Intermec Technologies Corporation

SMC45 with PW40 Bluetooth Enabled Printer

December 14, 2004

Report No. ITRM0051.6

Report Prepared By

NORTHWEST EMC

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: December 14, 2004
Intermec Technologies Corporation
Model: SMC45 with PW40 Bluetooth Enabled Printer

	Emissions		
Specification	**Test Method**	**Pass**	**Fail**
FCC 24.238(a) Spurious Radiated Emissions:2003 (Simultaneous Transmit)	ANSI / TIA-603-B:2002	☒	☐

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:
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 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

Accreditations and Authorizations

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

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/scope.asp

What is measurement uncertainty?

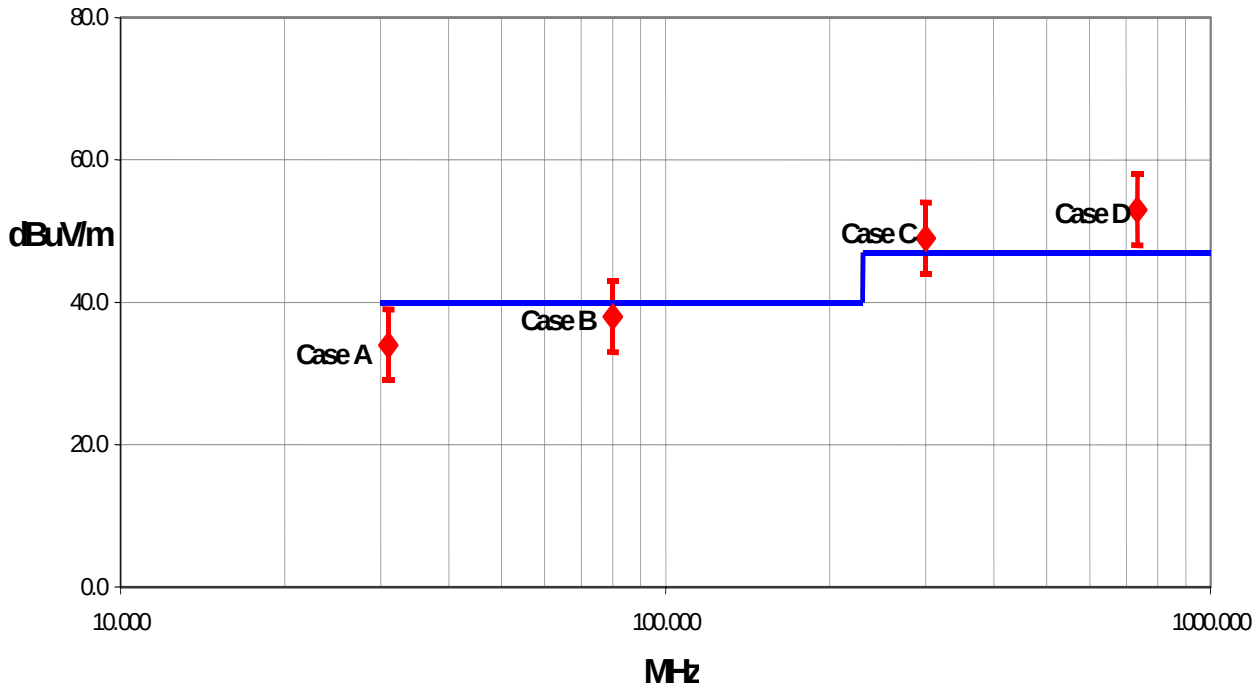
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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)					
	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
Test Distance		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 ≈ 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)		
	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 ***U*** (level of confidence ≈ 95%)	normal (k=2)	+ 2.57 - 2.51	+ 2.76 - -2.70

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

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

Conducted Immunity		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty ***uc(y)***	normal	1.05
Expanded uncertainty ***U*** (level of confidence ≈ 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, uc(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
Model:	SMC45 with PW40 Bluetooth Enabled Printer
First Date of Test:	11-21-2004
Last Date of Test:	11-29-2004
Receipt Date of Samples:	11-06-2004
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.
I/O Ports:	Serial

Functional Description of the EUT (Equipment Under Test):
The SMC45 GSM Module is used in Intermec's 700C handheld computer. The 700C can be used in the cradle of Intermec's PW40 Bluetooth enabled printer.

