MEASUREMENT/TECHNICAL REPORT

Technologies Corporation
EMC Test Laboratory
Cedar Rapids, IA

Intermec Technologies Corporation

IM5 Intermec RFID Radio
FCC ID: EHARFID915IM5
IC: 1223A-RFIDIM5

DOC. NO.: 577-501-360
REPORT NO: 060829-1

REPORT NO: 060829-1

DATE: August 29, 2006

This report concerns: Original Grant _____ Class II Change ____X____
This report concerns: Class II Permissive Change to add antennas to this FHSS radio certified under FCC 15.247 and Canada RSS-210. All antennas similar in construction compared to currently approved antennas. The highest gain antenna is tested for radiated spurious emissions. Include a listing of the descriptions, gain and RF exposure compliance statement.
Request issue of the grant immediately upon completion of review.
Measurement procedure used: ANSI C63.4-2003 and as described within this test report.

Report Prepared by:	Report Prepared For:
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SECTION NUMBER

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(-XXX), Par.	TEST NAME
15.33, 15.35	(-GEN), 4.2, 4.7	Range of Meas., Meas. Detectors
15.15, 15.31	(-GEN), 4.1, (-212)	General Requirements, Meas. Methods
15.203, 15.204	(-GEN), 7.1.4	Antenna Description(s)
2.925, 15.19	(-GEN), 5.2	Labeling
15.21	(-GEN), 7.1.4, 7.1.5	Information to the User
15.247, 15.209	(-GEN), 7.2, (-210), Annex 8	Transmitter Characteristics
1.1307 (b)(1)	(-GEN), 5.5, (-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.

NVLAP®

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 accreditations addressed in this report is limited to NVLAP codes:

[12/FCC15b] ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B
Unintentional Radiators
[12/FCC15c] ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart C
Intentional Radiators
[12/T51a] AS/NZS CISPR 22 (2004)
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
[12/RSS210] RSS-210, Issue 5 (2004)
Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)
[12/RSS210a] RSS-210, Issue 5, Amendments A1 (2001), A2 (2003), A3 (2004), and A4 (2004)

EMC 017

Technology International (Europe) Ltd.

Dave Fry — Date 09/08/06
NCE, EMC Engineer III — mm/dd/yy

Signature — Date 09/08/06
mm/dd/yy

JERRY JOHNSON, RFID Eng Manager
Print Name and Title

CERTIFIED NARTE ENGINEER

National Association of Radio and Telecommunications Engineers

1.1 Measurement Uncertainties:

		UKAS LAB 34		CISPR 16-4	
Radiated Emissions On 3 Meter Open Area Test Site					
30-200 MHz	has an Expanded Measurement Uncertainty of	+ 4.26	-4.10 dB	+ 4.14	-3.98 dB
200-1000 MHz	has an Expanded Measurement Uncertainty of	+ 4.41	-4.26 dB	+ 4.30	-4.14 dB
1-5 GHz without pre-amp	has an Expanded Measurement Uncertainty of	+ 3.76	-3.74 dB	+ 3.62	-3.61 dB
5-13 GHz	has an Expanded Measurement Uncertainty of	+ 3.81	-3.81 dB	+ 3.68	-3.67 dB
12.4-18 GHz	has an Expanded Measurement Uncertainty of	+ 3.80	-3.79 dB	+ 3.66	-3.65 dB
18-26.5 GHz	has an Expanded Measurement Uncertainty of	+ 3.94	-3.95 dB	+ 3.81	-3.82 dB
26.5-40 GHz	has an Expanded Measurement Uncertainty of	+ 4.22	-4.29 dB	+ 4.09	-4.17 dB
Radio TA 1-13 GHz	has an Expanded Measurement Uncertainty of	+ 3.81	-3.81 dB	+ 3.68	-3.67 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
1-13 GHz	has an Expanded Measurement Uncertainty of	+ 2.76	-2.81 dB

Generator Substitution Radiated Measurements Using The 1 Meter Open Area Test Site			
1-13 GHz	has an Expanded Measurement Uncertainty of	+ 4.40	-2.83 dB

