Intermec Technologies Corporation

Simultaneous Transmission - FCC Part 22H & Part 24E

Testing for Class II Permissive Change of FCC ID: EHAEM3420 to authorize co-location with FCC ID: EHA2610CF

700C configured with three internal radio modules: CDMA (FCC ID: EHAEM3420) 802.11b/g (FCC ID: EHA2610CF) Bluetooth (FCC ID: EHABTS080)

March 30, 2005

Report No. ITRM0073

Report Prepared By



www.nwemc.com 1-888-EMI-CERT

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22975 NW Evergreen Parkway Suite 400 Hillsboro, Oregon 97124

Certificate of Test

Issue Date: March 30, 2005
Intermec Technologies Corporation

700C configured with three internal radio modules:

CDMA (FCC ID: EHAEM3420) 802.11b/g (FCC ID: EHA2610CF) Bluetooth (FCC ID: EHABTS080)

	Emissions		
Specification	Test Method	Pass	Fail
FCC 22.917(a) and FCC 24.238(a) Spurious Radiated Emissions:2004	TA/EIA 603-B:2001	\boxtimes	
(Simultaneous Transmit)			

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:

Jonul Manager

Don Facteau, 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 History

Revision 05/05/03

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 TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV'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. - Hillsboro: C-1071 and R-1025, Irvine: C-2094 and R-1943, Newberg: 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

What is measurement uncertainty?

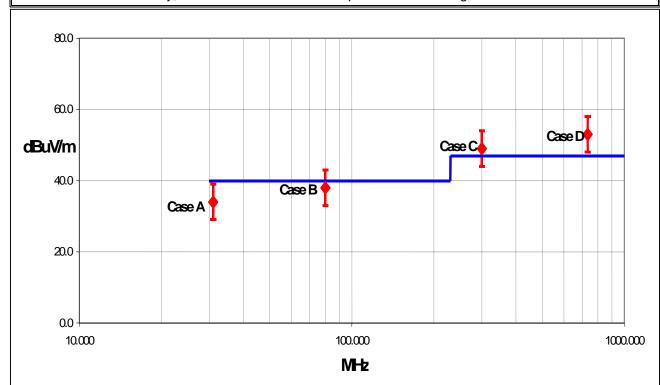
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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.

Measurement Uncertainty

Radiated Emissions ≤ 1 GHz		Value (dB)				
	Probability	Bico	nical	Log Pe	eriodic	D	ipole
	Distribution	Ante	enna	Ante	enna	An	tenna
Test Distance		3m	10m	3m	10m	3m	10m
Combined standard	normal	+ 1.86	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
uncertainty u _c (y)		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty <i>U</i>	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
(level of confidence ≈ 95%)		- 3.77	- 3.73	-2.81	- 2.52	- 2.55	- 2.49

Radiated Emissions > 1 GHz	Value (dB)		
	Probability Distribution	Without High Pass Filter	With High Pass Filter
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25	+ 1.38 - 1.35
Expanded uncertainty <i>U</i> (level of confidence ≈ 95%)	normal (k=2)	+ 2.57 - 2.51	+ 2.76 2.70

Conducted Emissions		
	Probability	Value
	Distribution	(+/- dB)
Combined standard uncertainty <i>uc(y)</i>	normal	1.48
Expanded uncertainty U (level of confidence ≈ 95 %)	normal (k = 2)	2.97

Radiated Immunity		
	Probability	Value
	Distribution	(+/- dB)
Combined standard uncertainty uc(y)	normal	1.05
Expanded uncertainty <i>U</i> (level of confidence ≈ 95 %)	normal (k = 2)	2.11

Conducted Immunity		
	Probability	Value
	Distribution	(+/- dB)
Combined standard uncertainty <i>uc(y</i>)	normal	1.05
Expanded uncertainty U	normal (k = 2)	2.10
(level of confidence ≈ 95 %)	Horriai (K = 2)	2.10

Legend

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

 $\it U$ = combined standard uncertainty multiplied by the coverage factor: $\it k$. 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 $\it k$ =3 (CL of 99.7%) can be used. Please note that with a coverage factor of one, uc(y) yields a confidence level of only 68%.

