Intermec Technologies Corporation

Test Report

Bluetooth (8520-00080) in 6820 with GSM, CDMA, 802.11b, and Bluetooth (BC02) in 700C

June 18, 2004

Report No. ITRM0033

Report Prepared By:

1-888-EMI-CERT

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NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: June 18, 2004
Intermec Technologies Corporation
Model: Bluetooth (8520-00080) in 6820 with GSM, CDMA, 802.11b, and Bluetooth (BC02) in 700C

Emissions		
Description	**Pass**	**Fail**
FCC 15.247(c) Spurious Radiated Emissions:2003	☒	☐

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, 200630-0, and 200676-0.

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

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

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

Accreditations and Authorizations

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

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

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

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

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

BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.

GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

SCOPE

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

What is measurement uncertainty?

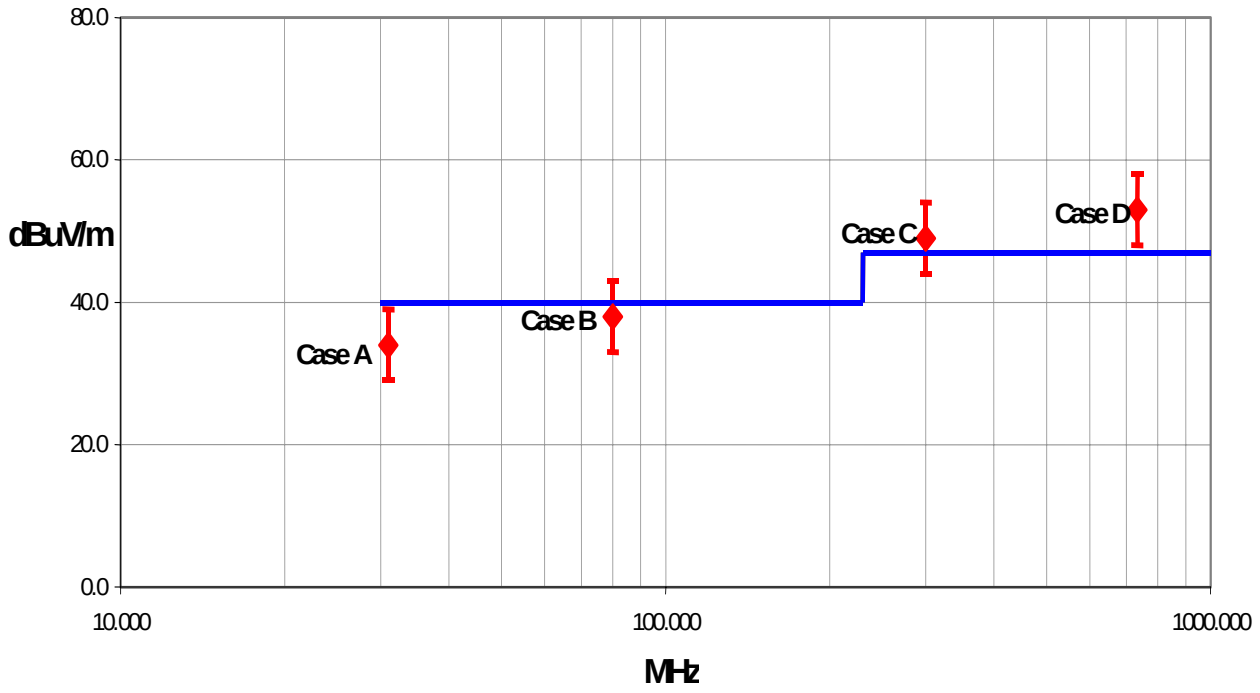
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:
Case A: Product complies.
Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.
Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.
Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz		Value (dB)					
	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna	
Test Distance		3m	10m	3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25
Expanded uncertainty ***U*** (level of confidence ≈ 95%)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 -2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49

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

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

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

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

Legend

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

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

California

Orange County Facility

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

Oregon

Evergreen Facility

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

Oregon

Trails End Facility

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

Washington

Sultan Facility

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

Party Requesting the Test	
Company Name:	Intermec Technologies Corporation
Address:	550 Second St. SE
City, State, Zip:	Cedar Rapids, IA 52401-2023
Test Requested By:	Scott Holub
Equipment Under Test:	Bluetooth in 6820 printer with CDMA, GSM, 802.11b, and a different Bluetooth module in 700C
Model:	8520-00080
First Date of Test:	06-16-2004
Last Date of Test:	06-18-2004
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):
Bluetooth radio installed in a 6820 Printer. Printer includes a docking station for 700C.