Receiver and Transmitter Conducted, Generator Substitution Measurements with HP83630A RF Generator and ESI 40 Receiver / Spectrum Analyzer			
50-5000 MHz	has an Expanded Measurement Uncertainty of	+ 1.22	-1.22 dB
5-18 GHz	has an Expanded Measurement Uncertainty of	+ 1.29	-1.29 dB
18-26.5 GHz	has an Expanded Measurement Uncertainty of	+ 1.29	-1.29 dB
26.5-40 GHz	has an Expanded Measurement Uncertainty of	+ 1.80	-1.87 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	+ 1.11	-1.11 dB
5-18 GHz	has an Expanded Measurement Uncertainty of	+ 1.18	-1.18 dB
18-26.5 GHz	has an Expanded Measurement Uncertainty of	+ 1.28	-1.28 dB
26.5-40 GHz	has an Expanded Measurement Uncertainty of	+ 1.87	-1.87 dB

Receiver Frequency Accuracy

20 Hz - 40 GHz has an Expanded Measurement Uncertainty of +/-2.5x10^-7 Hz/yr.

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%.

1.2 Test Summary

The following is the summary of testing for this product. Each test that was performed and the status of compliance are listed.

Test Specification	Classification	Test Results
Antenna Descriptions:		
FCC Part 15.203, 15.204 Canada RSS-GEN, 7.1.4, RSS-210 Annex 8.4(1)	_	Pass
Radiated Emissions:		
FCC Part 15.247 a, c, 15.209 Canada RSS-GEN 4.7 RSS-210 Annex 8.5	_	Pass
RF Safety, Exposure Limits:		
FCC Part 1.1307 (b)(1) Canada RSS-GEN, 5.5, RSS-102	_	Pass

2.0 GENERAL INFORMATION

2.1 Product Description

The RFID 915 MHz PC Card continues to operate as a FHSS transmitter operating within the 902-928 MHz band. The reader is used in industrial, warehouse and commercial locations to track products through the manufacturing and supply chain.

This report addresses the addition of nine antennas to support RFID label printing and industrial installations. The new antennas contain the unique antenna connector currently approved to meet the requirements in 15.203.

The final product is for globally marketing, where the 915 MHz transmitter is allowed, therefore must comply with the CISPR 22 (EN55022) digital emissions. The Intermec, Cedar Rapids, EMC Test Lab has perform testing for compliance for digital emissions to the CISPR 22 limits and issue separate reports addressing the integration in Intermec products. Based on these tests and reports the Declaration of Conformity or verification is used for United States marketing. Canada will accept a self-declaration for compliance to ICES-003.

2.2 Related Submittal(s)/Grants(s)

Intermec Technologies IM5 Grant FCC ID: EHARFID915IM5, Date: Dec. 2, 2004
Intermec Technologies IM5 Class 2 Permissive Change, Date: Dec. 12, 2005

2.3 Tested Systems Details Items tested:

Model Number (Serial Number)	ID:	Description	Cable Description
IM5 MFD Jan 2006 PN 715-418-001 PCB SN 35310509017	FCC ID: EHARFID915IM5 IC: 1223A-RFIDIM5	902.5 – 927.5 MHz FHSS RFID Transceiver	Unshielded DC cable, standard shielded RS232
MagTech SPU24-104 SN 01290943	DOC	DC Power Supply	Unshielded detachable AC 2m cable, unshielded DC 2m cable

Antenna tested for this report.

Intermec PN	MFG	Model	Const	Circular or Linear	Linear Gain (dBi)	Cable Loss (dB)
805-654-001	Huber Suhner	SPA 915/60/10/0/RCP_C	Panel	CP	7	2.0

Antennas to be added for use with the IM5 radio.

Intermec PN	MFG	Model	Const	Circular or Linear	Linear Gain (dBi)	Cable Loss (dB)
805-644-001	Huber Suhner	SPA 915/63/9/0/RCP_C	Panel	CP	5.5	2.0
805-644-002	Huber Suhner	SPA 915/63/9/0/LCP_C	Panel	CP	5.5	2.0
805-654-001	Huber Suhner	SPA 915/60/10/0/RCP_C	Panel	CP	7	2.0
805-654-002	Huber Suhner	SPA 915/60/10/0/LCP_C	Panel	CP	7	2.0
	Mobile Mark	BP6-915LCP	Patch	CP	2.5	2.0
	Mobile Mark	EDN#241	Patch	LP	3	2.0
805-816-002	Cushcraft	SP9026C _Spec?	Patch	CP	3	2.0
	Mobile Mark	DLM3-915RS	Patch	LP	3	2.0
1-971040-001	Intermec	PM4i Coupler	Patch	LP	-34	N/A

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; 4.1 Instrumentation, 4.2 Measurement Bandwidths, 5.3 Test Method, 5.17, Digital Circuits Emissions, 5.18 Modular Construction, 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) and RSS-GEN 4.1 (g), 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 IM5 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 01, 25, or 50. The transmitter test sends pseudo-

random data continuously or CW on the selected channel. The radio operates at a single data rate so the test data enclosed represents the worst case operating mode.

