



M. Flom Associates, Inc.

International Compliance Testing Laboratory

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Date: September 20, 2004

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Thrane & Thrane A/S
Equipment: TT-5038A
FCC ID: ROJAERO-HSU
FCC Rules: Radiofrequency Radiation Exposure Limits
47 CFR 1.1310
MPE - Mobiles X Fixed Based Station

Gentlemen:

On behalf of the Applicant, enclosed please find the Supplemental Test Data Report, the whole for Environmental Assessment (MPE) of the referenced equipment as shown.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

Michael Schafer,
General Manager

enclosure(s)
cc: Applicant
MS/del



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Environmental Assessment

for

Mobiles/Fixed Base Station

for

FCC ID: FCC ID: ROJAERO-HSU
Model:TT-5038A

to

Federal Communications Commission

47 CFR 1.1310 (MPE)

Radiofrequency Radiation Exposure Limits

Date Of Report: September 20, 2004

On the Behalf of the Applicant:

Thrane & Thrane A/S

At the Request of:

P.O. W.T. 7/20/2004

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

Attention of:

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Supervised By:




David E. Lee,
Compliance Test 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: d0490031
- d) Client: Thrane & Thrane A/S
Lundtoftogardsvej 93D
DK-2800 Lyngby, Denmark
- e) Identification: TT-5038A
Description: FCC ID: ROJAERO-HSU
Aeronautical Satellite Telephone
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: September 20, 2004
EUT Received: July 28, 2004
- 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,
Compliance Test 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.

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Identification of the Equipment Under Test (EUT)**Name and Address of Applicant:**

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

Manufacturer:

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

FCC ID:

ROJAERO-HSU

Model Number:

TT-5038A

Description:

Aeronautical Satellite Telephone

Type of Emission:

21K0G1D
 40K0G1D

Frequency Range, MHz:

1643.0 – 1660.5MHz

Power Rating, Watts: Switchable Variable

1 to 20

 N/A**Modulation:**

AMPS
 TDMA
 CDMA
 16QAM

Antenna:

Helical
 Monopole
 Whip
 Aero H/H+ (High Gain Antenna)

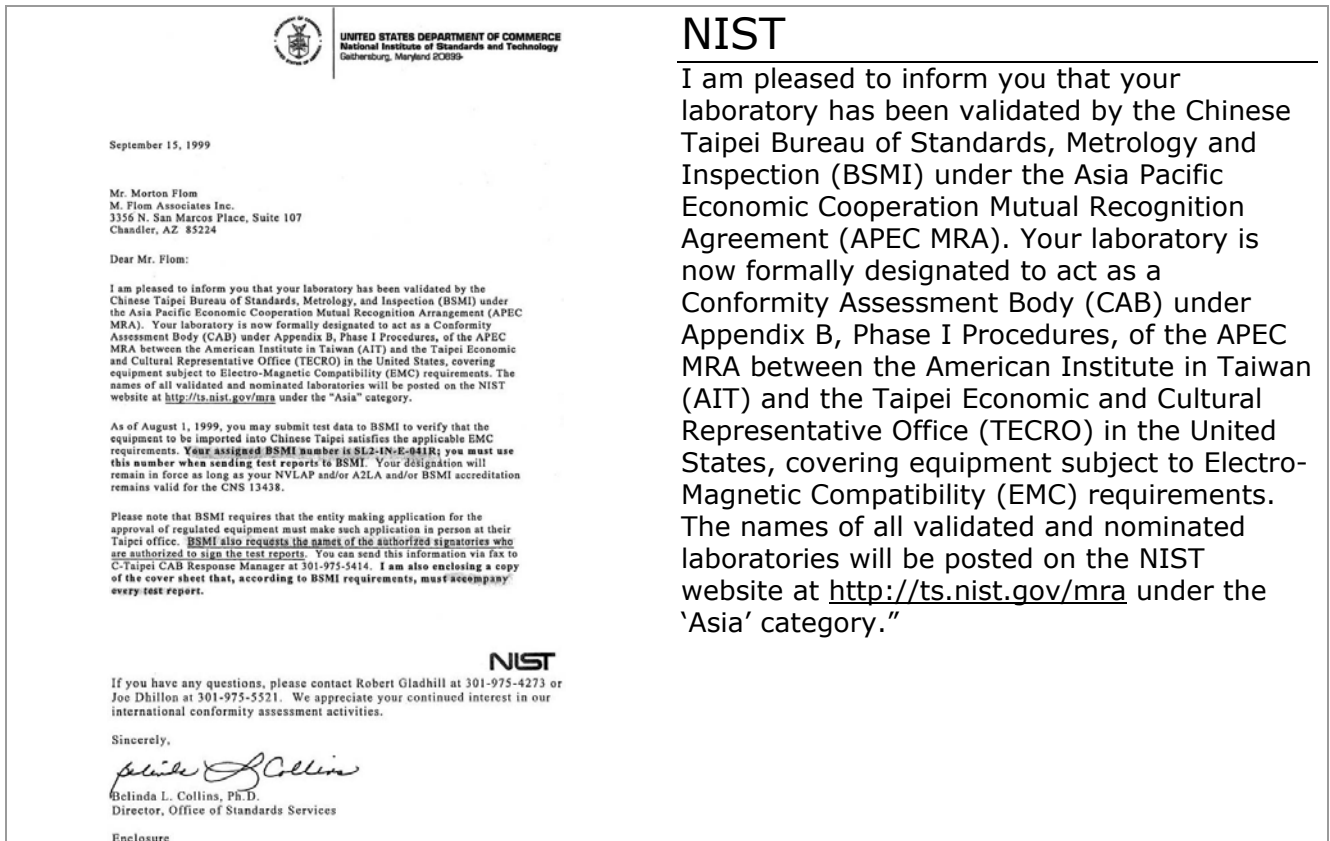
Note: For RF Safety test antenna gain taken at the upper range of expected gain (i.e. 6 dBi) and RF Power set to highest nominal power across all channels.



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."

**Standard Test Conditions
and
Engineering Practices**

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

In accordance with ANSI C63.4-1992/2001, section 6.1.9, 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.

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Expository Statement

The ROJAERO-HSU / ROJAERO-HSD system is intended for mounting on commercial aircraft and business jets.

Therefore:

- The antenna installation will on the upper fuselage or tail section of the aircraft not directly accessible from the ground.
- The antenna pattern is directed upwards to access geosynchronous communication satellites.
- The system is under the control of the flight crew who are trained in the radiation hazards associated with avionics equipment.
- FAA licensed avionics engineers will carry out the installation.

No radiation hazard exists to the general public.

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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:
AR FP6001 Field Probe Kit (Calibrated June 2004)

Measurement Procedure:

1. The following measurements were performed with a field 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 $\text{Power Density} = \text{EIRP} / 4\pi R^2$ (Peak Watts/m²). 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.

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Test Setup:

Maximum Permissible Exposure (MPE)



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Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
 Description, EUT: Aeronautical Satellite Telephone

Limits: Controlled Exposure 0.3-3.0 MHz: Limit [mW/cm²] = 100
 47 CFR 1.1310 3.0-30 MHz: Limit [mW/cm²] = (900/f²)
 Table 1, (A) 30-300 MHz: Limit [mW/cm²] = 1.0
 300-1500 MHz: Limit [mW/cm²] = f/300
 1500-100,000 MHz: Limit [mW/cm²] = 5.0

Test Frequencies, MHz 1630.50 1643.50 1660.50
 Power, Conducted, W = 20
 Antenna Gain = 6dBi
 Antenna Model CP Helix

Pre-test Calculations
 $Power_{[W\ EIRP]} = P_{[conducted]} \times G_{[antenna]} = 20 \times 4 = 80.0$
 $Limit_{[mW/cm^2]} = 5.0$
 $Limit_{[W/m^2]} = 10 \times Limit_{[mW/cm^2]} = 50.0$
 $R_{[m]} = [P_{[W\ EIRP]} / (4\pi \times Limit_{[W/m^2]})]^{1/2} = 0.357$

Results at tested distances	Probe Height, m	Power Density, mW/cm ²		
		Freq. 1630.50MHz Distance 36cm	Freq. 1643.50MHz Distance 36cm	Freq. 1660.50MHz Distance 36cm
	2.0	0.23	0.14	0.16
	1.8	0.28	0.16	0.23
	1.6	0.16	0.22	0.18
	1.4	0.48	0.48	0.59
	1.2	0.73	0.78	0.82
	1.0	1.00	1.12	1.13
	0.8	0.86	0.96	0.94
	0.6	0.34	0.65	0.56
	0.4	0.29	0.36	0.19
	0.2	0.15	0.14	0.15

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

	1630.50MHz	1643.50MHz	1660.50MHz
Whole body average (0.2 - 0.8 m, mW/cm ²) =	0.45	0.50	0.50
Lower body average (0.2 - 0.8 m, mW/cm ²) =	0.41	0.53	0.56
Upper body average (1.0 - 2.0 m, mW/cm ²) =	0.48	0.48	0.52



Performed By:

David E. Lee,
 Compliance Test Manager

(The following will be placed in the Instruction Manual)

Mandatory Safety Instructions to Installers & Users

Use only manufacturer or dealer supplied antenna.

Antenna Minimum Safe Distance: 36cm.

Antenna Gain: 6dB referenced to an isotropic source (dBi).

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 or radio dealer must not be mounted at a location such that during radio transmission, any person or persons can come closer than the above-indicated minimum safe distance to the antenna i.e. **36cm**.

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. RF Exposure compliance must be addressed at the time of installation.

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

Warning: Maintain a separation distance from the antenna to a person(s) of at least **36cm**.

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 properly installed, externally mounted antenna.

**Testimonial
and
Statement of Certification**

This is to certify that:

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,
Compliance Test Manager