

## FCC PART 15 SUBPART C CERTIFICATION REPORT

FOR

## 433.92 MHz RFID TAGS FOR ASSET PROTECTION SYSTEM

## MODEL: DURESS TAG, RF TEST TAG

## FCC ID NO: HE7DTG

## **REPORT NO: 03U1799-1**

**ISSUE DATE: FEBUARY 21, 2003** 

Prepared for

EXI WIRELESS SYSTEMS INC. SUITE 100, 13551 COMMERCE PARKWAY RICHMOND, BC CANADA

Prepared by COMPLIANCE ENGINEERING SERVICES, INC. d.b.a. COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD MORGAN HILL, CA 95037 USA TEL: (408) 463-0885 FAX: (408) 463-0888

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#### TEST DATA

- Maximum Modulation Percentage Plot
- Emission Bandwidth Plot
- Radiated Emission Worksheet for Peak Measurement
- Radiated Emission Worksheet for Average Measurement

#### ATTACHMENT

- EUT Photographs
- Proposed FCC ID Label
- Schematics & Block Diagram
- User Manual

#### **1. VERIFICATION OF COMPLIANCE**

COMPAN	IY NAME	:	EXI WIRELESS SYSTEMS INC.
			SUITE 100, 13551 COMMERCE PARKWAY
			RICHMOND BC, CANADA
EUT DES	CRIPTION	:	433.92 MHz RFID TAGS FOR ASSET PROTECTION SYSTEM
MODEL N	OV	:	DURESSS TAG, RF TEST TAG
FCC ID		:	HE7DTG
DATE TE	STED	:	2-21-2003
REPORT	NUMBER	:	03U1799-1
TYPE OF EQUIPM	ENT		RF TAGS
EQUIPMENT TYPE	E		433.92MHz TRANSCEIVERS
MEASUREMENT F	PROCEDURE		ANSI C63.4 / 2001
LIMIT TYPE			CERTIFICATION
FCC RULE			CFR 47, PART 15

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Tested By:

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Chin Pany

CHIN PANG EMC TECHNICIAN COMPLIANCE CERTIFICATION SERVICES

Approved & Released By:

THU CHAN EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

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#### **2. PRODUCT DESCRIPTION**

Fundamental Frequency	433.92 MHz
Power Source	12V Battery
Transmitting Time	Periodic < 5 seconds
Associated Receiver	NA
Manufacturer	EXI Wireless Systems Inc.

#### **3. TEST FACILITY**

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27,1994.

#### 4. MEASUREMENT STANDARD

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/2001.

#### **5. TEST METHODOLOGY**

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

#### 6. MEASUREMENT EQUIPMENT USED

	TEST EQUIPMENTS	LIST		
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Quasi-Peak Detector	HP9K - 1 GHz	85650A	2521A01038	4/16/03
Spectrum Analyzer	HP100Hz - 1.5GHz	8568A	101236	4/16/03
Spectrum Display	HP	8560A	2314A020604	4/16/03
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P5)	2944A06550	8/22/03
Antenna, LP	EMCO200 - 2000MHz	3146	9107-3163	3/30/03
Pre-amplifier,35.5 dB (1 - 26.5 GHz)	HP	8449B	3008A00369	6/20/03
Spectrum Analyzer	HP	8593EM	3008A00369	6/11/03
Horn	EMCO	3115	6717	1/30/04

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## 7. POWERLINE RFI LIMIT

CONNECTED TO AC POWER LINE	SECTION 15.207
CARRIER CURRENT SYSTEM IN THE FREQUENCY RANGE OF 150 KHZTO 30 MHz	SECTION 15.205 AND SECTION 15.209, 15.221, 15.223, 15.225 OR 15.227, AS APPROPRIATE.
BATTERY POWER	NOT REQUIRED

### 8. RADIATED EMISSION LIMITS

GENERAL REQUIREMENTS	SECTION 15.209
RESTRICTED BANDS OF OPERATION	SECTION 15.205
PERIODIC OPERATION IN THE BAND 40.66 - 40.70 MHz AND ABOVE 70 MHz.	SECTION 15.231(e)

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### 9. SYSTEM TEST CONFIGURATION

Use a block of foam and combined it with EUT wrapping rubber band around it. This way it can test X.Y, and Z axis. To activate continuous transmission, place a small plastic block between rubber band and EUT push button.





