



EMC Test Report

*Application for Grant of Equipment Authorization
Class II Permissive Change/Reassessment
pursuant to*

*Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15 Subpart C*

Model: i38HG

FCC ID: PGR2WI38HG

APPLICANT: 2Wire, Inc.
310 Providence Mine Road, Suite #200
Nevada City, CA 95959

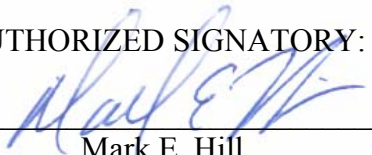
TEST SITE(S): Elliott Laboratories
684 W. Maude Avenue
Sunnyvale, CA 94085

IC SITE REGISTRATION #: 2845A-2

REPORT DATE: December 16, 2009

FINAL TEST DATES: November 4 and November 10, 2009

AUTHORIZED SIGNATORY:



Mark E. Hill
Staff Engineer
Elliott Laboratories



Testing Cert #2016-01

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	December 16, 2009	First release	

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SCOPE

An electromagnetic emissions test has been performed on the 2Wire, Inc. model i38HG, pursuant to the following rules:

FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003

FCC DTS Measurement Procedure KDB558074, March 2005

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of 2Wire, Inc. model i38HG complied with the requirements of the following regulations:

FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of 2Wire, Inc. model i38HG and therefore apply only to the tested sample. The sample was selected and prepared by Mark Rieger of 2Wire, Inc.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY**DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Unchanged from original application	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11b: 10.2MHz 802.11g: 16.5MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b: 25.4 dBm (0.34 Watts) EIRP = 0.68 W ^{Note 1} 802.11g: 24.7 dBm (0.30 Watts) EIRP = 0.59 W ^{Note 1}	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11b: -9.3dBm / 3kHz 802.11g: 0.3dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	>30dB below the limit	< -30dBc ^{Note 2}	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.0dBμV/m @ 7308.5MHz (-1.0dB)	15.207 in restricted bands, all others <-30dBc ^{Note 2}	Complies

Note 1: EIRP calculated using antenna gain of 3 dBi for the highest EIRP multi-point system. Power measurements in original filing were performed using a peak power meter. Power measurements taken for this permissive change using method #1 of FCC Public Notice DA 02-2138.

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4).

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The 2Wire, Inc. model i38HG is an 802.11bg DSL router/gateway for home use. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 100-127 Volts , 60 Hz, 1 Amps.

The sample was received on November 4, 2009 and tested on November 4 and November 10, 2009. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
2 Wire	i38HG	DSL router (Unit #1)	430819049034	PGR2WI38HG

OTHER EUT DETAILS

The objective of this project is to retest the device and file (if appropriate a C2PC) based on the following changes: There are no PCB changes, no changes in the TX or RX functionality, and no changes to power or frequency settings. There is a new PA, that is a pin compatible equivalent part (upgraded version of the original version from the vendor at a lower cost). Adjusted the values on a few passive components in the impedance matching/low pass filter circuit to the antenna to improve the margins for band edge and spurious emissions performance but the circuit remains electrically equivalent.

ANTENNA SYSTEM

The antenna is integral to the device, antenna gain 2.95dBi. For testing purposes, the EUT was provided with an RF port to take direct measurements.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 29 cm wide by 24 cm deep by 5.5 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

No local support equipment was used during testing.

The following equipment was used as remote support equipment for emissions testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Latitude 131L	Laptop	9CBPQC1	-

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Description	Cable(s) Shielded or Unshielded	Length(m)
Ethernet	Remote Laptop	CAT5	Unshielded	30m
AC/DC Adapter	AC Mains	-	-	-
DC Power	AC/DC Adapter	Multiconductor	Unshielded	1.5m

EUT OPERATION

During emissions testing, the EUT was configured to continuously transmit or receive (depending on the test in question) at a specific channel and power setting.

TEST SITE**GENERAL INFORMATION**

Final test measurements were taken on «FinalDate» at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
SVOATS #2	90593	2845A-2	684 West Maude Ave, Sunnyvale CA 94085-3518

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception, on OATS sites, of predictable local TV, radio, and mobile communications traffic. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

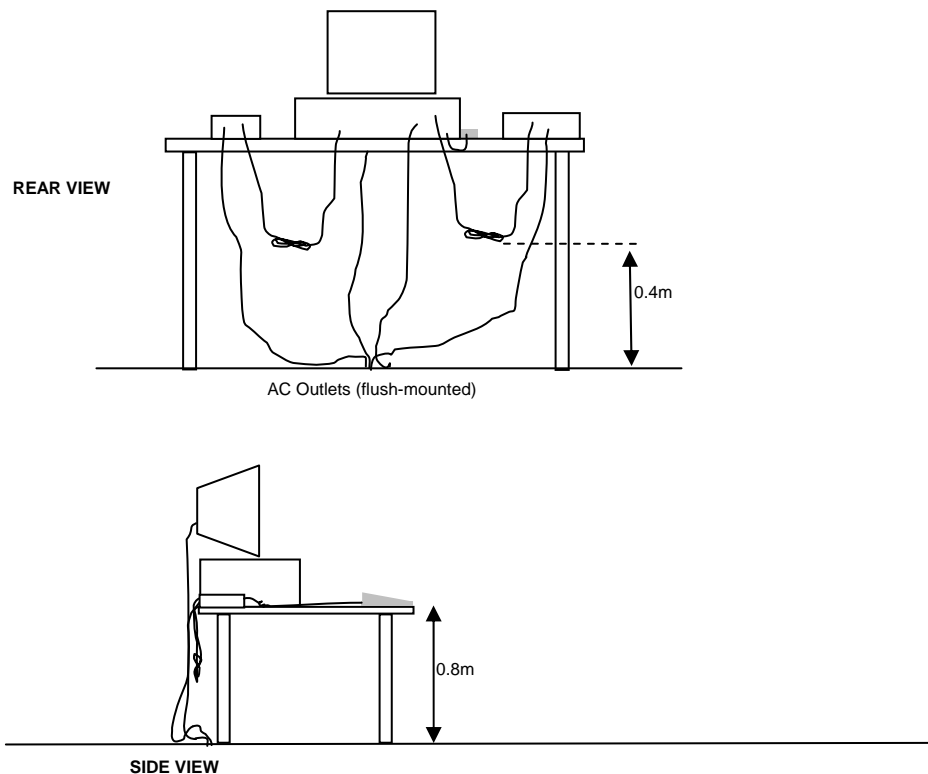
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

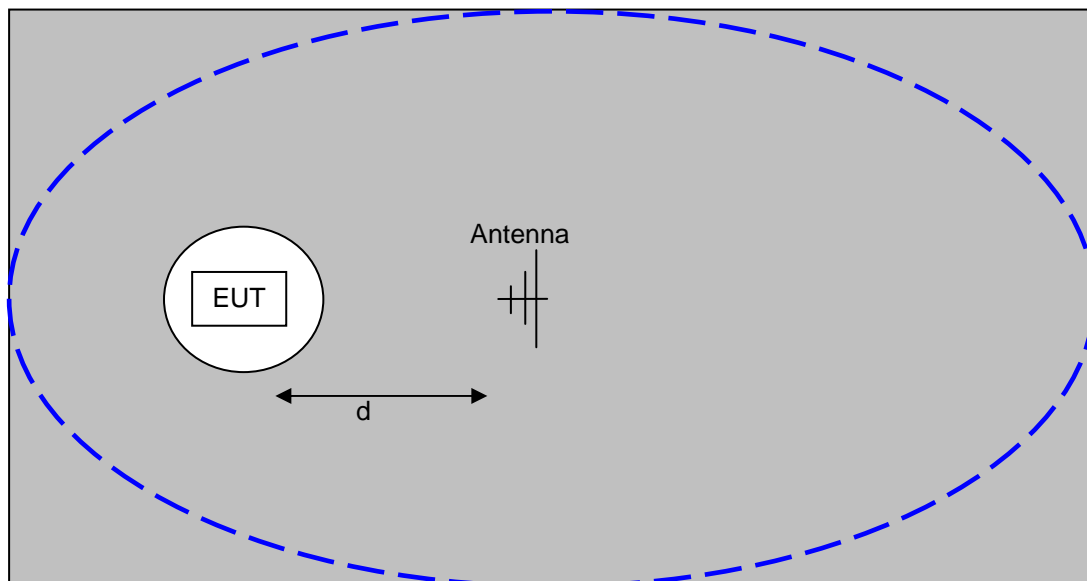
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

