Spectrum Technology

IX-BTBR51 Bluetooth Radio in the IX605

October 24, 2007

Report No. SPTE0061 Rev 01

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: October 24, 2007
Spectrum Technology
Model: IX-BTBR51 Bluetooth Radio in the IX605

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Spurious Radiated Emissions	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	**Pass**
Conducted Emissions	FCC 15.207:2006	ANSI C63.4:2003	**Pass**

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

Test Facility

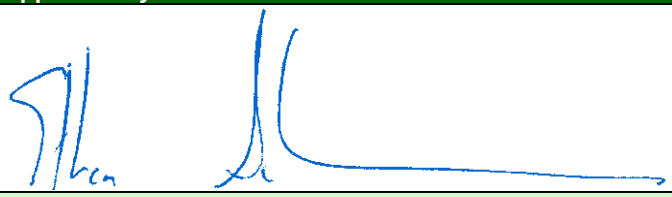
The measurement facility used to collect the data is located at:

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 BT radio model name to IX-BTBR51	1/8/2008	12-17

Accreditations and Authorizations

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

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

Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.

CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

TÜV Product Service: Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements. Certificate No. USA0604C.

TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.

NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

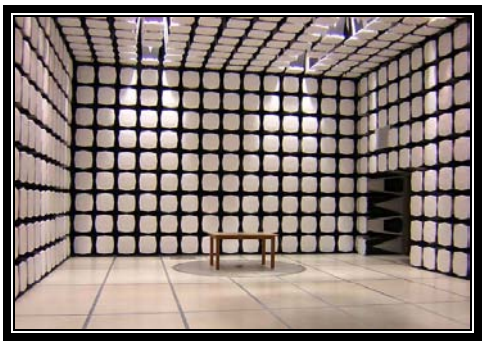
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943,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

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

GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

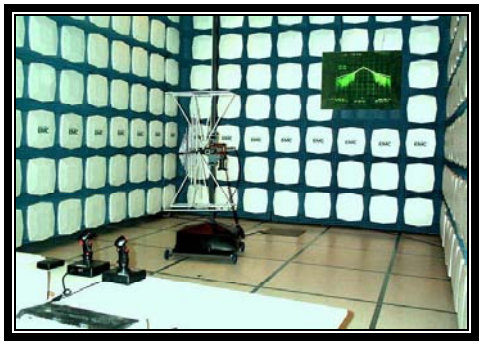
SCOPE

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



California – Orange County Facility
Labs OC01 – OC13

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



Oregon – Evergreen Facility
Labs EV01 – EV11

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

Washington – Sultan Facility
Labs SU01 – SU07

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

Party Requesting the Test

Company Name:	Spectrum Technology
Address:	209 Dayton Street Suite #205
City, State, Zip:	Edmonds, WA 98020
Test Requested By:	Rod Munro
Model:	IX-BTBR51 Bluetooth Radio in the IX605
First Date of Test:	October 18, 2007
Last Date of Test:	October 18, 2007
Receipt Date of Samples:	October 18, 2007
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

This is the IX-BTBR51 Bluetooth radio in the IX605. The radio is an add-in card for the pc.

Testing Objective:

TCB certification of the Itronix Model IX-BTBR51 Bluetooth radio. The client is seeking limited modular approval. The Bluetooth radio has a single integrated internal antenna available.

CONFIGURATION 1 SPTE0061

Software/Firmware Running during test	
Description	**Version**
Broadcom BlueTool	V 0.8.9.1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Bluetooth radio	General Dynamics Itronix Corporation	IX-BTBR51	Unknown

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
IX-605 Host Computer	General Dynamics Itronix Corporation	IX605	814T101004G71500A4CM000
AC Adapter	Lite-On	PA-1700-02	5600210201
Headset	Unknown	Unknown	Unknown
Mouse	Logitech	M-BE58	LZE02357693
Keyboard	Gateway	SK-9900U	C800441

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC	No	1.8 m	No	AC Adapter	AC Mains
DC	No	1.3 m	Yes	IX-605 Host Computer	AC Adapter
AC	No	1.8 m	No	AC Adapter	AC Mains
Speaker	No	1.6 m	No	IX-605 Host Computer	Headset
Mic	No	1.6 m	No	IX-605 Host Computer	Headset
LAN	No	3.0 m	No	IX-605 Host Computer	Unterminated
Video	Yes	1.0 m	Yes	IX-605 Host Computer	Unterminated
USB	Yes	1.3 m	No	IX-605 Host Computer	Mouse
Serial	Yes	1.0 m	No	IX-605 Host Computer	Unterminated
USB	Yes	1.3 m	Yes	IX-605 Host Computer	Keyboard
Telecom	No	1.0 m	No	IX-605 Host Computer	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 7 SPTE0049

Software/Firmware Running during test	
Description	**Version**
Broadcom BlueTool	0.7.3.5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
USB Bluetooth Module	Broadcomm	BCM92035NMD (Itronix P/N: IX-BTBR51)	Unknown

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Notebook PC	Itronix, Corp.	IX605	814T101002G70400806M000
AC Adapter	Delta Electronics	SADP-65KB D	92W0546007993
USB Card Reader	ImageMate	SDDR-91	015336
USB Mouse	Logitech	M-BE58	LZE02357693
USB Bluetooth Module	Broadcomm	BCM92035NMD	Unknown
Headset	Unknown	Unknown	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	Yes	1.0m	No	Card Reader	Notebook PC
USB	Yes	1.2m	No	USB mouse	Notebook PC
Audio	No	1.0m	No	Headset	Notebook PC
Serial	Yes	1.0m	No	Notebook PC	Unterminated
Video	Yes	1.0m	No	Notebook PC	Unterminated
Phone	No	1.3m	No	Notebook PC	Unterminated
Ethernet	No	1.0m	No	Notebook PC	Unterminated
DC	No	1.2m	Yes	Notebook PC	AC Adapter
AC	No	1.6m	No	AC Adapter	AC Mains
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	10/18/2007	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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

Tx, Cell band, High channel (2480MHz)
Tx, Cell band, Mid channel (2441MHz)
Tx, Cell band, Low channel (2402MHz)

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

7 - Conducted Emissions - BT - Notebook Configuration

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	12/7/2006	13 mo
High Pass Filter	TTE	H97-100K-50-720B	HFX	8/22/2006	24 mo
Attenuator	Tektronix	011-0059-02	ATC	12/27/2006	13 mo
EV07 cable d			EVG	4/17/2007	13 mo
LISN	Solar	9252-50-R-24-BNC	LIR	11/20/2007	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 2007.11.20

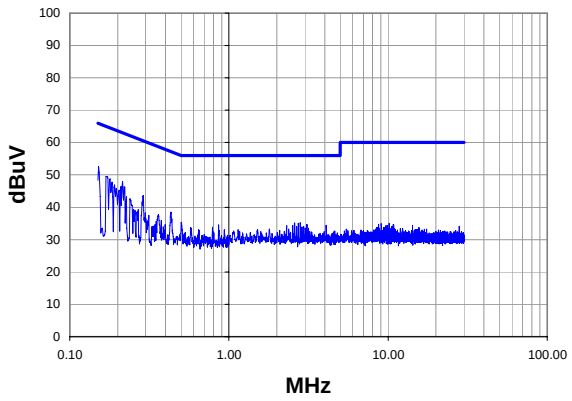
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, Low channel (2402MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