X-Axis



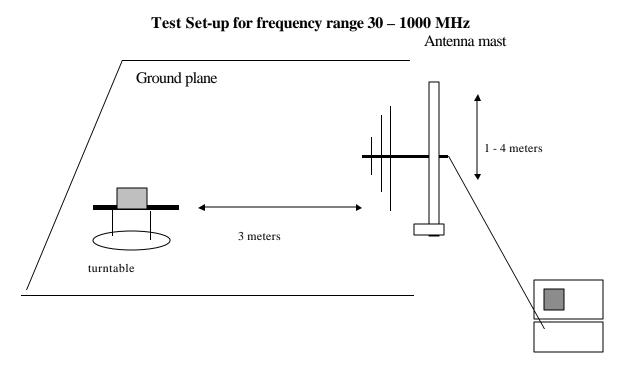


Z-Axis

Radiated Open Site Test Set-up

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### 10. TEST PROCEDURE Radiated Emissions, 15.231(4)(b)



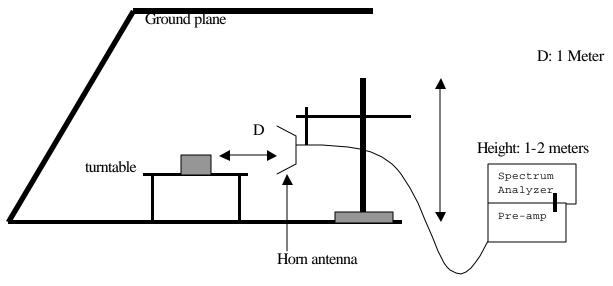
preamplifier/spectrum analyzer



- 1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.
- 2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.
- 3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

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#### Test set-up for measurements above 1GHz





1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 1-meters from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the search antenna.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

#### **11. EQUIPMENT MODIFICATIONS**

To achieve compliance to FCC Section 15.231 technical limits, the following change(s) were made during compliance testing:

No changes were required in order to achieve compliance to Section 15.231 levels.

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### **12. TEST RESULT**

Powerline RFI Class B	Eut	Radiated Emission Limits	Eut
SECTION 15.207		SECTION 15.209	Х
SECTION 15.205, 15.209, 15.221, 15.223, x 15.225 OR 15.227		SECTION 15.205	Х
BATTERY POWER	X	SECTION 15.231 (e)	Х

### 12.1 MAXIMUM MODULATION PERCENTAGE (M%)

#### CALCULATION:

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle)

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

WHERE	1 Period	= 148.75ms
	Long pulse	= 0.525  ms
	Short pulse	=0.300 ms
	No of Long pulse	= 15
	No of Short pulse	= 45

Duty Cycle = (N1L1+N2L2+...+Nn-1Ln-1+NnLn)/100 or T

Duty Cycle = ((15x0.525)+(45x0.3))/100=0.21375=21.375%

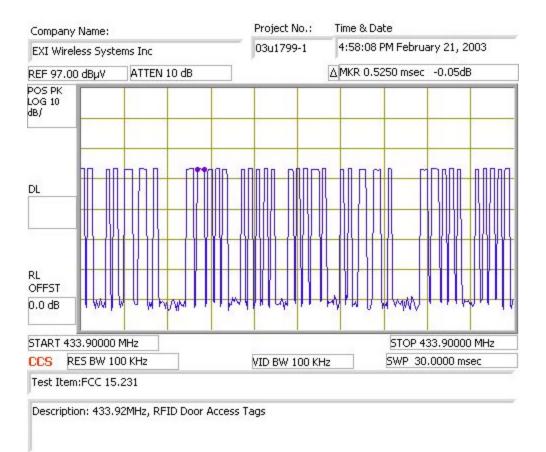
For duty cycle refer to plot #1, 2, 3,4, 5.

