Honeywell

Multinode 2.4GHz 802.15.4 DSSS-FH Radio

Part Number 51306343-125, Revision A

March 11, 2004

Report No. HONE0021 Rev. 2

Report Prepared By

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: August 24, 2007
Honeywell
Model: Multinode 2.4GHz 802.15.4 DSSS-FH Radio

Emissions				
Test Description	**Specification**	**Test Method**	**Pass**	**Fail**
Band Edge Compliance	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Channel Spacing	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Number of Hopping Frequencies	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Occupied Bandwidth	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Output Power	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Power Spectral Density	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
Spurious Radiated Emissions	FCC 15.247(d)	ANSI C63.4:2003	☒	☐
Dwell Time	FCC 15.247 (FHSS):2006	ANSI C63.4:2003 DA 00-705:2000	☒	☐
AC Powerline Conducted Emissions	FCC 15.207:2006	ANSI C63.4:2003	☒	☐
Spurious Conducted Emissions	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	☒	☐
Radiated Emissions	EN 61326-1:2006 Class A	CISPR 11:2004 (Amended by A2:2006)	☒	☐

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

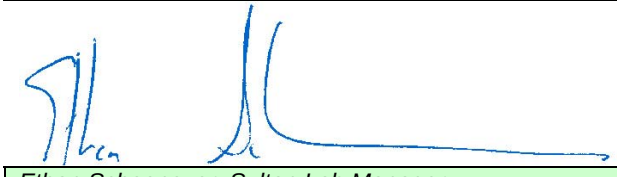
Test Facility

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

Northwest EMC, Inc.
41 Tesla Avenue
Irvine, CA 92618

Phone: (949) 861-8918 Fax: 861-8923

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

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 the High Pass Filter to the test equipment	11-30-07	28
02	Added Output Power, Band Edge Compliance, Dwell Time, Spurious Radiated Emissions, and Occupied Bandwidth data for the DSSS unit per client's request.	7-9-08	70-77, 78-81, 82-85, 86-119, & 116-120
02	Updated Product Description and Modifications Page to reflect recent testing performed on the DSSS unit.	7-9-08	7, 10
02	Added the following comment to Channel Spacing: Channel spacing must be greater than or equal to the 20 dB Occupied Bandwidth	7-9-08	22
02	Changed Limit to 3.78 MHz	7-9-08	22
02	Added the following comments: duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.	7-9-08	26 – 41
02	Changed comments about the limit to state the following: The 20 dB occupied bandwidth must be less than or equal to the channel spacing	7-9-08	52
02	Changed the limit to 5 MHz	7-9-08	52
02	Deleted DSSS Dwell Time module	7-9-08	75 – 78
02	Updated the header to say Dwell Time – FHSS	7-9-08	61, 62
02	Changed comments to state the following: Total Dwell time must be no greater than 400msec in a period equal to the number of hopping channels multiplied by 400msec. In this case:Number of hopping channels = 3 channels. 3 channels x 400msec = 1.2seconds = Measurement period. Total Dwell time, in 1.2 seconds = 10.75msec x 3 = 32.25msec.	7-9-08	62

02	Corrected the value back to 10.75msec	7-9-08	62, 63
02	Corrected graphs for dwell time	7-9-08	63
02	Added the following to the comments: the duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.	7-9-08	97 – 121
02	Corrected the comments to state that the channel spacing = 500kHz	7-9-08	92
02	Added radiated emissions data to this report	7-9-08	127-132

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).

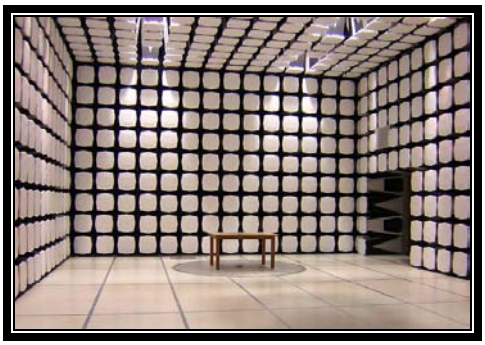
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943,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

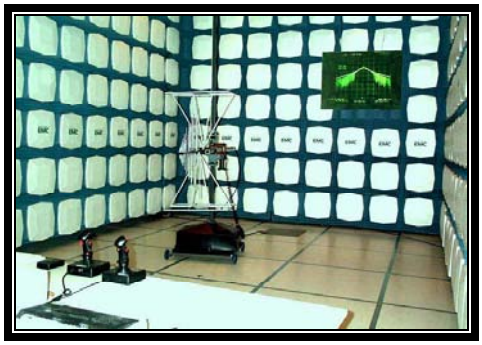
SCOPE

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

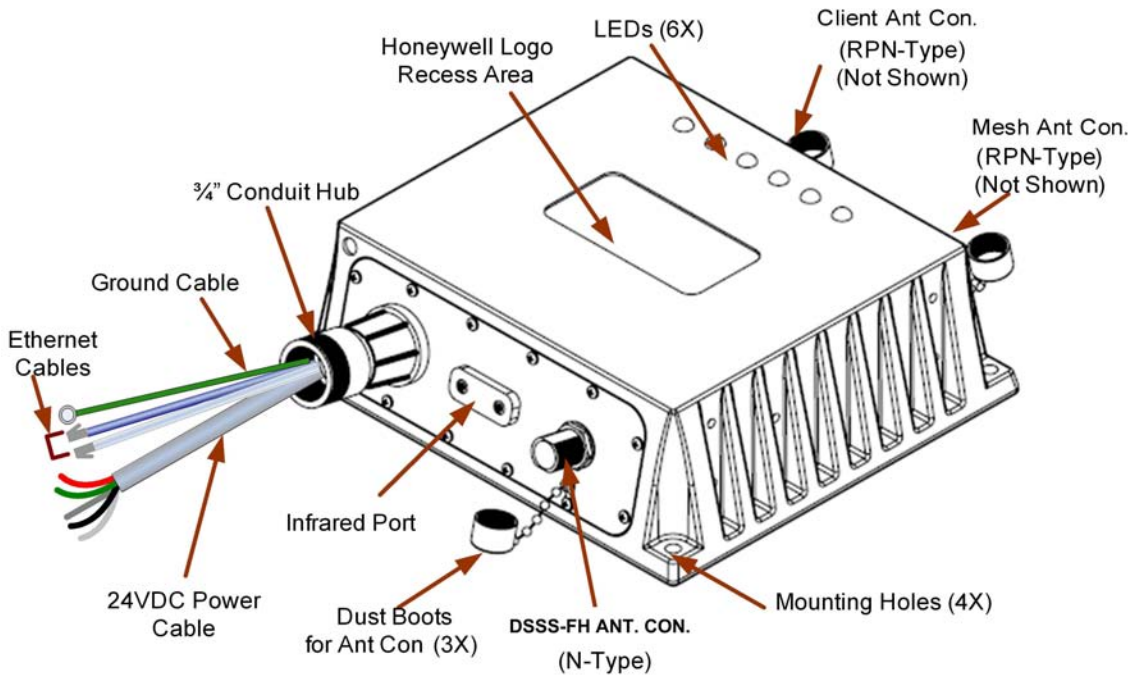
Company Name:	Honeywell
Address:	2500 W. Union Hills Road
City, State, Zip:	Phoenix, AZ 85027
Test Requested By:	David Shipley
Model:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio
First Date of Test:	August 07, 2007
Last Date of Test:	March 11, 2008
Receipt Date of Samples:	July 31, 2007
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Honeywell 2.4GHz DSSS-FH Radio Board 51306343-125

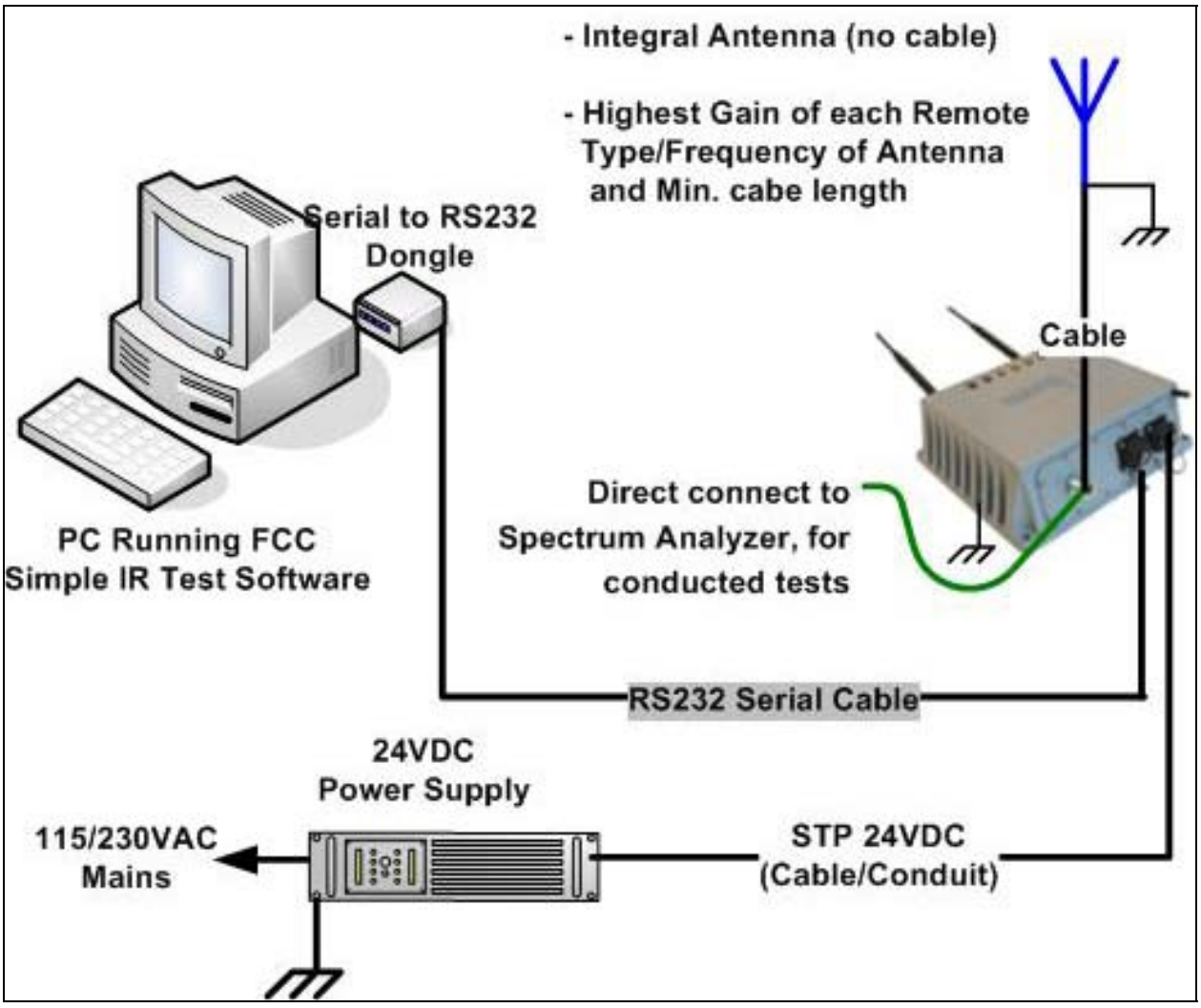
Testing Objective:
These tests were selected to satisfy the EMC requirements requested by the client.

EUT Photo



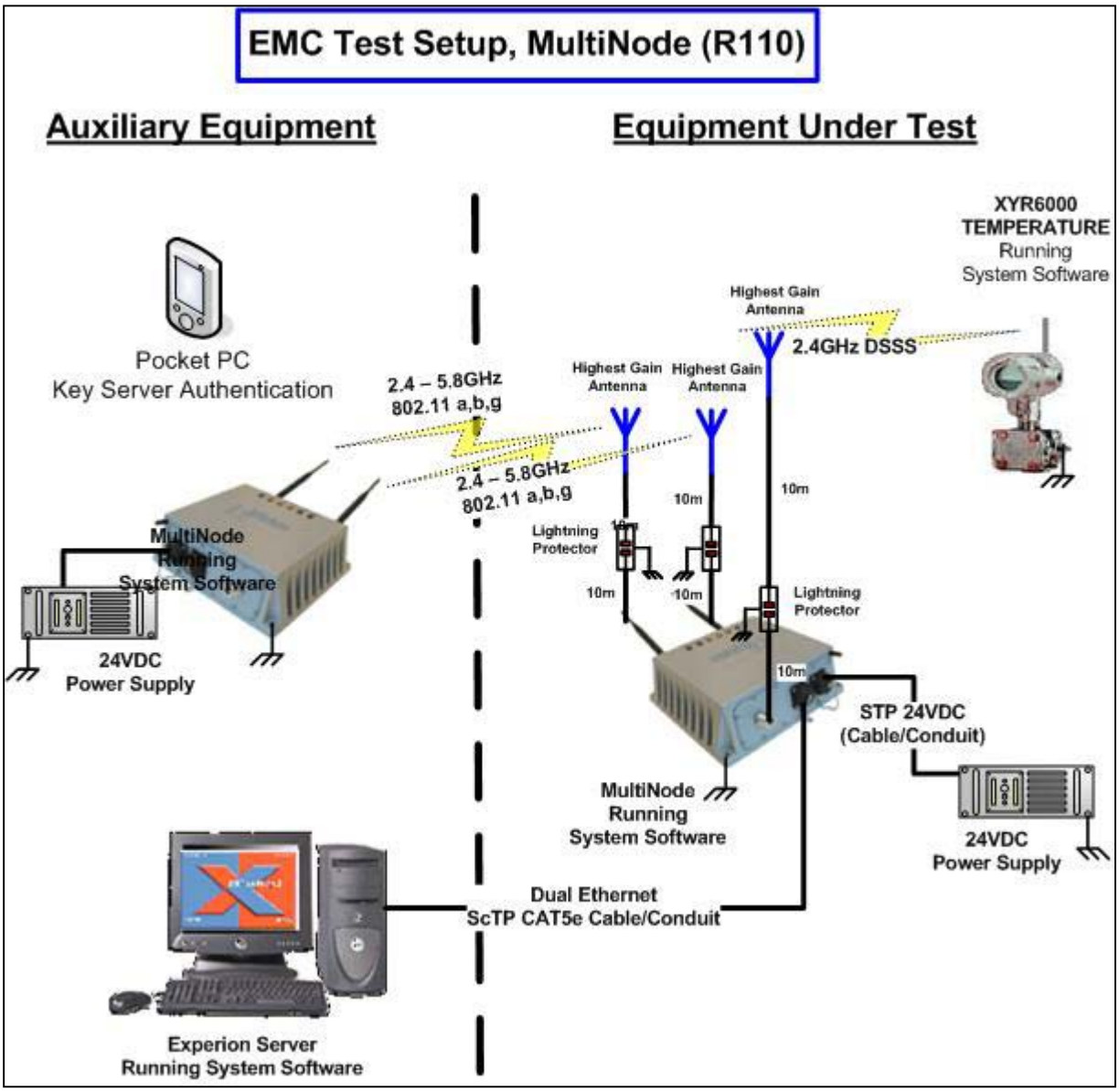
CONFIGURATION 1 HONE0021

EUT
Description
Refer to the configuration document provided by the client below.



CONFIGURATION 1 HONE0034

EUT
Description
Refer to the configuration document provided by the client below.



Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	8/8/2007	Channel Spacing	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	8/8/2007	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.
3	8/9/2007	Number of Hopping Frequencies	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	8/9/2007	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	8/13/2007	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	3/4/2008	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.
7	3/10/2008	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
8	3/10/2008	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
9	3/11/2008	Dwell Time	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.
10	3/11/2008	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
11	6/4/2008	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

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

NORTHWEST EMC

OUTPUT POWER

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/07/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC13

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193; Output Power = 30 dBm - 8dbi (14dBi - 6dBi) + .7 dBm (cable loss) = 22.7 dBm (Worst Case)
Midde Gain Antenna (8 dBi). PC Power Level = 193; Output Power = 30 dBm - 2dbi (8dBi - 6dBi) + .7 dBm (cable loss) = 28.7 dBm
Lowest Gain Antenna (5 dBi). PC Power Level = 193; Output Power = 30 dBm = Max Output Power = 30 dBm

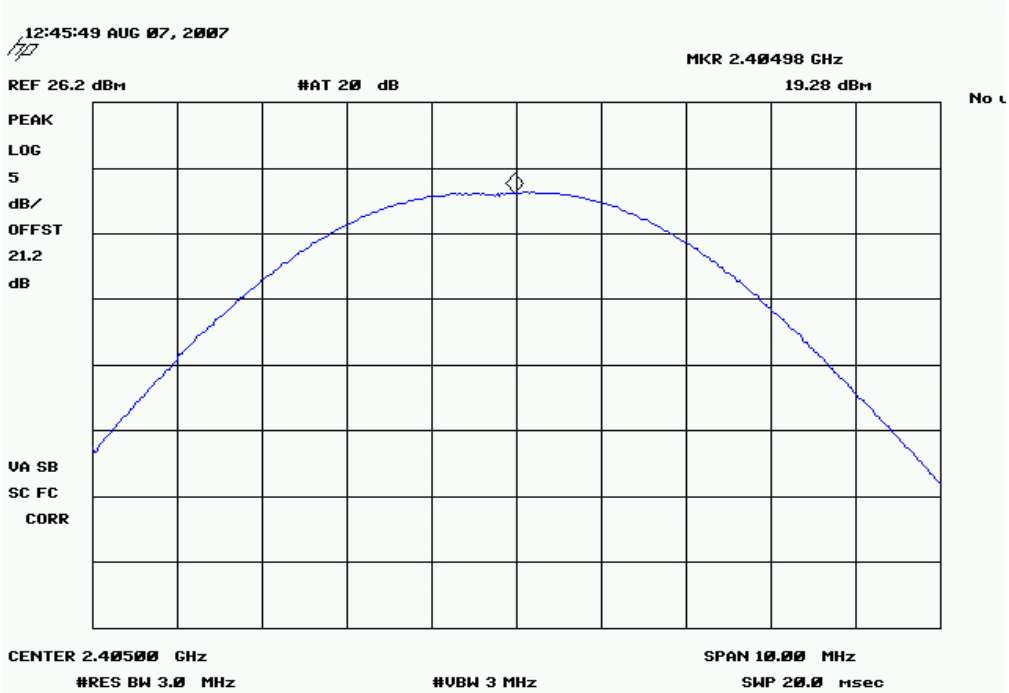
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

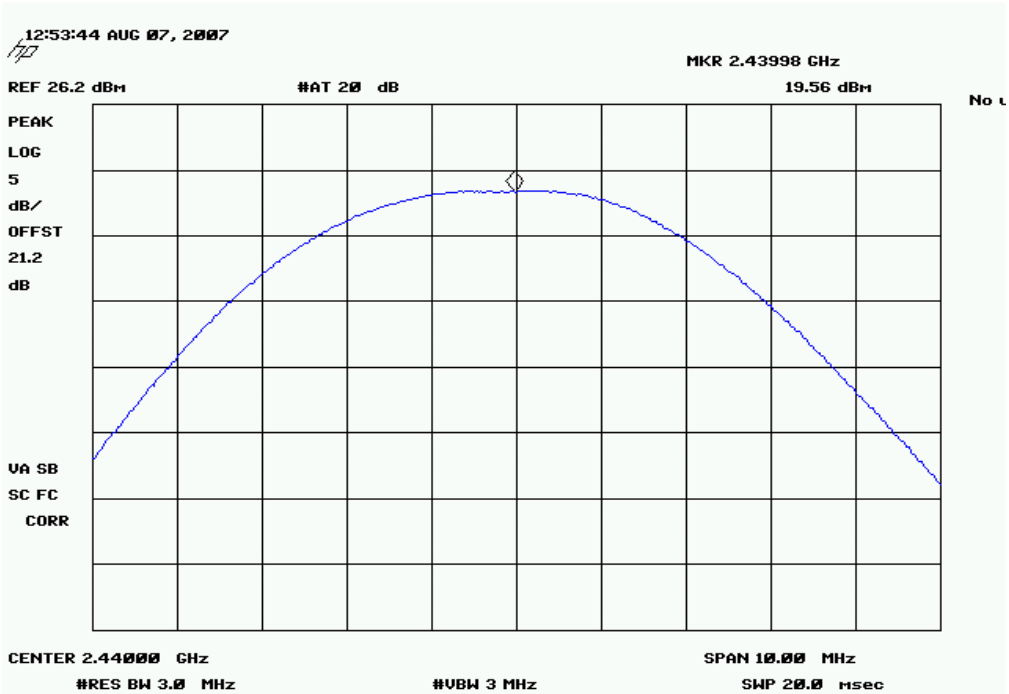
	Value	Limit	Results
Highest Output Power			
Low Channel	19.28 dBm	22.7 dBm	Pass
Mid Channel	19.56 dBm	22.7 dBm	Pass
High Channel	19.38 dBm	22.7 dBm	Pass

OUTPUT POWER

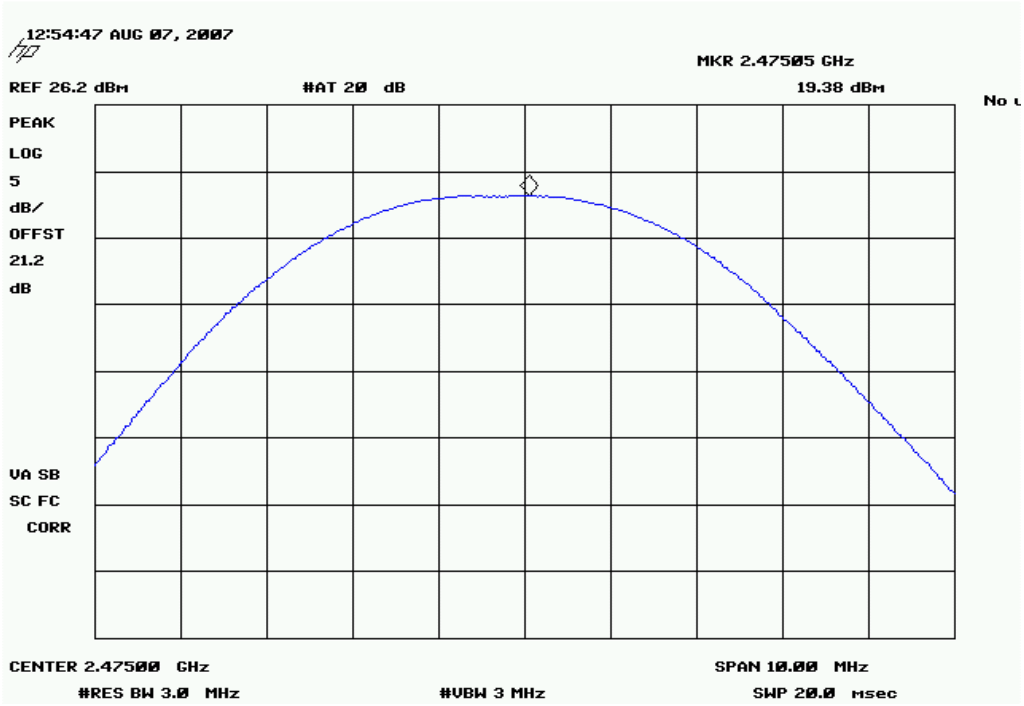
Highest Output Power, Low Channel					
Result:	Pass	**Value:**	19.28 dBm	**Limit:**	22.7 dBm

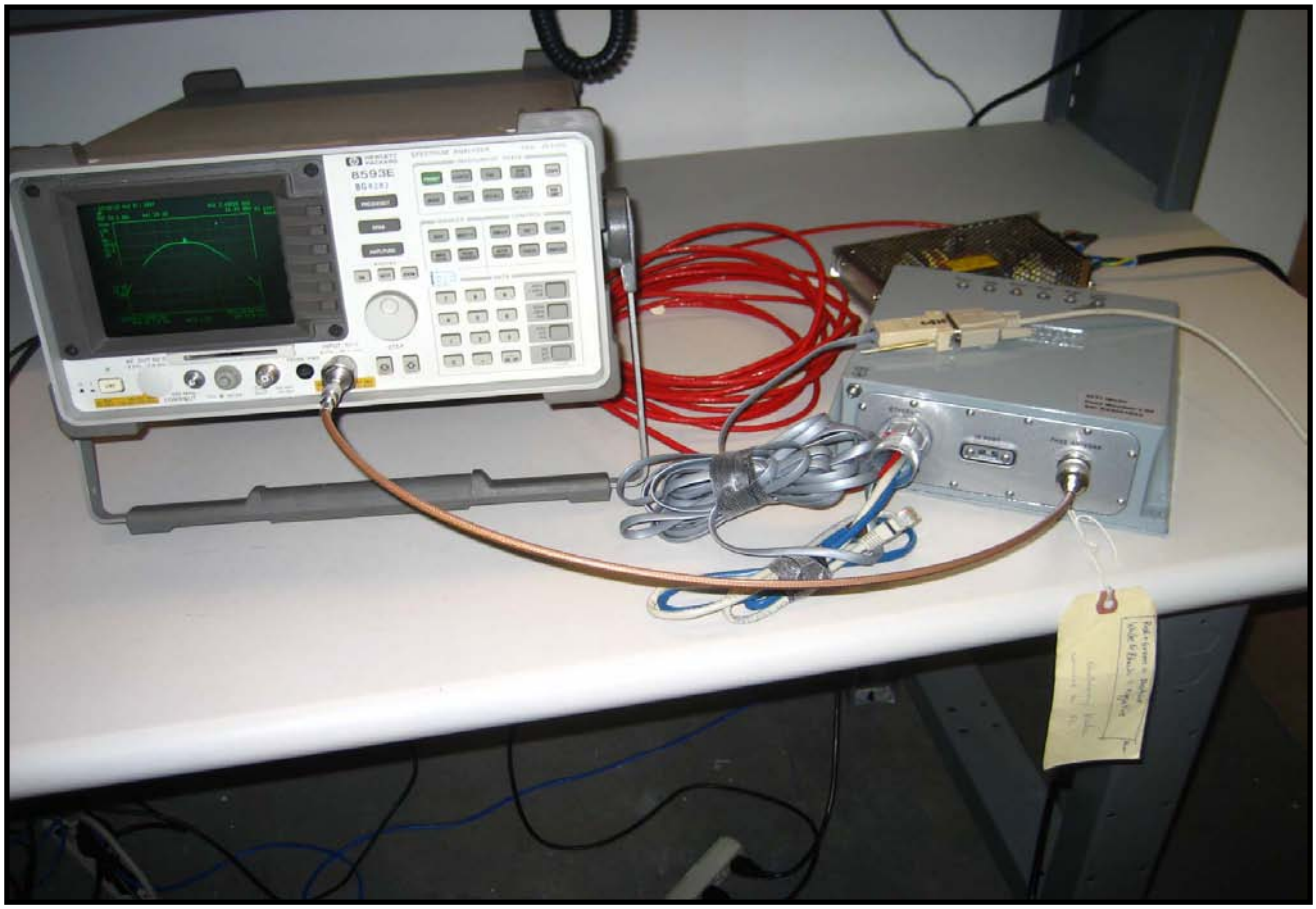


Highest Output Power, Mid Channel					
Result:	Pass	**Value:**	19.56 dBm	**Limit:**	22.7 dBm



Highest Output Power, High Channel					
Result:	Pass	**Value:**	19.38 dBm	**Limit:**	22.7 dBm




8593E

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

NORTHWEST EMC

BAND EDGE COMPLIANCE

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/08/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC13

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

COMMENTS

PC Power Level: 193.

DEVIATIONS FROM TEST STANDARD

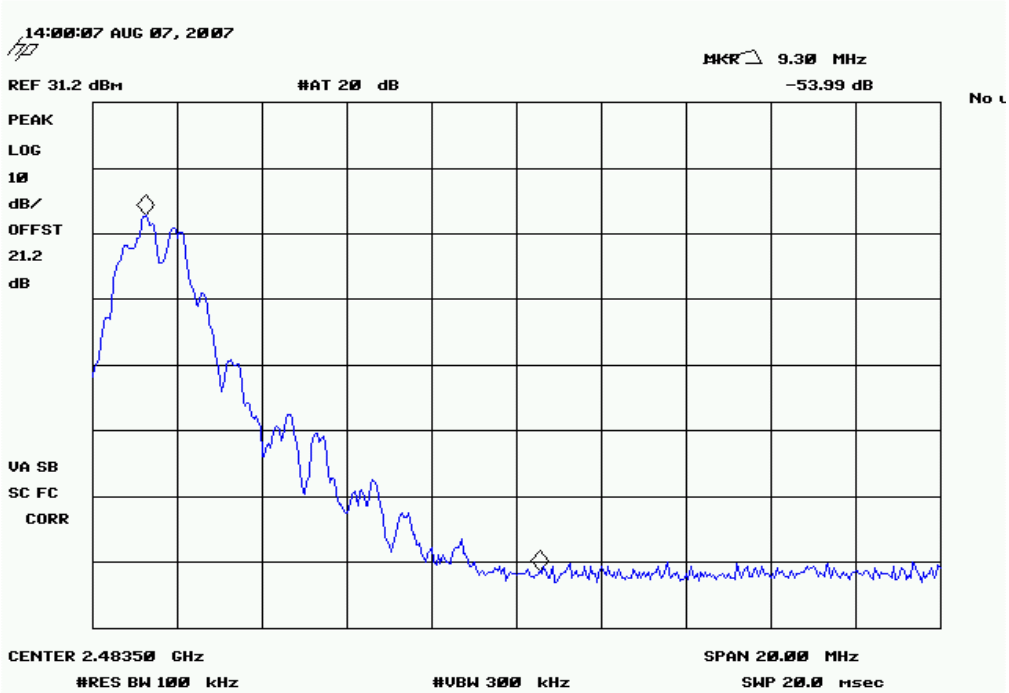
Configuration #	1	Signature

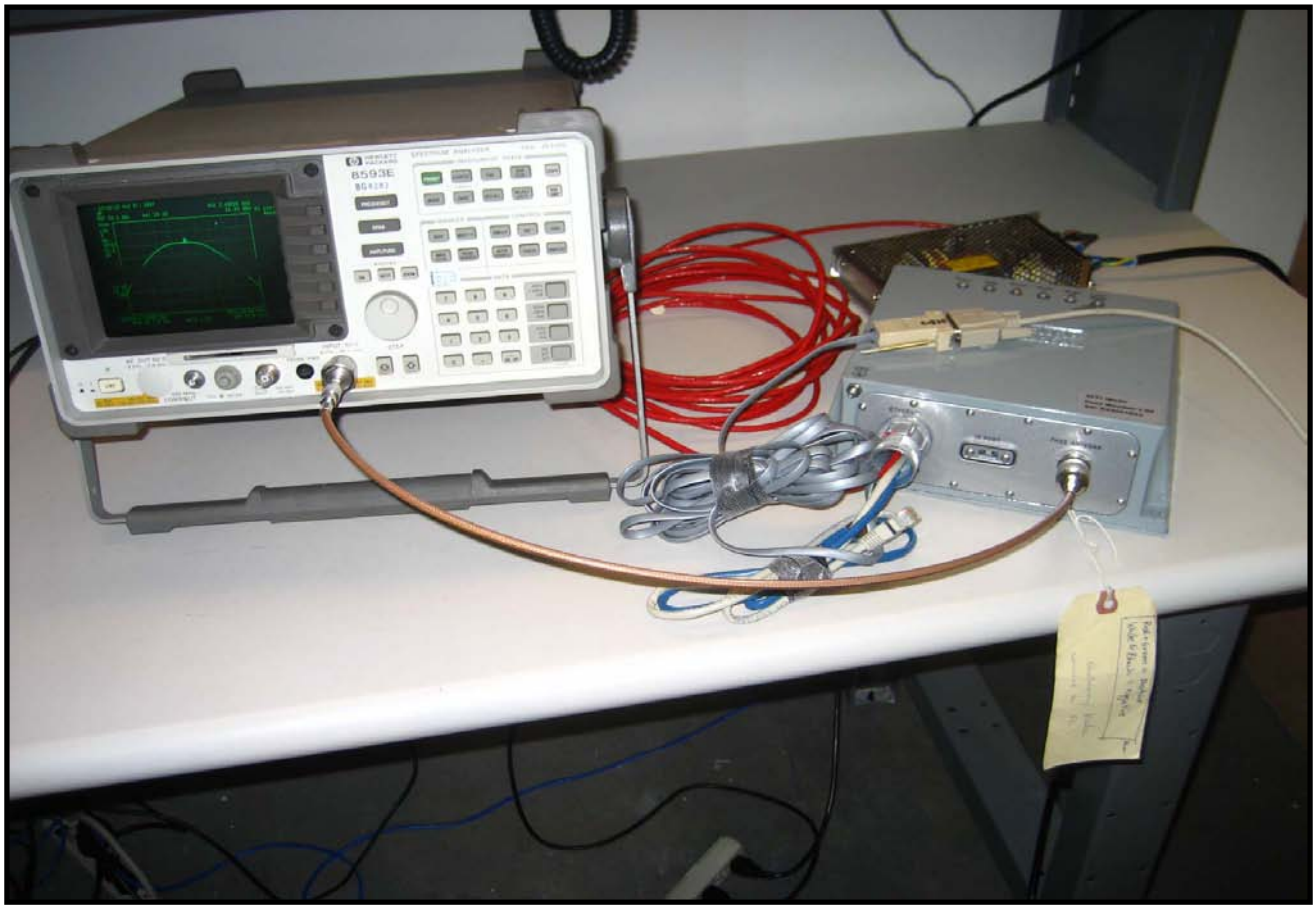
	Value	Limit	Results
Highest Output Power			
Low Channel	- 44.15 dB	≤ -20 dBc	Pass
High Channel	- 53.99 dB	≤ -20 dBc	Pass

BAND EDGE COMPLIANCE

Highest Output Power, Low Channel					
Result:	Pass	**Value:**	- 44.15 dB	**Limit:**	≤ -20 dBc

Highest Output Power, High Channel					
Result:	Pass	**Value:**	- 53.99 dB	**Limit:**	≤ -20 dBc




8593E

CHANNEL SPACING

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

Per 47 CFR 15.247(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel. The measurement is made with the spectrum analyzer's resolution bandwidth set to greater than or equal to 1% of the span, and the video bandwidth set to greater than or equal to the resolution bandwidth

The carrier frequency separation was measured between each of 4 hopping channels in the middle of the authorized band. The measurements were made using a spectrum analyzer. The hopping function of the EUT was enabled.

NORTHWEST EMC

CHANNEL SPACING

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/08/07
Customer:	Honeywell			Temperature:	24°C
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC13

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

COMMENTS

Channel spacing must be greater than or equal to the 20 dB Occupied Bandwidth

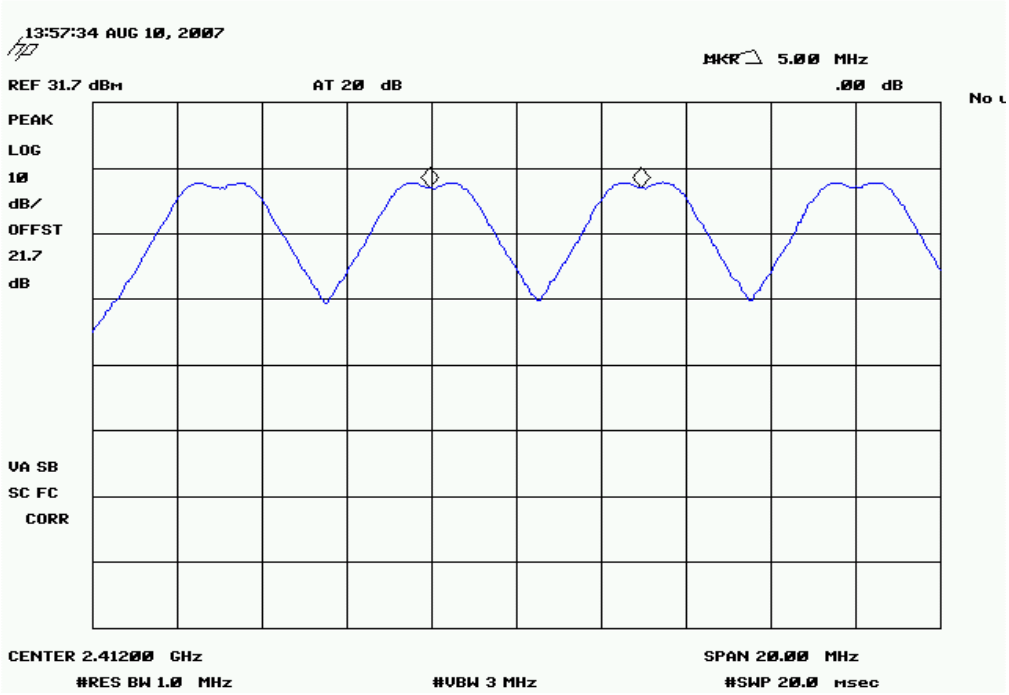
DEVIATIONS FROM TEST STANDARD

No deviations

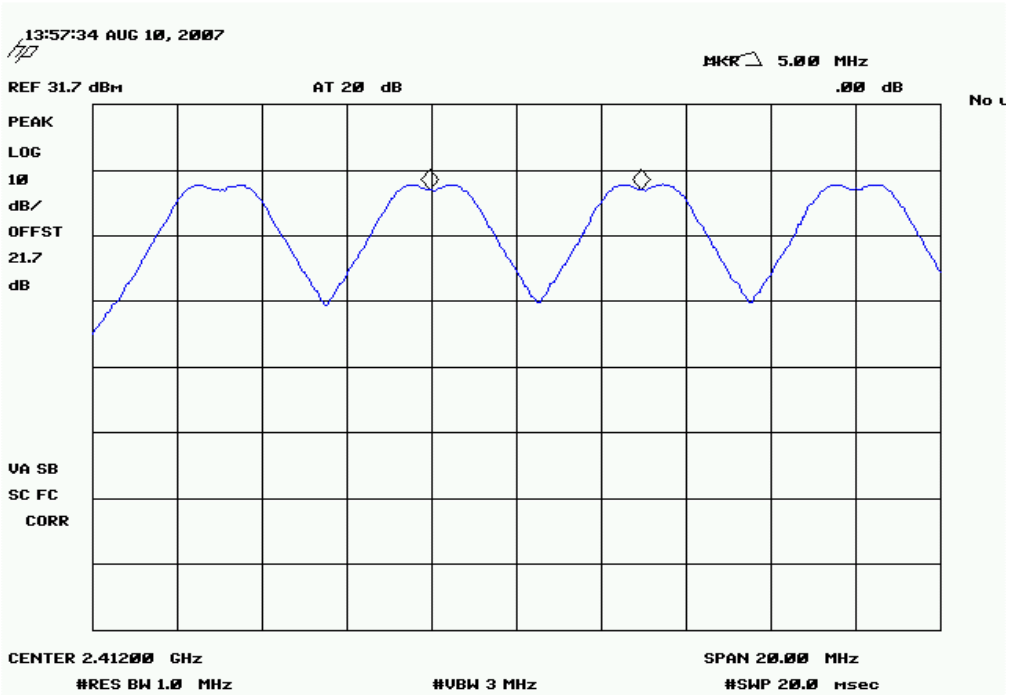
Configuration #	1	Signature

	Value	Limit	Results
Highest Output Power			
Low Channel	5 MHz	≥ 3.78 MHz	Pass
Mid Channel	5 MHz	≥ 3.78 MHz	Pass
High Channel	5 MHz	≥ 3.78 MHz	Pass

Highest Output Power, Low Channel					
Result:	Pass	**Value:**	5 MHz	**Limit:**	≥ 3.78 MHz

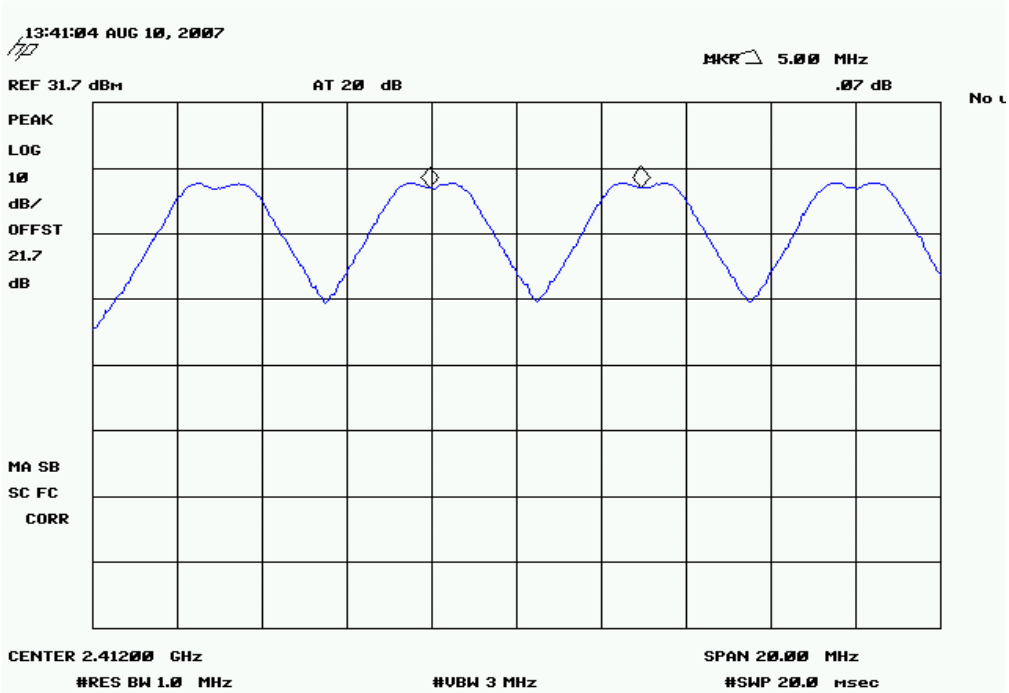


Highest Output Power, Mid Channel					
Result:	Pass	**Value:**	5 MHz	**Limit:**	≥ 3.78 MHz



CHANNEL SPACING

Highest Output Power, High Channel		
Result: Pass	**Value:** 5 MHz	**Limit:** ≥ 3.78 MHz



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 at Channel 75. 2475 MHz.
Transmitting at Channel 40. 2440 MHz.
Transmitting at Channel 1. 2405 MHz.

ANTENNA TYPE
5 dB Omni (Dipole) Antenna. Honeywell Part # 51506534-100. MFR Part #: HON04-052160
8 dB Omni (Dipole) Antenna. Honeywell Part # 50018414-001. MFR Part#: HGV-2409U
14 dB Sector Antenna. . MFR Part #: HG2414P-120

MODE USED FOR FINAL DATA
Transmitting at Channel 75. 2475 MHz.
Transmitting at Channel 40. 2440 MHz.
Transmitting at Channel 1. 2405 MHz.

