Intermec
Technologies Corporation
EMC Test Laboratory
Cedar Rapids, IA

MEASUREMENT/TECHNICAL REPORT

Intermec Technologies Corporation
RF Identification (RFID) IM3U
915 MHz Spread Spectrum Transmitter

REPORT NO: 030611-1

DATE: June 11, 2003

This report concerns: Original Grant _____ Class II Permissive Change ___X___
Equipment Type: 902-928 MHz Frequency Hopping Spread Spectrum Transceiver, FCC 15.247 Industry Canada RSS-210 Issue 4, RSS-102 Issue 1
Request issue of the grant immediately upon completion of review.
Measurement procedure used: ANSI C63.4-1992 and as described within this test report.

Report Prepared by:	Report Prepared For:
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This report contains data that is outside the NVLAP scope of accreditation.

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SECTION NUMBER

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

xxx = file extension .doc or .pdf

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-

FCC SECTION	CANADA RSS-210	TEST NAME
15.33, 15.35	4.0	Range of Meas., Meas. Detectors
15.15, 15.31	5.3, 5.8, 9.0, 11.0	General Requirements, Meas. Methods
15.203, 15.204	5.5	Antenna Description(s)
2.925, 15.19	5.10	Labeling
15.21	5.11, 14.0	Information to the User
15.247 (a, b, c), 15.209	5.7-5.9.2	Transmitter Characteristics
1.1307 (b)(1)	14.0 & RSS-102	RF Safety, Exposure Limits

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.

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NVLAP LAB CODE 100269-0

Accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program.

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 (1998) and EN 55022 (1998): 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 ANSI C63.4 (2001) – cited in FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a Conducted Emissions, Power Lines, 150 kHz to 30 MHz
12/F01b Radiated Emissions
12/T51 AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

EMC 017

Interference Technology International

Dave Fry
NCE, EMC Engineer III

Date 10/15/03
mm/dd/yy

Signature

Date 10/15/03
mm/dd/yy

Thomas Schuster Principal Engineer
Print Name and Title

CERTIFIED NARTE ENGINEER

National Association of Radio and Telecommunications Engineers

1.1 Measurement Uncertainties:

ESI 40 Receiver / Spectrum Analyzer

Radiated Emissions on 3 Meter Open Area Test Site

30-300 MHz	has an Expanded Measurement Uncertainty of + 3.04 -3.99 dB
200-1000 MHz	has an Expanded Measurement Uncertainty of + 4.59 -3.01 dB
1-5 GHz without pre-amp	has an Expanded Measurement Uncertainty of + 2.99 -2.93 dB
1-5 GHz	has an Expanded Measurement Uncertainty of + 3.16 –3.11 dB
5-18 GHz	has an Expanded Measurement Uncertainty of + 3.20 –3.15 dB

AC Line Conducted Emissions

0.15-30 MHz	has an Expanded Measurement Uncertainty of + 0.59 -0.44 dB

Generator Substitution Radiated Measurements Using the 3 Meter Open Area Test Site

30-50 MHz	has an Expanded Measurement Uncertainty of + 2.94 -2.98 dB
50-1000 MHz	has an Expanded Measurement Uncertainty of + 2.85 -2.86 dB
1-12.5 GHz	has an Expanded Measurement Uncertainty of + 2.76 -2.81 dB

Receiver and Transmitter Conducted, Generator Substitution Measurements with
HP83630A RF Generator and ESI 40 Receiver / Spectrum Analyzer

50-7000 MHz	has an Expanded Measurement Uncertainty of + 0.88 -0.88 dB
7- 20 GHz	has an Expanded Measurement Uncertainty of + 1.01 -1.02 dB
20-26.5 GHz	has an Expanded Measurement Uncertainty of + 1.23 -1.27 dB
26.5-40 GHz	has an Expanded Measurement Uncertainty of + 1.55 -1.63 dB

Receiver and Transmitter Direct Measurements of Conducted Emissions with
ESI 40 Receiver / Spectrum Analyzer

9 kHz-5 GHz	has an Expanded Measurement Uncertainty of + 0.56 -0.56 dB
5-7 GHz	has an Expanded Measurement Uncertainty of + 0.74 -0.75 dB
7-20 GHz	has an Expanded Measurement Uncertainty of + 1.16 -1.18 dB
20-26.5 GHz	has an Expanded Measurement Uncertainty of + 1.40 -1.46 dB
26.5-40 GHz	has an Expanded Measurement Uncertainty of + 1.73 -1.88 dB

Confidence Statement
The measurement uncertainty statements above use a Coverage Factor K = 2.
The Coverage Factor K = 2 equates to an approximate confidence level of 95%.

