

Intermec Technologies Corporation

RFID in IP3 with 802.11(b) and CDMA in 700C

July 6, 2004

Report No. ITRM0030.2

Report Prepared By:



1-888-EMI-CERT

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Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: June 6, 2004

Intermec Technologies Corporation

Model: RFID in IP3 with 802.11(b) and CDMA in 700C

Emissions		
Description	Pass	Fail
FCC 15.247(c) Spurious Radiated Emissions:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product

See the Modifications section of this report

Test Facility

- The measurement facility used to collect the data is located at:
Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066 Fax: 844-3826
This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Donald Fecteau, IS Manager

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities, have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



NVLAP: Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada. Accreditation has been granted to Northwest EMC, Inc. under Certificate Numbers: 200629-0, 200630-0, and 200676-0.



Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body. (NVLAP)



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Nos. - Evergreen: C-1071 and R-1025, Trails End: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761*)



BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/scope.asp>

What is measurement uncertainty?

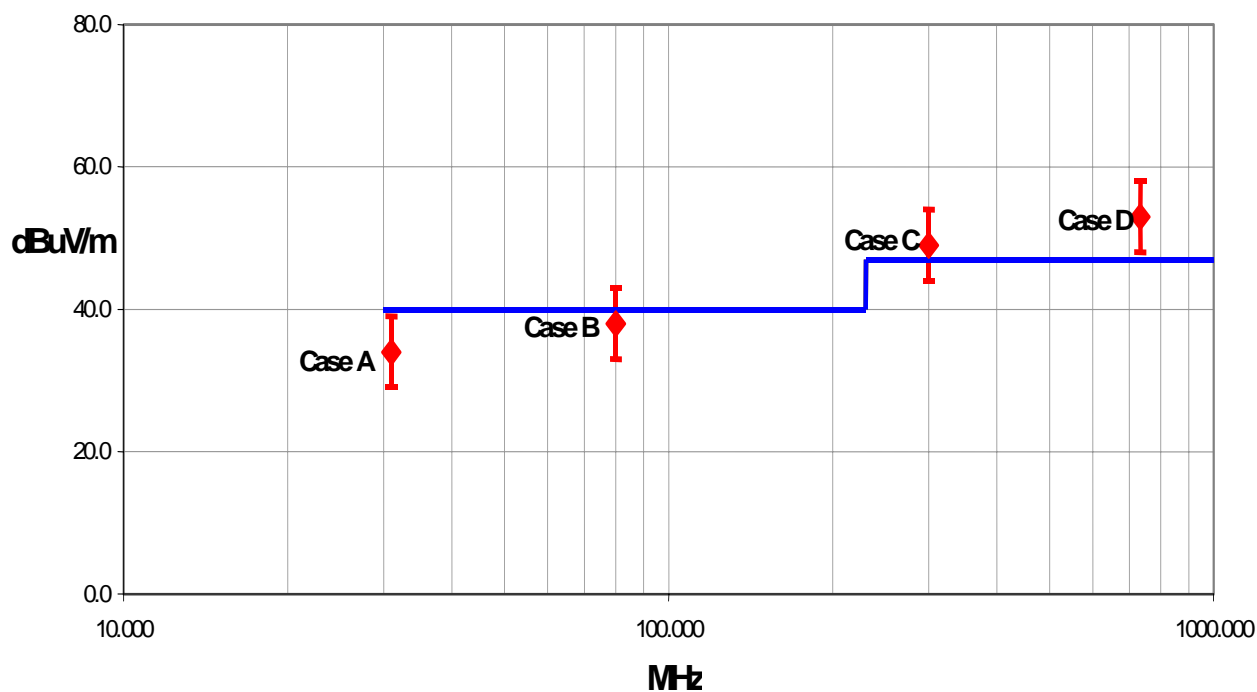
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- “ISO Guide to the Expression of Uncertainty in Measurements”, October 1993
- “NIS81: The Treatment of Uncertainty in EMC Measurements”, May 1994
- “IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques”, December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz

Value (dB)

Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

Radiated Emissions > 1 GHz

Value (dB)

Test Distance	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.29 - 1.25	+ 1.38 - 1.35	+ 1.38 - 1.35
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 2.57 - 2.51	+ 2.57 - 2.51	+ 2.76 - 2.70	+ 2.76 - 2.70

Conducted Emissions

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.48
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.97

Radiated Immunity

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.11

Conducted Immunity

Test Distance	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.10

Legend

$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties

U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $u_c(y)$ yields a confidence level of only 68%.

**California****Orange County Facility**

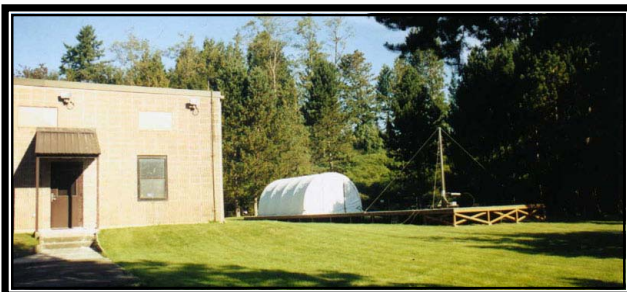
41 Tesla Ave.
Irvine, CA 92618
(888) 364-2378
FAX (503) 844-3826

**Oregon****Evergreen Facility**

22975 NW Evergreen Pkwy.,
Suite 400
Hillsboro, OR 97124
(503) 844-4066
FAX (503) 844-3826

**Oregon****Trails End Facility**

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735

**Washington****Sultan Facility**

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	550 Second St. SE
City, State, Zip:	Cedar Rapids, IA 52401-2023
Test Requested By:	Scott Holub
Equipment Under Test:	RFID in IP3 co-located with Bluetooth, 802.11(b), and CDMA in 700C
Model:	IP3
First Date of Test:	07-01-2004
Last Date of Test:	07-03-2004
Receipt Date of Samples:	06-15-2004
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators: Not provided at the time of test.

Functional Description of the EUT (Equipment Under Test):

RFID radio installed in mobile IP3. The 700C Handheld Computer can be installed in the IP3. When installed, the RFID radio is co-located with Bluetooth, 802.11(b), and CDMA radios. The CDMA radio is new, Model EM3420.

Client Justification for EUT Selection:

The EUT is a representative production sample.

Client Justification for Test Selection:

These tests satisfy the requirements FCC 15.247 (c) for co-located transmitters.

EUT Photo

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions	07/01/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
2	Spurious Radiated Emissions	07/02/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT remained at Northwest EMC.
3	Spurious Radiated Emissions	07/03/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT was returned to client following testing.

Justification

The EUT is a previously certified RFID radio module (FCC ID: EHARFID915PCC-6) installed inside Intermec's Model IP3. The IP3 is an optional pistol grip accessory that attaches externally to the bottom of Intermec's 700C. The 700C is a handheld computer that contains three co-located radio modules (CDMA, 802.11(b) and Bluetooth). The 802.11(b) and Bluetooth radios have been previously certified for portable, co-located use in the 700C (FCC ID: HN22011B-2, FCC ID: EHABTS0080). The CDMA radio is a new radio module that is undergoing certification (FCC ID: EHAEM3420). Since the IP3 uses the same IRDA interface port as the Bluetooth radio, the Bluetooth and RFID radios cannot transmit simultaneously (see Intermec's attestation letter). All other radios can transmit simultaneously. Each radio transmits through its own antenna. This test demonstrates compliance with FCC 15.247(c) emissions limits while the EUT is co-located with the 700C radios.

All possible combinations of harmonic emissions from the CDMA, 802.11(b) and RFID radios were compared numerically. It was determined that there were no possible coincidental harmonics below 1 GHz. All the radios were configured for simultaneous transmission at the channels specified below:

Channels in Specified Band Investigated:

802.11(b):	1, 5, 8, 11
CDMA (Cellular):	310, 477, 602, 727
CDMA (PCS):	41, 932, 1117, 1175
RFID:	7, 8, 12, 47, 50, 62, 69, 71, 73

Operating Modes Investigated:

Simultaneous transmission of CDMA (cellular) and 802.11(b) radios in 700C and RFID radio in IP3
Simultaneous transmission of CDMA (PCS) and 802.11(b) radios in 700C and RFID radio in IP3

Operating Modes Investigated:

Simultaneous Transmission of CDMA Cellular Channel 477, RFID Channel 12, and 802.11(b) Channel 1
Simultaneous Transmission of CDMA Cellular Channel 727, RFID Channel 47, and 802.11(b) Channel 8
Simultaneous Transmission of CDMA Cellular Channel 602, RFID Channel 73, and 802.11(b) Channel 1
Simultaneous Transmission of CDMA Cellular Channel 310, RFID Channel 71, and 802.11(b) Channel 5
Simultaneous Transmission of CDMA Cellular Channel 310, RFID Channel 71, and 802.11(b) Channel 11
Simultaneous Transmission of CDMA PCS Channel 41, RFID Channel 69, and 802.11(b) Channel 11
Simultaneous Transmission of CDMA PCS Channel 1175, RFID Channel 12, and 802.11(b) Channel 1
Simultaneous Transmission of CDMA PCS Channel 1117, RFID Channel 7, and 802.11(b) Channel 11
Simultaneous Transmission of CDMA PCS Channel 932, RFID Channel 8, and 802.11(b) Channel 11
Simultaneous Transmission of CDMA PCS Channel 1117, RFID Channel 50, and 802.11(b) Channel 1
Simultaneous Transmission of CDMA PCS Channel 1117, RFID Channel 62, and 802.11(b) Channel 1
Simultaneous Transmission of CDMA PCS Channel 1175, RFID Channel 7, and 802.11(b) Channel 11

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Antennas Investigated:

802.11(b):	Custom internal to 700C
CDMA (Cellular):	805-606-102 Dual Band CDMA 900/1900MHz Antenna (SB555)
CDMA (PCS):	805-666-204 Single Band CDMA 1900MHz Antenna (SB555)
RFID:	IP3 integral antenna (internal to IP3)

