



L.S. Compliance, Inc.

W66 N220 Commerce Court
Cedarburg, WI 53012
262-375-4400 Fax: 262-375-4248

COMPLIANCE TESTING OF:

900 MHz Body Worn Portable Transceiver; EZ-Com
Model # WLAD116 6 Rev. A

PREPARED FOR:

Grayhill
561 Hillgrove Avenue
La Grange, IL 60525-5997

TEST REPORT NUMBER:

303121

TEST DATE:

January 21st and February 12th – 14th, 2003

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, Inc.

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1. L. S. Compliance In Review

L. S. Compliance, Inc. is located in Cedarburg, Wisconsin – United States.

We may be contacted by:

Mail: L. S. Compliance, Inc.
W66 N220 Commerce Court
Cedarburg, Wisconsin 53012

Phone: 262-375-4400
Fax: 262-375-4248
E-mail: eng@lsr.com

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**

U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Conformity Assessment Body operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union EMC Directive 89/336/EEC, Article 10.2.

Date of Validation: **January 16, 2001**

Federal Communications Commission (FCC) – USA

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

Listing of 3 and 10 meter OATS based on 47CFR 2.948
FCC Registration Number: **90757**

Industry Canada

On-file, 3 Meter Semi-Anechoic Chamber based on 47CFR 2.948
File Number: **IC 3088**

On-file 3 and 10 Meter OATS based on RSS-210
File Number: **IC 3088-A**

2. A2LA Certificate of Accreditation



**THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION**

ACCREDITED LABORATORY

A2LA has accredited

L.S. COMPLIANCE, INC.
Cedarburg, WI

for technical competence in the field of

Electrical Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 26th day of March 2003.




President
For the Accreditation Council
Certificate Number 1255.01
Valid to January 31, 2005

For tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.

3. A2LA Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

L.S. COMPLIANCE, INC.
W66 N220 Commerce Court
Cedarburg, WI 53012
James Blaha Phone: 262 375 4400

ELECTRICAL (EMC)

Valid to: January 31, 2005

Certificate Number: 1255-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

Test

Test Method(s)

Emissions

Conducted Emissions
Continuous/Discontinuous

Code of Federal Regulations (CFR) 47, FCC Method Parts
15 and 18 using ANSI C63.4;
EN: 55011, 55022, 55081-1, 55081-2;
CISPR: 11, 22; CNS 13438

Radiated Emissions

Code of Federal Regulations (CFR) 47, FCC Method Parts
15 and 18 using ANSI C63.4;
EN: 55011, 55022, 55081-1, 55081-2;
CISPR: 11, 22; CNS 13438

Current Harmonics

EN 61000-3-2

Voltage Fluctuations & Flicker

EN 61000-3-3

Immunity

Conducted Immunity
Fast Transients/Burst

IEC: 1000-4-4, 801-4;
EN: 61000-4-4, 50082-1, 50082-2
IEC: 1000-4-5, 801-5; ENV 50142;
EN: 61000-4-5, 50082-1, 50082-2
IEC: 1000-4-6, 801-6; ENV 50141;
EN: 61000-4-6, 50082-1, 50082-2

Surge

RF Fields

Voltage Dips/Interruptions

IEC 1000-4-11;
EN: 61000-4-11, 50082-1, 50082-2

Lynne M. Robinson

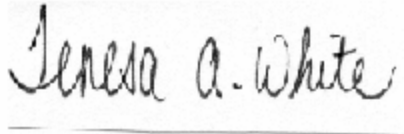
(A2LA Cert. No. 1255.01) 03/26/03
5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974



4. Validation Letter – U.S. Competent Body for EMC Directive 89/336/EEC

 1901/2001 NIST CENTENNIAL	 DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA	UNITED STATES DEPARTMENT OF COMMERCE National Institute of Standards and Technology Gaithersburg, Maryland 20899-
January 16, 2001		
Mr. James J. Blaha L.S. Compliance Inc. W66 N220 Commerce Court Cedarburg, WI 53012-2636		
Dear Mr. Blaha:		
I am pleased to inform you that the European Commission has validated your organization's nomination as a U.S. Conformity Assessment Body (CAB) for the following checked (✓) sectoral annex(es) of the U.S.-EU Mutual Recognition Agreement (MRA). (✓) Electromagnetic Compatibility-Council Directive 89/336/EEC, Article 10(2) () Telecommunication Equipment-Council Directive 98/13/EC, Annex III () Telecommunication Equipment-Council Directive 98/13/EC, Annex III and IV - Identification Number: () Telecommunication Equipment-Council Directive 98/13/EC, Annex V - Identification Number:		
This validation is only for the location noted in the address block, unless otherwise indicated below. (✓) Only the facility noted in the address block above has been approved. () Additional EMC facilities: () Additional R&TTE facilities:		
Please note that an organization's validations for various sectors of the MRA are listed on our web site at http://ts.nist.gov/mra. You may now participate in the conformity assessment activities for the operational period of the MRA as described in the relevant sectoral annex or annexes of the U.S.-EU MRA document. NIST will continue to work with you throughout the operational period. All CABs validated for the operational phase of the Agreement must sign and return the enclosed CAB declaration form, which states that each CAB is responsible for notifying NIST of any relevant changes such as accreditation status, liability insurance, and key staff involved with projects under the MRA. Please be sure that you fully understand the terms under which you are obligated to operate as a condition of designation as a CAB. As a designating authority, NIST is responsible for monitoring CAB performance to ensure continued competence under the terms of the MRA.		
		