2.0 GENERAL INFORMATION

2.1 Product Description

This report addresses a Class II Permissive Change for a type 2 PCMCIA spread spectrum radio module operating as a frequency hopper in the 902-928 MHz radio band. The 915 PC Card –6 is a radio used for communicating to RF Identification (RFID) tags operating in the same frequency band. The tags allow tracking and inventory of packages, laundry and pallets using RF energy to turn on, interrogate and write information to the RF tags.

This permissive change request for PC Card radio is to add a new mobile antenna in the configuration of an Intermec IP3, RFID scanner handle for use with the Intermec 700 mobile computers. The PC-Card digital section has modifications to support IrDA communication necessary to communicate with the 700. The radio section and operation remains as originally certified. The PCMCIA card exterior remains intact as does the module labeling and conditions for identification when the module is not customer accessible. The new radio module is refered to as Intermec Model IM3U.

The IM3U radio continues to be manufactured by Intermec Technologies Corporation and will be marketed as an OEM radio to other companies with the possibility of re-labeling. The conditions of re-labeling will address modification restrictions and antennas restrictions to inform the end user of their regulatory requirements and responsibilities.

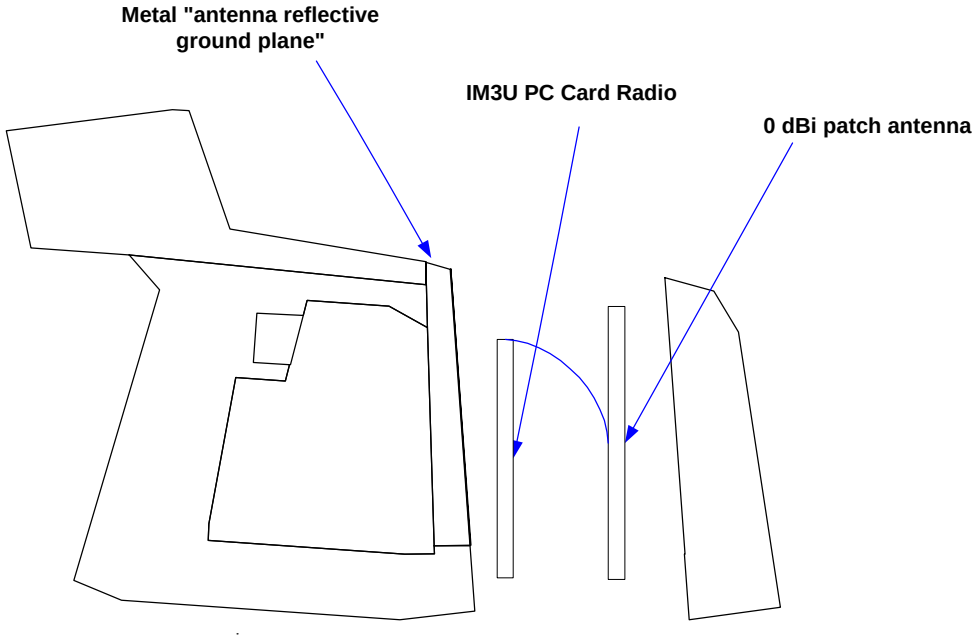
This report shows the IM3U shows the radio continues to comply with the FCC and Canadian requirements when used with the new antenna. The new antenna continues satisfies the unique connection requirements outlined in the FCC and Canada rules. The modular approval conditions as outlined in the original application for certification continue to remain valid.

The Intermec IP3 RFID Scanner does not connect to an AC source; the batteries must be removed for recharging. No AC conducted emissions testing is required for the IP3.

The IP3 RFID Scanner Handle is intended for global marketing therefore must comply to the CISPR 22 (EN55022) Class B digital emissions. The Intermec, Cedar Rapids, EMC Test Lab will perform testing for compliance for digital emissions to the CISPR 22 Class B limits and issue separate reports addressing the integration in Intermec products. Based on these tests and reports the Class B Declaration of Conformity can be used for United States marketing. Canada will accept a self-declaration for compliance to ICES-003.

