Intermec Technologies Corporation

BTM312

EMC Test Report

Report No. INMC0726 Rev 01

Report Prepared By

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

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: July 29, 2011
Intermec Technologies Corporation
Model: BTM312

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Spurious Radiated Emissions	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Occupied Bandwidth	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Output Power	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Band Edge Compliance	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Spurious Conducted Emissions	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Power Spectral Density	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
AC Power Line Conducted Emissions	FCC 15.207:2011	ANSI C63.10:2009	**Pass**
Duty Cycle Correction Factor	FCC 15.247:2011	ANSI C63.10:2009	**Pass**

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

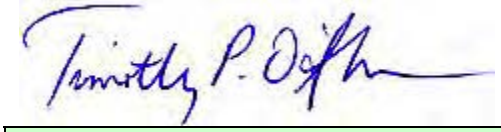
Test Facility

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:



Tim O'Shea, Operations 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	Added Bluetooth specific information	10/21/2011	71

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 National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. 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.

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).

Accreditations and Authorizations

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-3265, 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).

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, Brooklyn Park: US0175)*

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.

SCOPE

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 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796

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:	BTM312
First Date of Test:	7/18/2011
Last Date of Test:	7/29/2011
Receipt Date of Samples:	7/18/2011
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Bluetooth EDR radio module

Testing Objective:
To demonstrate compliance to FCC 15.247 requirements

CONFIGURATION 1 INMC0726

Software/Firmware Running during test	
Description	**Version**
BlueTest3	2.3.0.15

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Module	Intermec	BTM312	12

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Shuttle Board	Intermec Technologies Corporation	145-375-001	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote PC	Dell	Latitude D620	D9CMBD1

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	Yes	5.0m	No	Shuttle Board	Remote PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 INMC0726

Software/Firmware Running during test	
Description	**Version**
BlueTest3	2.3.0.15

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Module	Intermec	BTM312	13

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Shuttle Board	Intermec Technologies Corporation	145-375-001	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote PC	Dell	Latitude D620	D9CMBD1

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	Yes	2.0m	No	Shuttle Board	Remote PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 3 INMC0726

Software/Firmware Running during test	
Description	**Version**
BlueTest3	2.3.0.15

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth Module	Intermec	BTM312	12

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Shuttle Board	Intermec Technologies Corporation	145-375-001	None
Power Supply	Topward Electric Instruments Co.	TPS-2000	946425

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote PC	Dell	Latitude D620	D9CMBD1

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	Yes	5.0m	No	Shuttle Board	Remote PC
DC Leads	No	1.0m	No	Bluetooth Module	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	7/18/2011	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	7/26/2011	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.
3	7/26/2011	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.
4	7/26/2011	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.
5	7/26/2011	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.
6	7/26/2011	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.
7	7/27/2011	AC Power Line 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.
8	7/29/2011	Duty Cycle Correction Factor	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Duty Cycle Correction Factor

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	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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

To derive value to apply to the average emission measurements as allowed for FHSS radios, a duty cycle correction factor per 15.35(c) was utilized:

Duty Cycle = On time/100 milliseconds (or the period, whichever is less)

Duty Cycle Correction = 20 log [PW/100]

NORTHWEST EMC

Duty Cycle Correction Factor

XMit 2010.11.03

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/29/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	46%
Project:	None			Barometric Pres.:	30.15
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from USB. Frequency Hopping mode. Duty Cycle Correction factor = 20*LOG(PW/100ms) = -30.8 dB

DEVIATIONS FROM TEST STANDARD

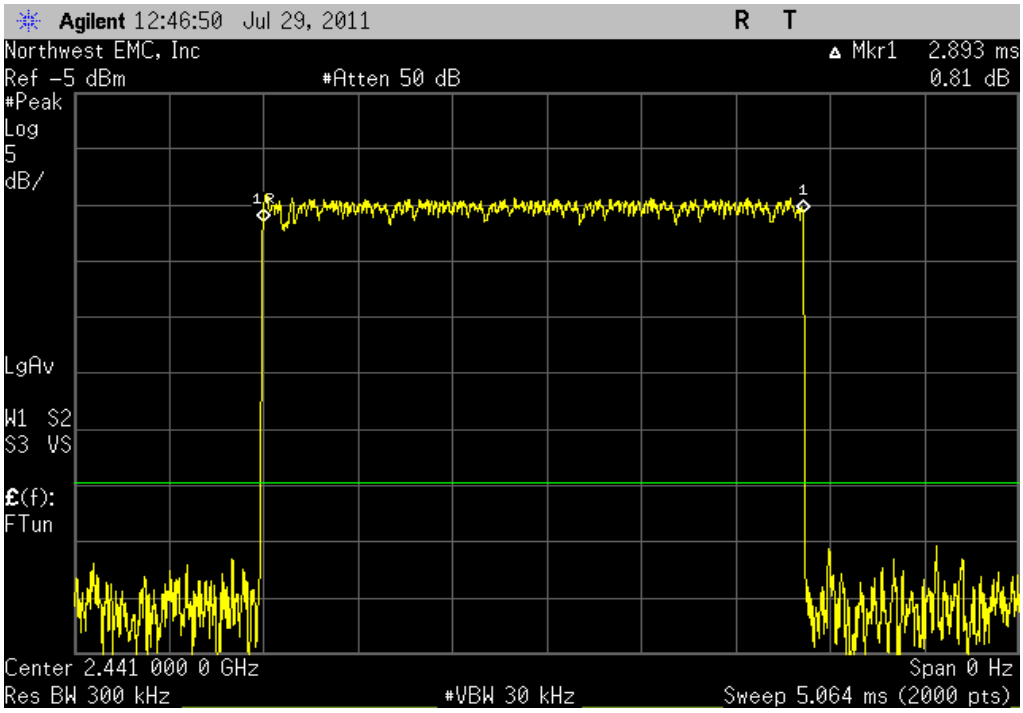
None

Configuration #	2	Signature

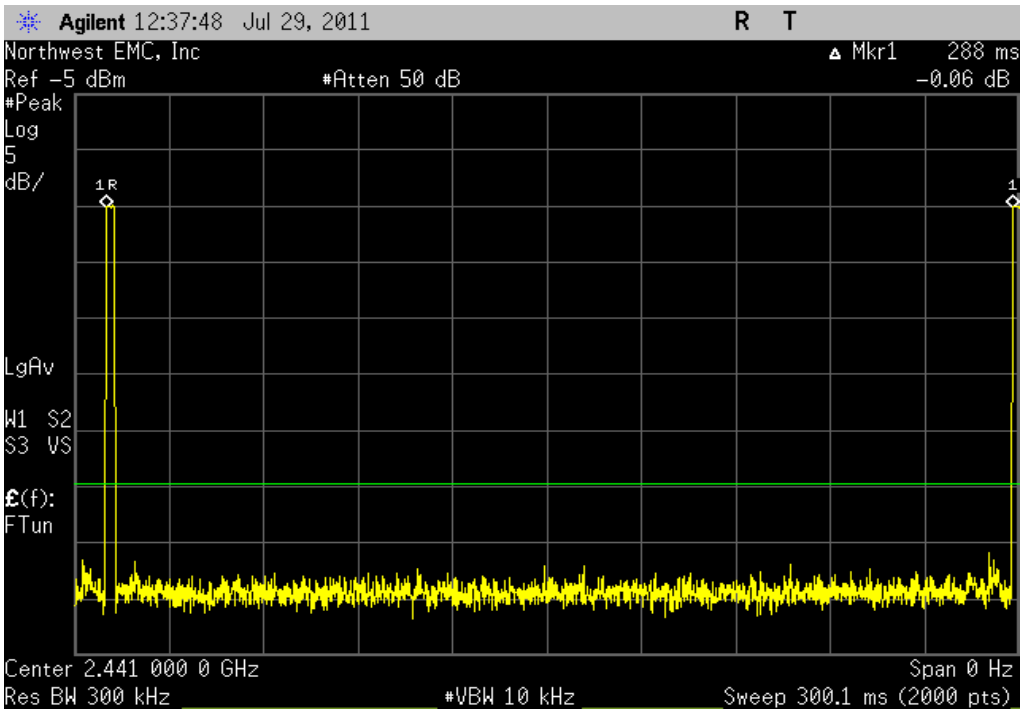
	Value	Limit	Results
Bluetooth, GFSK, DH5			
Pulse Width	2.9 ms	N/A	-30.8 dB
Period	288 ms	N/A	N/A
Total Period	31.6 s	N/A	N/A
Bluetooth, 4-DQPSK, 2DH5			
Pulse Width	2.9 ms	N/A	-30.7 dB
Period	284.4 ms	N/A	N/A
Total Period	31.6 s	N/A	N/A
Bluetooth, 8-DPSK, 3DH5			
Pulse Width	2.9 ms	N/A	-30.7 dB
Period	284.3 ms	N/A	N/A
Total Period	31.6 s	N/A	N/A

Duty Cycle Correction Factor

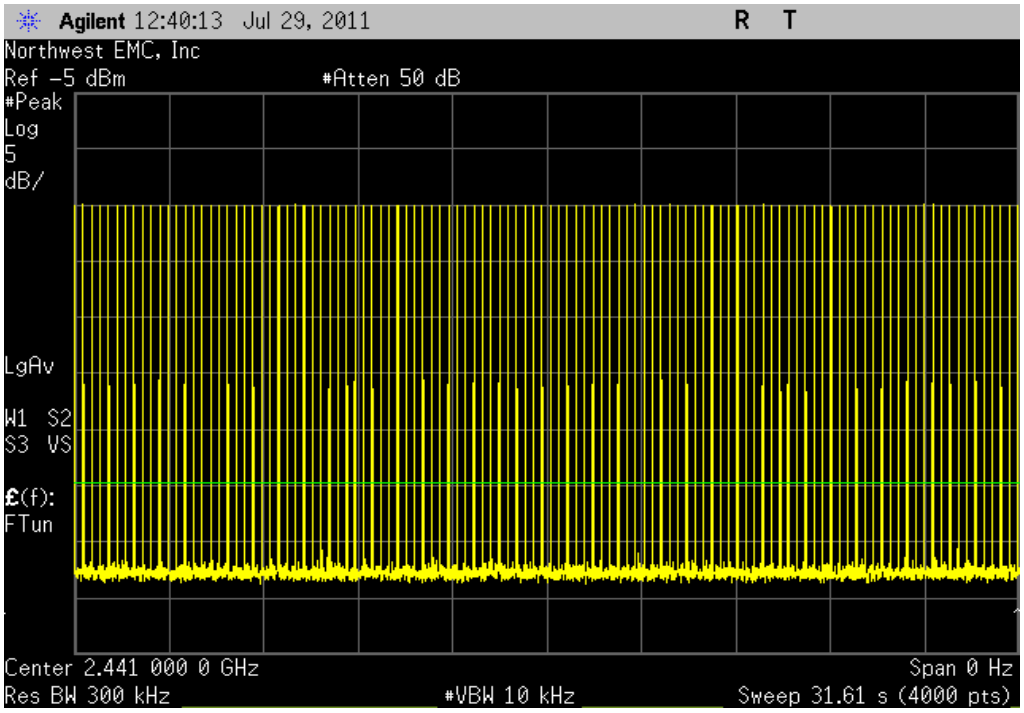
Bluetooth, GFSK, DH5, Pulse Width					
Result:	-30.8 dB	**Value:**	2.9 ms	**Limit:**	N/A



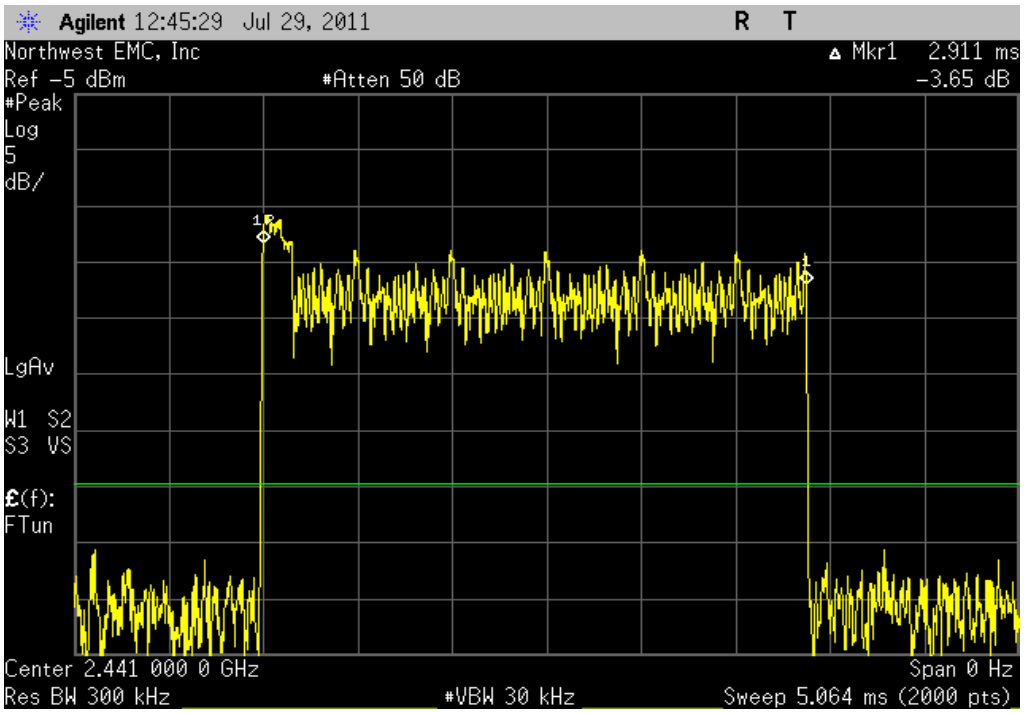
Bluetooth, GFSK, DH5, Period					
Result:	N/A	**Value:**	288 ms	**Limit:**	N/A



Bluetooth, GFSK, DH5, Total Period					
Result:	N/A	**Value:**	31.6 s	**Limit:**	N/A

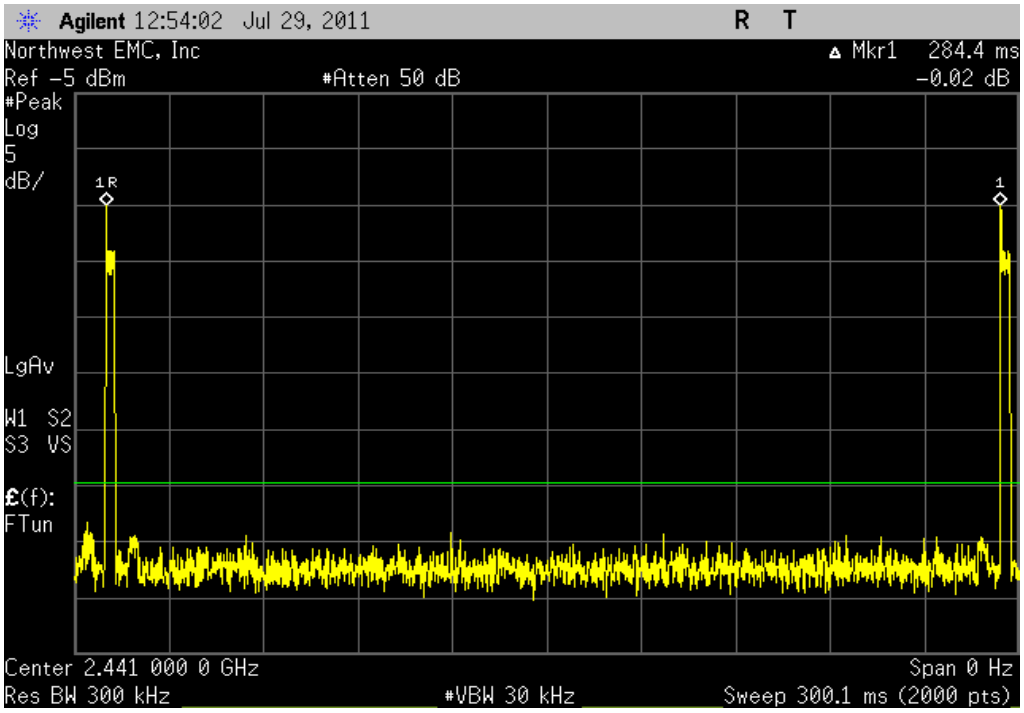


Bluetooth, 4-DQPSK, 2DH5, Pulse Width					
Result:	-30.7 dB	**Value:**	2.9 ms	**Limit:**	N/A

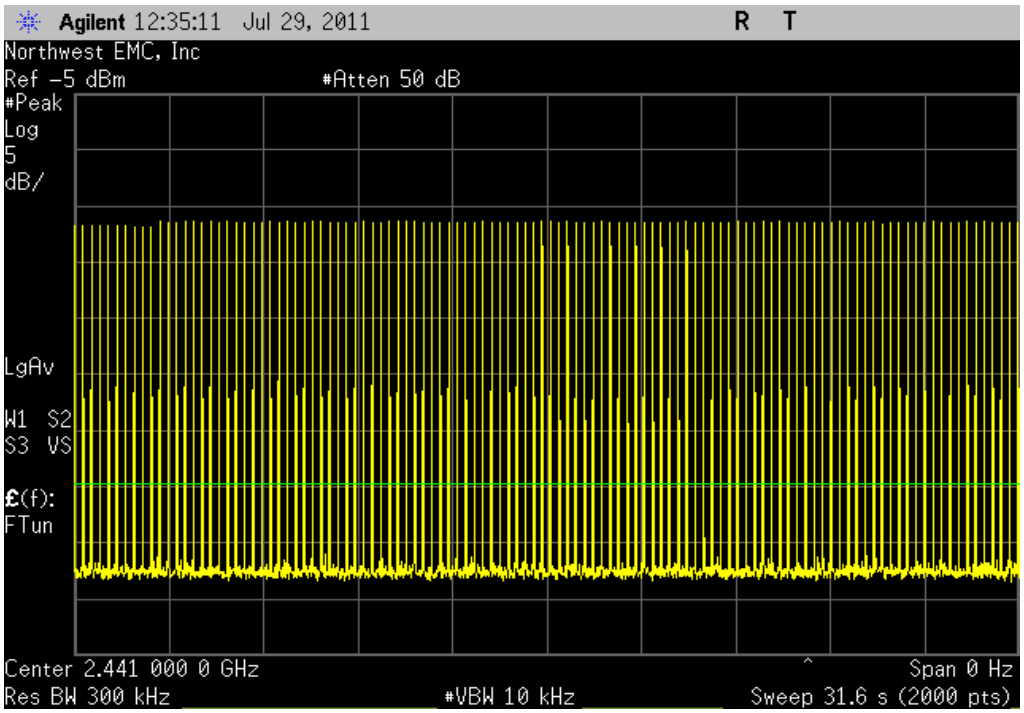


Duty Cycle Correction Factor

Bluetooth, 4-DQPSK, 2DH5, Period					
Result:	N/A	**Value:**	284.4 ms	**Limit:**	N/A

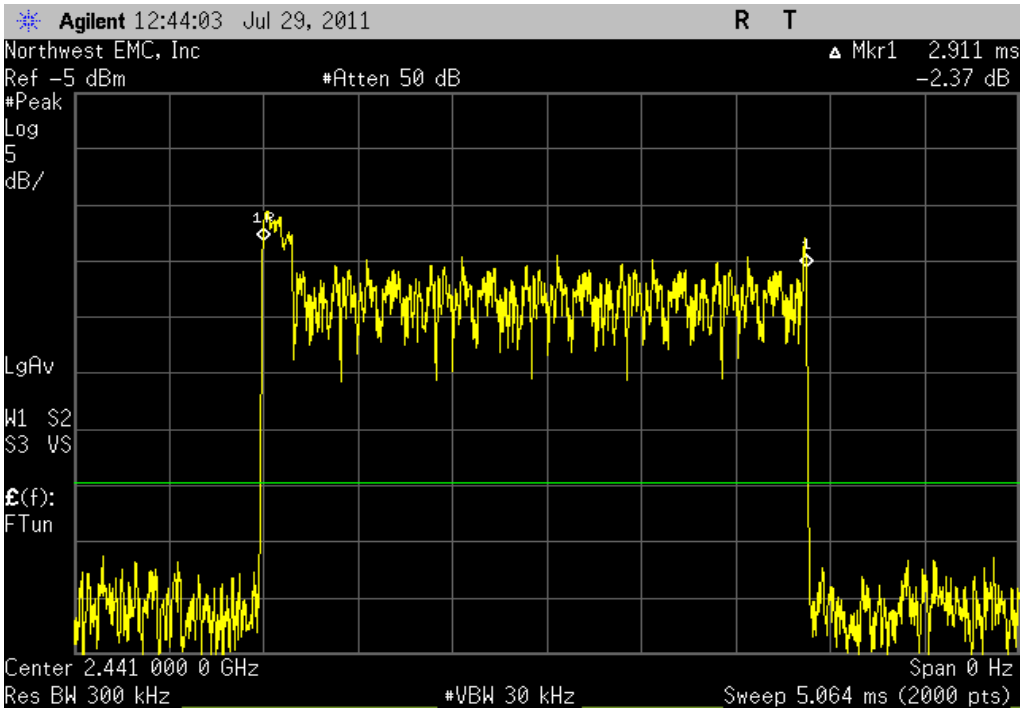


Bluetooth, 4-DQPSK, 2DH5, Total Period					
Result:	N/A	**Value:**	31.6 s	**Limit:**	N/A

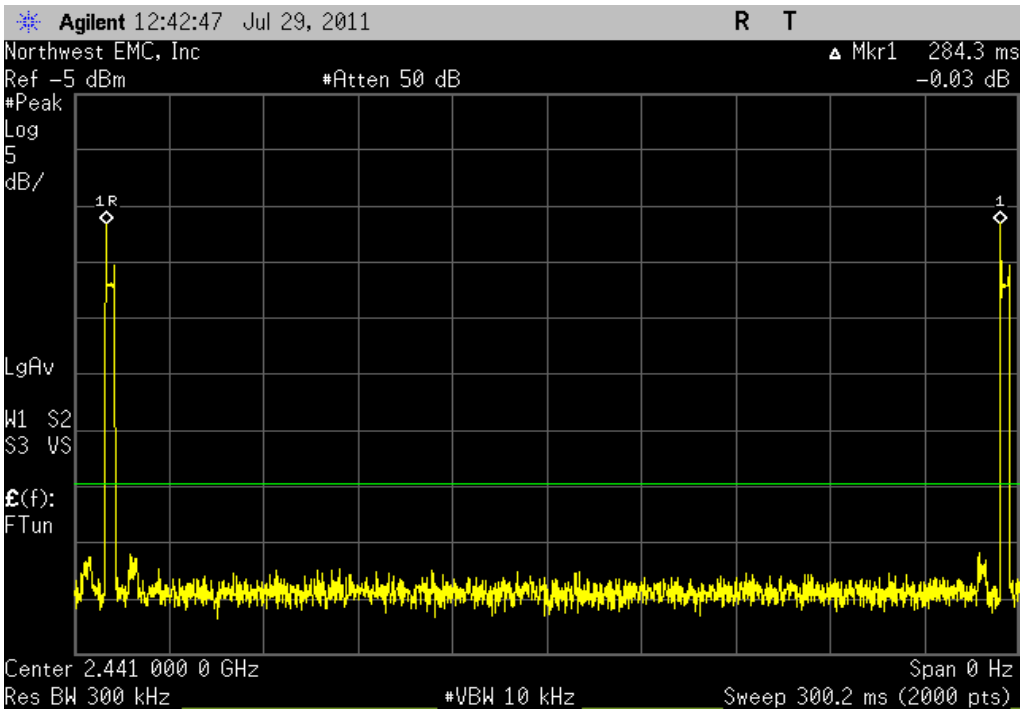


Duty Cycle Correction Factor

Bluetooth, 8-DPSK, 3DH5, Pulse Width					
Result:	-30.7 dB	**Value:**	2.9 ms	**Limit:**	N/A

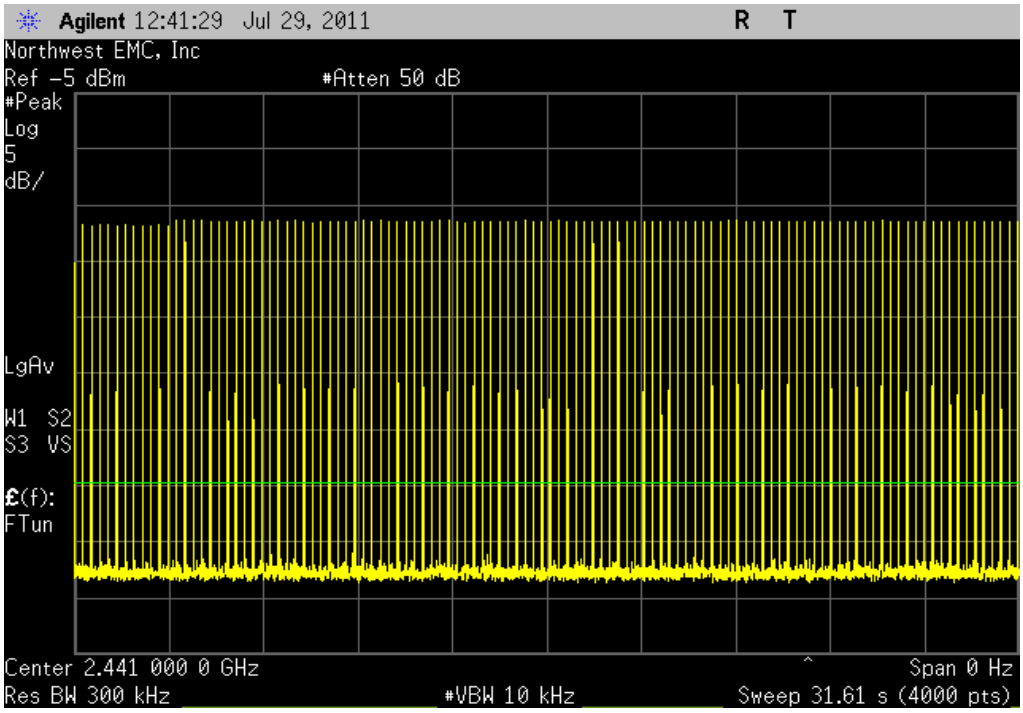


Bluetooth, 8-DPSK, 3DH5, Period					
Result:	N/A	**Value:**	284.3 ms	**Limit:**	N/A



Duty Cycle Correction Factor

Bluetooth, 8-DPSK, 3DH5, Total Period					
Result:	N/A	**Value:**	31.6 s	**Limit:**	N/A



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	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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 20 dB 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 in a no hop mode at its maximum data rate for each of the three different modulations available.