#### **12.2 EMISSION BANDWIDTH**

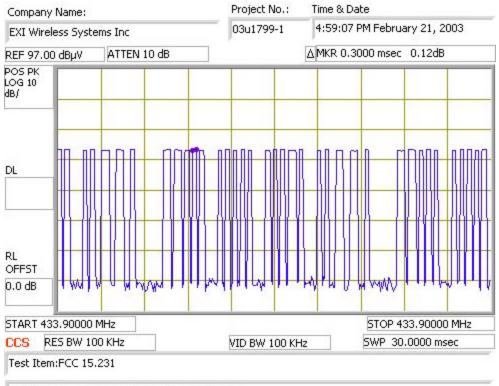
The bandwidth of the emissions were investigated per 15.231(c)

Center Frequency	Measured	Limits
433.92 MHz	385 KHz	433.96 x 0.25%= 1.0849MHz
	(refer to plot)	

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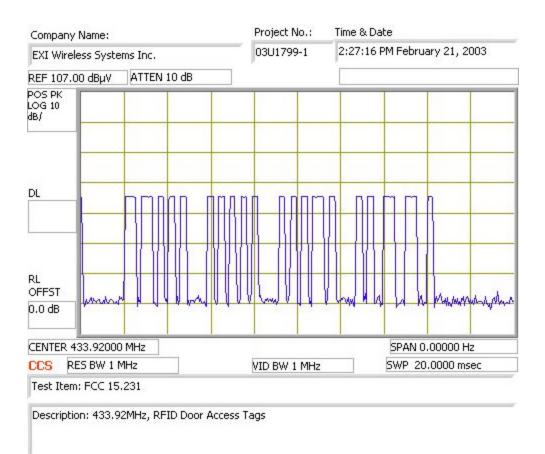


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Description: 433.92MHz, RFID Door Access Tags

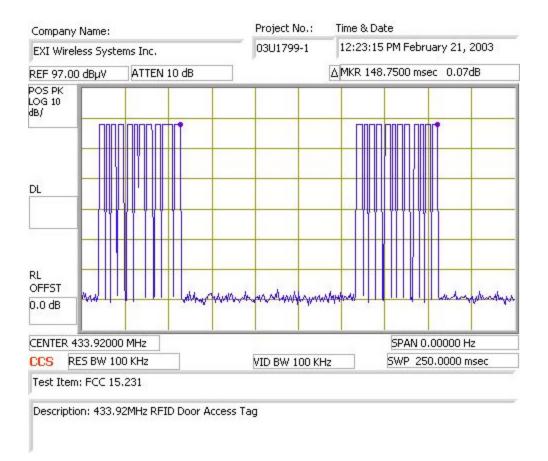
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### EMISSION BANDWIDTH

03U1799-1	44.50.03				
0301799-1	11:58:2.	27 AM February 21, 2003			
[	∆MKR 385	5.00000 K	Hz -0.09dB		
	-	-			
		-			
		SPAN 1	.00000 MHz		
VID BW 100 KH	Iz	SWP 1.	50 sec		
	VID BW 100 KH	ДМКЯ 385			

