



FCC CFR47 PART 15 SUBPART E

**CLASS II PERMISSIVE CHANGE
CERTIFICATION TEST REPORT**

FOR

802.11A/B/G/N 2X2 RADIO MODULE INSIDE PANASONIC PC CF-53mk2

MODEL NUMBER: WL11A

FCC ID: ACJ9TGWL11A

REPORT NUMBER: 12J14381-1

ISSUE DATE: MAY 14, 2012

Prepared for
**PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY 07094, U.S.A.**

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

Rev.	Issue Date	Revisions	Revised By
	05/14/2012	Original	T. LEE

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION	6
4.3. MEASUREMENT UNCERTAINTY	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT	7
5.1. MAXIMUM OUTPUT POWER	7
5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE	7
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.4. SOFTWARE AND FIRMWARE	7
5.5. WORST-CASE CONFIGURATION AND MODE	8
5.6. DESCRIPTION OF TEST SETUP	9
6. TEST AND MEASUREMENT EQUIPMENT	11
7. RADIATED TEST RESULTS	12
7.1. LIMITS AND PROCEDURE	12
7.2. TRANSMITTER ABOVE 1 GHz AT 5.2 GHz BAND	13
7.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND	13
7.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND	16
7.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND	19
7.2.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND	22
7.2.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND	25
7.3. TRANSMITTER ABOVE 1 GHz AT 5.3 GHz BAND	28
7.3.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND	28
7.3.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND	31
7.3.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND	34
7.3.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND	37
7.3.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND	40
7.4. TRANSMITTER ABOVE 1 GHz AT 5.6 GHz BAND	43
7.4.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND	43
7.4.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND	47
7.4.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND	51
7.4.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND	55
7.4.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND	59
7.5. WORST-CASE BELOW 1 GHz	63

8. AC POWER LINE CONDUCTED EMISSIONS	66
9. SETUP PHOTOS.....	70

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY 07094, U.S.A.

EUT DESCRIPTION: 802.11a/b/g/n 2x2 Radio Module inside Panasonic PC CF-53mk2

MODEL: WL11A

SERIAL NUMBER: STD016 (CONDUCTED), TS037 (RADIATED)

DATE TESTED: APRIL 23 TO MAY 02, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	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.

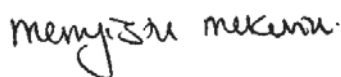
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this 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:



TIM LEE
STAFF ENGINEER
UL CCS



MENGISTU MEKURIA
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033 and ANSI C63.10-2009.

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 an 802.11a/b/g/n Intel Corporation Centrino advanced-N 6205 PCIe half mini card that form factor IEEE 802.11 a/b/g/n wireless network adaptor. It operates in both the 2.4GHz and 5 GHz frequency range. The card supports 2x2 MIMO at 802.11n for both 20MHz and 40MHz channels and 1x2 at legacy modes of operation.

The radio module is manufactured by Intel.

5.1. MAXIMUM OUTPUT POWER

The measured average power values were within ± 0.5 dB of the original values. Refer to original report number "PD962295ANH FCC IC UNII WLAN Report" for exact output power values and for all antenna port results.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The change filed under this application is changing of higher gain Auxiliary antenna than the originally filed that can be used for 5GHz frequency bands.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes PIFA antennas with maximum gains as a function of frequency is given in the following table:

Bands	Originally Listed Gain	Main Antenna Gain	Sub Antenna Gain
2400-2500MHz	3.2dBi	0.9dBi	3.06dBi
5180-5320MHz	3.7dBi	0.9dBi	6.74dBi
5500-5700MHz	4.8dBi	1.35dBi	5.94dBi
5700-5825MHz	5.0dBi	1.35dBi	6.22dBi

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was DRTU, rev. 1.3.12-0263.

Driver software is V14.1.4.115.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an internal module installed inside a host Laptop PC.

Worst-Case data rates were utilized from preliminary testing of the Chipset, worst-case data rates, per original test reports, are the lower rates for each mode.

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power, that was determined to be 11n HT40 mode, mid channel.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Panasonic	CF-53mk2	TS037	N/A
Power Supply	Panasonic	CF-AA5713AM1	5713AM112105301A	DoC

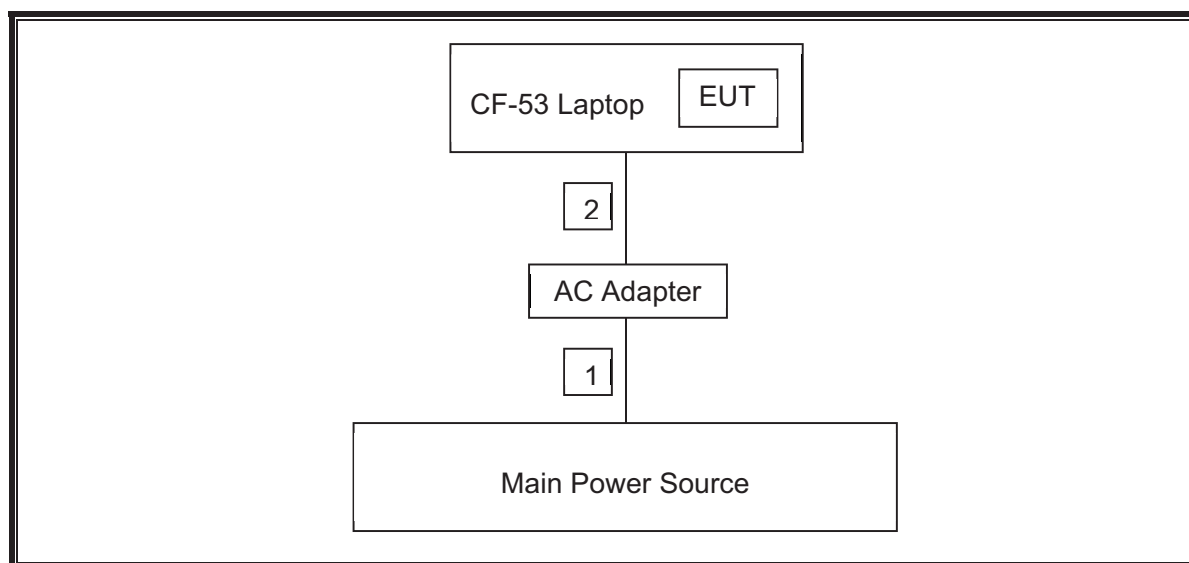
I/O CABLES (CONDUCTED SETUP)

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	2	AC	Unshielded	1.7m	
2	DC	1	DC	Shielded	1.7m	Ferrite on DC connector

TEST SETUP

The EUT is installed in 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
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	7/16/2012
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/6/2012
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	7/28/2012
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	3/22/2013
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	8/19/2013
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/2012
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	7/12/2012
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02679	CNR
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02680	CNR
Reject Filter, 5.47-5.725 GHz	Micro-Tronics	BRC13191	N02678	CNR
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02601	CNR

7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 7.2.5 (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.

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; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

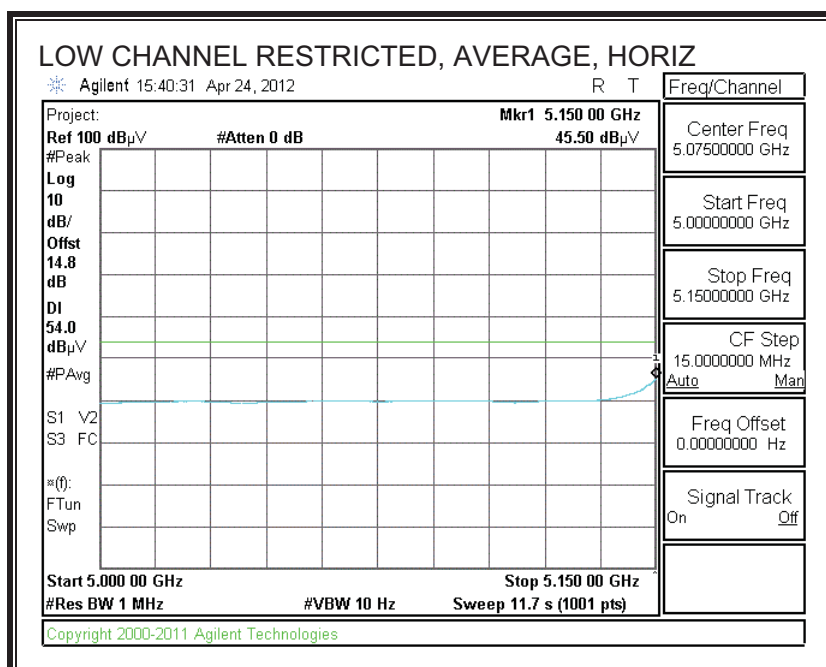
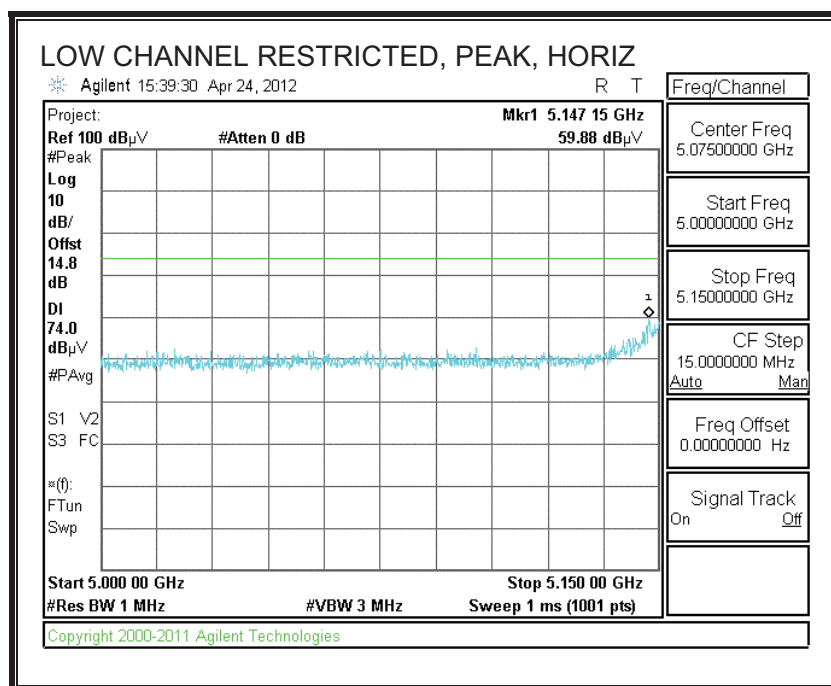
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

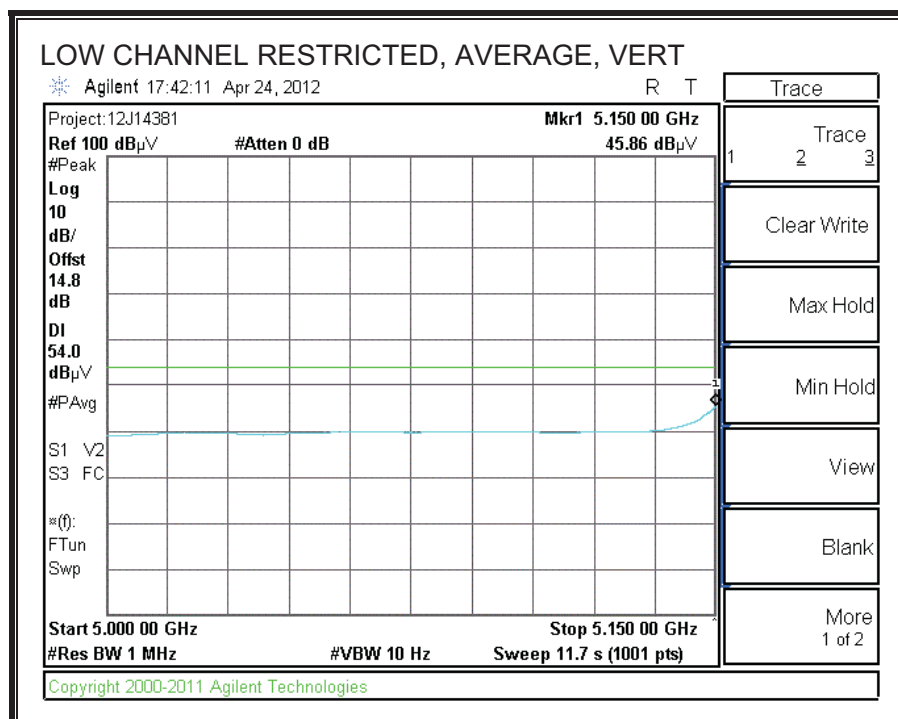
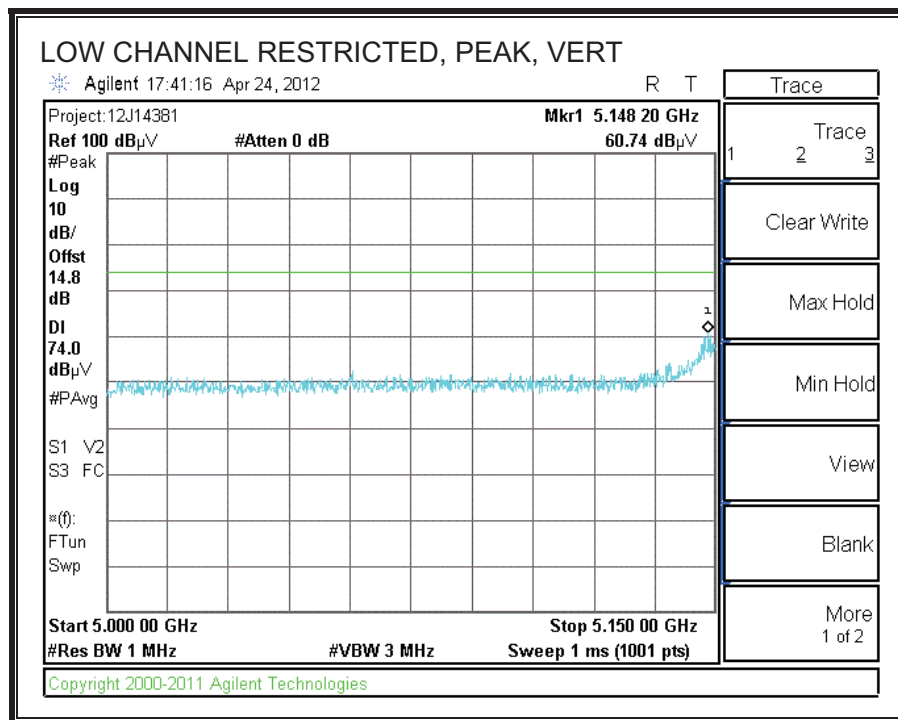
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

7.2. TRANSMITTER ABOVE 1 GHz AT 5.2 GHz BAND

7.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL) CHAIN B





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
Date: 04/26/12
Project #: 12J14381
Company: PANASONIC
Test Target: FCC CFR47 PART 15
Mode Oper: TX, 802.11a CHAIN B

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

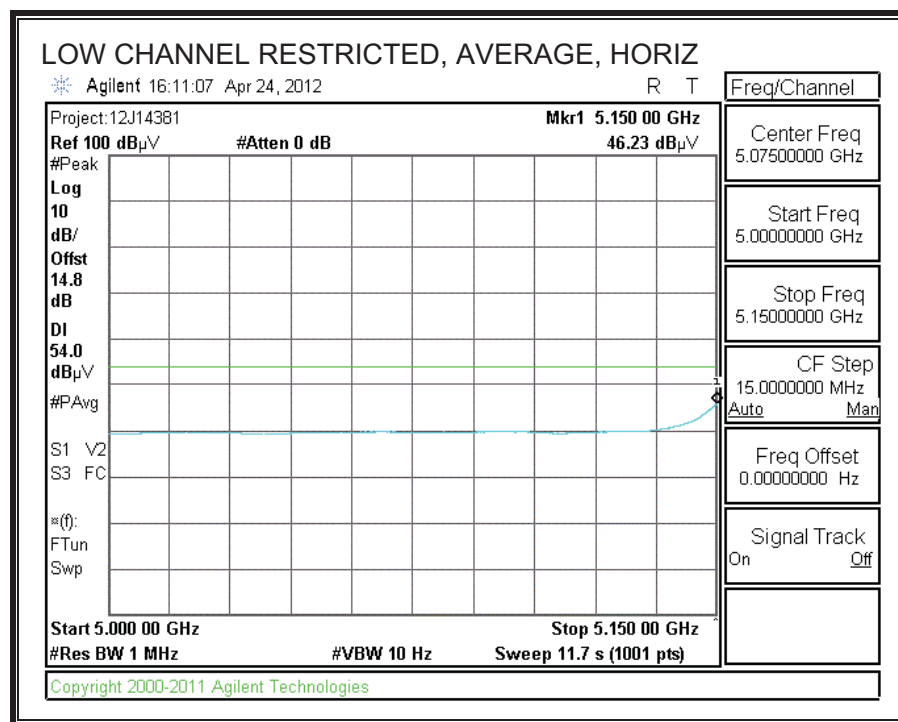
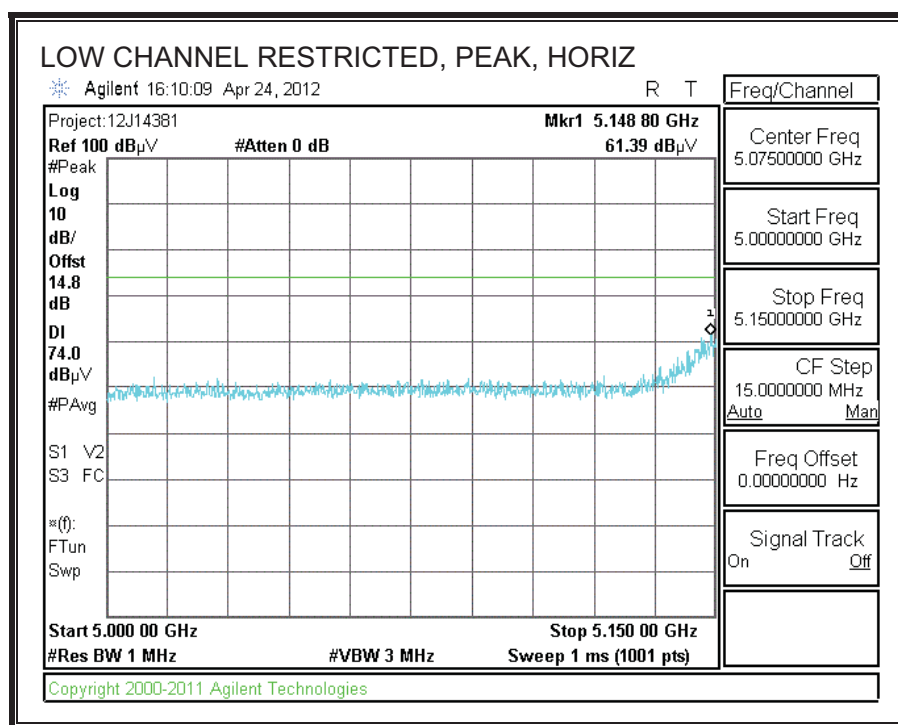
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5180 MHz)													
10.360	3.0	35.1	38.2	9.5	-35.8	0.0	0.0	46.9	74.0	-27.1	H	P	
10.360	3.0	22.7	38.2	9.5	-35.8	0.0	0.0	34.6	54.0	-19.4	H	A	
15.540	3.0	36.5	39.0	12.2	-34.0	0.0	0.0	53.7	74.0	-20.3	H	P	
15.540	3.0	28.3	39.0	12.2	-34.0	0.0	0.0	45.5	54.0	-8.5	H	A	
10.360	3.0	35.4	38.2	9.5	-35.8	0.0	0.0	47.3	74.0	-26.7	V	P	
10.360	3.0	22.9	38.2	9.5	-35.8	0.0	0.0	34.8	54.0	-19.2	V	A	
15.540	3.0	38.0	39.0	12.2	-34.0	0.0	0.0	55.2	74.0	-18.8	V	P	
15.540	3.0	23.8	39.0	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	V	A	
Mid Channel (5200 MHz)													
10.400	3.0	34.6	38.2	9.5	-35.8	0.0	0.0	46.5	74.0	-27.5	H	P	
10.400	3.0	22.6	38.2	9.5	-35.8	0.0	0.0	34.6	54.0	-19.4	H	A	
15.600	3.0	36.3	38.8	12.2	-34.0	0.0	0.0	53.3	74.0	-20.7	H	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	H	A	
10.400	3.0	34.6	38.2	9.5	-35.8	0.0	0.0	46.5	74.0	-27.5	V	P	
10.400	3.0	22.4	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	V	A	
15.600	3.0	36.4	38.8	12.2	-34.0	0.0	0.0	53.5	74.0	-20.5	V	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	V	A	
High Channel (5240 MHz)													
10.480	3.0	34.2	38.2	9.6	-35.8	0.0	0.0	46.3	74.0	-27.7	H	P	
10.480	3.0	21.9	38.2	9.6	-35.8	0.0	0.0	34.0	54.0	-20.0	H	A	
15.720	3.0	36.4	38.4	12.3	-34.0	0.0	0.0	53.1	74.0	-20.9	H	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.1	54.0	-13.9	H	A	
10.480	3.0	34.7	38.2	9.6	-35.8	0.0	0.0	46.8	74.0	-27.2	V	P	
10.480	3.0	21.7	38.2	9.6	-35.8	0.0	0.0	33.7	54.0	-20.3	V	A	
15.720	3.0	36.5	38.4	12.3	-34.0	0.0	0.0	53.2	74.0	-20.8	V	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.2	54.0	-13.8	V	A	

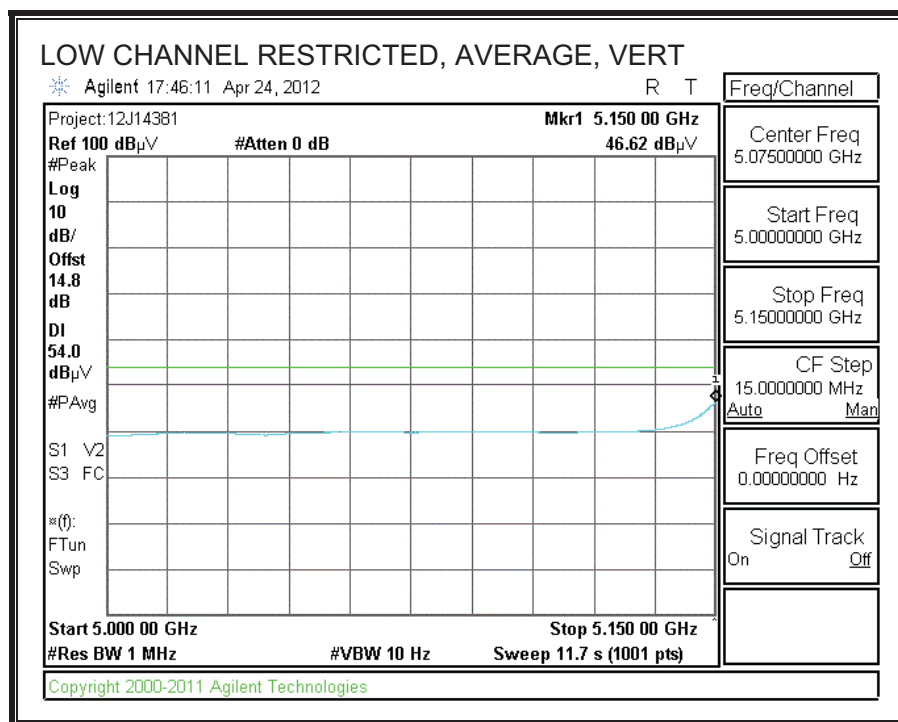
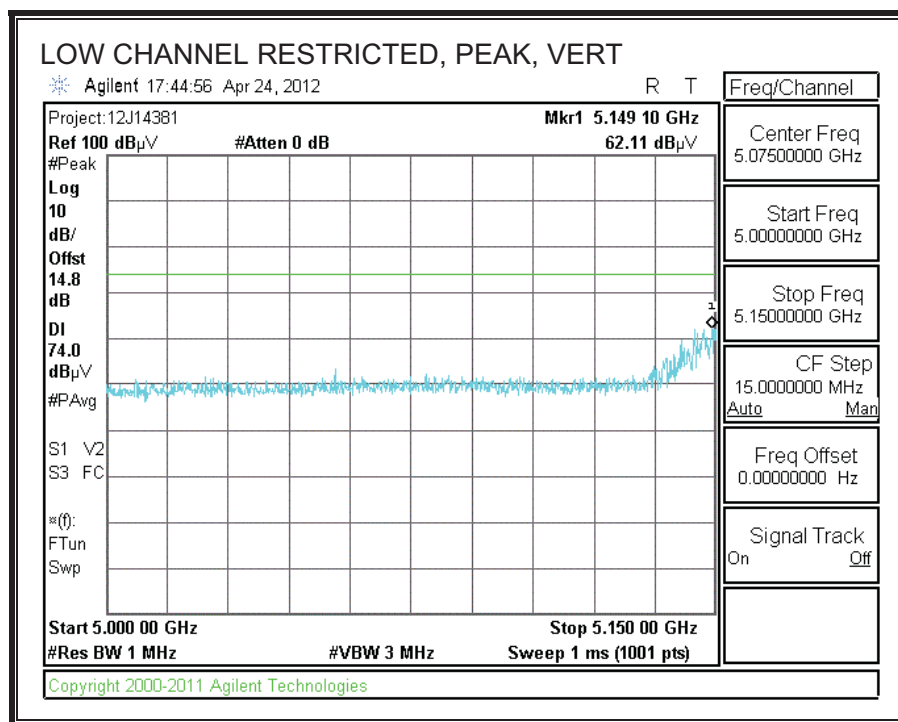
Rev. 4.1.2.7

