Intermec Technologies Corporation

CN3 Large Keyboard

June 21, 2007

Report No. ITRM0161 Rev. 1

Report Prepared By

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: June 21, 2007
Intermec Technologies Corporation
Model: CN3 Large Keyboard

Emissions				
Test Description	**Specification**	**Test Method**	**Pass**	**Fail**
Effective Radiated Power	FCC 22H:2006	ANSI/TIA/EIA-603-B:2002	☒	☐
Effective Radiated Power	FCC 24E:2006	ANSI/TIA/EIA-603-B:2002	☒	☐
Out of Band Emissions	FCC 22H:2006	ANSI/TIA/EIA-603-B:2002	☒	☐
Out of Band Emissions	FCC 24E:2006	ANSI/TIA/EIA-603-B:2002	☒	☐

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

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:
Don Facteau, IS Manager

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
01	Changed the Model Name\EUT to CN3 Large Keyboard	7-12-07	1, 2, 7, 8, 12, 13, 14, 15, 16, 17, 21, 25

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 accredited under the United States Department of Commerce, National Institute of Standards and Technology, and 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, and ANSI C63.4. 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.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0

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. USA0604C.

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).

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).

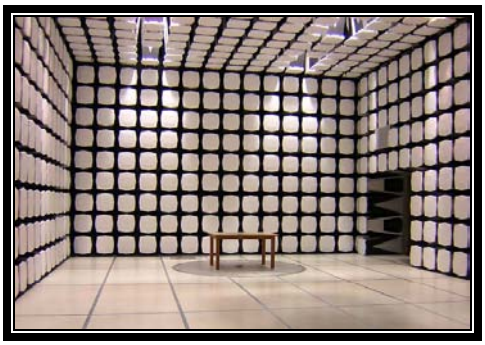
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294).*

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

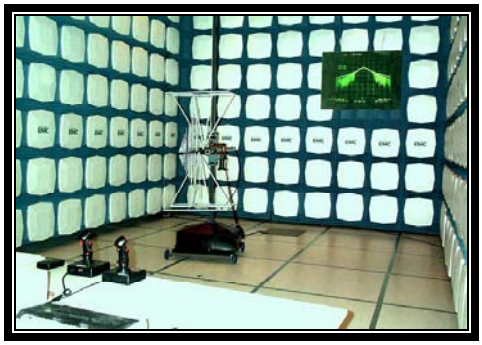
SCOPE

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



California – Orange County Facility
Labs OC01 – OC13

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



Oregon – Evergreen Facility
Labs EV01 – EV11

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

Washington – Sultan Facility
Labs SU01 – SU07

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

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:	CN3 Large Keyboard
First Date of Test:	June 16, 2007
Last Date of Test:	June 17, 2007
Receipt Date of Samples:	June 16, 2007
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
GSM Radio installed in the CN3 Large Keyboard handheld computer.

Testing Objective:
To demonstrate compliance with the radiated emissions requirements of FCC Parts 22H and 24E

CONFIGURATION 1 ITRM0161

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
GSM Radio	Unknown	MC75	Unknown

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CNE Large Keyboard	Intermec Technologies Corporation	cn3-LrgKey	12090700028

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	6/16/2007	ERP and EIRP	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	6/17/2007	Out of Band Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Out of Band Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Transmitting GSM in PCS band high channel
Transmitting GSM in PCS band low channel
Transmitting GSM in PCS band mid channel
Transmitting GSM in Cellular band mid channel
Transmitting GSM in Cellular band low channel
Transmitting GSM in Cellular band high channel

POWER SETTINGS INVESTIGATED
Battery

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	26 MHz

CLOCKS AND OSCILLATORS
Not provided

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
1-2 GHz Notch Filter	K&L Microwave	3TNF-1000/2000-N/N	HFU	8/29/2006	13
.5-1 GHz Notch Filter	K&L Microwave	3TNF-500/1000-N/N	HFT	8/29/2006	13
EV01 Cable D			EVD	3/30/2006	15
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	3/23/2006	17
Antenna, Horn	EMCO	3115	AHF	4/10/2006	24
EV01 cables g,h,I			EVF	5/10/2007	13
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	5/10/2007	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
High Pass Filter 1.2 - 18 GHz	Micro-Tronics	HPM50108	HFV	12/29/2006	13
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFD	12/29/2006	13
Low Pass Filter 0-425 MHz	Micro-Tronics	LPM50003	LFB	12/29/2006	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	12/29/2006	13
EV01 cables g,h,j			EVB	5/10/2007	13
EV01 cables c,g, h			EVA	12/29/2006	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	12
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2006	13

MEASUREMENT BANDWIDTHS				
	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.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically

TEST DESCRIPTION

The highest gain antenna to be used with the EUT was tested for final measurements. The EUT was configured for the lowest, a middle, and the highest transmit frequency in each operational band. For each configuration, the spectrum was scanned throughout the specified range. 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 C63.4:2003). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

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

At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest spurious emissions for emissions below 1 GHz, and a horn antenna for emissions above 1 GHz. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the antenna and its gain; the power (dBm) into an ideal ½ wave dipole antenna is determined for each radiated spurious emission.