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### RADIATED DATA

	FCC,	CON COLL VCCI, CISPR, SA, TUV, BSM	CE, AUSTEL,	n Se				Re Date&	oject #: port #: Time: t Engr:	03U1799-1 030221C1 02/21/03 Chin Pang	10:06 AM	
	561F MONTE PHONE: (408	REY ROAD, S ) 463-0885	AN JOSE, CA		) 463-0888							
		Tes	EUT Desci t Configu	ration : of Test:	-	<u>ss Systems</u> z RFID Doo 1		g				
	+2++2+	0.0% = 21.2	750/							(1.10())		т
	KHZ, VBW=		13%				20*log(M%	/	ing + 20*lo	g(M%)		
	,		AF	Closs	Pre-amp		,	/	ng + 20*10 Pol	g(M%) Az	Height	Mark
RBW=100	, KHZ, VBW=	100KHz		Closs (dB)	Pre-amp (dB)	-	20*log(M%	) = -13.4	0		Height (Meter)	Mark (P/Q/A)
RBW=100 Freq. (MHz) 433.92Mhz	KHZ, VBW= Pk Rdg (dBuV)	100KHz Av Rdg (dBuV) tal frequenc	AF (dB)			Level	20*log(M% Limit	) = -13.4 Margin	Pol	Az	U U	
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92	KHZ, VBW=	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10	AF (dB)			Level	20*log(M% Limit	) = -13.4 Margin	Pol	Az	U U	
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92 433.92 X-Position	KHZ, VBW= Pk Rdg (dBuV) Fundamen ( stand Up ) 75.90 69.50 ( EUT Lay I	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10 Down )	AF (dB) y 16.35 16.35	(dB) 3.72 3.72	(dB) 27.27 27.27	Level (dBuV/m) 55.30 48.90	20*log(M% Limit FCC_B 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96	Pol (H/V) 3mV 3mH	Az (Deg) 0.00 0.00	(Meter) 1.50 2.00	(P/Q/A) P P
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92 433.92 X-Position 433.92	KHZ, VBW=	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10	AF (dB) y 16.35	(dB) 3.72	(dB) 27.27	Level (dBuV/m) 55.30	20*log(M% Limit FCC_B 72.86	) = -13.4 Margin (dB) -17.56	Pol (H/V) 3mV	Az (Deg) 0.00	(Meter)	(P/Q/A) P
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92 X-Position 433.92 433.92 433.92	KHZ, VBW=	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10 Down ) 52.60	AF (dB) y 16.35 16.35 16.35 16.35	(dB) 3.72 3.72 3.72	(dB) 27.27 27.27 27.27	Level (dBuV/m) 55.30 48.90 45.40	20*log(M% Limit FCC_B 72.86 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96 -27.46	Pol (H/V) 3mV 3mH 3mV	Az (Deg) 0.00 0.00 0.00	(Meter) 1.50 2.00 1.20	(P/Q/A) P P P
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92 X-Position 433.92 433.92 Z-Position	KHZ, VBW=	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10 Down ) 52.60 60.40	AF (dB) y 16.35 16.35 16.35 16.35	(dB) 3.72 3.72 3.72	(dB) 27.27 27.27 27.27	Level (dBuV/m) 55.30 48.90 45.40	20*log(M% Limit FCC_B 72.86 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96 -27.46	Pol (H/V) 3mV 3mH 3mV	Az (Deg) 0.00 0.00 0.00	(Meter) 1.50 2.00 1.20	(P/Q/A) P P P
RBW=100 Freq. (MHz) 433.92Mhz 433.92 433.92 433.92 X-Position 433.92 433.92 Z-Position 433.92	KHZ, VBW= Pk Rdg (dBuV) Fundamen (stand Up) 75.90 69.50 (EUT Lay I 66.00 73.80 (EUT Place	100KHz Av Rdg (dBuV) tal frequenc 62.50 62.50 56.10 Down ) 52.60 60.40 e Side Way	AF (dB) y 16.35 16.35 16.35 16.35 )	(dB) 3.72 3.72 3.72 3.72 3.72	(dB) 27.27 27.27 27.27 27.27 27.27	Level (dBuV/m) 55.30 48.90 45.40 53.20	20*log(M% Limit FCC_B 72.86 72.86 72.86 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96 -27.46 -19.66	Pol (H/V) 3mV 3mH 3mV 3mH	Az (Deg) 0.00 0.00 0.00 0.00 0.00	(Meter) 1.50 2.00 1.20 2.00	(P/Q/A) P P P
RBW=100 Freq. (MHz) 433.92Mhz Y-Position 433.92 X-Position 433.92 Z-Position 433.92 Z-Position 433.92 The Data s	KHZ, VBW= Pk Rdg (dBuV) Fundamen (stand Up) 75.90 69.50 (EUT Lay I 66.00 73.80 (EUT Place 75.30 69.20 show Y-Posi	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10 Down ) 52.60 60.40 e Side Way 61.90	AF (dB) y 16.35 16.35 16.35 16.35 ) 16.35 16.35	(dB) 3.72 3.72 3.72 3.72 3.72 3.72	(dB) 27.27 27.27 27.27 27.27 27.27 27.27	Level (dBuV/m) 55.30 48.90 45.40 53.20 54.70	20*log(M% Limit FCC_B 72.86 72.86 72.86 72.86 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96 -27.46 -19.66 -18.16	Pol (H/V) 3mV 3mH 3mV 3mH 3mV	Az (Deg) 0.00 0.00 0.00 0.00 0.00	(Meter) 1.50 2.00 1.20 2.00 2.50	(P/Q/A) P P P P
Freq. (MHz) 433.92Mhz Y-Position 433.92 433.92 X-Position 433.92 Z-Position 433.92 433.92	KHZ, VBW= Pk Rdg (dBuV) Fundamen (stand Up) 75.90 69.50 (EUT Lay I 66.00 73.80 (EUT Place 75.30 69.20	100KHz Av Rdg (dBuV) tal frequenc 62.50 56.10 Down ) 52.60 60.40 5 Side Way 61.90 55.80	AF (dB) y 16.35 16.35 16.35 16.35 ) 16.35 16.35	(dB) 3.72 3.72 3.72 3.72 3.72 3.72	(dB) 27.27 27.27 27.27 27.27 27.27 27.27	Level (dBuV/m) 55.30 48.90 45.40 53.20 54.70	20*log(M% Limit FCC_B 72.86 72.86 72.86 72.86 72.86 72.86	) = -13.4 Margin (dB) -17.56 -23.96 -27.46 -19.66 -18.16	Pol (H/V) 3mV 3mH 3mV 3mH 3mV	Az (Deg) 0.00 0.00 0.00 0.00 0.00	(Meter) 1.50 2.00 1.20 2.00 2.50	(P/Q/A) P P P P