Facilities



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

Product Description

Revision 10/3/03

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	
Model: 700C configured with three internal radio modules: CDMA (FCC ID: EHAEM3420) 802.11b/g (FCC ID: EHA2610CF) Bluetooth (FCC ID: EHABTS080)		
First Date of Test:	2-2-2005	
Last Date of Test:	2-2-2005	
Receipt Date of Samples: 2-2-2005		
Equipment Design Stage:	ige: Production	
Equipment Condition:	No visual damage.	

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided at the time of test.
I/O Ports:	Serial

Functional Description of the EUT (Equipment Under Test):

Intermec's Handheld Computer, Model 700C was configured with three co-located radios. The 700C contained a CDMA radio (FCC ID: EHAEM3420), an 802.11(b)/(g) radio (FCC ID: EHA2610CF), and a Bluetooth radio (FCC ID: EHABTS080).

Client Justification for EUT Selection:

Not Provided

Client Justification for Test Selection:

This test demonstrated compliance with FCC Part 22H and Part 24E emissions limits while the co-located radios were transmitting simultaneously. Each radio transmits through its own antenna. This report will be used as part of a Class II Permissive Change to authorize the co-location of the 802.11b/g radio with the CDMA radio.

EUT Photo



Modifications

	Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT	
1	Spurious Radiated Emissions	2/2/2005	No EMI suppression devices were added or modified during this test.	Same configuration as received.	EUT remained at Northwest EMC.	

Spurious Radiated Emissions

Revision 10/1/03

Justification

Intermec's Handheld Computer, Model 700C was configured with three co-located radios. The 700C contained a CDMA radio (FCC ID: EHAEM3420), an 802.11(b)/(g) radio (FCC ID: EHA2610CF), and a Bluetooth radio (FCC ID: EHABTS080). This test demonstrated compliance with FCC Part 22H and Part 24E emissions limits while the co-located radios were transmitting simultaneously. Each radio transmits through its own antenna.

All possible combinations of harmonic emissions from the CDMA, 802.11(b)/(g), and Bluetooth 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 Specif	Channels in Specified Band Investigated:			
802.11(b):	1, 11			
CDMA (Cellular):	54, 55, 395, 467			
CDMA (PCS):	1, 35, 1153			
Bluetooth:	5, 11, 62, 68, 79			

Operating Modes Investigated:

Simultaneous transmission of Bluetooth Channel 11, 802.11Channel 1, & CDMA PCS Channel 1
Simultaneous transmission of Bluetooth Channel 11, 802.11Channel 1, & CDMA PCS Channel 1153
Simultaneous transmission of Bluetooth Channel 68, 802.11Channel 11, & CDMA PCS Channel 35
Simultaneous transmission of Bluetooth Channel 62, 802.11Channel 11, & CDMA PCS Channel 1153
Simultaneous transmission of Bluetooth Channel 11, 802.11Channel 1, & CDMA Cellular Channel 467
Simultaneous transmission of Bluetooth Channel 5, 802.11 Channel 1, & CDMA Cellular Channel 395
Simultaneous transmission of Bluetooth Channel 79, 802.11Channel 11, & CDMA Cellular Channel 55
Simultaneous transmission of Bluetooth Channel 79, 802.11Channel 11, & CDMA Cellular Channel 54

Data Rates Investigated:

Maximum

Antennas Investigated:			
802.11(b): Folded Monopole internal to 700C, P/N 805-608-104			
CDMA:	CDMA: Tri-band Antenna external to 700C, P/N 805-624-001		
Bluetooth:	Bluetooth: Chip antenna integral to Bluetooth module inside 700C		

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Invest	igated		
Start Frequency	1 GHz	Stop Frequency	25 GHz

Revision 10/1/03

Software\Firmware Appl	ied During Test		
Exercise software	FCC Tests Blue Test Test Utility	Version	Unknown Unknown 0.4
Description			

This system was tested using special test software to exercise the functions of the device during the testing such as channels, power, and modulation during simultaneous transmission.

EUT and Peripherals			
Description	Manufacturer	Model/Part Number	Serial Number
Handheld Computer	Intermec Technologies Corporation	700C	13790400011
AC Adapter	Elpac Power Systems	FW1812	011025

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.3	PA	Handheld Computer	AC Adapter
AC Power	No	2.0	No	AC Adapter	AC Mains
PA = Cable is pe	ermanently	attached to the de	evice. Shie	Iding and/or presence of ferrite ma	y be unknown.

