



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7**

CERTIFICATION TEST REPORT

FOR

HANDHELD TERMINAL

MODEL NUMBER: IT- 800E

**FCC ID: BBQIT800
IC: 2388F-IT800**

REPORT NUMBER: 09J12750-2, Revision A

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Prepared for
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NVLAP LAB CODE 200065-0

Revision History

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--	11/03/09	Initial Issue	T. Chan
A	11/09/09	Revised report number on cover page and revised model name on page 5	A. Zaffar

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CASIO COMPUTER CO., LTD
6-2 HON-MACHI 1-CHOME
SHIBUYA-KU
TOKYO, 151-8543, JAPAN

EUT DESCRIPTION: HANDHELD TERMINAL

MODEL: IT-800E (HANDHELD) & HA-H62IO (ETHERNET CRADLE)

SERIAL NUMBER: 75 (CONDUCTED) & 02121 (RADIATED)

DATE TESTED: AUGUST 21 TO OCTOBER 21, 2009

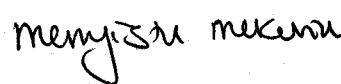
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

MENGISTU MEKURIA
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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Bluetooth and RFID equipped Handheld Terminal

The Bluetooth module is manufactured by Murata Manufacturing Co., Ltd.

5.2. ACCESSORY AND MODEL DIFFERENCES

The EUT model IT-800E (2D) with HA-H62IO was chosen as a representative of the following models for testing since it represents the worst-case scenario. The table below shows the model differences:

*: Model tested

Type	Bluetooth	RFID	2D Scanner	SD slot	Camera
*2D Model	X	X	X		X
SD Model	X	X		X	X

Product name	Model name	Mode			
		LAN	USB Host	USB Client	Charge
USB Cradle	HA-H60IO		mode1	mode2	
AC Adapter	AD-S42120B				
*Ethernet Cradle	HA-H62IO	mode3	mode4	mode5	
AC Adapter	AD-S42120B				
Cradle-type Battery Charger	HA-H30CHG				mode6
AC Adapter	AD-S15050B				
AC Adapter directly connected to Handheld Terminal	AD-S15050B				mode7

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	0.65	1.16
2402 - 2480	Enhanced 8PSK	2.22	1.67

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Chip antenna antenna, with a maximum gain of -2.6 dBi.

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was BTRadioTest CE6.0, ver. 3.00.

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on input from the manufacturer of the radio.

All final tests in the GFSK mode were made at 1 Mb/s.
All final tests in the 8PSK mode were made at 3 Mb/s.

The EUT also has been evaluated at X, Y, Z-orientations and the worst among them with AC/DC Adapter and with Ethernet cradle. The highest measured emission was determined the EUT with cradle configuration.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	Manufacturer	Model	Serial Number
AC/DC Adapter	Casio	AD-S42120B	N/A
Ethernet Cradle	Casio	HA-H62IO	N/A
Micro SD	San Disk	09228042950J1	N/A

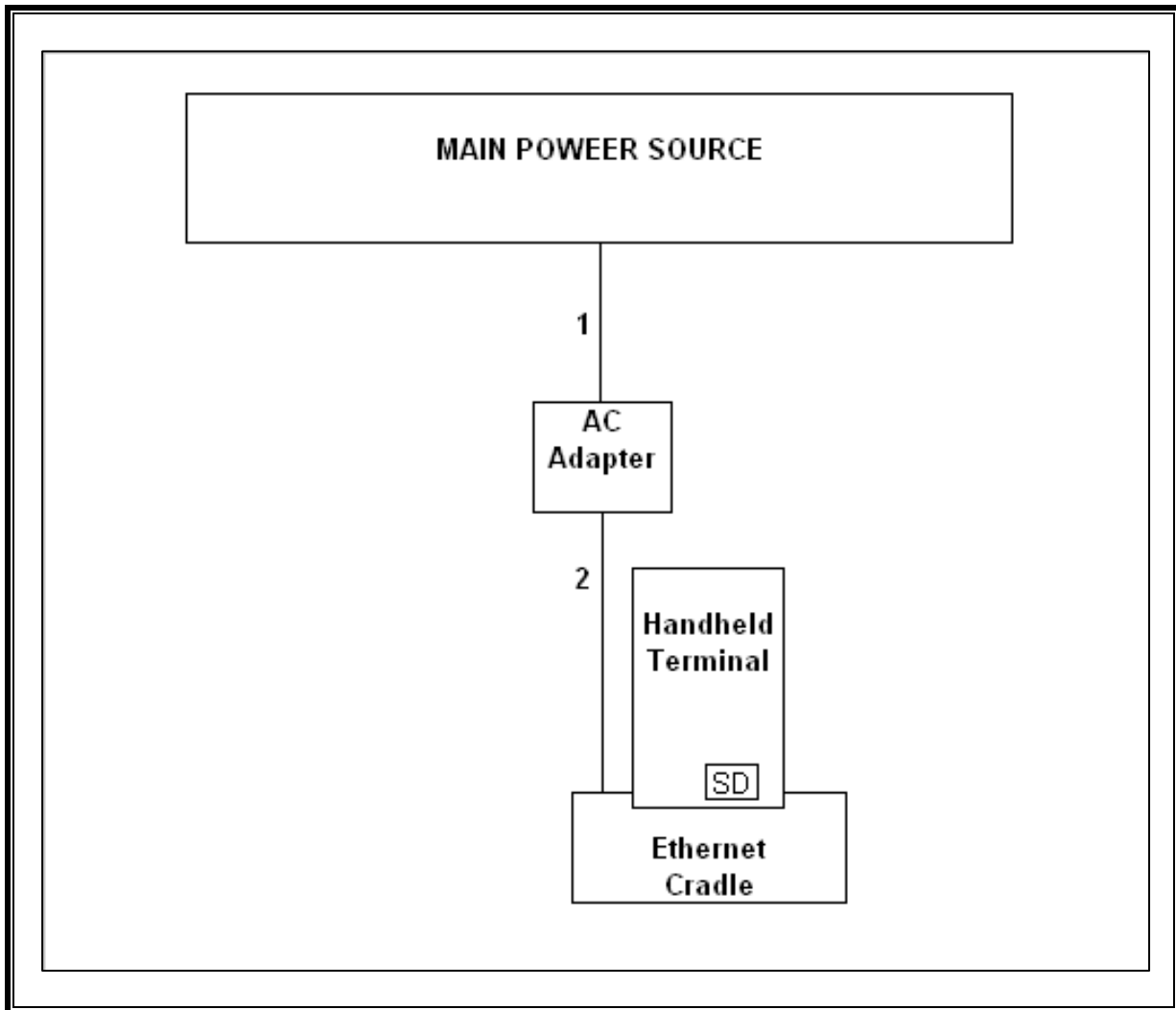
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	one ferrite at Cradle end.

TEST SETUP

The EUT is sitting on a cradle during the tests. 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
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	1/14/2009	1/14/2010
Antenna, Horn, 18 GHz	EMCO	3115	C00945	1/29/2009	1/29/2010
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/2008	12/16/2009
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	2/4/2009	2/4/2010
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	8/24/2009	8/24/2010
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	1/5/2009	1/5/2010
Power Meter	Agilent / HP	437B	N02785	6/2/2008	12/2/2009
Power Sensor, 18 GHz	Agilent / HP	8481A	N02783	5/2/2008	11/2/2009
Temperature / Humidity	Thermotron	SE 600-10-10	C00930	4/6/2009	4/6/2010

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.

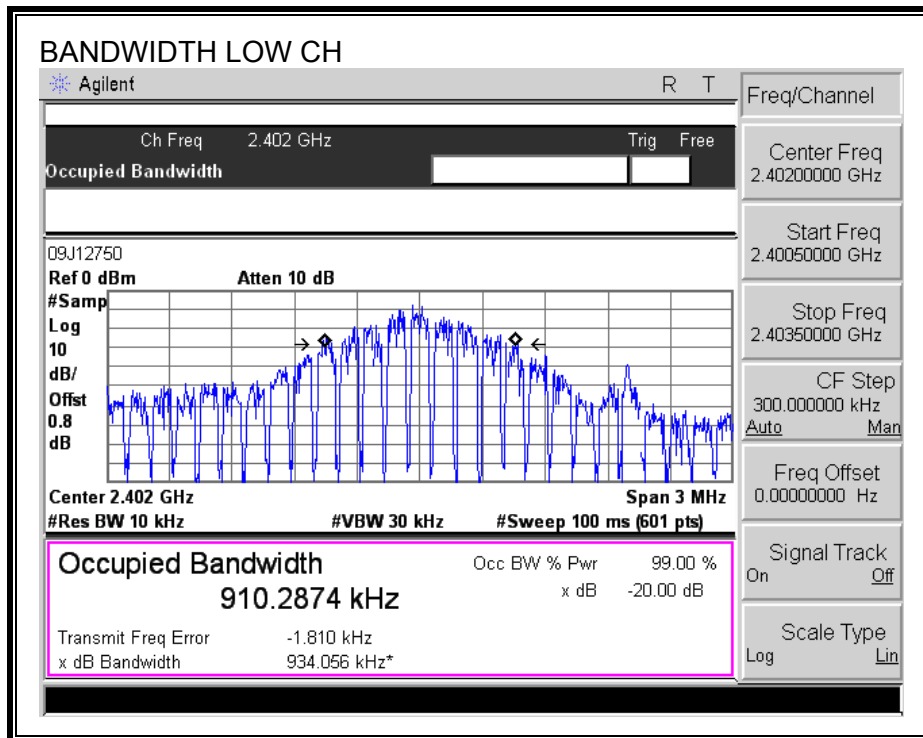
TEST PROCEDURE

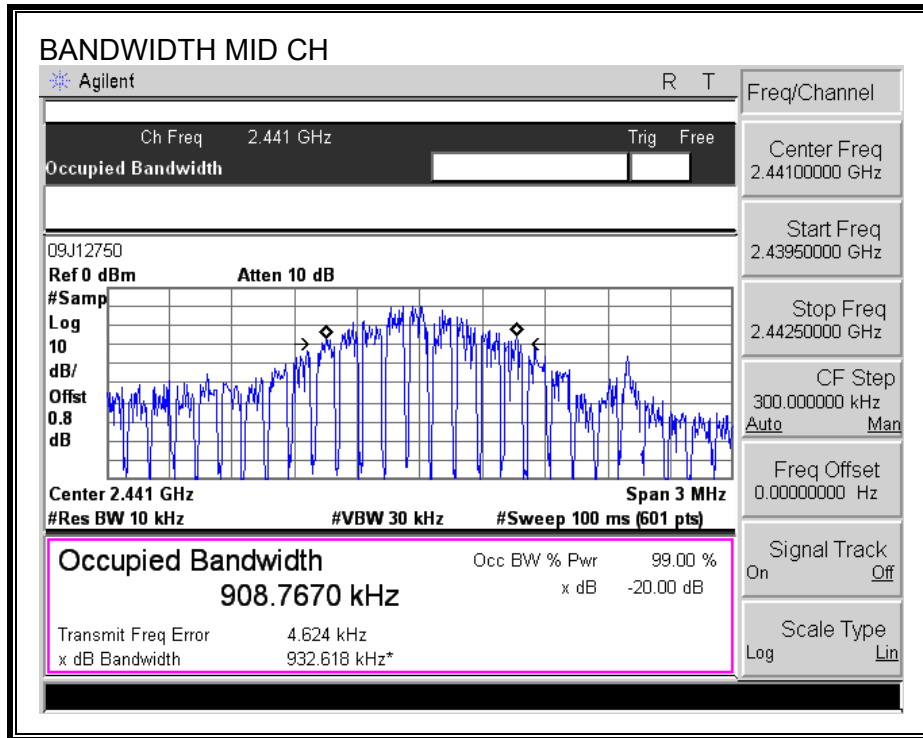
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

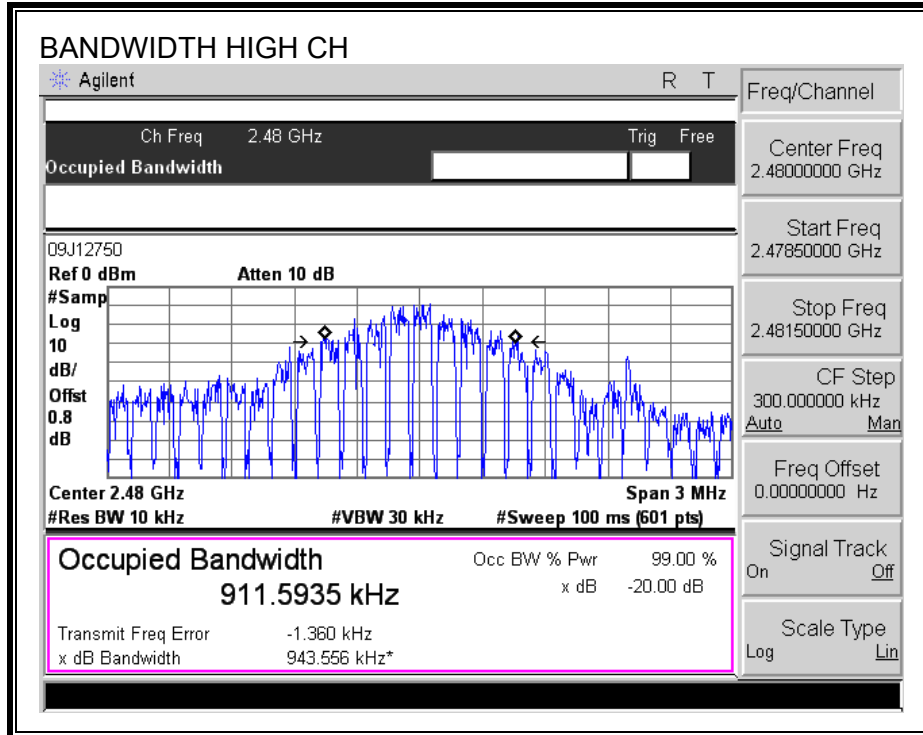
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	934.056	910.2874
Middle	2441	932.618	908.767
High	2480	943.556	911.5935

20 dB AND 99% BANDWIDTH







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 hopping channel, whichever is greater.

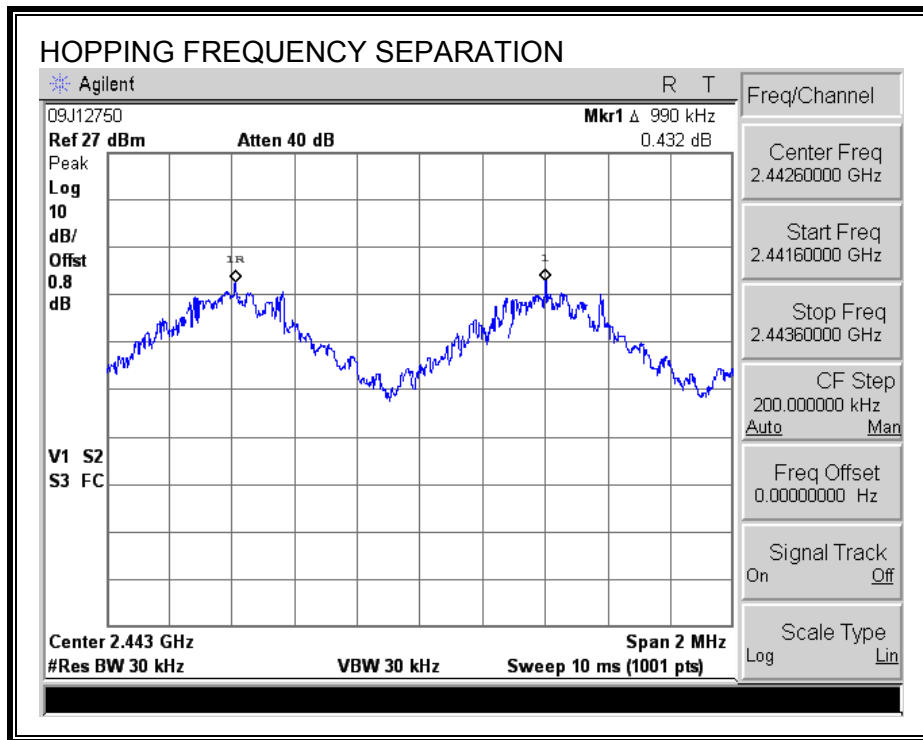
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

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.

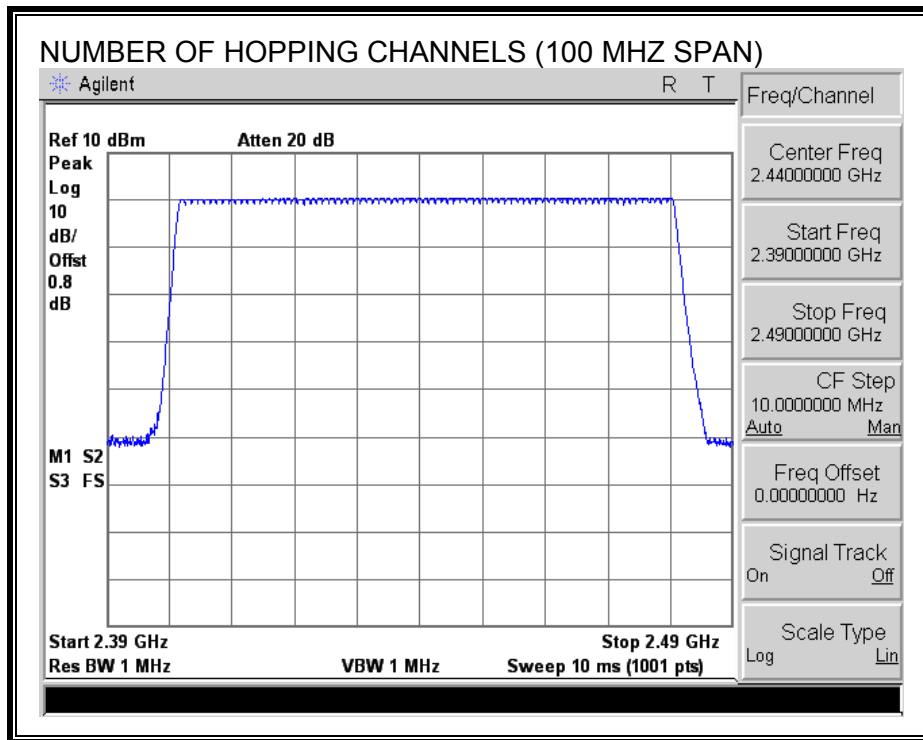
TEST PROCEDURE

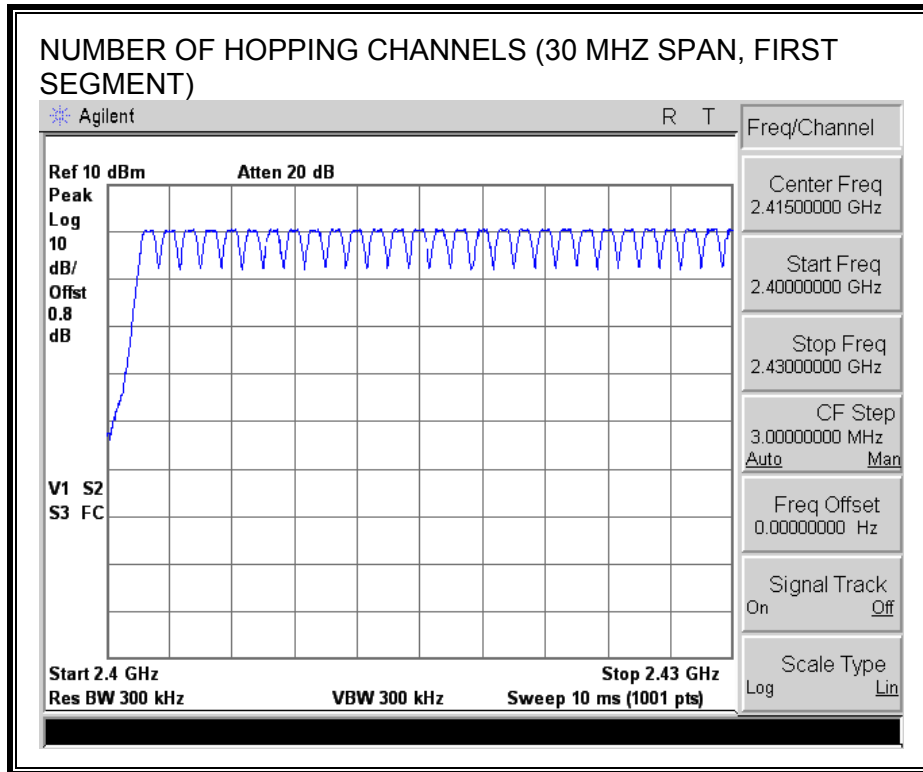
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

