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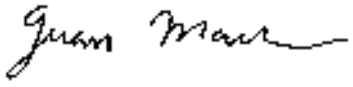
Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to

FCC Part 15, Subpart C Section 15.247(DTS)

on the 2Wire, Inc. Transmitter Model: RG3800HGV-00

FCC ID:	PGR2W3800
GRANTEE:	2Wire, Inc. 1704 Automation Parkway San Jose, CA 95131
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	March 30, 2006
FINAL TEST DATE:	February 21 and February 23, 2006

AUTHORIZED SIGNATORY: 

Juan Martinez
Senior EMC Engineer

A2LA ACCREDITED
2016-01

Equipment Name and Model:

Transceiver RG3800HGV-00

Manufacturer:

2Wire, Inc.
1704 Automation Parkway
San Jose, CA 95131

Tested to applicable standard:

FCC Part 15, Subpart C requirements for DTS devices

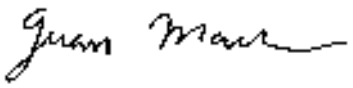
Test Report Prepared For:
Jeremy Muir
2Wire, Inc.
1704 Automation Parkway
San Jose, CA 95131

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 SV2 Dated August 16, 2007

Declaration of Compliance

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4: 2003 as referenced by FCC Part 15 and by section 1.0 of RSS-212, Issue 1, "Test Facilities and Test Methods for Radio Equipment" / RSS-Gen Issue 1); and that the equipment performed in accordance with the data submitted in this report.



Signature _____
Name Juan Martinez
Title Senior EMC Engineer
Elliott Laboratories Inc.
Address 684 W. Maude Ave
Sunnyvale, CA 94086
USA

Date: March 30, 2006

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SCOPE

An electromagnetic emissions test has been performed on the 2Wire, Inc. model RG3800HGV-00 pursuant to the following rules:

FCC Part 15, Subpart C requirements for DTS devices

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
RSS-212 Issue 1 Test Facilities and Test Methods for Radio Equipment

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.

The test results recorded herein are based on a single type test of the 2Wire, Inc. model RG3800HGV-00 and therefore apply only to the tested sample. The sample was selected and prepared by Jeremy Muir of 2Wire, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section. Certification of these devices is required as a prerequisite to marketing in the US.

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 RG3800HGV-00 complied with the requirements of the following regulations:

FCC Part 15, Subpart C requirements for DTS devices

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.).

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Part 15 Reference	RSS Reference	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	12.8 MHz (802.11b) 16.6 MHz (802.11g)	>500kHz	Complies
	RSP100	99% Bandwidth	15.6 MHz (802.11b) 17.4 MHz (802.11g)	Information only	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	26 dBm (0.398 Watts) EIRP = .501[Note 1]	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-1.37 dBm / MHz (802.11b) -7.42 dB/m MHz (802.11g)	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All Emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	50.8dBµV/m (345.5µV/m) @ 2483.5MHz (-3.2dB)	15.207 in restricted bands, all others < -20dBc	Complies

Note 1: EIRP calculated using antenna gain of 1 dBi for the highest EIRP multi-point system and 1 dBi for the highest EIRP point-to-point system.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Part 15 Section	RSS 210 Section	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antennas are part of the PCB board	N/A	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	35.4dBµV/m (58.7µV/m) @ 12260.4MHz	Refer to standard	Complies (-24.6dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	45.5dBµV @ 0.252MHz	EN55022 B	Complies (-6.2dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies

MEASUREMENT UNCERTAINTIES

ISO Guide 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 were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of *U*cispr and therefore no adjustment of the data for measurement uncertainty is required.

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The 2Wire, Inc. model RG3800HGV-00 is a VDSL wireless router that is designed to wirelessly connect to the Internet. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120 / 230 Volts, 50 / 60 Hz, 2.9 Amps, (12V dc output).

The sample was received on February 21, 2006 and tested on February 21 and February 23, 2006. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire	3800 HGV-B	wireless router	325114026627	

OTHER EUT DETAILS

List any items from the test log.

ANTENNA SYSTEM

The antenna system used with the 2Wire, Inc. model RG3800HGV-00 consists of one transmit and diversity receive antennas.

ENCLOSURE

The EUT enclosure is primarily constructed of ABS plastic surrounding a metal shield. It measures approximately 30 cm wide by 24 cm deep by 6 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

LOCAL SUPPORT EQUIPMENT

Manufacturer	Model	Description	Serial Number	FCC ID
Coby	CTP220	phone	324001152	-

SUPPORT EQUIPMENT

Manufacturer	Model	Description	Serial Number	FCC ID
HP	NX6110	Laptop PC #1	36Nu54200Y8	-
Dell	Latitude	Laptop PC #2	None	-
Scientific Atlanta	DPH548	IP over COAX	20172	

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC Power	AC Mains	-	unshielded	2.0
HPNA port	laptop PC #1	serial	unshielded	2.0
USB	laptop PC #2	serial	shielded	2.0
Cable	IP over coax	serial	shielded coax	2.0
broadband	unconnected	serial	unshielded	-

EUT OPERATION

During emissions testing the EUT transmitting Ethernet, USB, and wireless packets.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on February 21 and February 23, 2006 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California or 41039 Boyce Road, Fremont, California 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.

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 of predictable local TV, radio, and mobile communications traffic. The test site contains 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 and RSS 212.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and RSS 212. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

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 / RSS 212.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 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.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

Power measurements are made using either a power meter (typically with a peak power sensor) or as detailed in FCC KDB558074 using a spectrum analyzer and either the built-in channel power measurement function or software to integrate the power over the displayed spectrum.

When using the integration method the analyzer's internal function or software account for the equivalent noise bandwidth of the resolution bandwidth used when performing the integration. The bandwidths, detector (peak or sample) and trace data (max held or power averaging) are detailed in the test data. When using a power averaging function the device is either in a continuous transmit mode or the analyzer is configured to only sweep when the transmitter is active to ensure that the averaging is performed over a transmit burst and not over quiet periods.

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 biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors 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.

ANSI C63.4:2003 and RSS 212 secify 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.

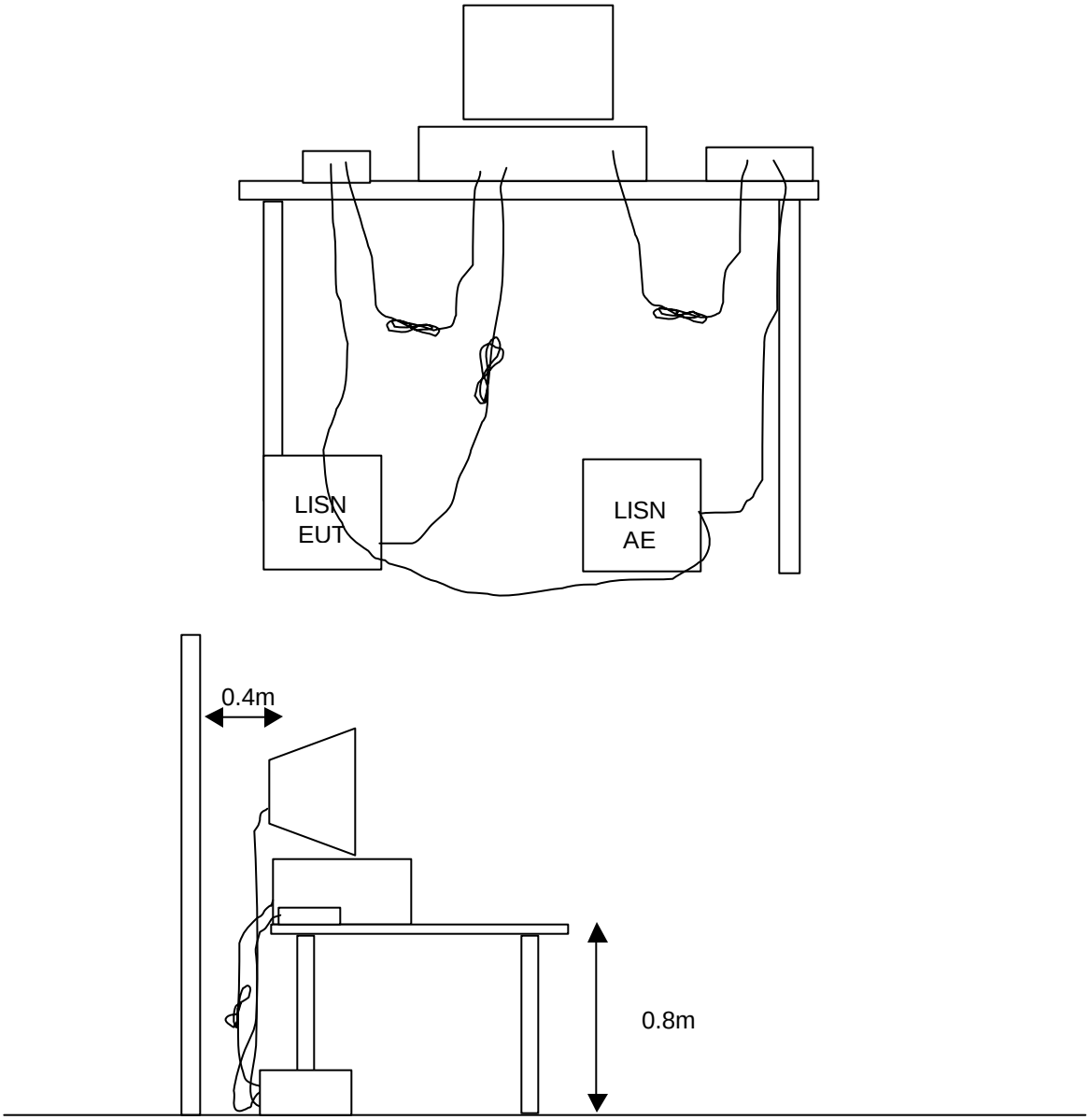
TEST PROCEDURES

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.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

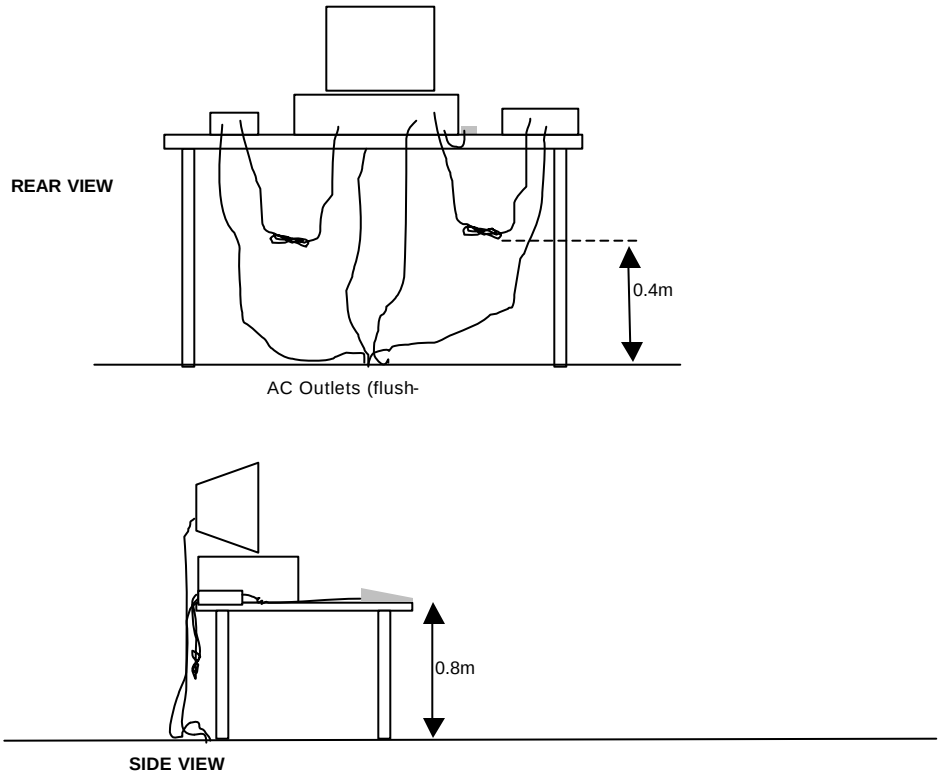


RADIATED EMISSIONS

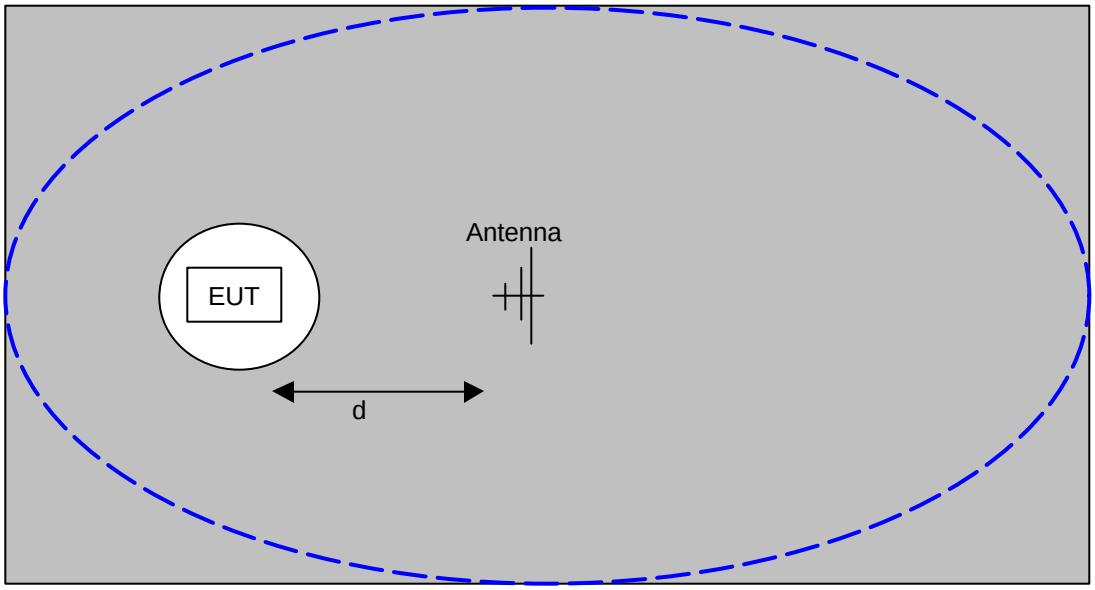
Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied 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.