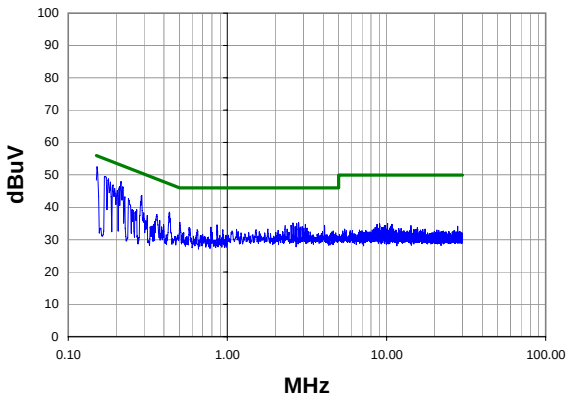
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	31	**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)
0.152	30.6	2.0	52.6	65.9	-13.3
0.215	27.0	1.0	48.0	63.0	-15.0
0.170	28.0	1.6	49.6	64.9	-15.3
0.179	27.3	1.4	48.7	64.5	-15.8
0.184	26.5	1.3	47.8	64.3	-16.5
0.220	25.3	1.0	46.3	62.8	-16.5
0.210	25.4	1.0	46.4	63.2	-16.8
0.289	22.7	0.9	43.6	60.5	-16.9
0.191	25.7	1.2	46.9	64.0	-17.1
0.204	24.2	1.0	45.2	63.4	-18.2
0.432	17.6	0.9	38.5	57.2	-18.8
0.227	22.2	1.0	43.2	62.6	-19.4
0.238	21.7	1.0	42.7	62.2	-19.5
0.504	14.5	0.8	35.3	56.0	-20.7
2.808	14.7	0.5	35.2	56.0	-20.8
2.584	14.6	0.5	35.1	56.0	-20.9
0.361	16.9	0.9	37.8	58.7	-20.9
2.728	14.5	0.5	35.0	56.0	-21.0
3.096	14.2	0.5	34.7	56.0	-21.3
0.862	13.9	0.6	34.5	56.0	-21.5

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.152	30.6	2.0	52.6	55.9	-3.3
0.215	27.0	1.0	48.0	53.0	-5.0
0.170	28.0	1.6	49.6	54.9	-5.3
0.179	27.3	1.4	48.7	54.5	-5.8
0.184	26.5	1.3	47.8	54.3	-6.5
0.220	25.3	1.0	46.3	52.8	-6.5
0.210	25.4	1.0	46.4	53.2	-6.8
0.289	22.7	0.9	43.6	50.5	-6.9
0.191	25.7	1.2	46.9	54.0	-7.1
0.204	24.2	1.0	45.2	53.4	-8.2
0.432	17.6	0.9	38.5	47.2	-8.8
0.227	22.2	1.0	43.2	52.6	-9.4
0.238	21.7	1.0	42.7	52.2	-9.5
0.504	14.5	0.8	35.3	46.0	-10.7
2.808	14.7	0.5	35.2	46.0	-10.8
2.584	14.6	0.5	35.1	46.0	-10.9
0.361	16.9	0.9	37.8	48.7	-10.9
2.728	14.5	0.5	35.0	46.0	-11.0
3.096	14.2	0.5	34.7	46.0	-11.3
0.862	13.9	0.6	34.5	46.0	-11.5

NORTHWEST

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CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.11.20

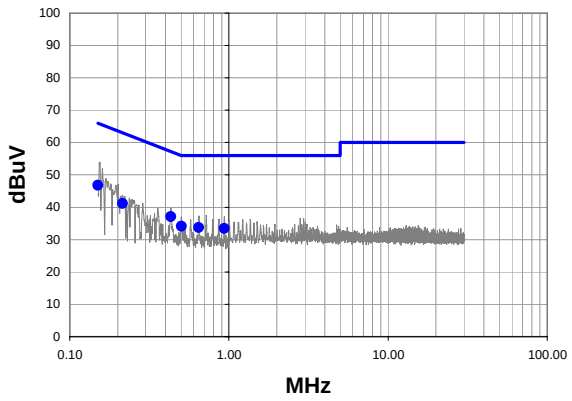
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, Low channel (2402MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

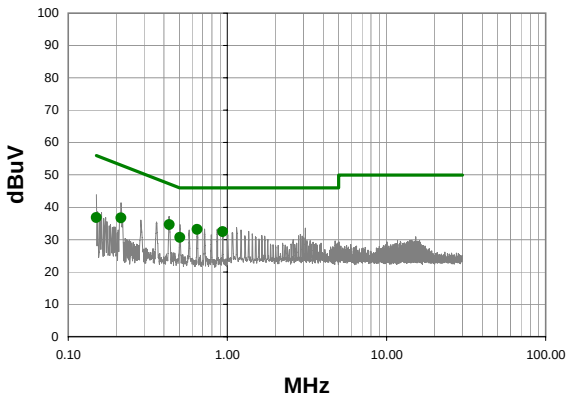
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	32	**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)
0.150	24.8	2.0	46.8	66.0	-19.2
0.431	16.2	0.9	37.1	57.2	-20.2
0.215	20.2	1.0	41.2	63.0	-21.8
0.504	13.3	0.8	34.1	56.0	-21.9
0.646	13.0	0.7	33.7	56.0	-22.3
0.935	12.9	0.5	33.4	56.0	-22.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.431	13.8	0.9	34.7	47.2	-12.6
0.646	12.4	0.7	33.1	46.0	-12.9
0.935	11.9	0.5	32.4	46.0	-13.6
0.504	9.9	0.8	30.7	46.0	-15.3
0.215	15.7	1.0	36.7	53.0	-16.3
0.150	14.8	2.0	36.8	56.0	-19.2

NORTHWEST

EMC

CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.11.20

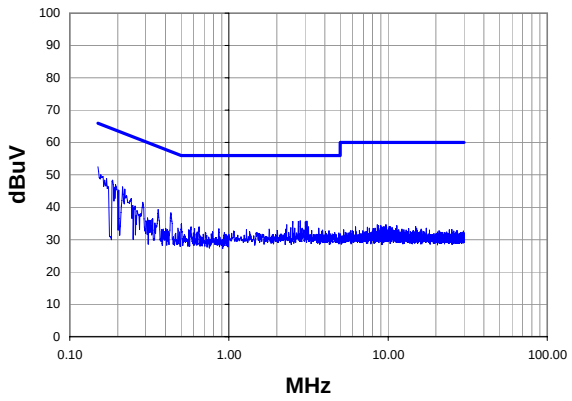
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, Mid channel (2441MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

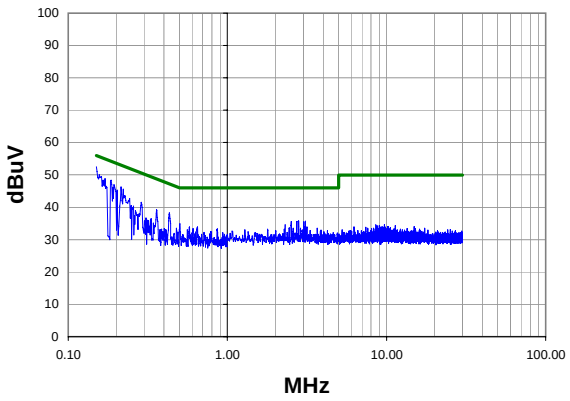
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	33	**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)
0.150	30.5	2.0	52.5	66.0	-13.5
0.186	27.1	1.3	48.4	64.2	-15.8
0.215	25.3	1.0	46.3	63.0	-16.7
0.194	25.9	1.1	47.0	63.9	-16.8
0.221	24.6	1.0	45.6	62.8	-17.2
0.191	25.0	1.2	46.2	64.0	-17.8
0.203	24.3	1.0	45.3	63.5	-18.2
0.432	17.4	0.9	38.3	57.2	-19.0
0.288	20.6	0.9	41.5	60.6	-19.0
0.359	18.4	0.9	39.3	58.7	-19.4
2.808	15.3	0.5	35.8	56.0	-20.2
3.096	15.2	0.5	35.7	56.0	-20.3
2.520	15.1	0.5	35.6	56.0	-20.4
2.728	15.1	0.5	35.6	56.0	-20.4
3.024	15.0	0.5	35.5	56.0	-20.5
0.504	14.1	0.8	34.9	56.0	-21.1
0.257	19.4	1.0	40.4	61.5	-21.2
0.249	19.6	1.0	40.6	61.8	-21.2
2.304	14.1	0.5	34.6	56.0	-21.4
3.040	13.5	0.5	34.0	56.0	-22.0