For the purposes of preliminary measurements, the field strength of the spurious emissions can be measured and compared with a 3 meter limit. The 3 meter limit was calculated to be 82.5 dBuV/m at 3 meters. The final measurements must be made utilizing the substitution method described above.

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard			Work Order:	ITRM0161
Serial Number:	Unknown			Date:	06/16/07
Customer:	Intermec Technologies Corporation			Temperature:	23
Attendees:	None			Humidity:	33%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 22H:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

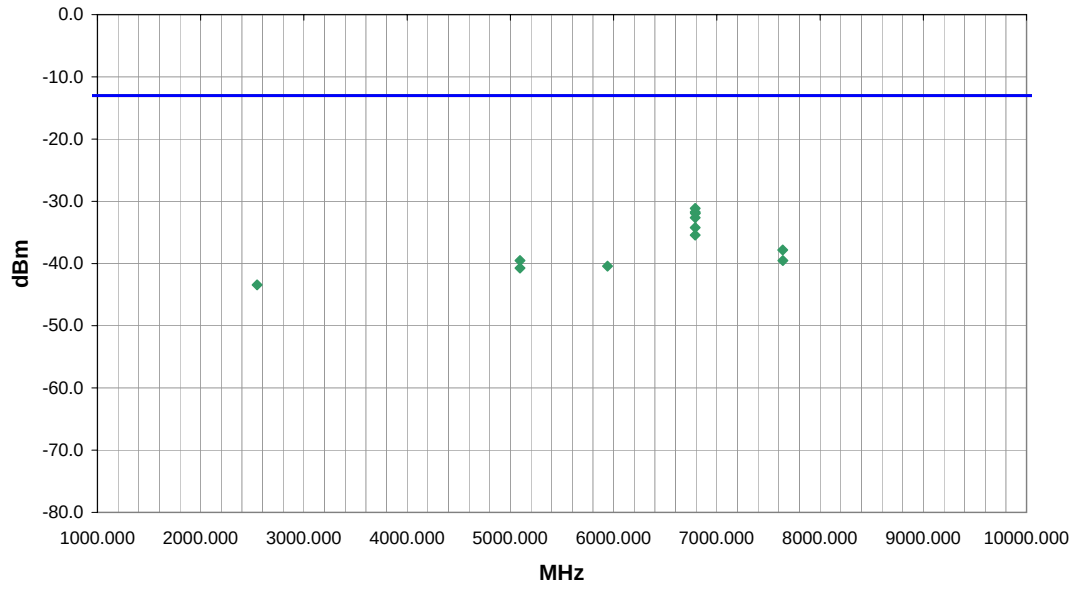
Transmitting GSM in Cellular band high channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
6790.398			123.0	1.1			V-Horn	PK	7.71E-07	-31.1	-13.0	-18.1	EUT horizontal
6790.290			245.0	1.1			H-Horn	PK	6.72E-07	-31.7	-13.0	-18.7	EUT vertical
6791.043			347.0	1.2			H-Horn	PK	6.41E-07	-31.9	-13.0	-18.9	EUT horizontal
6789.945			360.0	1.1			V-Horn	PK	5.46E-07	-32.6	-13.0	-19.6	EUT on side
6790.047			286.0	1.1			H-Horn	PK	3.78E-07	-34.2	-13.0	-21.2	EUT on side
6790.438			258.0	1.1			V-Horn	PK	2.86E-07	-35.4	-13.0	-22.4	EUT vertical
7638.772			201.0	1.2			V-Horn	PK	1.65E-07	-37.8	-13.0	-24.8	EUT horizontal
5092.910			93.0	1.4			V-Horn	PK	1.11E-07	-39.5	-13.0	-26.5	EUT horizontal
7638.950			73.0	1.1			H-Horn	PK	1.11E-07	-39.5	-13.0	-26.5	EUT horizontal
5941.130			351.0	1.0			V-Horn	PK	9.06E-08	-40.4	-13.0	-27.4	EUT horizontal
5092.593			359.0	1.1			H-Horn	PK	8.46E-08	-40.7	-13.0	-27.7	EUT horizontal
2546.553			193.0	1.2			V-Horn	PK	4.54E-08	-43.4	-13.0	-30.4	EUT horizontal

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard			Work Order:	ITRM0161
Serial Number:	Unknown			Date:	06/16/07
Customer:	Intermec Technologies Corporation			Temperature:	23
Attendees:	None			Humidity:	33%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 22H:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

