FCC CFR47 PART 15 SUBPART C
CERTIFICATION TEST REPORT

FOR

VOIP MOBILE PHONE TERMINAL

MODEL NUMBER: WLPS3(E)-A

FCC ID: EW4-WLPS3-1

REPORT NUMBER: 07J11502-1
ISSUE DATE: JANUARY 31, 2008

Prepared for

MITSUMI ELECTRIC CO., LTD
1601, SAKAI, ATSUGI-SHI, KANAGAWA
JAPAN 243-8533

Prepared by

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

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	01/31/08	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	MITSUMI ELECTRIC CO., LTD. 1601 SAKAI, ATSUGI-SHI KANAGAWA, 243-8533, JAPAN
EUT DESCRIPTION:	VoIP Mobile Phone Terminal
MODEL:	WLPS3(E)-A
SERIAL NUMBER:	HJMTT009951
DATE TESTED:	JAUNARY 24-26 AND JANUARY 30, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	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:

CHIN PANG
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, and FCC CFR 47 Part 15.

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 an 802.11b VoIP Mobile Phone Terminal.

The radio module is manufactured by MITSUMI ELECTRIC CO., LTD.

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 - 2462	802.11b	14.93	31.12

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two monopole antennas, main port antenna with a maximum gain of 0.6dBi & aux port antenna with a maximum gain of -1.7dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was TeraTerm_utf.8-4.44

The test utility software used during testing was KS7010-AN001 (1-5)

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2412 MHz.

The worst-case data rate for this channel is determined to be 11Mbps.

Thus all emissions tests were made in the 802.11b mode, 2412-2462 MHz, 11Mbp/s, and with higher antenna gain at the main port with EUT sitting on cradle as worst condition, and also X, Y, Z portable positions were investigated.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
EUT AC Adpter	NEC	WLP53	CBG-002535--004	DoC
Laptop	Toshiba	Satellite	9161793	DoC
Test Kit	Mitsumi	NA	NA	NA

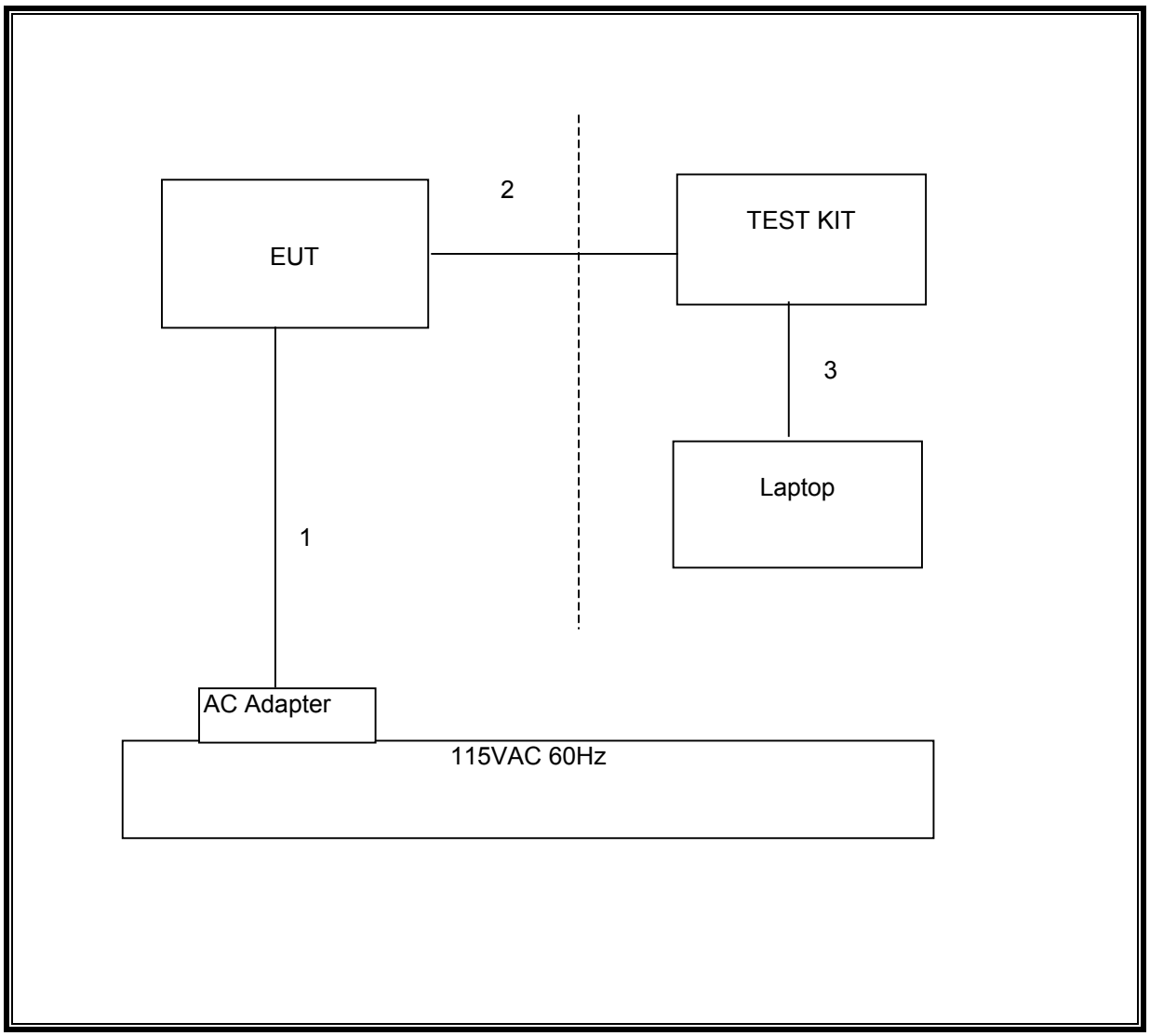
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	DC	1	DC	Un-shielded	2m	NA
2	6-pins	1	Ribbon Cable	Un-shielded	2m	NA
3	USB	1	USB	Un-shielded	2m	Connected to Laptop

TEST SETUP

The EUT is connected to a test kit via a ribbon cable and laptop; the test software exercised the EUT.

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**
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/3/2007	9/27/2008
Antenna, Horn, 18 GHz	EMCO	3115	C00945	4/15/2007	4/15/2008
EMI Receiver 2.9GHz	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
Preamplifier, 1300 MHz	Agilent / HP	8447D	NA	5/9/2007	5/9/2008
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	10/13/2007	9/28/2008
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	9/15/2007	9/15/2008
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	10/16/2007	10/27/2008
Peak / Average Power Sensor	Agilent	E9327A	C00964	2/14/2007	12/7/2008
Peak Power Meter	Agilent / HP	E4416A	C00963	2/14/2007	12/7/2008

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

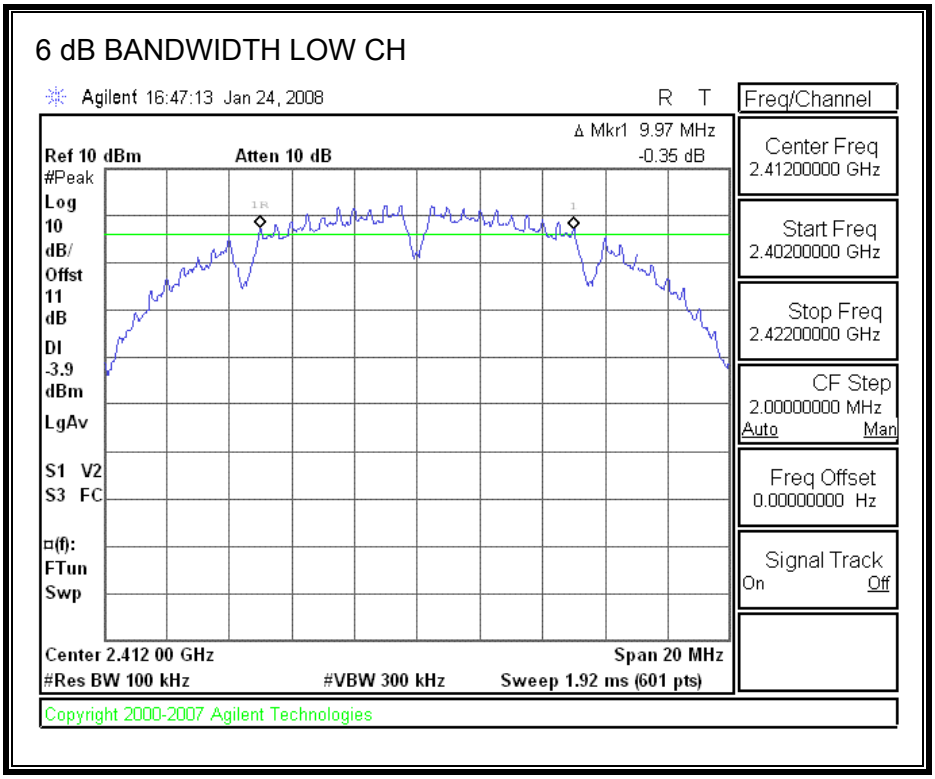
TEST PROCEDURE

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.

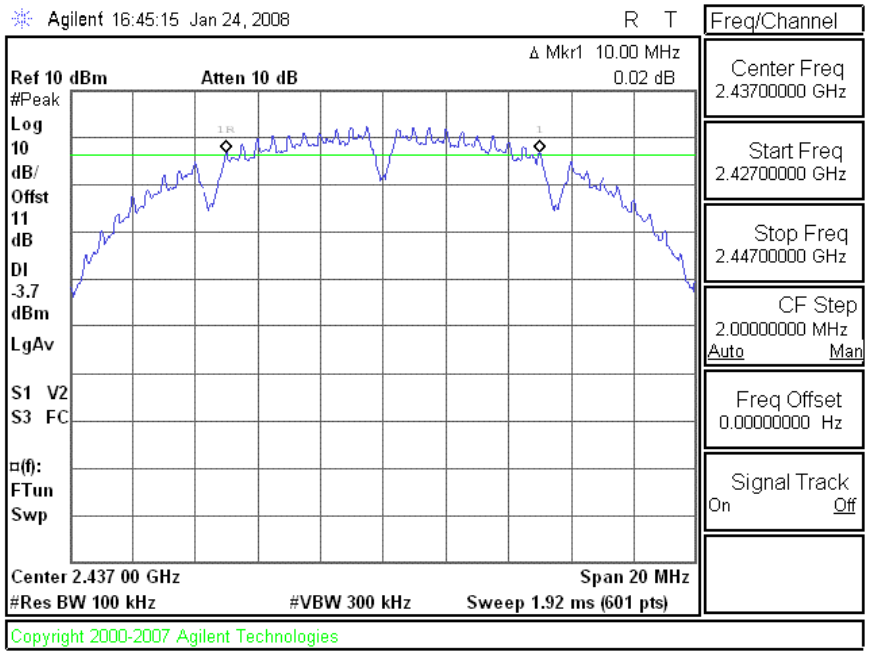
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.97	0.5
Middle	2437	10.00	0.5
High	2462	10.00	0.5

