

MEASUREMENT/TECHNICAL REPORT



**Intermec Technologies Corporation
Cellular Radio Module
OEM From RIM 902**

REPORT NO: 20000822-1

DATE: August 22, 2000

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	
Report Prepared by: Dave Fry Intermec Technologies Corporation EMC Test Laboratory 550 Second Street SE Cedar Rapids, Iowa 52401 Phone: (319) 846-2415 FAX: (319) 846-2475	Report Prepared For: Stu Adams Intermec Technologies Corporation 550 Second Street SE Cedar Rapids, Iowa 52401 Phone: (319) 369-3100 FAX: (319) 369-3453

This report contains data that is outside the NVLAP scope of accreditation.

This report shall not be reproduced, except in full, without the permission of Intermec Technologies Corporation, EMC Test Laboratory, Cedar Rapids, IA.

TABLE OF CONTENTS

SECTION NUMBER

- 1.0 Compliance Certification
 - 1.1 Measurement Uncertainties

- 2.0 General Information
 - 2.1 Product Description
 - 2.2 Related Submittal(s)/Grant(s)
 - 2.3 Tested System Details
 - 2.4 Test Methodology
 - 2.5 Test Facility

- 3.0 Product Labeling and Information to the User
 - 3.1 Product Labeling and Placement
 - 3.2 Information to the User

- 4.0 Theories of Operation

- 5.0 Schematics

- 6.0 SAR Test Results

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

- A. 20000717A1.pdf Radio and Antenna Photos
 - B. 20000717B1.pdf Label and Placement Diagram
 - C. 20000717C1.pdf Tablet Computer Photos
 - D. 20000717D1.pdf Typical Use Photos
 - E. 20000717E1.pdf DoC insert
 - F. 20000717F1.pdf
- APREL Laboratories SAR Report

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 preformed 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




Interference Technology
International

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/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.


Date 08/ 23/ 00
mm/dd/yy
Dave Fry
Regulatory Engineer II


Date 08/ 23/ 00
mm/dd/yy
Stu Adams
Manager, Safety and Compliance



National Association of
Radio and Telecommunications
Engineers

1.1 Measurement Uncertainties:

Not Applicable

2.0 GENERAL INFORMATION

2.1 Product Description

This report addresses the request for certification for a cellular modem radio module operating in the 896-901 MHz radio band. The RIM 902 radio will be used as a wireless LAN within various mobile tablet computers to communicate to mainframe computers or other terminal devices. Intermec Technologies Corporation is requesting a change of FCC ID to add two antennas to the conditional Grant issued by the FCC.

The RIM 902 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: L6AR902M-2-O that lists 3 antennas approved for MPE evaluation. This report and FCC application addresses the SAR requirements for two new antennas used exclusively on the Intermec 6100 family of tablet computers.

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 tablet computers manufactured by Intermec. This 6100 family of tablet computers uses the same exterior shell. The options available change the processor, memory, display and peripheral interface options. The radio cannot be removed from the 6100 by the customer therefore the labeling for the transmitter within this terminal series will be on the exterior only.

Intermec markets the 6100 series 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 902 radio are required to meet FCC Class B emissions. Digital emissions of the RIM 902 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 902 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: L6AR902M-2-O Issued 07/07/1999

2.3 Systems Details

Model Part Number Serial Number	FCC ID:	Description	Cable Description
RIM 902 OEM PN N/A SN N/A	EHAWANRIM902-6100	Cellular Wide Area Network Radio/Modem	N/A
Mobile Mark PSTN2-899CI Intermec PN 805-572-001	N/A	New Antenna -1.2 dBd Gain Local antenna for tablet computer	Internal tablet cable 5 cm long (0.1 dB loss)
Centurion MN CAF28766 Intermec PN 805-490-004	N/A	New Antenna -2.5 dBd Gain Local antenna for tablet computer	Internal tablet cable 5 cm long (0.1 dB loss)
Larsen NMO 3E 900B	L6AR902M-2-O	Remote antenna 3 dBd Gain (currently approved)	2 meter (1 dB loss) RF cable
Austin 200160 500V	L6AR902M-2-O	Remote Antenna 0 dBd Gain (currently approved)	2 meter (1 dB loss) RF cable
Andrew Eclipse II Magnet Mount	L6AR902M-2-O	Remote Antenna 3 dBd Gain (currently approved)	2 meter (1 dB loss) RF cable

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 a report dated; October 15, 1997, submitted to the Federal Communication Commission USA, and accepted in a letter dated February 6, 1998 (31040/SIT 1300F2) for ANSI C63.4: 1992 testing.

Test site complies with CISPR Publication 22: 1993, Clauses 10 and 11 for methods of measurements for radiated and conducted emissions testing.

The Industry Canada has received a description of the open area test site and finds it complies with RSP-100 Issue 7 section 3.3. Reference file number "IC1223".

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: L6AR902M-2-O.

5.0 SCHEMATICS

Not applicable, refer to the original RIM request for grant under FCC ID: L6AR902M-2-O.

6.0 SAR TEST RESULTS

The 6100 terminals are small enough that the 20-cm (4-inch) spacing between the antenna and user cannot be maintained. The SAR testing shows the 6100 located within the optional belt holster. This can be used with a waist or shoulder belt. Testing for SAR is required to demonstrate compliance to the RF Exposure requirements defined by the FCC.

See Appendix F, APREL report. Project #: INTB-6110 Hand-Held Terminal-3445

ANTENNAS AND USAGE DISCRIPTION

The 6100 family of terminals has a vehicle dock option. When docked, the transceiver can be ported to externally mounted antennas. The remote antennas will be the specific antennas listed on the original grant issued to Research In Motion Ltd. (RIM).

Intermec will be using two different antennas on the 6100 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) CAF28766, Intermec PN 805-490-004. Gain -2.5 dBd, VSWR 1.5:1, 50 Ohms.

The short antenna is 3.5-inch (9-cm) long $\frac{1}{4}$ wave end fed dipole from Mobile Mark model number PSTN2-899CI, Intermec PN 805-572-002. Gain -1.2 dBd, VSWR 2-2.5:1, 50 Ohms

This tablet computer has 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:

WARNING: per the FCC RF exposure requirements, the user shall not touch the terminal antenna and is to remain 22-mm (7/8 of an inch) from the center of the antenna while the transceiver is in use. When using remote mounted antennas associated with the vehicle dock, a 20-cm (8-inch) distance must be maintained from the operator and 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 only concern, using the warning we will publish in the users guide and compliance insert protects the user.

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.