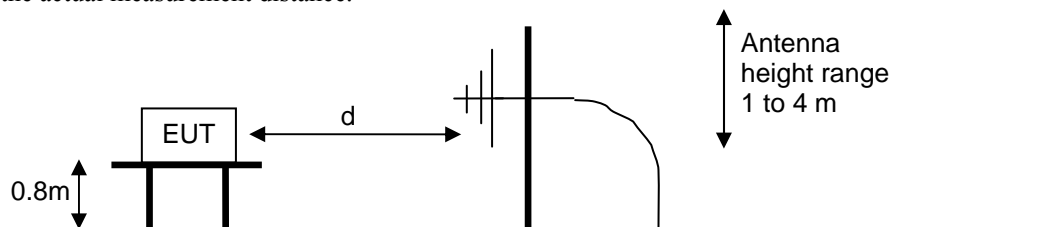
When testing above 18 GHz, the receive antenna is located at 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



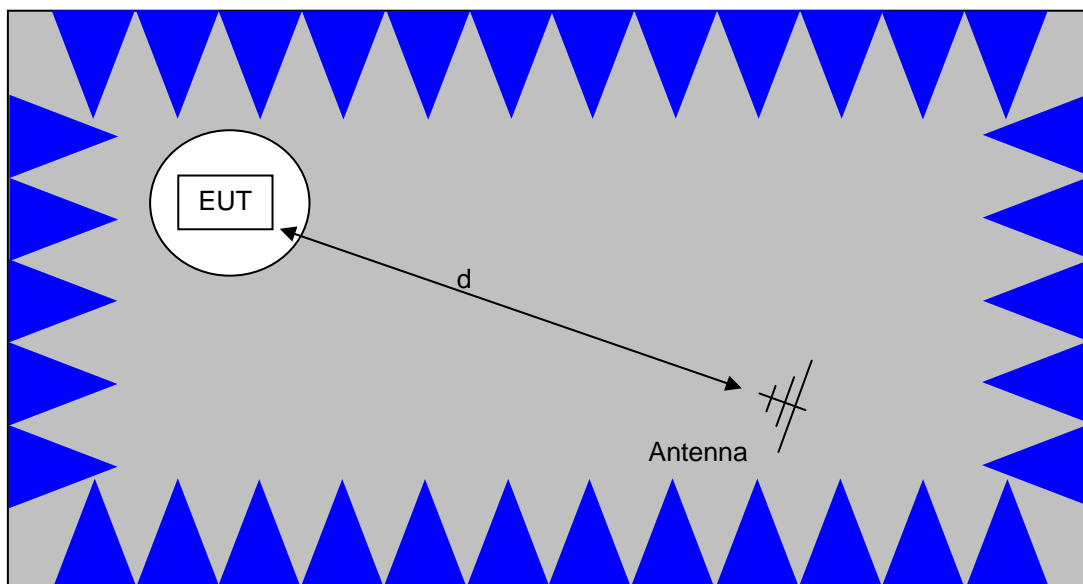
Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

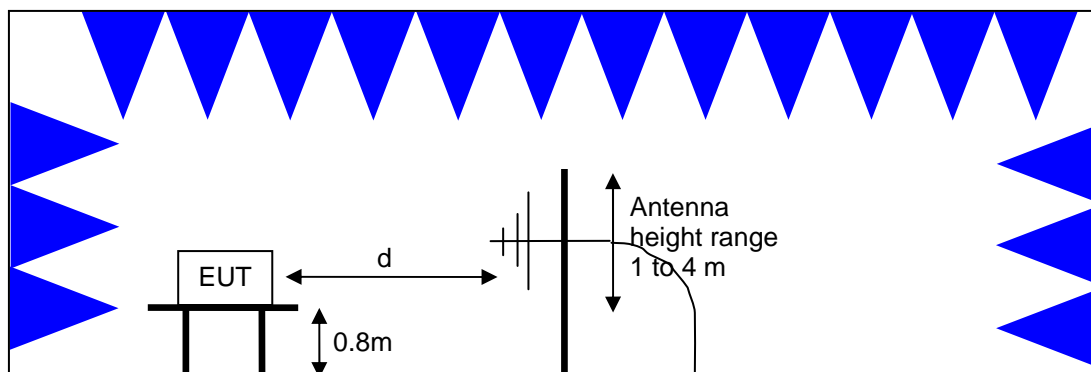


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

¹ The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

Appendix A Test Equipment Calibration Data**Radiated Emissions, DTS, 30 - 25,000 MHz, 04-Nov-09****Engineer: John Caizzi**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	19-Aug-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	29-Jul-10

Radiated Emissions, 30 - 26,500 MHz, 05-Nov-09**Engineer: Joseph Cadigal**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	19-Aug-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10

Radio Antenna Port (Power and Spurious Emissions), 10-Nov-09**Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Mar-10

Appendix B Test Data

T77016 27 Pages

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
		Account Manager:	Susan Pelzl
Contact:	Mark Rieger		-
Emissions Standard(s):	15.247/RSS-210	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

2Wire

Model

i38HG

Date of Last Test: 12/16/2009

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions (802.11b Mode)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 11/4/2009
Test Engineer: Joseph Cadigal
Test Location: Chamber#2

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:
Temperature: 19.9 °C
Rel. Humidity: 44 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	26	-	Output Power	15.247(b)	Pass	25.4 dBm
2	26	-	Power spectral Density (PSD)	15.247(d)	Pass	-9.3 dBm/3kHz
3	20	-	Minimum 6dB Bandwidth	15.247(a)	Pass	10.2 MHz
3	20	-	99% Bandwidth	RSS GEN	-	15.6 MHz
4	26	-	Spurious emissions	15.247(b)	Pass	>30dB below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

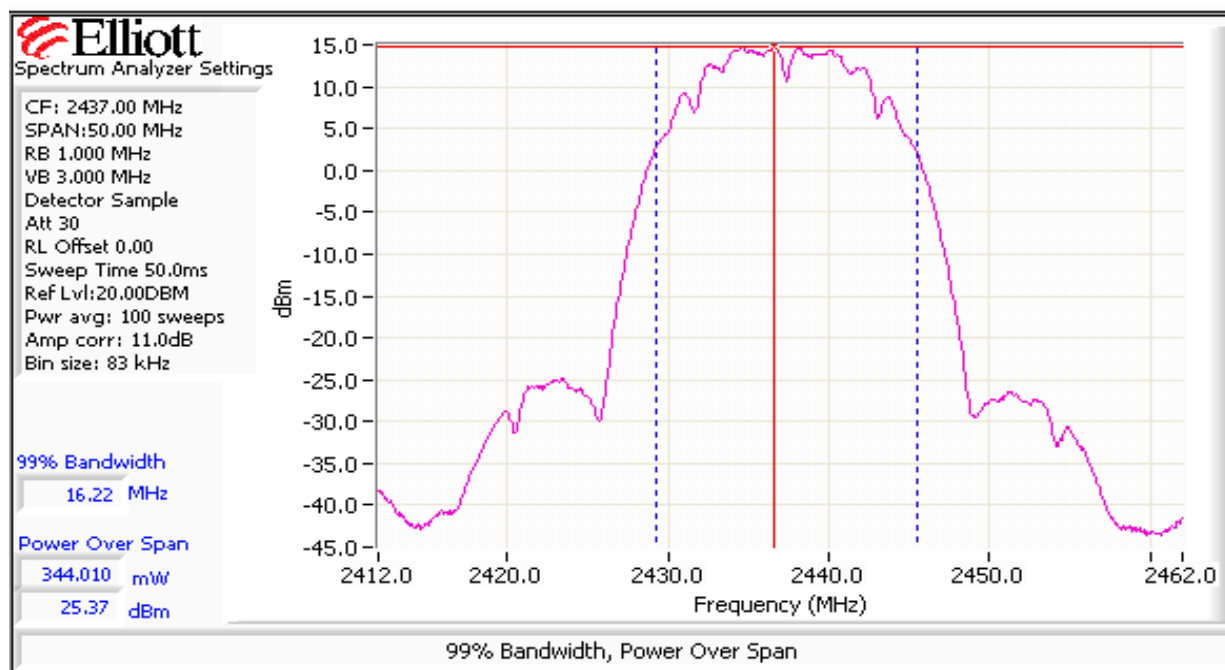
Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}	
		(dBm) ¹	mW			dBm	W
20	2412	19.2	82.2	2.95	Pass	22.1	0.162
26	2437	25.4	344.3	2.95	Pass	28.3	0.679
20	2462	18.8	76.6	2.95	Pass	21.8	0.151

Note 1: Output power measured using a spectrum analyzer (see plots below):
RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. **Spurious limit is -30dBc because this method was used.**
The output power limit is 30dBm

Note 2: Power setting - the software power setting used during testing, included for reference only.