5. Signature Page



Prepared By:

April 21, 2003

Teresa A. White, Document Coordinator

Date

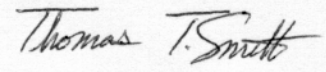


Tested By:

April 21, 2003

Abtin Spantman, EMC Engineer

Date

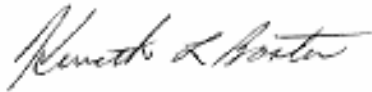


Tested By:

April 21, 2003

Thomas T. Smith, EMC Engineer

Date



Approved By:

April 21, 2003

Kenneth L. Boston, EMC Lab Manager
PE #31926 Licensed Professional Engineer
Registered in the State of Wisconsin, United States

Date

6. Product and General Information

Manufacturer:	Grayhill
Model No.:	900 MHz Body Worn Portable Transceiver #WLAD1166 Rev.A
Serial No.:	502 (501 for Conducted RF Emissions)
Description:	902 to 928 Direct Sequence Spread Spectrum Transceiver

7. Product Description

The EZCom DSSS Radio Transceiver is a packaged radio system which is used for remote controlled applications in a railroad yard environment. The transceiver and integrated antenna are enclosed in a larger assembly, which is worn as a belt pack by a user located in the railway switch yard. The EUT itself is a 902 to 928 MHz Direct Sequence Spread Spectrum Transceiver.

8. Test Requirements

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

15.207	15.247b	15.247e
15.205	15.247c	15.209
15.247a2	15.247d	

All radiated emissions tests were performed to measure the emissions in the frequency bands described by the above sections, and to determine whether said emissions are below the limits established by the above sections. These tests were performed in accordance with the procedure 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 C63.4-2001). Another document used as reference for the EMI receiver specification was the International Special Committee on Radio Interference CISPR 16-1 (2002). Measurement technique guidelines found in Appendix C to FCC 97-114 were also consulted. During all tests, the transceiver was operated in a continuous data transmit mode, on various channels.

9. Summary of Test Report

DECLARATION OF CONFORMITY

The Grayhill 900 MHz Body Worn Portable Transceiver was found to **MEET** the requirements as described within the specification of Title 47 CFR FCC, Part 15.247, Subpart C; and I.C. RSS-210, Section 7 for an intentional radiator.

10. Introduction

On February 12th – 14th, 2003 a series of Radiated and Conducted Emission tests were performed on two samples of the Grayhill 900 MHz body Worn Portable Transceiver, Serial Numbers 501 and 502, here forth referred to as the *“Equipment Under Test”* or *“EUT”*. These tests were performed using the procedures outlined in ANSI C63.4-2001 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.109 (Industry Canada RSS-210) for a receiver or digital device. These tests were performed by Thomas T. Smith, EMC Engineer and Abtin Spantman, EMC Engineer of L.S. Compliance, Inc.

11. Purpose

All Radiated and Conducted Emission tests upon the EUT were performed to measure the emissions in the frequency bands described in title 47 CFR, FCC Part 15, including 15.35, 15.205, 15.247, 15.209a 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 procedure 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 C63.4-2001). Another document used as a reference for the EMI Receiver specification was the Comite International Special Des Perturbations Radioelectriques CISPR 16-1, 2002

12. Radiated Emissions Test

Test Setup

The test setup was assembled in accordance with Title 47, CRF FCC Part 15 and ANSI C63.4-2001. The EUT was placed on an 80cm high non-conductive table centered on a flush mounted 2meter diameter turntable inside the 3 Meter Semi-Anechoic, FCC listed Chamber located at L. S. Compliance, Inc., Cedarburg, Wisconsin. The EUT (S/N 502) was operated in a simulated normal mode, using DC power as supplied by a re-chargeable battery pack. The applicable limits for the emissions in the bands described in 15.205 apply at a 3 meter distance, and are found on Page 12. Measurements above 5 GHz were also performed at a 1 meter separation distance, and the calculation can also be found on Page 12. 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 (0), medium (4) and high (8) to comply with FCC Part 15.35. The sample tested for Radiated Emissions (Serial Number 502) was operated on a fully charged 12.7 VDC battery package.

Test Procedure

Radiation and Emission measurements were performed on the EUT in the 3 Meter Semi-Anechoic, FCC listed Chamber, located at L. S. Compliance, Inc. in Cedarburg, Wisconsin. The frequency range from 30 MHz to 10,000 MHz was scanned, and 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 80 centimeter pedestal in the 3 Meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the test object. 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 10 GHz. The maximum radiated emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities. The EUT was evaluated in all 3 orthogonal axes, in order to locate the orientation with the maximum emissions.

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 85462A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the HP 85462A EMI Receiver database. As a result, the data taken from the HP 85462A 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 85462A EMI Receiver was operated with a bandwidth of 120 kHz for measurements below 1 GHz. Both the Peak and Quasi-Peak Detector functions were utilized. From 5 GHz to 10 GHz, an HP E4407 Spectrum Analyzer and an EMCO Horn Antenna were used.