Client Justification for EUT Selection:
Not Provided

Client Justification for Test Selection:
These tests satisfy the requirements for a Class II Permissive Change to allow the co-location of the SMC45 with the PW40 printer.

EUT Photo

Equipment modifications					
Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions	11/21/2004 thru 11/29/2004	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test. Tested in standalone mode.	EUT remained at Northwest EMC.

Justification

The EUTs are previously certified, co-located radio modules installed inside Intermec's Handheld Computer, Model 700C and Intermec's Bluetooth enabled printer, Model PW40. The 700C contains a GSM radio (FCC ID: EHA700C-SMC45-1), a 802.11b radio (FCC ID: HN22011B-2), and a Bluetooth radio (FCC ID: HN2ABTM3-3). The PW40 contains a Bluetooth radio (FCCID: EHABTS080-1). The 700C can be installed in the PW40's cradle. This test demonstrates compliance with FCC 24.238(a) emissions limits while the co-located radios are transmitting simultaneously. Each radio transmits through its own antenna.

All possible combinations of harmonic emissions from the GSM, 802.11(b), 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 Specified Band Investigated:	
802.11(b):	1,11
Bluetooth:	2, 11, 67, 80
GSM:	516, 606

Operating Modes Investigated:
Bluetooth Radio in PW40 with 700C in cradle:
Simultaneous transmission of Bluetooth Channel 11, 802.11(b) Channel 1, & GSM Channel 516
Simultaneous transmission of Bluetooth Channel 67, 802.11(b) Channel 11, & GSM Channel 516
Simultaneous transmission of Bluetooth Channel 2, 802.11(b) Channel 1, & GSM Channel 606
Simultaneous transmission of Bluetooth Channel 80, 802.11(b) Channel 11, & GSM Channel 606

Data Rates Investigated:
Maximum

Antennas Investigated:	
802.11(b):	2011B integral antenna (internal to 700C)
GSM:	SMC45
Bluetooth:	Integral PCB trace, ABTM3 (internal to 700C)
Bluetooth:	Integral PCB trace, (internal to PW40)

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120 VAC, 60 Hz.

Frequency Range Investigated			
Start Frequency	1 GHz	**Stop Frequency**	26 GHz

Software\Firmware Applied During Test			
Exercise software	Blue Test 802.11 Agency Test PhoneUtility	**Version**	Unknown
Description			
The 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**
Bluetooth Radio in Printer	Intermec Technologies Corporation	8520-00080	Unknown
EUT – Bluetooth Enabled Printer	Intermec Technologies Corporation	PW40	4898184
AC Adapter	Ault Inc.	PW160	Unknown
Handheld Computer	Intermec Technologies Corporation	700C	05400400868
Bluetooth Radio in 700C	Intermec Technologies Corporation	ABTM3	N/A
802.11(b) Radio in 700C	Intermec Technologies Corporation	2011B	N/A
GSM/GPRS Radio in 700C	Intermec Technologies Corporation	SMC45	N/A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote laptop	Dell	TS30G	Unknown
Equipment isolated from the EUT so as not to contribute to the measurement result is considered to be outside the test setup boundary			

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	PA	1.0	Yes	EUT- Bluetooth Enabled Printer	Power Adapter
AC Power	No	1.2	No	Power Adapter	AC Mains
Serial	PA	1.2	PA	EUT- Bluetooth Enabled Printer	Laptop
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**
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 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
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
Attenuator		2082-6148-20	ATE	02/03/2004	13 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo
GSM/DCS/PCS MS Test Set	Hewlett-Packard	8922M	N/A	NCR	NA
GSM/DCS/PCS RF Interface	Hewlett-Packard	83220E	N/A	NCR	NA
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

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 26 GHZ. The applicable limit is FCC 24.238(a) for the PCS band.

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).