NORTHWEST EMC

Occupied Bandwidth

XMit 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added.

DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Value	Limit	Result
DH5, GFSK				
	Low Channel	932.254 kHz	< 1.5 MHz	Pass
	Mid Channel	934.724 kHz	< 1.5 MHz	Pass
	High Channel	930.594 kHz	< 1.5 MHz	Pass
2DH5, 4-DQPSK				
	Low Channel	1.261 MHz	< 1.5 MHz	Pass
	Mid Channel	1.277 MHz	< 1.5 MHz	Pass
	High Channel	1.252 MHz	< 1.5 MHz	Pass
3DH5, 8-DPSK				
	Low Channel	1.257 MHz	< 1.5 MHz	Pass
	Mid Channel	1.257 MHz	< 1.5 MHz	Pass
	High Channel	1.257 MHz	< 1.5 MHz	Pass

DH5, GFSK, Low Channel

				Value	Limit	Result
				932.254 kHz	< 1.5 MHz	Pass

DH5, GFSK, Mid Channel

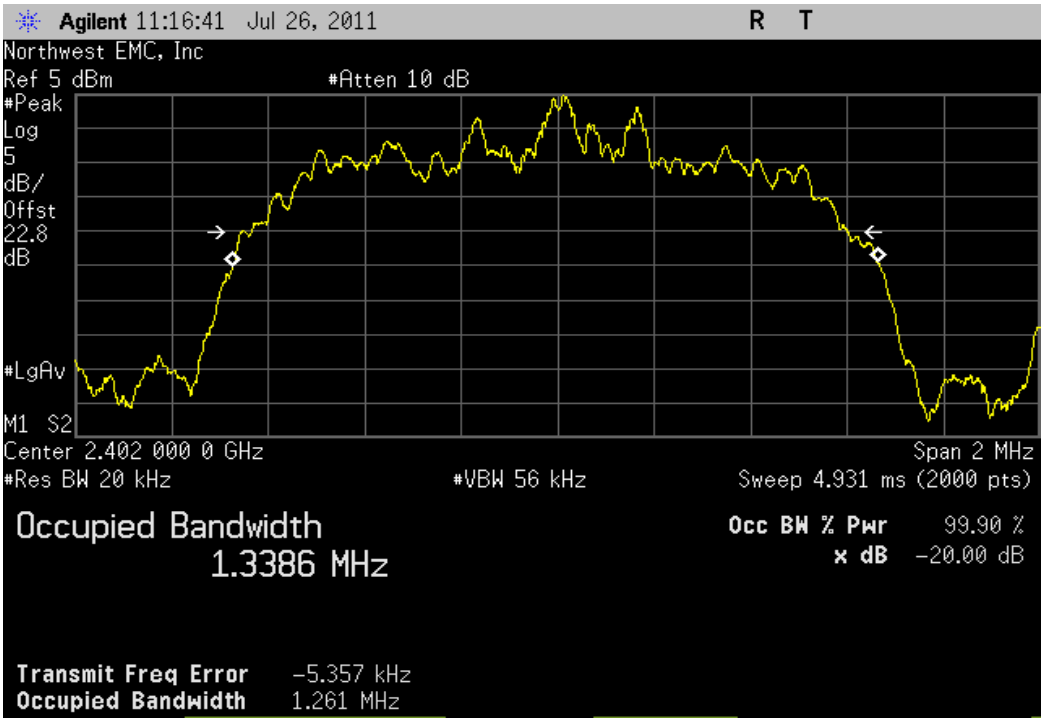
				Value	Limit	Result
				934.724 kHz	< 1.5 MHz	Pass

DH5, GFSK, High Channel

				Value	Limit	Result
				930.594 kHz	< 1.5 MHz	Pass

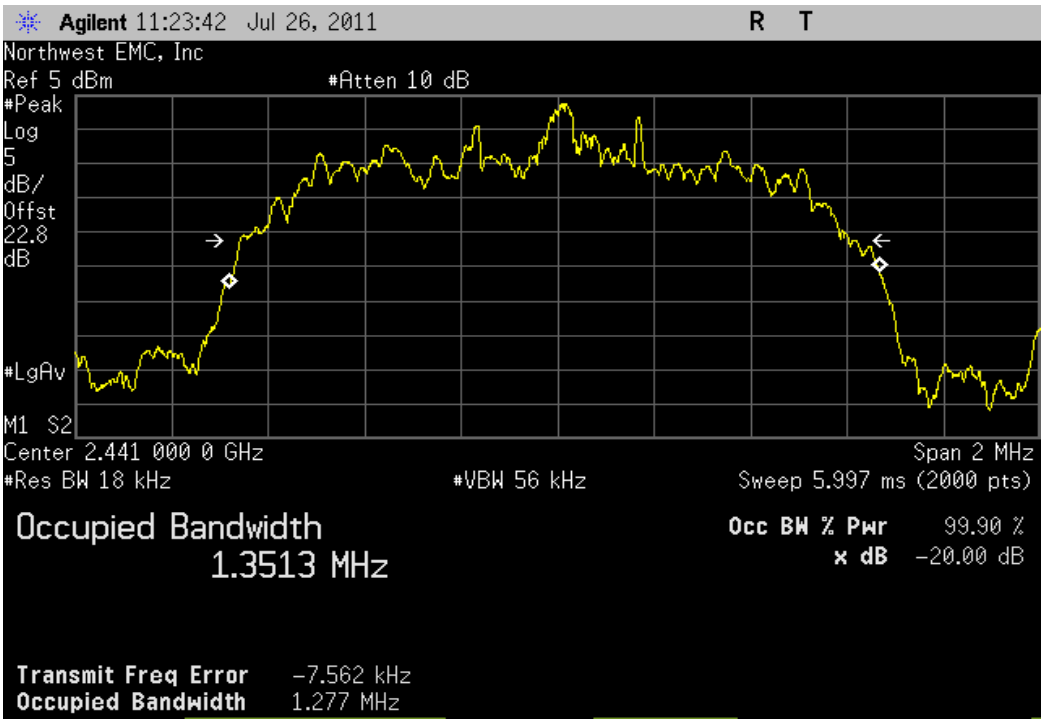
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				1.261 MHz	< 1.5 MHz	Pass



2DH5, 4-DQPSK, Mid Channel

				Value	Limit	Result
				1.277 MHz	< 1.5 MHz	Pass

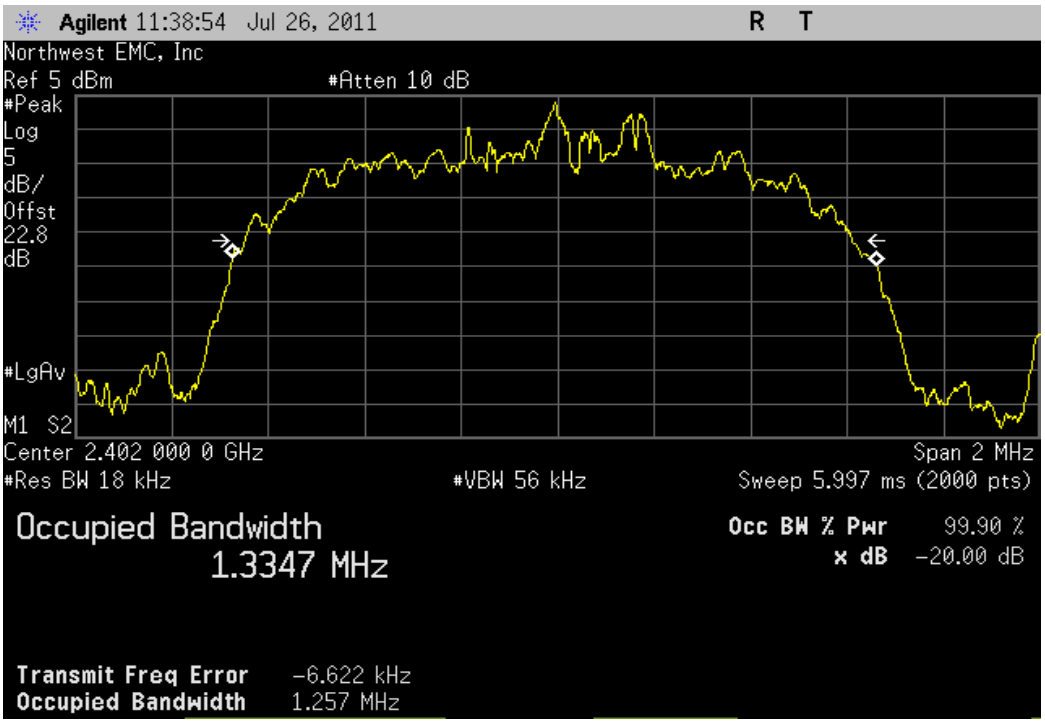


2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				1.252 MHz	< 1.5 MHz	Pass

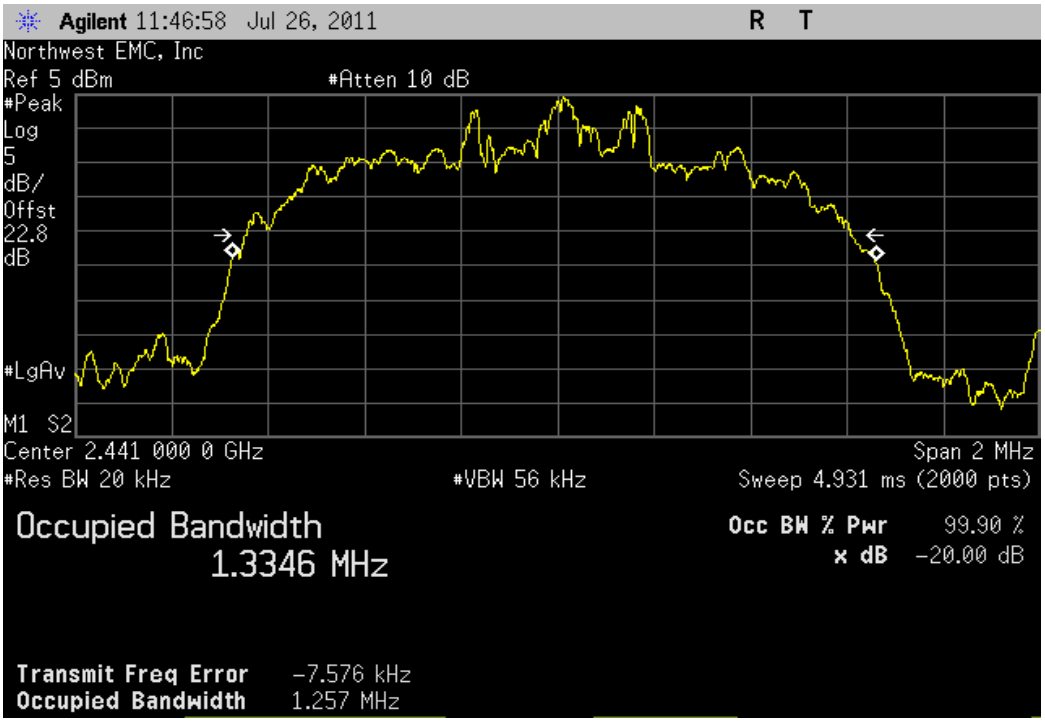
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				1.257 MHz	< 1.5 MHz	Pass



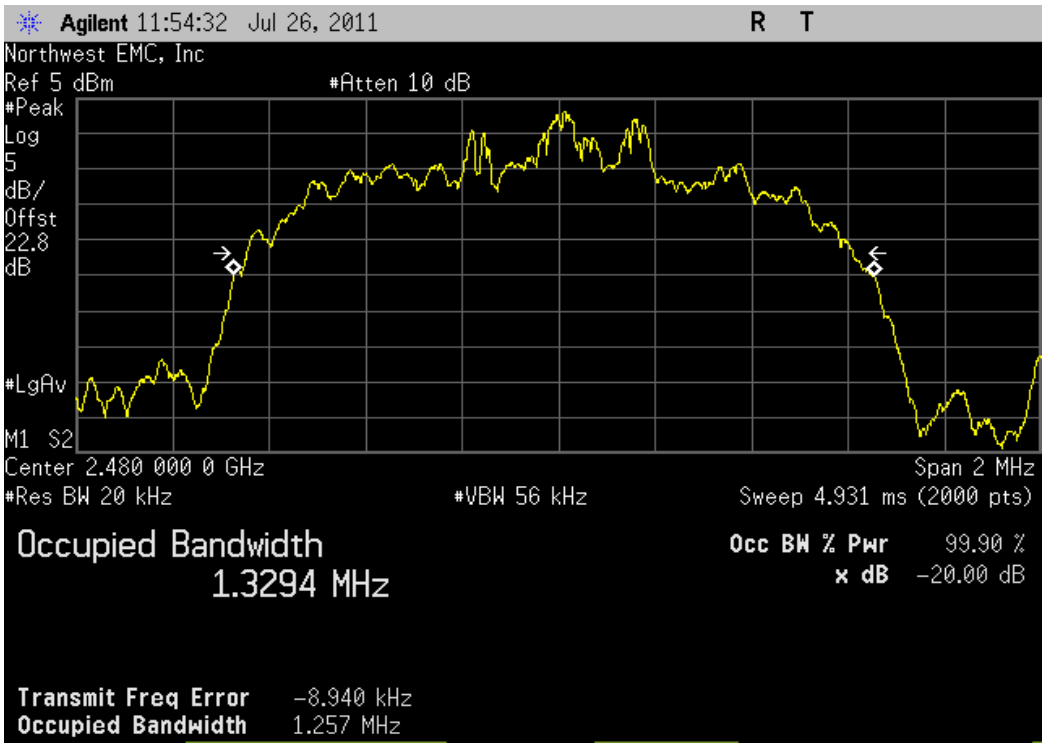
3DH5, 8-DPSK, Mid Channel

				Value	Limit	Result
				1.257 MHz	< 1.5 MHz	Pass



3DH5, 8-DPSK, High Channel

					Value	Limit	Result
					1.257 MHz	< 1.5 MHz	Pass



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
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2011	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
Power Meter	Gigatronics	8651A	SPM	1/7/2010	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0

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 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 in a no hop mode at its maximum data rate for each of the three different modulations available.

NORTHWEST EMC

Output Power

XMit 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added.

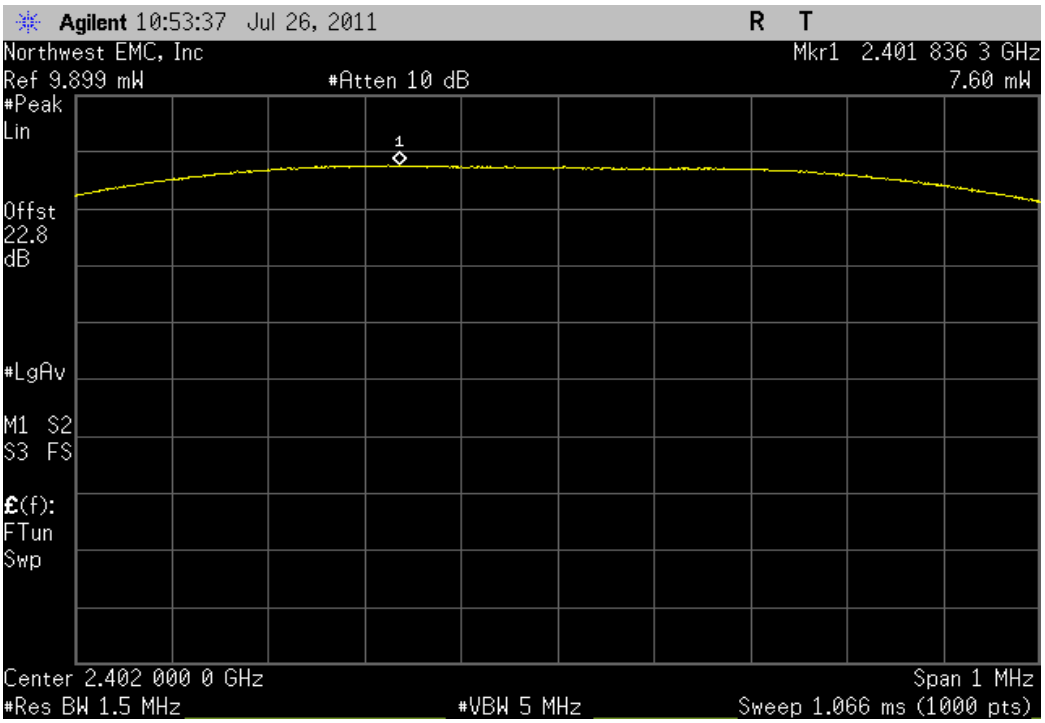
DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Value	Limit	Result
DH5, GFSK				
	Low Channel	7.602 mW	< 125 mW	Pass
	Mid Channel	7.575 mW	< 125 mW	Pass
	High Channel	5.773 mW	< 125 mW	Pass
2DH5, 4-DQPSK				
	Low Channel	6.879 mW	< 125 mW	Pass
	Mid Channel	6.942 mW	< 125 mW	Pass
	High Channel	5.249 mW	< 125 mW	Pass
3DH5, 8-DPSK				
	Low Channel	7.502 mW	< 125 mW	Pass
	Mid Channel	7.369 mW	< 125 mW	Pass
	High Channel	5.673 mW	< 125 mW	Pass

