



# M. Flom Associates, Inc.

## International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107  
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Date: July 25, 2005

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Honeywell International Inc.  
Equipment: HD-128  
FCC ID: GB8HD-128  
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, President

enclosure(s)  
cc: Applicant  
MS/del



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## **Environmental Assessment**

for

**Mobiles/Fixed Base Station**

for

**FCC ID: GB8HD-128**  
Model: HD-128

to

**Federal Communications Commission**

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

**Date Of Report:** July 25, 2005

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

Honeywell International Inc.

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

Honeywell Inc., Business & Commuter Aviation Systems  
5353 W. Bell Rd.  
Glendale, AZ 85308-3999

Supervised By:


Michael Findley, Laboratory 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: d0570042
- d) Client: Honeywell Inc., Business & Commuter Aviation Systems  
5353 W. Bell Rd.  
Glendale, AZ 85308-3999
- e) Identification: HD-128  
FCC ID: GB8HD-128  
Description: SATCOM Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: July 25, 2005  
EUT Received: July 19, 2005
- 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:
- 
- Michael Findley, Laboratory 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:

Honeywell International Inc.  
Commercial Electronic Systems  
21111 N. 19th Avenue  
Phoenix, AZ 85027

### Manufacturer:

EMS Technologies Ltd.  
1725 Woodward Drive  
Ottawa, Ontario K2C 0P9  
CANADA

<b>FCC ID:</b>	GB8HD-128
<b>Model Number:</b>	HD-128
<b>Description:</b>	SATCOM Transceiver
<b>Type of Emission:</b>	31K0D7W, 7K20G1D
<b>Frequency Range, MHz:</b>	1626.5 to 1660.5
<b>Power Rating, Watts:</b>	60
<input type="checkbox"/> Switchable <input checked="" type="checkbox"/> Variable <input type="checkbox"/> N/A	
<b>Modulation:</b>	<input type="checkbox"/> AMPS <input type="checkbox"/> TDMA <input type="checkbox"/> CDMA <input checked="" type="checkbox"/> OTHER
<b>Antenna:</b>	<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 in the azimuth plane and RF Power set to highest nominal power across all channels.

## **Expository Statement**

The system is for installation in commercial aircraft or larger GA aircraft. When installed the antenna is mounted on the top of the fuselage with the maximum gain skyward. For this testing a blade antenna was used which represents the maximum azimuth radiation pattern that would be found in practice. Several types of high gain antenna are commercially available for this kind of SATCOM system, all with radiation directed to the upper hemisphere.

The system is under the control of a licensed pilot or qualified maintenance technician at all times when in use due to the power supply requirements. These personnel are educated in the RF Exposure Hazards as part of their Standard Operating Procedures.

The device would normally be mounted in a dual width ARINC rack located in the radio equipment bay of the aircraft and RF Exposure warnings are only appropriate for installers/maintenance personal and are included in the manual.

The safety distance shown is only applicable for while transmitting on the ground and at 45 cm does not have any impact on any members of the general public that may be on the ramp.



## 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 C63.4-1992/2000, 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.



**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:

**Measurement Procedure:**

1. The following measurements were performed with a AR 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/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)



Performed by:

David E. Lee, Test Engineer

**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: Controlled Exposure	0.3-3.0 MHz:	Limit [mW/cm <sup>2</sup> ] = 100
47 CFR 1.1310	3.0-30 MHz:	Limit [mW/cm <sup>2</sup> ] = (900/f <sup>2</sup> )
Table 1, (A)	30-300 MHz:	Limit [mW/cm <sup>2</sup> ] = 1.0
	300-1500 MHz:	Limit [mW/cm <sup>2</sup> ] = f/300
	1500-100,000 MHz:	Limit [mW/cm <sup>2</sup> ] = 5.0

Test Frequencies, MHz	1626.5	1643.5	1660.5
Power, Conducted, W	= 60		
Antenna Gain	= 3 dBi		
Antenna Model	Aircraft Blade Antenna (Worst Case Azimuth)		

Pre-test Calculations

$$\text{Power}_{[W \text{ EIRP}]} = P_{[\text{conducted}]} \times G_{[\text{antenna}]} = 60 \times 2 = 120$$

$$\text{Limit}_{[mW/cm^2]} = 5.0$$

$$\text{Limit}_{[W/m^2]} = 10 \times \text{Limit}_{[mW/cm^2]} = 50.0$$

$$R_{[m]} = [P_{[W \text{ EIRP}]} / (4\pi \times \text{Limit}_{[W/m^2]})]^{1/2} = 43.7\text{cm}$$

Results at tested distances	Probe Height, m	Power Density, mW/cm <sup>2</sup>		
		Freq. 1626.5 MHz Distance 45 cm	Freq. 1643.5 MHz Distance 45 cm	Freq. 1660.5 MHz Distance 45 cm
	2.0	0.41	0.39	4.0
	1.8	0.54	0.51	5.2
	1.6	0.66	0.65	6.4
	1.4	0.72	0.73	7.1
	1.2	0.87	0.87	8.6
	1.0	0.98	0.97	9.7
	0.8	0.72	0.70	7.0
	0.6	0.52	0.51	5.2
	0.4	0.33	0.31	3.0
	0.2	0.19	0.18	1.5

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

	MHz	MHz	MHz
Whole body average (0.2 - 0.8 m, mW/cm <sup>2</sup> ) =	0.59	0.58	0.58
Lower body average (0.2 - 0.8 m, mW/cm <sup>2</sup> ) =	0.44	0.42	0.42
Upper body average (1.0 - 2.0 m, mW/cm <sup>2</sup> ) =	0.77	0.69	0.69



Performed by: David E. Lee, Test Engineer

END OF TEST REPORT

(The following will be placed in the Instruction Manual)

### **Mandatory Safety Instructions to Installers & Users**

**Antenna Minimum Safe Distance:** 45cm.

Antenna Gain: 0.88 dBd referenced to a dipole in or below the horizontal plane of the antenna (3dBi)

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. **45cm**.

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 Location:** The antenna should be fixed-mounted to the aircraft upper surface. RF Exposure compliance must be addressed at the time of installation.

**Warning:** Maintain a separation distance from the antenna to a person(s) of at least **45cm**.

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:



Michael Findley, Laboratory Manager