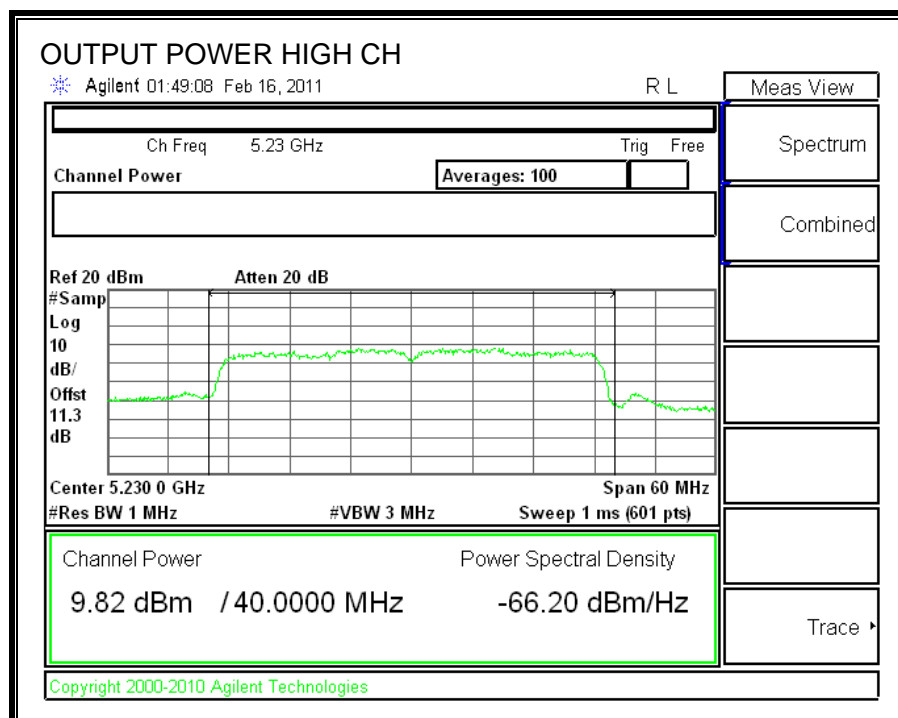
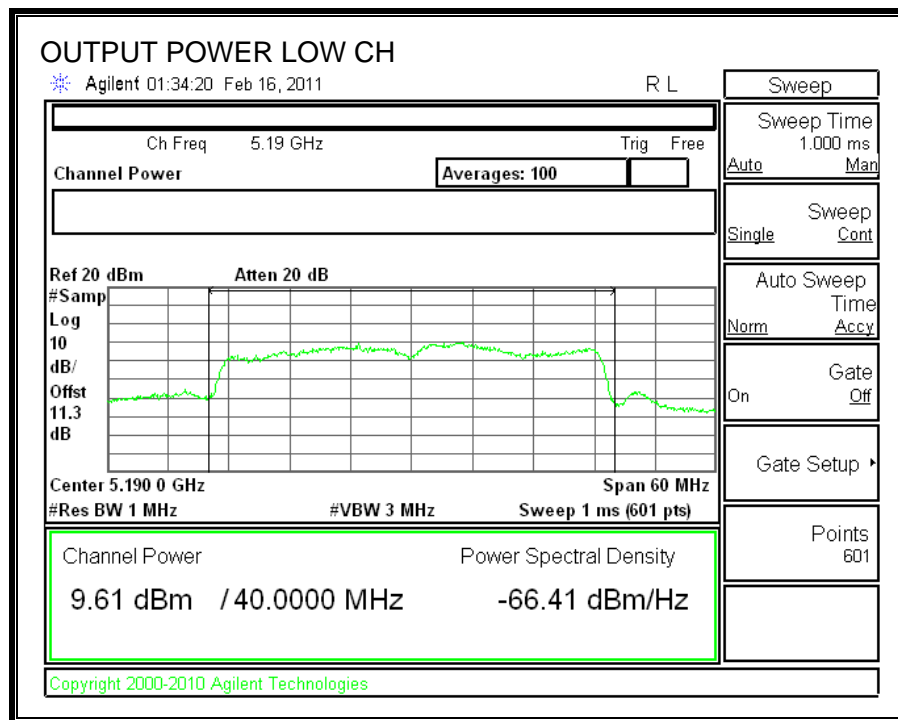
Limit

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
Low	5190	17	60.52	21.82	4.99	17.00
High	5230	17	76.70	22.85	4.99	17.00

Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5190	9.61	17.00	-7.39
High	5230	9.82	17.00	-7.18

OUTPUT POWER



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.

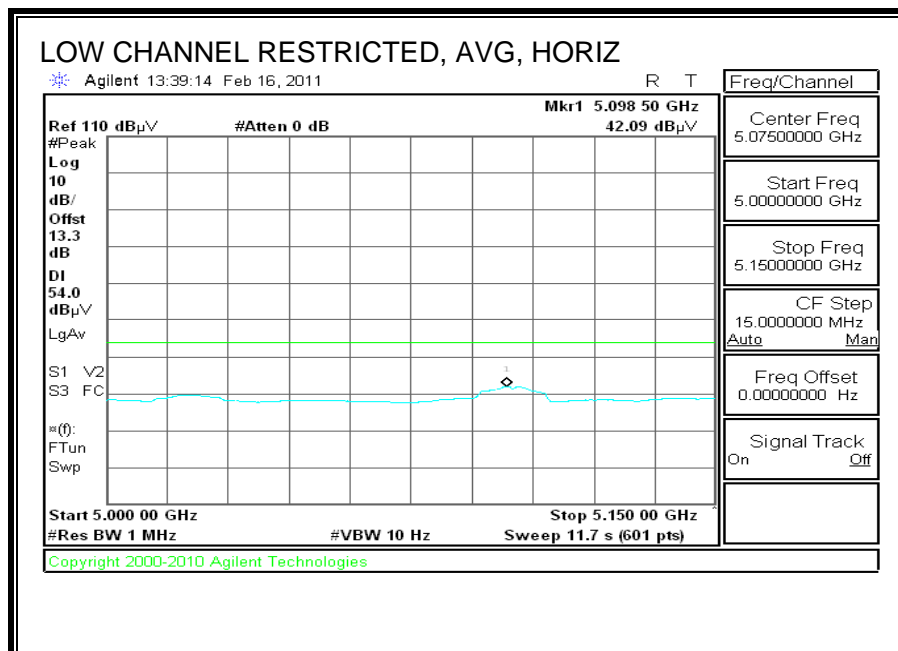
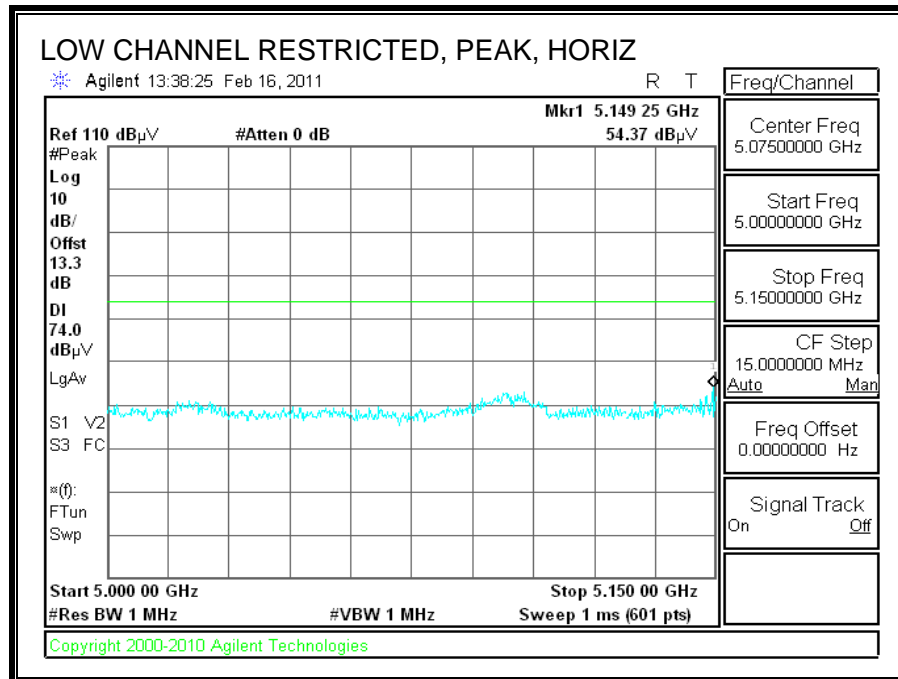
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