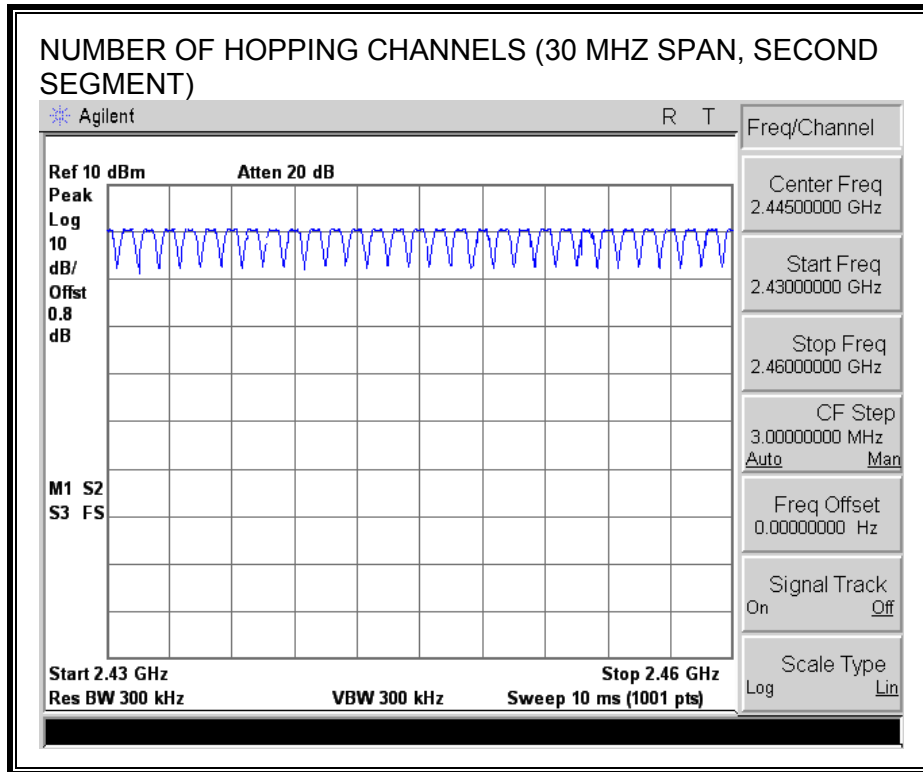
RESULTS

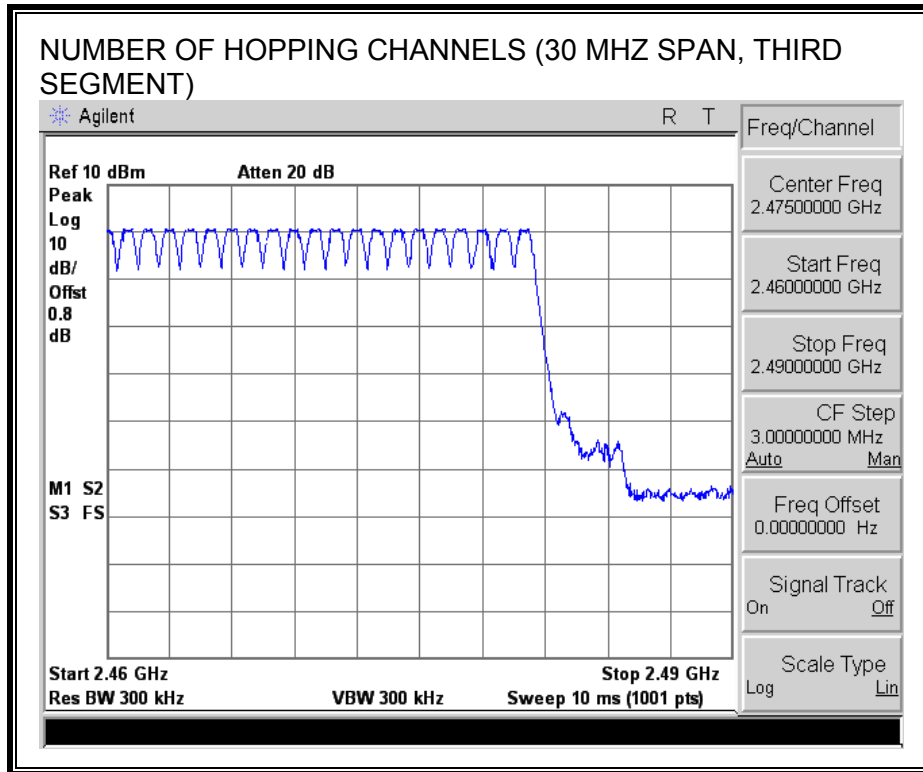
79 Channels observed.

NUMBER OF HOPPING CHANNELS









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

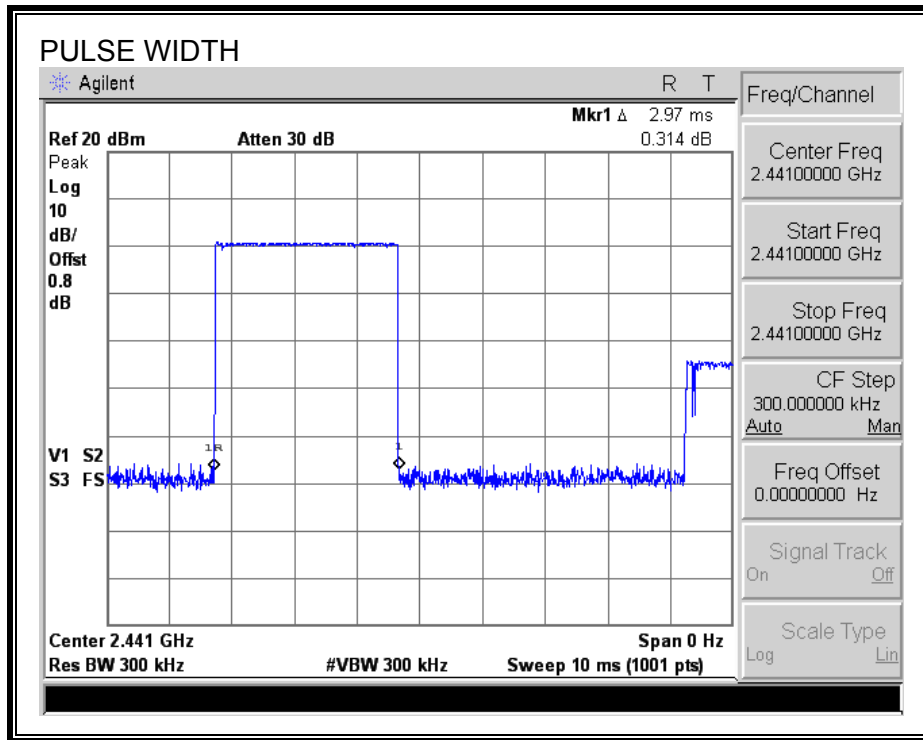
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

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

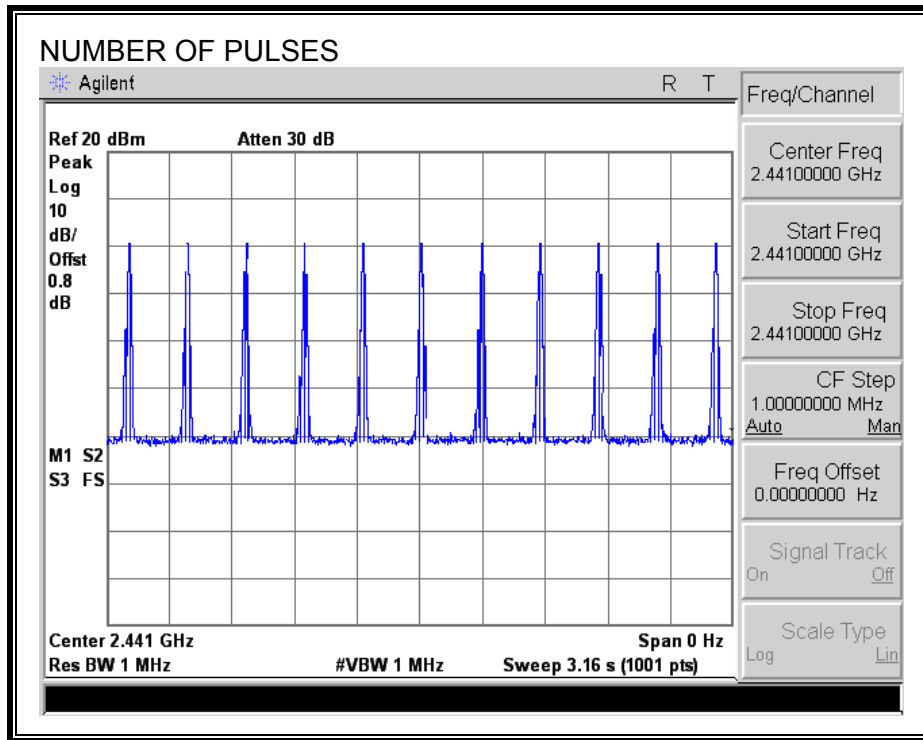
RESULTS

Time Of Occupancy = $10 * 11 \text{ pulses} * 2.97 \text{ msec} = 326.7 \text{ msec}$

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.

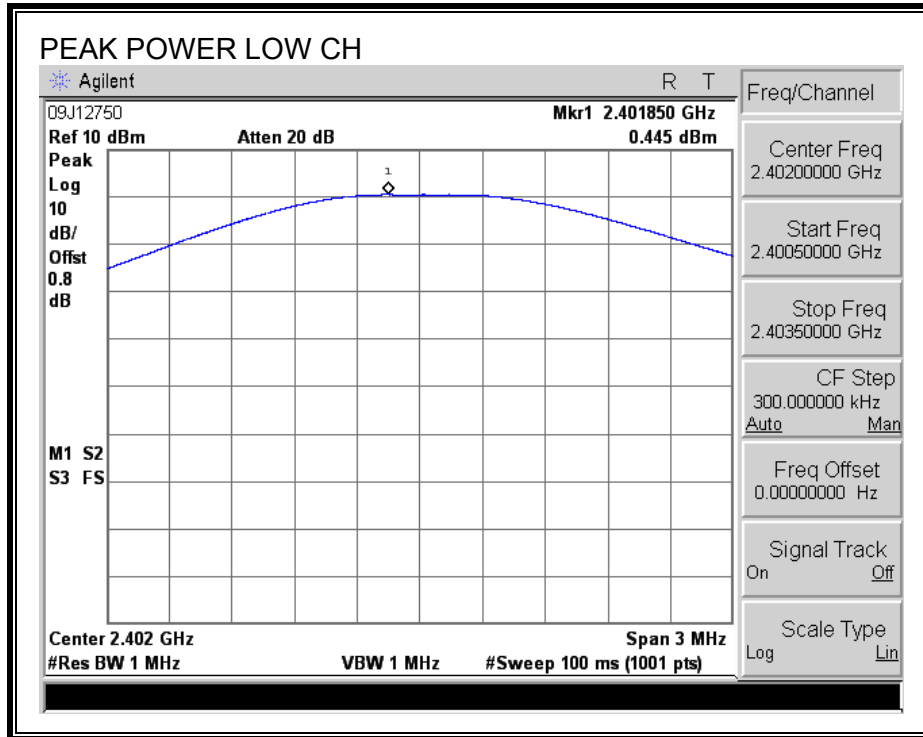
TEST PROCEDURE

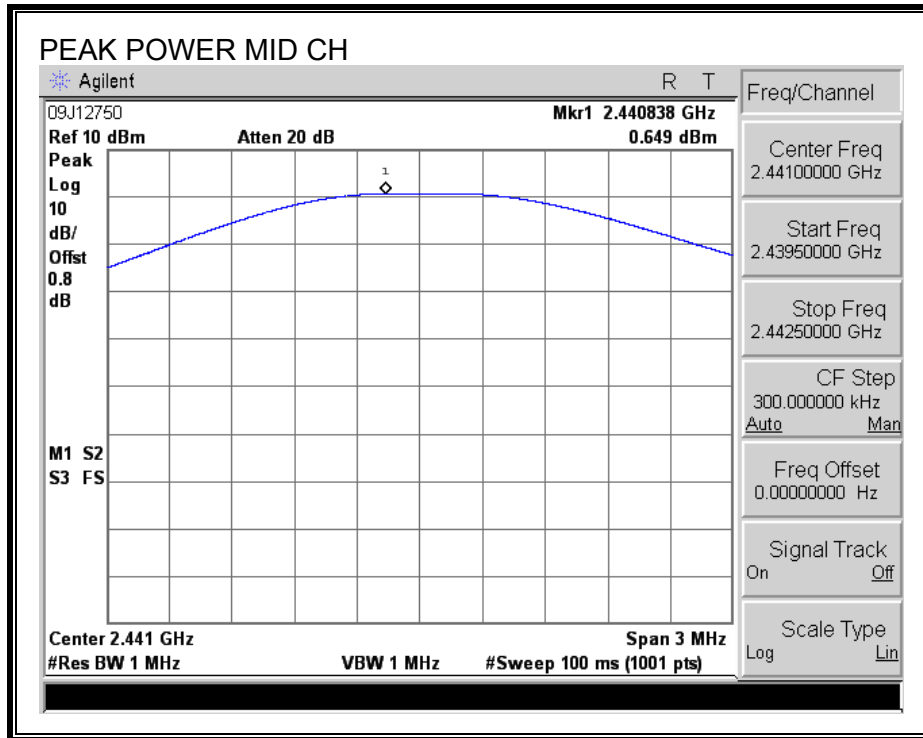
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

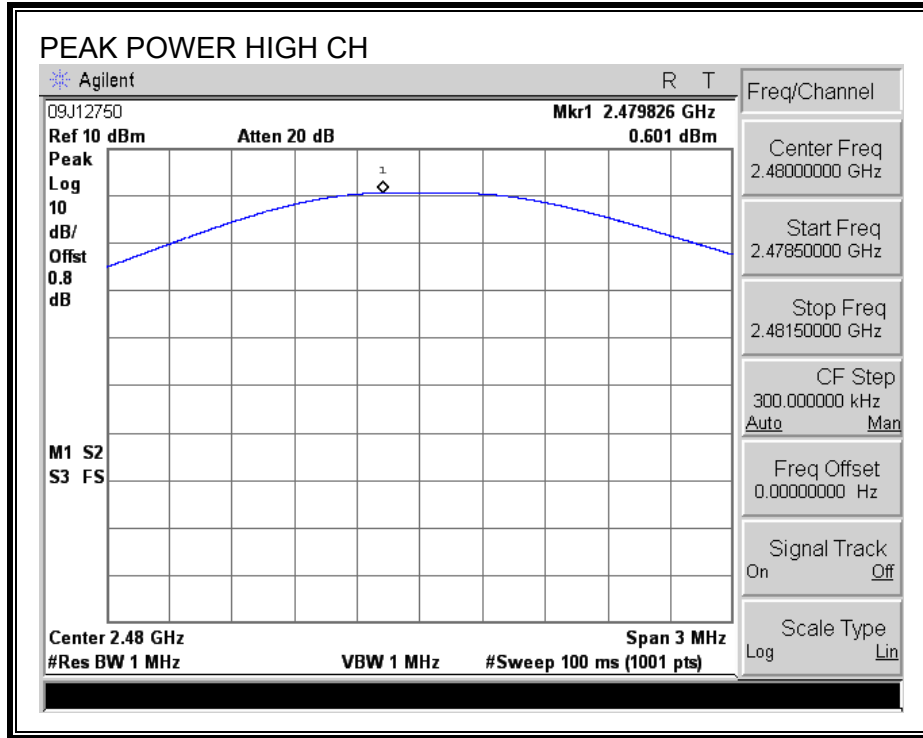
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	0.45	30	-29.56
Middle	2441	0.65	30	-29.35
High	2480	0.60	30	-29.40

OUTPUT POWER







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 0.8dB was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	-1.02
Middle	2441	-0.91
High	2480	-0.81

7.1.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

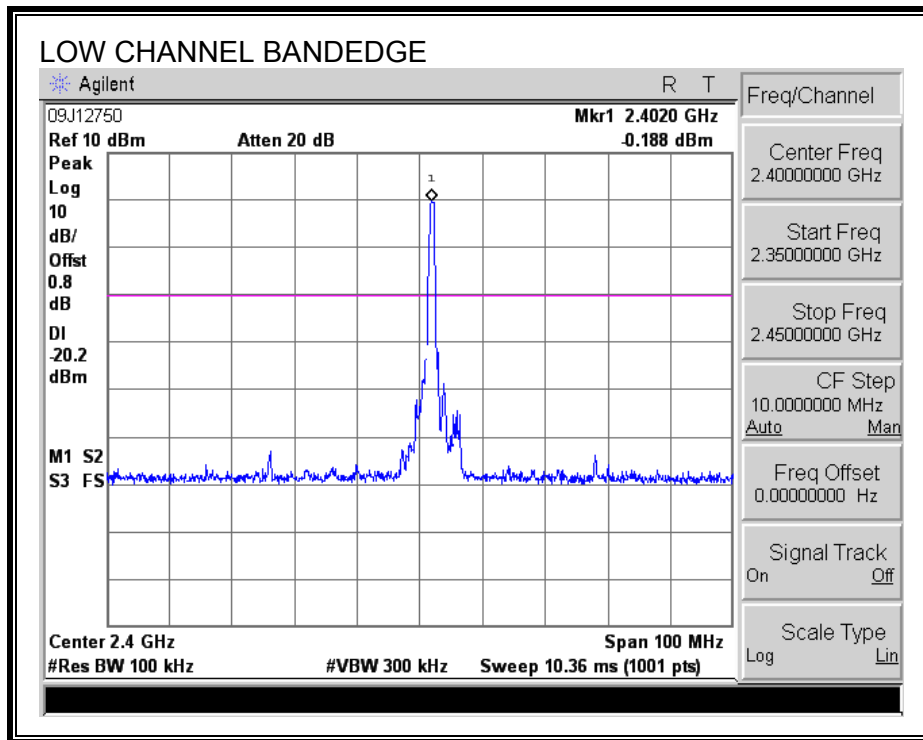
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

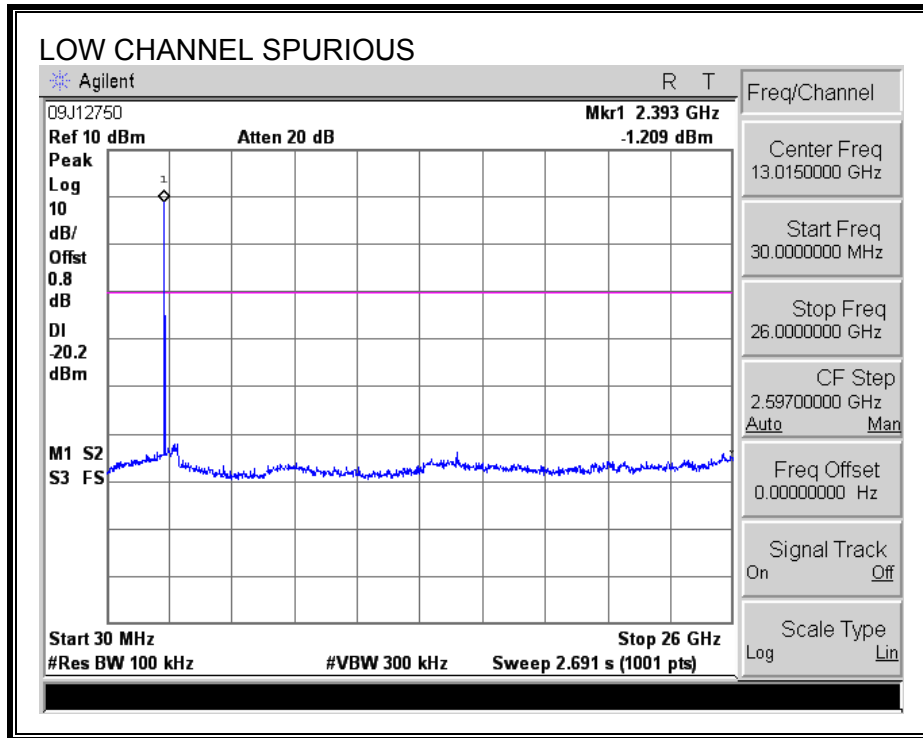
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