Configuration: The EUTs are previously certified, co-located radio modules installed inside Intermec's Handheld Computer, Model 700C and Intermec's Bluetooth enabled printer, Model PW40. The 700C contains a GSM radio (FCC ID: EHA700C-SMC45-1), a 802.11b radio (FCC ID: HN22011B-2), and a Bluetooth radio (FCC ID: HN2ABTM3-3). The PW40 contains a Bluetooth radio (FCCID: EHABTS080-1). The 700C can be installed in the PW40's cradle. This test demonstrates compliance with FCC 24.238(a) emissions limits while the co-located radios are 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 GSM, 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 26 GHz was investigated for channel combinations that would produce coincidental harmonics.

The substitution method as described in ANSI/TIA-603-B Section 2.2.12 was used for the highest spurious emissions.

Test Methodology: For licensed transmitters, the FCC references ANSI/TIA-603-B as the measurement procedure standard. ANSI/TIA-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.

Completed by:
Holly Arlington

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/21/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Greg Kiemel	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, GSM 516 (PCS) in 700C.

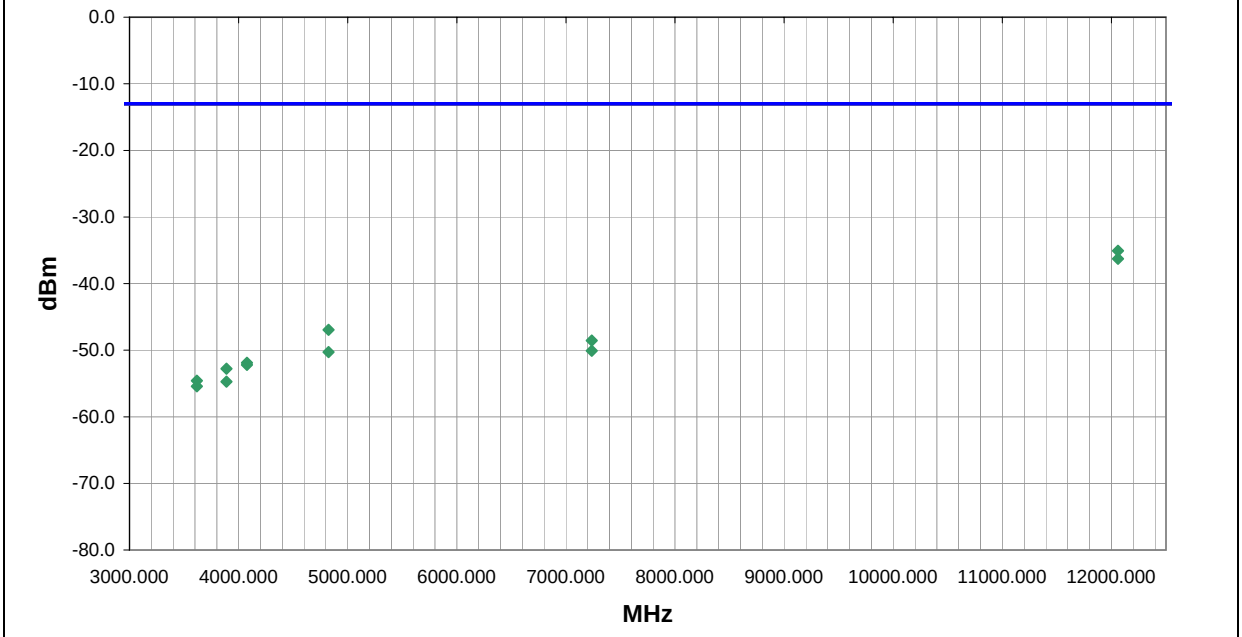
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	41

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12060.030			127.0	1.3			H-Horn	PK	0.0000	-35.1	-13.0	-22.1
12060.030			115.0	1.2			V-Horn	PK	0.0000	-36.3	-13.0	-23.3
4824.030			258.0	1.5			V-Horn	PK	0.0000	-46.9	-13.0	-33.9
7236.039			243.0	1.8			H-Horn	PK	0.0000	-48.5	-13.0	-35.5
7236.039			243.0	1.4			V-Horn	PK	0.0000	-50.1	-13.0	-37.1
4824.030			120.0	2.2			H-Horn	PK	0.0000	-50.3	-13.0	-37.3
4075.955			22.0	1.3			H-Horn	PK	0.0000	-51.9	-13.0	-38.9
4075.955			208.0	1.2			V-Horn	PK	0.0000	-52.2	-13.0	-39.2
3888.960			20.0	1.3			H-Horn	PK	0.0000	-52.8	-13.0	-39.8
3618.020			322.0	1.2			V-Horn	PK	0.0000	-54.6	-13.0	-41.6
3888.960			179.0	1.2			V-Horn	PK	0.0000	-54.7	-13.0	-41.7
3618.020			14.0	1.3			H-Horn	PK	0.0000	-55.4	-13.0	-42.4

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/21/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Greg Kiemel	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 67 in PW40. Bluetooth 67, 802.11b 11, GSM 516 (PCS) in 700C.

