Intermec Technologies Corporation

Bluetooth Radio (8520-00080)

July 01, 2004

Report No. ITRM0020

Report Prepared By:

NORTHWEST EMC

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

Certificate of Test
Issue Date: July 01, 2004
Intermec Technologies Corporation
Model: Bluetooth Radio (8520-00080)

Emissions			
Specification	**Test Method**	**Pass**	**Fail**
FCC 15.207 AC Powerline Conducted Emissions:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(a) Occupied Bandwidth:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(b) Output Power:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Band Edge Compliance:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Spurious Conducted Emissions:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(c) Spurious Radiated Emissions:2003	ANSI C63.4:2001	☒	☐
FCC 15.247(d) Power Spectral Density:2003	ANSI C63.4:2001	☒	☐

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

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

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.
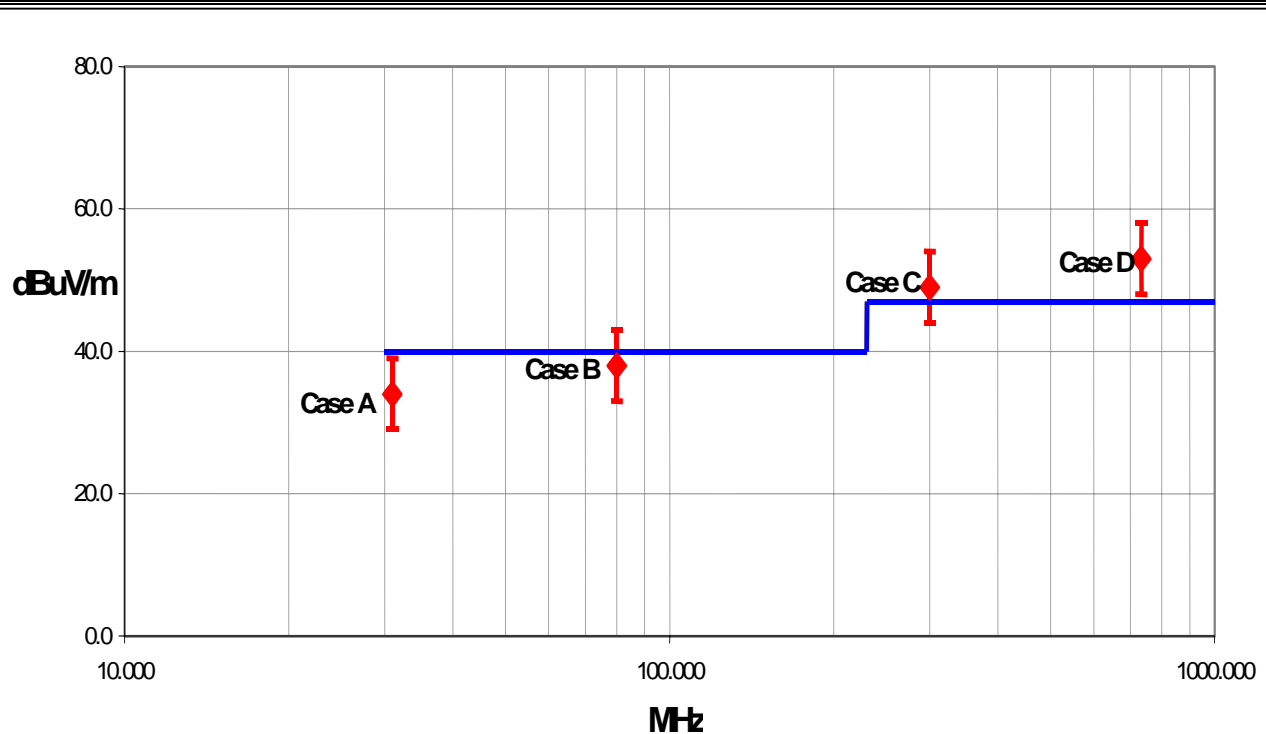
Test Result Scenarios:

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
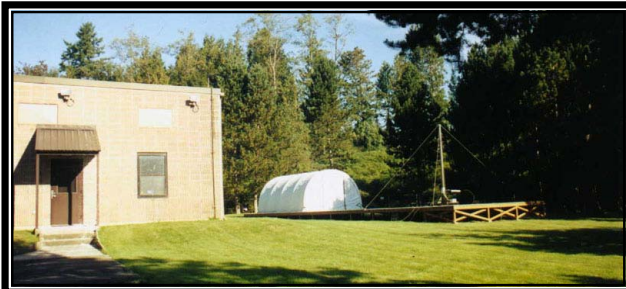
Washington

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
Model:	8520-00080 in the 700C
First Date of Test:	05-11-2004
Last Date of Test:	05-24-2004
Receipt Date of Samples:	05-11-2004
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided.
I/O Ports:	N/A

Functional Description of the EUT (Equipment Under Test):

Bluetooth radio in a hand-held computer.

Client Justification for EUT Selection:

The product is a representative production sample.

Client Justification for Test Selection:

These tests satisfy the requirements for FCC certification under 15.247.

EUT Photo
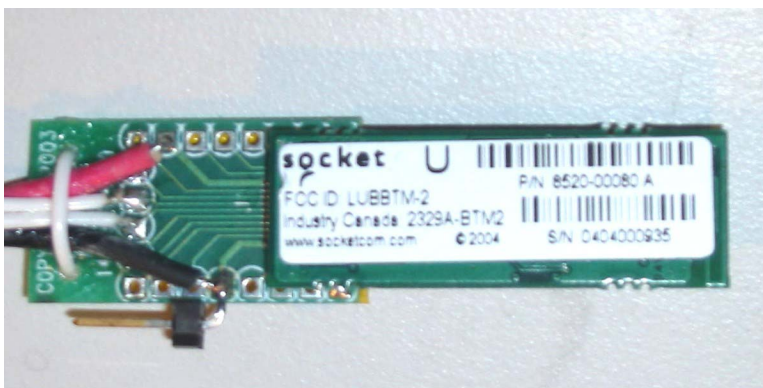
EUT - 8520-00080
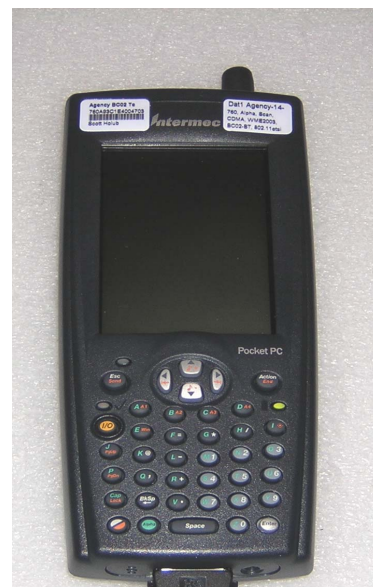
Host Device – 700C

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Other Settings Investigated:

Bluetooth only

Software\Firmware Applied During Test

Exercise software	FCC_Smart	Version	Unknown
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Radio (EUT)	Intermec Technologies Corporation	8520-00080	4004703
Handheld Radio/Scanner (Host)	Intermec Technologies Corporation	700C	05400400869
Power Adapter	Elpac Power Systems	FW1812	014852

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Cal**	**Interval**
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per an FCC Interpretation sent to TCBs on October 8, 2002, frequency hoppers in the 2.4 GHz band operating under 15.247 are required to use a minimum of 15 non-overlapping channels. The hopping channel bandwidth can be wider than 1 MHz as long as the channels do not overlap and all emissions stay within the 2400-2483.5 MHz band. For example, a system that uses the minimum 15 channels can have hopping channel bandwidth that are up to 5 MHz wide. The measurement is made with the spectrum analyzer's resolution bandwidth set to $\geq$1% of the 20dB bandwidth, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Completed by:

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees: none		**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.: N/A		**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(a) Occupied Bandwidth		**Year:** 2003	**Method:** ANSI C63.4		**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 20 dB bandwidth is less than the minimum channel separation of 1 MHz.

RESULTS	**BANDWIDTH**
Pass	0.994 MHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Occupied Bandwidth - Low Channel

Mkr △ 994kHz   △ -0.35dB   Tek

Ref Lvl*125.0dBuV   5dB/   Atten 20dB

Freq   2.402 000GHz   Span 2.0MHz

ResBW 100kHz   VidBW 300kHz   SWP 50mS

LEVEL	SPAN	Freq 2.402 000GHz

KNOB 2   KNOB 1   KEYPAD   Tektronix   2784

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(a) Occupied Bandwidth	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 20 dB bandwidth is less than the minimum channel separation of 1 MHz.

RESULTS	**BANDWIDTH**
Pass	0.990 MHz

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(a) Occupied Bandwidth	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

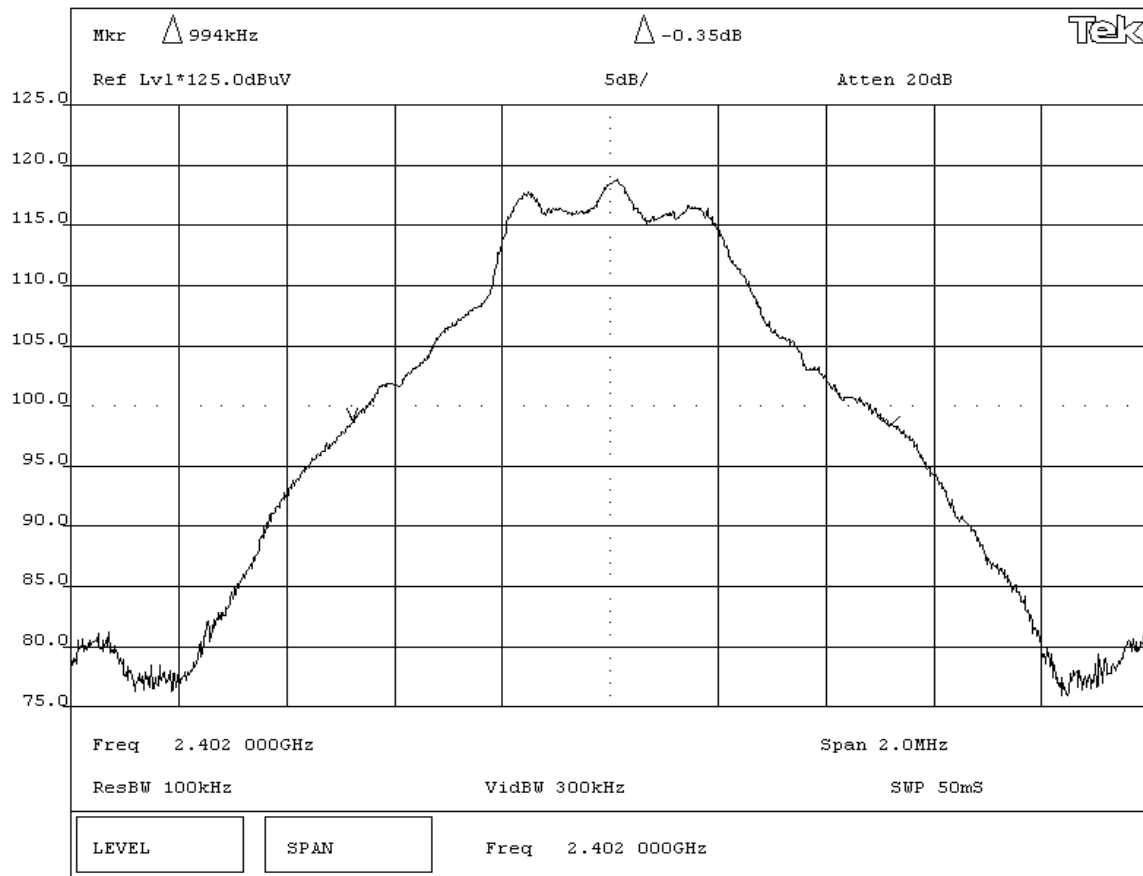No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 20 dB bandwidth is less than the minimum channel separation of 1 MHz.

RESULTS	**BANDWIDTH**
Pass	0.992 MHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Occupied Bandwidth - High Channel

Mkr △992kHz   △ -0.20dB

Ref Lvl*125.0dBuV   5dB/   Atten 20dB

Freq   2.480 000GHz   Span 2.0MHz

ResBW 100kHz   VidBW 300kHz   SWP 50mS

LEVEL   SPAN   Freq   2.480 000GHz

KNOB 2   KNOB 1   KEYPAD   Tektronix   2784

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Other Settings Investigated:

Bluetooth only

Software\Firmware Applied During Test

Exercise software	FCC_Smart	Version		Unknown
Description				
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.				

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Radio (EUT)	Intermec Technologies Corporation	8520-00080	4004703
Handheld Radio/Scanner (Host)	Intermec Technologies Corporation	700C	05400400869
Power Adapter	Elpac Power Systems	FW1812	014852

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo
Signal Generator	Hewlett Packard	8341B	TGN	01/23/2004	13 mo
Power Meter	Hewlett Packard	E4418A	SPA	06/21/2002	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	06/21/2002	24 mo

Test Description

Requirement: Per 47 CFR 15.247(b)(3), the maximum peak output power must not exceed 1 Watt. The measurement is made using a spectrum analyzer using the following settings:

- Resolution bandwidth set to greater than the 6 dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Prior to measuring the output power from the EUT, the test set-up was calibrated using a signal generator and power meter.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

Completed by:

EMC EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080		**Work Order:**	ITRM0020
Serial Number:	4004703		**Date:**	05/21/04
Customer:	Intermec Technologies Corporation		**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:**	42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:**	EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(b) Output Power	**Year:** 2003	**Method:** ANSI C63.4		**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

RESULTS	**AMPLITUDE**
Pass	12.08 mW

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Output Power - Low Channel


```
Mkr   2.401 60GHz       *12.08mW                                    Tek

Ref Lvl*15.0mW                        *1.5mW/        Atten 20dB
100

 90

 80

 70

 60

 50

 40

 30

 20

 10

  0

Freq   2.402 00GHz                              Span 5.0MHz

ResBW 3MHz                 VidBW 7MHz                  SWP 50mS


  LEVEL        SPAN        Ref Lvl*15.0mW


  KNOB 2       KNOB 1      KEYPAD       Tektronix    2784
```

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 8520-00080	**Work Order:** ITRM0020	
Serial Number: 4004703	**Date:** 05/21/04	
Customer: Intermec Technologies Corporation	**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(b) Output Power	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

RESULTS	**AMPLITUDE**
Pass	13.86 mW

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Output Power - Mid Channel

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(b) Output Power	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

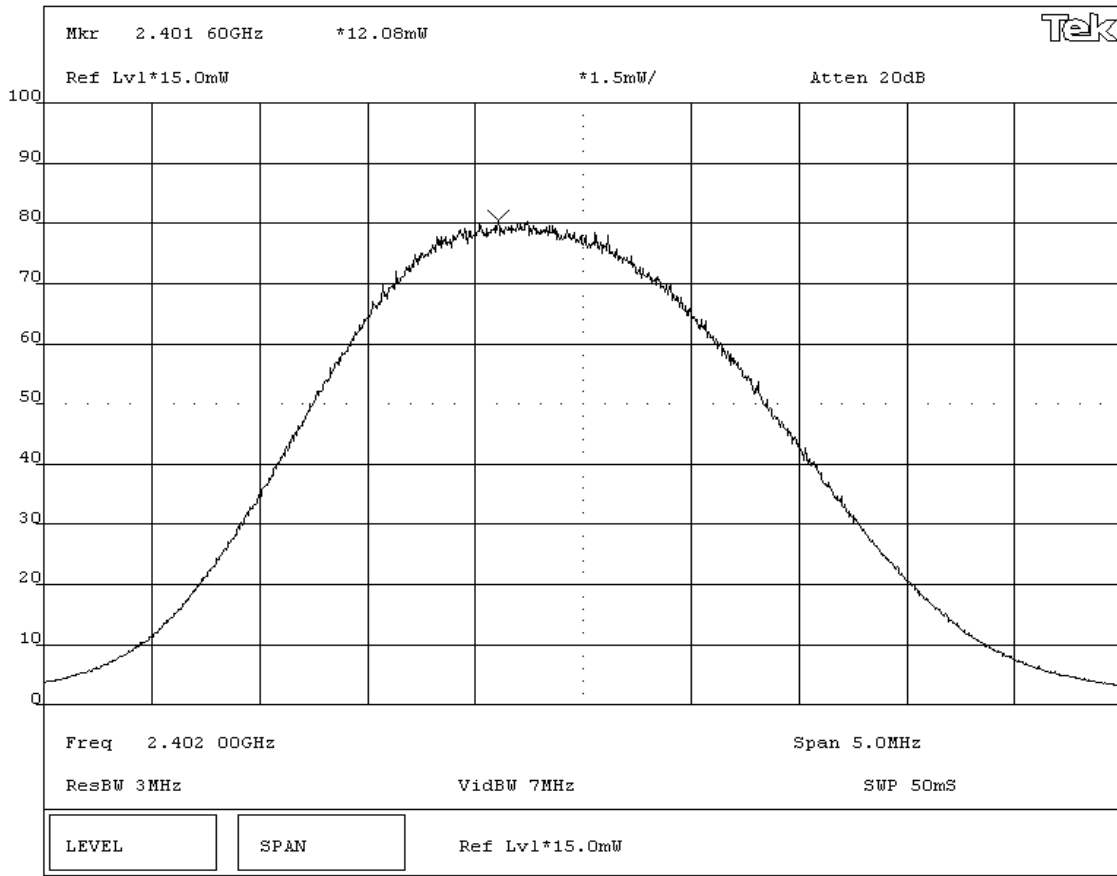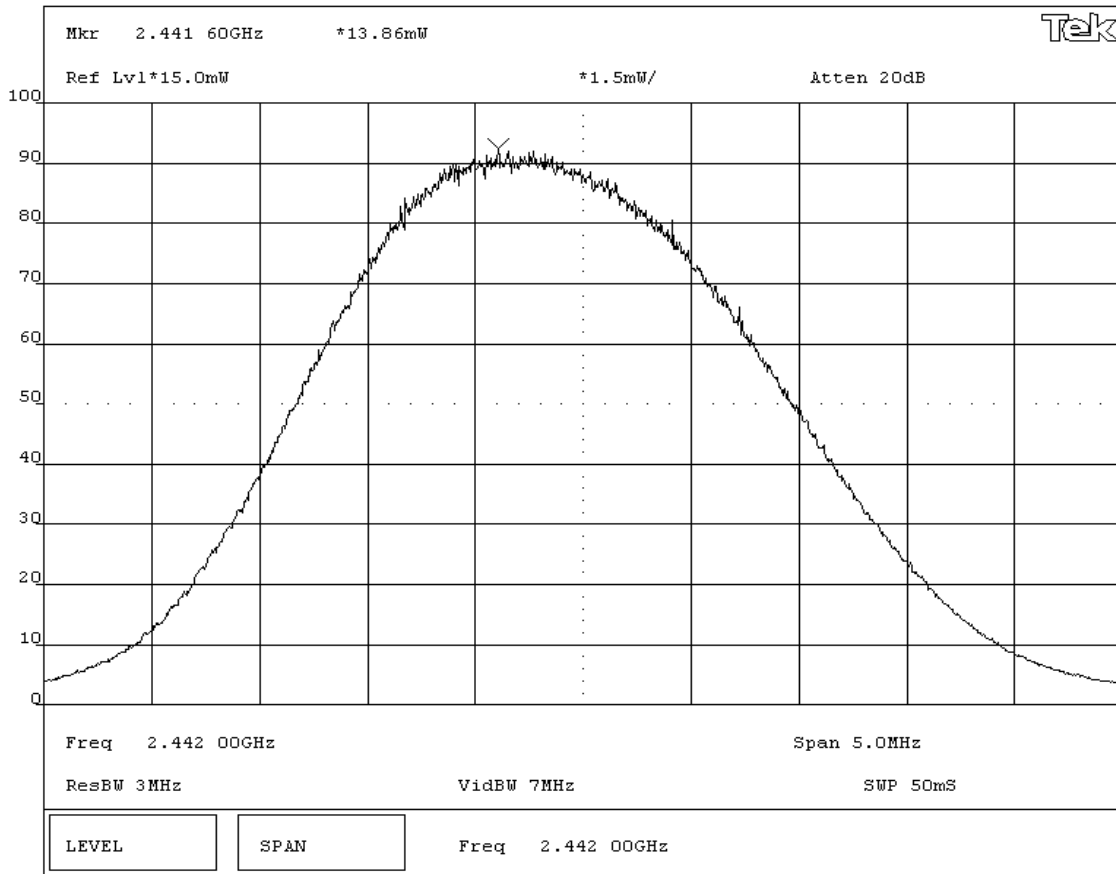No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

RESULTS	**AMPLITUDE**
Pass	11.09 mW

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Output Power - High Channel

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Other Settings Investigated:

Bluetooth only

Software\Firmware Applied During Test

Exercise software	FCC_Smart	Version		Unknown
Description				
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.				

EUT and Peripherals

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Power Adapter	Elpac Power Systems	FW1812	014852

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

Completed by:

EMISSIONS DATA SHEET

EUT:	8520-00080		**Work Order:**	ITRM0020
Serial Number:	4004703		**Date:**	05/21/04
Customer:	Intermec Technologies Corporation		**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:**	42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:**	EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Band Edge Compliance	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	**AMPLITUDE**
Pass	-50.4 dB

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Band Edge Compliance - Low Channel

Mkr △ −2.05MHz   △ −50.40dB

Ref Lvl*10.0dBm   10dB/   Atten 10dB

Freq   2.400 00GHz   Span 10MHz

ResBW 100kHz   VidBW 300kHz   SWP 50mS

LEVEL	SPAN	Freq 2.400 00GHz

KNOB 2   KNOB 1   KEYPAD   Tektronix   2784

EMISSIONS DATA SHEET

EUT:	8520-00080		**Work Order:**	ITRM0020
Serial Number:	4004703		**Date:**	05/21/04
Customer:	Intermec Technologies Corporation		**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:**	42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:**	EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Band Edge Compliance	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	**AMPLITUDE**
Pass	-60.5 dB

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Band Edge Compliance - High Channel
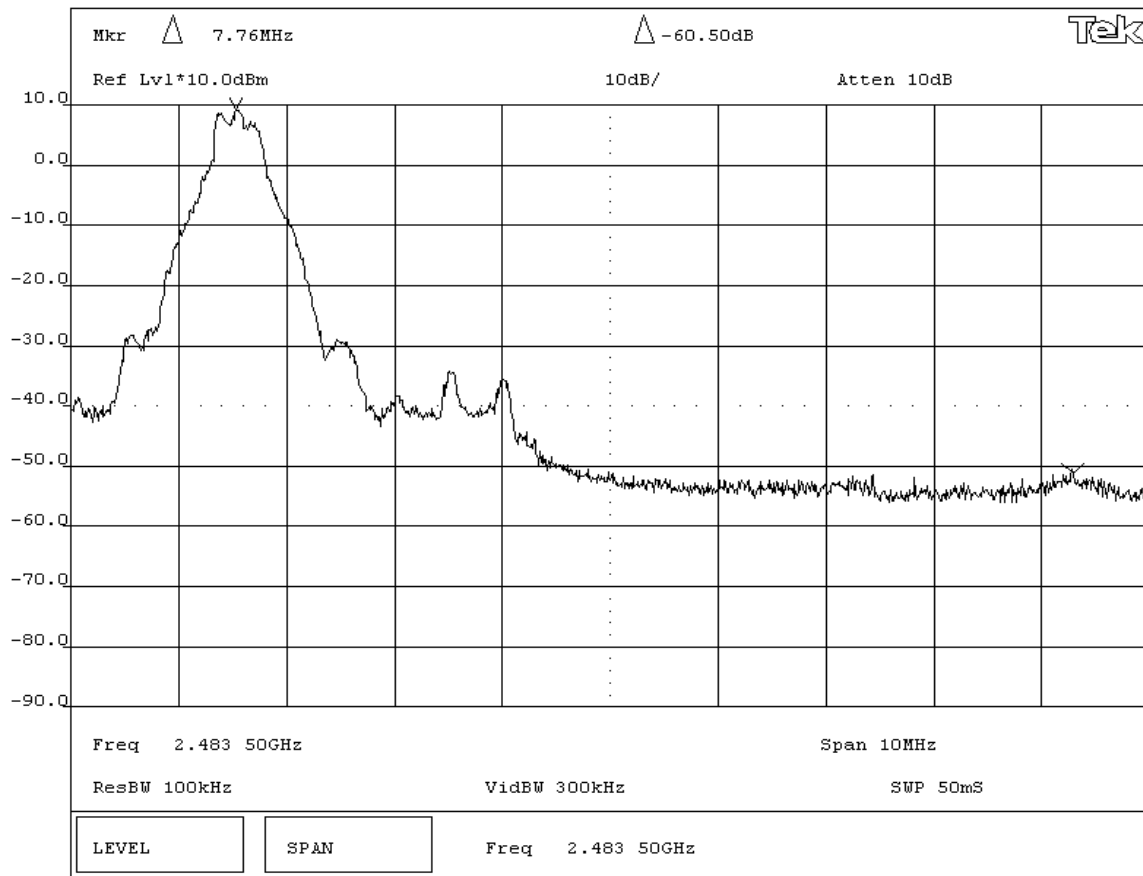

```
Mkr   △  7.76MHz              △ -60.50dB        Tek

Ref Lvl*10.0dBm         10dB/          Atten 10dB

 10.0
  0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0

Freq  2.483 50GHz                   Span 10MHz

ResBW 100kHz          VidBW 300kHz          SWP 50mS

  LEVEL       SPAN        Freq  2.483 50GHz

  KNOB 2      KNOB 1     KEYPAD     Tektronix    2784
```

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:	
High	
Mid	
Low	

Operating Modes Investigated:	
No Hop	

Data Rates Investigated:	
Maximum	

Output Power Setting(s) Investigated:	
Maximum	

Power Input Settings Investigated:	
120 VAC, 60 Hz.	