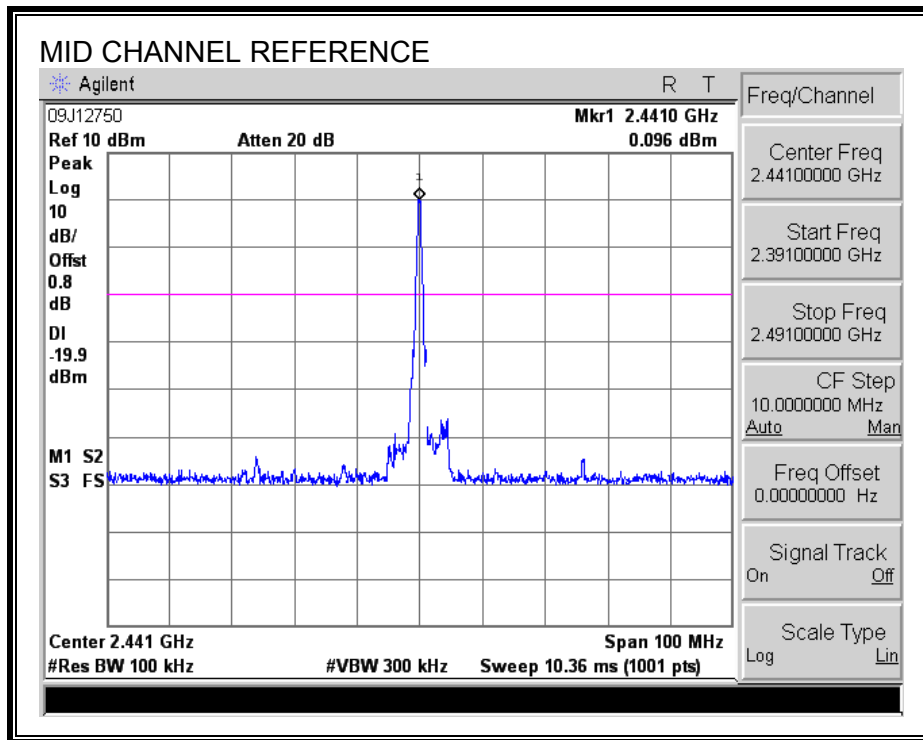
RESULTS

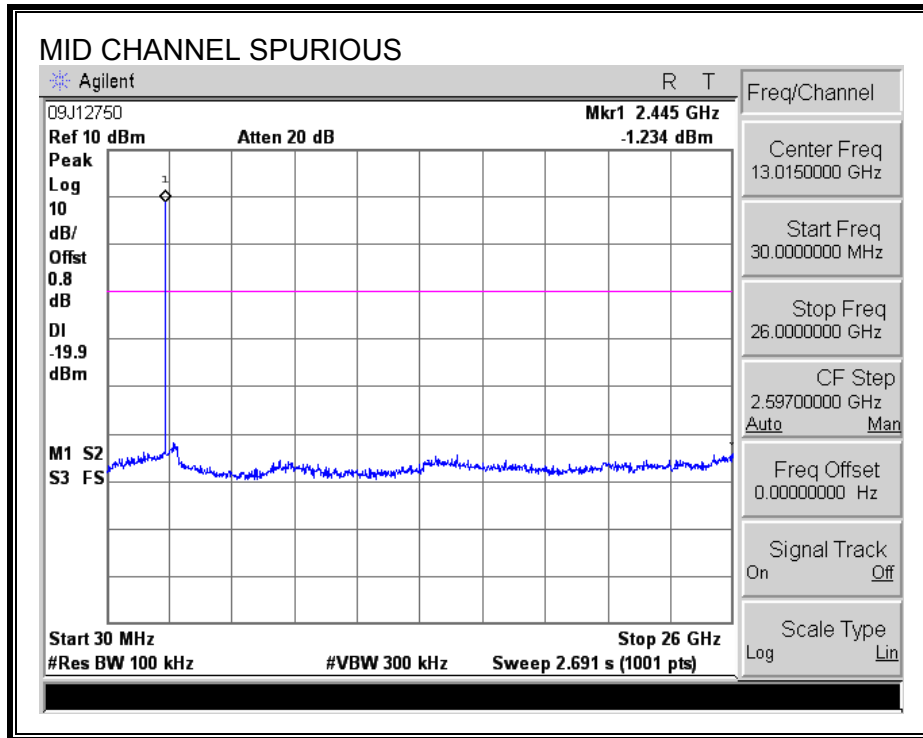
SPURIOUS EMISSIONS, LOW CHANNEL



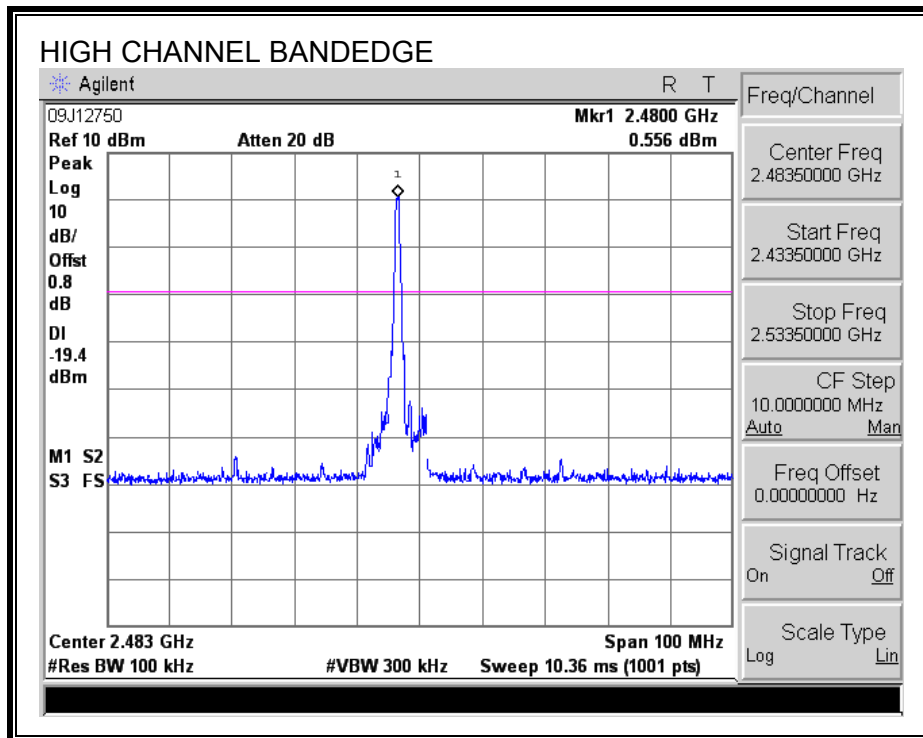


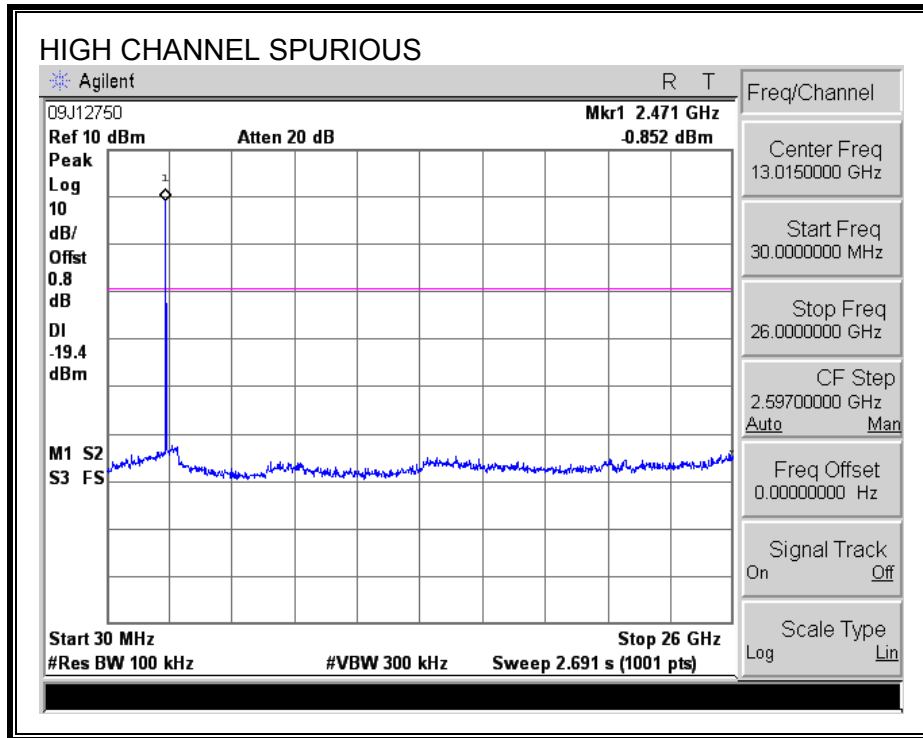
SPURIOUS EMISSIONS, MID CHANNEL



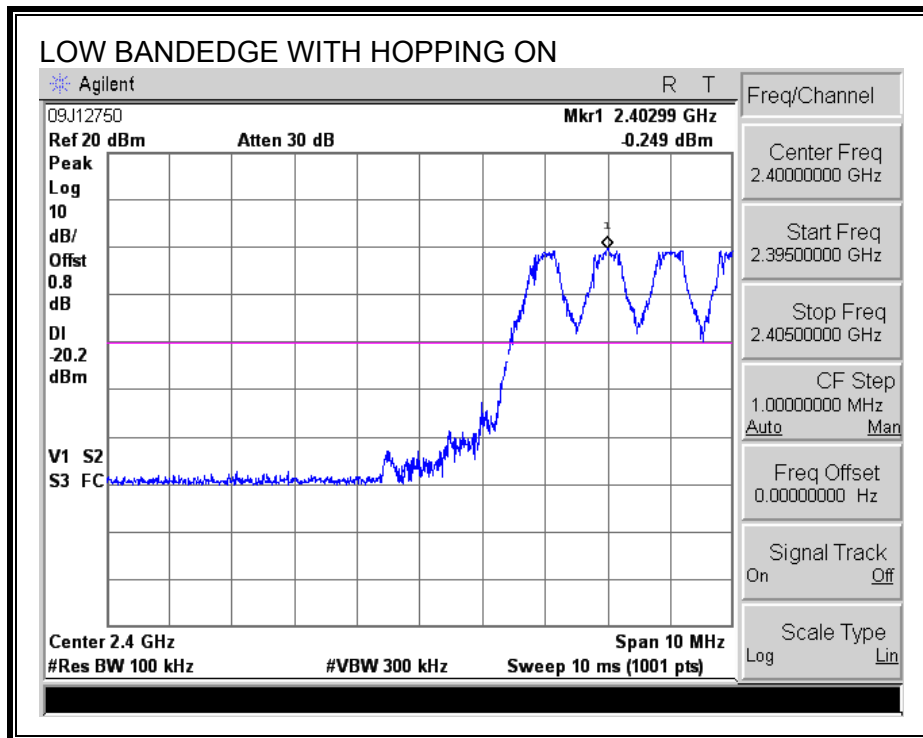


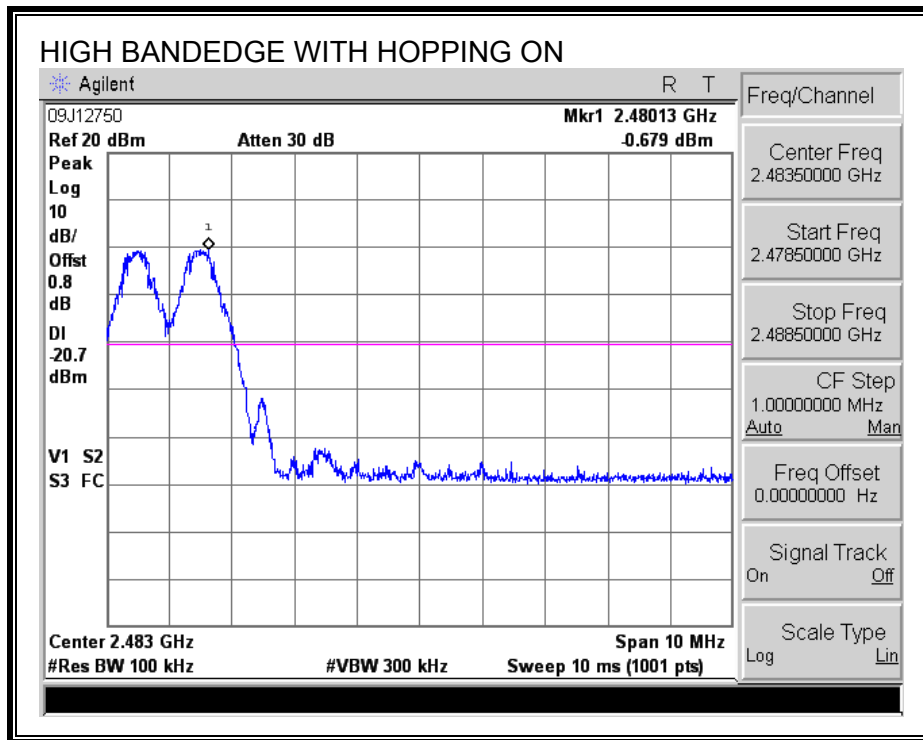
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON





7.2. ENHANCED DATA RATE 8PSK MODULATION

7.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

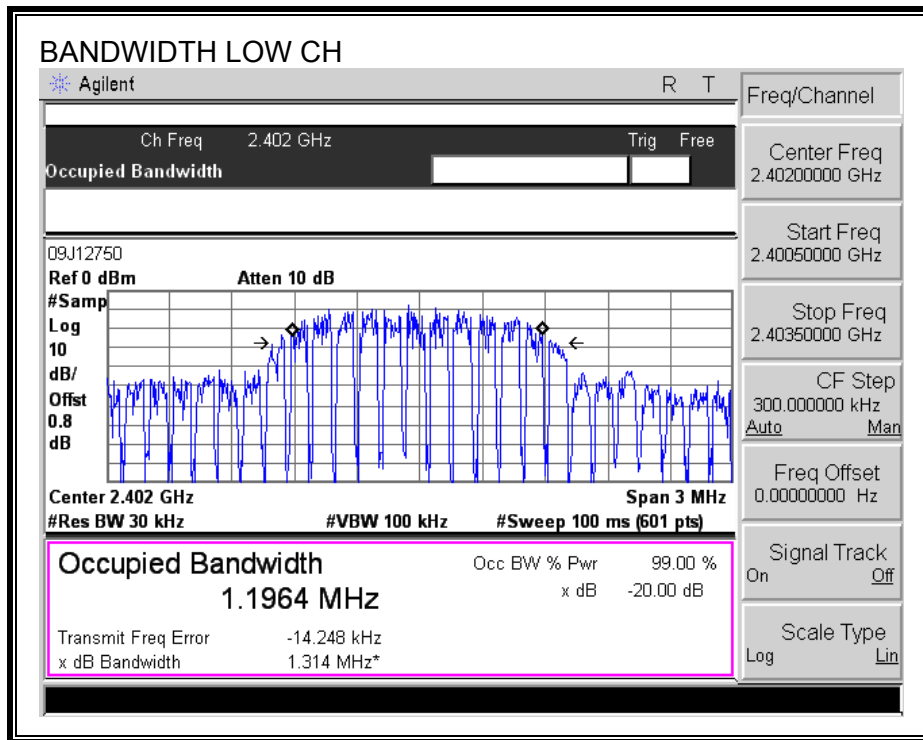
TEST PROCEDURE

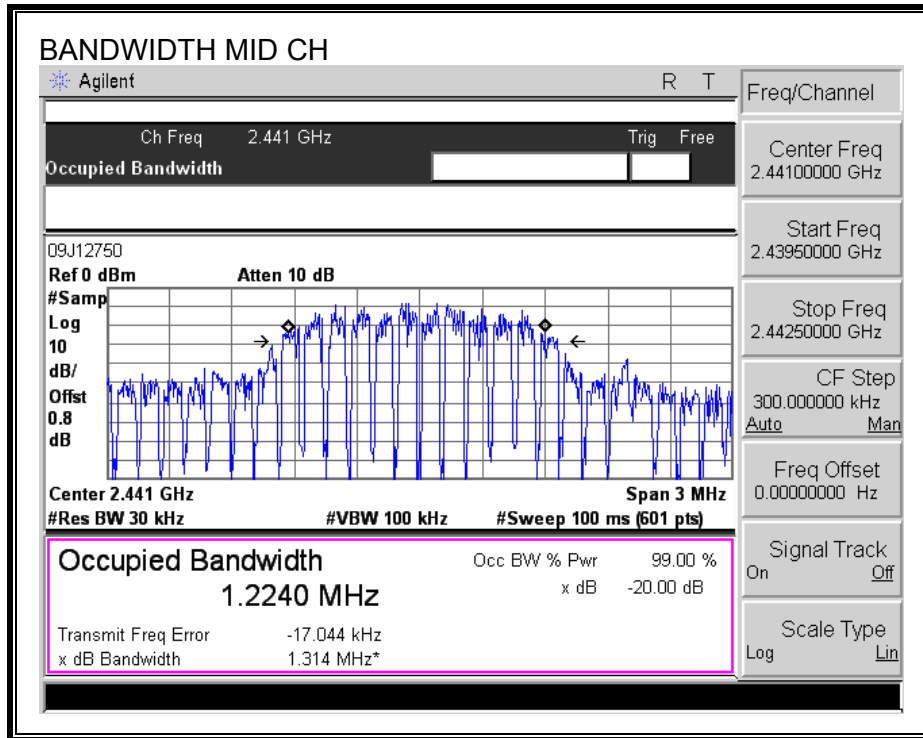
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

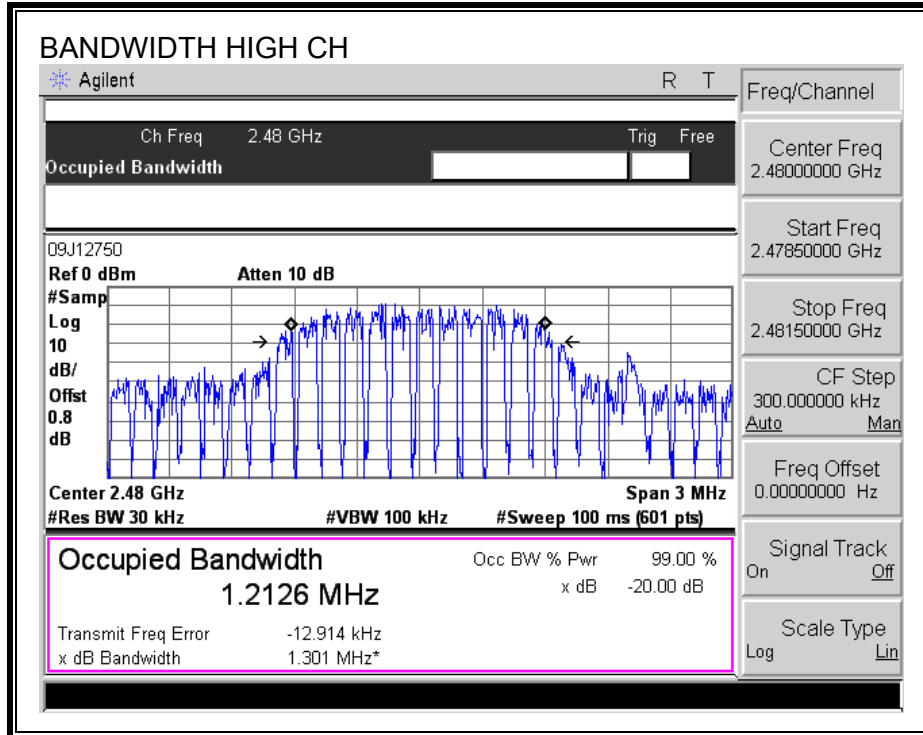
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	2402	1314	1196.4
Middle	2441	1314	1224
High	2480	1301	1212.6

20 dB AND 99% BANDWIDTH







7.2.2. 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 hopping channel, whichever is greater.

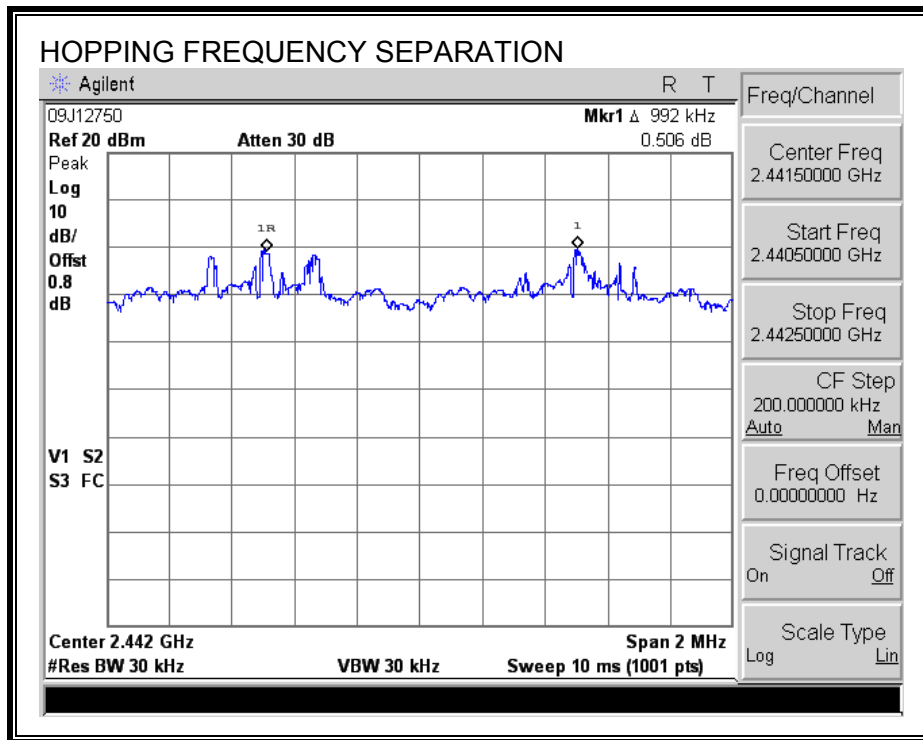
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

RESULTS

HOPPING FREQUENCY SEPARATION



7.2.3. 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.