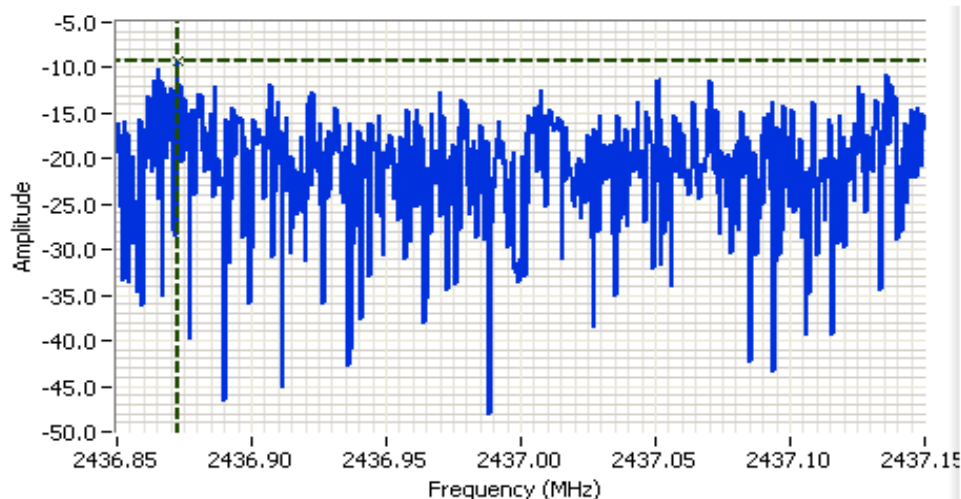
Client: 2Wire	Job Number: J77009
Model: i38HG	T-Log Number: T77016
Contact: Mark Rieger	Account Manager: Susan Pelzl
Standard: 15.247/RSS-210	Class: N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
20	2412	-13.3	8.0	Pass
26	2437	-9.3	8.0	Pass
20	2462	-16.3	8.0	Pass

Note 1:

Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



Analyzer Settings

HP8564E
CF: 2437.000 MHz
SPAN: 300 kHz
RB 3.00 kHz
VB 100 kHz
Detector Sample
Att 30
RL Offset 11.00
Sweep Time 100.0s
Ref Lvl: 31.00 dBm

Comments

PSD: -9dBm/3KHz
2437MHz
802.11b

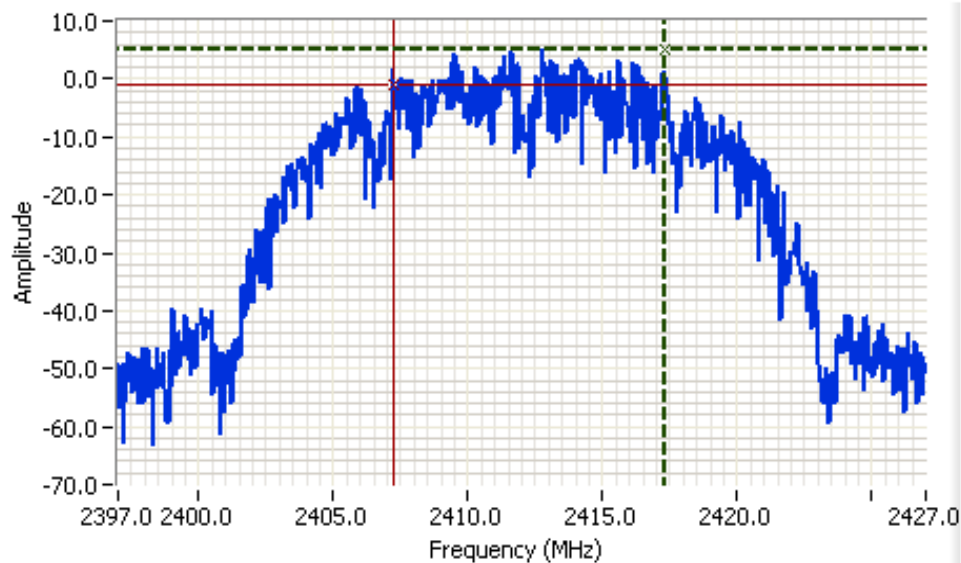
Cursor 1	2436.8725	-9.33			
	0.0000	0.00			

Client: 2Wire	Job Number: J77009
Model: i38HG	T-Log Number: T77016
Contact: Mark Rieger	Account Manager: Susan Pelzl
Standard: 15.247/RSS-210	Class: N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Resolution Bandwidth	99% Signal Bandwidth
20	2412	100 kHz	10.2	300 kHz	15.8
26	2437	100 kHz	11.4	300 kHz	15.7
20	2462	100 kHz	11.2	300 kHz	15.6

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB









Analyzer Settings

HP8564E
CF: 2412.000 MHz
SPAN: 30.000 MHz
RB 100 kHz
VB 100 kHz
Detector Sample
Att 30
RL Offset 11.00
Sweep Time 50.0ms
Ref Lvl: 31.00DBM

Comments

6dB BW: 10.150 MHz

Cursor 1	2417.3500	5.00			
Cursor 2	2407.2000	-1.00			

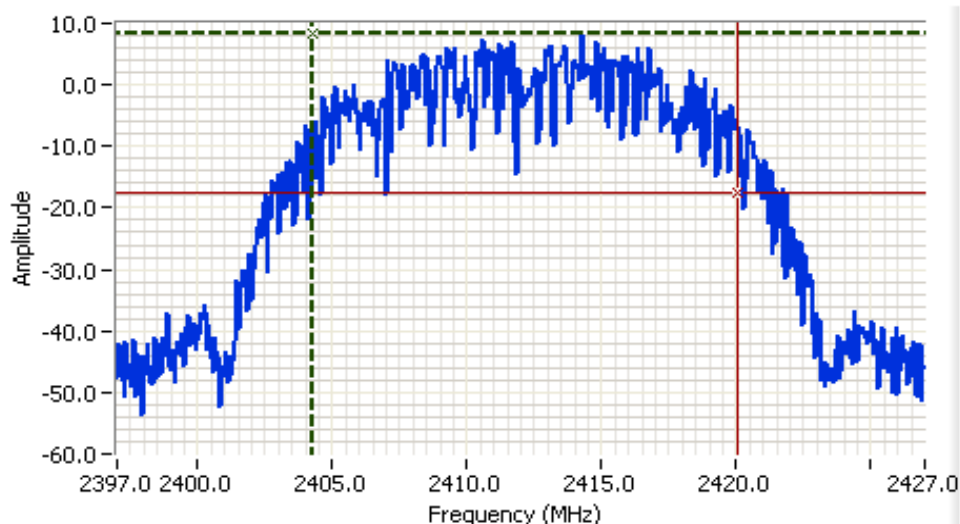
Delta Freq. 10.150

Delta Amplitude 6.00



Client: 2Wire	Job Number: J77009
Model: i38HG	T-Log Number: T77016
Contact: Mark Rieger	Account Manager: Susan Pelzl
Standard: 15.247/RSS-210	Class: N/A

Run #3: Signal Bandwidth



Analyzer Settings

HP8564E
 CF: 2412.000 MHz
 SPAN: 30.000 MHz
 RB 300 kHz
 VB 1.000 MHz
 Detector Sample
 Att 30
 RL Offset 11.00
 Sweep Time 50.0ms
 Ref Lvl: 31.00DBM

