

# Intermec Technologies Corporation

## 2011B and ABTM3 with PW40 Bluetooth Enabled Printer

December 10, 2004

Report No. ITRM0051.1

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)  
1-888-EMI-CERT

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**EMC Test Report**



22975 NW Evergreen Parkway  
Suite 400  
Hillsboro, Oregon 97124

## Certificate of Test

Issue Date: December 10, 2004

Intermec Technologies Corporation

Model: 2011B and ABTM3 with PW40 Bluetooth Enabled Printer

Specification	Emissions		
	Test Method	Pass	Fail
FCC 15.247(d) Spurious Radiated Emissions:2004 (Simultaneous Transmit)	ANSI C63.4:2003	<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:

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 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. - 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?

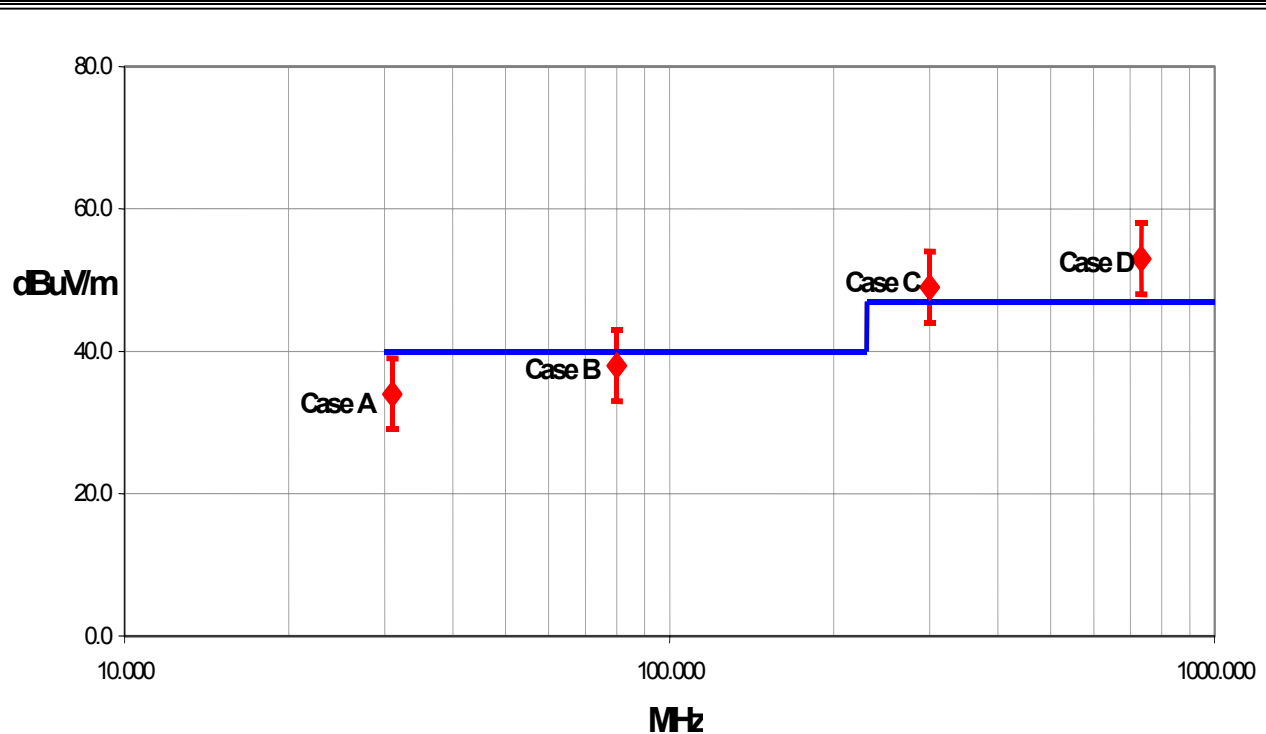
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following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

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	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty $U$ (level of confidence ≈ 95%)	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
		- 3.77	- 3.73	- 2.81	- 2.52	- 2.55	- 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	+ 1.38	+ 1.35
		- 1.25	- 1.25	- 1.35	- 1.35
Expanded uncertainty $U$ (level of confidence ≈ 95%)	normal (k=2)	+ 2.57	+ 2.51	+ 2.76	+ 2.70
		- 2.51	- 2.51	- 2.70	- 2.70

**Conducted Emissions**

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

**Radiated Immunity**

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

**Conducted Immunity**

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	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,  $u_c(y)$  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 339<sup>th</sup> Ave. SE  
Sultan, WA 98294  
(888) 364-2378  
FAX (360) 793-2536



**Party Requesting the Test**

<b>Company Name:</b>	Intermec Technologies Corporation
<b>Address:</b>	550 Second St. SE
<b>City, State, Zip:</b>	Cedar Rapids, IA 52401-2023
<b>Test Requested By:</b>	Scott Holub
<b>Model:</b>	2011B and ABTM3 with PW40 Bluetooth Enabled Printer
<b>First Date of Test:</b>	11-13-2004
<b>Last Date of Test:</b>	11-29-2004
<b>Receipt Date of Samples:</b>	11-06-2004
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No visual damage.

**Information Provided by the Party Requesting the Test**

<b>Clocks/Oscillators:</b>	Not provided.
<b>I/O Ports:</b>	Serial

**Functional Description of the EUT (Equipment Under Test):**

The 2011B 802.11b and the ABTM3 Bluetooth modules are 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 2011B and ABTM3 modules with the PW40 printer.

**EUT Photo**

**Equipment modifications**

Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions	11/06/2004	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.
2	Spurious Radiated Emissions (Bluetooth, 802.11b, CDMA)	11/13/2004	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.
3	Spurious Radiated Emissions (Bluetooth, 802.11b, GSM)	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 15.247(d) 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:**

<b>802.11(b):</b>	1, 11
<b>Bluetooth:</b>	2, 11, 67, 80
<b>GSM:</b>	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:**

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

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 VAC, 60 Hz.

**Frequency Range Investigated**

<b>Start Frequency</b>	1 GHz	<b>Stop Frequency</b>	26 GHz
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**Software\Firmware Applied During Test**

<b>Exercise software</b>	Blue Test 802.11 Agency Test PhoneUtility	<b>Version</b>	Unknown
<b>Description</b>			
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**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
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**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
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**

<b>Cable Type</b>	<b>Shield</b>	<b>Length (m)</b>	<b>Ferrite</b>	<b>Connection 1</b>	<b>Connection 2</b>
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
<b>PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.</b>					

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 15.247(d), 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 EUTs are previously certified, co-located radio modules installed inside Intermecc's Handheld Computer, Model 700C and Intermecc'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 15.247(d) 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:

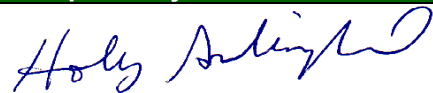
**Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted 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. 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 C63.4:2003). 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:



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

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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.

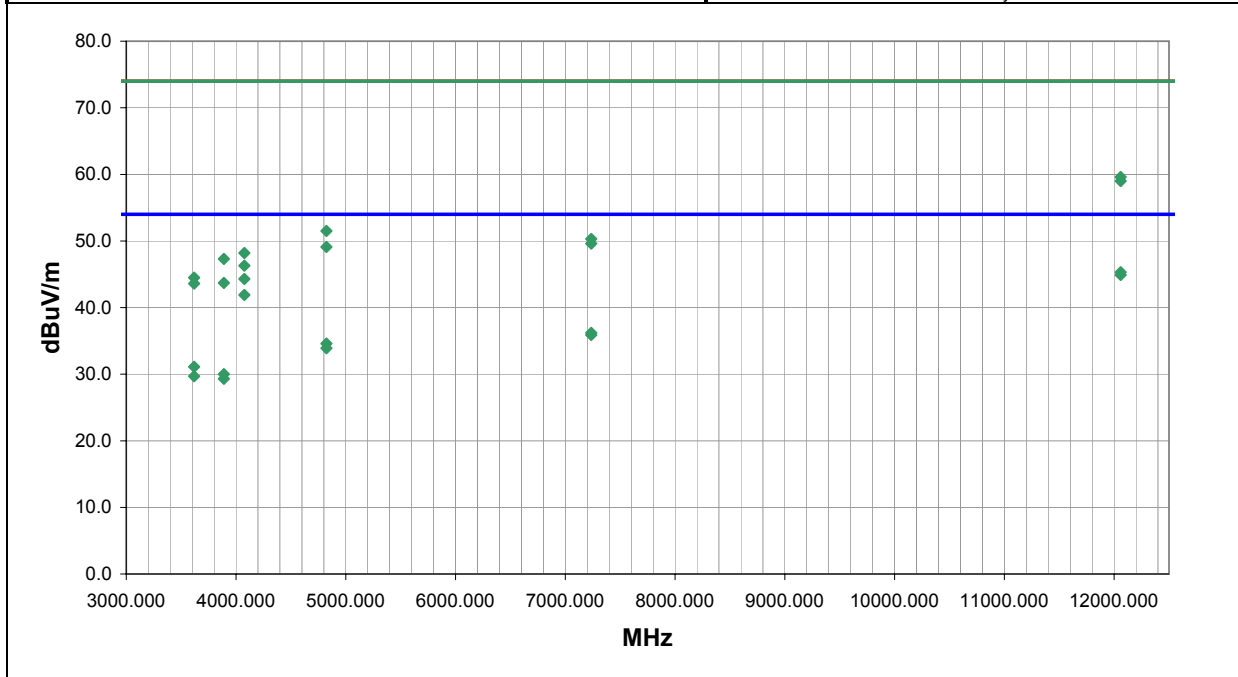
**DEVIATIONS FROM TEST STANDARD**

No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	41

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)
12060.030	25.1	20.2	127.0	1.3	3.0	0.0	H-Horn	AV	0.0	45.3	54.0	-8.7
12060.030	24.7	20.2	115.0	1.2	3.0	0.0	V-Horn	AV	0.0	44.9	54.0	-9.1
4075.955	41.9	2.4	22.0	1.3	3.0	0.0	H-Horn	AV	0.0	44.3	54.0	-9.7
4075.955	39.5	2.4	208.0	1.2	3.0	0.0	V-Horn	AV	0.0	41.9	54.0	-12.1
7236.039	26.1	10.1	243.0	1.4	3.0	0.0	V-Horn	AV	0.0	36.2	54.0	-17.8
7236.039	25.8	10.1	243.0	1.8	3.0	0.0	H-Horn	AV	0.0	35.9	54.0	-18.1
4824.030	31.3	3.3	258.0	1.5	3.0	0.0	V-Horn	AV	0.0	34.6	54.0	-19.4
4824.030	30.6	3.3	120.0	2.2	3.0	0.0	H-Horn	AV	0.0	33.9	54.0	-20.1
3618.020	30.3	0.8	14.0	1.3	3.0	0.0	H-Horn	AV	0.0	31.1	54.0	-22.9
3888.960	28.1	1.9	20.0	1.3	3.0	0.0	H-Horn	AV	0.0	30.0	54.0	-24.0
3618.020	28.9	0.8	322.0	1.2	3.0	0.0	V-Horn	AV	0.0	29.7	54.0	-24.3
3888.960	27.4	1.9	179.0	1.2	3.0	0.0	V-Horn	AV	0.0	29.3	54.0	-24.7
12060.030	39.4	20.2	115.0	1.2	3.0	0.0	V-Horn	PK	0.0	59.6	74.0	-14.4
12060.030	38.8	20.2	127.0	1.3	3.0	0.0	H-Horn	PK	0.0	59.0	74.0	-15.0
4824.030	48.2	3.3	258.0	1.5	3.0	0.0	V-Horn	PK	0.0	51.5	74.0	-22.5
7236.039	40.2	10.1	243.0	1.8	3.0	0.0	H-Horn	PK	0.0	50.3	74.0	-23.7
7236.039	39.5	10.1	243.0	1.4	3.0	0.0	V-Horn	PK	0.0	49.6	74.0	-24.4
4824.030	45.8	3.3	120.0	2.2	3.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9
4075.955	45.8	2.4	22.0	1.3	3.0	0.0	H-Horn	PK	0.0	48.2	74.0	-25.8
3888.960	45.4	1.9	20.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.3	74.0	-26.7
4075.955	43.9	2.4	208.0	1.2	3.0	0.0	V-Horn	PK	0.0	46.3	74.0	-27.7