Client Justification for EUT Selection:
The EUT is a representative production sample.

Client Justification for Test Selection:
These tests satisfy the requirements FCC 15.247 (c) for co-located transmitters.

EUT Photo

Justification

The EUT is a Bluetooth radio module installed inside Intermec's mobile printer, Model 6820. The 6820 includes a docking station for Intermec's handheld computers, Models 700C. With the hand-held scanners, the EUT contains co-located radio modules (CDMA , GSM, 802.11(b), and Bluetooth). This test demonstrates compliance with FCC 15.247(c) emissions limits while the EUT is co-located with the previously certified Bluetooth radio in the 700C hand-held computers (FCC ID: HN2ABTM3-3). Each radio transmits through its own antenna.

Combinations of harmonic emissions from the CDMA, 802.11(b), GSM, 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):	11
CDMA (Cellular):	55
CDMA (PCS):	4
Bluetooth:	80
GSM:	512

Operating Modes Investigated:
Bluetooth Radio in 6820 with 700C in docking station:
Simultaneous transmission of Bluetooth Channel 80, 802.11(b) Channel 11, & CDMA PCS Channel 4
Simultaneous transmission of Bluetooth Channel 80, 802.11(b) Channel 11, & CDMA cellular Channel 55
Simultaneous transmission of Bluetooth Channel 80, 802.11(b) Channel 11, & GSM Channel 512

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, 700C)
GSM:	SMC45

Output Power Setting(s) Investigated:
Maximum

Power Input Settings Investigated:
120 VAC, 60 Hz.

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

Software\Firmware Applied During Test			
Exercise software	Blue Test FCC_Smart 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	8520-0080	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	05400400873
Handheld Computer with GSM option	Intermec Technologies Corporation	700C	05400400641
Bluetooth Radio in 700C	Intermec Technologies Corporation	BC02	N/A
802.11(b) Radio	Intermec Technologies Corporation	2011B	N/A
CDMA Radio	Intermec Technologies Corporation	SB555	N/A
GSM Radio	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

Test Description

Requirement: Per 15.247(c), 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 for Simultaneous Transmission: The EUT is an Bluetooth radio module installed inside Intermec's mobile printer, Model 6820. The printer can have co-located radio modules when an Intermec Handheld Computer, 700C, is installed in the docking station. The 700C has Bluetooth radio module that has been previously certified (FCC ID: HN2ABTM3-3). With a handheld computer installed in the printer, the Bluetooth radio module can simultaneously transmit with four other co-located radios (CDMA, GSM, Bluetooth, and 802.11(b)). This test demonstrates compliance with FCC 15.247(c) emissions limits while the EUT is co-located with the previously certified Bluetooth radio module. The EUT can transmit simultaneously with CDMA, 802.11(b), and Bluetooth or with GSM, 802.11(b), and Bluetooth in the 700C. 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:

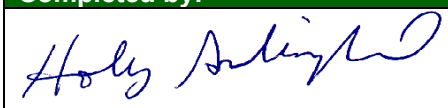
> **Assuming that the radios do not share an antenna, only radiated tests for simultaneous transmission is required. If the radios share an antenna, antenna conducted measurements would also be required. Only one set of worst case simultaneous transmission data is going to be requested to be submitted 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), GSM, 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
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

Completed by:



NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/16/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Radiated Emissions	Year:	2003
Method:	ANSI C63.4	Year:	2001

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, GSM 512 in 700C.