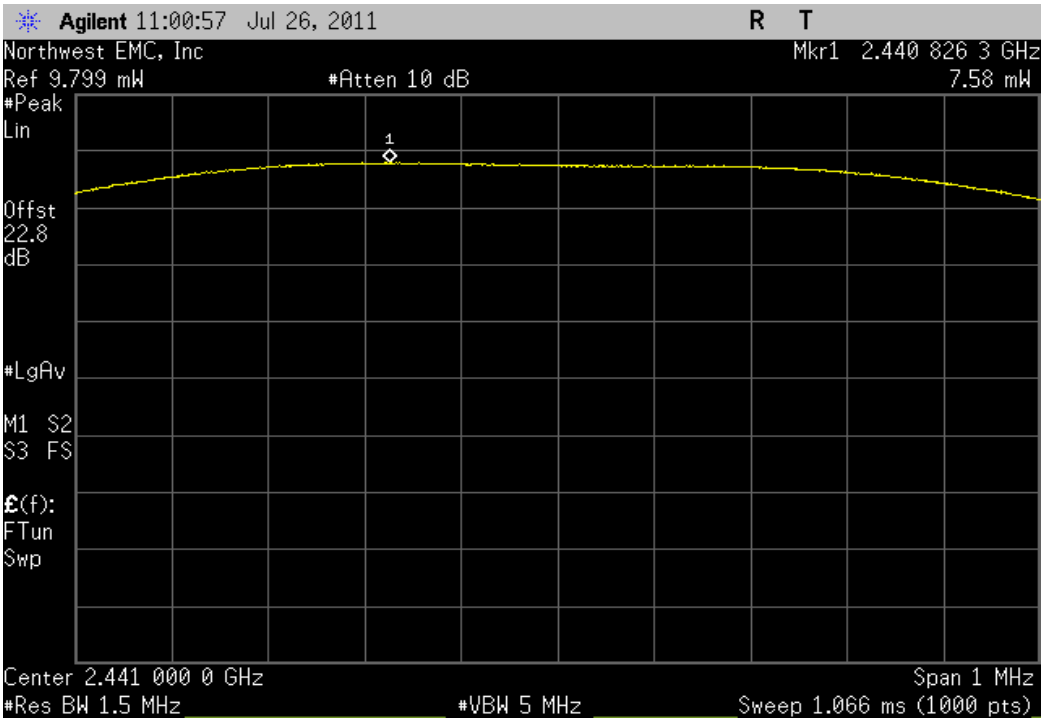
DH5, GFSK, Low Channel

				Value	Limit	Result
				7.602 mW	< 125 mW	Pass



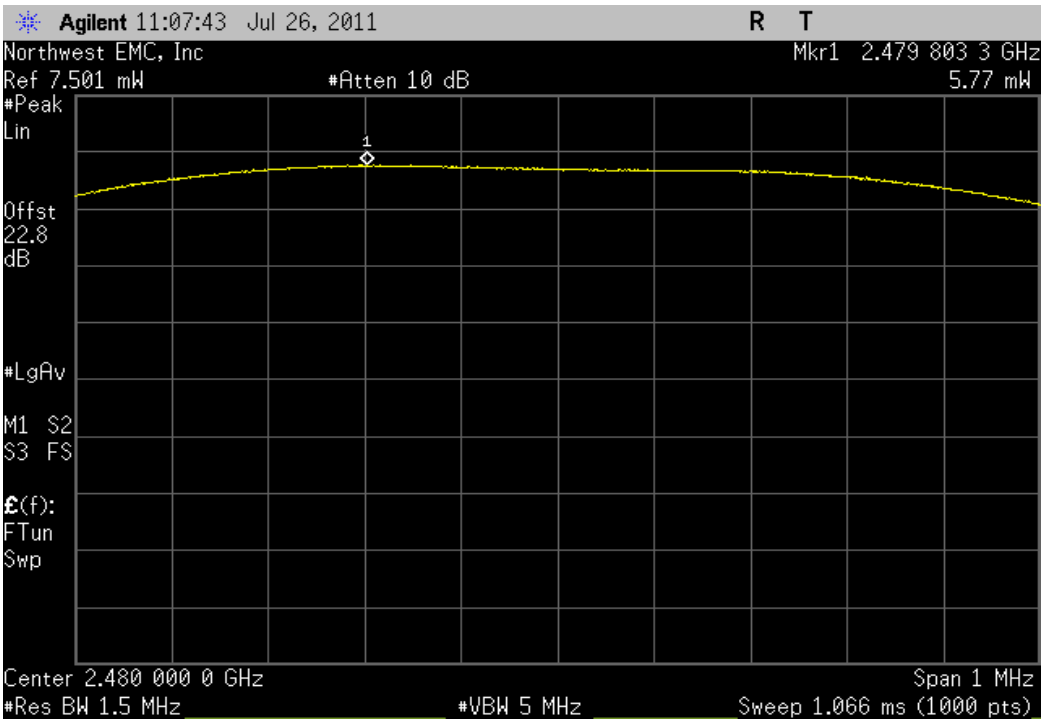
DH5, GFSK, Mid Channel

				Value	Limit	Result
				7.575 mW	< 125 mW	Pass



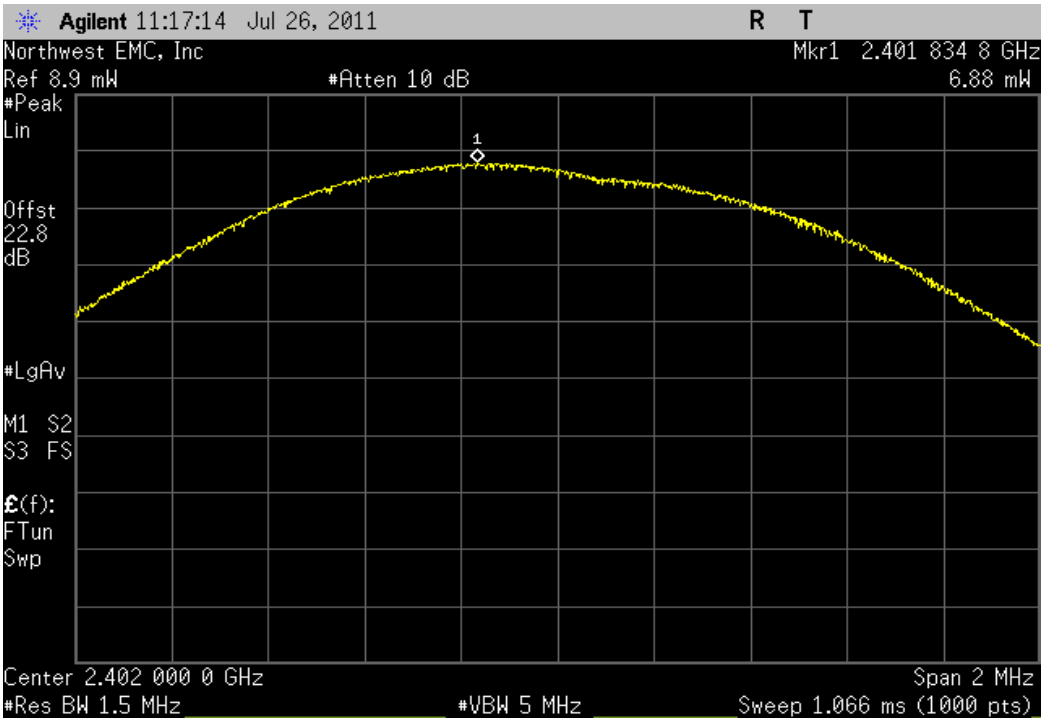
DH5, GFSK, High Channel

Value	Limit	Result
5.773 mW	< 125 mW	Pass



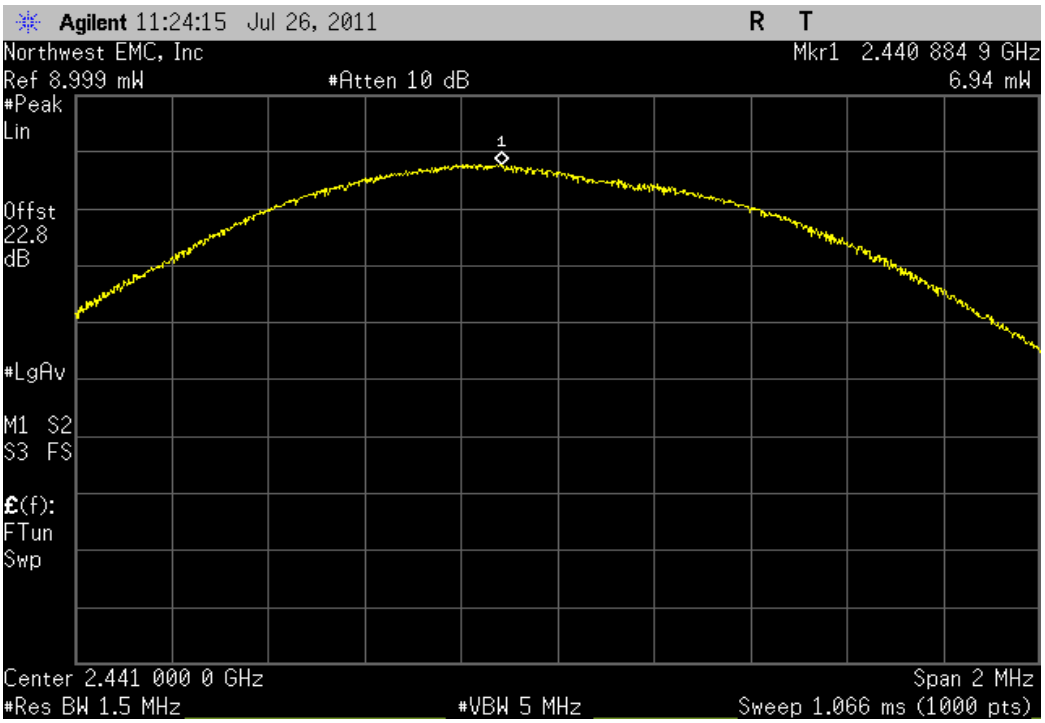
2DH5, 4-DQPSK, Low Channel

Value	Limit	Result
6.879 mW	< 125 mW	Pass



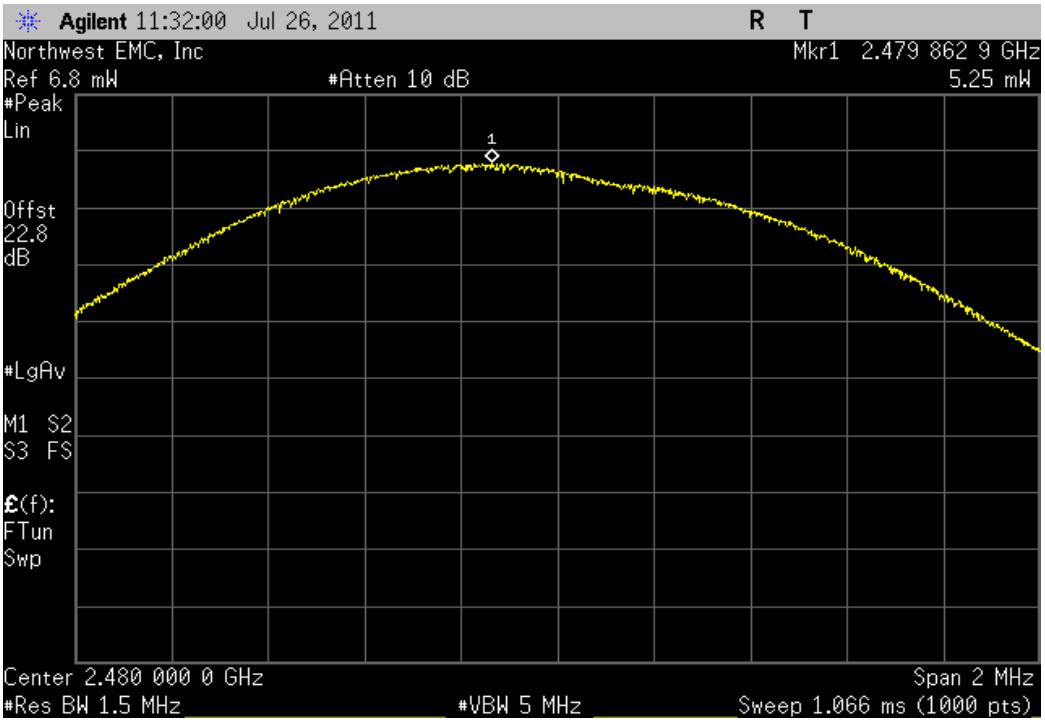
2DH5, 4-DQPSK, Mid Channel

				Value	Limit	Result
				6.942 mW	< 125 mW	Pass



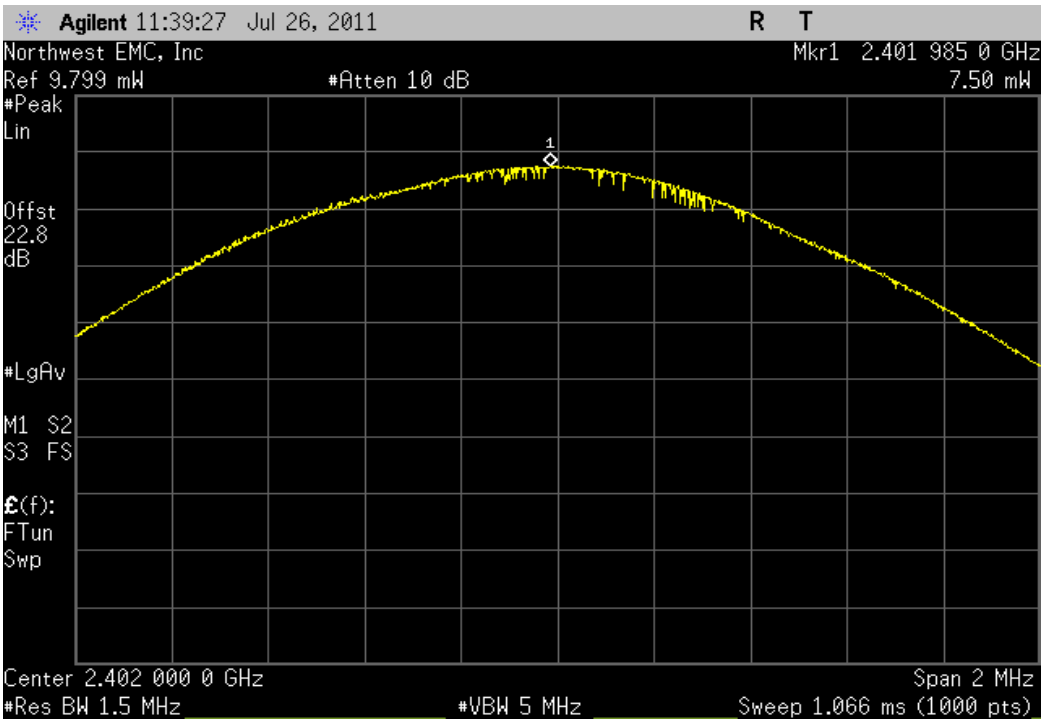
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				5.249 mW	< 125 mW	Pass



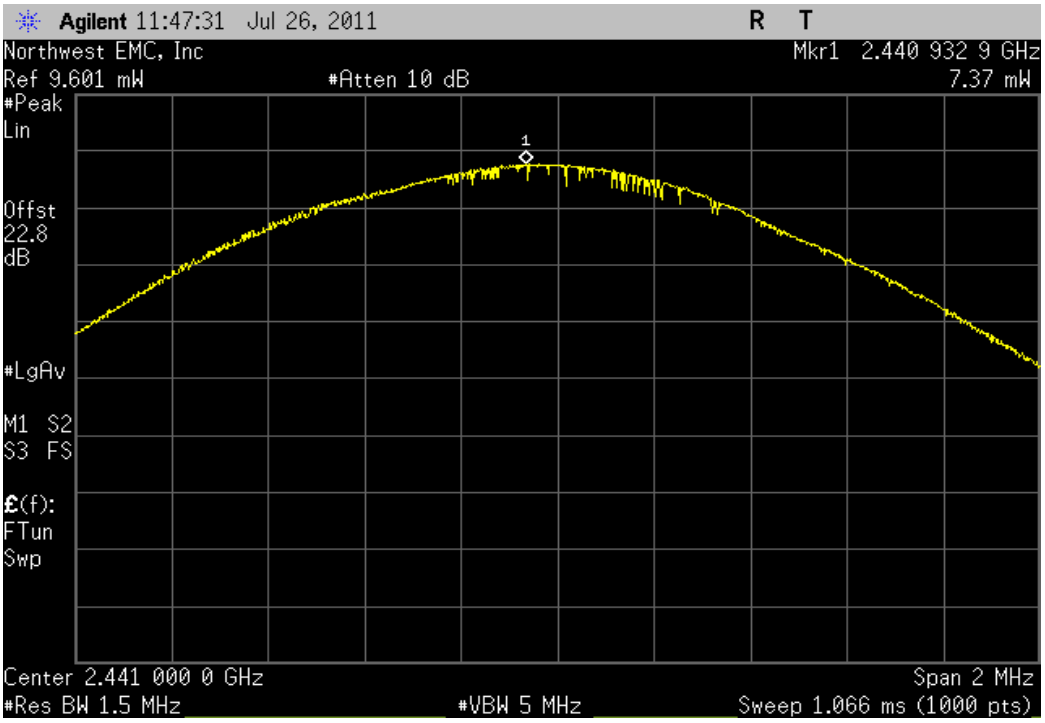
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				7.502 mW	< 125 mW	Pass



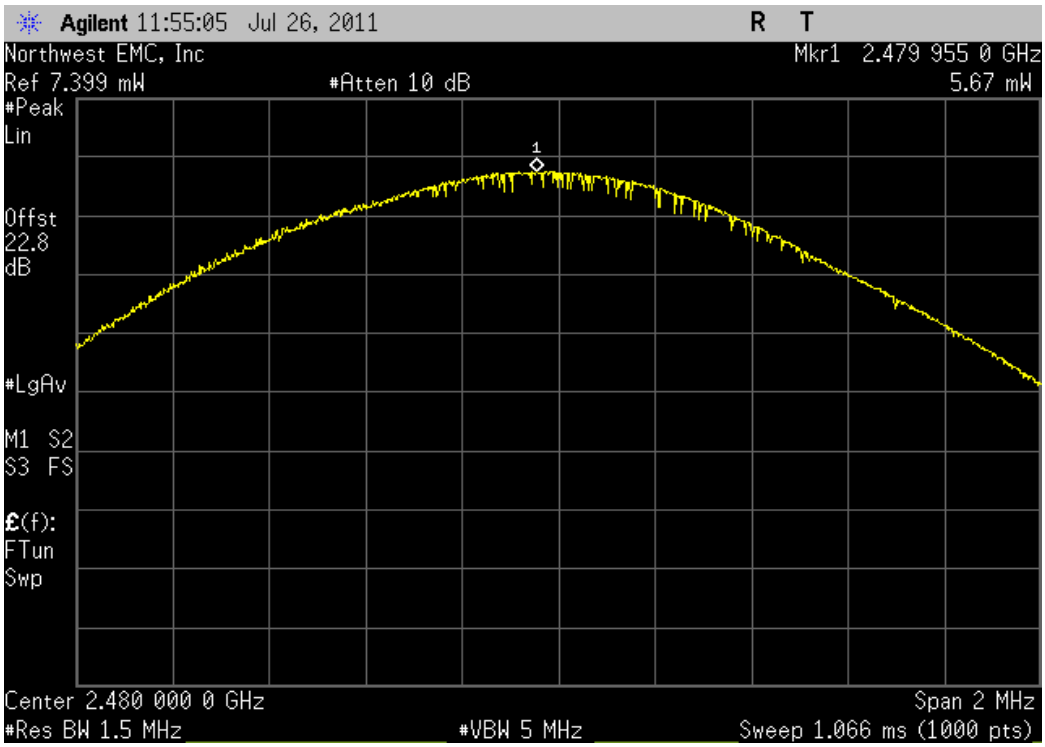
3DH5, 8-DPSK, Mid Channel

				Value	Limit	Result
				7.369 mW	< 125 mW	Pass



3DH5, 8-DPSK, High Channel

					Value	Limit	Result
					5.673 mW	< 125 mW	Pass



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	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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 requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was measured with the EUT in a hopping mode. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 10 MHz below the band edge to 10 MHz above the band edge.

The EUT was transmitting at its maximum data rate using all three types of modulations available in Bluetooth EDR.

NORTHWEST EMC

Band Edge Compliance

XMit 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added. Frequency hopping mode enabled.

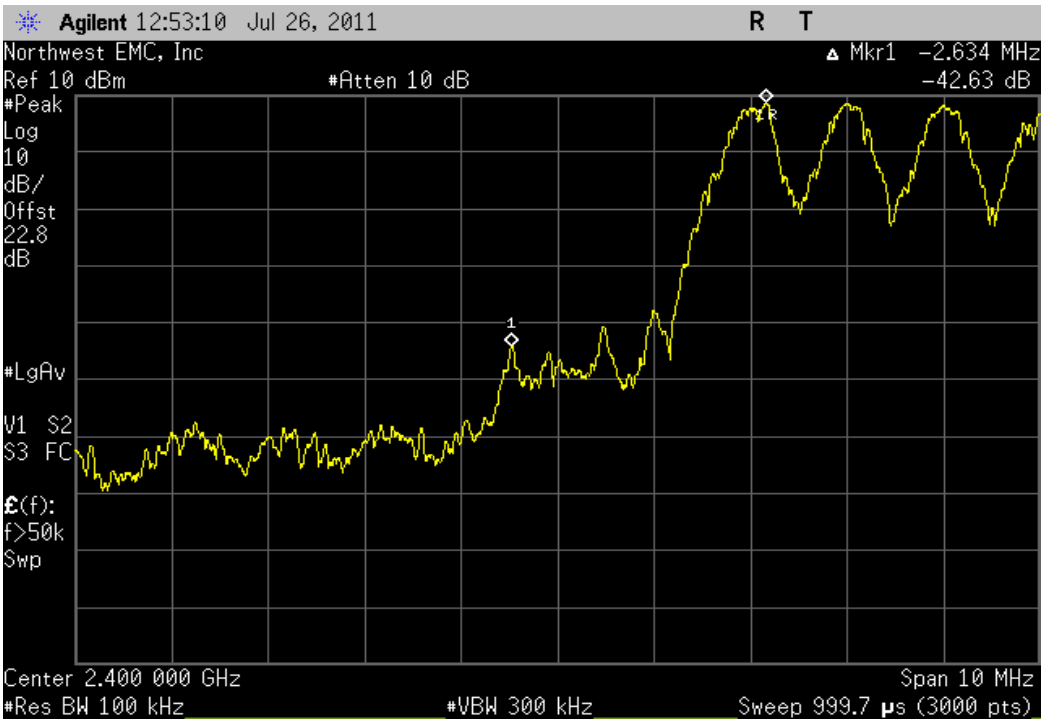
DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Value	Limit	Result
DH5, GFSK				
	Low Channel	-42.63 dBc	≤ -20 dBc	Pass
	High Channel	-45.95 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK				
	Low Channel	-41.12 dBc	≤ -20 dBc	Pass
	High Channel	-41.63 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
	Low Channel	-42.92 dBc	≤ -20 dBc	Pass
	High Channel	-43.41 dBc	≤ -20 dBc	Pass

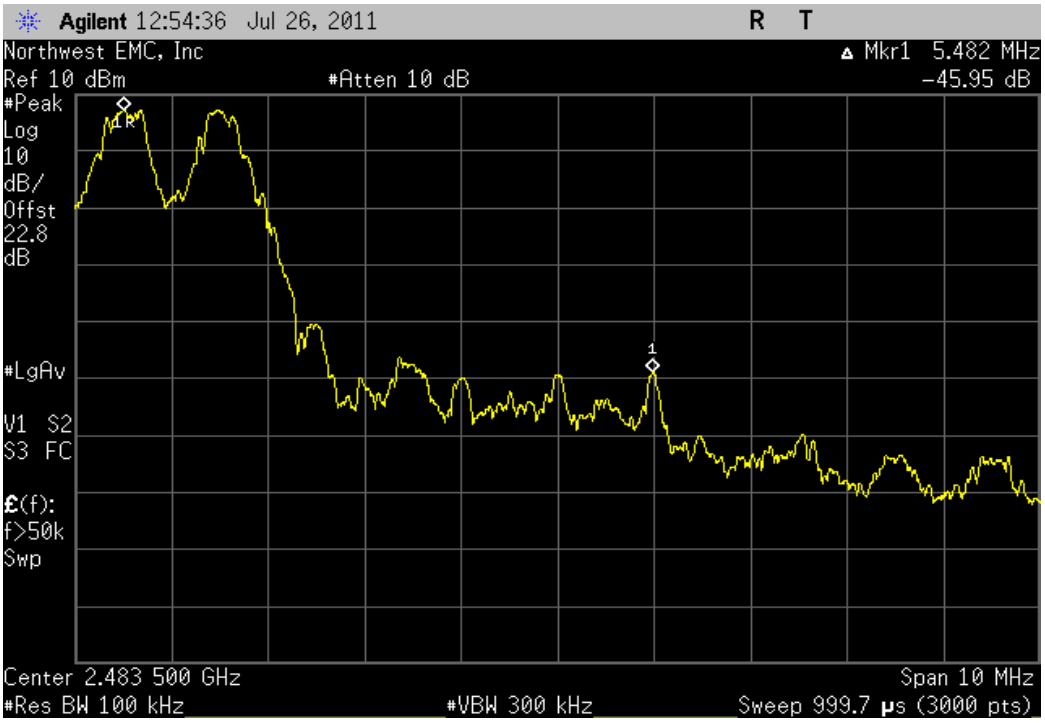
DH5, GFSK, Low Channel

				Value	Limit	Result
				-42.63 dBc	≤ -20 dBc	Pass



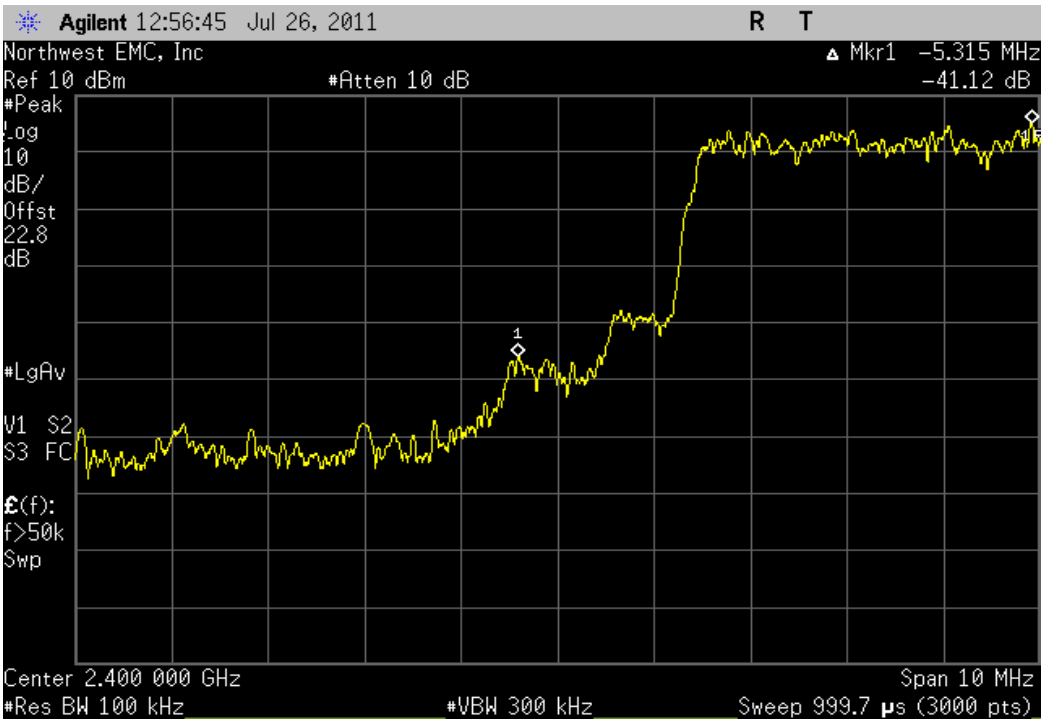
DH5, GFSK, High Channel

				Value	Limit	Result
				-45.95 dBc	≤ -20 dBc	Pass



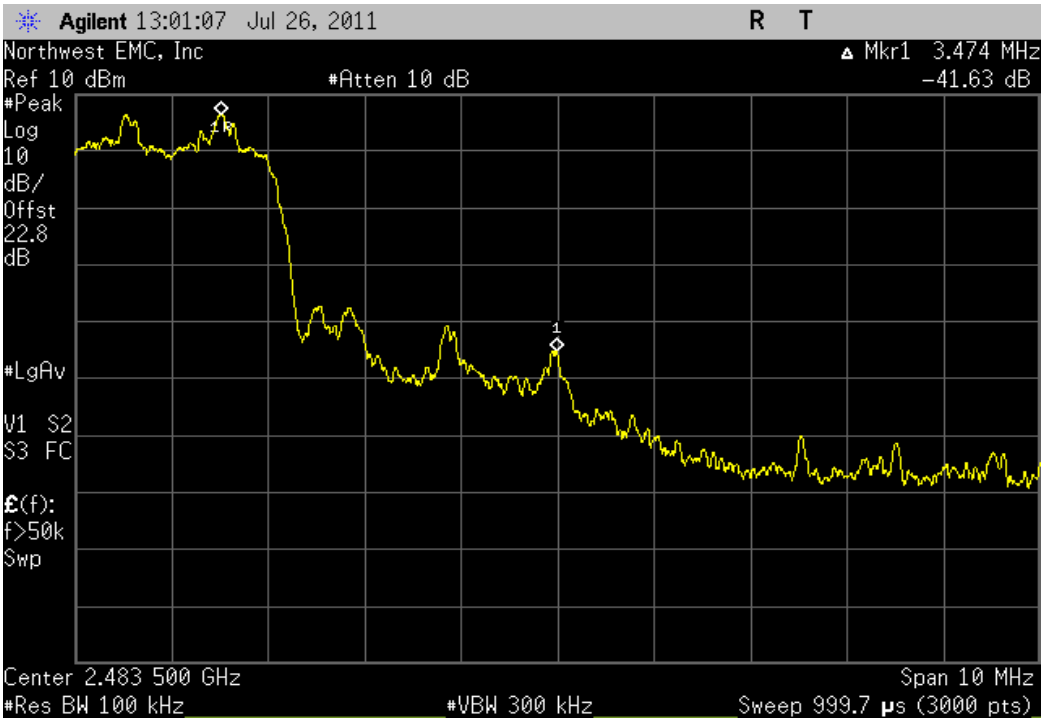
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				-41.12 dBc	≤ -20 dBc	Pass



