

DATE: 06 February 2005

I.T.L. (PRODUCT TESTING) LTD.

EMC/Radio Test Report

For

AeroScout Inc.

Equipment under test:

AeroScout™ Location Receiver

(For Transmitter Section)

BWH1000-02, LR-1000*

See customer's declaration on page 6 and product description on page 8.

Approved by: _____

I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



**Measurement/Technical Report for
AeroScout Inc.**

AeroScout™ Location Receiver

(For Transmitter Section)

BWH1000-02, LR-1000*

*See customer's declaration on page 6 and product description on page 8.

FCC ID: Q3H BS2020-1

06 February 2005

This report concerns: Original Grant Class II change

Class B verification Class A verification Class I change

Equipment type: Radio Telemetry Transmitter

Request Issue of Grant:

Immediately upon completion of review

Limits used:

CISPR 22 Part 15

Measurement procedure used is ANSI C63.4-2001.

Application for Certification

prepared by:

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Applicant for this device:

(different from "prepared by")

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TABLE OF CONTENTS

| | | |
|-----------|---|-----------|
| 1. | GENERAL INFORMATION ----- | 5 |
| 1.1 | Administrative Information..... | 5 |
| 1.2 | List of Accreditations..... | 7 |
| 1.3 | Product Description..... | 8 |
| 1.4 | Test Methodology..... | 9 |
| 1.5 | Test Facility..... | 9 |
| 1.6 | Measurement Uncertainty..... | 9 |
| 2. | PRODUCT LABELING ----- | 10 |
| 3. | SYSTEM TEST CONFIGURATION ----- | 11 |
| 3.1 | Justification..... | 11 |
| 3.2 | EUT Exercise Software..... | 11 |
| 3.3 | Special Accessories..... | 11 |
| 3.4 | Equipment Modifications..... | 12 |
| 3.5 | Configuration of Tested System..... | 13 |
| 4. | BLOCK DIAGRAM ----- | 14 |
| 4.1 | Schematic Block/Connection Diagram..... | 14 |
| 4.2 | Theory of Operation..... | 14 |
| 5. | CONDUCTED EMISSION DATA ----- | 15 |
| 6.1 | Test Specification..... | 15 |
| 6.2 | Test Procedure..... | 15 |
| 6.3 | Measured Data..... | 15 |
| 6.4 | Test Instrumentation Used, Conducted Measurement..... | 20 |
| 7 | SPURIOUS RADIATED EMISSION, BELOW 1 GHZ ----- | 21 |
| 7.1 | Test Specification..... | 21 |
| 7.2 | Test Procedure..... | 21 |
| 7.3 | Measured Data..... | 22 |
| 7.4 | Test Instrumentation Used, Radiated Measurements..... | 35 |
| 7.5 | Field Strength Calculation..... | 36 |
| 8 | SPURIOUS RADIATED EMISSION ABOVE 1 GHZ ----- | 37 |
| 8.1 | Radiated Emission Above 1 GHz..... | 37 |
| 8.2 | Test Data..... | 38 |
| 8.3 | Test Instrumentation Used, Radiated Measurements Above 1 GHz..... | 63 |
| 9 | MAXIMUM TRANSMITTED PEAK POWER OUTPUT ----- | 64 |
| 9.1 | Test procedure..... | 64 |
| 9.2 | Results table..... | 64 |
| 9.3 | Test Equipment Used..... | 65 |
| 10 | PEAK POWER OUTPUT OUT OF 2400-2483.5 MHZ BAND ----- | 66 |
| 10.1 | Test procedure..... | 66 |
| 10.2 | Results table..... | 83 |
| 10.3 | Test Equipment Used..... | 83 |
| 11 | 6 DB MINIMUM BANDWIDTH ----- | 84 |
| 11.1 | Test procedure..... | 84 |
| 11.2 | Results table..... | 86 |
| 11.3 | Test Equipment Used..... | 86 |
| 12 | BAND EDGE SPECTRUM ----- | 87 |
| 12.1 | Test procedure..... | 87 |
| 12.2 | Results table..... | 89 |
| 12.3 | Test Equipment Used..... | 90 |



| | | |
|------------|---|-----------|
| 13 | TRANSMITTED POWER DENSITY ----- | 91 |
| | 13.1 Test procedure | 91 |
| | 13.2 Results table..... | 94 |
| | 13.3 Test Equipment Used..... | 95 |
| 14 | ANTENNA GAIN ----- | 96 |
| 15 | R.F EXPOSURE/SAFETY ----- | 97 |
| 17. | APPENDIX C – CORRESPONDENCE WITH THE TCB ----- | 98 |

1. General Information

1.1 Administrative Information

| | |
|--------------------------------|--|
| Manufacturer: | AeroScout Inc. |
| Manufacturer's Address: | 10 Oppenheimer St. Park Tamar Rehovot 76701 Israel Tel: +972-8-9363136 Fax: +972-8-9365977 |
| Manufacturer's Representative: | Reuven Amsalem |
| Equipment Under Test (E.U.T): | AeroScout™ Location Receiver |
| Equipment Model No.: | BWH1000-02, LR-1000 (See customer's declaration on following page and product description on page 8). |
| Equipment Serial No.: | 130-1000-4190 |
| Date of Receipt of E.U.T: | 25.08.03 |
| Start of Test: | 25.08.03 |
| End of Test: | 26.10.03 |
| Test Laboratory Location: | I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780 |
| Test Specifications: | See Section 2 |

DECLARATION

I HEREBY DECLARE THAT THE FOLLOWING PRODUCTS:

- 1. BWH1000-02**
- 2. BWH1000-02-R**
- 3. BWH1000-02-TA**

**ARE IDENTICAL ELECTRONICALLY, PHYSICALLY, AND MECHANICALLY
TO:**

- 1. LR-1000**
- 2. LR-1000-R**
- 3. TGA-1000**

Respectively

Please relate to them all (from an EMC point of view) as the same product.

Sincerely,
Reuven Amsalem
Director, HW R&D
AeroScout, Ltd

Signature:



Date: 16/1/05



1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 **Product Description**

The AeroScout™ Location Receiver is a component of the AeroScout wireless LAN location platform, which adds accurate location capabilities to a Wi-Fi™ wireless network

The Aeroscout Location Receiver / Tag Activator include an 802.11b 2.4GHz radio module, a LF (125 KHz) Transmitter and a powerful TOA processor, typically installed alongside standard access points and remotely configurable from the AeroScout Administration Console. Approximately the size of a small access point, Location Receivers includes two external antenna connectors with a range of antenna types. The Location Receivers can work over a wireless bridge to avoid the need for a wired Ethernet connection.

The Location Receiver is used to receive 802.11b clients and Aeroscout tags packets and calculate their location.

The EUT can act as a Tag Activator (**Model – BWH1000-02-TA and TGA-1000**) in this mode the Tag Activator transmits to the Aeroscout tags a short message via its LF transmitter, the tag wakeup, receive the message and replay using its 2.4GHz channel, the tag replay is received using the Tag activator 2.4GHz receiver. The Tag Activator is used to configure the AeroScout tag. This model uses the same plastic case as the original model BWH1000-02 FCC ID Q3H BS2020-0.

The Location Receiver has two other configurations/models where the 125kHz transmitter is not connected to an antenna:

- A. Housed in a plastic case (Model BWH1000-02 and LR-1000) (identical to model TGA-1000; BWH1000-02-TA)
- B. Housed in a metal case in the rugged version (Model BWH1000-02-R and LR-1000-R), Everything else is identical to model TGA-1000; BWH1000-02-TA.

Each model can be supplied with 6 new 2.4 GHz antennas.

NOTES:

The E.U.T. was originally authorized under FCC ID# Q3H BS2020-0.

See correspondence with the TCB, METLabs in Appendix C.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing March 9, 2001).

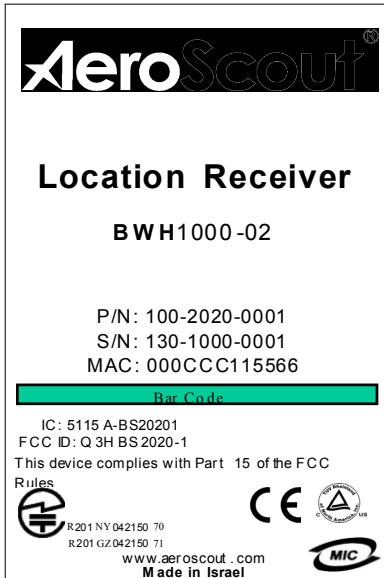
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01. The other tests in this report were performed at the Nexus Data facility, Rosh Ha'ayin, Israel.

1.6 Measurement Uncertainty

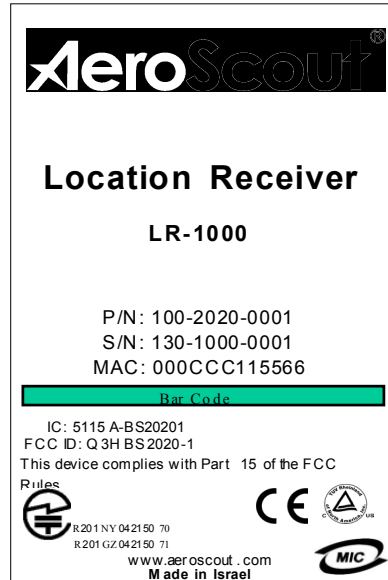
Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2001. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling



76.2 x 50.80



76.2 x 50.80

Figure 1. FCC Label

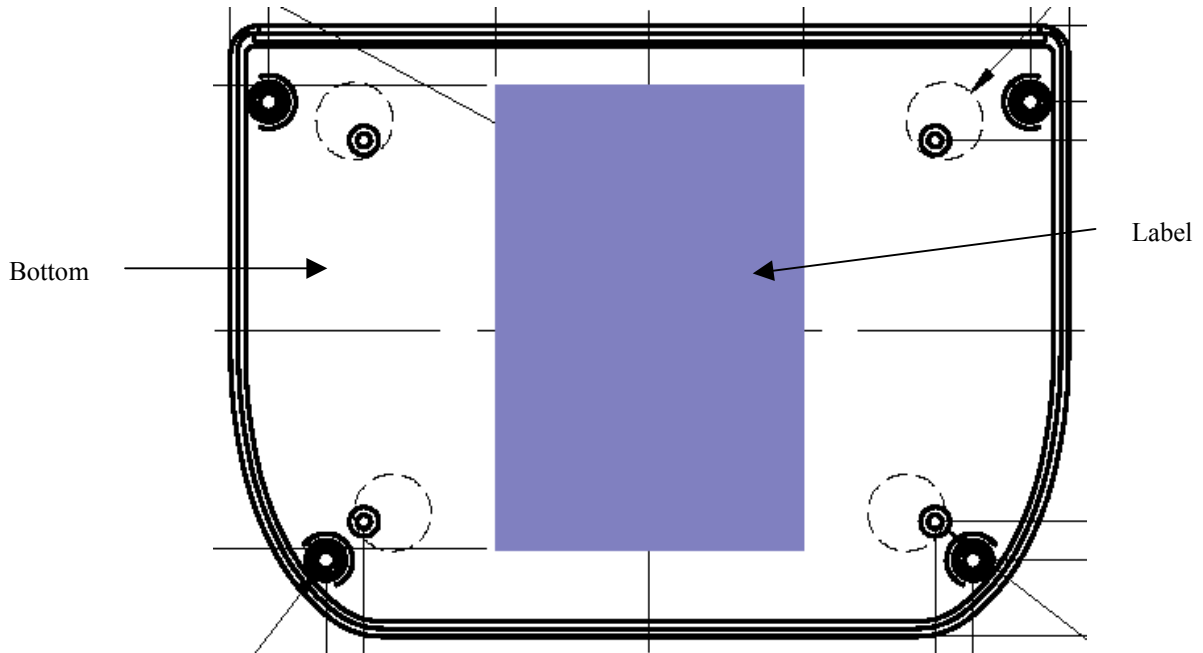


Figure 2. Location of Label on EUT

3. System Test Configuration

3.1 *Justification*

The product is a fixed installation type, either wall mounted or table mounted. The antennae direction may be re-oriented.

To determine the E.U.T. and transmission antenna orientation for the spurious radiated emissions tests, the product carrier field level was measured in both E.U.T. orientations and three orthogonal directions of the transmit antenna. The table mounted (placed) orientation with the transmission antenna in vertical position was selected as the worst case final orientation position.

The typical operation of the Location Receiver (as a customer would normally use) is that the unit is in continuous receive mode. It collects received data information and performs calculations on the received data. In a specific application, one Location Receiver unit in the system acts as transmitter and transmits a short message to a 802.11b client which triggers it to reply and all the other Location Receivers in the system receive its signal and calculate the location.

The product was tested in two test modes:

1. Continuous Receive mode in which All Receive path was activated.
2. Transmit mode. Due to the short period of transmission in a typical operation mode, the Location Receiver was configured to transmit continuously.

3.2 *EUT Exercise Software*

The Location Receiver SW uses two working modes in typical operation, a receive mode and then a transmit mode.

The testing configuration SW, allows the configuring of the Location Receiver to one of two programmable modes:

1. Continuous Receive Mode
2. Continuous Transmit Mode

The testing SW also allows configuring the channel of operation on those two modes. It can be done on three different channels.

3.3 *Special Accessories*

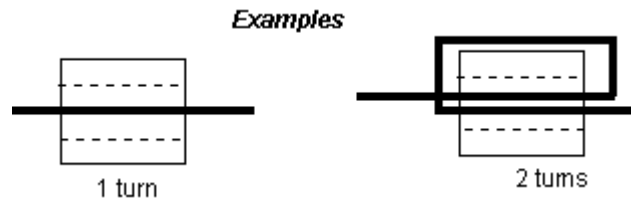
No special accessories were needed to achieve compliance.

3.4 Equipment Modifications

1. The power supply was changed to a power supply, model AD1605CF, manufactured by DEER Computer.
2. A ground strap was added between the PCB ground and Antenna #2.
3. A ferrite core, P/N 0443164251, manufactured by Fair-Rite was added on the LAN cable at the E.U.T. LAN connector. The core has two turns.
4. A ferrite core, P/N 2643665802, manufactured by Fair-Rite, was added on the DC cable at the E.U.T. connector. The core has two turns.

General Note:

The number of turns when using ferrite cores is determined by the times the cable/wire crosses the internal aperture of the core.



3.5 Configuration of Tested System

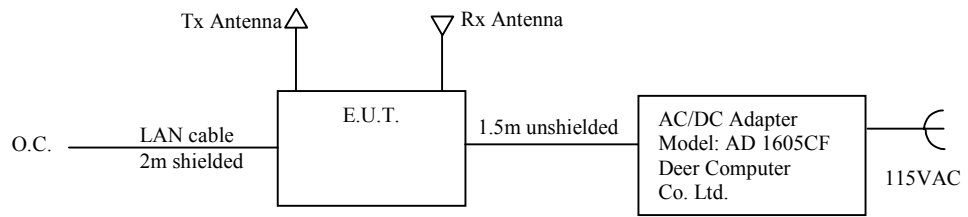


Figure 3. Configuration of Tested System

4. Block Diagram

4.1 Schematic Block/Connection Diagram

Intentionally Blank for Reasons of Confidentiality

4.2 Theory of Operation

The AeroScout Location Receiver (BWH1000-02) includes an 802.11b radio module and a powerful TOA processor, typically installed alongside standard 802.11b access points.

AeroScout™ Location Receiver size is approximately the size of a small access point.

AeroScout™ Location Receiver is remotely configurable from the AeroScout Administration Console to listen on a specific channel, the AeroScout™ Location Receiver samples the incoming signal, and upon receiving the MAC address of a specific 802.11b client or a TAG, it will perform calculations on the sampled data and transfer the results via Ethernet channel to the “master station”.

The AeroScout™ Location Receiver can be used as a transmitter, which transmits an RTS message to trigger an 802.11b client to reply using a CTS message to allow the location system to locate this unit.

5. Conducted Emission Data

6.1 Test Specification

FCC, Part 15, Subpart B: Class B

6.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see section 3), with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak detector

6.3 Measured Data

JUDGEMENT: Passed by 14.4 dB

The EUT met the FCC Part 15, Subpart B, Class B specification requirements.

The details of the highest emissions at operating frequency 2442 MHz are given in *Figure 4* to *Figure 9*.

For the operating frequencies 2412 and 2462 MHz, the results were the same.

