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

CERTIFICATION TEST REPORT

FOR

WLAN Module

MODEL NUMBER: J27H023.01

FCC ID: MCLJ27H02301
IC: 2878D-J27H02301

REPORT NUMBER: 32FE0108-HO-01-A-R1

ISSUE DATE: June 27, 2012

Prepared for
HON HAI Precision Ind. Co., Ltd.
5F-1, 5, Hsin-An Road Hsinchu Science-Based Industrial Park, Taiwan

Prepared by
UL Japan, Inc.
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NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/16/12	Initial Issue	M.Nishiyama
1	06/27/12	Addition of the test equipment (MHA-16) *This report is a revised version of 32FE0108-HO-01-A, which is replaced with this report.	M.Nishiyama

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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

EUT DESCRIPTION: WLAN Module

MODEL: J27H023.01

SERIAL NUMBER: No. RJN10000286 7, RJN10000311 6 (Radiated and Conducted tests), No. RJN10000287 4(Antenna Terminal Conducted test)

DATE TESTED: January 31 to February 10, 2012

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

UL Japan, Inc. 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 Japan, Inc based on interpretations and/or observations of test results. 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 Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by any government agency.

Approved & Released For UL Japan, Inc. By:

Masanori Nishiyama
Leader of WiSE Japan
UL Verification Services
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Tested By:

Satofumi Matsuyama
Engineer of WiSE Japan
UL Verification Services
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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, 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 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0
The full scope of accreditation can be viewed at
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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4.3. MEASUREMENT UNCERTAINTY

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

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	**Conducted emission (±dB)**
	150kHz-30MHz
No.1	3.1dB
No.2	3.3dB
No.3	3.7dB
No.4	3.2dB

Test room (semi-anechoic chamber)	**Radiated emission**						
	(3m*)(±dB)				**(1m*)(±dB)**		**(0.5m*)(±dB)**
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	5.1dB	4.2dB

*3m/1m/0.5m = Measurement distance

Power meter (±dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (±dB)			**Antenna terminal conducted emission (±dB)**		**Channel power (±dB)**
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Foxconn Wireless LAN module (802.11b/g).

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)
2412-2472	802.11b	7.03	5.05
2412-2462	802.11g	13.30	21.38

Model No/: 071-0001-1725, Dipole λ/2 built-in antenna, -1.5 dBi.

5.3 SOFTWARE AND FIRMWARE

Host of EUT Hardware version is 1.0.

Test Utility for RF:
HOSTIO-ART ver. 1.8

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5.4 WORST-CASE CONFIGURATIONS

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 802.11b mode were made at 1 Mb/s.
All final tests in the 802.11g mode were made at 12 Mb/s.

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

The EUT was investigated in three orthogonal orientations X,Y, and Z. Orientation Z was found to be worst-case orientation.

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5.5 DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC	Lenovo	1952E69	L3KY127	DoC
AC Adapter	Lenovo	92P1156	1129P1156Z1ZDXN0991HM	N/A
UIC-MIDI Intercade	Kyoto Microcomputer Co.	Partner CTR	I0200185-UBA	N/A
EUT AC Adapter	Mitsumi	WAP-002 (USA)	-	N/A
EUT AC Adapter	Tabuchi	WAP-002 (USA)	C3ET101	N/A
Emulator	-	TIS-002(JPN)	-	N/A
AC Adapter for Emulator	-	RVL-002 (JPN)	DN3KK50	N/A
Headset	-	-	-	N/A

I/O CABLES (ANTENNA PORT TEST CONFIGURATION)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	AC	Unshielded	0.9m	
2	DC	1	DC	Unshielded	1.7m	
3	USB	1	USB	Shielded	1.5m	
4	DC	1	DC	Unshielded	1.9m	

I/O CABLES (RADIATED AND LINE CONDUCTED TEST CONFIGURATION)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	DC	1	DC	Unshielded	1.9m	
2	Headset	1	AUDIO	Unshielded	0.9m	

I/O CABLES (RADIATED AND LINE CONDUCTED TEST CONFIGURATION (Addition of Host device))

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	AC	Unshielded	1.6m	
2	DC	1	DC	Unshielded	1.0m	
3	micro-HDMI	1	HDMI	Shielded	1.0m	
4	Headset	1	AUDIO	Unshielded	0.9m	

TEST SETUP

The EUT is connected to a Jig card and host laptop computer via a USB cable during the tests. Test software exercised the radio card. The Jig card is removed after the setup.

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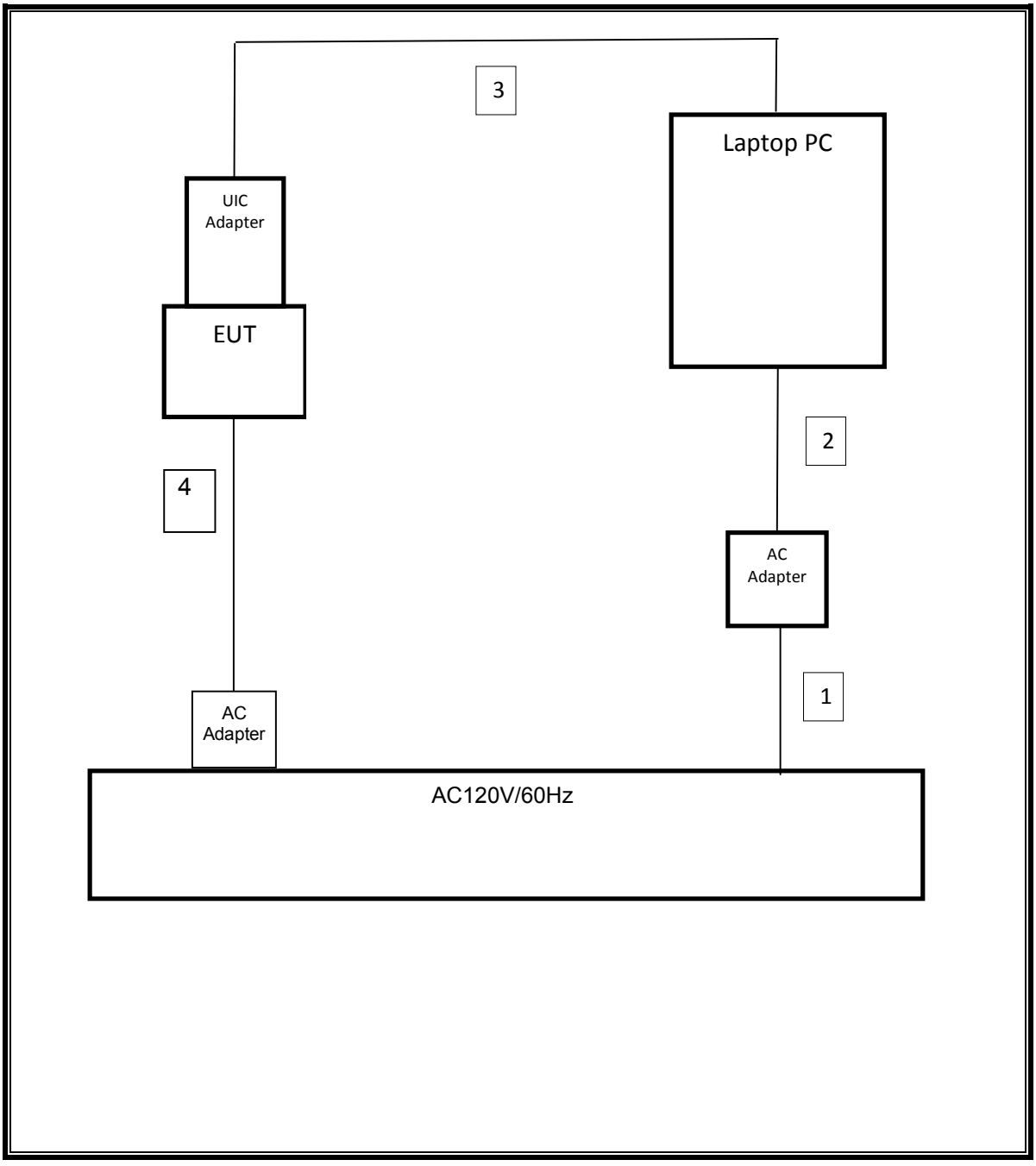
SETUP DIAGRAM FOR ANTENNA PORT TESTS



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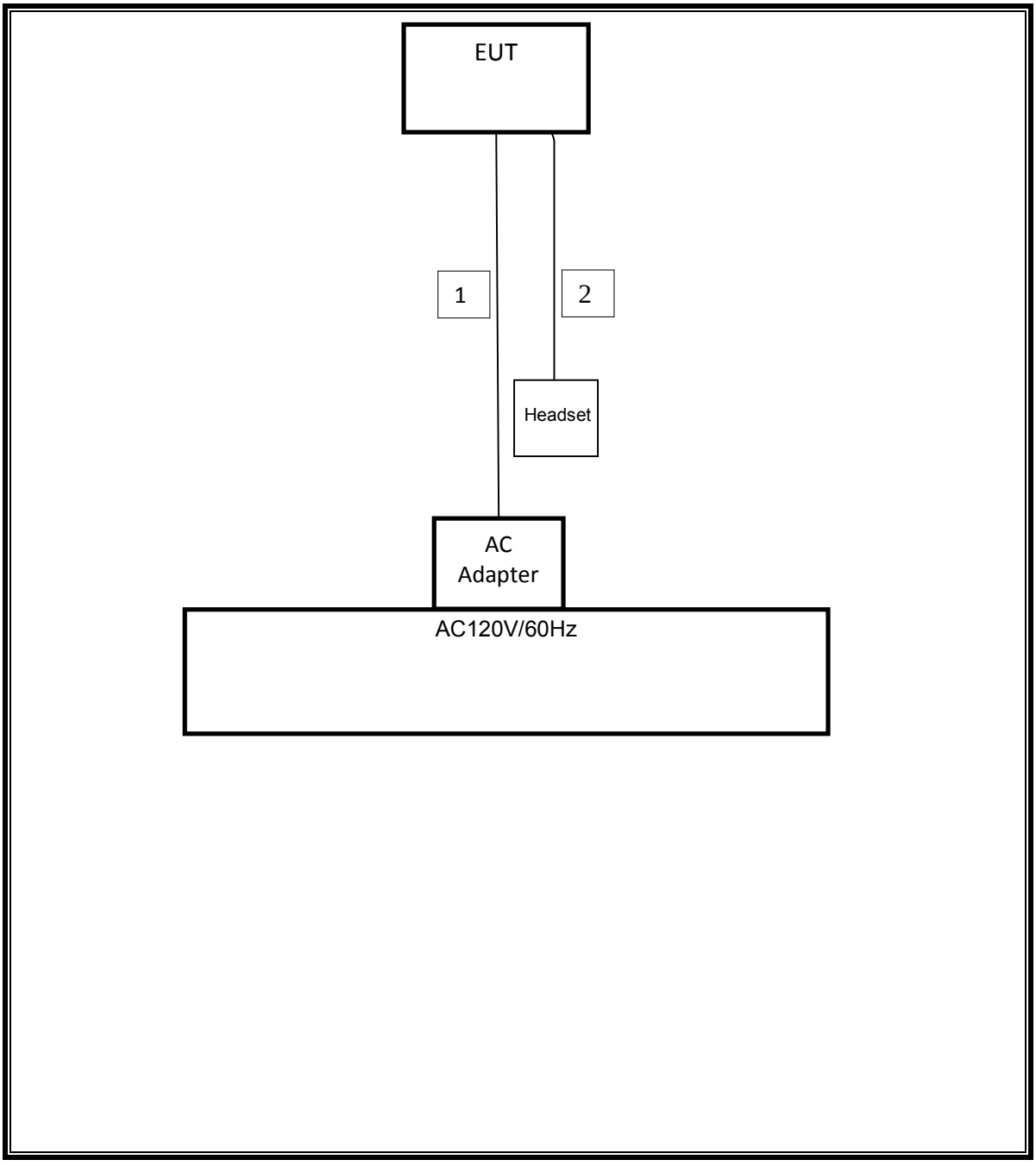
SETUP DIAGRAM FOR RADIATED EMISSIONS TESTS



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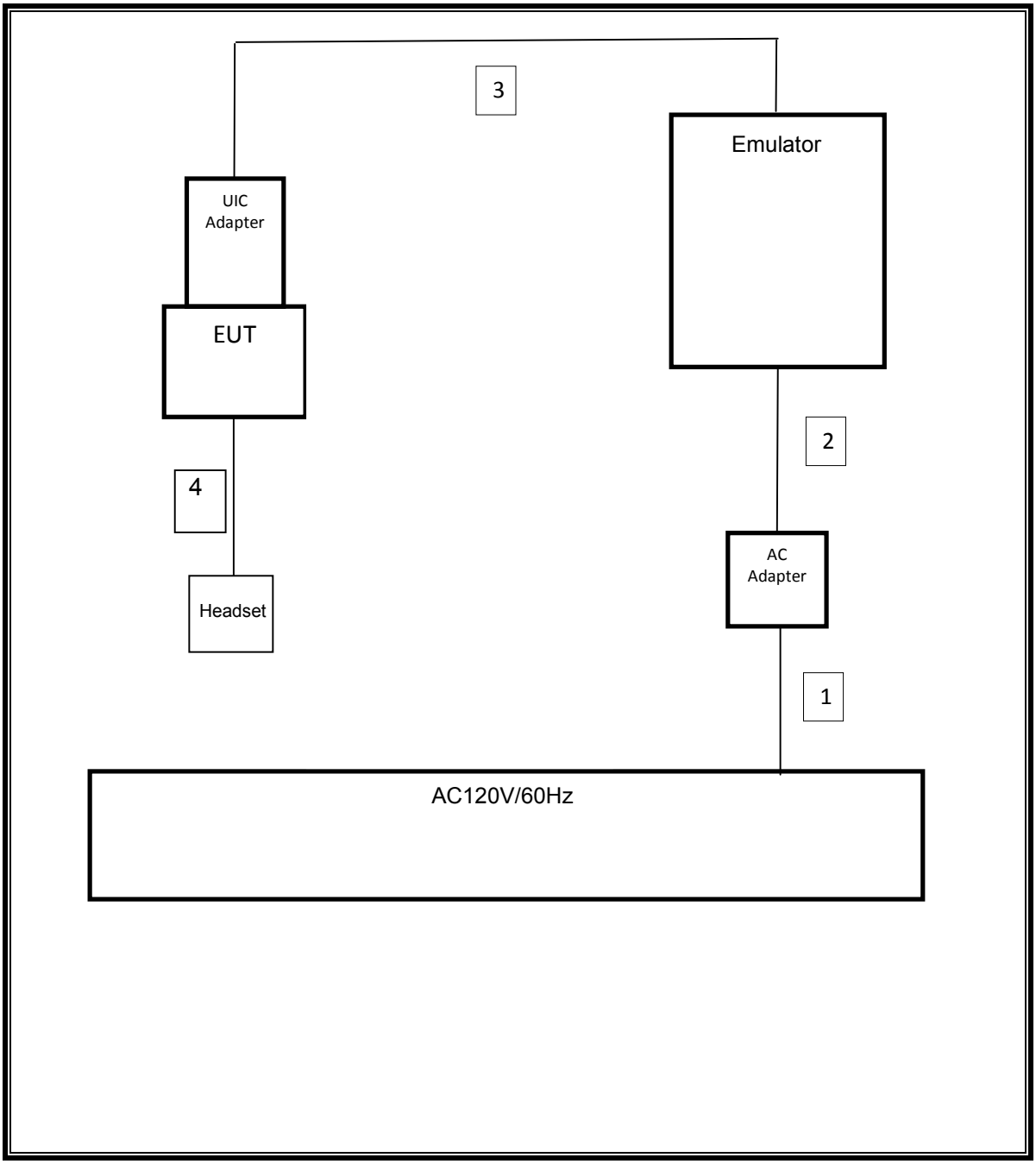
SETUP DIAGRAM FOR CONDUCTED AND RADIATED EMISSION TEST (Addition of Host device)



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TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:
(1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2011/02/15 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MCC-115	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	290211/4	AT	2011/08/24 * 12
MCC-105	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2011/06/24 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2012/01/06 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2011/06/30 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2011/11/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2011/08/11 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2011/10/15 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2011/10/15 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2011/07/15 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2011/11/02 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	CE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	CE	-
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	CE	2011/10/19 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE	2011/02/22 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2012/01/11 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform 141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2011/07/04 * 12

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(2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE/CE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2011/11/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2011/08/11 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2011/10/15 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2011/10/15 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2011/07/15 * 12
MAT-32	Attenuator(6dB)	TME	UFA-01	-	RE	2011/03/02 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2011/02/20 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2011/07/15 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/23 * 12

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.
Test Item: RE: Radiated emission, CE: Conducted emission, AT: Antenna Terminal Conducted test

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6 ANTENNA PORT TEST RESULTS

6.1 802.11b MODE IN THE 2.4 GHz BAND

6.1.1 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	12.095	0.5
Middle	2442	12.558	0.5
High	2472	12.091	0.5

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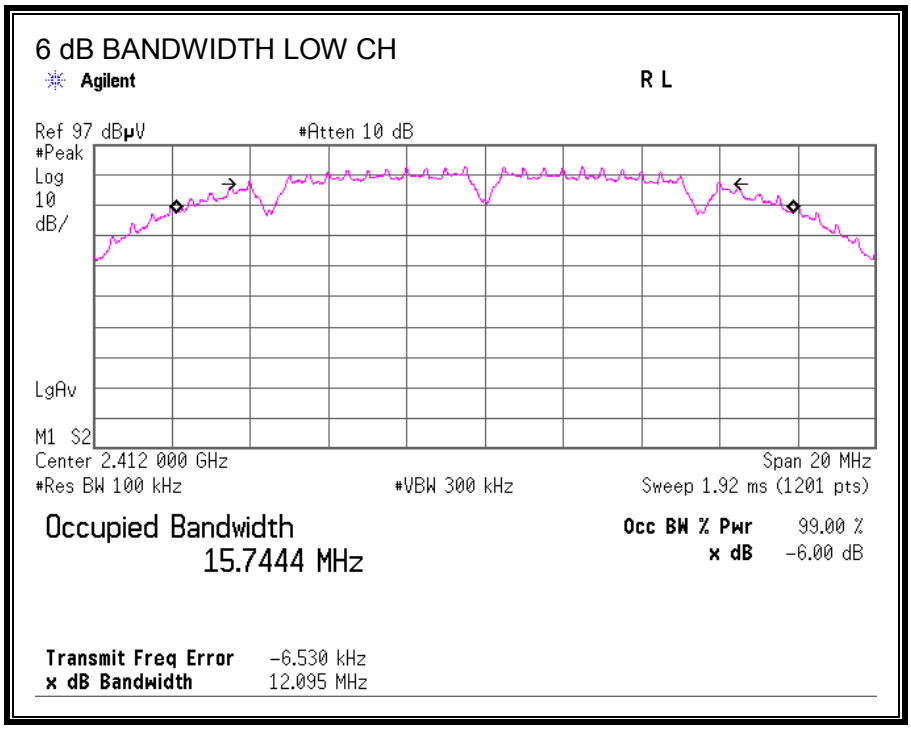
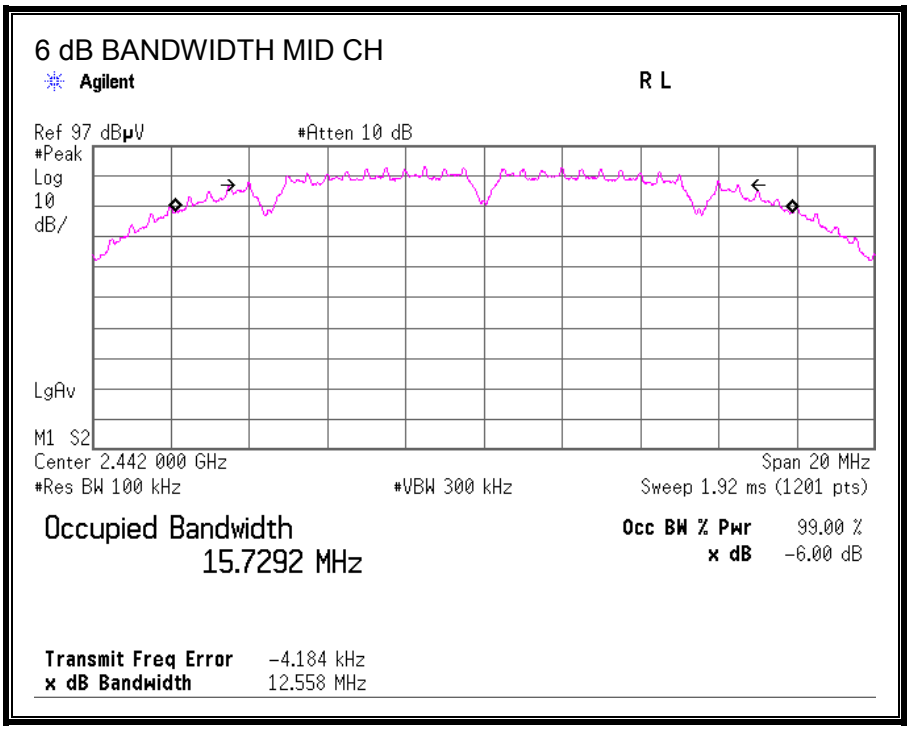
6 dB BANDWIDTH