<b>Freq (MHz)</b>	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)
3618.020	43.7	0.8	14.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.5	74.0	-29.5
3888.960	41.8	1.9	179.0	1.2	3.0	0.0	V-Horn	PK	0.0	43.7	74.0	-30.3
3618.020	42.8	0.8	322.0	1.2	3.0	0.0	V-Horn	PK	0.0	43.6	74.0	-30.4



# RADIATED EMISSIONS DATA SHEET

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

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

<b>SAMPLE CALCULATIONS</b>	
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

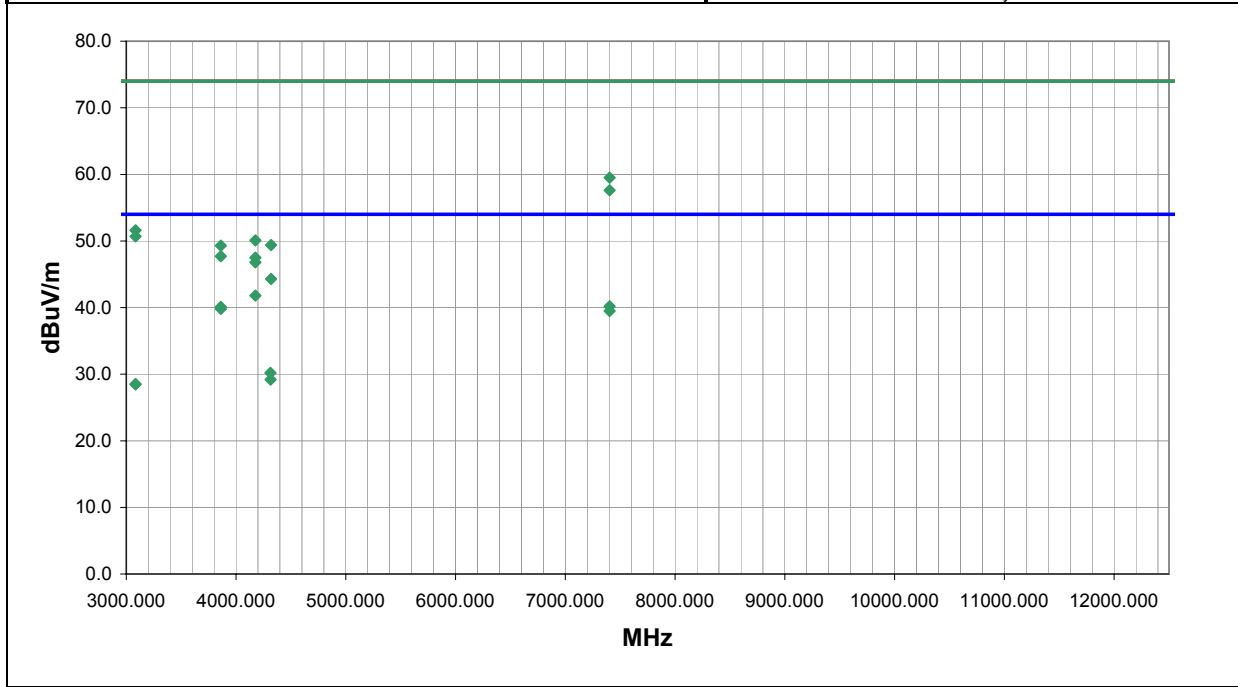
**EUT OPERATING MODES**  
Bluetooth 67 in PW40. Bluetooth 67, 802.11b 11, GSM 516 (PCS) in 700C.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	42

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)
4175.955	45.1	2.4	244.0	1.2	3.0	0.0	V-Horn	AV	0.0	47.5	54.0	-6.5
4175.955	39.4	2.4	192.0	1.2	3.0	0.0	H-Horn	AV	0.0	41.8	54.0	-12.2
7404.273	29.1	11.1	113.0	1.6	3.0	0.0	V-Horn	AV	0.0	40.2	54.0	-13.8
3862.027	38.4	1.7	27.0	1.4	3.0	0.0	V-Horn	AV	0.0	40.1	54.0	-13.9
3862.027	38.1	1.7	57.0	1.3	3.0	0.0	H-Horn	AV	0.0	39.8	54.0	-14.2
7404.273	28.4	11.1	340.0	1.1	3.0	0.0	H-Horn	AV	0.0	39.5	54.0	-14.5
4313.652	27.7	2.5	267.0	1.2	3.0	0.0	V-Horn	AV	0.0	30.2	54.0	-23.8
4314.192	26.7	2.5	30.0	1.3	3.0	0.0	H-Horn	AV	0.0	29.2	54.0	-24.8
3085.091	28.1	0.4	201.0	1.4	3.0	0.0	H-Horn	AV	0.0	28.5	54.0	-25.5
3085.091	28.1	0.4	360.0	1.6	3.0	0.0	V-Horn	AV	0.0	28.5	54.0	-25.5
7404.273	48.4	11.1	113.0	1.6	3.0	0.0	V-Horn	PK	0.0	59.5	74.0	-14.5
7404.273	46.5	11.1	340.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.6	74.0	-16.4
3085.091	51.2	0.4	201.0	1.4	3.0	0.0	H-Horn	PK	0.0	51.6	74.0	-22.4
3085.091	50.3	0.4	360.0	1.6	3.0	0.0	V-Horn	PK	0.0	50.7	74.0	-23.3
4175.955	47.7	2.4	244.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.1	74.0	-23.9
4318.632	46.9	2.5	267.0	1.2	3.0	0.0	V-Horn	PK	0.0	49.4	74.0	-24.6
3862.027	47.6	1.7	27.0	1.4	3.0	0.0	V-Horn	PK	0.0	49.3	74.0	-24.7
3862.027	46.0	1.7	57.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.7	74.0	-26.3
4175.955	44.4	2.4	192.0	1.2	3.0	0.0	H-Horn	PK	0.0	46.8	74.0	-27.2
4318.632	41.8	2.5	30.0	1.3	3.0	0.0	H-Horn	PK	0.0	44.3	74.0	-29.7

# RADIATED EMISSIONS DATA SHEET

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 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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.

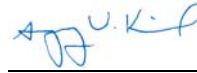
**DEVIATIONS FROM TEST STANDARD**

No deviations.

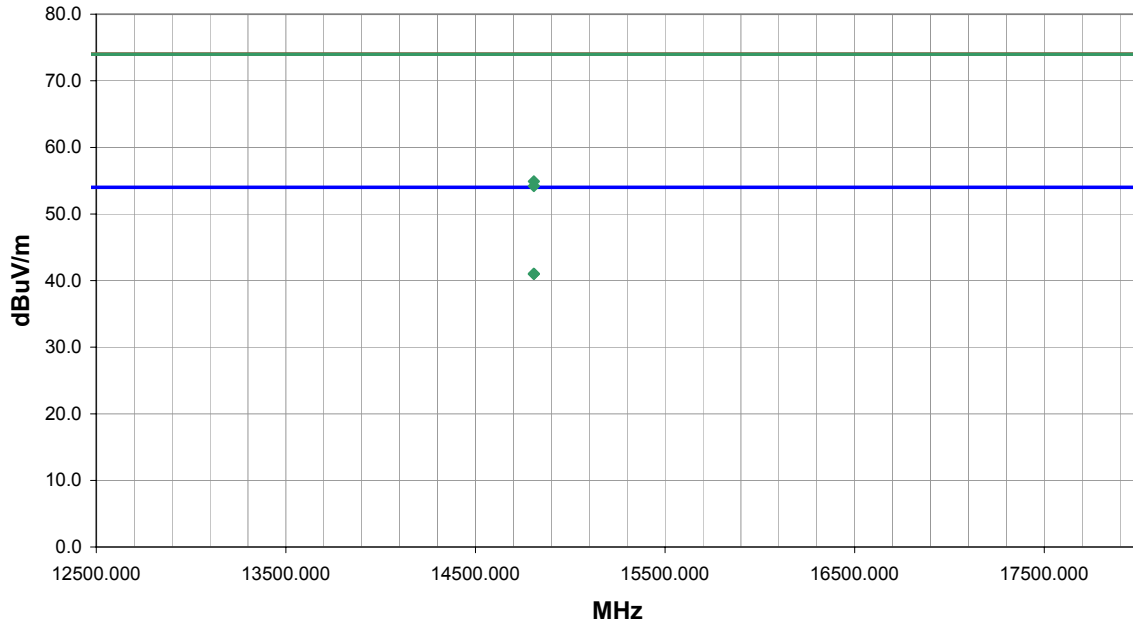
**RESULTS**

Pass	Run #	43
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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)
14807.840	27.0	14.0	187.0	2.2	3.0	0.0	H-Horn	AV	0.0	41.0	54.0	-13.0
14807.840	27.0	14.0	35.0	1.2	3.0	0.0	V-Horn	AV	0.0	41.0	54.0	-13.0
14807.840	40.9	14.0	35.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.9	74.0	-19.1
14807.840	40.2	14.0	187.0	2.2	3.0	0.0	H-Horn	PK	0.0	54.2	74.0	-19.8

# RADIATED EMISSIONS DATA SHEET

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 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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**

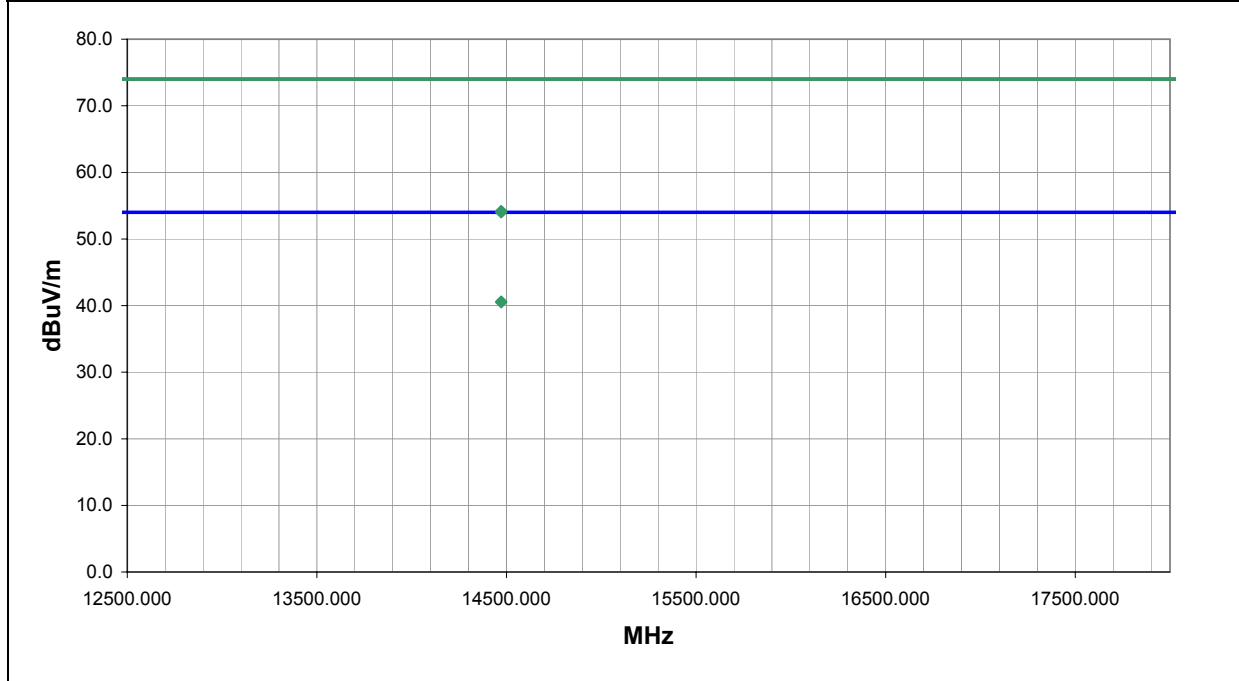
No deviations.

**RESULTS**

Pass	Run #	44
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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	26.8	13.8	204.0	3.0	3.0	0.0	H-Horn	AV	0.0	40.6	54.0	-13.4
14472.000	26.7	13.8	308.0	2.3	3.0	0.0	V-Horn	AV	0.0	40.5	54.0	-13.5
14472.000	40.4	13.8	204.0	3.0	3.0	0.0	H-Horn	PK	0.0	54.2	74.0	-19.8
14472.000	40.2	13.8	308.0	2.3	3.0	0.0	V-Horn	PK	0.0	54.0	74.0	-20.0

# RADIATED EMISSIONS DATA SHEET

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 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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.

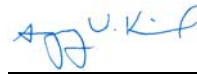
**DEVIATIONS FROM TEST STANDARD**

No deviations.