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

7.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL) CHAIN B





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
Date: 04/26/12
Project #: 12J14381
Company: PANASONIC
Test Target: FCC CFR47 PART 15
Mode Oper: TX, 802.11n HT20 MHz, CHAIN B

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

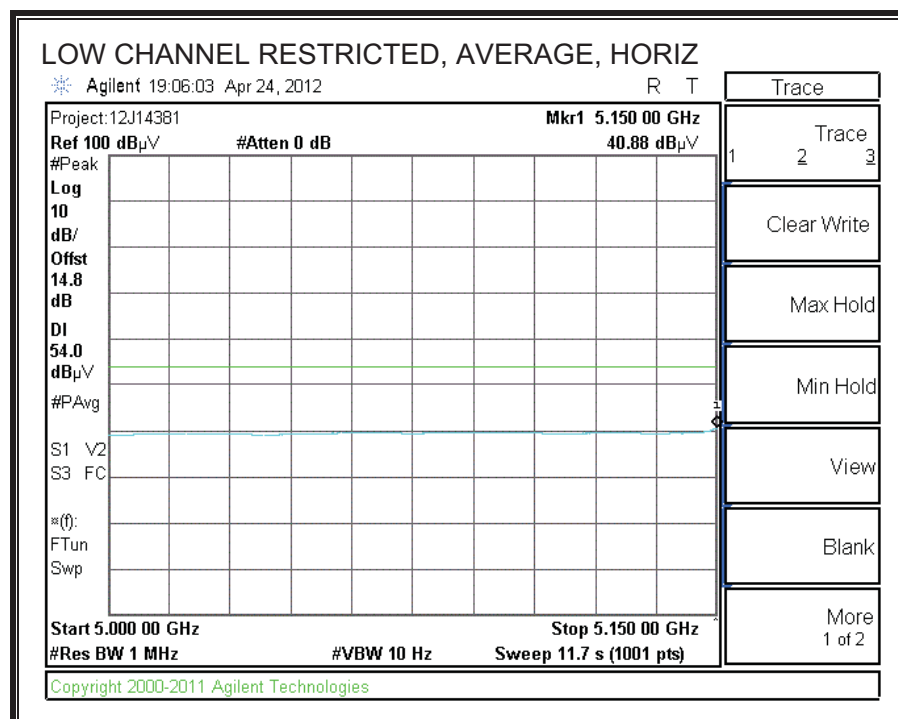
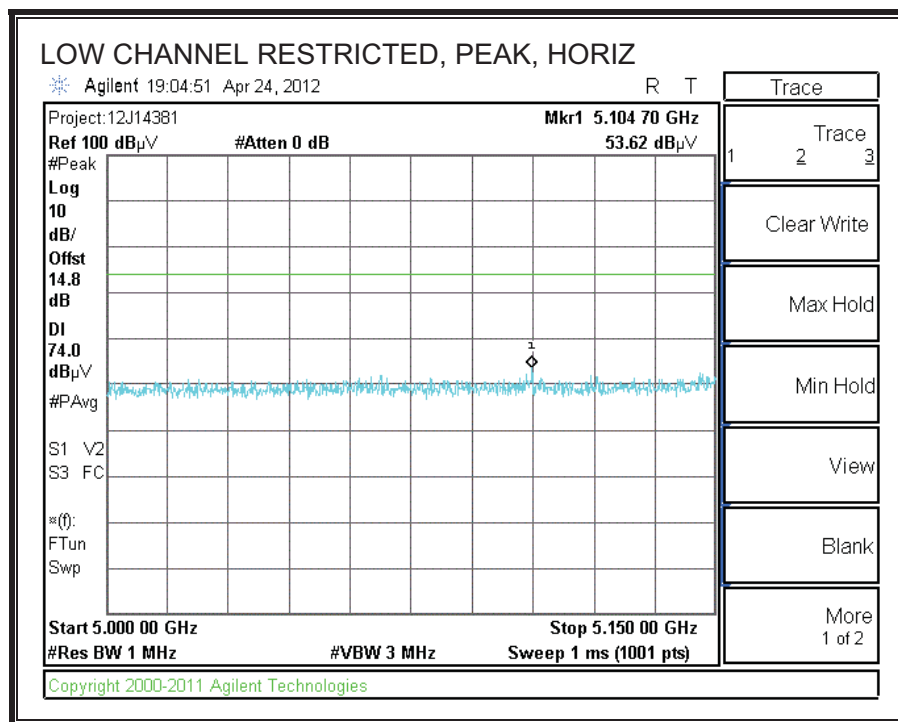
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5180 MHz)													
10.360	3.0	35.6	38.2	9.5	-35.8	0.0	0.0	47.5	74.0	-26.5	H	P	
10.360	3.0	23.0	38.2	9.5	-35.8	0.0	0.0	34.8	54.0	-19.2	H	A	
15.540	3.0	36.4	39.0	12.2	-34.0	0.0	0.0	53.6	74.0	-20.4	H	P	
15.540	3.0	23.8	39.0	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	H	A	
10.360	3.0	35.8	38.2	9.5	-35.8	0.0	0.0	47.7	74.0	-26.3	V	P	
10.360	3.0	22.8	38.2	9.5	-35.8	0.0	0.0	34.7	54.0	-19.3	V	A	
15.540	3.0	36.5	39.0	12.2	-34.0	0.0	0.0	53.7	74.0	-20.3	V	P	
15.540	3.0	23.8	39.0	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	V	A	
Mid Channel (5200 MHz)													
10.400	3.0	34.8	38.2	9.5	-35.8	0.0	0.0	46.7	74.0	-27.3	H	P	
10.400	3.0	22.5	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	H	A	
15.600	3.0	37.0	38.8	12.2	-34.0	0.0	0.0	54.0	74.0	-20.0	H	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	H	A	
10.400	3.0	34.5	38.2	9.5	-35.8	0.0	0.0	46.4	74.0	-27.6	V	P	
10.400	3.0	22.4	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	V	A	
15.600	3.0	36.2	38.8	12.2	-34.0	0.0	0.0	53.3	74.0	-20.7	V	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	V	A	
High Channel (5240 MHz)													
10.480	3.0	33.9	38.2	9.6	-35.8	0.0	0.0	46.0	74.0	-28.0	H	P	
10.480	3.0	21.6	38.2	9.6	-35.8	0.0	0.0	33.7	54.0	-20.3	H	A	
15.720	3.0	36.7	38.4	12.3	-34.0	0.0	0.0	53.4	74.0	-20.6	H	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.1	54.0	-13.9	H	A	
10.480	3.0	33.7	38.2	9.6	-35.8	0.0	0.0	45.8	74.0	-28.2	V	P	
10.480	3.0	21.6	38.2	9.6	-35.8	0.0	0.0	33.6	54.0	-20.4	V	A	
15.720	3.0	36.1	38.4	12.3	-34.0	0.0	0.0	52.8	74.0	-21.2	V	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.1	54.0	-13.9	V	A	

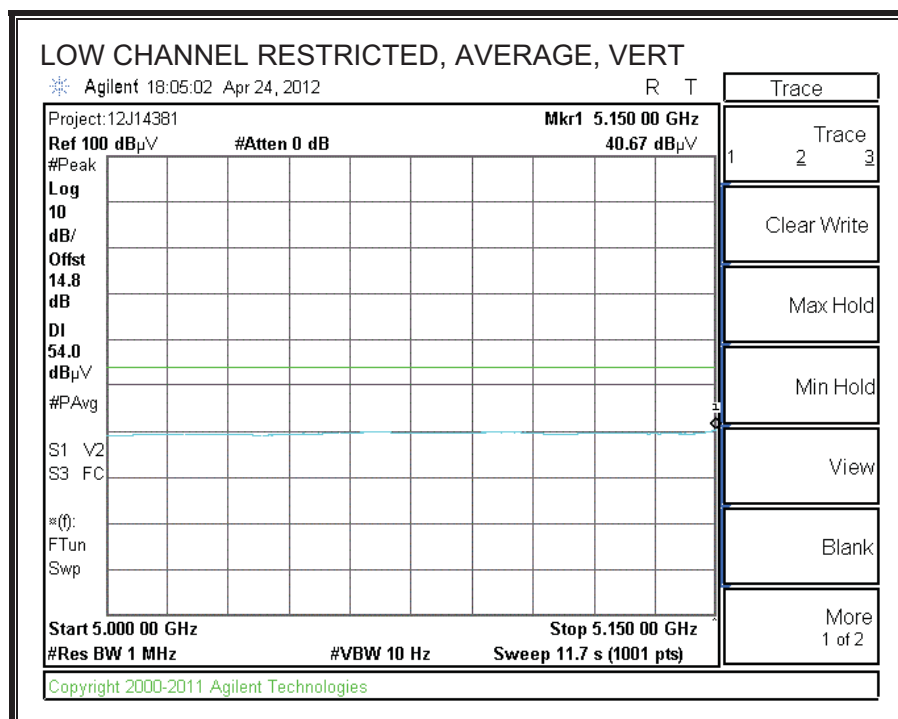
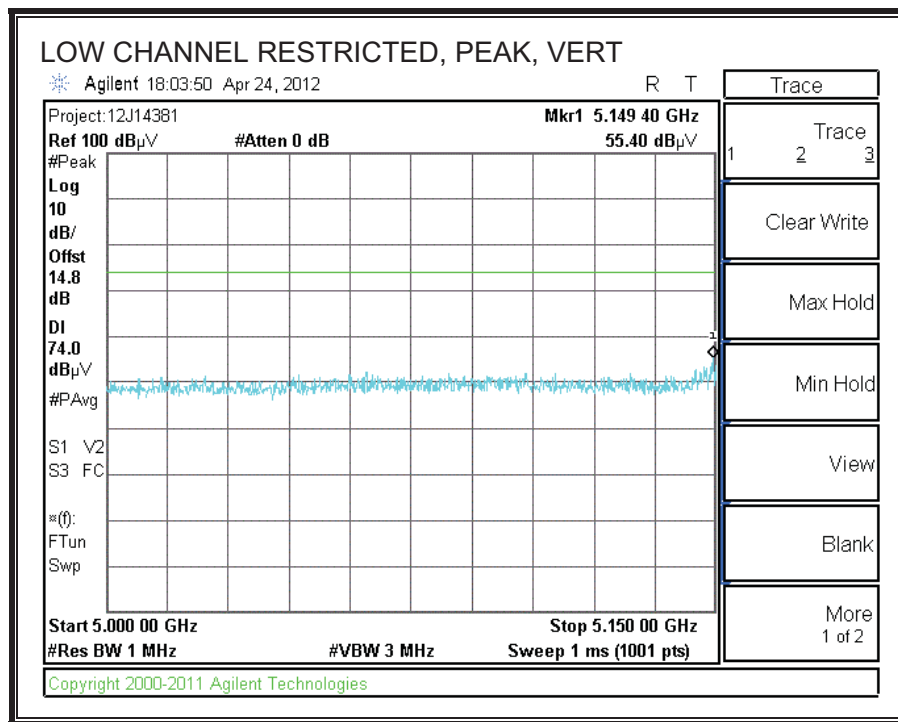
Rev. 4.1.2.7

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

7.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL) CHAIN A AND B





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
Date: 04/26/12
Project #: 12J14381
Company: PANASONIC
Test Target: FCC CFR47 PART 15
Mode Oper: TX, 802.11n HT20 MHz, CHAIN A AND B

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

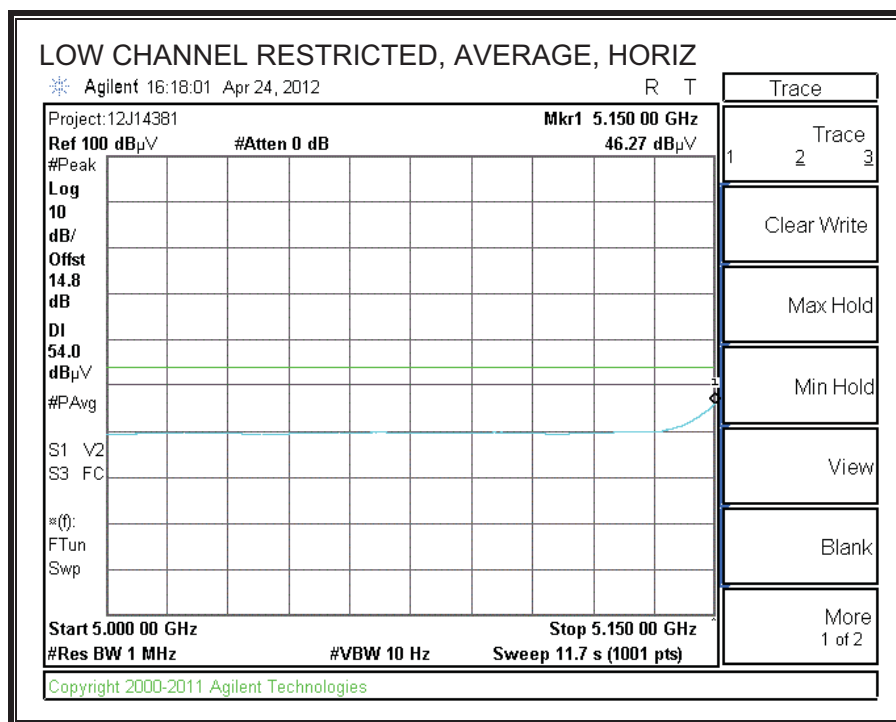
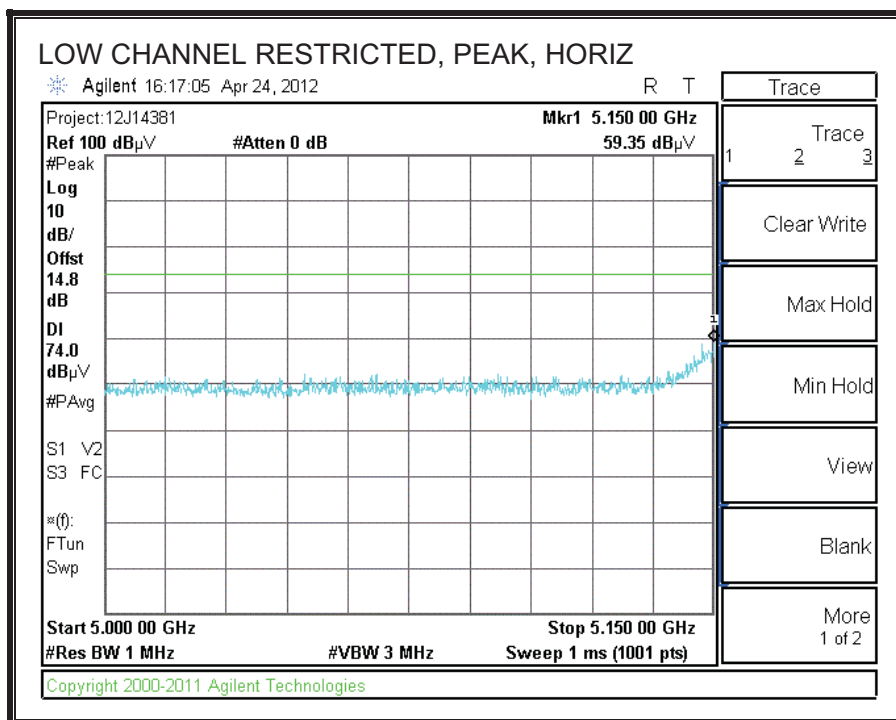
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5180 MHz)													
10.360	3.0	35.3	38.2	9.5	-35.8	0.0	0.0	47.1	74.0	-26.9	H	P	
10.360	3.0	23.2	38.2	9.5	-35.8	0.0	0.0	35.0	54.0	-19.0	H	A	
15.540	3.0	37.0	39.0	12.2	-34.0	0.0	0.0	54.2	74.0	-19.8	H	P	
15.540	3.0	23.9	39.0	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	H	A	
10.360	3.0	35.4	38.2	9.5	-35.8	0.0	0.0	47.3	74.0	-26.7	V	P	
10.360	3.0	23.0	38.2	9.5	-35.8	0.0	0.0	34.9	54.0	-19.1	V	A	
15.540	3.0	37.7	39.0	12.2	-34.0	0.0	0.0	54.8	74.0	-19.2	V	P	
15.540	3.0	23.9	39.0	12.2	-34.0	0.0	0.0	41.1	54.0	-12.9	V	A	
Mid Channel (5200 MHz)													
10.400	3.0	34.9	38.2	9.5	-35.8	0.0	0.0	46.8	74.0	-27.2	H	P	
10.400	3.0	22.6	38.2	9.5	-35.8	0.0	0.0	34.6	54.0	-19.4	H	A	
15.600	3.0	37.2	38.8	12.2	-34.0	0.0	0.0	54.2	74.0	-19.8	H	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	H	A	
10.400	3.0	34.7	38.2	9.5	-35.8	0.0	0.0	46.6	74.0	-27.4	V	P	
10.400	3.0	22.4	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	V	A	
15.600	3.0	37.3	38.8	12.2	-34.0	0.0	0.0	54.3	74.0	-19.7	V	P	
15.600	3.0	23.8	38.8	12.2	-34.0	0.0	0.0	40.8	54.0	-13.2	V	A	
High Channel (5240 MHz)													
10.480	3.0	34.1	38.2	9.6	-35.8	0.0	0.0	46.2	74.0	-27.8	H	P	
10.480	3.0	22.0	38.2	9.6	-35.8	0.0	0.0	34.1	54.0	-19.9	H	A	
15.720	3.0	36.4	38.4	12.3	-34.0	0.0	0.0	53.1	74.0	-20.9	H	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.1	54.0	-13.9	H	A	
10.480	3.0	34.1	38.2	9.6	-35.8	0.0	0.0	46.1	74.0	-27.9	V	P	
10.480	3.0	22.0	38.2	9.6	-35.8	0.0	0.0	34.0	54.0	-20.0	V	A	
15.720	3.0	36.2	38.4	12.3	-34.0	0.0	0.0	52.9	74.0	-21.1	V	P	
15.720	3.0	23.4	38.4	12.3	-34.0	0.0	0.0	40.2	54.0	-13.8	V	A	

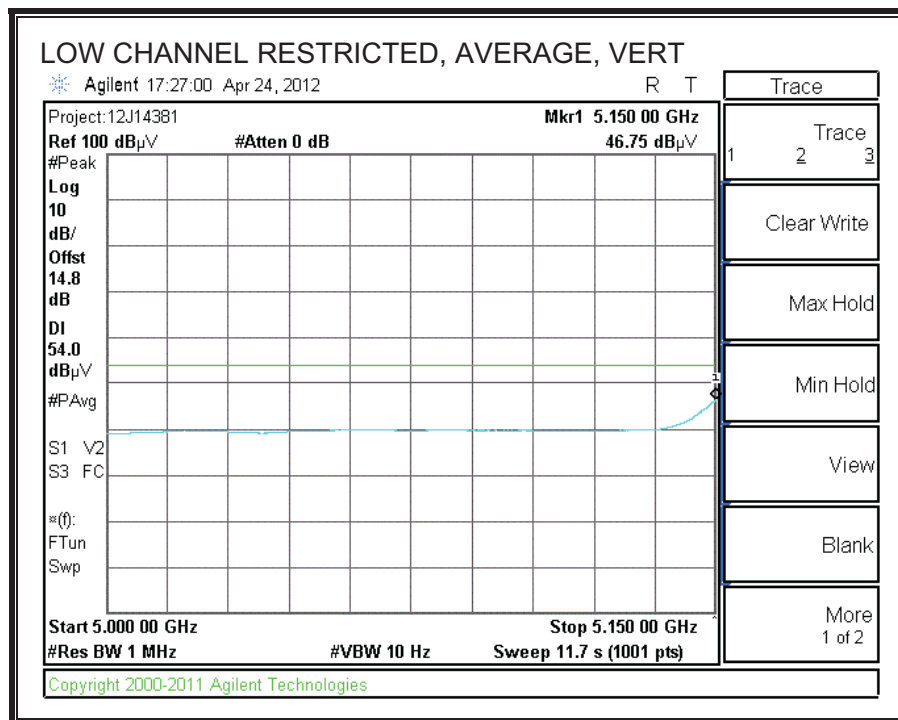
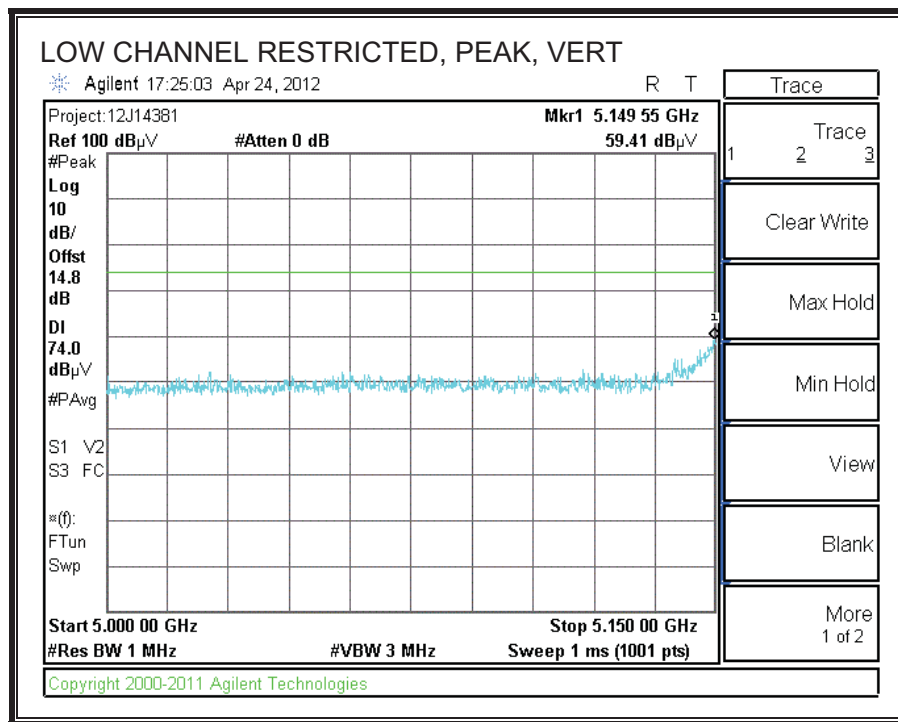
Rev. 4.1.2.7

