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Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart C (15.247) DTS Specifications and Industry Canada RSS 210 Issue 5 for an Intentional Radiator on the 2Wire, Inc. Model: 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

FCC ID:	PGR2WATHG01
UPN:	3439-TWATHG01
GRANTEE:	2Wire, Inc. 1704 Automation Parkway San Jose, CA 95131
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	March 25, 2005
FINAL TEST DATE:	March 3, 2005
AUTHORIZED SIGNATORY:	Juan Martinez Senior EMC Engineer

ACCREDITED
2016-01

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:

1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

Manufacturer:

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

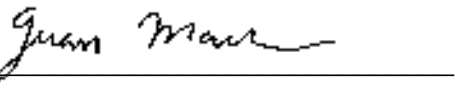
Tested to applicable standards:

RSS-210, Issue 5, November 2001 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15.247 (DTS)

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 **SV1** Dated July 30, 2001

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 detailed in section 5.3 of RSS-210, Issue 5); and that the equipment performed in accordance with the data submitted in this report.



Signature	
Name	Juan Martinez
Title	Senior EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	March 25, 2005

Maintenance of compliance with the above standards 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.).

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

SCOPE

An electromagnetic emissions test has been performed on the 2Wire, Inc. model 1801HG Gateway pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and RSS-210 Issue 5 for licence-exempt low power devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4:2003 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC 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 1801HG Gateway and therefore apply only to the tested sample. The sample was selected and prepared by Jeremy Muir of 2Wire, Inc.

Testing performed on the 2Wire, Inc. model 1801HG Gateway covered the following models: 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00. The wireless circuitry is identical in all models.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules and RSS-210 Issue 5 for license-exempt low power devices for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their 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.

SUMMARY OF RESULTS

FCC Part 15 Section	RSS 210 Section	Description	Measured Value	Comments	Result
15.247(a)	6.2.2(o)(b)	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	6.2.2(o)(b)	6dB Bandwidth	16.8 MHz	Minimum allowed is 500kHz	Complies
	RSP 100	99% Bandwidth	16.8 MHz	For information only	Complies
15.247 (b) (3)	6.2.2(o)(b)	Output Power, 2400 - 2483.5 MHz	26 dBm (0.398 Watts) EIRP = 0.631 W	Multi-point applications: Maximum permitted is 1Watt, with EIRP limited to 4 Watts.	Complies
15.247(d)	6.2.2(o)(b)	Power Spectral Density	-0.12 dBm / MHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	6.2.2(o)(e1)	Antenna Port Spurious Emissions – 30MHz – 25 GHz	All spurious emissions < -20dBc	All spurious emissions < -20dBc.	Complies
15.247(c) / 15.209		Radiated Spurious Emissions – 30MHz – 25 GHz	53.8 dBuV/m @ 7311 MHz (-0.2 dB)	Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -20dBc	Complies
15.207		AC Conducted Emissions	35.4 dBuV @ 20.199 MHz (-14.6 dB)		Complies
	6.6	AC Conducted Emissions	40.8 dBuV @ 20.199 MHz (-7.2 dB)		Complies
15.247 (b) (5)		RF Exposure Requirements	MPE calculation		Complies
15.203		RF Connector	Permanently attached	-	Complies

EIRP calculated using antenna gain of dBi (6) for the highest EIRP point-to-multipoint system.

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 are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

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 1801HG Gateway is an ADSL wireless router which is designed to route ADSL to the home network. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 0.2 Amps.

The sample was received on March 3, 2005 and tested on March 3, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire, Inc	1801HG Gateway	ADSL Wireless router	985211000291	PGR2WATHG01

ENCLOSURE

The EUT enclosure is primarily constructed of ABS Plastic with a fabricated sheet steel shield internal to the unit. It measures approximately 22 cm wide by 6 cm deep by 210 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	-	DoC
Dell	AA20031	AC Adapter	-	-
Epson	Stylus Photo	Printer	ADA0013241	BKMFBP952A

No remote support equipment was used for emissions testing:

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)
Ethernet	Laptop	CAT 5	Unshielded	3
Ethernet (x4)	Hub	CAT 5	Unshielded	3
USB	laptop	Multiwire	Shielded	1
AC in	AC Mains	2 wire	Unshielded	1.5

EUT OPERATION DURING TESTING

The EUT was transmitting continuously on either the low, 2412MHz, the middle, 2437MHz, or the high, 2462MHz, channels

ANTENNA REQUIREMENTS

The antenna port is permanently attached, which meets the requirements of 15.203.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on March 3, 2005at the Elliott Laboratories Open Area Test Site #1 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 5 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications Commission.

The FCC 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 FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. 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. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines.

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.

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.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and 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

A power meter and peak power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

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.

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 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 FCC requires 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.

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.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements 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.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in temrs of Watts, milliwatts or dBm. 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.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter at a distance of 3m from the equipment under test:

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

where P is the eirp (Watts)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

FCC 15.407 (a)and RSS 210 (o) OUTPUT POWER LIMITS

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 Watts (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watts (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watts (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.

RSS 210 (o) AND FCC 15.247 SPURIOUS RADIATED EMISSIONS LIMITS

T limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands detailed in Part 15.205 and for all spurious emissions from the receiver are:

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

All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level.

FCC 15.205 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205.

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

RSS-210 SECTION 6.6 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in Industry Canada RSS-210 section 6.6.

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4:2003 , 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

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, 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

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

EXHIBIT 1: Test Equipment Calibration Data

2 Pages

Radio Antenna Port (Power and Spurious Emissions), 04-Mar-05
Engineer: Chris Byleckie

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Fremont	8564E (84125C)	1393	26-Oct-05

Radiated Emissions, 30 - 26,500 MHz, 03-Mar-05
Engineer: Chris Byleckie

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9KHz-26.5GHz, non programmable	8563E	284	15-Mar-05
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	08-Nov-05
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	13-Jan-06
Hewlett Packard	High Pass filter, 3.5GHz	P/N 84300-80038	1157	12-Apr-05

Radio Antenna Port (Power and Spurious Emissions), 04-Mar-05
Engineer: Chris Byleckie

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 40 GHz, Fremont	8564E (84125C)	1393	26-Oct-05

Conducted Emissions - AC Power Ports, 17-Mar-05
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	01-Sep-05
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-Mar-05
Solar Electronics	LISN	8028-50-TS-24-BNC support	904	10-Aug-05
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	1316	31-Jan-06
Elliott Laboratories	LISN-2 + 2 Fischer (Solar 8028 + 6512 Cap)	LISN-1	198	19-Aug-05

Conducted Emissions - AC Power Ports, 23-Mar-05
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	LISN-2 + 2 Fischer (Solar 8028 + 6512 Cap)	LISN-1	198	19-Aug-05
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	01-Sep-05
Solar Electronics	LISN	8028-50-TS-24-BNC support	904	10-Aug-05
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	1316	31-Jan-06

Conducted Emissions - AC Power and Telecommunications Ports, 28-Mar-05
Engineer: Peter Sales

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-Apr-05
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	11-Feb-06
Solar Electronics	LISN	8028-50-TS-24-BNC support	904	10-Aug-05
Fischer Custom Comm.	LISN, Freq. 0.9 -30 MHz,16 Amp	FCC-LISN-50/250-16-2	1079	01-Jul-05
Fischer Custom Communication	ISN, 9 KHz -30 MHz, sunnyvale	FCC-TLISN-T4	1263	11-Apr-05
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12-Jan-06

Radiated Emissions, 30 - 2,000 MHz, 28-Mar-05
Engineer: Peter Sales

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-Apr-05
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	08-Nov-05
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	09-Jul-05
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	13-Jan-06
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12-Jan-06
EMCO (ETS-Lindgren)	Log Periodic Antenna, 0.2-2 GHz	3148	1595	01-Jun-05

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T59214 6 Pages
T59215 25 Pages
T59215 plots 6 Pages

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

2Wire

Model

1801HG Gateway with DVE DSA-12W-05AUS1 PS

Date of Last Test: 3/31/2005

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is an ADSL wireless router which is designed to route ADSL to the home network. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 0.2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire, Inc	1801HG Gateway	ADSL Wireless router	985211000291	PGR2WATHG01

Other EUT Details

Testing performed on the 2Wire, Inc. model 1801HG Gateway covered the following models:
1701HG Gateway, 171HG Gateway, RG1801HG-01, RG1701HG-01 and RG171HG-01. The wireless circuitry is identical in all models.

EUT Antenna

The antenna is integral to the device.

EUT Enclosure

The EUT enclosure is primarily constructed of ABS Plastic with a fabricated sheet steel shield internal to the unit. It measures approximately 22 cm wide by 6 cm deep by 210 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.

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	-	DoC
Dell	AA20031	AC Adapter	-	-
Epson	Stylus Photo	Printer	ADA0013241	BKMFBP952A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet	Laptop	CAT 5	Unshielded	3
Ethernet (x4)	Hub	CAT 5	Unshielded	3
USB	laptop	Multiwire	Shielded	1
AC in	AC Mains	2 wire	Unshielded	1.5

EUT Operation During Emissions Tests

The ETU was transmitting continously on either the low, 2412MHz, the middle, 2437MHz, or the high ,2462MHz, channels and Remote support laptops was exercising/pinping the other ports.

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	B

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: 3/28/2005
Test Engineer: Pete Sales
Test Location: SVOATS #1

Config. Used: 1
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. Remote support equipment was located approximately 30 meters from the test area. All I/O connections were routed overhead.

Ambient Conditions:

Temperature: 58 °C
Rel. Humidity: 53 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	EN 55022 B	Pass	35.4dBµV @ 20.199MHz (-14.6dB)
1	CE, AC Power,120V/60Hz	RSS-210	Pass	40.8dBuV @ 20.199MHz (-7.2dB)

Modifications Made During Testing:

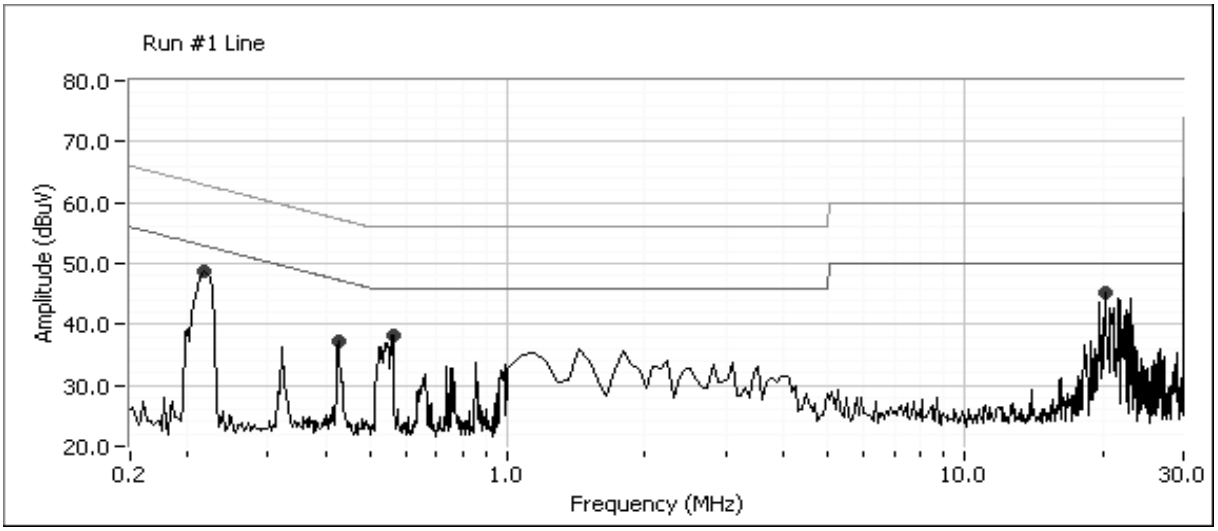
No modifications were made to the EUT during testing

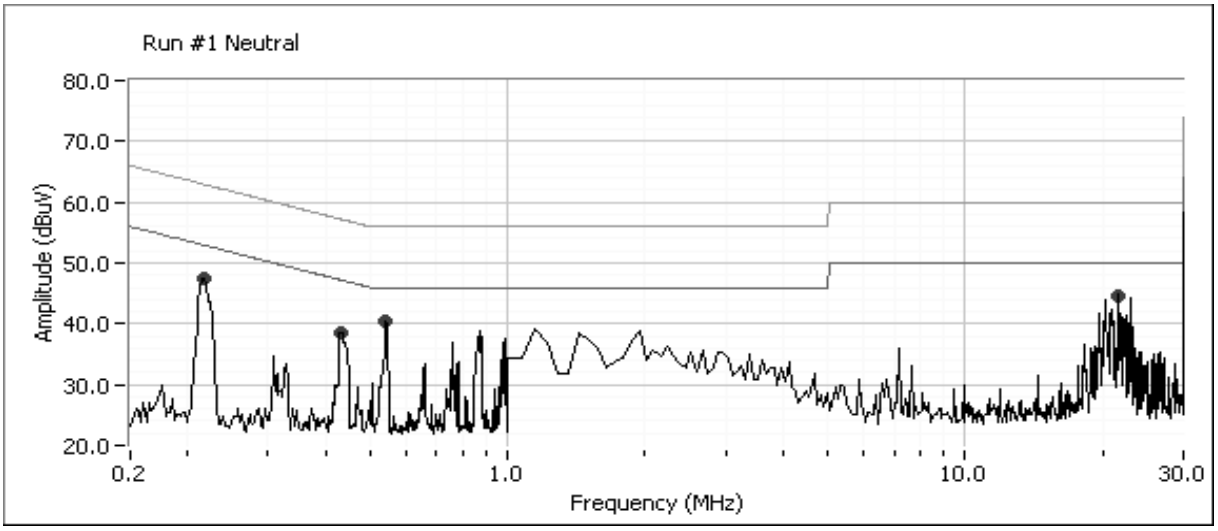
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
Model S/N# DSA-12W-05 AUS 1 05109





Elliott

EMC Test Data

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway with DVE DSA-12W-05AUS1 PS	T-Log Number:	T59214
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
20.199	35.4	Neutral	50.0	-14.6	Average	
20.199	35.3	Line	50.0	-14.7	Average	
0.215	47.3	Line	63.0	-15.7	QP	
0.215	36.9	Line	53.0	-16.1	Average	
0.216	36.1	Neutral	53.0	-16.9	Average	
0.216	45.7	Neutral	63.0	-17.3	QP	
0.543	28.3	Neutral	46.0	-17.7	Average	
0.543	38.2	Neutral	56.0	-17.8	QP	
20.199	40.8	Line	60.0	-19.2	QP	
20.199	39.7	Neutral	60.0	-20.3	QP	
0.536	35.5	Line	56.0	-20.5	QP	
0.536	24.8	Line	46.0	-21.2	Average	

Frequency	Level	AC	RSS-210		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
20.199	35.4	Neutral	48.0	-12.6	Average	
20.199	35.3	Line	48.0	-12.7	Average	
0.543	28.3	Neutral	48.0	-19.7	Average	
0.543	38.2	Neutral	48.0	-9.8	QP	
20.199	40.8	Line	48.0	-7.2	QP	
20.199	39.7	Neutral	48.0	-8.3	QP	
0.536	35.5	Line	48.0	-12.5	QP	
0.536	24.8	Line	48.0	-23.2	Average	

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

2Wire

Model

1801HG Gateway Radio

Date of Last Test: 4/15/2005

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is an ADSL wireless router which is designed to route ADSL to the home network. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 0.2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire, Inc	1801HG Gateway	ADSL Wireless router	985211000291	PGR2WATHG01

Other EUT Details

Testing performed on the 2Wire, Inc. model 1801HG Gateway covered the following models:
1701HG Gateway, 171HG Gateway, RG1801HG-01, RG1701HG-01 and RG171HG-01. The wireless circuitry is identical in all models.

EUT Antenna

The antenna is integral to the device

EUT Enclosure

The EUT enclosure is primarily constructed of ABS Plastic with a fabricated sheet steel shield internal to the unit. It measures approximately 22 cm wide by 6 cm deep by 210 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:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247 / EN300328	Class:	B
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	-	DoC
Dell	AA20031	AC Adapter	-	-
Epson	Stylus Photo	Printer	ADA0013241	BKMFBP952A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet	Laptop	CAT 5	Unshielded	3
Ethernet (x4)	Hub	CAT 5	Unshielded	3
USB	laptop	Multiwire	Shielded	1
AC in	AC Mains	2 wire	Unshielded	1.5

EUT Operation During Emissions Tests

The EUT was transmitting continuously on either the low, 2412MHz, the middle, 2437MHz, or the high, 2462MHz, channels

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions

Test Specifics

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

Date of Test: 3/3/2005
Test Engineer: Chris Byleckie
Test Location: SVOATS #1

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 or routed in overhead in the GR-1089 test configuration.

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: 15 °C
Rel. Humidity: 80 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 1000 - 26500 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.8dBuV/m (489.8 uV/m) @ 7311Mhz (-0.2dB)
2	6dB Bandwidth	15.247(a)	Pass	12.83 MHz
3	Output Power	15.247(b)	Pass	25.9 dBm
4	Power Spectral Density (PSD)	15.247(d)	Pass	-0.12 dBm

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

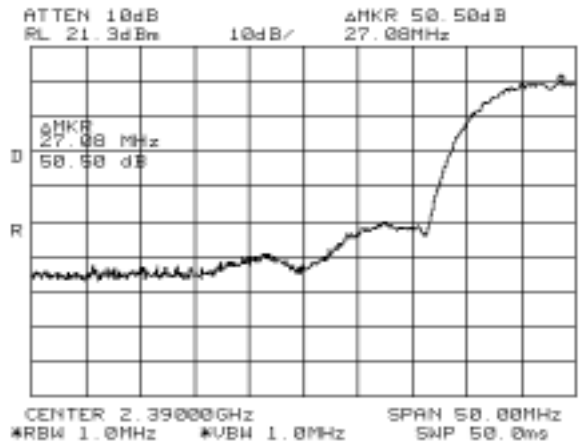
No deviations were made from the requirements of the standard.

EMC Test Data

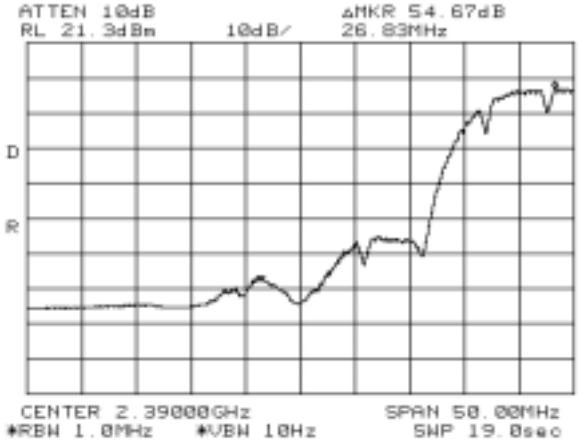
Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1a: Radiated Spurious Emissions, 1000 - 18000 MHz. Low Channel @ 2412 MHz
Power setting 15.0

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	108.54	106.18	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	105.92	103.16	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	50.5 dB		
Delta Marker - Average	54.67 dB		
Calculated Band-Edge Measurement:	58.04 dBuV/m		Peak
Calculated Band-Edge Measurement:	51.25 dBuV/m		Average



Peak



Average

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.00	62.3	h	74.0	-11.7	Pk	304	1.4	
4824.00	49.9	h	54.0	-4.1	Avg	304	1.4	
4824.00	63.8	v	74.0	-10.2	Pk	0	1.3	
4824.00	51.0	v	54.0	-3.0	Avg	0	1.3	
12060.00	50.8	v	74.0	-23.2	Pk	0	1.0	Noise floor
12060.00	39.6	v	54.0	-14.4	Avg	0	1.0	Noise floor
12060.00	50.2	h	74.0	-23.8	Pk	0	1.0	Noise floor
12060.00	38.8	h	54.0	-15.2	Avg	0	1.0	Noise floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

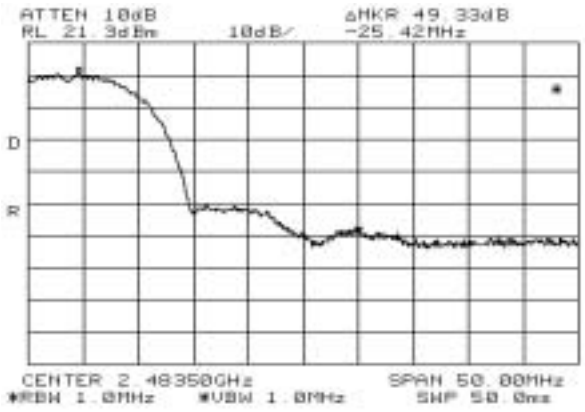
Run #1b: Radiated Spurious Emissions, 1000 - 26500 MHz. Center Channel @ 2437 MHz
Power setting 20.0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.000	59.5	v	74.0	-14.5	Pk	325	1.3	
4874.000	45.7	v	54.0	-8.3	Avg	325	1.3	
7311.000	63.5	v	74.0	-10.5	Pk	281	1.3	
7311.000	53.8	v	54.0	-0.2	Avg	281	1.3	
4874.000	61.4	h	74.0	-12.6	Pk	245	1.2	
4874.000	48.6	h	54.0	-5.4	Avg	245	1.2	
7311.000	58.0	h	74.0	-16.0	Pk	309	1.3	
7311.000	48.8	h	54.0	-5.3	Avg	309	1.3	

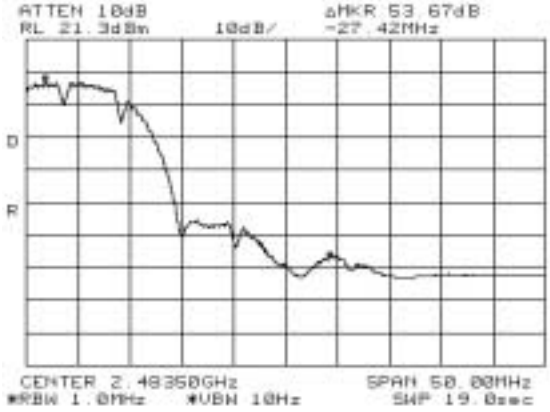
Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1c: Radiated Spurious Emissions, 1000 - 26500 MHz. High Channel @ 2462 MHz
Power setting 16

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	107.04	106.96	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	103.91	103.78	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	49.33 dB		
Delta Marker - Average	53.67 dB		
Calculated Band-Edge Measurement:	57.71 dBuV/m		Peak
Calculated Band-Edge Measurement:	50.24 dBuV/m		Average



Peak



Average

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.00	60.9	h	74.0	-13.1	Pk	285	1.1	
4924.00	48.0	h	54.0	-6.0	Avg	285	1.1	
7386.00	58.0	h	74.0	-16.0	Pk	320	1.3	
7386.00	48.6	h	54.0	-5.4	Avg	320	1.3	
4924.00	60.4	v	74.0	-13.6	Pk	57	1.2	
4924.00	47.3	v	54.0	-6.7	Avg	57	1.2	
7386.00	60.3	v	74.0	-13.7	Pk	331	1.2	
7386.00	50.4	v	54.0	-3.6	Avg	331	1.2	

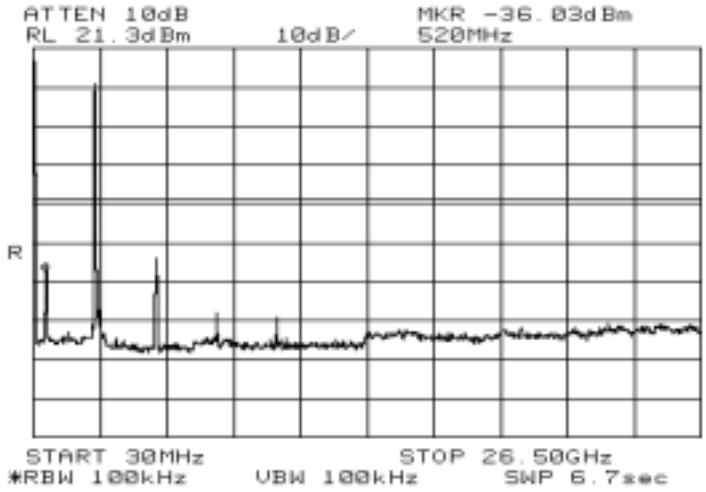
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

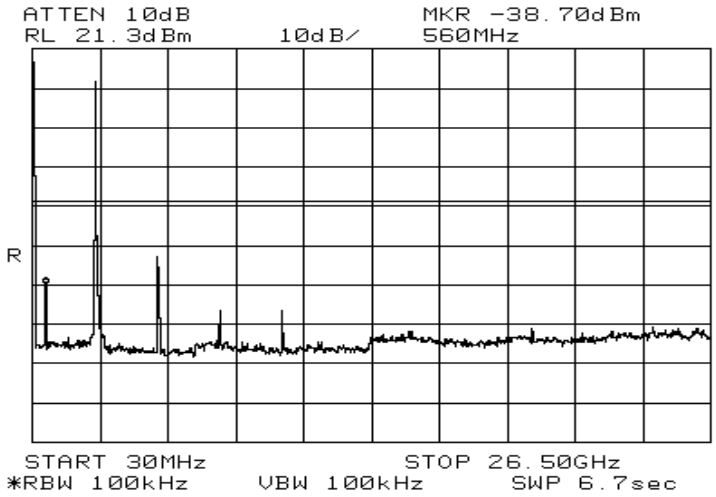
Run #1d: Antenna Conducted Spurious Emissions, 30 - ??? MHz.

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.

Channel 1 2412MHz



Channel 6 2437MHz

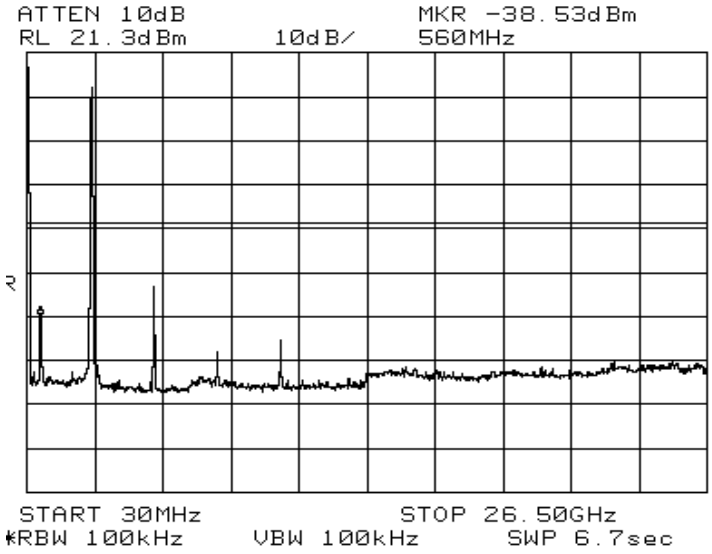


Run #1d conmtinued on next apge

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1d continued

Channel 11 2462MHz



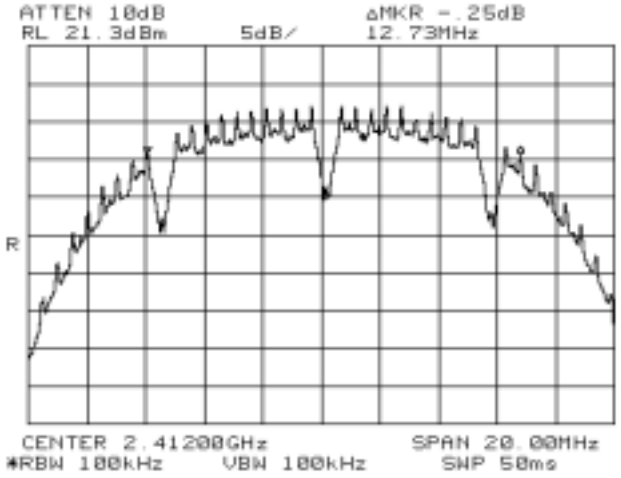
LO 2/3 carrier frequency

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

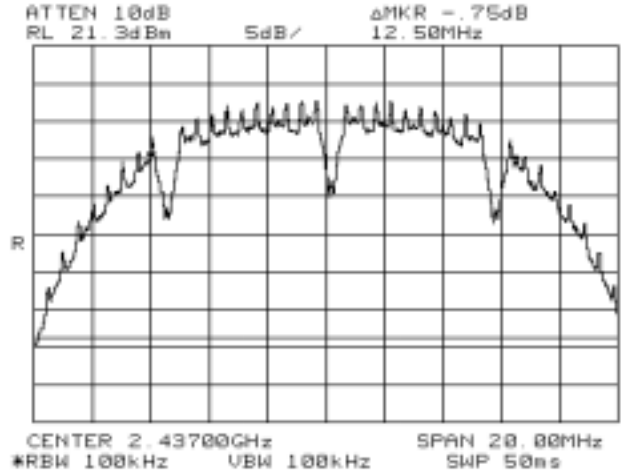
Run #2: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	99% Signal Bandwidth
Low	2412	100kHz	12.73 MHz	15.77 MHz
Mid	2437	100kHz	12.50 MHz	15.77 MHz
High	2462	100kHz	12.83 MHz	15.77 MHz

Channel 1 2412MHz



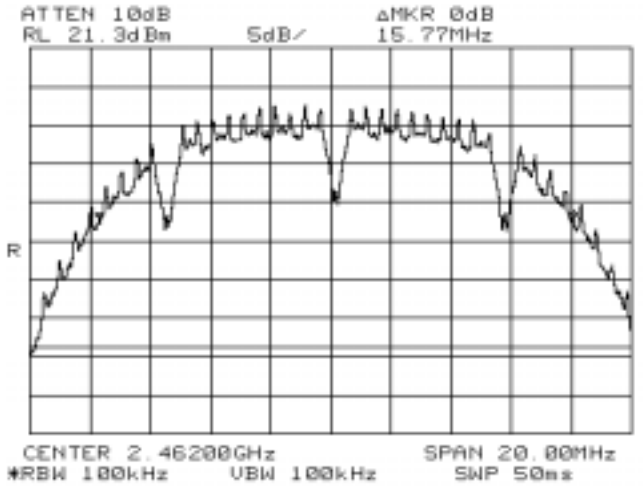
Channel 6 2437MHz



Run #2 continued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #2 continued
Channel 11 2462MHz



Run #3: Output Power

Maximum antenna gain: 2 dBi

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2412	20	0.1	0.158489
Mid	2437	25.9	0.389045145	0.616595
High	2462	20	0.1	0.158489

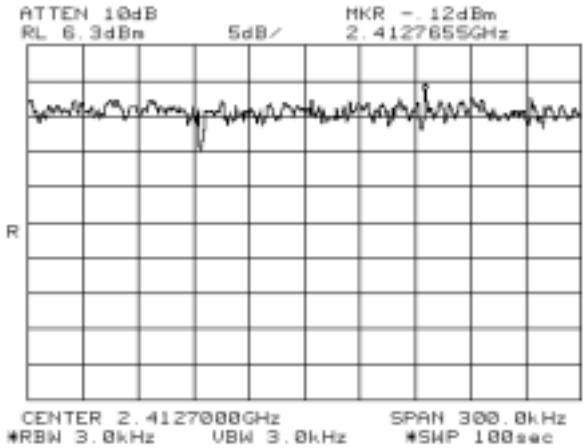
Note 1:	Output power measured using a peak power meter

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

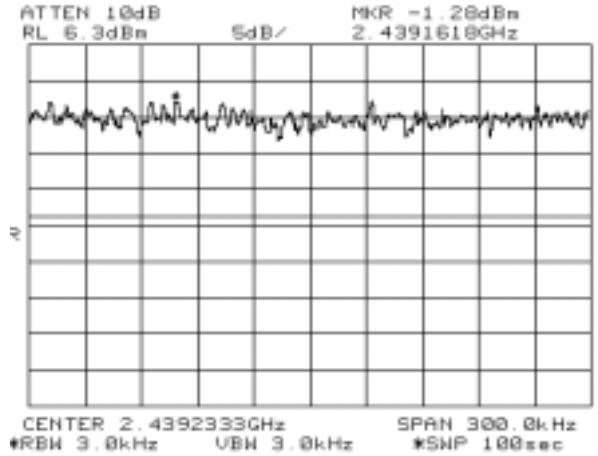
Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
Low	2412	3 kHz	-0.12 dBm
Mid	2437	3 kHz	-1.28 dBm
High	2462	3 kHz	-1.78dBm

Channel 1 2412MHz



Channel 6 2437MHz

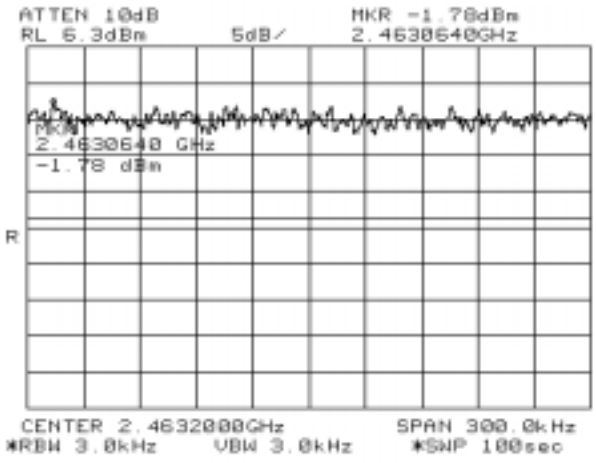


Run #4 continued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #4 continued

Channel 11 2462MHz



Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions

Test Specifics

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

Date of Test: 3/3/2005
Test Engineer: Chris Byleckie
Test Location: SVOATS #1

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 or routed in overhead in the GR-1089 test configuration.

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: 15 °C
Rel. Humidity: 80 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 26500 MHz - Spurious Emissions In Restricted Bands	FCC Part 15.209 / 15.247(c)	Pass	53.8dBµV/m (489 µV/m) @ 2412MHz (-0.2dB)
2	6dB Bandwidth	15.247(a)	Pass	16.8 MHz
3	Output Power	15.247(b)	Pass	26 dBm
4	Power Spectral Density (PSD)	15.247(d)	Pass	-7.12 dBm

Modifications Made During Testing:

No modifications were made to the EUT during testing

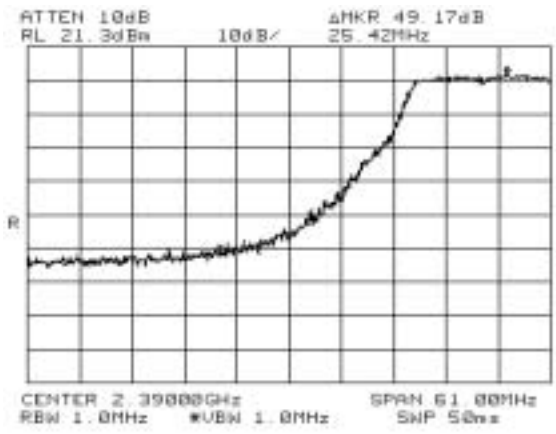
Deviations From The Standard

No deviations were made from the requirements of the standard.

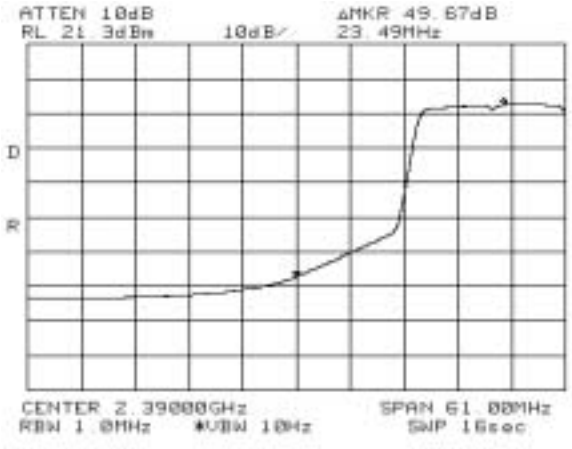
Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1a: Radiated Spurious Emissions, 1000 - 26500 MHz. Low Channel @ 2412 MHz
Power Setting 15.5

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	111.47	109.55	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	103.51	100.99	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	47.67 dB		
Delta Marker - Average	49.67 dB		
Calculated Band-Edge Measurement:	63.8 dBuV/m		Peak
Calculated Band-Edge Measurement:	53.84 dBuV/m		Average



Peak



Average

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.00	51.4	h	74.0	-22.6	Pk	318	1.3	
4824.00	40.1	h	54.0	-13.9	Avg	318	1.3	
4824.00	50.2	v	74.0	-23.8	Pk	0	1.1	
4824.00	37.8	v	54.0	-16.2	Avg	0	1.1	
12060.00	50.6	v	74.0	-23.4	Pk	240	1.0	Noise floor
12060.00	40.0	v	54.0	-14.0	Avg	240	1.0	Noise floor
12060.00	50.3	h	74.0	-23.7	Pk	305	1.0	Noise floor
12060.00	39.5	h	54.0	-14.5	Avg	305	1.0	Noise floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1b: Radiated Spurious Emissions, 1000 - 26500 MHz. Center Channel @ 2437 MHz
Power setting 15.5

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.000	49.8	v	74.0	-24.2	Pk	317	1.2	
4874.000	36.9	v	54.0	-17.2	Avg	317	1.2	
7311.000	60.5	v	74.0	-13.5	Pk	11	1.3	
7311.000	47.4	v	54.0	-6.6	Avg	11	1.3	
4874.000	53.4	h	74.0	-20.7	Pk	138	1.2	
4874.000	41.0	h	54.0	-13.0	Avg	138	1.2	
7311.000	53.8	h	74.0	-20.2	Pk	142	1.3	
7311.000	42.1	h	54.0	-11.9	Avg	142	1.3	

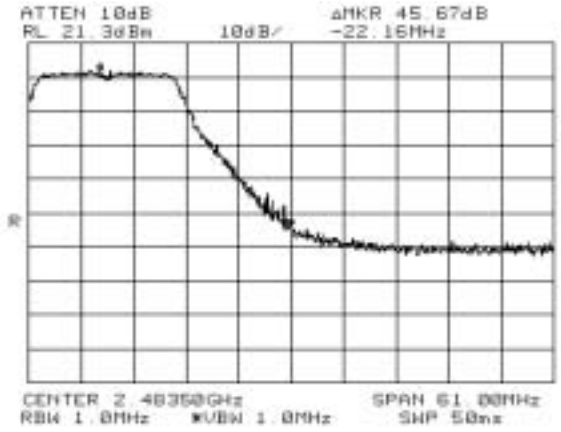
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below

EMC Test Data

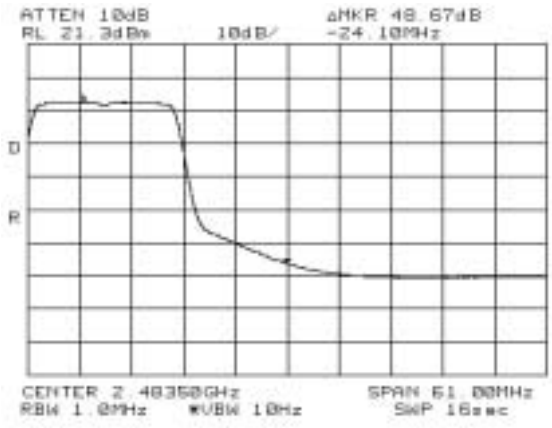
Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1c: Radiated Spurious Emissions, 1000 - 26500 MHz. High Channel @ 2462 MHz
Power setting 16

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	109	109	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	100.46	100.26	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - Peak	45.67 dB		
Delta Marker - Average	48.67 dB		
Calculated Band-Edge Measurement:	63.33 dBuV/m		Peak
Calculated Band-Edge Measurement:	51.79 dBuV/m		Average



Peak



Average

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.00	55.6	h	74.0	-18.4	Pk	252	1.2	
4924.00	43.5	h	54.0	-10.5	Avg	252	1.2	
7386.00	52.3	h	74.0	-21.8	Pk	248	1.2	
7386.00	40.2	h	54.0	-13.8	Avg	248	1.2	
4924.00	53.1	v	74.0	-20.9	Pk	257	1.1	
4924.00	39.7	v	54.0	-14.3	Avg	257	1.1	
7386.00	60.5	v	74.0	-13.5	Pk	11	1.1	
7386.00	48.2	v	54.0	-5.8	Avg	11	1.1	

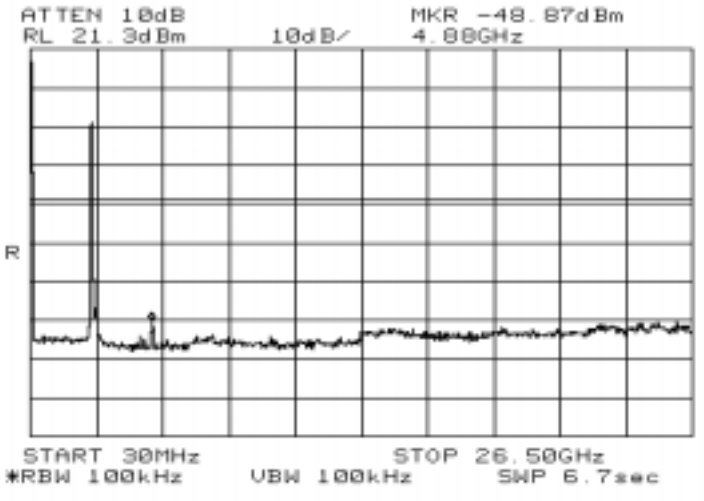
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

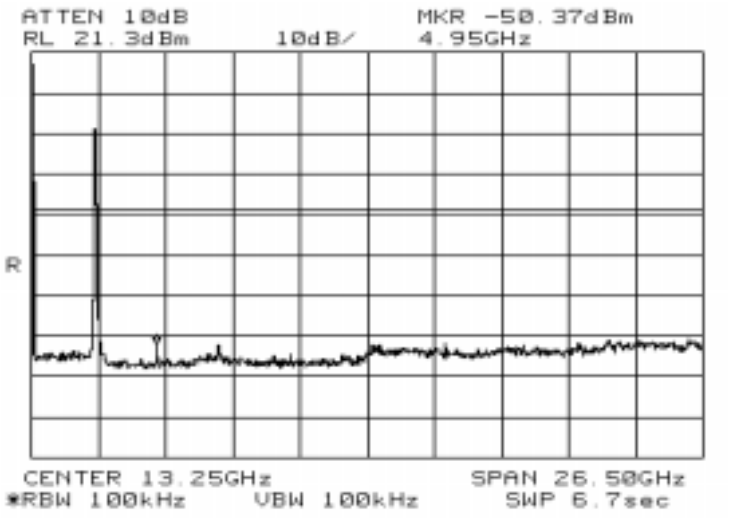
Run #1d: Antenna Conducted Spurious Emissions, 30 - 26500 MHz.

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.

Channel 1 2412MHz



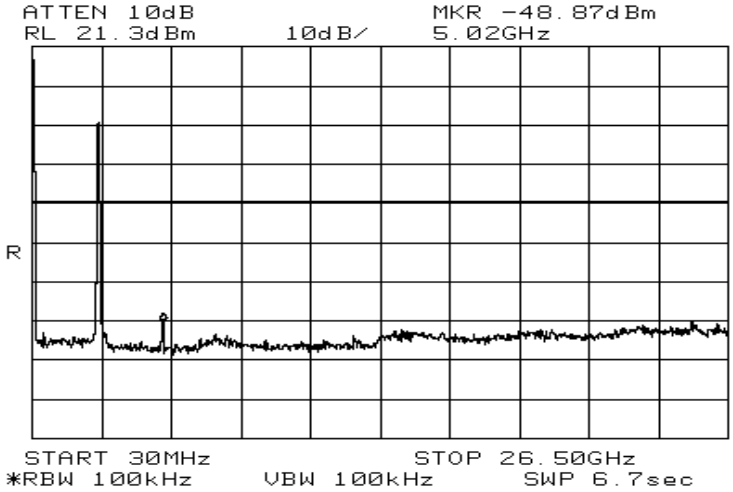
Channel 6 2437MHz



Run #1d continued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1d continued
Channel 11 2462MHz

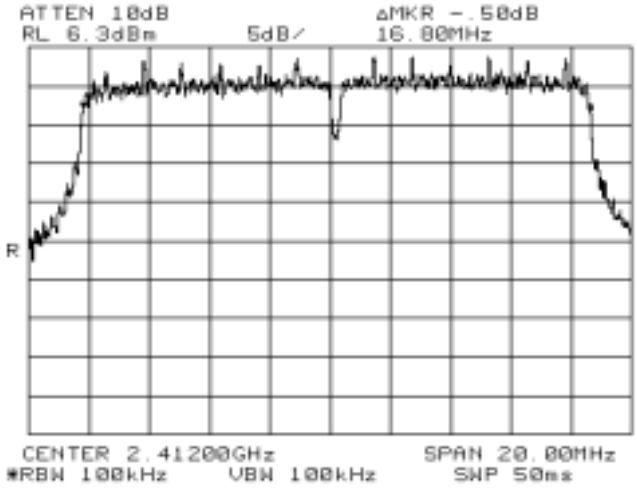


Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

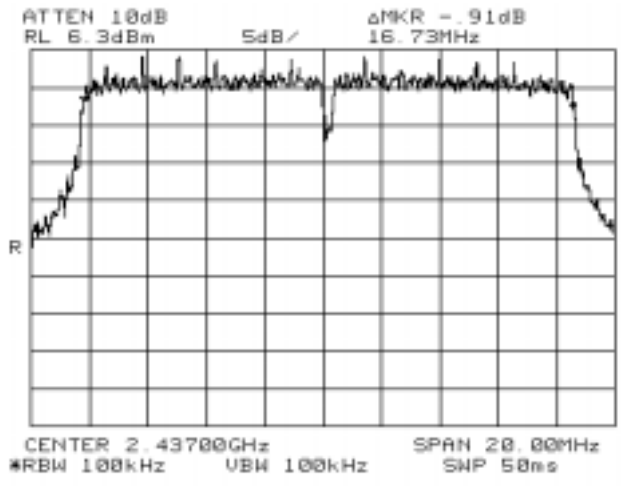
Run #2: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	99% Signal Bandwidth
Low	2412	100kHz	16.80MHz	16.80MHz
Mid	2437	100kHz	16.73MHz	16.77MHz
High	2462	100kHz	16.73MHz	16.77MHz

Channel 1 2412MHz



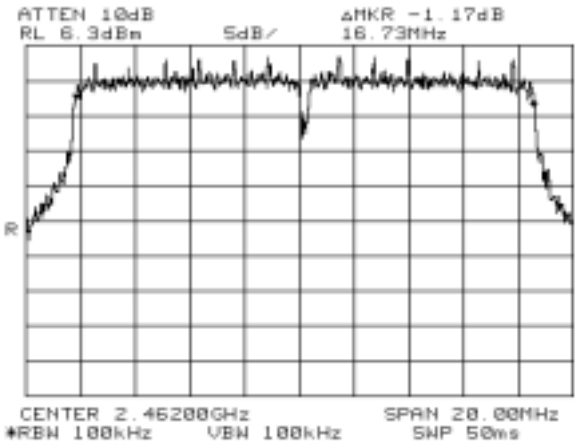
Channel 6 2437MHz



Run #2 continued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #2 continued
Channel 11 2462MHz



Run #3: Output Power

Maximum antenna gain: 2 dBi

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2412	26	0.398107171	0.630957
Mid	2437	25.5	0.354813389	0.562341
High	2462	26	0.398107171	0.630957

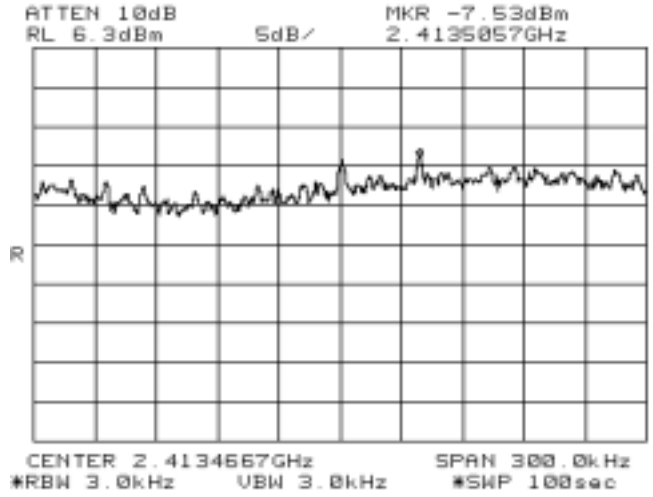
Note 1:	Output power measured using a peak power meter

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

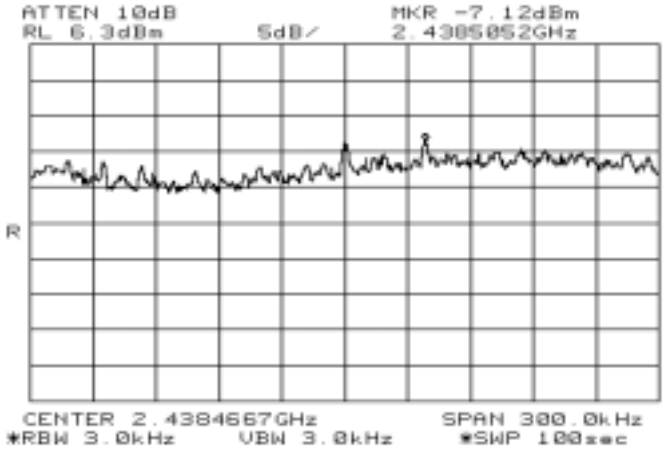
Run #4: Power Spectral Density

Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)
Low	2412	3kHz	-7.53 dBm
Mid	2437	3kHz	-7.12 dBm
High	2462	3kHz	-7.78 dBm

Channel 1 2412MHz



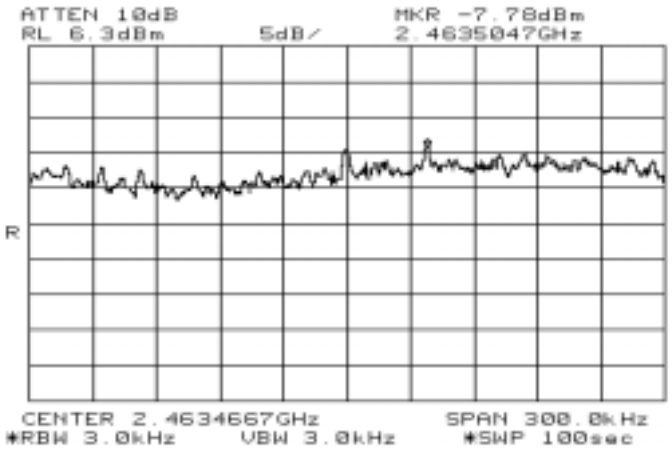
Channel 6 2437MHz



Run #4 continued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #4 continued
Channel 11 2462MHz



Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	B

Rx Emissions (RSS-210)

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: 3/8/2005
Test Engineer: Juan Martinez
Test Location: SVOATS #3
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 emissions testing.

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

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: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1-2	RE, 1000 - 6500 MHz, Maximized Emissions	RSS-210 Rx mode	Pass	44.3dBuV/m (164.8uV/m) @ 4824MHz (-15.7dB)

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:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	B

Run #1 Maximized readings, 1000 - 8000 MHz
802.11G

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
CH: 2412								
1608.000	43.0	v	60.0	-17.0	Avg	0	1.0	
3219.000	41.0	v	60.0	-19.0	Avg	360	1.0	
4824.000	44.3	v	60.0	-15.7	Avg	0	1.0	
CH: 2437								
1624.000	31.8	v	60.0	-28.2	Avg	0	1.0	
3248.000	39.4	v	60.0	-20.6	Avg	360	1.0	
4872.000	43.2	v	60.0	-16.8	Avg	0	1.0	
CH: 2462								
1641.000	31.4	v	60.0	-28.6	Avg	360	1.0	
3265.000	39.0	v	60.0	-21.0	Avg	0	1.0	
4889.000	43.7	v	60.0	-16.3	Avg	360	1.0	

Run #2: Maximized readings, 1000 - 8000 MHz
802.11B

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
CH: 2412								
1608.000	30.7	v	60.0	-29.3	Avg	0	1.0	
3219.000	39.5	v	60.0	-20.5	Avg	360	1.0	
4824.000	43.7	v	60.0	-16.3	Avg	0	1.0	
CH: 2437								
1624.000	31.6	v	60.0	-28.5	Avg	0	1.0	
3248.000	39.3	v	60.0	-20.7	Avg	360	1.0	
4872.000	42.5	v	60.0	-17.5	Avg	0	1.0	
CH: 2462								
1641.000	31.0	v	60.0	-29.0	Avg	0	1.0	
3265.000	40.0	v	60.0	-20.0	Avg	360	1.0	
4889.000	43.2	v	60.0	-16.8	Avg	0	1.0	

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions

Test Specifics

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

Date of Test: 4/15/2005
Test Engineer: Chris Byleckie
Test Location: EMC Lab

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 or routed in overhead in the GR-1089 test configuration.

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: 22 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Antenna Conducted Spurious Emissions, 30 - 26500 MHz	FCC Part 15.209 / 15.247(c)	Pass	

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

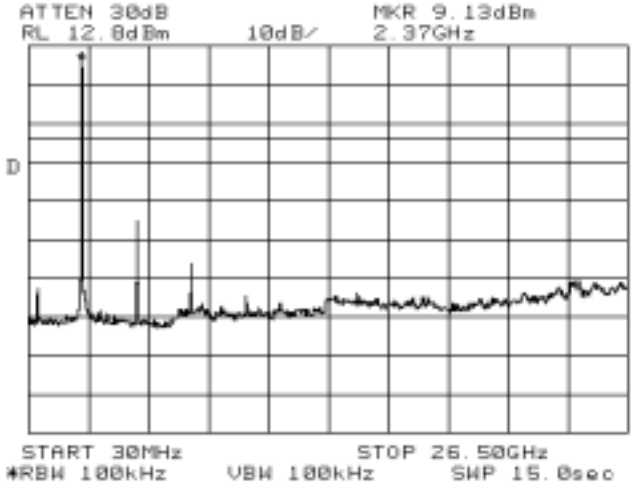
No deviations were made from the requirements of the standard.

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

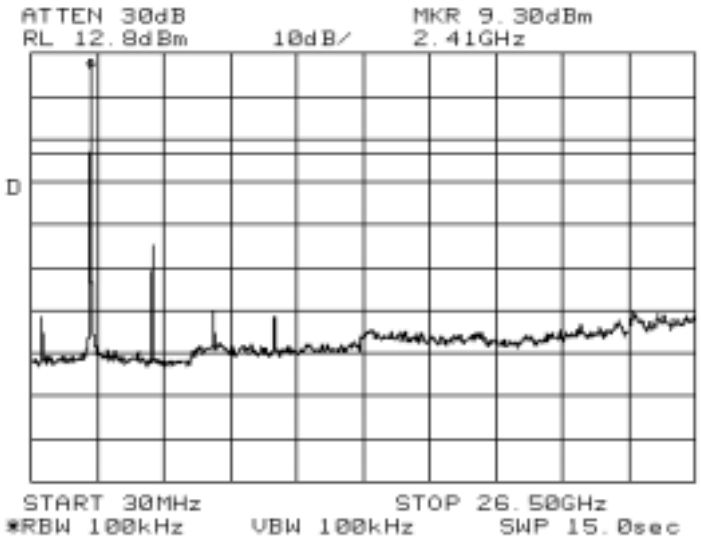
Run #1: Antenna Conducted Spurious Emissions, 30 - 26500 MHz.

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.

Channel 1 2412MHz



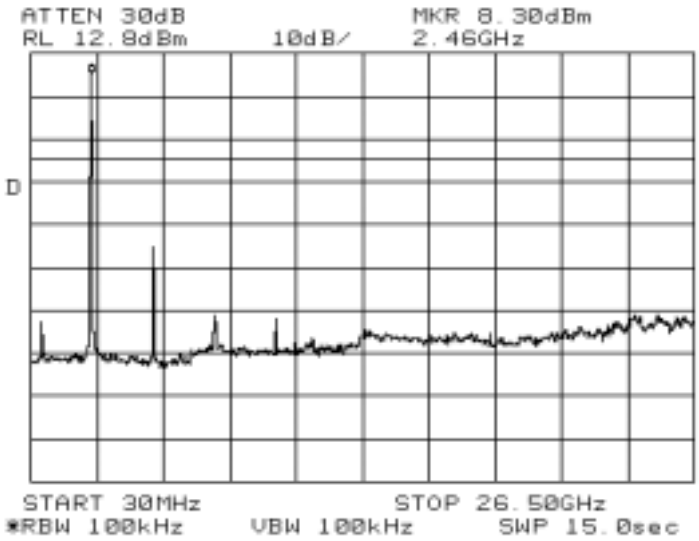
Channel 6 2437MHz



Run #1d conmtinued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1d continued
Channel 11 2462MHz



LO 2/3 carrier frequency

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

FCC 15.247 DTS - Power, Bandwidth and Spurious Emissions

Test Specifics

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

Date of Test: 4/15/2005
Test Engineer: Chris Byleckie
Test Location: EMC Lab

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 or routed in overhead in the GR-1089 test configuration.

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: 22 °C
Rel. Humidity: 33 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Antenna Conducted Spurious Emissions, 30 - 26500 MHz	FCC Part 15.209 / 15.247(c)	Pass	

Modifications Made During Testing:

No modifications were made to the EUT during testing

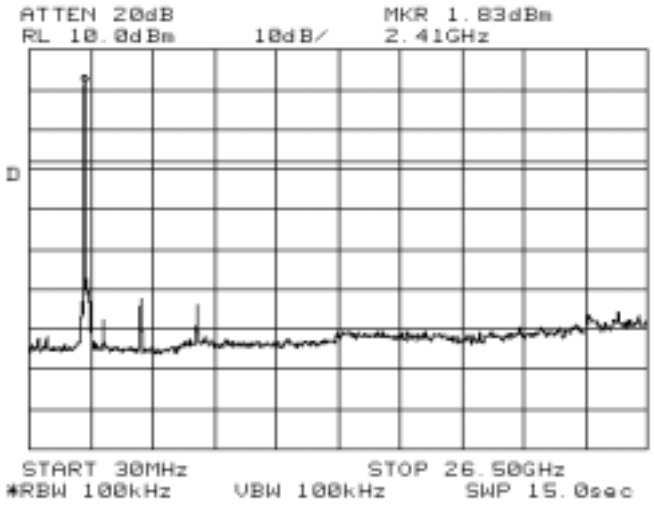
Deviations From The Standard

No deviations were made from the requirements of the standard.

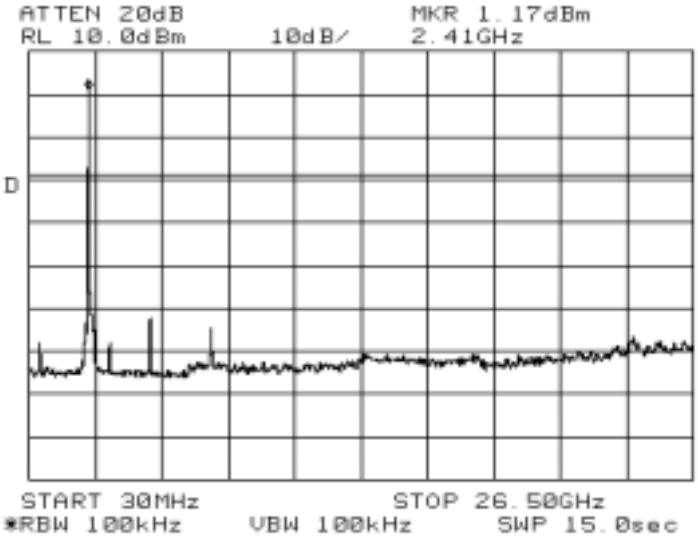
Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1: Antenna Conducted Spurious Emissions, 30 - 26500 MHz.
Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.

Channel 1 2412MHz



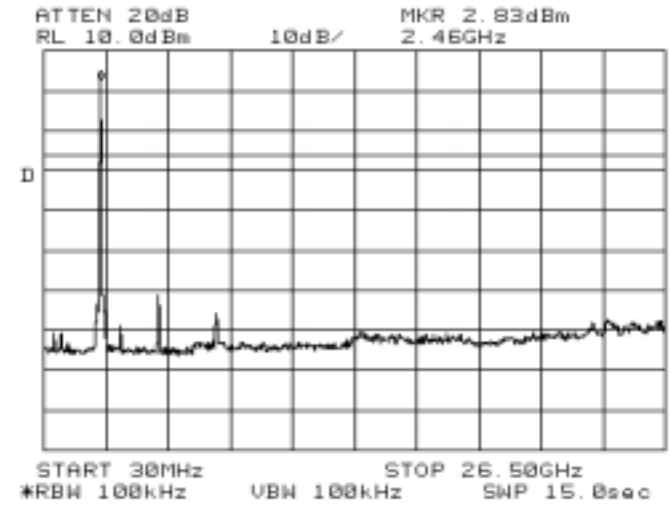
Channel 6 2437MHz



Run #1d conmtinued on next page

Client:	2Wire	Job Number:	J58759
Model:	1801HG Gateway Radio	T-Log Number:	T59215
		Account Manager:	Rod Wong
Contact:	Jeremy Muir		
Spec:	FCC 15.247 / EN300328	Class:	N/A

Run #1d continued
Channel 11 2462MHz



LO 2/3 carrier frequency

EXHIBIT 3: Test Configuration Photographs

4 Pages

EXHIBIT 4: Proposed FCC ID Label & Label Location

3 Pages

EXHIBIT 5: Detailed Photographs of 2Wire, Inc. Model 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00Construction

6 Pages

EXHIBIT 6: Operator's Manual
For 2Wire, Inc. Model 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

44 Pages

EXHIBIT 7: Block Diagram of 2Wire, Inc. Model 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

1 Page

EXHIBIT 8: Schematic Diagrams for 2Wire, Inc. Model 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

32 Pages

EXHIBIT 9: Theory of Operation for 2Wire, Inc. Model 1801HG Gateway, 1701HG Gateway, 171HG Gateway, RG1801HG-00, RG1701HG-00 and RG171HG-00

2 Pages

EXHIBIT 10: Advertising Literature

None at this time.

EXHIBIT 11: RF Exposure Information

2 Page