Elliott Laboratories Inc.
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684 West Maude Avenue
Sunnyvale, CA 94085-3518
408-245-7800 Phone
408-245-3499 Fax

July 15, 2005

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

Subject: FCC and Industry Canada Report, model Wireless Remote

Dear Mr. Muir:

A report has been created detailing the results of the FCC and IC electromagnetic emissions testing performed on the Wireless Remote. This has been submitted to the FCC for a Grant of Equipment Authorization pursuant to Subpart C of Part 15 of FCC Rules (CFR 47) regarding intentional radiators and to Industry Canada as a Low Power, License Exempt Radio Communications Device. Please find this report enclosed. This report has been sent to the FCC and Industry Canada.

We will periodically check the status of the applications and immediately communicate any problems, should they arise.

If you have any questions, please don't hesitate to call us at 408-245-7800.

Sincerely,

Juan Martinez
Senior EMC Engineer

JM/dmg
Enclosure: Copy of Application Package

Elliott Laboratories Inc.
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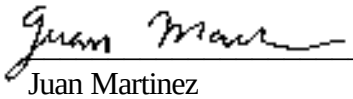
Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 210 And FCC Part 15 Sections 15.231 on the 2Wire, Inc. Transmitter Model: Wireless Remote

FCC ID:	PGR2WMPLRMT
GRANTEE:	2Wire, Inc. 1704 Automation Parkway San Jose, CA 95131
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	July 15, 2005
FINAL TEST DATE:	July 12, 2005

AUTHORIZED SIGNATORY: 

Juan Martinez
Senior EMC Engineer

ACCREDITED
2016-01

Equipment Name and Model:

Transceiver, Wireless Remote

Manufacturer:

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

Tested to applicable standard:
RSS210, Issue 6, September 2005
Low Power License-Exempt Radio Communication Devices
FCC Part 15 321

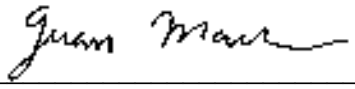
Test Report Prepared For:
Jeremy Muir
2Wire, Inc.
1704 Automation Parkway
San Jose, CA 95131

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC4549 2, Dated July 3, 1997

Declaration of Compliance

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4:2003 as detailed in section 5.3 of RSS-210, Issue 6); and that the equipment performed in accordance with the data submitted in this report.



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

Date: July 15, 2005

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SCOPE

An electromagnetic emissions test has been performed on the 2Wire, Inc. model Wireless Remote pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and Industry Canada Radio Standards Specification RSS-210 for Low Power, License-Exempt Radio Communication 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 Industry Canada performance and procedural standards.

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

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

The test results recorded herein are based on a single type test of the 2Wire, Inc. model Wireless Remote 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 for the radiated and conducted emissions of intentional radiators and Industry Canada RSS-210 for Low Power, License-Exempt Radio Communication Devices. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules and Industry Canada Radio Standards Procedure RSP-100.

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.

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

STATEMENT OF COMPLIANCE

The tested sample of 2Wire, Inc. model Wireless Remote complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators and Industry Canada specification RSS 210 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands).

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

TEST RESULTS SUMMARY

15.231 / RSS 210 Section 6.1

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz	Battery operated	N/A
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz	Battery operated	N/A
15.231 (a) (1)	6.1.1(a) (1)	Duration of manually activated transmission	<5 seconds after button released	
15.231 (a) (3)	6.1.1(a) (3)	Transmissions at predetermined / regular intervals are not permitted	All transmissions are control signals that are manually activated and do not occur at predetermined intervals.	Compliant
15.231 (b)	6.1.1(b) / Table 1	Transmitter Radiated Emissions, 433.87 MHz	71.1 dBuV/m @ 433.875 MHz (-9.7dB)	Compliant
15.231 (b)	6.1.1(b) / Table 1	Transmitter Radiated Spurious Emissions, 30-4180 MHz	48.9 dBuV/m @ 868.75 MHz (-11.9dB)	Compliant
15.231 (c)	6.1.1 (c)	Bandwidth	62 kHz	Compliant
15.231 (d)	6.1.1 (d)	Frequency Stability	Not Applicable	N/A
15.109	7.3	Receiver Spurious Emissions	Transmitter only	N/A

Note 1 – Refer to the operational description included with this application for detailed description and timing diagrams for transmission duration.
Note 2 – As the device is intended for hand-held operation it was tested in all three orthogonal orientations.

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 UKAS document LAB 34.