Other Settings Investigated:	
Bluetooth only	

Software\Firmware Applied During Test			
Exercise software	FCC_Smart	**Version**	Unknown
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.			

EUT and Peripherals			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Radio (EUT)	Intermec Technologies Corporation	8520-00080	4004703
Handheld Radio/Scanner (Host)	Intermec Technologies Corporation	700C	05400400869
Power Adapter	Elpac Power Systems	FW1812	014852

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

Completed by:

EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 0MHz-3GHz

Tek

```
    Ref Lvl*10.0dBm                    10dB/              Atten 10dB
 10.0
  0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0

    0MHz          to        3.000GHz

    ResBW 100kHz              VidBW 100kHz              SWP 1.7S

    LEVEL        SPAN         Ref Lvl*10.0dBm

    KNOB 2        KNOB 1        KEYPAD        Tektronix    2784
```

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 3GHz-6.5GHz

Ref Lvl*10.0dBm   10dB/   Atten 10dB

2.990GHz   to   6.500GHz

ResBW 100kHz   VidBW 100kHz   SWP 2.0S

LEVEL   SPAN   Stop   6.500GHz

KNOB 2   KNOB 1   KEYPAD   Tektronix   2784

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.
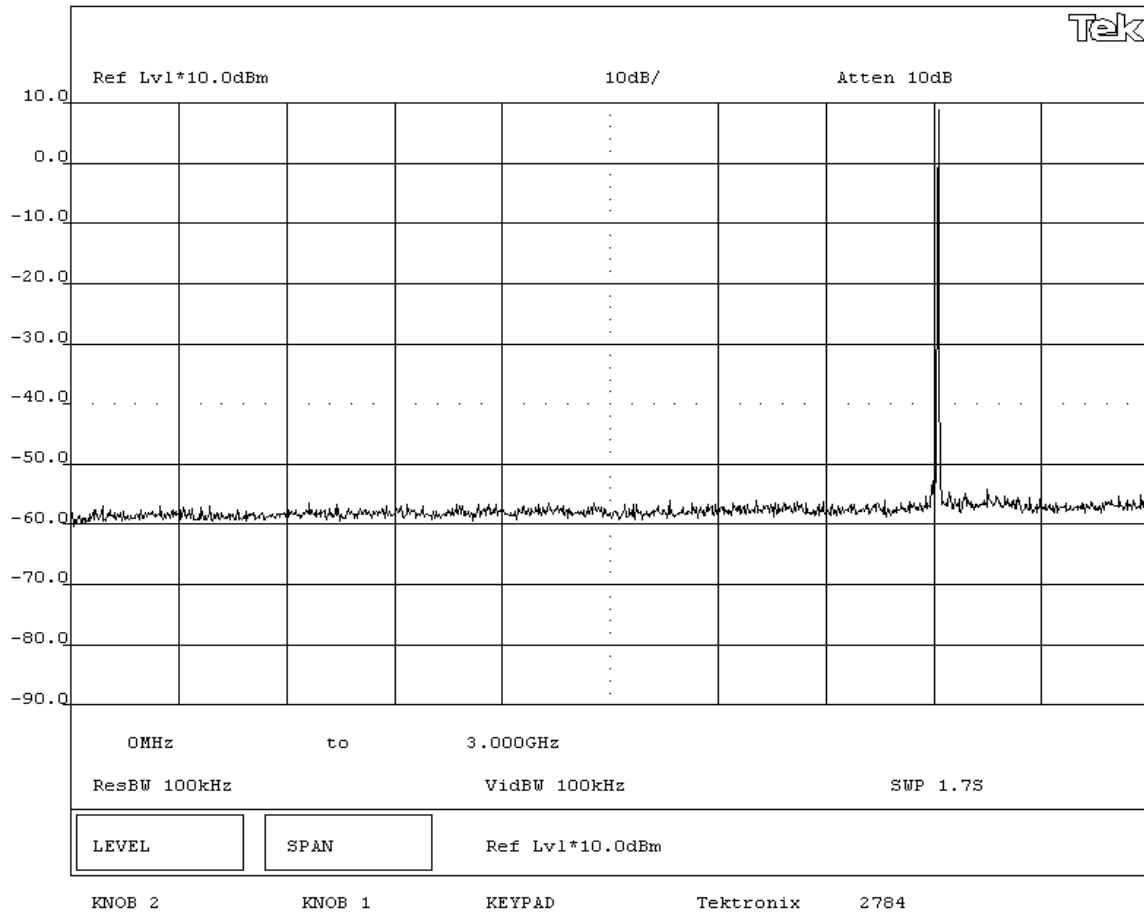
DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 6.5GHz-15GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS
EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES
No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

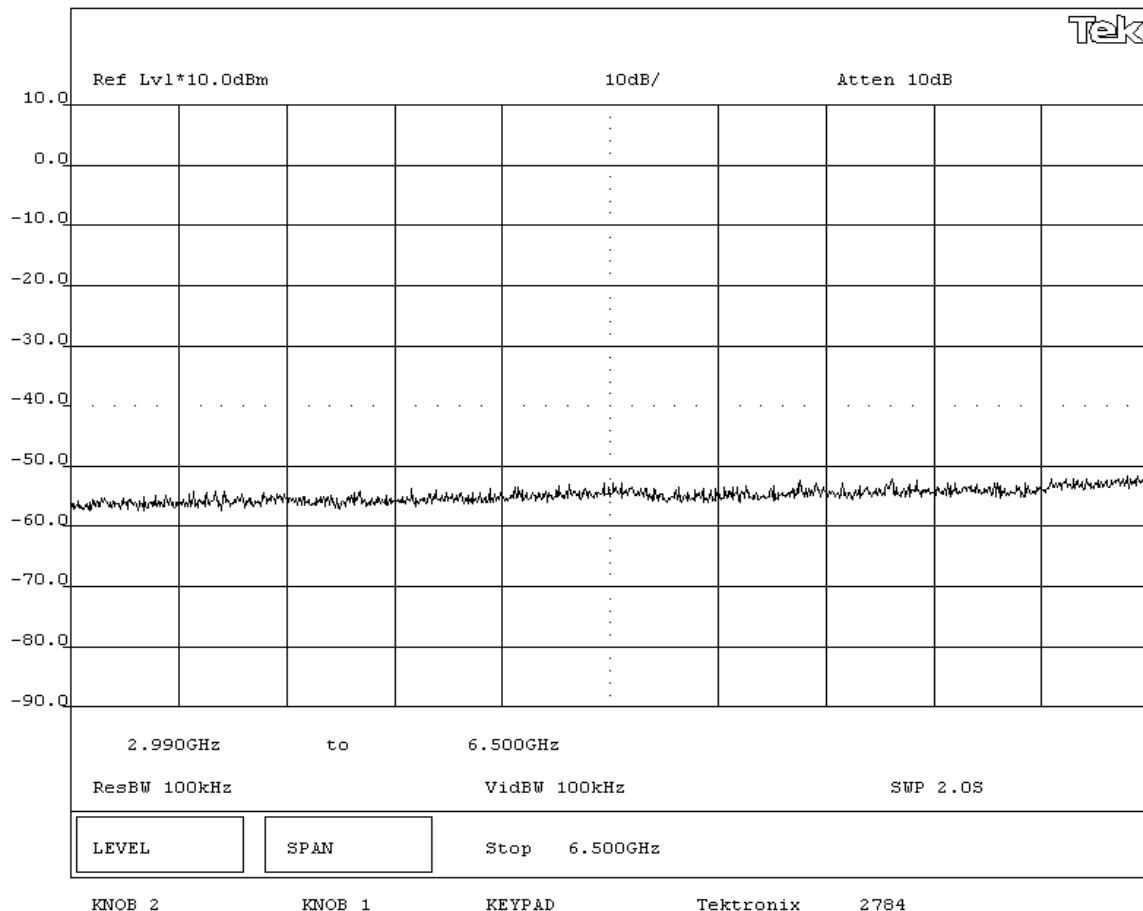**DEVIATIONS FROM TEST STANDARD**
None

REQUIREMENTS
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS
Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Low Channel 15GHz - 25GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

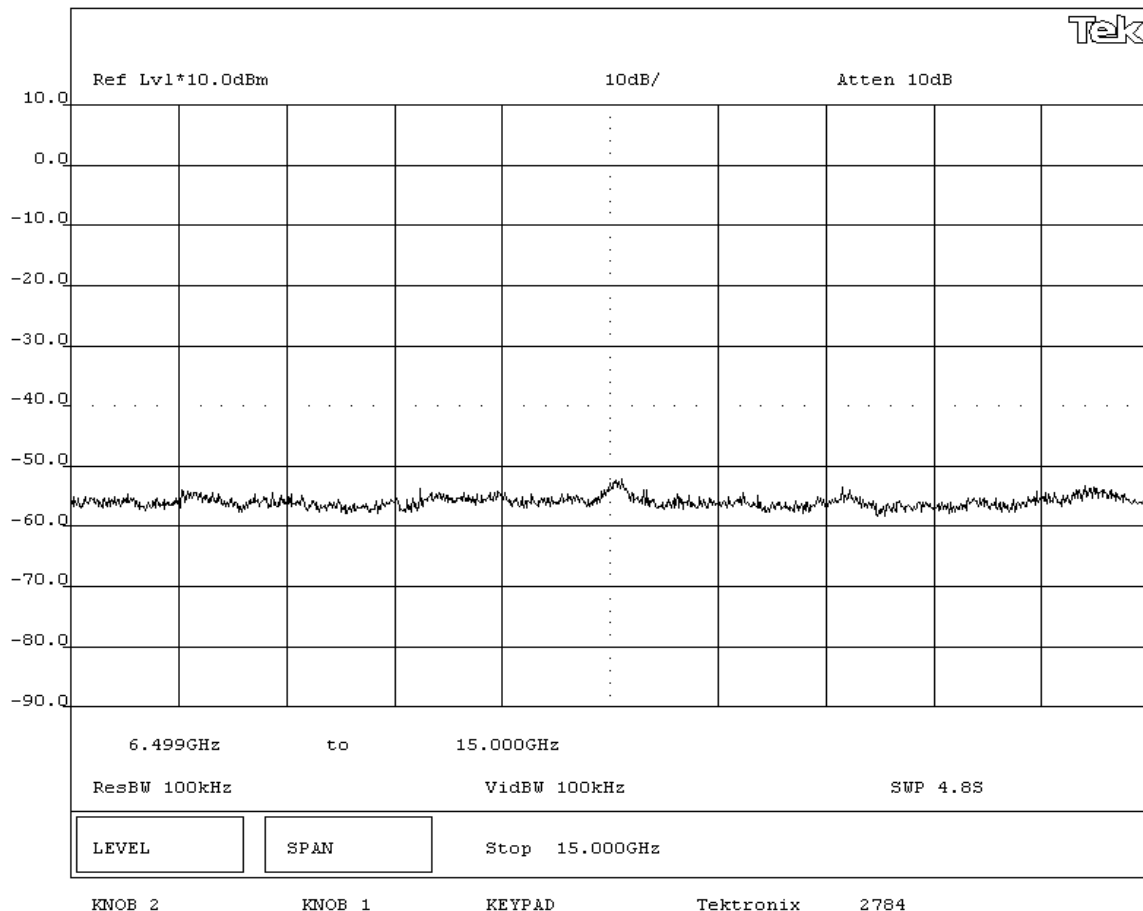No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 0MHz-3GHz


```
            Ref Lvl*10.0dBm                10dB/              Atten 10dB
      10.0
       0.0
     -10.0
     -20.0
     -30.0
     -40.0
     -50.0
     -60.0
     -70.0
     -80.0
     -90.0
            0MHz            to        3.000GHz

            ResBW 100kHz            VidBW 100kHz              SWP 1.7S

         LEVEL        SPAN        Ref Lvl*10.0dBm

         KNOB 2       KNOB 1       KEYPAD        Tektronix     2784
```

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080		Work Order:	ITRM0020
Serial Number:	4004703		Date:	05/21/04
Customer:	Intermec Technologies Corporation		Temperature:	73 F
Attendees:	none	Tested by: Greg Kiemel	Humidity:	42%
Customer Ref. No.:	N/A	Power: 3.3 Vdc from host	Job Site:	EV06

TEST SPECIFICATIONS

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

SAMPLE CALCULATIONS

COMMENTS
EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES
No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
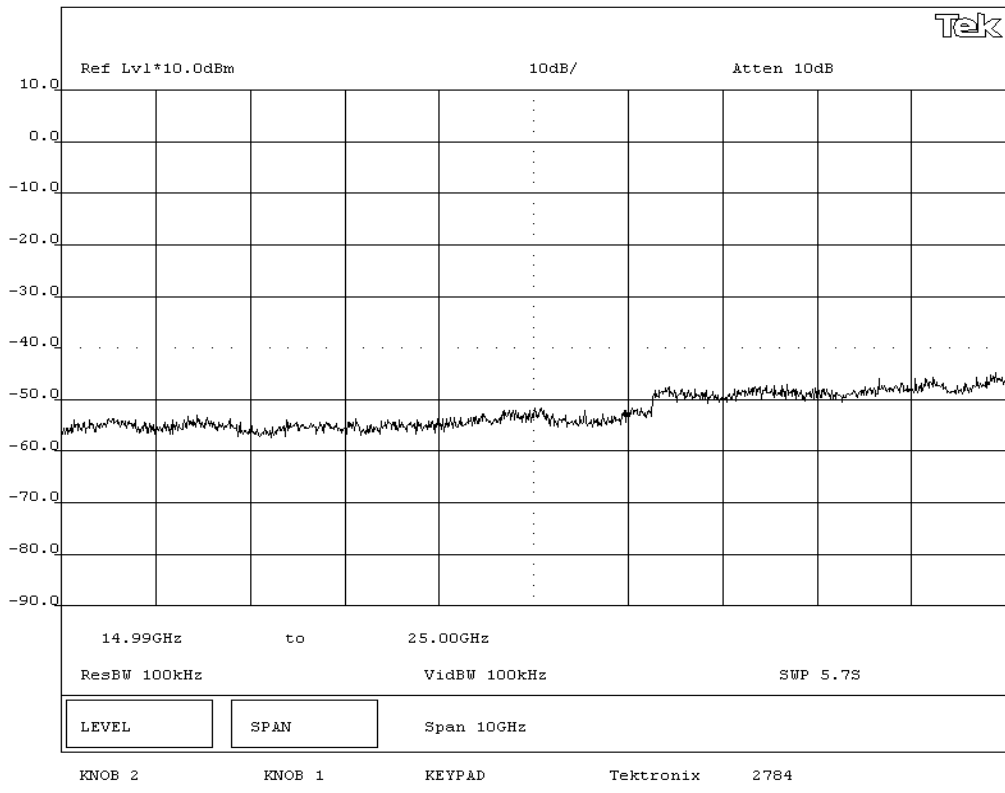Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS
Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 3GHz-6.5GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS
EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES
No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental
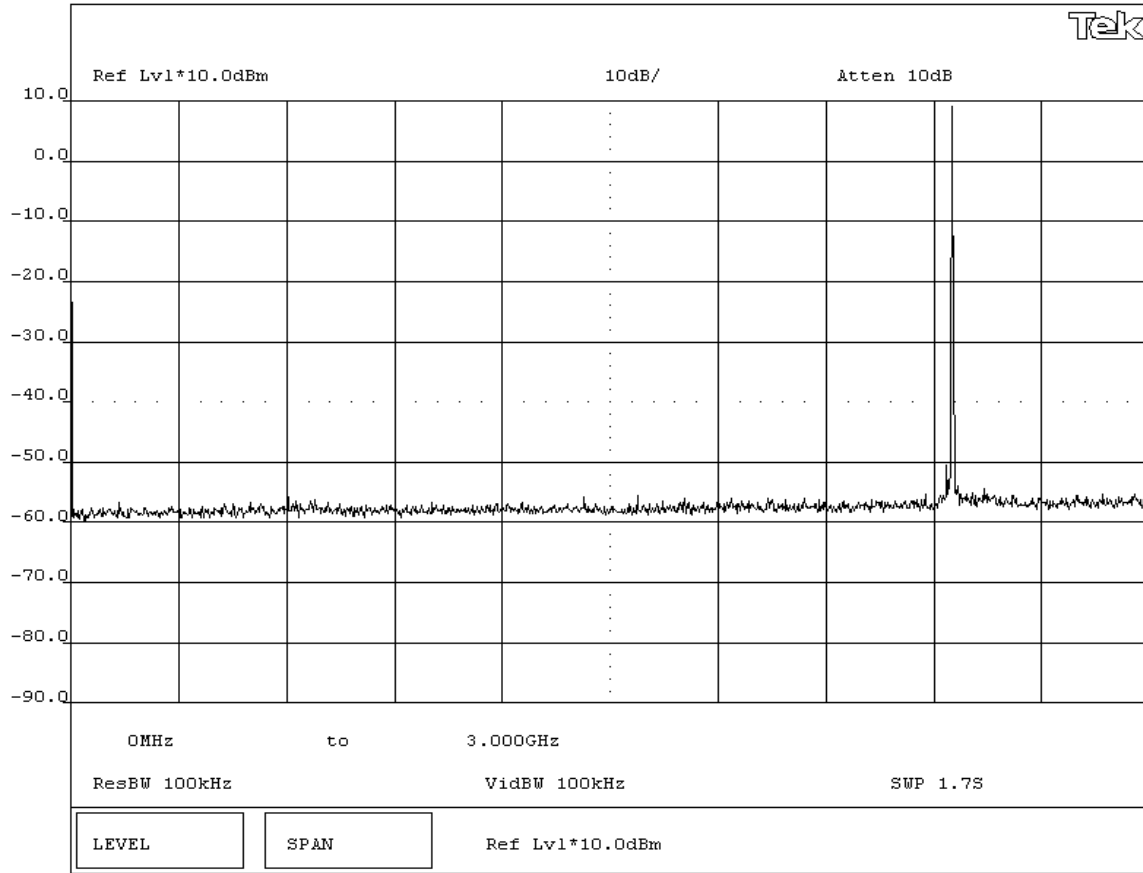
RESULTS
Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 6.5GHz-15GHz

EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

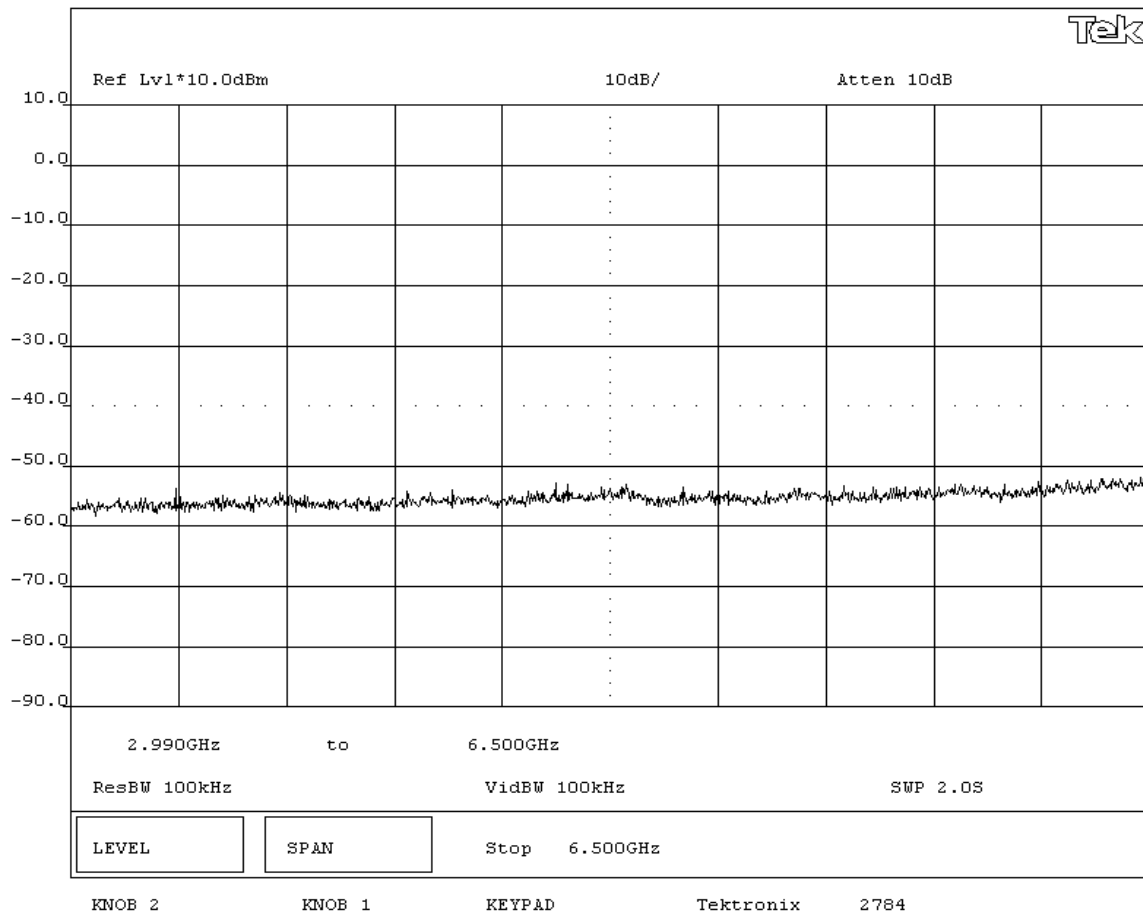No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - Mid Channel 15GHz-25GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080		**Work Order:**	ITRM0020
Serial Number:	4004703		**Date:**	05/21/04
Customer:	Intermec Technologies Corporation		**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:**	42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:**	EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:**	2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

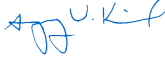**DEVIATIONS FROM TEST STANDARD**

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental
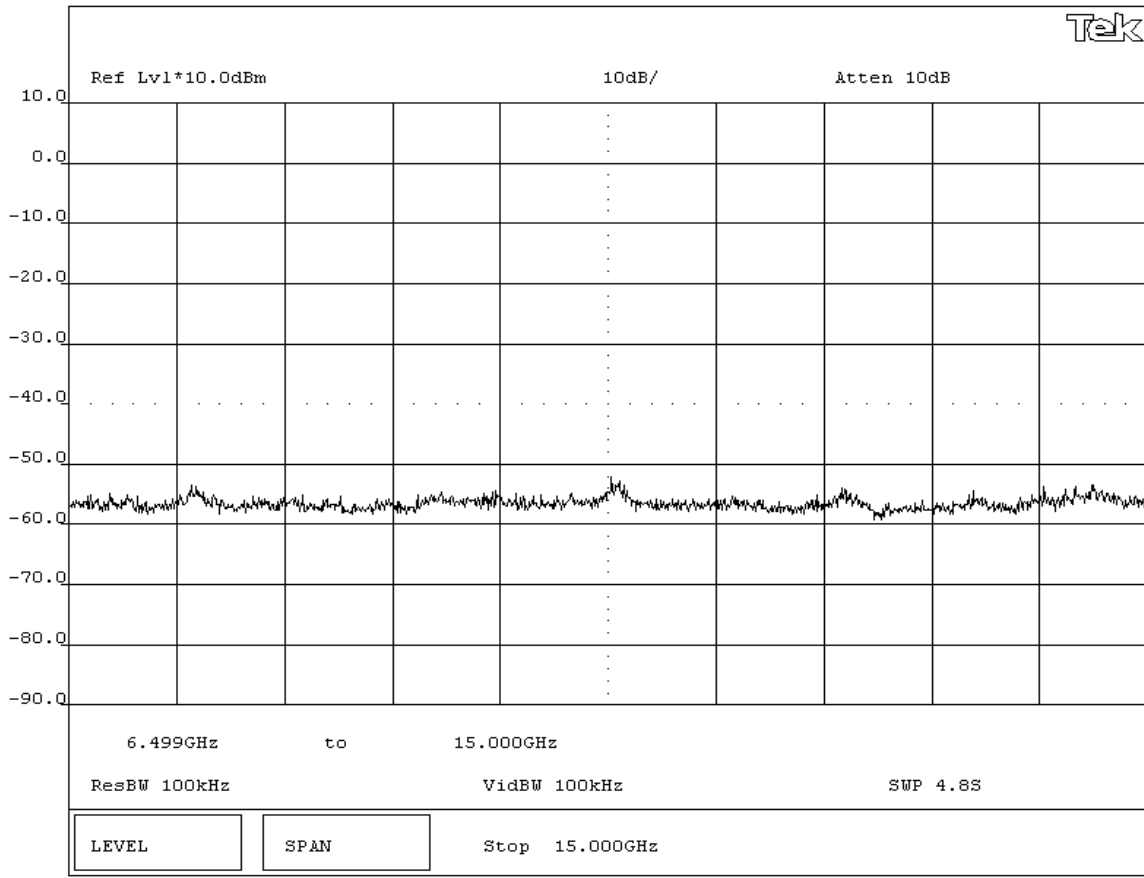
RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - High Channel 0MHz-3GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001	