POWER SETTINGS INVESTIGATED
120VAC/60Hz

POWER SETTINGS USED FOR FINAL DATA
120VAC/60Hz

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	26000 MHz

CLOCKS AND OSCILLATORS
2405 MHz, 2440 MHz, 2475 MHz

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	7/11/2006	13
Antenna, Horn	EMCO	3160-09	AHN	NCR	0
OC10 SMA cable for 18026 GHz			OCK	7/11/2006	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	10/13/2006	12
Antenna, Horn	ETS	3160-08	AHT	NCR	0
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	10/13/2006	12
Antenna, Horn	ETS	3160-07	AHR	NCR	24
OC10 cables a,b,c,e,f Horn Cables			OCJ	1/14/2007	13
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	1/14/2007	13
Antenna, Horn	EMCO	3115	AHB	8/1/2005	26
OC 10 Cables a, b, c, l Cables			OCO	1/14/2007	13
Antenna, Biconilog	EMCO	3142	AXJ	3/14/2006	24
OC10 cables a,b,c,d Bilog			OCH	12/17/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOM	12/17/2006	13
Spectrum Analyzer	Agilent	E4446A	AAQ	1/18/2007	13
High Pass Filter	Micro-Tronics	HPW50111	HFM	12/17/2006	13

MEASUREMENT BANDWIDTHS

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

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The 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 EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio	Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A	Date:	08/01/07
Customer:	Honeywell	Temperature:	24
Attendees:	David Shipley	Humidity:	45%
Project:	None	Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power: 120VAC/60Hz	Job Site: OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Lowest Gain Antenna (5 dBi). PC Power Level = 193. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

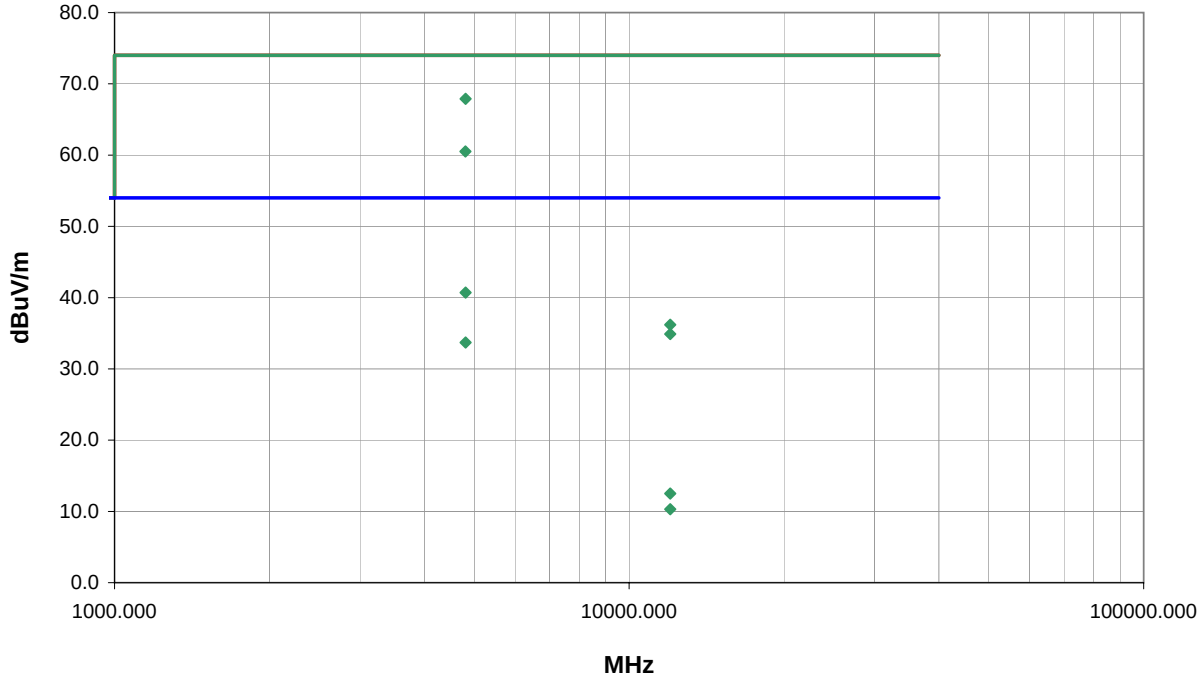
Transmitting at Channel 1. 2405 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	24
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)
4809.063	56.2	11.7	294.0	1.0	0.0	0.0	V-Horn	PK	0.0	67.9	74.0	-6.1
4809.829	47.0	11.7	294.0	1.0	18.0	0.0	V-Horn	AV	0.0	40.7	54.0	-13.3
4808.947	48.8	11.7	315.0	1.5	0.0	0.0	H-Horn	PK	0.0	60.5	74.0	-13.5
4809.093	40.0	11.7	315.0	1.5	18.0	0.0	H-Horn	AV	0.0	33.7	54.0	-20.3
12022.540	45.2	-9.0	351.0	1.1	0.0	0.0	V-Horn	PK	0.0	36.2	74.0	-37.8
12022.540	43.9	-9.0	8.0	1.1	0.0	0.0	H-Horn	PK	0.0	34.9	74.0	-39.1
12022.540	39.5	-9.0	351.0	1.1	18.0	0.0	V-Horn	AV	0.0	12.5	54.0	-41.5
12022.540	37.3	-9.0	8.0	1.1	18.0	0.0	H-Horn	AV	0.0	10.3	54.0	-43.7

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/08/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Lowest Gain Antenna (5 dBi). PC Power Level = 193. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

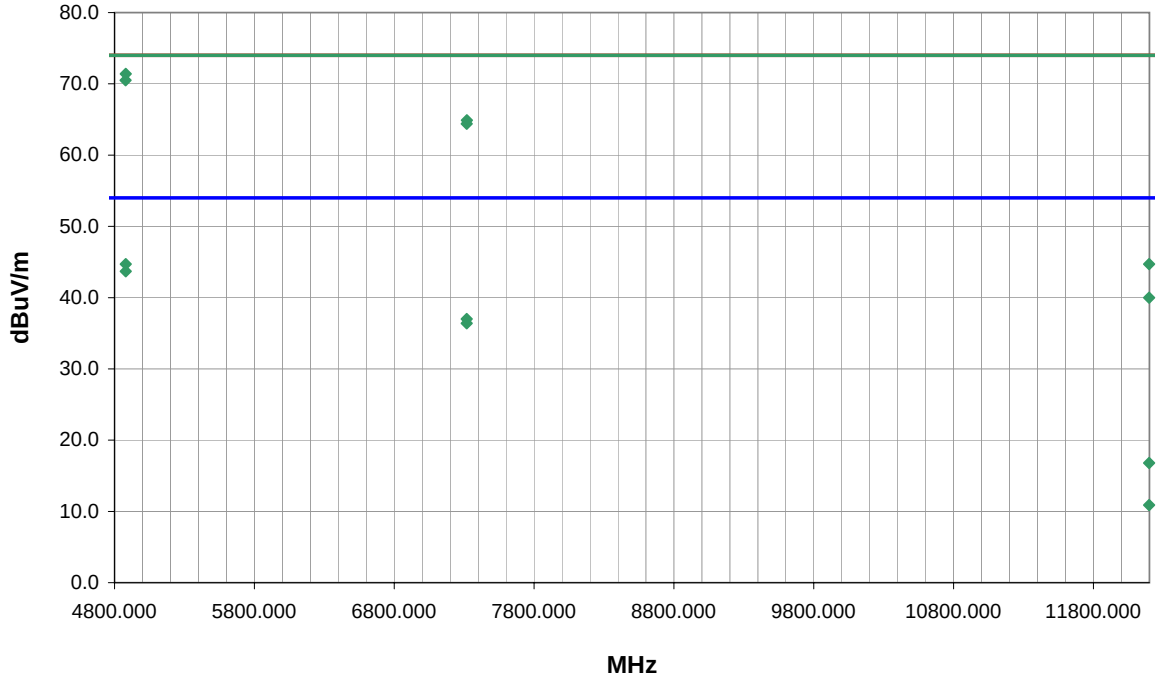
Transmitting at Channel 40. 2440 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	43
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)
4879.600	59.0	12.4	135.0	1.9	0.0	0.0	H-Horn	PK	0.0	71.4	74.0	-2.6
4879.061	58.1	12.4	298.0	1.6	0.0	0.0	V-Horn	PK	0.0	70.5	74.0	-3.5
7318.737	49.2	15.7	182.0	1.3	0.0	0.0	V-Horn	PK	0.0	64.9	74.0	-9.1
4879.624	50.3	12.4	135.0	1.9	18.0	0.0	H-Horn	AV	0.0	44.7	54.0	-9.3
7318.477	48.7	15.7	186.0	1.8	0.0	0.0	H-Horn	PK	0.0	64.4	74.0	-9.6
4879.655	49.3	12.4	298.0	1.6	18.0	0.0	V-Horn	AV	0.0	43.7	54.0	-10.3
7318.660	39.3	15.7	182.0	1.3	18.0	0.0	V-Horn	AV	0.0	37.0	54.0	-17.0
7318.661	38.7	15.7	186.0	1.8	18.0	0.0	H-Horn	AV	0.0	36.4	54.0	-17.6
12197.620	53.1	-8.4	51.0	1.0	0.0	0.0	V-Horn	PK	0.0	44.7	74.0	-29.3
12197.630	48.4	-8.4	360.0	1.0	0.0	0.0	H-Horn	PK	0.0	40.0	74.0	-34.0
12197.620	43.2	-8.4	51.0	1.0	18.0	0.0	V-Horn	AV	0.0	16.8	54.0	-37.2
12197.630	37.3	-8.4	360.0	1.0	18.0	0.0	H-Horn	AV	0.0	10.9	54.0	-43.1

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/06/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247(FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Lowest Gain Antenna (5 dBi). PC Power Level = 193. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

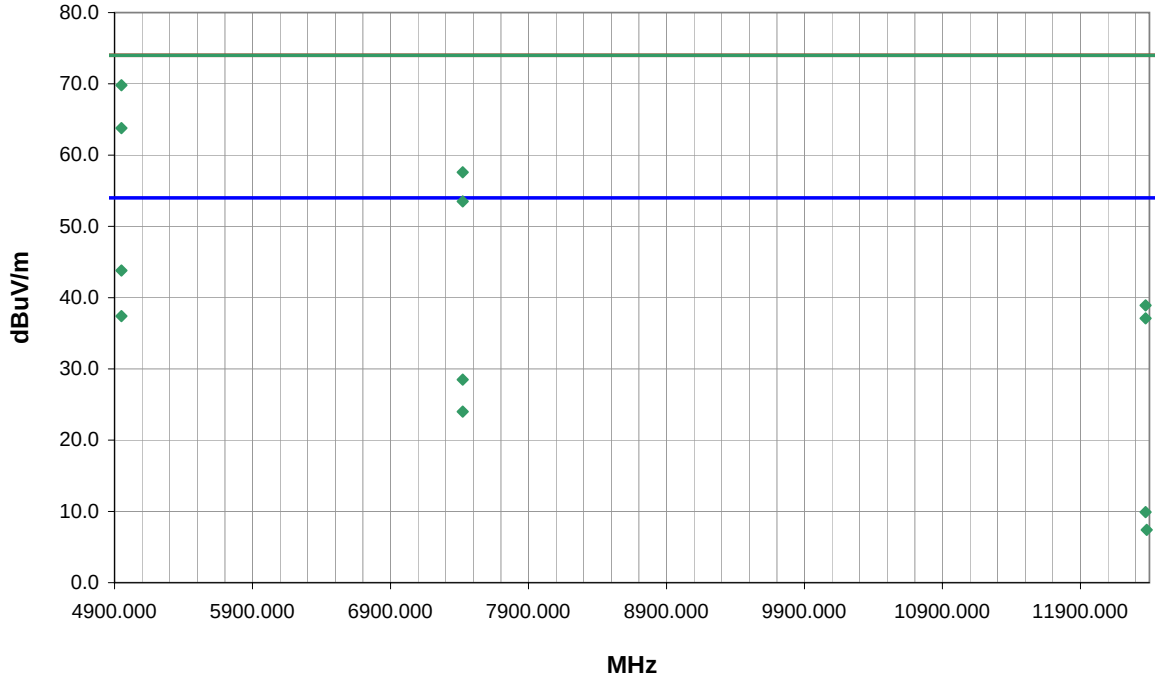
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	28
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)
4949.417	56.9	12.9	353.0	1.0	0.0	0.0	V-Horn	PK	0.0	69.8	74.0	-4.2
4949.459	48.9	12.9	353.0	1.0	18.0	0.0	V-Horn	AV	0.0	43.8	54.0	-10.2
4949.348	50.9	12.9	25.0	1.4	0.0	0.0	H-Horn	PK	0.0	63.8	74.0	-10.2
7423.606	41.2	16.4	232.0	1.2	0.0	0.0	H-Horn	PK	0.0	57.6	74.0	-16.4
4949.369	42.5	12.9	25.0	1.4	18.0	0.0	H-Horn	AV	0.0	37.4	54.0	-16.6
7423.528	37.1	16.4	143.0	1.5	0.0	0.0	V-Horn	PK	0.0	53.5	74.0	-20.5
7423.574	30.1	16.4	232.0	1.2	18.0	0.0	H-Horn	AV	0.0	28.5	54.0	-25.5
7423.610	25.6	16.4	143.0	1.5	18.0	0.0	V-Horn	AV	0.0	24.0	54.0	-30.0
12372.490	46.6	-7.7	1.0	1.0	0.0	0.0	V-Horn	PK	0.0	38.9	74.0	-35.1
12371.710	44.8	-7.7	301.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.1	74.0	-36.9
12372.570	35.7	-7.8	1.0	1.0	18.0	0.0	V-Horn	AV	0.0	9.9	54.0	-44.1
12379.980	33.2	-7.8	301.0	1.0	18.0	0.0	H-Horn	AV	0.0	7.4	54.0	-46.6

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/06/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247(FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Lowest Gain Antenna (5 dBi). PC Power Level = 193. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

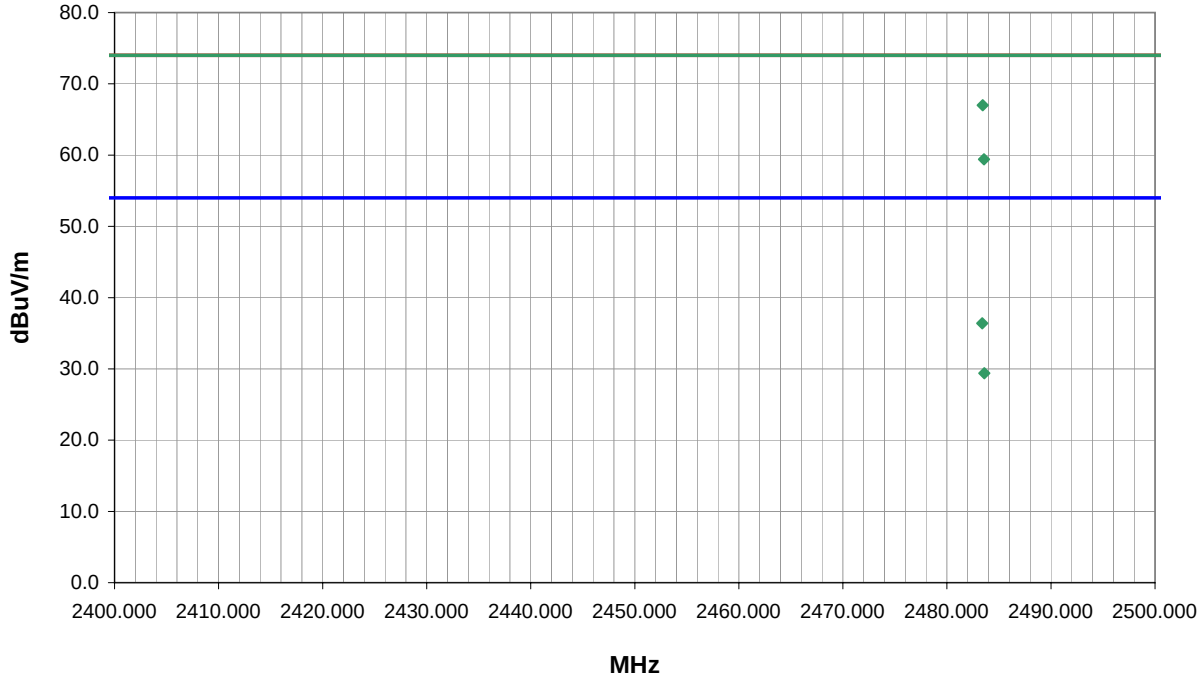
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	29
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)
2483.431	45.6	1.4	219.0	1.0	0.0	20.0	V-Horn	PK	0.0	67.0	74.0	-7.0
2483.569	38.0	1.4	155.0	1.0	0.0	20.0	H-Horn	PK	0.0	59.4	74.0	-14.6
2483.386	33.0	1.4	219.0	1.0	18.0	20.0	V-Horn	AV	0.0	36.4	54.0	-17.6
2483.586	26.0	1.4	155.0	1.0	18.0	20.0	H-Horn	AV	0.0	29.4	54.0	-24.6

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	07/31/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Middle Gain Antenna (8 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

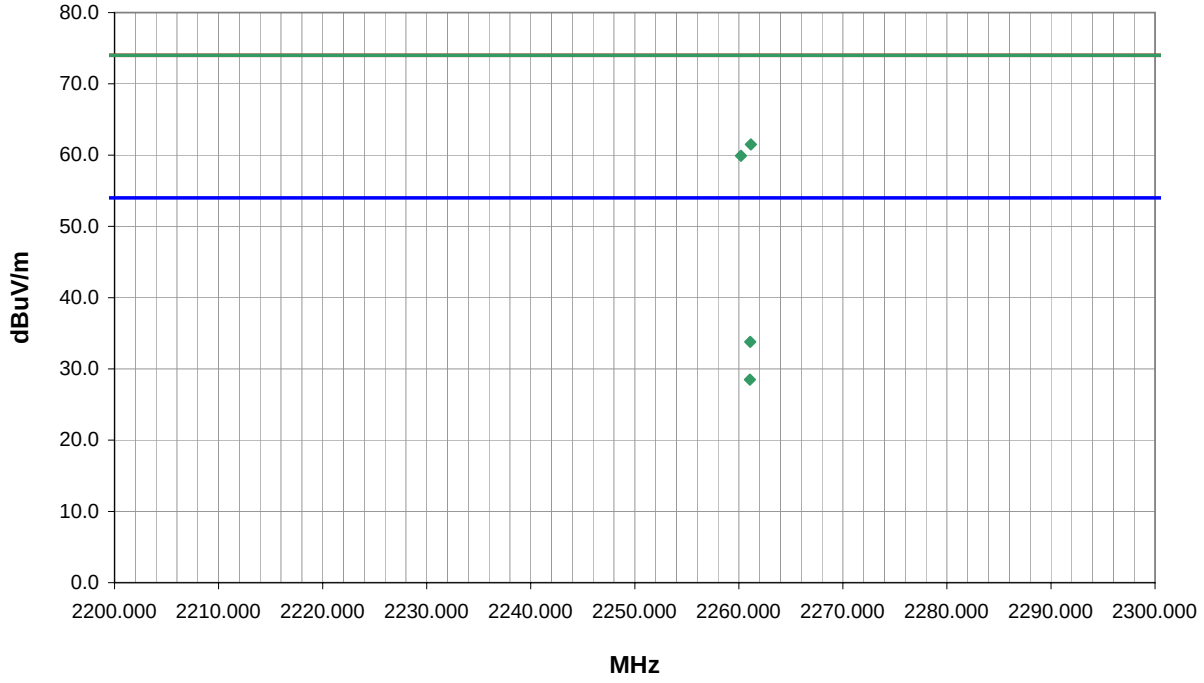
Transmitting at Channel 1. 2405 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	8
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)
2261.160	39.7	1.8	331.0	1.0	0.0	20.0	V-Horn	PK	0.0	61.5	74.0	-12.5
2260.208	38.1	1.8	62.0	1.1	0.0	20.0	H-Horn	PK	0.0	59.9	74.0	-14.1
2261.092	30.0	1.8	331.0	1.0	18.0	20.0	V-Horn	AV	0.0	33.8	54.0	-20.2
2261.061	24.7	1.8	62.0	1.1	18.0	20.0	H-Horn	AV	0.0	28.5	54.0	-25.5

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	07/31/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (Sector 14dBi). PC Power Level = 115. 10m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

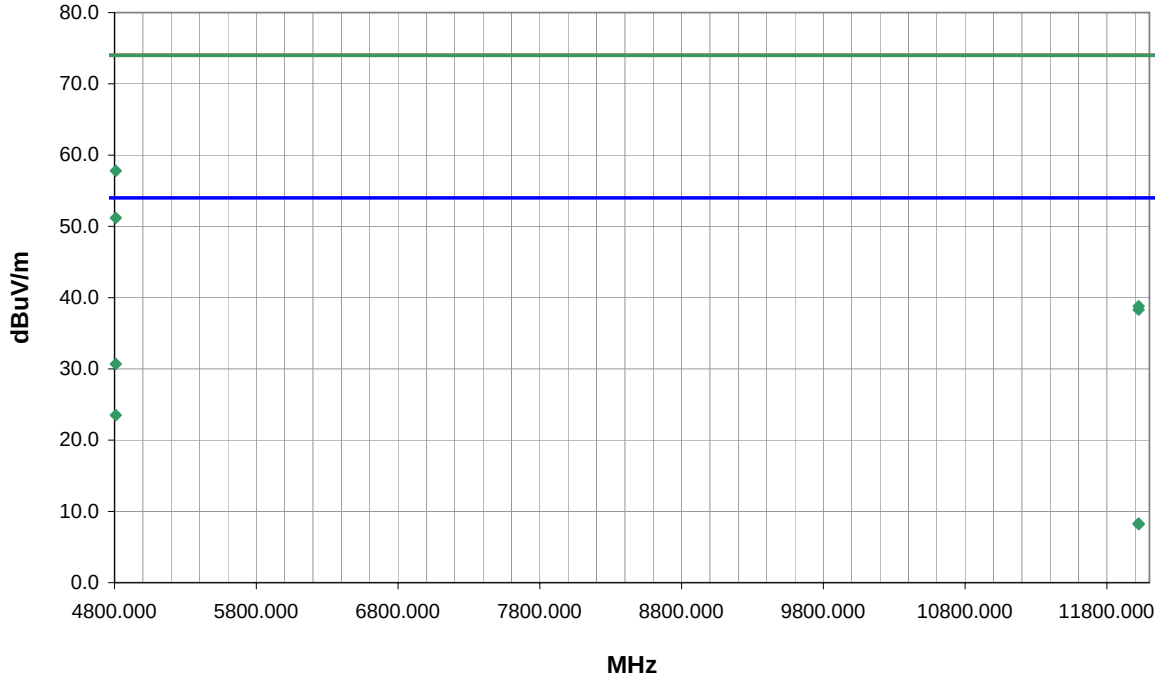
Transmitting at Channel 1. 2405 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	9
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)
4809.069	46.1	11.7	206.0	1.8	0.0	0.0	V-Horn	PK	0.0	57.8	74.0	-16.2
4809.027	39.5	11.7	192.0	1.4	0.0	0.0	H-Horn	PK	0.0	51.2	74.0	-22.8
4809.045	37.0	11.7	206.0	1.8	18.0	0.0	V-Horn	AV	0.0	30.7	54.0	-23.3
4809.080	29.8	11.7	192.0	1.4	18.0	0.0	H-Horn	AV	0.0	23.5	54.0	-30.5
12024.250	47.8	-9.0	315.0	1.0	0.0	0.0	V-Horn	PK	0.0	38.8	74.0	-35.2
12023.780	47.3	-9.0	147.0	1.0	0.0	0.0	H-Horn	PK	0.0	38.3	74.0	-35.7
12023.300	35.3	-9.0	315.0	1.0	18.0	0.0	V-Horn	AV	0.0	8.3	54.0	-45.7
12024.410	35.2	-9.0	147.0	1.0	18.0	0.0	H-Horn	AV	0.0	8.2	54.0	-45.8

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	07/31/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Middle Gain Antenna (8 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

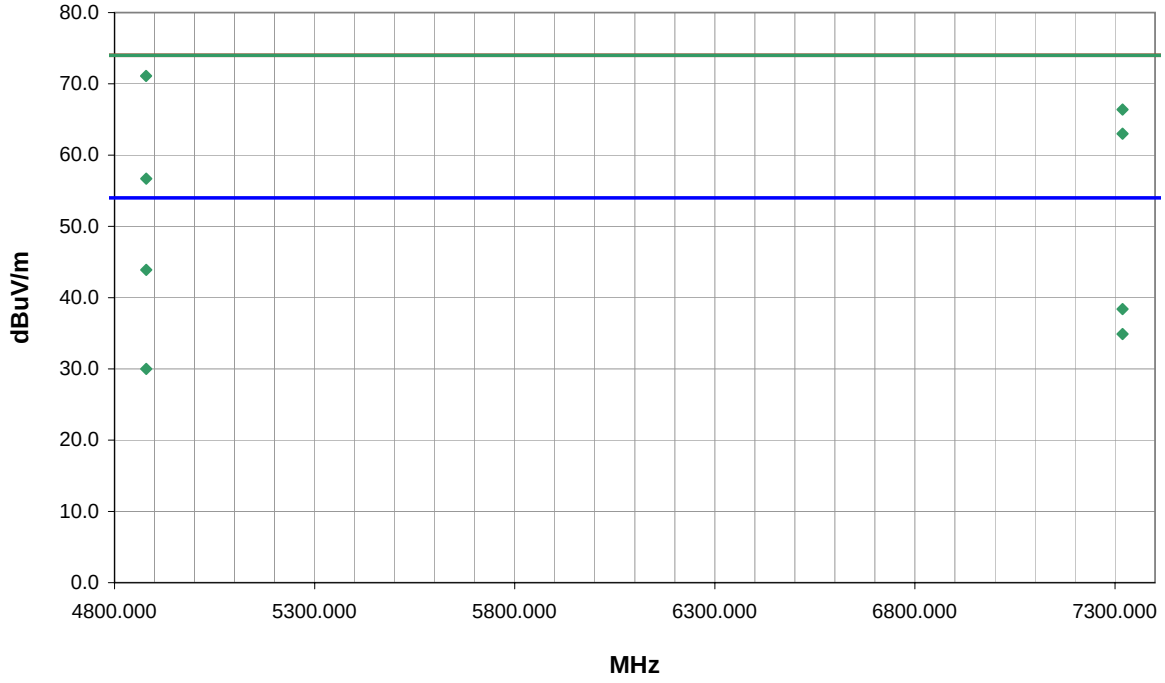
Transmitting at Channel 40. 2440 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	10
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)
4878.958	58.7	12.4	254.0	1.6	0.0	0.0	V-Horn	PK	0.0	71.1	74.0	-2.9
7318.654	50.7	15.7	160.0	1.7	0.0	0.0	H-Horn	PK	0.0	66.4	74.0	-7.6
4879.065	49.5	12.4	254.0	1.6	18.0	0.0	V-Horn	AV	0.0	43.9	54.0	-10.1
7318.670	47.3	15.7	156.0	1.7	0.0	0.0	V-Horn	PK	0.0	63.0	74.0	-11.0
7318.667	40.7	15.7	160.0	1.7	18.0	0.0	H-Horn	AV	0.0	38.4	54.0	-15.6
4878.996	44.3	12.4	185.0	1.2	0.0	0.0	H-Horn	PK	0.0	56.7	74.0	-17.3
7318.644	37.2	15.7	156.0	1.7	18.0	0.0	V-Horn	AV	0.0	34.9	54.0	-19.1
4879.088	35.6	12.4	185.0	1.2	18.0	0.0	H-Horn	AV	0.0	30.0	54.0	-24.0

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/01/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Middle Gain Antenna (8 dBi). PC Power Level = 193. 1m cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

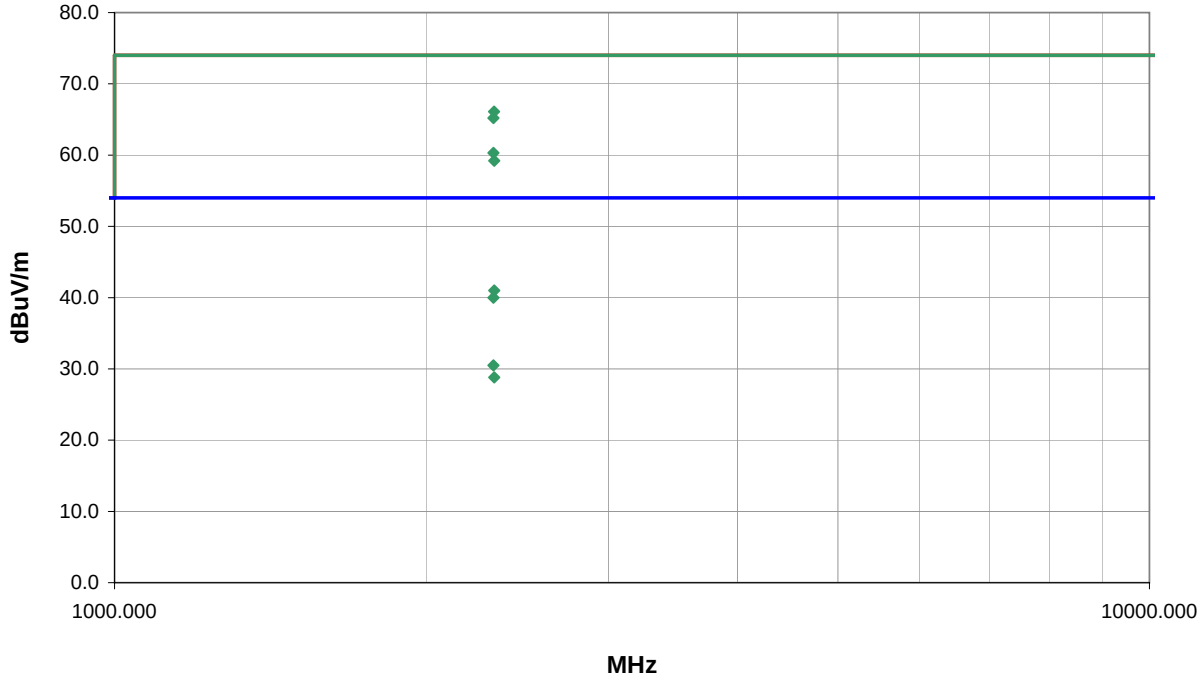
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	20
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)
2327.000	44.8	1.3	337.0	1.2	0.0	20.0	V-Horn	PK	0.0	66.1	74.0	-7.9
2323.037	43.8	1.4	334.0	1.0	0.0	20.0	V-Horn	PK	0.0	65.2	74.0	-8.8
2327.086	37.7	1.3	337.0	1.2	18.0	20.0	V-Horn	AV	0.0	41.0	54.0	-13.0
2322.963	38.9	1.4	165.0	1.2	0.0	20.0	H-Horn	PK	0.0	60.3	74.0	-13.7
2323.092	36.6	1.4	334.0	1.0	18.0	20.0	V-Horn	AV	0.0	40.0	54.0	-14.0
2327.192	37.9	1.3	157.0	1.2	0.0	20.0	H-Horn	PK	0.0	59.2	74.0	-14.8
2323.308	27.1	1.4	165.0	1.2	18.0	20.0	H-Horn	AV	0.0	30.5	54.0	-23.5
2327.119	25.5	1.3	157.0	1.2	18.0	20.0	H-Horn	AV	0.0	28.8	54.0	-25.2

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/01/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Middle Gain Antenna (8 dBi). PC Power Level = 193. 1m cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

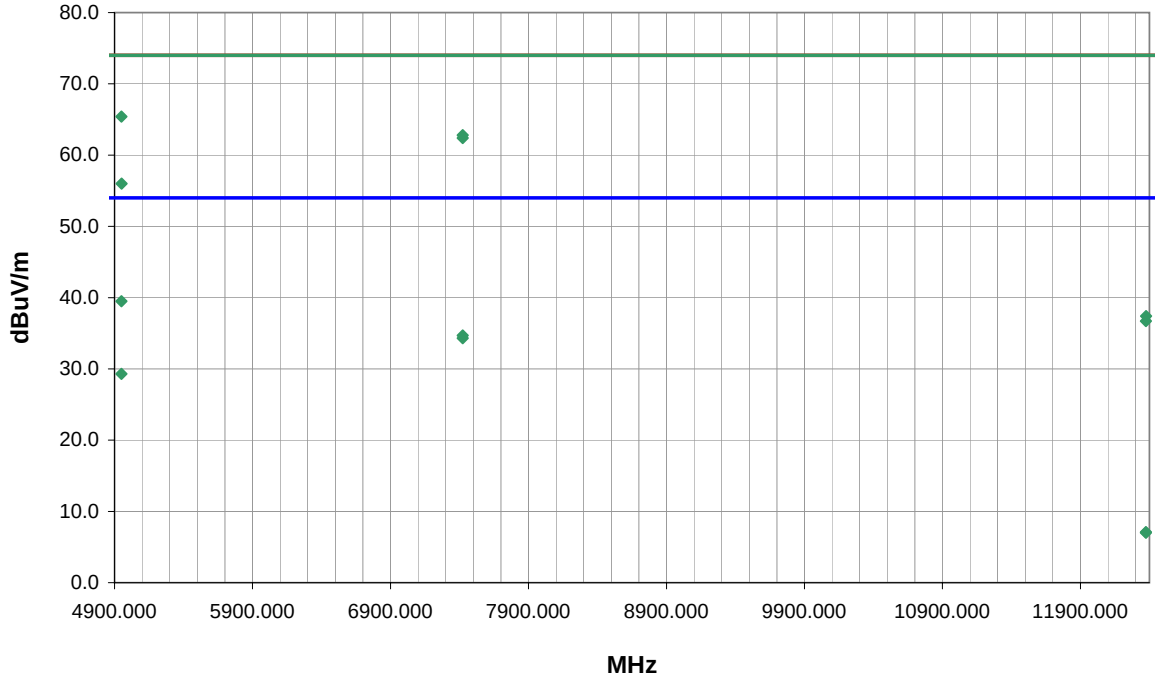
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	19
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)
4949.400	52.5	12.9	203.0	1.3	0.0	0.0	V-Horn	PK	0.0	65.4	74.0	-8.6
7423.491	46.4	16.4	128.0	1.3	0.0	0.0	V-Horn	PK	0.0	62.8	74.0	-11.2
7423.429	46.0	16.4	122.0	1.8	0.0	0.0	H-Horn	PK	0.0	62.4	74.0	-11.6
4949.451	44.6	12.9	203.0	1.3	18.0	0.0	V-Horn	AV	0.0	39.5	54.0	-14.5
4950.605	43.1	12.9	150.0	1.6	0.0	0.0	H-Horn	PK	0.0	56.0	74.0	-18.0
7423.594	36.3	16.4	128.0	1.3	18.0	0.0	V-Horn	AV	0.0	34.7	54.0	-19.3
7423.586	35.9	16.4	122.0	1.8	18.0	0.0	H-Horn	AV	0.0	34.3	54.0	-19.7
4949.333	34.4	12.9	150.0	1.6	18.0	0.0	H-Horn	AV	0.0	29.3	54.0	-24.7
12375.430	45.1	-7.7	107.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.4	74.0	-36.6
12374.540	44.4	-7.7	193.0	1.0	0.0	0.0	H-Horn	PK	0.0	36.7	74.0	-37.3
12374.280	32.8	-7.7	107.0	1.0	18.0	0.0	V-Horn	AV	0.0	7.1	54.0	-46.9
12374.790	32.8	-7.8	193.0	1.0	18.0	0.0	H-Horn	AV	0.0	7.0	54.0	-47.0

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/01/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Middle Gain Antenna (8 dBi). PC Power Level = 193. 1m cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

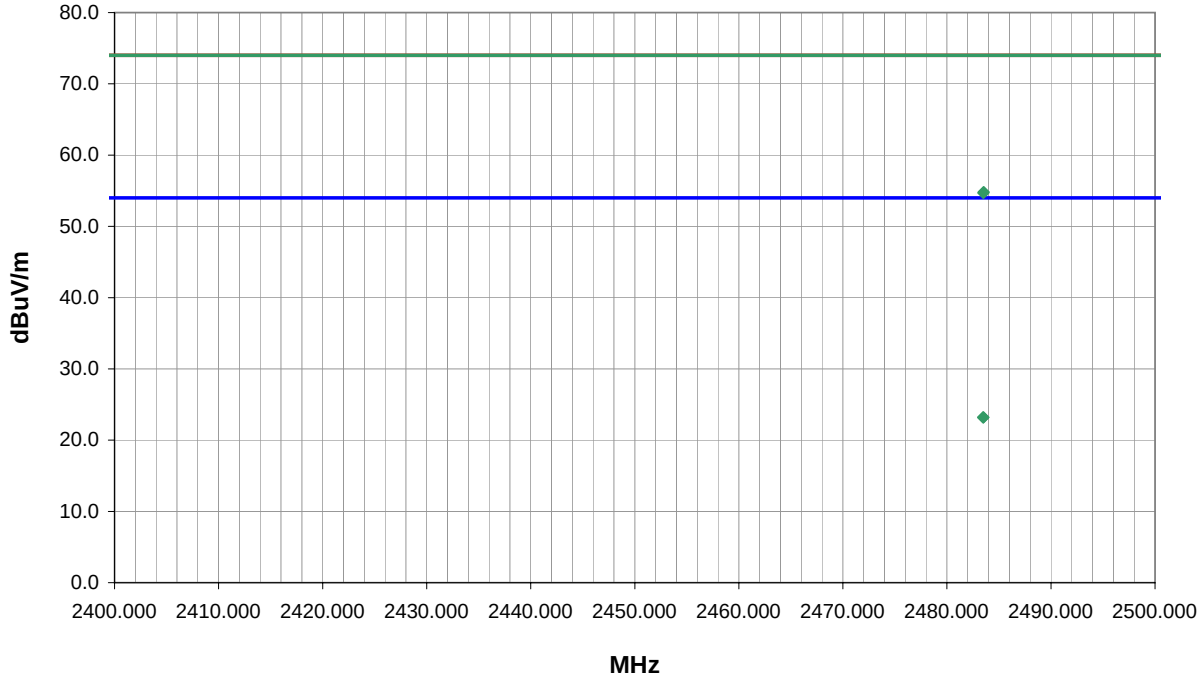
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	18
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)
2483.538	33.4	1.4	223.0	1.3	0.0	20.0	H-Horn	PK	0.0	54.8	74.0	-19.2
2483.500	33.3	1.4	267.0	1.0	0.0	20.0	V-Horn	PK	0.0	54.7	74.0	-19.3
2483.486	19.8	1.4	267.0	1.0	18.0	20.0	V-Horn	AV	0.0	23.2	54.0	-30.8
2483.501	19.8	1.4	223.0	1.3	18.0	20.0	H-Horn	AV	0.0	23.2	54.0	-30.8

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/06/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247(FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

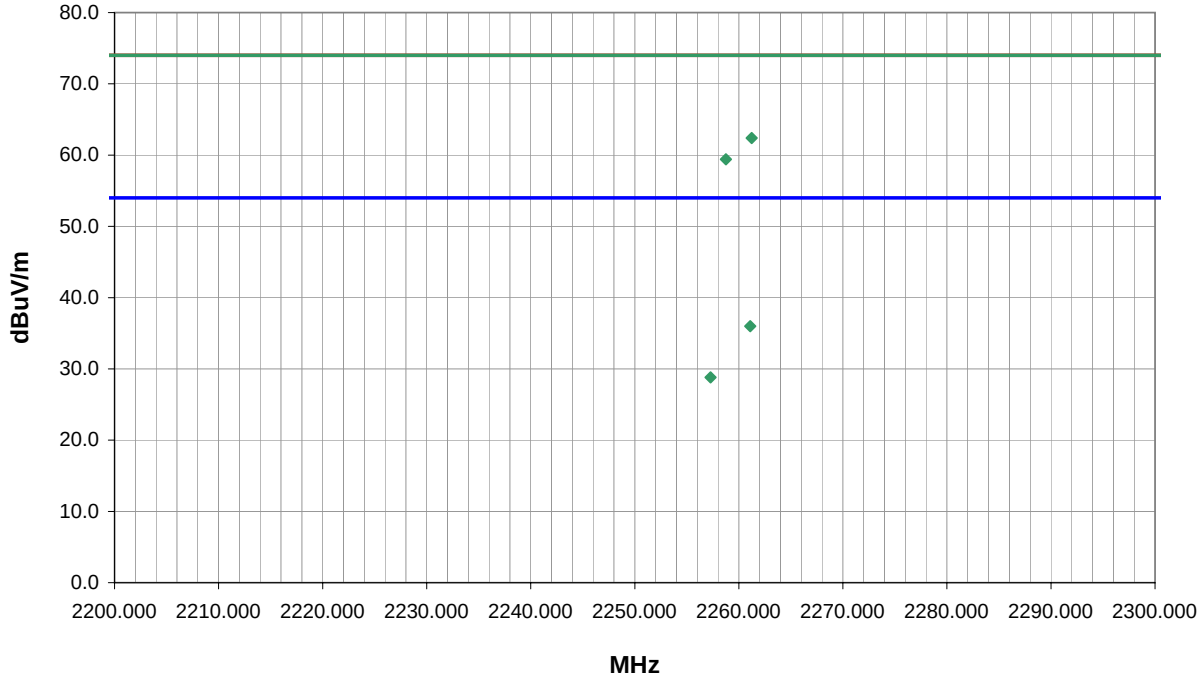
Transmitting at Channel 1. 2405 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	30
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)
2261.237	40.6	1.8	155.0	1.6	0.0	20.0	V-Horn	PK	0.0	62.4	74.0	-11.6
2258.760	37.6	1.8	135.0	1.0	0.0	20.0	H-Horn	PK	0.0	59.4	74.0	-14.6
2261.090	32.2	1.8	155.0	1.6	18.0	20.0	V-Horn	AV	0.0	36.0	54.0	-18.0
2257.276	25.0	1.8	135.0	1.0	18.0	20.0	H-Horn	AV	0.0	28.8	54.0	-25.2

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/06/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247(FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

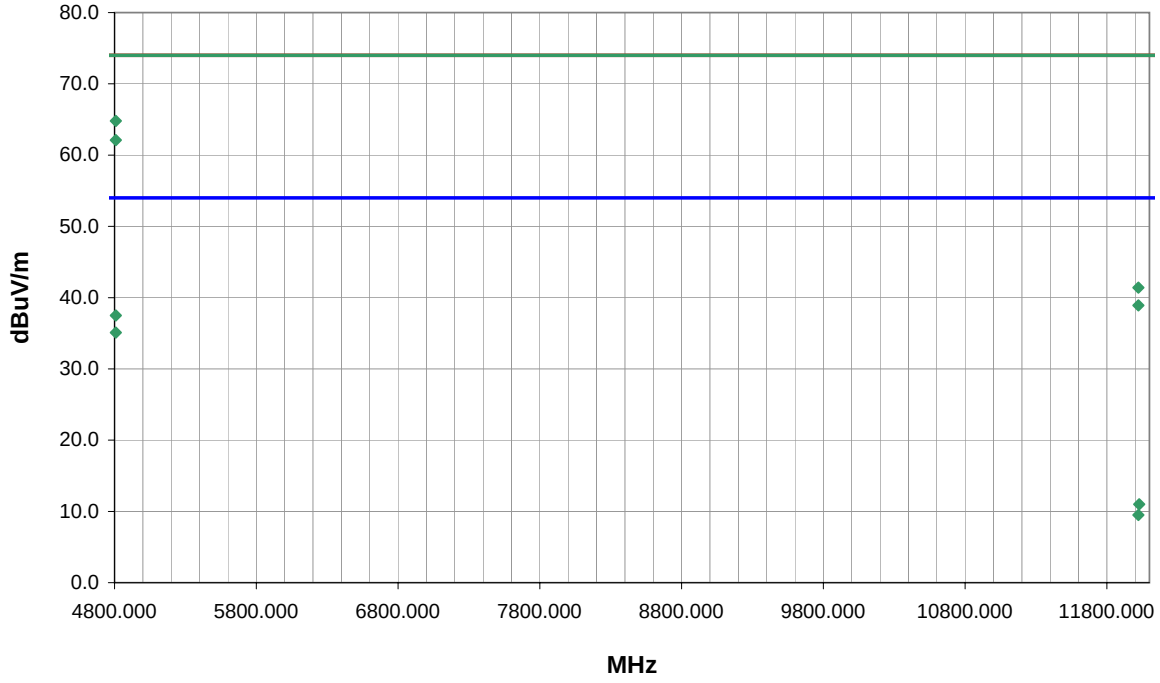
Transmitting at Channel 1. 2405 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	32
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)
4809.011	53.1	11.7	149.0	1.5	0.0	0.0	V-Horn	PK	0.0	64.8	74.0	-9.2
4809.114	50.4	11.7	243.0	1.8	0.0	0.0	H-Horn	PK	0.0	62.1	74.0	-11.9
4809.018	43.8	11.7	149.0	1.5	18.0	0.0	V-Horn	AV	0.0	37.5	54.0	-16.5
4809.072	41.4	11.7	243.0	1.8	18.0	0.0	H-Horn	AV	0.0	35.1	54.0	-18.9
12022.600	50.4	-9.0	177.0	1.0	0.0	0.0	V-Horn	PK	0.0	41.4	74.0	-32.6
12022.520	47.9	-9.0	149.0	1.0	0.0	0.0	H-Horn	PK	0.0	38.9	74.0	-35.1
12027.420	38.0	-9.0	177.0	1.0	18.0	0.0	V-Horn	AV	0.0	11.0	54.0	-43.0
12022.500	36.5	-9.0	149.0	1.0	18.0	0.0	H-Horn	AV	0.0	9.5	54.0	-44.5

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/07/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

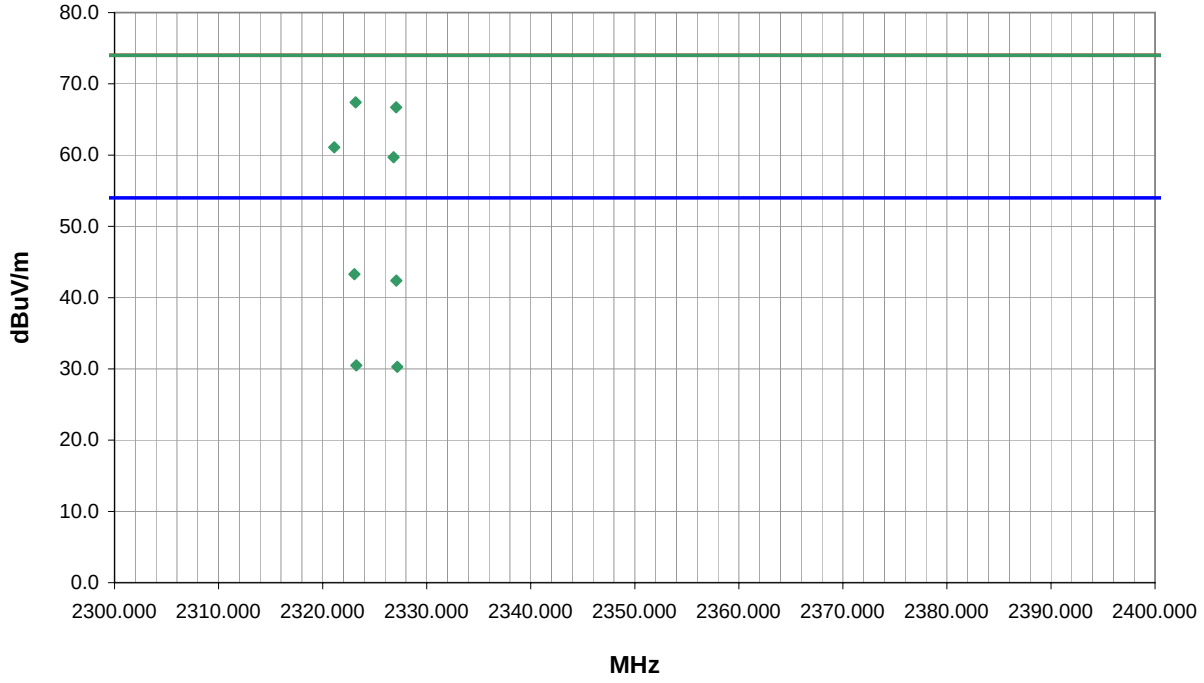
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	39
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)
2323.168	46.0	1.4	349.0	1.6	0.0	20.0	V-Horn	PK	0.0	67.4	74.0	-6.6
2327.071	45.4	1.3	357.0	1.4	0.0	20.0	V-Horn	PK	0.0	66.7	74.0	-7.3
2323.058	39.9	1.4	349.0	1.6	18.0	20.0	V-Horn	AV	0.0	43.3	54.0	-10.7
2327.080	39.1	1.3	357.0	1.4	18.0	20.0	V-Horn	AV	0.0	42.4	54.0	-11.6
2321.112	39.7	1.4	327.0	2.1	0.0	20.0	H-Horn	PK	0.0	61.1	74.0	-12.9
2326.812	38.4	1.3	327.0	2.1	0.0	20.0	H-Horn	PK	0.0	59.7	74.0	-14.3
2323.240	27.1	1.4	327.0	2.1	18.0	20.0	H-Horn	AV	0.0	30.5	54.0	-23.5
2327.165	27.0	1.3	327.0	2.1	18.0	20.0	H-Horn	AV	0.0	30.3	54.0	-23.7

