FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7
CERTIFICATION TEST REPORT
FOR

BLUETOOTH HUB ADAPTER

MODEL NUMBER: LO(BHA)B, LO(BHA)U*
FCC ID: UI3LOBHA
IC: 140L-LOBHA
REPORT NUMBER : 07J11537-1, REVISION A
ISSUE DATE : JANUARY 23, 2008

Prepared for

NEC INFRONTIA, INC.
6365 NORTH STATE HIGHWAY 161
IRVING, TEXAS 75039-2402, USA

Prepared by

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

*Details of model(s) and model differences are listed in the body of this report

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	1/14/08	Initial Issue	T. Chan
A	01/23/08	Revised IC number	T. Hong

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	NEC INFRONTIA, INC.
	6365 NORTH STATE HIGHWAY 161
	IRVING, TEXAS 75039-2402, USA
EUT DESCRIPTION:	BLUETOOTH HUB ADAPTER
MODEL:	LO(BHA)B (tested), LO(BHA)U
SERIAL NUMBER:	2483
DATE TESTED:	JANUARY 11 – 12, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	No Non-Compliance Noted
RSS-210 Issue 7 Annex 8 and RSS-GEN Issue 2	No Non-Compliance Noted

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

YOBI ZHOU
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

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

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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth HUB Adapter.

The radio module is manufactured by JEPICO, model PQUP1013YA.

5.2. DESCRIPTION OF MODEL DIFFERENCES

The only difference between LO(BHA)B and LO(BHA)U is the model name. There is no change in radio frequency, RF output power, radio frequency circuitry, Antenna, PCB and functional capabilities.

LO(BHA)B was the model tested.

5.3. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	12.16	16.44

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an Chip antenna, with a maximum gain of 2.15 dBi.

5.5. SOFTWARE AND FIRMWARE

The EUT driver and Utility software installed in the host support equipment during testing was Tera Term Pro, rev. V0.30

5.6. WORST-CASE CONFIGURATION AND MODE

EUT has been evaluated at X, and Y-axis. The highest measured output power was at Y-Axis.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	NEC	VA80J	NA	DoC
AC Adapter	NEC	PA-1600-01	1727642LP	DoC
AC Adapter	NEC	A42406	NG-150642	NA
Jig	NEC	NA	NA	NA

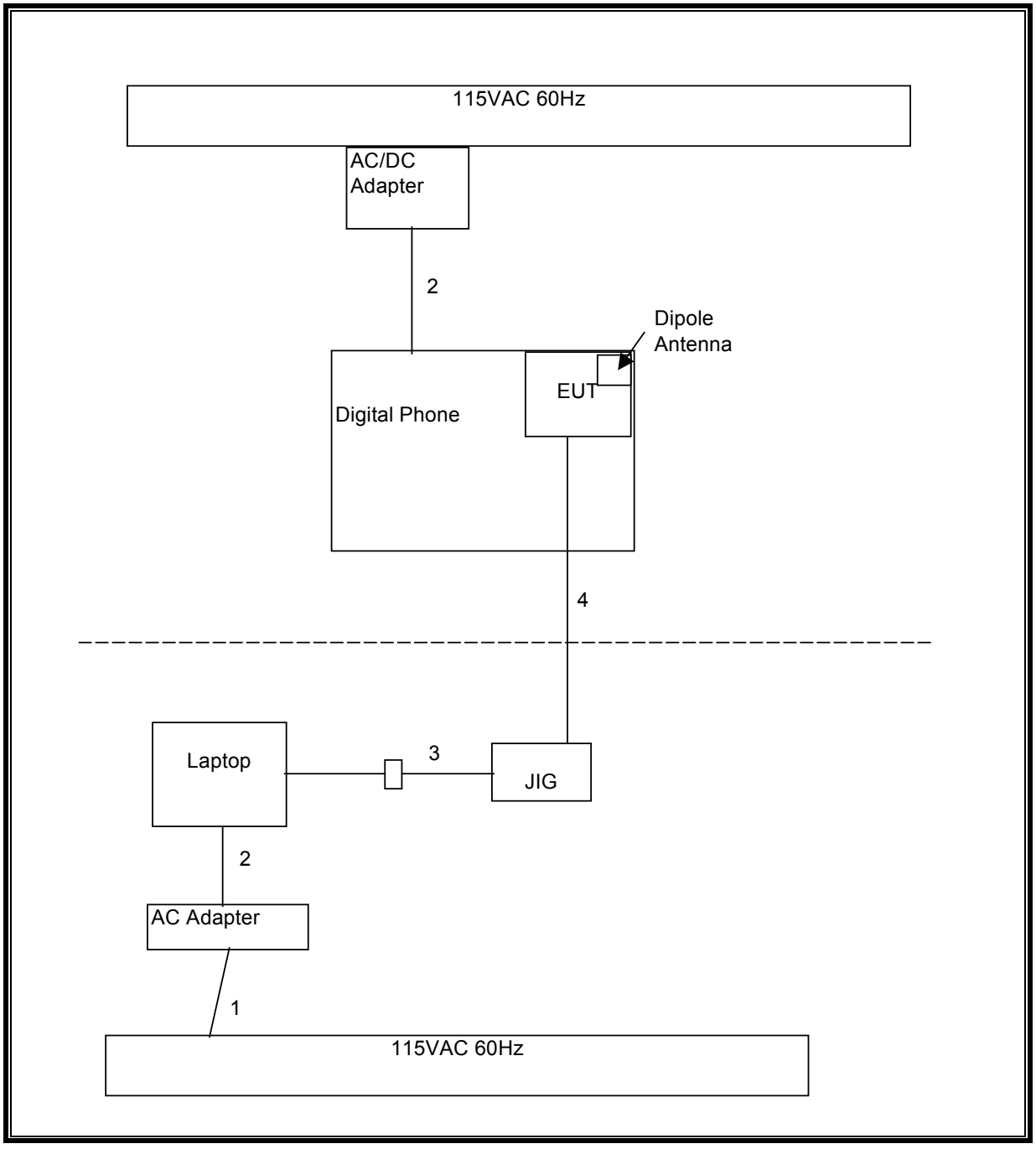
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	2	DC	Un-shielded	2m	Ferrite on EUT's end
3	USB	1	DB9 to USB	Un-shielded	2m	NA
4	Jig	1	10 Pins	Un-shielded	0.1m	NA

TEST SETUP

The EUT is connected to a laptop and activated through a Jig via a serial to USB cable. The EUT was tested as a standalone unit.

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 Date**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/14/2006	3/18/2008
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	10/13/2007	9/2/2008
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	2/6/2007	6/12/2008
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	2/6/2007	6/12/2008
Antenna, Horn, 18 GHz	ETS	3117	C01005	4/15/2007	4/15/2008
Preamplifier, 1300 MHz	Agilent / HP	8447D	NA	5/9/2007	5/9/2008
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/3/2006	9/27/2008
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	1/27/2007	1/27/2008
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	9/15/2007	9/15/2008
Peak / Average Power Sensor	Agilent	E9327A	C00964	2/14/2006	127/2008
Peak Power Meter	Agilent / HP	E4416A	C00963	2/14/2006	12/7/2008

7. ANTENNA PORT TEST RESULTS

7.1. BASIC DATA RATE GFSK MODULATION

7.1.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

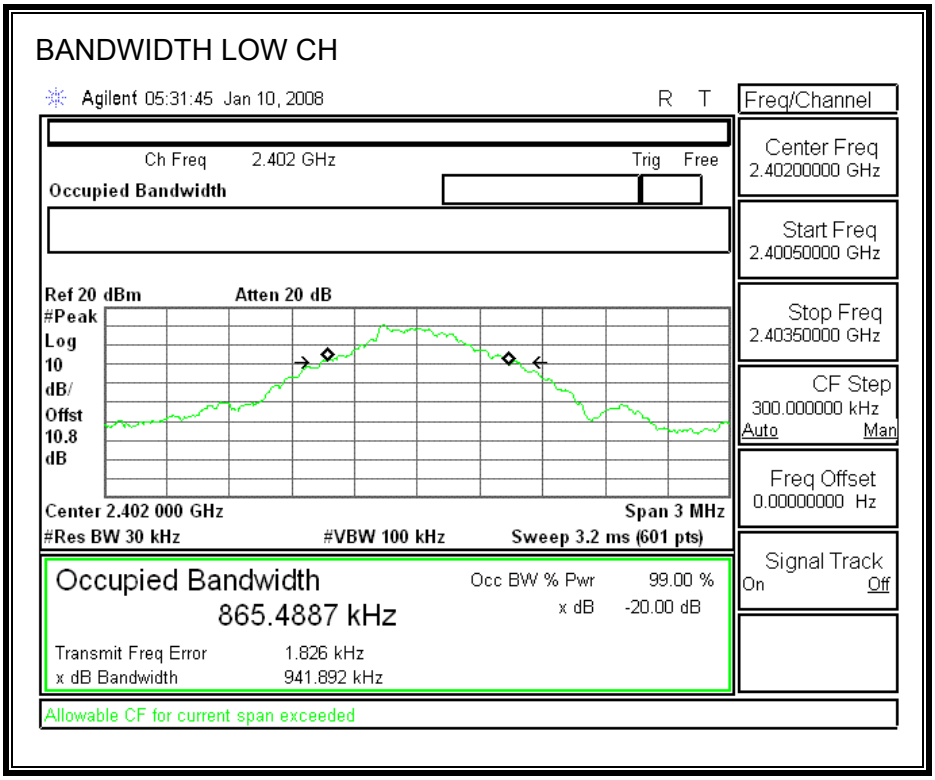
TEST PROCEDURE

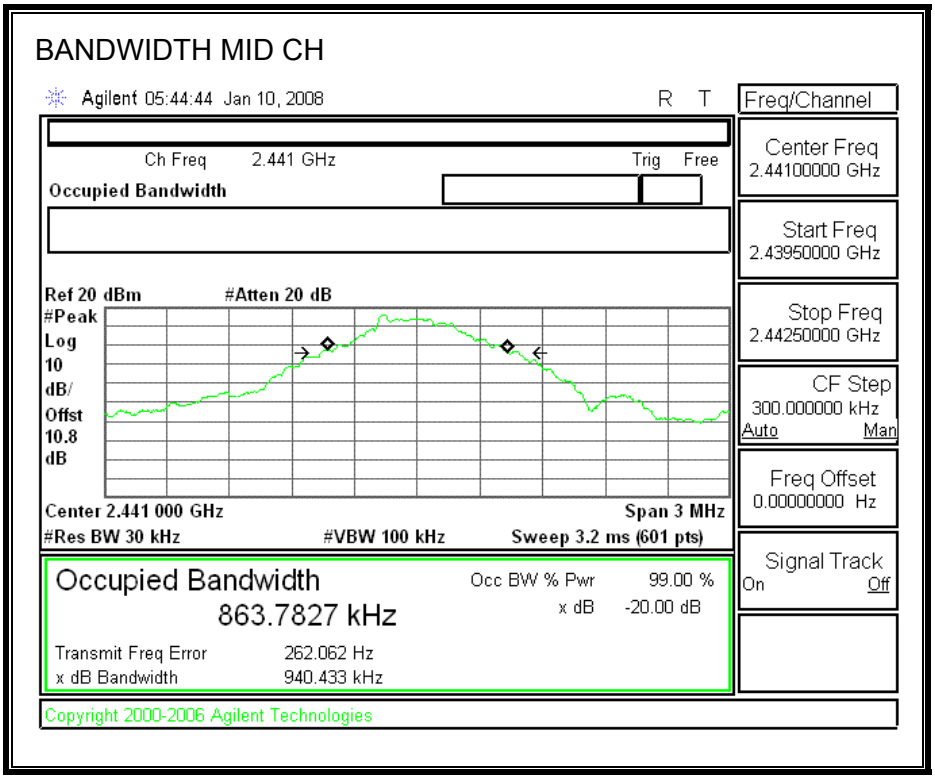
The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

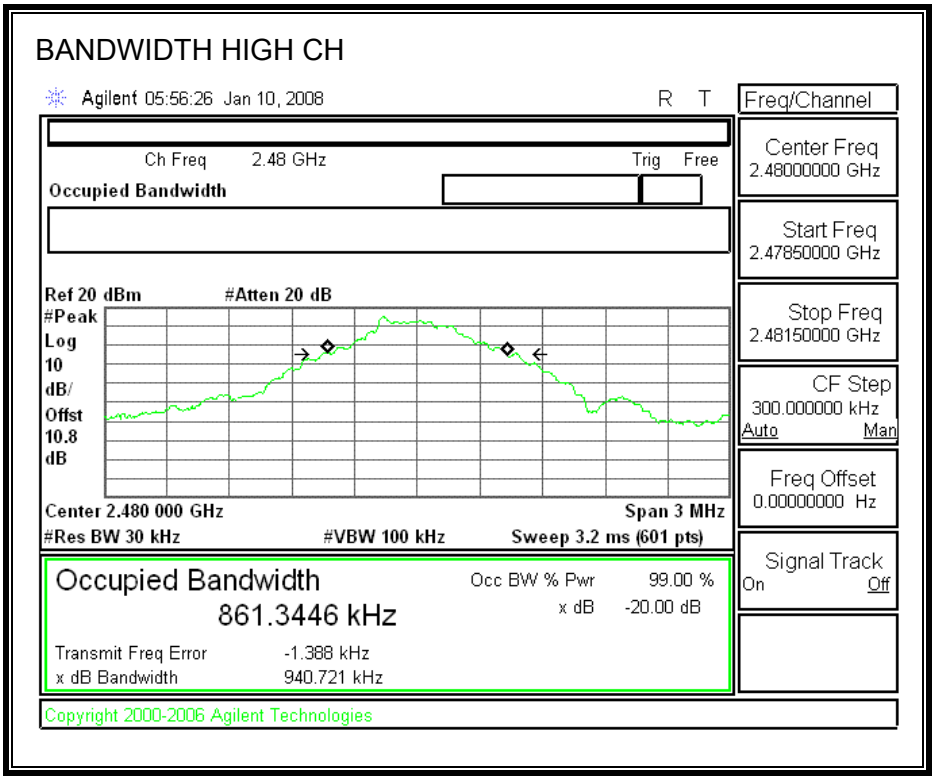
Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	941.892	865.4887
Middle	2441	940.433	863.7827
High	2480	940.721	861.3446