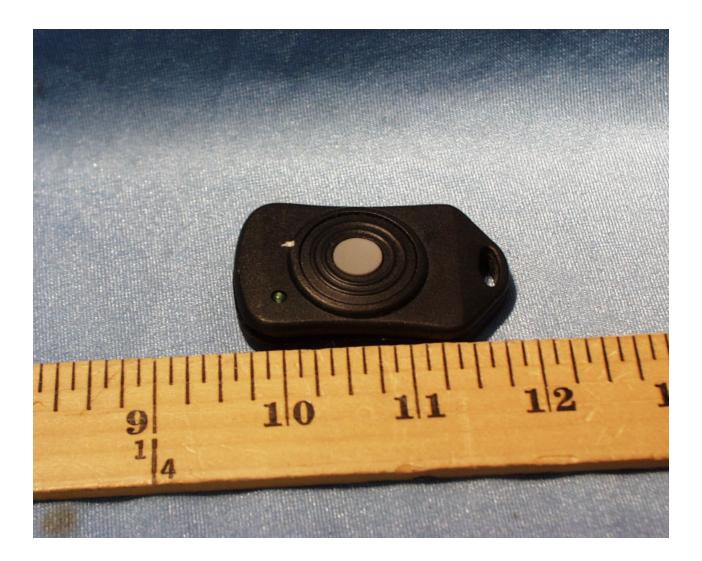
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### RADIATED EMISSIONS (HARMONIC)