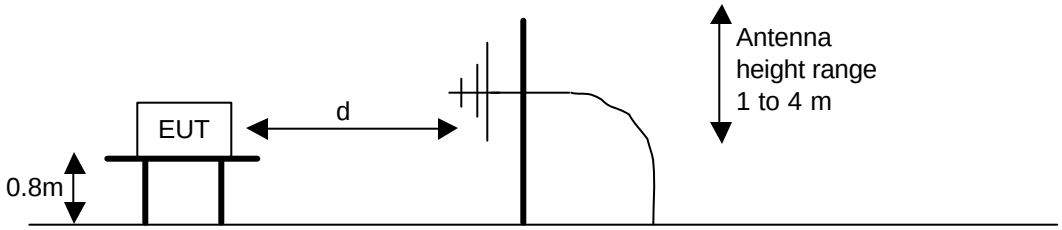
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. 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. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.



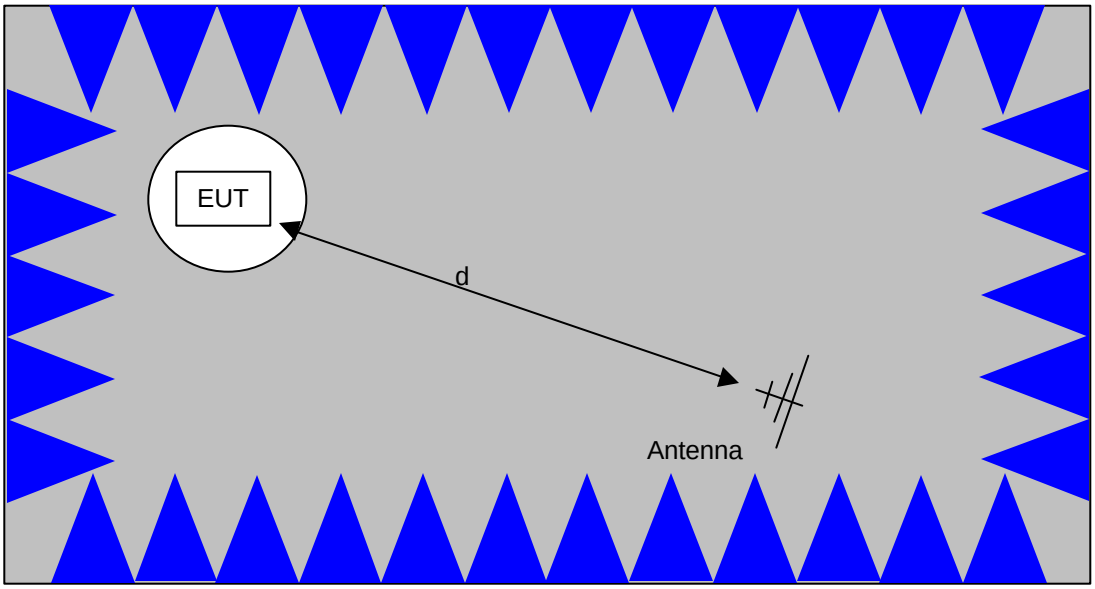
Typical Test Configuration for Radiated Field Strength Measurements



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.

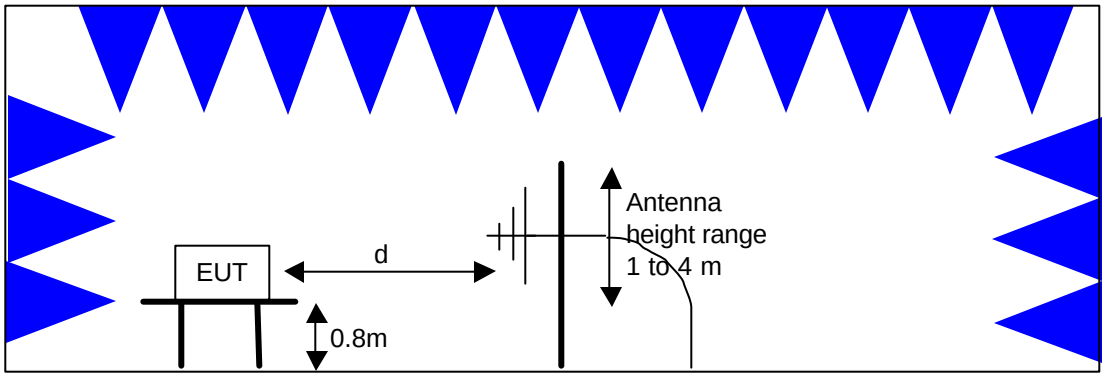


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



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.

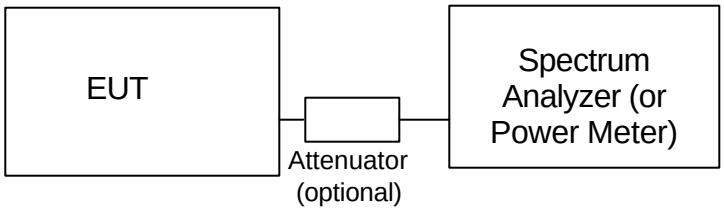
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and Elliott's test procedures for the type of radio being tested.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

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:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D) and the limits for all emissions for a low power device operating under the general rules of RSS 210, FCC Part 15 Subpart C.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
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

RECEIVER SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for emissions from the receiver as detailed in FCC Part 15.109, RSS 210 table 2, RSS GEN table 1.

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

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

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

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:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

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:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

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 = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_C = Corrected Reading in dBuV/m

L_S = Specification Limit in dBuV/m

M = 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:

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

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 1000 - 26,000 MHz, 21-Feb-06
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	26-Apr-06
Hewlett Packard	High Pass filter, 3.5GHz	P/N 84300-80038	1157	28-Apr-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Purple (SA40)	8564E (84125C)	1771	02-Aug-06
EMCO	Horn Antenna D. Ridge 1-18 GHz (SA40 9kHZ horn), Purple	3115	1779	07-Feb-07

EXHIBIT 2: Test Measurement Data

35 Pages

Elliott

EMC Test Data

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	Test-Log Number:	T62931
		Project Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC Part 15.247/RSS 210,	Class:	B
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

2 Wire

Model

3800HGV-B

Date of Last Test: 2/21/2006

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	Test-Log Number:	T62931
		Project Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC Part 15.247/RSS 210, EN550	Class:	B
Immunity Spec:	-	Environment:	-

EUT INFORMATION

The following information was collected during the test sessions(s).

General Description

The EUTis a VDSL wireless router that is designed to wirelessly connect to the Internet. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120 / 230 Volts, 50 / 60 Hz, 2.9 Amps, (12V dc output).

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire	3800 HGV-B	wireless router	325114026627	

EUT Enclosure

The EUT enclosure is primarily constructed of ABS plastic surrounding a metal shield. It measures approximately 30 cm wide by 24 cm deep by 6 cm high.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Project Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC Part 15.247/RSS 210, EN550	Class:	B
Immunity Spec:	-	Environment:	-

Test Configuration #1

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Coby	CTP220	phone	324001152	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
HP	NX6110	laptop PC #1	36Nu54200Y8	-
Dell	Latitude	laptop PC #2	none	-
Scientific Atlanta	DPH548	IP over COAX	20172	

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC Power	AC Mains	-	unshielded	2.0
HPNA port	laptop PC #1	serial	unshielded	2.0
USB	laptop PC #2	serial	shielded	2.0
Cable	IP over coax	serial	shielded coax	2.0
broadband	unconnected	serial	unshielded	-

Note: The broadband port was not connected during testing. The manufacturer stated that these would not normally be connected.

EUT Operation During Emissions Tests

During emissions testing the EUT transmitting ethernet, USB, and wireless packets.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Project Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC Part 15.247/RSS 210, EN550	Class:	B
Immunity Spec:	-	Environment:	-

Test Configuration #2

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Coby	CTP220	phone	324001152	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
HP	NX6110	laptop PC #1	36Nu54200Y8	-
HP	NX6111	laptop PC #2	CNU542018G	-
Dell	Latitude	laptop PC 3#	none	-
Adapcom	mini DSLAM	mini DSLAM	-	-
Scientific Atlanta	DPH548	IP over COAX	20172	

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
-	-	-	unshielded	-
AC Power	AC Mains	-	unshielded	2.0
HPNA port	laptop PC #1	serial	unshielded	2.0
USB	laptop PC #2	serial	shielded	2.0
Ethernet (to DSLAM)	laptop PC #3	serial	unshielded	2.0
Cable	IP over coax	serial	shielded coax	2.0
broadband	unconnected	serial	unshielded	-

Note: The broadband port was not connected during testing. The manufacturer stated that these would not normally be connected.

EUT Operation During Emissions Tests

During emissions testing the EUT transmitting ethernet, USB, and wireless packets.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Conducted Emissions - Power Ports

Test Specifics

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: 3/9/2006
Test Engineer: Juan Gonzalez
Test Location: SVOATS #2

Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 11 °C
Rel. Humidity: 51 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	EN55022 B	PASS	45.5dBµV @ 0.252MHz (-6.2dB)

Modifications Made During Testing:

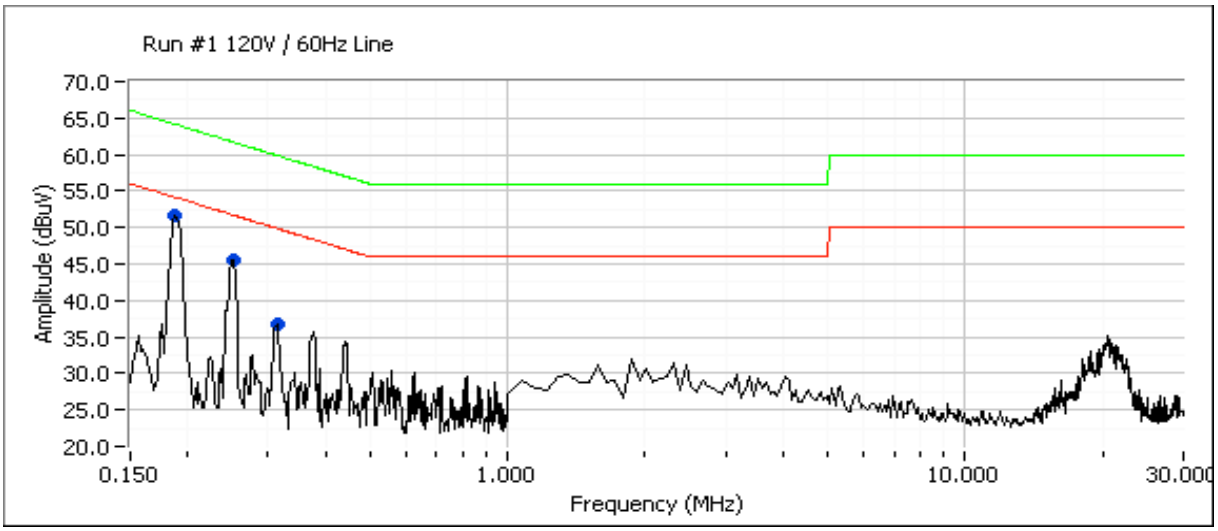
No modifications were made to the EUT during testing

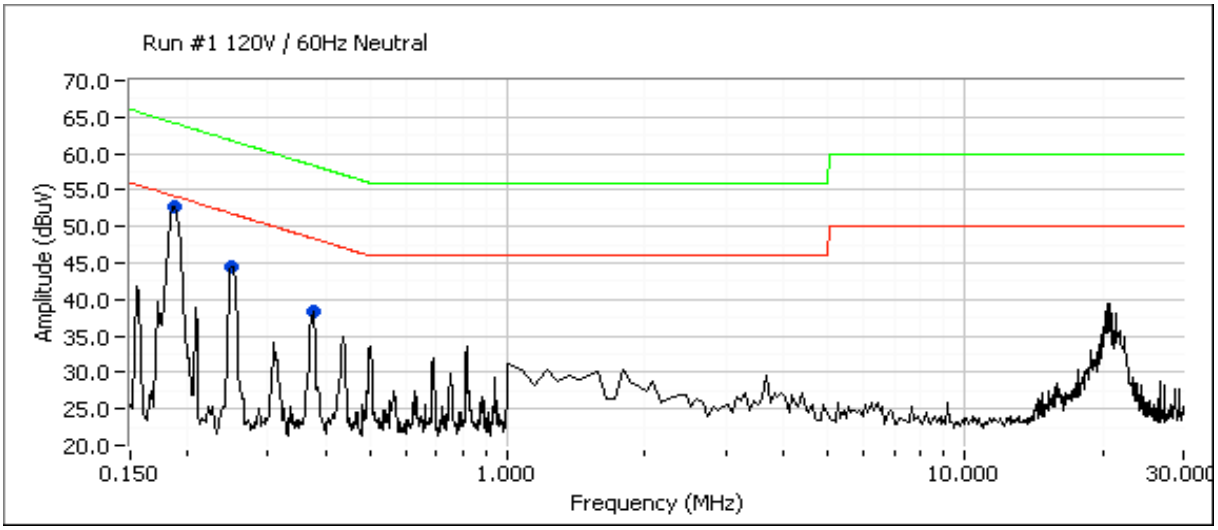
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
3800 W/ YM-1031AA Supply





Elliott

EMC Test Data

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.252	45.5	Line	51.7	-6.2	Peak	Note 1
0.250	44.6	Line 1	51.8	-7.2	Peak	Note 1
0.375	38.3	Line 1	48.4	-10.1	Peak	Note 1
0.188	51.5	Line	64.1	-12.6	QP	
0.188	51.4	Neutral	64.1	-12.7	QP	
0.314	36.6	Line	49.9	-13.3	Peak	Note 1
0.188	38.8	Neutral	54.1	-15.3	Average	
0.188	37.8	Line	54.1	-16.3	Average	

Note 1:	No QO and Avg readings taken since peak readings are more than 6dB below Avg limit

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions 802.11b

Test Specifics

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: 2/21/2006
Test Engineer: Mehran Birgani
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.