Test Results

The EUT was found to MEET the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.205 and 15.247 for a low power 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

The following table depicts the general limits for an intentional radiator. These limits are obtained from Title 47 CFR, Part 15.209, for radiated emissions measurements, and are used for measurements performed in the 15.205 bands.

Frequency (MHz)	3 m Limit mV/m	3 m Limit dB _m V/m
30-88	100	40
88-216	150	43.5
216-960	200	46.0
960-10,000	500	54.0

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

from 30 -88 MHz for example:

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

Sample conversion of limits between 3 meters and 1 meter:

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

or:

$$3\text{m limit (dB}\mu\text{V/m)} = 10\text{m limit (dB}\mu\text{V/m)} - 20 \log_{10} (1\text{m}/3\text{m})$$

from 960 – 10,000 MHz for example:

$$1\text{m limit (dB}\mu\text{V/m)} = 54.0 \text{ dB}\mu\text{V/m} + 9.54 \text{ dB}$$
$$63.5 \text{ dB}\mu\text{V/m} = 54.0 \text{ dB}\mu\text{V/m} + 9.54 \text{ dB}$$

Note: Limits are rounded to the nearest 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, (Industry Canada RSS-210) for a low power 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.

Measurement of Electromagnetic Radiated Emissions Within the 3 Meter FCC Listed Chamber

Frequency Range Inspected: 30 MHz - 10,000 MHz

Manufacturer: Grayhill

Date of Test: February 12th – 14th, 2003

Model No.: 900 MHz Body Worn Transceiver #WLAD1166 Rev.A

Serial No.: 502

Test Requirements: 15.247, 15.209 and 15.205

Distance: 3 Meters, *1 Meter	Frequency Range Inspected: 30 to 10,000 MHz
Configuration: Continuous Data Transmit, operating on a fully charged 12.7 VDC battery	

Test Equipment Used:

EMI Receiver: HP 85462A				Biconical Antenna: EMCO 3110				
Double-Ridged Wave Guide/Horn Antenna: EMCO 3115				Log Periodic Antenna: EMCO 43146A				
Detector(s) Used:			Peak	v	Quasi-Peak		v	Average

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

Frequency (MHz)	Antenna Polarity	Channel	Height (meters)	Azimuth (0° - 360°)	EMI Meter Reading (dBmV/m)	15.209 Limit (dBmV/m)	Margin (dB)
127.0	H	4	1.5	0	18.7	43.5	24.8
128.6	V	4	1.0	245	25.9	43.5	17.6
260.5	V	4	2.2	280	28.8	46.0	17.2
398.1	H	4	1.0	340	24.0	46.0	22.0
972.8	V	4	1.0	250	30.5	54.0	23.5
998.0	V	4	1.0	285	34.0	54.0	20.0
1609	V	4	1.05	190	40.9	54.0	13.1
2745	H	4	1.0	120	50.0	54.0	4.0
3660	H	4	1.15	130	42.7	54.0	11.3
4575	H	4	1.0	310	48.2	54.0	5.8
*7319	H	4	1.0	0	61.8	63.5	1.7

Note: A Quasi-Peak Detector was used in measurements below 1 GHz, and an Average Detector was used in measurements above 1 GHz. Channels 0, 4 and 8 were inspected; data for the highest emitting channel is represented, and in the highest signal orientation of the device.

Any radiated spurious emissions seen that were not in a 15.205 band were found to be well below the -20dBc limit specification of 15.247c.

* Measurement made at a 1 meter separation distance.