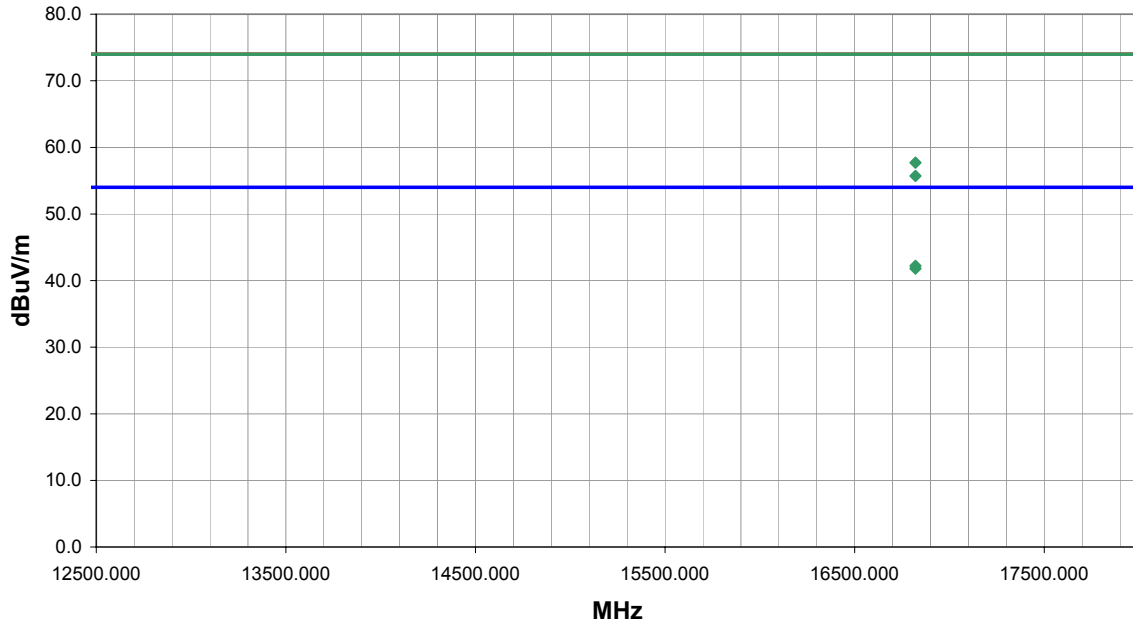
**RESULTS**

Pass	Run #	45
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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)
16821.000	27.3	14.9	178.0	1.2	3.0	0.0	V-Horn	AV	0.0	42.2	54.0	-11.8
16821.000	26.9	14.9	190.0	1.2	3.0	0.0	H-Horn	AV	0.0	41.8	54.0	-12.2
16821.000	42.8	14.9	178.0	1.2	3.0	0.0	V-Horn	PK	0.0	57.7	74.0	-16.3
16821.000	40.8	14.9	190.0	1.2	3.0	0.0	H-Horn	PK	0.0	55.7	74.0	-18.3

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

<b>TEST SPECIFICATIONS</b>	
Specification: FCC 15.247(d) Spurious Radiated Emissions	Year: 2004
Method: ANSI C63.4	Year: 2003

<b>SAMPLE CALCULATIONS</b>	
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

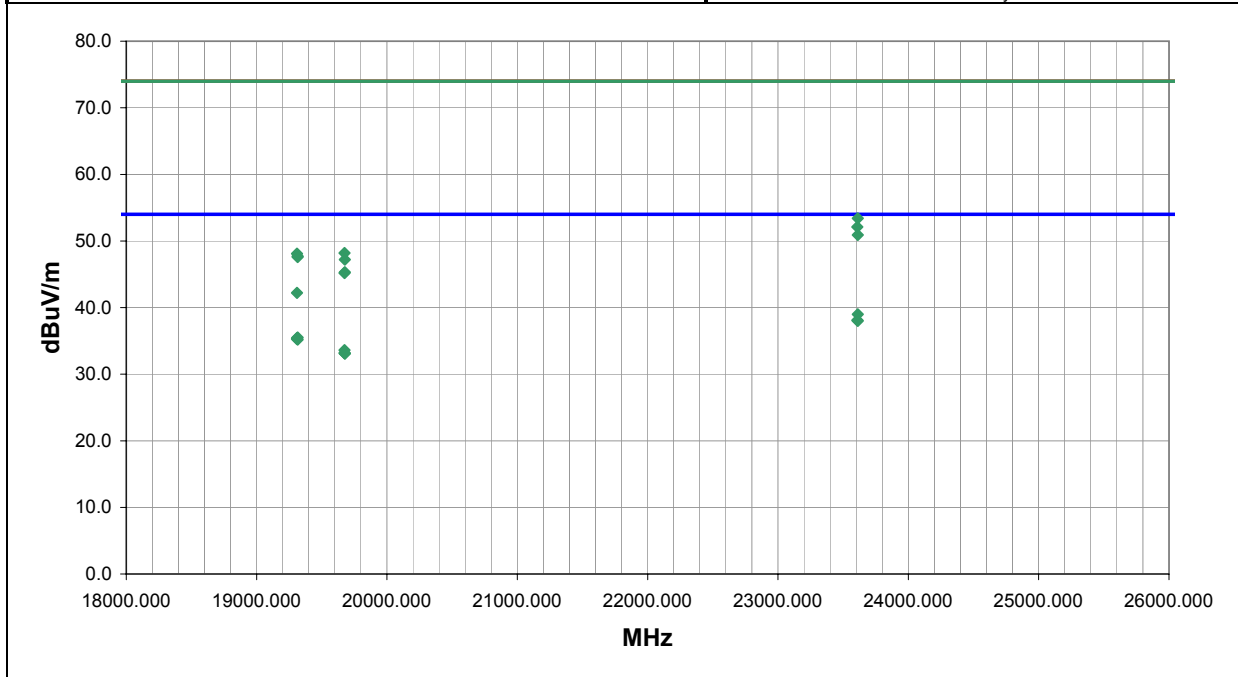
**EUT OPERATING MODES**  
Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, GSM 516 (PCS) in 700C.

**DEVIATIONS FROM TEST STANDARD**  
No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	46

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)	
23612.000	28.7	10.3	150.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	39.0	54.0	-15.0
23609.000	27.8	10.3	-1.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	38.1	54.0	-15.9
23612.000	27.7	10.3	69.0	1.0	3.0	0.0	I-High	Horr	AV	0.0	38.0	54.0	-16.0
19314.500	27.5	8.0	304.0	1.5	3.0	0.0	I-High	Horr	AV	0.0	35.5	54.0	-18.5
19310.000	27.4	8.0	304.0	1.5	3.0	0.0	I-High	Horr	AV	0.0	35.4	54.0	-18.6
19310.000	27.3	8.0	247.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	35.3	54.0	-18.7
19314.500	27.2	8.0	166.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	35.2	54.0	-18.8
19674.000	25.0	8.6	242.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	33.6	54.0	-20.4
23612.000	43.1	10.3	150.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	53.4	74.0	-20.6
19674.000	24.6	8.6	352.0	1.4	3.0	0.0	I-High	Horr	AV	0.0	33.2	54.0	-20.8
19676.500	24.5	8.6	327.0	1.5	3.0	0.0	I-High	Horr	AV	0.0	33.1	54.0	-20.9
19676.500	24.5	8.6	58.0	1.0	3.0	0.0	V-High	Horr	AV	0.0	33.1	54.0	-20.9
23609.000	41.8	10.3	-1.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	52.1	74.0	-21.9
23612.000	40.6	10.3	69.0	1.0	3.0	0.0	I-High	Horr	PK	0.0	50.9	74.0	-23.1
19674.000	39.6	8.6	242.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	48.2	74.0	-25.8
19310.000	40.1	8.0	247.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	48.1	74.0	-25.9
19314.500	39.7	8.0	304.0	1.5	3.0	0.0	I-High	Horr	PK	0.0	47.7	74.0	-26.3
19314.500	39.6	8.0	166.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	47.6	74.0	-26.4
19676.500	38.6	8.6	327.0	1.5	3.0	0.0	I-High	Horr	PK	0.0	47.2	74.0	-26.8
19676.500	36.7	8.6	58.0	1.0	3.0	0.0	V-High	Horr	PK	0.0	45.3	74.0	-28.7
19674.000	36.6	8.6	352.0	1.4	3.0	0.0	I-High	Horr	PK	0.0	45.2	74.0	-28.8

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)
19310.000	34.2	8.0	304.0	1.5	3.0	0.0	-I-High Horr	PK	0.0	42.2	74.0	-31.8

# RADIATED EMISSIONS DATA SHEET

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

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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

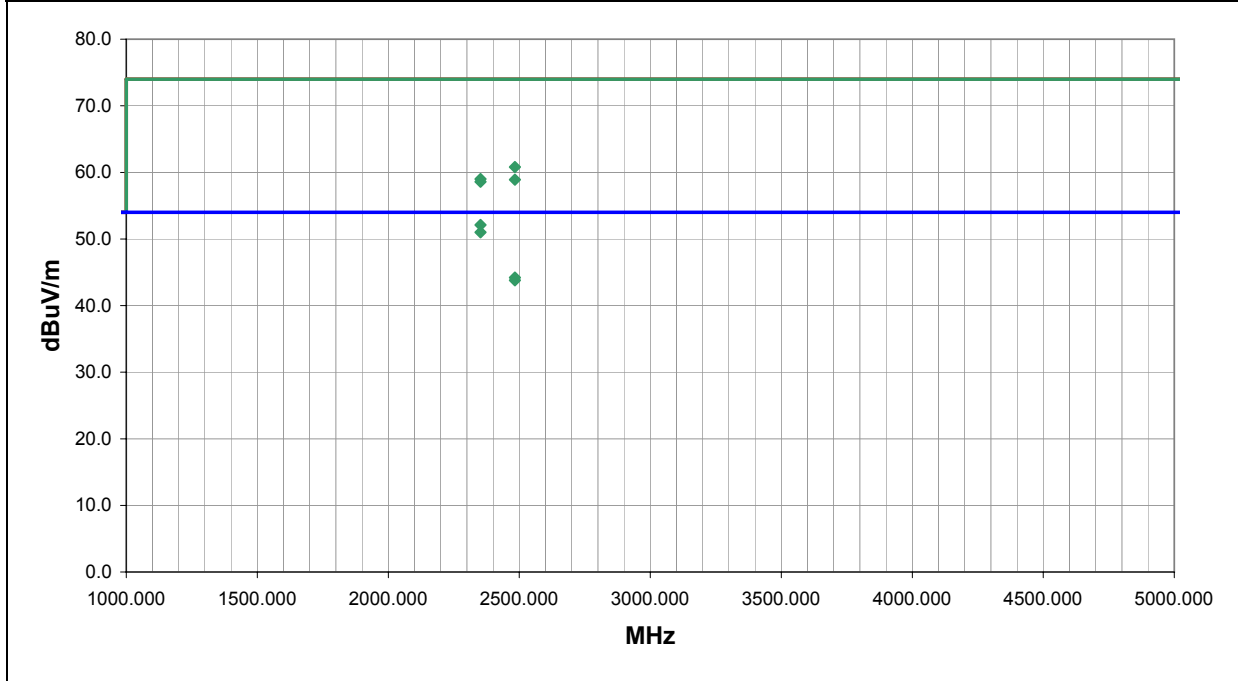
**EUT OPERATING MODES**  
 Bluetooth 80 in PW40. Bluetooth 80, 802.11b 11, GSM 606 (PCS) in 700C.