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

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 16 °C
Rel. Humidity: 29 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 26000 MHz Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	50.1dBµV/m (321.0µV/m) @ 2488.0MHz (-3.9dB)
2	6dB Bandwidth	15.247(a)	Pass	Refer to run
3	Output Power	15.247(b)	Pass	26 dBm
4	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run

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:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1a: Radiated Spurious Emissions, 30 - 26000 MHz. 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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.933	106.60	H	-	-	AVG	216	1.4	RB = 1MHz, VB = 10Hz
2413.933	109.68	H	-	-	PK	216	1.4	RB = VB = 1MHz
2414.667	106.12	H	-	-	PK	216	1.4	RB = VB = 100kHz
2410.367	104.87	V	-	-	AVG	173	1.0	RB = 1MHz, VB = 10Hz
2410.367	107.85	V	-	-	PK	173	1.0	RB = VB = 1MHz
2414.167	104.52	V	-	-	PK	173	1.0	RB = VB = 100kHz

Fundamental emission level @ 3m in 100kHz RBW:	106.1	104.5	
Limit for emissions outside of restricted bands:	86.1 dBµV/m		**Limit is -20dBc**
Delta Marker - Peak	52.50 dB		Delta between highest in-band and highest
Delta Marker - Average	56.50 dB		

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.462	50.10	H	54.0	-3.9	AVG	216	1.4	
2386.262	57.18	H	74.0	-16.8	PK	216	1.4	

Note 1: Calculated by subtracting the marker delta values from the fundamental field strength measurements.

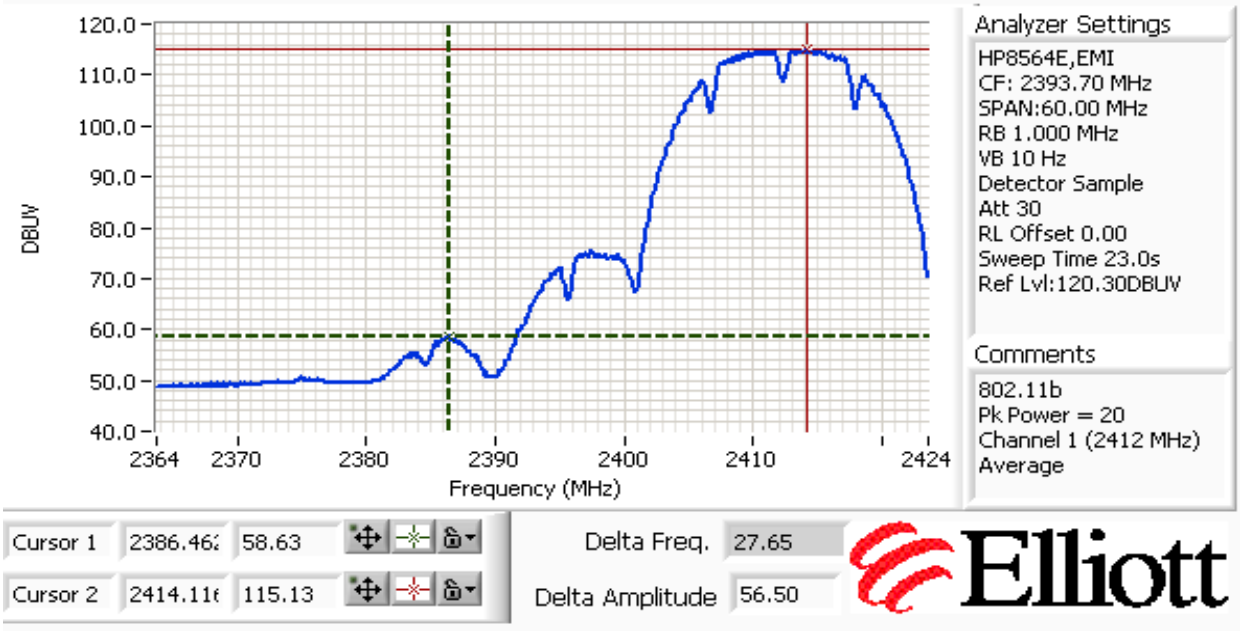
Other Spurious Emissions

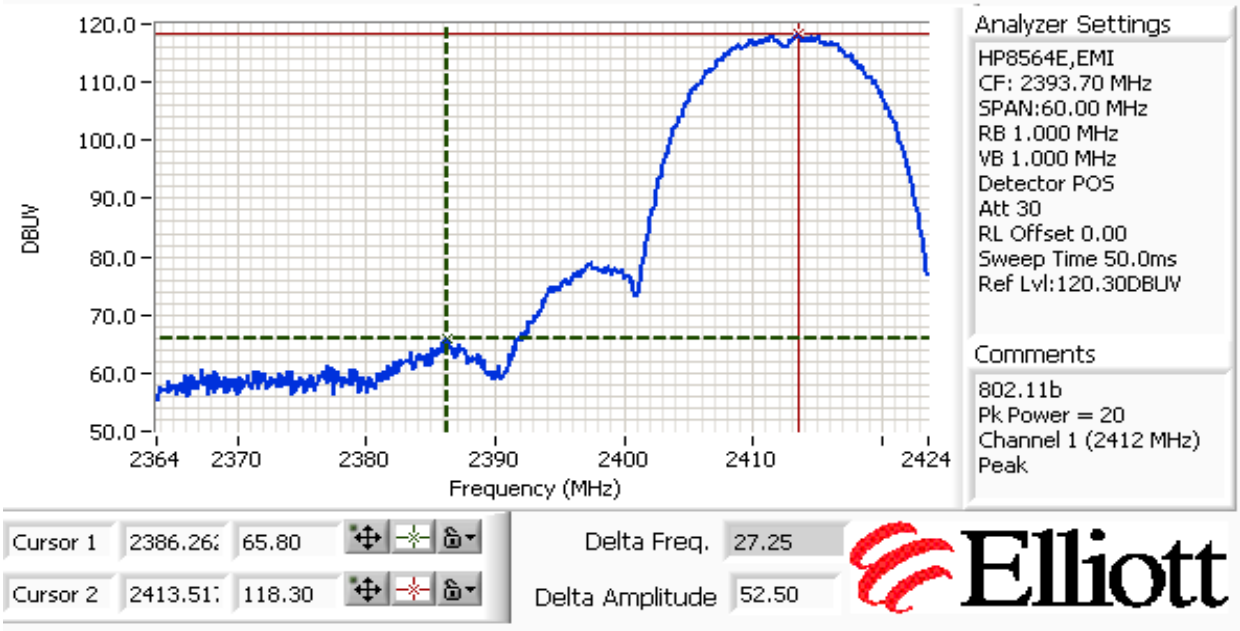
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
12061.19	39.7	V	54.0	-14.4	AVG	215	1.0	
12060.79	39.6	H	54.0	-14.4	AVG	210	1.0	
4824.030	37.9	H	54.0	-16.1	AVG	37	2.0	
4824.050	35.3	V	54.0	-18.7	AVG	340	1.2	
12061.19	51.3	V	74.0	-22.7	PK	215	1.0	
12060.79	50.8	H	74.0	-23.2	PK	210	1.0	
4824.030	45.1	H	74.0	-28.9	PK	37	2.0	
4824.050	44.2	V	74.0	-29.8	PK	340	1.2	

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.

EMC Test Data

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1b: Radiated Spurious Emissions, 30 - 26000 MHz. Center Channel @ 2437 MHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	109.3	110.2
Limit for emissions outside of restricted bands:	90.17 dBµV/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.950	43.2	V	54.0	-10.8	AVG	200	1.0	
4873.87	41.0	H	54.0	-13.1	AVG	26	1.1	
7309.87	40.7	H	54.0	-13.3	AVG	259	1.6	
12184.05	39.9	H	54.0	-14.1	AVG	278	1.4	
12185.78	39.8	V	54.0	-14.2	AVG	66	1.0	
7312.325	37.6	V	54.0	-16.4	AVG	92	1.0	
12184.05	51.8	H	74.0	-22.2	PK	278	1.4	
12185.78	50.9	V	74.0	-23.1	PK	66	1.0	
7309.87	50.3	H	74.0	-23.7	PK	259	1.6	
7312.325	48.6	V	74.0	-25.4	PK	92	1.0	
4873.950	47.4	V	74.0	-26.6	PK	200	1.0	
4873.87	46.9	H	74.0	-27.1	PK	26	1.1	

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.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1c: Radiated Spurious Emissions, 30 - 26000 MHz. High Channel @ 2462 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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.400	106.23	V	-	-	AVG	171	1.2	RB = 1MHz, VB = 10Hz
2460.400	109.25	V	-	-	PK	171	1.2	RB = VB = 1MHz
2460.100	106.22	V	-	-	PK	171	1.2	RB = VB = 100kHz
2460.400	106.30	H	-	-	AVG	219	1.7	RB = 1MHz, VB = 10Hz
2460.400	109.31	H	-	-	PK	219	1.7	RB = VB = 1MHz
2461.167	106.08	H	-	-	PK	219	1.7	RB = VB = 100kHz

Fundamental emission level @ 3m in 100kHz RBW:	106.1	106.2	
Limit for emissions outside of restricted bands:	86.2 dBµV/m		**Limit is -20dBc**

Delta Marker - Peak	48.7 dB	Delta between highest in-band and highest
Delta Marker - Average	56.2 dB	

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2488.037	50.13	V	54.0	-3.9	AVG	219	1.7	
2490.134	60.64	V	74.0	-13.4	PK	219	1.7	

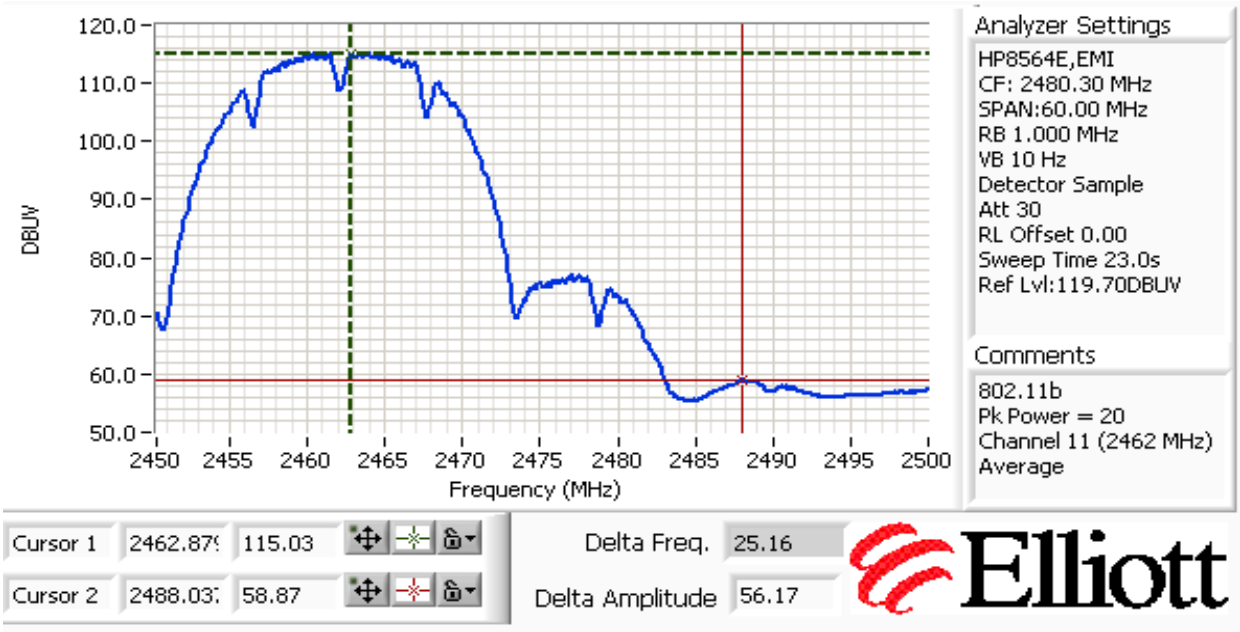
Note 1:	Calculated by subtracting the marker delta values from the fundamental field strength measurements.

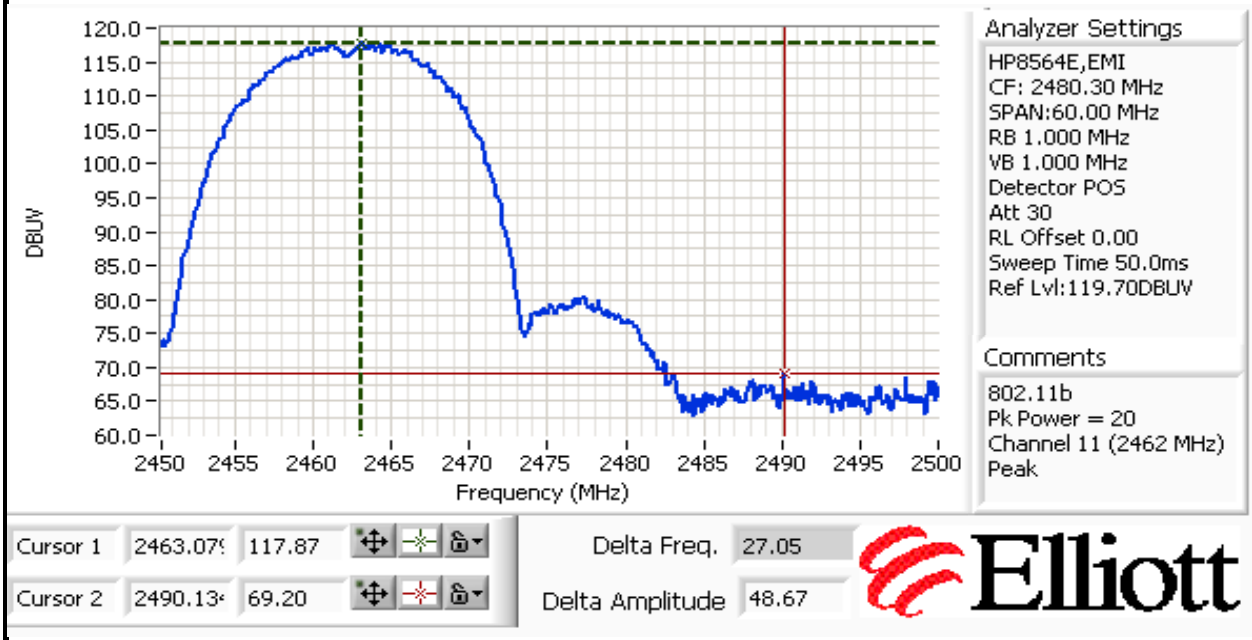
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
7387.908	39.1	H	54.0	-14.9	AVG	283	1.5	
4923.897	38.6	H	54.0	-15.4	AVG	37	1.6	
4923.977	37.2	V	54.0	-16.8	AVG	202	1.0	
7386.850	36.9	V	54.0	-17.1	AVG	233	1.9	
7387.908	48.7	H	74.0	-25.3	PK	283	1.5	
7386.850	47.6	V	74.0	-26.4	PK	233	1.9	
4923.897	46.2	H	74.0	-27.9	PK	37	1.6	
4923.977	45.3	V	74.0	-28.7	PK	202	1.0	

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.