Photos Taken During Radiated Emission Testing

Setup for the Radiated Emissions Test, Horizontal Orientation

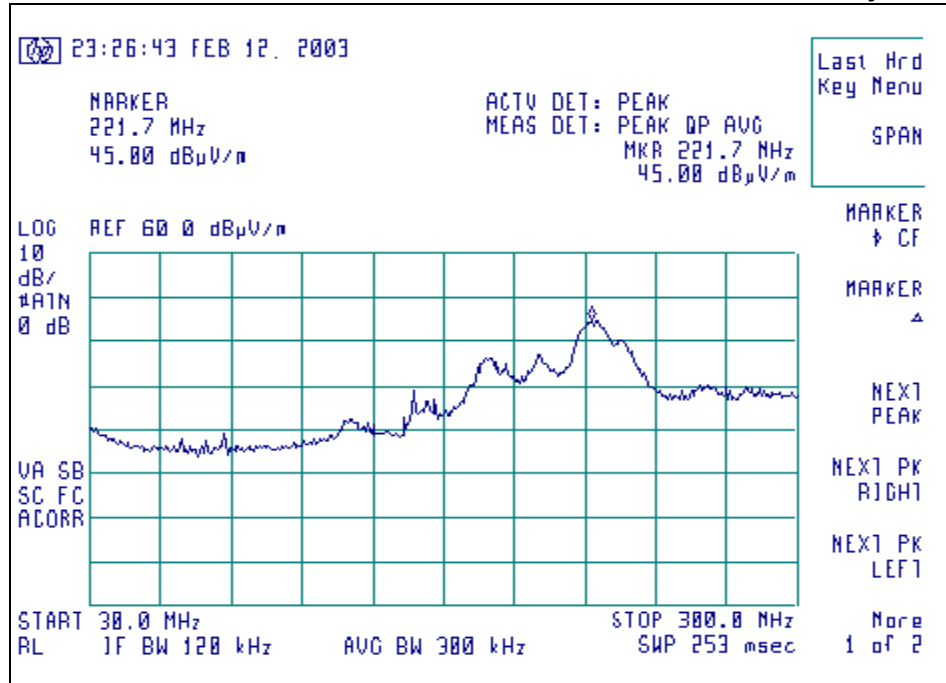


Setup for the Radiated Emissions Test, Vertical Orientation

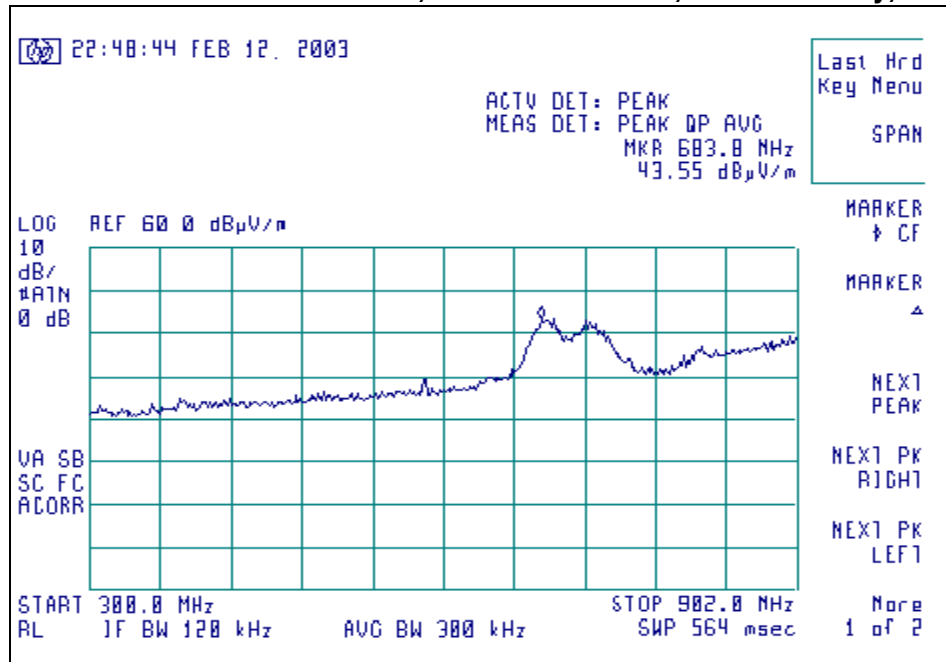


Graphs made during Radiated Emission Testing

Signature Scan of Radiated Emissions, 30 MHz – 300 MHz, Vertical Polarity, Channel 4

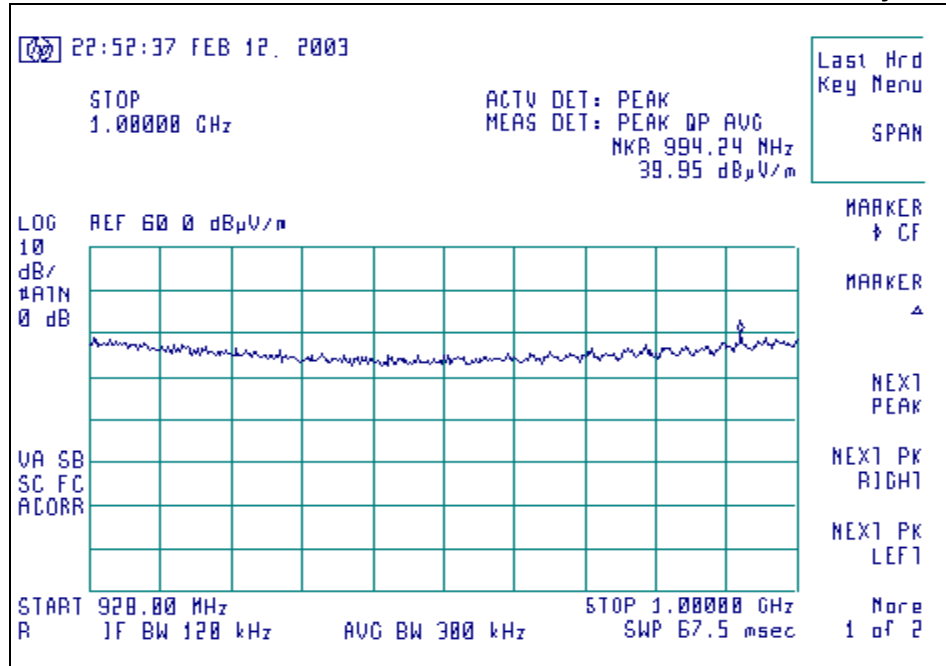


Signature Scan of Radiated Emissions, 300 MHz – 902 MHz, Vertical Polarity, Channel 4