Measurement Equipmen	nt				
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	24 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24- 10P	APJ	01/05/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/02/2004	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/02/2004	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/02/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	01/02/2005	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24- 10P	APC	10/08/2003	15 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	1/06/2005	24 mo

Spurious Radiated Emissions

Revision 10/1/03

Test Description

Requirement: Per 2.1053, the field strength of spurious radiation was measured in the far-field at an FCC Listed semi-anechoic chamber up to 25 GHZ. The applicable limits are 22.917(a) for the cellular band, and 24.238(a) for the PCS band.

Per 22.917(a), The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB (-13 dBm).

Per 24.238(a), The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB (-13 dBm).

<u>Configuration:</u> Intermec's Handheld Computer, Model 700C was configured with three co-located radios. The 700C contained a CDMA radio (FCC ID: EHAEM3420), an 802.11(b)/(g) radio (FCC ID: EHA2610CF), and a Bluetooth radio (FCC ID: EHABTS080). This test demonstrated compliance with FCC Part 22H and Part 24E emissions limits while the co-located radios were transmitting simultaneously. Each radio transmits through its own antenna.

Simultaneous Transmission:

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.

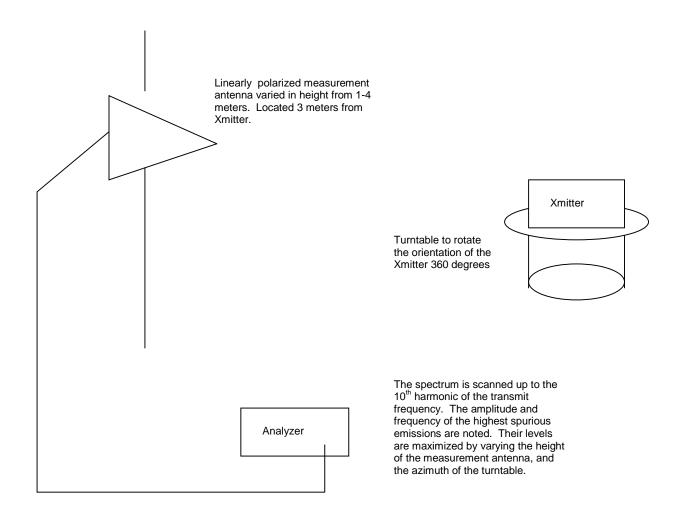
All possible combinations of harmonic emissions from the CDMA, 802.11(b), and Bluetooth radios were compared numerically. It was determined that there were no possible coincidental harmonics below 1 GHz. The frequency range from 1 GHz to 25 GHz was investigated for channel combinations that would produce coincidental harmonics.

Test Methodology: For licensed transmitters, the FCC references TIA/EIA 603-B as the measurement procedure standard. TIA/EIA 603-B Section 2.2.12 describes a method for measuring radiated emissions that utilizes an antenna substitution method:

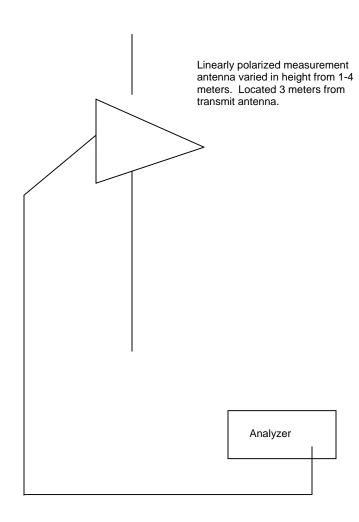
At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (ERP or e.i.r.p) is determined for each radiated emission.

Test Setup Diagram

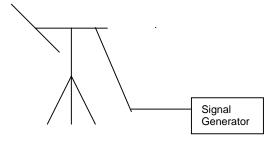
Test Setup for Field Strength Measurements



Test Setup for Power Measurements Utilizing the Antenna Substitution Method



During field strength measurements, the amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole (at the same height) that is successively tuned to each of the highest spurious emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency.



The spectrum analyzer is monitored to verify that the output of the signal generator produces a signal equal in amplitude to a previously measured spurious emission.