20 dB AND 99% BANDWIDTH





BANDWIDTH HIGH CH



7.1.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

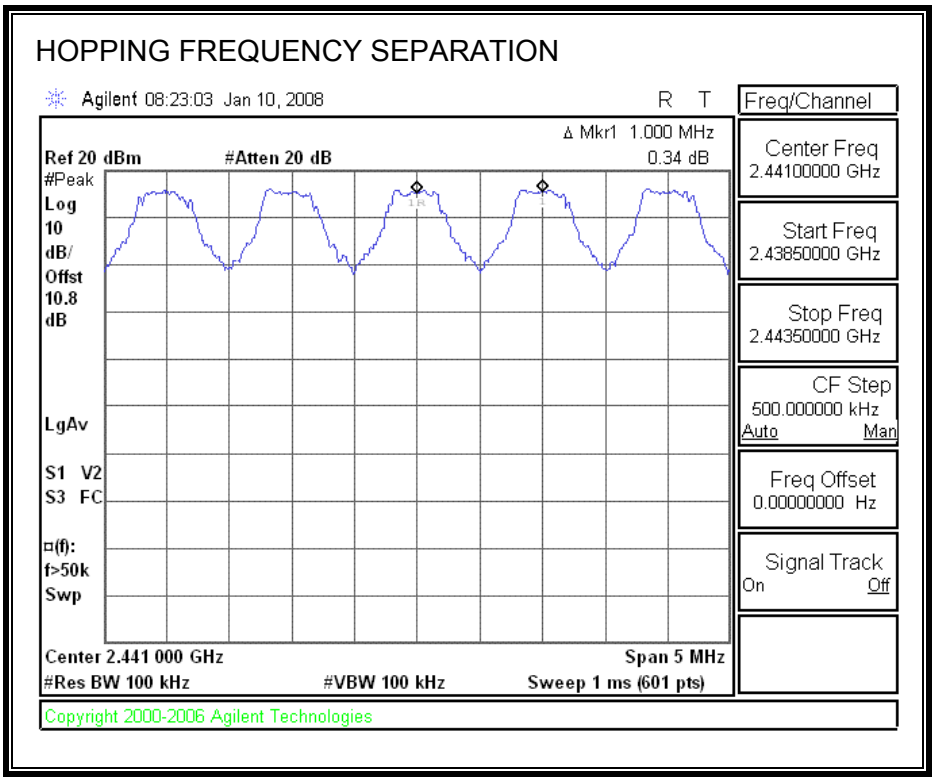
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

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

RESULTS

HOPPING FREQUENCY SEPARATION



7.1.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

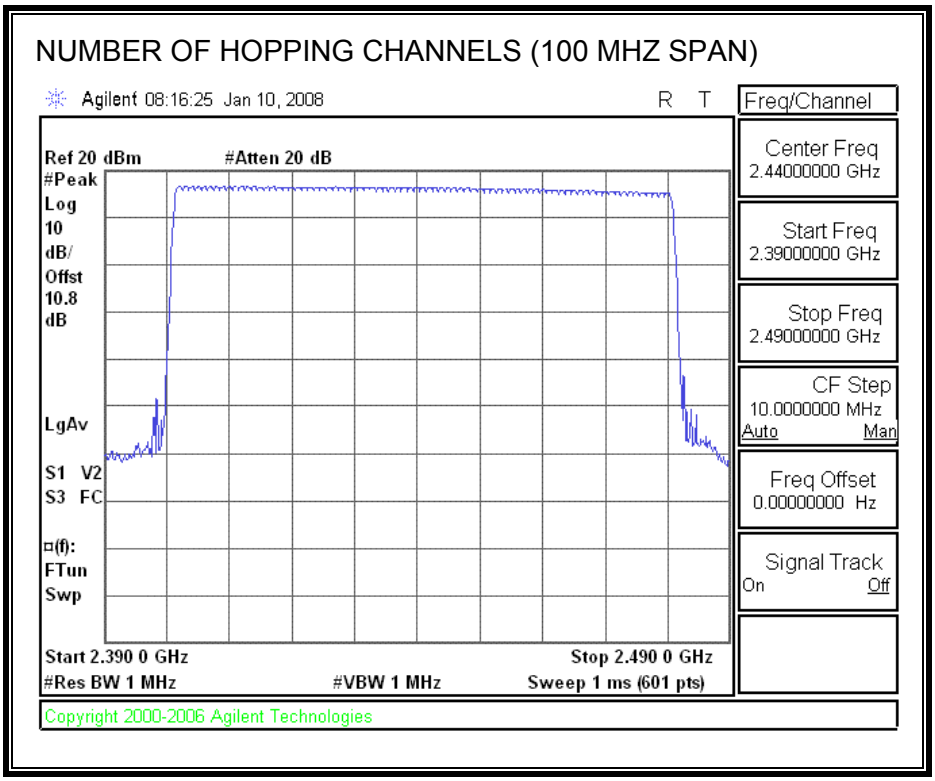
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

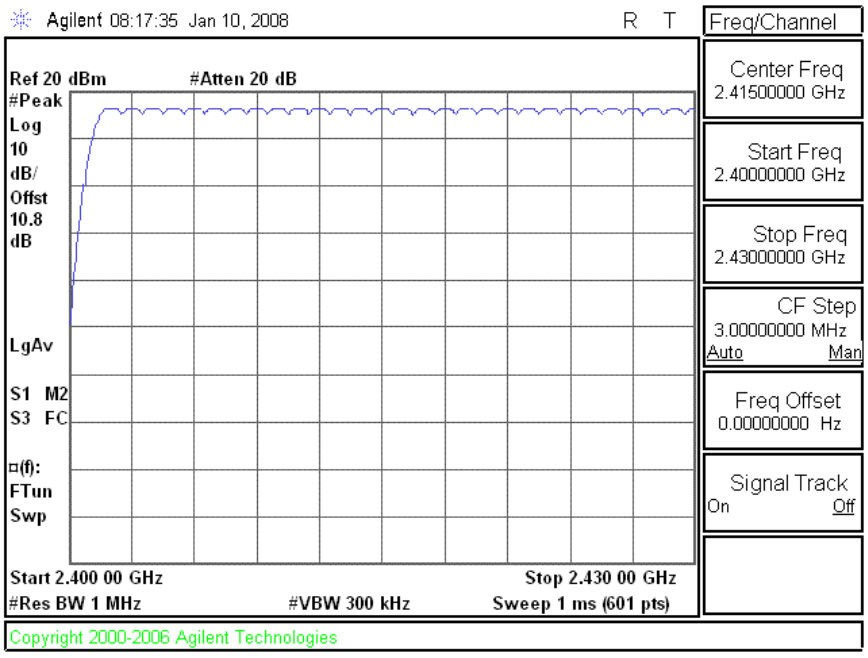
RESULTS

79 Channels observed.

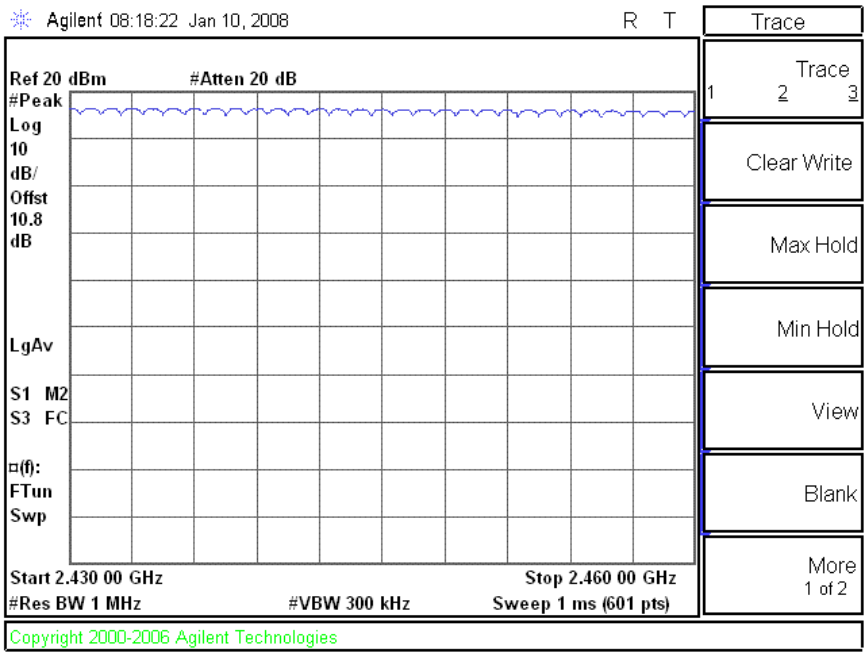
NUMBER OF HOPPING CHANNELS



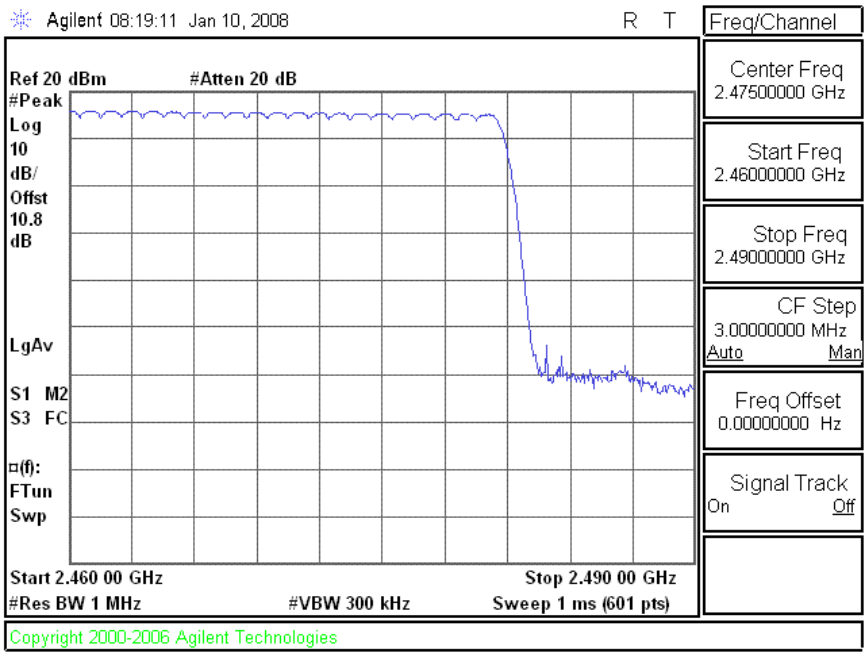
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



7.1.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

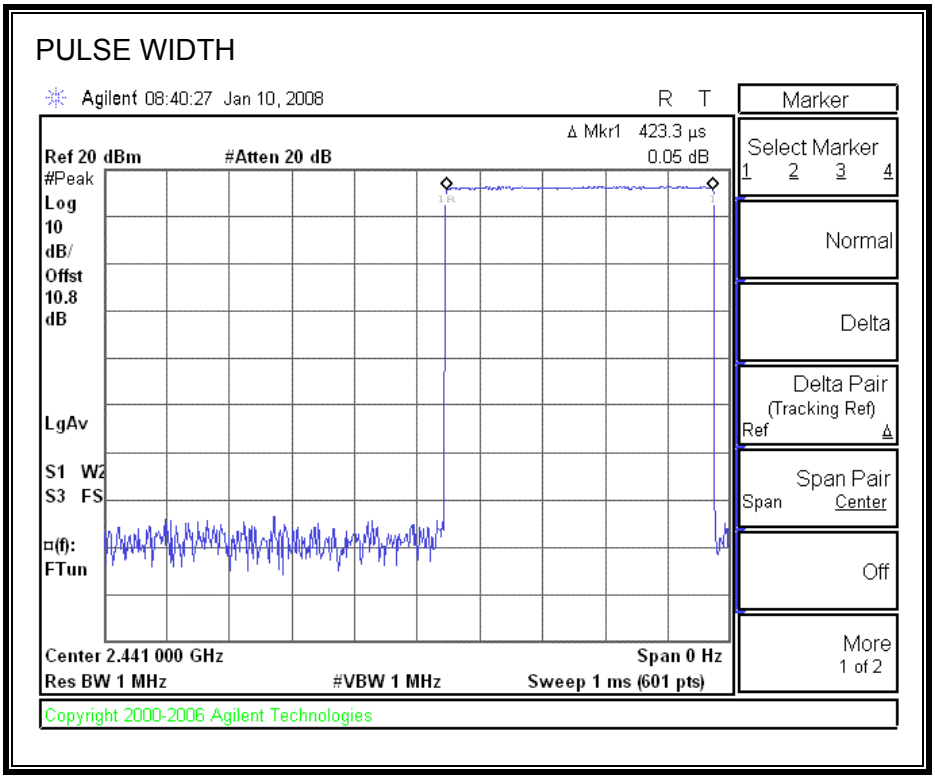
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