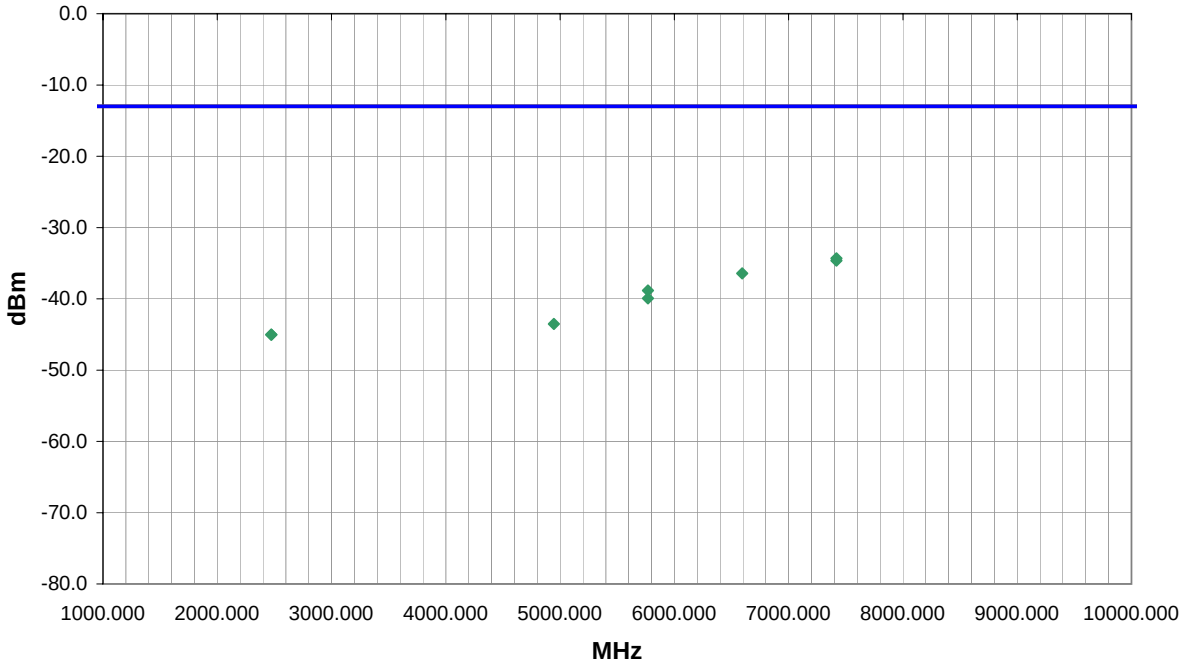
Transmitting GSM in Cellular band low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
7417.894			27.0	1.6			V-Horn	PK	3.69E-07	-34.3	-13.0	-21.3
7418.294			236.0	1.3			H-Horn	PK	3.44E-07	-34.6	-13.0	-21.6
6594.103			314.0	1.0			V-Horn	PK	2.28E-07	-36.4	-13.0	-23.4
5769.456			10.0	1.3			H-Horn	PK	1.31E-07	-38.8	-13.0	-25.8
5768.931			319.0	1.1			V-Horn	PK	1.02E-07	-39.9	-13.0	-26.9
4945.611			330.0	1.2			H-Horn	PK	4.44E-08	-43.5	-13.0	-30.5
2472.468			314.0	1.3			H-Horn	PK	3.14E-08	-45.0	-13.0	-32.0
2472.608			11.0	1.1			V-Horn	PK	3.14E-08	-45.0	-13.0	-32.0

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard			Work Order:	ITRM0161
Serial Number:	Unknown			Date:	06/16/07
Customer:	Intermec Technologies Corporation			Temperature:	23
Attendees:	None			Humidity:	33%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 22H:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

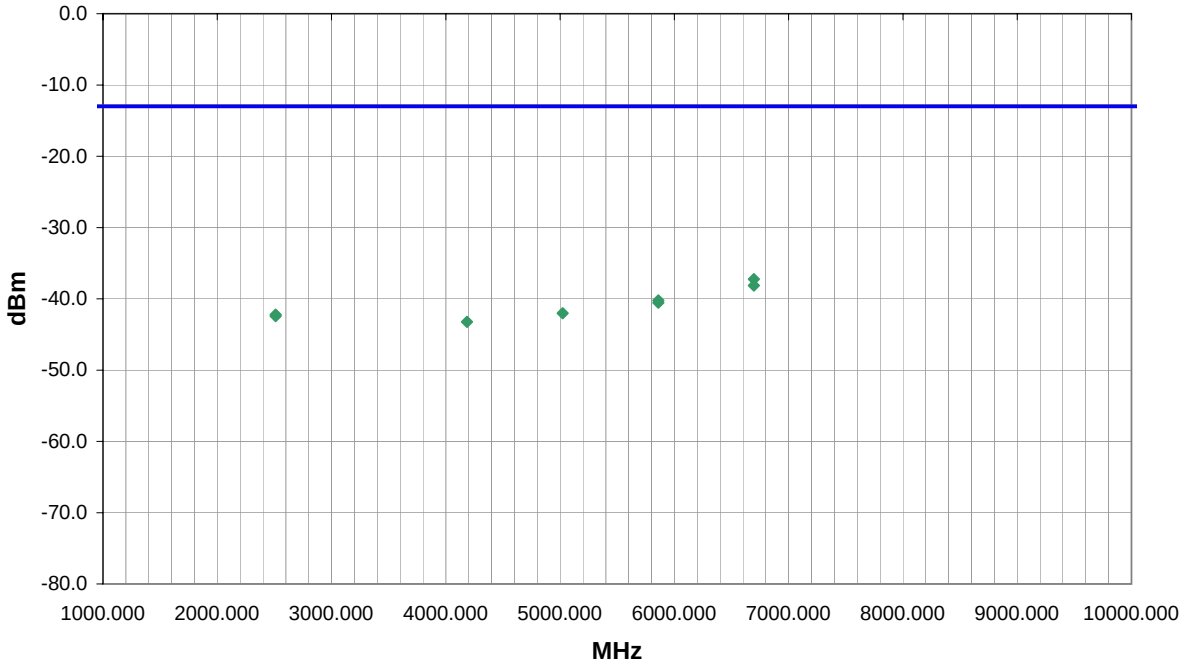
Transmitting GSM in Cellular band mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
6695.319			8.0	1.3			V-Horn	PK	1.89E-07	-37.2	-13.0	-24.2
6696.070			15.0	1.1			H-Horn	PK	1.54E-07	-38.1	-13.0	-25.1
5859.477			344.0	1.0			V-Horn	PK	9.49E-08	-40.2	-13.0	-27.2
5859.484			174.0	1.2			H-Horn	PK	8.85E-08	-40.5	-13.0	-27.5
5022.405			356.0	1.1			H-Horn	PK	6.27E-08	-42.0	-13.0	-29.0
2510.807			40.0	1.2			H-Horn	PK	5.99E-08	-42.2	-13.0	-29.2
2511.177			10.0	1.0			V-Horn	PK	5.72E-08	-42.4	-13.0	-29.4
4184.675			315.0	1.3			H-Horn	PK	4.75E-08	-43.2	-13.0	-30.2

