

Intermec Technologies Corporation

**GSM/GPRS (SMC45) in 700C
with Bluetooth (8520-00080)
in 6820**

May 17, 2004

Report No. ITRM0026.3

Report Prepared By:



1-888-EMI-CERT

Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: May 17, 2004

Intermec Technologies Corporation

Model: GSM/GPRS (SMC45) in 700C with Bluetooth (8520-00080) in 6820

Emissions		
Description	Pass	Fail
FCC 24.238 Spurious Radiated Emissions:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product
 See the Modifications section of this report

Test Facility

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

Approved By:

Greg Kiemel, Director of Engineering

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 and 200630-0.



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



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



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



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



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



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



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



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Nos. - Evergreen: C-1071 and R-1025, Trails End: C-1877 and R-1760, Sultan: C-905, R-871, C-1784 and R-1761, North Sioux City C-1246 and R-1217*)



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?

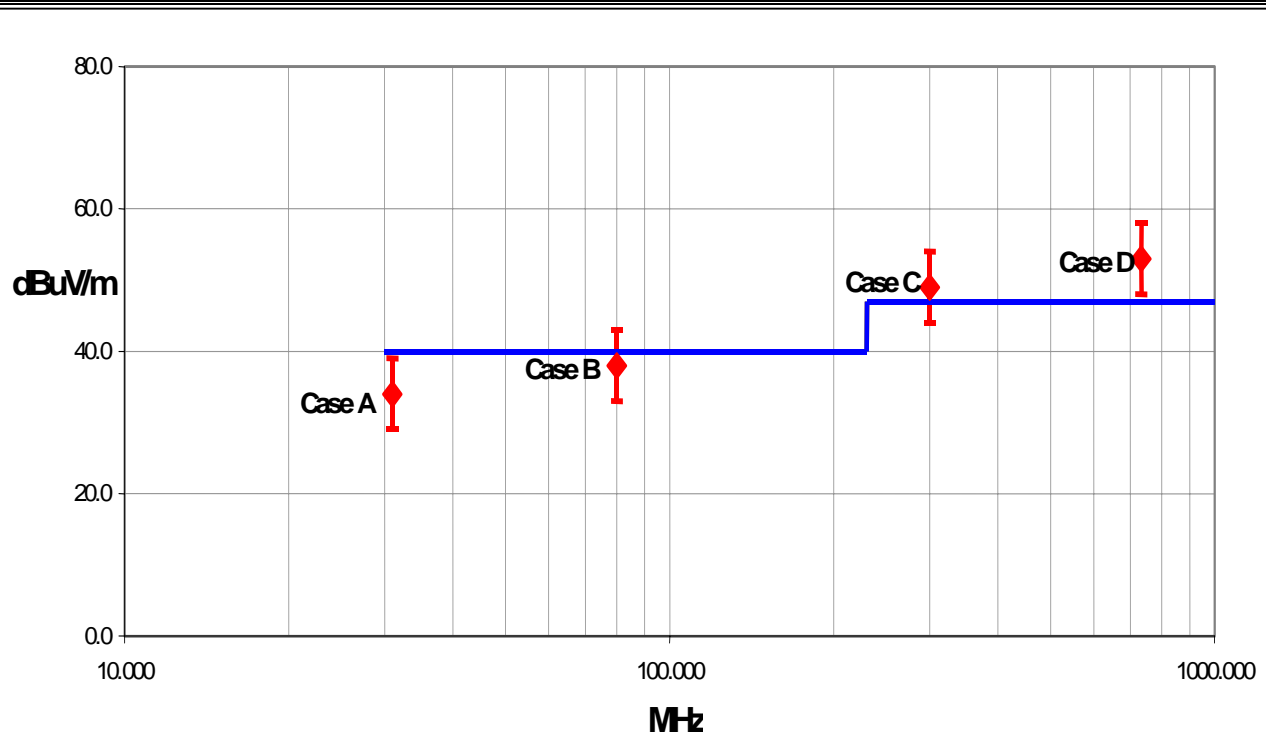
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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	+ 1.38	- 1.25	- 1.35
		- 1.25	- 1.35	+ 2.57	+ 2.76
Expanded uncertainty U (level of confidence ≈ 95%)	normal (k=2)	+ 2.57	+ 2.76	- 2.51	- 2.70
		- 2.51	- 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



South Dakota

North Sioux City Facility

745 N. Derby Lane
P.O. Box 217
North Sioux City, SD 57049
(605) 232-5267
FAX (605) 232-3873



Washington

Sultan Facility

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

Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	550 Second St. SE
City, State, Zip:	Cedar Rapids, IA 52401-2023
Test Requested By:	Scott Holub
Equipment Under Test:	GSM/GPRS in 700C with Bluetooth in 6820
Model:	SMC45
First Date of Test:	05-13-2004
Last Date of Test:	05-17-2004
Receipt Date of Samples:	05-13-2004
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 on printer.

Functional Description of the EUT (Equipment Under Test):

Handheld computer with 3 internal radios for inventory control that can be co-located with a bluetooth radio in the Intermec 6820 Printer when installed in the docking station.

Client Justification for EUT Selection:

The EUT is a representative production sample.

Client Justification for Test Selection:

These tests satisfy the requirements FCC 24.238 for co-located transmitters.

EUT Photo

Equipment modifications

Item	Test	Date	Modification	Note	Disposition of EUT
1	Spurious Radiated Emissions	05/17/2004	No EMI suppression devices were added or modified during this test.	Same configuration as delivered.	EUT was returned to client following testing.