Software\Firmware Applied During Test

Exercise software	CDMA FCC Test PrismTest IP3FCC2	Version	6/7/04 6/1/04 11/17/03
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channel, band, and operating mode.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
CDMA Radio	Intermec Technologies Corporation	EM3420	Unknown
Handheld Computer	Intermec Technologies Corporation	700C	13790400008
AC Adapter	Elpac Power Systems	FW1812	014869
802.11(b) Radio	Intermec Technologies Corporation	2011B	N/A
RFID Radio in Pistol Grip	Intermec Technologies Corporation	IP3	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.4	No	Handheld Computer	AC Adapter
AC Power	No	2.0	No	AC Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Attenuator	Pasternack	PE7001-10	ATD	02/03/2004	13 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
Antenna, Horn	EMCO	3115	AHF	03/18/2004	24 mo
Signal Generator	Hewlett Packard	8341B	TGN	01/23/2004	13 mo
Antenna, Dipole (ADAA included)	Roberts	Roberts	ADA	12/27/2002	24 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo

Test Description

Requirement: Per 15.247(c), the field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 15.205, is measured. The peak level must comply with the limits specified in 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

Configuration: The EUT is a previously certified RFID radio module (FCC ID: EHARFID915PCC-6) installed inside Intermec's Model IP3. The IP3 is an optional pistol grip accessory that attaches externally to the bottom of Intermec's 700C. The 700C is a handheld computer that contains three co-located radio modules (CDMA, 802.11(b) and Bluetooth). The 802.11(b) and Bluetooth radios have been previously certified for portable, co-located use in the 700C (FCC ID: HN22011B-2, FCC ID: EHABTS0080). The CDMA radio is a new radio module that is undergoing certification (FCC ID: EHAEM3420). Since the IP3 uses the same IRDA interface port as the Bluetooth radio, the Bluetooth and RFID radios cannot transmit simultaneously (see Intermec's attestation letter). All other radios can transmit simultaneously. Each radio transmits through its own antenna.

The following is an excerpt from the FCC / TCB Training Q & A, October 2002, Day 2, Question 7:

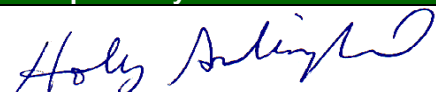
Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted at this time. The test engineer should indicate the worst case condition and provide justification as to why the worst case condition was chosen. The grantee should be reminded that even if the FCC requests one set of data, they are responsible for compliance for all modes of simultaneous transmission.


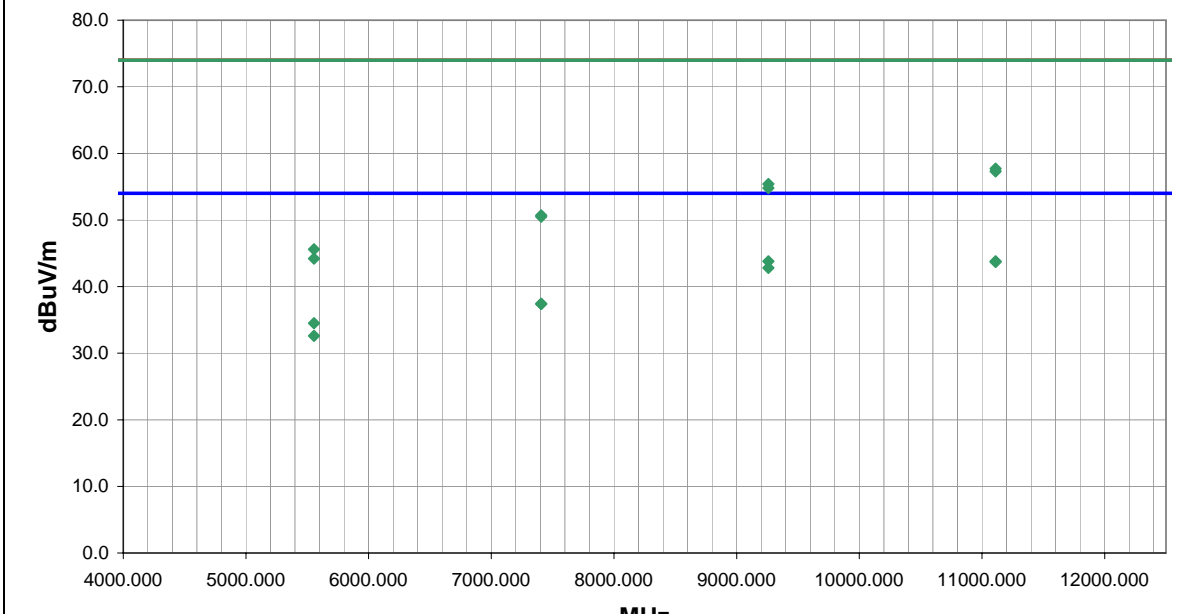
All possible combinations of harmonic emissions from the CDMA, 802.11(b) and RFID radios were compared numerically. It was determined that there were no possible coincidental harmonics below 1 GHz. The frequency range from 1 GHz to 25 GHz was investigated for channel combinations that would produce coincidental harmonics. Compliance with the restricted band at 2483.5 – 2500 MHz was also measured.


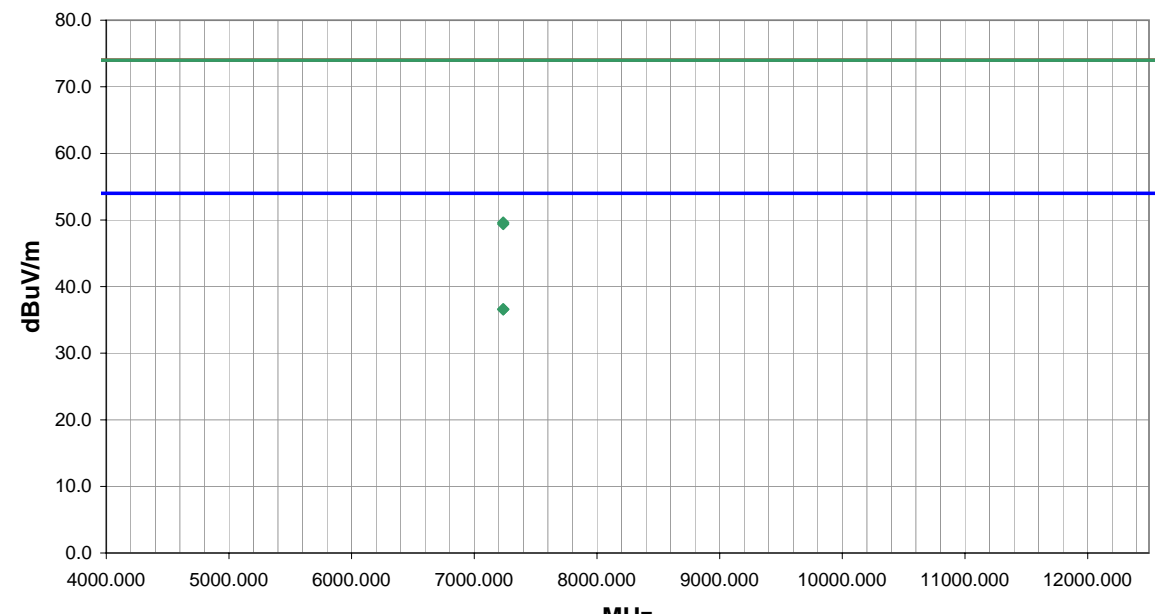
All the radios were configured for simultaneous transmission at the channels specified in the previous pages. The highest gain antennas to be used with the radios were tested. The spectrum was scanned throughout the specified range. While scanning, emissions from the radios were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antennas in three orthogonal axes, and adjusting the measurement antenna height and polarization (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.


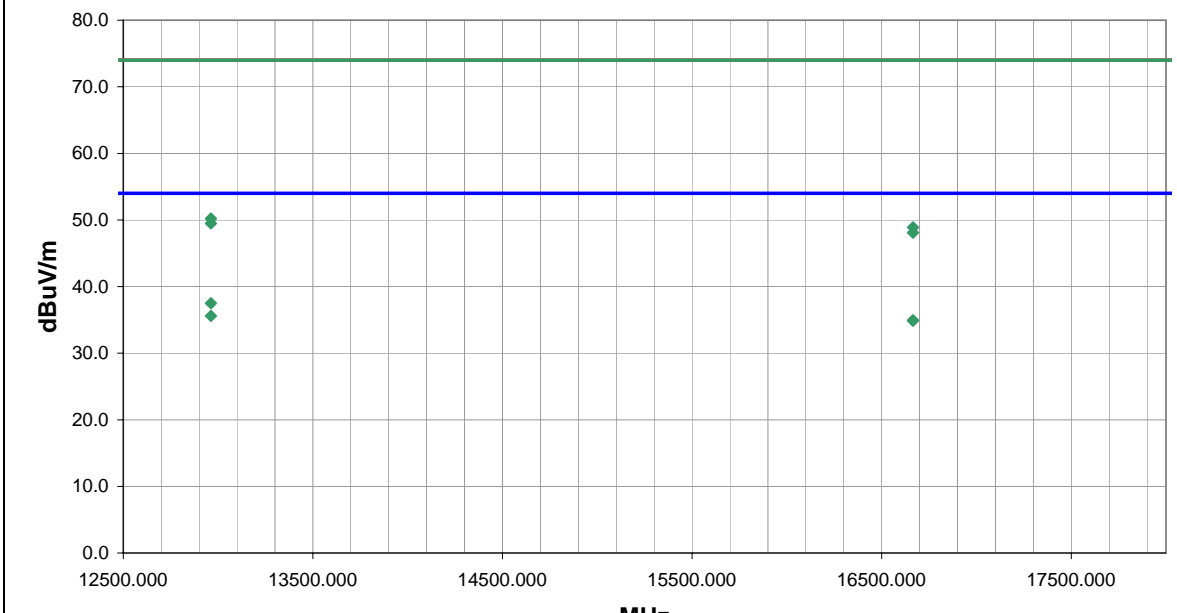
Bandwidths Used for Measurements			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
<i>Measurements were made using the bandwidths and detectors specified. No video filter was used.</i>			