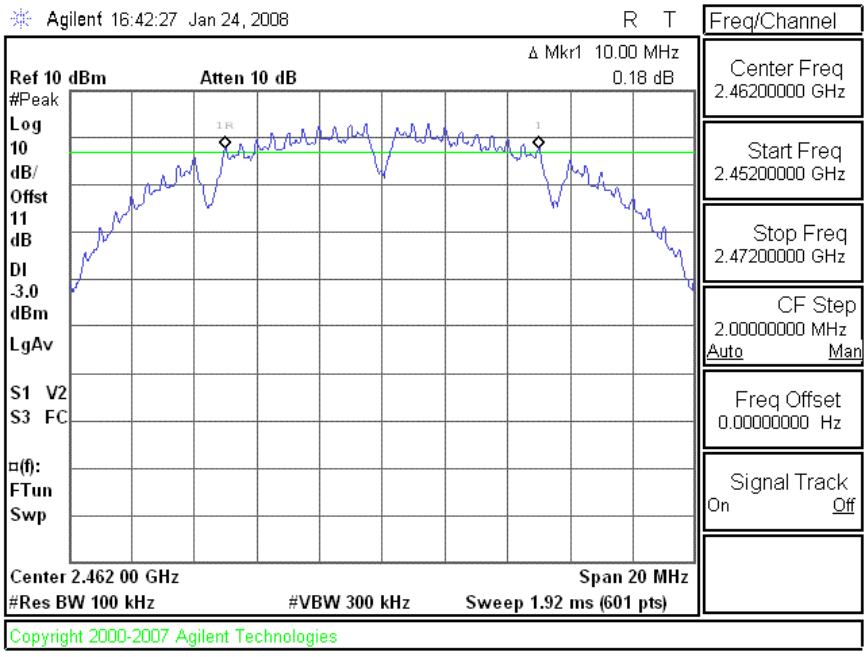
6 dB BANDWIDTH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

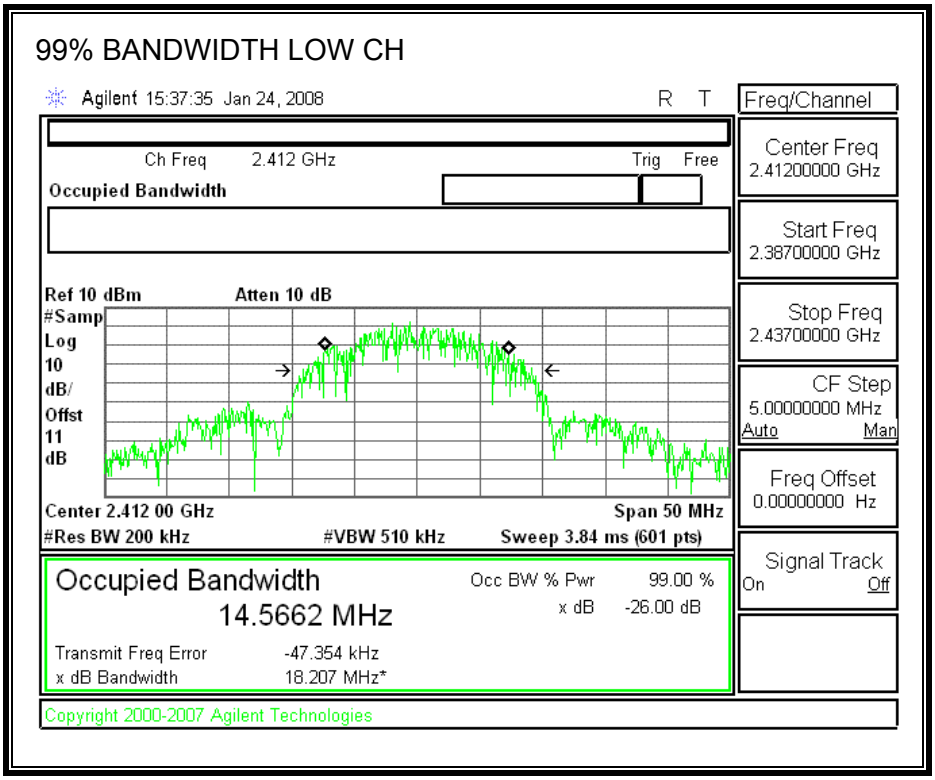
TEST PROCEDURE

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.

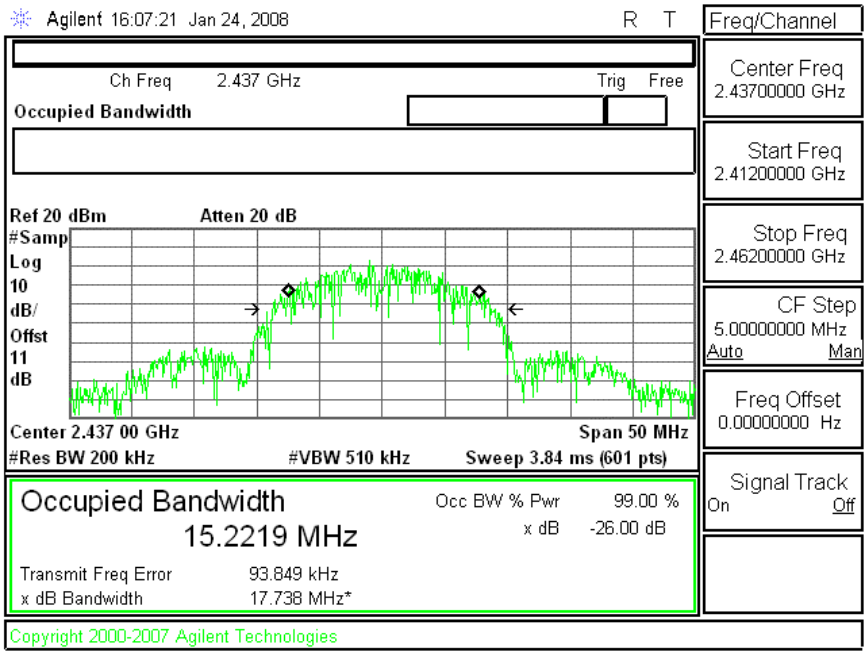
RESULTS

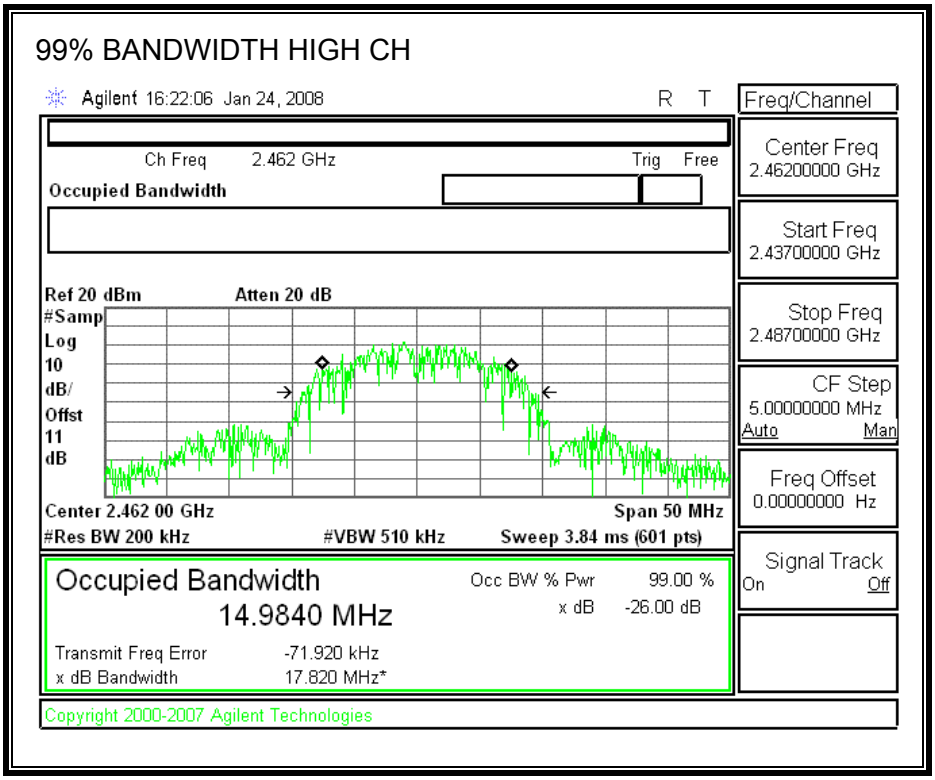
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	14.5662
Middle	2437	15.2219
High	2462	14.984

99% BANDWIDTH



99% BANDWIDTH MID CH





7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

TEST PROCEDURE

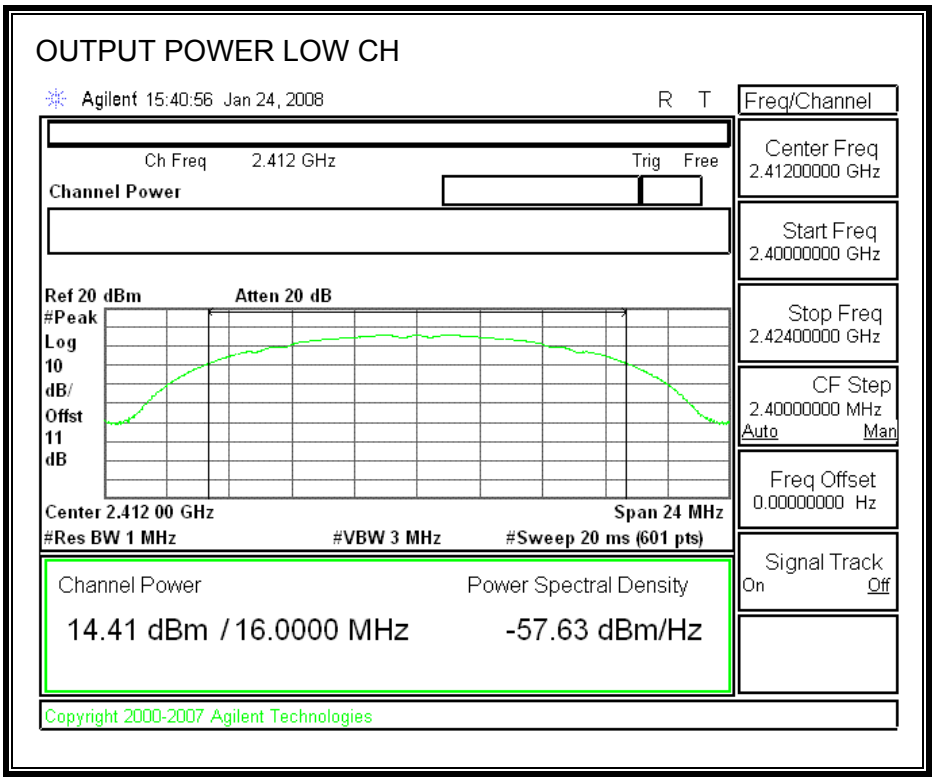
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

Maximum Conducted Output Power based on RMS averaging over a time interval is measured in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005. The transmitter operates continuously therefore Power Output Option 2, Method # 1 is used.

