



LS Research, LLC



Cert. # 1255.01

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COMPLIANCE TESTING OF:
Wireless Acquisition Module

PREPARED FOR:
Mortara Instrument, Inc.
Attn: Brian Sueppel
7865 North 86th Street
Milwaukee, WI 53224

TEST REPORT NUMBER: 309056

LSR Job #: C-544

TEST DATE(S):

February 20, March 6, 8 & April 12, May 5, 2009

All results of this report relate only to the items that were tested. This report is not to be reproduced, except in full, without written approval of LS Research, LLC.

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1. **LS Research, LLC In Review**

LS Research, LLC - Accreditations and Listing's

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025 : 2005
with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: IC 3088-A

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: IC 3088

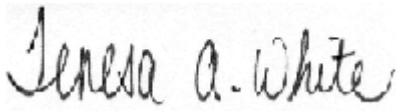
U. S. Conformity Assessment Body (CAB) Validation

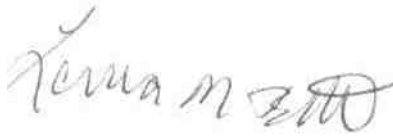
Validated by the European Commission as a U. S. Competent Body operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2)
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

2. Signature Page

Reviewed By:  May 6, 2009
Teresa A. White, Quality Manager Date

Tested By:  May 6, 2009
Laura Bott, EMC Engineer Date

Approved By:  May 6, 2009
Ryan Urness, EMC Lab Manager Date

3. Product and General Information

Manufacturer:	Mortara Instrument, Inc.				
Date(s) of Test:	February 20, March 6,8 & April 12, 2009				
Test Engineer(s):	√	Laura Bott		Ryan Urness	Ken Boston
Model #:	WAM				
Serial #:	Engineering Proto #5				
Voltage:	1.5 VDC				
Operation Mode:	Normal, continuous transmit				

4. Introduction

On February 20, March 6,8 & April 12, 2009 a series of Radiated Emission tests were performed on one sample of the Wireless Acquisition Module, Model Number WAM Serial Number Engineering Proto #5, here forth referred to as the "*Equipment Under Test*" or "*EUT*". These tests were performed using the procedures outlined in ANSI C63.4-2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.249 (Industry Canada RSS-210, Issue 7, 2007) for a low power transmitter. These tests were performed by Laura Bott, EMC Engineer of LS Research, LLC and witnessed by Brian Sueppel of Mortara Instrument Inc.

All Radiated and Conducted Emission tests were performed upon the EUT to measure the emissions in the frequency bands described in FCC Title 47 CFR Part 15, including 15.35, 15.209, 15.249 and Industry Canada RSS-210, Issue 7, 2007 to determine whether these emissions are below the limits expressed within the standards. These tests were performed in accordance with the procedures described in the American National Standard for methods of measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003). Another document used as a reference for the EMI Receiver specification was the Comite International Special Des Perturbations Radioelectriques (CISPR) Number 16-1, 2003.

5. Product Description

The Mortara Wireless Acquisition Module (WAM) is a patient worn transceiver used in hospitals and clinics for the transmission of ECG data. The WAM is made up of an ECG amplifier, microprocessor, and RF transceiver. The ECG amplifier is a 12 lead device with diagnostic quality response and digital conversion. The microprocessor formats the ECG data for transmission, handles user I/O, and controls the radio.

The WAM transceiver operates in the 2.4 GHz ISM band and is designed to meet FCC rules Part 15.249. The modulation of the carrier is done with simple Minimum Shift Keying (MSK). Antennas are integrated internally and are not removable or replaceable. The WAM has a single printed circuit board.

The WAM has a detachable light weight 12 lead patient cable and operates from a single AA Alkaline battery for over 20 Hours. The battery is installed through a removable side opening. The top side has a three buttons for control. The overall dimensions of the WAM are 11x10.5x3 cm.

6. EUT'S TECHNICAL SPECIFICATIONS

Additional Information:

Frequency Range (in MHz)	2403.38-2479.45 MHz
RF Power in Watts	0.000398 W ^{Note 1}
Conducted Output Power (in dBm)	-4 dBm ^{Note 2}
EIRP (in mW)	0.369 mW
Field Strength (and at what distance)	100.4 dBµV/m @ 1 meter (2441 MHz) 90.9 dBµV/m @ 3 meter (2441 MHz)
Occupied Bandwidth (99% BW)	1483 kHz (CH 16: 2441 MHz)
Type of Modulation	MSK
Emission Designator	1M1F1D
Transmitter Spurious (worst case)	54.9 dBµV/m @1m (4882.7 MHz) 45.4 dBµV/m @3m (4882.7 MHz)
Receiver Spurious (worst case)	59.08 dBµV/m @1m (1798 MHz) 49.58 dBµV/m @3m (1798 MHz)
Frequency Tolerance %, Hz, ppm	N/A
Microprocessor Model # (if applicable)	TI CC2511
EUT will be operated under FCC Rule Part(s)	CFR 47 §15.249
Antenna Information:	
a) Antenna Type	PCB inverted F
b) Detachable/Non-Detachable	Non-Detachable
c) Antenna Gain (in dBi)	-0.33 dBi
Modular Filing	☐ Yes ☒ No
Portable/Mobile	☒ Portable ☐ Mobile

Notes

1. The RF power was calculated using the formula: Power (mW) = 10^{power(dBm)/10}
2. The Conducted Output power was supplied by Mortara Instrument, Inc.

RF Technical Information:

No RF or SAR Evaluation is necessary for this product.

Type of Evaluation (check one)	☐	SAR Evaluation: Device Used in the Vicinity of the Human Head
	☐	SAR Evaluation: Body-worn Device
	☐	RF Evaluation

If RF Evaluation checked above, test engineer to complete the following:

- Evaluated against exposure limits: ☐ General Public Use ☐ Controlled Use
- Duty Cycle used in evaluation: %
- Standard used for evaluation:
- Measurement Distance: m
- RF Value: 0.105 ☐ V/m ☐ A/m ☐ W/m²
☐ Measured ☐ Computed ☐ Calculated

7. Test Requirements

The above mentioned tests were performed in order to determine the compliance of the Wireless Acquisition Module with limits contained in various provisions of Title 47 CFR, FCC Part 15, including:

15.31	15.205
15.33	15.207
15.35	15.209
15.37	15.249

8. Summary of Test Report

DECLARATION OF CONFORMITY

The Wireless Acquisition Module was found to meet the requirements as described within the specification of Title 47 CFR FCC, Part 15.249, Subpart (a); and Industry Canada RSS-210, Issue 7, 2007 Section 6.2 for a '*Non-Momentarily Operated Transmitting Device*'.

Some emissions are seen to be within 3dB of their respective limits. As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

The enclosed test results pertain to the sample(s) of the test item listed, and only for the tests performed on the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

9. Radiated Emissions Test

Test Setup

The test setup was assembled in accordance with Title 47, CFR FCC Part 15 and ANSI C63.4-2003. The EUT was placed on an 80cm high non-conductive pedestal centered on a flush mounted 2-meter diameter turntable inside the 3 Meter Semi-Anechoic, FCC listed Chamber located at LS Research, LLC Cedarburg, Wisconsin. The EUT was operated in continuous modulated transmit mode, using power provided by a (1.5 V) AA battery. The unit has the capability to operate on three channels, controllable via firmware loaded on the EUT. The limits in FCC 15.249 (a) apply at a 3 meter distance. Measurements above 4 GHz were performed at a 1.0 meter separation distance, and limits were adjusted appropriately. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a list of the test equipment. The test sample was operated on one of three (3) standard channels: low (2403 MHz), medium (2441 MHz) and high (2479 MHz) to comply with FCC Part 15.35. The channels and operating modes were changed via the EUT hardware, which interfaced with firmware loaded on the EUT.

