MEASUREMENT/TECHNICAL REPORT

Intermec
Technologies Corporation
EMC Test Laboratory
Cedar Rapids, IA

Intermec Technologies Corporation

IF6 RFID Transmitter
FCC ID: EHARFID915PCC-6 (IC: 1223A-RFIDPCC6)

REPORT NO: 041116-1

DOC. NO.: 577-501-207
REPORT NO: 041116-1

DATE: November 16, 2004

This report concerns: Original Grant _____ Class II Permissive Change ___X___	
Equipment Type: 902-928 MHz Frequency Hopping Spread Spectrum Transceiver Request to add antenna for use under regulatory rules; FCC 15.247 Industry Canada RSS-210 Issue 5, RSS-102 Issue 1	
Request issue of the grant immediately upon completion of review.	
Measurement procedure used: ANSI C63.4-2001 and as described within this test report.	
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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
15.207, 15.107	6.6, 7.4/3.2	AC Line Conducted Emissions, TX, RX
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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Accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program.

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EMC Test Laboratory
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Cedar Rapids, Iowa 52401

The scope of accreditations addressed in this report is limited to NVLAP codes:

[12/FCC15b] ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators

[12/FCC15c] ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart C: Intentional Radiators

[12/T51] AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997) Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

*[12/RSS210]*RSS-210, Issue 5 (November 2001)Low Power Licence-Exempt Radiocommunication Devices

[12/RSS210a] RSS-210, Issue 5, Amendment 2 (April 26, 2003)

EMC 017

Interference Technology International

Dave Fry
NCE, EMC Engineer III

Date 1/25/05 mm/dd/yy

Signature

Date 1/26/05 mm/dd/yy

Terry Johnson, Engineering Manager
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

Radiated Emissions on 1 Meter Open Area Test Site

18-26.5 GHz	has an Expanded Measurement Uncertainty of + 4.32 -2.64 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 Class II Permissive Change to add an antenna to the IM3, spread spectrum radio module operating as a frequency hopper in the 902-928 MHz radio band

The IM3 915 MHz RFID is a radio used for communicating to RF Identification (RFID) tags operating in the same frequency band. The integration of the IM3 radio within a rugged antenna creates the IF6 RFID reader. The IF6 is a mobile RFID reader that is designed for mounting at dock doors or on product conveyor lines to interrogate RFID tags within a warehouse, store or industrial environment. The tags allow tracking and inventory of packages, laundry and pallets using RF energy to turn on, interrogate and write to the RF tags.

The IM3 radio continues to be manufactured by Intermec Technologies Corporation.

This report shows the IF6 antenna continues to comply with the FCC and Canadian requirements.

The Intermec IF6 RFID antenna-reader may be connected to a Power Over Ethernet (POE) AC source so AC conducted emissions testing are also presented.

The IF6 is intended for global marketing therefore must comply with CISPR 22 (EN55022) digital emissions. The Intermec, Cedar Rapids, EMC Test Lab will perform testing for compliance for digital emissions to the CISPR 22 Class A limits and issue separate reports. Based on these tests and reports the verification of compliance rules 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 production model. The antennas listed herein are also production versions.

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)	Regulatory Identity:	Description	Cable Description
Intermec IF6-915 PN: LC444-24265-019 SN: 309M0400019	Class A Verified, Contains TX FCC ID: EHARFID915PCC–6 Canada IC: 1223A-RFIDPCC6	RFID antenna with integrated 915 MHz frequency hopping spread spectrum transmitter	TX module integrated within the IF6 antenna. No TX antenna cables are external. Ethernet and Intermec custom power - I/O port cable attached
Intermec POE Power Supply PN/MN: 071620-002 SN: IO4446046012330A05	-	Intermec MobileLAN™ "Power Bridge"	detachable AC cord, unshielded Ethernet cable
Remote controller to operate 915 PC-Card, IF6 antenna:			
Intermec CV60 Vehicle Computer CN: CV60A20AB4001804 SN: 08900401036	FCC DOC, Contains TX FCC ID: HN2802MIG2 and EHABTM210 Canada IC: 1223A-802MIG2 and 1223A-BTM210	Host computer	Remote from IF6 via Ethernet to operate 915 MHz RFID radio.
Intermec Power Supply PN: N.A. MN: Skynet SNP-PA57 SN: 035228454	-	universal supply 12VDC 4.2A	detachable shielded AC cord, shielded DC cable

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, 2001 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 9.28 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 G and test setup figures in section 8 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 accredited with a scope covering the required measurements and was 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 was also submitted to Industry Canada for the performance of radiated 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. 041116A1.xxx

3.2 Internal pictures appendix C. 041116C1.xxx

3.3 Test setup pictures appendix E. 041116E1.xxx

4.0 PRODUCT LABELING AND INFORMATION TO THE USER

4.1 PRODUCT LABELING

The IM3 radio module remains as labeled. The exterior label and placement for the IF6 final assembly is shown in Appendix B (041116B1.xxx).

4.2 INFORMATION TO THE USER

The appendix F shows the compliance insert for the IF6 (041116F1.xxx). This document insert is shipped with each product.

5.0 BLOCK DIAGRAM

Block diagram for the transmitter remains as originally filed.

6.0 THEORIES OF OPERATION

Theory of operation for the transmitter remains as originally filed.

7.0 SCHEMATICS

Schematics for each radio layout remains as originally filed.

8.0 EMISSIONS TEST DATA

The following tests and results are recorded within this section.

Antenna Description

RF Safety, Exposure Limits

AC Wireline Conducted Emissions

Out of Band Emissions, Transmitter Radiated

EQUIPMENT: IF6

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: January 21, 2005

SET UP: Not applicable

TEST RESULTS:
The IF6 antenna does not have external connectors; the IM3 transmitter is enclosed within the IF6 product. The IM3 remains as originally filed with the MMCX miniature connector.

The IF6 antenna is supplied by Kathrien and has a measured gain of 4.33 dBi. The antenna gain is lower than the +6 dBi limit for antenna again allowed according the rules. The measured gain is shown on the following page. The conducted power from the IM3 radio is +30 dBm. The measured EIRP is +34.33 dBm.

EIRP dBm (measured) – TX dBm (conducted power) = Gain (dBi)

34.33 dBm - 30 dBm = 4.33 dBi

TRANSMITTER EFFECTIVE ISOTROPIC RADIATED POWER (EIRP)

Product: Intermec IF6, IV6 (Connecticut)
Set Up: Radio within Kathrien antenna housing.
Test Date (mm/dd/yy): 12/01/04
Measurement System Calibration Date: 4/17/04
Peak Power Measured In 1 MHz BW with ESI Receiver

Intermec Technologies Corporation
EMC Test Laboratory
Cedar Rapids, IA
Standard: FCC 15.247

Frequency (MHz)	Antenna Polarity	Spurious Measured dB(uV)	Spur Meas. (dBm)	Generator 0 dBm Ref. Level	Caculated 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)		(=l-j)
Low Channel 07	**902.625**	**MHz**								
902.625	Vert	103.83	-3.17	-35.35	32.18	1.90	1.90	32.18	36.00	-3.82
(Fc)	Hor	103.25	-3.75	-33.79	30.04	1.90	1.90	30.04	36.00	-5.96
Middle Channel 40	**915.00**	**MHz**								
915.00	Vert	104.25	-2.75	-35.56	32.81	1.81	1.92	32.92	36.00	-3.08
(Fc)	Hor	105.11	-1.89	-34.15	32.26	1.81	1.92	32.37	36.00	-3.63
High Channel 73	**927.375**	**MHz**								
927.375	Vert	105.10	-1.90	-35.78	33.88	1.72	1.93	34.09	36.00	-1.91
(Fc)	Hor	106.60	-0.40	-34.52	34.12	1.72	1.93	34.33	36.00	-1.67

EQUIPMENT: IF6

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.

Per FCC TCB Training April 3, 2002, Devices operating in multiple frequency bands.

When RF exposure evaluation is required for TCB approval

Separate antennas - estimated minimum separation distances may be considered for the frequency bands that do not require evaluation or TCB approval, however, the estimated distance should take into account the effect of co-located transmitters. (Note 24)\

Note 24 According to multiple frequency exposure criteria, the ratio of field strength or power density to the applicable exposure limit at the exposure location should be determined for each transmitter and the sum of these ratios must not exceed 1.0 for the location to be compliant."

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).

2.11 (b) Where the electromagnetic radiation consists of a number of frequencies in the same or different frequency bands shown in Column 1 of Table 1, then the ratio of the measured value at each frequency to the limit at that given frequency shown in Column 2, 3, or 4 shall be determined

and the sum of all ratios thus obtained for all frequencies shall not exceed unity when averaged spatially and over time. For field strength measurements, the measured values and the limits shall be squared before determining the ratios. The limit, as applied to multiple frequencies, can be expressed as:

$$\sum_{f\ =\ 3\ kHz}^{300\ GHz} R_f \le 1 ,$$

where f is the frequency for which measurements were taken and,
where the electric or magnetic field strength is measured,

$$R_f = \left(\frac{Measured\ Value\ of\ Field\ Strength\ at\ f}{Exposure\ Limit\ of\ Field\ Strength\ at\ f} \right)^2 ,$$

or where the power density is measured,

$$R_f = \frac{Measured\ Value\ of\ Power\ Density\ at\ f}{Exposure\ Limit\ of\ Power\ Density\ at\ f} ,$$

MINIMUM STANDARD: 915 MHz and 2450 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 and mobile transmitters operating above 1.5 GHz with less than 5 watts EIRP.

PERFORMED BY: Dave Fry Date: January 21, 2004

USER INFORMATION: Observe the appendix F (041116F1.xxx) that shows the warning information delivered with each RFID scanner.

MPE DATA: Observe the appendix D (041116D1.xxx) that shows the transmitter RF exposure calculations. The transmitter is exempt from routine environmental evaluation per FCC rules.

Canada RSS-102 does require an evaluation of exposure. The primary transmitter operates at a power of 2.75 watts EIRP.

The table below shows the calculations of each radio and the frequency band of operation. The ratio of the limit for each frequency band is summed as described in the specifications defined above.