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

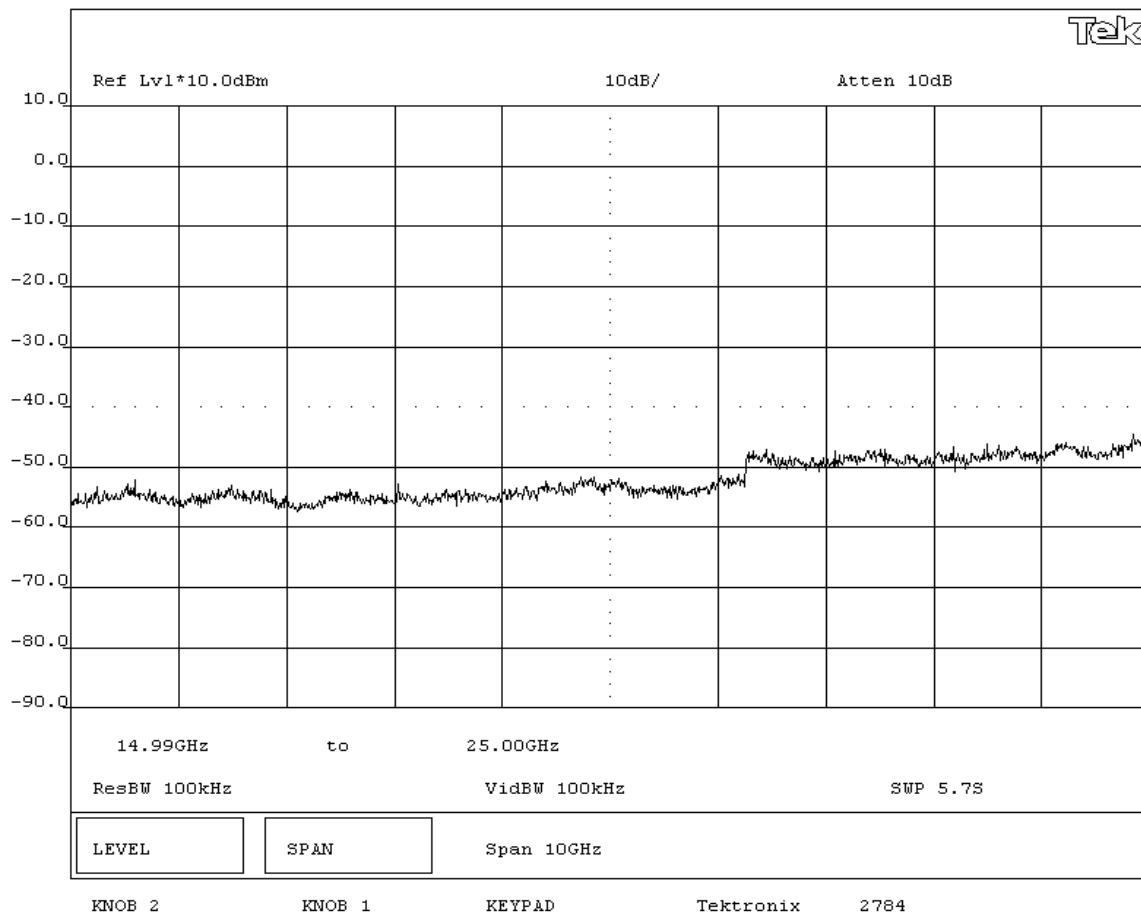No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - High Channel 3GHz-6.5GHz


```
                                                              Tek
   Ref Lvl*10.0dBm              10dB/              Atten 10dB
 10.0
  0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
       2.990GHz        to       6.500GHz

   ResBW 100kHz              VidBW 100kHz              SWP 2.0S

   LEVEL        SPAN        Stop  6.500GHz

   KNOB 2       KNOB 1      KEYPAD      Tektronix    2784
```

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental
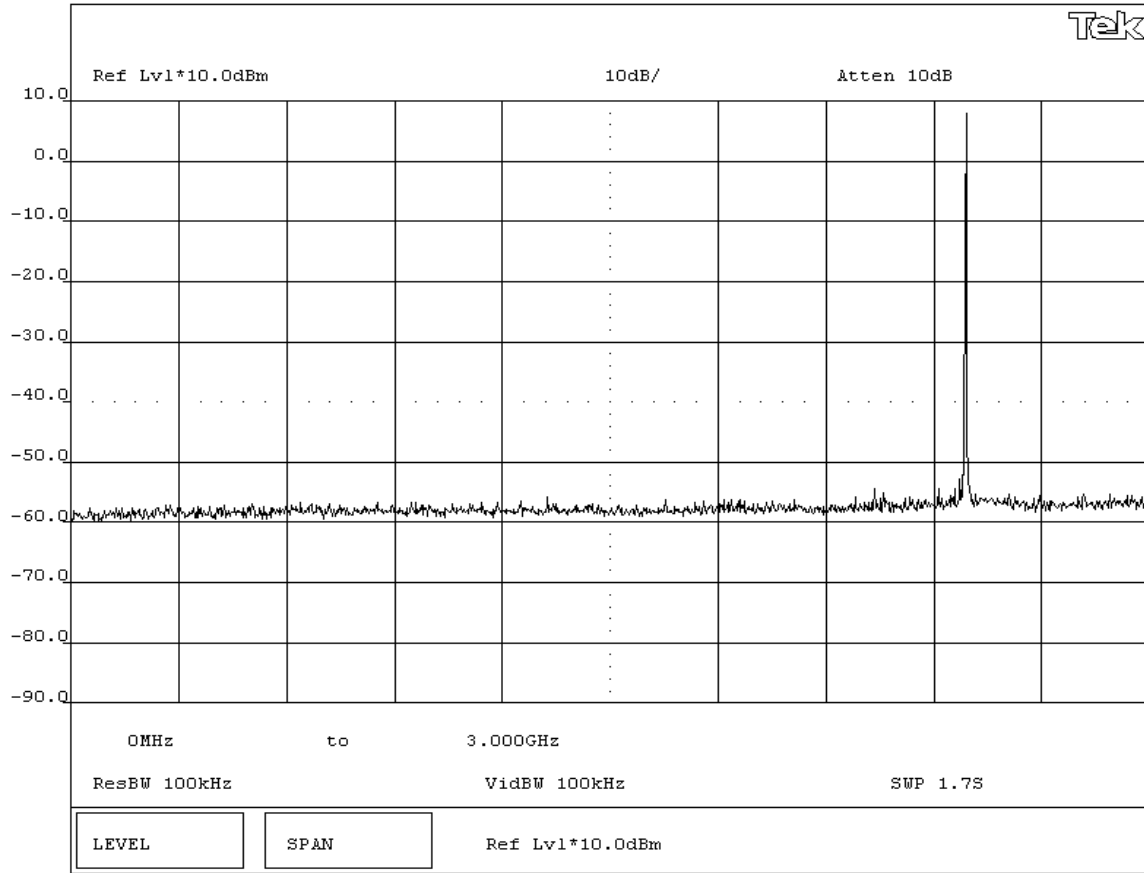
RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - High Channel 6.5GHz-15GHz

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification: FCC 15.247(c) Spurious Cond. Em.	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

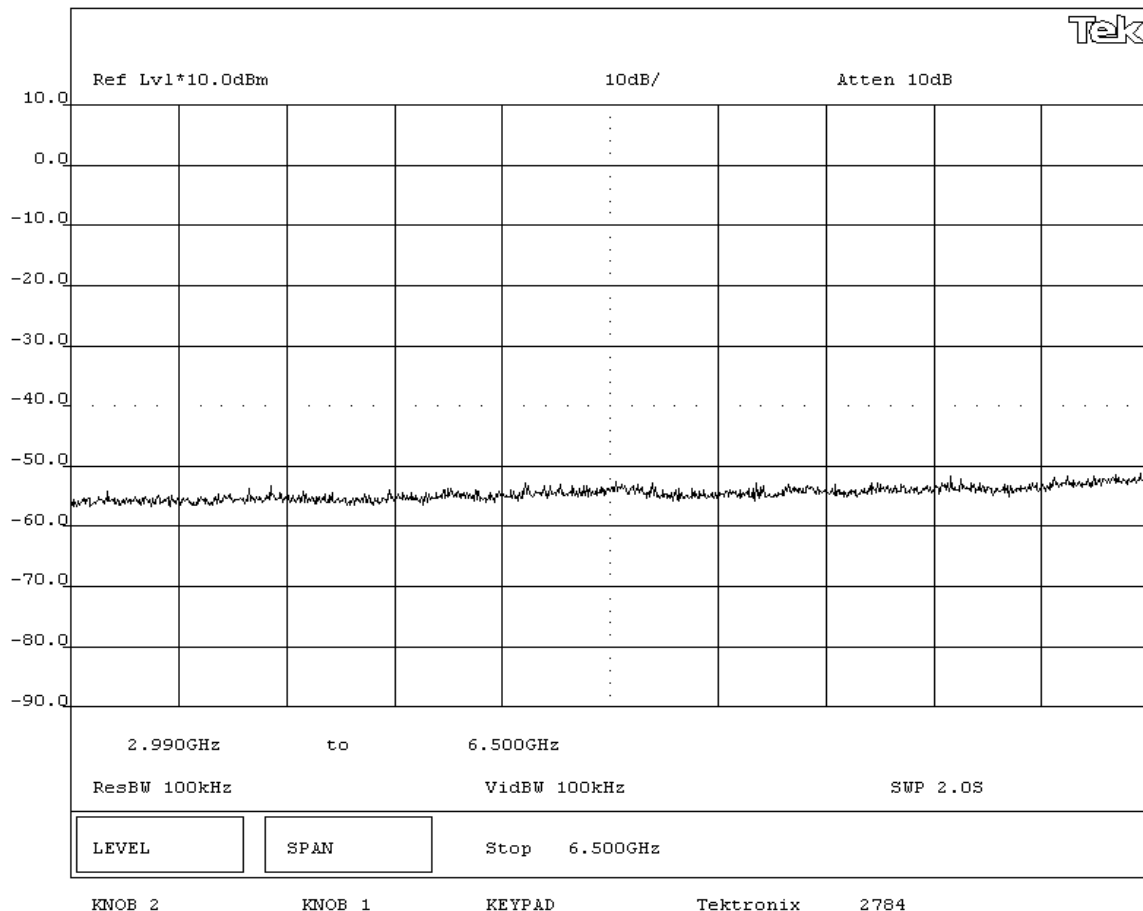No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission outside of the authorized band is 20 dB down from the fundamental

RESULTS

Pass

SIGNATURE

Tested By:

DESCRIPTION OF TEST

Antenna Conducted Spurious Emissions - High Channel 15GHz-25GHz


```
Ref Lvl*10.0dBm              10dB/              Atten 10dB
 10.0
  0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
     14.99GHz        to        25.00GHz
     ResBW 100kHz          VidBW 100kHz              SWP 5.7S
     LEVEL        SPAN        Span 10GHz
   KNOB 2        KNOB 1      KEYPAD      Tektronix    2784
```

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Other Settings Investigated:

Bluetooth only

Software\Firmware Applied During Test

Exercise software	FCC_Smart	Version	Unknown
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Radio (EUT)	Intermec Technologies Corporation	8520-00080	4004703
Handheld Radio/Scanner (Host)	Intermec Technologies Corporation	700C	05400400869
Power Adapter	Elpac Power Systems	FW1812	014852

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(d), the peak power spectral density conducted from the antenna port of a direct sequence transmitter must not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

Configuration: The peak power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

> The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be 1.5 x 106 ÷ 3 x 103 = 500 seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

Completed by:

EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/21/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73 F	
Attendees: none	**Tested by:** Greg Kiemel	**Humidity:** 42%	
Customer Ref. No.: N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06	

TEST SPECIFICATIONS

Specification: FCC 15.247(d) Power Spectral Density	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = 10*log(3 kHz / 1 Hz) = 34.8 dB

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DTS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS | **AMPLITUDE**

Pass | Power Spectral Density = +1.2 dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Low Channel

EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Power Spectral Density	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = 10*log(3 kHz / 1 Hz) = 34.8 dB

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DTS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS	**AMPLITUDE**
Pass	Power Spectral Density = +1.5 dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - Mid Channel

EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/21/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73 F
Attendees:	none	**Tested by:** Greg Kiemel	**Humidity:** 42%
Customer Ref. No.:	N/A	**Power:** 3.3 Vdc from host	**Job Site:** EV06

TEST SPECIFICATIONS

Specification:	FCC 15.247(d) Power Spectral Density	**Year:** 2003	**Method:** ANSI C63.4	**Year:** 2001

SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation.

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

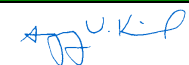Bandwidth Correction Factor = 10*log(3 kHz / 1 Hz) = 34.8 dB

COMMENTS

EUT installed outside of Intermec Model 700C. Direct connect to antenna port

EUT OPERATING MODES

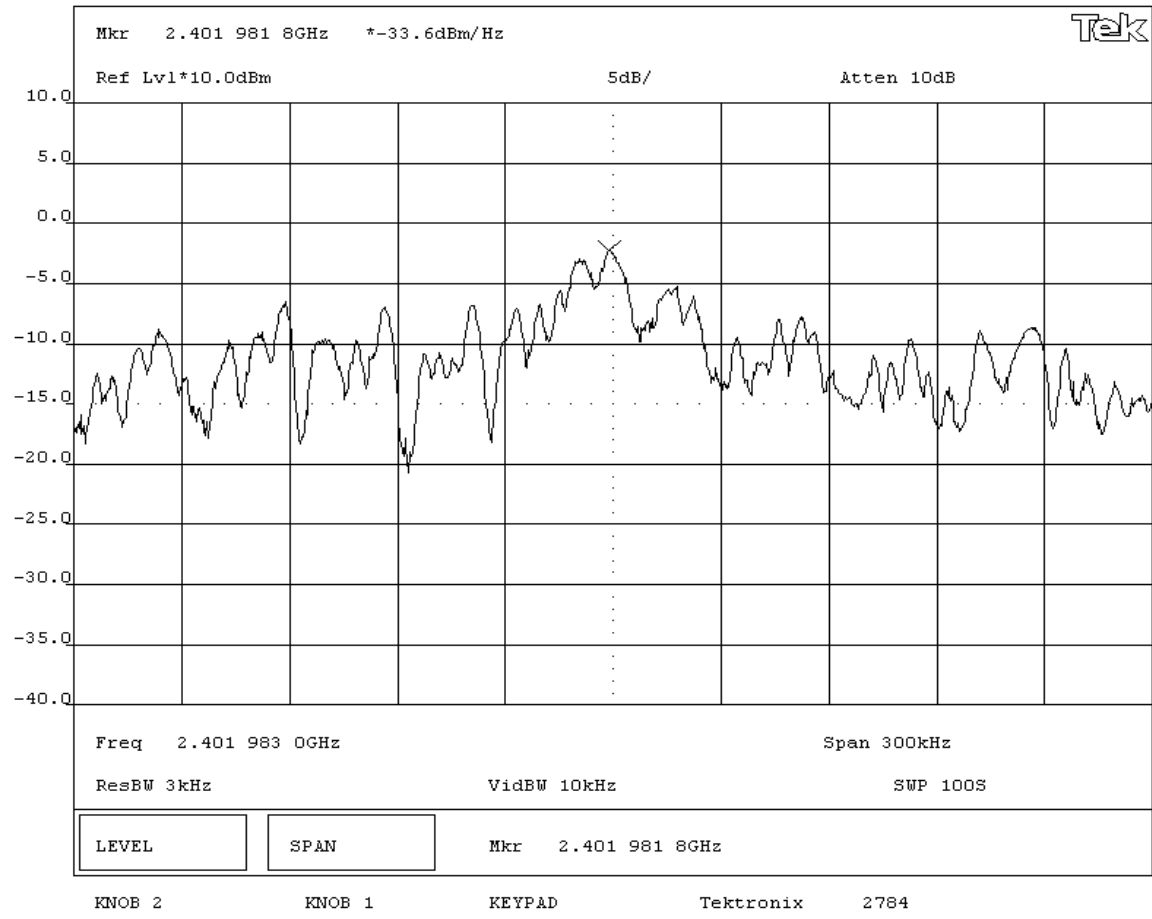No hop mode. Modulated by PRBS at maximum data rate, at maximum output power.
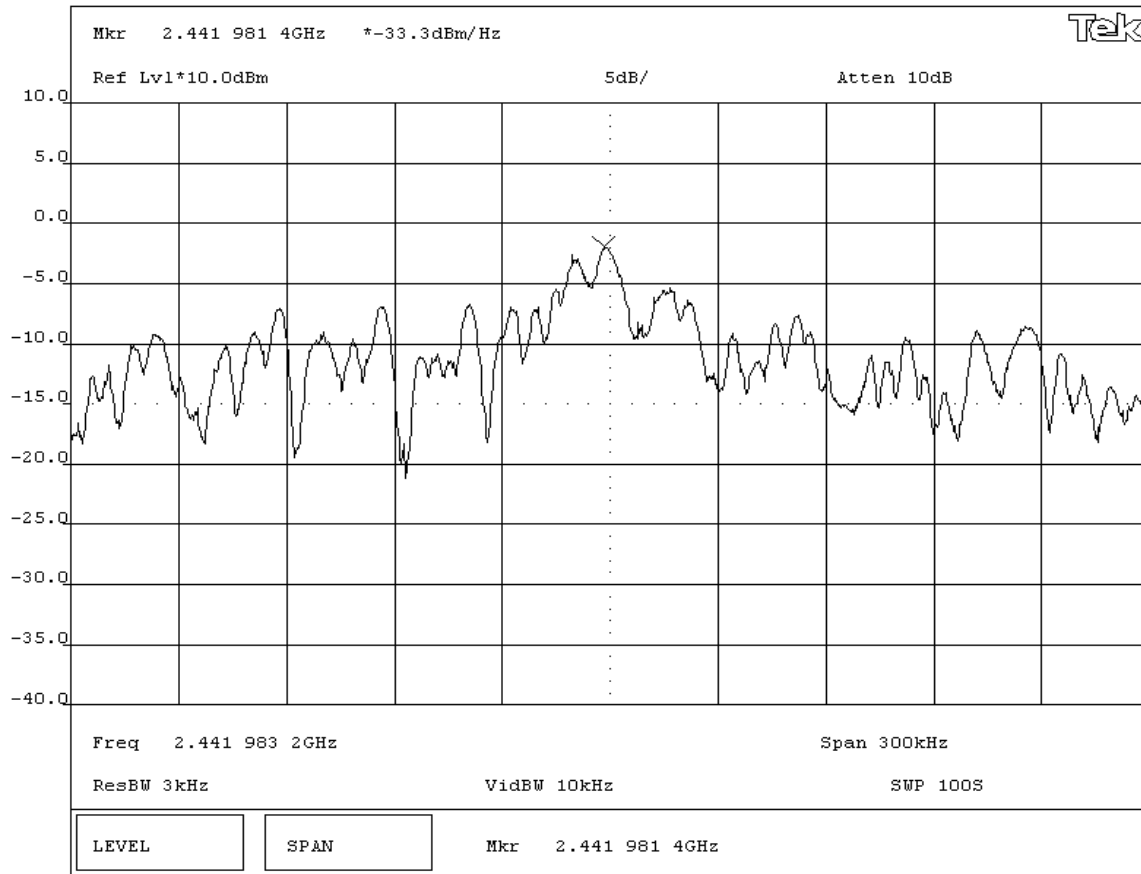
DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DTS transmitter does not exceed 8 dBm in any 3 kHz band

RESULTS	**AMPLITUDE**
Pass	Power Spectral Density = +0.4 dBm / 3kHz

SIGNATURE

Tested By: _____

DESCRIPTION OF TEST

Power Spectral Density - High Channel
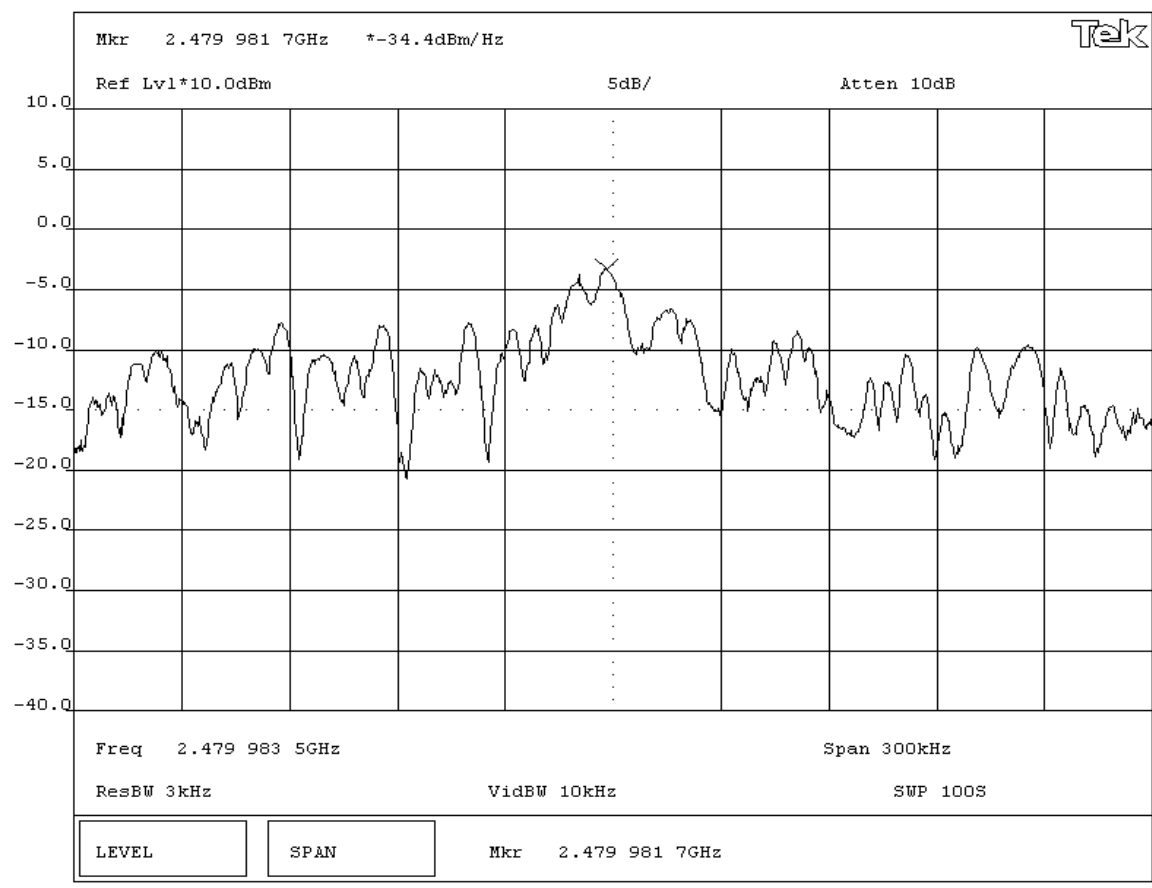
Justification

The EUT is a Bluetooth radio module installed inside Intermec's handheld computer, Model 700C. The EUT is seeking Limited Modular Approval (FCC ID: EHABTS080) for portable use with three other previously certified co-located radios: CDMA (Model SB555, FCC ID: HN2SB555-2), GSM (Model SMC45, FCC ID: EHA700C-SMC45-1), and 802.11b (Model 2011B, FCC ID: HN22011B-2). This test demonstrates compliance with FCC 15.247 emissions limits for the EUT transmitting alone, or simultaneously with the co-located radios. Each radio transmits through its own antenna.

All possible combinations of harmonic emissions from the CDMA, GSM, and 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. Note that the 700C can contain either a CDMA or GSM radio – never both.:

Channels in Specified Band Investigated:	
CDMA (PCS):	1, 35, 1153
CDMA (Cellular):	54, 55, 395, 467
GSM/GPRS:	516, 606
802.11(b):	1, 11
Bluetooth:	2, 5, 11, 62, 67, 68, 79, 80 Low Channel (2402MHz), Mid Channel (2442MHz), High Channel (2480MHz)

Operating Modes Investigated:
Transmission of Bluetooth radio only (No hop)
Simultaneous transmission of Bluetooth (No hop), CDMA, and 802.11(b) radios
Simultaneous transmission of Bluetooth (No hop), GSM, and 802.11(b) radios

Antennas Investigated:	
802.11(b):	Custom internal to 700C
CDMA (Cellular):	805-606-102 Dual Band CDMA 900/1900MHz Antenna (SB555)
CDMA (PCS):	805-666-204 Single Band CDMA 1900MHz Antenna (SB555)
GSM/GPRS:	805-666-204 Single Band 1900MHz Antenna (SMC45)
Bluetooth:	Integral PCB trace

Data Rates Investigated:
Maximum

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

Software\Firmware Applied During Test			
Exercise software	FCC_Smart 802.11 Agency Test Blue Test	**Version**	Unknown
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.			

EUT and Peripherals			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Handheld Radio/Scanner	Intermec Technologies Corporation	700C	05400400869
Bluetooth Radio	Intermec Technologies Corporation	8520-00080	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
Power Adapter	Elpac Power Systems	FW1812	014852

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains
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**
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	10/08/2003	12 mo
Antenna, Horn	EMCO	3160-09	AHG	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/23/2003	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

Configuration: The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, 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.

Simultaneous Transmission: For co-located radios, it is necessary to measure the field strength of spurious emissions, while co-located radios are transmitting simultaneously. 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, GSM, 802.11(b), and Bluetooth radios were compared numerically. It was determined that there were no possible coincidental harmonics below 1 GHz. The frequency range from 1 GHz to 26 GHz was investigated for channel combinations that would produce coincidental harmonics. Compliance with the restricted band at 2483.5 – 2500 MHz was also measured.