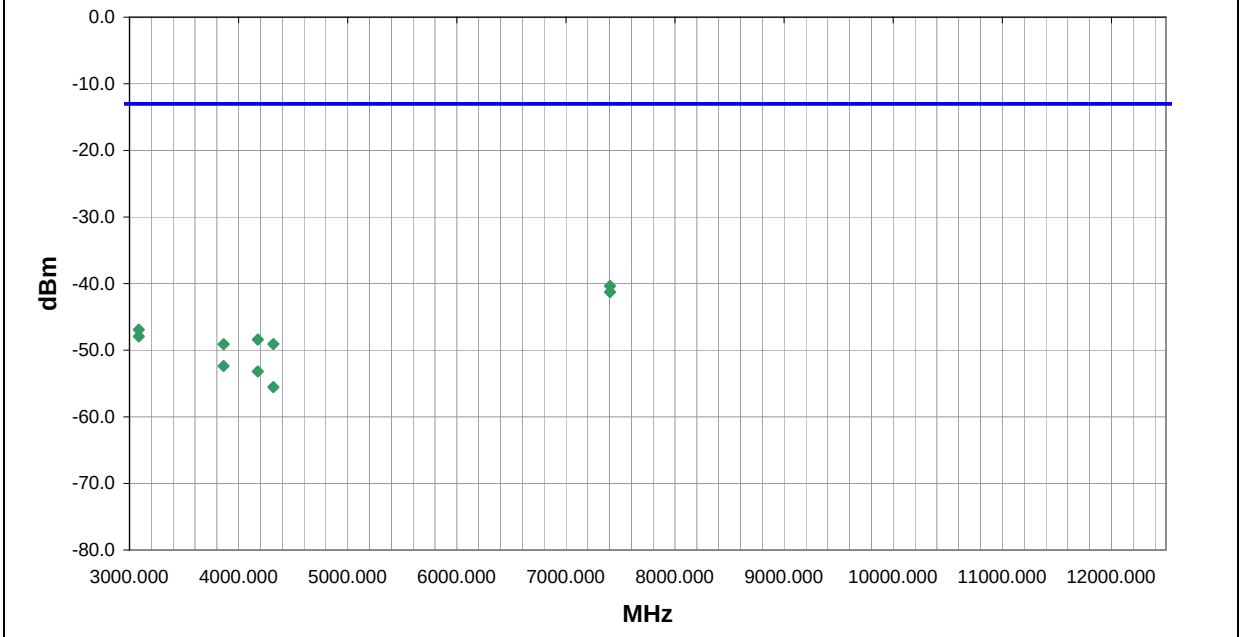
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	42

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
7404.273			113.0	1.6			V-Horn	PK	0.0000	-40.4	-13.0	-27.4
7404.273			340.0	1.1			H-Horn	PK	0.0000	-41.3	-13.0	-28.3
3085.091			360.0	1.6			V-Horn	PK	0.0000	-46.9	-13.0	-33.9
3085.091			201.0	1.4			H-Horn	PK	0.0000	-47.9	-13.0	-34.9
4175.955			244.0	1.2			V-Horn	PK	0.0000	-48.4	-13.0	-35.4
4318.632			267.0	1.2			V-Horn	PK	0.0000	-49.1	-13.0	-36.1
3862.027			27.0	1.4			V-Horn	PK	0.0000	-49.1	-13.0	-36.1
3862.027			57.0	1.3			H-Horn	PK	0.0000	-52.4	-13.0	-39.4
4175.955			192.0	1.2			H-Horn	PK	0.0000	-53.2	-13.0	-40.2
4318.632			30.0	1.3			H-Horn	PK	0.0000	-55.5	-13.0	-42.5

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/21/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Greg Kiemel	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 67 in PW40. Bluetooth 67, 802.11b 11, GSM 516 (PCS) in 700C.