Transmitter FCC ID: Antenna Description	Antenna Type	Antenna Part No.	Transmit Freq. (MHz)	Peak Conducted Power (mW)	Gain (dBi)	Pwr Density @ 20cm mW/cm^2	Pwr Density Limit mW/cm^2
FCC ID: EHARFID915 PCC-6 RFID panel	panel	NA	915	1000.0	4.4	0.5479	0.61

Mobile Transmitter Usage Justification

The IF6 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 RFID tag read/write operations. The RFID transmitter operates when scanning items, the operation of the transmitter can be limited by proximity sensors at entry ways or on the product conveyor line. Making the installer aware of the potential for exposure the warning statement below will be included with each IF6 RFID reader.

WARNING: per the FCC and Canada RF (radio frequency) exposure requirements,
(1) The IF6 antennas must be installed as recommended by Intermec Technologies to ensure compliance to RF exposure requirements. Correct antenna mounting is fully described within the Intermec IF6 Users Guide.
(2) When installing and using Intermec Technologies the IF6 RFID tag interrogator, a 20-cm (8-inch) passing distance must be maintained from any body part of the user or near by persons and the antenna. The antenna must not be touched during transmitter operation.
(3) RF safety requirements mandate this device cannot be co-located with other transmitters.

WARNING: Canada procedures defined in RSS-210
"The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb"

EQUIPMENT: IF6

NAME OF TEST: TX, RX AC Wireline Conducted Emissions

FCC RULE NUMBER: 15.209 (a)
CANADA RSS-210 Par: 6.6-7.4

MINIMUM STANDARD: FCC Rules § 15.207 Conducted limits.
(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases with the logarithm of the frequency.

Canada RSS-210 6.6, 7.4 This is a measurement of the extent of unwanted emissions conducted back into the AC electrical network by LPDs. Note that this test is only for unwanted emissions and not the wanted conducted emissions of AC Carrier Current devices described in section 8.3. This test applies when the device has any one or more of the following characteristics:
(i) The carrier frequency is within 0.45-30 MHz; (ii) The equipment power supply contains switching circuitry (any frequency); (iii) Internal clock or local oscillator frequency is within 0.45-30 MHz.

To claim test exemption, the engineering brief or test report shall contain a statement that the conditions of test exemption are met. More information on this is in section 9. The test on the transmitter may be combined with the test of section 7.4 on the receiver.

(a) On any frequency or frequencies within the band of 0.45-30 MHz, the measured RF voltage (CISPR meter) shall not exceed 250 microvolts (across 50 ohms).
(b) Transmitters marketed for use only in a commercial, industrial or business environment and not intended for use in homes are permitted a limit of 1000 microvolts (0.45 - 1.705 MHz) and 3000 microvolts (1.705 - 30 MHz).

TEST PROCEDURE: As referenced in ANSI C63.4-2001, place the EUT on a wooden table inside a shield room. Connect the AC power supply to the LISN mounted on the floor behind the table. Measure from .15 to 30 MHz the conducted emissions while the radio is transmitting, then repeat with the radio in receive mode. Preliminary testing was made using a spectrum analyzer to determine the maximum emissions placement of the EUT. Final measurements were made and plots of the conducted emissions were produced. The spectrum analyzer was used in a pre-scan and swept the frequency range from .15 to 30 MHz using the peak detector as compared to the FCC Class B limit.

Quasi-peak measurements of the highest emissions were made with the test receiver. The tabulated data is contained with the measurement data section.

Refer to appendix A for photographs of the maximum emissions placement of the EUT during AC wireline conducted testing.

General and Environmental Conditions

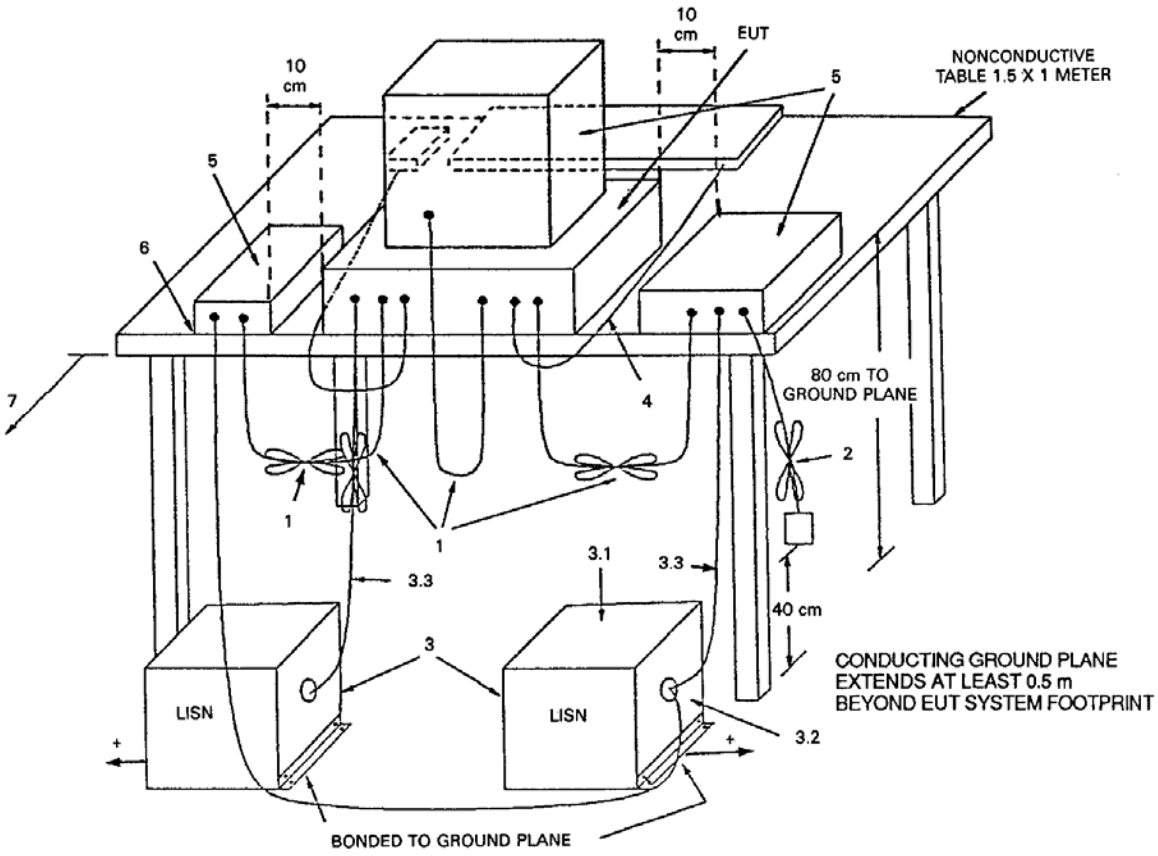
For FCC and Industry Canada, testing was performed within a shield room, setup as described in ANSI C63.4-2001 section 5.2. The EUT was powered by single phase 120 Volts ~ 60 Hz AC power.

Environmental conditions at the time of testing were a temperature 25 C, pressure 30.1 inches and relative humidity of 42 %.

TEST EQUIPMENT:	LISN	Rohde & Schwarz, ESH3.Z5
	EMI Test Receiver	Rohde & Schwarz, ESI-40

PERFORMED BY: Dave Fry Date: Dec. 13, 2004

NAME OF TEST: AC Wireline Conducted Emissions, TX and RX



+LISNs may have to be moved to the side to meet 3.3 below.

LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. EUT connected to one LISN. Unused LISN connectors shall be terminated in 50 Ω LISN can be placed on top of, or immediately beneath, ground plane.

3.1 All other equipment powered from second LISN.
3.2 Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
3.3 LISN at least 80 cm from nearest part of EUT chassis.
Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the host.

4. Non-EUT components being tested.
5. Rear of EUT, including peripherals, shall be all aligned and flush with rear of tabletop.
6. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the floor ground plane.

Test Configuration
Tabletop Equipment Conducted Emissions

NAME OF TEST: AC Wireline Conducted Emissions, TX and RX

CALCULATIONS AND CONVERSION FACTORS:

The conducted emissions are calculated using the following. The receiver reading is added to the correction factor "Transd (dB)" (includes LISN insertion loss, RF cable loss and filter loss (if used)) to create “Level (dBµV)”. The “LIMIT” is subtracted from “Level” to show "Margin". Margin will be displayed as a positive margin below the limit.

The conversion for calculating dB (µV) to microvolts (µV) follows.

dB(µV) to µV (dB (µV) / 20) anti log = µV

µV to dB (µV) 20 (log µV) = dB (µV)

TEST RESULTS: Complies with FCC and Industry Canada (IC) requirements while operated at 120 VAC. Listed below are the operation configuration and AC voltage.

MEASURED DATA: Judgment: For FCC testing; PASSED, see the following tabulated results. Detailed plots are following.

The conducted emissions are calculated using the following. The receiver reading is added to the correction factor "Transd (dB)" (includes LISN insertion loss, RF cable loss and filter loss (if used)) to create “Level (dBµV)”. The “LIMIT” is subtracted from “Level” to show "Margin". Margin will be displayed as a positive margin below the limit.

Unless otherwise noted, all final measurements are made using an average or quasi-peak detector and a 9 kHz measurement bandwidth with the data being compared to the CISPR quasi-peak and average limit.