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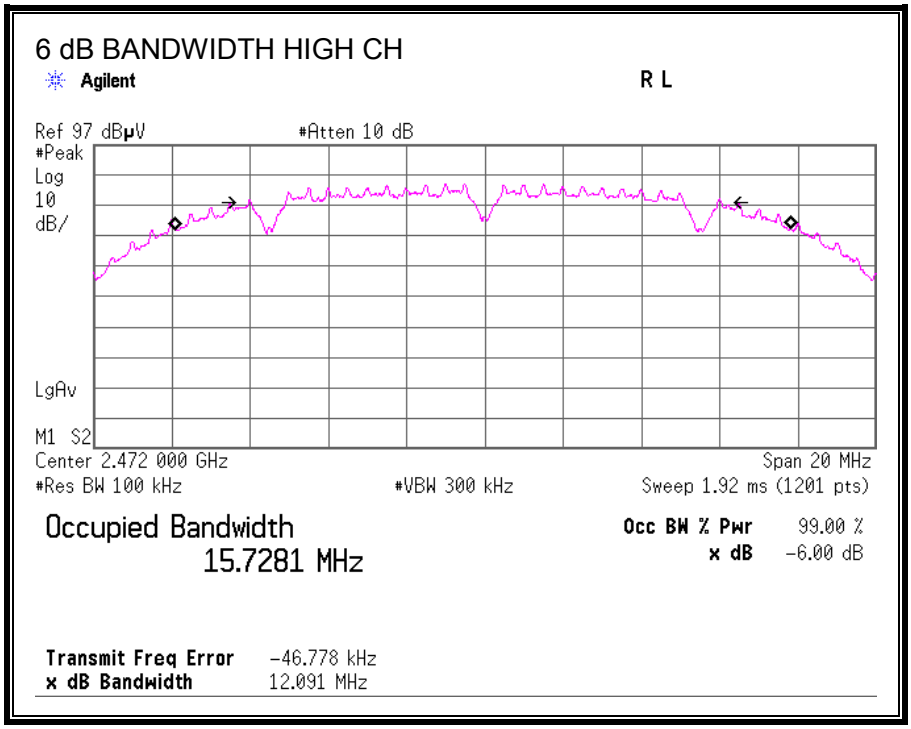

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6.1.2 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	15.8286
Middle	2442	15.8317
High	2472	15.7713

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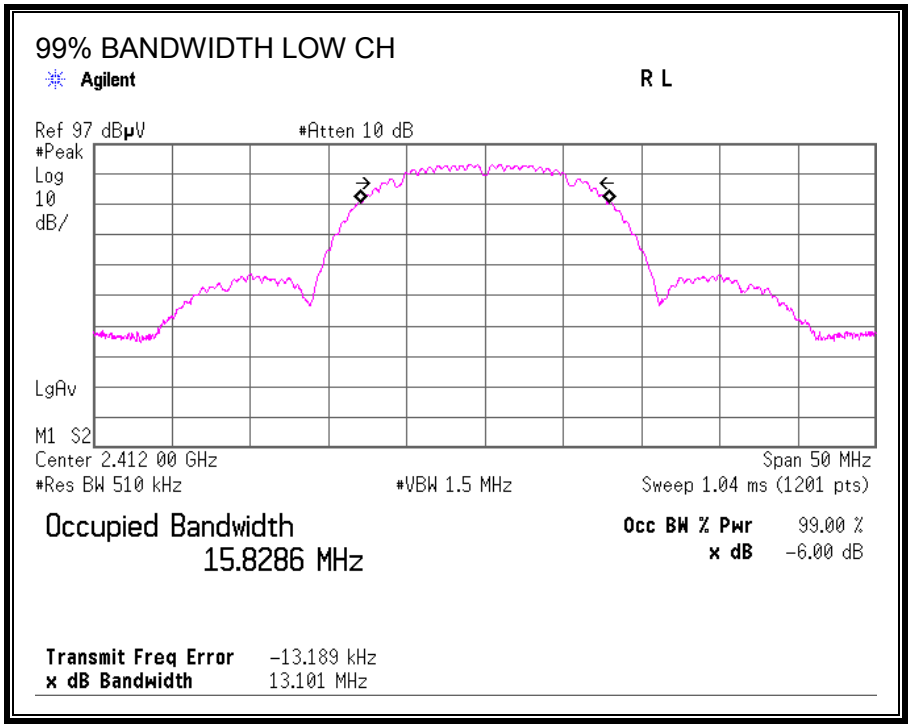
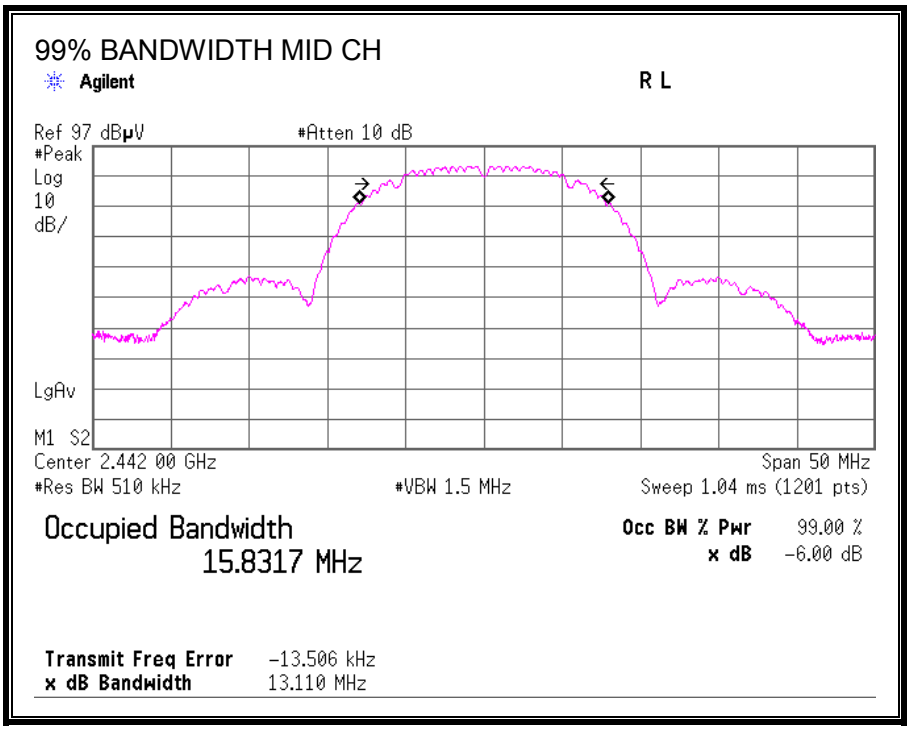
99% BANDWIDTH





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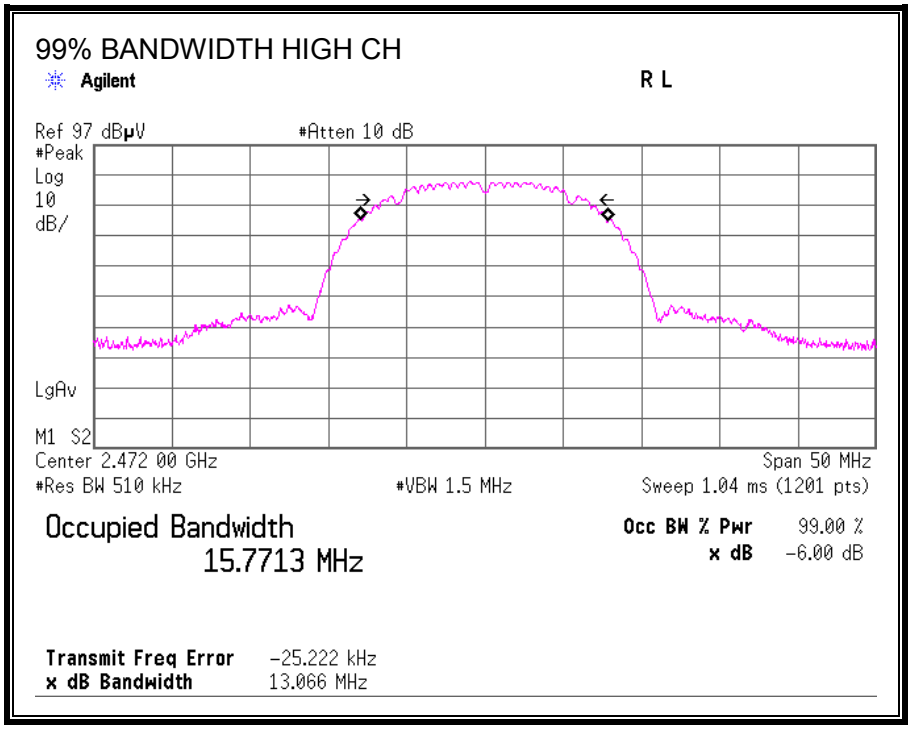

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6.1.3 OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

Peak power is measured using a wide bandwidth Peak Power Meter.

The cable assembly insertion loss of 11.68 dB (including 10.07 dB pad and 1.61 dB cable for 2412MHz/2442MHz) or 11.7 dB (including 10.07 dB pad and 1.63 dB cable for 2472MHz) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power Meter Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2412	6.96	30	-23.04
Middle	2442	7.03	30	-22.97
High	2472	1.67	30	-28.33

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6.1.4 AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.68 dB (including 10.07 dB pad and 1.61 dB cable for 2412MHz/2442MHz) or 11.7 dB (including 10.07 dB pad and 1.63 dB cable for 2472MHz)was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	4.56
Middle	2442	4.62
High	2472	-1.02

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6.1.5 POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-17.88	8	-25.88
Middle	2442	-16.18	8	-24.18
High	2472	-23.55	8	-31.55

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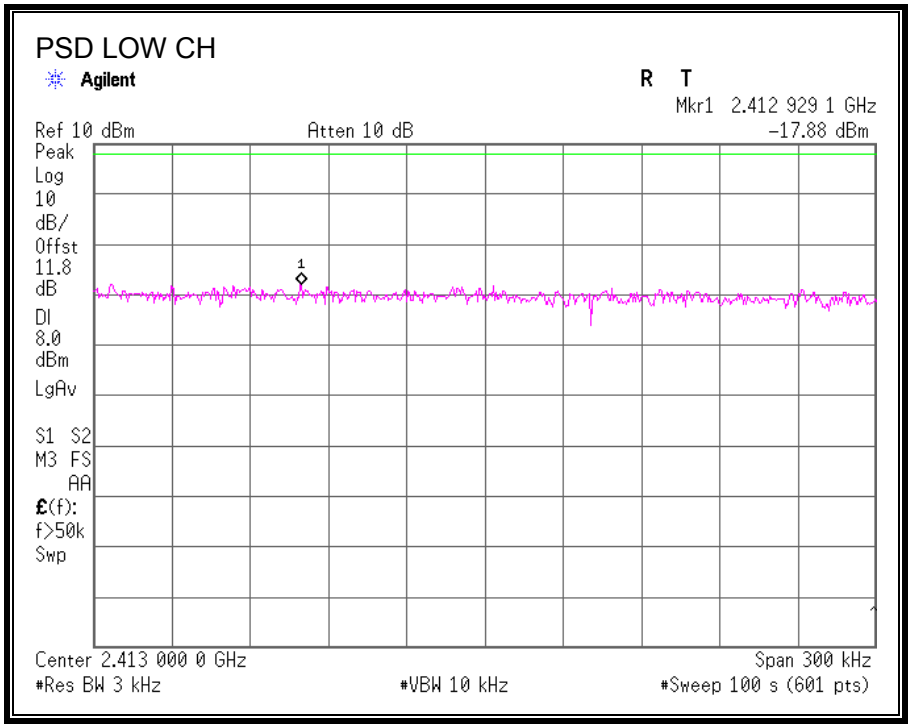
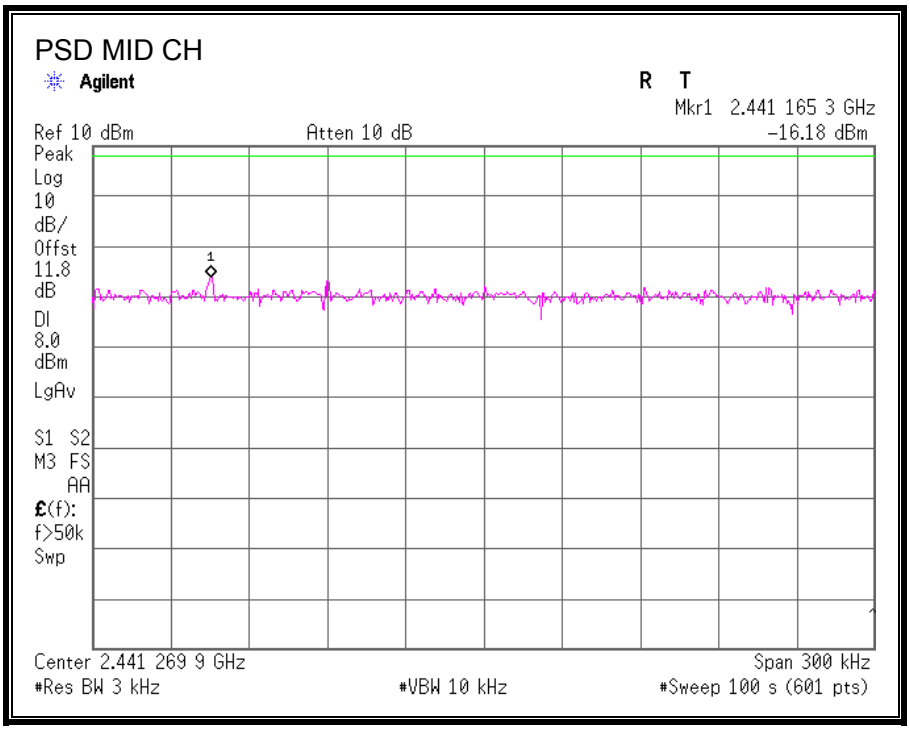
POWER SPECTRAL DENSITY





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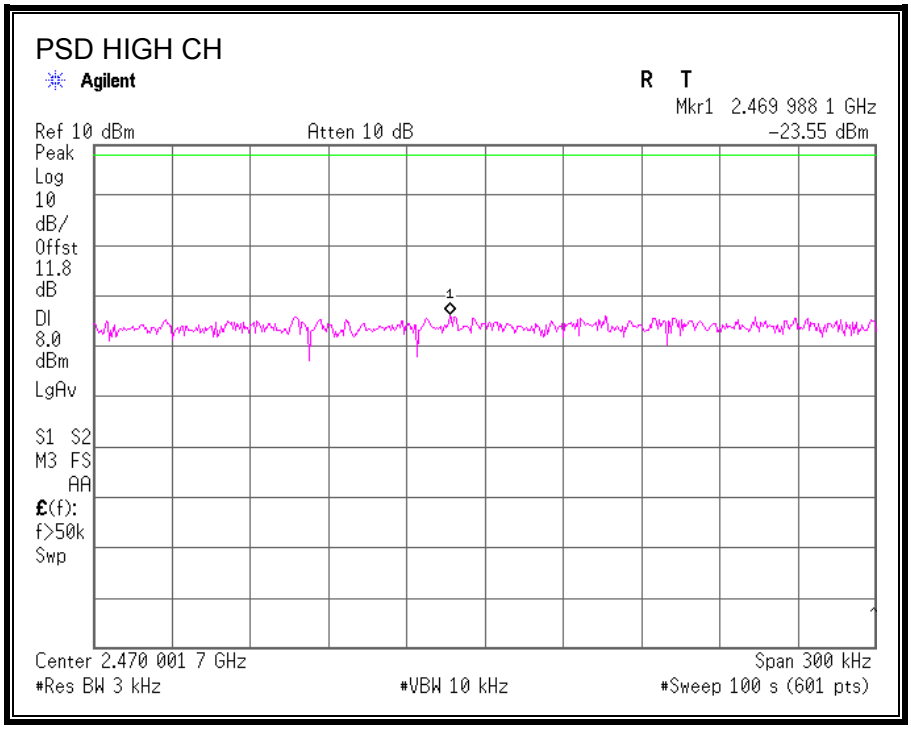

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6.1.6 CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

TEST PROCEDURE

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

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

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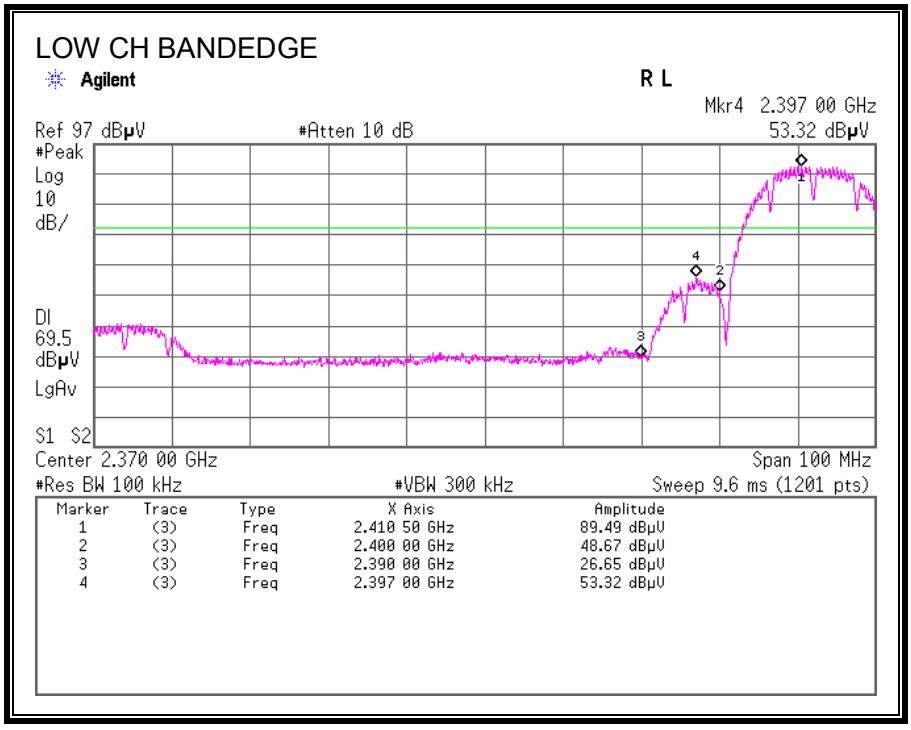
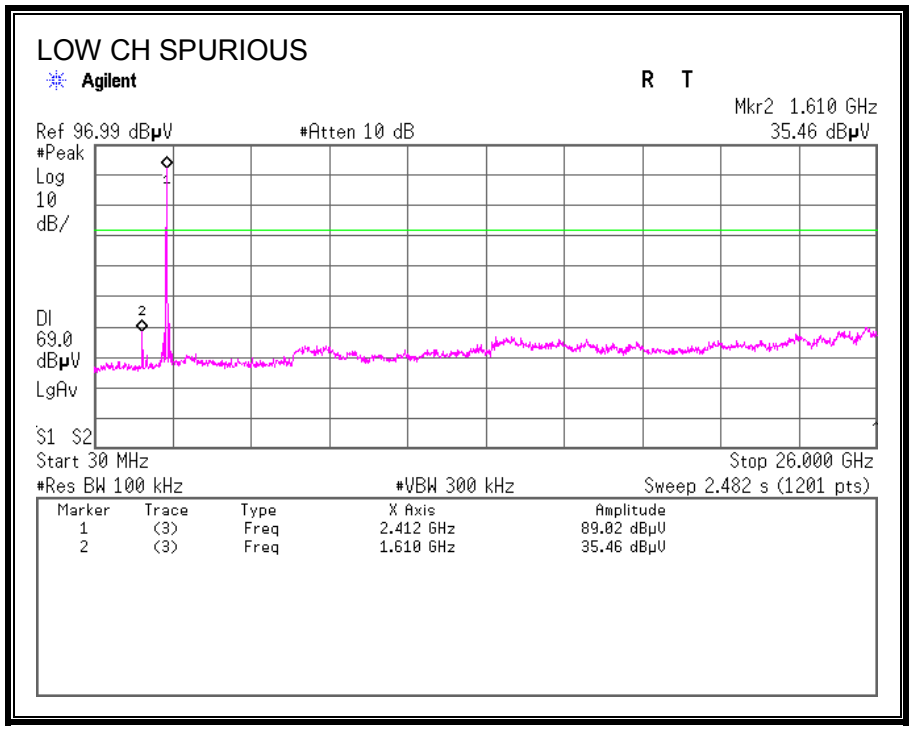
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL





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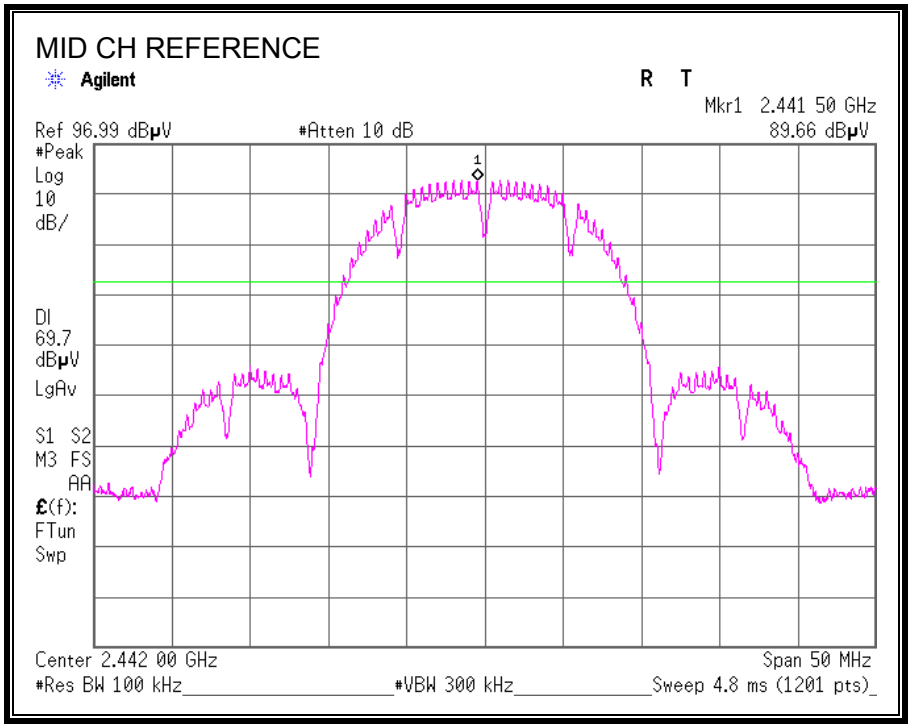
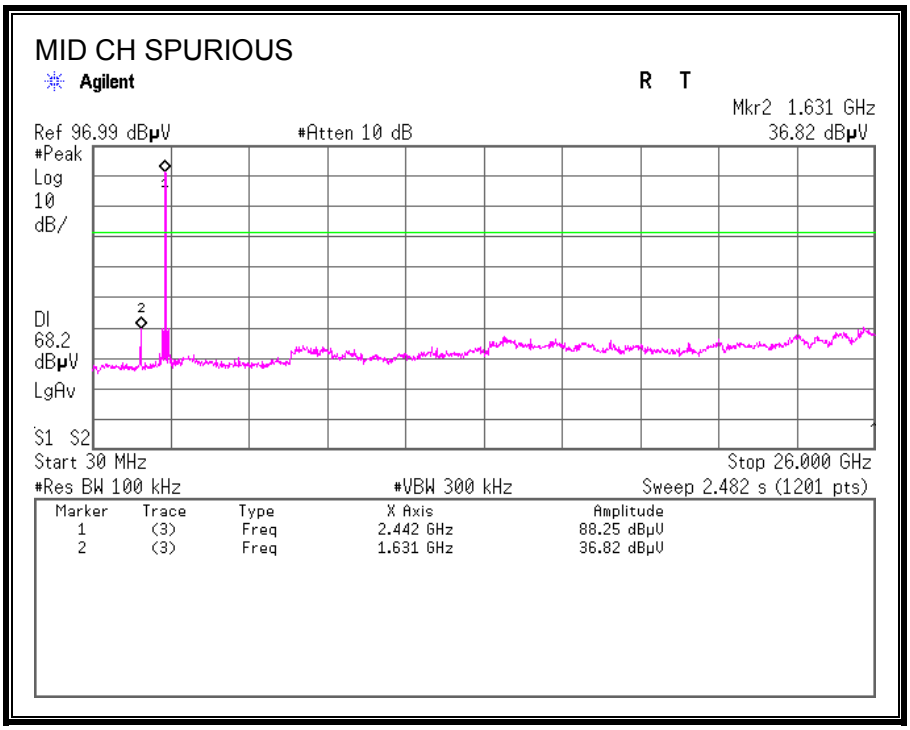
SPURIOUS EMISSIONS, MID CHANNEL





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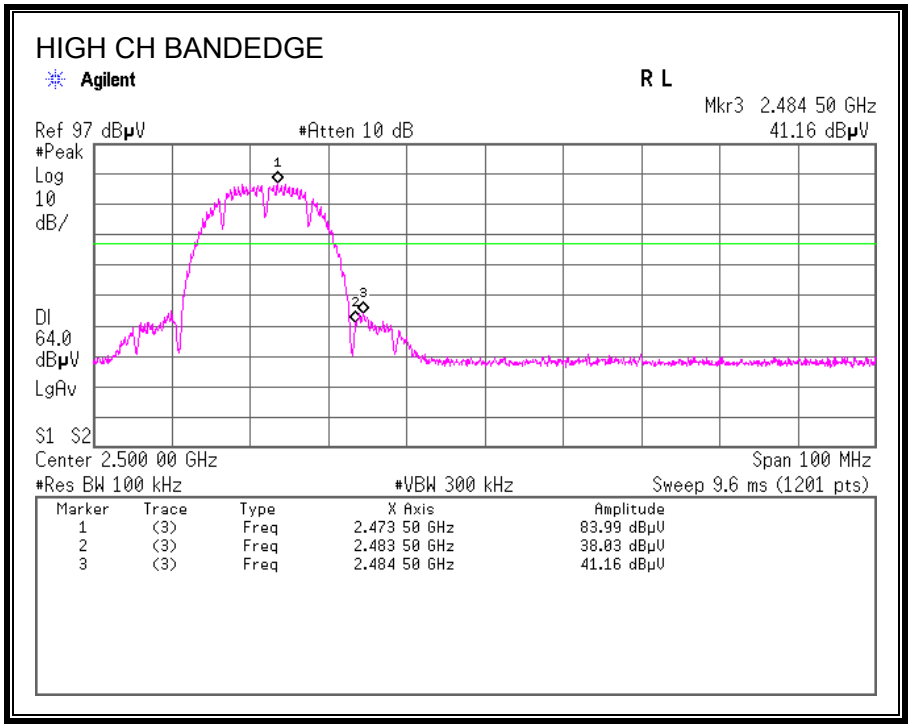
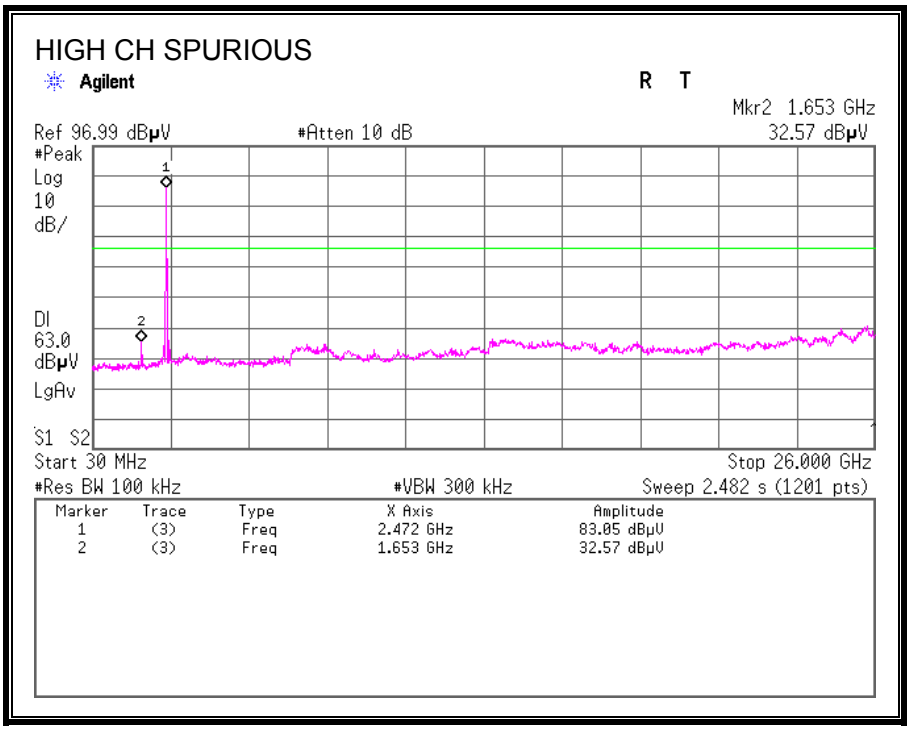
SPURIOUS EMISSIONS, HIGH CHANNEL





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6.2 802.11g MODE IN THE 2.4 GHz BAND

6.2.1 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.451	0.5
Middle	2437	16.464	0.5
High	2462	16.462	0.5

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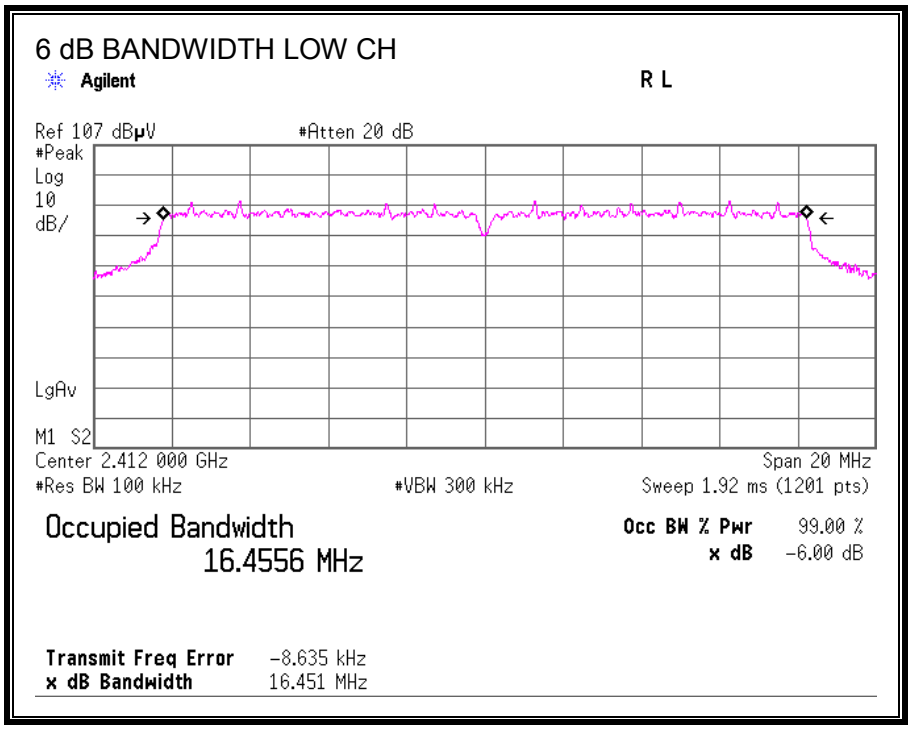
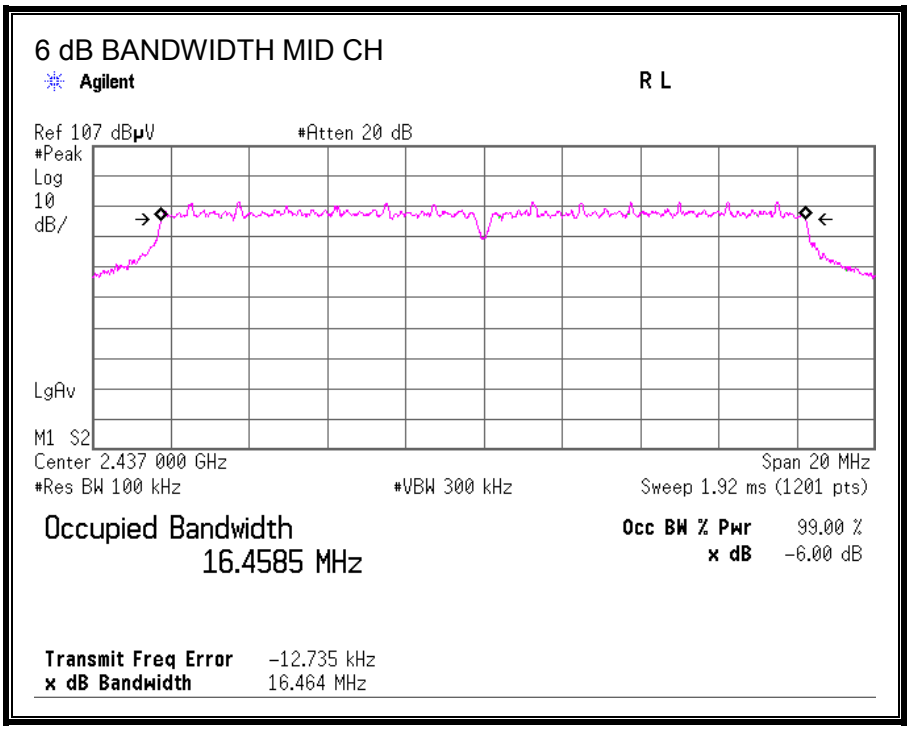
6 dB BANDWIDTH





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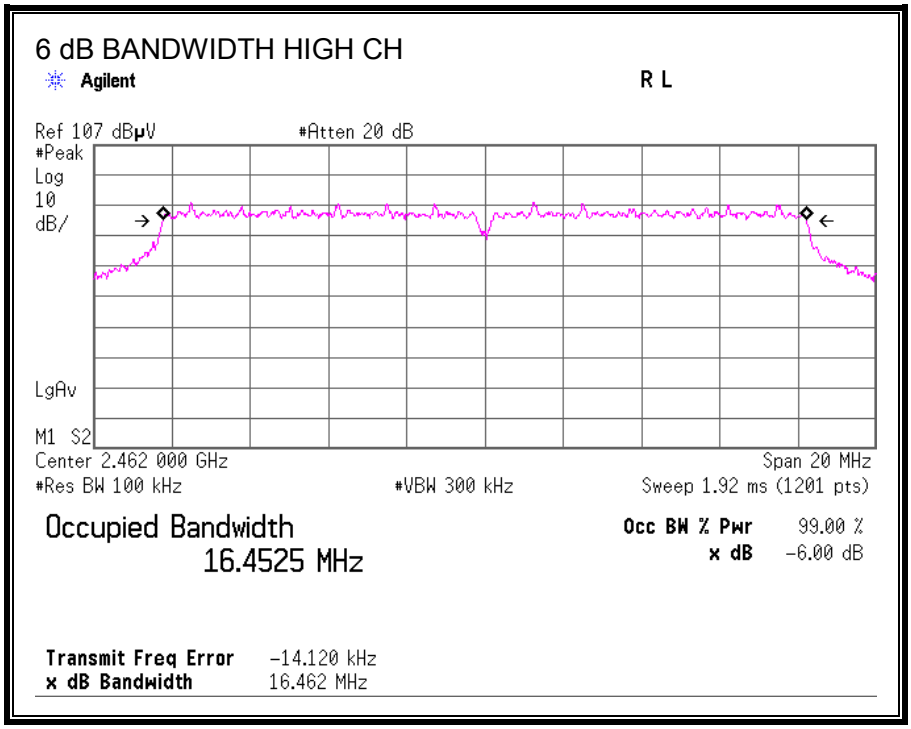

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6.2.2 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.8025
Middle	2437	17.8671
High	2462	17.7826

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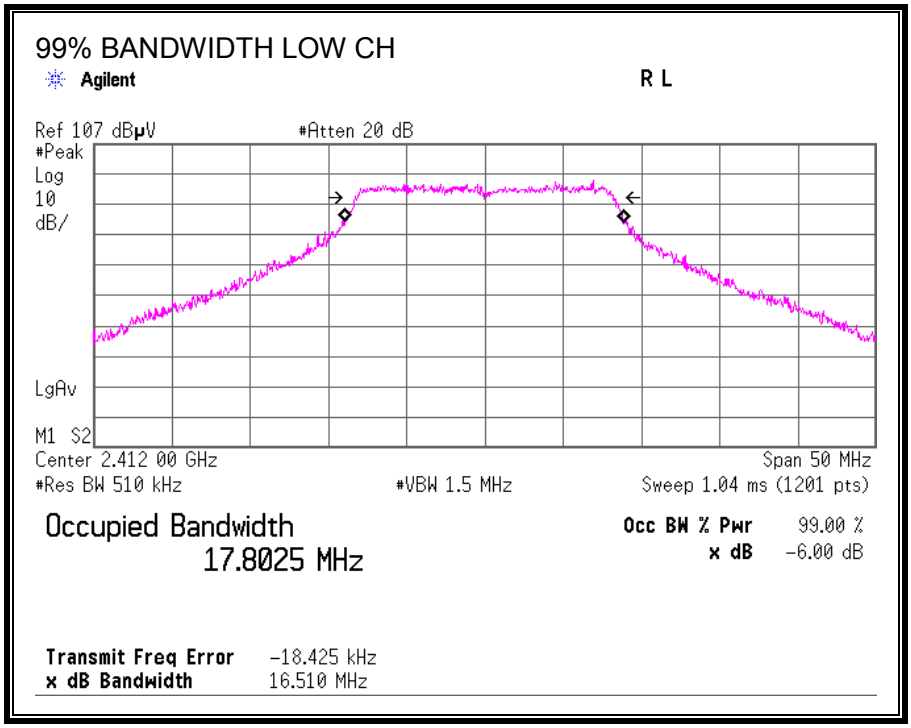
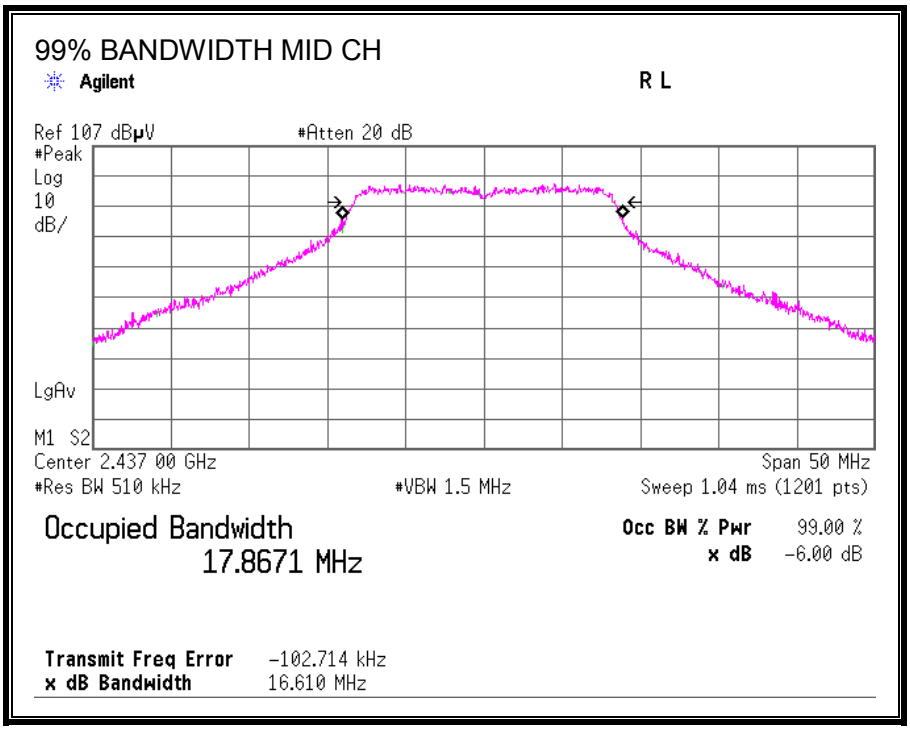
99% BANDWIDTH





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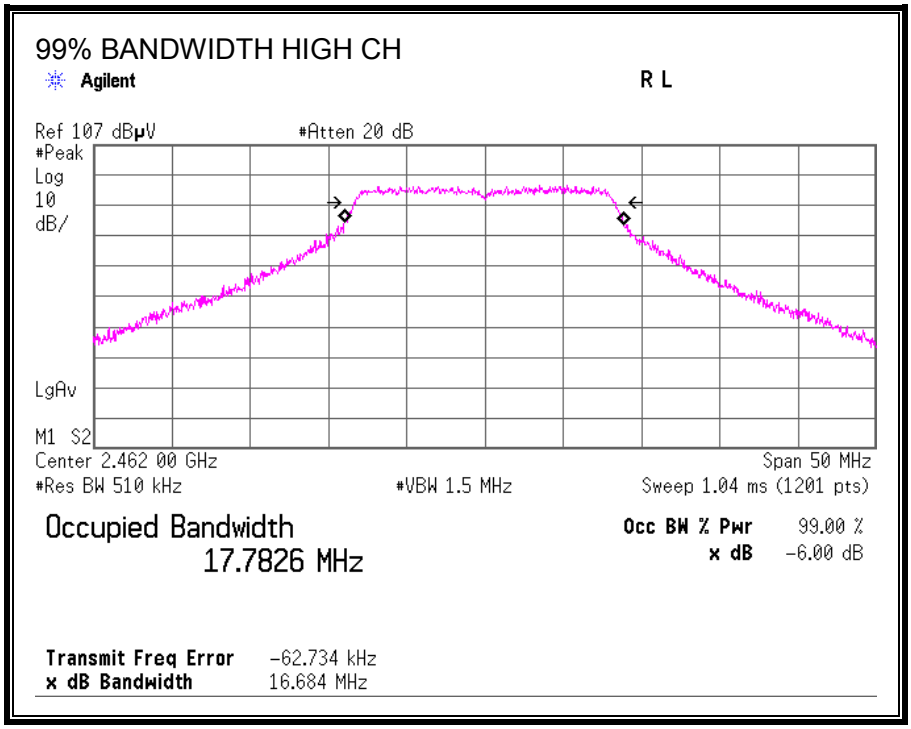

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6.2.3 OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

Peak power is measured using a wide bandwidth Peak Power Meter.