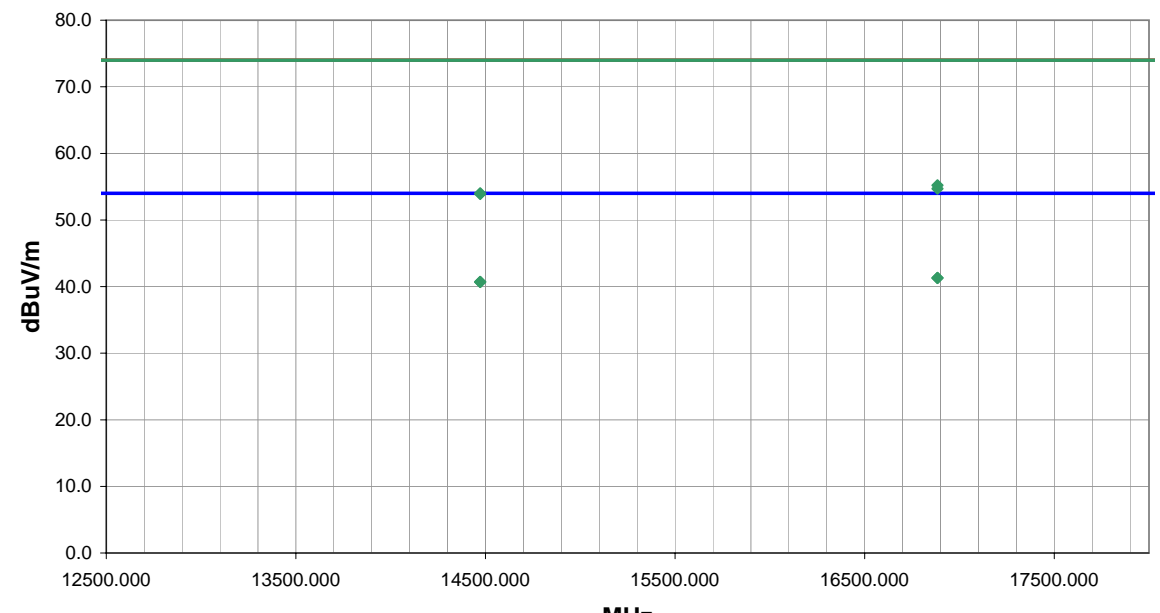
Completed by:


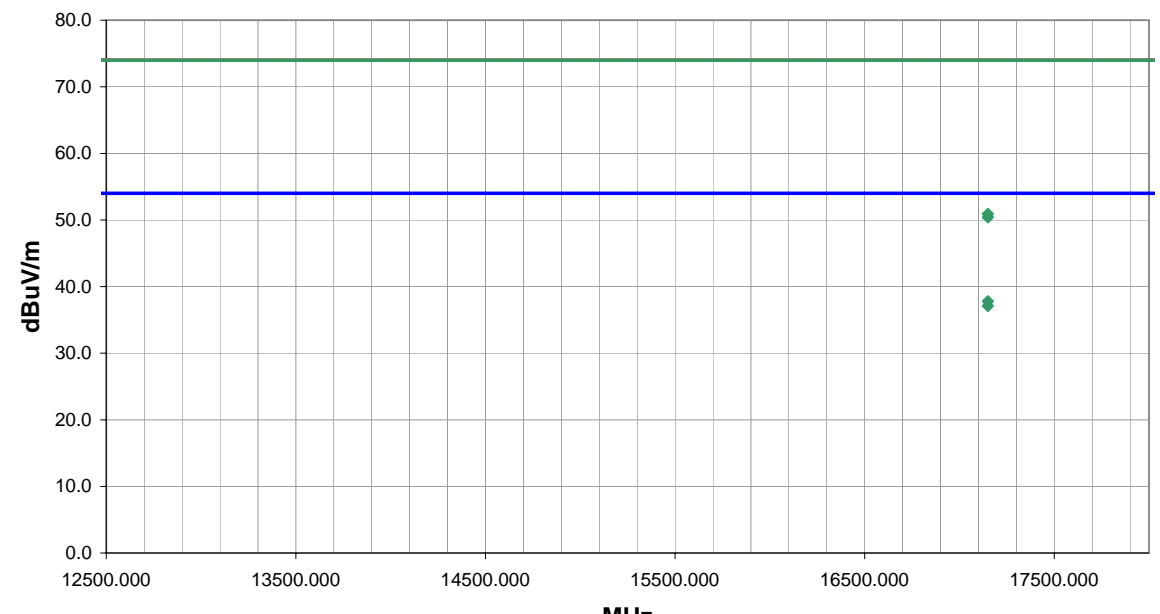



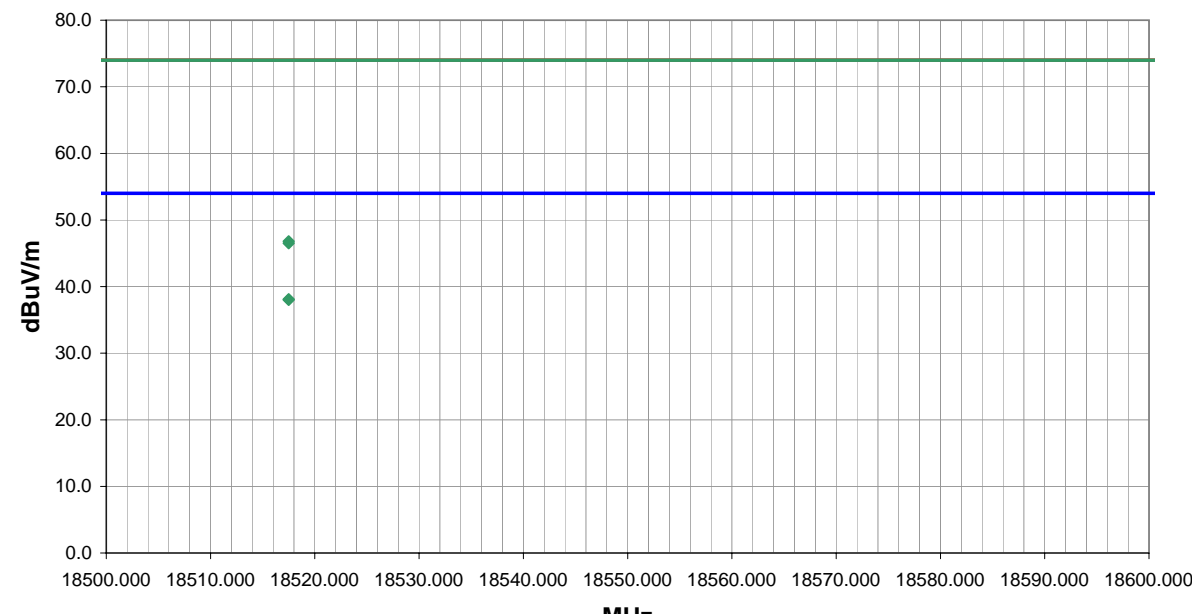
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d14.13 05/06/2004								
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C			Work Order: ITRM0030									
Serial Number:			Date: 07/01/04									
Customer: Intermec Technologies Corporation			Temperature: 79									
Attendees: none			Humidity: 43%									
Cust. Ref. No.:			Barometric Pressure: 29.93									
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(c) Spurious Radiated Emissions			Year: 2003									
Method: ANSI C63.4			Year: 2001									
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.												
EUT OPERATING MODES												
Transmitting CDMA (PCS) 41 and 802.11b 11 in 700C, and RFID 69 in IP3												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS					Run #							
Pass					57							
Other												
					 Tested By:							
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
9258.750	28.6	15.2	33.0	1.2	3.0	0.0	V-Horn	AV	0.0	43.8	54.0	-10.2
11110.500	24.9	18.9	47.0	2.5	3.0	0.0	H-Horn	AV	0.0	43.8	54.0	-10.2
11110.500	24.8	18.9	108.0	3.8	3.0	0.0	V-Horn	AV	0.0	43.7	54.0	-10.3
9258.750	27.6	15.2	28.0	1.8	3.0	0.0	H-Horn	AV	0.0	42.8	54.0	-11.2
11110.500	38.8	18.9	47.0	2.5	3.0	0.0	H-Horn	PK	0.0	57.7	74.0	-16.3
7407.000	26.4	11.0	247.0	1.8	3.0	0.0	V-Horn	AV	0.0	37.4	54.0	-16.6
7407.000	26.4	11.0	154.0	1.3	3.0	0.0	H-Horn	AV	0.0	37.4	54.0	-16.6
11110.500	38.4	18.9	108.0	3.8	3.0	0.0	V-Horn	PK	0.0	57.3	74.0	-16.7
9258.750	40.2	15.2	28.0	1.8	3.0	0.0	H-Horn	PK	0.0	55.4	74.0	-18.6
9258.750	39.6	15.2	33.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.8	74.0	-19.2
5555.250	28.4	6.1	48.0	1.6	3.0	0.0	V-Horn	AV	0.0	34.5	54.0	-19.5
5555.250	26.5	6.1	46.0	1.3	3.0	0.0	H-Horn	AV	0.0	32.6	54.0	-21.4
3703.500	30.4	1.1	17.0	1.2	3.0	0.0	V-Horn	AV	0.0	31.5	54.0	-22.5
3703.500	29.9	1.1	48.0	1.3	3.0	0.0	H-Horn	AV	0.0	31.0	54.0	-23.0
7407.000	39.7	11.0	154.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.7	74.0	-23.3
7407.000	39.5	11.0	247.0	1.8	3.0	0.0	V-Horn	PK	0.0	50.5	74.0	-23.5
5555.250	39.5	6.1	48.0	1.6	3.0	0.0	V-Horn	PK	0.0	45.6	74.0	-28.4
5555.250	38.1	6.1	46.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.2	74.0	-29.8
3703.500	42.1	1.1	17.0	1.2	3.0	0.0	V-Horn	PK	0.0	43.2	74.0	-30.8
3703.500	41.4	1.1	48.0	1.3	3.0	0.0	H-Horn	PK	0.0	42.5	74.0	-31.5