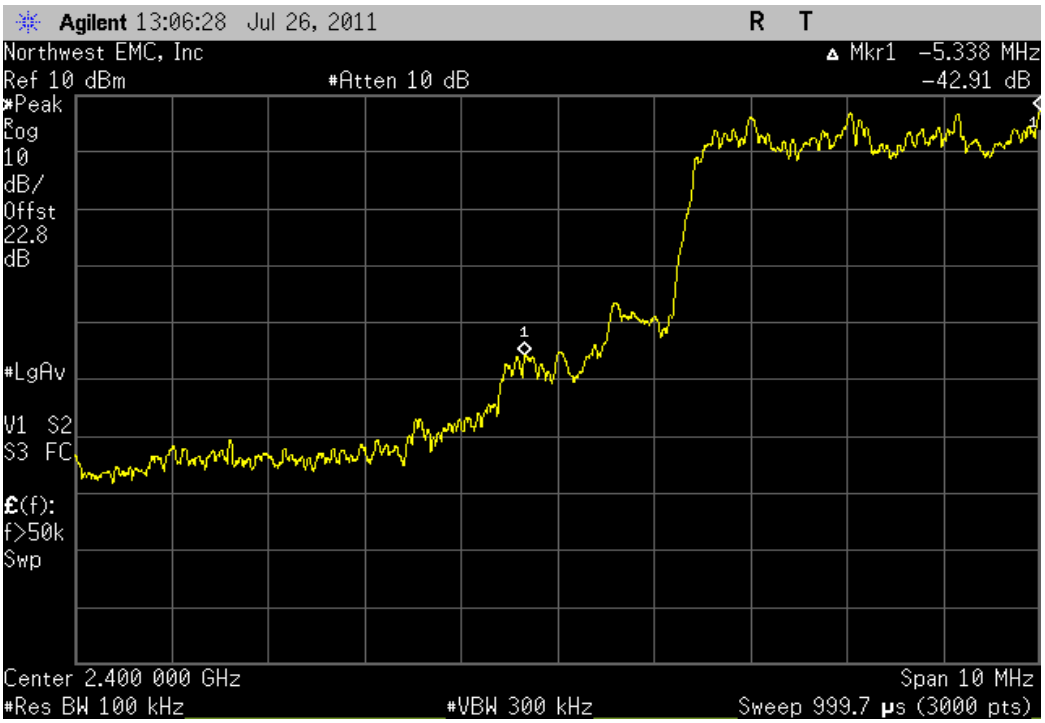
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				-41.63 dBc	≤ -20 dBc	Pass



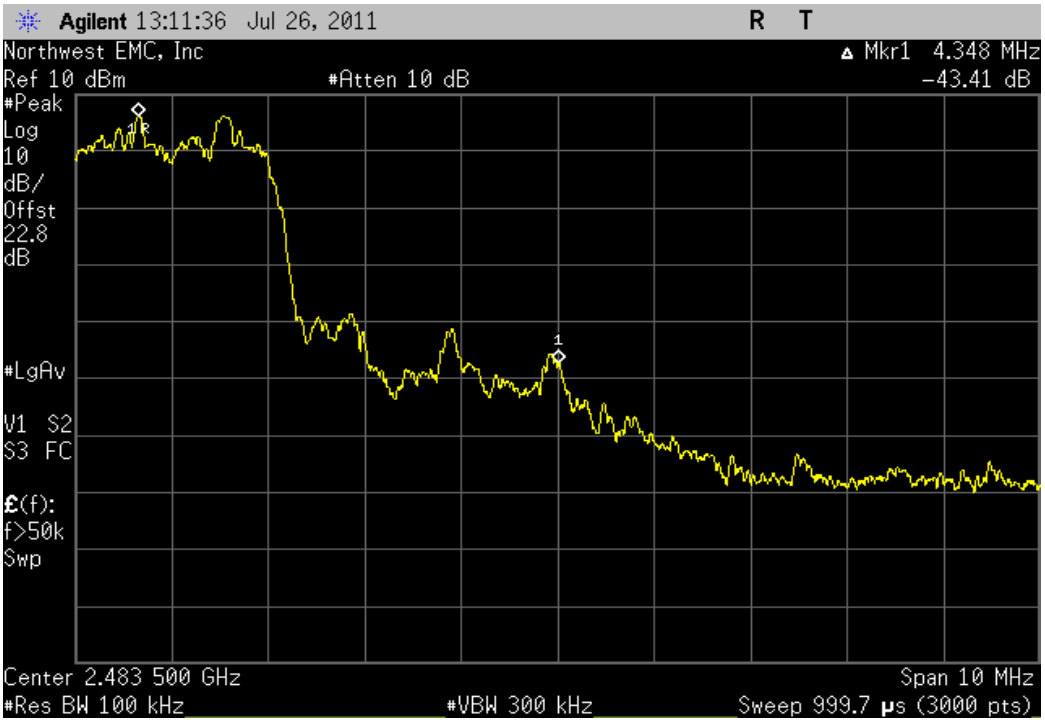
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				-42.92 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel

				Value	Limit	Result
				-43.41 dBc	≤ -20 dBc	Pass



Band Edge Compliance - No Hop

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	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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 requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was measured with the EUT set to low and high transmit frequencies, without frequency hopping enabled. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 10 MHz below the band edge to 10 MHz above the band edge.

The EUT was transmitting at its maximum data rate using all three types of modulations available in Bluetooth EDR.

NORTHWEST EMC

Band Edge Compliance - No Hop

XMit 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added.

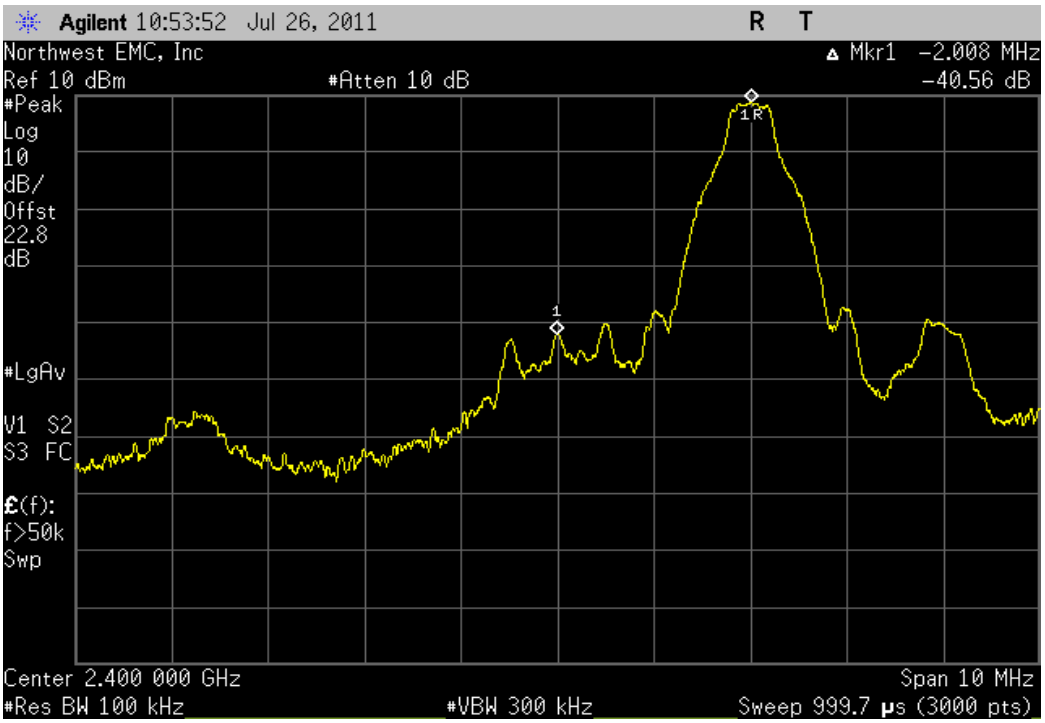
DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Value	Limit	Result
DH5, GFSK				
	Low Channel	-40.57 dBc	≤ -20 dBc	Pass
	High Channel	-46.07 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK				
	Low Channel	-43.58 dBc	≤ -20 dBc	Pass
	High Channel	-42.58 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
	Low Channel	-42.84 dBc	≤ -20 dBc	Pass
	High Channel	-42.33 dBc	≤ -20 dBc	Pass

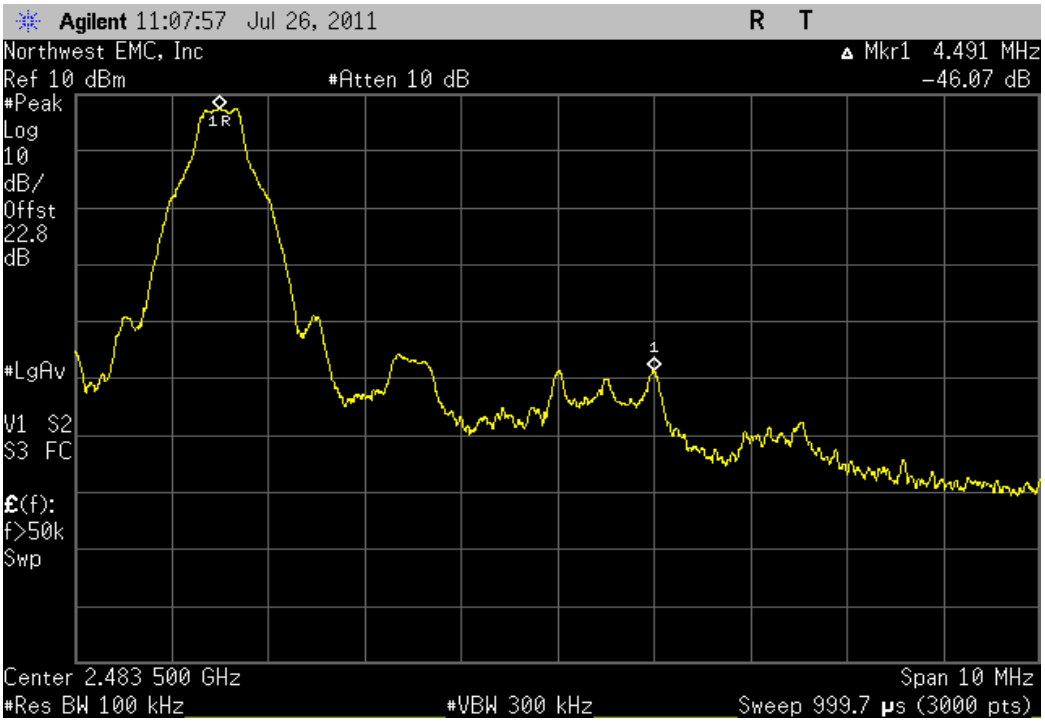
DH5, GFSK, Low Channel

				Value	Limit	Result
				-40.57 dBc	≤ -20 dBc	Pass



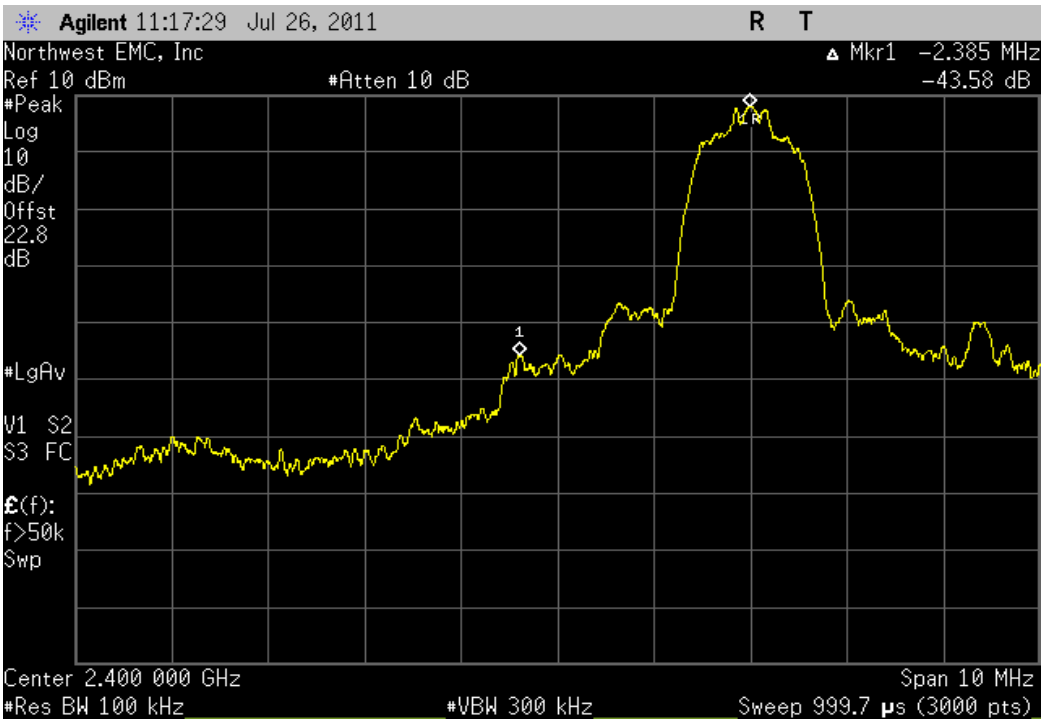
DH5, GFSK, High Channel

				Value	Limit	Result
				-46.07 dBc	≤ -20 dBc	Pass



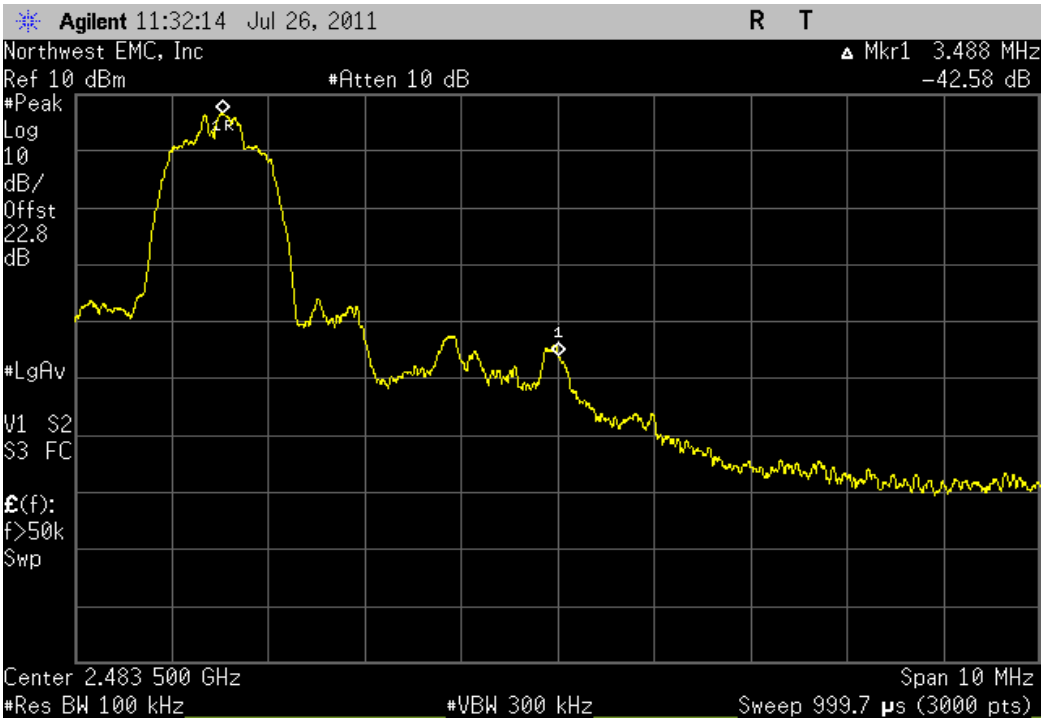
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				-43.58 dBc	≤ -20 dBc	Pass



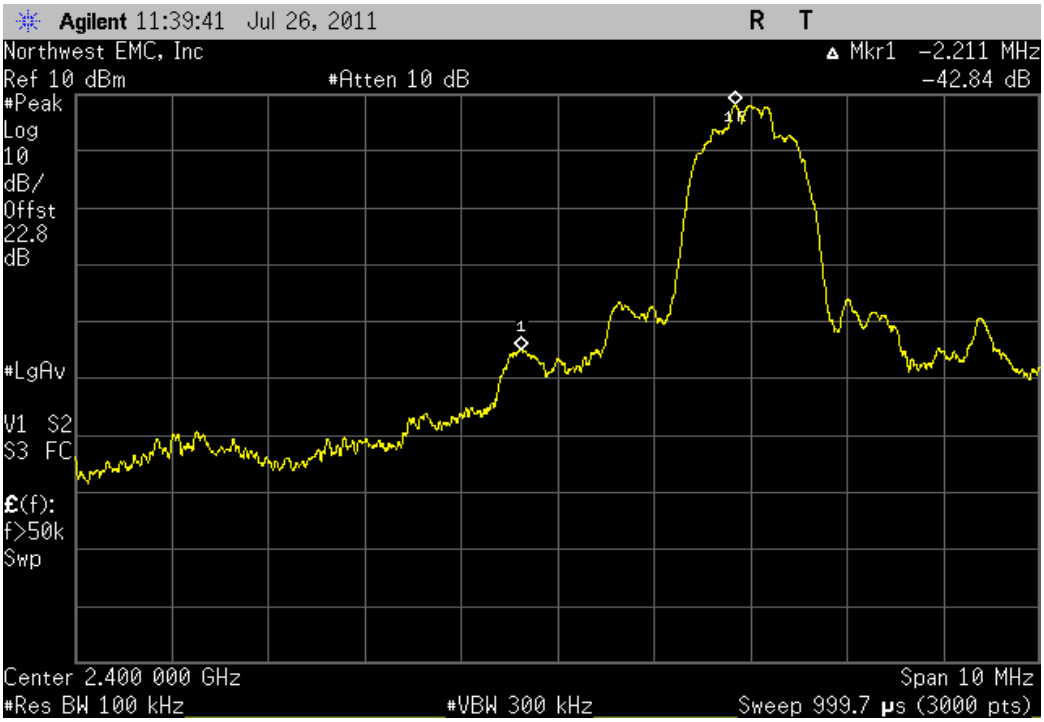
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				-42.58 dBc	≤ -20 dBc	Pass



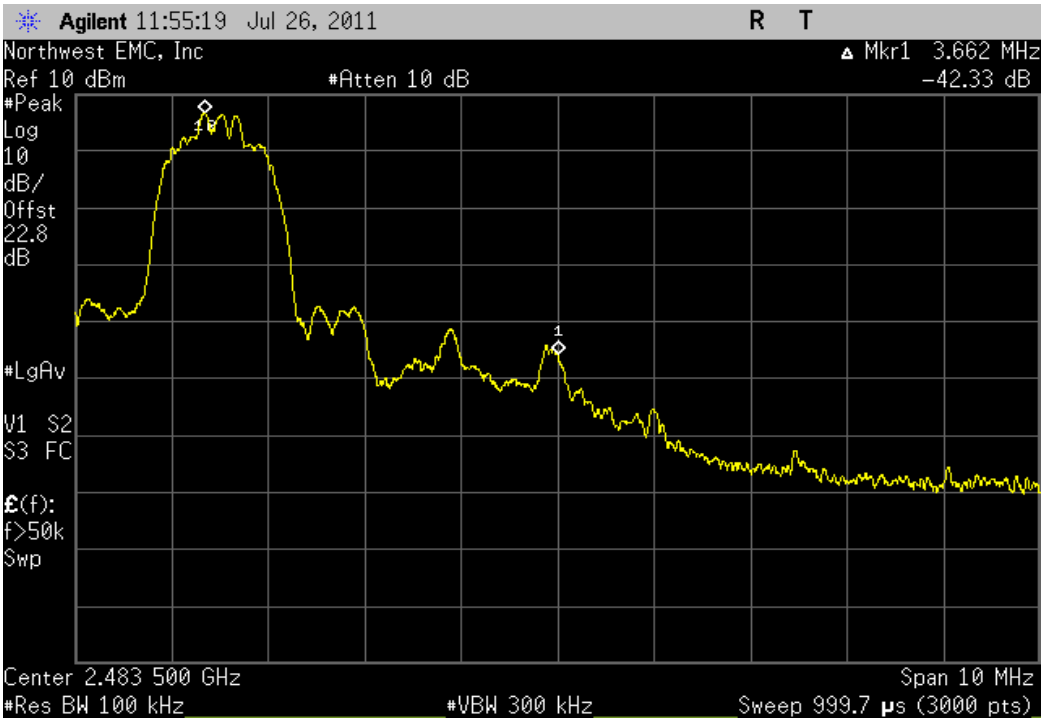
3DH5, 8-DPSK, Low Channel

Value	Limit	Result
-42.84 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel

Value	Limit	Result
-42.33 dBc	≤ -20 dBc	Pass



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
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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 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 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added.