TEST PERSONNEL:

Tester Signature: 

Date: 13.11.03

Typed/Printed Name: Y. Mordukhovitch

Conducted Emission

E.U.T Description AeroScout™ Location
 Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: FCC Part 15, Subpart B, Class B
 Lead: Phase
 Detectors: Peak, Quasi-peak, Average

| Frequency (MHz) | Peak Amplitude (dBμV) | Quasi-peak Amplitude (dBμV) | Specification (dB μV) | Pass/Fail | Margin (dB) |
|--------------------|-----------------------------|-----------------------------------|--------------------------|-----------|----------------|
| 0.26 | 43.4 | 42.0 | 61.5 | Pass | -19.5 |
| 0.40 | 37.8 | 33.8 | 57.9 | Pass | -24.1 |
| 0.92 | 38.8 | 36.8 | 56.0 | Pass | -19.2 |
| 1.45 | 41.4 | 38.4 | 56.0 | Pass | -17.6 |
| 1.85 | 40.2 | 37.8 | 56.0 | Pass | -18.2 |
| 3.00 | 41.4 | 36.5 | 56.0 | Pass | -19.5 |
| 4.10 | 40.2 | 35.1 | 56.0 | Pass | -20.9 |

Figure 4. Conducted Emission: PHASE. Detectors: Peak, QUASI-PEAK


| Frequency (MHz) | Peak Amplitude (dBμV) | Average Amplitude (dBμV) | Specification (dB μV) | Pass/Fail | Margin (dB) |
|--------------------|-----------------------------|--------------------------------|--------------------------|-----------|----------------|
| 0.26 | 43.4 | 38.6 | 51.4 | Pass | -12.8 |
| 0.40 | 37.8 | 30.4 | 48.0 | Pass | -17.6 |
| 0.92 | 38.8 | 20.3 | 46.0 | Pass | -25.7 |
| 1.45 | 41.4 | 19.6 | 46.0 | Pass | -26.4 |
| 1.85 | 40.2 | 14.0 | 46.0 | Pass | -32.0 |
| 3.00 | 41.4 | 16.8 | 46.0 | Pass | -29.2 |
| 4.10 | 40.2 | 15.6 | 46.0 | Pass | -30.4 |

Figure 5. Detectors: Peak, AVERAGE .

Conducted Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: FCC Part 15, Subpart B, Class B
 Lead: Phase
 Detectors: Peak, Quasi-peak, Average

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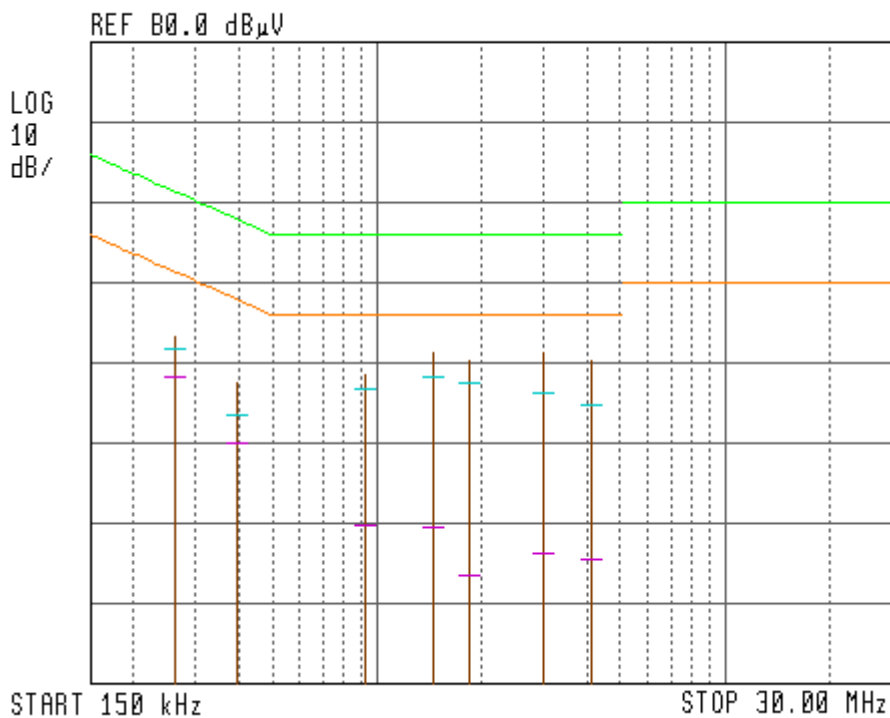


Figure 6. Detectors: Peak, Quasi-peak, Average

Notes:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V).
3. Peak detection is designated by the top of each vertical line.
4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.
5. Average detection is designated by the second dash mark (from the top) of each vertical line.

Conducted Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: FCC Part 15, Subpart B, Class B
 Lead: Neutral
 Detectors: Peak, Quasi-peak, Average

| Frequency (MHz) | Peak Amplitude (dB μ V) | Quasi-peak Amplitude (dB μ V) | Specification (dB μ V) | Pass/Fail | Margin (dB) |
|--------------------|-----------------------------------|---|-------------------------------|-----------|----------------|
| 0.97 | 42.9 | 41.5 | 56.0 | Pass | -14.5 |
| 1.37 | 43.2 | 41.6 | 56.0 | Pass | -14.4 |
| 2.74 | 41.6 | 35.9 | 56.0 | Pass | -20.1 |
| 3.05 | 41.7 | 36.7 | 56.0 | Pass | -19.3 |
| 4.08 | 41.4 | 37.7 | 56.0 | Pass | -18.3 |
| 4.18 | 41.0 | 34.5 | 56.0 | Pass | -21.5 |

Figure 7. Detectors: Peak, QUASI-PEAK

| Frequency (MHz) | Peak Amplitude (dB μ V) | Average Amplitude (dB μ V) | Specification (dB μ V) | Pass/Fail | Margin (dB) |
|--------------------|-----------------------------------|--------------------------------------|-------------------------------|-----------|----------------|
| 0.97 | 42.9 | 27.6 | 46.0 | Pass | -18.4 |
| 1.37 | 43.2 | 26.0 | 46.0 | Pass | -20.0 |
| 2.74 | 41.6 | 17.5 | 46.0 | Pass | -28.5 |
| 3.05 | 41.7 | 18.1 | 46.0 | Pass | -27.9 |
| 4.08 | 41.4 | 18.4 | 46.0 | Pass | -27.6 |
| 4.18 | 41.0 | 15.3 | 46.0 | Pass | -30.7 |

Figure 8. Detectors: Peak, AVERAGE

Conducted Emission

E.U.T Description AeroScout™ Location Receiver
Type BWH1000-02
Serial Number: 130-1000-4190

Specification: FCC Part 15, Subpart B, Class B
Lead: Neutral
Detectors: Peak, Quasi-peak, Average

16:16:55 NOV 11, 2003

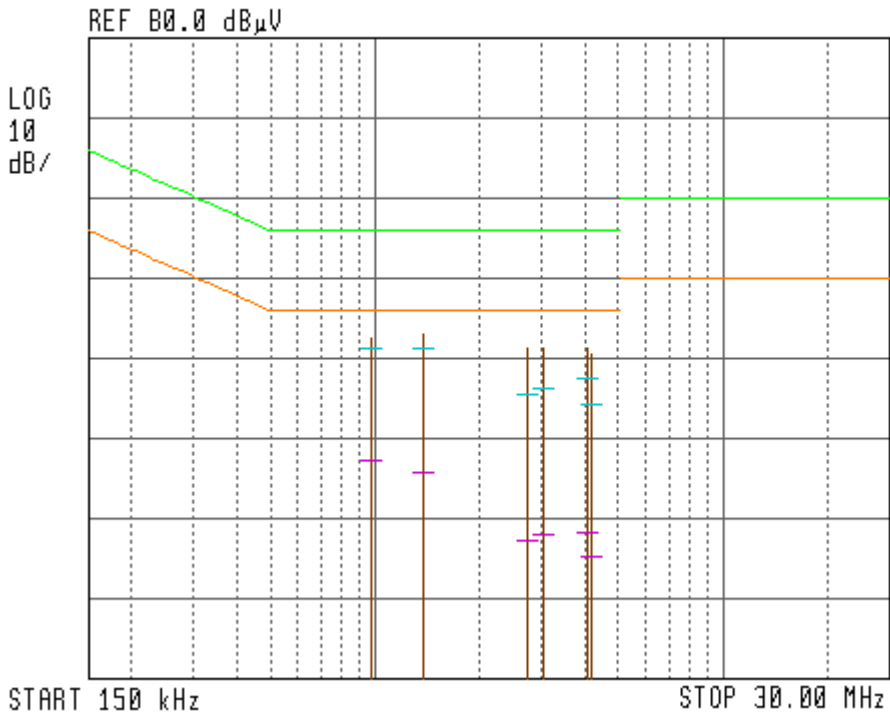


Figure 9 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

Notes:

- 1. Horizontal axis shows logarithmic frequency scale.*
- 2. The vertical axis shows amplitude (in dB μV).*
- 3. Peak detection is designated by the top of each vertical line.*
- 4. Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*
- 5. Average detection is designated by the second dash mark (from the top) of each vertical line.*

6.4 Test Instrumentation Used, Conducted Measurement

| Instrument | Manufacturer | Model | Serial No. | Calibration | Period |
|-------------------|---------------------|---------------|-------------------|--------------------|---------------|
| LISN | Fischer | FCC-LISN-2A | 127 | March 12, 2003 | 1 year |
| LISN | Fischer | FCC-LISN-2A | 128 | March 12, 2003 | 1 year |
| Receiver | HP | 85420E/85422E | 3427A00103/34 | January 31, 2003 | 1 year |
| Printer | HP | ThinkJet2225 | 2738508357 | N/A | N/A |

7 Spurious Radiated Emission, Below 1 GHz

7.1 Test Specification

30-1000 MHz, F.C.C., Part 15, Subpart C

7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in Figure 3.1.

The frequency range 30-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

- Turning the E.U.T on and off.

- Using a frequency span less than 10 MHz.

- Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.



7.3 Measured Data

JUDGEMENT: Passed by 2.6 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

The worst cases were:

for 2412 MHz, 2.9 dB at 110.00 MHz frequency, horizontal polarization.

for 2442 MHz, 3.0 dB at 110. MHz frequency, horizontal polarization

for 2462 MHz, 2.6 dB at 110.00 MHz frequency, horizontal polarization

The details of the highest emissions are given in *Figure 10* to *Figure 21*.

In the tables in Figures 15-26, Peak Amp Quasi-peak Amp id the field strength including the correction factor.

TEST PERSONNEL:

Tester Signature: _____

Date: 17.11.03

Typed/Printed Name: I. Raz

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2412 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 110.00 | 39.5 | 38.6 | 13.0 | 43.5 | -4.9 |
| 132.00 | 31.7 | 29.8 | 14.0 | 43.5 | -13.7 |
| 241.99 | 40.4 | 38.8 | 19.7 | 46.0 | -7.2 |
| 263.99 | 36.3 | 33.2 | 21.4 | 46.0 | -12.8 |

**Figure 10. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 2412 MHz

| Frequency (MHz) | Peak Amp (dBμV/m) | QP Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|--------------------|----------------------|--------------------|--------------------|---------------------------|----------------|
| 330.01 | 35.7 | 34.7 | 15.9 | 46.0 | -11.3 |
| 967.98 | 35.8 | 32.5 | 28.3 | 54.0 | -21.5 |

**Figure 11. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2412 MHz

| Frequency (MHz) | Peak Amp (dBμV/m) | QP Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|--------------------|----------------------|--------------------|--------------------|---------------------------|----------------|
| 110.00 | 41.4 | 40.6 | 13.0 | 43.5 | -2.9 |
| 132.00 | 32.2 | 30.1 | 14.0 | 43.5 | -13.4 |
| 241.99 | 35.0 | 32.6 | 19.7 | 46.0 | -13.4 |

**Figure 12. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



Radiated Emission

E.U.T Description AeroScout™ Location Receiver
Type BWH1000-02
Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 2142 MHz

| Frequency (MHz) | Peak Amp (dB μ V/m) | QP Amp (dB μ V/m) | Correction (dB) | Specification (dB μ V/m) | Margin (dB) |
|---------------------------|-----------------------------------|---------------------------------|---------------------------|--|-----------------------|
| 330.01 | 30.4 | 27.9 | 15.9 | 46.0 | -18.1 |
| 967.98 | 35.5 | 32.2 | 28.3 | 54.0 | -21.8 |

**Figure 13. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2442 MHz

| Frequency (MHz) | Peak Amp (dBμV/m) | QP Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|--------------------|----------------------|--------------------|--------------------|---------------------------|----------------|
| 110.00 | 39.9 | 39.3 | 13.0 | 43.5 | -4.2 |
| 132.02 | 25.0 | 22.7 | 14.0 | 43.5 | -20.8 |
| 242.02 | 32.8 | 31.0 | 19.8 | 46.0 | -15.0 |
| 263.98 | 30.6 | 28.2 | 21.4 | 46.0 | -17.8 |

**Figure 14. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 2442 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 329.99 | 31.2 | 29.8 | 15.9 | 46.0 | -16.2 |
| 968.00 | 36.4 | 33.1 | 28.3 | 54.0 | -20.9 |

**Figure 15. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2442 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 110.00 | 41.3 | 40.5 | 13.0 | 43.5 | -3.0 |
| 132.02 | 29.9 | 27.3 | 14.0 | 43.5 | -16.2 |
| 242.02 | 30.5 | 27.0 | 19.8 | 46.0 | -19.0 |
| 263.98 | 30.0 | 27.1 | 21.4 | 46.0 | -18.9 |

**Figure 16. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 2442 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 329.99 | 26.3 | 23.8 | 15.9 | 46.0 | -22.2 |
| 968.00 | 33.9 | 29.5 | 28.3 | 54.0 | -24.5 |

**Figure 17. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|------------------|-----------------|---------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 110.00 | 40.6 | 40.1 | 13.0 | 43.5 | -3.4 |
| 132.02 | 24.9 | 22.5 | 14.0 | 43.5 | -21.0 |
| 242.02 | 33.1 | 31.4 | 19.8 | 46.0 | -14.6 |
| 263.98 | 33.0 | 30.6 | 21.4 | 46.0 | -15.4 |

**Figure 18. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 329.99 | 32.3 | 30.9 | 15.9 | 46.0 | -15.1 |
| 968.00 | 39.5 | 36.9 | 28.3 | 54.0 | -17.1 |

**Figure 19. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Quasi-peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|------------------|-----------------|---------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 110.00 | 41.7 | 40.9 | 13.0 | 43.5 | -2.6 |
| 132.02 | 28.8 | 26.7 | 14.0 | 43.5 | -16.8 |
| 242.02 | 27.8 | 24.8 | 19.8 | 46.0 | -21.2 |
| 263.98 | 30.1 | 26.8 | 21.4 | 46.0 | -19.2 |

**Figure 20. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | QP Amp | Correction | Specification | Margin |
|-----------|----------|----------|------------|---------------|--------|
| (MHz) | (dBμV/m) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 329.99 | 26.0 | 23.1 | 15.9 | 46.0 | -22.9 |
| 968.00 | 33.5 | 29.4 | 28.3 | 54.0 | -24.6 |

**Figure 21. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak, Quasi-peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

7.4 Test Instrumentation Used, Radiated Measurements

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|-------------------------|--------------|---------------|---------------|------------------|--------|
| EMI Receiver | HP | 85422E | 3411A00102 | January 31, 2003 | 1 year |
| RF Section | HP | 85420E | 3427A00103 | January 31, 2003 | 1 year |
| Antenna Bioconical | ARA | BCD 235/B | 1041 | April 20, 2003 | 1 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | ThinkJet 2225 | 2738508357 | N/A | N/A |

7.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[\text{dB}\mu\text{v}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

- FS: Field Strength [dB μ v/m]
- RA: Receiver Amplitude [dB μ v]
- AF: Receiving Antenna Correction Factor [dB/m]
- CF: Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

8 Spurious Radiated Emission Above 1 GHz

8.1 Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in Figure 3.1.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used.

In the frequency range 2.9-25.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.

The test distance was 3 meters.

Above 12.0 GHz:

- a. The test distance was 1.5 meters. The reduced distance was used to increase the signal to noise ratio.
- b. For the average test, the IF bandwidth was reduced to 100kHz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)



8.2 Test Data

JUDGEMENT: Passed by 1.9 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.
The worst cases were:

for 2412 MHz, 2.1 dB at 4824.00 MHz frequency, vertical polarization.

for 2442 MHz, 2.0 dB at 4884.00 MHz frequency, vertical polarization

for 2462 MHz, 1.9 dB at 4924.00 MHz frequency, vertical polarization

The details of the highest emissions are given in *Figure 22* to *Figure 45*.