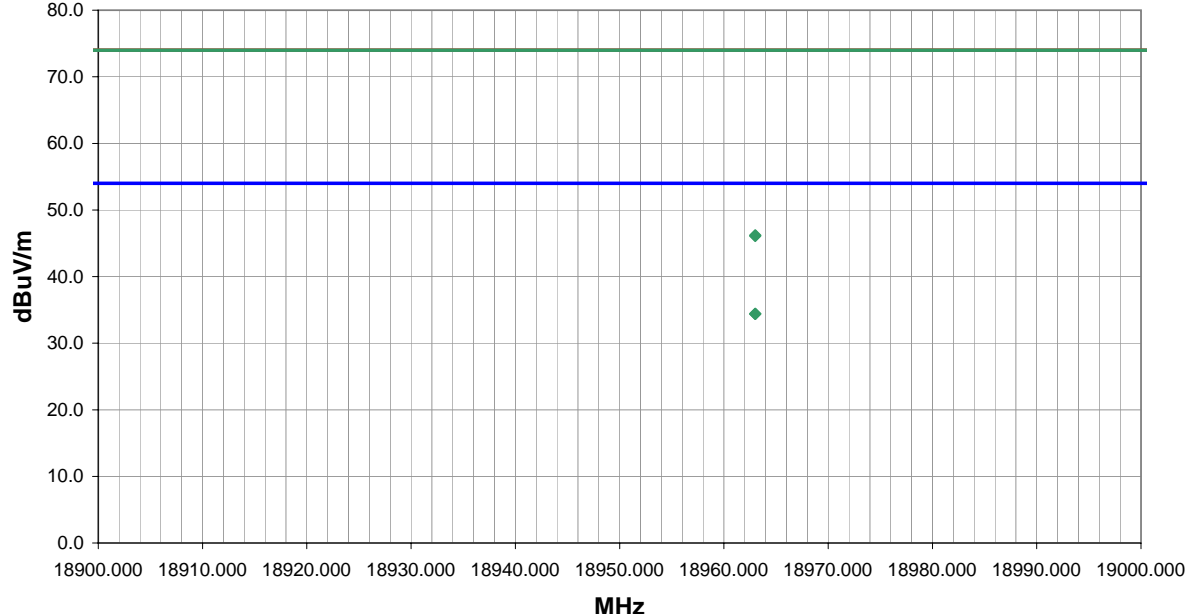
NORTHWEST EMC										REV d14.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C						Work Order: ITRM0030							
Serial Number:						Date: 07/02/04							
Customer: Intermec Technologies Corporation						Temperature: 79							
Attendees: none						Humidity: 43%							
Cust. Ref. No.:						Barometric Pressure: 29.93							
Tested by: Holly Ashkannejhad				Power: 120VAC, 60Hz		Job Site: EV01							
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions						Year: 2003							
Method: ANSI C63.4						Year: 2001							
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (PCS) 1182 and 802.11b 1 in 700C, and RFID 12 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS										Run #			
Pass										58			
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
7236.000	26.2	10.4	305.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.6	54.0	-17.4	
7236.000	26.2	10.4	159.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.6	54.0	-17.4	
7236.000	39.2	10.4	305.0	1.2	3.0	0.0	V-Horn	PK	0.0	49.6	74.0	-24.4	
7236.000	39.0	10.4	159.0	1.3	3.0	0.0	H-Horn	PK	0.0	49.4	74.0	-24.6	


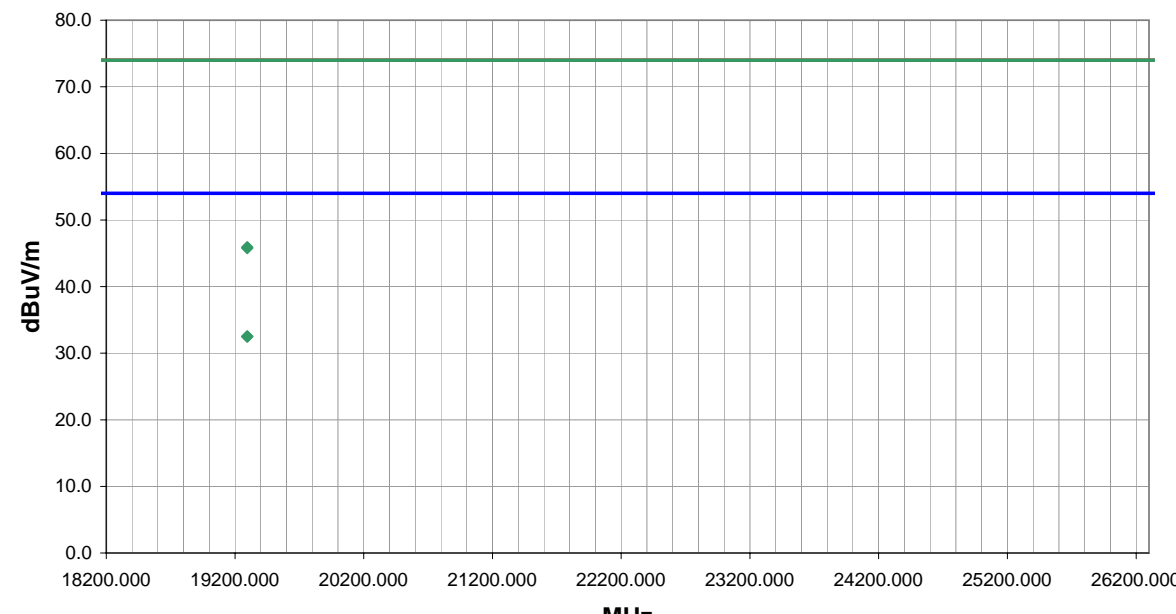
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d4.13 05/06/2004								
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C			Work Order: ITRM0030									
Serial Number:			Date: 07/02/04									
Customer: Intermec Technologies Corporation			Temperature: 79									
Attendees: none			Humidity: 43%									
Cust. Ref. No.:			Barometric Pressure: 29.93									
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(c) Spurious Radiated Emissions			Year: 2003									
Method: ANSI C63.4			Year: 2001									
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.												
EUT OPERATING MODES												
Transmitting CDMA (PCS) 41 and 802.11b 11 in 700C, and RFID 69 in IP3												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS					Run #							
Pass					59							
Other												
					 Tested By:							
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12962.250	28.9	8.6	116.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.5	54.0	-16.5
12962.250	27.0	8.6	48.0	1.5	3.0	0.0	H-Horn	AV	0.0	35.6	54.0	-18.4
16665.750	26.4	8.5	54.0	1.2	3.0	0.0	V-Horn	AV	0.0	34.9	54.0	-19.1
16665.750	26.4	8.5	348.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.9	54.0	-19.1
12962.250	41.6	8.6	116.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.2	74.0	-23.8
12962.250	40.9	8.6	48.0	1.5	3.0	0.0	H-Horn	PK	0.0	49.5	74.0	-24.5
16665.750	40.4	8.5	347.0	1.3	3.0	0.0	H-Horn	PK	0.0	48.9	74.0	-25.1
16665.750	39.6	8.5	54.0	1.2	3.0	0.0	V-Horn	PK	0.0	48.1	74.0	-25.9


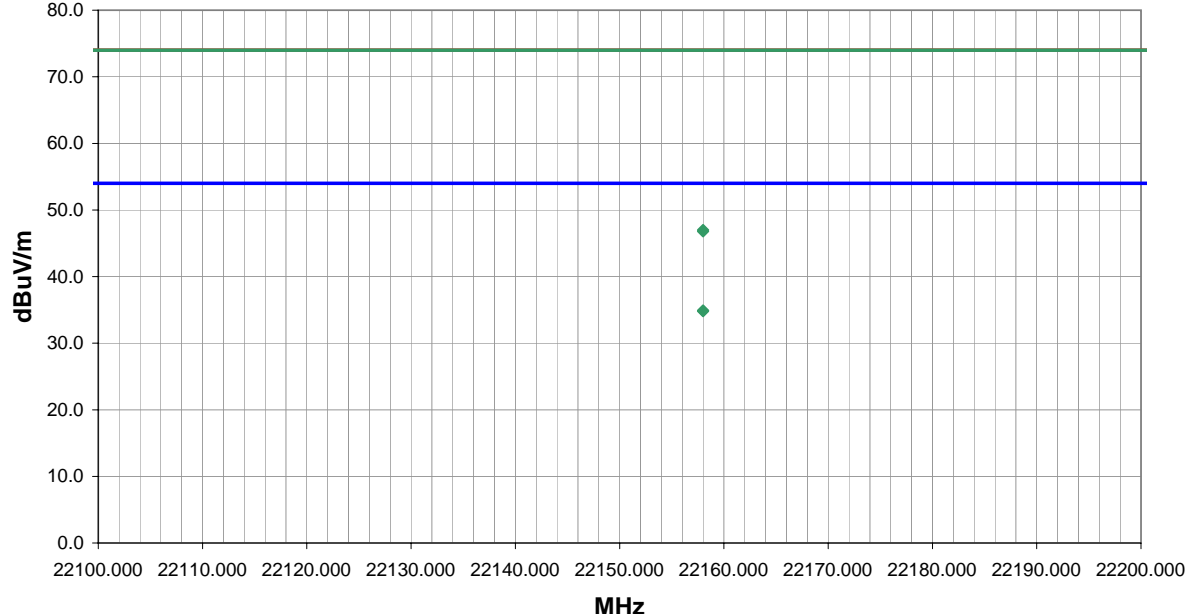
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d4.13 05/06/2004								
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C			Work Order: ITRM0030									
Serial Number:			Date: 07/02/04									
Customer: Intermec Technologies Corporation			Temperature: 79									
Attendees: none			Humidity: 43%									
Cust. Ref. No.:			Barometric Pressure: 29.93									
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(c) Spurious Radiated Emissions			Year: 2003									
Method: ANSI C63.4			Year: 2001									
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.												
EUT OPERATING MODES												
Transmitting CDMA (PCS) 1175 and 802.11b 1 in 700C, and RFID 12 in IP3												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS					Run #							
Pass					60							
Other												
					 Tested By:							
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
16884.000	26.5	14.8	20.0	1.2	3.0	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7
16884.000	26.5	14.8	141.0	1.3	3.0	0.0	H-Horn	AV	0.0	41.3	54.0	-12.7
14472.000	26.9	13.8	117.0	2.2	3.0	0.0	V-Horn	AV	0.0	40.7	54.0	-13.3
14472.000	26.9	13.8	89.0	1.3	3.0	0.0	H-Horn	AV	0.0	40.7	54.0	-13.3
16884.000	40.4	14.8	20.0	1.2	3.0	0.0	V-Horn	PK	0.0	55.2	74.0	-18.8
16884.000	39.9	14.8	141.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.7	74.0	-19.3
14472.000	40.2	13.8	89.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.0	74.0	-20.0
14472.000	40.1	13.8	117.0	2.2	3.0	0.0	V-Horn	PK	0.0	53.9	74.0	-20.1