Comments

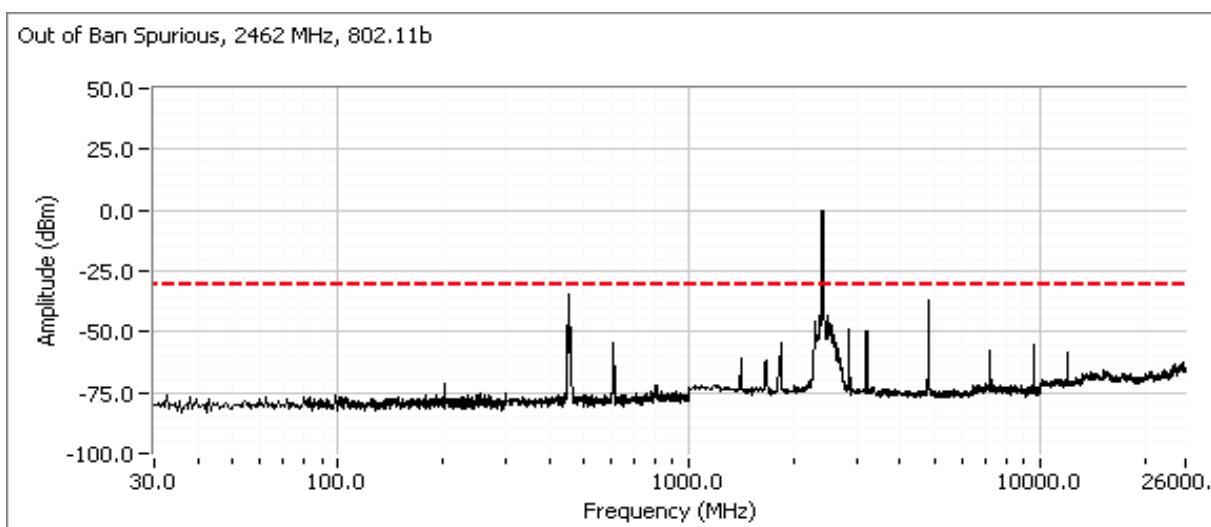
99% power BW:
 15.774 MHz

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

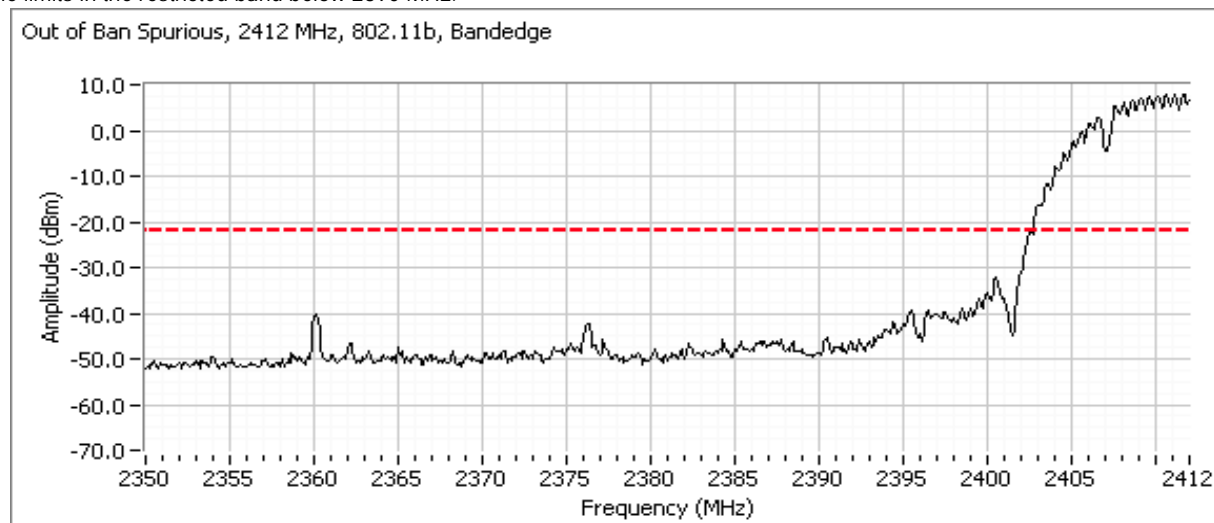
Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel, power setting(s) = 20



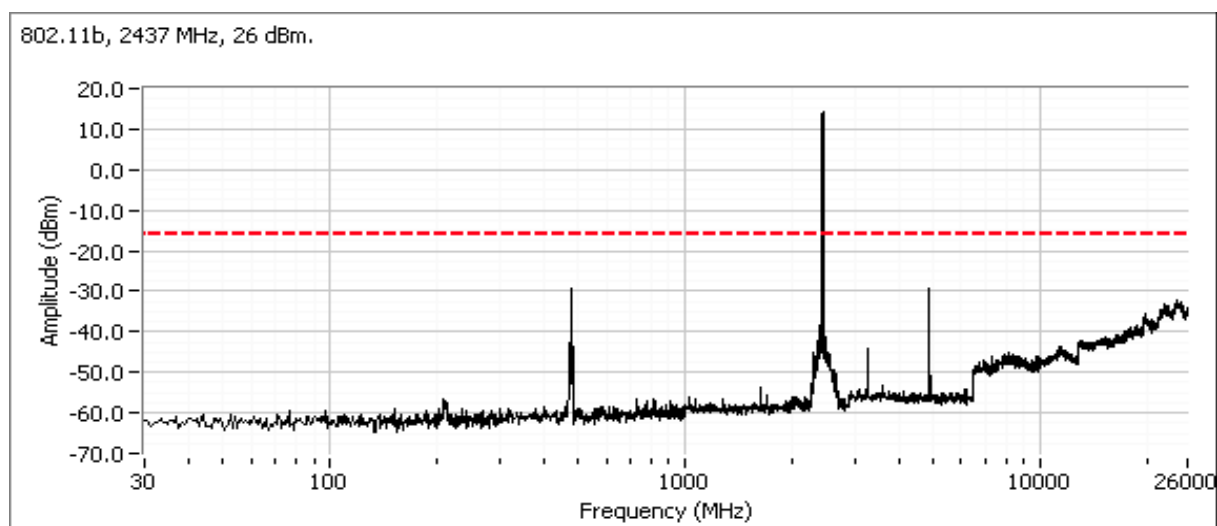
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #4: Out of Band Spurious Emissions

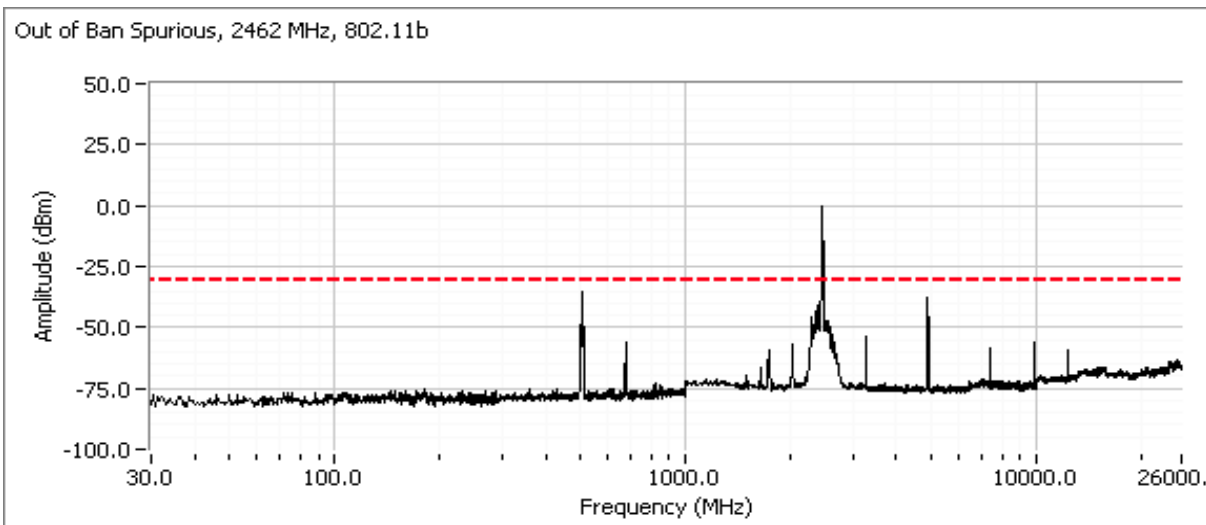
Plots for center channel, power setting(s) = 26



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #4: Out of Band Spurious Emissions

Plots for high channel, power setting(s) = 20



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions (802.11g Mode)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 11/4 & 10/2009
 Test Engineer: J. Cadigal & M. Birgani
 Test Location: Chamber#2

Config. Used: 1
 Config Change: none
 EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 18-21 °C
 Rel. Humidity: 40-50 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	26		Output Power	15.247(b)	Pass	24.7 dBm
2	26		Power spectral Density (PSD)	15.247(d)	Pass	0.3 dBm/3kHz
3	26		Minimum 6dB Bandwidth	15.247(a)	Pass	16.5 MHz
3	26		99% Bandwidth	RSS GEN	-	17.6 MHz
4	-		Spurious emissions	15.247(b)	Pass	>30dB below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