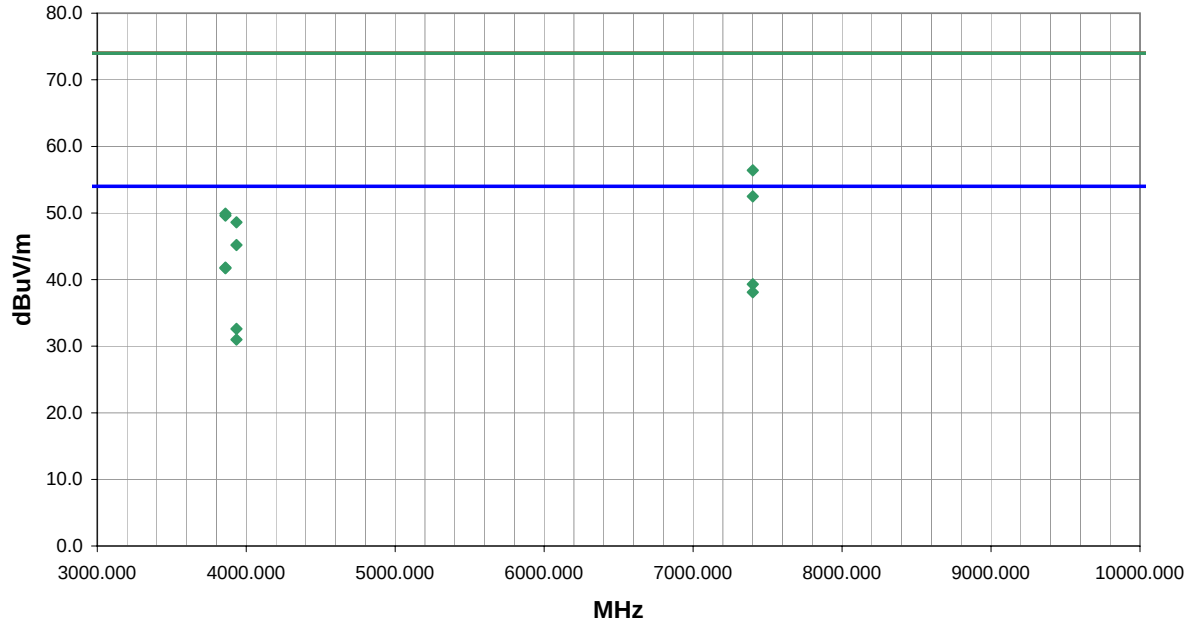
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	3

Other

Tested By: Holly Ashkannejhad



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)
3860.724	40.0	1.8	159.0	1.3	3.0	0.0	V-Horn	AV	0.0	41.8	54.0	-12.2
3860.724	39.9	1.8	208.0	1.3	3.0	0.0	H-Horn	AV	0.0	41.7	54.0	-12.3
7401.000	28.3	11.0	209.0	1.3	3.0	0.0	V-Horn	AV	0.0	39.3	54.0	-14.7
7401.000	27.1	11.0	228.0	1.3	3.0	0.0	H-Horn	AV	0.0	38.1	54.0	-15.9
7401.000	45.4	11.0	209.0	1.3	3.0	0.0	V-Horn	PK	0.0	56.4	74.0	-17.6
3934.944	30.4	2.2	149.0	1.2	3.0	0.0	V-Horn	AV	0.0	32.6	54.0	-21.4
7401.000	41.5	11.0	228.0	1.3	3.0	0.0	H-Horn	PK	0.0	52.5	74.0	-21.5
3934.944	28.8	2.2	17.0	1.3	3.0	0.0	H-Horn	AV	0.0	31.0	54.0	-23.0
3860.724	48.1	1.8	159.0	1.3	3.0	0.0	V-Horn	PK	0.0	49.9	74.0	-24.1
3860.724	47.8	1.8	208.0	1.3	3.0	0.0	H-Horn	PK	0.0	49.6	74.0	-24.4
3934.944	46.4	2.2	149.0	1.2	3.0	0.0	V-Horn	PK	0.0	48.6	74.0	-25.4
3934.944	43.0	2.2	17.0	1.3	3.0	0.0	H-Horn	PK	0.0	45.2	74.0	-28.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/16/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Radiated Emissions	Year:	2003
Method:	ANSI C63.4	Year:	2001

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, CDMA 4 (PCS) in 700C.

