



Nemko USA, Inc.
11696 Sorrento Valley Rd., Suite F
San Diego, CA 92121-1024
Phone (858) 755-5525 Fax (858) 452-1810



CERTIFICATION TEST REPORT

Report Number: 2010 02144343 FCCTX

FCC PART 15.247C

For The Wireless Internet Appliance
Model: EWIG CHB801

FCC ID: N9ZNS-DP8CH

PREPARED FOR:

Chumby Industries, Inc.
12264 El Camino Real, Suite 203
San Diego, CA 92130

Prepared on: February 20, 2010

Project Number: 41446

NEx Number: 144343

Total Pages: 45

Nemko USA, Inc.		11696 Sorrento Valley Road, Suite F, San Diego, CA 92121 Phone (858) 755-5525 Fax (858) 452-1810	
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DOCUMENT HISTORY

REVISION	DATE	COMMENTS
-	February 20, 2010	Prepared By: Alan Laudani
-	February 20, 2010	Initial Release: Alan Laudani

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- o The unit described in this report was received at Nemko USA, Inc.'s facilities on February 12, 20.
- o Testing was performed on the unit described in this report on February 12, 2010 to February 20, 20.
- o The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- o This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

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CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4-2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.



Alan Laudani
EMC Engineer

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1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT: Chumby Industries, Inc.
12264 El Camino Real, Suite 203
San Diego, CA 92130

CONTACT: Mary Jungman
E-Mail: mary@chumby.com

DATE (S) OF TEST: February 12, 2010 to February 20, 20

EQUIPMENT UNDER TEST (EUT): Wireless Internet Appliance

MODEL: EWIG CHB801

CONDITION UPON RECEIPT: Suitable for Test

TEST SPECIFICATION: FCC, Part 15.247, Subpart C Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands and RSS 210 (Issue 7, June 2007) Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

1.2. Test Summary

<i>Specification</i>	<i>Frequency Range</i>	<i>Compliance Status</i>
FCC, CFR 47, Section 15.207	0.15 MHz - 30.00 MHz	PASS
FCC, CFR 47, Section 15.209	30 MHz – 10 th Harmonic	PASS
FCC CFR 47, §15.247 Plus Bandedge	2412– 2462 MHz	PASS
RSS-210 - Low Power License Exempt Radio-communication Devices (All Frequency Bands)	2412 – 2462 MHz	PASS

Testing was started at 30 MHz as there are no RF signals generated below this frequency.

Refer to the test results section for further details.

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2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The EWIG CHB801 is a Wireless Internet Appliance commonly known as Chumby. The Chumby is a device that displays information (flash based feeds or ‘widgets’) from the internet using your wireless Wi-Fi 802.11b/g internet router and connection. Log on to Chumby.com on your PC and select the custom (personalized) content you want it to display. When turned on it displays customized online matter to the user. Features include a 3.5" LCD color touch screen, two (2) external USB ports, stereo speakers, headphone jack, squeeze sensor, and accelerometer (motion sensor). The dimensions are 5 1/2" wide, 4 1/4" tall, 3 1/4" deep at the base, and 2 1/4" deep at the top. The chip antenna was set aside for conductive RF measurements. The antenna is not accessible by the user.

2.2. System Components and Power Cables

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Wireless Internet Appliance	Chumby Industries, Inc. Model: EWIG CHB801 Serial #: NA	1.5 m, 18 AWG x 2, DC Power Plug from AC Wall Adaptor
EUT – AC Wall Adaptor	Kings Model: KSS18-050-2500U S/N: NA	Direct Plug In, 2 Prong
Support – Stereo Headphones	Sony Model: MDR-V150 S/N: NA	N/A
Support – USB thumb drive	No Name Model: Chumby Supplied S/N: NA	N/A
Support – USB thumb drive	No Name Model: Chumby Supplied S/N: NA	N/A
Support – Wireless Broadband Router	Linksys Model: Wireless G S/N: CDFD1F5U6857	1 m, 18 AWG x 2, DC Power Plug from AC Wall Adaptor
Support – Wireless Broadband Router Power Supply	Linksys Model: MW48-0751500 S/N: NA	Direct Plug In, 2 Prong
Support – 1GB memory chip	Crucial Model: 1GB S/N: NA	NA

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2.3. Device Interconnection and I/O Cables

Connection	I/O Cable
Support Headphones to EUT	3.2 m, 1/8th inch stereo plug
Support USB drive to EUT	USB port direct plug-in

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

None, No design modifications were made to the EUT during testing.

2.5. Technical Specifications of the EUT

Manufacturer:	Chumby Industries, Inc.
Operating Frequency:	2412 MHz to 2462 MHz in the 2400-2483.5 MHz Band
Rated Power:	0.128W
Modulation:	DSSS and OFDM
Antenna Connector:	Internal within enclosure – not accessible to user
Power Source:	120 VAC, 60 Hz

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3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	17 – 22 °C
Humidity range	:	29 - 55%
Pressure range	:	87 - 105 kPa
Power supply range	:	120VAC 60Hz (±15%)

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4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4-2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

4.3. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, the EUT's signal is centered on the analyzer, the scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

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4.4. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a “normally operating” mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:

Example: $A = RR + CL + AF$

A = Amplitude $\text{dB}\mu\text{V}/\text{m}$

RR = Receiver Reading $\text{dB}\mu\text{V}$

CL = cable loss dB

AF = antenna factor dB/m

Example Frequency = 110MHz

18.5 $\text{dB}\mu\text{V}$ (spectrum analyzer reading)

+3.0 dB (cable loss @ frequency)

21.5 $\text{dB}\mu\text{V}$

+15.4 dB/m (antenna factor @ frequency)

36.9 $\text{dB}\mu\text{V}/\text{m}$ Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

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5. Test Results

5.1. Conducted Emissions – Transceiver Mode

Part 15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

7.2.2 The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network. Except when the requirements applicable to a given device state otherwise, for any licence-exempt radiocommunication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown below. The tighter limit applies at the frequency range boundaries. The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network

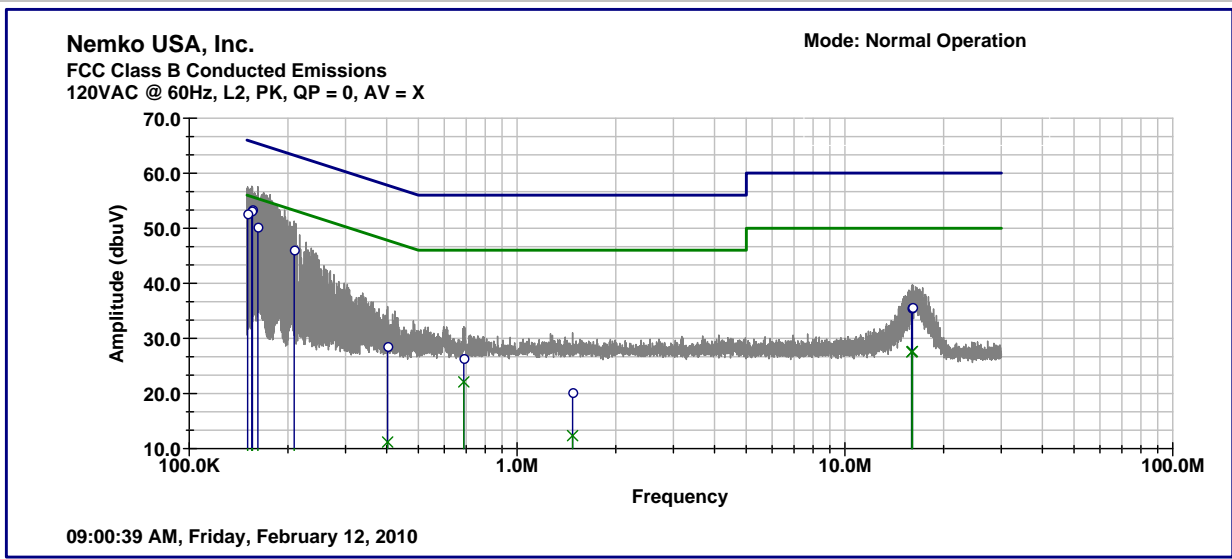
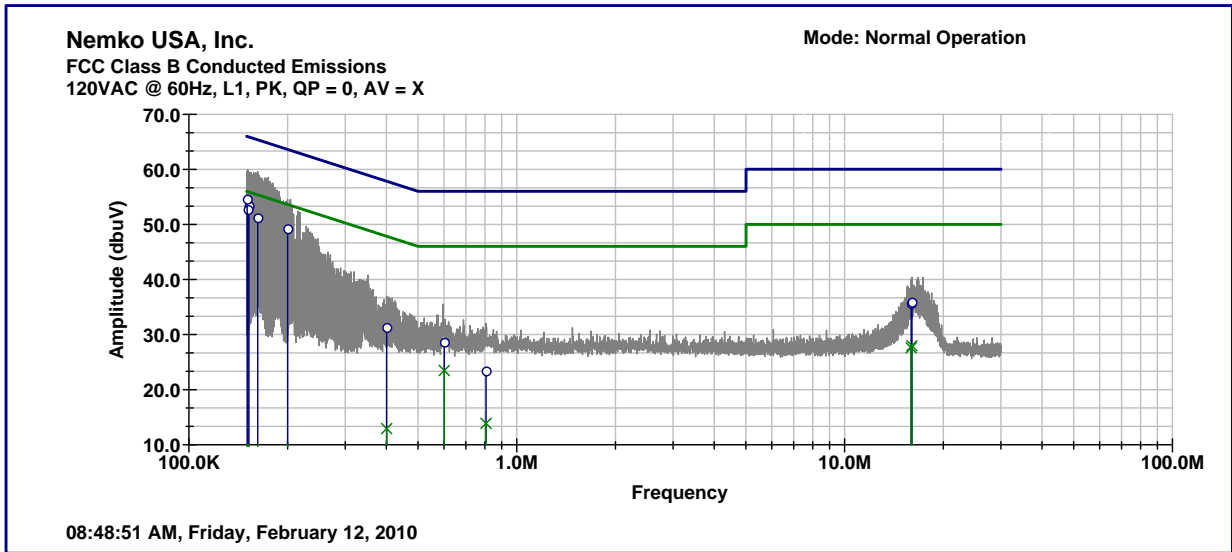
Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

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Normal Operation with Access Point Data Traffic

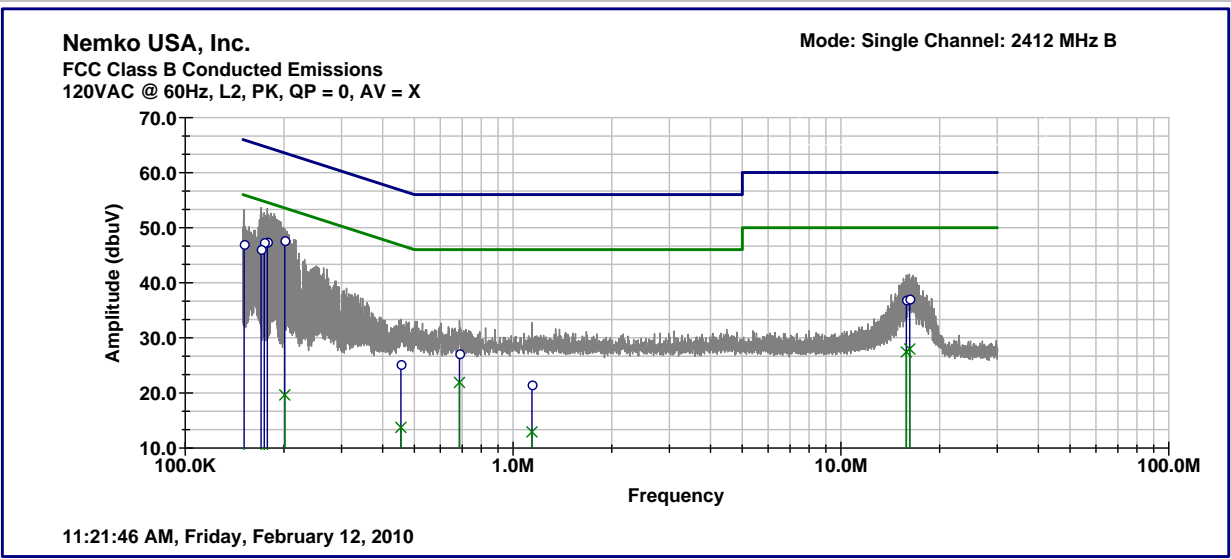
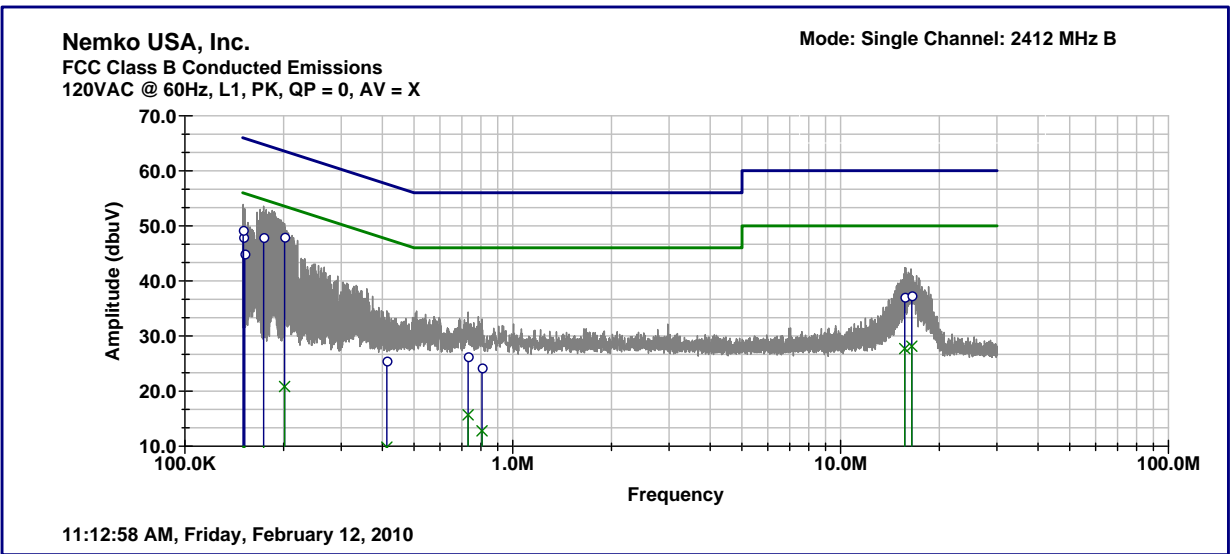
Client	Chumby Industries, Inc.	Temperature	23	°C
PAN #	41446	Relative Humidity	34	%
EUT Name	Wireless Internet Appliance	Barometric Pressure	101.5	kPa
EUT Model	EWIG CHB801	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.207	Date	2-12-2010	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			