Channel 01 transmit = 902.5 MHz
Channel 25 transmit = 915.000 MHz
Channel 50 transmit = 927.5 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 C63.4-2003 is referenced during radiated and AC wireline conducted emissions testing. Details on measurement equipment, set-up, test details, and calculations are presented within the specific test section. RSS-212 allows the use of this standard.

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 above 1 GHz are tested at three-meter measurement distance with a preamplifier to improve the measurement sensitivity. All measurements above 1 GHz use a 1 MHz bandwidth. Both Peak and Average measurements are made using the ESI-40 receiver.

Refer to the diagrams and test setup figures in section 8.0 for details.

2.5 TEST FACILITY:

The location of the open area test site and conducted measurement facility used to collect the test data is 90 West Cemetery Road, Fairfax, Iowa 52228. The laboratory is NVLAP accredited with a scope covering the required measurements and deemed competent to test and submit test data for equipment subject to verification, Declaration of Conformity, and certification under FCC Section 2.948(d).

The test site is listed with Industry Canada for the performance of radiated and AC wireline conducted emissions measurements and is reference by the file number IC 3909.

Test site also complies with CISPR Publication 22 for methods of measurements for radiated and conducted emissions testing.

3.0 PHOTOGRAPHS

3.1 External pictures appendix A, 060829A1.xxx

3.2 Internal pictures remain as certified.

3.3 Test setup pictures appendix D, 060829D1.xxx

4.0 PRODUCT LABELING AND INFORMATION TO THE USER

4.1 Product labeling is remains as certified.

4.2 Information to the user is unchanged; RF safety distance is still 23 cm, appendix E, 060829E1.xxx

5.0 BLOCK DIAGRAM

Remains as Certified.

6.0 OPERATION DESCRIPTION

Remains as Certified.

7.0 SCHEMATICS

Remains as Certified.

8.0 CONDUCTED AND RADIATED EMISSIONS TEST DATA

The following tests and results are recorded within this section.

Antenna Descriptions, Gain, Connector, Cables

RF Safety, Exposure Limits; supporting appendix B, 060829B1.XXX

Out of Band Emissions, Transmitter Radiated; supporting appendix C, 060829C1.XXX

EQUIPMENT: IM5

NAME OF TEST: Antenna Description

FCC RULE NUMBER: 15.203, 15.204
CANADA RSS-GEN Par.: 7.4
CANADA RSS-210 Par.: Annex 8

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: Sept, 8, 2006

SET UP: Not applicable

TEST RESULTS:
The antennas for the IM5 radio interface using a reverse sex SMA connector. The cables to the antennas are provided from Intermec with these unique connectors. All antenna cables have a minimum loss of 2.2 dB and none are sold to be terminated in the field at a shorter length.

Antennas sold for the IM5 will only be offered through Intermec Technologies and Intermec approved resellers; the antennas have either a reverse sex N or reverse sex SMA connector.

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 IM5 radio.

The highest antenna gain Intermec Technologies is offering for sale is + 6.0 dBi. The transmitter peak power is +30.0 dBm. Adding the antenna gain to the transmitter power totals +36.0 dBm. This total is at the maximum ERP of +36 dBm allowed under FCC or Industry Canada rules.

Antenna Descriptions: IM5

CIRCULAR POLARIZED TO LINEAR POLARIZED GAIN CONVERSION

Measuring the complex plane-wave field along the real axis of vertical or horizontal, we realize a polarization isolation of p=|1/2^1/2(x+jy)*y|^2=0.5 or -3 dB where x and y are orthogonal components in the complex plane-wave field. In addition, the attenuation of the RF antenna cable reduces the effective antenna gain. Thus, the effective antenna gains are:

Intermec PN	Manufacturer	Model No.	Type	Pattern	Linear dBi Gain antenna cable system
805-644-001,	Huber Suhner,	SPA 915/63/9/0/RCP_C,	Panel,	CP,	3.5,
Cable Loss 2 dB, N(RP) connector, physical size 12" x 12" x 1"					
805-644-002,	Huber Suhner,	SPA 915/63/9/0/LCP_C,	Panel,	CP,	3.5,
Cable Loss 2 dB, connector N(RP) connector, physical size 12" x 12" x 1"					
805-654-001,	Huber Suhner,	SPA 915/60/10/0/RCP_C,	Panel,	CP,	5
Cable Loss 2 dB, N(RP) connector, physical size, 14.5" x 14.5" x 1"					
805-654-002,	Huber Suhner,	SPA 915/60/10/0/LCP_C,	Panel,	CP,	5
Cable Loss 2 dB, N(RP) connector, physical size 14.5" x 14.5" x 1"					
Not Assigned	Mobile Mark,	BP6-915LCP,	Patch,	CP,	0.5
Cable Loss 2 dB, SMA(RP) connector, physical size 5.75" x 5.75" x 0.7"					
Not Assigned	Mobile Mark,	EDN#241,	Patch,	LP,	1
Cable Loss 2 dB, SMA(RP) connector, physical size 3.5" x 3.5" x 0.9"					
805-816-002,	Cushcraft,	SP9026C _Spec?,	Patch,	CP,	1
Cable Loss 2 dB, N(RP) connector, physical size 7" x 7" x 2"					
Not Assigned	Mobile Mark,	DLM3-915RS,	Patch,	LP,	1
Cable Loss 2 dB, SMA(RP) connector, physical size 4.52" dia. x 1"					
1-971040-001	Intermec	PM4i RFID Printer Coupler	Patch	LP	-34
Cable Loss included, MMCX connector, physical size 2.325” x 0.75” x 0.063					

CP = Circular Polarized
LP = Linear Polarized
N = N connector
SMA = SMA connector
(RP) = Reverse Polarity connector sex

EQUIPMENT: IM5

NAME OF TEST: RF Exposure Safety

FCC RULE NUMBER: **§ 15.247 (i) Rules reference to RF exposure guidelines**
§ 1.1310(b)(1) 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 Ex-Posed 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: Summarized within the rules sections above.

PERFORMED BY: Dave Fry Date: September 8, 2006

CALCULATION DATA: Observe the appendix B, 060829B1.xxx, that shows the transmitter RF exposure calculations.

WARNING STATEMENTS TO THE USER:

FCC and Industry Canada regulations limit exposure to radio frequency (RF) radiation. To comply with the se regulations, operators of this device must maintain a distance of at least 23 cm. (9 inches) from the cover on the antenna assembly (The cover on the antenna is the dome shaped surface). While the device is on , the operator's body and parts of the body such as eyes, hands, or head, must be 23 cm. (9 inches) or farther from the cover of the antenna assembly.

EQUIPMENT: IM5

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 in band spectral density, or shall not exceed the levels specified in Table 3, whichever is less stringent. **Note:** For frequency hopping systems, the in band 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 one meter and an amplifier between the horn antenna and spectrum analyzer, measure emissions from 1 – 24.84 GHz. Refer to section 2.4, Test Methodology, for more details on testing above 1000 MHz.

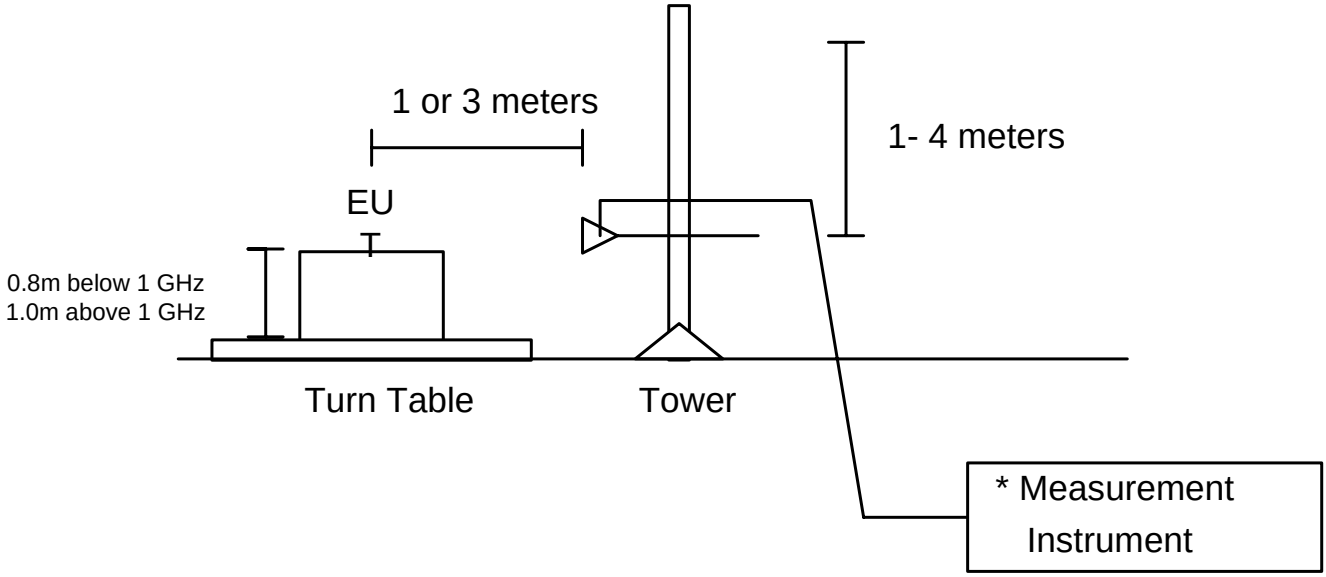
TEST EQUIPMENT:	Antenna, bi-conical	EMCO 3110
	Antenna, log periodic	EMCO 3146
	Antenna, DRG horn	EMCO 3115
	Antenna, Std G horn	EMCO 3160-08
	Antenna, Std G horn	EMCO 3160-09
	Attenuator	HP 8491-20 dB
	Receiver	Rohde & Schwarz ESI-40
	Microwave amplifier	HP 8449B
	High Pass Filter	Cir-Q-Tel R9H-1G5/10G-28A
	High Pass Filter	K&L 13SH01-3000/T24000