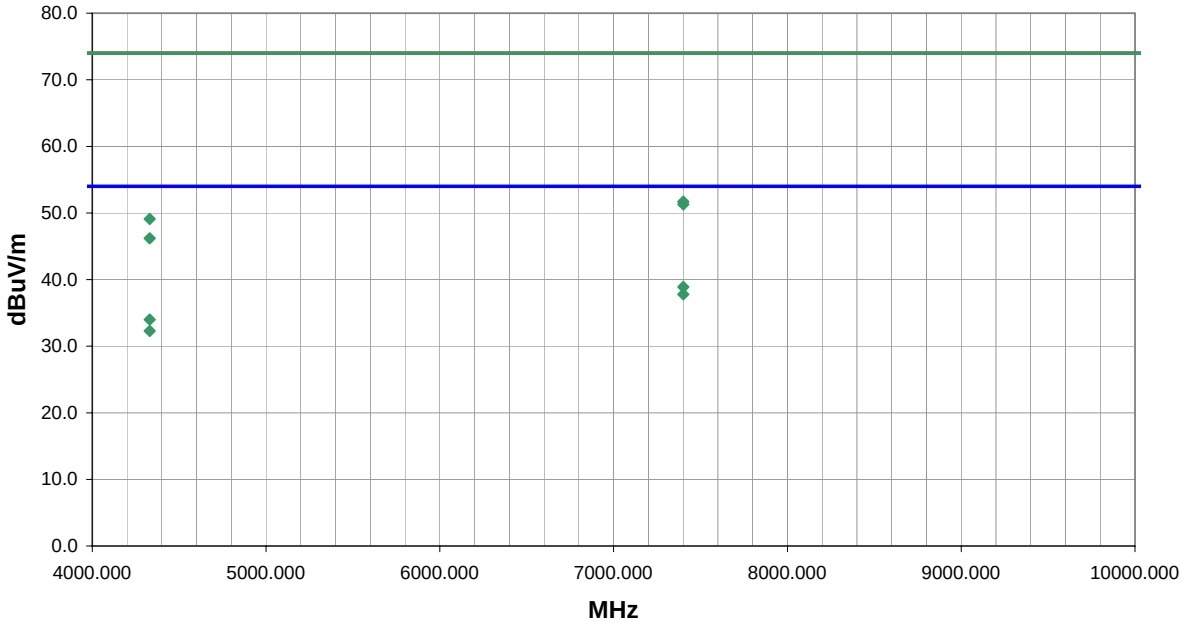
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	4

Other

Tested By: Holly Ashkannejhad



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)
7401.000	27.9	11.0	214.0	1.4	3.0	0.0	H-Horn	AV	0.0	38.9	54.0	-15.1
7401.000	26.8	11.0	133.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.8	54.0	-16.2
4330.097	31.5	2.5	119.0	1.7	3.0	0.0	H-Horn	AV	0.0	34.0	54.0	-20.0
4330.097	29.8	2.5	168.0	1.7	3.0	0.0	V-Horn	AV	0.0	32.3	54.0	-21.7
7401.000	40.7	11.0	214.0	1.4	3.0	0.0	H-Horn	PK	0.0	51.7	74.0	-22.3
7401.000	40.3	11.0	133.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.3	74.0	-22.7
4330.097	46.6	2.5	119.0	1.7	3.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9
4330.097	43.7	2.5	168.0	1.7	3.0	0.0	V-Horn	PK	0.0	46.2	74.0	-27.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/16/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Radiated Emissions	Year:	2003
Method:	ANSI C63.4	Year:	2001

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, CDMA 55 (cellular) in 700C