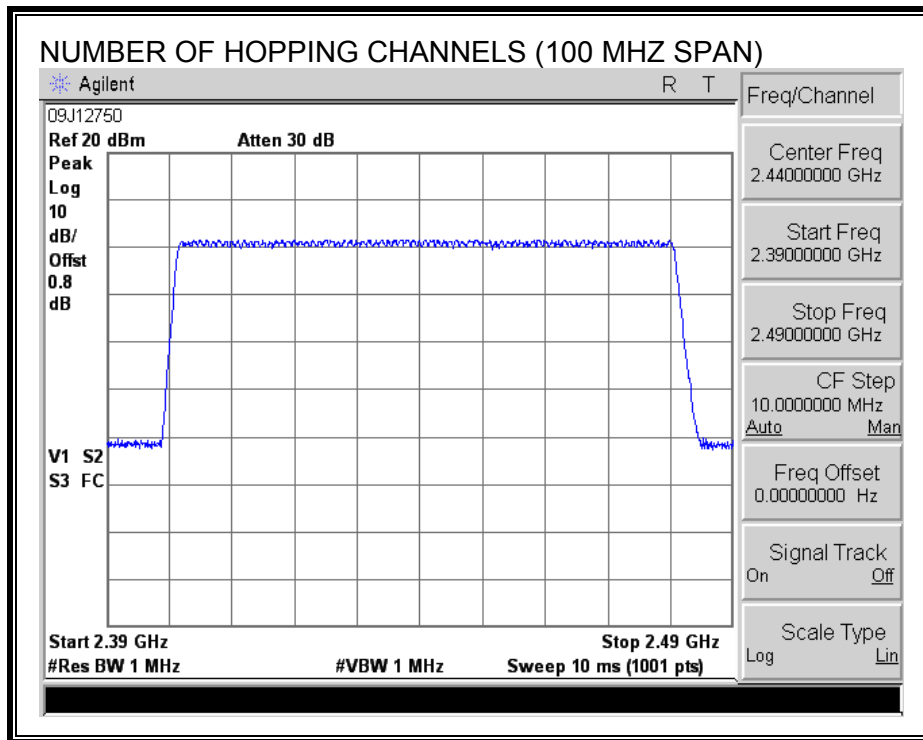
TEST PROCEDURE

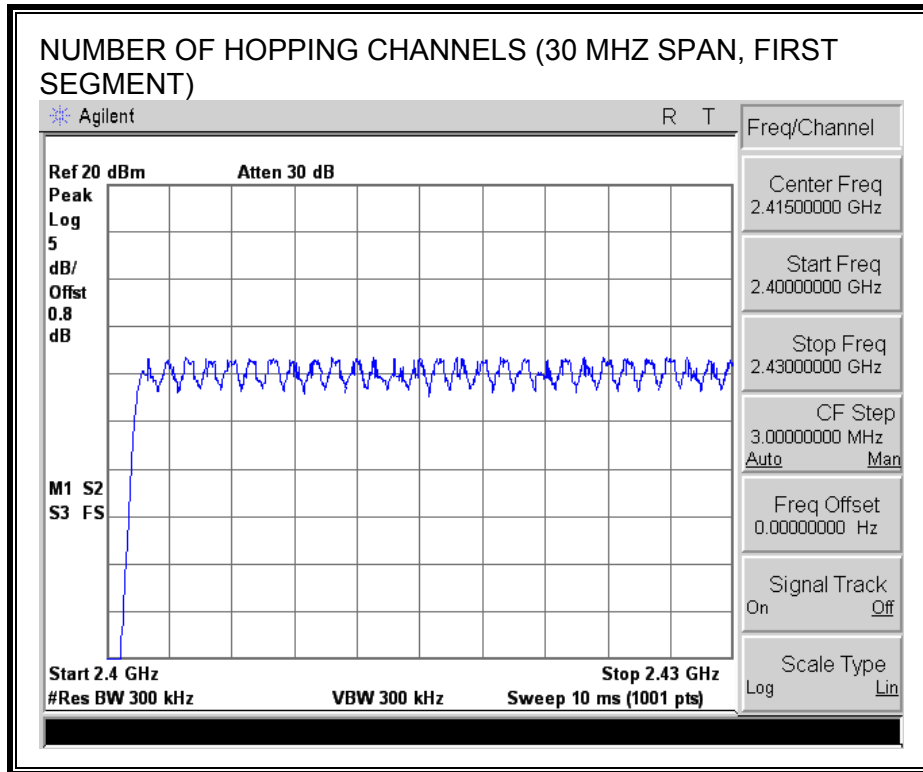
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

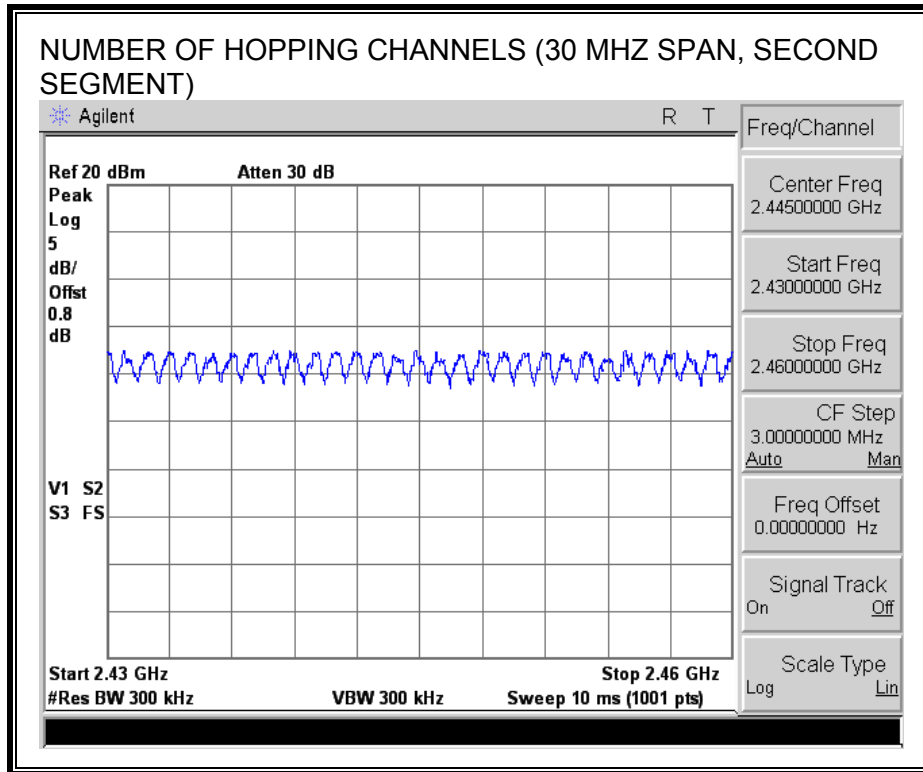
RESULTS

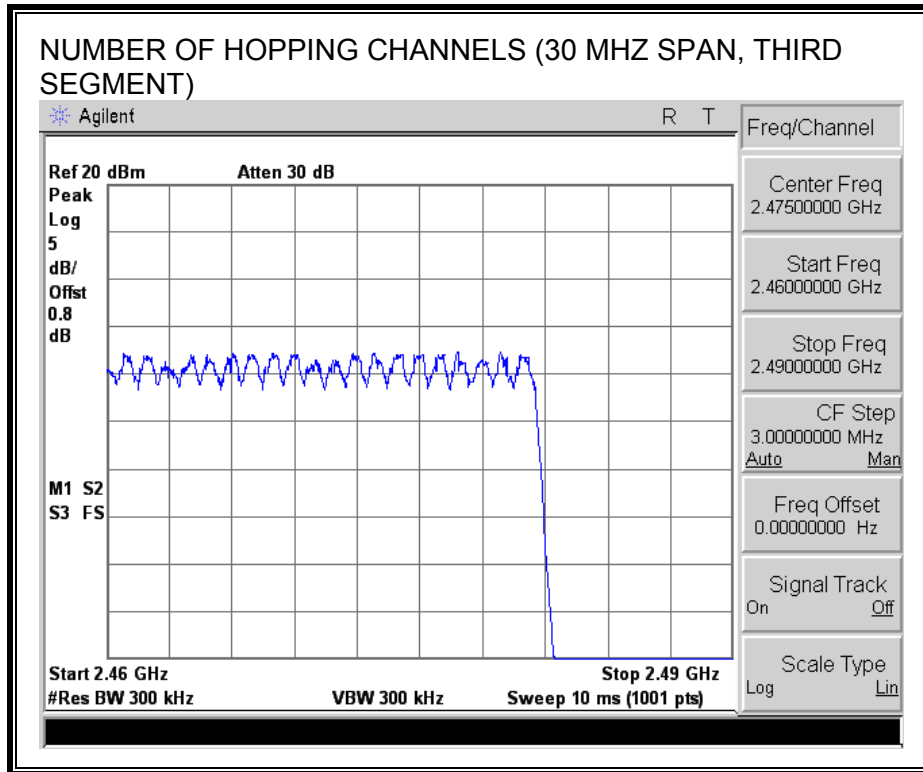
79 Channels observed.

NUMBER OF HOPPING CHANNELS









7.2.4. 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

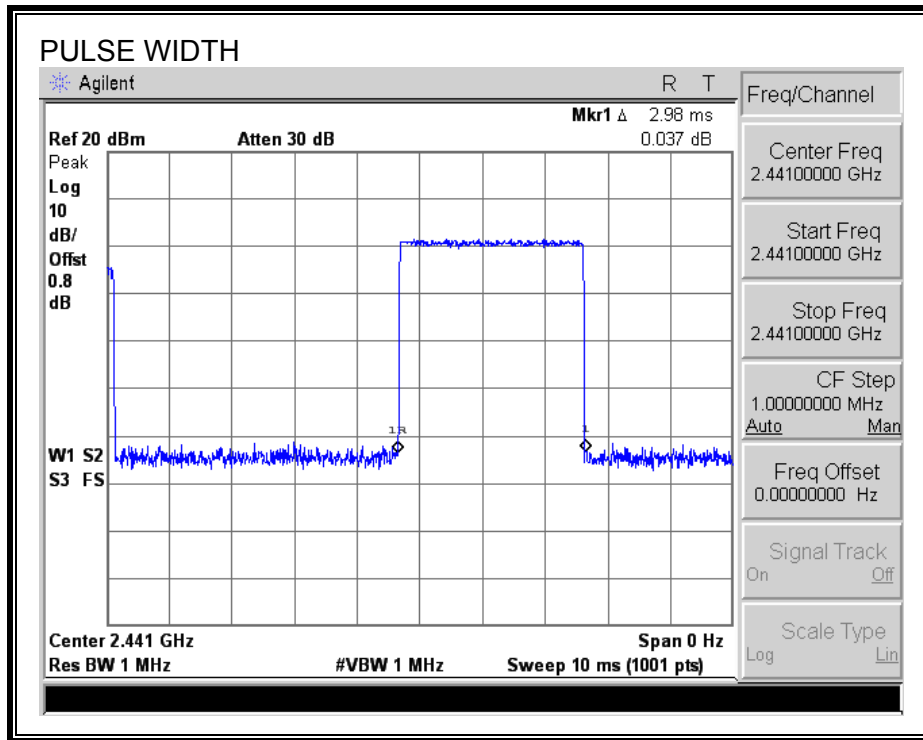
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

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

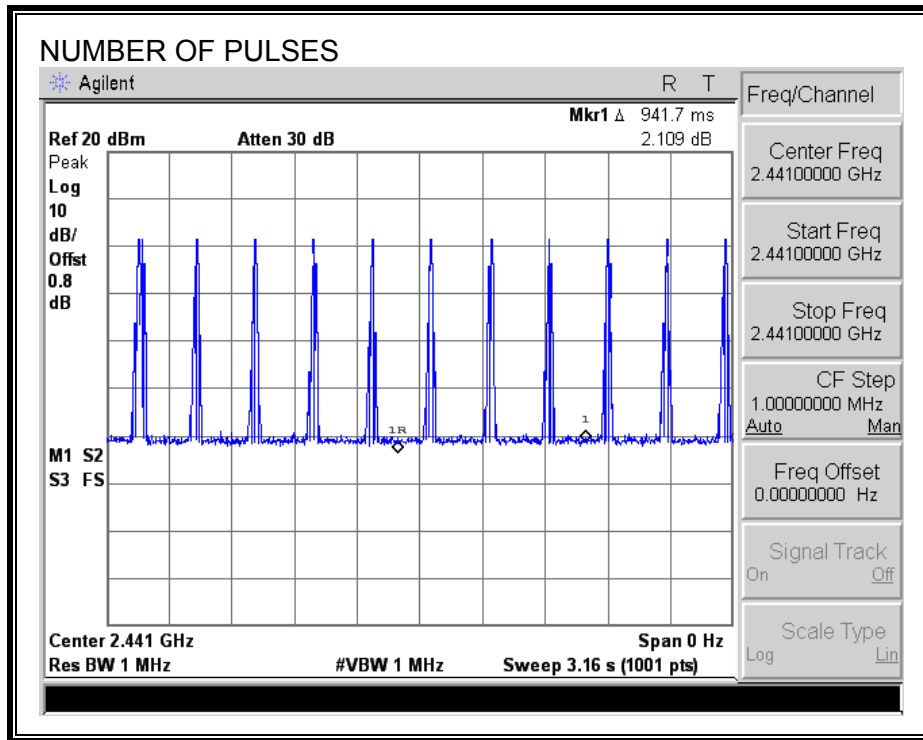
RESULTS

Time Of Occupancy = $10 * 11 \text{ pulses} * 2.98 \text{ msec} = 327.8 \text{ msec}$

PULSE WIDTH



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD



7.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The Channel Separation is greater than two-thirds of the 20 dB bandwidth and the maximum antenna gain is less than 6 dBi, therefore the limit is 21 dBm.

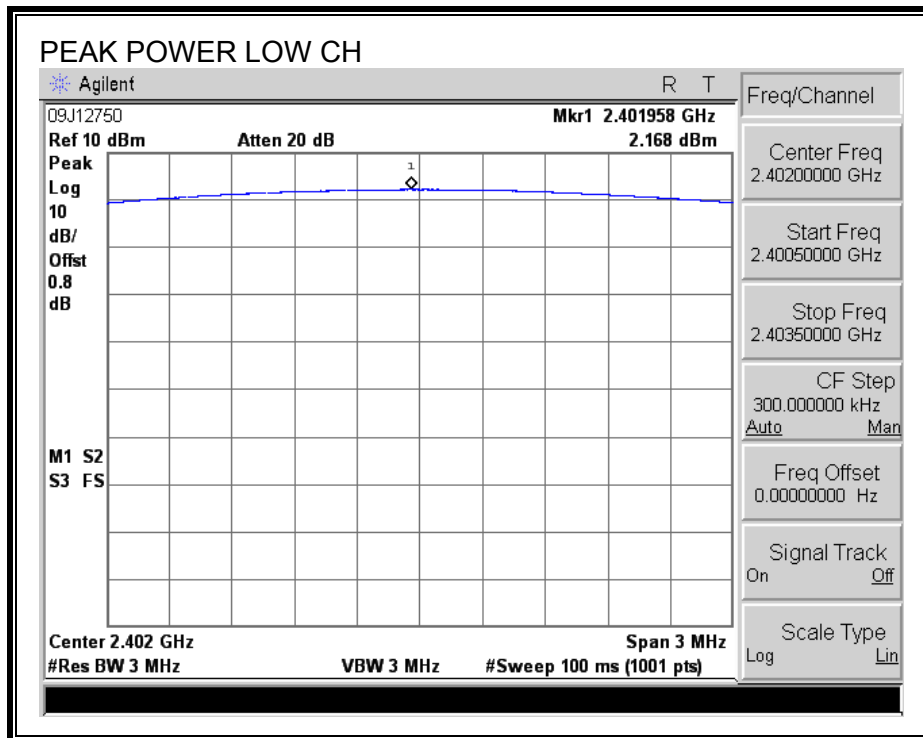
TEST PROCEDURE

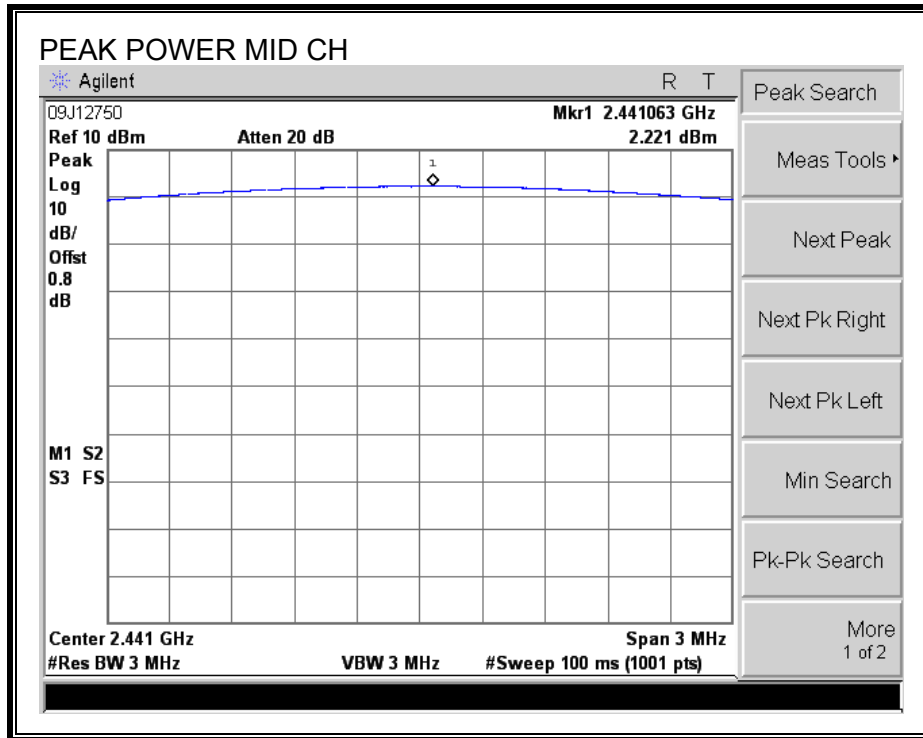
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

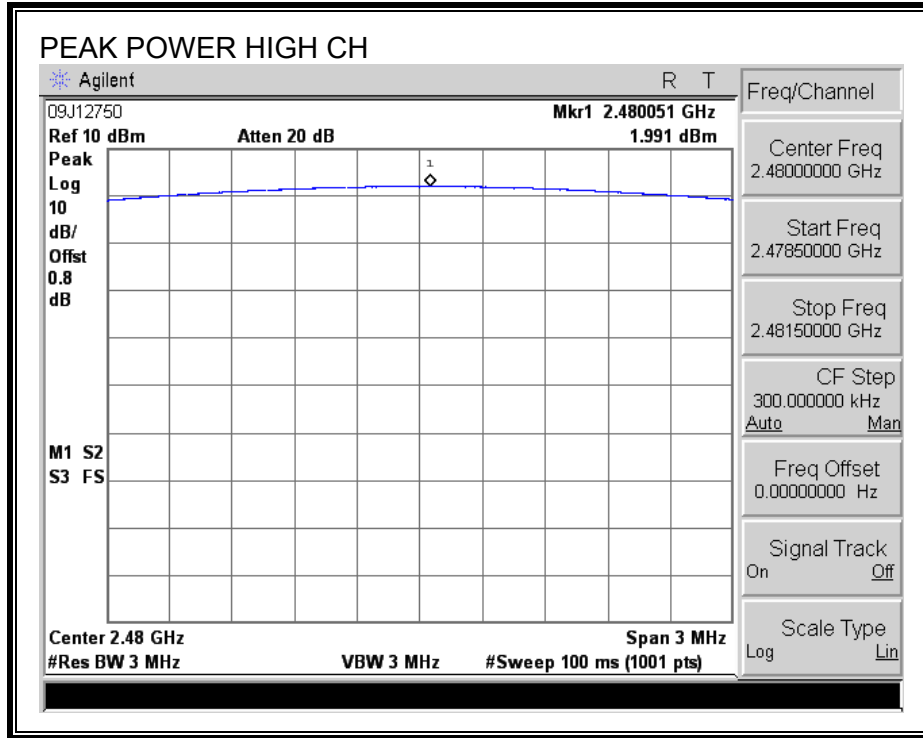
RESULTS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	2.17	21	-18.83
Middle	2441	2.22	21	-18.78
High	2480	1.99	21	-19.01

OUTPUT POWER







7.2.6. 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 0.8 was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	-1.49
Middle	2441	-1.60
High	2480	-1.72

7.2.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

TEST PROCEDURE

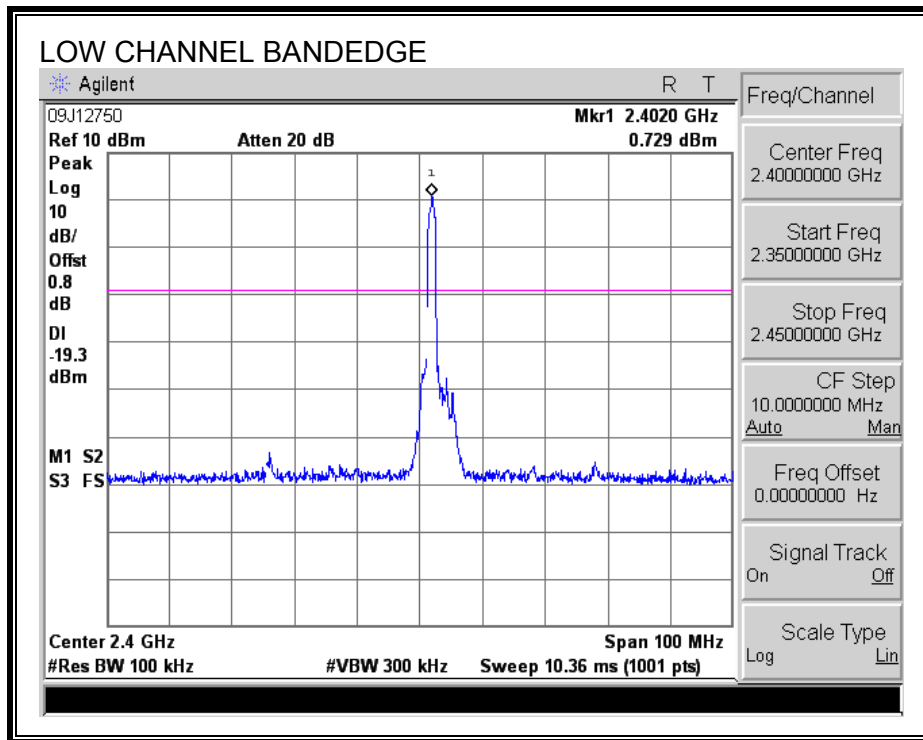
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