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/06/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

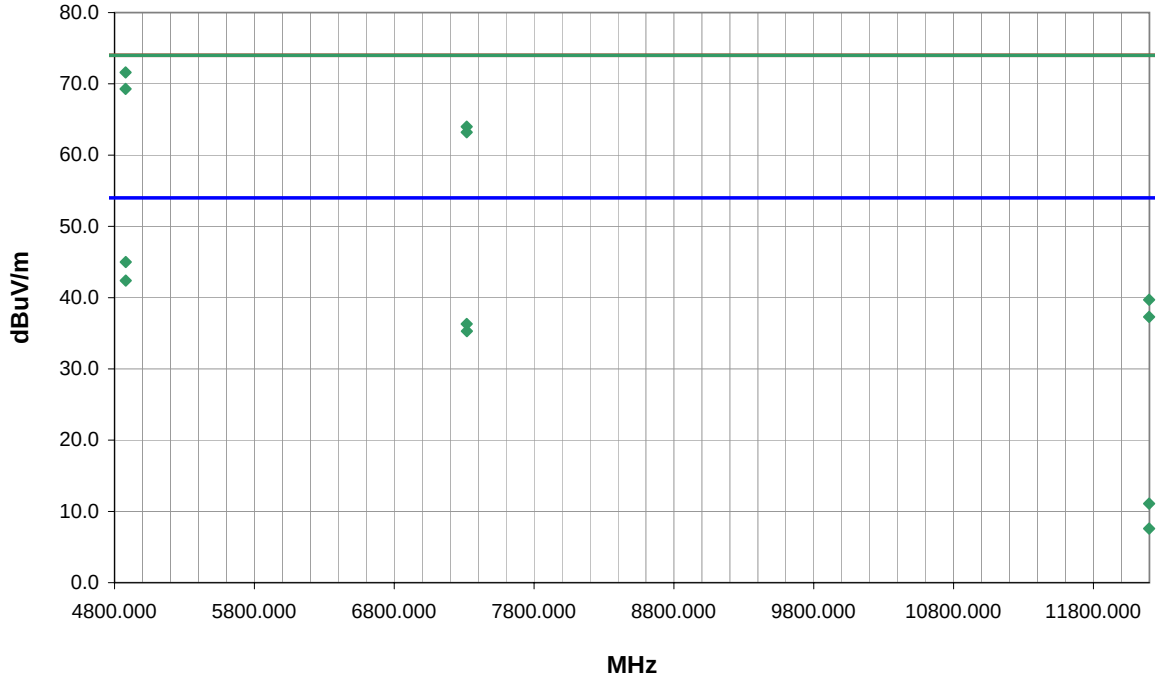
Transmitting at Channel 40. 2440 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	34
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)
4879.088	59.2	12.4	174.0	1.6	0.0	0.0	V-Horn	PK	0.0	71.6	74.0	-2.4
4879.179	56.9	12.4	67.0	1.3	0.0	0.0	H-Horn	PK	0.0	69.3	74.0	-4.7
4879.641	50.6	12.4	174.0	1.6	18.0	0.0	V-Horn	AV	0.0	45.0	54.0	-9.0
7318.636	48.3	15.7	143.0	1.6	0.0	0.0	V-Horn	PK	0.0	64.0	74.0	-10.0
7318.539	47.5	15.7	155.0	1.3	0.0	0.0	H-Horn	PK	0.0	63.2	74.0	-10.8
4879.680	48.0	12.4	67.0	1.3	18.0	0.0	H-Horn	AV	0.0	42.4	54.0	-11.6
7318.644	38.6	15.7	143.0	1.6	18.0	0.0	V-Horn	AV	0.0	36.3	54.0	-17.7
7318.761	37.6	15.7	155.0	1.3	18.0	0.0	H-Horn	AV	0.0	35.3	54.0	-18.7
12197.420	48.1	-8.4	166.0	1.0	0.0	0.0	V-Horn	PK	0.0	39.7	74.0	-34.3
12198.180	45.7	-8.4	149.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.3	74.0	-36.7
12197.560	37.5	-8.4	166.0	1.0	18.0	0.0	V-Horn	AV	0.0	11.1	54.0	-42.9
12197.800	34.0	-8.4	149.0	1.0	18.0	0.0	H-Horn	AV	0.0	7.6	54.0	-46.4

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/07/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

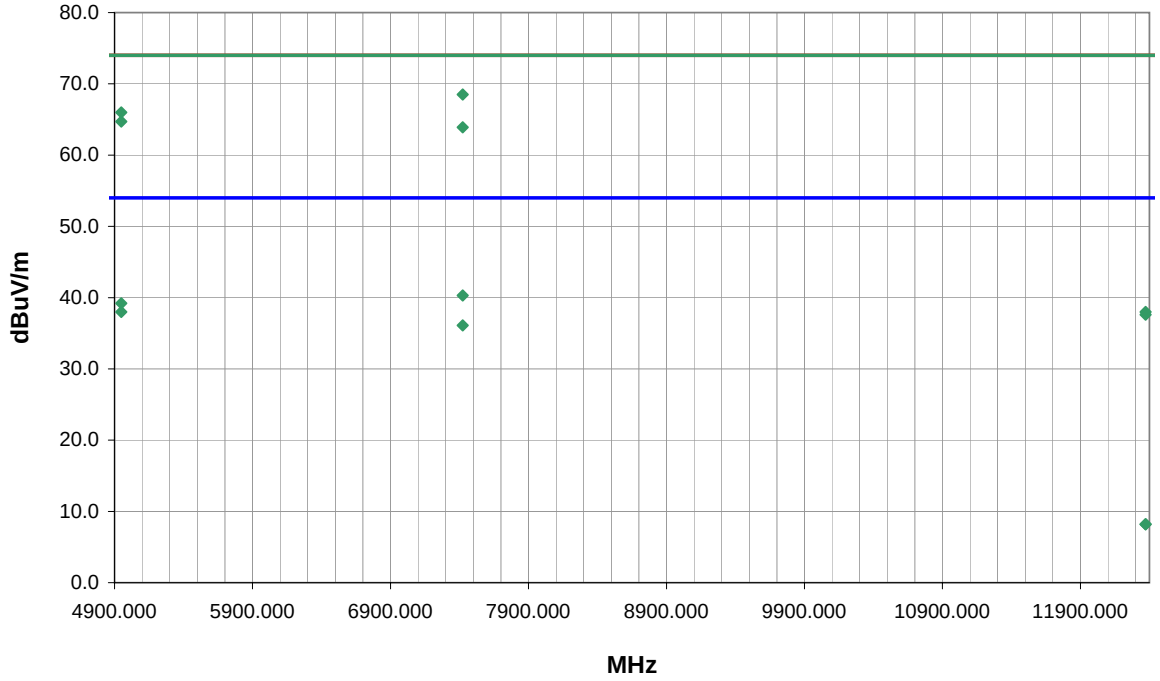
Transmitting at Channel 75. 2475 MHz.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	37
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)
7423.609	52.1	16.4	345.0	1.6	0.0	0.0	V-Horn	PK	0.0	68.5	74.0	-5.5
4949.114	53.1	12.9	355.0	1.0	0.0	0.0	V-Horn	PK	0.0	66.0	74.0	-8.0
4949.207	51.8	12.9	69.0	2.0	0.0	0.0	H-Horn	PK	0.0	64.7	74.0	-9.3
7423.258	47.5	16.4	16.0	2.0	0.0	0.0	H-Horn	PK	0.0	63.9	74.0	-10.1
7423.696	41.9	16.4	345.0	1.6	18.0	0.0	V-Horn	AV	0.0	40.3	54.0	-13.7
4949.246	44.3	12.9	355.0	1.0	18.0	0.0	V-Horn	AV	0.0	39.2	54.0	-14.8
4949.111	43.1	12.9	69.0	2.0	18.0	0.0	H-Horn	AV	0.0	38.0	54.0	-16.0
7423.637	37.7	16.4	16.0	2.0	18.0	0.0	H-Horn	AV	0.0	36.1	54.0	-17.9
12372.640	45.7	-7.7	320.0	1.0	0.0	0.0	H-Horn	PK	0.0	38.0	74.0	-36.0
12372.580	45.3	-7.7	327.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.6	74.0	-36.4
12372.470	34.0	-7.8	327.0	1.0	18.0	0.0	V-Horn	AV	0.0	8.2	54.0	-45.8
12372.540	34.0	-7.8	320.0	1.0	18.0	0.0	H-Horn	AV	0.0	8.2	54.0	-45.8

NORTHWEST EMC

SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			Work Order:	HONE0021
Serial Number:	Part # 51306343-125 Rev A			Date:	08/07/07
Customer:	Honeywell			Temperature:	24
Attendees:	David Shipley			Humidity:	45%
Project:	None			Barometric Pres.:	29.83
Tested by:	Jaemi Suh	Power:	120VAC/60Hz	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (FHSS):2007	ANSI C63.4:2003 DA 00-705:2000

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

COMMENTS

Highest Gain Antenna (14 dBi). PC Power Level = 193. 1m Cable. Duty cycle corr. factor is based on an assumed 12msec dwell time: 20log(12ms/100ms) = 18dB.

EUT OPERATING MODES

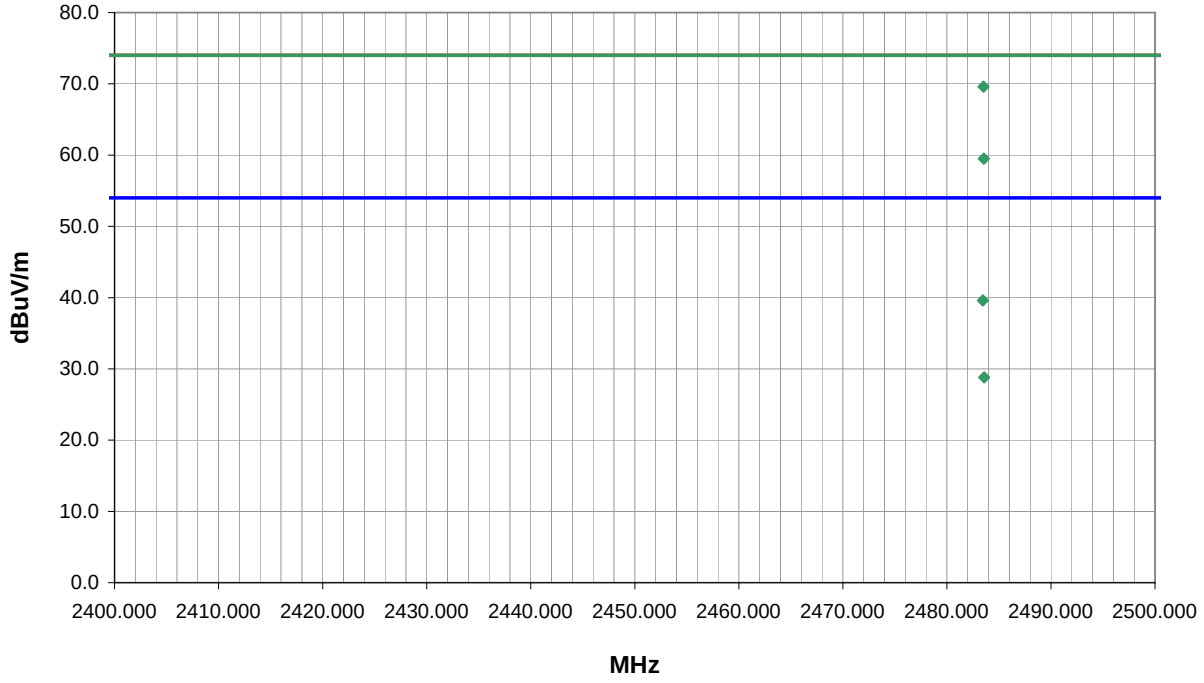
Transmitting at Channel 80. 2480 MHz.

DEVIATIONS FROM TEST STANDARD

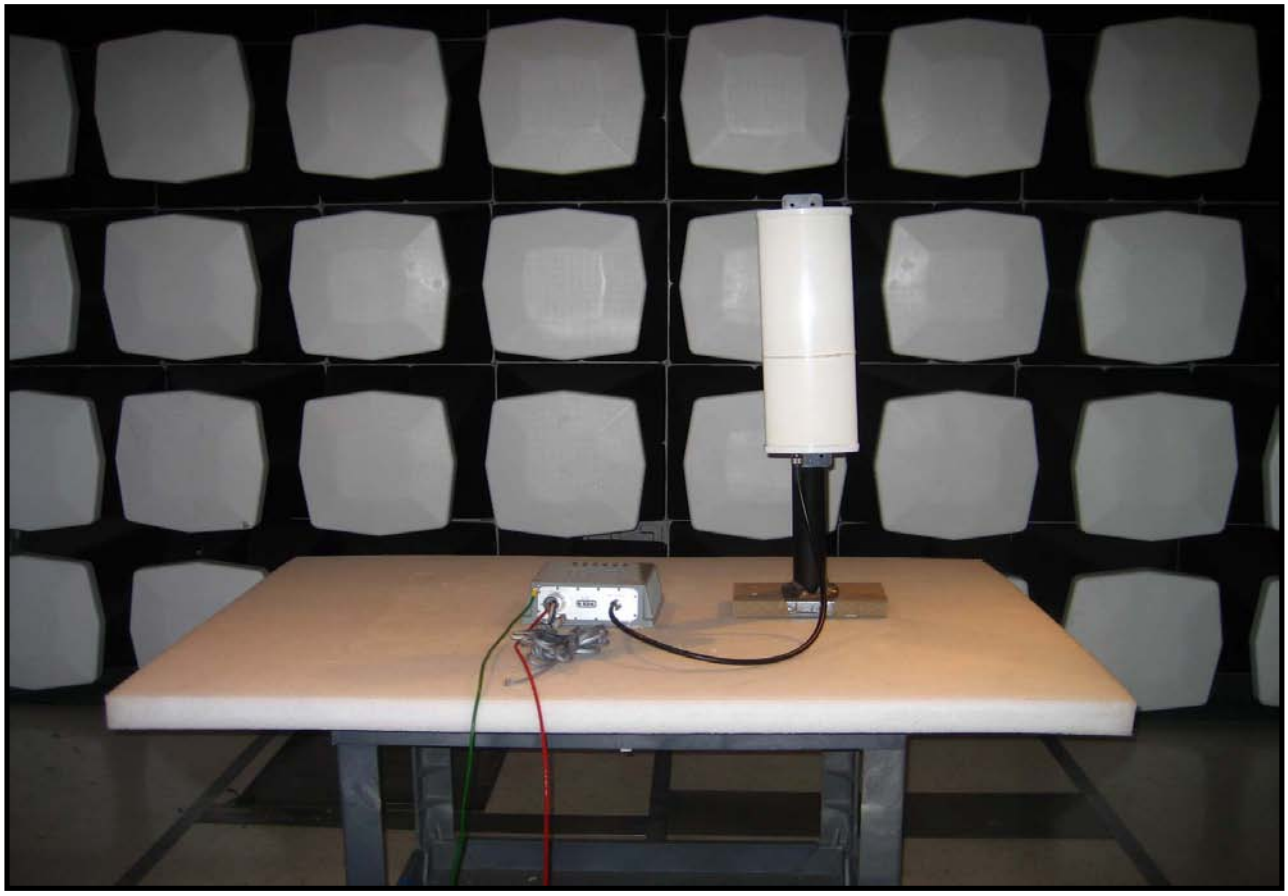
No deviations.

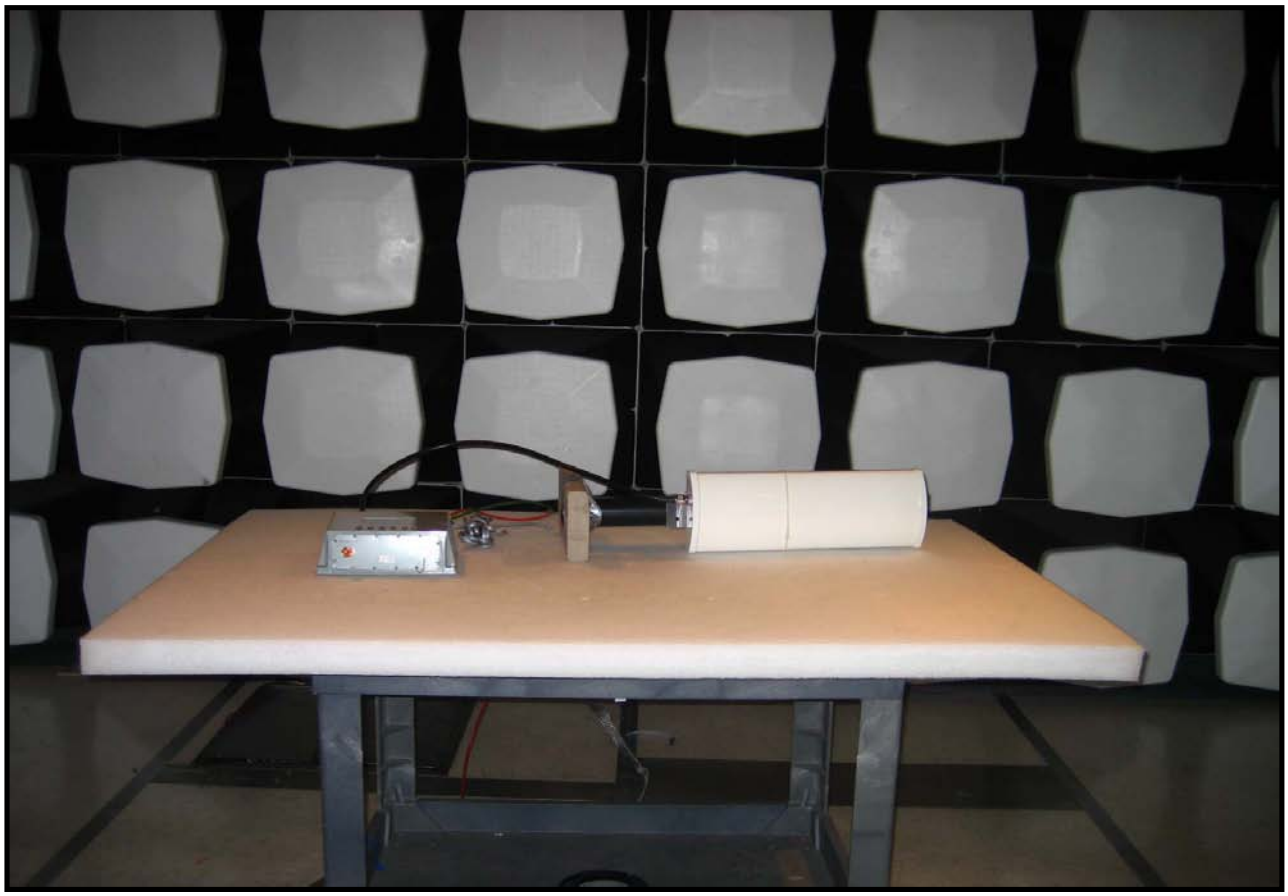
Run #	38
Configuration #	1
Results	Pass

Signature

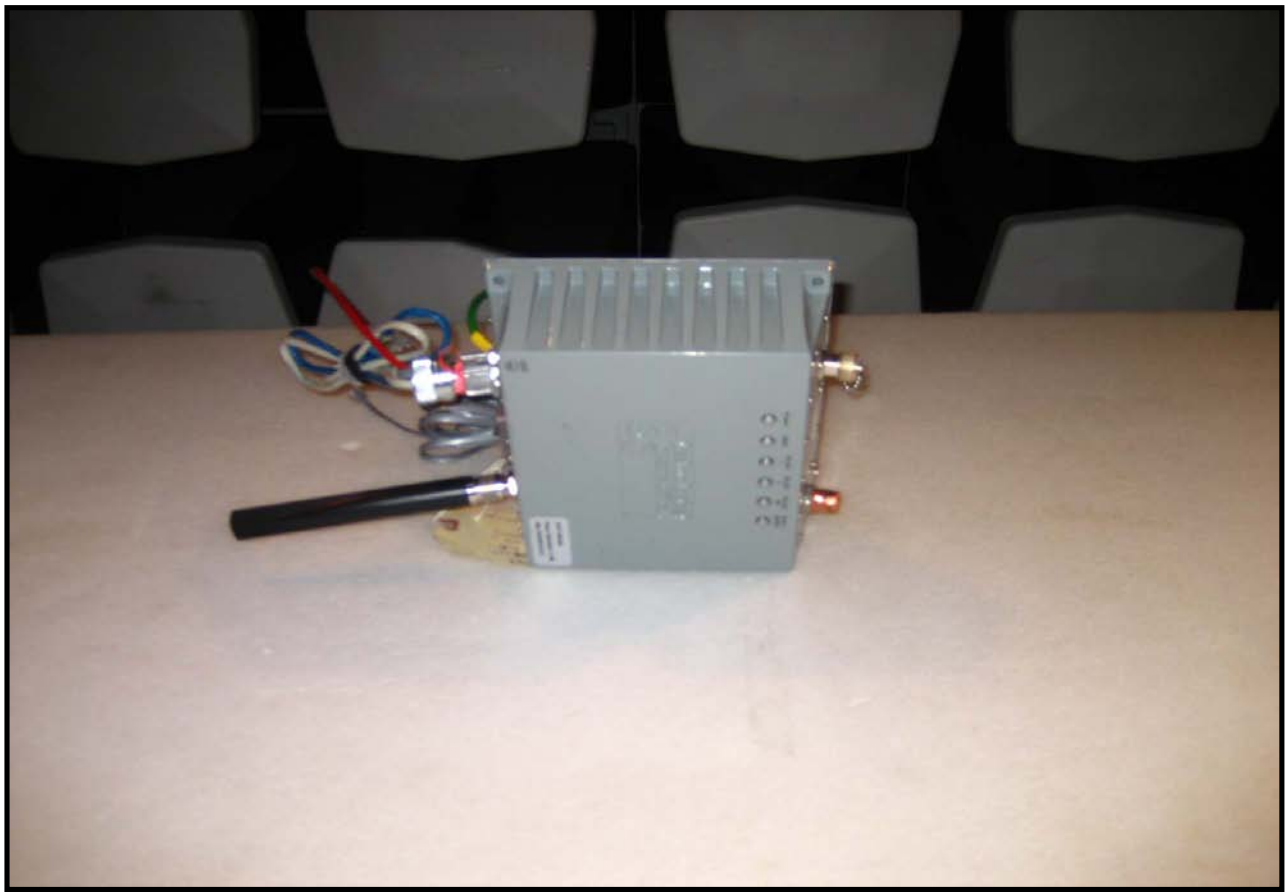


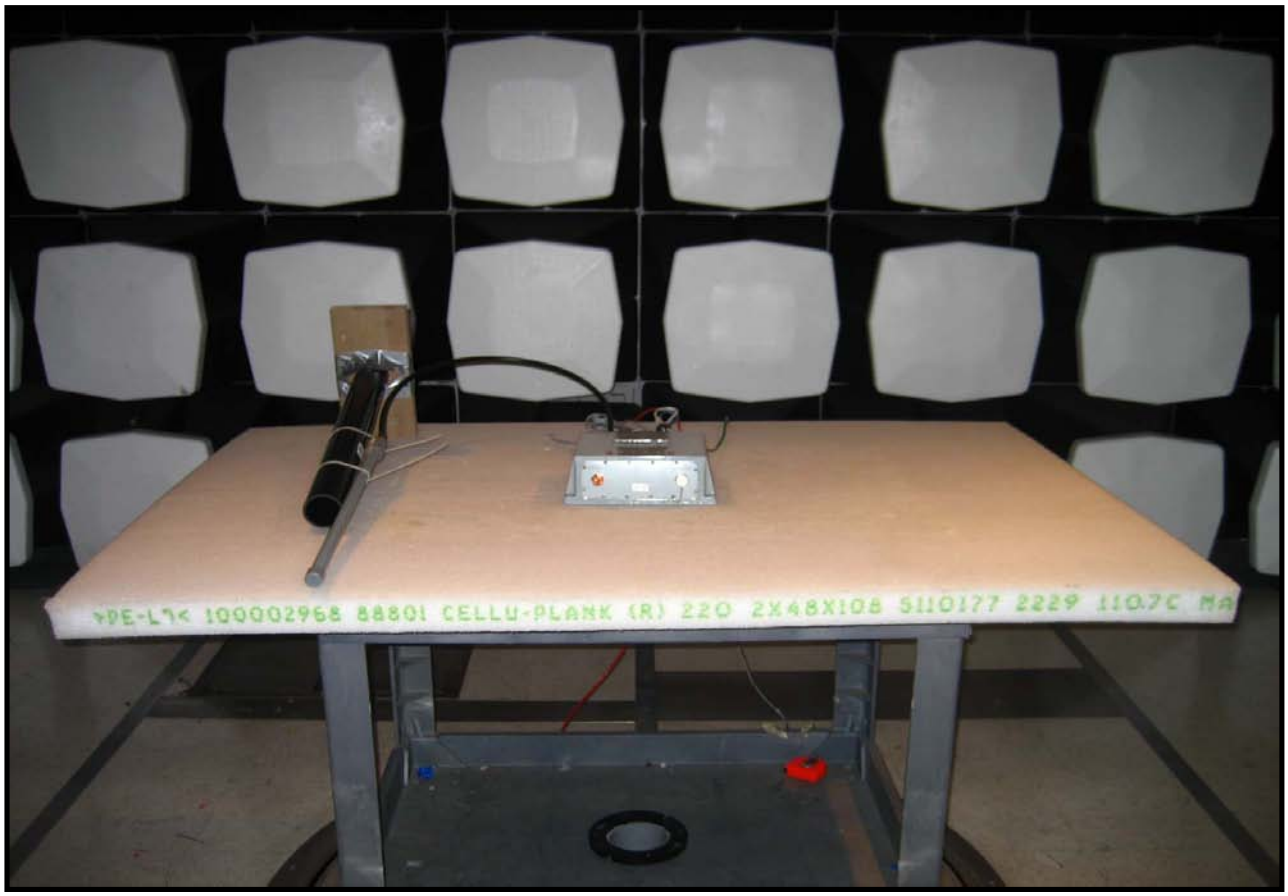
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.513	48.2	1.4	322.0	1.4	0.0	20.0	V-Horn	PK	0.0	69.6	74.0	-4.4
2483.452	36.2	1.4	322.0	1.4	18.0	20.0	V-Horn	AV	0.0	39.6	54.0	-14.4
2483.543	38.1	1.4	67.0	1.1	0.0	20.0	H-Horn	PK	0.0	59.5	74.0	-14.5
2483.578	25.4	1.4	67.0	1.1	18.0	20.0	H-Horn	AV	0.0	28.8	54.0	-25.2

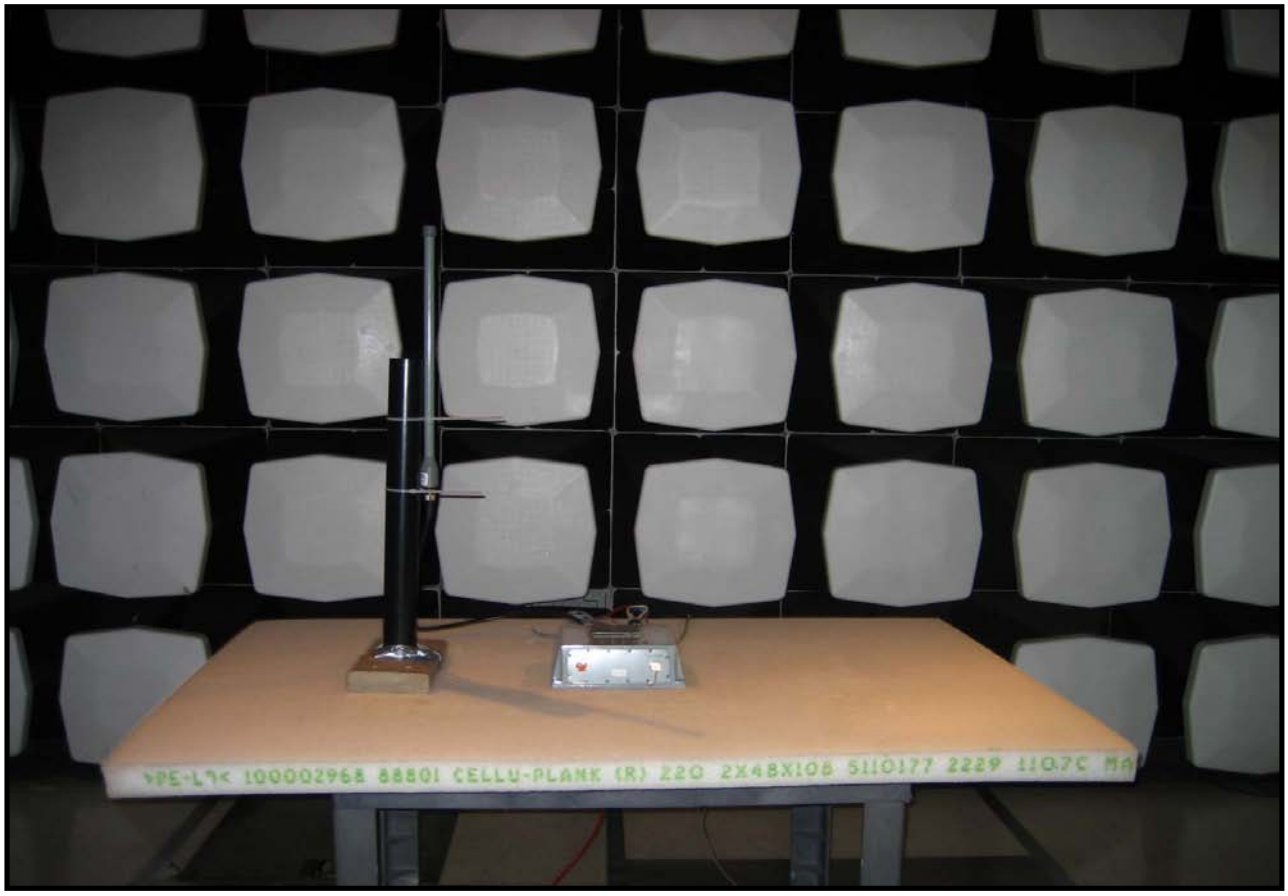





100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 11D7C




100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 1107C


100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 1107C

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The peak power spectral density measurements were measured with the EUT set to low, mid, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

> The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

NORTHWEST EMC

Power Spectral Density

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/08/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC13

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

COMMENTS

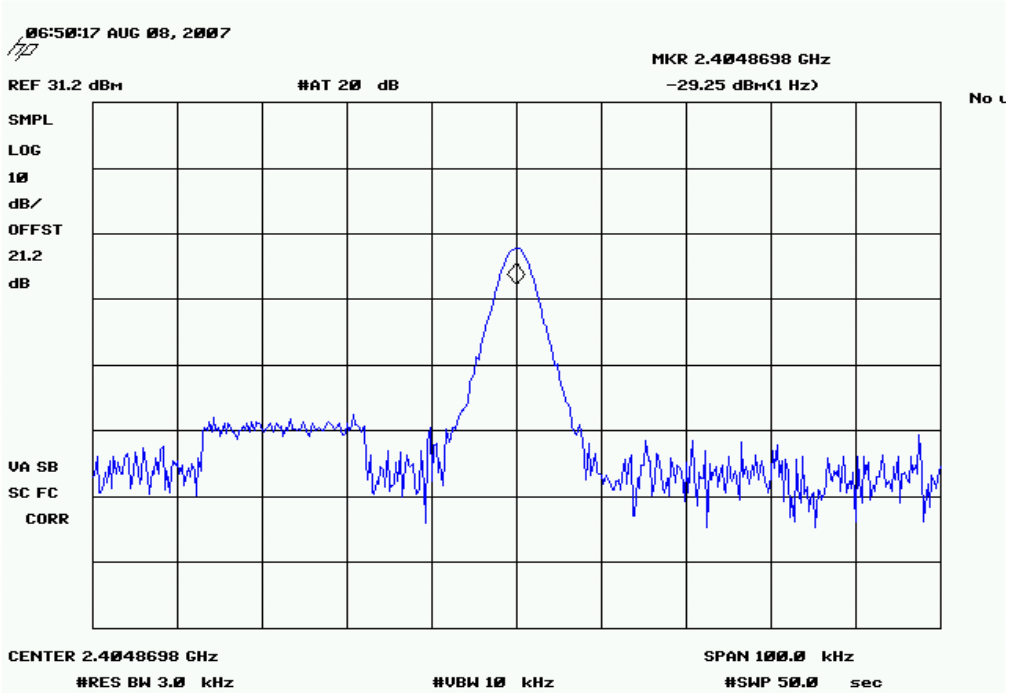
PC Power Level = 193.

DEVIATIONS FROM TEST STANDARD

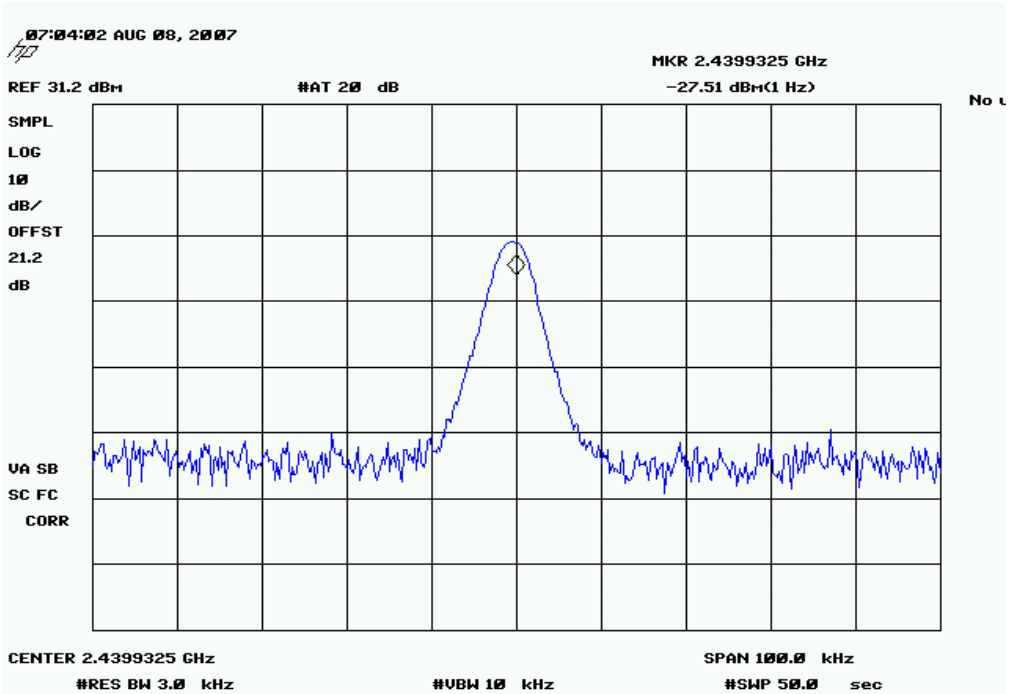
Configuration #	1	Signature

	Value	Limit	Results
Highest Output Power			
Low Channel	5.55 dBm / 3 kHz	8 dBm / 3 kHz	Pass
Mid Channel	7.29 dBm / 3 kHz	8 dBm / 3 kHz	Pass
High Channel	7.01 dBm / 3 Khz	8 dBm / 3 kHz	Pass

Highest Output Power, Low Channel					
Result:	Pass	**Value:**	5.55 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz

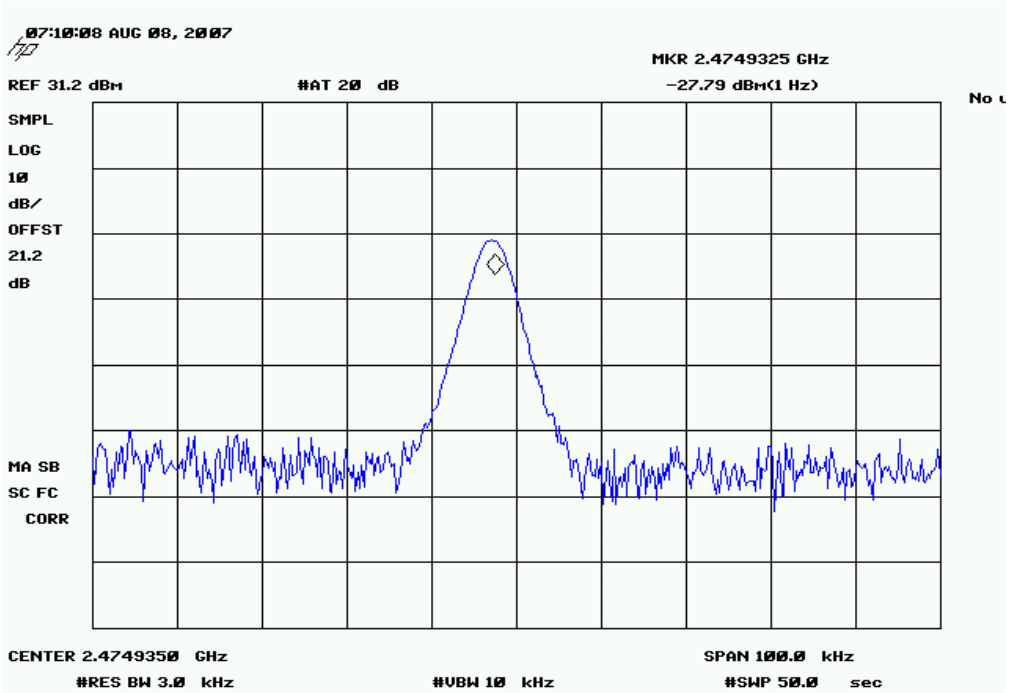


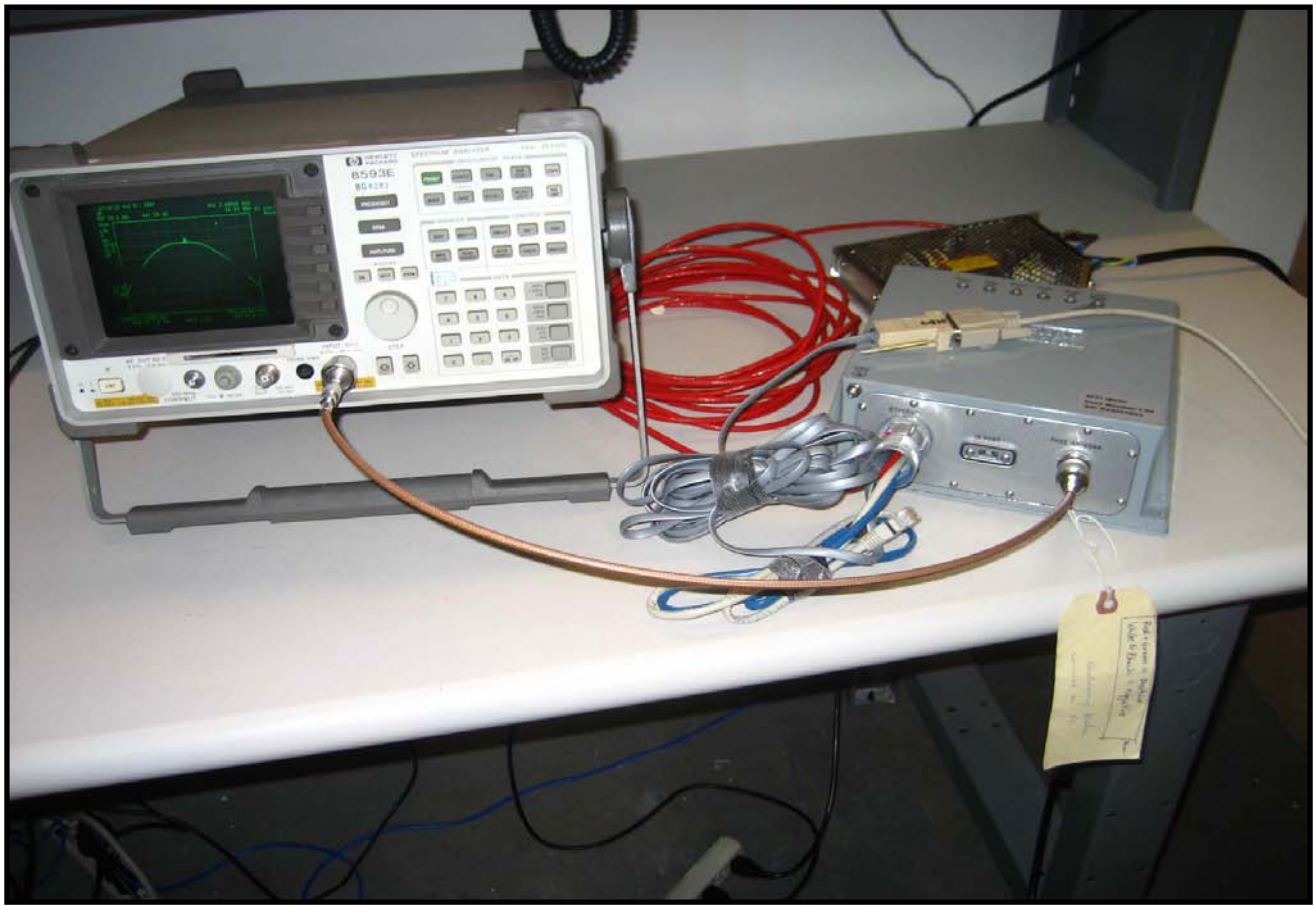
Highest Output Power, Mid Channel					
Result:	Pass	**Value:**	7.29 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



Power Spectral Density

Highest Output Power, High Channel					
Result:	Pass	**Value:**	7.01 dBm / 3 Khz	**Limit:**	8 dBm / 3 kHz




8593E

20 dB OCCUPIED BANDWIDTH - FHSS

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

NORTHWEST EMC

20 dB OCCUPIED BANDWIDTH - FHSS

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/08/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC13

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

COMMENTS

No Hop, Modulated Random Data. PC Power Level: 193. The 20 dB occupied bandwidth must be less than or equal to the channel spacing.