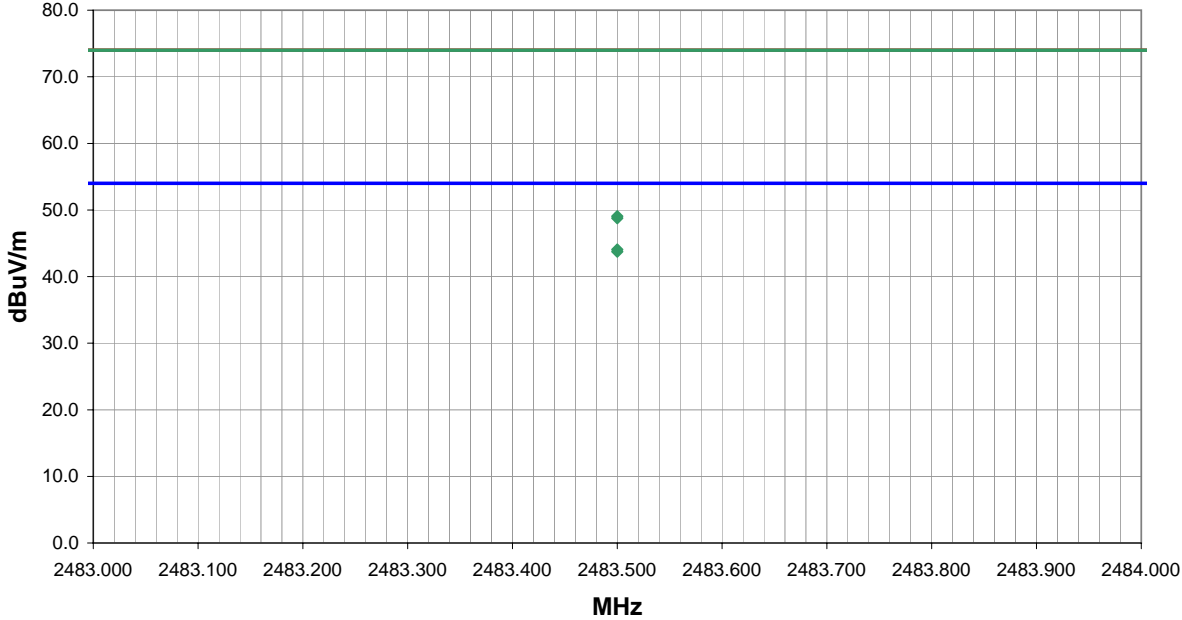
NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C						Work Order: ITRM0030							
Serial Number:						Date: 07/02/04							
Customer: Intermec Technologies Corporation						Temperature: 79							
Attendees: none						Humidity: 43%							
Cust. Ref. No.:						Barometric Pressure: 29.93							
Tested by: Holly Ashkannejhad				Power: 120VAC, 60Hz		Job Site: EV01							
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions						Year: 2003							
Method: ANSI C63.4						Year: 2001							
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (PCS) 1117 and 802.11b 11 in 700C, and RFID 7 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												61	
Other													
<div style="text-align: right;">  Tested By: </div>													
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
17150.050	27.2	10.6	121.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.8	54.0	-16.2	
17149.910	26.5	10.6	2.0	3.5	3.0	0.0	H-Horn	AV	0.0	37.1	54.0	-16.9	
17149.910	40.3	10.6	2.0	3.5	3.0	0.0	H-Horn	PK	0.0	50.9	74.0	-23.1	
17149.910	39.8	10.6	121.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.4	74.0	-23.6	


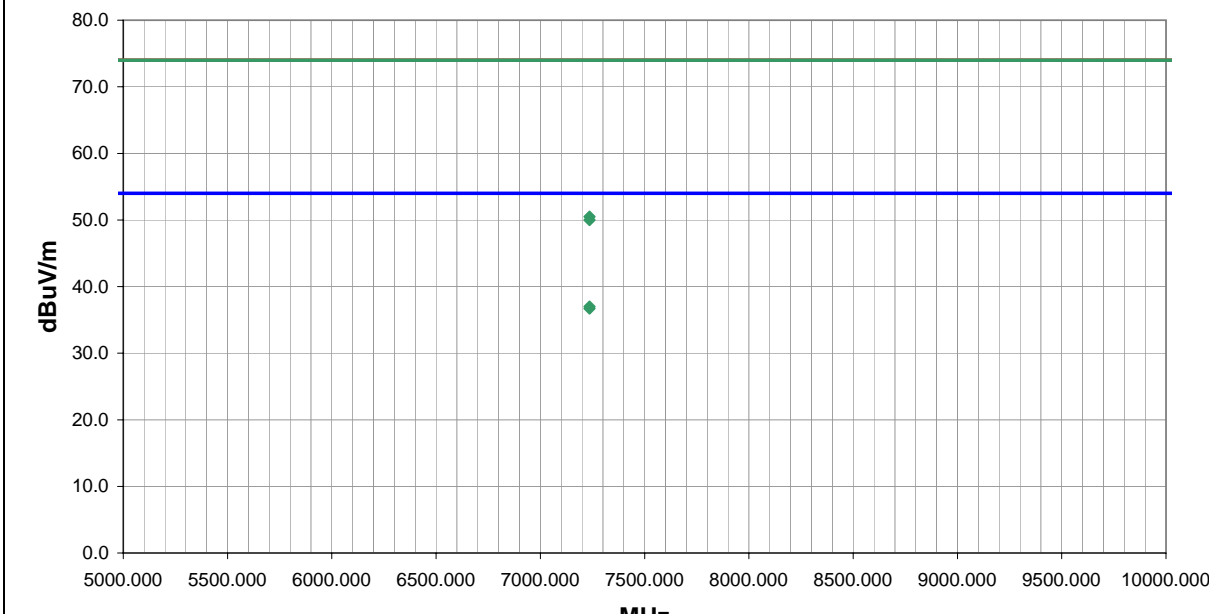
NORTHWEST EMC										REV dtd. 13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C						Work Order: ITRM0030							
Serial Number:						Date: 07/02/04							
Customer: Intermec Technologies Corporation						Temperature: 79							
Attendees: none						Humidity: 43%							
Cust. Ref. No.:						Barometric Pressure: 29.93							
Tested by: Holly Ashkannejhad				Power: 120VAC, 60Hz		Job Site: EV01							
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions						Year: 2003							
Method: ANSI C63.4						Year: 2001							
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (PCS) 41 and 802.11b 11 in 700C, and RFID 69 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												66	
Other													
<div style="text-align: right;">  Tested By: </div>													
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
18517.500	31.1	7.0	303.0	1.1	3.0	0.0	V-High Horr	AV	0.0	38.1	54.0	-15.9	
18517.500	31.0	7.0	121.0	1.0	3.0	0.0	I-High Horr	AV	0.0	38.0	54.0	-16.0	
18517.500	39.8	7.0	303.0	1.1	3.0	0.0	V-High Horr	PK	0.0	46.8	74.0	-27.2	
18517.500	39.5	7.0	121.0	1.0	3.0	0.0	I-High Horr	PK	0.0	46.5	74.0	-27.5	