Justification

The EUT is a GSM/GPRS radio module installed inside Intermec's handheld computer, Model 700C. The EUT has been previously certified (FCC ID: EHA700C-SMC45-1) for portable use with these three radios. The 700C also contains two other previously certified radio modules, 802.11(b) and Bluetooth (FCC ID: HN22011B-2 and FCC ID: EHABTS0080). This test demonstrates compliance with FCC 24.238 emissions limits while the EUT is co-located with another Bluetooth radio. This new Bluetooth radio is internal to the Intermec mobile printer, Model 6820 (FCC ID: EHABTS0080). The printer serves as a docking station for the 700C handheld computer. All radios can transmit 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:

802.11(b):	1, 11
Bluetooth:	5, 11, 62, 68, 79, 80
GSM/GPRS:	516, 606

Operating Modes Investigated:**Bluetooth Radio in 6820 with 700C in docking station:**

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 (internal to 6820 and 700C)

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	26 GHz
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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
Printer	Intermec Technologies Corporation	6820	N/A
AC Adapter	Intermec Technologies Corporation	851-064-001	0001771
Handheld Computer with CDMA option	Intermec Technologies Corporation	700C	05400400868
Bluetooth Radio in 700C	Intermec Technologies Corporation	8520-00080	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	7247346BYK0204A
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
AC Power	No	2.0	No	AC Adapter	AC Mains
DC Leads	PA	1.8	PA	Printer	AC Adapter
Serial	Yes	4.0	No	Printer	Remote 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
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
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
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 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 25 GHz. The applicable limits are 24.238(a) for the PCS band.

Per 24.238(a), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. (-13 dBm).

Configuration: Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure radiated harmonics and spurious emissions. The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions.

The substitution method was described in TIA/EIA-603 Section 2.2.12 was used for the highest spurious emissions. The EUT was tested while simultaneously transmitting with co-located radios.

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

At an approved test site, the transmitter is placed 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 spurious 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 $\frac{1}{2}$ wave dipole that is successively tuned to each of the highest spurious emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain, the power (dBm) into an ideal $\frac{1}{2}$ wave dipole antenna is determined for each radiated spurious emissions.

Simultaneous Transmission: The EUT is a GSM/GPRS radio module installed inside Intermec's handheld computer, Model 700C. The EUT has been previously certified (FCC ID: EHA700C-SMC45-1) for portable use with these three radios. The 700C also contains two other previously certified radio modules, 802.11(b) and Bluetooth (FCC ID: HN22011B-2 and FCC ID: EHABTS0080). This test demonstrates compliance with FCC 24.238 emissions limits while the EUT is co-located with another Bluetooth radio. This new Bluetooth radio is internal to the Intermec mobile printer, Model 6820 (FCC ID: EHABTS0080). The printer serves as a docking station for the 700C handheld computer. All radios can transmit simultaneously. Each radio transmits through its own antenna.

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

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

All possible combinations of harmonic emissions from the CDMA, 802.11(b), and 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 C63.4:2001). 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

Measurements were made using the bandwidths and detectors specified. No video filter was used.

Completed by:

Apparent Power Data Sheet

EUT: GSM (SMC45) in 700C with Bluetooth in 6820		Work Order: ITRM0026
Serial Number:		Date: 05/15/04
Customer: Intermec Technologies Corporation		Temperature: 72
Attendees: None		Humidity: 42%
Cust. Ref. No.:		Barometric Pressure: 30.05
Tested by: Holly Ashkannejhad	Power: 120 V, 60 Hz	Job Site: EV01

TEST SPECIFICATIONS	
Specification: FCC 24.238(a)	Year: 2003
Method: TIA/EIA-603	Year: 1998

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
 EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

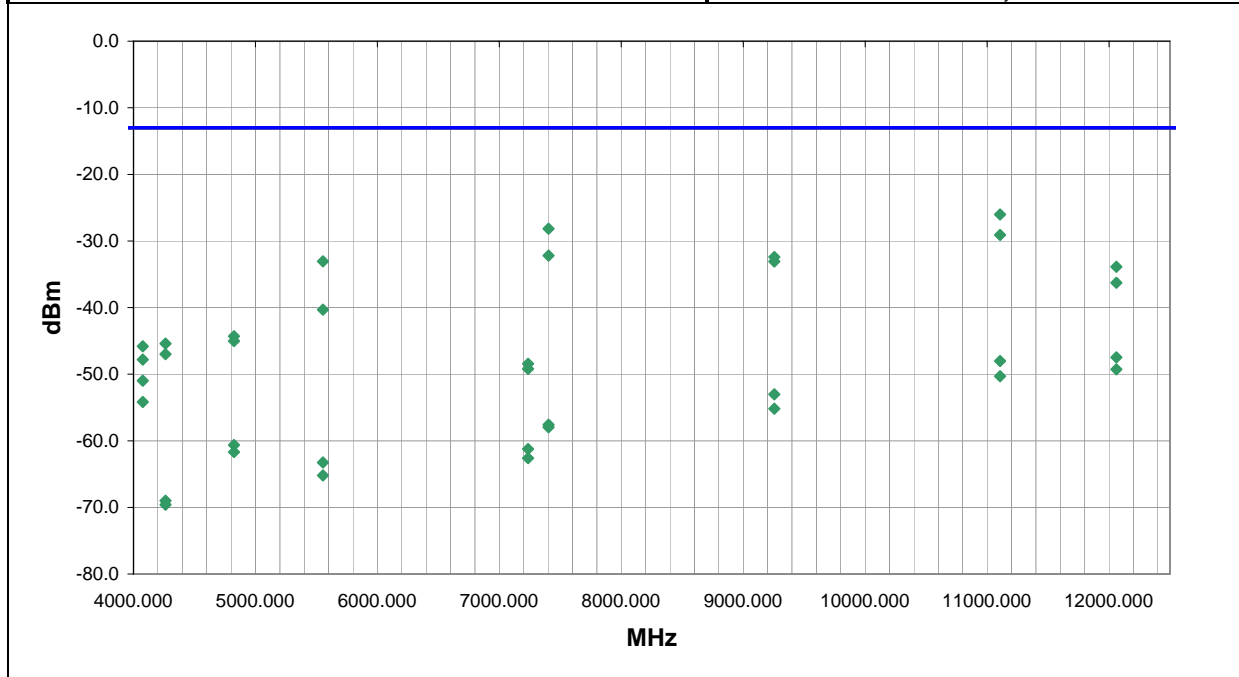
EUT OPERATING MODES
 Bluetooth 11, 802.11b 1, GSM 516 in 700C. Bluetooth 11 in 6820