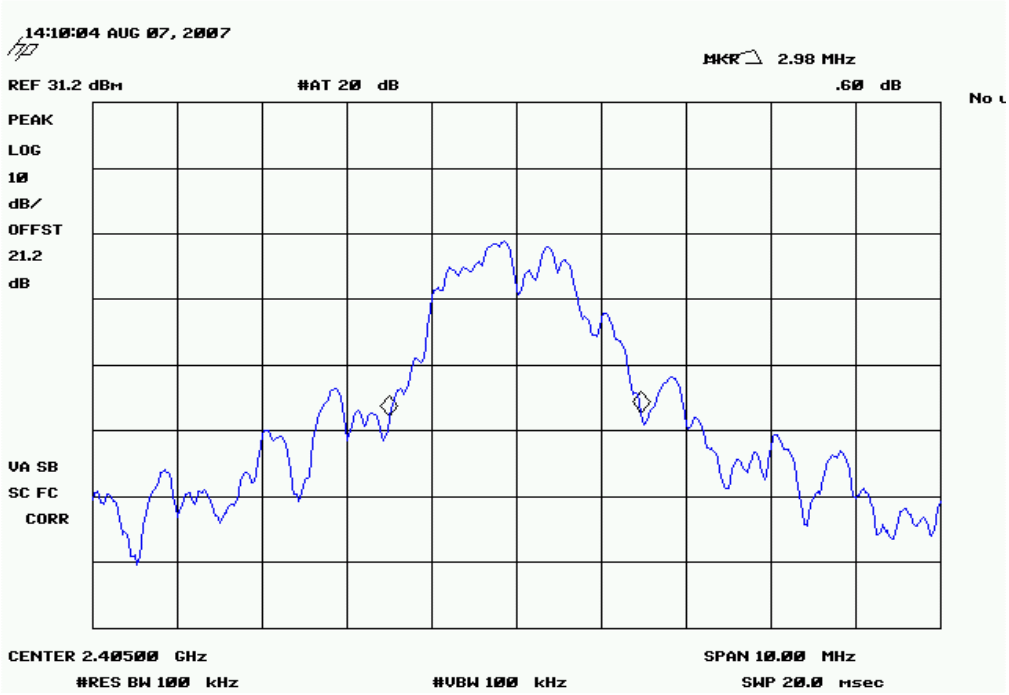
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

	Value	Limit	Results
Highest Output Power			
Low Channel	2.98 MHz	≥ 5 MHz	Pass
Mid Channel	3.78 MHz	≥ 5 MHz	Pass
High Channel	3.20 MHz	≥ 5 MHz	Pass

20 dB OCCUPIED BANDWIDTH - FHSS

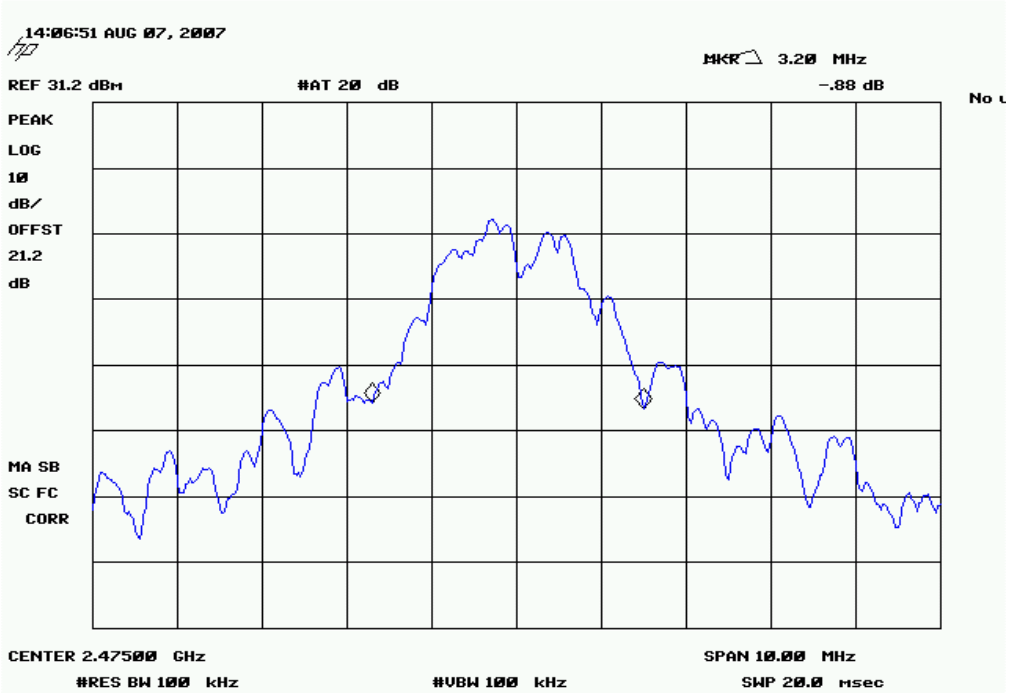
Highest Output Power, Low Channel					
Result:	Pass	**Value:**	2.98 MHz	**Limit:**	≥ 5 MHz

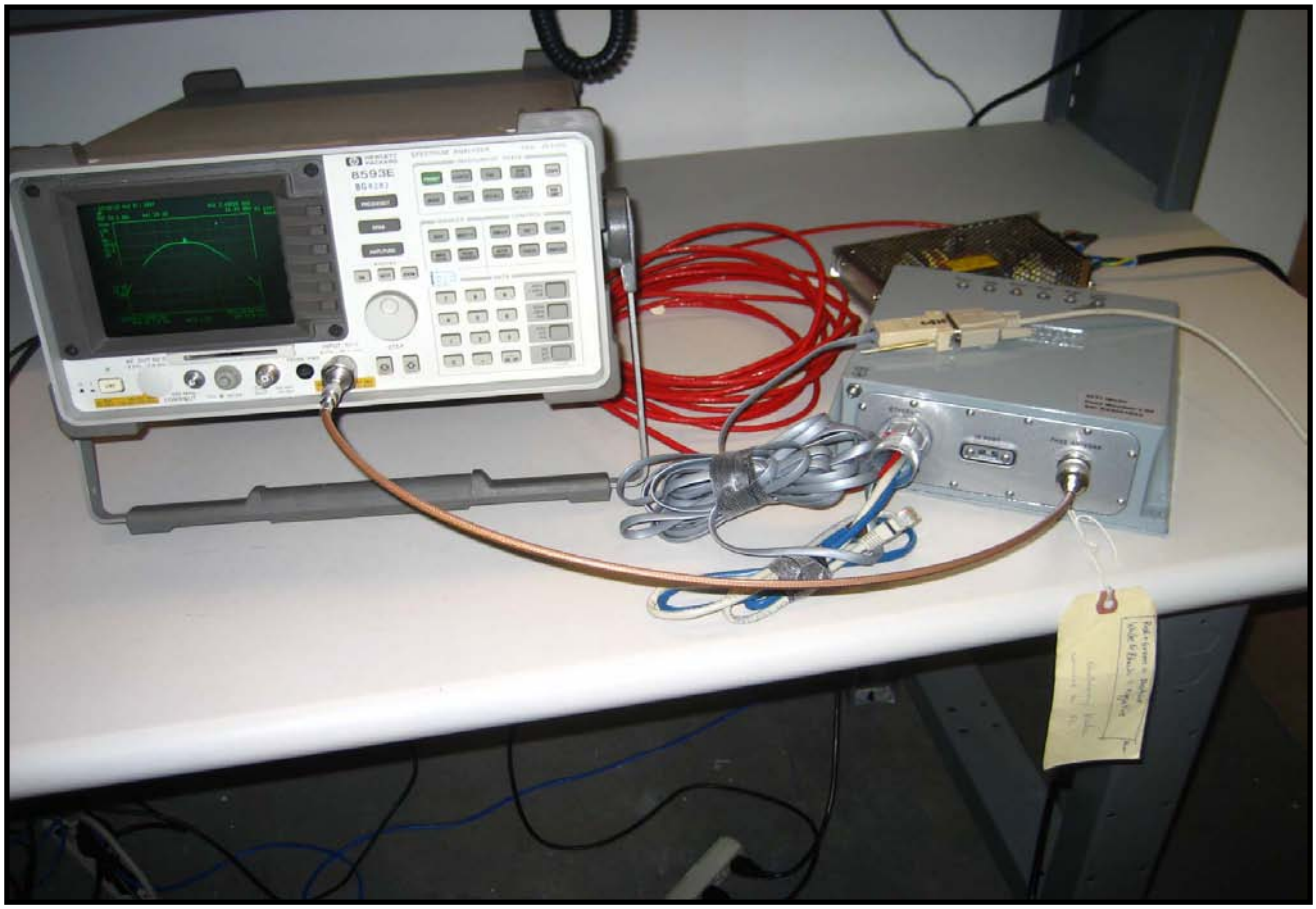


Highest Output Power, Mid Channel					
Result:	Pass	**Value:**	3.78 MHz	**Limit:**	≥ 5 MHz

20 dB OCCUPIED BANDWIDTH - FHSS

Highest Output Power, High Channel					
Result:	Pass	**Value:**	3.20 MHz	**Limit:**	≥ 5 MHz




8593E

NUMBER OF HOPPING FREQUENCIES

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	Hewlett Packard	8593E	AAP	12/14/2006	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

Per 47 CFR 15.247(a)(1), the hopping channel carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel. The measurement is made with the spectrum analyzer's resolution bandwidth set to greater than or equal to 1% of the span, and the video bandwidth set to greater than or equal to the resolution bandwidth.

NORTHWEST EMC

NUMBER OF HOPPING FREQUENCIES

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/09/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC13

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

COMMENTS

PC Power Level = 193. Pattern 1. Hopping Carrier.

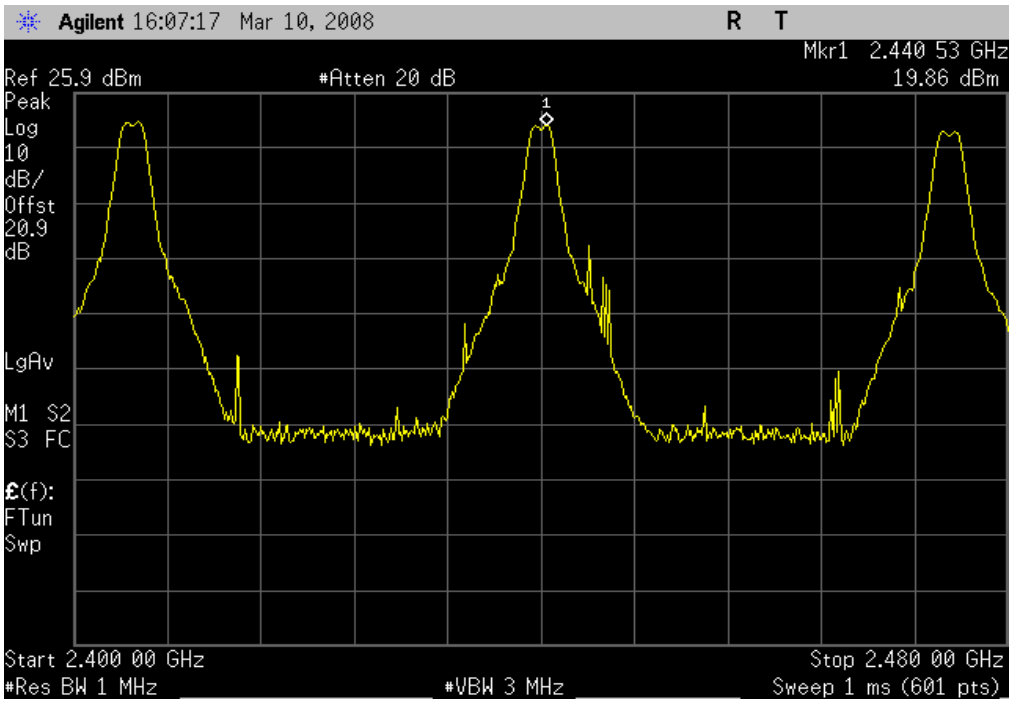
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

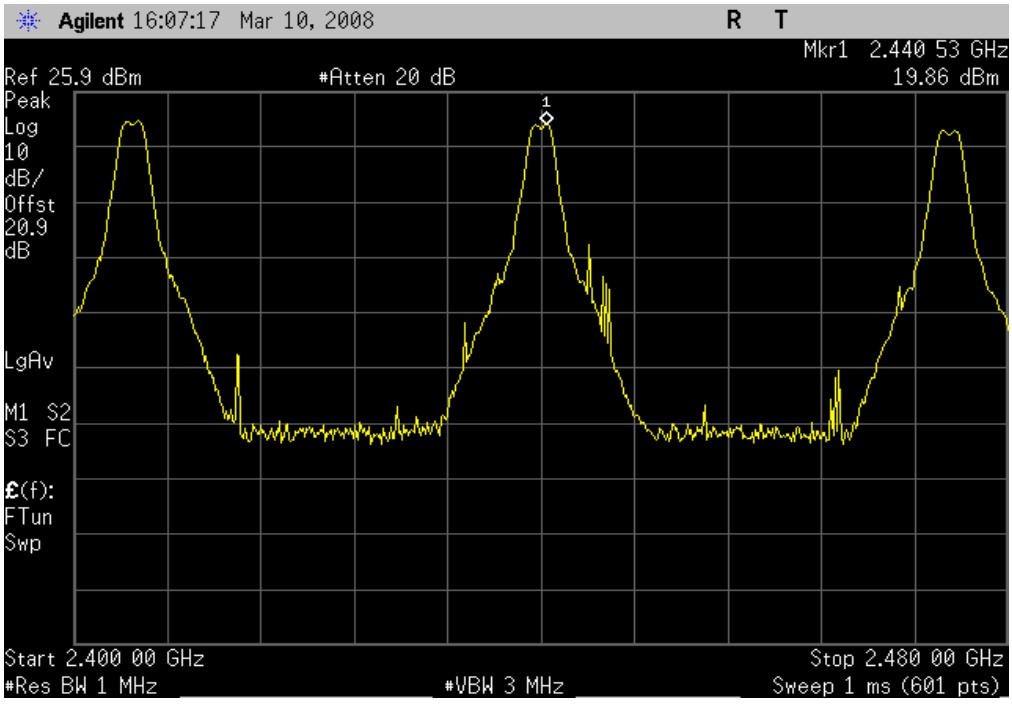
	Value	Limit	Results
Highest Conducted Output			
Low Channel	3		Pass
Mid Channel	3		Pass
High Channel	3		Pass

NUMBER OF HOPPING FREQUENCIES

Highest Conducted Output, Low Channel					
Result:	Pass	**Value:**	3	**Limit:**	

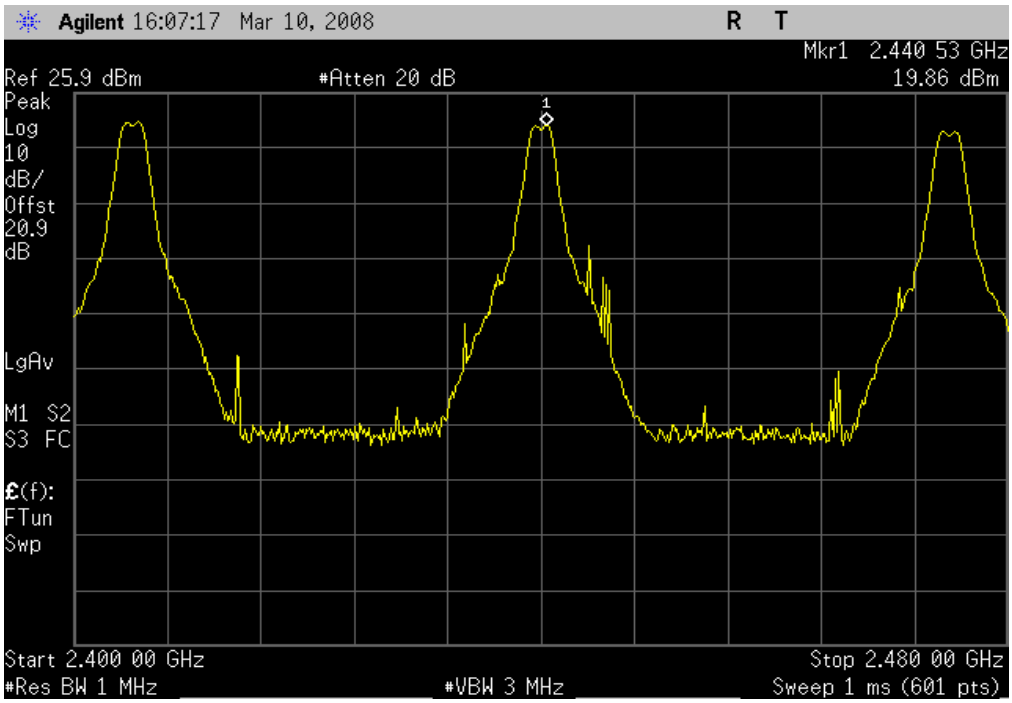


Highest Conducted Output, Mid Channel					
Result:	Pass	**Value:**	3	**Limit:**	

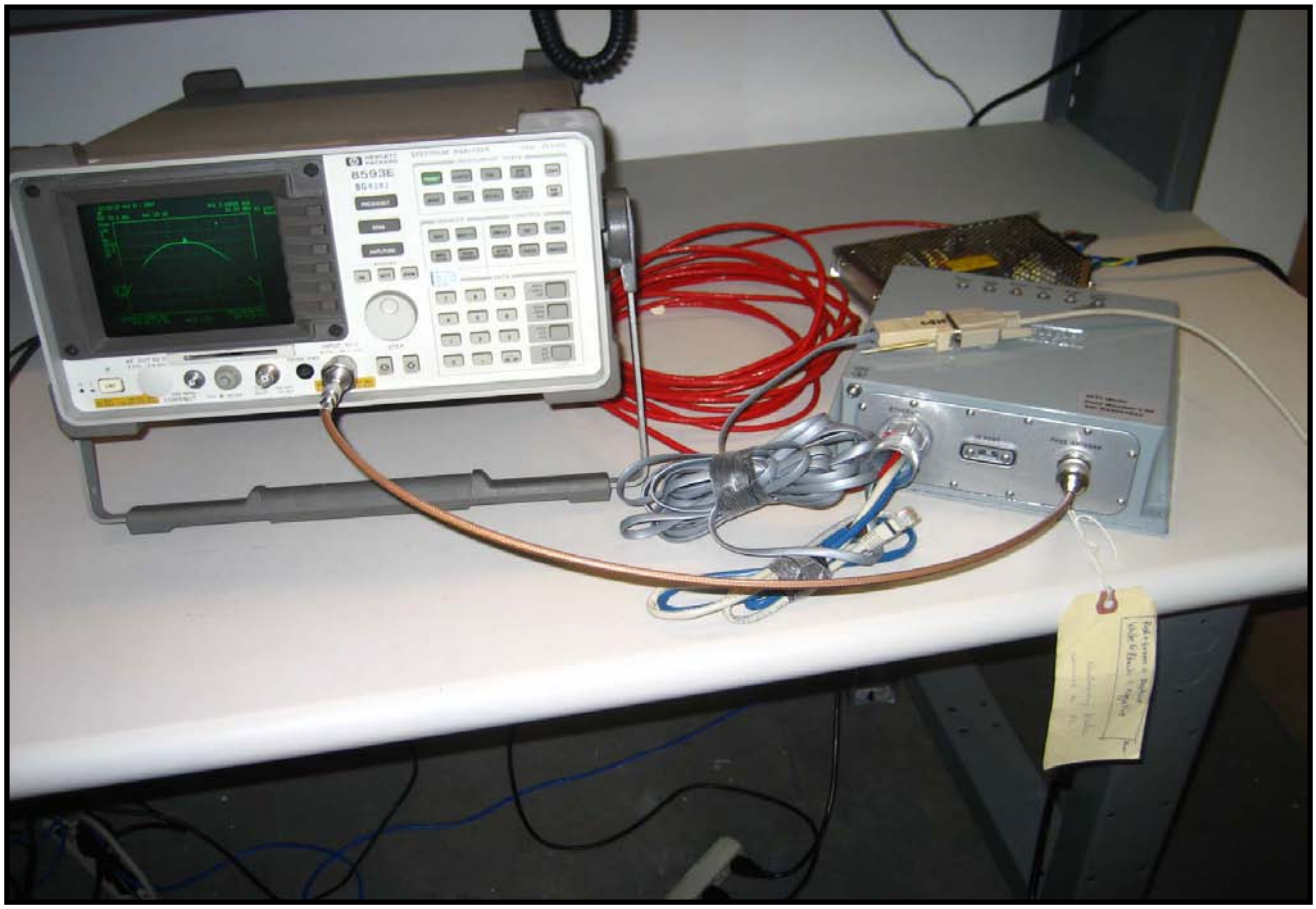


NUMBER OF HOPPING FREQUENCIES

Highest Conducted Output, High Channel					
Result:	Pass	**Value:**	3	**Limit:**	



NUMBER OF HOPPING FREQUENCIES



DWELL TIME - FHSS

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	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

NORTHWEST EMC

DWELL TIME - FHSS

XMit 2007.06.13

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/11/08
Customer:	Honeywell			Temperature:	22c°C
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	12 VDC	Job Site:	OC11

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

COMMENTS

Total Dwell time must be no greater than 400msec in a period equal to the number of hopping channels multiplied by 400msec. In this case:
Number of hopping channels = 3 channels
3 channels x 400msec = 1.2seconds = Measurement period. Total Dwell time, in 1.2 seconds = 10.75msec x 3 = 32.25msec.

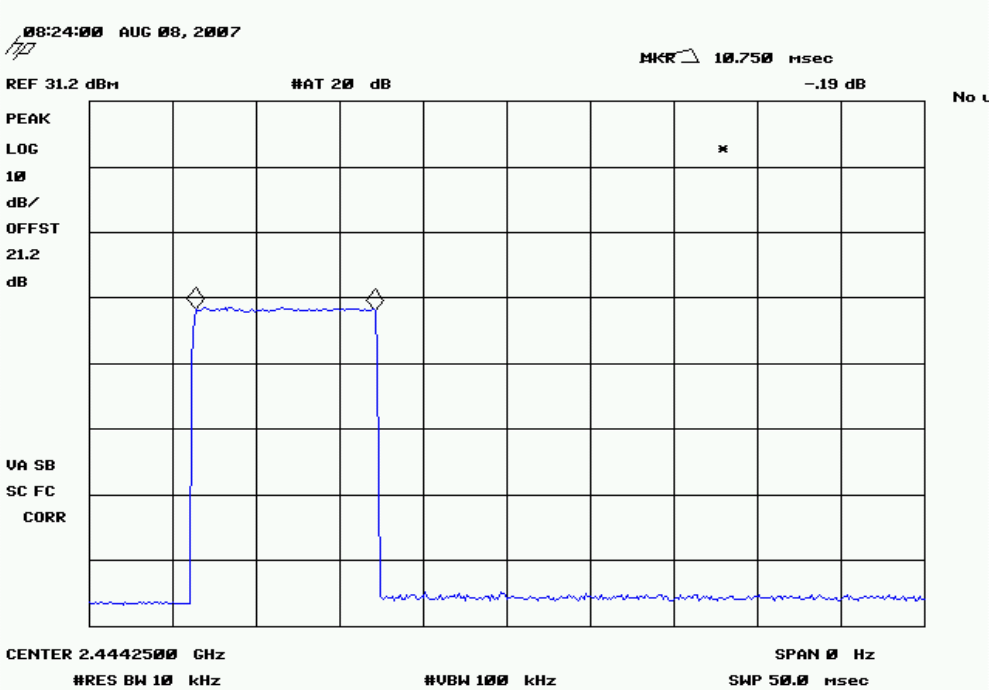
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

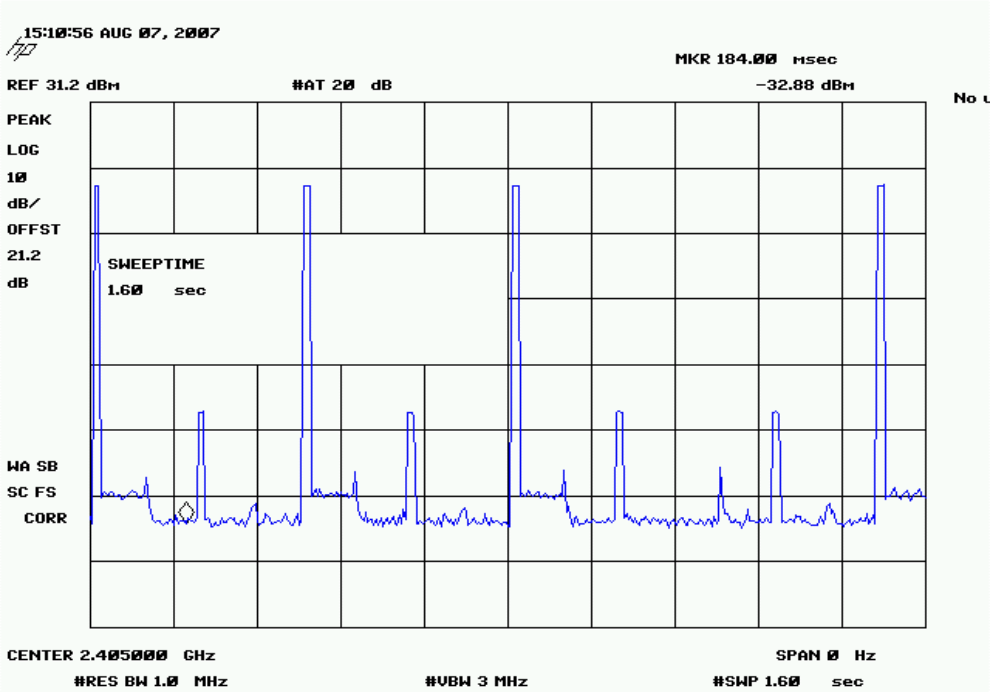
	Value	Limit	Results
Highest Output Power			
Dwell Time	10.75msec	See Comments	Pass
Dwell Time in 1.2 Seconds	4 Transmissions	See Comments	Pass

Dwell Time

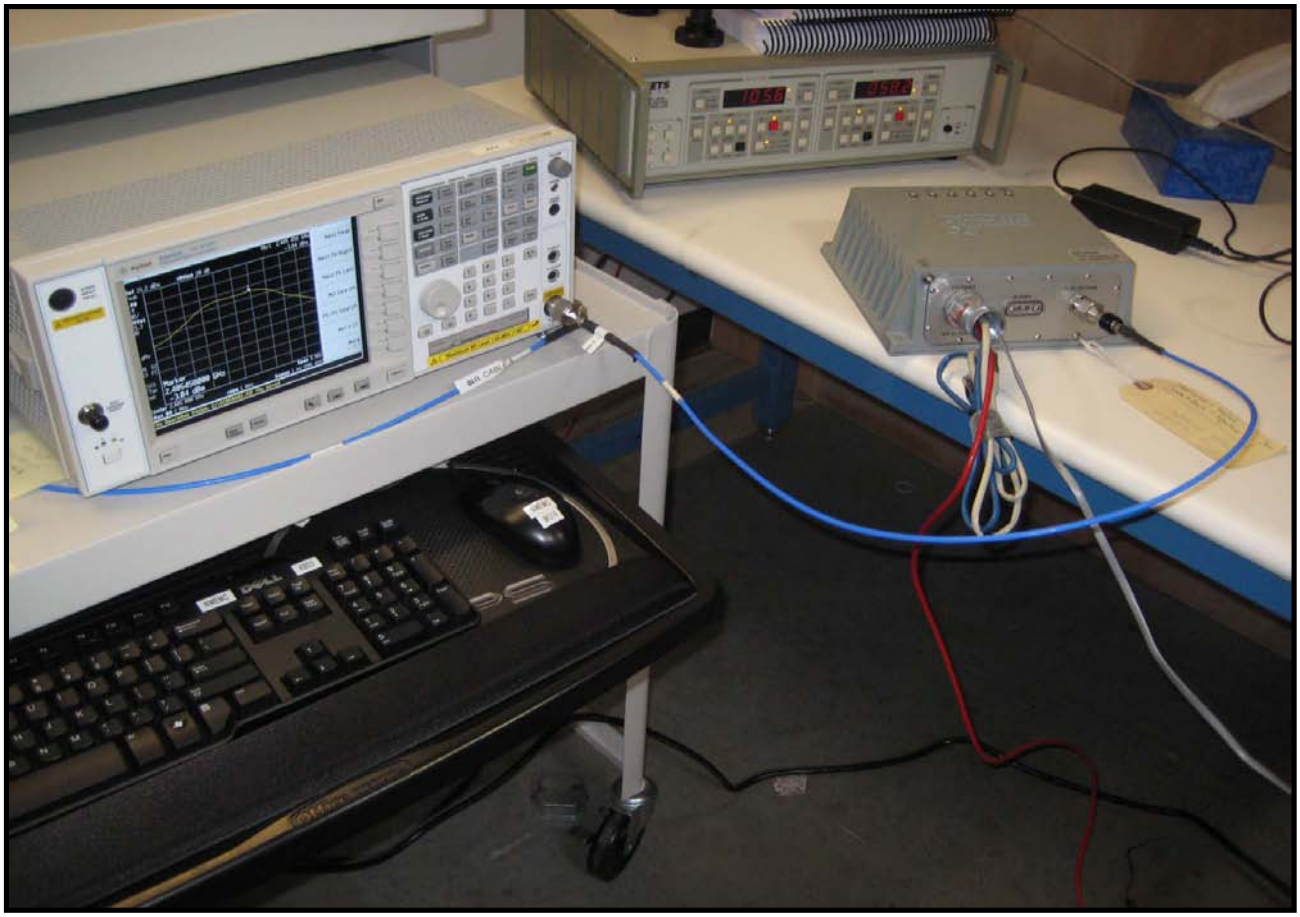
Hopping Mode					
Result:	Pass	**Value:**	10.75 mS	**Limit:**	See Comments



Hopping Mode					
Result:	Pass	**Value:**	4 Transmissions	**Limit:**	See Comments



DWELL TIME - FHSS



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	E4446A	AAQ	1/18/2007	13

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The spurious RF conducted emissions 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 using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

NORTHWEST EMC

SPURIOUS CONDUCTED EMISSIONS

XMit 2007.06.13

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio			**Work Order:**	HONE0021
Serial Number:	Part # 51306343-125 Rev A			**Date:**	08/09/07
Customer:	Honeywell			**Temperature:**	24°C
Attendees:	David Shipley			**Humidity:**	45%
Project:	None			**Barometric Pres.:**	29.83
Tested by:	Jaemi Suh	**Power:**	120VAC/60Hz	**Job Site:**	OC10

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

COMMENTS

PC Power Level = 193.

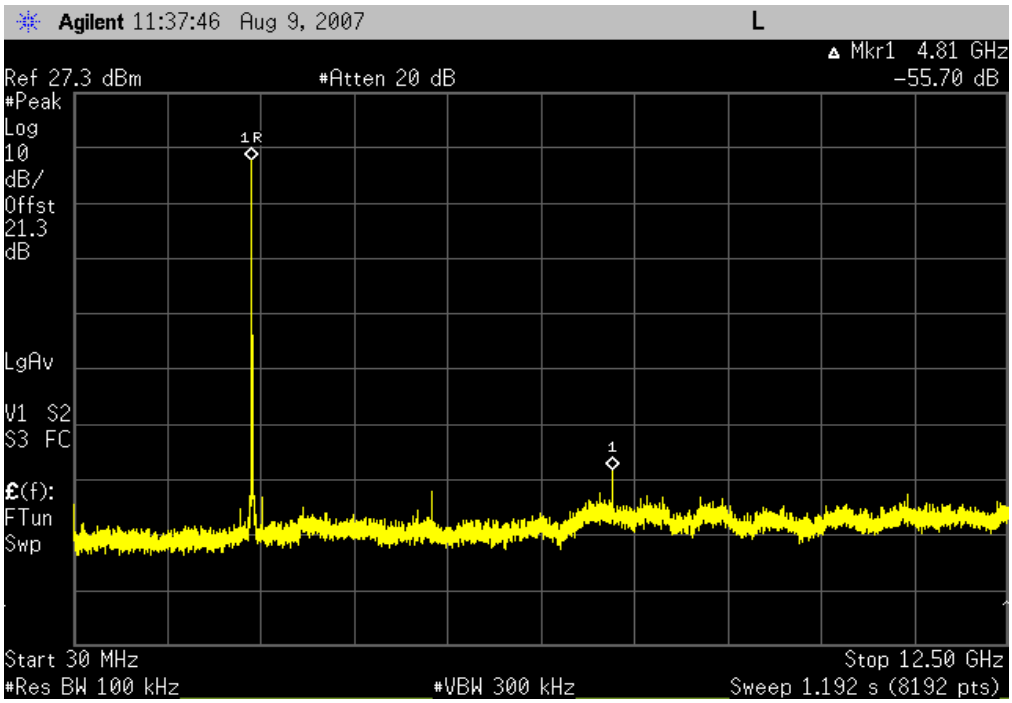
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

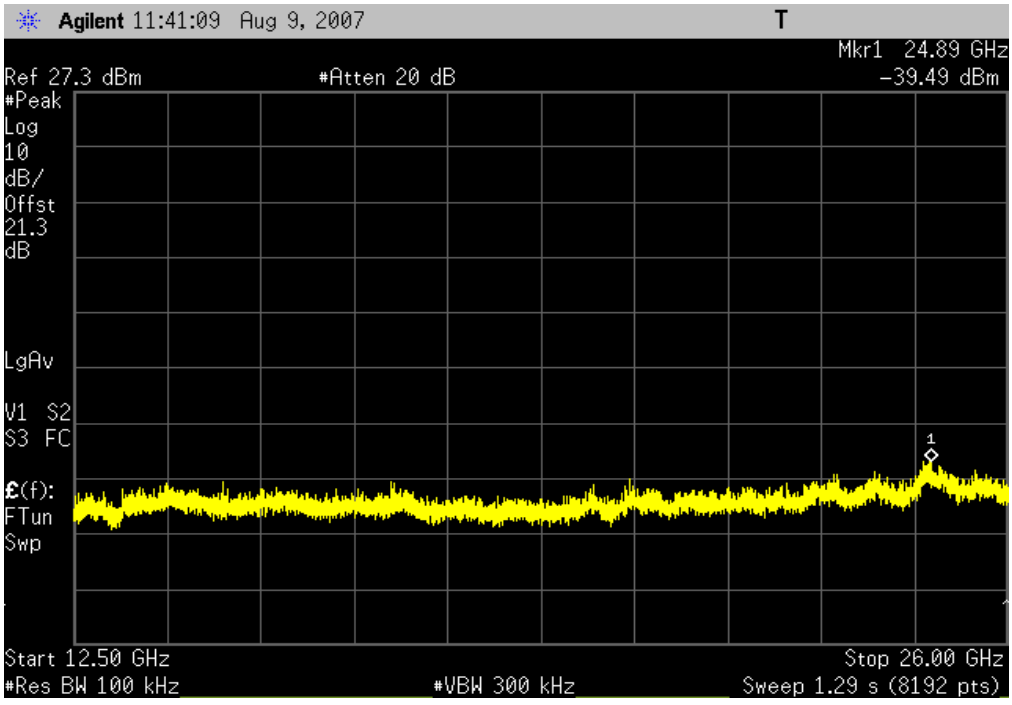
		Value	Limit	Results
Highest Output Power				
	Low Channel			
	30 Mhz - 12.5 GHz	- 55.70 dBc	≤ - 20 dBc	Pass
	12.5 GHz - 26 GHz	- 39.49 dBc	≤ - 20 dBc	Pass
	Mid Channel			
	30 Mhz - 12.5 GHz	- 49.39 dBc	≤ - 20 dBc	Pass
	12.5 GHz - 26 GHz	- 39.35 dBc	≤ - 20 dBc	Pass
	High Channel			
	30 Mhz - 12.5 GHz	- 52.00 dBc	≤ - 20 dBc	Pass
	12.5 GHz - 26 GHz	- 40.01 dBc	≤ - 20 dBc	Pass

SPURIOUS CONDUCTED EMISSIONS

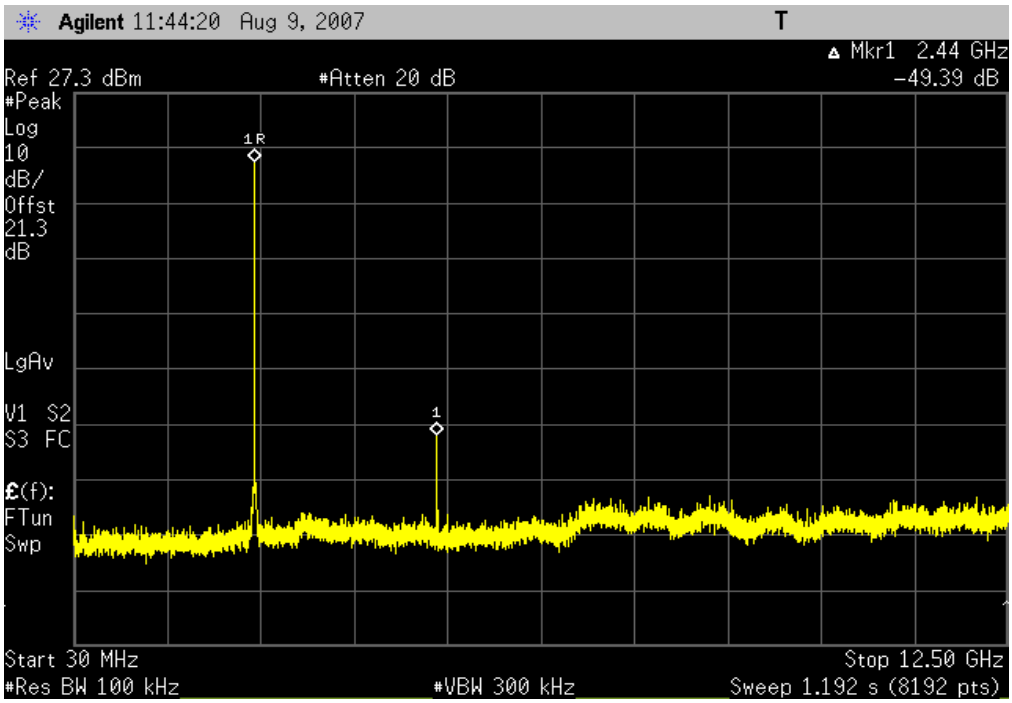
Highest Output Power, Low Channel, 30 Mhz - 12.5 GHz					
Result:	Pass	**Value:**	- 55.70 dBc	**Limit:**	≤ - 20 dBc



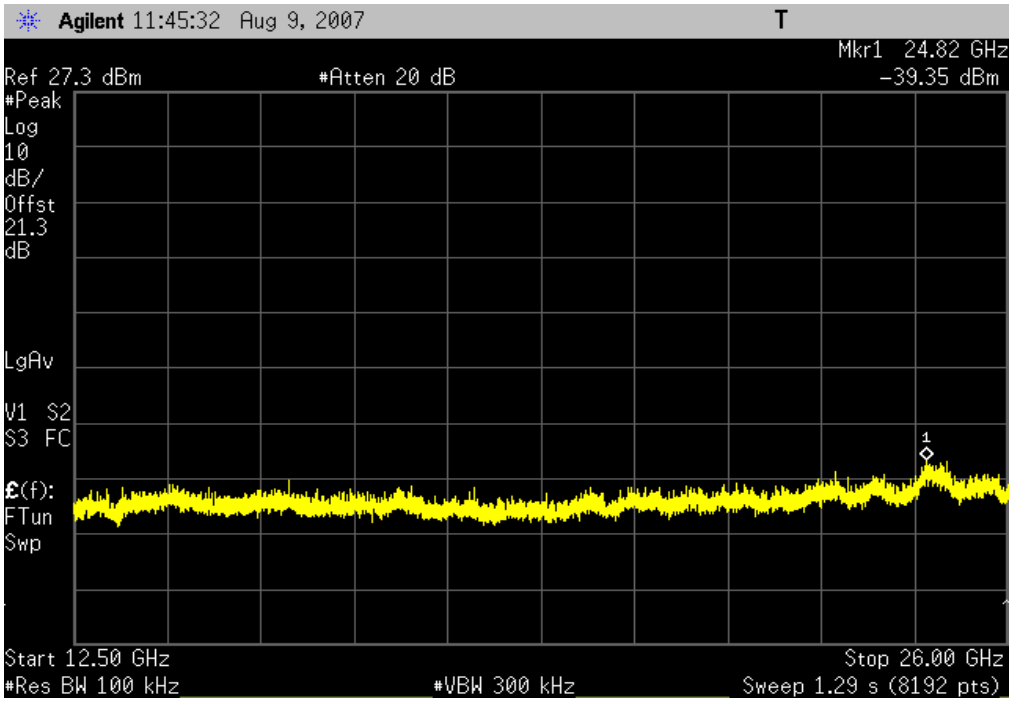
Highest Output Power, Low Channel, 12.5 GHz - 26 GHz					
Result:	Pass	**Value:**	- 39.49 dBc	**Limit:**	≤ - 20 dBc



Highest Output Power, Mid Channel, 30 Mhz - 12.5 GHz					
Result:	Pass	**Value:**	- 49.39 dBc	**Limit:**	≤ - 20 dBc

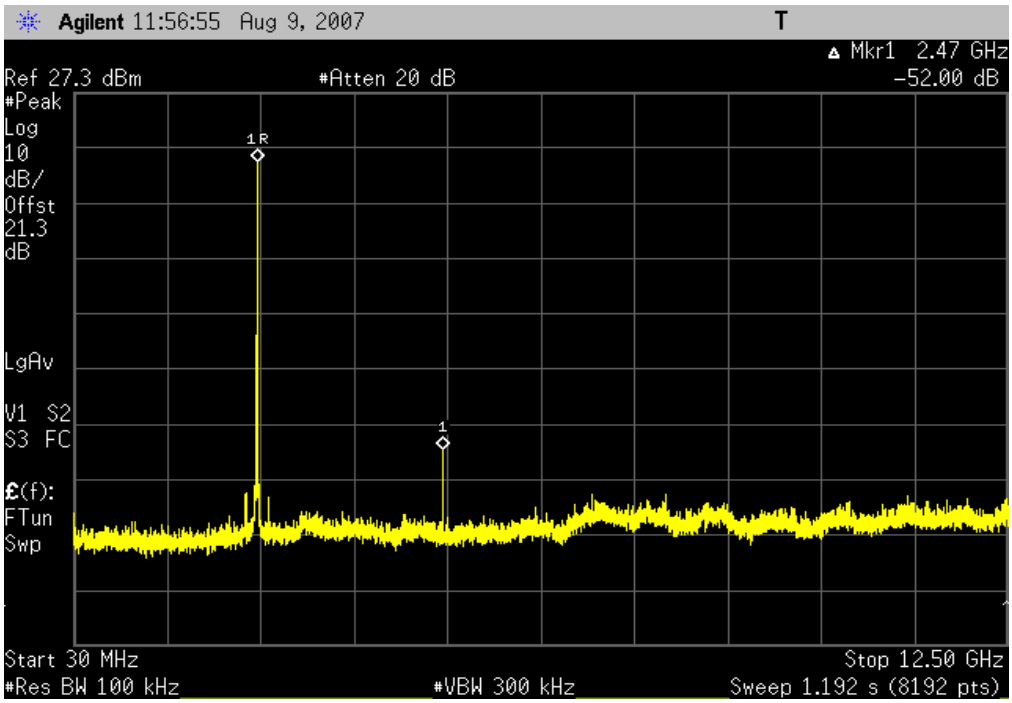


Highest Output Power, Mid Channel, 12.5 GHz - 26 GHz					
Result:	Pass	**Value:**	- 39.35 dBc	**Limit:**	≤ - 20 dBc

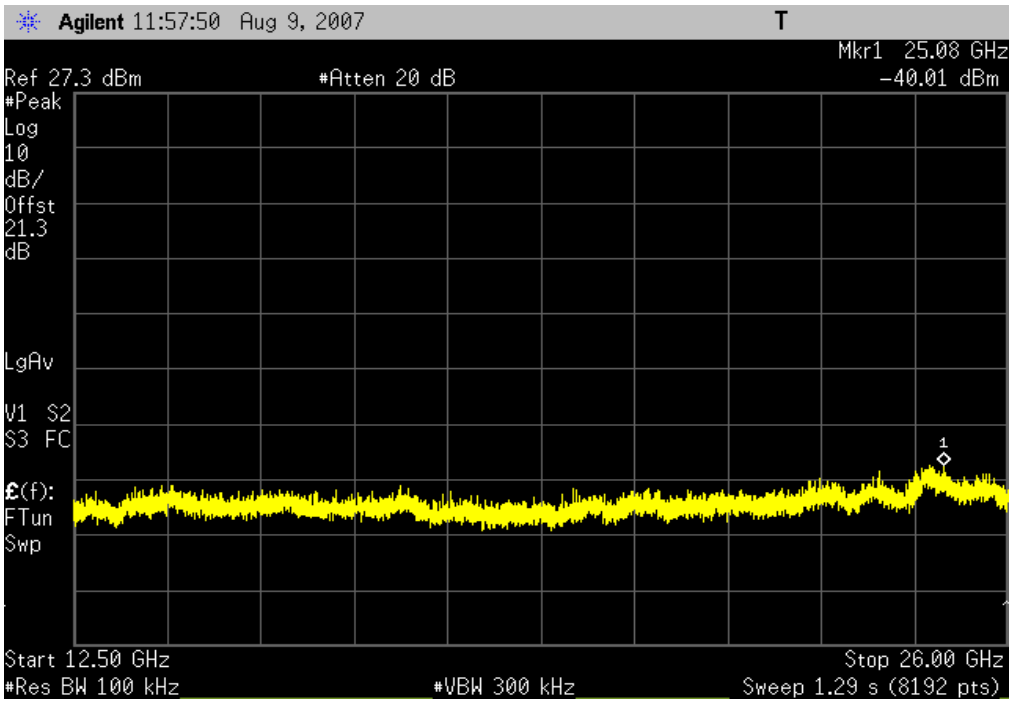


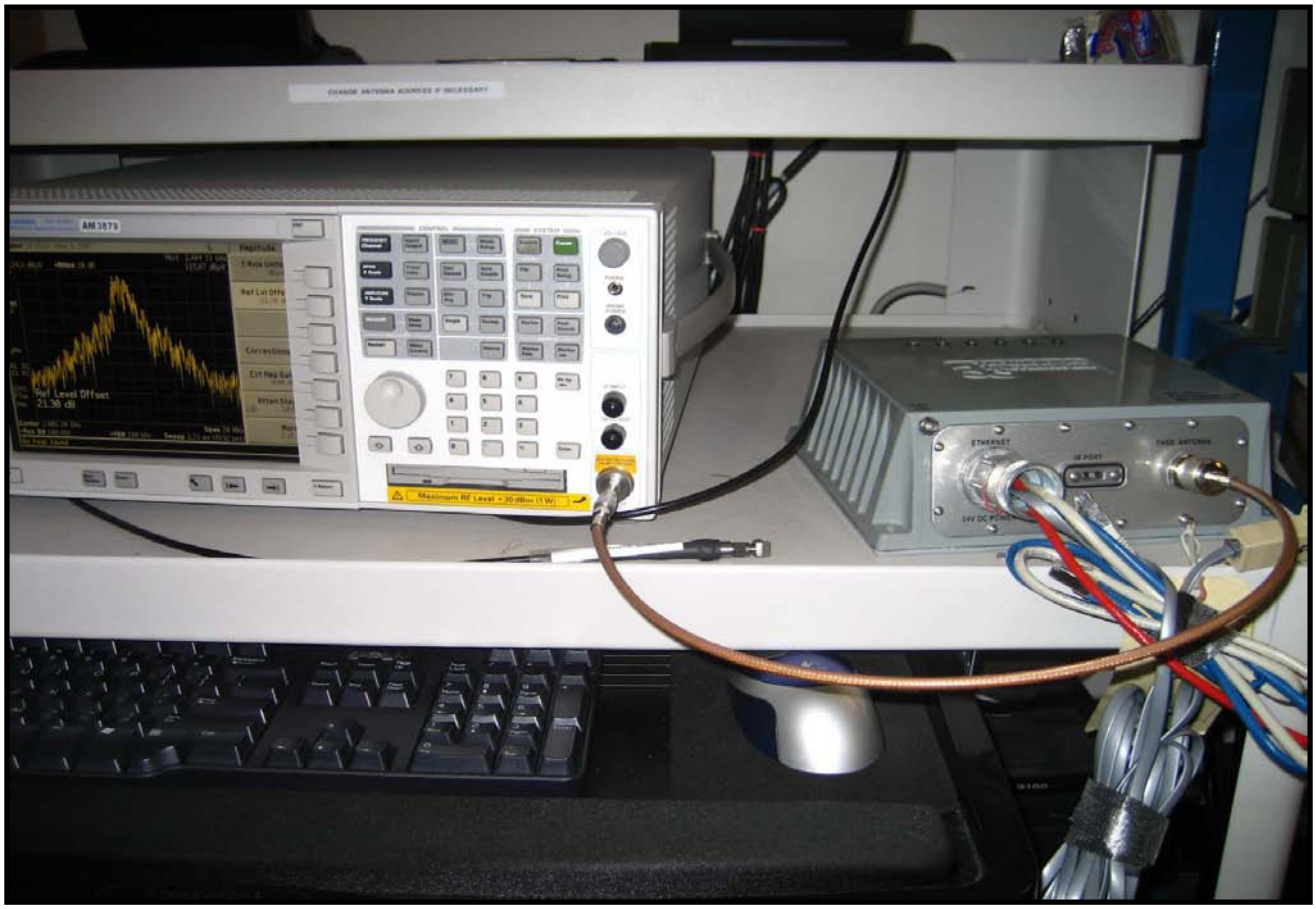
SPURIOUS CONDUCTED EMISSIONS

Highest Output Power, High Channel, 30 Mhz - 12.5 GHz					
Result:	Pass	**Value:**	- 52.00 dBc	**Limit:**	≤ - 20 dBc



Highest Output Power, High Channel, 12.5 GHz - 26 GHz					
Result:	Pass	**Value:**	- 40.01 dBc	**Limit:**	≤ - 20 dBc





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 at 2480 MHz. High Channel; Channel 80
Transmitting at 2440 MHz. Mid Channel; Channel 40
Transmitting at 2405 MHz. Low Channel; Channel 4

POWER SETTINGS INVESTIGATED

120VAC/60Hz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-24-BNC	LIB	5/8/2006	16
OC11 cables a-b-e-f			OCM	1/8/2007	13
Receiver	Rohde & Schwartz	ESCI	ARF	12/14/2006	13

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

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 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

Version 2006.11.12
PSA-ESCI 2007.05.07

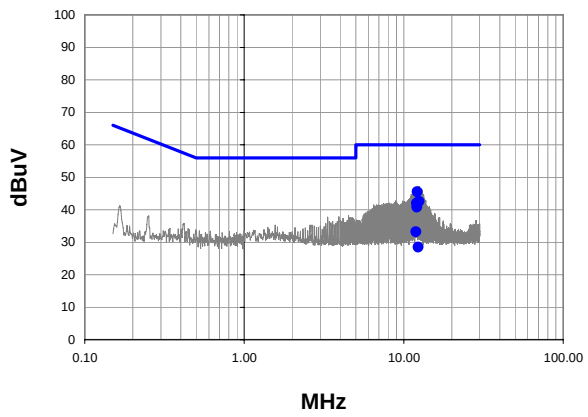
Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A
Configuration:	1
Customer:	Honeywell
Attendees:	David Shipley
EUT Power:	120VAC/60Hz
Operating Mode:	Transmitting at 2405 MHz. Low Channel; Channel 4
Deviations:	None
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.