Test Procedure

Radiated RF measurements were performed on the EUT in the 3 Meter Semi-Anechoic, FCC listed Chamber, located at LS Research, LLC, in Cedarburg, Wisconsin. The frequency range from 30 MHz to 25000 MHz was scanned and investigated. The radiated RF emission levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on the non-conductive pedestal in the 3 Meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double Ridged Waveguide Horn Antenna was used from 1 GHz to 18 GHz. The maximum radiated RF emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities. From 18 GHz to 25 GHz, the EUT was measured at a 0.3 meter separation, using a standard gain Horn antenna and pre-amplifier. The battery voltage was checked frequently, and the battery was replaced as necessary.

Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All calibrations of the antennas used were performed at an N.I.S.T. traceable site. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and a HP 8546A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the HP 8546A EMI Receiver database. As a result, the data taken from the HP 8546A EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The HP 8546A EMI Receiver was operated with a resolution bandwidth of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz), and a bandwidth of 1 MHz for measurements above 1 GHz (video bandwidth of 1 MHz). From 4 GHz to 18 GHz, an HP E4446A Spectrum Analyzer and an EMCO Horn Antenna were used. From 18 GHz to 25 GHz, the HP E4446A with a standard gain horn antenna, and preamp were used.

Test Results

The EUT was found to meet the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.249 for a transmitter (Canada RSS-210). The frequencies with significant signals were recorded and plotted as shown in the Data Charts and Graphs.

CALCULATION OF RADIATED EMISSIONS LIMITS:

Field Strength of Fundamental Frequencies:

The fundamental emissions for an intentional radiator in the 2400-2483.5 MHz band, operating under FCC part 15.249 limits, must have electric field strength of no greater than 50 mV/m, for the fundamental frequency, when measured at 3 meters, and harmonic field strength of no greater than 500 $\mu\text{V/m}$, when measured at 3 meters. Spurious emissions outside the 2400-2483.5 MHz band shall be attenuated by at least 50 dB below the level of the fundamental, or meet the limits expressed in FCC part 15.209 under general emission limits.

Field Strength of Fundamental Frequencies is Limited to 50,000 $\mu\text{V/m}$, or 94 dB $\mu\text{V/m}$.

Field Strength of Harmonic and Spurious Frequencies is Limited by FCC 15.249 (c)

The harmonic limit of -50 dBc with respect to the fundamental limit would be:

$$94 \text{ dB}\mu\text{V/m} - 50 \text{ dB} = 44 \text{ dB}\mu\text{V/m},$$

with the exception of where FCC 15.209 allows for a higher limit to be used.

Frequency (MHz)	3 m Limit ($\mu\text{V/m}$)	3 m Limit (dB $\mu\text{V/m}$)
2480-2483.5	50,000	94.0
30-88 ; 88-216	159	44.0
216-902 ; 928-960	500	46.0*
960-40,000	500	54.0*

The following table depicts the general radiated emission limits obtained from Title 47 CFR, part 15.209a, for radiated emissions measurements, including restricted band limits as expressed in 47 CFR, part 15.205.

Frequency (MHz)	3 m Limit ($\mu\text{V/m}$)	3 m Limit (dB $\mu\text{V/m}$)
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
960-40,000	500	54.0

Sample conversion from field strength $\mu\text{V/m}$ to dB $\mu\text{V/m}$:

$$\text{dB}\mu\text{V/m} = 20 \log_{10} (3\text{m limit})$$

from 30 - 88 MHz for example: $\text{dB}\mu\text{V/m} = 20 \log_{10} (100)$

$$40.0 \text{ dB}\mu\text{V/m} = 20 \log_{10} (100)$$

For measurements made at 1 meter, a 9.5 dB correction may be been invoked.

960 MHz to 40,000 MHz

500 $\mu\text{V/m}$ or 54.0 dB $\mu\text{V/m}$ at 3 meters

$$54.0 + 9.5 = 63.5 \text{ dB}\mu\text{V/m} \text{ at 1 meter}$$

Note: Limits are conservatively rounded to the nearest tenth of a whole number.

Summary of Results and Conclusions

Based on the procedures outlined in this report, and the test results, it can be determined that the EUT does meet the emission requirements of Title 47 CFR, FCC Part 15.249, for a frequency modulated transmitter.

The enclosed test results pertain to the samples of the test item listed, and only for the tests performed per the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

Radiated Emissions Data Chart
3 Meter Measurements of Electromagnetic Radiated Emissions
Test Standard: Title 47 CFR 15.249
Frequency Range Inspected: 30 MHz to 25000 MHz

Manufacturer:	Mortara Instrument, Inc.					
Date(s) of Test:	February 20, March 6,8 & April 12, 2009					
Test Engineer(s):	√	Laura Bott		Ryan Urness		Ken Boston
Model #:	WAM					
Serial #:	Engineering Proto #5					
Voltage:	1.5 VDC					
Operation Mode:	Normal , Continuous Data Modulation					
EUT Power:		Single Phase ___ VAC			3 Phase ___ VAC	
	√	Battery			Other:	
EUT Placement:	√	80cm non-conductive table			10cm Spacers	
EUT Test Location:	√	3 Meter Semi-Anechoic FCC Listed Chamber			3/10m OATS	
Measurements:		Pre-Compliance			Preliminary	√ Final
Detectors Used:	√	Peak		√	Quasi-Peak	√ Average

Environmental Conditions in the Lab:

Temperature: 20 – 25°C
Relative Humidity: 30 – 60 %

Test Equipment Used:

EMI Measurement Instrument: HP8546A and Agilent E4407B
Log Periodic Antenna: EMCO #93146
Horn Antenna: EMCO #3115
Biconical Antenna: EMCO 93110
Pre-Amp: Advanced Microwave WHA6224
Standard Gain Horn: EMCO 3160-09

The following table depicts the level of significant radiated emissions found on the fundamental frequencies:

Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dBμV/m)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Margin (dB)	Antenna Polarity	EUT orientation
2403.38	1.25	156	99.6	99.4	103.5	4.1	Horizontal	Flat
2441.35	1.00	221	100.6	100.4	103.5	3.1	Vertical	Vertical
2479.45	1.12	186	100.6	100.4	103.5	3.1	Horizontal	Flat

Note: The fundamental measurements were taken at a 1 meter separation distance.