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

7.2.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL) CHAIN B



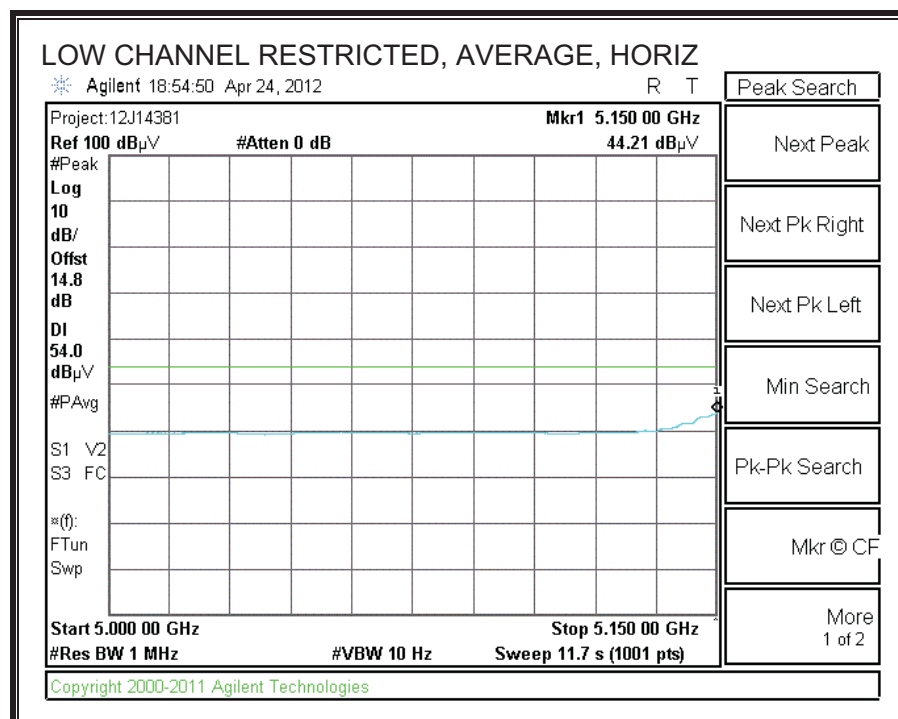
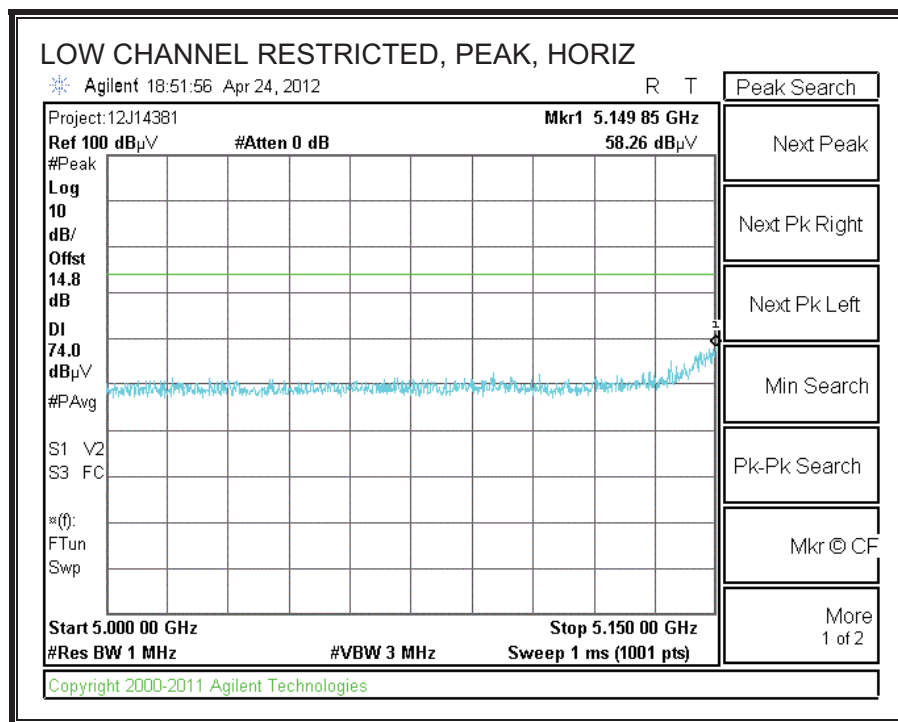


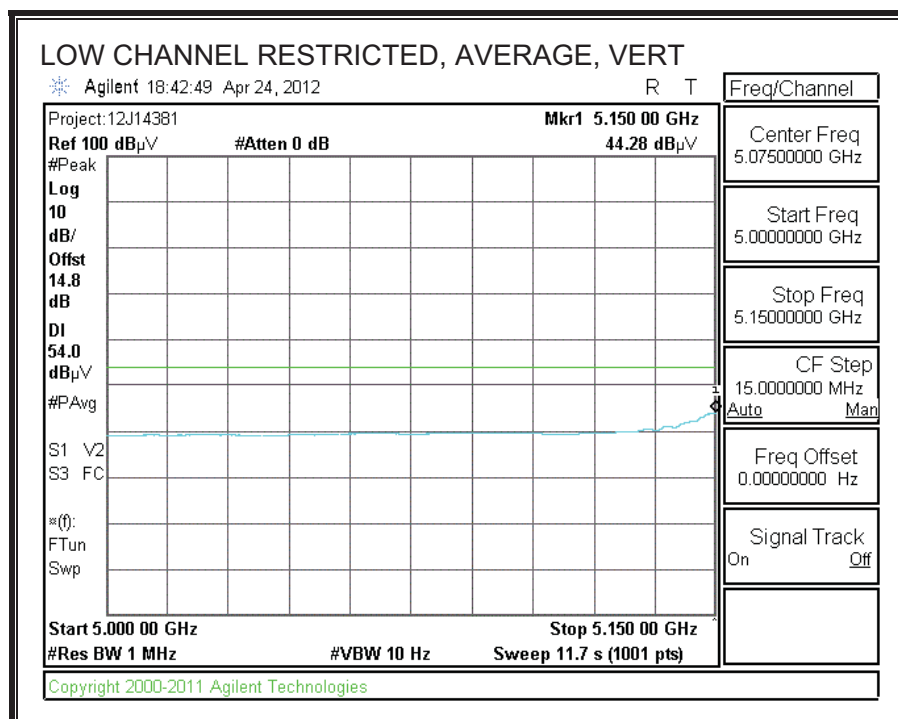
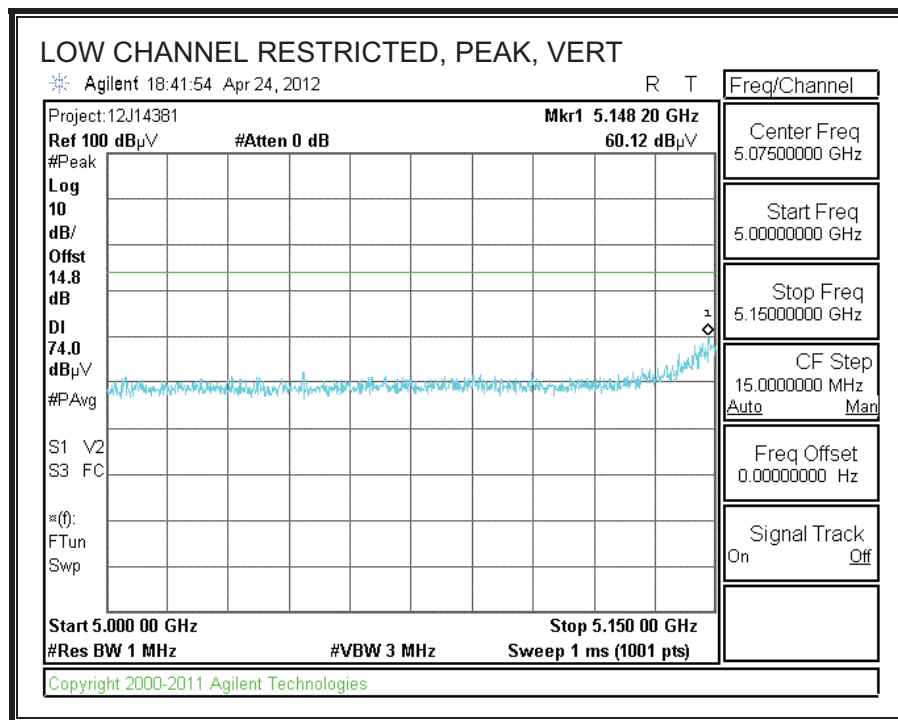
HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		MENGISTU MEKURIA											
Date:		04/26/12											
Project #:		12J14381											
Company:		PANASONIC											
Test Target:		FCC CFR47 PART15											
Mode Oper:		TX, 802.11n HT40 MHz, CHAIN B											
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. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5190 MHz)													
10.380	3.0	34.4	38.2	9.5	-35.8	0.0	0.0	46.3	74.0	-27.7	H	P	
10.380	3.0	22.5	38.2	9.5	-35.8	0.0	0.0	34.5	54.0	-19.5	H	A	
15.570	3.0	36.8	38.9	12.2	-34.0	0.0	0.0	53.9	74.0	-20.1	H	P	
15.570	3.0	23.9	38.9	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	H	A	
10.380	3.0	35.4	38.2	9.5	-35.8	0.0	0.0	47.3	74.0	-26.7	V	P	
10.380	3.0	22.5	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	V	A	
15.570	3.0	36.7	38.9	12.2	-34.0	0.0	0.0	53.8	74.0	-20.2	V	P	
15.570	3.0	23.8	38.9	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	V	A	
High Channel (5230 MHz)													
10.460	3.0	34.3	38.2	9.6	-35.8	0.0	0.0	46.3	74.0	-27.7	H	P	
10.460	3.0	22.5	38.2	9.6	-35.8	0.0	0.0	34.6	54.0	-19.4	H	A	
15.690	3.0	36.2	38.5	12.3	-34.0	0.0	0.0	53.0	74.0	-21.0	H	P	
15.690	3.0	23.5	38.5	12.3	-34.0	0.0	0.0	40.4	54.0	-13.6	H	A	
10.460	3.0	34.2	38.2	9.6	-35.8	0.0	0.0	45.9	74.0	-28.1	V	P	
10.460	3.0	22.0	38.2	9.6	-35.8	0.0	0.0	33.8	54.0	-20.2	V	A	
15.690	3.0	36.9	38.5	12.3	-34.0	0.0	0.0	54.1	74.0	-19.9	V	P	
15.690	3.0	23.6	38.5	12.3	-34.0	0.0	0.0	40.6	54.0	-13.4	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

7.2.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL) CHAIN A AND B





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		MENGISTU MEKURIA											
Date:		04/26/12											
Project #:		12J14381											
Company:		PANASONIC											
Test Target:		FCC CFR47 PART 15											
Mode Oper:		TX, 802.11n HT40 MHz, CHAIN A AND B											
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. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (510 MHz)													
10.380	3.0	34.8	38.2	9.5	-35.8	0.0	0.0	46.7	74.0	-27.3	H	P	
10.380	3.0	22.5	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	H	A	
15.570	3.0	36.9	38.9	12.2	-34.0	0.0	0.0	54.0	74.0	-20.0	H	P	
15.570	3.0	23.8	38.9	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	H	A	
10.380	3.0	34.8	38.2	9.5	-35.8	0.0	0.0	46.7	74.0	-27.3	V	P	
10.380	3.0	22.5	38.2	9.5	-35.8	0.0	0.0	34.4	54.0	-19.6	V	A	
15.570	3.0	36.8	38.9	12.2	-34.0	0.0	0.0	54.0	74.0	-20.0	V	P	
15.570	3.0	23.9	38.9	12.2	-34.0	0.0	0.0	41.0	54.0	-13.0	V	A	
High Channel (5230 MHz)													
10.460	3.0	34.3	38.2	9.6	-35.8	0.0	0.0	46.3	74.0	-27.7	H	P	
10.460	3.0	22.3	38.2	9.6	-35.8	0.0	0.0	34.4	54.0	-19.6	H	A	
15.690	3.0	36.3	38.5	12.3	-34.0	0.0	0.0	53.1	74.0	-20.9	H	P	
15.690	3.0	23.4	38.5	12.3	-34.0	0.0	0.0	40.2	54.0	-13.8	H	A	
10.460	3.0	34.5	38.2	9.6	-35.8	0.0	0.0	46.5	74.0	-27.5	V	P	
10.460	3.0	22.2	38.2	9.6	-35.8	0.0	0.0	34.2	54.0	-19.8	V	A	
15.690	3.0	36.5	38.5	12.3	-34.0	0.0	0.0	53.3	74.0	-20.7	V	P	
15.690	3.0	23.4	38.5	12.3	-34.0	0.0	0.0	40.2	54.0	-13.8	V	A	

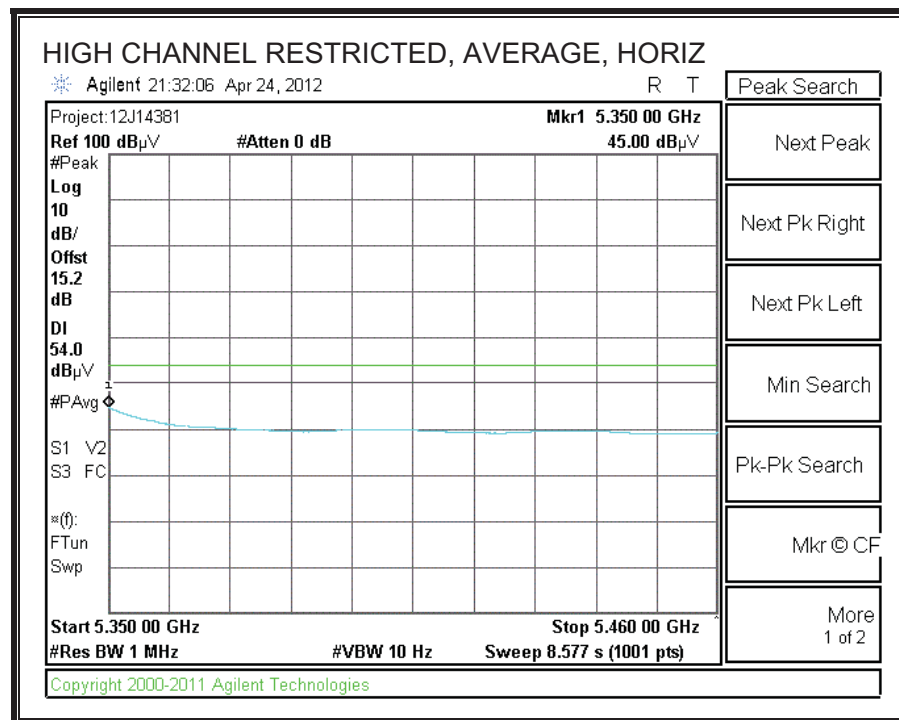
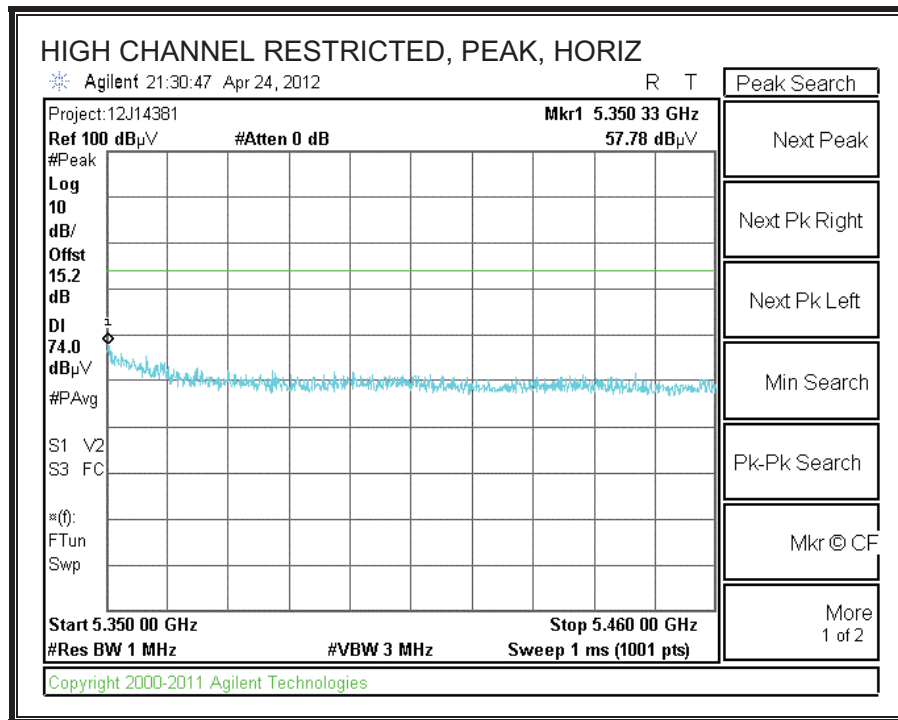
Rev. 4.1.2.7

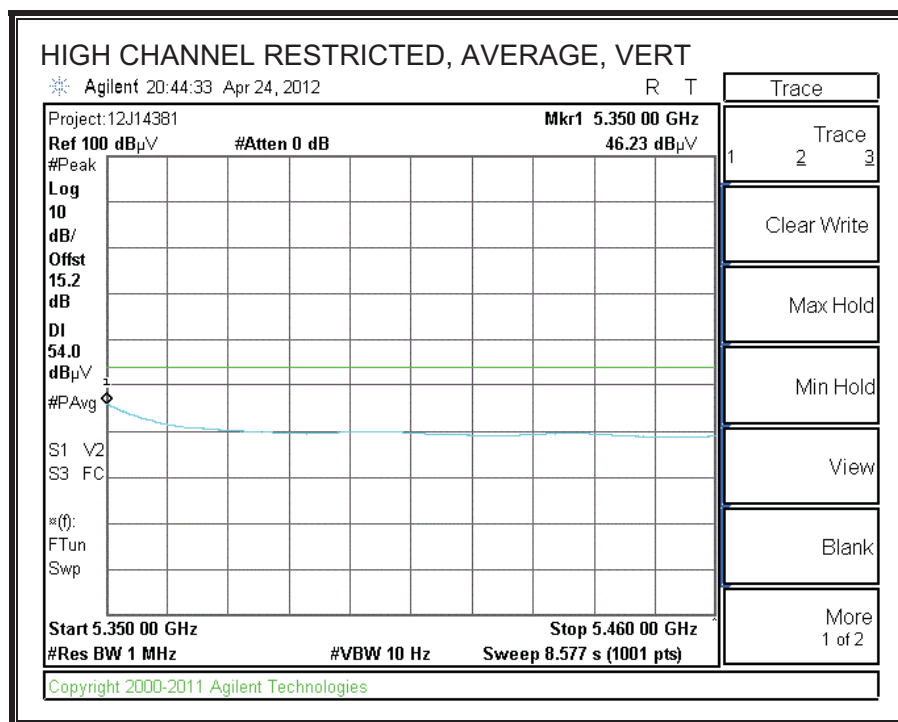
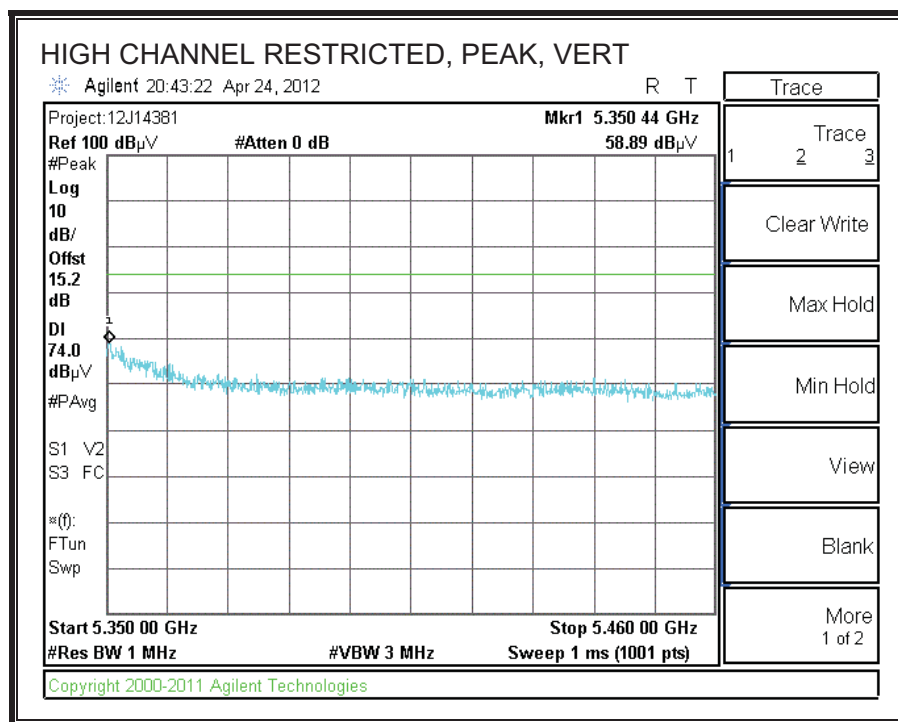
Note: No other emissions were detected above the system noise floor.

7.3. TRANSMITTER ABOVE 1 GHz AT 5.3 GHz BAND

7.3.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL) CHAIN B





HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA

Date: 04/27/12

Project #: 12J14381

Company: PANASONIC

Test Target: FCC CFR47 PART 15

Mode Oper: TX, 802.11n HT20 MHz, CHAIN B

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	

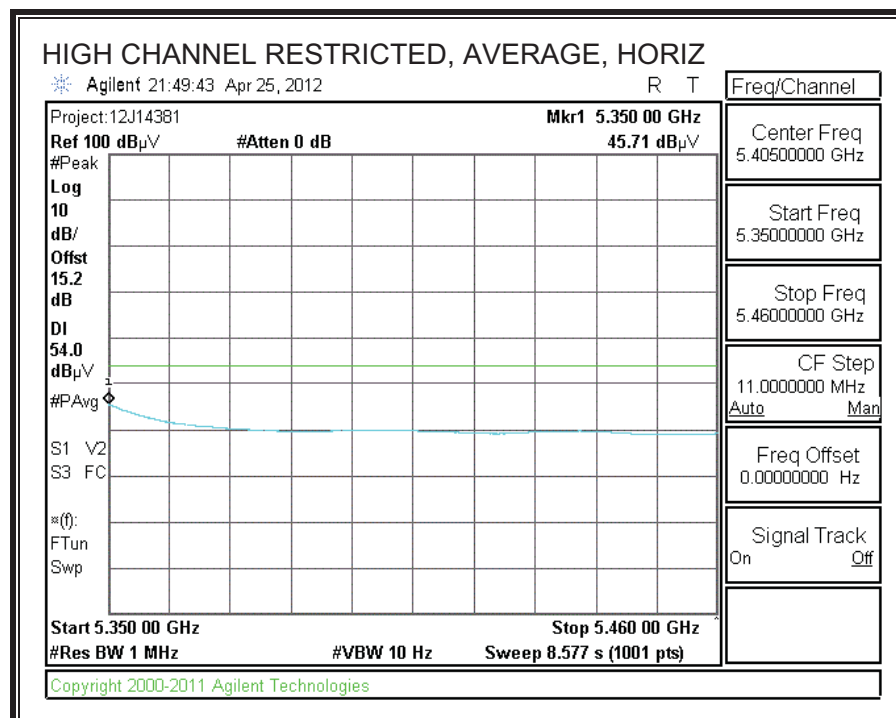
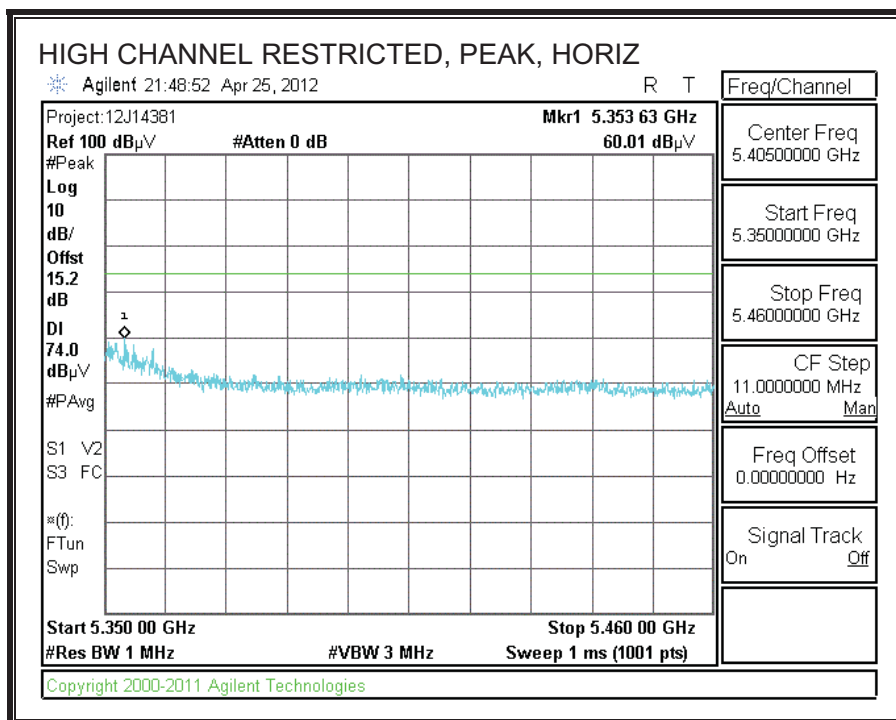
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5260 MHz)													
10.520	3.0	34.4	38.3	9.6	-35.8	0.0	0.0	46.5	74.0	-27.5	H	P	
10.520	3.0	22.1	38.3	9.6	-35.8	0.0	0.0	34.3	54.0	-19.7	H	A	
15.780	3.0	35.7	38.2	12.3	-33.9	0.0	0.0	52.2	74.0	-21.8	H	P	
15.780	3.0	23.3	38.2	12.3	-33.9	0.0	0.0	39.9	54.0	-14.1	H	A	
10.520	3.0	34.1	38.3	9.6	-35.8	0.0	0.0	46.2	74.0	-27.8	V	P	
10.520	3.0	21.8	38.3	9.6	-35.8	0.0	0.0	34.0	54.0	-20.0	V	A	
15.780	3.0	35.9	38.2	12.3	-33.9	0.0	0.0	52.5	74.0	-21.5	V	P	
15.780	3.0	23.3	38.2	12.3	-33.9	0.0	0.0	39.9	54.0	-14.1	V	A	
Mid Channel (5300 MHz)													
10.600	3.0	34.5	38.3	9.7	-35.7	0.0	0.0	46.8	74.0	-27.2	H	P	
10.600	3.0	22.0	38.3	9.7	-35.7	0.0	0.0	34.2	54.0	-19.8	H	A	
15.900	3.0	35.8	37.8	12.4	-33.9	0.0	0.0	52.1	74.0	-22.0	H	P	
15.900	3.0	23.2	37.8	12.4	-33.9	0.0	0.0	39.5	54.0	-14.5	H	A	
10.600	3.0	34.3	38.3	9.7	-35.7	0.0	0.0	46.5	74.0	-27.5	V	P	
10.600	3.0	21.9	38.3	9.7	-35.7	0.0	0.0	34.1	54.0	-19.9	V	A	
15.900	3.0	35.7	37.8	12.4	-33.9	0.0	0.0	51.9	74.0	-22.1	V	P	
15.900	3.0	23.2	37.8	12.4	-33.9	0.0	0.0	39.5	54.0	-14.5	V	A	
High Channel (5320 MHz)													
10.640	3.0	34.7	38.3	9.8	-35.7	0.0	0.0	47.0	74.0	-27.0	H	P	
10.640	3.0	21.9	38.3	9.8	-35.7	0.0	0.0	34.2	54.0	-19.8	H	A	
15.960	3.0	35.9	37.6	12.4	-33.9	0.0	0.0	52.0	74.0	-22.0	H	P	
15.960	3.0	23.2	37.6	12.4	-33.9	0.0	0.0	39.3	54.0	-14.7	H	A	
10.640	3.0	34.5	38.3	9.8	-35.7	0.0	0.0	46.8	74.0	-27.2	V	P	
10.640	3.0	21.9	38.3	9.8	-35.7	0.0	0.0	34.2	54.0	-19.8	V	A	
15.960	3.0	37.0	37.6	12.4	-33.9	0.0	0.0	53.1	74.0	-20.9	V	P	
15.960	3.0	23.4	37.6	12.4	-33.9	0.0	0.0	39.5	54.0	-14.5	V	A	