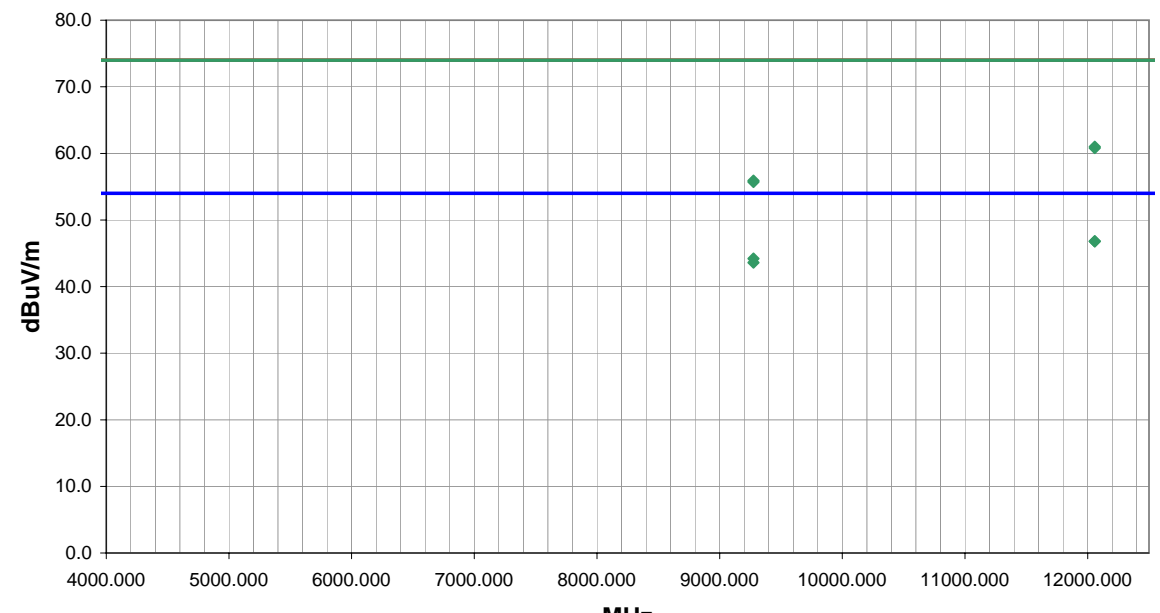
NORTHWEST EMC										RADIATED EMISSIONS DATA SHEET				REV dtd. 13 05/06/2004	
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C										Work Order: ITRM0030					
Serial Number:										Date: 07/02/04					
Customer: Intermec Technologies Corporation										Temperature: 79					
Attendees: none										Humidity: 43%					
Cust. Ref. No.:										Barometric Pressure: 29.93					
Tested by: Holly Ashkannejhad					Power: 120VAC, 60Hz					Job Site: EV01					
TEST SPECIFICATIONS															
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003					
Method: ANSI C63.4										Year: 2001					
SAMPLE CALCULATIONS															
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation															
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator															
COMMENTS															
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.															
EUT OPERATING MODES															
Transmitting CDMA (PCS) 932 and 802.11b 11 in 700C, and RFID 8 in IP3															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
RESULTS												Run #			
Pass												67			
Other															
										 Tested By:					
															
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)			
18963.000	26.9	7.5	248.0	1.0	3.0	0.0	V-High Horr	AV	0.0	34.4	54.0	-19.6			
18963.000	26.9	7.5	117.0	1.1	3.0	0.0	I-High Horr	AV	0.0	34.4	54.0	-19.6			
18963.000	38.7	7.5	117.0	1.1	3.0	0.0	I-High Horr	PK	0.0	46.2	74.0	-27.8			
18963.000	38.6	7.5	248.0	1.0	3.0	0.0	V-High Horr	PK	0.0	46.1	74.0	-27.9			


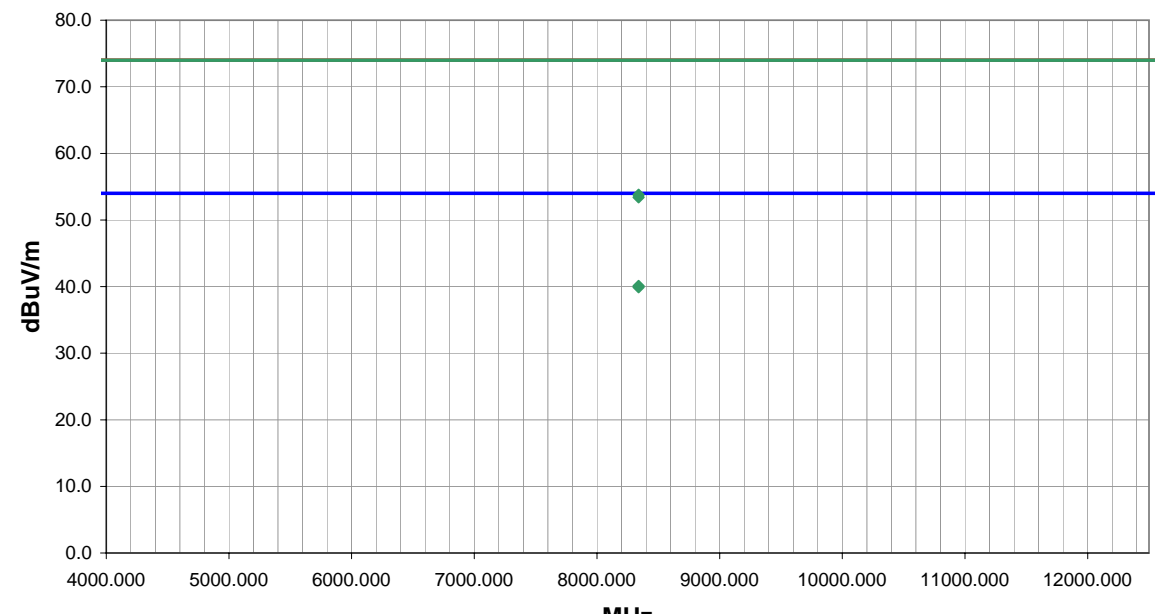
NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C						Work Order: ITRM0030							
Serial Number:						Date: 07/02/04							
Customer: Intermec Technologies Corporation						Temperature: 79							
Attendees: none						Humidity: 43%							
Cust. Ref. No.:						Barometric Pressure: 29.93							
Tested by: Holly Ashkannejhad				Power: 120VAC, 60Hz		Job Site: EV01							
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions						Year: 2003							
Method: ANSI C63.4						Year: 2001							
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (PCS) 1117 and 802.11b 1 in 700C, and RFID 50 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS										Run #			
Pass										68			
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
19294.880	24.5	8.0	309.0	1.0	3.0	0.0	I-High Horr	AV	0.0	32.5	54.0	-21.5	
19294.880	24.5	8.0	118.0	1.1	3.0	0.0	V-High Horr	AV	0.0	32.5	54.0	-21.5	
19294.880	37.9	8.0	309.0	1.0	3.0	0.0	I-High Horr	PK	0.0	45.9	74.0	-28.1	
19294.880	37.8	8.0	118.0	1.1	3.0	0.0	V-High Horr	PK	0.0	45.8	74.0	-28.2	


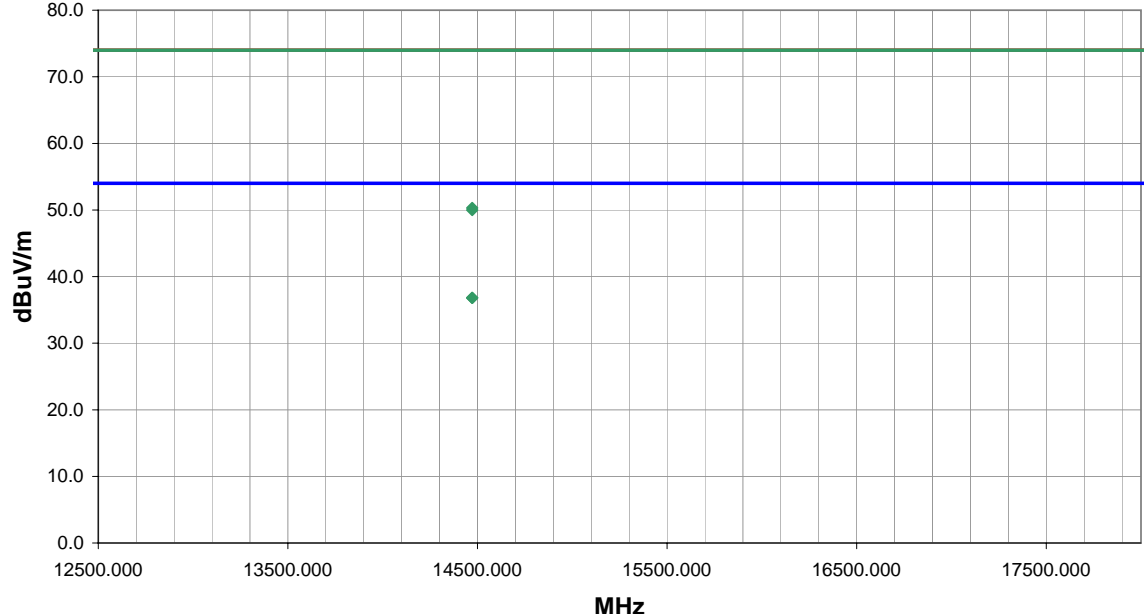
NORTHWEST EMC										RADIATED EMISSIONS DATA SHEET				REV dtd. 13 05/06/2004	
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C										Work Order: ITRM0030					
Serial Number:										Date: 07/03/04					
Customer: Intermec Technologies Corporation										Temperature: 79					
Attendees: none										Humidity: 43%					
Cust. Ref. No.:										Barometric Pressure: 29.93					
Tested by: Holly Ashkannejhad						Power: 120VAC, 60Hz		Job Site: EV01							
TEST SPECIFICATIONS															
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003					
Method: ANSI C63.4										Year: 2001					
SAMPLE CALCULATIONS															
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation															
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator															
COMMENTS															
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.															
EUT OPERATING MODES															
Transmitting CDMA (PCS) 1117 and 802.11b 1 in 700C, and RFID 62 in IP3															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
RESULTS												Run #			
Pass												69			
Other															
										 Tested By:					
															
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)			
22158.000	26.0	8.9	-1.0	1.0	3.0	0.0	I-High Horr	AV	0.0	34.9	54.0	-19.1			
22158.000	25.9	8.9	361.0	1.0	3.0	0.0	V-High Horr	AV	0.0	34.8	54.0	-19.2			
22158.000	38.1	8.9	-1.0	1.0	3.0	0.0	I-High Horr	PK	0.0	47.0	74.0	-27.0			
22158.000	37.9	8.9	361.0	1.0	3.0	0.0	V-High Horr	PK	0.0	46.8	74.0	-27.2			