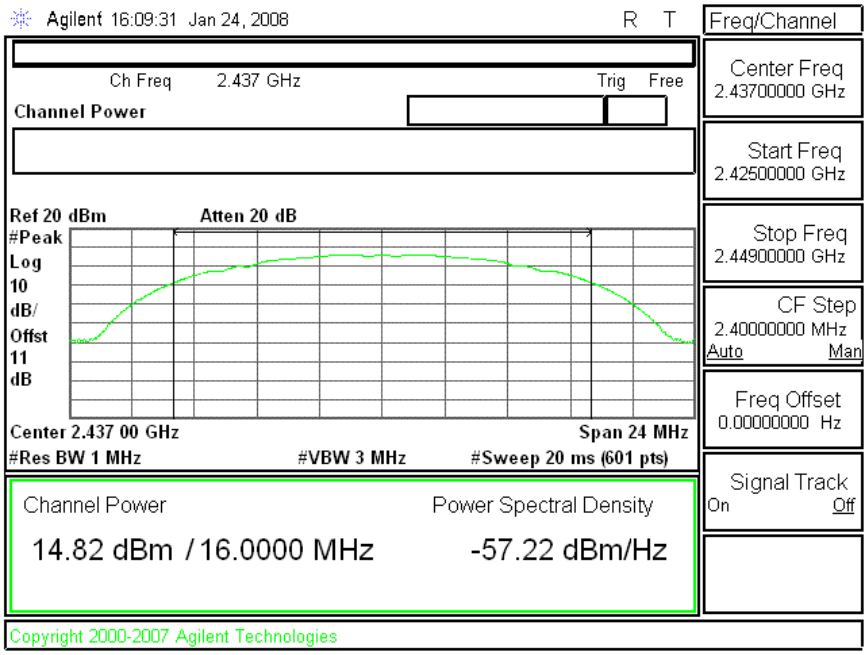
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	14.41	30	-15.59
Middle	2437	14.82	30	-15.18
High	2462	14.93	30	-15.07

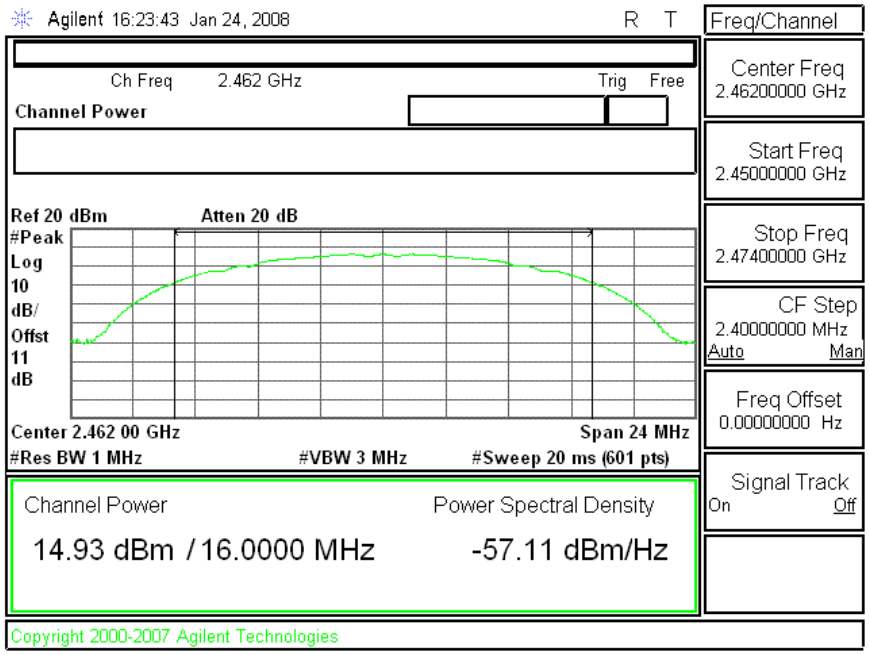
OUTPUT POWER



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



7.1.4. 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 dB (including 10 dB pad and 1dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.10
Middle	2437	12.27
High	2462	12.31

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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

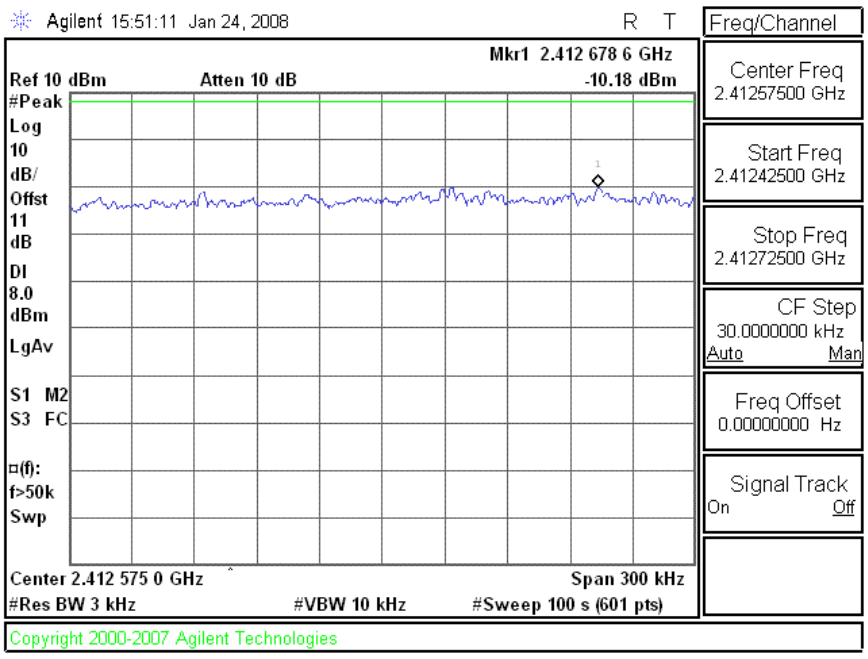
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

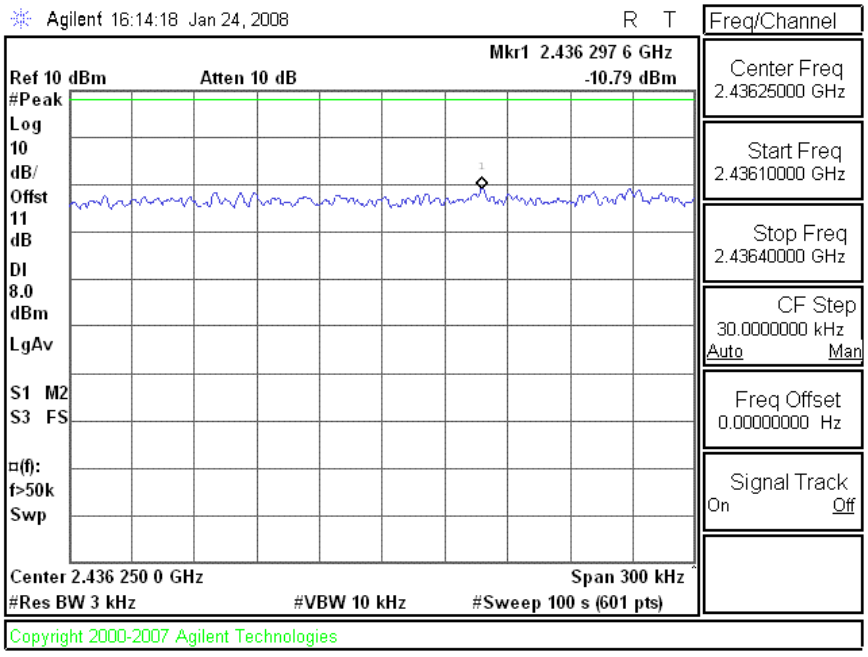
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.18	8	-18.18
Middle	2437	-10.79	8	-18.79
High	2462	-10.10	8	-18.10

POWER SPECTRAL DENSITY

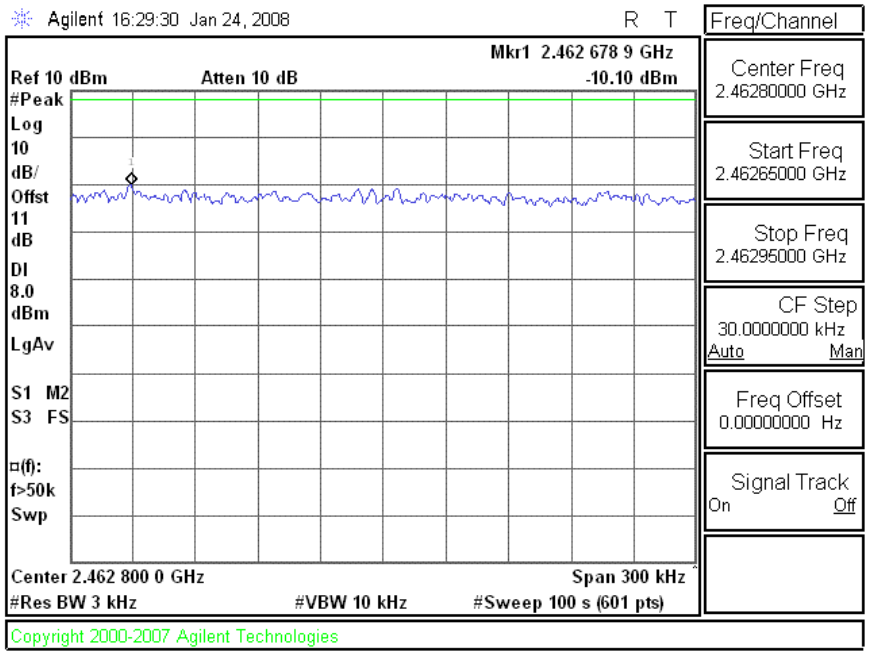
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

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

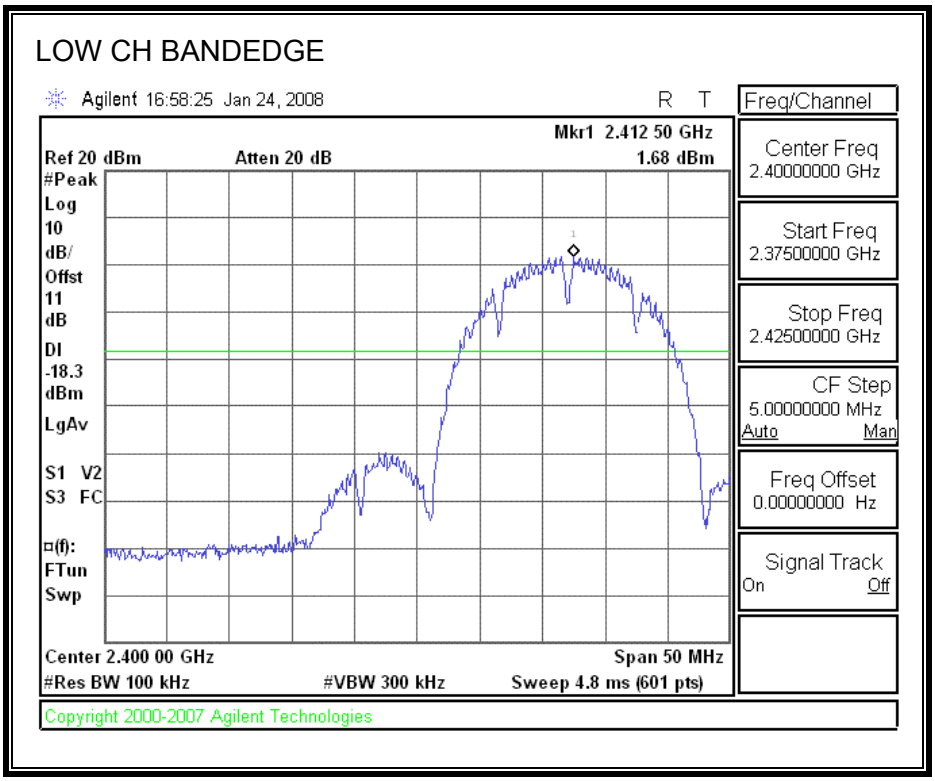
PROCEDURE

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.

