Flom Test Labs
EMI, EMC, RF Testing Experts Since 1963
toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.flomlabs.com
info@flomlabs.com

Sub-part
2.1033(c):

**Equipment Identification**

FCC ID: ROJEXPLORER300

**Nameplate Drawing**

Attached, Exhibit 1.

**Location**

As Per Label Drawing(s)

**Date Of Report**

May 23, 2006

Supervised By: David E. Lee, FCC/IC Compliance Manager

**The Applicant has been cautioned as to the following:**

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

# Table Of Contents

*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

a) **Test Report**

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0640004

d) Client: Thrane & Thrane A/S
Lundtoftegardsvej 93D
DK-2800 Lyngby, Denmark

e) Identification: Explorer 300
FCC ID: ROJEXPLORER300
Description: Immersat Terminal

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: May 23, 2006
EUT Received: April 2, 2006

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:

David E. Lee, FCC/IC Compliance Manager

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

**List Of General Information Required For Certification**

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to Part 15.247 (Bluetooth)

**Sub-Part 2.1033**

©(1): **Name and Address of Applicant:**

Thrane & Thrane A/S
Lundtoftegardsvej 93D
DK-2800 Lyngby, Denmark

**Manufacturer:**

Applicant

(c)(2): **FCC ID:** ROJEXPLORER300

**Model Number:** Explorer 300

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type Of Emission:** GFSK

(c)(5): **FREQUENCY RANGE, MHz:** 2400 to 2483.5

(c)(6): **Power Rating, W:** 0.100

____ Switchable __X__ Variable ____ N/A

(c)(7): **Maximum Power Rating, W:** 1.0

15.203: **Antenna Requirement:**

__X__ The antenna is permanently attached to the EUT
____ The antenna uses a unique coupling
____ The EUT must be professionally installed
____ The antenna requirement does not apply

**Subpart 2.1033** (continued)
(c)(8): Voltages & Currents in All Elements in Final RF Stage, Including Final Transistor or Solid State Device:

Composite Unit: Figures are with both Part 25 and Part 15.247 units operating;

| | | |
|---|---|---|
| Collector Current, A | = | 3.0 |
| Collector Voltage, Vdc | = | 8.0 |
| Supply Voltage, Vdc | = | 10 - 16 |

(c)(9): **Tune-Up Procedure**:

Please See Attached Exhibits

(c)(10): **Circuit Diagram/Circuit Description**:
Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

(c)(11): **Label Information**:

Please See Attached Exhibits

(c)(12): **Photographs**:

Please See Attached Exhibits

(c)(13): **Digital Modulation Description**:

___ Attached Exhibits
_x_ N/A

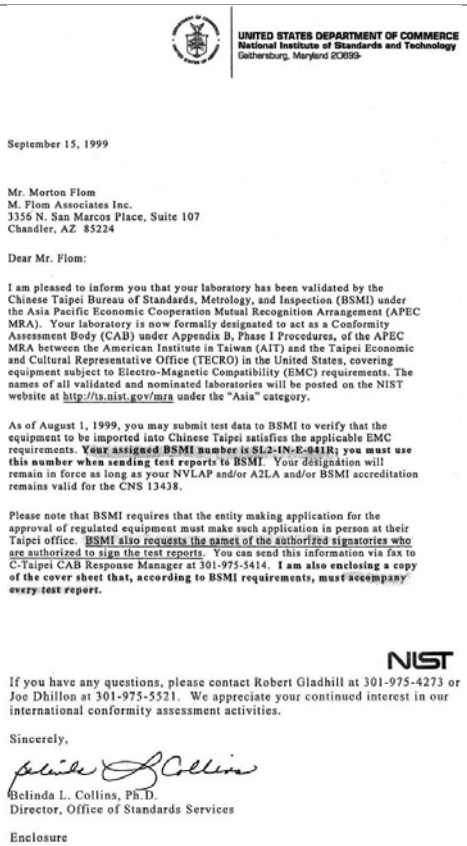
(c)(14): **Test And Measurement Data**:

Follows

## A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ 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."

Certificate Number: **2152-01**



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-

September 15, 1999

Mr. Morton Flom
M. Flom Associates Inc.
3356 N. San Marcos Place, Suite 107
Chandler, AZ 85224

Dear Mr. Flom:

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology, and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Arrangement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at http://ts.nist.gov/mra under the "Asia" category.

As of August 1, 1999, you may submit test data to BSMI to verify that the equipment to be imported into Chinese Taipei satisfies the applicable EMC requirements. **Your assigned BSMI number is SL2-IN-E-041R; you must use this number when sending test reports to BSMI.** Your designation will remain in force as long as your NVLAP and/or A2LA and/or BSMI accreditation remains valid for the CNS 13438.

Please note that BSMI requires that the entity making application for the approval of regulated equipment must make such application in person at their Taipei office. BSMI also requests the names of the authorized signatories who are authorized to sign the test reports. You can send this information via fax to C-Taipei CAB Response Manager at 301-975-5414. **I am also enclosing a copy of the cover sheet that, according to BSMI requirements, must accompany every test report.**

NIST

If you have any questions, please contact Robert Gladhill at 301-975-4273 or Joe Dhillon at 301-975-5521. We appreciate your continued interest in our international conformity assessment activities.

Sincerely,

Belinda L. Collins, Ph.D.
Director, Office of Standards Services

Enclosure

## NIST

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at http://ts.nist.gov/mra under the 'Asia' category."