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 Wireless Remote is a 433 MHz remote control which is designed to control the 2Wire Media Portal. 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 EUT is battery powered using 4 AAA batteries.

The sample was received on July 12, 2005 and tested on July 12, 2005. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
2Wire	Wireless Remote	433 MHz Remote Control	EMI Sample

OTHER EUT DETAILS

List any items from the test log.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 9 cm wide by 3 cm deep by 22 cm long.

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
None				

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

Manufacturer	Model	Description	Serial Number	FCC ID
None				

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)
None				

EUT OPERATION

Transmitting continuously at full power.

ANTENNA SYSTEM

The antenna is integral to the device.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on July 12, 2005 at the Elliott Laboratories Open Area Test Site # 2 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

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

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 & 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.

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.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

CONDUCTED EMISSIONS SPECIFICATION LIMITS, SECTION 15.207 & 15.107(a)

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

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

CONDUCTED EMISSIONS SPECIFICATION LIMITS, RSS 210

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

FUNDAMENTAL AND HARMONIC LIMITS 15.231 (b) / RSS 210 Table 1

The table below shows the limits for both the Fundamental and Harmonic emissions for each frequency band of operation detailed in Section 15.231 (b) for control signals.

Operating Frequency (MHz)	Field strength (microvolts/m)	Harmonics (microvolts/m)
70 - 130	1250	125
130 - 174	1250 - 3750	125 - 375
174 – 260	3750	375
260 – 470	3750 – 12,500	375 - 1250
Above 470	12,500	1250

FUNDAMENTAL AND HARMONIC LIMITS 15.231 (e)/RSS 210 Table 4

The table below shows the limits for both the Fundamental and Harmonic emissions (that do not fall in restricted bands) for each frequency band of operation detailed in Section 15.231 (e) for data signals.

Operating Frequency (MHz)	Field strength (microvolts/m)	Harmonics (microvolts/m)
70 - 130	500	50
130 - 174	500 - 1500	50 - 150
174 – 260	1500	150
260 – 470	1500 – 5000	150 - 500
Above 470	5000	500

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209 / RSS 210 Table 3

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands and the limits for all emissions for a low power device operating under the general rules of RSS 210 and FCC Part 15 Subpart C.

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

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.109 / RSS 210 Table 3 (RECEIVER)

The table below shows the limits for emissions from the receiver.

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_C = R_r + F_d$$

and

$$M = R_C - L_S$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_C = Corrected Reading in dBuV/m

L_S = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Bandwidth and Timing, 12-Jul-05
Engineer: Mark Hill

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	28-Mar-06

Radiated Emissions, 30 - 5,000 MHz, 12-Jul-05
Engineer: J Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	487	13-May-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-May-06
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	26-Apr-06
EMCO	Biconical Antenna, 30-300 MHz	3110B	1320	25-Aug-05
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1321	30-Mar-07
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	23-May-06

EXHIBIT 2: Test Measurement Data

12 pages

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.231	Class:	B
Immunity Spec:		Environment:	

EMC Test Data

For The

2Wire

Model

Wireless Remote

Date of Last Test: 8/16/2005

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.231	Class:	B
Immunity Spec:		Environment:	

EUT INFORMATION

General Description

The EUT is a 433 MHz remote control which is designed to control the 2Wire Media Portal. 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 EUT is battery powered using 4 AAA batteries.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
2Wire	Wireless Remote	433 MHz Remote Control	EMI Sample	PGR2WMPLRMT

Other EUT Details

Prior to testing the device a fresh set of batteries was installed.

EUT Antenna

The antenna is integral to the device.

EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 9 cm wide by 3 cm deep by 22 cm long.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None made

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

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Emissions Spec:	FCC 15.231	Class:	B
Immunity Spec:		Environment:	

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

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)
None				

EUT Operation During Emissions Tests

Transmitting continously at full power.

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	N/A

FCC 15.231(a) - Bandwidth and Timing Measurements

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: 7/12/2005
Test Engineer: Mark Hill
Test Location: 3m Lab
Config. Used: 1
Config Change: None
EUT Voltage: Battery Powered

General Test Configuration

The timing and bandwidth measurements were taken with a spectrum analyzer and a near field probe located adjacent to the EUT.