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.150	30.5	2.0	52.5	56.0	-3.5
0.186	27.1	1.3	48.4	54.2	-5.8
0.215	25.3	1.0	46.3	53.0	-6.7
0.194	25.9	1.1	47.0	53.9	-6.8
0.221	24.6	1.0	45.6	52.8	-7.2
0.191	25.0	1.2	46.2	54.0	-7.8
0.203	24.3	1.0	45.3	53.5	-8.2
0.432	17.4	0.9	38.3	47.2	-9.0
0.288	20.6	0.9	41.5	50.6	-9.0
0.359	18.4	0.9	39.3	48.7	-9.4
2.808	15.3	0.5	35.8	46.0	-10.2
3.096	15.2	0.5	35.7	46.0	-10.3
2.520	15.1	0.5	35.6	46.0	-10.4
2.728	15.1	0.5	35.6	46.0	-10.4
3.024	15.0	0.5	35.5	46.0	-10.5
0.504	14.1	0.8	34.9	46.0	-11.1
0.257	19.4	1.0	40.4	51.5	-11.2
0.249	19.6	1.0	40.6	51.8	-11.2
2.304	14.1	0.5	34.6	46.0	-11.4
3.040	13.5	0.5	34.0	46.0	-12.0

NORTHWEST

EMC

CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.11.20

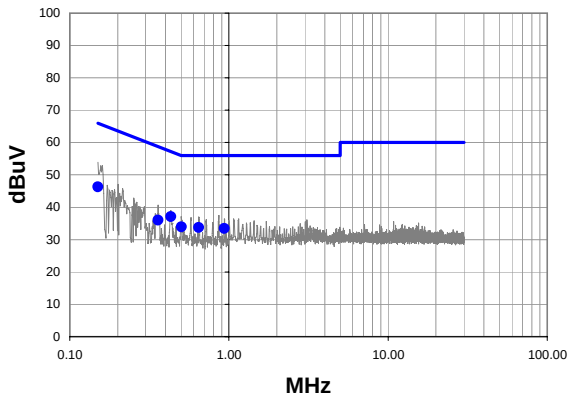
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, Mid channel (2441MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

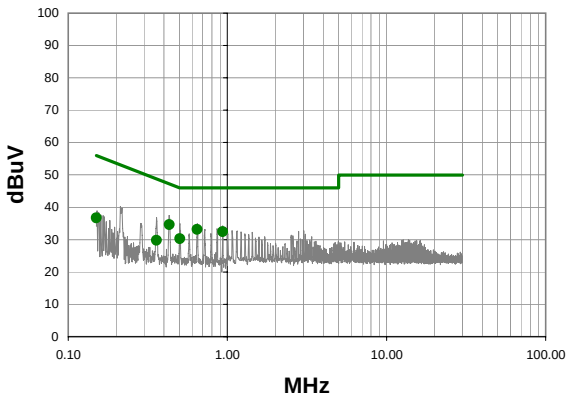
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	34	**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)
0.150	24.3	2.0	46.3	66.0	-19.7
0.431	16.2	0.9	37.1	57.2	-20.2
0.504	13.1	0.8	33.9	56.0	-22.1
0.646	13.0	0.7	33.7	56.0	-22.3
0.935	12.9	0.5	33.4	56.0	-22.6
0.359	15.1	0.9	36.0	58.8	-22.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.431	13.8	0.9	34.7	47.2	-12.6
0.646	12.4	0.7	33.1	46.0	-12.9
0.935	11.9	0.5	32.4	46.0	-13.6
0.504	9.5	0.8	30.3	46.0	-15.7
0.359	8.9	0.9	29.8	48.8	-19.0
0.150	14.7	2.0	36.7	56.0	-19.3

NORTHWEST

EMC

CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.11.20

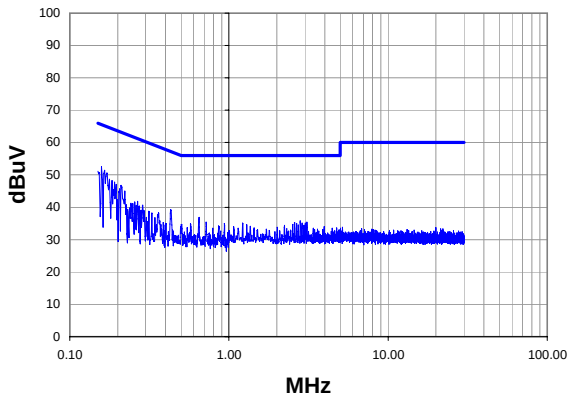
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, High channel (2480MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

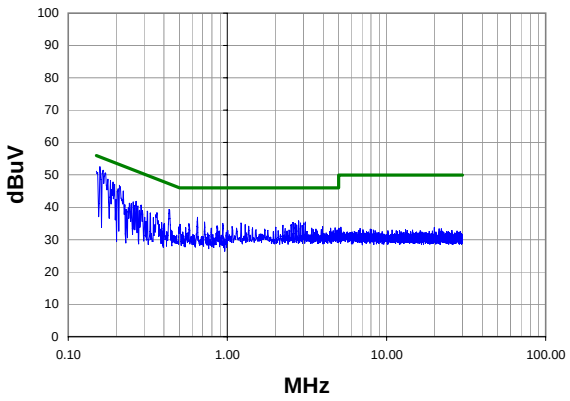
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	35	**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)
0.159	30.7	1.8	52.5	65.5	-13.0
0.165	29.7	1.7	51.4	65.2	-13.8
0.170	29.0	1.6	50.6	64.9	-14.3
0.150	29.1	2.0	51.1	66.0	-14.9
0.177	27.2	1.5	48.7	64.6	-16.0
0.184	26.9	1.3	48.2	64.3	-16.1
0.191	26.6	1.2	47.8	64.0	-16.2
0.210	25.8	1.0	46.8	63.2	-16.4
0.196	26.0	1.1	47.1	63.8	-16.7
0.206	24.7	1.0	45.7	63.4	-17.7
0.221	24.0	1.0	45.0	62.8	-17.8
0.431	18.4	0.9	39.3	57.2	-18.0
0.648	16.2	0.7	36.9	56.0	-19.1
0.267	20.9	1.0	41.9	61.2	-19.3
0.255	20.7	1.0	41.7	61.6	-19.9
0.288	19.7	0.9	40.6	60.6	-19.9
2.808	15.3	0.5	35.8	56.0	-20.2
0.361	17.4	0.9	38.3	58.7	-20.4
3.096	14.9	0.5	35.4	56.0	-20.6
0.719	14.7	0.7	35.4	56.0	-20.6

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.159	30.7	1.8	52.5	55.5	-3.0
0.165	29.7	1.7	51.4	55.2	-3.8
0.170	29.0	1.6	50.6	54.9	-4.3
0.150	29.1	2.0	51.1	56.0	-4.9
0.177	27.2	1.5	48.7	54.6	-6.0
0.184	26.9	1.3	48.2	54.3	-6.1
0.191	26.6	1.2	47.8	54.0	-6.2
0.210	25.8	1.0	46.8	53.2	-6.4
0.196	26.0	1.1	47.1	53.8	-6.7
0.206	24.7	1.0	45.7	53.4	-7.7
0.221	24.0	1.0	45.0	52.8	-7.8
0.431	18.4	0.9	39.3	47.2	-8.0
0.648	16.2	0.7	36.9	46.0	-9.1
0.267	20.9	1.0	41.9	51.2	-9.3
0.255	20.7	1.0	41.7	51.6	-9.9
0.288	19.7	0.9	40.6	50.6	-9.9
2.808	15.3	0.5	35.8	46.0	-10.2
0.361	17.4	0.9	38.3	48.7	-10.4
3.096	14.9	0.5	35.4	46.0	-10.6
0.719	14.7	0.7	35.4	46.0	-10.6