BSMI Number: **SL2-IN-E-041R**

Page Number 5 of 27

Sub-part 2.1033(b): **Test And Measurement Data**

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

| | | |
|---|---|---|
| ____ | 15.209 | Radiated emission limits; general requirements |
| ____ | 15.211 | Tunnel radio systems |
| ____ | 15.213 | Cable locating equipment |
| ____ | 15.214 | Cordless telephones |
| ____ | 15.217 | Operation in the band 160-190 kHz |
| ____ | 15.219 | Operation in the band 510-1705 kHz |
| ____ | 15.221 | Operation in the band 525-1705 kHz (leaky coax) |
| ____ | 15.223 | Operation in the band 1.705-10 MHz |
| ____ | 15.225 | Operation in the band 13.553-13.567 MHz |
| ____ | 15.227 | Operation in the band 26-27.28 MHz (remote control) |
| ____ | 15.229 | Operation in the band 40.66-40.70 MHz |
| ____ | 15.231 | Periodic operation in the band 40.66-40.70 MHz and above 70 MHz |
| ____ | 15.233 | Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz |
| ____ | 15.235 | Operation within the band 49.82-49.90 MHz |
| ____ | 15.237 | Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance) |
| ____ | 15.239 | Operation in band 88-108 MHz |
| ____ | 15.241 | Operation in the band 174-216 MHz (biomedical) |
| ____ | 15.243 | Operation in the band 890-940 MHz (materials) |
| ____ | 15.245 | Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors) |
| X | 15.247 | Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum) |
| ____ | 15.249 | Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz |
| ____ | 15.251 | Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz (vehicle identification systems) |
| ____ | 15.321 | Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-2400 MHz bands (Unlicensed PCS) |
| ____ | 15.323 | Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS) |

**Standard Test Conditions**
**and**
**Engineering Practices**

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2003, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

| | |
|---|---|
| Page Number | 7 of 27 |
| **Name of Test:** | Maximum Peak Output Power |
| **Specification:** | 47 CFR 15.247(b) |
| **Spec. Limit:** | ≤ 1 Watt peak (0.25 if <50 Hopping Channels) |
| **Test Equipment:** | Attached |

**Measurement Data**

| | | |
|---|---|---|
| Peak Output Power, Watts | = | Worst Case For All Channels |
| Frequency of Carrier, MHz | = | 2402.0, 2443.0, 2481.0 |
| Ambient Temperature | = | 23˚C ± 3˚C |

| Power Setting | RF Power, dBm | RF Power, Watts |
|---|---|---|
| High | 20.0 | 0.10 |

Performed by: Fred Chastain, Test Technician

Page Number 8 of 27

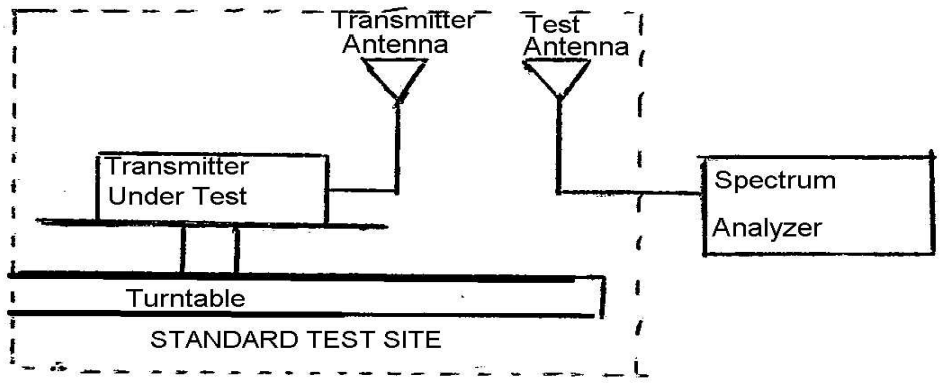
**Name of Test:** EIRP Carrier Power (Radiated)

**Specification:** TIA/EIA-603-C (Substitution Method)

## Measurement Procedure

**Definition**
The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

**Method of Measurement:**
A) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.




B) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

C) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

D) Calculate the radiated output power from the following:

$$\text{average radiated power} = 10 \log_{10} \text{Ó } 10^{(LVL - LOSS)/10} \text{ (dBm)}$$

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**Name of Test:** EIRP Carrier Power (Radiated)

**Test Equipment**

| | Asset | Description | s/n | Cycle | Last Cal |
|---|---|---|---|---|---|
| | | **Transducer** | | | |
| | i00088 | EMCO 3109-B 25MHz-300MHz | 2336 | 24 mo. | Sep-05 |
| X | i00089 | Aprel 2001 200MHz-1GHz | 001500 | 24 mo. | Sep-05 |
| X | i00103 | EMCO 3115 1GHz-18GHz | 9208-3925 | 24 mo. | Jan-05 |
| | | **Amplifier** | | | |
| X | i00028 | HP 8449A | 2749A00121 | 12 mo. | May-05 |
| | | **Spectrum Analyzer** | | | |
| X | i00029 | HP 8563E | 3213A00104 | 12 mo. | Jan-06 |
| X | i00033 | HP 85462A | 3625A00357 | 12 mo. | Sep-05 |
| | | **Substitution Generator** | | | |
| | i00067 | HP 8920A Communication TS | 3345U01242 | 12 mo. | Jun-05 |
| X | i00207 | HP 8753D Network Analyzer | 3410A08514 | 12 mo. | Jul-05 |

Measurement Results

2006-Apr-18 Tue 15:20:00
State: 2:High Power Ambient Temperature: 30°C ± 3°C

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV/m | CF, dB | EIRP, dBm | EIRP, Watts |
|---|---|---|---|---|---|
| 2402.000000 | 2402.100000 | 78.3 | 36.8 | 20.15 | |
| 2441.000000 | 2441.010000 | 76.7 | 37.7 | 20.18 | 0.095 |
| 2481.000000 | 2481.010000 | 77.6 | 37.1 | 19.70 | |

Performed by: Fred Chastain, Test Technician

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**Name of Test:** Unwanted Emissions (Transmitter Conducted)