DEVIATIONS FROM TEST STANDARD
 No deviations.

RESULTS	Run #
Pass	20

Other
 This data sheet includes data that is not in a restricted band. Do not use it for the final data.

Holly Ashkannejhad
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
11106.000	314.0	1.4	H-Horn	PK	-26.0	-13.0	-13.0
7403.982	41.0	1.6	V-Horn	PK	-28.2	-13.0	-15.2
11106.000	174.0	1.2	V-Horn	PK	-29.1	-13.0	-16.1
7403.982	316.0	1.2	H-Horn	PK	-32.2	-13.0	-19.2
9254.978	65.0	1.3	H-Horn	PK	-32.4	-13.0	-19.4
5553.007	313.0	1.5	V-Horn	PK	-33.1	-13.0	-20.1
9254.978	52.0	1.4	V-Horn	PK	-33.1	-13.0	-20.1
12060.000	191.0	2.0	H-Horn	PK	-33.9	-13.0	-20.9
12060.000	237.0	1.2	V-Horn	PK	-36.3	-13.0	-23.3
5553.007	16.0	1.5	H-Horn	PK	-40.3	-13.0	-27.3
4823.935	345.0	1.3	H-Horn	PK	-44.3	-13.0	-31.3
4823.935	186.0	1.2	V-Horn	PK	-45.0	-13.0	-32.0
4262.958	248.0	1.6	H-Horn	PK	-45.4	-13.0	-32.4
4075.979	30.0	1.2	V-Horn	PK	-45.8	-13.0	-32.8
4262.958	65.0	1.5	V-Horn	PK	-47.0	-13.0	-34.0
12060.000	191.0	2.0	H-Horn	AV	-47.5	-13.0	-34.5
4075.979	30.0	1.2	V-Horn	AV	-47.8	-13.0	-34.8
11106.000	314.0	1.4	H-Horn	AV	-48.0	-13.0	-35.0
7236.000	337.0	1.3	H-Horn	PK	-48.4	-13.0	-35.4
7236.000	46.0	1.4	V-Horn	PK	-49.2	-13.0	-36.2
12060.000	237.0	1.2	V-Horn	AV	-49.3	-13.0	-36.3

Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
11106.000			174.0	1.2			V-Horn	AV		-50.3	-13.0	-37.3
4075.979			250.0	1.3			H-Horn	PK		-51.0	-13.0	-38.0
9254.978			65.0	1.3			H-Horn	AV		-53.0	-13.0	-40.0
4075.979			250.0	1.3			H-Horn	AV		-54.2	-13.0	-41.2
9254.978			52.0	1.4			V-Horn	AV		-55.2	-13.0	-42.2
7403.982			316.0	1.2			H-Horn	AV		-57.6	-13.0	-44.6
7403.982			41.0	1.6			V-Horn	AV		-58.0	-13.0	-45.0
4823.935			186.0	1.2			V-Horn	AV		-60.6	-13.0	-47.6
7236.000			337.0	1.3			H-Horn	AV		-61.2	-13.0	-48.2
4823.935			345.0	1.3			H-Horn	AV		-61.7	-13.0	-48.7
7236.000			46.0	1.4			V-Horn	AV		-62.6	-13.0	-49.6
5553.007			313.0	1.5			V-Horn	AV		-63.3	-13.0	-50.3
5553.007			16.0	1.5			H-Horn	AV		-65.2	-13.0	-52.2
4262.958			65.0	1.5			V-Horn	AV		-69.0	-13.0	-56.0
4262.958			248.0	1.6			H-Horn	AV		-69.6	-13.0	-56.6

EUT: GSM (SMC45) in 700C with Bluetooth in 6820		Work Order: ITRM0026
Serial Number:		Date: 05/15/04
Customer: Intermec Technologies Corporation		Temperature: 72
Attendees: None		Humidity: 42%
Cust. Ref. No.:		Barometric Pressure: 30.05
Tested by: Holly Ashkannejhad	Power: 120 V, 60 Hz	Job Site: EV01

TEST SPECIFICATIONS	
Specification: FCC 24.238(a)	Year: 2003
Method: TIA/EIA-603	Year: 1998

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
 EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