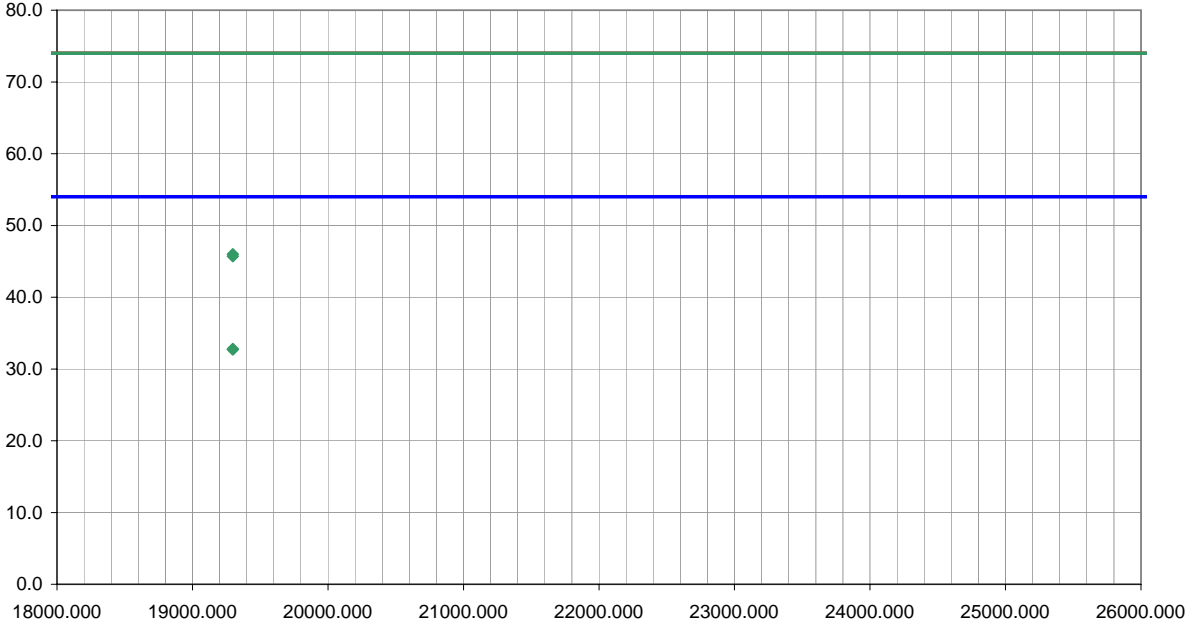
NORTHWEST EMC										REV d14.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 with CDMA and 802.11(b) in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/03/04			
Customer: Intermec Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad						Power: 120VAC, 60Hz		Job Site: EV01					
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(PCS) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (PCS) 1175 and 802.11b 11 in 700C, and RFID 7 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												70	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
2483.500	24.2	29.4	331.0	1.1	1.0	0.0	H-Horn	AV	-9.5	44.1	54.0	-9.9	
2483.500	23.9	29.4	285.0	1.0	1.0	0.0	V-Horn	AV	-9.5	43.8	54.0	-10.2	
2483.500	29.2	29.4	331.0	1.1	1.0	0.0	H-Horn	PK	-9.5	49.1	74.0	-24.9	
2483.500	28.9	29.4	285.0	1.0	1.0	0.0	V-Horn	PK	-9.5	48.8	74.0	-25.2	


NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/01/04			
Customer: Intermec Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad						Power: 120VAC, 60Hz		Job Site: EV01					
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (cellular) 477 and 802.11b 1 in 700C, and RFID 12 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												54	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
7236.000	26.6	10.4	9.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.0	54.0	-17.0	
7236.000	26.3	10.4	354.0	1.5	3.0	0.0	H-Horn	AV	0.0	36.7	54.0	-17.3	
7236.000	40.1	10.4	354.0	1.5	3.0	0.0	H-Horn	PK	0.0	50.5	74.0	-23.5	
7236.000	39.6	10.4	9.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.0	74.0	-24.0	

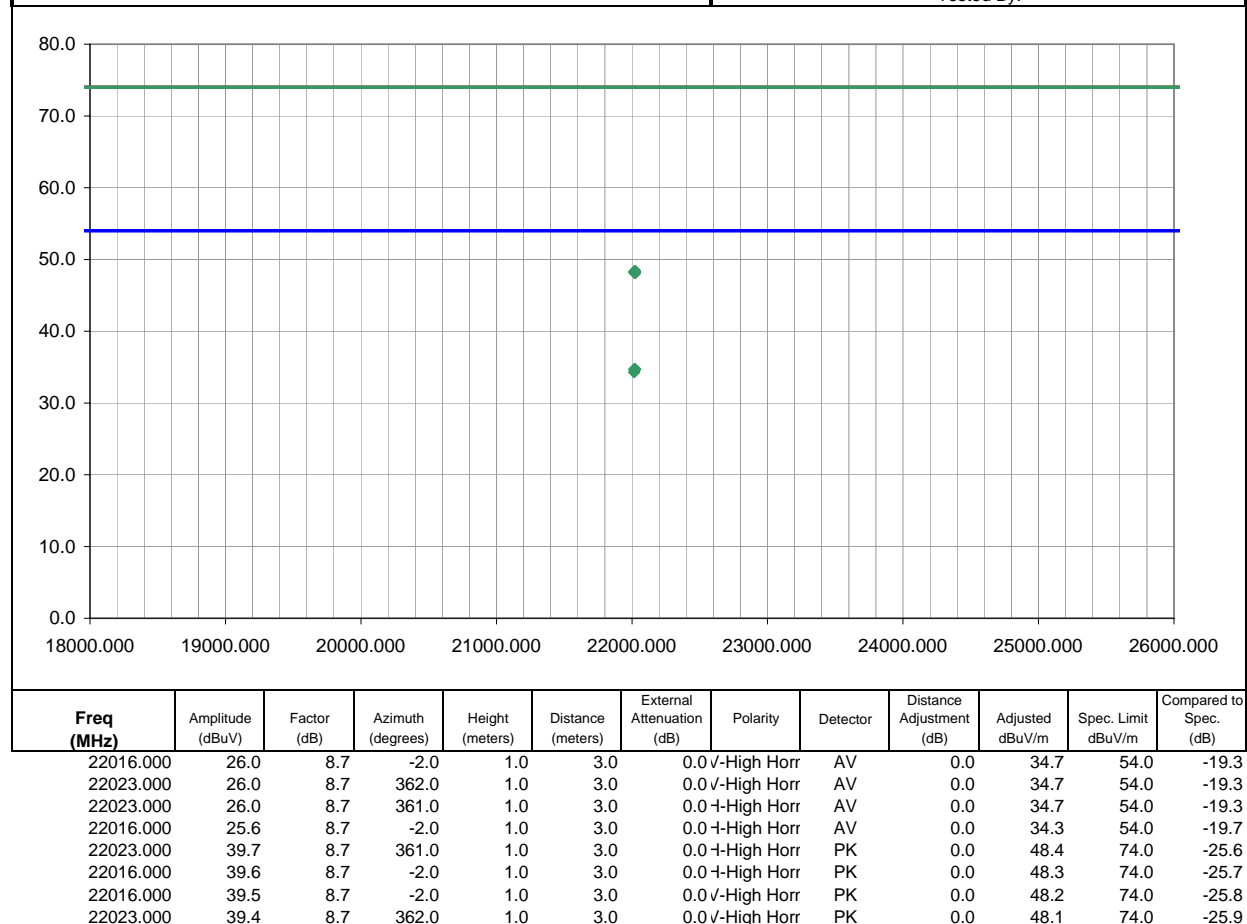
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d4.13 05/06/2004								
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C			Work Order: ITRM0030									
Serial Number:			Date: 07/01/04									
Customer: Intermec Technologies Corporation			Temperature: 79									
Attendees: none			Humidity: 43%									
Cust. Ref. No.:			Barometric Pressure: 29.93									
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(c) Spurious Radiated Emissions			Year: 2003									
Method: ANSI C63.4			Year: 2001									
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.												
EUT OPERATING MODES												
Transmitting CDMA (cellular) 602 and 802.11b 1 in 700C, and RFID 73 in IP3												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS					Run #							
Pass					55							
Other												
					 Tested By:							
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12057.940	26.2	20.6	349.0	1.0	3.0	0.0	H-Horn	AV	0.0	46.8	54.0	-7.2
12057.940	26.2	20.6	21.0	1.0	3.0	0.0	V-Horn	AV	0.0	46.8	54.0	-7.2
9275.500	29.0	15.2	340.0	1.1	3.0	0.0	V-Horn	AV	0.0	44.2	54.0	-9.8
9275.500	28.4	15.2	73.0	1.1	3.0	0.0	H-Horn	AV	0.0	43.6	54.0	-10.4
12057.940	40.4	20.6	349.0	1.0	3.0	0.0	H-Horn	PK	0.0	61.0	74.0	-13.0
12057.940	40.2	20.6	21.0	1.0	3.0	0.0	V-Horn	PK	0.0	60.8	74.0	-13.2
9275.500	40.7	15.2	73.0	1.1	3.0	0.0	H-Horn	PK	0.0	55.9	74.0	-18.1
9275.500	40.5	15.2	340.0	1.1	3.0	0.0	V-Horn	PK	0.0	55.7	74.0	-18.3