**Specification:** 47 CFR 2.1051

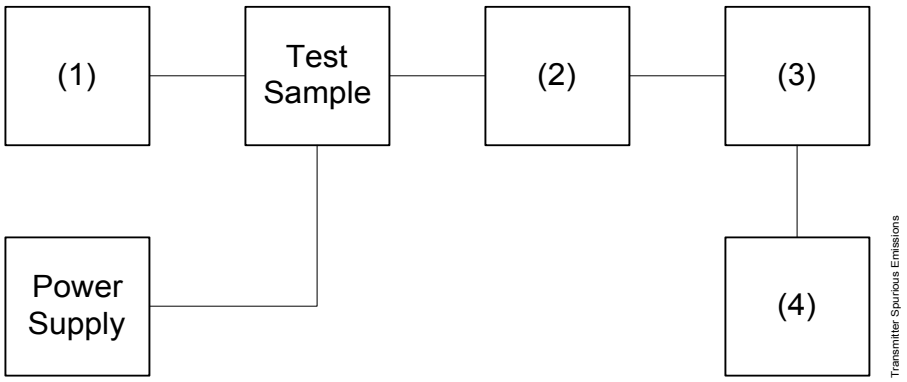
**Guide:** ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

Measurement Procedure

A) The emissions were measured for the worst case as follows:
   1). within a band of frequencies defined by the carrier frequency plus and minus one channel.
   2). from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.

B) The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.

**Transmitter Test Set-Up: Spurious Emission**




| | Asset | Description | s/n | | |
|---|---|---|---|---|---|
| (1) **Audio Oscillator/Generator** | | | | | |
| X | i00017 | HP 8903A Audio Analyzer | 2216A01753 | 12 mo. | Apr-05 |
| | i00002 | HP 3336B Synthesizer / Level Gen. | 1931A01465 | 12 mo. | Apr-05 |
| (2) **Coaxial Attenuator** | | | | | |
| X | i00231/2 | PASTERNACK PE7021-30 (30 dB) | 231 or 232 | NCR | |
| | i0012/3 | NARDA 766 (10 dB) | 7802 or 7802A | NCR | |
| (3) **Filters; Notch, HP, LP, BP** | | | | | |
| X | - | High Pass, 3GHz | - | NCR | |
| (4) **Spectrum Analyzer** | | | | | |
| | i00048 | HP 8566B Spectrum Analyzer | 2511A01467 | 12 mo. | Jun-05 |
| X | i00029 | HP 8563E Spectrum Analyzer | 3213A00104 | 12 mo. | May-05 |

**Name of Test:** Unwanted Emissions (Transmitter Conducted)

**Measurement Results**
(Worst Case)

Summary:

| | | |
|---|---|---|
| Frequency of carrier, MHz | = | 2402.0, 2443.0, 2481.0 |
| Spectrum Searched, GHz | = | 0 to 10 x $F_C$ |
| Maximum Response, Hz | = | N/A |
| All Other Emissions | = | ≥ 20 dB Below Limit |
| Limit(s), dBc | | 20dBc |

Tabulated Results follow:

**Name of Test:** Unwanted Emissions (Transmitter Conducted)

**Measurement Results**

2006-Apr-22 Sat 11:39:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C

| Frequency Tuned, MHz | Frequency Emission, MHz | Level, dBm | Level, dBuv/m |
|---|---|---|---|
| 2402.000000 | 4803.983333 | -74.00 | 30.00 |
| 2441.000000 | 4881.973333 | -72.00 | 32.00 |
| 2480.000000 | 4959.971667 | -74.70 | 29.30 |
| 2402.000000 | 7205.948333 | -72.00 | 32.00 |
| 2441.000000 | 7322.960000 | -67.00 | 37.00 |
| 2480.000000 | 7439.958333 | -62.00 | 42.00 |
| 2402.000000 | 9608.183333 | -75.70 | 28.30 |
| 2441.000000 | 9764.190000 | -75.80 | 28.20 |
| 2480.000000 | 9920.230000 | -75.70 | 28.30 |
| 2402.000000 | 12009.606667 | -76.50 | 27.50 |
| 2441.000000 | 12204.658333 | -75.70 | 28.30 |
| 2480.000000 | 12399.756667 | -75.50 | 28.50 |
| 2402.000000 | 14411.555000 | -74.20 | 29.80 |
| 2441.000000 | 14645.911667 | -73.50 | 30.50 |
| 2480.000000 | 14880.001667 | -73.50 | 30.50 |
| 2402.000000 | 16813.911667 | -73.20 | 30.80 |
| 2441.000000 | 17087.231667 | -74.00 | 30.00 |
| 2480.000000 | 17360.030000 | -74.50 | 29.50 |
| 2402.000000 | 19215.718333 | -73.80 | 30.20 |
| 2441.000000 | 19527.893333 | -74.00 | 30.00 |
| 2480.000000 | 19840.033333 | -73.30 | 30.70 |
| 2402.000000 | 21617.955000 | -72.70 | 31.30 |
| 2441.000000 | 21968.983333 | -72.50 | 31.50 |

Performed by: Fred Chastain, Test Technician

**Name of Test**: Restricted Bands of Operation

**Specification**: 47 CFR 15.205

**Test Equipment**: As per attached page

**Measurement Procedure**

The EUT was set up on a three-meter open field site according to the procedure on ANSI C63.4.

Sensitivity of system was measured:

Below 2 GHz:

| | | |
|---|---|---|
| CISPR Bandwidths | = | 8 dBμV |
| 1 MHz RBW, 1 MHz VBW | = | 12 dBμV |
| 1 MHz RBW, 10 Hz VBW | = | 3 dBμV |

Above 2 GHz:

| | | |
|---|---|---|
| 1 MHz RBW, 1 MHz VBW | = | 33 dBμV |
| 1 MHz RBW, 10 Hz VBW | = | 22 dBμV |

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

| | | |
|---|---|---|
| Peak | = | 3 dBμV |
| Average | = | -8 dBμV |

Cable Loss:

| | | |
|---|---|---|
| 915 MHz | = | -0.8 dBμV |
| 2450 MHz | = | -3 dBμV |

Note:

dB loss vs. frequency included in programmed software.

Reference Level Offset:

set @ 1 dB, accounts for cable and connector loss.

**Test Results**: No harmonic or spurious emissions were detected in the restricted bands in excess of the limits of 15.205. System measurement sensitivity was –130 dBm.