The following table depicts the level of significant radiated emissions found on the low channel (2403 MHz):

Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dB μ V/m)	Avg Reading (dB μ V/m)	Avg Limit (dB μ V/m)	Margin (dB)	Antenna Polarity	EUT orientation
4806.76	1.078	291	55.9	52.4	63.5	11.1	Horizontal	Vertical
7210.14	1.091	320	50.3	40.6	63.5	22.9	Horizontal	Side
9613.52	1.048	340	50.6	37.0	63.5	26.5	Vertical	Side
12016.9	1.641	289	50.0	37.7	63.5	25.8	Horizontal	Vertical
14420.28	1.127	338	51.6	39.7	63.5	23.8	Vertical	Vertical
16823.66	1.738	346	52.3	39.9	63.5	23.6	Horizontal	Side
19227.04				*Note 2	74.0			
21630.42				*Note 2	74.0			
24033.80				*Note 2	74.0			

The following table depicts the level of significant radiated emissions found on the middle channel (2441 MHz):

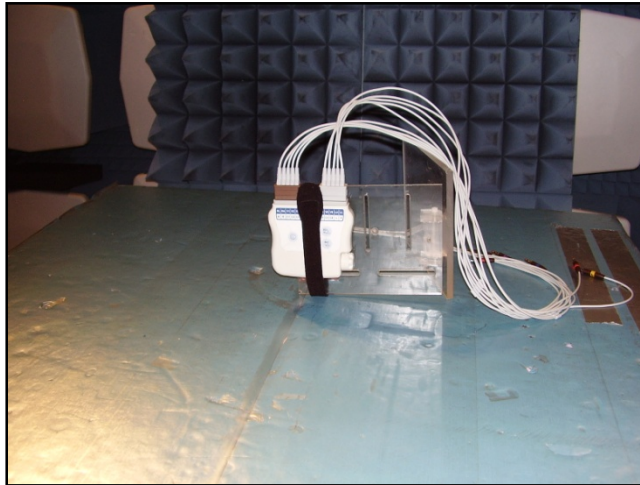
Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dB μ V/m)	Avg Reading (dB μ V/m)	Avg Limit (dB μ V/m)	Margin (dB)	Antenna Polarity	EUT orientation
4882.70	1	146	58.0	54.9	63.5	8.6	Horizontal	Side
7324.05	1.022	239	50.0	41.6	63.5	21.9	Horizontal	Vertical
9765.40	1.09	289	49.8	37.8	63.5	25.7	Horizontal	Side
12206.75	1.119	355	49.6	37.3	63.5	26.2	Vertical	Vertical
14648.10	1.08	342	52.0	39.8	63.5	23.7	Horizontal	Flat
17089.45	1.146	307	54.8	43.1	63.5	20.4	Horizontal	Flat
19530.80				*Note 2	74.0			
21972.150				*Note 2	74.0			
24413.50				*Note 2	74.0			

The following table depicts the level of significant radiated emissions found on the high channel (2479 MHz):

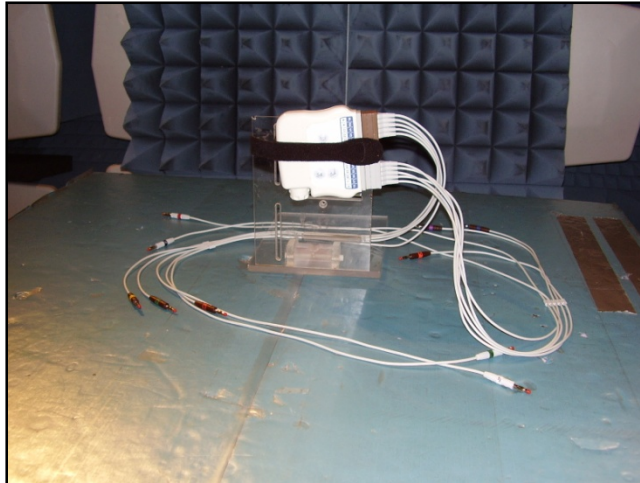
Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dB μ V/m)	Avg Reading (dB μ V/m)	Avg Limit (dB μ V/m)	Margin (dB)	Antenna Polarity	EUT orientation
4958.90	1.00	252	56.9	53.8	63.5	9.7	Vertical	Vertical
7438.35	1.09	193	49.2	39.9	63.5	23.6	Vertical	Flat
9917.80	1.05	144	50.1	38.0	63.5	25.5	Vertical	Side
12397.25	1.38	352	50.9	38.0	63.5	25.5	Vertical	Side
14876.70	1.68	322	51.0	39.0	63.5	24.5	Vertical	Vertical
17356.15	1.65	351	57.2	44.1	63.5	19.4	Vertical	Vertical
19835.60				*Note 2	74.0			
22315.05				*Note 2	74.0			
24794.50				*Note 2	74.0			

- Notes:** 1. A Quasi-Peak Detector was used in measurements below 1 GHz, and a 10 Hz video averaged signal was used to obtain average measurements for frequencies above 1 GHz.
2. Measurement in system noise floor.

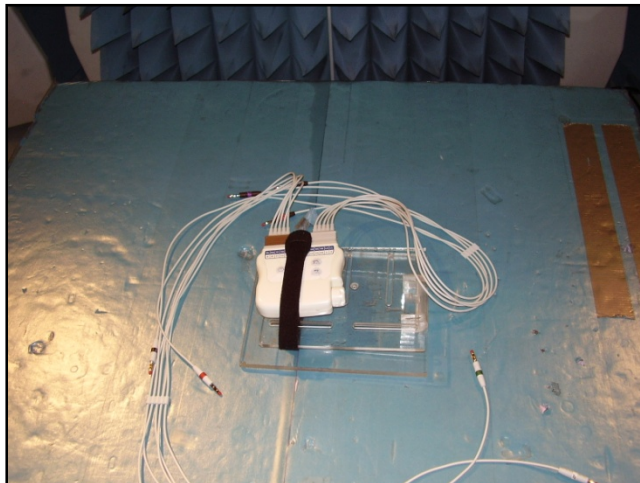
Setup for the Radiated Emissions Test EUT Vertical