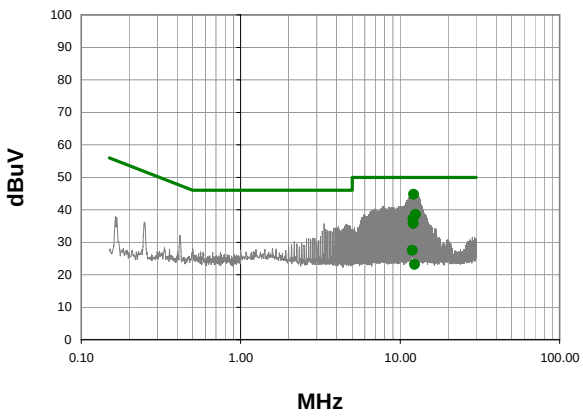
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

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)
12.188	24.5	1.0	45.5	60.0	-14.5
12.522	21.5	1.0	42.5	60.0	-17.5
12.022	21.0	1.0	42.0	60.0	-18.0
12.102	19.8	1.0	40.8	60.0	-19.2
11.942	12.2	1.0	33.2	60.0	-26.8
12.352	7.5	1.0	28.5	60.0	-31.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
12.188	23.7	1.0	44.7	50.0	-5.3
12.522	17.5	1.0	38.5	50.0	-11.5
12.022	16.2	1.0	37.2	50.0	-12.8
12.102	14.8	1.0	35.8	50.0	-14.2
11.942	6.5	1.0	27.5	50.0	-22.5
12.352	2.1	1.0	23.1	50.0	-26.9

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

Version 2006.11.12
PSA-ESCI 2007.05.07

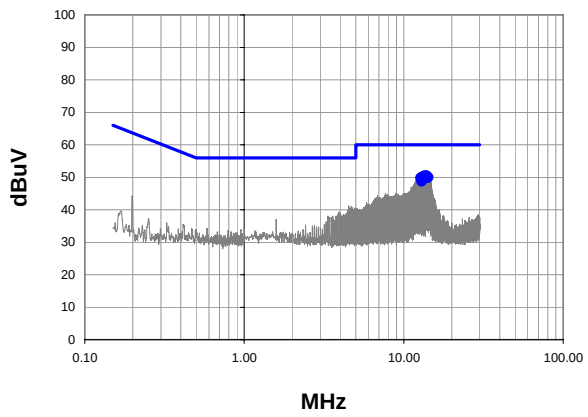
Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A
Configuration:	1
Customer:	Honeywell
Attendees:	David Shipley
EUT Power:	120VAC/60Hz
Operating Mode:	Transmitting at 2405 MHz. Low Channel; Channel 4
Deviations:	None
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.

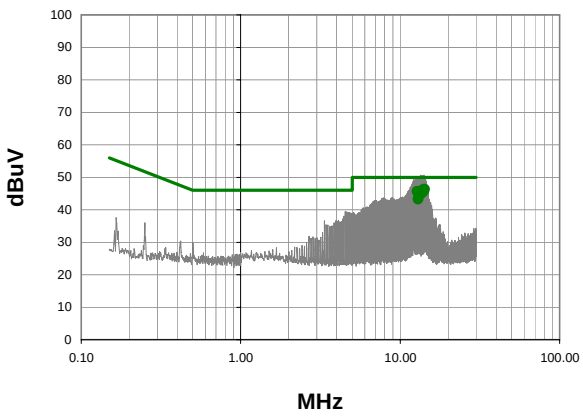
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

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)
13.568	29.4	1.1	50.5	60.0	-9.5
13.908	29.4	1.1	50.5	60.0	-9.5
13.394	29.1	1.1	50.2	60.0	-9.8
13.232	29.0	1.1	50.1	60.0	-9.9
13.068	29.0	1.1	50.1	60.0	-9.9
13.734	28.9	1.1	50.0	60.0	-10.0
14.242	28.9	1.1	50.0	60.0	-10.0
14.070	28.8	1.1	49.9	60.0	-10.1
12.814	28.7	1.0	49.7	60.0	-10.3
12.984	27.7	1.1	48.8	60.0	-11.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
14.242	25.2	1.1	46.3	50.0	-3.7
13.908	25.0	1.1	46.1	50.0	-3.9
14.070	24.6	1.1	45.7	50.0	-4.3
12.814	24.6	1.0	45.6	50.0	-4.4
13.568	24.3	1.1	45.4	50.0	-4.6
13.734	24.0	1.1	45.1	50.0	-4.9
13.068	24.0	1.1	45.1	50.0	-4.9
13.394	23.8	1.1	44.9	50.0	-5.1
13.232	23.5	1.1	44.6	50.0	-5.4
12.984	22.2	1.1	43.3	50.0	-6.7

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

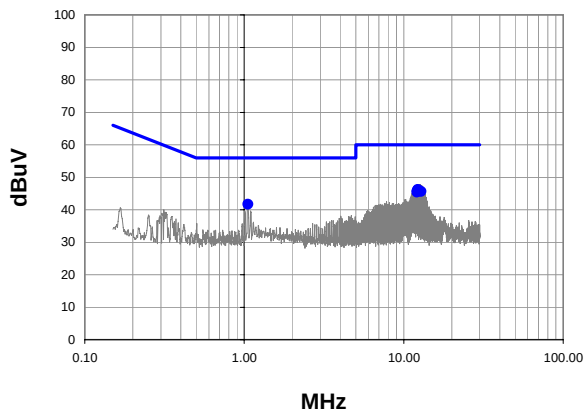
Version 2006.11.12
PSA-ESCI 2007.05.07

Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh
EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A				
Configuration:	1				
Customer:	Honeywell				
Attendees:	David Shipley				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmitting at 2440 MHz. Mid Channel; Channel 40				
Deviations:	None				
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.				

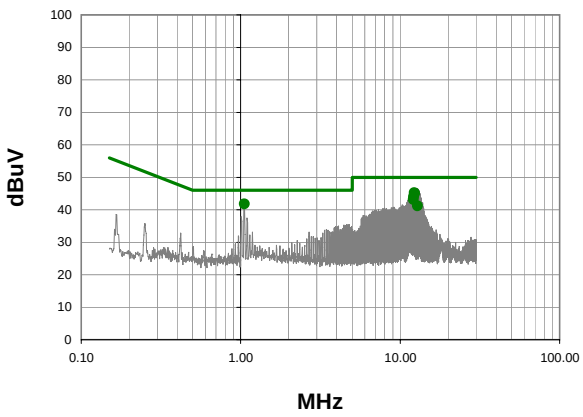
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

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)
12.254	25.2	1.0	46.2	60.0	-13.8
12.342	25.0	1.0	46.0	60.0	-14.0
12.172	24.8	1.0	45.8	60.0	-14.2
1.056	21.0	0.7	41.7	56.0	-14.3
12.844	24.6	1.0	45.6	60.0	-14.4
12.092	24.4	1.0	45.4	60.0	-14.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
1.056	21.1	0.7	41.8	46.0	-4.2
12.254	24.2	1.0	45.2	50.0	-4.8
12.342	23.9	1.0	44.9	50.0	-5.1
12.172	23.0	1.0	44.0	50.0	-6.0
12.092	22.2	1.0	43.2	50.0	-6.8
12.844	20.1	1.0	41.1	50.0	-8.9

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

Version 2006.11.12
PSA-ESCI 2007.05.07

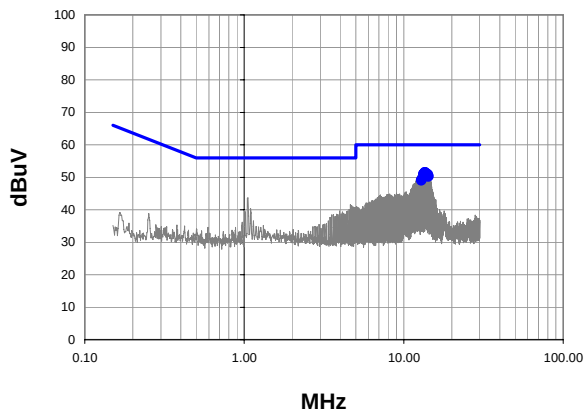
Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A
Configuration:	1
Customer:	Honeywell
Attendees:	David Shipley
EUT Power:	120VAC/60Hz
Operating Mode:	Transmitting at 2440 MHz. Mid Channel; Channel 40
Deviations:	None
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.

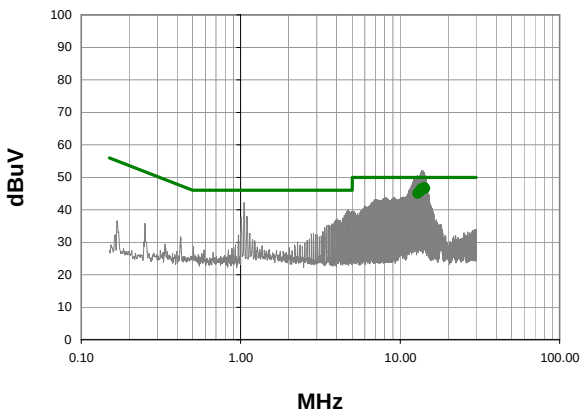
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	5	**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)
13.564	30.4	1.1	51.5	60.0	-8.5
13.642	30.4	1.1	51.5	60.0	-8.5
13.814	30.1	1.1	51.2	60.0	-8.8
13.398	30.0	1.1	51.1	60.0	-8.9
13.484	30.0	1.1	51.1	60.0	-8.9
13.310	29.9	1.1	51.0	60.0	-9.0
13.984	29.9	1.1	51.0	60.0	-9.0
14.154	29.8	1.1	50.9	60.0	-9.1
14.324	29.2	1.1	50.3	60.0	-9.7
12.892	28.0	1.1	49.1	60.0	-11.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
14.154	25.7	1.1	46.8	50.0	-3.2
14.324	25.4	1.1	46.5	50.0	-3.5
13.642	25.3	1.1	46.4	50.0	-3.6
13.564	25.2	1.1	46.3	50.0	-3.7
13.814	25.2	1.1	46.3	50.0	-3.7
13.984	25.2	1.1	46.3	50.0	-3.7
13.310	24.7	1.1	45.8	50.0	-4.2
13.398	24.7	1.1	45.8	50.0	-4.2
13.484	24.6	1.1	45.7	50.0	-4.3
12.892	24.0	1.1	45.1	50.0	-5.0

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

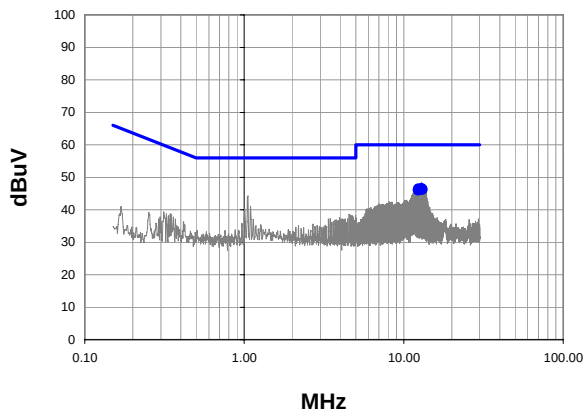
Version 2006.11.12
PSA-ESCI 2007.05.07

Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh
EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A				
Configuration:	1				
Customer:	Honeywell				
Attendees:	David Shipley				
EUT Power:	120VAC/60Hz				
Operating Mode:	Transmitting at 2480 MHz. High Channel; Channel 80				
Deviations:	None				
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.				

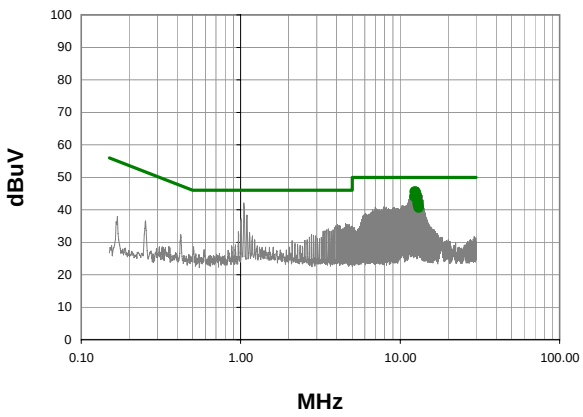
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	6	**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)
12.988	25.4	1.1	46.5	60.0	-13.5
12.902	25.4	1.1	46.5	60.0	-13.5
12.398	25.4	1.0	46.4	60.0	-13.6
12.728	25.2	1.0	46.2	60.0	-13.8
12.482	25.2	1.0	46.2	60.0	-13.8
13.068	25.1	1.1	46.2	60.0	-13.8
12.312	25.0	1.0	46.0	60.0	-14.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
12.398	24.5	1.0	45.5	50.0	-4.5
12.482	24.4	1.0	45.4	50.0	-4.6
12.312	23.0	1.0	44.0	50.0	-6.0
12.728	22.9	1.0	43.9	50.0	-6.1
12.902	21.2	1.1	42.3	50.0	-7.7
12.988	20.4	1.1	41.5	50.0	-8.5
13.068	19.6	1.1	40.7	50.0	-9.3

NORTHWEST

EMC AC POWERLINE CONDUCTED EMISSIONS

Version 2006.11.12
PSA-ESCI 2007.05.07

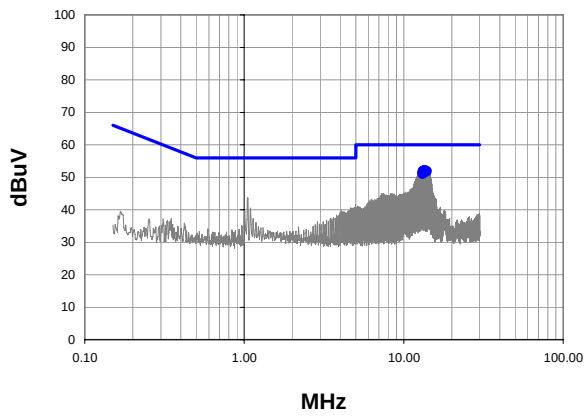
Work Order:	HONE0021	**Date:**	08/13/07		
Project:	None	**Temperature:**	23		
Job Site:	OC06	**Humidity:**	46		
Serial Number:	None	**Barometric Pres.:**	1015.0 mb	**Tested by:**	Jaemi Suh

EUT:	Multinode 2.4GHz 802.15.4 DSSS-FH Radio, Part # 51306343-125 Rev A
Configuration:	1
Customer:	Honeywell
Attendees:	David Shipley
EUT Power:	120VAC/60Hz
Operating Mode:	Transmitting at 2480 MHz. High Channel; Channel 80
Deviations:	None
Comments:	Highest Gain Antenna 14 dBi. PC Power Level: 193. 1m Cable.

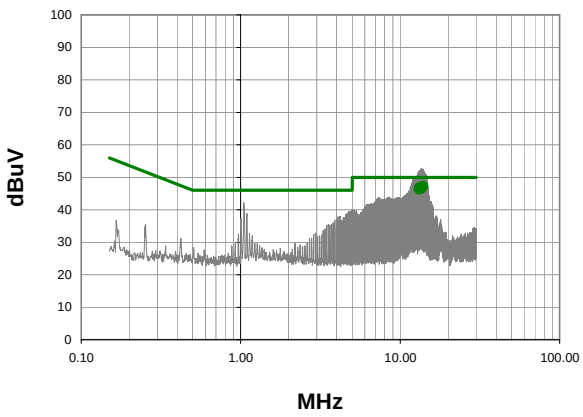
Test Specifications	**Class B**	**Test Method**
FCC 15.207:2006		ANSI C63.4:2003

Run #	8	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit

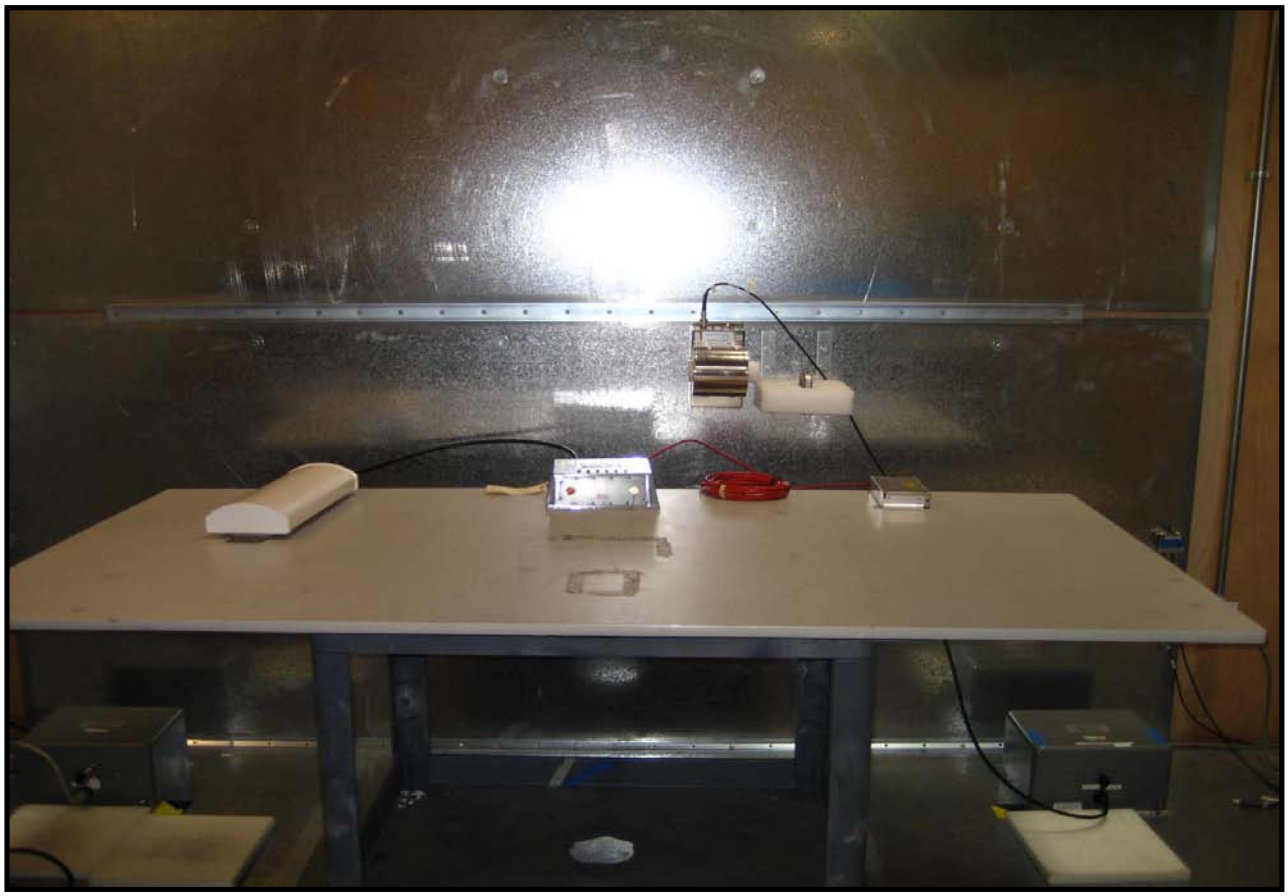


Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.496	30.9	1.1	52.0	60.0	-8.0
13.326	30.8	1.1	51.9	60.0	-8.1
13.666	30.8	1.1	51.9	60.0	-8.1
13.920	30.7	1.1	51.8	60.0	-8.2
13.244	30.6	1.1	51.7	60.0	-8.3
13.584	30.6	1.1	51.7	60.0	-8.3
13.160	30.1	1.1	51.2	60.0	-8.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.920	26.1	1.1	47.2	50.0	-2.8
13.326	25.7	1.1	46.8	50.0	-3.2
13.666	25.7	1.1	46.8	50.0	-3.2
13.496	25.6	1.1	46.7	50.0	-3.3
13.244	25.5	1.1	46.6	50.0	-3.4
13.584	25.4	1.1	46.5	50.0	-3.5
13.160	25.2	1.1	46.3	50.0	-3.7




S-100F-24
INPUT: 100-120VAC 3.15A
200-240VAC 1.5A
50/60Hz
OUTPUT: +24V 4.5A
Intended for Installation in a Protected Environment
MADE IN TAIWAN
CA17062403

OUTPUT POWER - DSSS

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	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

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

NORTHWEST EMC

OUTPUT POWER - DSSS

XMit 2007.06.13

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			**Work Order:**	HONE0028
Serial Number:	None			**Date:**	03/11/08
Customer:	Honeywell			**Temperature:**	22c°C
Attendees:	David Shipley			**Humidity:**	40%
Project:	None			**Barometric Pres.:**	1019 mb
Tested by:	Jaemi Suh	**Power:**	12 VDC	**Job Site:**	OC11

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

COMMENTS

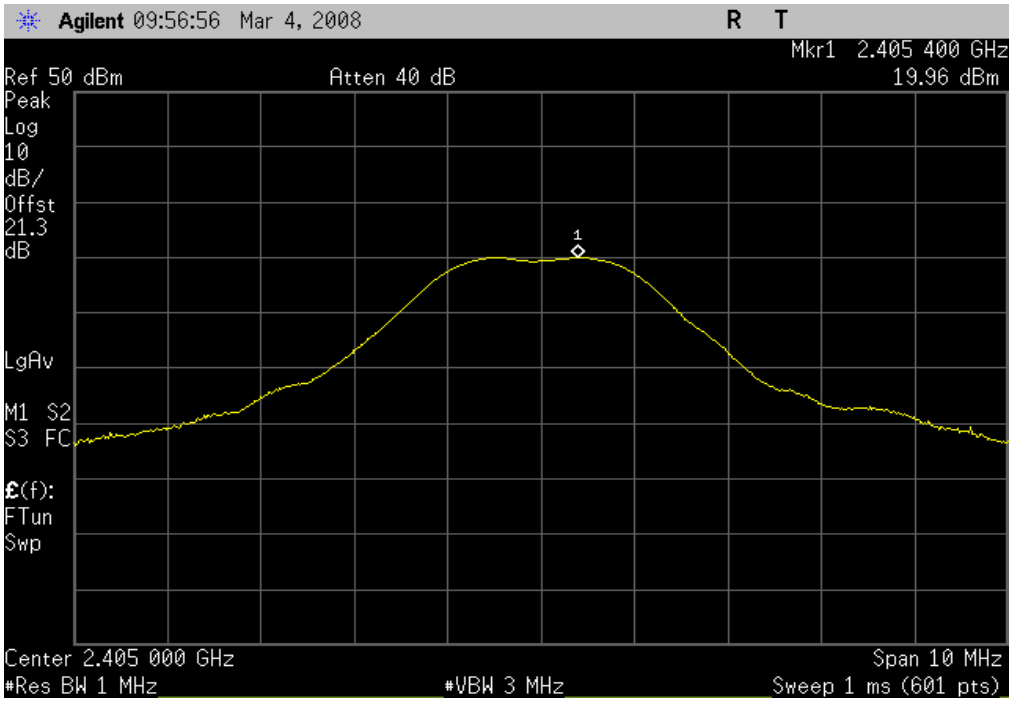
Highest Gain Antenna 14dBi. PC Power Level: 193. CHIP PA level = -10 dBm
Midde Gain Antenna 8 dBi. PC Power Level: 193 CHIP PA level = -3 dBm
Lowest Gain Antenna 5dBi. PC Power Level: 193. CHIP PA level = -1 dBm

DEVIATIONS FROM TEST STANDARD

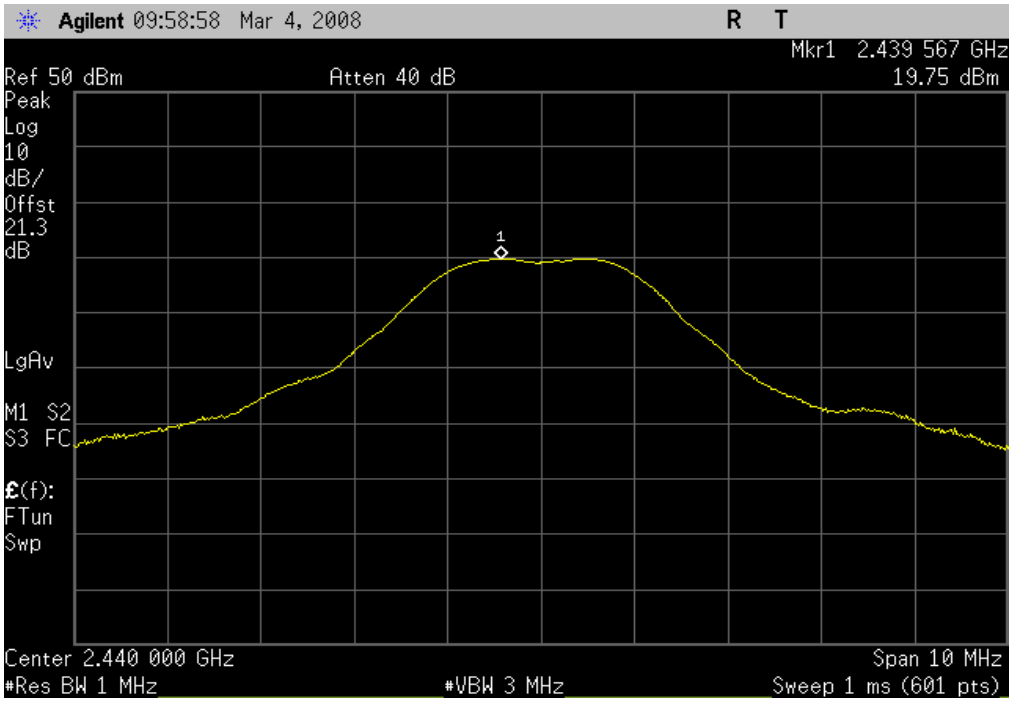
Configuration #	1	Signature

		Value	Limit	Results
DSSS Output Power				
	Low Gain Antenna			
	Low Channel	19.96 dBm	30 dBm	Pass
	Mid Channel	19.75 dBm	30 dBm	Pass
	High Channel	19.12 dBm	30 dBm	Pass
	Middle Gain Antenna			
	Low Channel	19.26 dBm	28 dBm	Pass
	Mid Channel	18.87 dBm	28 dBm	Pass
	High Channel	17.93 dBm	28 dBm	Pass
	Highest Gain Antenna			
	Low Channel	14.57 dBm	22 dBm	Pass
	Mid Channel	12.68 dBm	22 dBm	Pass
	High Channel	11.54 dBm	22 dBm	Pass

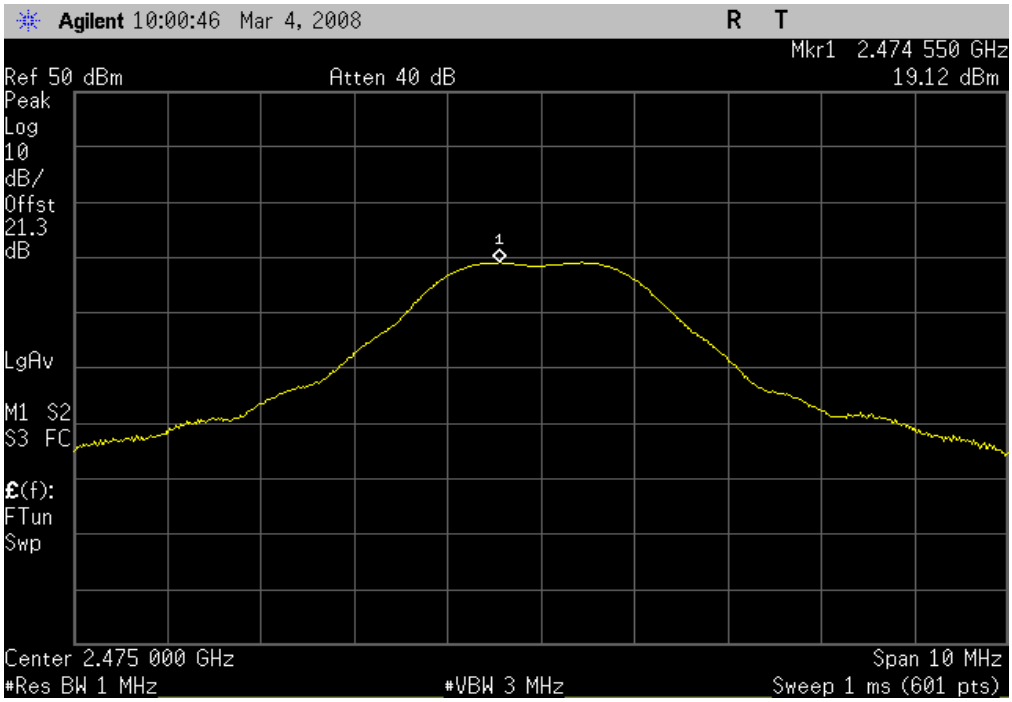
DSSS Output Power,Low Gain Antenna, Low Channel					
Result:	Pass	**Value:**	19.96 dBm	**Limit:**	30 dBm



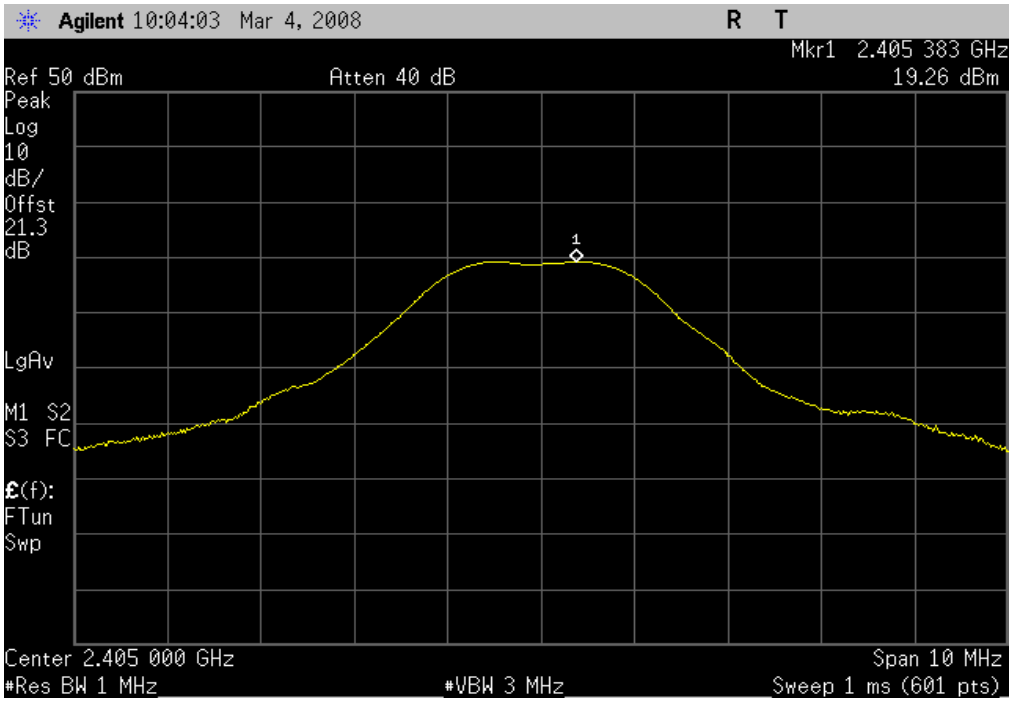
DSSS Output Power,Low Gain Antenna, Mid Channel					
Result:	Pass	**Value:**	19.75 dBm	**Limit:**	30 dBm



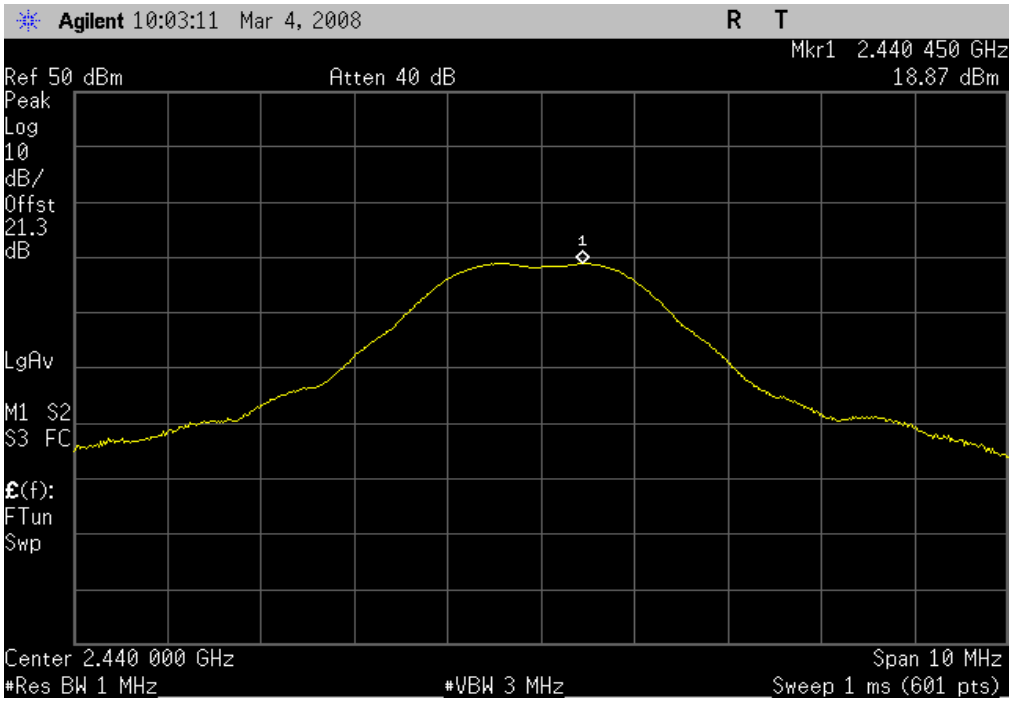
DSSS Output Power,Low Gain Antenna, High Channel					
Result:	Pass	**Value:**	19.12 dBm	**Limit:**	30 dBm



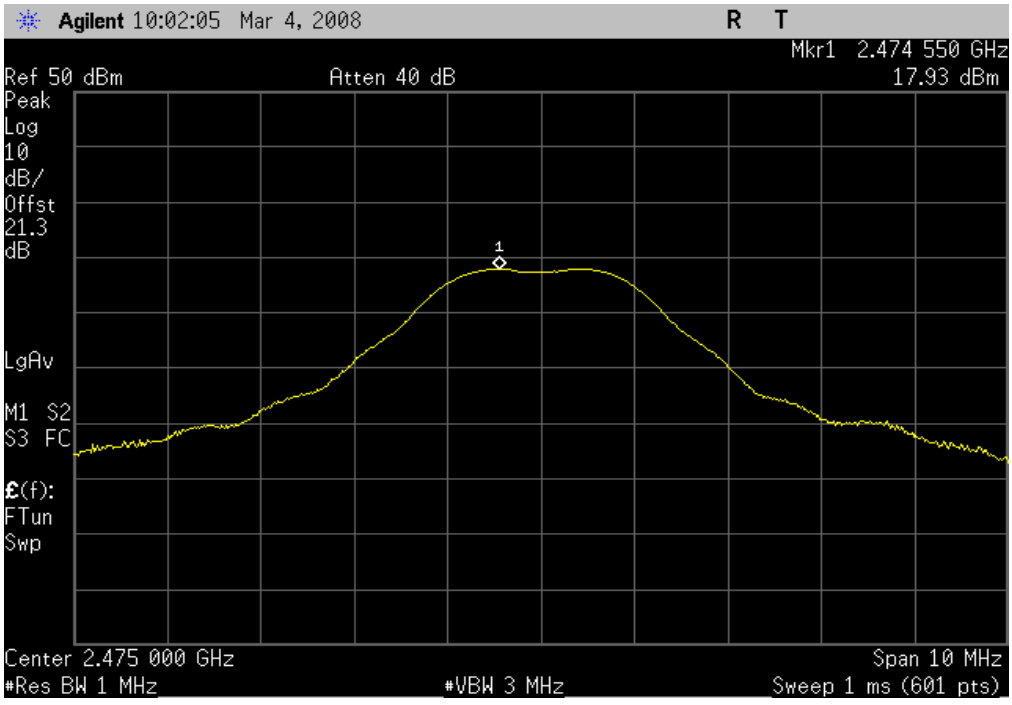
DSSS Output Power, Middle Gain Antenna, Low Channel					
Result:	Pass	**Value:**	19.26 dBm	**Limit:**	28 dBm



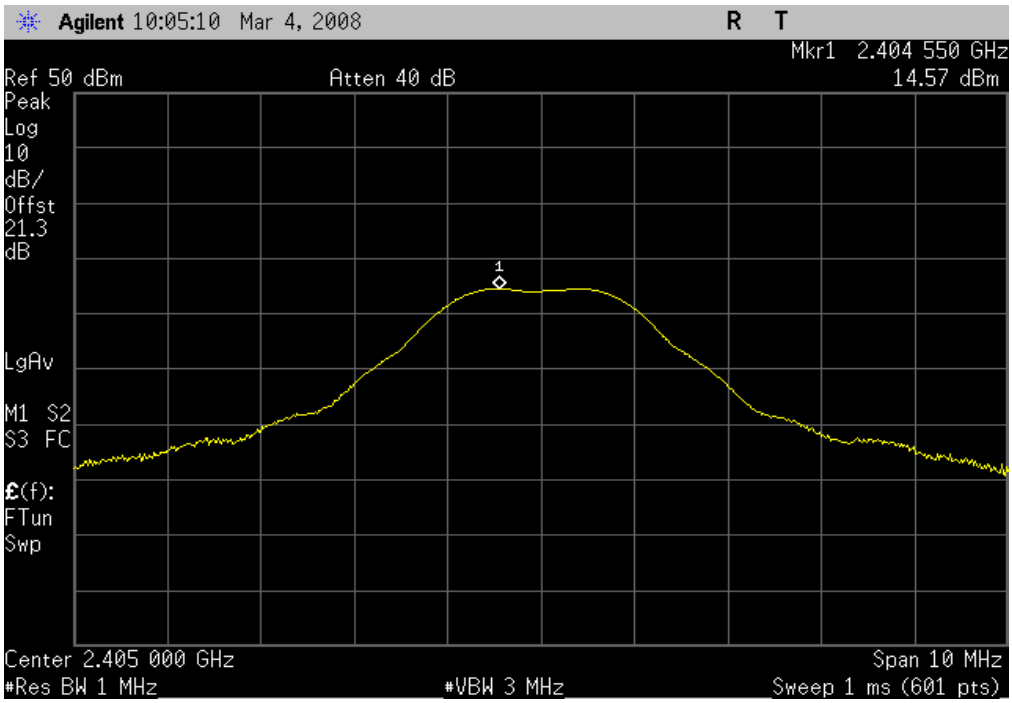
DSSS Output Power, Middle Gain Antenna, Mid Channel					
Result:	Pass	**Value:**	18.87 dBm	**Limit:**	28 dBm



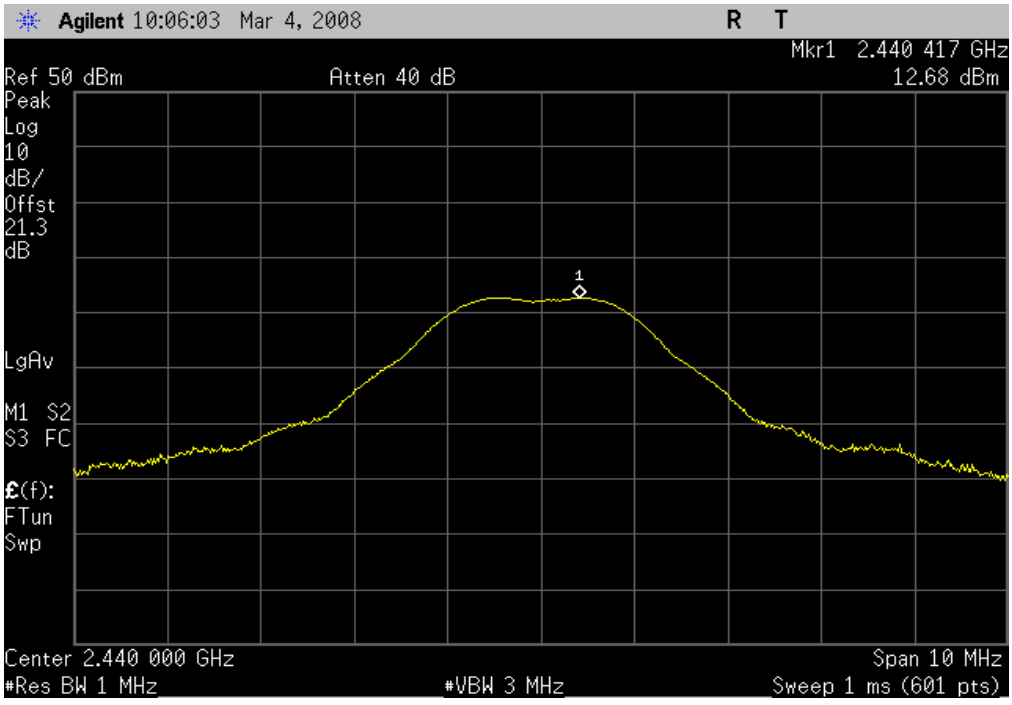
DSSS Output Power, Middle Gain Antenna, High Channel					
Result:	Pass	**Value:**	17.93 dBm	**Limit:**	28 dBm



DSSS Output Power,Highest Gain Antenna, Low Channel					
Result:	Pass	**Value:**	14.57 dBm	**Limit:**	22 dBm