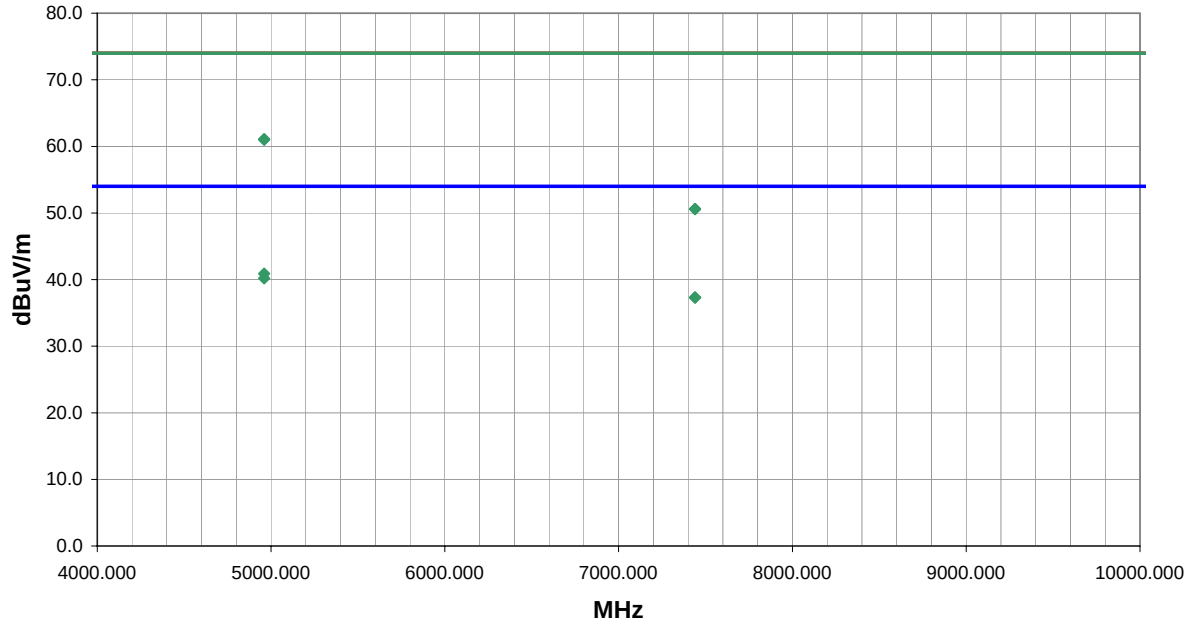
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	5

Other

Tested By: Holly Ashkannejhad



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)
4960.000	57.3	3.8	201.0	1.2	3.0	0.0	V-Horn	PK	0.0	61.1	74.0	-12.9
4960.000	57.2	3.8	148.0	1.9	3.0	0.0	H-Horn	PK	0.0	61.0	74.0	-13.0
4960.000	37.1	3.8	148.0	1.9	3.0	0.0	H-Horn	AV	0.0	40.9	54.0	-13.1
4960.000	36.4	3.8	201.0	1.2	3.0	0.0	V-Horn	AV	0.0	40.2	54.0	-13.8
7440.000	26.3	11.0	349.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.3	54.0	-16.7
7440.000	26.3	11.0	214.0	3.0	3.0	0.0	H-Horn	AV	0.0	37.3	54.0	-16.7
7440.000	39.6	11.0	349.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.6	74.0	-23.4
7440.000	39.6	11.0	214.0	3.0	3.0	0.0	H-Horn	PK	0.0	50.6	74.0	-23.4

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/16/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Radiated Emissions	Year:	2003
Method:	ANSI C63.4	Year:	2001