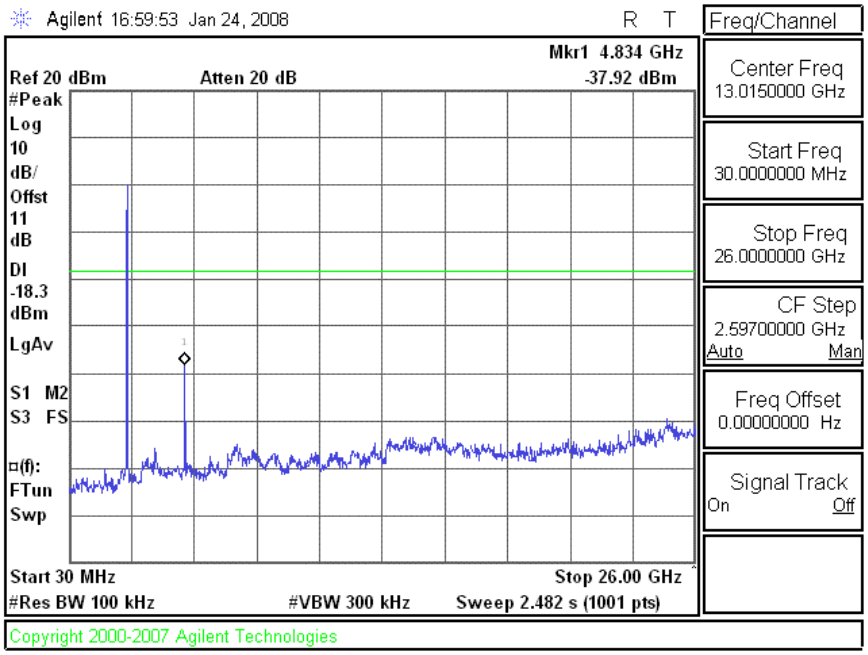
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

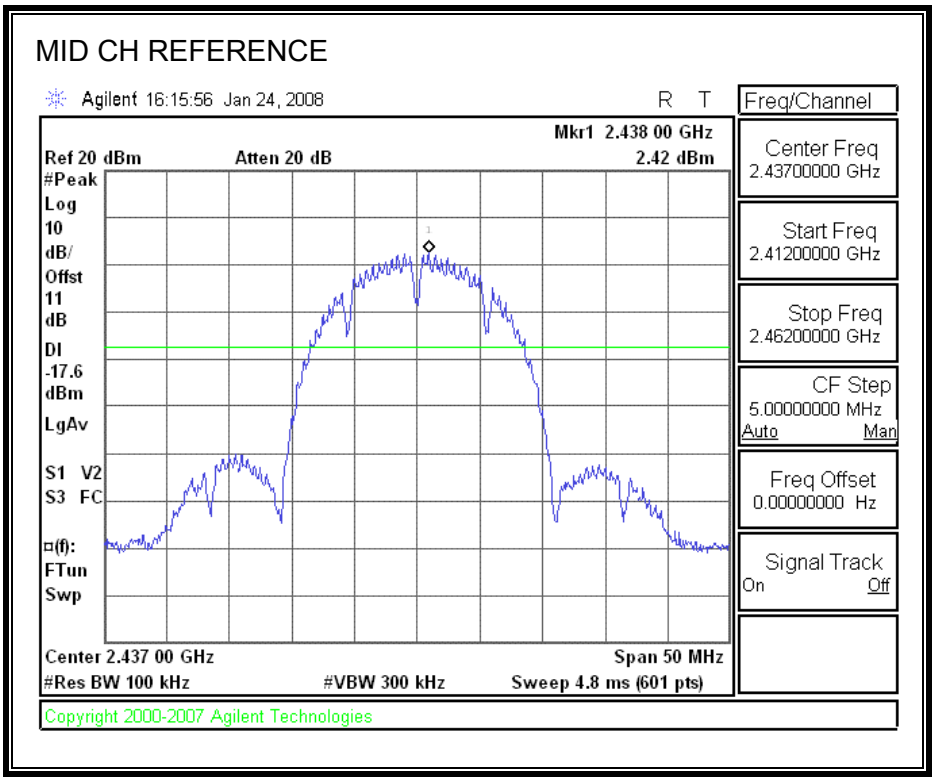
SPURIOUS EMISSIONS, LOW CHANNEL



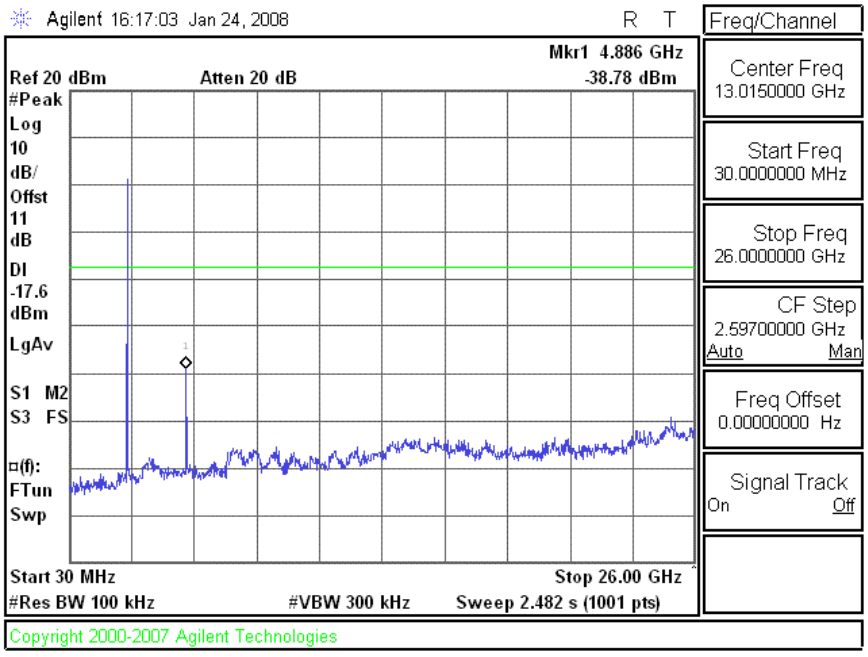
LOW CH SPURIOUS



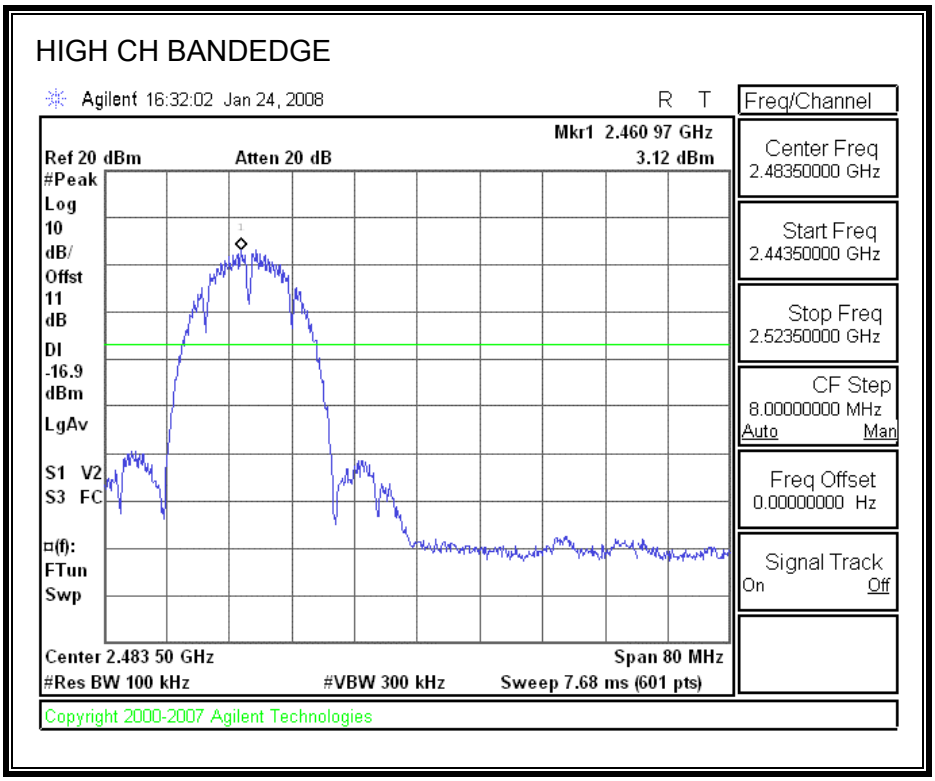
SPURIOUS EMISSIONS, MID CHANNEL



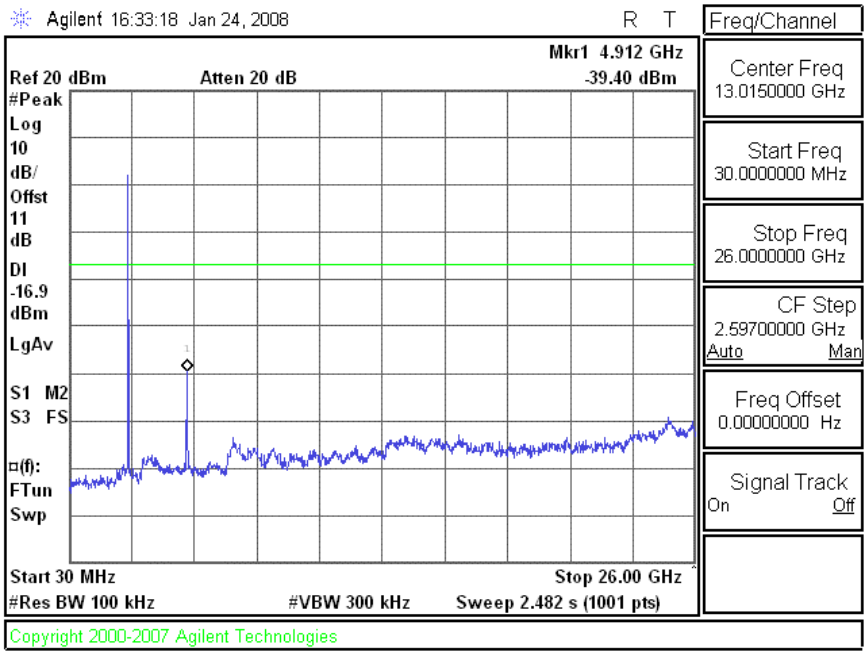
MID CH SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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.