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 50 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	20dB Bandwidth	15.231(c)	Pass	62 kHz
2	Timing	15.231(a)	Pass	(Total on Time is < 5 sec) Refer to plots

Modifications Made During Testing:

No modifications were made to the EUT during testing

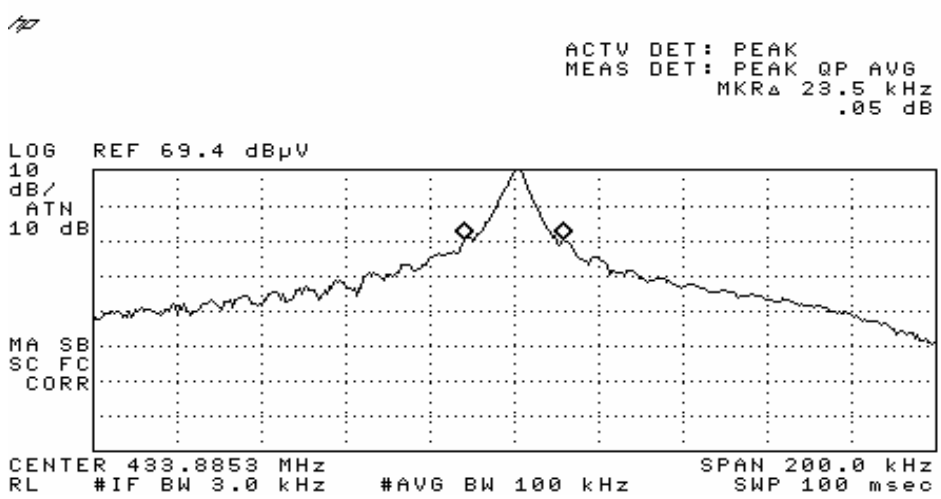
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	N/A

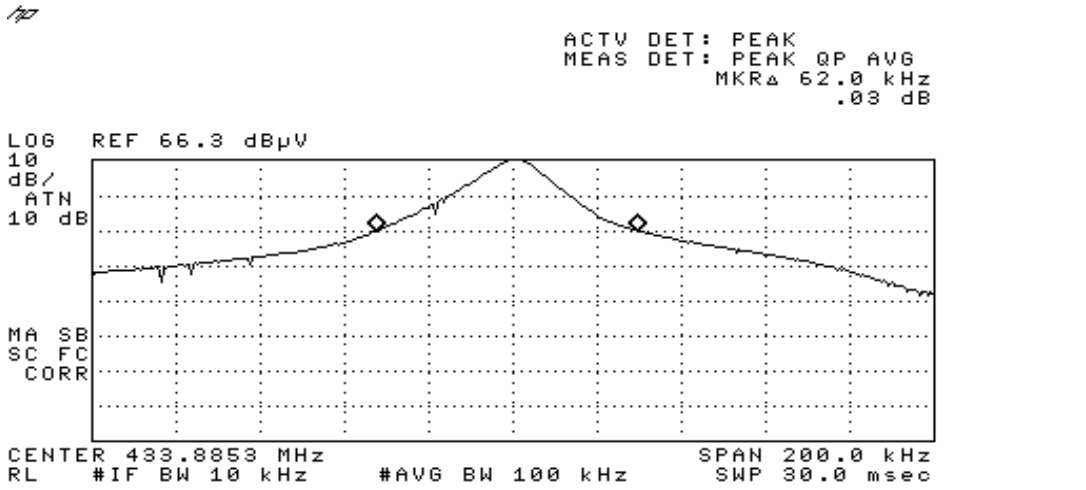
Run #1: Signal Bandwidth

Frequency (MHz)	Resolution Bandwidth	20dB Signal Bandwidth	Limit
433.88	3 kHz	0.0235 MHz	1.0847



Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	N/A

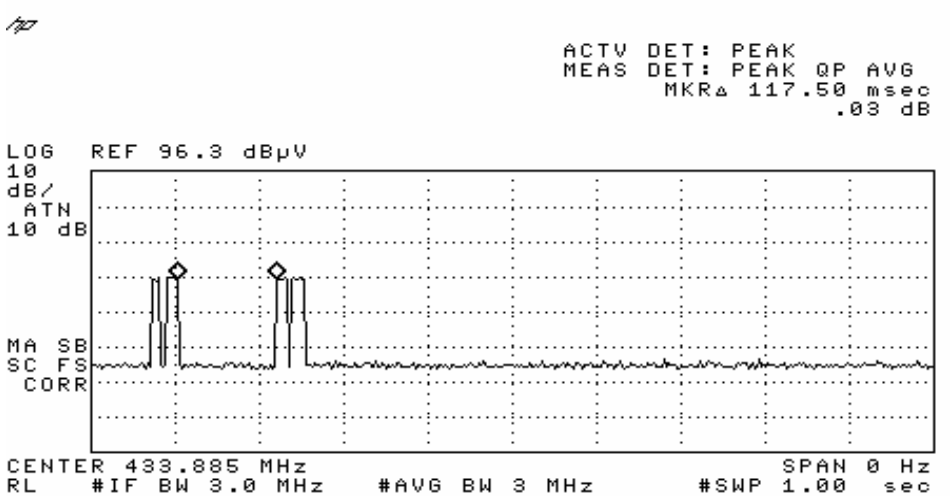
Frequency (MHz)	Resolution Bandwidth	20dB Signal Bandwidth	Limit
433.88	10 kHz	0.0062 MHz	1.0847