All the radios were configured for simultaneous transmission at the channels specified in the previous pages. The highest gain antennas to be used with the radios were tested. The spectrum was scanned throughout the specified range. While scanning, emissions from the radios were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antennas in three orthogonal axes, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2001). 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:

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	Work Order:	ITRM0020
Serial Number:		Date:	05/11/04
Customer:	Intermec Technologies Corporation	Temperature:	73
Attendees:	Scot Holub	Humidity:	36%
Cust. Ref. No.:		Barometric Pressure	29.95
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

Radio in 700C

EUT OPERATING MODES

Low, Mid, or High Channel, Modulated with PRBS at Maximum data rate

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

Pass

Run #
1

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)	Comments
8351.966	31.9	14.0	284.0	1.6	3.0	0.0	V-Horn	AV	0.0	45.9	54.0	-8.1	High Channel
8351.966	30.4	14.0	131.0	1.3	3.0	0.0	H-Horn	AV	0.0	44.4	54.0	-9.6	High Channel
4175.979	40.5	2.4	206.0	1.5	3.0	0.0	H-Horn	AV	0.0	42.9	54.0	-11.1	High Channel
4804.000	59.2	3.3	135.0	1.1	3.0	0.0	H-Horn	PK	0.0	62.5	74.0	-11.5	Low channel
4804.000	36.8	3.3	135.0	1.1	3.0	0.0	H-Horn	AV	0.0	40.1	54.0	-13.9	Low channel
4959.946	34.9	3.8	129.0	1.1	3.0	0.0	H-Horn	AV	0.0	38.7	54.0	-15.3	High Channel
4883.960	34.5	3.7	135.0	1.1	3.0	0.0	H-Horn	AV	0.0	38.2	54.0	-15.8	Mid channel
4804.000	34.5	3.3	129.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.8	54.0	-16.2	Low channel
4883.960	54.1	3.7	135.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.8	74.0	-16.2	Mid channel
4959.946	53.7	3.8	129.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.5	74.0	-16.5	Mid channel
4883.960	33.5	3.7	305.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.2	54.0	-16.8	Mid channel
4959.946	33.1	3.8	324.0	1.1	3.0	0.0	V-Horn	AV	0.0	36.9	54.0	-17.1	High Channel
4529.979	34.2	2.4	307.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.6	54.0	-17.4	Mid channel
4804.000	53.3	3.3	129.0	1.2	3.0	0.0	V-Horn	PK	0.0	56.6	74.0	-17.4	Low channel
4529.979	33.7	2.4	111.0	2.0	3.0	0.0	H-Horn	AV	0.0	36.1	54.0	-17.9	Mid channel
4175.979	33.1	2.4	184.0	1.2	3.0	0.0	V-Horn	AV	0.0	35.5	54.0	-18.5	High Channel
3862.004	33.4	1.8	110.0	1.1	3.0	0.0	H-Horn	AV	0.0	35.2	54.0	-18.8	Low channel
8351.966	41.2	14.0	284.0	1.6	3.0	0.0	V-Horn	PK	0.0	55.2	74.0	-18.8	High Channel
3822.022	33.2	1.6	112.0	1.3	3.0	0.0	H-Horn	AV	0.0	34.8	54.0	-19.2	Mid channel
8351.966	40.7	14.0	131.0	1.3	3.0	0.0	H-Horn	PK	0.0	54.7	74.0	-19.3	High Channel

RADIATED EMISSIONS DATA SHEET

REV
df4.13
05/06/2004

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/11/04
Customer:	Intermec Technologies Corporation	**Temperature:**	73
Attendees:	Scot Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.01
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

Radio in 700C

EUT OPERATING MODES

High Channel, Modulated with PRBS at Maximum data rate

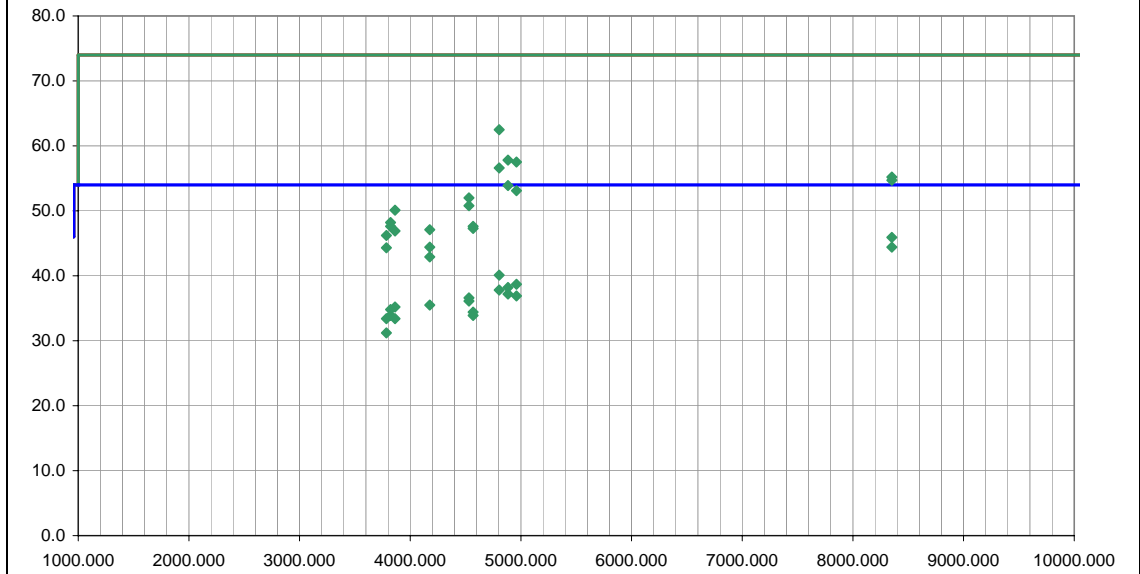**DEVIATIONS FROM TEST STANDARD**

No deviations.

RESULTS — **Run #**

Pass	2

Other

Tested By:
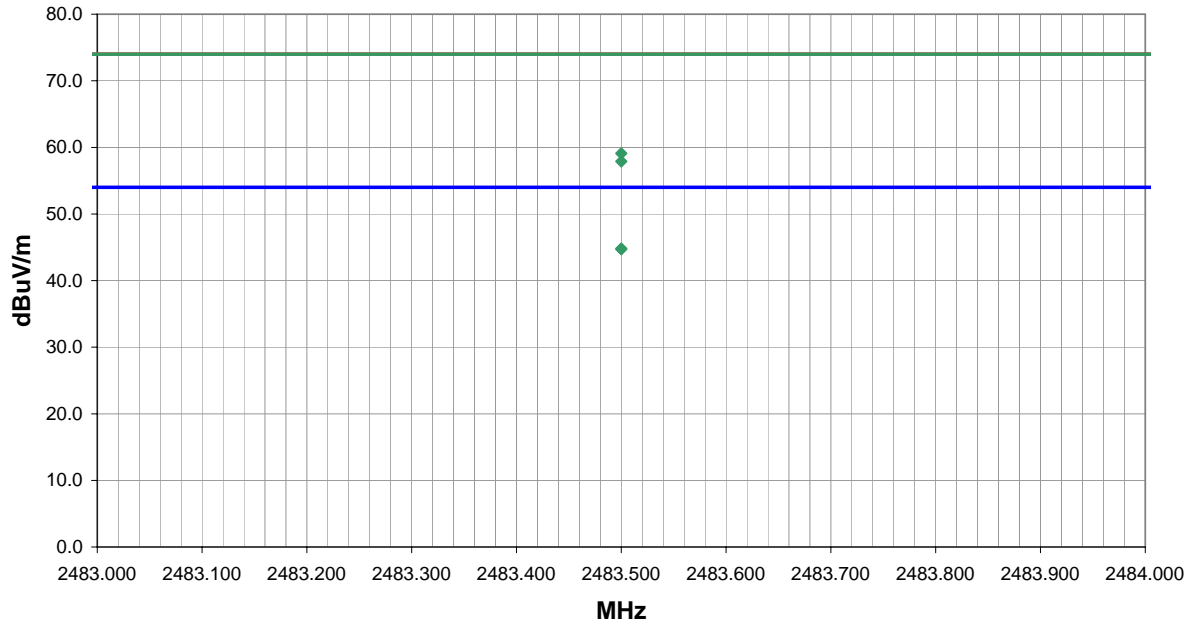
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	27.3	-2.5	307.0	1.2	3.0	20.0	V-Horn	AV	0.0	44.8	54.0	-9.2
2483.500	27.2	-2.5	253.0	1.3	3.0	20.0	H-Horn	AV	0.0	44.7	54.0	-9.3
2483.500	41.6	-2.5	307.0	1.2	3.0	20.0	V-Horn	PK	0.0	59.1	74.0	-14.9
2483.500	40.4	-2.5	253.0	1.3	3.0	20.0	H-Horn	PK	0.0	57.9	74.0	-16.1

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/12/04	
Customer: Intermec Technologies Corporation		**Temperature:** 72	
Attendees: Scot Holub		**Humidity:** 39%	
Cust. Ref. No.:		**Barometric Pressure** 30.19	
Tested by: Rod Peloquin	**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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (cellular) 467

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Run #
Pass	**8**

Other

Tested By:
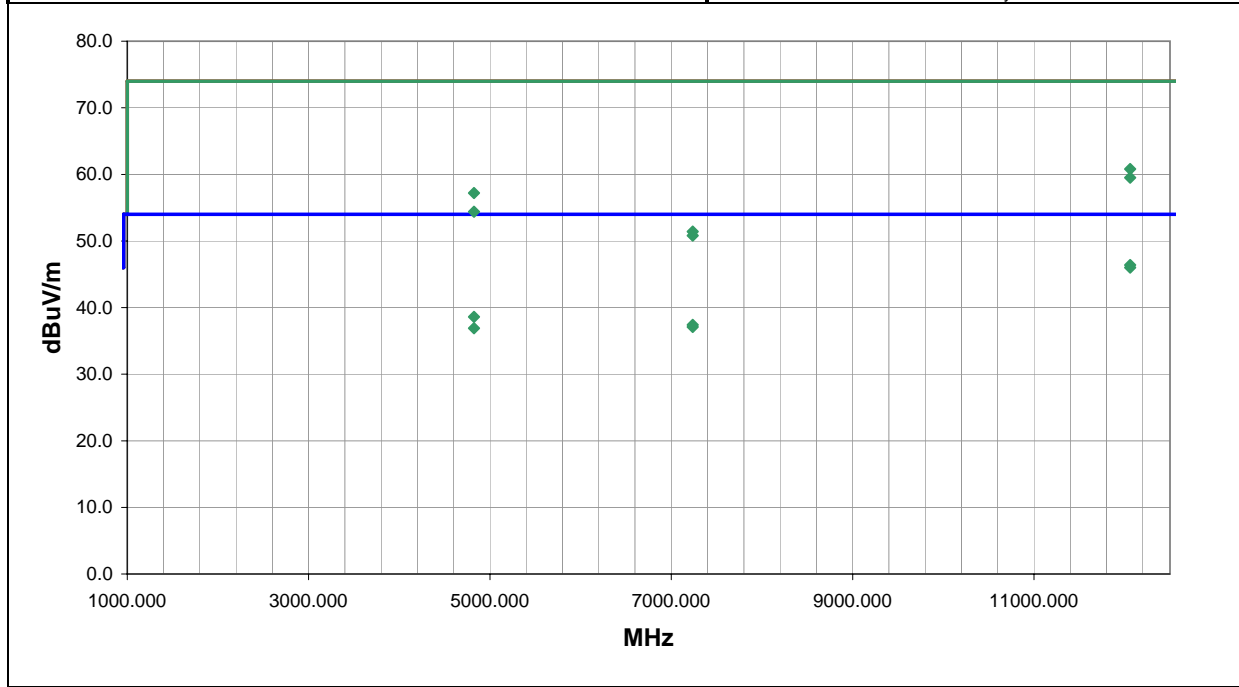
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12060.000	25.8	20.6	10.0	1.2	3.0	0.0	V-Horn	AV	0.0	46.4	54.0	-7.6
12060.000	25.4	20.6	204.0	1.3	3.0	0.0	H-Horn	AV	0.0	46.0	54.0	-8.0
12060.000	40.2	20.6	204.0	1.3	3.0	0.0	H-Horn	PK	0.0	60.8	74.0	-13.2
12060.000	38.9	20.6	10.0	1.2	3.0	0.0	V-Horn	PK	0.0	59.5	74.0	-14.5
4824.000	35.2	3.4	294.0	1.3	3.0	0.0	H-Horn	AV	0.0	38.6	54.0	-15.4
7236.000	27.0	10.4	360.0	1.3	3.0	0.0	H-Horn	AV	0.0	37.4	54.0	-16.6
4824.000	53.8	3.4	294.0	1.3	3.0	0.0	H-Horn	PK	0.0	57.2	74.0	-16.8
7236.000	26.7	10.4	50.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.1	54.0	-16.9
4824.000	33.5	3.4	147.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.9	54.0	-17.1
4824.000	51.0	3.4	147.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.4	74.0	-19.6
7236.000	41.0	10.4	360.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.4	74.0	-22.6
7236.000	40.4	10.4	50.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/12/04	
Customer: Intermec Technologies Corporation		**Temperature:** 73	
Attendees: Scot Holub		**Humidity:** 38%	
Cust. Ref. No.:		**Barometric Pressure** 30.01	
Tested by: Rod Peloquin	**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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 5, 802.11(b) 1, CDMA (cellular) 395

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS   Run

Pass	**9**

Other

Tested By:
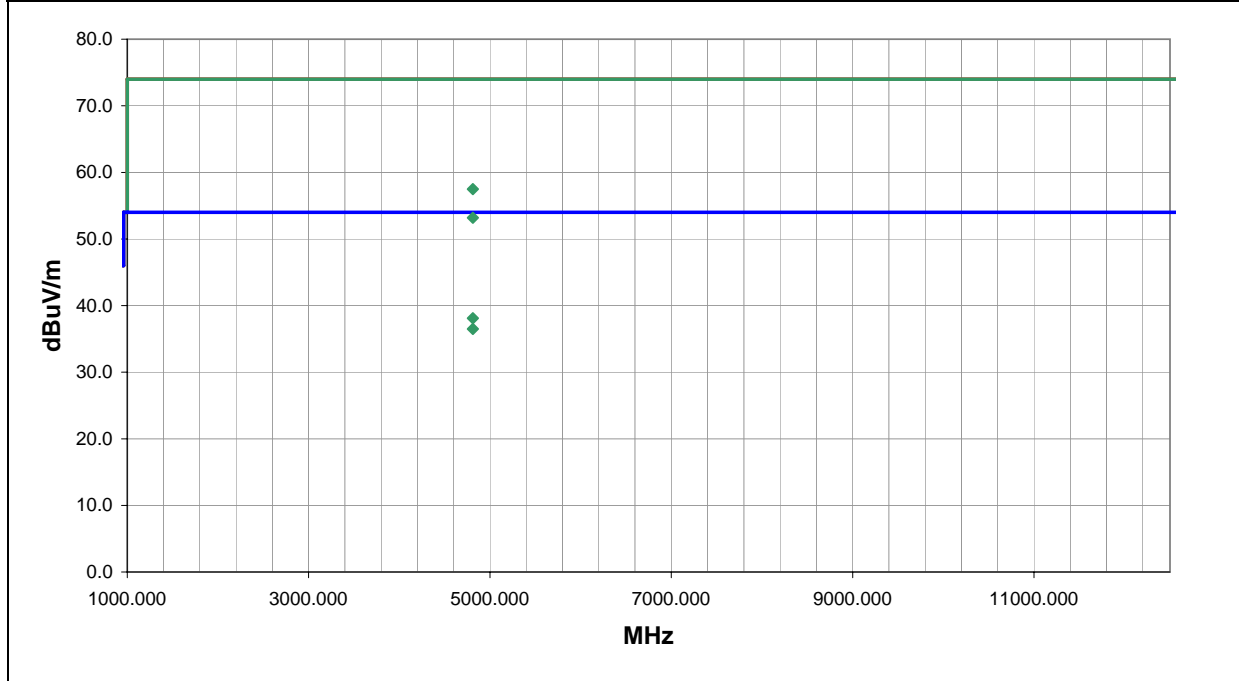
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4811.960	34.8	3.3	302.0	1.2	3.0	0.0	H-Horn	AV	0.0	38.1	54.0	-15.9
4811.960	54.2	3.3	302.0	1.2	3.0	0.0	H-Horn	PK	0.0	57.5	74.0	-16.5
4811.960	33.2	3.3	317.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.5	54.0	-17.5
4811.960	49.9	3.3	317.0	1.2	3.0	0.0	V-Horn	PK	0.0	53.2	74.0	-20.8

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

REV
df4.13
05/06/2004

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/12/04	
Customer: Intermec Technologies Corporation		**Temperature:** 72	
Attendees: Scott Holub		**Humidity:** 38%	
Cust. Ref. No.:		**Barometric Pressure** 30.19	
Tested by: Rod Peloquin	**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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 79, 802.11(b) 11, CDMA (cellular) 55

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | **10**

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)
12400.000	24.9	21.6	96.0	4.0	3.0	0.0	V-Horn	AV	0.0	46.5	54.0	-7.5
12400.000	24.8	21.6	233.0	1.3	3.0	0.0	H-Horn	AV	0.0	46.4	54.0	-7.6
12400.000	38.7	21.6	233.0	1.3	3.0	0.0	H-Horn	PK	0.0	60.3	74.0	-13.7
12400.000	38.4	21.6	96.0	4.0	3.0	0.0	V-Horn	PK	0.0	60.0	74.0	-14.0
4959.941	34.3	3.8	10.0	1.3	3.0	0.0	V-Horn	AV	0.0	38.1	54.0	-15.9
7440.000	26.5	11.0	110.0	1.3	3.0	0.0	H-Horn	AV	0.0	37.5	54.0	-16.5
7440.000	26.4	11.0	159.0	1.6	3.0	0.0	V-Horn	AV	0.0	37.4	54.0	-16.6
4959.941	32.2	3.8	145.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.0	54.0	-18.0
4959.941	49.3	3.8	10.0	1.3	3.0	0.0	V-Horn	PK	0.0	53.1	74.0	-20.9
7440.000	39.8	11.0	110.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.8	74.0	-23.2
7440.000	39.7	11.0	159.0	1.6	3.0	0.0	V-Horn	PK	0.0	50.7	74.0	-23.3
4959.941	46.8	3.8	145.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.6	74.0	-23.4

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/12/04	
Customer: Intermec Technologies Corporation		**Temperature:** 72	
Attendees: Scott Holub		**Humidity:** 38%	
Cust. Ref. No.:		**Barometric Pressure** 30.19	
Tested by: Rod Peloquin	**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

Radio in 700C SN 05400400869

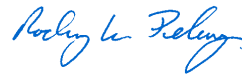## EUT OPERATING MODES

Bluetooth 79, 802.11(b) 11, CDMA (cellular) 54

DEVIATIONS FROM TEST STANDARD
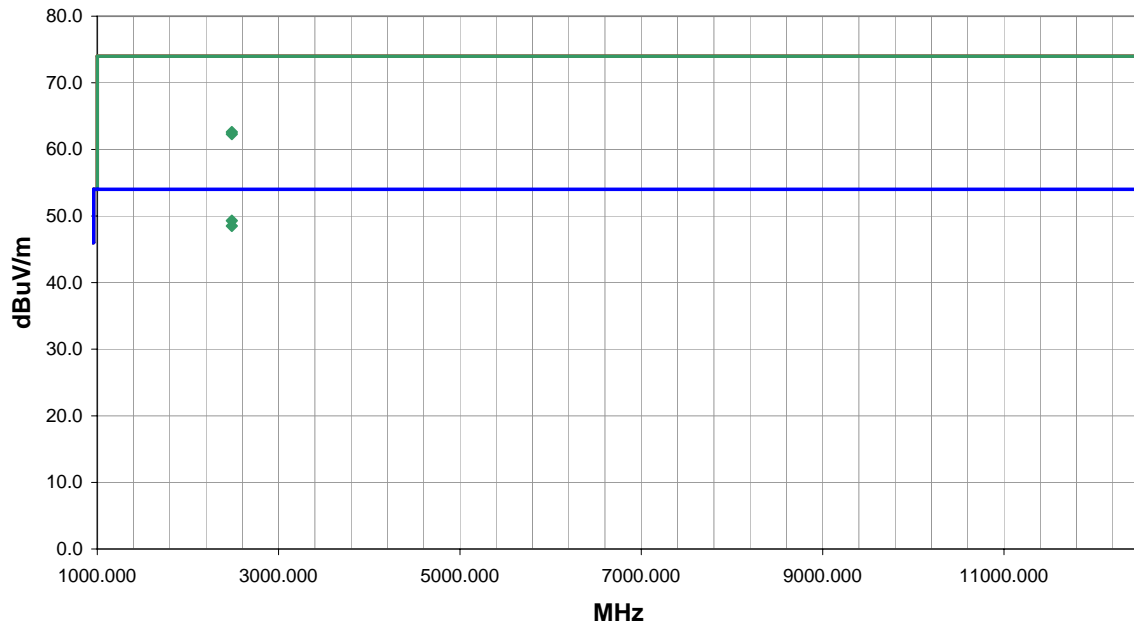
No deviations.

RESULTS

	Run #
Pass	11

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.523	31.8	-2.5	352.0	2.0	3.0	20.0	H-Horn	AV	0.0	49.3	54.0	-4.7
2483.523	31.0	-2.5	127.0	1.5	3.0	20.0	V-Horn	AV	0.0	48.5	54.0	-5.5
2484.500	45.1	-2.5	128.0	1.5	3.0	20.0	V-Horn	PK	0.0	62.6	74.0	-11.4
2484.500	44.8	-2.5	352.0	2.0	3.0	20.0	H-Horn	PK	0.0	62.3	74.0	-11.7

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
Tested by:	Rod Peloquin	**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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (cellular) 467
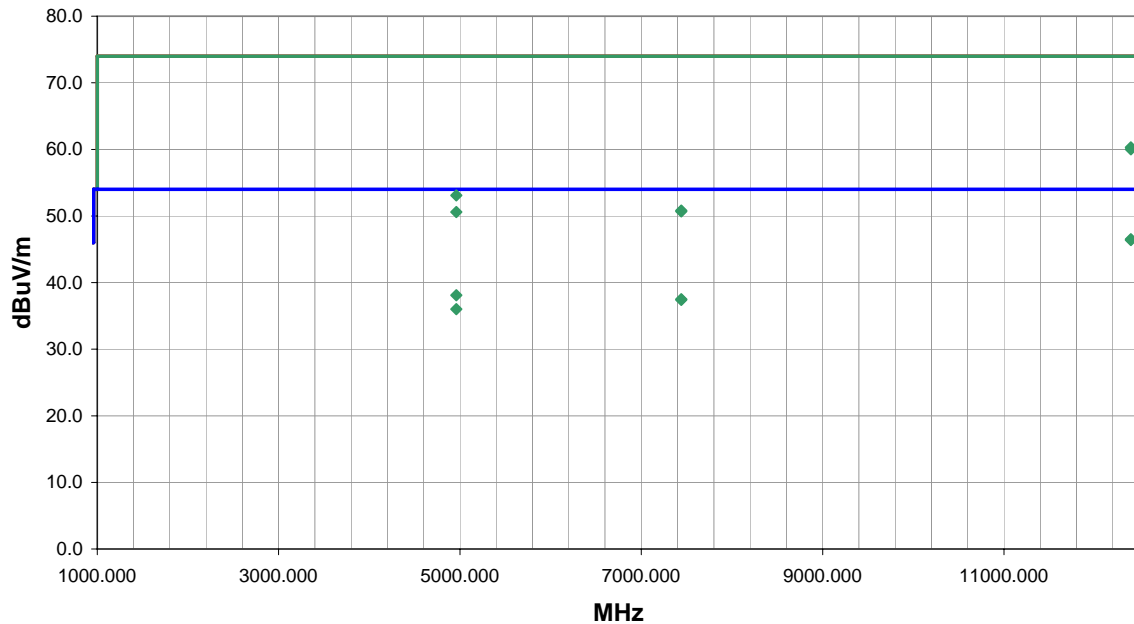
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | 12

Other

Tested By:
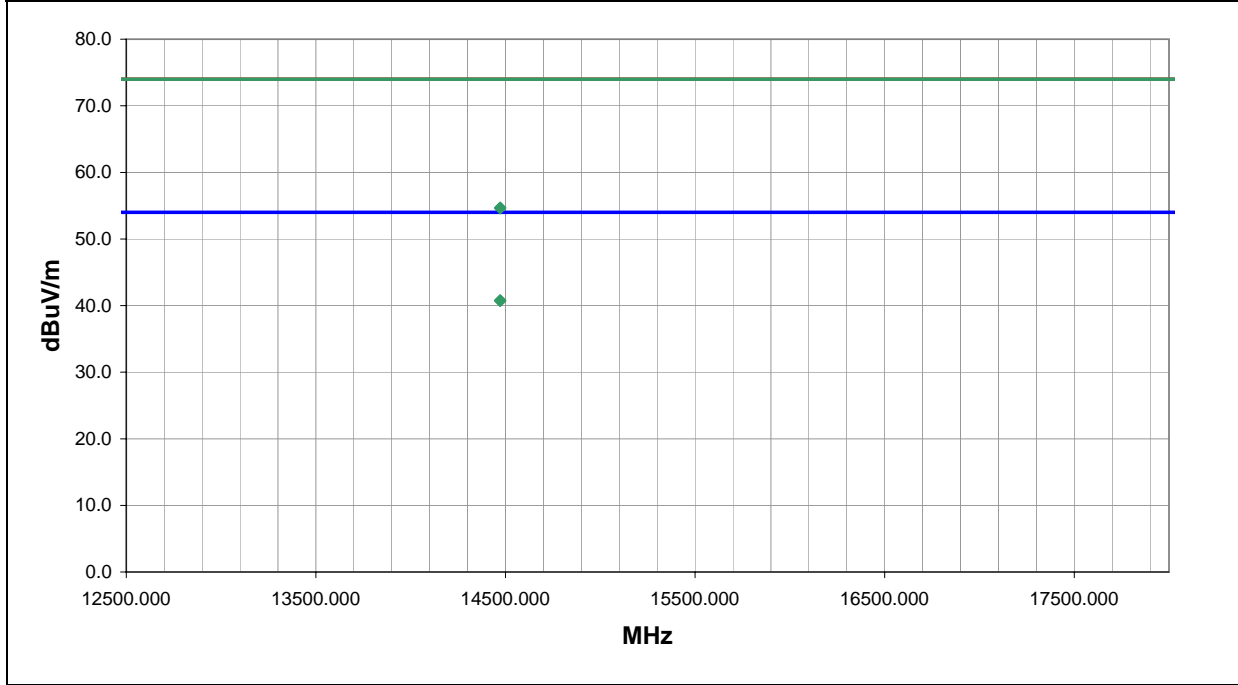
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
14472.110	27.0	13.8	110.0	1.2	3.0	0.0	V-Horn	AV	0.0	40.8	54.0	-13.2
14472.110	26.9	13.8	230.0	2.3	3.0	0.0	H-Horn	AV	0.0	40.7	54.0	-13.3
14472.110	40.9	13.8	230.0	2.3	3.0	0.0	H-Horn	PK	0.0	54.7	74.0	-19.3
14472.110	40.8	13.8	110.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.6	74.0	-19.4