Performed by: Fred Chastain, Test Technician

| | |
|---|---|
| Page Number | 14 of 27 |
| **Name of Test**: | Out of Band Emissions |
| **Specification**: | 47 CFR 15.247(c), 15.209(a) |
| **Spec. Limit**: | See Below |

| | | |
|---|---|---|
| Search Antennas: | 10 kHz – 32 MHz: | LOOP 94598-1 |
| | 32 MHz – 1 GHz: | SINGER DM105, $T_1T_2T_3$ |
| | 1 GHz – 18 GHz: | EMCO 3115 |

**Limit**

In any 100 kHz bandwidth outside these frequency bands, radio frequency power that is produced by the modulation products of the spreading sequence, information sequence, and the carrier frequency shall be either:
- at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power
or
- shall not exceed the general levels specified in 15.209(a), whichever results in the lesser attenuation. All other emissions outside these bands shall not exceed the general radiated emission limits specified in 15.209(a).

**Measurements Procedure**:
At first, bench tests were performed to locate the emissions around the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response.

The field strength was calculated from:

$E\ \mu V/m\ @\ 3\ m = LOG_{10}^{-1}\underline{(dBm + 107 + A.F. + C.L.)}$

The following results are worst case conditions. Tests were conducted in Horizontal and Vertical polarization.

Measurement Results: Attached

Page Number 15 of 27

**Name of Test:** Field Strength of Spurious Radiation

**Specification:** 47 CFR 2.1053(a), 15.209 and 15.35(b)

**Guide:** ANSI/TIA/EIA-603-C, 47 CFR 22.917

**Measurement Procedure**

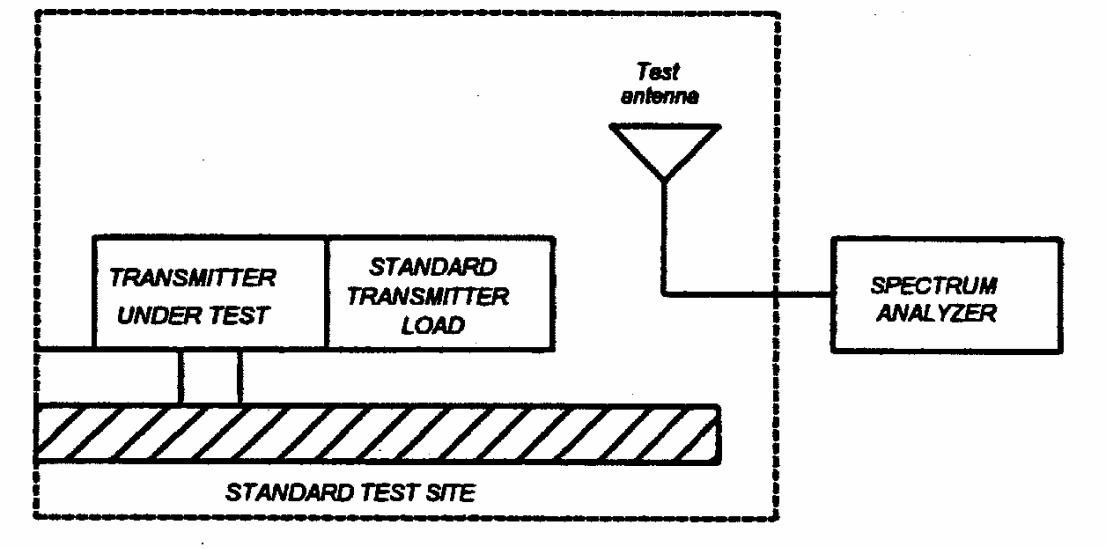
1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 Method of Measurement

A) Connect the equipment as illustrated

B) Adjust the spectrum analyzer for the following settings:
1) Resolution Bandwidth 100 kHz (<1 GHZ), 1 MHZ (> 1GHz).
2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz (22.917)
3) Sweep Speed ≤2000 Hz/second
4) Detector Mode = Mean or Average Power

C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.

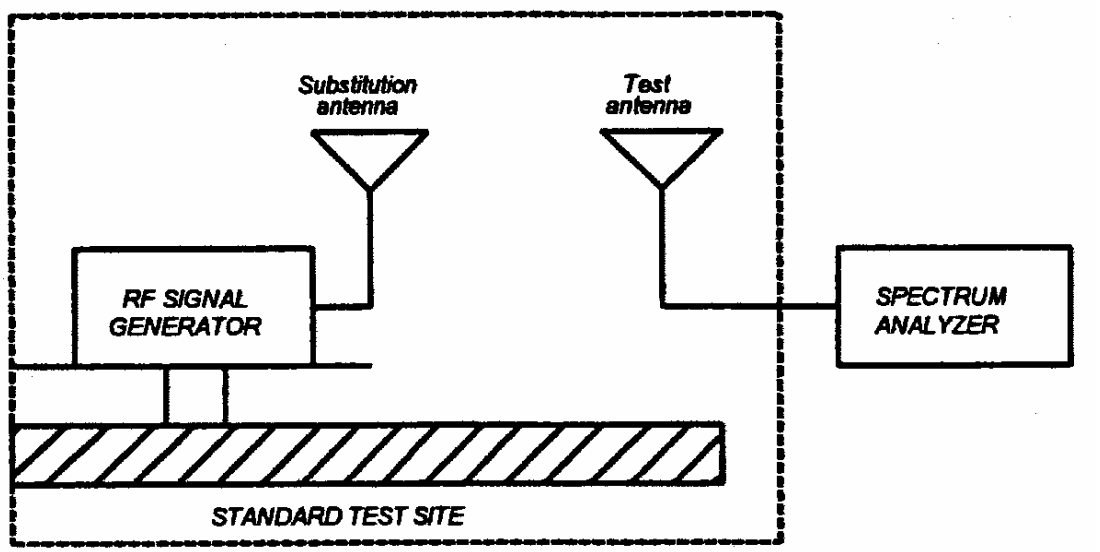


**Name of Test:** Field Strength of Spurious Radiation (Cont.)

D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.