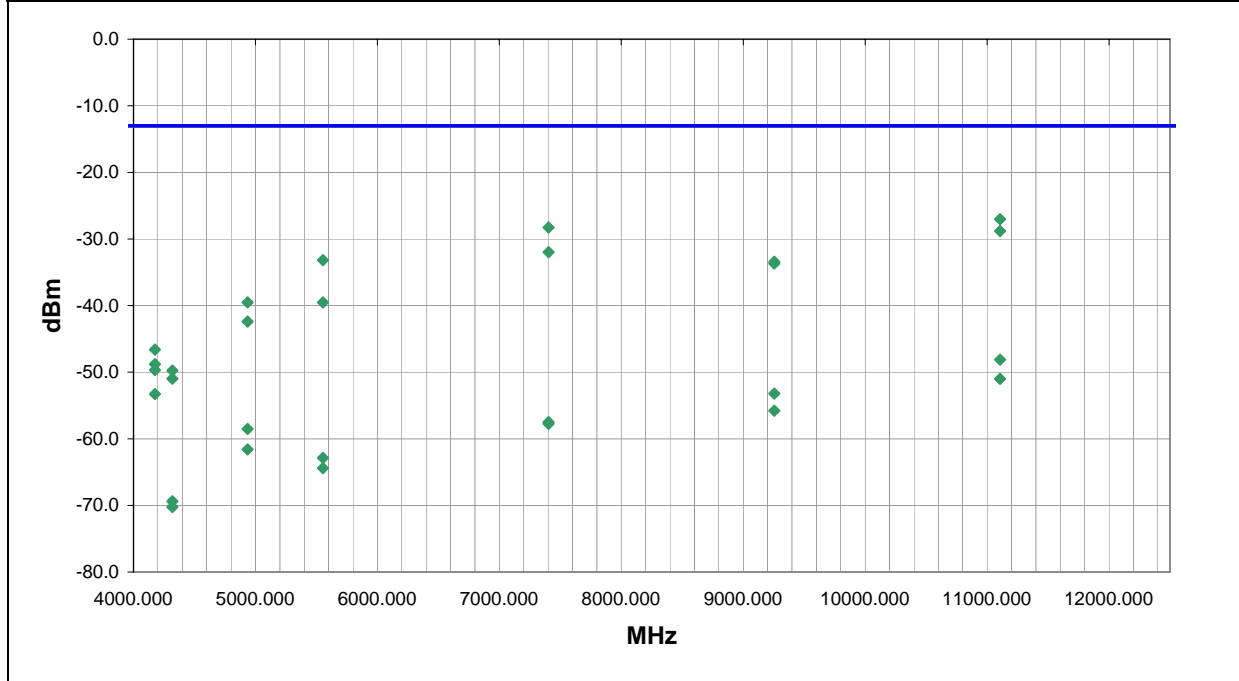
EUT OPERATING MODES
 Bluetooth 67, 802.11b 11, GSM 516 in 700C. Bluetooth 67 in 6820

DEVIATIONS FROM TEST STANDARD
 No deviations.

RESULTS	Run #
Pass	21

Other
 This data sheet includes data that is not in a restricted band. Do not use it for the final data.

Holly Ashkannejhad
 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
11106.000	318.0	1.5	H-Horn	PK	-27.0	-13.0	-14.0
7404.005	40.0	1.2	V-Horn	PK	-28.3	-13.0	-15.3
11106.000	238.0	1.2	V-Horn	PK	-28.8	-13.0	-15.8
7404.005	314.0	1.3	H-Horn	PK	-32.0	-13.0	-19.0
5552.998	317.0	1.2	V-Horn	PK	-33.2	-13.0	-20.2
9254.974	67.0	1.3	H-Horn	PK	-33.4	-13.0	-20.4
9254.974	103.0	1.3	V-Horn	PK	-33.7	-13.0	-20.7
5552.998	16.0	1.5	H-Horn	PK	-39.5	-13.0	-26.5
4935.961	35.0	1.1	V-Horn	PK	-39.5	-13.0	-26.5
4935.961	327.0	1.3	H-Horn	PK	-42.4	-13.0	-29.4
4176.030	17.0	1.2	V-Horn	PK	-46.6	-13.0	-33.6
11106.000	318.0	1.5	H-Horn	AV	-48.1	-13.0	-35.1
4176.030	17.0	1.2	V-Horn	AV	-48.8	-13.0	-35.8
4176.030	57.0	1.6	H-Horn	PK	-49.7	-13.0	-36.7
4318.977	311.0	1.3	H-Horn	PK	-49.7	-13.0	-36.7
4318.977	189.0	1.2	V-Horn	PK	-51.0	-13.0	-38.0
11106.000	238.0	1.2	V-Horn	AV	-51.0	-13.0	-38.0
9254.974	67.0	1.3	H-Horn	AV	-53.2	-13.0	-40.2
4176.030	57.0	1.6	H-Horn	AV	-53.3	-13.0	-40.3
9254.974	103.0	1.3	V-Horn	AV	-55.8	-13.0	-42.8
7404.005	314.0	1.3	H-Horn	AV	-57.5	-13.0	-44.5

Freq (MHz)		Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
7404.005		40.0	1.2			V-Horn	AV		-57.8	-13.0	-44.8
4935.961		35.0	1.1			V-Horn	AV		-58.5	-13.0	-45.5
4935.961		327.0	1.3			H-Horn	AV		-61.6	-13.0	-48.6
5552.998		317.0	1.2			V-Horn	AV		-62.9	-13.0	-49.9
5552.998		16.0	1.5			H-Horn	AV		-64.4	-13.0	-51.4
4318.977		189.0	1.2			V-Horn	AV		-69.4	-13.0	-56.4
4318.977		311.0	1.3			H-Horn	AV		-70.2	-13.0	-57.2