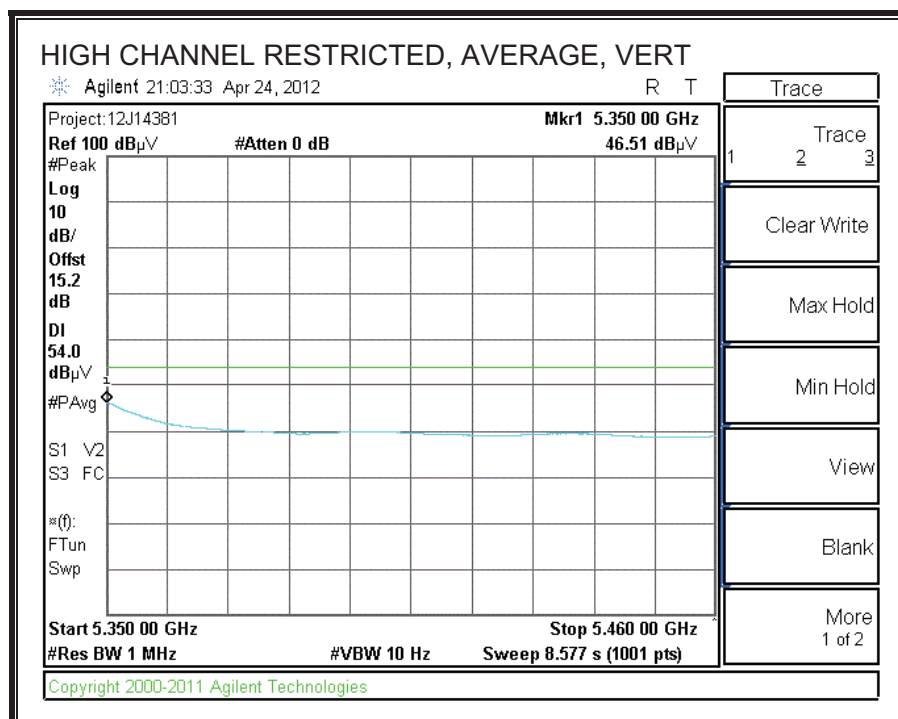
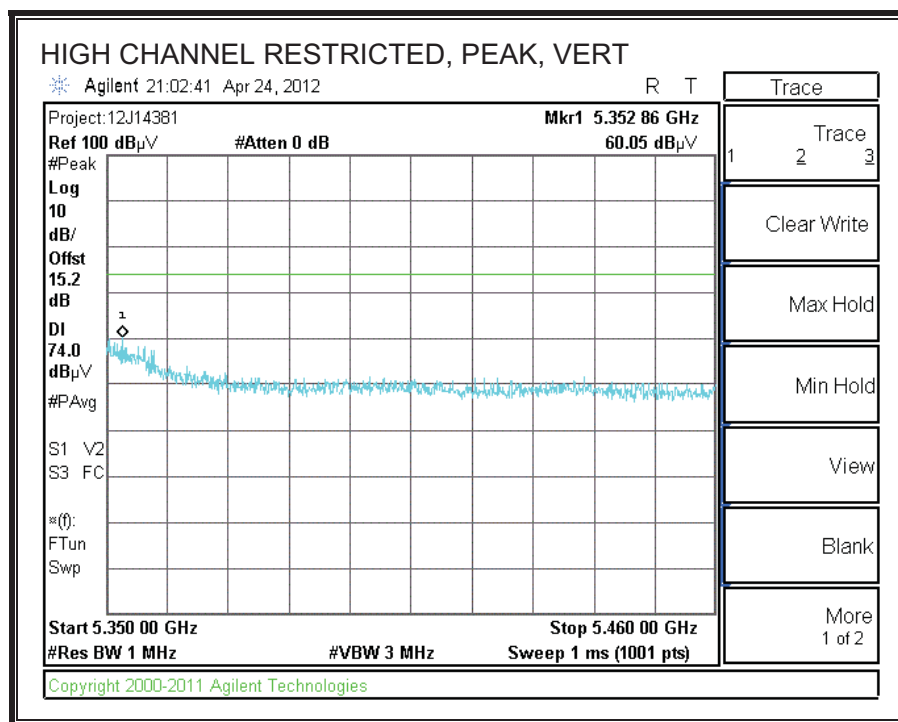
Rev. 4.1.2.7

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

7.3.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL) CHAIN B





HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA

Date: 04/27/12

Project #: 12J14381

Company: PANASONIC

Test Target: FCC CFR47 PART 15

Mode Oper: TX, 802.11n HT20 MHz, CHAIN B

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	

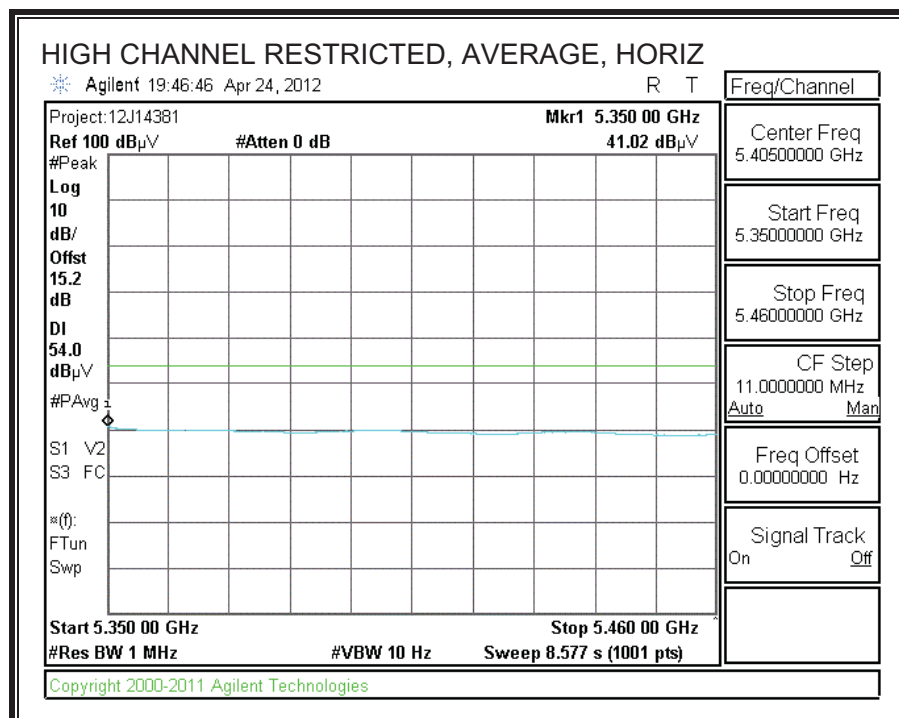
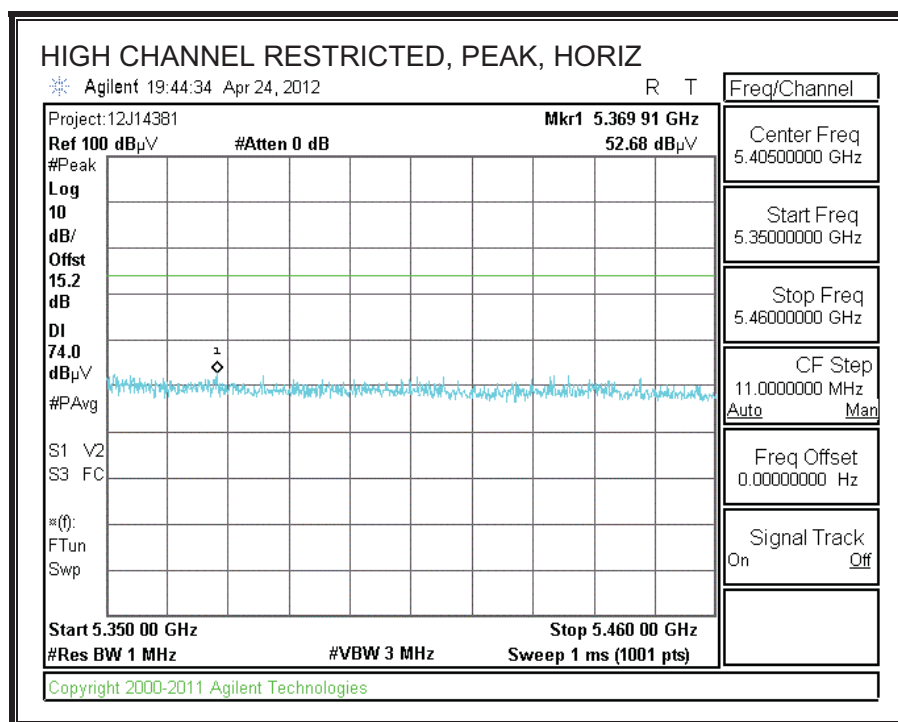
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5260 MHz)													
10.520	3.0	34.5	38.3	9.6	-35.8	0.0	0.0	46.7	74.0	-27.3	H	P	
10.520	3.0	22.3	38.3	9.6	-35.8	0.0	0.0	34.5	54.0	-19.5	H	A	
10.520	3.0	34.6	38.3	9.6	-35.8	0.0	0.0	46.7	74.0	-27.3	V	P	
10.520	3.0	22.4	38.3	9.6	-35.8	0.0	0.0	34.5	54.0	-19.5	V	A	
Mid Channel (5300 MHz)													
10.600	3.0	35.0	38.3	9.7	-35.7	0.0	0.0	47.2	74.0	-26.8	H	P	
10.600	3.0	22.3	38.3	9.7	-35.7	0.0	0.0	34.6	54.0	-19.4	H	A	
10.600	3.0	34.6	38.3	9.7	-35.7	0.0	0.0	46.9	74.0	-27.1	V	P	
10.600	3.0	22.4	38.3	9.7	-35.7	0.0	0.0	34.6	54.0	-19.4	V	A	
High Channel (5320 MHz)													
10.640	3.0	35.4	38.3	9.8	-35.7	0.0	0.0	47.7	74.0	-26.3	H	P	
10.640	3.0	22.2	38.3	9.8	-35.7	0.0	0.0	34.6	54.0	-19.4	H	A	
10.640	3.0	35.5	38.3	9.8	-35.7	0.0	0.0	47.8	74.0	-26.2	V	P	
10.640	3.0	22.3	38.3	9.8	-35.7	0.0	0.0	34.6	54.0	-19.4	V	A	

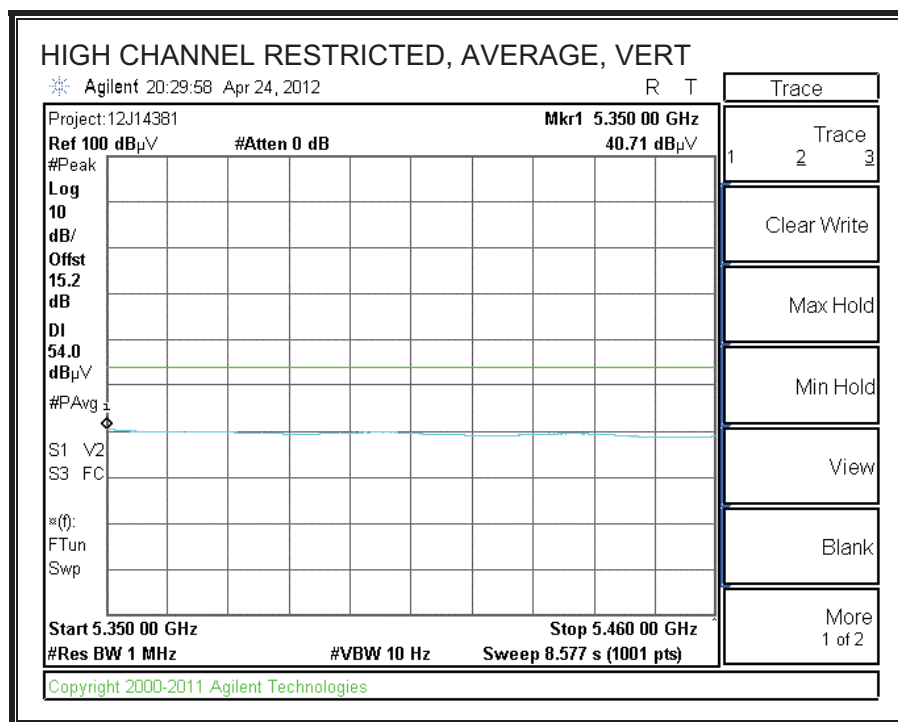
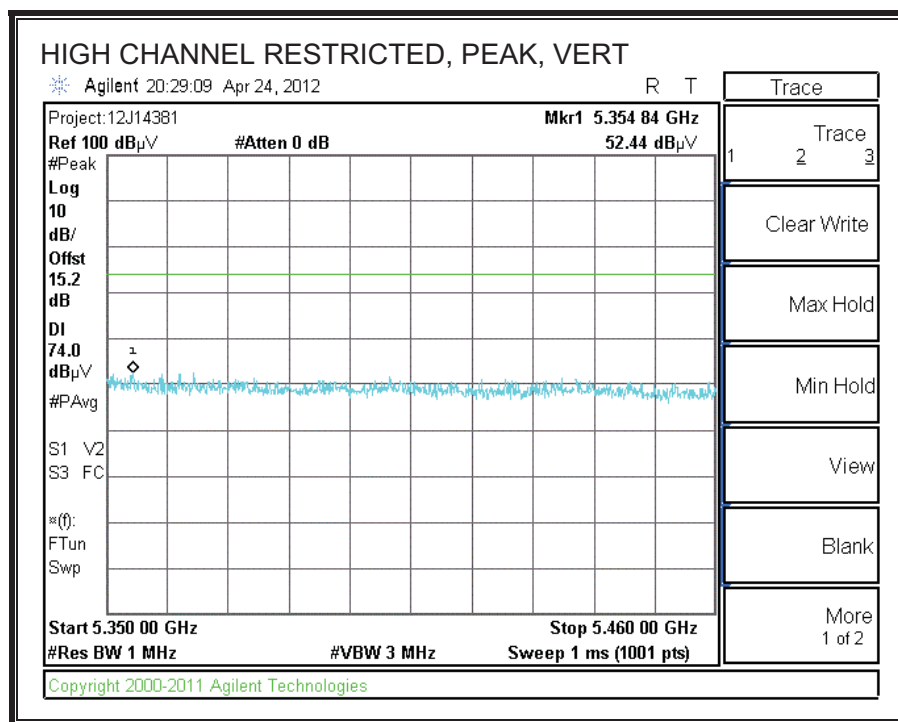
Rev. 4.1.2.7

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

7.3.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL) CHAIN A AND B





HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 04/27/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11n HT20 MHz, CHAIN A AND B

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	

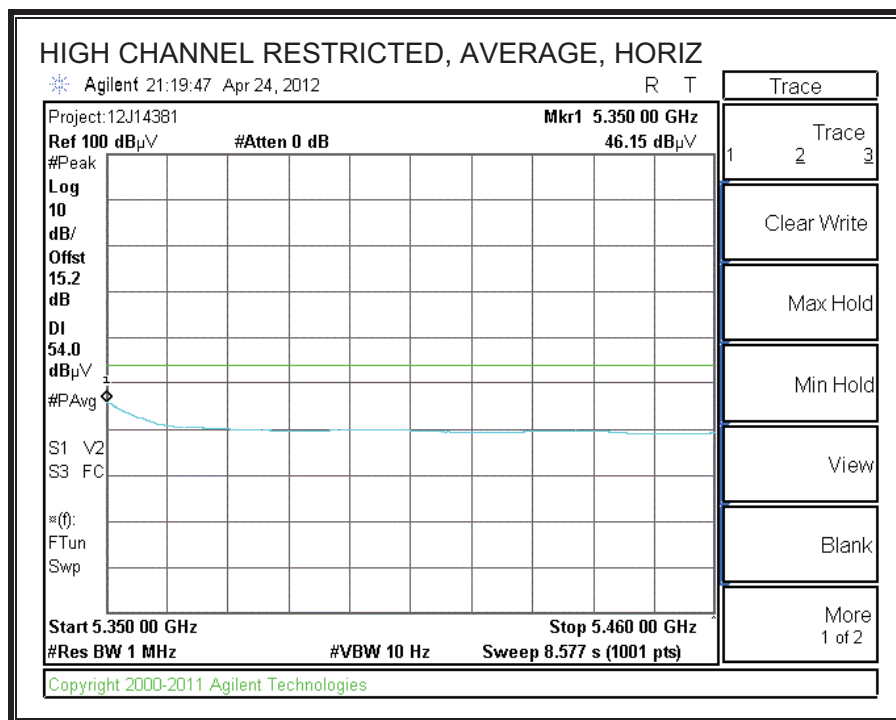
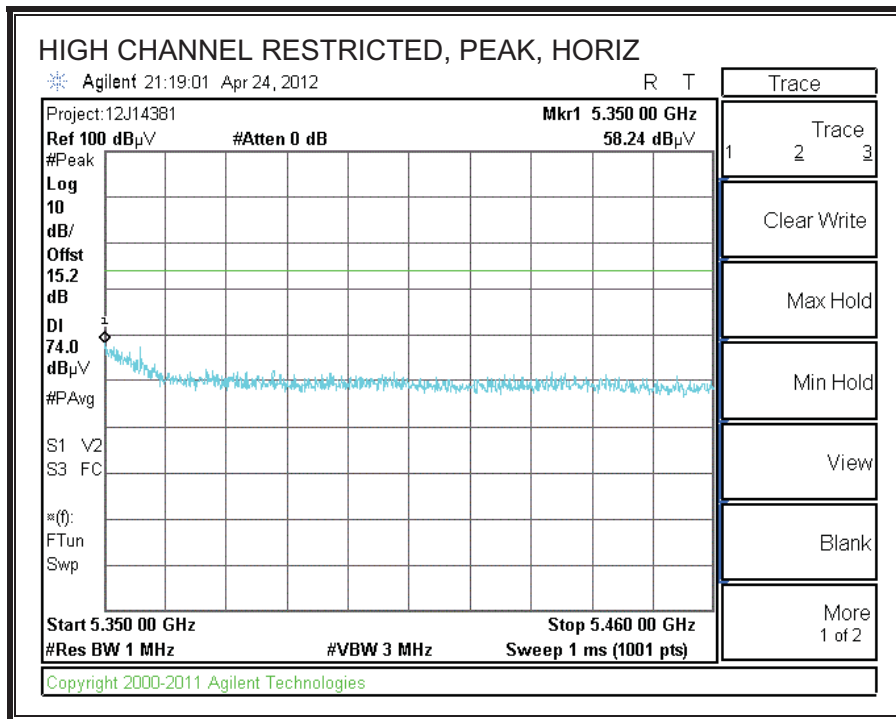
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5260 MHz)													
10.520	3.0	34.9	38.3	9.6	-35.8	0.0	0.0	47.0	74.0	-27.0	H	P	
10.520	3.0	22.8	38.3	9.6	-35.8	0.0	0.0	34.9	54.0	-19.1	H	A	
10.520	3.0	37.0	38.3	9.6	-35.8	0.0	0.0	49.1	74.0	-24.9	V	P	
10.520	3.0	23.4	38.3	9.6	-35.8	0.0	0.0	35.5	54.0	-18.5	V	A	
Mid Channel (5300 MHz)													
10.600	3.0	34.0	38.3	9.7	-35.7	0.0	0.0	46.3	74.0	-27.7	H	P	
10.600	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.4	54.0	-19.6	H	A	
10.600	3.0	33.8	38.3	9.7	-35.7	0.0	0.0	46.1	74.0	-27.9	V	P	
10.600	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.4	54.0	-19.6	V	A	
High Channel (5320 MHz)													
10.640	3.0	34.9	38.3	9.8	-35.7	0.0	0.0	47.2	74.0	-26.8	H	P	
10.640	3.0	22.1	38.3	9.8	-35.7	0.0	0.0	34.5	54.0	-19.5	H	A	
10.640	3.0	34.2	38.3	9.8	-35.7	0.0	0.0	46.5	74.0	-27.5	V	P	
10.640	3.0	22.1	38.3	9.8	-35.7	0.0	0.0	34.5	54.0	-19.5	V	A	

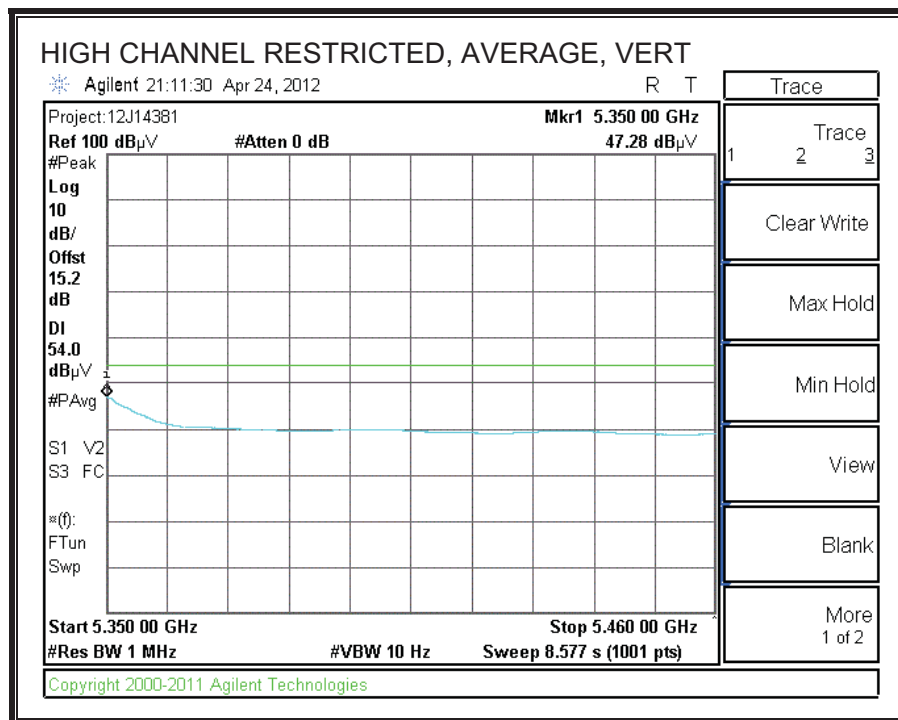
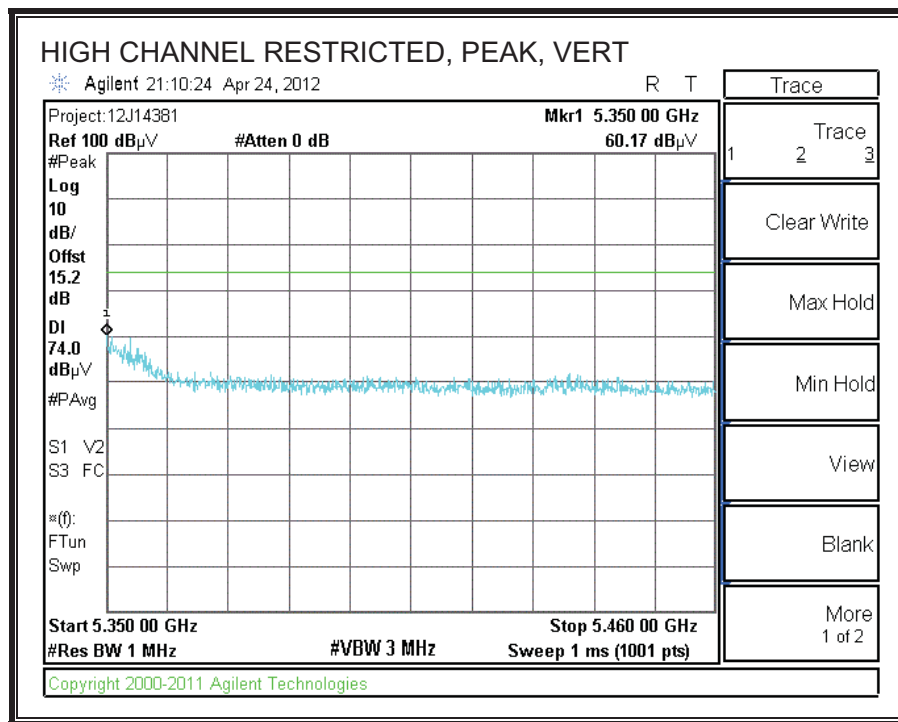
Rev. 4.1.2.7