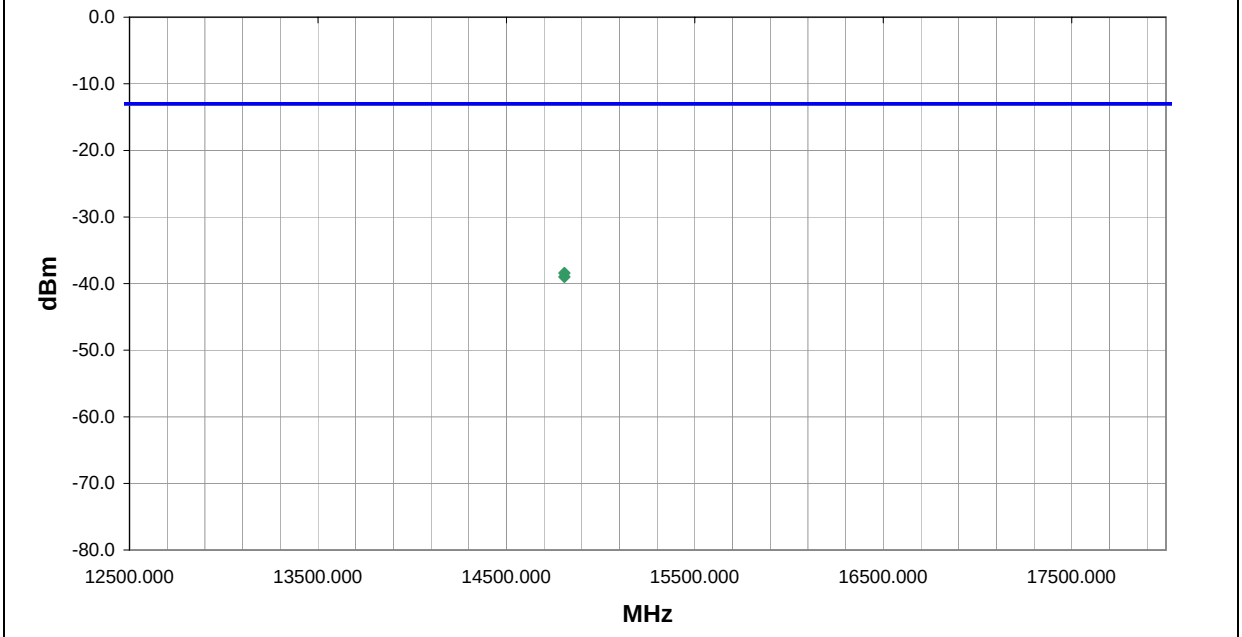
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	43

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
14807.840			35.0	1.2			V-Horn	PK	0.0000	-38.4	-13.0	-25.4
14807.840			187.0	2.2			H-Horn	PK	0.0000	-39.0	-13.0	-26.0

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/21/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Greg Kiemel	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, GSM 516 (PCS) in 700C.