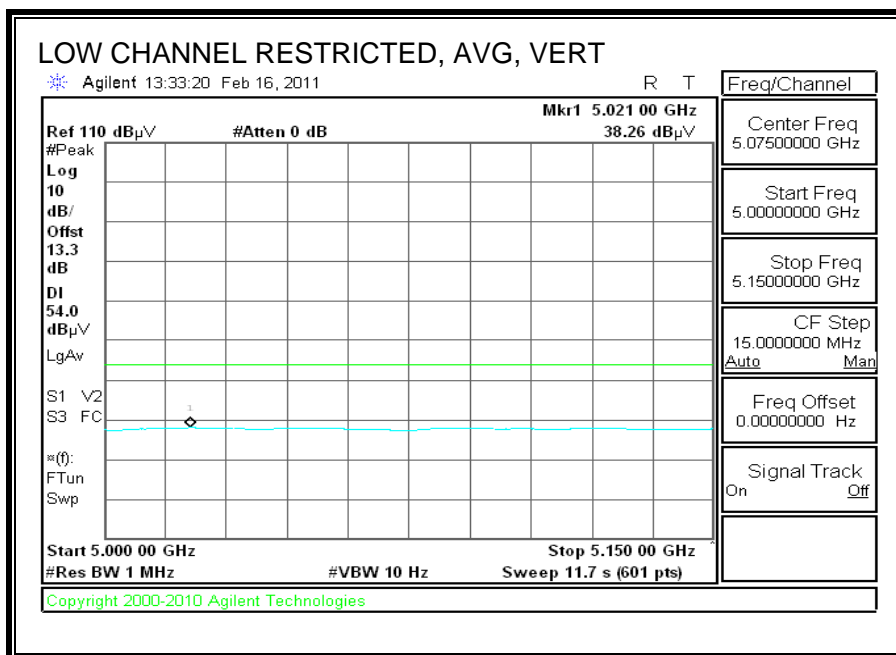
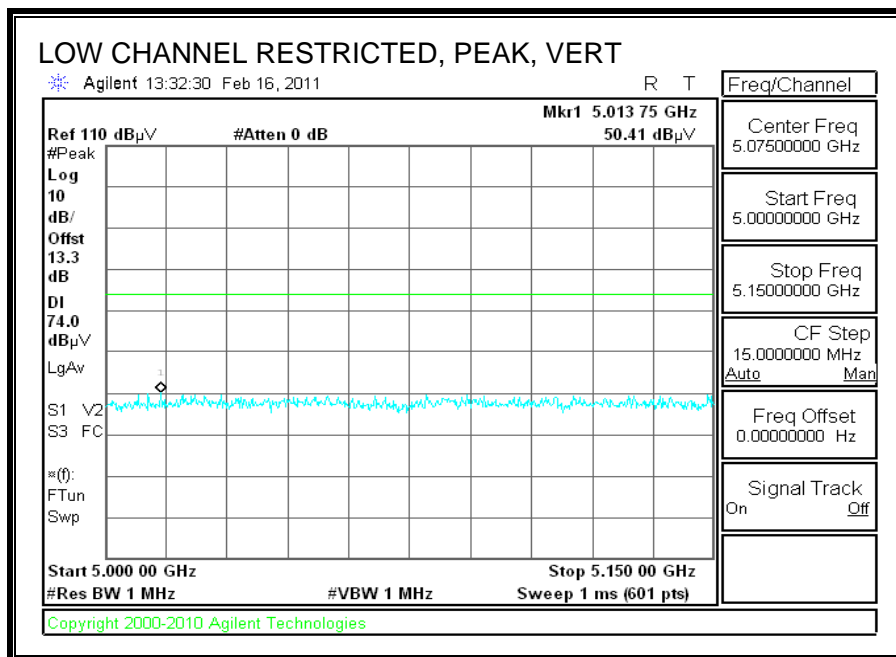
8.2. TRANSMITTER ABOVE 1 GHz

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

Test Engr: Chin Pang
Date: 02/16/11
Project #: 11J13632
Company: Hon Hai
Test Target: FCC 15.407
Mode Oper: TX, 5.2GHz Band, Legacy

