

*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: HomePortal1800HW and HomePortal1000HW*

FCC ID: PGR2WHPLHW

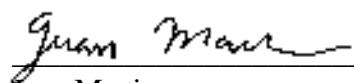
GRANTEE: 2Wire, Inc.  
1704 Automation Parkway  
San Jose, CA 91776

TEST SITE: Elliott Laboratories, Inc.  
684 W. Maude Avenue  
Sunnyvale, CA 94086

REPORT DATE: August 8, 2003

FINAL TEST DATE: July 30, 2003

AUTHORIZED SIGNATORY:

  
Juan Martinez  
Sr. EMC Engineer



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**DECLARATIONS OF COMPLIANCE**

Equipment Name and Model:  
HomePortal1800HW and HomePortal1000HW

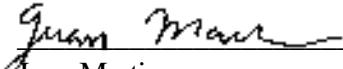
Manufacturer:  
2Wire, Inc.  
1704 Automation Parkway  
San Jose, CA 91776

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 **SV2** Dated August 12, 2001  
Departmental Acknowledgement Number: IC2845 **SV3** Dated July 30, 2001  
Departmental Acknowledgement Number: IC2845 **SV4** Dated July 19, 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 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	Sr. EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA

Date: August 8, 2003

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**

<b>COVER PAGE</b> .....	<b>1</b>
<b>DECLARATIONS OF COMPLIANCE</b> .....	<b>2</b>
<b>TABLE OF CONTENTS</b> .....	<b>3</b>
<b>SCOPE</b> .....	<b>4</b>
<b>OBJECTIVE</b> .....	<b>4</b>
<b>SUMMARY OF RESULTS</b> .....	<b>5</b>
MEASUREMENT UNCERTAINTIES .....	6
<b>EQUIPMENT UNDER TEST (EUT) DETAILS</b> .....	<b>7</b>
GENERAL.....	7
ENCLOSURE.....	7
MODIFICATIONS .....	7
SUPPORT EQUIPMENT .....	7
EUT INTERFACE PORTS.....	8
EUT OPERATION DURING TESTING.....	8
ANTENNA REQUIREMENTS.....	8
<b>TEST SITE</b> .....	<b>9</b>
GENERAL INFORMATION .....	9
CONDUCTED EMISSIONS CONSIDERATIONS.....	9
RADIATED EMISSIONS CONSIDERATIONS.....	9
<b>MEASUREMENT INSTRUMENTATION</b> .....	<b>10</b>
RECEIVER SYSTEM .....	10
INSTRUMENT CONTROL COMPUTER .....	10
LINE IMPEDANCE STABILIZATION NETWORK (LISN) .....	10
POWER METER.....	11
FILTERS/ATTENUATORS .....	11
ANTENNAS .....	11
ANTENNA MAST AND EQUIPMENT TURNTABLE .....	11
INSTRUMENT CALIBRATION.....	11
<b>TEST PROCEDURES</b> .....	<b>12</b>
EUT AND CABLE PLACEMENT.....	12
CONDUCTED EMISSIONS .....	12
RADIATED EMISSIONS.....	12
CONDUCTED EMISSIONS FROM ANTENNA PORT .....	13
<b>SPECIFICATION LIMITS AND SAMPLE CALCULATIONS</b> .....	<b>14</b>
FCC 15.407 (A)AND RSS 210 (O) OUTPUT POWER LIMITS.....	15
RSS 210 (O) AND FCC 15.247 SPURIOUS RADIATED EMISSIONS LIMITS.....	15
FCC 15.205 AC POWER PORT CONDUCTED EMISSIONS LIMITS .....	16
RSS-210 SECTION 6.6 AC POWER PORT CONDUCTED EMISSIONS LIMITS.....	16
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS .....	17
SAMPLE CALCULATIONS - RADIATED EMISSIONS.....	18
<i>EXHIBIT 1: Test Equipment Calibration Data</i> .....	1
<i>EXHIBIT 2: Test Data Log Sheets</i> .....	2

**SCOPE**

An electromagnetic emissions test has been performed on the 2Wire, Inc. model HomePortal1800HW and HomePortal1000HW pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and RSS-210 Issue 5 for license-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 C63.4-1992 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 HomePortal1800HW and HomePortal1000HW 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 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 DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	6.2.2(o)(b)	6dB Bandwidth	12.48 MHz	Minimum allowed is 500kHz	Complies
	RSP 100	99% Bandwidth	15.5 MHz	For information only	Complies
15.247 (b) (3) 15.247 (b) (4) (i)	6.2.2(o)(b)	Output Power, 2400 - 2483.5 MHz	26.02dBm (0.400 Watts) EIRP = 0.0 W	Point-to-point applications: Maximum permitted is 1Watt, reduced by 1dB for every .3dB that the antenna gain exceeds 6dBi	Complies
15.247(d)	6.2.2(o)(b)	Power Spectral Density	-1.39dBm / 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	53.3 dBuV/m @ 2483.5 MHz (-0.7 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	49.2 dBuV @ 0.199 MHz (-14.4 dB)		Complies
	6.6	AC Conducted Emissions	33.6 dBuV @ 29.426 MHz (-14.4 dB)		Complies
15.247 (b) (5)		RF Exposure Requirements	MPE Calculation		
15.203		RF Connector	Antenna is permanently attached.	Unique antenna connection required for user-installed applications. Standard rf connectors permitted for professionally installed systems	Complies

EIRP calculated using antenna gain of dBi (2) for the highest EIRP point-to-point 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	$\pm 2.4$
Radiated Emissions	30 to 1000	$\pm 3.6$

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

The 2Wire, Inc. model HomePortal1800HW and HomePortal1000HW is a Homeportal which is designed to provide HomePNA technology to allow you to connect computers in different rooms using your home's existing telephone wiring. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 1 Amps.

The sample was received on July 30, 2003 and tested on July 30, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number	Proposed FCC ID #
2Wire/ Chipboy SLI /HomePortal	253231011023	PGR2WHPLHW

**ENCLOSURE**

The EUT enclosure is primarily constructed of plastic. It measures approximately 4 cm wide by 23 cm deep by 20 cm high.

**MODIFICATIONS**

The EUT require the following modifications during testing in order to comply with the emission specifications:

R529 changed to 10k? as referenced on page 5 of schematic 3100-000364-003.

**SUPPORT EQUIPMENT**

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

Manufacturer/Model/Description	Serial Number	FCC ID Number
Dell PP01L Laptop	J4RN331	DoC

No equipment was used as remote support equipment 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	1
Power	EUT	Multiwire	Unshielded	1.8

**EUT OPERATION DURING TESTING**

Transmitting at full power on channels 1, 6, and 11.