The radio module shown herein is a pre-production model. The antennas listed herein are also pre-production versions.

IP3 exploded diagram
Dave Fry Aug. 18, 2003



2.2 Related Submittal(s)/Grants(s) Original Grant FCC ID: EHARFID915PCC-6
Date of Grant: 09/27/2001

2.3 Tested Systems Details

Items tested:			
Model Number (Serial Number)	FCC ID:	Description	Cable Description
Intermec IP3 IM3U Radio Module PN: 705-449-001 SN: 0000004	Contains TX FCC ID: EHARFID915PCC–6	Type II PCMCIA frequency hopping spread spectrum	Module testing shown in PCMCIA extension. Antenna cables represent the shortest versions used.
Remote controller to operate 915 PC-Card, IP3 antenna:			
Dell Expression Lap-top PN: 04949 SN: 2RVX-5180	AK8PD475SC	Host computer	No peripherals or cables attached to show maximum radio emissions.
Dell Charger PN: 73463 SN: T4037851	-	universal charger	detachable shielded AC cord, unshielded DC cable to mobile computer
Antennas tested for this report that will be used with the IM3U radio:			
Patch Antenna for IP3 PN: 805-616-001 Mfg. PN: AT900-4	-	AeroAntenna Technology, Inc. 7.5x7.5-cm (3x3 inch) 0 dBi panel antenna	8 centimeter (3 inch) RG316 with MMCX miniature connectors. This antenna will be used with mobile computers.
Antennas not tested for this report that will be used with the IM3U radio:			
Second Source Vendor Patch Antenna for IP3 PN: 805-616-002 Mfg PN: ROS-915	-	Radiall 7.5x7.5-cm (3x3 inch) 0 dBi panel antenna	8 centimeter (3 inch) RG316 with MMCX miniature connectors. This antenna will be used with mobile computers.

2.4 Test Methodology

This section addresses the following: FCC Sections 15.15 General Requirements, 15.31 Measurement Standards, 15.33 Range of Measurement, and 15.35 Measurement Detectors

Industry Canada RSS-210 sections; 4.0 Instrumentation, 5.3 Test Method, 5.8 Measurement Bandwidths, 5.17, Digital Circuits Emissions, 6.3 Restricted Bands and Unwanted Emissions Frequencies, 9.0 AC Wireline Conducted Measurement Method, 11.0 Radiation Measurement Method

Per FCC rules 15.31 (k) the measurements on an intentional radiator operating over a range greater than 10 MHz requires testing on channels at the bottom, middle and top of the range of operation.

The test software of the IM3U radio is capable of operating the radio continuously in transmit modes locked on channel or hop using a pre-programmed pseudo-random hop sequence. The test software is set to operate on channel 07, 40 or 73. The transmitter test sends pseudo-random data continuously or CW on the selected channel.

Channel 07 transmit = 902.625 MHz
Channel 40 transmit = 915.000 MHz
Channel 73 transmit = 927.375 MHz

These channels represent the low, middle and highest channels of operation within the band of 902 – 928 MHz.

Per FCC regulations the transmitter emissions are measured to the 10^{th} harmonic, or 9.28 GHz. Canadian regulations for transmitters require testing to the 5^{th} harmonic. Receiver emissions are not presented here because the receiver is enabled with the transmitter during operation. All testing of the transmitter includes any spurious emissions the receiver may generate.

Where possible ANSI C63.4, 1992 is referenced during radiated and AC wireline conducted emissions testing. Details on measurement equipment, set-up, test details and calculations are presented within each specific test section.

Radiated emissions from 30 to 1000 MHz are tested at a three-meter distance using a Quasi-Peak detector with a 120 kHz measurement bandwidth (BW).

Radiated emissions from 1 to 10 GHz are tested at three-meter measurement distance with a preamplifier to improve the measurement sensitivity. Average measurements above 1 GHz are made with a spectrum analyzer on a 100 MHz span with Resolution BW 1 MHz and Video BW of 10 Hz. Peak measurements are made using the spectrum analyzer on a 100 MHz span with Resolution BW and Video BW of 1 MHz, these settings are detailed on the spreadsheet test results.