The cable assembly insertion loss of 11.68 dB or 11.7 dB (including 10.07 dB pad and 1.61 dB cable for 2412MHz/2442MHz or 1.63 dB cable for 2472MHz) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power Meter (dBm)	Limit (dBm)	Margin (dB)
Low	2412	13.07	30	-16.93
Middle	2437	13.30	30	-16.70
High	2462	12.87	30	-17.13

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6.2.4 AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.68 dB or 11.7 dB (including 10.07 dB pad and 1.61 dB cable for 2412MHz/2442MHz or 1.63 dB cable for 2472MHz) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	4.21
Middle	2437	4.50
High	2462	3.92

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6.2.5 POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

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

RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-17.74	8	-25.74
Middle	2437	-18.51	8	-26.51
High	2462	-18.29	8	-26.29

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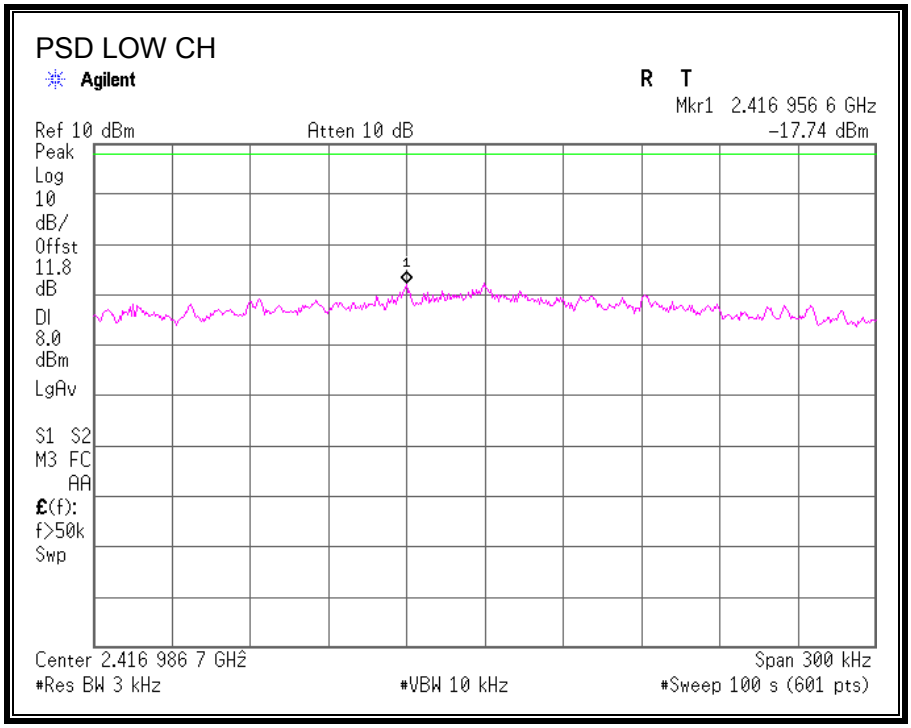
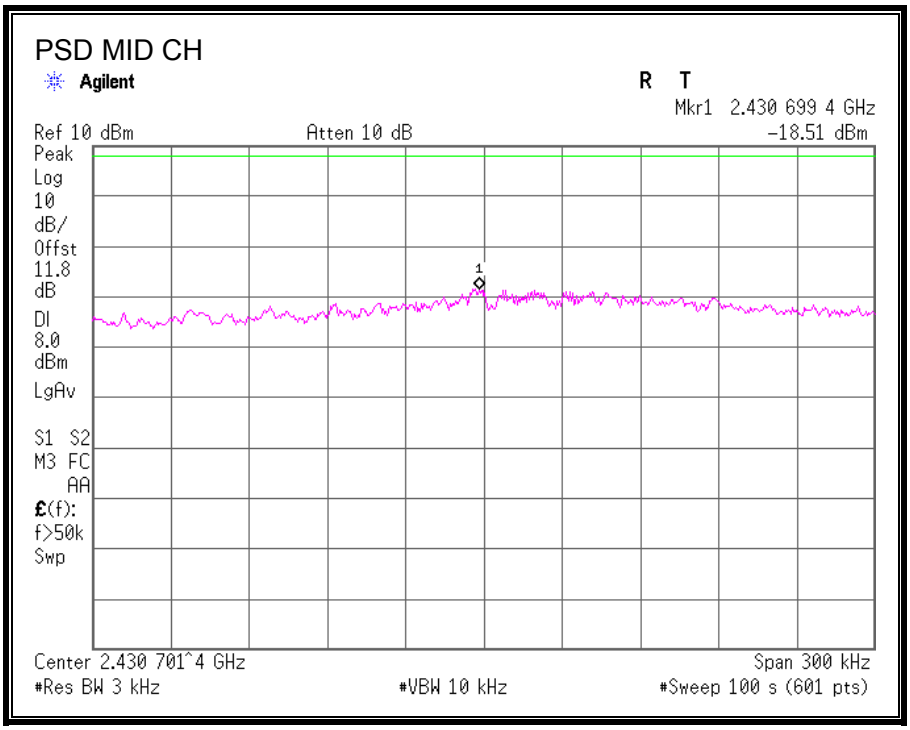
POWER SPECTRAL DENSITY





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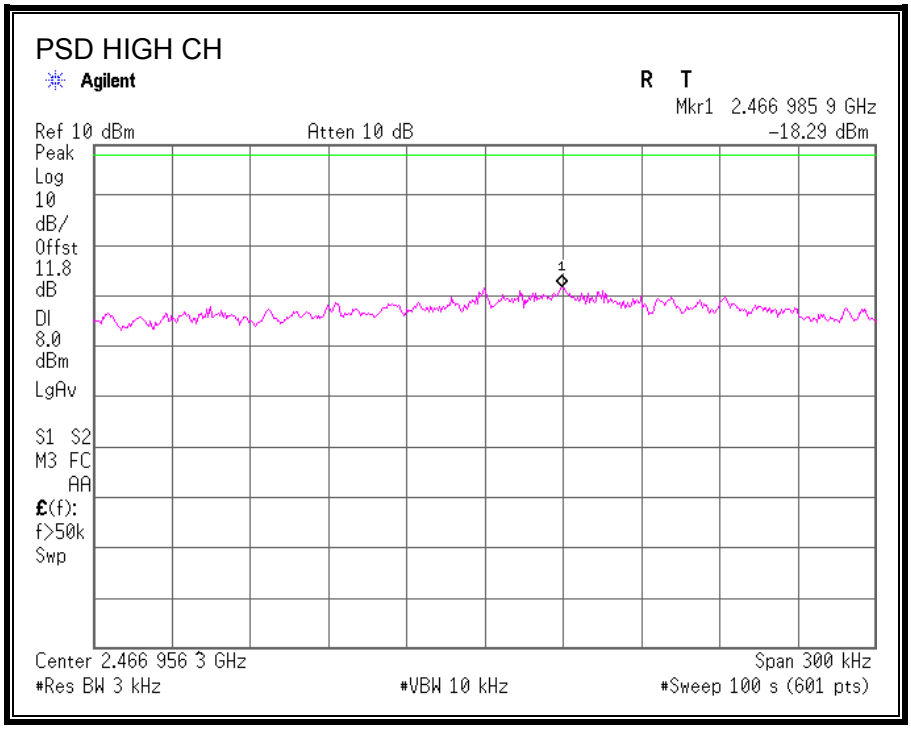

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6.2.6 CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

TEST PROCEDURE

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

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

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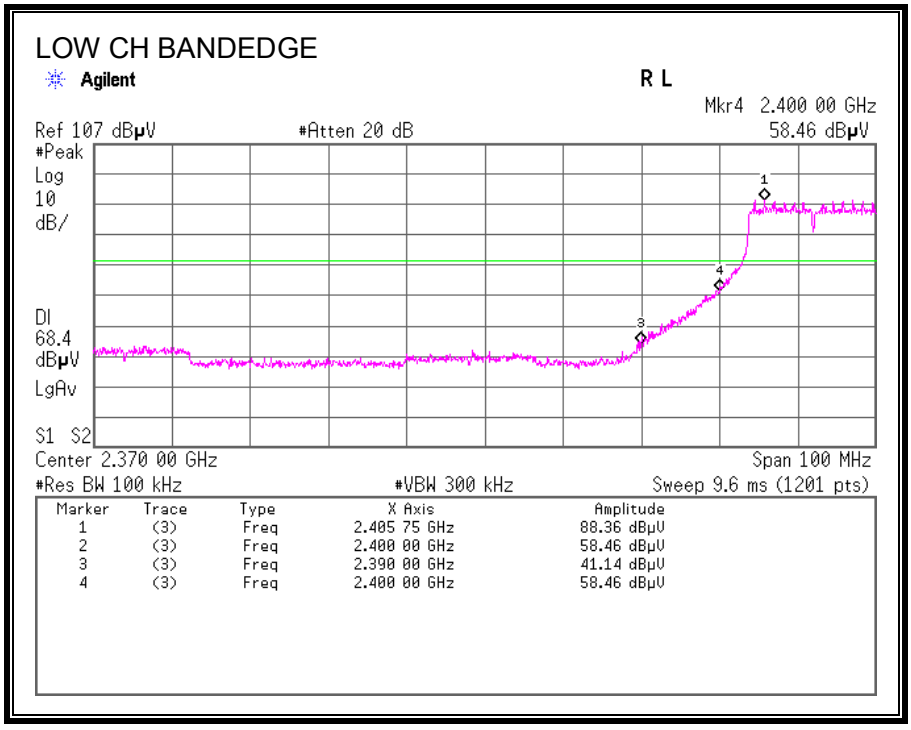
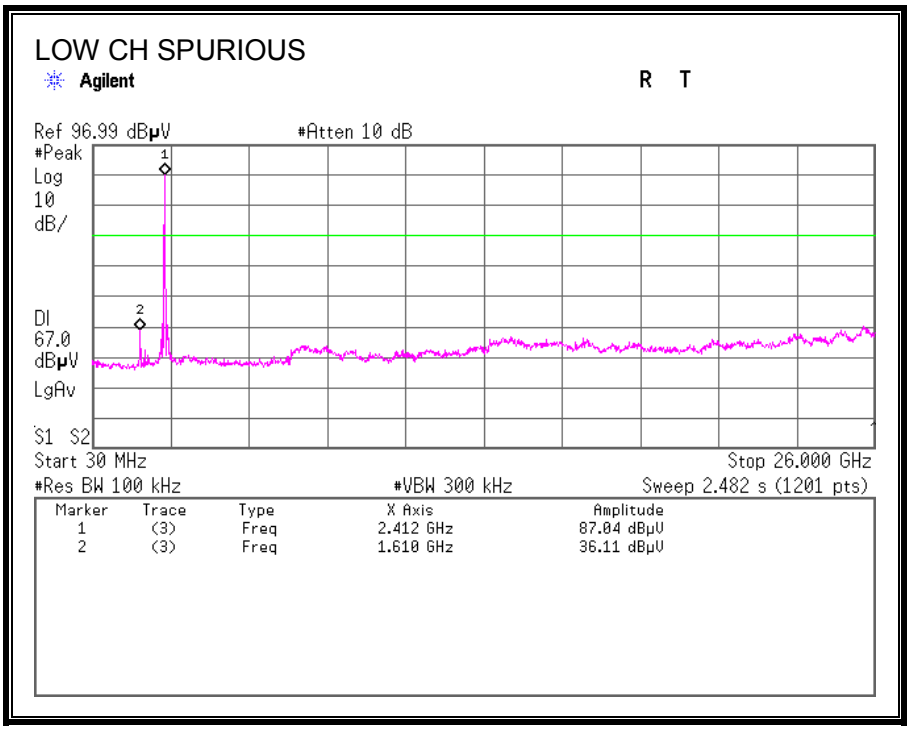
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL





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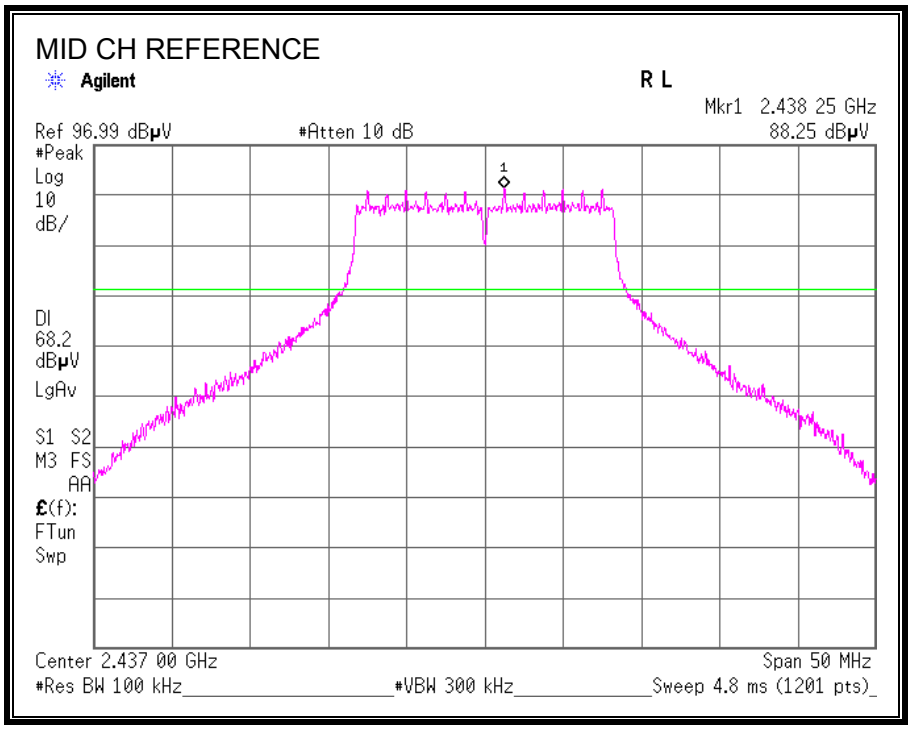
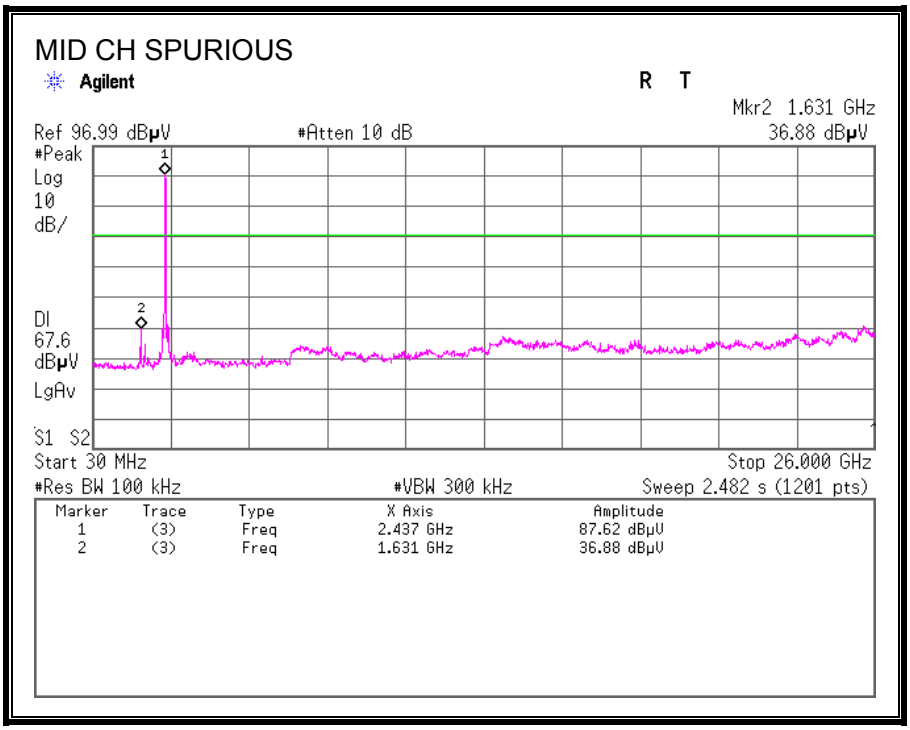
SPURIOUS EMISSIONS, MID CHANNEL





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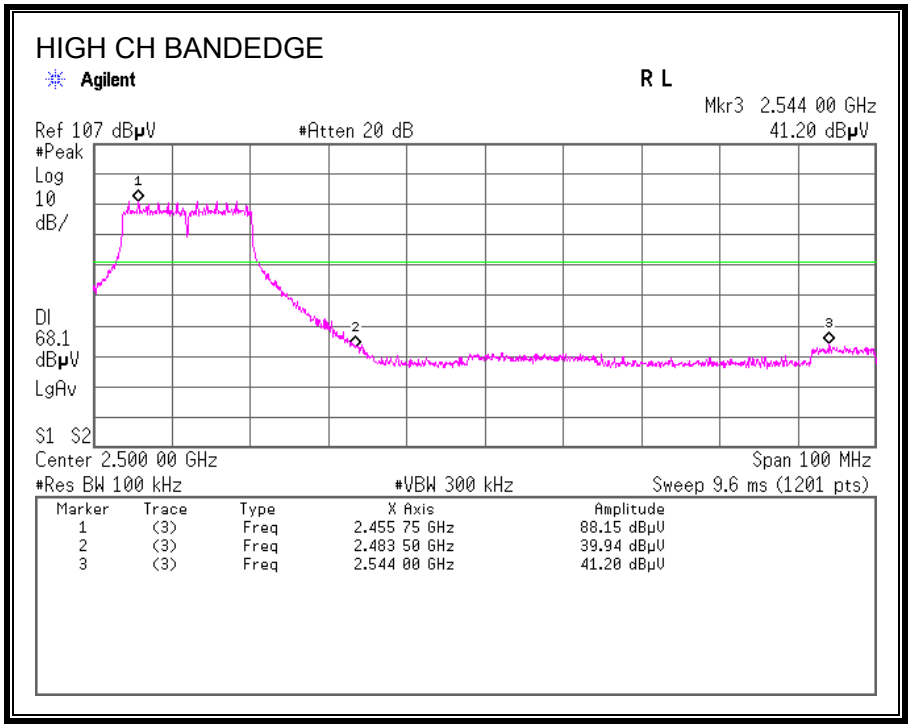
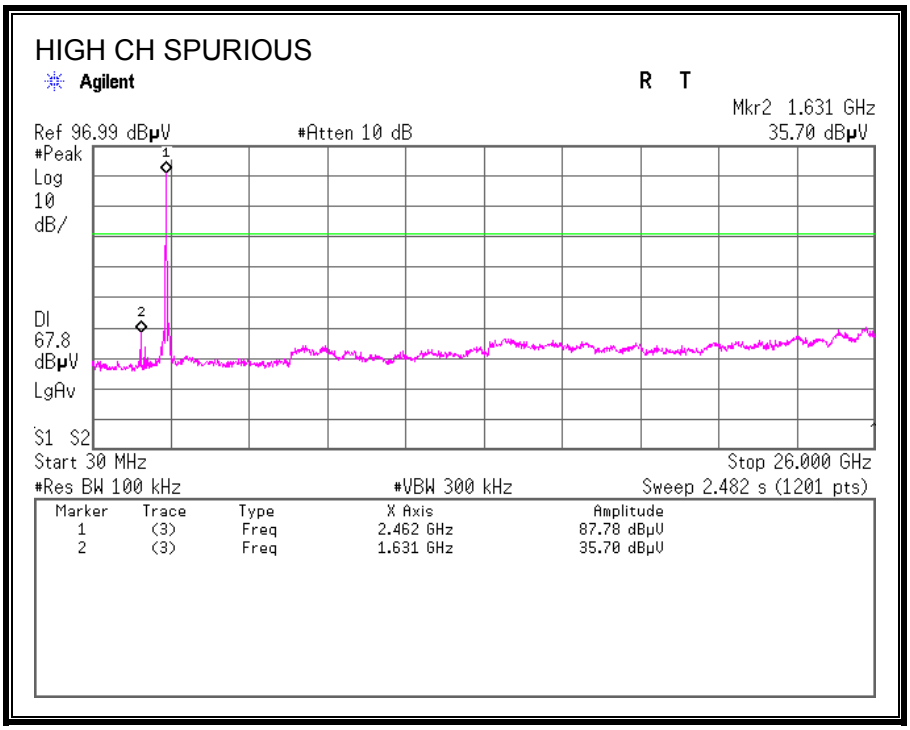
SPURIOUS EMISSIONS, HIGH CHANNEL





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7 RADIATED TEST RESULTS

7.1 LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 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. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

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

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

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

The 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.