NORTHWEST

EMC

CONDUCTED EMISSIONS

Version 2007.8.27
PSA-ESCI 2007.11.20

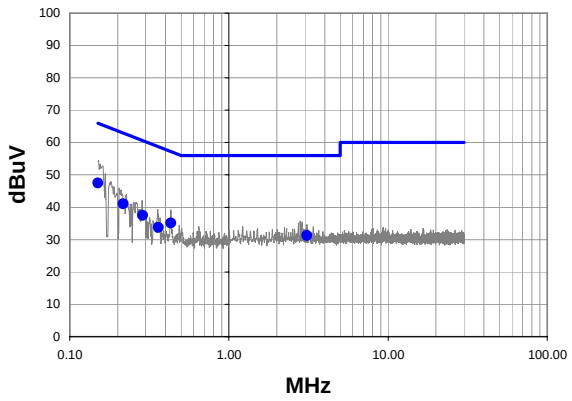
Work Order:	SPTE0049	**Date:**	11/20/07		
Project:	None	**Temperature:**	21		
Job Site:	EV07	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1031.1mb	**Tested by:**	Dan Haas

EUT:	IX-BTBR51 Bluetooth Radio in the IX-605
Configuration:	7 - Conducted Emissions - BT - Notebook Configuration
Customer:	Spectrum Technology
Attendees:	Rod Munro
EUT Power:	120VAC/60Hz
Operating Mode:	Tx, High channel (2480MHz)
Deviations:	No deviations.
Comments:	Notebook configuration

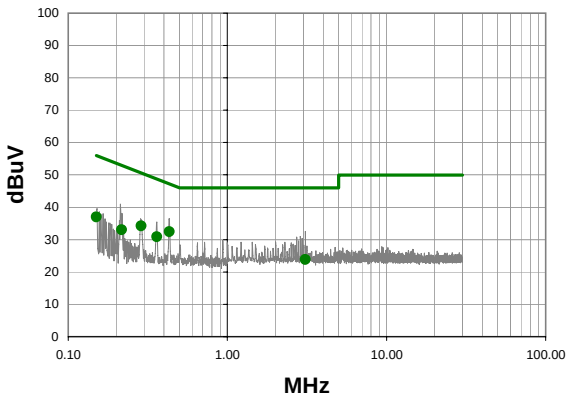
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	36	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit

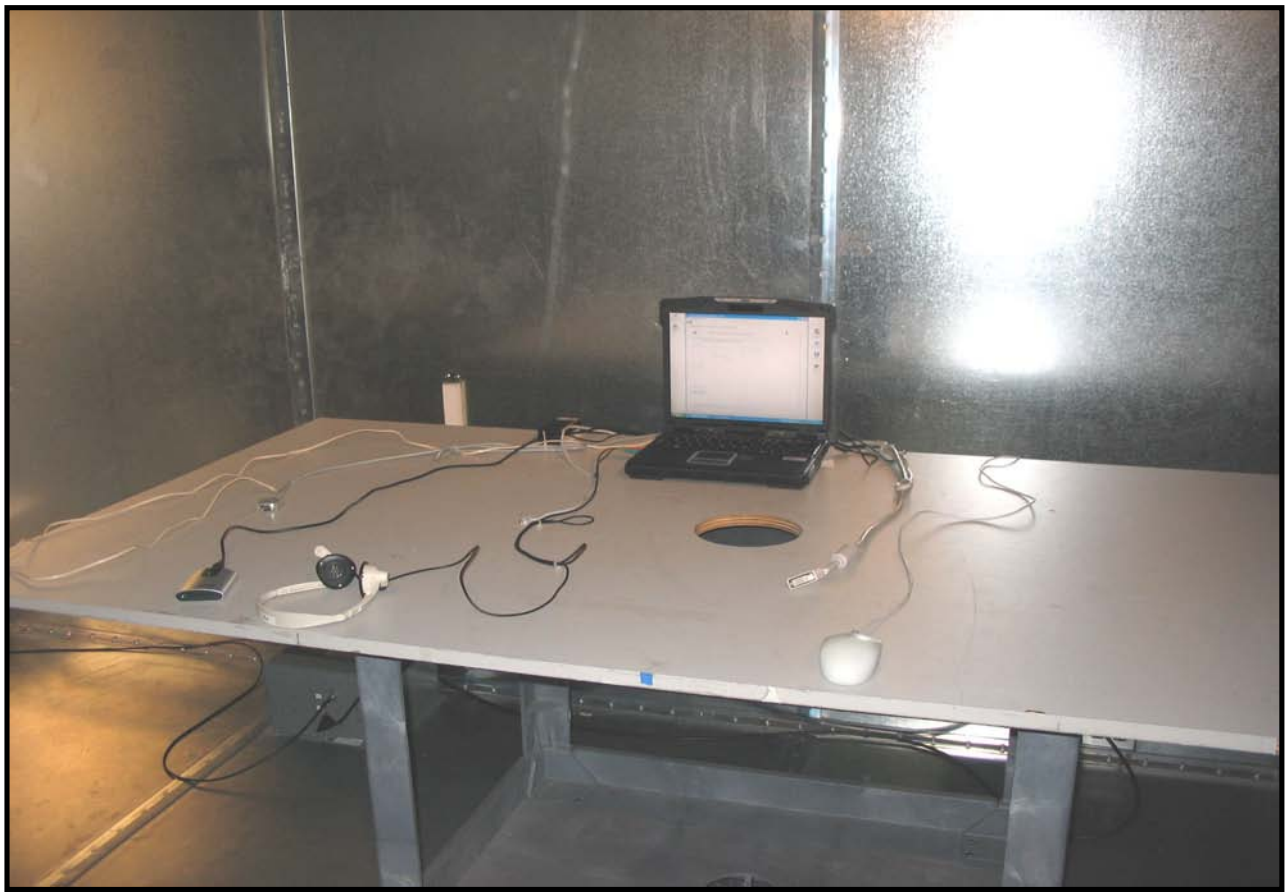


Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.150	25.5	2.0	47.5	66.0	-18.5
0.217	20.1	1.0	41.1	62.9	-21.8
0.431	14.3	0.9	35.2	57.2	-22.1
0.288	16.5	0.9	37.4	60.6	-23.1
3.092	10.8	0.5	31.3	56.0	-24.7
0.361	12.8	0.9	33.7	58.7	-25.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
0.431	11.6	0.9	32.5	47.2	-14.8
0.288	13.3	0.9	34.2	50.6	-16.3
0.361	10.0	0.9	30.9	48.7	-17.8
0.150	15.0	2.0	37.0	56.0	-19.0
0.217	12.0	1.0	33.0	52.9	-19.9
3.092	3.3	0.5	23.8	46.0	-22.2



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
Transmitting Bluetooth, GFSK modulation (DH5)
Transmitting Bluetooth, QPSK modulation (2DH5)
Transmitting Bluetooth, 8PSK modulation (3DH5)

CHANNELS
Low channel (2402 MHz)
Mid channel (2441 MHz)
High channel (2480 MHz)

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	12/7/2006	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	12/29/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
EV01 cables c,g, h			EVA	12/29/2006	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	24
EV01 cables g,h,j			EVB	5/10/2007	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	6/22/2007	13
Antenna, Horn	ETS	3160-08	AHV	NCR	0
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	7/25/2007	13
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 Cable D			EVD	7/25/2007	13
EV01 cables g,h,l			EVF	5/10/2007	13

MEASUREMENT BANDWIDTHS

	Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The 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