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 68, 802.11(b) 11, CDMA (PCS) 35

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

Run #

Pass

13

Other

Tested By:
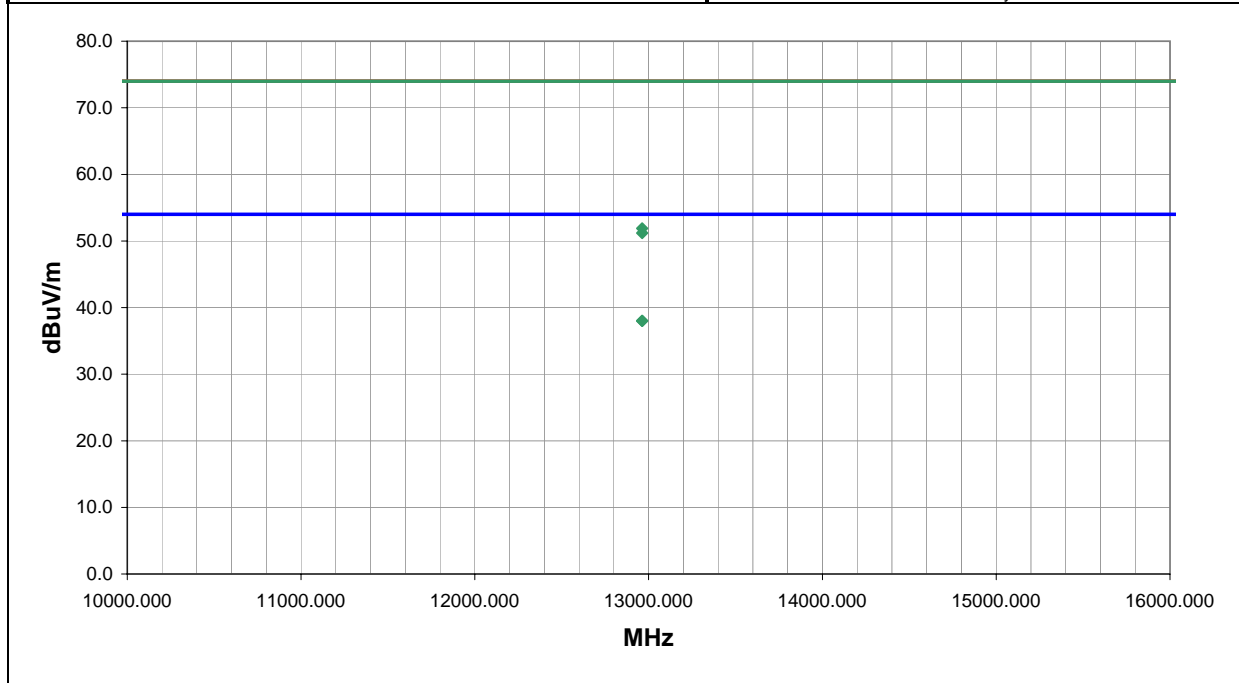
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12962.280	29.4	8.6	280.0	1.2	3.0	0.0	V-Horn	AV	0.0	38.0	54.0	-16.0
12962.280	29.4	8.6	253.0	1.3	3.0	0.0	H-Horn	AV	0.0	38.0	54.0	-16.0
12962.280	43.3	8.6	280.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.9	74.0	-22.1
12962.280	42.6	8.6	253.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.2	74.0	-22.8

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	Work Order:	ITRM0020
Serial Number:		Date:	05/12/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	Scott Holub	Humidity:	38%
Cust. Ref. No.:		Barometric Pressure	30.19
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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (PCS) 1

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Run #
Pass	14

Other

Tested By:
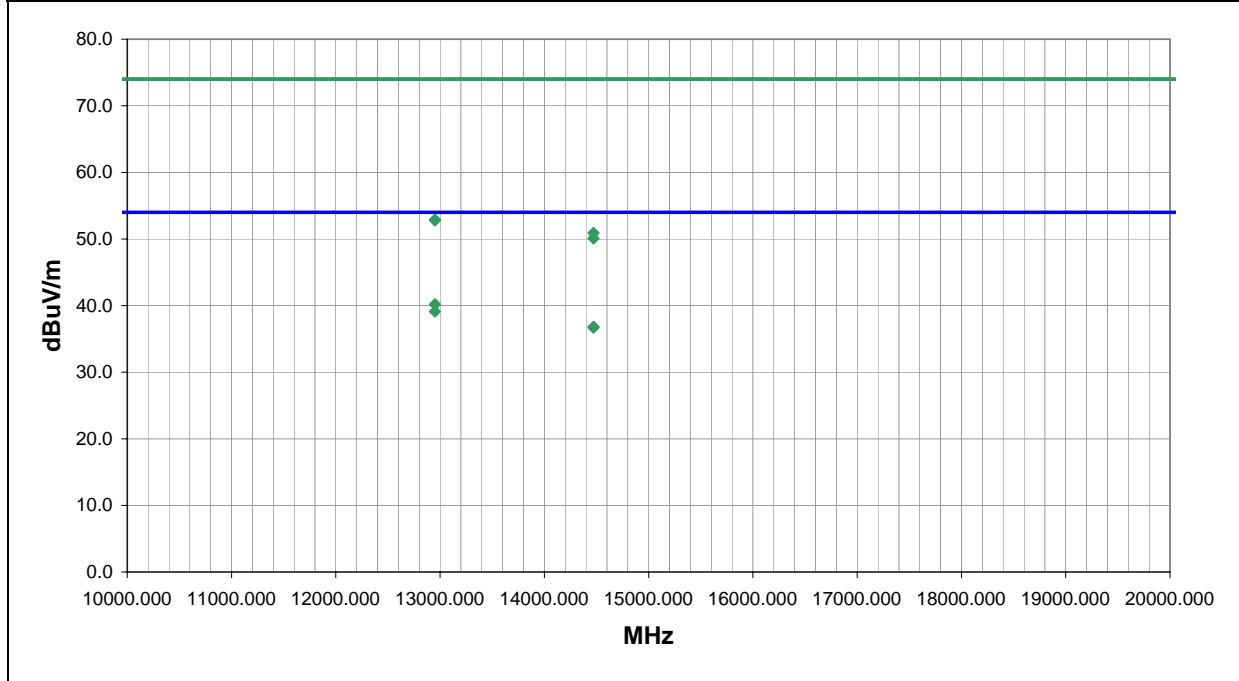
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12950.370	31.6	8.6	306.0	1.4	3.0	0.0	H-Horn	AV	0.0	40.2	54.0	-13.8
12950.370	30.5	8.6	271.0	1.4	3.0	0.0	V-Horn	AV	0.0	39.1	54.0	-14.9
14472.000	26.9	9.9	247.0	1.2	3.0	0.0	V-Horn	AV	0.0	36.8	54.0	-17.2
14472.000	26.8	9.9	338.0	2.3	3.0	0.0	H-Horn	AV	0.0	36.7	54.0	-17.3
12950.370	44.3	8.6	306.0	1.4	3.0	0.0	H-Horn	PK	0.0	52.9	74.0	-21.1
12950.370	44.2	8.6	271.0	1.4	3.0	0.0	V-Horn	PK	0.0	52.8	74.0	-21.2
14472.000	41.0	9.9	338.0	2.3	3.0	0.0	H-Horn	PK	0.0	50.9	74.0	-23.1
14472.000	40.2	9.9	247.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.1	74.0	-23.9

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	Work Order:	ITRM0020
Serial Number:		Date:	05/12/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	Scott Holub	Humidity:	38%
Cust. Ref. No.:		Barometric Pressure	30.19
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

Radio in 700C SN 05400400869

**EUT OPERATING MODES**

Bluetooth 11, 802.11(b) 1, CDMA (PCS) 1

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS   **Run #**

Pass   15

Other

Tested By:
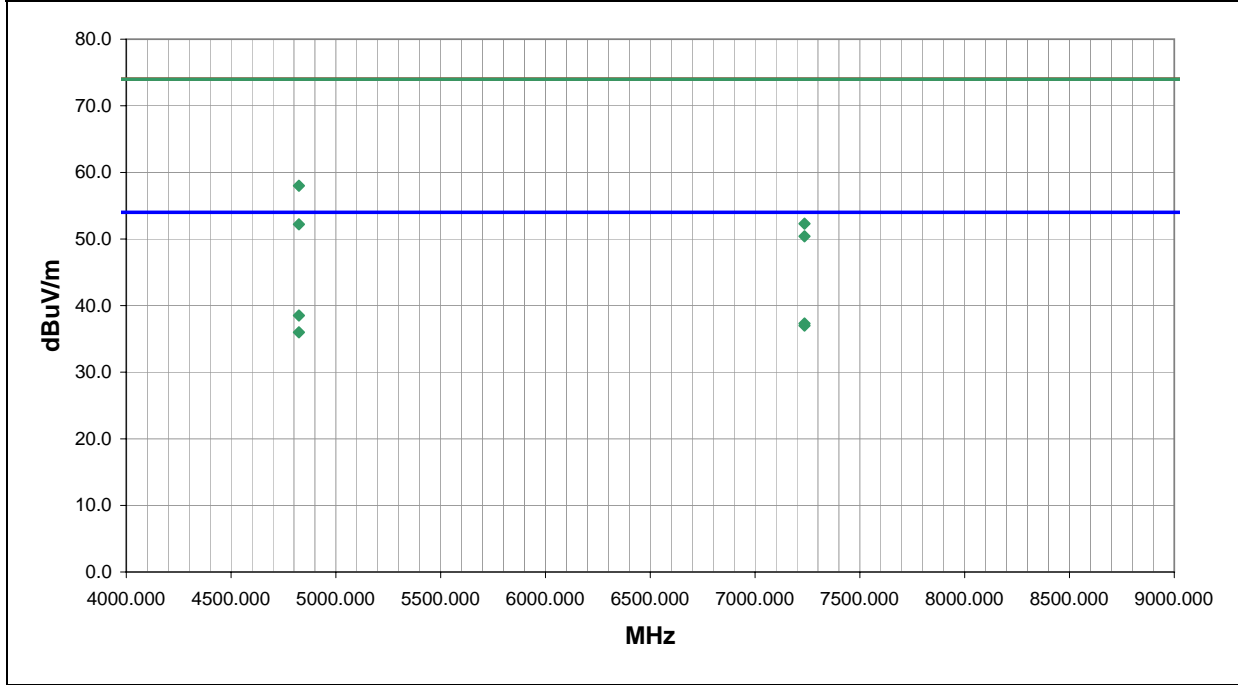
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4823.962	35.1	3.4	331.0	1.1	3.0	0.0	H-Horn	AV	0.0	38.5	54.0	-15.5
4823.962	54.6	3.4	331.0	1.1	3.0	0.0	H-Horn	PK	0.0	58.0	74.0	-16.0
7236.000	26.9	10.4	17.0	2.1	3.0	0.0	V-Horn	AV	0.0	37.3	54.0	-16.7
7236.000	26.6	10.4	50.0	1.3	3.0	0.0	H-Horn	AV	0.0	37.0	54.0	-17.0
4823.962	32.6	3.4	270.0	1.3	3.0	0.0	V-Horn	AV	0.0	36.0	54.0	-18.0
7236.000	41.9	10.4	17.0	2.1	3.0	0.0	V-Horn	PK	0.0	52.3	74.0	-21.7
4823.962	48.8	3.4	270.0	1.3	3.0	0.0	V-Horn	PK	0.0	52.2	74.0	-21.8
7236.000	40.0	10.4	50.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.4	74.0	-23.6

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (PCS) 1153

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | 16

Other

Tested By: *Holly Ashkannejhad*
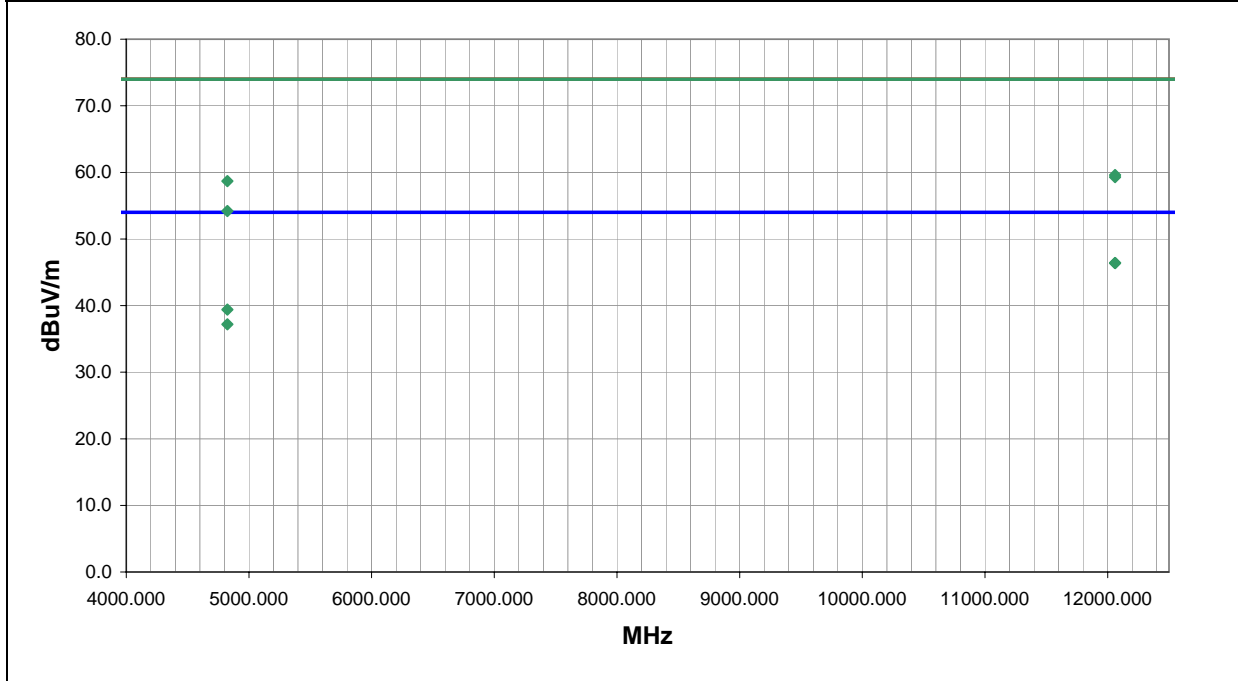
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12060.000	25.8	20.6	192.0	1.2	3.0	0.0	V-Horn	AV	0.0	46.4	54.0	-7.6
12060.000	25.8	20.6	338.0	1.3	3.0	0.0	H-Horn	AV	0.0	46.4	54.0	-7.6
12060.000	39.0	20.6	192.0	1.2	3.0	0.0	V-Horn	PK	0.0	59.6	74.0	-14.4
4823.929	36.0	3.4	333.0	1.1	3.0	0.0	H-Horn	AV	0.0	39.4	54.0	-14.6
12060.000	38.7	20.6	338.0	1.3	3.0	0.0	H-Horn	PK	0.0	59.3	74.0	-14.7
4823.929	55.3	3.4	333.0	1.1	3.0	0.0	H-Horn	PK	0.0	58.7	74.0	-15.3
4823.929	33.8	3.4	289.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.2	54.0	-16.8
4823.929	50.8	3.4	289.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.2	74.0	-19.8

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/12/04	
Customer: Intermec Technologies Corporation		**Temperature:** 72	
Attendees: Scott Holub		**Humidity:** 38%	
Cust. Ref. No.:		**Barometric Pressure** 30.19	
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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 68, 802.11(b) 11, CDMA (PCS) 35

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | **17**

Other

Tested By: _Holly Ashkannejhad_
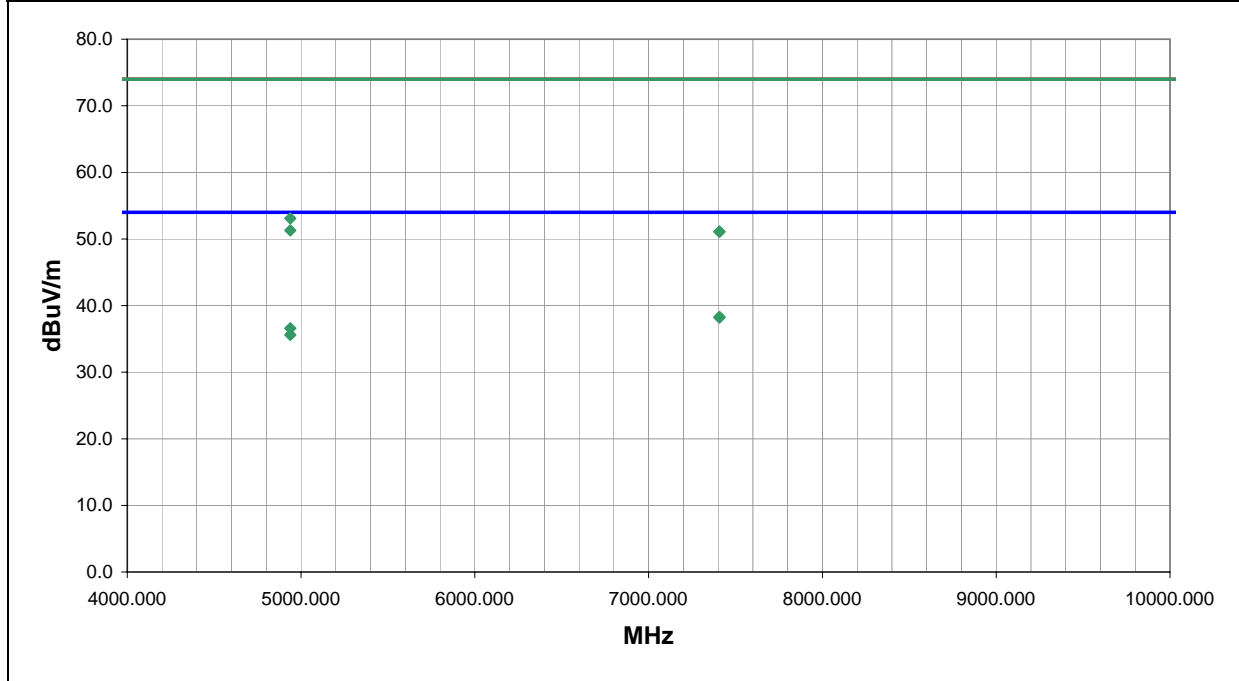
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7407.000	27.3	11.0	61.0	1.3	3.0	0.0	H-Horn	AV	0.0	38.3	54.0	-15.7
7407.000	27.2	11.0	46.0	1.2	3.0	0.0	V-Horn	AV	0.0	38.2	54.0	-15.8
4937.960	32.9	3.7	330.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.6	54.0	-17.4
4937.960	31.9	3.7	14.0	1.6	3.0	0.0	V-Horn	AV	0.0	35.6	54.0	-18.4
4937.960	49.4	3.7	330.0	1.3	3.0	0.0	H-Horn	PK	0.0	53.1	74.0	-20.9
4937.960	47.6	3.7	14.0	1.6	3.0	0.0	V-Horn	PK	0.0	51.3	74.0	-22.7
7407.000	40.1	11.0	61.0	1.3	3.0	0.0	H-Horn	PK	0.0	51.1	74.0	-22.9
7407.000	40.1	11.0	46.0	1.2	3.0	0.0	V-Horn	PK	0.0	51.1	74.0	-22.9

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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:**	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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (cellular) 467

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | **18**

Other

Holly Ashkannejhad (signature)

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
19296.000	25.1	8.0	-2.0	1.0	3.0	0.0	H-High Horn	AV	0.0	33.1	54.0	-20.9
19296.000	25.1	8.0	-2.0	1.0	3.0	0.0	V-High Horn	AV	0.0	33.1	54.0	-20.9
19296.000	38.2	8.0	-2.0	1.0	3.0	0.0	H-High Horn	PK	0.0	46.2	74.0	-27.8
19296.000	37.5	8.0	-2.0	1.0	3.0	0.0	V-High Horn	PK	0.0	45.5	74.0	-28.5

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	Work Order:	ITRM0020
Serial Number:		Date:	05/12/04
Customer:	Intermec Technologies Corporation	Temperature:	72
Attendees:	Scott Holub	Humidity:	38%
Cust. Ref. No.:		Barometric Pressure	30.19
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:	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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 5, 802.11(b) 1, CDMA (cellular) 395

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS — Run #

Pass — 19

Other

Tested By:
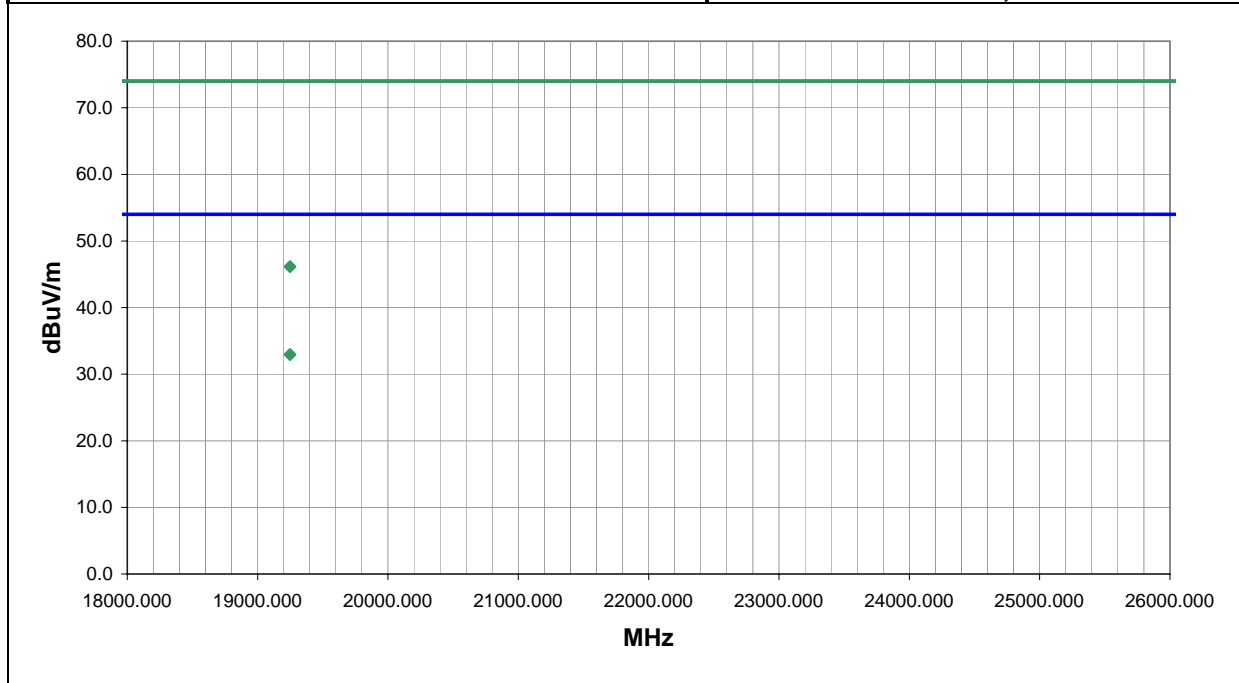
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
19248.000	25.2	7.8	362.0	1.0	3.0	0.0	V-High Horn	AV	0.0	33.0	54.0	-21.0
19248.000	25.1	7.8	-2.0	1.0	3.0	0.0	H-High Horn	AV	0.0	32.9	54.0	-21.1
19248.000	38.4	7.8	362.0	1.0	3.0	0.0	V-High Horn	PK	0.0	46.2	74.0	-27.8
19248.000	38.3	7.8	-2.0	1.0	3.0	0.0	H-High Horn	PK	0.0	46.1	74.0	-27.9

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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:**	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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 79, 802.11(b) 11, CDMA (cellular) 55
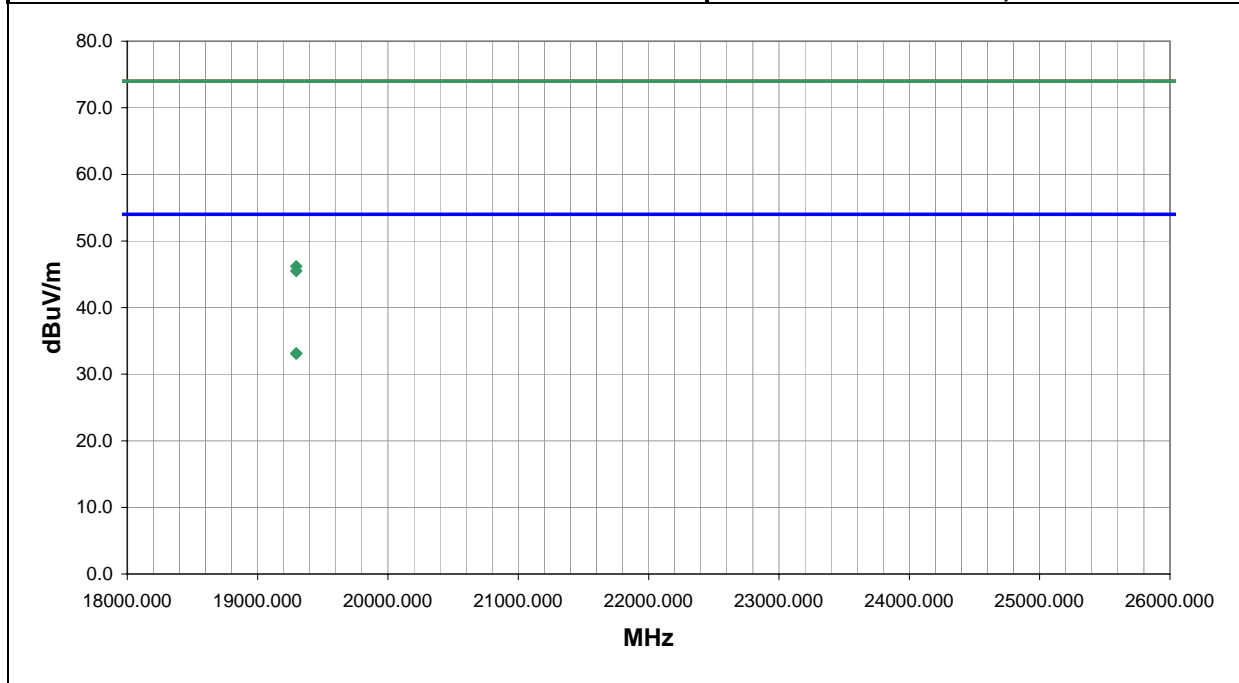
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS **Run #**