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

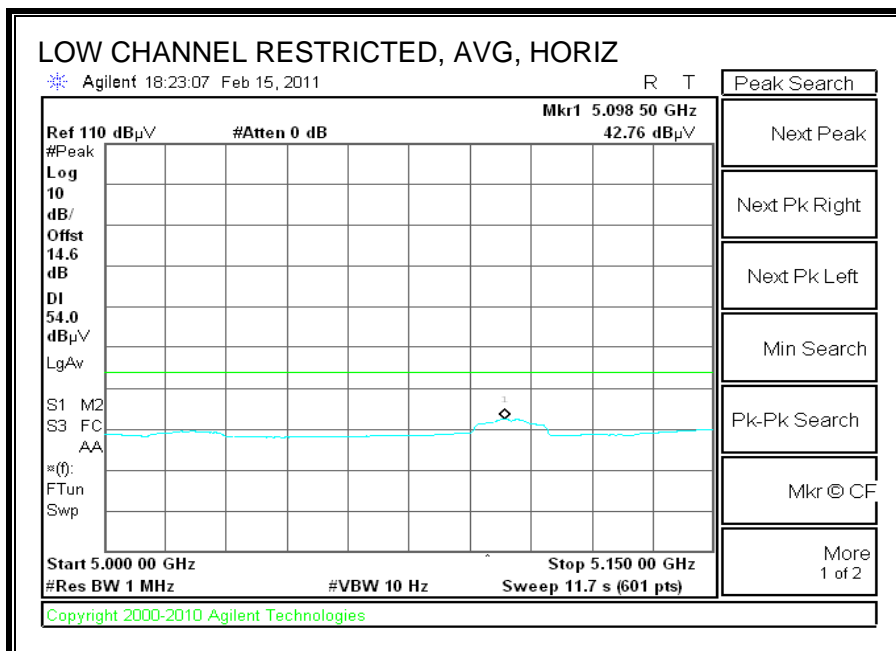
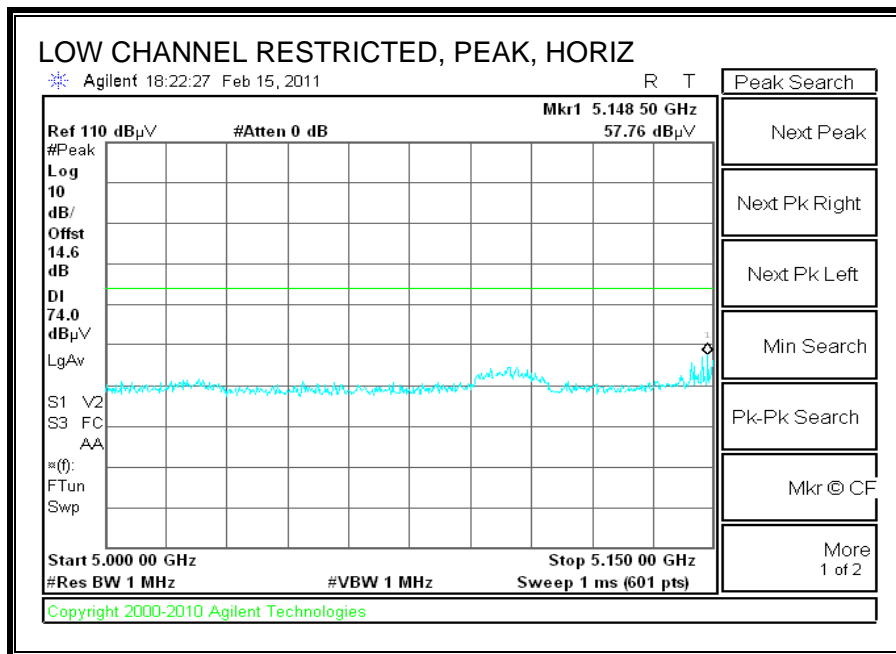
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5180MHz													
15.540	3.0	34.5	38.7	11.3	-34.8	0.0	10.7	60.5	74.0	-23.6	H	P	
15.540	3.0	22.3	38.7	11.3	-34.8	0.0	10.7	48.2	54.0	-15.8	H	A	
15.540	3.0	35.1	38.7	11.3	-34.8	0.0	10.7	61.0	74.0	-23.0	V	P	
15.540	3.0	22.3	38.7	11.3	-34.8	0.0	10.7	48.2	54.0	-15.8	V	A	
Mid Ch, 5200MHz													
15.600	3.0	39.3	38.4	11.4	-34.7	0.0	0.7	55.1	74.0	-18.9	H	P	
15.600	3.0	24.5	38.4	11.4	-34.7	0.0	0.7	40.3	54.0	-13.7	H	A	
15.600	3.0	36.0	38.4	11.4	-34.7	0.0	0.7	51.7	74.0	-22.3	V	P	
15.600	3.0	22.7	38.4	11.4	-34.7	0.0	0.7	38.4	54.0	-15.6	V	A	
High Ch 5240MHz													
15.720	3.0	39.0	38.2	11.4	-34.7	0.0	0.7	54.6	74.0	-19.4	H	P	
15.720	3.0	24.8	38.2	11.4	-34.7	0.0	0.7	40.5	54.0	-13.5	H	A	
15.720	3.0	38.3	38.2	11.4	-34.7	0.0	0.7	54.0	74.0	-20.0	V	P	
15.720	3.0	24.0	38.2	11.4	-34.7	0.0	0.7	39.6	54.0	-14.4	V	A	

Rev. 4.1.2.7

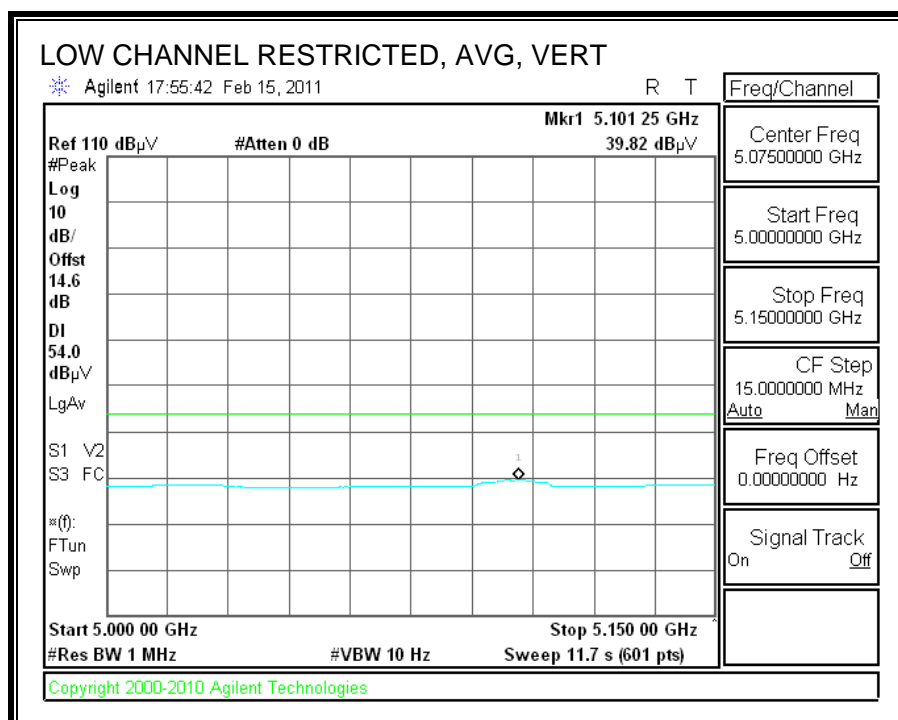
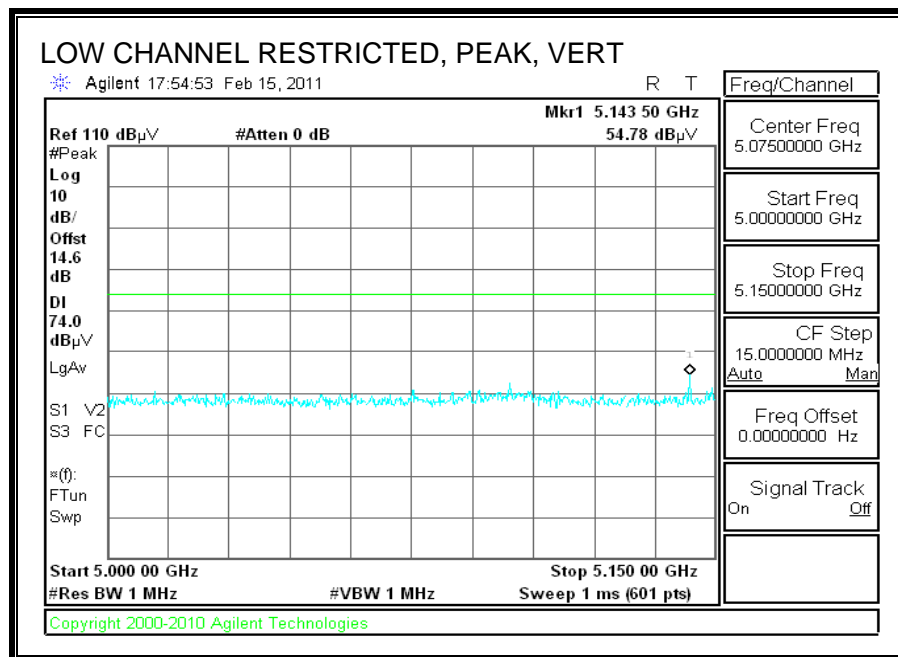
Note: No other emissions were detected above the system noise floor.