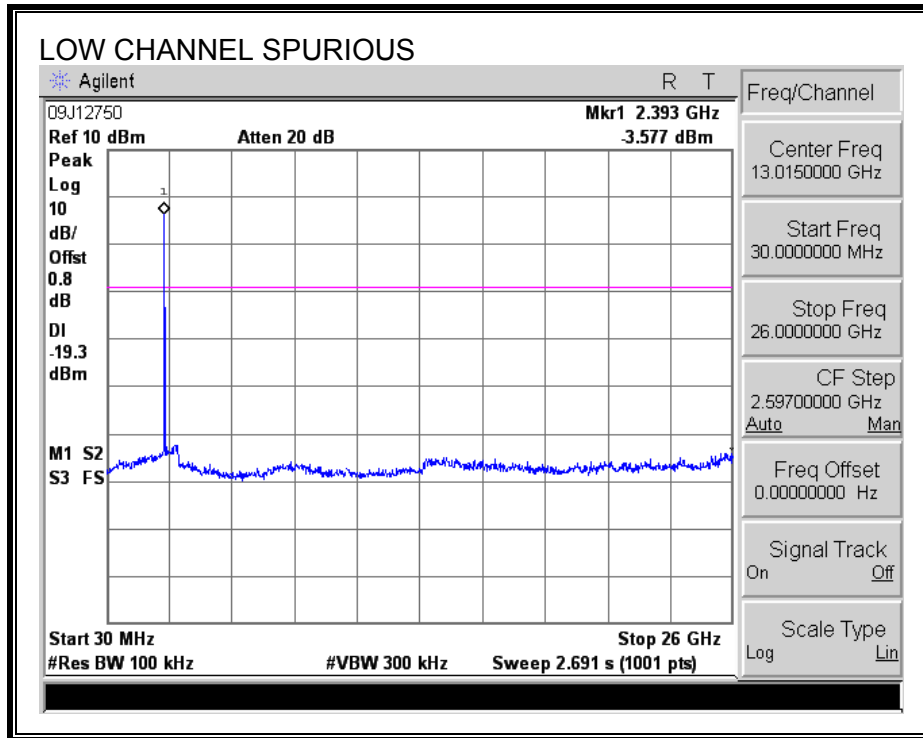
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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

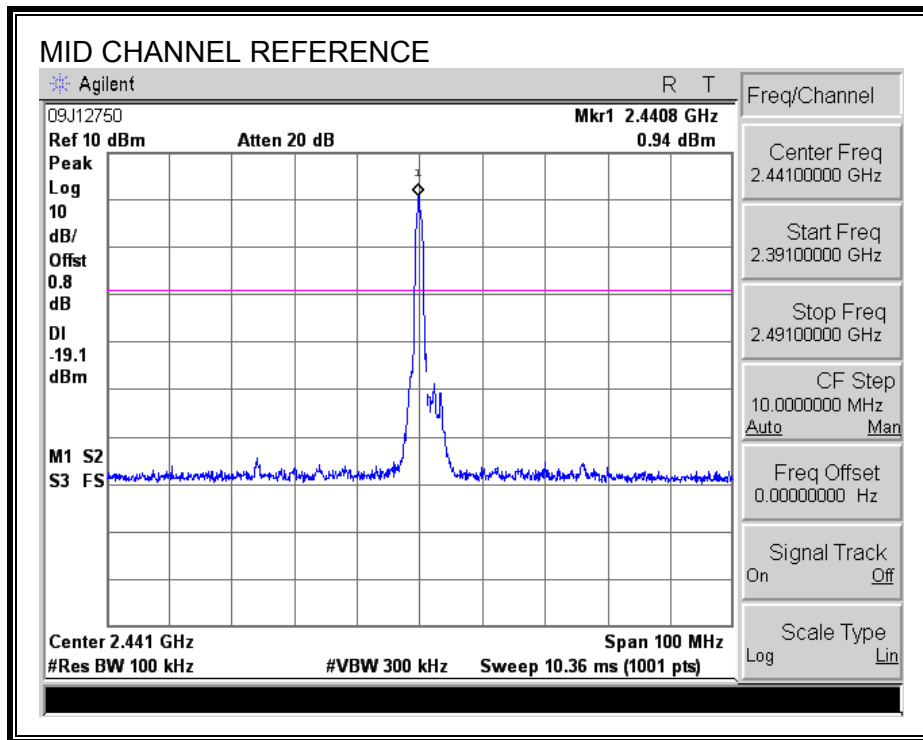
RESULTS

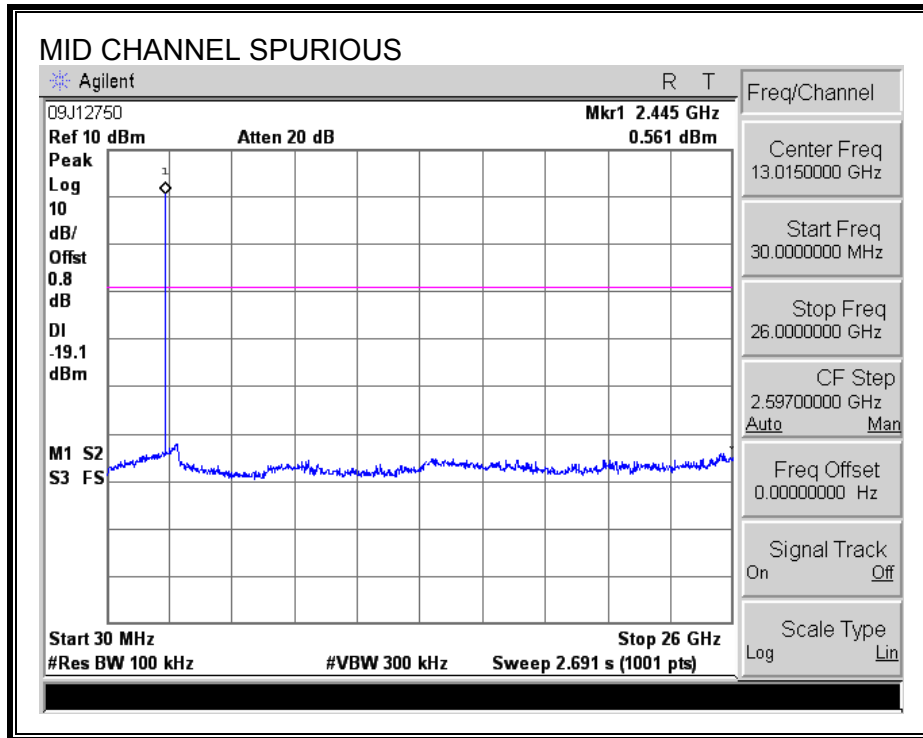
SPURIOUS EMISSIONS, LOW CHANNEL



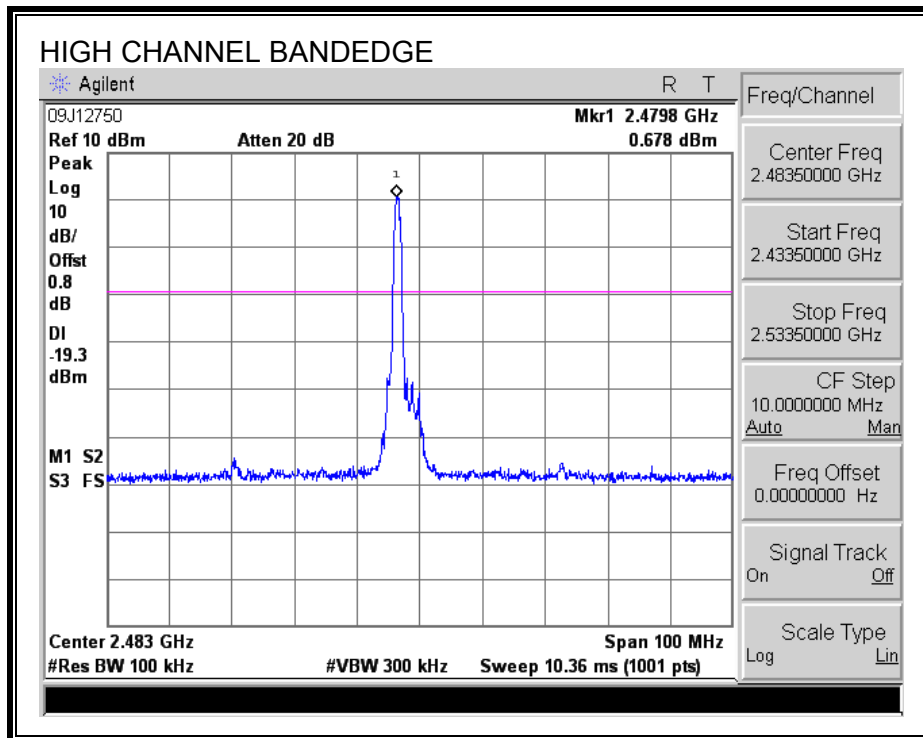


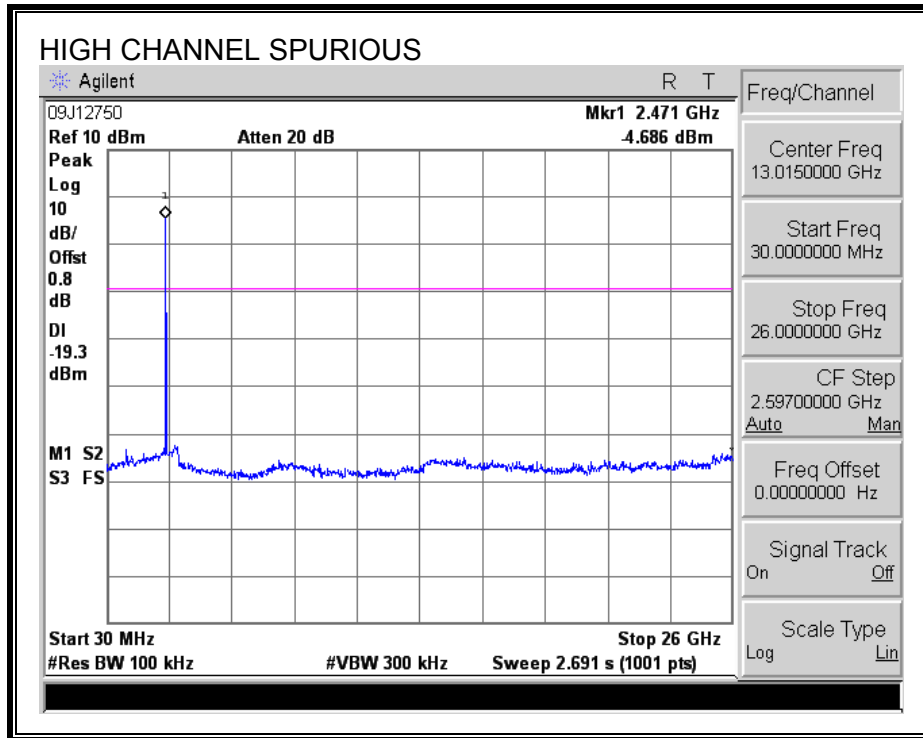
SPURIOUS EMISSIONS, MID CHANNEL



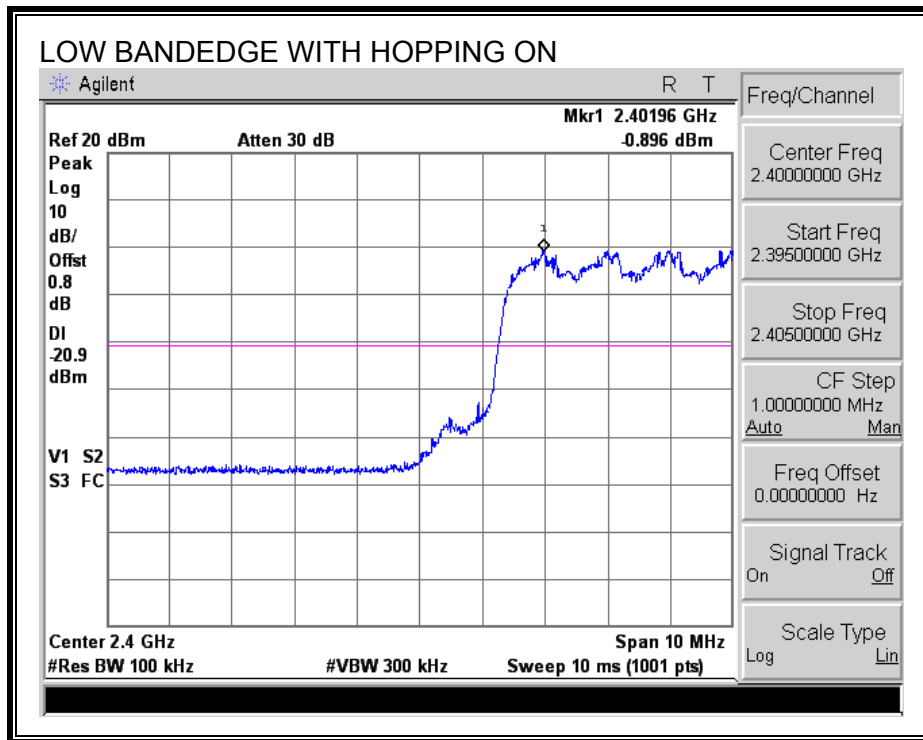


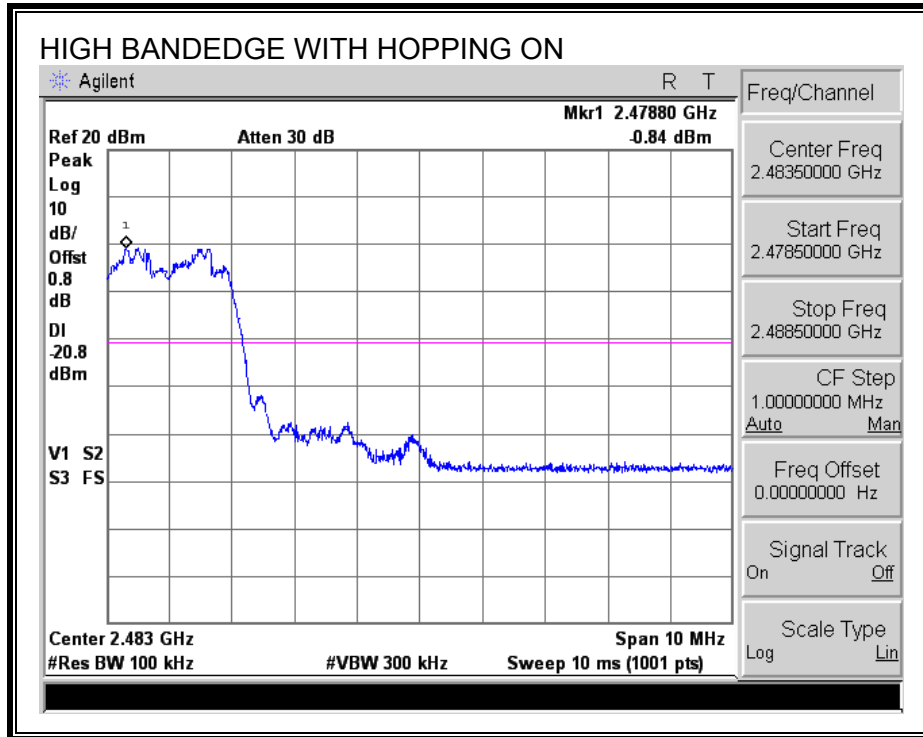
SPURIOUS EMISSIONS, HIGH CHANNEL





SPURIOUS BANDEDGE EMISSIONS 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.

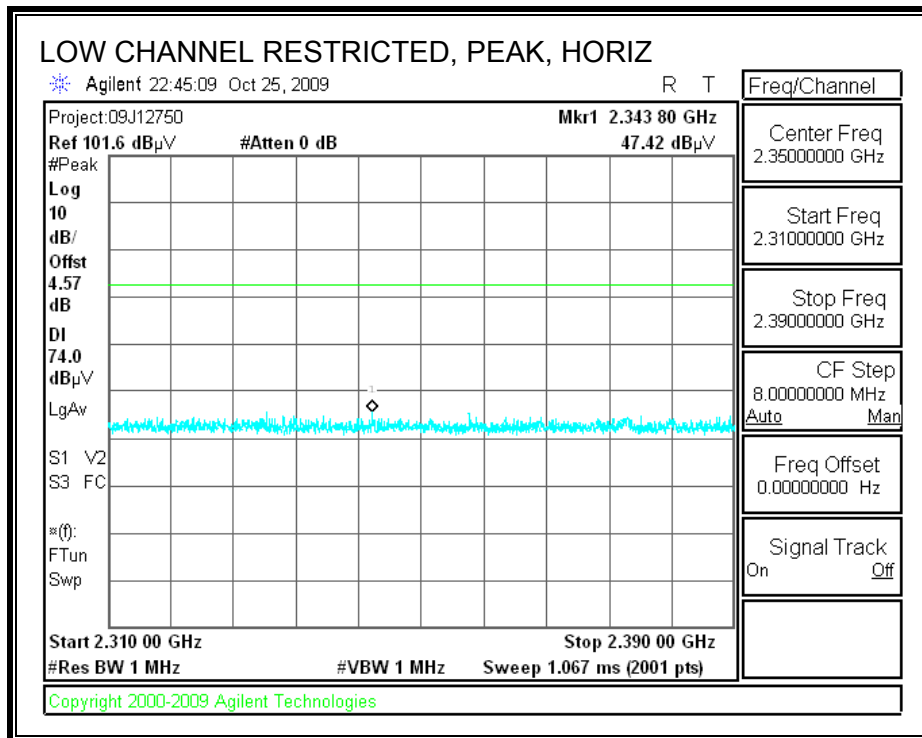
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

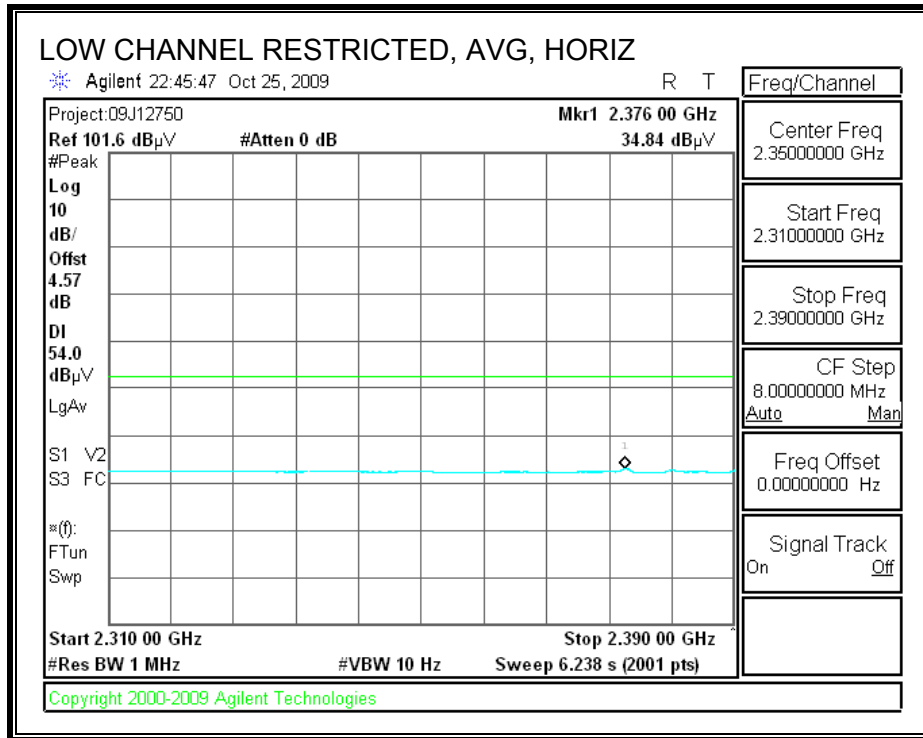
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