TEST PERSONNEL:

Tester Signature: 

Date: 13.11.03

Typed/Printed Name: Y. Mordukhovitch

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2412 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1011.99 | 44.3 | 31.7 | 74.0 | -29.7 |
| 1034.00 | 45.2 | 31.9 | 74.0 | -28.8 |
| 1121.99 | 44.3 | 32.8 | 74.0 | -29.7 |
| 1166.00 | 47.5 | 33.2 | 74.0 | -26.5 |
| 1210.00 | 44.8 | 33.6 | 74.0 | -29.2 |
| 1232.00 | 45.1 | 33.9 | 74.0 | -28.9 |

**Figure 22. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2412 MHz

| Frequency (MHz) | Avg. Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|--------------------|-------------------------|--------------------|---------------------------|----------------|
| 1011.99 | 35.6 | 31.7 | 54.0 | -18.4 |
| 1034.00 | 36.5 | 31.9 | 54.0 | -17.5 |
| 1121.99 | 34.3 | 32.8 | 54.0 | -19.7 |
| 1166.00 | 35.9 | 33.2 | 54.0 | -18.1 |
| 1210.00 | 34.0 | 33.6 | 54.0 | -20.0 |
| 1232.00 | 34.0 | 33.9 | 54.0 | -20.0 |

**Figure 23. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2412 MHz

| Freq. | PeakAmp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 3740.00 | 40.7 | 5.0 | 74.0 | -33.3 |
| 4076.00 | 47.7 | 6.6 | 74.0 | -26.3 |
| 8152.00 | 51.7 | 16.0 | 74.0 | -22.3 |

**Figure 24. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2412 MHz

| Freq. | Average Amp | Correction Factor (1) | Average Spec. | Average Margin (2) |
|---------|-------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 3740.00 | 31.1 | 5.0 | 54.0 | -22.9 |
| 4076.00 | 43.6 | 6.6 | 54.0 | -10.4 |
| 8152.00 | 43.1 | 16.0 | 54.0 | -10.9 |

**Figure 25. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2412 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1144.00 | 48.1 | 33.0 | 74.0 | -25.9 |
| 1166.00 | 43.6 | 33.2 | 74.0 | -30.4 |
| 1188.00 | 45.2 | 33.4 | 74.0 | -28.8 |
| 1663.98 | 49.2 | 37.7 | 74.0 | -24.8 |
| 2367.98 | 56.6 | 42.1 | 74.0 | -17.4 |
| 2490.13 | 53.3 | 42.7 | 74.0 | -20.7 |

**Figure 26. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2412 MHz

| Frequency (MHz) | Avg. Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|---------------------------|-----------------------------|---------------------------|----------------------------------|-----------------------|
| 1144.00 | 34.71 | 33.0 | 54.0 | -19.3 |
| 1166.00 | 31.18 | 33.2 | 54.0 | -22.8 |
| 1188.00 | 33.97 | 33.4 | 54.0 | -20.0 |
| 1663.98 | 39.20 | 37.7 | 54.0 | -14.8 |
| 2367.98 | 46.77 | 42.1 | 54.0 | -7.2 |
| 2490.13 | 40.47 | 42.7 | 54.0 | -13.5 |

**Figure 27. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2412 MHz

| Freq. | Peak Amp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|-----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4824.00 | 64.0 | 28.7 | 74.0 | -10.0 |

**Figure 28. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp. + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2412 MHz

| Freq. | Average Amp (1) | Correction Factor (2) | Average Spec. | Average Margin (3) |
|---------|-----------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4824.00 | 51.9 | 28.7 | 54.0 | -2.1 |

**Figure 29. Radiated Emission. Antenna Polarization: VERTICAL
 Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2442 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1033.99 | 45.5 | 31.9 | 74.0 | -28.5 |
| 1121.99 | 44.8 | 32.8 | 74.0 | -29.2 |
| 1165.99 | 44.9 | 33.2 | 74.0 | -29.1 |
| 1188.01 | 44.9 | 33.4 | 74.0 | -29.1 |
| 1210.01 | 44.8 | 33.6 | 74.0 | -29.2 |
| 1231.99 | 46.0 | 33.9 | 74.0 | -28.0 |
| 1688.98 | 50.9 | 37.9 | 74.0 | -23.1 |

**Figure 30. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C:
 Class B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2442 MHz

| Frequency (MHz) | Avg. Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|---------------------------|-----------------------------|---------------------------|----------------------------------|-----------------------|
| 1033.99 | 37.4 | 31.9 | 54.0 | -16.6 |
| 1121.99 | 34.5 | 32.8 | 54.0 | -19.5 |
| 1165.99 | 34.7 | 33.2 | 54.0 | -19.3 |
| 1188.01 | 33.5 | 33.4 | 54.0 | -20.5 |
| 1210.01 | 33.4 | 33.6 | 54.0 | -20.6 |
| 1231.99 | 33.8 | 33.9 | 54.0 | -20.2 |
| 1688.98 | 41.5 | 37.9 | 54.0 | -12.5 |

**Figure 31. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2442 MHz

| Freq. | Peak Amp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|-----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4136.00 | 50.2 | 7.1 | 74.0 | -23.8 |
| 8272.00 | 54.1 | 16.2 | 74.0 | -19.9 |

**Figure 32. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2442 MHz

| Freq. | Average Amp (1) | Correction Factor (2) | Average Spec. | Average Margin (3) |
|---------|-----------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4136.00 | 44.6 | 7.1 | 54.0 | -9.4 |
| 8272.00 | 42.8 | 16.2 | 54.0 | -11.2 |

**Figure 33. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2442 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1121.99 | 43.6 | 32.8 | 74.0 | -30.4 |
| 1144.00 | 44.6 | 33.0 | 74.0 | -29.4 |
| 1165.98 | 44.7 | 33.2 | 74.0 | -29.3 |
| 1210.00 | 45.1 | 33.6 | 74.0 | -28.9 |
| 1688.98 | 51.0 | 37.9 | 74.0 | -23.0 |
| 1719.00 | 50.4 | 38.1 | 74.0 | -23.6 |

**Figure 34. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2442 MHz

| Frequency (MHz) | Avg. Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|--------------------|-------------------------|--------------------|---------------------------|----------------|
| 1121.99 | 31.99 | 32.8 | 54.0 | -22.0 |
| 1144.00 | 34.31 | 33.0 | 54.0 | -19.7 |
| 1165.98 | 33.56 | 33.2 | 54.0 | -20.4 |
| 1210.00 | 32.69 | 33.6 | 54.0 | -21.3 |
| 1688.98 | 40.10 | 37.9 | 54.0 | -13.9 |
| 1719.00 | 34.82 | 38.1 | 54.0 | -19.2 |

**Figure 35. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2442 MHz

| Freq. | Peak Amp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|-----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4884.00 | 64.6 | 28.8 | 74.0 | -9.4 |

**Figure 36. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp. + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2442 MHz

| Freq. | Average Amp (1) | Correction Factor (2) | Average Spec. | Average Margin (3) |
|---------|-----------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4884.00 | 52.0 | 28.8 | 54.0 | -2.0 |

**Figure 37. Radiated Emission. Antenna Polarization: VERTICAL
Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp. + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1011.98 | 48.6 | 31.7 | 74.0 | -25.4 |
| 1077.63 | 48.5 | 32.4 | 74.0 | -25.5 |
| 1231.82 | 51.0 | 33.9 | 74.0 | -23.0 |
| 1495.74 | 53.1 | 36.4 | 74.0 | -20.9 |
| 1693.70 | 54.7 | 37.9 | 74.0 | -19.3 |
| 2332.39 | 53.3 | 41.9 | 74.0 | -20.7 |

**Figure 38. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2462 MHz

| Frequency (MHz) | Avg. Amp (dBμV/m) | Correction (dB) | Specification (dBμV/m) | Margin (dB) |
|---------------------------|-----------------------------|---------------------------|----------------------------------|-----------------------|
| 1011.98 | 35.4 | 31.7 | 54.0 | -18.6 |
| 1077.63 | 35.5 | 32.4 | 54.0 | -18.5 |
| 1231.82 | 38.8 | 33.9 | 54.0 | -15.2 |
| 1495.74 | 40.0 | 36.4 | 54.0 | -14.0 |
| 1693.70 | 41.6 | 37.9 | 54.0 | -12.4 |
| 2332.39 | 39.7 | 41.9 | 54.0 | -14.3 |

**Figure 39. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2462 MHz

| Freq. | Peak Amp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|-----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4176.00 | 49.3 | 6.7 | 74.0 | -24.7 |
| 8356.00 | 52.8 | 16.2 | 74.0 | -21.2 |

**Figure 40. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2462 MHz

| Freq. | Average Amp | Correction Factor (1) | Average Spec. | Average Margin (2) |
|---------|-------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4176.00 | 45.2 | 6.7 | 54.0 | -8.8 |
| 8356.00 | 42.7 | 16.2 | 54.0 | -11.3 |

**Figure 41. Radiated Emission. Antenna Polarization: AVERAGE.
Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2462 MHz

| Frequency | Peak Amp | Correction | Specification | Margin |
|------------------|-----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1011.98 | 44.0 | 31.7 | 74.0 | -30.0 |
| 1077.63 | 44.8 | 32.4 | 74.0 | -29.2 |
| 1231.82 | 47.0 | 33.9 | 74.0 | -27.0 |
| 1495.74 | 45.9 | 36.4 | 74.0 | -28.1 |
| 1693.70 | 46.6 | 37.9 | 74.0 | -27.4 |
| 2332.39 | 52.8 | 41.9 | 74.0 | -21.2 |

**Figure 42. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2462 MHz

| Frequency | Avg Amp | Correction | Specification | Margin |
|------------------|----------------|-------------------|----------------------|---------------|
| (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dB) |
| 1011.98 | 31.8 | 31.7 | 54.0 | -22.2 |
| 1077.63 | 32.0 | 32.4 | 54.0 | -22.0 |
| 1231.82 | 33.7 | 33.9 | 54.0 | -20.3 |
| 1495.74 | 32.4 | 36.4 | 54.0 | -21.6 |
| 1693.70 | 34.1 | 37.9 | 54.0 | -19.9 |
| 2332.39 | 40.0 | 41.9 | 54.0 | -14.0 |

**Figure 43. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 2462 MHz

| Freq. | Peak Amp (1) | Correction Factor (2) | Peak Spec. | Peak Margin (3) |
|---------|-----------------|--------------------------|------------|-----------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4924.00 | 64.8 | 28.8 | 74.0 | -9.2 |

**Figure 44. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp. + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission Above 1 GHz

E.U.T Description AeroScout™ Location Receiver
 Type BWH1000-02
 Serial Number: 130-1000-4190

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 25.0 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 2462 MHz

| Freq. | Average Amp (1) | Correction Factor (2) | Average Spec. | Average Margin (3) |
|---------|-----------------|-----------------------|---------------|--------------------|
| (MHz) | (dBμV/m) | (dB) | (dB μV/m) | (dB) |
| 4924.00 | 52.1 | 28.8 | 54.0 | -1.9 |

**Figure 45. Radiated Emission. Antenna Polarization: VERTICAL
Detector: Average**

Notes:

1. Reading includes correction factor.
2. Correction Factor = Antenna Factor + Cable Factor – Gain amp. + ATT.
3. Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

8.3 Test Instrumentation Used, Radiated Measurements Above 1 GHz

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|--------------------------------------|---------------|------------------|---------------|------------------|--------|
| Receiver | HP | 85422E | 3411A00102 | January 31, 2003 | 1 year |
| RF Section | HP | 85420E | 3427A00103 | January 31, 2003 | 1 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | ThinkJet2225 | 2738508357 | N/A | N/A |
| Antenna-Log Periodic | A.H.System | SAS-200/511 | 253 | January 31,2003 | 2 year |
| Double Ridged Waveguide Horn Antenna | EMCO | 3115 | 9702-5111 | May 1, 2003 | 1 year |
| Horn Antenna | ARA | SWH-28 | 1007 | October 28, 2003 | 1 year |
| Band Pass Filter | SERNO | 22102-0001 | 322 | August 15, 2003 | 1 year |
| Low Noise Amplifier | DBS MICROWAVE | LNA-DBS-0411N313 | 013 | April 10, 2003 | 1 year |
| Spectrum Analyzer | HP | 8592L | 3926A01204 | January 31,2003 | 1 year |
| Attenuator | MACOM | ATT-10 | N/A | July 27, 2003 | 1 year |
| Attenuator | MACOM | ATT-20 | N/A | July 27, 2003 | 1 year |

9 Maximum Transmitted Peak Power Output

9.1 Test procedure

The E.U.T. antenna terminal was connected to the Power Meter through appropriate coaxial cable. Peak power level was measured at selected operation frequencies.

9.2 Results table

E.U.T. Description: AeroScout™ Location Receiver
 Model No.: BWH1000-02
 Serial Number: 130-1000-4190
 Specification: F.C.C. Part 15, Subpart C

| Operation Frequency (MHz) | Reading Power Meter (dBm) | Cable Attenuation (dB) | Peak Output Power (dBm) | Specification (dBm) | Margin (dB) |
|---------------------------|---------------------------|------------------------|-------------------------|---------------------|-------------|
| 2412 | 13.1 | 1.0 | 14.1 | 30.0 | -15.9 |
| 2442 | 13.6 | 1.0 | 14.6 | 30.0 | -15.4 |
| 2462 | 11.0 | 1.0 | 12.0 | 30.0 | -18.0 |

Figure 46 Maximum Peak Power Output

JUDGEMENT: Passed by 15.4 dB

TEST PERSONNEL:

Tester Signature: 

Date: 13.11.03

Typed/Printed Name: E. Pitt

9.3 Test Equipment Used.

Peak Power Output

| Instrument | Manufacture | Model | Serial Number | Calibration | |
|--------------|-------------|-------|---------------|-------------------|-----------|
| | | | | Last Calibr. | Period |
| Power Meter | HP | 436A | 20312262 | August 7, 2003 | 1.5 years |
| Cable | Avnet | MTS | N/A | September 9, 2003 | 1 year |
| Power Sensor | HP | 8481A | 2237A32152 | August 6, 2003 | 1.5 years |

Figure 47 Test Equipment Used

10 Peak Power Output Out of 2400-2483.5 MHz Band

10.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through appropriate coaxial cable. The spectrum analyzer was set to 100 kHz resolution BW except for the frequency range 9 kHz-1 MHz where the RBW was set to 3kHz. The frequency range from 9 kHz to 25 GHz was scanned. Level of spectrum components out of the 2400-2483.5 MHz was measured at the selected operation frequencies.