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard	Work Order:	ITRM0161
Serial Number:	Unknown	Date:	06/17/07
Customer:	Intermec Technologies Corporation	Temperature:	22
Attendees:	None	Humidity:	34%
Project:	None	Barometric Pres.:	30.1
Tested by:	Holly Ashkannejhad	Power: Battery	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 24E:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	0

COMMENTS

EUT OPERATING MODES

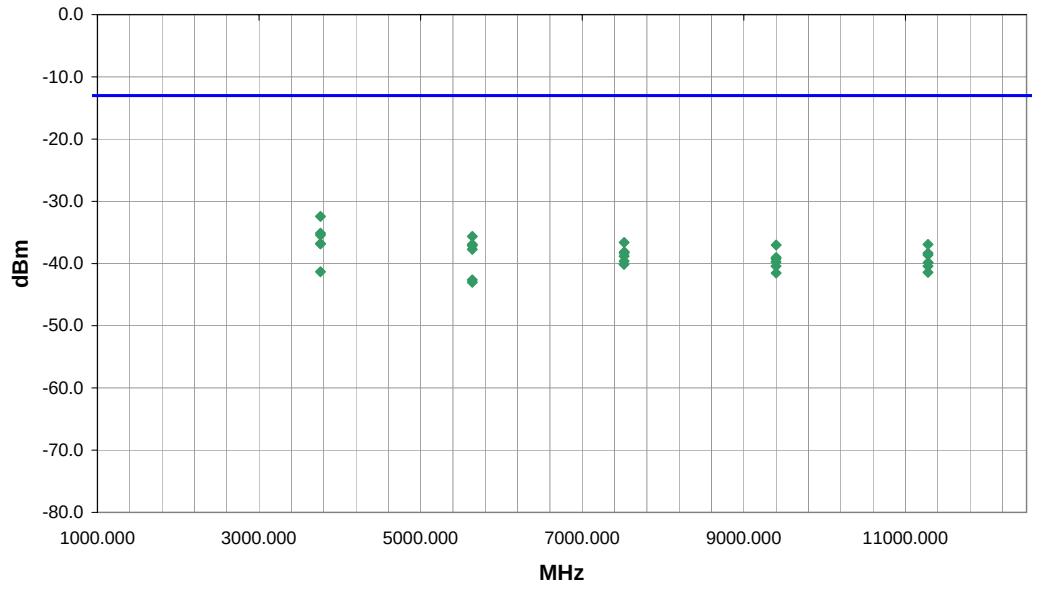
Transmitting GSM in PCS band mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	6
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3760.874			332.0	1.1			V-Horn	PK	5.72E-07	-32.4	-13.0	-19.4	EUT horizontal
3760.417			133.0	1.0			H-Horn	PK	3.07E-07	-35.1	-13.0	-22.1	EUT horizontal
3759.689			254.0	1.0			H-Horn	PK	2.86E-07	-35.4	-13.0	-22.4	EUT on side
5640.116			-1.0	1.0			H-Horn	PK	2.74E-07	-35.6	-13.0	-22.6	EUT vertical
7519.931			-1.0	1.7			V-Horn	PK	2.17E-07	-36.6	-13.0	-23.6	EUT on side
3760.084			332.0	1.0			V-Horn	PK	2.08E-07	-36.8	-13.0	-23.8	EUT vertical
3761.114			248.0	1.0			V-Horn	PK	2.08E-07	-36.8	-13.0	-23.8	EUT on side
11280.790			252.0	1.0			V-Horn	PK	2.03E-07	-36.9	-13.0	-23.9	EUT horizontal
5640.061			351.0	1.0			V-Horn	PK	2.03E-07	-36.9	-13.0	-23.9	EUT on side
9401.464			323.0	1.0			V-Horn	PK	1.98E-07	-37.0	-13.0	-24.0	EUT vertical
5639.833			320.0	1.0			H-Horn	PK	1.94E-07	-37.1	-13.0	-24.1	EUT horizontal
5639.341			285.0	1.0			H-Horn	PK	1.69E-07	-37.7	-13.0	-24.7	EUT on side
7520.386			359.0	2.1			H-Horn	PK	1.54E-07	-38.1	-13.0	-25.1	EUT on side
7519.761			282.0	1.0			H-Horn	PK	1.47E-07	-38.3	-13.0	-25.3	EUT horizontal
11280.680			319.0	1.0			H-Horn	PK	1.47E-07	-38.3	-13.0	-25.3	EUT vertical
11280.240			360.0	1.8			V-Horn	PK	1.37E-07	-38.6	-13.0	-25.6	EUT on side
7519.616			-1.0	1.2			V-Horn	PK	1.31E-07	-38.8	-13.0	-25.8	EUT vertical
9400.079			342.0	1.0			H-Horn	PK	1.25E-07	-39.0	-13.0	-26.0	EUT vertical
9399.534			321.0	1.3			V-Horn	PK	1.19E-07	-39.2	-13.0	-26.2	EUT on side
7520.156			199.0	1.0			H-Horn	PK	1.09E-07	-39.6	-13.0	-26.6	EUT vertical

