# Intermec Technologies Corporation

# Bluetooth Module, FCC ID: EHABTS080

Report No. INMC0585

Report Prepared By



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

© 2010 Northwest EMC, Inc



#### Certificate of Test Last Date of Test: May 22, 2010 Intermec Technologies Corporation Model: Bluetooth Module, FCC ID: EHABTS080

Emissions					
Test Description	Specification	Test Method	Pass/Fail		
Spurious Radiated Emissions	FCC 15.247:2010	ANSI.C63.10:2009	Pass		
AC Powerline Conducted Emissions	FCC 15.207:2010	ANSI.C63.10:2009	Pass		

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 (Site filing #2834D-1).

Approved By:
Donald Mantan
Don Facteau, IS Manager

NVLAP Lab Code: 200630-0

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

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



Revision Number	Description	Date	Page Number
00	None		

**Barometric Pressure** 

The recorded barometric pressure has been normalized to sea level.



# Accreditations and Authorizations

### 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 2004/108/EC, 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.

### **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-Gen, Issue 2 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. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)

### 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.

### 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).



NVLAP LAB CODE 200629-0 NVLAP LAB CODE 200630-0 NVLAP LAB CODE 200676-0 NVLAP LAB CODE 200761-0 NVLAP LAB CODE 200881-0









## Accreditations and Authorizations

### 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, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).* 

### 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 (US0017). 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

### KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)

### VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

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

















## **Northwest EMC Locations**





Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy Suite 400 Hillsboro, OR 97124 (503) 844-4066 California Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918 Minnesota Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281 Washington Labs SU01-SU07 14128 339<sup>th</sup> Ave. SE Sultan, WA 98294 (360) 793-8675 New York Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796









Rev 11/17/06

#### Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	6001 36th Avenue West
City, State, Zip:	Everett, WA 98203-1264
Test Requested By:	Sean MacKellar
Model:	Bluetooth Module, FCC ID: EHABTS080
First Date of Test:	May 20, 2010
Last Date of Test:	May 22, 2010
Receipt Date of Samples:	May 19, 2010
Equipment Design Stage:	Production
Equipment Condition:	No Damage

#### Information Provided by the Party Requesting the Test

#### Functional Description of the EUT (Equipment Under Test): Bluetooth Module

#### **Testing Objective:**

To demonstrate compliance of FCC ID: EHABTS080 to FCC 15.247 requirements while in a stand-alone configuration.



### Configurations

### **CONFIGURATION 1 INMC0585**

Software/Firmware Running during test	
Description	Version
BluetestC	Unknown

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Bluetooth Module	Intermec	BTS080	0906003659		

Peripherals in test setup boundary				
Description	Manufacturer	Model/Part Number	Serial Number	
Host hand held computer	Intermec	CK31	33020826067	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Module ribbon cable	No	0.3m	No	Bluetooth Module	Host hand held computer
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

### CONFIGURATION 2 INMC0585

Software/Firmware Running during test			
Description	Version		
BluetestC	Unknown		

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Bluetooth Module	Intermec	BTS080	0906003659		

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Host hand held computer	Intermec	CK31	33020826067		
CK31 battery replacer module	Intermec	None	None		
DC Power Supply	Topward	TPS-2000	TPD		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Module ribbon cable	No	0.3m	No	Bluetooth Module	Host hand held computer
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					



Equipment modifications						
Item	Date	Test	Modification	Note	Disposition of EUT	
1	5/20/2010	Spurious Radiated Emissions	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	5/22/2010	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.	

# **EMC**

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION							
Transmitting Bluetooth DH5							
CHANNELS TESTED							
Low channel, 2402 MHz							
Mid channel, 2441 MHz							
High channel, 2480 MHz							
<u> </u>							
POWER SETTINGS INVESTIGATED	)						
DC from Host							
CONFIGURATIONS INVESTIGATED	)						
INMC0585 - 1							
111100303							
EREQUENCY RANGE INVESTIGAT	'ED						
Start Frequency	20 MHz	Stop Fraguapay	25.047				
Start Trequency	30 10112	Stop Trequency		25 0112			
CLOCKS AND OSCILLATORS							
CLOCKS AND USCILLATORS							
INONE Provided							
SAMPLE CALCULATIONS							
SAMPLE CALCULATIONS							
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation							
TEST FOUR							
Description	Manufacturor	Model	ID	Lact Cal	Intorvol		
Enoctrum Analyzor				1/6/2010	12 ma		
Spectrum Analyzer	Aglient Micro Tropico			7/10/2010	13 mo		
Low Pass Filter 0-1000 MHz	MICRO-TRONICS	LPIVI50004	LFD	7/10/2009	13 mo		
High Pass Filter	Micro-Tronics	HPM50111	HFO	7/10/2009	13 mo		
Pre-Amplifier	Miteq	AM-1616-1000	AOL	7/10/2009	13 mo		
Antenna, Biconilog	EMCO	3141	AXE	1/14/2010	13 mo		
EV01 Cables	N/A	Bilog Cables	EVA	7/10/2009	13 mo		
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/10/2009	13 mo		
Antenna, Horn	EMCO	3115	AHC	8/12/2008	24 mo		
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	7/10/2009	13 mo		
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	7/10/2009	13 mo		
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	7/10/2009	13 mo		
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo		
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	4/2/2010	13 mo		
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	5/19/2009	13 mo		
Antenna Horn	FTOLL	0400.00	A I) /	NCD	0		
Antenna, Hom	ETS Lindgren	3160-09	AIV	NCK	0 mo		

MEASUREMENT BANDWIDTHS						
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data		
	(MHz)	(kHz)	(kHz)	(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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC						
Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.						

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

#### TEST DESCRIPTION

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 the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.





### AC POWERLINE CONDUCTED 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 Bluetooth DH5 (15, 339), high channel Transmitting Bluetooth DH5 (15, 339), mid channel Transmitting Bluetooth DH5 (15, 339), low channel

#### **POWER SETTINGS INVESTIGATED**

120VAC/60Hz

#### **CONFIGURATIONS INVESTIGATED**

INMC0585 - 2

#### SAMPLE CALCULATIONS

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

TEST EQUIPMENT						
Description	Manufacturer	Model	ID	Last Cal.	Interval	
Receiver	Rohde & Schwarz	ESCI	ARE	4/29/2010	12 mo	
Attenuator	Coaxicom	66702 2910-20	ATO	7/21/2009	13 mo	
High Pass Filter	TTE	H97-100K-50-720B	HFX	2/16/2010	13 mo	
LISN	Solar	9252-50-R-24-BNC	LIP	3/2/2010	13 mo	
EV07 Cables	N/A	Conducted Cables	EVG	6/1/2009	13 mo	

#### MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data		
	(MHz)	(kHz)	(kHz)	(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

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

#### TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm.