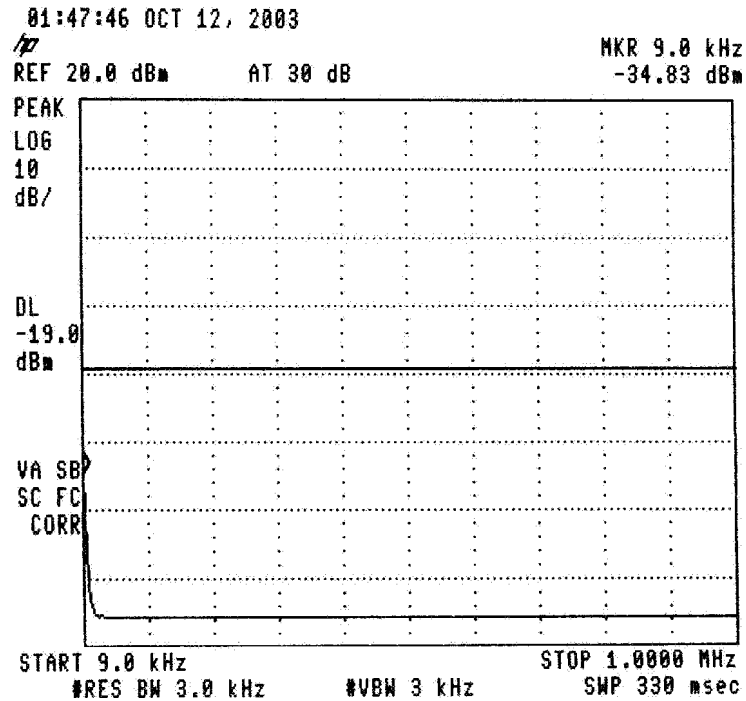


Figure 48 —2412 MHz

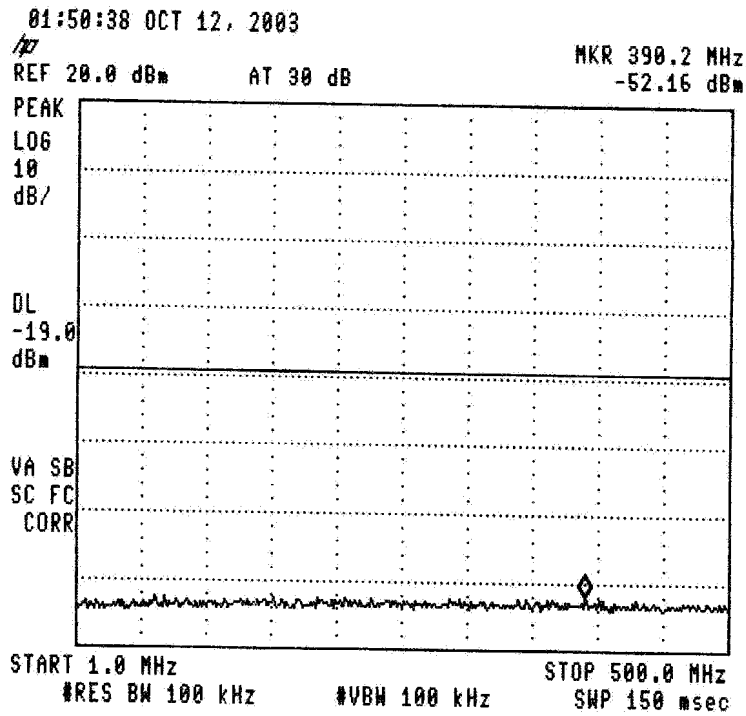


Figure 49 —2412 MHz

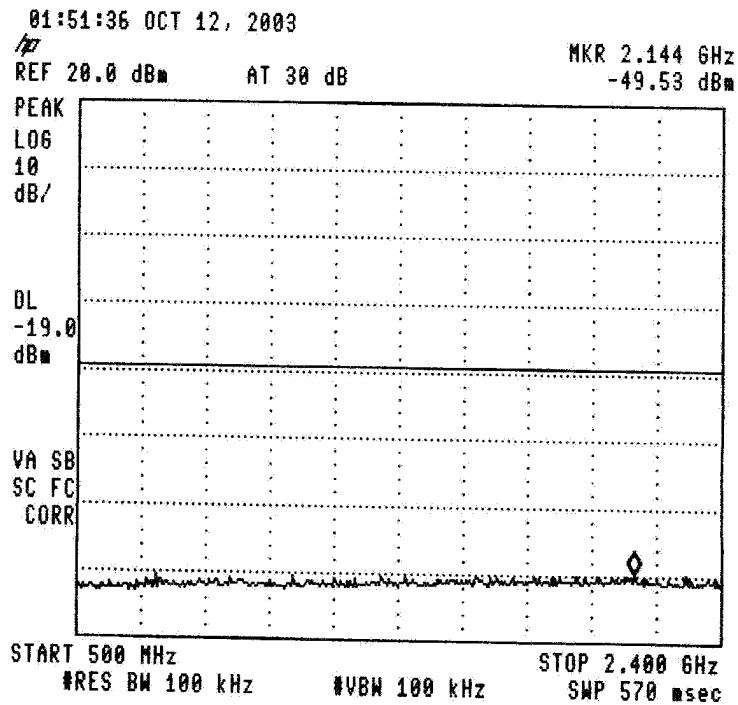


Figure 50 —2412 MHz

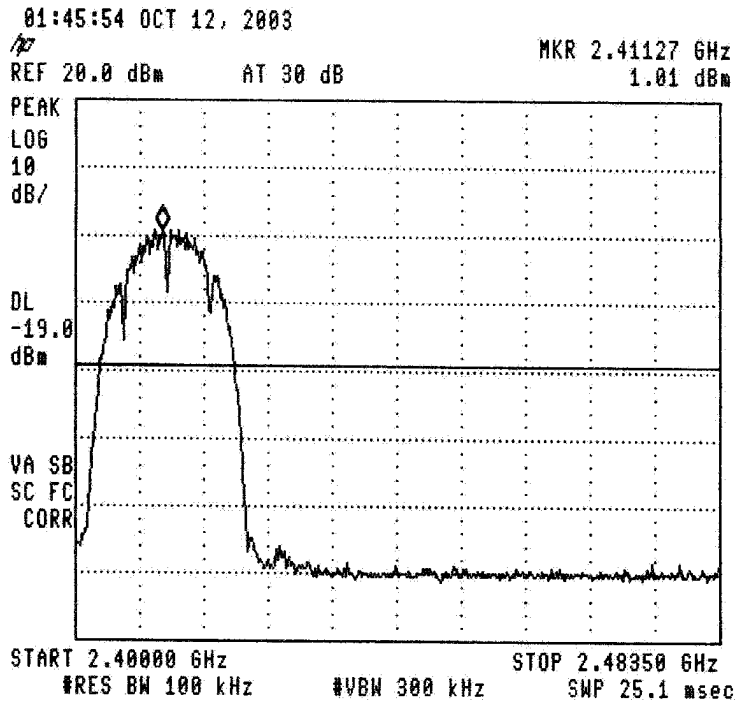


Figure 51 —2412 MHz

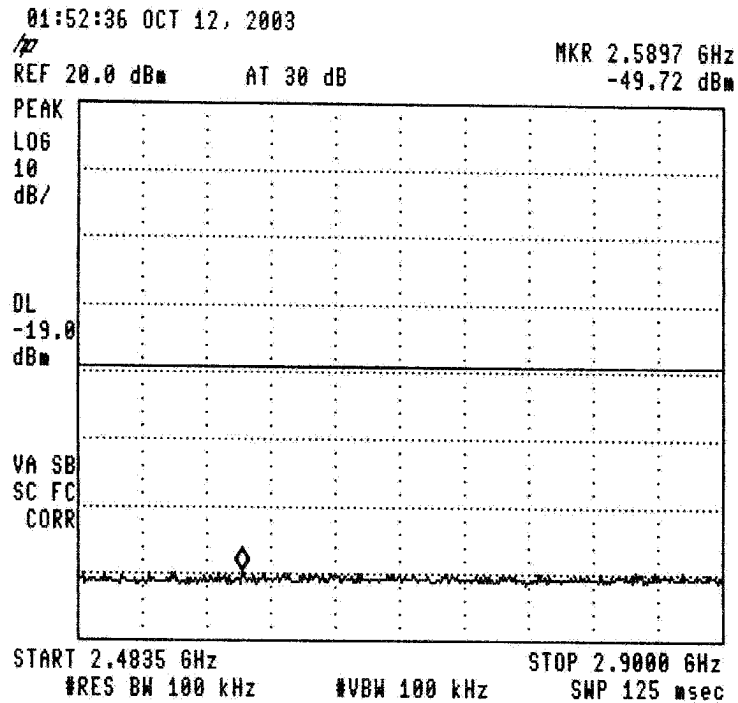


Figure 52 —2412 MHz

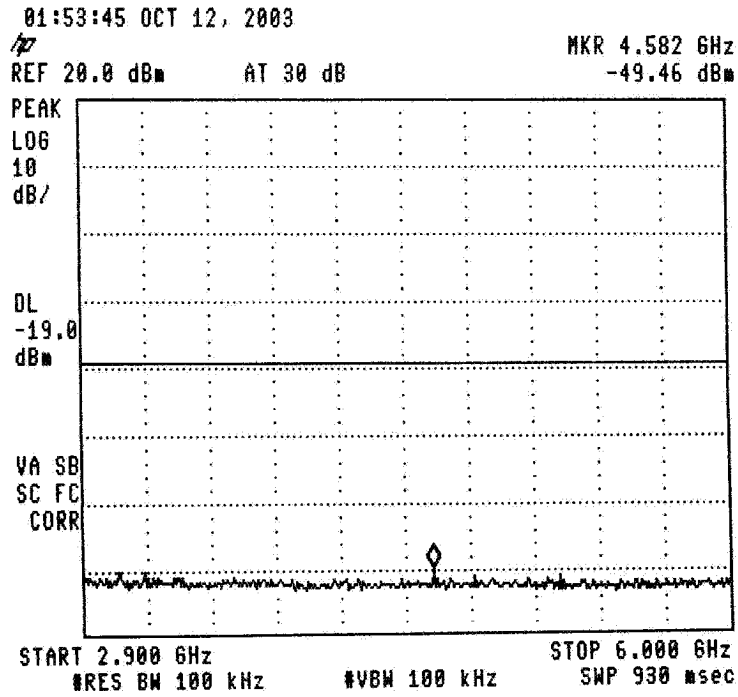


Figure 53 —2412 MHz

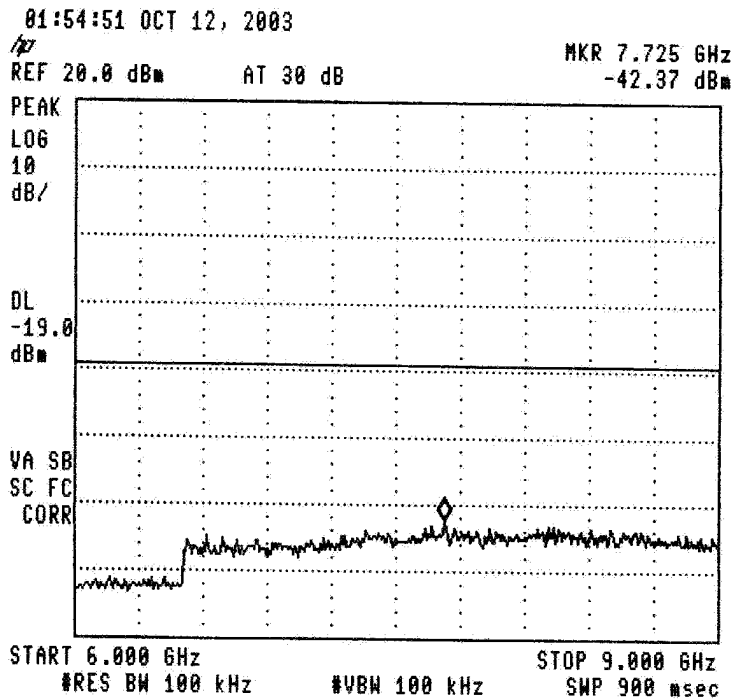


Figure 54 —2412 MHz

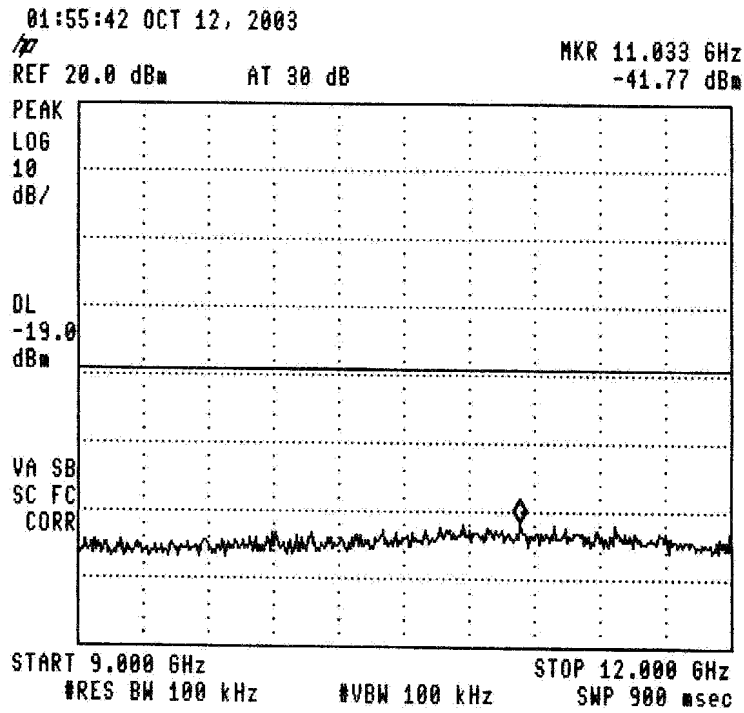


Figure 55 —2412 MHz

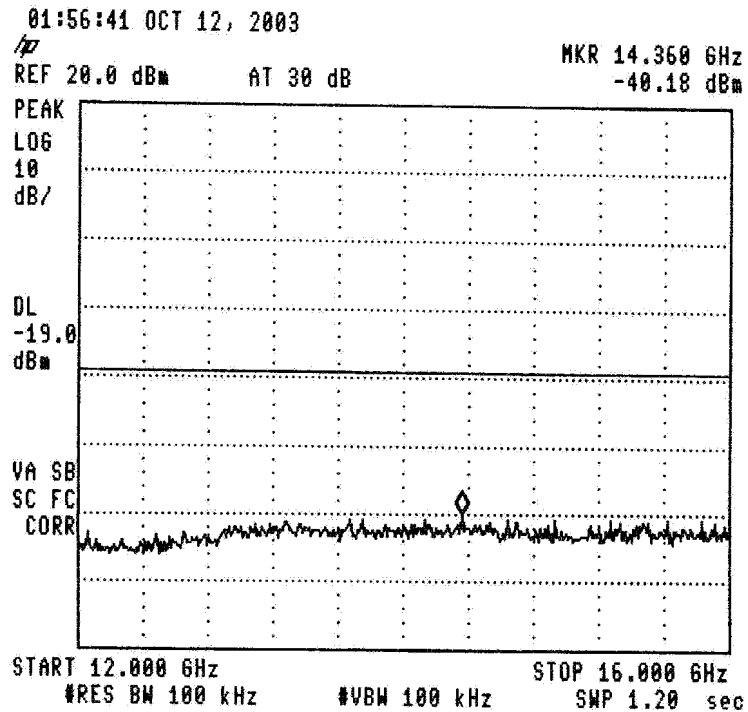


Figure 56 —2412 MHz

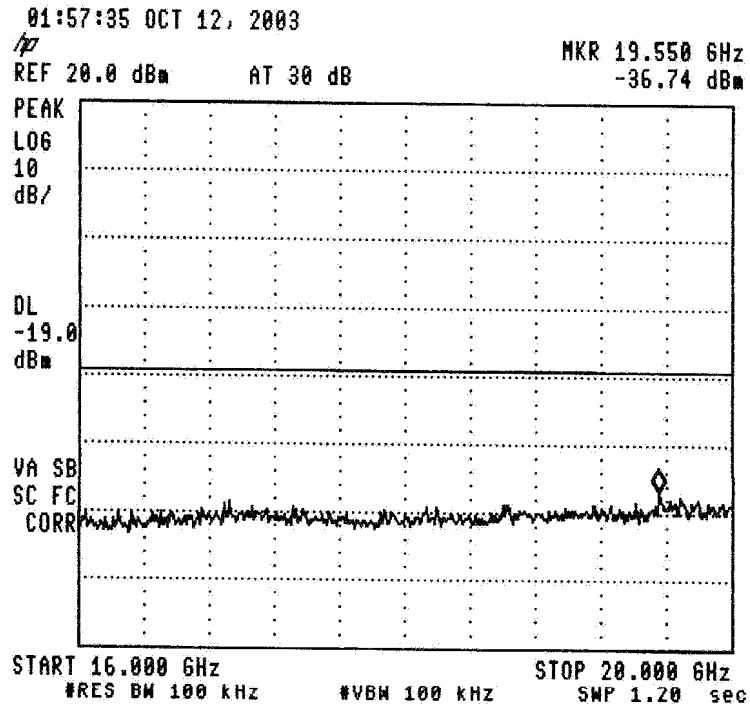


Figure 57 —2412 MHz