est Eno	r: Chin	Pano													
	#: 03U17														
		Vireless Svs	tems Inc												
			FID Door Ac	ress Ta	,										
		s Tag, RF 1			•										
		Class B													
ode Oj	per: Tx/I	Rx													
st Eau	unment:														
												Horn	> 18GHz		
ahla ( fa 1 -	unt)	EMCO Ho	orn 1-18GHz		Pre-am	plifer 1-26	GHz		pectrum Ana			11011			
15		T73: S/N:	6717 -	ΙГ	HP 844	9B	-	85	593EM Analv	zer 🝷				-	
				L											
ak Me	asureme	ents: Resolution Ba	n davi deb												
		video Bandwid													
	1101112 0	Ideo Dandwik													
erage=1	Peak-Duty		1	1					-					· · · · ·	
f	Dist	Read Pk	Read Avg.		CL	Amp	D Corr	HPF		Avg		Avg Lim			Notes
	feet	dBuV	dBuV	dB/m	dB	dB	dB				dBuV/m		dB	dB	
GHz	1			25.3	2.8	-37.5	-9.5	0.0	58.2	44.8	74.0	54.0	-15.8	-9.2	
.302	3.3	77.1	63.7												V
.302	3.3	75.6	62.2	26.8	3.3	-36.7	-9.5	1.0	60.6	47.1	74.0	54.0	-13.4	-6.9	v
.302 .735 2.170	3.3 3.3	75.6 74.4	62.2 61.0	26.8 28.4	3.7	-36.1	-9.5	1.0	61.9	47.1 48.5	74.0 74.0	54.0 54.0	-13.4 -12.1	-6.9 -5.5	V V V
.302 .735 .170 .604	3.3	75.6	62.2	26.8						47.1	74.0	54.0	-13.4	-6.9	v
.302 .735 .170 .604	3.3 3.3 3.3	75.6 74.4 60.9	62.2 61.0 47.5	26.8 28.4 29.5	3.7 4.0	-36.1 -35.9	-9.5 -9.5 -9.5 -9.5	1.0 1.0	61.9 50.0	47.1 48.5 36.6	74.0 74.0 74.0	54.0 54.0 54.0	-13.4 -12.1 -24.0	-6.9 -5.5 -17.4 -24.5 -25.2	V V V V V V
L.302 L.735 2.170 2.604 3.070 3.471 3.905	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6	62.2 61.0 47.5 38.3 36.0 36.2	26.8 28.4 29.5 31.2 32.1 33.1	3.7 4.0 4.3 4.6 5.0	-36.1 -35.9 -35.7 -35.4 -35.2	-9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0	47.1 48.5 36.6 29.5 28.8 30.6	74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4	V V V V V V V
L.302 L.735 2.170 2.604 3.070 3.471 3.905 4.339	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4	62.2 61.0 47.5 38.3 36.0 36.2 35.0	26.8 28.4 29.5 31.2 32.1 33.1 33.0	3.7 4.0 4.3 4.6 5.0 5.4	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4	47.1 48.5 36.6 29.5 28.8 30.6 30.0	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0	V V V V V V V V V
1.302 1.735 2.170 2.604 3.070 3.471 3.905 1.339 1.302	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5	26.8 28.4 29.5 31.2 32.1 33.1 33.0 25.3	3.7 4.0 4.3 4.6 5.0 5.4 2.8	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4	V V V V V V V V H
.302 .735 .170 .604 .070 .471 .905 .339 .302 .735	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1	26.8 28.4 29.5 31.2 32.1 33.1 33.0 25.3 26.8	3.7 4.0 4.3 4.6 5.0 5.4 2.8 3.3	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0	V V V V V V V H H
.302 .735 2.170 2.604 3.070 3.471 3.905 1.339 1.302 1.735 2.604	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5	26.8 28.4 29.5 31.2 32.1 33.1 33.0 25.3	3.7 4.0 4.3 4.6 5.0 5.4 2.8	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4	V V V V V V V V H
1.302 1.735 2.170 2.604 3.070 3.471 3.905 4.339 1.302 1.735 2.604 3.070	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1 55.3	26.8 28.4 29.5 31.2 32.1 33.1 33.0 25.3 26.8 29.5	3.7 4.0 4.3 4.6 5.0 5.4 2.8 3.3 4.0	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 44.4	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6	V V V V V V V H H H
.302 .735 .170 2.604 3.070 3.471 3.905 1.339 1.302 .735 2.604 3.070 3.471 3.905	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1 55.1 55.3 48.0 38.9 36.9	26.8 28.4 29.5 31.2 32.1 33.1 25.3 26.8 29.5 31.2 32.1 33.1	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9 -35.7 -35.4 -35.2	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	$ \begin{array}{r}   1.0 \\   $	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1 44.7	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 44.4 39.2 31.7 31.3	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7	V V V V V V V H H H H H H H
.302 .735 .170 .604 .070 .471 .905 .339 .302 .735 .604 .070 .471 .905	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1 55.3 48.0 38.9	26.8 28.4 29.5 31.2 32.1 33.1 33.0 25.3 26.8 29.5 31.2 32.1	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9 -35.7 -35.4	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	$ \begin{array}{r}   1.0 \\  1$	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 44.4 39.2 31.7	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3	V V V V V V V H H H H H
.302 .735 .170 .604 .070 .471 .905 .339 .302 .735 .604 .070 .471 .905	3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3 44.5	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.3 48.0 38.9 36.9 31.1	26.8 28.4 29.5 31.2 32.1 33.0 25.3 26.8 29.5 31.2 32.1 33.1 33.0 33.0	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7 -36.7 -35.9 -35.7 -35.4 -35.2 -35.4 -35.2 -34.9	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	$ \begin{array}{r}   1.0 \\   $	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1 44.7	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 44.4 39.2 31.7 31.3	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3 -34.5	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7 -27.9	V V V V V V V V H H H H H H H H H
.302 .735 .170 .604 .070 .471 .905 .339 .302 .735 .604 .070 .471 .905	3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3       3.3     3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3 44.5 Measureme	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1 55.3 48.0 38.9 36.9 38.9 36.9 31.1	26.8 28.4 29.5 31.2 32.1 33.0 25.3 26.8 29.5 31.2 32.1 33.1 33.0 33.0	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9 -35.7 -35.7 -35.7 -35.2 -34.9 -34.9 -34.9	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0       5.0       Gain	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1 44.7 39.5	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 44.4 39.2 31.7 31.3 26.1	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3 -34.5 -34.5	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7 -27.9 Field Strengt	V V V V V V H H H H H H H H H
.302 .735 .170 2.604 3.070 3.471 3.905 1.339 1.302 .735 2.604 3.070 3.471 3.905	3.3     3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3 44.5 Measureme Distance to	62.2 61.0 47.5 38.3 36.0 36.2 35.0 61.5 55.1 55.3 48.0 38.9 36.9 31.1 ent Frequenc o Antenna	26.8 28.4 29.5 31.2 32.1 33.0 25.3 26.8 29.5 31.2 32.1 33.1 33.0 33.0	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9 -35.7 -35.7 -35.7 -35.2 -35.2 -34.9 Amp D Corr	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1 44.7 39.5 ct to 3 meter	47.1 48.5 36.6 29.5 28.8 30.6 30.0 43.6 39.0 43.6 39.0 43.6 39.0 31.7 31.3 26.1	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3 -34.5 Average F Peak Field	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7 -27.9 Field Strength L	V V V V V V V H H H H H H H Limit imit
.302 .735 .170 2.604 3.070 3.471 3.905 1.339 1.302 .735 2.604 3.070 3.471 3.905	3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3 44.5 Measureme Distance to Analyzer F	62.2 61.0 47.5 38.3 36.0 35.0 61.5 55.1 55.3 48.0 38.9 36.9 31.1 ent Frequenc o Antenna Reading	26.8 28.4 29.5 31.2 32.1 33.0 25.3 26.8 29.5 31.2 32.1 33.1 33.0 33.0	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.2 -36.7 -35.9 -37.5 -36.7 -35.9 -35.9 -35.7 -35.9 -35.7 -35.4 -35.2 -34.9 D Corr Avg	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 57.0 52.4 57.8 52.6 45.1 44.7 39.5 ct to 3 mete Strength @	47.1 48.5 36.6 29.5 28.8 30.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 31.7 31.3 26.1	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3 -34.5 Average F Peak Field Margin vs	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7 -27.9 Field Strength L s. Average L	V V V V V V V H H H H H H H H H H H
GHz 1.302 1.735 2.170 2.604 3.070 3.471 3.905 1.302 1.735 2.604 3.070 3.471 3.905 4.339 4.339	3.3     3	75.6 74.4 60.9 51.7 49.4 49.6 48.4 74.9 68.5 68.7 61.4 52.3 50.3 44.5 Measureme Distance to	62.2 61.0 47.5 38.3 36.0 35.0 61.5 55.1 55.3 48.0 38.9 36.9 31.1 ent Frequenc o Antenna Reading	26.8 28.4 29.5 31.2 32.1 33.0 25.3 26.8 29.5 31.2 32.1 33.1 33.0 33.0	$\begin{array}{r} 3.7 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \\ 5.4 \\ 2.8 \\ 3.3 \\ 4.0 \\ 4.3 \\ 4.6 \\ 5.0 \end{array}$	-36.1 -35.9 -35.7 -35.4 -35.4 -35.2 -34.9 -37.5 -36.7 -35.9 -35.7 -35.7 -35.7 -35.2 -34.9 Amp D Corr	-9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5 -9.5	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	61.9 50.0 42.9 42.2 44.0 43.4 57.0 52.4 57.8 52.6 45.1 44.7 39.5 ct to 3 meter	47.1 48.5 36.6 29.5 28.8 30.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 43.6 39.0 31.7 31.3 26.1	74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	-13.4 -12.1 -24.0 -31.1 -31.8 -30.0 -30.6 -17.0 -21.6 -16.2 -21.4 -28.9 -29.3 -34.5 Average F Peak Field Margin vs	-6.9 -5.5 -17.4 -24.5 -25.2 -23.4 -24.0 -10.4 -15.0 -9.6 -14.8 -22.3 -22.7 -27.9 Field Strength L	V V V V V V V H H H H H H H H H H H

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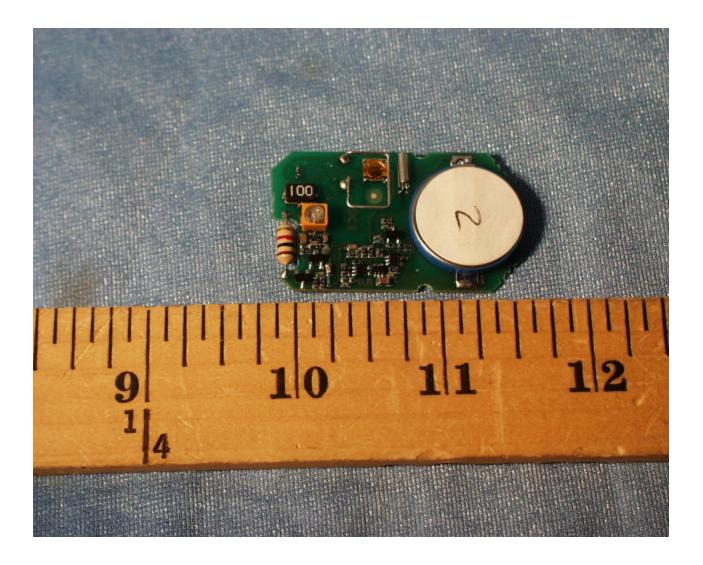
## **EUT PHOTOGRAPHS**



