

Intermec Technologies Corporation

**CDMA (SB555) in 700C with
Bluetooth (8520-00080) in 6820**

May 17, 2004

Report No. ITRM0026.2

Report Prepared By:



1-888-EMI-CERT

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Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: May 17, 2004

Intermec Technologies Corporation

Model: CDMA (SB555) in 700C with Bluetooth (8520-00080) in 6820

Emissions		
Description	Pass	Fail
FCC 22.917 Spurious Radiated Emissions:2003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?

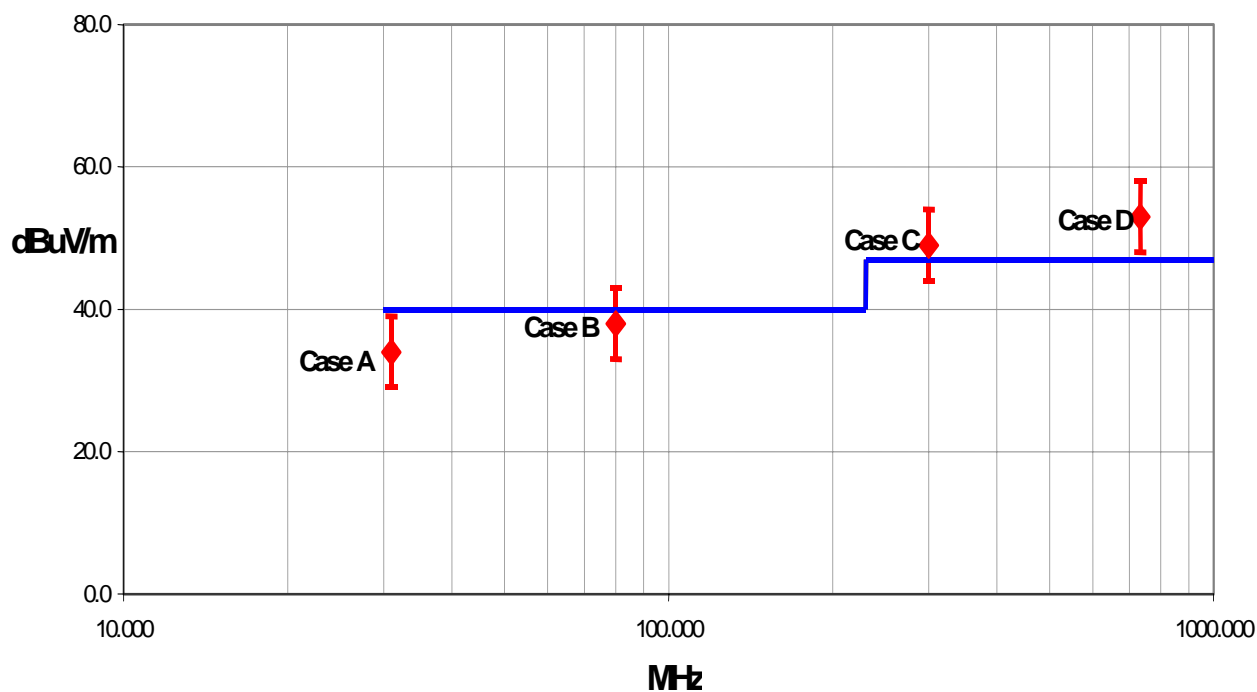
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

Radiated Emissions > 1 GHz

Value (dB)

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

Conducted Emissions

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

Radiated Immunity

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

Conducted Immunity

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

Legend

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

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

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

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

**Oregon****Evergreen Facility**

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

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

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

**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:	CDMA in 700C with Bluetooth in 6820
Model:	SB555
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 22.917 and 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 CDMA radio module installed inside Intermec's handheld computer, Model 700C. The 700C also contains two other previously certified radio modules, 802.11(b) and Bluetooth. The EUT has been previously certified (FCC ID: HN2SB555-2) for portable use with these two other radios (FCC ID: HN22011B-2 and FCC ID: EHABTS0080). This test demonstrates compliance with FCC 22.917 and 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
CDMA (Cellular):	54, 55, 395, 467
CDMA (PCS):	1, 35, 1153
Bluetooth:	5, 11, 62, 68, 79, 80

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

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

Antennas Investigated:

802.11(b):	2011B integral antenna (internal to 700C)
CDMA (Cellular):	805-606-102 Dual Band CDMA 900/1900MHz Antenna (SB555) (external to 700C)
CDMA (PCS):	805-666-204 Single Band CDMA 1900MHz Antenna (SB555) (external to 700C)
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 FCC_Smart 802.11 Agency Test	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
CDMA Radio in 700C	Intermec Technologies Corporation	SB555	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 22.917(e) for the cellular band, and 24.238(a) for the PCS band.

Per 22.917(e), the mean power of out of band emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log (P)$ dB (-13 dBm).

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 CDMA radio module installed inside Intermec's handheld computer, Model 700C. The 700C also contains two other previously certified radio modules, 802.11(b) and Bluetooth. The EUT has been previously certified (FCC ID: HN2SB555-2) for portable use with these two other radios (FCC ID: HN22011B-2 and FCC ID: EHABTS0080). This test demonstrates compliance with FCC 22.917 and 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.

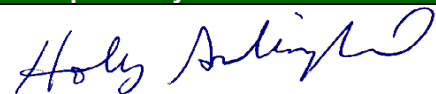
The following is an excerpt from the FCC / TCB Training Q & A, October 2002, Day 2, Question 7:


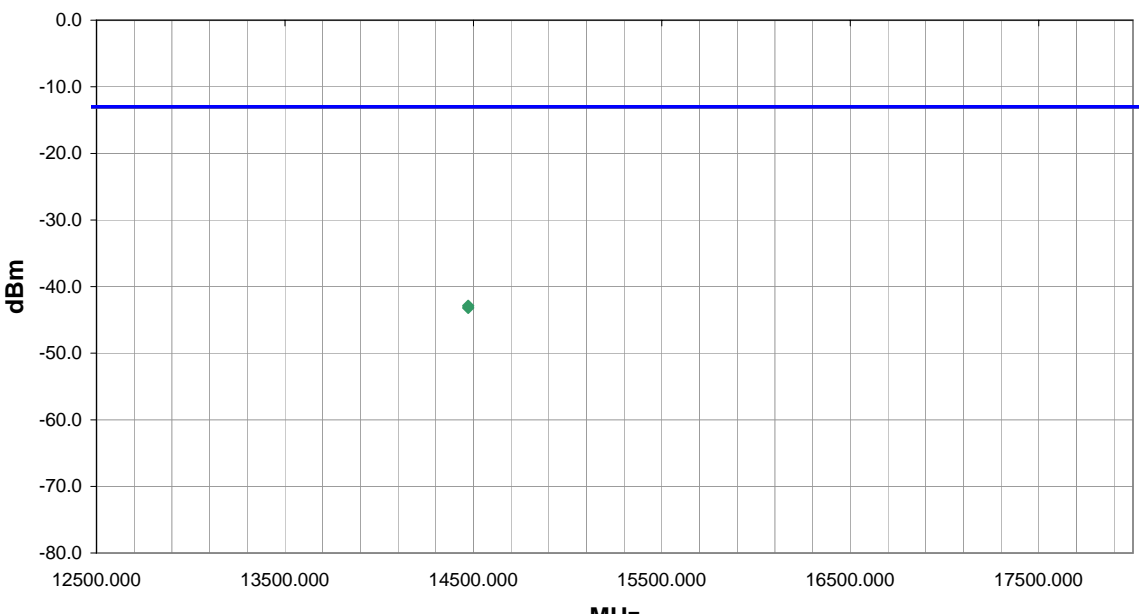
Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted at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


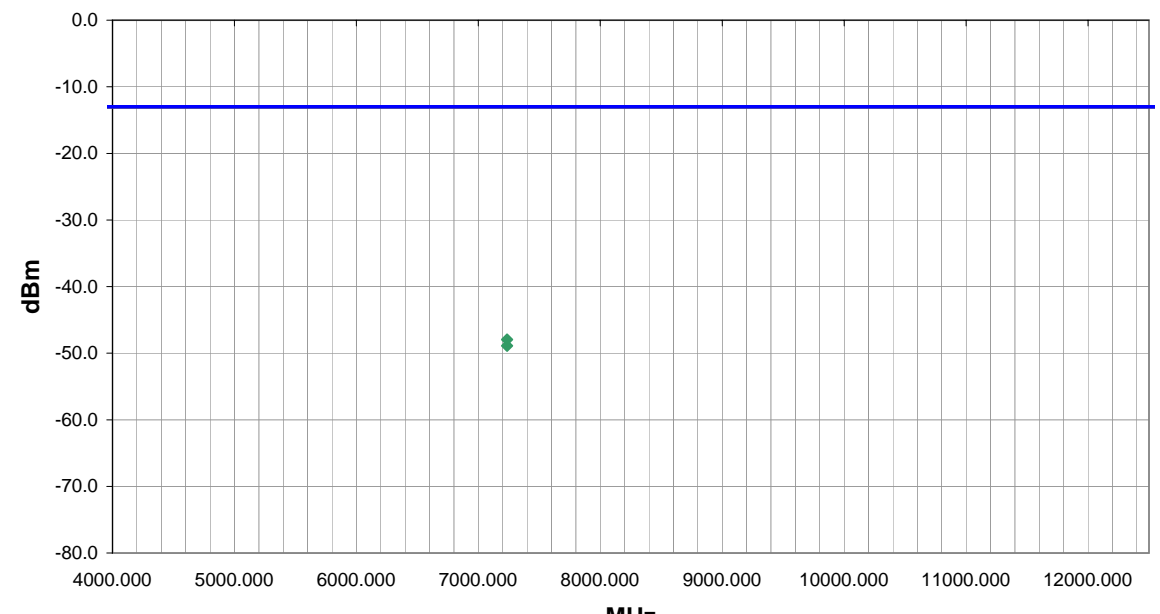
All possible combinations of harmonic emissions from the CDMA, 802.11(b), and Bluetooth radios were compared numerically. It was determined that there were no possible coincidental harmonics below 1 GHz. The frequency range from 1 GHz to 26 GHz was investigated for channel combinations that would produce coincidental harmonics. Compliance with the restricted band at 2483.5 – 2500 MHz was also measured.


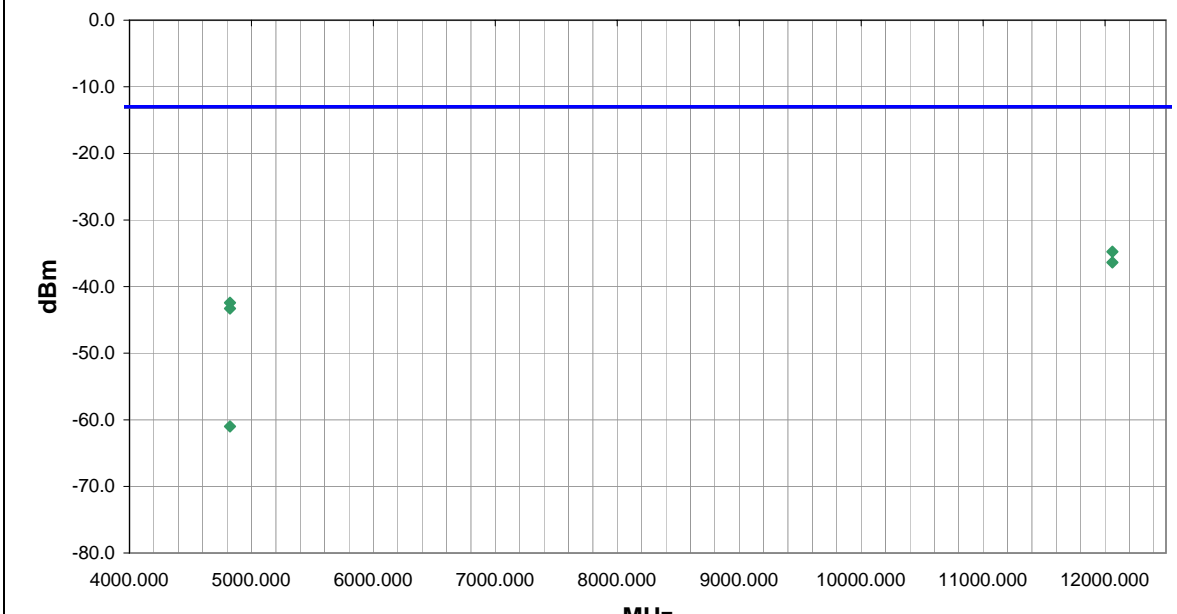
All the radios were configured for simultaneous transmission at the channels specified in the previous pages. The highest gain antennas to be used with the radios were tested. The spectrum was scanned throughout the specified range. While scanning, emissions from the radios were maximized by rotating 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 C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.