Refer to the test photographs in appendix F and test setup figures in section 7 for details.

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 577-501-057, dated November 06, 2002, and submitted to the Federal Communication Commission USA, and accepted in a letter dated January 08, 2003 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 3909. Test site complies too CISPR Publication 22 for methods of measurements for radiated and conducted emissions testing.

3.0 PRODUCT LABELING AND INFORMATION TO THE USER

3.1 PRODUCT LABELING

Remains as originally filed.

3.2 INFORMATION TO THE USER

The appendix G shows the compliance insert for the IP3 with the IM3U radio module (030611G1.xxx). This document insert is shipped with each product.

4.0 THEORIES OF OPERATION

Remains as originally filed.

5.0 BLOCK DIAGRAM

Remains as originally filed.

6.0 SCHEMATICS

Radio section remains as originally filed.

7.0 EMISSIONS TEST DATA

The following tests and results are recorded within this section.

Antenna Description

Out of Band Emissions, Transmitter Radiated

RF Safety, Exposure Limits

EQUIPMENT: IM3U Radio Module

NAME OF TEST: Antenna Description

FCC RULE NUMBER: 15.203, 15.204
CANADA RSS-210 Par.: 5.5

MINIMUM STANDARD:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

Antenna Gain in excess of 6 dBi shall be added to the measured RF power before using the specified power limits.

TEST PROCEDURE: Inspection

TEST EQUIPMENT: Not applicable

PERFORMED BY: Dave Fry Date: October 14, 2003

SET UP: Not applicable

TEST RESULTS:
The antennas for the IM3U radio interface using a miniature MMCX connector. The remote antennas are provided from their suppliers with these miniature coaxial connectors. Antennas sold for the IM3U will only be offered through Intermec Technologies.

In the event the radio is marketed as an OEM device to another system integrator, antenna types and connector restrictions will be communicated to re-seller. Their regulatory obligations will be made clear as a condition for re-selling and or re-labeling of the IM3U PC Card.

The new antennas have a gain of 0 dBi. The transmitter peak power is +30.0 dBm. Adding the antenna gain to the transmitter power totals +30.0 dBm. This total is –6.0 dB below the maximum ERP of +36 dBm allowed under FCC or Industry Canada rules.

Antenna Descriptions: Antennas for the IP3 RFID reader

Patch - is a 3"x3" right hand circular polarized patch antenna from AeroAntenna Technology, Inc. complete with 4 inch RG316 cable and right angle MMCX connector. The AeroAntenna part number is AT900-4, the Intermec part number is 805-616-001. Nominal gain is 0 dBi, for a 50 ohm system, return loss is > 10 dB over the 902-928 MHz band. This is one of two antennas to be used with Intermec Technologies IP3 mobile computer RFID scanner.

Patch - is a 3"x3" right hand circular polarized patch antenna from Radiall complete with 4 inch RG316 cable and right angle MMCX connector. The Radiall part number is ROS-915; the Intermec part number is 805-616-002. Nominal gain is 0 dBi, for a 50 ohm system, return loss is > 10 dB over the 902-928 MHz band. This is one of two antennas to be used with Intermec Technologies IP3 mobile computer RFID scanner.

EQUIPMENT: IM3U Radio Module

NAME OF TEST: Out of Band Emissions

FCC RULE NUMBER: 15.247 (c)
MINIMUM STANDARD:
(c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

CANADA RSS-210 Par.: 6.2.2, (o)(e1)
MINIMUM STANDARD:
(e1) **Out of Band Emissions:** In any 100 kHz bandwidth outside the operating frequency bands, between 30 MHz and 5 times the carrier frequency, the unwanted emission spectral density shall be either at least 20 dB below the inband spectral density, or shall not exceed the levels specified in Table 3, whichever is less stringent. **Note:** For frequency hopping systems, the inband density S_i shall be measured with the hopping sequence stopped at the lowest channel and the highest channel in turn, as well as with the hopping running normally. The 20 dB shall be with reference to the lowest of the three S_i values.