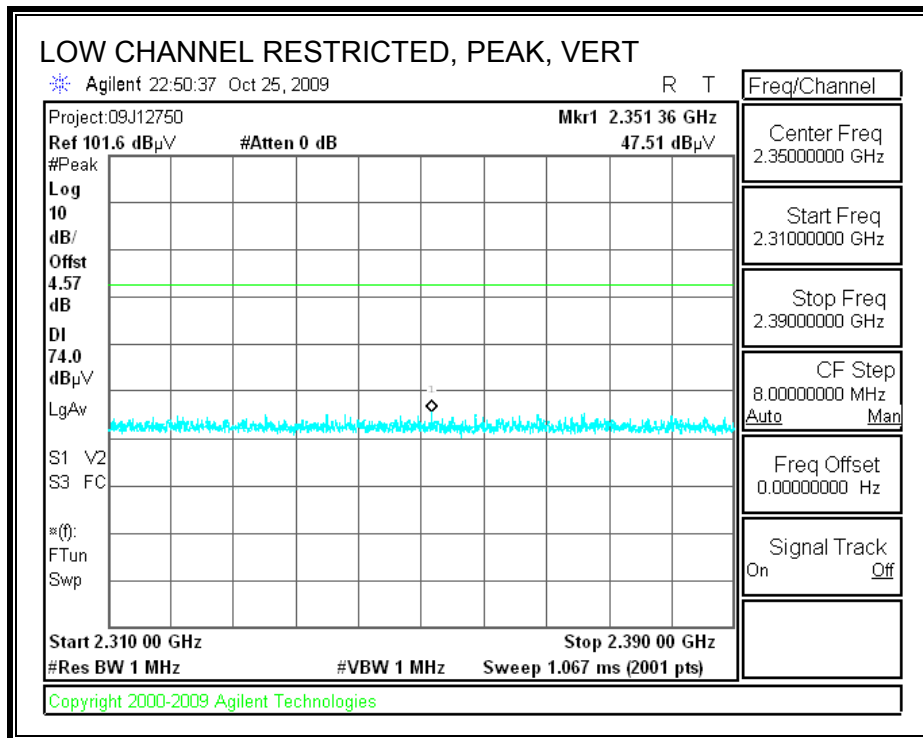
8.2.1. BASIC DATA RATE GFSK MODULATION

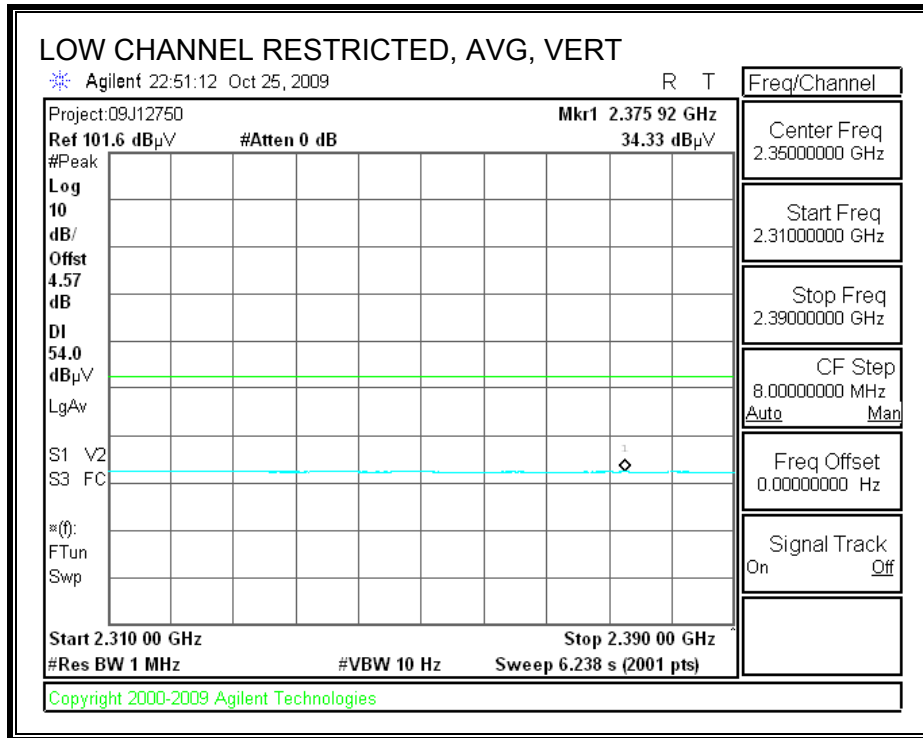
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



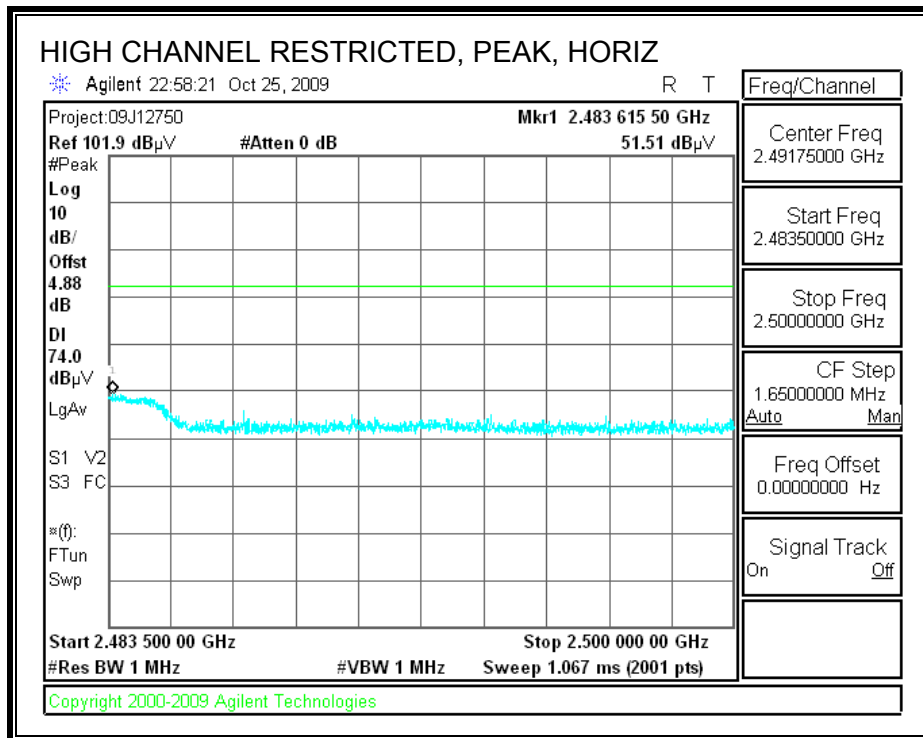


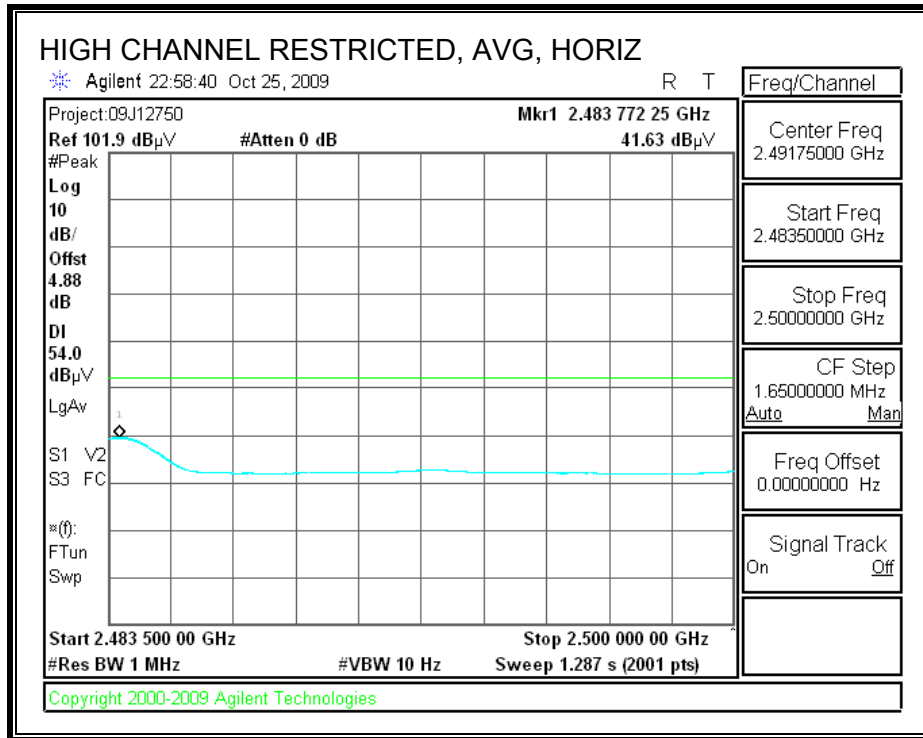
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



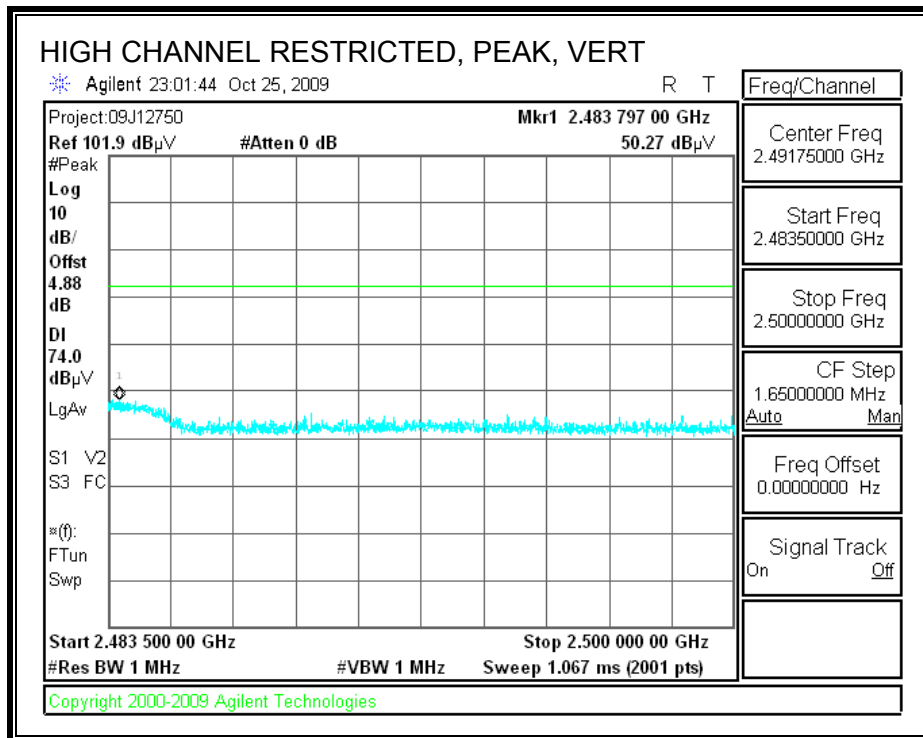


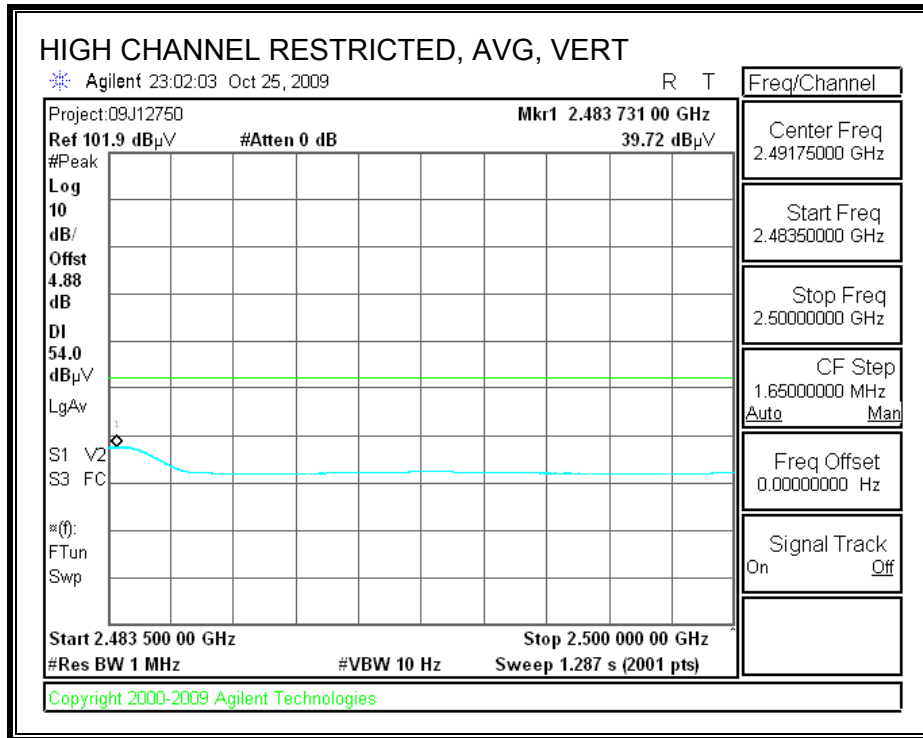
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: CASIO COMPUTER CO., LTD.
 Project #: 09J12750
 Date: 10/25/2009
 Test Engineer: MENGISTU MEKURIA
 Configuration: EUT WITH ETHERNET CRADLE
 Mode: TX GFSK MODE

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz, VBW=10Hz

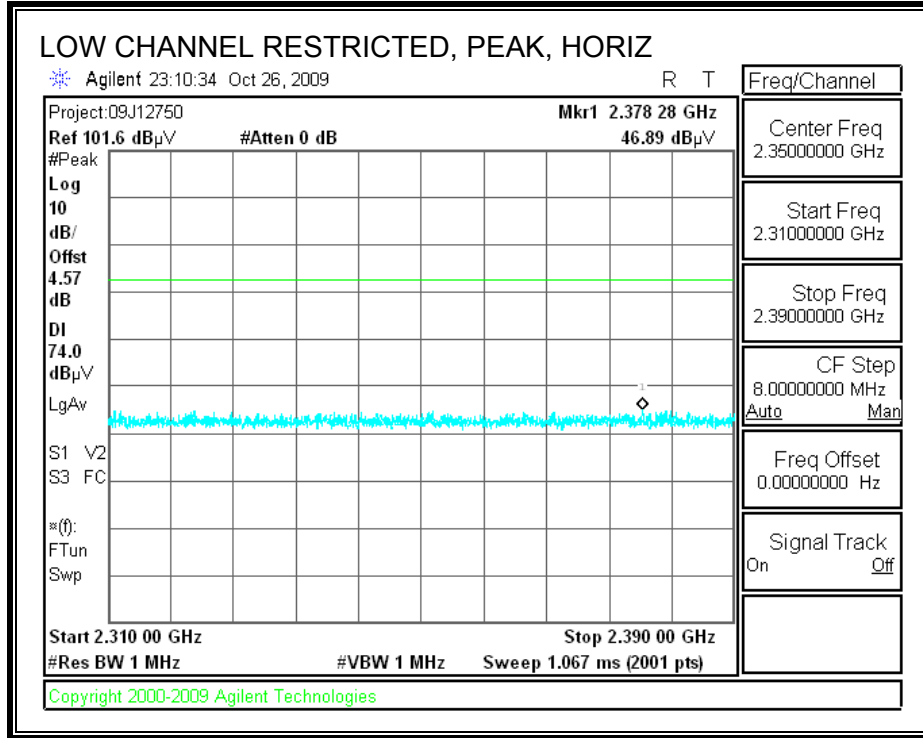
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CH (2402.0 MHz)															
1.602	3.0	49.4	43.1	25.9	3.0	-38.6	0.0	0.0	39.7	33.4	74	54	-34.3	-20.6	H
4.804	3.0	48.2	40.7	33.0	5.8	-36.5	0.0	0.0	50.6	43.0	74	54	-23.4	-11.0	H
1.602	3.0	51.0	47.0	25.9	3.0	-38.6	0.0	0.0	41.3	37.3	74	54	-32.7	-16.7	V
4.804	3.0	45.8	37.8	33.0	5.8	-36.5	0.0	0.0	48.1	40.2	74	54	-25.9	-13.8	V
MID CH (2441.0 MHz)															
1.208	3.0	51.1	45.3	24.6	2.6	-39.2	0.0	0.0	39.0	33.3	74	54	-35.0	-20.7	H
1.628	3.0	50.0	43.9	26.0	3.1	-38.6	0.0	0.0	40.5	34.3	74	54	-33.5	-19.7	H
1.716	3.0	48.5	40.7	26.3	3.2	-38.5	0.0	0.0	39.5	31.6	74	54	-34.5	-22.4	H
4.882	3.0	48.3	40.9	33.1	5.8	-36.5	0.0	0.0	50.8	43.3	74	54	-23.2	-10.7	H
7.323	3.0	41.3	29.7	35.3	7.3	-36.2	0.0	0.0	47.7	36.1	74	54	-26.3	-17.9	H
1.208	3.0	52.1	47.6	24.6	2.6	-39.2	0.0	0.0	40.0	35.5	74	54	-34.0	-18.5	V
1.628	3.0	51.9	47.9	26.0	3.1	-38.6	0.0	0.0	42.3	38.3	74	54	-31.7	-15.7	V
1.716	3.0	45.6	33.6	26.3	3.2	-38.5	0.0	0.0	36.6	24.6	74	54	-37.4	-29.4	V
4.882	3.0	46.6	39.4	33.1	5.8	-36.5	0.0	0.0	49.1	41.9	74	54	-24.9	-12.1	V
7.323	3.0	40.3	27.6	35.3	7.3	-36.2	0.0	0.0	46.7	33.9	74	54	-27.3	-20.1	V
HI CH (2480 MHz)															
1.654	3.0	49.6	43.7	26.1	3.1	-38.6	0.0	0.0	40.2	34.3	74	54	-33.8	-19.7	H
4.960	3.0	47.5	40.3	33.2	5.9	-36.5	0.0	0.0	50.2	42.9	74	54	-23.8	-11.1	H
7.440	3.0	40.6	29.0	35.5	7.3	-36.2	0.0	0.0	47.2	35.6	74	54	-26.8	-18.4	H
1.654	3.0	51.1	46.9	26.1	3.1	-38.6	0.0	0.0	41.7	37.5	74	54	-32.3	-16.5	V
4.960	3.0	47.1	39.5	33.2	5.9	-36.5	0.0	0.0	49.7	42.1	74	54	-24.3	-11.9	V
7.440	3.0	40.3	28.3	35.5	7.3	-36.2	0.0	0.0	46.9	34.9	74	54	-27.1	-19.1	V

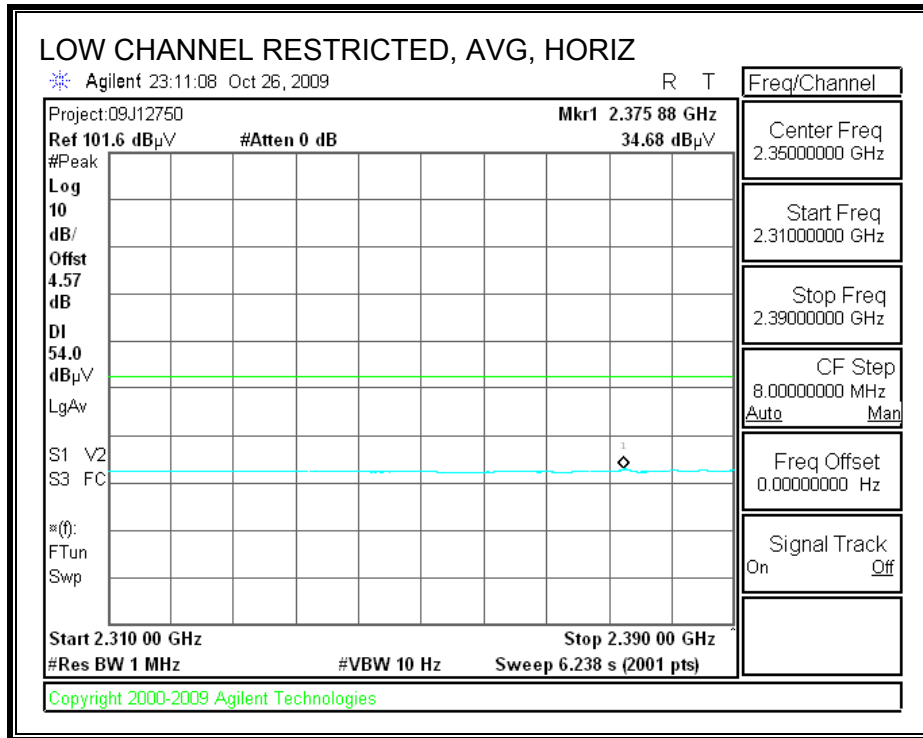
Rev. 11.10.08

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		

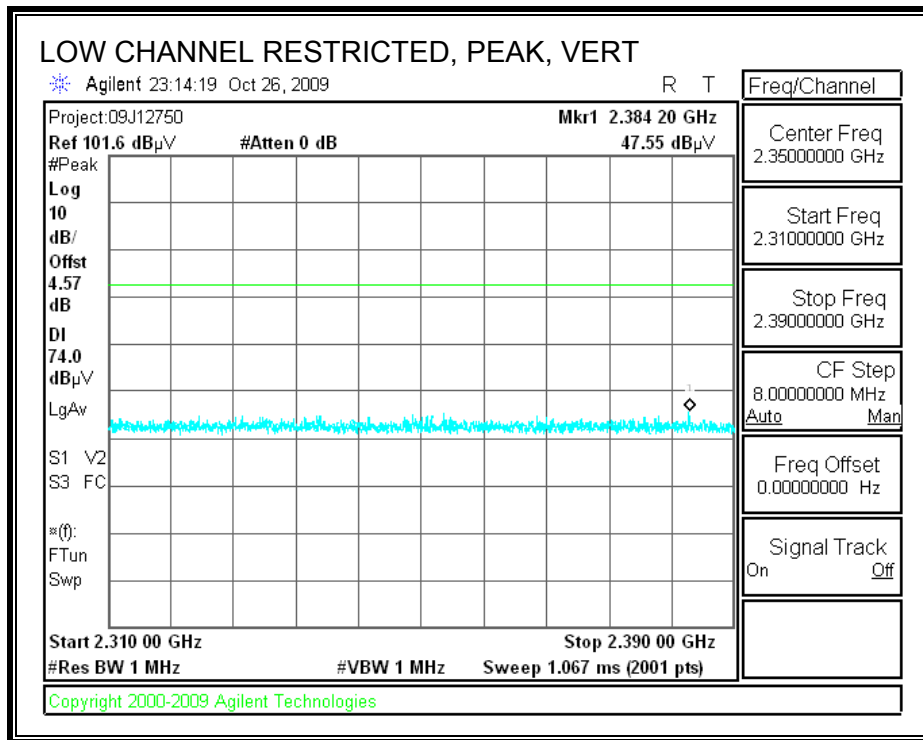
8.2.2. ENHANCED DATA RATE 8PSK MODULATION