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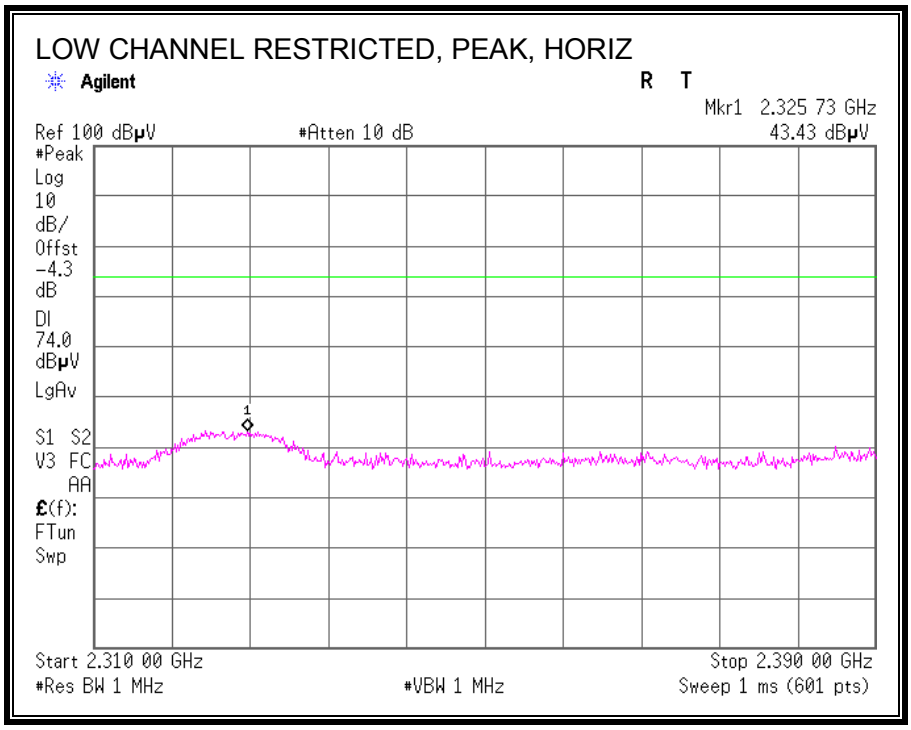
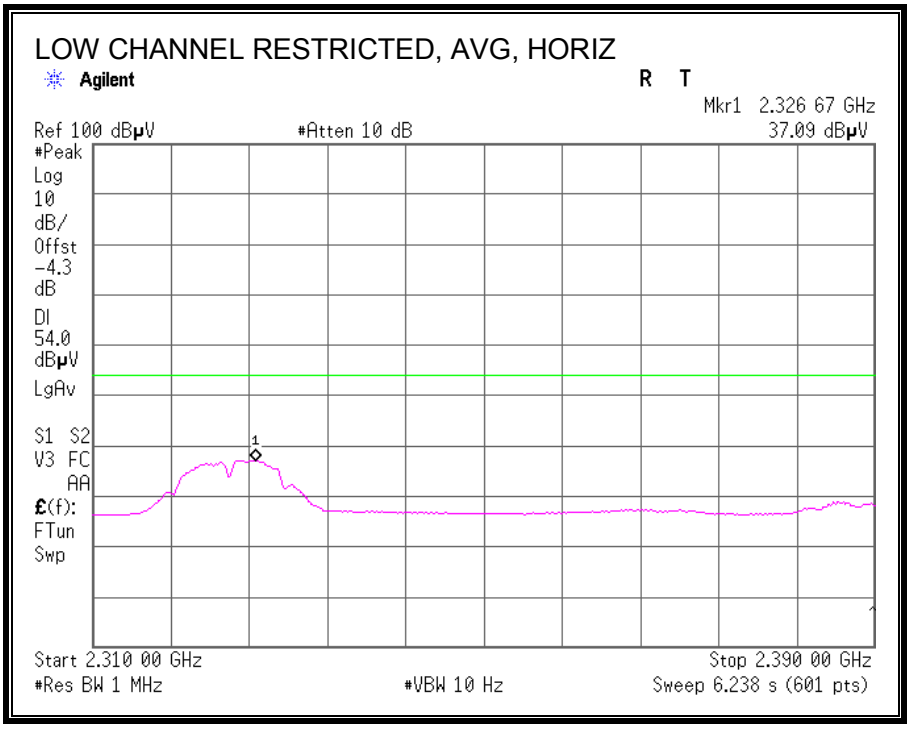
7.2 TRANSMITTER ABOVE 1 GHz

7.2.1 TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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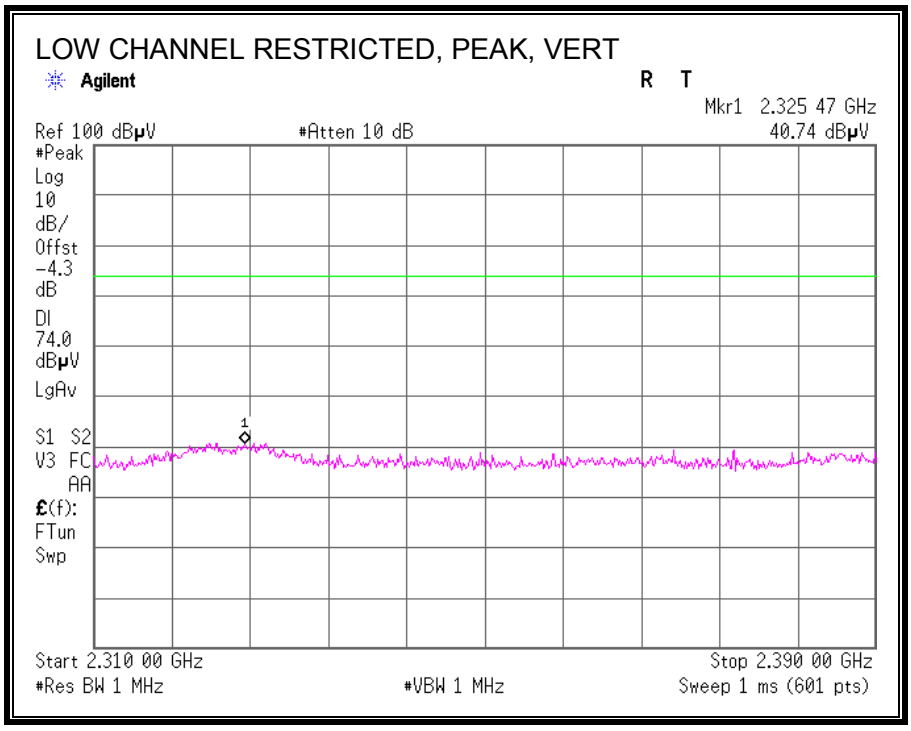
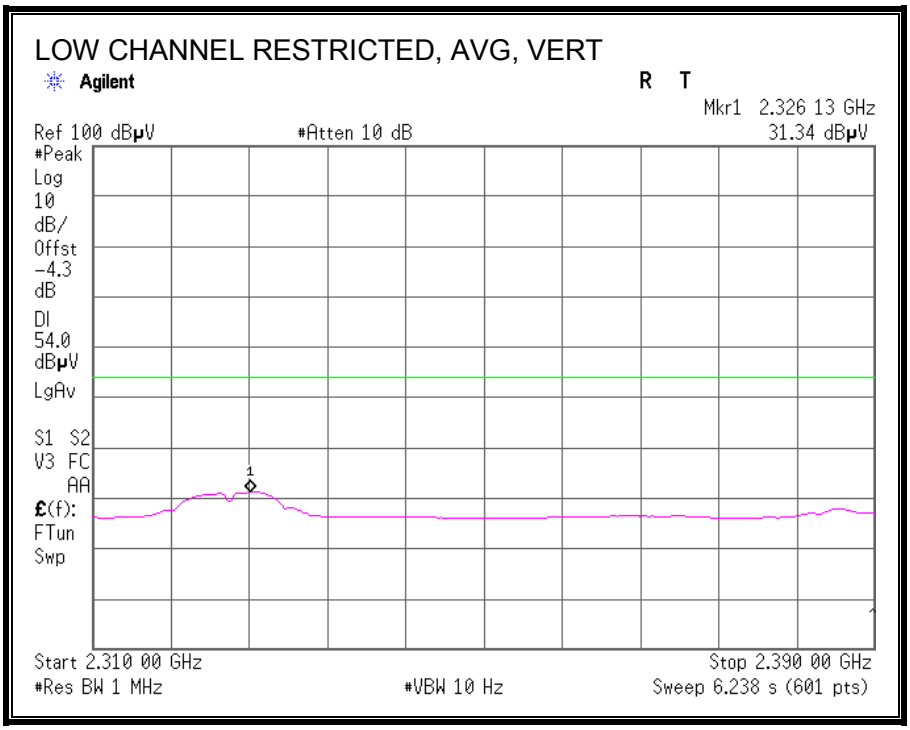
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





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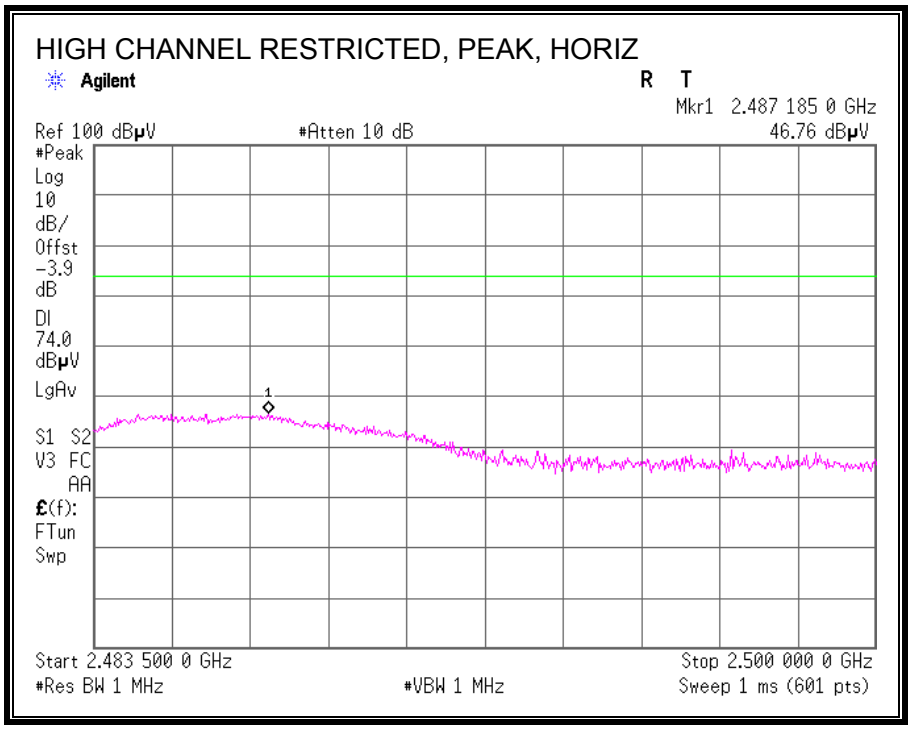
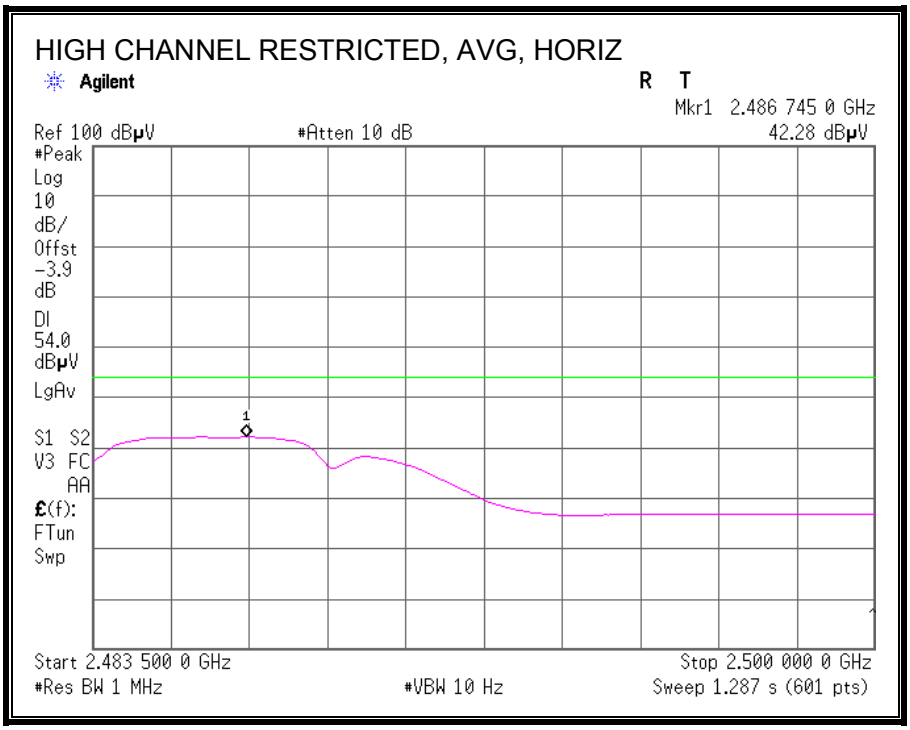
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





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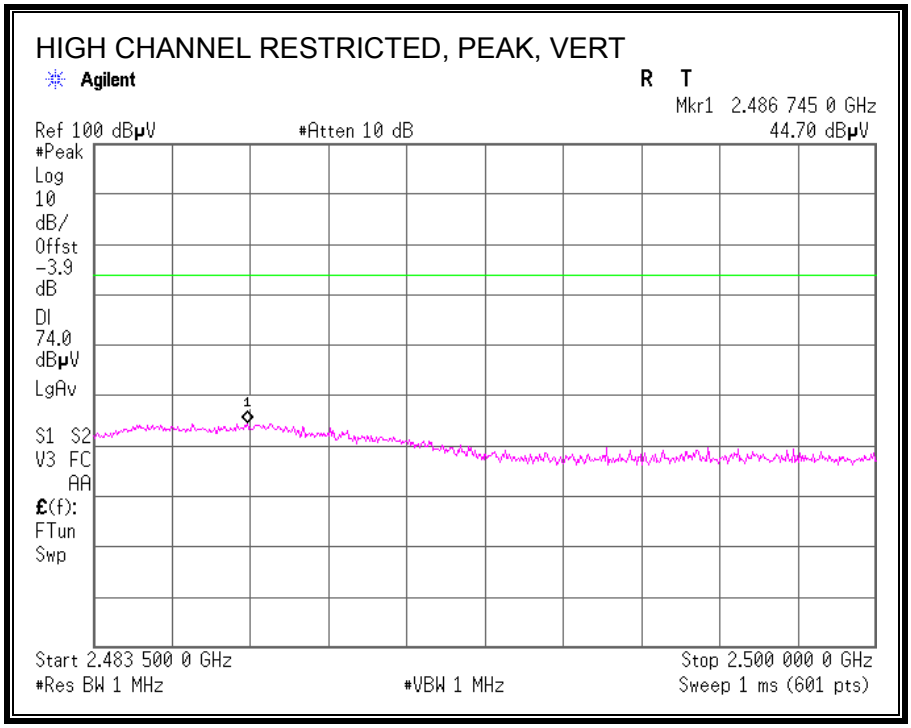
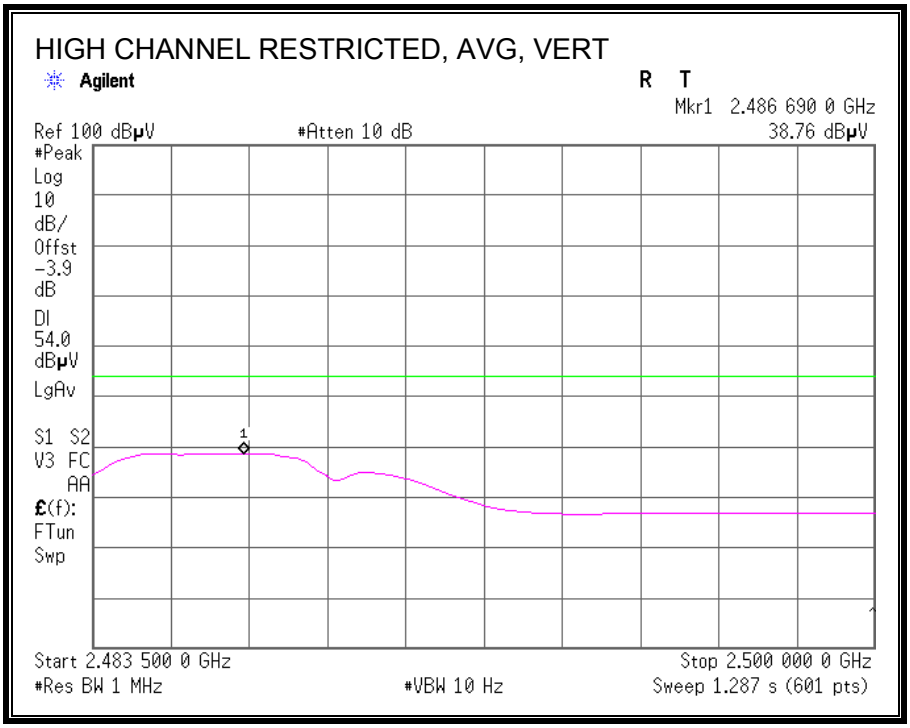
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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HARMONICS AND SPURIOUS EMISSIONS

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	32FE0108-HO	
Date	01/31/2012	02/01/2012
Temperature/ Humidity	22 deg.C/ 30% RH	23 deg.C/ 32% RH
Engineer	Katsunori Okai	Katsunori Okai
Mode	11b Tx	

Low Ch, 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2326.670	PK	47.7	26.3	2.1	32.7	43.4	74	30.5	
Hori	2390.000	PK	44.6	26.4	2.2	32.6	40.6	74	33.3	
Hori	2397.183	PK	60.1	26.4	2.2	32.6	56.1	-	-	See 20dBc Data Sheet
Hori	2400.000	PK	56.2	26.4	2.2	32.6	52.2	-	-	See 20dBc Data Sheet
Hori	2498.167	PK	45.8	26.5	2.2	32.6	41.9	74	32.0	
Hori	4824.000	PK	40.0	30.4	3.8	31.9	42.3	74	31.6	
Hori	7236.000	PK	41.5	35.2	4.6	32.4	48.9	74	25.0	
Hori	2326.670	AV	41.4	26.3	2.1	32.7	37.1	54	16.8	
Hori	2390.000	AV	32.0	26.4	2.2	32.6	28.0	54	25.9	
Hori	2397.183	AV	57.0	26.4	2.2	32.6	53.0	-	-	See 20dBc Data Sheet
Hori	2400.000	AV	51.9	26.4	2.2	32.6	47.9	-	-	See 20dBc Data Sheet
Hori	2498.167	AV	37.7	26.5	2.2	32.6	33.8	54	20.1	
Hori	4824.000	AV	28.1	30.4	3.8	31.9	30.4	54	23.5	
Hori	7236.000	AV	29.8	35.2	4.6	32.4	37.2	54	16.7	
Vert	2326.130	PK	45.0	26.3	2.1	32.7	40.7	74	33.2	
Vert	2390.000	PK	43.7	26.4	2.2	32.6	39.7	74	34.2	
Vert	2397.217	PK	57.7	26.4	2.2	32.6	53.7	-	-	See 20dBc Data Sheet
Vert	2400.000	PK	54.4	26.4	2.2	32.6	50.4	-	-	See 20dBc Data Sheet
Vert	2498.167	PK	45.1	26.5	2.2	32.6	41.2	74	32.7	
Vert	4824.000	PK	40.3	30.4	3.8	31.9	42.6	74	31.3	
Vert	7236.000	PK	41.3	35.2	4.6	32.4	48.7	74	25.2	
Vert	2326.130	AV	36.0	26.3	2.1	32.7	31.7	54	22.2	
Vert	2390.000	AV	31.1	26.4	2.2	32.6	27.1	54	26.8	
Vert	2397.217	AV	54.7	26.4	2.2	32.6	50.7	-	-	See 20dBc Data Sheet
Vert	2400.000	AV	49.8	26.4	2.2	32.6	45.8	-	-	See 20dBc Data Sheet
Vert	2498.167	AV	37.3	26.5	2.2	32.6	33.4	54	20.5	
Vert	4824.000	AV	28.1	30.4	3.8	31.9	30.4	54	23.5	
Vert	7236.000	AV	29.8	35.2	4.6	32.4	37.2	54	16.7	

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	92.7	26.4	2.2	32.6	88.7	-	-	Carrier
Hori	2400.000	PK	53.8	26.4	2.2	32.6	49.8	68.7	18.9	
Hori	2397.183	PK	58.1	26.4	2.2	32.6	54.1	68.7	14.6	
Vert	2412.000	PK	91.9	26.4	2.2	32.6	87.9	-	-	Carrier
Vert	2400.000	PK	51.8	26.4	2.2	32.6	47.8	67.9	20.1	
Vert	2397.217	PK	56.4	26.4	2.2	32.6	52.4	67.9	15.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