EUT Side



EUT Flat



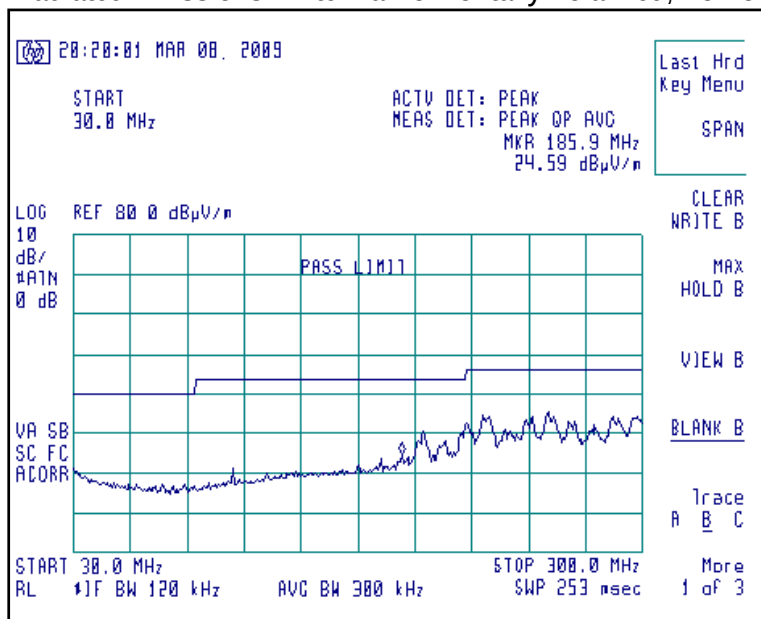
GRAPHS

Transmit Mode

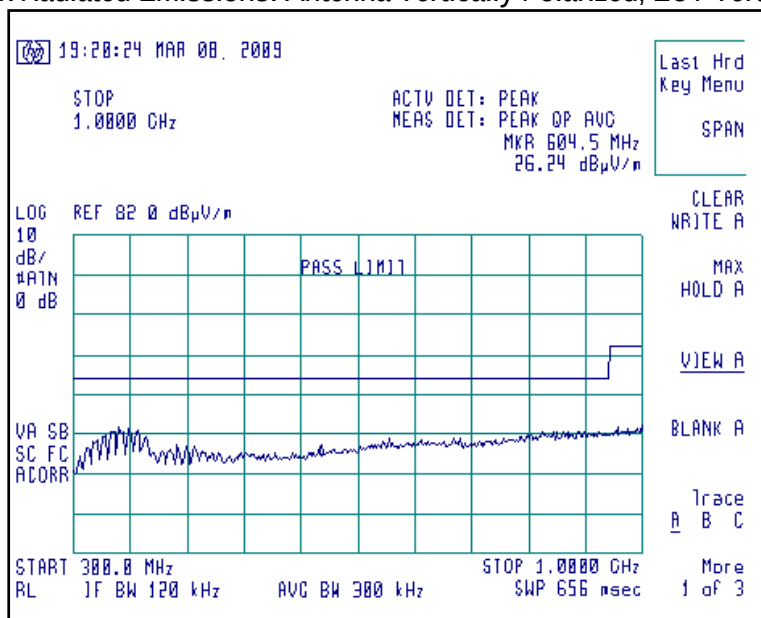
Screen Captures of Radiated RF Emissions:

Please note these screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz. The signature scans shown here are from worst-case emissions, as measured on channels 2403, 2441, or 2479 with the sense and EUT antennas both in vertical polarity for worst case presentations.

Channel 16, Peak Radiated Emissions: Antenna Horizontally Polarized, EUT on Side 30-300 MHz,

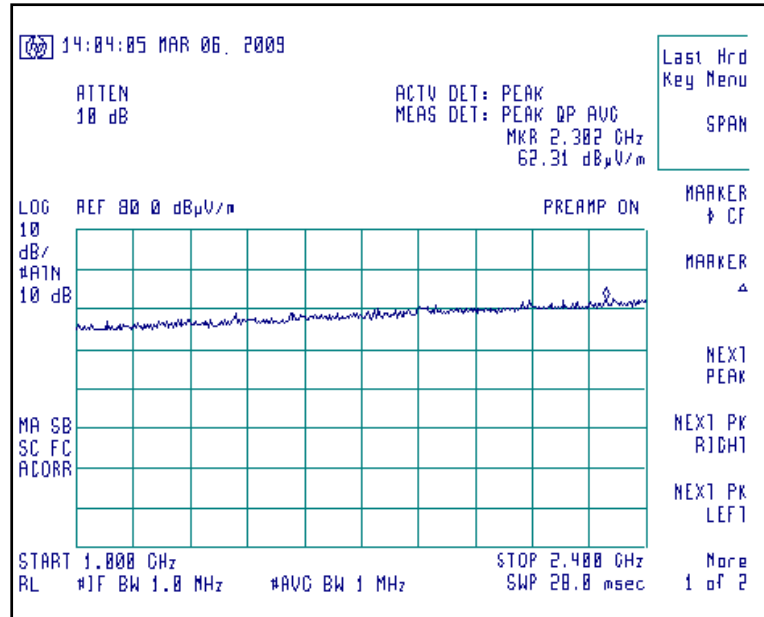


Channel 16, Peak Radiated Emissions: Antenna Vertically Polarized, EUT Vertical 300-1000 MHz

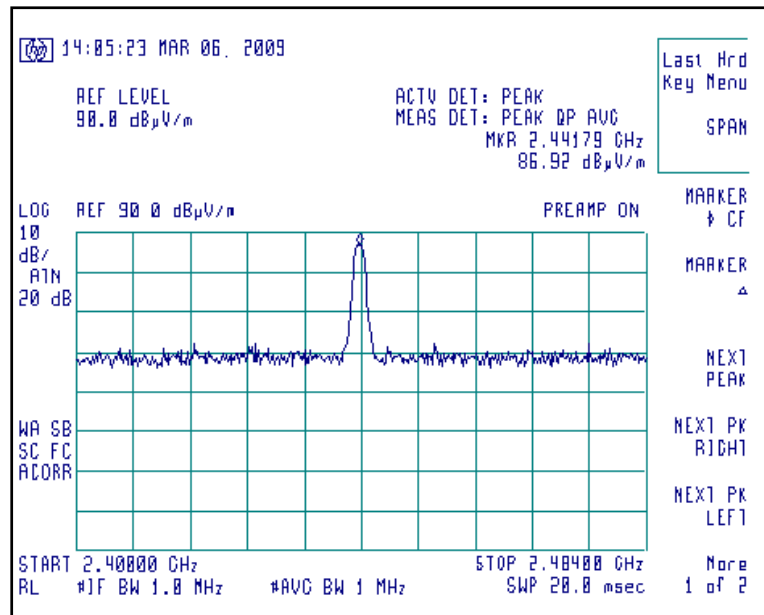


Graphs made during Radiated Emission Testing (continued)

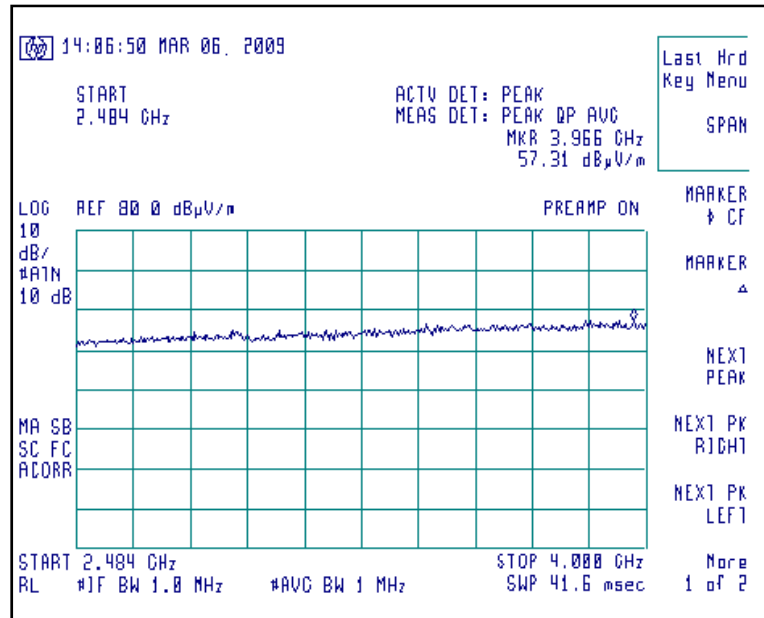
Channel 16, Peak Radiated Emissions: Antenna Vertically Polarized, EUT Vertical
1000-2400 MHz



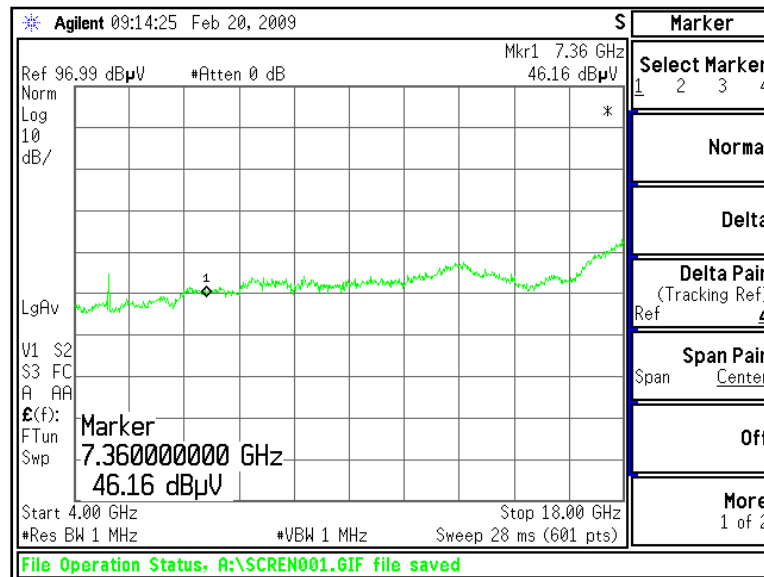
Channel 16, Peak Radiated Emissions: Antenna Vertically Polarized, EUT Vertical
2400-2484 MHz