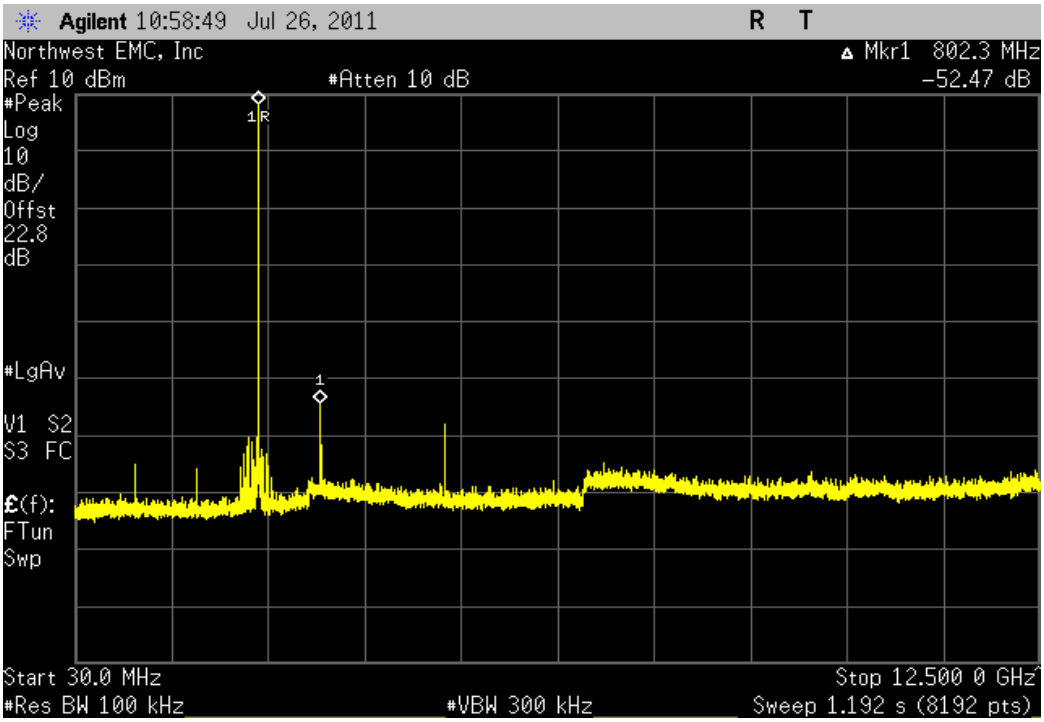
DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Frequency Range	Value	Limit	Result
DH5, GFSK					
	Low Channel	30 MHz - 12.5 GHz	-52.47 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-60.75 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-55.78 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-61.17 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-54.35 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-58.95 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK					
	Low Channel	30 MHz - 12.5 GHz	-48.43 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-59.9 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-46.49 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-55.19 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-49.39 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-58.73 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK					
	Low Channel	30 MHz - 12.5 GHz	-44.45 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-55.54 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-46.86 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-55.24 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-50.07 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-57.78 dBc	≤ -20 dBc	Pass

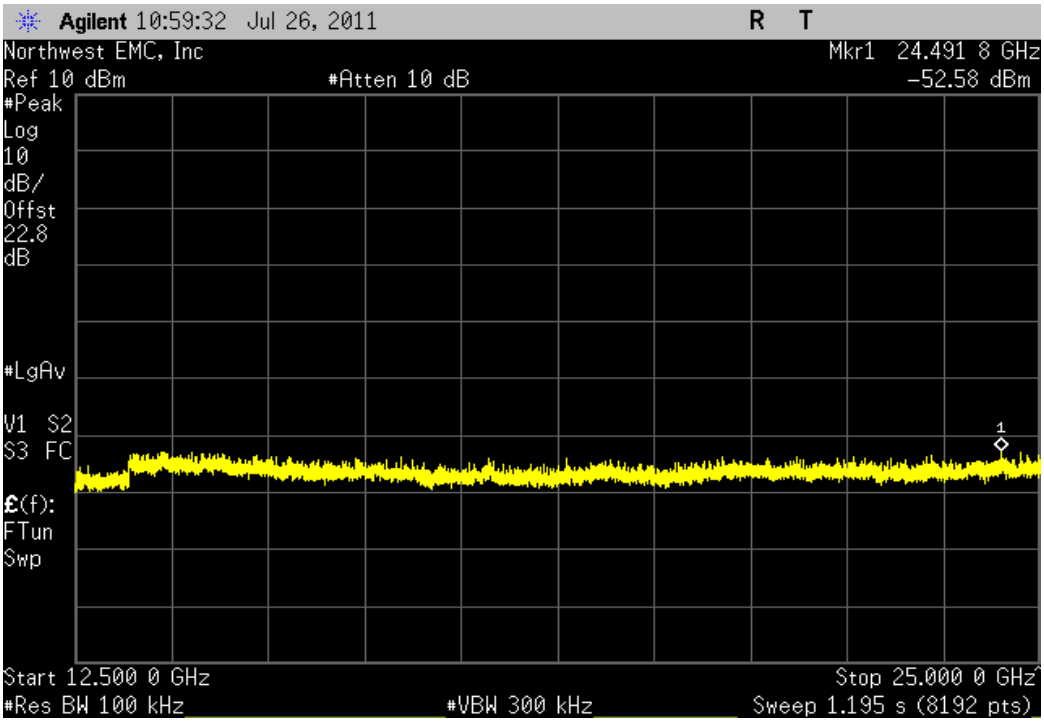
DH5, GFSK, Low Channel

Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-52.47 dBc	≤ -20 dBc	Pass



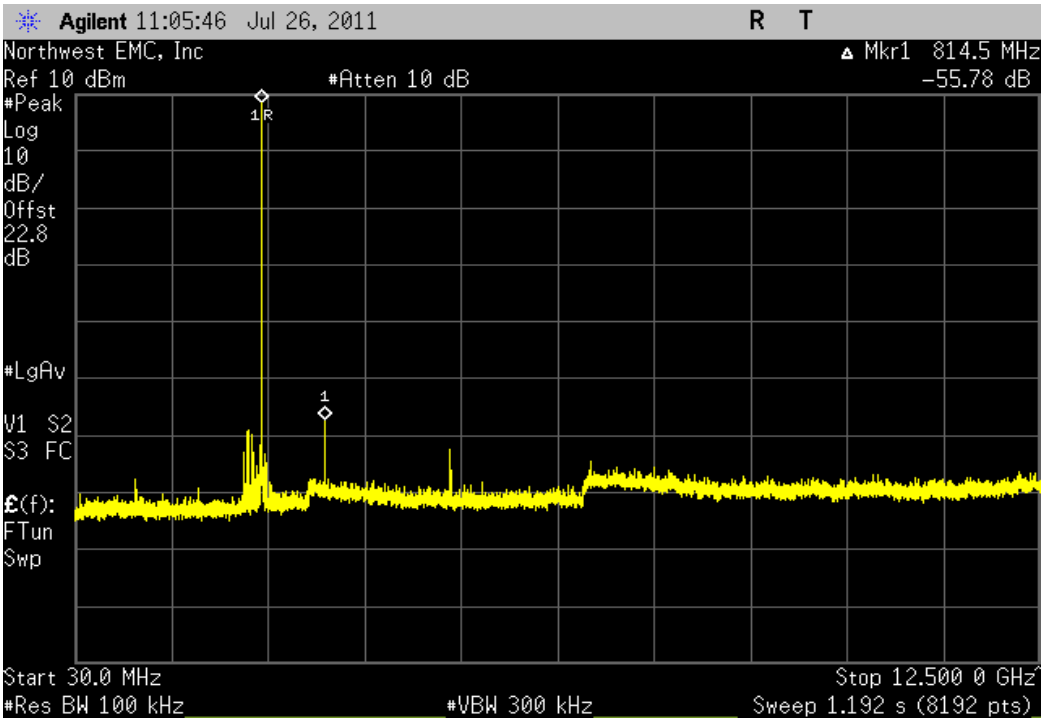
DH5, GFSK, Low Channel

Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-60.75 dBc	≤ -20 dBc	Pass



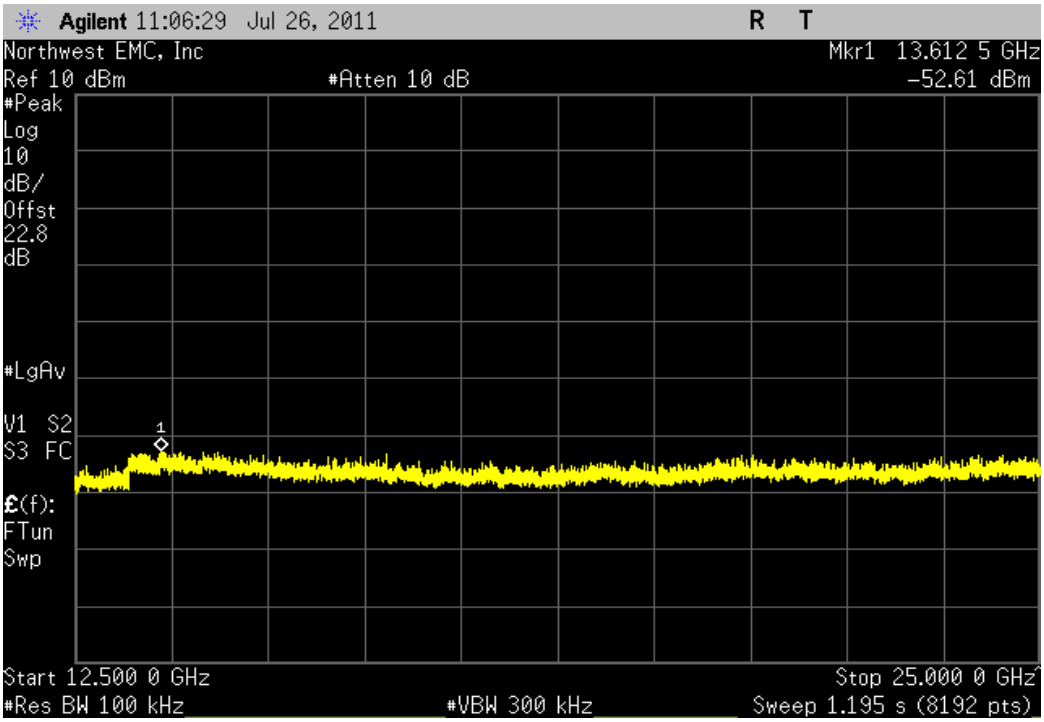
DH5, GFSK, Mid Channel

Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-55.78 dBc	≤ -20 dBc	Pass

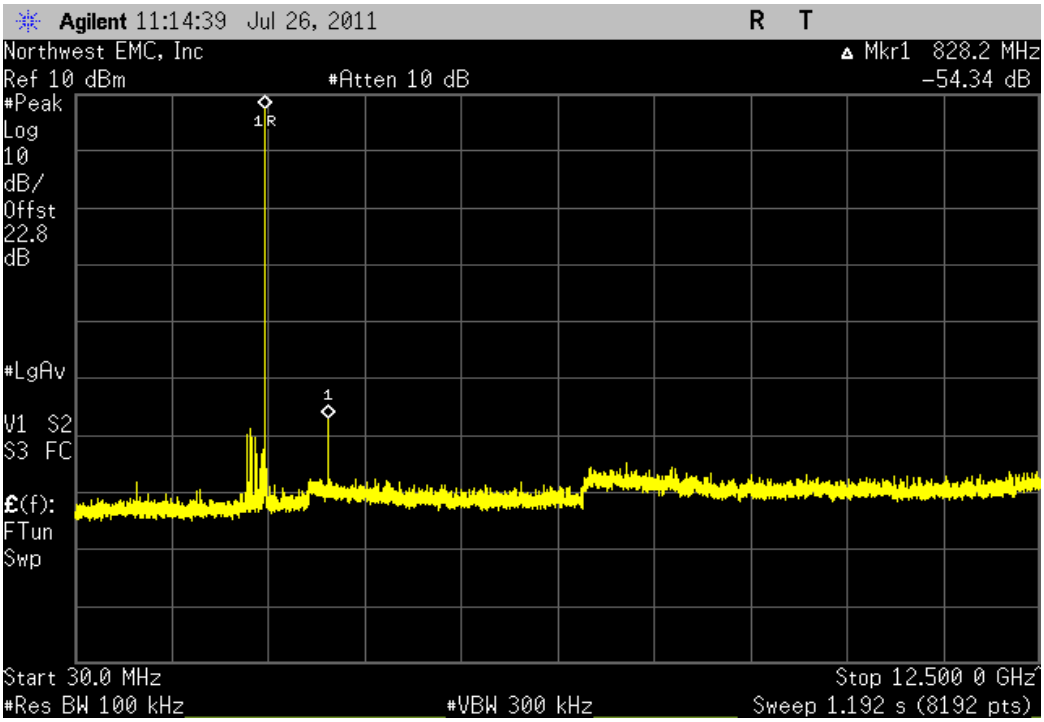


DH5, GFSK, Mid Channel

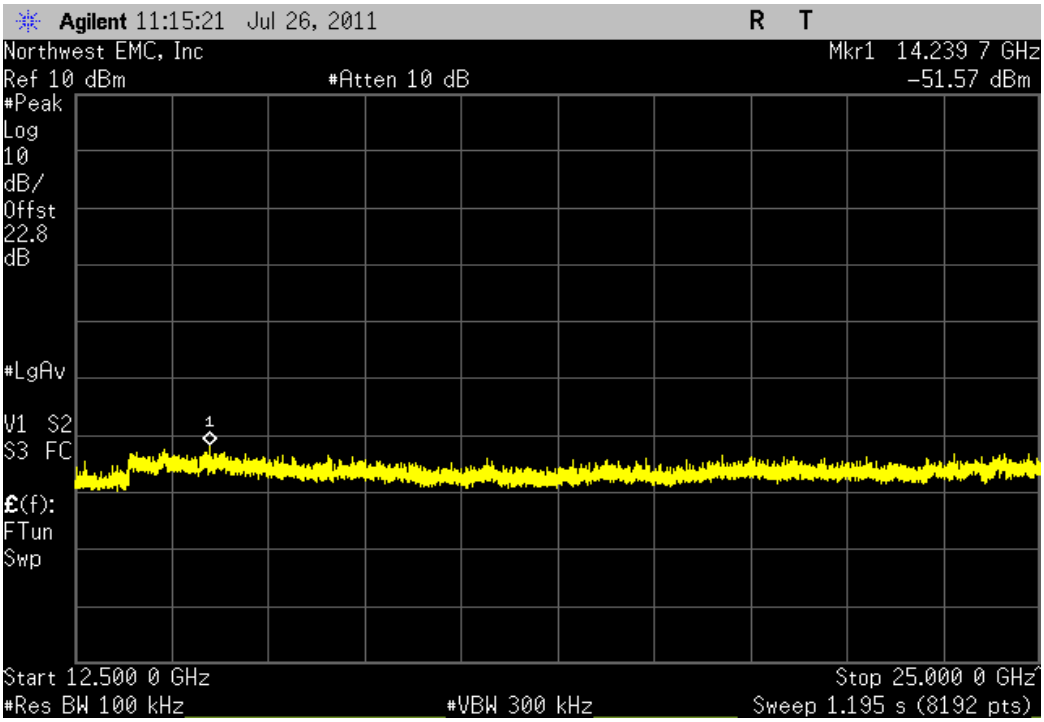
Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-61.17 dBc	≤ -20 dBc	Pass



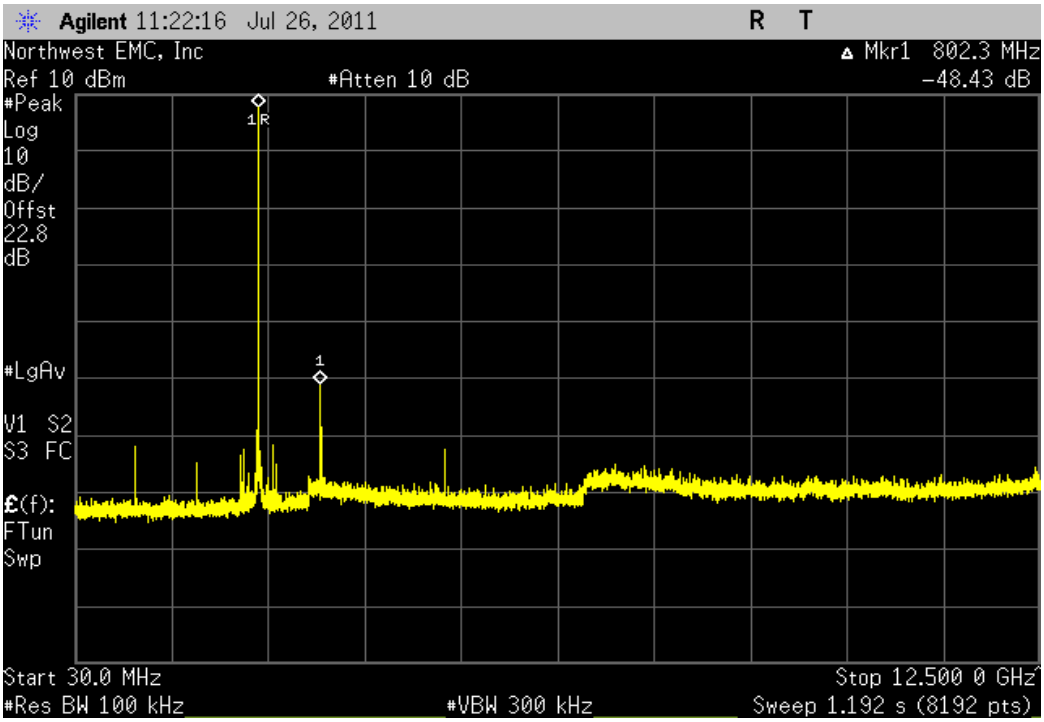
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-54.35 dBc	≤ -20 dBc	Pass



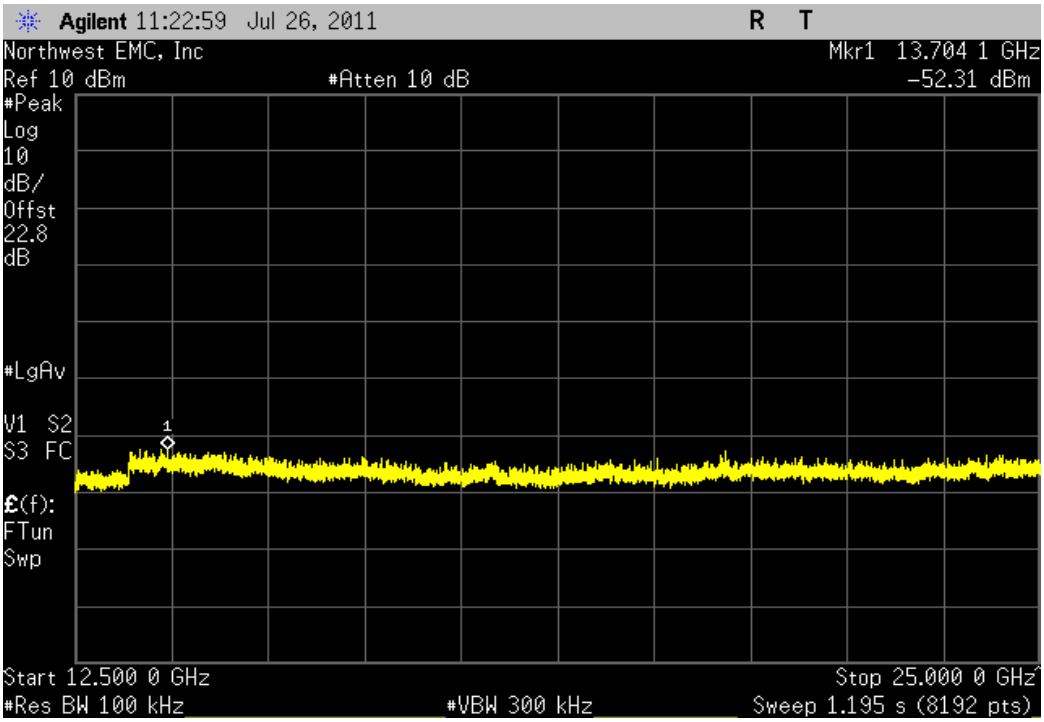
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-58.95 dBc	≤ -20 dBc	Pass



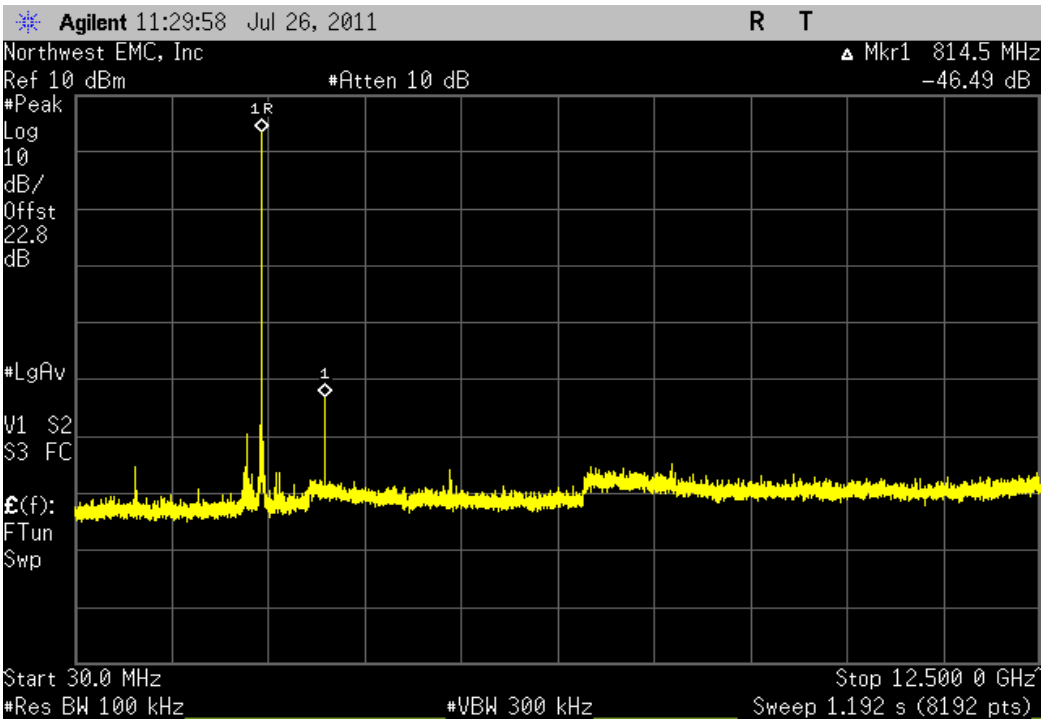
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-48.43 dBc	≤ -20 dBc	Pass



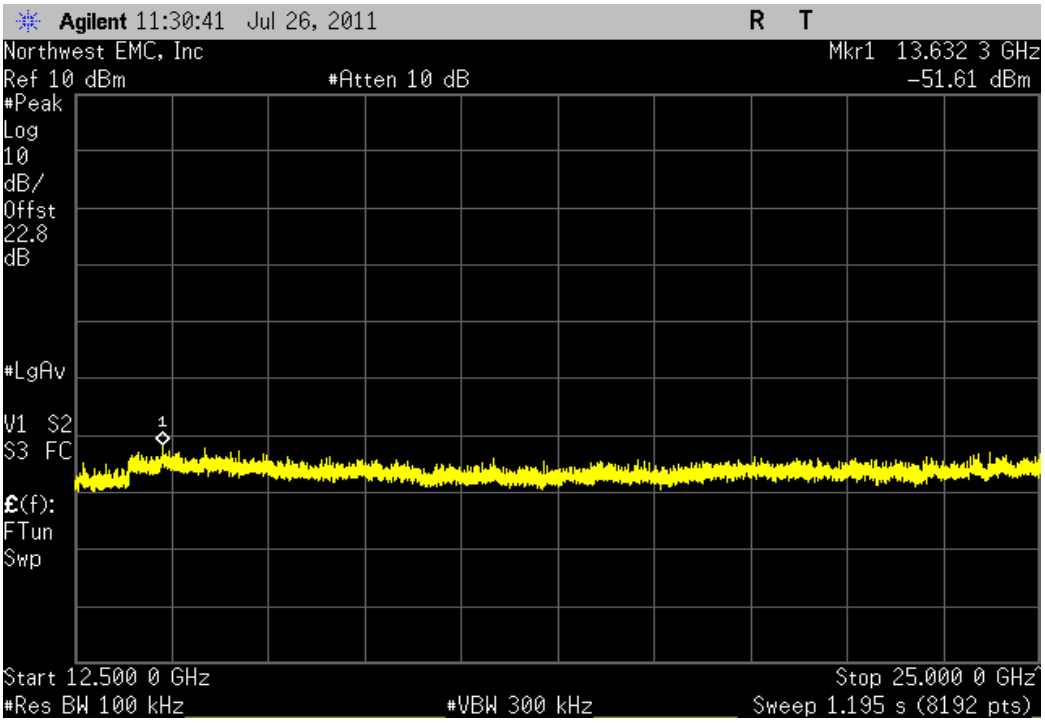
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-59.9 dBc	≤ -20 dBc	Pass