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	51

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)
2352.000	22.6	29.5	11.0	1.0	3.0	0.0	V-Horn	AV	0.0	52.1	54.0	-1.9
2352.000	21.5	29.5	127.0	1.4	3.0	0.0	H-Horn	AV	0.0	51.0	54.0	-3.0
2483.500	14.5	29.7	183.0	1.0	3.0	0.0	H-Horn	AV	0.0	44.2	54.0	-9.8
2483.500	14.1	29.7	80.0	1.2	3.0	0.0	V-Horn	AV	0.0	43.8	54.0	-10.2
2483.500	31.1	29.7	183.0	1.0	3.0	0.0	H-Horn	PK	0.0	60.8	74.0	-13.2
2352.000	29.5	29.5	11.0	1.0	3.0	0.0	V-Horn	PK	0.0	59.0	74.0	-15.0
2483.500	29.2	29.7	80.0	1.2	3.0	0.0	V-Horn	PK	0.0	58.9	74.0	-15.1
2352.000	29.1	29.5	127.0	1.4	3.0	0.0	H-Horn	PK	0.0	58.6	74.0	-15.4









**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 CDMA radio (FCC ID: HN2SB555-2), 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 15.247(d) 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 CDMA, 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:**

<b>802.11(b):</b>	1, 11
<b>CDMA (Cellular):</b>	54, 55, 395, 467
<b>CDMA (PCS):</b>	1, 35, 1153
<b>Bluetooth:</b>	5, 11, 62, 68, 79

**Operating Modes Investigated:****Bluetooth Radio in PW40 with 700C in cradle:**

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

**Data Rates Investigated:**

Maximum
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**Antennas Investigated:**

<b>802.11(b):</b>	2011B integral antenna (internal to 700C)
<b>CDMA (Cellular):</b>	805-606-102 Dual Band CDMA 900/1900MHz Antenna (SB555) (external to 700C)
<b>CDMA (PCS):</b>	805-666-204 Single Band CDMA 1900MHz Antenna (SB555) (external to 700C)
<b>Bluetooth:</b>	Integral PCB trace, ABTM3 (internal to 700C)
<b>Bluetooth:</b>	Integral PCB trace, (internal to PW40)

**Output Power Setting(s) Investigated:**

Maximum
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**Power Input Settings Investigated:**

120 VAC, 60 Hz.
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**Frequency Range Investigated**

<b>Start Frequency</b>	1 GHz	<b>Stop Frequency</b>	26 GHz
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**Software\Firmware Applied During Test**

<b>Exercise software</b>	Blue Test FCC_Smart 802.11 Agency Test	<b>Version</b>	Unknown
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**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**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
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	05400400873
Bluetooth Radio in 700C	Intermec Technologies Corporation	ABTM3	N/A
802.11(b) Radio in 700C	Intermec Technologies Corporation	2011B	N/A
CDMA Radio in 700C	Intermec Technologies Corporation	SB555	Unknown

**Remote Equipment Outside of Test Setup Boundary**

<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Remote laptop	Dell	TS30G1	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**

<b>Cable Type</b>	<b>Shield</b>	<b>Length (m)</b>	<b>Ferrite</b>	<b>Connection 1</b>	<b>Connection 2</b>
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

### Test Description

**Requirement:** Per 15.247(d), 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 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 CDMA radio (FCC ID: HN2SB555-2), 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 15.247(d) 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:

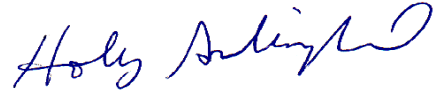
**Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted 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 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 26 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 C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

<b>Bandwidths Used for Measurements</b>			
<b>Frequency Range (MHz)</b>	<b>Peak Data (kHz)</b>	<b>Quasi-Peak Data (kHz)</b>	<b>Average Data (kHz)</b>
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:**



# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

<b>SAMPLE CALCULATIONS</b>	
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	

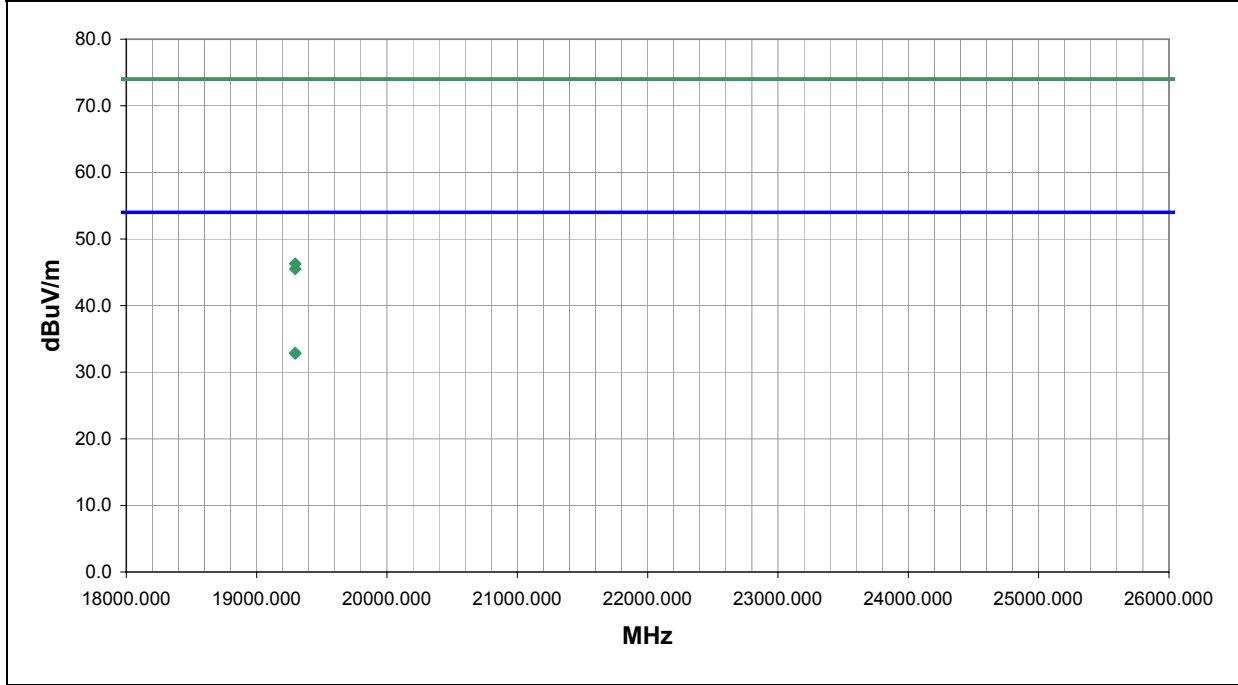
<b>COMMENTS</b>	
Simultaneous Transmission	

<b>EUT OPERATING MODES</b>	
Bluetooth 11 on PW40. Bluetooth 11, 802.11(b) 1 and CDMA (cellular) 467 on 700C	

<b>DEVIATIONS FROM TEST STANDARD</b>	
No deviations.	

<b>RESULTS</b>		Run #
Pass		8

Other	 Tested By:
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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)
19296.000	24.9	8.0	-4.0	1.0	3.0	0.0	I-High Horr	AV	0.0	32.9	54.0	-21.1
19296.000	24.8	8.0	363.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.8	54.0	-21.2
19296.000	38.3	8.0	-4.0	1.0	3.0	0.0	I-High Horr	PK	0.0	46.3	74.0	-27.7
19296.000	37.5	8.0	363.0	1.0	3.0	0.0	V-High Horr	PK	0.0	45.5	74.0	-28.5

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

<b>SAMPLE CALCULATIONS</b>	
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	

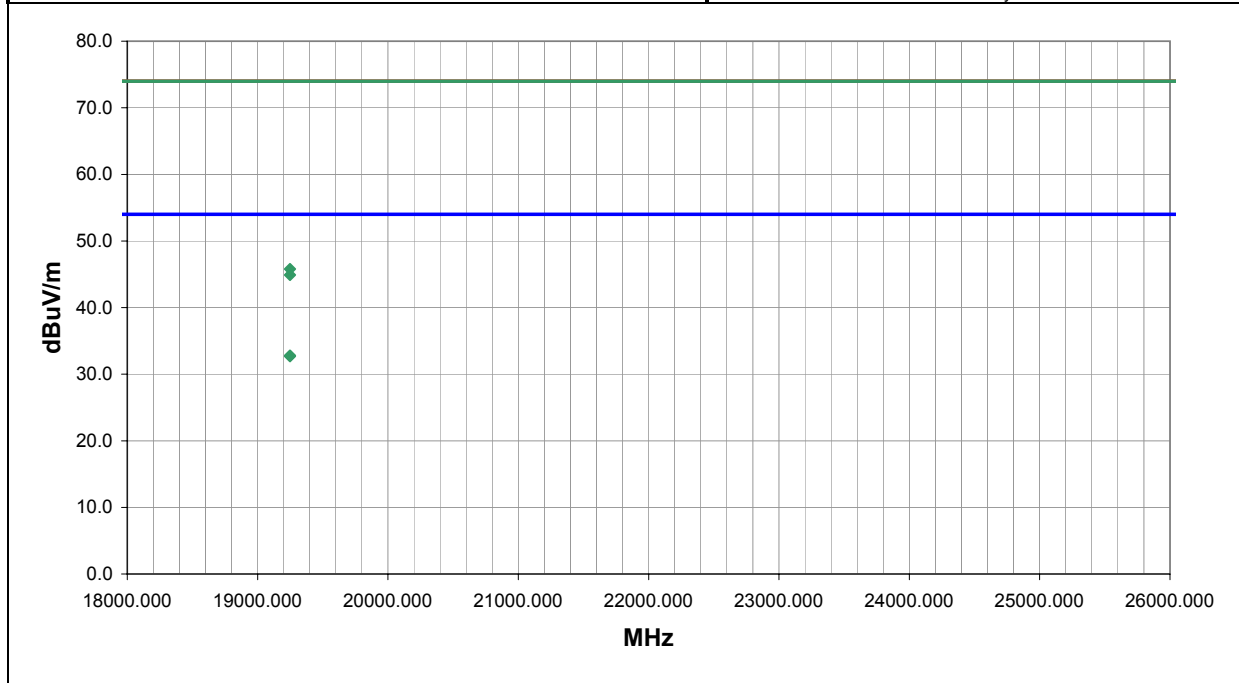
<b>COMMENTS</b>
Simultaneous Transmission

<b>EUT OPERATING MODES</b>
Bluetooth 5 on PW40. Bluetooth 5, 802.11(b) 1 and CDMA (cellular) 395 on 700C

<b>DEVIATIONS FROM TEST STANDARD</b>
No deviations.

<b>RESULTS</b>	Run #
Pass	9

Other	 Tested By:
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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)
19248.000	25.0	7.8	-3.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.8	54.0	-21.2
19248.000	24.9	7.8	363.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.7	54.0	-21.3
19248.000	38.0	7.8	-3.0	1.0	3.0	0.0	V-High Horr	PK	0.0	45.8	74.0	-28.2
19248.000	37.1	7.8	363.0	1.0	3.0	0.0	V-High Horr	PK	0.0	44.9	74.0	-29.1



# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

<b>SAMPLE CALCULATIONS</b>	
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	

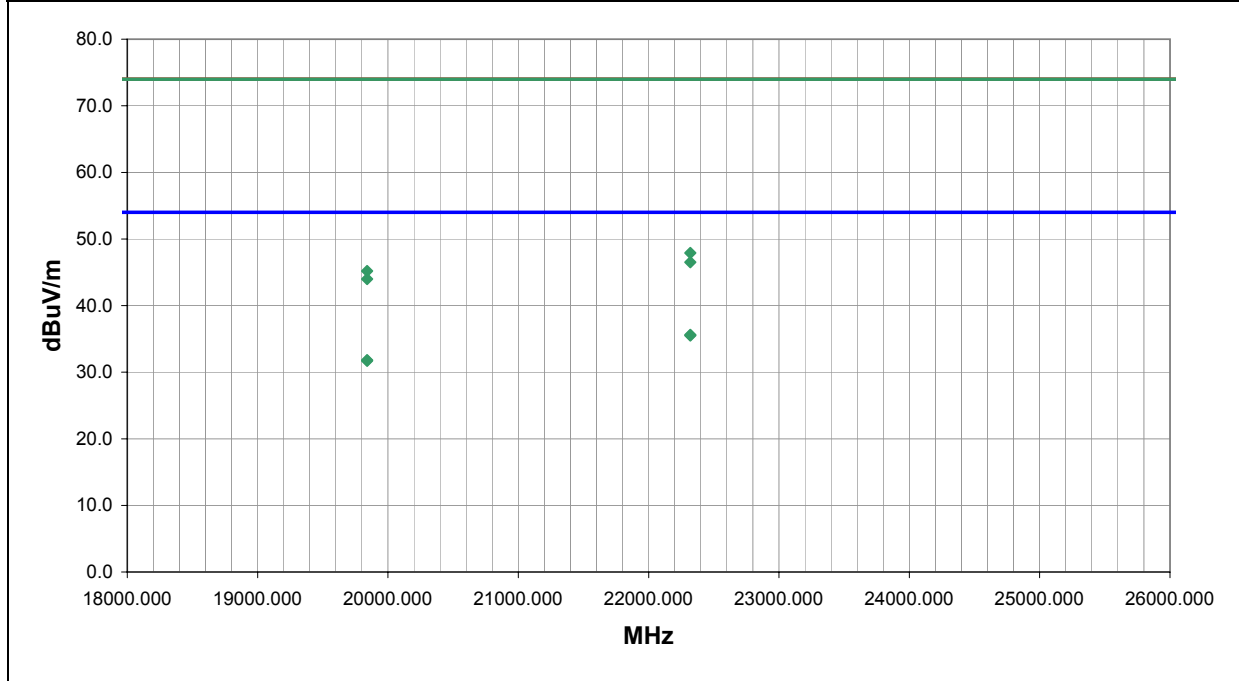
<b>COMMENTS</b>	
Simultaneous Transmission	

<b>EUT OPERATING MODES</b>	
Bluetooth 79 on PW40. Bluetooth 79, 802.11(b) 1 and CDMA (cellular) 55 on 700C	

<b>DEVIATIONS FROM TEST STANDARD</b>	
No deviations.	