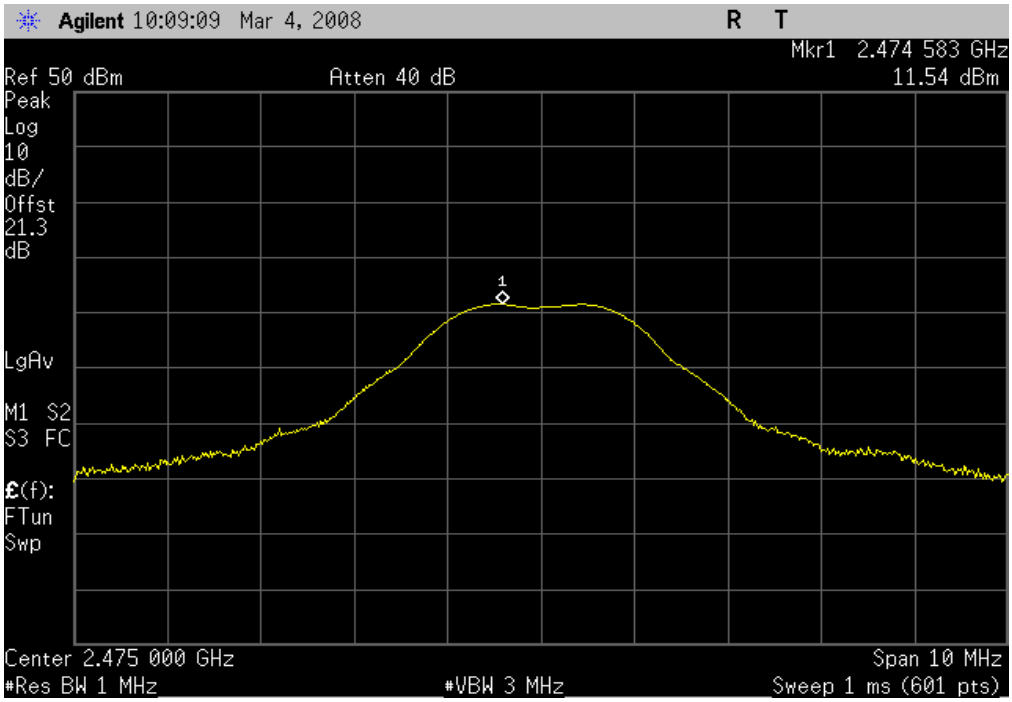


DSSS Output Power,Highest Gain Antenna, Mid Channel					
Result:	Pass	**Value:**	12.68 dBm	**Limit:**	22 dBm

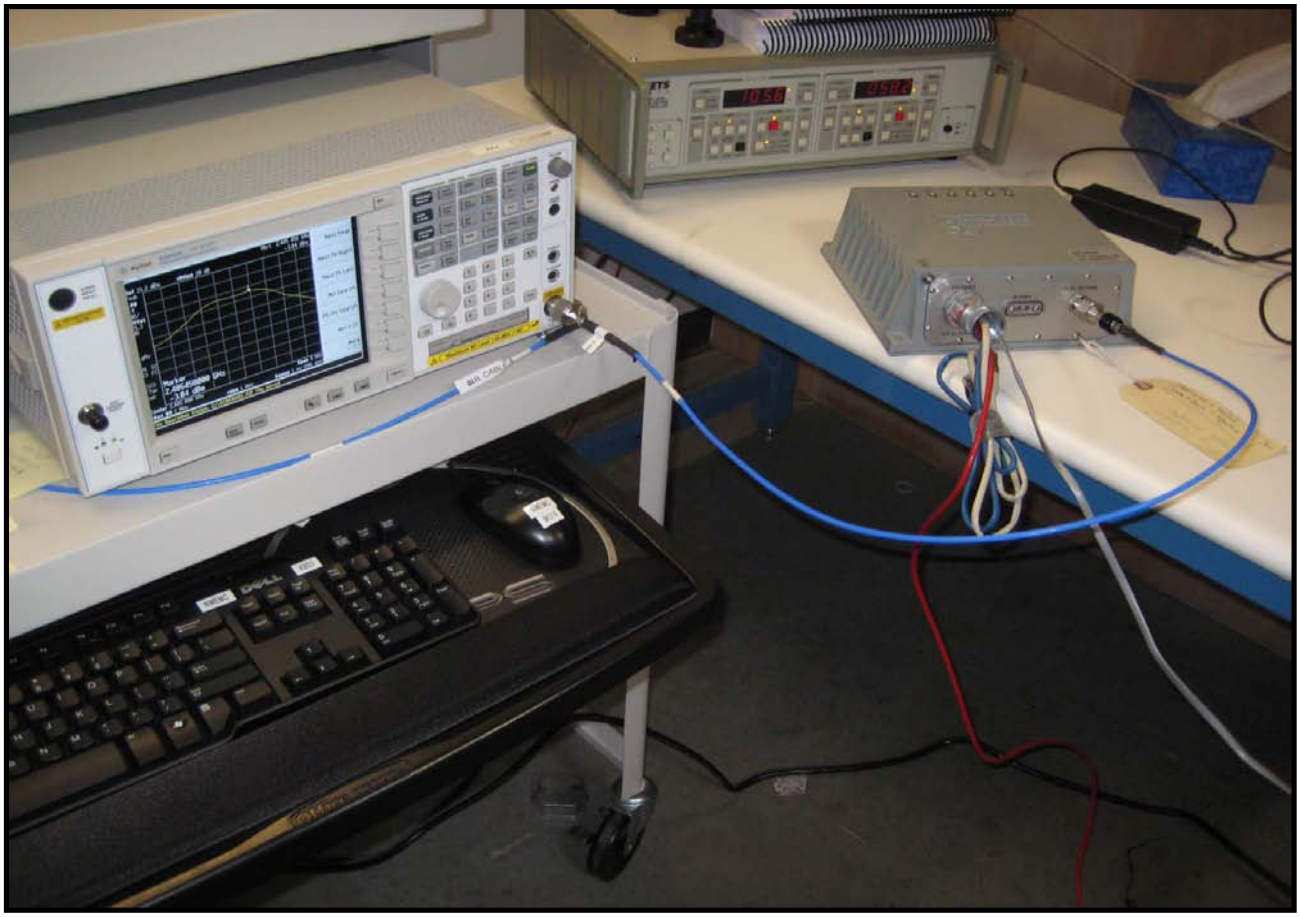


OUTPUT POWER - DSSS

DSSS Output Power,Highest Gain Antenna, High Channel					
Result:	Pass	**Value:**	11.54 dBm	**Limit:**	22 dBm



OUTPUT POWER - DSSS



BAND EDGE COMPLIANCE - DSSS

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	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

NORTHWEST EMC

BAND EDGE COMPLIANCE - DSSS

XMit 2007.06.13

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			**Work Order:**	HONE0028
Serial Number:	None			**Date:**	03/10/08
Customer:	Honeywell			**Temperature:**	22c°C
Attendees:	David Shipley			**Humidity:**	40%
Project:	None			**Barometric Pres.:**	1019 mb
Tested by:	Jaemi Suh	**Power:**	12 VDC	**Job Site:**	OC11

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

COMMENTS

PC Power Level: 193. CHIP PA level = -1 dBm. Cable Loss = 0.9 dBm

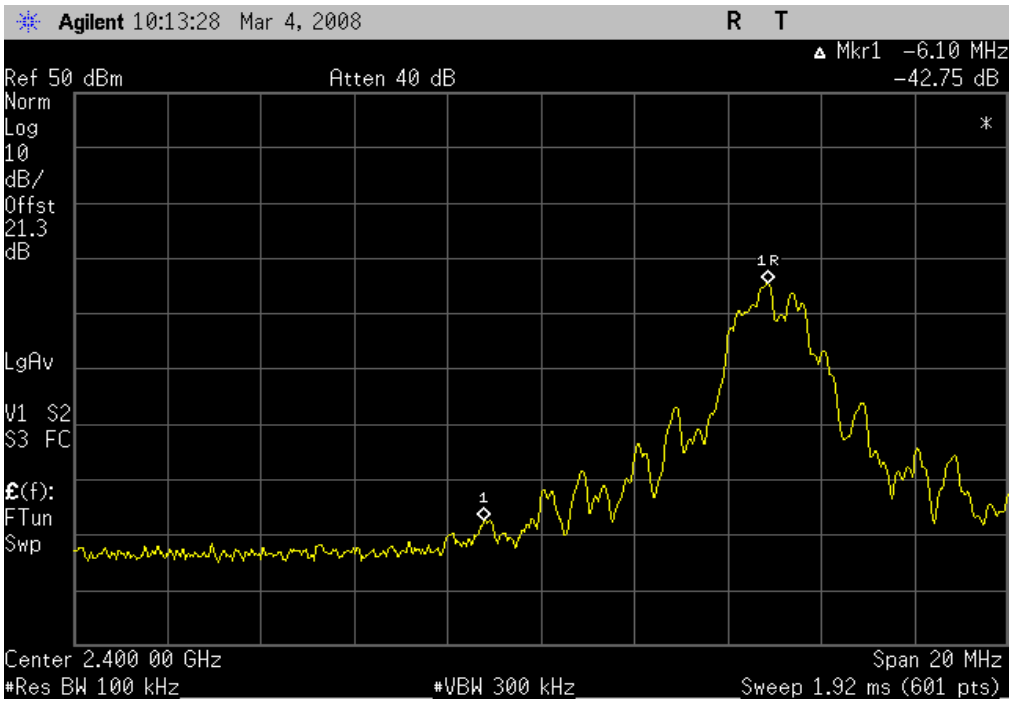
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

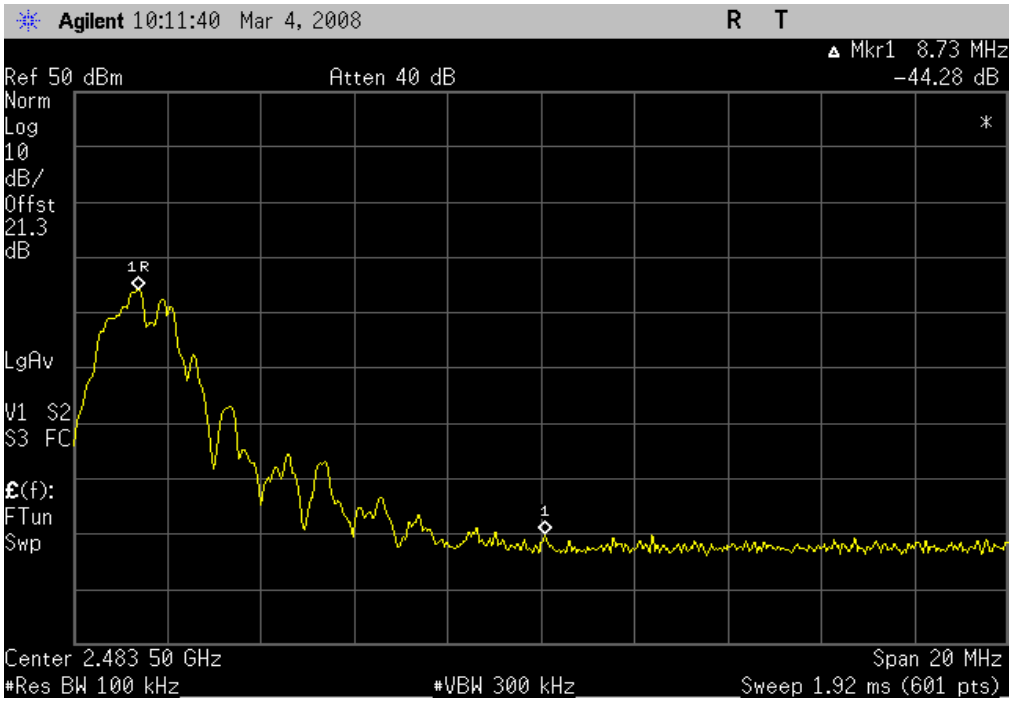
		Value	Limit	Results
Band Edge				
	Low Channel	-42.75 dBc	≤ - 20 dBc	Pass
	High Channel	-44.28 dBc	≤ - 20 dBc	Pass

BAND EDGE COMPLIANCE - DSSS

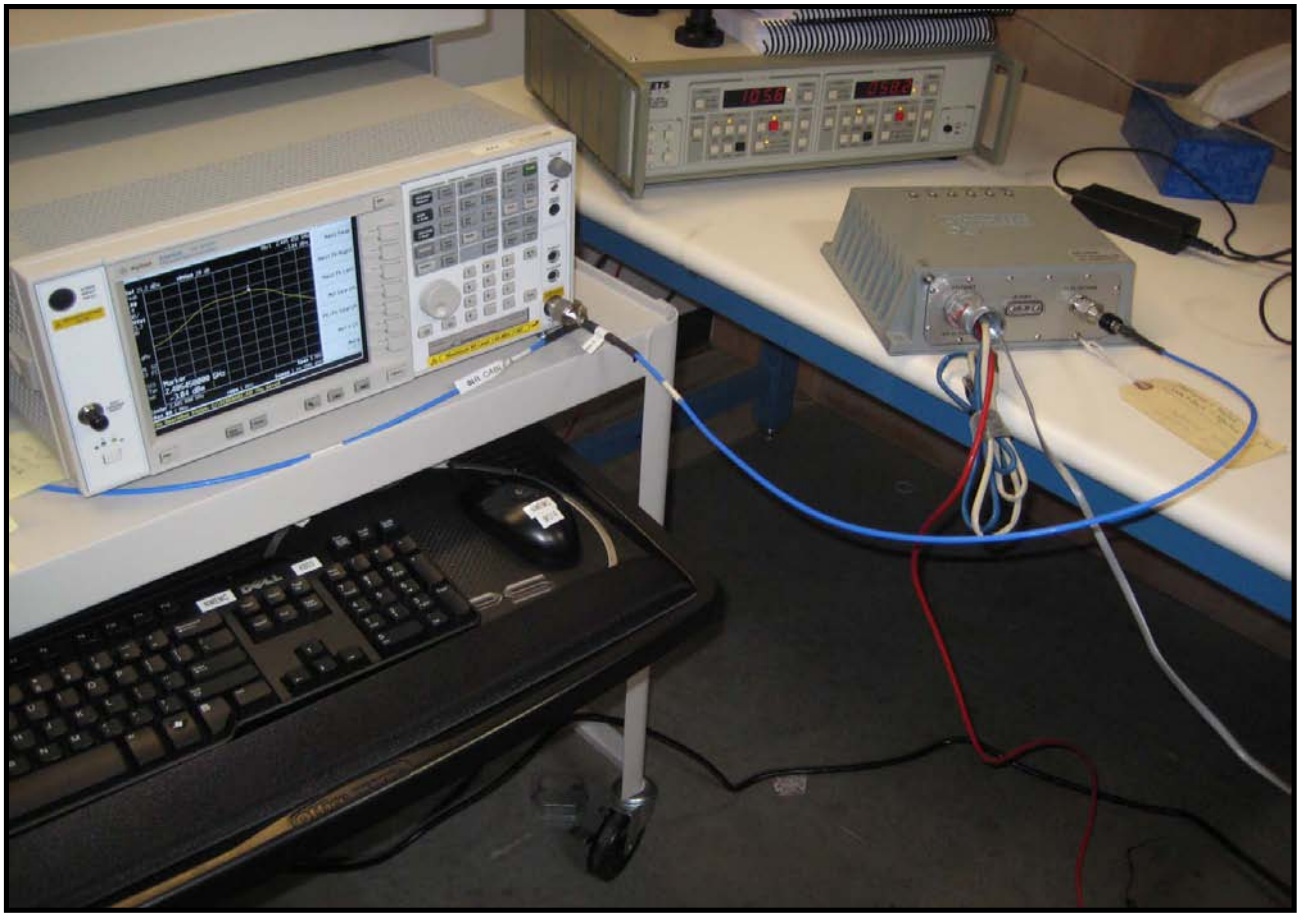
Band Edge , Low Channel					
Result:	Pass	**Value:**	-42.75 dBc	**Limit:**	≤ - 20 dBc



Band Edge , High Channel					
Result:	Pass	**Value:**	-44.28 dBc	**Limit:**	≤ - 20 dBc



BAND EDGE COMPLIANCE - DSSS



6 dB - OCCUPIED BANDWIDTH - DSSS

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	AAX	10/1/2007	12

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

NORTHWEST EMC

6 dB - OCCUPIED BANDWIDTH - DSSS

XMit 2007.06.13

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			**Work Order:**	HONE0028
Serial Number:	None			**Date:**	03/10/08
Customer:	Honeywell			**Temperature:**	22c°C
Attendees:	David Shipley			**Humidity:**	40%
Project:	None			**Barometric Pres.:**	1019 mb
Tested by:	Jaemi Suh	**Power:**	12 VDC	**Job Site:**	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

COMMENTS

PC Power Level=193 PA Level= -1. Cable Loss =0.9. Limit is equal to 1.5 * 5 MHz (Channel Spacing) = 500 kHz

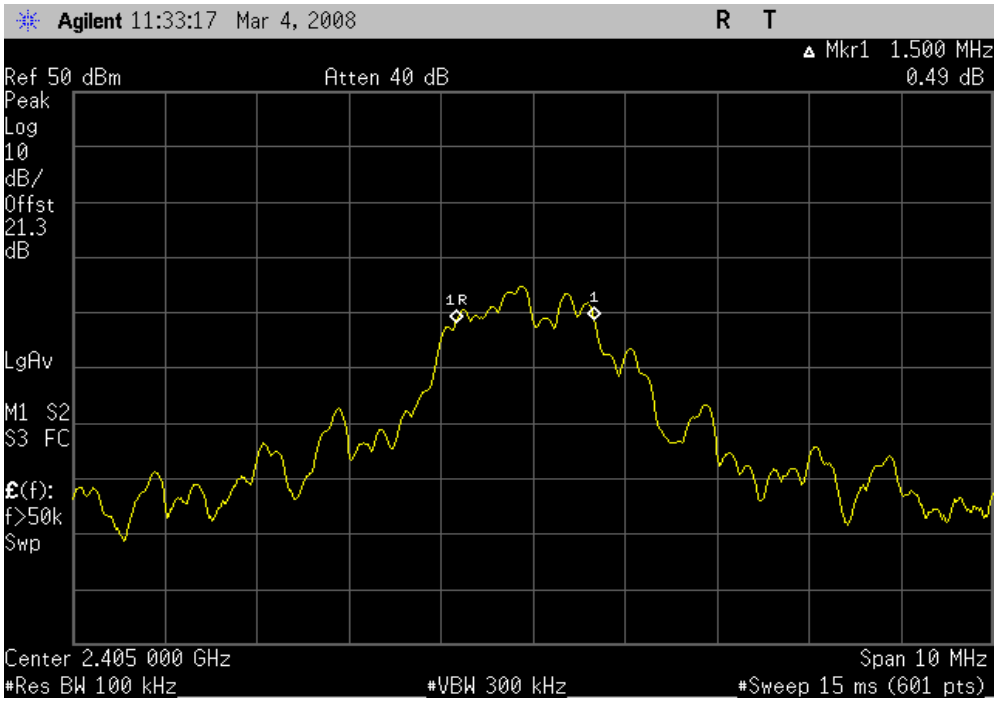
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

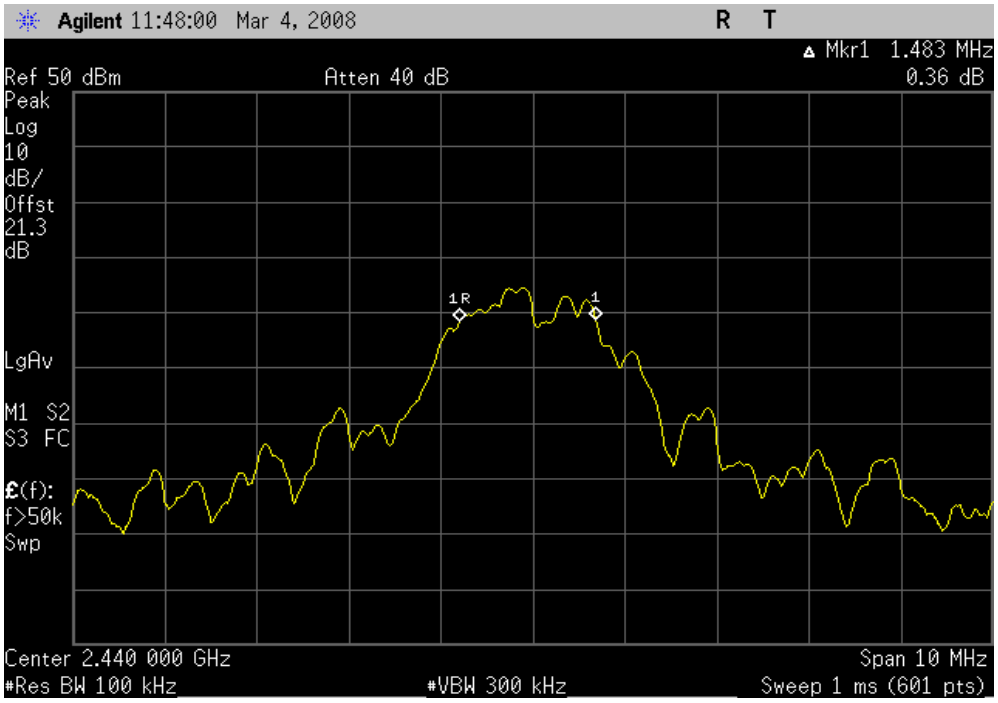
	Value	Limit	Results
Occupied Bandwidth			
Low Channel	1.5 MHz	≥ 500 kHz	Pass
Mid Channel	1.48 MHz	≥ 500 kHz	Pass
High Channel	1.5 MHz	≥ 500 kHz	Pass

6 dB - OCCUPIED BANDWIDTH - DSSS

Occupied Bandwidth, Low Channel					
Result:	Pass	**Value:**	1.5 MHz	**Limit:**	≥ 500 kHz

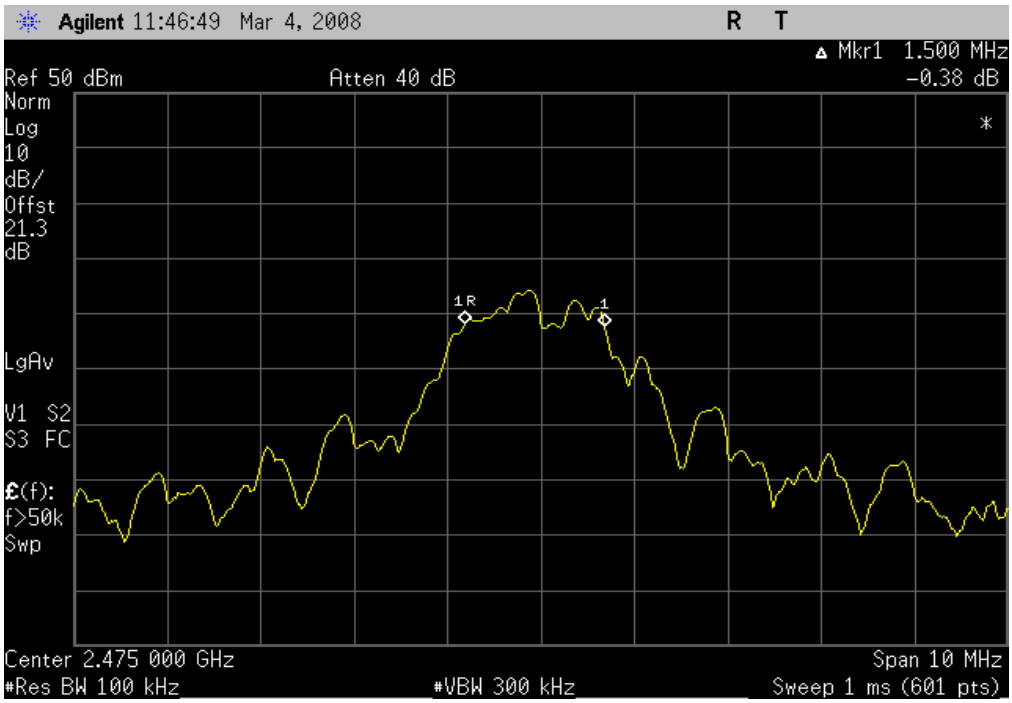


Occupied Bandwidth, Mid Channel					
Result:	Pass	**Value:**	1.48 MHz	**Limit:**	≥ 500 kHz

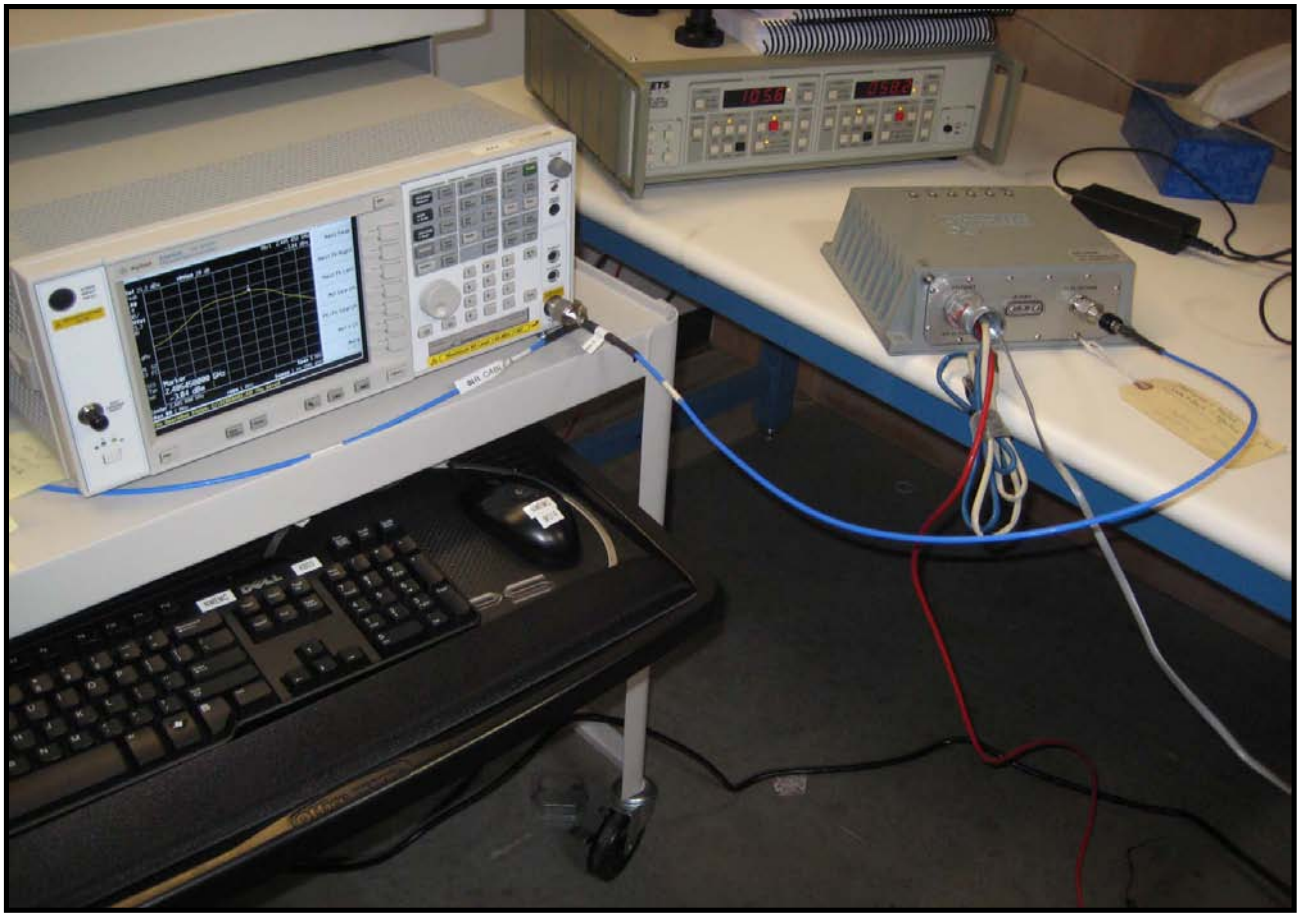


6 dB - OCCUPIED BANDWIDTH - DSSS

Occupied Bandwidth, High Channel					
Result:	Pass	**Value:**	1.5 MHz	**Limit:**	≥ 500 kHz



6 dB - OCCUPIED BANDWIDTH - DSSS



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
Channel 1. Transmitting at 2405. DSSS Mode.
Channel 40. Transmitting at 2440. DSSS Mode.
Channel 75. Transmitting at 2475. DSSS Mode.

ANTENNA TYPE
5 dB Omni (Dipole) Antenna. Honeywell Part # 51506534-100. MFR Part #: HON04-052160
8 dB Omni (Dipole) Antenna. Honeywell Part # 50018414-001. MFR Part#: HGV-2409U
14 dB Sector Antenna. . MFR Part #: HG2414P-120

MODE USED FOR FINAL DATA
Channel 1. Transmitting at 2405. DSSS Mode.
Channel 40. Transmitting at 2440. DSSS Mode.
Channel 75. Transmitting at 2475. DSSS Mode.

POWER SETTINGS INVESTIGATED
12 VDC

POWER SETTINGS USED FOR FINAL DATA
12 VDC

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	26 GHz

CLOCKS AND OSCILLATORS
2405 MHz, 2440 MHz, 2475 MHz

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Horn	EMCO	3160-09	AHN	NCR	0
OC10 SMA cable for 18026 GHz			OCK	3/3/2008	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	10/13/2006	24
Antenna, Horn	ETS	3160-08	AHT	NCR	0
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	10/13/2006	24
Antenna, Horn	ETS	3160-07	AHR	NCR	0
OC 10 Cables a, b, c, l Cables			OCO	2/2/2008	13
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	2/2/2008	13
Antenna, Horn	EMCO	3115	AHB	8/31/2007	24
OC10 cables a,b,c,e,f Horn Cables			OCJ	2/2/2008	13
Antenna, Biconilog	EMCO	3142	AXJ	2/25/2008	24
OC10 cables a,b,c,d Bilog			OCH	1/7/2008	13
Pre-Amplifier	Miteq	AM-1616-1000	AOM	1/7/2008	13
Spectrum Analyzer	Agilent	E4446A	AAQ	12/14/2007	13

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

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

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

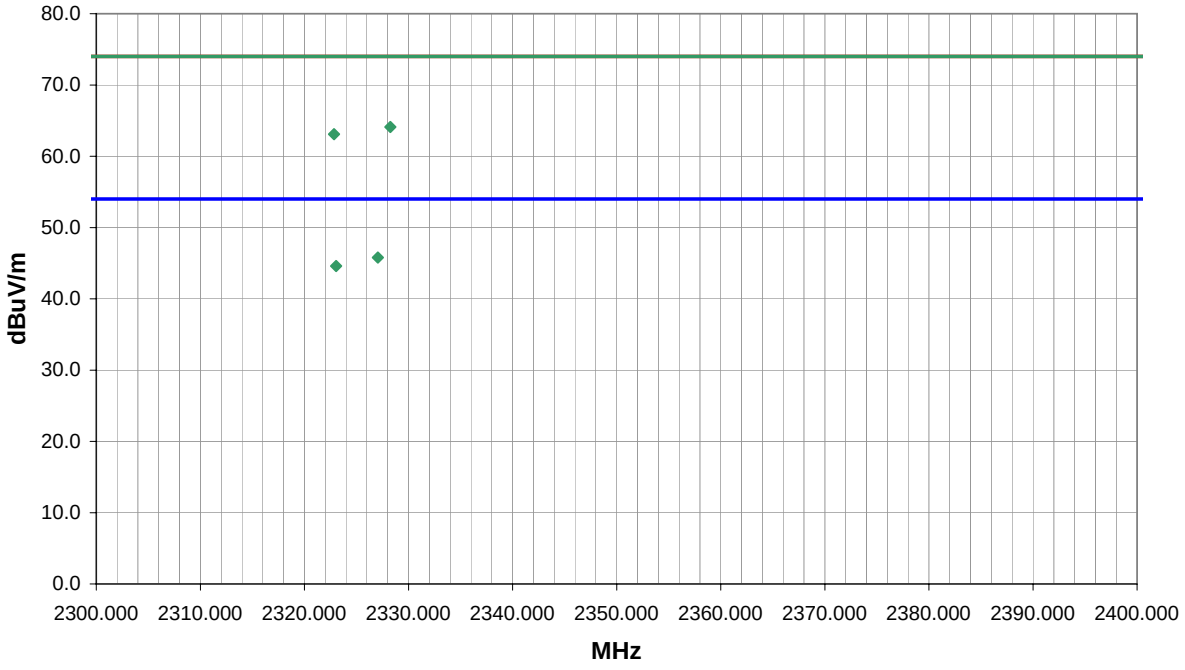
Transmitting at 2475.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	23
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)
2327.053	28.1	5.4	350.0	1.5	7.7	20.0	V-Horn	AV	0.0	45.8	54.0	-8.2
2323.045	26.9	5.4	146.0	1.7	7.7	20.0	V-Horn	AV	0.0	44.6	54.0	-9.4
2328.258	38.7	5.4	350.0	1.5	0.0	20.0	V-Horn	PK	0.0	64.1	74.0	-9.9
2322.844	37.7	5.4	146.0	1.7	0.0	20.0	V-Horn	PK	0.0	63.1	74.0	-10.9

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

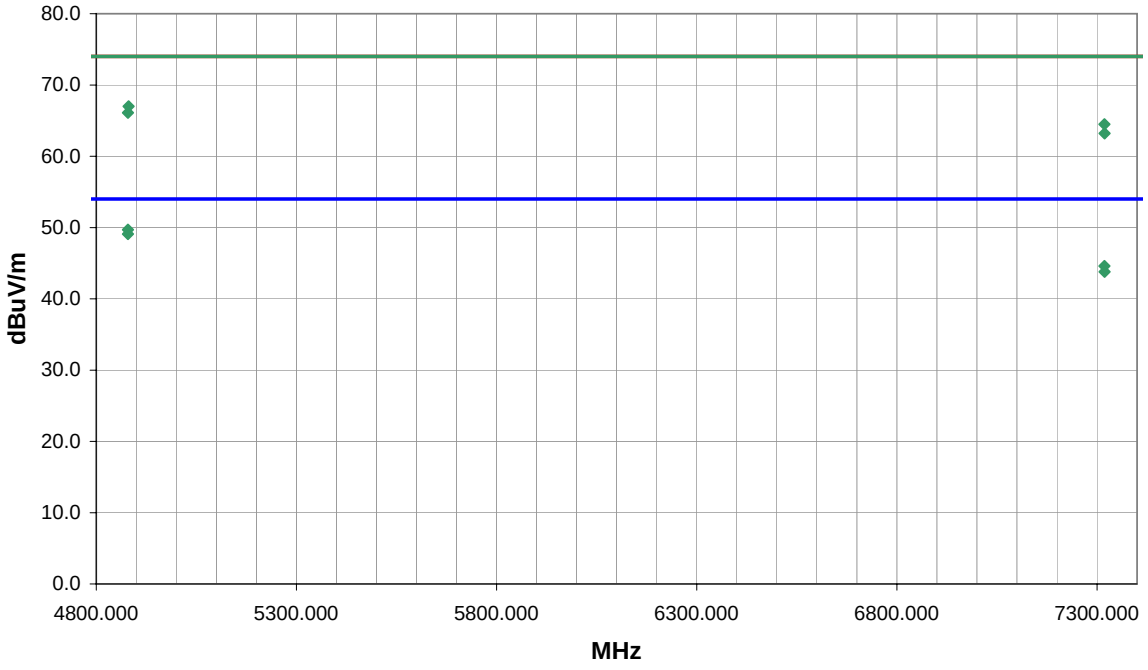
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	24
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)
4878.990	44.8	12.6	115.0	1.5	7.7	0.0	H-Horn	AV	0.0	49.7	54.0	-4.3
4878.998	44.2	12.6	335.0	1.0	7.7	0.0	V-Horn	AV	0.0	49.1	54.0	-4.9
4880.820	54.4	12.6	115.0	1.5	0.0	0.0	H-Horn	PK	0.0	67.0	74.0	-7.0
4878.951	53.5	12.6	335.0	1.0	0.0	0.0	V-Horn	PK	0.0	66.1	74.0	-7.9
7318.606	35.9	16.4	317.0	1.1	7.7	0.0	H-Horn	AV	0.0	44.6	54.0	-9.4
7318.305	48.1	16.4	349.0	1.6	0.0	0.0	V-Horn	PK	0.0	64.5	74.0	-9.5
7319.019	35.1	16.4	349.0	1.6	7.7	0.0	V-Horn	AV	0.0	43.8	54.0	-10.2
7318.781	46.8	16.4	317.0	1.1	0.0	0.0	H-Horn	PK	0.0	63.2	74.0	-10.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

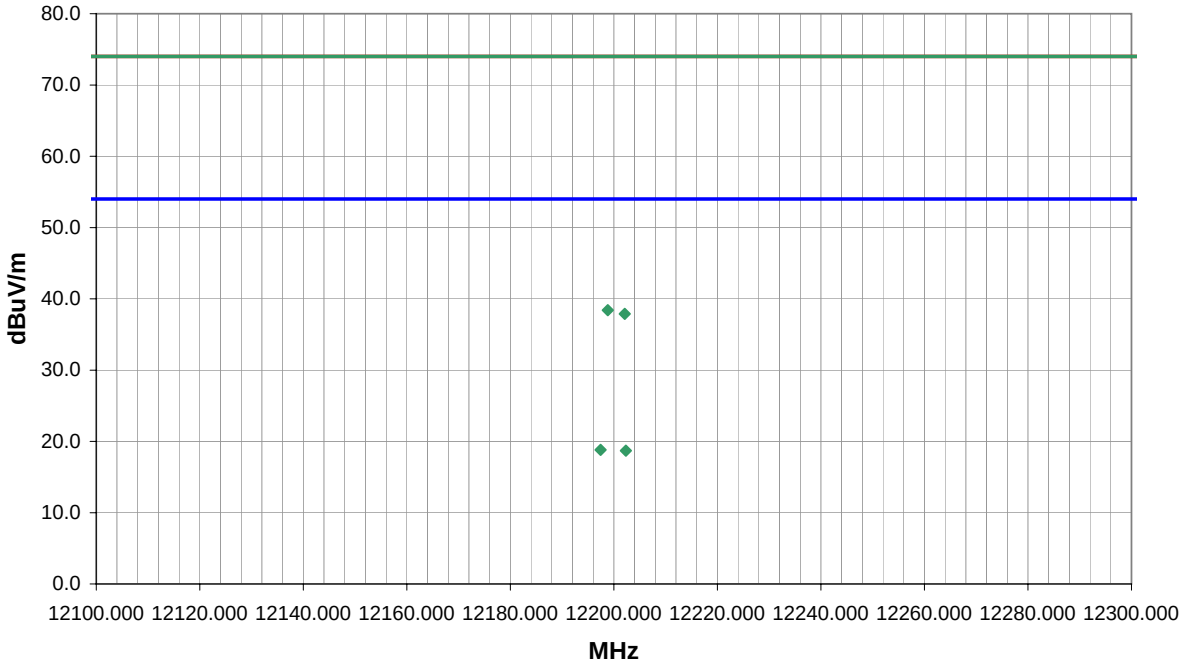
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	25
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)
12197.440	34.9	-8.4	325.0	1.0	7.7	0.0	H-Horn	AV	0.0	18.8	54.0	-35.2
12202.310	34.8	-8.4	327.0	1.0	7.7	0.0	V-Horn	AV	0.0	18.7	54.0	-35.3
12198.840	46.8	-8.4	327.0	1.0	0.0	0.0	V-Horn	PK	0.0	38.4	74.0	-35.6
12202.100	46.3	-8.4	325.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.9	74.0	-36.1

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

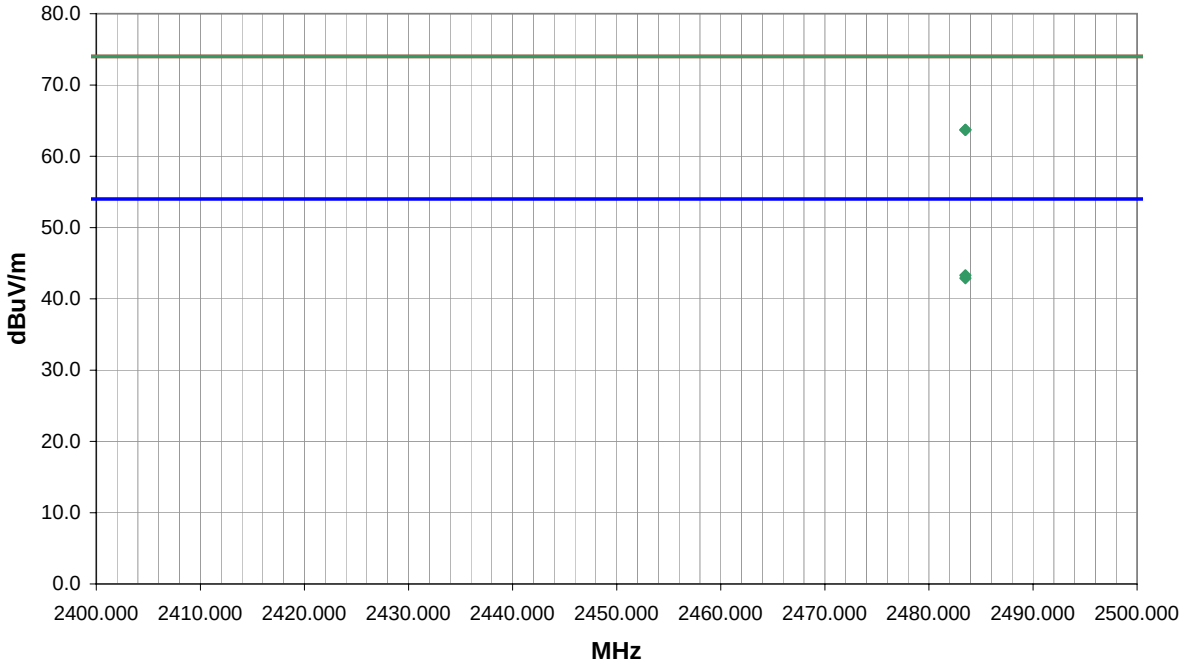
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	26
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)
2483.500	38.3	5.4	26.0	1.0	0.0	20.0	H-Horn	PK	0.0	63.7	74.0	-10.3
2483.500	38.3	5.4	187.0	1.0	0.0	20.0	V-Horn	PK	0.0	63.7	74.0	-10.3
2483.499	25.6	5.4	26.0	1.0	7.7	20.0	H-Horn	AV	0.0	43.3	54.0	-10.7
2483.500	25.2	5.4	187.0	1.0	7.7	20.0	V-Horn	AV	0.0	42.9	54.0	-11.1

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

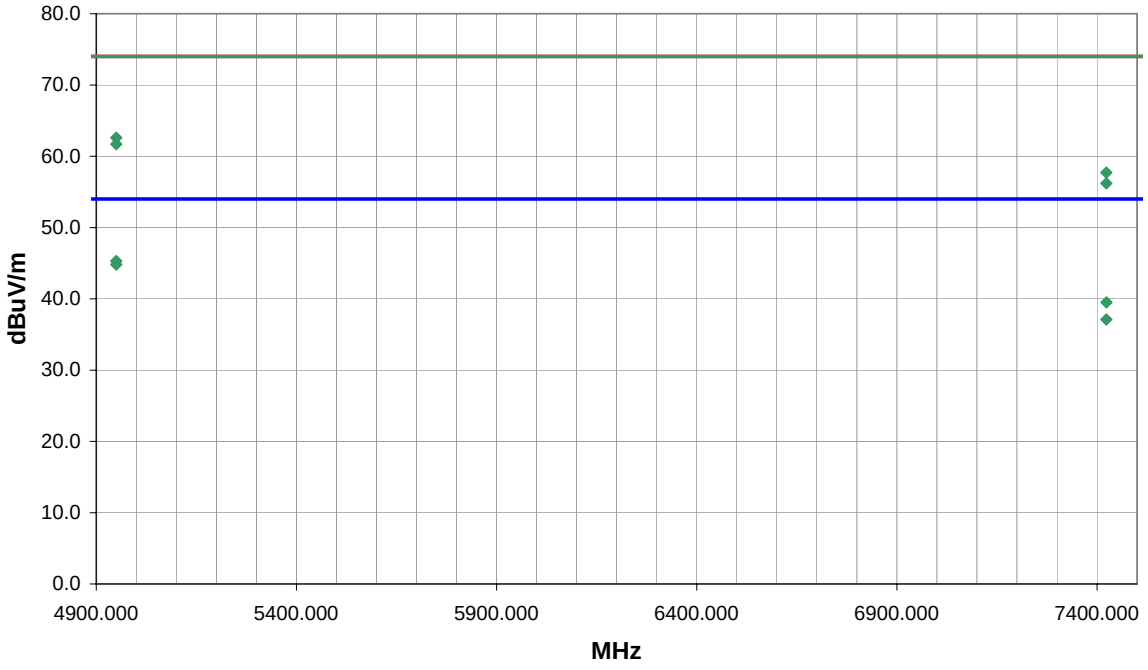
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	27
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)
4950.000	40.2	12.8	334.0	1.3	7.7	0.0	V-Horn	AV	0.0	45.3	54.0	-8.7
4950.000	39.7	12.8	316.0	1.3	7.7	0.0	H-Horn	AV	0.0	44.8	54.0	-9.2
4950.000	49.8	12.8	334.0	1.3	0.0	0.0	V-Horn	PK	0.0	62.6	74.0	-11.4
4950.000	48.9	12.8	316.0	1.3	0.0	0.0	H-Horn	PK	0.0	61.7	74.0	-12.3
7423.524	30.7	16.5	315.0	1.0	7.7	0.0	H-Horn	AV	0.0	39.5	54.0	-14.5
7423.222	41.2	16.5	315.0	1.0	0.0	0.0	H-Horn	PK	0.0	57.7	74.0	-16.3
7423.441	28.3	16.5	353.0	1.3	7.7	0.0	V-Horn	AV	0.0	37.1	54.0	-16.9
7423.154	39.7	16.5	353.0	1.3	0.0	0.0	V-Horn	PK	0.0	56.2	74.0	-17.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