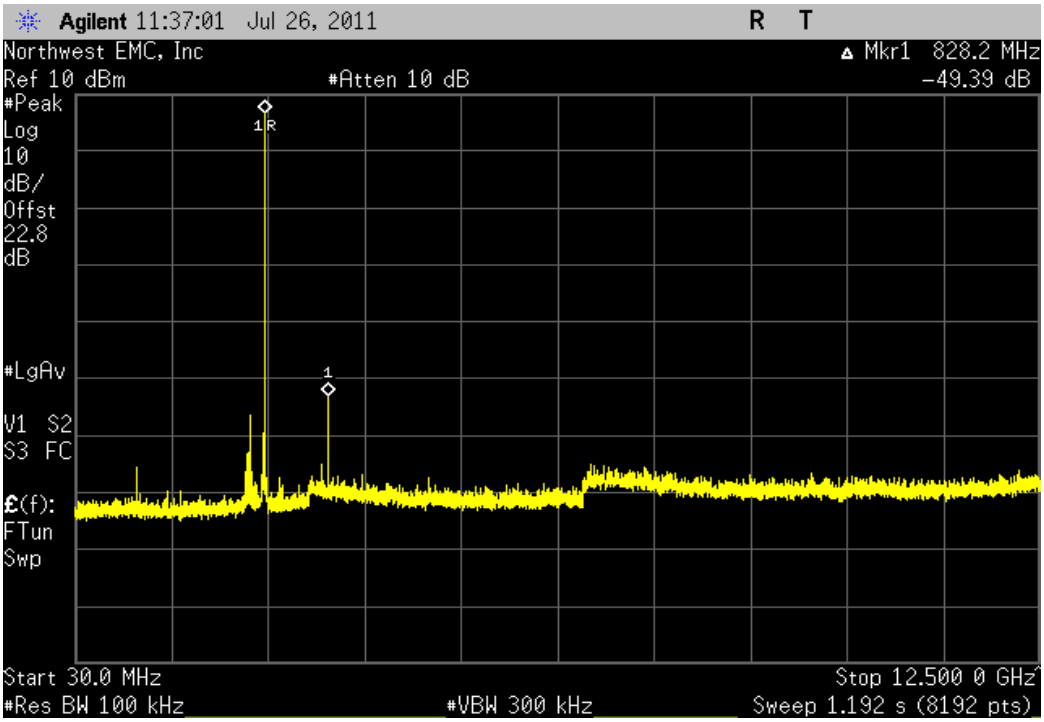
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.49 dBc	≤ -20 dBc	Pass



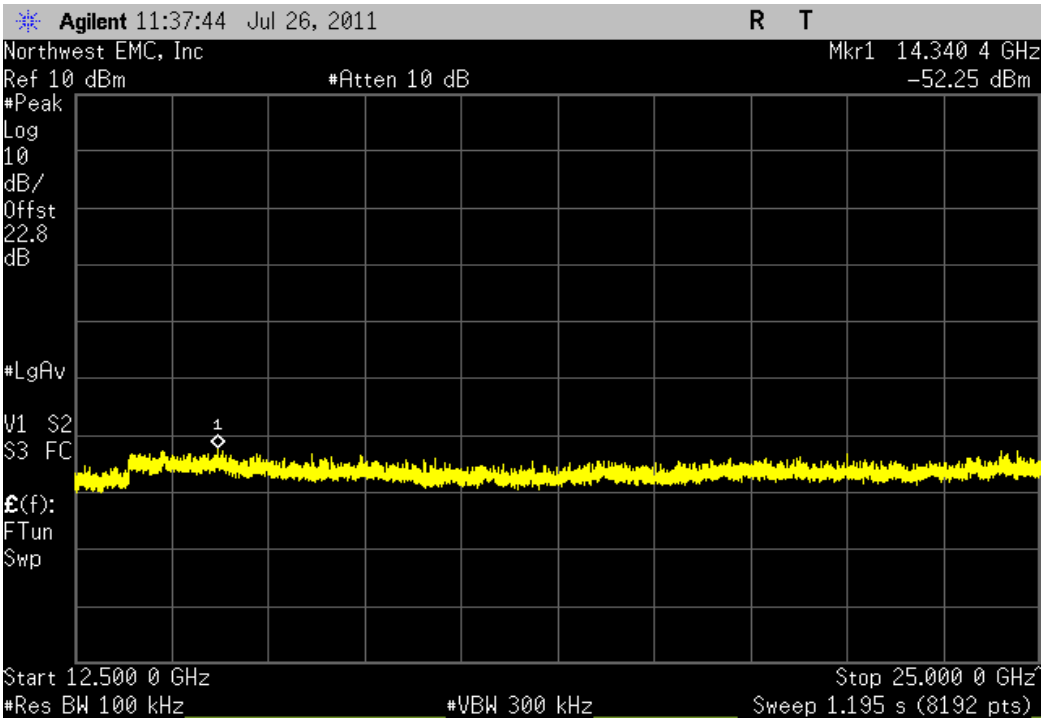
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.19 dBc	≤ -20 dBc	Pass



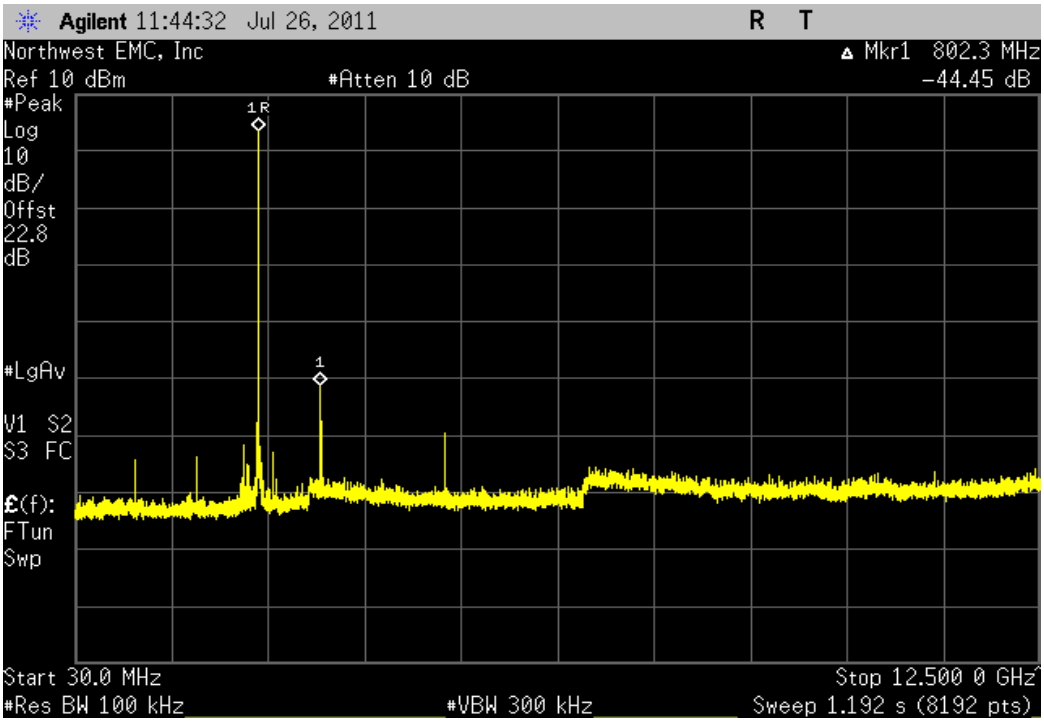
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.39 dBc	≤ -20 dBc	Pass



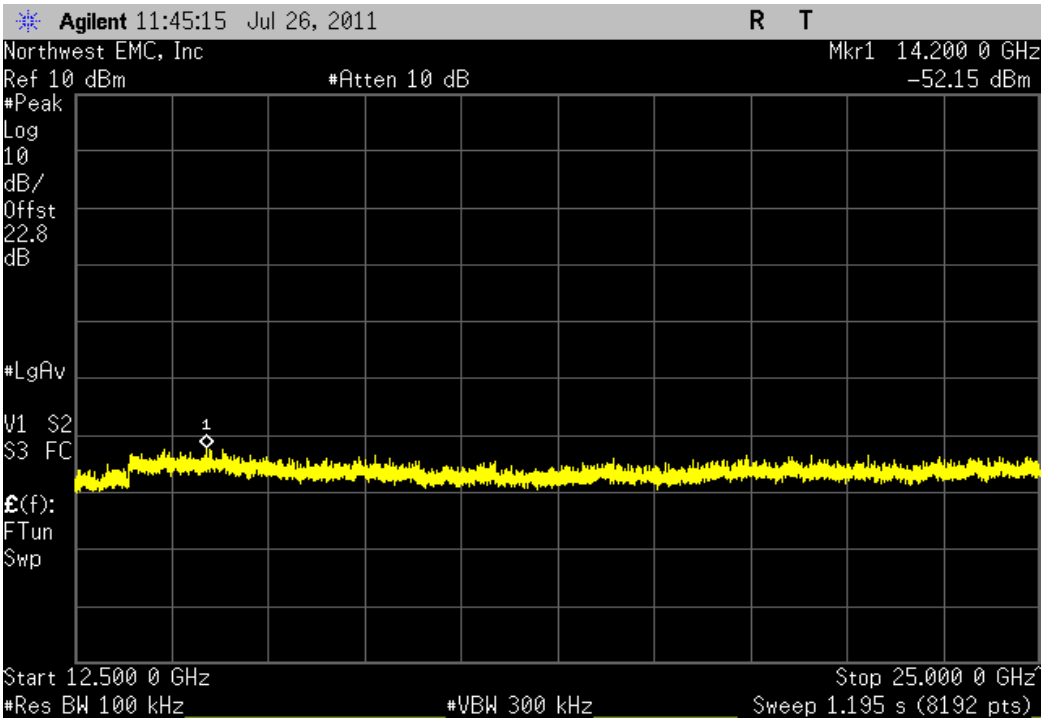
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-58.73 dBc	≤ -20 dBc	Pass



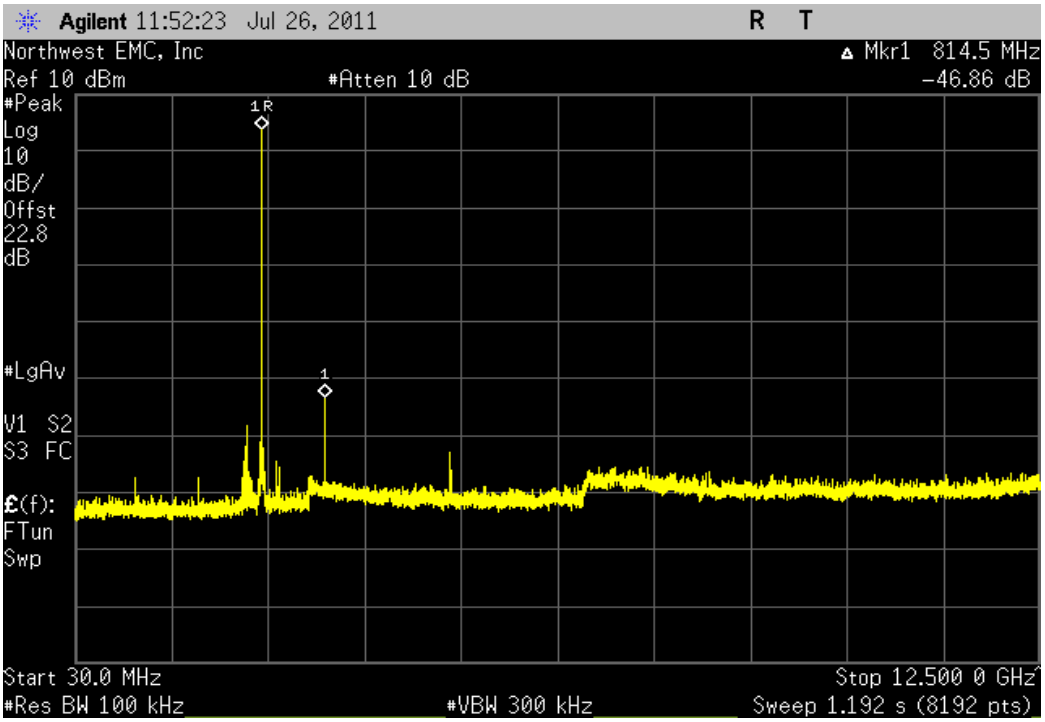
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-44.45 dBc	≤ -20 dBc	Pass



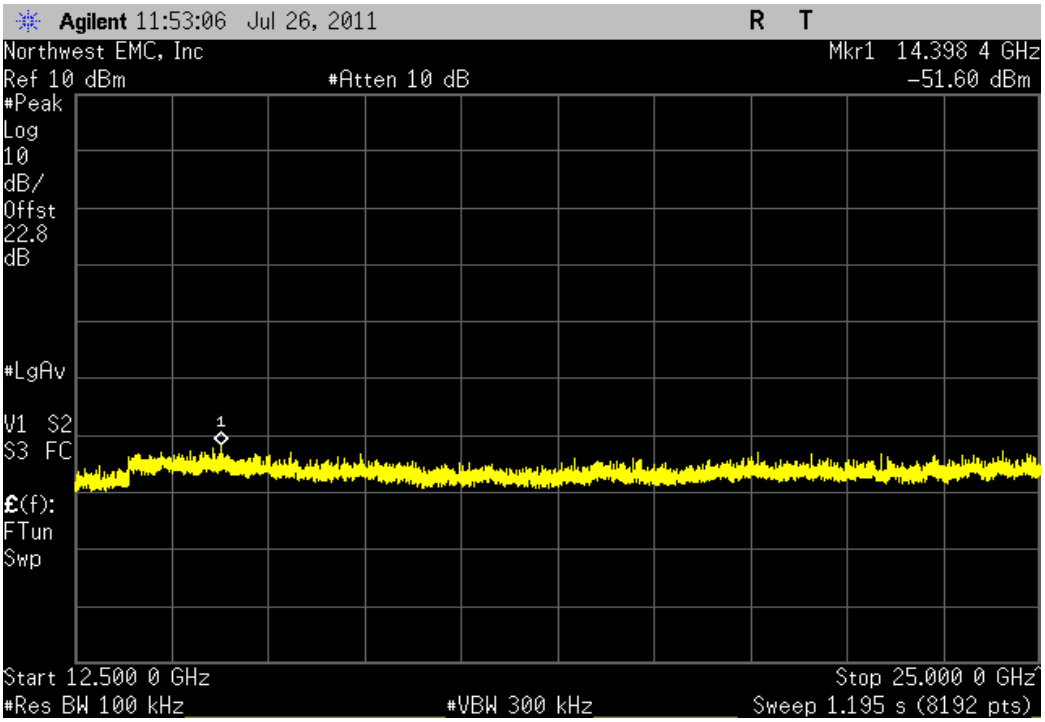
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.54 dBc	≤ -20 dBc	Pass



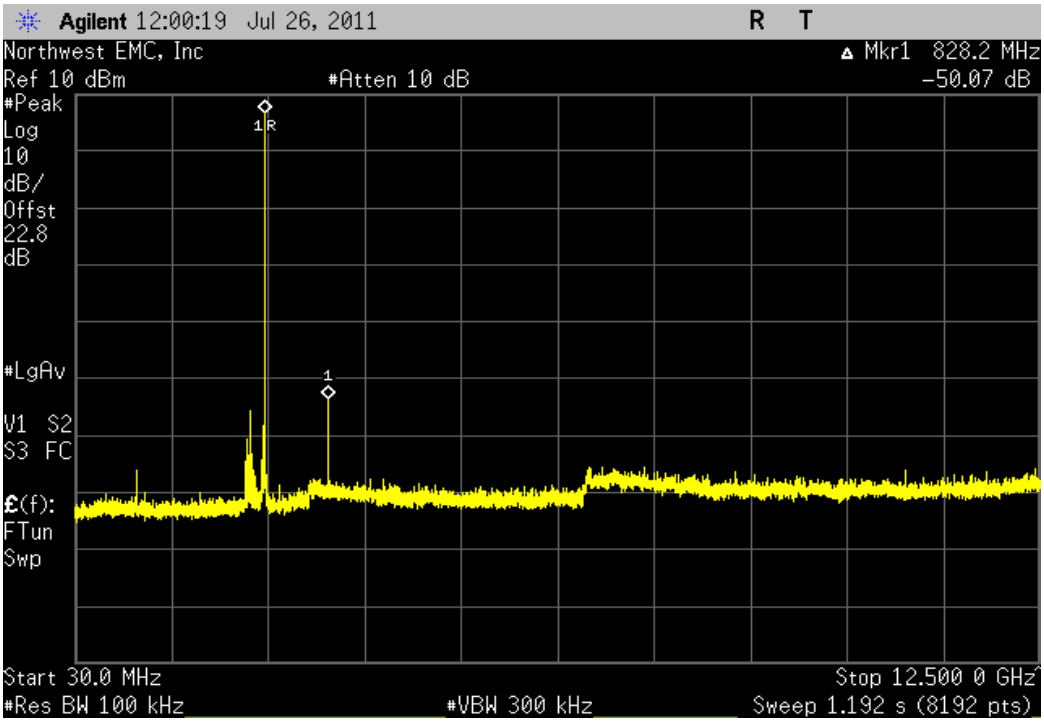
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.86 dBc	≤ -20 dBc	Pass



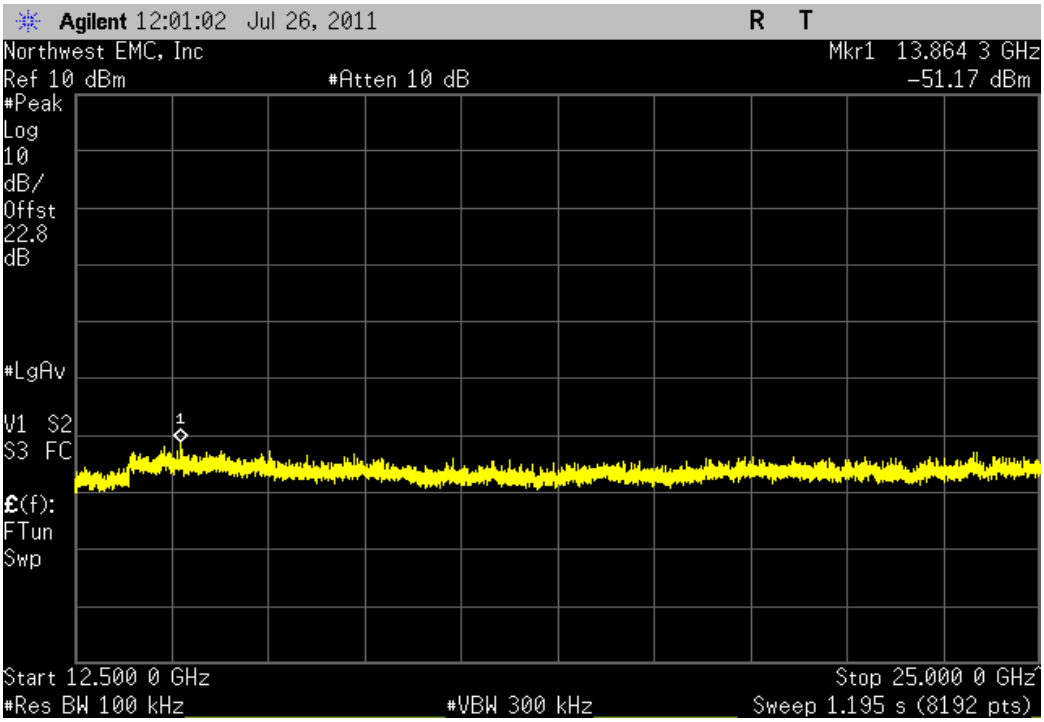
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.24 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-50.07 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-57.78 dBc	≤ -20 dBc	Pass



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
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2011	12
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Power Meter	Gigatronics	8651A	SPM	1/7/2010	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0

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 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 for each modulation type available. ANSI C63.10:2009, Section 6.11.2.3 was followed. The spectrum analyzer was set as follows:

The emission peak was located and zoomed in on within the passband.

a) RBW = 3 kHz

b) VBW = 10 kHz

c) Span = 300 kHz

d) Sweep time = 100s

e) Trace set to MAX

f) The 1 hz Marker Noise function on the analyzer was used. The data was corrected to 3 kHz by adding 34.8 dB to the reading.

NORTHWEST EMC

Power Spectral Density

XMit 2011.04.20
PsaTx 2011.07.25

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	13			Date:	07/26/11
Customer:	Intermec Technologies Corporation			Temperature:	23°C
Attendees:	None			Humidity:	48%
Project:	None			Barometric Pres.:	30.09
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Powered from PC, Adapter cable loss of 0.6 dB added.

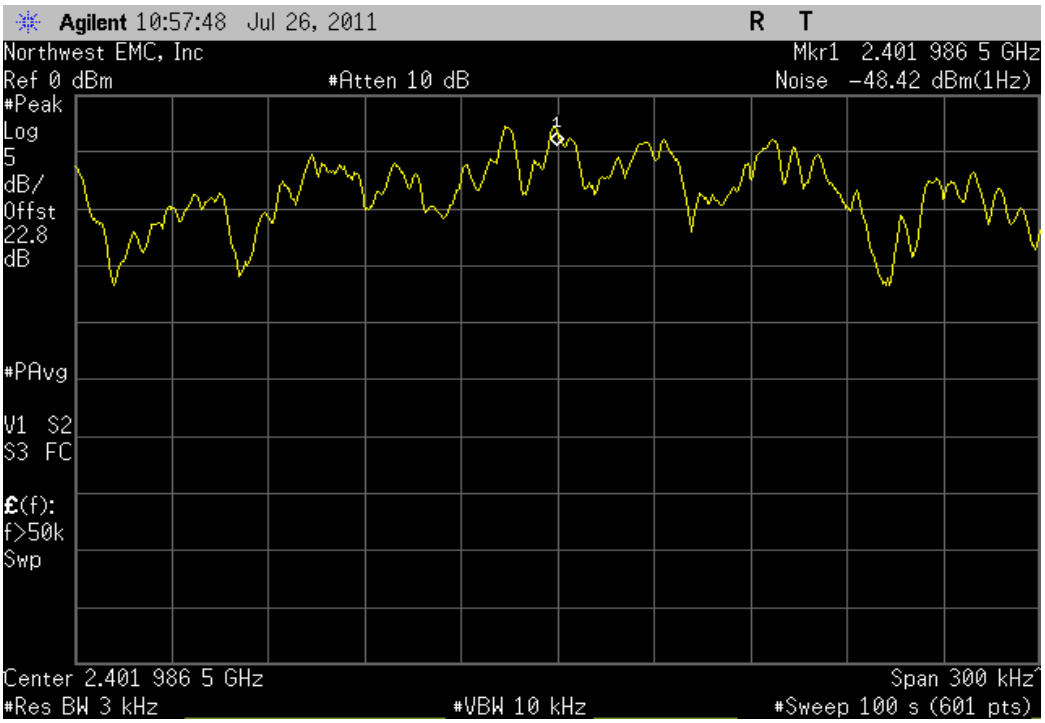
DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

		Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
DH5, GFSK				
	Low Channel	-13.619	8	Pass
	Mid Channel	-13.576	8	Pass
	High Channel	-14.931	8	Pass
2DH5, 4-DQPSK				
	Low Channel	-16.247	8	Pass
	Mid Channel	-17.14	8	Pass
	High Channel	-18.094	8	Pass
3DH5, 8-DPSK				
	Low Channel	-16.399	8	Pass
	Mid Channel	-16.784	8	Pass
	High Channel	-18.147	8	Pass