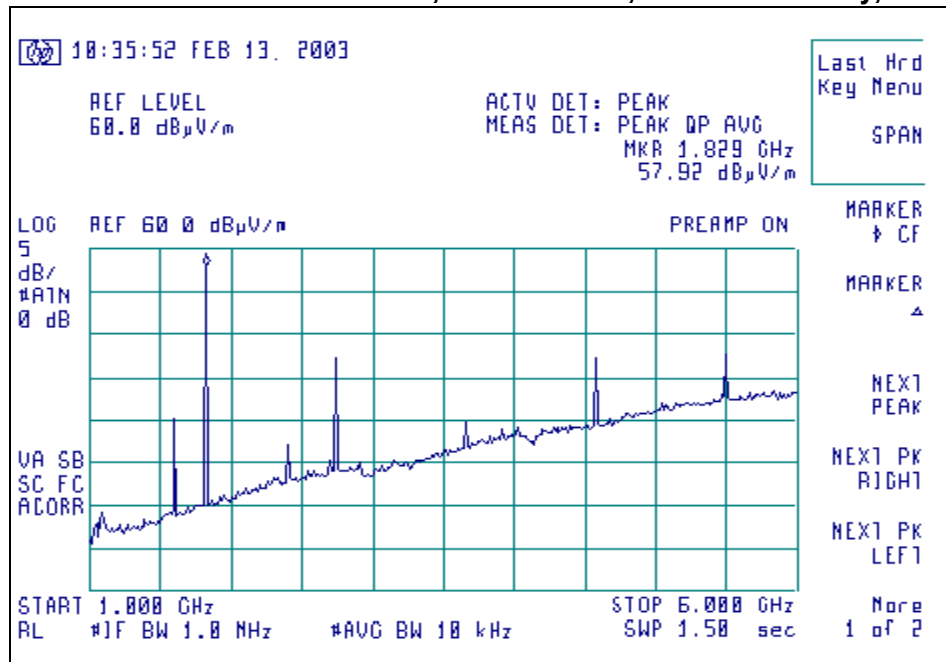


Graphs made during Radiated Emission Testing

Signature Scan of Radiated Emissions, 928 MHz – 1000 MHz, Vertical Polarity, Channel 4

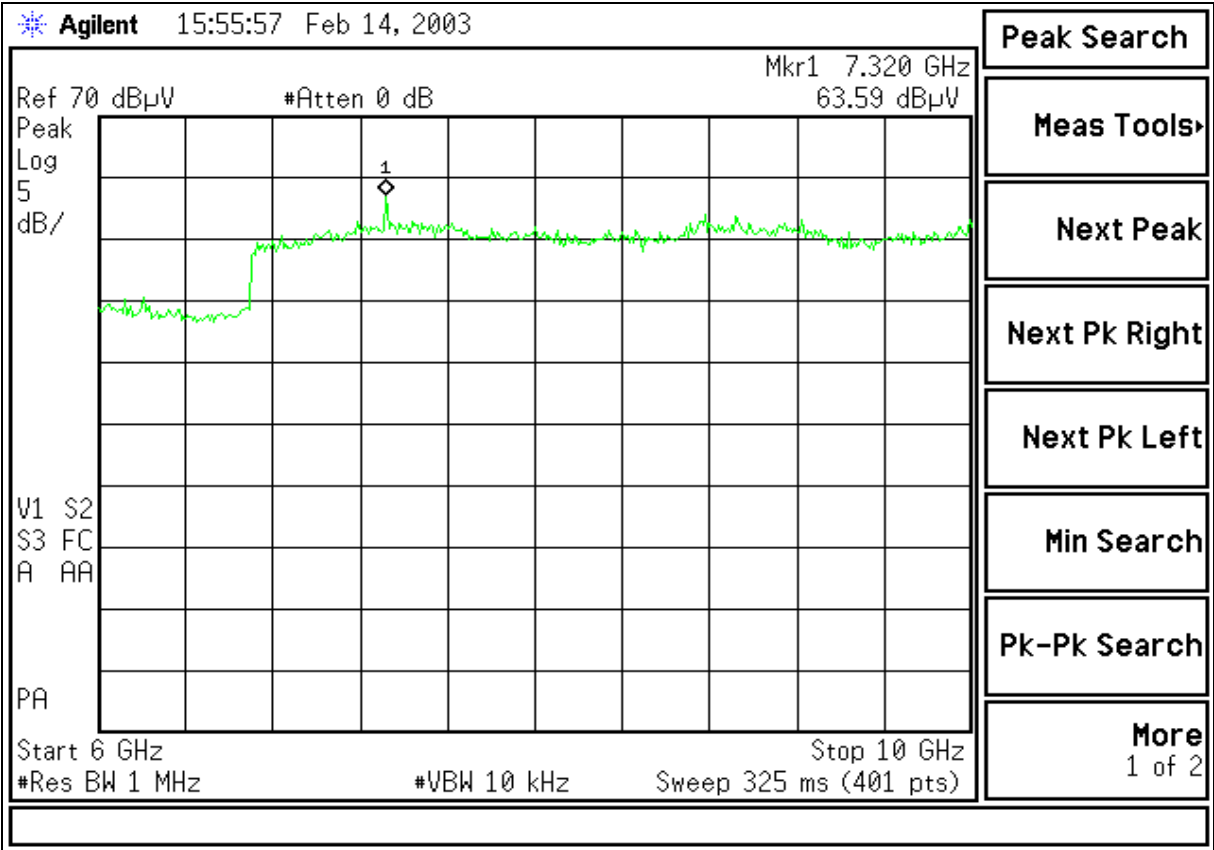


Signature Scan of Radiated Emissions, 1 GHz – 6 GHz, Horizontal Polarity, Channel 4



