Intermec Technologies Corporation

BTM4 module 10mW

February 19, 2008

Report No. ITRM0173 Rev. 2

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: February 19, 2008
Intermec Technologies Corporation
Model: BTM4 module 10mW

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Spurious Radiated Emissions	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Peak Output Power	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Occupied Bandwidth	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Band Edge Compliance	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Power Spectral Density	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
Spurious Conducted Emissions	FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000	**Pass**
AC Power Line Conducted Emissions	FCC 15.207:2007	ANSI C63.4:2003	**Pass**

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

Test Facility

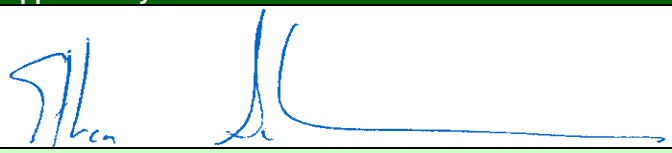
The measurement facility used to collect the data is located at:

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.

Approved By:



Ethan Schoonover, Sultan Lab 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
01	Changed report number on cover page	2/27/08	Cover Page
01	Changed EUT name to BTM4 module 10mW.	2/27/08	Cover page, 2, 7, 8, 9, 12-15, 20, 25, 30, 34, 43, 48-53
02	Changed the functional description of the EUT to state the following: “The BTM4 module is a new Bluetooth radio for use in Intermec products. Power reduction to 10 mW will allow use in portable applications without SAR RF Exposure testing.”	3-3-08	7

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.

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).*

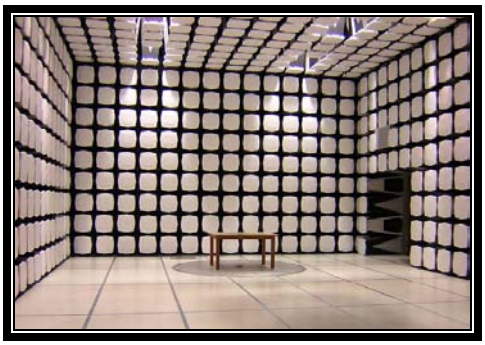
BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.

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

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

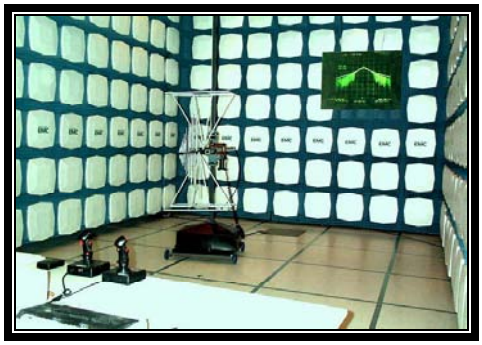
SCOPE

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:	Dave Fry
Model:	BTM4 module 10 mW
First Date of Test:	February 1, 2008
Last Date of Test:	February 7, 2008
Receipt Date of Samples:	February 1, 2008
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

The BTM4 module is a new Bluetooth radio for use in Intermec products. Power reduction to 10 mW will allow use in portable applications without SAR RF Exposure testing.

Testing Objective:

The Bluetooth radio (from Socket Communications) has testing under FCC ID: LUBBTM-4). Intermec will be testing the Bluetooth radio under their own FCC ID: EHA-BTM4 for full modular appproval with a lower output power than used in the Socket Communications grant (9mW vs. 28mW). The Bluetooth radio operates in the 2400-2483.5MHz band; Intermec will only be utilizing GFSK modulation.

CONFIGURATION 1 ITRM0173

Software/Firmware Running during test	
Description	**Version**
CSR BlueTest3	
BC4 firmware	4279

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth module	Socket Communications	BTM4	Unknown

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Test Fixture	Socket Communicatinos	BC02/BC04 Development Board	Unknown
Laptop	IBM	Type 2647-4EU	78-P7DA9
Laptop Power Supply	IBM	AA21131	11S002K6756Z1Z2UF3385GN
Test Fixture Power Supply	Phihong	PSC05R-050	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Parallel	Yes	1.3m	No	Laptop	Test Fixture
Control	No	0.1m	No	Test Fixture	Bluetooth module
DC	No	1.3m	No	Test Fixture	Test Fixture Power Supply
DC	No	1.3m	No	Laptop	Laptop Power Supply
AC	No	1.0m	No	Laptop Power Supply	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 ITRM0173

Software/Firmware Running during test	
Description	**Version**
CSR BlueTest3	
BC4 firmware	4279

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth module	Socket Communications	BTM4	0744000329

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Test Fixture	Socket Communicatinos	BC02/BC04 Development Board	Unknown
Test Fixture Power Supply	Phihong	PSC05R-050	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC	No	1.3m	No	Test Fixture	Test Fixture Power Supply
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 3 ITRM0173

Software/Firmware Running during test	
Description	**Version**
CSR BlueTest3	
BC4 firmware	4279

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth module	Socket Communications	BTM4	0744000329

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Test Fixture	Socket Communicatinos	BC02/BC04 Development Board	Unknown
Linear Power Supply	CUI Stack	DV-51AAT	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC	No	1.3m	No	Test Fixture	Test Fixture Power Supply
AC	No	1.0m	No	Linear Power Supply	AC Mains
DC	No	0.4m	No	Test Fixture	Linear Power Supply
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	2/1/2008	Band Edge Compliance	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	2/1/2008	Occupied Bandwidth	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.
3	2/1/2008	Peak Output Power	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.
4	2/1/2008	Power Spectral Density	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.
5	2/1/2008	Spurious Conducted 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.
6	2/4/2008	Radiated Spurious Emissions - Bluetooth	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.
7	2/7/2008	AC Power Line Conducted Emissions - Bluetooth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing completed.

RADIATED SPURIOUS 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, Software power level = 255/34, GFSK, DH5, low channel
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5, Mid channel
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5, High channel

POWER SETTINGS INVESTIGATED
120VAC/60Hz

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	25 GHz

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	12/7/2007	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	16
Antenna, Biconilog	EMCO	3141	AXE	1/15/2008	24
EV01 Cables		Bilog Cables	EVA	10/23/2007	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	1/16/2008	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	1/3/2008	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	24
EV01 Cables		Double Ridge Horn Cables	EVB	1/3/2008	13
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	6/22/2007	13
Antenna, Horn	ETS	3160-07	AHU	NCR	0
EV01 Cables		Standard Gain Horns Cables	EVF	10/23/2007	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	6/22/2007	13
Antenna, Horn	ETS	3160-08	AHV	NCR	0
EV01 Cables		Standard Gain Horns Cables	EVF	10/23/2007	13
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	7/25/2007	13
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 Cables		18-26GHz Standard Gain Horn Cable	EVD	7/25/2007	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 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 C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

RADIATED SPURIOUS EMISSIONS

PSA 2007.05.07
EMI 2008.1.9

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/04/08
Customer:	Intermec Technologies Corporation			Temperature:	22°C
Attendees:	None			Humidity:	24%
Project:	None			Barometric Pres.:	30.26
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Bluetooth module powered through test fixture

EUT OPERATING MODES

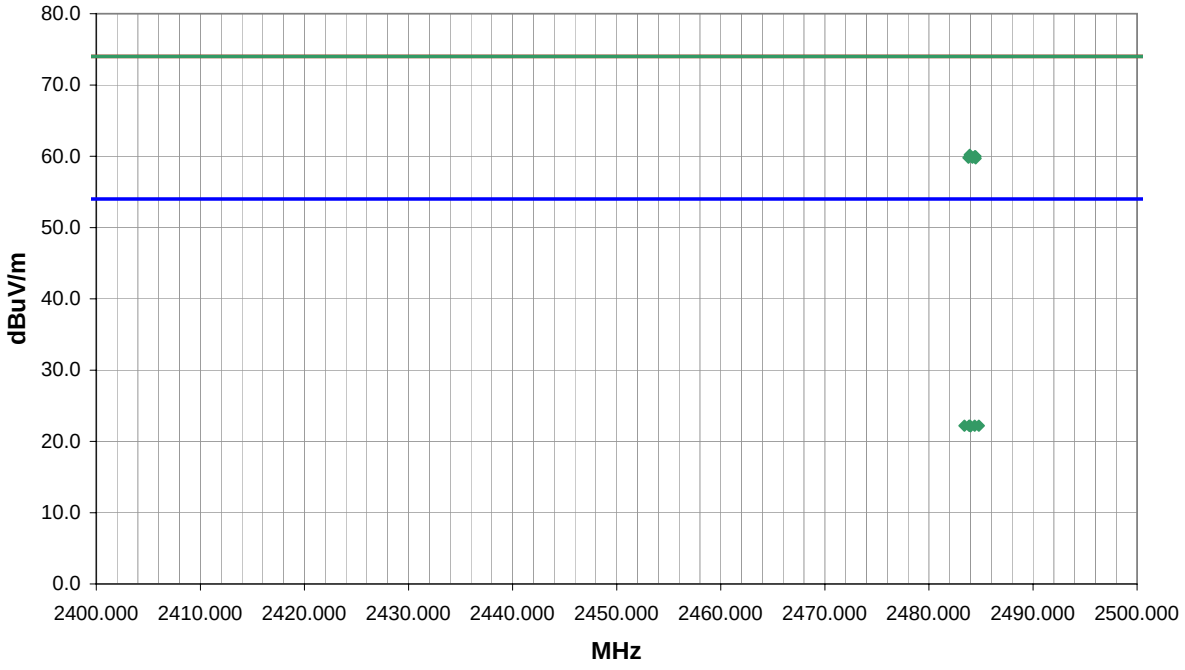
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5, High channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	2
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.922	38.0	2.2	8.0	1.0	0.0	20.0	H-Horn	PK	0.0	60.2	74.0	-13.8
2484.410	37.8	2.2	246.0	1.0	0.0	20.0	H-Horn	PK	0.0	60.0	74.0	-14.0
2484.468	37.8	2.2	59.0	1.6	0.0	20.0	V-Horn	PK	0.0	60.0	74.0	-14.0
2483.797	37.6	2.2	13.0	1.0	0.0	20.0	H-Horn	PK	0.0	59.8	74.0	-14.2
2484.175	37.6	2.2	329.0	1.7	0.0	20.0	V-Horn	PK	0.0	59.8	74.0	-14.2
2484.487	37.5	2.2	69.0	1.0	0.0	20.0	V-Horn	PK	0.0	59.7	74.0	-14.3
2483.407	24.0	2.2	246.0	1.0	24.0	20.0	H-Horn	AV	0.0	22.2	54.0	-31.8
2483.852	24.0	2.2	8.0	1.0	24.0	20.0	H-Horn	AV	0.0	22.2	54.0	-31.8
2483.942	24.0	2.2	59.0	1.6	24.0	20.0	V-Horn	AV	0.0	22.2	54.0	-31.8
2484.397	24.0	2.2	329.0	1.7	24.0	20.0	V-Horn	AV	0.0	22.2	54.0	-31.8
2484.798	24.0	2.2	69.0	1.0	24.0	20.0	V-Horn	AV	0.0	22.2	54.0	-31.8
2484.002	23.9	2.2	13.0	1.0	24.0	20.0	H-Horn	AV	0.0	22.1	54.0	-31.9

NORTHWEST EMC

RADIATED SPURIOUS EMISSIONS

PSA 2007.05.07
EMI 2008.1.9

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/04/08
Customer:	Intermec Technologies Corporation			Temperature:	22°C
Attendees:	None			Humidity:	24%
Project:	None			Barometric Pres.:	30.26
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Bluetooth module powered through test fixture

EUT OPERATING MODES

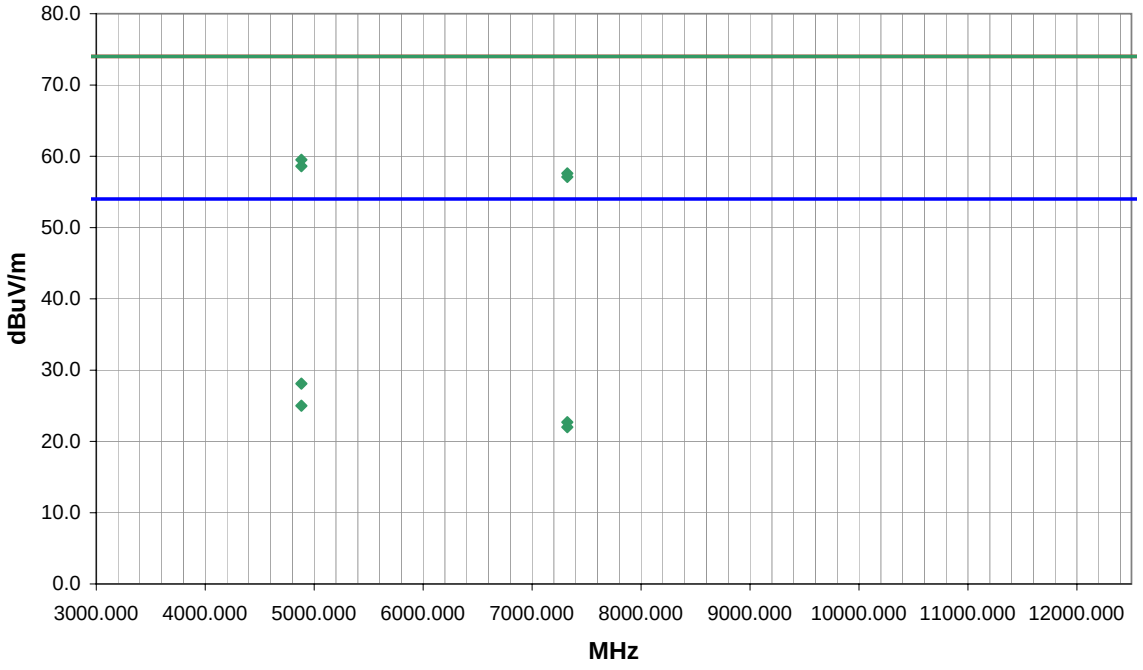
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5, Mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
Configuration #	2
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4882.314	49.0	10.5	94.0	1.0	0.0	0.0	V-Horn	PK	0.0	59.5	74.0	-14.5
4882.120	48.1	10.5	101.0	1.3	0.0	0.0	H-Horn	PK	0.0	58.6	74.0	-15.4
7322.596	40.5	17.1	198.0	1.1	0.0	0.0	H-Horn	PK	0.0	57.6	74.0	-16.4
7323.329	40.0	17.1	253.0	1.2	0.0	0.0	V-Horn	PK	0.0	57.1	74.0	-16.9
4882.056	41.6	10.5	94.0	1.0	24.0	0.0	V-Horn	AV	0.0	28.1	54.0	-25.9
4882.024	38.5	10.5	101.0	1.3	24.0	0.0	H-Horn	AV	0.0	25.0	54.0	-29.0
7323.013	29.6	17.1	198.0	1.1	24.0	0.0	H-Horn	AV	0.0	22.7	54.0	-31.3
7323.004	28.9	17.1	253.0	1.2	24.0	0.0	V-Horn	AV	0.0	22.0	54.0	-32.0

NORTHWEST EMC

RADIATED SPURIOUS EMISSIONS

PSA 2007.05.07
EMI 2008.1.9

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/04/08
Customer:	Intermec Technologies Corporation			Temperature:	22°C
Attendees:	None			Humidity:	24%
Project:	None			Barometric Pres.:	30.26
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Bluetooth module powered through test fixture

EUT OPERATING MODES

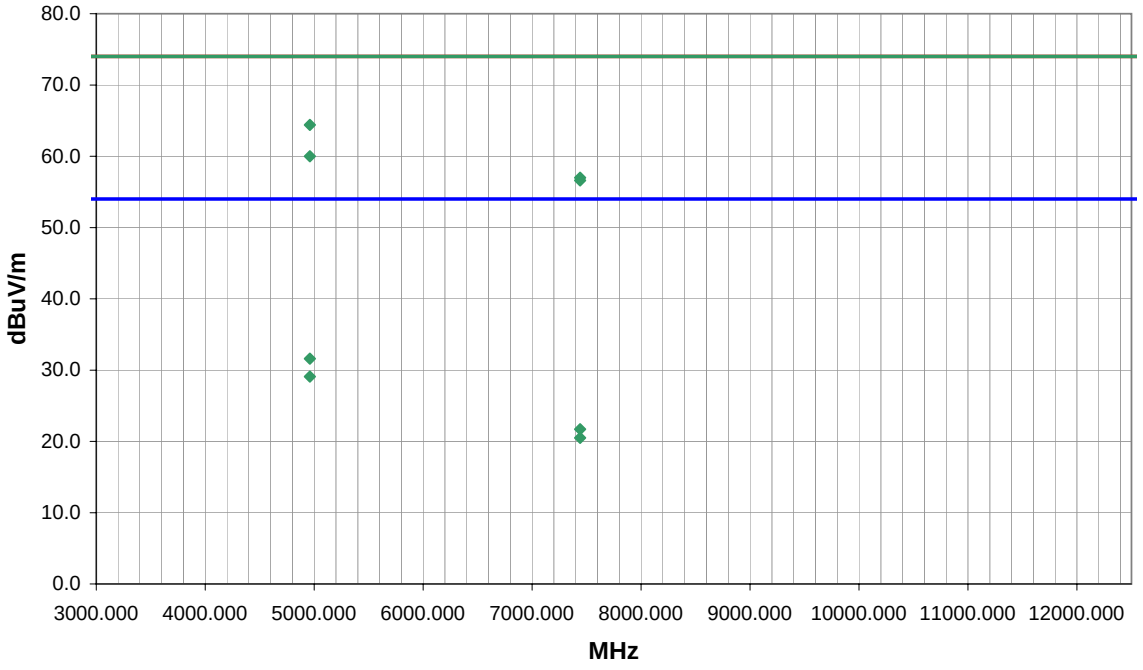
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5, High channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
Configuration #	2
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4960.343	53.4	11.0	97.0	1.0	0.0	0.0	V-Horn	PK	0.0	64.4	74.0	-9.6
4959.745	49.0	11.0	97.0	1.4	0.0	0.0	H-Horn	PK	0.0	60.0	74.0	-14.0
7440.242	39.3	17.7	195.0	1.1	0.0	0.0	H-Horn	PK	0.0	57.0	74.0	-17.0
7440.067	38.9	17.7	255.0	1.2	0.0	0.0	V-Horn	PK	0.0	56.6	74.0	-17.4
4960.010	44.6	11.0	97.0	1.0	24.0	0.0	V-Horn	AV	0.0	31.6	54.0	-22.4
4960.020	42.1	11.0	97.0	1.4	24.0	0.0	H-Horn	AV	0.0	29.1	54.0	-24.9
7440.021	28.0	17.7	195.0	1.1	24.0	0.0	H-Horn	AV	0.0	21.7	54.0	-32.3
7439.971	26.8	17.7	255.0	1.2	24.0	0.0	V-Horn	AV	0.0	20.5	54.0	-33.5

NORTHWEST EMC

RADIATED SPURIOUS EMISSIONS

PSA 2007.05.07
EMI 2008.1.9

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/04/08
Customer:	Intermec Technologies Corporation			Temperature:	22°C
Attendees:	None			Humidity:	24%
Project:	None			Barometric Pres.:	30.26
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Bluetooth module powered through test fixture