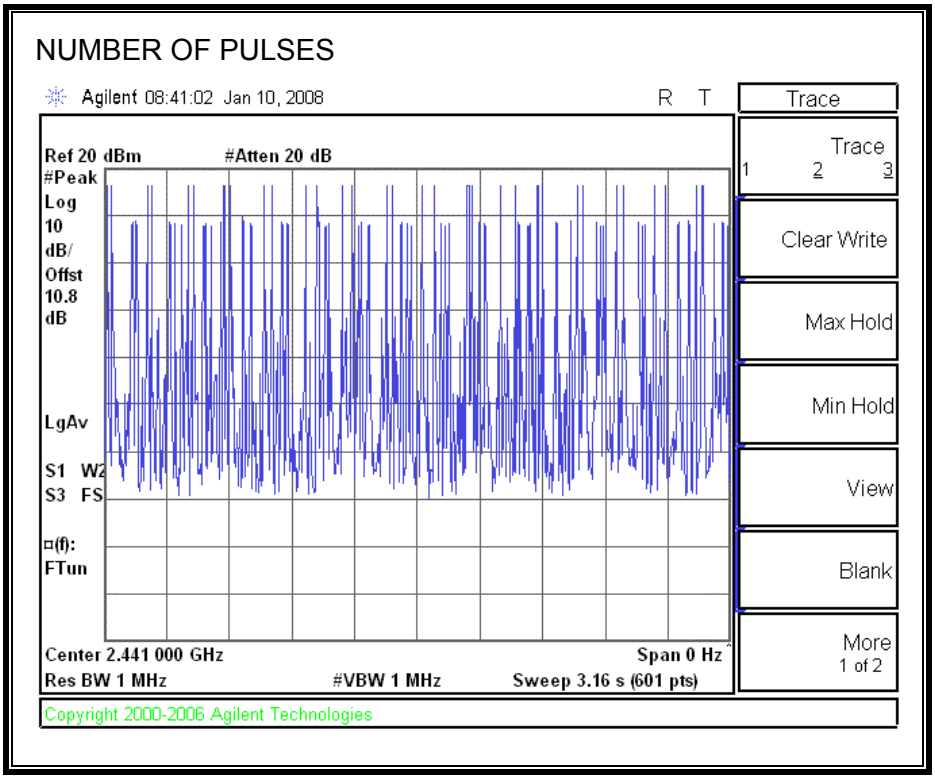
DH1 RESULTS

Time Of Occupancy = 10 * 31 pulses * 0.4233 msec = 131.223 msec

PULSE WIDTH



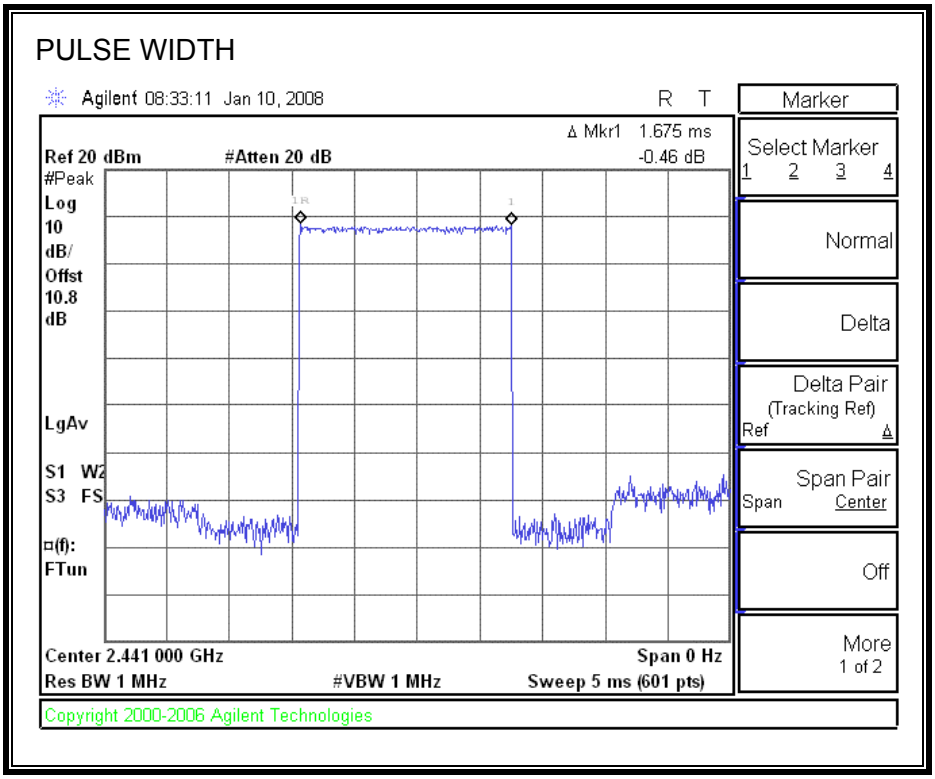
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



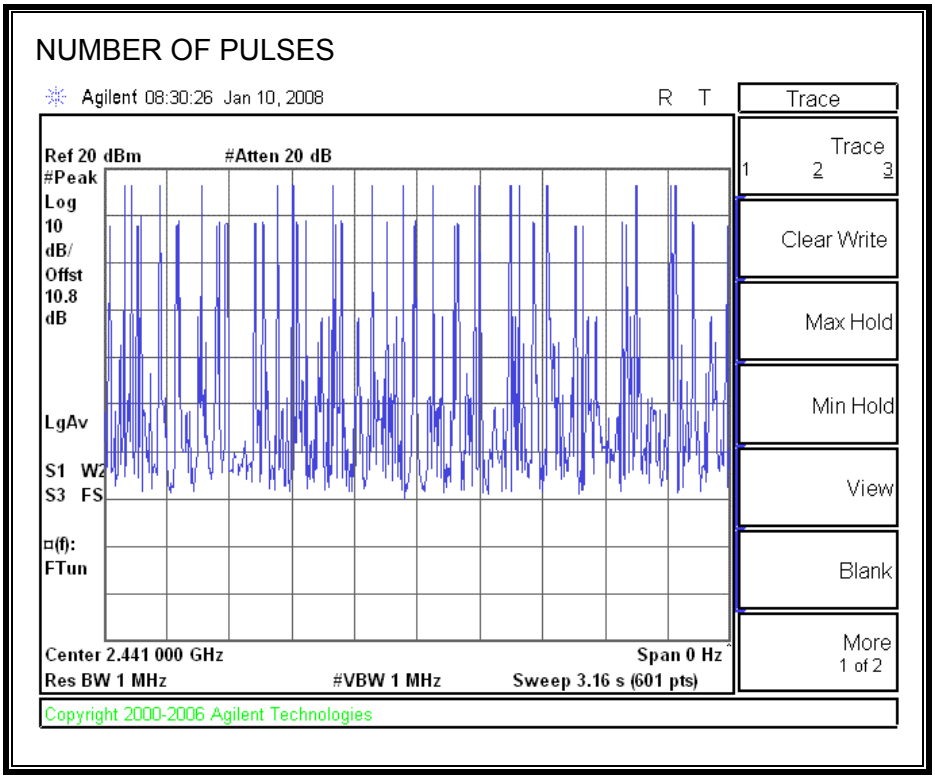
DH3 RESULTS

Time Of Occupancy = 10 * 19 pulses * 1.675 msec = 318.25 msec

PULSE WIDTH



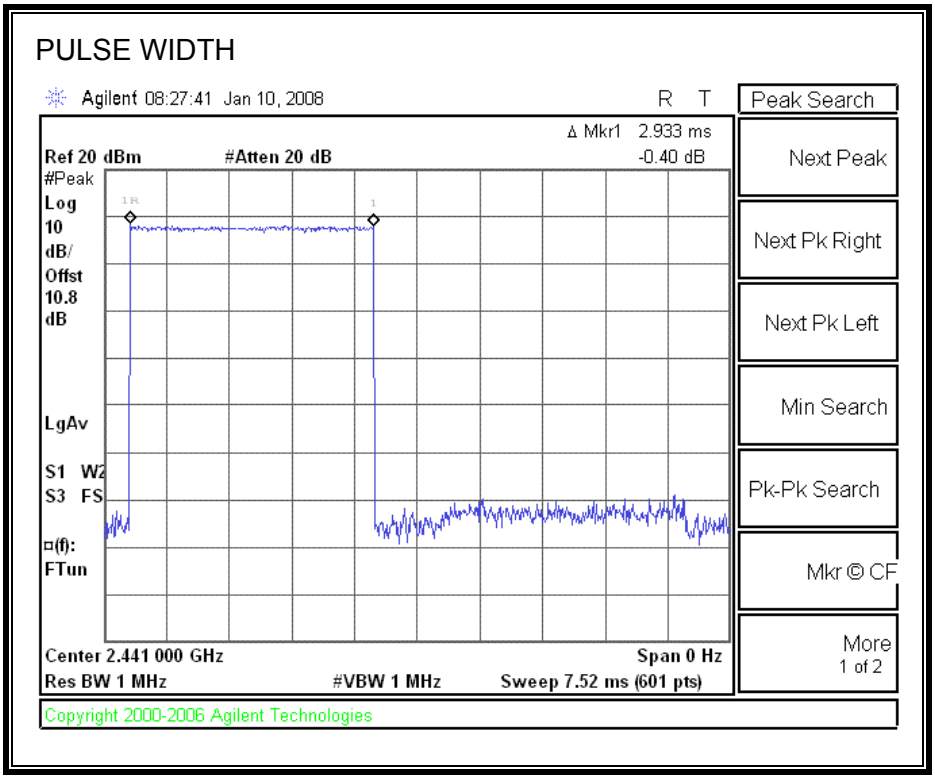
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



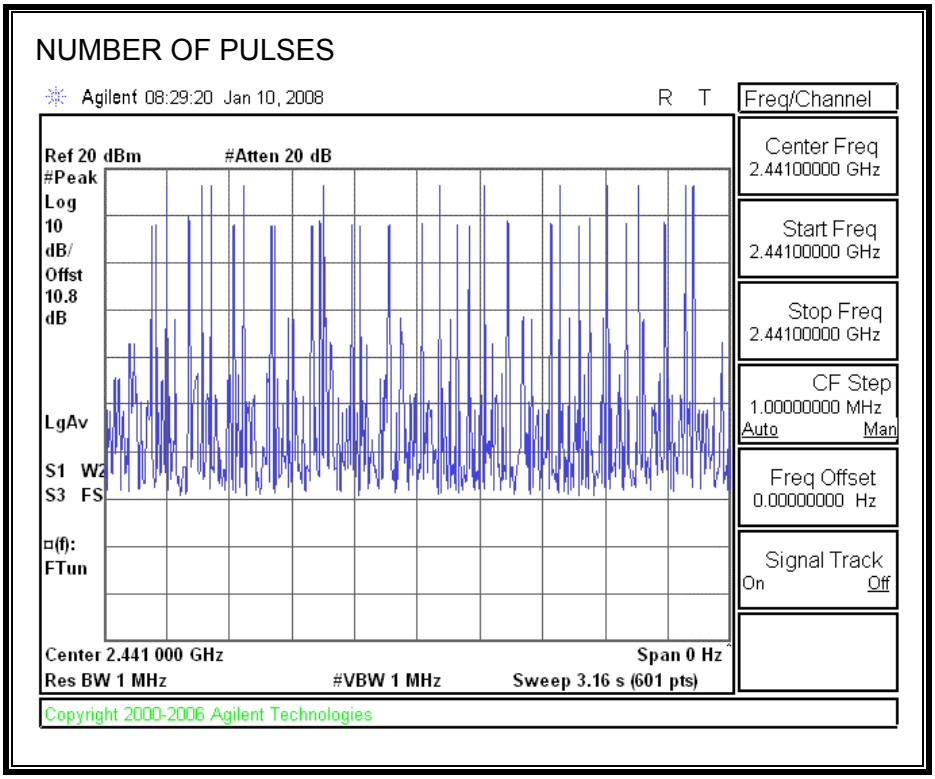
DH5 RESULTS

Time Of Occupancy = 10 * 12 pulses * 2.933 msec = 351.96 msec

PULSE WIDTH



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



7.1.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

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

TEST PROCEDURE

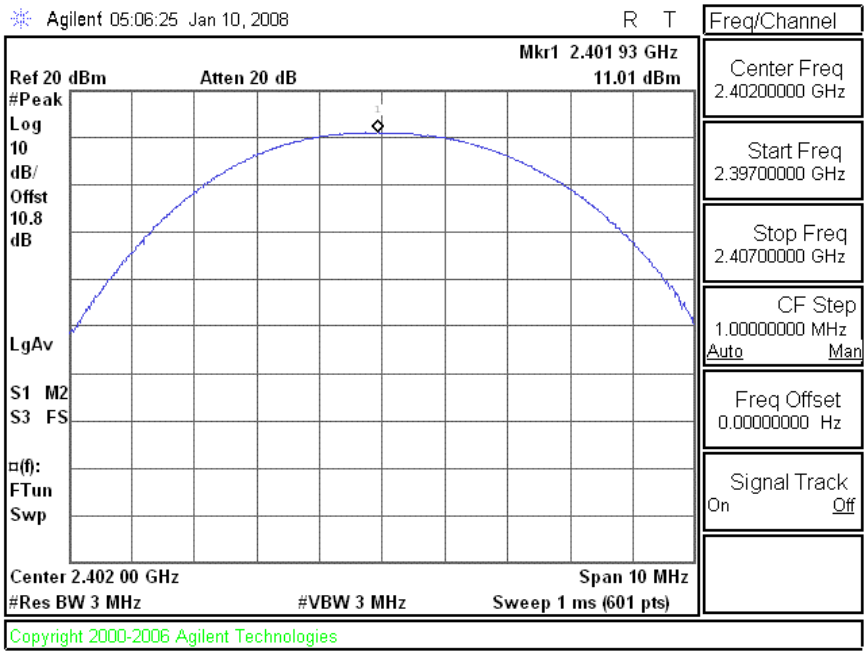
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