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard	Work Order:	ITRM0161
Serial Number:	Unknown	Date:	06/17/07
Customer:	Intermec Technologies Corporation	Temperature:	22
Attendees:	None	Humidity:	34%
Project:	None	Barometric Pres.:	30.1
Tested by:	Holly Ashkannejhad	Power: Battery	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 24E:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	0

COMMENTS

EUT OPERATING MODES

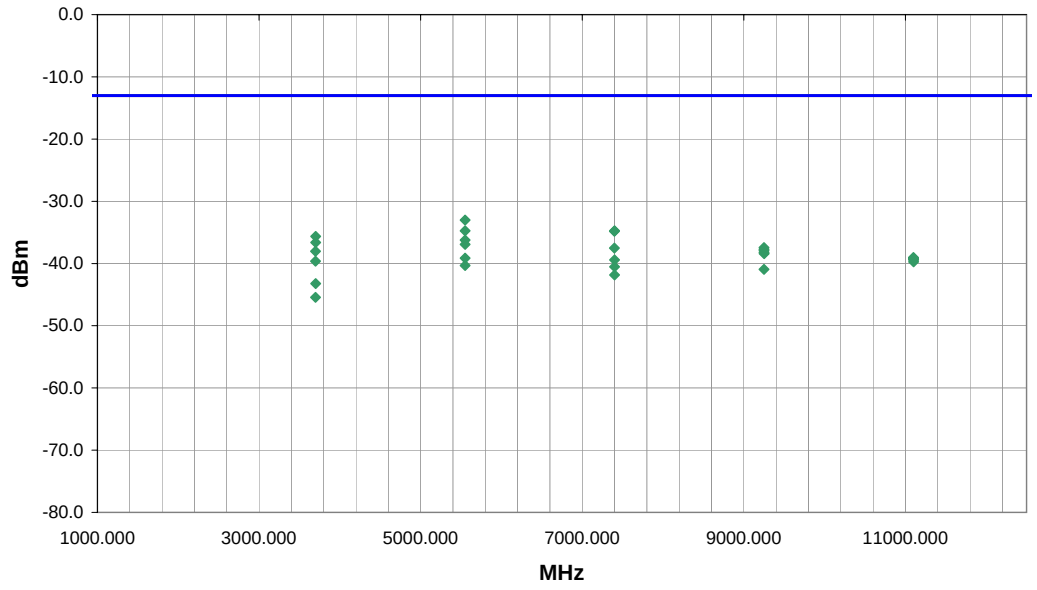
Transmitting GSM in PCS band low channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	7
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
5550.483			331.0	1.0			V-Horn	PK	4.98E-07	-33.0	-13.0	-20.0	EUT on side
5551.208			352.0	1.0			H-Horn	PK	3.37E-07	-34.7	-13.0	-21.7	EUT horizontal
7401.465			-1.0	1.5			V-Horn	PK	3.37E-07	-34.7	-13.0	-21.7	EUT on side
7399.495			359.0	1.0			H-Horn	PK	3.29E-07	-34.8	-13.0	-21.8	EUT on side
3700.390			318.0	1.0			H-Horn	PK	2.74E-07	-35.6	-13.0	-22.6	EUT on side
5550.408			1.0	1.0			H-Horn	PK	2.38E-07	-36.2	-13.0	-23.2	EUT vertical
3700.535			159.0	1.0			H-Horn	PK	2.17E-07	-36.6	-13.0	-23.6	EUT horizontal
5551.008			0.0	1.0			H-Horn	PK	2.03E-07	-36.9	-13.0	-23.9	EUT on side
9249.561			287.0	1.0			V-Horn	PK	1.81E-07	-37.4	-13.0	-24.4	EUT horizontal
7399.335			286.0	1.0			H-Horn	PK	1.77E-07	-37.5	-13.0	-24.5	EUT vertical
9250.901			9.0	1.0			H-Horn	PK	1.69E-07	-37.7	-13.0	-24.7	EUT on side
9250.616			179.0	1.0			H-Horn	PK	1.61E-07	-37.9	-13.0	-24.9	EUT horizontal
3699.440			296.0	1.8			V-Horn	PK	1.57E-07	-38.0	-13.0	-25.0	EUT horizontal
9249.906			33.0	1.0			H-Horn	PK	1.50E-07	-38.2	-13.0	-25.2	EUT vertical
9252.366			0.0	1.0			V-Horn	PK	1.44E-07	-38.4	-13.0	-25.4	EUT vertical
11100.660			219.0	1.7			H-Horn	PK	1.25E-07	-39.0	-13.0	-26.0	EUT on side
5550.103			360.0	1.5			V-Horn	PK	1.22E-07	-39.1	-13.0	-26.1	EUT vertical
11100.750			317.0	1.0			V-Horn	PK	1.22E-07	-39.1	-13.0	-26.1	EUT vertical
11100.280			320.0	1.0			V-Horn	PK	1.19E-07	-39.2	-13.0	-26.2	EUT on side
11101.180			335.0	1.0			H-Horn	PK	1.17E-07	-39.3	-13.0	-26.3	EUT horizontal