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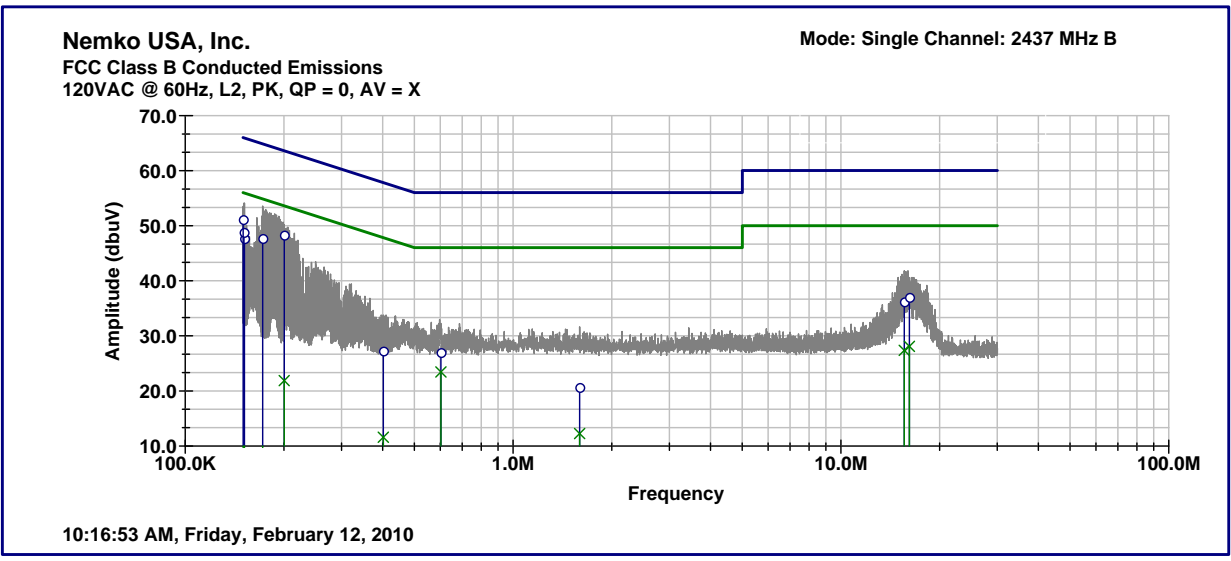
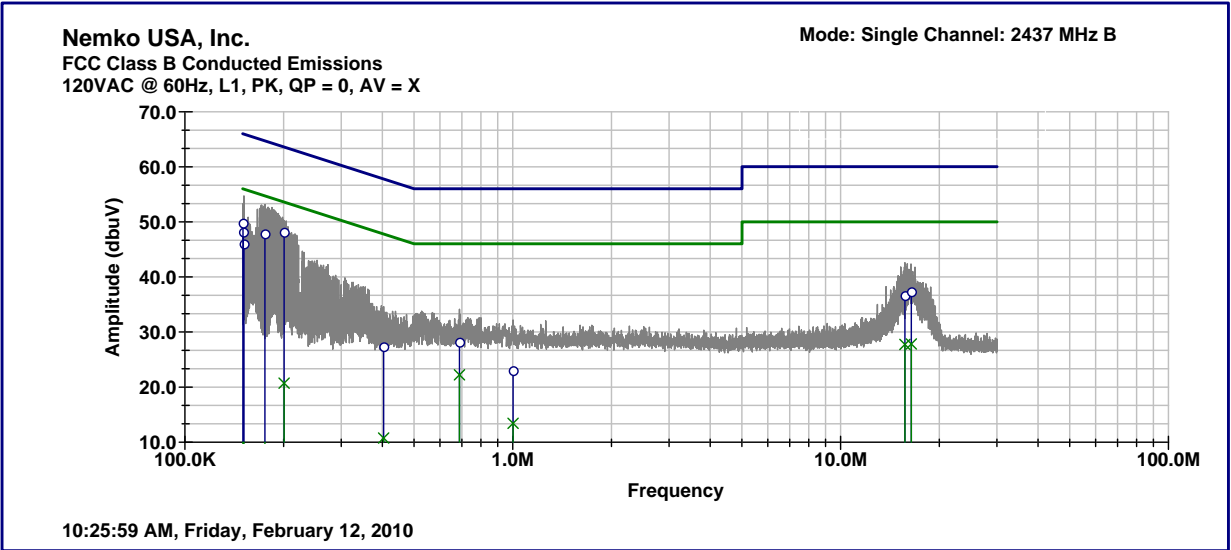
Test Operation Transmitting on Low, Mid and High Channels

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Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	2-12-2010	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz			
Legend	.Quasi-Peak Limit Blue Line, Average Limit Green Line			



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EUT Model	EWIG CHB801	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	2-12-2010	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz			
Legend	.Quasi-Peak Limit Blue Line, Average Limit Green Line			

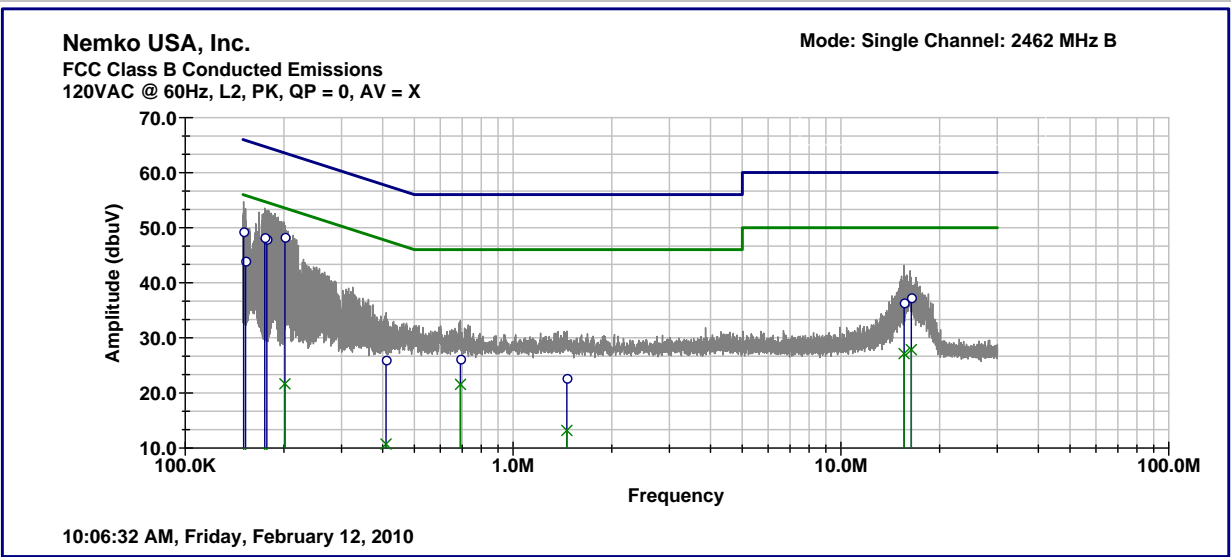
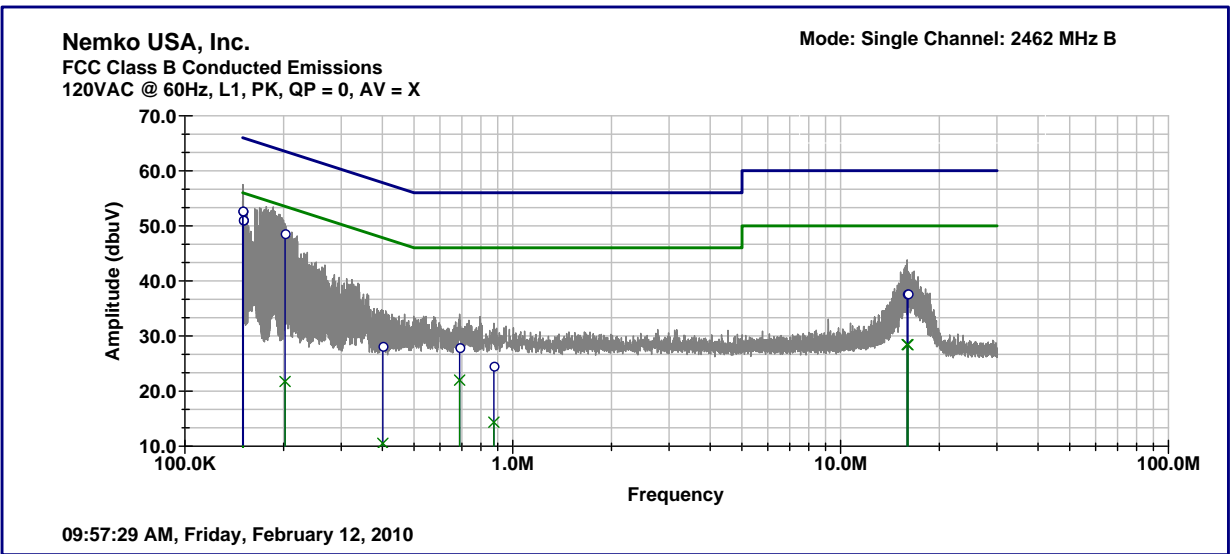


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Basic Standard	Sec. 15.107	Date	2-12-2010	

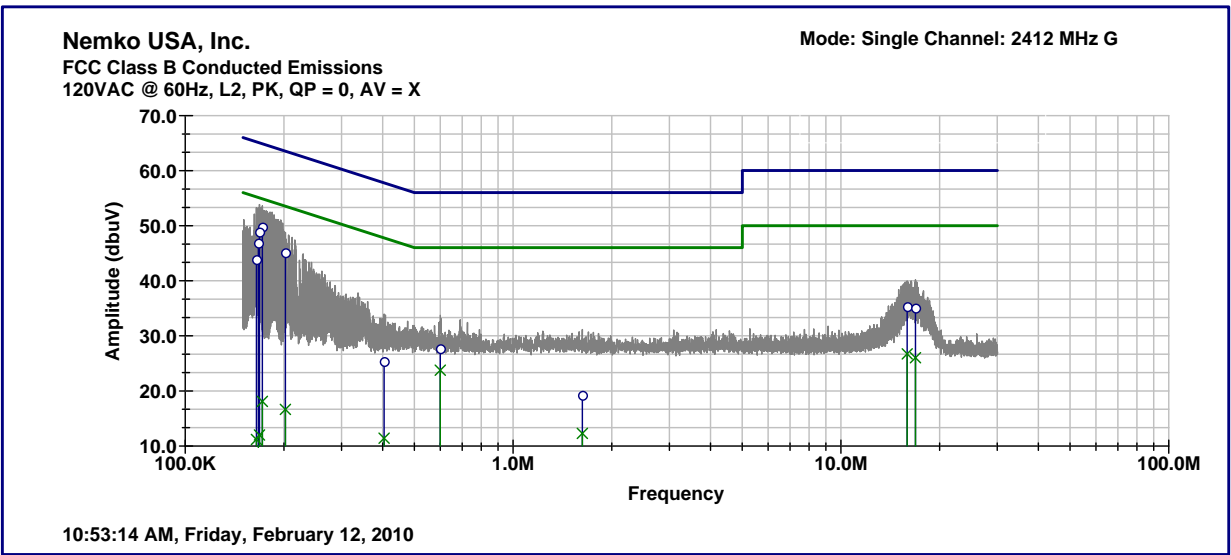
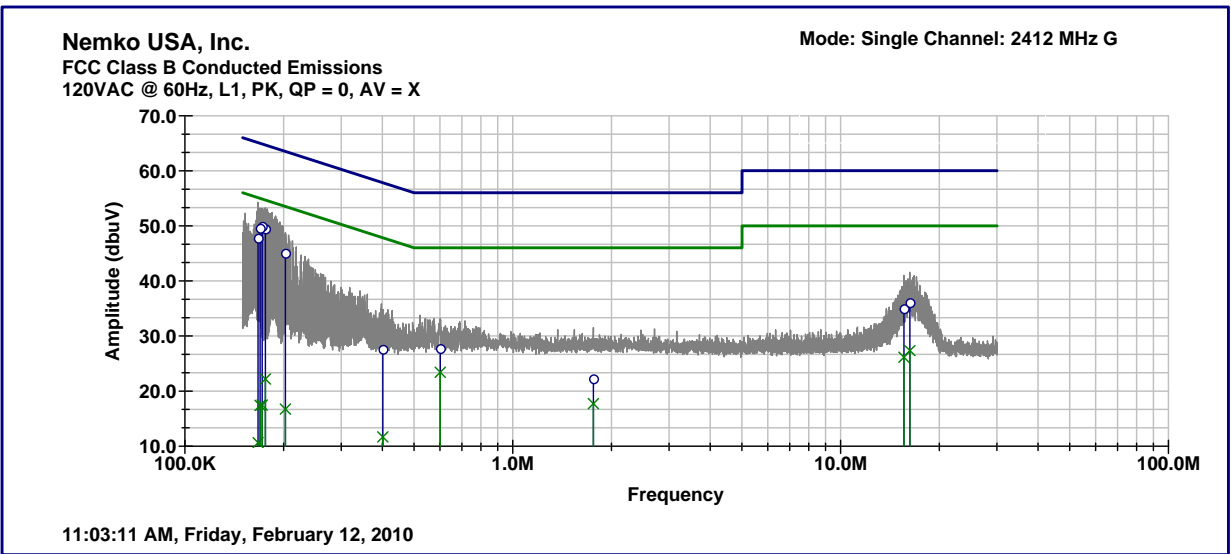
Parameters
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Quasi-Peak: RBW 9kHz, VBW 30 kHz
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Legend
. Quasi-Peak Limit Blue Line, Average Limit Green Line



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Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	2-12-2010	
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Legend	.Quasi-Peak Limit Blue Line, Average Limit Green Line			