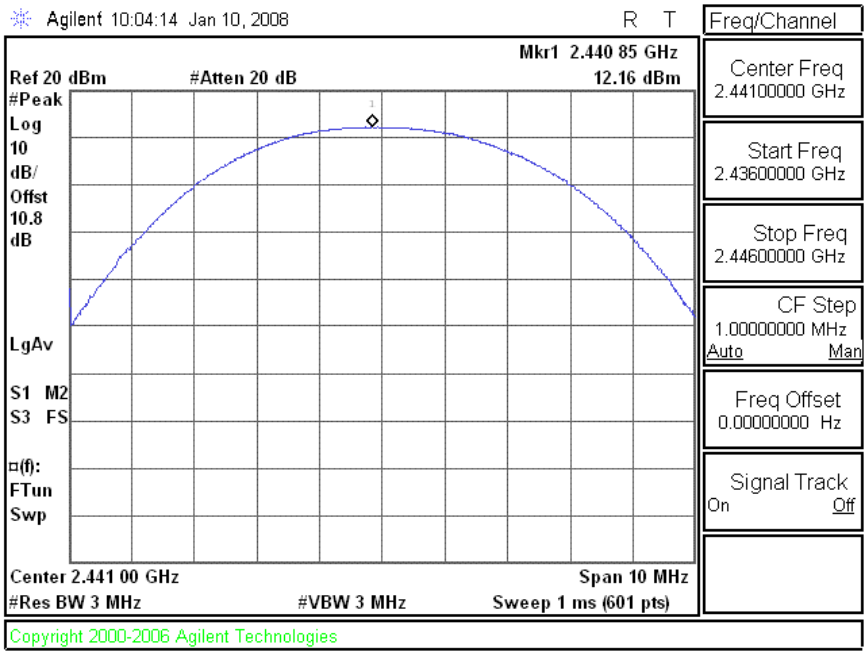
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.01	30	-18.99
Middle	2441	12.16	30	-17.84
High	2480	10.90	30	-19.10

OUTPUT POWER

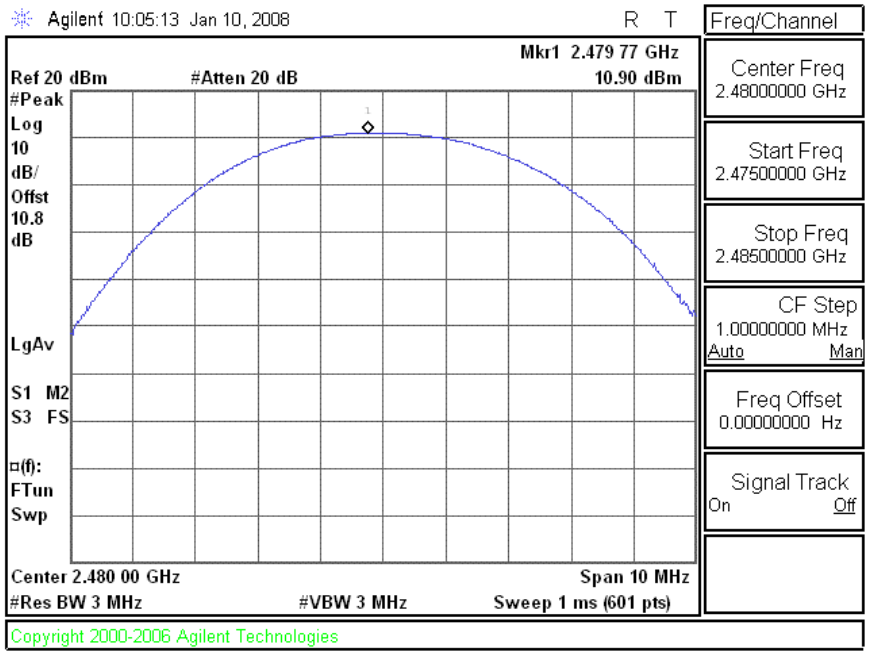
PEAK POWER LOW CH



PEAK POWER MID CH



PEAK POWER HIGH CH



7.1.6. AVERAGE POWER

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.8 dB (including 10 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	9.50
Middle	2441	10.07
High	2480	8.85

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

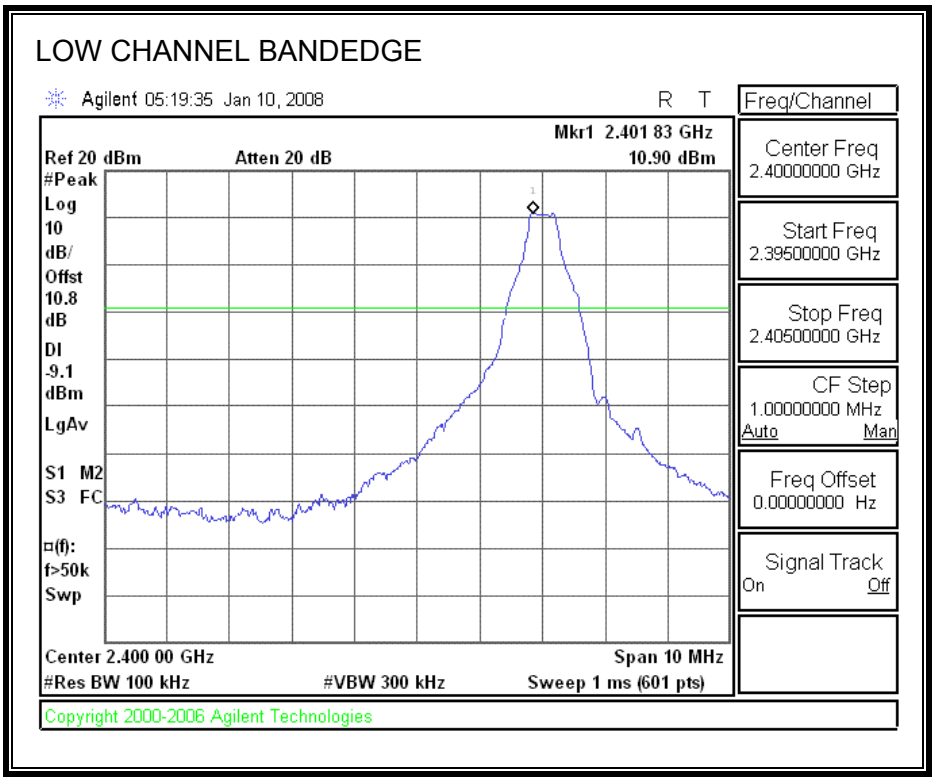
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

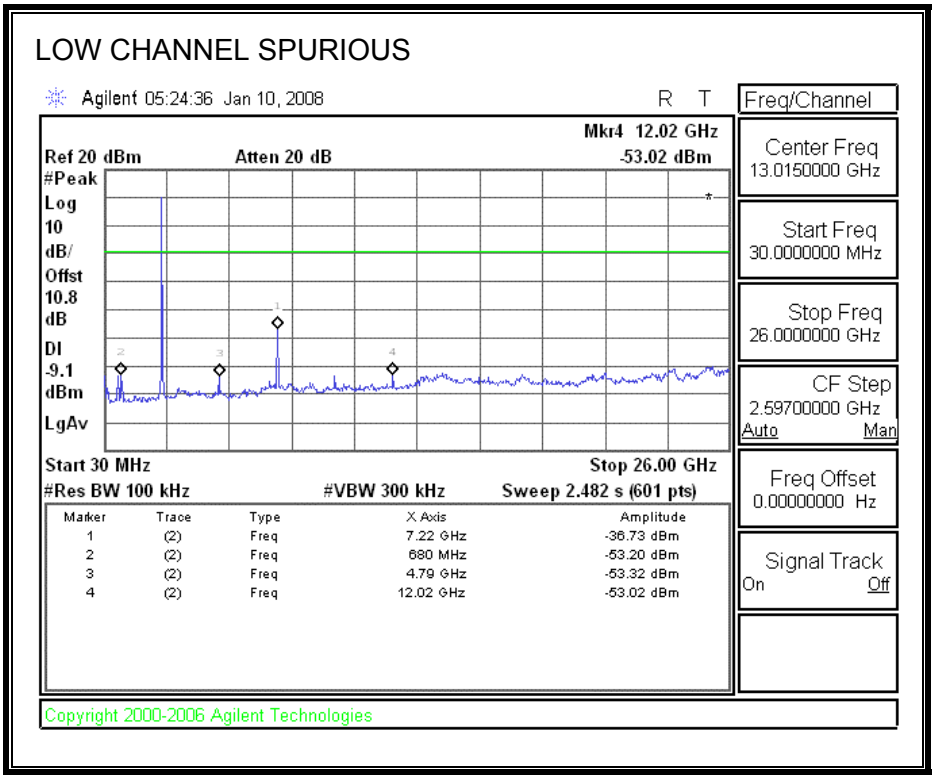
The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