EUT: GSM (SMC45) in 700C with Bluetooth in 6820		Work Order: ITRM0026
Serial Number:		Date: 05/15/04
Customer: Intermec Technologies Corporation		Temperature: 72
Attendees: None		Humidity: 42%
Cust. Ref. No.:		Barometric Pressure: 30.05
Tested by: Holly Ashkannejhad	Power: 120 V, 60 Hz	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC 24.238(a)	Year: 2003
Method: TIA/EIA-603	Year: 1998

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

EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

EUT OPERATING MODES

Bluetooth 67, 802.11b 11, GSM 516 in 700C. Bluetooth 67 in 6820

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

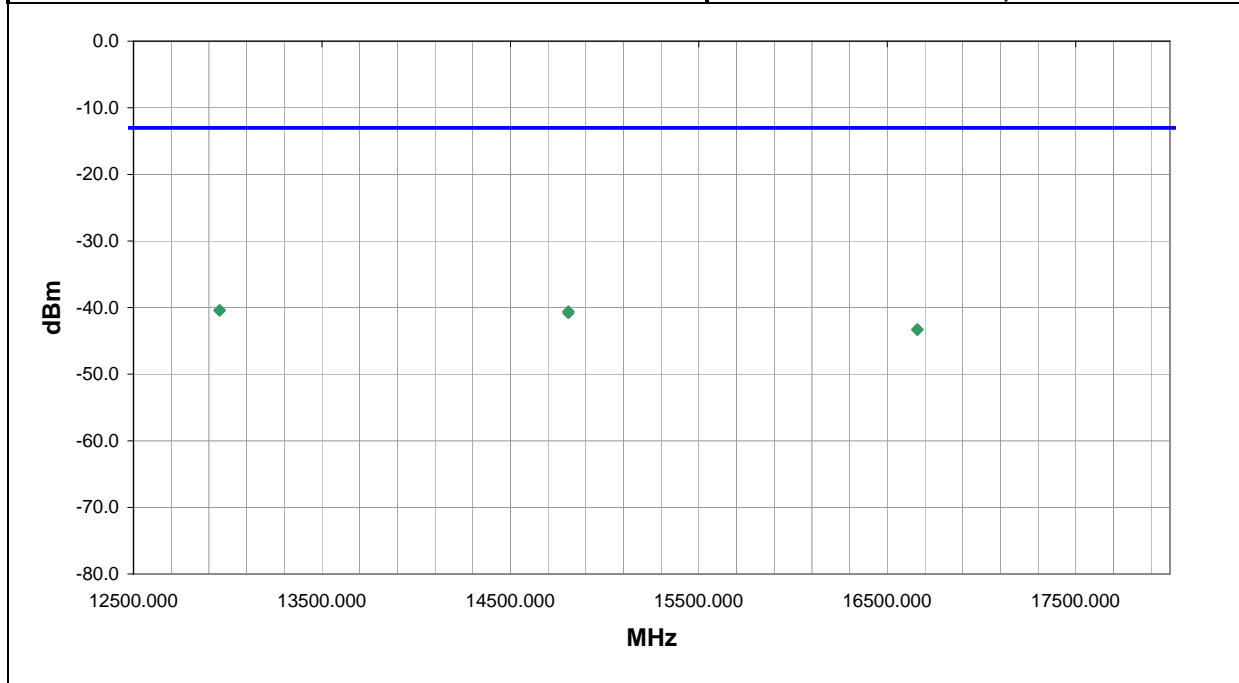
Pass	Run #
	22

Other

This data sheet includes data that is not in a restricted band. Do not use it for the final data.

Holly Ashkannejhad

Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12957.030	308.0	1.2	V-Horn	PK	-40.4	-13.0	-27.4
12957.030	343.0	1.3	H-Horn	PK	-40.5	-13.0	-27.5
14808.000	330.0	1.3	H-Horn	PK	-40.6	-13.0	-27.6
14808.000	341.0	1.3	V-Horn	PK	-40.8	-13.0	-27.8
16659.000	9.0	1.3	H-Horn	PK	-43.3	-13.0	-30.3
16659.000	33.0	1.2	V-Horn	PK	-43.3	-13.0	-30.3

Apparent Power Data Sheet

EUT:	GSM (SMC45) in 700C with Bluetooth in 6820	Work Order:	ITRM0026
Serial Number:		Date:	05/15/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.05
Tested by:	Holly Ashkannejhad	Power:	120 V, 60 Hz
		Job Site:	EV01