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, GSM 512 in 700C

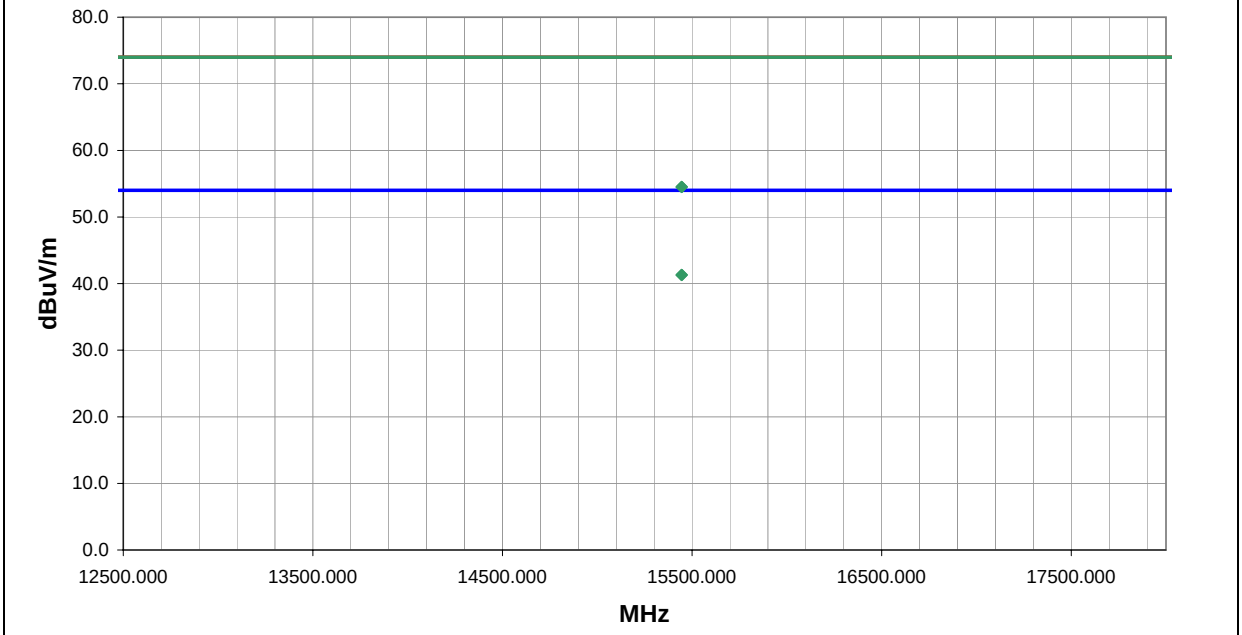
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	6

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)
15445.150	27.3	14.0	169.0	1.2	3.0	0.0	V-Horn	AV	0.0	41.3	54.0	-12.7
15445.150	27.3	14.0	266.0	1.6	3.0	0.0	H-Horn	AV	0.0	41.3	54.0	-12.7
15445.150	40.5	14.0	169.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.5	74.0	-19.5
15445.150	40.5	14.0	266.0	1.6	3.0	0.0	H-Horn	PK	0.0	54.5	74.0	-19.5

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/18/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2003
Method:	ANSI C63.4	Year:	1992

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

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, GSM 512 in 700C

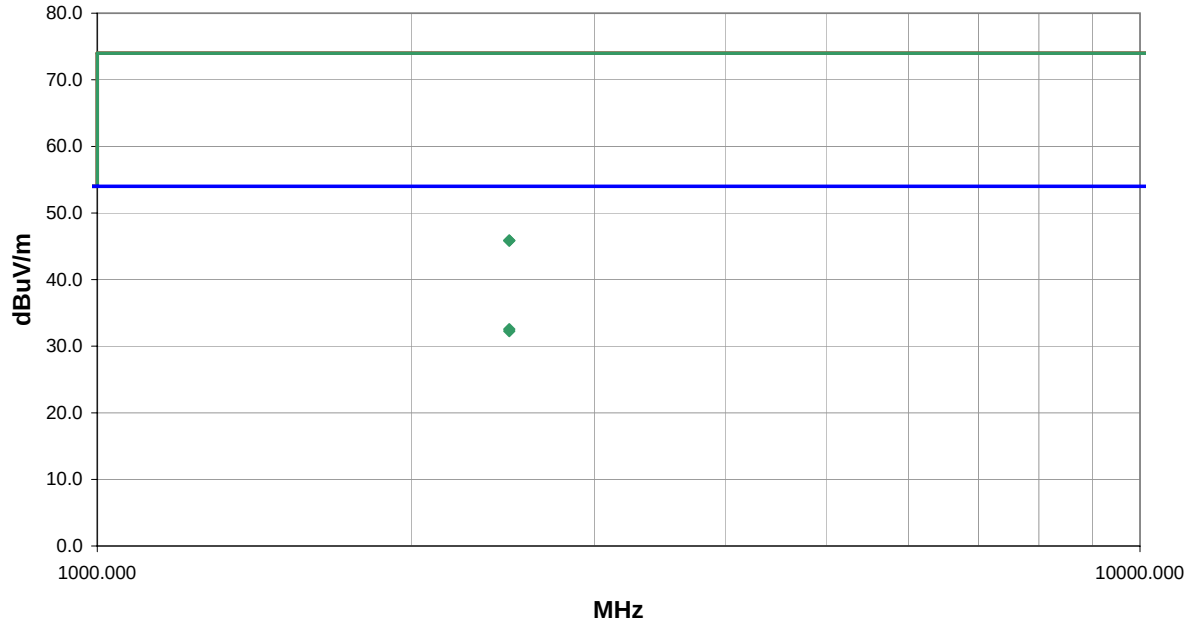
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	7