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

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

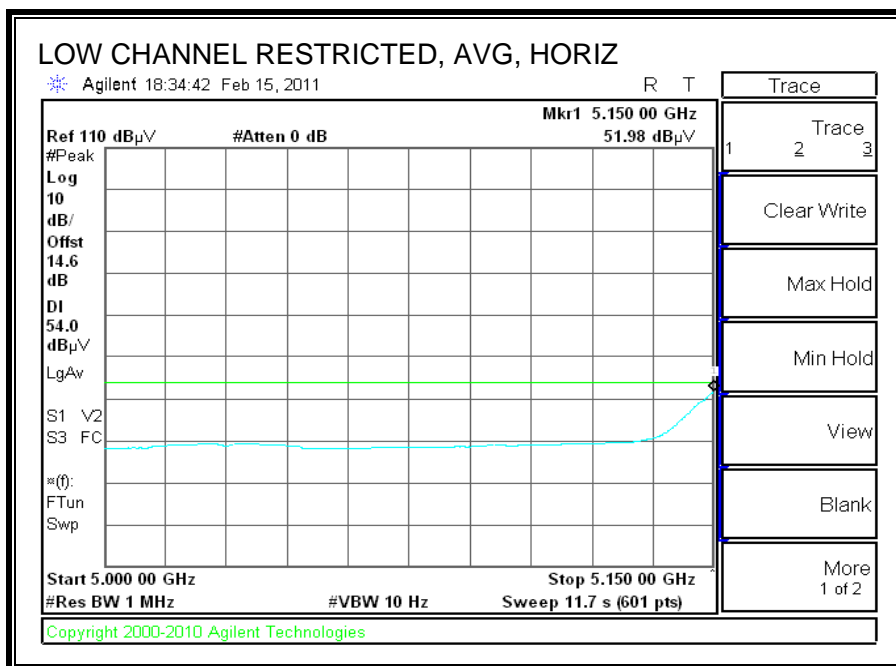
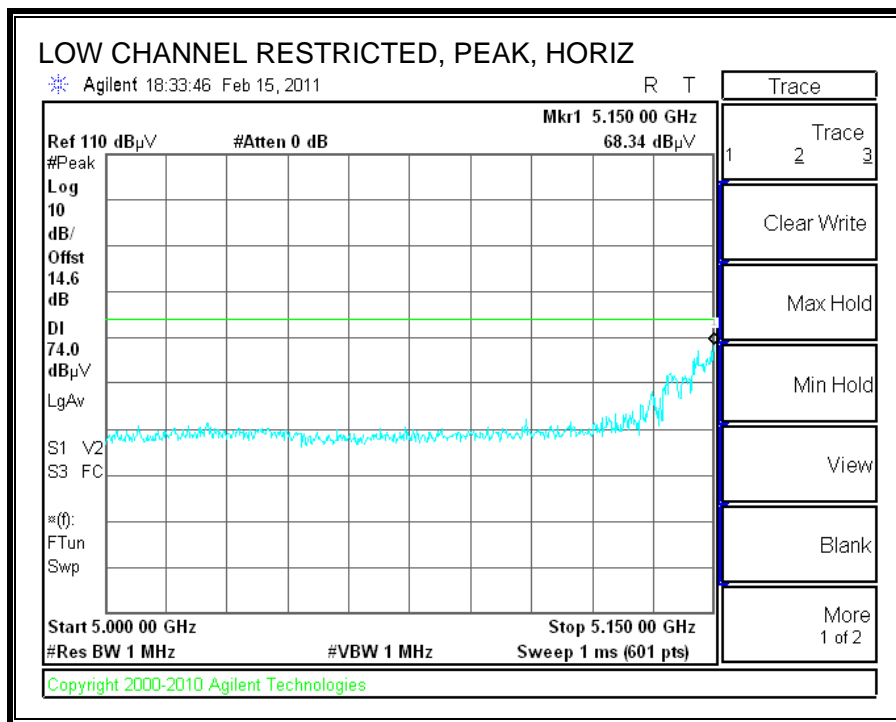