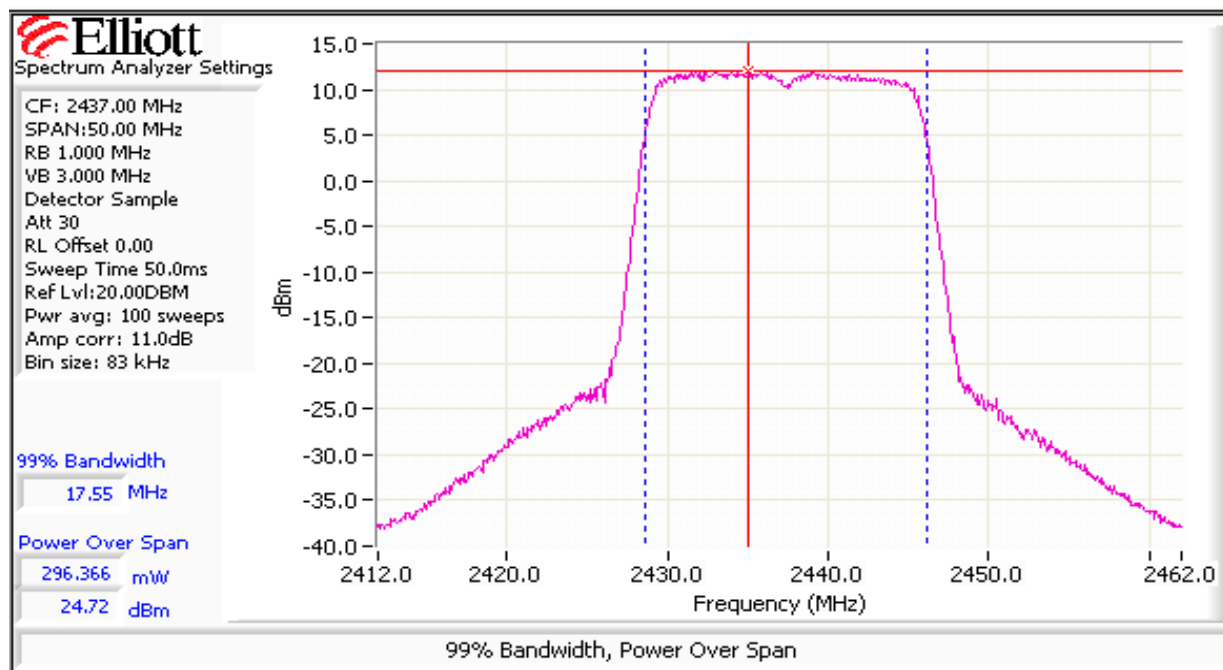
No deviations were made from the requirements of the standard.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}	
		(dBm) ¹	mW			dBm	W
20	2412	18.2	65.3	2.95	Pass	21.1	0.129
26	2437	24.7	296.5	2.95	Pass	27.7	0.585
20	2462	18.1	64.9	2.95	Pass	21.1	0.128

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm
Note 2:	Power setting - the software power setting used during testing, included for reference only.

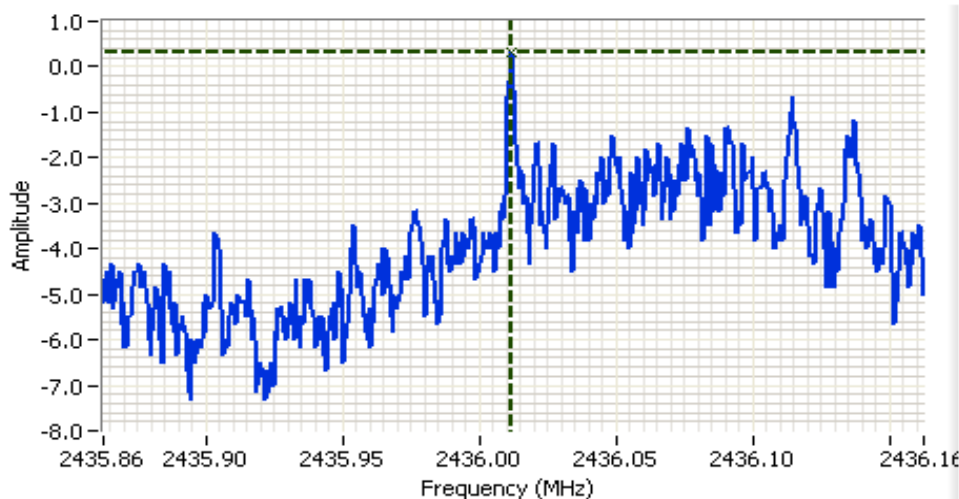


Client: 2Wire	Job Number: J77009
Model: i38HG	T-Log Number: T77016
Contact: Mark Rieger	Account Manager: Susan Pelzl
Standard: 15.247/RSS-210	Class: N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) <small>Note 1</small>		
20	2412	-6.2	8.0	Pass
26	2437	0.3	8.0	Pass
20	2462	-6.9	8.0	Pass

Note 1: Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.









Analyzer Settings

HP8564E
CF: 2436.012 MHz
SPAN: 300 kHz
RB 3.00 kHz
VB 10.00 kHz
Detector POS
Att 10
RL Offset 11.00
Sweep Time 100.0s
Ref Lvl: 3.50 DBM

Comments

802.11g @ 2437MHz
PSD: 0.3 dBm/3kHz

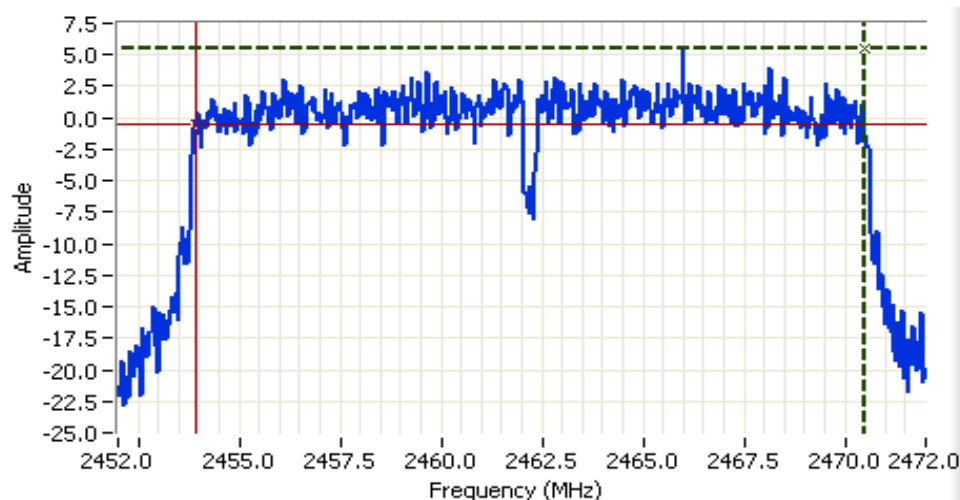
Cursor 1	2436.0120	0.33			
	0.0000	0.00			

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
20	2412	100 kHz	16.7	17.6
26	2437	100 kHz	16.8	17.6
20	2462	100 kHz	16.5	17.5

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Analyzer Settings

HP8564E
CF: 2462.000 MHz
SPAN: 20.000 MHz
RB 100 kHz
VB 100 kHz
Detector POS
Att 10
RL Offset 11.00
Sweep Time 50.0ms
Ref Lvl: 10.50DBM

Comments

802.11g @ 2462MHz
6dB BW: 16.5 MHz

Cursor 1 2470.4667 5.50
Cursor 2 2453.9333 -0.50

Delta Freq. 16.533

Delta Amplitude 6.00



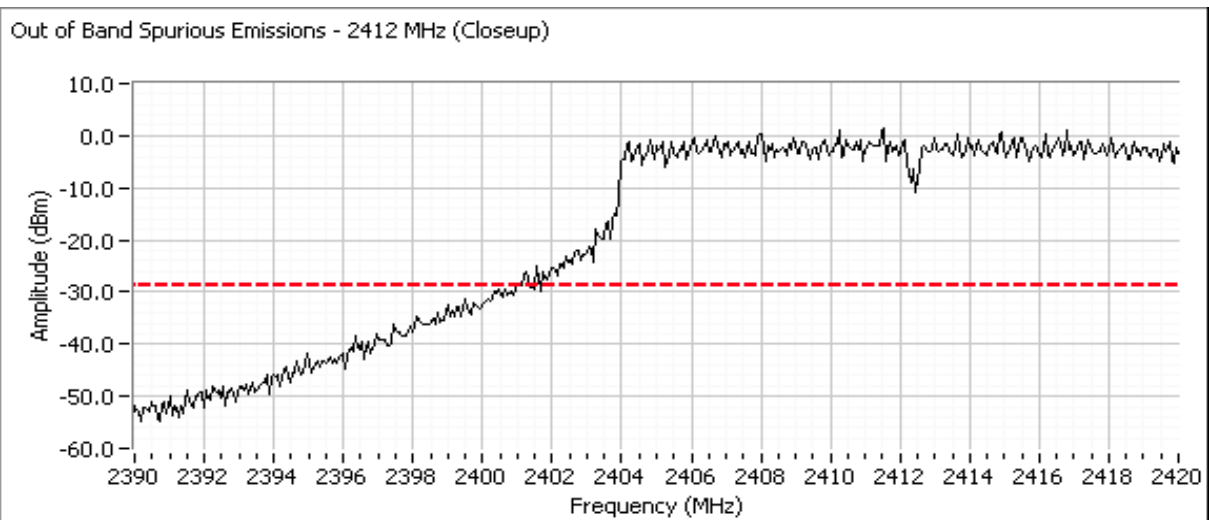
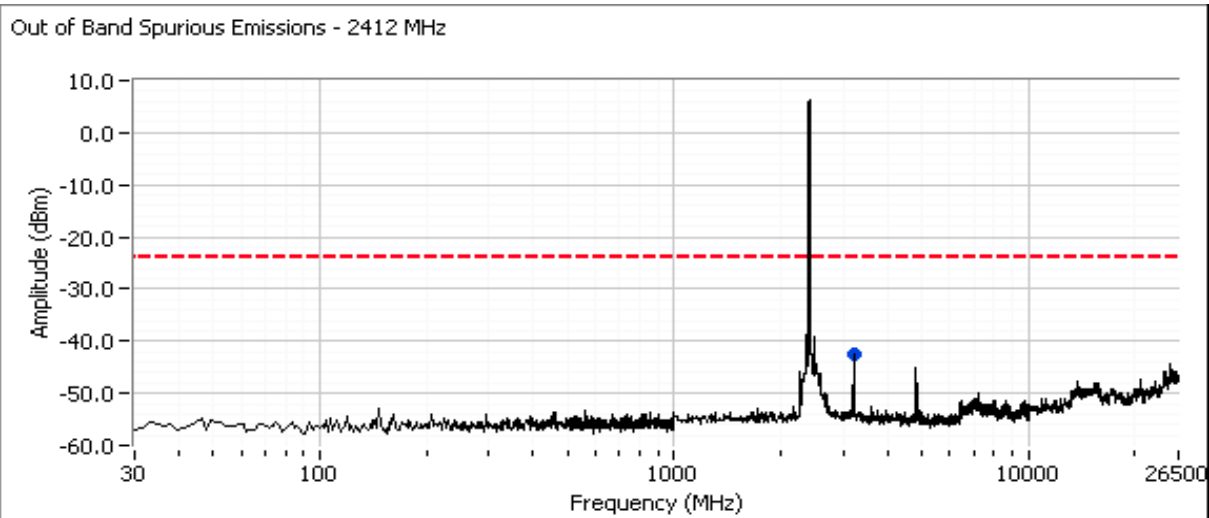
Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