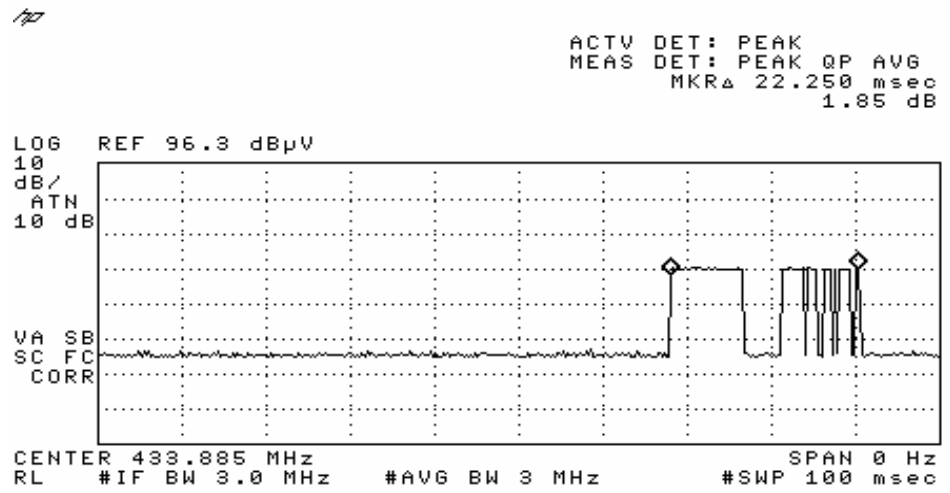
Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	N/A

Run #2: Timing

Plot showing the timing between data packets > 100ms



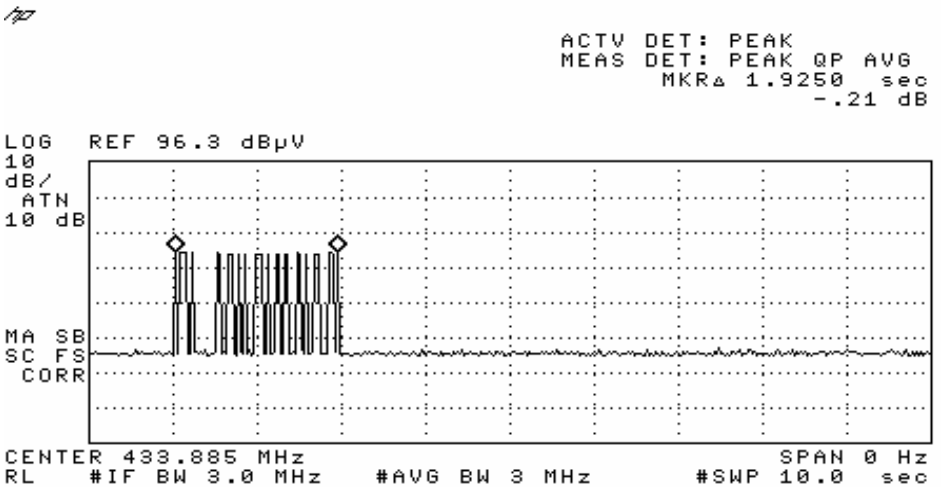
Individual packet - duration 22.25ms with duty cycle (refer to operational description for duty cycle information)



timing resolution on the analyzer is not adequate to resolve the on/off times within the burst

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	N/A

Total control message on time after button is release which is less then 5secs



Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	B

Radiated 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: 7/8/2005
Test Engineer: Joseph Cadigal
Test Location: SVOATS# 2

Config. Used: 1
Config Change: none
EUT Voltage: battery

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

In the anechoic chamber the measurement antenna was located 3m from the EUT. The measurement data has been extrapolated to the appropriate distance.

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 measuremen

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.