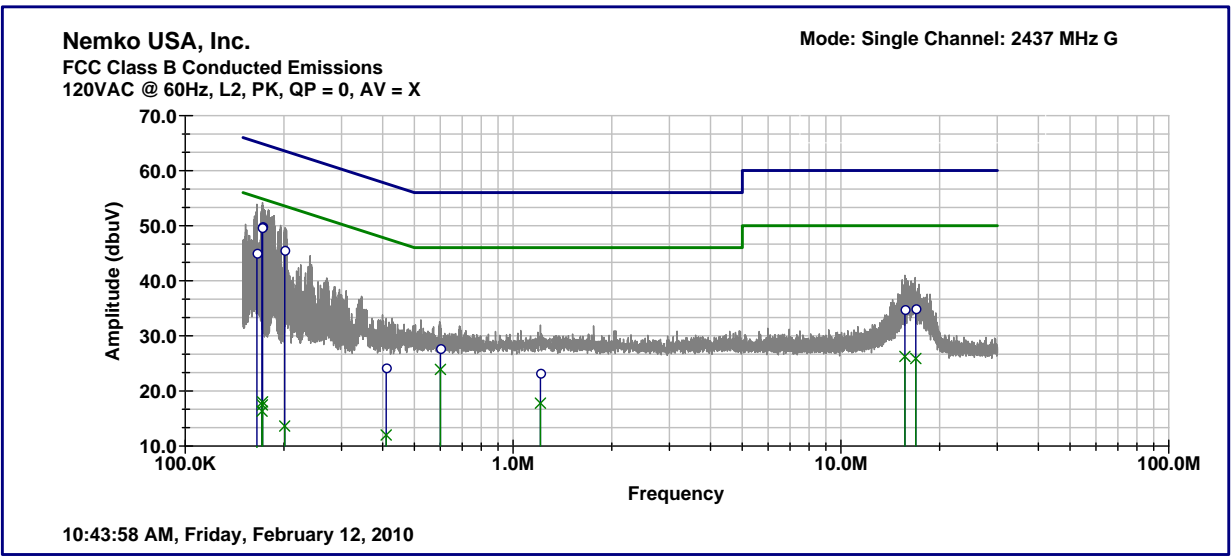
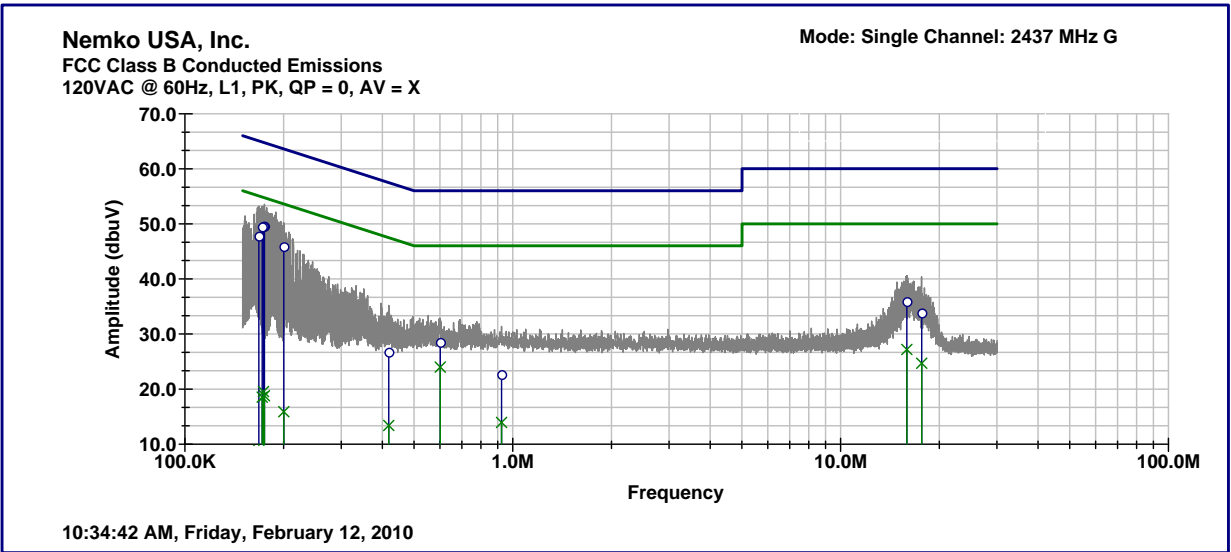


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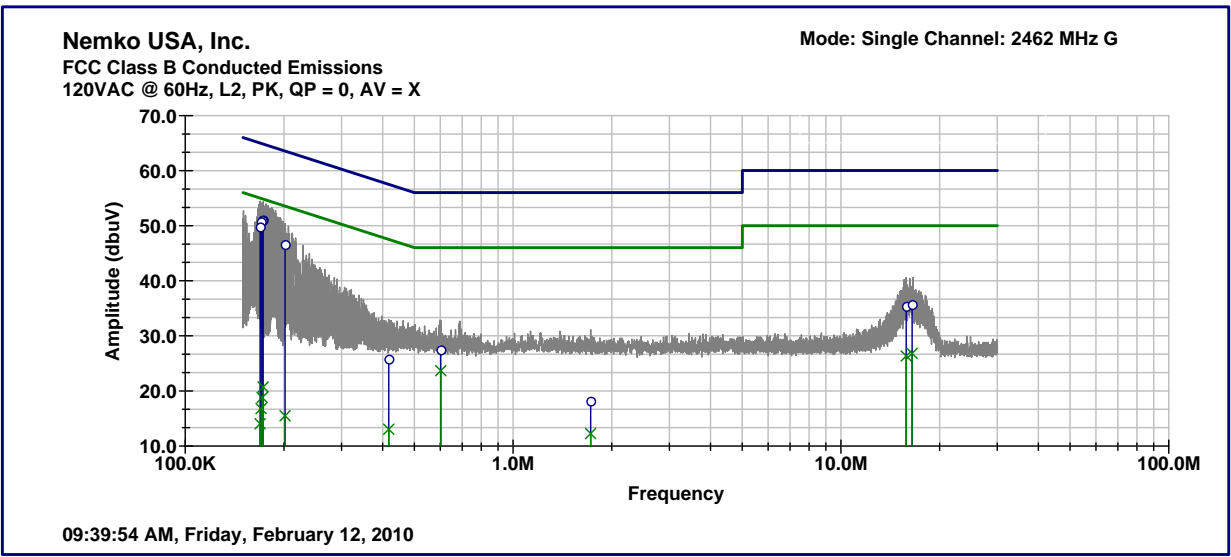
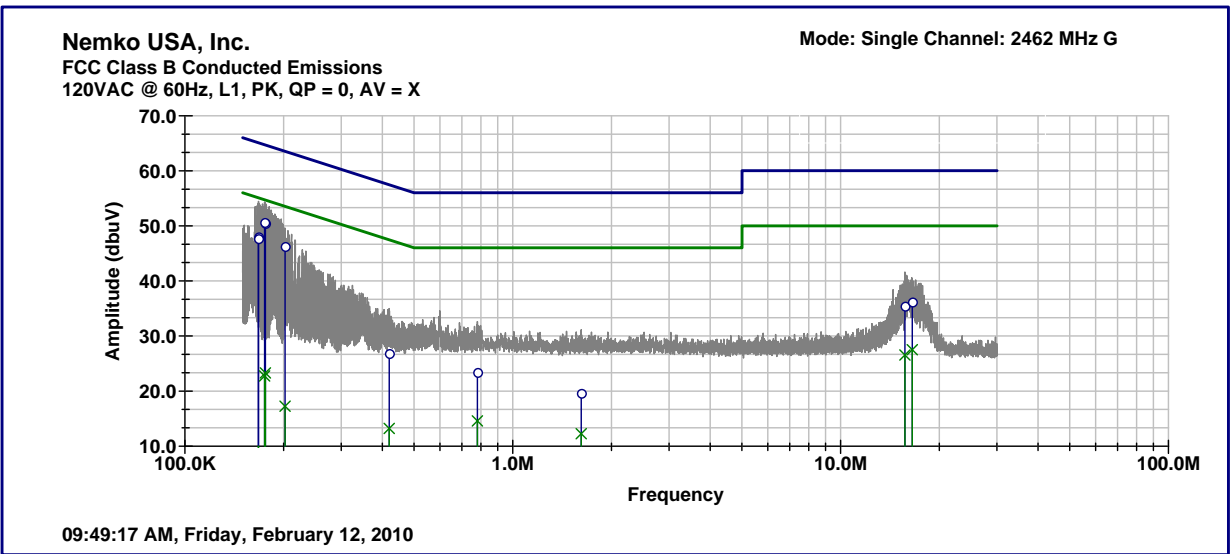
Parameters
Peak RBW: 100kHz VBW: 100kHz
Quasi-Peak: RBW 9kHz, VBW 30 kHz
Average: RBW 9kHz, VBW 30 kHz

Legend
. Quasi-Peak Limit Blue Line, Average Limit Green Line



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Client	Chumby Industries, Inc.	Temperature	23	°C
PAN #	41446	Relative Humidity	34	%
EUT Name	Wireless Internet Appliance	Barometric Pressure	101.5	kPa
EUT Model	EWIG CHB801	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15B	Test Engineer	Alan Laudani	
Basic Standard	Sec. 15.107	Date	2-12-2010	
Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz			
Legend	.Quasi-Peak Limit Blue Line, Average Limit Green Line			



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5.2. Bandwidth

RSS-Gen 4.6.1

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

Sample Number:	EWIG CHB801	Temperature:	23°C
Date:	2-15-2010	Humidity:	34%RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

15.247(a)(1)

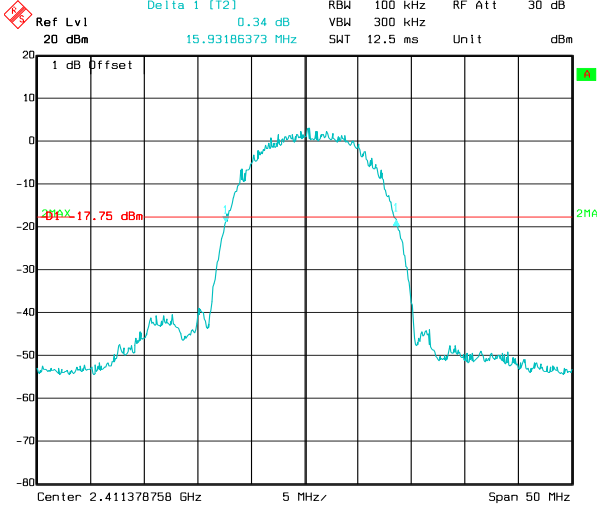
Measurements were made conductively. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK max hold reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level. The bandwidth was determined from where the channel output spectrum intersected the display line.

Test Results:

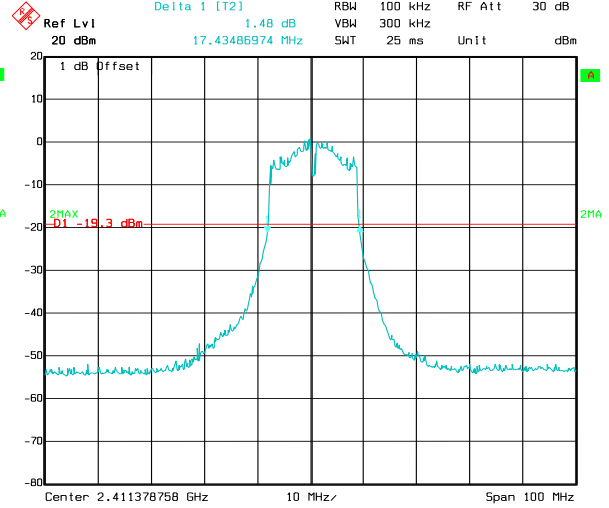
Mode	20 dB Bandwidth		
	Low Channel	Mid Channel	High Channel
“b”	15.9 MHz	16.1 MHz	16.3 MHz
“g”	17.4 MHz	17.3 MHz	17.4 MHz

DATE	DOCUMENT NAME	DOCUMENT #	PAGE
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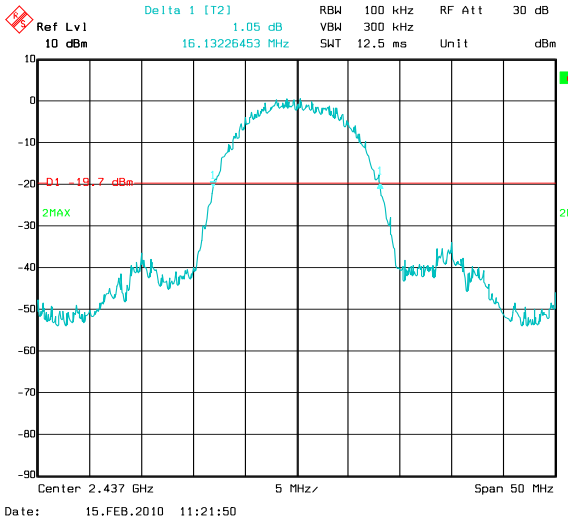
Low Channel b-Mode