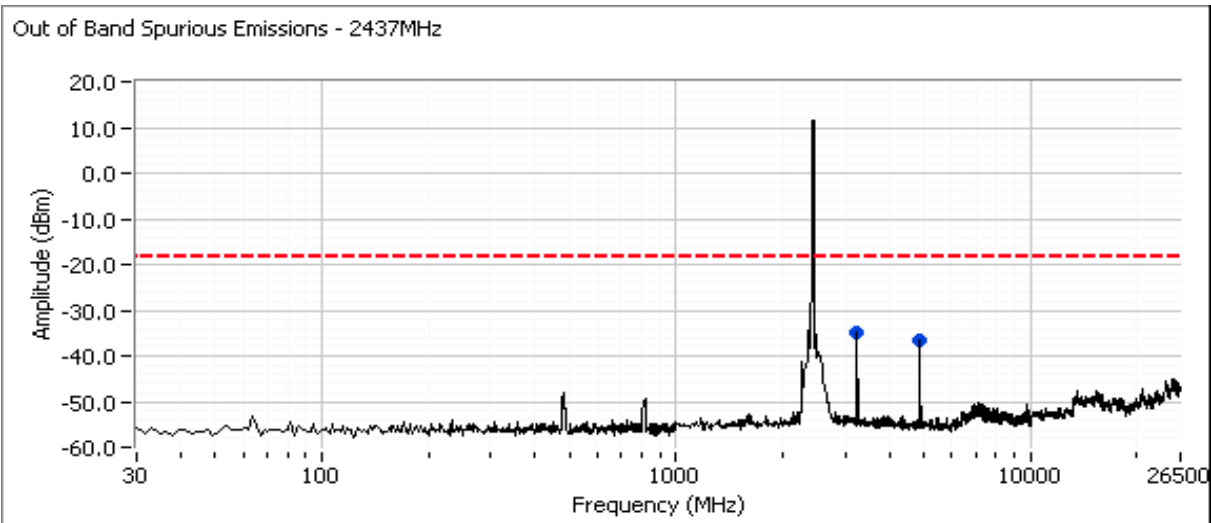
Plots for low channel, power setting(s) = 20

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

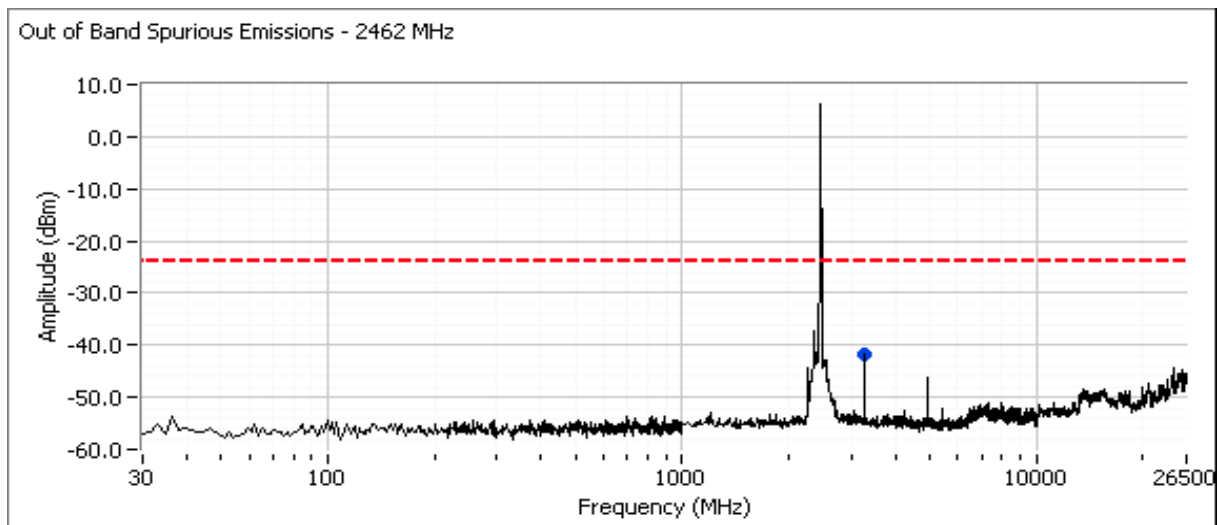


Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Plots for center channel, power setting(s) = 26



Plots for high channel, power setting(s) = 20



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: See runs below
Test Engineer: See runs below
Test Location: SVOATS#2

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:
Temperature: 19.9 °C
Rel. Humidity: 44 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band. Test unit #1.

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11b	low	20	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.3dBμV/m @ 2360.1MHz (-3.7dB)
			20	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	48.0dBμV/m @ 7233.5MHz (-6.0dB)
1b	802.11b	center	26	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.0dBμV/m @ 7308.5MHz (-1.0dB)
1c	802.11b	high	20	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	47.0dBμV/m @ 2484.5MHz (-7.0dB)
			20	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	47.7dBμV/m @ 7388.0MHz (-6.3dB)
2a	802.11g	low	20	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.9dBμV/m @ 2360.1MHz (-1.1dB)
			20	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.2dBμV/m @ 4825.5MHz (-8.8dB)
2b	802.11g	center	26	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	49.9dBμV/m @ 7308.9MHz (-4.1dB)
2c	802.11g	high	20	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.9dBμV/m @ 2483.5MHz (-4.1dB)
			20	-	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	43.1dBμV/m @ 7384.6MHz (-10.9dB)

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Modifications Made During Testing

Modifications are detailed under each run description.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: 802.11b, 1 Mbps.

Date of Test: 11/4/2009

Test Engineer: John Caizzi

Test Location: SVOATS #2

Run #1a: Low Channel @ 2412 MHz. 20 dBm.

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.400	104.9	V	120.0	-15.1	PK	105	1.00	
2409.930	102.1	V	120.0	-17.9	AVG	105	1.00	
2410.800	100.9	V	120.0	-19.1	Pk	105	1.00	RB 100 kHz; VB: 100 kHz
2411.270	102.6	H	120.0	-17.4	PK	160	1.00	
2411.130	99.9	H	120.0	-20.1	AVG	160	1.00	
2411.270	98.4	H	120.0	-21.6	Pk	160	1.00	RB 100 kHz; VB: 100 kHz