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

7.3.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL) CHAIN B





HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 04/27/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11n HT40 MHz, CHAIN B

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	

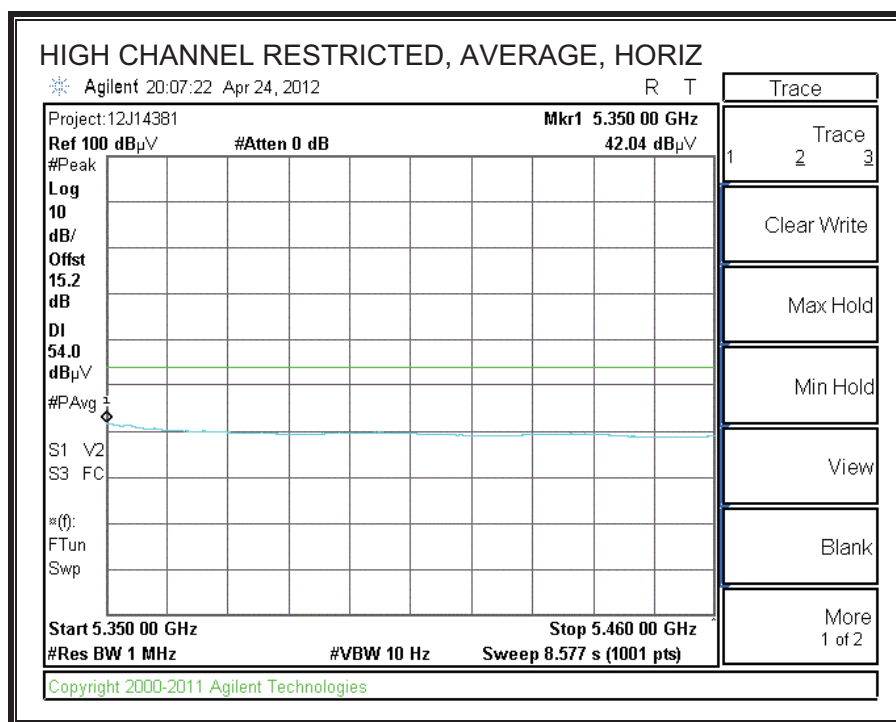
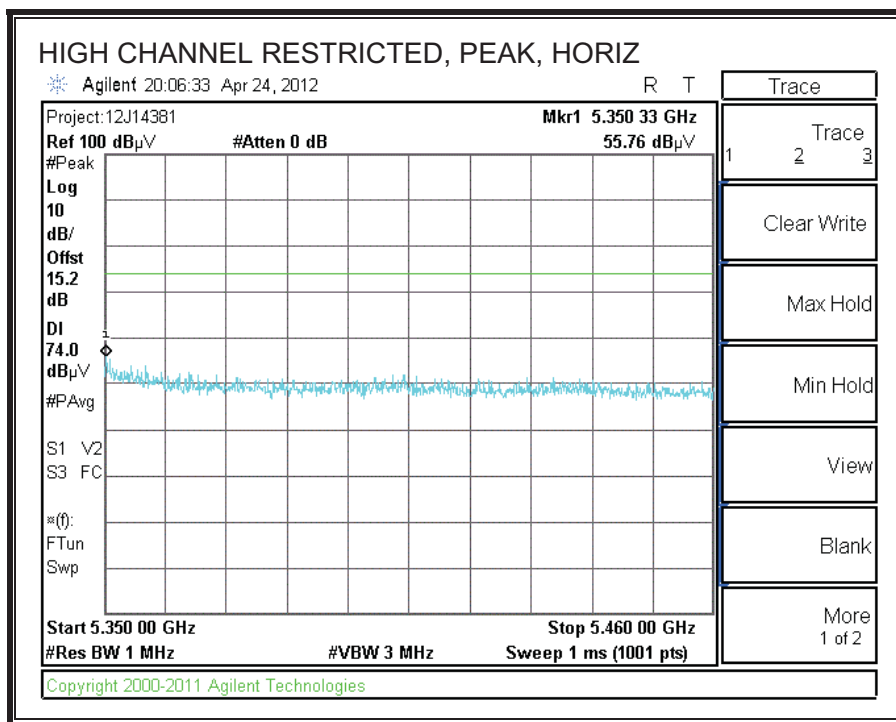
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5270 MHz)													
10.540	3.0	34.1	38.3	9.7	-35.7	0.0	0.0	46.3	74.0	-27.7	H	P	
10.540	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.3	54.0	-19.7	H	A	
10.540	3.0	34.0	38.3	9.7	-35.7	0.0	0.0	46.2	74.0	-27.8	V	P	
10.540	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.3	54.0	-19.7	V	A	
High Channel (5310 MHz)													
10.620	3.0	34.6	38.3	9.7	-35.7	0.0	0.0	46.9	74.0	-27.1	H	P	
10.620	3.0	22.2	38.3	9.7	-35.7	0.0	0.0	34.5	54.0	-19.5	H	A	
10.620	3.0	34.6	38.3	9.7	-35.7	0.0	0.0	46.9	74.0	-27.1	V	P	
10.620	3.0	22.3	38.3	9.7	-35.7	0.0	0.0	34.6	54.0	-19.4	V	A	

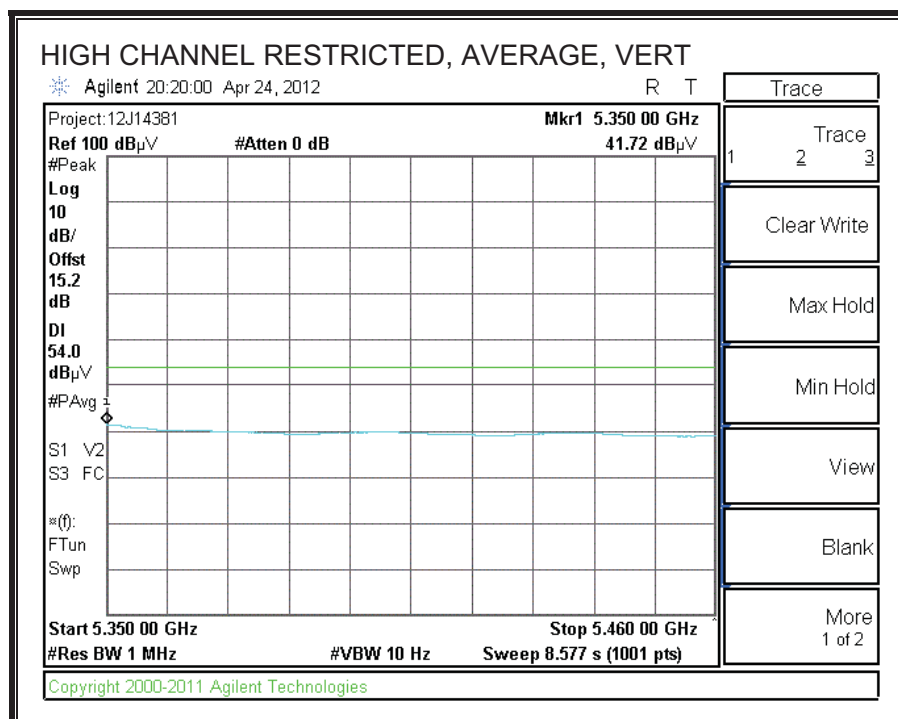
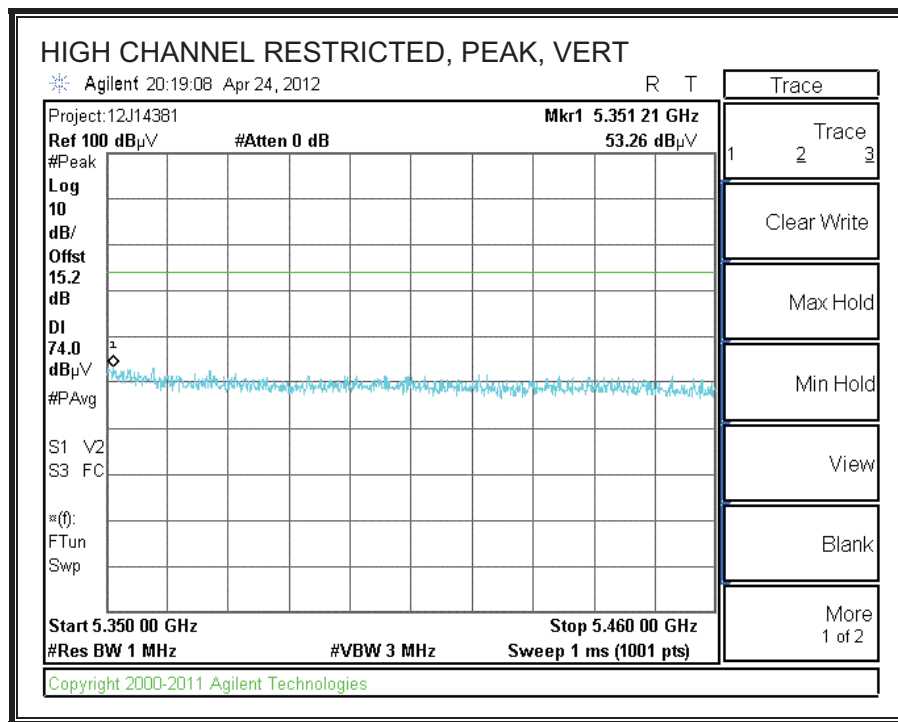
Rev. 4.1.2.7

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

7.3.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL) CHAIN A AND B





HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**
Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 04/27/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11n HT40 MHz, CHAIN A AND B

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/Q/P	Notes
Low Channel (5270 MHz)													
10.540	3.0	34.8	38.3	9.7	-35.7	0.0	0.0	46.9	74.0	-27.1	H	P	
10.540	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.3	54.0	-19.7	H	A	
10.540	3.0	35.7	38.3	9.7	-35.7	0.0	0.0	47.8	74.0	-26.2	V	P	
10.540	3.0	22.3	38.3	9.7	-35.7	0.0	0.0	34.4	54.0	-19.6	V	A	
High Channel (5310 MHz)													
10.620	3.0	35.0	38.3	9.7	-35.7	0.0	0.0	47.3	74.0	-26.7	H	P	
10.620	3.0	22.1	38.3	9.7	-35.7	0.0	0.0	34.4	54.0	-19.6	H	A	
10.620	3.0	34.7	38.3	9.7	-35.7	0.0	0.0	47.0	74.0	-27.0	V	P	
10.620	3.0	22.3	38.3	9.7	-35.7	0.0	0.0	34.5	54.0	-19.5	V	A	

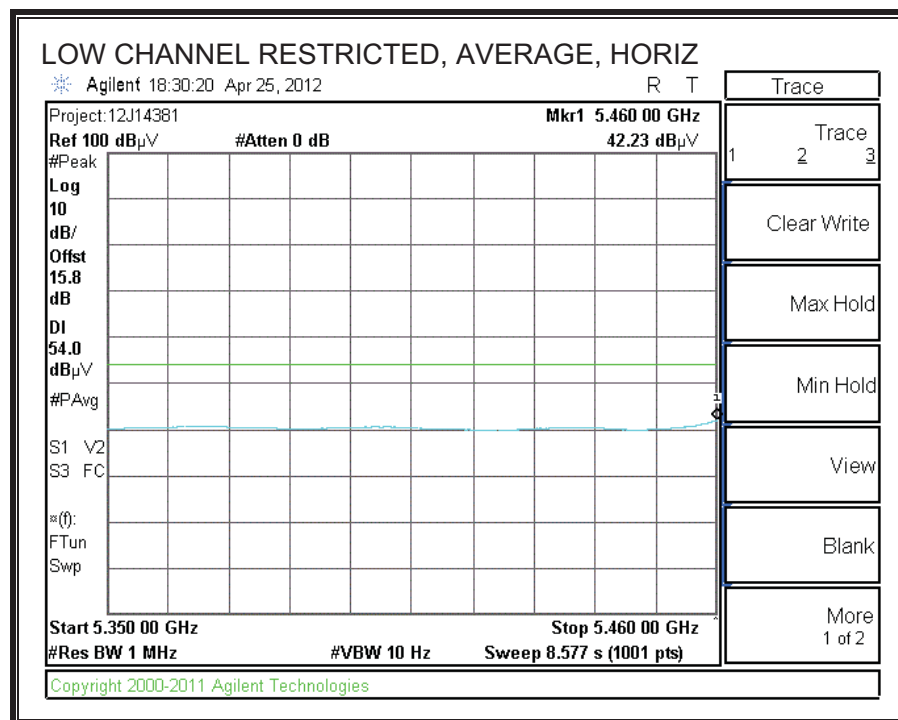
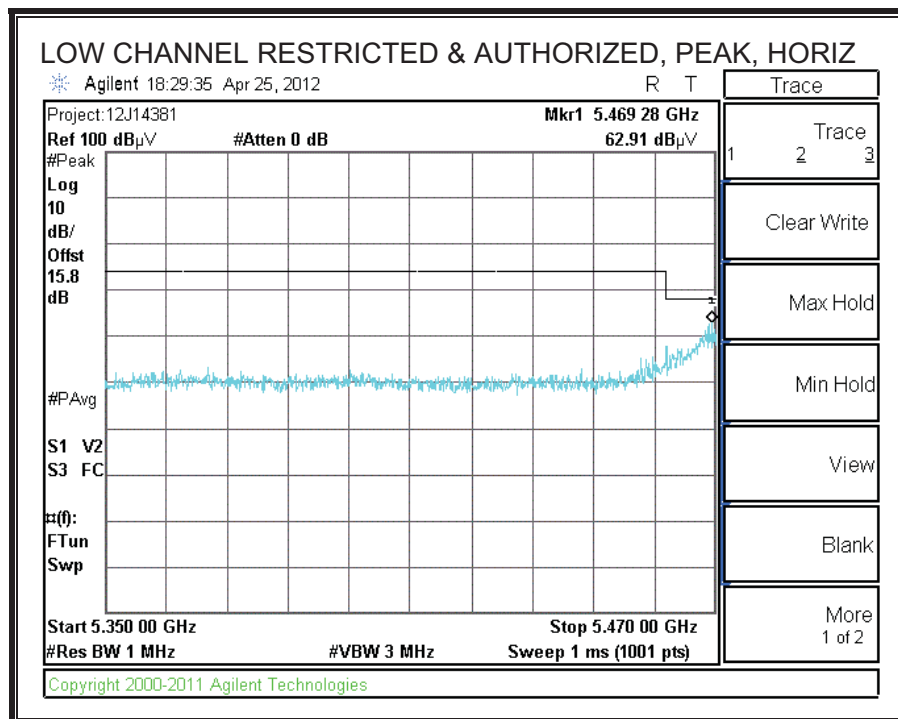
Rev. 4.1.2.7

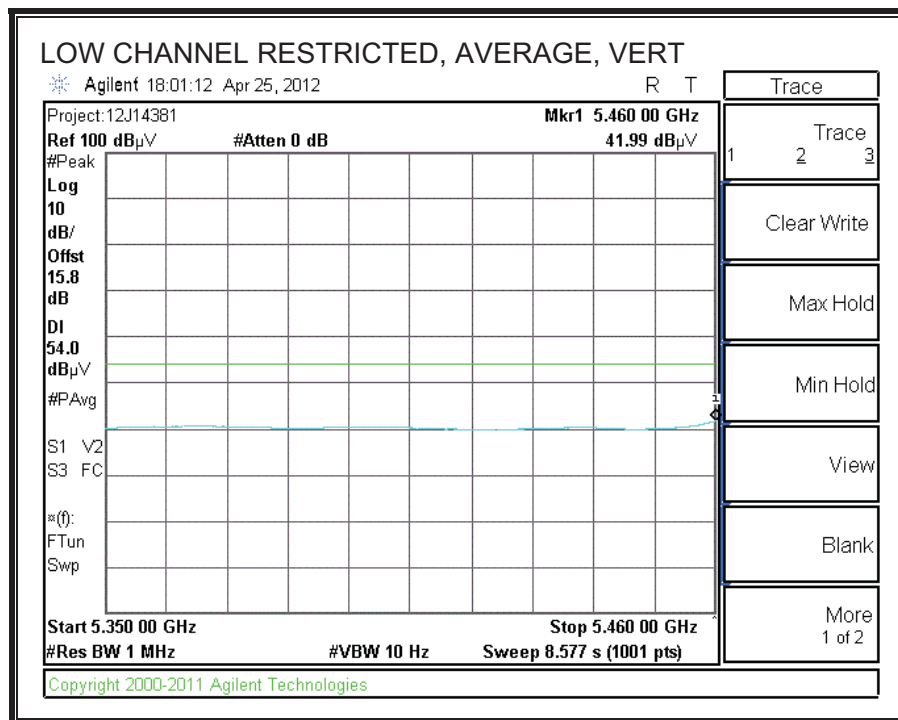
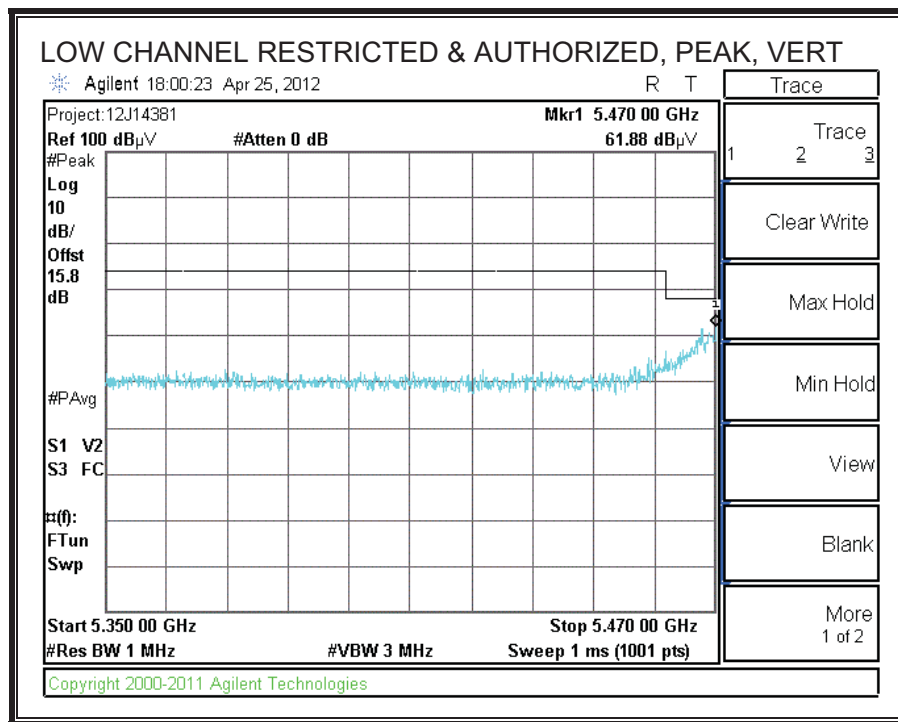
Note: No other emissions were detected above the system noise floor.

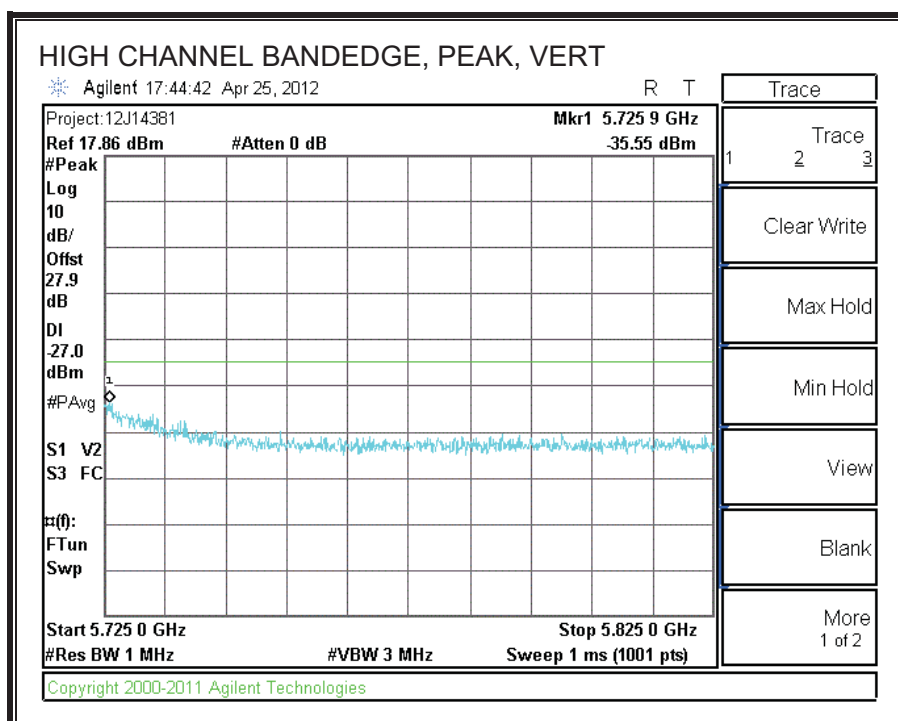
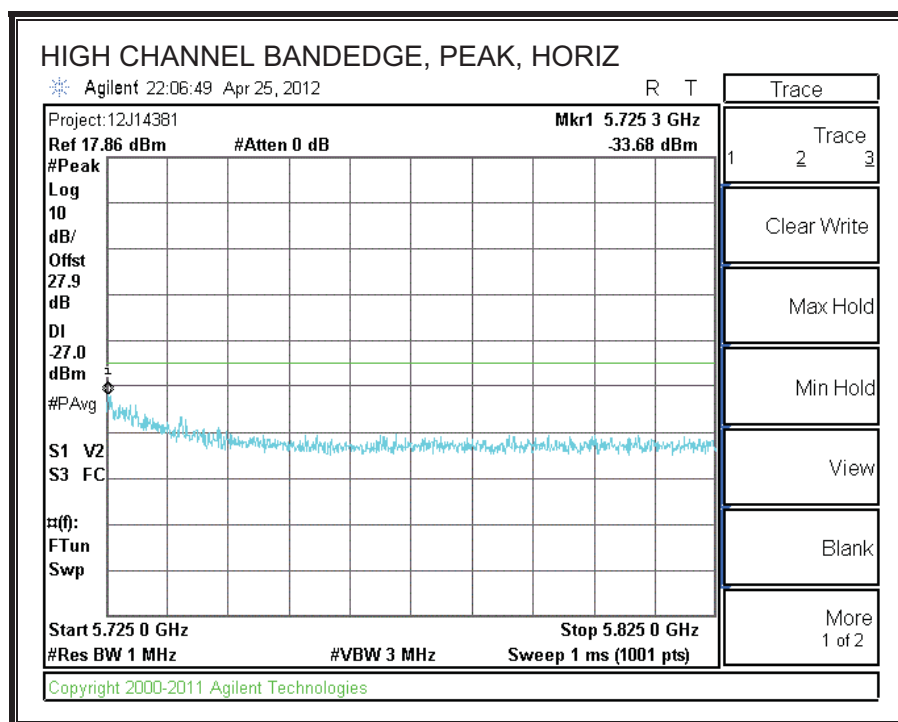
7.4. TRANSMITTER ABOVE 1 GHz AT 5.6 GHz BAND

7.4.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL) CHAIN B





AUTHORIZED BANDEDGE (HIGH CHANNEL)

HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 05/22/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11a, CHAIN B