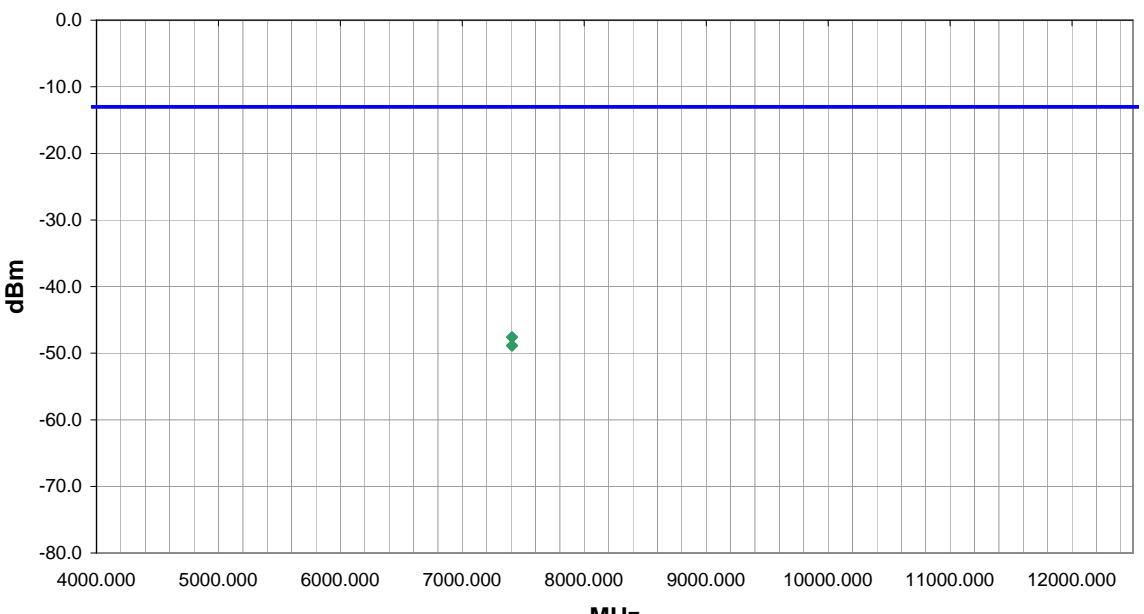
Bandwidths Used for Measurements			
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0
<i>Measurements were made using the bandwidths and detectors specified. No video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


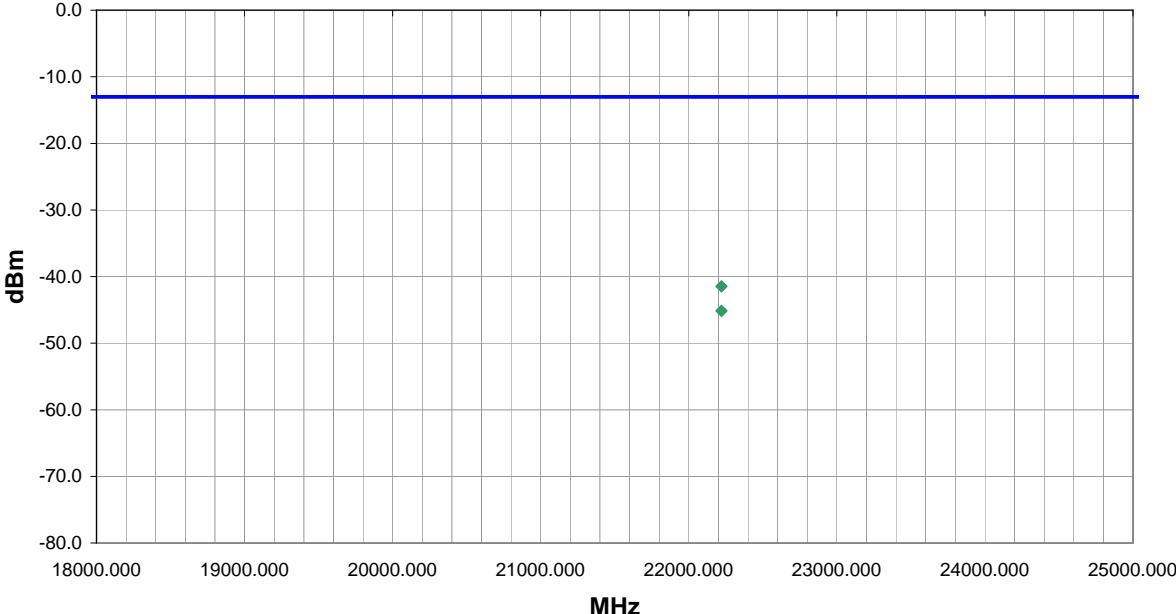
Completed by:


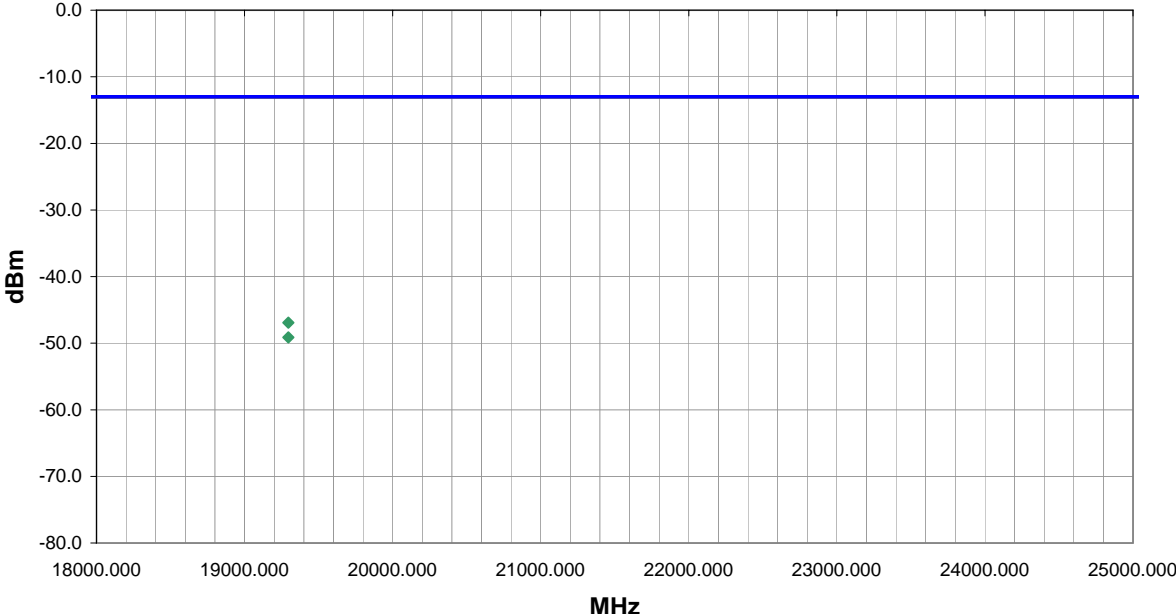
NORTHWEST EMC										Apparent Power Data Sheet										REV d14.13 05/06/2004	
EUT: SB555 Radio in 700C with Bluetooth in 6820										Work Order: ITRM0026											
Serial Number:										Date: 05/14/04											
Customer: Intermec Technologies Corporation										Temperature: 77											
Attendees: None										Humidity: 37%											
Cust. Ref. No.:										Barometric Pressure: 30.03											
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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer																					
EUT OPERATING MODES																					
Bluetooth 11, 802.11b 1, CDMA 1 (PCS) in 700C. Bluetooth 11 in 6820																					
DEVIATIONS FROM TEST STANDARD																					
No deviations.																					
RESULTS															Run #						
Pass															6						
Other																					
															 Tested By:						
																					
Freq (MHz)				Azimuth (degrees)		Height (meters)				Polarity		Detector				EIRP (dBm)		Spec. Limit (dBm)		Compared to Spec. (dB)	
14472.000				81.0		2.2				H-Horn		PK				-42.9		-13.0		-29.9	
14472.000				18.0		2.4				V-Horn		PK				-43.2		-13.0		-30.2	


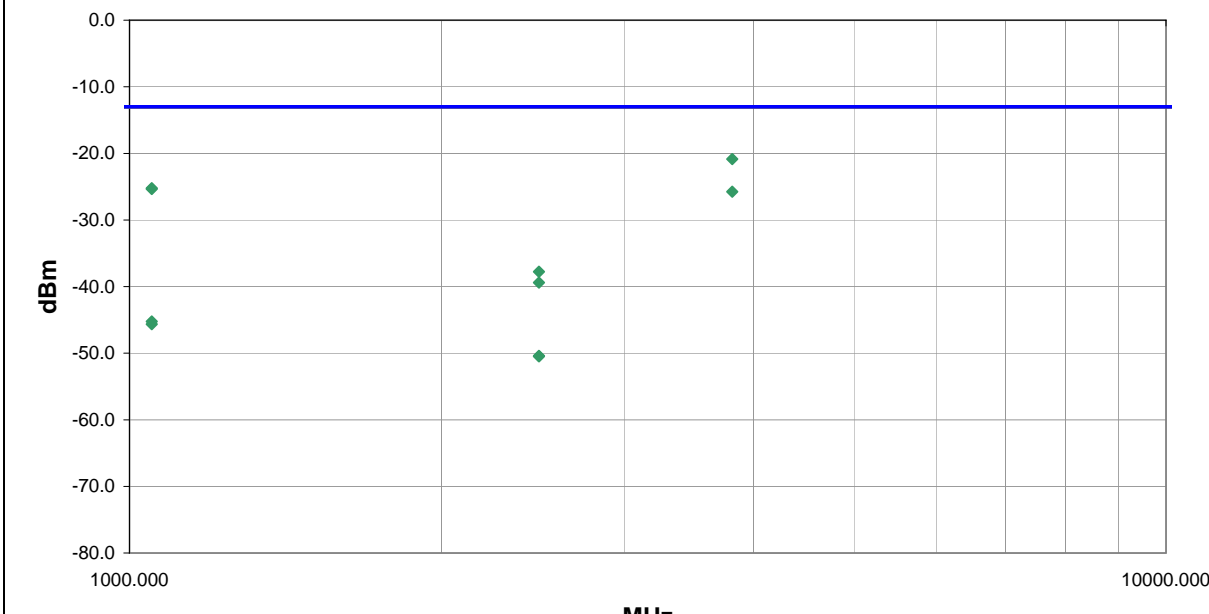
NORTHWEST										REV		
EMC										d4.13		
Apparent Power Data Sheet										05/06/2004		
EUT: SB555 Radio in 700C with Bluetooth in 6820										Work Order: ITRM0026		
Serial Number:										Date: 05/14/04		
Customer: Intermec Technologies Corporation										Temperature: 77		
Attendees: None										Humidity: 37%		
Cust. Ref. No.:										Barometric Pressure: 30.03		
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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer												
EUT OPERATING MODES												
Bluetooth 11, 802.11b 1, CDMA 1 (PCS) in 700C. Bluetooth 11 in 6820												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS										Run #		
Pass										7		
Other												
										 Tested By:		
												
Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
7236.000			63.0	1.2			H-Horn	PK		-47.9	-13.0	-34.9
7236.000			199.0	1.3			V-Horn	PK		-48.9	-13.0	-35.9