SPURIOUS RADIATED EMISSIONS

PSA 2007.05.07
EMI 2006.11.29

EUT:	IX-BTBR51 Bluetooth Radio in the IX605	Work Order:	SPTE0061
Serial Number:	None	Date:	10/18/07
Customer:	Spectrum Technology	Temperature:	24
Attendees:	Rod Munro	Humidity:	28%
Project:	None	Barometric Pres.:	1018.30 mb
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

EUT OPERATING MODES

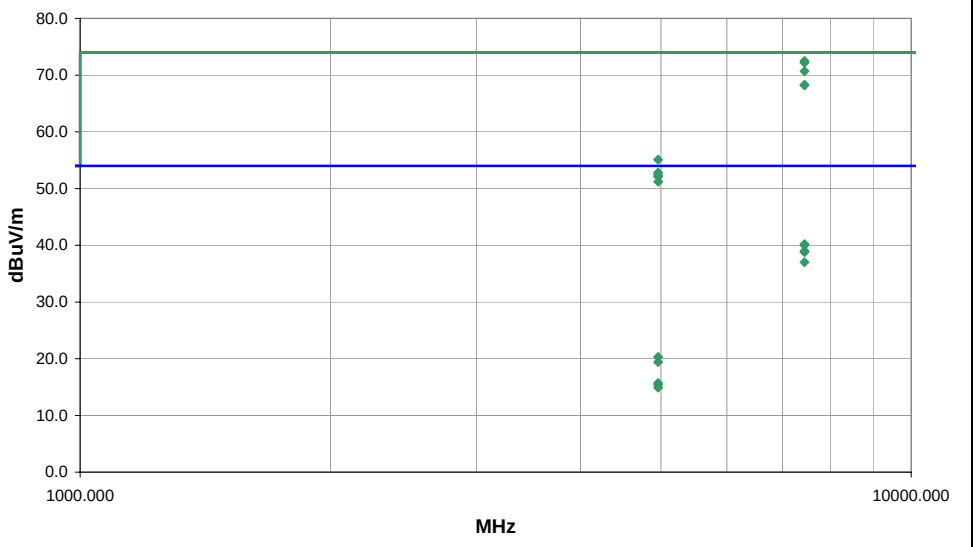
Transmitting Bluetooth, high channel

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
7440.016	58.0	14.5	69.0	1.1	0.0	0.0	V-Horn	PK	0.0	72.5	74.0	-1.5	8PSK, EUT host on side
7440.441	57.7	14.5	69.0	1.1	0.0	0.0	V-Horn	PK	0.0	72.2	74.0	-1.8	QPSK, EUT host on side
7440.124	56.2	14.5	343.0	1.7	0.0	0.0	H-Horn	PK	0.0	70.7	74.0	-3.3	8PSK, EUT host screen horizontal
7439.566	53.8	14.5	89.0	1.1	0.0	0.0	V-Horn	PK	0.0	68.3	74.0	-5.7	GFSK, EUT host on side
7439.649	53.7	14.5	347.0	1.7	0.0	0.0	H-Horn	PK	0.0	68.2	74.0	-5.8	GFSK, EUT host screen horizontal
7440.046	50.5	14.5	89.0	1.1	24.8	0.0	V-Horn	AV	0.0	40.2	54.0	-13.8	GFSK, EUT host on side
7440.031	50.3	14.5	69.0	1.1	24.8	0.0	V-Horn	AV	0.0	40.0	54.0	-14.0	QPSK, EUT host on side
7440.086	49.3	14.5	69.0	1.1	24.8	0.0	V-Horn	AV	0.0	39.0	54.0	-15.0	8PSK, EUT host on side
7440.044	49.1	14.5	347.0	1.7	24.8	0.0	H-Horn	AV	0.0	38.8	54.0	-15.2	GFSK, EUT host screen horizontal
7440.104	47.3	14.5	343.0	1.7	24.8	0.0	H-Horn	AV	0.0	37.0	54.0	-17.0	8PSK, EUT host screen horizontal
4959.935	47.1	8.0	275.0	1.4	0.0	0.0	H-Horn	PK	0.0	55.1	74.0	-18.9	GFSK, EUT host screen horizontal
4959.534	44.8	8.0	84.0	1.1	0.0	0.0	V-Horn	PK	0.0	52.8	74.0	-21.2	QPSK, EUT host on side
4959.414	44.4	8.0	83.0	1.1	0.0	0.0	V-Horn	PK	0.0	52.4	74.0	-21.6	8PSK, EUT host on side
4959.395	44.1	8.0	296.0	1.4	0.0	0.0	H-Horn	PK	0.0	52.1	74.0	-21.9	8PSK, EUT host screen horizontal
4960.454	43.2	8.0	85.0	1.1	0.0	0.0	V-Horn	PK	0.0	51.2	74.0	-22.8	GFSK, EUT host on side
4960.044	37.1	8.0	85.0	1.1	24.8	0.0	V-Horn	AV	0.0	20.3	54.0	-33.7	GFSK, EUT host on side
4960.025	36.2	8.0	275.0	1.4	24.8	0.0	H-Horn	AV	0.0	19.4	54.0	-34.6	GFSK, EUT host screen horizontal
4960.030	32.5	8.0	296.0	1.4	24.8	0.0	H-Horn	AV	0.0	15.7	54.0	-38.3	8PSK, EUT host screen horizontal
4960.004	32.2	8.0	83.0	1.1	24.8	0.0	V-Horn	AV	0.0	15.4	54.0	-38.6	8PSK, EUT host on side
4959.769	31.7	8.0	84.0	1.1	24.8	0.0	V-Horn	AV	0.0	14.9	54.0	-39.1	QPSK, EUT host on side

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS

PSA 2007.05.07
EMI 2006.11.29

EUT:	IX-BTBR51 Bluetooth Radio in the IX605	Work Order:	SPTE0061
Serial Number:	None	Date:	10/18/07
Customer:	Spectrum Technology	Temperature:	24
Attendees:	Rod Munro	Humidity:	28%
Project:	None	Barometric Pres.:	1018.30 mb
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