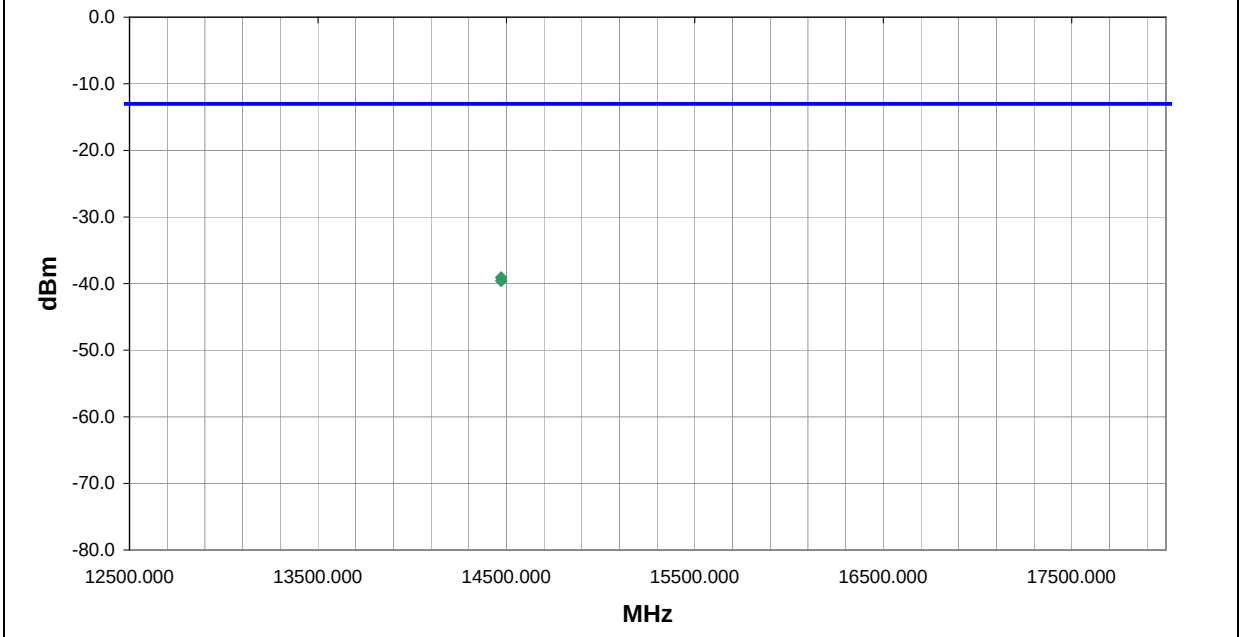
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	44

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
14472.000			204.0	3.0			H-Horn	PK	0.0000	-39.1	-13.0	-26.1
14472.000			308.0	2.3			V-Horn	PK	0.0000	-39.6	-13.0	-26.6

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/21/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Greg Kiemel	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 2 in PW40. Bluetooth 2, 802.11b 1, GSM 606 (PCS) in 700C.

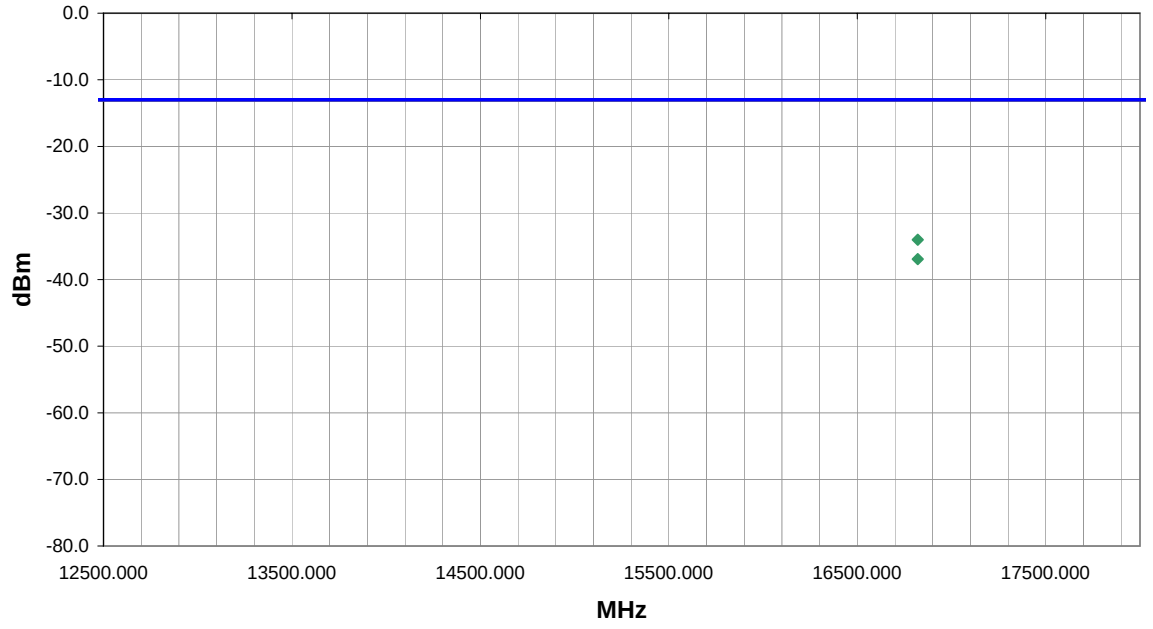
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	45

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
16821.000			178.0	1.2			V-Horn	PK	0.0000	-34.0	-13.0	-21.0
16821.000			190.0	1.2			H-Horn	PK	0.0000	-36.9	-13.0	-23.9

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/24/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, GSM 516 (PCS) in 700C.