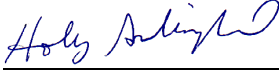
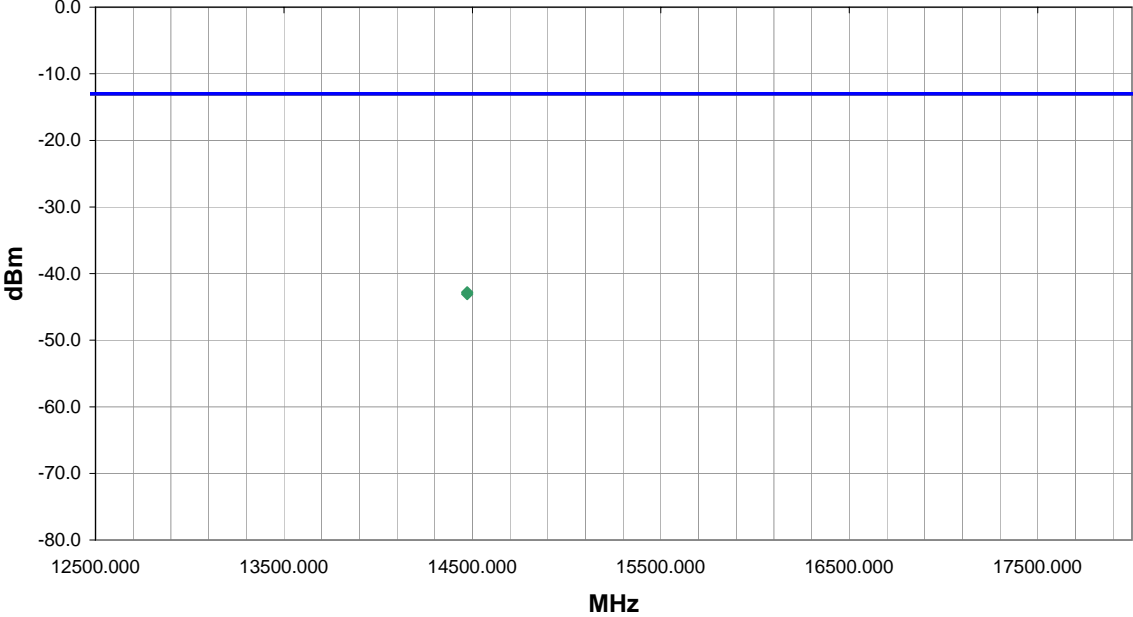
NORTHWEST EMC		Apparent Power Data Sheet		REV dtd. 13 05/06/2004							
EUT: SB555 Radio in 700C with Bluetooth in 6820			Work Order: ITRM0026								
Serial Number:			Date: 05/14/04								
Customer: Intermec Technologies Corporation			Temperature: 77								
Attendees: None			Humidity: 37%								
Cust. Ref. No.:			Barometric Pressure: 30.03								
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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 11, 802.11b 1, CDMA 1153 (PCS) in 700C. Bluetooth 11 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS					Run #						
Pass					8						
Other											
					 Tested By:						
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12060.000			160.0	4.0		H-Horn	PK		-34.8	-13.0	-21.8
12060.000			97.0	3.3		V-Horn	PK		-36.4	-13.0	-23.4
4824.000			126.0	1.2		V-Horn	PK		-42.4	-13.0	-29.4
4824.000			81.0	1.3		H-Horn	PK		-43.3	-13.0	-30.3
4824.000			81.0	1.3		H-Horn	AV		-61.0	-13.0	-48.0


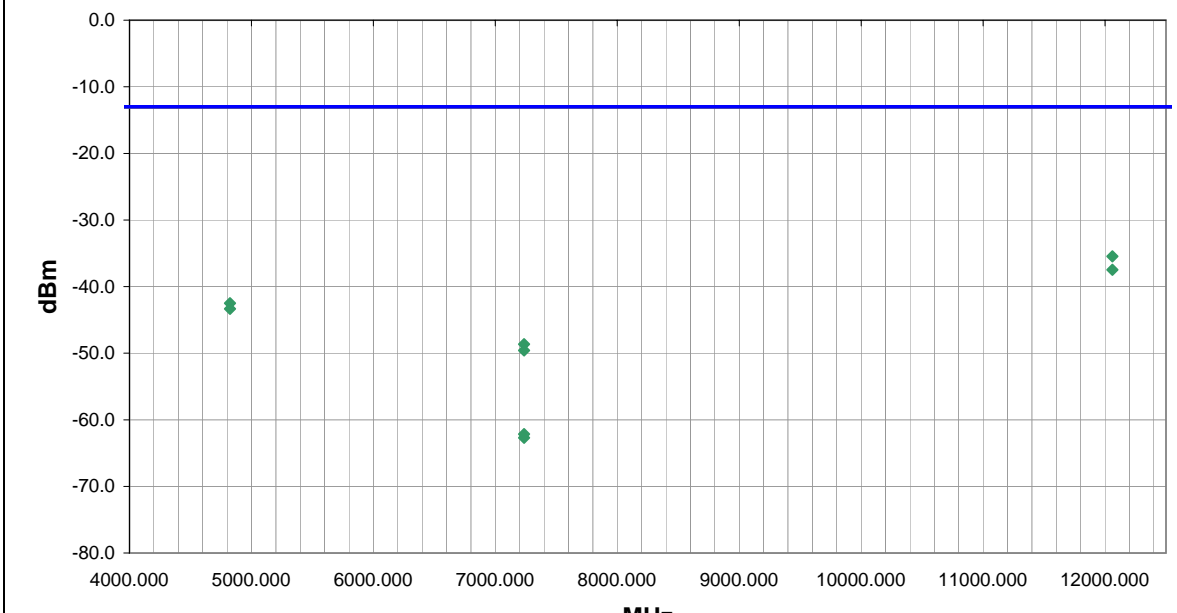
NORTHWEST										REV		
EMC										dtd. 13		
Apparent Power Data Sheet										05/06/2004		
EUT: SB555 Radio in 700C with Bluetooth in 6820										Work Order: ITRM0026		
Serial Number:										Date: 05/14/04		
Customer: Intermec Technologies Corporation										Temperature: 77		
Attendees: None										Humidity: 37%		
Cust. Ref. No.:										Barometric Pressure: 30.03		
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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer												
EUT OPERATING MODES												
Bluetooth 68, 802.11b 11, CDMA 35 (PCS) in 700C. Bluetooth 68 in 6820												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS										Run #		
Pass										9		
Other												
										 Tested By:		
												
Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
7407.000			163.0	1.3			H-Horn	PK		-47.6	-13.0	-34.6
7407.000			47.0	2.9			V-Horn	PK		-48.9	-13.0	-35.9