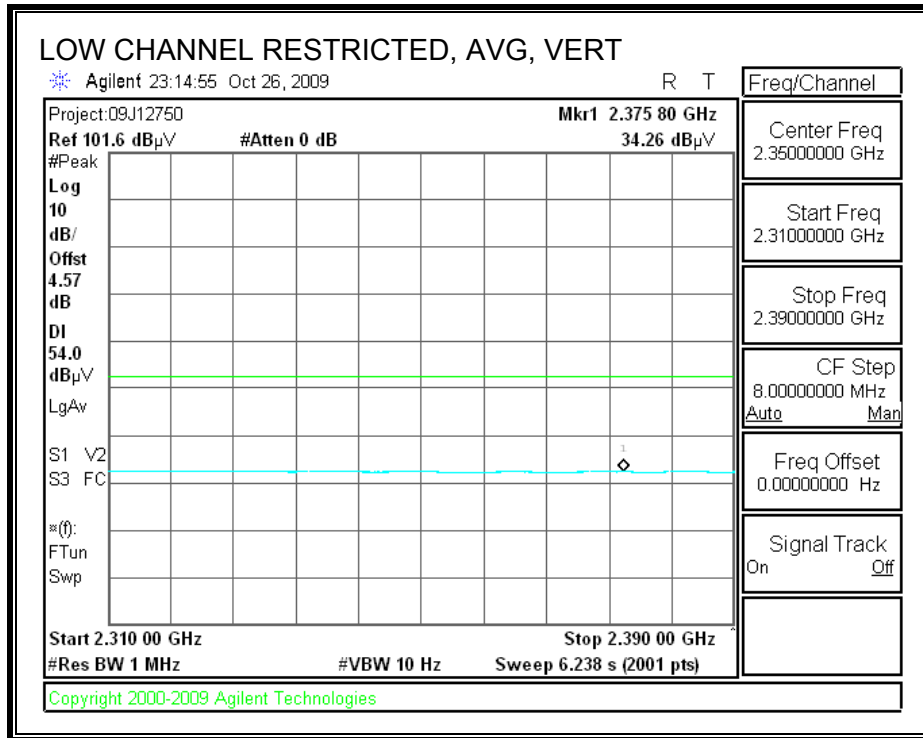
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



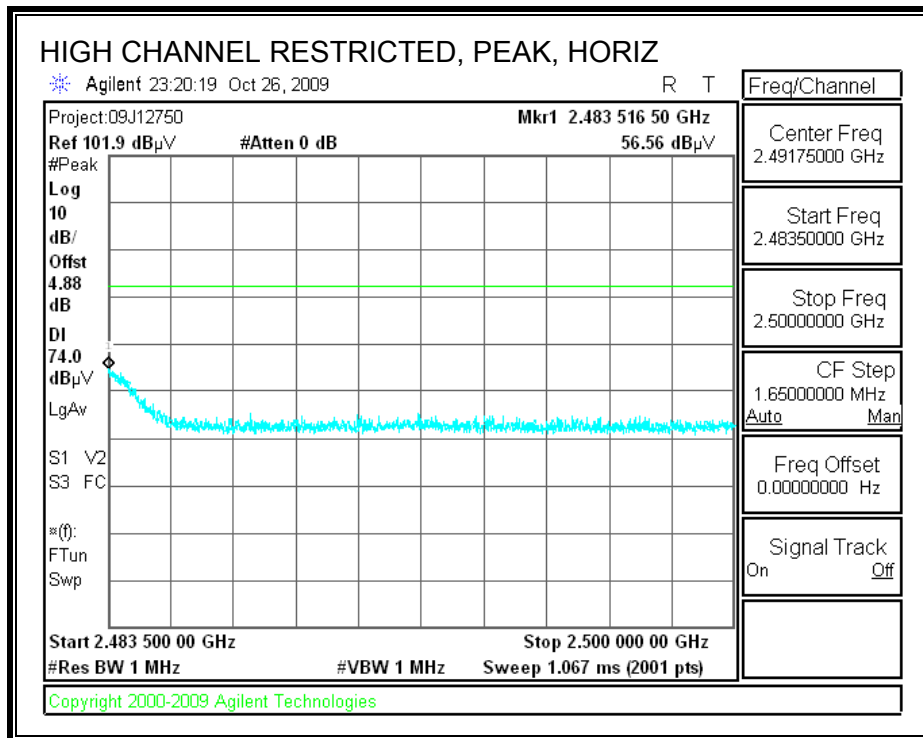


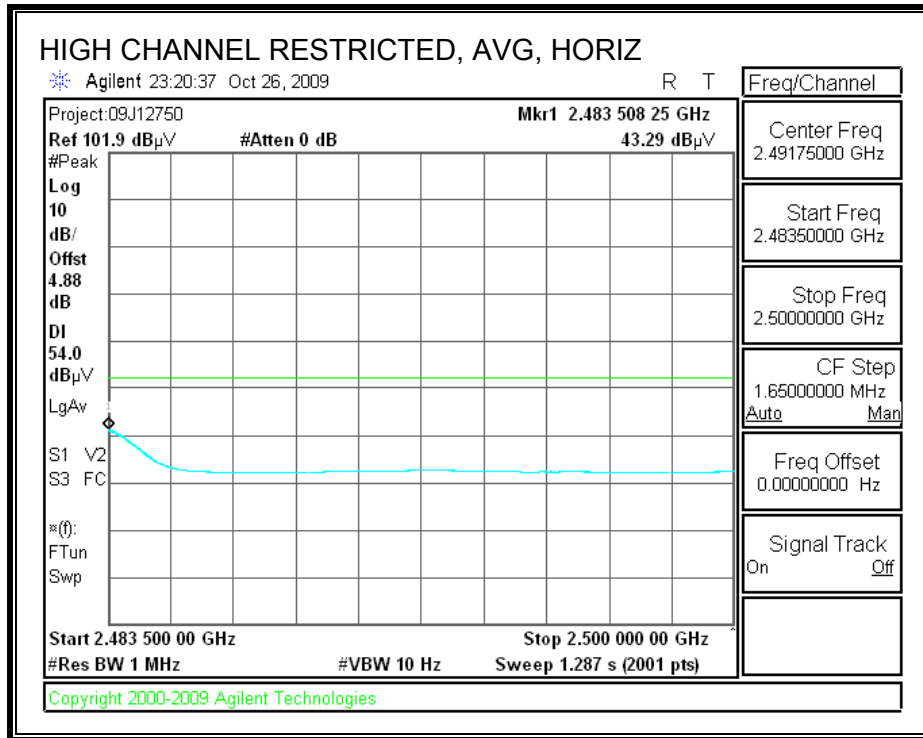
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



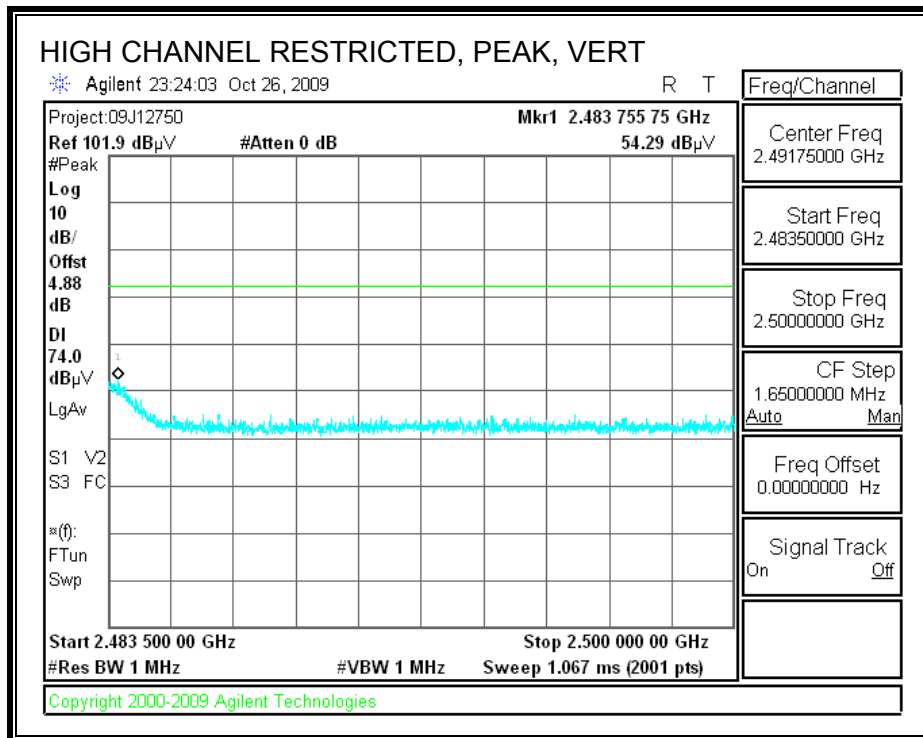


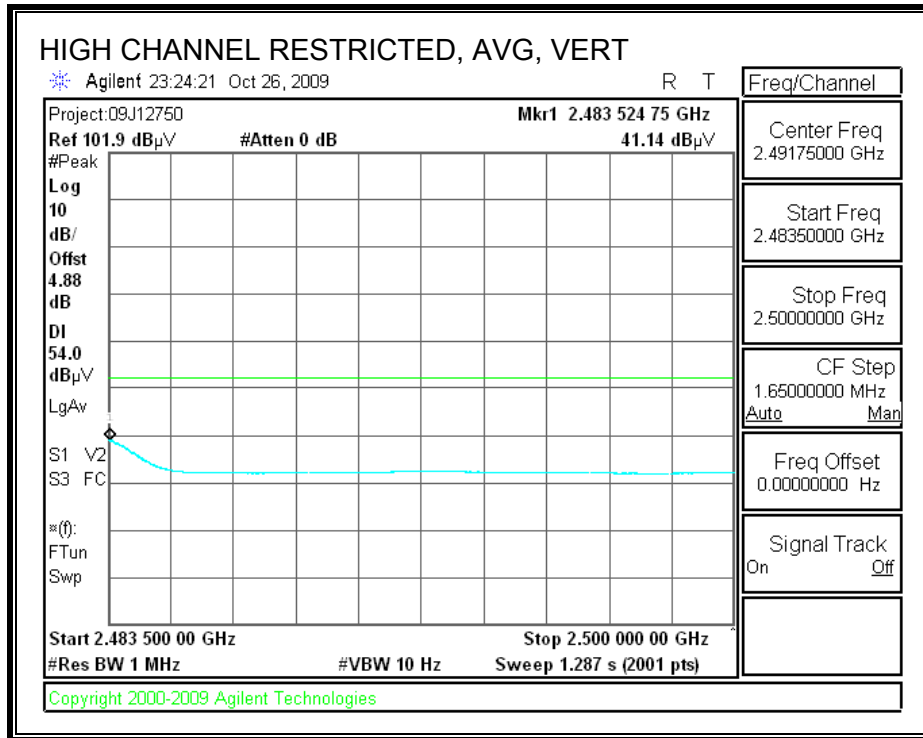
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: CASIO COMPUTER CO., LTD.
 Project #: 09J12750
 Date: 10/25/2009
 Test Engineer: MENGISTU MEKURIA
 Configuration: EUT WITH ETHERNET CRADLE
 Mode: TX 8PSK MODE

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001	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	Fldr 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 (2402.0 MHz)															
1.602	3.0	49.4	43.1	25.9	3.0	-38.6	0.0	0.0	39.7	33.4	74	54	-34.3	-20.6	H
4.804	3.0	43.5	29.2	33.0	5.8	-36.5	0.0	0.0	45.9	31.5	74	54	-28.1	-22.5	H
1.602	3.0	51.0	47.0	25.9	3.0	-38.6	0.0	0.0	41.3	37.3	74	54	-32.7	16.7	V
4.804	3.0	41.9	28.1	33.0	5.8	-36.5	0.0	0.0	44.3	30.4	74	54	-29.7	-23.6	V
MID CH (2441.0 MHz)															
1.208	3.0	51.1	45.3	24.6	2.6	-39.2	0.0	0.0	39.0	33.3	74	54	-35.0	-20.7	H
1.628	3.0	50.0	43.9	26.0	3.1	-38.6	0.0	0.0	40.5	34.3	74	54	-33.5	-19.7	H
1.716	3.0	48.5	40.7	26.3	3.2	-38.5	0.0	0.0	39.5	31.6	74	54	-34.5	-22.4	H
4.882	3.0	42.8	29.5	33.1	5.8	-36.5	0.0	0.0	45.3	32.0	74	54	-28.7	-22.0	H
1.208	3.0	52.1	47.6	24.6	2.6	-39.2	0.0	0.0	40.0	35.5	74	54	-34.0	-18.5	V
1.628	3.0	51.9	47.9	26.0	3.1	-38.6	0.0	0.0	42.3	38.3	74	54	-31.7	-15.7	V
1.716	3.0	41.0	33.6	26.3	3.2	-38.5	0.0	0.0	32.0	24.6	74	54	-42.0	-29.4	V
4.882	3.0	41.0	28.2	33.1	5.8	-36.5	0.0	0.0	43.5	30.6	74	54	-30.5	-23.4	V
HI CH (2480 MHz)															
1.654	3.0	49.6	43.7	26.1	3.1	-38.6	0.0	0.0	40.2	34.3	74	54	-33.8	-19.7	H
4.960	3.0	43.3	29.1	33.2	5.9	-36.5	0.0	0.0	45.9	31.7	74	54	-28.1	-22.3	H
1.654	3.0	51.1	46.9	26.1	3.1	-38.6	0.0	0.0	41.7	37.5	74	54	-32.3	-16.5	V
4.960	3.0	41.2	27.9	33.2	5.9	-36.5	0.0	0.0	43.9	30.6	74	54	-30.1	-23.4	V

Rev. 11.10.08

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: CASIO COMPUTER CO., LTD.
 Project #: 09J12750
 Date: 10/25/2009
 Test Engineer: MENGISTU MEKURIA
 Configuration: EUT WITH ETHERNET CRADLE
 Mode: RX WORST-CASE

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz

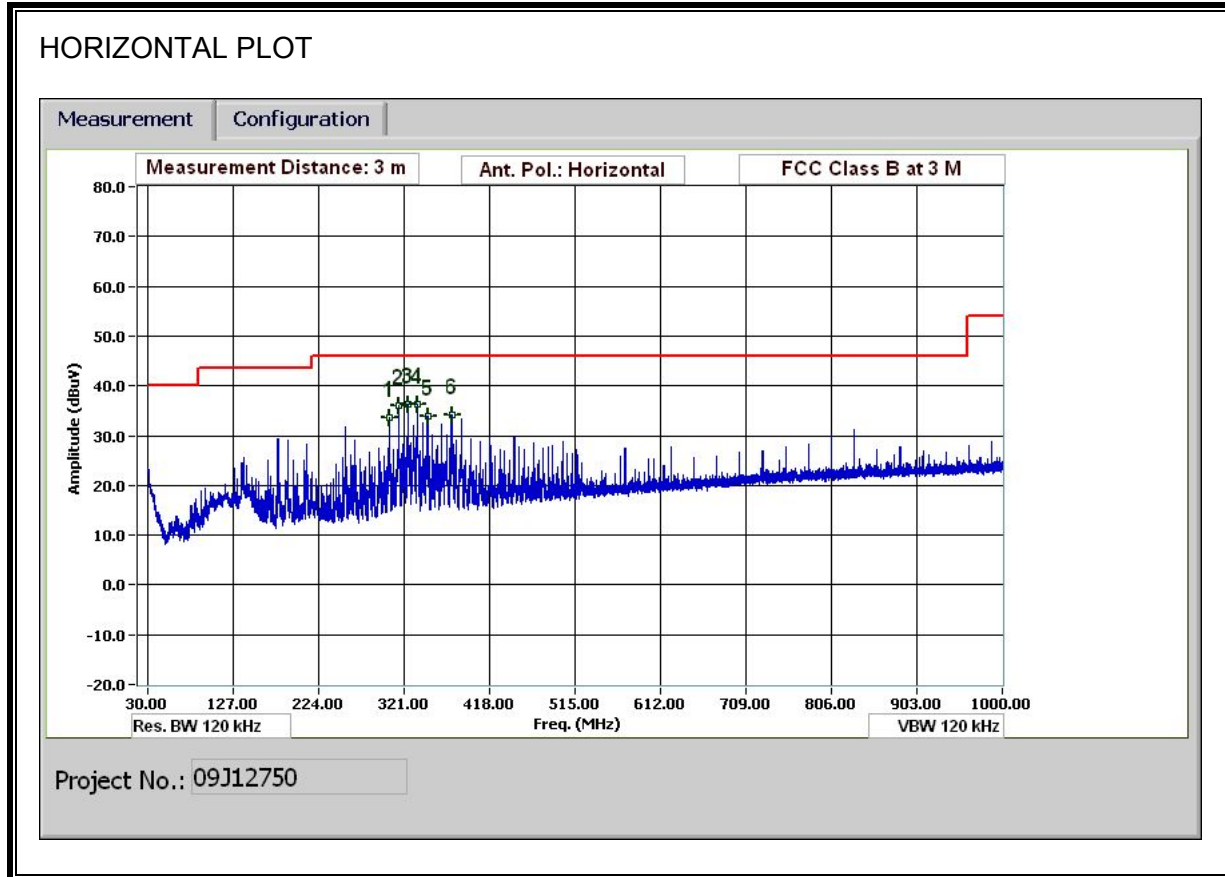
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.520	3.0	49.5	43.2	25.6	3.0	-38.7	0.0	0.0	39.3	33.0	74	54	-34.7	-21.0	V
1.626	3.0	52.7	49.6	26.0	3.1	-38.6	0.0	0.0	43.1	40.0	74	54	-30.9	-14.0	V
1.651	3.0	49.0	43.2	26.0	3.1	-38.6	0.0	0.0	39.6	33.7	74	54	-34.4	-20.3	V
1.520	3.0	49.1	42.5	25.6	3.0	-38.7	0.0	0.0	39.0	32.3	74	54	-35.0	-21.7	H
1.626	3.0	50.3	45.3	26.0	3.1	-38.6	0.0	0.0	40.8	35.8	74	54	-33.2	-18.2	H
1.651	3.0	50.8	45.6	26.0	3.1	-38.6	0.0	0.0	41.4	36.1	74	54	-32.6	-17.9	H
1.808	3.0	50.0	44.3	26.6	3.3	-38.3	0.0	0.0	41.5	35.8	74	54	-32.5	-18.2	H
1.820	3.0	49.4	43.6	26.6	3.3	-38.3	0.0	0.0	40.9	35.2	74	54	-33.1	-18.8	H
1.832	3.0	50.0	45.8	26.6	3.3	-38.3	0.0	0.0	41.7	37.4	74	54	-32.3	-16.6	H
1.846	3.0	50.8	45.6	26.7	3.3	-38.3	0.0	0.0	42.5	37.3	74	54	-31.5	-16.7	H

Rev. 11.10.08

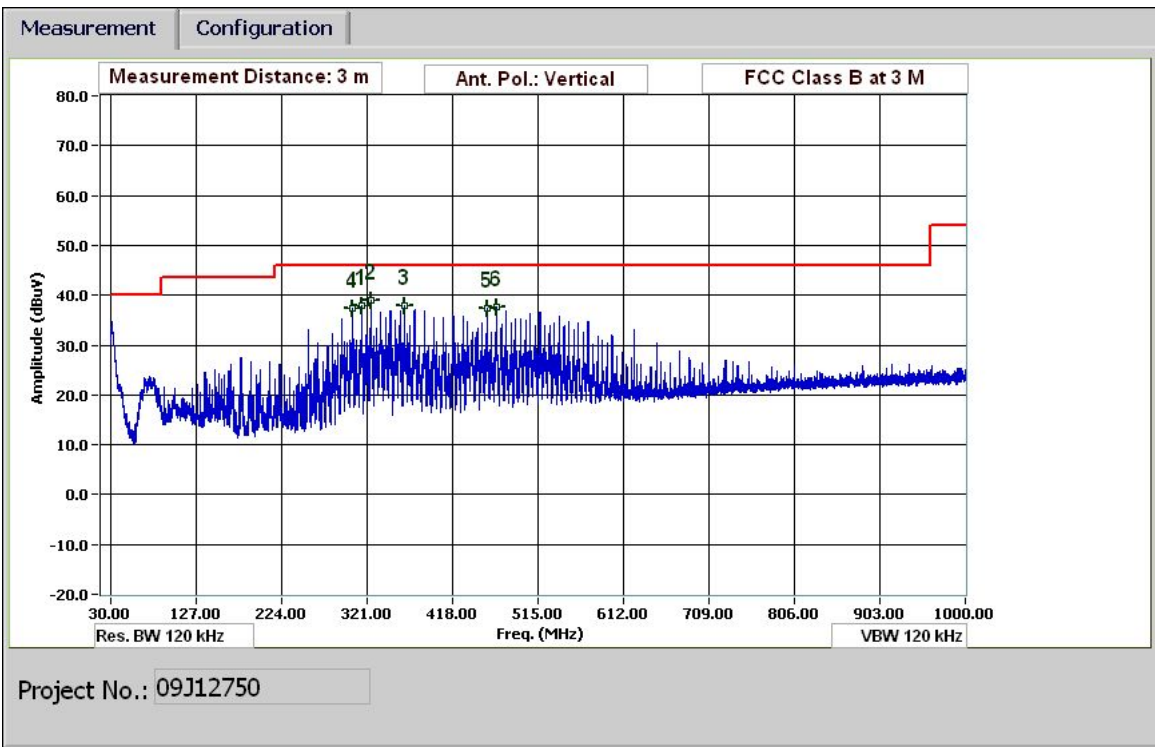
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
Date: 10/25/2009
Project #: 09J12750
Company: CASIO COMPUTER CO., LTD.
EUT Description: EUT WITH ETHERNET CRADLE
EUT M/N: IT-800R
Test Target: FCC PART CRF47
Mode Oper: TX WORST-CASE

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

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
303.851	3.0	46.8	13.5	1.5	28.1	0.0	0.0	33.7	46.0	-12.3	H	P	
314.772	3.0	48.9	13.6	1.6	28.1	0.0	0.0	36.0	46.0	-10.0	H	P	
325.692	3.0	49.1	13.8	1.6	28.1	0.0	0.0	36.4	46.0	-9.6	H	P	
336.613	3.0	48.8	14.0	1.6	28.1	0.0	0.0	36.2	46.0	-9.8	H	P	
347.533	3.0	46.2	14.1	1.7	28.1	0.0	0.0	33.9	46.0	-12.1	H	P	
374.894	3.0	45.9	14.5	1.7	28.1	0.0	0.0	34.1	46.0	-11.9	H	P	
303.851	3.0	50.4	13.5	1.5	28.1	0.0	0.0	37.3	46.0	-8.7	V	P	
314.772	3.0	50.8	13.6	1.6	28.1	0.0	0.0	37.9	46.0	-8.1	V	P	
325.692	3.0	51.8	13.8	1.6	28.1	0.0	0.0	39.1	46.0	-6.9	V	P	
363.974	3.0	49.9	14.4	1.7	28.1	0.0	0.0	37.9	46.0	-8.1	V	P	
457.098	3.0	47.4	16.0	1.9	27.9	0.0	0.0	37.3	46.0	-8.7	V	P	
468.018	3.0	47.4	16.2	2.0	27.9	0.0	0.0	37.6	46.0	-8.4	V	P	

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

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.