HARMONICS AND SPURIOUS EMISSIONS

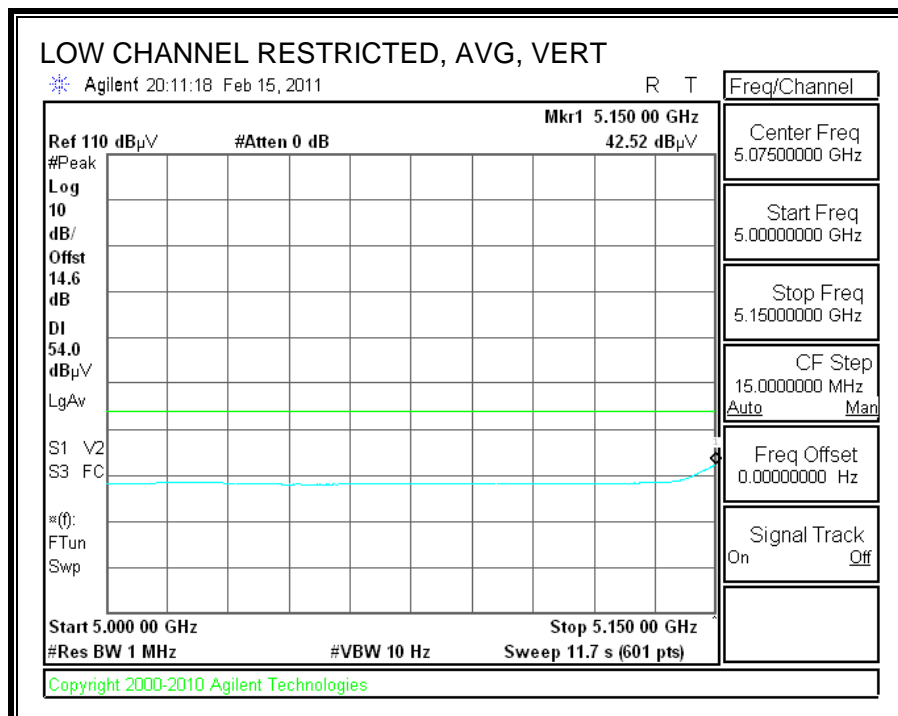
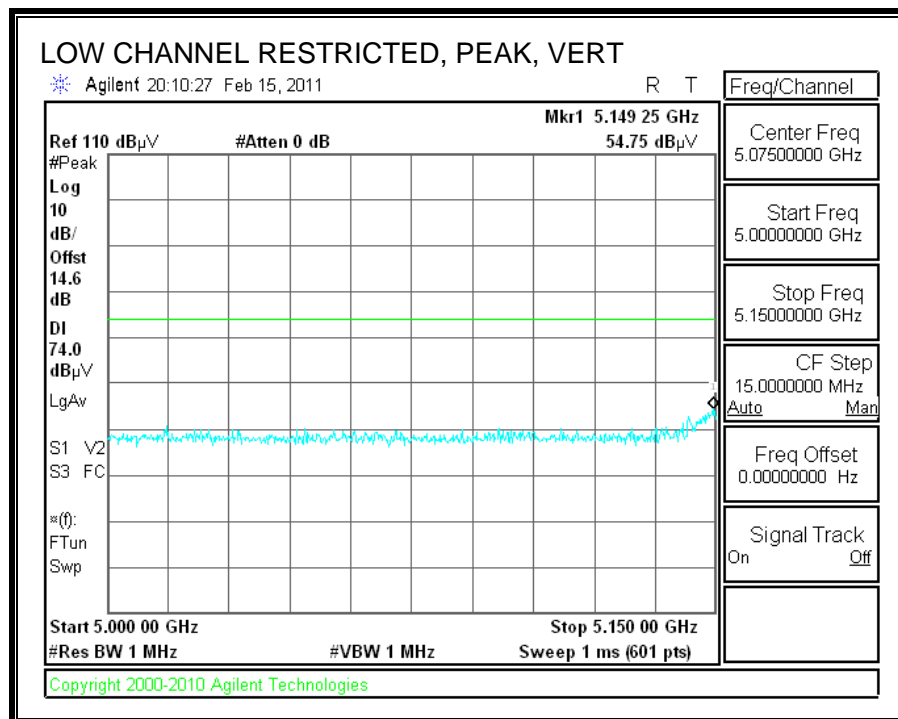
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		02/15/11											
Project #:		11J13632											
Company:		Hon Hai											
Test Target:		FCC 15.407											
Mode Oper:		TX, 5.2GHz Legacy Mode											
f	Measurement 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	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5180MHz													
15.540	3.0	33.7	38.5	11.3	-32.2	0.0	0.7	52.0	74.0	-22.0	V	P	
15.540	3.0	21.0	38.5	11.3	-32.2	0.0	0.7	39.4	54.0	-14.6	V	A	
15.540	3.0	33.0	38.5	11.3	-32.2	0.0	0.7	51.4	74.0	-22.6	H	P	
15.540	3.0	21.0	38.5	11.3	-32.2	0.0	0.7	39.3	54.0	-14.7	H	A	
Mid Ch, 5200MHz													
15.600	3.0	33.3	38.1	11.4	-32.2	0.0	0.7	51.4	74.0	-22.6	H	P	
15.600	3.0	21.1	38.1	11.4	-32.2	0.0	0.7	39.2	54.0	-14.8	H	A	
15.600	3.0	34.1	38.1	11.4	-32.2	0.0	0.7	52.2	74.0	-21.8	V	P	
15.600	3.0	21.1	38.1	11.4	-32.2	0.0	0.7	39.2	54.0	-14.8	V	A	
High Ch, 5240MHz													
15.720	3.0	32.9	38.0	11.4	-32.2	0.0	0.7	50.8	74.0	-23.2	V	P	
15.720	3.0	21.0	38.0	11.4	-32.2	0.0	0.7	38.9	54.0	-15.1	V	A	
15.720	3.0	33.0	38.0	11.4	-32.2	0.0	0.7	51.0	74.0	-23.0	H	P	
15.720	3.0	21.0	38.0	11.4	-32.2	0.0	0.7	39.0	54.0	-15.0	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

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

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 02/15/11
Project #: 11J13632
Company: Hon Hai
Test Target: FCC 15.407
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	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 5190MHz													
15.570	3.0	33.2	38.4	11.4	-32.2	0.0	0.7	51.5	74.0	-22.5	V	P	
15.570	3.0	21.1	38.4	11.4	-32.2	0.0	0.7	39.4	54.0	-14.6	V	A	
15.570	3.0	32.9	38.4	11.4	-32.2	0.0	0.7	51.2	74.0	-22.8	H	P	
15.570	3.0	21.0	38.4	11.4	-32.2	0.0	0.7	39.3	54.0	-14.7	H	A	
High Ch, 5230MHz													
15.690	3.0	33.5	38.1	11.4	-32.2	0.0	0.7	51.5	74.0	-22.5	H	P	
15.690	3.0	21.1	38.1	11.4	-32.2	0.0	0.7	39.1	54.0	-14.9	H	A	
15.690	3.0	33.1	38.1	11.4	-32.2	0.0	0.7	51.1	74.0	-22.9	V	P	
15.690	3.0	21.0	38.1	11.4	-32.2	0.0	0.7	39.1	54.0	-14.9	V	A	

Rev. 4.1.2.7

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz (20MHz Bandwidth)