TEST SPECIFICATIONS	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	1998

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

EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

EUT OPERATING MODES

Bluetooth 2, 802.11b 1, GSM 606 in 700C. Bluetooth 2 in 6820

DEVIATIONS FROM TEST STANDARD

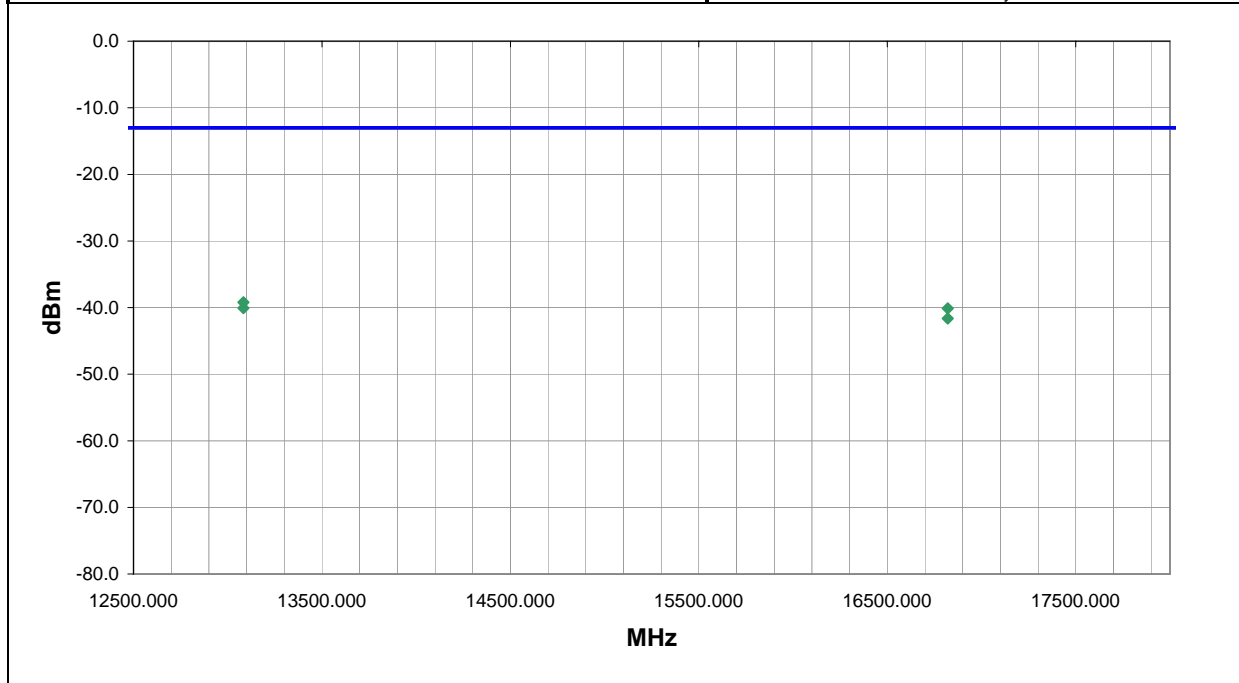
No deviations.

RESULTS	Run #
Pass	23

Other

This data sheet includes data that is not in a restricted band. Do not use it for the final data.

Holly Ashkannejhad
Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
13083.000	315.0	1.3	H-Horn	PK	-39.2	-13.0	-26.2
13083.000	306.0	1.2	V-Horn	PK	-40.1	-13.0	-27.1
16821.000	343.0	1.4	V-Horn	PK	-40.1	-13.0	-27.1
16821.000	9.0	1.3	H-Horn	PK	-41.6	-13.0	-28.6

Apparent Power Data Sheet

EUT:	GSM (SMC45) in 700C with Bluetooth in 6820	Work Order:	ITRM0026
Serial Number:		Date:	05/15/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.05
Tested by:	Holly Ashkannejhad	Power:	120 V, 60 Hz
		Job Site:	EV01

TEST SPECIFICATIONS	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	1998

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
 EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

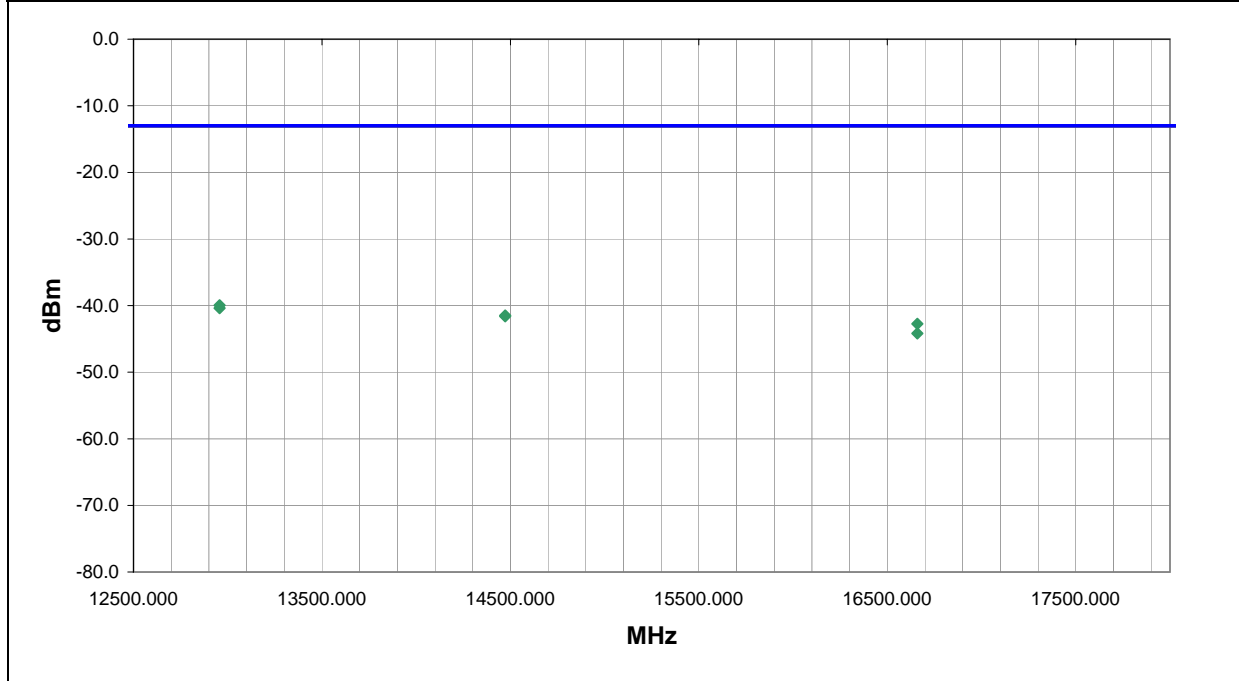
EUT OPERATING MODES
 Bluetooth 11, 802.11b 1, GSM 516 in 700C. Bluetooth 11 in 6820

DEVIATIONS FROM TEST STANDARD
 No deviations.