EUT OPERATING MODES

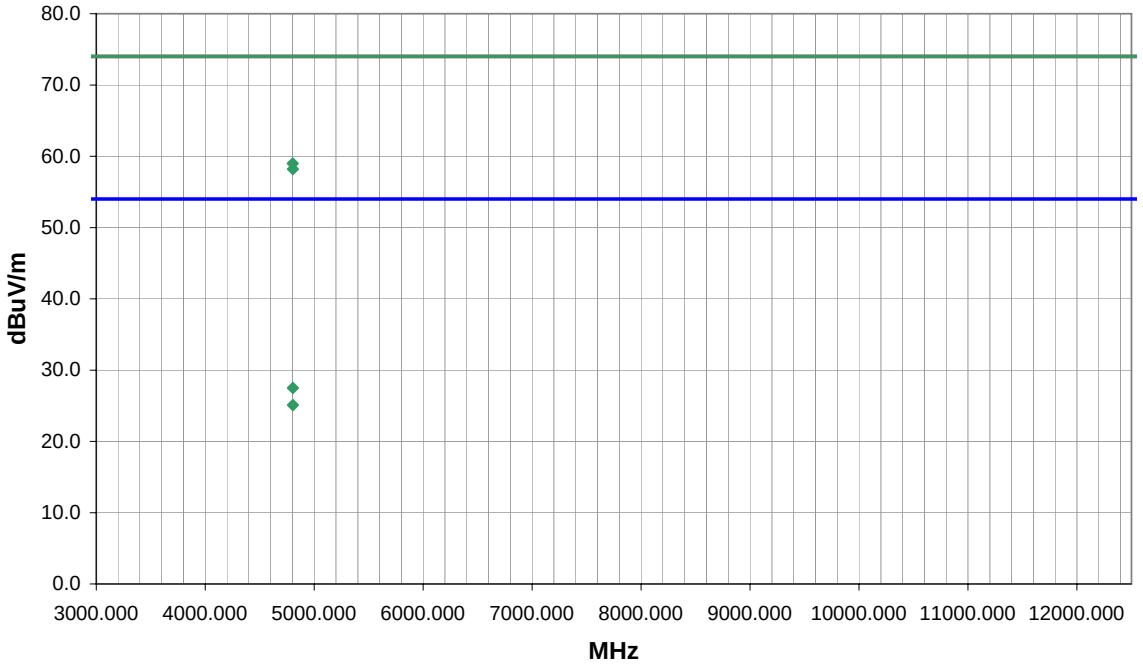
Transmitting Bluetooth, Software power level = 255/34, GFSK, DH5

DEVIATIONS FROM TEST STANDARD

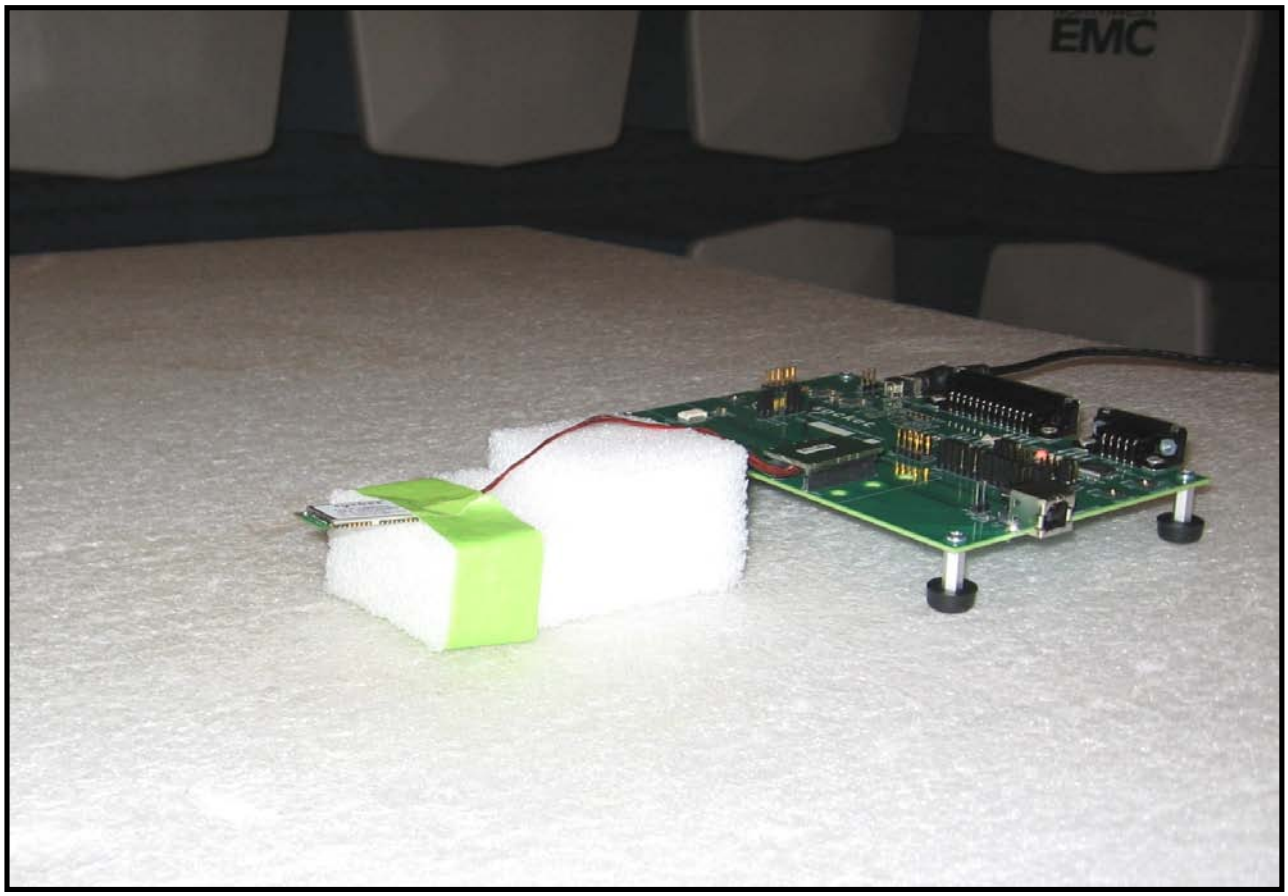
No deviations.

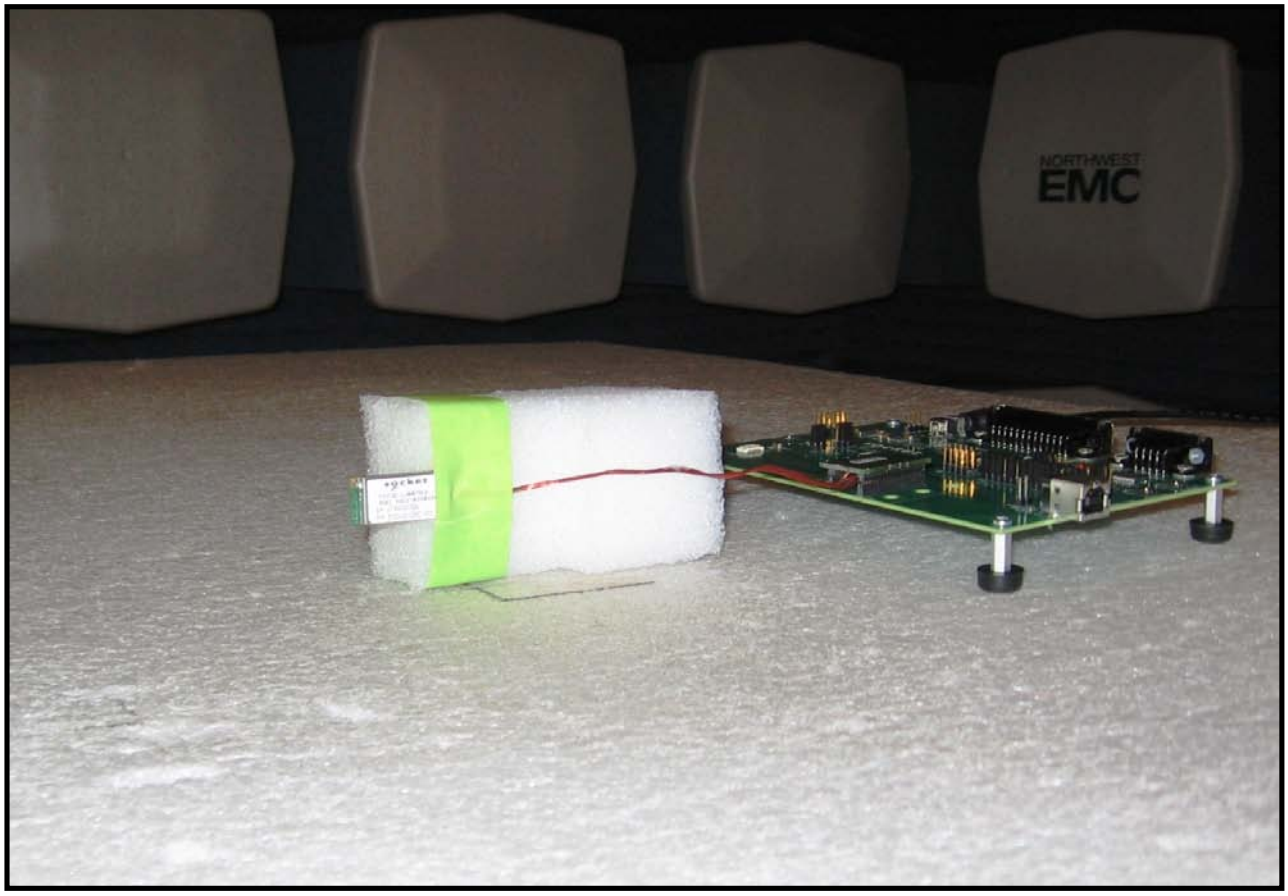
Run #	5
Configuration #	2
Results	Pass

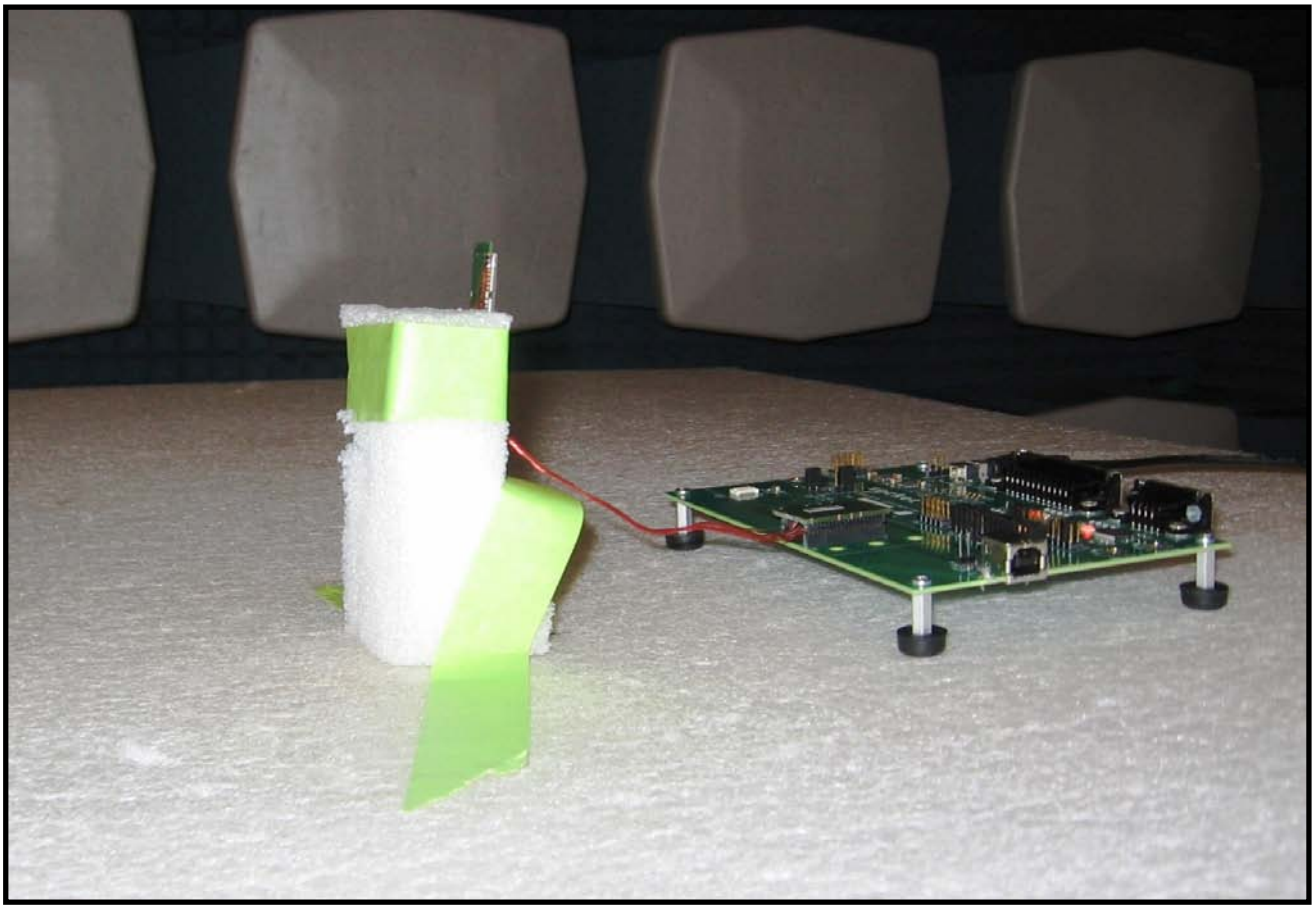
Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4803.732	48.9	10.1	93.0	1.2	0.0	0.0	V-Horn	PK	0.0	59.0	74.0	-15.0
4804.428	48.1	10.1	36.0	1.3	0.0	0.0	H-Horn	PK	0.0	58.2	74.0	-15.8
4804.044	41.4	10.1	93.0	1.2	24.0	0.0	V-Horn	AV	0.0	27.5	54.0	-26.5
4804.045	39.0	10.1	36.0	1.3	24.0	0.0	H-Horn	AV	0.0	25.1	54.0	-28.9


EMC


NORTHWEST
EMC



Occupied Bandwidth

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4446A	AAY	12/18/2007	12

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 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.

NORTHWEST EMC

Occupied Bandwidth

XMit 2007.06.13

EUT:	BTM4 module 10mW			**Work Order:**	ITRM0173
Serial Number:	0744000329			**Date:**	02/01/08
Customer:	Intermec Technologies Corporation			**Temperature:**	22C°C
Attendees:	None			**Humidity:**	26%
Project:	None			**Barometric Pres.:**	1017.6mb
Tested by:	Holly Ashkannejhad	**Power:**	120VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

COMMENTS

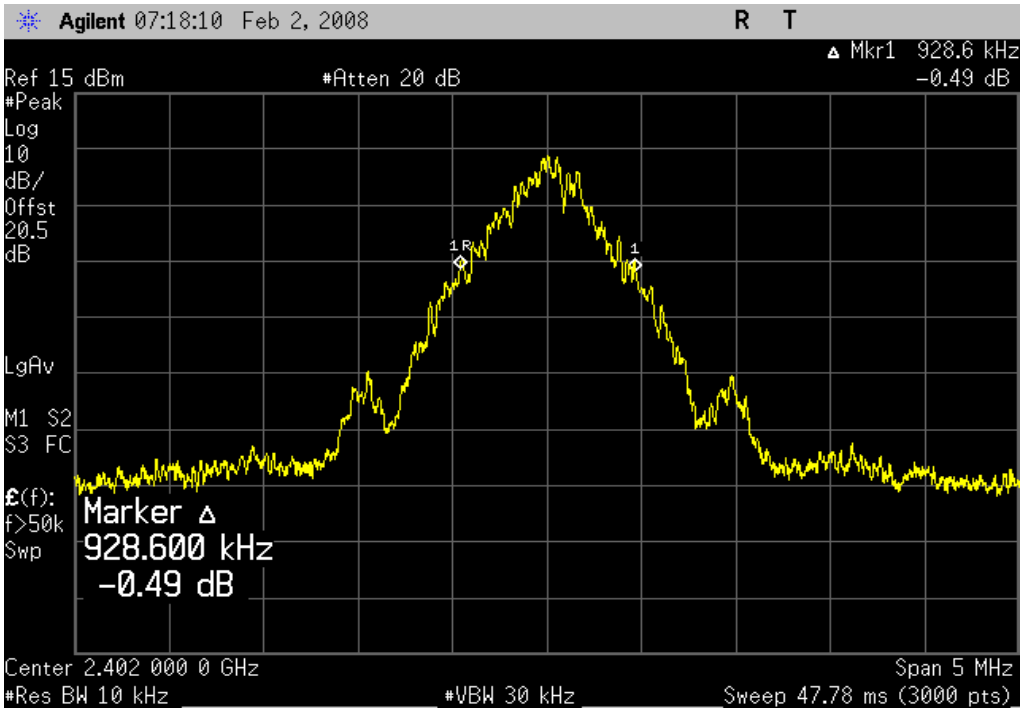
Bluetooth module powered through test fixture. Software power level = 255, 34.

DEVIATIONS FROM TEST STANDARD

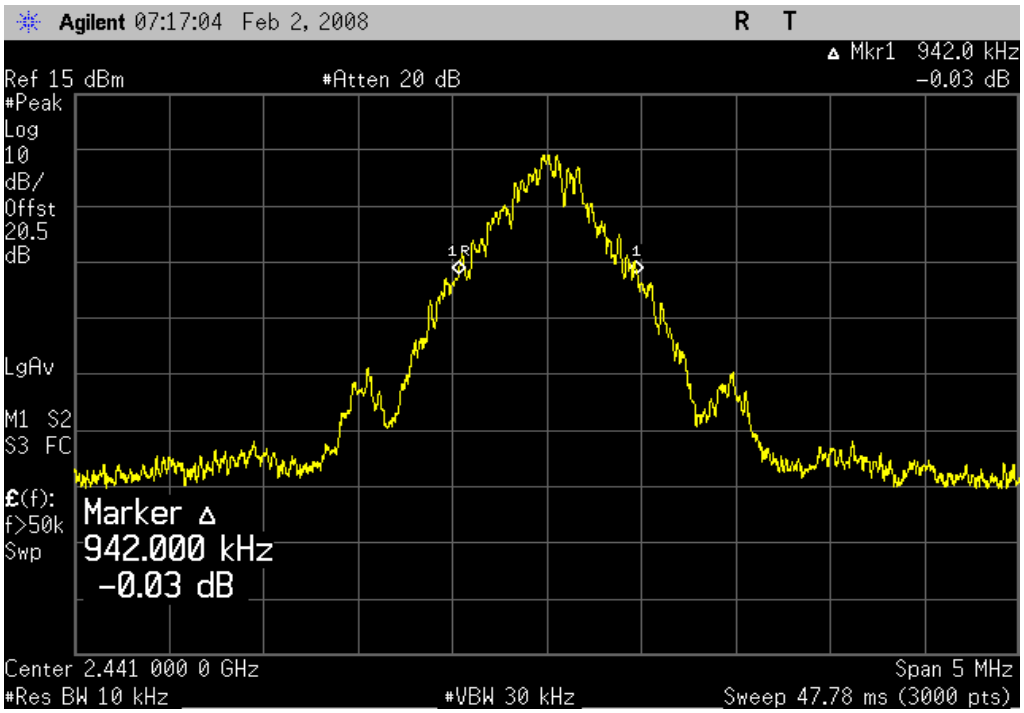
Configuration #	1	Signature Holly Ashkannejhad

	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	928.6 kHz	1.5 MHz	Pass
Mid channel, 2441MHz	942 kHz	1.5 MHz	Pass
High channel, 2480MHz	933.6 kHz	1.5 MHz	Pass