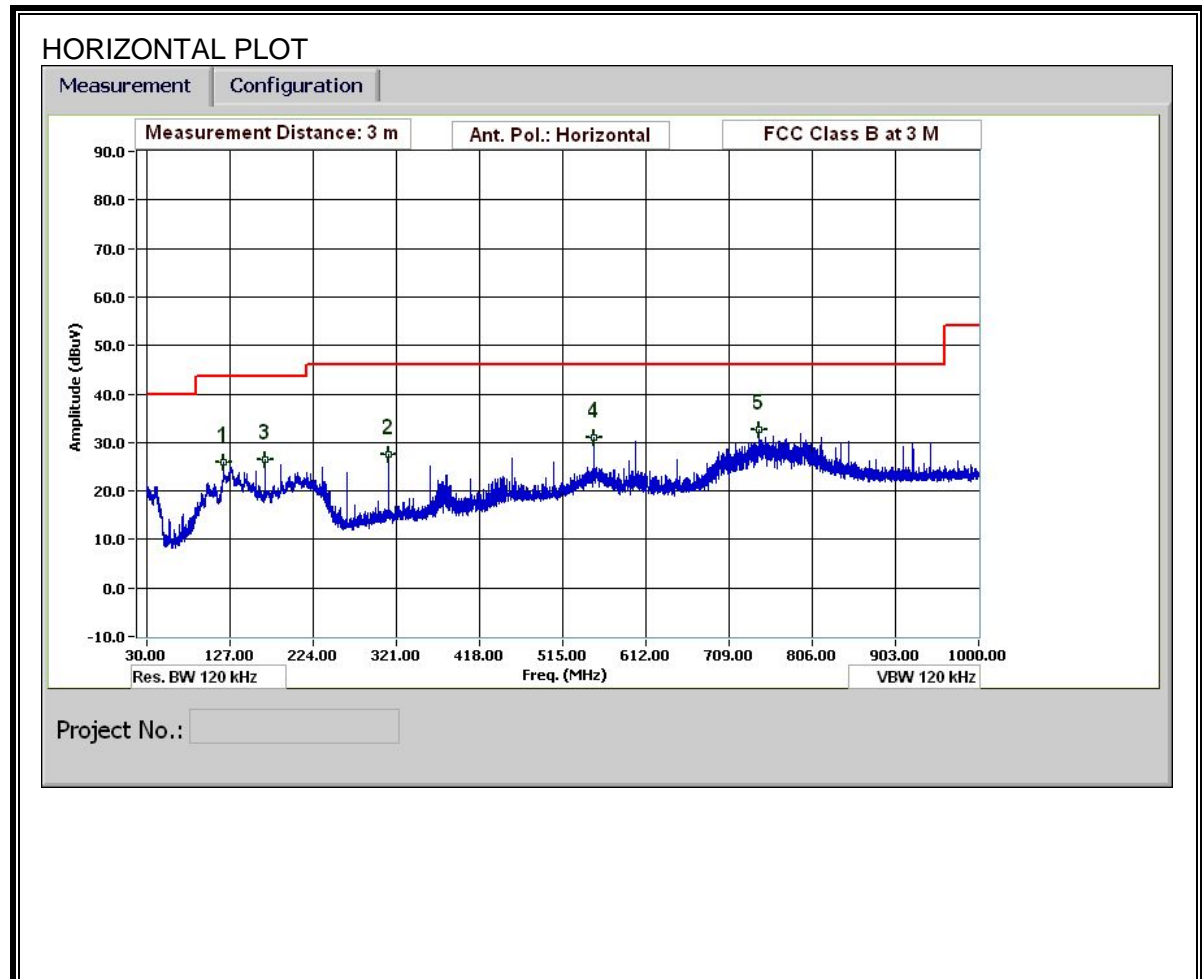
High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Company:		Hon Hai														
Project #:		11J13632														
Date:		2/16/2011														
Test Engineer:		Chin Pang														
Configuration:		EUT only														
Mode:		RX, HT20														
Test Equipment:																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T73; S/N: 6717 @3m			T144 Miteq 3008A00931									RX RSS 210				
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	Fln dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
1.600	3.0	52.0	32.5	25.9	3.0	-38.6	0.0	0.0	42.3	22.8	74	54	-31.7	-31.2	H	
2.500	3.0	48.2	30.8	28.5	3.9	-37.5	0.0	0.0	43.2	25.8	74	54	-30.8	-28.2	H	
2.665	3.0	50.5	30.6	29.0	4.1	-37.4	0.0	0.0	46.1	26.2	74	54	-27.9	-27.8	H	
1.600	3.0	48.8	31.8	25.9	3.0	-38.6	0.0	0.0	39.1	22.1	74	54	-34.9	-31.9	V	
2.665	3.0	51.0	30.8	29.0	4.1	-37.4	0.0	0.0	46.6	26.4	74	54	-27.4	-27.6	V	
Rev. 07.22.09																
Note: No other emissions were detected above the system noise floor.																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