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Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	32FE0108-HO	
Date	01/31/2012	02/01/2012
Temperature/ Humidity	22 deg.C/ 30% RH	23 deg.C/ 32% RH
Engineer	Katsunori Okai	Katsunori Okai
Mode	11b Tx	

Mid Ch, 2442MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2355.831	PK	49.5	26.3	2.2	32.7	45.3	74	28.6	
Hori	2527.818	PK	47.4	26.6	2.2	32.5	43.7	74	30.2	
Hori	4884.000	PK	39.4	30.5	3.2	31.9	41.2	74	32.7	
Hori	7326.000	PK	40.5	35.2	4.1	32.4	47.4	74	26.5	
Hori	2355.831	AV	40.4	26.3	2.2	32.7	36.2	54	17.7	
Hori	2527.818	AV	36.6	26.6	2.2	32.5	32.9	54	21.0	
Hori	4884.000	AV	28.3	30.5	3.2	31.9	30.1	54	23.8	
Hori	7326.000	AV	29.9	35.2	4.1	32.4	36.8	54	17.1	
Vert	2355.833	PK	46.7	26.3	2.2	32.7	42.5	74	31.4	
Vert	2527.815	PK	44.6	26.6	2.2	32.5	40.9	74	33.0	
Vert	4884.000	PK	39.1	30.5	3.2	31.9	40.9	74	33.0	
Vert	7326.000	PK	40.8	35.2	4.1	32.4	47.7	74	26.2	
Vert	2355.833	AV	39.7	26.3	2.2	32.7	35.5	54	18.4	
Vert	2527.815	AV	35.7	26.6	2.2	32.5	32.0	54	21.9	
Vert	4884.000	AV	28.3	30.5	3.2	31.9	30.1	54	23.8	
Vert	7326.000	AV	29.9	35.2	4.1	32.4	36.8	54	17.1	

High Ch, 2472MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2385.621	PK	45.1	26.4	2.2	32.6	41.1	74	32.8	
Hori	2483.500	PK	48.2	26.5	2.2	32.6	44.3	74	29.6	
Hori	2486.674	PK	50.9	26.5	2.2	32.6	47.0	74	26.9	
Hori	2559.101	PK	43.8	26.7	2.3	32.5	40.3	74	33.6	
Hori	4944.000	PK	38.2	30.6	3.9	31.9	40.8	74	33.1	
Hori	7416.000	PK	40.4	35.2	4.6	32.4	47.8	74	26.1	
Hori	2385.621	AV	35.2	26.4	2.2	32.6	31.2	54	22.7	
Hori	2483.500	AV	40.9	26.5	2.2	32.6	37.0	54	16.9	
Hori	2486.674	AV	46.4	26.5	2.2	32.6	42.5	54	11.4	
Hori	2559.101	AV	33.3	26.7	2.3	32.5	29.8	54	24.1	
Hori	4944.000	AV	28.0	30.6	3.9	31.9	30.6	54	23.3	
Hori	7416.000	AV	30.1	35.2	4.6	32.4	37.5	54	16.4	
Vert	2385.622	PK	44.0	26.4	2.2	32.6	40.0	74	33.9	
Vert	2483.500	PK	46.5	26.5	2.2	32.6	42.6	74	31.3	
Vert	2486.707	PK	49.6	26.5	2.2	32.6	45.7	74	28.2	
Vert	2559.103	PK	42.1	26.7	2.3	32.5	38.6	74	35.3	
Vert	4944.000	PK	38.8	30.6	3.9	31.9	41.4	74	32.5	
Vert	7416.000	PK	40.7	35.2	4.6	32.4	48.1	74	25.8	
Vert	2385.622	AV	34.6	26.4	2.2	32.6	30.6	54	23.3	
Vert	2483.500	AV	38.5	26.5	2.2	32.6	34.6	54	19.3	
Vert	2486.707	AV	44.0	26.5	2.2	32.6	40.1	54	13.8	
Vert	2559.103	AV	32.6	26.7	2.3	32.5	29.1	54	24.8	
Vert	4944.000	AV	28.0	30.6	3.9	31.9	30.6	54	23.3	
Vert	7416.000	AV	30.1	35.2	4.6	32.4	37.5	54	16.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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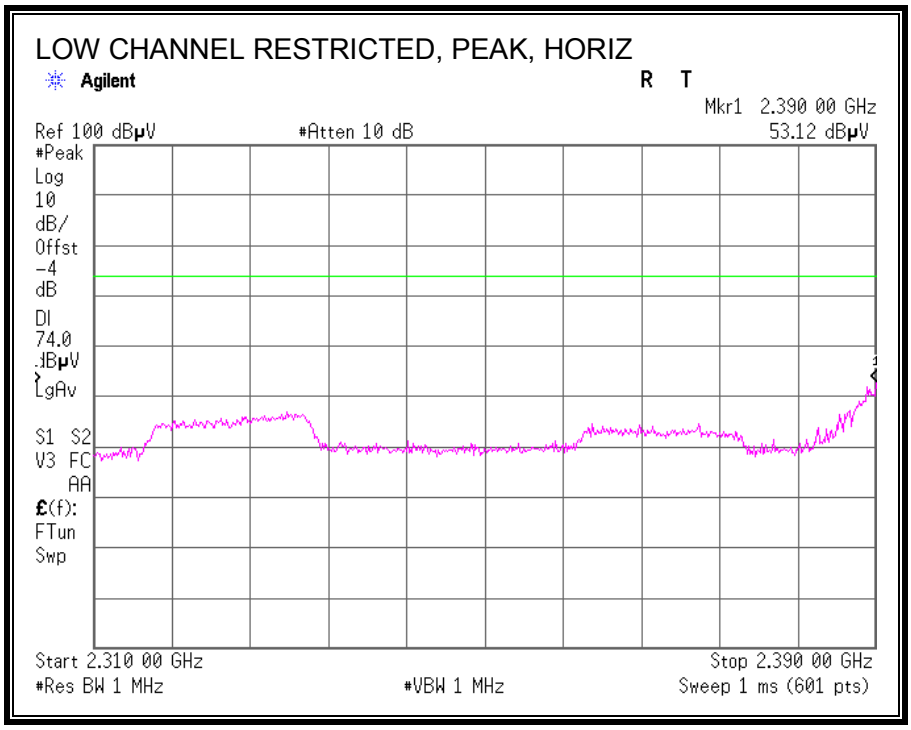
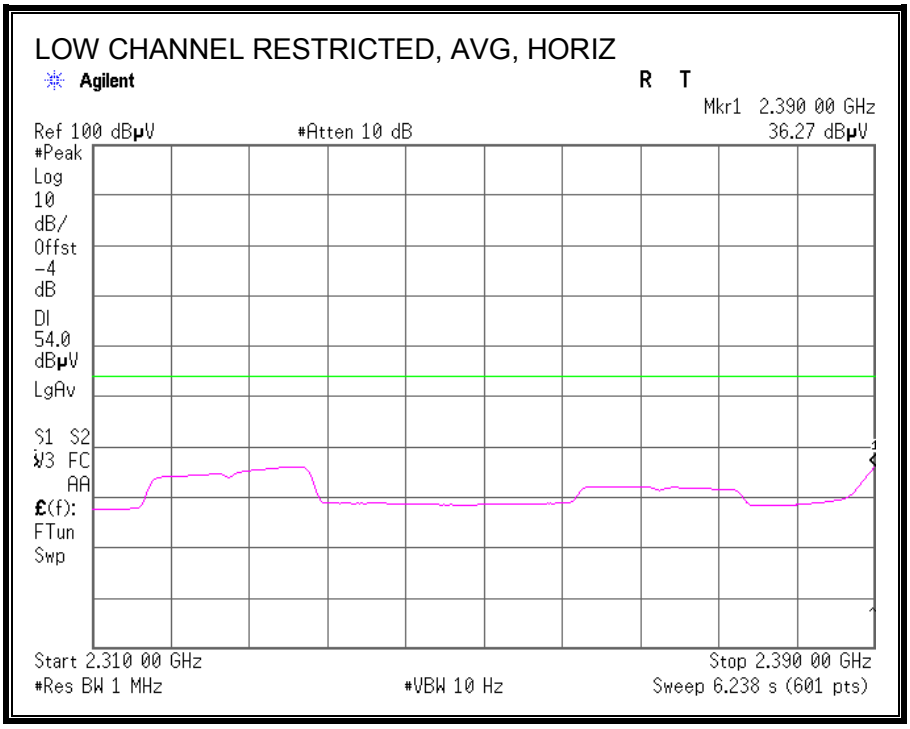
7.2.2 TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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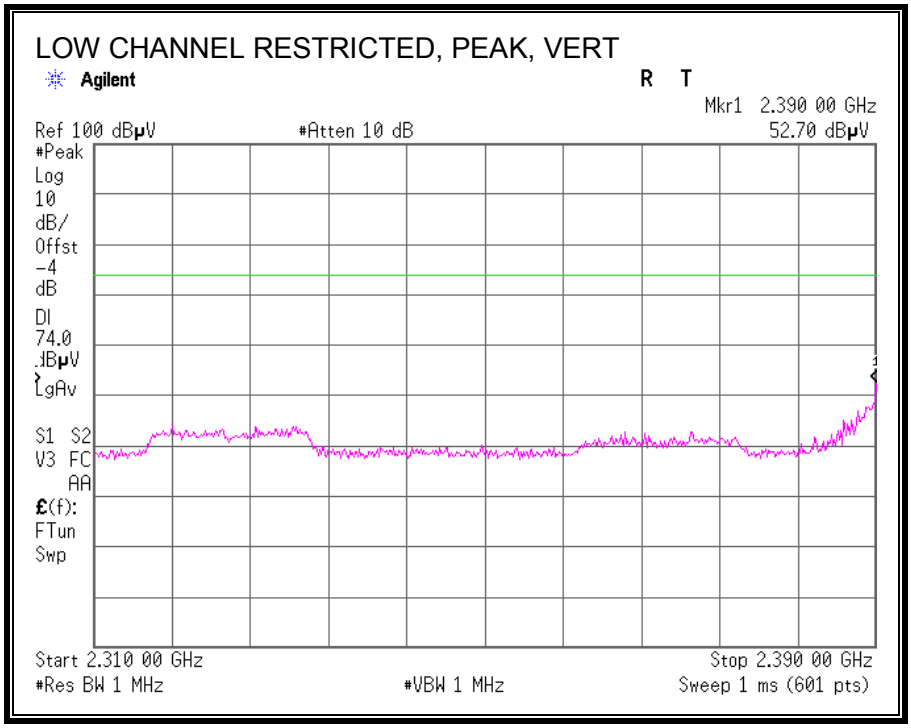
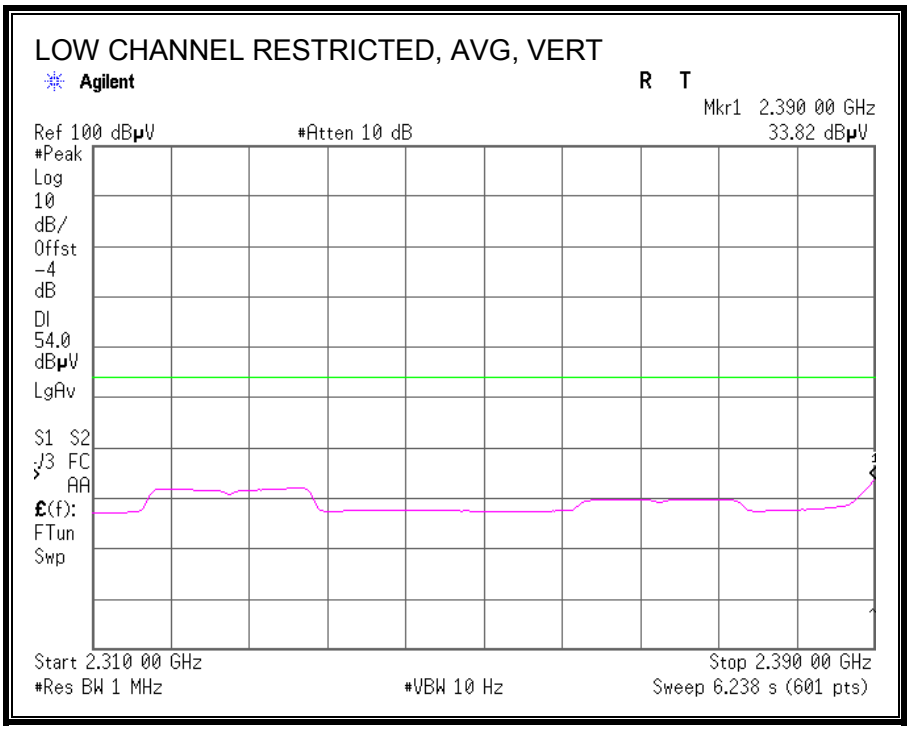
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





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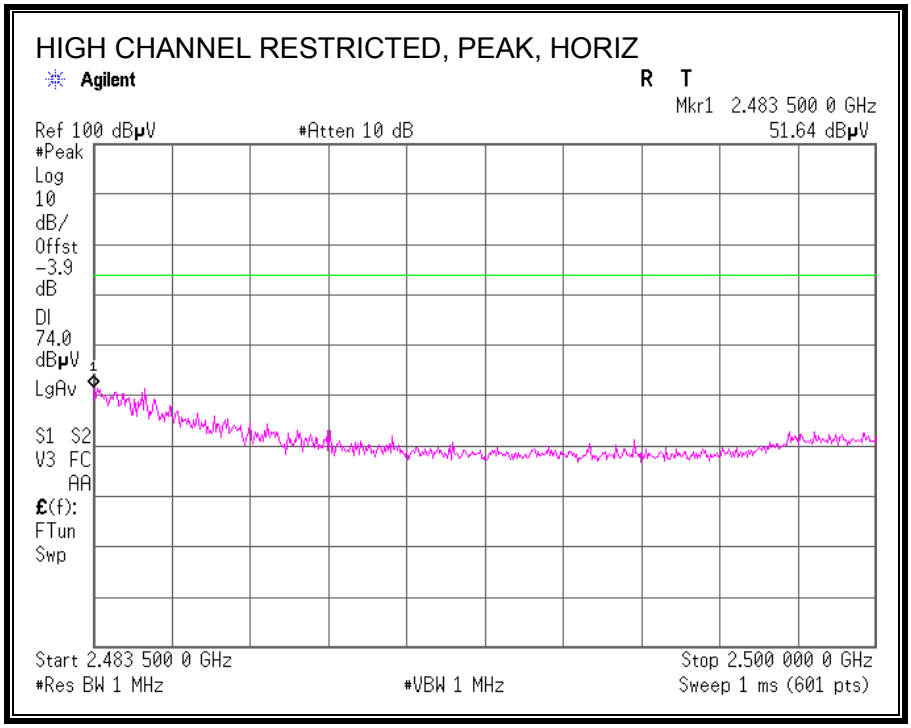
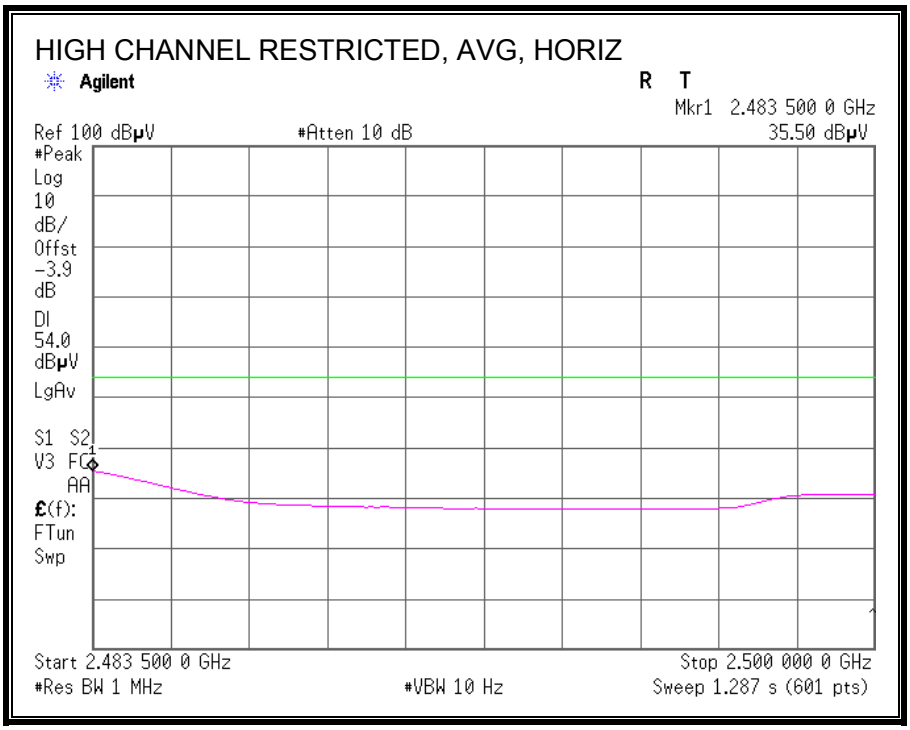
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





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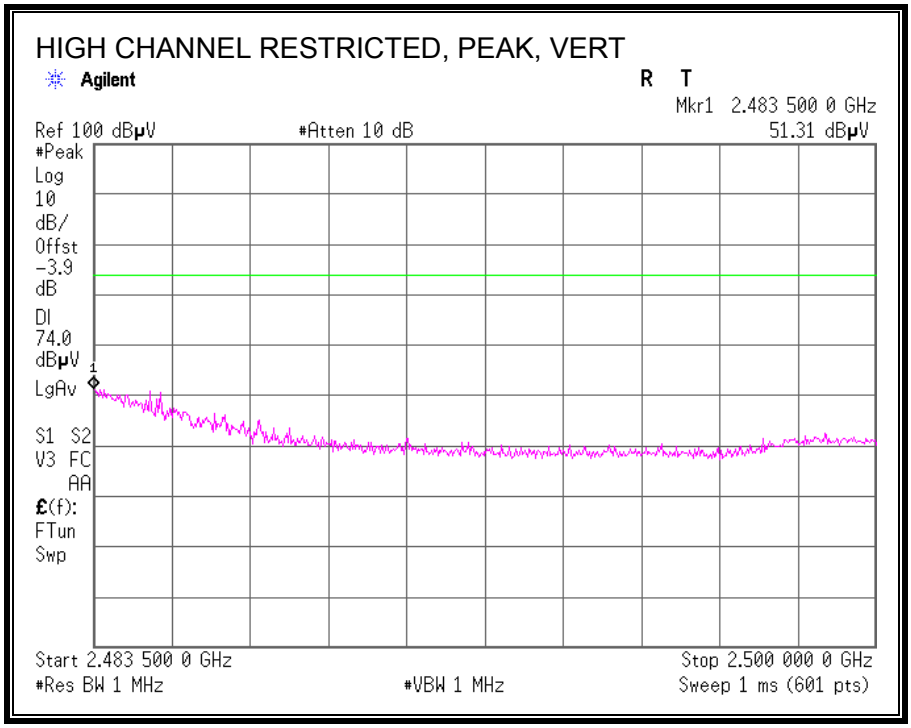
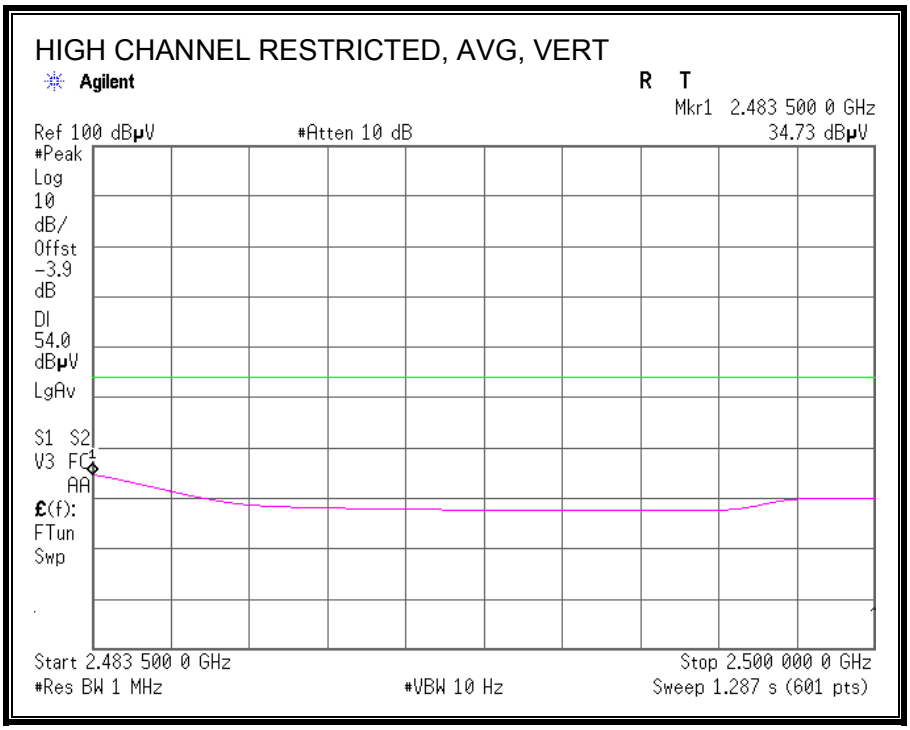
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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HARMONICS AND SPURIOUS EMISSIONS