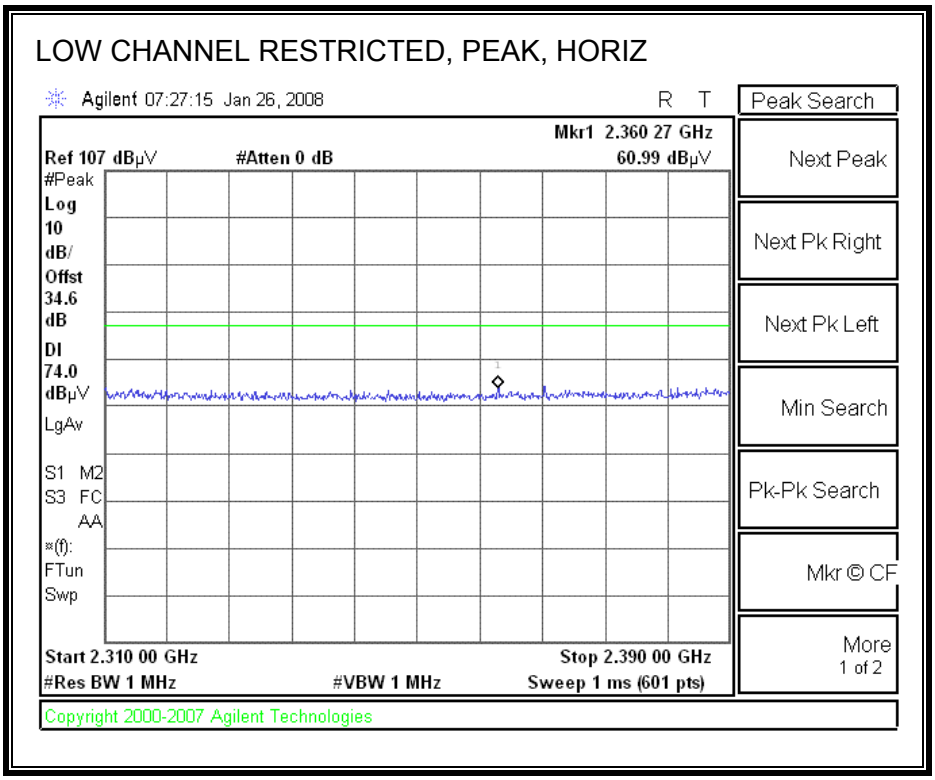
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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.

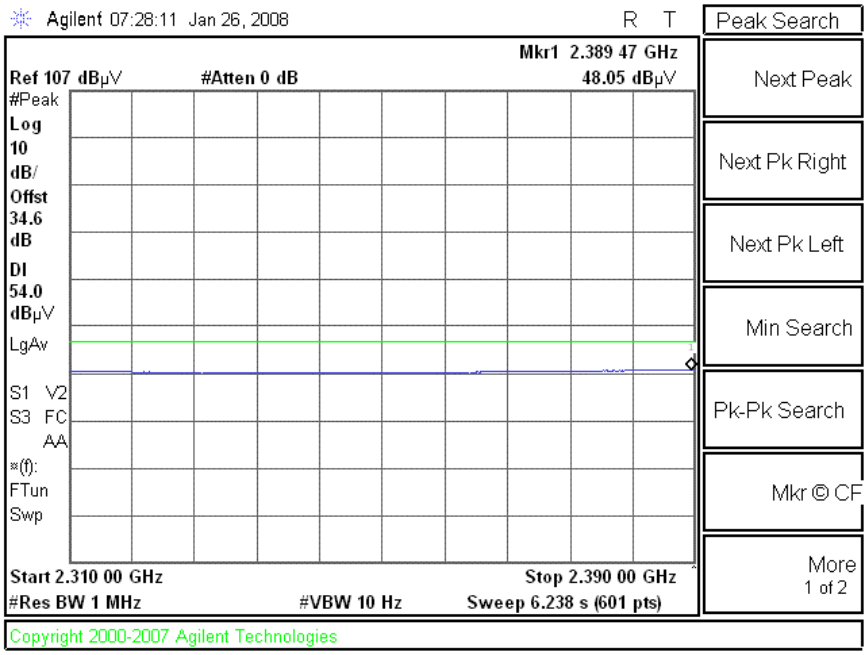
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.1.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

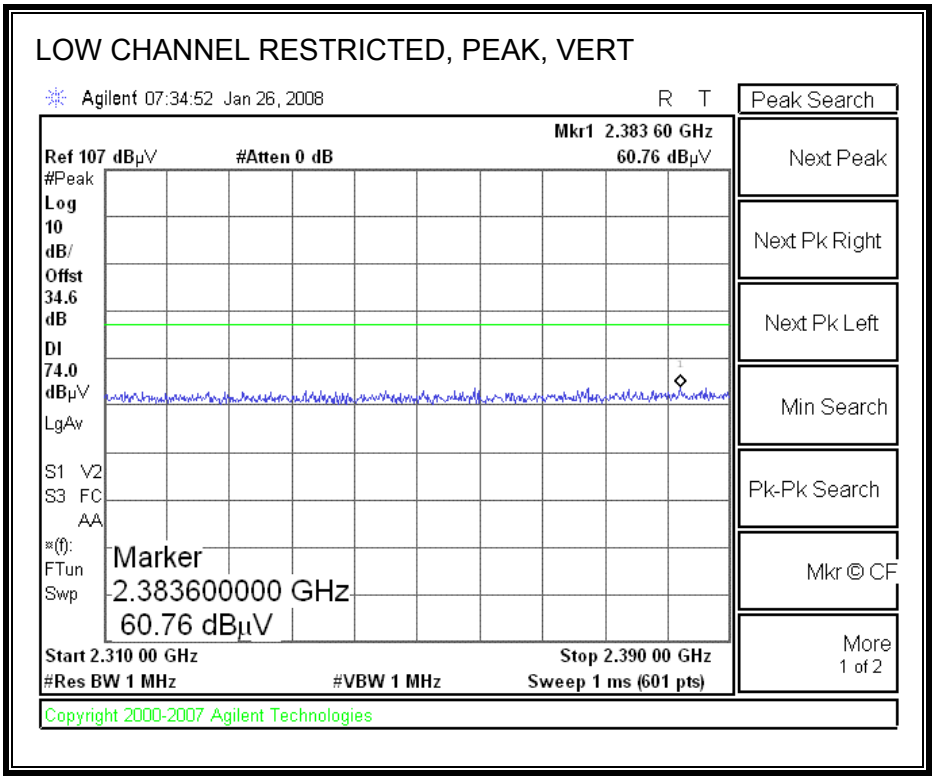
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



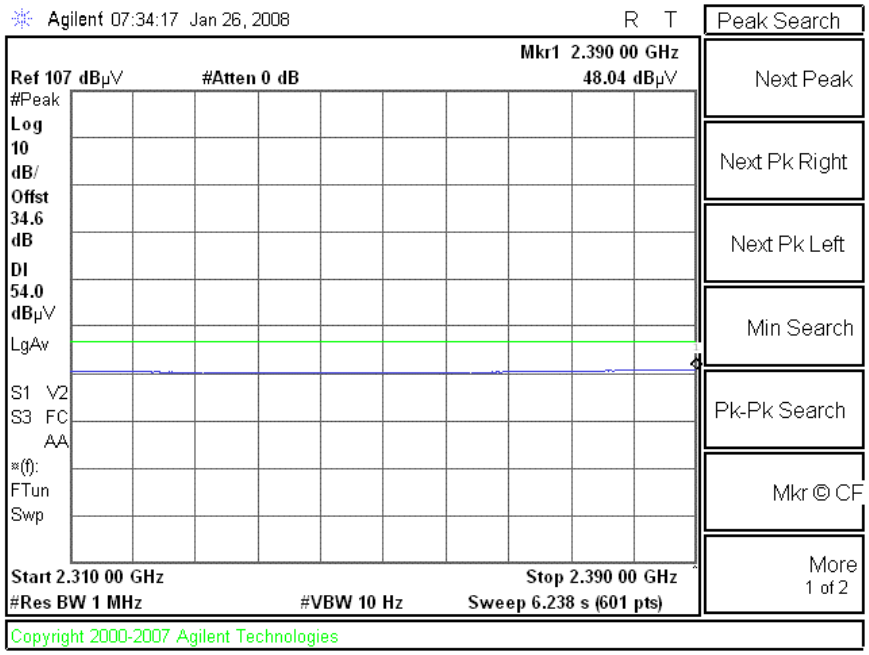
LOW CHANNEL RESTRICTED, AVG, HORIZ



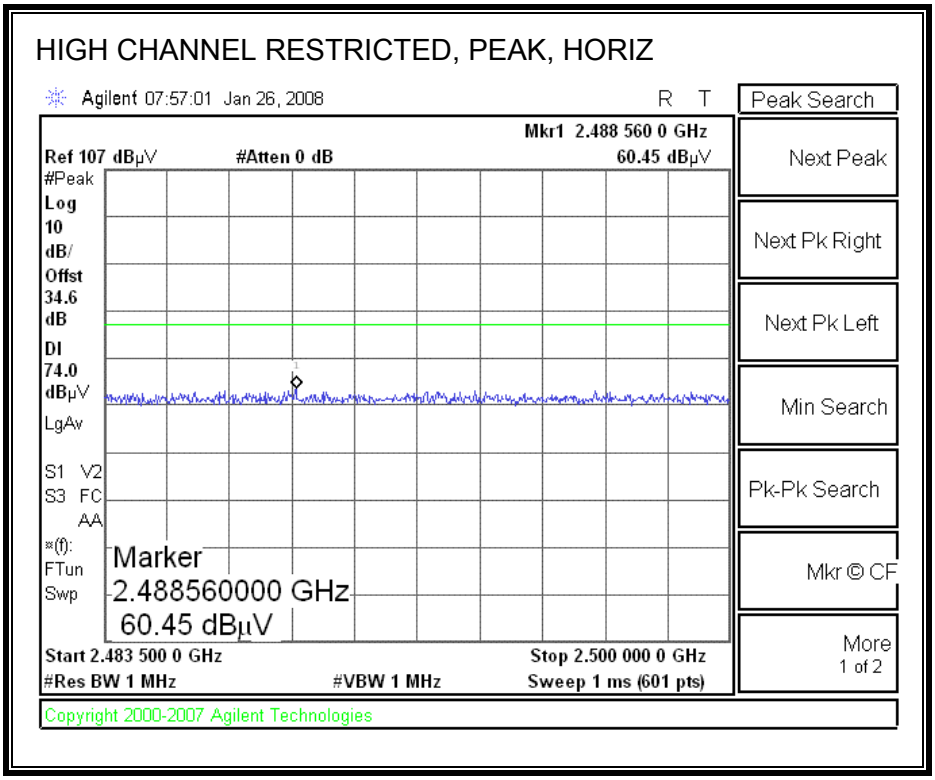
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