Other

Tested By: Holly Ashkannejhad



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	12.7	29.4	35.0	1.0	1.0	0.0	V-Horn	AV	-9.5	32.6	54.0	-21.4
2483.500	12.4	29.4	321.0	1.0	1.0	0.0	H-Horn	AV	-9.5	32.3	54.0	-21.7
2483.500	26.0	29.4	35.0	1.0	1.0	0.0	V-Horn	PK	-9.5	45.9	74.0	-28.1
2483.500	26.0	29.4	321.0	1.0	1.0	0.0	H-Horn	PK	-9.5	45.9	74.0	-28.1

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/18/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2003
Method:	ANSI C63.4	Year:	1992

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

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, CDMA 4 (PCS) in 700C

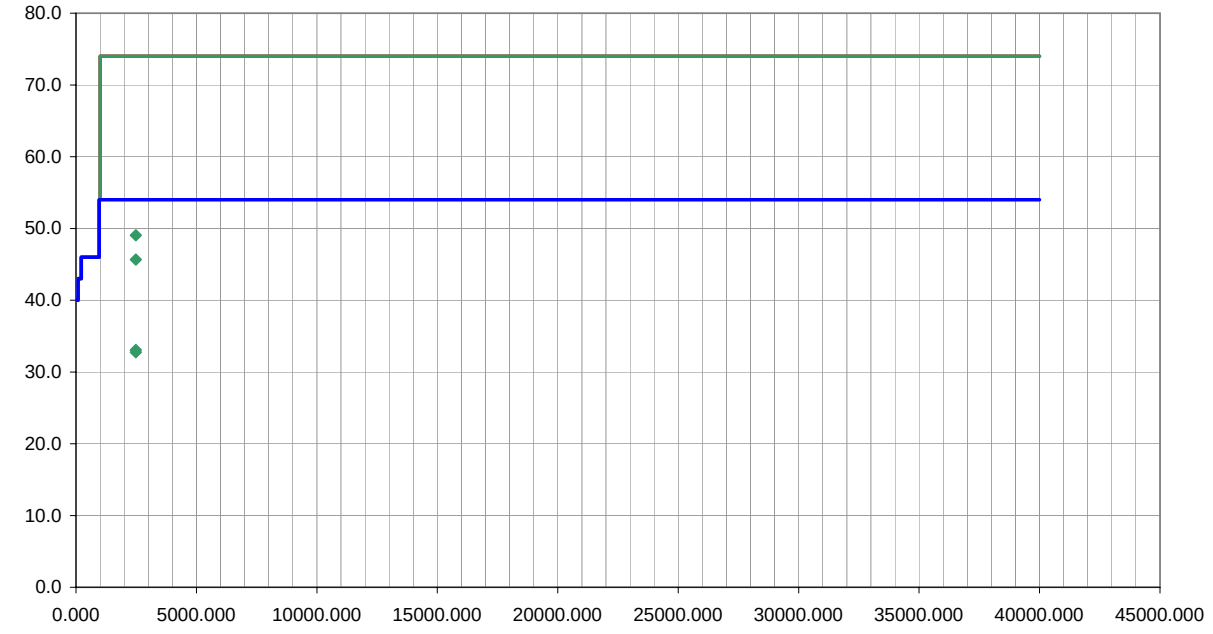
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	8