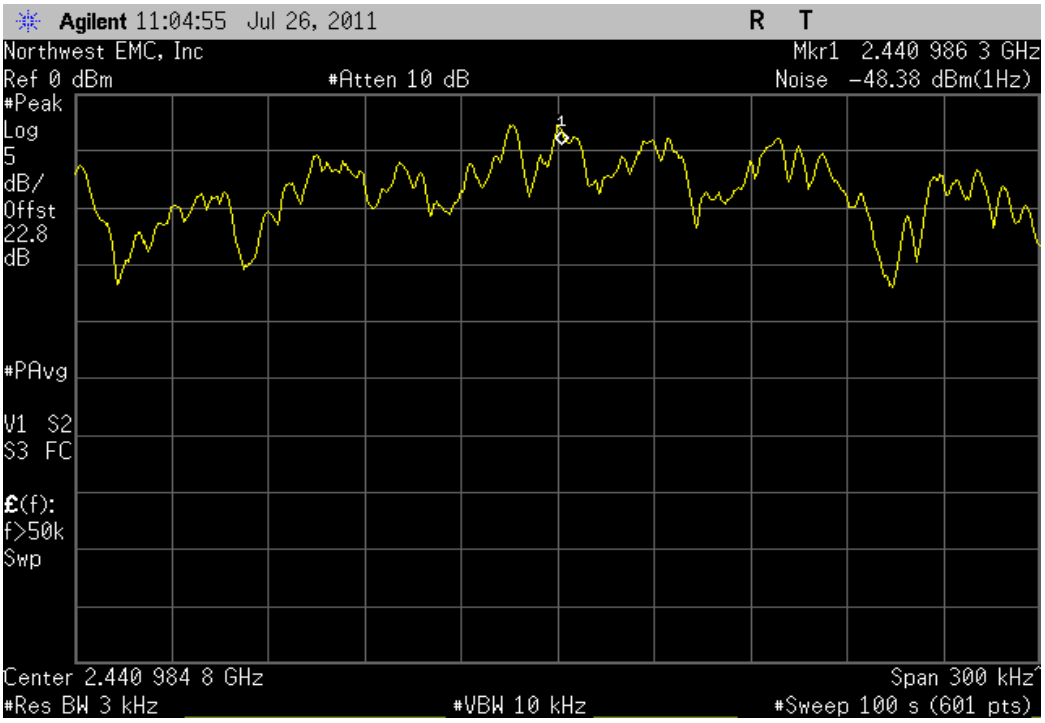
DH5, GFSK, Low Channel

				Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
				-13.619	8	Pass



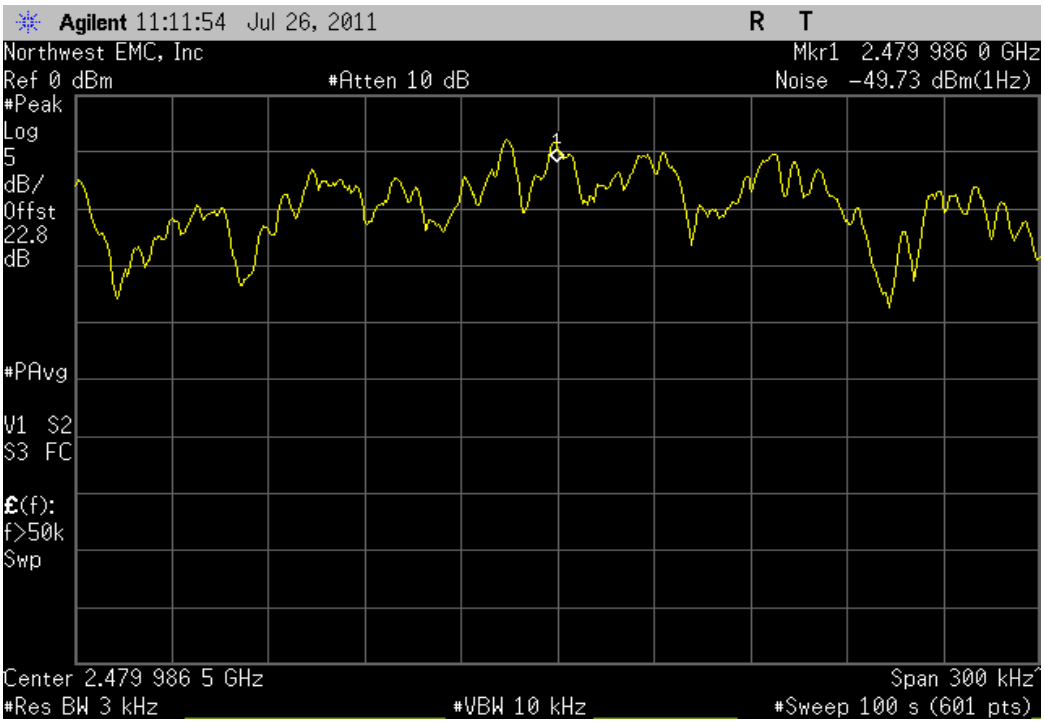
DH5, GFSK, Mid Channel

				Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
				-13.576	8	Pass



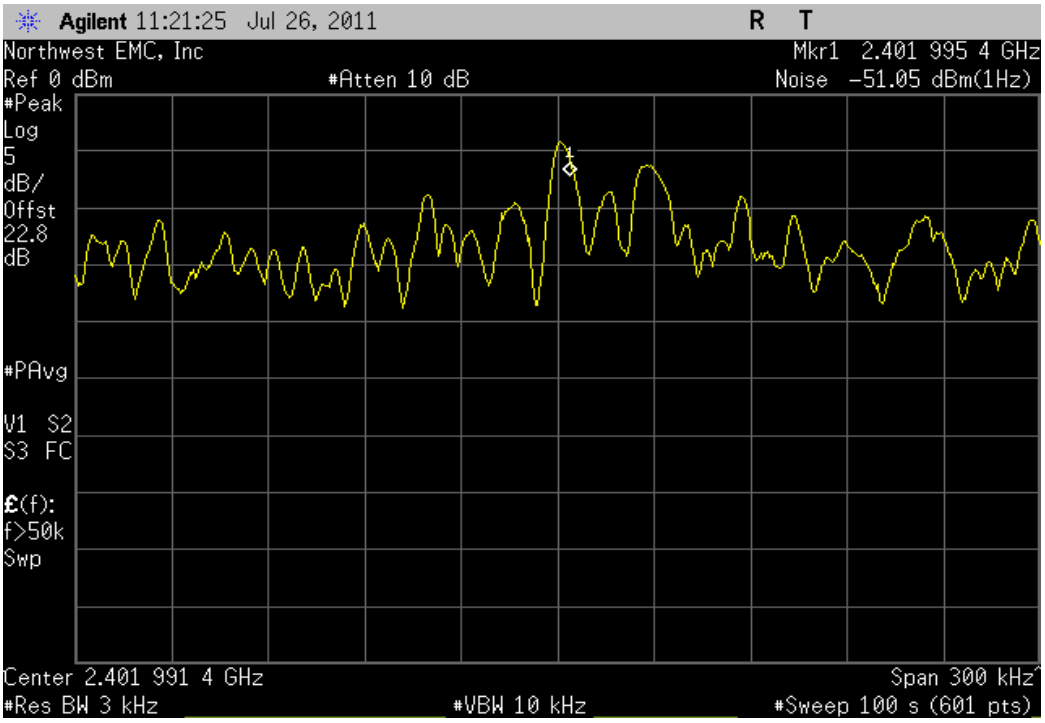
DH5, GFSK, High Channel

				Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
				-14.931	8	Pass

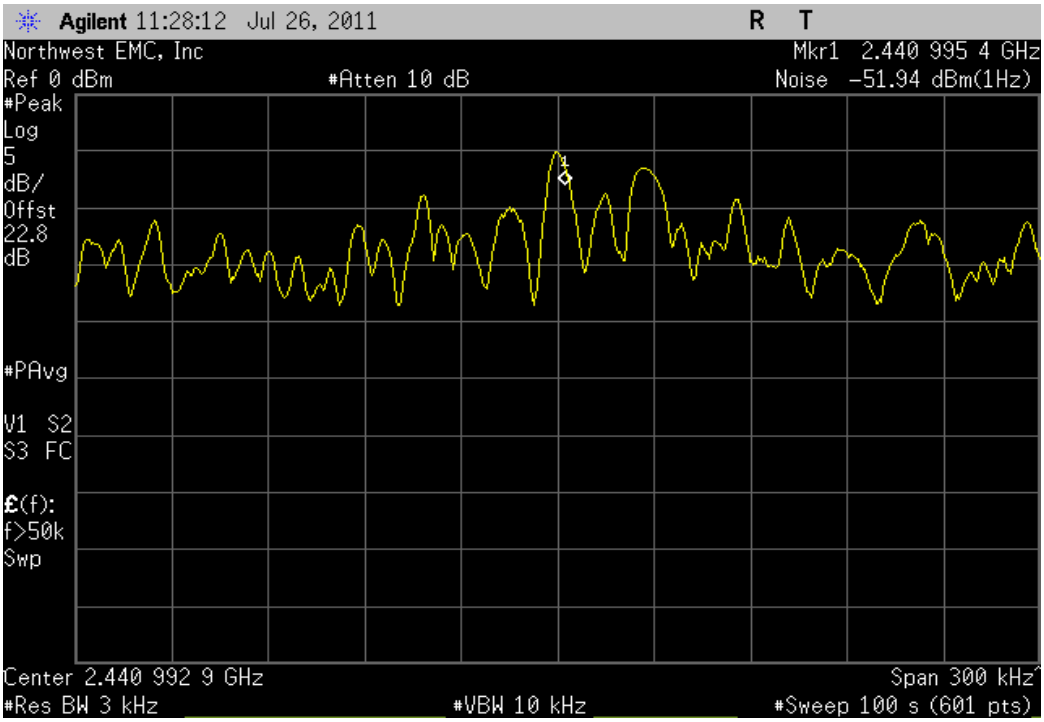


2DH5, 4-DQPSK, Low Channel

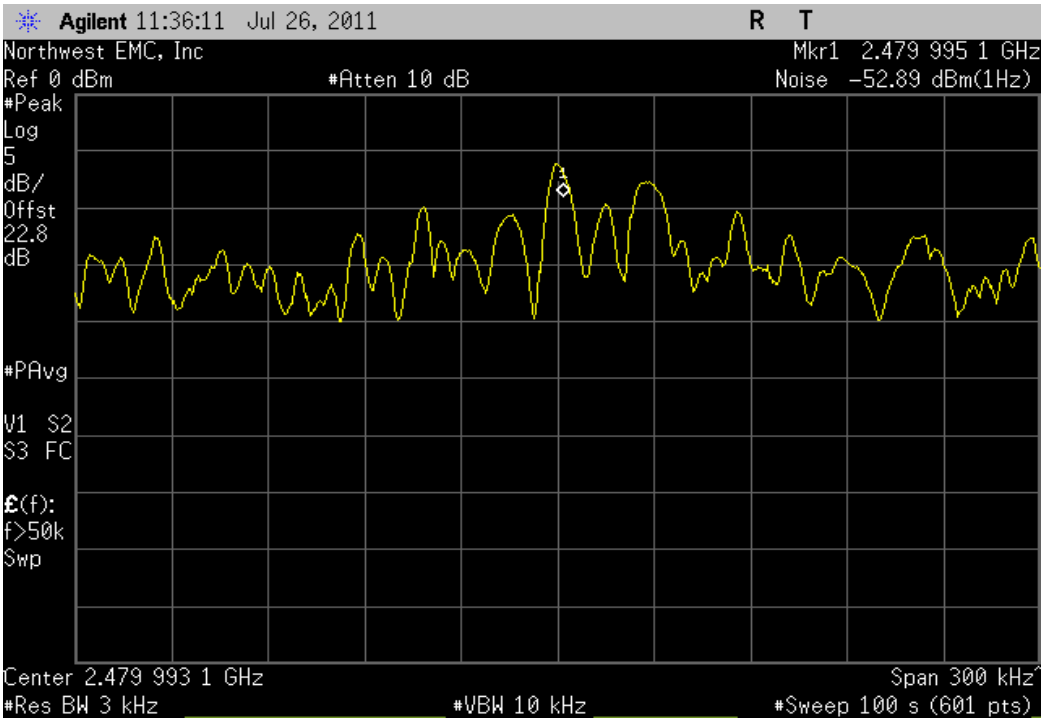
				Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
				-16.247	8	Pass



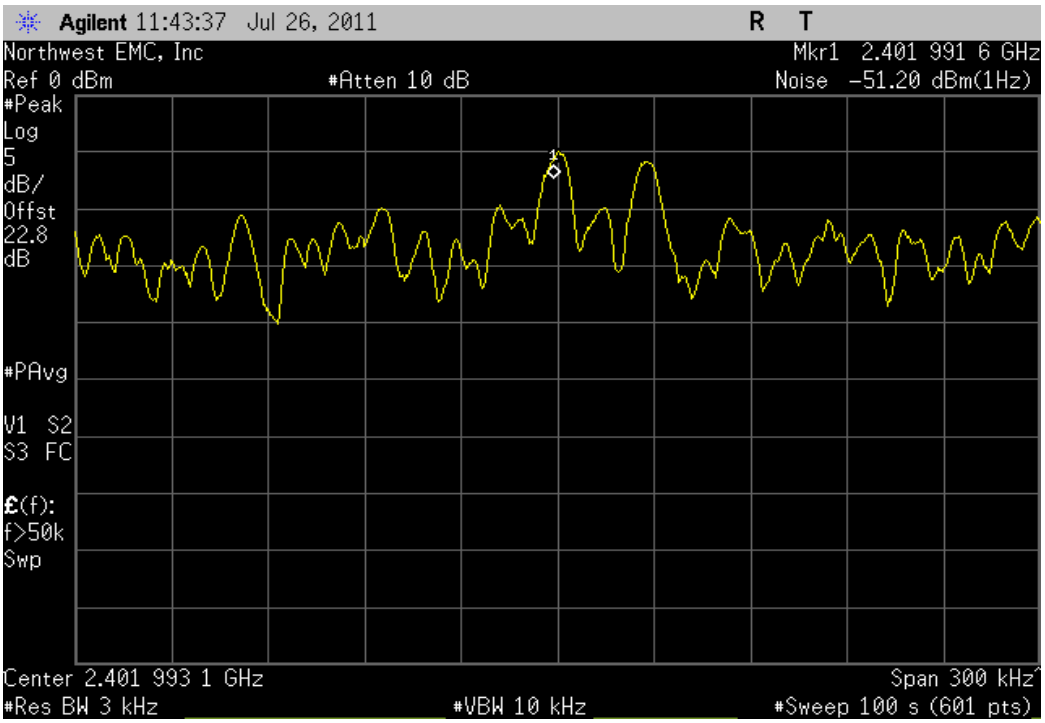
2DH5, 4-DQPSK, Mid Channel							
					Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
					-17.14	8	Pass



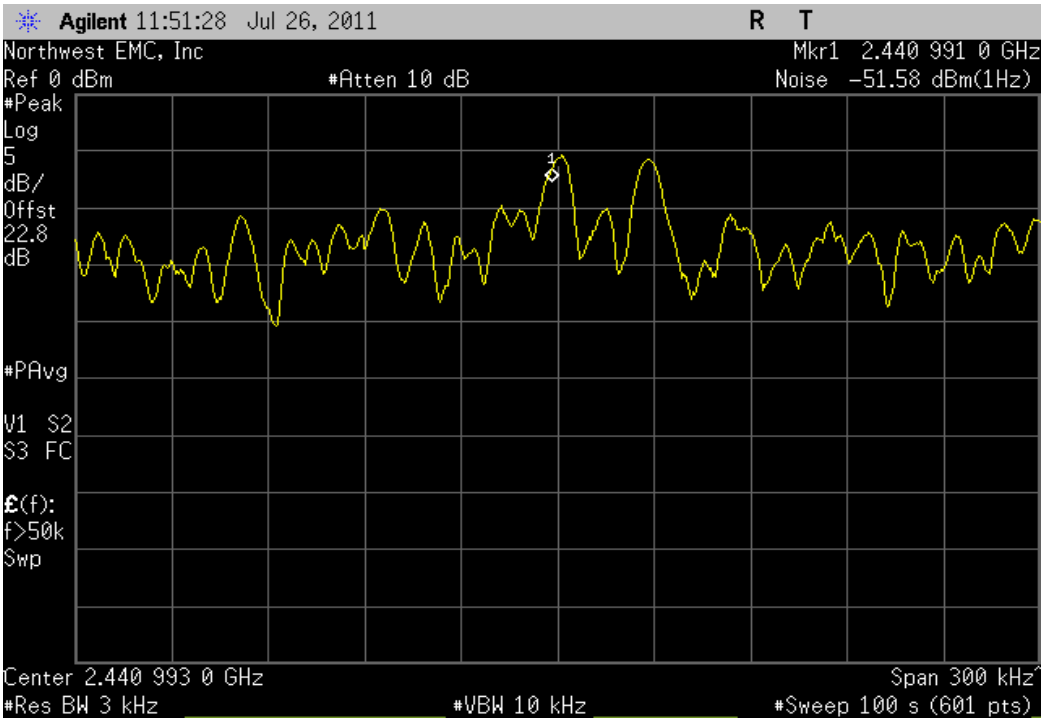
2DH5, 4-DQPSK, High Channel							
					Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
					-18.094	8	Pass



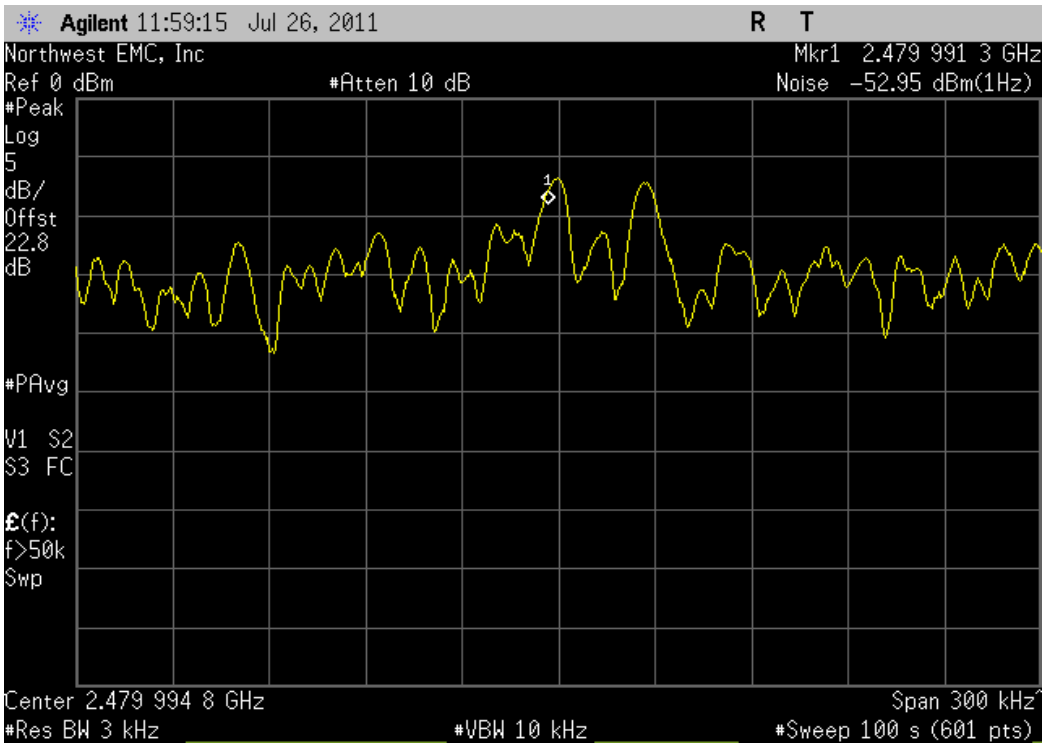
3DH5, 8-DPSK, Low Channel							
					Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
					-16.399	8	Pass



3DH5, 8-DPSK, Mid Channel							
					Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
					-16.784	8	Pass



3DH5, 8-DPSK, High Channel						
				Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
				-18.147	8	Pass



Spurious Radiated 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
Bluetooth GFSK, DH5, Intermec settings
Bluetooth 4-QPSK, 2-DH5, Intermec settings
Bluetooth 8DPSK, 3-DH5, Intermec settings

CHANNELS TESTED
Low Channel, 2402 MHz
Mid Channel, 2441 MHz
High Channel, 2480 MHz

POWER SETTINGS INVESTIGATED
USB

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
High Pass Filter	Micro-Tronics	HPM50111	HFO	8/9/2010	24
Spectrum Analyzer	Agilent	E4446A	AAQ	6/24/2011	12
EV01 Cables	N/A	Bilog Cables	EVA	6/28/2011	12
Antenna, Bilog	Teseq	CBL 6141B	AXR	11/29/2010	12
Antenna, Horn	ETS	3115	AIZ	1/24/2011	24
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	6/28/2011	12
Antenna, Horn	ETS	3160-08	AHV	NCR	0
Antenna, Horn	ETS	3160-07	AHU	NCR	0
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	3/2/2011	12
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	3/2/2011	12
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	3/2/2011	12
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/15/2010	12
Cable	ESM Cable Corp.	KMKM-72	EVY	9/15/2010	12

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

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. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation 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 C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

Spurious Radiated Emissions

PSA 2011.05.11
EMI 2008.1.9

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	12			Date:	07/18/11
Customer:	Intermec Technologies Corporation			Temperature:	22
Attendees:	None			Humidity:	55%
Project:	None			Barometric Pres.:	29.96
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

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

COMMENTS

Powered from remote PC

EUT OPERATING MODES

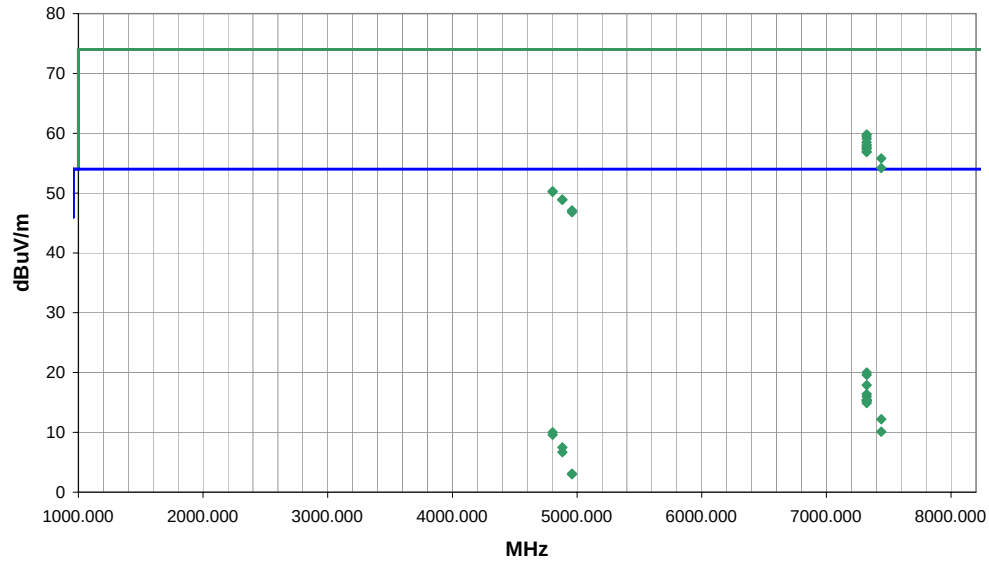
Transmitting Bluetooth, Intermec settings

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	1
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)	Comments
7322.860	43.2	16.6	220.0	1.1	0.0	0.0	V-Horn	PK	0.0	59.8	74.0	-14.2	Mid Channel, DH5, EUT on side
7322.657	42.9	16.6	202.0	1.4	0.0	0.0	H-Horn	PK	0.0	59.5	74.0	-14.5	Mid Channel, DH5, EUT horizontal
7323.423	42.5	16.6	199.0	1.1	0.0	0.0	V-Horn	PK	0.0	59.1	74.0	-14.9	Mid Channel, 2-DH5, EUT on side
7322.497	41.9	16.6	203.0	1.1	0.0	0.0	V-Horn	PK	0.0	58.5	74.0	-15.5	Mid Channel, 3-DH5, EUT on side
7323.497	41.5	16.6	356.0	1.1	0.0	0.0	V-Horn	PK	0.0	58.1	74.0	-15.9	Mid Channel, DH5, EUT horizontal
7322.473	41.2	16.6	192.0	1.4	0.0	0.0	H-Horn	PK	0.0	57.8	74.0	-16.2	Mid Channel, 2-DH5, EUT horizontal
7323.537	40.9	16.6	192.0	1.4	0.0	0.0	H-Horn	PK	0.0	57.5	74.0	-16.5	Mid Channel, 3-DH5, EUT horizontal
7322.400	40.8	16.6	147.0	1.4	0.0	0.0	H-Horn	PK	0.0	57.4	74.0	-16.6	Mid Channel, DH5, EUT vertical
7322.530	40.3	16.6	346.0	1.1	0.0	0.0	V-Horn	PK	0.0	56.9	74.0	-17.1	Mid Channel, DH5, EUT vertical
7323.333	40.3	16.6	284.0	1.3	0.0	0.0	H-Horn	PK	0.0	56.9	74.0	-17.1	Mid Channel, DH5, EUT on side
7440.027	39.1	16.7	198.0	1.1	0.0	0.0	V-Horn	PK	0.0	55.8	74.0	-18.2	High Channel, DH5, EUT on side
7439.787	37.5	16.7	177.0	1.4	0.0	0.0	V-Horn	PK	0.0	54.2	74.0	-19.8	High Channel, 2-DH5, EUT on side
4803.640	40.9	9.4	214.0	1.1	0.0	0.0	H-Horn	PK	0.0	50.3	74.0	-23.7	Low Channel, DH5, EUT horizontal
4803.877	40.8	9.4	173.0	1.1	0.0	0.0	V-Horn	PK	0.0	50.2	74.0	-23.8	Low Channel, DH5, EUT on side
4881.550	39.5	9.4	181.0	1.1	0.0	0.0	V-Horn	PK	0.0	48.9	74.0	-25.1	Mid Channel, DH5, EUT on side
4882.363	39.5	9.4	224.0	1.1	0.0	0.0	H-Horn	PK	0.0	48.9	74.0	-25.1	Mid Channel, DH5, EUT horizontal
4959.280	37.6	9.5	223.0	1.0	0.0	0.0	H-Horn	PK	0.0	47.1	74.0	-26.9	High Channel, DH5, EUT horizontal
4959.563	37.3	9.5	187.0	1.0	0.0	0.0	V-Horn	PK	0.0	46.8	74.0	-27.2	High Channel, DH5, EUT on side
7323.000	34.2	16.6	220.0	1.1	30.8	0.0	V-Horn	AV	0.0	20.0	54.0	-34.0	Mid Channel, DH5, EUT on side
7322.980	33.8	16.6	202.0	1.4	30.8	0.0	H-Horn	AV	0.0	19.6	54.0	-34.4	Mid Channel, DH5, EUT horizontal