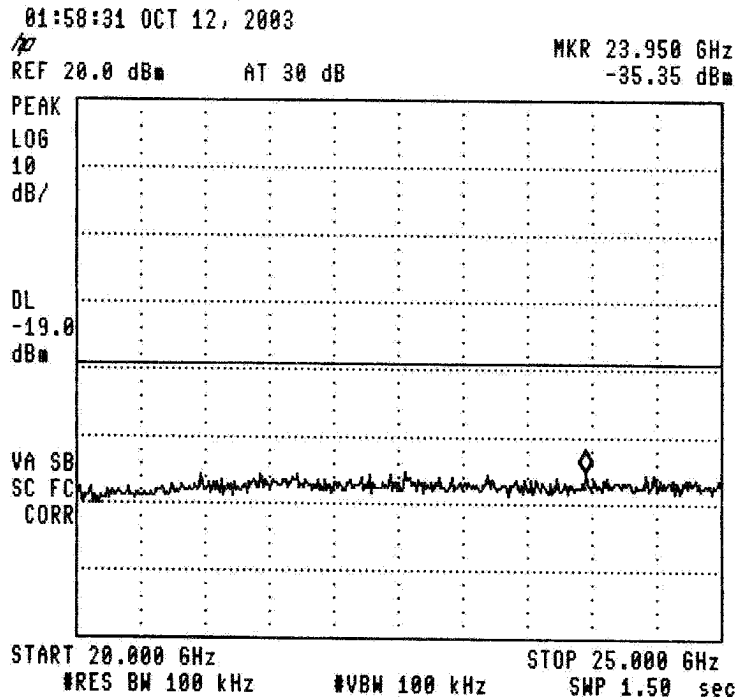


Figure 58 —2412 MHz

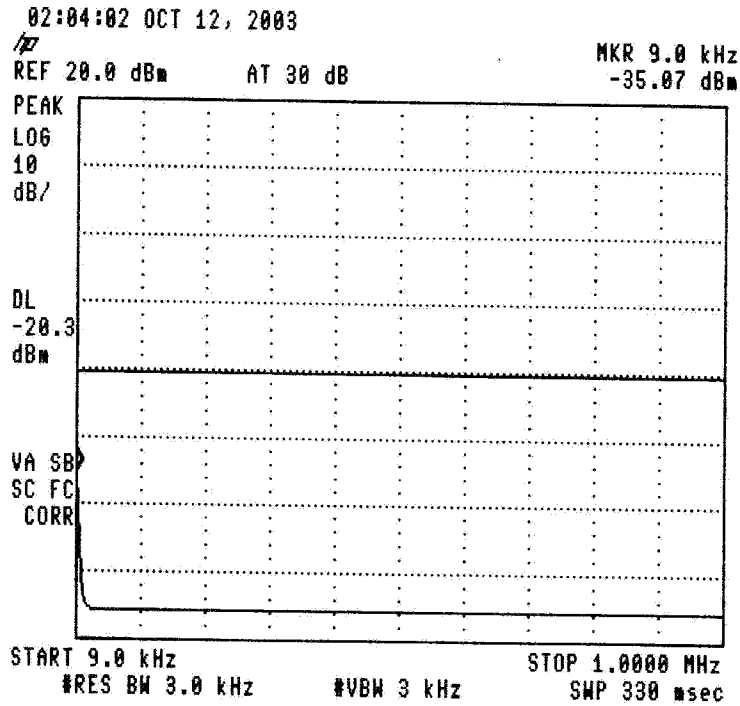


Figure 59 —2442 MHz

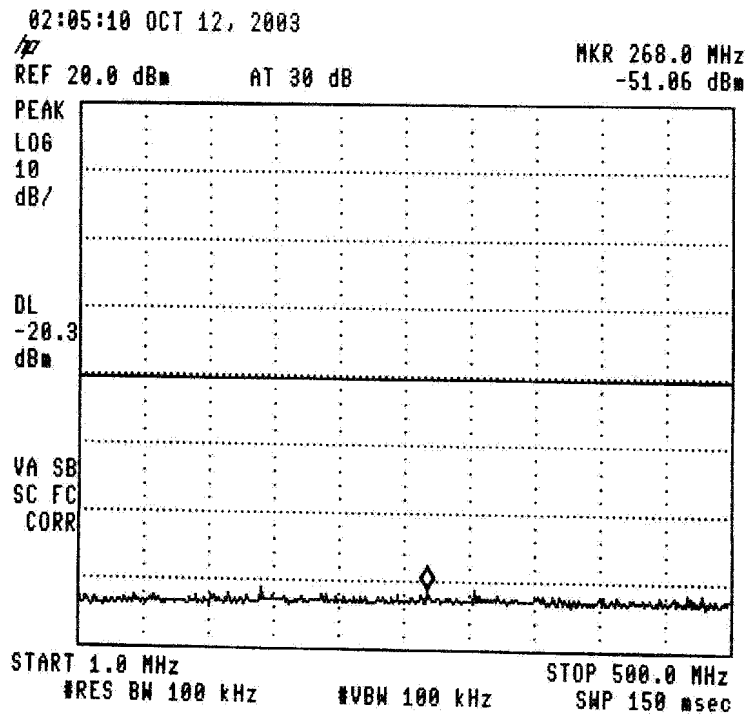


Figure 60 —2442 MHz

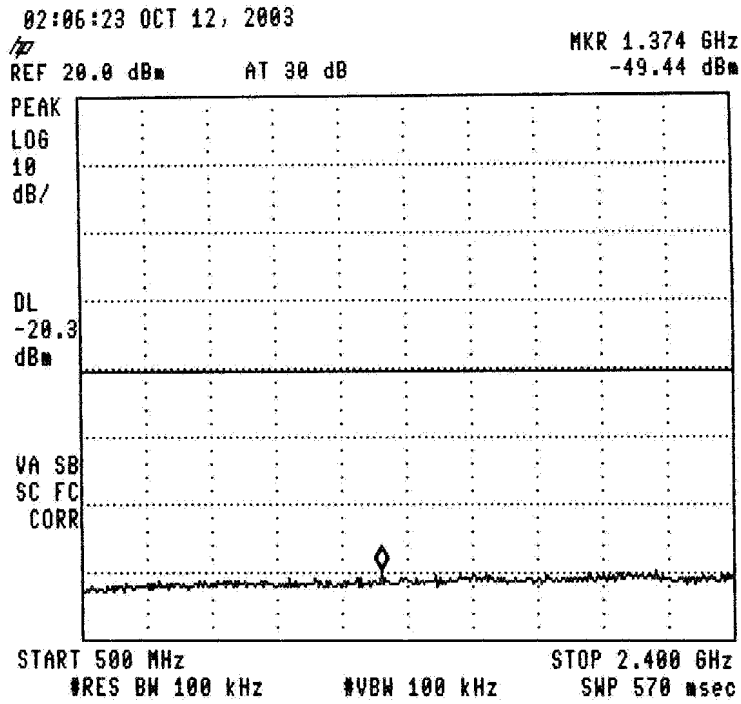


Figure 61 —2442 MHz

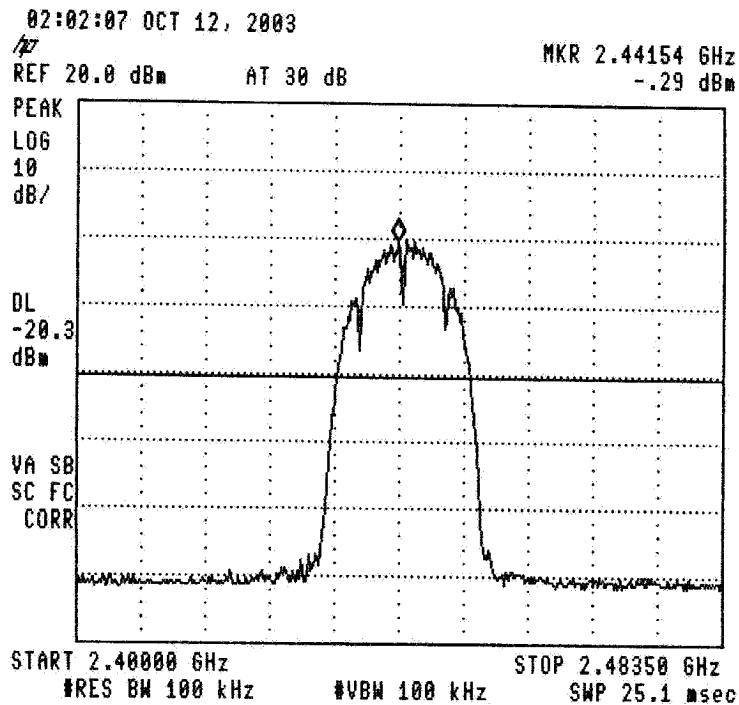


Figure 62 —2442 MHz

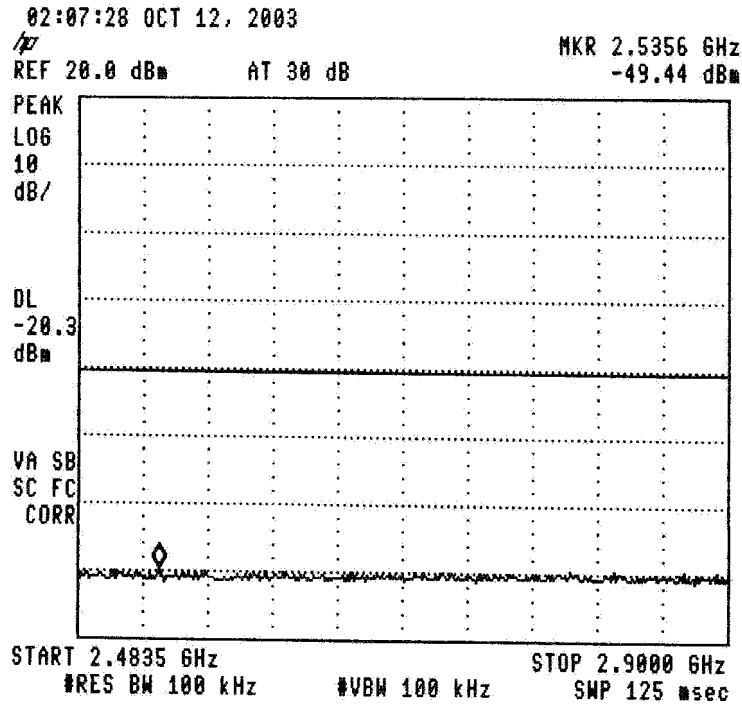


Figure 63 —2442 MHz

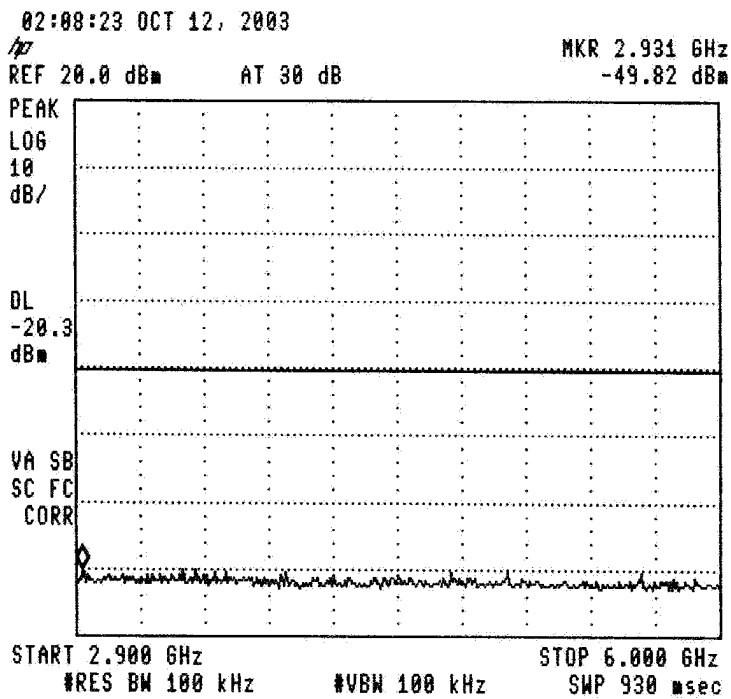


Figure 64 —2442 MHz

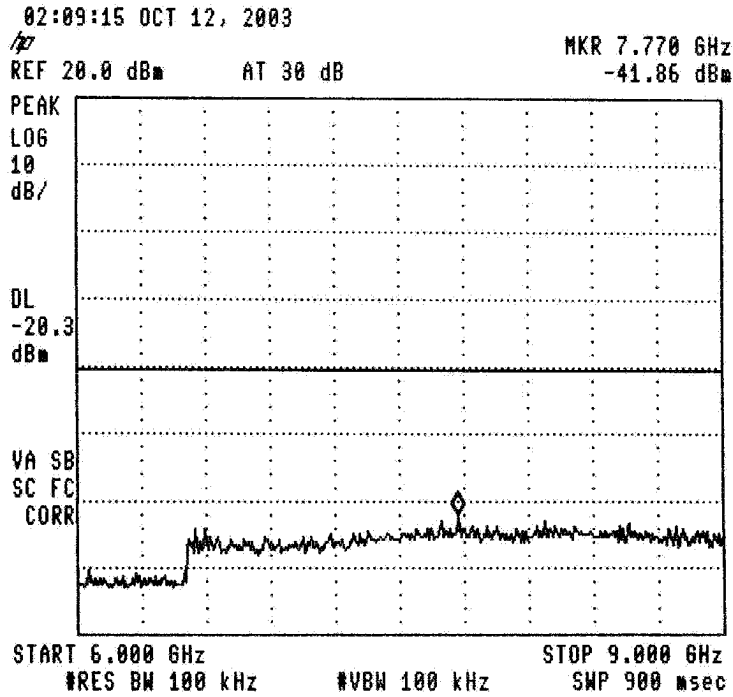


Figure 65 —2442 MHz

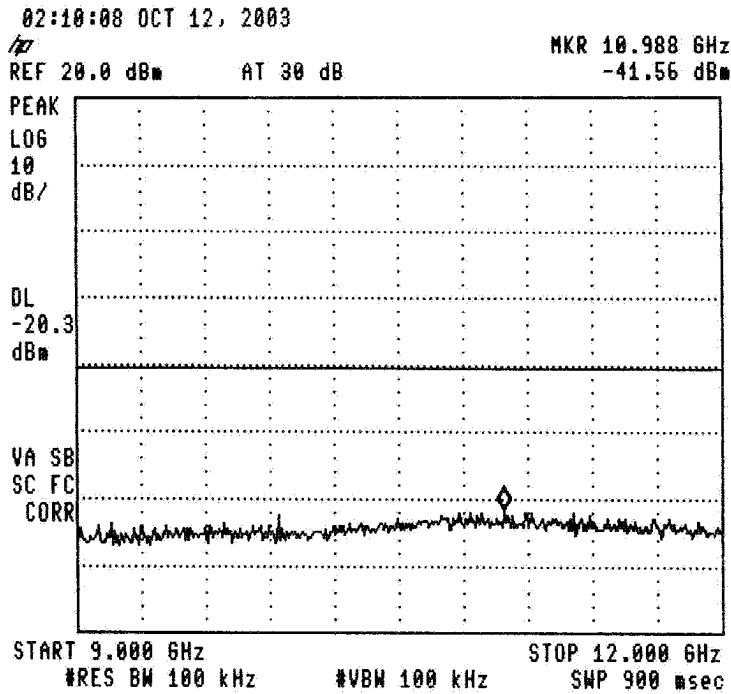


Figure 66 —2442 MHz

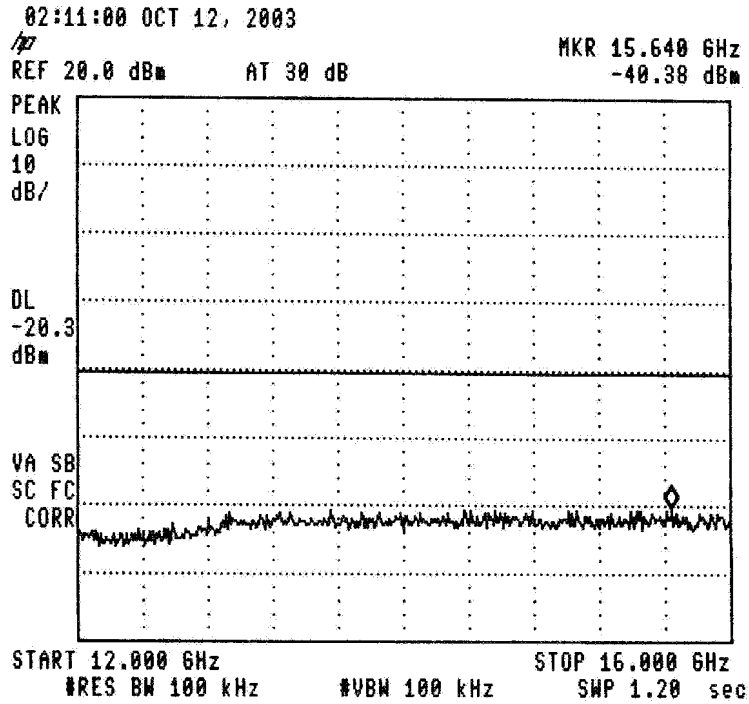


Figure 67 —2442 MHz