<b>RESULTS</b>		Run #
Pass		10

Other	 Tested By:
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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)
22320.000	26.4	9.2	362.0	1.0	3.0	0.0	V-High Horr	AV	0.0	35.6	54.0	-18.4
22320.000	26.3	9.2	-2.0	1.0	3.0	0.0	I-High Horr	AV	0.0	35.5	54.0	-18.5
19840.000	22.9	8.9	0.0	1.0	3.0	0.0	I-High Horr	AV	0.0	31.8	54.0	-22.2
19840.000	22.8	8.9	362.0	1.0	3.0	0.0	V-High Horr	AV	0.0	31.7	54.0	-22.3
22320.000	38.7	9.2	362.0	1.0	3.0	0.0	V-High Horr	PK	0.0	47.9	74.0	-26.1
22320.000	37.3	9.2	-2.0	1.0	3.0	0.0	I-High Horr	PK	0.0	46.5	74.0	-27.5
19840.000	36.3	8.9	0.0	1.0	3.0	0.0	I-High Horr	PK	0.0	45.2	74.0	-28.8
19840.000	35.1	8.9	362.0	1.0	3.0	0.0	V-High Horr	PK	0.0	44.0	74.0	-30.0

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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 on PW40. Bluetooth 11, 802.11(b) 1 and CDMA (PCS) 1153 on 700C

**DEVIATIONS FROM TEST STANDARD**

No deviations.

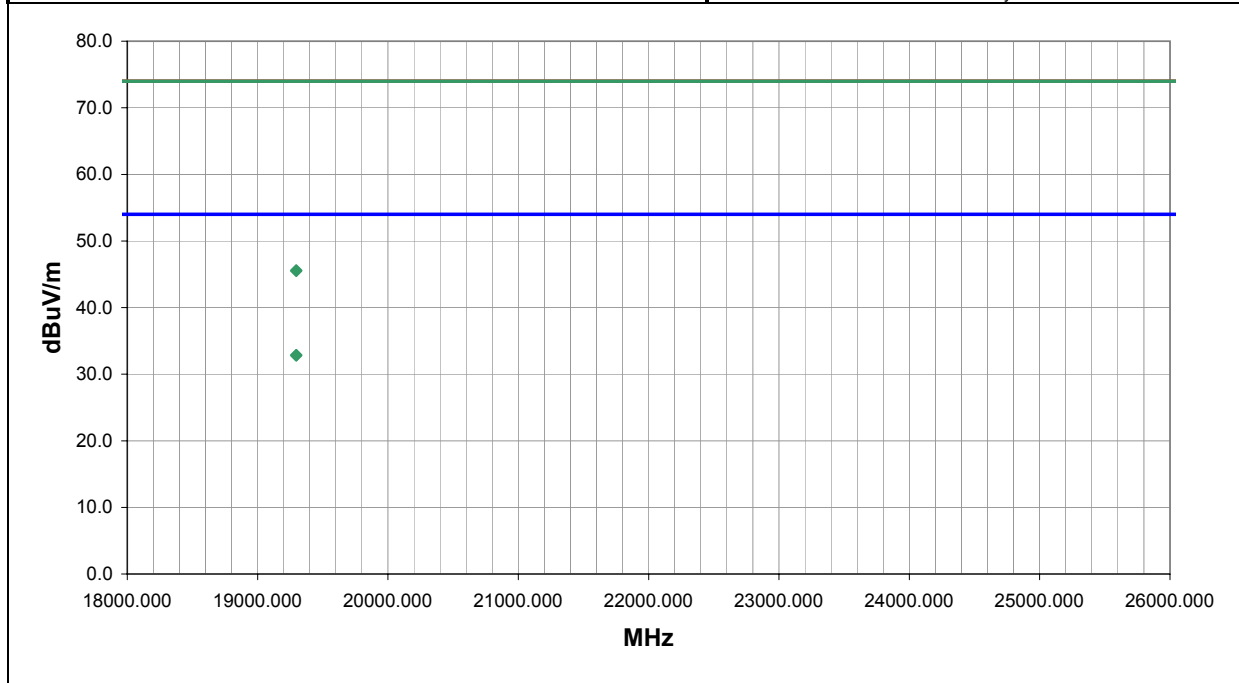
**RESULTS**

Pass	Run #	11
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Other

*Holly Ashkannejhad*

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)
19296.000	24.9	8.0	362.0	1.0	3.0	0.0	-High Horr	AV	0.0	32.9	54.0	-21.1
19296.000	24.8	8.0	-3.0	1.0	3.0	0.0	-High Horr	AV	0.0	32.8	54.0	-21.2
19296.000	37.6	8.0	-3.0	1.0	3.0	0.0	-High Horr	PK	0.0	45.6	74.0	-28.4
19296.000	37.5	8.0	362.0	1.0	3.0	0.0	-High Horr	PK	0.0	45.5	74.0	-28.5

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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 69 on PW40. Bluetooth 69 802.11(b) 11 and CDMA (PCS) 35 on 700C

**DEVIATIONS FROM TEST STANDARD**

No deviations.

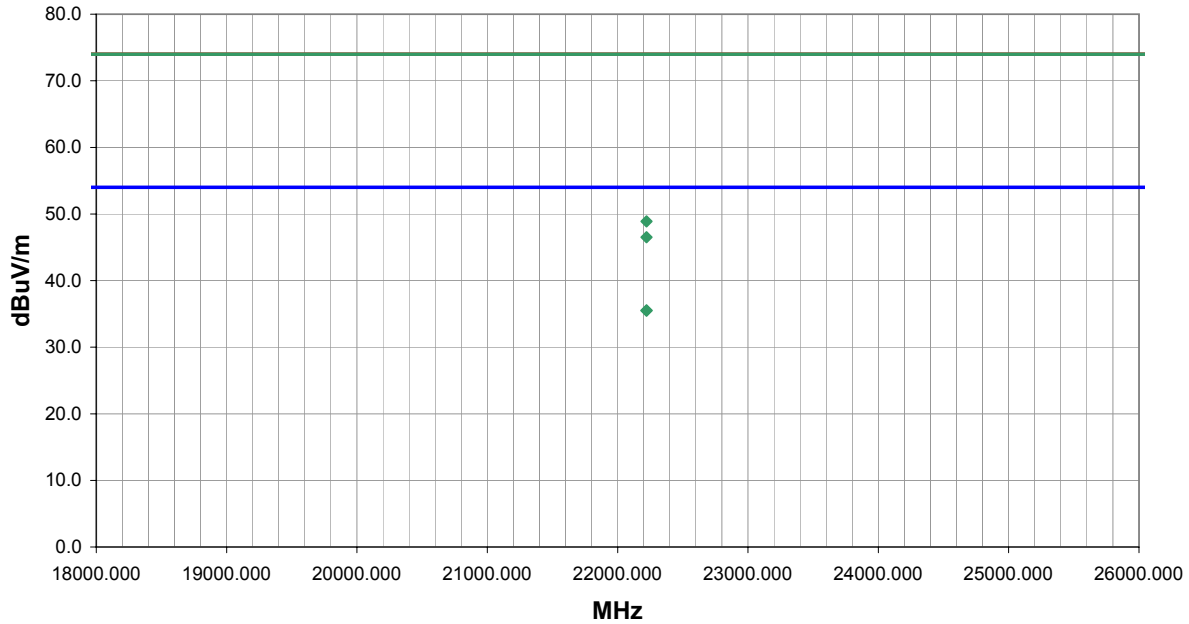
**RESULTS**

Pass	Run #	12
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Other

*Holly Ashkannejhad*

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)
22221.000	26.5	9.0	0.0	1.0	3.0	0.0	-I-High Horr	AV	0.0	35.5	54.0	-18.5
22221.000	26.5	9.0	362.0	1.0	3.0	0.0	-I-High Horr	AV	0.0	35.5	54.0	-18.5
22221.000	39.9	9.0	0.0	1.0	3.0	0.0	-I-High Horr	PK	0.0	48.9	74.0	-25.1
22221.000	37.5	9.0	362.0	1.0	3.0	0.0	-I-High Horr	PK	0.0	46.5	74.0	-27.5

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/13/04
Customer:	Intermec Technologies Corporation	Temperature:	64
Attendees:	none	Humidity:	35%
Cust. Ref. No.:		Barometric Pressure:	30.19
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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 62 on PW40. Bluetooth 62, 802.11(b) 11 and CDMA (PCS) 1153 on 700C

**DEVIATIONS FROM TEST STANDARD**

No deviations.

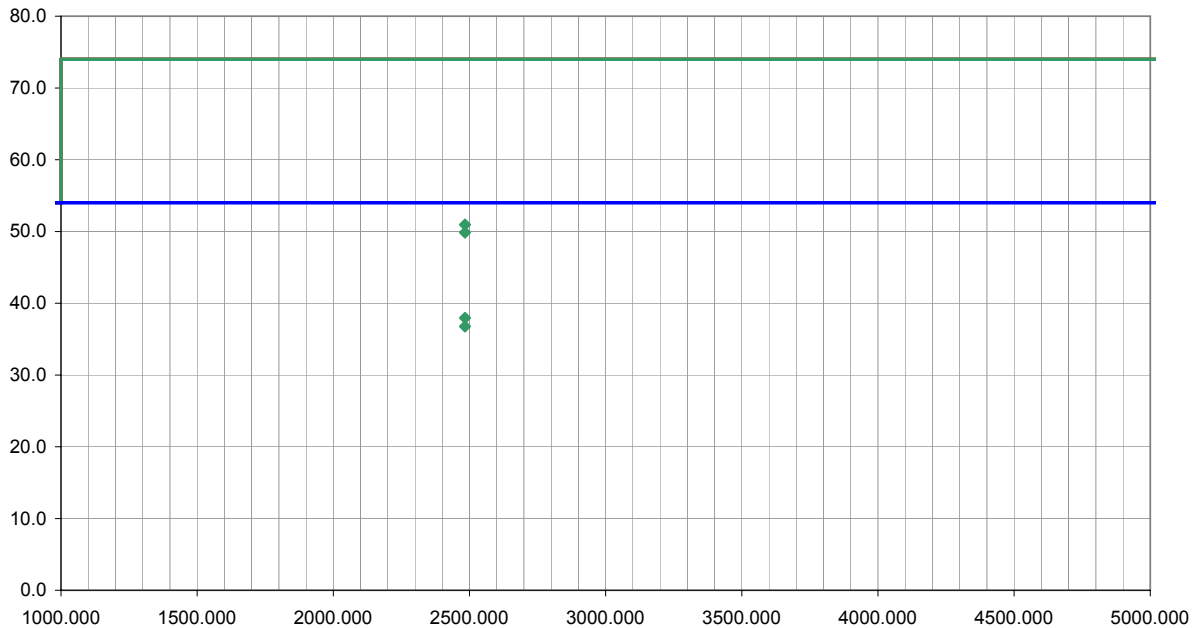
**RESULTS**

Pass	Run #	13
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Other

*Holly Ashkannejhad*

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	15.5	32.0	257.0	1.1	1.0	0.0	H-Horn	AV	-9.5	38.0	54.0	-16.0
2483.500	14.3	32.0	129.0	1.0	1.0	0.0	V-Horn	AV	-9.5	36.8	54.0	-17.2
2483.500	28.5	32.0	129.0	1.0	1.0	0.0	V-Horn	PK	-9.5	51.0	74.0	-23.0
2483.500	27.4	32.0	257.0	1.1	1.0	0.0	H-Horn	PK	-9.5	49.9	74.0	-24.1

# RADIATED EMISSIONS DATA SHEET

EUT: PW40 Bluetooth Enabled Printer	Work Order: ITRM0051
Serial Number: 4898184	Date: 11/13/04
Customer: Intermec Technologies Corporation	Temperature: 66
Attendees: none	Humidity: 45%
Cust. Ref. No.:	Barometric Pressure: 30.33
Tested by: Holly Ashkannejhad	Power: 120VAC/60Hz
	Job Site: EV01