Graphs made during Radiated Emission Testing

Signature Scan of Radiated Emissions, 6 GHz – 10 GHz, Horizontal Polarity, Channel 4



13. Conducted Emissions Test (AC Line)

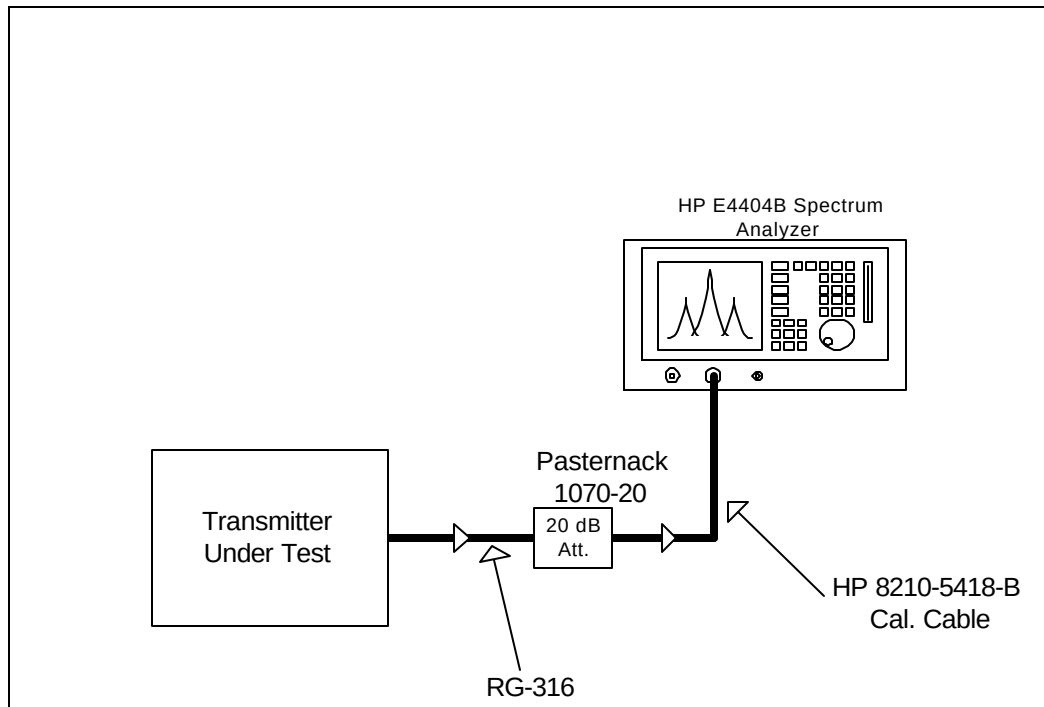
Note:

Due to this product operating on batteries, no AC Conducted Emissions were performed on the EUT.

14. Conducted Emissions Test, Power Output

For the FCC Part 15.247b measurement, the output of the Transceiver (Sample #501) was connected via a short jumper cable created only for this measurement, and a 20 dB fixed attenuator into the input of the HP E4407B Spectrum Analyzer. Sample 501 was powered via a regulated power supply for these tests. The unit was configured to run in a normal transmit mode, while being supplied with a test program as a modulation source. The HP receiver was set to a 5 MHz Bandwidth, and the transmit signal was then stored, with the peak signal level stored. This power level was collected for all four channels and can be seen in the chart presented below. Power output was also inspected while setting the power supply to 10.2 VDC and 13.8 VDC in order to satisfy Part 15.31e; no variation in power output or frequency was observed.