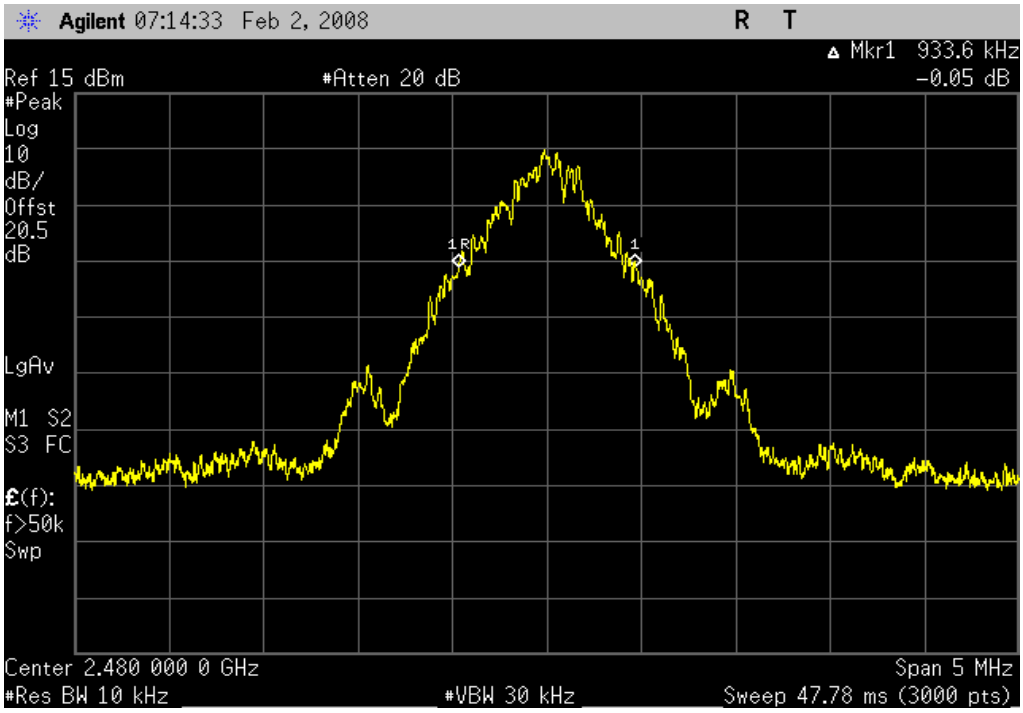
Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	928.6 kHz	**Limit:**	1.5 MHz



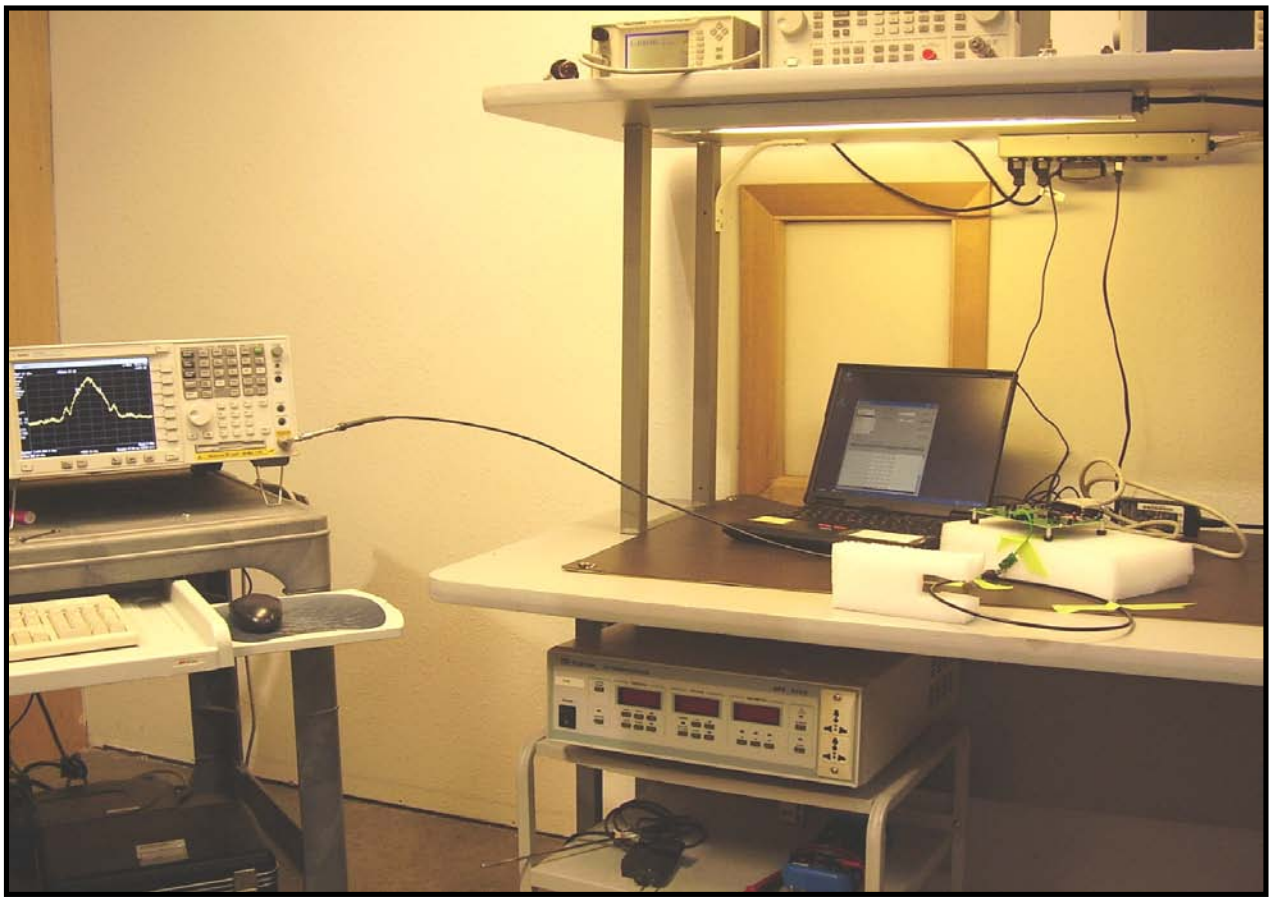
Bluetooth, GFSK, DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	942 kHz	**Limit:**	1.5 MHz

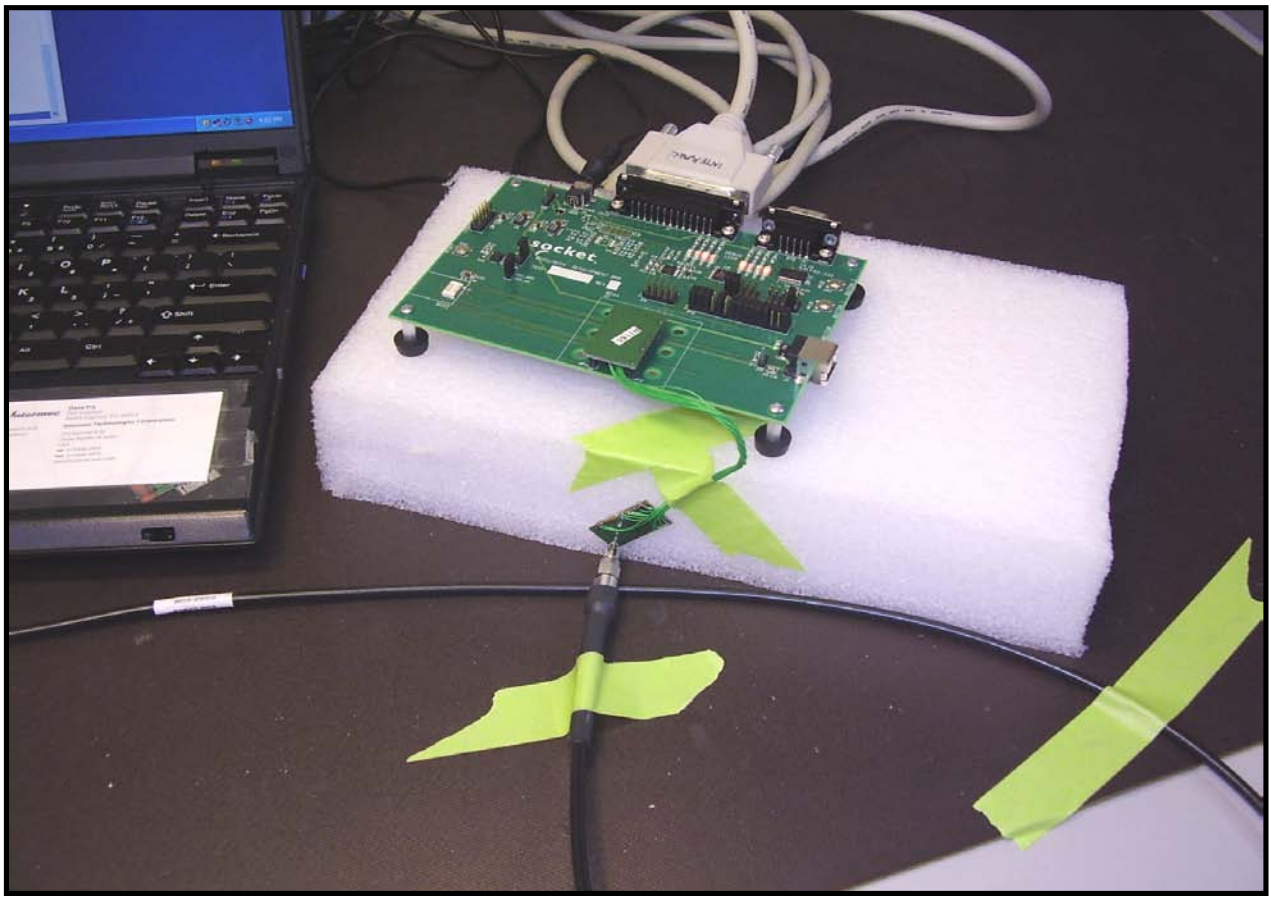


Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	933.6 kHz	**Limit:**	1.5 MHz



Occupied Bandwidth





Output Power

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4446A	AAY	12/18/2007	12

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 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.

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

NORTHWEST EMC

Output Power

XMit 2007.06.13

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/01/08
Customer:	Intermec Technologies Corporation			Temperature:	22C°C
Attendees:	None			Humidity:	26%
Project:	None			Barometric Pres.:	1017.6mb
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

COMMENTS

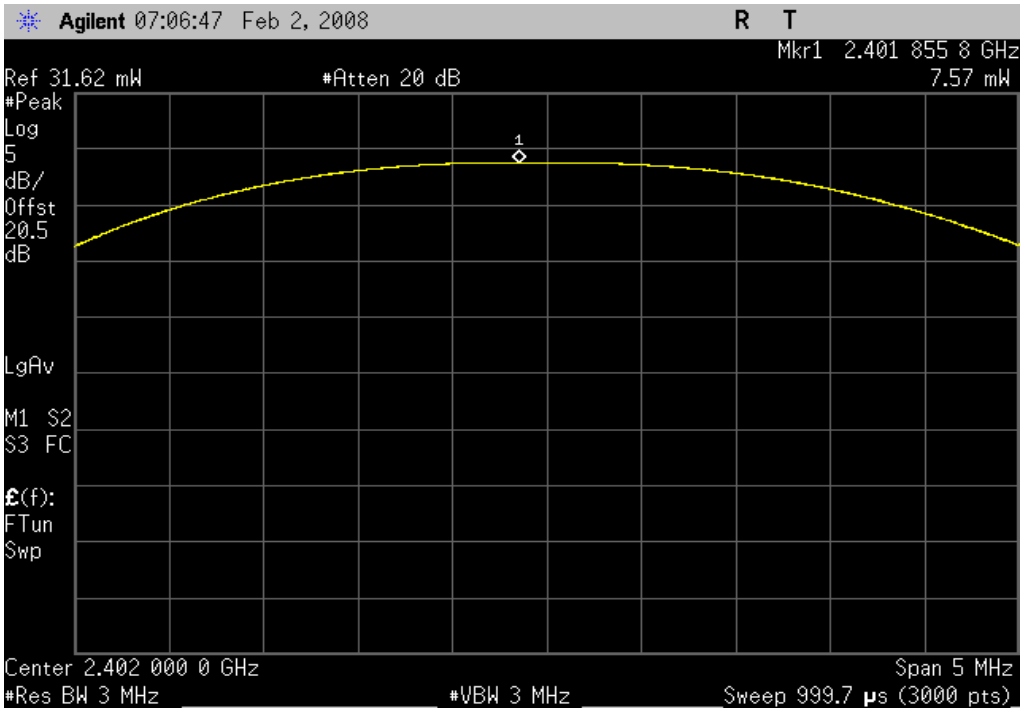
Bluetooth module powered through test fixture. Software power level = 255, 34.

DEVIATIONS FROM TEST STANDARD

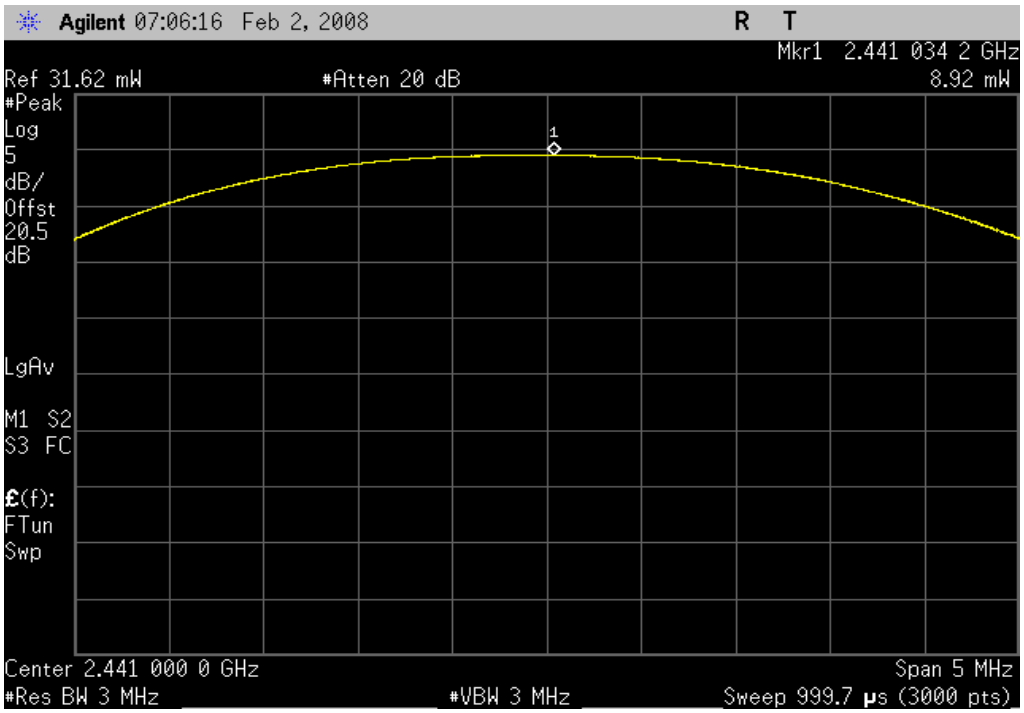
Configuration #	1	Signature Holly Ashkannejhad

	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	7.57 mW	1 Watt	Pass
Mid channel, 2441MHz	8.92 mW	1 Watt	Pass
High channel, 2480MHz	9.64 mW	1 Watt	Pass

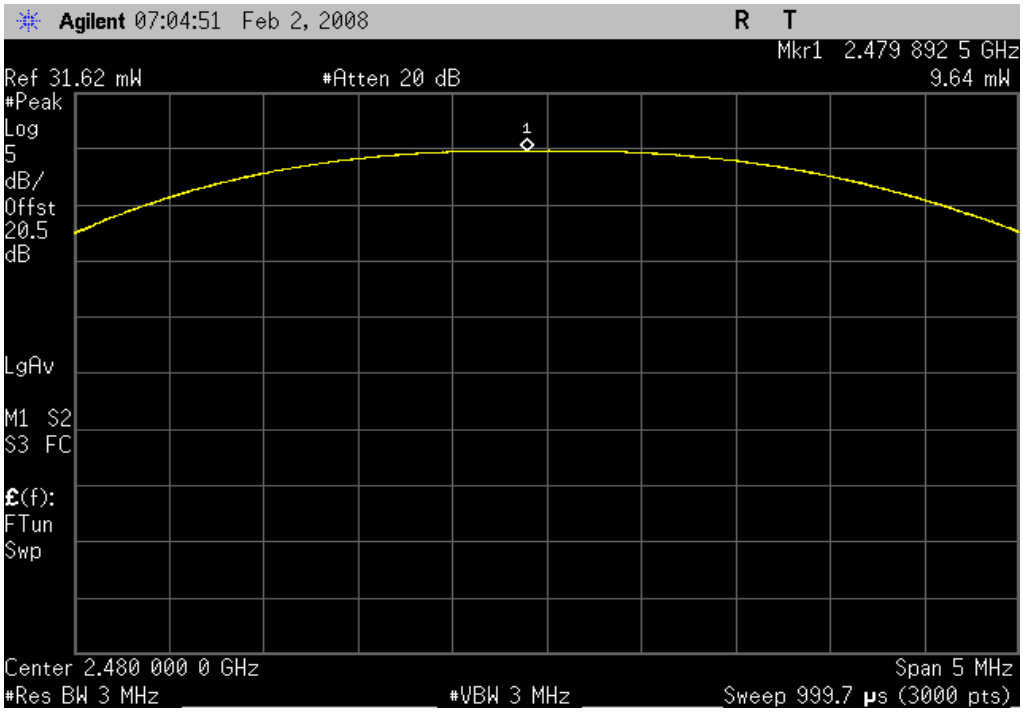
Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	7.57 mW	**Limit:**	1 Watt

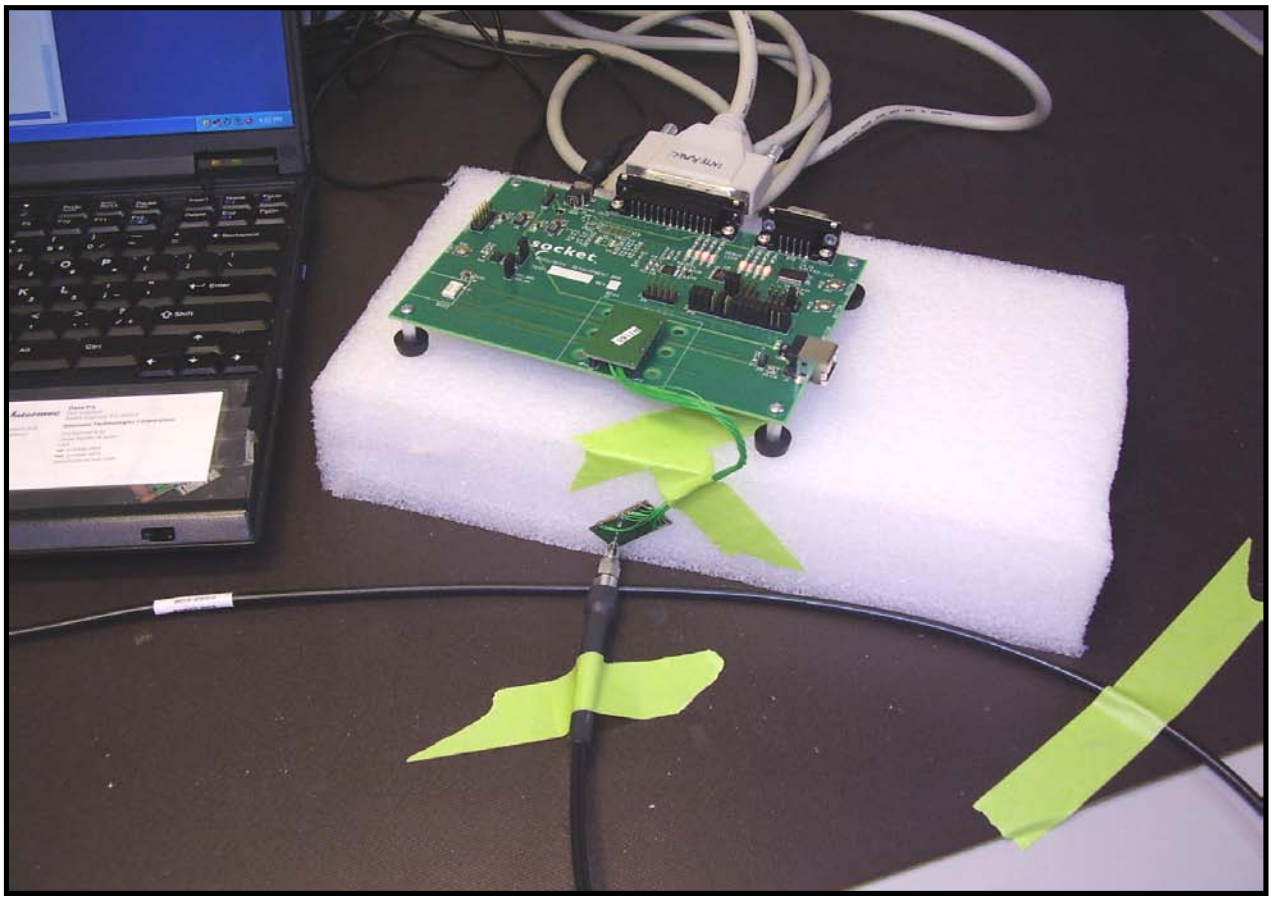


Bluetooth, GFSK, DH5, Mid channel, 2441MHz					
Result:	Pass	**Value:**	8.92 mW	**Limit:**	1 Watt



Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	9.64 mW	**Limit:**	1 Watt





Band Edge Compliance

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAY	12/18/2007	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13

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 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.