G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

**Name of Test:** Field Strength of Spurious Radiation (Cont.)

J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

K) Repeat step J) with both antennas vertically polarized for each spurious frequency.

L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =
$10\log_{10}$(TX power in watts/0.001) – the levels in step l)

Note: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

| | Asset (as applicable) | Description | s/n | Cycle (Per ANSI C63.4-1992/2000 Draft, 10.1.4) | Last Cal |
|---|---|---|---|---|---|
| **Transducer** | | | | | |
| X | i00088 | EMCO 3109-B 25MHz-300MHz | 2336 | 24 mo. | Sep-05 |
| | i00065 | EMCO 3301-B Active Monopole | 2635 | 24 mo. | Sep-05 |
| X | i00089 | Aprel 2001 200MHz-1GHz | 001500 | 24 mo. | Sep-05 |
| X | i00103 | EMCO 3115 1GHz-18GHz | 9208-3925 | 24 mo. | Jan-05 |
| **Amplifier** | | | | | |
| X | i00028 | HP 8449A | 2749A00121 | 12 mo. | May-05 |
| **Spectrum Analyzer** | | | | | |
| X | i00029 | HP 8563E | 3213A00104 | 12 mo. | Jan-06 |
| X | i00033 | HP 85462A | 3625A00357 | 12 mo. | Sep-05 |
| | i00048 | HP 8566B | 2511AD1467 | 12 mo. | Jun-05 |

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**Name of Test:** Field Strength of Spurious Radiation
2006-Apr-24 Mon 09:45:00
State: 2:High Power
Harmonically Related:

| Frequency Tuned, MHz | Frequency Emission, MHz | dBuV/m |
|---|---|---|
| 2402.000000 | 4803.968000 | 47.00 |
| 2443.000000 | 4885.988800 | 48.50 |
| 2481.000000 | 4961.968894 | 40.70 |
| 2402.000000 | 7206.000000 | 37.60 |
| 2443.000000 | 7329.000000 | 36.20 |
| 2481.000000 | 7442.969512 | 38.50 |
| 2402.000000 | 9608.000000 | 44.90 |
| 2443.000000 | 9772.000000 | 36.40 |
| 2481.000000 | 9923.968961 | 41.30 |
| 2402.000000 | 12010.000000 | 41.10 |
| 2443.000000 | 12215.000000 | 43.20 |
| 2481.000000 | 12404.967978 | 43.10 |
| 2402.000000 | 14412.000000 | 53.30 |
| 2443.000000 | 14658.000000 | 50.00 |
| 2481.000000 | 14885.967894 | 48.00 |
| 2402.000000 | 16814.000000 | 52.30 |
| 2443.000000 | 17101.000000 | 48.50 |
| 2481.000000 | 17366.969293 | 57.10 |
| 2402.000000 | 19216.000000 | 47.20 |
| 2443.000000 | 19544.000000 | 46.30 |
| 2481.000000 | 19847.968977 | 42.60 |
| 2402.000000 | 21618.000000 | 55.50 |
| 2443.000000 | 21987.000000 | 41.60 |
| 2481.000000 | 22328.968927 | 48.90 |
| 2443.000000 | 24430.000000 | 52.70 |

Digital Scan:

2006-Apr-24 Mon 07:30:00
State: 0:General

| Frequency Emission, MHz | Level, dBuV | @ m | C.F., dB | dBμV/m | @ m | Margin, dB |
|---|---|---|---|---|---|---|
| 36.000000 | 14.60 | 3 | 11.57 | 20.35 | 3 | -13.8 |
| 36.300000 | 14.63 | 3 | 11.63 | 20.56 | 3 | -13.7 |
| 36.800000 | 13.74 | 3 | 11.73 | 18.77 | 3 | -14.5 |
| 46.210000 | 14.42 | 3 | 12.27 | 21.60 | 3 | -13.3 |
| 48.000000 | 17.05 | 3 | 12.07 | 28.58 | 3 | -10.9 |
| 50.000000 | 15.34 | 3 | 11.83 | 22.83 | 3 | -12.8 |
| 54.944000 | 16.45 | 3 | 10.95 | 23.44 | 3 | -12.6 |
| 69.310000 | 14.49 | 3 | 7.93 | 13.21 | 3 | -17.6 |
| 72.000000 | 16.66 | 3 | 7.60 | 16.33 | 3 | -15.7 |
| 73.088000 | 17.44 | 3 | 7.51 | 17.68 | 3 | -15.1 |
| 75.000000 | 13.76 | 3 | 7.34 | 11.35 | 3 | -18.9 |
| 84.000000 | 14.28 | 3 | 7.49 | 12.26 | 3 | -18.2 |
| 109.376000 | 17.13 | 3 | 10.48 | 24.02 | 3 | -15.4 |
| 115.520000 | 14.38 | 3 | 10.92 | 18.41 | 3 | -17.7 |
| 120.000000 | 14.43 | 3 | 11.22 | 19.16 | 3 | -17.4 |
| 125.000000 | 21.90 | 3 | 11.55 | 47.04 | 3 | -9.6 |
| 127.520000 | 16.53 | 3 | 11.62 | 25.56 | 3 | -14.9 |
| 138.620000 | 14.69 | 3 | 11.94 | 21.45 | 3 | -16.4 |