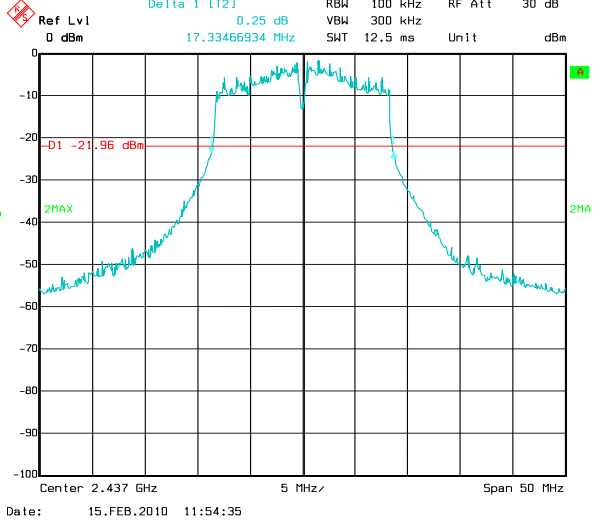
Mid Channel g-Mode



Low Channel b-Mode

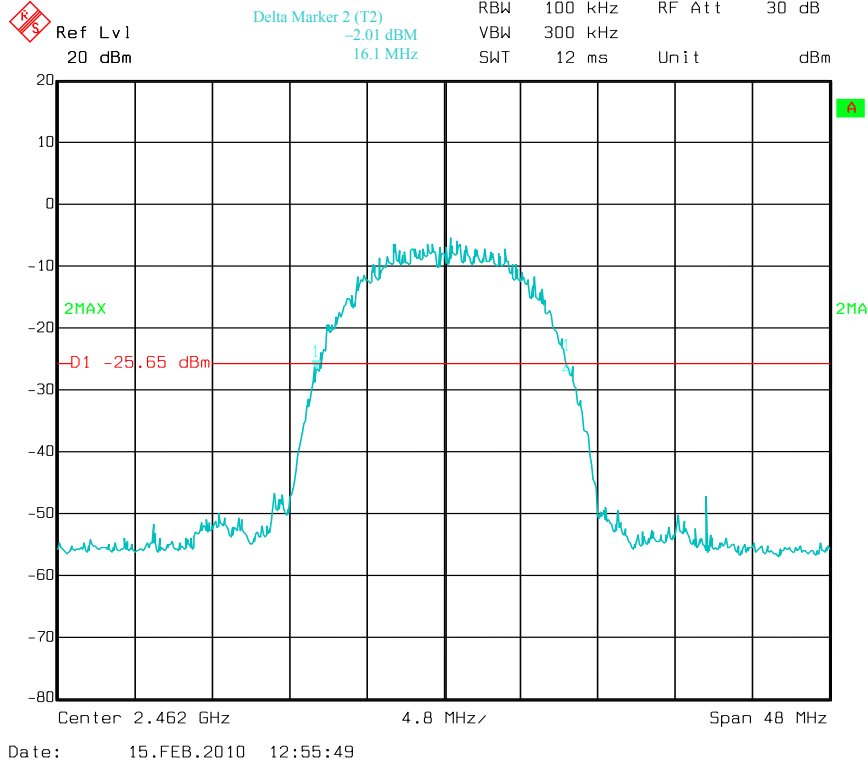


Mid Channel g-Mode

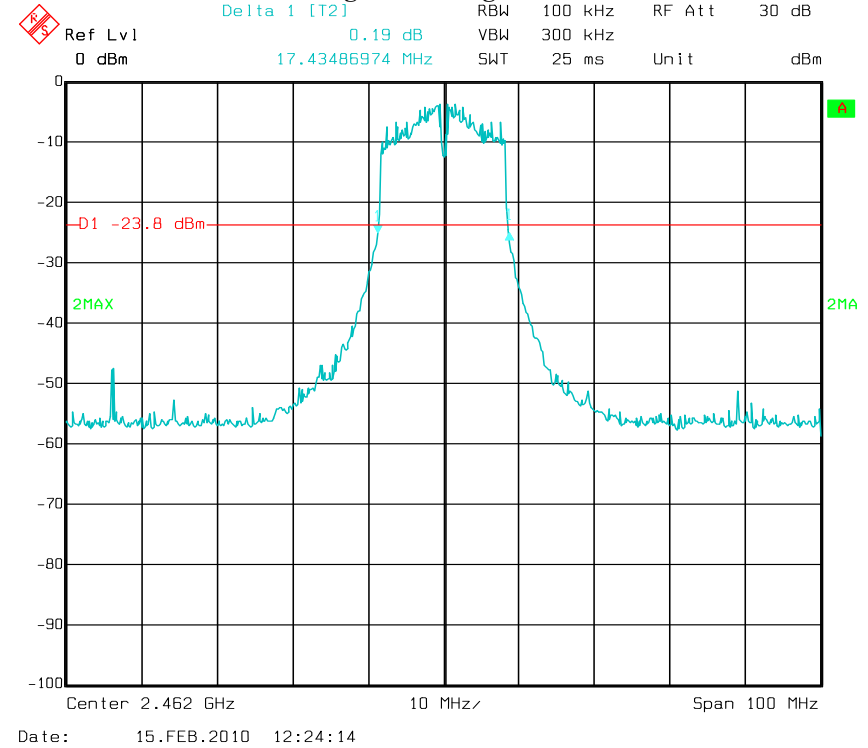


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High Channel b-Mode



High Channel g-Mode



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5.3. Out-of-band Conducted Emissions

A8.5 Out-of-band Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

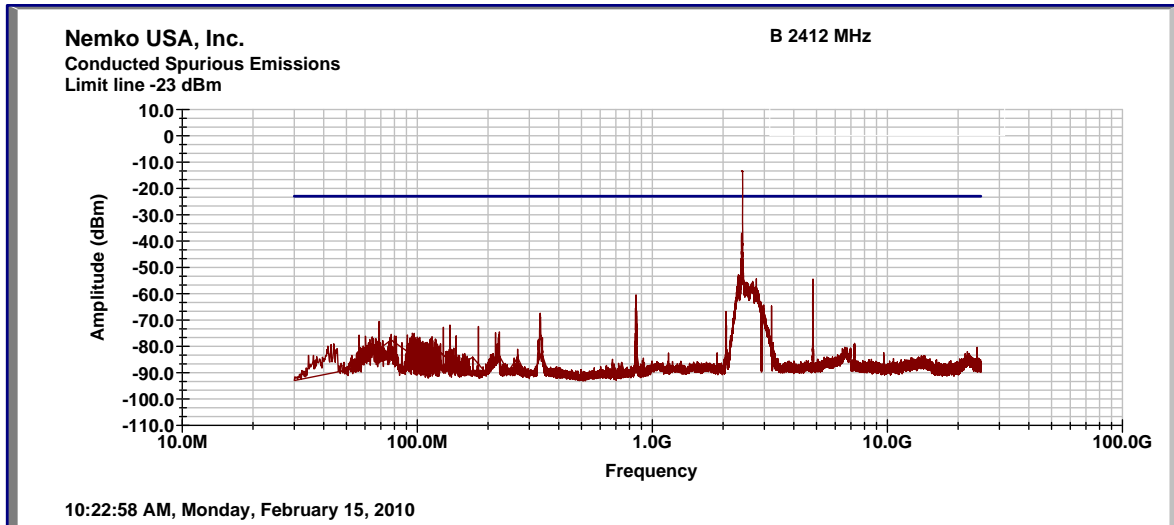
Sample Number:	EWIG CHB801	Temperature:	23°C
Date:	2-15-2010	Humidity:	34% RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

Test Results: See plots below.

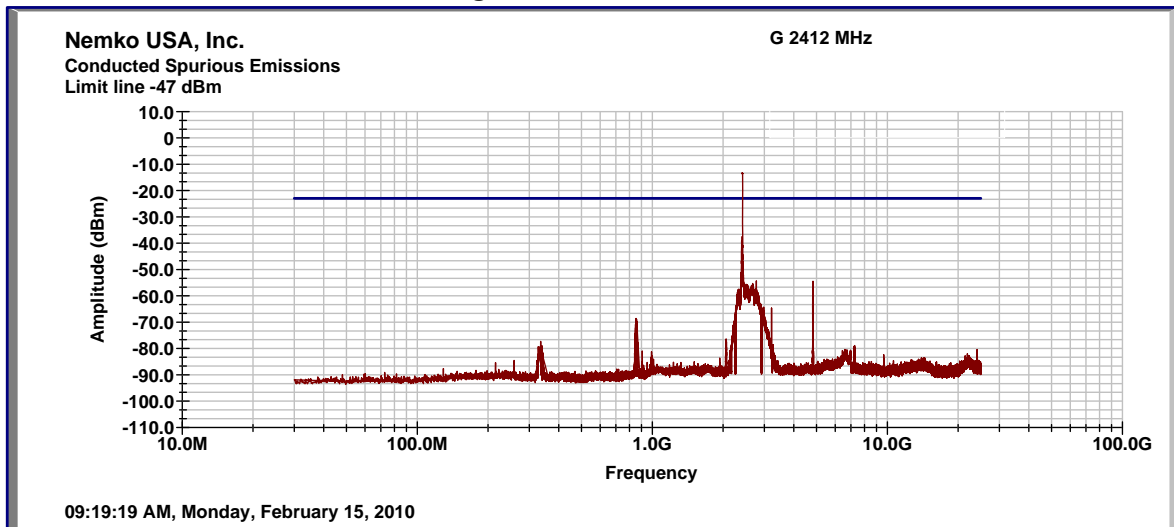
Sweeps from 30 MHz to 25 GHz, Max Peak Hold, RBW 100 kHz, VBW 300 kHz

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Low Channel b-Mode 2412 MHz; Limit is 20 dBc

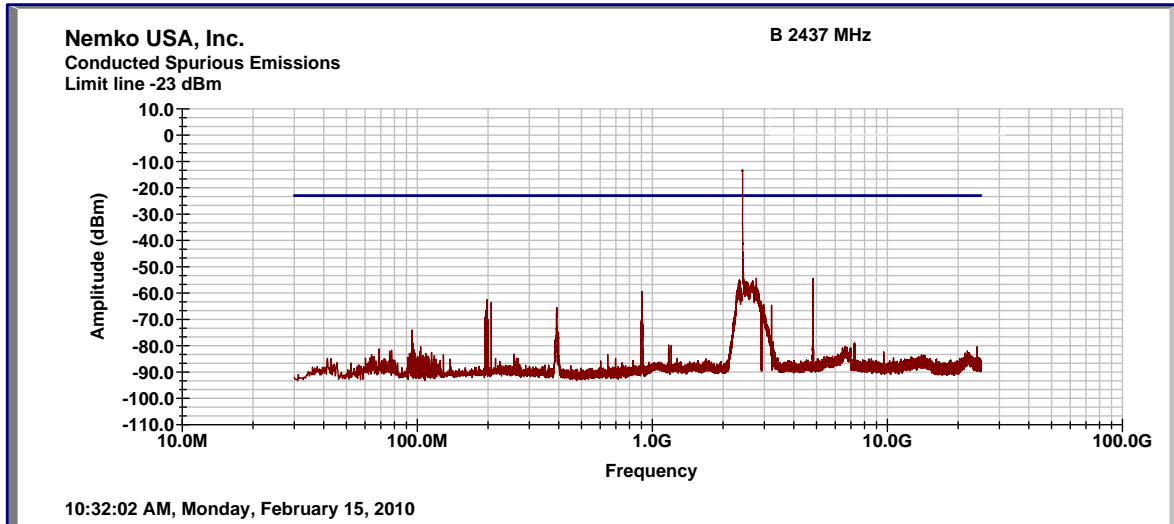


Low Channel g-Mode 2412 MHz; Limit is 20 dBc

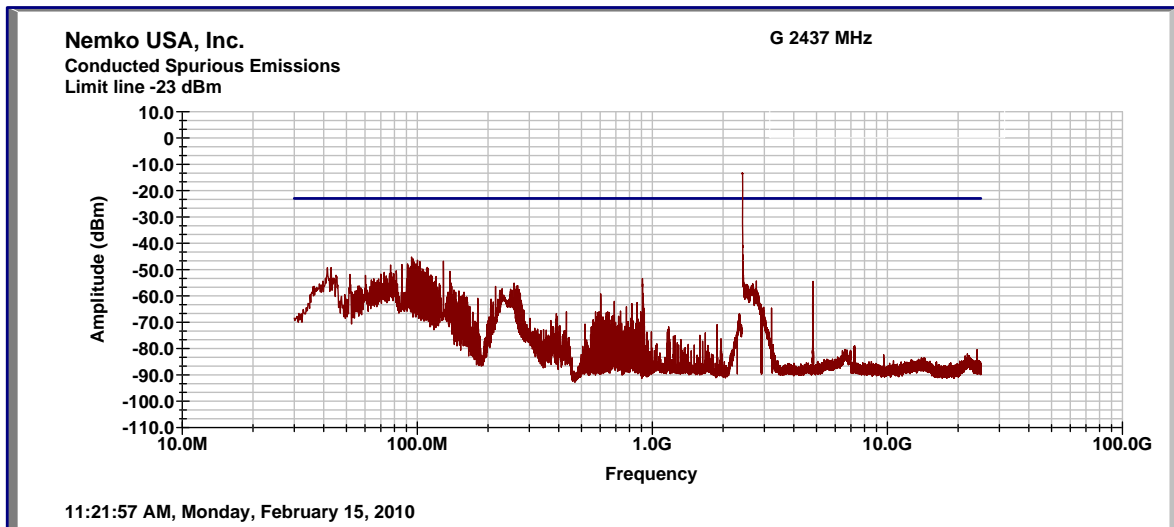


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Mid Channel b-Mode 2437 MHz; Limit is 20 dBc

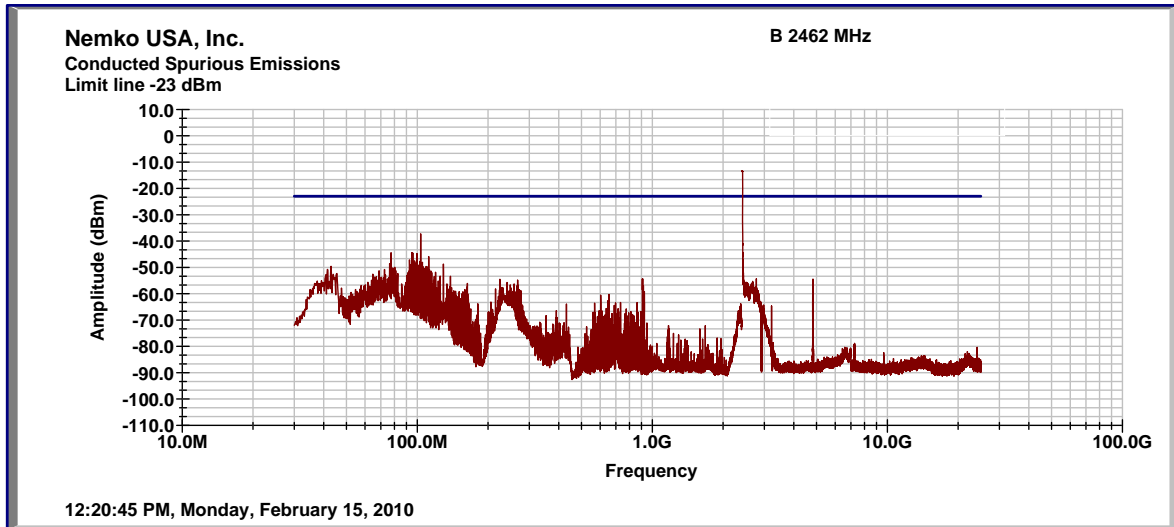


Mid Channel g-Mode 2437 MHz; Limit is 20 dBc

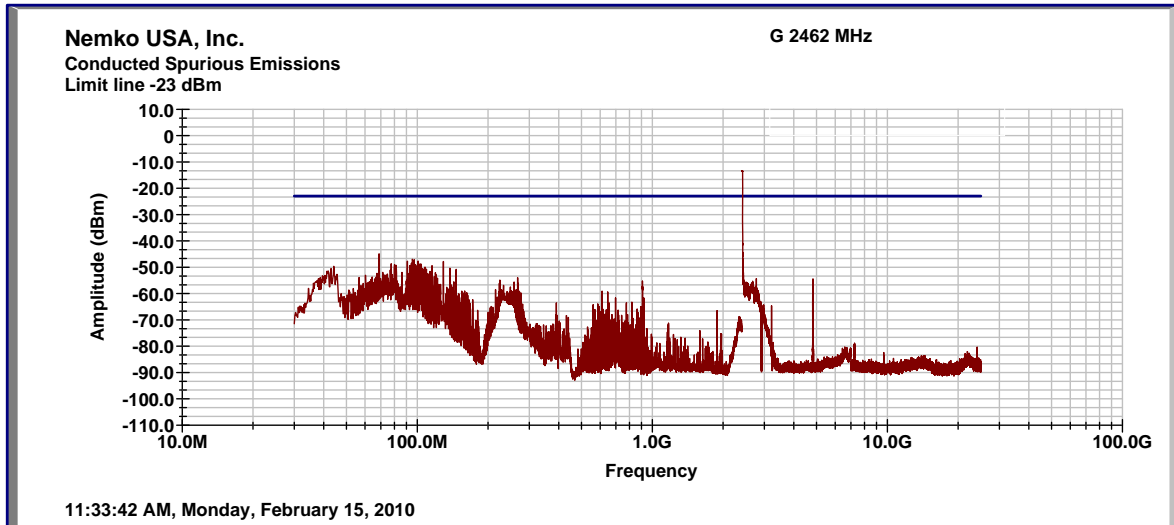


Nemko USA, Inc.		11696 Sorrento Valley Road, Suite F, San Diego, CA 92121 Phone (858) 755-5525 Fax (858) 452-1810	
DATE February 20, 2010	DOCUMENT NAME EWIG CHB801 Certification Test Report FCC ID: N9ZNS-DP8CH	DOCUMENT # Error! Cannot open file.	PAGE 25 of 45