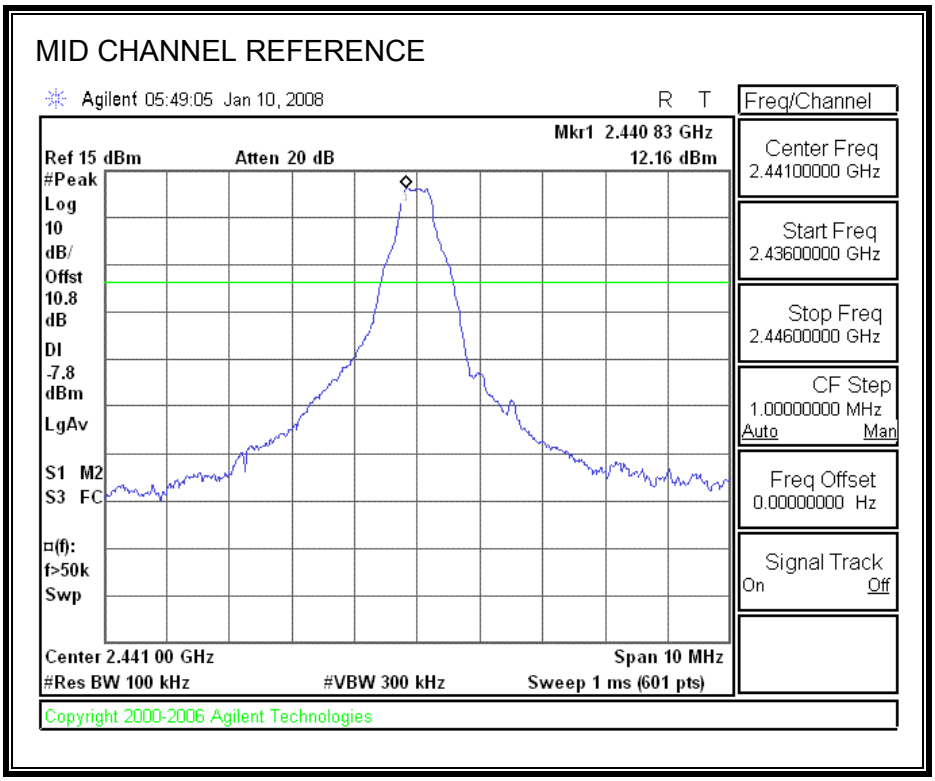
SPURIOUS EMISSIONS, LOW CHANNEL



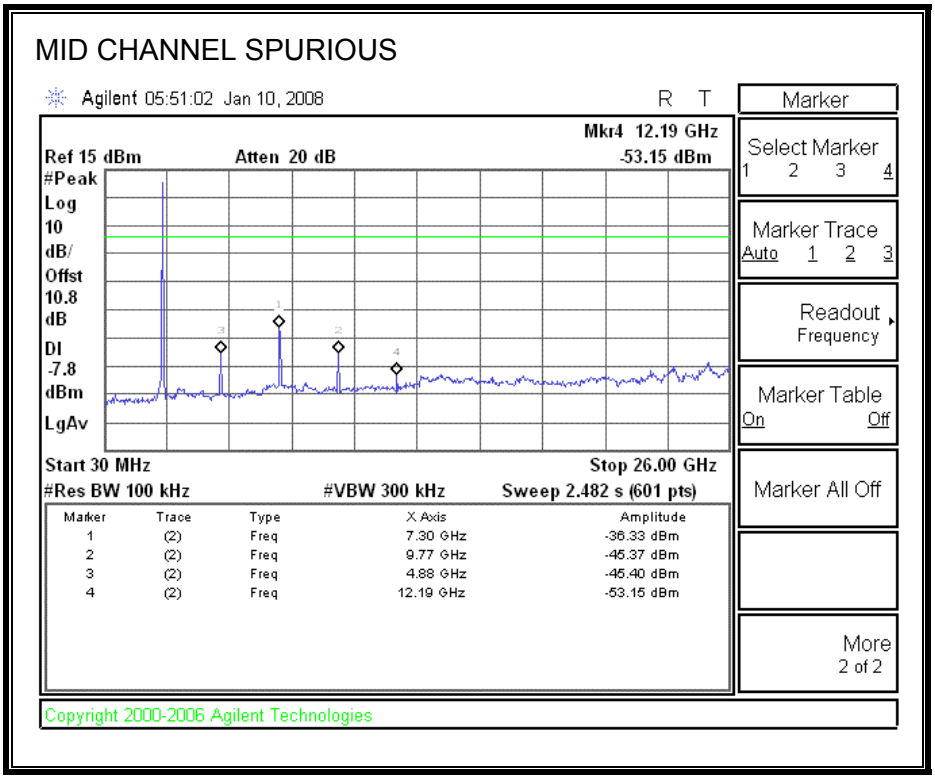
LOW CHANNEL SPURIOUS



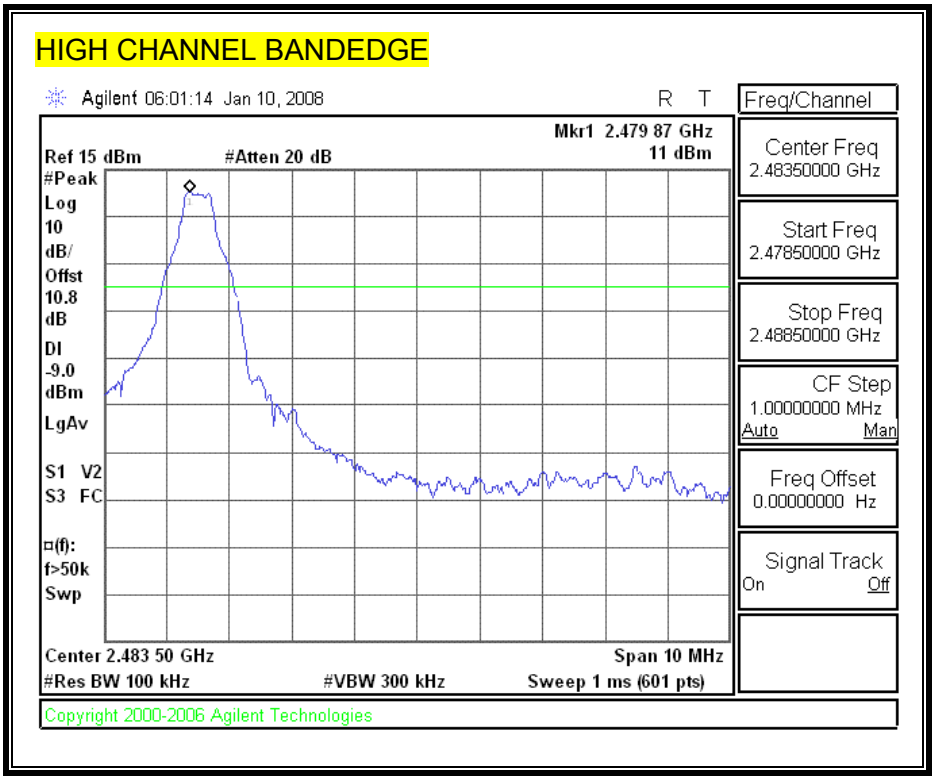
SPURIOUS EMISSIONS, MID CHANNEL



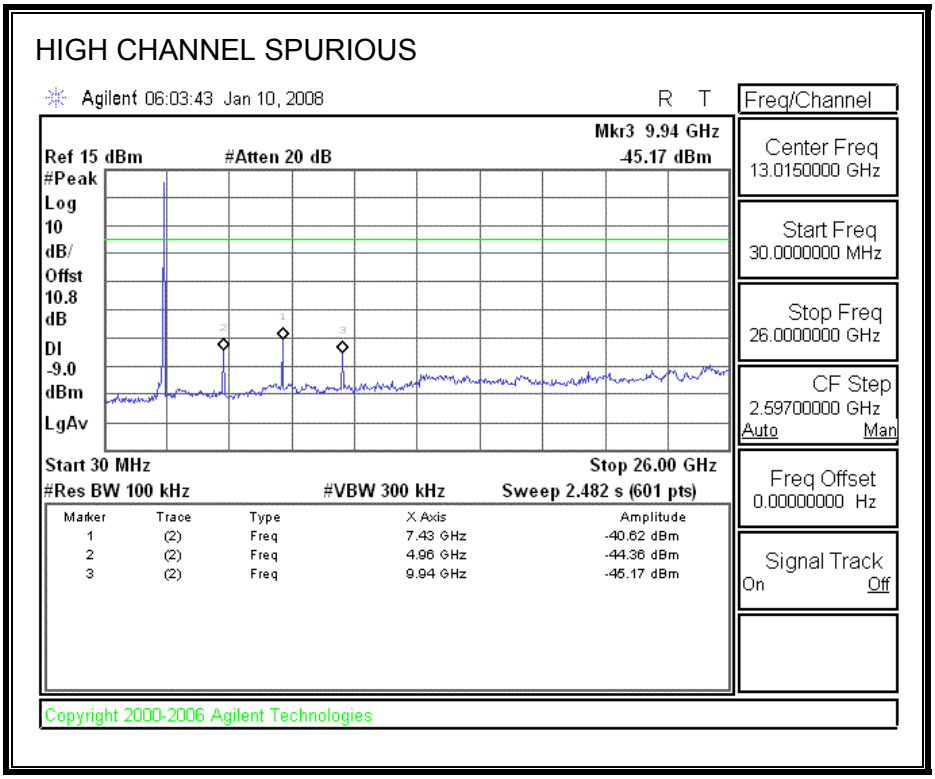
MID CHANNEL SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL

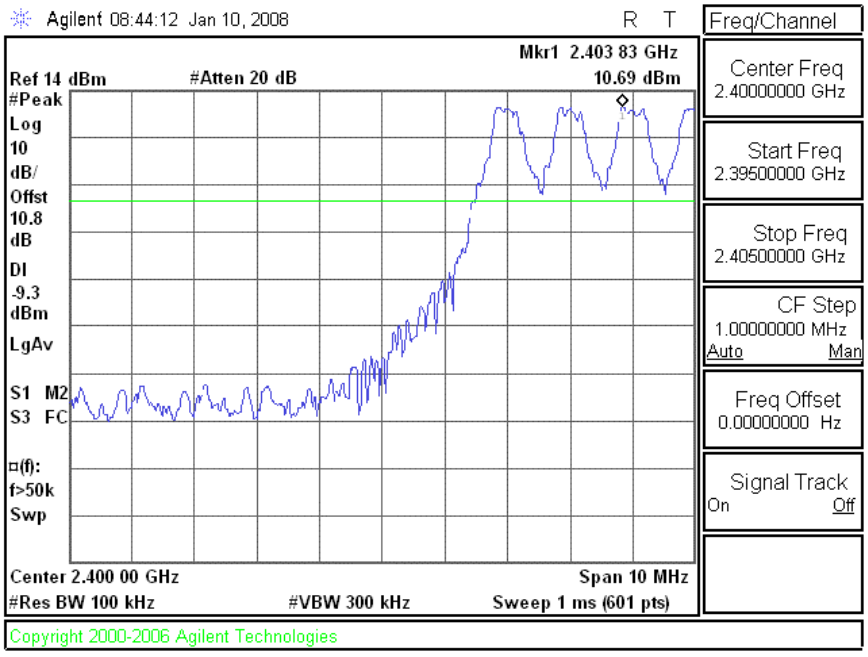


HIGH CHANNEL SPURIOUS

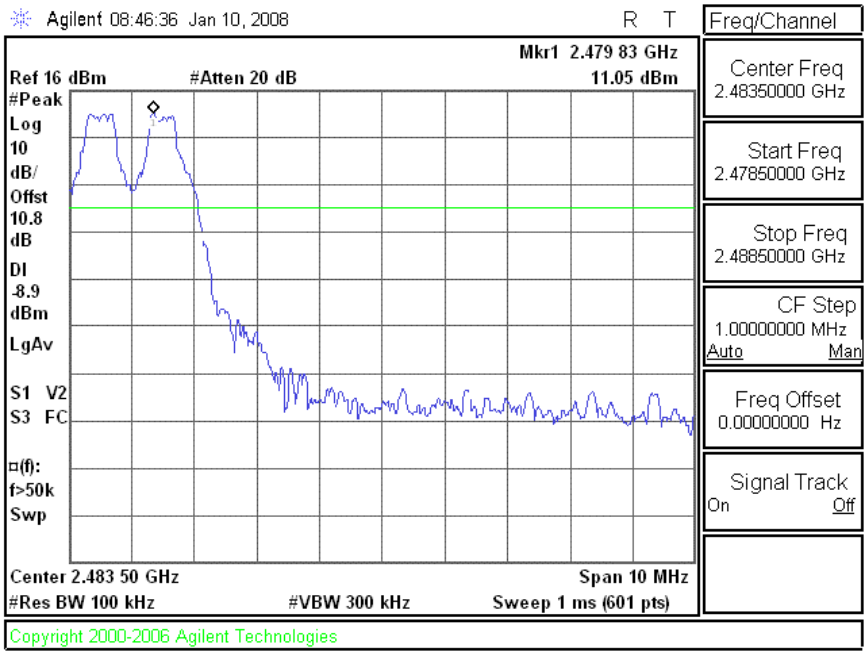


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

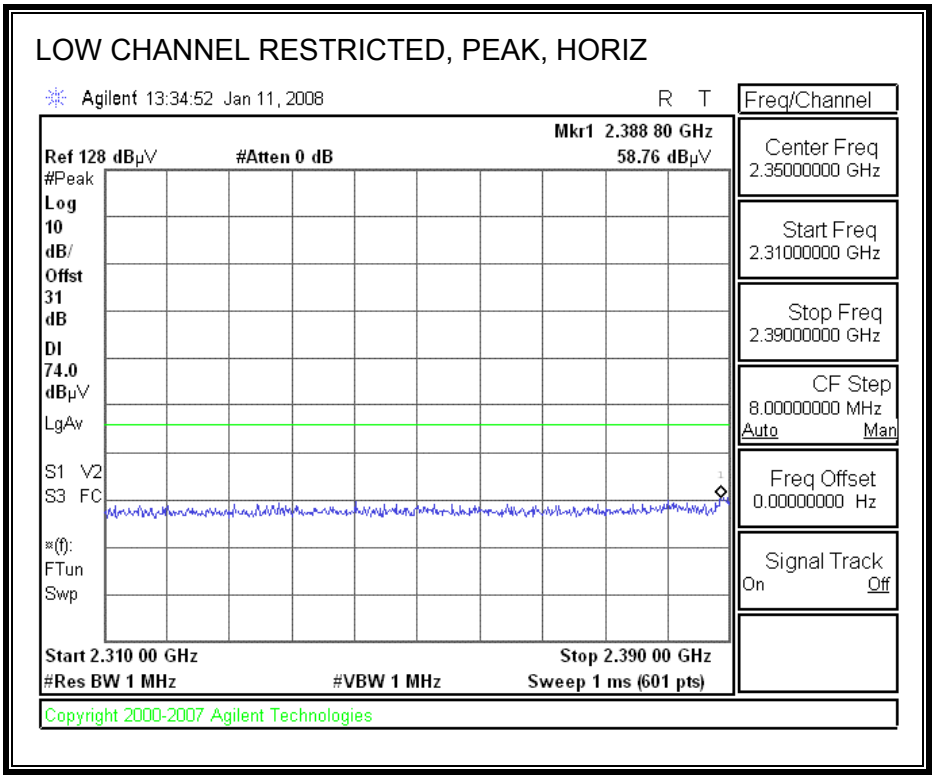
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