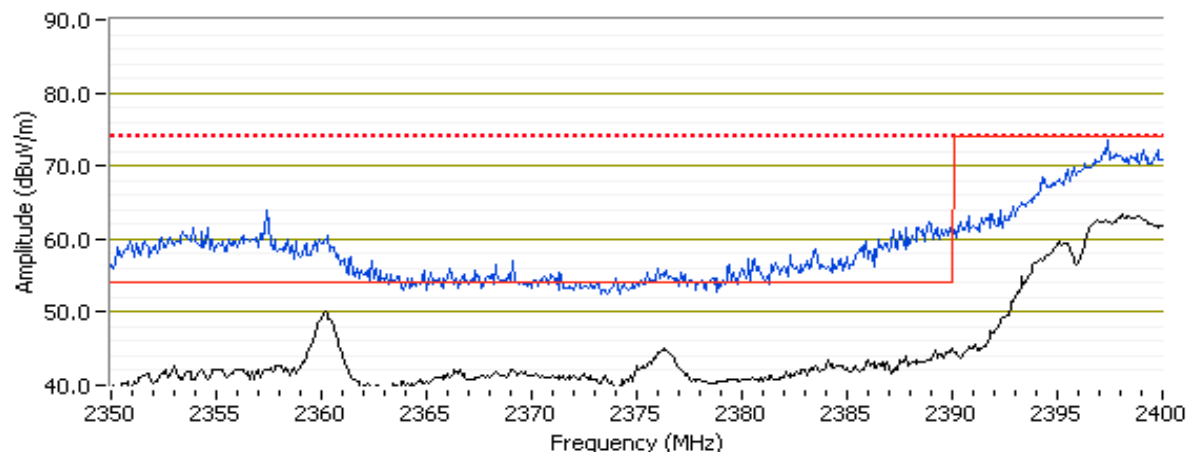
Fundamental emission level @ 3m in 100kHz RBW:	100.9	dB μ V/m
Limit for emissions outside of restricted bands:	80.9	dB μ V/m
Limit for emissions outside of restricted bands:	70.9	dB μ V/m

Limit is -20dBc (Peak power measurement)
Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2360.130	50.3	V	54.0	-3.7	AVG	105	1.0	
2388.600	61.0	V	74.0	-13.0	PK	105	1.0	

RB 1 MHz; VB 10 Hz Blue trace=pk, black trace=avg



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7233.470	48.0	V	54.0	-6.0	AVG	156	1.31	Note 2
4824.050	44.4	V	54.0	-9.6	AVG	226	1.12	Note 2
4824.100	41.2	H	54.0	-12.8	AVG	189	1.48	
7234.800	40.6	H	54.0	-13.4	AVG	166	1.00	Note 2
7235.030	54.1	V	74.0	-19.9	PK	156	1.31	Note 2
4823.900	51.5	V	74.0	-22.5	PK	226	1.12	
7231.870	49.6	H	74.0	-24.4	PK	166	1.00	
4824.220	46.5	H	74.0	-27.5	PK	189	1.48	

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No other harmonics were observed above the measurement noise floor.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #1b: Center Channel @ 2437 MHz. 26 dBm.

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2436.400	109.4	V	120.0	-10.6	PK	82	1.61	
2436.470	106.4	V	120.0	-13.6	AVG	82	1.61	
2436.330	105.8	V	120.0	-14.2	Pk	82	1.61	RB 100 kHz; VB: 100 kHz
2436.400	108.5	H	120.0	-11.5	PK	319	1.00	
2436.400	105.5	H	120.0	-14.5	AVG	319	1.00	
2438.870	104.7	H	120.0	-15.3	Pk	319	1.00	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	105.8	dBμV/m
Limit for emissions outside of restricted bands:	85.8	dBμV/m
Limit for emissions outside of restricted bands:	75.8	dBμV/m

Limit is -20dBc (Peak power measurement)

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7308.500	53.0	V	54.0	-1.0	AVG	162	1.12	
7308.400	48.6	H	54.0	-5.4	AVG	188	1.77	
4874.130	47.3	H	54.0	-6.7	AVG	159	1.04	
4874.150	47.1	V	54.0	-6.9	AVG	230	1.09	
9748.250	47.0	V	54.0	-7.0	AVG	190	1.02	Note 2
9748.150	44.4	H	54.0	-9.6	AVG	166	1.16	Note 2
7310.000	57.4	V	74.0	-16.6	PK	162	1.12	
7309.600	54.3	H	74.0	-19.7	PK	188	1.77	
9748.230	52.6	V	74.0	-21.4	PK	190	1.02	
4870.100	52.2	V	74.0	-21.8	PK	230	1.09	
9747.980	51.9	H	74.0	-22.1	PK	166	1.16	
4874.200	50.4	H	74.0	-23.6	PK	159	1.04	

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #1c: High Channel @ 2462 MHz. 20 dBm.

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.330	104.3	V	120.0	-15.7	PK	104	1.00	
2460.000	101.4	V	120.0	-18.6	AVG	104	1.00	
2464.330	100.3	V	120.0	-19.7	Pk	104	1.00	RB 100 kHz; VB: 100 kHz
2461.330	102.1	H	120.0	-17.9	PK	236	1.00	
2459.600	99.2	H	120.0	-20.8	AVG	236	1.00	
2462.800	98.0	H	120.0	-22.0	Pk	236	1.00	RB 100 kHz; VB: 100 kHz

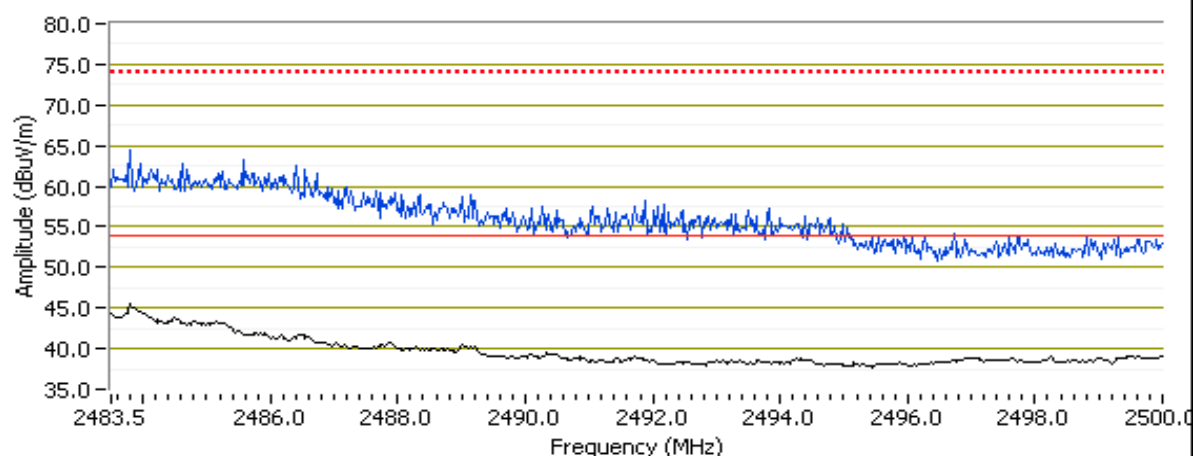
Fundamental emission level @ 3m in 100kHz RBW:	100.3	dB μ V/m
Limit for emissions outside of restricted bands:	80.3	dB μ V/m
Limit for emissions outside of restricted bands:	70.3	dB μ V/m

Limit is -20dBc (Peak power measurement)
Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.540	47.0	V	54.0	-7.0	AVG	104	1.00	
2484.380	60.6	V	74.0	-13.4	PK	104	1.00	

RB 1 MHz; VB 10 Hz Blue trace=pk, black trace=avg



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7387.970	47.7	V	54.0	-6.3	AVG	158	1.00	
4924.200	44.9	H	54.0	-9.1	AVG	215	1.03	
4924.080	44.1	V	54.0	-9.9	AVG	209	1.07	
7385.070	43.3	H	54.0	-10.7	AVG	180	1.00	
7383.400	54.4	V	74.0	-19.6	PK	158	1.00	
7384.030	51.8	H	74.0	-22.2	PK	180	1.00	
4923.980	48.8	H	74.0	-25.2	PK	215	1.03	
4924.100	48.3	V	74.0	-25.7	PK	209	1.07	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No other harmonics were observed above the measurement noise floor.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: 802.11g, 6 Mbps.