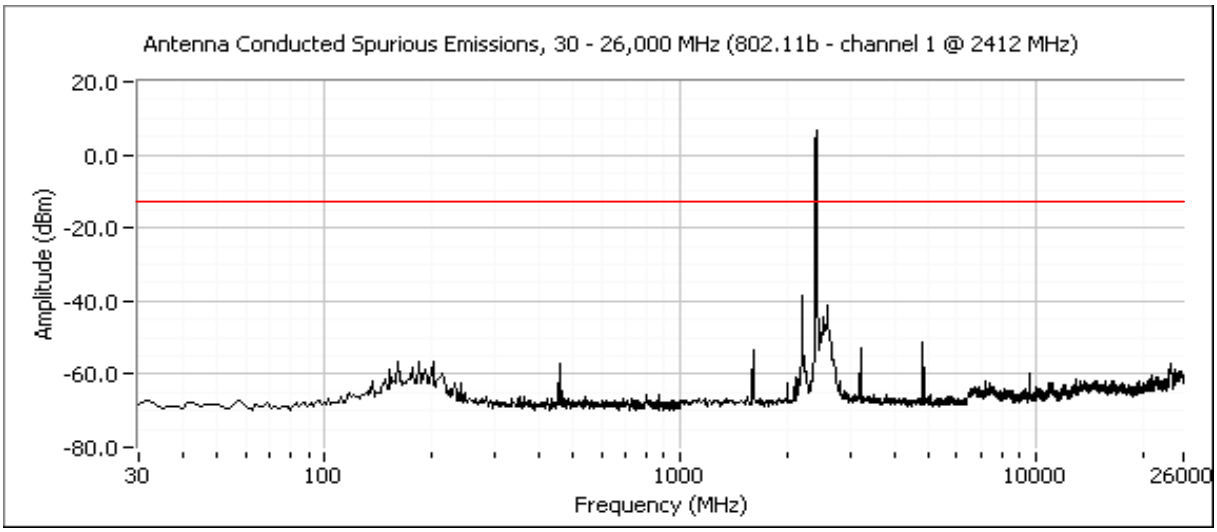
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

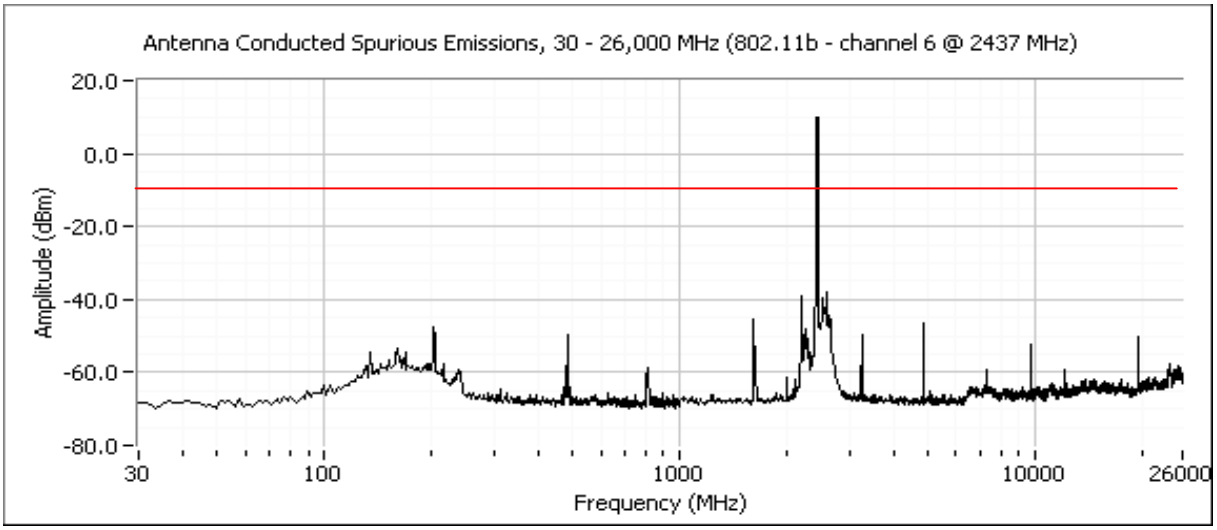




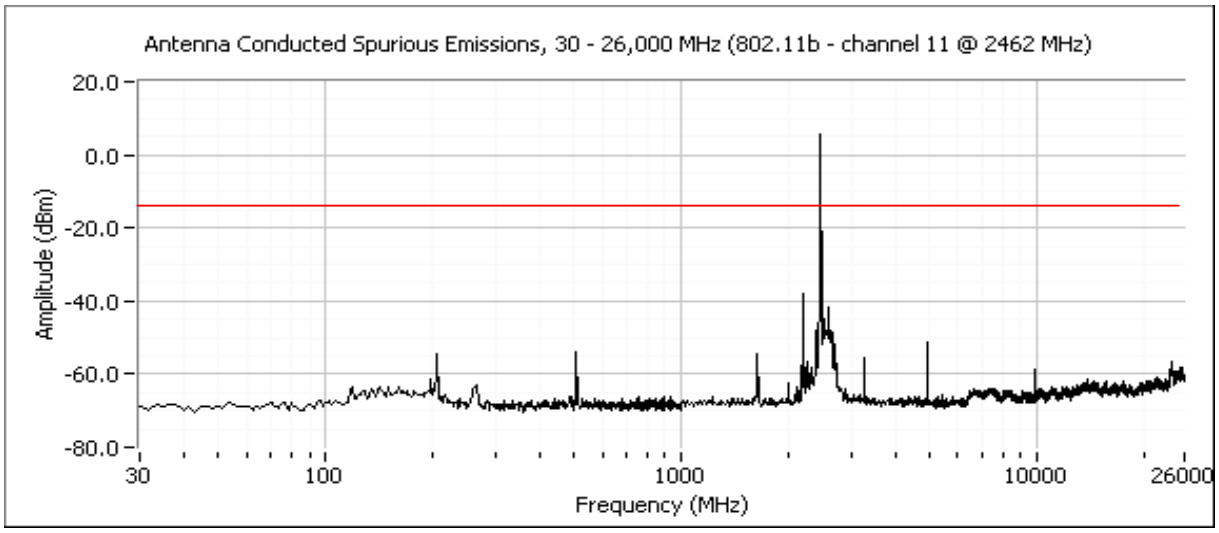
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1d: Antenna Conducted Spurious Emissions, 30 - 26000 MHz.
Refer to plots below. Scans made using RBW = VBW = 100 kHz with the limit line set at 20dB below the highest in-band signal level.





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

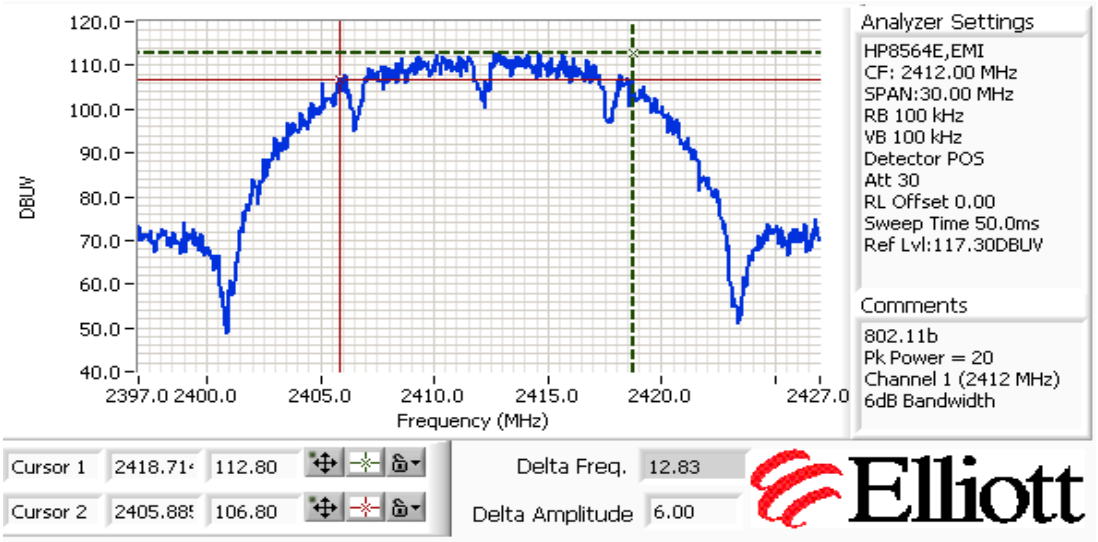


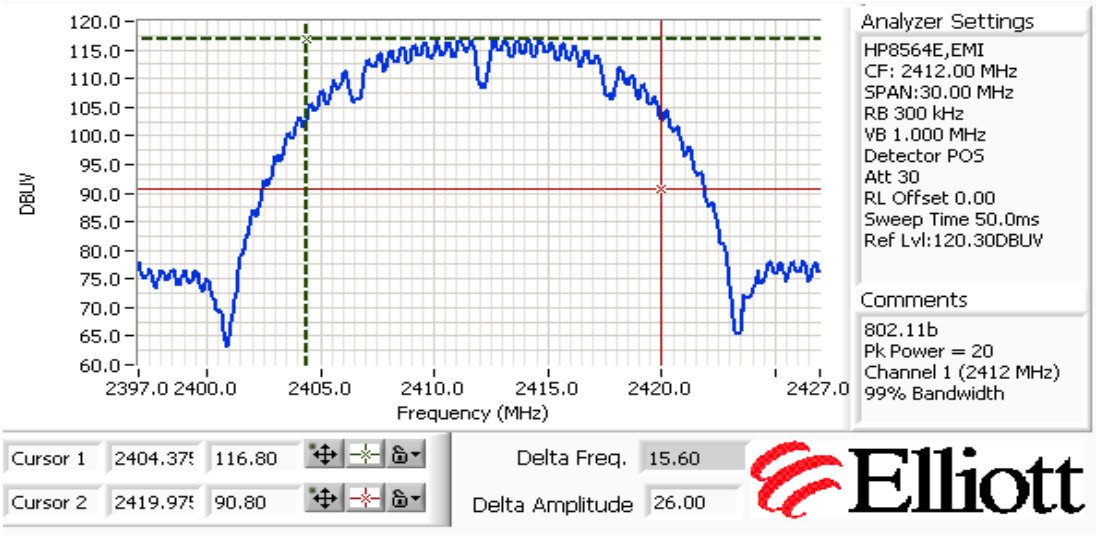
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #2: Signal Bandwidth

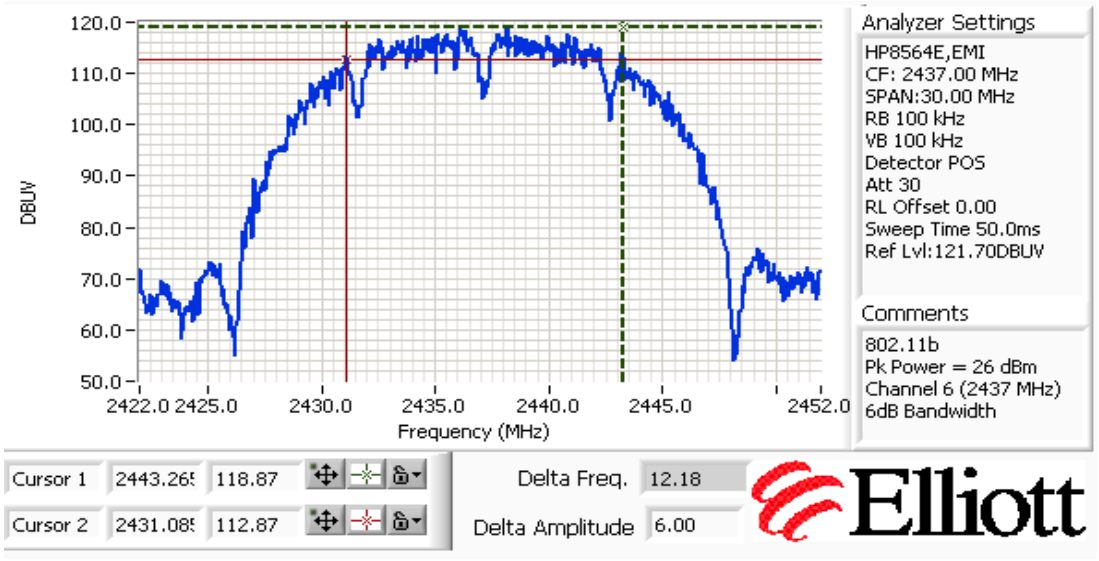
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Resolution Bandwidth	99% Signal Bandwidth
21	2412	100 kHz	12.8	300 kHz	15.6
27	2437	100 kHz	12.2	300 kHz	15.6
12	2462	100 kHz	12.1	300 kHz	15.6