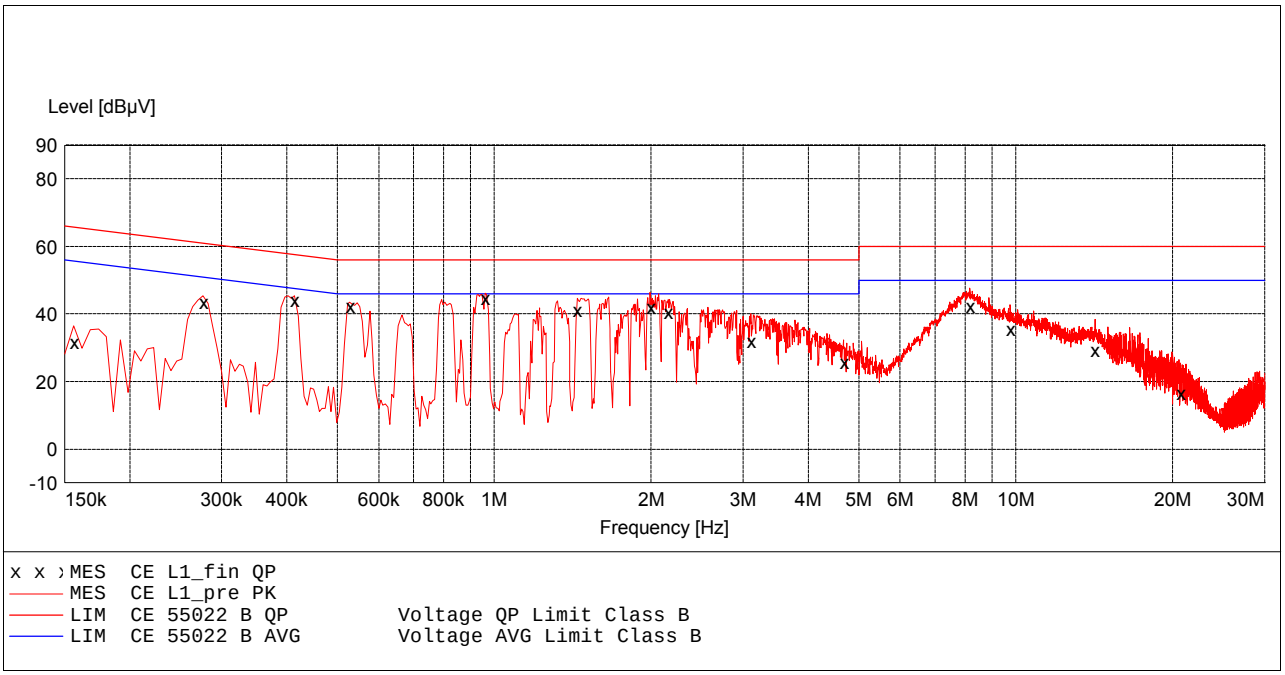
Emission Test

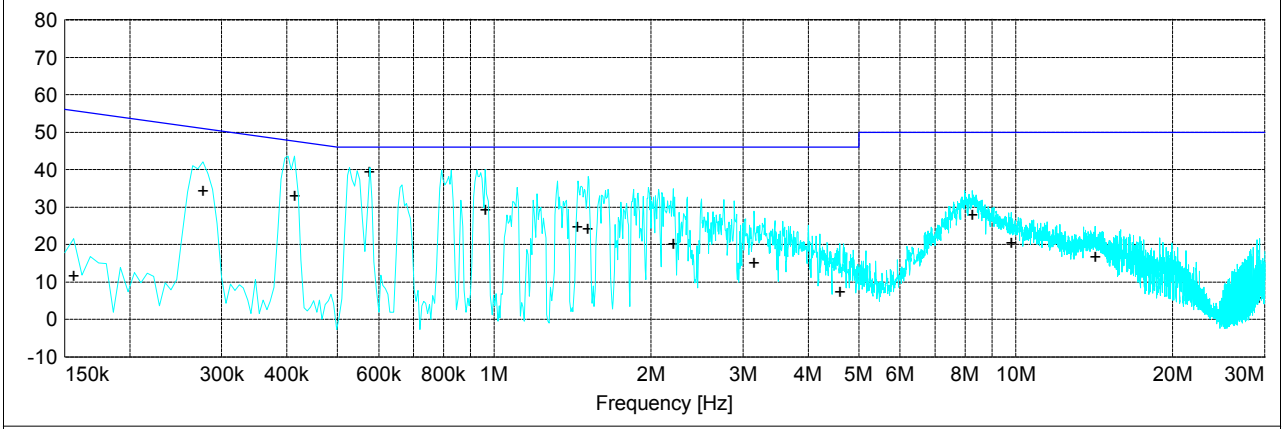
EUT: IV6 with POE, E-Net Active, CV60 Isol.
Manufacturer / Eng.: Intermec / J Johnson
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: df
Test Specification: CISPR 22 Class B
Comment: Max test, L1 Side, 120V
Start of Test: 12/13/04 / 4:43:01PM

SCAN TABLE: "CE ESI R&S L1"

Short Description: EN 55022 Voltage L1 Side

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	6.0 kHz	MaxPeak Average	1.0 ms	9 kHz	C LISN R&S L1





MES CE L1_pre AV
MES CE L1_fin AV
LIM CE 55022 B AVG Voltage AVG Limit Class B

MEASUREMENT RESULT: "CE L1_fin QP"

12/13/04 4:47PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.156000	31.70	0.00	65.70	33.90	L1	GND
0.276000	43.50	0.00	60.90	17.40	L1	GND
0.414000	44.30	0.00	57.60	13.30	L1	GND
0.528000	42.40	0.00	56.00	13.60	L1	GND
0.960000	44.80	0.00	56.00	11.20	L1	GND
1.440000	41.10	0.10	56.00	14.90	L1	GND
1.992000	41.90	0.20	56.00	14.10	L1	GND
2.154000	40.80	0.20	56.00	15.20	L1	GND
3.108000	31.80	0.10	56.00	24.20	L1	GND
4.674000	25.80	0.20	56.00	30.20	L1	GND
8.172000	42.30	0.30	60.00	17.70	L1	GND
9.768000	35.60	0.20	60.00	24.40	L1	GND
14.184000	29.50	0.10	60.00	30.50	L1	GND
20.658000	16.50	-0.10	60.00	43.50	L1	GND

MEASUREMENT RESULT: "CE L1_fin AV"

12/13/04 4:47PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.156000	11.70	0.00	55.70	43.90	L1	GND
0.276000	34.50	0.00	50.90	16.40	L1	GND
0.414000	33.10	0.00	47.60	14.40	L1	GND
0.576000	39.40	0.00	46.00	6.60	L1	GND
0.960000	29.30	0.00	46.00	16.70	L1	GND
1.446000	24.90	0.10	46.00	21.10	L1	GND
1.512000	24.10	0.10	46.00	21.90	L1	GND
2.202000	20.00	0.20	46.00	26.00	L1	GND
3.150000	15.20	0.10	46.00	30.80	L1	GND
4.596000	7.50	0.20	46.00	38.50	L1	GND
8.262000	27.90	0.30	50.00	22.10	L1	GND
9.798000	20.60	0.20	50.00	29.40	L1	GND
14.184000	16.80	0.10	50.00	33.20	L1	GND
29.268000	6.00	-0.10	50.00	44.00	L1	GND

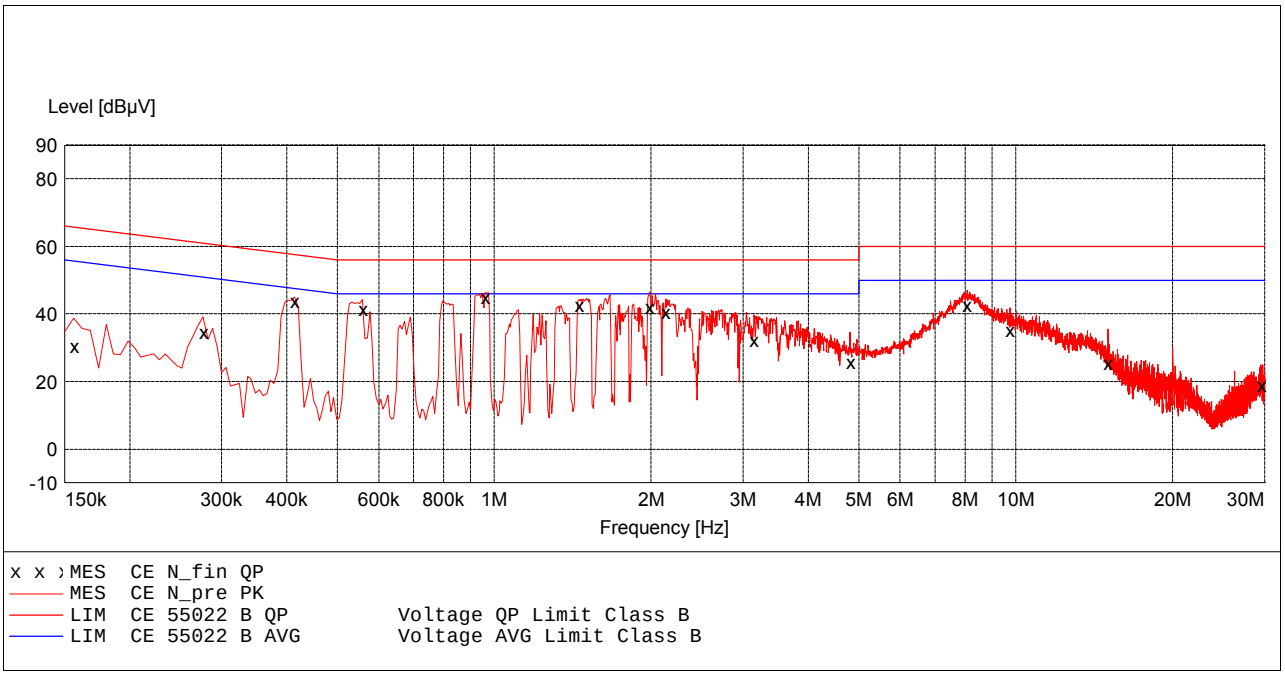
Emission Test

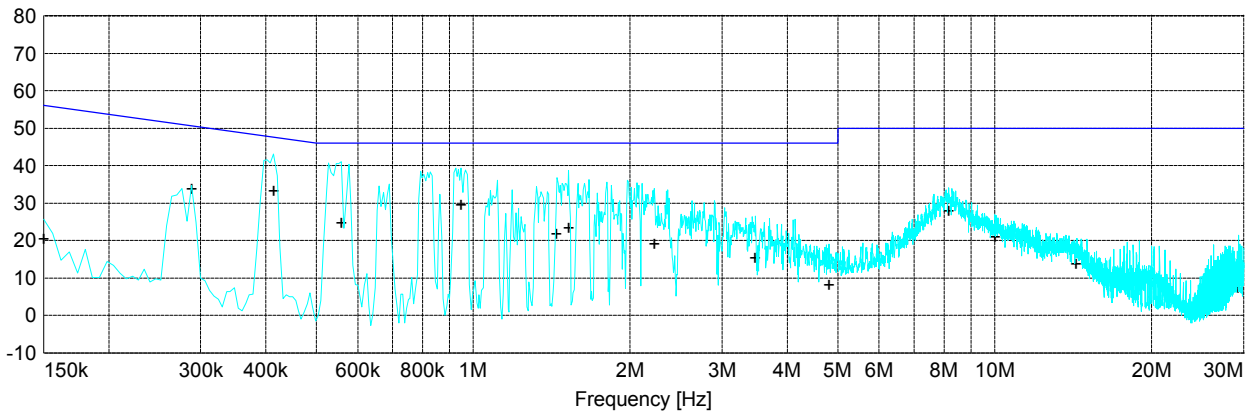
EUT: IV6 with POE, E-Net Active, CV60 Isol.
Manufacturer / Eng.: Intermec / J Johnson
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: df
Test Specification: CISPR 22 Class B
Comment: Max test, N Side, 120V
Start of Test: 12/13/04 / 4:50:03PM