Completed by: Holy Arling

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Freq (MHz)		Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
19296.00 19296.00		360.0 -1.0	1.0 1.0			H-High Horr H-High Horr		0.0000 0.0000	-45.3 -46.2	-13.0 -13.0	-32.3 -33.2

NORTHWEST EMC	A	Appa	rent	Pow	er l	Data S	Sheet	t		,	ACQ 2005.1 EMI A2.
	: 2601CF	-							/ork Order	ITRM0054	
Serial Numbe										02/02/05	
	: Intermec Technologies	s Corporat	tion					Tei	mperature:		
Attendee									Humidity:		
Cust. Ref. No	: N/A : Holly Ashkannejhad				Powe	er: 120VAC/6	NH ₇	Barometri	c Pressure Job Site:		
ST SPECIFICA					TOW	11. 120VAO/0	JIIZ		JOD Oile.		
	FCC 22.917(a):2004					Method:	TIA/EIA 60	3-B:2001			
AMPLE CALCUI Radiated Emission	.ATIONS s: Field Strength = Measured Le	vel + Antenna	a Factor + Cab	ole Factor - An	nplifier Gain	+ Distance Adjus	stment Factor +	External Atten	nuation		
	s: Adjusted Level = Measured Le	evel + Transd	ucer Factor +	Cable Attenua	ation Factor	+ External Attenu	uator				
MMENTS											
C standalone.											
T OPERATING	MODES										
etooth 5, 802.11b 1	, CDMA 395 (cellular) on 700C										
VIATIONS FRO	M TEST STANDARD										
deviations. SULTS										Run #	
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	00 19210.000 19220.0	100	0.000 100	240 000 4	0250.00	0 10260 000	10270.00	10200	100 1020	0.000 403	00 000
19200.0	UU 1921U.UUU 1922U.U	JUU 1923	0.000 192	240.000 1		U 1920U.UU(19270.00	JU 1928U.(JUU 1929	0.000 193	00.000
					MHz						
	1 1	1						I			Compared
Freq		Azimuth	Height			Polarity	Detector	EIRP	EIRP	Spec. Limit	Spec.
(MHz)		(degrees)	(meters)				LI	(Watts)	(dBm)	(dBm)	(dB)
19248.00		360.0	1.0			V-High Hor		0.0000	-44.4	-13.0	-31
19248.00	0	-1.0	1.0			H-High Hori	PK	0.0000	-47.1	-13.0	-3

NORTHWEST **Apparent Power Data Sheet EMC** EUT: 2601CF Work Order: ITRM0054 Serial Number: Unknown Date: 02/02/05 Customer: Intermec Technologies Corporation Temperature: 70 Attendees: None Humidity: 38% Cust. Ref. No.: N/A Barometric Pressure 30.15 Tested by: Holly Ashkannejhad Power: 120VAC/60Hz Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 22.917(a):2004 Method: TIA/EIA 603-B: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 **EUT OPERATING MODES** Bluetooth 79, 802.11b 11, CDMA 55 (cellular) on 700C DEVIATIONS FROM TEST STANDARD RESULTS 34 Pass Other Holy Aligh Tested By: 0.0 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 -80.0 19800.000 20800.000 20300.000 21300.000 21800.000 22300.000 MHz Compared to Polarity Azimuth Height EIRP EIRP Spec. Limit Freq Detector Spec. (dB) (degrees) (meters) (Watts) (dBm) (dBm) (MHz)