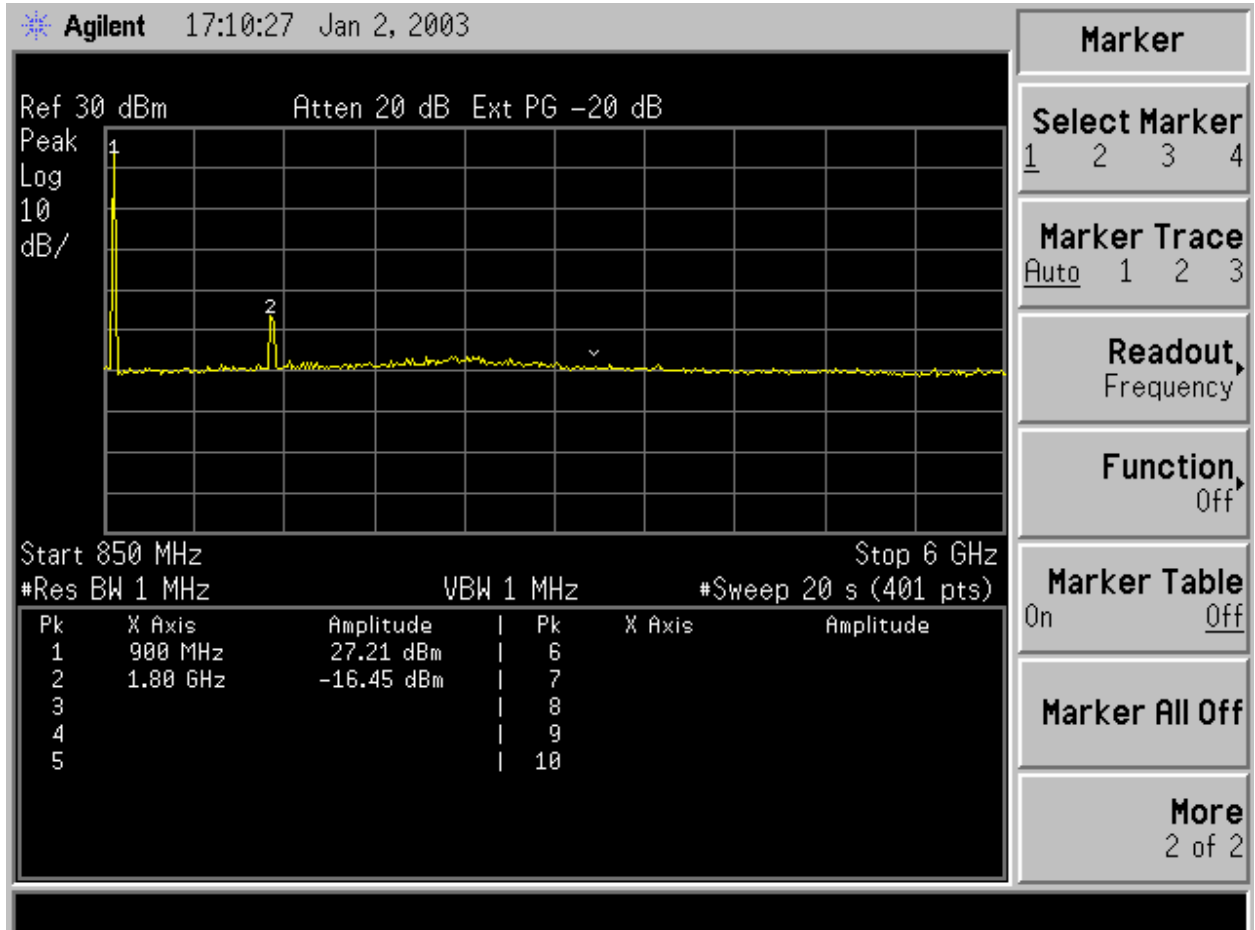
CHANNEL	CENTER FREQ (MHz)	LIMIT (dBm)	MEASURED POWER (dBm)	MARGIN (dB)
0	903.838	30 dBm	26.5	3.5
4	914.897	30 dBm	26.0	4.0
8	925.957	30 dBm	25.5	4.5



15. Conducted RF Test , Spurious Emissions

FCC Part 15.247 (c) requires an antenna conducted measurement of conducted harmonic and spurious levels, as reference to the carrier frequency in a 100 kHz bandwidth. For this test, the video transmitter module was directly connected to the HP E4407B Spectrum Analyzer, through a very short Coaxial Cable and a 20 DB Attenuator. Plots were then taken, with any noticeable spurious or harmonic signals identified. No significant levels at any spurious products could be found within -20 dBc of the fundamental of the transmitter. Signals that were observed were greater than 40 dB down. (In the 100 kHz bandwidth)

Plots of Conducted Spurious and Fundamental Levels, Channel 0 (worst case)



16. Conducted Emissions Test, Occupied Bandwidth

The 6 dB bandwidth requirement found in FCC Part 15.247.a.2 is a minimum of 500 kHz. Direct measurement of the transmitted signal, via a direct cabled connection to the HP E4407B Analyzer, was then used to determine the signal bandwidth. For each of the representative channels, refer to the graphs found in Appendix C. From this data, the bandwidth of Channel 8, which is the closest data to the specification limit, is 987 kHz, which is above the minimum of 500 kHz.

CHANNEL	CENTER FREQ (MHz)	MEASURED 6 dB BW (kHz)	MINIMUM LIMIT (kHz)
0	903.838	1002	500
4	914.897	1002	500
8	925.957	987	500
0 *	904.64	1995	500
3 *	913.36	1945	500
7 *	924.998	1970	500

* Test was repeated at high data rate, with channel center frequencies assigned to keep transmitted signal within the 902-928 MHz I.S.M. band.

Plots of Occupied Bandwidth, Channel 8, low data rate (worst case)