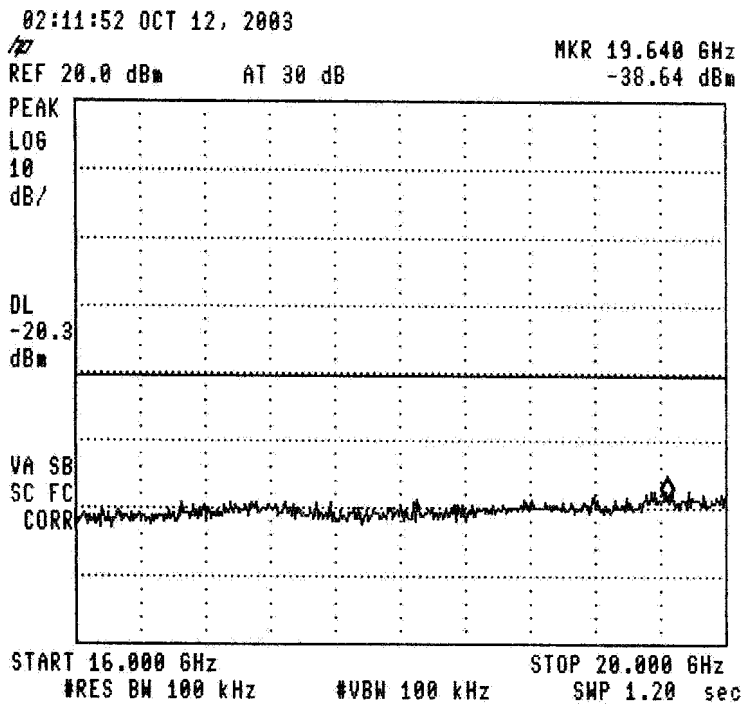


Figure 68 —2442 MHz

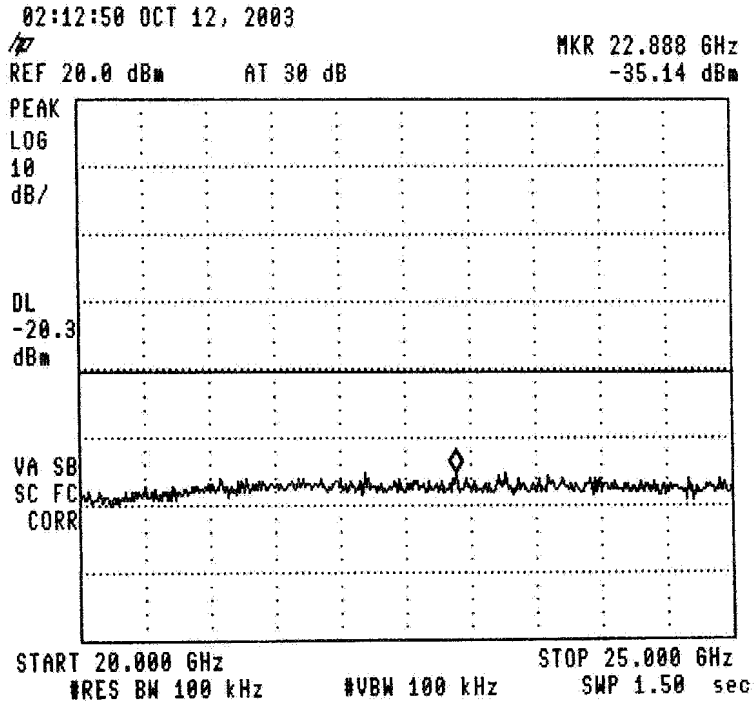


Figure 69 —2442 MHz

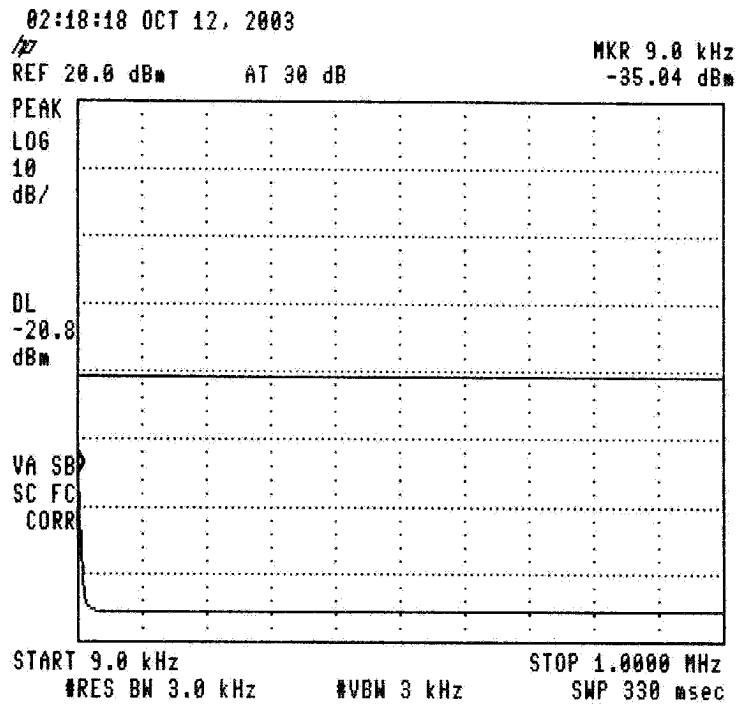


Figure 70 —2462 MHz

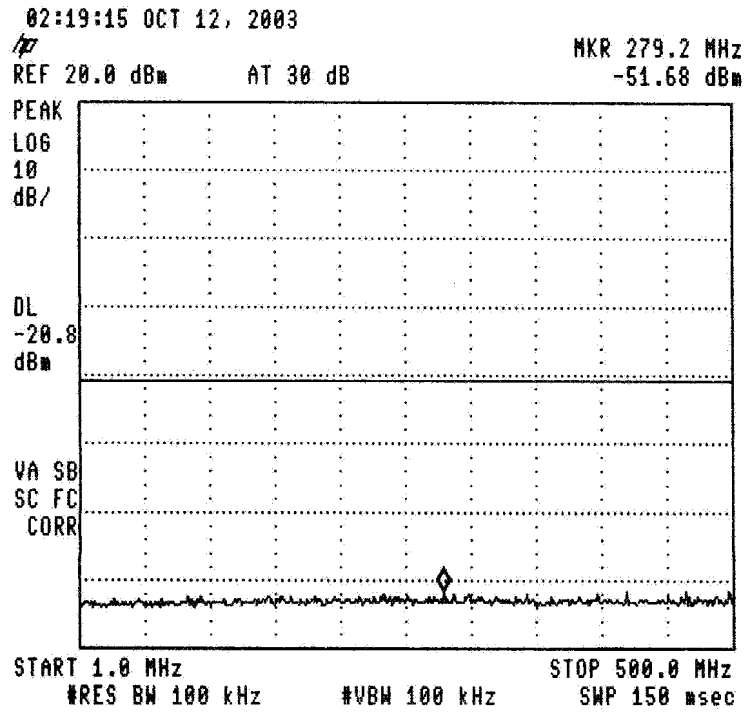


Figure 71 —2462 MHz

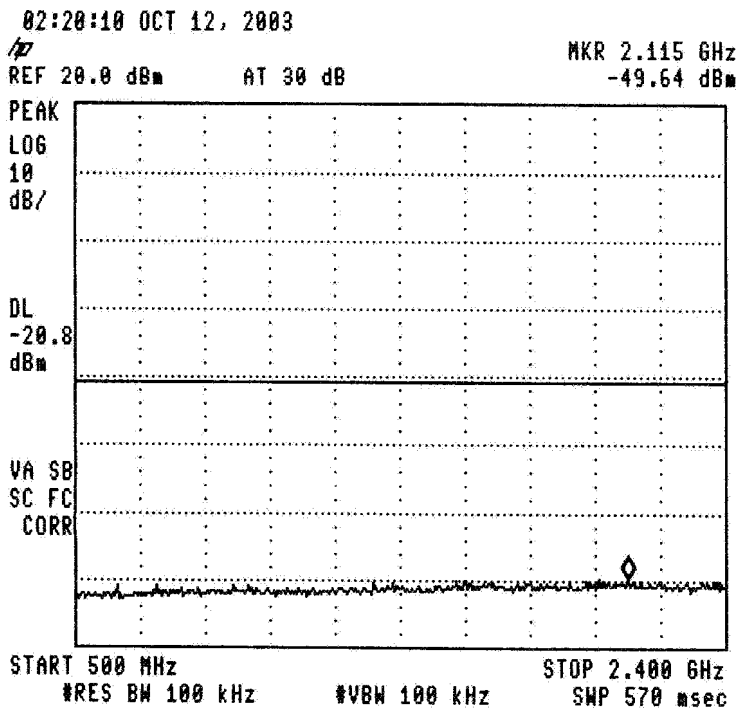


Figure 72 —2462 MHz

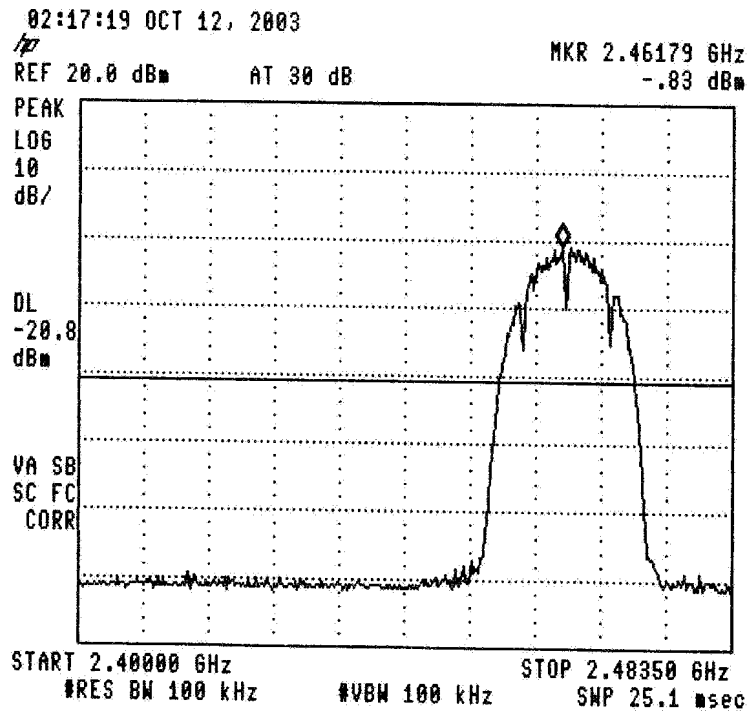


Figure 73 —2462 MHz

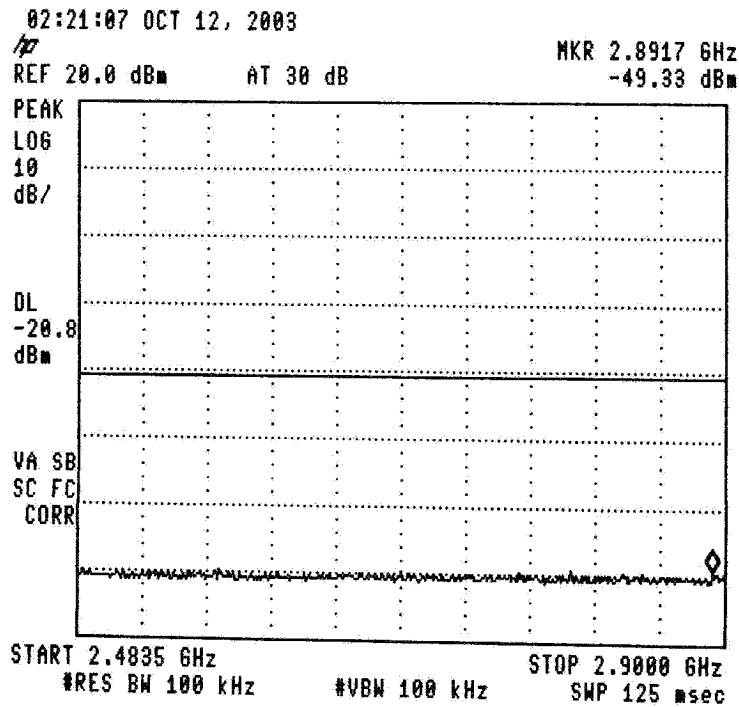


Figure 74 —2462 MHz

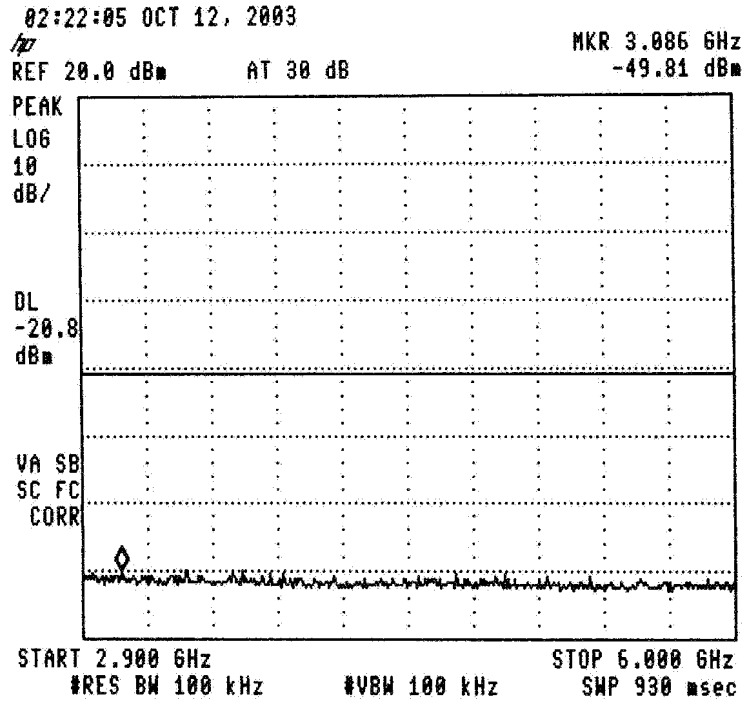


Figure 75 —2462 MHz

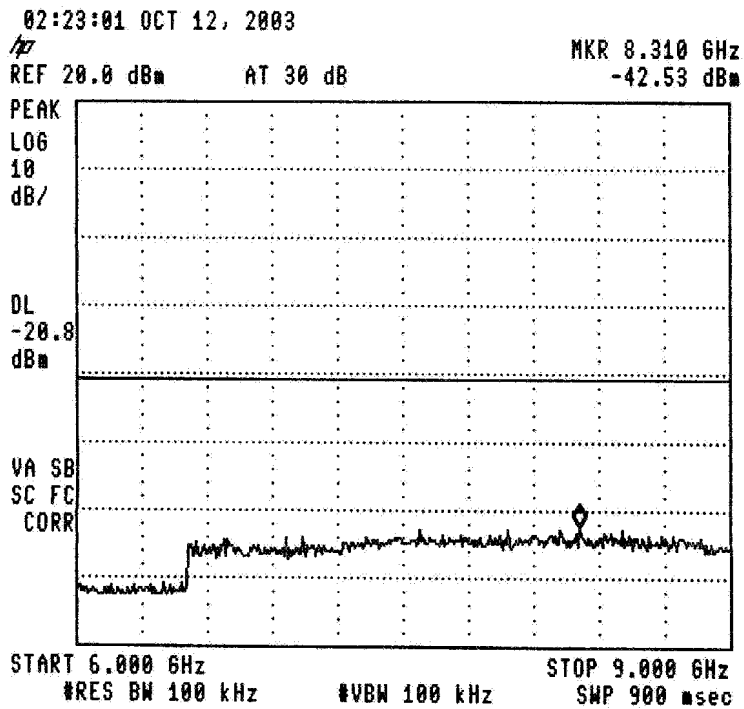


Figure 76 —2462 MHz

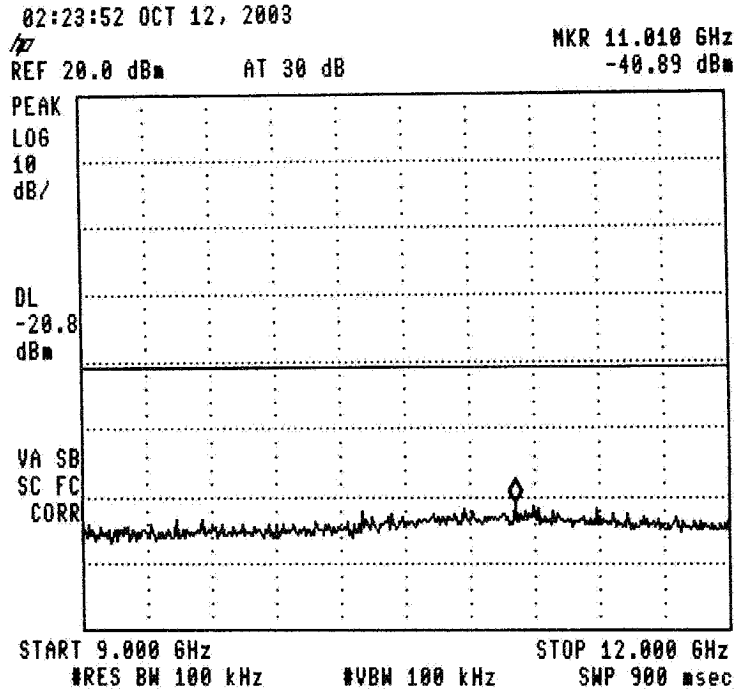
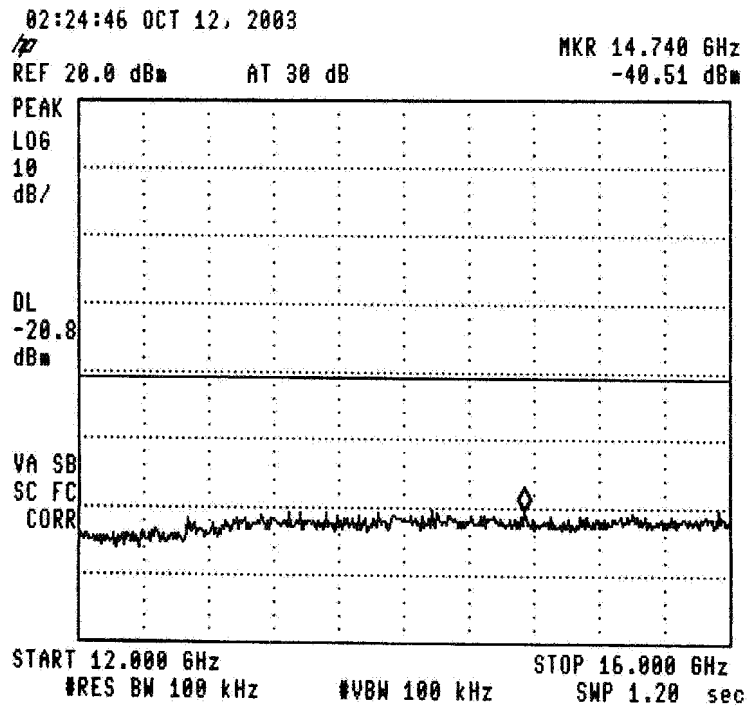