22320.000

22320.000

19840.000

19840.000

360.0

-1.0

-1.0

360.0

1.0

1.0

1.0

1.0

V-High Horr

H-High Horr

V-High Horr

H-High Horr

PΚ

PΚ

0.0000

0.0000

0.0000

0.0000

-38.8

-42.4

-44.3

-46.4

-13.0

-13.0

-13.0

-13.0

-25.8

-29.4

-31.3

-33.4

NORTHWEST EMC		Ap	par	ent	Pov	ver D	ata S	Sheet				ACQ 2005.1. EMI A2.1
	IT: 2601CF		_							k Ordor:	ITRM0054	
	er: Unknown								VVOI		02/02/05	•
	er: Intermec Tec	hnologies C	ornoration	•					Tomn	erature:		
	es: None	illologies C	oi poi atioi							umidity:		
Cust. Ref. N									Barometric P			
	oy: Holly Ashkan	neihad				Dowe	: 120VAC/60)H-		ob Site:		
EST SPECIFICA		nejnau				Fower	. 120VAC/00	лг		ob Site.	EVUI	
	on: FCC 24.238(a):2004					Method:	TIA/EIA 603	-B:2001			
AMPLE CALCU	LATIONS											
	ns: Field Strength = N					-	-		External Attenuat	ion		
	ns: Adjusted Level = I	Measured Level	+ Transduce	r Factor + C	able Atten	uation Factor +	External Attenu	ator				
OMMENTS UT OPERATING	MODES b 11, CDMA 1153 (PC	CS) on 700C										
deviations.	OM TEST STAND	DARD										
ESULTS ass											Run #	35
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-80.0 <u> </u>	000 2410.000	2420.000	2430.00	00 244	10.000	2450.000 MHz	2460.000	2470.000	0 2480.000	249	0.000 2	500.000
Freq (MHz)				Height meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit	Compared Spec. (dB)
2483.5 2483.5		•	165.0 327.0	1.2 1.2			V-Horn H-Horn	PK PK	0.0000 0.0000	-47.4 -50.5	-13.0 -13.0	

NORTHWEST EMC		Appai	rent Po	wer D	ata S	Sheet	t			ACQ 2005.1 EMI 2005.1
EU1	T: 2601CF						W	ork Order:	ITRM0054	
Serial Numbe	r: Unknown							Date:	02/02/05	
Custome	r: Intermec Technolog	ies Corporation	on				Tei	mperature:	20	
Attendees	s: None							Humidity:	35%	
Cust. Ref. No	.:						Barometri	c Pressure	30.38	
	y: Holly Ashkannejhad			Power:	120VAC/6	0Hz		Job Site:	EV01	
ST SPECIFICA										
	FCC 24.238(a):2004				Method:	TIA/EIA 60	3-B:2001			
	s: Field Strength = Measured s: Adjusted Level = Measured				-		- External Atten	uation		
MMENTS C Standalone	s. Aujusteu Level – Measuret	Level + Transduc	Sel Tactor + Cable Att	endation ractor +	External Attend	Jatoi				
T OPERATING	MODES									
	1, CDMA 1 (PCS) on 700C									
leviations.	OM TEST STANDARD									
SULTS									Run #	6
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표 -40.0			•							
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-80.0 12500.0	00 13500.0	100	14500.000	15500	000	1650	0.000	175	00.000	
.2300.0	10000.0		. 1000.000	MHz		10001		175	5.000	
Freq (MHz)		Azimuth (degrees)	Height (meters)		Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compare Spec. (dB)
14472.00 14472.00		193.0 26.0	1.4 2.9	•	H-Horn V-Horn	PK PK	0.0000	-39.1 -39.6	-13.0 -13.0	-2 -2

NORTHWEST EMC		Appa	rent Po	ower	Data S	Shee	t			ACQ 2005.1 EMI 2005.1
EU	T: 2601CF						W	ork Order:	ITRM0054	
Serial Numbe	r: Unknown								02/02/05	
	r: Intermec Technologi	es Corporati	on				Tei	mperature:		
Attendees		•						Humidity:	38%	
Cust. Ref. No	.:						Barometri	c Pressure	30.47	
Tested by	y: Holly Ashkannejhad			Pov	wer: 120VAC/6	0Hz		Job Site:	EV01	
ST SPECIFICA										
	FCC 22.917(a):2004				Method:	TIA/EIA 60	3-B:2001			
	s: Field Strength = Measured				-		External Atten	uation		
MMENTS C Standalone	s: Adjusted Level = Measured	Level + Transdu	cei Factoi + Cable F	dendation Fact	or + External Atten	uator				
T OPERATING										
	1, CDMA 467 (cellular) on 70	0C								
deviations.	M TEST STANDARD									
SULTS ss									Run #	7
ner										
						Holy	Ale	\\		
0.0 —							Tested	а ву:		
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-40.0			•							
-50.0										
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-70.0										
-80.0 12500.0	00 13500.0	00	14500.000		500.000	1650	0.000	175	00.000	
	T T	 		MHz	<u>. </u>	-	F T			Compared
Freq (MHz) 14472.00	0	Azimuth (degrees)	Height (meters)		Polarity H-Horn	Detector	EIRP (Watts) 0.0000	EIRP (dBm)	Spec. Limit (dBm)	Spec. (dB)
14472.00		278.0	1.2		V-Horn	PK	0.0000	-39.9	-13.0	-2