TEST PROCEDURE:
1. Record the radiated emissions using the testing methodology described in section 2.4 to measure the spurious emissions. Using the three-meter measurement distance and test receiver, scan and measure transmitter related spurious emissions from 30 to 1000 MHz. A measurement distance of three meters and an amplifier between the horn antenna and spectrum analyzer, measure emissions from1 – 10 GHz. Refer to section 2.4, Test Methodology, for more details on testing above 1000 MHz.

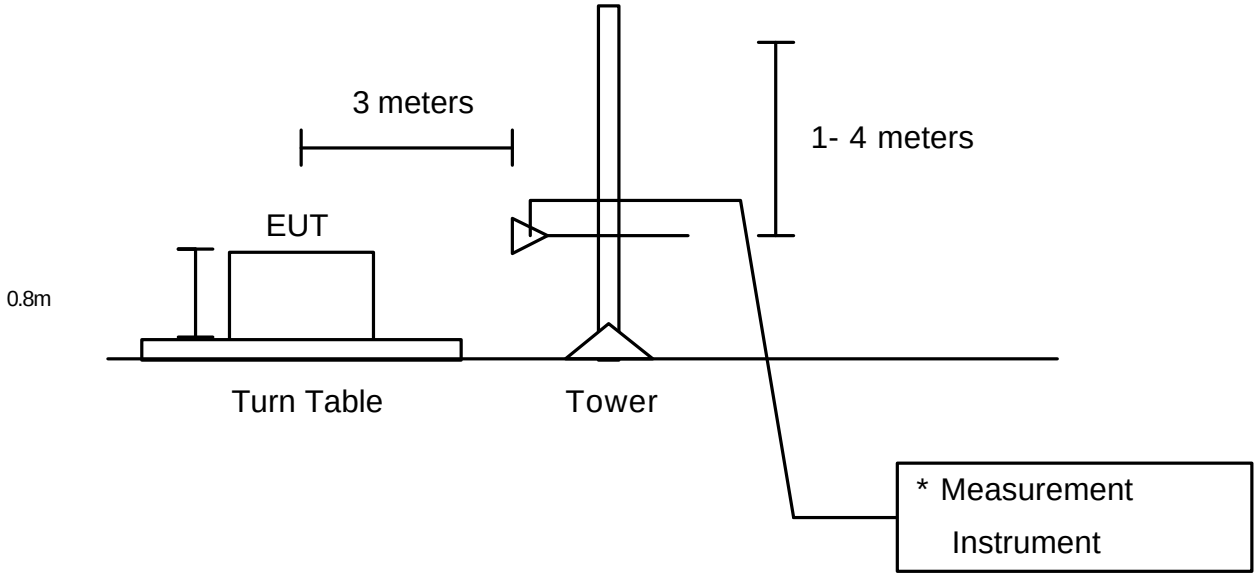
TEST EQUIPMENT:	Antenna, bi-conical	EMCO 3110
	Antenna, log periodic	EMCO 3146
	Antenna, DRG horn	EMCO 3115
	Antenna, DRG horn	EMCO 3116
	Receiver	Rohde & Schwarz ESI-40
	High Pass Filter	Cir-Q-Tel R9H-1G5/10G-28A
	Microwave amplifier	HP 8449B

PERFORMED BY: Dave Fry Date: September 22-29, 2003

TEST SETUP: Transmitter Radiated Spurious Emissions

Open area test site at the Intermec EMC Test Facility
Three-meter test range 30 MHz - 10 GHz.

Review the following diagrams for setup details. Refer to the photographs in appendix F (030611F1.xxx) for placement IM3U radio.



* 30-1000 MHz, Rohde & Schwarz ESI40 receiver or
1-10 GHz, ESI40 with preamplifier and high-pass filter

TEST RESULTS: Transmitter radiated emissions conform.
The IM3U radio module continues to use the duty cycle operation as originally tested and approved for certification. The details are contained in the original test report.

Below is listed the Average and Peak radiated measurements for each antenna specified for use with the radio module. The data presented below calculates the AVERAGE emissions by recording the 100% duty cycle emissions. The attached calculation spreadsheets show the de-rating the measurement limit for 50% duty cycle, or -6 dB. The 50% de-rating is a conservative figure, duty cycles for operation is nearer the 40-45% on time for duty cycle.

with AeroAntenna patch antenna (see appendix E, 030611E1.xxx, for the data spreadsheets)

The highest AVERAGE field strength of the out of band transmitter radiated emissions is 63.0 dB(µV)/m measured at a distance of three-meter for 2707.875 MHz. The emissions were observed during testing of the unit with the measurement antenna horizontally polarized. Applying the 6 dB duty cycle correction the emissions are 57.0 dB(µV)/m. That is –7.0 dB relative to the limit of 54 dB(µV)/m at three-meters.