Figure 77 —2462 MHz

Figure 78 —2462 MHz



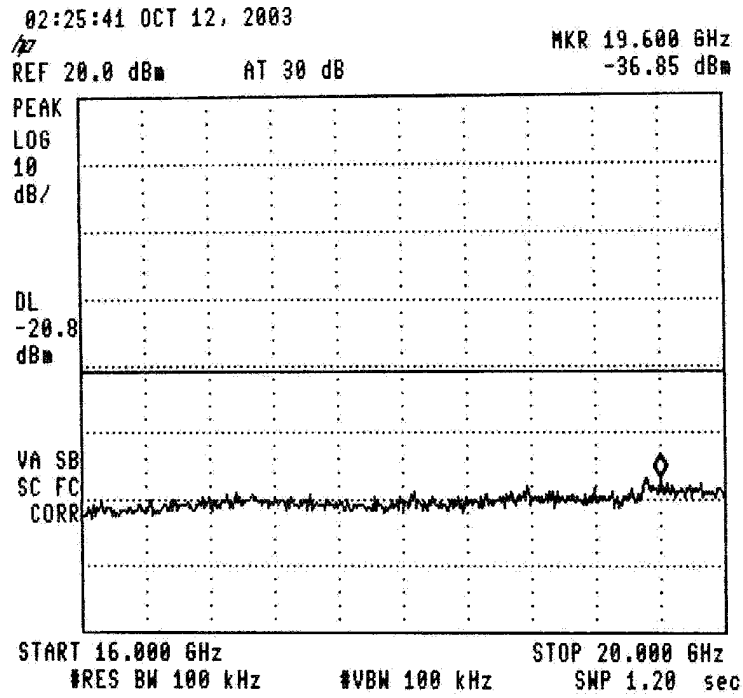


Figure 79 —2462 MHz

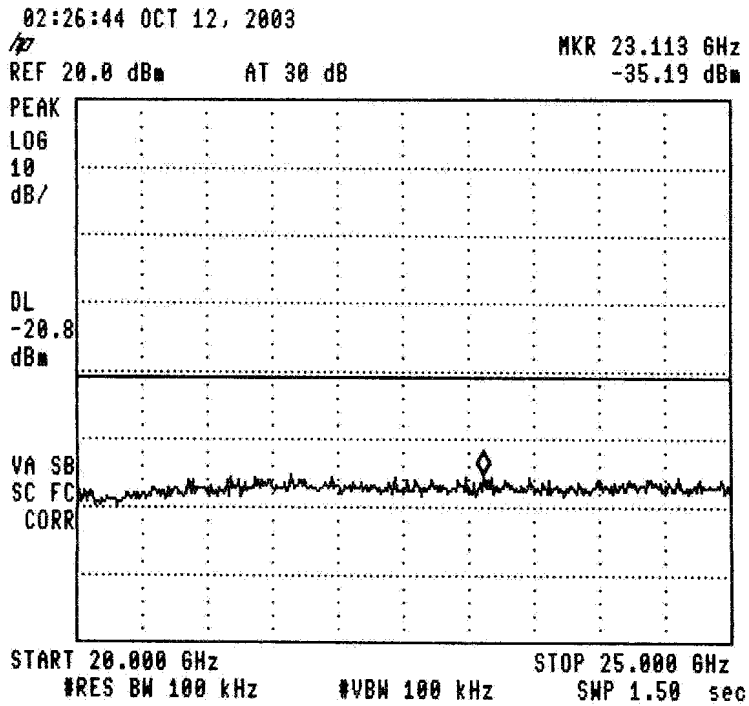


Figure 80 —2462 MHz

10.2 Results table

E.U.T Description: SALU AeroScout™ Location Receiver
 Model No.: BWH1000-02
 Serial Number: 130-1000-4190
 Specification: F.C.C. Part 15, Subpart C (15.247)

| Operation Frequency (MHz) | Reading (dBc) | Specification (dBc) | Margin (dB) |
|---------------------------|---------------|---------------------|-------------|
| 2412 | 36.36 | 20.0 | 16.36 |
| 2442 | 34.85 | 20.0 | 14.85 |
| 2462 | 34.36 | 20.0 | 14.36 |

Figure 81 Peak Power Output of 2400-2483.5 MHz Band

JUDGEMENT: Passed by 14.36 dB

TEST PERSONNEL:

Tester Signature: *E. Pitt*

Date: 13.11.03

Typed/Printed Name: E. Pitt

10.3 Test Equipment Used.

Peak Power Output of 2400-2438.5 MHz Band

| Instrument | Manufacture | Model | Serial Number | Calibration | |
|-------------------|-------------|-------|---------------|--------------------|--------|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | January 31, 2003 | 1 year |
| Cable | Avnet | MTS | N/A | September 20, 2003 | 1 year |

Figure 82 Test Equipment Used

11 6 dB Minimum Bandwidth

11.1 Test procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an appropriate coaxial cable section. The spectrum analyzer was set to 100 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded.

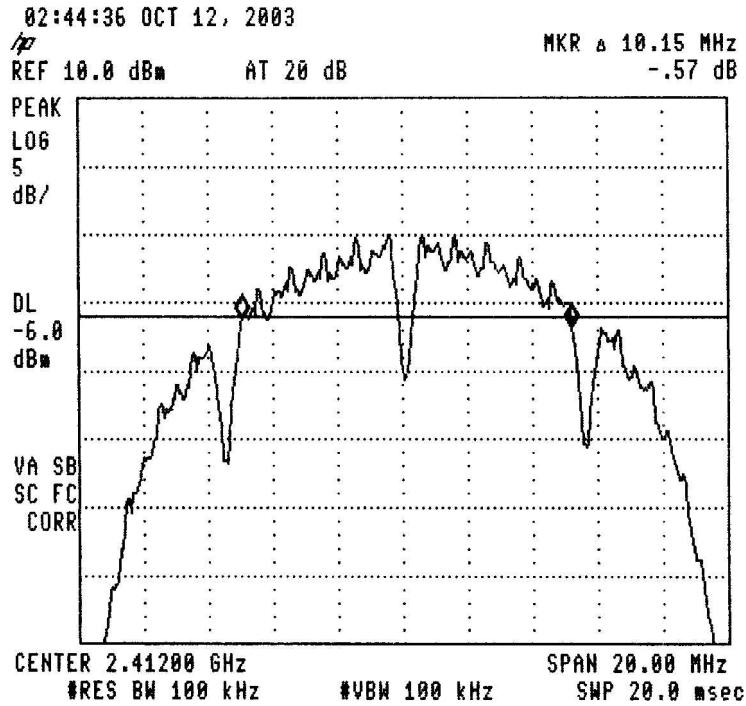


Figure 83 —2412 MHz

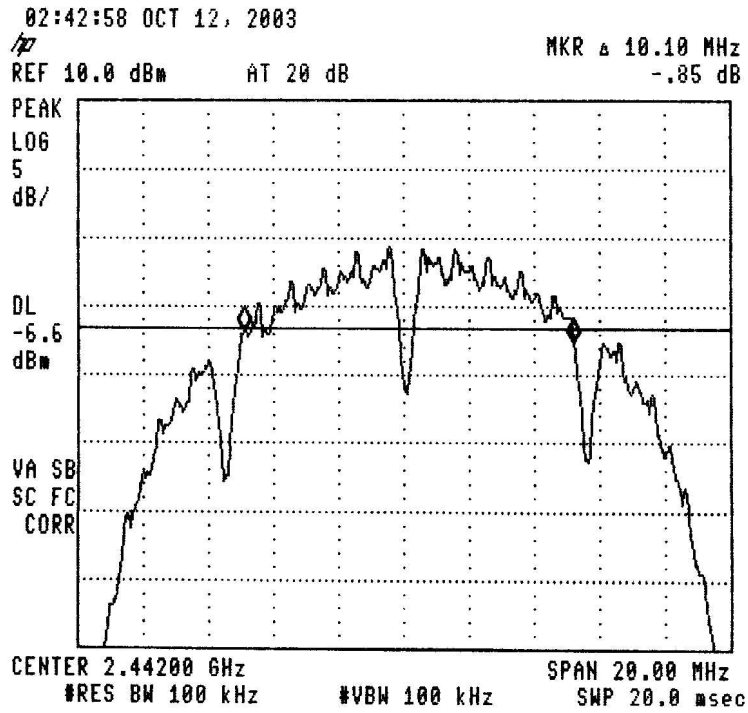


Figure 84 —2442 MHZ

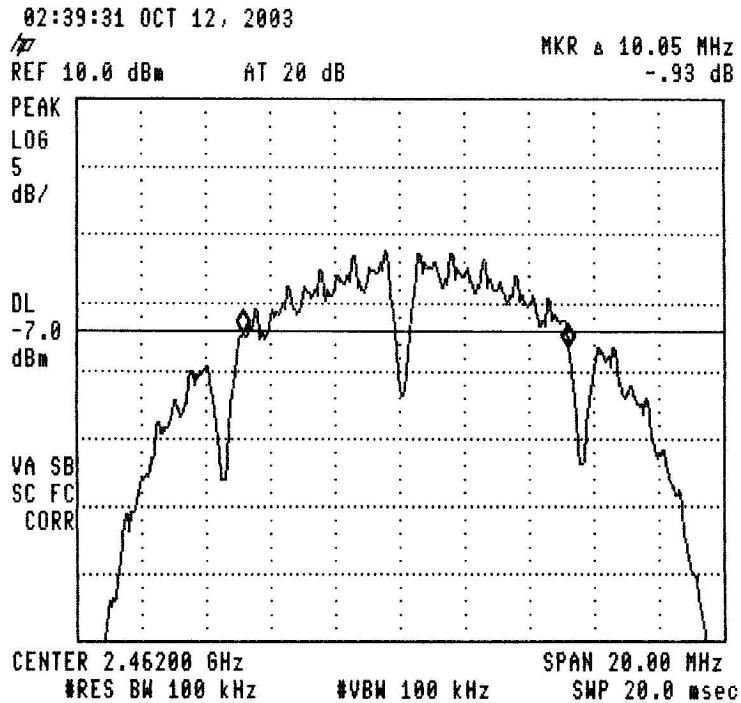


Figure 85 —2462 MHZ

12 Band Edge Spectrum

[In Accordance with section 15.247(c)]

12.1 Test procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency (2412 MHz) and the highest operation frequency (2462 MHz) in which the E.U.T. is planned to be used.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an appropriate coaxial cable. The spectrum analyzer was set to 100 kHz resolution BW. Maximum power level below 2400 MHz and above 2483.5 MHz was measured relative to power level at 2412 MHz and 2462 MHz correspondingly.

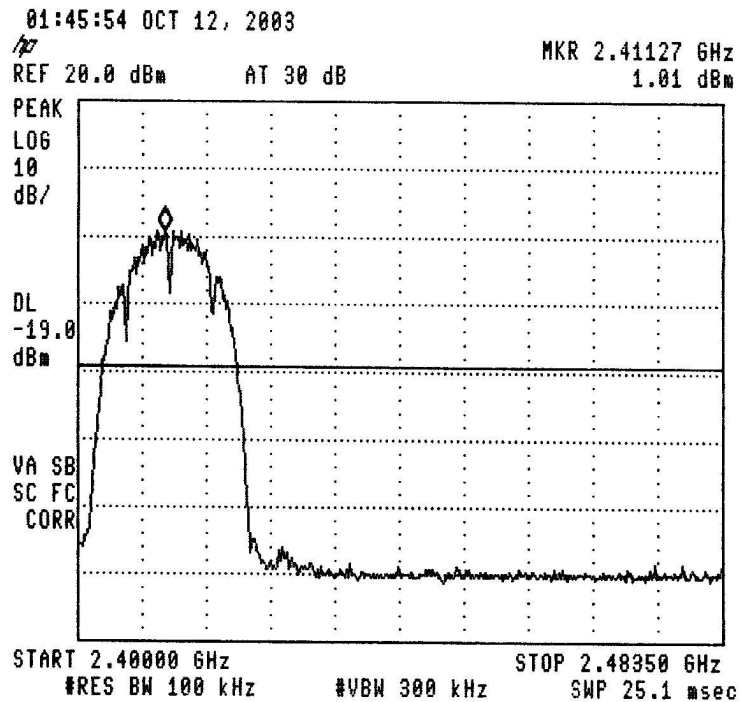


Figure 88 —2412 MHz

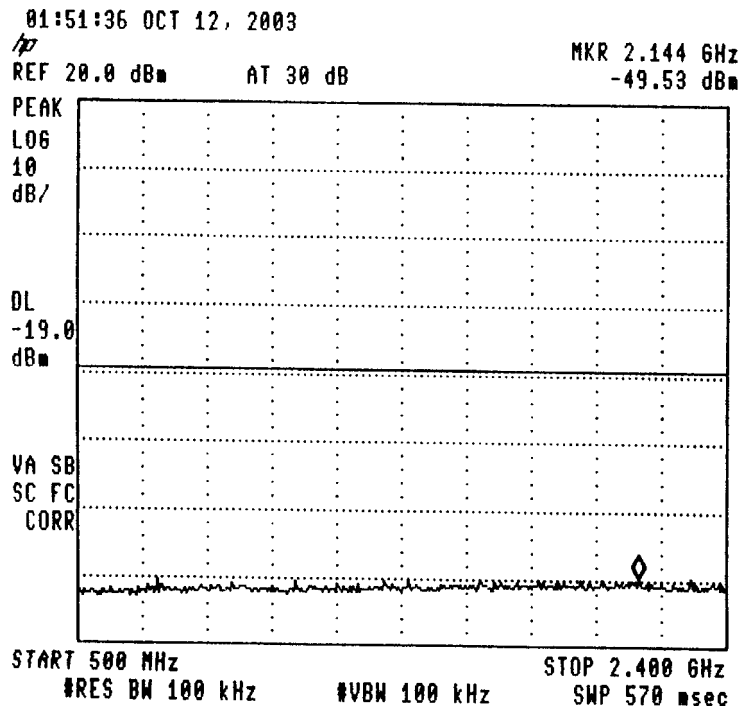


Figure 89 —2412 MHz

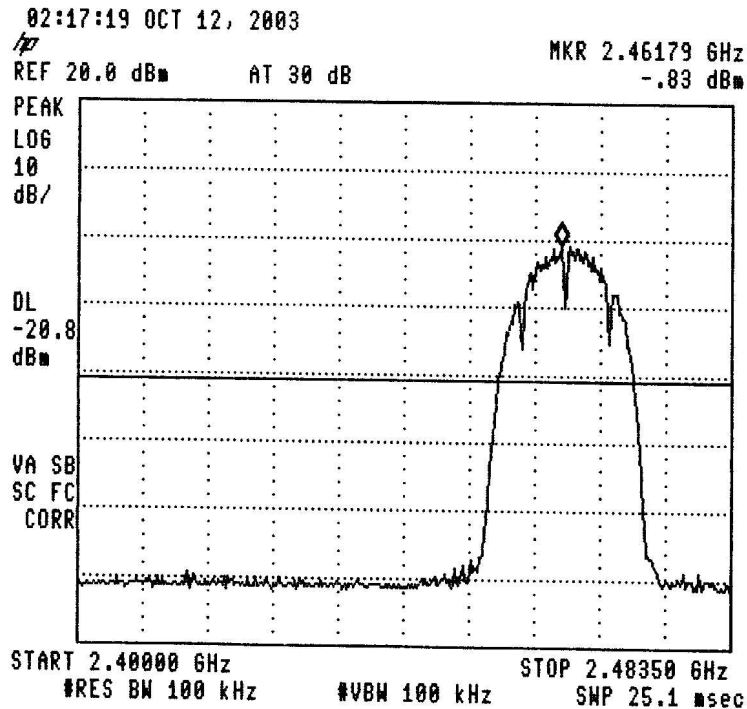


Figure 90 —2462 MHz

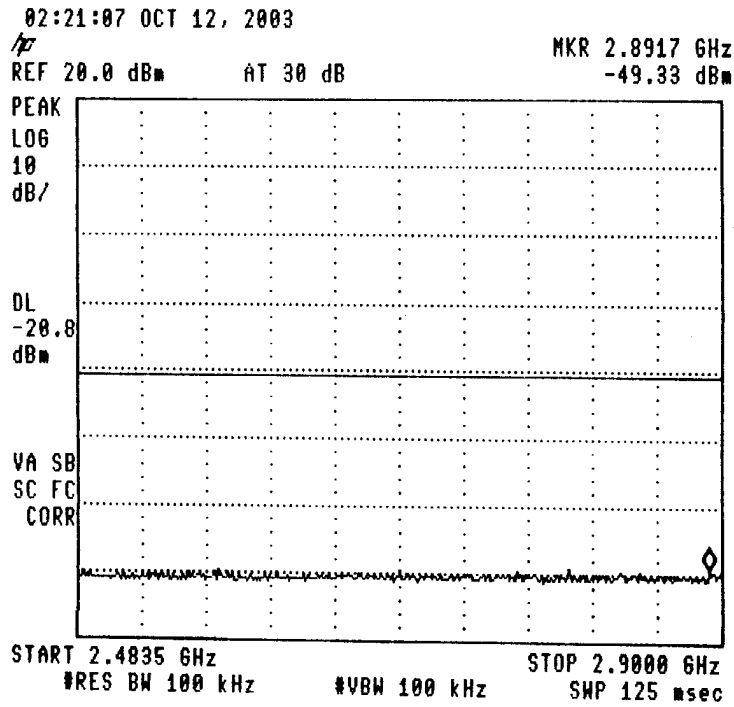


Figure 91 —2462 MHz

12.2 Results table

E.U.T. Description: SALU AeroScout™ Location Receiver
 Model No.: BWH1000-02
 Serial Number: 130-1000-4190
 Specification: F.C.C. Part 15, Subpart C (15.247)

| Operation Frequency (MHz) | Band Edge Frequency (MHz) | Spectrum Level (dBc) | Specification (dBc) | Margin (dB) |
|---------------------------|---------------------------|----------------------|---------------------|-------------|
| 2412 | 2144.00 | 50.54 | 20.0 | 30.54 |
| 2462 | 2892.00 | 48.50 | 20.0 | 28.50 |

Figure 92 Band Edge Spectrum

JUDGEMENT: Passed by 28.50 dB

TEST PERSONNEL:

Tester Signature: *E. Pitt*

Date: 13.11.03

Typed/Printed Name: E. Pitt

12.3 Test Equipment Used.

Band edge Spectrum

| Instrument | Manufacture | Model | Serial Number | Calibration | |
|-------------------|-------------|-------|---------------|--------------------|--------|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | January 31, 2003 | 1 year |
| Cable | Avnet | MTS | N/A | September 20, 2003 | 1 year |

Figure 93 Test Equipment Used

13 Transmitted Power Density

[In accordance with section 15.247(d)]

13.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an appropriate coaxial cable. The spectrum analyzer was set to 3 kHz resolution BW, 10 kHz video BW and sweep time of 1 second for each 3 kHz “window”. The spectrum peaks were located at each of the 3 operating frequencies.