8.3.2. RECEIVER ABOVE 1 GHz (40MHz Bandwidth)

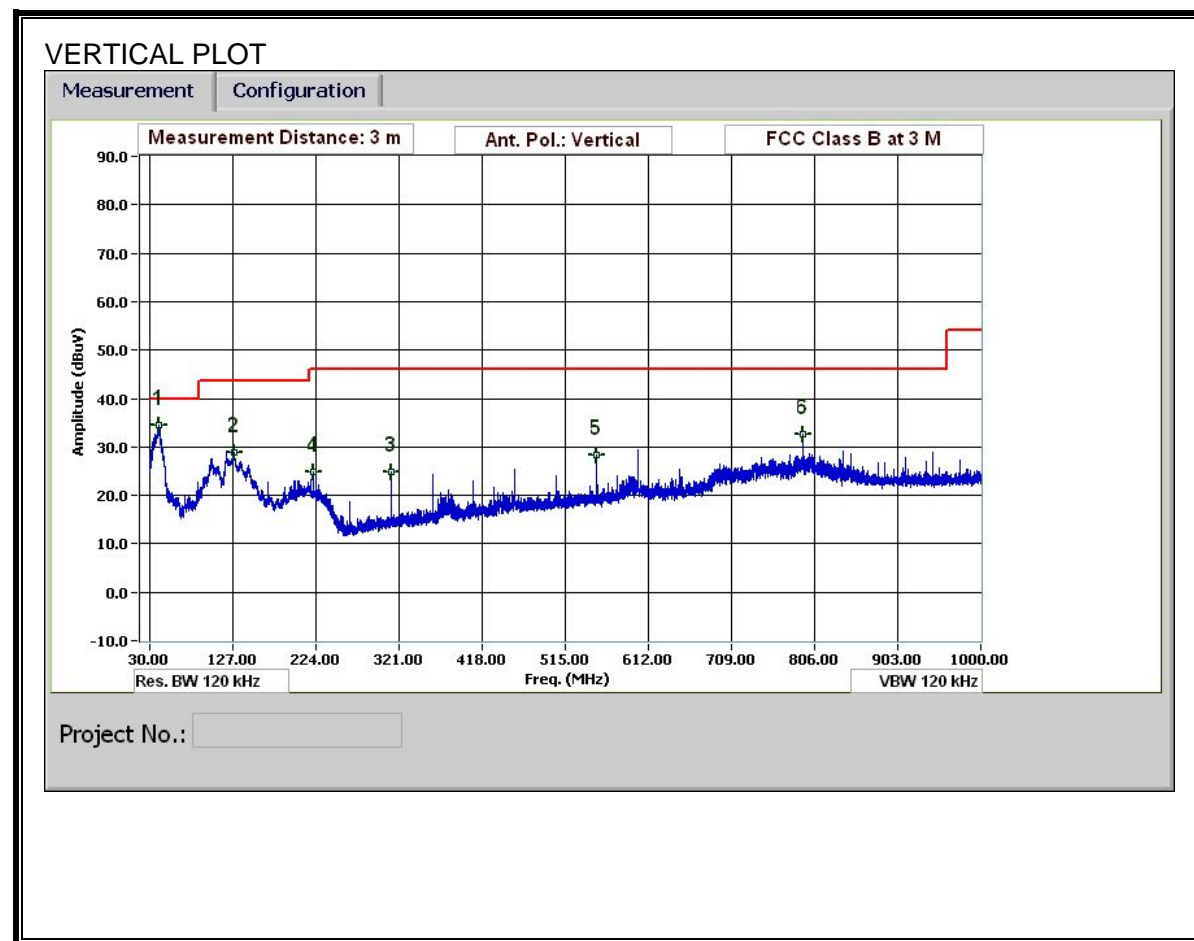
High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Hon Hai															
Project #:		11J13632															
Date:		2/16/2011															
Test Engineer:		Chin Pang															
Configuration:		EUT only															
Mode:		RX, HT40															
Test Equipment:																	
Horn 1-18GHz				Pre-amplifier 1-26GHz				Pre-amplifier 26-40GHz				Horn > 18GHz				Limit	
T73; S/N: 6717 @3m				T144 Miteq 3008A00931												RX RSS 210	
Hi Frequency Cables																	
3' cable 22807700				12' cable 22807600				20' cable 22807500				HPF				Reject Filter	
3' cable 22807700				12' cable 22807600				20' cable 22807500									
<div> <div>Peak Measurements</div> <div>RBW=VBW=1MHz</div> <div>Average Measurements</div> <div>RBW=1MHz ; VBW=10Hz</div> </div>																	
f	Dist	Read Pk	Read Avg	AF	CL	Amp	D Corr	Fldr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
1.600	3.0	53.5	38.4	25.9	3.0	-38.6	0.0	0.0	43.8	28.7	74	54	-30.2	-25.3	H		
2.125	3.0	48.6	31.6	27.5	3.6	-37.9	0.0	0.0	41.8	24.8	74	54	-32.2	-29.2	H		
2.665	3.0	52.4	29.4	29.0	4.1	-37.4	0.0	0.0	48.0	25.0	74	54	-26.0	-29.0	H		
2.125	3.0	46.0	30.0	27.5	3.6	-37.9	0.0	0.0	39.2	23.2	74	54	-34.8	-30.8	V		
2.650	3.0	47.1	29.0	29.0	4.1	-37.4	0.0	0.0	42.7	24.6	74	54	-31.3	-29.4	V		
Rev. 07.22.09																	
Note: No other emissions were detected above the system noise floor.																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

8.4. WORST-CASE BELOW 1 GHz

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



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



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

HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 02/16/11
Project #: 11J13632
Company: Hon Hai
Test Target: FCC 15C
Mode Oper: TX (Worst Case)

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

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Pad dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
vert													
40.08	3.0	48.6	13.8	0.6	28.4	0.0	0.0	34.6	40.0	-5.4	V	P	
127.804	3.0	42.4	13.6	1.1	28.3	0.0	0.0	28.8	43.5	-14.7	V	P	
220.928	3.0	39.8	11.9	1.3	28.2	0.0	0.0	24.8	46.0	-21.2	V	P	
312.012	3.0	37.9	13.6	1.5	28.1	0.0	0.0	24.9	46.0	-21.1	V	P	
552.022	3.0	36.3	17.6	2.1	27.7	0.0	0.0	28.4	46.0	-17.6	V	P	
792.031	3.0	36.7	20.9	2.6	27.4	0.0	0.0	32.7	46.0	-13.3	V	P	
120.004	3.0	39.5	13.6	1.0	28.3	0.0	0.0	25.9	43.5	-17.6	H	P	
168.006	3.0	42.6	11.0	1.2	28.2	0.0	0.0	26.5	43.5	-17.0	H	P	
312.012	3.0	40.6	13.6	1.5	28.1	0.0	0.0	27.6	46.0	-18.4	H	P	
552.022	3.0	38.9	17.6	2.1	27.7	0.0	0.0	30.9	46.0	-15.1	H	P	
744.029	3.0	37.3	20.2	2.5	27.3	0.0	0.0	32.8	46.0	-13.2	H	P	

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

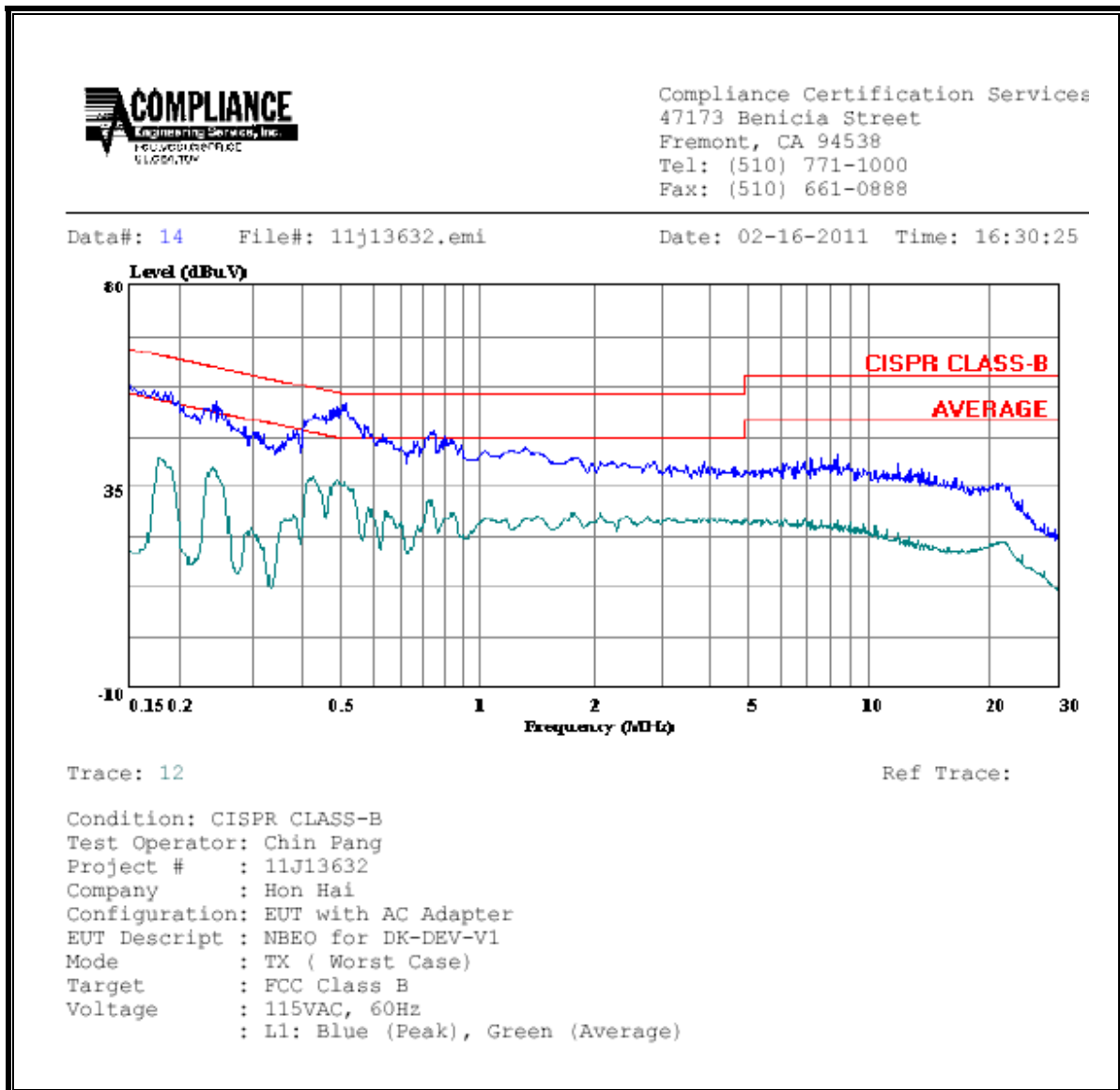
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