NORTHWEST EMC

Out of Band Emissions

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard	Work Order:	ITRM0161
Serial Number:	Unknown	Date:	06/17/07
Customer:	Intermec Technologies Corporation	Temperature:	22
Attendees:	None	Humidity:	34%
Project:	None	Barometric Pres.:	30.1
Tested by:	Holly Ashkannejhad	Power: Battery	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 24E:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

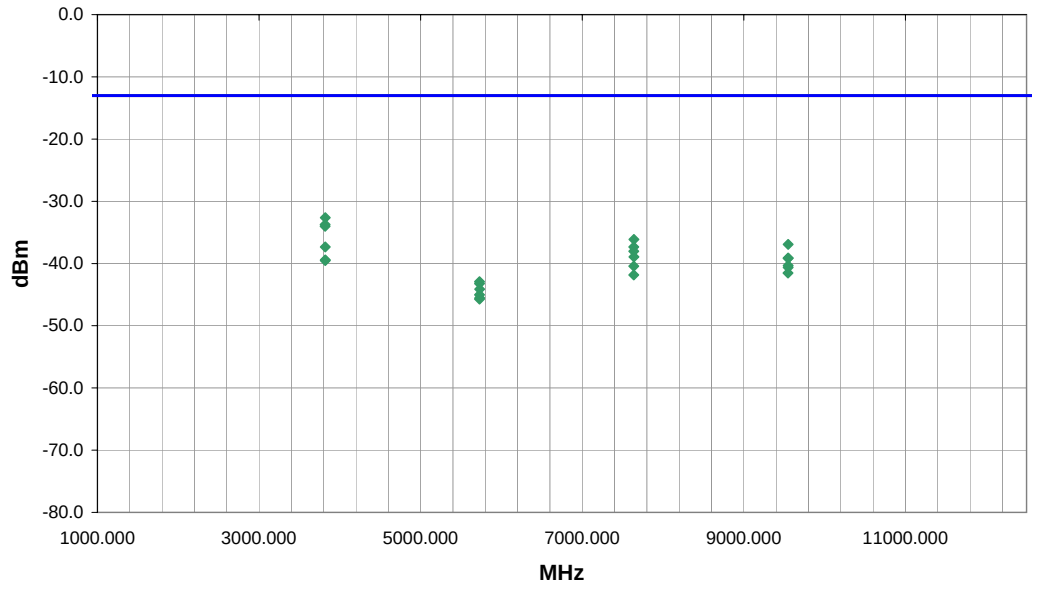
Transmitting GSM in PCS band high channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	8
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
3820.790			333.0	1.0			V-Horn	PK	5.46E-07	-32.6	-13.0	-19.6	EUT on side
3818.570			24.0	1.0			H-Horn	PK	4.24E-07	-33.7	-13.0	-20.7	EUT horizontal
3818.165			319.0	1.0			V-Horn	PK	3.95E-07	-34.0	-13.0	-21.0	EUT horizontal
7639.290			360.0	1.5			V-Horn	PK	2.44E-07	-36.1	-13.0	-23.1	EUT vertical
9548.999			306.0	1.0			V-Horn	PK	2.03E-07	-36.9	-13.0	-23.9	EUT on side
3820.930			162.0	1.0			H-Horn	PK	1.85E-07	-37.3	-13.0	-24.3	EUT vertical
7637.720			287.0	1.0			H-Horn	PK	1.85E-07	-37.3	-13.0	-24.3	EUT vertical
7637.905			355.0	1.0			V-Horn	PK	1.57E-07	-38.0	-13.0	-25.0	EUT horizontal
7639.245			16.0	1.0			H-Horn	PK	1.28E-07	-38.9	-13.0	-25.9	EUT horizontal
9548.969			84.0	1.8			H-Horn	PK	1.22E-07	-39.1	-13.0	-26.1	EUT on side
9549.379			314.0	1.0			V-Horn	PK	1.22E-07	-39.1	-13.0	-26.1	EUT horizontal
3820.450			325.0	1.0			V-Horn	PK	1.14E-07	-39.4	-13.0	-26.4	EUT vertical
3820.960			181.0	3.0			H-Horn	PK	1.11E-07	-39.5	-13.0	-26.5	EUT on side
9550.119			244.0	1.0			H-Horn	PK	9.27E-08	-40.3	-13.0	-27.3	EUT vertical
7638.730			256.0	1.0			H-Horn	PK	9.06E-08	-40.4	-13.0	-27.4	EUT on side
9548.394			41.0	1.0			H-Horn	PK	8.65E-08	-40.6	-13.0	-27.6	EUT horizontal
9547.604			112.0	1.0			V-Horn	PK	7.03E-08	-41.5	-13.0	-28.5	EUT vertical
7637.775			23.0	1.0			V-Horn	PK	6.56E-08	-41.8	-13.0	-28.8	EUT on side
5728.875			322.0	1.0			V-Horn	PK	5.09E-08	-42.9	-13.0	-29.9	EUT vertical
5729.120			348.0	1.0			H-Horn	PK	4.75E-08	-43.2	-13.0	-30.2	EUT vertical