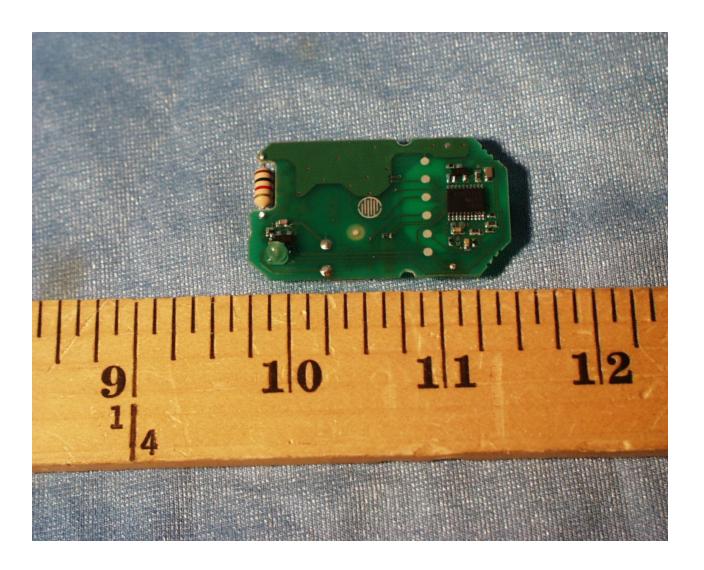
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# **END OF REPORT**

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