RESULTS	Run #
Pass	24

Other


 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12957.140	341.0	1.3	H-Horn	PK	-40.0	-13.0	-27.0
12957.140	307.0	1.1	V-Horn	PK	-40.4	-13.0	-27.4
14472.000	325.0	1.3	H-Horn	PK	-41.5	-13.0	-28.5
14472.000	341.0	1.2	V-Horn	PK	-41.6	-13.0	-28.6
16659.000	26.0	1.2	V-Horn	PK	-42.7	-13.0	-29.7
16659.000	148.0	1.8	H-Horn	PK	-44.2	-13.0	-31.2

Apparent Power Data Sheet

EUT:	GSM (SMC45) in 700C with Bluetooth in 6820	Work Order:	ITRM0026
Serial Number:		Date:	05/15/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	None	Humidity:	42%
Cust. Ref. No.:		Barometric Pressure:	30.05
Tested by:	Holly Ashkannejhad	Power:	120 V, 60 Hz
		Job Site:	EV01

TEST SPECIFICATIONS	
Specification:	FCC 24.238(a)
Method:	TIA/EIA-603
Year:	2003
Year:	1998

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
 EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

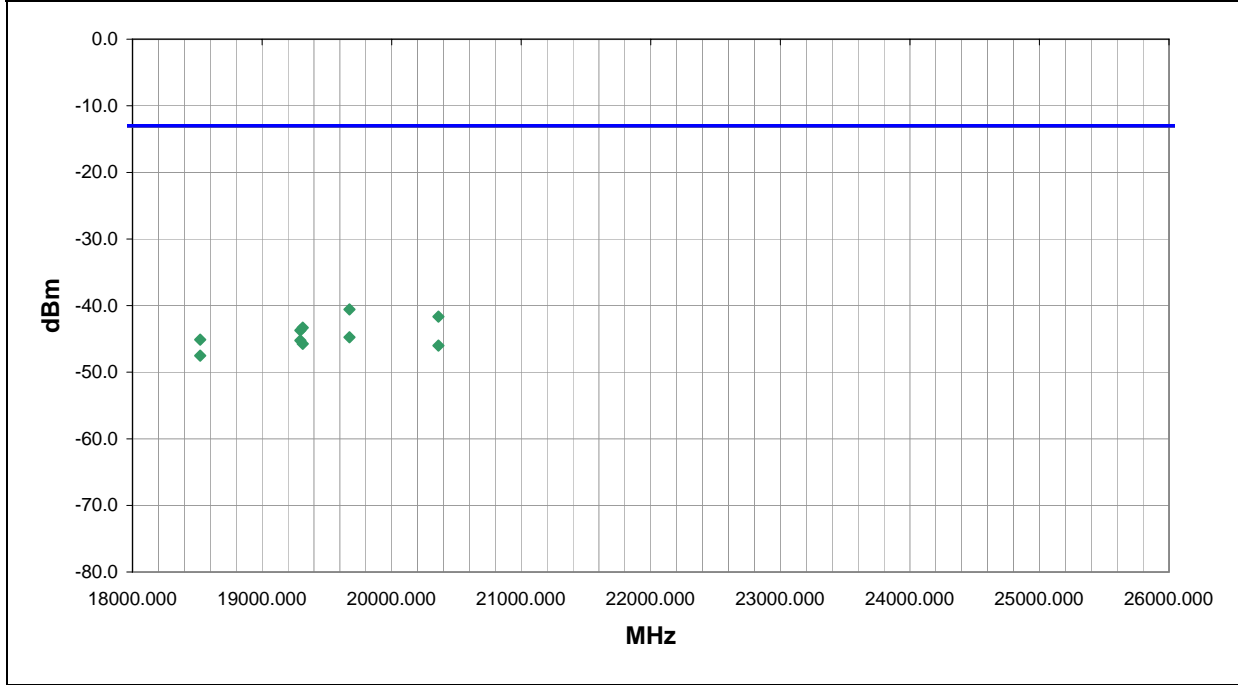
EUT OPERATING MODES
 Bluetooth 11, 802.11b 1, GSM 516 in 700C. Bluetooth 11 in 6820

DEVIATIONS FROM TEST STANDARD
 No deviations.