AVERAGE EMISSIONS

Highest emissions observed for this radio/terminal and antenna configuration.
Complete data is contained in the Spreadsheet Appendix or file attachments

Ch. /MHz	Meas. Polarity	100% dB(uV)/M	duty cycle conversion dB	50% dB(uV)/M	limit dB(uV)/M @1M	margin dB
07 / 6318.38	V	56.7	-6.0	50.7	54.0	-3.3
07 / 6318.38	H	56.7	-6.0	50.7	54.0	-3.3
40 / 6405.00	V	54.4	-6.0	48.4	54.0	-5.6
40 / 6405.00	H	53.8	-6.0	47.8	54.0	-6.2
73 / 6491.63	V	49.8	-6.0	43.8	54.0	-10.2
73 / 7419.00	V	50.8	-6.0	44.8	54.0	-9.2

The highest Quasi-Peak or PEAK field strength of the out of band transmitter radiated emissions relative to the limit is 47.9 dB(µV)/m measured at a distance of three-meter for 216.04 MHz. The emissions were observed during testing of the unit with the measurement antenna horizontally polarized. That is –0.1 dB relative to the limit of 48 dB(µV)/m at three-meters. (No duty cycle correction can be applied to QP or Pk data).

QUASI-PEAK AND PEAK EMISSIONS

Highest emissions observed for this radio/terminal and antenna configuration.
Complete data is contained in the Spreadsheet Appendix or file attachments

Ch. / MHz	Detector QP or Pk	Meas. Polarity	dB(uV)/M	limit dB(uV)/M@3M	margin dB
40 / 168.00	QP	H	39.4	43.5	-4.1
40 / 216.04	QP	H	47.9	48.0	-0.1
07 / 6318.38	Pk	V	59.4	74.0	-14.6
07 / 6318.38	Pk	H	60.3	74.0	-13.7
40 / 6405.00	Pk	V	58.1	74.0	-15.9
40 / 6405.00	Pk	H	57.4	74.0	-16.6
73 / 6491.63	Pk	V	56.3	74.0	-17.7
73 / 7419.00	Pk	V	56.2	74.0	-17.8

MEASUREMENT DATA: The appendix E (030611E1.xxx) file attachment spreadsheets show the radiated emissions data tabulated and graphically in dB(µV)/m. The conversion for calculating dB(µV)/m to µV/m follows.

[(dB (µV)/m)/ 20] anti log = µV/m
[(54 dB (µV)/m @ 3 mtr) / 20] anti log = 501.2 µV/m @ 3 mtr

or µV/m to dB(µV)/m

20 (log µV/m) = dB (µV)/m
20 (log 500 µV/m) = 54 dB (µV)/m

These spreadsheets include the calculation for duty cycle de-rating by adding 6 dB to the average limits. De-rating correction is not allowed for the peak and quasi-peak emissions.

54 dB (µV)/m @ 3 mtr + 6 dB (correction) = 60 dB (µV)/m @ 3 mtr

EQUIPMENT: RM915L Radio Module

NAME OF TEST: RF Exposure Safety

FCC RULE NUMBER: **1.1307 Actions that may have significant environmental effect, for which Environmental Assessments (EAs) must be prepared.**

1.1310 Radiofrequency radiation exposure limits.

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, ''Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.''

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/ controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be ex-posed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

(a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular § 1.1307(b).

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20-centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term ''fixed location'' means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily relocated, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20-centimeter separation requirement.

CANADA RSS-210 Par.: 14.0 (see RSS-102)

CANADA RSS-102

4.2 Exemption power levels for portable radios are: - Operation at frequencies below 1.0 GHz with an output power equal to or less than 200 milliwatts (mW); - Operation at frequencies between 1.0 and 2.2 GHz with an output power equal to or less than 100 mW.