High Channel b-Mode 2462 MHz; Limit is 20 dBc



High Channel g-Mode 2462 MHz; Limit is 20 dBc



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5.4. Out-of-band Emissions / Radiated Emissions within Restricted Bands

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/meter)	Measurement Distance (meter)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	3
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

A8.5 Out-of-band Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

Sample Number:	EWIG CHB801	Temperature:	16°C
Date:	2-12-2010	Humidity:	60%RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

Test Results:

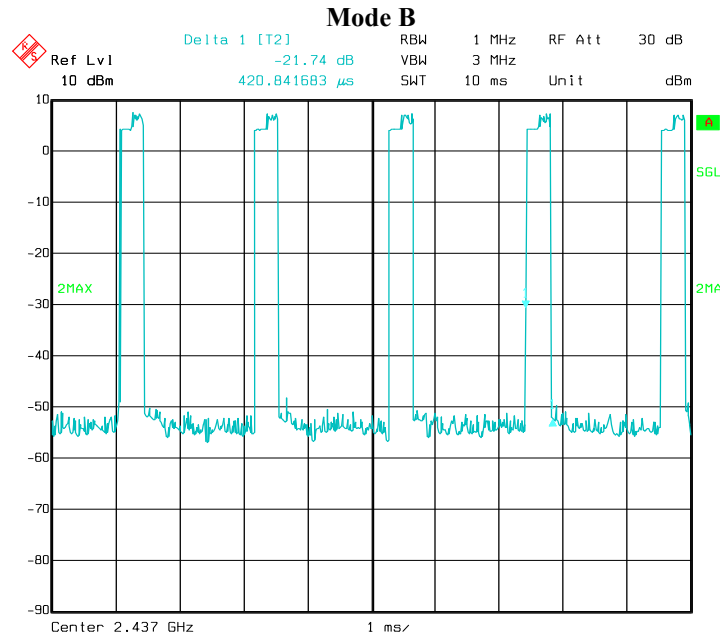
Emissions reported below, Emissions were searched over a range of 30 MHz to 1000 MHz and in the restricted bands from 1000 to 25000 MHz.

Prescan investigations with both power supplies and both modes were performed, the Chumby Power Supply (MPB-12012500) proved to be worst case and emissions shown below are presented. Emissions presented are digital emissions due to the computer, not RF spurious due to harmonics of the transmitter.

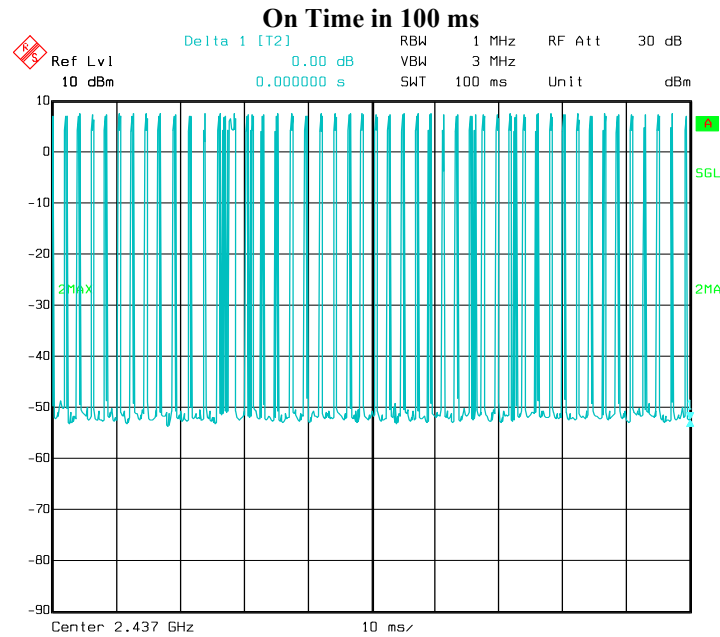
No emissions recorded within 20 dB of the limit other than the emissions recorded below.

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DATE February 20, 2010	DOCUMENT NAME EWIG CHB801 Certification Test Report FCC ID: N9ZNS-DP8CH	DOCUMENT # Error! Cannot open file.	PAGE 28 of 45

5.5. Duty Cycle Correction Factor



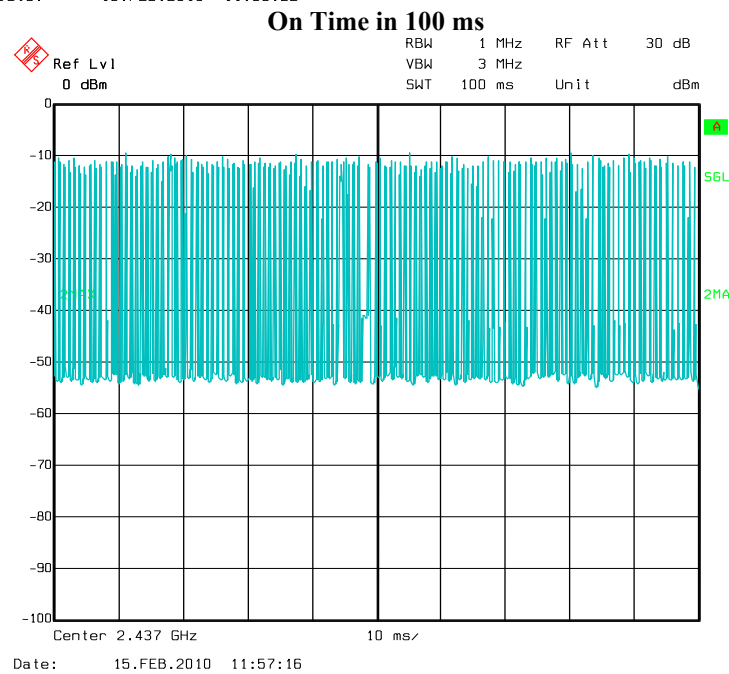
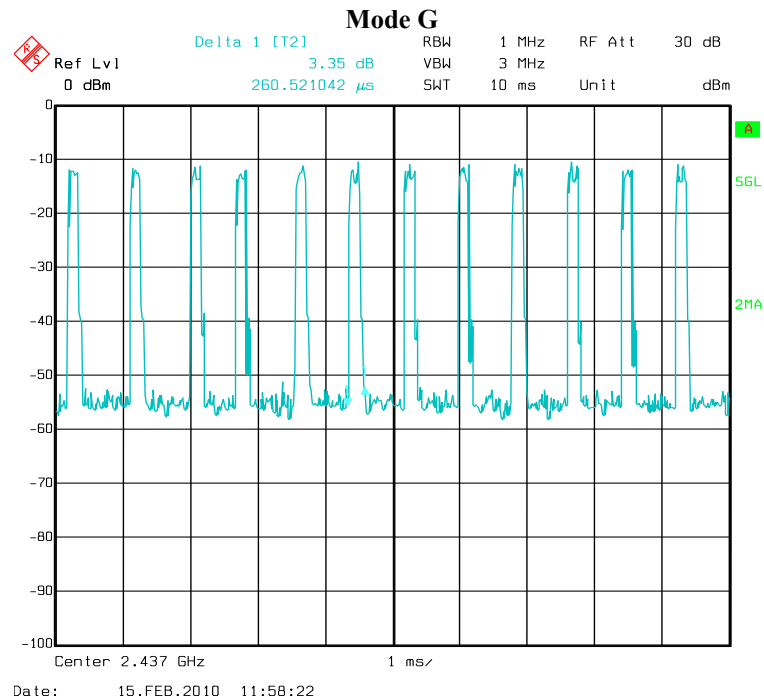
Date: 15.FEB.2010 11:23:59



Date: 15.FEB.2010 11:23:21

On time = (0.420 ms x 5) in 10 ms or 2.1 ms in 10 ms;
10 x 2.1ms = 21ms in 100 ms
Duty Cycle Factor = 20 x log (21/100)
Therefore Duty Cycle Correction Factor (DCCF) = -13.5 dB

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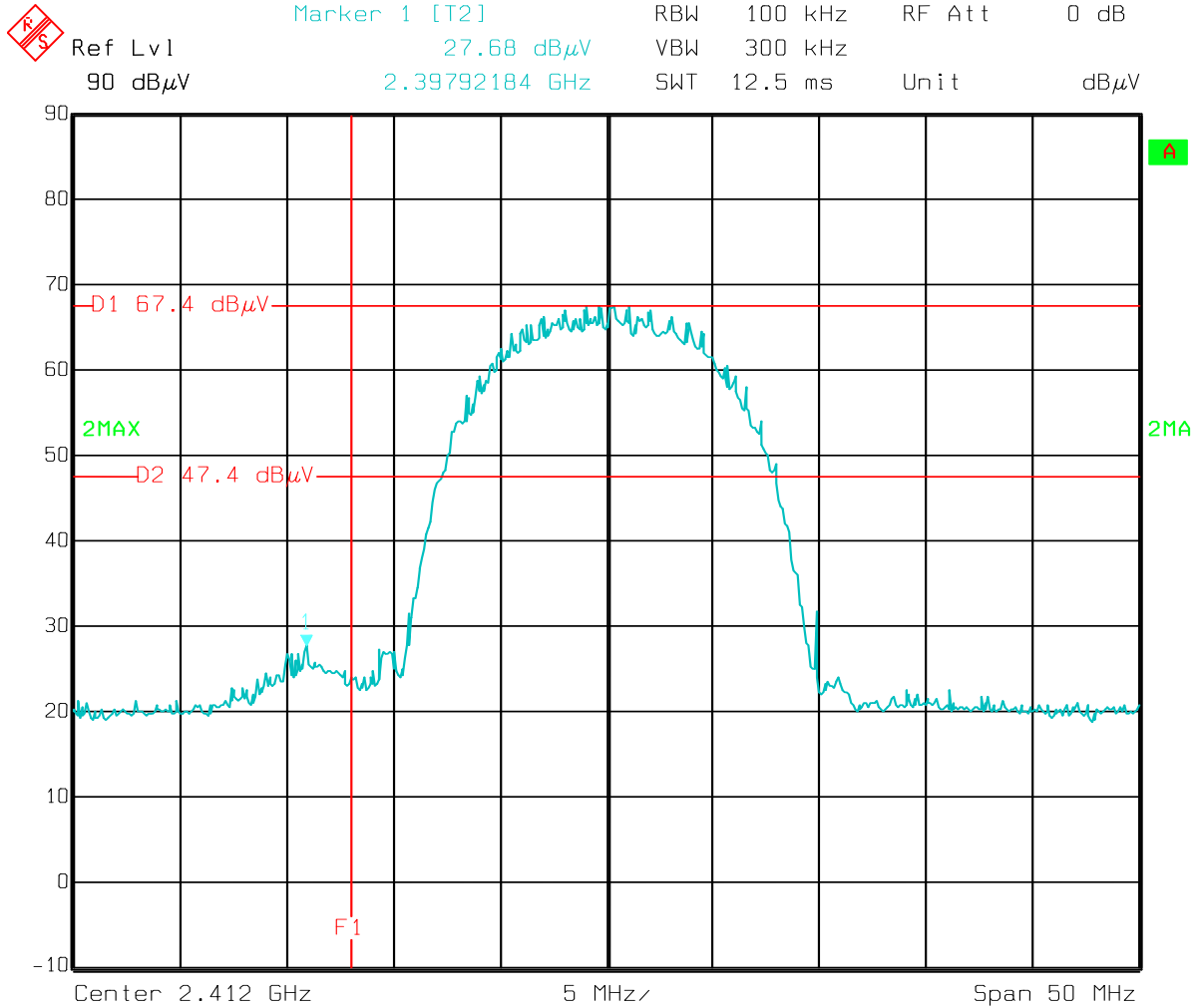
On time = (0.260 ms x 12) in 10 ms or 3.12 ms in 10 ms;
10 x 3.12 ms = 31.2 ms in 100 ms
Duty Cycle Factor = 20 x log (31.2/100)
Therefore Duty Cycle Correction Factor (DCCF) = -10.1 dB

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Bandedge Plots

Limit used is 20dB from emission peak

Low Channel (b-Mode) 2412 MHz (Peak Measurement)



