

Intermec Technologies Corporation

EMC Test Laboratory

DOC. NO.: 577-501-130

915 PC Card Radio Module, IP3, PCII, FCC 15.247, Canada RSS-210, RSS-102

APPENDIX D, RF Exposure MPE Calculation, EIRP

REPORT NO: 030611-1

DATE: June 11, 2003

Page 1 of 5

FCC ID: EHARFID915PCC-6

MEASUREMENT/TECHNICAL REPORT


Technologies Corporation
EMC Test Laboratory
Cedar Rapids, IA

Intermec Technologies Corporation
RF Identification (RFID) 915 PC Card –6
915 MHz Spread Spectrum Transmitter

REPORT NO: 030611-1

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Appendix D

RF EXPOSURE AND MEASURED EIRP

Page 2-3

Maximum Permissive Exposure

Page 4-5

EIRP (Effective Isotropic Radiated Power)

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.

MAXIMUM PERMISSIVE EXPOSURE, MPE CALCULATOR

915 RFID with 0 dBi antenna, Intermec PN 805-616-001

MPE Calculator dBi **0.00**
dBd + 2.17 = dBi
 TX Frequency (MHz) **915** Watts **1** dBi to dBd 2.17
Antenna Gain dBd **-2.17**

Cable Losses dB **0** dBm 30.000000

Calculated ERP (mW) 606.736330 radiated (ERP) dBm 27.830
 Calculated EIRP (mW) 1000.000000 radiated (EIRP) dBm 30.000

Occupational Limit
3.05 mW/cm²

General Public Limit
0.61 mW/cm²

$$\frac{\text{EIRP}}{4 \pi d^2} = \text{mW/cm}^2$$

d = cm EIRP=mW

TX Frequency (MHz)	
wavelength	
meters	cm
0.327868852	32.787

FCC radiofrequency radiation exposure limits 1.1310			
Freq. MHz	occ.limit		public limit
300-1,500	f/300		f/1500
1,500-10,000	5		1

MPE uses EIRP for calculations. EIRP is based on TX power added to the antenna gain in dBi.
 dBi = dB gain compared to an isotropic radiator

*

EIRP (watts)	Distance (cm)	Distance (Meters)	Distance (inches)	mW/cm ²
1000	100.00	1.0000	39.37	0.00796
1000	75.00	0.7500	29.53	0.01415
1000	50.00	0.5000	19.69	0.03183
1000	40.00	0.4000	15.75	0.04974
1000	35.00	0.3500	13.78	0.06496
1000	30.00	0.3000	11.81	0.08842
1000	25.00	0.2500	9.84	0.12732
1000	22.50	0.2250	8.86	0.15719
1000	20.00	0.2000	7.87	0.19894
1000	17.50	0.1750	6.89	0.25984
1000	15.00	0.1500	5.91	0.35368
1000	14.75	0.1475	5.81	0.36577
1000	14.50	0.1450	5.71	0.37849
1000	14.25	0.1425	5.61	0.39189
1000	14.00	0.1400	5.51	0.40601
1000	13.75	0.1375	5.41	0.42091
1000	13.50	0.1350	5.31	0.43664
1000	13.25	0.1325	5.22	0.45327
1000	13.00	0.1300	5.12	0.47087
1000	12.75	0.1275	5.02	0.48952
1000	12.50	0.1250	4.92	0.50930
1000	12.25	0.1225	4.82	0.53030
1000	12.00	0.1200	4.72	0.55262
1000	11.75	0.1175	4.63	0.57639
1000	11.50	0.1150	4.53	0.60172
1000	11.25	0.1125	4.43	0.62876
1000	11.00	0.1100	4.33	0.65767

TRANSMITTER EFFECTIVE ISOTROPIC RADIATED POWER (EIRP)

FCC ID: EHARFID915PCC-6

Intermec Technologies Corporation

Product: Intermec IP3 RFID Scanner for Intermec 700

EMC Test Laboratory

Set Up: Radio remote antenna from handle on PCMCIA/serial adapter

Cedar Rapids, IA

Test Date (mm/dd/yy): 09/22/03

Standard: ANSI/EIA 603

Measurement System Calibration Date: 06/20/03

Span 100 MHz, Res. B.W. 5 MHz, Video B.W. 5 MHz

Frequency (MHz)	Antenna Polarity	Spurious Measured dB(uV)	Spur Meas. (dBm)	Generator 0 dBm Ref. Level	Calculated Generator Substitution (dBm)	Antenna Comp (dB)	Cable Comp (dB)	Generator Reference at Antenna (dBm)	Spec Limit (dBm)	Margin (dB)
a	b	c	d	e	f	g	h	i	j	k
(formula)			(=c-107)		(=d-e)			(=f+g-h)		(=i-j)
Low Channel 07										
902.625	Vert	92.23	-14.77	-36.70	21.93	1.20	2.10	21.03	36	-15.0
(Fc)	Hor	96.76	-10.24	-35.40	25.16	1.20	2.10	24.26	36	-11.7
Middle Channel 40										
915.00	Vert	99.85	-7.15	-37.10	29.95	1.20	2.10	29.05	36	-7.0
(Fc)	Hor	99.56	-7.44	-35.70	28.26	1.20	2.10	27.36	36	-8.6
High Channel 73										
927.375	Vert	96.28	-10.7	-31.50	20.78	1.10	2.20	19.68	36	-16.3
(Fc)	Hor	97.57	-9.4	-31.40	21.97	1.10	2.20	20.87	36	-15.1

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