NORTHWEST	г					_											<u> </u>							,	ACQ 2	2005.1.3
EMC	;					A	pr	a	re	nt	P	O	WE	er D	at	a	Sh	ee							EMI 2	2005.1.3
		2601	CF																	W	ork (Order:	ITRN	10054		
Serial Nu																							02/02	2/05		
	tomer:			Techi	nolog	ies (Corp	ora	ion											Te		ature:	22 37%			
Cust. Re		NOHE																	Baron	netri			_			
Test	ed by:		Ash	kann	ejhad	ı								Power	120V	AC/6	0Hz						EV01			
TEST SPECIF Specific			22.91	17(a):	2004										Me	ethod:	TIA/E	IA 60	3-B:200	1						
SAMPLE CAL																										
Radiated Em Conducted Em																		actor	- External	Atten	uation	1				
COMMENTS	15510115.	Aujuste	eu Lev	ei = ivie	easured	a Leve	1 7 11	ansu	ucerr	actor + v	Jabie	e Alle	iluatioi	T F dCtOT +	Externa	ıı Allem	uatoi									
700C Standalone)																									
EUT OPERAT	ING N	IODE:	S																							
Bluetooth 11, 80	2.11b 1,	CDMA	467 (Cellula	ır) on 7	700C																				
DEVIATIONS	FROM	TES	т ст	AND/	ARD																					
No deviations.	TRON	ILO		AND	יווע																					
RESULTS Pass																							Run		88	
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Freq							zimut			ight					Pol	arity	Dete	ector	EIRP			RP		. Limit	S	pec.
(MHz)	23.973					(d	egree		(me	ters)					\/ '	امت		V	(Watts		(dE	3m)		Bm)		(dB)
	23.973							9.0 4.0		1.2 1.2						Horn Horn		K K	0.00			-52.5 -53.0		-13.0 -13.0		-39.5 -40.0
407	75.981						12	5.0		1.2					V-H	Horn	Р	K	0.00	000		-54.6		-13.0		-41.6
407	5.981						35	0.0		1.3					H-F	Horn	Р	K	0.00	000		-55.0		-13.0		-42.0

NORTHWEST **Apparent Power Data Sheet EMC** Work Order: ITRM0054 EUT: 2601CF Serial Number: Unknown Date: 02/02/05 Customer: Intermec Technologies Corporation Temperature: 21 Attendees: None Humidity: 38% Cust. Ref. No.: Barometric Pressure 30.47 Tested by: Holly Ashkannejhad Power: 120VAC/60Hz Job Site: EV01 TEST SPECIFICATIONS Specification: FCC 22.917(a):2004 Method: TIA/EIA 603-B: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 **EUT OPERATING MODES** Bluetooth 79, 802.11b 11, CDMA 55 (cellular) on 700C DEVIATIONS FROM TEST STANDARD RESULTS 39 Pass Other Holy Sligh Tested By: 0.0 -10.0 -20.0 -30.0 \$ -40.0 \$ -50.0 -60.0 -70.0 -80.0 4100.000 5100.000 6100.000 7100.000 8100.000 9100.000 10100.000 11100.000 12100.000 MHz Compared to Height Polarity EIRP EIRP Spec. Limit Freq Azimuth Detector Spec. (degrees) (meters) (Watts) (dBm) (dBm) (dB) (MHz) 12400.000 293.0 1.5 H-Horn 0.0000 -33.9 -13.0 -20.9 12400.000 275.0 V-Horn PΚ 0.0000 -35.8 -13.0 -22.8 7440.000 40.0 2.8 H-Horn PΚ 0.0000 -48.3 -13.0 -35.3 7440.000 V-Horn 295.0 1.2 0.0000 -49.8 -13.0 -36.8 4959.969 209.0 V-Horn PΚ 0.0000 -54.0 -13.0 -41.0 1.1 PΚ -54.3 -41.3 4175.990 224.0 0.0000 -13.0 1.3 H-Horn PΚ 0.0000 -55.1 4175.990 131.0 1.2 V-Horn -13.0 -42.14959.969 -1.0 1.3 H-Horn PΚ 0.0000 -56.5 -13.0 -43.5 7440.000 40.0 2.8 H-Horn ΑV 0.0000 -62.1 -13.0 -49.1