SCAN TABLE: "CE ESI R&S N"

Short Description: EN 55022 Voltage N Side

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	6.0 kHz	MaxPeak Average	1.0 ms	9 kHz	C LISN R&S N





MES CE N_pre AV
MES CE N_fin AV
LIM CE 55022 B AVG Voltage AVG Limit Class B

MEASUREMENT RESULT: "CE N_fin QP"

12/13/04 4:55PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.156000	30.60	0.00	65.70	35.10	N	GND
0.276000	34.80	0.00	60.90	26.20	N	GND
0.414000	43.90	0.00	57.60	13.70	N	GND
0.558000	41.50	0.00	56.00	14.50	N	GND
0.960000	45.00	0.00	56.00	11.00	N	GND
1.452000	42.60	0.10	56.00	13.40	N	GND
1.980000	42.00	0.20	56.00	14.00	N	GND
2.130000	40.50	0.20	56.00	15.50	N	GND
3.150000	32.40	0.10	56.00	23.60	N	GND
4.812000	25.70	0.20	56.00	30.30	N	GND
8.064000	42.70	0.30	60.00	17.30	N	GND
9.732000	35.40	0.30	60.00	24.60	N	GND
15.018000	25.50	0.20	60.00	34.50	N	GND
29.538000	18.80	0.20	60.00	41.20	N	GND

MEASUREMENT RESULT: "CE N_fin AV"

12/13/04 4:55PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	20.40	0.00	56.00	35.60	N	GND
0.288000	33.80	0.00	50.60	16.80	N	GND
0.414000	33.20	0.00	47.60	14.30	N	GND
0.558000	24.80	0.00	46.00	21.20	N	GND
0.948000	29.50	0.00	46.00	16.50	N	GND
1.446000	21.90	0.10	46.00	24.10	N	GND
1.524000	23.30	0.10	46.00	22.70	N	GND
2.220000	19.10	0.20	46.00	26.90	N	GND
3.474000	15.60	0.10	46.00	30.40	N	GND
4.812000	8.30	0.20	46.00	37.70	N	GND
8.160000	28.00	0.30	50.00	22.00	N	GND
9.996000	21.10	0.30	50.00	28.90	N	GND
14.340000	13.90	0.20	50.00	36.10	N	GND
29.292000	7.30	0.20	50.00	42.70	N	GND

EQUIPMENT: IF6

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. Create a spread sheet that shows the harmonics for the low, middle and high channel of each transmitter. Scan the spread sheet for channel harmonics that coincide. Also adjust the channels up or down per the radio channel step size to verify any spurious emissions that fall within a 1 MHz of each other. Record these channels and frequencies for investigation.

2. 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 – 9.28 GHz. Refer to section 2.4, Test Methodology, for more details on testing above 1000 MHz. Record emissions of simultaneous transmission. In the event emissions for simultaneous operation at 100 % duty cycle are over the AVERAGE limit, record the emission with each radio individually so the appropriate duty cycle reduction may be applied.

TEST EQUIPMENT:

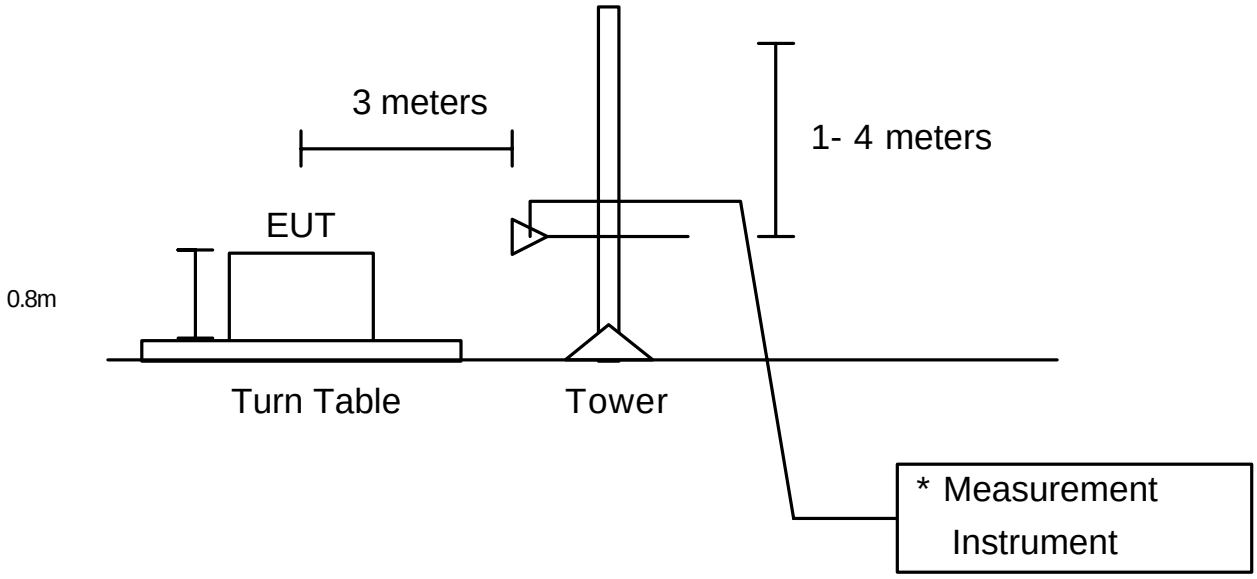
Antenna, bi-conical	EMCO 3110
Antenna, log periodic	EMCO 3146
Antenna, DRG horn	EMCO 3115
Antenna, Std G horn	EMCO 3160-08
Antenna, Std G horn	EMCO 3160-09
Receiver	Rohde & Schwarz ESI-40
High Pass Filter	Cir-Q-Tel R9H-1G5/10G-28A
High Pass Filter	K&L 13SH10-3000/T24000-0/0
Microwave amplifier	HP 8449B

PERFORMED BY: Dave Fry Date: Dec. 15-16, 2004

TEST SETUP: Transmitter Radiated Spurious Emissions

Open area test site at the Intermec EMC Test Facility
Three-meter test range 30 MHz - 25 GHz.

Review the following diagrams for setup details. Refer to the photographs in appendix E (041116E1.xxx) for placement IF6.



* 30-1000 MHz, Rohde & Schwarz ESI40 receiver or
1-25 GHz, ESI40 with preamplifier and high-pass filter

TEST RESULTS: Transmitter radiated emissions conform.

The IM3, FCC ID: EHARFID915PCC-6, 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.

The following 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. The data presented below calculates the AVERAGE emissions by recording the 100% duty cycle emissions and subtracting the 6 dB duty cycle correction factor.

AVERAGE EMISSIONS

Intermec IF6
RFID antenna

The highest AVERAGE field strength of the out of band transmitter radiated emissions is 58.3 dB(µV)/m measured at a distance of three-meter for 5318.38 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 52.3 dB(µV)/m. That is 1.7 dB under the limit of 54 dB(µV)/m at three-meters.

MEASUREMENT RESULT: "Semi TX 1-12_fin AV"

12/2/04 6:03PM

Frequency	Level	Duty Cycle	Transd	Limit	Margin	IFBW kHz	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	CF dB	dB	dBµV/m	dB		cm	deg		
a	b	c	d	e	f	g	h	i	j	
1					(=e-b-c)					
1805.250	32.80	-6	-5.1	54	27.2	1000	142	179	VER	-comment-
1830.000	34.10	-6	-4.9	54	25.9	1000	143	172	VER	-comment-
1854.750	36.20	-6	-4.7	54	23.8	1000	141	173	VER	-comment-
2707.880	43.80	-6	-1.8	54	16.2	1000	137	182	VER	-comment-
2745.000	47.30	-6	-1.6	54	12.7	1000	132	178	VER	-comment-
2777.800	51.30	-6	-1.5	54	8.7	1000	132	176	VER	-comment-
2777.800	51.10	-6	-1.5	54	8.9	1000	132	176	VER	ch69
3610.500	39.60	-6	1.2	54	20.4	1000	112	217	VER	-comment-
3660.000	35.90	-6	1.4	54	24.1	1000	134	144	VER	-comment-
3709.500	34.00	-6	1.5	54	26.0	1000	132	176	VER	-comment-
4513.130	37.80	-6	2.7	54	22.2	1000	150	178	VER	-comment-
4575.000	39.00	-6	2.8	54	21.0	1000	157	181	VER	-comment-
4636.880	39.20	-6	3.0	54	20.8	1000	159	180	VER	-comment-
5415.750	37.30	-6	5.3	54	22.7	1000	103	155	VER	-comment-
5490.000	38.10	-6	5.4	54	21.9	1000	121	181	VER	-comment-
5564.250	39.60	-6	5.5	54	20.4	1000	134	186	VER	-comment-
6318.375	57.10	-6	6.6	54	2.9	1000	188	45	VER	-comment-
6405.000	50.60	-6	6.6	54	9.4	1000	173	43	VER	-comment-
6491.630	50.30	-6	6.9	54	9.7	1000	176	42	VER	-comment-
7320.000	38.70	-6	8.9	54	21.3	1000	150	251	VER	-comment-
8123.625	46.10	-6	9.5	54	13.9	1000	108	0	VER	-comment-
8235.000	40.40	-6	9.7	54	19.6	1000	152	157	VER	-comment-
8346.375	40.70	-6	10.0	54	19.3	1000	99	23	VER	-comment-
9150.000	40.60	-6	10.4	54	19.4	1000	152	203	VER	-comment-

MEASUREMENT RESULT: "Semi TX 1-12_fin AV"