Date: 12.FEB.2010 16:07:26

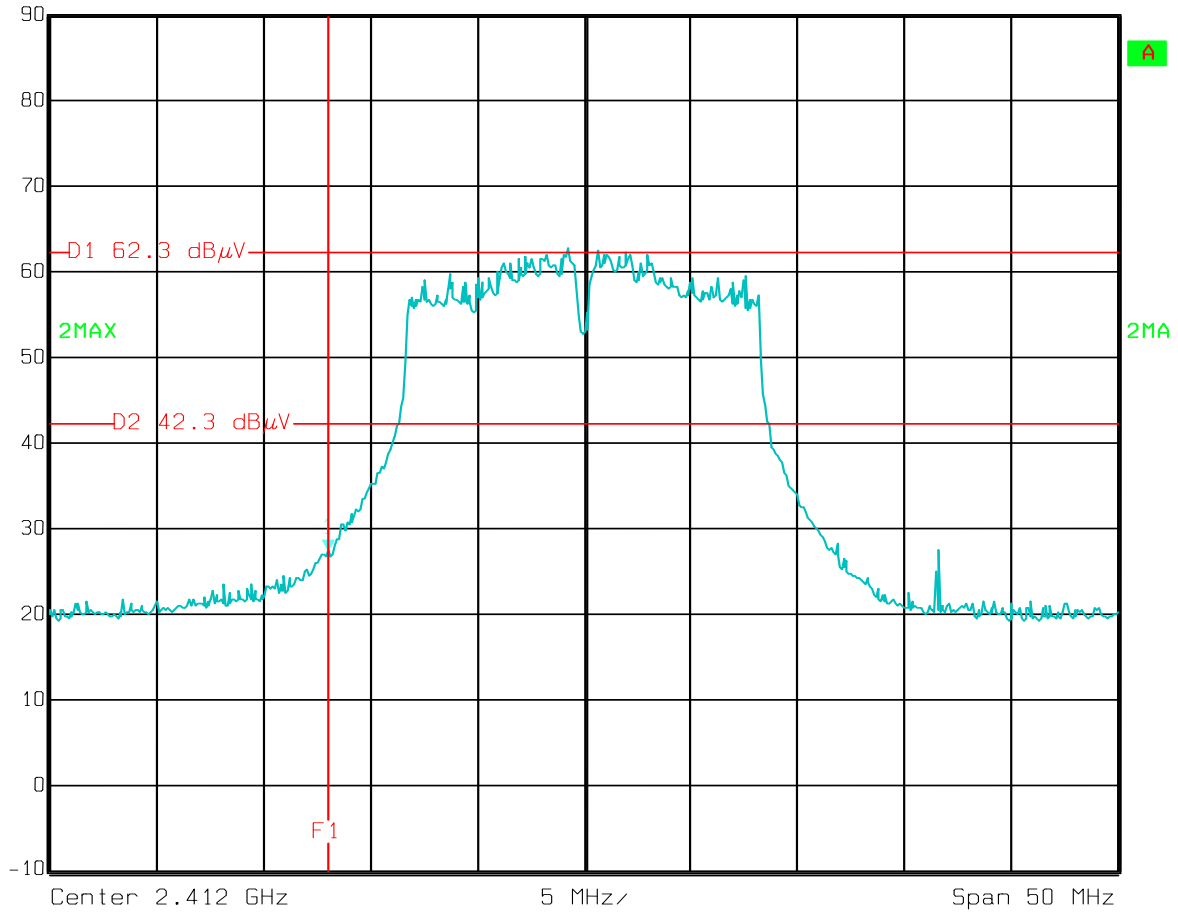
Limit 20 dBc = 47.4 + correction factors.
Correction factors = 28.3 dBV/m antenna factors and 7.7 dB cable loss
Limit (Peak) = 83.4 dBuV/m
Peak = 27.7 dBuV/m or 63.7 corrected, 19.7 dB below limit
EUT complies

Average limit 20dB below peak limit
Limit (average) = 63.4 dBuV/m
Average = Peak – DCF
DCF = 13.5 dB
Average = 27.7 – 13.5 = 14.2 dBuV/m or 50.2 corrected, 13.2 dB below limit (average)
EUT complies

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Low Channel (g-Mode) 2412 MHz (Peak Measurement)


 Marker 1 [T2] RBW 100 kHz RF Att 0 dB
 Ref Lvl 27.44 dB μ V VBW 300 kHz
 90 dB μ V 2.40002605 GHz SWT 12.5 ms Unit dB μ V



Date: 12.FEB.2010 16:04:21

Frequency line is 2400MHz,

Limit 20 dBc = 42.3 + correction factors.

Correction factors = 28.3 dBV/m antenna factors and 7.7 dB cable loss

Limit (Peak) = 68.3 dBuV/m

Peak = 27.4 dBuV/m or 63.4 corrected, 14.9 dB below peak limit

EUT complies

Average limit 20dB below peak limit

Average = Peak - DCF

Limit (average) = 58.3 dBuV/m

DCF = 10.1 dB

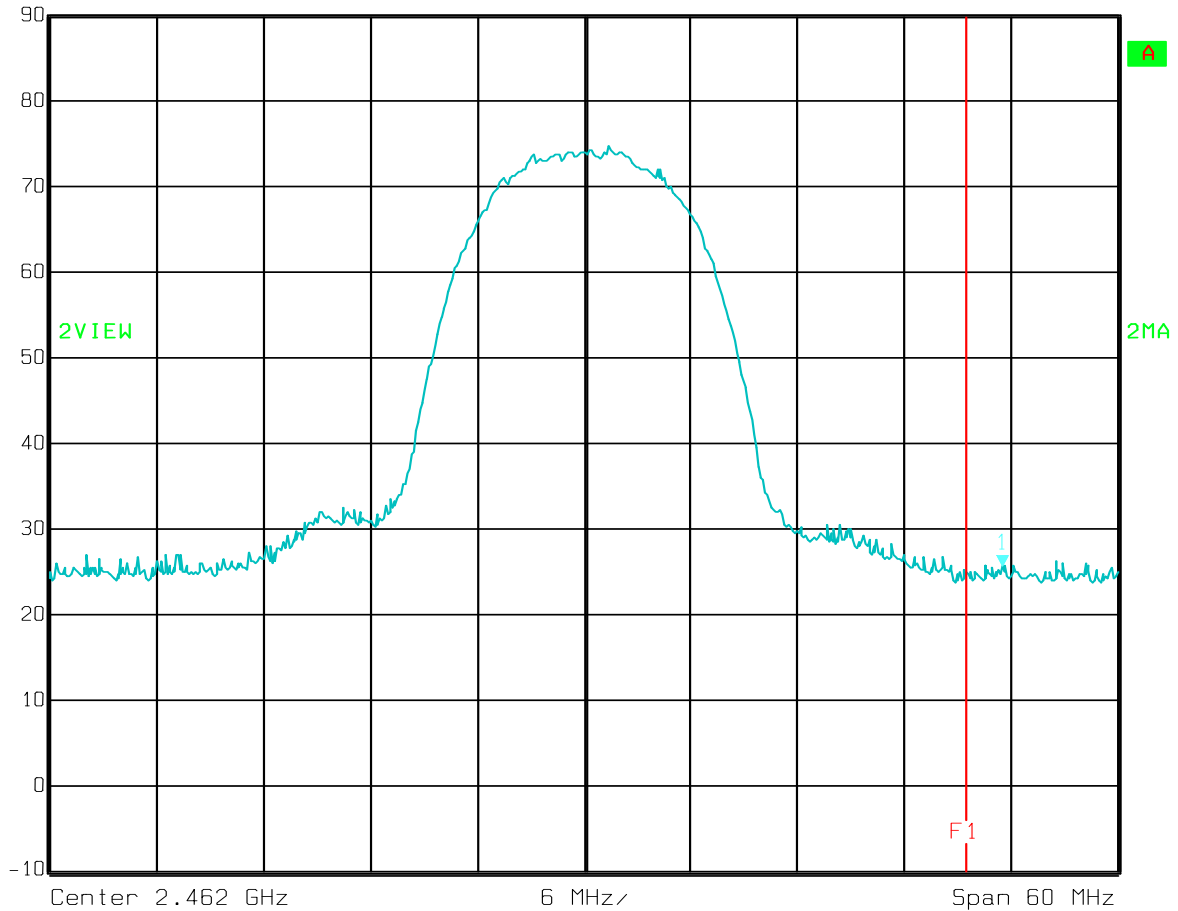
Average = 27.7 -10.1 = 17.3 dBuV/m or 53.3 corrected , 5.0 dB below limit (average)

EUT complies

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High Channel (b-mode) 2462 MHz (Peak Measurement)


 Marker 1 [T2] RBW 1 MHz RF Att 0 dB
 Ref Lvl 25.51 dB μ V VBW 3 MHz
 90 dB μ V 2.48550701 GHz SWT 5 ms Unit dB μ V



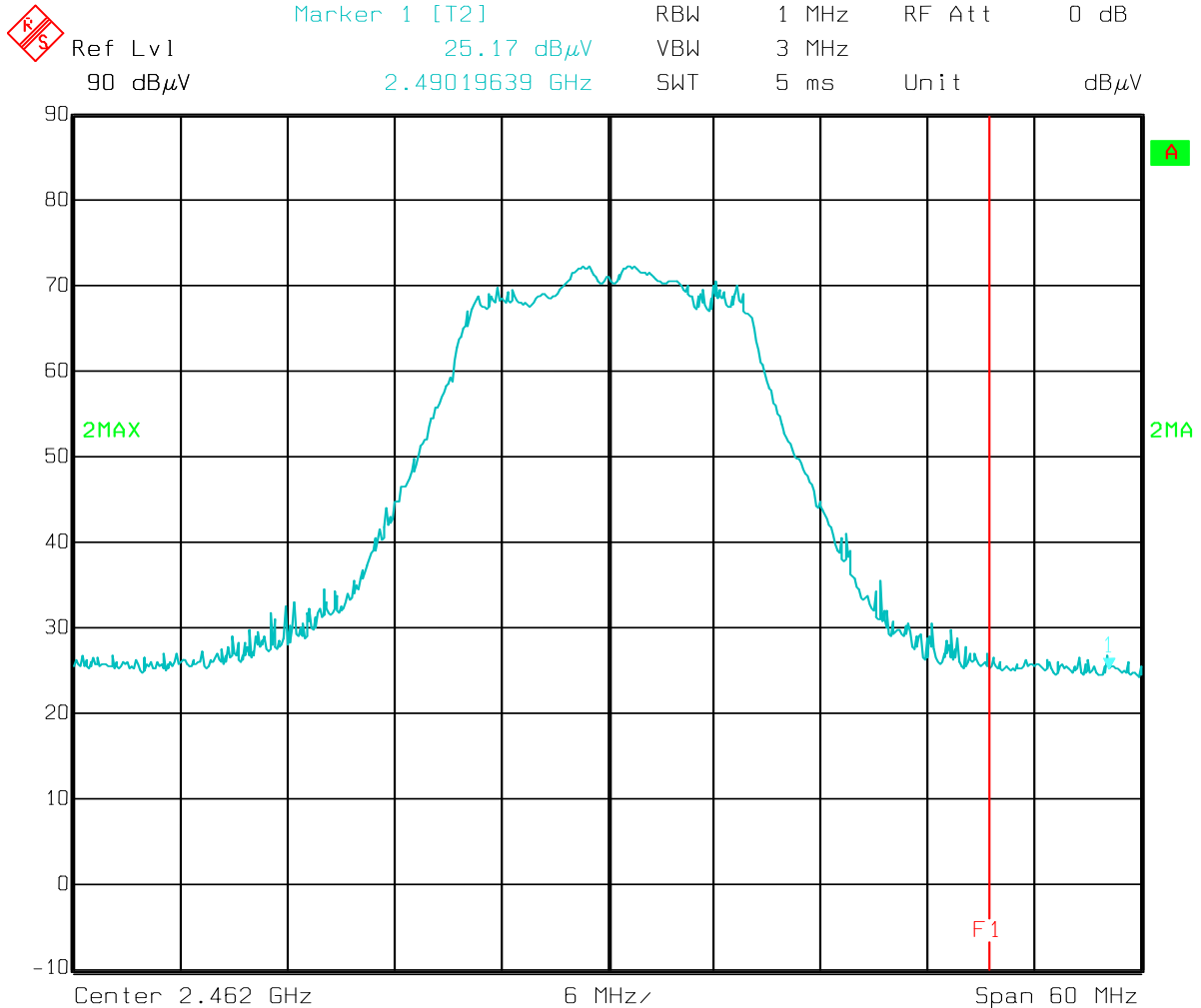
Date: 12.FEB.2010 16:57:50

Frequency line is 2483.5 MHz,
Correction factors = 28.3 dBV/m antenna factors and 7.7 dB cable loss

Peak Limit used is 74 dB μ V/m
Average Limit = 54 dB μ V/m,
Average = Peak + DCCF
Peak Emission = 25.5 dB or 61.5 dB μ V/m corrected, EUT complies
Average Emission = Peak -13.5 dB or 48.0 dB μ V/m corrected, EUT complies

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High Channel (g-mode) 2462 MHz (Peak Measurement)



Date: 12.FEB.2010 17:02:55

Frequency line is 2483.5 MHz,
Correction factors = 28.3 dBV/m antenna factors and 7.7 dB cable loss

Peak Limit used is 74 dB μ V/m
Average Limit = 54 dB μ V/m,
Average = Peak + DCCF
Peak Emission = 25.2 dB or 61.2 dB μ V/m corrected, EUT complies
Average Emission = Peak -10.1 dB or 51.1 dB μ V/m corrected, EUT complies

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5.6. Minimum 6dB RF Bandwidth

(a)(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

A8.2 (a) The minimum 6 dB bandwidth shall be at least 500 kHz.

Sample Number:	EWIG CHB801	Temperature:	23°C
Date:	2-15-2010	Humidity:	34%RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

Test Results: EUT complies

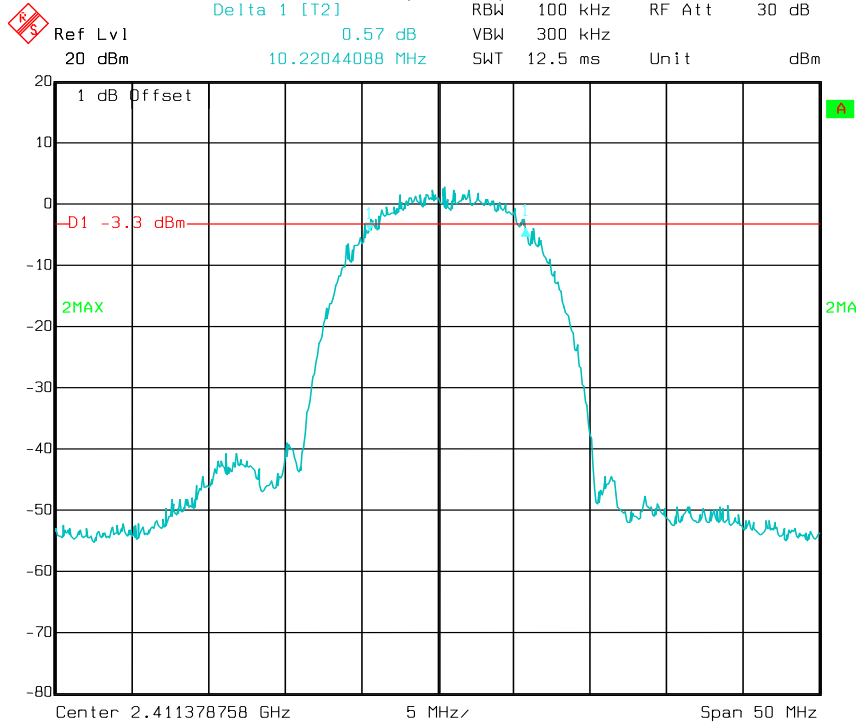
6dB Bandwidth:

Measurements were made conductively. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Channel Range	6 dB Bandwidth
Mode B	
Low (2412 MHz)	10.2 MHz
Mid (2440 MHz)	11.1 MHz
High (2462 MHz)	10.0 MHz
Mode G	
Low (2412 MHz)	16.4 MHz
Mid (2440 MHz)	16.5 MHz
High (2462 MHz)	16.6 MHz