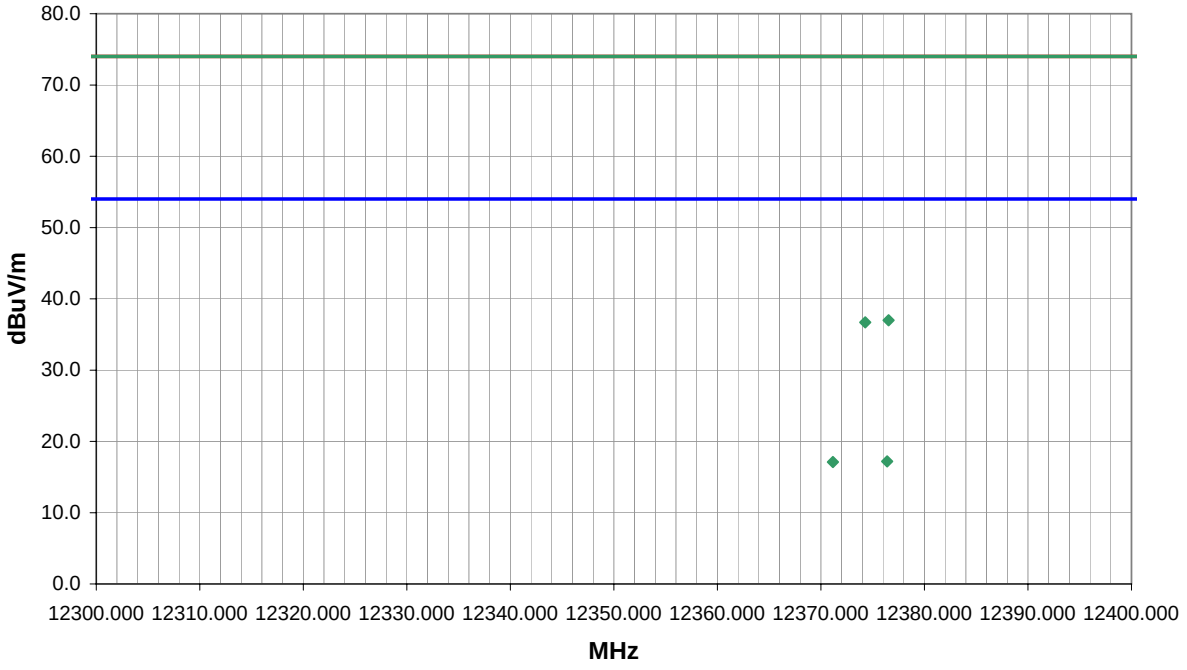
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	28
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)
12376.400	32.6	-7.7	315.0	1.0	7.7	0.0	V-Horn	AV	0.0	17.2	54.0	-36.8
12371.160	32.6	-7.8	21.0	1.0	7.7	0.0	H-Horn	AV	0.0	17.1	54.0	-36.9
12376.540	44.7	-7.7	315.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.0	74.0	-37.0
12374.280	44.4	-7.7	21.0	1.0	0.0	0.0	H-Horn	PK	0.0	36.7	74.0	-37.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

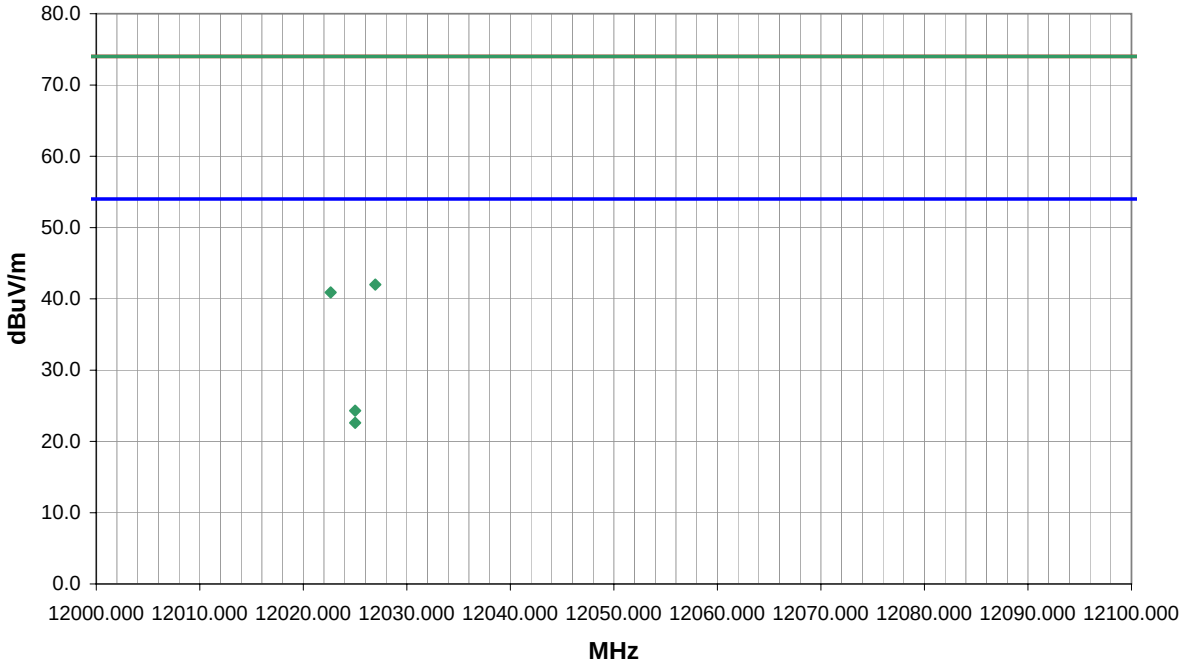
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	29
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)
12025.000	41.0	-9.0	360.0	1.0	7.7	0.0	H-Horn	AV	0.0	24.3	54.0	-29.7
12025.000	39.3	-9.0	0.0	1.0	7.7	0.0	V-Horn	AV	0.0	22.6	54.0	-31.4
12026.950	51.0	-9.0	360.0	1.0	0.0	0.0	H-Horn	PK	0.0	42.0	74.0	-32.0
12022.650	49.9	-9.0	0.0	1.0	0.0	0.0	V-Horn	PK	0.0	40.9	74.0	-33.1

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/04/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Lowest Gain Antenna 5 dBI. PC Power Level: 193 (17.6 dBm). CC2420 CHIP PA level = -1 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

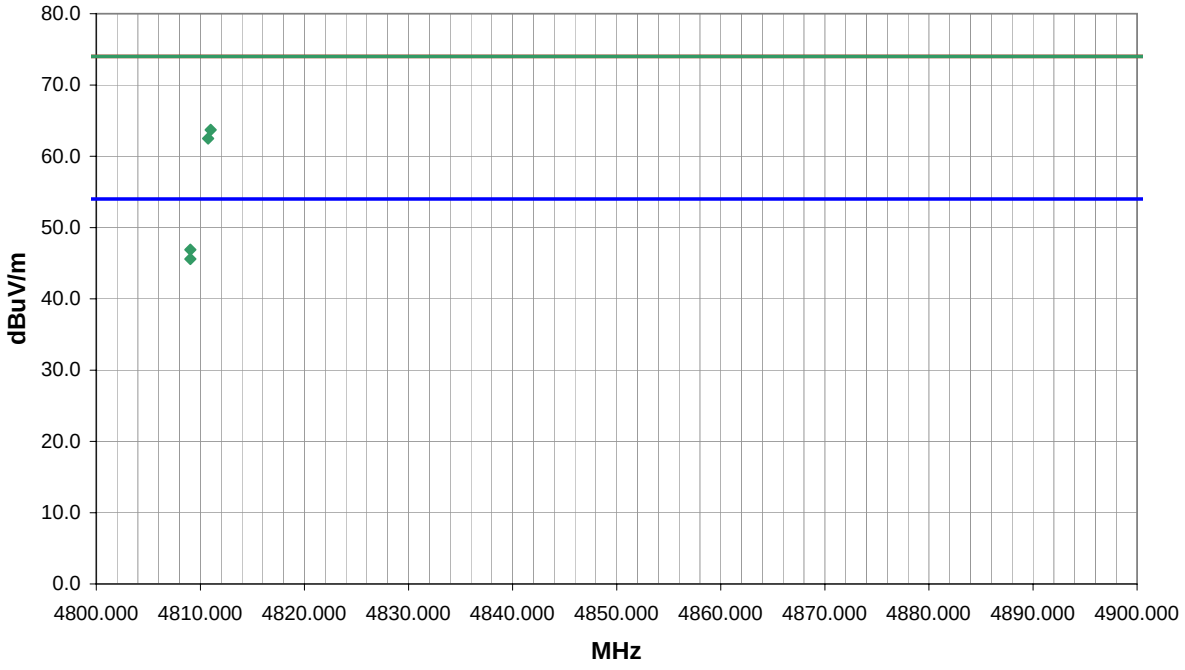
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	30
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)
4809.036	42.1	12.5	157.0	1.0	7.7	0.0	V-Horn	AV	0.0	46.9	54.0	-7.1
4809.045	40.8	12.5	100.0	1.7	7.7	0.0	H-Horn	AV	0.0	45.6	54.0	-8.4
4810.992	51.2	12.5	157.0	1.0	0.0	0.0	V-Horn	PK	0.0	63.7	74.0	-10.3
4810.741	50.0	12.5	100.0	1.7	0.0	0.0	H-Horn	PK	0.0	62.5	74.0	-11.5

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

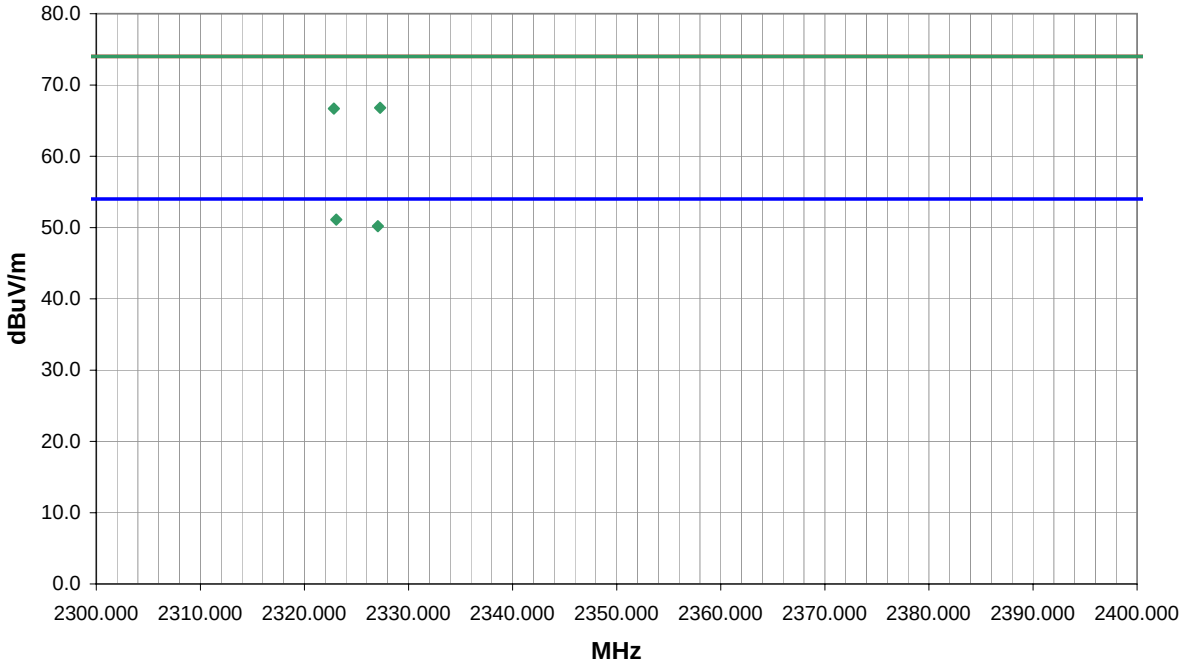
Transmitting at 2475.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	14
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)
2323.065	33.4	5.4	77.0	1.0	7.7	20.0	V-Horn	AV	0.0	51.1	54.0	-2.9
2327.057	32.5	5.4	80.0	1.0	7.7	20.0	V-Horn	AV	0.0	50.2	54.0	-3.8
2327.270	41.4	5.4	80.0	1.0	0.0	20.0	V-Horn	PK	0.0	66.8	74.0	-7.2
2322.831	41.3	5.4	77.0	1.0	0.0	20.0	V-Horn	PK	0.0	66.7	74.0	-7.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

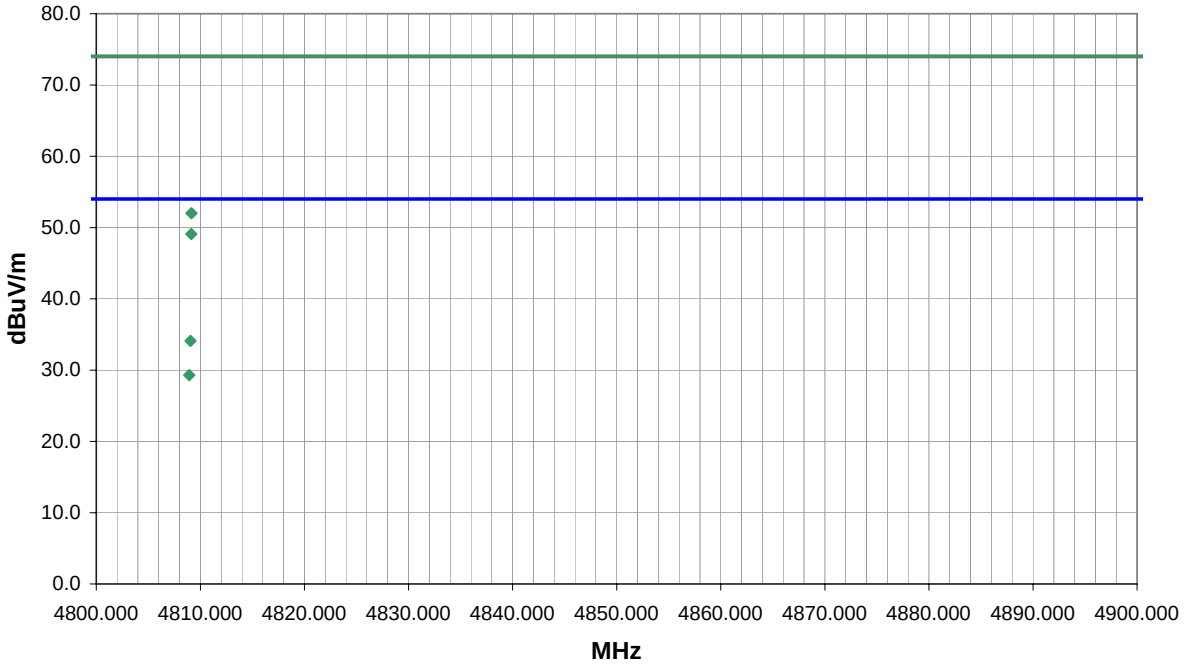
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	15
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)
4809.062	29.3	12.5	359.0	1.3	7.7	0.0	V-Horn	AV	0.0	34.1	54.0	-19.9
4809.151	39.5	12.5	359.0	1.3	0.0	0.0	V-Horn	PK	0.0	52.0	74.0	-22.0
4808.936	24.5	12.5	205.0	1.0	7.7	0.0	H-Horn	AV	0.0	29.3	54.0	-24.7
4809.134	36.6	12.5	205.0	1.0	0.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

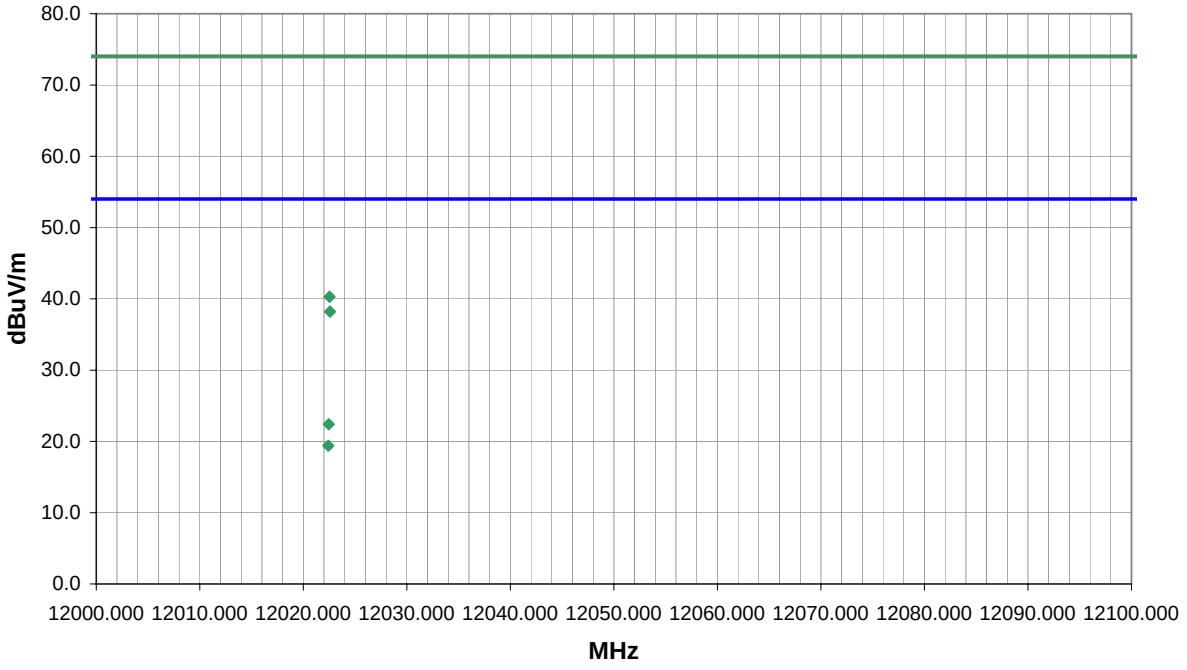
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	16
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)
12022.450	39.1	-9.0	11.0	1.0	7.7	0.0	V-Horn	AV	0.0	22.4	54.0	-31.6
12022.540	49.3	-9.0	11.0	1.0	0.0	0.0	V-Horn	PK	0.0	40.3	74.0	-33.7
12022.410	36.1	-9.0	204.0	1.0	7.7	0.0	H-Horn	AV	0.0	19.4	54.0	-34.6
12022.580	47.2	-9.0	204.0	1.0	0.0	0.0	H-Horn	PK	0.0	38.2	74.0	-35.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

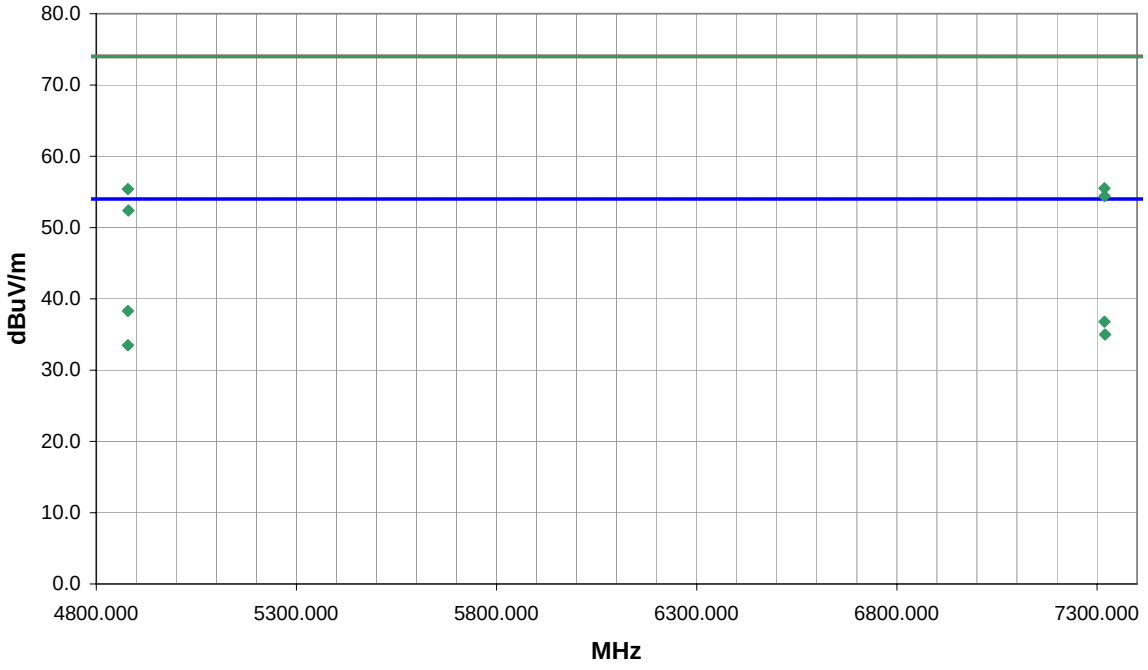
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	17
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)
4879.020	33.4	12.6	11.0	1.2	7.7	0.0	V-Horn	AV	0.0	38.3	54.0	-15.7
7318.503	28.1	16.4	303.0	1.9	7.7	0.0	V-Horn	AV	0.0	36.8	54.0	-17.2
7318.450	39.1	16.4	303.0	1.9	0.0	0.0	V-Horn	PK	0.0	55.5	74.0	-18.5
4879.047	42.8	12.6	11.0	1.2	0.0	0.0	V-Horn	PK	0.0	55.4	74.0	-18.6
7320.000	26.3	16.4	329.0	1.2	7.7	0.0	H-Horn	AV	0.0	35.0	54.0	-19.0
7318.691	38.0	16.4	329.0	1.2	0.0	0.0	H-Horn	PK	0.0	54.4	74.0	-19.6
4879.072	28.6	12.6	354.0	1.2	7.7	0.0	H-Horn	AV	0.0	33.5	54.0	-20.5
4880.379	39.8	12.6	354.0	1.2	0.0	0.0	H-Horn	PK	0.0	52.4	74.0	-21.6

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

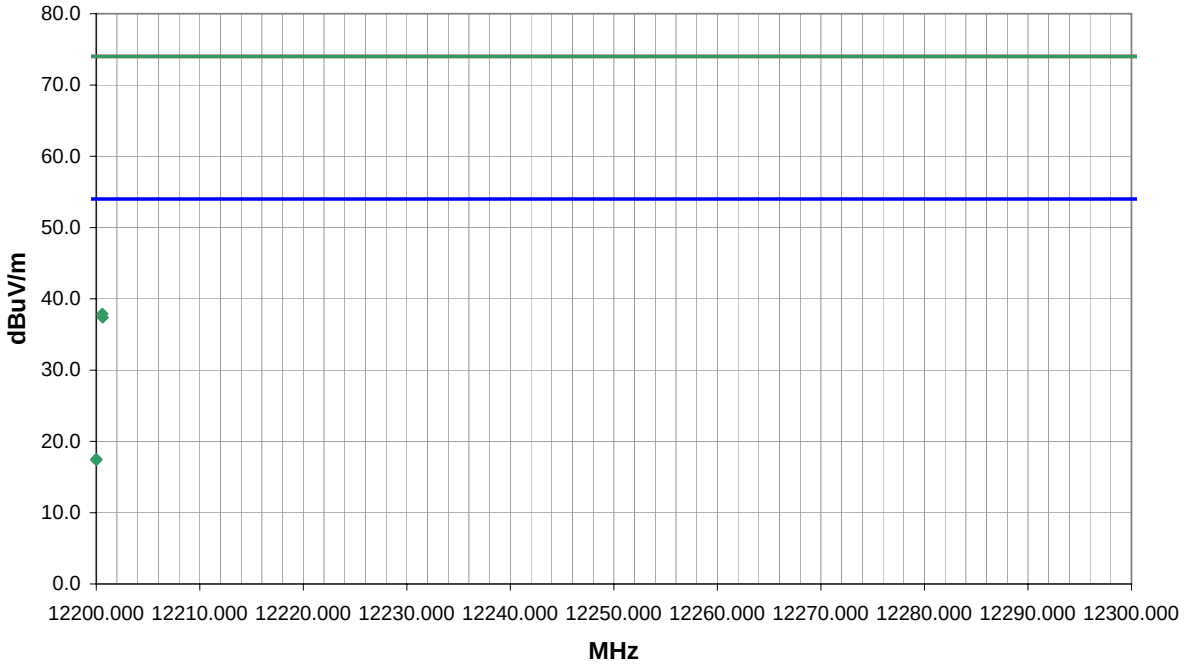
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	18
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)
12200.580	46.3	-8.4	0.0	1.3	0.0	0.0	V-Horn	PK	0.0	37.9	74.0	-36.1
12200.000	33.6	-8.4	0.0	1.3	7.7	0.0	V-Horn	AV	0.0	17.5	54.0	-36.5
12200.000	33.5	-8.4	319.0	1.3	7.7	0.0	H-Horn	AV	0.0	17.4	54.0	-36.6
12200.620	45.8	-8.4	319.0	1.3	0.0	0.0	H-Horn	PK	0.0	37.4	74.0	-36.6

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

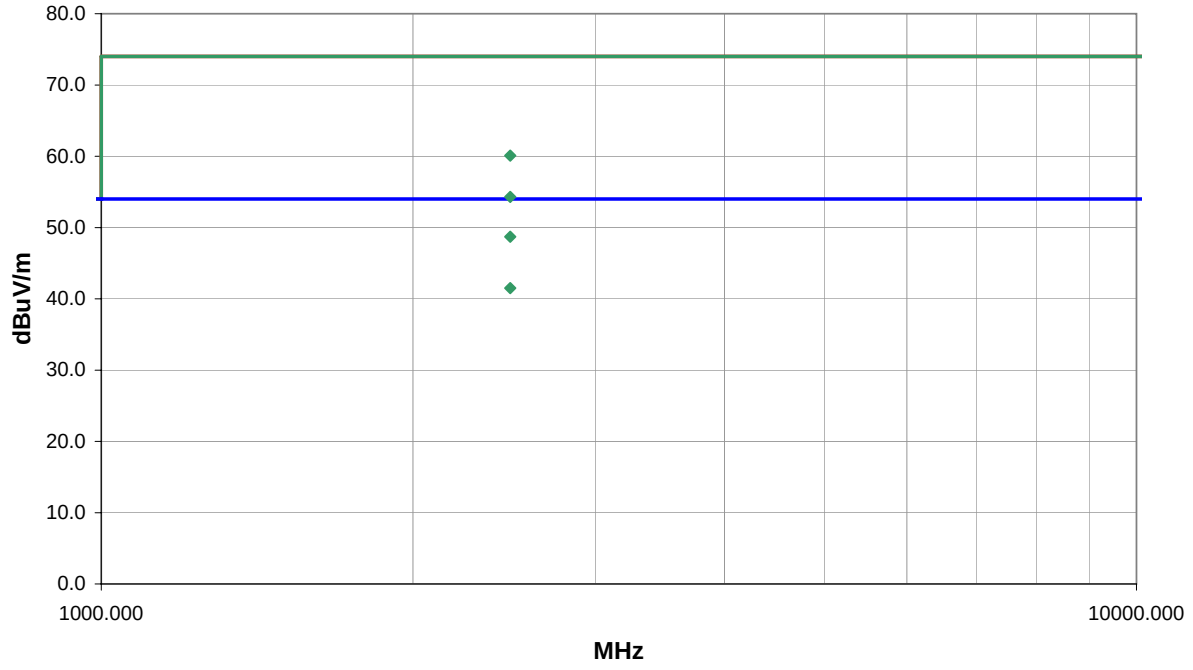
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	52
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	23.3	5.4	292.0	1.0	3.0	20.0	V-Horn	AV	0.0	48.7	54.0	-5.3
2483.499	16.1	5.4	65.0	1.0	3.0	20.0	H-Horn	AV	0.0	41.5	54.0	-12.5
2483.500	34.7	5.4	292.0	1.0	3.0	20.0	V-Horn	PK	0.0	60.1	74.0	-13.9
2483.499	28.9	5.4	65.0	1.0	3.0	20.0	H-Horn	PK	0.0	54.3	74.0	-19.7

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

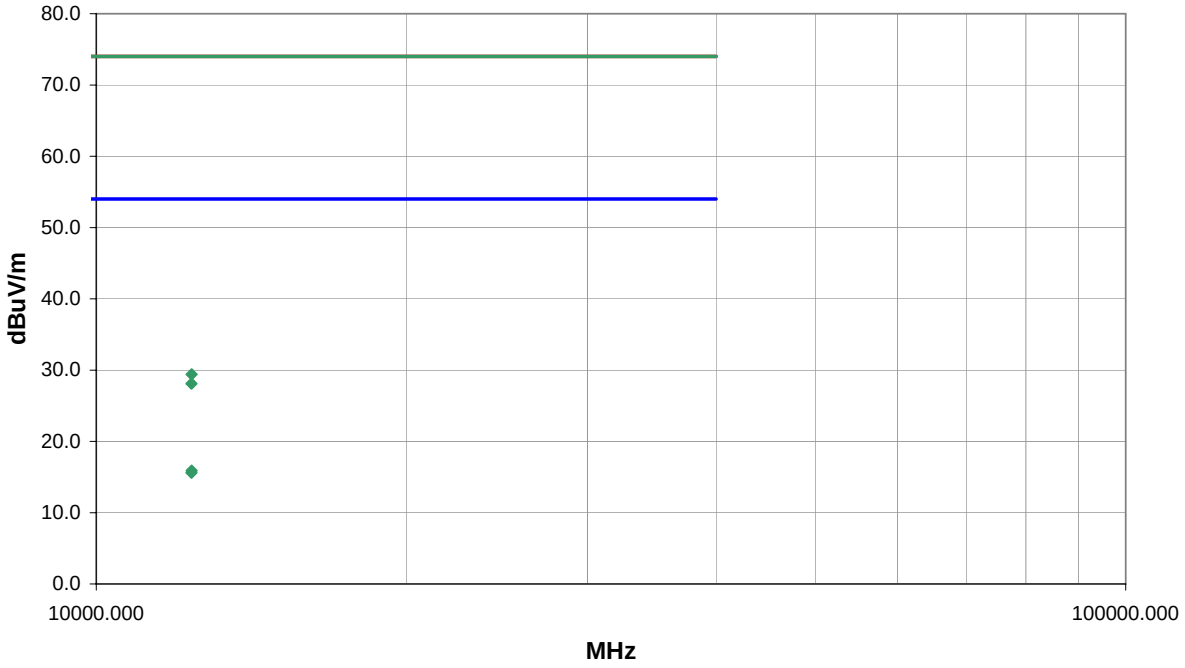
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	20
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12375.650	23.6	-7.7	170.0	1.0	0.0	0.0	V-Horn	AV	0.0	15.9	54.0	-38.1
12374.250	23.4	-7.8	9.0	1.0	0.0	0.0	H-Horn	AV	0.0	15.6	54.0	-38.4
12375.330	37.1	-7.7	170.0	1.0	0.0	0.0	V-Horn	PK	0.0	29.4	74.0	-44.6
12374.880	35.8	-7.7	9.0	1.0	0.0	0.0	H-Horn	PK	0.0	28.1	74.0	-45.9

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

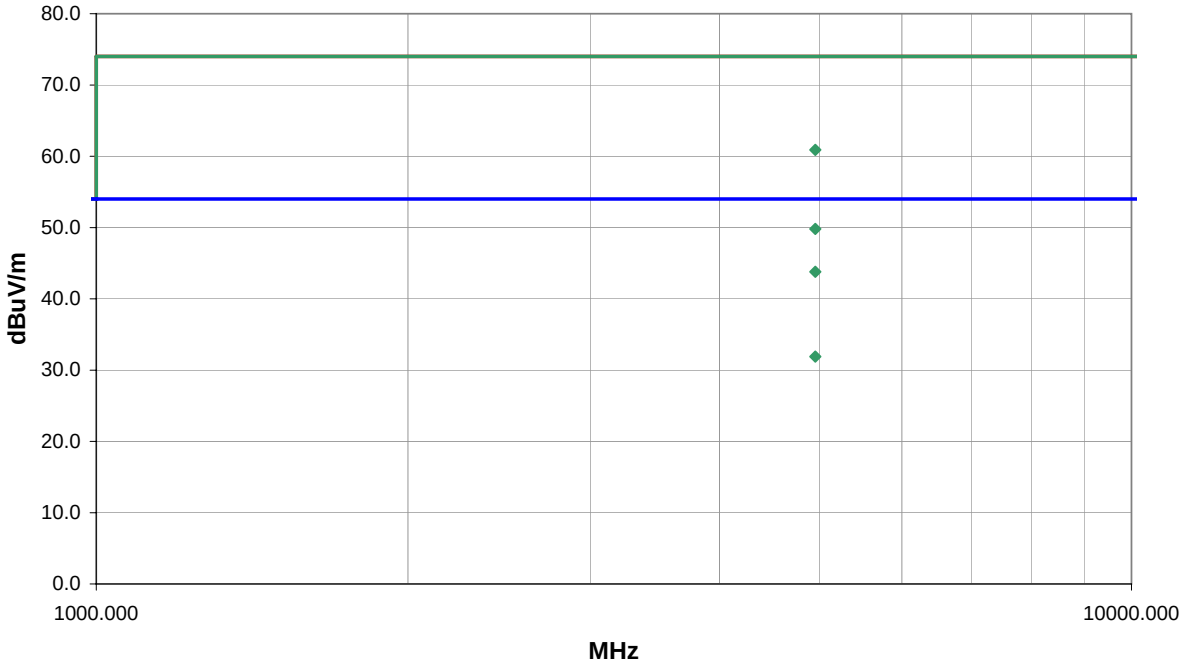
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	22
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)
4949.000	38.7	12.8	236.0	1.6	7.7	0.0	V-Horn	AV	0.0	43.8	54.0	-10.2
4949.016	48.1	12.8	236.0	1.6	0.0	0.0	V-Horn	PK	0.0	60.9	74.0	-13.1
4949.006	26.8	12.8	221.0	1.0	7.7	0.0	H-Horn	AV	0.0	31.9	54.0	-22.1
4949.117	37.0	12.8	221.0	1.0	0.0	0.0	H-Horn	PK	0.0	49.8	74.0	-24.2

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Middle Gain Antenna 8dBI. PC Power Level: 193 (16.3 dBm). 1m Cable. CC2420 CHIP PA level = -3 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

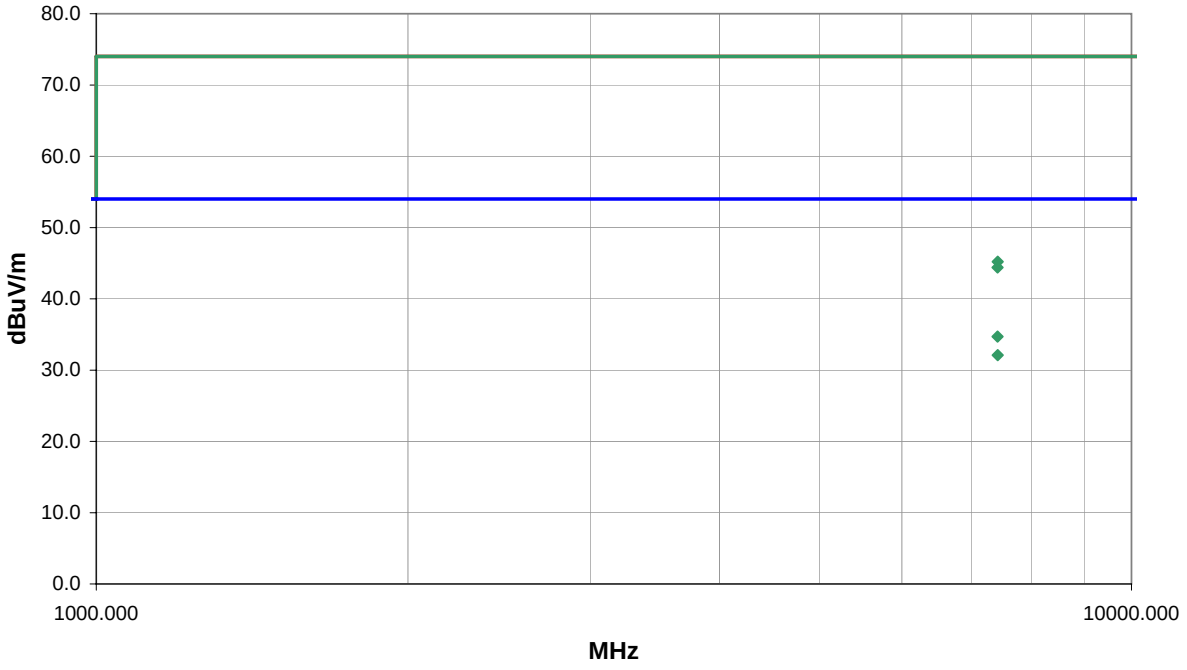
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	22
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7425.054	18.2	16.5	359.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.7	54.0	-19.3
7425.631	15.6	16.5	306.0	1.8	3.0	0.0	H-Horn	AV	0.0	32.1	54.0	-21.9
7425.356	28.7	16.5	359.0	1.0	3.0	0.0	V-Horn	PK	0.0	45.2	74.0	-28.8
7424.887	27.9	16.5	306.0	1.8	3.0	0.0	H-Horn	PK	0.0	44.4	74.0	-29.6

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

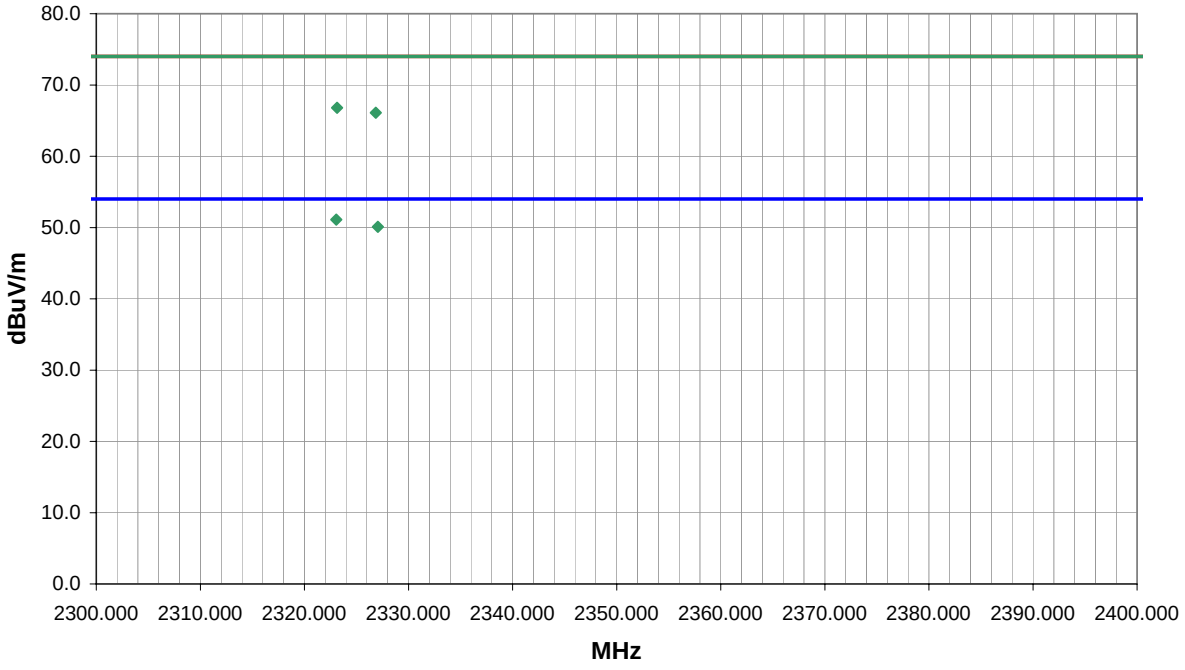
Transmitting at 2475.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	6
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)
2323.060	33.4	5.4	355.0	1.0	7.7	20.0	V-Horn	AV	0.0	51.1	54.0	-2.9
2327.058	32.4	5.4	2.0	1.1	7.7	20.0	V-Horn	AV	0.0	50.1	54.0	-3.9
2323.140	41.4	5.4	355.0	1.0	0.0	20.0	V-Horn	PK	0.0	66.8	74.0	-7.2
2326.856	40.7	5.4	2.0	1.1	0.0	20.0	V-Horn	PK	0.0	66.1	74.0	-7.9

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

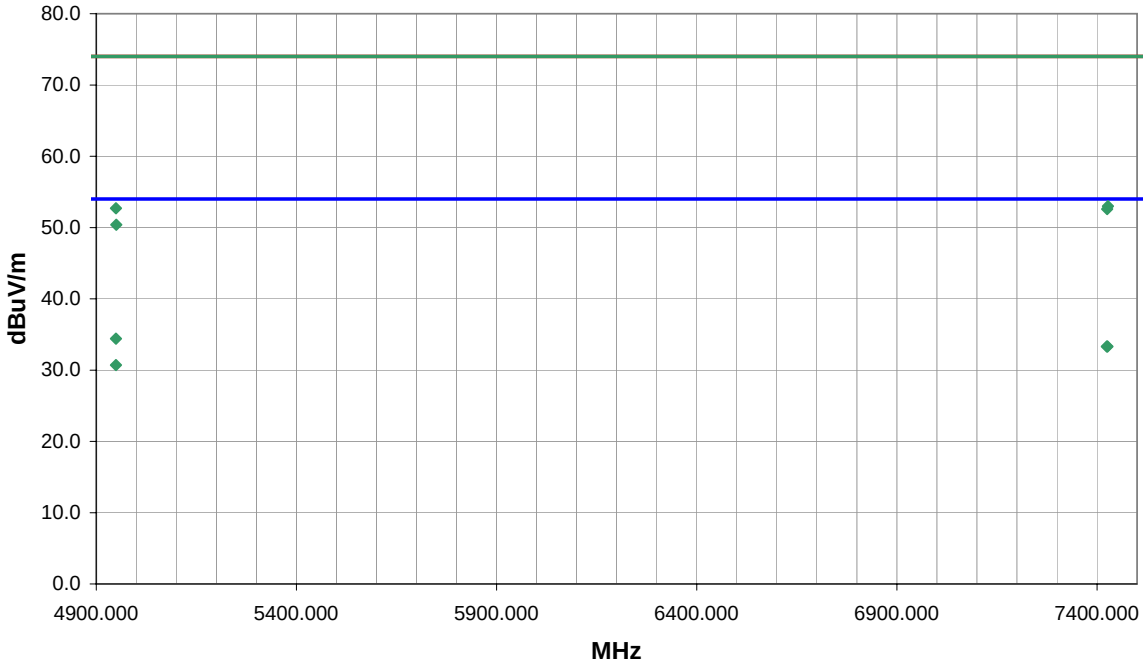
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	7
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)
4949.066	29.3	12.8	6.0	1.2	7.7	0.0	V-Horn	AV	0.0	34.4	54.0	-19.6
7424.506	24.5	16.5	105.0	1.2	7.7	0.0	V-Horn	AV	0.0	33.3	54.0	-20.7
7426.059	24.5	16.5	41.0	1.0	7.7	0.0	H-Horn	AV	0.0	33.3	54.0	-20.7
7427.234	36.5	16.5	105.0	1.2	0.0	0.0	V-Horn	PK	0.0	53.0	74.0	-21.0
4949.104	39.9	12.8	6.0	1.2	0.0	0.0	V-Horn	PK	0.0	52.7	74.0	-21.3
7425.241	36.1	16.5	41.0	1.0	0.0	0.0	H-Horn	PK	0.0	52.6	74.0	-21.4
4949.051	25.6	12.8	328.0	1.0	7.7	0.0	H-Horn	AV	0.0	30.7	54.0	-23.3
4950.057	37.6	12.8	328.0	1.0	0.0	0.0	H-Horn	PK	0.0	50.4	74.0	-23.6

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

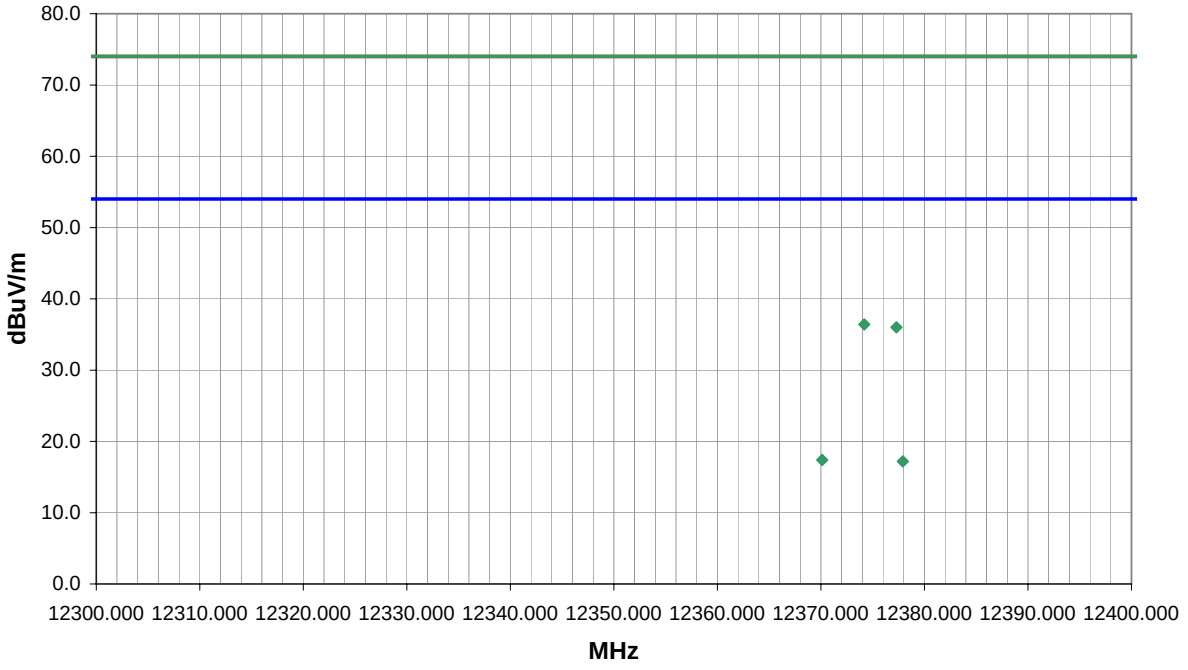
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	8
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)
12370.130	32.9	-7.8	148.0	1.0	7.7	0.0	V-Horn	AV	0.0	17.4	54.0	-36.6
12377.910	32.6	-7.7	164.0	1.0	7.7	0.0	H-Horn	AV	0.0	17.2	54.0	-36.8
12374.190	44.1	-7.7	148.0	1.0	0.0	0.0	V-Horn	PK	0.0	36.4	74.0	-37.6
12377.300	43.7	-7.7	164.0	1.0	0.0	0.0	H-Horn	PK	0.0	36.0	74.0	-38.0