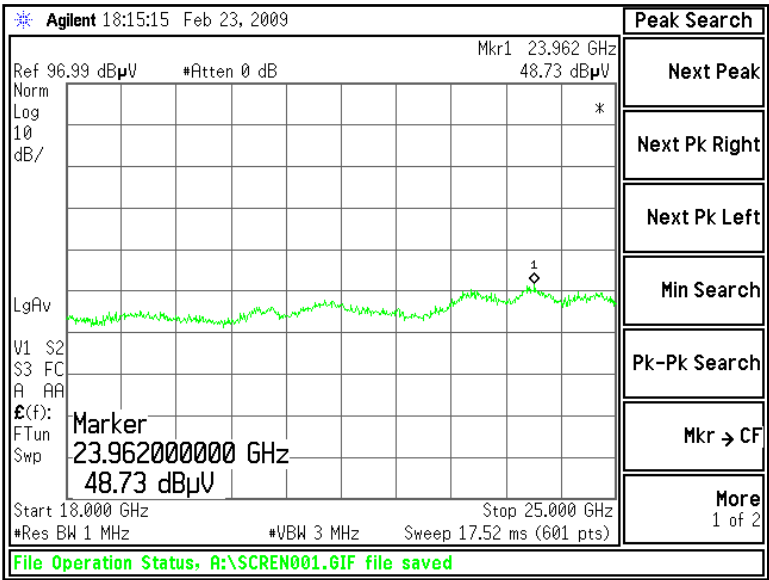
Channel 16, Peak Radiated Emissions: Antenna Vertically Polarized, EUT Vertical
2484-4000 MHz



Channel 16, Peak Radiated Emissions: Antenna Vertically Polarized, EUT Vertical
4000-18000 MHz



Channel 16, Peak Radiated Emissions: Antenna Horizontally Polarized, EUT Flat at 1 meter
18000-25000 MHz

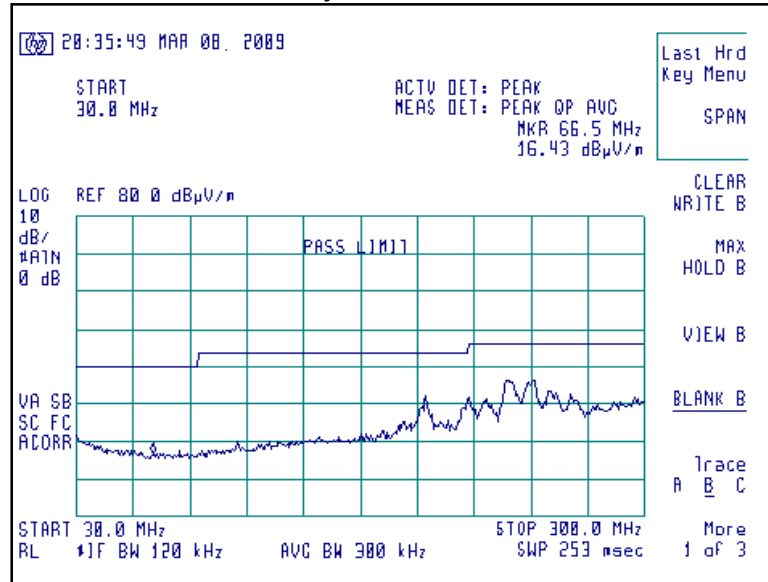


GRAPHS

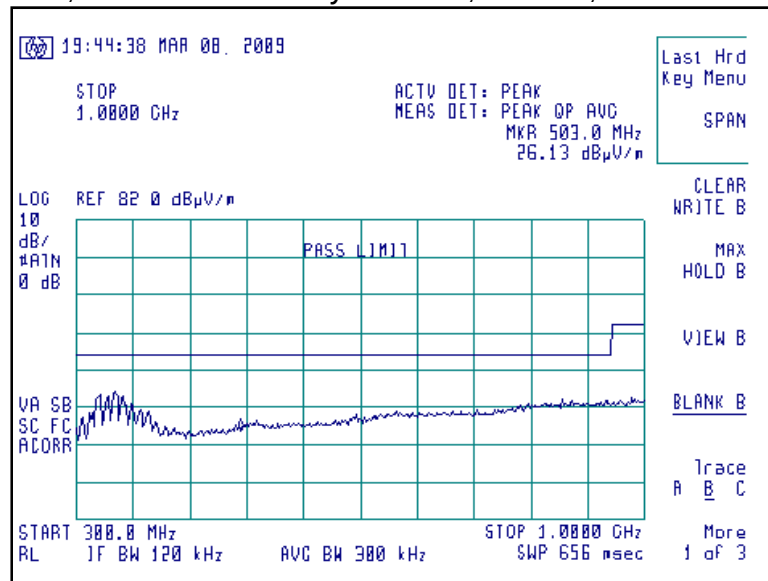
Receive Mode

Screen Captures of Radiated RF Emissions:

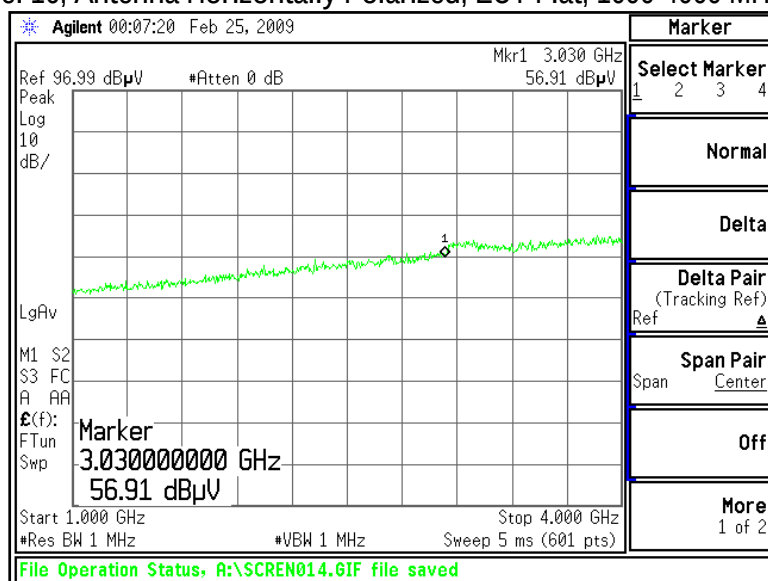
Channel 16, Antenna Horizontally Polarized, EUT Vertical 30-300 MHz, at 3m



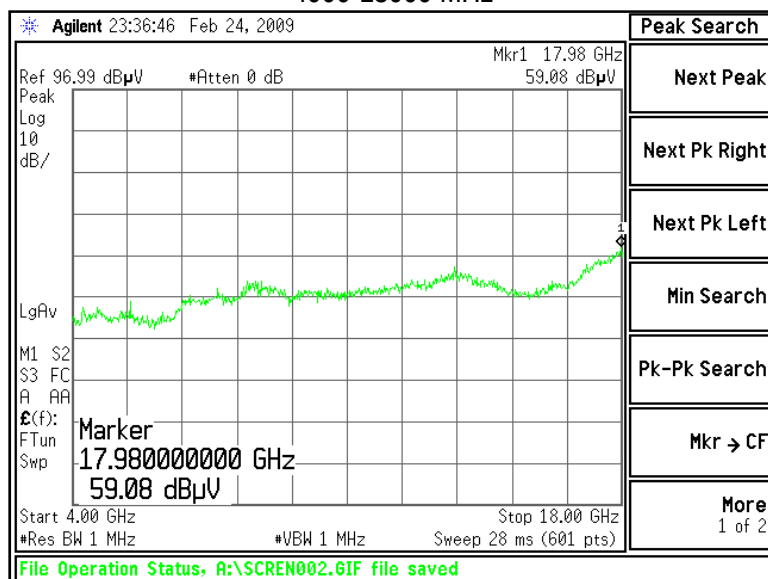
Channel 16, Antenna Horizontally Polarized, EUT Flat, 300-1000 MHz, at 3m



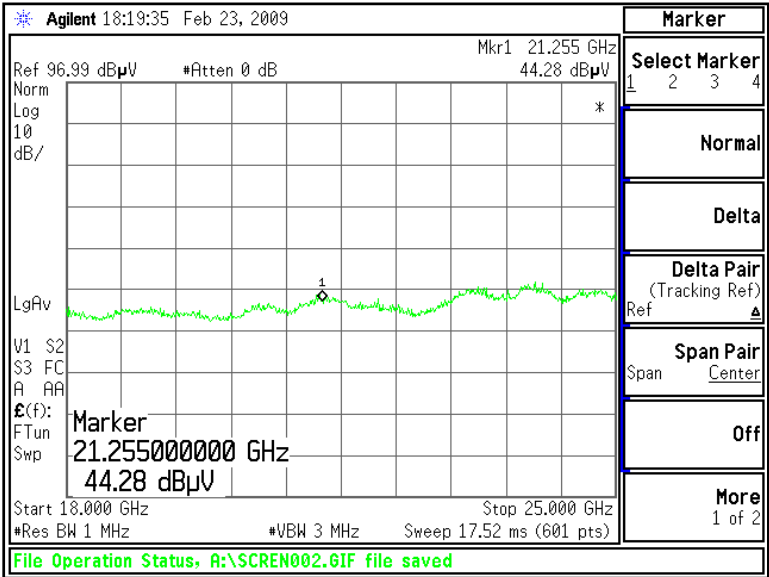
Channel 16, Antenna Horizontally Polarized, EUT Flat, 1000-4000 MHz, at 3m



Channel 16, Peak Radiated Emissions: Antenna Horizontally Polarized, EUT Flat at 1 meter
4000-18000 MHz



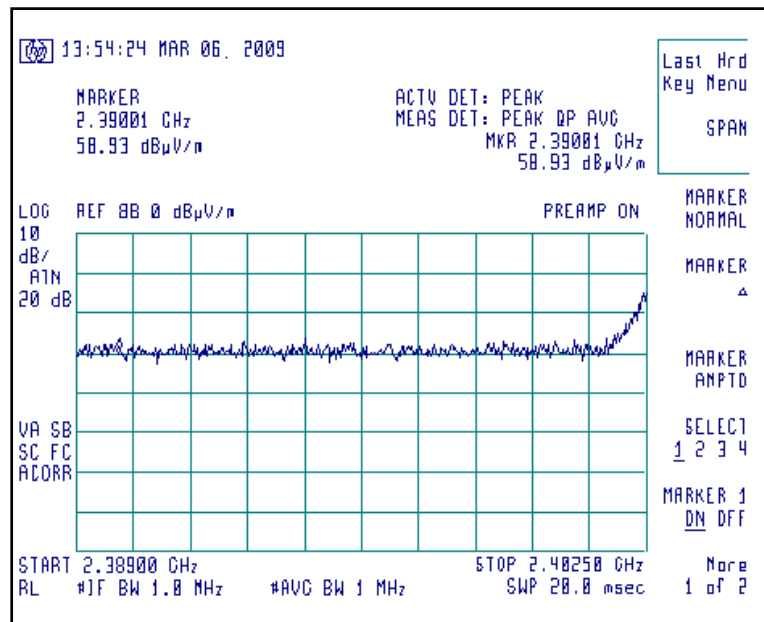
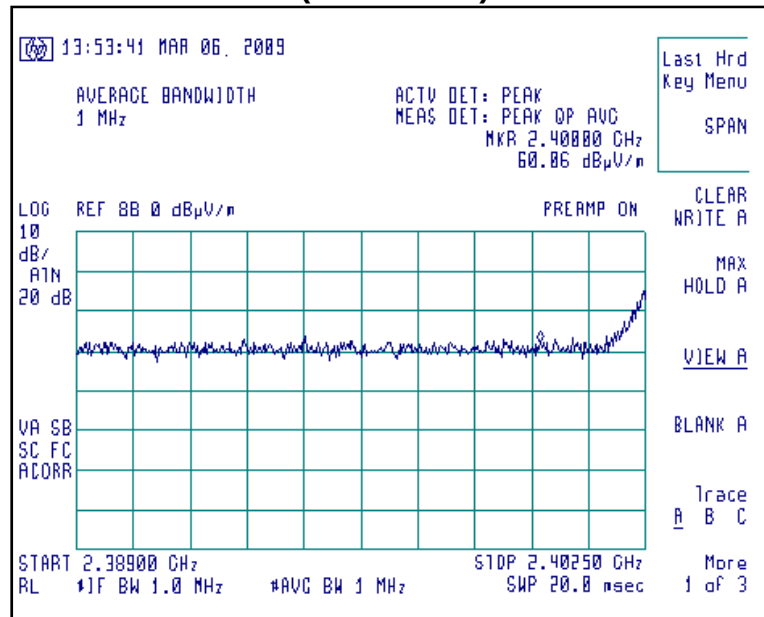
Channel 16, Peak Radiated Emissions: Antenna Horizontally Polarized, EUT Flat at 1 meter
18000-25000 MHz