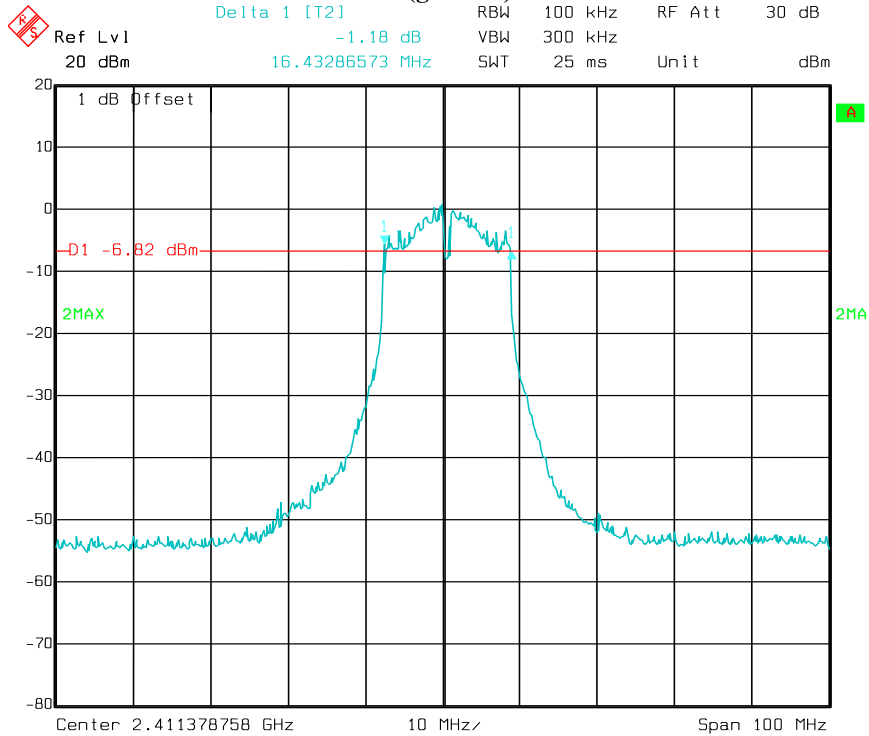
DATE	DOCUMENT NAME	DOCUMENT #	PAGE
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Low Channel (b-Mode) 2412 MHz



Date: 15.FEB.2010 10:38:57

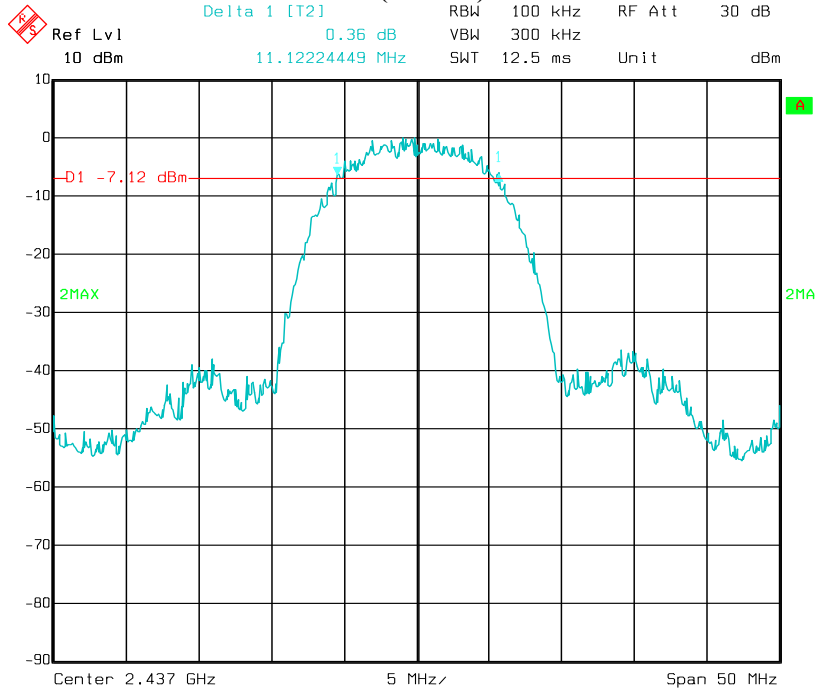
Low Channel (g-Mode) 2412 MHz



Date: 15.FEB.2010 10:29:45

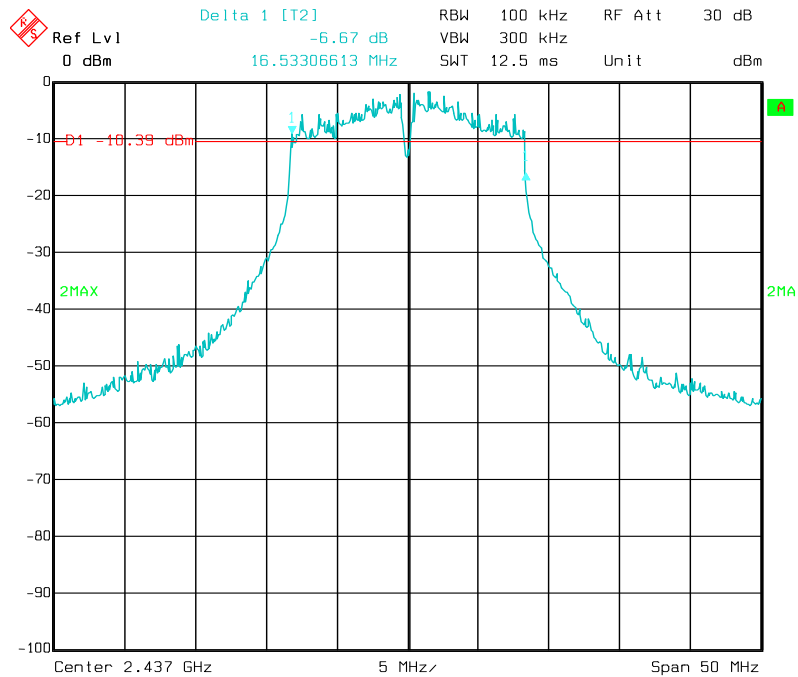
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Mid Channel (b-Mode) 2437 MHz



Date: 15.FEB.2010 11:21:00

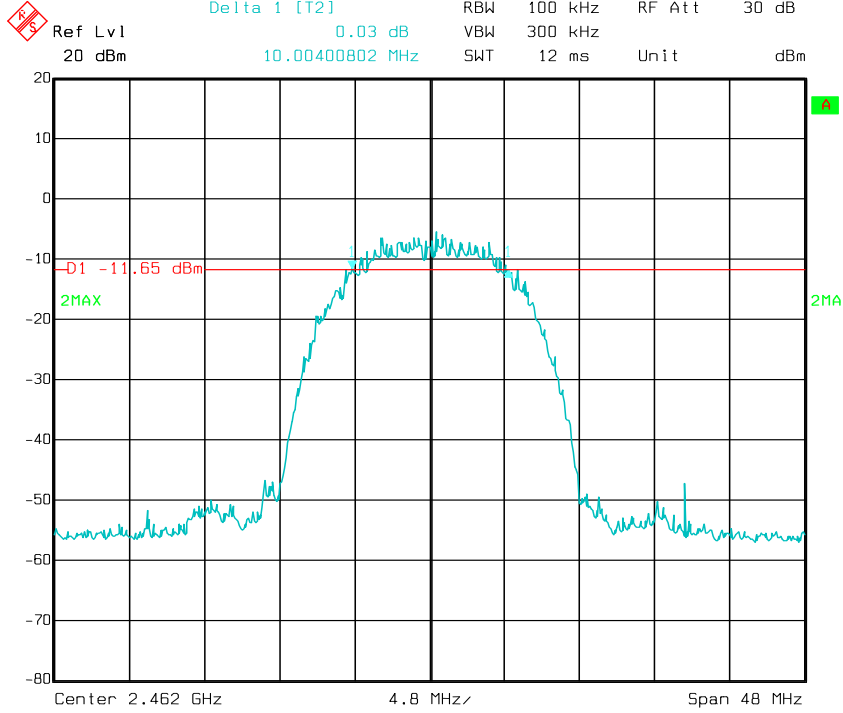
Mid Channel (g-Mode) 2437 MHz



Date: 15.FEB.2010 11:53:39

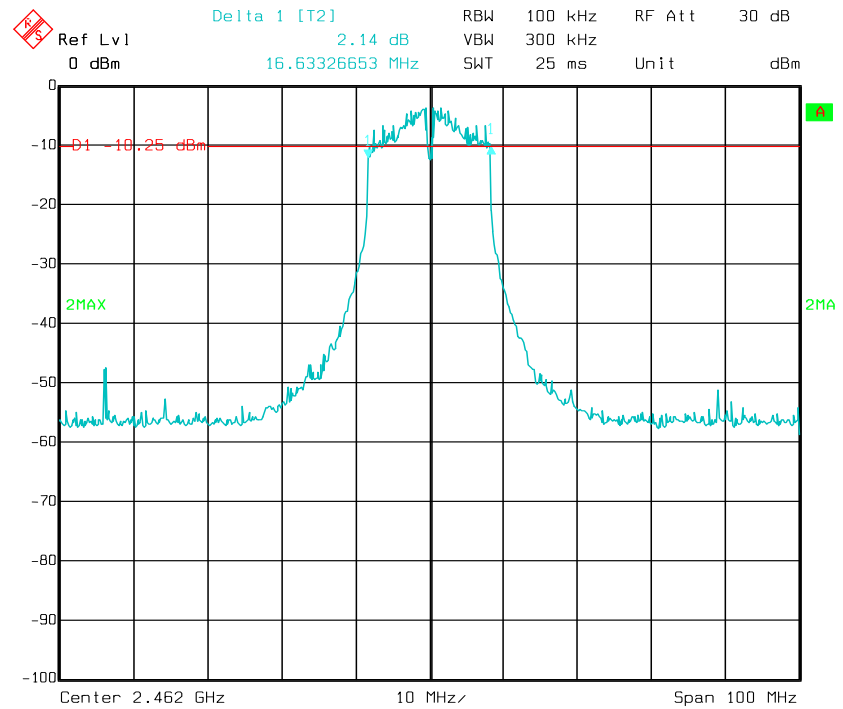
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High Channel (g-Mode) 2462 MHz



Date: 15.FEB.2010 12:54:07

High Channel (g-Mode) 2462 MHz



Date: 15.FEB.2010 12:23:19

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5.7. Maximum peak output power

(b) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

Sample Number:	EWIG CHB801	Temperature:	23°C
Date:	2-15-2010	Humidity:	34%RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

Test Results:

Channel Frequency (MHz)	Measured Output Power (dBm)	Bandwidth Correction $10 \times \log \frac{BW}{BW_m}$	Output Power (dBm)	Gain dBi	EIRP Calculated Output Power (dBm)
2412 b	18.16	2.0	20.16	2.15	22.31
2437 b	15.77	2.1	17.87	2.15	20.02
2462 b	15.18	2.1	18.28	2.15	20.43
2412 g	18.69	2.4	21.09	2.15	23.24
2437 g	15.42	2.4	17.82	2.15	19.97
2462 g	16.30	2.4	18.70	2.15	20.85

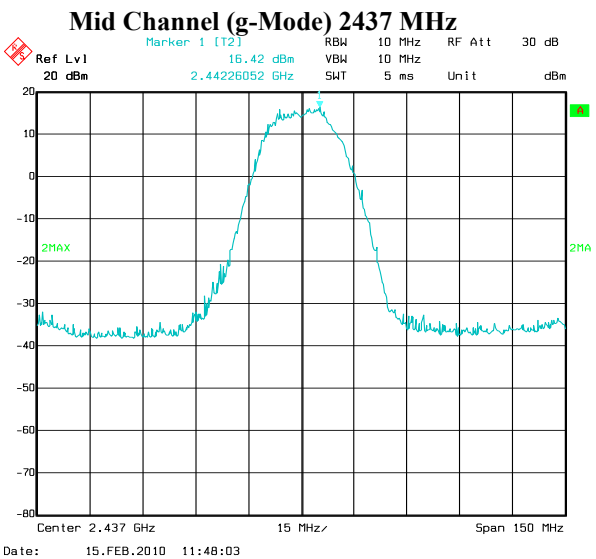
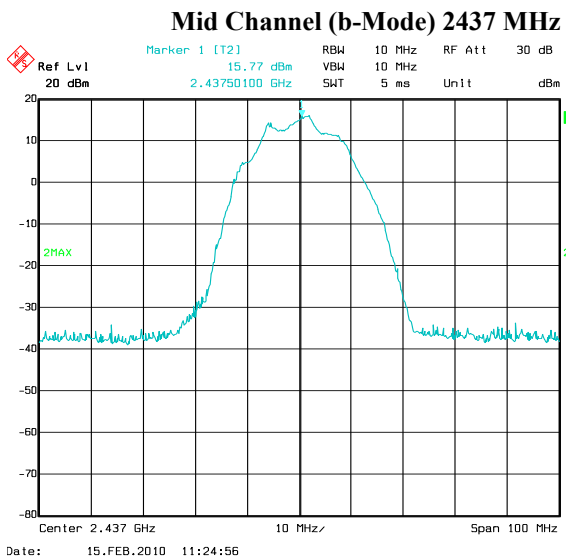
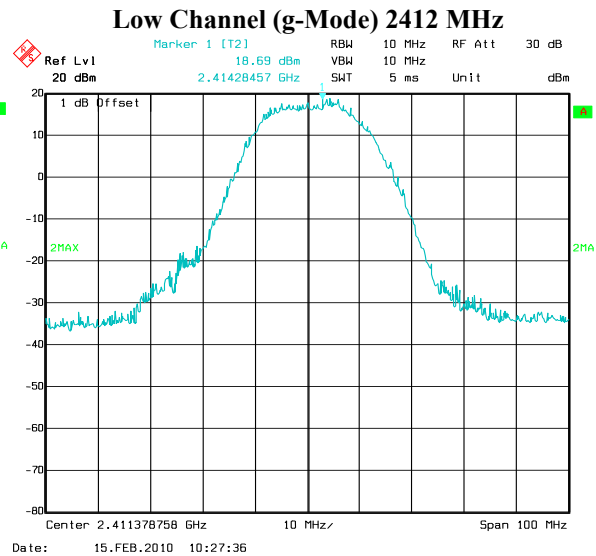
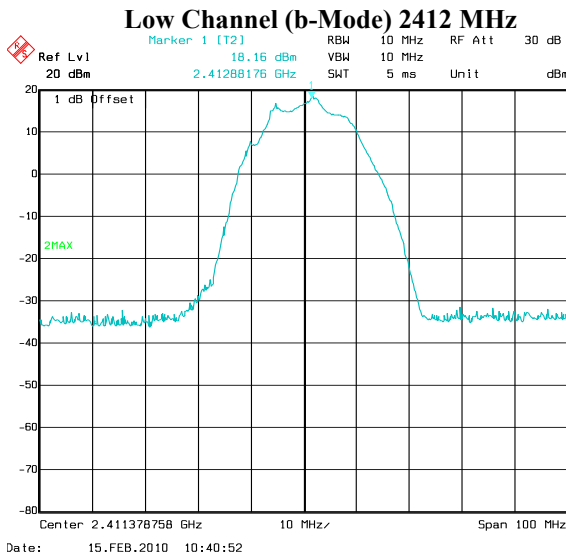
Limit = 30 dBm