NORTHWEST EMC

Band Edge Compliance

XMit 2007.06.13

EUT:	BTM4 module 10mW			**Work Order:**	ITRM0173
Serial Number:	0744000329			**Date:**	02/01/08
Customer:	Intermec Technologies Corporation			**Temperature:**	22C°C
Attendees:	None			**Humidity:**	26%
Project:	None			**Barometric Pres.:**	1017.6mb
Tested by:	Holly Ashkannejhad	**Power:**	120VAC/60Hz	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

COMMENTS

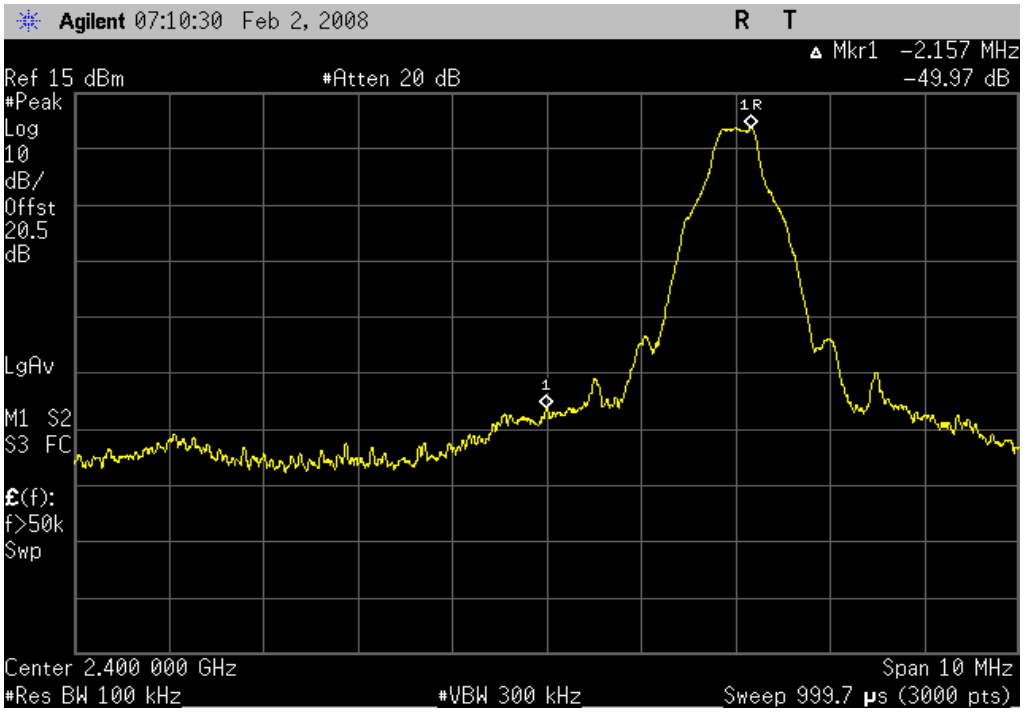
Bluetooth module powered through test fixture. Software power level = 255, 34.

DEVIATIONS FROM TEST STANDARD

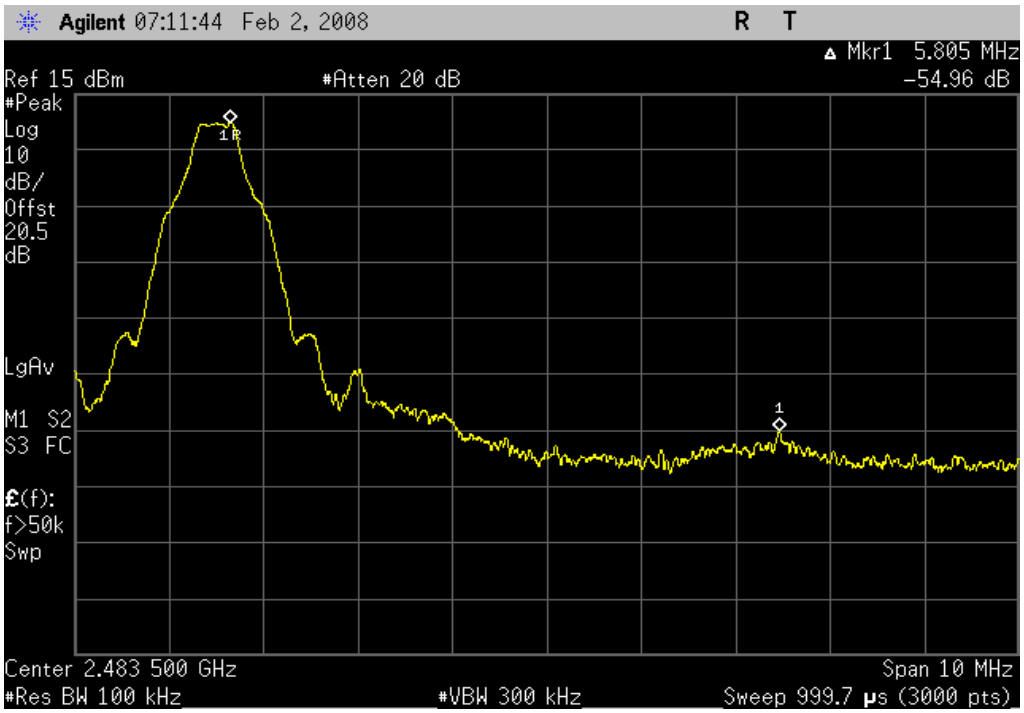
Configuration #	1	Signature Holly Ashkannejhad

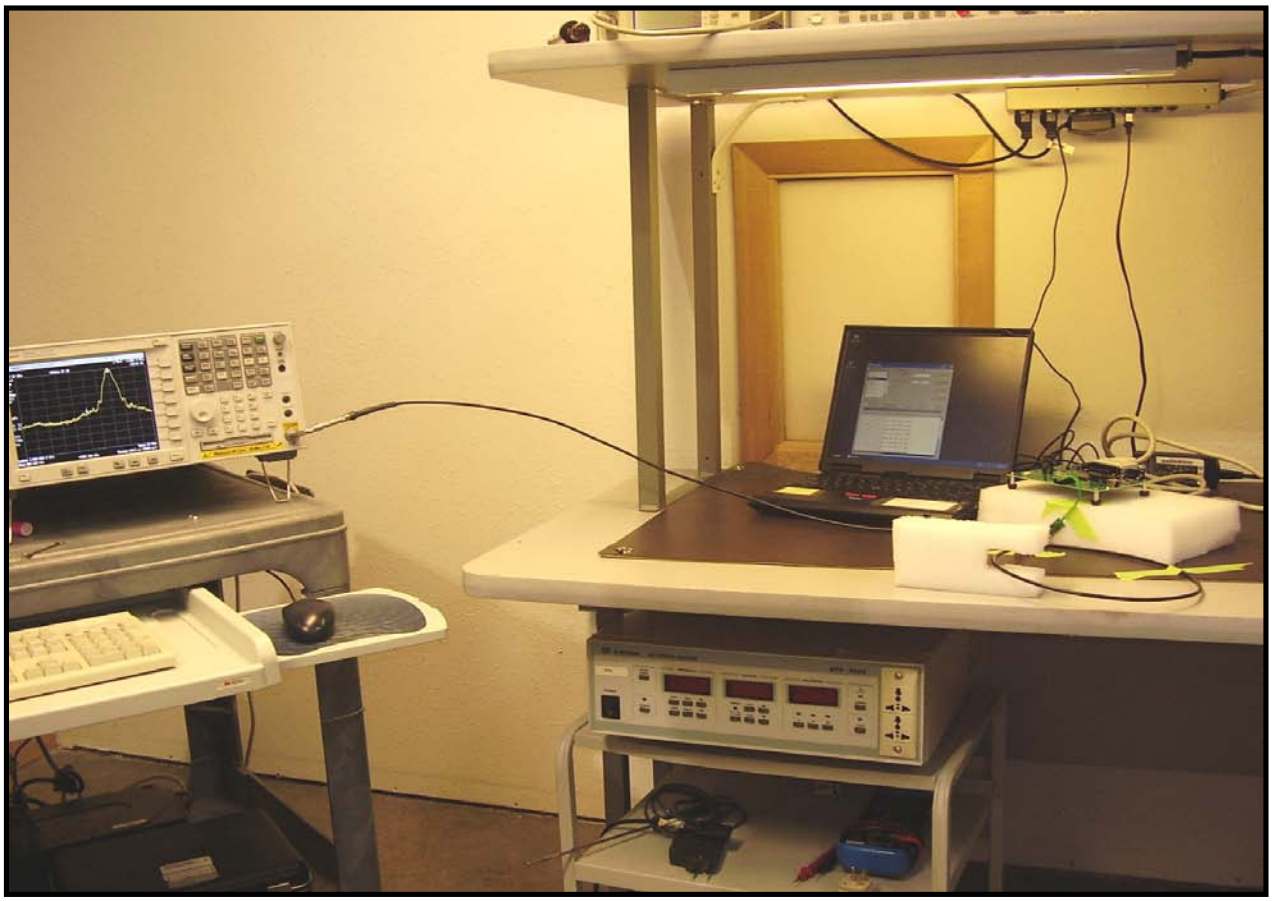
	Value	Limit	Results
Bluetooth, GFSK, DH5			
Low channel, 2402MHz	-49.97 dBc	≤ -20.0 dBc	Pass
High channel, 2480MHz	-54.96 dBc	≤ -20.0 dBc	Pass

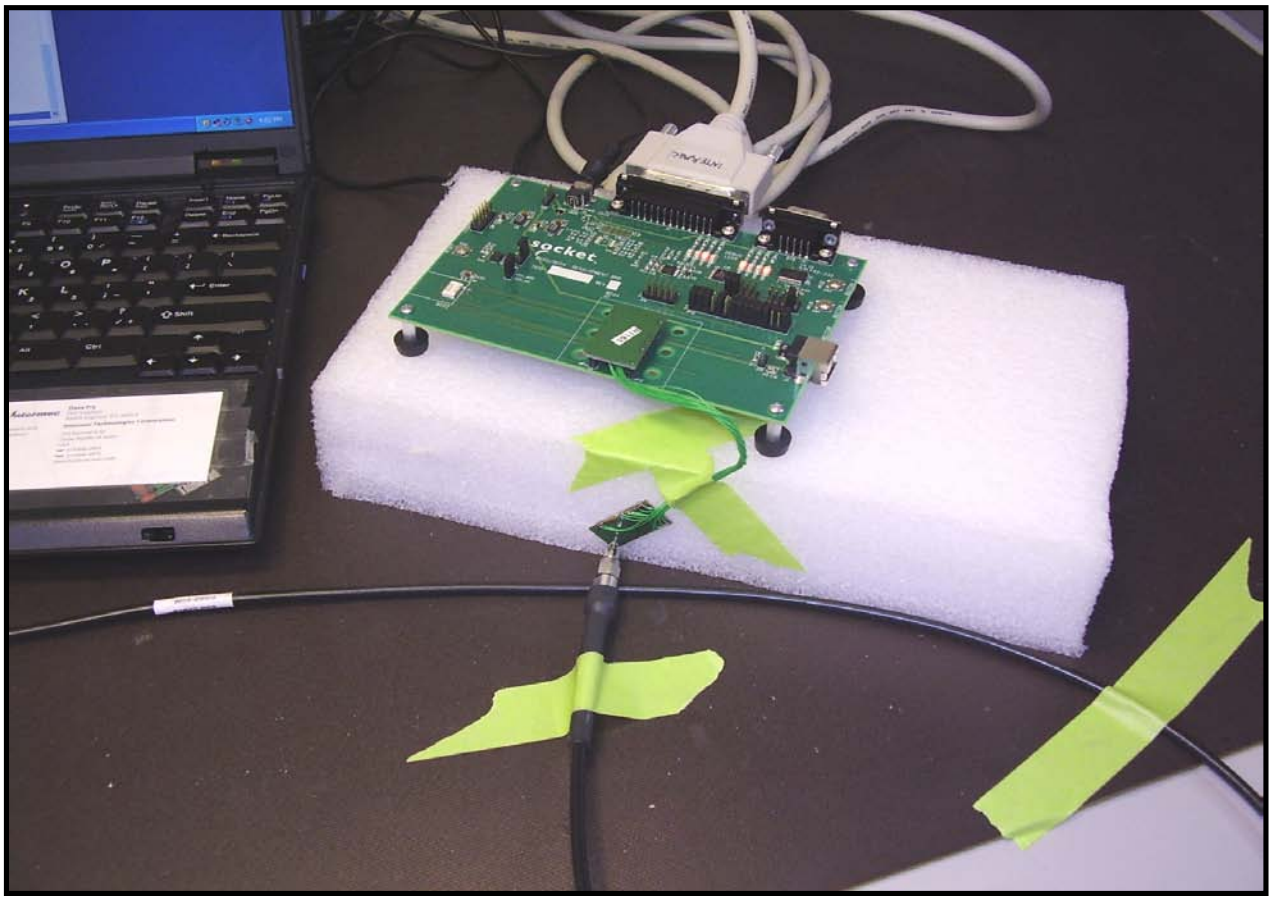
Bluetooth, GFSK, DH5, Low channel, 2402MHz					
Result:	Pass	**Value:**	-49.97 dBc	**Limit:**	≤ -20.0 dBc



Bluetooth, GFSK, DH5, High channel, 2480MHz					
Result:	Pass	**Value:**	-54.96 dBc	**Limit:**	≤ -20.0 dBc







Spurious 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4446A	AAY	12/18/2007	12

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 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.

NORTHWEST EMC

Spurious Conducted Emissions

XMit 2007.06.13

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/01/08
Customer:	Intermec Technologies Corporation			Temperature:	22C°C
Attendees:	None			Humidity:	26%
Project:	None			Barometric Pres.:	1017.6mb
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

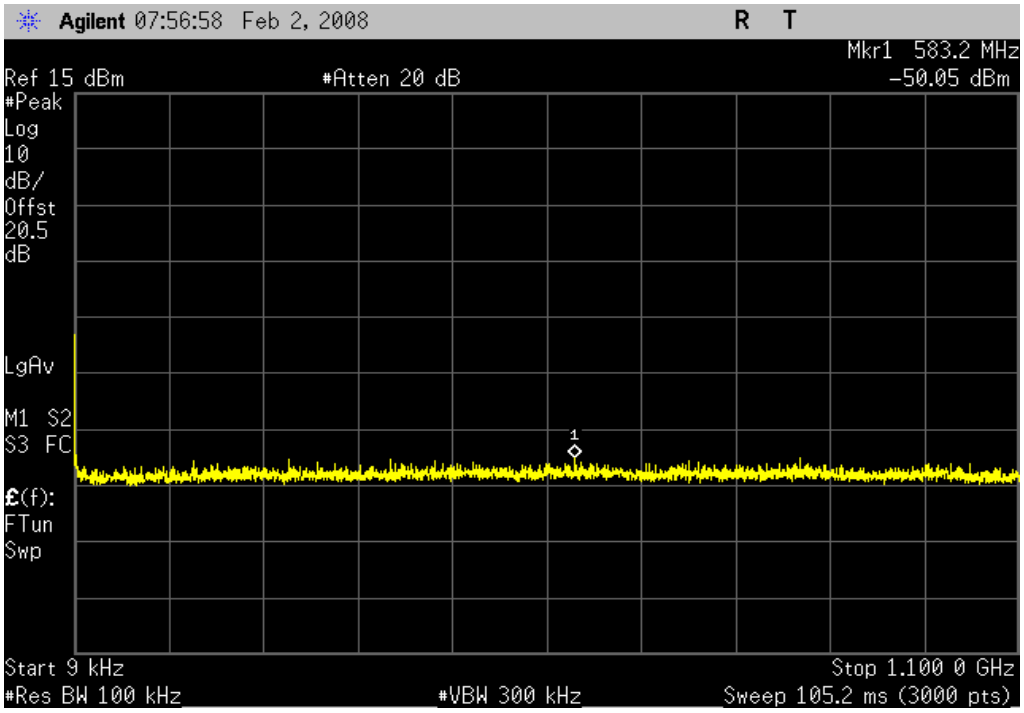
COMMENTS

DEVIATIONS FROM TEST STANDARD

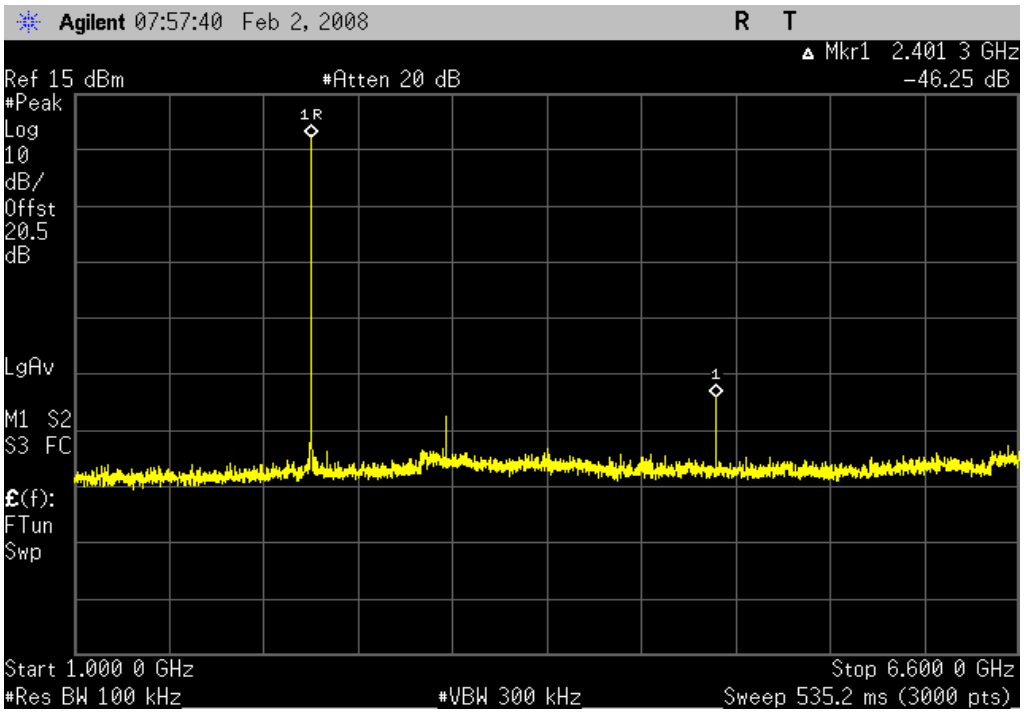
Configuration #	1	Signature Holly Ashkannejhad