7440.000

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-57.1

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EMC					Ap	pa	re	nt	Po	We	er	Da	ata	Sh	ee	et				ЛI 2005.1.3
		2601C	F														Work Order	: ITRM00	54	
Serial Nu																		: 02/02/05	5	
	tomer: ndees:		ec le	chnolog	gies Cor	pora	ion										Temperature Humidity			
Cust. Re	ef. No.:															Barome	tric Pressur	30.47		
			Ashka	nnejhad	t						Pow	er: 1	20VAC	:/60Hz			Job Site	: EV01		
TEST SPECII Specifi			4.238(a):2004									Metho	od: TIA/	EIA 6	603-B:2001				
SAMPLE CAI Radiated Em				Measured	d Level + A	ntenna	a Factor	+ Cable	Factor	- Ampli	fier Gai	n + Di	istance A	diustment	Factor	r + External At	tenuation			
Conducted Em																				
COMMENTS 700C STandalon	10																			
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Freq					Azim	uth	Heig	ıht					Polarity	/ De	tector	EIRP	EIRP	Spec. Lin		ompared to Spec.
(MHz)	20.65				(degre		(mete								214	(Watts)	(dBm)	(dBm)	Ĺ	(dB)
	36.000 36.000					32.0 53.0		1.3 1.5					H-Horn V-Horn		PK PK	0.000				-36.3 -37.4
407	75.990				2	63.0		1.5					V-Horr	n l	PK	0.000	0 -52.9	9 -13	3.0	-39.9
407	75.990				2	50.0		1.5					H-Hori	n l	PK	0.000	0 -53.	I -13	3.0	-40.1

	MC				Appa	arer	nt F	0	WE	er	D	ata	a S	Sho	eet					ACQ 2005.1.3 EMI 2005.1.3
		2601CF			• •												Work Orde	er: ITF	RM0054	
Se	rial Number:		/n															te: 02		
			c Tech	nolog	ies Corpor	ation											Temperatui			
	Attendees:	None															Humidi			
Cı	ust. Ref. No.:	Hally A	hkoni	aaibad						D		1201/	AC/60	\U-		Barome	etric Pressu Job Si			
TEST S	Tested by: PECIFICAT		SIIKalii	lejnau						Pov	ver:	1200	AC/60	JITZ			JOD 511	e: Ev	U I	
S	pecification:	FCC 24.	238(a)	:2004								Me	thod:	TIA/E	IA 603-	B:2001				
Radia	E CALCULA ited Emissions:	Field Strer	-										-		actor + E	xternal At	tenuation			
COMME	ted Emissions:	Adjusted L	.evel = N	/leasure	d Level + Trans	sducer Fact	or + Cab	le Atte	enuation	Facto	or + E	xterna	l Attenu	ator						
700C stan																				
EUT OP	ERATING N	MODES																		
Bluetooth	11, 802.11b 1	, CDMA 11	53 (PCS) on 700	С															
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Г	Freq				Azimuth	Height						Pol	arity	Dete	ector	EIRP	EIRP		ec. Limit	Spec.
(!	MHz)				(degrees)	(meters						L				(Watts)	(dBm)		(dBm)	(dB)
	12060.000				232.0		1.3						lorn	Р		0.000			-13.0	
	12060.000 4823.940				145.0 204.0		1.2 1.2						lorn Iorn		K	0.000			-13.0 -13.0	
	4823.940				257.0		1.3						lorn		K	0.000			-13.0	
	4823.940				204.0		1.2						lorn	A		0.000			-13.0	
	4823.940				257.0		1.3						lorn	Α		0.000			-13.0	