NORTHWEST EMC

Spurious Radiated Emissions

PSA 2011.05.11
EMI 2008.1.9

EUT:	BTM312			Work Order:	INMC0726
Serial Number:	12			Date:	07/18/11
Customer:	Intermec Technologies Corporation			Temperature:	22
Attendees:	None			Humidity:	55%
Project:	None			Barometric Pres.:	29.96
Tested by:	Rod Peloquin	Power:	USB	Job Site:	EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

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

COMMENTS

Powered from remote PC

EUT OPERATING MODES

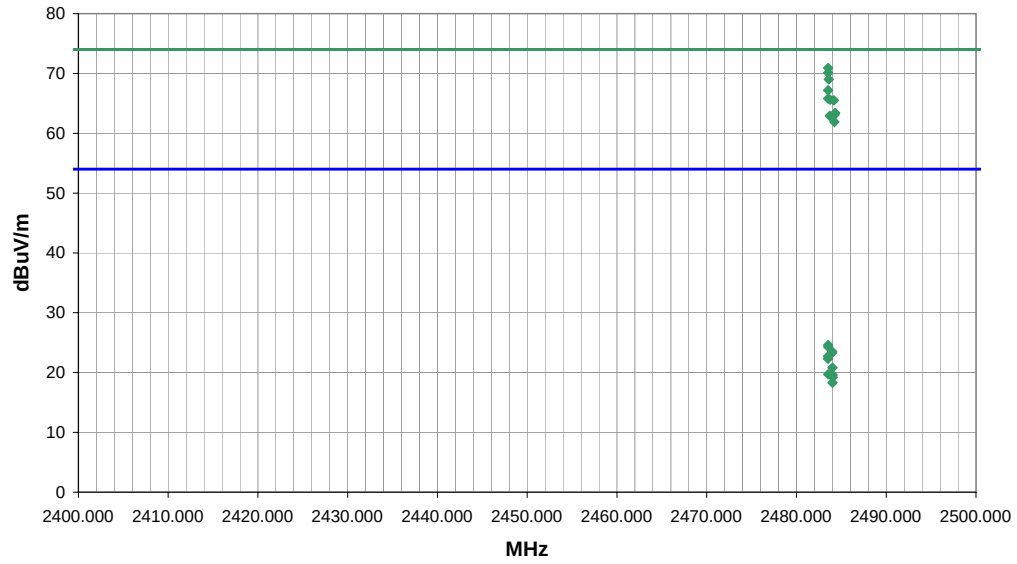
Transmitting Bluetooth, Intermec settings

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
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)	Comments
2483.523	48.6	2.3	245.0	1.2	0.0	20.0	V-Horn	PK	0.0	70.9	74.0	-3.1	High Channel, 3-DH5, EUT vertical
2483.535	47.8	2.3	245.0	1.2	0.0	20.0	V-Horn	PK	0.0	70.1	74.0	-3.9	High Channel, 2-DH5, EUT vertical
2483.600	46.7	2.3	360.0	1.3	0.0	20.0	V-Horn	PK	0.0	69.0	74.0	-5.0	High Channel, 3-DH5, EUT horizontal
2483.537	44.9	2.3	360.0	1.3	0.0	20.0	V-Horn	PK	0.0	67.2	74.0	-6.8	High Channel, 2-DH5, EUT horizontal
2483.537	43.5	2.3	184.0	1.1	0.0	20.0	V-Horn	PK	0.0	65.8	74.0	-8.2	High Channel, 3-DH5, EUT on side
2483.735	43.3	2.3	243.0	1.5	0.0	20.0	H-Horn	PK	0.0	65.6	74.0	-8.4	High Channel, DH5, EUT vertical
2484.167	43.2	2.3	49.0	1.0	0.0	20.0	H-Horn	PK	0.0	65.5	74.0	-8.5	High Channel, DH5, EUT on side
2484.310	41.1	2.3	64.0	1.3	0.0	20.0	V-Horn	PK	0.0	63.4	74.0	-10.6	High Channel, DH5, EUT horizontal
2484.242	40.8	2.3	160.0	1.3	0.0	20.0	V-Horn	PK	0.0	63.1	74.0	-10.9	High Channel, DH5, EUT vertical
2483.707	40.6	2.3	65.0	1.0	0.0	20.0	H-Horn	PK	0.0	62.9	74.0	-11.1	High Channel, DH5, EUT horizontal
2484.220	39.6	2.3	146.0	1.3	0.0	20.0	V-Horn	PK	0.0	61.9	74.0	-12.1	High Channel, DH5, EUT on side
2483.525	33.1	2.3	245.0	1.2	30.8	20.0	V-Horn	AV	0.0	24.6	54.0	-29.4	High Channel, 2-DH5, EUT vertical
2483.525	32.8	2.3	245.0	1.2	30.8	20.0	V-Horn	AV	0.0	24.3	54.0	-29.7	High Channel, 3-DH5, EUT vertical
2483.967	32.0	2.3	243.0	1.5	30.8	20.0	H-Horn	AV	0.0	23.5	54.0	-30.5	High Channel, DH5, EUT vertical
2483.977	31.8	2.3	49.0	1.0	30.8	20.0	H-Horn	AV	0.0	23.3	54.0	-30.7	High Channel, DH5, EUT on side
2483.505	31.2	2.3	360.0	1.3	30.8	20.0	V-Horn	AV	0.0	22.7	54.0	-31.3	High Channel, 2-DH5, EUT horizontal
2483.520	30.8	2.3	360.0	1.3	30.8	20.0	V-Horn	AV	0.0	22.3	54.0	-31.7	High Channel, 3-DH5, EUT horizontal
2484.010	29.3	2.3	64.0	1.3	30.8	20.0	V-Horn	AV	0.0	20.8	54.0	-33.2	High Channel, DH5, EUT horizontal
2483.532	28.2	2.3	184.0	1.1	30.8	20.0	V-Horn	AV	0.0	19.7	54.0	-34.3	High Channel, 3-DH5, EUT on side
2484.028	28.1	2.3	65.0	1.0	30.8	20.0	H-Horn	AV	0.0	19.6	54.0	-34.4	High Channel, DH5, EUT horizontal

EMC 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, Intermec settings, Low channel
Transmitting Bluetooth, Intermec settings, Mid channel
Transmitting Bluetooth, Intermec settings, High channel

POWER SETTINGS INVESTIGATED

3.3VDC

CONFIGURATIONS INVESTIGATED

INMC0726 - 3

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV07 Cables	N/A	Conducted Cables	EVG	6/17/2011	12 mo
Receiver	Rohde & Schwarz	ESCI	ARH	3/30/2011	12 mo
Attenuator	Coaxicom	66702 2910-20	ATO	7/20/2011	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HFX	2/9/2011	24 mo
LISN	Solar	9252-50-R-24-BNC	LIR	2/17/2011	12 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

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 EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

NORTHWEST

EMC

AC Powerline Conducted Emissions

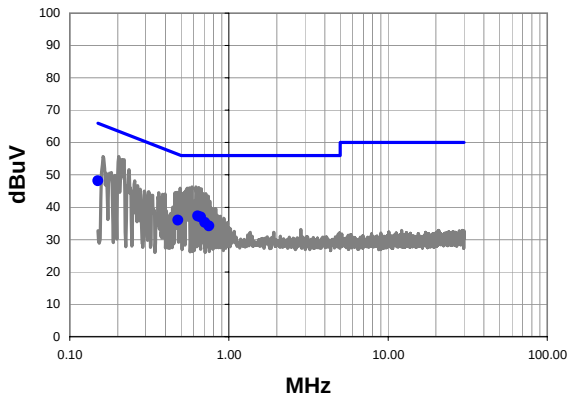
PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener
EUT:	BTM312				
Configuration:	3				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	3.3VDC				
Operating Mode:	Transmitting Bluetooth, Intermec settings, Low channel				
Deviations:	No deviations.				
Comments:	Powered from DC power supply				

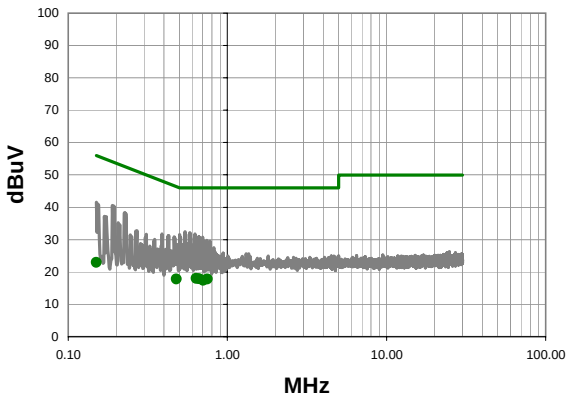
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.150	28.1	20.1	48.2	66.0	-17.8
0.638	17.2	20.1	37.3	56.0	-18.7
0.664	16.9	20.1	37.0	56.0	-19.0
0.479	15.9	20.1	36.0	56.4	-20.4
0.704	15.2	20.1	35.3	56.0	-20.7
0.750	14.1	20.1	34.2	56.0	-21.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.638	-2.1	20.1	18.0	46.0	-28.0
0.664	-2.2	20.1	17.9	46.0	-28.1
0.750	-2.3	20.1	17.8	46.0	-28.2
0.479	-2.3	20.1	17.8	46.4	-28.6
0.704	-2.7	20.1	17.4	46.0	-28.6
0.150	2.8	20.1	22.9	56.0	-33.1

NORTHWEST

EMC

AC Powerline Conducted Emissions

PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

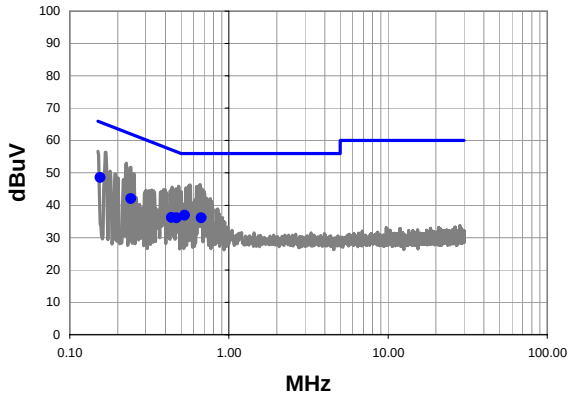
Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener

EUT:	BTM312
Configuration:	3
Customer:	Intermec Technologies Corporation
Attendees:	None
EUT Power:	3.3VDC
Operating Mode:	Transmitting Bluetooth, Intermec settings, Low channel
Deviations:	No deviations.
Comments:	Powered from DC power supply

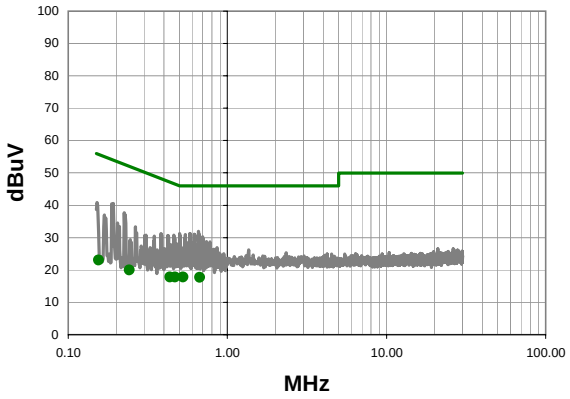
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.155	28.5	20.1	48.6	65.7	-17.1
0.526	16.8	20.1	36.9	56.0	-19.1
0.672	16.0	20.1	36.1	56.0	-19.9
0.242	21.9	20.1	42.0	62.0	-20.0
0.469	16.0	20.1	36.1	56.5	-20.4
0.435	16.1	20.1	36.2	57.2	-21.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.526	-2.3	20.1	17.8	46.0	-28.2
0.672	-2.4	20.1	17.7	46.0	-28.3
0.469	-2.3	20.1	17.8	46.5	-28.7
0.435	-2.3	20.1	17.8	47.2	-29.4
0.242	-0.1	20.1	20.0	52.0	-32.0
0.155	2.9	20.1	23.0	55.7	-32.7

NORTHWEST

EMC

AC Powerline Conducted Emissions

PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

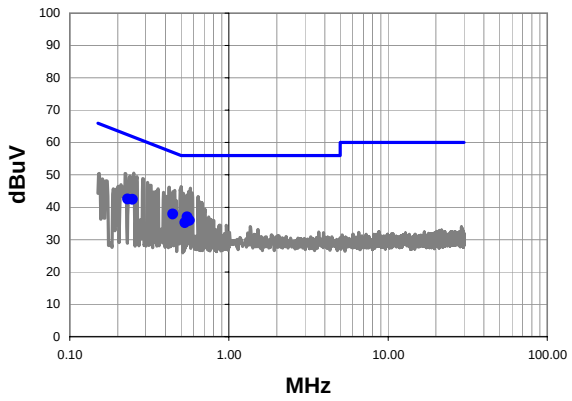
Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener

EUT:	BTM312
Configuration:	3
Customer:	Intermec Technologies Corporation
Attendees:	None
EUT Power:	3.3VDC
Operating Mode:	Transmitting Bluetooth, Intermec settings, Mid channel
Deviations:	No deviations.
Comments:	Powered from DC power supply

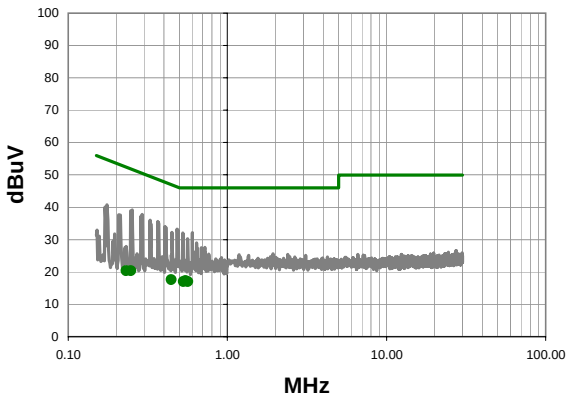
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.546	16.9	20.1	37.0	56.0	-19.0
0.444	17.8	20.1	37.9	57.0	-19.1
0.248	22.3	20.1	42.4	61.8	-19.4
0.231	22.4	20.1	42.5	62.4	-19.9
0.564	15.8	20.1	35.9	56.0	-20.1
0.529	15.1	20.1	35.2	56.0	-20.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.546	-2.8	20.1	17.3	46.0	-28.7
0.564	-3.1	20.1	17.0	46.0	-29.0
0.529	-3.1	20.1	17.0	46.0	-29.0
0.444	-2.5	20.1	17.6	47.0	-29.4
0.248	0.3	20.1	20.4	51.8	-31.4
0.231	0.3	20.1	20.4	52.4	-32.0

NORTHWEST

EMC

AC Powerline Conducted Emissions

PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

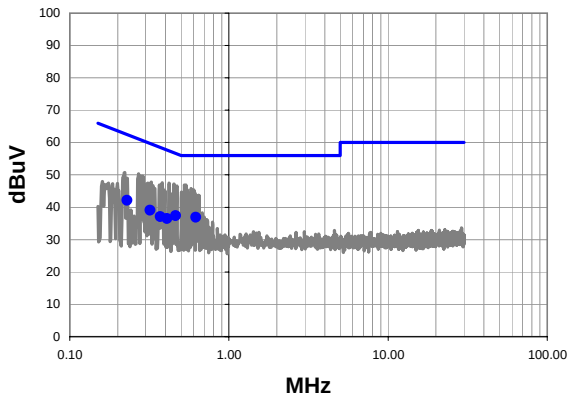
Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener

EUT:	BTM312
Configuration:	3
Customer:	Intermec Technologies Corporation
Attendees:	None
EUT Power:	3.3VDC
Operating Mode:	Transmitting Bluetooth, Intermec settings, Mid channel
Deviations:	No deviations.
Comments:	Powered from DC power supply

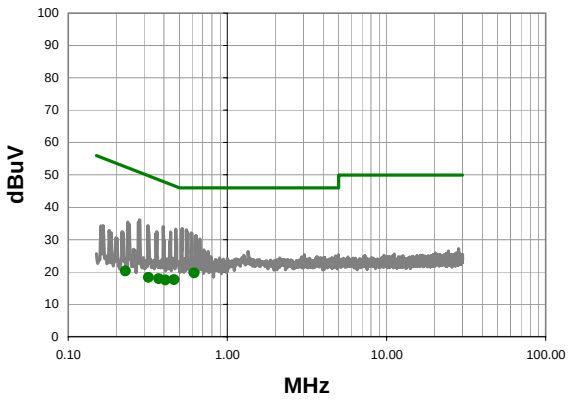
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.619	16.8	20.1	36.9	56.0	-19.1
0.463	17.3	20.1	37.4	56.6	-19.2
0.229	22.0	20.1	42.1	62.5	-20.4
0.319	19.0	20.1	39.1	59.7	-20.6
0.408	16.4	20.1	36.5	57.7	-21.2
0.370	17.0	20.1	37.1	58.5	-21.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.619	-0.4	20.1	19.7	46.0	-26.3
0.463	-2.5	20.1	17.6	46.6	-29.0
0.408	-2.6	20.1	17.5	47.7	-30.2
0.370	-2.2	20.1	17.9	48.5	-30.6
0.319	-1.8	20.1	18.3	49.7	-31.4
0.229	0.2	20.1	20.3	52.5	-32.2

NORTHWEST

EMC

AC Powerline Conducted Emissions

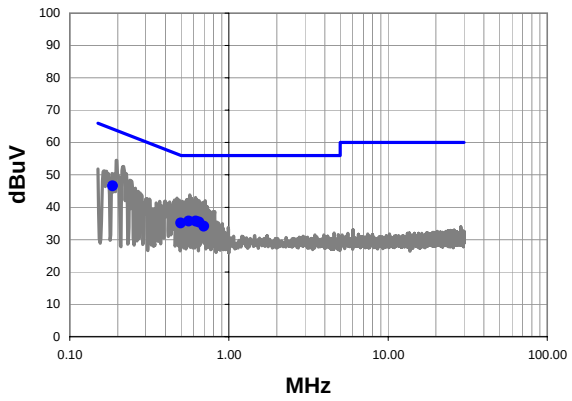
PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener
EUT:	BTM312				
Configuration:	3				
Customer:	Intermec Technologies Corporation				
Attendees:	None				
EUT Power:	3.3VDC				
Operating Mode:	Transmitting Bluetooth, Intermec settings, High channel				
Deviations:	No deviations.				
Comments:	Powered from DC power supply				

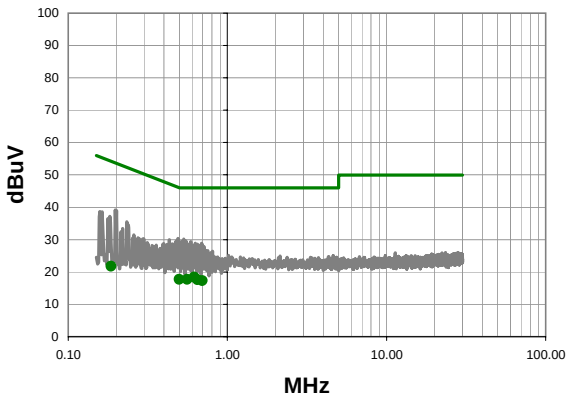
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.186	26.5	20.1	46.6	64.2	-17.6
0.560	15.6	20.1	35.7	56.0	-20.3
0.620	15.6	20.1	35.7	56.0	-20.3
0.648	15.3	20.1	35.4	56.0	-20.6
0.498	15.0	20.1	35.1	56.0	-20.9
0.696	14.0	20.1	34.1	56.0	-21.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.620	-1.7	20.1	18.4	46.0	-27.6
0.560	-2.4	20.1	17.7	46.0	-28.3
0.498	-2.4	20.1	17.7	46.0	-28.3
0.648	-2.5	20.1	17.6	46.0	-28.4
0.696	-2.8	20.1	17.3	46.0	-28.7
0.186	1.7	20.1	21.8	54.2	-32.4

NORTHWEST

EMC

AC Powerline Conducted Emissions

PSA-ESCI 2009.06.09
PSA-ESCI Version 2011.05.10

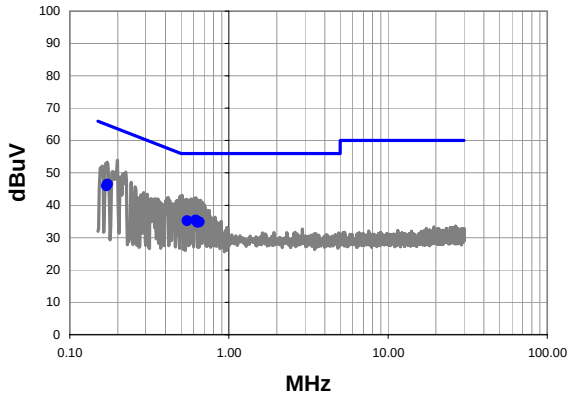
Work Order:	INMC0726	**Date:**	07/27/11		
Project:	None	**Temperature:**	23		
Job Site:	EV07	**Humidity:**	49		
Serial Number:	12	**Barometric Pres.:**	30.01	**Tested by:**	Travis Rychener

EUT:	BTM312
Configuration:	3
Customer:	Intermec Technologies Corporation
Attendees:	None
EUT Power:	3.3VDC
Operating Mode:	Transmitting Bluetooth, Intermec settings, High channel
Deviations:	No deviations.
Comments:	Powered from DC power supply

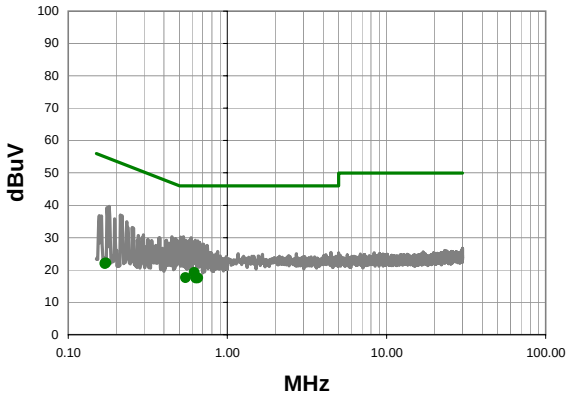
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	26.4	20.1	46.5	64.8	-18.3
0.170	25.9	20.1	46.0	65.0	-19.0
0.619	15.3	20.1	35.4	56.0	-20.6
0.547	15.1	20.1	35.2	56.0	-20.8
0.651	14.7	20.1	34.8	56.0	-21.2
0.633	14.6	20.1	34.7	56.0	-21.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.619	-0.9	20.1	19.2	46.0	-26.8
0.547	-2.5	20.1	17.6	46.0	-28.4
0.633	-2.6	20.1	17.5	46.0	-28.5
0.651	-2.6	20.1	17.5	46.0	-28.5
0.173	2.1	20.1	22.2	54.8	-32.6
0.170	1.9	20.1	22.0	55.0	-33.0

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.