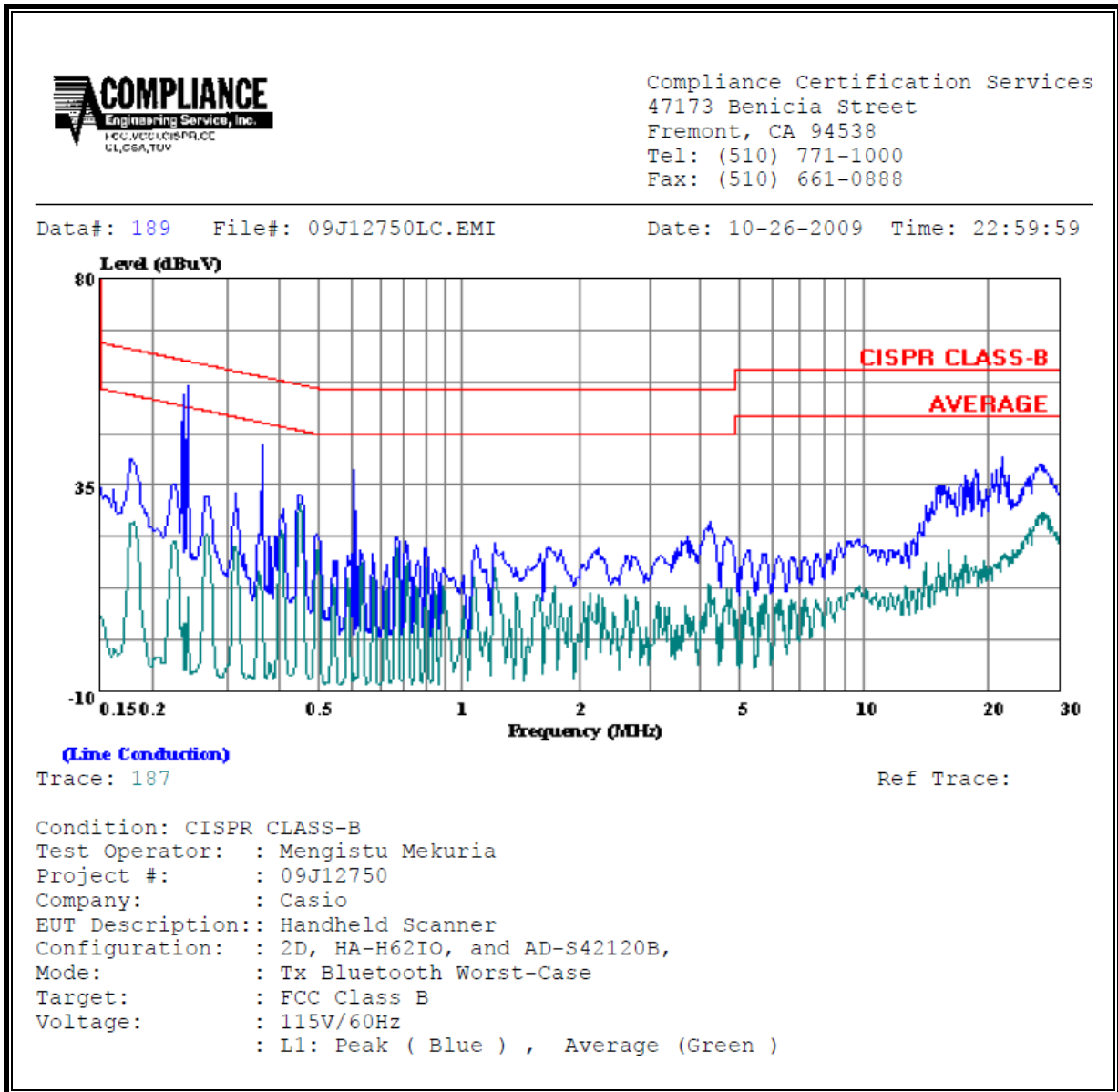
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

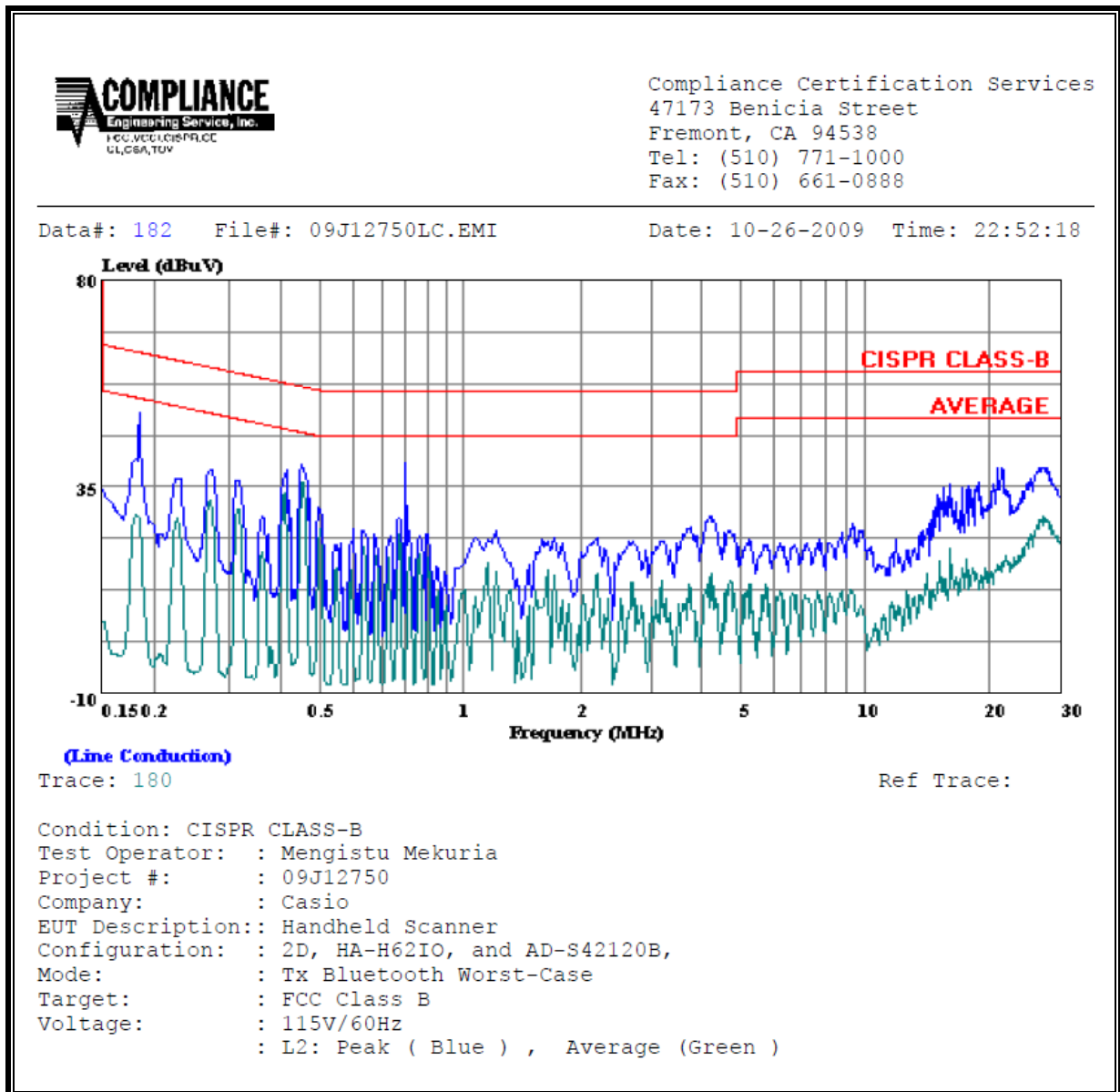
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B		Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)			AV	QP (dB)	AV (dB)		
0.24	56.47	--	24.16	0.00	62.03	52.03	-5.56	-27.87	L1	
0.37	43.61	--	25.04	0.00	58.61	48.61	-15.00	-23.57	L1	
0.61	38.32	--	18.08	0.00	56.00	46.00	-17.68	-27.92	L1	
0.18	51.30	--	29.05	0.00	64.35	54.35	-13.05	-25.30	L2	
0.45	39.69	--	36.08	0.00	56.89	46.89	-17.20	-10.81	L2	
0.80	40.33	--	24.83	0.00	56.00	46.00	-15.67	-21.17	L2	
6 Worst Data										

LINE 1 RESULTS



LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

IC RULES

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

**Table 5
 Exposure Limits for Persons Not 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/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{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/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

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

where

- S = Power density in W/m²
- EIRP = Equivalent Isotropic Radiated Power in W
- D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

where

- D = Separation distance in m
- EIRP = Equivalent Isotropic Radiated Power in W
- S = Power density in W/m²

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

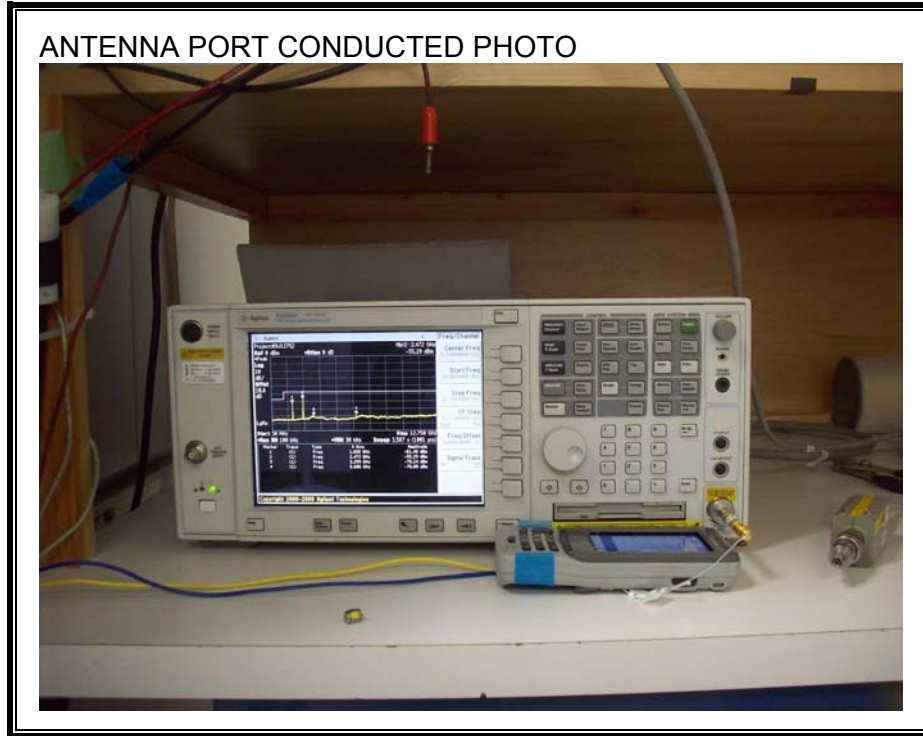
From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

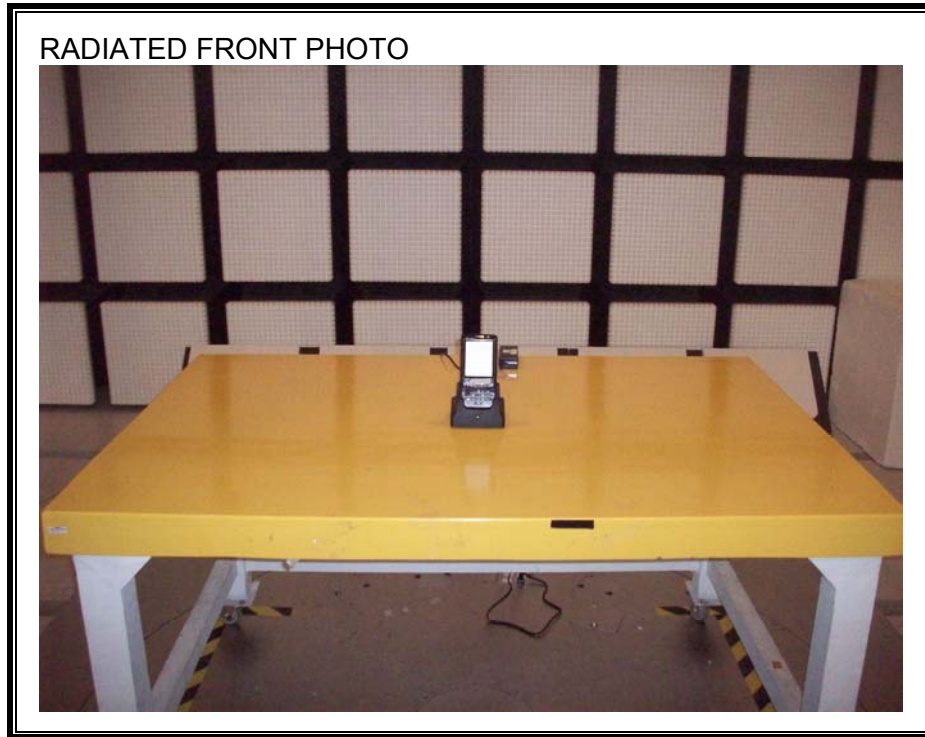
Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m ²)	FCC Power Density (mW/cm ²)
2.4 GHz	Bluetooth	0.20	2.22	-2.60	0.00	0.000

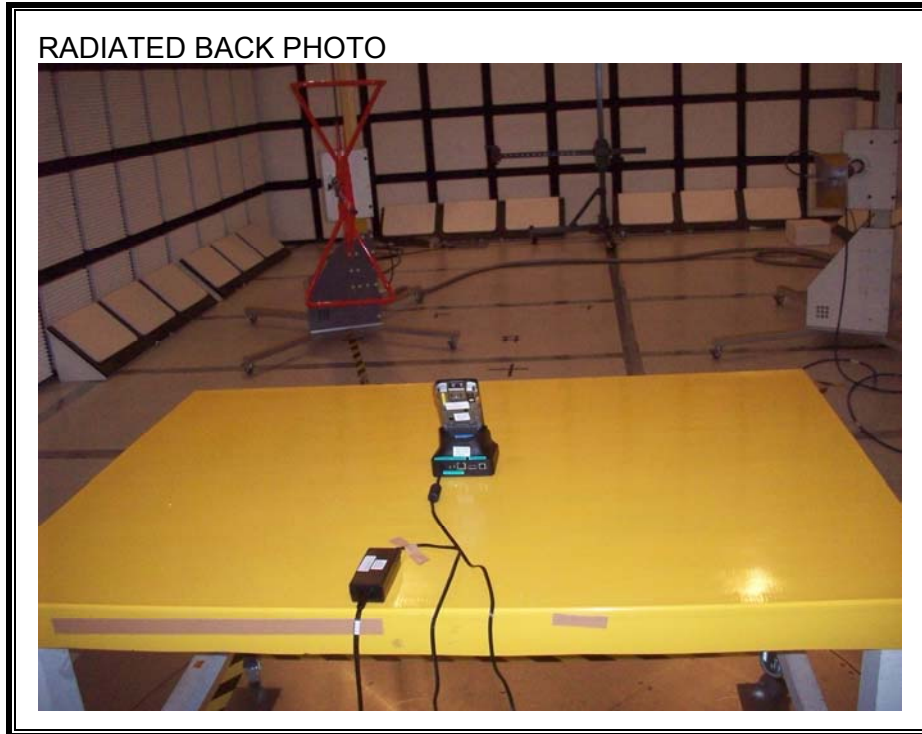
11. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



RADIATED RF MEASUREMENT SETUP





RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION



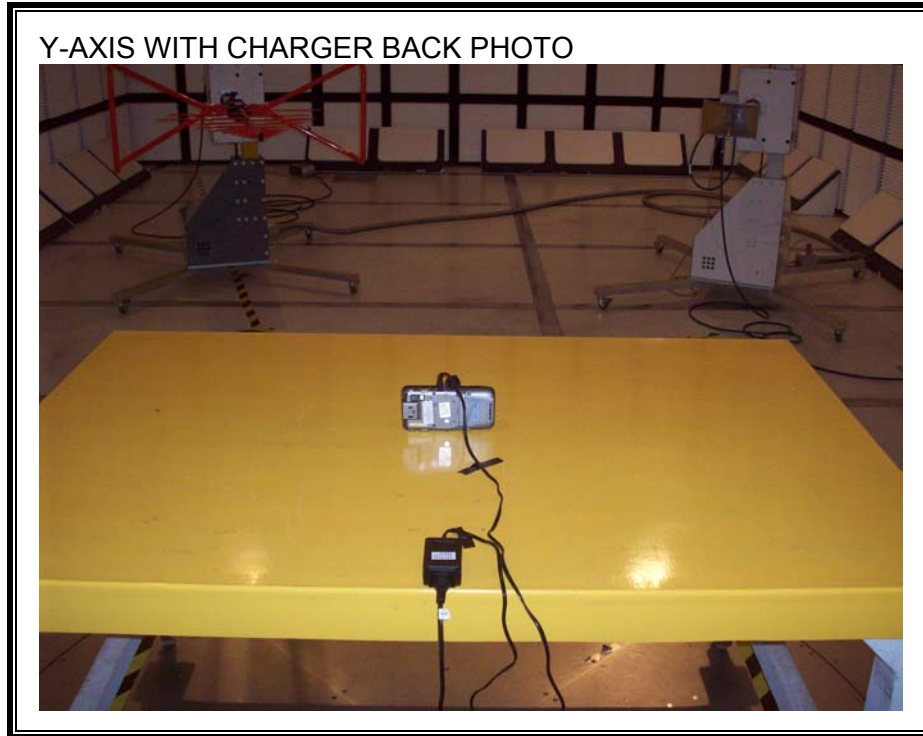






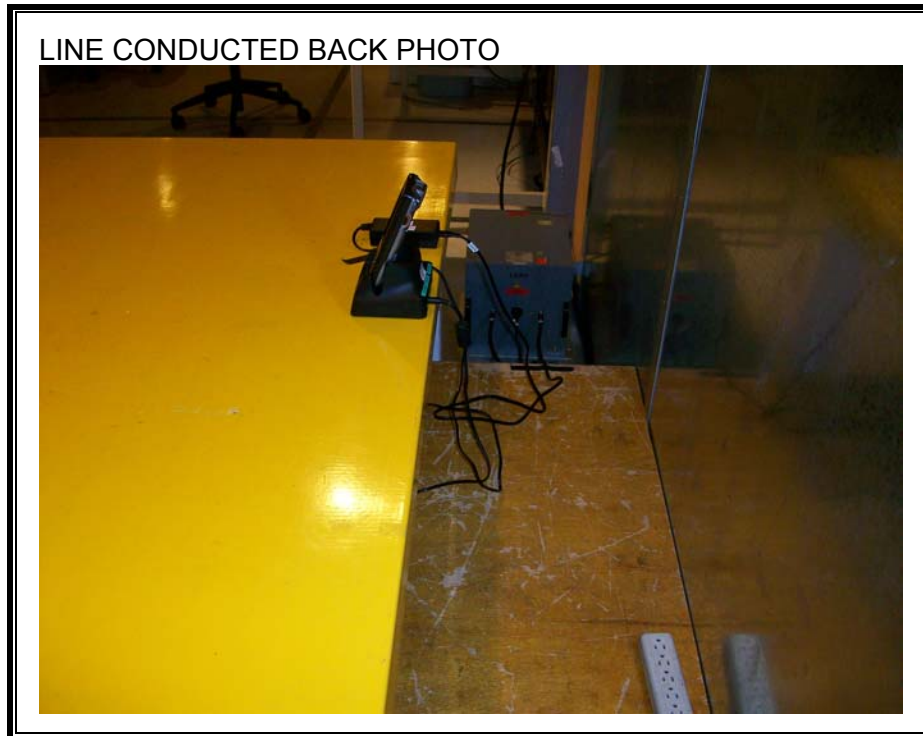






POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT