



LS Research, LLC

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COMPLIANCE TESTING OF:

Personal Beacon

Prepared For:

**Scott Health and Safety
Attn: Ms. Ann Carver
4320 Goldmine Road
Monroe, NC 28079
U.S.A.**

Test Report Number:

306151-Tx-v1

Test Dates:

March 20TH and 21ST, 2006

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 L. S. Compliance, 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 : 1999
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

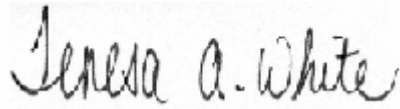
Validated by the European Commission as a U. S. Competent Body operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2)
Date of Validation: January 16, 2001

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

Prepared By:



June 9, 2006

Teresa A. White, Document Coordinator

Date

Tested By:



June 9, 2006

Abtin Spantman, EMC Engineer

Date

Approved By:



June 9, 2006

Brian E. Petted, VP of Engineering

Date

3. Product and General Information

Manufacturer:	Scott Health and Safety				
Date(s) of Test:	March 20 TH and 21 ST , 2006				
Test Engineer(s):	Tom Smith	√	Abtin Spantman		Ken Boston
Model #:	Personal Beacon				
Serial #:	Engineering Sample				
Voltage:	4.5 VDC				
Operation Mode:	Normal and continuous transmit				

4. Introduction

On March 20TH and 21ST, 2006, a series of Conducted and Radiated RF Emission tests were performed on one engineering sample of the Scott Health and Safety's "*Personal Beacon*" transmitter, 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 15.247 (Industry Canada RSS-210) for a low power transmitter. These tests were performed by Abtin Spantman, EMC Engineer at LS Research, LLC.

All Radiated and Conducted RF 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, 15.205, 15.247 and Industry Canada RSS-210 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.

All tests were performed at LS Research, LLC, in Cedarburg, Wisconsin, unless otherwise noted.

5. Product Description

The Scott Health and Safety's "*Personal Beacon*" is an emergency transmitter intended to allow a disabled firefighter to be located by radio direction finding. The Personal Beacon is a Direct Sequence Spread Spectrum (DSSS) transmitter operating on a single frequency of 2425 MHz at a maximum conducted power of +20 dBm.

The Personal Beacon is powered by three standard type "AAA" Alkaline batteries, at 4.5 VDC. The Personal Beacon uses the Chipcon CC2420 RF chip-set, along with a PCB trace antenna and proprietary communication protocol. The Personal Beacon does not have any peripheral ports or contingencies for any other types of antennas.

The Scott Technologies' "Personal Beacon"



6. Test Requirements

The above mentioned tests were performed in order to determine the compliance of the Scott Health and Safety's "*Personal Beacon*" transmitter with limits contained in various provisions of Title 47 CFR, FCC Part 15, including:

15.31	15.247a	15.247d
15.205	15.247b	15.247e
15.207	15.247c	

7. Summary of Test Report

DECLARATION OF CONFORMITY

The Scott Health and Safety's "*Personal Beacon*" transmitter was found to **MEET** the requirements as described within the specification of Title 47 CFR FCC, Part 15.247, and Industry Canada RSS-210, Annex 8 (section 8.2), for a Digital Spread Spectrum (DTS) Transmitter.

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.

8. Radiated Emissions Test 15.247 (b) and (d)

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 a 3 meter Semi-Anechoic, FCC listed Chamber. The EUT was operated in continuous transmit modulated mode for this portion of the testing, using 4.5 VDC power as provided by three standard 'AAA' type Alkaline batteries. The unit has the capability to operate on only one channel. During the testing, the mode selection between CW and modulated modes was accomplished by pressing one of the emergency buttons, reprogrammed to provide the necessary functionality during these tests.

The applicable limits apply at a 3 meter distance. Measurements above 5 GHz were performed at a 1.0 meter separation distance. The calculations to determine these limits are detailed in the following pages.

Test Procedure

Radiated RF measurements were performed on the EUT in a 3 meter Semi-Anechoic, FCC listed Chamber. 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 a 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 batteries were replaced as necessary.

The EUT was rotated along three orthogonal axis during the investigations to find the highest emission levels.

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 5 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 Spectrum Analyzer with a standard gain horn, and preamp were used.

Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.247 for a DTS transmitter [Canada RSS-210, Annex 8 (section 8.2)]. The frequencies with significant RF signal strength were recorded and plotted as shown in the Data Charts and Graphs.

CALCULATION OF RADIATED EMISSIONS LIMITS

The maximum peak output power of an intentional radiator in the 2400-2483.5 MHz band, as specified in Title 47 CFR 15.247 (b)(3), is 1 Watt. The harmonic and spurious RF emissions, as measured in any 100 kHz bandwidth, as specified in 15.247 (d), shall be at least 20 dB below the measured power of the desired signal, and must also meet the requirements described in 15.205(c).

The following table depicts the general radiated emission limits above 30 MHz. These limits are obtained from Title 47 CFR, Part 15.209, for radiated emissions measurements. These limits were applied to any signals found in the 15.205 restricted bands.

Frequency (MHz)	3 m Limit $\mu\text{V/m}$	3 m Limit (dB $\mu\text{V/m}$)	1 m Limit (dB $\mu\text{V/m}$)
30-88	100	40.0	-
88-216	150	43.5	-
216-960	200	46.0	-
960-24,000	500	54.0	63.5

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

$$\begin{aligned}\text{dB}\mu\text{V/m} &= 20 \log_{10} (100) \\ &= 40 \text{ dB}\mu\text{V/m} \text{ (from 30-88 MHz)}\end{aligned}$$

For measurements made at 1.0 meter, a 9.5 dB correction has been invoked.

$$\begin{aligned}&960 \text{ MHz to } 10,000 \text{ MHz} \\ &500\mu\text{V/m or } 54.0 \text{ dB}\mu\text{V/m at 3 meters} \\ &54.0 + 9.5 = 63.5 \text{ dB}\mu\text{V/m at 1 meter}\end{aligned}$$

For measurements made at 0.3 meter, a 20 dB correction has been invoked.

$$\begin{aligned}&960 \text{ MHz to } 10,000 \text{ MHz} \\ &500\mu\text{V/m or } 54.0 \text{ dB}\mu\text{V/m at 3 meters} \\ &54.0 + 20 = 74 \text{ dB}\mu\text{V/m at 0.3 meters}\end{aligned}$$

Radiated Emissions Data Chart
3 Meter Measurements of Electromagnetic Radiated Emissions
Test Standard: 47CFR, Part 15.205 and 15.247(DTS)
Frequency Range Inspected: 30 MHz to 25000 MHz

Manufacturer:	Scott Health and Safety					
Date(s) of Test:	March 20 TH and 21 ST , 2006					
Test Engineer(s):		Tom Smith	√	Abtin Spantman		Ken Boston
Model #:	Personal Beacon					
Serial #:	Engineering Sample					
Voltage:	4.5 VDC					
Operation Mode:	Normal and continuous transmit					
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: 23.5°C
Relative Humidity: 30 %

Test Equipment Used:

EMI Measurement Instrument: HP8546A and Agilent E4446A
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 spurious radiated RF emissions found:

Frequency (MHz)	ANT./EUT Polarity	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBμV/m)	15.205 Limit (dBμV/m)	Margin (dB)
				Note (3)		

No significant spurious emissions were noted other than the fundamental and harmonic emissions.

The following table depicts the measured radiated RF fundamental and harmonic emissions.

Frequency (MHz)	ANT./EUT Polarity	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBμV/m)	15.247 Limit (dBμV/m)	Margin (dB)
2425	H / H	1.05	175	117.0	125.2	8.2
4850	H / V	1.30	310	46.0	54.0	8.0
7275	V / H	1.00	90	51.2	63.5	12.3
9700	V / H	1.00	5	60.8	105.2	44.4
12125	H / S	1.00	0	44.2	63.5	19.3
14550	H / S	1.00	0	36.0	105.2	69.2
16975	H / S	1.00	0	38.2	105.2	67.0
19400	H / H	1.00	90	42.1	74.0	31.9
21825	H / H	1.00	90	38.1	125.2	87.1
24250				Note (3)	125.2	

Notes:

- 1) A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak as well as an Average Detector was used in measurements above 1 GHz. Only the results from the Average detector are published in the table above. The peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits.
- 2) Measurements above 5 GHz were made at 1 meters of separation from the EUT, and at 0.3 m separation for frequencies between 18 – 25 GHz.
- 3) Measurement at receiver system noise floor.
- 4) For measurements of the fundamental power, because of spectral bandwidth, the receiver was set to RBW=VBW=3 MHz.

View of the EUT setup in Side orientation (Highest emissions measured)



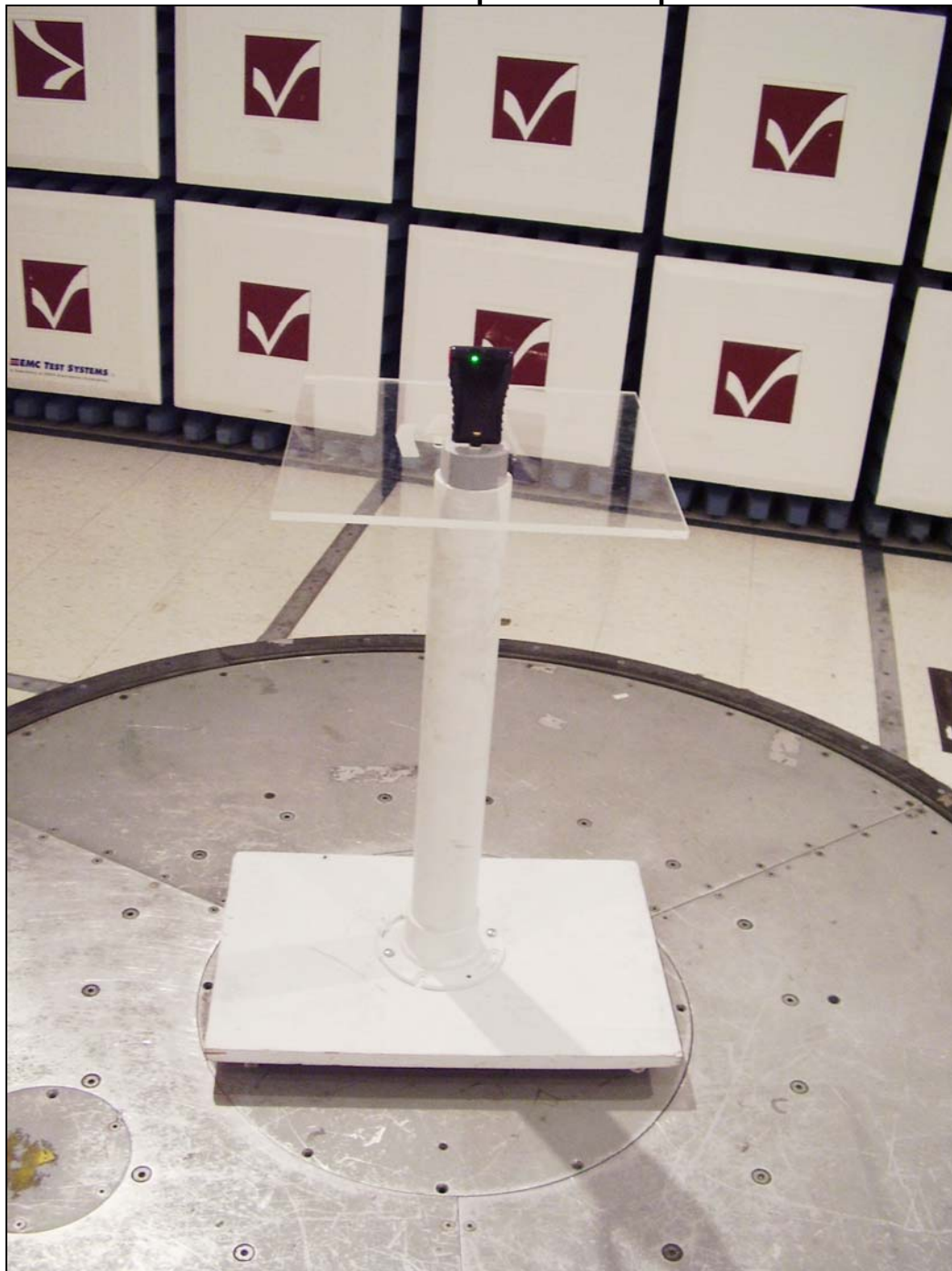
View of the EUT setup in vertical orientation



View of the EUT setup in Horizontal orientation



View of the EUT setup on the test pedestal



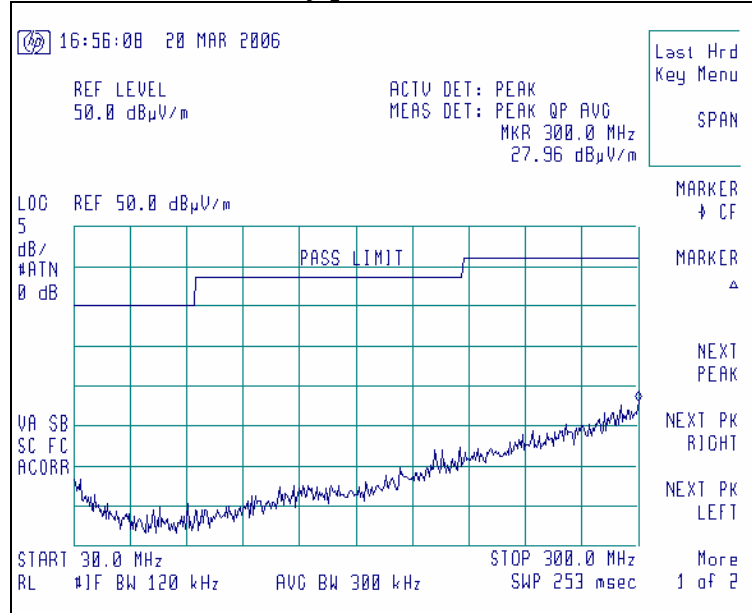
Graphs made during Radiated Emission Testing

Screen Captures of Radiated RF Emissions:

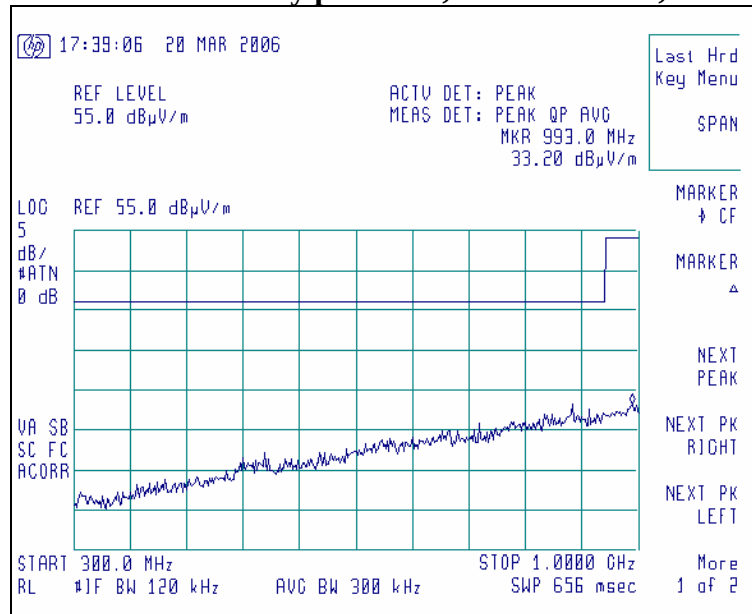
Please note these screen captures represent Peak Emissions. For radiated emission measurements, we utilize a Quasi-Peak detector function when measuring frequencies below 1 GHz, and an Average detector function when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured with the sense antenna both in vertical and horizontal polarity for worst case presentations.

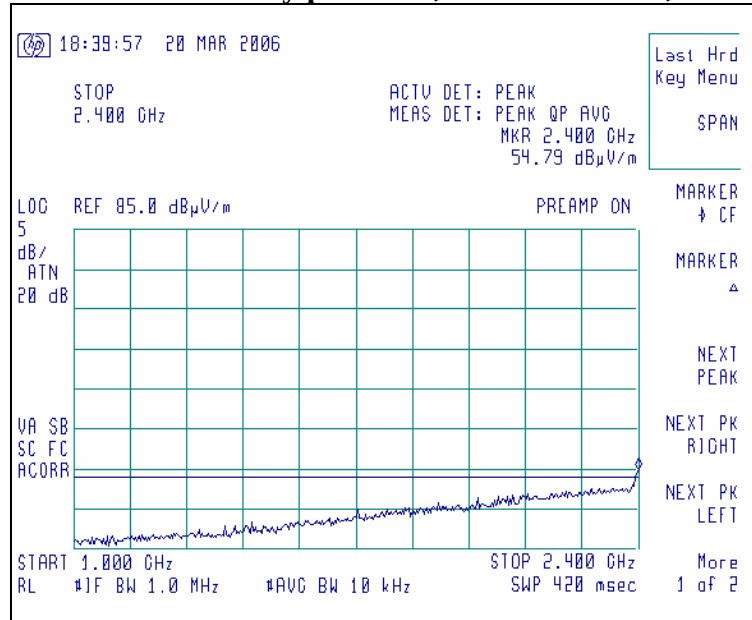
Antenna horizontally polarized, 30-300 MHz, at 3m.



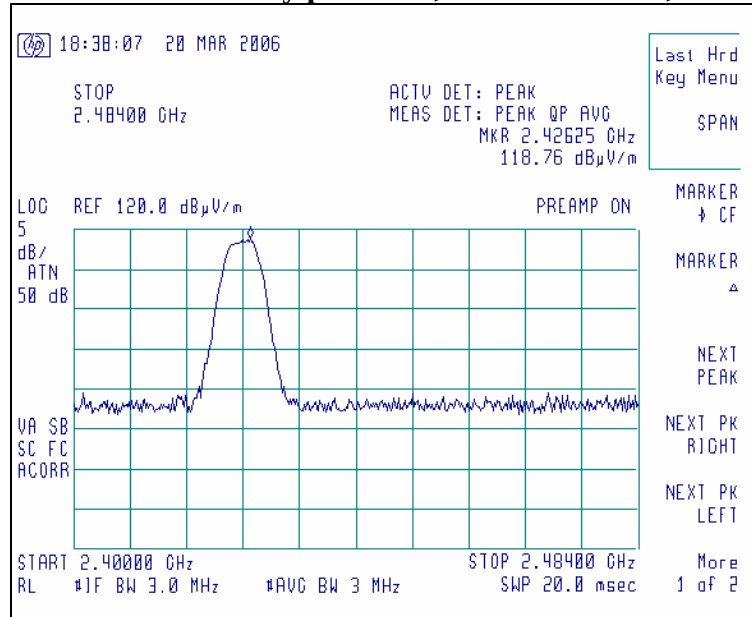
Antenna horizontally polarized, 300-1000 MHz, at 3m.



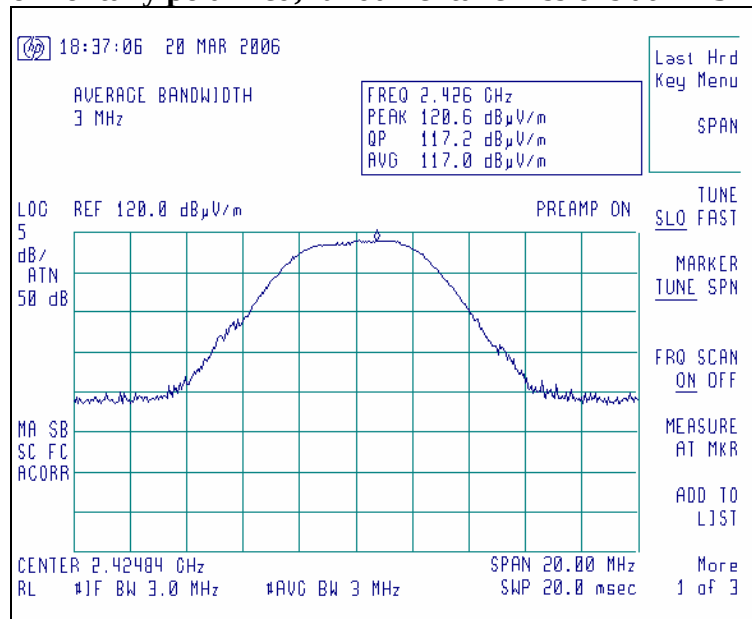
Antenna horizontally polarized, 1000-2400 MHz, at 3m.



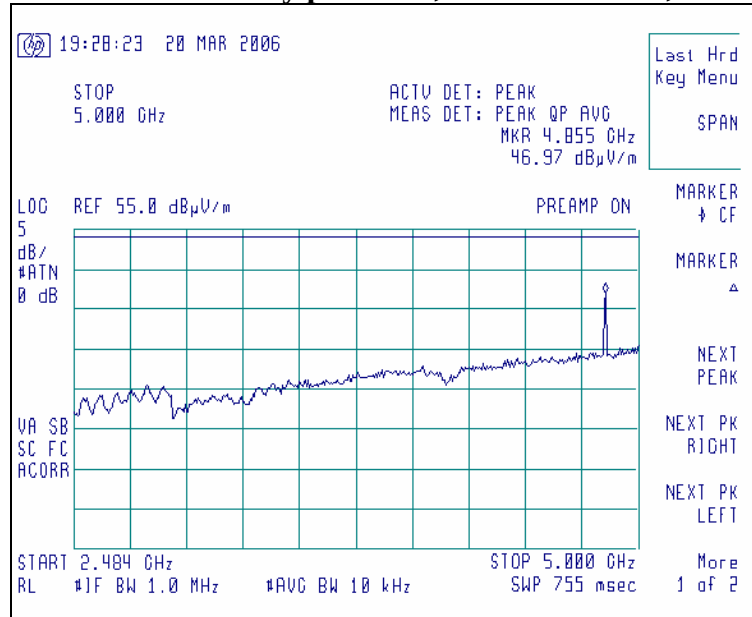
Antenna horizontally polarized, 2400-2484 MHz, at 3m.



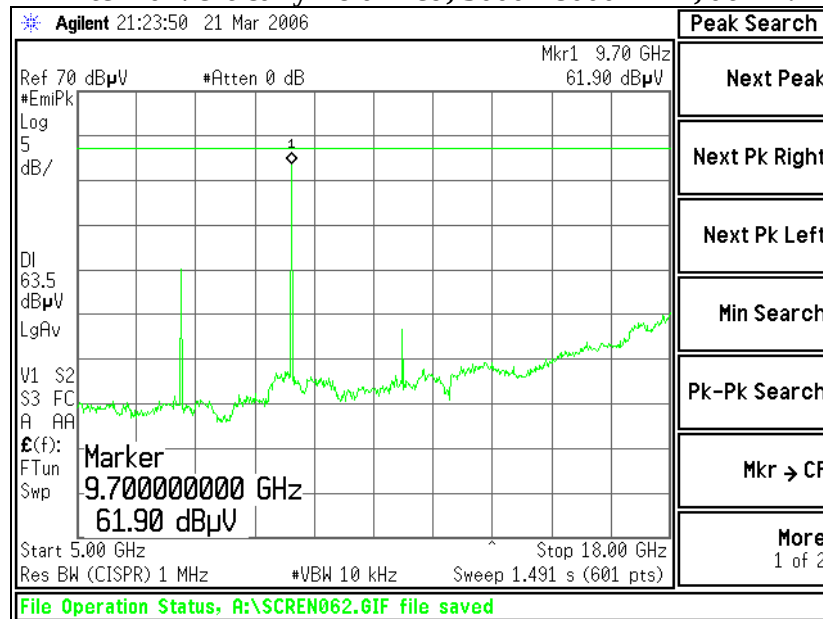
Antenna horizontally polarized, fundamental emissions at 2425 MHz, at 3m.



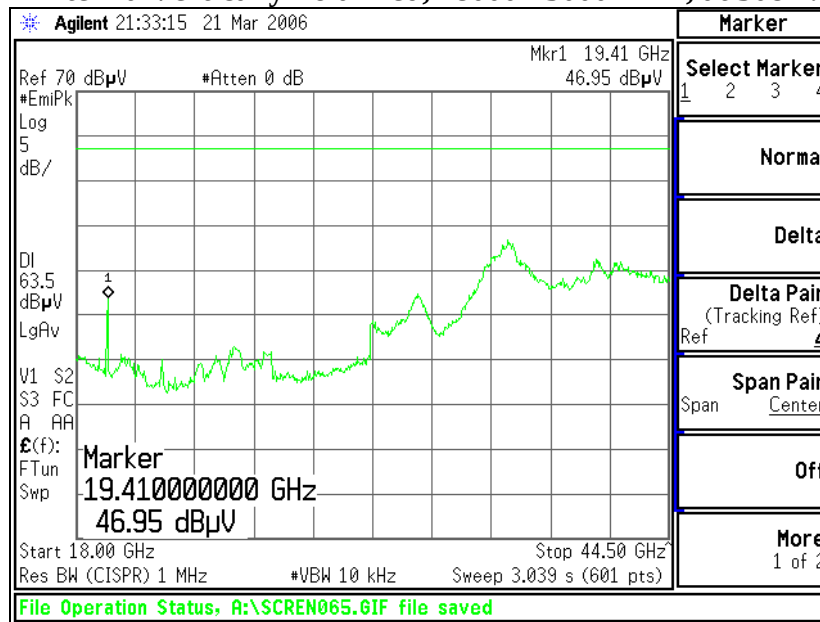
Antenna horizontally polarized, 2484-5000 MHz, at 3m.



Antenna Vertically Polarized, 5000-18000 MHz, at 1m.



Antenna Vertically Polarized, 18000-25000 MHz, at 30cm.

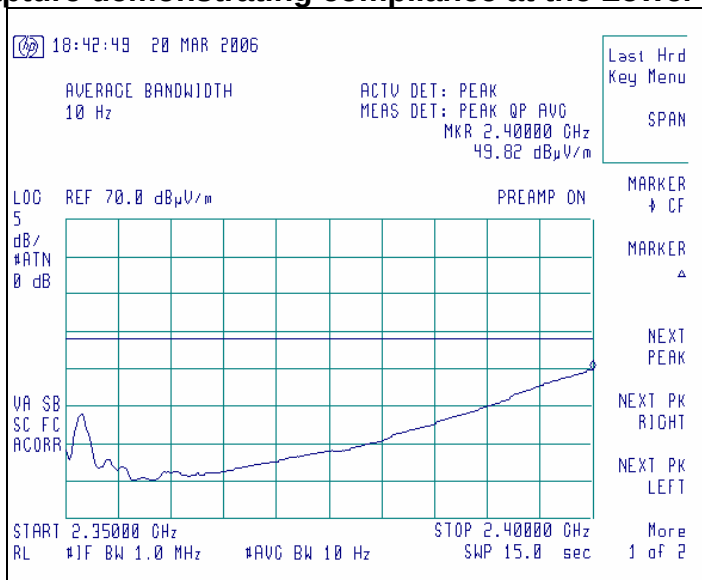


9. Band-Edge Measurements 15.247 (d)

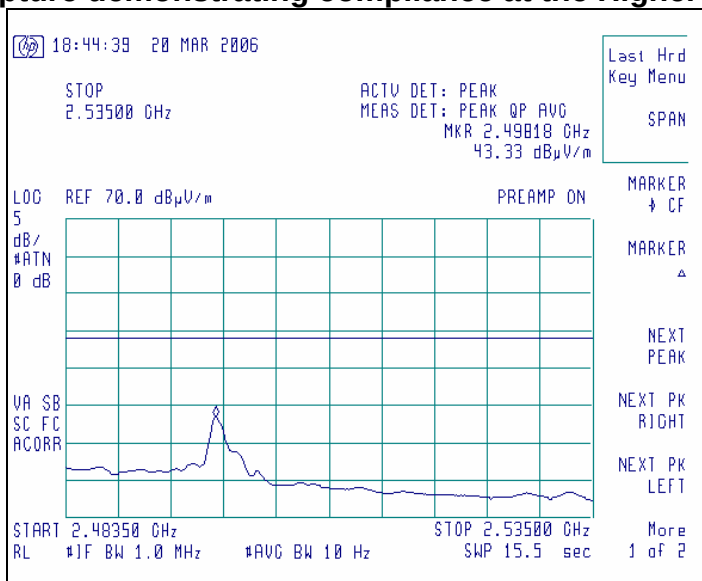
FCC 15.209(b) and 15.247(d) require a measurement of spurious emission levels to be at least 20 dB lower than the fundamental emission level, in particular at the band-edges where the intentional radiator operates. The following screen captures demonstrate compliance of the intentional radiator at the 2400-2483.5 MHz band-edges. The EUT was operated in continuous transmit mode with continuous modulation, with internally generated data as the modulating source. The EUT was operated at the lowest channel for the investigation of the lower band-edge, and at the highest channel for the investigation of the higher band-edge.

The Lower Band-Edge limit, in this case, would be = -20dBc with respect to the fundamental level.
The Upper Band-Edge limit, in this case, would be = +54 dBμV/m at 3m.

Screen Capture demonstrating compliance at the Lower Band-Edge



Screen Capture demonstrating compliance at the Higher Band-Edge

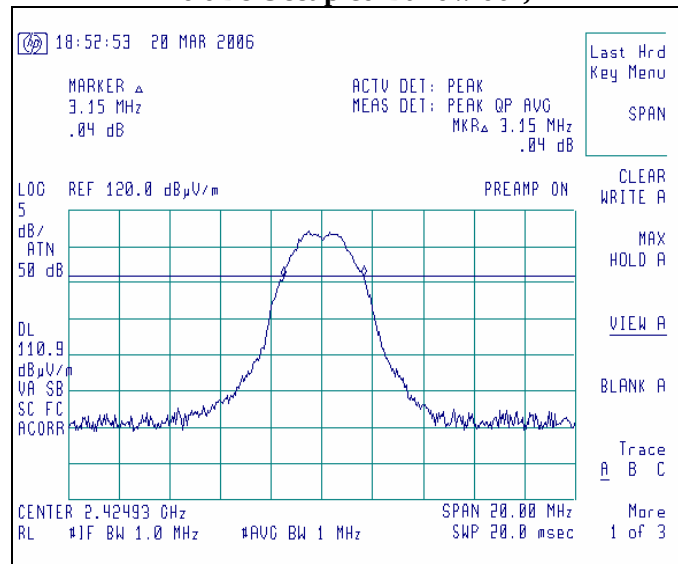


10. Occupied Bandwidth 15.247 (a)

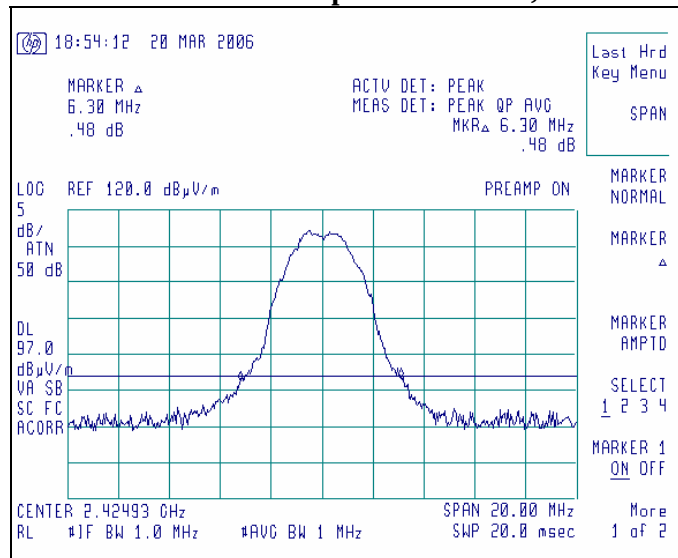
The 20 dB bandwidth requirement found in FCC Part 15.247(a)(2) requires a minimum -6dBc occupied bandwidth of 500 kHz. For this portion of the tests, a direct measurement of the transmitted signal was performed at the antenna port of the EUT, via a cable connection to the spectrum analyzer. The loss from the cable was added on the analyzer as gain offset settings, there by allowing direct readings of the measurements made without the need for any further corrections. A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used in peak-hold mode while measurements were made, as presented in the chart below.

Center Frequency (MHz)	Measured -6 dBc BW (kHz)	Minimum Limit (kHz)
2425	3150	500

-6 dBc Occupied Bandwidth,



-20 dBc Occupied Bandwidth,



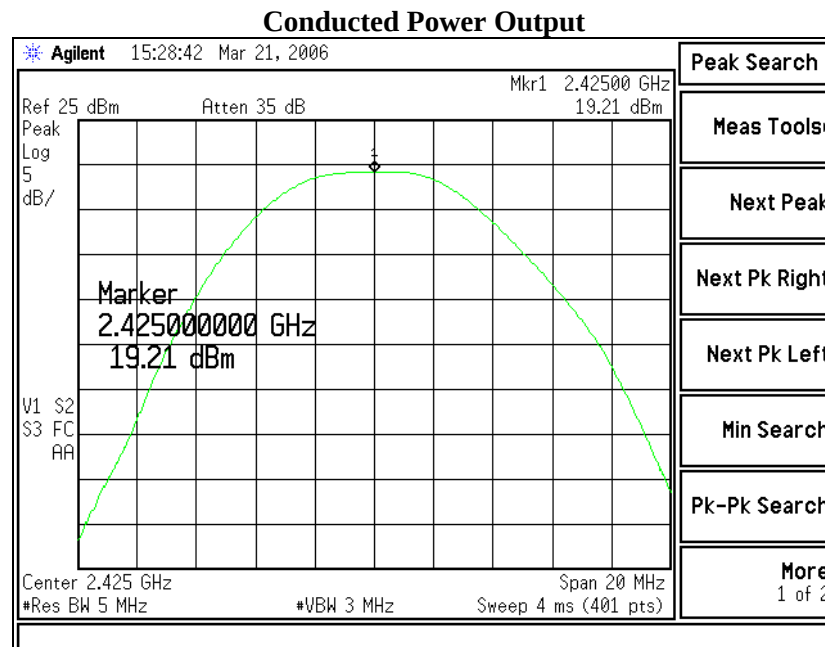
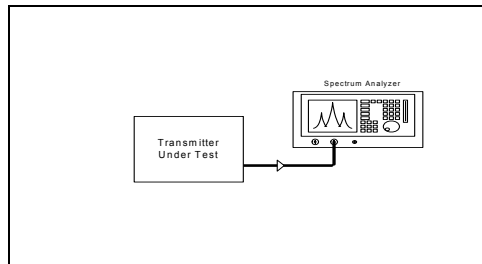
11. Conducted RF Emissions Test AC, Power Line 15.207

This device does not have any contingencies for connection to AC Mains.
No conducted RF emissions testing was performed on this product.

12. Power Output 15.247(b)

The conducted RF output power of the EUT was measured at the antenna port using a short RF cable to the spectrum analyzer. The loss from the cable was added on the analyzer as gain offset settings, there by allowing direct readings of the measurements made without the need for any further corrections. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with resolution bandwidth of 5 MHz, and a video bandwidth of 3 MHz, and a span of 20 MHz, with measurements from a peak detector presented in the chart below. RF Power Output was also monitored while varying the DC voltage as sourced by a DC bench type power supply, as described in a later section of this report. No considerable variation in output power was observed while varying the voltage to +/- 15% of nominal.

CENTER FREQ (MHz)	LIMIT (dBm)	MEASURED POWER (dBm)	MARGIN (dB)
2425	+ 30.0	+ 19.2	10.8



Measured RF power output (in watts): 0.0832 Watts (+19.2 dBm)

Declared RF power output (in watts): 0.1000 Watts (+20.0 dBm)

13. Spurious Emissions 15.247(d)

FCC Part 15.247(d) requires a measurement of conducted harmonic and spurious RF emission levels, as reference to the carrier level when measured in a 100 kHz bandwidth. For this test, the spurious and harmonic RF emissions from the EUT were measured at the EUT antenna port using a short RF cable into the spectrum analyzer. The loss from the cable was added on the analyzer as gain offset settings, thereby allowing direct readings of the measurements made without the need for any further corrections. A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with measurements from a peak detector presented in the chart below. Screen captures were acquired and any noticeable spurious and harmonic signals were identified and measured.

No significant emissions could be noted within -50 dBc of the fundamental level for this product.

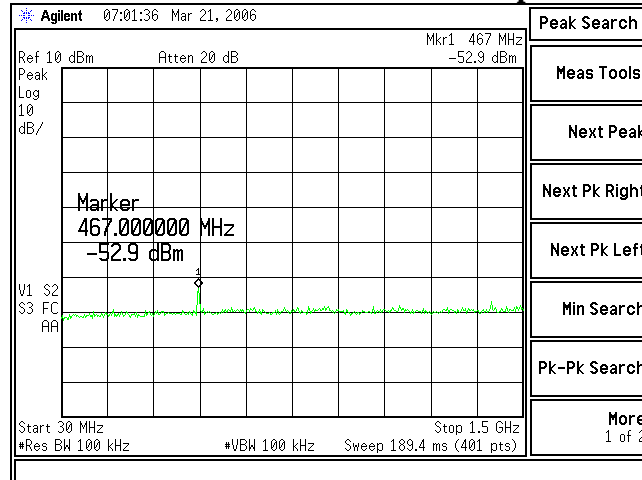
	Spurious Power
467 MHz	- 52.9 (dBm)
1658 MHz	- 58.4 (dBm)
2742 MHz	- 47.9 (dBm)
Fundamental	+ 15.5 (dBm)
2 nd Harmonic	- 48.9 (dBm)
3 rd Harmonic	- 59.0 (dBm)
4 th Harmonic	- 70.4 (dBm)
5 th Harmonic	- 56.8 (dBm)
6 th Harmonic	- 83.4 (dBm)
7 th Harmonic	- 80.3 (dBm)
8 th Harmonic	- 75.4 (dBm)
9 th Harmonic	- 80.0 (dBm)
10 th Harmonic	Note (1)

Notes:

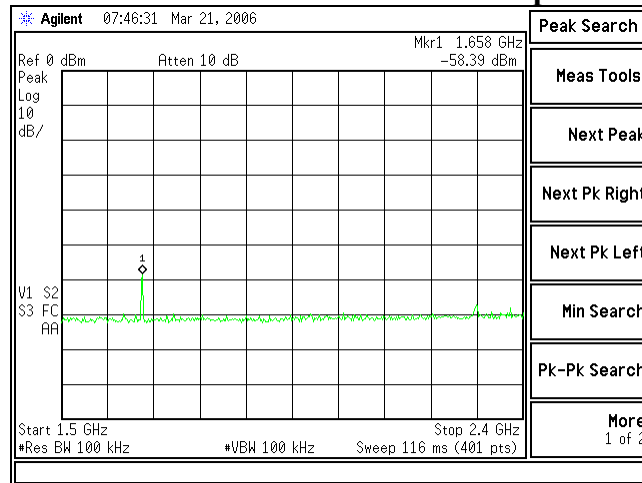
(1) Measurement at system noise floor.

Plots of Conducted Spurious and Fundamental Levels

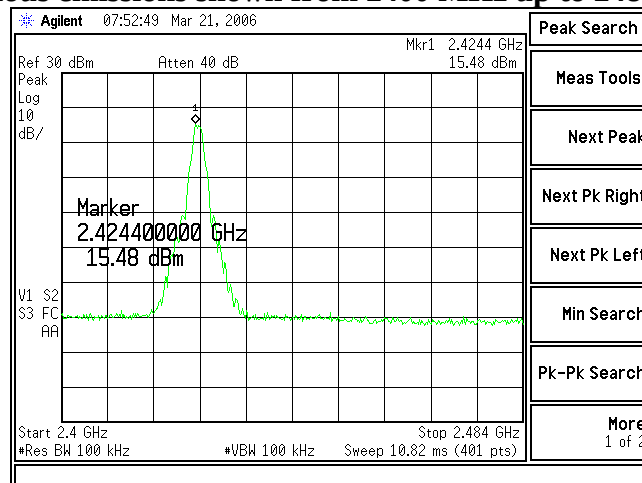
Spurious emissions shown from 30 MHz up to 1500 MHz



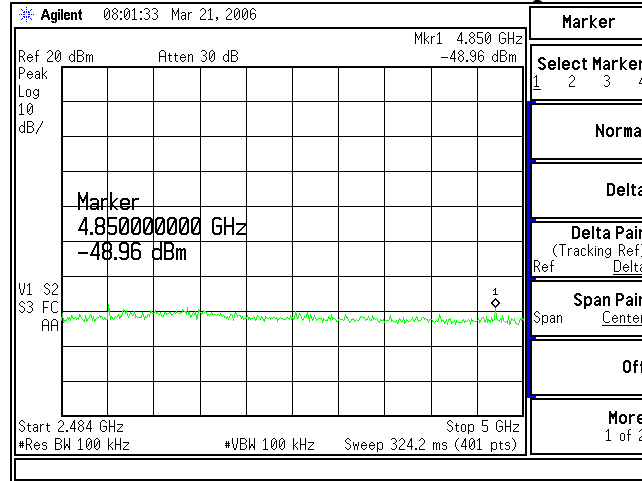
Spurious emissions shown from 1500 MHz up to 2400 MHz



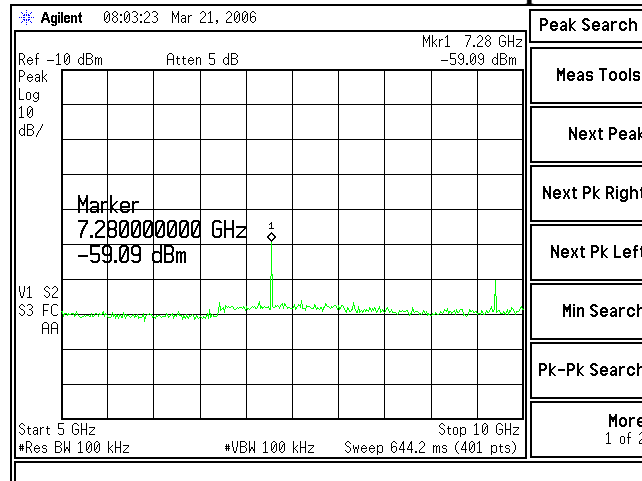
Spurious emissions shown from 2400 MHz up to 2484 MHz



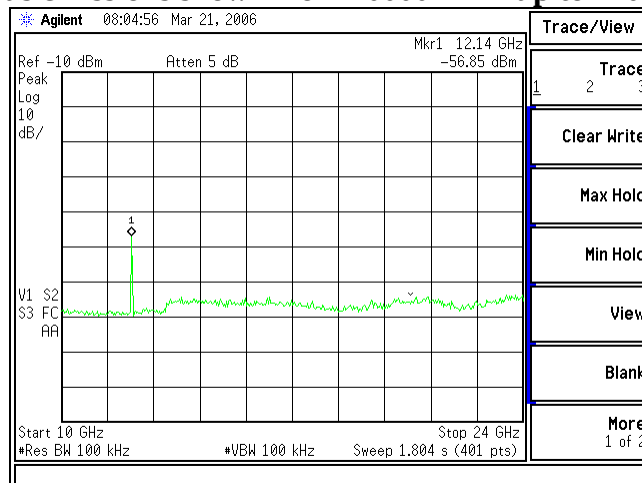
Spurious emissions shown from 2484 MHz up to 5000 MHz