12/2/04 12:41PM

Frequency	Level	Duty Cycle	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	CF dB	dB	dBµV/m	dB	kHz	cm	deg		
a	b	c	d	e	f (=e-b-c)	g	h	i	j	
1805.250	33.9	-6	-5.1	54	26.1	1000	186	137	HOR	-comment-
1830.000	35.3	-6	-4.9	54	24.7	1000	188	131	HOR	-comment-
1854.750	39.5	-6	-4.7	54	20.5	1000	186	138	HOR	-comment-
2707.880	46.5	-6	-1.8	54	13.5	1000	160	123	HOR	-comment-
2745.000	51.2	-6	-1.6	54	8.8	1000	155	121	HOR	-comment-
2745.000	30.2	-6	-1.6	54	29.8	1000	139	121	HOR	-comment-
2782.125	56.7	-6	-1.4	54	3.3	1000	139	121	HOR	-comment-
3610.500	43.3	-6	1.2	54	16.7	1000	185	114	HOR	-comment-
3660.000	36.4	-6	1.4	54	23.6	1000	196	104	HOR	-comment-
3709.500	36.6	-6	1.5	54	23.4	1000	126	214	HOR	-comment-
4513.130	40.5	-6	2.7	54	19.5	1000	124	169	HOR	-comment-
4575.000	40.7	-6	2.8	54	19.3	1000	126	150	HOR	-comment-
4636.880	42.6	-6	3.0	54	17.4	1000	123	149	HOR	-comment-
5415.750	37.4	-6	5.3	54	22.6	1000	100	184	HOR	-comment-
5490.000	39.2	-6	5.4	54	20.8	1000	101	117	HOR	-comment-
5564.250	40.2	-6	5.5	54	19.8	1000	99	218	HOR	-comment-
6318.380	58.3	-6	6.6	54	1.7	1000	210	70	HOR	-comment-
6405.000	51.4	-6	6.6	54	8.6	1000	107	304	HOR	-comment-
6405.000	50.1	-6	6.6	54	9.9	1000	227	20	HOR	-comment-
6491.630	49.6	-6	6.9	54	10.4	1000	107	304	HOR	-comment-
7320.000	39.2	-6	8.9	54	20.8	1000	99	226	HOR	-comment-
8123.630	45.3	-6	9.5	54	14.7	1000	107	358	HOR	-comment-
8235.000	41.7	-6	9.7	54	18.3	1000	109	0	HOR	-comment-
8346.380	41.8	-6	10.0	54	18.2	1000	109	0	HOR	-comment-
9150.000	41.2	-6	10.4	54	18.8	1000	151	0	HOR	-comment-

QUASI-PEAK AND PEAK EMISSIONS

The highest Quasi-Peak or PEAK field strength of the out of band transmitter radiated emissions relative to the limit is 63.3 dB(µV)/m measured at a distance of three-meter for 2777.88 MHz. The emissions were observed during testing of the unit with the measurement antenna vertically polarized. That is 10.7 dB under the limit of 74 dB(µV)/m at three-meters. (No duty cycle correction can be applied to QP or Pk data).

MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

12/2/04 6:03PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
				kHz					
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
1805.250	40.7	-5.1	74.0	33.3	1000	142	179	VER	-comment-
1830.000	42.6	-4.9	74.0	31.4	1000	143	172	VER	-comment-
1854.750	43.5	-4.7	74.0	30.5	1000	141	173	VER	-comment-
1854.750	42.9	-4.7	74.0	31.1	1000	141	173	VER	-comment-
2707.880	48.1	-1.8	74.0	25.9	1000	137	182	VER	-comment-
2745.000	50.4	-1.6	74.0	23.6	1000	132	178	VER	-comment-
2777.800	63.3	-1.5	74.0	10.7	1000	132	176	VER	-comment-
2777.800	63.3	-1.5	74.0	10.7	1000	132	176	VER	ch69
3610.500	47.4	1.2	74.0	26.6	1000	112	217	VER	-comment-
3660.000	46.7	1.4	74.0	27.3	1000	134	144	VER	-comment-
3709.500	45.1	1.5	74.0	28.9	1000	132	176	VER	-comment-
4513.130	47.0	2.7	74.0	27.0	1000	150	178	VER	-comment-
4575.000	47.2	2.8	74.0	26.8	1000	157	181	VER	-comment-
4636.880	47.3	3.0	74.0	26.7	1000	159	180	VER	-comment-
5415.750	49.5	5.3	74.0	24.5	1000	103	155	VER	-comment-
5490.000	49.6	5.4	74.0	24.4	1000	121	181	VER	-comment-
5564.250	51.0	5.5	74.0	23.0	1000	134	186	VER	-comment-
6318.375	60.1	6.6	74.0	13.9	1000	188	45	VER	-comment-
6405.000	56.1	6.6	74.0	17.9	1000	173	43	VER	-comment-
6491.630	56.8	6.9	74.0	17.2	1000	176	42	VER	-comment-
7320.000	51.1	8.9	74.0	22.9	1000	150	251	VER	-comment-
8123.625	54.3	9.5	74.0	19.7	1000	108	0	VER	-comment-
8235.000	52.8	9.7	74.0	21.2	1000	152	157	VER	-comment-
8346.375	52.2	10.0	74.0	21.8	1000	99	23	VER	-comment-
9150.000	51.6	10.4	74.0	22.4	1000	152	203	VER	-comment-

MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

12/2/04 12:41PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
				kHz					
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
1805.250	42.7	-5.1	74.0	31.3	1000	186	137	HOR	-comment-
1830.000	43.1	-4.9	74.0	30.9	1000	188	131	HOR	-comment-
1854.750	45.6	-4.7	74.0	28.4	1000	186	138	HOR	-comment-
2707.880	50.3	-1.8	74.0	23.7	1000	160	123	HOR	-comment-
2745.000	53.2	-1.6	74.0	20.8	1000	155	121	HOR	-comment-
2745.000	42.6	-1.6	74.0	31.4	1000	139	121	HOR	-comment-
2782.125	62.3	-1.4	74.0	11.7	1000	139	121	HOR	-comment-
3610.500	49.5	1.2	74.0	24.5	1000	185	114	HOR	-comment-
3660.000	45.5	1.4	74.0	28.5	1000	196	104	HOR	-comment-
3709.500	46.1	1.5	74.0	27.9	1000	126	214	HOR	-comment-
4513.130	47.7	2.7	74.0	26.3	1000	124	169	HOR	-comment-
4575.000	48	2.8	74.0	26.0	1000	126	150	HOR	-comment-
4636.880	48.9	3.0	74.0	25.1	1000	123	149	HOR	-comment-
5415.750	49.1	5.3	74.0	24.9	1000	100	184	HOR	-comment-
5490.000	49.7	5.4	74.0	24.3	1000	101	117	HOR	-comment-
5564.250	51.2	5.5	74.0	22.8	1000	99	218	HOR	-comment-
6318.380	61.2	6.6	74.0	12.8	1000	210	70	HOR	-comment-
6405.000	56.6	6.6	74.0	17.4	1000	107	304	HOR	-comment-
6405.000	56.2	6.6	74.0	17.8	1000	227	20	HOR	-comment-
6491.630	56.1	6.9	74.0	17.9	1000	107	304	HOR	-comment-
7320.000	51.9	8.9	74.0	22.1	1000	99	226	HOR	-comment-
8123.630	54.7	9.5	74.0	19.3	1000	107	358	HOR	-comment-
8235.000	53.2	9.7	74.0	20.8	1000	109	0	HOR	-comment-
8346.380	53	10.0	74.0	21.0	1000	109	0	HOR	-comment-
9150.000	52.7	10.4	74.0	21.3	1000	151	0	HOR	N.F.

MEASUREMENT DATA: The field strength is calculated by adding the measured receiver readings (dBµV) to the correction factors, which includes antenna factor(dB/m), cable loss (dB) and preamplifier gain (dB), which creates the corrected data “Level (dBµV/m)”. The “Level” is subtracted from “Limit” to show "Margin". Margin will be displayed as a positive margin below the limit.

The following pages of measurements 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 following sheets show the 100% duty cycle measurements of the average and peak emissions compared to the limits.

Quasi-Peak emission scans below 1 GHz to Class A limit
IF6 is a “commercial, industrial” product only
(no transmitter emissions found)

IM3 duty cycle CF
Meas. dB (µV)/m @ 3 mtr - 6 dB (correction) = Duty Cycle Corrected dB (µV)/m @ 3 mtr

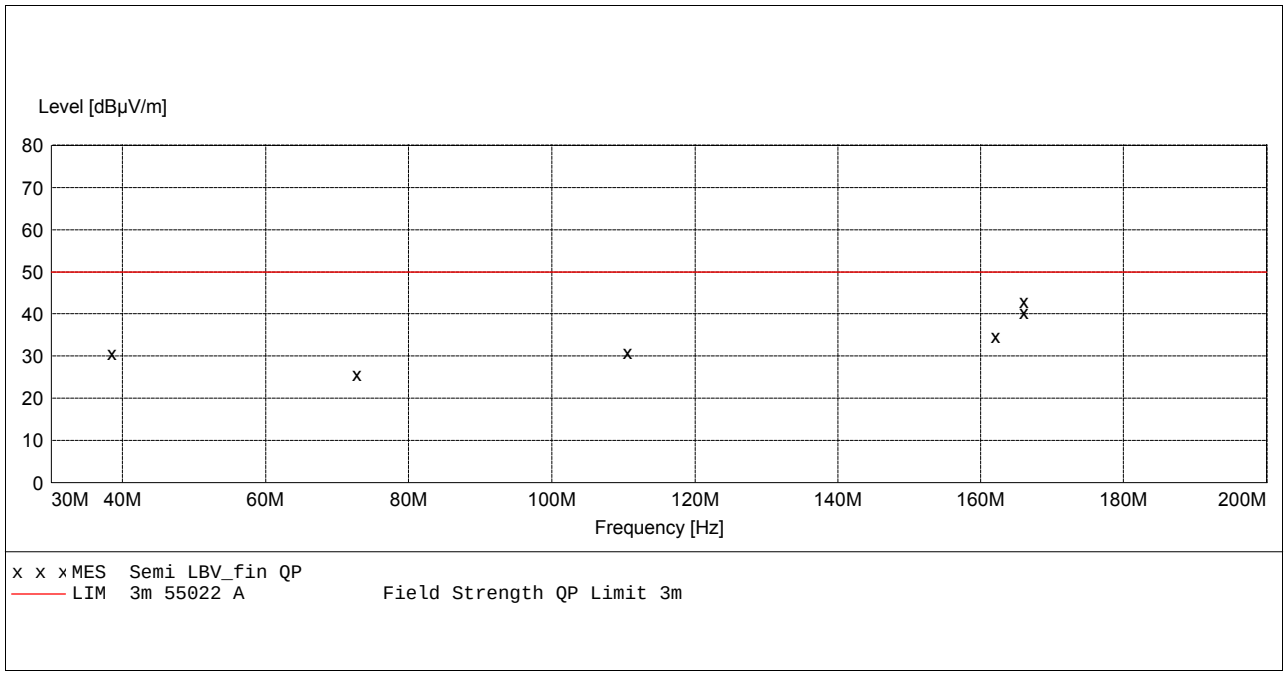
Emission Test

EUT: IF6-915 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR 22 Class A
Comment: MAX, Test
Start of Test: 1/3/05 / 11:35:00AM