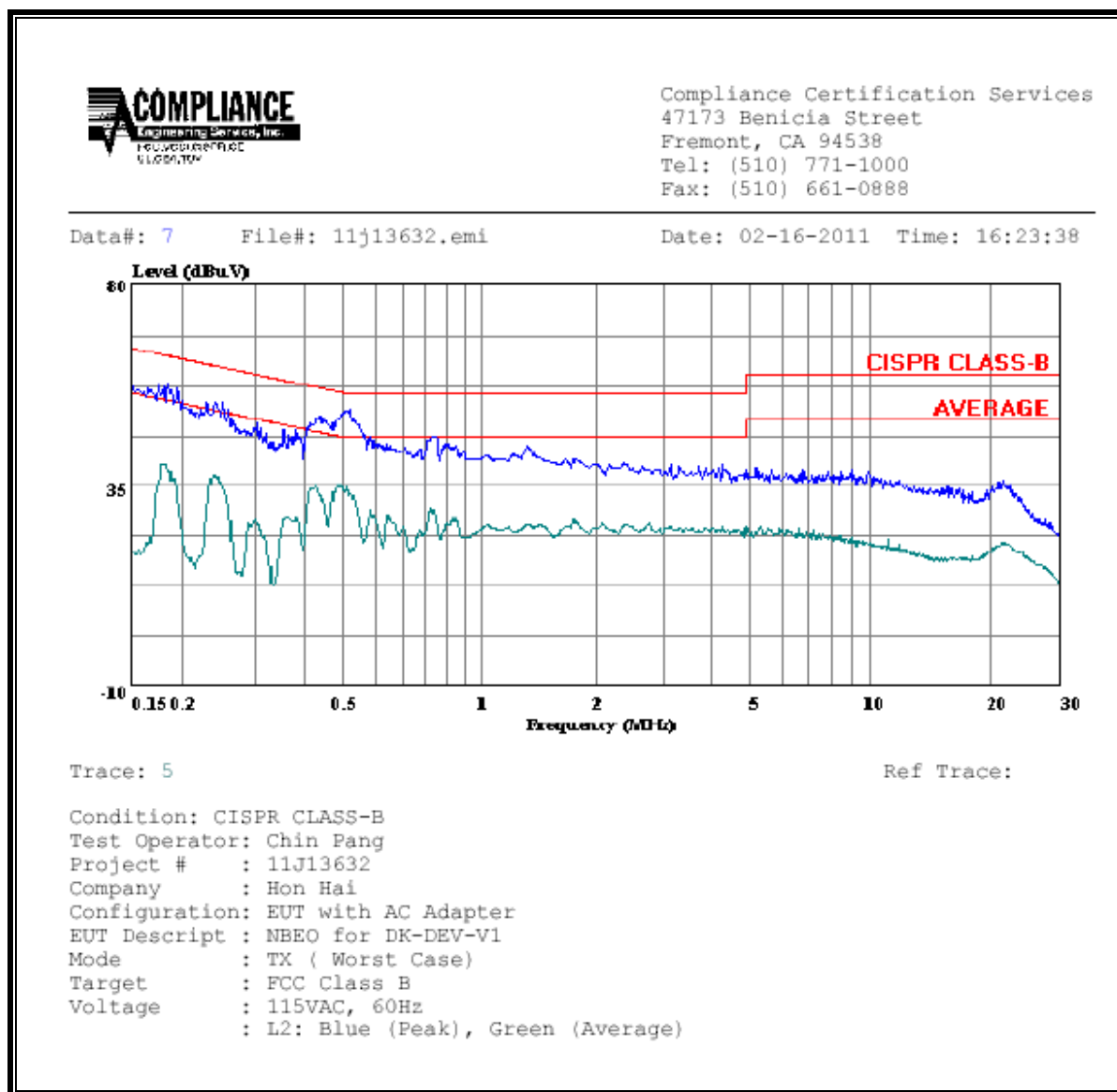
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.18	58.08	--	39.88	0.00	64.35	54.35	-6.27	-14.47	L1
0.52	52.18	--	35.35	0.00	56.00	46.00	-3.82	-10.65	L1
1.45	43.51	--	27.28	0.00	56.00	46.00	-12.49	-18.72	L1
0.18	56.50	--	41.44	0.00	64.58	54.58	-8.08	-13.14	L2
0.42	54.00	--	37.36	0.00	57.37	47.37	-3.37	-10.01	L2
1.45	43.64	--	28.45	0.00	56.00	46.00	-12.36	-17.55	L2
6 Worst Data									

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 ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

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

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

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

IC RULES

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

Table 5
Exposure Limits for Persons Not 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 ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, f , is in MHz.
 2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2 .
 3. A magnetic field strength of 1 A/m corresponds to $1.257\text{ microtesla } (\mu\text{T})$ or $12.57\text{ milligauss (mG)}$.

EQUATIONS

Power density is given by:

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

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² 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/cm²

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

RESULTS

Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
5 GHz	WLAN	0.20	10.65	2.30	0.04	0.004