RESULTS	Run #
Pass	25

Other


 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
19675.130	15.0	1.1	V-High Horr	PK	-40.6	-13.0	-27.6
20361.140	-1.0	1.0	V-High Horr	PK	-41.6	-13.0	-28.6
19314.200	31.0	1.1	V-High Horr	PK	-43.3	-13.0	-30.3
19296.000	361.0	1.0	V-High Horr	PK	-43.7	-13.0	-30.7
19675.130	-1.0	1.0	H-High Horr	PK	-44.8	-13.0	-31.8
18522.350	-1.0	1.0	V-High Horr	PK	-45.1	-13.0	-32.1
19296.000	95.0	1.1	H-High Horr	PK	-45.2	-13.0	-32.2
19314.200	28.0	1.0	H-High Horr	PK	-45.7	-13.0	-32.7
20361.140	18.0	1.0	H-High Horr	PK	-46.0	-13.0	-33.0
18522.350	-1.0	1.0	H-High Horr	PK	-47.5	-13.0	-34.5

EUT: GSM (SMC45) in 700C with Bluetooth in 6820		Work Order: ITRM0026
Serial Number:		Date: 05/16/04
Customer: Intermec Technologies Corporation		Temperature: 72
Attendees: None		Humidity: 42%
Cust. Ref. No.:		Barometric Pressure: 30.05
Tested by: Holly Ashkannejhad	Power: 120 V, 60 Hz	Job Site: EV01

TEST SPECIFICATIONS	
Specification: FCC 24.238(a)	Year: 2003
Method: TIA/EIA-603	Year: 1998

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
 EUT installed in Intermec Model 700C co-located with Intermec Model 6820 printer

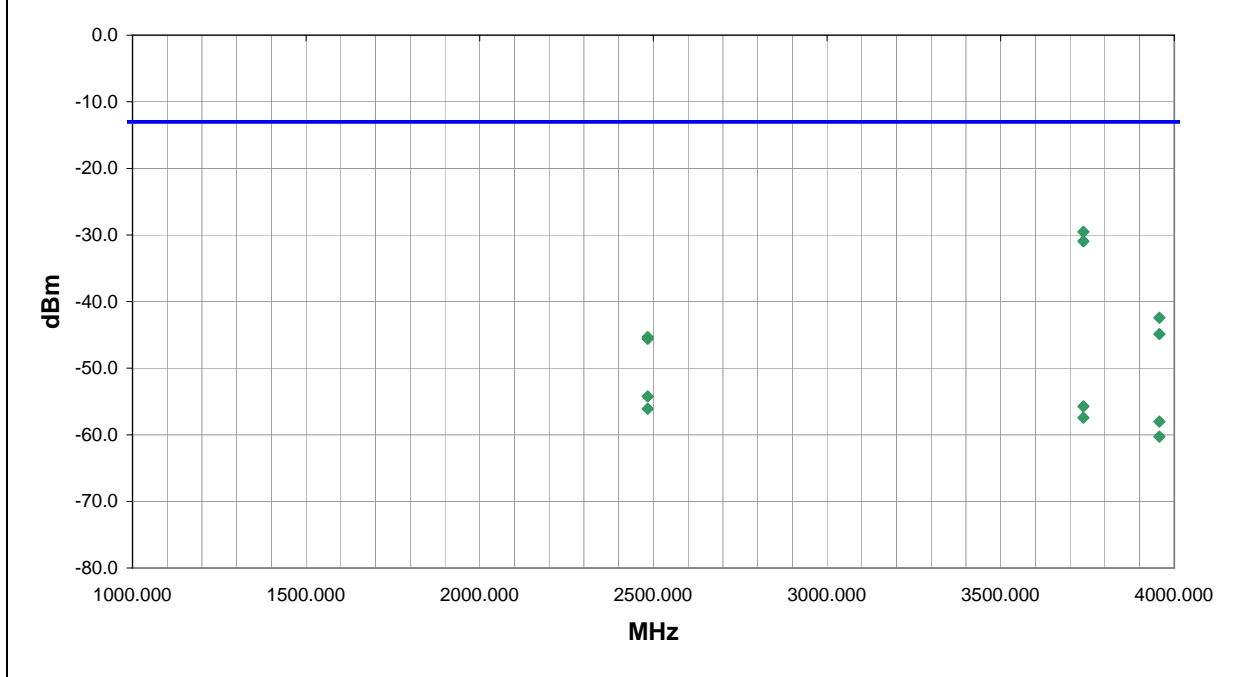
EUT OPERATING MODES
 Bluetooth 80, 802.11b 11, GSM 606 in 700C. Bluetooth 80 in 6820

DEVIATIONS FROM TEST STANDARD
 No deviations.

RESULTS	Run #
Pass	26

Other


 Tested By:



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
3738.060	309.0	1.0	V-Horn	PK	-29.5	-13.0	-16.5
3738.060	94.0	1.1	H-Horn	PK	-30.9	-13.0	-17.9
3957.060	-2.0	1.0	V-Horn	PK	-42.4	-13.0	-29.4
3957.060	321.0	1.0	H-Horn	PK	-44.9	-13.0	-31.9
2483.500	15.0	1.0	H-Horn	PK	-45.3	-13.0	-32.3
2483.500	336.0	1.1	V-Horn	PK	-45.6	-13.0	-32.6
2483.500	15.0	1.0	H-Horn	AV	-54.2	-13.0	-41.2
3738.060	309.0	1.0	V-Horn	AV	-55.7	-13.0	-42.7
2483.500	336.0	1.1	V-Horn	AV	-56.1	-13.0	-43.1
3738.060	94.0	1.1	H-Horn	AV	-57.4	-13.0	-44.4
3957.060	-2.0	1.0	V-Horn	AV	-58.0	-13.0	-45.0
3957.060	321.0	1.0	H-Horn	AV	-60.3	-13.0	-47.3

Intermec 6820 Printer with 700C