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Fundamental	FCC 15.231a	Pass	-9.7dB @ 433.87 MHz
2	RE, Spurious Emission	FCC 15.231a	Pass	-11.9dB @ 868.75 MHz

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:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	B

OATS Measurements

Run #1: Fundamental and 2nd harmonic

Frequency	Level	Pol	FCC 15.231a		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
433.875	91.1	V	100.8	-9.7	Peak	116	1.0	upright
433.875	71.1	V	80.8	-9.7	Avg	116	1.0	upright
433.875	90.5	H	100.8	-10.3	Peak	29	1.0	laying flat on table
433.875	70.5	H	80.8	-10.3	Avg	29	1.0	laying flat on table
433.875	88.0	H	100.8	-12.8	Peak	151	2.0	on side
433.875	68.0	H	80.8	-12.8	Avg	151	2.0	on side
433.875	82.4	V	100.8	-18.4	Peak	227	1.0	on side
433.875	62.4	V	80.8	-18.4	Avg	227	1.0	on side
433.875	60.6	V	80.8	-20.2	Avg	130	2.0	laying flat on table
433.875	80.6	V	100.8	-20.2	Peak	130	2.0	laying flat on table
433.875	79.8	H	100.8	-21.0	Peak	53	1.3	upright
433.875	59.8	H	80.8	-21.0	Avg	53	1.3	upright
868.750	68.9	V	80.8	-11.9	Peak	102	1.0	on side
868.750	48.9	V	60.8	-11.9	Avg	102	1.0	on side
868.750	66.8	H	80.8	-14.0	Peak	53	1.9	upright
868.750	46.8	H	60.8	-14.0	Avg	53	1.9	upright
868.750	66.5	H	80.8	-14.3	Peak	133	1.0	laying flat on table
868.750	46.5	H	60.8	-14.3	Avg	133	1.0	laying flat on table
868.750	64.4	H	80.8	-16.4	Peak	210	1.0	on side
868.750	44.4	H	60.8	-16.4	Avg	210	1.0	on side
868.750	63.5	V	80.8	-17.3	Peak	154	1.5	upright
868.750	43.5	V	60.8	-17.3	Avg	154	1.5	upright
868.750	61.6	V	80.8	-19.2	Peak	246	1.6	laying flat on table
868.750	41.6	V	60.8	-19.2	Avg	246	1.6	laying flat on table

Note - peak readings, peak limit. Average readings calculated from peak readings by applying average correction factor of 20dB - this assumes a maximum duty cycle of 10% in any 100ms period. With 10% duty cycle average reading is 20dB below peak reading.

Elliott

EMC Test Data

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	B

Run #2: Harmonic emission, 1000-5000 MHz

Frequency	Level	Pol	FCC 15.231a		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1301.625	60.2	V	74.0	-13.8	Peak	112	1.5	upright
1301.625	40.2	V	54.0	-13.8	Avg	112	1.5	upright
1301.611	37.6	V	54.0	-16.4	Avg	99	1.0	laying flat on table
1301.611	37.6	V	54.0	-16.4	Avg	355	1.0	on side
1301.611	57.6	V	74.0	-16.4	Peak	355	1.0	on side
1301.611	57.6	V	74.0	-16.4	Peak	99	1.0	laying flat on table
1301.559	37.0	H	54.0	-17.0	Avg	51	1.0	on side
1301.559	57.0	H	74.0	-17.0	Peak	51	1.0	on side
1301.618	36.9	H	54.0	-17.1	Avg	16	2.0	upright
1301.618	56.9	H	74.0	-17.1	Peak	16	2.0	upright
1301.626	36.0	H	54.0	-18.0	Avg	57	1.0	laying flat on table
1301.626	56.0	H	74.0	-18.0	Peak	57	1.0	laying flat on table
3037.102	33.3	H	60.8	-27.5	Avg	346	1.1	upright
3037.102	53.3	H	80.8	-27.5	Peak	346	1.1	upright
3470.933	52.9	H	80.8	-27.9	Peak	335	1.0	upright
3470.933	32.9	H	60.8	-27.9	Avg	335	1.0	upright
2603.197	32.3	H	60.8	-28.5	Avg	338	1.9	on side
2603.197	52.3	H	80.8	-28.5	Peak	338	1.9	on side
3037.132	50.6	V	80.8	-30.2	Peak	0	1.2	upright
3470.948	50.6	V	80.8	-30.2	Peak	339	1.0	upright
3037.132	30.6	V	60.8	-30.2	Avg	0	1.2	upright
3470.948	30.6	V	60.8	-30.2	Avg	339	1.0	upright
2603.257	49.8	V	80.8	-31.0	Peak	86	1.4	on side
2169.375	29.8	H	60.8	-31.0	Avg	360	1.0	upright
2603.257	29.8	V	60.8	-31.0	Avg	86	1.4	on side
2169.375	49.8	H	80.8	-31.0	Peak	360	1.0	upright
2603.160	49.3	H	80.8	-31.5	Peak	90	1.9	laying flat on table
2603.160	29.3	H	60.8	-31.5	Avg	90	1.9	laying flat on table
3037.132	28.9	H	60.8	-31.9	Avg	237	1.5	laying flat on table
3037.132	48.9	H	80.8	-32.0	Peak	237	1.5	laying flat on table
2603.250	48.7	V	80.8	-32.1	Peak	341	1.0	upright
2603.250	28.7	V	60.8	-32.1	Avg	341	1.0	upright
3471.053	28.7	H	60.8	-32.1	Avg	360	1.4	laying flat on table
3471.053	48.7	H	80.8	-32.1	Peak	360	1.4	laying flat on table
2603.377	28.6	V	60.8	-32.2	Avg	112	1.3	laying flat on table
2603.377	48.6	V	80.8	-32.2	Peak	112	1.3	laying flat on table
2169.390	28.4	V	60.8	-32.4	Avg	271	1.4	on side