| Frequency Emission, MHz | Level, dBuV | @ m | C.F., dB | dBμV/m | @ m | Margin, dB |
|---|---|---|---|---|---|---|
| 145.664000 | 14.46 | 3 | 12.12 | 21.33 | 3 | -16.4 |
| 150.000000 | 9.55 | 3 | 12.23 | 12.27 | 3 | -21.2 |
| 150.000000 | 16.18 | 3 | 12.23 | 26.33 | 3 | -14.6 |
| 161.730000 | 12.15 | 3 | 12.14 | 16.39 | 3 | -18.7 |
| 163.808000 | 10.49 | 3 | 12.13 | 13.52 | 3 | -20.4 |
| 175.000000 | 9.59 | 3 | 12.10 | 12.15 | 3 | -21.3 |
| 200.000000 | 11.41 | 3 | 13.83 | 18.28 | 3 | -17.8 |
| 225.000000 | 12.48 | 3 | 15.35 | 24.63 | 3 | -18.2 |
| 231.040000 | 16.75 | 3 | 15.66 | 41.73 | 3 | -13.6 |
| 250.000000 | 21.09 | 3 | 16.66 | 77.18 | 3 | -8.3 |
| 260.820000 | 14.22 | 3 | 18.83 | 44.93 | 3 | -13.0 |
| 275.000000 | 15.65 | 3 | 21.47 | 71.78 | 3 | -8.9 |
| 300.000000 | 12.32 | 3 | 15.28 | 23.99 | 3 | -18.4 |
| 350.000000 | 16.01 | 3 | 16.43 | 41.88 | 3 | -13.6 |
| 400.000000 | 15.63 | 3 | 17.49 | 45.29 | 3 | -12.9 |
| 450.000000 | 8.44 | 3 | 18.32 | 21.78 | 3 | -19.2 |
| 500.000000 | 9.67 | 3 | 18.98 | 27.07 | 3 | -17.4 |
| 521.618000 | 13.60 | 3 | 20.24 | 49.20 | 3 | -12.2 |
| 600.000000 | 14.95 | 3 | 24.82 | 97.39 | 3 | -6.2 |
| 782.438000 | 12.62 | 3 | 25.33 | 78.98 | 3 | -8.1 |
| 800.000000 | 9.40 | 3 | 25.10 | 53.09 | 3 | -11.5 |
| 900.000000 | 11.37 | 3 | 26.12 | 74.90 | 3 | -8.5 |
| 999.978000 | 10.45 | 3 | 30.36 | 109.77 | 3 | -13.2 |

Performed by: Fred Chastain, Test Technician

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Name of test: Environmental Assessment

Included in MPE Assessment of main unit.

Supervised By: David E. Lee, Quality Assurance Manager

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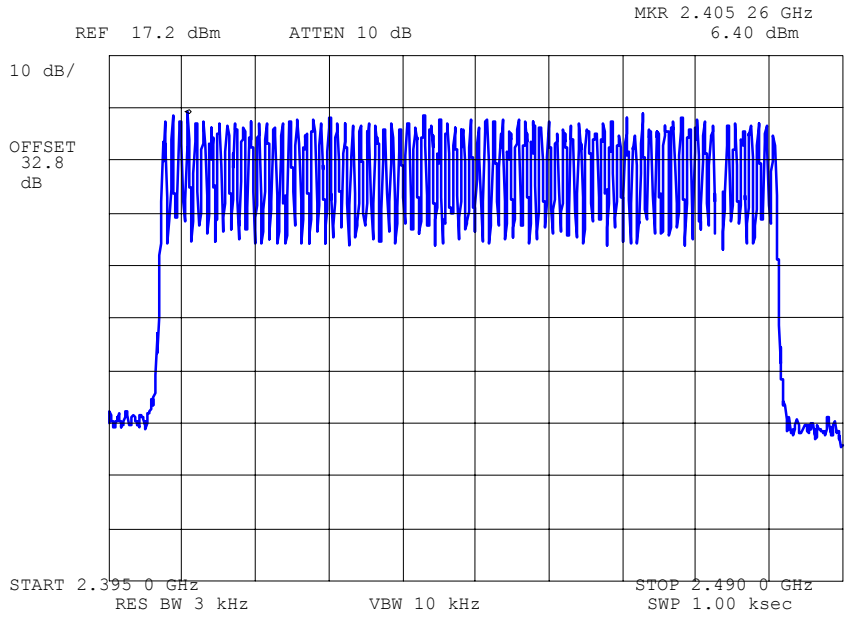
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Aug-22 Sat 12:58:00
State: 2:High Power

Ambient Temperature: 23°C ± 3°C




| | |
|---|---|
| Power: | HIGH |
| Modulation: | BLUETOOTH - Full Bandwidth Hopping |
| Total number of Channels | 79 |

Performed by: Fred Chastain, Test Technician

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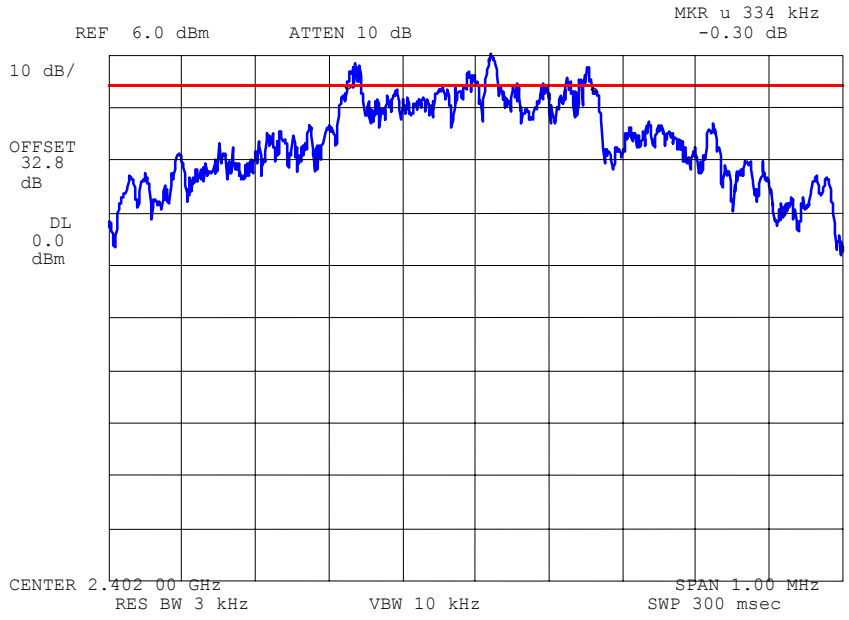
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Apr-24 Mon 11:15:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