Date of Test: 11/4/2009

Test Engineer: John Caizzi / Joseph Cadigal

Test Location: SVOATS #2

Run #2a: Low Channel @ 2412 MHz

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

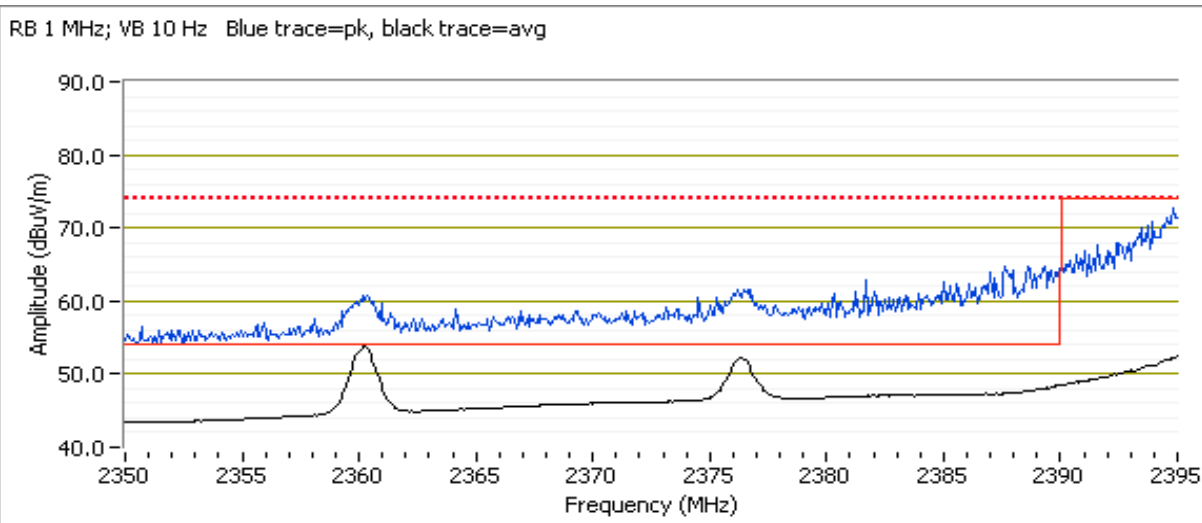
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.130	108.3	V	120.0	-11.7	PK	116	1.62	
2413.930	99.7	V	120.0	-20.3	AVG	116	1.62	
2415.870	98.8	V	120.0	-21.2	Pk	116	1.62	RB 100 kHz; VB: 100 kHz
2410.130	105.4	H	120.0	-14.6	PK	319	1.00	
2413.000	97.3	H	120.0	-22.7	Pk	319	1.00	RB 100 kHz; VB: 100 kHz
2414.600	97.3	H	120.0	-22.7	AVG	319	1.00	

Fundamental emission level @ 3m in 100kHz RBW:	98.8	dB μ V/m
Limit for emissions outside of restricted bands:	78.8	dB μ V/m
Limit for emissions outside of restricted bands:	68.8	dB μ V/m

Limit is -20dBc (Peak power measurement)
Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2360.120	52.9	V	54.0	-1.1	AVG	115	1.0	MHz; VB: 10 Hz
2360.370	60.8	V	74.0	-13.2	PK	115	1.0	MHz; VB: 1 MHz



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4825.500	45.2	H	54.0	-8.8	AVG	156	1.9	
4825.370	43.4	V	54.0	-10.6	AVG	158	2.5	
9646.500	39.8	H	54.0	-14.2	AVG	260	1.9	Note 2
9649.220	39.1	V	54.0	-14.9	AVG	360	1.0	Note 2
4825.460	59.0	H	74.0	-15.0	PK	156	1.9	
9647.240	59.0	H	74.0	-15.0	PK	260	1.9	Note 2
4825.330	57.6	V	74.0	-16.4	PK	158	2.5	
7326.750	37.0	H	54.0	-17.0	AVG	321	1.0	
7326.830	36.9	V	54.0	-17.1	AVG	360	1.0	
9648.680	50.2	V	74.0	-23.8	PK	360	1.0	Note 2
7324.770	48.3	V	74.0	-25.7	PK	360	1.0	
7326.830	47.7	H	74.0	-26.3	PK	321	1.0	

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #2b: Center Channel @ 2437 MHz. 26 dBm.

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2436.070	111.0	V	120.0	-9.0	PK	82	1.59	
2435.870	103.1	V	120.0	-16.9	AVG	82	1.59	
2434.800	102.7	V	120.0	-17.3	Pk	82	1.59	RB 100 kHz; VB: 100 kHz
2431.000	110.4	H	120.0	-9.6	PK	319	1.00	
2432.270	102.6	H	120.0	-17.4	Pk	319	1.00	RB 100 kHz; VB: 100 kHz
2435.670	102.5	H	120.0	-17.5	AVG	319	1.00	

Fundamental emission level @ 3m in 100kHz RBW:	102.7	dB μ V/m	
Limit for emissions outside of restricted bands:	82.7	dB μ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	72.7	dB μ V/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7308.930	49.9	V	54.0	-4.1	AVG	160	1.00	
7309.670	46.0	H	54.0	-8.0	AVG	231	1.54	
7312.270	62.1	V	74.0	-11.9	PK	160	1.00	
9747.470	41.0	V	54.0	-13.0	AVG	185	1.00	Note 2
4873.830	38.5	V	54.0	-15.5	AVG	175	1.24	
7311.930	57.4	H	74.0	-16.6	PK	231	1.54	
4872.670	35.4	H	54.0	-18.6	AVG	219	1.31	
9736.330	52.4	V	74.0	-21.6	PK	185	1.00	Note 2
4868.070	49.4	V	74.0	-24.6	PK	175	1.24	
4873.700	46.5	H	74.0	-27.5	PK	219	1.31	

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Note 3: No other harmonics were observed above the measurement noise floor.

Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Run #2c: High Channel @ 2462 MHz. 10 dB pad in front of preamp.

Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2466.070	109.2	V	120.0	-10.8	PK	122	1.47	
2459.800	100.8	V	120.0	-19.2	AVG	122	1.47	
2463.800	98.6	V	120.0	-21.4	Pk	122	1.47	RB 100 kHz; VB: 100 kHz
2459.130	107.2	H	120.0	-12.8	PK	314	1.04	
2460.330	99.2	H	120.0	-20.8	AVG	314	1.04	
2466.070	98.6	H	120.0	-21.4	Pk	314	1.04	RB 100 kHz; VB: 100 kHz

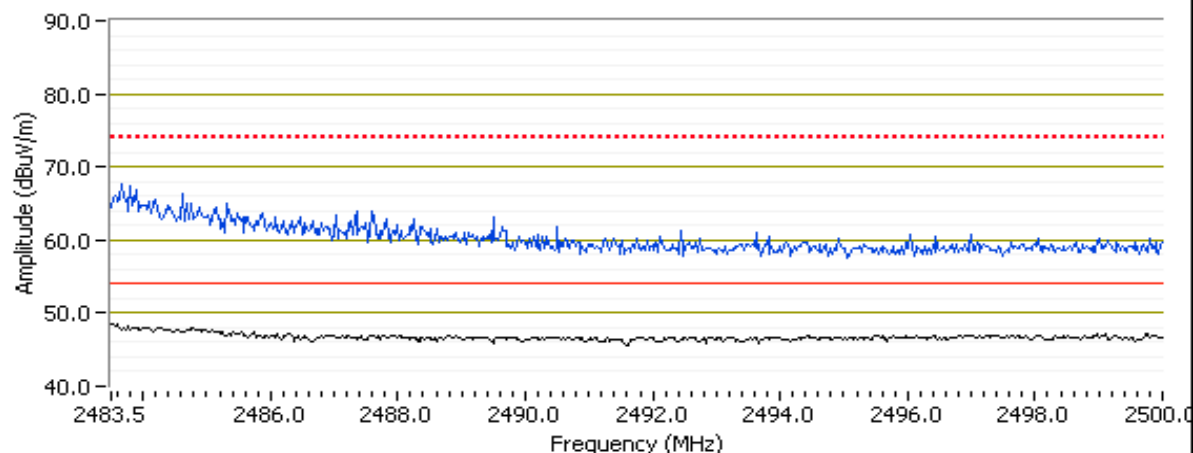
Fundamental emission level @ 3m in 100kHz RBW:	98.6	dB μ V/m
Limit for emissions outside of restricted bands:	78.6	dB μ V/m
Limit for emissions outside of restricted bands:	68.6	dB μ V/m

Limit is -20dBc (Peak power measurement)
Limit is -30dBc (UNII power measurement)

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	49.9	V	54.0	-4.1	AVG	122	1.44	
2484.490	65.1	V	74.0	-8.9	PK	122	1.44	

RB 1 MHz; VB 10 Hz Blue trace=pk, black trace=avg



Client:	2Wire	Job Number:	J77009
Model:	i38HG	T-Log Number:	T77016
Contact:	Mark Rieger	Account Manager:	Susan Pelzl
Standard:	15.247/RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7384.560	43.1	V	54.0	-10.9	AVG	156	1.1	
7385.650	40.8	H	54.0	-13.2	AVG	179	1.2	
9846.500	39.1	H	54.0	-14.9	AVG	191	1.0	Note 2
9846.500	39.0	V	54.0	-15.0	AVG	0	1.0	Note 2
7387.380	55.6	V	74.0	-18.4	PK	156	1.1	
4923.330	34.8	V	54.0	-19.2	AVG	217	1.0	
4922.880	34.0	H	54.0	-20.0	AVG	196	1.1	
7385.210	52.1	H	74.0	-21.9	PK	179	1.2	
9848.250	51.1	H	74.0	-22.9	PK	191	1.0	Note 2
9847.090	50.3	V	74.0	-23.7	PK	0	1.0	Note 2
4924.460	46.7	V	74.0	-27.3	PK	217	1.0	
4923.700	45.0	H	74.0	-29.0	PK	196	1.1	

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Appendix C Photographs of Test Configurations

Uploaded as a separate exhibit

Appendix D Schematic Diagrams

Uploaded as a separate exhibit