4.3 Mobile radios (not portables, see 2.2 for definition) are exempt from RF evaluation if the operating frequency is below 1.5 GHz with effective radiated power (ERP) of 1.5 watts or less (i.e. EIRP of 2.5 watts or less) or above 1.5 GHz with ERP of 3 watts or less (i.e. EIRP of 5 watts or less).

Exposures produced by such radios shall not exceed the exposure limits (see section 3 below) specified in Health Canada's Safety Code 6. Health Canada's address is 775 Brookfield Road, Ottawa, Ontario Canada K1A 1C1; Tel: (613) 954-6699/ Fax: (613) 941-1734; e-mail: alice_mackinnon@hc-sc.gc.ca.

HEALTH CANADA SAFETY CODE 6, 99-EHD-237

Table 5

Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.
Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/ m corresponds to 1. 257 microtesla (μT) or 12. 57 milligauss (mG).

MINIMUM STANDARD: 915 MHz transmitters utilized in workplaces are considered "General Public" exposures. The limits are defined in the tables above.

EXEMPTIONS: Transmitters operating under FCC rules 47 CFR 15.247 are categorically excluded from routine environmental evaluation or subject to environmental evaluation under FCC rules 47 CFR 1.1307.

Industry Canada as stated in CANADA RSS-102 paragraph 4.3, exempt mobile transmitters operating under 2.5 watts EIRP at frequencies below 1.5 GHz.

PERFORMED BY: Dave Fry Date: October 14, 2003

USER INFORMATION: Observe the appendix G (030616G1.xxx) that shows the warning information delivered with each RFID scanner.

MPE DATA: Observe the appendix D (030616D1.xxx) that shows the transmitter RF exposure calculations.

Calculation for exposure at 20cm distance

		EIRP P (mW)	G (dBi)	mW/cm^2	Limit		
		1000	0	0.19894	0.61		

Mobile Transmitter Usage Justification

The IP3 utilize low gain antennas at the front of the unit. The normal operation keeps the operator as well as nearby persons greater than the 20-cm spacing to comply with the RF exposure requirements.

Calculations show compliance for RF exposure levels during normal operation for scanning. The user initiates transmitter operation when scanning items. During normal operation the operator intent is to interrogate scanner tags on items or enter data on the keyboard. Normal operation directs the radio antenna away from the user and nearby persons. Making the operator aware of the potential for exposure the warning statement below will be included with each RFID scanner.

WARNING: per the FCC and Canada RF (radio frequency) exposure requirements,
(1) Only the antenna supplied and installed with this unit by Intermec Technologies is to be used with this scanner. The product is configured to ensure compliance to RF exposure requirements.
(2) The user shall not touch the scanner front (antenna) during operation. Proper use of the scanner should direct the antenna toward items to be scanned. A 20-cm (8-inch) passing distance must be maintained from any body part of the user or near by persons and the scanner antenna.
(3) RF safety requirements mandate this device cannot be co-located with other transmitters.

8.0 EQUIPMENT LIST

EQUIPMENT	MFG/MODEL	SERIAL NO.	CAL. DATE	CYCLE
Antenna, dipole	EMCO 3121C	9812-1414	03/03	24 Mo
Antenna, biconical	EMCO 3110B	1787	09/02	12 Mo
Antenna, log periodic	EMCO 3146	1262	09/02	12 Mo
Antenna, biconical	EMCO 3110B	1185	09/02	12 Mo
Antenna, log periodic	EMCO 3146	3277	09/02	12 Mo
Antenna, DRG Horn	EMCO 3115	4143	06/03	12 Mo
Attenuator	HP 8491-20 dB	36824	05/03	12 Mo.
High Pass Filter	Cir-Q-Tel R9H-1G5/10G-28A	01	05/03	12 Mo.
Power Supply	HP6200A	N/A	On Req.	
Preamplifier	HP 8449B	3008A00439	05/03	24 Mo.
EMI Test Receiver	Rohde & Schwarz, ESI-40	1088.7490.40	06/03	12 Mo
Signal Generator	HP 83630A	3250A00322	03/03	24 Mo.
Voltmeter	Fluke 77	007-2153	06/02	16 Mo.
Test Automation SW	Rohde & Schwarz, ES-K1 V1.6	2492	12/99	N/A

On Req. = On Request N/A = Not Available