Pass 20

Other

Tested By: _Holly Ashkannejhad_
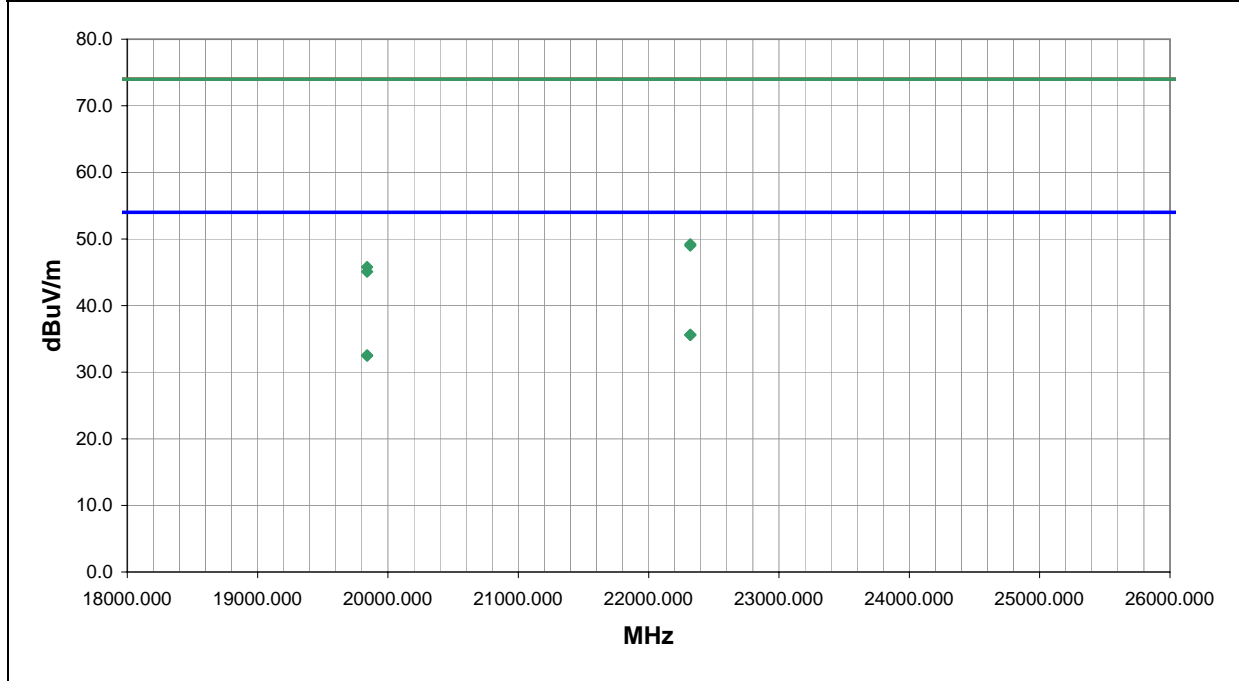
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
22320.000	26.4	9.2	361.0	1.0	3.0	0.0	H-High Horr	AV	0.0	35.6	54.0	-18.4
22320.000	26.4	9.2	-2.0	1.0	3.0	0.0	V-High Horr	AV	0.0	35.6	54.0	-18.4
19840.000	23.6	8.9	0.0	1.0	3.0	0.0	H-High Horr	AV	0.0	32.5	54.0	-21.5
19840.000	23.6	8.9	361.0	1.0	3.0	0.0	V-High Horr	AV	0.0	32.5	54.0	-21.5
22320.000	40.0	9.2	-2.0	1.0	3.0	0.0	V-High Horr	PK	0.0	49.2	74.0	-24.8
22320.000	39.8	9.2	361.0	1.0	3.0	0.0	H-High Horr	PK	0.0	49.0	74.0	-25.0
19840.000	36.9	8.9	0.0	1.0	3.0	0.0	H-High Horr	PK	0.0	45.8	74.0	-28.2
19840.000	36.2	8.9	361.0	1.0	3.0	0.0	V-High Horr	PK	0.0	45.1	74.0	-28.9

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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:**	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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 11, 802.11(b) 1, CDMA (PCS) 1153

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | 21

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)
19296.000	25.1	8.0	-2.0	1.0	3.0	0.0	I-High Horn	AV	0.0	33.1	54.0	-20.9
19296.000	25.0	8.0	361.0	1.0	3.0	0.0	V-High Horn	AV	0.0	33.0	54.0	-21.0
19296.000	37.2	8.0	-2.0	1.0	3.0	0.0	I-High Horn	PK	0.0	45.2	74.0	-28.8
19296.000	37.1	8.0	361.0	1.0	3.0	0.0	V-High Horn	PK	0.0	45.1	74.0	-28.9

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/12/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
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:**	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
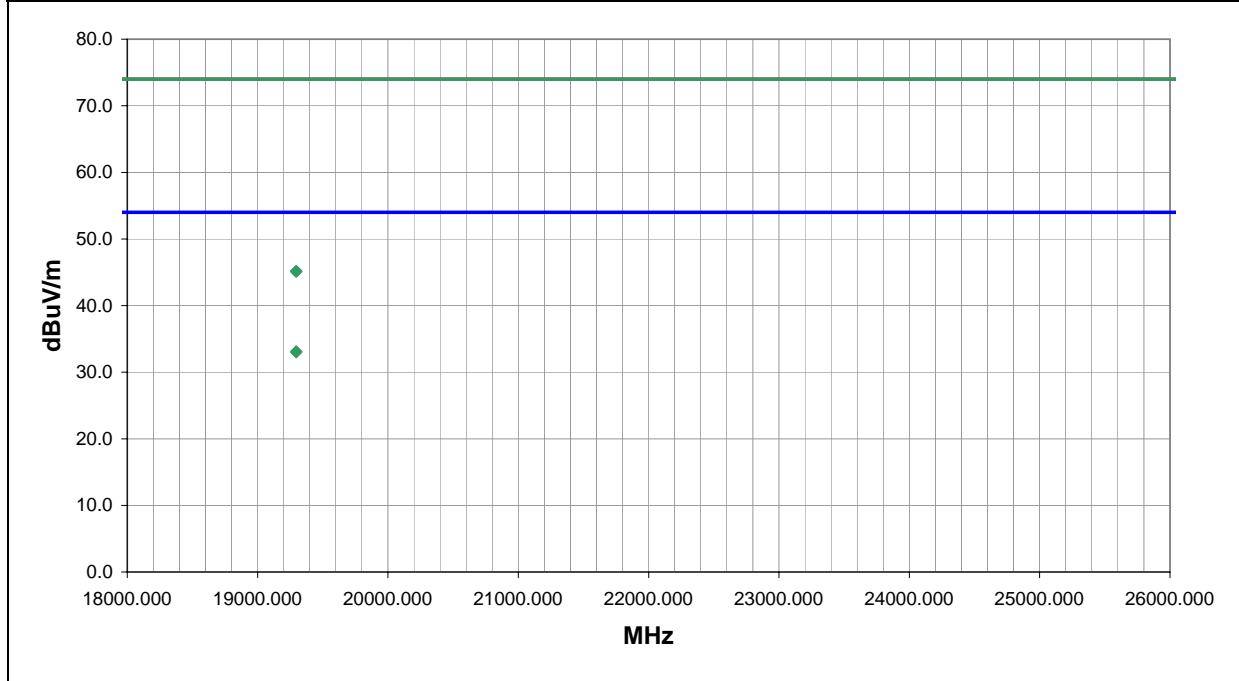
COMMENTS

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 68, 802.11(b) 11, CDMA (PCS) 35

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS — **Run #**

Pass — 22

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
22221.000	26.5	9.0	360.0	1.0	3.0	0.0	V-High Horn	AV	0.0	35.5	54.0	-18.5
22221.000	26.4	9.0	-1.0	1.0	3.0	0.0	H-High Horn	AV	0.0	35.4	54.0	-18.6
22221.000	38.8	9.0	-1.0	1.0	3.0	0.0	H-High Horn	PK	0.0	47.8	74.0	-26.2
22221.000	38.6	9.0	360.0	1.0	3.0	0.0	V-High Horn	PK	0.0	47.6	74.0	-26.4

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/13/04
Customer:	Intermec Technologies Corporation	**Temperature:**	72
Attendees:	Scott Holub	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.19
Tested by:	Rod Peloquin	**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

Radio in 700C SN 05400400869

EUT OPERATING MODES

Bluetooth 62, 802.11(b) 11, CDMA (PCS) 1153
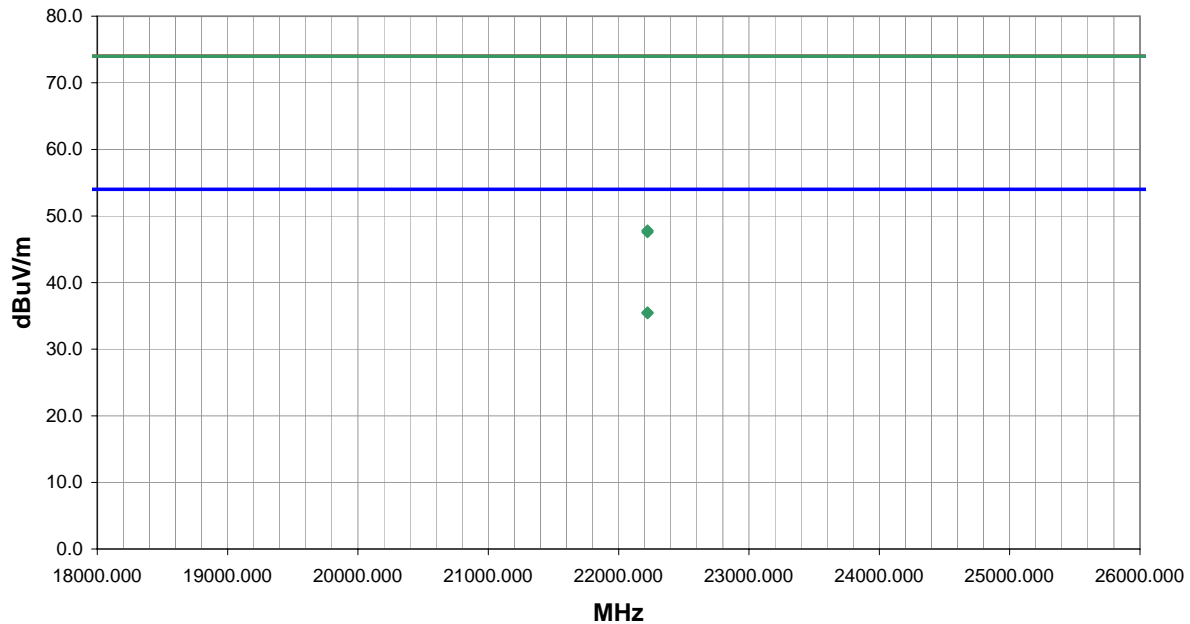
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS | **Run #**

Pass | 23

Other

Tested By:
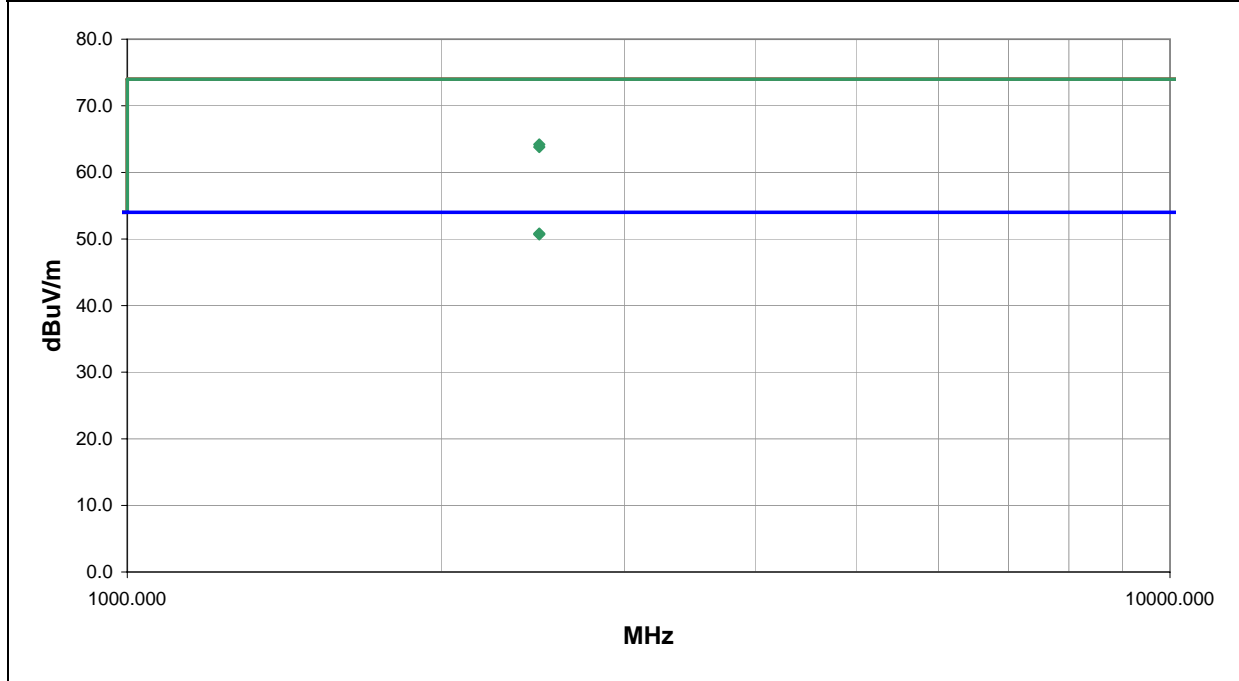
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.537	27.3	-2.5	75.0	1.7	3.0	26.0	H-Horn	AV	0.0	50.8	54.0	-3.2
2483.537	27.2	-2.5	106.0	3.8	3.0	26.0	V-Horn	AV	0.0	50.7	54.0	-3.3
2483.537	40.7	-2.5	75.0	1.7	3.0	26.0	H-Horn	PK	0.0	64.2	74.0	-9.8
2483.537	40.3	-2.5	106.0	3.8	3.0	26.0	V-Horn	PK	0.0	63.8	74.0	-10.2

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/16/04	
Customer: Intermec Technologies Corporation		**Temperature:** 68	
Attendees: None		**Humidity:** 39%	
Cust. Ref. No.:		**Barometric Pressure** 30.01	
Tested by: Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec 700C

EUT OPERATING MODES

Bluetooth 80, 802.11b 11, GSM 606 in 700C.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS **Run #**

Pass **23A**

Other

Tested By:
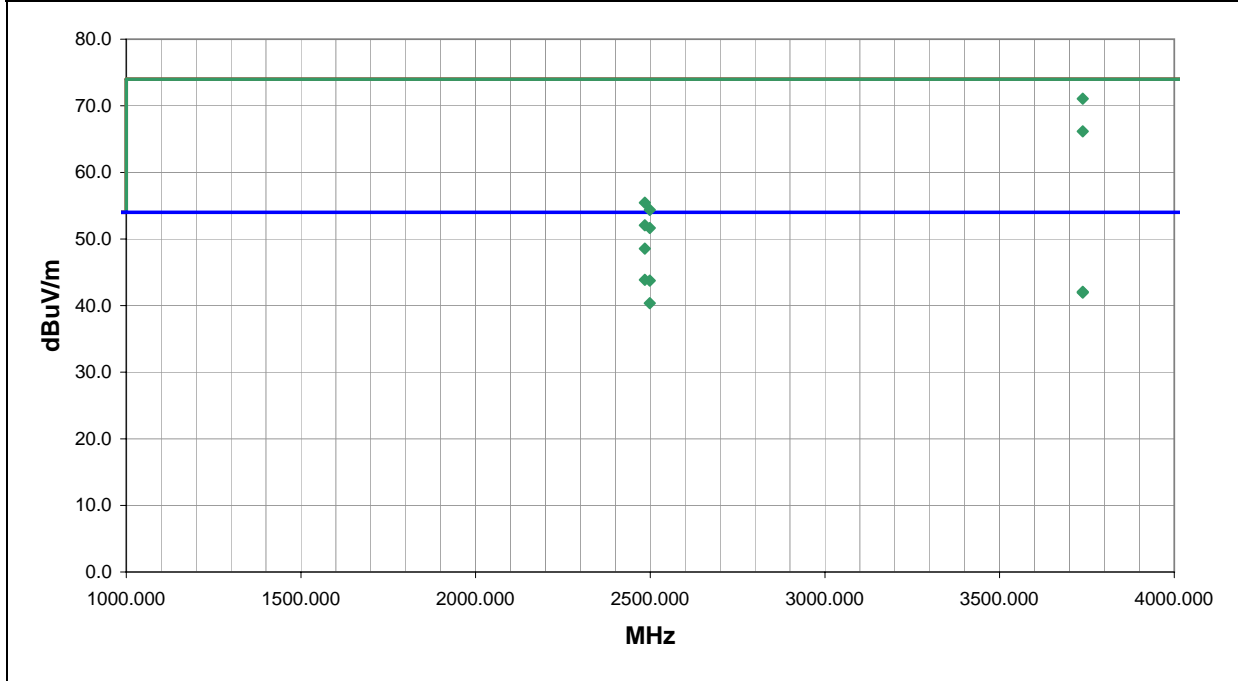
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
3738.060	46.6	34.0	73.0	1.3	1.0	0.0	V-Horn	PK	-9.5	71.1	74.0	-2.9
2484.220	28.4	29.7	191.0	1.1	1.0	0.0	V-Horn	AV	-9.5	48.6	54.0	-5.4
3738.060	41.7	34.0	304.0	1.5	1.0	0.0	H-Horn	PK	-9.5	66.2	74.0	-7.8
2484.220	23.7	29.7	91.0	1.3	1.0	0.0	H-Horn	AV	-9.5	43.9	54.0	-10.1
2498.830	23.5	29.8	183.0	1.2	1.0	0.0	V-Horn	AV	-9.5	43.8	54.0	-10.2
3738.060	17.6	34.0	304.0	1.5	1.0	0.0	H-Horn	AV	-9.5	42.1	54.0	-11.9
3738.060	17.5	34.0	73.0	1.3	1.0	0.0	V-Horn	AV	-9.5	42.0	54.0	-12.0
2498.830	20.1	29.8	91.0	1.3	1.0	0.0	H-Horn	AV	-9.5	40.4	54.0	-13.6
2484.220	35.3	29.7	191.0	1.1	1.0	0.0	V-Horn	PK	-9.5	55.5	74.0	-18.5
2498.830	34.1	29.8	183.0	1.2	1.0	0.0	V-Horn	PK	-9.5	54.4	74.0	-19.6
2484.220	31.9	29.7	91.0	1.3	1.0	0.0	H-Horn	PK	-9.5	52.1	74.0	-21.9
2498.830	31.4	29.8	91.0	1.3	1.0	0.0	H-Horn	PK	-9.5	51.7	74.0	-22.3

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	Work Order:	ITRM0020
Serial Number:	4004703	Date:	05/16/04
Customer:	Intermec Technologies Corporation	Temperature:	68
Attendees:	None	Humidity:	39%
Cust. Ref. No.:		Barometric Pressure	30.01
Tested by:	Greg Kiemel	Power: 120 V, 60 Hz	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

EUT installed in Intermec Model 700C

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)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
19296.000	24.9	8.0	360.0	1.1	3.0	0.0	H-High Horn	AV	0.0	32.9	54.0	-21.1
19296.000	24.5	8.0	-1.0	1.0	3.0	0.0	V-High Horn	AV	0.0	32.5	54.0	-21.5
18522.350	24.6	7.0	360.0	1.0	3.0	0.0	H-High Horn	AV	0.0	31.6	54.0	-22.4
18522.350	24.4	7.0	360.0	1.0	3.0	0.0	V-High Horn	AV	0.0	31.4	54.0	-22.6
19296.000	36.0	8.0	-1.0	1.0	3.0	0.0	V-High Horn	PK	0.0	44.0	74.0	-30.0
18522.350	37.0	7.0	360.0	1.0	3.0	0.0	H-High Horn	PK	0.0	44.0	74.0	-30.0
19296.000	35.0	8.0	360.0	1.1	3.0	0.0	H-High Horn	PK	0.0	43.0	74.0	-31.0
18522.350	35.5	7.0	360.0	1.0	3.0	0.0	V-High Horn	PK	0.0	42.5	74.0	-31.5

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/16/04
Customer:	Intermec Technologies Corporation	**Temperature:**	75
Attendees:	None	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	30.01
Tested by:	Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth 11, 802.11b 1, GSM 516 in 700C.
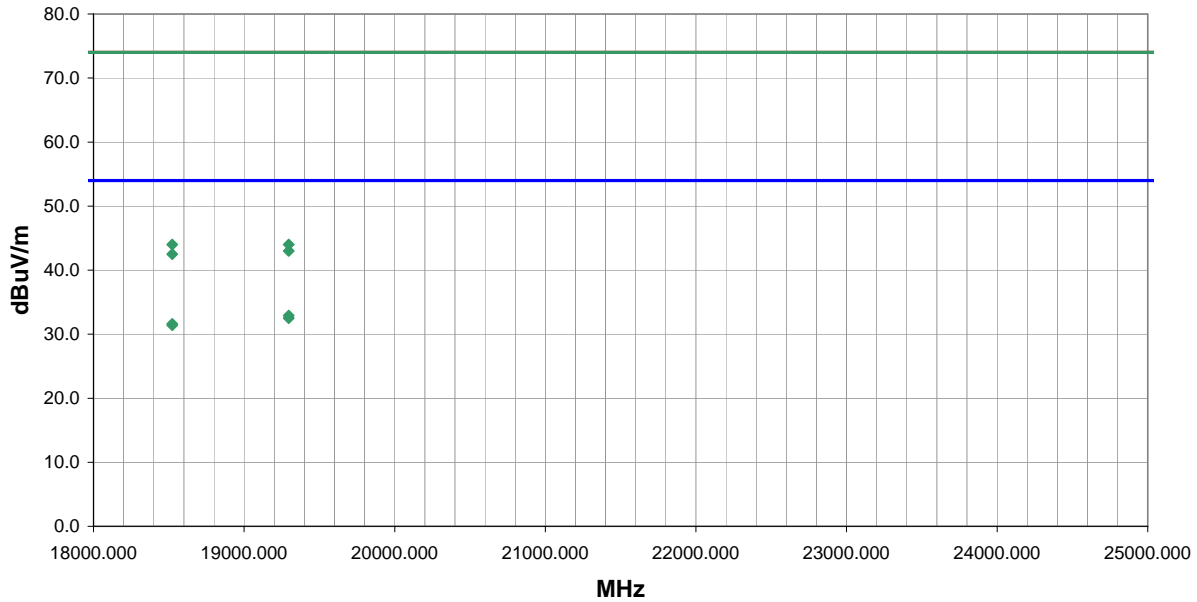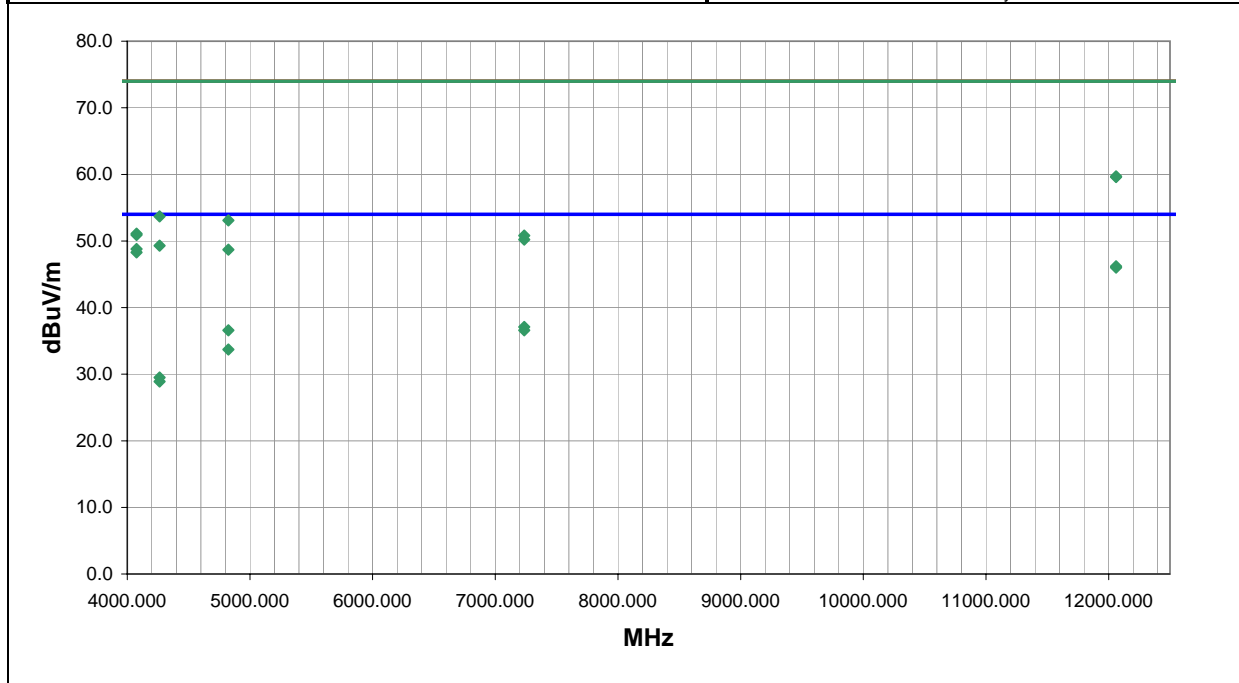
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS — **Run #**