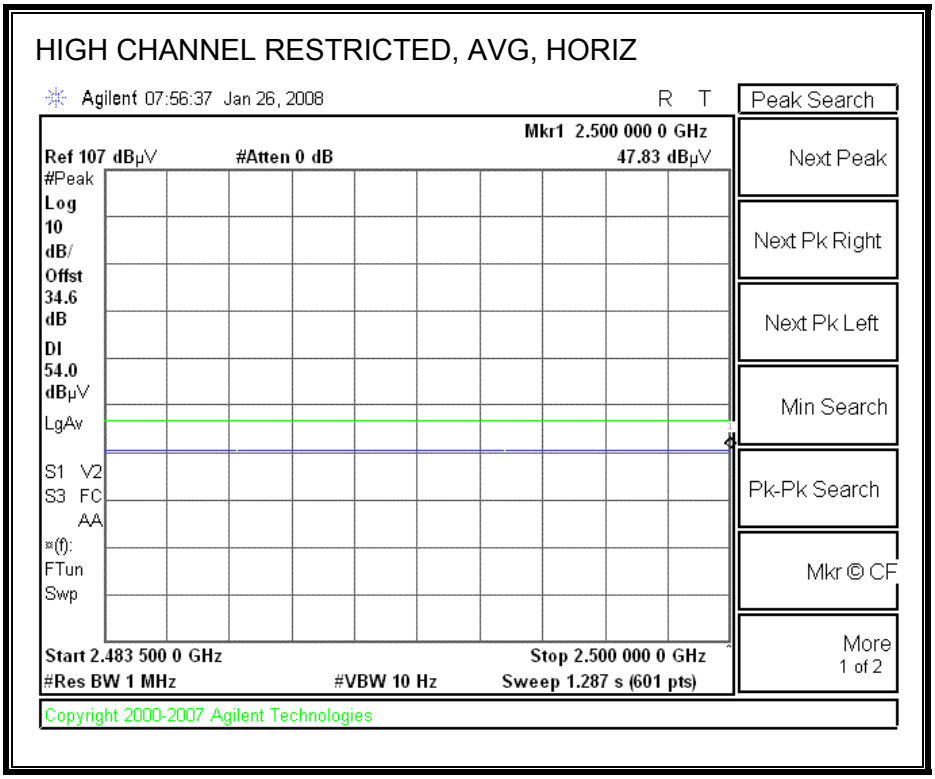
LOW CHANNEL RESTRICTED, AVG, VERT



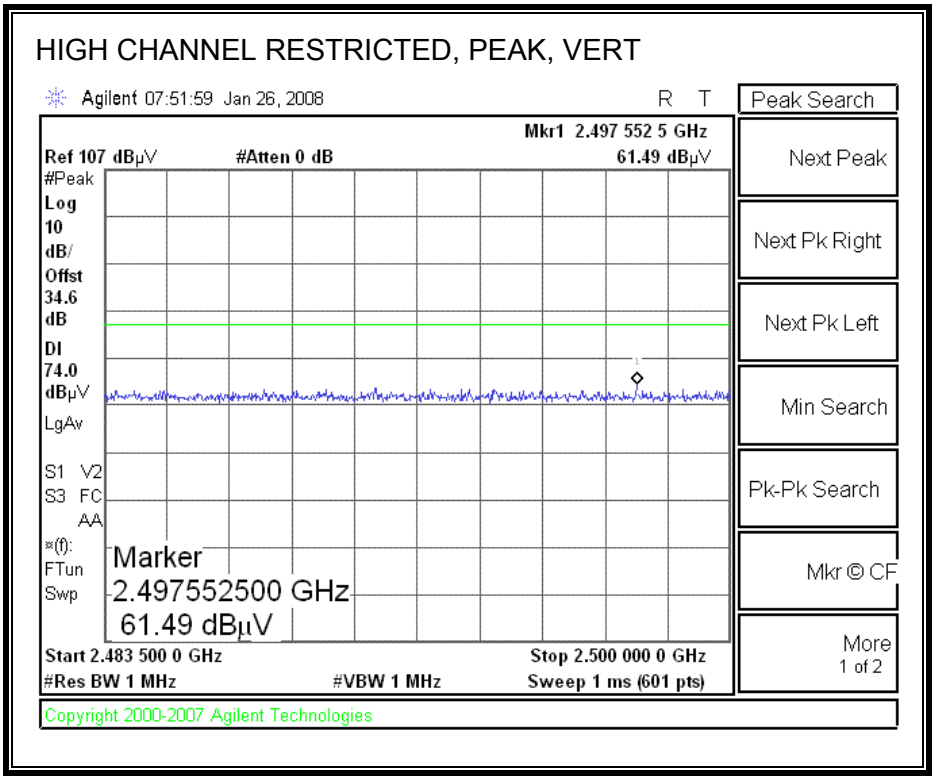
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



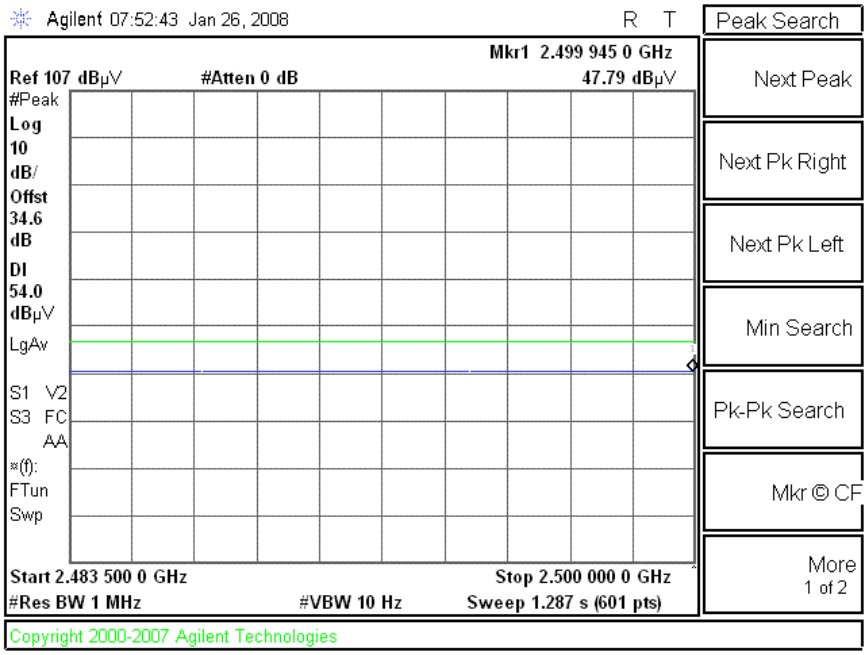
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 07J11502
Date: 1/25/2008
Test Engineer: Chin Pang
Configuration: EUT Only
Mode: TX b mode
Main Antenna
Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T145 Agilent 3008A005(			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-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 Ch															
4.824	3.0	42.0	32.0	33.7	7.1	-34.8	0.0	0.0	48.0	38.0	74	54	-26.0	-16.0	H
4.824	3.0	40.8	31.5	33.7	7.1	-34.8	0.0	0.0	46.8	37.5	74	54	-27.2	-16.5	V
Mid Ch															
4.874	3.0	42.6	32.4	33.8	7.2	-34.9	0.0	0.0	48.7	38.5	74	54	-25.3	-15.5	H
7.311	3.0	43.0	30.0	36.2	8.6	-34.7	0.0	0.0	53.2	40.2	74	54	-20.8	-13.8	H
4.874	3.0	41.3	31.7	33.8	7.2	-34.9	0.0	0.0	47.4	37.8	74	54	-26.6	-16.2	V
7.311	3.0	42.8	29.3	36.2	8.6	-34.7	0.0	0.0	53.0	39.5	74	54	-21.0	-14.5	V
High Ch															
4.924	3.0	43.0	33.6	33.9	7.2	-34.9	0.0	0.0	49.2	39.8	74	54	-24.8	-14.2	H
7.386	3.0	43.6	31.4	36.3	8.7	-34.6	0.0	0.0	53.9	41.7	74	54	-20.1	-12.3	H
4.924	3.0	42.6	33.2	33.9	7.2	-34.9	0.0	0.0	48.8	39.4	74	54	-25.2	-14.6	V
7.386	3.0	43.4	31.2	36.3	8.7	-34.6	0.0	0.0	53.7	41.5	74	54	-20.3	-12.5	V

Rev. 4.12.7
Note: No other emissions were detected above the system noise floor

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

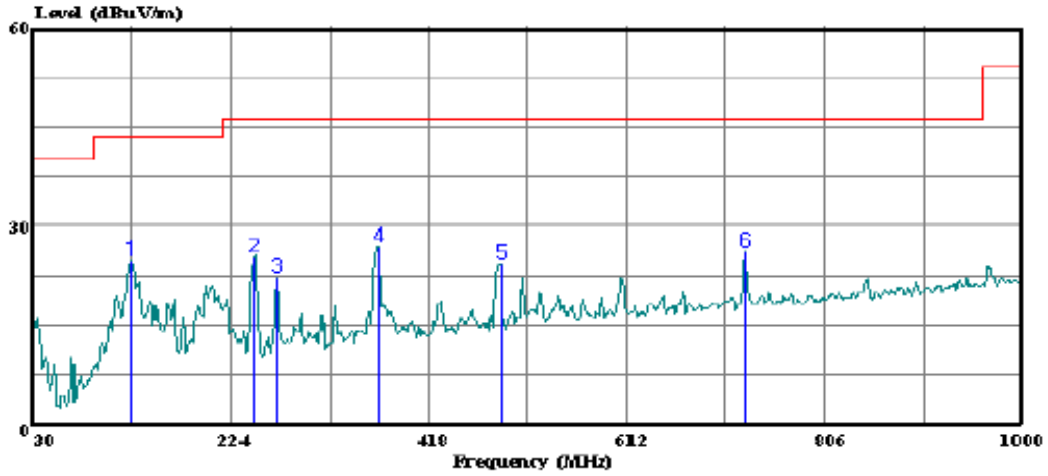
8.2. WORST-CASE BELOW 1 GHz

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

HORIZONTAL DATA

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

Data#: 4 File#: 07J11502.EMI Date: 01-25-2008 Time: 16:56:12



Trace: 3 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: Chin Pang
Project # : 07J11502
Company : Mitsumi
Config : EUT/Cradle
Mode : TX (Mid Ch)
Target : FCC Class B
: VoIP Mobile Phone Terminal

Page: 1

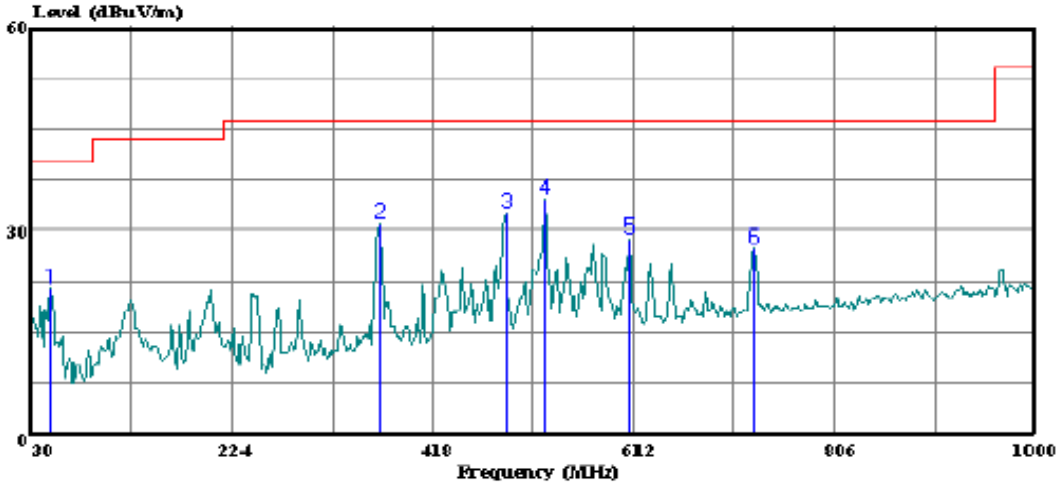
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	126.030	41.94	-16.90	25.04	43.50	-18.46	Peak
2	246.310	43.86	-18.49	25.37	46.00	-20.63	Peak
3	269.590	39.96	-17.60	22.36	46.00	-23.64	Peak
4	368.530	41.99	-14.90	27.09	46.00	-18.91	Peak
5	487.840	36.72	-12.23	24.49	46.00	-21.51	Peak
6	727.430	35.22	-8.98	26.24	46.00	-19.76	Peak