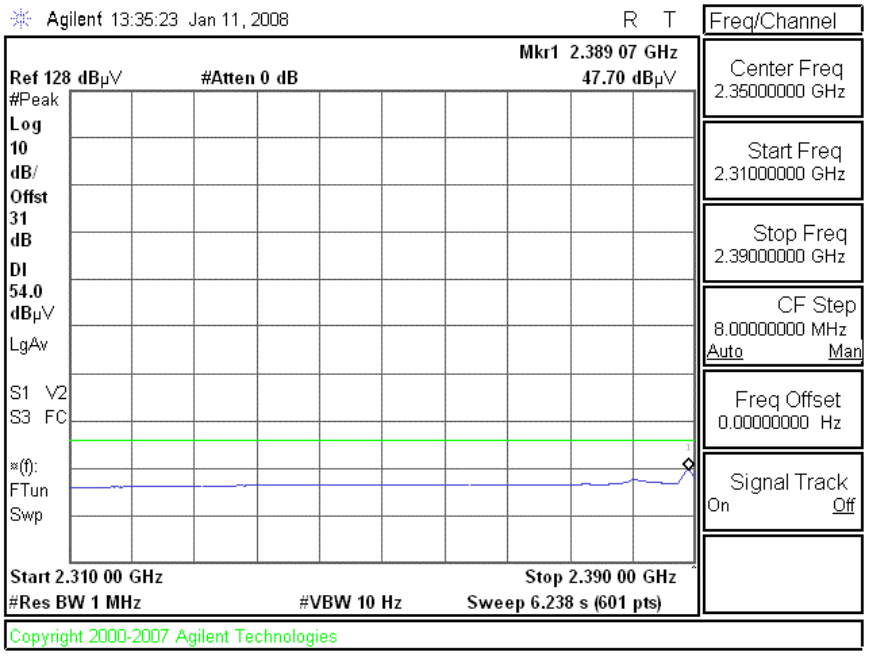
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

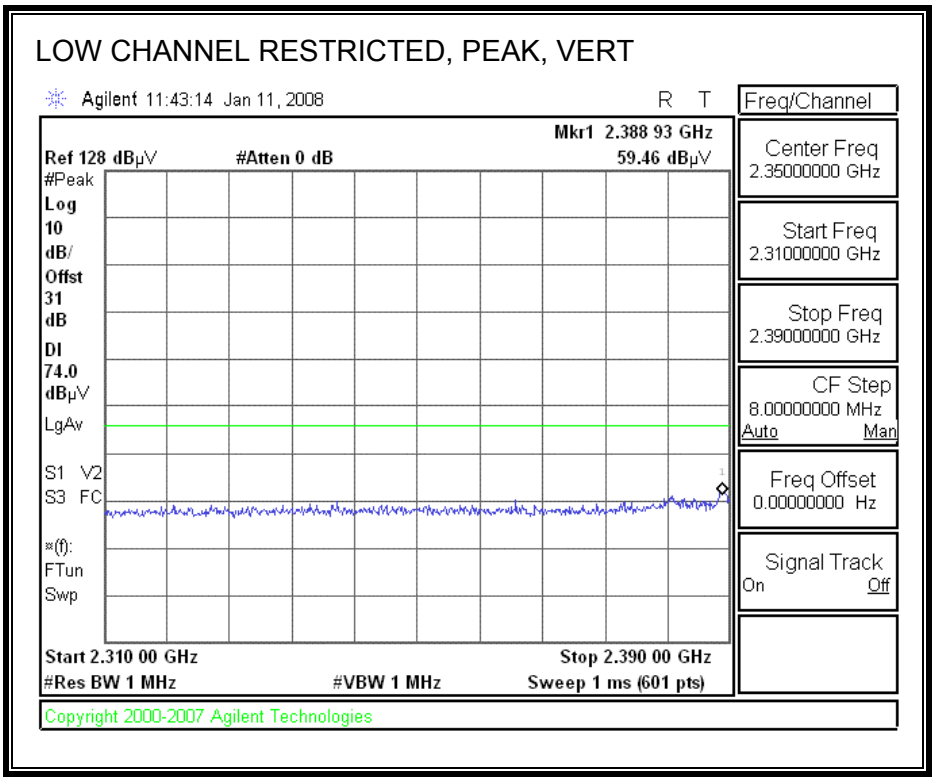
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



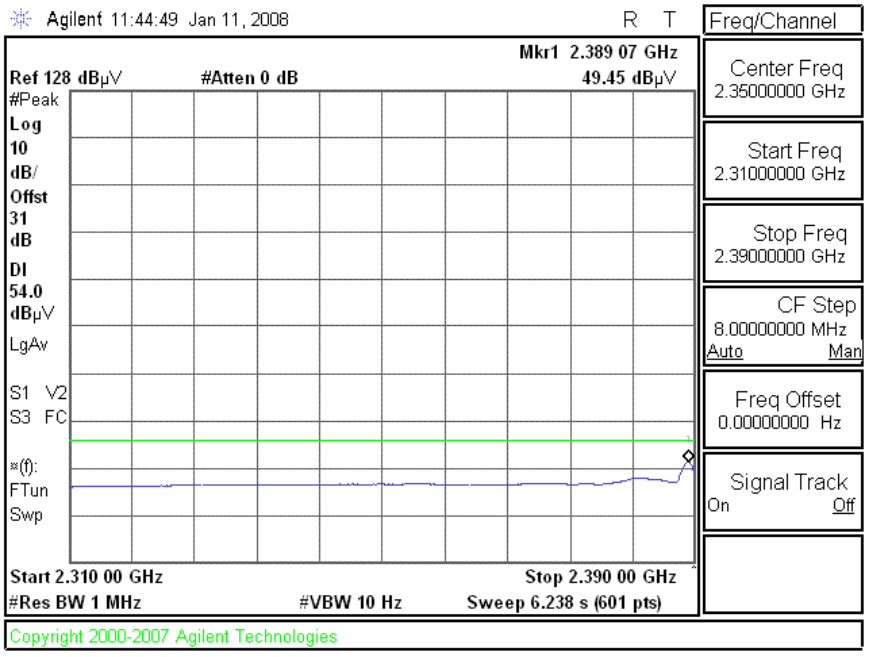
LOW CHANNEL RESTRICTED, AVG, HORIZ



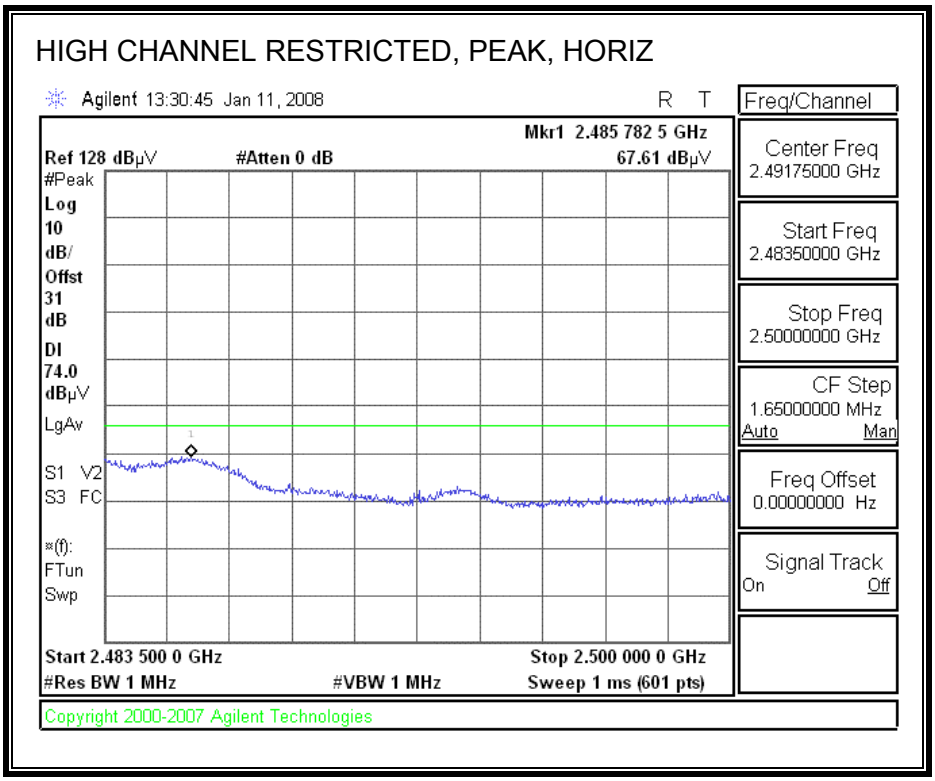
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



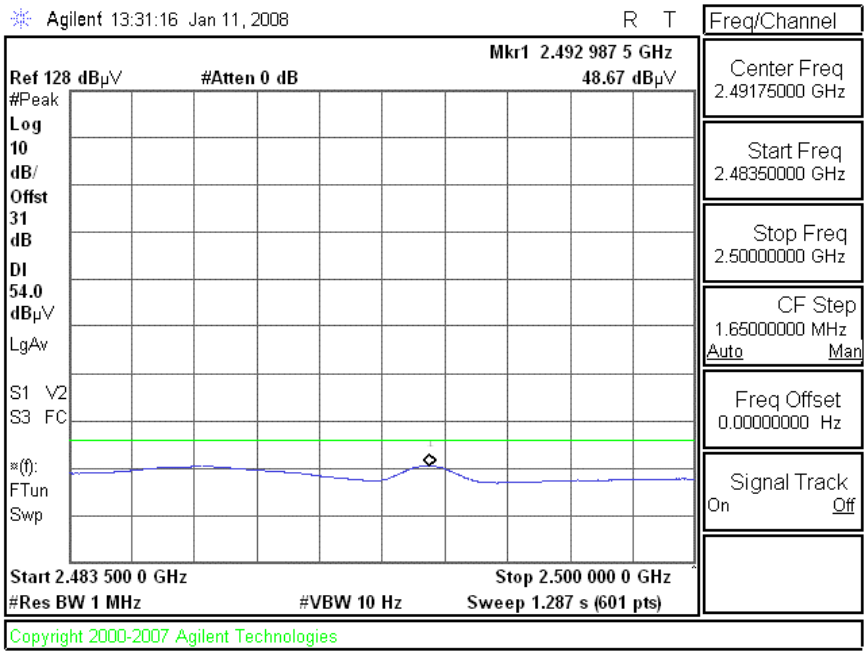
LOW CHANNEL RESTRICTED, AVG, VERT



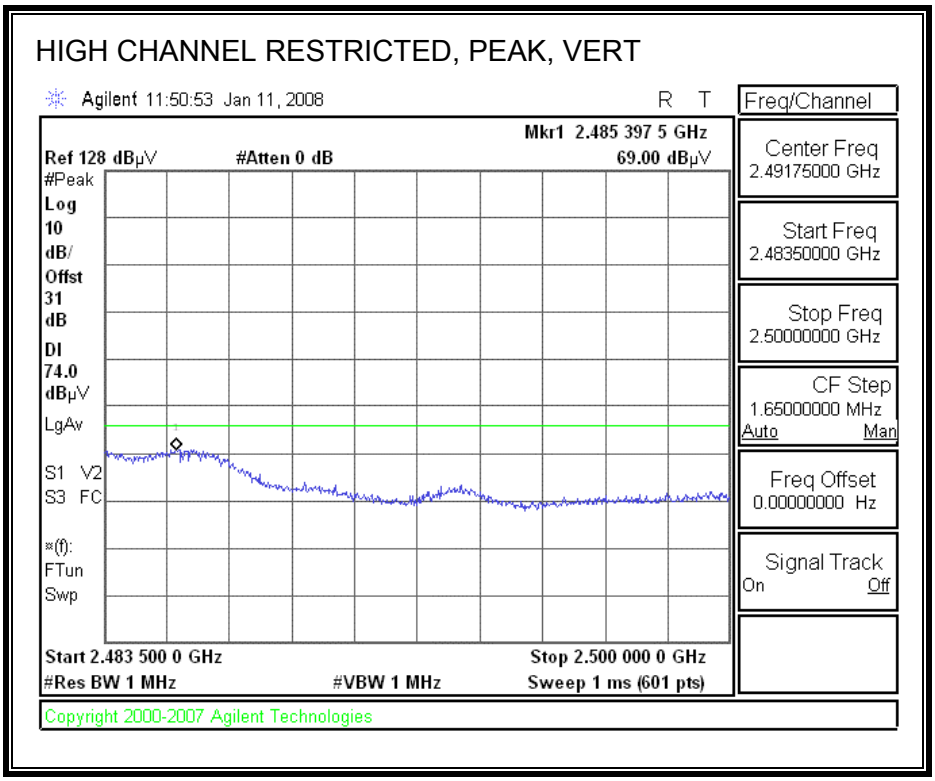
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