<b>TEST SPECIFICATIONS</b>	
Specification: FCC 15.247(d) Spurious Radiated Emissions	Year: 2004
Method: ANSI C63.4	Year: 2003

**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

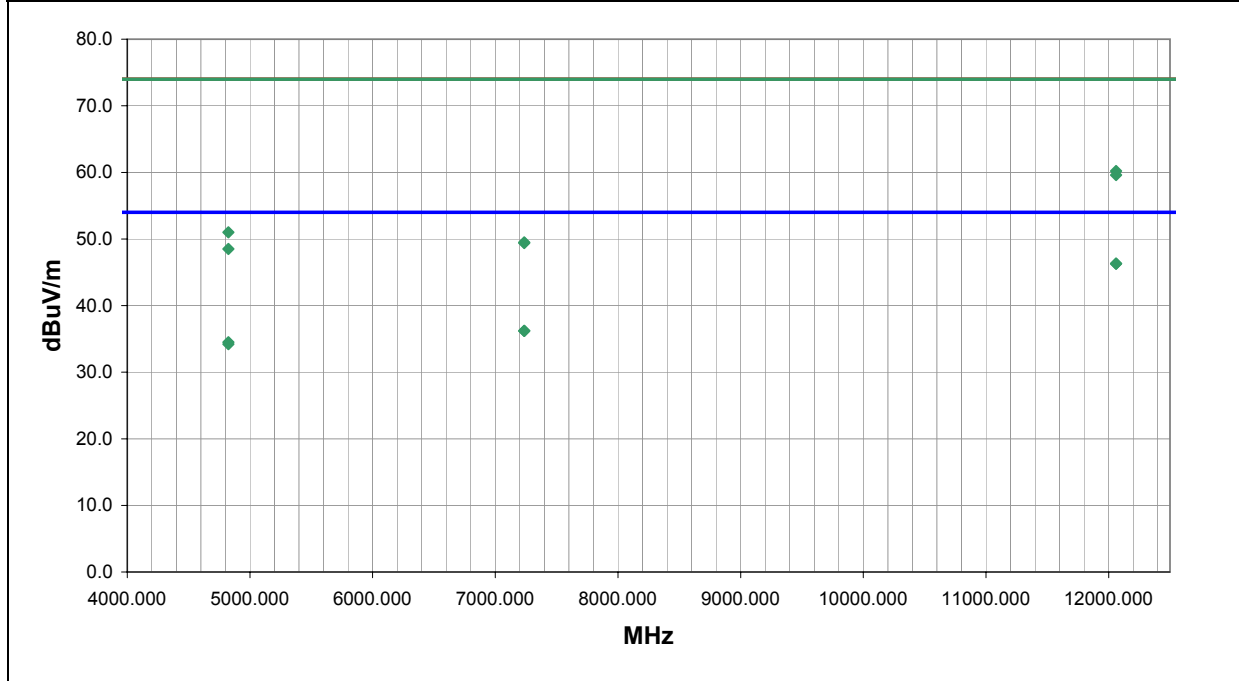
**EUT OPERATING MODES**  
 Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, and CDMA (cellular) 467 in 700C.

**DEVIATIONS FROM TEST STANDARD**  
 No deviations.

<b>RESULTS</b>	<b>Run #</b>
Pass	14

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)
12060.000	26.1	20.2	292.0	1.2	3.0	0.0	V-Horn	AV	0.0	46.3	54.0	-7.7
12060.000	26.1	20.2	53.0	1.7	3.0	0.0	H-Horn	AV	0.0	46.3	54.0	-7.7
12060.000	40.0	20.2	292.0	1.2	3.0	0.0	V-Horn	PK	0.0	60.2	74.0	-13.8
12060.000	39.4	20.2	53.0	1.7	3.0	0.0	H-Horn	PK	0.0	59.6	74.0	-14.4
7236.000	26.1	10.1	336.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.2	54.0	-17.8
7236.000	26.1	10.1	18.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.2	54.0	-17.8
4824.000	31.2	3.3	242.0	1.2	3.0	0.0	V-Horn	AV	0.0	34.5	54.0	-19.5
4824.000	30.9	3.3	206.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.2	54.0	-19.8
4824.000	47.7	3.3	242.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.0	74.0	-23.0
7236.000	39.4	10.1	18.0	1.2	3.0	0.0	V-Horn	PK	0.0	49.5	74.0	-24.5
7236.000	39.3	10.1	336.0	1.3	3.0	0.0	H-Horn	PK	0.0	49.4	74.0	-24.6
4824.000	45.2	3.3	206.0	1.3	3.0	0.0	H-Horn	PK	0.0	48.5	74.0	-25.5

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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

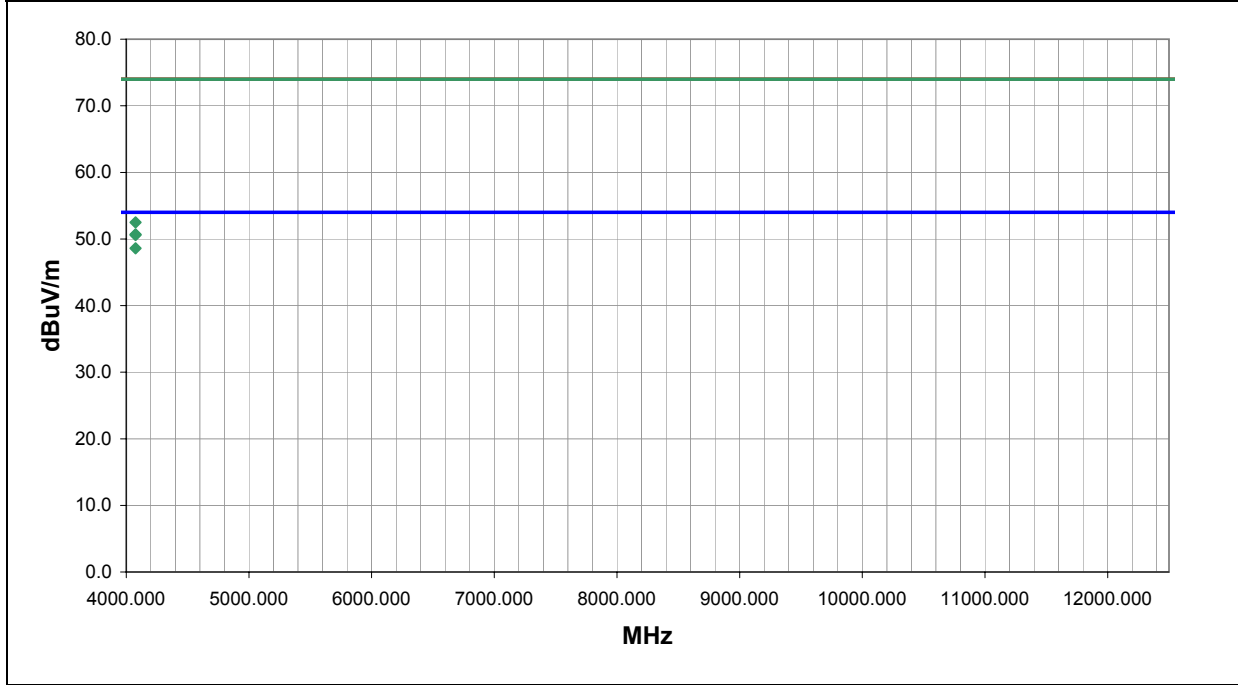
**EUT OPERATING MODES**  
 Bluetooth 5 in PW40. Bluetooth 5, 802.11b 1, and CDMA (cellular) 395 in 700C.

**DEVIATIONS FROM TEST STANDARD**  
 None

<b>RESULTS</b>	<b>Run #</b>
Pass	15

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)
4075.974	48.2	2.4	157.0	1.5	3.0	0.0	V-Horn	AV	0.0	50.6	54.0	-3.4
4075.974	46.2	2.4	351.0	1.3	3.0	0.0	H-Horn	AV	0.0	48.6	54.0	-5.4
4075.974	50.1	2.4	157.0	1.5	3.0	0.0	V-Horn	PK	0.0	52.5	74.0	-21.5
4075.974	48.3	2.4	351.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.7	74.0	-23.3

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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 79 in PW40. Bluetooth 79, 802.11b 11, and CDMA (cellular) 55 in 700C.

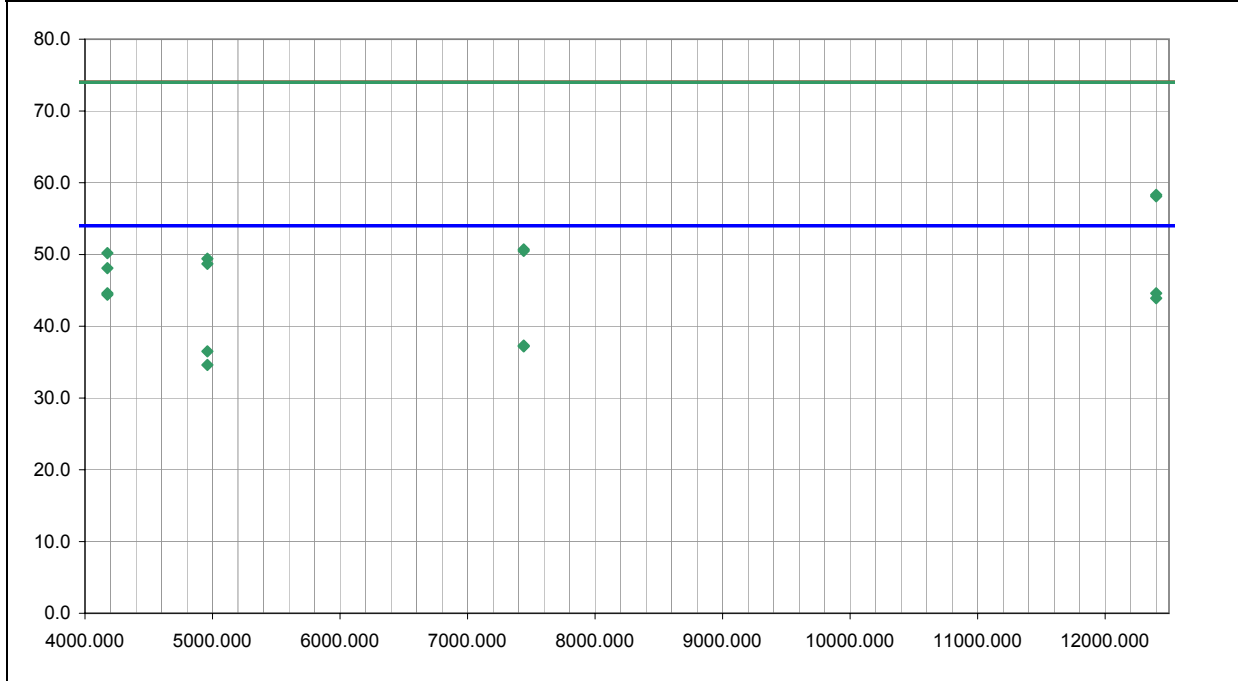
**DEVIATIONS FROM TEST STANDARD**

None

<b>RESULTS</b>	<b>Run #</b>
Pass	16

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)
4176.027	42.2	2.4	110.0	1.6	3.0	0.0	H-Horn	AV	0.0	44.6	54.0	-9.4
12400.000	23.8	20.8	60.0	2.6	3.0	0.0	V-Horn	AV	0.0	44.6	54.0	-9.4
4176.027	42.0	2.4	79.0	1.3	3.0	0.0	V-Horn	AV	0.0	44.4	54.0	-9.6
12400.000	23.1	20.8	58.0	1.3	3.0	0.0	H-Horn	AV	0.0	43.9	54.0	-10.1
12400.000	37.5	20.8	60.0	2.6	3.0	0.0	V-Horn	PK	0.0	58.3	74.0	-15.7
12400.000	37.3	20.8	58.0	1.3	3.0	0.0	H-Horn	PK	0.0	58.1	74.0	-15.9
7440.000	26.2	11.1	157.0	1.5	3.0	0.0	H-Horn	AV	0.0	37.3	54.0	-16.7
7440.000	26.1	11.1	228.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.2	54.0	-16.8
4959.630	32.9	3.6	217.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.5	54.0	-17.5
4959.630	31.0	3.6	209.0	1.2	3.0	0.0	H-Horn	AV	0.0	34.6	54.0	-19.4
7440.000	39.6	11.1	157.0	1.5	3.0	0.0	H-Horn	PK	0.0	50.7	74.0	-23.3
7440.000	39.4	11.1	228.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.5	74.0	-23.5
4176.027	47.8	2.4	110.0	1.6	3.0	0.0	H-Horn	PK	0.0	50.2	74.0	-23.8
4959.630	45.8	3.6	217.0	1.2	3.0	0.0	V-Horn	PK	0.0	49.4	74.0	-24.6
4959.630	45.1	3.6	209.0	1.2	3.0	0.0	H-Horn	PK	0.0	48.7	74.0	-25.3
4176.027	45.7	2.4	79.0	1.3	3.0	0.0	V-Horn	PK	0.0	48.1	74.0	-25.9

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

**TEST SPECIFICATIONS**

Specification:	FCC 15.247(d) Spurious Radiated Emissions	Year:	2004
Method:	ANSI C63.4	Year:	2003

**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 79 in PW40. Bluetooth 79, 802.11b 11, and CDMA (cellular) 54 in 700C.