NWEMC GSM Test SIM installed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Effective Radiated Power (ERP)

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Transmitting GSM in Cellular band

MODE USED FOR FINAL DATA
Transmitting GSM in Cellular band

POWER SETTINGS INVESTIGATED
Battery

POWER SETTINGS USED FOR FINAL DATA
Battery

FREQUENCY RANGE INVESTIGATED			
Start Frequency	824 MHz	Stop Frequency	849 MHz

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
Universal Radio Communication Teste	Rhode & Schwartz	CMU200	BSU	12/21/2006	24
EV01 cables c,g, h			EVA	12/29/2006	13

MEASUREMENT BANDWIDTHS

	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.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and/or receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003).

The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the dipole antenna and its gain (dBi); the effective radiated power for each radiated spurious emission was determined.

NORTHWEST EMC

Effective Radiated Power (ERP)

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard			Work Order:	ITRM0161
Serial Number:	Unknown			Date:	06/16/07
Customer:	Intermec Technologies Corporation			Temperature:	23
Attendees:	None			Humidity:	33%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 22H:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

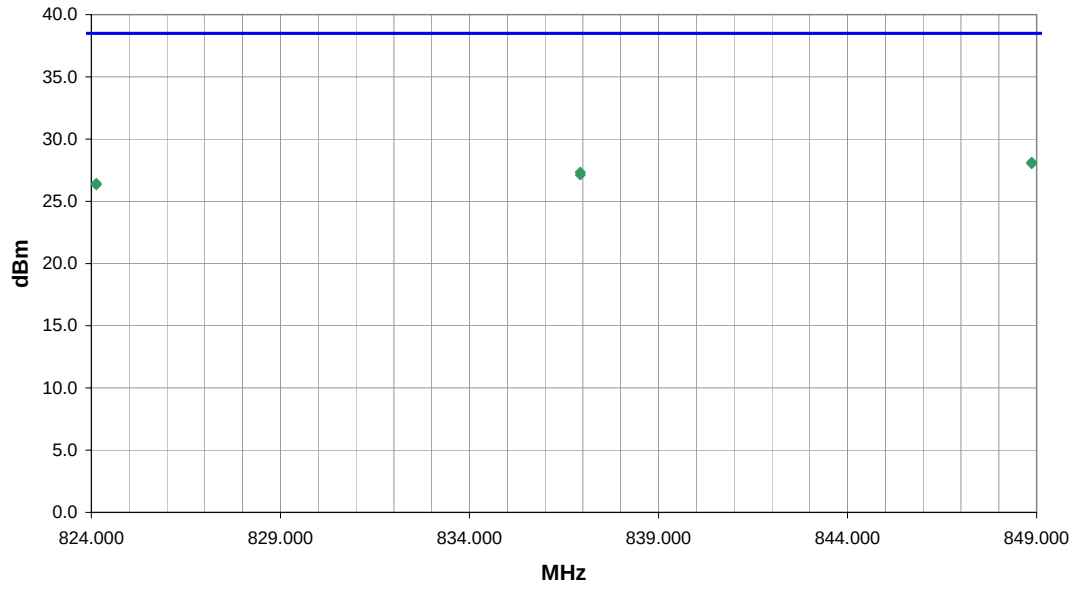
Transmitting GSM in Cellular band

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	ERP (Watts)	ERP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
848.868			120.0	1.2			V-Bilog	PK	6.50E-01	28.1	38.5	-10.4	EUT vertical
848.868			190.0	1.0			H-Bilog	PK	6.36E-01	28.0	38.5	-10.5	EUT on side
836.933			91.0	1.2			V-Bilog	PK	5.41E-01	27.3	38.5	-11.2	EUT vertical
836.932			91.0	1.1			H-Bilog	PK	5.17E-01	27.1	38.5	-11.4	EUT on side
824.132			94.0	1.2			V-Bilog	PK	4.40E-01	26.4	38.5	-12.1	EUT vertical
824.132			83.0	1.1			H-Bilog	PK	4.30E-01	26.3	38.5	-12.2	EUT on side