SCAN TABLE: "3m ESI RE"

Short Description: 3m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi LBV_fin QP"

1/3/05 11:55AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azimu. deg	Pol.	Comment
38.320000	30.70	12.7	50.0	19.3	120	101.0	257.0	VER	-comment-
72.640000	25.80	9.9	50.0	24.2	120	101.0	257.0	VER	-comment-
110.560000	30.90	11.9	50.0	19.1	120	101.0	213.0	VER	-comment-
162.000000	34.80	13.9	50.0	15.2	120	214.0	284.0	VER	-comment-
165.920000	43.20	14.0	50.0	6.8	120	200.0	281.0	VER	-comment-
165.920000	40.40	14.0	50.0	9.6	120	101.0	281.0	VER	-comment-

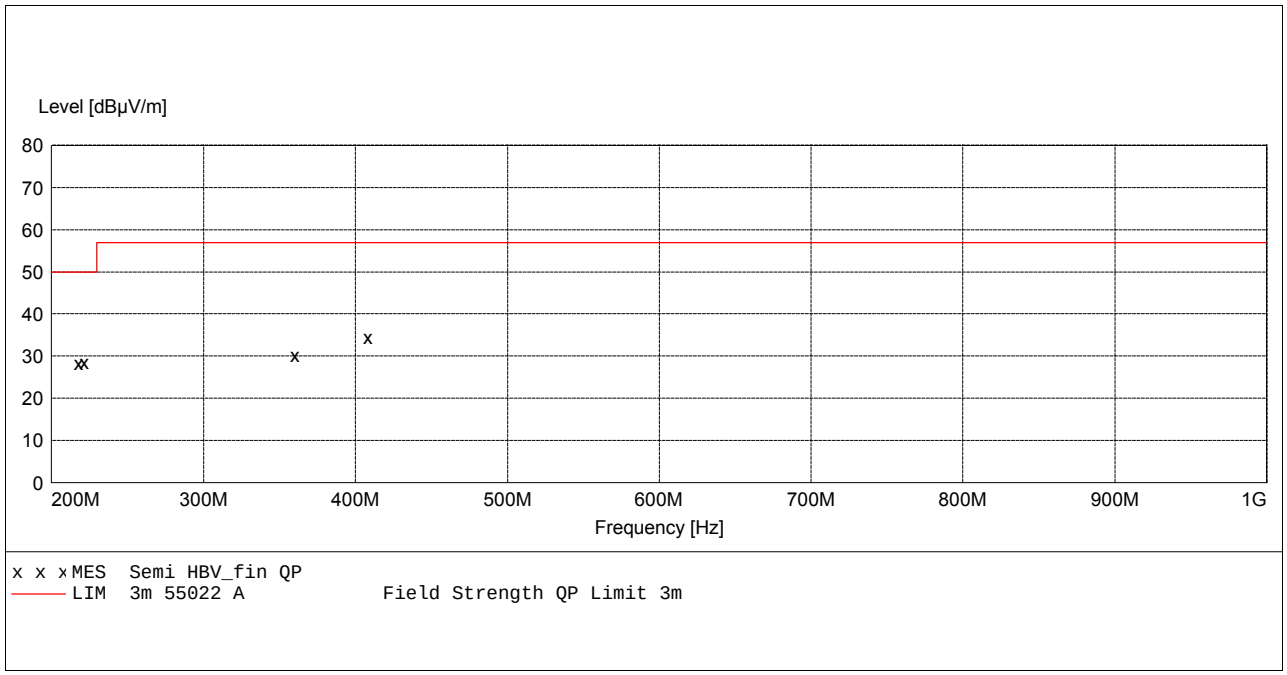
Emission Test

EUT: IF6-915 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR22 Class A
Comment: MAX test
Start of Test: 1/3/05 / 2:21:26PM

SCAN TABLE: "3m ESI RE"

Short Description: 3m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi HBV_fin QP"

1/3/05 2:32PM

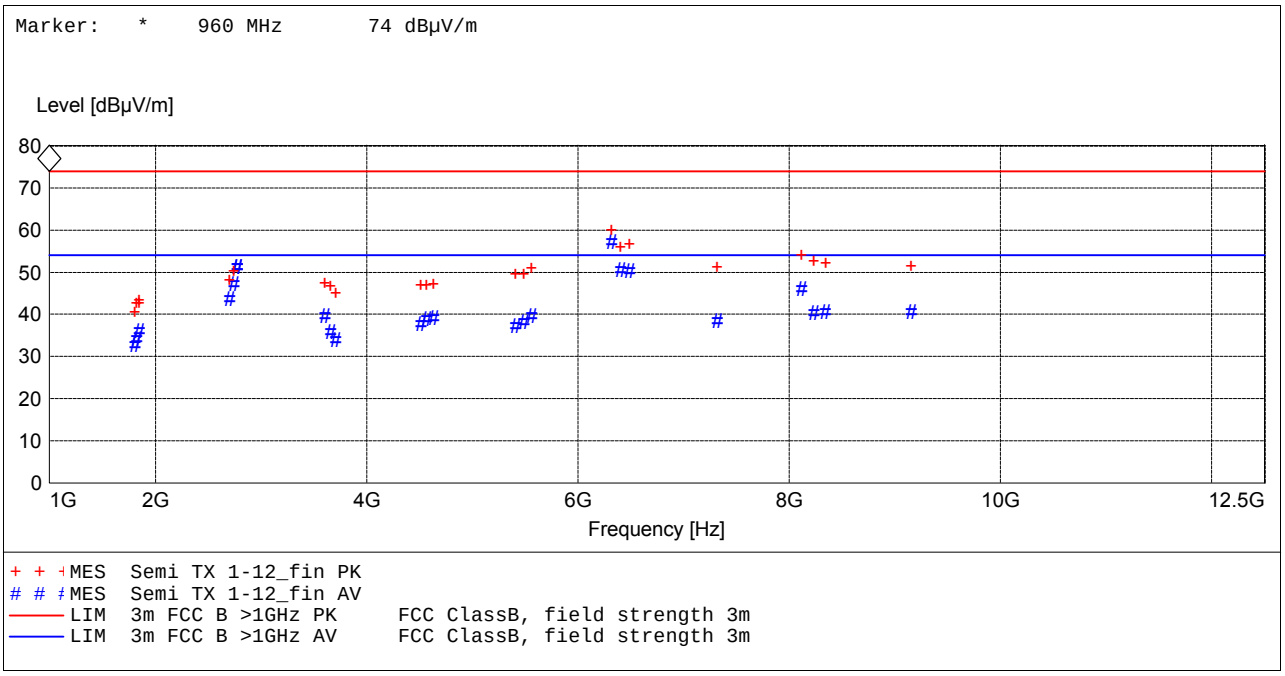
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azimu. deg	Pol.	Comment
217.440000	28.30	12.8	50.0	21.7	120	106.0	176.0	VER	-comment-
221.200000	28.70	12.7	50.0	21.3	120	106.0	176.0	VER	-comment-
360.000000	30.20	16.9	57.0	26.8	120	101.0	269.0	VER	-comment-
408.000000	34.60	17.7	57.0	22.4	120	101.0	269.0	VER	-comment-

Emission Test

```
EUT:                    IF6 CONNECTICUT
Manufacturer / Eng.:    Intermec / J JOHNSON
Operating Condition:    emission test program
Test Site:              EMC Lab, Cedar Rapids IA
Operator:               DF
Test Specification:     FCC Class B
Comment:                Max test of system
Start of Test:          12/2/04 / 2:56:39PM
```

SCAN TABLE: "3m ESI RE TX 1-12"

```
  Short Description:              3m Field Strength
  Start      Stop       Step      Detector  Meas.     IF      Transducer
  Frequency  Frequency  Width               Time      Bandw.
  1.0 GHz    12.5 GHz   600.0 kHz MaxPeak   1.0 ms    1 MHz   1M 3115 4143 HORN
                                  Average
```



MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

12/2/04 6:03PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
					kHz				
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
1805.250000	40.70	-5.1	74.0	33.3	1000	142.0	179.0	VER	-comment-
1830.000000	42.60	-4.9	74.0	31.4	1000	143.0	172.0	VER	-comment-
1854.750000	43.50	-4.7	74.0	30.5	1000	141.0	173.0	VER	-comment-
1854.750000	42.90	-4.7	74.0	31.1	1000	141.0	173.0	VER	-comment-
2707.880000	48.10	-1.8	74.0	25.9	1000	137.0	182.0	VER	-comment-
2745.000000	50.40	-1.6	74.0	23.6	1000	132.0	178.0	VER	-comment-

MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

(continued)

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
2777.800000	63.30	-1.5	74.0	10.7	1000	132.0	176.0	VER	-comment-
2777.800000	63.30	-1.5	74.0	10.7	1000	132.0	176.0	VER	ch69
3610.500000	47.40	1.2	74.0	26.6	1000	112.0	217.0	VER	-comment-
3660.000000	46.70	1.4	74.0	27.3	1000	134.0	144.0	VER	-comment-
3709.500000	45.10	1.5	74.0	28.9	1000	132.0	176.0	VER	-comment-
4513.130000	47.00	2.7	74.0	27.0	1000	150.0	178.0	VER	-comment-
4575.000000	47.20	2.8	74.0	26.8	1000	157.0	181.0	VER	-comment-
4636.880000	47.30	3.0	74.0	26.7	1000	159.0	180.0	VER	-comment-
5415.750000	49.50	5.3	74.0	24.5	1000	103.0	155.0	VER	-comment-
5490.000000	49.60	5.4	74.0	24.4	1000	121.0	181.0	VER	-comment-
5564.250000	51.00	5.5	74.0	23.0	1000	134.0	186.0	VER	-comment-
6318.375000	60.10	6.6	74.0	13.9	1000	188.0	45.0	VER	-comment-
6405.000000	56.10	6.6	74.0	17.9	1000	173.0	43.0	VER	-comment-
6491.630000	56.80	6.9	74.0	17.2	1000	176.0	42.0	VER	-comment-
7320.000000	51.10	8.9	74.0	22.9	1000	150.0	251.0	VER	-comment-
8123.625000	54.30	9.5	74.0	19.7	1000	108.0	0.0	VER	-comment-
8235.000000	52.80	9.7	74.0	21.2	1000	152.0	157.0	VER	-comment-
8346.375000	52.20	10.0	74.0	21.8	1000	99.0	23.0	VER	-comment-
9150.000000	51.60	10.4	74.0	22.4	1000	152.0	203.0	VER	-comment-