		Value	Limit	Results
Bluetooth, GFSK, DH5				
	Low channel, 2402MHz			
	9 kHz - 1.1GHz	≤ -40 dBc	≤ -20 dBc	Pass
	1 GHz - 6.6 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	6.5 GHz - 15.1 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	15 GHz - 26 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	Mid channel, 2441MHz			
	9 kHz - 1.1GHz	≤ -40 dBc	≤ -20 dBc	Pass
	1 GHz - 6.6 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	6.5 GHz - 15.1 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	15 GHz - 26 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	High channel, 2480MHz			
	9 kHz - 1.1GHz	≤ -40 dBc	≤ -20 dBc	Pass
	1 GHz - 6.6 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	6.5 GHz - 15.1 GHz	≤ -40 dBc	≤ -20 dBc	Pass
	15 GHz - 26 GHz	≤ -40 dBc	≤ -20 dBc	Pass

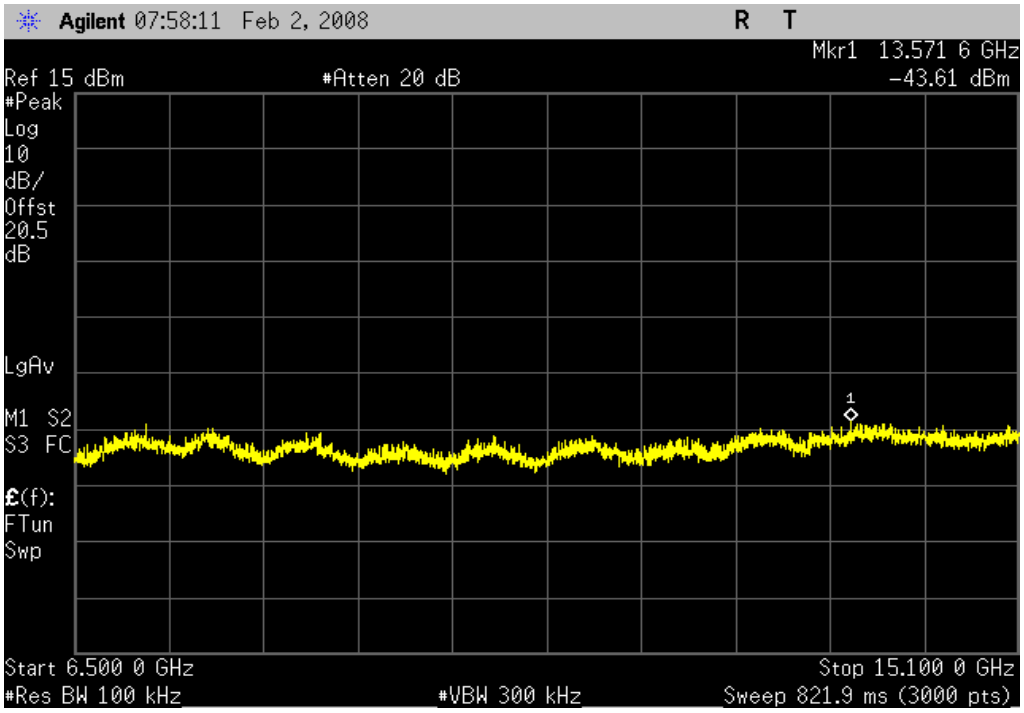
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 9 kHz - 1.1GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



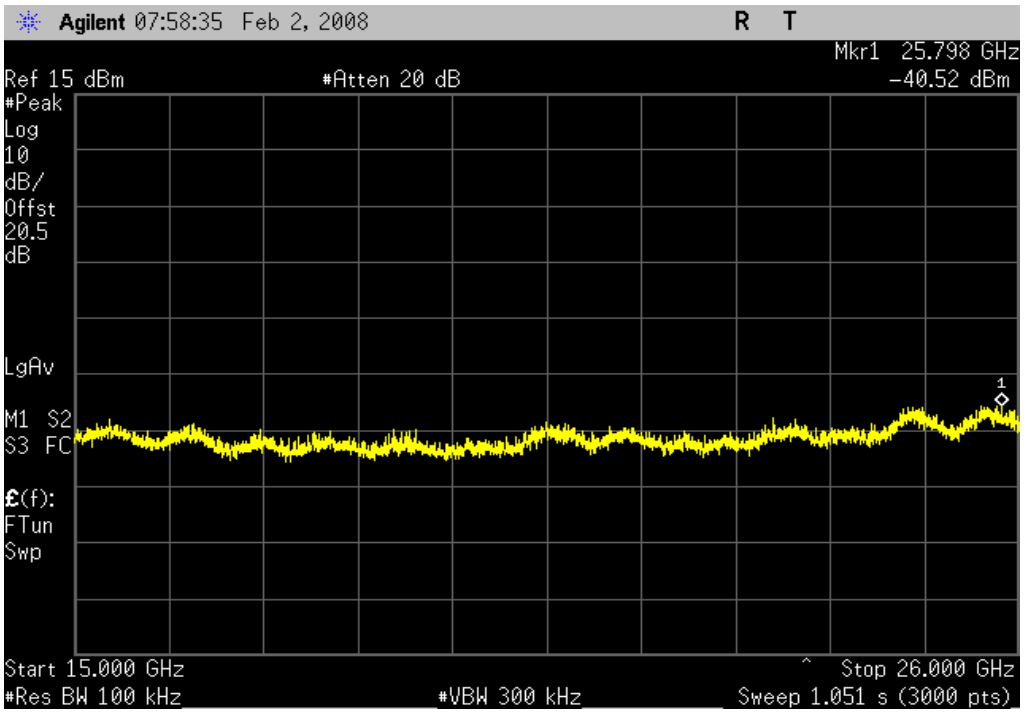
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 1 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



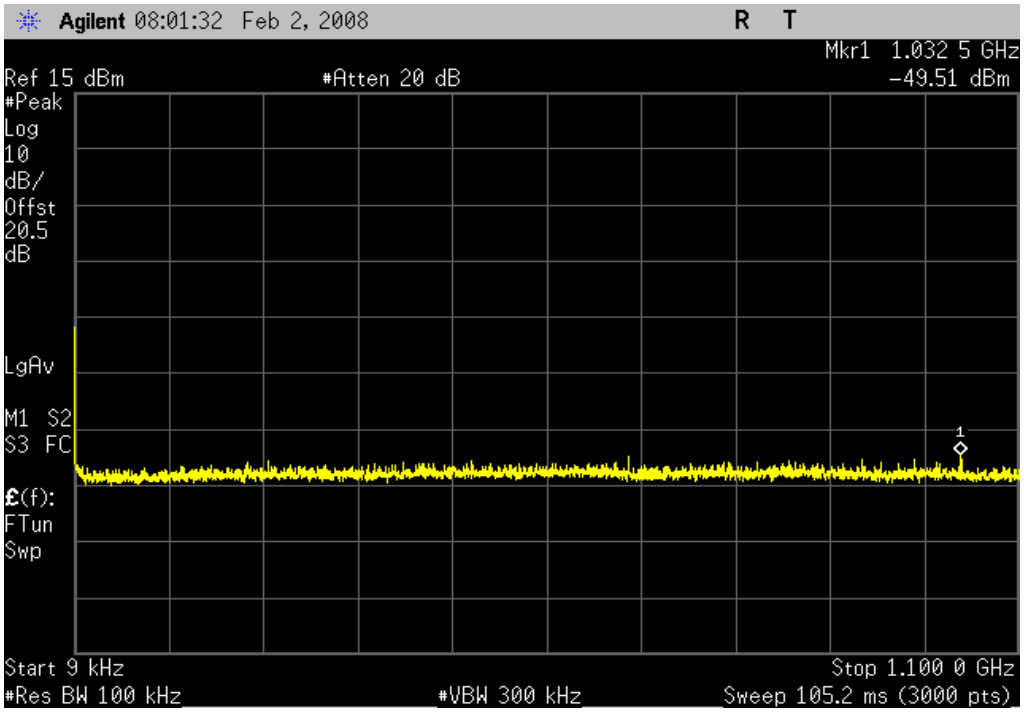
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 6.5 GHz - 15.1 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



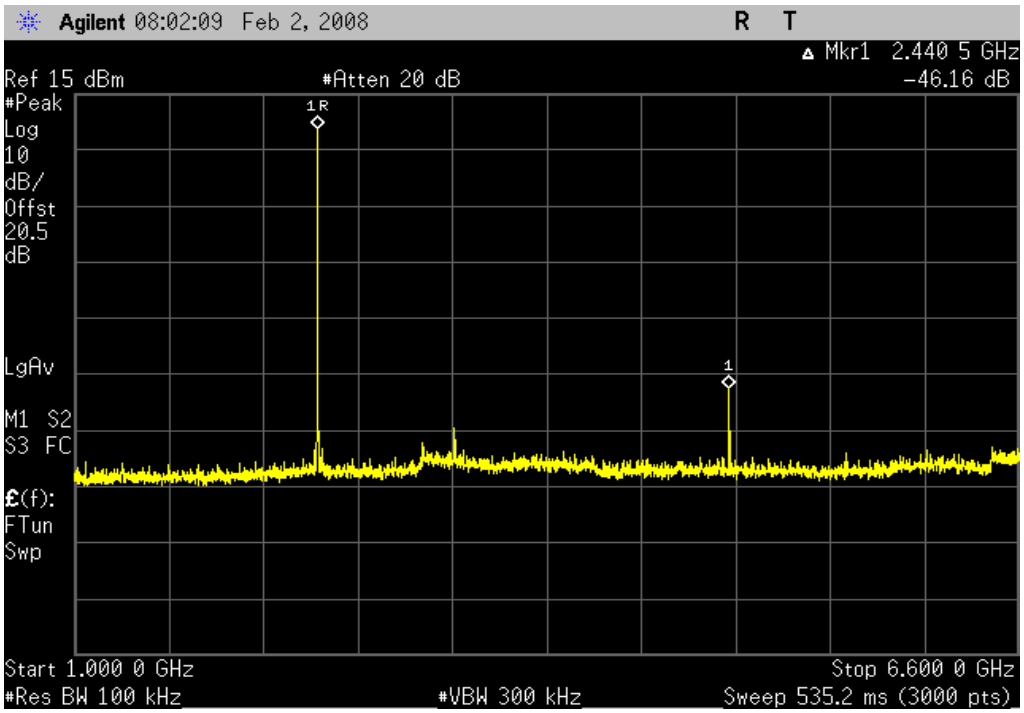
Bluetooth, GFSK, DH5, Low channel, 2402MHz, 15 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



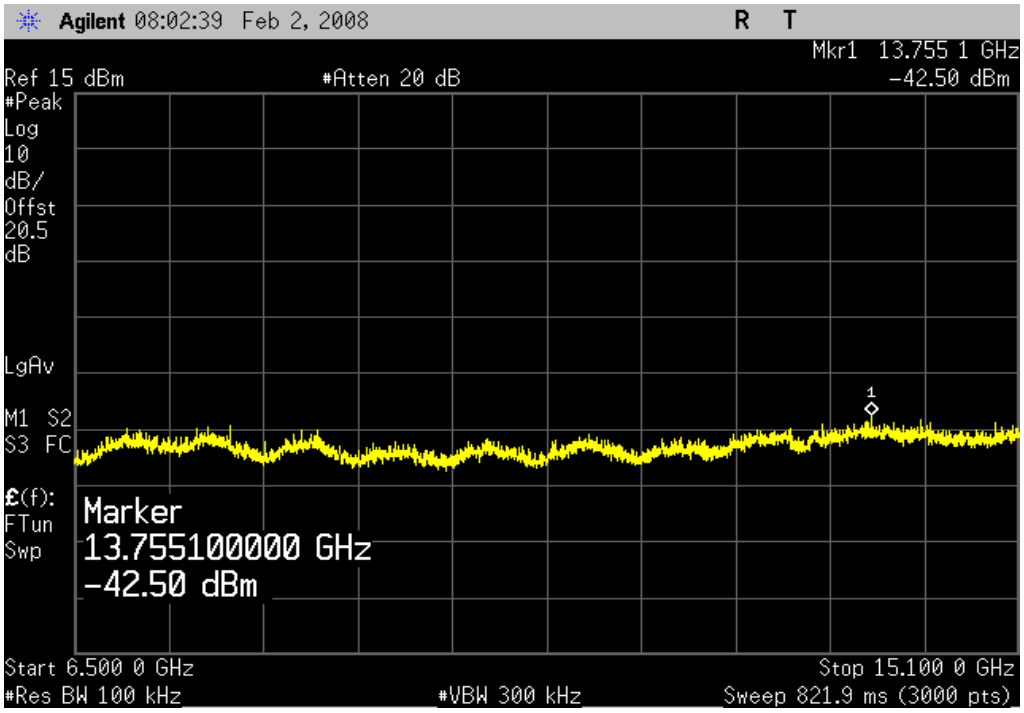
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 9 kHz - 1.1GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



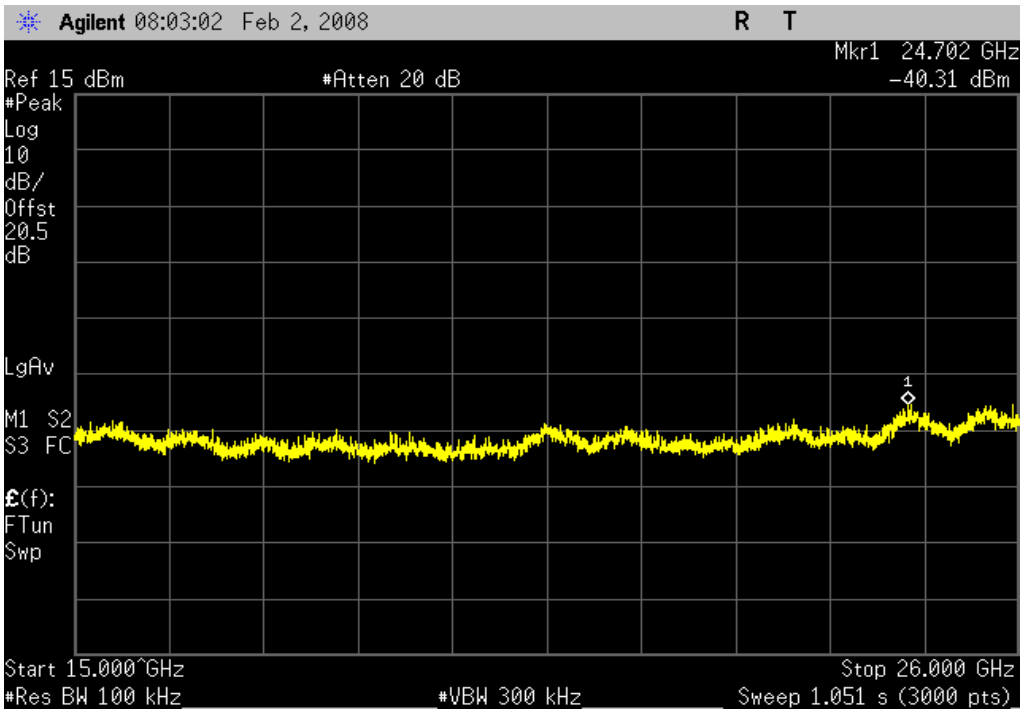
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 1 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



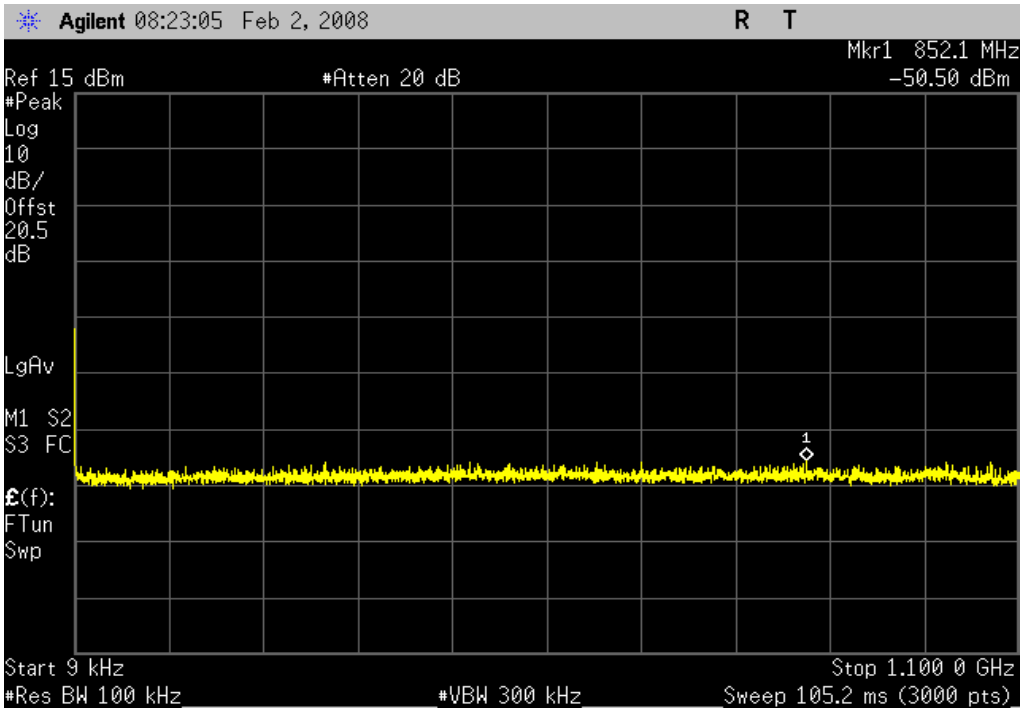
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 6.5 GHz - 15.1 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



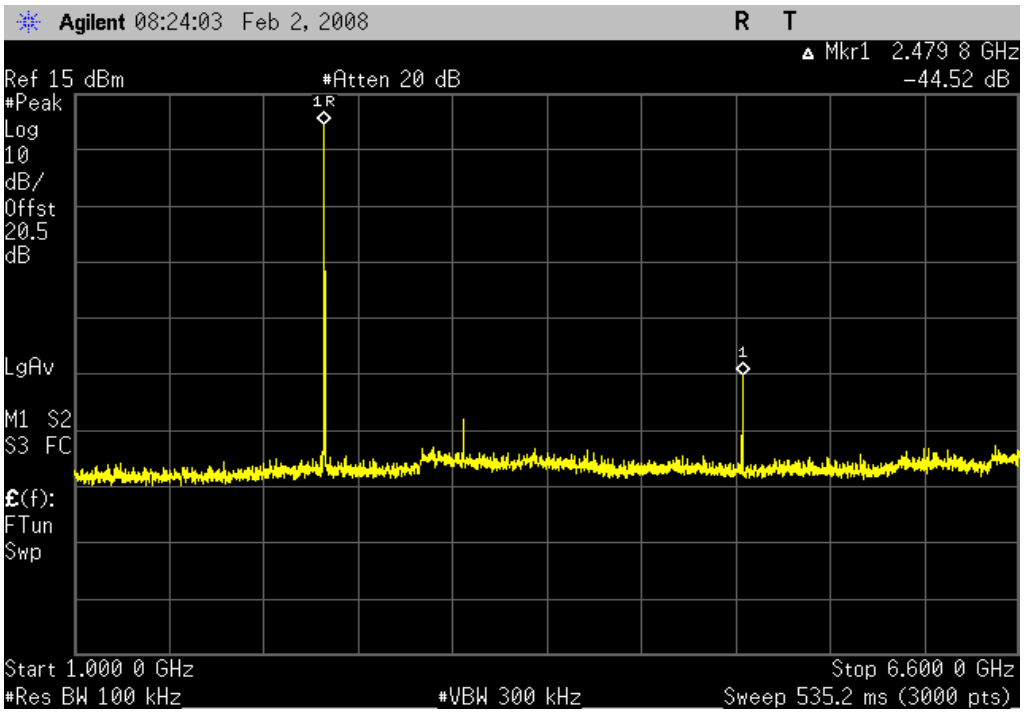
Bluetooth, GFSK, DH5, Mid channel, 2441MHz, 15 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