Spurious emissions shown from 5000 MHz up to 10000 MHz



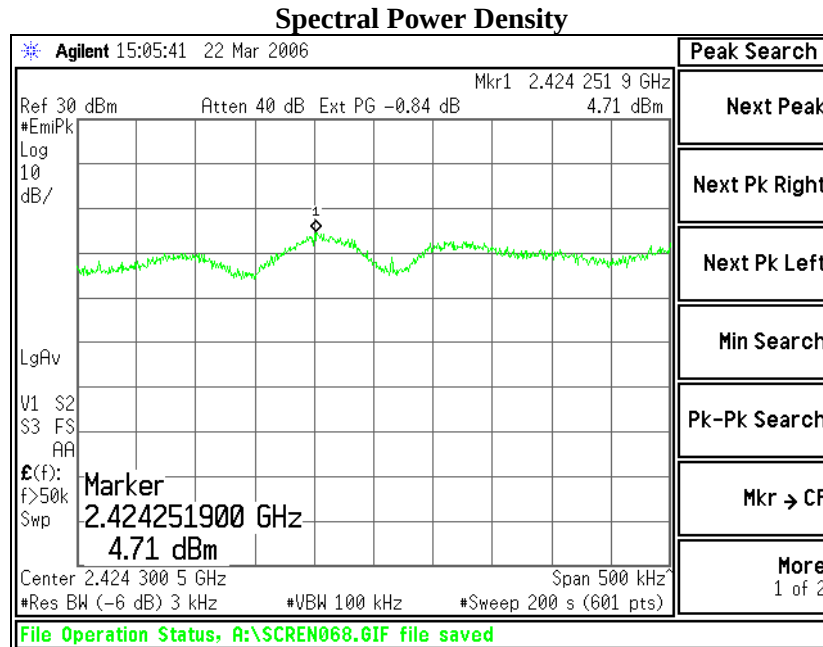
Spurious emissions shown from 10000 MHz up to 24000 MHz



14. Power Spectral Density 15.247 (e)

In accordance with FCC Part 15.247(e), the peak power spectral density should not exceed +8 dBm in any 3 kHz band. This measurement was performed along with the conducted power output readings performed as described in previous sections. The peak output frequency for each representative frequency was scanned, with a narrow bandwidth, and reduced sweep, and a power density measurement was performed. The highest density was found to be no greater than +4.7 dBm, which is under the allowable limit by 3.3 dB.

Center Frequency (MHz)	Measured Power (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
2425	+ 4.7	+8.0	3.3



15. Frequency and Power Stability 15.31 (e)

The stability of the device was examined as a function of the input voltage available to the EUT. In this case, the EUT uses three type “AAA” Alkaline batteries, with a nominal voltage of 4.5 VDC.

A Spectrum Analyzer was used to measure the frequency at the appropriate frequency markers. For this test, the EUT was placed in continuous transmit CW mode. Power to the EUT was supplied by an external bench-type variable power supply. The frequency of operation was monitored using the spectrum analyzer with RBW=VBW=3kHz settings while the voltage was varied.

	DC Voltage Source		
	3.83 VDC	4.50 VDC	5.18 VDC
Channel 0	2424.8164 MHz	2424.8164 MHz	2424.8164 MHz

The RF power output of the EUT was also monitored in a separate test, also using a spectrum analyzer with RBW=VBW=3MHz setting while the voltage was varied.

	DC Voltage Source		
	3.83 VDC	4.50 VDC	5.18 VDC
Channel 0	+ 19.2 dBm	+ 19.2 dBm	+ 19.2 dBm

The power was then cycled On/Off to observe system response. No unusual response was observed during power loss, the emission characteristics were well behaved, and the system returned to the proper power-up state (standby state, not transmitting).

16. MPE Calculations 15.247 (j)

MPE Calculations are based on the perceived gain of the PCB trace antenna, calculated to be +6.2 dBi based on actual radiated fundamental emission measurements as described in the previous sections of this report.

The calculations are performed twice, at two different separation distances of 20cm and 7cm.

MPE Calculation at 20 cm separation:

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	19.20 (dBm)
Maximum peak output power at antenna input terminal:	83.176 (mW)
Antenna gain(typical):	6.2 (dBi)
Maximum antenna gain:	4.169 (numeric)
Prediction distance:	20 (cm)
Prediction frequency:	2425 (MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1 (mW/cm ²)
Power density at prediction frequency:	0.068981 (mW/cm ²)
Maximum allowable antenna gain:	17.8 (dBi)
Margin of Compliance at 20 cm =	11.6 dB

MPE Calculation at 7 cm separation:
Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	<u>19.20</u>	(dBm)
Maximum peak output power at antenna input terminal:	<u>83.176</u>	(mW)
Antenna gain(typical):	<u>6.2</u>	(dBi)
Maximum antenna gain:	<u>4.169</u>	(numeric)
Prediction distance:	<u>7</u>	(cm)
Prediction frequency:	<u>2425</u>	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	<u>1</u>	(mW/cm ²)
Power density at prediction frequency:	0.563111	(mW/cm ²)
Maximum allowable antenna gain:	8.7	(dBi)
Margin of Compliance at 7 cm =	2.5	dB

Appendix A

Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Date	Due
AA960008	EMCO	3816/2NM	9701-1057	Line Impedance Stabilization Network	9/27/05	9/27/06
AA960031	HP	119474A	3107A01708	Transient Limiter	Note 1	Note 1
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	9/27/05	9/27/06
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	9/27/05	9/27/06
AA960081	EMCO	3115	6907	Double Ridge Horn Antenna	12/07/05	12/07/06
CC00221C	Agilent	E4407B	US39160256	Spectrum Analyzer	12/29/05	12/29/06
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	9/29/05	9/29/06
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	9/29/05	9/29/06
EE960073	Agilent	E4446A	US45300564	Spectrum Analyzer	2/01/06	2/01/07
N/A	LSC	Cable	0011	3 Meter ½" Armored Cable	Note 1	Note 1
N/A	LSC	Cable	0050	10 Meter RG 214 Cable	Note 1	Note 1
N/A	Pasternack	Attenuator	N/A	10 dB Attenuator	Note 1	Note 1

Note 1 - Equipment calibrated within a traceable system.

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