EUT OPERATING MODES

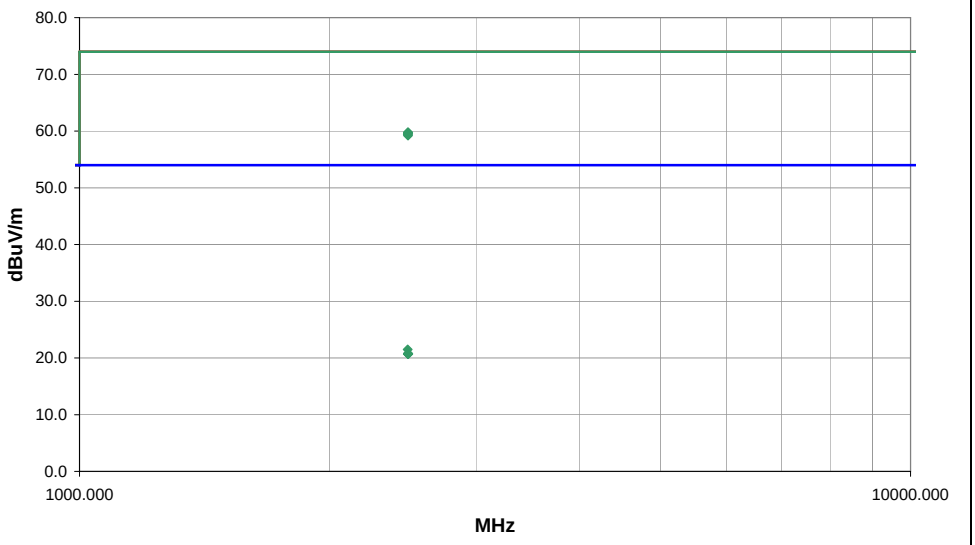
Transmitting Bluetooth, High channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	3
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
2484.471	39.4	0.4	308.0	1.1	0.0	20.0	V-Horn	PK	0.0	59.8	74.0	-14.2	QPSK, EUT host on side
2484.921	39.3	0.4	80.0	1.8	0.0	20.0	V-Horn	PK	0.0	59.7	74.0	-14.3	8PSK, EUT host on side
2484.274	39.2	0.4	339.0	1.3	0.0	20.0	H-Horn	PK	0.0	59.6	74.0	-14.4	GFSK, EUT host screen horizontal
2483.998	39.1	0.4	131.0	1.1	0.0	20.0	V-Horn	PK	0.0	59.5	74.0	-14.5	GFSK, EUT host on side
2483.714	39.0	0.4	151.0	1.3	0.0	20.0	H-Horn	PK	0.0	59.4	74.0	-14.6	QPSK, EUT host screen horizontal
2485.061	38.8	0.4	293.0	1.3	0.0	20.0	H-Horn	PK	0.0	59.2	74.0	-14.8	8PSK, EUT host screen horizontal
2482.641	25.9	0.4	80.0	1.8	24.8	20.0	V-Horn	AV	0.0	21.5	54.0	-32.5	8PSK, EUT host on side
2484.281	25.2	0.4	293.0	1.3	24.8	20.0	H-Horn	AV	0.0	20.8	54.0	-33.2	8PSK, EUT host screen horizontal
2484.058	25.1	0.4	308.0	1.1	24.8	20.0	V-Horn	AV	0.0	20.7	54.0	-33.3	QPSK, EUT host on side
2484.234	25.1	0.4	151.0	1.3	24.8	20.0	H-Horn	AV	0.0	20.7	54.0	-33.3	QPSK, EUT host screen horizontal
2484.828	25.1	0.4	131.0	1.1	24.8	20.0	V-Horn	AV	0.0	20.7	54.0	-33.3	GFSK, EUT host on side
2486.364	25.1	0.4	339.0	1.3	24.8	20.0	H-Horn	AV	0.0	20.7	54.0	-33.3	GFSK, EUT host screen horizontal

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS

PSA 2007.05.07
EMI 2006.11.29

EUT:	IX-BTBR51 Bluetooth Radio in the IX605	Work Order:	SPTE0061
Serial Number:	None	Date:	10/18/07
Customer:	Spectrum Technology	Temperature:	24
Attendees:	Rod Munro	Humidity:	28%
Project:	None	Barometric Pres.:	1018.30 mb
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

EUT OPERATING MODES

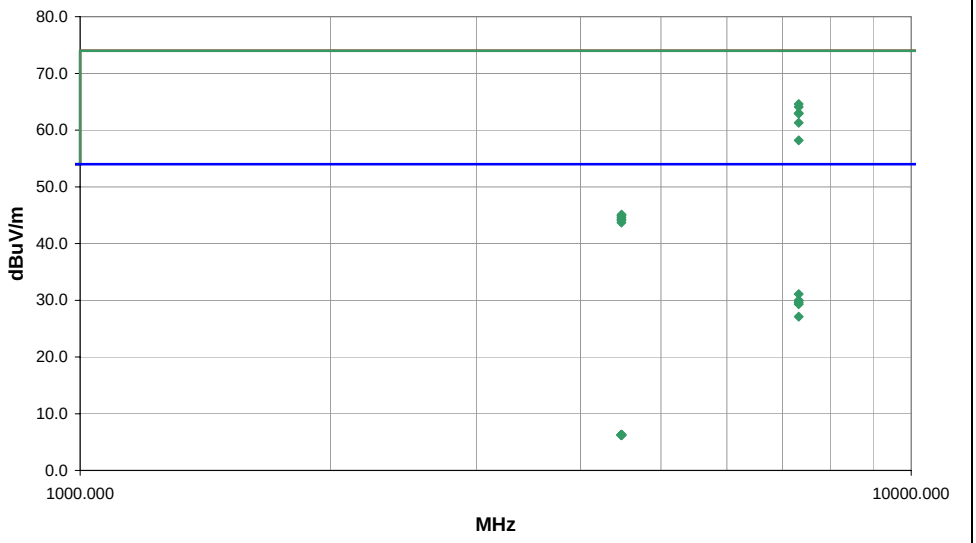
Transmitting Bluetooth, mid channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
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
7323.096	50.6	14.0	39.0	1.1	0.0	0.0	V-Horn	PK	0.0	64.6	74.0	-9.4	8PSK, EUT host on side
7323.034	50.1	14.0	338.0	1.7	0.0	0.0	H-Horn	PK	0.0	64.1	74.0	-9.9	8PSK, EUT host screen horizontal
7322.436	49.0	14.0	38.0	1.2	0.0	0.0	V-Horn	PK	0.0	63.0	74.0	-11.0	QFSK, EUT host on side
7323.409	48.9	14.0	344.0	1.9	0.0	0.0	H-Horn	PK	0.0	62.9	74.0	-11.1	QFSK, EUT host screen horizontal
7322.836	47.3	14.0	35.0	1.1	0.0	0.0	V-Horn	PK	0.0	61.3	74.0	-12.7	GFSK, EUT host on side
7323.014	44.2	14.0	9.0	1.2	0.0	0.0	H-Horn	PK	0.0	58.2	74.0	-15.8	GFSK, EUT host screen horizontal
7323.026	41.9	14.0	35.0	1.1	24.8	0.0	V-Horn	AV	0.0	31.1	54.0	-22.9	GFSK, EUT host on side
7323.011	40.8	14.0	38.0	1.2	24.8	0.0	V-Horn	AV	0.0	30.0	54.0	-24.0	QFSK, EUT host on side
7323.019	40.7	14.0	344.0	1.9	24.8	0.0	H-Horn	AV	0.0	29.9	54.0	-24.1	QFSK, EUT host screen horizontal
7323.066	40.4	14.0	39.0	1.1	24.8	0.0	V-Horn	AV	0.0	29.6	54.0	-24.4	8PSK, EUT host on side
7323.059	40.1	14.0	338.0	1.7	24.8	0.0	H-Horn	AV	0.0	29.3	54.0	-24.7	8PSK, EUT host screen horizontal
7323.029	37.9	14.0	9.0	1.2	24.8	0.0	H-Horn	AV	0.0	27.1	54.0	-26.9	GFSK, EUT host screen horizontal
4481.884	38.6	6.5	230.0	2.0	0.0	0.0	H-Horn	PK	0.0	45.1	74.0	-28.9	8PSK, EUT host screen horizontal
4481.314	38.4	6.5	214.0	1.2	0.0	0.0	V-Horn	PK	0.0	44.9	74.0	-29.1	GFSK, EUT host on side
4481.024	38.1	6.5	209.0	1.0	0.0	0.0	H-Horn	PK	0.0	44.6	74.0	-29.4	GFSK, EUT host screen horizontal
4480.704	37.8	6.5	201.0	1.2	0.0	0.0	V-Horn	PK	0.0	44.3	74.0	-29.7	QFSK, EUT host on side
4480.529	37.6	6.5	22.0	1.1	0.0	0.0	V-Horn	PK	0.0	44.1	74.0	-29.9	8PSK, EUT host on side
4480.774	37.2	6.5	165.0	1.0	0.0	0.0	H-Horn	PK	0.0	43.7	74.0	-30.3	QFSK, EUT host screen horizontal
4479.209	24.6	6.5	165.0	1.0	24.8	0.0	H-Horn	AV	0.0	6.3	54.0	-47.7	QFSK, EUT host screen horizontal
4480.614	24.6	6.5	22.0	1.1	24.8	0.0	V-Horn	AV	0.0	6.3	54.0	-47.7	8PSK, EUT host on side

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS

PSA 2007.05.07
EMI 2006.11.29

EUT:	IX-BTBR51 Bluetooth Radio in the IX605	Work Order:	SPTE0061
Serial Number:	None	Date:	10/18/07
Customer:	Spectrum Technology	Temperature:	24
Attendees:	Rod Munro	Humidity:	28%
Project:	None	Barometric Pres.:	1018.30 mb
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