MEASUREMENT RESULT: "Semi TX 1-12_fin AV"

12/2/04 6:03PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
1805.250000	32.80	-5.1	54.0	21.2	1000	142.0	179.0	VER	-comment-
1830.000000	34.10	-4.9	54.0	19.9	1000	143.0	172.0	VER	-comment-
1854.750000	36.20	-4.7	54.0	17.8	1000	141.0	173.0	VER	-comment-
2707.880000	43.80	-1.8	54.0	10.2	1000	137.0	182.0	VER	-comment-
2745.000000	47.30	-1.6	54.0	6.7	1000	132.0	178.0	VER	-comment-
2777.800000	51.30	-1.5	54.0	2.7	1000	132.0	176.0	VER	-comment-
2777.800000	51.10	-1.5	54.0	2.9	1000	132.0	176.0	VER	ch69
3610.500000	39.60	1.2	54.0	14.4	1000	112.0	217.0	VER	-comment-
3660.000000	35.90	1.4	54.0	18.1	1000	134.0	144.0	VER	-comment-
3709.500000	34.00	1.5	54.0	20.0	1000	132.0	176.0	VER	-comment-
4513.130000	37.80	2.7	54.0	16.2	1000	150.0	178.0	VER	-comment-
4575.000000	39.00	2.8	54.0	15.0	1000	157.0	181.0	VER	-comment-
4636.880000	39.20	3.0	54.0	14.8	1000	159.0	180.0	VER	-comment-
5415.750000	37.30	5.3	54.0	16.7	1000	103.0	155.0	VER	-comment-
5490.000000	38.10	5.4	54.0	15.9	1000	121.0	181.0	VER	-comment-
5564.250000	39.60	5.5	54.0	14.4	1000	134.0	186.0	VER	-comment-
6318.375000	57.10	6.6	54.0	-3.1	1000	188.0	45.0	VER	-comment-
6405.000000	50.60	6.6	54.0	3.4	1000	173.0	43.0	VER	-comment-
6491.630000	50.30	6.9	54.0	3.7	1000	176.0	42.0	VER	-comment-
7320.000000	38.70	8.9	54.0	15.3	1000	150.0	251.0	VER	-comment-
8123.625000	46.10	9.5	54.0	7.9	1000	108.0	0.0	VER	-comment-
8235.000000	40.40	9.7	54.0	13.6	1000	152.0	157.0	VER	-comment-
8346.375000	40.70	10.0	54.0	13.3	1000	99.0	23.0	VER	-comment-
9150.000000	40.60	10.4	54.0	13.4	1000	152.0	203.0	VER	-comment-

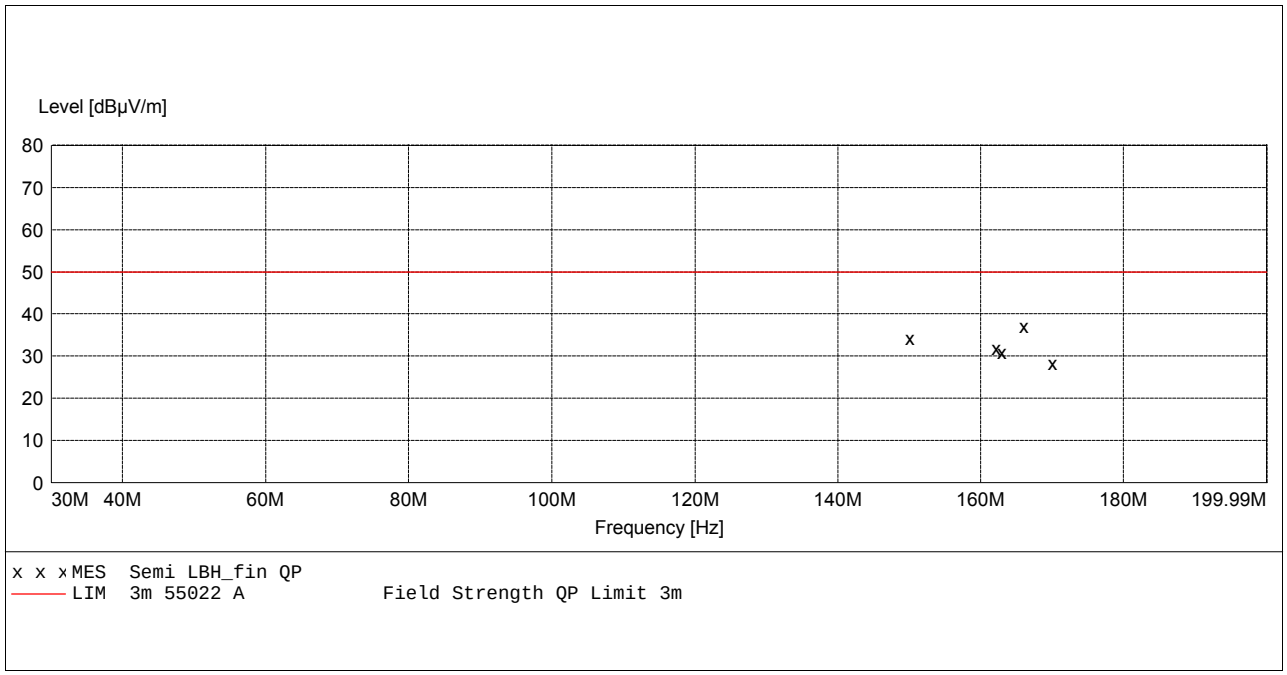
Emission Test

EUT: IF6-915 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR 22 Class A
Comment: MAX, Test
Start of Test: 1/3/05 / 1:38:47PM

SCAN TABLE: "3m ESI RE"

Short Description: 3m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi LBH_fin QP"

1/3/05 1:51PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azimu. deg	Pol.	Comment
150.000000	34.30	13.8	50.0	15.7	120	168.0	194.0	HOR	-comment-
162.080000	32.00	13.9	50.0	18.0	120	115.0	193.0	HOR	-comment-
162.960000	31.00	14.0	50.0	19.0	120	115.0	193.0	HOR	-comment-
165.920000	37.20	14.0	50.0	12.8	120	113.0	176.0	HOR	-comment-
170.000000	28.40	14.2	50.0	21.6	120	115.0	193.0	HOR	-comment-

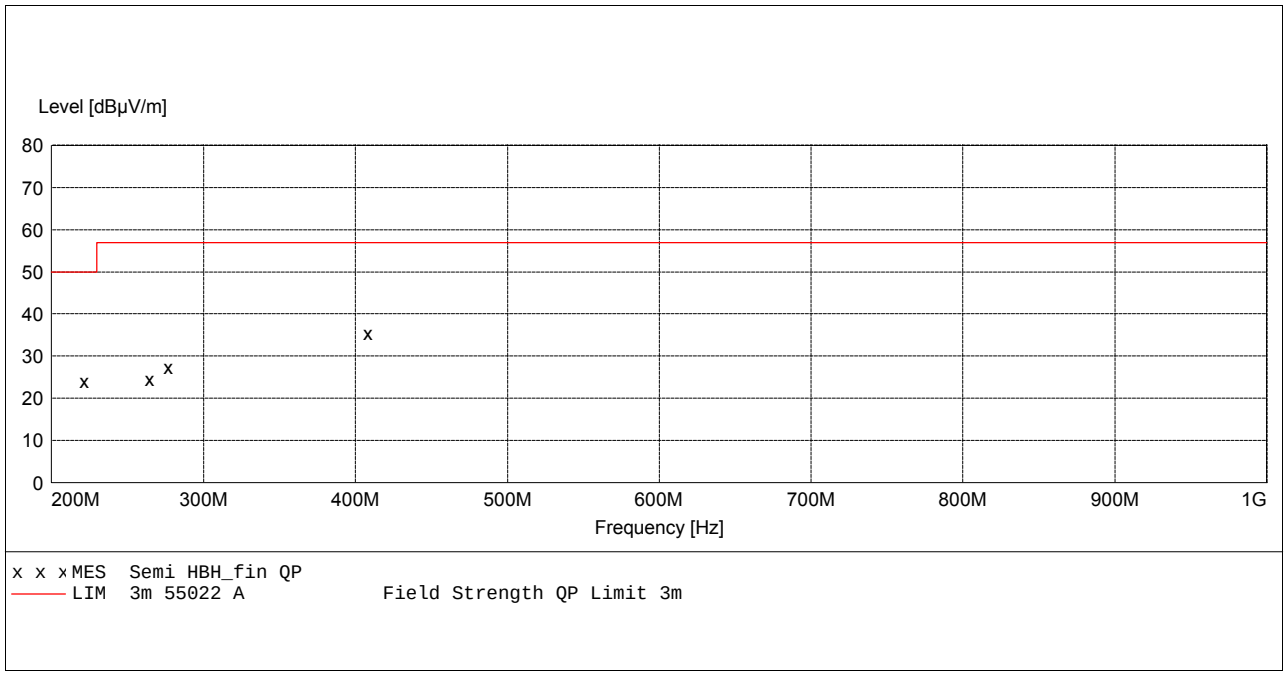
Emission Test

EUT: IF6-915 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR22 Class A
Comment: MAX test
Start of Test: 1/3/05 / 2:50:58PM

SCAN TABLE: "3m ESI RE"

Short Description: 3m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi HBH_fin QP"

1/3/05 3:00PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azimu. deg	Pol.	Comment
221.200000	24.10	12.7	50.0	25.9	120	130.0	221.0	HOR	-comment-
264.000000	24.60	14.2	57.0	32.4	120	216.0	326.0	HOR	-comment-
276.480000	27.40	14.6	57.0	29.6	120	216.0	326.0	HOR	-comment-
408.000000	35.50	17.7	57.0	21.5	120	160.0	152.0	HOR	-comment-