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

VERTICAL DATA

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

Data#: 2 File#: 07J11502.EMI Date: 01-25-2008 Time: 16:49:53



Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: Chin Pang
Project # : 07J11502
Company : Mitsumi
Config : EUT/Cradle
Mode : TX (Mid Ch)
Target : FCC Class B
: VoIP Mobile Phone Terminal

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	48.430	43.47	-21.78	21.69	40.00	-18.31	Peak
2	366.590	45.71	-14.87	30.84	46.00	-15.16	Peak
3	487.840	44.60	-12.23	32.37	46.00	-13.63	Peak
4	526.640	46.16	-11.64	34.52	46.00	-11.48	Peak
5	609.090	39.42	-10.52	28.90	46.00	-17.10	Peak
6	727.430	36.45	-8.98	27.47	46.00	-18.53	Peak

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

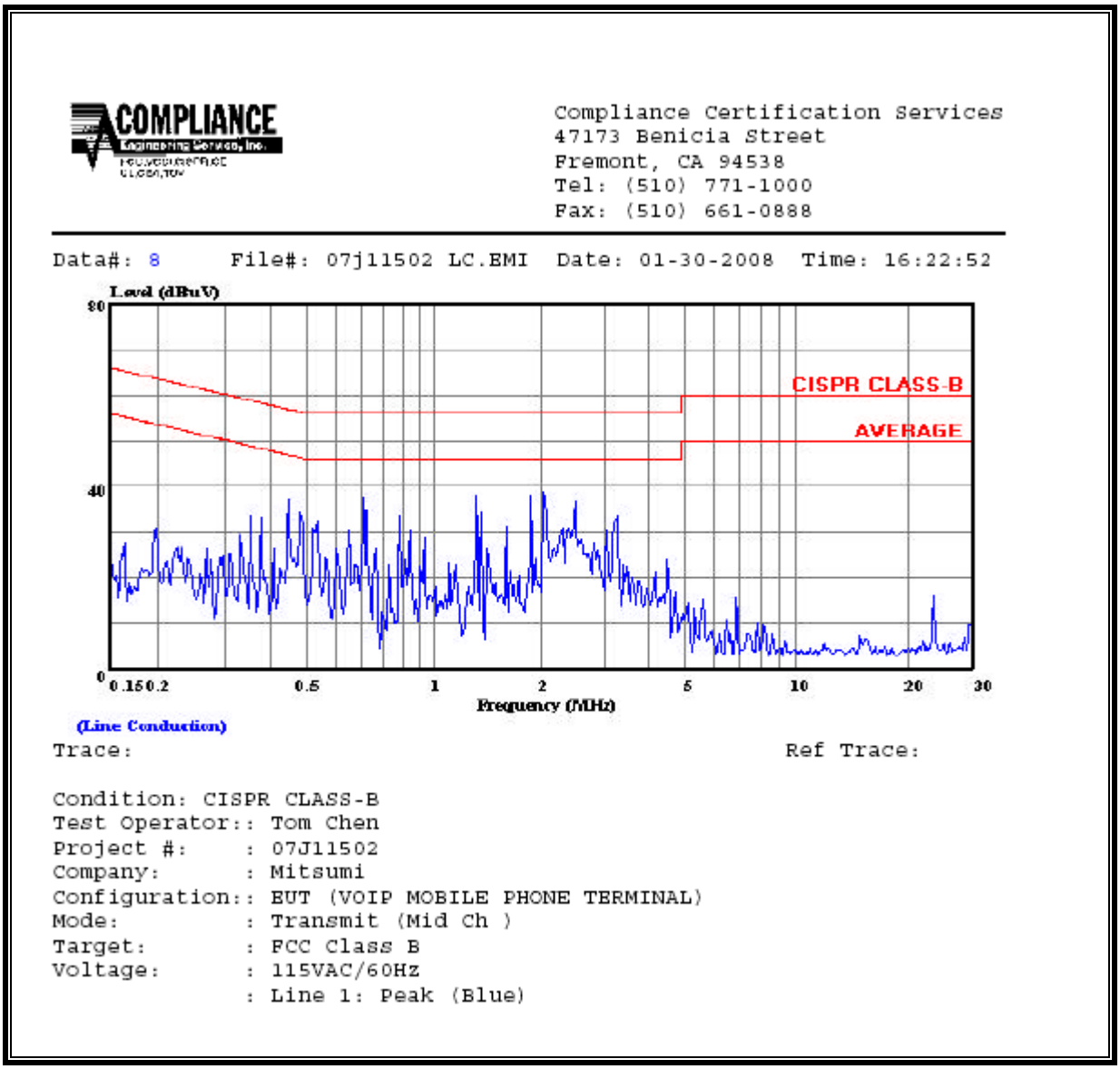
ANSI C63.4

RESULTS

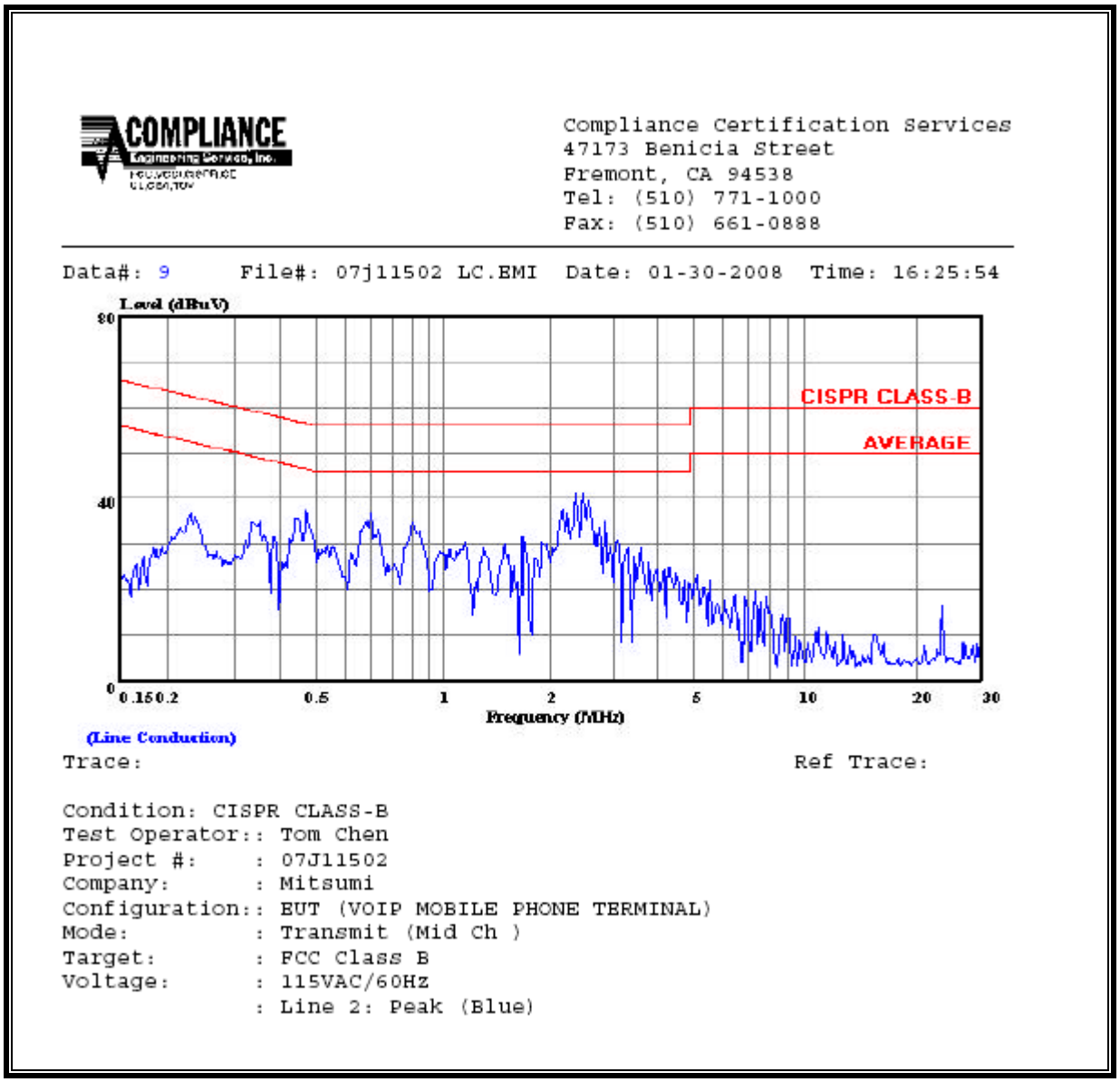
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.71	37.73	--	--	0.00	56.00	46.00	-18.27	-8.27	L1
1.42	38.16	--	--	0.00	56.00	46.00	-17.84	-7.84	L1
2.14	38.92	--	--	0.00	56.00	46.00	-17.08	-7.08	L1
0.23	36.63	--	--	0.00	62.45	52.45	-25.82	-15.82	L2
0.47	37.43	--	--	0.00	56.58	46.58	-19.15	-9.15	L2
2.58	41.25	--	--	0.00	56.00	46.00	-14.75	-4.75	L2
6 Worst Data									