EUT OPERATING MODES

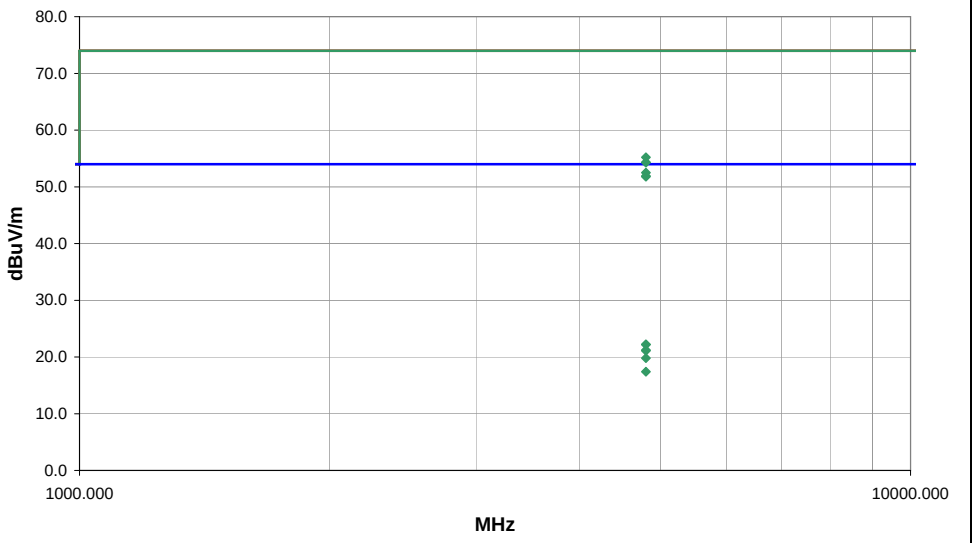
Transmitting Bluetooth, low channel

DEVIATIONS FROM TEST STANDARD

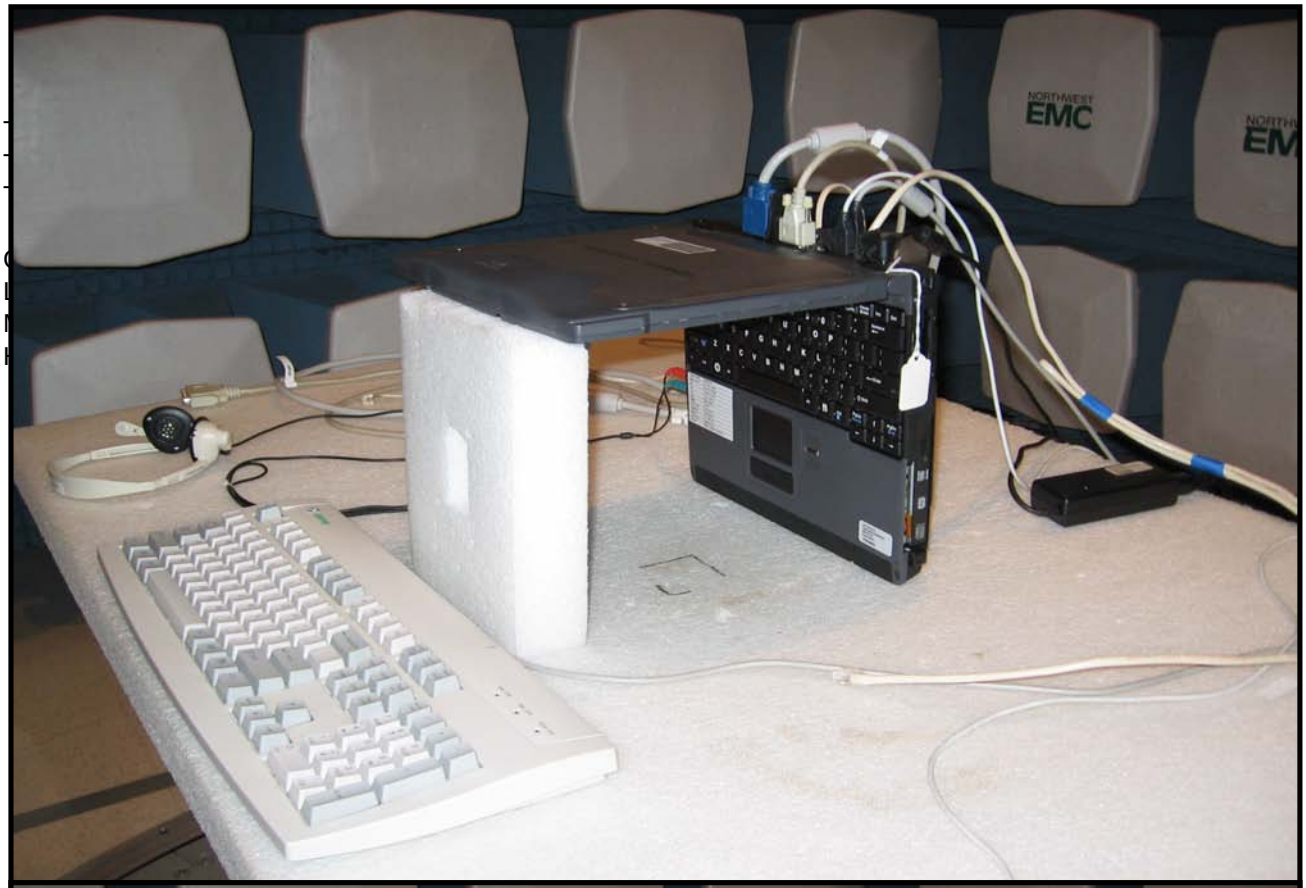
No deviations.