Continued on next page

Client:	2Wire	Job Number:	J60278
Model:	Wireless Remote	T-Log Number:	T60352
		Account Manager:	Mark Hill
Contact:	Jeremy Muir		
Spec:	FCC 15.231	Class:	B

Run #2: Harmonic Emission, 1000-5000 MHz (continued)

Frequency	Level	Pol	FCC 15.231a		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2169.473	28.4	V	60.8	-32.4	Avg	68	1.0	upright
2169.390	48.4	V	80.8	-32.4	Peak	271	1.4	on side
2169.473	48.4	V	80.8	-32.5	Peak	68	1.0	upright
1735.455	47.8	H	80.8	-33.0	Peak	22	1.0	upright
1735.455	27.8	H	60.8	-33.0	Avg	22	1.0	upright
1735.448	46.5	V	80.8	-34.3	Peak	0	1.0	on side
1735.448	26.5	V	60.8	-34.3	Avg	0	1.0	on side
2169.315	26.0	H	60.8	-34.8	Avg	19	1.0	laying flat on table
2169.315	46.0	H	80.8	-34.8	Peak	19	1.0	laying flat on table
2169.285	25.9	H	60.8	-34.9	Avg	251	1.9	on side
2169.285	45.9	H	80.8	-34.9	Peak	251	1.9	on side
1735.463	45.4	V	80.8	-35.4	Peak	360	1.0	laying flat on table
1735.463	25.4	V	60.8	-35.4	Avg	360	1.0	laying flat on table
2169.120	45.3	V	80.8	-35.5	Peak	360	1.0	laying flat on table
2169.120	25.3	V	60.8	-35.5	Avg	360	1.0	laying flat on table
1735.508	45.1	H	80.8	-35.7	Peak	0	2.2	laying flat on table
1735.508	25.1	H	60.8	-35.7	Avg	0	2.2	laying flat on table
1735.410	44.5	V	80.8	-36.3	Peak	358	2.7	upright
1735.410	24.5	V	60.8	-36.3	Avg	358	2.7	upright
1735.561	44.4	H	80.8	-36.4	Peak	194	1.0	on side
1735.561	24.4	H	60.8	-36.4	Avg	194	1.0	on side

Note - peak readings, peak limit. Average readings calculated from peak readings by applying average correction factor of 20dB - this assumes a maximum duty cycle of 10% in any 100ms period. With 10% duty cycle average reading is 20dB below peak reading.

EXHIBIT 3: Photographs of Test Configurations

Uploaded in separate attachment

EXHIBIT 4: Detailed Photographs of 2Wire, Inc. Model Wireless Remote

Uploaded in separate attachment

EXHIBIT 5: Block Diagram of 2Wire, Inc. Model Wireless Remote

Uploaded in separate attachment

EXHIBIT 6: Schematic Diagrams of 2Wire, Inc. Model Wireless Remote

Uploaded in separate attachment

EXHIBIT 7: Theory of Operation for 2Wire, Inc. Model Wireless Remote

Uploaded in separate attachment

EXHIBIT 8: Advertising Literature

Uploaded in separate attachment

EXHIBIT 9: Operator's Manual

Uploaded in separate attachment