**DEVIATIONS FROM TEST STANDARD**

None

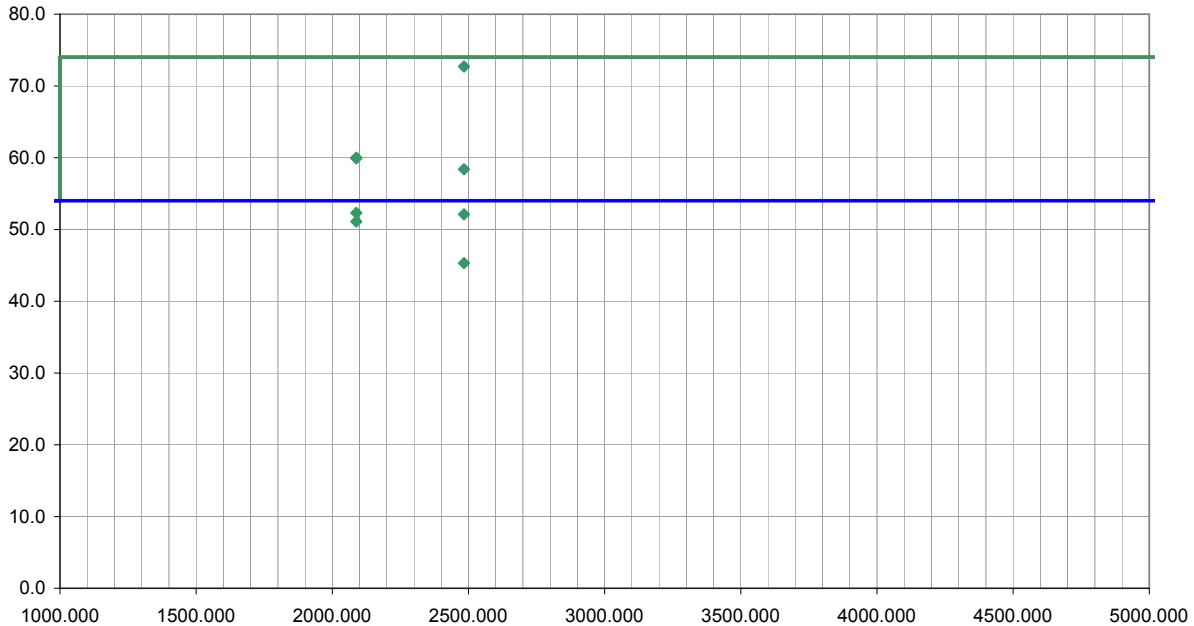
**RESULTS**

Pass	Run #	17
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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	54.9	-2.2	31.0	1.4	3.0	20.0	H-Horn	PK	0.0	72.7	74.0	-1.3
2087.997	35.6	-3.3	216.0	1.3	3.0	20.0	H-Horn	AV	0.0	52.3	54.0	-1.7
2483.500	34.3	-2.2	32.0	1.4	3.0	20.0	H-Horn	AV	0.0	52.1	54.0	-1.9
2087.997	34.4	-3.3	210.0	1.2	3.0	20.0	V-Horn	AV	0.0	51.1	54.0	-2.9
2483.500	27.5	-2.2	211.0	2.0	3.0	20.0	V-Horn	AV	0.0	45.3	54.0	-8.7
2087.997	43.3	-3.3	216.0	1.3	3.0	20.0	H-Horn	PK	0.0	60.0	74.0	-14.0
2087.997	43.2	-3.3	210.0	1.2	3.0	20.0	V-Horn	PK	0.0	59.9	74.0	-14.1
2483.500	40.6	-2.2	211.0	2.0	3.0	20.0	V-Horn	PK	0.0	58.4	74.0	-15.6



# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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

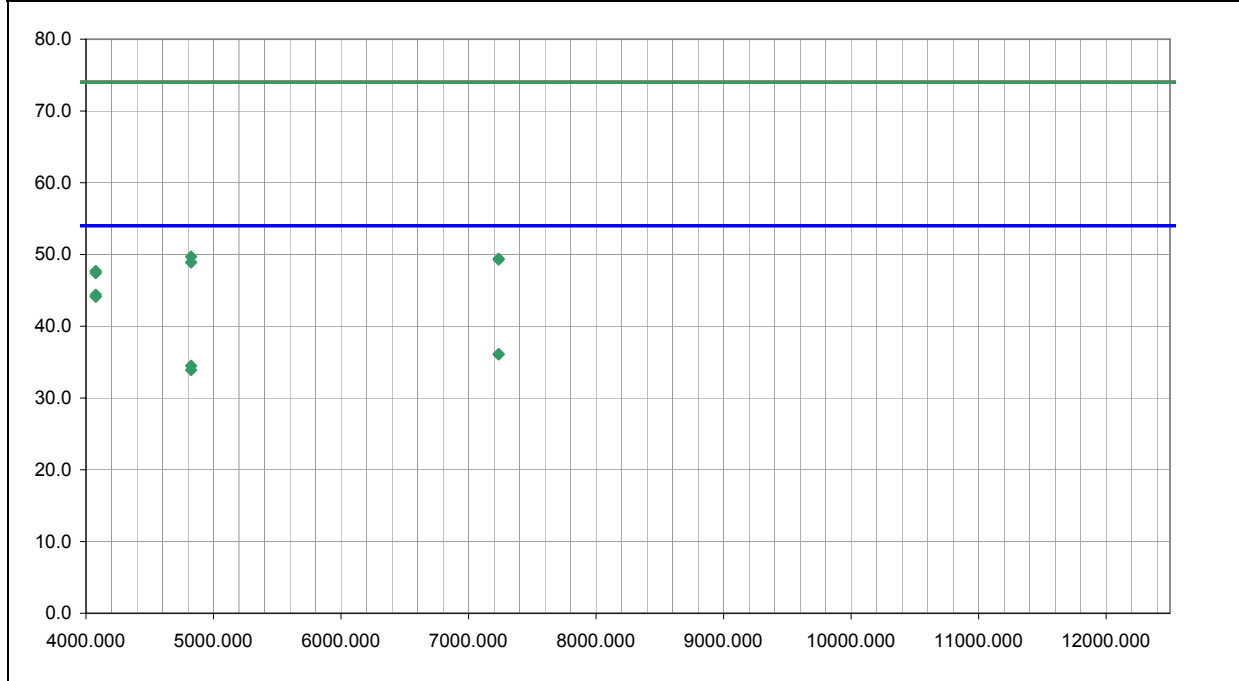
**EUT OPERATING MODES**  
 Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, and CDMA (PCS) 1 in 700C.

**DEVIATIONS FROM TEST STANDARD**  
 None

<b>RESULTS</b>	<b>Run #</b>
Pass	18

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)
4076.030	42.0	2.4	276.0	1.3	3.0	0.0	V-Horn	AV	0.0	44.4	54.0	-9.6
4076.030	41.7	2.4	344.0	1.3	3.0	0.0	H-Horn	AV	0.0	44.1	54.0	-9.9
7236.000	26.0	10.1	151.0	1.4	3.0	0.0	H-Horn	AV	0.0	36.1	54.0	-17.9
7236.000	26.0	10.1	276.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.1	54.0	-17.9
4823.825	31.2	3.3	235.0	1.5	3.0	0.0	V-Horn	AV	0.0	34.5	54.0	-19.5
4823.825	30.6	3.3	12.0	1.2	3.0	0.0	H-Horn	AV	0.0	33.9	54.0	-20.1
4823.825	46.4	3.3	235.0	1.5	3.0	0.0	V-Horn	PK	0.0	49.7	74.0	-24.3
7236.000	39.3	10.1	151.0	1.4	3.0	0.0	H-Horn	PK	0.0	49.4	74.0	-24.6
7236.000	39.2	10.1	276.0	1.2	3.0	0.0	V-Horn	PK	0.0	49.3	74.0	-24.7
4823.825	45.6	3.3	12.0	1.2	3.0	0.0	H-Horn	PK	0.0	48.9	74.0	-25.1
4076.030	45.3	2.4	276.0	1.3	3.0	0.0	V-Horn	PK	0.0	47.7	74.0	-26.3
4076.030	45.0	2.4	344.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.4	74.0	-26.6

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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

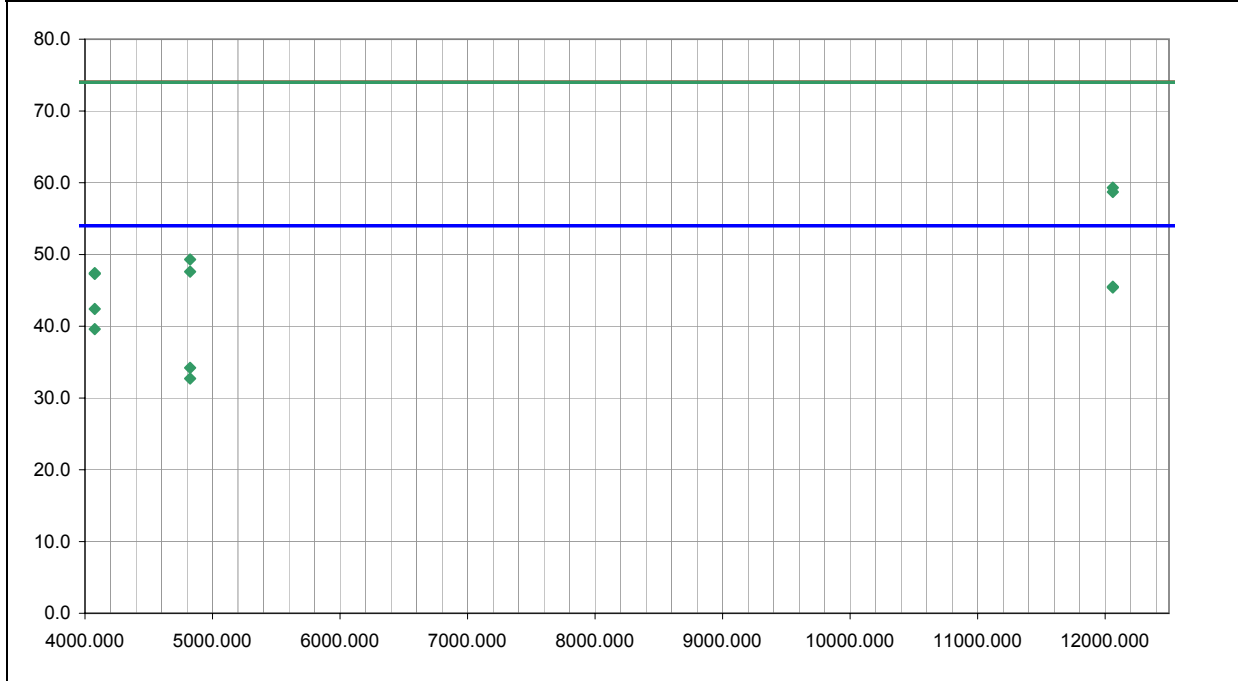
**EUT OPERATING MODES**  
 Bluetooth 11 in PW40. Bluetooth 11, 802.11b 1, and CDMA (PCS) 1153 in 700C.