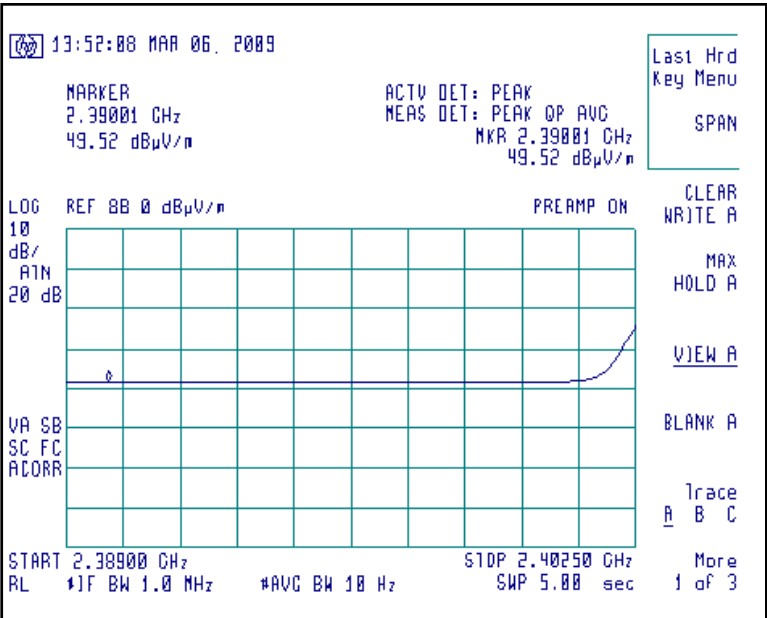
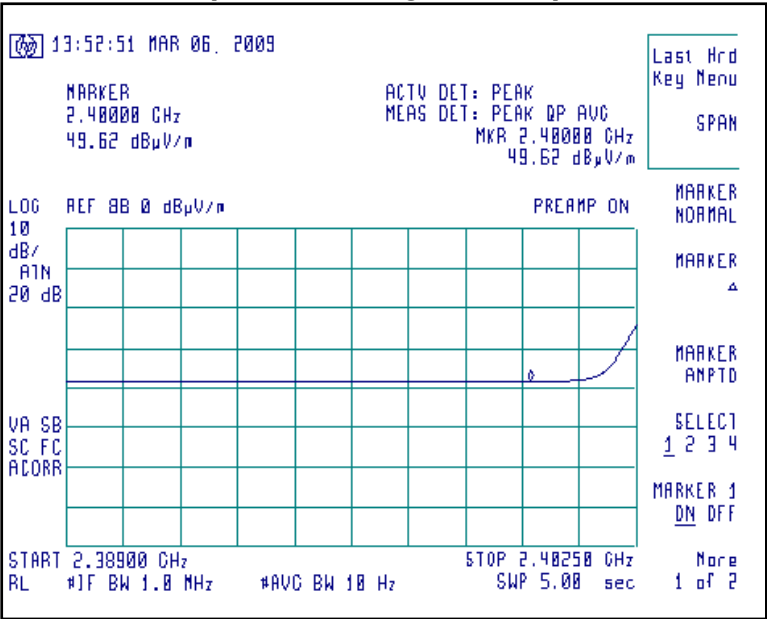
10. Band-Edge Measurements

FCC 15.209(b) and 15.249(d) require a measurement of spurious emission levels, in particular at the band-edges where the intentional radiator operates. The following screen captures demonstrate compliance of the intentional radiator at the 2400-2483.5 MHz band-edges. The EUT was operated at the lowest channel, with continuous modulation, for the investigation of the lower band-edge, and at the highest channel for the investigation of the higher band-edge.

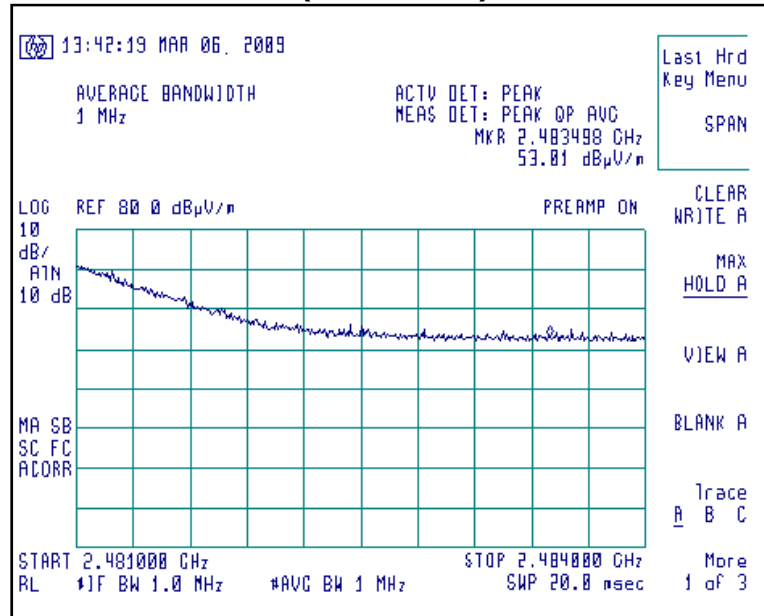
Screen Capture demonstrating compliance at the Lower Band-Edge (Peak Trace)



Screen Capture demonstrating compliance at the Lower Band-Edge
(Video Averaged Trace)



Screen Capture demonstrating compliance at the Higher Band-Edge (Peak Trace)



Screen Capture demonstrating compliance at the Higher Band-Edge (Video Average Trace)

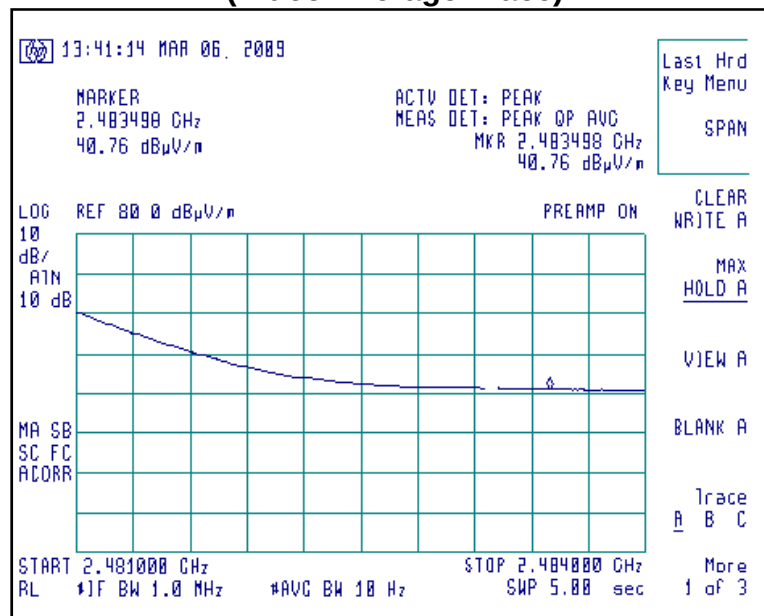


EXHIBIT 10. OCCUPIED BANDWIDTH: RSS GEN 4.6.1

10.1 Method of Measurements

Refer to ANSI C63.4 and RSS GEN 4.6.1 for test procedures.

Because there is no access to the antenna port of the EUT, a radiated measurement in the near field was made. For this portion of the tests, the EUT was placed on a flat, non conductive surface close to an antenna which was attached to the front end of a HP E4446A spectrum analyzer.

The -20 dB occupied bandwidth was measured by measuring the peak of the fundamental signal when RBW = 3 MHz, and VBW = 8 MHz, setting that trace to "view," then reducing the RBW to 30 kHz and VBW to 100 kHz and measuring the bandwidth that was 20 dB down from the initial peak value measured when RBW = 3 and VBW = 8.