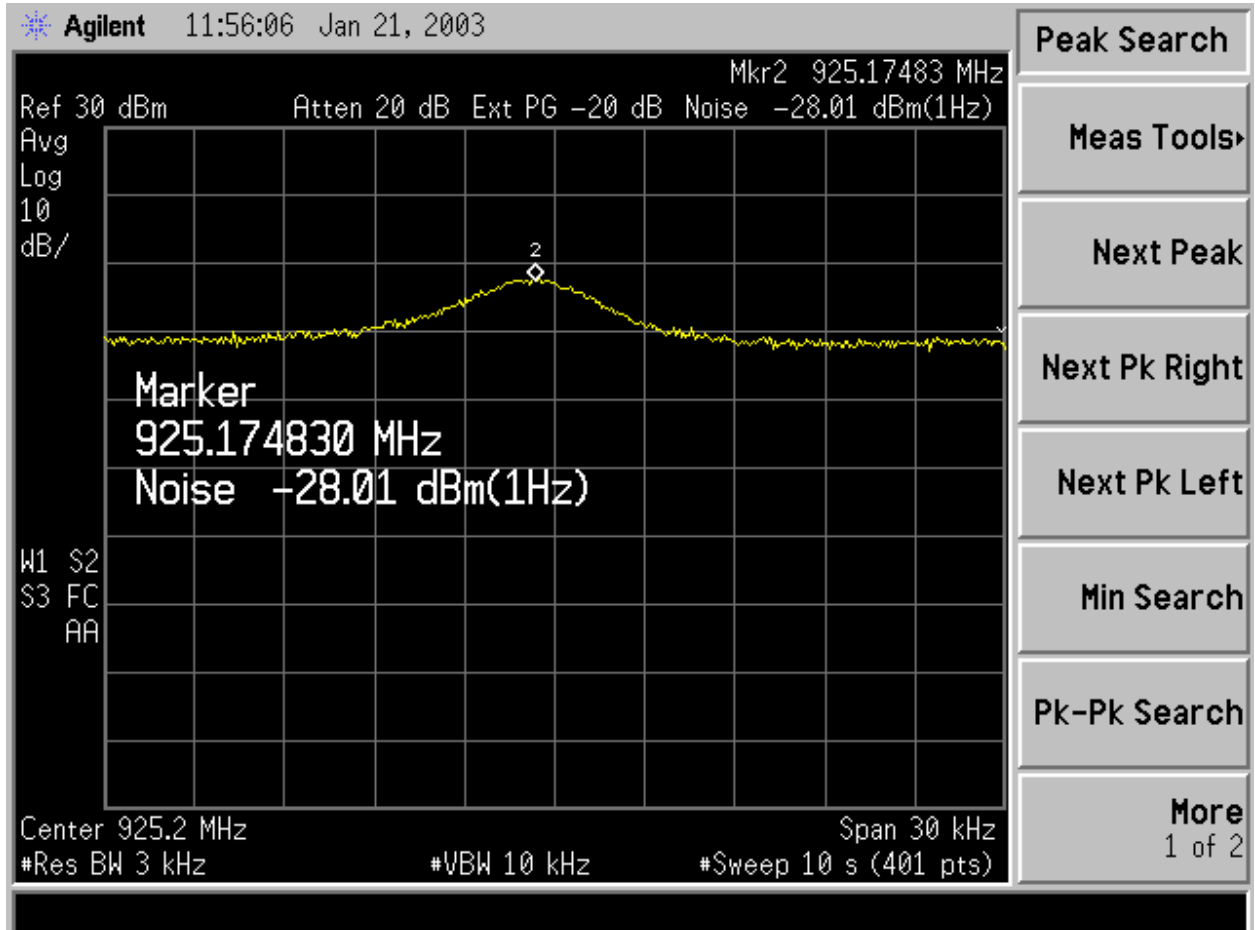
17. Conducted Emissions Test, Spectral Density

In accordance with FCC Part 15.247(d), 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 Section 14. The peak output frequency for each representative frequency was scanned, with a narrow bandwidth, and reduced sweep, and a power density measurement was performed using the utility built into the HP Analyzer. The resultant density was then corrected to a 3 kHz bandwidth, and can be determined by inspection of the graphs found on the following page. The highest density was found to be no greater than +6.8 dBm, which is under the allowable limit by 1.2 dB.

CHANNEL	CENTER FREQ	MEASURED P	3khz corr.	CORRECTED	SPEC	MARGIN
0	903.838	-31.6	34.8	+3.2	+8.0dBm	4.8
4	914.897	-30.0	34.8	+4.8	+8.0dBm	3.2
8	925.957	-30.3	34.8	+4.5	+8.0dBm	3.5
0 *	904.64	-29.0	34.8	+5.8	+8.0dBm	2.2
3 *	913.36	-28.6	34.8	+6.2	+8.0dBm	1.8
7 *	924.998	-28.0	34.8	+6.8	+8.0dBm	1.2

* Test was run at high data rate, with channel center frequencies assigned to keep transmitted signal within the 902-928 MHz I.S.M. band.

Plots of Power Spectral Density; highest reading, Channel 7, high data rate (worst case)



Appendix A

Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Calibration Information	
					Date	Due Date
AA960007	EMCO	3115	99111-4198	Double Ridge Horn Antenna	12-06-02	12-06-03
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	09-19-02	09-19-03
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	09-19-02	09-19-03
CC000221	HP	E4407b	Us39160256	26.5 GHz Spectrum Analyzer	10-28-02	10-28-03
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	09-20-02	09-20-03
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	09-20-02	09-20-03
N/A	LSC	Cable	0011	3 meter ½" Armored Cable	06-07-02	06-07-03
N/A	LSC	Cable	0038	1 meter RG 214 Cable	06-07-02	06-07-03
N/A	LSC	Cable	0050	10 meter RG 214 Cable	06-07-02	06-07-03
N/A	Pasternak	Attenuator		20 db Attenuator	06-07-02	06-07-03

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	4.80 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 Meter Chamber, 3 Volts/Meter	1.128 Volts/Meter
Conducted Immunity	3 Volt level	1.0 V