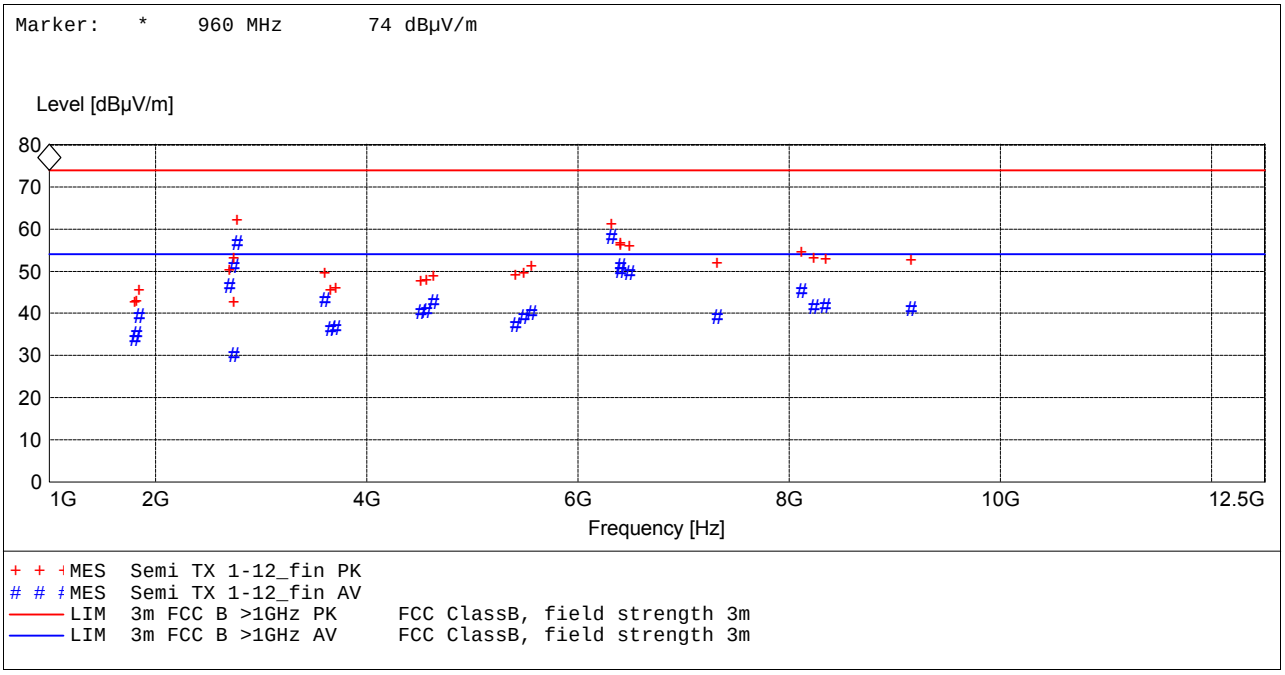
Emission Test

EUT: IF6 CONNECTICUT
Manufacturer / Eng.: Intermec / J JOHNSON
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: DF
Test Specification: FCC Class B
Comment: Max test of system
Start of Test: 12/2/04 / 9:21:40AM

SCAN TABLE: "3m ESI RE TX 1-12"

Short Description: 3m Field Strength

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	12.5 GHz	600.0 kHz	MaxPeak Average	1.0 ms	1 MHz	1M 3115 4143 HORN



MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

12/2/04 12:41PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	IFBW kHz	Height cm	Azimu. deg	Pol.	Comment
1805.250000	42.70	-5.1	74.0	31.3	1000	186.0	137.0	HOR	-comment-
1830.000000	43.10	-4.9	74.0	30.9	1000	188.0	131.0	HOR	-comment-
1854.750000	45.60	-4.7	74.0	28.4	1000	186.0	138.0	HOR	-comment-
2707.880000	50.30	-1.8	74.0	23.7	1000	160.0	123.0	HOR	-comment-
2745.000000	53.20	-1.6	74.0	20.8	1000	155.0	121.0	HOR	-comment-
2745.000000	42.60	-1.6	74.0	31.4	1000	139.0	121.0	HOR	-comment-

MEASUREMENT RESULT: "Semi TX 1-12_fin PK"

(continued)

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
					kHz				
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
2782.125000	62.30	-1.4	74.0	11.7	1000	139.0	121.0	HOR	-comment-
3610.500000	49.50	1.2	74.0	24.5	1000	185.0	114.0	HOR	-comment-
3660.000000	45.50	1.4	74.0	28.5	1000	196.0	104.0	HOR	-comment-
3709.500000	46.10	1.5	74.0	27.9	1000	126.0	214.0	HOR	-comment-
4513.130000	47.70	2.7	74.0	26.3	1000	124.0	169.0	HOR	-comment-
4575.000000	48.00	2.8	74.0	26.0	1000	126.0	150.0	HOR	-comment-
4636.880000	48.90	3.0	74.0	25.1	1000	123.0	149.0	HOR	-comment-
5415.750000	49.10	5.3	74.0	24.9	1000	100.0	184.0	HOR	-comment-
5490.000000	49.70	5.4	74.0	24.3	1000	101.0	117.0	HOR	-comment-
5564.250000	51.20	5.5	74.0	22.8	1000	99.0	218.0	HOR	-comment-
6318.380000	61.20	6.6	74.0	12.8	1000	210.0	70.0	HOR	-comment-
6405.000000	56.60	6.6	74.0	17.4	1000	107.0	304.0	HOR	-comment-
6405.000000	56.20	6.6	74.0	17.8	1000	227.0	20.0	HOR	-comment-
6491.630000	56.10	6.9	74.0	17.9	1000	107.0	304.0	HOR	-comment-
7320.000000	51.90	8.9	74.0	22.1	1000	99.0	226.0	HOR	-comment-
8123.630000	54.70	9.5	74.0	19.3	1000	107.0	358.0	HOR	-comment-
8235.000000	53.20	9.7	74.0	20.8	1000	109.0	0.0	HOR	-comment-
8346.380000	53.00	10.0	74.0	21.0	1000	109.0	0.0	HOR	-comment-
9150.000000	52.70	10.4	74.0	21.3	1000	151.0	0.0	HOR	N.F.

MEASUREMENT RESULT: "Semi TX 1-12_fin AV"

12/2/04 12:41PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
					kHz				
MHz	dBµV/m	dB	dBµV/m	dB		cm	deg		
1805.250000	33.90	-5.1	54.0	20.1	1000	186.0	137.0	HOR	-comment-
1830.000000	35.30	-4.9	54.0	18.7	1000	188.0	131.0	HOR	-comment-
1854.750000	39.50	-4.7	54.0	14.5	1000	186.0	138.0	HOR	-comment-
2707.880000	46.50	-1.8	54.0	7.5	1000	160.0	123.0	HOR	-comment-
2745.000000	51.20	-1.6	54.0	2.8	1000	155.0	121.0	HOR	-comment-
2745.000000	30.20	-1.6	54.0	23.8	1000	139.0	121.0	HOR	-comment-
2782.125000	56.70	-1.4	54.0	-2.7	1000	139.0	121.0	HOR	-comment-
3610.500000	43.30	1.2	54.0	10.7	1000	185.0	114.0	HOR	-comment-
3660.000000	36.40	1.4	54.0	17.6	1000	196.0	104.0	HOR	-comment-
3709.500000	36.60	1.5	54.0	17.4	1000	126.0	214.0	HOR	-comment-
4513.130000	40.50	2.7	54.0	13.5	1000	124.0	169.0	HOR	-comment-
4575.000000	40.70	2.8	54.0	13.3	1000	126.0	150.0	HOR	-comment-
4636.880000	42.60	3.0	54.0	11.4	1000	123.0	149.0	HOR	-comment-
5415.750000	37.40	5.3	54.0	16.6	1000	100.0	184.0	HOR	-comment-
5490.000000	39.20	5.4	54.0	14.8	1000	101.0	117.0	HOR	-comment-
5564.250000	40.20	5.5	54.0	13.8	1000	99.0	218.0	HOR	-comment-
6318.380000	58.30	6.6	54.0	-4.3	1000	210.0	70.0	HOR	-comment-
6405.000000	51.40	6.6	54.0	2.6	1000	107.0	304.0	HOR	-comment-
6405.000000	50.10	6.6	54.0	3.9	1000	227.0	20.0	HOR	-comment-
6491.630000	49.60	6.9	54.0	4.4	1000	107.0	304.0	HOR	-comment-
7320.000000	39.20	8.9	54.0	14.8	1000	99.0	226.0	HOR	-comment-
8123.630000	45.30	9.5	54.0	8.7	1000	107.0	358.0	HOR	-comment-
8235.000000	41.70	9.7	54.0	12.3	1000	109.0	0.0	HOR	-comment-
8346.380000	41.80	10.0	54.0	12.2	1000	109.0	0.0	HOR	-comment-
9150.000000	41.20	10.4	54.0	12.8	1000	151.0	0.0	HOR	-comment-

9.0 EQUIPMENT LIST

EQUIPMENT	MFG/MODEL	SERIAL NO.	CAL. DATE mm/yy	CYCLE
Antenna, dipole	EMCO 3121C	9812-1414	03/03	24 Mo
Antenna, biconical	EMCO 3110B	1787	09/04	12 Mo
Antenna, log periodic	EMCO 3146	1262	09/04	12 Mo
Antenna, biconical	EMCO 3110B	1185	09/04	12 Mo
Antenna, log periodic	EMCO 3146	3277	09/04	12 Mo
Antenna, DRG Horn	EMCO 3115	4143	06/04	12 Mo
Antenna, Std G Horn	EMCO 3160-08	31562	02/04	N.R.
Antenna, Std G Horn	EMCO 3160-09	34731	07/04	N.R.
Attenuator	HP 8491-20 dB	36824	05/04	12 Mo.
High Pass Filter	Cir-Q-Tel R9H-1G5/10G-28A	01	05/04	12 Mo.
High Pass Filter	K&L 13SH10-3000/T24000-0/0	01	05/04	12 Mo.
Preamplifier	HP 8449B	3008A00439	05/03	24 Mo.
EMI Test Receiver	Rohde & Schwarz, ESI-40	1088.7490.40	06/04	12 Mo
Signal Generator	HP 83630A	3250A00322	03/03	24 Mo.
Test Automation SW	Rohde & Schwarz, ES-K1 V1.6	2492	10/04	On Req.

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