Power: BLUETOOTH
Modulation: MOD - NO HOPPING
6DB BW

Performed by: Fred Chastain, Test Technician

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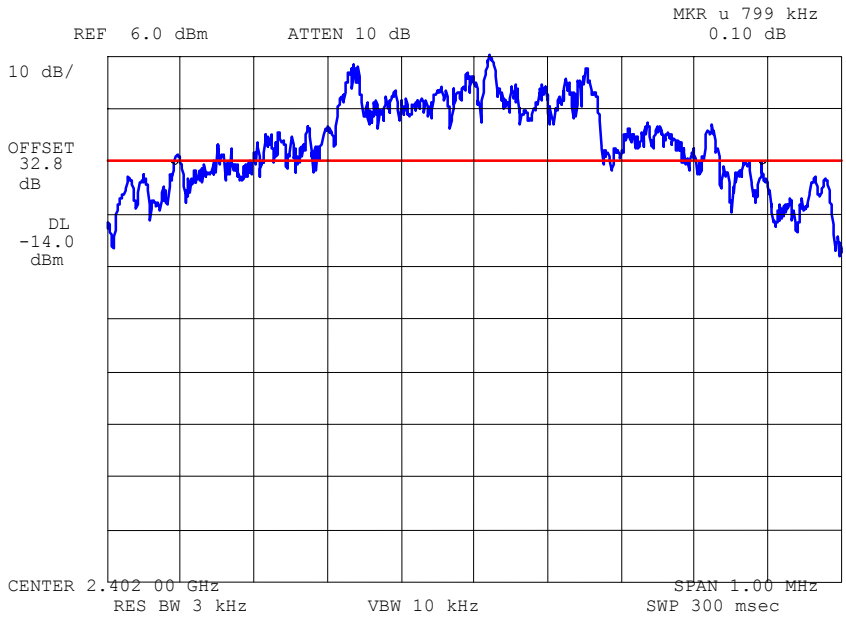
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Apr-24 Mon 11:17:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




Power: BLUETOOTH
Modulation: MOD - NO HOPPING
20dB BW: 799kHz

Performed by: Fred Chastain, Test Technician

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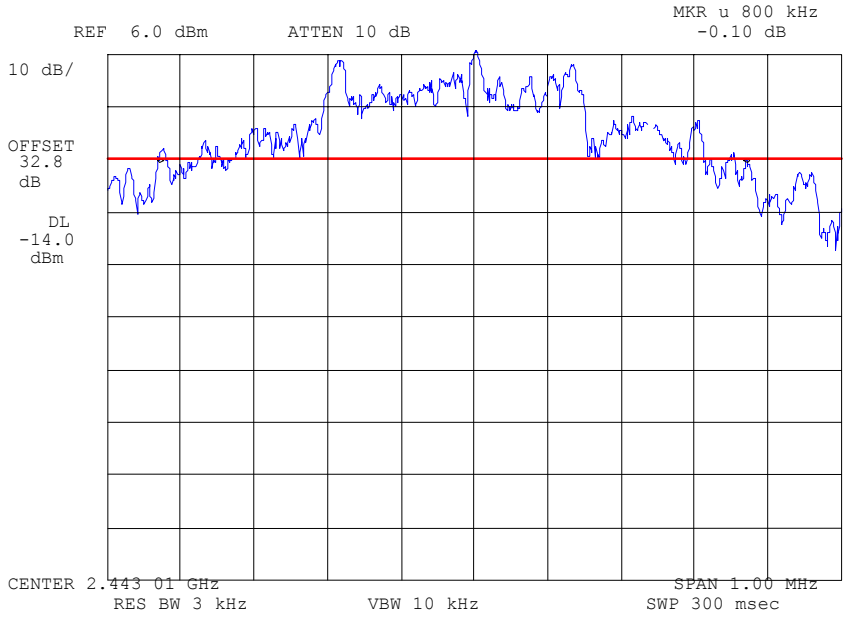
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Apr-24 Mon 11:20:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




| | |
|---|---|
| Power: | BLUETOOTH |
| Modulation: | MOD - NO HOPPING |
| 20dB BW: | 800kHz |

Performed by: Fred Chastain, Test Technician

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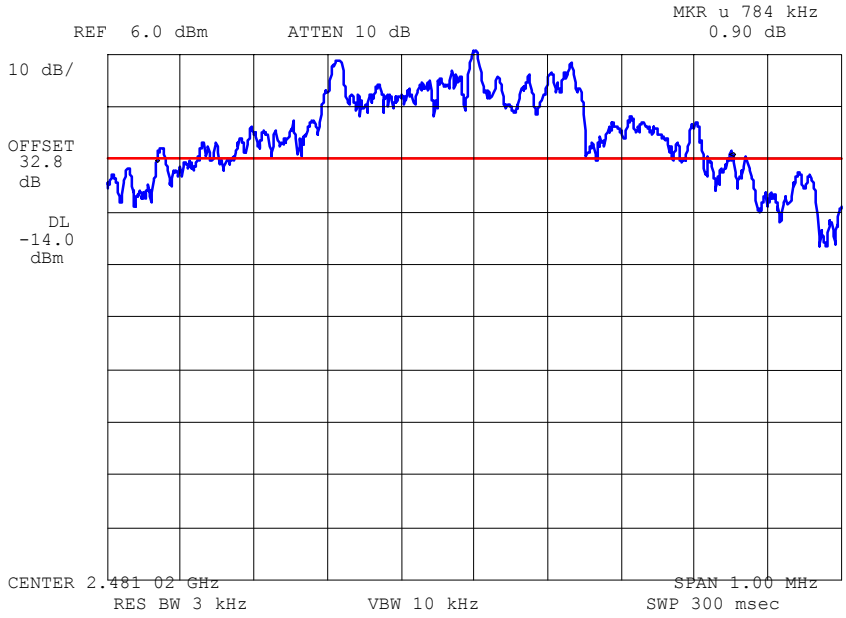
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2005-Apr-24 Mon 11:22:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




Power: BLUETOOTH
Modulation: MOD - NO HOPPING
20dB BW 784kHz

Performed by: Fred Chastain, Test Technician

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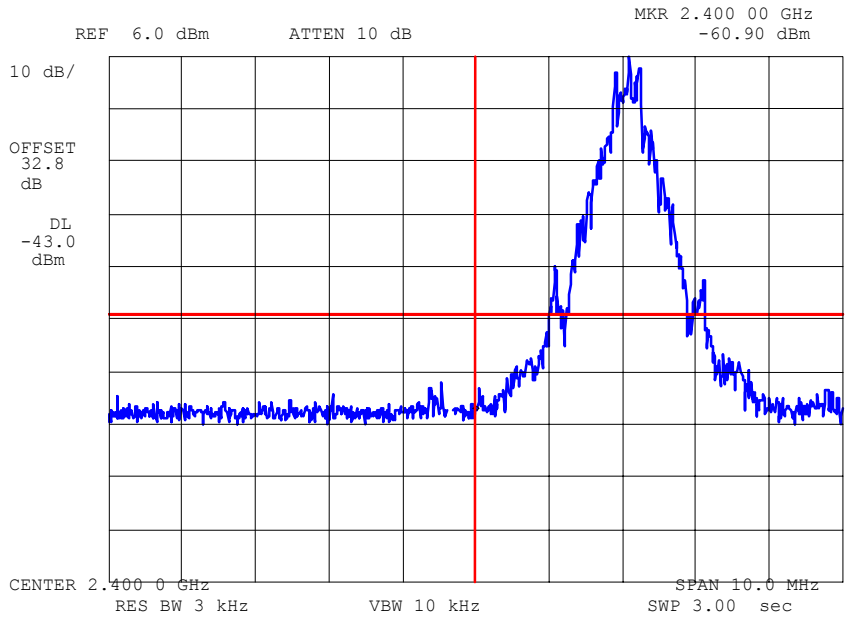
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Apr-24 Mon 11:30:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




Power: BLUETOOTH
Modulation: MOD - NO HOPPING
LOWER BAND EDGE

Performed by: Fred Chastain, Test Technician

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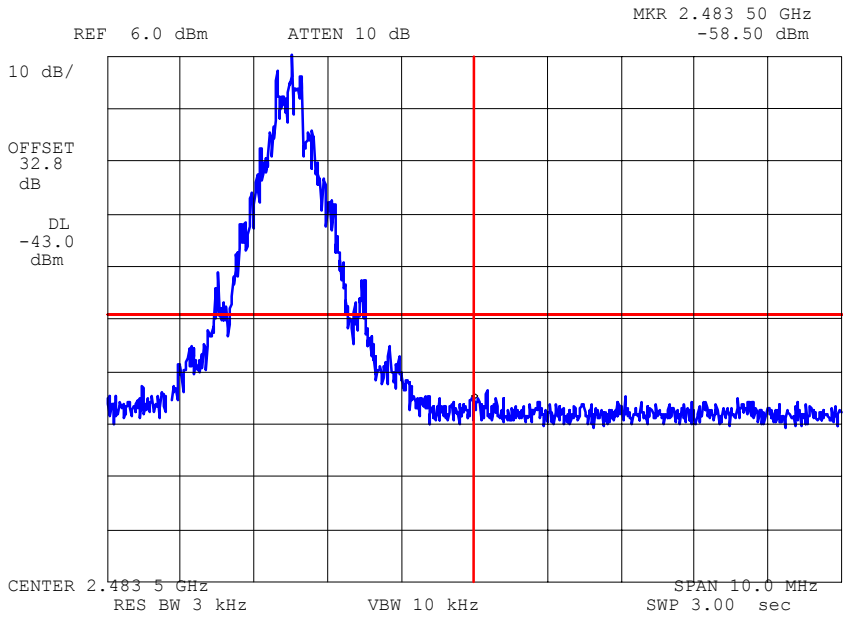
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

2006-Apr-24 Mon 11:31:00
State: 0:General

Ambient Temperature: 23°C ± 3°C




Power: BLUETOOTH
Modulation: MOD - NO HOPPING
UPPER BAND EDGE

Performed by: Fred Chastain, Test Technician

## Radiated Measurements
## For Part 15 Transmitters with Integral Antennas

### Radiated Measurements

| Range Of Measurement | Specification | Resolution B/W | Video B/A |
|---|---|---|---|
| 30 to 1000 MHz | CISPR | ≥100 kHz | ≥100 kHz |
| >1000 MHz | FCC, 15.37(b) | 1 MHz | ≥1 MHz |
| (if averaging) | FCC, 15.37(b) | 1 MHz | 10 Hz |

### Measuring Equipment

a. **Antennas**:

| | |
|---|---|
| EMCO 3109 | 20 - 300 MHz |
| APREL AALP2001 | 200 - 1000 MHz |
| APREL AAB20200 | 20 - 200 MHz |
| APREL AAH118 | 1 - 18 GHz |

b. **Instruments**:

| | |
|---|---|
| HP8566B | Spectrum Analyzer |
| HP85685A | Preselector, w/ preamp below 2 GHz |
| HP85650A | Quasi Peak Adapter |
| HP8449 | Preamp, above 2 GHz |
| HP8563E | Spectrum Analyzer, above 2 GHz |

### Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

### Part 15.21, Information To User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly avoided by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.205 Restricted Bands of Operation

(a) Except as shown in paragraph (b) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.25 |
| 0.495-0.505 | 16.69475-16.69625 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2655-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-339.4 | 3600-4400 | |
| 13.36-13.41 | | | |

# Testimonial
# and
# Statement of Certification

**This is to certify**:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.

2. **That** the technical data supplied with the application was taken under my direction and supervision.

3. **That** the data was obtained on representative units, randomly selected.

4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Certifying Engineer: David E. Lee, FCC/IC Compliance Manager