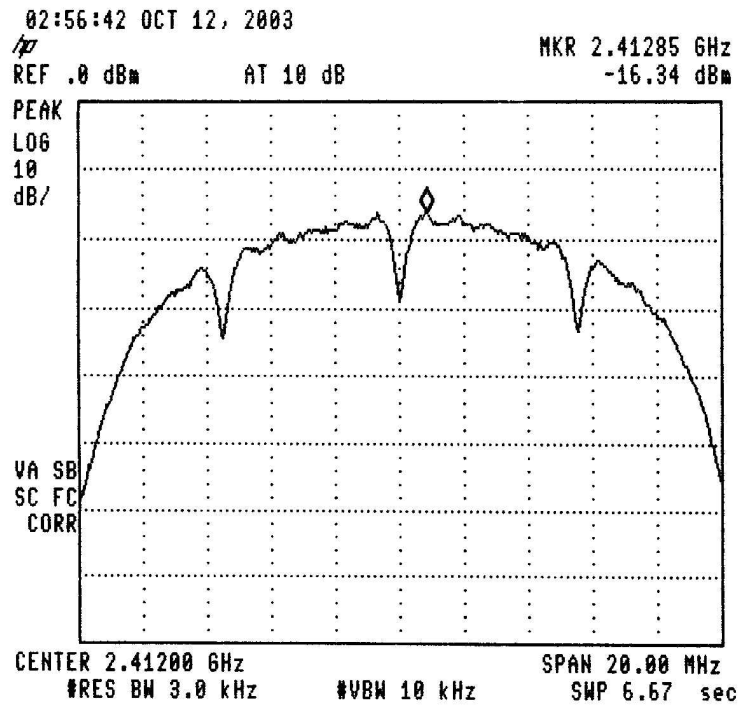


Figure 94 —2412 MHz

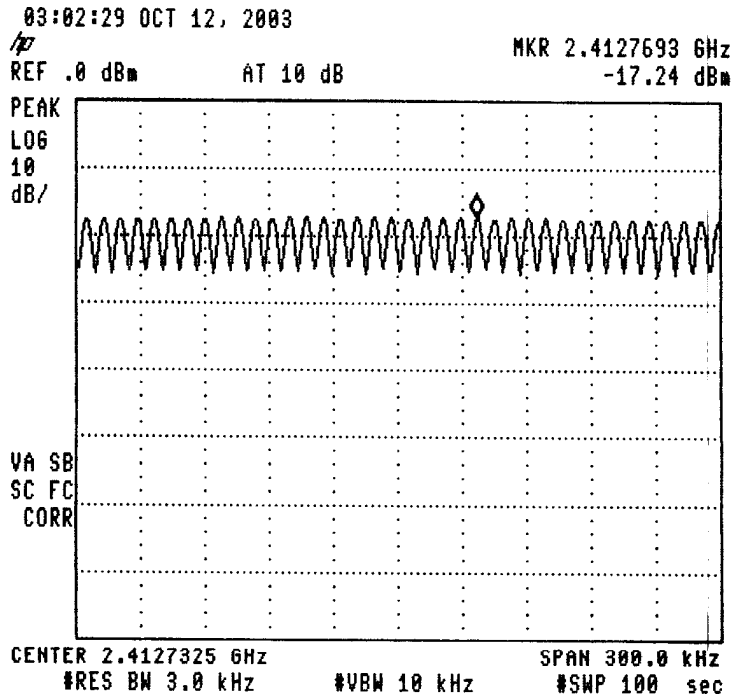


Figure 95 —2412 MHz

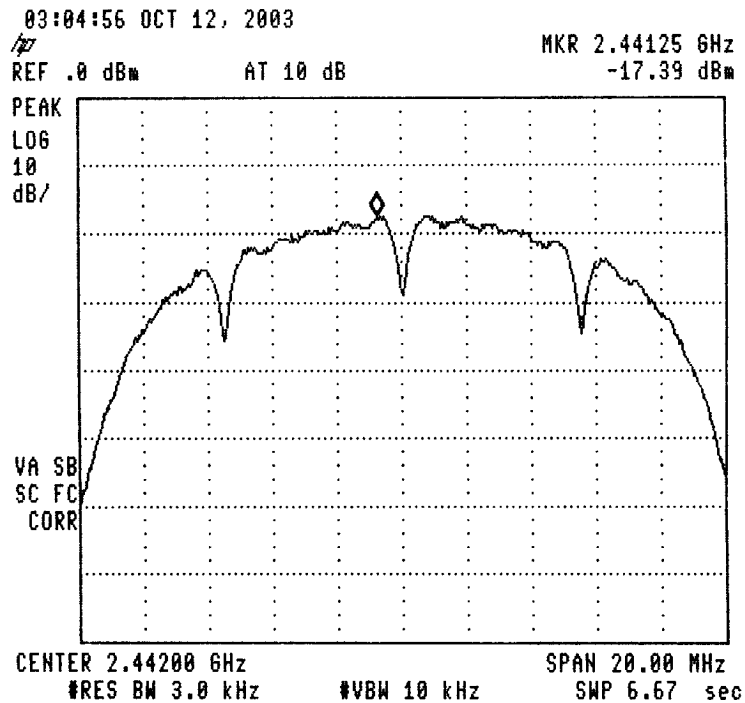


Figure 96 —2442 MHz

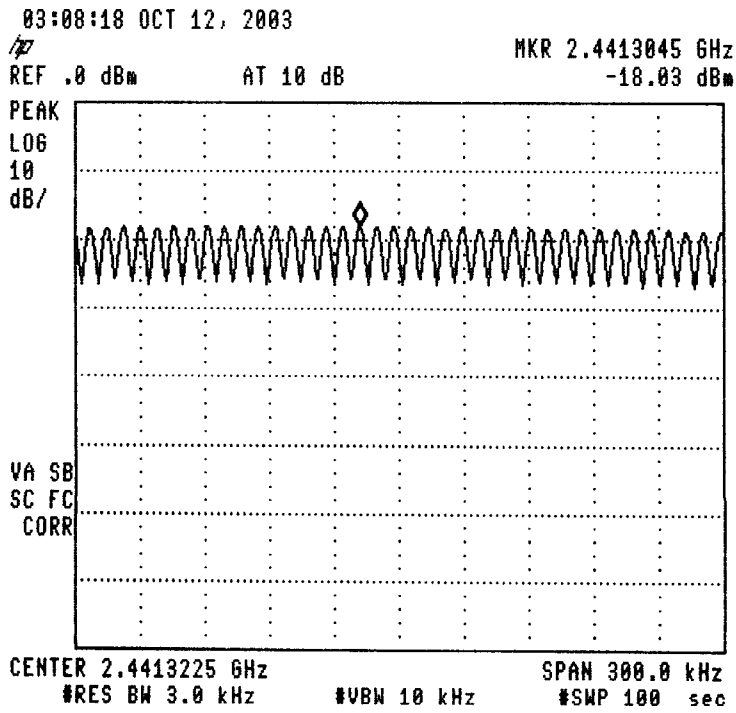


Figure 97 —2442 MHz

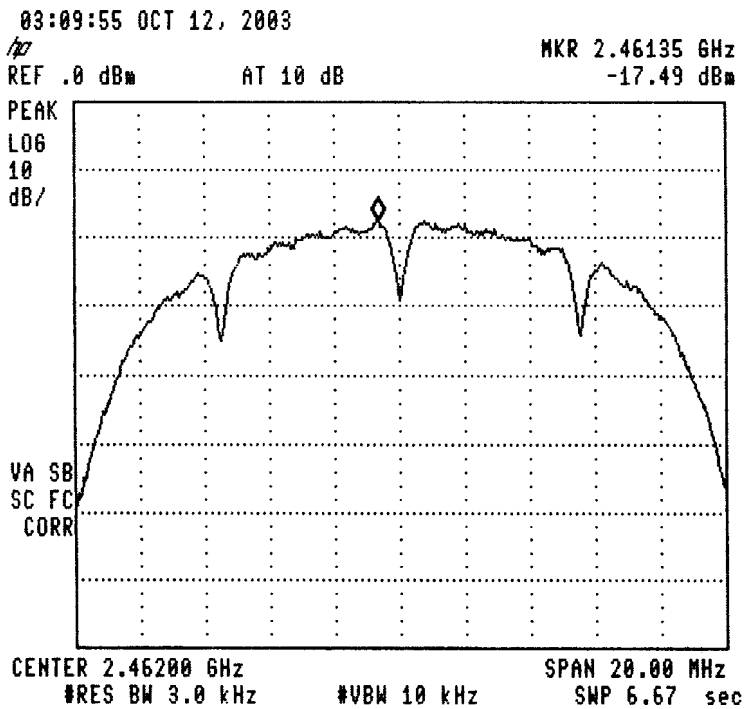


Figure 98 —2462 MHz

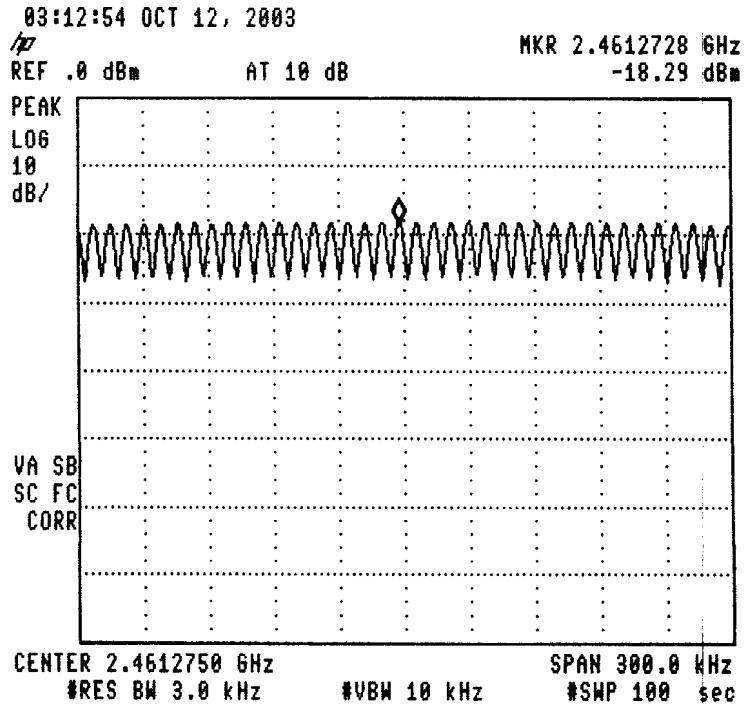


Figure 99 — 2462 MHz

13.2 Results table

E.U.T. Description: SALU AeroScout™ Location Receiver
 Model No.: BWH1000-02
 Serial Number: 130-1000-4190
 Specification: F.C.C. Part 15, Subpart C (15.247)

| Operation Frequency (MHz) | Reading Signal Analyzer (dBm) | Cable Loss (dB) | Final Result (dBm) | Specification (dBm) | Margin (dB) |
|---------------------------|-------------------------------|-----------------|--------------------|---------------------|-------------|
| 2412 | -17.24 | 1.0 | -16.24 | 8.0 | 24.24 |
| 2442 | -18.03 | 1.0 | -17.03 | 8.0 | 25.03 |
| 2462 | -18.29 | 1.0 | -17.29 | 8.0 | 25.29 |

Figure 100 Test Equipment Used

JUDGEMENT: Passed by 25.24 dB

TEST PERSONNEL:

Tester Signature: _____

Date:

Typed/Printed Name: E. Pitt

13.3 Test Equipment Used.

Transmitted Power Density

| Instrument | Manufacture | Model | Serial Number | Calibration | |
|-------------------|-------------|-------|---------------|--------------------|--------|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | January 31, 2003 | 1 year |
| Cable | Avnet | MTS | N/A | September 20, 2003 | 1 year |

Figure 101 Test Equipment Used

14 Antenna Gain

The antenna gain is 0dBi.



YE EUN TECH CO., LTD

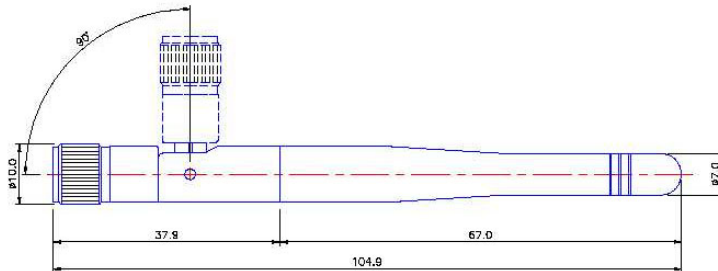
#604, GunpoJeil-Gongdan, 323-1, DangJeong-dong, Gunpo City,
Kyounggi, Korea Zip:435-832

TEL : 82-31-459-0960~1

FAX : 82-31-459-0962

MODEL : HPD-2400N/RP (Reverse Polarity)

■ **ANTENNA TYPE: SLEEVE DIPOLE**



■ **ELECTRICAL SPECIFICATIONS**

| | |
|-----------------------|--------------------|
| FREQUENCY BAND | 2.4~2.5 GHz |
| V.S.W.R | LESS THAN 1.9:1 |
| GAIN | 0 dBi (Max.) |
| RADIATION PATTERN | OMNI - DIRECTIONAL |
| POLARIZATION | VERTICAL |
| POWER INPUT(Watts) | 5 (MAX) |
| IMPEDANCE(Ω) | 50 |

■ **MECHANICAL SPECIFICATIONS**

| | |
|----------------|-----------------------------------|
| LENGTH | 105mm \pm 2.0 |
| WEIGHT | 17g |
| CONNECTOR TYPE | SMA-PLUG/ NICKEL PLATED/ SWIVLE |
| TEMPERATURE | -30 $^{\circ}$ C~+70 $^{\circ}$ C |
| COVER MATERIAL | URETHANE – IVORY COLOR |

15 R.F Exposure/Safety

The E.U.T. is installed in fixed locations for application of collecting location data. Typical locations for the E.U.T. are offices and communication centers. The typical distance between the E.U.T. and the general population in normal use is at least 0.5 meters.

Calculation of Maximum Permissible Exposure (MPE) Based on Section 1.1307(b)(1) Requirements

- (a) FCC limits at 2442 MHz is: $1 \frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

- (b) The power density produced by the E.U.T. is

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

P_t - Transmitted Power 30mw (Peak)

G_t - Antenna Gain, 0dBi

R - Distance from Transmitter using 20cm worst case

- (c) The peak power density is :

$$S_p = \frac{30}{4\pi(20)^2} = 6 \times 10^{-3} \frac{mW}{cm^2}$$

- (d) The duty cycle of transmission in actual worst case is 1 millisecond “on” and 50 microsecond “Off”.

The average power over 30 minutes is:

$$P_{AV} = \frac{30 \times 1}{1.05} = 28.6mW$$

- (e) The averaged power density of the E.U.T. is:

$$S_{AV} = \frac{28.6}{4\pi(20)^2} = 5.7 \times 10^{-3} \frac{mW}{cm^2}$$

- (f) This is 3 orders of magnitude below the FCC limit.



17. APPENDIX C – Correspondence With the TCB

Date: 24/11/04

To: Marianne Bosley

From: EMC

Subject: FCC Authorization for AeroScout Location Receiver Model BWH1000-2-AeroScout

Hello Marianne,

1. The subject product is a wireless spread spectrum receiver/transmitter, authorized for FCC via METLabs' TCB service (FCC ID # Q3HBS2020-0).

2. The customer plans now to add to the original product as follows:

- a. A 125 kHz transmitter.
- b. Use of 5 new antennas (1 at a time)
- c. Produce another version of the original product + modifications 2.a, 2.b. + replacement of its plastic housing by metallic housing.

Note: The prior 2.4 GHz receiver/transmitter is without changes

3. We plan to:

- a. Fully test to Part 15, Sub-part C the 125 kHz transmitter using the plastic housing.
- b. Test spurious radiation for each new antenna with the plastic housing unit.
- c. The metal housing version will be tested only for spurious radiation with only one new antenna (worst case), selected on maximum e-field at the operation frequency band.

4. Questions:

4.1. Could the authorization for the new product be under a single permissive change Class II?

Is a new FCC ID # required?

Please advise

4.2. Is the test plan acceptable?

Please advise/comment.

Regards

Shaika Raz

EMC Laboratory Manager

EMC Laboratory

ITL (Product Testing) Ltd.

Kfar Bin Nun

Israel

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<http://www.itl.co.il>

<http://www.i-spec.com>

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Date: 01/12/04

To: EMC

From: Chris Harvey

Subject: RE: FCC Authorization for AeroScout Location Receiver Model BWH1000-2-AeroScout-URGENT

Shaik, the FCC does not allow the addition of a Transmitter to a device under the existing FCC ID number, so this is not exactly doable as requested.

If you handle the 125kHz transmitter as a modular approval then this module can be added to this device under a permissive change.

The changes to the original unit then can be handled as Class II Permissive Changes (adding antennas, changing enclosures and co-locating with the 125kHz module as a single application for Class II). The label on the units that incorporated the 125kHz module would include the external Modular label required by the FCC. This module would have its own FCC ID number.

Since the final product is Mobile for RF Exposure classification you would need to address the multiple RF sources co-located within 20cm of each other in an MPE calculation.

The test plan approach seems appropriate for this approval.

I hope this is helpful.

Best regards,

Chris Harvey

Chris Harvey EMC Consultants, LLC

charvey@ieee.org

cell 443-622-3300

See additional correspondence with METLabs dated: 23.01.05, 07.12.05, and 02.12.05.