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	

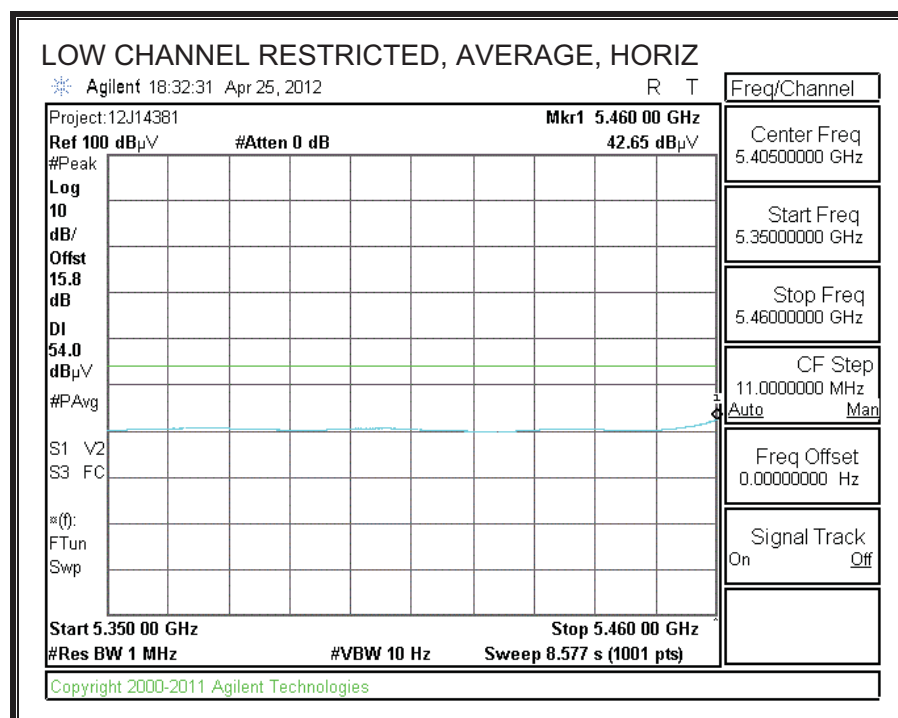
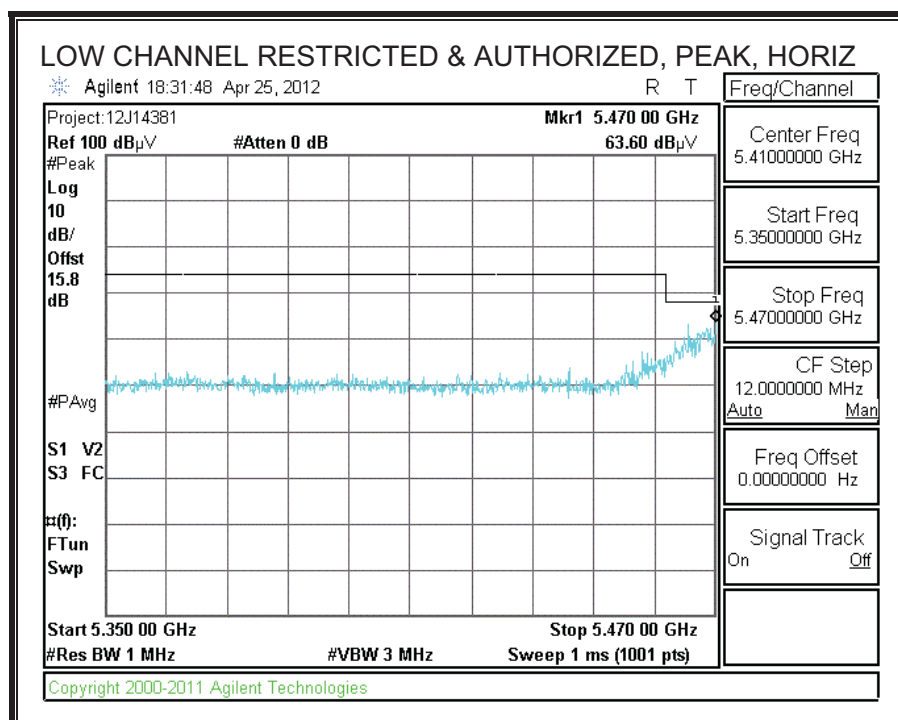
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5500 MHz)													
11.000	3.0	36.2	38.4	10.2	-35.6	0.0	0.0	49.1	74.0	-24.9	H	P	
11.000	3.0	22.5	38.4	10.2	-35.6	0.0	0.0	35.4	54.0	-18.6	H	A	
16.500	3.0	36.1	38.8	12.7	-33.7	0.0	0.0	54.0	74.0	-20.0	H	P	
16.500	3.0	22.5	38.8	12.7	-33.7	0.0	0.0	40.3	54.0	-13.7	H	A	
11.000	3.0	35.7	38.4	10.2	-35.6	0.0	0.0	48.5	74.0	-25.5	V	P	
11.000	3.0	22.3	38.4	10.2	-35.6	0.0	0.0	35.2	54.0	-18.8	V	A	
16.500	3.0	35.4	38.8	12.7	-33.7	0.0	0.0	53.2	74.0	-20.8	V	P	
16.500	3.0	22.5	38.8	12.7	-33.7	0.0	0.0	40.4	54.0	-13.6	V	A	
Mid Channel (5600 MHz)													
11.200	3.0	34.7	38.5	10.4	-35.6	0.0	0.0	48.1	74.0	-25.9	H	P	
11.200	3.0	22.2	38.5	10.4	-35.6	0.0	0.0	35.5	54.0	-18.5	H	A	
16.800	3.0	35.0	39.7	12.8	-33.6	0.0	0.0	54.0	74.0	-20.0	H	P	
16.800	3.0	22.4	39.7	12.8	-33.6	0.0	0.0	41.3	54.0	-12.7	H	A	
11.200	3.0	34.7	38.5	10.4	-35.6	0.0	0.0	48.1	74.0	-25.9	V	P	
11.200	3.0	22.2	38.5	10.4	-35.6	0.0	0.0	35.5	54.0	-18.5	V	A	
16.800	3.0	36.0	39.7	12.8	-33.6	0.0	0.0	55.0	74.0	-19.0	V	P	
16.800	3.0	22.4	39.7	12.8	-33.6	0.0	0.0	41.4	54.0	-12.6	V	A	
High Channel (5700 MHz)													
11.400	3.0	35.3	38.7	10.6	-35.6	0.0	0.0	49.1	74.0	-24.9	H	P	
11.400	3.0	22.1	38.7	10.6	-35.6	0.0	0.0	35.9	54.0	-18.1	H	A	
17.100	3.0	35.8	40.9	13.0	-33.5	0.0	0.0	56.2	74.0	-17.8	H	P	
17.100	3.0	23.3	40.9	13.0	-33.5	0.0	0.0	43.7	54.0	-10.3	H	A	
11.400	3.0	34.0	38.7	10.6	-35.6	0.0	0.0	47.8	74.0	-26.2	V	P	
11.400	3.0	22.0	38.7	10.6	-35.6	0.0	0.0	35.8	54.0	-18.2	V	A	
17.100	3.0	35.8	40.9	13.0	-33.5	0.0	0.0	56.2	74.0	-17.8	V	P	
17.100	3.0	23.3	40.9	13.0	-33.5	0.0	0.0	43.7	54.0	-10.3	V	A	

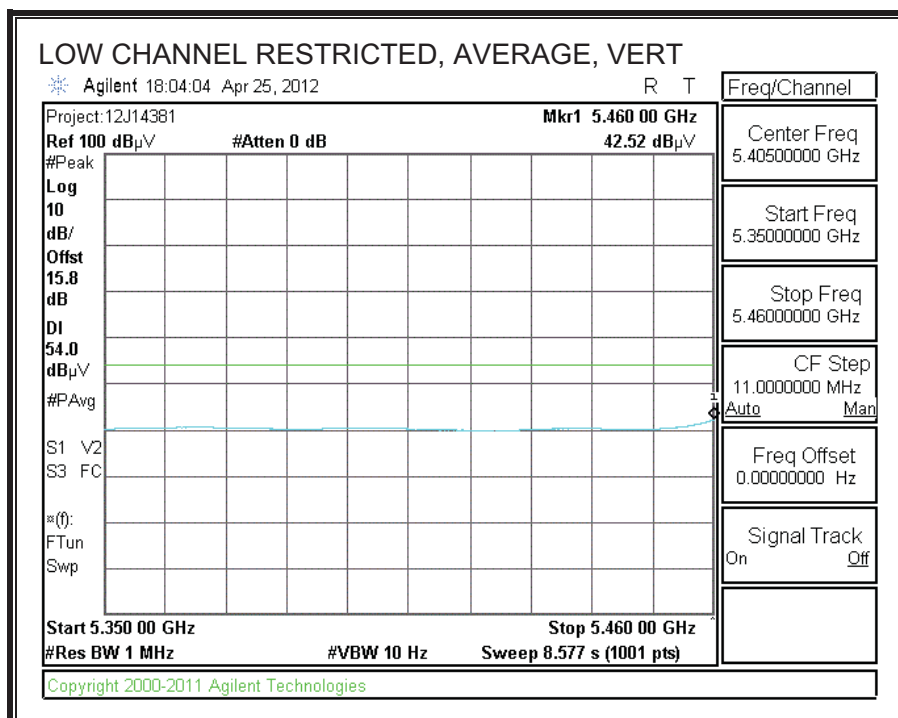
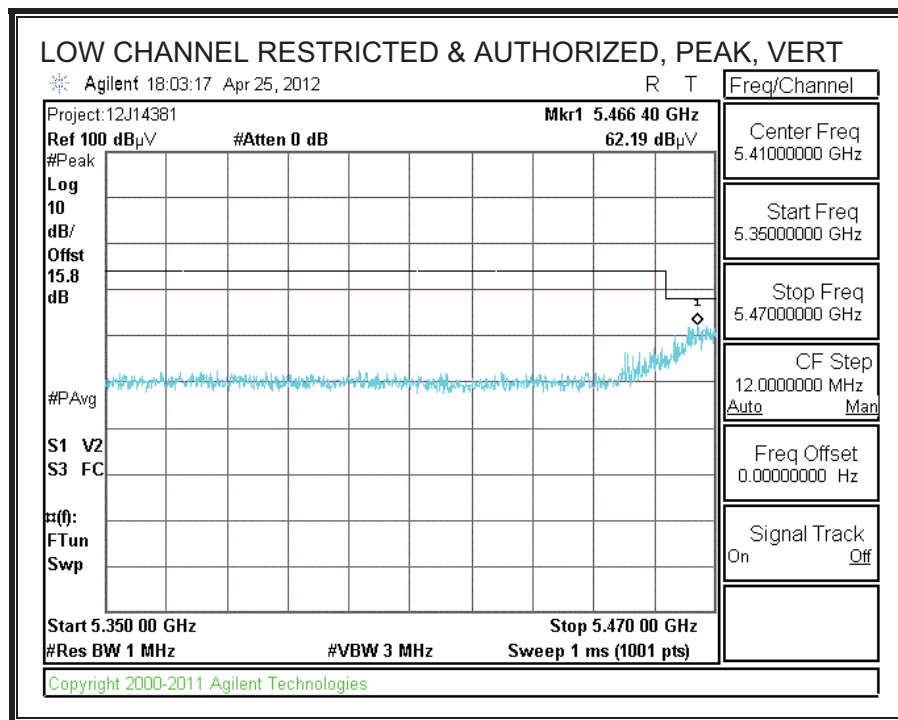
Rev. 4.1.2.7

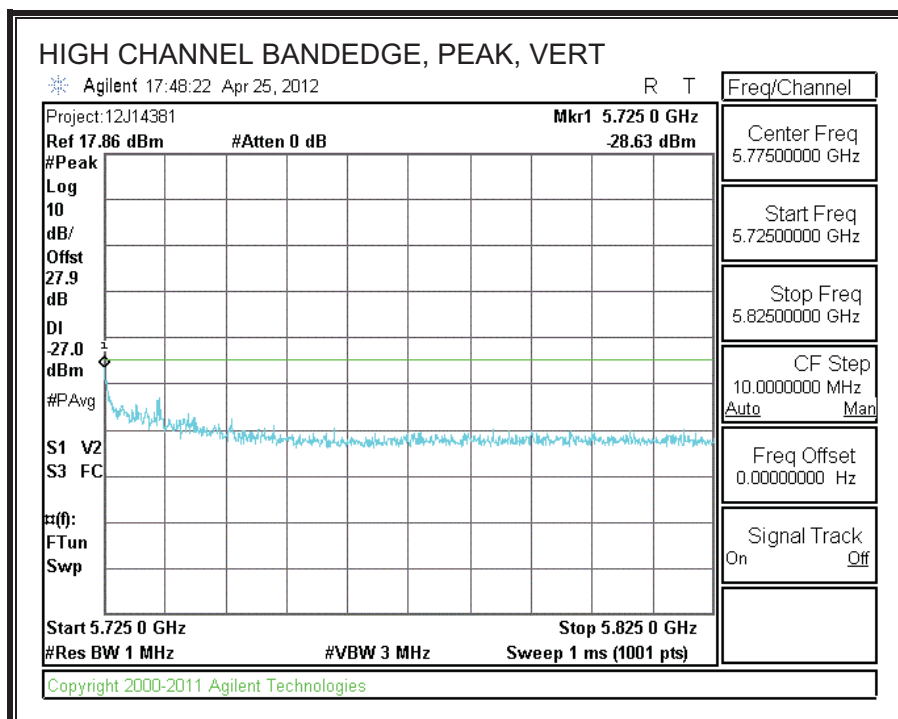
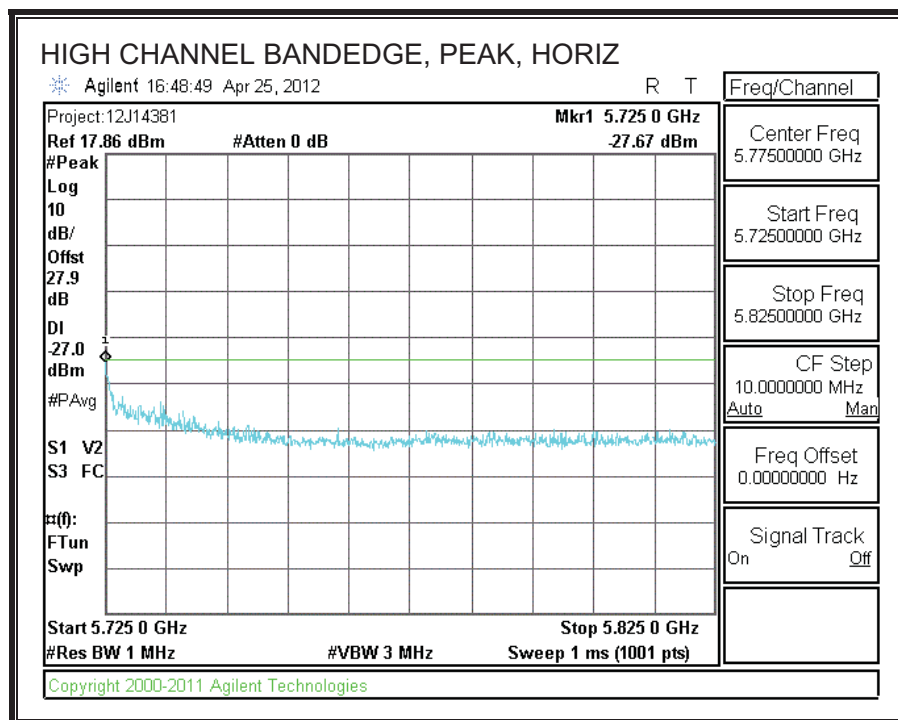
Note: No other emissions were detected above the system noise floor.

7.4.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL) CHAIN B





AUTHORIZED BANDEDGE (HIGH CHANNEL)

HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 04/28/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11n HT20 MHz, CHAIN B

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	

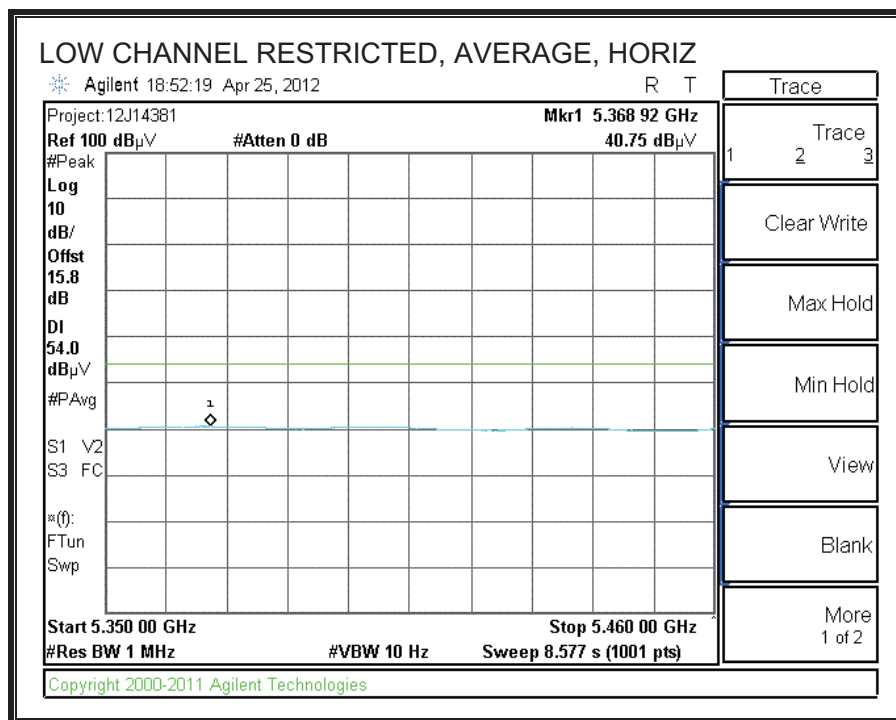
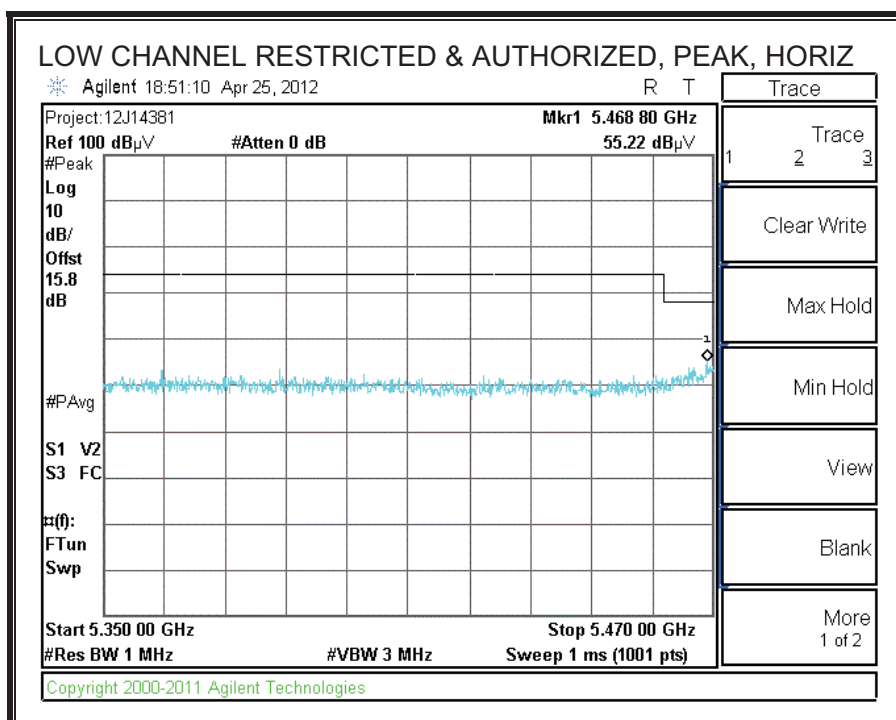
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Channel (5500 MHz)													
11.000	3.0	35.3	38.4	10.2	-35.6	0.0	0.0	48.2	74.0	-25.8	H	P	
11.000	3.0	22.3	38.4	10.2	-35.6	0.0	0.0	35.1	54.0	-18.9	H	A	
16.500	3.0	35.6	38.8	12.7	-33.7	0.0	0.0	53.5	74.0	-20.5	H	P	
16.500	3.0	22.2	38.8	12.7	-33.7	0.0	0.0	40.0	54.0	-14.0	H	A	
11.000	3.0	35.2	38.4	10.2	-35.6	0.0	0.0	48.1	74.0	-25.9	V	P	
11.000	3.0	22.1	38.4	10.2	-35.6	0.0	0.0	35.0	54.0	-19.0	V	A	
16.500	3.0	34.5	38.8	12.7	-33.7	0.0	0.0	52.3	74.0	-21.7	V	P	
16.500	3.0	22.2	38.8	12.7	-33.7	0.0	0.0	40.1	54.0	-13.9	V	A	
Mid Channel (5600 MHz)													
11.200	3.0	36.2	38.5	10.4	-35.6	0.0	0.0	49.6	74.0	-24.4	H	P	
11.200	3.0	21.8	38.5	10.4	-35.6	0.0	0.0	35.1	54.0	-18.9	H	A	
11.200	3.0	34.4	38.5	10.4	-35.6	0.0	0.0	47.7	74.0	-26.3	V	P	
11.200	3.0	21.9	38.5	10.4	-35.6	0.0	0.0	35.2	54.0	-18.8	V	A	
High Channel (5700 MHz)													
11.400	3.0	34.1	38.7	10.6	-35.6	0.0	0.0	47.9	74.0	-26.1	H	P	
11.400	3.0	21.7	38.7	10.6	-35.6	0.0	0.0	35.6	54.0	-18.4	H	A	
11.400	3.0	33.5	38.7	10.6	-35.6	0.0	0.0	47.3	74.0	-26.7	V	P	
11.400	3.0	21.8	38.7	10.6	-35.6	0.0	0.0	35.6	54.0	-18.4	V	A	

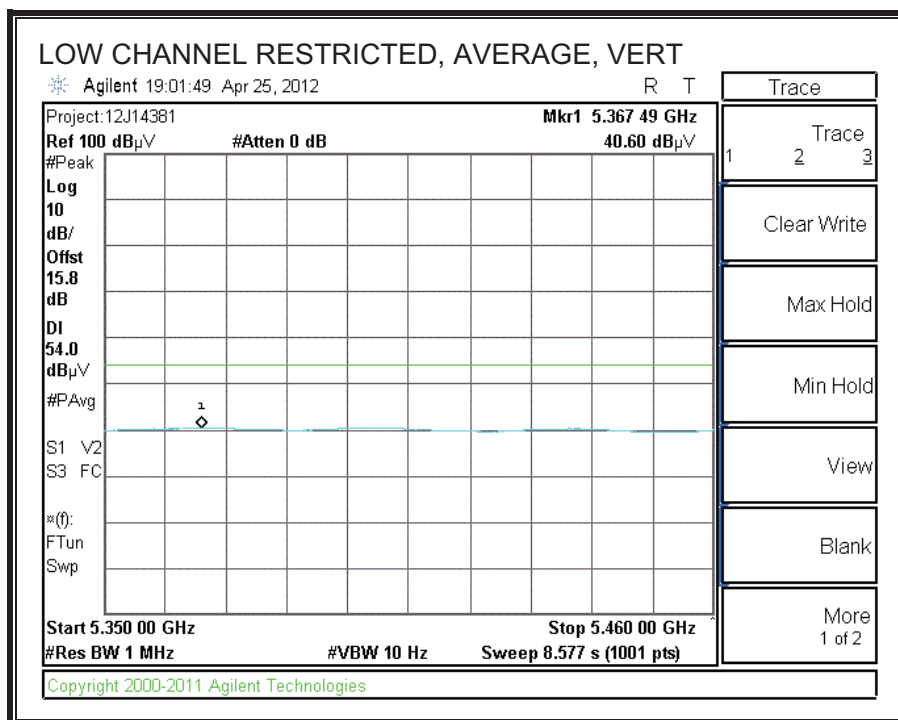
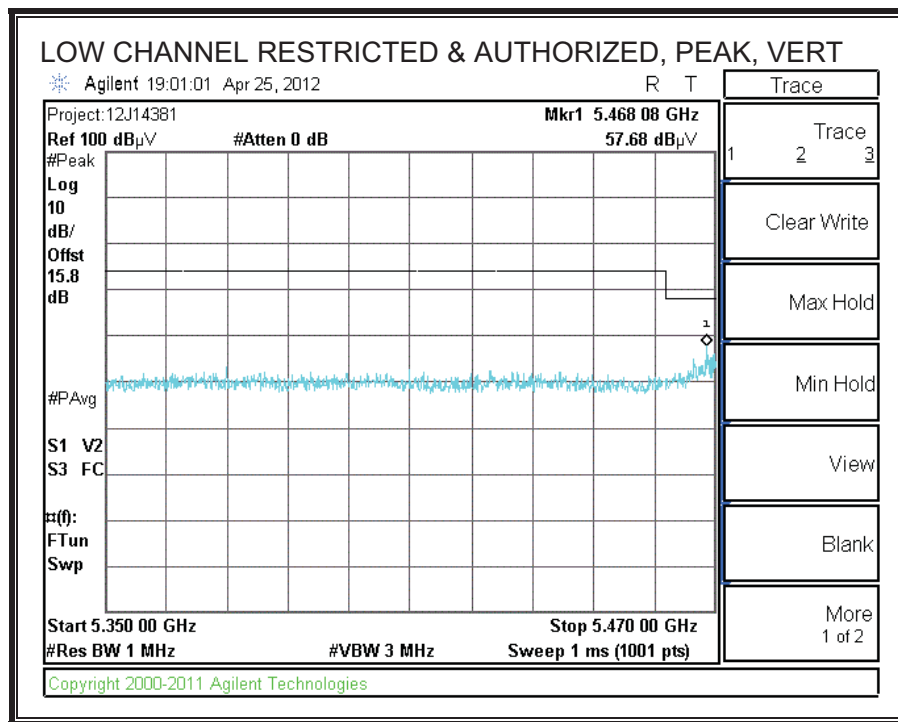
Rev. 4.1.2.7