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32FE0108-HO
Date	02/01/2012
Temperature/ Humidity	23 deg.C/ 32% RH
Engineer	Katsunori Okai
Mode	11g Tx

Low Ch, 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2330.120	PK	50.8	26.3	2.2	32.7	46.6	74	27.3	
Hori	2390.000	PK	59.6	26.4	2.2	32.6	55.6	74	18.3	
Hori	2400.000	PK	78.6	26.4	2.2	32.6	74.6	-	-	See 20dBc Data Sheet
Hori	2493.333	PK	48.0	26.5	2.2	32.6	44.1	74	29.8	
Hori	4824.000	PK	39.8	30.4	3.8	31.9	42.1	74	31.8	
Hori	7236.000	PK	41.4	35.2	4.6	32.4	48.8	74	25.1	
Hori	2330.120	AV	40.8	26.3	2.2	32.7	36.6	54	17.3	
Hori	2390.000	AV	41.8	26.4	2.2	32.6	37.8	54	16.1	
Hori	2400.000	AV	58.9	26.4	2.2	32.6	54.9	-	-	See 20dBc Data Sheet
Hori	2493.333	AV	38.4	26.5	2.2	32.6	34.5	54	19.4	
Hori	4824.000	AV	28.2	30.4	3.8	31.9	30.5	54	23.4	
Hori	7236.000	AV	29.9	35.2	4.6	32.4	37.3	54	16.6	
Vert	2330.120	PK	48.3	26.3	2.2	32.7	44.1	74	29.8	
Vert	2390.000	PK	57.9	26.4	2.2	32.6	53.9	74	20.0	
Vert	2400.000	PK	77.3	26.4	2.2	32.6	73.3	-	-	See 20dBc Data Sheet
Vert	2492.801	PK	48.1	26.5	2.2	32.6	44.2	74	29.7	
Vert	4824.000	PK	39.6	30.4	3.8	31.9	41.9	74	32.0	
Vert	7236.000	PK	41.1	35.2	4.6	32.4	48.5	74	25.4	
Vert	2330.120	AV	37.7	26.3	2.2	32.7	33.5	54	20.4	
Vert	2390.000	AV	40.3	26.4	2.2	32.6	36.3	54	17.6	
Vert	2400.000	AV	57.7	26.4	2.2	32.6	53.7	-	-	See 20dBc Data Sheet
Vert	2492.801	AV	37.5	26.5	2.2	32.6	33.6	54	20.3	
Vert	4824.000	AV	28.2	30.4	3.8	31.9	30.5	54	23.4	
Vert	7236.000	AV	29.9	35.2	4.6	32.4	37.3	54	16.6	

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m	Margin [dB]	Remark
Hori	2412.000	PK	92.2	26.4	2.2	32.6	88.2	-	-	Carrier
Hori	2400.000	PK	63.2	26.4	2.2	32.6	59.2	68.2	9.0	
Vert	2412.000	PK	91.0	26.4	2.2	32.6	87.0	-	-	Carrier
Vert	2400.000	PK	62.1	26.4	2.2	32.6	58.1	67.0	8.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

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Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32FE0108-HO
Date	02/01/2012
Temperature/ Humidity	23 deg.C/ 32% RH
Engineer	Katsunori Okai
Mode	11g Tx

Mid Ch, 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2354.231	PK	52.1	26.3	2.2	32.7	47.9	74	26.0	
Hori	2518.731	PK	47.8	26.6	2.2	32.5	44.1	74	29.8	
Hori	4874.000	PK	39.3	30.5	3.8	31.9	41.7	74	32.2	
Hori	7311.000	PK	41.1	35.2	4.6	32.4	48.5	74	25.4	
Hori	2354.231	AV	41.0	26.3	2.2	32.7	36.8	54	17.1	
Hori	2518.731	AV	37.8	26.6	2.2	32.5	34.1	54	19.8	
Hori	4874.000	AV	28.0	30.5	3.8	31.9	30.4	54	23.5	
Hori	7311.000	AV	29.6	35.2	4.6	32.4	37.0	54	16.9	
Vert	2354.233	PK	49.4	26.3	2.2	32.7	45.2	74	28.7	
Vert	2518.701	PK	47.2	26.6	2.2	32.5	43.5	74	30.4	
Vert	4874.000	PK	39.5	30.5	3.8	31.9	41.9	74	32.0	
Vert	7311.000	PK	40.8	35.2	4.6	32.4	48.2	74	25.7	
Vert	2354.233	AV	38.1	26.3	2.2	32.7	33.9	54	20.0	
Vert	2518.701	AV	36.2	26.6	2.2	32.5	32.5	54	21.4	
Vert	4874.000	AV	28.0	30.5	3.8	31.9	30.4	54	23.5	
Vert	7311.000	AV	29.6	35.2	4.6	32.4	37.0	54	16.9	

High Ch, 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2366.801	PK	50.4	26.3	2.2	32.6	46.3	74	27.6	
Hori	2483.500	PK	56.4	26.5	2.2	32.6	52.5	74	21.4	
Hori	2483.775	PK	54.9	26.5	2.2	32.6	51.0	74	22.9	
Hori	2555.031	PK	47.9	26.7	2.3	32.5	44.4	74	29.5	
Hori	4924.000	PK	39.5	30.5	3.8	31.9	41.9	74	32.0	
Hori	7386.000	PK	41.8	35.2	4.6	32.4	49.2	74	24.7	
Hori	2366.801	AV	39.5	26.3	2.2	32.6	35.4	54	18.5	
Hori	2483.500	AV	40.3	26.5	2.2	32.6	36.4	54	17.5	
Hori	2483.775	AV	39.6	26.5	2.2	32.6	35.7	54	18.2	
Hori	2555.031	AV	36.2	26.7	2.3	32.5	32.7	54	21.2	
Hori	4924.000	AV	28.0	30.5	3.8	31.9	30.4	54	23.5	
Hori	7386.000	AV	30.2	35.2	4.6	32.4	37.6	54	16.3	
Vert	2366.823	PK	48.9	26.3	2.2	32.6	44.8	74	29.1	
Vert	2483.500	PK	55.5	26.5	2.2	32.6	51.6	74	22.3	
Vert	2483.555	PK	54.6	26.5	2.2	32.6	50.7	74	23.2	
Vert	2555.044	PK	47.2	26.7	2.3	32.5	43.7	74	30.2	
Vert	4924.000	PK	39.8	30.5	3.8	31.9	42.2	74	31.7	
Vert	7386.000	PK	41.5	35.2	4.6	32.4	48.9	74	25.0	
Vert	2366.823	AV	38.2	26.3	2.2	32.6	34.1	54	19.8	
Vert	2483.500	AV	39.2	26.5	2.2	32.6	35.3	54	18.6	
Vert	2483.555	AV	38.5	26.5	2.2	32.6	34.6	54	19.3	
Vert	2555.044	AV	35.8	26.7	2.3	32.5	32.3	54	21.6	
Vert	4924.000	AV	28.0	30.5	3.8	31.9	30.4	54	23.5	
Vert	7386.000	AV	30.2	35.2	4.6	32.4	37.6	54	16.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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7.3 RECEIVER ABOVE 1 GHz

7.3.1 RX ABOVE 1 GHz FOR 20 MHz BANDWIDTH IN THE 2.4 GHz BAND

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32FE0108-HO
Date	02/02/2012
Temperature/ Humidity	23 deg.C/ 31% RH
Engineer	Tomohisa Nakagawa
Mode	Rx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1209.001	PK	47.9	24.5	1.5	34.7	39.2	74	34.8	
Hori	1475.003	PK	48.1	25.5	1.7	34.0	41.3	74	32.6	
Hori	1741.005	PK	49.4	25.7	1.9	33.4	43.6	74	30.3	
Hori	2013.340	PK	46.0	25.9	2.0	32.9	41.0	74	32.9	
Hori	1209.001	AV	39.5	24.5	1.5	34.7	30.8	54	23.1	
Hori	1475.003	AV	43.1	25.5	1.7	34.0	36.3	54	17.6	
Hori	1741.005	AV	44.7	25.7	1.9	33.4	38.9	54	15.0	
Hori	2013.340	AV	38.7	25.9	2.0	32.9	33.7	54	20.2	
Vert	1209.001	PK	49.2	24.5	1.5	34.7	40.5	74	33.4	
Vert	1475.003	PK	47.3	25.5	1.7	34.0	40.5	74	33.4	
Vert	1741.005	PK	48.5	25.7	1.9	33.4	42.7	74	31.2	
Vert	2013.340	PK	45.9	25.9	2.0	32.9	40.9	74	33.0	
Vert	1209.001	AV	42.1	24.5	1.5	34.7	33.4	54	20.5	
Vert	1475.003	AV	38.5	25.5	1.7	34.0	31.7	54	22.2	
Vert	1741.005	AV	44.1	25.7	1.9	33.4	38.3	54	15.6	
Vert	2013.340	AV	36.5	25.9	2.0	32.9	31.5	54	22.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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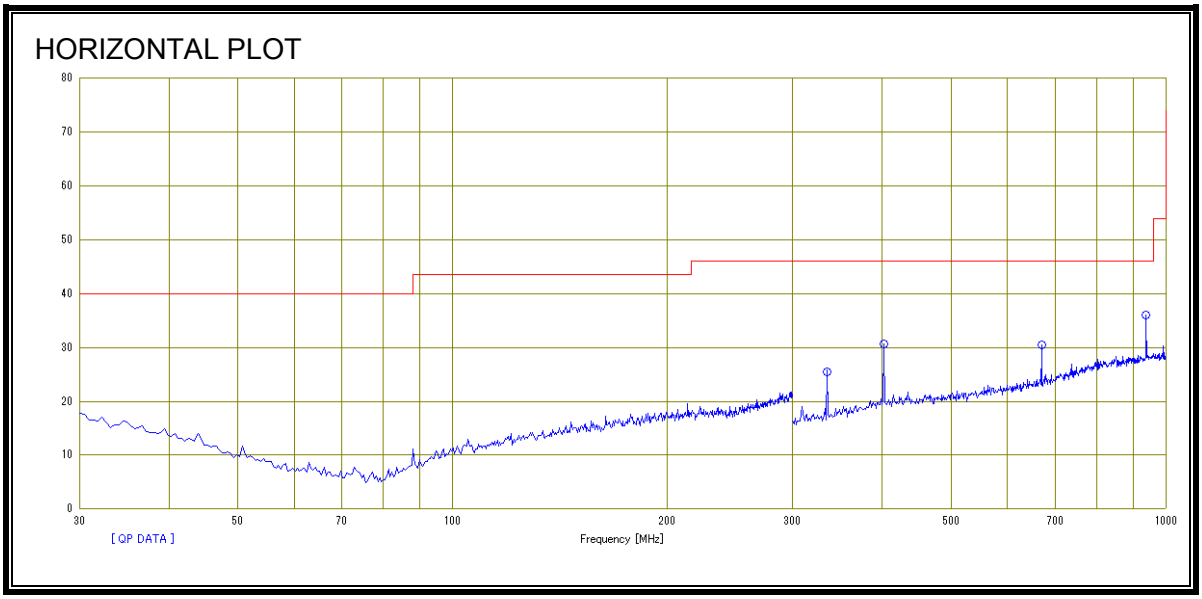
7.4 WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (HORIZONTAL)



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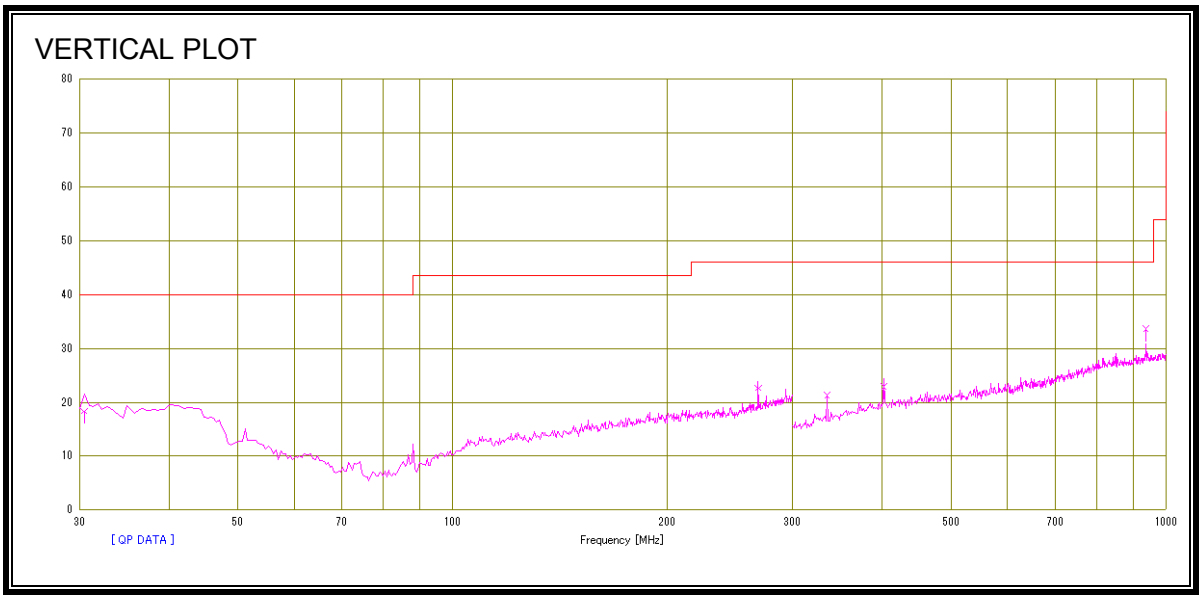
SPURIOUS EMISSIONS 30 TO 1000 MHz (VERTICAL)



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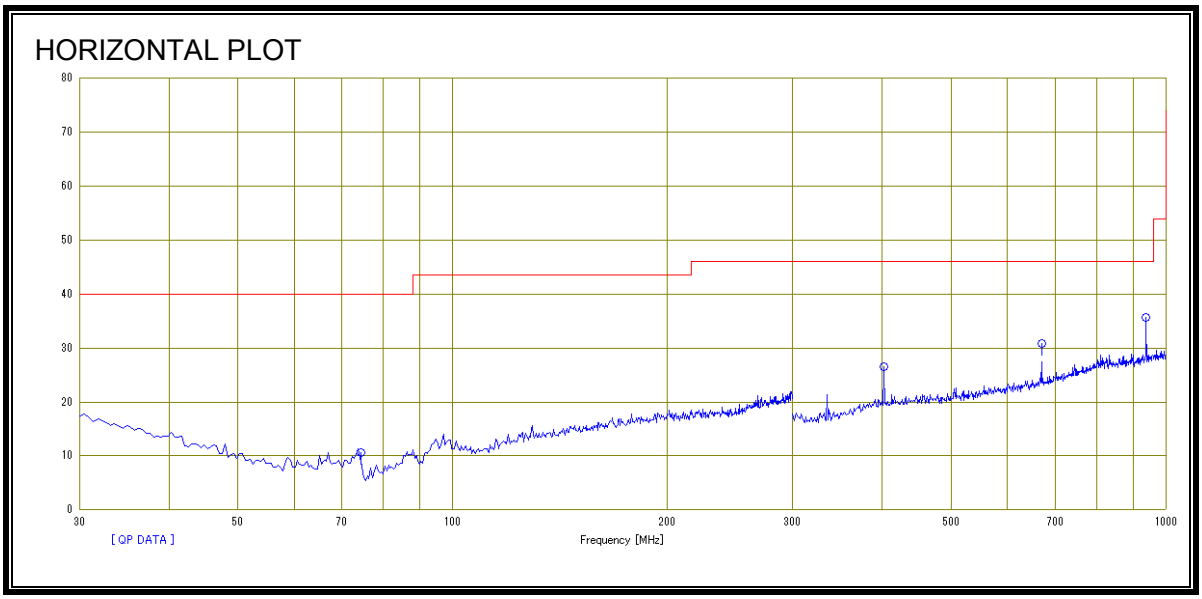
SPURIOUS EMISSIONS 30 TO 1000 MHz (HORIZONTAL)



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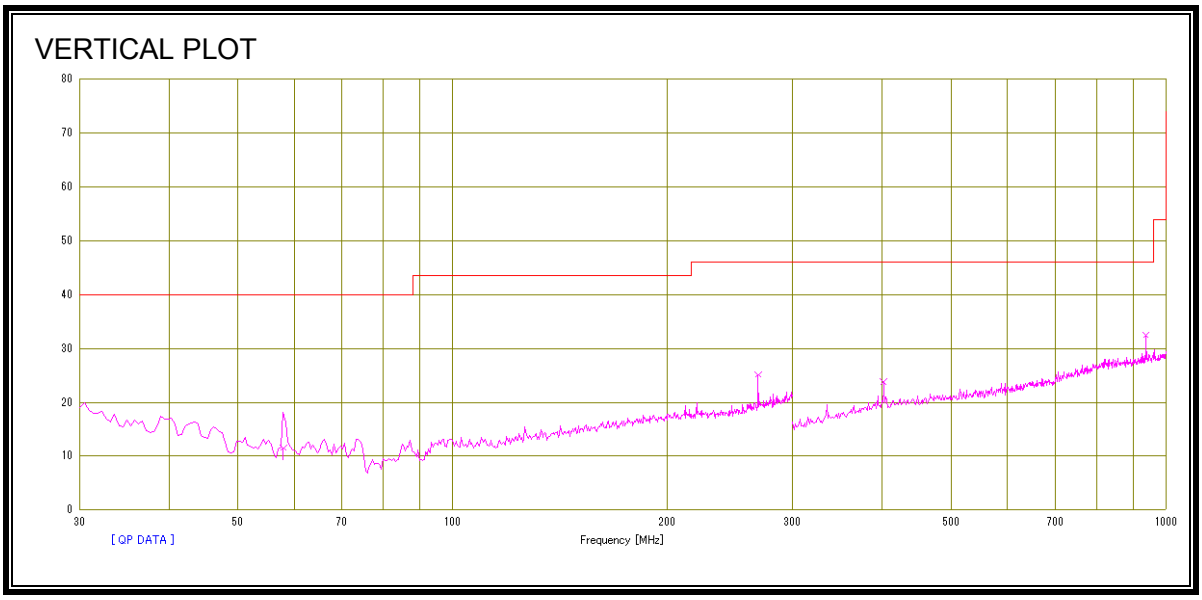
SPURIOUS EMISSIONS 30 TO 1000 MHz (VERTICAL)



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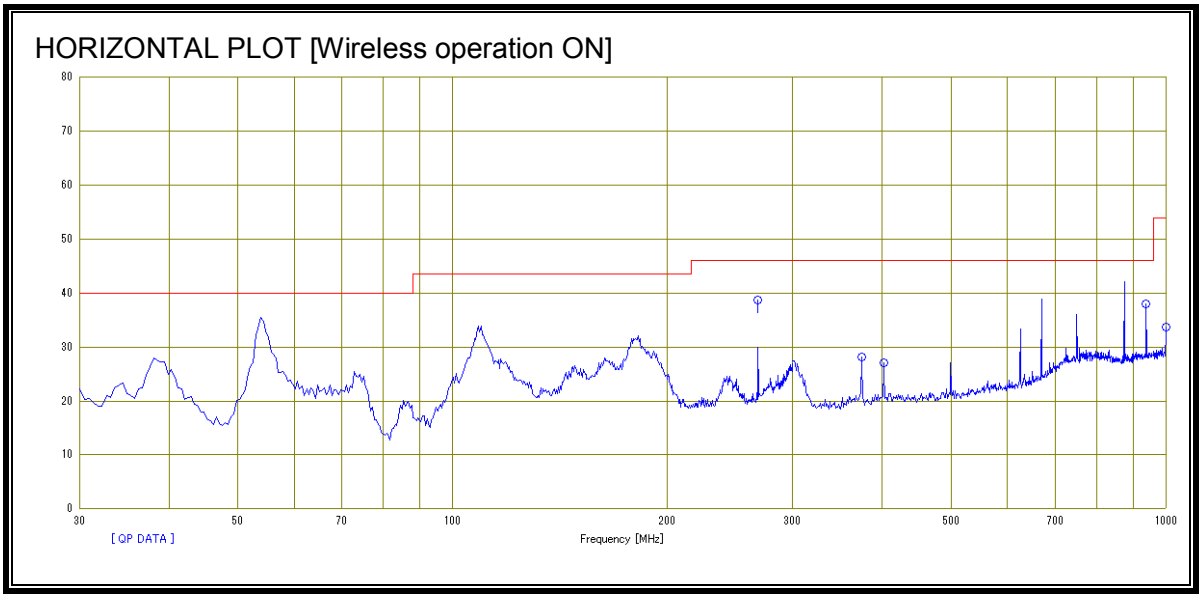
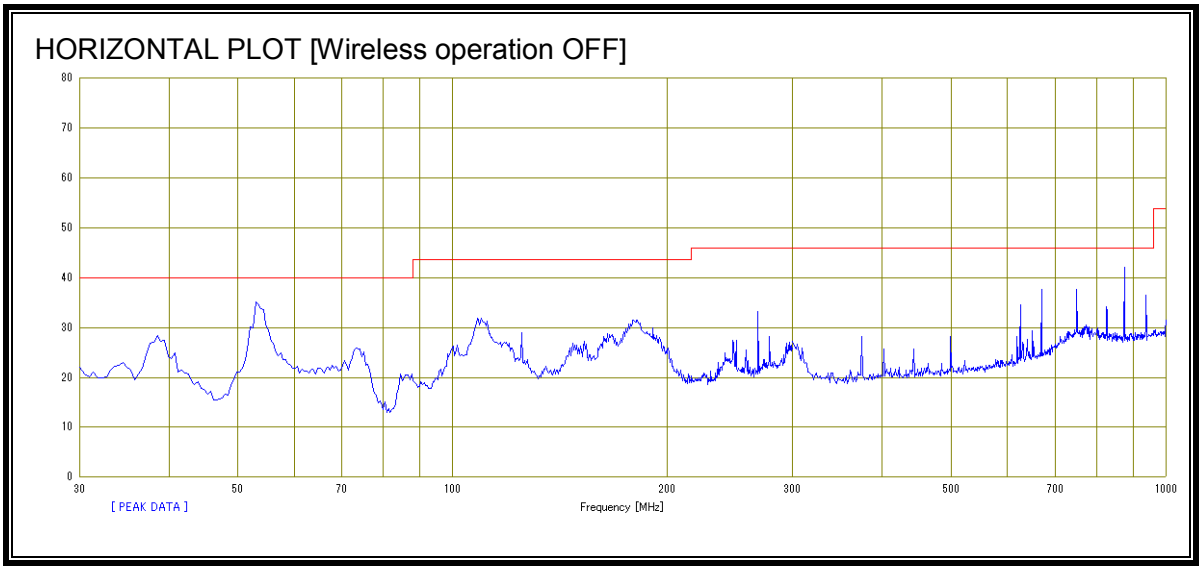
SPURIOUS EMISSIONS 30 TO 1000 MHz (HORIZONTAL) (Addition of Host device)