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Se	erial Numbe	_																							_	2/02/05		
	Custome	er: I	ntern	nec T	echn	ologi	ies C	orpoi	atio	n												1		eratur				
	Attendee	_	lone																					umidit				
С	ust. Ref. No															140		0/0			Ва	arome		ressu				
TEST	Tested b			Ashk	anne	jhad									Powe	r: 12	20VA	AC/6	0Hz					Job Site	e: E	V01		
	SPECIFICA Specification			4.238	(a):2	004											Met	hod:	TIA/E	IA 6	03-B:	2001						
SAMPL	E CALCU	LA	TIONS	5																								
	ated Emission																			actor	+ Exte	rnal At	tenua	tion				
	cted Emission	ns: A	djuste	d Level	= Mea	sured	Level	+ Tran	sduce	r Facto	r + C	cable.	Attenu	uation I	-actor -	- Exte	ernal a	Atteni	uator									
COMMI 700C Sta																												
700C Sta	indaione																											
EUT OF	PERATING	M	ODES	;																								
Bluetootl	h 68, 802.11k	11,	CDMA	35 (P	CS) on	700C																						
<u></u>		_																										
	TIONS FR	MC	TEST	STA	NDAI	RD																						
No devia																												
RESUL	.TS																								R	un #	40	
Pass																									_		42	
Other																т												
Cinci																			,			^	, `	1	0			
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dBm	-40.0										\neg																•	
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	4100.0	<u></u>		10	00.00	nn -		E10	0.00	nn -		5.0	00.0	100		61	00.0	ากก		66	00.0	00		7100	ገ	Λ .		
	4100.0	UU		40	.U.U	JU		310	ال. ن	,0		50	ا.ںں.ر			ΟI	JU.(,00		00	JU.U	oo		, 100	J.UU	U		
														M	Hz													
		<u> </u>		- 1			1		1		<u> </u>			1		T			I				1				Co	mpared to
	Freq						Az	imuth		Height							Pola	rity	Dete	ector	Е	IRP		EIRP	S	Spec. Lim		Spec.
	(MHz)						(de	grees)	_	meters)	_											Vatts)		(dBm)		(dBm)		(dB)
	7407.00							212.			.6						H-H			K		0.000		-41.		-13		-28.6
	7407.00							121.			.1						V-H			K		0.000		-41.		-13		-28.9
	4175.98							259.			.5						H-H			K		0.000		-53.		-13		-40.5
	4175.98	5/						300.	U	- 1	.1					- 1	H-H	orn	۲	K	(0.000	U	-54.	.4	-13	.U	-41.4

NORTHWEST	Apparant Da	WOR D	ata Chas	4	ACQ 2005.1.3
EMC	Apparent Po	wel D	ala Snee	L	EMI 2005.1.0
	2601CF			Work Order	
Serial Number				Date	02/02/05
	Intermec Technologies Corporation			Temperature	
Attendees Cust. Ref. No.	None			Humidity Barometric Pressure	
	Holly Ashkannejhad	Power	120VAC/60Hz	Job Site:	
TEST SPECIFICAT		1 0 11 0 1	1201710700112	COD CITO	
	FCC 22.917(a):2004		Method: TIA/EIA 60	3-B:2001	
SAMPLE CALCULA	TIONS				
	Field Strength = Measured Level + Antenna Factor + Cable Factor	- Amplifier Gain +	Distance Adjustment Factor +	External Attenuation	
	Adjusted Level = Measured Level + Transducer Factor + Cable Atte	enuation Factor + I	External Attenuator		
COMMENTS					
700C Standalone					
EUT OPERATING I					
Bluetooth 68, 802.11b 1	1, CDMA 54 (cellular) on 700C				
DEVIATIONS FOR	A TEST STANDARD				
DEVIATIONS FROM No deviations.	I TEST STANDARD				
RESULTS					Run #
Pass					43
Other					7
			1/ 0,	Aligh Total Bu	/
			Hory	18- 1	
				Tested By:	
0.0					
-10.0					
-10.0					
-20.0					
-30.0					
30.0					
E					
E -40.0					
ס					
-50.0					
-30.0					
-60.0					
70.0					
-70.0					
-80.0					
2400.00	2410.000 2420.000 2430.000 2440.000	2450.000	2460.000 2470.0	00 2480.000 249	90.000 2500.000
			=		
		MHz			
				5100	Compared to
Freq	Azimuth Height (degrees) (meters)		Polarity Detector	EIRP EIRP (Watts) (dBm)	Spec. Limit Spec. (dBm) (dB)
(MHz)	(uagrees) (meters)		1 1	(VYGRO) (UDIII)	(4511) (46)
2483.500	48.0 1.0		H-Horn PK	0.0000 -16.0	-13.0 -3.0
2483.500	272.0 1.1		V-Horn AV	0.0000 -37.9	-13.0 -24.9
2483.500	48.0 1.0		H-Horn AV	0.0000 -38.1	-13.0 -25.1