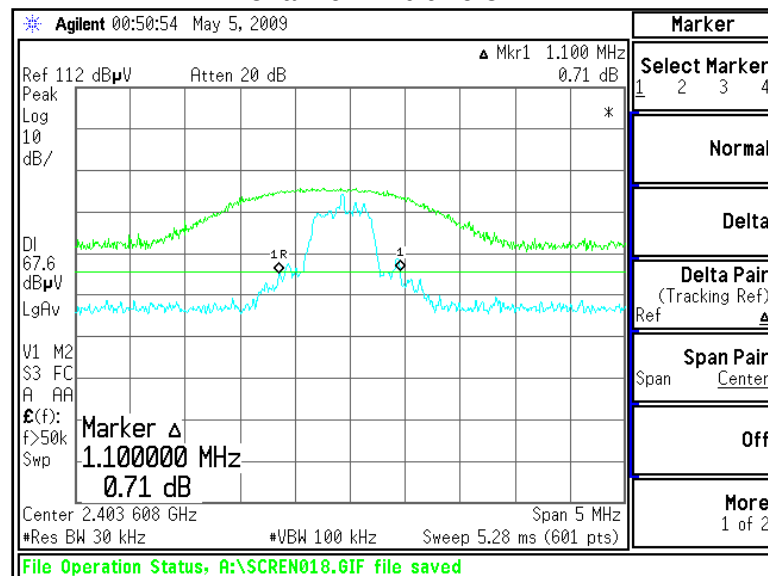
10.2 Test Data

Channel	Center Frequency (MHz)	Measured -20 dBc Occupied Bandwidth (kHz)
1	2403	1100
16	2441	1042
32	2479	1042

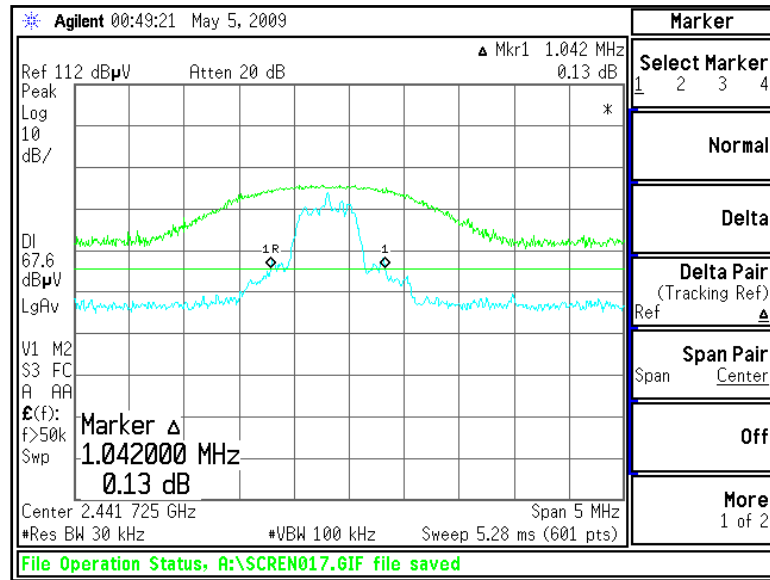
10.3 Test Equipment List

Test Equipment	Manufacturer	Model No.	Serial No.
Spectrum Analyzer	Agilent	E4446A	US45300564

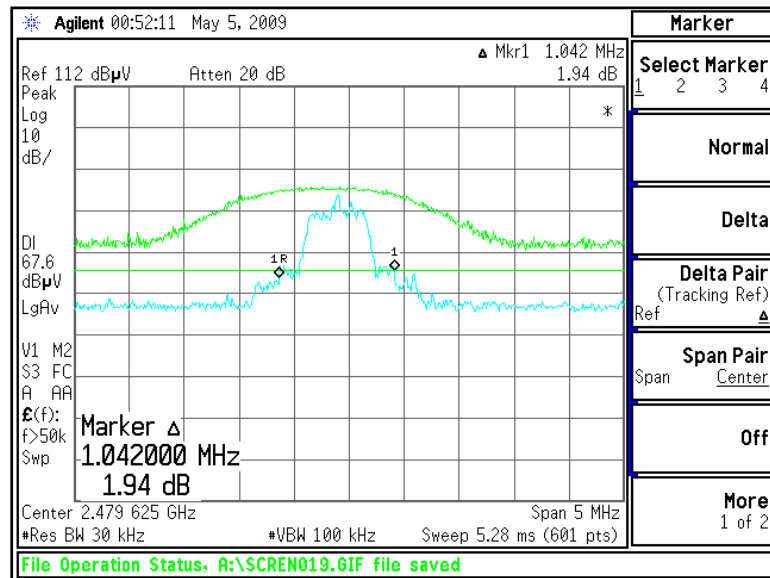
Channel 1 -20 dBc OBW



Channel 16 -20 dBc OBW



Channel 32 -20 dBc OBW



APPENDIX A

Test Equipment List



Date : 5-Mar-2009

Type Test : Radiated Emissions

Job # : C-544

Prepared By: L Bott

Customer : Mortara Instrument, Inc.

Quote # : 309056

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960004	Log Periodic Antenna	EMCO	93146	9512-4276	8/28/2008	8/28/2009	Active Calibration
2	AA 960005	Biconical Antenna	EMCO	93110B	9601-2280	6/17/2008	6/17/2009	Active Calibration
3	AA 960063	Pyramidal Horn Antenna	EMCO	3160-09	9809-1120	6/17/2008	6/17/2009	Active Calibration
4	AA 960081	Double Ridge Horn Antenna	EMCO	3115	6907	9/26/2008	9/26/2009	Active Calibration
5	AA 960142	Phaseflex	Gore	EMOCJOCJO36	4943263	10/15/2008	10/15/2009	Active Calibration
6	EE 960013	EMI Receiver	HP	8546A System	3617A00320;3448A	9/23/2008	9/23/2009	Active Calibration
7	EE 960014	EMI Receiver-filter section	HP	85460A	3448A00296	9/23/2008	9/23/2009	Active Calibration
8	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	9/26/2008	9/26/2009	Active Calibration

Note 1 - Equipment calibrated within a traceable system.

APPENDIX B

STANDARD #	DATE	Am. 1	Am. 2
ANSI C63.4	2003		
CISPR11	2003-03	2004-05	2006-06
CISPR14-1	2005-11		
CISPR14-2	2001-11	2001-11	2008-05
CISPR16-1-1 Note 1	2006-03	2006-09	2007-07
CISPR16-1-2 Note 1	2003	2004-04	2006-07
CISPR22	2005	2005-07	2006-01
CISPR24	1997-09	2001-07	2002-10
EN 55011	2007-05		
EN 55014-1	2006		
EN 55014-2	1997		
EN 55022	2006		
EN 60601-1-2	2007		
EN 61000-3-2	2006-05		
EN 61000-3-3	1994	1995	
EN 61000-4-2	2001	1998	2001
EN 61000-4-3	2006-07	2008-05	
EN 61000-4-4	2004		
EN 61000-4-5	2006-12		
EN 61000-4-6	2007-08		
EN 61000-4-8	1993	1994-01	
EN 61000-4-11	2004-10		
EN 61000-6-1	2007-02		
EN 61000-6-2	2005-12		
EN 61000-6-3	2007-02		
EN 61000-6-4	2007-02		
FOC 47 CFR, Parts 0-15, 18, 90, 95	2007		
FOC Public Notice DA 00-1407	2000		
FOC ET Docket # 99-231	2002		
FOC Procedures	2007		
ICES 001	2006-06		
ICES 002	2007-02		
ICES 003	2004-02		
IEC 60601-1-2 Note 1	2007-03		
IEC 61000-3-2	2005	2008-03	
IEC 61000-3-3	2008-06		
IEC 61000-4-2	2001-04	1998	2000
IEC 61000-4-3	2006-02	ind in 2006	
IEC 61000-4-4	2004-07		

[illegible]

Note 1: Test not on LSR Scope of Accreditation.

APPENDIX C
Uncertainty Statement

This uncertainty represents an expanded uncertainty
expressed at approximately the 95% confidence level, using a coverage factor of $k=2$.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V