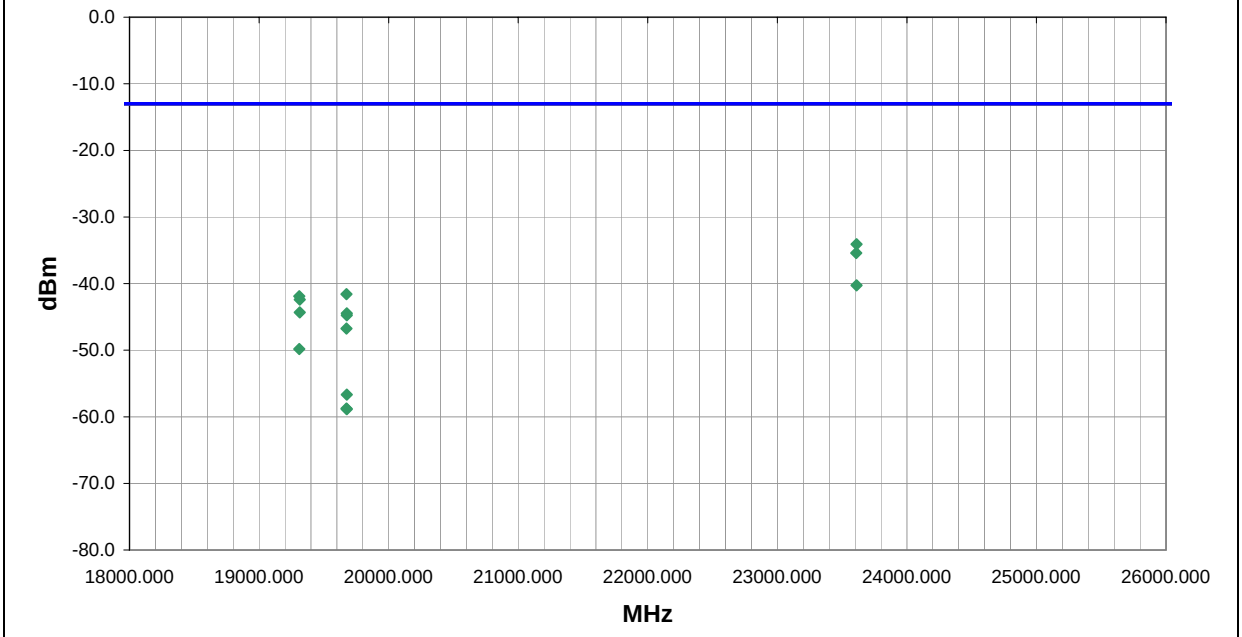
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	46

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
23612.000			150.0	1.0			V-High Horr	PK	0.0000	-34.1	-13.0	-21.1
23609.000			-1.0	1.0			V-High Horr	PK	0.0000	-35.4	-13.0	-22.4
23612.000			69.0	1.0			H-High Horr	PK	0.0000	-40.3	-13.0	-27.3
19674.000			242.0	1.0			V-High Horr	PK	0.0000	-41.6	-13.0	-28.6
19310.000			247.0	1.0			V-High Horr	PK	0.0000	-41.9	-13.0	-28.9
19314.500			166.0	1.0			V-High Horr	PK	0.0000	-42.4	-13.0	-29.4
19314.500			304.0	1.5			H-High Horr	PK	0.0000	-44.3	-13.0	-31.3
19676.500			58.0	1.0			V-High Horr	PK	0.0000	-44.5	-13.0	-31.5
19676.500			327.0	1.5			H-High Horr	PK	0.0000	-44.8	-13.0	-31.8
19674.000			352.0	1.4			H-High Horr	PK	0.0000	-46.8	-13.0	-33.8
19310.000			304.0	1.5			H-High Horr	PK	0.0000	-49.8	-13.0	-36.8
19676.500			58.0	1.0			V-High Horr	AV	0.0000	-56.7	-13.0	-43.7
19674.000			352.0	1.4			H-High Horr	AV	0.0000	-58.8	-13.0	-45.8
19676.500			327.0	1.5			H-High Horr	AV	0.0000	-58.9	-13.0	-45.9

