



**ADDENDUM TO FC03-025 TEST REPORT**

**FOR THE**

**TRANSMITTER (RP-800-RT) & RECEIVER (RP-800-RR)**

**FCC PART 15 SUBPART B SECTIONS 15.107 & 15.109 CLASS B**

**AND**

**FCC PART 15 SUBPART C SECTION 15.231**

**COMPLIANCE**

**DATE OF ISSUE: AUGUST 8, 2003**

**PREPARED FOR:**

e-BI  
10700 SW Beaverton Hillsdale Hwy, Ste. 655  
Beaverton, OR 97005

P.O. No.: 7005  
W.O. No.: 79450

**PREPARED BY:**

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CKC Laboratories, Inc.  
5473A Clouds Rest  
Mariposa, CA 95338

Date of test: March 21 - April 9, 2003

**Report No.: FC03-025A**

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## **ADMINISTRATIVE INFORMATION**

**DATE OF TEST:** March 21 - April 9, 2003

**DATE OF RECEIPT:** March 21, 2003

**PURPOSE OF TEST:** To demonstrate the compliance of the Transmitter (RP-800-RT) & Receiver (RP-800-RR) with the requirements for FCC Part 15 Subpart B Sections 15.107 & 15.109 Class B and FCC Part 15 Subpart C Section 15.231 devices.  
Addendum A is to correct the FCC ID number on the transmitter when it was used as a peripheral.

**TEST METHOD:** ANSI C63.4 (1992)

**MANUFACTURER:** e-BI  
10700 SW Beaverton Hillsdale Highway, Suite 655  
Beaverton, OR 97005

**REPRESENTATIVE:** Jason Mershon

**TEST LOCATION:** CKC Laboratories, Inc.  
5473A Clouds Rest  
Mariposa, CA 95338

## SUMMARY OF RESULTS

As received, the e-BI Transmitter (RP-800-RT) & Receiver (RP-800-RR) was found to be fully compliant with the following standards and specifications:

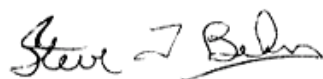
United States	Section Descriptions	Canada
<b>FCC Part 15 Subpart B</b>		<b>IEC003</b>
15.107 Class A	Mains Conducted Emissions	Class B
15.109 Class A	Radiated Emissions	Class B
<b>FCC Part 15 Subpart C</b>		<b>RSS 210</b>
15.203	Transmitter Antenna	5.5
15.205	Restricted Bands of Operation (RSS 210 Table 2)	6.3
15.209	General Field Strength Requirements (RSS 210 Table 3)	6.2.1
15.231 (a)	Periodic Operation	6.1.1 (a)
15.231 (b)	Field Strength Limitations (RSS 210 Table 1)	6.1.1 (b)
15.231 (c)	Bandwidth Limitation	6.1.1 (c)
15.231 (e)	Reduced Field Strength (RSS 210 Table 4)	6.1.1 (e)
ANSI C63.4 (1992)	<b>Test Method</b>	ANSI C63.4 (1992)
		Industry of Canada File No. IC 3082-B

## CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

## APPROVALS

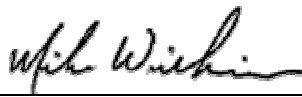
### QUALITY ASSURANCE:



Steve Behm, Director of Engineering Services  
and Quality Assurance



Joyce Walker, Quality Assurance Administrative  
Manager



Mike Wilkinson, Lab Manager

### TEST PERSONNEL:



Randy Clark, EMC Engineer

#### **FCC 15.31(e) Voltage Variations**

A new battery was used for all testing.

#### **FCC 15.31(m) Number of Channels**

This device operates on a single channel.

#### **FCC 15.33(a) Frequency Ranges Tested**

15.107 Conducted Emissions: 150 kHz – 30 MHz

15.109 Radiated Emissions: 30 MHz – 1000 MHz

15.209 Radiated: 9 kHz – 3.5 GHz

<b>FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE</b>			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	3.5 GHz	1 MHz

#### **FCC 15.203 Antenna Requirements**

The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

#### **FCC 15.205 Restricted Bands**

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

#### **EUT Operating Frequency**

The EUT was operating at 315 MHz.

#### **Temperature And Humidity During Testing**

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

### **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

The EUT tested by CKC Laboratories was a production unit. The handheld periodically operated transmitter (RP-800-RT) and the wallmounted receiver (RCMR-002) are designed to be used with an irrigation control system.

The following model was tested by CKC Laboratories: **PCMR-001 and PCMR-002**

Since the time of testing the manufacturer has chosen to use the following model name in its place. Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets: **RP-800-RT and RP-800-RR**

### **EQUIPMENT UNDER TEST**

#### **Transmitter**

Manuf: e-BI  
Model: RP-800-RT  
Serial: 032103-001  
FCC ID: Pending

#### **Receiver**

Manuf: e-BI  
Model: RP-800-RR  
Serial: 032103-002  
FCC ID: DoC

### **PERIPHERAL DEVICES**

The EUT was tested with the following peripheral device(s):

#### **Irrigation Control**

Manuf: Rain Pro  
Model: Rain Pro Modular  
Serial: None  
FCC ID: DoC

#### **Transmitter\***

Manuf: e-BI  
Model: RP-800-RT  
Serial: 032103-001  
FCC ID: Pending

\*peripheral device during receiver testing

## REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: FCC 15.107 Six Highest Conducted Emission Levels									
FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV	SPEC LIMIT dBμV	MARGIN dB	NOTES
		Lisn dB		cable dB					
0.391430	39.8	0.0		0.1		39.9	48.0	-8.1	B
0.467786	38.2	0.0		0.1		38.3	46.6	-8.3	B
0.493238	37.3	0.0		0.1		37.4	46.1	-8.7	B
0.525235	37.2	0.0		0.1		37.3	46.0	-8.7	B
0.574685	37.9	0.1		0.1		38.1	46.0	-7.9	B
24.085860	41.5	0.2		0.3		42.0	50.0	-8.0	W

Test Method: ANSI C63.4 (1992)  
Spec Limit : FCC Part 15 Subpart B Section 15.107 Class B

NOTES: B = Black Lead  
W = White Lead

COMMENTS: EUT is a receiver used for remote irrigation control in conjunction with the RP-800-RT. EUT gains its power through the irrigation control unit, which is a representative of a typical installation. Receiver contacts would normally be mounted in conduit, however for the purposes of testing, the interconnecting wires are left uncovered. The EUT is mounted vertically on a wooden support structure which is representative of a typical installation. The transmitter (Hand-Held Remote) is located away from the test area and is set to transmit continuously in order to activate the EUT repeatedly. Frequency Range Investigated: 150kHz - 30MHz.



**Table 2: FCC 15.109 Six Highest Radiated Emission Levels**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
32.020	39.5	17.2	-27.3	0.7		30.1	40.0	-9.9	V
40.050	47.5	13.8	-27.3	0.9		34.9	40.0	-5.1	V
55.170	51.3	6.9	-27.3	1.1		32.0	40.0	-8.0	V
58.190	50.8	5.9	-27.3	1.1		30.5	40.0	-9.5	V
59.170	50.4	5.6	-27.3	1.1		29.8	40.0	-10.2	V
60.225	51.5	5.4	-27.3	1.1		30.7	40.0	-9.3	V

Test Method: ANSI C63.4 (1992)  
Spec Limit : FCC Part 15 Subpart B Section 15.109 Class B  
Test Distance: 3 Meters

NOTES: V = Vertical Polarization

COMMENTS: EUT is a receiver used for remote irrigation control in conjunction with the RP-800-RT. EUT gains its power through the irrigation control unit, which is a representative of a typical installation. Receiver contacts would normally be mounted in conduit, however for the purposes of testing, the interconnecting wires are left uncovered. The EUT is mounted vertically on a wooden support structure which is representative of a typical installation. The transmitter (Hand-Held Remote) is located away from the test area and is set to transmit continuously in order to activate the EUT repeatedly. Frequency Range Investigated: 30-1000MHz.

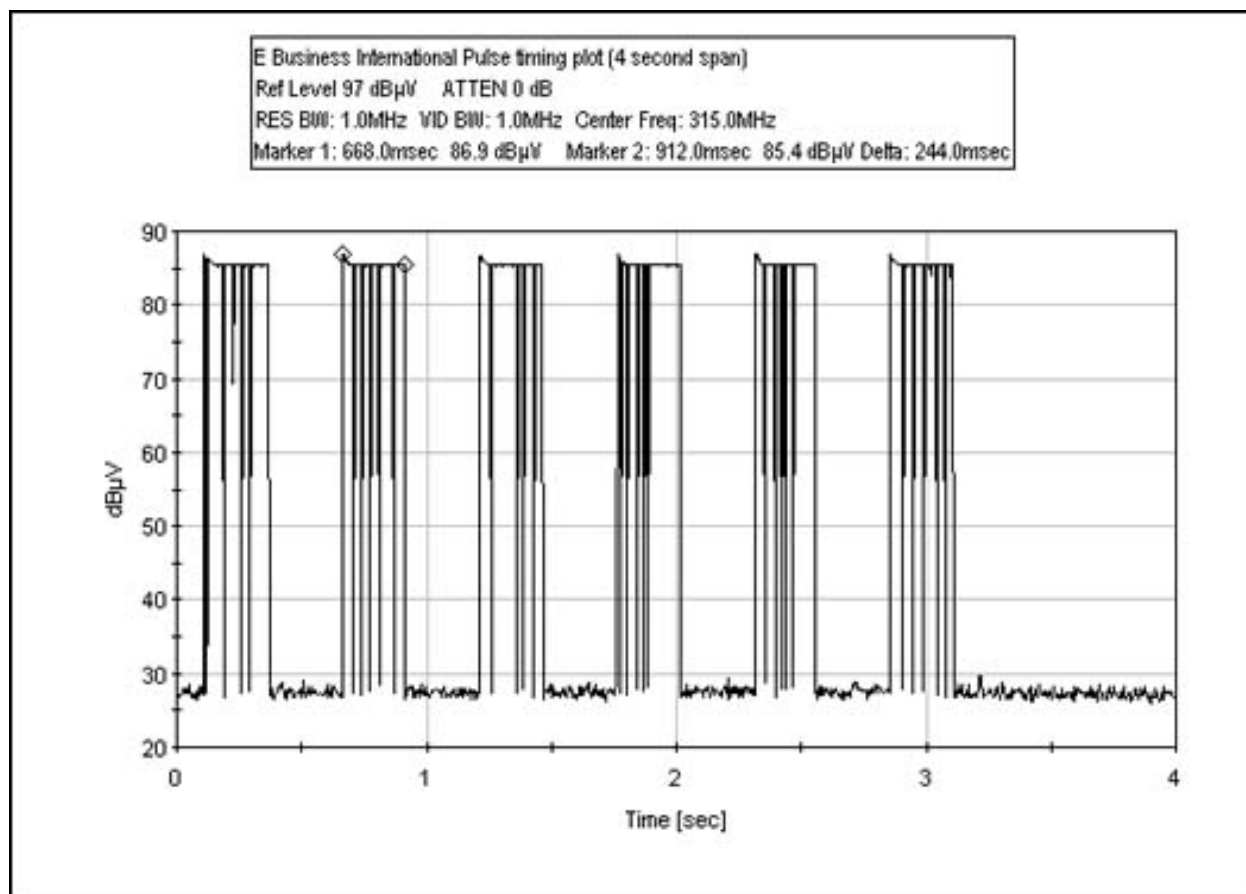
### FCC 15.231(a) - 4 Sec Plot

TEST CONDITIONS: EUT is designed for periodic operation, therefore only one instance of transmission is considered for this calculation. The timing used for calculation are averaged over 5 readings, the following 4 plots show examples of each measurement. For regulatory purposes, this calculation assumes the maximum possible duty cycle of the device at any given instant.

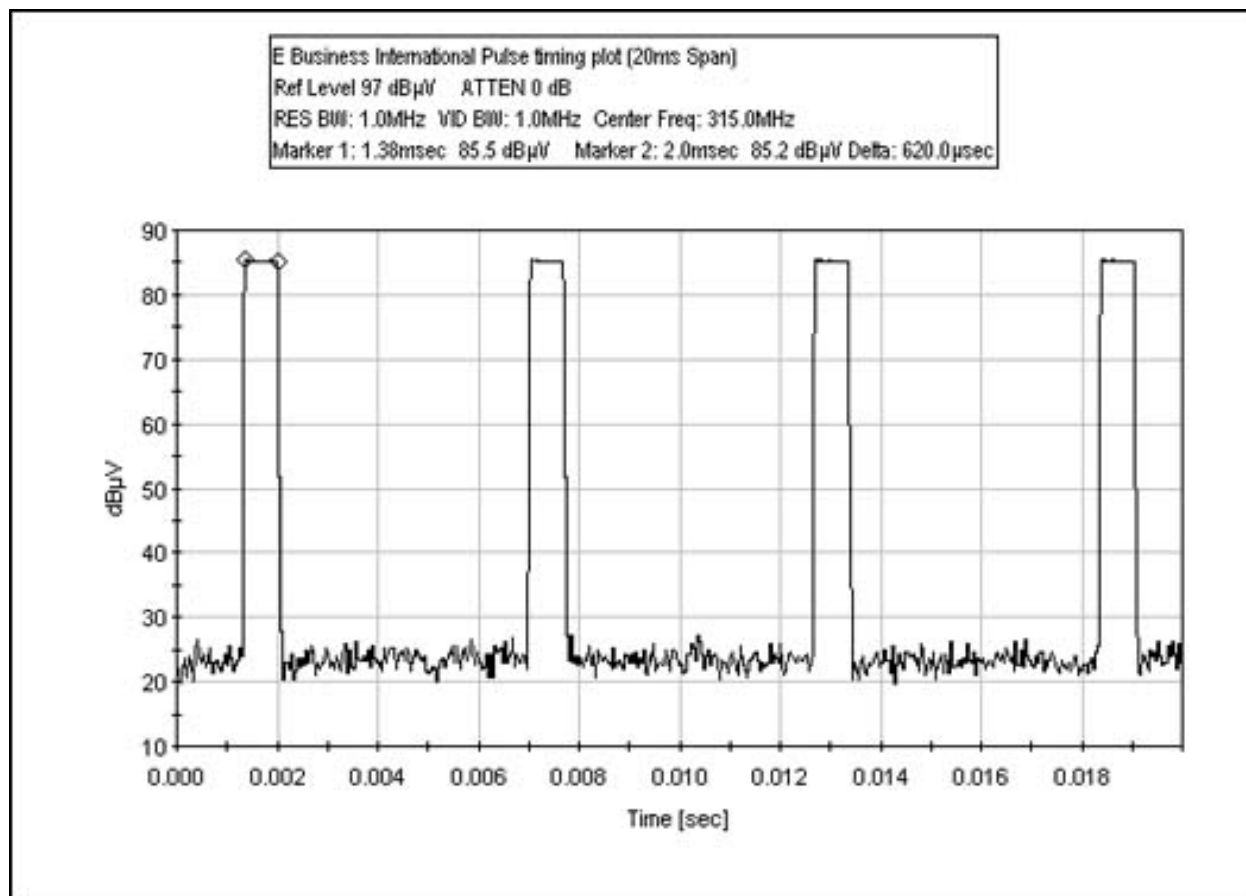
For each transmission, the transmitter sends 6 pulse trains. Each pulse train has an average duration of 248ms. Within each pulse train, the minimum dead time between pulses was determined to be 3.0ms and the average individual pulse width was determined to be 620.0uS.

Using the above pulse timing measurements, the maximum duty cycle within 100ms is calculated as follows:

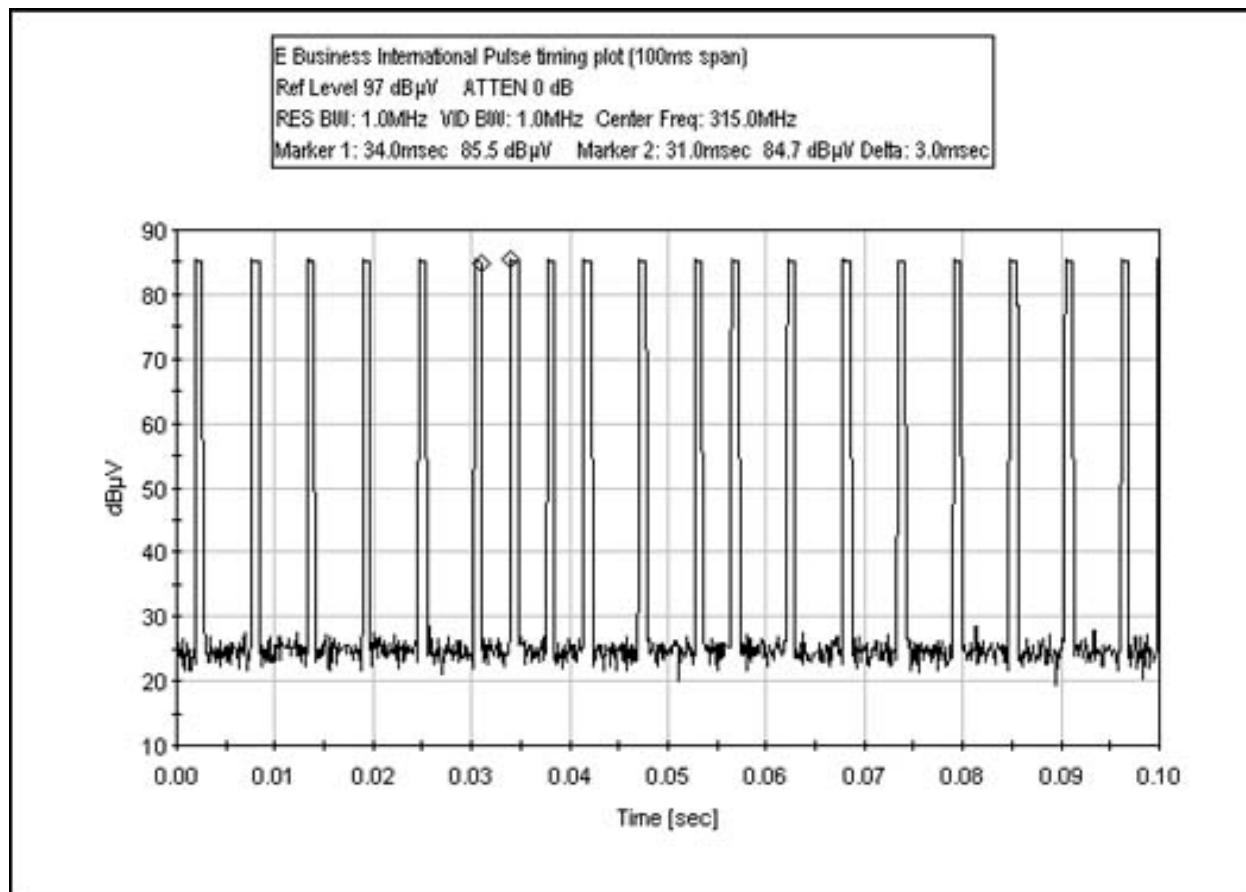
In any 100ms span, there could be a maximum of 27 pulses (Number of pulses =  $100\text{ms} / 3.62\text{ms} \sim 27.6$ ). Therefore;  $27 * 0.62\text{ms} = 16.74\text{ ms}$  or 16.74% duty cycle. In accordance with 15.35 duty cycle reduction, the minimum reduction allowed is  $20 * \text{LOG} (\text{On Time} / 100\text{ ms})$  which calculates to -15.5dB.



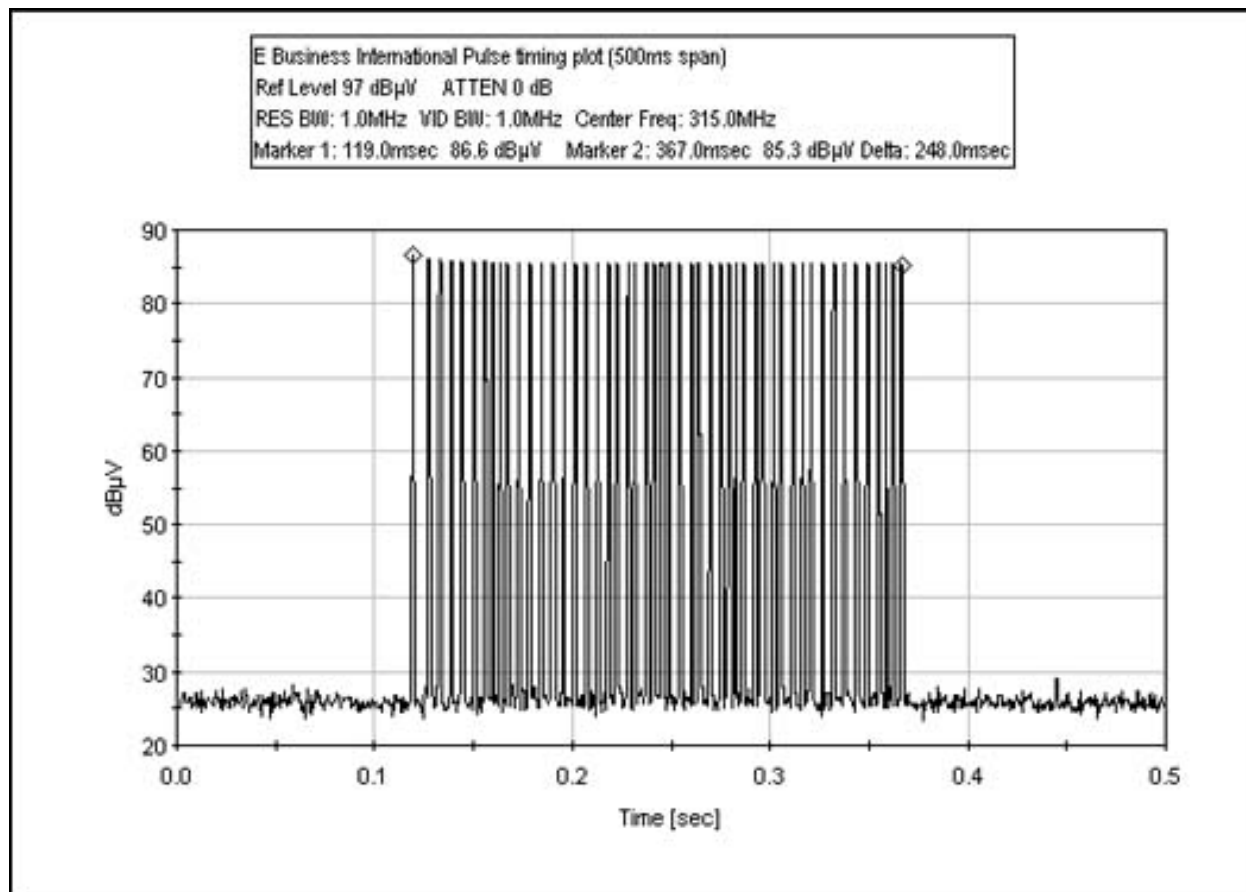
**FCC 15.231(b)(2) - 20ms Plot**



### FCC 15.231(b)(2) - 100ms Plot



### FCC 15.231(b)(2) - 500ms Plot



**Table 3: FCC 15.231(b) Peak Output Levels**

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Corr dB				
314.920	82.7	21.2	-26.6	3.1	-15.5	64.9	74.9	-10.0	H
314.989	80.9	21.2	-26.6	3.1	-15.5	63.1	74.9	-11.8	V
314.994	75.9	21.2	-26.6	3.1	-15.5	58.1	74.9	-16.8	H
314.996	85.6	21.2	-26.6	3.1	-15.5	67.8	74.9	-7.1	V
315.003	80.6	21.2	-26.6	3.1	-15.5	62.8	74.9	-12.1	H
315.010	73.0	21.2	-26.6	3.1	-15.5	55.2	74.9	-19.7	V

Test Method: ANSI C63.4 (1992)  
Spec Limit : FCC Part 15 Subpart C Section 15.231(b)  
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization  
V = Vertical Polarization

**COMMENTS:** EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna. Y axis is with the EUT lying flat on its back with the LCD screen facing upards. Z axis is with the EUT standing on it side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance with FCC 15.35. Frequency Range Investigated: Fundamental.

**Table 4: FCC 15.231(b) Six Highest Radiated Emission Levels: 9kHz-1GHz**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Corr dB				
629.902	77.5	19.7	-27.9	5.0	-15.5	58.8	61.9	-3.1	V
629.906	73.9	19.7	-27.9	5.0	-15.5	55.2	61.9	-6.7	H
629.909	77.8	19.7	-27.9	5.0	-15.5	59.1	61.9	-2.8	V
629.915	79.5	19.7	-27.9	5.0	-15.5	60.8	61.9	-1.1	H
629.923	77.7	19.7	-27.9	5.0	-15.5	59.0	61.9	-2.9	H
944.838	67.3	23.6	-27.2	6.1	-15.5	54.3	61.9	-7.6	H

Test Method: ANSI C63.4 (1992)  
Spec Limit : FCC Part 15 Subpart C Section 15.231(b)  
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization  
V = Vertical Polarization

**COMMENTS:** EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna. Y axis is with the EUT lying flat on its back with the LCD screen facing upwards. Z axis is with the EUT standing on it side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance with FCC 15.35. Lower limit reflects 15.209 within restricted bands of operation. Frequency Range Investigated: 9kHz to 1GHz.

**Table 5: FCC 15.231(b) Six Highest Radiated Emission Levels: 1-3.5GHz**

FREQUENCY MHz	METER READING dB $\mu$ V	CORRECTION FACTORS				CORRECTED READING dB $\mu$ V/m	SPEC LIMIT dB $\mu$ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Corr dB				
2204.405	67.2	27.8	-35.1	9.3	-15.5	53.7	54.0	-0.3	H
2204.438	67.1	27.8	-35.1	9.3	-15.5	53.6	54.0	-0.4	H
2204.460	62.8	27.8	-35.1	9.3	-15.5	49.3	54.0	-4.7	H
2204.495	63.9	27.8	-35.1	9.3	-15.5	50.4	54.0	-3.6	V
2834.188	52.8	29.5	-35.0	13.3	-15.5	45.1	54.0	-8.9	H
2834.210	55.4	29.5	-35.0	13.3	-15.5	47.7	54.0	-6.3	H

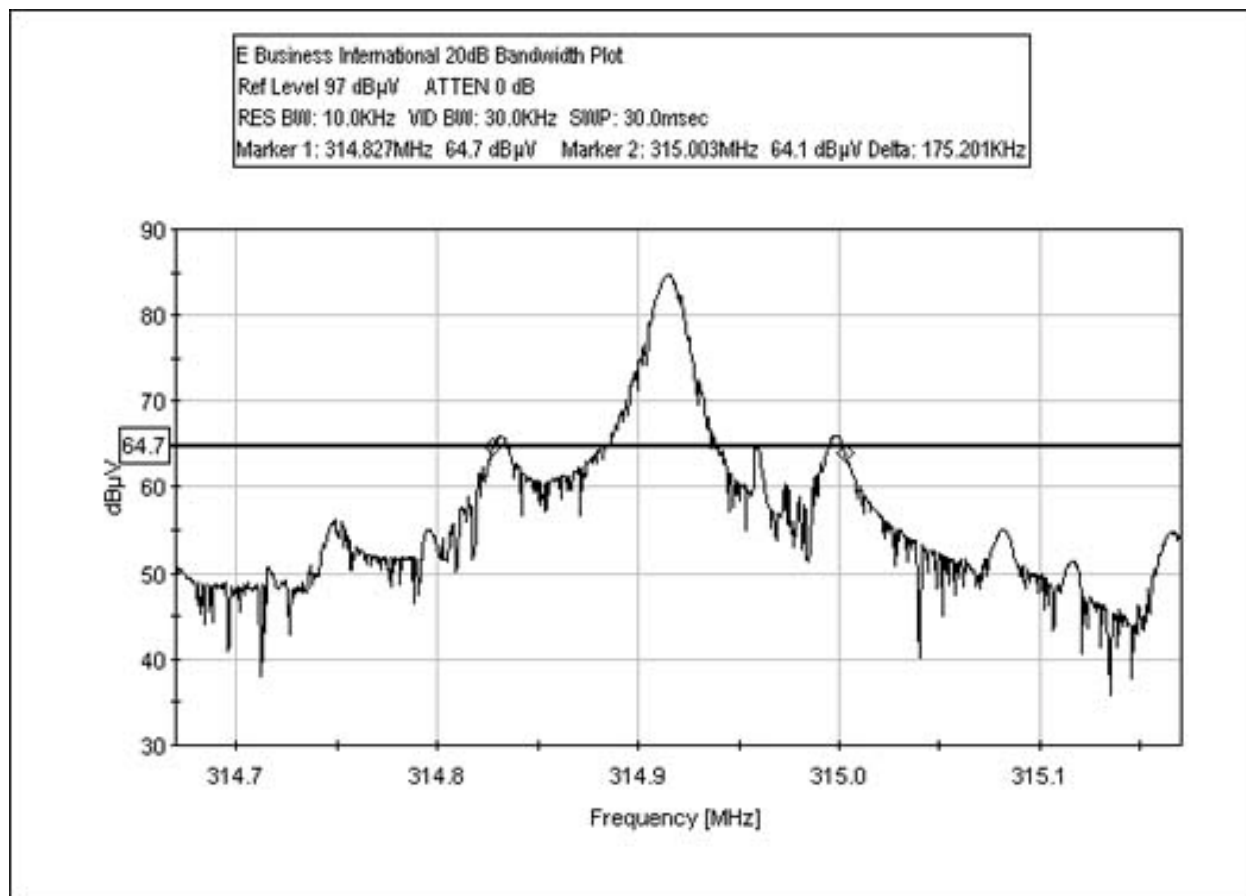
Test Method: ANSI C63.4 (1992)  
Spec Limit : FCC Part 15 Subpart C Section 15.231(b)  
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization  
V = Vertical Polarization

COMMENTS: EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna. Y axis is with the EUT lying flat on its back with the LCD screen facing upwards. Z axis is with the EUT standing on it side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance with FCC 15.35. Lower limit reflects 15.209 within restricted bands of operation. Frequency Range Investigated: 1 to 3.5GHz.



### FCC 15.231(c) - 20dB Bandwidth



### MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB
Conducted Emissions	+/- 1.56 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Statements of compliance are based on the nominal values only.

### EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated and conducted emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

### CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB $\mu$ V/m, the spectrum analyzer reading in dB $\mu$ V was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS		
	Meter reading	(dB $\mu$ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB $\mu$ V/m)

## **TEST INSTRUMENTATION AND ANALYZER SETTINGS**

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements below 300 MHz, the bicon antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. For frequencies from 30 to 1000 MHz, the bicon antenna was used. The horn antenna was used for frequencies above 1000 MHz. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB $\mu$ V, and a vertical scale of 10 dB per division.

## **SPECTRUM ANALYZER DETECTOR FUNCTIONS**

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

### **Peak**

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

### **Quasi-Peak**

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

### **Average**

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

## **EUT TESTING**

### **Mains Conducted Emissions**

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT was located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50  $\mu$ H/+50 ohms. Above 150 kHz, a 0.15  $\mu$ F series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

### **Radiated Emissions**

The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 1000 MHz was scanned with the bicon antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. For frequencies exceeding 1000 MHz, the horn antenna was used. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

**APPENDIX A**

**INFORMATION ABOUT THE EQUIPMENT UNDER TEST**

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	
CRT was displaying:	TDS3052
Power Supply Manufacturer:	KEYWOOD
Power Supply Part Number:	PS-C008
AC Line Filter Manufacturer:	DONG AN
AC Line Filter Part Number:	FM-205S-K

I/O PORTS	
Type	#
PIC16C54	4,5,6,7,9,10,15,16,17,18
24C01A	1,2,3,4,5,6,7,8
PIC16C57	1,2,4,6,8--28

CRYSTAL OSCILLATORS	
Type	Freq In MHz
Figuline Oscillator	4 MHz
Quartz Oscillator	4.914 MHz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Transmit	RPC--TX	4 MHz	1	Transmitter
Receiver	RPC--RX	1) 4 MHz 2) 4.914 MHz	2	Receiver

## TEST SETUP PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS



Test Setup Mains Conducted Emissions - Front View



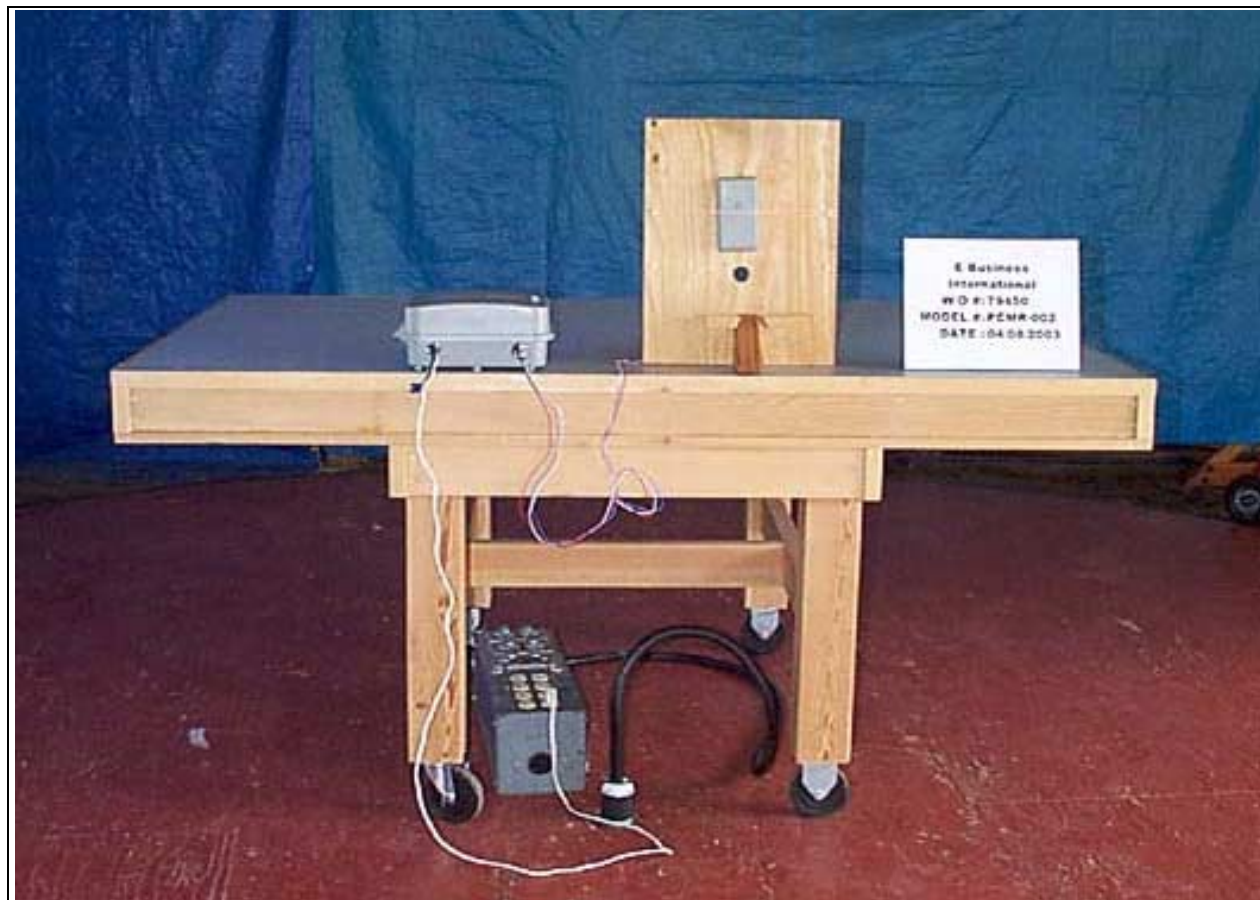
**TEST SETUP PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS**



Test Setup Mains Conducted Emissions - Side View

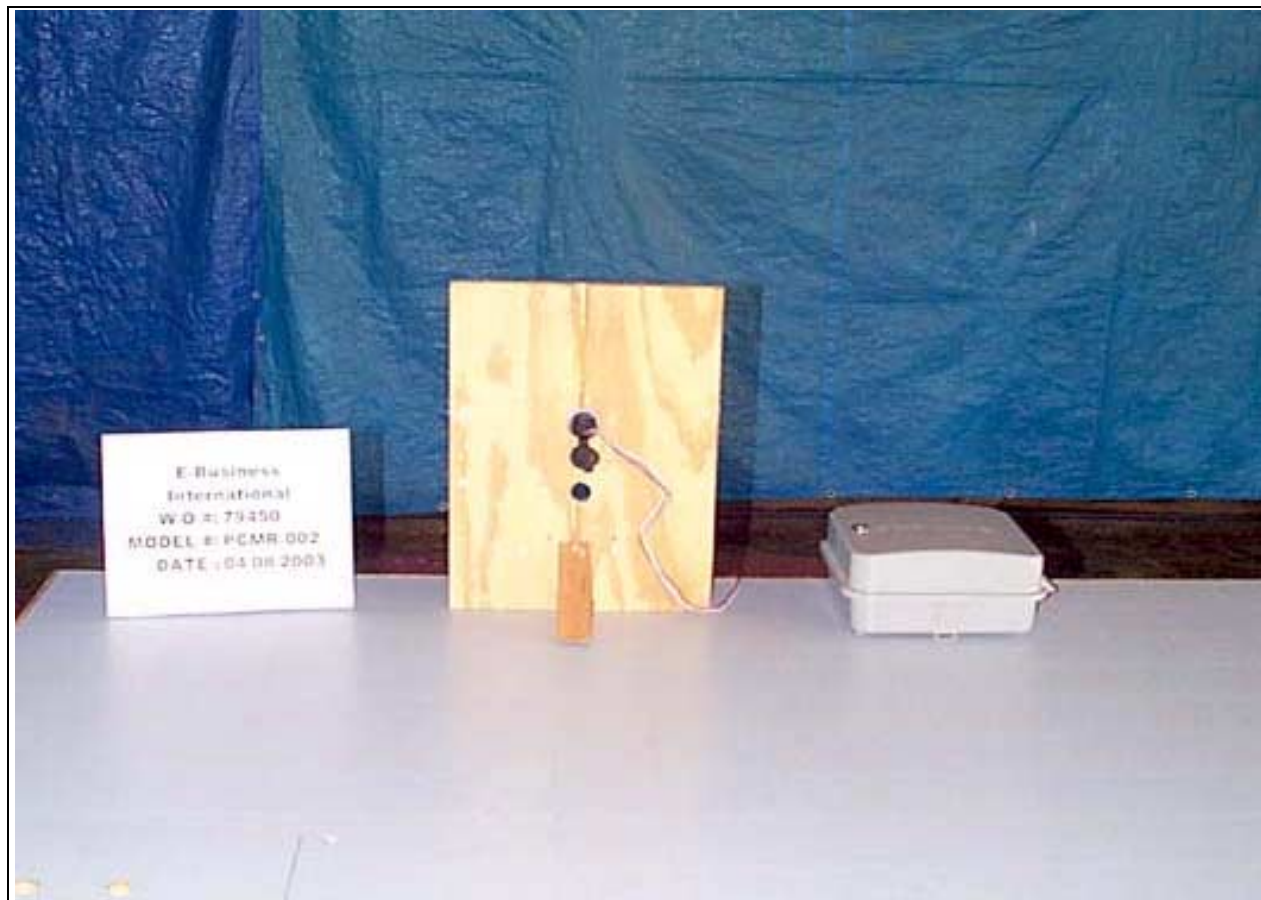


## TEST SETUP PHOTOGRAPH SHOWING RADIATED EMISSIONS



Test Setup Radiated Emissions - Front View

## TEST SETUP PHOTOGRAPH SHOWING RADIATED EMISSIONS



Test Setup Radiated Emissions - Back View

**TEST SETUP PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Test Setup Radiated Emissions - X Axis

**TEST SETUP PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Test Setup Radiated Emissions - Y Axis



**TEST SETUP PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Test Setup Radiated Emissions - Z Axis

## APPENDIX B

### TEST EQUIPMENT LIST

#### 20dB Bandwidth

##### #1-#4 Pulse timing Plots

<i>Description</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Asset #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/2/02	12/2/03
Antenna, Log Periodic	A&H	SAS-200/510	154	01330	6/19/02	6/19/03
Preamp	HP	8447D	1937A02604	00099	3/7/03	3/6/04
Spectrum Analyzer 100Hz - 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

#### 9kHz - 1GHz

<i>Description</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Asset #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/2/02	12/2/03
Antenna, Log Periodic	A&H	SAS-200/510	154	01330	6/19/02	6/19/03
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/03
Preamp	HP	8447D	1937A02604	00099	3/7/03	3/6/04
Spectrum Analyzer 100Hz - 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

#### 1-3.5GHz

<i>Description</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Asset #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Preamp	HP	8449B	3008A00301	02010	10/18/02	10/18/03
Spectrum Analyzer 100Hz - 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04
Cable #2 (2')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03
Cable #4 (50')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03
Cable #7 (25')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03
Antenna, Horn 1-18GHz	EMCO	3115	9806-3413	00327	11/25/02	11/25/03

#### FCC 15.107

<i>Description</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Asset #</i>	<i>Cal Date</i>	<i>Cal Due</i>
LISN Set	Solar	8028-50-TS-24-BNC	814493, 474	02056	11/20/02	11/20/03
Spectrum Analyzer 100Hz - 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

**APPENDIX C:**  
**MEASUREMENT DATA SHEETS**

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 1-800-500-4EMC

Customer: **e-BI**  
 Specification: **FCC 15.107(a) – Class B (AVE)**  
 Work Order #: **79450**  
 Test Type: **Conducted Emissions**  
 Equipment: **Receiver**  
 Manufacturer: **e-BI**  
 Model: **PCMR-002**  
 S/N: **032103-002**

Date: 4/8/03  
 Time: 16:24:39  
 Sequence#: 5  
 Tested By: Randal Clark  
 120V 60Hz

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Receiver*	e-BI	PCMR-002	032103-002

**Support Devices:**

Function	Manufacturer	Model #	S/N
Hand-Held Remote	e-BI	PCMR-001	032103-001
Irrigation Control	Rain Pro	Rain Pro Modular	None

**Test Conditions / Notes:**

EUT is a receiver used for remote irrigation control in conjunction with the PCMR-001. EUT gains its power through the irrigation control unit, which is a representative of a typical installation. Receiver contacts would normally be mounted in conduit, however for the purposes of testing, the interconnecting wires are left uncovered. The EUT is mounted vertically on a wooden support structure which is representative of a typical installation. The transmitter (Hand-Held Remote) is located away from the test area and is set to transmit continuously in order to activate the EUT repeatedly. Frequency Range Investigated: 150kHz - 30MHz.

**Transducer Legend:**

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n474
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**Measurement Data:**

Reading listed by margin.

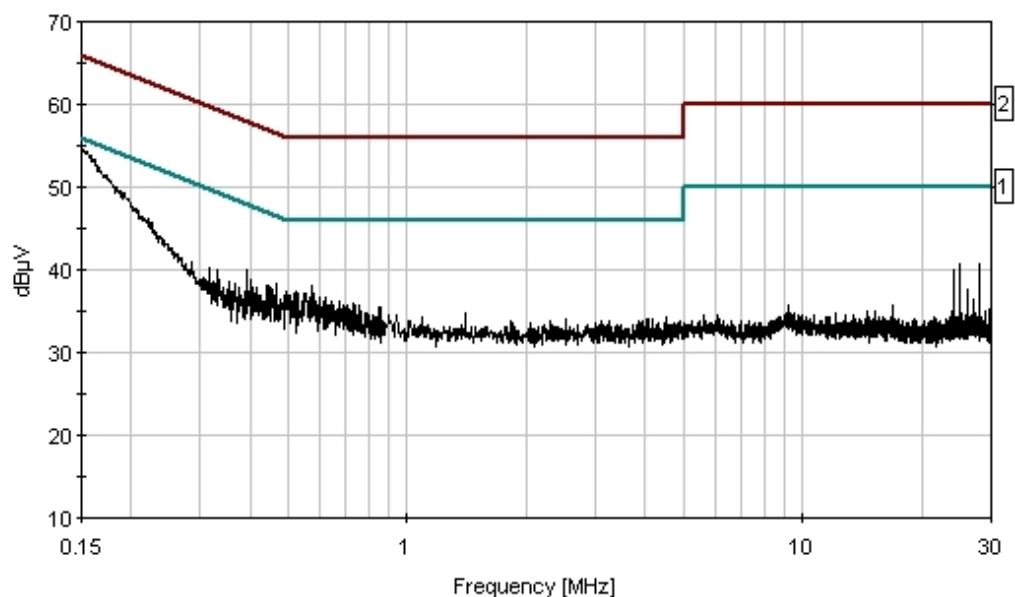
Test Lead: Black

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	574.685k	37.9	+0.1	+0.1			+0.0	38.1	46.0	-7.9	Black
2	391.430k	39.8	+0.1	+0.0			+0.0	39.9	48.0	-8.1	Black
3	467.786k	38.2	+0.1	+0.0			+0.0	38.3	46.6	-8.3	Black
4	493.238k	37.3	+0.1	+0.0			+0.0	37.4	46.1	-8.7	Black
5	525.235k	37.2	+0.1	+0.0			+0.0	37.3	46.0	-8.7	Black
6	448.152k	38.0	+0.1	+0.0			+0.0	38.1	46.9	-8.8	Black
7	517.963k	37.1	+0.1	+0.0			+0.0	37.2	46.0	-8.8	Black
8	401.611k	38.7	+0.1	+0.0			+0.0	38.8	47.8	-9.0	Black
9	449.606k	37.7	+0.1	+0.0			+0.0	37.8	46.9	-9.1	Black



10	25.100M	40.2	+0.3	+0.2	+0.0	40.7	50.0	-9.3	Black
11	598.682k	36.4	+0.1	+0.1	+0.0	36.6	46.0	-9.4	Black
12	618.317k	36.4	+0.1	+0.1	+0.0	36.6	46.0	-9.4	Black
13	28.102M	40.0	+0.3	+0.3	+0.0	40.6	50.0	-9.4	Black
14	642.314k	36.1	+0.1	+0.1	+0.0	36.3	46.0	-9.7	Black
15	675.766k	35.9	+0.1	+0.1	+0.0	36.1	46.0	-9.9	Black
16	729.578k	35.9	+0.0	+0.1	+0.0	36.0	46.0	-10.0	Black
17	24.086M	39.6	+0.3	+0.1	+0.0	40.0	50.0	-10.0	Black
18	365.978k	38.3	+0.1	+0.0	+0.0	38.4	48.6	-10.2	Black
19	736.123k	35.5	+0.0	+0.1	+0.0	35.6	46.0	-10.4	Black
20	150.000k	39.4	+0.1	+0.0	+0.0	39.5	56.0	-16.5	Black
Ave									
^	150.000k	54.5	+0.1	+0.0	+0.0	54.6	56.0	-1.4	Black

CKC Laboratories Date: 4/8/03 Time: 16:24:39 E-Business International WVO#: 79450  
FCC 15.107(a) - AVE Test Lead: Black 120V 60Hz Sequence#: 5



1 - FCC 15.107(a) - AVE 2 - FCC 15.107(a) - QP

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 1-800-500-4EMC

Customer: **e-BI**  
 Specification: **FCC 15.107(a) – Class B (AVE)**  
 Work Order #: **79450**  
 Test Type: **Conducted Emissions**  
 Equipment: **Receiver**  
 Manufacturer: **e-BI**  
 Model: **PCMR-002**  
 S/N: **032103-002**

Date: 4/8/03  
 Time: 4:25:10 PM  
 Sequence#: 6  
 Tested By: Randal Clark  
 120V 60Hz

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Receiver*	e-BI	PCMR-002	032103-002

**Support Devices:**

Function	Manufacturer	Model #	S/N
Hand-Held Remote	e-BI	PCMR-001	032103-001
Irrigation Control	Rain Pro	Rain Pro Modular	None

**Test Conditions / Notes:**

EUT is a receiver used for remote irrigation control in conjunction with the PCMR-001. EUT gains its power through the irrigation control unit, which is a representative of a typical installation. Receiver contacts would normally be mounted in conduit, however for the purposes of testing, the interconnecting wires are left uncovered. The EUT is mounted vertically on a wooden support structure which is representative of a typical installation. The transmitter (Hand-Held Remote) is located away from the test area and is set to transmit continuously in order to activate the EUT repeatedly. Frequency Range Investigated: 150kHz - 30MHz.

**Transducer Legend:**

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n493
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**Measurement Data:**

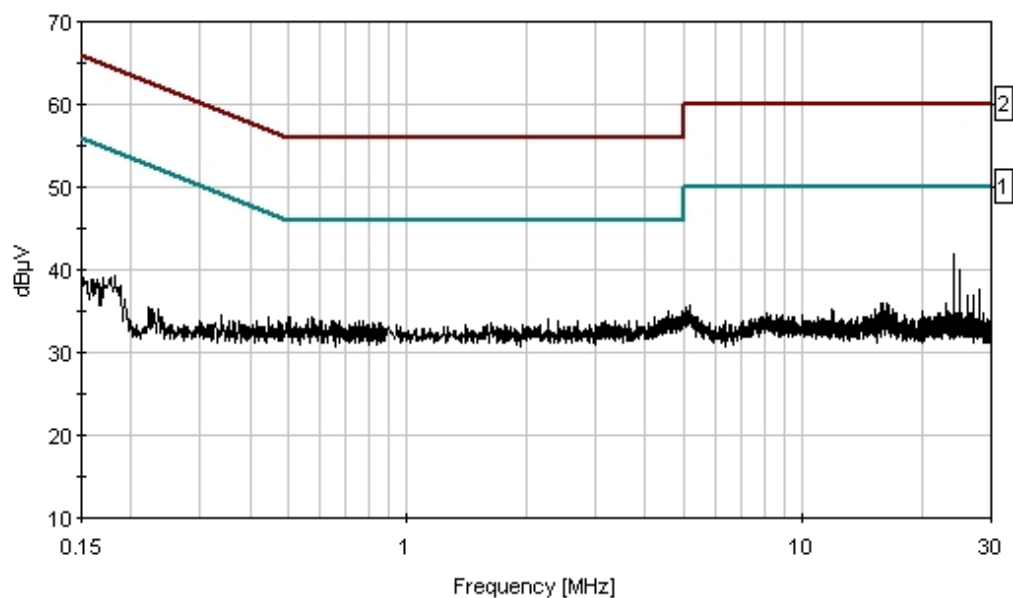
Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	24.086M	41.5	+0.3	+0.2			+0.0	42.0	50.0	-8.0	White
2	25.093M	39.4	+0.3	+0.2			+0.0	39.9	50.0	-10.1	White
3	771.756k	33.7	+0.0	+0.2			+0.0	33.9	46.0	-12.1	White
4	28.088M	37.3	+0.3	+0.1			+0.0	37.7	50.0	-12.3	White
5	26.087M	36.5	+0.3	+0.1			+0.0	36.9	50.0	-13.1	White
6	27.087M	36.4	+0.3	+0.1			+0.0	36.8	50.0	-13.2	White
7	15.724M	35.2	+0.2	+0.5			+0.0	35.9	50.0	-14.1	White
8	5.201M	34.1	+0.1	+1.4			+0.0	35.6	50.0	-14.4	White
9	5.096M	33.8	+0.1	+1.6			+0.0	35.5	50.0	-14.5	White

10	23.387M	34.6	+0.3	+0.2	+0.0	35.1	50.0	-14.9	White
11	181.997k	39.0	+0.0	+0.2	+0.0	39.2	54.4	-15.2	White
12	151.454k	38.7	+0.1	+0.2	+0.0	39.0	55.9	-16.9	White

CKC Laboratories Date: 4/8/03 Time: 4:25:10 PM E-Business International WO#: 79450  
FCC 15.107(a) - AVE Test Lead: White 120V 60Hz Sequence#: 6



1 - FCC 15.107(a) - AVE      2 - FCC 15.107(a) - QP

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 1-800-500-4EMC

Customer: **e-BI**  
 Specification: **15.109 CLASS B**  
 Work Order #: **79450**  
 Test Type: **Radiated Scan**  
 Equipment: **Receiver**  
 Manufacturer: **e-BI**  
 Model: **PCMR-002**  
 S/N: **032103-002**

Date: 4/8/03  
 Time: 14:10:56  
 Sequence#: 4  
 Tested By: Randal Clark

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Receiver*	e-BI	PCMR-002	032103-002

**Support Devices:**

Function	Manufacturer	Model #	S/N
Hand-Held Remote	e-BI	PCMR-001	032103-001
Irrigation Control	Rain Pro	Rain Pro Modular	None

**Test Conditions / Notes:**

EUT is a receiver used for remote irrigation control in conjunction with the PCMR-001. EUT gains its power through the irrigation control unit, which is a representative of a typical installation. Receiver contacts would normally be mounted in conduit, however for the purposes of testing, the interconnecting wires are left uncovered. The EUT is mounted vertically on a wooden support structure which is representative of a typical installation. The transmitter (Hand-Held Remote) is located away from the test area and is set to transmit continuously in order to activate the EUT repeatedly. Frequency Range Investigated: 30-1000MHz.

**Transducer Legend:**

T1=Amp - S/N 604	T2=Bilog B
T3=Cable - 10 Meter	

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	40.050M	47.5	-27.3	+13.8	+0.9		+0.0	34.9	40.0	-5.1	Vert
2	55.170M	51.3	-27.3	+6.9	+1.1		+0.0	32.0	40.0	-8.0	Vert
3	60.225M	51.5	-27.3	+5.4	+1.1		+0.0	30.7	40.0	-9.3	Vert
4	58.190M	50.8	-27.3	+5.9	+1.1		+0.0	30.5	40.0	-9.5	Vert
5	32.020M	39.5	-27.3	+17.2	+0.7		+0.0	30.1	40.0	-9.9	Vert
6	59.170M	50.4	-27.3	+5.6	+1.1		+0.0	29.8	40.0	-10.2	Vert
7	65.789M	49.6	-27.2	+5.8	+1.2		+0.0	29.4	40.0	-10.6	Horiz
8	48.195M	45.0	-27.3	+9.7	+1.0		+0.0	28.4	40.0	-11.6	Vert
9	77.324M	47.3	-27.2	+6.9	+1.4		+0.0	28.4	40.0	-11.6	Horiz

10	52.200M	46.5	-27.3	+7.8	+1.0	+0.0	28.0	40.0	-12.0	Vert
11	63.244M	48.0	-27.3	+5.6	+1.2	+0.0	27.5	40.0	-12.5	Horiz
12	63.220M	47.2	-27.3	+5.6	+1.2	+0.0	26.7	40.0	-13.3	Vert
13	57.180M	46.3	-27.3	+6.2	+1.1	+0.0	26.3	40.0	-13.7	Vert
14	53.190M	44.7	-27.3	+7.5	+1.0	+0.0	25.9	40.0	-14.1	Vert
15	52.169M	43.2	-27.3	+7.9	+1.0	+0.0	24.8	40.0	-15.2	Horiz
16	314.530M	39.8	-26.6	+13.4	+3.1	+0.0	29.7	46.0	-16.3	Vert
17	56.174M	43.3	-27.3	+6.6	+1.1	+0.0	23.7	40.0	-16.3	Horiz
18	53.184M	42.5	-27.3	+7.5	+1.0	+0.0	23.7	40.0	-16.3	Horiz
19	120.360M	40.9	-27.2	+11.6	+1.7	+0.0	27.0	43.5	-16.5	Vert
20	64.214M	43.5	-27.3	+5.7	+1.2	+0.0	23.1	40.0	-16.9	Horiz
21	71.244M	42.6	-27.2	+6.2	+1.3	+0.0	22.9	40.0	-17.1	Horiz
22	115.325M	40.6	-27.2	+11.1	+1.7	+0.0	26.2	43.5	-17.3	Vert
23	128.346M	39.7	-27.2	+11.6	+1.7	+0.0	25.8	43.5	-17.7	Vert
24	113.345M	40.4	-27.2	+10.9	+1.7	+0.0	25.8	43.5	-17.7	Vert
25	168.501M	40.0	-26.8	+10.1	+2.1	+0.0	25.4	43.5	-18.1	Vert
26	54.179M	40.9	-27.3	+7.2	+1.0	+0.0	21.8	40.0	-18.2	Horiz
27	156.431M	38.2	-26.9	+11.4	+2.0	+0.0	24.7	43.5	-18.8	Vert
28	164.456M	39.0	-26.9	+10.4	+2.1	+0.0	24.6	43.5	-18.9	Vert
29	68.250M	41.1	-27.2	+5.9	+1.3	+0.0	21.1	40.0	-18.9	Horiz
30	111.325M	39.4	-27.2	+10.7	+1.6	+0.0	24.5	43.5	-19.0	Vert
31	130.371M	37.7	-27.2	+11.5	+1.7	+0.0	23.7	43.5	-19.8	Vert
32	129.366M	37.6	-27.2	+11.6	+1.7	+0.0	23.7	43.5	-19.8	Vert
33	136.371M	37.1	-27.1	+11.5	+1.8	+0.0	23.3	43.5	-20.2	Vert
34	150.926M	35.9	-27.0	+12.4	+1.9	+0.0	23.2	43.5	-20.3	Vert
35	58.204M	39.8	-27.3	+5.9	+1.1	+0.0	19.5	40.0	-20.5	Horiz

36	160.447M	36.9	-26.9	+10.8	+2.0	+0.0	22.8	43.5	-20.7	Horiz
37	161.456M	36.9	-26.9	+10.7	+2.0	+0.0	22.7	43.5	-20.8	Vert
38	59.214M	39.6	-27.3	+5.6	+1.1	+0.0	19.0	40.0	-21.0	Horiz
39	172.515M	36.6	-26.8	+9.8	+2.2	+0.0	21.8	43.5	-21.7	Vert
40	69.250M	38.1	-27.2	+6.0	+1.3	+0.0	18.2	40.0	-21.8	Horiz
41	85.995M	35.8	-27.1	+7.9	+1.5	+0.0	18.1	40.0	-21.9	Horiz
42	156.432M	34.3	-26.9	+11.4	+2.0	+0.0	20.8	43.5	-22.7	Horiz
43	164.476M	34.9	-26.9	+10.4	+2.1	+0.0	20.5	43.5	-23.0	Horiz

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 1-800-500-4EMC

Customer: **e-BI**  
 Specification: **FCC 15.231(b) Fundamental**  
 Work Order #: **79450**  
 Test Type: **Radiated Scan**  
 Equipment: **Hand-Held Remote**  
 Manufacturer: **e-BI**  
 Model: **PCMR-001**  
 S/N: **032103-001**

Date: 3/25/03  
 Time: 14:17:28  
 Sequence#: 1  
 Tested By: Randal Clark

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Hand-Held Remote*	e-BI	PCMR-001	032103-001

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

COMMENTS: EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna. Y axis is with the EUT lying flat on its back with the LCD screen facing upwards. Z axis is with the EUT standing on its side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance with FCC 15.35. Frequency Range Investigated: Fundamental.

**Transducer Legend:**

T1=Amp - S/N 604	T2=Cable - 10 Meter
T3=Log s/n 154	T4=15.35 Duty Cycle Correction

**Measurement Data:** Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	314.996M	85.6	-26.6	+3.1	+21.2	-15.5	+0.0	67.8	74.9	-7.1	Vert
									X Axis		
2	314.920M	82.7	-26.6	+3.1	+21.2	-15.5	+0.0	64.9	74.9	-10.0	Horiz
									Y Axis		
3	314.989M	80.9	-26.6	+3.1	+21.2	-15.5	+0.0	63.1	74.9	-11.8	Vert
									Z Axis		
4	315.003M	80.6	-26.6	+3.1	+21.2	-15.5	+0.0	62.8	74.9	-12.1	Horiz
									Z Axis		
5	314.994M	75.9	-26.6	+3.1	+21.2	-15.5	+0.0	58.1	74.9	-16.8	Horiz
									X Axis		
6	315.010M	73.0	-26.6	+3.1	+21.2	-15.5	+0.0	55.2	74.9	-19.7	Vert
									Y Axis		

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA 95338 • 1.800.500.4362  
 Customer: **e-BI**  
 Specification: **FCC 15.231 (b) Spurious**  
 Work Order #: **79450**  
 Test Type: **Radiated Scan**  
 Equipment: **Hand-Held Remote**  
 Manufacturer: e-BI  
 Model: PCMR-001  
 S/N: 032103-001

Date: 3/25/03  
 Time: 14:17:28  
 Sequence#: 2  
 Tested By: Randal Clark

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Hand-Held Remote*	e-BI	PCMR-001	032103-001

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna Y axis is with the EUT lying flat on its back with the LCD screen facing upwards Z axis is with the EUT standing on it side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance to FCC 15.35. Lower limit reflects 15.209 within restricted bands of operation. Frequency Range Investigated: 9kHz to 1GHz.

**Transducer Legend:**

T1=Amp - S/N 604	T2=Cable - 10 Meter
T3=Log s/n 154	T4=15.35 Duty Cycle Correction

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dBμ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμ V/m	Spec dBμ V/m	Margin dB	Polar Ant
1	629.915M	79.5	-27.9	+5.0	+19.7	-15.5	+0.0	60.8	61.9 Y Axis	-1.1	Horiz
2	629.909M	77.8	-27.9	+5.0	+19.7	-15.5	+0.0	59.1	61.9 Z Axis	-2.8	Vert
3	629.923M	77.7	-27.9	+5.0	+19.7	-15.5	+0.0	59.0	61.9 Z Axis	-2.9	Horiz
4	629.902M	77.5	-27.9	+5.0	+19.7	-15.5	+0.0	58.8	61.9 X Axis	-3.1	Vert
5	629.906M	73.9	-27.9	+5.0	+19.7	-15.5	+0.0	55.2	61.9 X Axis	-6.7	Horiz
6	944.838M	67.3	-27.2	+6.1	+23.6	-15.5	+0.0	54.3	61.9 Z Axis	-7.6	Horiz
7	944.804M	66.3	-27.2	+6.1	+23.6	-15.5	+0.0	53.3	61.9 Z Axis	-8.6	Vert
8	944.836M	64.8	-27.2	+6.1	+23.6	-15.5	+0.0	51.8	61.9 X Axis	-10.1	Vert
9	944.823M	64.5	-27.2	+6.1	+23.6	-15.5	+0.0	51.5	61.9 X Axis	-10.4	Horiz
10	944.837M	61.8	-27.2	+6.1	+23.6	-15.5	+0.0	48.8	61.9 Y Axis	-13.1	Vert
11	629.911M	62.2	-27.9	+5.0	+19.7	-15.5	+0.0	43.5	61.9 Y Axis	-18.4	Vert



Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA 95338 • 1.800.500.4EMC

Customer: **e-BI**  
 Specification: **FCC 15.231/15.209**  
 Work Order #: **79450**  
 Test Type: **Radiated Scan**  
 Equipment: **Hand-Held Remote**  
 Manufacturer: **e-BI**  
 Model: **PCMR-001**  
 S/N: **032103-001**

Date: 3/25/03  
 Time: 17:31:55  
 Sequence#: 3  
 Tested By: Randal Clark

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Hand-Held Remote*	e-BI	PCMR-001	032103-001

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

EUT is a hand-held periodically operated remote for use in an irrigation control system. The EUT is mounted to a section of non-conductive foam in the following orientations: X axis is with the EUT standing upwards with the LCD screen facing the antenna Y axis is with the EUT lying flat on its back with the LCD screen facing upwards Z axis is with the EUT standing on it side with the LCD screen facing the antenna. The EUT is battery operated. Tests are performed with a new battery. Duty cycle correction factor applied in accordance to FCC 15.35. Lower limit reflects 15.209 within restricted bands of operation. Frequency Range Investigated: 1 to 3.5GHz.

**Transducer Legend:**

T1=Cable GHz #1	T2=Cable GHz #4
T3=Cable GHz #9	T4=Amp - S/N 301
T5=Horn 1-18	T6=15.35 Duty Cycle Correction

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2204.405M	67.2	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	53.7	54.0 Y Axis	-0.3	Horiz
2	2204.438M	67.1	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	53.6	54.0 X Axis	-0.4	Horiz
3	2204.495M	63.9	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	50.4	54.0 Z Axis	-3.6	Vert
4	2204.460M	62.8	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	49.3	54.0 Z Axis	-4.7	Horiz
5	2834.210M	55.4	+5.3 +29.5	+7.3 -15.5	+0.7	-35.0	+0.0	47.7	54.0 Y Axis	-6.3	Horiz
6	2834.188M	52.8	+5.3 +29.5	+7.3 -15.5	+0.7	-35.0	+0.0	45.1	54.0 X Axis	-8.9	Horiz
7	2204.345M	58.5	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	45.0	54.0 X Axis	-9.0	Vert
8	1259.630M	72.7	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	51.9	61.9 Z Axis	-10.0	Vert
9	1259.680M	72.3	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	51.5	61.9 Z Axis	-10.4	Horiz

10	2834.210M	49.7	+5.3 +29.5	+7.3 -15.5	+0.7	-35.0	+0.0	42.0	54.0 Z Axis	-12.0	Horiz
11	1259.643M	70.5	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	49.7	61.9 X Axis	-12.2	Vert
12	1259.705M	69.7	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	48.9	61.9 Y Axis	-13.0	Horiz
13	1259.670M	67.7	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	46.9	61.9 X Axis	-15.0	Horiz
14	2204.410M	52.4	+3.5 +27.8	+5.3 -15.5	+0.5	-35.1	+0.0	38.9	54.0 Y Axis	-15.1	Vert
15	1259.665M	67.3	+2.0 +24.9	+3.1 -15.5	+0.5	-35.8	+0.0	46.5	61.9 Y Axis	-15.4	Vert
16	2834.600M	45.4	+5.3 +29.5	+7.3 -15.5	+0.7	-35.0	+0.0	37.7	54.0 Z Axis	-16.3	Vert
17	2834.050M	45.4	+5.3 +29.5	+7.3 -15.5	+0.7	-35.0	+0.0	37.7	54.0 X Axis	-16.3	Vert
18	1574.645M	56.1	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	37.2	54.0 Y Axis	-16.8	Horiz
19	2519.398M	54.3	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	44.8	61.9 X Axis	-17.1	Horiz
20	2519.285M	53.6	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	44.1	61.9 Z Axis	-17.8	Horiz
21	1574.418M	55.0	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	36.1	54.0 X Axis	-17.9	Vert
22	1574.730M	54.5	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	35.6	54.0 Z Axis	-18.4	Vert
23	3149.128M	50.9	+5.1 +30.1	+7.2 -15.5	+0.8	-35.1	+0.0	43.5	61.9 X Axis	-18.4	Horiz
24	1574.540M	53.3	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	34.4	54.0 X Axis	-19.6	Horiz
25	1574.420M	52.8	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	33.9	54.0 Z Axis	-20.1	Horiz
26	1889.480M	58.8	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	41.6	61.9 Y Axis	-20.3	Horiz
27	2519.215M	50.5	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	41.0	61.9 Y Axis	-20.9	Horiz
28	3149.270M	48.0	+5.1 +30.1	+7.2 -15.5	+0.8	-35.1	+0.0	40.6	61.9 Y Axis	-21.3	Horiz
29	1889.470M	57.4	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	40.2	61.9 Z Axis	-21.7	Horiz
30	1574.440M	50.6	+2.3 +25.7	+3.5 -15.5	+0.5	-35.4	+0.0	31.7	54.0 Y Axis	-22.3	Vert
31	1889.500M	56.2	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	39.0	61.9 Z Axis	-22.9	Vert
32	1889.514M	55.3	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	38.1	61.9 X Axis	-23.8	Horiz
33	2519.210M	47.0	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	37.5	61.9 X Axis	-24.4	Vert
34	3149.180M	44.6	+5.1 +30.1	+7.2 -15.5	+0.8	-35.1	+0.0	37.2	61.9 Z Axis	-24.7	Horiz
35	2519.350M	46.5	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	37.0	61.9 Y Axis	-24.9	Vert

36	1889.540M	54.2	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	37.0	61.9 X Axis	-24.9	Vert
37	2519.520M	46.4	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	36.9	61.9 Y Axis	-25.0	Vert
38	3149.130M	43.7	+5.1 +30.1	+7.2 -15.5	+0.8	-35.1	+0.0	36.3	61.9 X Axis	-25.6	Vert
39	2519.500M	45.5	+4.8 +28.6	+7.0 -15.5	+0.6	-35.0	+0.0	36.0	61.9 Z Axis	-25.9	Vert
40	1889.500M	51.6	+2.4 +26.8	+3.9 -15.5	+0.5	-35.3	+0.0	34.4	61.9 Y Axis	-27.5	Vert