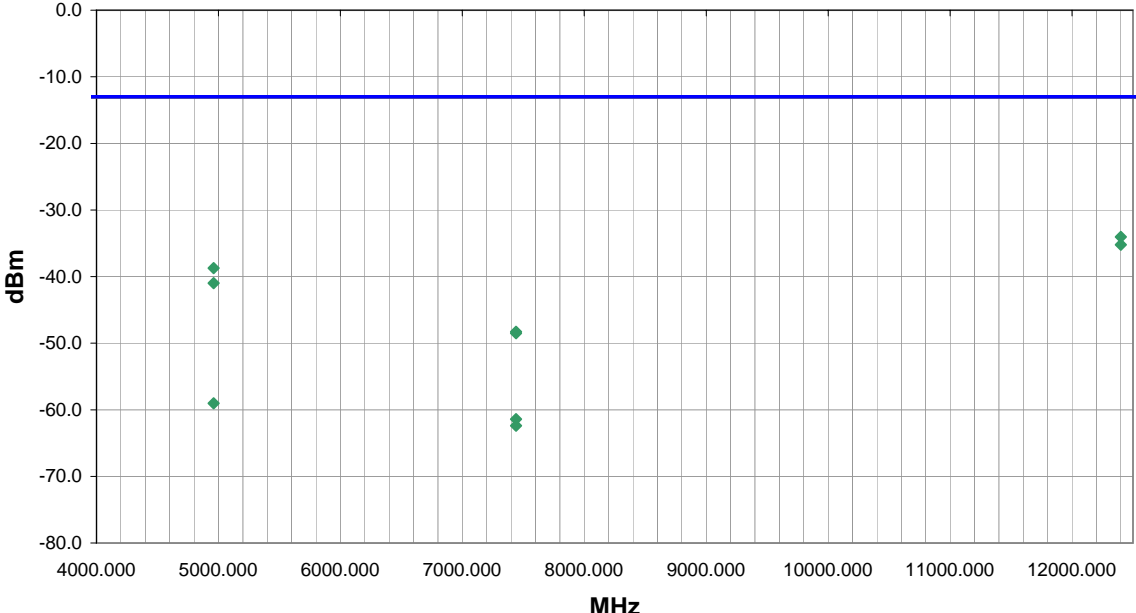
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EMC										d4.13		
Apparent Power Data Sheet										05/06/2004		
EUT: SB555 Radio in 700C with Bluetooth in 6820						Work Order: ITRM0026						
Serial Number:						Date: 05/15/04						
Customer: Intermec Technologies Corporation						Temperature: 72						
Attendees: None						Humidity: 42%						
Cust. Ref. No.:						Barometric Pressure: 30.05						
Tested by: Dan Haas				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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer												
EUT OPERATING MODES												
Bluetooth 68, 802.11b 11, CDMA 35 (PCS) in 700C. Bluetooth 68 in 6820												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS										Run #		
Pass										16		
Other												
										 Tested By:		
												
Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
22221.000			0.0	1.0			V-High Horr	PK		-41.5	-13.0	-28.5
22221.000			0.0	1.0			H-High Horr	PK		-45.1	-13.0	-32.1


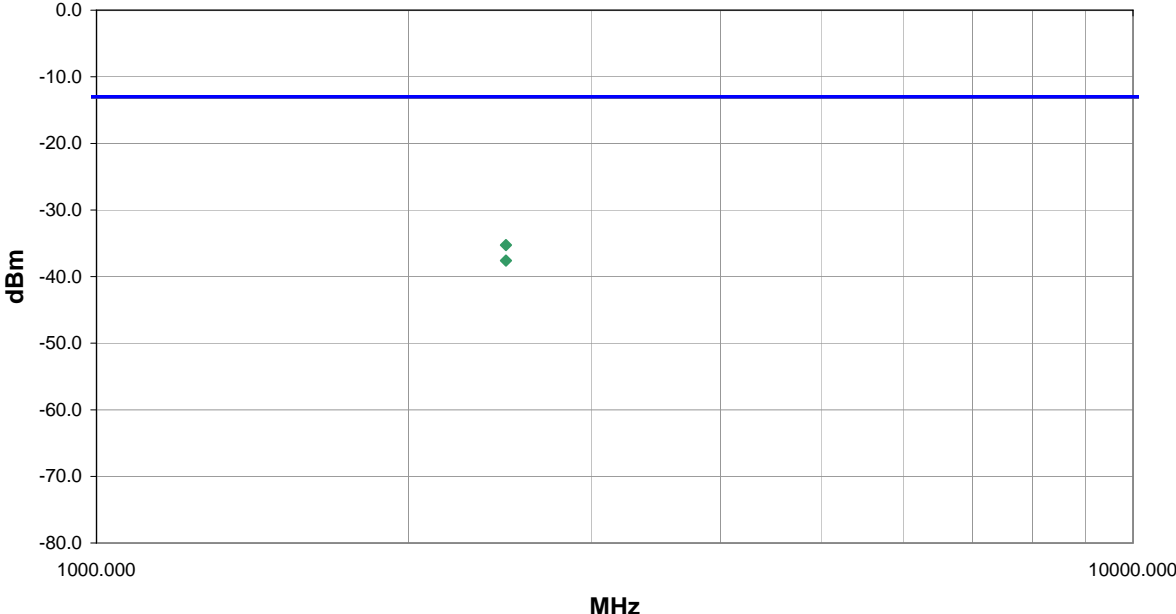
NORTHWEST EMC										Apparent Power Data Sheet										REV dtd. 13 05/06/2004	
EUT: SB555 Radio in 700C with Bluetooth in 6820										Work Order: ITRM0026											
Serial Number:										Date: 05/15/04											
Customer: Intermec Technologies Corporation										Temperature: 72											
Attendees: None										Humidity: 42%											
Cust. Ref. No.:										Barometric Pressure: 30.05											
Tested by: Dan Haas					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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer																					
EUT OPERATING MODES																					
Bluetooth 11, 802.11b 1, CDMA 1153 (PCS) in 700C. Bluetooth 11 in 6820																					
DEVIATIONS FROM TEST STANDARD																					
No deviations.																					
RESULTS										Run #											
Pass										17											
Other																					
										 Tested By:											
																					
Freq (MHz)		Azimuth (degrees)		Height (meters)		Polarity		Detector		EIRP (dBm)		Spec. Limit (dBm)		Compared to Spec. (dB)							
19296.000		0.0		1.0		V-High Horr		PK		-46.9		-13.0		-33.9							
19296.000		0.0		1.0		H-High Horr		PK		-49.1		-13.0		-36.1							


