



**Flom Test Labs**  
EMI, EMC, RF Testing Experts Since 1963

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## **Environmental Assessment**

for

### **Mobiles/Fixed Base Station**

**FCC ID:** FCC ID: ROJEXPLORER-300  
Model: Explorer 300

to

### **Federal Communications Commission**

**47 CFR 1.1310 (MPE)**  
Radiofrequency Radiation Exposure Limits

**Date Of Report:** May 23, 2006

#### **On the Behalf of the Applicant:**

Thrane & Thrane A/S

#### **At the Request of:**

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

#### **Attention of:**

Morten Becker Saul  
+45 39 55 8209  
Email: mbs@thrane.com

#### **Supervised By:**

David E. Lee, FCC/IC Compliance Manager

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

a) **Test Report (Supplemental)**

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: ROJEXPLORER-300  
Description: Immarsat Terminal

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

g) Report Date: May 23, 2006  
EUT Received: Apr 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.

### Identification of the Equipment Under Test (EUT)

**Name and Address of Applicant:**

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

**Manufacturer:**

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

**FCC ID:** ROJEXPLORER-300

**Model Number:** Explorer 300

**Description:** Immarsat Terminal

**Type of Emission:** 16QAM, QPSK

**Frequency Range, MHz:** 1626.5 – 1660.5

**Power Rating, Watts (EIRP):** 10.0  
 Switchable       Variable       N/A

**Modulation:**

|                                     |       |
|-------------------------------------|-------|
| <input type="checkbox"/>            | AMPS  |
| <input type="checkbox"/>            | TDMA  |
| <input checked="" type="checkbox"/> | CDMA  |
| <input checked="" type="checkbox"/> | OTHER |

**Antenna:**

|                                     |          |
|-------------------------------------|----------|
| <input type="checkbox"/>            | Helical  |
| <input type="checkbox"/>            | Monopole |
| <input type="checkbox"/>            | Whip     |
| <input checked="" type="checkbox"/> | Other    |

**Note:** For RF Safety test antenna gain taken at the upper range of expected gain (i.e. 11 dBi) and RF Power set to highest nominal power across all channels.



## 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**



## 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**

## **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.

**Name of Test:** Environmental Assessment

**Specification:** FCC: 47 CFR 1.1310

**Measurement Guide:** ANSI/IEEE C95.1 1992

**Test Equipment:** Maximum Permissible Exposure (MPE) measurement system, consisting of:  
Amplifier Research FP6001 Electric Field Probe Kit  
(Calibrated July 2005)

**Measurement Procedure:**

1. The following measurements were performed with a probe using ANSI/IEEE C95.1 as a guide.
2. Prior to making any measurements, the measurements system was calibrated in accordance with the manufacturer's procedures.
3. The EUT's radiating element (antenna) was placed on a 1 m tall table for ease of testing. For equipment normally operated on a metal surface, a ground plane was used.
4. The remaining equipment necessary to operate the EUT was maintained at a distance from the measurement arrangement suitable to minimize interference with the measurements.
5. The minimum safe distance was calculated from the formula Power Density =  $EIRP / 4\pi R^2$  (Peak Watts/m<sup>2</sup>). The calculation is shown with the measurement data.
6. With the EUT operating at maximum power, a search was initiated for worst case emissions with the probe raised and lowered over a range of 0.2 to 2 meters in height and over a horizontal plane of 0° to 360°.
7. Average values were calculated for the whole body (0.2-2.0m), lower body (0.2-0.8m) and upper body (1.0-2.0m).

**Results:** Attached.

**Test Setup:**

**Maximum Permissible Exposure (MPE)**





**Name of Test:** R.F. Radiation Exposure

**FCC Rules:** 1.1307, 1.1310, 1.1311, 2.1091  
**Description, EUT:** See page 2 of Test Report

|  |                   |   |
|--|-------------------|---|
| Limits: Uncontrolled Exposure<br>47 CFR 1.1310<br>Table 1, (B) | 0.3-1.234 MHz:    | Limit [mW/cm <sup>2</sup> ] = 100                   |
|  | 1.34-30 MHz:      | Limit [mW/cm <sup>2</sup> ] = (180/f <sup>2</sup> ) |
|  | 30-300 MHz:       | Limit [mW/cm <sup>2</sup> ] = 0.2                   |
|  | 300-1500 MHz:     | Limit [mW/cm <sup>2</sup> ] = f/1500                |
|  | 1500-100,000 MHz: | Limit [mW/cm <sup>2</sup> ] = 1.0                   |

|                       |                               |        |        |
|-----------------------|-------------------------------|--------|--------|
| Test Frequencies, MHz | 1626.5                        | 1643.5 | 1660.5 |
| Power, Conducted, W   | = 1.29 (15.0W EIRP)           |        |        |
| Antenna Gain          | = 11.1 dBi (Integral Antenna) |        |        |
| Antenna Model         | Directional Panel             |        |        |

**Note:** The unit contains a Class 1 Bluetooth transmitter. All tests were carried out with the Bluetooth operating at full power.

|                       |  |   |       |
|-----------------------|--|---|-------|
| Pre-test Calculations | Power <sub>[W EIRP]</sub> = P <sub>[conducted]</sub> x G <sub>[antenna]</sub>                          | = | 10.0  |
|                       | Limit <sub>[mW/cm<sup>2</sup>]</sub>   | = | 1.0   |
|                       | Limit <sub>[W/m<sup>2</sup>]</sub> = 10 x Limit <sub>[mW/cm<sup>2</sup>]</sub>                         | = | 10.0  |
|                       | R <sub>[m]</sub> = [P <sub>[W EIRP]</sub> / (4π x Limit <sub>[W/m<sup>2</sup>]</sub> )] <sup>1/2</sup> | = | 0.345 |

| Results at tested distances | Probe Height, m | Power Density, mW/cm <sup>2</sup>                          |  |  |
|-----------------------------|-----------------|--|--|--|
|                             |                 | Freq. 1626.5 MHz<br>(Bluetooth 2402 MHz)<br>Distance 60 cm | Freq. 1643.5 MHz<br>(Bluetooth 2441 MHz)<br>Distance 60 cm | Freq. 1660.5 MHz<br>(Bluetooth 2481 MHz)<br>Distance 60 cm |
|                             | 2.0             | 0.0330   | 0.0455   | 0.0455   |
|                             | 1.8             | 0.0797   | 0.0626   | 0.0966   |
|                             | 1.6             | 0.1313   | 0.1654   | 0.1520   |
|                             | 1.4             | 0.2099   | 0.2740   | 0.2636   |
|                             | 1.2             | 0.3842   | 0.4130   | 0.3800   |
|                             | 1.0             | 0.5657   | 0.5808   | 0.5048   |
|                             | 0.8             | 0.5487   | 0.5393   | 0.4790   |
|                             | 0.6             | 0.3628   | 0.3337   | 0.3282   |
|                             | 0.4             | 0.1766   | 0.1828   | 0.1675   |
|                             | 0.2             | 0.1025   | 0.1030   | 0.0588   |

**Power Density Calculations:** The measured power density readings were summed and the results divided by the number of readings to calculate the average.

|   | 1626.5 MHz | 1643.5 MHz | 1660.5 MHz |
|---|------------|------------|------------|
| Whole body average (0.2 - 0.8 m, mW/cm <sup>2</sup> ) = | 0.2594     | 0.2700     | 0.2476     |
| Lower body average (0.2 - 0.8 m, mW/cm <sup>2</sup> ) = | 0.2977     | 0.2897     | 0.2584     |
| Upper body average (1.0 - 2.0 m, mW/cm <sup>2</sup> ) = | 0.2340     | 0.2569     | 0.2404     |

**END OF TEST REPORT**

**(The following will be placed in the Instruction Manual)**

**Mandatory Safety Instructions to Installers & Users**

Use only manufacturer supplied antennas.

**Antenna Minimum Safe Distance:** 60cm.

Antenna Gain: Directional, with maximum gain of 11.1dB reference to isotropic.

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy which is below the OSHA (Occupational Safety and Health Act) limits.

**Antenna Mounting:** The antenna supplied by the manufacturer must not be located such that during radio transmission, any person or persons can come closer than the above indicated minimum safe distance to the antenna i.e. **60cm**.

To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.

**Antenna Substitution:** Do not substitute any antenna for the models supplied or recommended by the manufacturer. You may be exposing person or persons to excess radio frequency radiation. You may contact the manufacturer for further instructions.

**Warning:** Maintain a separation distance from the antenna to a person(s) of at least **60cm**.

You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use. Transmit only when person(s) are at least the minimum distance from the front face of the antenna.

**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