Maximum Conducted Output Power
0.128 W = 10^(21.09-30/10)

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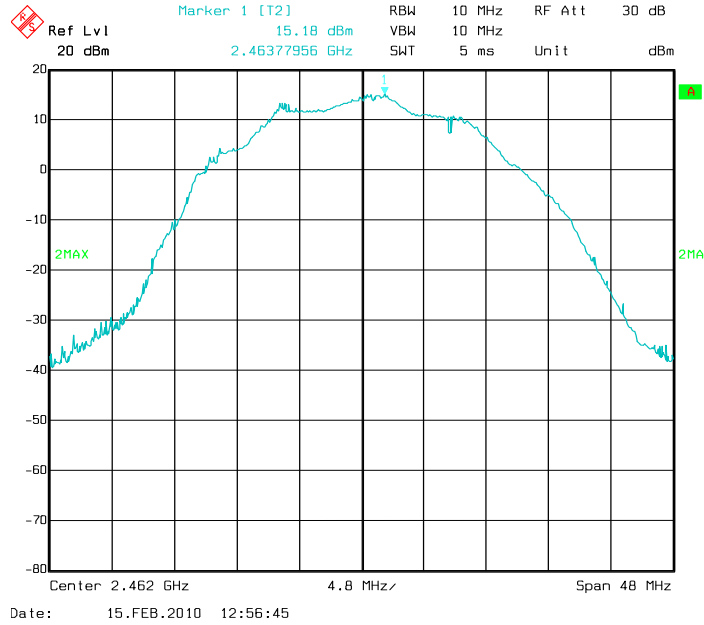
Additional Observations:

- **Correction was added for 20 dB bandwidth vs measurement bandwidth:
10 x log(20dB BW/10 MHz)**
- **Measurements were made at 102VAC, 120VAC and 138VAC 60Hz, however no noticeable differences were observed.**
- **Measured at Max Hold, Peak detector.**
- **Antenna Gain = 3 dBi**

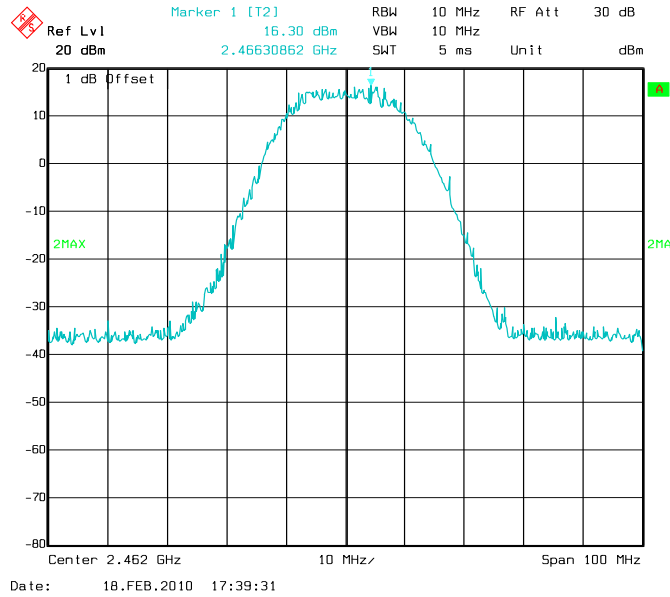


High Channel (b-Mode) 2462 MHz

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High Channel (g-Mode) 2462 MHz



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5.8. Power Spectral Density

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

A8.2(b) The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration. This power spectral density shall be determined in accordance with the provisions of Section A8.4(4); (i.e. the power spectral density shall be determined using the same method for determining the conducted output power).

Sample Number:	EWIG CHB801	Temperature:	23°C
Date:	2-15-2010	Humidity:	34%RH
Modification State:	Lo/Mid/High Channels	Tester:	Alan Laudani
		Laboratory:	Ground Plane 1

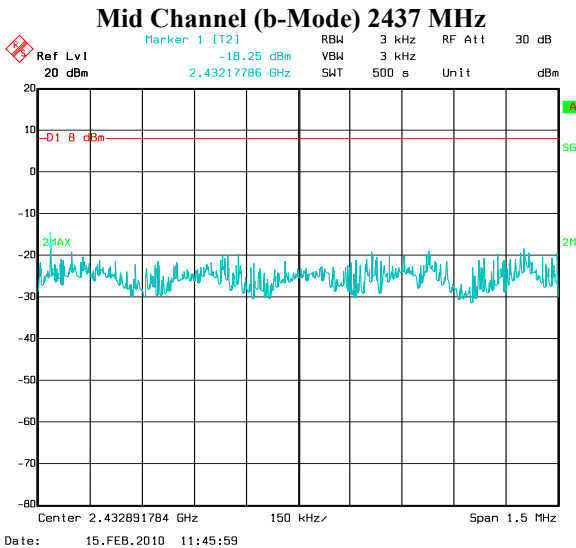
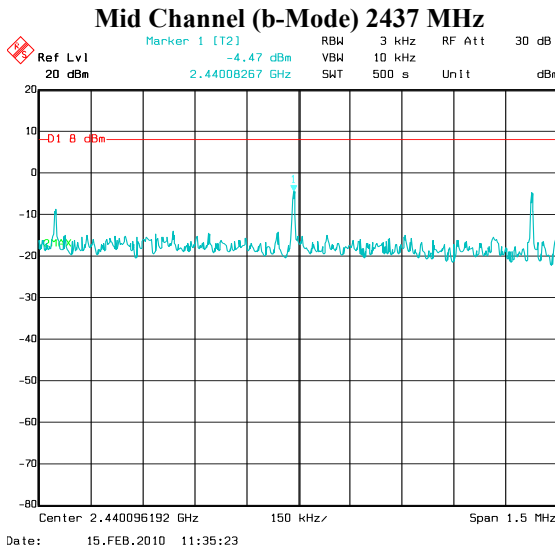
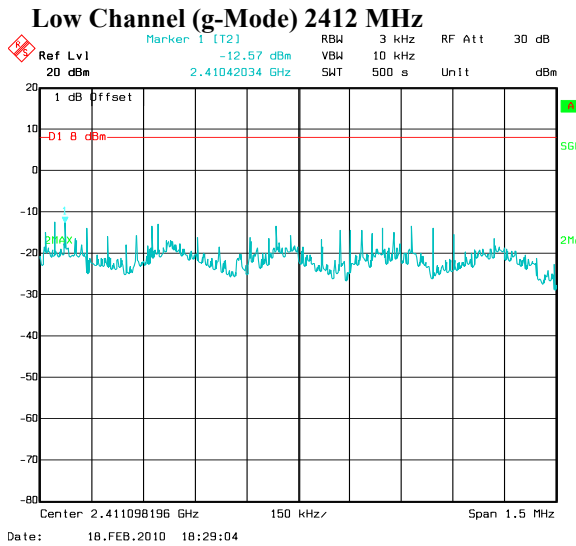
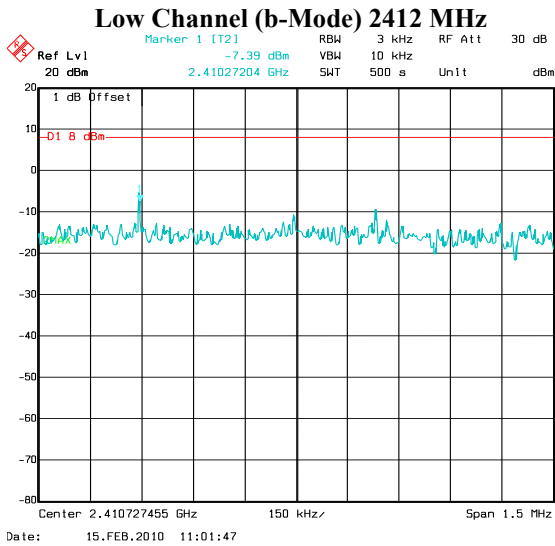
Test Results:

Channel Frequency (MHz)	RF Power Level in 3kHz BW (dBm)	Gain	Total	Maximum Limit (dBm)	PASS/FAIL
2412b	-7.38	2.15	-5.23	8	Pass
2437b	-14.33	2.15	-12.18	8	Pass
2462b	-4.47	2.15	-2.32	8	Pass
2412g	-12.57	2.15	-10.42	8	Pass
2437g	-3.57	2.15	-1.42	8	Pass
2462g	-17.54	2.15	-15.39	8	Pass

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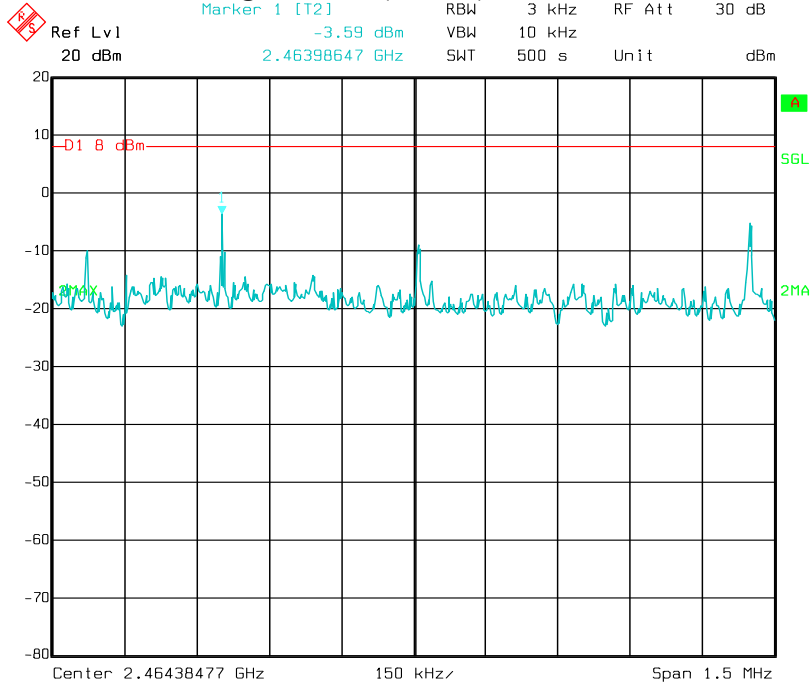
Additional Observations:

- Analyzer Span = 1.5 MHz, RES BW was set to 3 kHz, VBW to 10 kHz,
- Sweep time of 1.5 MHz/ 3kHz = 500 seconds.
- Conductive measurement, peak max hold.



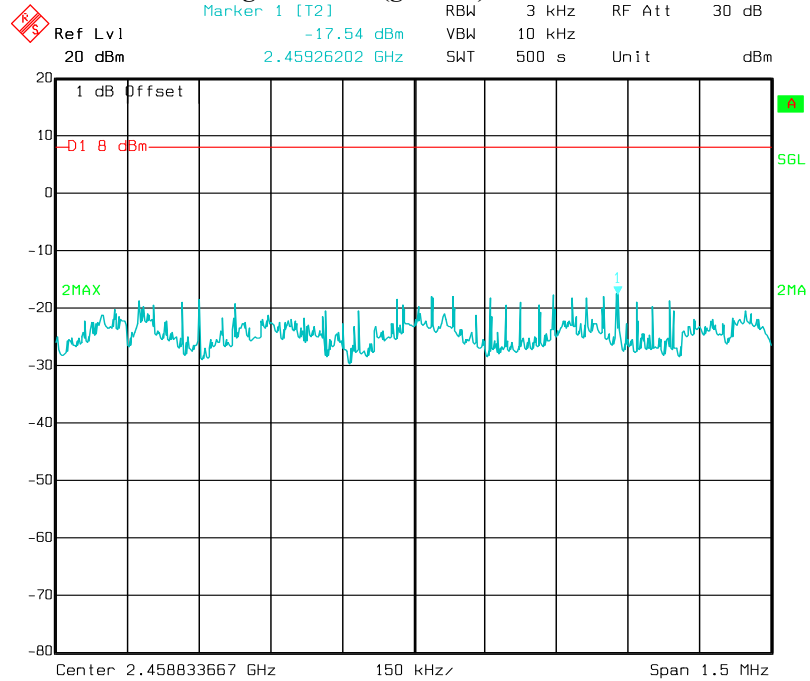
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High Channel (b-Mode) 2462 MHz



Date: 15.FEB.2010 13:32:53

High Channel (g-Mode) 2462 MHz



Date: 18.FEB.2010 17:53:33

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5.9. Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
110	ANTENNA, LPA	EMCO	LPA-25	1217	1/10/2009	2/10/2011
116	Antenna, Bicon	EMCO	3110	1267	11/12/2008	11/12/2010
384	LISN	Solar	9348-50-R-24-BNC	941716	8/31/2009	8/31/2010
404	Spectrum Analyzer Display	HP	85662A	2648A15448	9/30/2009	9/30/2010
421	Quasi-Peak Adapter	HP	85650A	3145A01672	9/30/2009	9/30/2010
559	High Pass Filter	Solar	8310-1.0	844823	4/15/2009	4/15/2010
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	7/28/2008	7/28/2010
625	Antenna, Dbl Ridge Horn	EMCO	3116	2325	5/19/2009	5/19/2011
684	Transient Limiter	HP	11974A	3107A02636	9/10/2009	9/10/2010
711	Spectrum Analyzer	HP	8566B	2747A04729	9/30/2009	9/30/2010
835	Spectrum Analyzer	Rohde & Schwarz	RHDFSEK	829058/005	3/31/2009	3/31/2010
317	Preamplifier	HP	8449A	2749A00167	4/16/2009	4/16/2010
897	Spectrum Analyzer	Rohde & Schwarz	FSP7	837620/009	10/14/2009	10/14/2010
902	pre amp	Sonoma	310 N	185803	8/4/2009	8/4/2010
815	Multimeter	Fluke	111	78130066	8/4/2009	8/4/2010
NA	Regulating Transformer	TDGC	0-250 Vac	NA	NCR	NCR