Run #	5
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
4803.700	47.8	7.4	3.0	1.5	0.0	0.0	H-Horn	PK	0.0	55.2	74.0	-18.8	8PSK, EUT host screen horizontal
4804.010	46.9	7.4	64.0	1.2	0.0	0.0	V-Horn	PK	0.0	54.3	74.0	-19.7	QPSK, EUT host screen horizontal
4804.180	46.9	7.4	4.0	1.5	0.0	0.0	H-Horn	PK	0.0	54.3	74.0	-19.7	8PSK, EUT host screen horizontal
4803.840	45.1	7.4	83.0	1.2	0.0	0.0	V-Horn	PK	0.0	52.5	74.0	-21.5	GFSK, EUT host on side
4803.680	44.5	7.4	343.0	1.1	0.0	0.0	V-Horn	PK	0.0	51.9	74.0	-22.1	8PSK, EUT host on side
4804.200	44.4	7.4	339.0	1.3	0.0	0.0	H-Horn	PK	0.0	51.8	74.0	-22.2	GFSK, EUT host screen horizontal
4804.035	39.6	7.4	83.0	1.2	24.8	0.0	V-Horn	AV	0.0	22.2	54.0	-31.8	GFSK, EUT host on side
4804.050	39.6	7.4	3.0	1.5	24.8	0.0	H-Horn	AV	0.0	22.2	54.0	-31.8	QPSK, EUT host screen horizontal
4804.020	38.6	7.4	339.0	1.3	24.8	0.0	H-Horn	AV	0.0	21.2	54.0	-32.8	GFSK, EUT host screen horizontal
4804.015	38.5	7.4	4.0	1.5	24.8	0.0	H-Horn	AV	0.0	21.1	54.0	-32.9	8PSK, EUT host screen horizontal
4804.010	37.2	7.4	64.0	1.2	24.8	0.0	V-Horn	AV	0.0	19.8	54.0	-34.2	QPSK, EUT host screen horizontal
4804.035	34.8	7.4	343.0	1.1	24.8	0.0	V-Horn	AV	0.0	17.4	54.0	-36.6	QPSK, EUT host on side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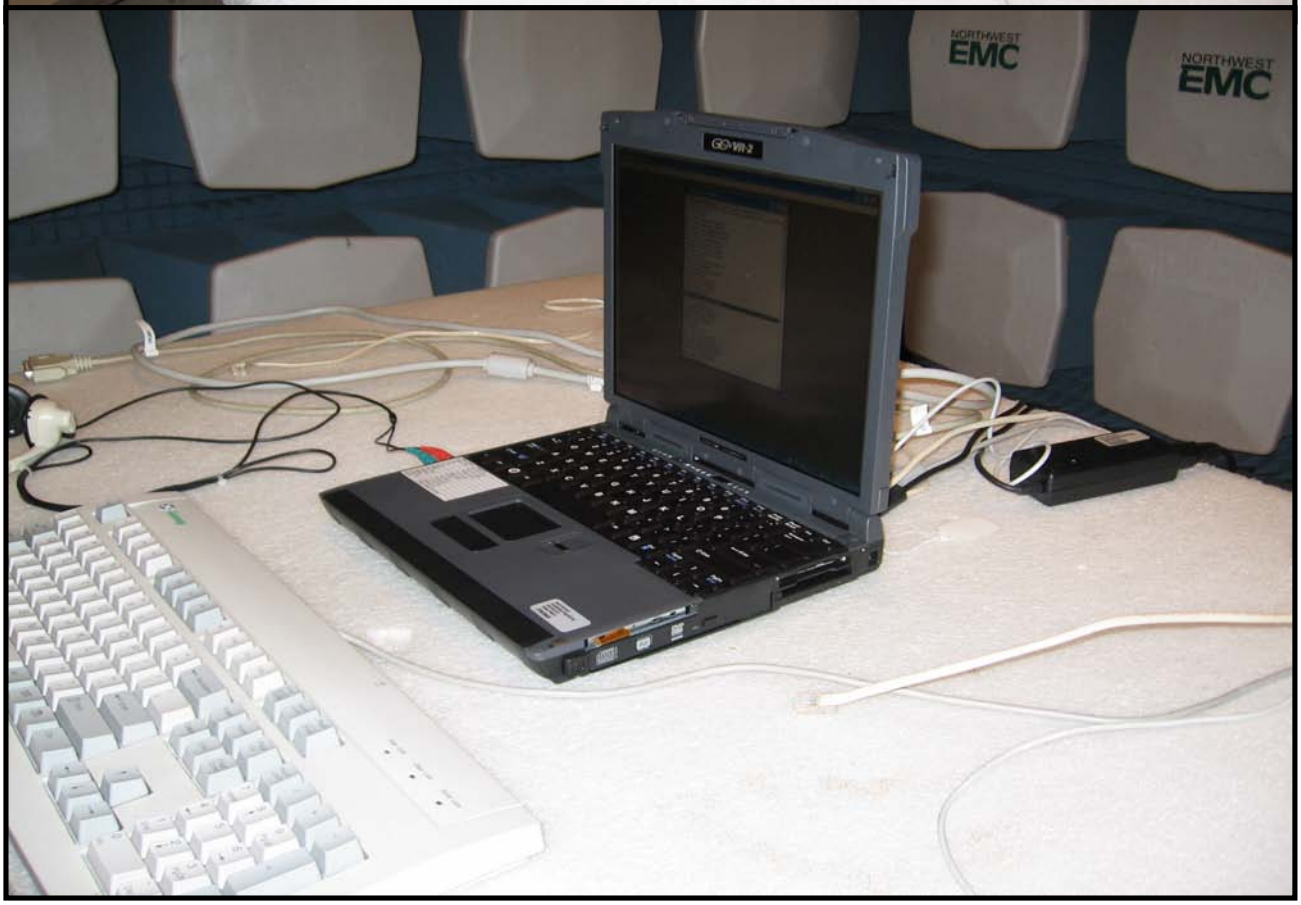
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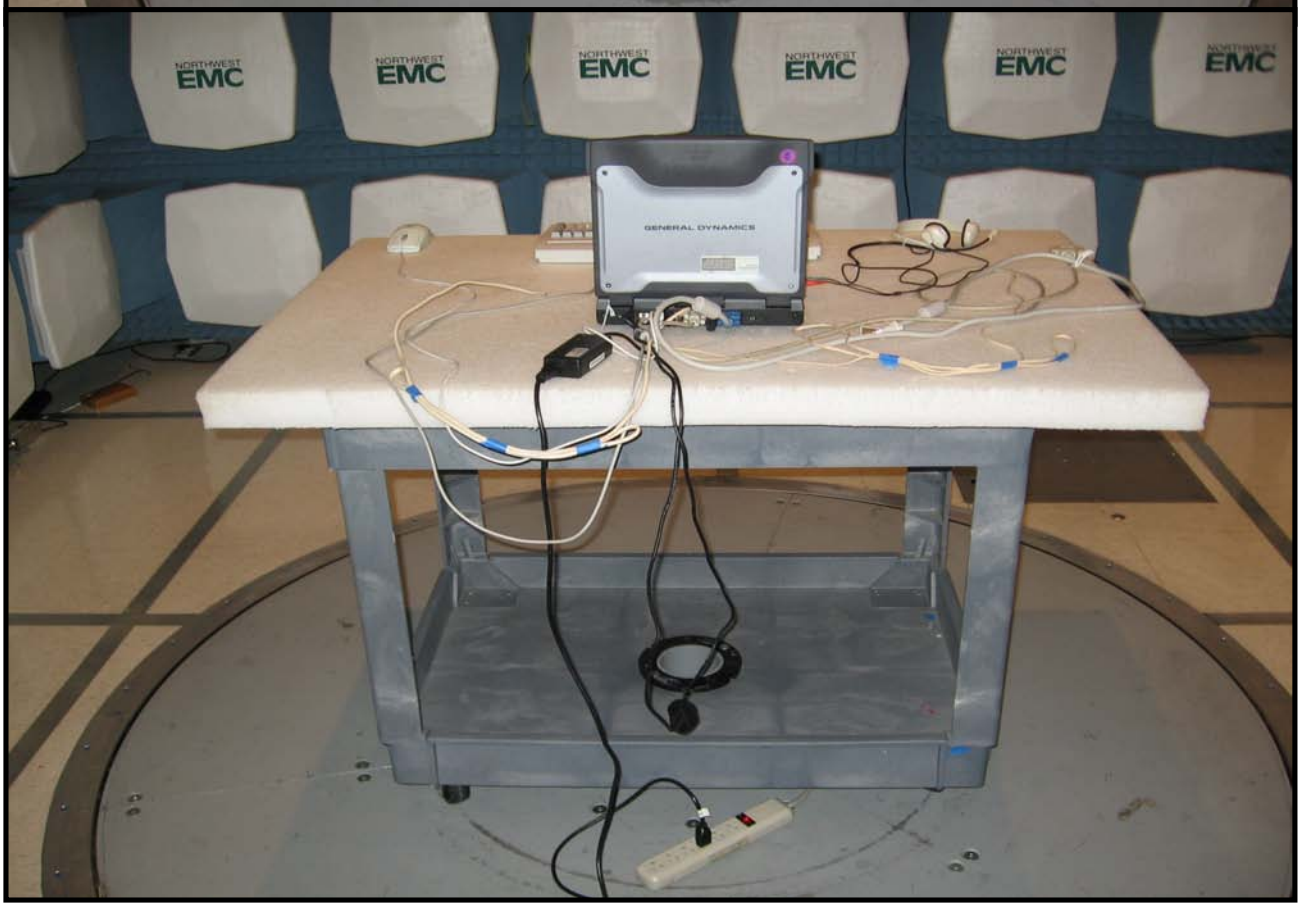
NORTHWEST
EMC


NORTHWEST
EMC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NORTHWEST
EMC

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.