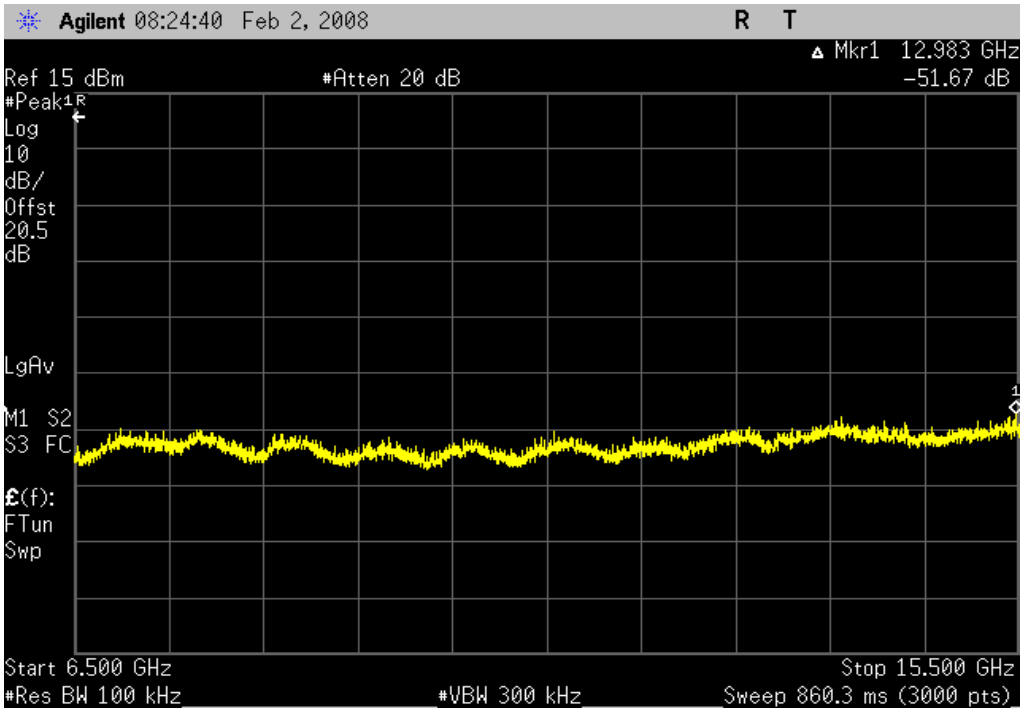
Bluetooth, GFSK, DH5, High channel, 2480MHz, 9 kHz - 1.1GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



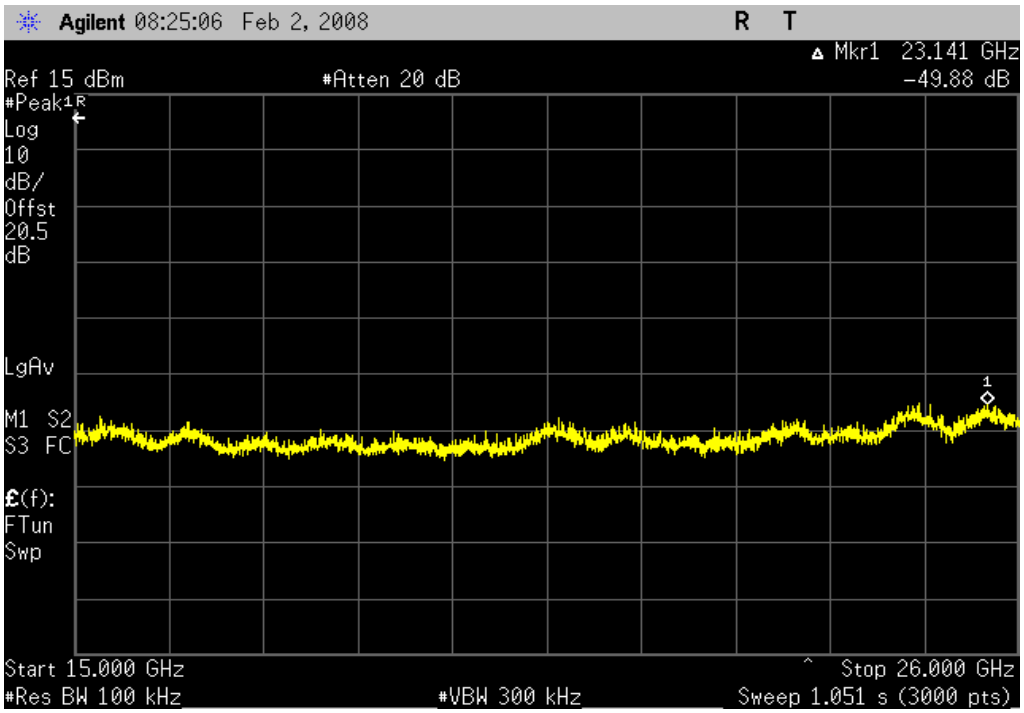
Bluetooth, GFSK, DH5, High channel, 2480MHz, 1 GHz - 6.6 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



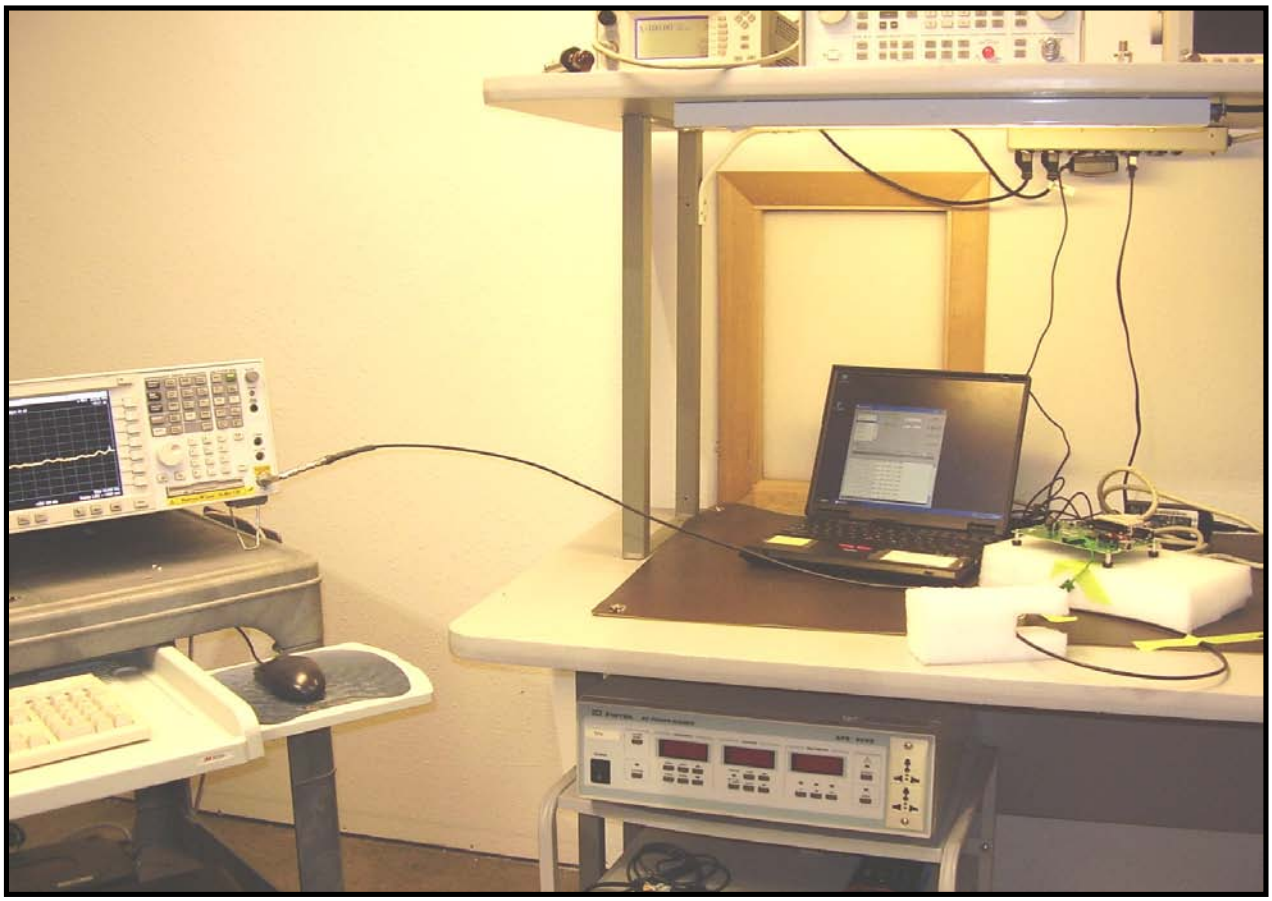
Bluetooth, GFSK, DH5, High channel, 2480MHz, 6.5 GHz - 15.1 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc

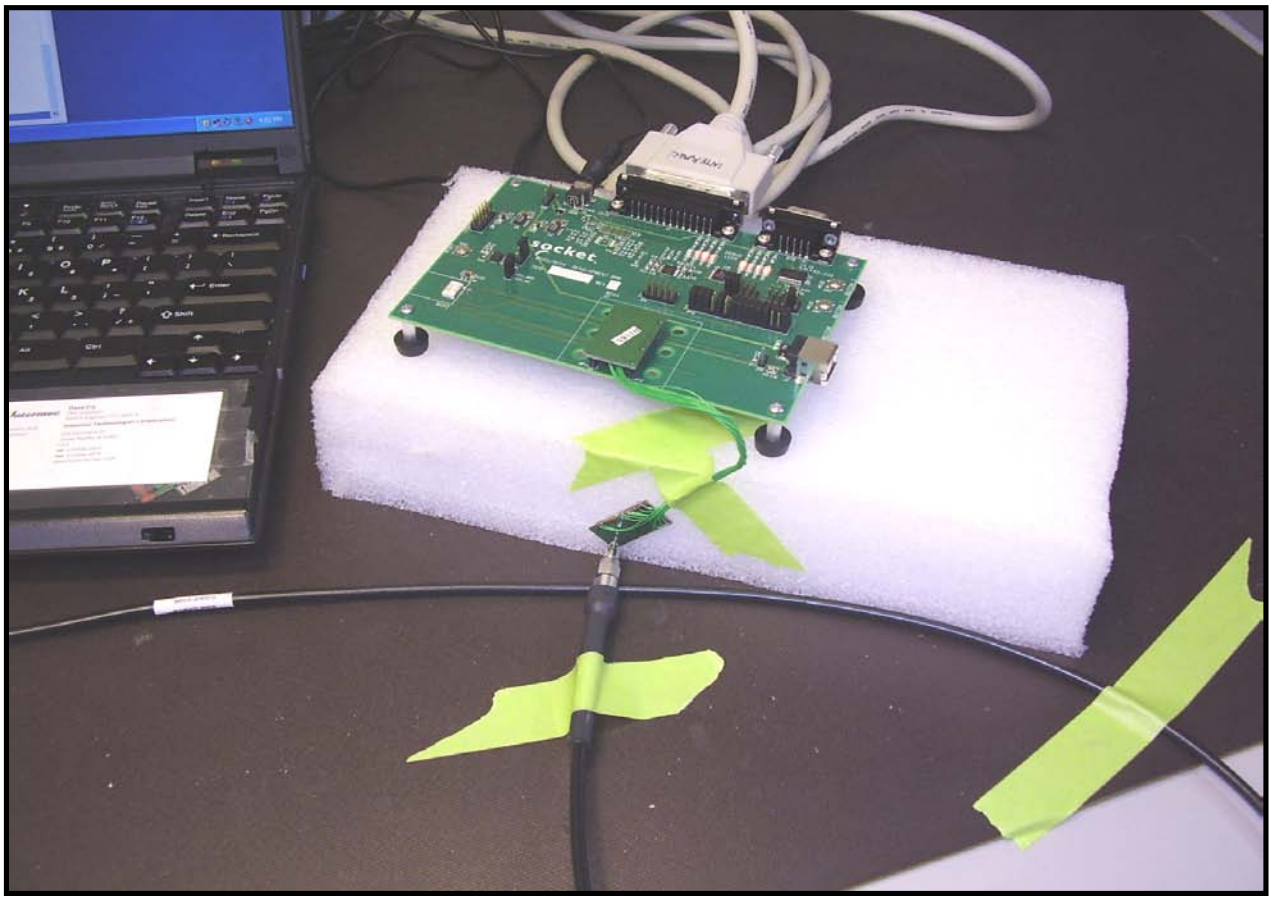


Bluetooth, GFSK, DH5, High channel, 2480MHz, 15 GHz - 26 GHz					
Result:	Pass	**Value:**	≤ -40 dBc	**Limit:**	≤ -20 dBc



Spurious Conducted Emissions





Power Spectral Density

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	6/8/2007	13
Spectrum Analyzer	Agilent	E4446A	AAY	12/18/2007	12

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 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 using direct sequence modulation. 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 $1.5 \times 10^6 \div 3 \times 10^3 = 500$ 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."

NORTHWEST EMC

Power Spectral Density

XMit 2007.06.13

EUT:	BTM4 module 10mW			Work Order:	ITRM0173
Serial Number:	0744000329			Date:	02/01/08
Customer:	Intermec Technologies Corporation			Temperature:	22C°C
Attendees:	None			Humidity:	26%
Project:	None			Barometric Pres.:	1017.6mb
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz	Job Site:	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000

COMMENTS

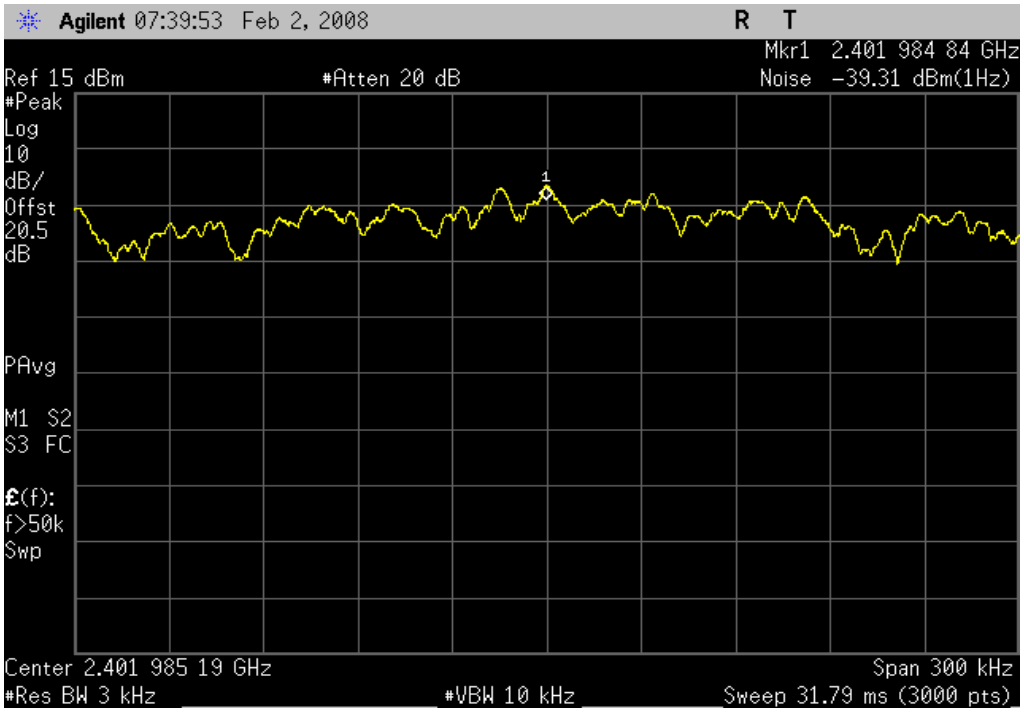
Bluetooth module powered through test fixture. Software power level = 255, 34.

DEVIATIONS FROM TEST STANDARD

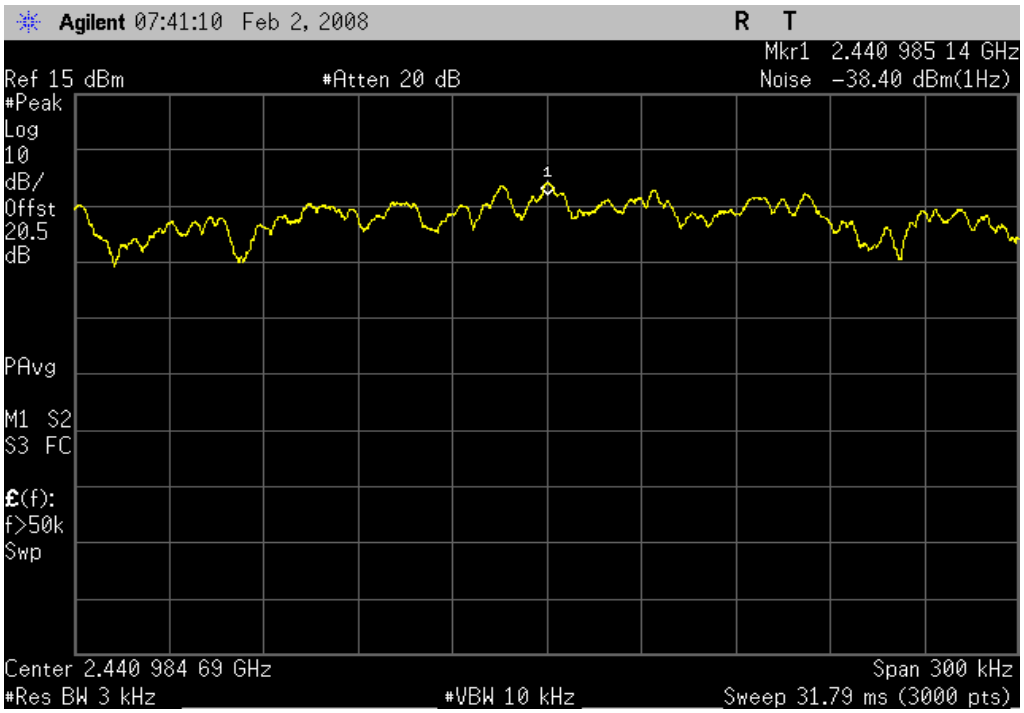
Configuration #	1	Signature Holly Ashkannejhad

	Value	Limit	Results
Low channel, 2402MHz	-4.51 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Mid channel, 2441MHz	-3.6 dBm / 3 kHz	8 dBm / 3 kHz	Pass
High channel, 2480MHz	-2.63 dBm / 3 kHz	8 dBm / 3 kHz	Pass

Low channel, 2402MHz					
Result:	Pass	**Value:**	-4.51 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz

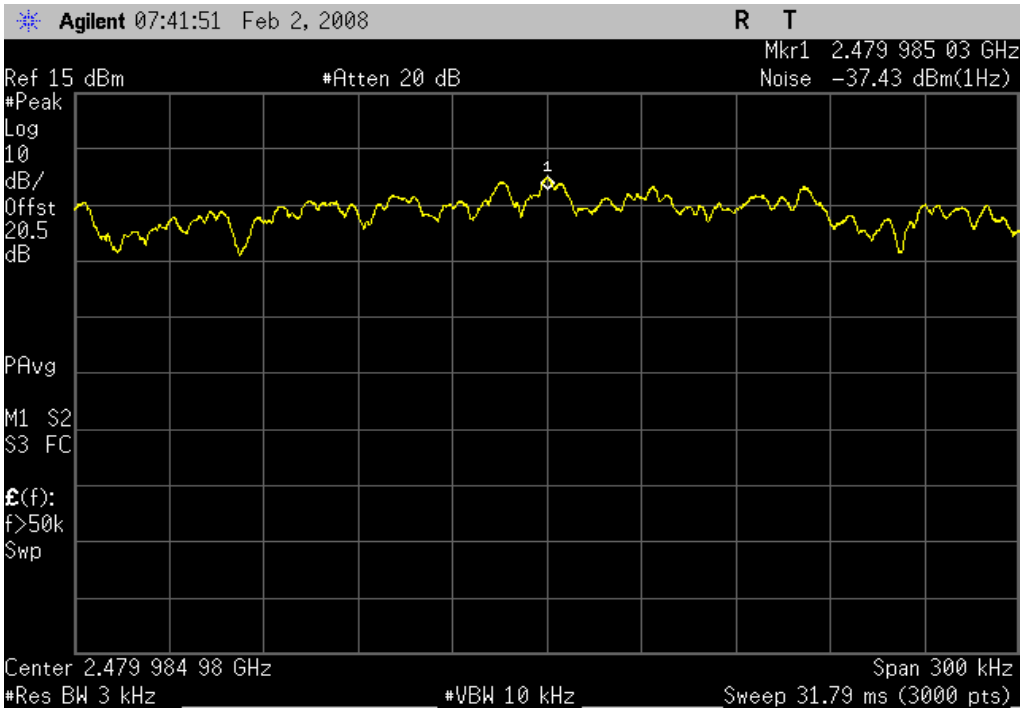


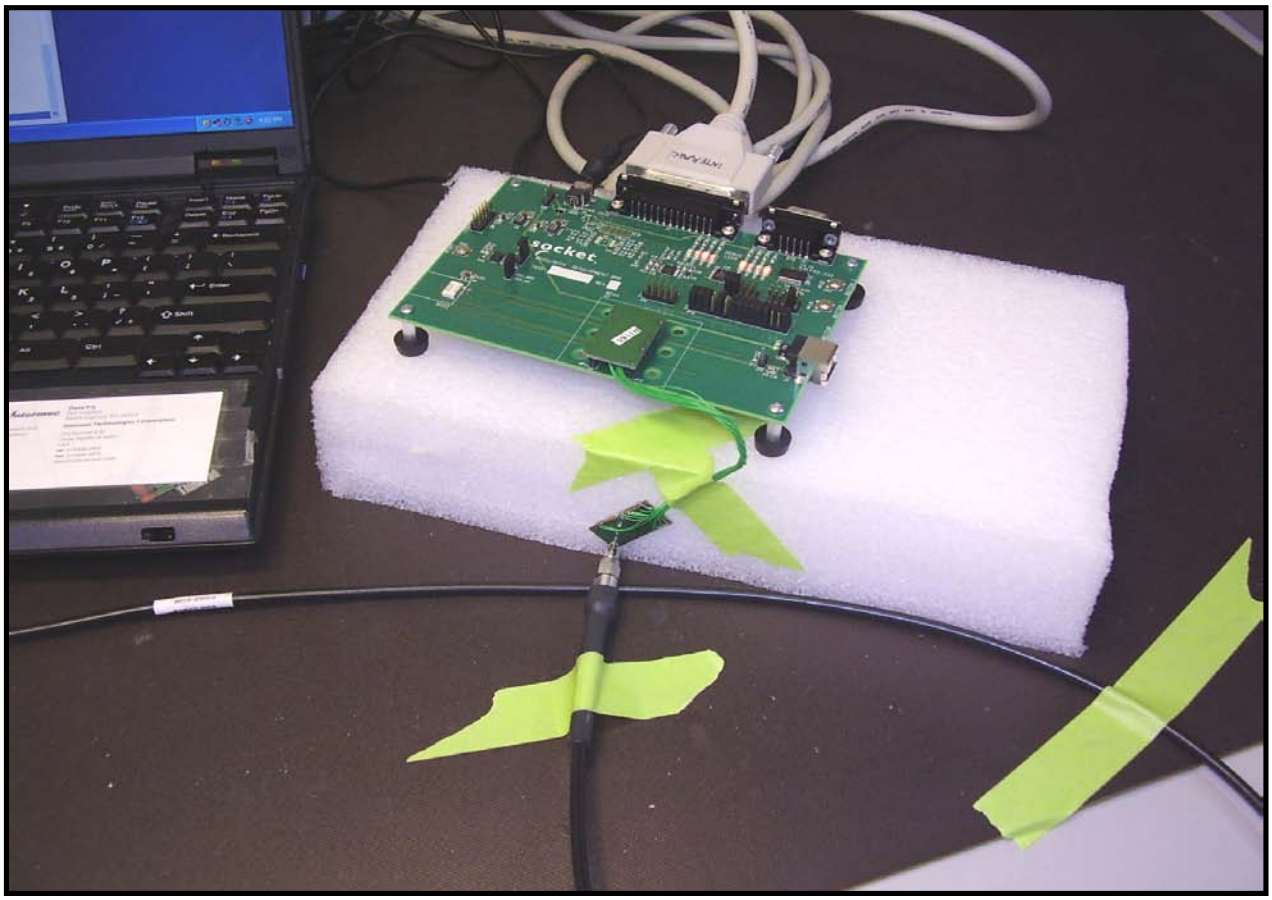
Mid channel, 2441MHz					
Result:	Pass	**Value:**	-3.6 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



Power Spectral Density

High channel, 2480MHz					
Result:	Pass	**Value:**	-2.63 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz





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
Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, high channel
Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, mid channel
Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, low channel

POWER SETTINGS INVESTIGATED
120VAC/60Hz

CONFIGURATIONS INVESTIGATED
ITRM0173 - 3) AC Powerline Conducted Emissions

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 & Schwartz	ESCI	ARG	12/7/2007	13 mo
High Pass Filter	T.T.E.	7766	HFG	2/5/2008	13 mo
Attenuator - 20dB/30W	JFW	50FH-020	RBB	NCR	0 mo
LISN	Solar	9252-50-R-24-BNC	LIR	1/4/2008	13 mo
EV07 cable d			EVG	4/17/2007	13 mo

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

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.

NORTHWEST

EMC

CONDUCTED EMISSIONS

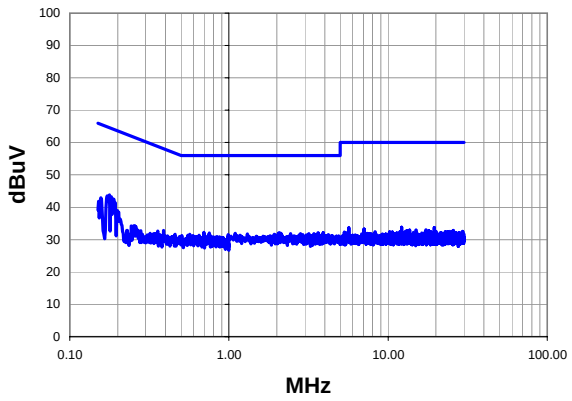
Version 2007.8.27
PSA-ESCI 2008.01.03

Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin
EUT:	BTM4 module 10mW				
Configuration:	3 - AC Powerline Conducted Emissions				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, low channel				
Deviations:	No deviations.				
Comments:	Bluetooth module powered through test fixture				

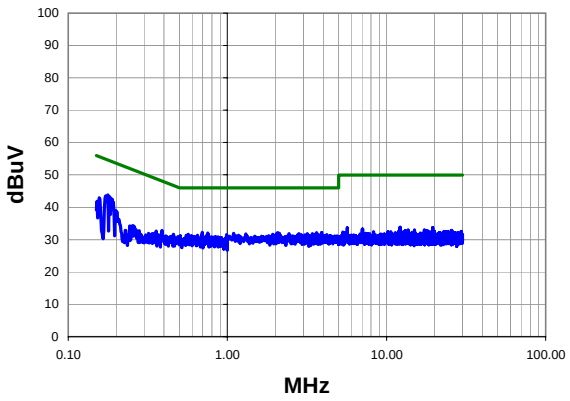
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	1	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	22.4	21.5	43.9	64.6	-20.8
0.182	21.9	21.4	43.3	64.4	-21.1
0.186	21.3	21.3	42.6	64.2	-21.6
0.157	21.1	21.9	43.0	65.6	-22.7
0.697	11.6	20.7	32.3	56.0	-23.7
3.912	11.7	20.5	32.2	56.0	-23.8
2.064	11.6	20.5	32.1	56.0	-23.9
3.624	11.6	20.5	32.1	56.0	-23.9
0.753	11.4	20.7	32.1	56.0	-23.9
0.152	19.9	22.0	41.9	65.9	-24.0
1.096	11.4	20.5	31.9	56.0	-24.1
2.440	11.4	20.5	31.9	56.0	-24.1
2.816	11.4	20.5	31.9	56.0	-24.1
3.184	11.4	20.5	31.9	56.0	-24.1
3.416	11.4	20.5	31.9	56.0	-24.1
1.928	11.2	20.5	31.7	56.0	-24.3
0.567	10.9	20.8	31.7	56.0	-24.3
0.991	11.0	20.5	31.5	56.0	-24.5
0.199	18.0	21.0	39.0	63.6	-24.6
0.648	10.6	20.7	31.3	56.0	-24.7

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	22.4	21.5	43.9	54.6	-10.8
0.182	21.9	21.4	43.3	54.4	-11.1
0.186	21.3	21.3	42.6	54.2	-11.6
0.157	21.1	21.9	43.0	55.6	-12.7
0.697	11.6	20.7	32.3	46.0	-13.7
3.912	11.7	20.5	32.2	46.0	-13.8
2.064	11.6	20.5	32.1	46.0	-13.9
3.624	11.6	20.5	32.1	46.0	-13.9
0.753	11.4	20.7	32.1	46.0	-13.9
0.152	19.9	22.0	41.9	55.9	-14.0
1.096	11.4	20.5	31.9	46.0	-14.1
2.440	11.4	20.5	31.9	46.0	-14.1
2.816	11.4	20.5	31.9	46.0	-14.1
3.184	11.4	20.5	31.9	46.0	-14.1
3.416	11.4	20.5	31.9	46.0	-14.1
1.928	11.2	20.5	31.7	46.0	-14.3
0.567	10.9	20.8	31.7	46.0	-14.3
0.991	11.0	20.5	31.5	46.0	-14.5
0.199	18.0	21.0	39.0	53.6	-14.6
0.648	10.6	20.7	31.3	46.0	-14.7

NORTHWEST

EMC

CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2008.01.03

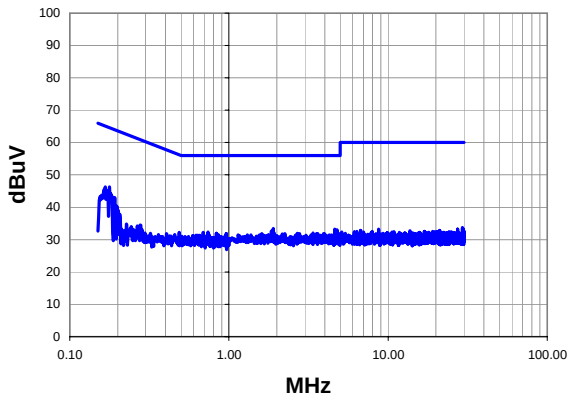
Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin

EUT:	BTM4 module 10mW
Configuration:	3 - AC Powerline Conducted Emissions
Customer:	Intermec Technologies Corporation
Attendees:	None
EUT Power:	120VAC/60Hz
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, low channel
Deviations:	No deviations.
Comments:	Bluetooth module powered through test fixture

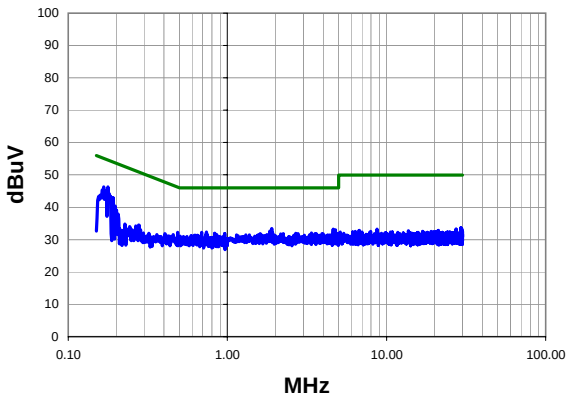
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	2	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	24.8	21.5	46.3	64.6	-18.4
0.167	24.6	21.7	46.3	65.1	-18.8
0.191	21.8	21.2	43.0	64.0	-21.0
1.896	12.9	20.5	33.4	56.0	-22.6
4.616	12.7	20.5	33.2	56.0	-22.8
4.784	12.5	20.5	33.0	56.0	-23.0
0.198	19.3	21.0	40.3	63.7	-23.4
1.848	12.1	20.5	32.6	56.0	-23.4
0.738	11.7	20.7	32.4	56.0	-23.6
0.689	11.6	20.7	32.3	56.0	-23.7
3.376	11.6	20.5	32.1	56.0	-23.9
2.688	11.5	20.5	32.0	56.0	-24.0
0.487	11.4	20.8	32.2	56.2	-24.0
0.833	11.3	20.6	31.9	56.0	-24.1
1.608	11.4	20.5	31.9	56.0	-24.1
2.248	11.4	20.5	31.9	56.0	-24.1
3.624	11.4	20.5	31.9	56.0	-24.1
4.928	11.4	20.5	31.9	56.0	-24.1
0.963	11.3	20.5	31.8	56.0	-24.2
0.859	11.0	20.6	31.6	56.0	-24.4

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	24.8	21.5	46.3	54.6	-8.4
0.167	24.6	21.7	46.3	55.1	-8.8
0.191	21.8	21.2	43.0	54.0	-11.0
1.896	12.9	20.5	33.4	46.0	-12.6
4.616	12.7	20.5	33.2	46.0	-12.8
4.784	12.5	20.5	33.0	46.0	-13.0
0.198	19.3	21.0	40.3	53.7	-13.4
1.848	12.1	20.5	32.6	46.0	-13.4
0.738	11.7	20.7	32.4	46.0	-13.6
0.689	11.6	20.7	32.3	46.0	-13.7
3.376	11.6	20.5	32.1	46.0	-13.9
2.688	11.5	20.5	32.0	46.0	-14.0
0.487	11.4	20.8	32.2	46.2	-14.0
0.833	11.3	20.6	31.9	46.0	-14.1
1.608	11.4	20.5	31.9	46.0	-14.1
2.248	11.4	20.5	31.9	46.0	-14.1
3.624	11.4	20.5	31.9	46.0	-14.1
4.928	11.4	20.5	31.9	46.0	-14.1
0.963	11.3	20.5	31.8	46.0	-14.2
0.859	11.0	20.6	31.6	46.0	-14.4

NORTHWEST

EMC

CONDUCTED EMISSIONS

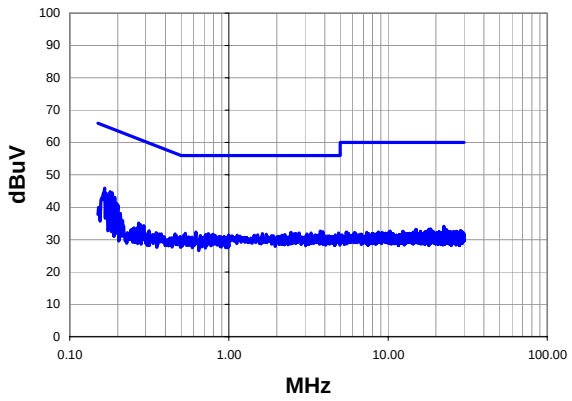
Version 2007.8.27
PSA-ESCI 2008.01.03

Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin
EUT:	BTM4 module 10mW				
Configuration:	3 - AC Powerline Conducted Emissions				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, mid channel				
Deviations:	No deviations.				
Comments:	Bluetooth module powered through test fixture				

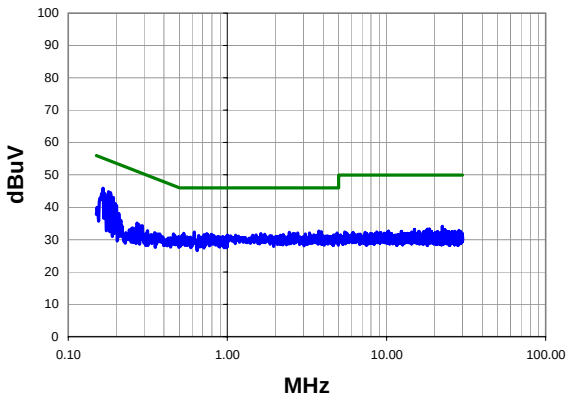
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	3	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.165	24.2	21.7	45.9	65.2	-19.3
0.179	23.4	21.4	44.8	64.5	-19.7
0.184	23.2	21.3	44.5	64.3	-19.8
0.169	22.7	21.6	44.3	65.0	-20.7
0.193	21.9	21.2	43.1	63.9	-20.9
0.198	20.1	21.0	41.1	63.7	-22.6
3.752	12.1	20.5	32.6	56.0	-23.4
3.888	11.9	20.5	32.4	56.0	-23.6
0.621	11.6	20.7	32.3	56.0	-23.7
2.456	11.7	20.5	32.2	56.0	-23.8
2.760	11.6	20.5	32.1	56.0	-23.9
3.288	11.6	20.5	32.1	56.0	-23.9
4.896	11.6	20.5	32.1	56.0	-23.9
0.533	11.2	20.8	32.0	56.0	-24.0
1.624	11.4	20.5	31.9	56.0	-24.1
2.584	11.4	20.5	31.9	56.0	-24.1
0.743	11.2	20.7	31.9	56.0	-24.1
3.096	11.3	20.5	31.8	56.0	-24.2
0.791	11.0	20.6	31.6	56.0	-24.4
2.240	11.1	20.5	31.6	56.0	-24.4

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.165	24.2	21.7	45.9	55.2	-9.3
0.179	23.4	21.4	44.8	54.5	-9.7
0.184	23.2	21.3	44.5	54.3	-9.8
0.169	22.7	21.6	44.3	55.0	-10.7
0.193	21.9	21.2	43.1	53.9	-10.9
0.198	20.1	21.0	41.1	53.7	-12.6
3.752	12.1	20.5	32.6	46.0	-13.4
3.888	11.9	20.5	32.4	46.0	-13.6
0.621	11.6	20.7	32.3	46.0	-13.7
2.456	11.7	20.5	32.2	46.0	-13.8
2.760	11.6	20.5	32.1	46.0	-13.9
3.288	11.6	20.5	32.1	46.0	-13.9
4.896	11.6	20.5	32.1	46.0	-13.9
0.533	11.2	20.8	32.0	46.0	-14.0
1.624	11.4	20.5	31.9	46.0	-14.1
2.584	11.4	20.5	31.9	46.0	-14.1
0.743	11.2	20.7	31.9	46.0	-14.1
3.096	11.3	20.5	31.8	46.0	-14.2
0.791	11.0	20.6	31.6	46.0	-14.4
2.240	11.1	20.5	31.6	46.0	-14.4

NORTHWEST

EMC

CONDUCTED EMISSIONS

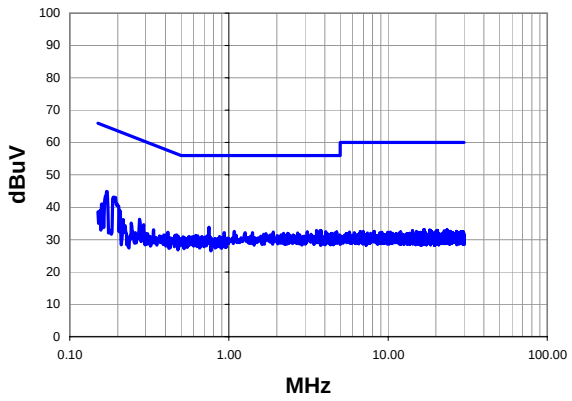
Version 2007.8.27
PSA-ESCI 2008.01.03

Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin
EUT:	BTM4 module 10mW				
Configuration:	3 - AC Powerline Conducted Emissions				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, mid channel				
Deviations:	No deviations.				
Comments:	Bluetooth module powered through test fixture				