**ANTENNA REQUIREMENTS**

The antenna is permanently attached and cannot be removed, which meets the requirements of 15.203.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken on July 30, 2003 at the Elliott Laboratories Open Area Test Site #4 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 C63.4-1992. 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 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 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, 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 terms 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:

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

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, 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:

$$F_d = 20 * \text{LOG10} (D_m/D_s)$$

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:

$$R_c = R_f + F_d$$

and

$$M = R_c - L_s$$

where:

$R_f$  = 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***

Test Equipment\_Radio 1 Page

Test Equipment\_Digital 1 Page

**Radiated Emissions, 10-25,000 MHz, 30-Jul-03****Engineer: jmartinez**

<b>Manufacturer</b>	<b>Description</b>	<b>Model #</b>	<b>Assett #</b>	<b>Cal interval</b>	<b>Last Calibrated</b>	<b>Cal Due</b>
Elliott Laboratories	1m x 1m loop generator	Magnetic immunity	1409	N/A		
Hewlett Packard	High Pass filter, 3.5GHz	84300-80038	1157	18	3/1/2002	9/1/2003
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	1242	12	10/9/2002	10/9/2003
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	12	1/24/2003	1/24/2004
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	12	4/8/2003	4/8/2004
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	12	8/15/2002	8/15/2003
Hewlett Packard	Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	12	11/19/2002	11/19/2003

**Radiated Emissions, 30 - 1000 MHz, 25-Jul-03****Engineer: rwong**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
EMCO	Biconical Antenna, 30-300 MHz	3110B	363	24	5/28/2002	5/28/2004
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	12	10/30/2002	10/30/2003
Rohde & Schwarz	Test Receiver, 20-1300MHz	ESVP	273	12	2/13/2003	2/13/2004

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**Conducted Emissions, 25-Jul-03****Engineer: Jay**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	12	6/5/2002	7/30/2003
Elliott Laboratories	LISN 2 x (Solar 8028 LISN + 6512 Caps)	LISN-5,Support	379	12	8/20/2002	8/20/2003
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	812	12	1/10/2003	1/10/2004
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	274	12	1/24/2003	1/24/2004

***EXHIBIT 2: Test Data Log Sheets***

***ELECTROMAGNETIC EMISSIONS***

***TEST LOG SHEETS***

***AND***

***MEASUREMENT DATA***

T52078\_Radio 17 Pages  
T52078\_Digital 10 Pages



## *EMC Test Data*

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	

## **EMC Test Data**

For The

**2Wire, Inc.**

Model

**ChipBoy SLI**

Date of Last Test: 7/30/2003



## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	

### EUT INFORMATION

#### General Description

The EUT is a Homeportal which is designed to provide HomePNA technology to allow you to connect computers in different rooms using your home's existing telephone wiring.. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 1 Amps.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire	Chipboy SLI	DSL wireless Router	253231011023	PGR2WHPLHW

#### Other EUT Details

#### EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 4 cm wide by 23 cm deep by 20 cm high.

#### Modification History

Mod. #	Test	Date	Modification
1	Radiated Harmonics	7/30/2003	- R529 changed to 10kΩ as referenced on page 5 of schematic 3100 000364-003
2			

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



## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.247	Class:	Radio
Immunity Spec:	-	Environment:	

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	J4RN331	DoC

#### 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	1
Power	EUT	Mulitwire	Unshielded	1.8

Note: The remaining ethernet ports, RJ-11, and usb ports were not connected as these are not required during the radio test portion.

#### EUT Operation During Emissions

Transmitting at full power on channels 1, 6, and 11.



## *EMC Test Data*

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
Contact:	Jeremy Muir	Account Manager:	Christine Vu
Spec:	FCC 15.247	Class:	N/A

## 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: 7/30/2003 Config. Used: 1  
Test Engineer: jmartinez Config Change: None  
Test Location: SVOATS #4 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: 22.8 °C  
Rel. Humidity: 68 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-1.3dB @ 2390 MHz
1b	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-4.7dB @ 12185 MHz
1c	RE, 30 - 25,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-0.7dB @ 2483.5 MHz
2	6dB Bandwidth	15.247(a)	Pass	12.48 MHz
3	Output Power	15.247(b)	Pass	26.02 dBm
4	Power Spectral Density (PSD)	15.247(d)	Pass	-1.39 dBm
5	Out-of-Band	15.247(c)	Pass	refer to plots



## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Modifications Made During Testing:

The following modifications were made to the EUT during testing in order to comply with the requirements of the standard:

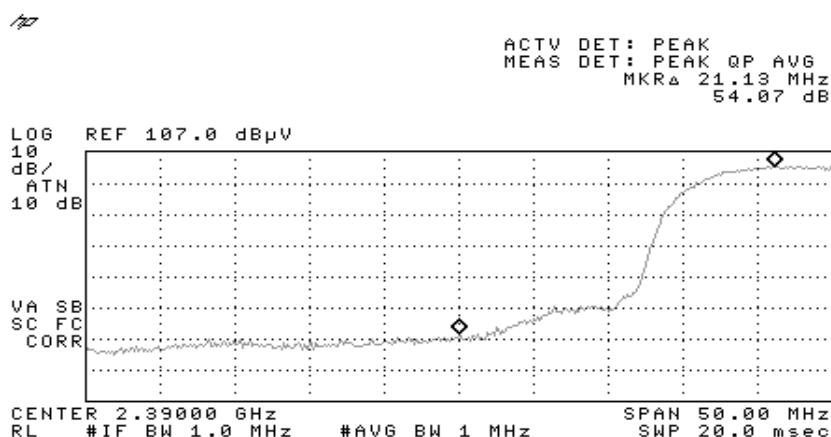
- R529 changed to 10kΩ as referenced on page 5 of schematic 3100-000364-003

### Deviations From The Standard

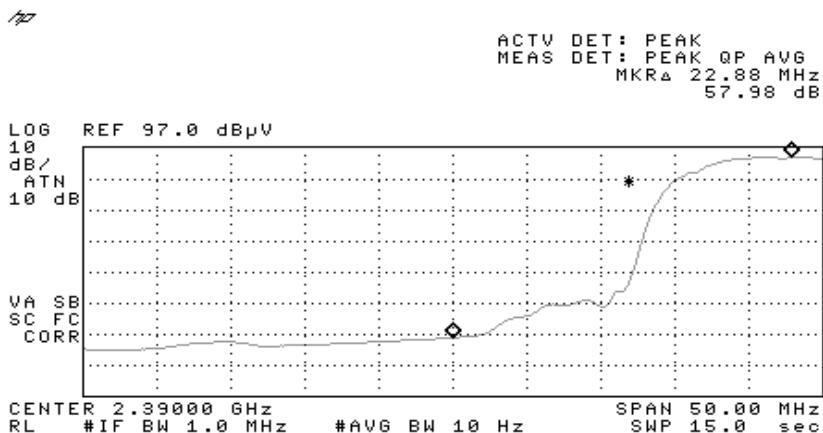
No deviations were made from the requirements of the standard.

### Run #1a: Radiated Spurious Emissions, 30 - 25,000 MHz. Low Channel @ 2412 MHz

#### Peak Bandedge



#### Average Bandedge



Continue on next page...



## EMC Test Data

Client:	2Wire, Inc.					Job Number:	J51776	
Model:	ChipBoy SLI					T-Log Number:	T52078	
Account Manager:	Christine Vu							
Contact:	Jeremy Muir							
Spec:	FCC 15.247					Class:	N/A	
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2412.000	118.6	v	-	-	Pk			Fundamental RBW, VBW=1MHz
2412.000	110.7	v	-	-	Avg			Fundamental RBW=1MHz VBW=10Hz
2412.000	117.1	h	-	-	Pk			Fundamental RBW, VBW=1MHz
2412.000	110.2	h	-	-	Avg			Fundamental RBW=1MHz VBW=10Hz
2390.000	64.5	v	74.0	-9.5	Pk	-	-	Bandedge Ch# 1
2390.000	52.7	v	54.0	-1.3	Avg	-	-	Bandedge Ch# 1
2390.000	63.0	h	74.0	-11.0	Pk	-	-	Bandedge Ch# 1
2390.000	52.2	h	54.0	-1.8	Avg	-	-	Bandedge Ch# 1
4824.000	48.4	v	74.0	-25.6	Pk	172	1.1	Restricted Emission
4824.000	35.3	v	54.0	-18.7	Avg	172	1.1	Restricted Emission
7236.000	51.9	v	74.0	-22.1	Pk	167	1.1	Restricted Emission
7236.000	40.1	v	54.0	-13.9	Avg	167	1.1	Restricted Emission
9647.000	58.1	v	98.6	-40.5	Pk	329	1.1	Non-Restricted Emission
12060.00	59.8	v	74.0	-14.2	Pk	32	1.0	Restricted Emission
12060.00	48.4	v	54.0	-5.6	Avg	32	1.0	Restricted Emission
4824.000	49.8	h	74.0	-24.2	Pk	248	1.0	Restricted Emission
4824.000	36.2	h	54.0	-17.8	Avg	248	1.0	Restricted Emission
7236.000	51.6	h	74.0	-22.4	Pk	17	1.0	Restricted Emission
7236.000	38.0	h	54.0	-16.0	Avg	17	1.0	Restricted Emission
9647.000	54.4	h	98.6	-44.2	Pk	276	1.0	Non-Restricted Emission
12060.00	57.2	h	74.0	-16.8	Pk	101	1.1	Restricted Emission
12060.00	44.5	h	54.0	-9.5	Avg	101	1.1	Restricted Emission
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 the limit of 15.209.							
Note 2:								



## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
Contact:	Jeremy Muir	Account Manager:	Christine Vu
Spec:	FCC 15.247	Class:	N/A

Run #1b: Radiated Spurious Emissions, 30 - 25,000 MHz. Center Channel @ 2437 MHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	117	119
Limit for emissions outside of restricted bands:	99 dB $\mu$ V/m	

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
4874.000	48.6	v	74.0	-25.4	Pk	175	1.0	Restricted Emission
4874.000	35.4	v	54.0	-18.6	Avg	175	1.0	Restricted Emission
7311.000	51.4	v	74.0	-22.6	Pk	0	1.0	Restricted Emission
7311.000	39.3	v	54.0	-14.7	Avg	0	1.0	Restricted Emission
9748.000	57.3	v	99.0	-41.7	Pk	334	1.0	Non-Restricted Emission
12185.00	60.2	v	74.0	-13.8	Pk	32	1.0	Restricted Emission
12185.00	49.3	v	54.0	-4.7	Avg	32	1.0	Restricted Emission
4874.000	51.2	h	74.0	-22.8	Pk	275	1.1	Restricted Emission
4874.000	36.3	h	54.0	-17.7	Avg	275	1.1	Restricted Emission
7311.000	50.7	h	74.0	-23.3	Pk	245	1.1	Restricted Emission
7311.000	38.2	h	54.0	-15.8	Avg	245	1.1	Restricted Emission
9748.000	60.0	h	99.0	-39.0	Pk	145	1.1	Non-Restricted Emission
12185.00	56.7	h	74.0	-17.3	Pk	360	1.4	Restricted Emission
12185.00	44.3	h	54.0	-9.7	Avg	360	1.4	Restricted Emission

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.

Note 2:

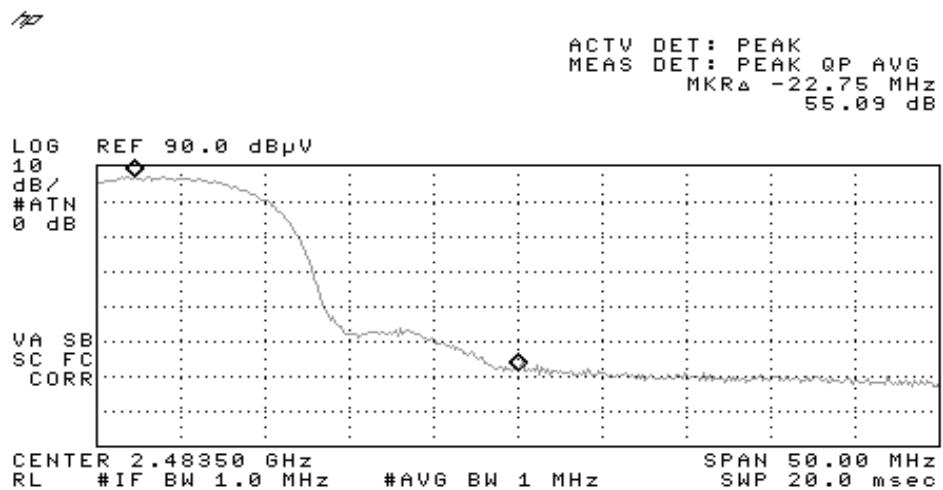


## EMC Test Data

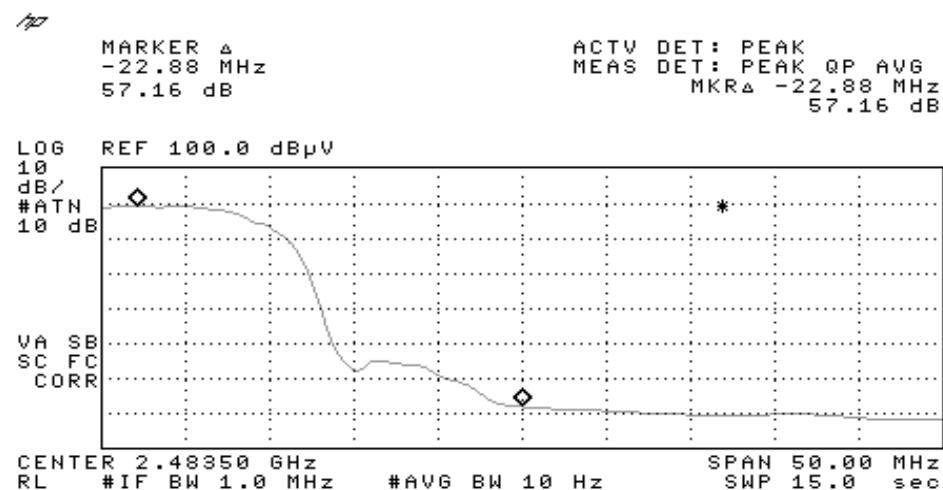
Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

Run #1c: Radiated Spurious Emissions, 30 - 25,000 MHz. High Channel @ 2462 MHz

### Peak Bandedge



### Average Bandedge



Continue on next page....



## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2462.000	117.8	v	-	-	Pk	-	-
2462.000	110.1	v	-	-	Avg	-	-
2462.000	118.3	h	-	-	Pk	-	-
2462.000	110.5	h	-	-	Avg	-	-
2483.500	62.7	v	74.0	-11.3	Pk	-	-
2483.500	52.9	v	54.0	-1.1	Avg	-	-
2483.500	63.2	h	74.0	-10.8	Pk	-	-
2483.500	53.3	h	54.0	-0.7	Avg	-	-
4924.000	51.0	v	74.0	-23.0	Pk	192	1.7
4924.000	37.0	v	54.0	-17.0	Avg	192	1.7
7386.000	52.4	v	74.0	-21.6	Pk	0	1.0
7386.000	38.7	v	54.0	-15.3	Avg	0	1.0
9848.000	54.2	v	100.5	-46.3	Pk	175	1.4
12310.00	57.4	v	74.0	-16.6	Pk	88	1.3
12310.00	45.1	v	54.0	-8.9	Avg	88	1.3
4924.000	51.7	h	74.0	-22.3	Pk	196	1.1
4924.000	38.1	h	54.0	-15.9	Avg	196	1.1
7386.000	50.8	h	74.0	-23.2	Pk	0	1.1
7386.000	38.8	h	54.0	-15.2	Avg	0	1.1
9848.000	54.5	h	100.5	-46.0	Pk	280	1.1
12310.00	58.3	h	74.0	-15.7	Pk	272	1.6
12310.00	45.8	h	54.0	-8.2	Avg	272	1.6

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.

Note 2:



## EMC Test Data

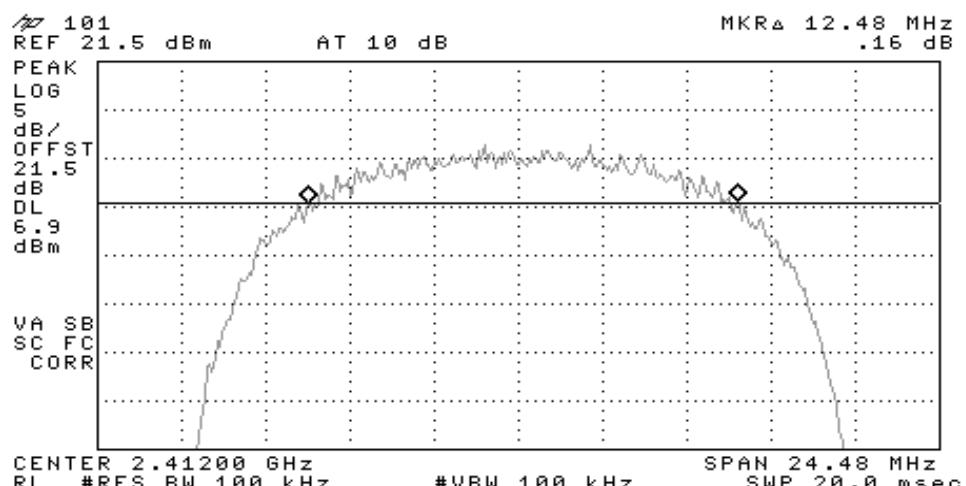
Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Run #2: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	6dB Signal Bandwidth	Graph reference #
Low	2412	100kHz	12.48 MHz	101
Mid	2437	100kHz	12.48 MHz	102
High	2462	100kHz	12.48 MHz	103

Note 1: Add note here

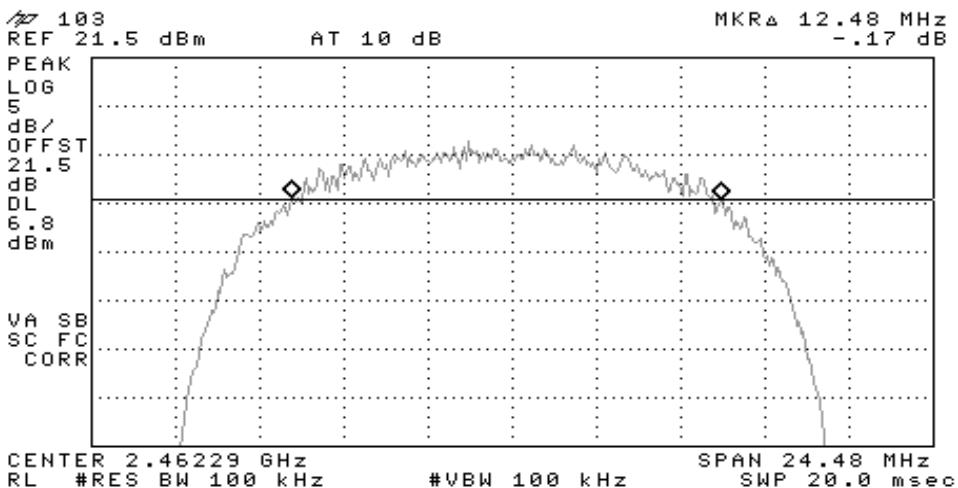
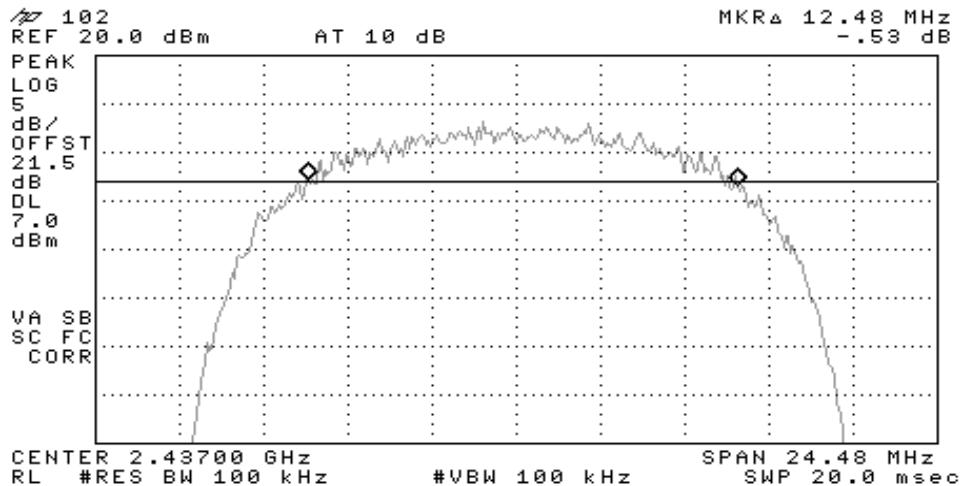
Note 2:





## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A





## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Run #3: Output Power

Channel	Frequency (MHz)	Output Power
Low	2412	25.83
Mid	2437	26.02
High	2462	26.02

Note 1: Add note here

Note 2:

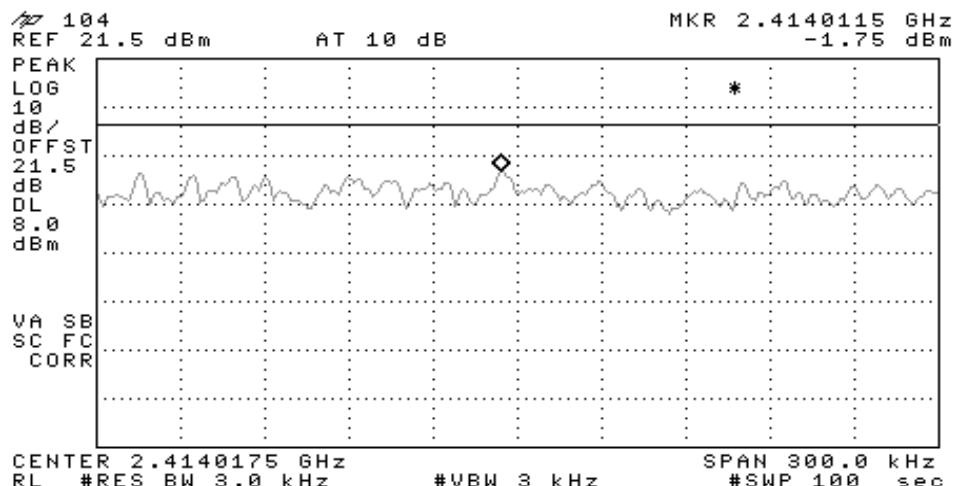


## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Run #4: Power Spectral Density

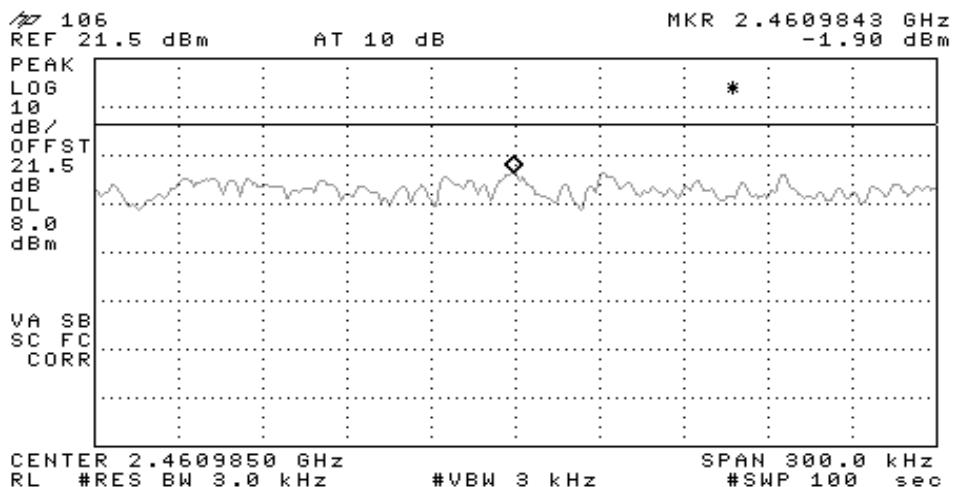
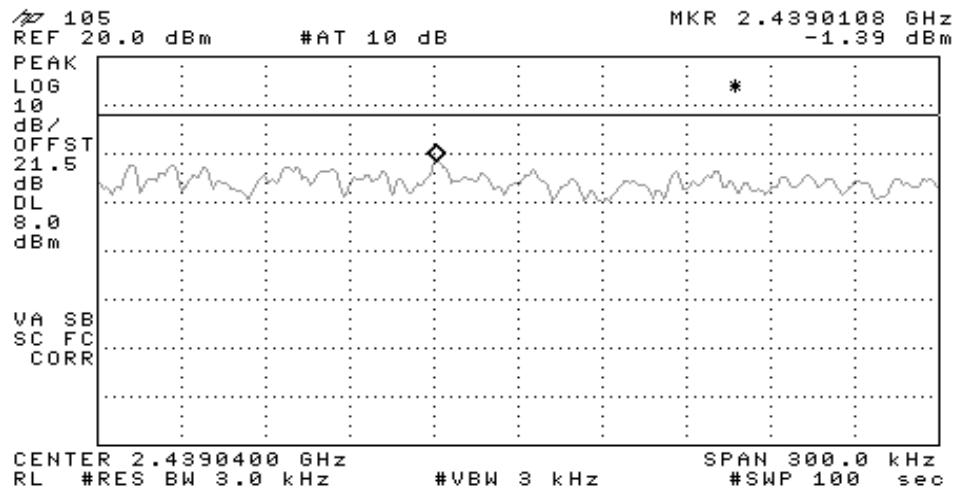
Channel	Frequency (MHz)	Res BW	P.S.D. (averaged over 1 second in a 3kHz bandwidth)	Graph reference #
Low	2412	3kHz	-1.75 dBm	104
Mid	2437	3kHz	-1.39 dBm	105
High	2462	3kHz	-1.9 dBm	106





## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A



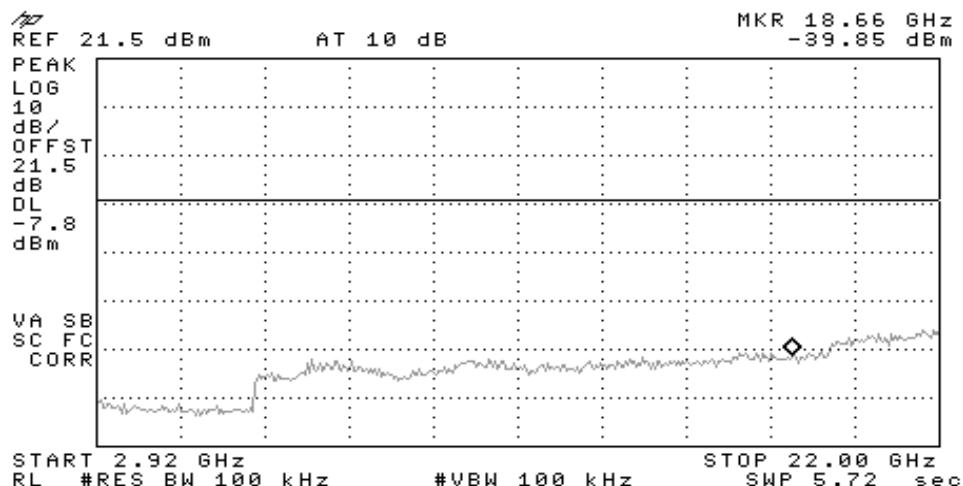
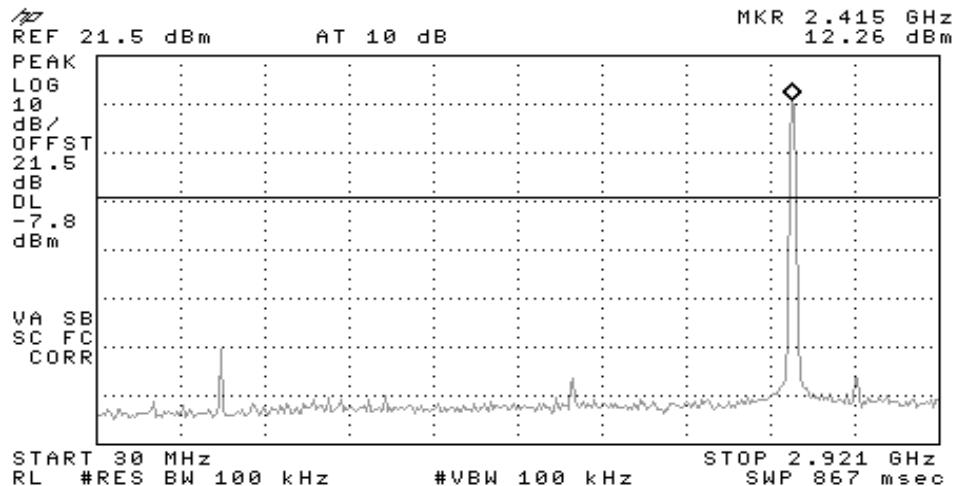


## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Run #5: Out-of-Band Emission

#### Low Channel

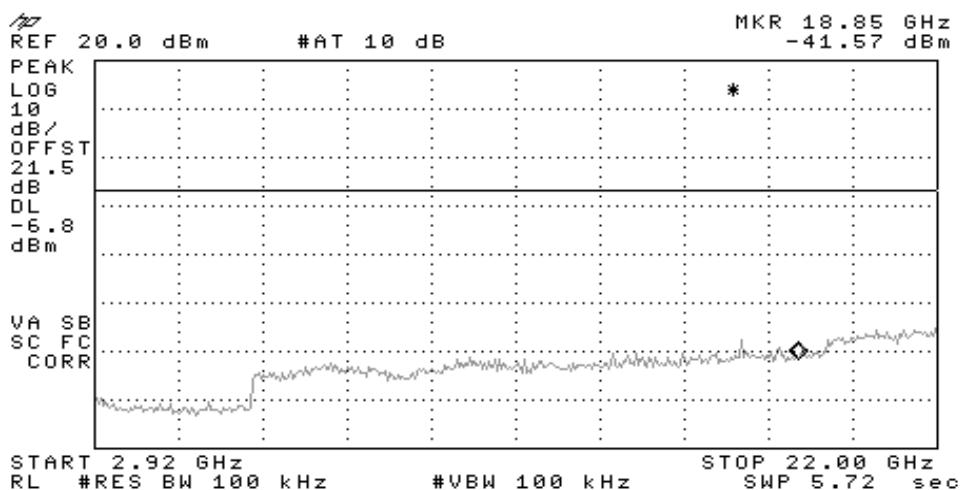
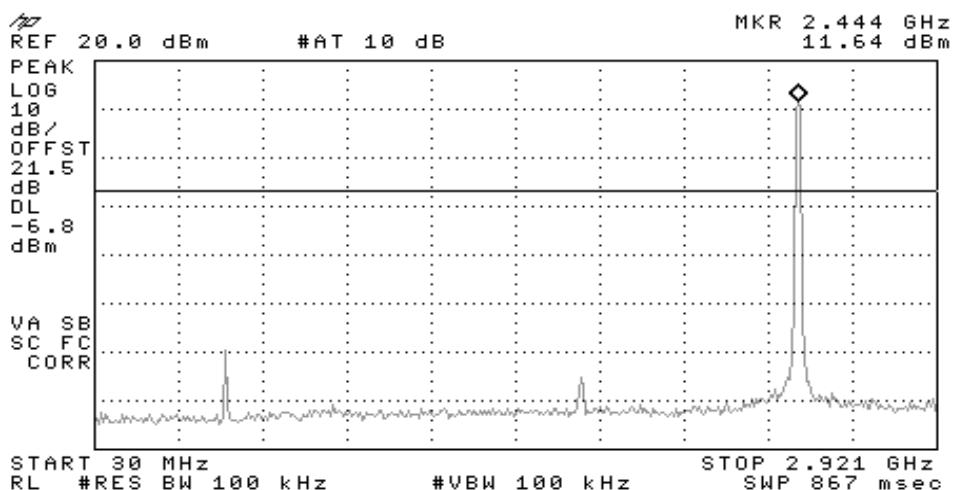




## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	FCC 15.247	Class:	N/A

### Middle Channel

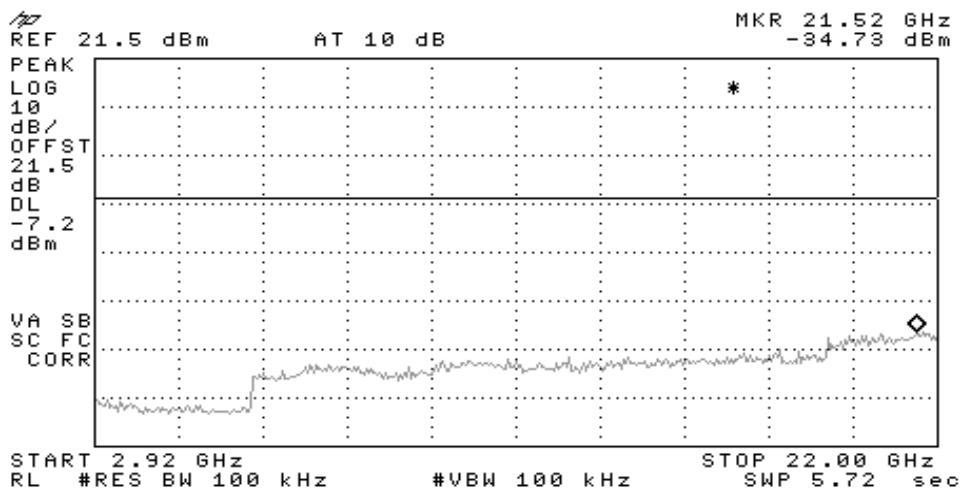
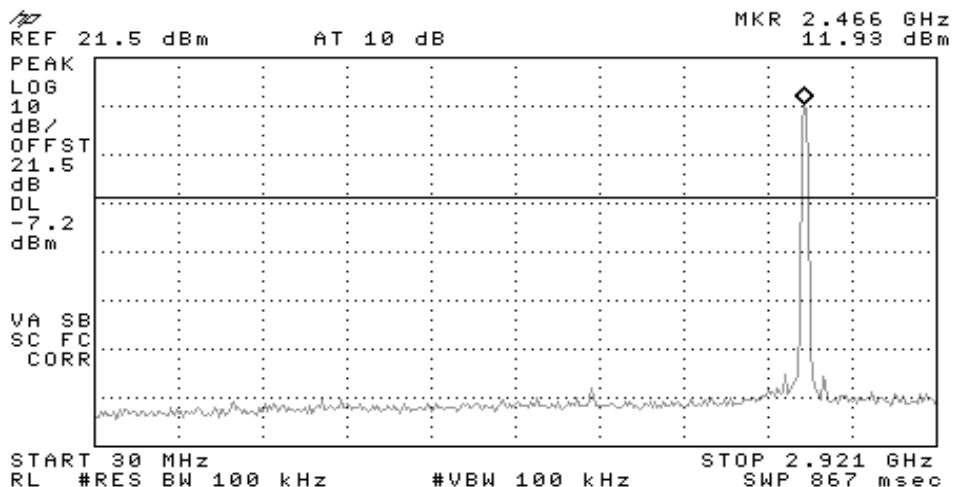




## EMC Test Data

Client:	2Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T52078
Contact:	Jeremy Muir	Account Manager:	Christine Vu
Spec:	FCC 15.247	Class:	N/A

### High Channel





## ***EMC Test Data***

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	EN 300 386 v.1.3.1; FCC	Class:	B
Immunity Spec:	TBD	Environment:	TTE

## **EMC Test Data**

For The

**2 Wire, Inc.**

Model

**ChipBoy SLI**

Date of Last Test: 8/18/2003



## EMC Test Data

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	EN 300 386 v.1.3.1; FCC	Class:	B
Immunity Spec:	TBD	Environment:	TTE

## EUT INFORMATION

### General Description

The EUT is a DSL router which is designed to provide web connectivity. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, 1 Amps.

### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire	Chipboy SLI	DSL wireless Router	253231011023	-

### Other EUT Details

### EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 4 cm wide by 23 cm deep by 20 cm high.

### Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

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



## EMC Test Data

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	EN 300 386 v.1.3.1; FCC	Class:	B
Immunity Spec:	TBD	Environment:	TTE

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Inspiron 3700 PPX	Laptop	99080	-
US Robotics	Pilot100	PDA	6.0482E+11	MQ9001
HP	ThinkJet 2225C+	Parallel Printer	3028576892	DS16XU225

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
D-Link	DSS-5+	10/100 Fast Ethernet Switch	B20522B004920	-
Coby	CT-P220	Phone	324001152	-
Teltone corp	TLS-3A-01	Telephone line simulator	132915	-
Ergo	MP-989	Laptop	KC05LGS140010	-
Dell	PP01L	Laptop	6P326A02	-
2Wire	PC port PCP-1	PCP-1	00D09E3C3E1D	-

#### Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Chipboy-RJ45	Switch	Cat5	Unshielded	3m
Chipboy-RJ11	Line Simulator	RJ11	Unshielded	4m
Chipboy-USB	Dell Laptop	USB	Shielded	2m
Dell Laptop	Printer	Serial	Shielded	2m
Dell Laptop	PDA	Serial	Shielded	2m
Line simulator	PC port	Serial	Unshielded	2m
Line simulator	Phone	RJ11	Unshielded	5m
PC port	Laptop	line	Unshielded	0.5m

#### EUT Operation During Emissions

During emissions testing, the EUT was connected to two remote laptop PCs using the EUT's phone line and Eherent ports. The two Laptops are pinging the EUT, a switch is pinging the EUT ethernet via loopback. A third laptop is pinging the EUT via wireless.



## EMC Test Data

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Emissions Spec:	EN 300 386 v.1.3.1; FCC	Class:	B
Immunity Spec:	TBD	Environment:	TTE

### Test Configuration #2

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Inspiron 3700 PPX	Laptop	99080	-
US Robotics	Pilot100	PDA	6.0482E+11	MQ9001
HP	ThinkJet 2225C+	Parallel Printer	3028576892	DS16XU225
D-Link	DSS-5+	10/100 Fast Ethernet Switch	B20522B004920	-
Coby	CT-P220	Phone	324001152	-
Teltone corp	TLS-3A-01	Telephone line simulator	132915	-
Ergo	MP-989	Laptop	KC05LGS140010	-
2Wire	PC port PCP-1	PCP-1	00D09E3C3E1D	-

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	PP01L	Laptop	6P326A02	-

#### Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Chipboy-RJ45	Switch	Cat5	Unshielded	3m
Chipboy-RJ11	Line Simulator	RJ11	Unshielded	4m
Chipboy-USB	Dell Laptop	USB	Shielded	2m
Dell Laptop	Printer	Serial	Shielded	2m
Dell Laptop	PDA	Serial	Shielded	2m
Line simulator	PC port	Serial	Unshielded	2m
Line simulator	Phone	RJ11	Unshielded	5m
PC port	Laptop	line	Unshielded	0.5m

#### EUT Operation During Emissions

During emissions testing, the EUT was connected to two remote laptop PCs using the EUT's phone line and Ethernet ports. The two Laptops are pinging the EUT, a switch is pinging the EUT ethernet via loopback. A third laptop is pinging the EUT via wireless.



## *EMC Test Data*

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
Contact:	Jeremy Muir	Account Manager:	Christine Vu
Spec:	EN 300 386 v.1.3.1; FCC	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: 7/25/2003 Config. Used: #1  
Test Engineer: Rod Wong Config Change: None  
Test Location: SVOATS #3 EUT Voltage: 120V/60Hz

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O connections routed overhead.

On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz.

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.

**Ambient Conditions:** Temperature: 19.4 °C  
Rel. Humidity: 70 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 -1000 MHz, Preliminary Scan	EN55022 B	Eval	Refer to individual runs
2	RE, 30 - 1000MHz, Maximized Emissions	EN55022 B	Pass	-1.3dB @ 167.101MHz

## 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:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	EN 300 386 v.1.3.1; FCC	Class:	B

### Run #1: Preliminary Radiated Emissions, 30-1000 MHz

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
166.297	28.0	V	30.0	-2.0	QP	83	1.0	
166.751	27.9	V	30.0	-2.1	QP	91	1.0	
167.101	27.2	V	30.0	-2.8	QP	197	1.0	
37.800	25.2	V	30.0	-4.8	QP	270	1.3	Broadband
215.011	24.6	H	30.0	-5.4	QP	316	2.9	
217.991	22.3	H	30.0	-7.7	QP	289	3.1	
665.026	29.2	H	37.0	-7.8	QP	316	1.9	
226.010	21.6	H	30.0	-8.4	QP	279	2.4	
665.026	28.3	V	37.0	-8.7	QP	32	1.0	
399.046	28.1	H	37.0	-8.9	QP	189	2.6	
399.046	27.5	V	37.0	-9.5	QP	0	1.0	
218.250	29.9	H	30.0	-0.1	QP	53	3.1	Support equipment

Note 1: 531.996MHz and 722.444MHz was not measured due to ambient noise levels.

### Run #2: Maximized Readings From Run #1

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
167.101	28.7	V	30.0	-1.3	QP	197	1.0	
166.297	28.2	V	30.0	-1.8	QP	83	1.0	
166.751	28.0	V	30.0	-2.0	QP	91	1.0	
37.800	25.2	V	30.0	-4.8	QP	270	1.3	Broadband
215.011	24.7	H	30.0	-5.3	QP	316	2.9	
217.991	22.6	H	30.0	-7.4	QP	289	3.1	



## *EMC Test Data*

Client:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
Contact:	Jeremy Muir	Account Manager:	Christine Vu
Spec:	EN 300 386 v.1.3.1; FCC	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: 7/25/2003 Config. Used: 2  
Test Engineer: Jay Dickinson Config Change: none  
Test Location: SVOATS #3 EUT Voltage: 120V/60Hz

## General Test Configuration

For tabletop equipment, 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: 19.4 °C  
Rel. Humidity: 70 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	EN55022B	Pass	-14.4dB @ 0.199MHz

### 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:	2 Wire, Inc.	Job Number:	J51776
Model:	ChipBoy SLI	T-Log Number:	T51789
		Account Manager:	Christine Vu
Contact:	Jeremy Muir		
Spec:	EN 300 386 v.1.3.1; FCC	Class:	B

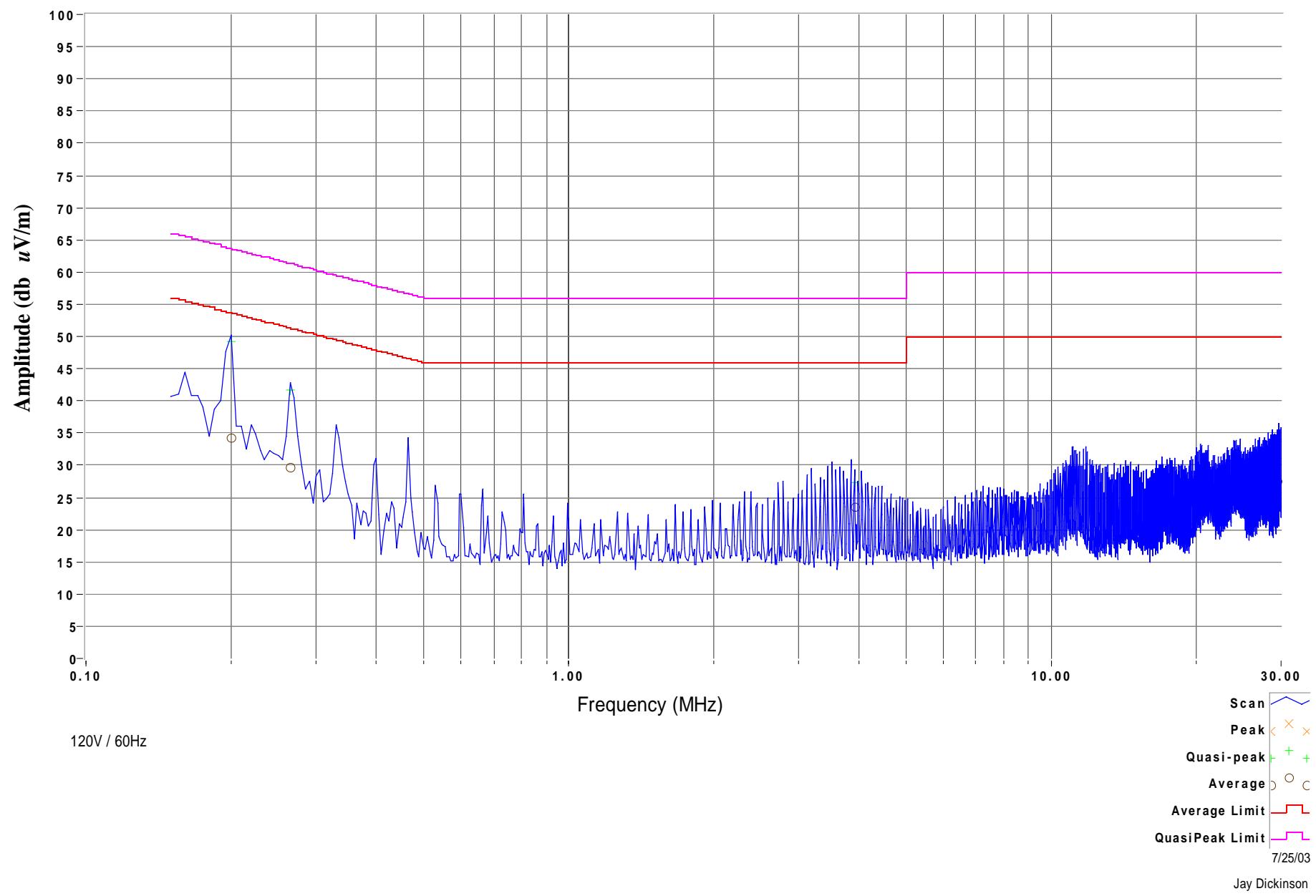
### Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dB $\mu$ V	Line	Limit	Margin	QP/Ave	
0.199	49.2	Line 2	63.6	-14.4	QP	
0.199	48.5	Line 1	63.6	-15.1	QP	
0.199	36.1	Line 1	53.6	-17.5	AV	
0.199	34.2	Line 2	53.6	-19.4	AV	
0.265	41.6	Line 2	61.1	-19.5	QP	
0.268	40.6	Line 1	61.1	-20.5	QP	
0.268	30.5	Line 1	51.1	-20.6	AV	
0.265	29.7	Line 2	51.1	-21.4	AV	
3.920	23.6	Line 2	46.0	-22.4	AV	
29.426	27.5	Line 2	50.0	-22.5	AV	
29.426	33.6	Line 2	60.0	-26.4	QP	
3.920	27.2	Line 2	56.0	-28.8	QP	
30.000	13.3	Line 1	50.0	-36.7	AV	
3.538	8.2	Line 1	46.0	-37.8	AV	
30.000	20.3	Line 1	60.0	-39.7	QP	
3.538	13.4	Line 2	56.0	-42.6	QP	



## SVOATS#3: 2Wire ChipBoy SLI Run 1

Spec:  
EN55022B  
Mains Lead  
Line 2





## SVOATS#3: 2Wire ChipBoy SLI Run 1

Spec:  
EN55022B  
Mains Lead  
Line 1