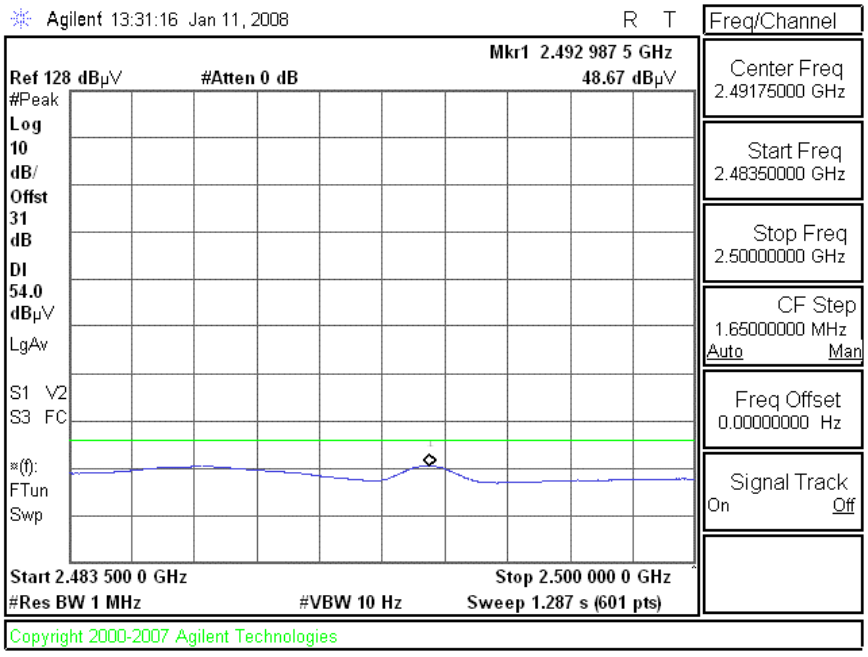
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: NEC Engineering
Project #: 07J11537
Date: 01.11.2008
Test Engineer: Yobi.Zhou
Configuration: EUT with Laptop
Mode: Tx On

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		C-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Chan															
4.804	3.0	57.4	49.8	33.7	0.6	-34.8	0.0	0.0	56.8	49.2	74	54	-17.2	-4.8	H
12.010	3.0	42.6	30.8	38.5	0.7	-32.5	0.0	0.0	49.3	37.4	74	54	-24.7	-16.6	H
4.804	3.0	57.8	50.3	33.7	0.6	-34.8	0.0	0.0	57.1	49.7	74	54	-16.9	-4.3	V
12.010	3.0	43.3	31.7	38.5	0.7	-32.5	0.0	0.0	50.0	38.4	74	54	-24.0	-15.6	V
Mid Chan															
4.882	3.0	54.8	47.4	33.7	0.6	-34.8	0.0	0.0	54.2	46.8	74	54	-19.8	-7.2	H
7.323	3.0	55.7	47.6	36.7	0.6	-34.1	0.0	0.0	58.9	50.8	74	54	-15.1	-3.2	H
12.205	3.0	43.5	31.8	29.6	0.7	-32.5	0.0	0.0	41.3	29.6	74	54	-32.7	-24.4	H
4.882	3.0	54.7	47.1	33.7	0.6	-34.8	0.0	0.0	54.1	46.6	74	54	-19.9	-7.4	V
7.323	3.0	53.8	46.0	36.7	0.6	-34.1	0.0	0.0	57.0	49.2	74	54	-17.0	-4.8	V
12.205	3.0	41.4	29.7	29.6	0.7	-32.5	0.0	0.0	39.2	27.5	74	54	-34.8	-26.5	V
High Chan															
4.960	3.0	52.9	45.5	33.8	0.6	-34.8	0.0	0.0	52.5	45.0	74	54	-21.5	-9.0	H
7.440	3.0	54.8	46.8	36.8	0.6	-34.1	0.0	0.0	58.1	50.1	74	54	-15.9	-3.9	H
4.960	3.0	51.3	44.4	33.8	0.6	-34.8	0.0	0.0	50.9	44.0	74	54	-23.1	-10.0	V
7.440	3.0	54.7	46.7	36.8	0.6	-34.1	0.0	0.0	58.0	50.0	74	54	-16.0	-4.0	V

Rev. 4.12.7

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

8.3. RECEIVER ABOVE 1 GHz

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: NEC Engineering
Project #: 07J11537
Date: 01.11.2008
Test Engineer: Yobi.Zhou
Configuration: EUT with Laptop
Mode: Rx (Mid Chan) On

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
Thanh 177079008		C-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid Chan															
1.293	3.0	54.9	38.2	27.2	0.3	-37.9	0.0	0.0	44.6	27.8	74	54	-29.4	-26.2	V
1.593	3.0	57.5	37.0	28.0	0.4	-37.4	0.0	0.0	48.5	27.9	74	54	-25.5	-26.1	V
1.890	3.0	52.1	36.1	28.8	0.4	-37.0	0.0	0.0	44.3	28.3	74	54	-29.7	-25.7	V
1.297	3.0	53.0	38.0	27.2	0.3	-37.8	0.0	0.0	42.7	27.7	74	54	-31.3	-26.3	H
1.493	3.0	46.4	33.8	27.7	0.4	-37.6	0.0	0.0	36.9	24.3	74	54	-37.1	-29.7	H
1.893	3.0	47.3	33.9	28.8	0.4	-37.0	0.0	0.0	39.5	26.1	74	54	-34.5	-27.9	H

Rev. 4.12.7

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

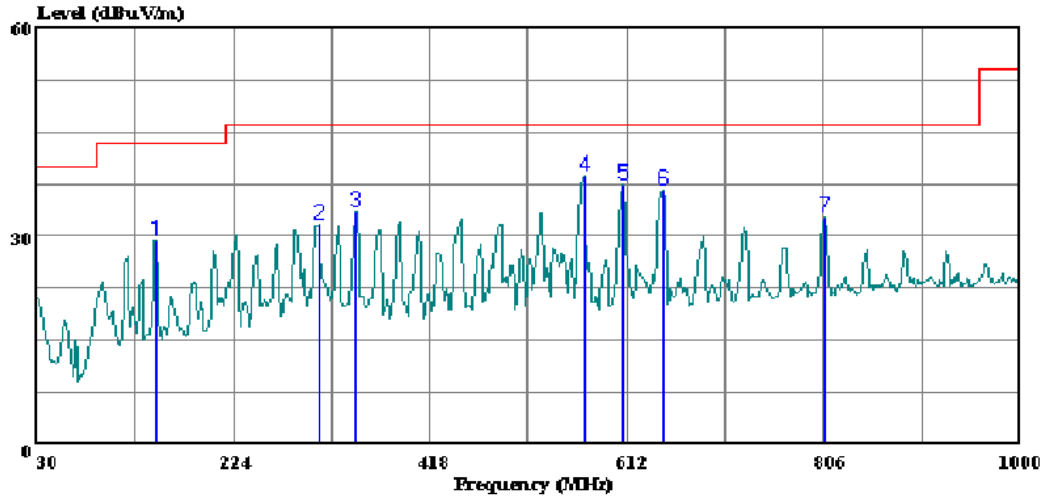
8.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT

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

Data#: 4 File#: 07J11537.EMI Date: 01-11-2008 Time: 15:48:34



Trace: 3 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: Yobi Zhou
Project # : 07J11537
Company : NEC Engineering
Config : EUT Only
Mode : Tx Worst Case
Target : FCC Class B

HORIZONTAL DATA

Page: 1

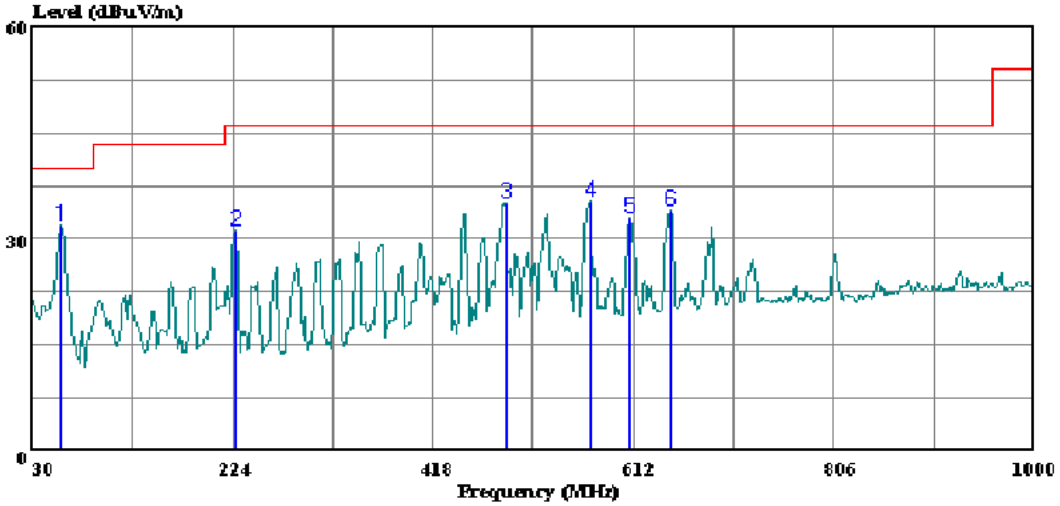
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	148.340	43.04	-13.74	29.30	43.50	-14.20	Peak
2	308.390	43.60	-12.04	31.56	46.00	-14.44	Peak
3	344.280	44.72	-11.15	33.57	46.00	-12.43	Peak
4	570.290	44.60	-5.96	38.64	46.00	-7.36	Peak
5	609.090	42.56	-5.21	37.35	46.00	-8.65	Peak
6	647.890	41.01	-4.45	36.56	46.00	-9.44	Peak
7	807.940	34.67	-1.99	32.68	46.00	-13.32	Peak

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

VERTICAL PLOT

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

Data#: 2 File#: 07J11537.EMI Date: 01-11-2008 Time: 15:36:02



Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: Yobi Zhou
Project # : 07J11537
Company : NEC Engineering
Config : EUT Only
Mode : Tx Worst Case
Target : FCC Class B

VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	58.130	51.42	-19.59	31.83	40.00	-8.17	Peak
2	225.940	46.22	-14.98	31.24	46.00	-14.76	Peak
3	487.840	42.61	-7.60	35.01	46.00	-10.99	Peak
4	570.290	41.28	-5.96	35.32	46.00	-10.68	Peak
5	609.090	38.28	-5.21	33.07	46.00	-12.93	Peak
6	647.890	38.59	-4.45	34.14	46.00	-11.86	Peak

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

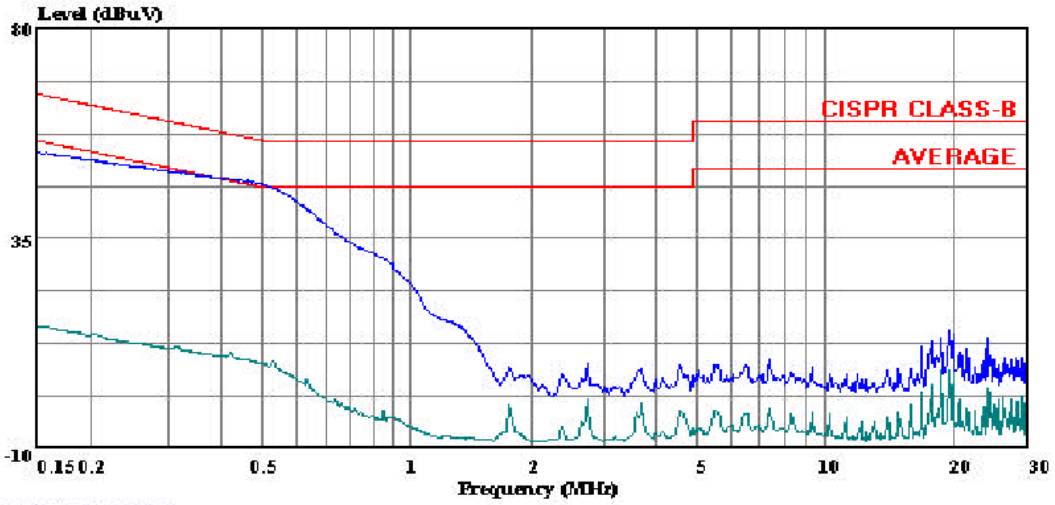
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.20	51.88	--	14.28	0.00	63.69	53.69	-11.81	-39.41	L1
0.36	48.52	--	10.37	0.00	58.66	48.66	-10.14	-38.29	L1
0.48	47.10	--	8.72	0.00	56.41	46.41	-9.31	-37.69	L1
0.20	51.23	--	14.82	0.00	63.53	53.53	-12.30	-38.71	L2
0.30	48.46	--	11.95	0.00	60.19	50.19	-11.73	-38.24	L2
0.41	46.50	--	10.26	0.00	57.73	47.73	-11.23	-37.47	L2
6 Worst Data									

LINE 1 RESULTS

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

Data#: 14 File#: 07U11537.EMI Date: 01-11-2008 Time: 09:38:56



(Line Conduction)

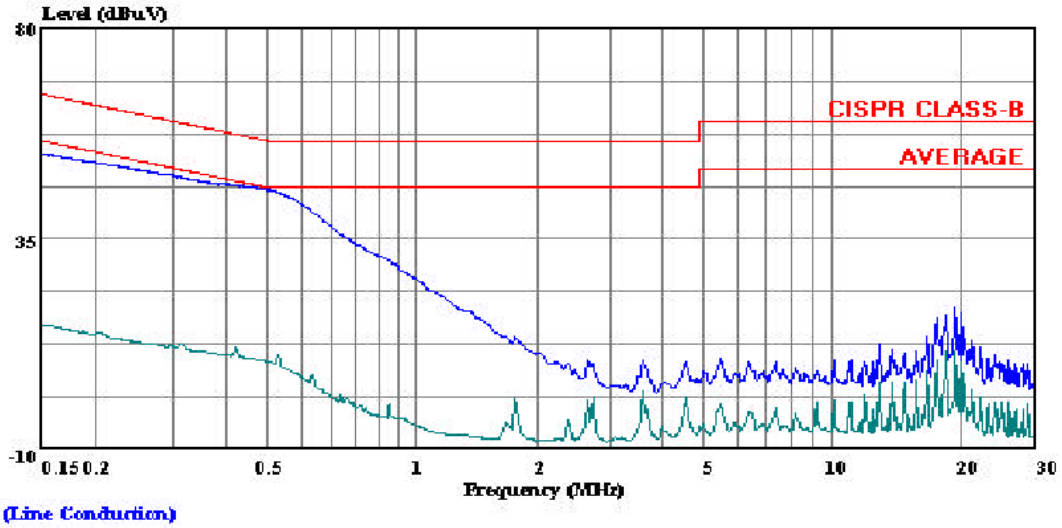
Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Yobi Zhou
Project #: : 07U11537
Company: : NEC Engineering
Configuration:: EUT Only
Mode: : Tx (Mid Ch)
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 1: Peak (Blue), Average (Green)

LINE 2 RESULTS

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

Data#: 21 File#: 07U11537.EMI Date: 01-11-2008 Time: 09:49:43



Trace: 19 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Yobi Zhou
Project #: : 07U11537
Company: : NEC Engineering
Configuration:: EUT Only
Mode: : Tx (Mid Ch)
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 2: Peak (Blue), Average (Green)

10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

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

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

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

IC RULES

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

Table 5
Exposure Limits for Persons Not 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).