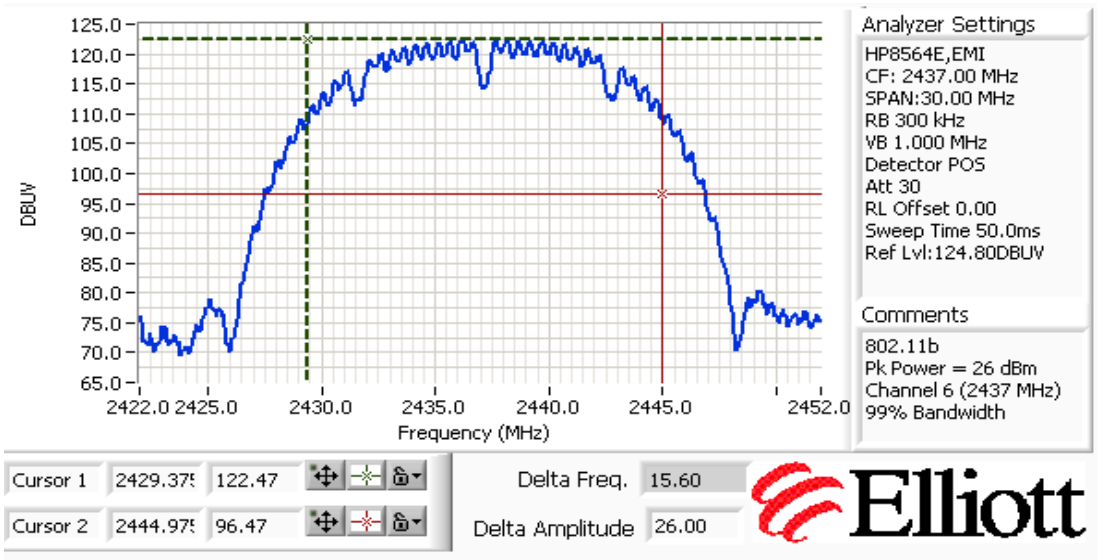
Note: Power setting is based on PCDAC of the software and this value is for reference purposes only.



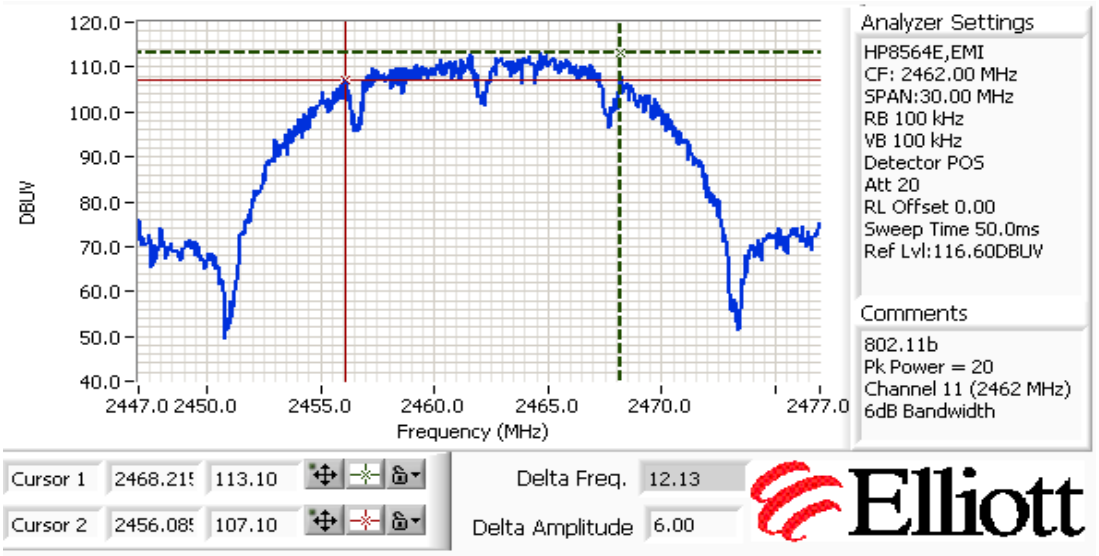


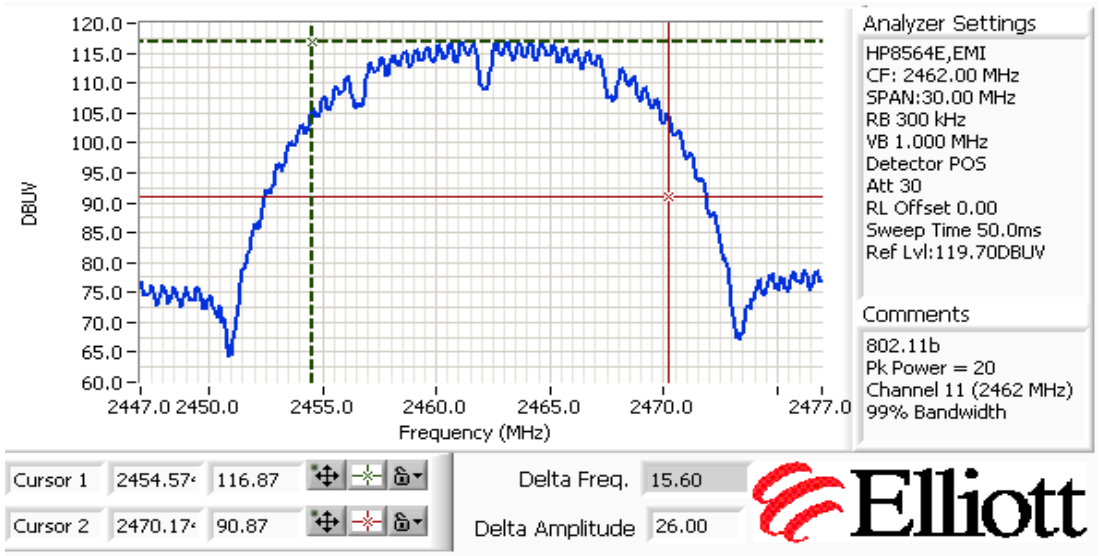
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #3: Output Power

Maximum antenna gain: 1 dBi

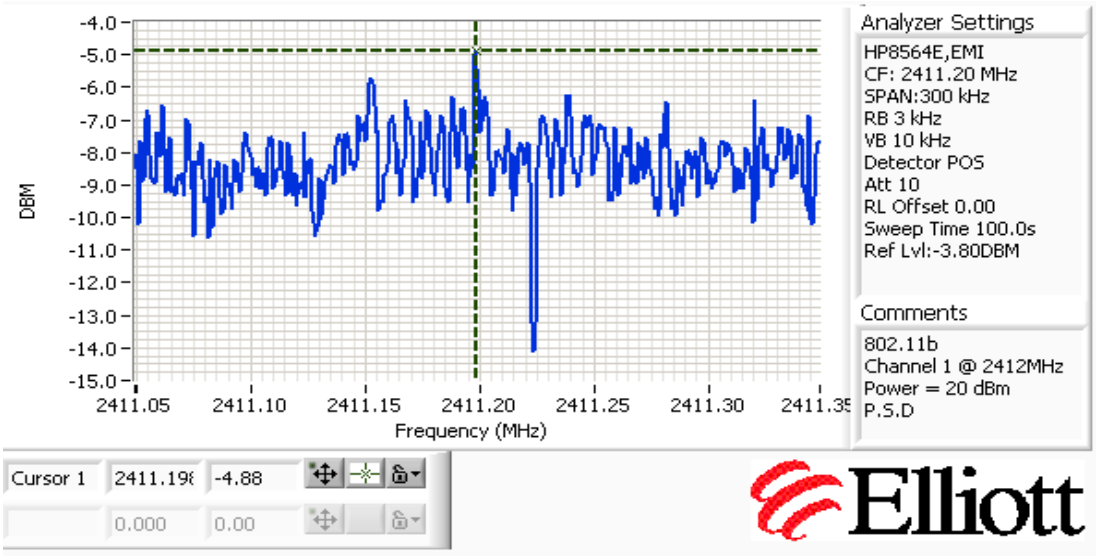
Power Setting	Frequency (MHz)	Res BW MHz	Output Power Note 1 dBm	Output Power Note 1 W	EIRP W	Average Power Note 2 dBm	Average Power Note 2 W
21	2412		20	0.100	0.126		
27	2437		26	0.398	0.501		
12	2462		20	0.100	0.126		

Note:	Power setting is based on PCDAC of the software and this value is for reference purposes only.
Note 1:	Output power measured using a peak power meter

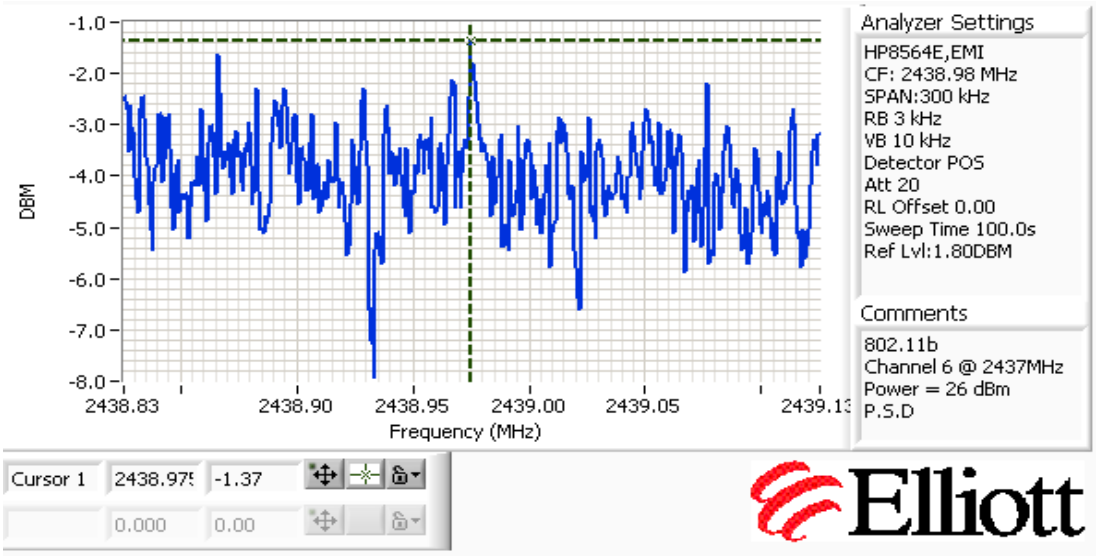
Run #4: Power Spectral Density

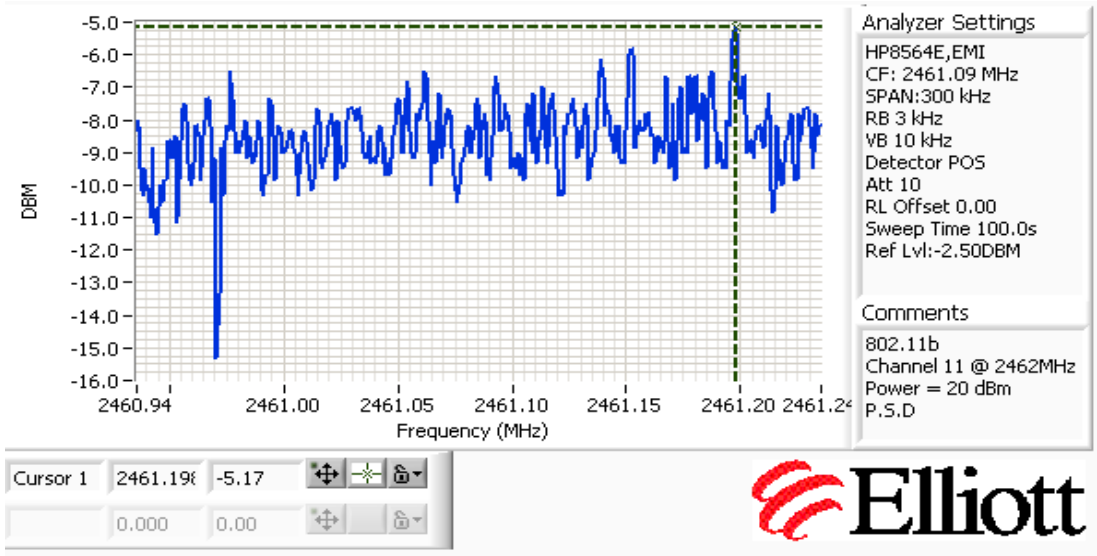
Power Setting	Operating Frequency (MHz)	Freq. @ PPSD	Res BW	P.S.D. (dBm/3kHz)
21	2412	2411.198	3 kHz	-4.88
27	2437	2438.975	3 kHz	-1.37
12	2462	2461.198	3 kHz	-5.20

Note:	Power setting is based on PCDAC of the software and this value is for reference purposes only.
Note 1:	Freq. @ PPSD: Frequency of the Peak Power Spectral Density (PPSD)
Note 2:	Power spectral density measured using RB=3 kHz, VB=10kHz 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.



Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions 802.11g

Test Specifics

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: 2/ 21&23 /2006
Test Engineer: Mehran Birgani
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.

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

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 16 °C
Rel. Humidity: 29 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 26000 MHz Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	50.8dBµV/m (345.5µV/m) @ 2483.5MHz (-3.2dB)
2	6dB Bandwidth	15.247(a)	Pass	Refer to run
3	Output Power	15.247(b)	Pass	26 dBm
4	Power Spectral Density (PSD)	15.247(d)	Pass	Refer to run

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:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1a: Radiated Spurious Emissions, 30 - 26000 MHz. 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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2415.233	101.21	V	-	-	AVG	159	1.1	RB = 1MHz, VB = 10Hz
2415.233	109.79	V	-	-	PK	159	1.1	RB = VB = 1MHz
2419.100	100.04	V	-	-	PK	159	1.1	RB = VB = 100kHz
2417.600	98.83	H	-	-	AVG	206	1.0	RB = 1MHz, VB = 10Hz
2417.600	107.59	H	-	-	PK	206	1.0	RB = VB = 1MHz
2414.667	97.22	H	-	-	PK	206	1.0	RB = VB = 100kHz

Fundamental emission level @ 3m in 100kHz RBW:	97.2	100.0	
Limit for emissions outside of restricted bands:	80.0 dBµV/m		**Limit is -20dBc**

Delta Marker - Peak	46.50 dB	Delta between highest in-band and highest
Delta Marker - Average	51.83 dB	

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.953	49.38	V	54.0	-4.6	AVG	159	1.1	
2389.953	63.29	V	74.0	-10.7	PK	159	1.1	

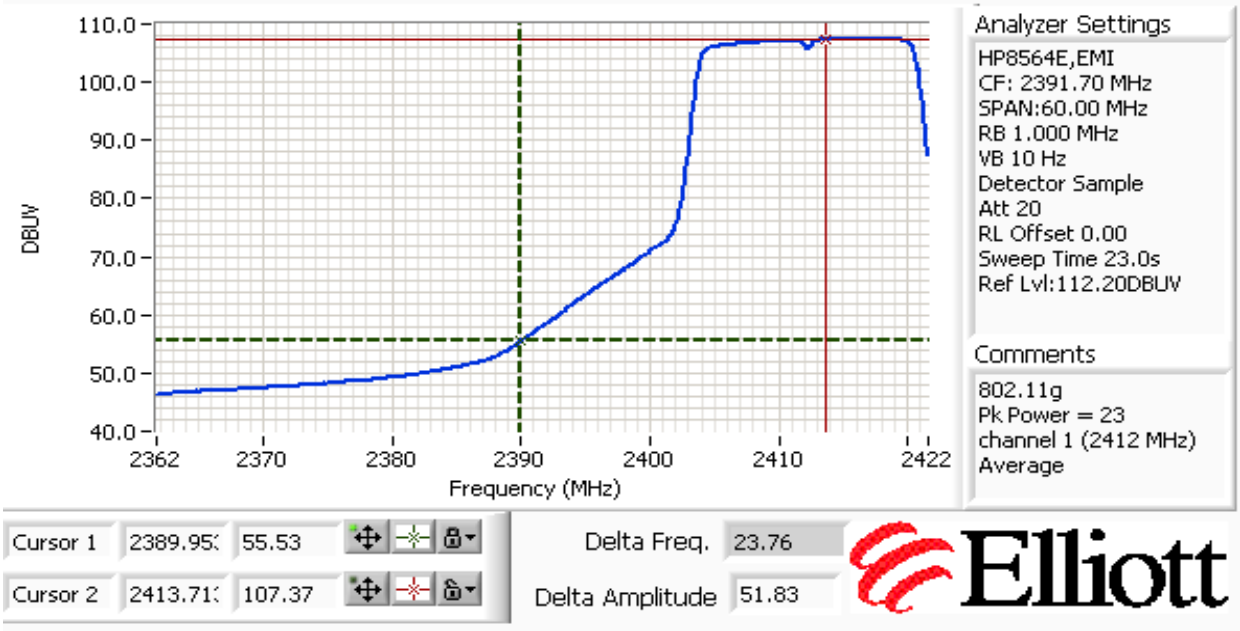
Note 1:	Calculated by subtracting the marker delta values from the fundamental field strength measurements.

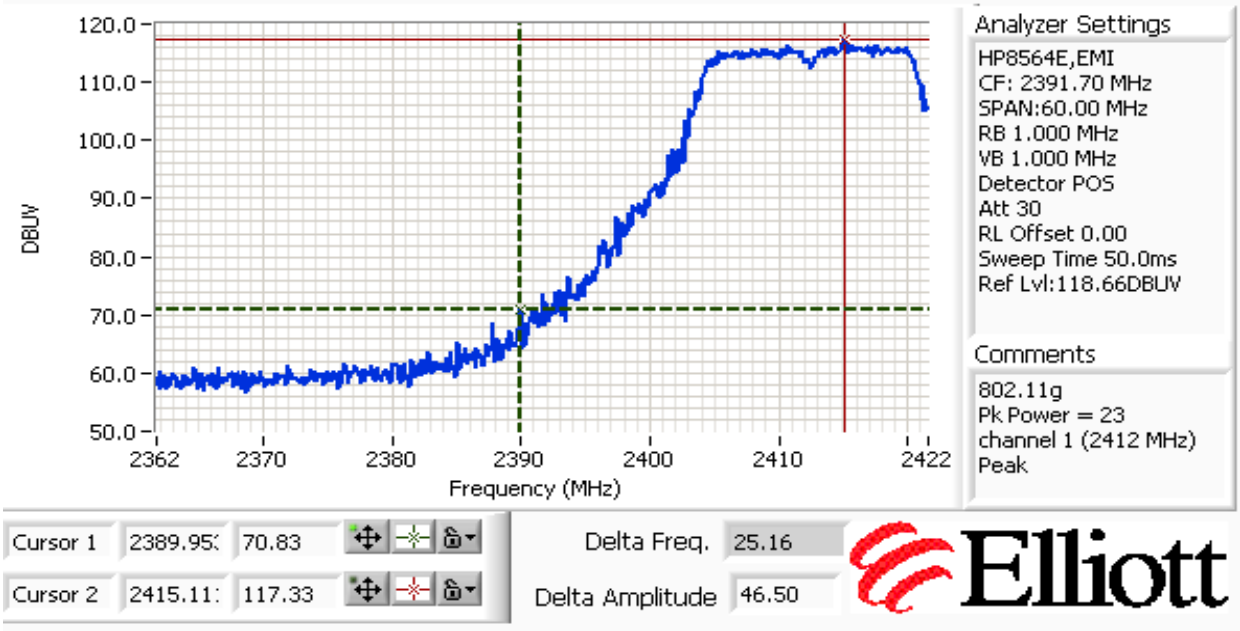
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
12062.32	39.0	V	54.0	-15.1	AVG	0	1.0	
7235.841	35.0	V	54.0	-19.0	AVG	203	1.0	Not Restriced (used restriced limits)
4822.865	31.6	H	54.0	-22.4	AVG	274	1.0	
4826.342	31.6	V	54.0	-22.4	AVG	238	1.0	
12062.32	50.8	V	74.0	-23.2	PK	0	1.0	
7235.841	46.4	V	74.0	-27.6	PK	203	1.0	Not Restriced (used restriced limits)
4826.342	43.7	V	74.0	-30.3	PK	238	1.0	
4822.865	42.9	H	74.0	-31.1	PK	274	1.0	

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.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1b: Radiated Spurious Emissions, 30 - 26000 MHz. Center Channel @ 2437 MHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	97.1	101.3
Limit for emissions outside of restricted bands:	81.3 dBµV/m	

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
7311.270	35.9	V	54.0	-18.2	AVG	0	1.0	
7311.475	34.5	H	54.0	-19.5	AVG	88	1.5	
4875.725	31.8	V	54.0	-22.2	AVG	139	1.0	
4874.455	28.4	H	54.0	-25.7	AVG	309	1.0	
7311.270	47.1	V	74.0	-26.9	PK	0	1.0	
7311.475	45.8	H	74.0	-28.2	PK	88	1.5	
4875.725	43.3	V	74.0	-30.8	PK	139	1.0	
4874.455	41.6	H	74.0	-32.4	PK	309	1.0	

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.

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1c: Radiated Spurious Emissions, 30 - 26000 MHz. High Channel @ 2462 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	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2467.134	99.10	V	-	-	AVG	182	1.1	RB = 1MHz, VB = 10Hz
2467.134	108.08	V	-	-	PK	182	1.1	RB = VB = 1MHz
2464.634	98.75	V	-	-	PK	182	1.1	RB = VB = 100kHz
2468.834	97.91	H	-	-	AVG	270	2.0	RB = 1MHz, VB = 10Hz
2468.834	106.87	H	-	-	PK	270	2.0	RB = VB = 1MHz
2465.300	97.76	H	-	-	PK	270	2.0	RB = VB = 100kHz

Fundamental emission level @ 3m in 100kHz RBW:	97.8	98.8	
Limit for emissions outside of restricted bands:	78.8 dBµV/m		**Limit is -20dBc**

Delta Marker - Peak	44.33 dB	Delta between highest in-band and highest
Delta Marker - Average	48.33 dB	

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.547	50.77	V	54.0	-3.2	AVG	182	1.1	
2483.647	63.75	V	74.0	-10.3	PK	182	1.1	

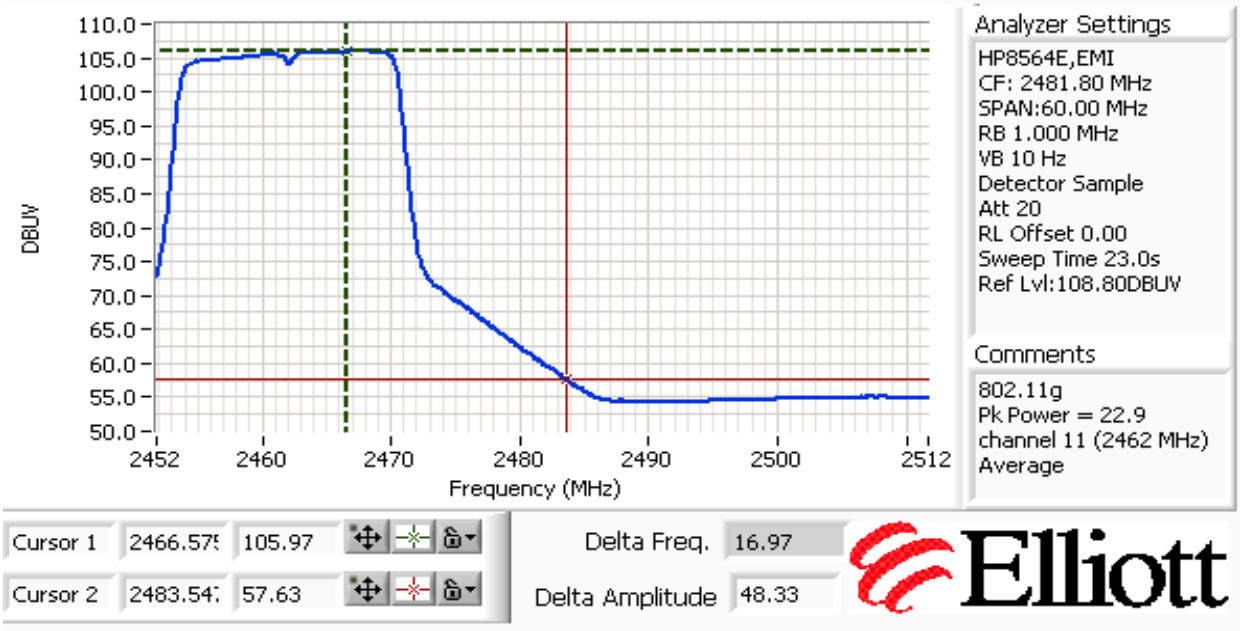
Note 1: Calculated by subtracting the marker delta values from the fundamental field strength measurements.

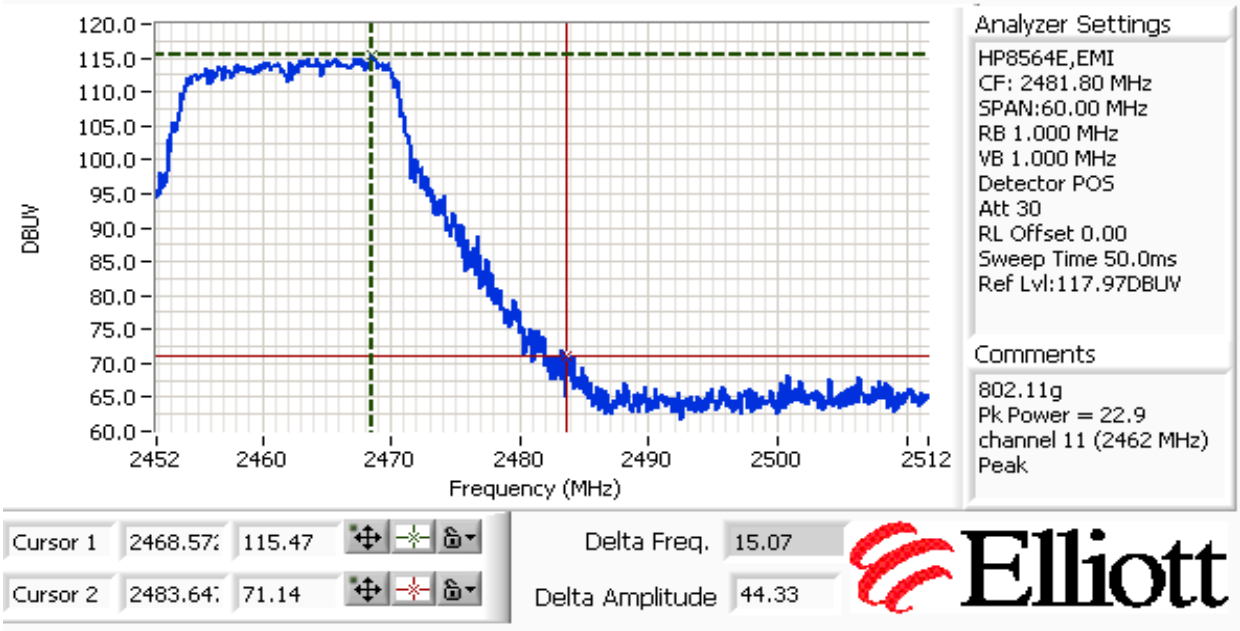
Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4921.542	32.1	V	54.0	-21.9	AVG	131	1.0	
4921.542	43.5	V	74.0	-30.5	PK	131	1.0	
7385.550	35.8	V	54.0	-18.2	AVG	36	1.0	
7385.550	46.8	V	74.0	-27.2	PK	36	1.0	
4922.765	31.8	H	54.0	-22.2	AVG	304	1.0	
4922.765	43.3	H	74.0	-30.7	PK	304	1.0	
7385.645	35.7	H	54.0	-18.3	AVG	167	1.0	
7385.645	47.9	H	74.0	-26.1	PK	167	1.0	

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.

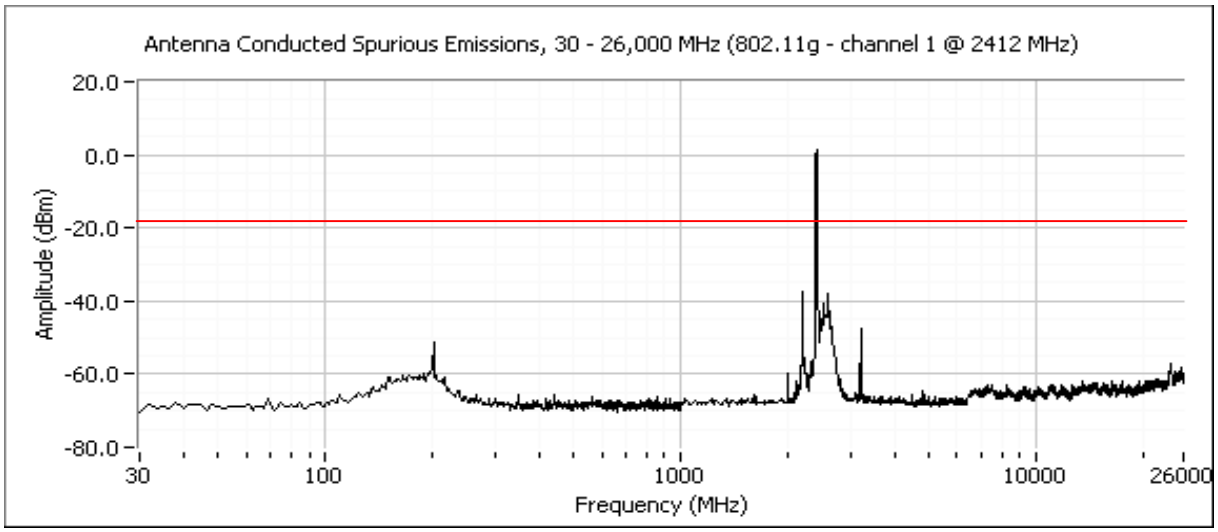
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

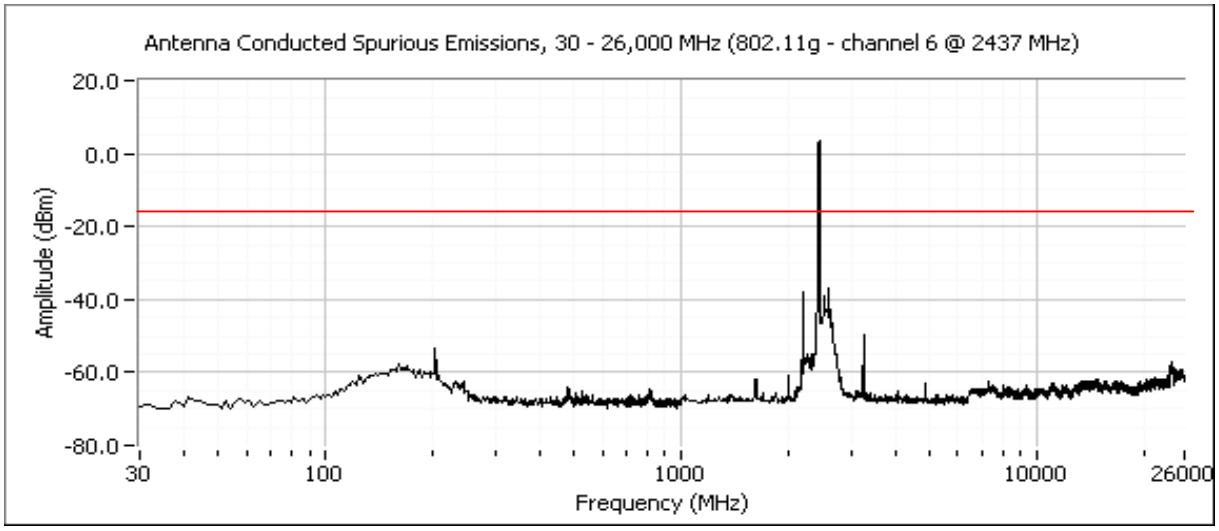




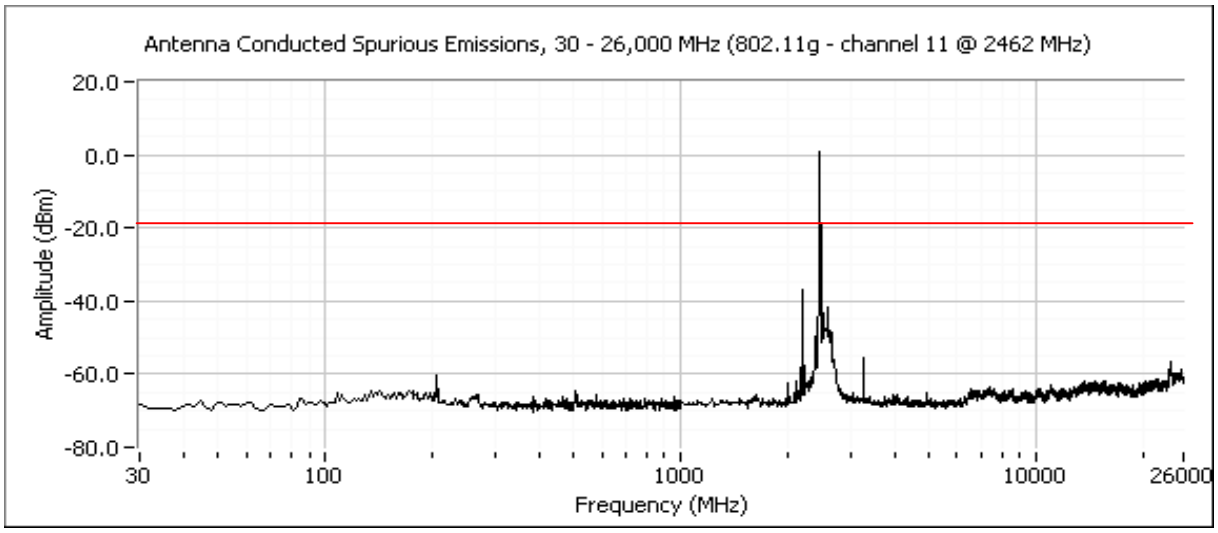
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #1d: Antenna Conducted Spurious Emissions, 30 - 26000 MHz.
Refer to plots below. Scans made using RBW = VBW = 100 kHz with the limit line set at 20dB below the highest in-band signal level.





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

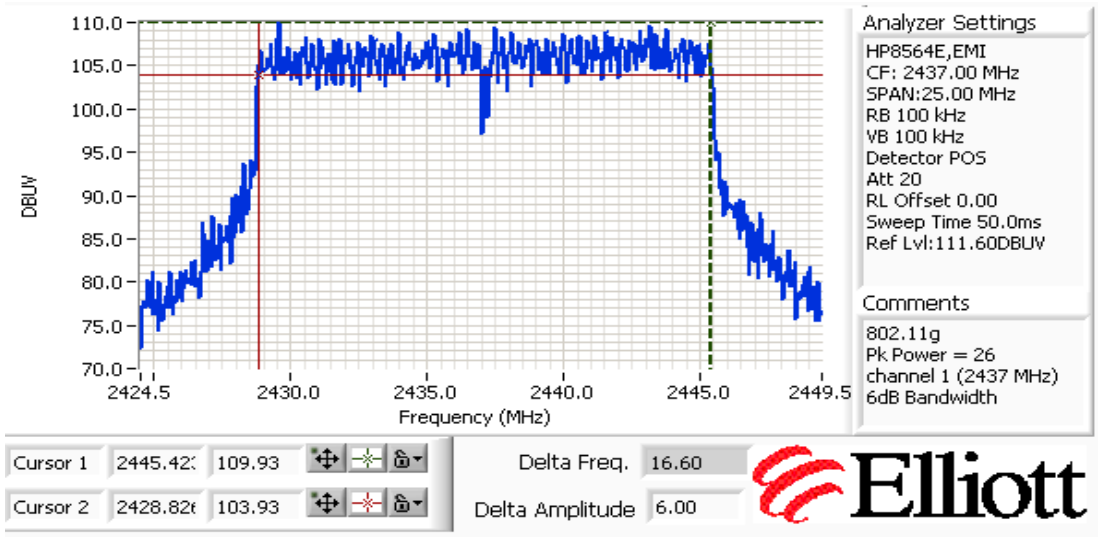


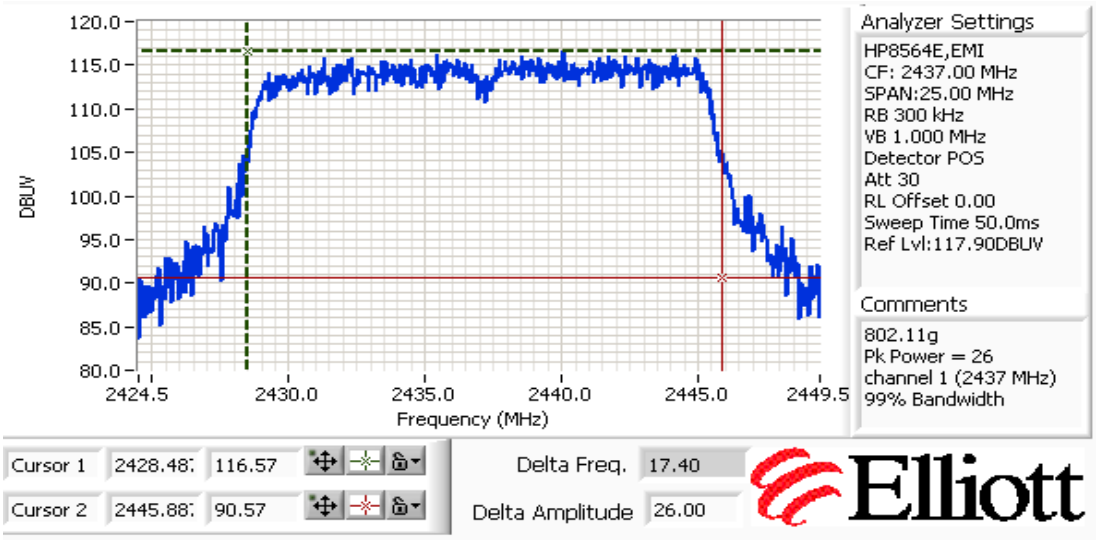
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #2: Signal Bandwidth

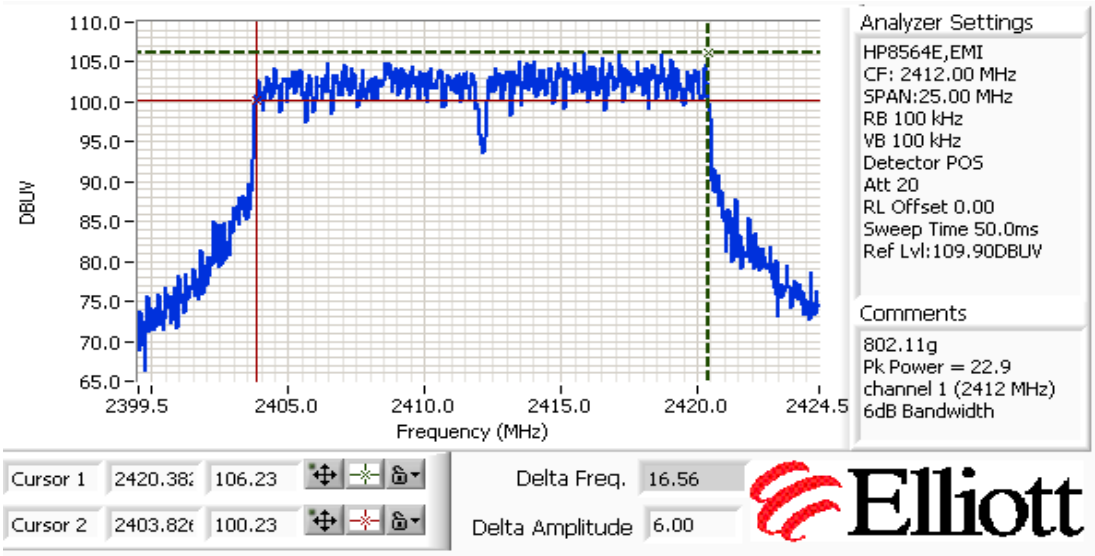
Power Setting	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Resolution Bandwidth	99% Signal Bandwidth
20	2412	100 kHz	16.6	300 kHz	17.4
11	2437	100 kHz	16.6	300 kHz	17.4
23	2462	100 kHz	16.5	300 kHz	17.1

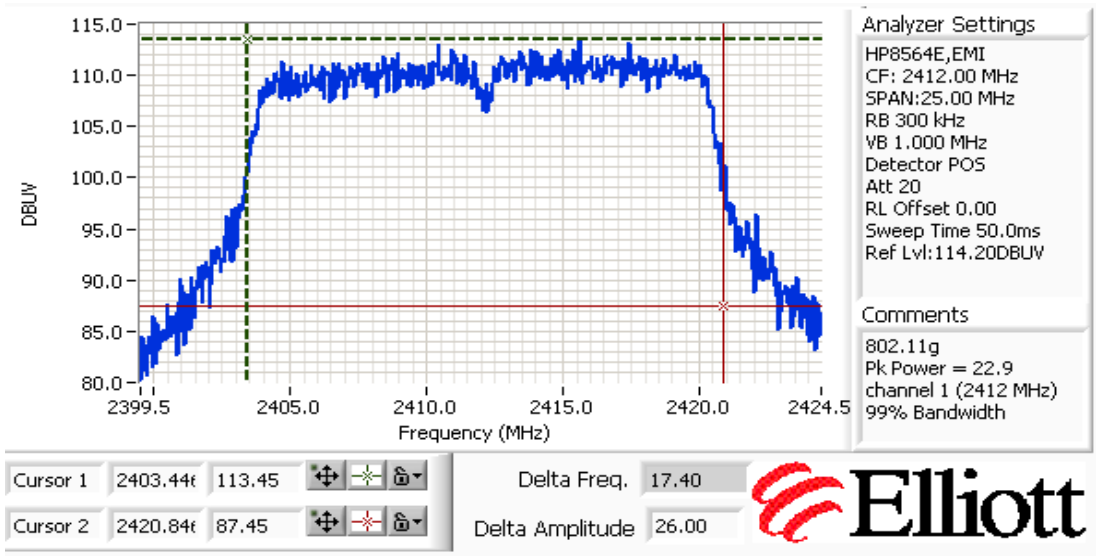
Note: Power setting is based on PCDAC of the software and this value is for reference purposes only.



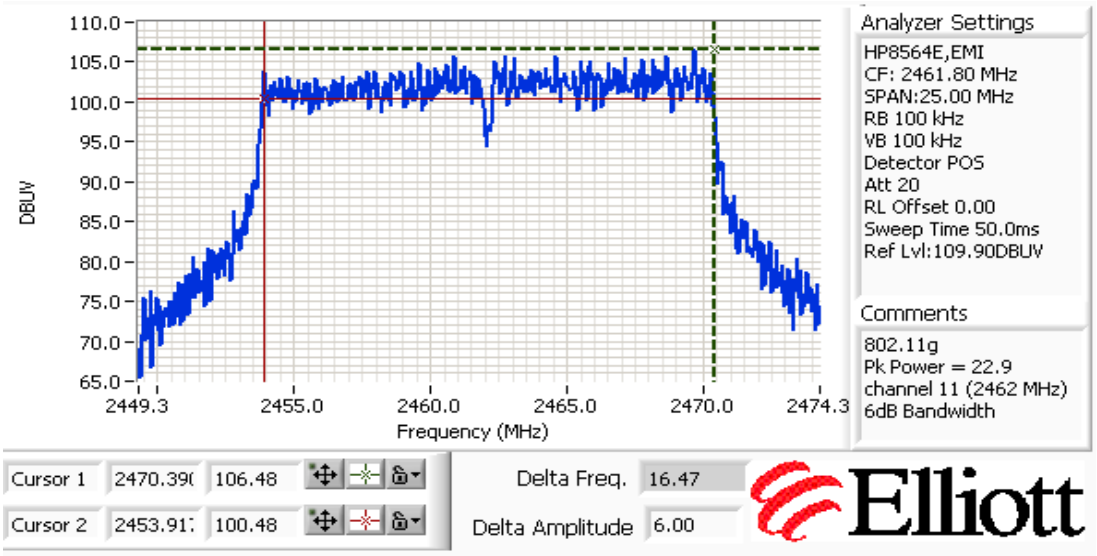


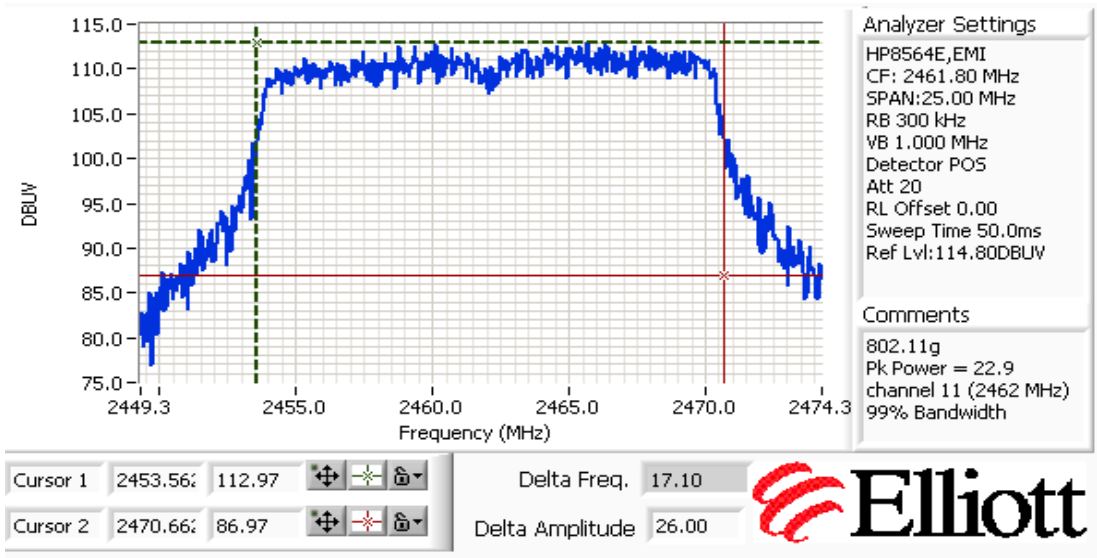
Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A

Run #3: Output Power

Maximum antenna gain: 1 dBi

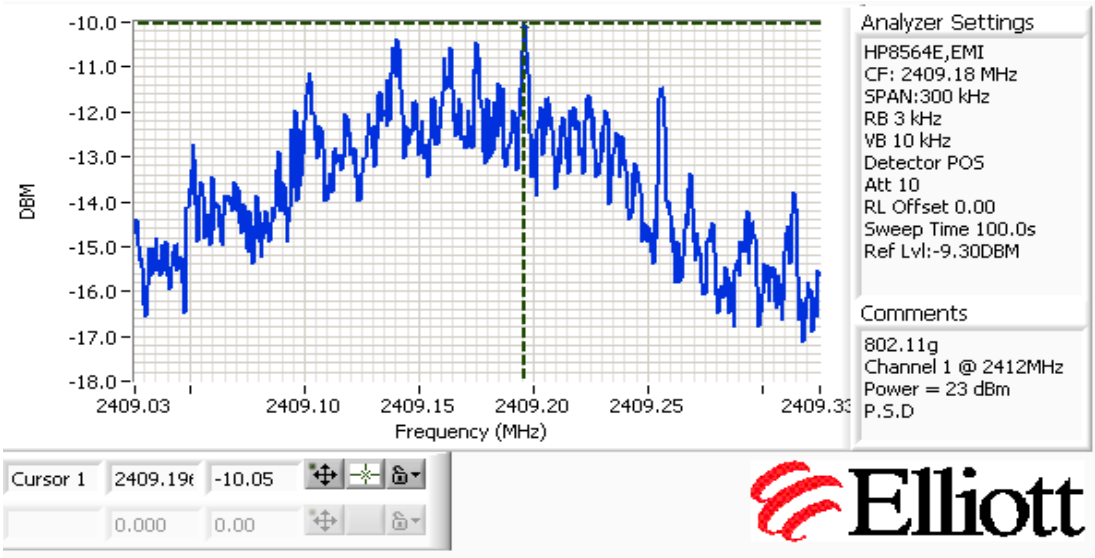
Power Setting	Frequency (MHz)	Res BW MHz	Output Power Note 1 dBm	Output Power Note 1 W	EIRP W	Average Power Note 2 dBm	Average Power Note 2 W
20	2412		23	0.200	0.251		
11	2437		26	0.398	0.501		
23	2462		23	0.200	0.251		

Note:	Power setting is based on PCDAC of the software and this value is for reference purposes only.
Note 1:	Output power measured using a peak power meter

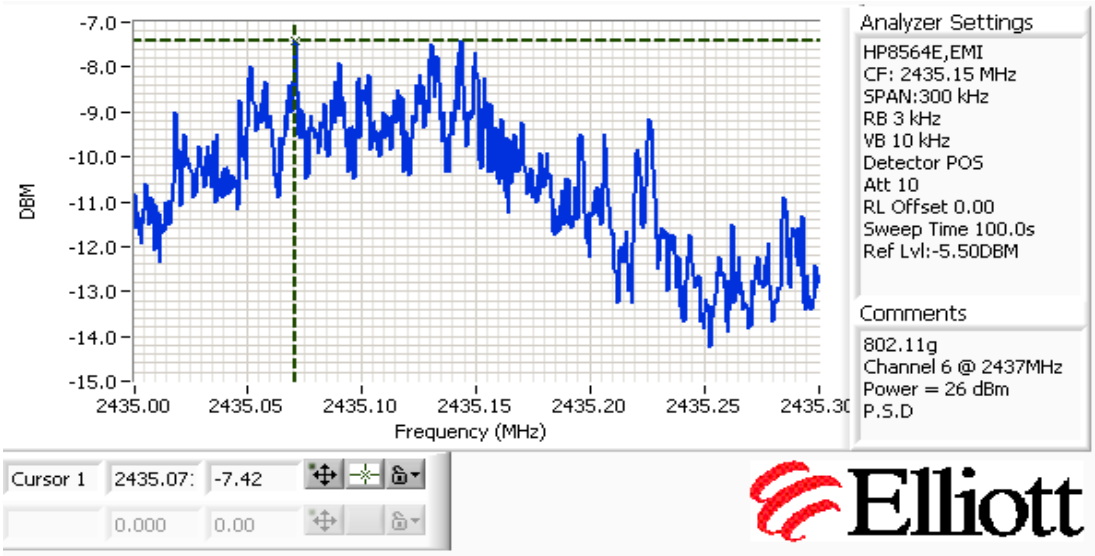
Run #4: Power Spectral Density

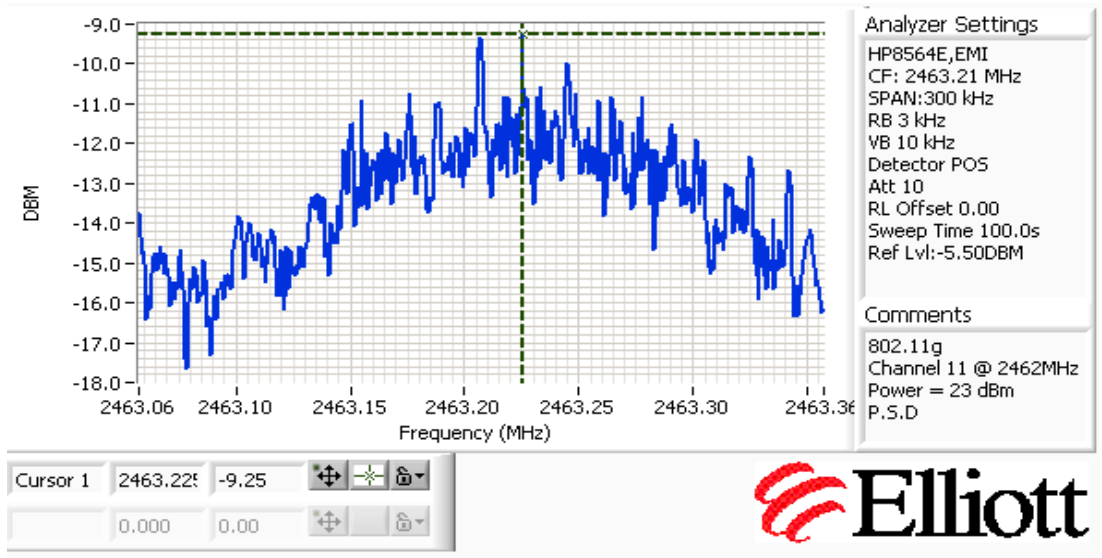
Power Setting	Operating Frequency (MHz)	Freq. @ PPSD	Res BW	P.S.D. (dBm/3kHz)
20	2412	2409.196	3 kHz	-10.05
11	2437	2435.072	3 kHz	-7.42
23	2462	2463.225	3 kHz	-9.25

Note:	Power setting is based on PCDAC of the software and this value is for reference purposes only.
Note 1:	Freq. @ PPSD: Frequency of the Peak Power Spectral Density (PPSD)
Note 2:	Power spectral density measured using RB=3 kHz, VB=10kHz 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.



Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	N/A





Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	B

Radiated Emissions

Test Specifics

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: 2/24/2006
Test Engineer: Jay Dickinson
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.

The test distance and extrapolation factor (if used) are detailed under each run description.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Ambient Conditions:

Temperature: 15 °C
Rel. Humidity: 58 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 13,000 MHz, Receiver Emissions	IC RSS-210	Pass	35.4dBµV/m (58.7µV/m) @ 12260.4MHz (-18.6dB)

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.

Elliott

EMC Test Data

Client:	2 Wire	Job Number:	J62836
Model:	3800HGV-B	T-Log Number:	T62931
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC Part 15.247/RSS 210, EN55022	Class:	B

Run #1: Rx Spurious Emissions Middle Channel 2437 MHz.

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
4800-14000 MHz	3	3	0

Frequency	Level	Pol	RSS-210 Rx		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
12260.360	35.4	H	54.0	-18.6	AVG	1	1.0	
12259.530	35.4	V	54.0	-18.6	AVG	1	1.0	
7336.485	33.9	H	54.0	-20.1	AVG	1	1.0	
7336.060	33.8	V	54.0	-20.2	AVG	1	1.0	
4872.995	29.7	V	54.0	-24.3	AVG	0	1.0	
4873.665	29.6	H	54.0	-24.4	AVG	0	1.0	
12259.530	47.2	V	74.0	-26.8	PK	1	1.0	
12260.360	47.0	H	74.0	-27.0	PK	1	1.0	
7336.485	45.2	H	74.0	-28.8	PK	1	1.0	
7336.060	44.6	V	74.0	-29.4	PK	1	1.0	
4873.665	41.6	H	74.0	-32.4	PK	0	1.0	
4872.995	41.1	V	74.0	-32.9	PK	0	1.0	

EXHIBIT 3: Photographs of Test Configurations

4 Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs of 2Wire, Inc. Model RG3800HGV-00Construction

5 Pages

EXHIBIT 6: Operator's Manual for 2Wire, Inc. Model RG3800HGV-00

82 Pages

EXHIBIT 7: Block Diagram of 2Wire, Inc. Model RG3800HGV-00

1 Page

EXHIBIT 8: Schematic Diagrams for 2Wire, Inc. Model RG3800HGV-00

55 Pages

EXHIBIT 9: Theory of Operation for 2Wire, Inc. Model RG3800HGV-00

2 Pages

EXHIBIT 10: RF Exposure Information

2 Pages