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

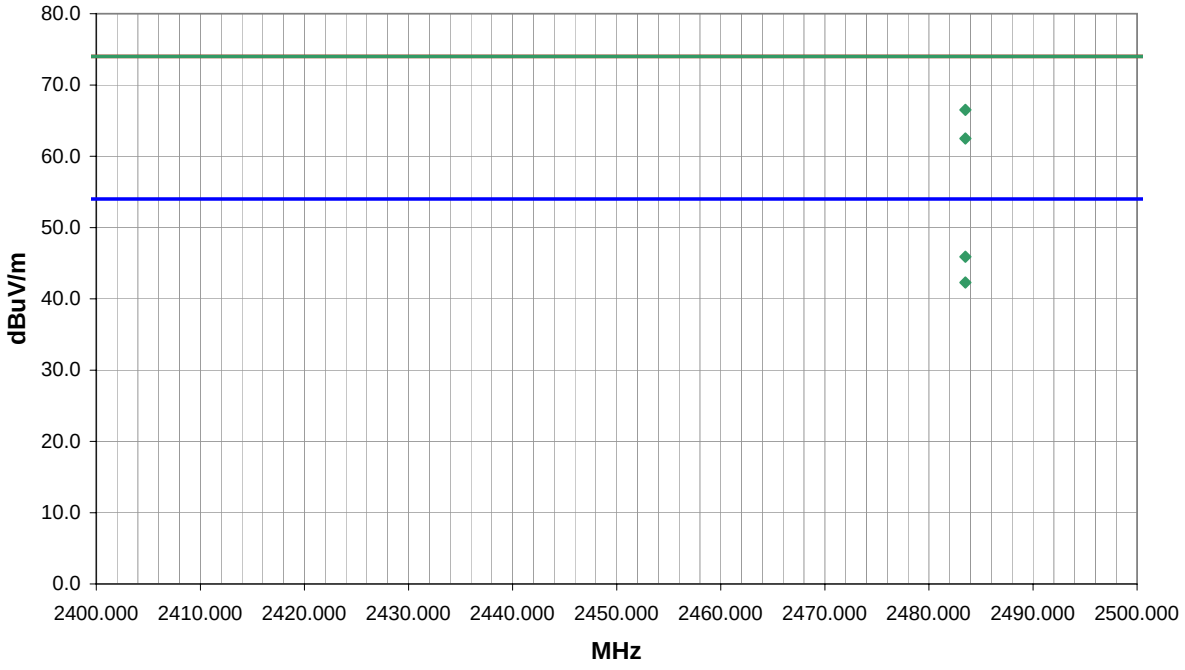
Transmitting at 2475

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	9
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)
2483.500	41.1	5.4	351.0	1.0	0.0	20.0	V-Horn	PK	0.0	66.5	74.0	-7.5
2483.500	28.2	5.4	351.0	1.0	7.7	20.0	V-Horn	AV	0.0	45.9	54.0	-8.1
2483.500	37.1	5.4	201.0	1.0	0.0	20.0	H-Horn	PK	0.0	62.5	74.0	-11.5
2483.500	24.6	5.4	201.0	1.0	7.7	20.0	H-Horn	AV	0.0	42.3	54.0	-11.7

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

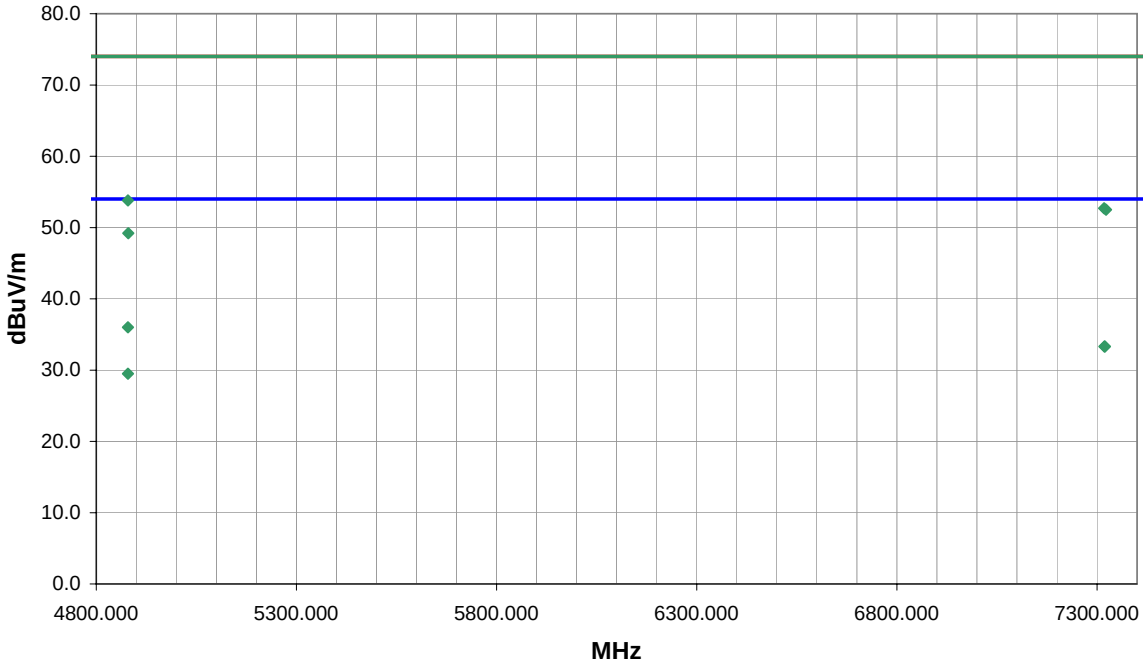
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	10
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)
4879.031	31.1	12.6	1.0	1.0	7.7	0.0	V-Horn	AV	0.0	36.0	54.0	-18.0
4879.003	41.2	12.6	1.0	1.0	0.0	0.0	V-Horn	PK	0.0	53.8	74.0	-20.2
7318.579	24.6	16.4	215.0	1.0	7.7	0.0	V-Horn	AV	0.0	33.3	54.0	-20.7
7319.785	24.6	16.4	222.0	1.0	7.7	0.0	H-Horn	AV	0.0	33.3	54.0	-20.7
7317.557	36.3	16.4	215.0	1.0	0.0	0.0	V-Horn	PK	0.0	52.7	74.0	-21.3
7322.445	36.1	16.4	222.0	1.0	0.0	0.0	H-Horn	PK	0.0	52.5	74.0	-21.5
4878.964	24.6	12.6	324.0	1.4	7.7	0.0	H-Horn	AV	0.0	29.5	54.0	-24.5
4880.084	36.6	12.6	324.0	1.4	0.0	0.0	H-Horn	PK	0.0	49.2	74.0	-24.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

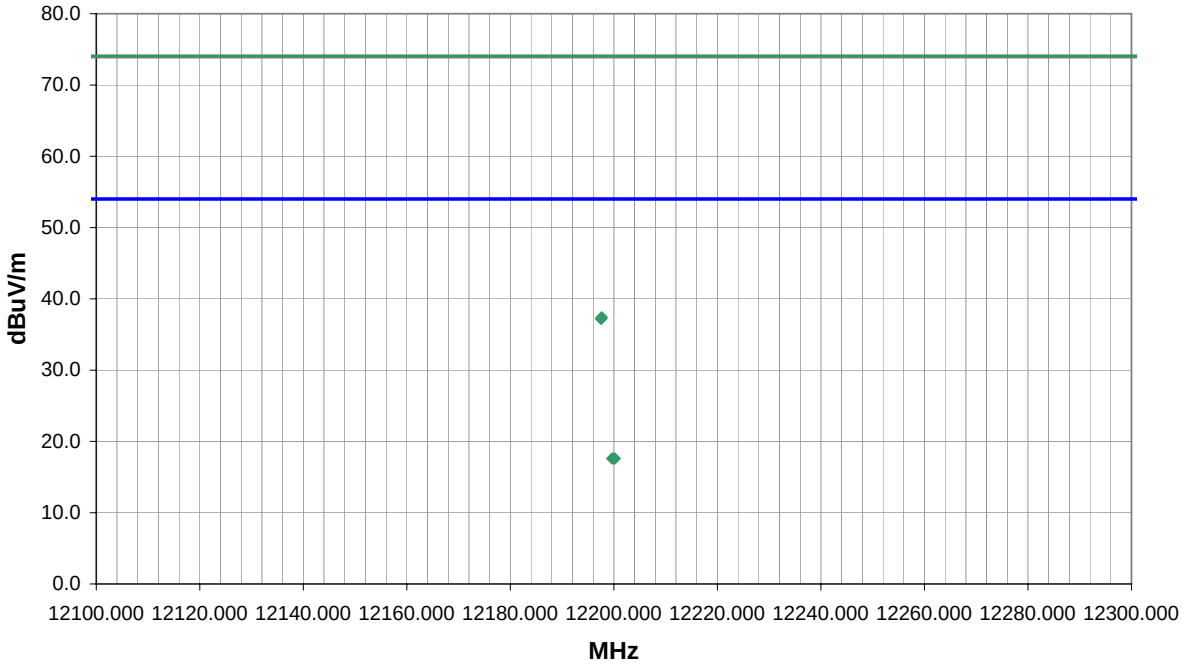
Transmitting at 2440

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11
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)
12199.700	33.7	-8.4	172.0	1.0	7.7	0.0	H-Horn	AV	0.0	17.6	54.0	-36.4
12200.150	33.7	-8.4	1.0	1.0	7.7	0.0	V-Horn	AV	0.0	17.6	54.0	-36.4
12197.650	45.8	-8.4	1.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.4	74.0	-36.6
12197.520	45.6	-8.4	172.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.2	74.0	-36.8

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

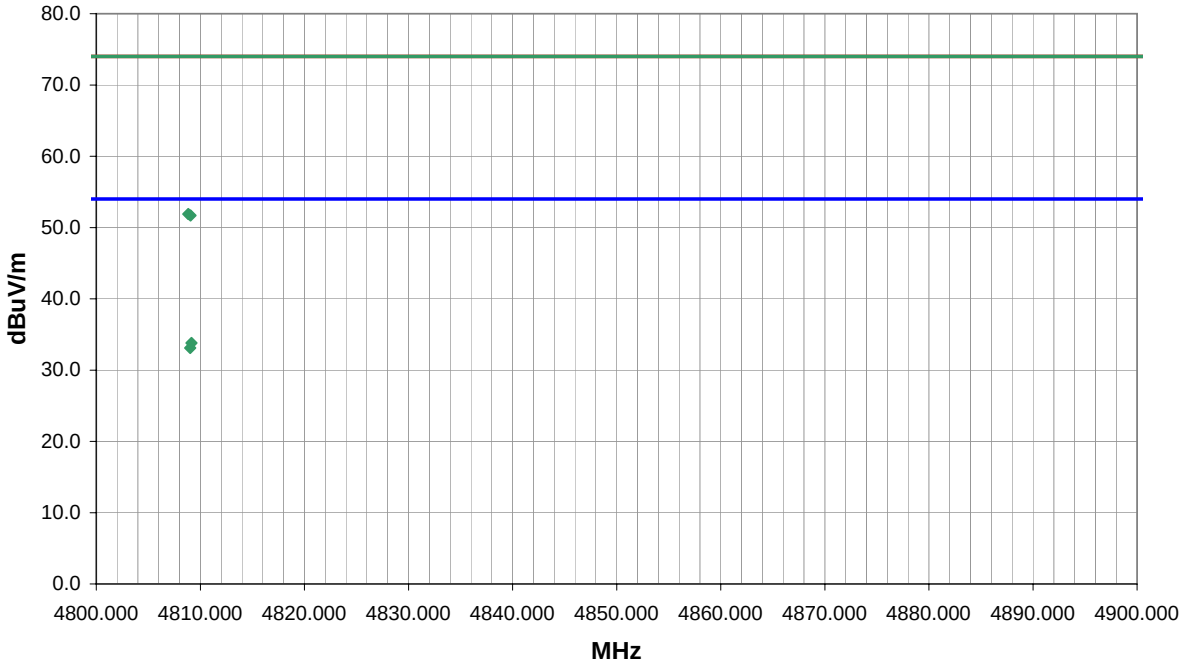
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	12
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)
4809.152	29.0	12.5	339.0	1.3	7.7	0.0	V-Horn	AV	0.0	33.8	54.0	-20.2
4809.020	28.3	12.5	274.0	1.0	7.7	0.0	H-Horn	AV	0.0	33.1	54.0	-20.9
4808.841	39.4	12.5	339.0	1.3	0.0	0.0	V-Horn	PK	0.0	51.9	74.0	-22.1
4809.061	39.2	12.5	274.0	1.0	0.0	0.0	H-Horn	PK	0.0	51.7	74.0	-22.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2007.05.07
EMI 2006.4.26

EUT:	Multinode 2.4 GHz 802.15.4 DSSS Radio.			Work Order:	HONE0028
Serial Number:	None			Date:	03/03/08
Customer:	Honeywell			Temperature:	22c
Attendees:	David Shipley			Humidity:	40%
Project:	None			Barometric Pres.:	1019 mb
Tested by:	Jaemi Suh	Power:	Battery	Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247 (DTS):2007	ANSI C63.4:2003 KDB No. 558074

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

COMMENTS

Sector Antenna 14dBI. PC Power Level: 193 (10 dBm). 1m Cable. CC2420 CHIP PA level = -10 dBm. The duty cycle corr. factor is based on a 41msec dwell time: 20log(41ms/100ms) = 7.7dB.

EUT OPERATING MODES

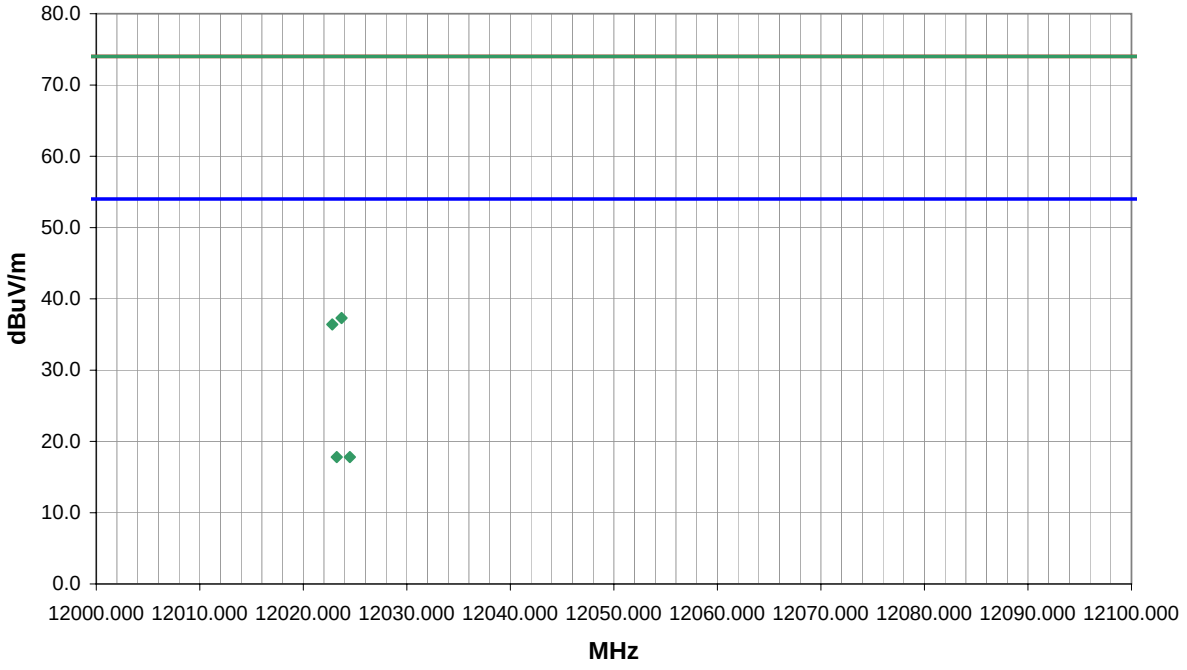
Transmitting at 2405.

DEVIATIONS FROM TEST STANDARD

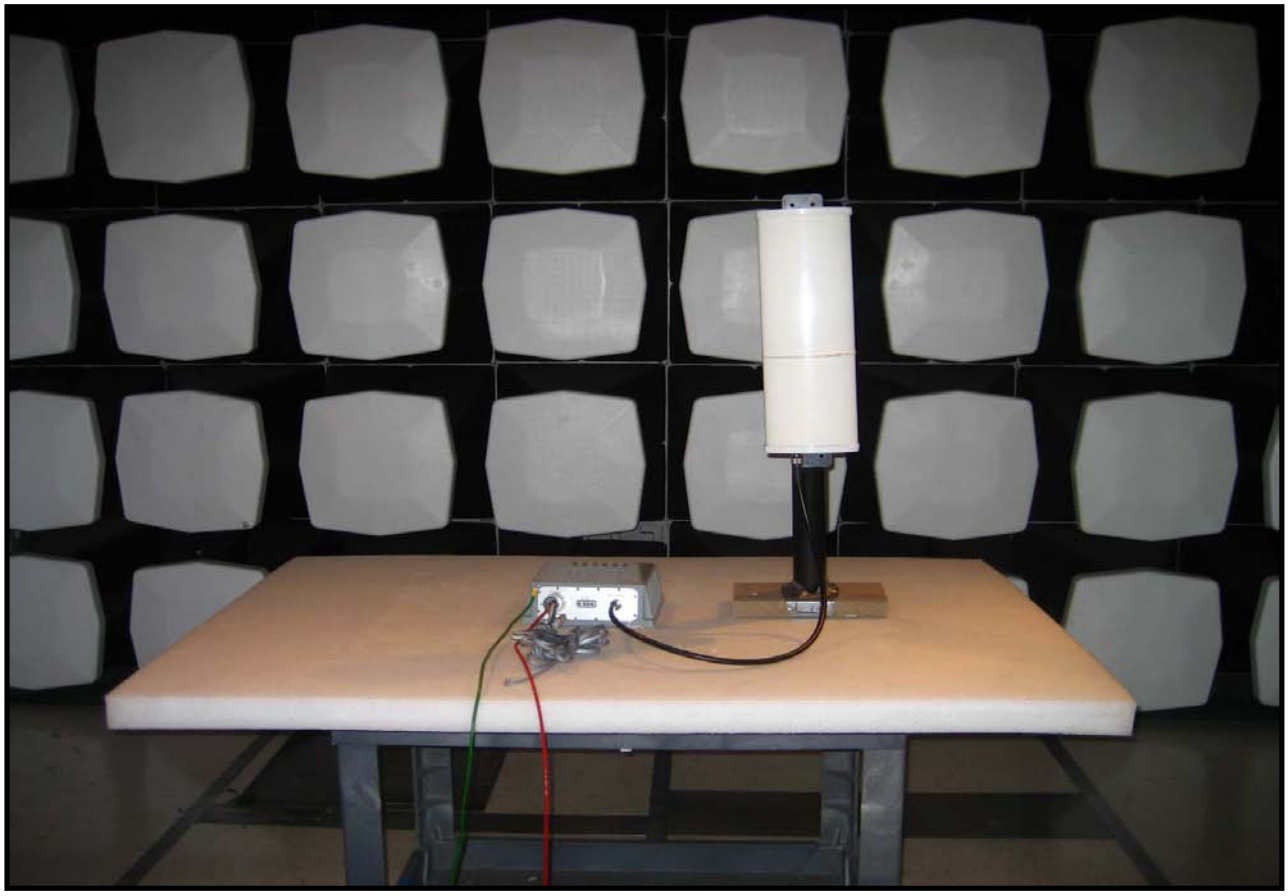
No deviations.

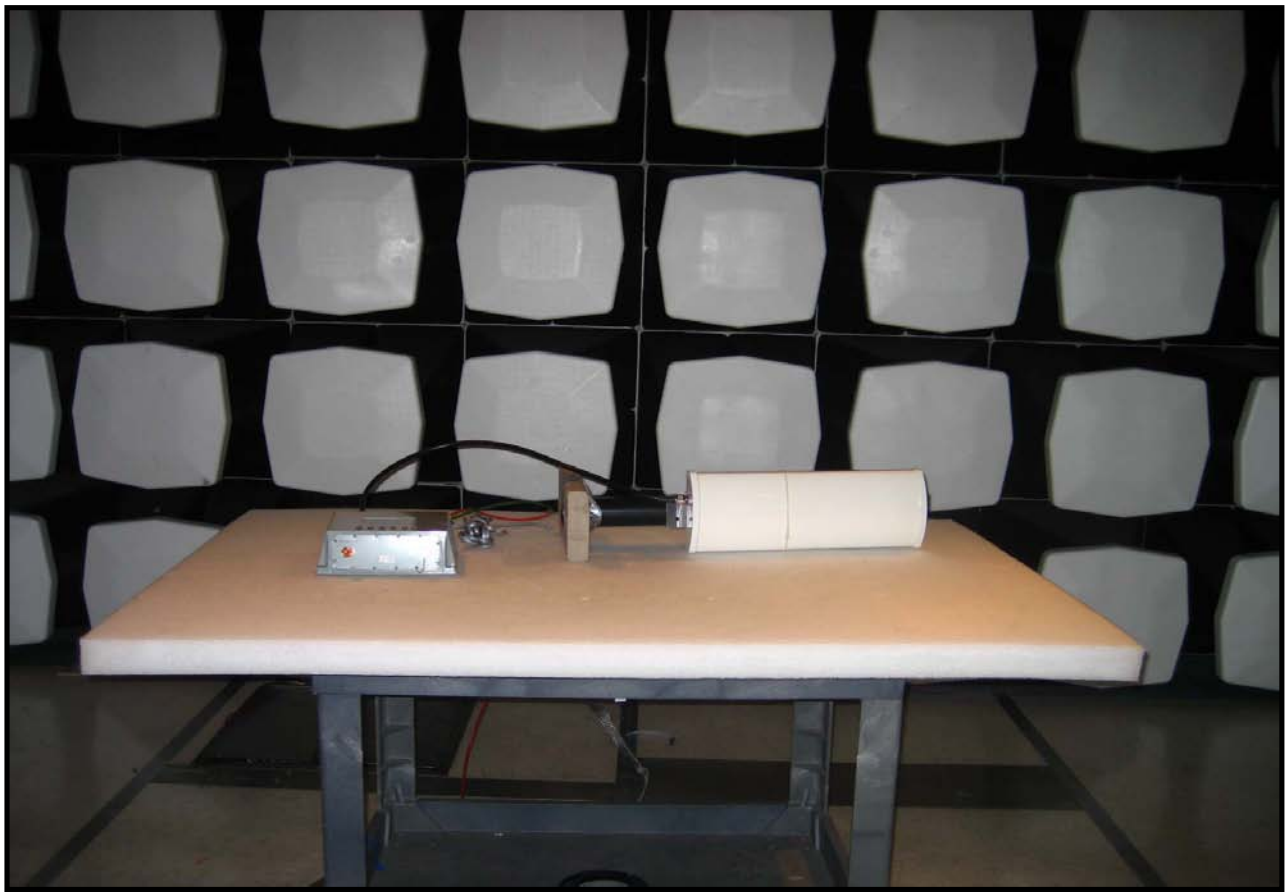
Run #	13
Configuration #	1
Results	Pass

Signature

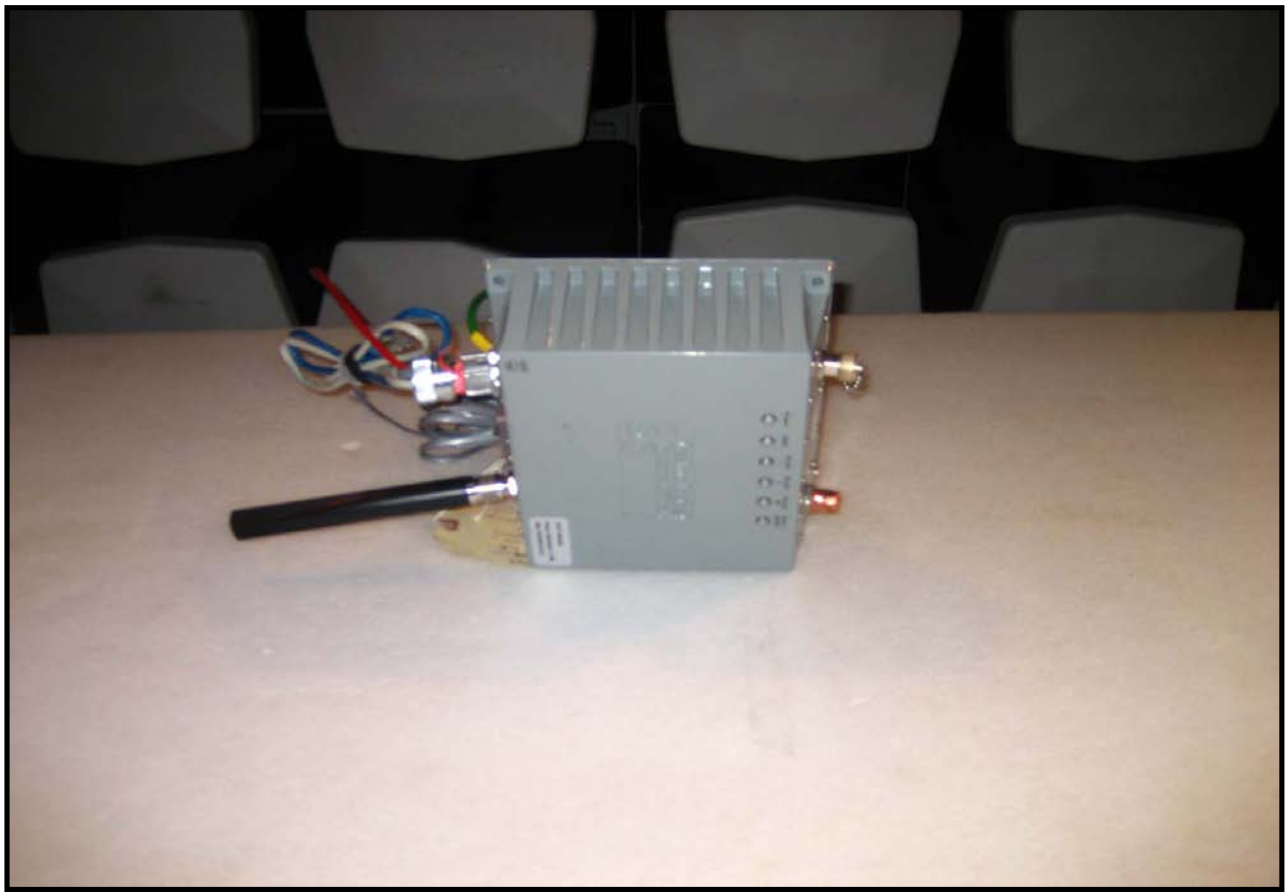


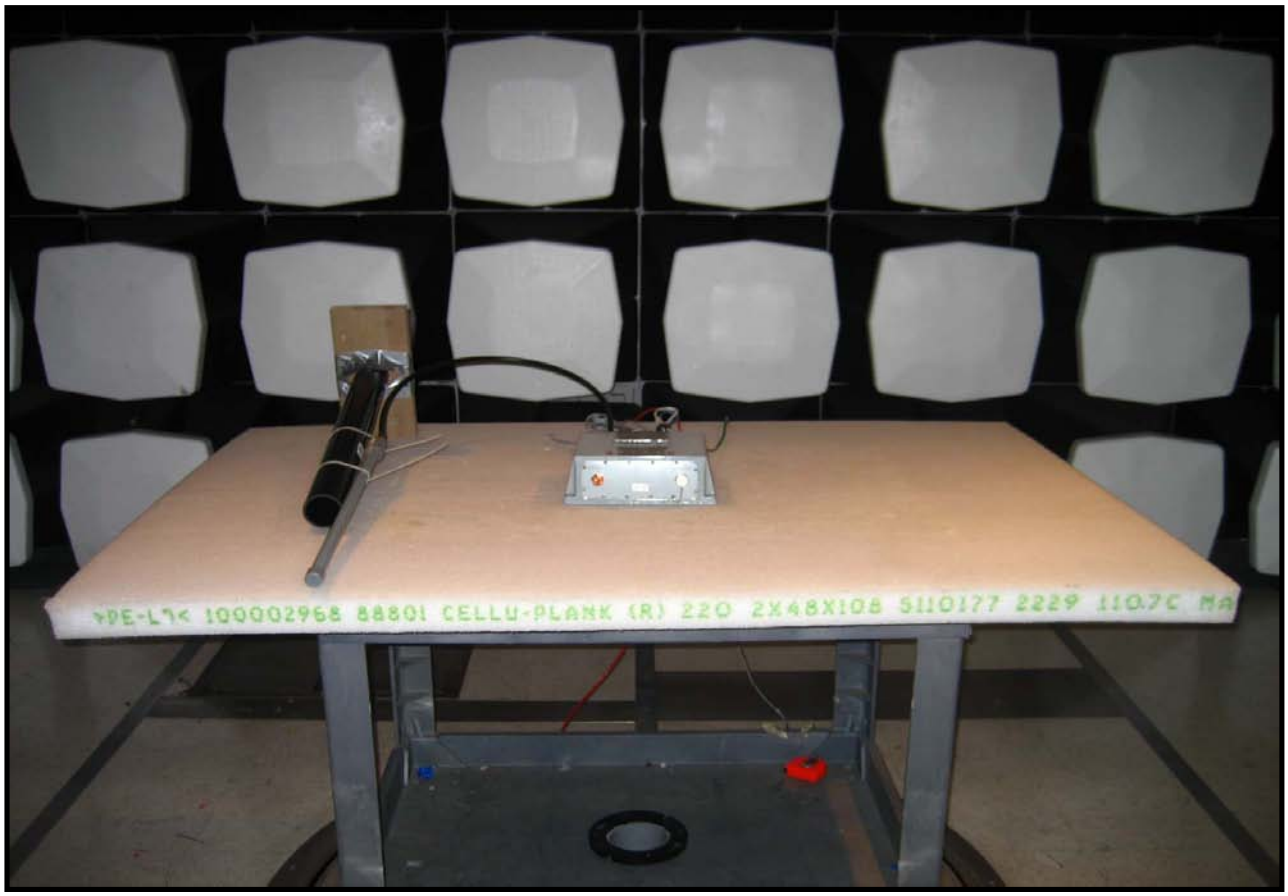
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
12023.230	34.5	-9.0	1.0	1.0	7.7	0.0	V-Horn	AV	0.0	17.8	54.0	-36.2
12024.490	34.5	-9.0	184.0	1.0	7.7	0.0	H-Horn	AV	0.0	17.8	54.0	-36.2
12023.700	46.3	-9.0	1.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.3	74.0	-36.7
12022.790	45.4	-9.0	184.0	1.0	0.0	0.0	H-Horn	PK	0.0	36.4	74.0	-37.6

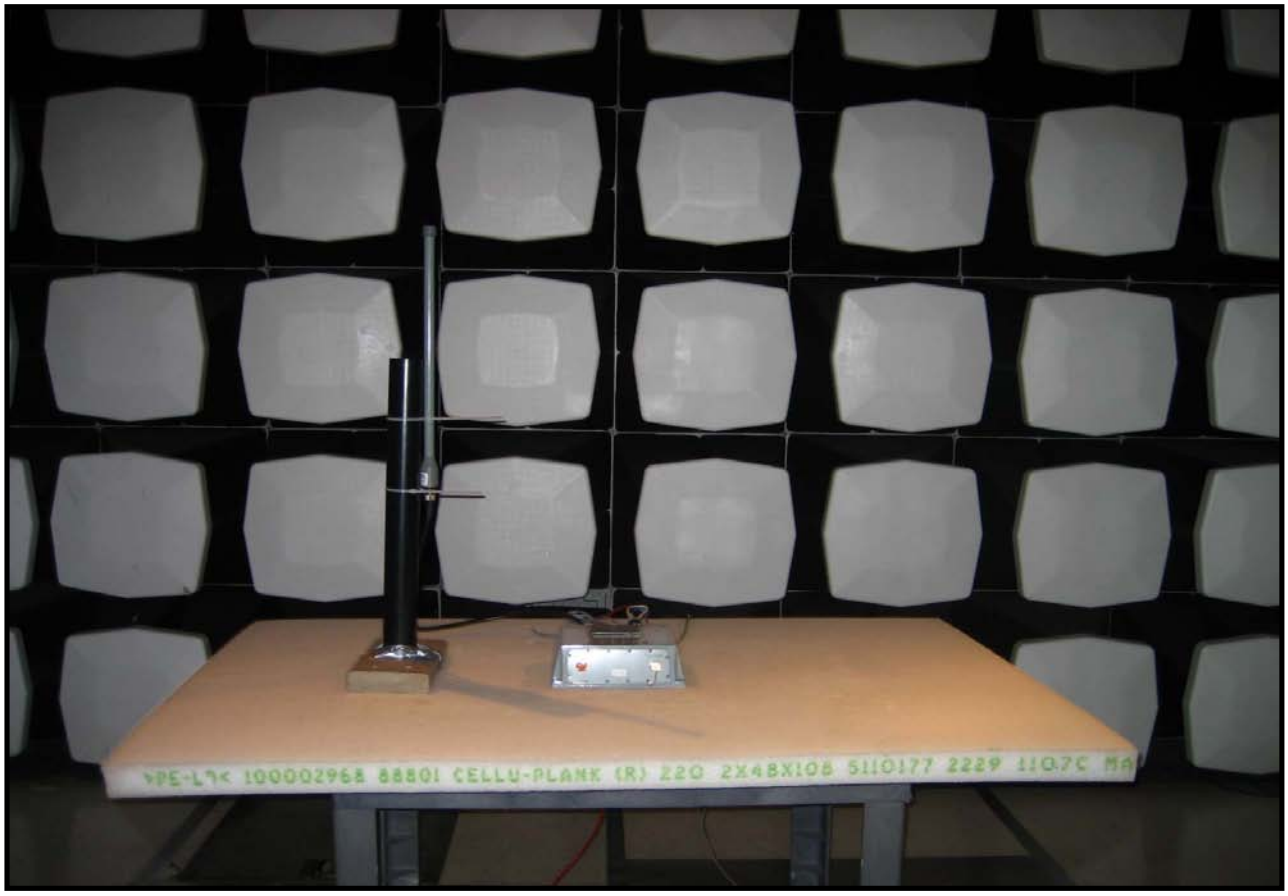





100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 11D7C




100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 1107C


100002968 88801 CELLU-PLANK (R) 220 2X48X108 5110177 2229 1107C

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

Receive Mode

POWER SETTINGS INVESTIGATED

24VDC

CONFIGURATIONS INVESTIGATED

1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz

CLOCKS AND OSCILLATORS

None Provided

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Biconilog	EMCO	3142	AXK	2/25/2008	24 mo
OC08 cables b,c,d,f			OCB	2/1/2008	13 mo
Pre-Amplifier	Miteq	AM-1551	AOX	2/1/2008	13 mo
Spectrum Analyzer	Agilent	E4443A	AAR	12/14/2007	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, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

NORTHWEST

EMC

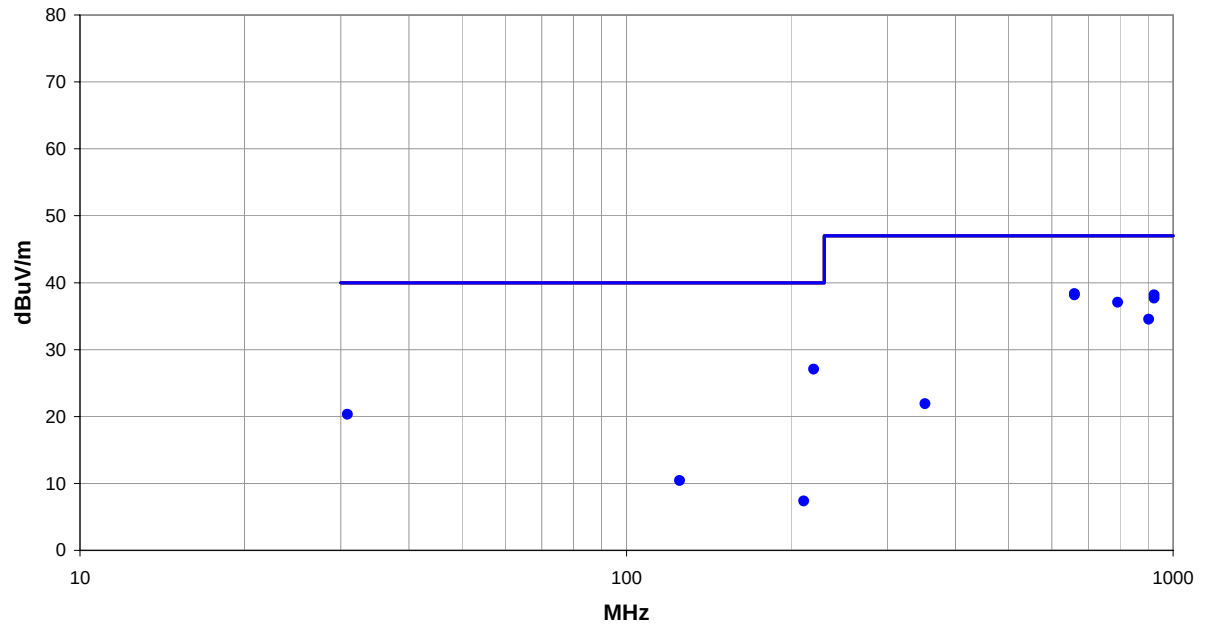
RADIATED EMISSIONS

PSA-ESCI 2008.05.22
Version 2008.3.31

Work Order:	HONE0039	**Date:**	06/04/08		
Project:	None	**Temperature:**	21 °C		
Job Site:	OC08	**Humidity:**	53		
Serial Number:	None	**Barometric Pres.:**	1018	**Tested by:**	Jeremiah Darden
EUT:	MultiNode (R110 Extended Temperature)				
Configuration:	1				
Customer:	Honeywell				
Attendees:	None				
EUT Power:	24VDC				
Operating Mode:	Receive Mode				
Deviations:	None				
Comments:	with XYR 6000				

Test Specifications	**Class A**	**Test Method**
EN 61326-1:2006		CISPR 11:2004 (Amended by A2:2006)

Run #	2	**Test Distance (m)**	10	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
660.016	50.3	-12.0	2.0	332.0	10.0	0.0	Vert	QP	0.0	38.3	47.0	-8.7
923.998	46.8	-8.6	1.0	63.0	10.0	0.0	Vert	QP	0.0	38.2	47.0	-8.8
660.006	50.1	-12.0	1.0	328.0	10.0	0.0	Horz	QP	0.0	38.1	47.0	-8.9
924.000	46.3	-8.6	2.0	172.0	10.0	0.0	Horz	QP	0.0	37.7	47.0	-9.3
791.990	47.7	-10.6	1.5	349.0	10.0	0.0	Vert	QP	0.0	37.1	47.0	-9.9
902.046	43.2	-8.7	1.5	313.0	10.0	0.0	Vert	QP	0.0	34.5	47.0	-12.5
220.038	49.6	-22.5	1.0	69.0	10.0	0.0	Vert	QP	0.0	27.1	40.0	-12.9
30.876	38.3	-18.0	1.2	133.0	10.0	0.0	Vert	QP	0.0	20.3	40.0	-19.7
351.983	39.5	-17.6	2.2	235.0	10.0	0.0	Horz	QP	0.0	21.9	47.0	-25.1
125.036	37.8	-27.4	2.5	49.0	10.0	0.0	Vert	QP	0.0	10.4	40.0	-29.6
211.097	30.5	-23.1	2.0	317.0	10.0	0.0	Horz	QP	0.0	7.4	40.0	-32.6

NORTHWEST

EMC

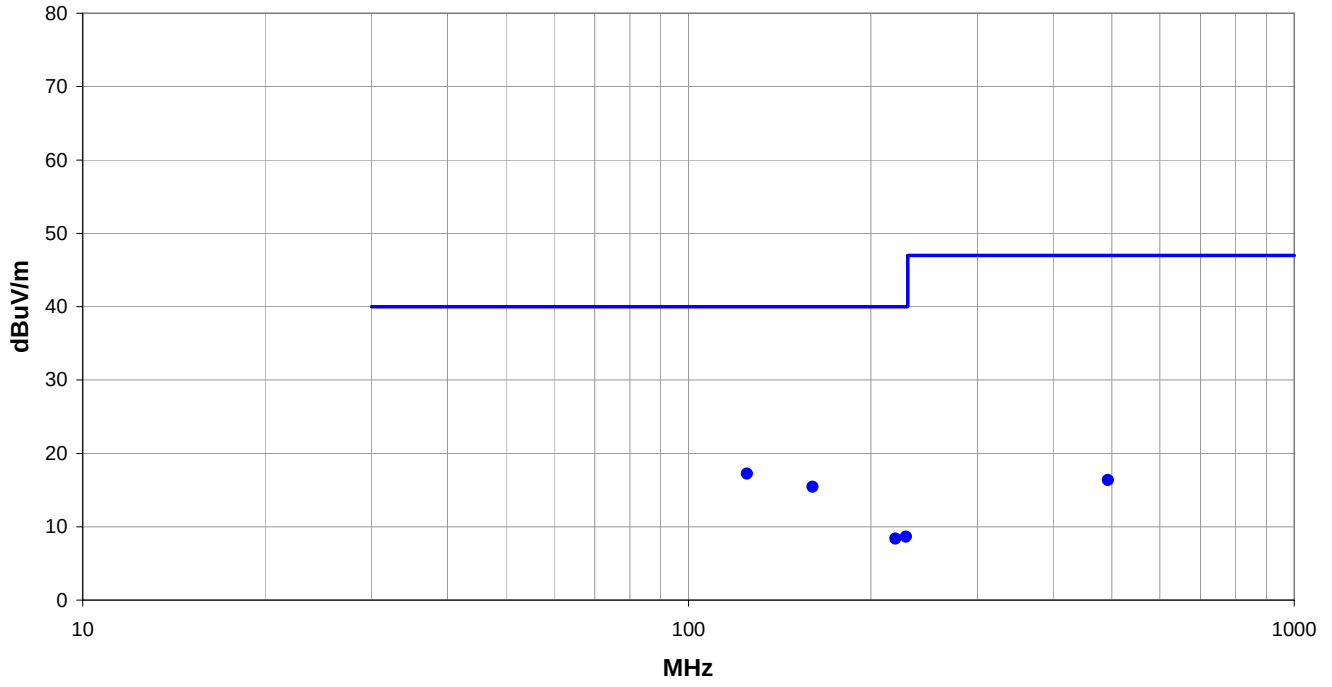
RADIATED EMISSIONS

Version 2008.3.31
PSA-ESCI 2008.05.13

Work Order:	HONE0034	**Date:**	05/19/08		
Project:	None	**Temperature:**	24 °C		
Job Site:	OC08	**Humidity:**	34		
Serial Number:	None	**Barometric Pres.:**	1018	**Tested by:**	Andrey Marcus
EUT:	XYR 6000 802.15.4 DSSS Radio				
Configuration:	1				
Customer:	Honeywell				
Attendees:	David Shipley				
EUT Power:	230VAC/50Hz				
Operating Mode:	Receive Mode				
Deviations:	None				
Comments:	None				

Test Specifications	**Class A**	**Test Method**
EN 61326-1:2006		CISPR 11:2004 (Amended by A2:2006)

Run #	2	**Test Distance (m)**	10	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq	Amplitude	Factor	Antenna Height	Azimuth (degrees)	Test Distance	External Attenuation	Polarity/ Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec. (dB)
124.995	44.6	-27.4	1.4	9.0	10.0	0.0	Vert	QP	0.0	17.2	40.0	-22.8
160.393	40.3	-24.9	1.0	315.0	10.0	0.0	Vert	QP	0.0	15.4	40.0	-24.6
492.438	31.1	-14.7	1.0	360.0	10.0	0.0	Vert	QP	0.0	16.4	47.0	-30.6
228.564	30.7	-22.1	2.5	20.0	10.0	0.0	Horz	QP	0.0	8.6	40.0	-31.4
219.794	30.9	-22.5	1.5	319.0	10.0	0.0	Vert	QP	0.0	8.4	40.0	-31.6