CALCULATIONS

Given

$E = \sqrt{(30 * P * G) / d}$

and

$S = E ^ 2 / 3770$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

$S = 0.0795 * 10 ^ ((P + G) / 10) / (d^2)$

The power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by a factor of 10.

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

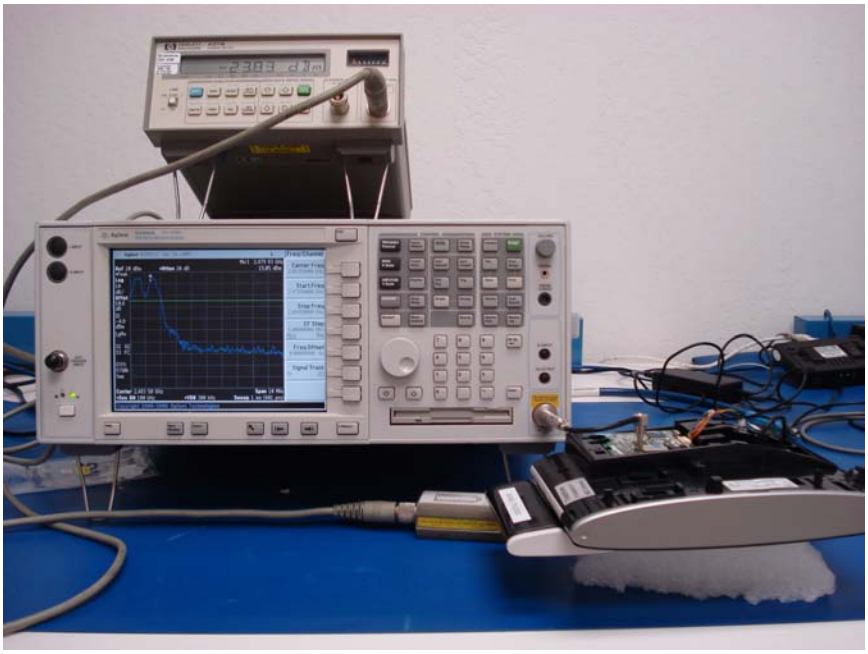
RESULTS

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
Bluetooth	2.4 GHz	20.0	12.16	2.15	0.005	0.05

11. SETUP PHOTOS

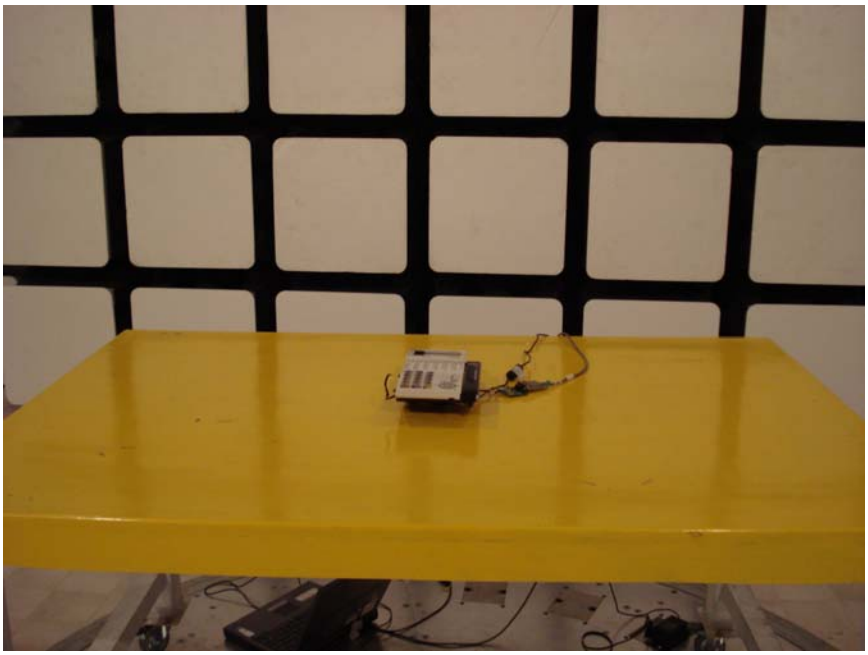
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

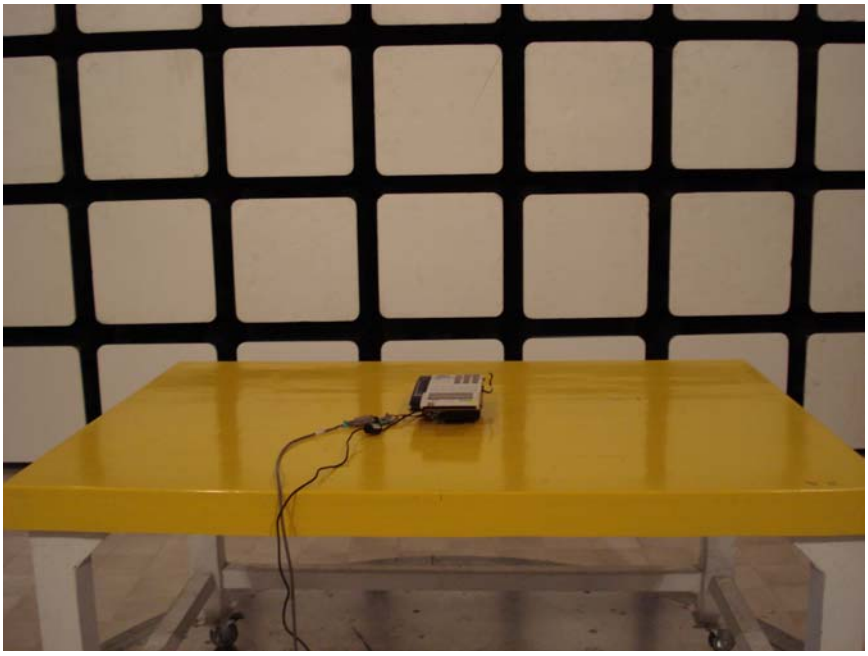


RADIATED RF MEASUREMENT SETUP FOR DESKTOP & WALL MOUNT CONFIGURATIONS

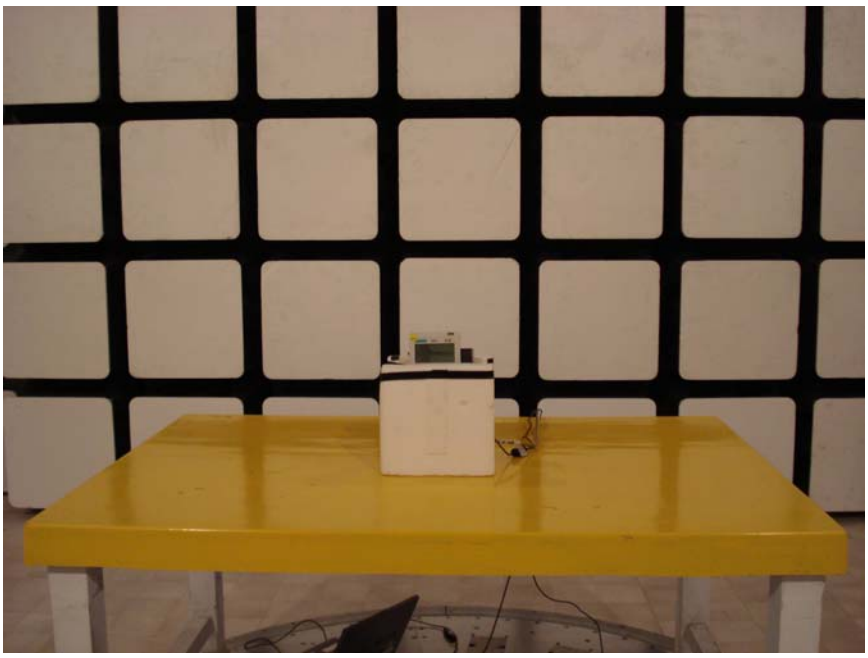
X-AXIS FRONT PHOTO



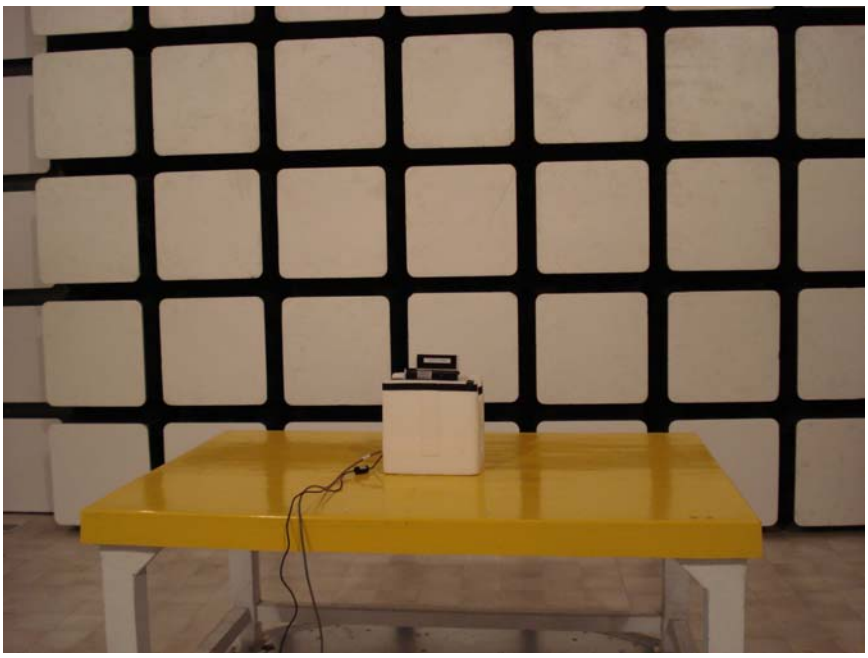
X-AXIS BACK PHOTO



Y-AXIS FRONT PHOTO



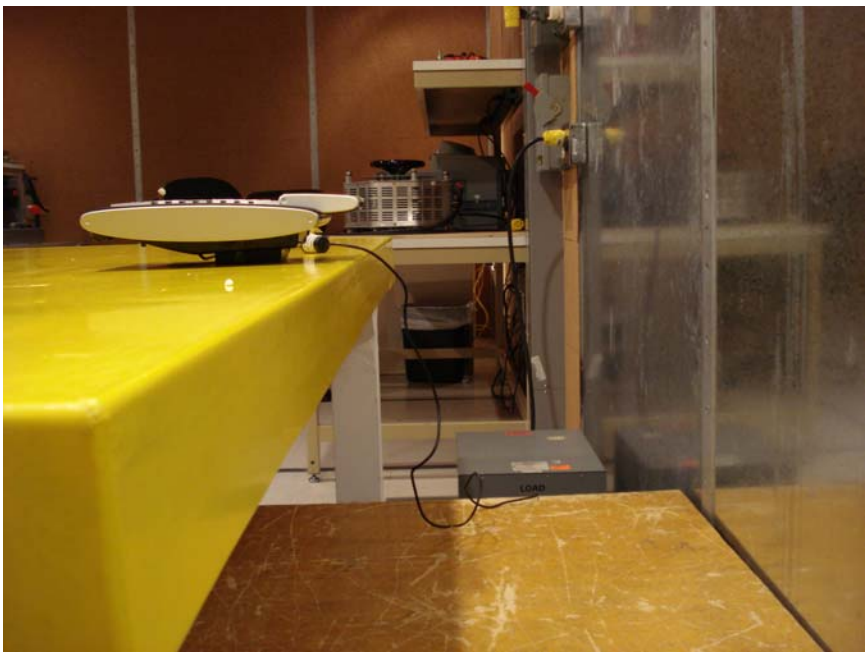
Y-AXIS BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO



END OF REPORT