LINE 1 RESULTS



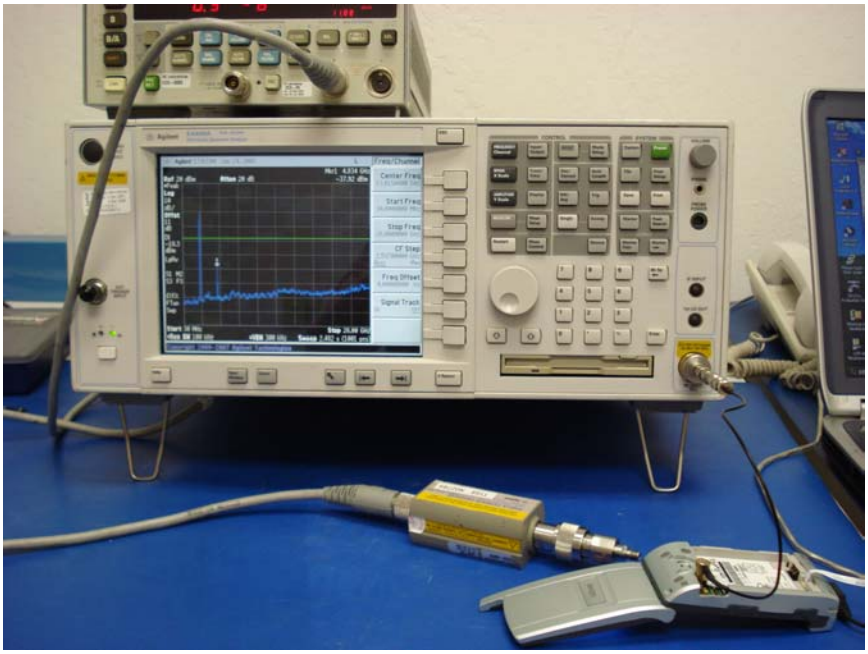
LINE 2 RESULTS



10. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

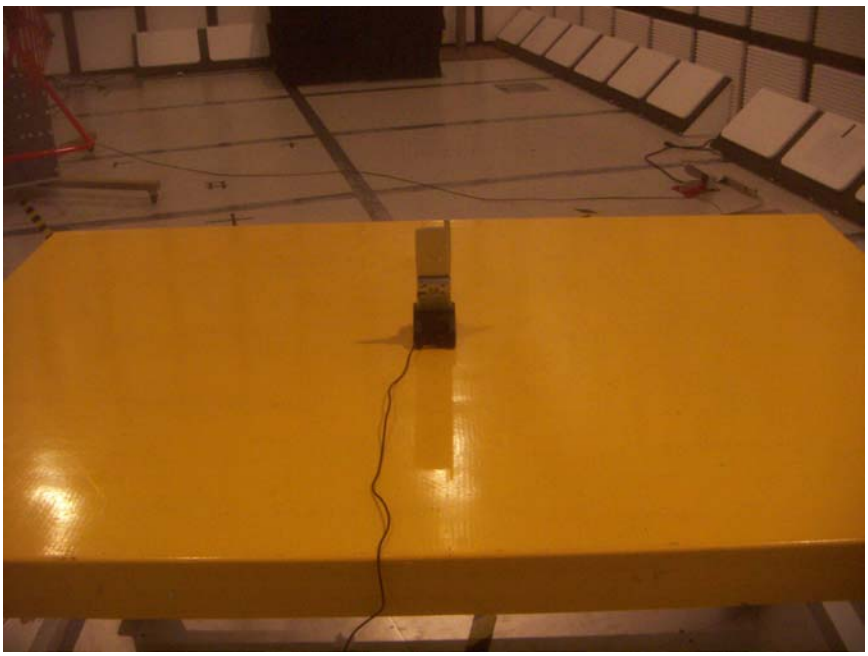
ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP

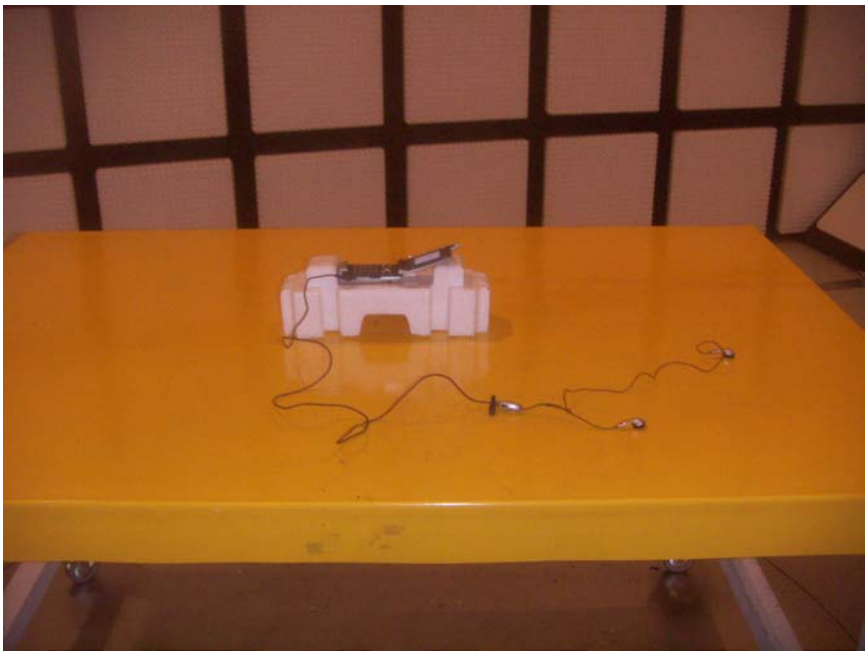
RADIATED FRONT PHOTO

RADIATED BACK PHOTO

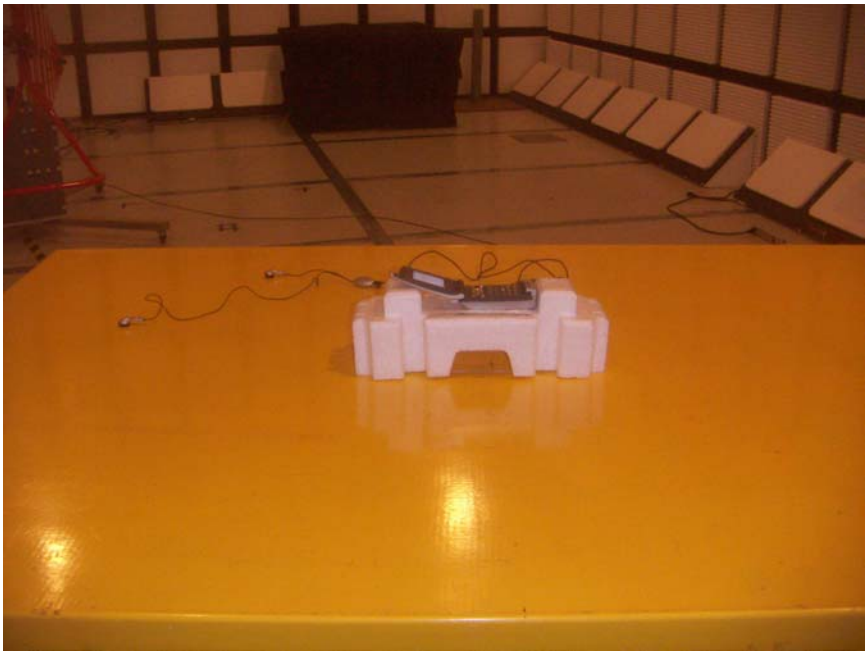


RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

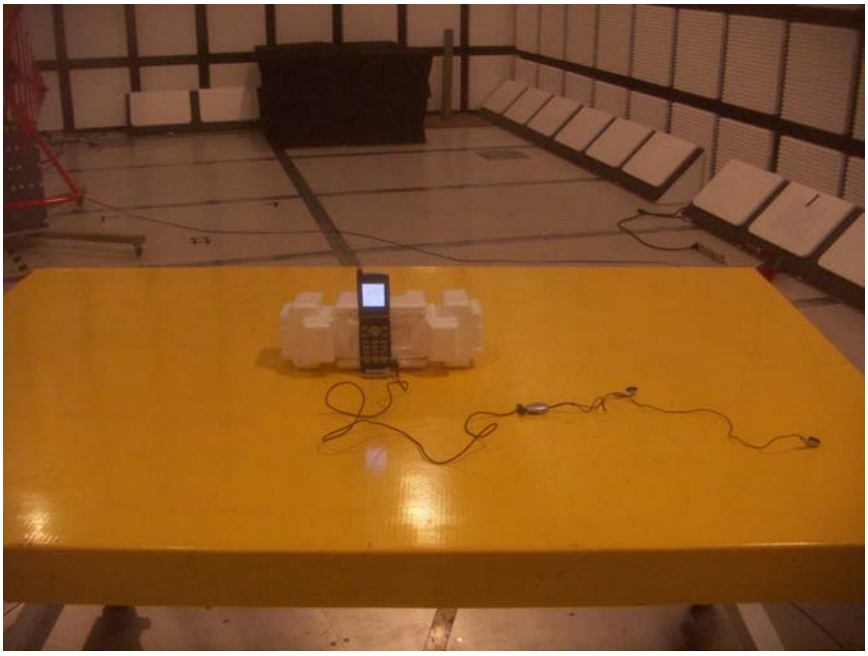
X-AXIS FRONT PHOTO



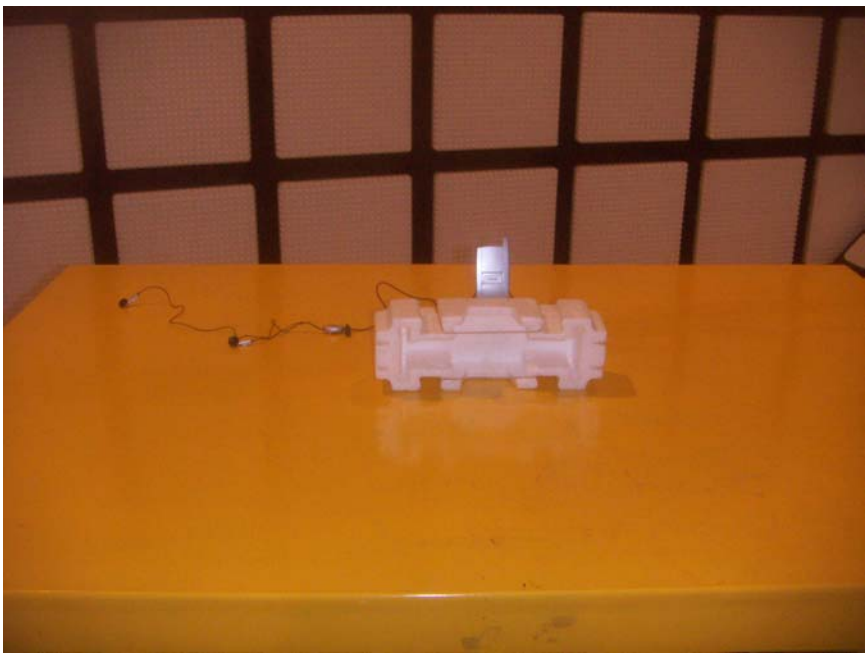
X-AXIS BACK PHOTO



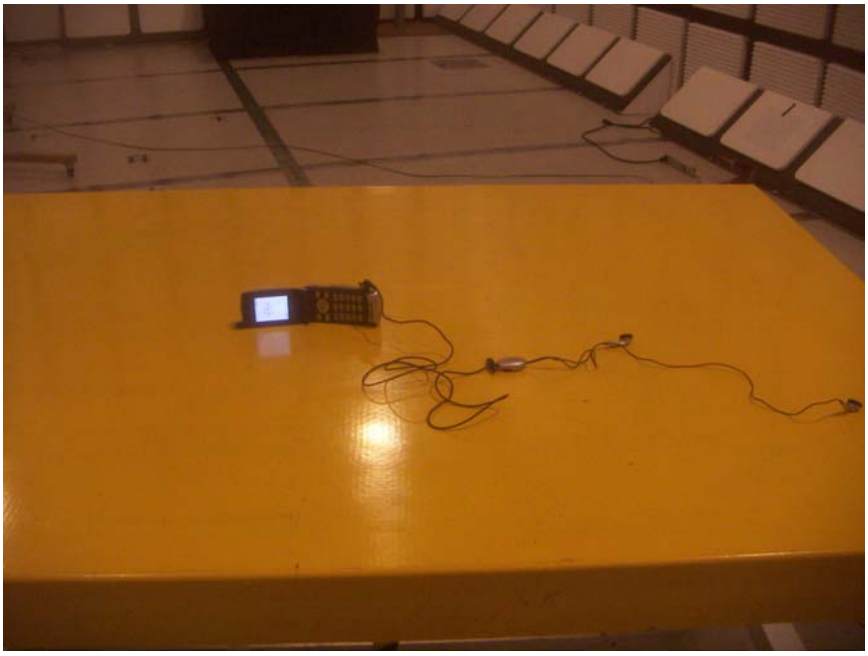
Y-AXIS FRONT PHOTO



Y-AXIS BACK PHOTO



Z-AXIS FRONT PHOTO



Z-AXIS BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT