

## MEASUREMENT/TECHNICAL REPORT



**Intermec Technologies Corporation  
Cellular Radio Module  
OEM From RIM 802**

**REPORT NO: 20010120-1**

**DATE: January 20, 2001**

This report concerns: Original Grant <input checked="" type="checkbox"/> Class II change <input type="checkbox"/>	
Equipment Type: Cellular Radio Certified Under FCC Part 90	
Request issue of the grant immediately upon completion of review.	
Measurement procedure used: FCC Rules Part 1, 2 and OET Bulletin 65	
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**This report contains data that is outside the NVLAP scope of accreditation.**

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### APPENDIXES (may be file attachments for electronic applications of approval)

- A. 20010120A1.pdf Radio and Antenna Photos
- B. 20010120B1.pdf Label and Placement Diagram
- C. 20010120C1.pdf Tablet Computer Photos
- D. 20010120D1.pdf Typical Use Photos
- E. 20010120E1.pdf DoC insert
- F. 20010120F1.pdf APREL Laboratories SAR Report
- G. 20010120G1.pdf Effective Radiated Power (ERP) and  
Maximum Permissible Exposure (MPE) Data

1.0 COMPLIANCE CERTIFICATION

The electromagnetic compatibility test and data evaluations findings of this report have been prepared by the EMC Test Lab, Intermec Technologies Corporation, in accordance with applicable specifications instructions required per-

SAR Testing performed by APREL Laboratories, Ottawa Canada

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the measurements of the test sample's electromagnetic compatibility characteristics as of the dates and at the times of the test under the conditions herein specified. The data presented herein is traceable to the National Institute of Standards and Technology.

This report is not an endorsement of the tested product by NVLAP or any agency of the U.S. Government.



Accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 100269-0.

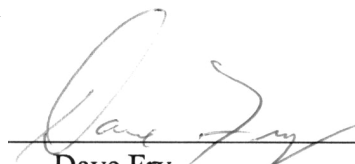
Intermec Technologies Corporation  
EMC Test Laboratory  
550 Second Street S.E.  
Cedar Rapids, Iowa 52401

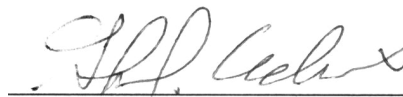
The scope of accreditation at the EMC Test Laboratory is limited to NVLAP codes:

12/CIS22 IEC/CISPR 22:1993: Limits and methods of measurement of radio disturbance characteristics of information technology equipment. 12/CIS22a IEC/CISPR 22:1993: Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1:1995, and Amendment 2:1996. 12/CIS22b CNS 13438:1997: Limits and methods of measurement of radio disturbance characteristics of information technology equipment.  
12/F01 FCC Method - 47 CFR Part 15 - Digital Devices. 12/F01a Conducted Emissions, Power Lines, 450 kHz to 30 MHz. 12/F01b Radiated Emissions.  
12/T51 AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment.



Interference Technology International

  
Date 02/ 23/ 01  
mm/dd/yy  
Dave Fry  
Regulatory Engineer II

  
Date 02/ 23/ 01  
mm/dd/yy  
Stu Adams  
Manager, Safety and Compliance



National Association of Radio and Telecommunications Engineers

1.1 Measurement Uncertainties:

**Not Applicable, see APREL test report.**

2.0 GENERAL INFORMATION

2.1 Product Description

This report addresses the request for certification for a cellular modem radio module operating in the 806-821 MHz radio band. The RIM 802 radio will be used as a wireless wide-area LAN within various mobile tablet computers to communicate to mainframe computers or other terminal devices. This report and FCC application addresses the portable radio specific absorption rate (SAR) requirements for two new antennas used exclusively on the Intermec 6100 and 6600 family of tablet computers. The 6100 unit shown within the SAR report is small enough to be considered a portable device. The 6600 unit is large enough to be classified mobile but will use the same antennas shown in the 6100 SAR report. It is Intermec Technologies intent to approve this radio as a module and label the radio with the same FCC ID for use in both terminals.

Intermec also has other mobile devices using this radio, it is our intent to use the Intermec FCC ID: EHAWANRIM802 for those products when the mobile radio antenna conditions remain as stated within this application.

The RIM 802 radio is provided to Intermec Technologies Corp. by Research In Motion Ltd. (RIM) as an OEM radio. This radio has a conditional Grant issued to RIM under FCC ID: L6AR802D-2-O that lists external antennas approved for MPE evaluation. As stated on the Grant issued to RIM;

“This module is approved for use with a 0 dBd, 11 cm long or a 3 dBd, 35.5 cm long antenna both with an attached 6 ft cable for vehicle-mount or substantially equivalent operating configurations. The antenna length should be within 1 inch of those tested for MPE and installed with a minimum separation distance of 20 cm from persons to satisfy MPE compliance.”

Intermec intends to use externally mounted antennas, those antennas will satisfy the conditions listed above.

The radio remains unchanged from RIM and the regulatory requirements under FCC Part 90 are represented the original request for Grant submitted to the FCC by RIM.

This report shows the radio to be used within the entire family of 6100 or 6600 tablet computers manufactured by Intermec. This 6100 or 6600 family of tablet computers uses the same exterior shell. The options available change the processor, memory, display and peripheral interface options.

Intermec markets these computers to users in the route and delivery services industries for inventory control automation. As this radio is integrated within each tablet computer model, the

digital emissions will be verified. The mobile computers that will interface to the RIM 802 radio are required to meet FCC Class B emissions. Digital emissions of the RIM 802 radio, when integrated within the tablet computer, will be tested to demonstrate compliance to the Class B requirements under the FCC Declaration of Conformity. The digital emissions concerns related to the RIM 802 radio integration will be addressed in separate reports.

The 6110, RIM radio and antennas for this report are production versions.

## 2.2 Related Submittal(s)/Grants(s)

RIM original FCC Grant FCC ID: L6AR802D-2-O Issued 11/17/1999

## 2.3 Systems Details

Model Part Number Serial Number	FCC ID:	Description	Cable Description
RIM 802 OEM PN N/A SN N/A	EHAWANRIM802	Cellular Wide Area Network Radio/Modem	N/A
Mobile Mark PSTN2-815CI Intermec PN 805-572-003	N/A	New Antenna -1.2 dBd Gain Local antenna for tablet computer	Internal tablet cable 5 cm long (0.1 dB loss)
Centurion PN CAF28764 Intermec PN 805-490-002	N/A	New Antenna -2.5 dBd Gain Local antenna for tablet computer	Internal tablet cable 5 cm long (0.1 dB loss)

## 2.4 Test Methodology

FCC regulations regarding RF Exposure are addressed within the FCC Part 1, 2 and OET Bulletin 65. This report address the FCC requirements regarding adding two antennas to a new FCC grant request. APREL Laboratories, Ottawa Canada, defined the SAR test procedure.

## 2.5 TEST FACILITY:

The location of the open area test site and conducted measurement facility used to collect the radiated data is 90 West Cemetery Road, Fairfax, Iowa 52228. This site has been fully described in report number 577-500-971, dated November 6, 2000, and submitted to the Federal Communication Commission USA, and accepted in a letter dated December 8, 2000 for ANSI C63.4: 1992 testing. The test site was also submitted to Industry Canada for the performance of radiated measurements and is reference by the file number IC 1223. Test site complies too CISPR Publication 22: 1993, Clauses 10 and 11 for methods of measurements for radiated and conducted emissions testing.

Details of the SAR test facility at APREL Laboratories is contained with Appendix F.

### 3.0 PRODUCT LABELING AND INFORMATION TO THE USER

#### 3.1 PRODUCT LABELING

See label and label placement in appendix B

#### 3.2 INFORMATION TO THE USER

The appendix E show the Declaration of Conformity inserts supplied and shipped with each tablet computer.

#### 4.0 THEORIES OF OPERATION

Not applicable, refer to the original RIM request for grant under FCC ID: L6AR802D-2-O. Supporting document are confidential and are made available upon request when appropriate.

#### 5.0 SCHEMATICS

Not applicable, refer to the original RIM request for grant under FCC ID: L6AR802D-2-O. Supporting document are confidential and are made available upon request when appropriate.

#### 6.0 SAR TEST RESULTS

Testing for SAR is required to demonstrate compliance to the RF Exposure requirements defined by the FCC 2.1093 for portable products. The 6100 terminals are small enough that the 20-cm (8-inch) spacing between the antenna and user cannot be maintained. The 6100 terminals are operated within the hand or located in a holster that can be worn with a waist or shoulder belt. Normal usage photographs are shown for clarification within appendix D. ERP data for the local antennas used on the 6100 and 6600 is shown in appendix G.

See Appendix F, APREL report. Project #: ITCC-Norand 6110w. RIM 802D-3640

#### 7.0 MPE AND ERP DATA

The 6600 terminals are large enough to show compliance for RF Exposure using a maximum permissible exposure calculation. As stated in the FCC rules the SAR data can be substituted to show compliance. Users of the 6600 and other products that fall within the "mobile" will be warned to remain 20-cm, (8-inches) from the antenna while the transmitter is in operation. MPE data for the local antennas used on the 6600 is shown in appendix G.

The ERP calculated for the local antennas is also shown in appendix G. The ERP for the Mobile Mark antennas was 1.4 watts. The Centurion antenna radiates 1.1 watts of power.

## 8.0 ANTENNAS AND USAGE DESCRIPTION

The 6100 and 6600 family of terminals have a vehicle dock option. When docked, the transceiver can be ported to externally mounted antennas. The remote antennas will meet the description listed on the original grant issued to Research In Motion Ltd. (RIM) FCC ID: L6AR802D-2-O.

Intermec will be using the two antennas described in this report on the 6100 and 6600 terminals. These are not listed on the original grant approved for RIM. The additional antennas are fully described below.

The long antenna is 7-inch (17.8-cm) long  $\frac{1}{2}$ wave end-fed whip dipole from Centurion part number (PN) CAF28764, Intermec PN 805-490-002. Gain  $-2.5$  dBd, VSWR 1.5:1, 50 Ohms.

The short antenna is 3.5-inch (9-cm) long  $\frac{1}{2}$ wave end fed dipole from Mobile Mark model number PSTN2-815CI, Intermec PN 805-572-003. Gain  $-1.2$  dBd, VSWR 2-2.5:1, 50 Ohms

The 6100 tablet computers have an accessory pouch (holster) so the operator may place the terminal next to the body. Test conditions for SAR used the holster with the antenna in the worst case configuration (nearest the body) for testing. Testing at APREL set the transmitter for the maximum duty cycle transmission available from the cellular phone service. Normally when in the holster the radio is enabled, however the transmitter is in standby. The cellular phone connection is maintained by a 2 mS (millisecond) ping once every 10 minutes in the standby state. As required the users manual compliance insert will address RF exposure by using the following statement:

### 6100 Compliance Warning

**WARNING:** per the FCC RF (radio frequency) exposure requirements, (1) Antennas must be supplied and installed as recommended by Intermec Technologies to ensure compliance to FCC RF exposure requirements. (2) The user shall not touch the terminal antenna and is to remain 15-mm (5/8 of an inch) from the center of the antenna while the transceiver is in use. (3) When installing and using Intermec approved remote antennas associated the vehicle dock, a 20-cm (8-inch) passing distance must be maintained from any body part of the user or near by persons and the remote antenna. (4) Cables attached to the remote antennas must have a minimum length of 183-cm (6 feet) to provide the proper losses to control RF exposure. (5) The correct mounting for external or remote antennas would be on a ground plane (vehicle roof), and positioning the antenna such that the minimum 20 cm is kept from any edge of the vehicle rooftop and the remote antenna.

## 6600 And Other Mobile Products Compliance Warning

**WARNING:** per the FCC RF (radio frequency) exposure requirements, (1) Antennas must be supplied and installed as recommended by Intermec Technologies to ensure compliance to FCC RF exposure requirements. (2) The user shall not touch the terminal antenna and is to remain 20-cm (8-inches) from the center of the antenna while the transceiver is in use. (3) When installing and using Intermec approved remote antennas associated the vehicle dock, a 20-cm (8-inch) passing distance must be maintained from any body part of the user or near by persons and the remote antenna. (4) Cables attached to the remote antennas must have a minimum length of 183-cm (6 feet) to provide the proper losses to control RF exposure. (5) The correct mounting for external or remote antennas would be on a ground plane (vehicle roof), and positioning the antenna such that the minimum 20 cm is kept from any edge of the vehicle rooftop and the remote antenna.

The end user can only initiate the transmitter for extended periods while the tablet is in the normal holding positions or in the dock, both of these conditions keep the user away from the antenna. Since the normal usage transmission is the primary concern, using the warning we will publish in the users guide and compliance insert protects the user and bystanders.

Our application is for approval of the radio as a module not tied to a specific tablet computer. The 6100 tablet computers referenced in this application will have the same exterior shell and antenna placements. The processing capability and options for memory, display and peripheral connection will change. If the radio is to be used in a tablet computer with substantially different antenna placement or case size, we will review the conditions for approval addressed herein and notify the FCC with a permissive change or request for new grant.

The 6600 tablet computers referenced in this application also will have the same exterior shell and antenna placements. The processing capability and options for memory, display and peripheral connection will change. If the radio is to be used in a tablet computer with substantially different antenna placement or case size, we will review the conditions for approval addressed herein and notify the FCC with a permissive change or request for new grant.

Intermec will also use the RIM 802 radio within other products in the future. Products classified as mobile as defined by FCC Part 2.1091 (b) will use antennas meeting the conditional grant provisions outlined on the original grant issued to Research In Motion Ltd. FCC ID: L6AR802D-2-O.