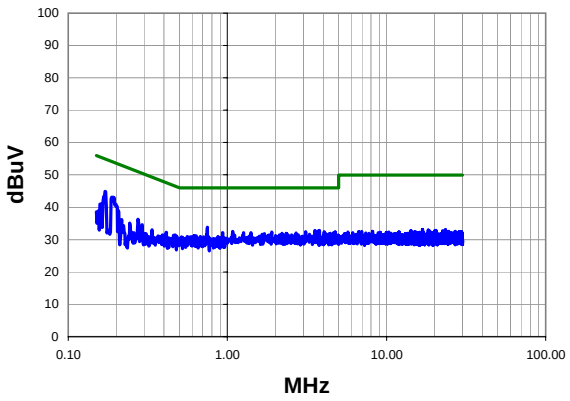
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	4	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.170	23.3	21.6	44.9	64.9	-20.0
0.187	21.9	21.3	43.2	64.2	-21.0
0.748	13.2	20.7	33.9	56.0	-22.1
3.552	12.3	20.5	32.8	56.0	-23.2
3.792	12.3	20.5	32.8	56.0	-23.2
3.728	12.2	20.5	32.7	56.0	-23.3
1.080	12.0	20.5	32.5	56.0	-23.5
3.104	11.9	20.5	32.4	56.0	-23.6
4.056	11.9	20.5	32.4	56.0	-23.6
4.752	11.9	20.5	32.4	56.0	-23.6
1.896	11.8	20.5	32.3	56.0	-23.7
0.932	11.6	20.5	32.1	56.0	-23.9
1.408	11.6	20.5	32.1	56.0	-23.9
2.696	11.6	20.5	32.1	56.0	-23.9
4.616	11.6	20.5	32.1	56.0	-23.9
2.208	11.5	20.5	32.0	56.0	-24.0
2.344	11.5	20.5	32.0	56.0	-24.0
4.440	11.5	20.5	32.0	56.0	-24.0
1.712	11.4	20.5	31.9	56.0	-24.1
4.160	11.4	20.5	31.9	56.0	-24.1

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.170	23.3	21.6	44.9	54.9	-10.0
0.187	21.9	21.3	43.2	54.2	-11.0
0.748	13.2	20.7	33.9	46.0	-12.1
3.552	12.3	20.5	32.8	46.0	-13.2
3.792	12.3	20.5	32.8	46.0	-13.2
3.728	12.2	20.5	32.7	46.0	-13.3
1.080	12.0	20.5	32.5	46.0	-13.5
3.104	11.9	20.5	32.4	46.0	-13.6
4.056	11.9	20.5	32.4	46.0	-13.6
4.752	11.9	20.5	32.4	46.0	-13.6
1.896	11.8	20.5	32.3	46.0	-13.7
0.932	11.6	20.5	32.1	46.0	-13.9
1.408	11.6	20.5	32.1	46.0	-13.9
2.696	11.6	20.5	32.1	46.0	-13.9
4.616	11.6	20.5	32.1	46.0	-13.9
2.208	11.5	20.5	32.0	46.0	-14.0
2.344	11.5	20.5	32.0	46.0	-14.0
4.440	11.5	20.5	32.0	46.0	-14.0
1.712	11.4	20.5	31.9	46.0	-14.1
4.160	11.4	20.5	31.9	46.0	-14.1

NORTHWEST

EMC

CONDUCTED EMISSIONS

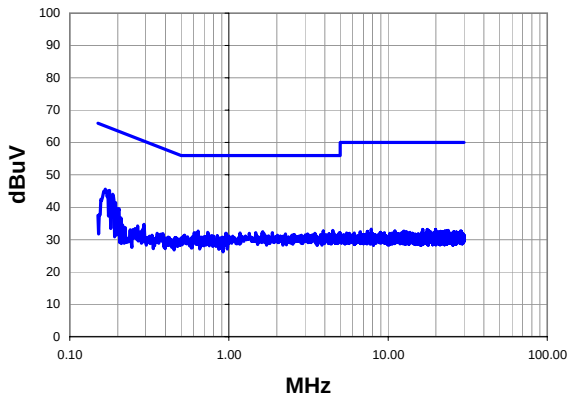
Version 2007.8.27
PSA-ESCI 2008.01.03

Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin
EUT:	BTM4 module 10mW				
Configuration:	3 - AC Powerline Conducted Emissions				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, high channel				
Deviations:	No deviations.				
Comments:	Bluetooth module powered through test fixture				

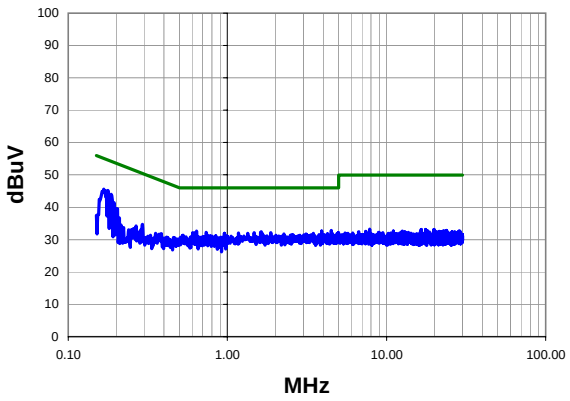
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	5	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	23.7	21.5	45.2	64.6	-19.5
0.167	23.9	21.7	45.6	65.1	-19.5
0.186	22.7	21.3	44.0	64.2	-20.2
0.194	20.3	21.1	41.4	63.9	-22.4
4.504	12.3	20.5	32.8	56.0	-23.2
0.641	11.9	20.7	32.6	56.0	-23.4
3.912	12.1	20.5	32.6	56.0	-23.4
1.632	11.9	20.5	32.4	56.0	-23.6
0.736	11.6	20.7	32.3	56.0	-23.7
4.976	11.7	20.5	32.2	56.0	-23.8
0.606	11.4	20.7	32.1	56.0	-23.9
0.626	11.4	20.7	32.1	56.0	-23.9
1.472	11.6	20.5	32.1	56.0	-23.9
1.872	11.6	20.5	32.1	56.0	-23.9
1.176	11.5	20.5	32.0	56.0	-24.0
3.464	11.5	20.5	32.0	56.0	-24.0
0.199	18.6	21.0	39.6	63.6	-24.0
0.957	11.4	20.5	31.9	56.0	-24.1
4.256	11.4	20.5	31.9	56.0	-24.1
2.264	11.3	20.5	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.177	23.7	21.5	45.2	54.6	-9.5
0.167	23.9	21.7	45.6	55.1	-9.5
0.186	22.7	21.3	44.0	54.2	-10.2
0.194	20.3	21.1	41.4	53.9	-12.4
4.504	12.3	20.5	32.8	46.0	-13.2
0.641	11.9	20.7	32.6	46.0	-13.4
3.912	12.1	20.5	32.6	46.0	-13.4
1.632	11.9	20.5	32.4	46.0	-13.6
0.736	11.6	20.7	32.3	46.0	-13.7
4.976	11.7	20.5	32.2	46.0	-13.8
0.606	11.4	20.7	32.1	46.0	-13.9
0.626	11.4	20.7	32.1	46.0	-13.9
1.472	11.6	20.5	32.1	46.0	-13.9
1.872	11.6	20.5	32.1	46.0	-13.9
1.176	11.5	20.5	32.0	46.0	-14.0
3.464	11.5	20.5	32.0	46.0	-14.0
0.199	18.6	21.0	39.6	53.6	-14.0
0.957	11.4	20.5	31.9	46.0	-14.1
4.256	11.4	20.5	31.9	46.0	-14.1
2.264	11.3	20.5	31.8	46.0	-14.2

NORTHWEST

EMC

CONDUCTED EMISSIONS

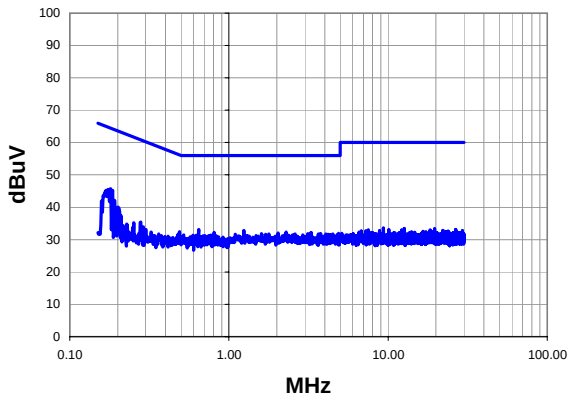
Version 2007.8.27
PSA-ESCI 2008.01.03

Work Order:	ITRM0173	**Date:**	02/07/08		
Project:	None	**Temperature:**	22°C		
Job Site:	EV07	**Humidity:**	24		
Serial Number:	0744000329	**Barometric Pres.:**	30.26	**Tested by:**	Rod Peloquin
EUT:	BTM4 module 10mW				
Configuration:	3 - AC Powerline Conducted Emissions				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmit Bluetooth GFSK, DH5, power settings in software 255, 34, high channel				
Deviations:	No deviations.				
Comments:	Bluetooth module powered through test fixture				

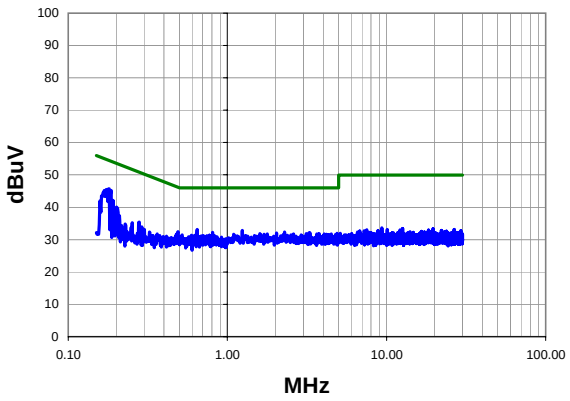
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2007		ANSI C63.4:2003

Run #	6	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit

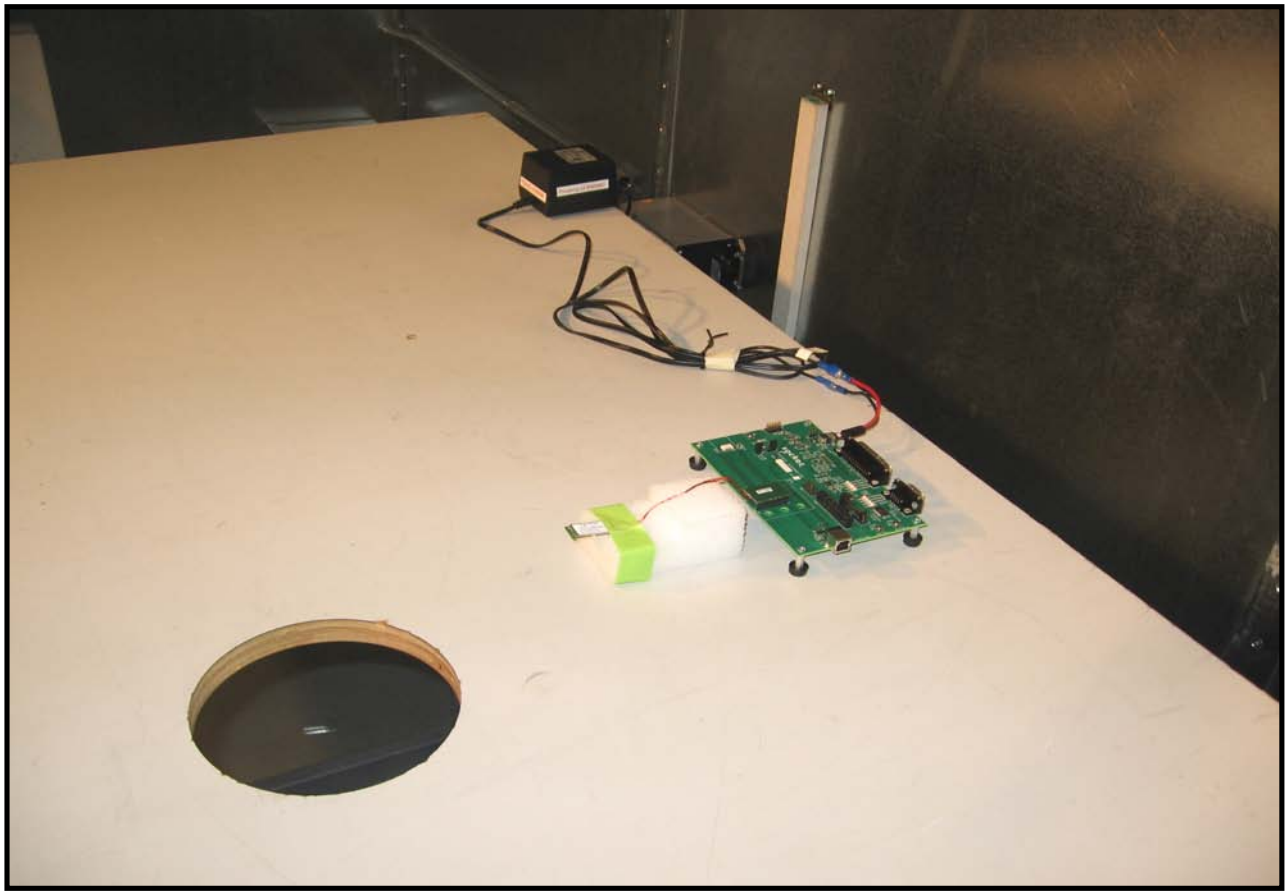


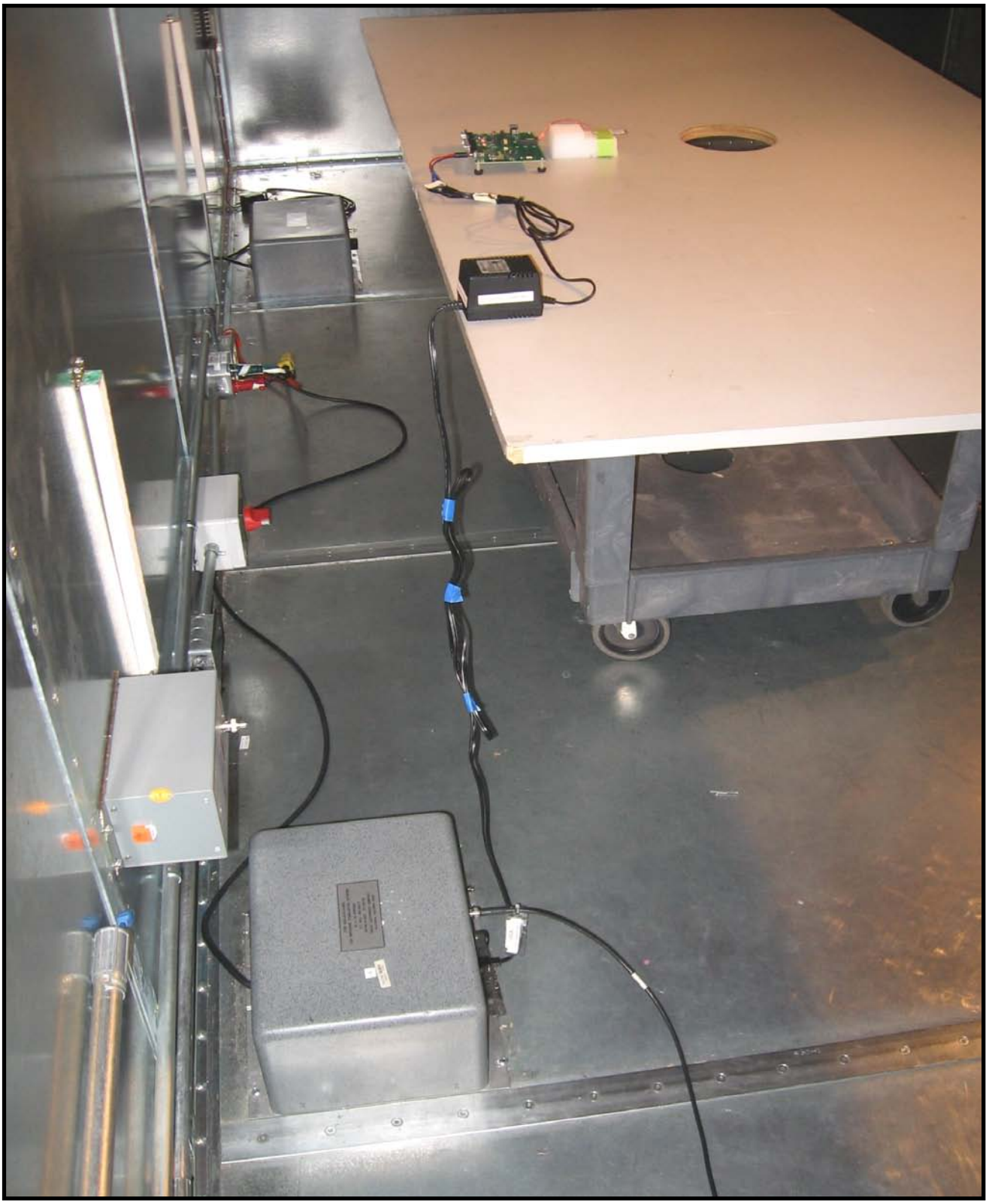
Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.179	24.3	21.4	45.7	64.5	-18.8
0.186	23.9	21.3	45.2	64.2	-19.0
0.174	24.0	21.5	45.5	64.8	-19.3
0.191	21.0	21.2	42.2	64.0	-21.8
0.645	12.4	20.7	33.1	56.0	-22.9
1.240	12.3	20.5	32.8	56.0	-23.2
0.201	19.1	21.0	40.1	63.6	-23.5
0.159	20.1	21.8	41.9	65.5	-23.6
2.288	11.8	20.5	32.3	56.0	-23.7
0.488	11.6	20.8	32.4	56.2	-23.8
0.808	11.6	20.6	32.2	56.0	-23.8
3.304	11.7	20.5	32.2	56.0	-23.8
3.256	11.6	20.5	32.1	56.0	-23.9
2.040	11.5	20.5	32.0	56.0	-24.0
4.880	11.5	20.5	32.0	56.0	-24.0
1.600	11.4	20.5	31.9	56.0	-24.1
3.128	11.4	20.5	31.9	56.0	-24.1
3.768	11.4	20.5	31.9	56.0	-24.1
1.784	11.3	20.5	31.8	56.0	-24.2
4.064	11.3	20.5	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.179	24.3	21.4	45.7	54.5	-8.8
0.186	23.9	21.3	45.2	54.2	-9.0
0.174	24.0	21.5	45.5	54.8	-9.3
0.191	21.0	21.2	42.2	54.0	-11.8
0.645	12.4	20.7	33.1	46.0	-12.9
1.240	12.3	20.5	32.8	46.0	-13.2
0.201	19.1	21.0	40.1	53.6	-13.5
0.159	20.1	21.8	41.9	55.5	-13.6
2.288	11.8	20.5	32.3	46.0	-13.7
0.488	11.6	20.8	32.4	46.2	-13.8
0.808	11.6	20.6	32.2	46.0	-13.8
3.304	11.7	20.5	32.2	46.0	-13.8
3.256	11.6	20.5	32.1	46.0	-13.9
2.040	11.5	20.5	32.0	46.0	-14.0
4.880	11.5	20.5	32.0	46.0	-14.0
1.600	11.4	20.5	31.9	46.0	-14.1
3.128	11.4	20.5	31.9	46.0	-14.1
3.768	11.4	20.5	31.9	46.0	-14.1
1.784	11.3	20.5	31.8	46.0	-14.2
4.064	11.3	20.5	31.8	46.0	-14.2





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.