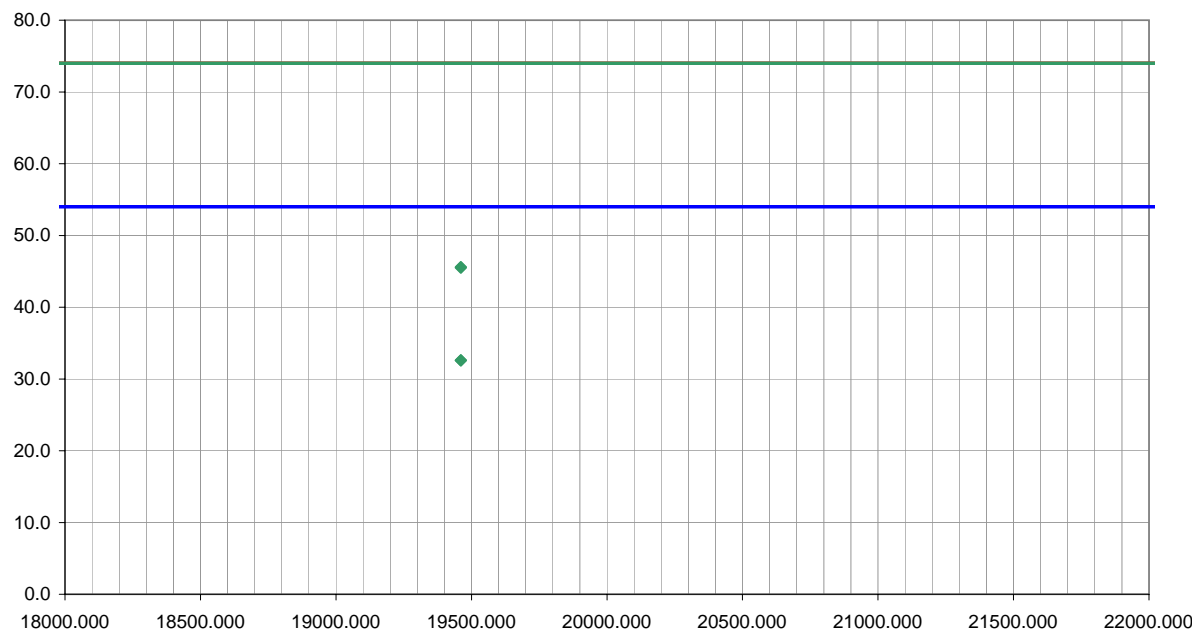
NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/01/04			
Customer: Intermec Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad					Power: 120VAC, 60Hz					Job Site: EV01			
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (cellular) 310 and 802.11b 5 in 700C, and RFID 71 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												56	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
8339.813	26.1	14.0	21.0	1.0	3.0	0.0	V-Horn	AV	0.0	40.1	54.0	-13.9	
8339.813	25.9	14.0	345.0	1.1	3.0	0.0	H-Horn	AV	0.0	39.9	54.0	-14.1	
8339.813	39.8	14.0	345.0	1.1	3.0	0.0	H-Horn	PK	0.0	53.8	74.0	-20.2	
8339.813	39.4	14.0	21.0	1.0	3.0	0.0	V-Horn	PK	0.0	53.4	74.0	-20.6	


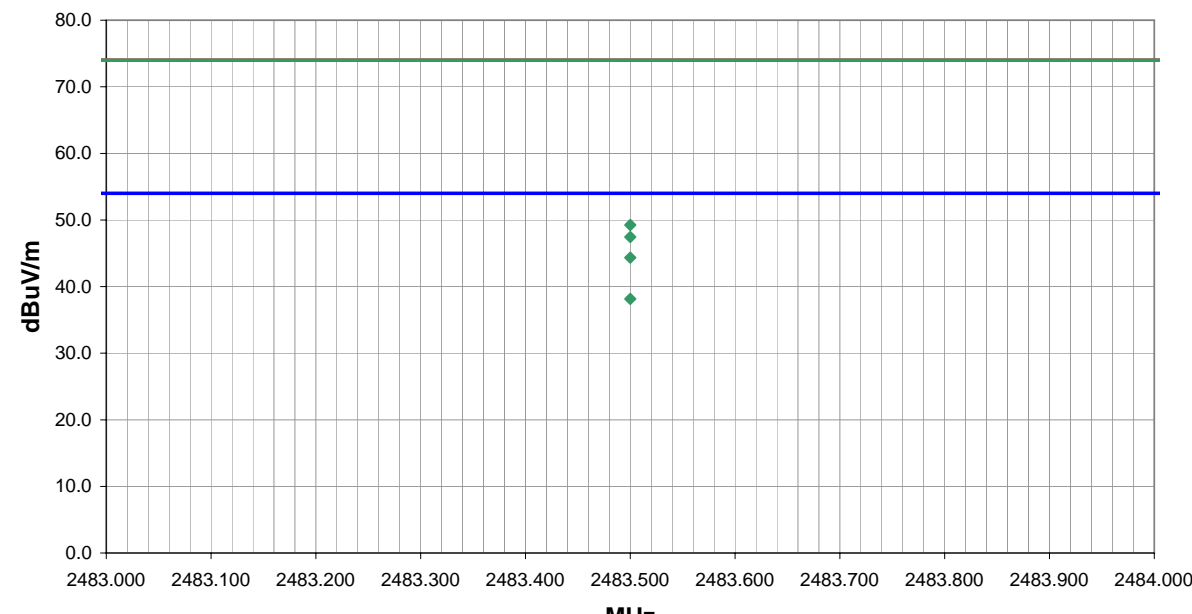
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV dtd. 13 05/06/2004								
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C			Work Order: ITRM0030									
Serial Number:			Date: 07/02/04									
Customer: Intermec Technologies Corporation			Temperature: 79									
Attendees: none			Humidity: 43%									
Cust. Ref. No.:			Barometric Pressure: 29.93									
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(c) Spurious Radiated Emissions			Year: 2003									
Method: ANSI C63.4			Year: 2001									
SAMPLE CALCULATIONS												
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation												
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator												
COMMENTS												
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.												
EUT OPERATING MODES												
Transmitting CDMA (cellular) 477 and 802.11b 1 in 700C, and RFID 12 in IP3												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS					Run #							
Pass					62							
Other												
					 Tested By:							
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
14472.000	26.9	9.9	228.0	1.6	3.0	0.0	V-Horn	AV	0.0	36.8	54.0	-17.2
14472.000	26.9	9.9	144.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.8	54.0	-17.2
14472.000	40.4	9.9	144.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.3	74.0	-23.7
14472.000	40.1	9.9	228.0	1.6	3.0	0.0	V-Horn	PK	0.0	50.0	74.0	-24.0

NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/02/04			
Customer: Intermed Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad					Power: 120VAC, 60Hz					Job Site: EV01			
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (cellular) 477 and 802.11b 1 in 700C, and RFID 12 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												63	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
19297.500	24.8	8.0	-3.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.8	54.0	-21.2	
19297.500	24.7	8.0	362.0	1.0	3.0	0.0	I-High Horr	AV	0.0	32.7	54.0	-21.3	
19297.500	38.0	8.0	362.0	1.0	3.0	0.0	I-High Horr	PK	0.0	46.0	74.0	-28.0	
19297.500	37.7	8.0	-3.0	1.0	3.0	0.0	V-High Horr	PK	0.0	45.7	74.0	-28.3	

NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d4.13 05/06/2004
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C		Work Order: ITRM0030		
Serial Number:		Date: 07/02/04		
Customer: Intermec Technologies Corporation		Temperature: 79		
Attendees: none		Humidity: 43%		
Cust. Ref. No.:		Barometric Pressure: 29.93		
Tested by: Holly Ashkannejhad		Power: 120VAC, 60Hz	Job Site: EV01	
TEST SPECIFICATIONS				
Specification: FCC 15.247(c) Spurious Radiated Emissions		Year: 2003		
Method: ANSI C63.4		Year: 2001		
SAMPLE CALCULATIONS				
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation				
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator				
COMMENTS				
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.				
EUT OPERATING MODES				
Transmitting CDMA (cellular) 727 and 802.11b 8 in 700C, and RFID 47 in IP3				
DEVIATIONS FROM TEST STANDARD				
No deviations.				
RESULTS				Run #
Pass				64
Other		 Tested By:		



NORTHWEST EMC										REV d4.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/02/04			
Customer: Intermec Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad					Power: 120VAC, 60Hz					Job Site: EV01			
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (cellular) 310 and 802.11b 5 in 700C, and RFID 71 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												65	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
19460.690	24.4	8.2	361.0	1.0	3.0	0.0	I-High Horr	AV	0.0	32.6	54.0	-21.4	
19460.690	24.4	8.2	-2.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.6	54.0	-21.4	
19460.690	37.4	8.2	361.0	1.0	3.0	0.0	I-High Horr	PK	0.0	45.6	74.0	-28.4	
19460.690	37.3	8.2	-2.0	1.0	3.0	0.0	V-High Horr	PK	0.0	45.5	74.0	-28.5	

NORTHWEST EMC										REV d14.13 05/06/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: RFID in IP3 co-located with 802.11(b) and CDMA in 700C										Work Order: ITRM0030			
Serial Number:										Date: 07/03/04			
Customer: Intermec Technologies Corporation										Temperature: 79			
Attendees: none										Humidity: 43%			
Cust. Ref. No.:										Barometric Pressure: 29.93			
Tested by: Holly Ashkannejhad						Power: 120VAC, 60Hz		Job Site: EV01					
TEST SPECIFICATIONS													
Specification: FCC 15.247(c) Spurious Radiated Emissions										Year: 2003			
Method: ANSI C63.4										Year: 2001			
SAMPLE CALCULATIONS													
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation													
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator													
COMMENTS													
CDMA(cellular) and 802.11(b) in 700C. RFID in IP3.													
EUT OPERATING MODES													
Transmitting CDMA (cellular) 310 and 802.11b 11 in 700C, and RFID 71 in IP3													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS												Run #	
Pass												71	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
2483.500	24.5	29.4	337.0	1.0	1.0	0.0	H-Horn	AV	-9.5	44.4	54.0	-9.6	
2483.500	18.3	29.4	118.0	1.0	1.0	0.0	V-Horn	AV	-9.5	38.2	54.0	-15.8	
2483.500	29.4	29.4	337.0	1.0	1.0	0.0	H-Horn	PK	-9.5	49.3	74.0	-24.7	
2483.500	27.6	29.4	118.0	1.0	1.0	0.0	V-Horn	PK	-9.5	47.5	74.0	-26.5	