PERFORMED BY: Dave Fry Date: Aug. 29, 2006

SET UP: Transmitter Radiated Spurious Emissions

Open area test site at the Intermec EMC Test Facility
Three-meter test range 30 MHz - 10 GHz.
Above 1 GHz the product was raised to 1-meter height to better align the horn antenna to potential emissions from the radio module.

Review the following diagrams for setup details. Refer to the photographs in appendix D, 060829D1.xxx, for radio placement.



* 30-1000 MHz, Rohde & Schwarz ESI-40 receiver or
1-10 GHz, R&S ESI-40 with preamplifier and high-pass filter

TEST RESULTS: Transmitter radiated emissions conform.

The data appendix C shows the measured emissions for a 100% transmit duty cycle. The data shows all emissions compared to the limits outlined in 15.209 for restricted bands. The data summary below highlights the highest emissions.

To show modular compliance the antenna data presented shows the radio removed from the case and placed horizontally. (See setup photographs in appendix D.)

MEASUREMENT DATA: The appendix C, 060829C1.xxx, file attachment 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

9.0 EQUIPMENT LIST

EQUIPMENT	MFG/MODEL	SERIAL NO.	DATE	CYCLE
230 Supply	Elgar 1203EL/4	N/A	03/95	On Req.
Antenna, dipole	EMCO 3121C	9812-1414	04/05	24 Mo
Antenna, biconical	EMCO 3110B	1787	09/05	12 Mo
Antenna, log periodic	EMCO 3146	1262	09/05	12 Mo
Antenna, biconical	EMCO 3110B	1185	09/05	12 Mo
Antenna, log periodic	EMCO 3146	3277	09/05	12 Mo
Antenna, DRG Horn	EMCO 3115, 1-18G	4143	08/05	12 Mo
Antenna, Std G Horn	EMCO 3160-08, 12.4-18G	31562	03/04	Not Req.
Antenna, Std G Horn	EMCO 3160-09, 18-26.5G	34731	09/04	Not Req.
Antenna, Std G Horn	EMCO 3160-10, 26-40G	31562	12/04	Not Req.
LISN	Rhode & Schwarz, ESH3-Z5	832479/018	12/06	12 Mo
LISN	EMCO 3825/2R	1026	03/06	12 Mo
TLISN	Fischer FCC-TLISN-T2-02	20211	04/06	12 Mo.
TLISN	Fischer FCC-TLISN-T4-02	20141	05/06	12 Mo.
Cap Voltage Probe	Fischer F-CVP-1	34	04/06	12 Mo.
Current Probe	Fischer F-33-4	10	05/06	12 Mo.
Common Mode ISN	Fischer F-CMISN	01004	05/06	12 Mo.
Preamplifier	HP 8449B	3008A00439	05/05	24 Mo
EMI Test Receiver	Rohde & Schwarz, ESI-40	100047	08/06	12 Mo
Test Automation SW	R&S, ES-K1 V1.6	2492	10/05	On Req.

On Req. = On Request
Not Req. = Not Required