Pass — 25

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4075.979	46.3	2.5	168.0	1.2	3.0	0.0	H-Horn	AV	0.0	48.8	54.0	-5.2
4075.979	45.8	2.5	274.0	1.3	3.0	0.0	V-Horn	AV	0.0	48.3	54.0	-5.7
12060.000	25.6	20.6	204.0	3.1	3.0	0.0	V-Horn	AV	0.0	46.2	54.0	-7.8
12060.000	25.4	20.6	138.0	2.4	3.0	0.0	H-Horn	AV	0.0	46.0	54.0	-8.0
12060.000	39.1	20.6	138.0	2.4	3.0	0.0	H-Horn	PK	0.0	59.7	74.0	-14.3
12060.000	39.0	20.6	204.0	3.1	3.0	0.0	V-Horn	PK	0.0	59.6	74.0	-14.4
7236.000	26.7	10.4	149.0	1.2	3.0	0.0	V-Horn	AV	0.0	37.1	54.0	-16.9
4823.935	33.2	3.4	139.0	1.7	3.0	0.0	V-Horn	AV	0.0	36.6	54.0	-17.4
7236.000	26.2	10.4	234.0	1.3	3.0	0.0	H-Horn	AV	0.0	36.6	54.0	-17.4
4262.958	51.2	2.5	157.0	1.8	3.0	0.0	V-Horn	PK	0.0	53.7	74.0	-20.3
4823.935	30.3	3.4	59.0	1.4	3.0	0.0	H-Horn	AV	0.0	33.7	54.0	-20.3
4823.935	49.7	3.4	139.0	1.7	3.0	0.0	V-Horn	PK	0.0	53.1	74.0	-20.9
4075.979	48.6	2.5	168.0	1.2	3.0	0.0	H-Horn	PK	0.0	51.1	74.0	-22.9
4075.979	48.4	2.5	274.0	1.3	3.0	0.0	V-Horn	PK	0.0	50.9	74.0	-23.1
7236.000	40.4	10.4	149.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2
7236.000	39.8	10.4	234.0	1.3	3.0	0.0	H-Horn	PK	0.0	50.2	74.0	-23.8
4262.958	27.0	2.5	157.0	1.8	3.0	0.0	V-Horn	AV	0.0	29.5	54.0	-24.5
4262.958	46.8	2.5	293.0	1.3	3.0	0.0	H-Horn	PK	0.0	49.3	74.0	-24.7
4262.958	26.4	2.5	293.0	1.3	3.0	0.0	H-Horn	AV	0.0	28.9	54.0	-25.1
4823.935	45.3	3.4	59.0	1.4	3.0	0.0	H-Horn	PK	0.0	48.7	74.0	-25.3

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/17/04	
Customer: Intermec Technologies Corporation		**Temperature:** 72	
Attendees: None		**Humidity:** 42%	
Cust. Ref. No.:		**Barometric Pressure** 30.05	
Tested by: Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

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

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Run #
Pass	
	26

Other

Tested By:
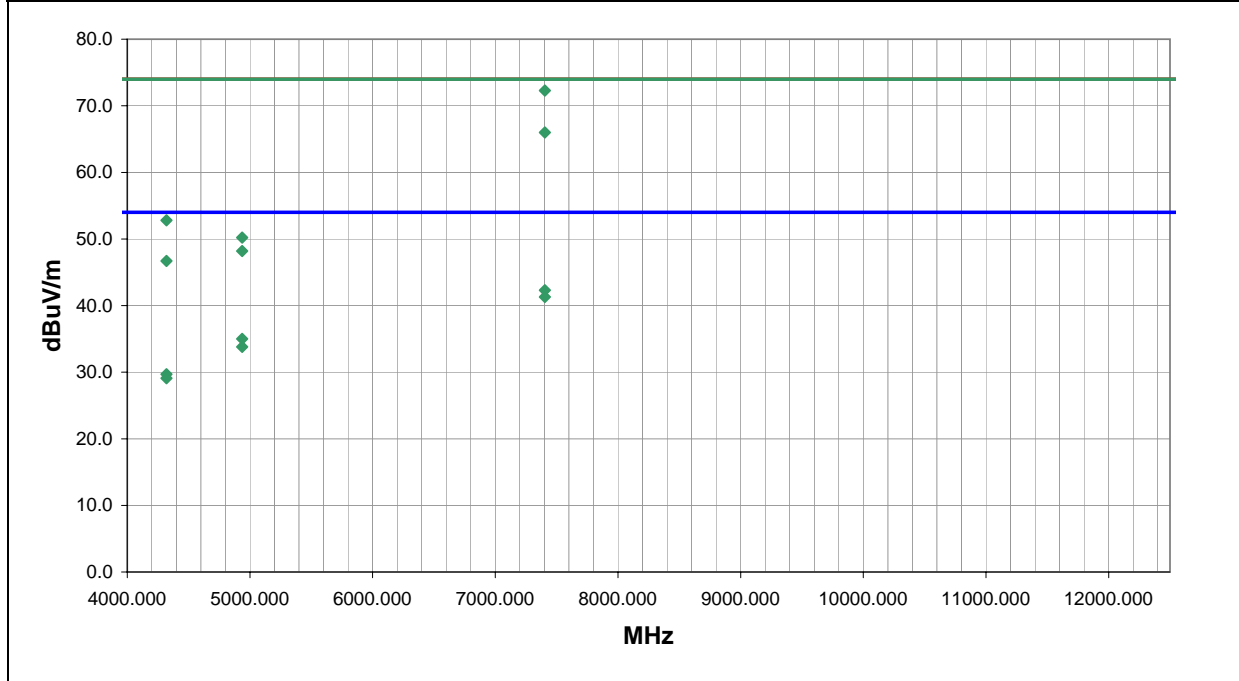
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7404.005	61.3	11.0	154.0	1.1	3.0	0.0	V-Horn	PK	0.0	72.3	74.0	-1.7
7404.005	55.0	11.0	123.0	1.4	3.0	0.0	H-Horn	PK	0.0	66.0	74.0	-8.0
7404.005	31.3	11.0	154.0	1.1	3.0	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7
7404.005	30.3	11.0	123.0	1.4	3.0	0.0	H-Horn	AV	0.0	41.3	54.0	-12.7
4935.961	31.3	3.7	132.0	1.2	3.0	0.0	V-Horn	AV	0.0	35.0	54.0	-19.0
4935.961	30.1	3.7	81.0	1.3	3.0	0.0	H-Horn	AV	0.0	33.8	54.0	-20.2
4318.977	50.4	2.4	119.0	1.3	3.0	0.0	V-Horn	PK	0.0	52.8	74.0	-21.2
4935.961	46.5	3.7	132.0	1.2	3.0	0.0	V-Horn	PK	0.0	50.2	74.0	-23.8
4318.977	27.3	2.4	119.0	1.3	3.0	0.0	V-Horn	AV	0.0	29.7	54.0	-24.3
4318.977	26.7	2.4	115.0	1.8	3.0	0.0	H-Horn	AV	0.0	29.1	54.0	-24.9
4935.961	44.5	3.7	81.0	1.3	3.0	0.0	H-Horn	PK	0.0	48.2	74.0	-25.8
4318.977	44.3	2.4	115.0	1.8	3.0	0.0	H-Horn	PK	0.0	46.7	74.0	-27.3

RADIATED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number: 4004703		**Date:** 05/17/04	
Customer: Intermec Technologies Corporation		**Temperature:** 75	
Attendees: None		**Humidity:** 38%	
Cust. Ref. No.:		**Barometric Pressure** 29.91	
Tested by: Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth 11, 802.11b 1, GSM 516 in 700C.

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS **Run #**

Pass 27

Other

Tested By:
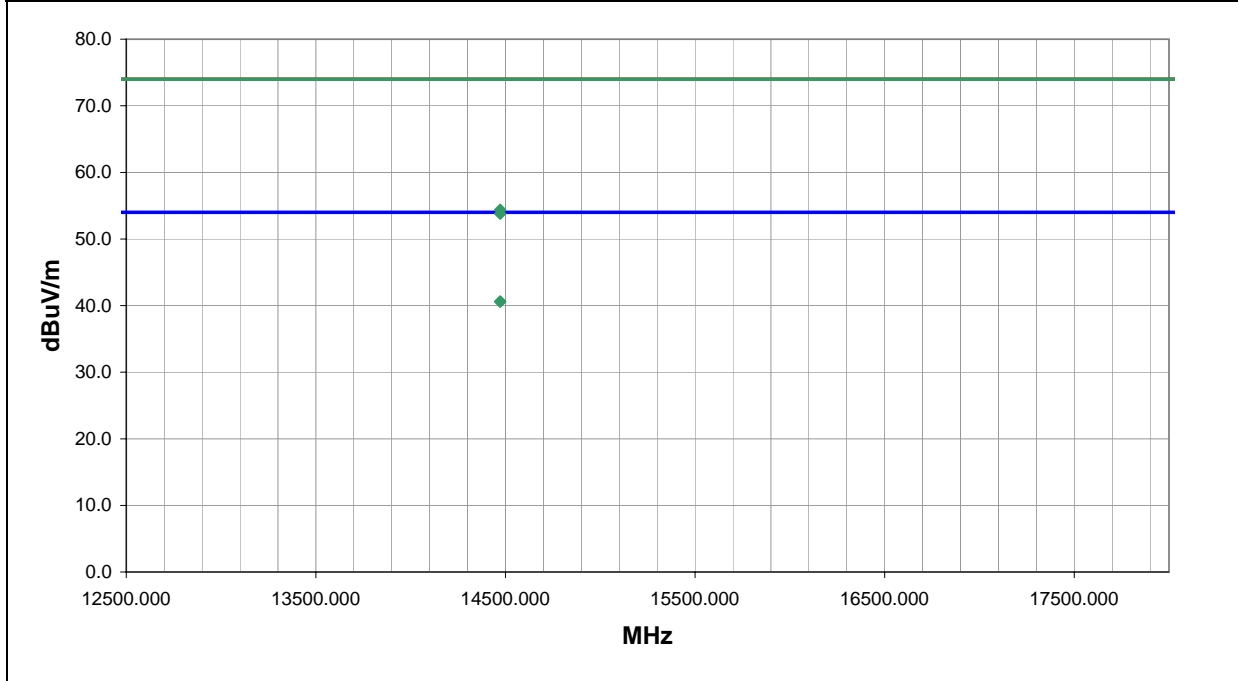
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
14472.000	26.8	13.8	187.0	1.3	3.0	0.0	H-Horn	AV	0.0	40.6	54.0	-13.4
14472.000	26.8	13.8	221.0	1.9	3.0	0.0	V-Horn	AV	0.0	40.6	54.0	-13.4
14472.000	40.6	13.8	221.0	1.9	3.0	0.0	V-Horn	PK	0.0	54.4	74.0	-19.6
14472.000	40.0	13.8	187.0	1.3	3.0	0.0	H-Horn	PK	0.0	53.8	74.0	-20.2

RADIATED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/17/04
Customer:	Intermec Technologies Corporation	**Temperature:**	75
Attendees:	None	**Humidity:**	38%
Cust. Ref. No.:		**Barometric Pressure**	29.91
Tested by:	Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

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

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS — **Run #**

Pass — **28**

Other

Tested By:
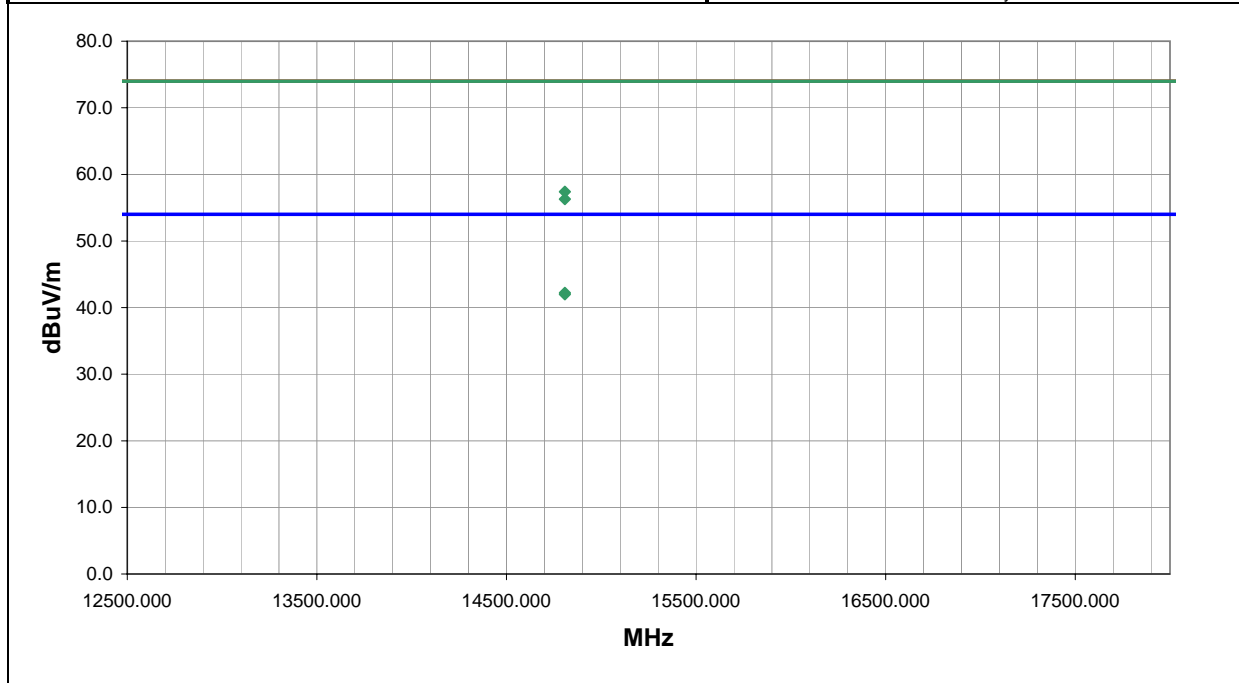
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
14808.000	28.2	14.0	176.0	1.3	3.0	0.0	H-Horn	AV	0.0	42.2	54.0	-11.8
14808.000	28.0	14.0	207.0	1.2	3.0	0.0	V-Horn	AV	0.0	42.0	54.0	-12.0
14808.000	43.4	14.0	176.0	1.3	3.0	0.0	H-Horn	PK	0.0	57.4	74.0	-16.6
14808.000	42.3	14.0	207.0	1.2	3.0	0.0	V-Horn	PK	0.0	56.3	74.0	-17.7

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

REV
df4.13
05/06/2004

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:	4004703	**Date:**	05/17/04
Customer:	Intermec Technologies Corporation	**Temperature:**	75
Attendees:	None	**Humidity:**	37%
Cust. Ref. No.:		**Barometric Pressure**	29.91
Tested by:	Greg Kiemel	**Power:** 120 V, 60 Hz	**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

EUT installed in Intermec Model 700C

**EUT OPERATING MODES**

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

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS — **Run #**

Pass — **29**

Other

Tested By:
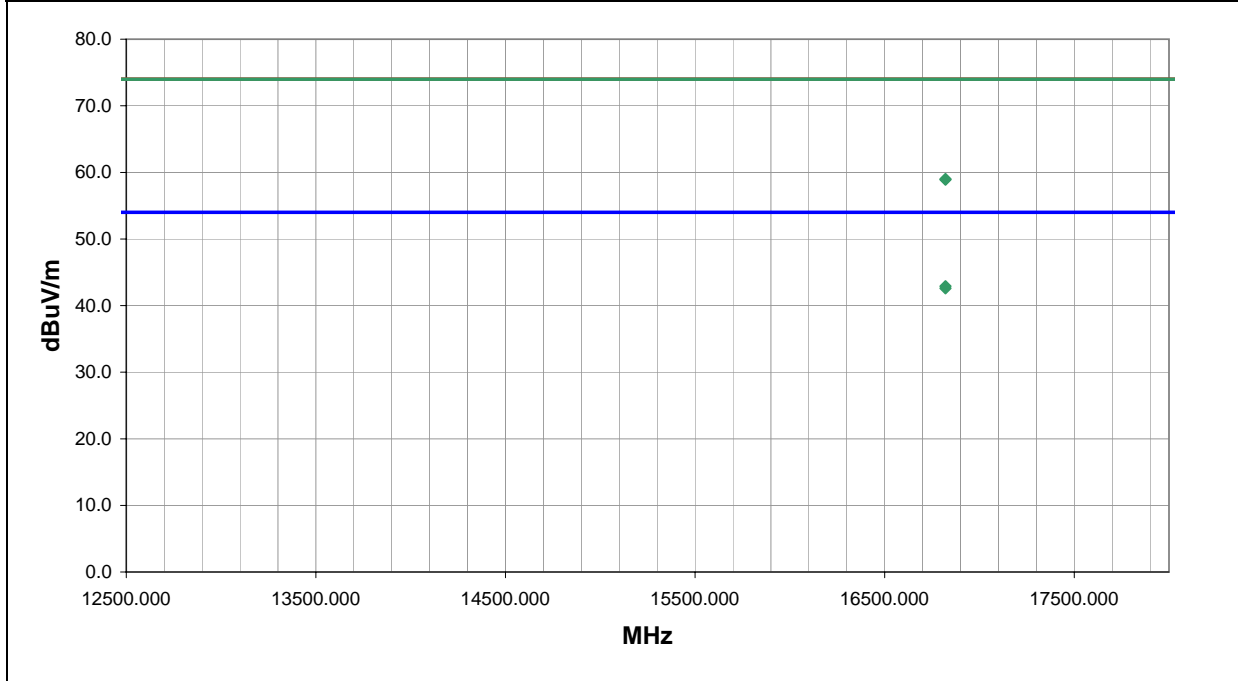
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
16821.000	28.0	14.9	179.0	1.2	3.0	0.0	H-Horn	AV	0.0	42.9	54.0	-11.1
16821.000	27.7	14.9	122.0	1.1	3.0	0.0	V-Horn	AV	0.0	42.6	54.0	-11.4
16821.000	44.1	14.9	179.0	1.2	3.0	0.0	H-Horn	PK	0.0	59.0	74.0	-15.0
16821.000	44.0	14.9	122.0	1.1	3.0	0.0	V-Horn	PK	0.0	58.9	74.0	-15.1

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

High
Mid
Low

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Other Settings Investigated:

Bluetooth only

Software\Firmware Applied During Test

Exercise software	BlueTest	**Version**	Unknown
Description			
The system was tested using special test software to exercise the functions of the device during the testing including channels, data rates, and output power.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Radio (EUT)	Intermec Technologies Corporation	8520-00080	4004703
Handheld Radio/Scanner (Host)	Intermec Technologies Corporation	700C	05400400869
Power Adapter	Elpac Power Systems	FW1812	014852

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.8	PA	Handheld Radio/Scanner	Power Adapter
AC Power	No	1.8	No	Power Adapter	AC Mains

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
LISN	Solar	9252-50-R-24-BNC	LIN	12/16/2003	13 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	02/01/2004	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	12/23/2003	13 mo

Test Description

Requirement: Per 47 15.207(d), if the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits of 15.207.

Configuration: The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

Completed by:

Holly Arlingh

CONDUCTED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/24/04
Customer:	Intermec Technologies Corporation	**Temperature:**	77
Attendees:	None	**Humidity:**	37%
Cust. Ref. No.:		**Barometric Pressure**	30.04
Tested by:	Holly Ashkannejhad	**Power:** 120 V, 60 Hz **Job Site:**	EV01

TEST SPECIFICATIONS

Specification:	FCC 15.207 AC Powerline Conducted 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
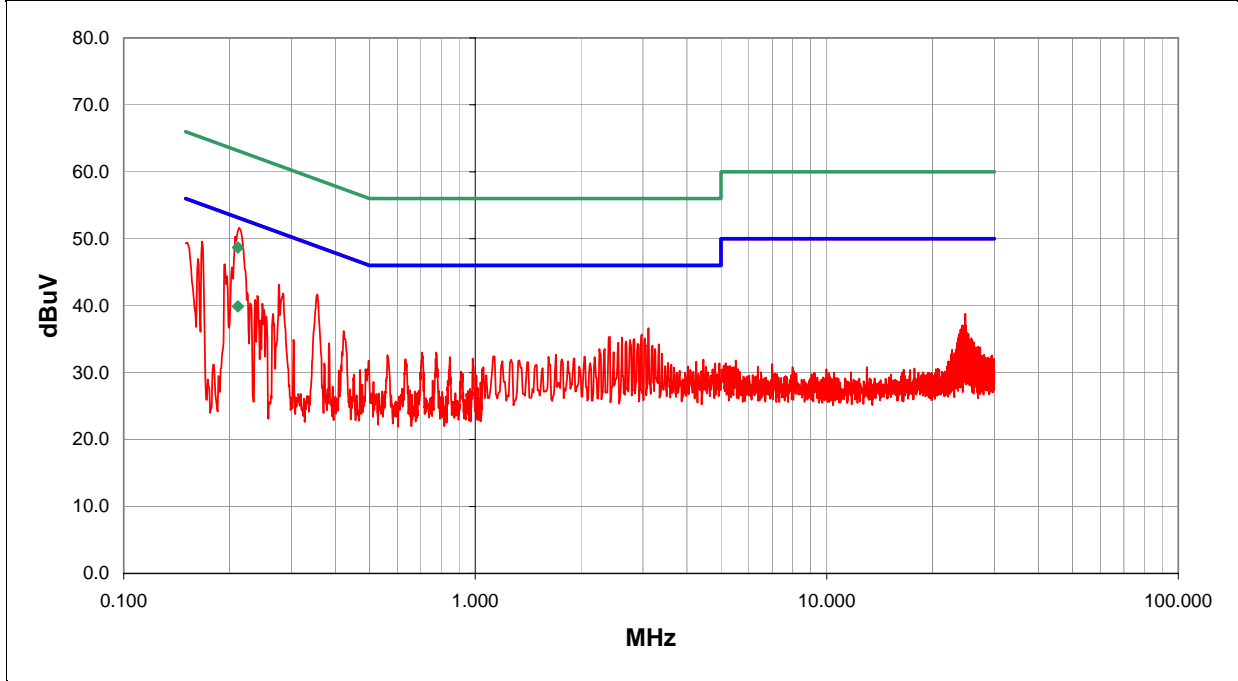
COMMENTS

EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth Low Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Line	Run #
Pass	L1	1

Other

Holly Ashkannejhad (signature)

Tested By: _____

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.211	19.9			0.0	0.0	20.0		AV		39.9	53.1	-13.2
0.211	28.7			0.0	0.0	20.0		QP		48.7	63.1	-14.4
0.213	31.5			0.0	0.1	20.0				51.6	53.1	-1.5
0.167	29.5			0.0	0.1	20.0				49.6	55.1	-5.5
0.151	29.3			0.0	0.1	20.0				49.4	56.0	-6.6
0.355	21.5			0.0	0.2	20.0				41.7	48.8	-7.2
0.194	26.1			0.0	0.1	20.0				46.2	53.9	-7.7
0.276	23.0			0.0	0.1	20.0				43.1	50.9	-7.8
0.163	26.9			0.0	0.1	20.0				47.0	55.3	-8.3
0.284	21.7			0.0	0.1	20.0				41.8	50.7	-8.9
3.116	16.1			0.0	0.5	20.0				36.6	46.0	-9.4
2.976	15.2			0.0	0.5	20.0				35.7	46.0	-10.3
0.240	21.3			0.0	0.2	20.0				41.5	52.1	-10.6
2.416	14.9			0.0	0.4	20.0				35.3	46.0	-10.7
2.616	14.8			0.0	0.5	20.0				35.3	46.0	-10.7
3.036	14.6			0.0	0.5	20.0				35.1	46.0	-10.9
2.836	14.5			0.0	0.5	20.0				35.0	46.0	-11.0
2.756	14.4			0.0	0.5	20.0				34.9	46.0	-11.1
0.423	16.0			0.0	0.2	20.0				36.2	47.4	-11.2

CONDUCTED EMISSIONS DATA SHEET

REV
df4.13
05/06/2004

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/24/04	
Customer: Intermec Technologies Corporation		**Temperature:** 77	
Attendees: None		**Humidity:** 37%	
Cust. Ref. No.:		**Barometric Pressure** 30.04	
Tested by: Holly Ashkannejhad	**Power:** 120 V, 60 Hz	**Job Site:** EV01	

TEST SPECIFICATIONS

Specification: FCC 15.207 AC Powerline Conducted 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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth Low Channel

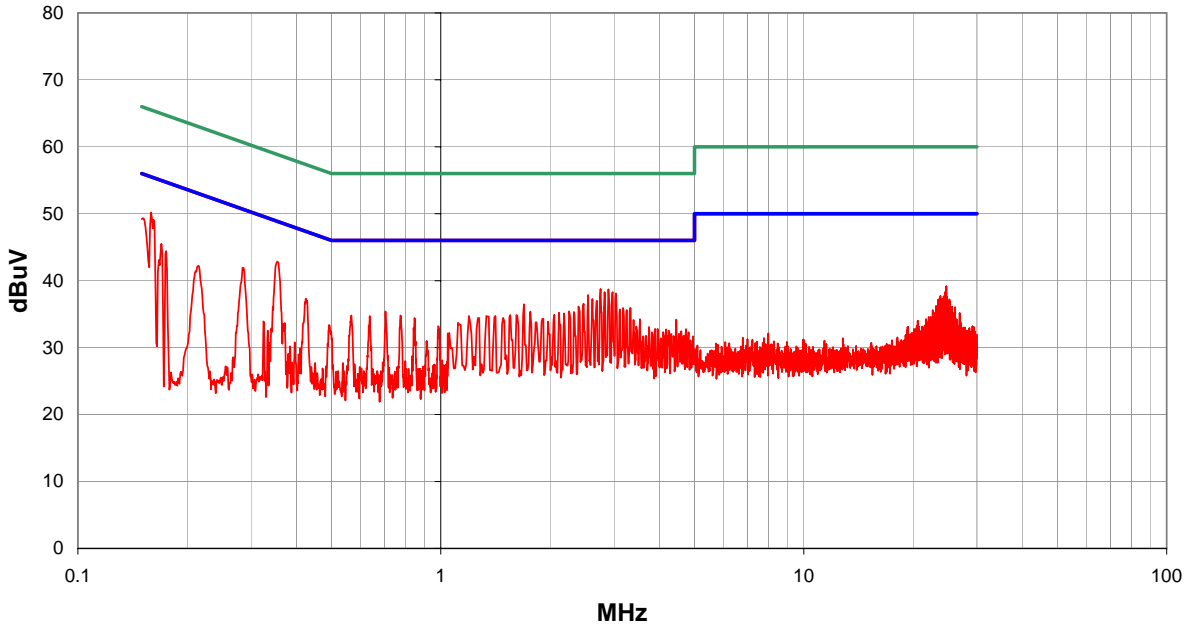**DEVIATIONS FROM TEST STANDARD**

No deviations.