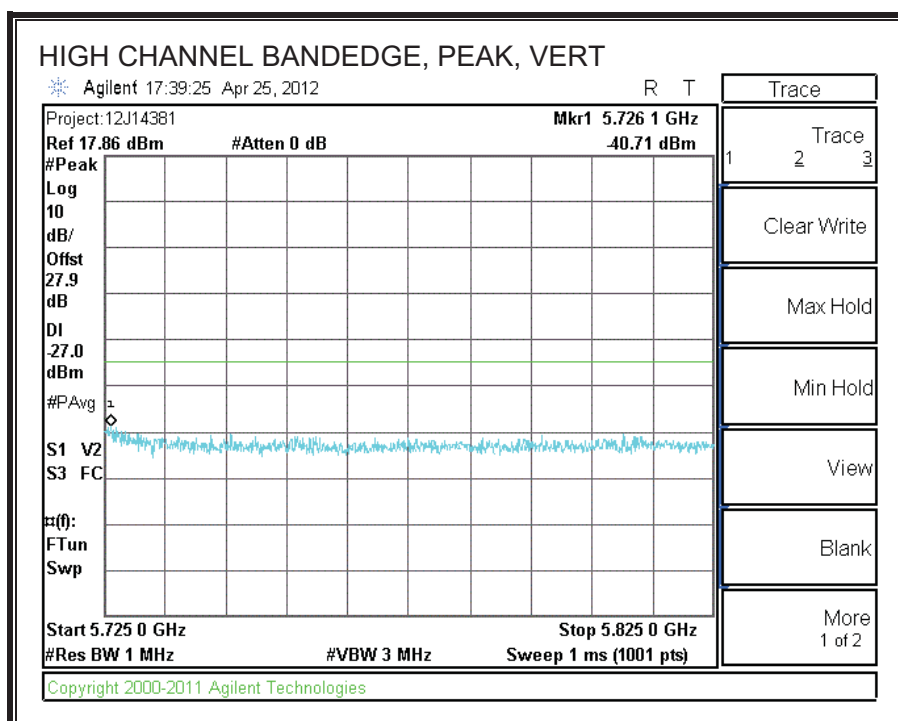
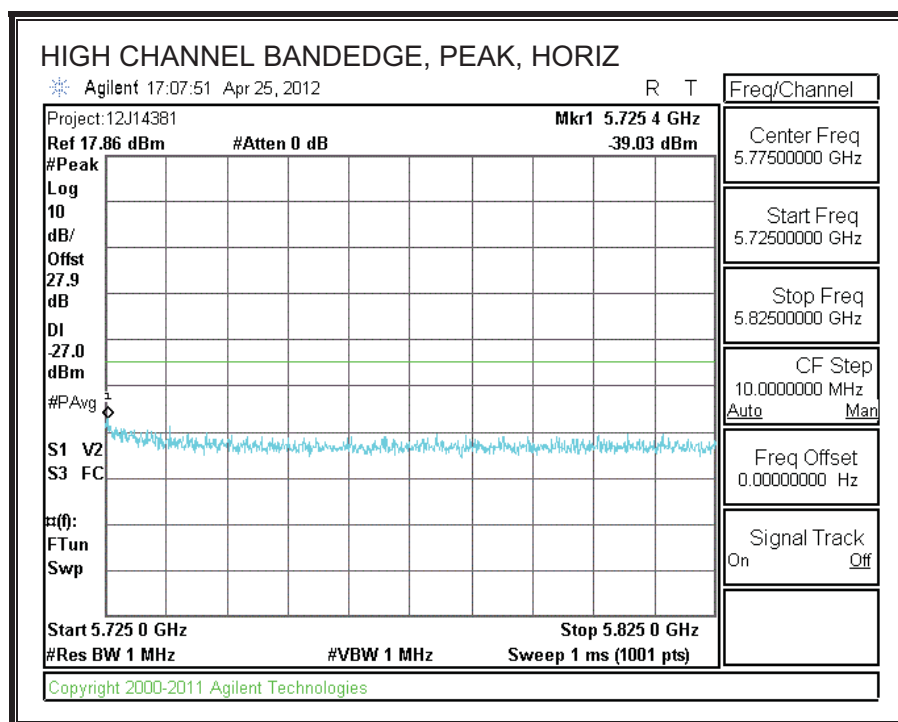
Note: No other emissions were detected above the system noise floor.

7.4.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL) CHAIN A AND B





AUTHORIZED BANDEDGE (HIGH CHANNEL)

HARMONICS AND SPURIOUS EMISSIONS
High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
 Date: 04/28/12
 Project #: 12J14381
 Company: PANASONIC
 Test Target: FCC CFR47 PART 15
 Mode Oper: TX, 802.11n HT20 MHz, CHAIN A AND B

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	

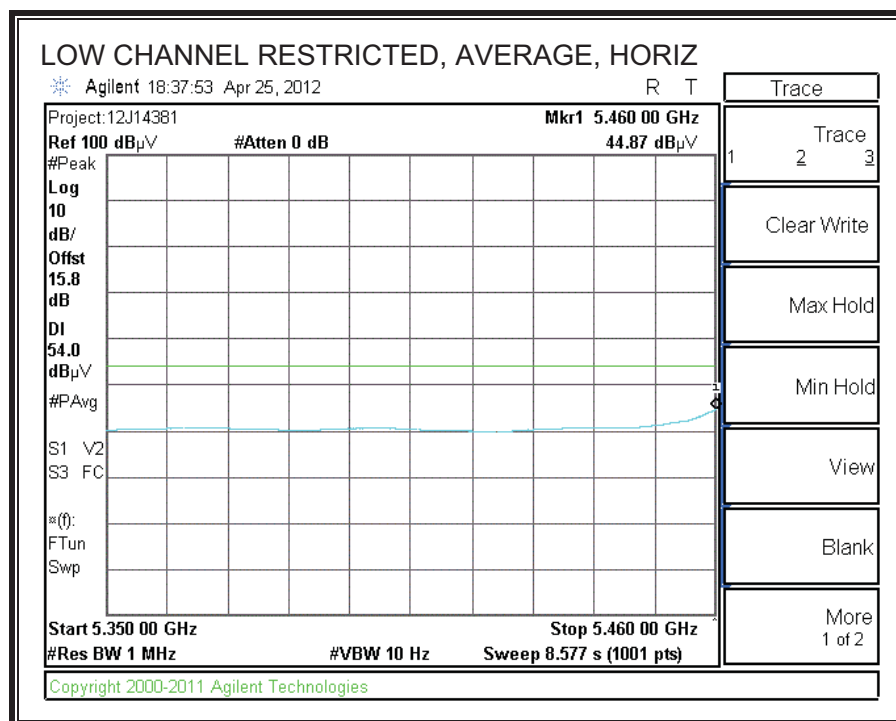
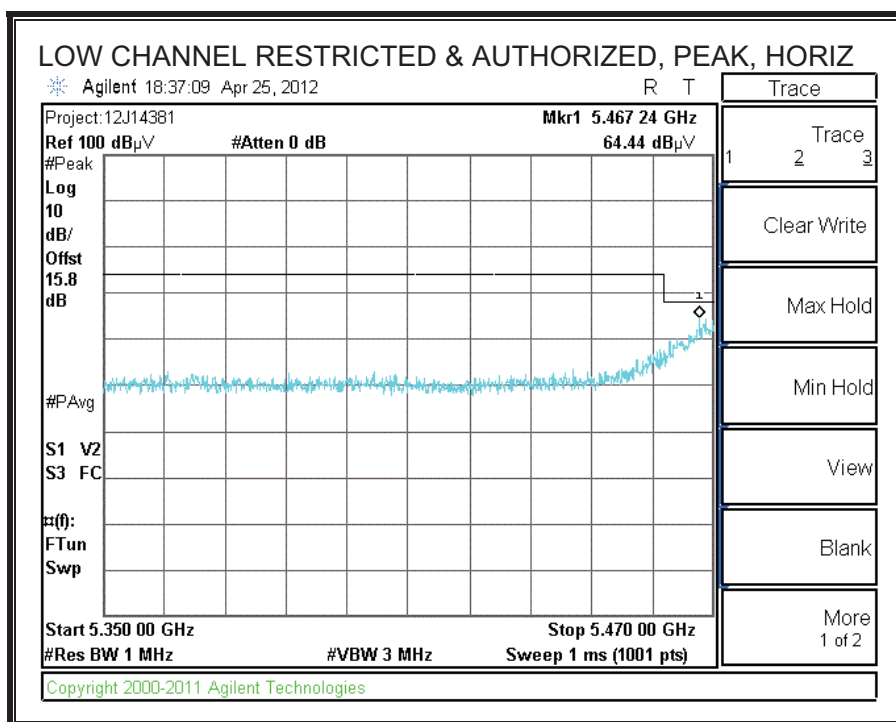
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5500 MHz)													
11.000	3.0	38.3	38.4	10.2	-35.6	0.0	0.0	51.1	74.0	-22.9	H	P	
11.000	3.0	22.9	38.4	10.2	-35.6	0.0	0.0	35.8	54.0	-18.2	H	A	
11.000	3.0	34.8	38.4	10.2	-35.6	0.0	0.0	47.7	74.0	-26.3	V	P	
11.000	3.0	22.3	38.4	10.2	-35.6	0.0	0.0	35.1	54.0	-18.9	V	A	
Mid Channel (5600 MHz)													
11.200	3.0	36.0	38.5	10.4	-35.6	0.0	0.0	49.3	74.0	-24.7	H	P	
11.200	3.0	22.5	38.5	10.4	-35.6	0.0	0.0	35.9	54.0	-18.1	H	A	
11.200	3.0	35.3	38.5	10.4	-35.6	0.0	0.0	48.6	74.0	-25.4	V	P	
11.200	3.0	22.2	38.5	10.4	-35.6	0.0	0.0	35.5	54.0	-18.5	V	A	
High Channel (5700 MHz)													
11.400	3.0	34.5	38.7	10.6	-35.6	0.0	0.0	48.3	74.0	-25.7	H	P	
11.400	3.0	22.0	38.7	10.6	-35.6	0.0	0.0	35.8	54.0	-18.2	H	A	
17.100	3.0	35.5	40.9	13.0	-33.5	0.0	0.0	55.9	74.0	-18.1	H	P	
17.100	3.0	23.0	40.9	13.0	-33.5	0.0	0.0	43.4	54.0	-10.6	H	A	
11.400	3.0	34.2	38.7	10.6	-35.6	0.0	0.0	48.0	74.0	-26.0	V	P	
11.400	3.0	21.7	38.7	10.6	-35.6	0.0	0.0	35.5	54.0	-18.5	V	A	
17.100	3.0	35.2	40.9	13.0	-33.5	0.0	0.0	55.6	74.0	-18.4	V	P	
17.100	3.0	23.0	40.9	13.0	-33.5	0.0	0.0	43.4	54.0	-10.6	V	A	

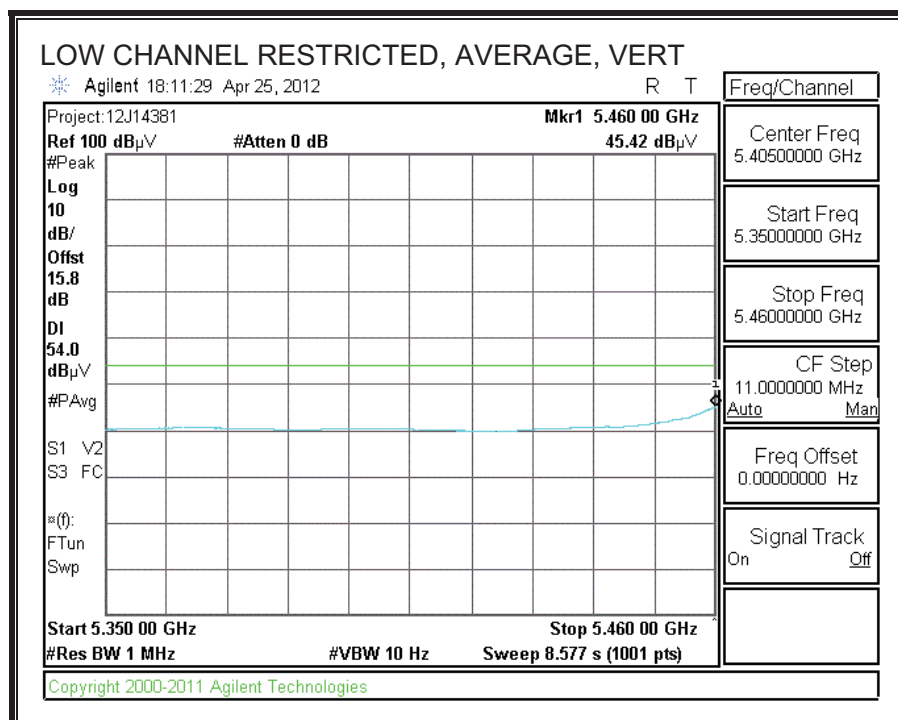
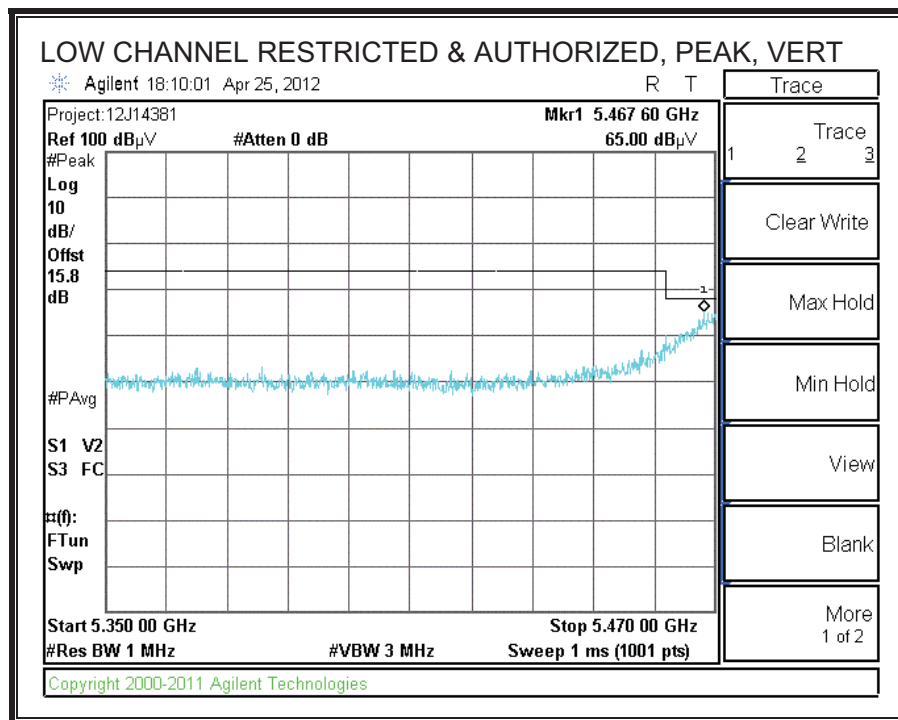
Rev. 4.1.2.7

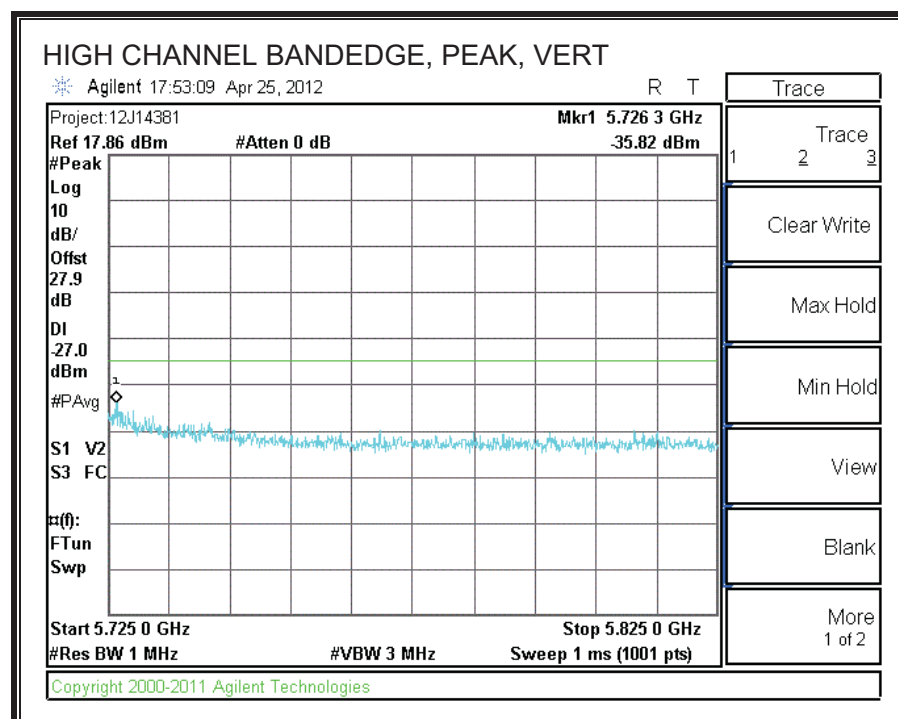
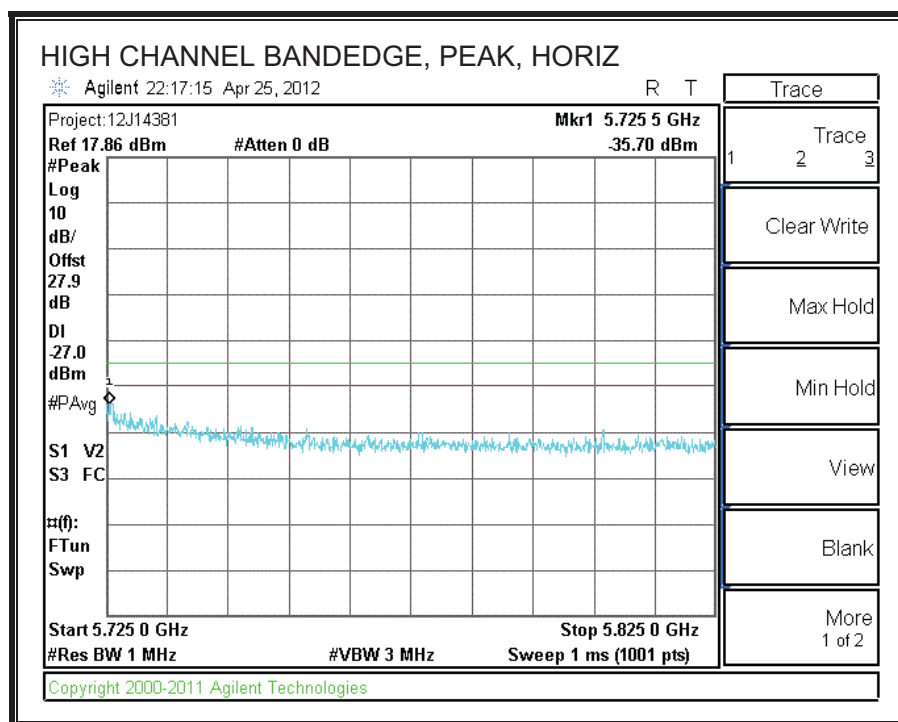
Note: No other emissions were detected above the system noise floor.

7.4.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL) CHAIN B





AUTHORIZED BANDEDGE (HIGH CHANNEL)

HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA

Date: 04/27/12

Project #: 12J14381

Company: PANASONIC

Test Target: FCC CFR47 PART 15

Mode Oper: TX, 802.11n HT40 MHz, CHAIN B

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	

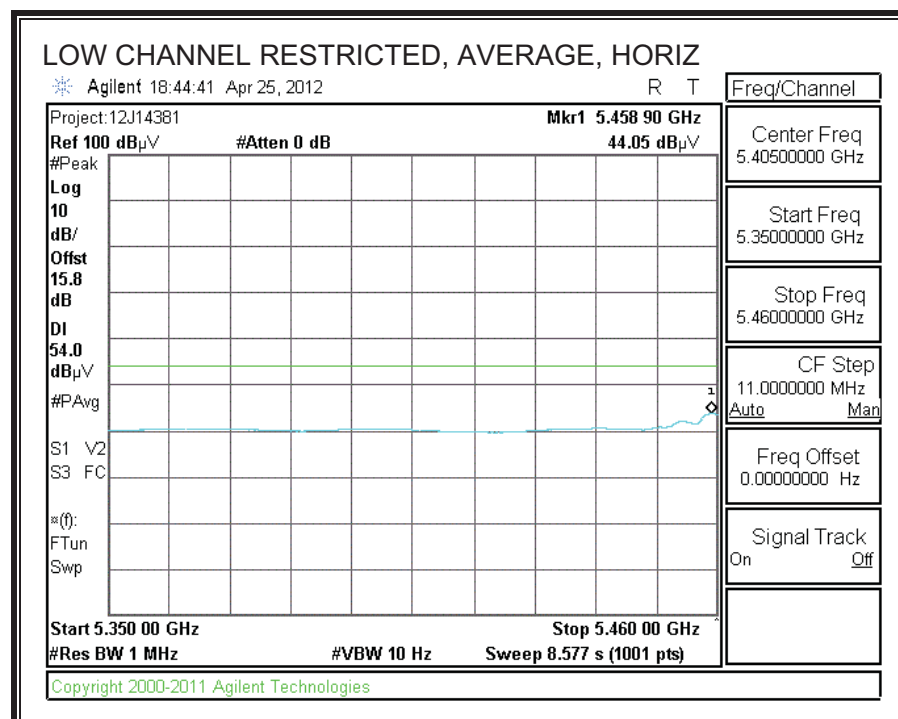
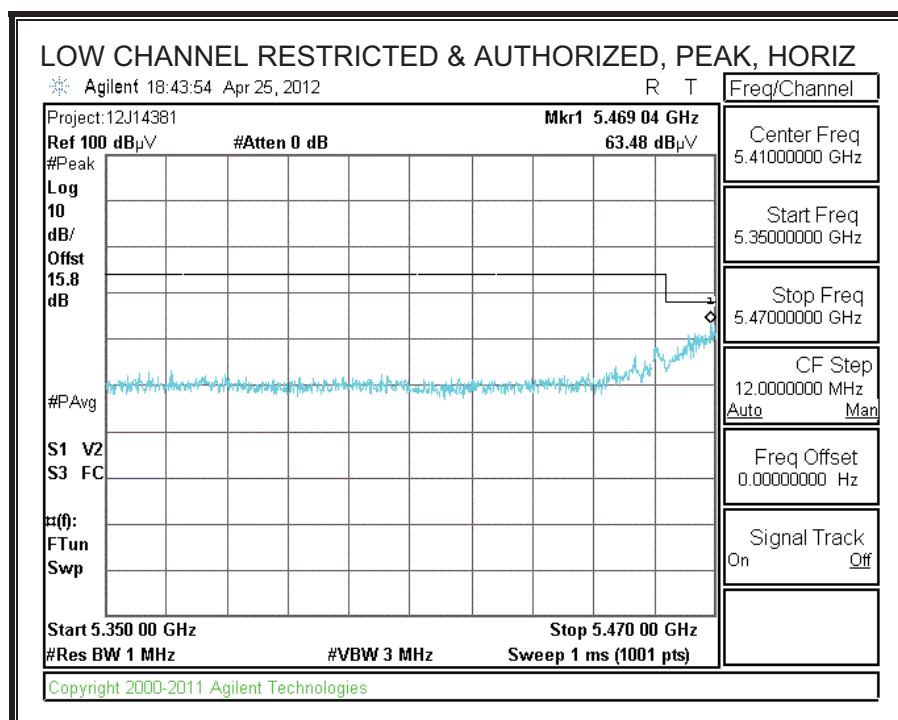
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Channel (5510 MHz)													
11.020	3.0	34.7	38.4	10.2	-35.6	0.0	0.0	47.6	74.0	-26.4	H	P	
11.020	3.0	22.2	38.4	10.2	-35.6	0.0	0.0	35.1	54.0	-18.9	H	A	
11.020	3.0	35.2	38.4	10.2	-35.6	0.0	0.0	48.1	74.0	-25.9	V	P	
11.020	3.0	22.2	38.4	10.2	-35.6	0.0	0.0	35.1	54.0	-18.9	V	A	
Mid Channel (5590 MHz)													
11.180	3.0	34.2	38.5	10.4	-35.6	0.0	0.0	47.5	74.0	-26.5	H	P	
11.180	3.0	22.1	38.5	10.4	-35.6	0.0	0.0	35.3	54.0	-18.7	H	A	
16.770	3.0	34.9	39.6	12.8	-33.6	0.0	0.0	53.8	74.0	-20.2	H	P	
16.770	3.0	22.2	39.6	12.8	-33.6	0.0	0.0	41.1	54.0	-12.9	H	A	
11.180	3.0	35.7	38.5	10.4	-35.6	0.0	0.0	49.0	74.0	-25.0	V	P	
11.180	3.0	22.0	38.5	10.4	-35.6	0.0	0.0	35.2	54.0	-18.8	V	A	
16.770	3.0	35.3	39.6	12.8	-33.6	0.0	0.0	54.1	74.0	-19.9	V	P	
16.770	3.0	22.2	39.6	12.8	-33.6	0.0	0.0	41.1	54.0	-12.9	V	A	
High Channel (5670 MHz)													
11.340	3.0	33.0	38.7	10.6	-35.6	0.0	0.0	46.6	74.0	-27.4	H	P	
11.340	3.0	21.3	38.7	10.6	-35.6	0.0	0.0	35.0	54.0	-19.0	H	A	
11.340	3.0	35.2	38.7	10.6	-35.6	0.0	0.0	48.9	74.0	-25.1	V	P	
11.340	3.0	21.4	38.7	10.6	-35.6	0.0	0.0	35.1	54.0	-18.9	V	A	