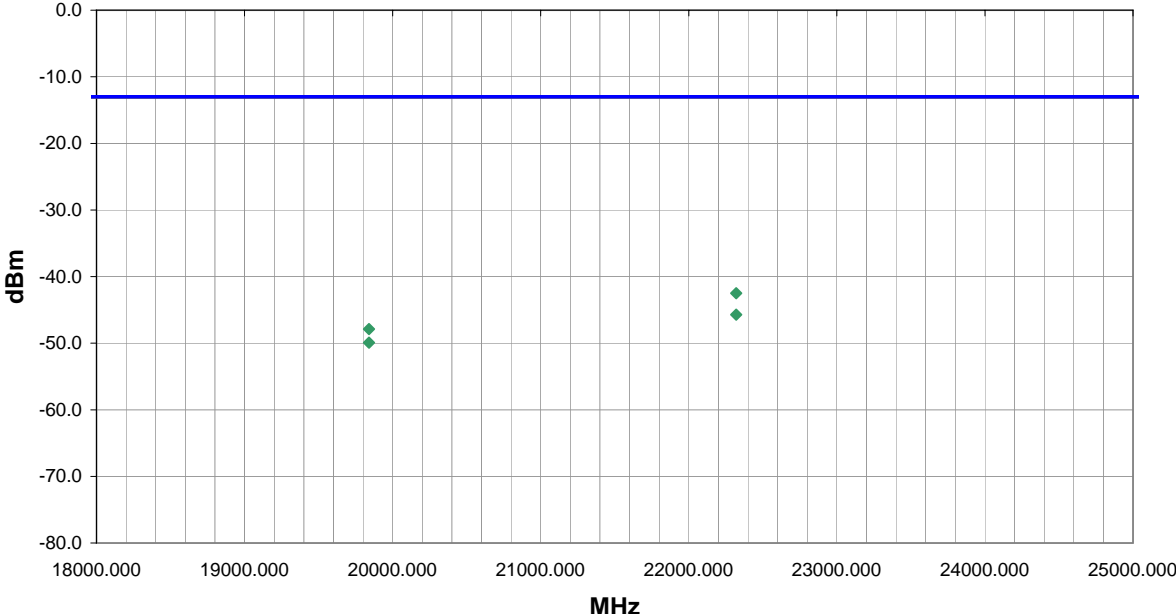
NORTHWEST		Apparent Power Data Sheet		REV dtd. 13 05/06/2004							
EUT: SB555 Radio in 700C with Bluetooth in 6820		Work Order: ITRM0026									
Serial Number:		Date: 05/15/04									
Customer: Intermec Technologies Corporation		Temperature: 72									
Attendees: None		Humidity: 42%									
Cust. 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 handheld computer co-located with Bluetooth in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 62, 802.11b 11, CDMA 1153 (PCS) in 700C. Bluetooth 62 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS				Run #							
Pass				18							
Other											
				 Tested By:							
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
3815.200			141.0	1.2		V-Horn	PK		-20.9	-13.0	-7.9
1050.766			136.0	1.1		V-Horn	PK		-25.2	-13.0	-12.2
1050.766			97.0	1.6		H-Horn	PK		-25.3	-13.0	-12.3
3815.200			59.0	2.0		H-Horn	PK		-25.7	-13.0	-12.7
2483.500			-1.0	1.0		V-Horn	PK		-37.8	-13.0	-24.8
2483.500			335.0	2.6		H-Horn	PK		-39.4	-13.0	-26.4
1050.766			136.0	1.1		V-Horn	AV		-45.2	-13.0	-32.2
1050.766			97.0	1.6		H-Horn	AV		-45.6	-13.0	-32.6
2483.500			335.0	2.6		H-Horn	AV		-50.4	-13.0	-37.4
2483.500			-1.0	1.0		V-Horn	AV		-50.5	-13.0	-37.5


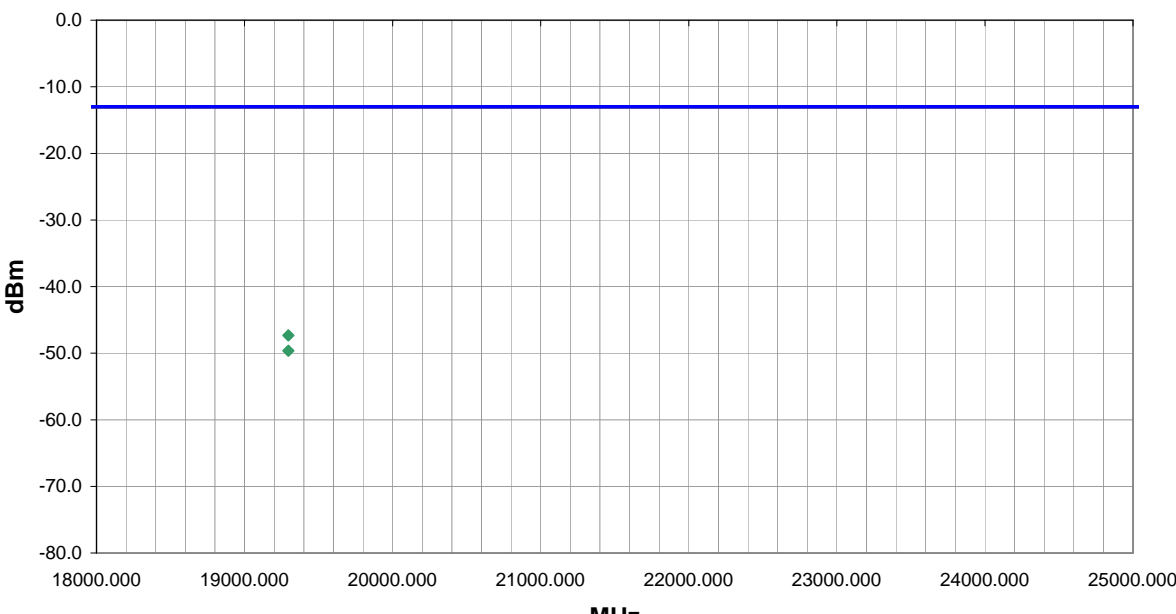
NORTHWEST		Apparent Power Data Sheet				REV d14.13 05/06/2004									
EUT: SB555 in 700C with Bluetooth in 6820		Work Order: ITRM0026													
Serial Number:		Date: 05/14/04													
Customer: Intermec Technologies Corporation		Temperature: 77													
Attendees: None		Humidity: 37%													
Cust. Ref. No.:		Barometric Pressure: 30.03													
Tested by: Holly Ashkannejhad		Power: 120 V, 60 Hz		Job Site: EV01											
TEST SPECIFICATIONS															
Specification: FCC 22.917(e)				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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer															
EUT OPERATING MODES															
Bluetooth 11, 802.11b 1, CDMA 467 (cellular) in 700C. Bluetooth 11 in 6820															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
RESULTS						Run #									
Pass						5									
Other															
						Tested By: 									
															