**DEVIATIONS FROM TEST STANDARD**  
 None

<b>RESULTS</b>	<b>Run #</b>
Pass	19

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)
12060.000	25.3	20.2	175.0	3.3	3.0	0.0	H-Horn	AV	0.0	45.5	54.0	-8.5
12060.000	25.2	20.2	261.0	1.2	3.0	0.0	V-Horn	AV	0.0	45.4	54.0	-8.6
4075.996	40.0	2.4	345.0	1.3	3.0	0.0	H-Horn	AV	0.0	42.4	54.0	-11.6
4075.996	37.2	2.4	275.0	1.2	3.0	0.0	V-Horn	AV	0.0	39.6	54.0	-14.4
12060.000	39.1	20.2	175.0	3.3	3.0	0.0	H-Horn	PK	0.0	59.3	74.0	-14.7
12060.000	38.5	20.2	261.0	1.2	3.0	0.0	V-Horn	PK	0.0	58.7	74.0	-15.3
4824.040	30.9	3.3	237.0	1.5	3.0	0.0	V-Horn	AV	0.0	34.2	54.0	-19.8
4824.040	29.4	3.3	194.0	1.3	3.0	0.0	H-Horn	AV	0.0	32.7	54.0	-21.3
4824.040	46.0	3.3	237.0	1.5	3.0	0.0	V-Horn	PK	0.0	49.3	74.0	-24.7
4824.040	44.3	3.3	194.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.6	74.0	-26.4
4075.996	45.0	2.4	275.0	1.2	3.0	0.0	V-Horn	PK	0.0	47.4	74.0	-26.6
4075.996	44.9	2.4	345.0	1.3	3.0	0.0	H-Horn	PK	0.0	47.3	74.0	-26.7

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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 68 in PW40. Bluetooth 68, 802.11b 11, and CDMA (PCS) 35 in 700C.

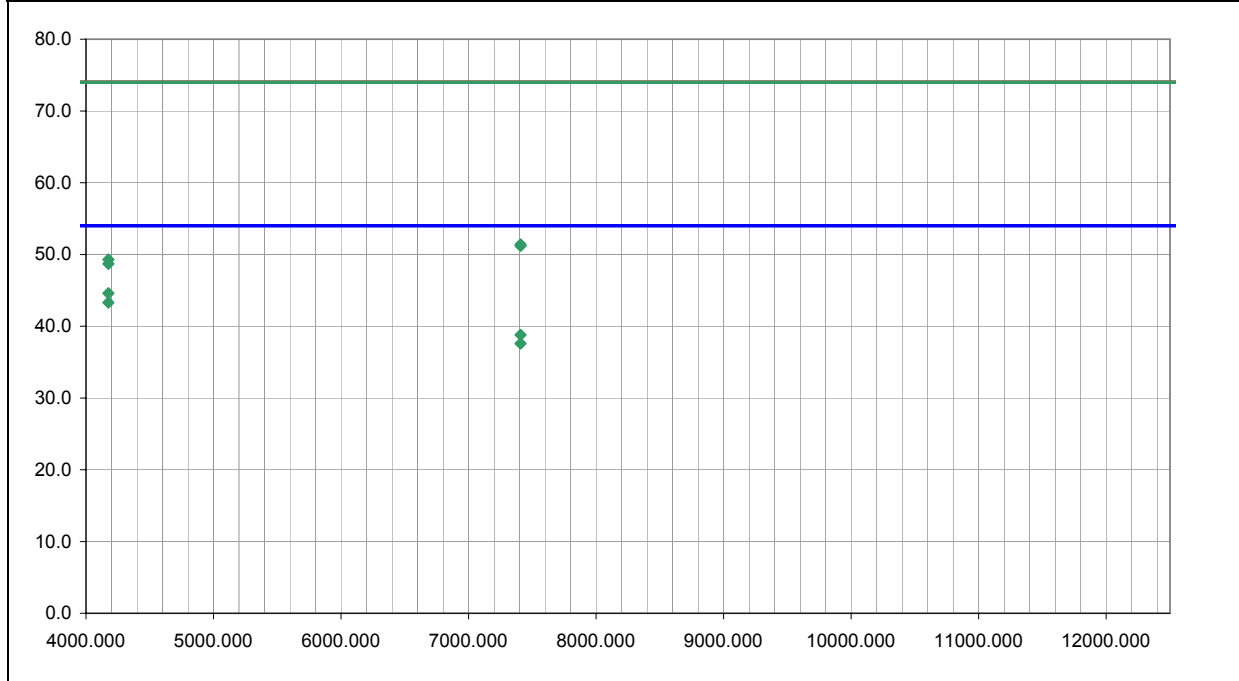
**DEVIATIONS FROM TEST STANDARD**

None

<b>RESULTS</b>	Run #
Pass	20

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)
4175.989	42.2	2.4	174.0	1.1	3.0	0.0	V-Horn	AV	0.0	44.6	54.0	-9.4
4175.989	40.9	2.4	99.0	1.6	3.0	0.0	H-Horn	AV	0.0	43.3	54.0	-10.7
7407.000	27.7	11.1	195.0	1.3	3.0	0.0	H-Horn	AV	0.0	38.8	54.0	-15.2
7407.000	26.5	11.1	85.0	1.6	3.0	0.0	V-Horn	AV	0.0	37.6	54.0	-16.4
7407.000	40.3	11.1	195.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.4	74.0	-22.6
7407.000	40.1	11.1	85.0	1.6	3.0	0.0	V-Horn	PK	0.0	51.2	74.0	-22.8
4175.989	46.9	2.4	99.0	1.6	3.0	0.0	H-Horn	PK	0.0	49.3	74.0	-24.7
4175.989	46.3	2.4	174.0	1.1	3.0	0.0	V-Horn	PK	0.0	48.7	74.0	-25.3

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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, and CDMA (PCS) 1 in 700C.

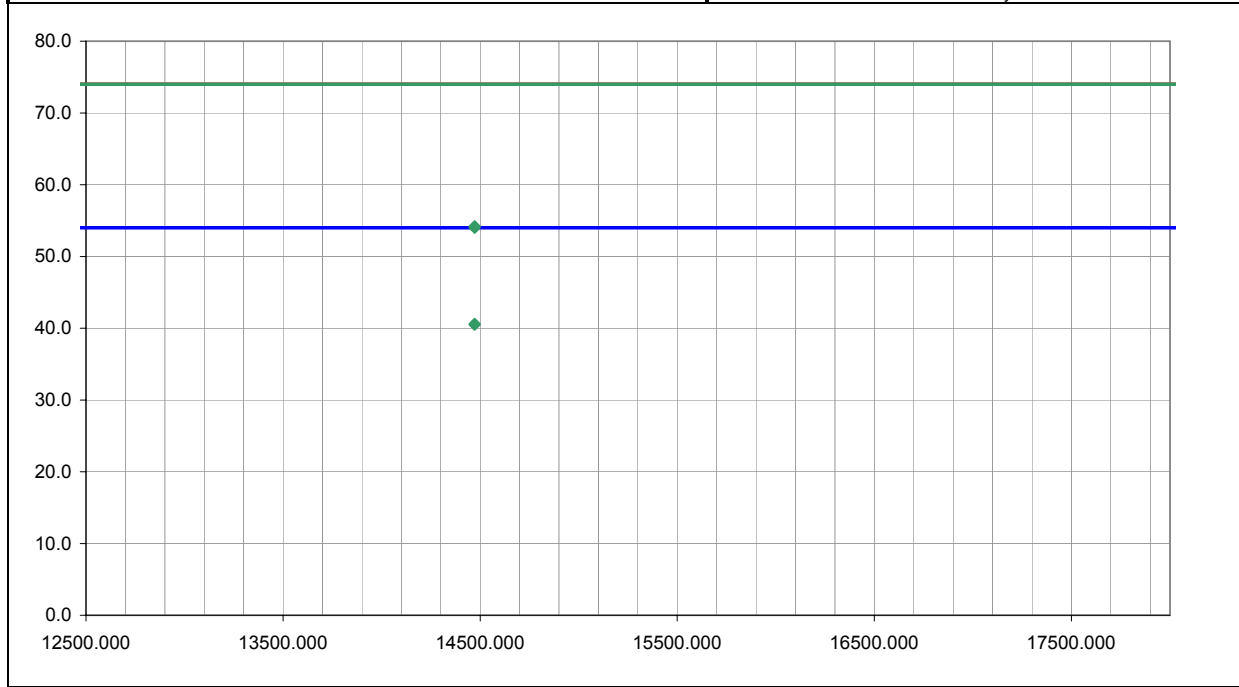
**DEVIATIONS FROM TEST STANDARD**

None

<b>RESULTS</b>	<b>Run #</b>
Pass	21

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	26.8	13.8	129.0	1.2	3.0	0.0	V-Horn	AV	0.0	40.6	54.0	-13.4
14472.000	26.7	13.8	264.0	1.3	3.0	0.0	H-Horn	AV	0.0	40.5	54.0	-13.5
14472.000	40.4	13.8	129.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.2	74.0	-19.8
14472.000	40.2	13.8	264.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.0	74.0	-20.0

# RADIATED EMISSIONS DATA SHEET

EUT:	PW40 Bluetooth Enabled Printer	Work Order:	ITRM0051
Serial Number:	4898184	Date:	11/14/04
Customer:	Intermec Technologies Corporation	Temperature:	66
Attendees:	none	Humidity:	45%
Cust. Ref. No.:		Barometric Pressure:	30.33
Tested by:	Dean Ghizzone	Power:	120VAC/60Hz
		Job Site:	EV01

<b>TEST SPECIFICATIONS</b>	
Specification:	FCC 15.247(d) Spurious Radiated Emissions
Method:	ANSI C63.4
Year:	2004
Year:	2003

**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, and CDMA (cellular) 467 in 700C.

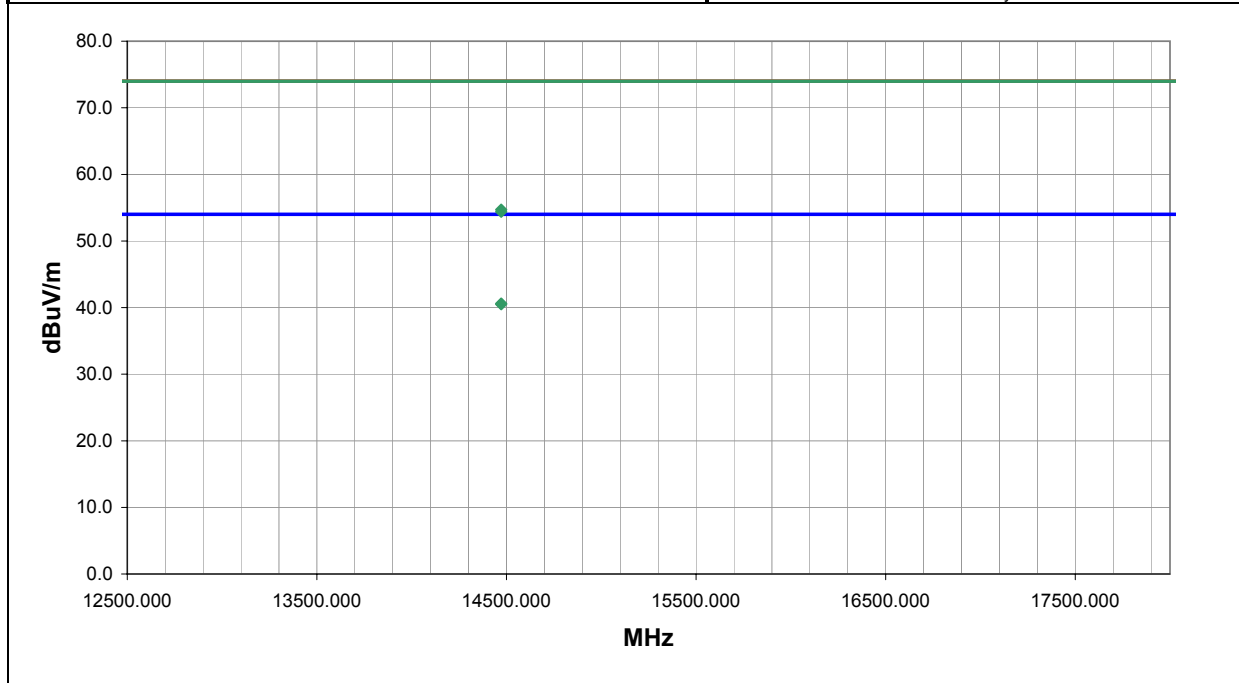
**DEVIATIONS FROM TEST STANDARD**

None

<b>RESULTS</b>	<b>Run #</b>
Pass	22

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	26.8	13.8	128.0	1.2	3.0	0.0	V-Horn	AV	0.0	40.6	54.0	-13.4
14472.000	26.7	13.8	234.0	1.3	3.0	0.0	H-Horn	AV	0.0	40.5	54.0	-13.5
14472.000	40.9	13.8	128.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.7	74.0	-19.3
14472.000	40.6	13.8	234.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.4	74.0	-19.6