Other

Tested By: Holly Ashkannejhad



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	13.2	29.4	305.0	1.0	1.0	0.0	V-Horn	AV	-9.5	33.1	54.0	-20.9
2483.500	12.9	29.4	332.0	1.0	1.0	0.0	H-Horn	AV	-9.5	32.8	54.0	-21.2
2483.500	29.2	29.4	305.0	1.0	1.0	0.0	V-Horn	PK	-9.5	49.1	74.0	-24.9
2483.500	25.8	29.4	332.0	1.0	1.0	0.0	H-Horn	PK	-9.5	45.7	74.0	-28.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV df4.13 05/06/2004

EUT:	8520-00080			Work Order:	ITRM0033
Serial Number:				Date:	06/18/04
Customer:	Intermec Technologies Corporation			Temperature:	75
Attendees:	none			Humidity:	35%
Cust. Ref. No.:				Barometric Pressure	30.3
Tested by:	Holly Ashkannejhad	Power:	120VAC, 60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 15.247(c)	Year:	2003
Method:	ANSI C63.4	Year:	1992

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

FCC: HN2ABTM3-3 installed in 700C. EUT installed in 6820 Printer.

EUT OPERATING MODES

Bluetooth 80 in 6820 Printer. Bluetooth 80, 802.11b 11, CDMA 55 (cell) in 700C

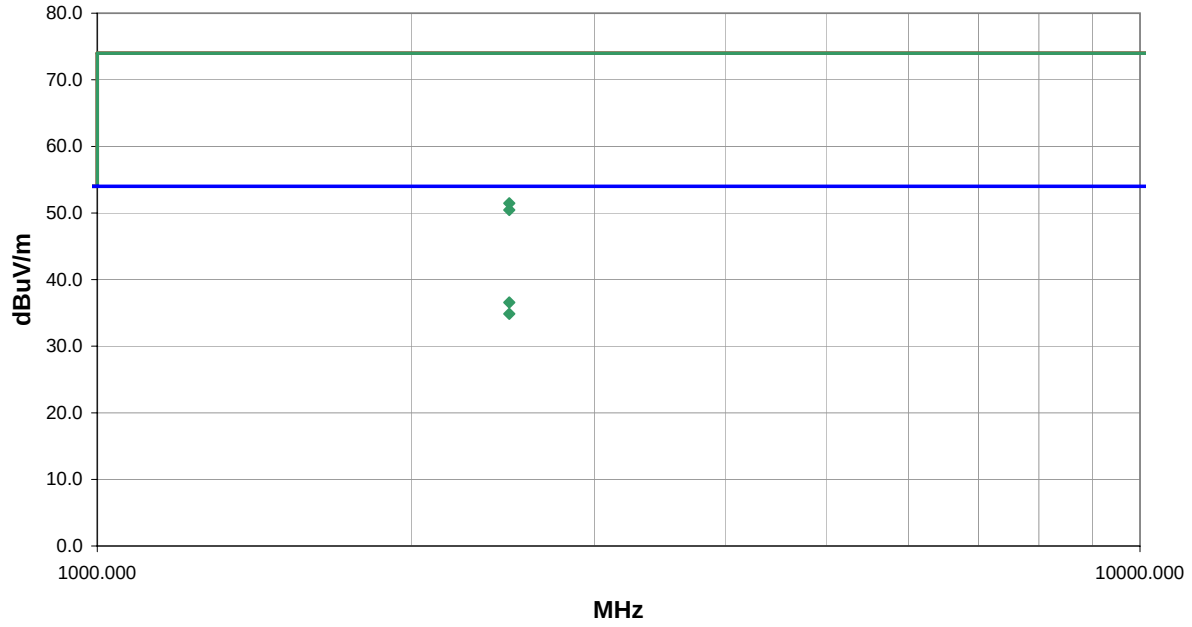
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	9

Other

Tested By: Holly Ashkannejhad



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	16.7	29.4	306.0	1.0	1.0	0.0	H-Horn	AV	-9.5	36.6	54.0	-17.4
2483.500	15.0	29.4	308.0	1.0	1.0	0.0	V-Horn	AV	-9.5	34.9	54.0	-19.1
2483.500	31.6	29.4	306.0	1.0	1.0	0.0	H-Horn	PK	-9.5	51.5	74.0	-22.5
2483.500	30.6	29.4	308.0	1.0	1.0	0.0	V-Horn	PK	-9.5	50.5	74.0	-23.5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