Freq (MHz)		Azimuth (degrees)		Height (meters)		Polarity		Detector		EIRP (dBm)		Spec. Limit (dBm)		Compared to Spec. (dB)	
14472.000		72.0		1.2		V-Horn		PK		-42.8		-13.0		-29.8	
14472.000		168.0		3.2		H-Horn		PK		-43.1		-13.0		-30.1	

NORTHWEST EMC		Apparent Power Data Sheet		REV dtd. 13 05/06/2004							
EUT: SB555 in 700C with Bluetooth in 6820			Work Order: ITRM0026								
Serial Number:			Date: 05/14/04								
Customer: Intermec Technologies Corporation			Temperature: 77								
Attendees: None			Humidity: 37%								
Cust. Ref. No.:			Barometric Pressure: 30.03								
Tested by: Holly Ashkannejhad		Power: 120 V, 60 Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 22.917(e)			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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 11, 802.11b 1, CDMA 467 (cellular) in 700C. Bluetooth 11 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS					Run #						
Pass					10						
Other											
					 Tested By:						
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12060.000			91.0	2.5		H-Horn	PK		-35.5	-13.0	-22.5
12060.000			250.0	1.2		V-Horn	PK		-37.5	-13.0	-24.5
4824.000			59.0	1.3		H-Horn	PK		-42.5	-13.0	-29.5
4824.000			255.0	1.2		V-Horn	PK		-43.3	-13.0	-30.3
7236.000			7.0	1.3		H-Horn	PK		-48.6	-13.0	-35.6
7236.000			180.0	1.2		V-Horn	PK		-49.6	-13.0	-36.6
7236.000			7.0	1.3		H-Horn	AV		-62.1	-13.0	-49.1
7236.000			180.0	1.2		V-Horn	AV		-62.7	-13.0	-49.7

NORTHWEST EMC		Apparent Power Data Sheet		REV d14.13 05/06/2004							
EUT: SB555 in 700C with Bluetooth in 6820			Work Order: ITRM0026								
Serial Number:			Date: 05/14/04								
Customer: Intermec Technologies Corporation			Temperature: 77								
Attendees: None			Humidity: 37%								
Cust. Ref. No.:			Barometric Pressure: 30.03								
Tested by: Holly Ashkannejhad		Power: 120 V, 60 Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 22.917(e)			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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 79, 802.11b 11, CDMA 55 (cellular) in 700C. Bluetooth 79 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS					Run #						
Pass					11						
Other											
					 Tested By:						
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
12400.000			66.0	1.9		H-Horn	PK		-34.0	-13.0	-21.0
12400.000			221.0	1.2		V-Horn	PK		-35.2	-13.0	-22.2
4960.000			117.0	1.2		V-Horn	PK		-38.7	-13.0	-25.7
4960.000			21.0	1.3		H-Horn	PK		-41.0	-13.0	-28.0
7440.000			125.0	1.2		V-Horn	PK		-48.3	-13.0	-35.3
7440.000			233.0	1.3		H-Horn	PK		-48.5	-13.0	-35.5
4960.000			117.0	1.2		V-Horn	AV		-59.0	-13.0	-46.0
7440.000			233.0	1.3		H-Horn	AV		-61.4	-13.0	-48.4
7440.000			125.0	1.2		V-Horn	AV		-62.4	-13.0	-49.4

NORTHWEST EMC										Apparent Power Data Sheet										REV d14.13 05/06/2004	
EUT: SB555 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: Dan Haas					Power: 120 V, 60 Hz					Job Site: EV01											
TEST SPECIFICATIONS																					
Specification: FCC 22.917(e)										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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer																					
EUT OPERATING MODES																					
Bluetooth 79, 802.11b 11, CDMA 54 (cellular) in 700C. Bluetooth 79 in 6820																					
DEVIATIONS FROM TEST STANDARD																					
No deviations.																					
RESULTS														Run #							
Pass														13							
Other																					
														 Tested By:							
																					
Freq (MHz)				Azimuth (degrees)		Height (meters)				Polarity		Detector		EIRP (dBm)		Spec. Limit (dBm)		Compared to Spec. (dB)			
2483.500				179.0		1.2				V-Horn		PK		-35.3		-13.0		-22.3			
2483.500				300.0		1.2				H-Horn		PK		-37.6		-13.0		-24.6			

NORTHWEST EMC		Apparent Power Data Sheet		REV d14.13 05/06/2004							
EUT: SB555 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: Dan Haas		Power: 120 V, 60 Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 22.917(e)			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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 79, 802.11b 11, CDMA 55 (cellular) in 700C. Bluetooth 79 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS					Run #						
Pass					14						
Other											
					 Tested By:						
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
22320.000			0.0	1.0		V-High Horr	PK		-42.5	-13.0	-29.5
22320.000			0.0	1.0		H-High Horr	PK		-45.7	-13.0	-32.7
19840.000			0.0	1.0		V-High Horr	PK		-47.9	-13.0	-34.9
19840.000			0.0	1.0		H-High Horr	PK		-49.9	-13.0	-36.9

NORTHWEST EMC		Apparent Power Data Sheet		REV dtd. 13 05/06/2004							
EUT: SB555 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: Dan Haas		Power: 120 V, 60 Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 22.917(e)			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 handheld computer co-located with Bluetooth radio in Intermec Model 6820 printer											
EUT OPERATING MODES											
Bluetooth 11, 802.11b 1, CDMA 467 (cellular) in 700C. Bluetooth 11 in 6820											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS					Run #						
Pass					15						
Other											
					 Tested By:						
											
Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector		EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
19296.000			0.0	1.0		V-High Horr	PK		-47.3	-13.0	-34.3
19296.000			0.0	1.0		H-High Horr	PK		-49.6	-13.0	-36.6

Intermec 6820 Printer with 700C