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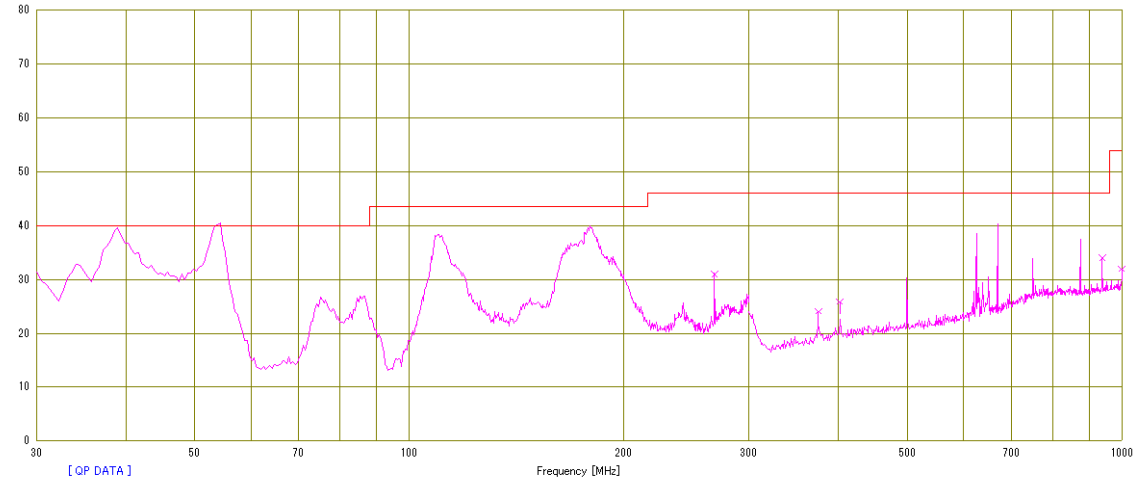
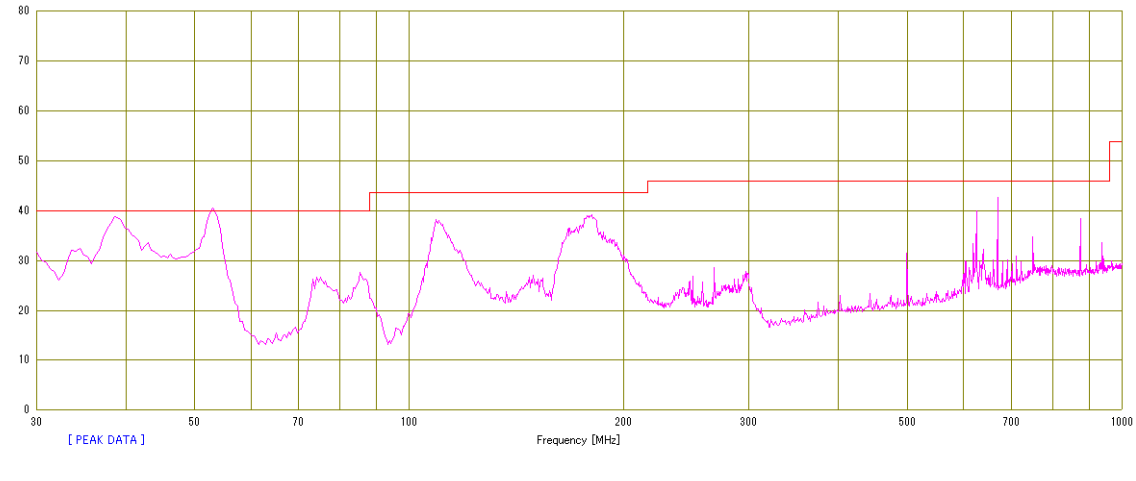
SPURIOUS EMISSIONS 30 TO 1000 MHz (VERTICAL) (Addition of Host device)

VERTICAL PLOT [Wireless operation ON]



VERTICAL PLOT [Wireless operation OFF]



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HORIZONTAL AND VERTICAL DATA

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32FE0108-HO
Date	02/02/2012
Temperature/ Humidity	23 deg.C/ 31% RH
Engineer	Tomohisa Nakagawa
Mode	Tx 11g 2437MHz

With Mitsumi AC Adaptor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	335.141	QP	31.6	15.6	10.2	32.0	25.4	46.0	20.6	
Hori	402.169	QP	34.3	17.7	10.7	32.0	30.7	46.0	15.3	
Hori	669.834	QP	30.0	20.2	12.2	31.9	30.5	46.0	15.5	
Hori	938.172	QP	30.4	22.8	13.7	30.9	36.0	46.0	10.0	
Vert	30.450	QP	25.0	18.4	7.1	32.2	18.3	40.0	21.7	
Vert	268.049	QP	26.6	18.3	9.7	32.0	22.6	46.0	23.4	
Vert	335.000	QP	27.5	15.6	10.2	32.0	21.3	46.0	24.7	
Vert	402.666	QP	26.5	17.7	10.7	32.0	22.9	46.0	23.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

With Tabuchi AC Adaptor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	74.323	QP	28.5	6.5	7.8	32.1	10.7	40.0	29.3	
Hori	402.169	QP	30.1	17.7	10.7	32.0	26.5	46.0	19.5	
Hori	669.834	QP	30.4	20.2	12.2	31.9	30.9	46.0	15.1	
Hori	938.395	QP	30.0	22.8	13.7	30.9	35.6	46.0	10.4	
Vert	57.900	QP	27.4	8.6	7.6	32.1	11.5	40.0	28.5	
Vert	268.113	QP	29.1	18.3	9.7	32.0	25.1	46.0	20.9	
Vert	402.170	QP	27.3	17.7	10.7	32.0	23.7	46.0	22.3	
Vert	938.172	QP	26.8	22.8	13.7	30.9	32.4	46.0	13.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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HORIZONTAL AND VERTICAL DATA (Addition of Host device)

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32FE0108-HO
Date	02/09/2012
Temperature/ Humidity	22 deg.C/ 32% RH
Engineer	Takumi Shimada
Mode	Tx 11g 2437MHz (Addition of Host device)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	268.112	QP	42.5	18.3	9.8	32.0	38.6	46.0	7.4	
Hori	374.993	QP	32.7	16.9	10.6	32.0	28.2	46.0	17.8	
Hori	402.169	QP	30.5	17.7	10.8	32.0	27.0	46.0	19.0	
Hori	938.386	QP	32.4	22.8	13.7	30.9	38.0	46.0	8.0	
Hori	1000.000	QP	27.1	23.4	13.9	30.7	33.7	53.9	20.2	
Vert	268.112	QP	34.8	18.3	9.8	32.0	30.9	46.0	15.1	
Vert	375.001	QP	28.5	16.9	10.6	32.0	24.0	46.0	22.0	
Vert	402.165	QP	29.3	17.7	10.8	32.0	25.8	46.0	20.2	
Vert	938.386	QP	28.4	22.8	13.7	30.9	34.0	46.0	12.0	
Vert	1000.000	QP	25.3	23.4	13.9	30.7	31.9	53.9	22.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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8 AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.4

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

UL Japan, Inc. Head Office EMC Lab.
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RESULTS

With Mitsumi AC Adaptor

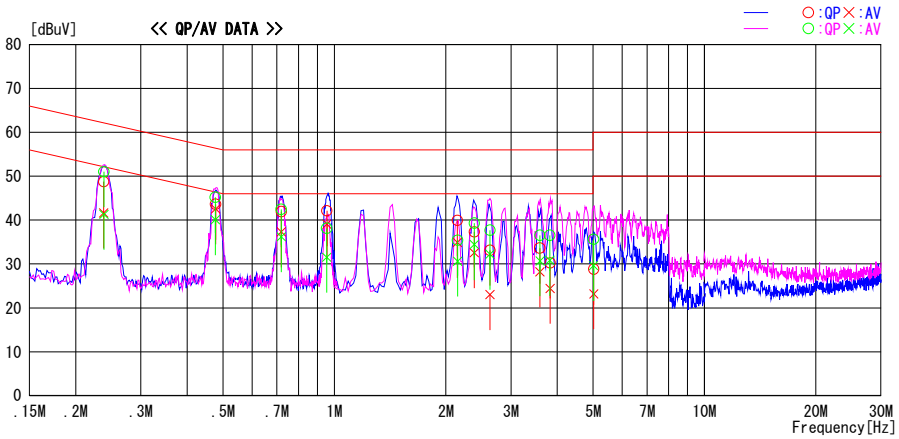
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/02/05

Report No. : 32FE0108-HO
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 32% RH
Engineer : Takeshi Choda

Mode / Remarks : Mitsumi Adaptor Tx 11g 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.23820	35.4	28.3	13.3	48.7	41.6	62.2	52.2	13.5	10.6	
0.47780	30.3	29.2	13.3	43.6	42.5	56.4	46.4	12.8	3.9	
0.71960	28.5	23.9	13.4	41.9	37.3	56.0	46.0	14.1	8.7	
0.95400	28.7	25.7	13.4	42.1	39.1	56.0	46.0	13.9	6.9	
2.15000	26.3	21.3	13.6	39.9	34.9	56.0	46.0	16.1	11.1	
2.38820	23.6	18.8	13.7	37.3	32.5	56.0	46.0	18.7	13.5	
2.63380	19.4	9.3	13.7	33.1	23.0	56.0	46.0	22.9	23.0	
3.58820	19.8	14.4	13.8	33.6	28.2	56.0	46.0	22.4	17.8	
3.82940	16.3	10.5	13.9	30.2	24.4	56.0	46.0	25.8	21.6	
5.02140	14.6	9.0	14.2	28.8	23.2	60.0	50.0	31.2	26.8	
0.23856	37.7	28.0	13.3	51.0	41.3	62.1	52.1	11.1	10.8	
0.47704	31.9	26.8	13.3	45.2	40.1	56.4	46.4	11.2	6.3	
0.71860	29.0	22.8	13.4	42.4	36.2	56.0	46.0	13.6	9.8	
0.95370	24.7	18.1	13.4	38.1	31.5	56.0	46.0	17.9	14.5	
2.15220	21.8	17.0	13.6	35.4	30.6	56.0	46.0	20.6	15.4	
2.39000	25.6	20.7	13.7	39.3	34.4	56.0	46.0	16.7	11.6	
2.63405	24.0	18.5	13.7	37.7	32.2	56.0	46.0	18.3	13.8	
3.59410	22.7	16.9	13.8	36.5	30.7	56.0	46.0	19.5	15.3	
3.82060	22.6	16.9	13.9	36.5	30.8	56.0	46.0	19.5	15.2	
5.01260	21.4	15.4	14.2	35.6	29.6	60.0	50.0	24.4	20.4	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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RESULTS

With Tabuchi AC Adaptor

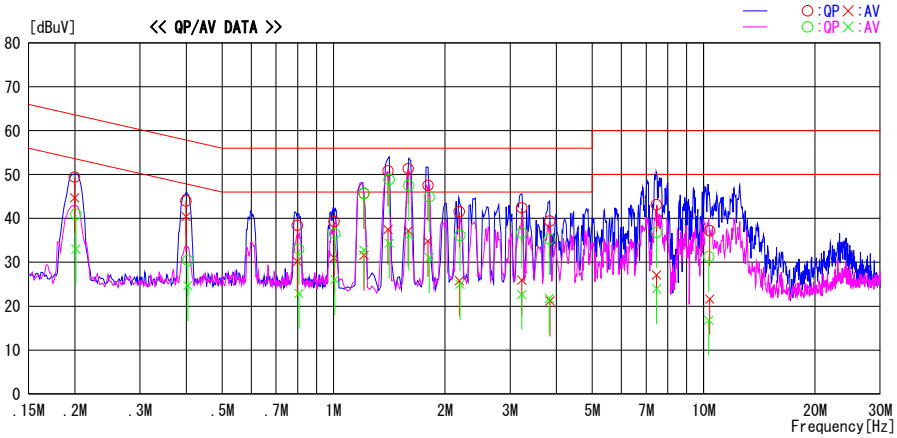
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/02/05

Report No. : 32FE0108-HO
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 32% RH
Engineer : Takeshi Choda

Mode / Remarks : Tabuchi Adaptor Tx 11g 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase
	QP	AV	Factor	QP	AV	QP	AV	QP	AV	
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]	
0.19990	36.1	31.4	13.3	49.4	44.7	63.6	53.6	14.2	8.9	
0.20130	27.6	19.7	13.3	40.9	33.0	63.6	53.6	22.7	20.6	
0.39932	30.7	27.1	13.3	44.0	40.4	57.9	47.9	13.9	7.5	
0.40402	17.1	11.4	13.3	30.4	24.7	57.8	47.8	27.4	23.1	
0.79860	25.0	16.8	13.4	38.4	30.2	56.0	46.0	17.6	15.8	
0.80620	19.6	9.5	13.4	33.0	22.9	56.0	46.0	23.0	23.1	
1.00300	25.8	17.5	13.5	39.3	31.0	56.0	46.0	16.7	15.0	
1.00760	23.0	12.6	13.5	36.5	26.1	56.0	46.0	19.5	19.9	
1.20930	32.2	19.3	13.5	45.7	32.8	56.0	46.0	10.3	13.2	
1.20960	32.2	18.1	13.5	45.7	31.6	56.0	46.0	10.3	14.4	
1.40460	37.3	24.0	13.5	50.8	37.5	56.0	46.0	5.2	8.5	
1.41280	35.3	20.9	13.5	48.8	34.4	56.0	46.0	7.2	11.6	
1.59240	37.8	23.7	13.5	51.3	37.2	56.0	46.0	4.7	8.8	
1.59800	34.0	22.7	13.5	47.5	36.2	56.0	46.0	8.5	9.8	
1.80009	34.0	21.3	13.5	47.5	34.8	56.0	46.0	8.5	11.2	
1.81450	31.4	17.6	13.5	44.9	31.1	56.0	46.0	11.1	14.9	
2.18604	27.9	12.2	13.6	41.5	25.8	56.0	46.0	14.5	20.2	
2.19520	22.5	11.4	13.6	36.1	25.0	56.0	46.0	19.9	21.0	
3.22631	28.6	12.2	13.8	42.4	26.0	56.0	46.0	13.6	20.0	
3.22700	22.9	8.9	13.8	36.7	22.7	56.0	46.0	19.3	23.3	
3.83080	21.4	7.9	13.9	35.3	21.8	56.0	46.0	20.7	24.2	
3.83940	25.5	7.3	13.9	39.4	21.2	56.0	46.0	16.6	24.8	
7.45600	28.6	12.6	14.5	43.1	27.1	60.0	50.0	16.9	22.9	
7.45940	22.3	9.5	14.5	36.8	24.0	60.0	50.0	23.2	26.0	
10.32000	16.4	1.9	14.9	31.3	16.8	60.0	50.0	28.7	33.2	
10.38400	22.3	6.7	14.9	37.2	21.6	60.0	50.0	22.8	28.4	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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Addition of Host device

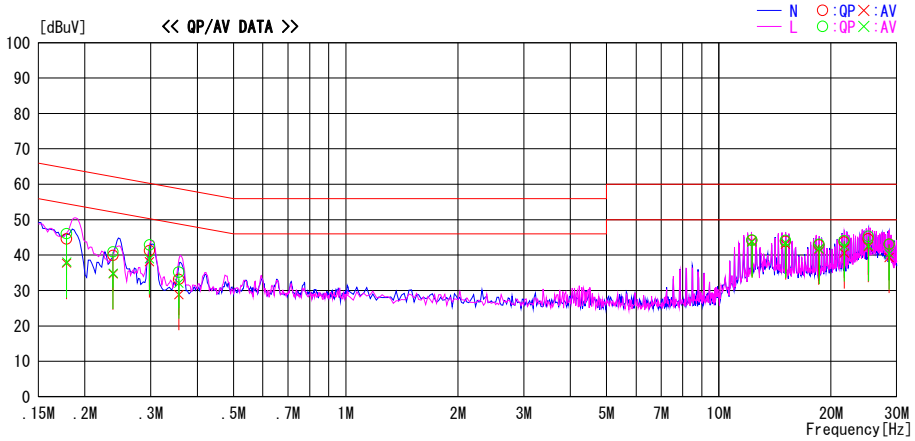
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2012/02/09

Report No. : 32FE0108-HO
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 32% RH
Engineer : Takumi Shimada

Mode / Remarks : Tx 11g 2437MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.17851	31.4	24.5	13.2	44.6	37.7	64.6	54.6	20.0	16.9	N	
0.23808	26.6	21.4	13.3	39.9	34.7	62.2	52.2	22.3	17.5	N	
0.29755	27.9	24.8	13.3	41.2	38.1	60.3	50.3	19.1	12.2	N	
0.35715	19.8	15.6	13.3	33.1	28.9	58.8	48.8	25.7	19.9	N	
12.26702	30.0	29.7	14.2	44.2	43.9	60.0	50.0	15.8	6.1	N	
15.09777	29.5	28.7	14.4	43.9	43.1	60.0	50.0	16.1	6.9	N	
18.55754	28.1	27.0	14.7	42.8	41.7	60.0	50.0	17.2	8.3	N	
21.70272	28.9	25.9	14.7	43.6	40.6	60.0	50.0	16.4	9.4	N	
25.15878	29.7	27.5	14.9	44.6	42.4	60.0	50.0	15.4	7.6	N	
28.62524	28.0	24.4	15.0	43.0	39.4	60.0	50.0	17.0	10.6	N	
0.17861	32.9	24.8	13.2	46.1	38.0	64.6	54.6	18.5	16.6	L	
0.23805	27.6	21.6	13.3	40.9	34.9	62.2	52.2	21.3	17.3	L	
0.29761	29.5	25.7	13.3	42.8	39.0	60.3	50.3	17.5	11.3	L	
0.35706	21.9	18.8	13.3	35.2	32.1	58.8	48.8	23.6	16.7	L	
12.26764	30.1	29.5	14.2	44.3	43.7	60.0	50.0	15.7	6.3	L	
15.09641	29.8	29.2	14.4	44.2	43.6	60.0	50.0	15.8	6.4	L	
18.55988	28.3	27.2	14.7	43.0	41.9	60.0	50.0	17.0	8.1	L	
21.70420	29.4	27.9	14.7	44.1	42.6	60.0	50.0	15.9	7.4	L	
25.16612	30.4	27.8	14.9	45.3	42.7	60.0	50.0	14.7	7.3	L	
28.62500	28.0	25.4	15.0	43.0	40.4	60.0	50.0	17.0	9.6	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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9 MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

f = frequency in MHz
* = Plane-wave equivalent power density

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

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

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IC RULES

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

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

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		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 microtesla (μT) or 12.57 milligauss (mG).

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EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

where

D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

Total EIRP = (P1 * G1) + (P2 * G2) + ... + (Pn * Pn)

where

Px = Power of transmitter x
Gx = Numeric gain of antenna x

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^2

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

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RESULTS

(MPE distance equals 20 cm)

Band	Mode	Separation Distance (m)	Output AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m^2)	FCC Power Density (mW/cm^2)
2.4GHz	WLAN	0.20	4.62	-1.50	0.004	0.0004

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