NWEMC GSM Test SIM installed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Effective Radiated Power (EIRP)

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting GSM in PCS 1900 band

MODE USED FOR FINAL DATA

Transmitting GSM in PCS 1900 band

POWER SETTINGS INVESTIGATED

Battery

POWER SETTINGS USED FOR FINAL DATA

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	1850 MHz	Stop Frequency	1910 MHz

CLOCKS AND OSCILLATORS

None Provided

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2006	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	12
Antenna, Horn	EMCO	3115	AHE	10/3/2005	24
Signal Generator	Agilent	E8257D	TGX	1/25/2007	13
Power Meter	Gigatronics	8651A	SPM	9/19/2006	12
Power Sensor	Gigatronics	80701A	SPL	9/19/2006	12
EV01 cables g,h,j			EVB	5/10/2007	13

MEASUREMENT BANDWIDTHS

	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.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and/or receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003).

The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the dipole antenna and its gain (dBi); the effective radiated power for each radiated spurious emission was determined.

NORTHWEST EMC

Effective Radiated Power (EIRP)

PSA 2007.05.07
EMI 2006.12.20

EUT:	CN3 Large Keyboard			Work Order:	ITRM0161
Serial Number:	Unknown			Date:	06/16/07
Customer:	Intermec Technologies Corporation			Temperature:	23
Attendees:	None			Humidity:	33%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	Battery	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 24E:2006	ANSI/TIA/EIA-603-B:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

EUT OPERATING MODES

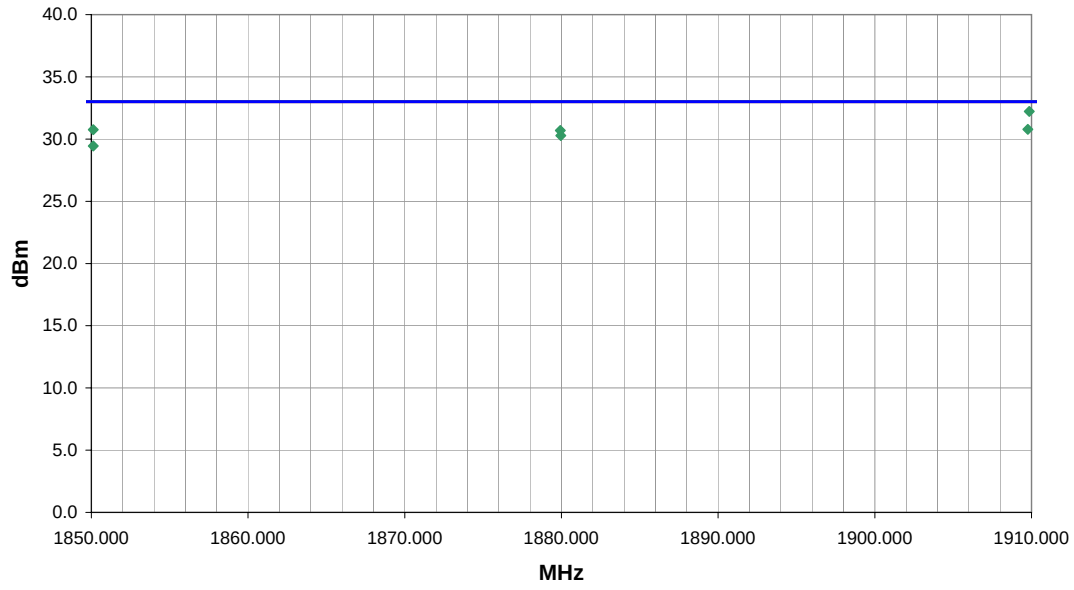
Transmitting GSM in PCS 1900 band

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	1
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
1909.858			194.0	1.1			H-Horn	PK	1.67E+00	32.2	33.0	-0.8	EUT on side
1909.768			303.0	1.2			V-Horn	PK	1.20E+00	30.8	33.0	-2.2	EUT horizontal
1850.120			197.0	1.1			H-Horn	PK	1.19E+00	30.8	33.0	-2.2	EUT on side
1879.932			191.0	1.1			H-Horn	PK	1.17E+00	30.7	33.0	-2.3	EUT on side
1879.958			150.0	1.1			V-Horn	PK	1.07E+00	30.3	33.0	-2.7	EUT horizontal
1850.120			320.0	1.3			V-Horn	PK	8.79E-01	29.4	33.0	-3.6	EUT horizontal


NWEMC GSM Test SIM installed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