NORTHWEST EMC

Apparent Power Data Sheet

REV df4.4 10/22/2004

EUT:	PW40 Bluetooth Enabled Printer			Work Order:	ITRM0051
Serial Number:	4898184			Date:	11/29/04
Customer:	Intermec Technologies Corporation			Temperature:	19
Attendees:	none			Humidity:	34%
Cust. Ref. No.:				Barometric Pressure	30.32
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 24.238(a)	Year:	2003
Method:	ANSI/TIA-603-B	Year:	2002

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

Simultaneous transmission

EUT OPERATING MODES

Bluetooth 80 in PW40. Bluetooth 80, 802.11b 11, GSM 606 (PCS) in 700C.

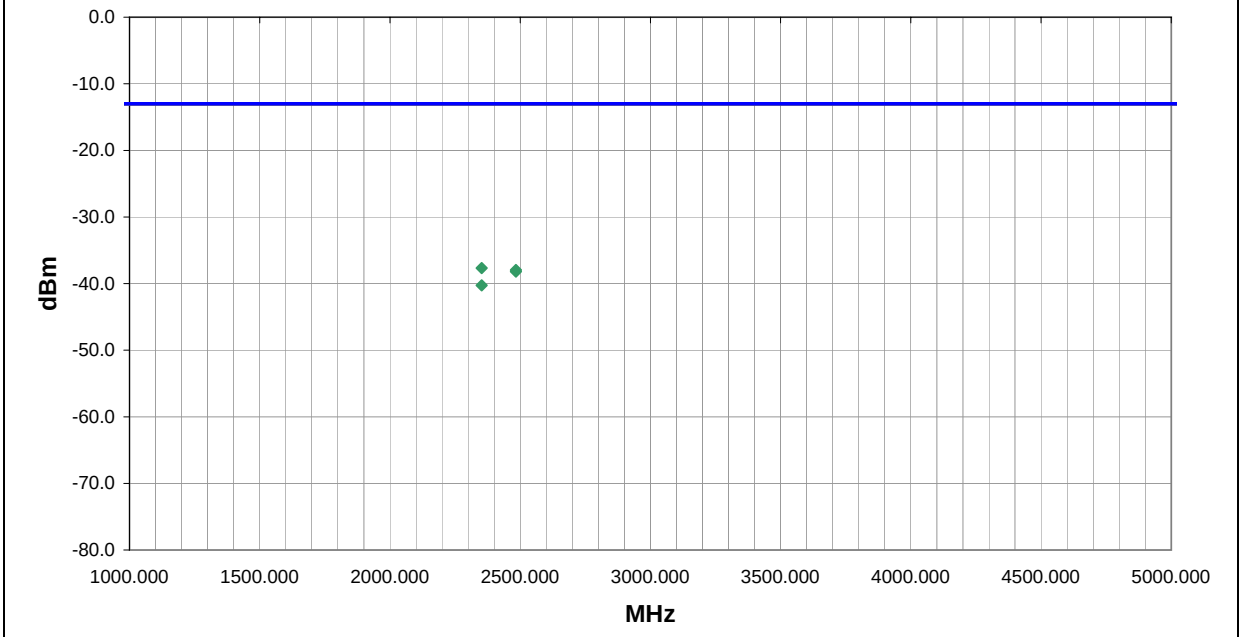
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	51

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
2352.000			11.0	1.0			V-Horn	PK	0.0000	-37.7	-13.0	-24.7
2483.500			80.0	1.2			V-Horn	PK	0.0000	-38.0	-13.0	-25.0
2483.500			183.0	1.0			H-Horn	PK	0.0000	-38.2	-13.0	-25.2
2352.000			127.0	1.4			H-Horn	PK	0.0000	-40.3	-13.0	-27.3


NORTHWEST
EMC


NORTHWEST
EMC


Printer Configuration
Available Fonts
Available Graphics
Available Bar Codes
Intermec