RESULTS	**Line**	**Run #**
Pass	N	2

Other

Holly Ashkannejhad (signature)

Tested By: _____

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.159	30.1			0.0	0.1	20.0				50.2	55.5	-5.3
0.354	22.7			0.0	0.2	20.0				42.9	48.9	-6.0
0.151	29.2			0.0	0.1	20.0				49.3	56.0	-6.7
2.756	18.3			0.0	0.5	20.0				38.8	46.0	-7.2
2.896	18.2			0.0	0.5	20.0				38.7	46.0	-7.3
2.976	17.8			0.0	0.5	20.0				38.3	46.0	-7.7
2.826	17.8			0.0	0.5	20.0				38.3	46.0	-7.7
3.036	17.6			0.0	0.5	20.0				38.1	46.0	-7.9
2.546	17.4			0.0	0.5	20.0				37.9	46.0	-8.1
2.616	16.8			0.0	0.5	20.0				37.3	46.0	-8.7
0.284	21.8			0.0	0.1	20.0				41.9	50.7	-8.8
2.696	16.5			0.0	0.5	20.0				37.0	46.0	-9.0
2.476	16.1			0.0	0.4	20.0				36.5	46.0	-9.5
0.170	25.4			0.0	0.1	20.0				45.5	55.0	-9.5
1.695	16.1			0.0	0.4	20.0				36.5	46.0	-9.5
2.396	15.7			0.0	0.4	20.0				36.1	46.0	-9.9
0.425	17.1			0.0	0.2	20.0				37.3	47.4	-10.1
3.336	15.4			0.0	0.5	20.0				35.9	46.0	-10.1
3.176	15.4			0.0	0.5	20.0				35.9	46.0	-10.1

CONDUCTED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/24/04
Customer:	Intermec Technologies Corporation	**Temperature:**	77
Attendees:	None	**Humidity:**	37%
Cust. Ref. No.:		**Barometric Pressure**	30.04
Tested by:	Holly Ashkannejhad	**Power:** 120 V, 60 Hz	**Job Site:** EV01

TEST SPECIFICATIONS

Specification:	FCC 15.207 AC Powerline Conducted 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

EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth Mid Channel

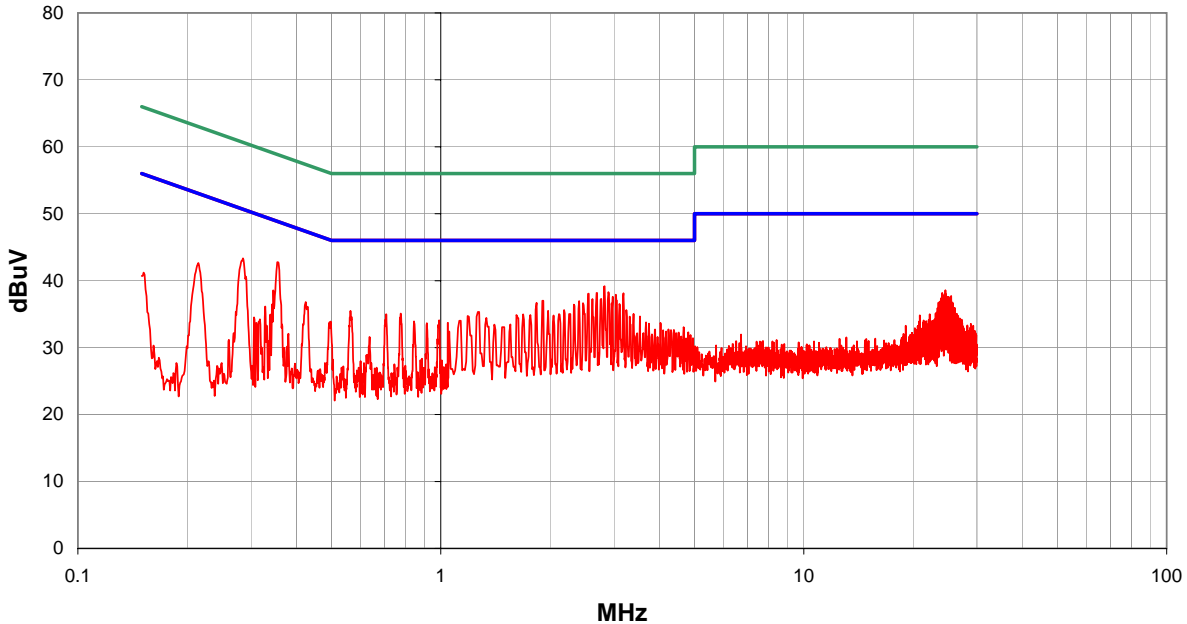**DEVIATIONS FROM TEST STANDARD**

No deviations.

RESULTS	**Line**	**Run #**
Pass	N	3

Other

Holly Ashkannejhad (signature)

Tested By: _____

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.356	22.6			0.0	0.2	20.0				42.8	48.8	-6.1
2.826	18.7			0.0	0.5	20.0				39.2	46.0	-6.8
0.285	23.2			0.0	0.1	20.0				43.3	50.7	-7.3
2.896	17.8			0.0	0.5	20.0				38.3	46.0	-7.7
2.696	17.7			0.0	0.5	20.0				38.2	46.0	-7.8
3.186	17.6			0.0	0.5	20.0				38.1	46.0	-7.9
2.556	17.6			0.0	0.5	20.0				38.1	46.0	-7.9
3.036	17.4			0.0	0.5	20.0				37.9	46.0	-8.1
2.976	17.1			0.0	0.5	20.0				37.6	46.0	-8.4
2.766	16.8			0.0	0.5	20.0				37.3	46.0	-8.7
2.616	16.8			0.0	0.5	20.0				37.3	46.0	-8.7
1.915	16.6			0.0	0.4	20.0				37.0	46.0	-9.0
2.406	16.5			0.0	0.4	20.0				36.9	46.0	-9.1
1.835	16.3			0.0	0.4	20.0				36.7	46.0	-9.3
2.466	16.2			0.0	0.4	20.0				36.6	46.0	-9.4
3.106	16.0			0.0	0.5	20.0				36.5	46.0	-9.5
2.326	16.0			0.0	0.4	20.0				36.4	46.0	-9.6
3.246	15.1			0.0	0.5	20.0				35.6	46.0	-10.4
2.186	15.2			0.0	0.4	20.0				35.6	46.0	-10.4

CONDUCTED EMISSIONS DATA SHEET

EUT:	8520-00080	**Work Order:**	ITRM0020
Serial Number:		**Date:**	05/24/04
Customer:	Intermec Technologies Corporation	**Temperature:**	77
Attendees:	None	**Humidity:**	37%
Cust. Ref. No.:		**Barometric Pressure**	30.04
Tested by:	Holly Ashkannejhad	**Power:** 120 V, 60 Hz	**Job Site:** EV01

TEST SPECIFICATIONS

Specification:	FCC 15.207 AC Powerline Conducted 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

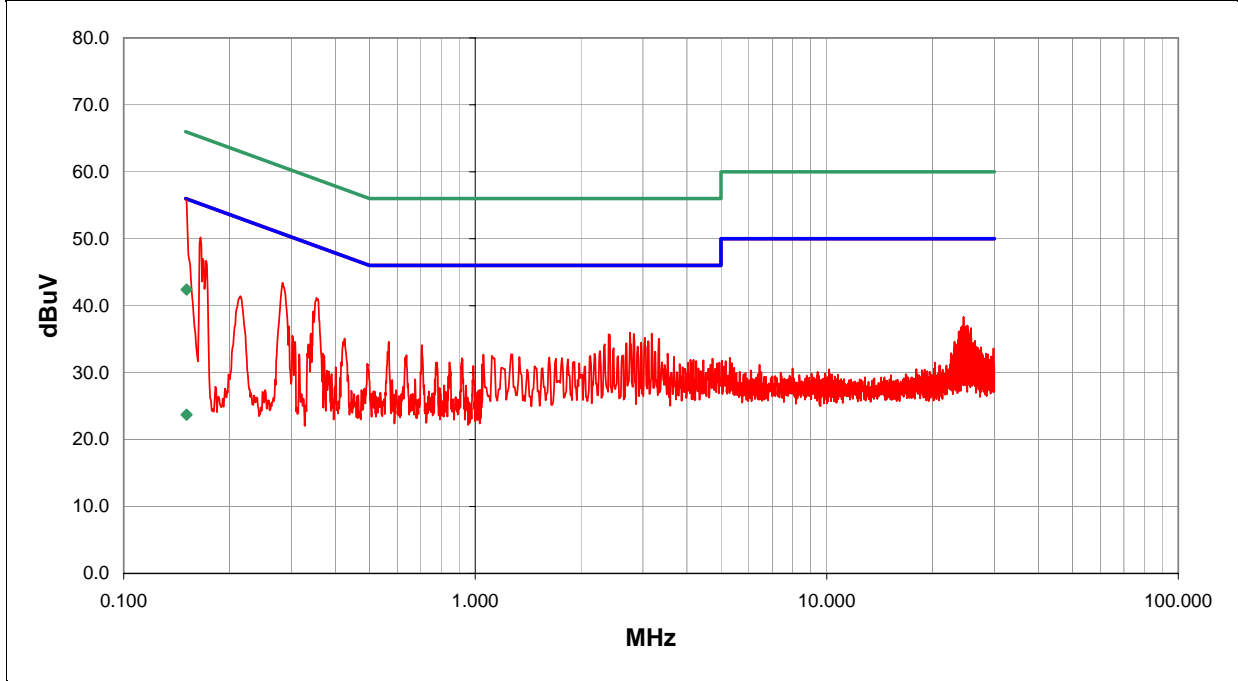EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth Mid Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Line	Run #
Pass	L1	4

Other

Tested By:

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.151	22.4			0.0	0.0	20.0		QP		42.4	65.9	-23.5
0.151	3.7			0.0	0.0	20.0		AV		23.7	55.9	-32.2
0.150	35.7			0.0	0.1	20.0				55.8	56.0	-0.2
0.165	30.1			0.0	0.1	20.0				50.2	55.2	-5.0
0.283	23.3			0.0	0.1	20.0				43.4	50.7	-7.3
0.353	21.0			0.0	0.2	20.0				41.2	48.9	-7.7
0.168	26.9			0.0	0.1	20.0				47.0	55.1	-8.1
0.172	26.6			0.0	0.1	20.0				46.7	54.9	-8.2
2.756	15.5			0.0	0.5	20.0				36.0	46.0	-10.0
3.176	15.3			0.0	0.5	20.0				35.8	46.0	-10.2
2.826	15.3			0.0	0.5	20.0				35.8	46.0	-10.2
2.396	15.3			0.0	0.4	20.0				35.7	46.0	-10.3
3.036	14.7			0.0	0.5	20.0				35.2	46.0	-10.8
3.336	14.5			0.0	0.5	20.0				35.0	46.0	-11.0
3.106	14.2			0.0	0.5	20.0				34.7	46.0	-11.3
0.568	14.4			0.0	0.2	20.0				34.6	46.0	-11.4
2.966	14.0			0.0	0.5	20.0				34.5	46.0	-11.5
0.215	21.3			0.0	0.1	20.0				41.4	53.0	-11.6
2.696	13.9			0.0	0.5	20.0				34.4	46.0	-11.6

CONDUCTED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/24/04	
Customer: Intermec Technologies Corporation		**Temperature:** 77	
Attendees: None		**Humidity:** 37%	
Cust. Ref. No.:		**Barometric Pressure** 30.04	
Tested by: Holly Ashkannejhad	**Power:** 120 V, 60 Hz	**Job Site:** EV01	

TEST SPECIFICATIONS

Specification: FCC 15.207 AC Powerline Conducted 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
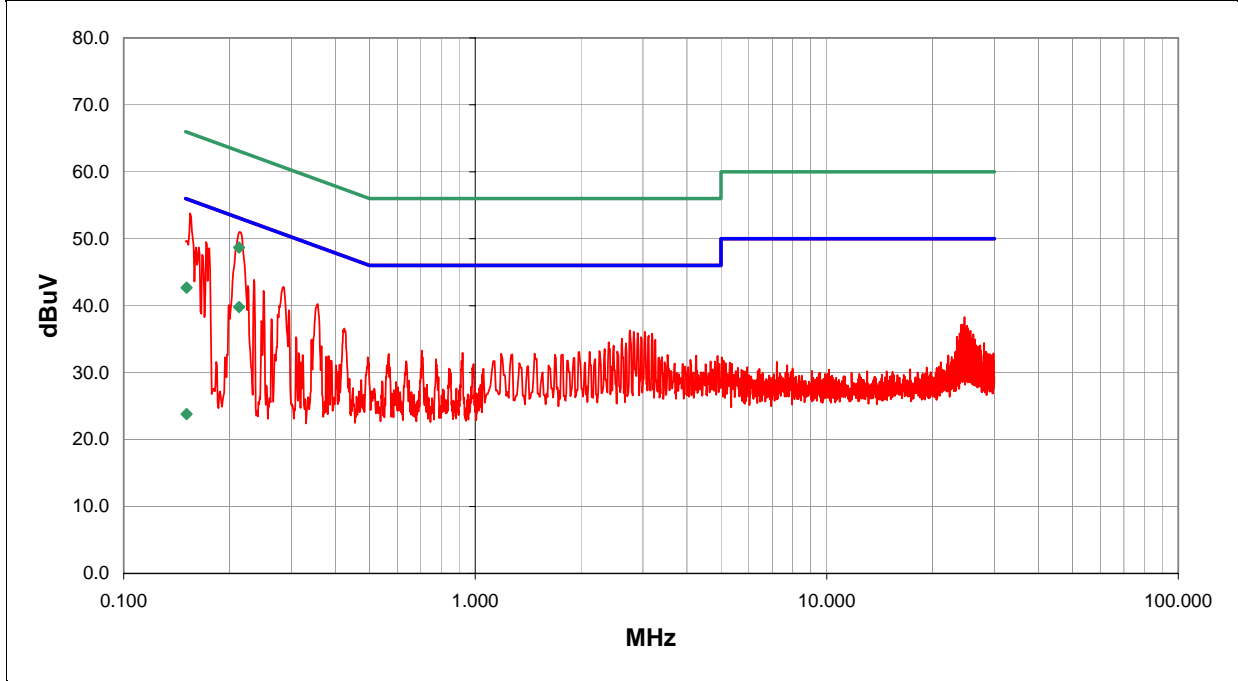
EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

	Line	Run #
Pass	L1	5

Other

Holly Ashkannejhad

Tested By: _____

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.213	19.8			0.0	0.0	20.0		AV		39.8	53.1	-13.3
0.213	28.7			0.0	0.0	20.0		QP		48.7	63.1	-14.4
0.151	22.7			0.0	0.0	20.0		QP		42.7	65.9	-23.2
0.151	3.8			0.0	0.0	20.0		AV		23.8	55.9	-32.1
0.155	33.7			0.0	0.1	20.0				53.8	55.8	-2.0
0.214	30.9			0.0	0.1	20.0				51.0	53.1	-2.0
0.172	29.4			0.0	0.1	20.0				49.5	54.9	-5.4
0.175	28.5			0.0	0.1	20.0				48.6	54.7	-6.1
0.164	28.6			0.0	0.1	20.0				48.7	55.3	-6.6
0.161	28.6			0.0	0.1	20.0				48.7	55.4	-6.7
0.167	27.5			0.0	0.1	20.0				47.6	55.1	-7.5
0.285	22.7			0.0	0.1	20.0				42.8	50.7	-7.8
0.235	23.7			0.0	0.2	20.0				43.9	52.3	-8.4
0.356	20.1			0.0	0.2	20.0				40.3	48.8	-8.6
0.250	22.0			0.0	0.2	20.0				42.2	51.8	-9.6
0.226	22.8			0.0	0.2	20.0				43.0	52.6	-9.7
2.756	15.8			0.0	0.5	20.0				36.3	46.0	-9.7
3.036	15.6			0.0	0.5	20.0				36.1	46.0	-9.9
2.826	15.6			0.0	0.5	20.0				36.1	46.0	-9.9

CONDUCTED EMISSIONS DATA SHEET

EUT: 8520-00080		**Work Order:** ITRM0020	
Serial Number:		**Date:** 05/24/04	
Customer: Intermec Technologies Corporation		**Temperature:** 77	
Attendees: None		**Humidity:** 37%	
Cust. Ref. No.:		**Barometric Pressure** 30.04	
Tested by: Holly Ashkannejhad	**Power:** 120 V, 60 Hz	**Job Site:** EV01	

TEST SPECIFICATIONS

Specification: FCC 15.207 AC Powerline Conducted 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
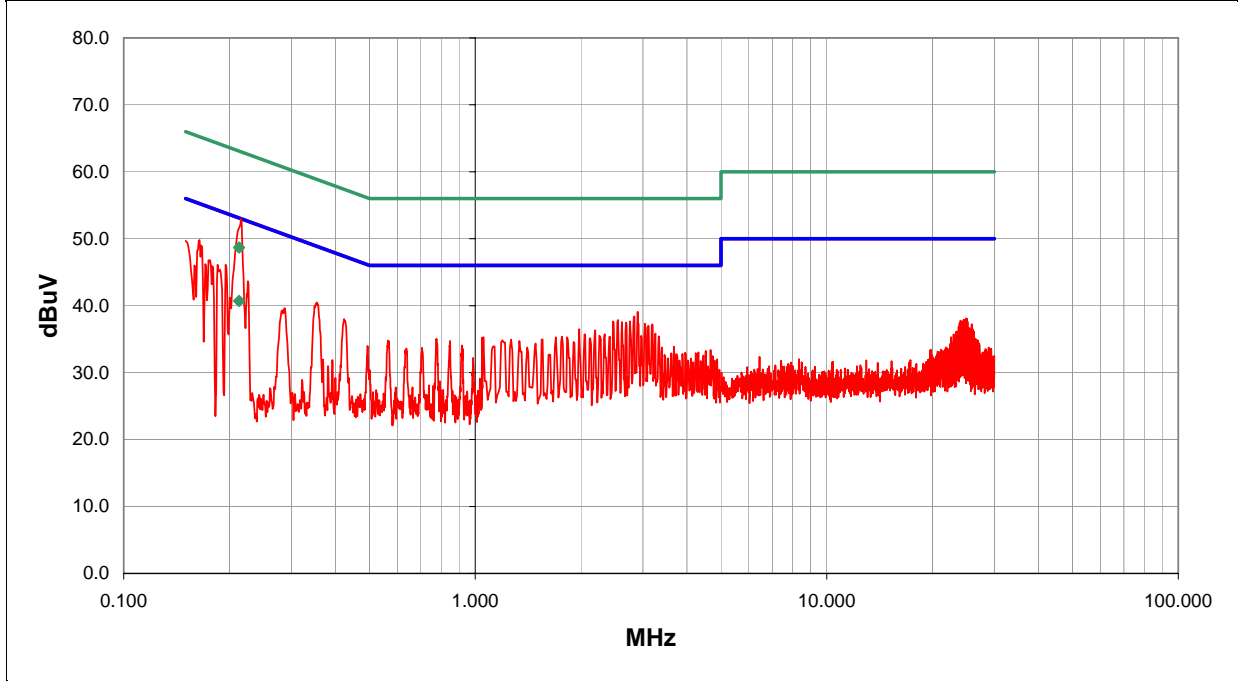
EUT installed in Intermec Model 700C

EUT OPERATING MODES

Bluetooth High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS		**Line**	**Run #**
Pass		N	6

Other

Holly Ashkannejhad (signature)

Tested By:

Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.213	20.7			0.0	0.0	20.0		AV		40.7	53.1	-12.4
0.213	28.7			0.0	0.0	20.0		QP		48.7	63.1	-14.4
0.216	32.8			0.0	0.1	20.0				52.9	53.0	-0.1
0.164	29.7			0.0	0.1	20.0				49.8	55.2	-5.4
0.150	29.6			0.0	0.1	20.0				49.7	56.0	-6.3
2.896	18.6			0.0	0.5	20.0				39.1	46.0	-6.9
2.836	17.9			0.0	0.5	20.0				38.4	46.0	-7.6
0.195	26.0			0.0	0.1	20.0				46.1	53.8	-7.7
0.174	26.7			0.0	0.1	20.0				46.8	54.8	-8.0
2.546	17.4			0.0	0.5	20.0				37.9	46.0	-8.1
0.185	26.0			0.0	0.1	20.0				46.1	54.3	-8.2
2.756	17.2			0.0	0.5	20.0				37.7	46.0	-8.3
2.466	17.2			0.0	0.4	20.0				37.6	46.0	-8.4
0.355	20.3			0.0	0.2	20.0				40.5	48.8	-8.4
2.616	17.1			0.0	0.5	20.0				37.6	46.0	-8.4
2.686	17.0			0.0	0.5	20.0				37.5	46.0	-8.5
0.179	25.8			0.0	0.1	20.0				45.9	54.5	-8.6
3.036	16.8			0.0	0.5	20.0				37.3	46.0	-8.7
0.171	26.1			0.0	0.1	20.0				46.2	54.9	-8.7

BLUETOOTH APPROVALS
FCC Procedure Received from Joe Dichoso on 2-15-02

The following exhibit indicates the FCC Spread Spectrum requirements in Section 15.247 for devices meeting the Bluetooth Specifications in the 2.4 GHz band as of February 2001 operating in the USA. The purpose of this exhibit is to help expedite the approval process for Bluetooth devices. This exhibit provides items that vary for each device and also provides a list of items that are common to Bluetooth devices that explains the remaining requirements. The list of common items can be submitted for each application for equipment authorization. This exhibit only specifies requirements in Section 15.247, requirements in other rule Sections for intentional radiators such as in Section 15.203 or 15.207 must be also be addressed. A Bluetooth device is a FHSS transmitter in the data mode and applies as a Hybrid spread spectrum device in the acquisition mode.

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.
1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

For all devices, the following items, 1-12, are common to all Bluetooth devices and will not vary from one device to another. This list can be copied into the filing.

1 Output power and channel separation of a Bluetooth device in the different operating modes:
The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.
2 Frequency range of a Bluetooth device:
The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification must **not be** supported by the device.
3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:
Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.
4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions, the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth, synchronization and repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz.

In every connection, one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single or multi-slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing is according to the packet type of the connection. Also, the slave of the connection uses these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:

Dwell time = time slot length * hop rate / number of hopping channels *30s

Example for a DH1 packet (with a maximum length of one time slot)

Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 μs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all
Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time
requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)

8 Channel Separation in hybrid mode
The nominal channel spacing of the Bluetooth system is 1Mhz independent of the
operating mode.
The maximum "initial carrier frequency tolerance" which is allowed for Bluetooth is
fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for
three frequencies (2402, 2441, 2480 MHz).

9 Derivation and examples for a hopping sequence in hybrid mode
For the generation of the inquiry and page hop sequences the same procedures as
described for the data mode are used (see item 5), but this time with different input
vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results
in the same 32 frequencies used by all devices doing an inquiry but every time with a
different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input
vector. This results in the use of a subset of 32 frequencies which is specific for that
initial state of the connection establishment between the two units. A page to
different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06,
17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18,
58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronization in hybrid mode:
The receiver input bandwidth is the same as in the data mode (1 MHz). When two
Bluetooth devices establish contact for the first time, one device sends an inquiry access
code and the other device is scanning for this inquiry access code. If two devices have
been connected previously and want to start a new transmission, a similar procedure
takes place. The only difference is, instead of the inquiry access code, a special access
code, derived from the BD_ADDRESS of the paged device will be, will be sent by the
master of this connection. Due to the fact that both units have been connected before (in
the inquiry procedure) the paging unit has timing and frequency information about the
page scan of the paged unit. For this reason the time to establish the connection is
reduced.

11 Spread rate / data rate of the direct sequence signal
The Spread rate / Data rate in inquiry and paging mode can be defined via the access
code. The access code is the only criterion for the system to check if there is a valid
transmission or not. If you regard the presence of a valid access code as one bit of
information, and compare it with the length of the access code of 68 bits, the Spread rate
/ Data rate will be 68/1.

12 Spurious emission in hybrid mode

The Dwell in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.