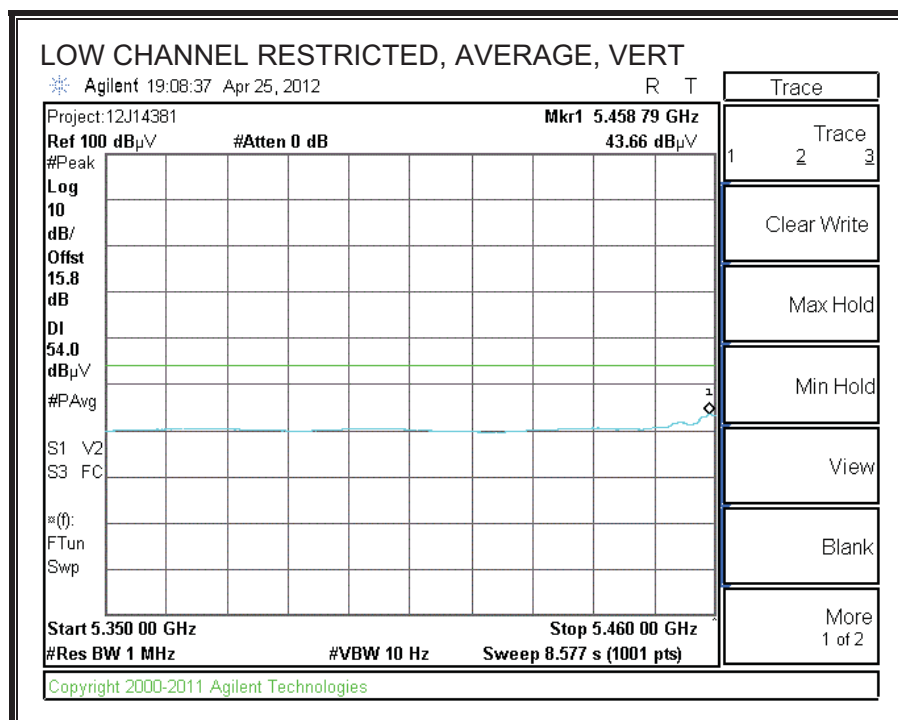
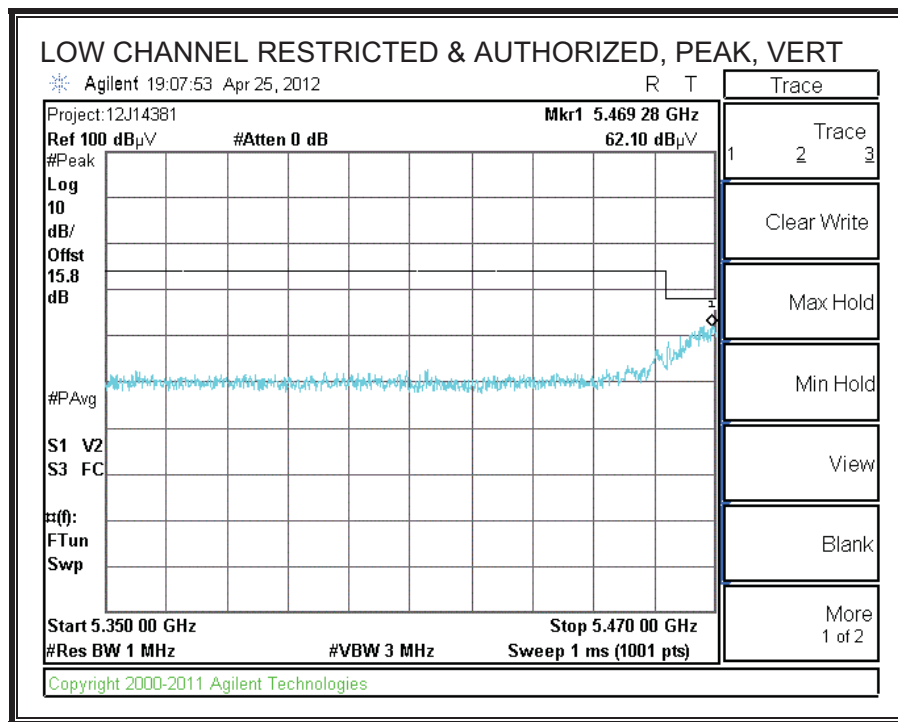
Rev. 4.1.2.7

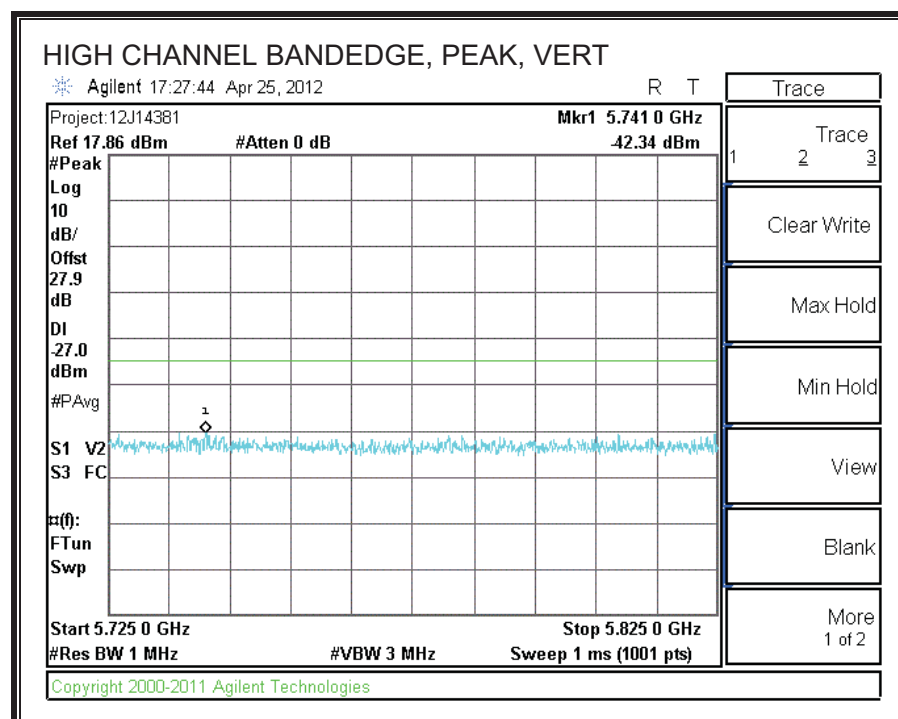
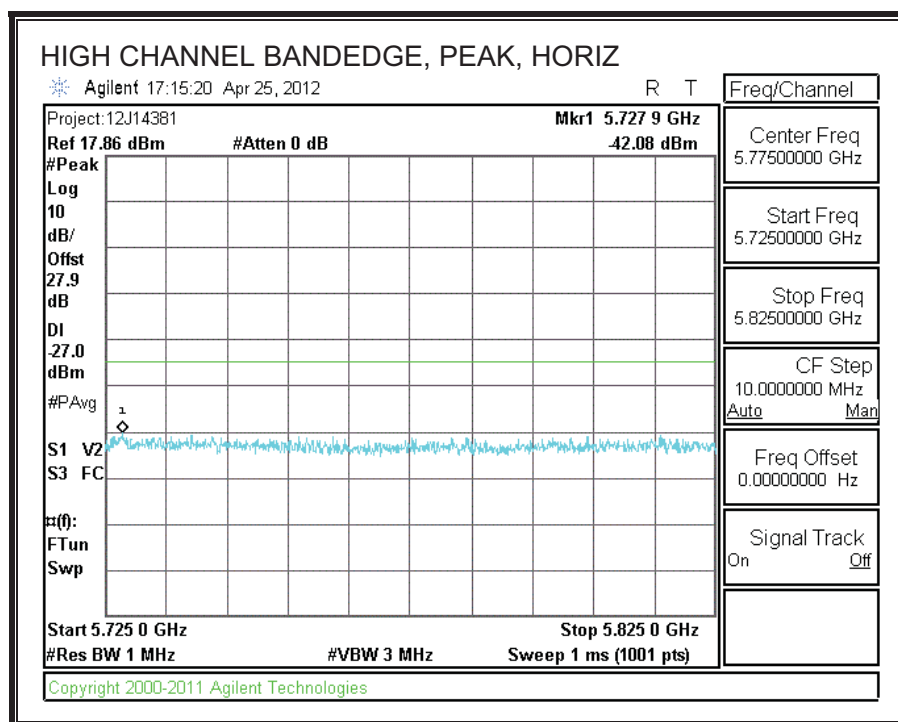
Note: No other emissions were detected above the system noise floor.

7.4.5. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL) CHAIN A AND B





AUTHORIZED BANDEDGE (HIGH CHANNEL)

HARMONICS AND SPURIOUS EMISSIONS**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA

Date: 05/02/12

Project #: 12J14381

Company: PANASONIC

Test Target: FCC CFR47 PART 15

Mode Oper: TX, 802.11n HT40 MHz, CHAIN A AND B

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	

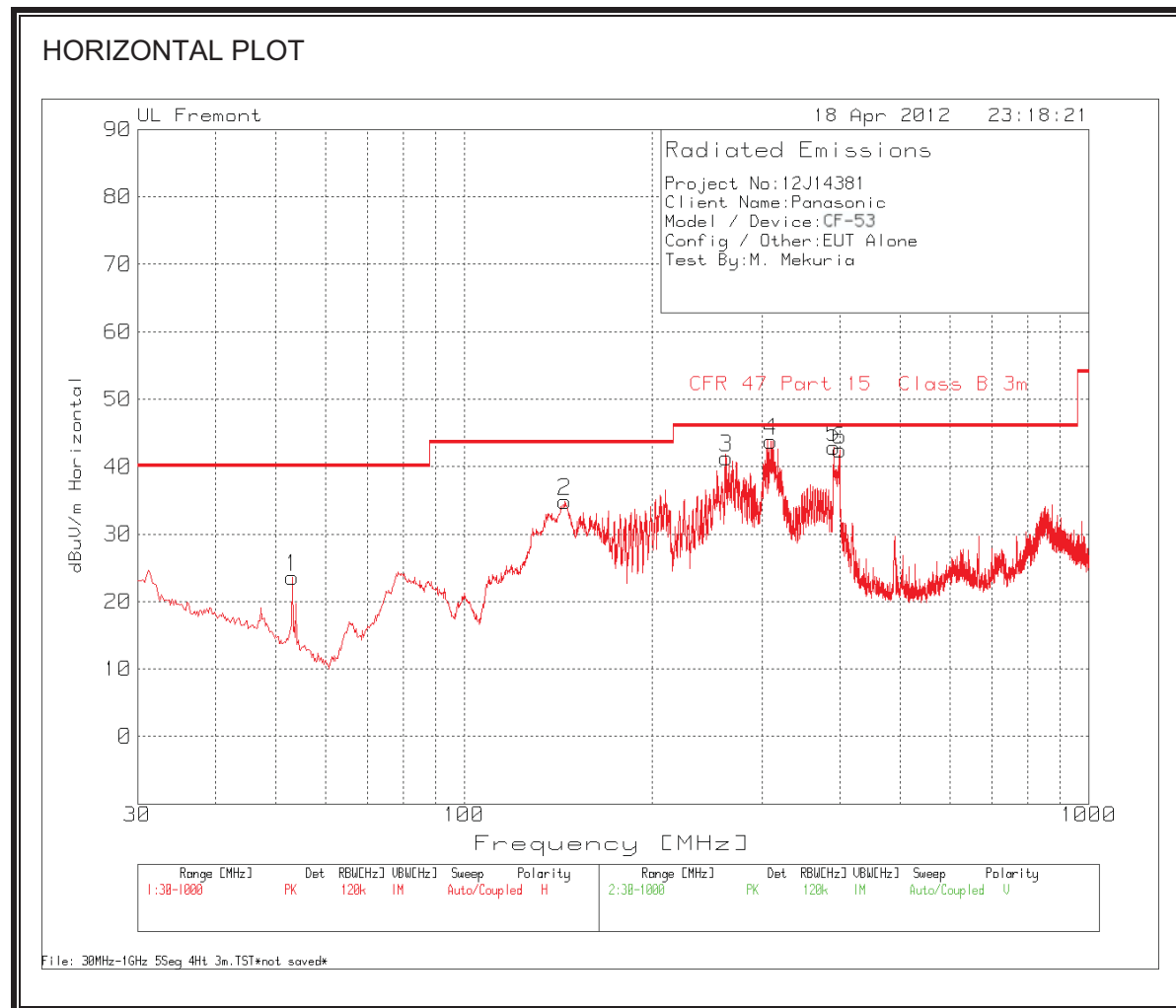
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/Q/P	Notes
Low Channel (5510 MHz)													
11.020	3.0	34.7	38.4	10.2	-35.6	0.0	0.0	47.6	74.0	-26.4	H	P	
11.020	3.0	22.2	38.4	10.2	-35.6	0.0	0.0	35.1	54.0	-18.9	H	A	
11.020	3.0	35.0	38.4	10.2	-35.6	0.0	0.0	47.9	74.0	-26.1	V	P	
11.020	3.0	22.6	38.4	10.2	-35.6	0.0	0.0	35.5	54.0	-18.5	V	A	
Mid Channel (5590 MHz)													
11.180	3.0	34.3	38.5	10.4	-35.6	0.0	0.0	47.6	74.0	-26.4	H	P	
11.180	3.0	22.1	38.5	10.4	-35.6	0.0	0.0	35.4	54.0	-18.6	H	A	
11.180	3.0	34.5	38.5	10.4	-35.6	0.0	0.0	47.8	74.0	-26.2	V	P	
11.180	3.0	22.1	38.5	10.4	-35.6	0.0	0.0	35.4	54.0	-18.6	V	A	
High Channel (5670 MHz)													
11.340	3.0	34.8	38.7	10.6	-35.6	0.0	0.0	48.5	74.0	-25.5	H	P	
11.340	3.0	21.5	38.7	10.6	-35.6	0.0	0.0	35.2	54.0	-18.8	H	A	
11.340	3.0	34.4	38.7	10.6	-35.6	0.0	0.0	48.1	74.0	-25.9	V	P	
11.340	3.0	21.6	38.7	10.6	-35.6	0.0	0.0	35.3	54.0	-18.7	V	A	

Rev. 4.1.2.7

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

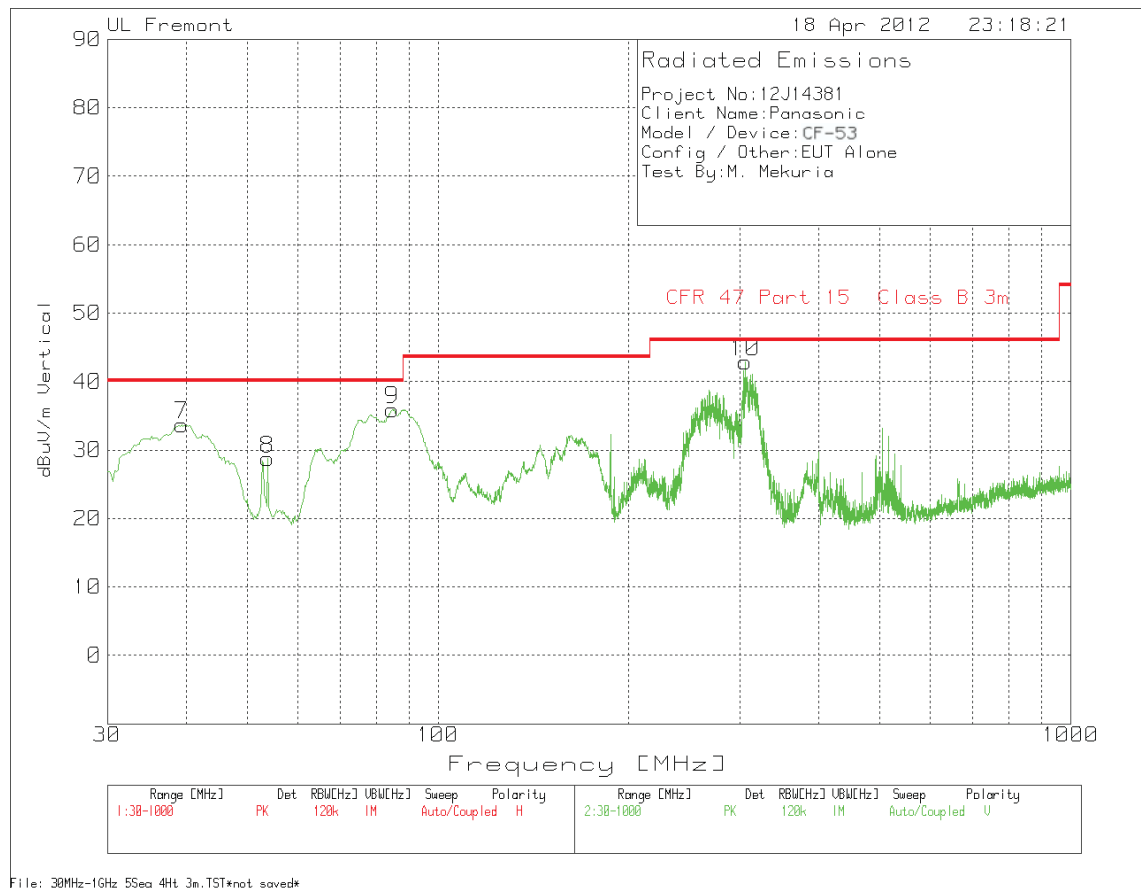
7.5. WORST-CASE BELOW 1 GHz

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



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

VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

Project No:12J14381									
Client Name:Panasonic									
Model / Device:CF-53									
Config / Other:EUT Alone									
Test By:M. Mekuria									
Range 1 30 - 1000MHz									
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX [dB]	T243 Sunol Bilog.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
53.0675	43.65	PK	-27.3	7.3	23.65	40	-16.35	300	Horz
145.1439	49.12	PK	-26.6	12.3	34.82	43.5	-8.68	200	Horz
263.1954	54.59	PK	-25.9	12.6	41.29	46	-4.71	100	Horz
263.1954	41.98	QP	-25.9	12.6	28.69	46	-17.32	100	Horz
310.4936	56.09	PK	-25.8	13.5	43.79	46	-2.21	100	Horz
310.4936	48.09	QP	-25.8	13.5	35.79	46	-10.21	100	Horz
390.5516	53.14	PK	-25.4	15.1	42.84	46	-3.16	300	Horz
390.5516	44.87	QP	-25.4	15.1	34.57	46	-11.43	300	Horz
399.4684	52.22	PK	-25.3	15.6	42.52	46	-3.48	300	Horz
399.4684	44.31	QP	-25.3	15.6	34.61	46	-11.39	300	Horz
Range 2 30 - 1000MHz									
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX [dB]	T243 Sunol Bilog.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
39.3046	46.63	PK	-27.4	14.5	33.73	40	-6.27	100	Vert
53.8429	48.71	PK	-27.3	7.3	28.71	40	-11.29	100	Vert
84.7612	55.74	PK	-27.1	7.3	35.94	40	-4.06	100	Vert
84.7612	45.33	QP	-27.1	7.3	25.53	40	-14.47	100	Vert
306.229	55.38	PK	-25.8	13.3	42.88	46	-3.12	200	Vert
306.229	45.18	QP	-25.8	13.3	32.68	46	-13.32	200	Vert

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

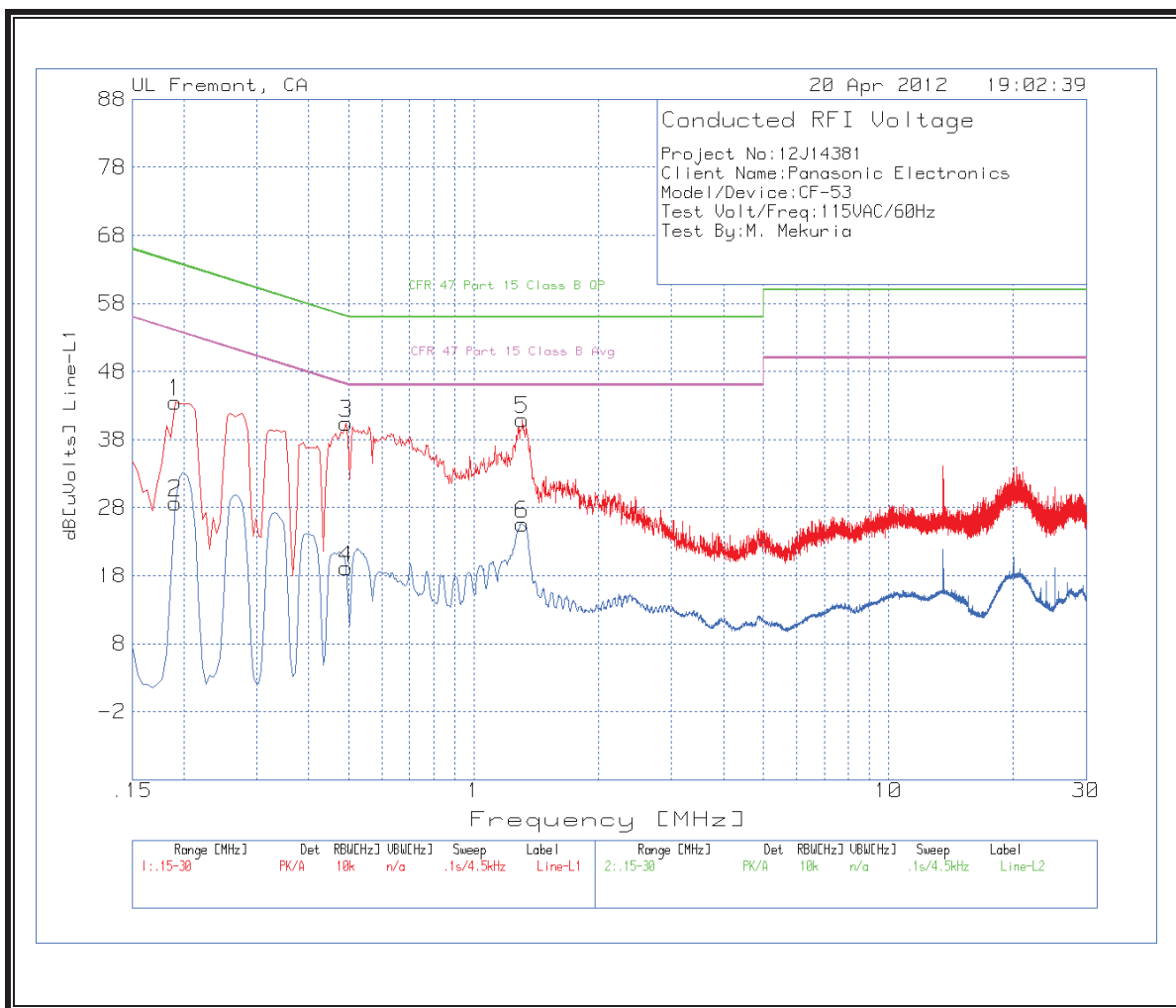
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

Project No:12J14381									
Client Name:Panasonic Electronics									
Model/Device:CF-53									
Test Volt/Freq:115VAC/60Hz									
Test By:M. Mekuria									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT [dB]	LC Cables 1&3.TXT [dB]	dB[uVolts]	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1905	43.37	PK	0.1	0	43.47	64	-20.53	-	-
0.1905	28.55	Av	0.1	0	28.65	-	-	54	-25.35
0.492	40.32	PK	0.1	0	40.42	56.1	-15.68	-	-
0.492	18.99	Av	0.1	0	19.09	-	-	46.1	-27.01
1.311	40.75	PK	0.1	0.1	40.95	56	-15.05	-	-
1.311	25.42	Av	0.1	0.1	25.62	-	-	46	-20.38
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L2.TXT [dB]	LC Cables 2&3.TXT [dB]	dB[uVolts]	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.195	38.32	PK	0.1	0	38.42	63.8	-25.38	-	-
0.195	24.44	Av	0.1	0	24.54	-	-	53.8	-29.26
0.492	29.43	PK	0.1	0	29.53	56.1	-26.57	-	-
0.492	12.75	Av	0.1	0	12.85	-	-	46.1	-33.25
1.338	30.42	PK	0.1	0.1	30.62	56	-25.38	-	-
1.338	14.55	Av	0.1	0.1	14.75	-	-	46	-31.25

LINE 1 RESULTS



LINE 2 RESULTS

