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FCC PART 15.209 LOW POWER
FCC PART 15 SUBPART B DIGITAL INTERFACE
UNLICENSED INTENTIONAL RADIATOR
TEST REPORT

Applicant	Icon Time Systems
Address	15201 New Greenbrier Pkwy, Suite A1 Beaverton, OR 97006
FCC ID	VRW09101
Model Number	N/A
Product Description	Employee Time Clock
Date Sample Received	June 19, 2008
Date Tested	July 2, 2008
Tested By	Joe Scoglio
Approved By	Mario de Aranzeta
Report Number	1295UT8TestRepot.pdf
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

TABLE OF CONTENT

ATTESTATION

Certificate #0955-01

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment does comply with the appropriate standards.

I attest that the necessary measurements were made by me or under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Authorized by: Mario de Aranzeta

Signature: On File

Function: Lab Supervisor / Test Engineer

Date: July 15, 2008

REPORT SUMMARY

Disclaimer	The test results only relate to the item tested.
Applicable Rule(s)	Pt 15.209, Pt 15.107, ANSI C63.4: 2003
Related Report	1295ZUT8Testreport.pdf (digital interface portion verified)

TEST ENVIRONMENT

Test Facility	Timco Engineering, Inc. 849 NW State Road 45 Newberry, FL 32669 USA.
Test Condition in the laboratory	Temperature: 26°C Relative humidity: 50%

TEST SETUP SUMMARY

Test Exercise/Software	The DUT was placed in continuous transmit mode of operation per applicant's instruction.
Supporting Equipment	N/A. The DUT is a stand-alone transmitter
Deviation from the standard/procedure	No deviation
Modification of DUT	No modification

PRODUCT SPECIFICATION

DUT Description	Employee Time Clock		
FCC ID	VRW09101		
IC Label	N/A		
Model Number	N/A		
Serial Number	N/A		
Trade Name	ICON		
Operating Frequency	125 kHz		
No. of Channels	1		
Max. Output Power	N/A		
Modulation	None		
DUT Power Source	☐ 110–120Vac/50– 60Hz		
	☒ DC Power – AC/DC Power Adapter9V/500mA		
	☐ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☐ Fixed	☐ Mobile	☒ Portable
Antenna Specification	N/A		

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/07	3/26/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/07	12/12/09
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/07	4/29/09
Analyzer Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/07	4/13/09
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/07	9/5/09
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/07	4/13/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/06	8/27/08
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/07	4/28/09
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/14/07	12/14/09
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	CAL 4/27/08	4/27/09

TEST PROCEDURES

Power Line Conducted Interference: The procedure used was ANSI C63.4-2003 using a 50uH LISN. The spectrum was scanned from .15 to 30 MHz. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

Radiation Interference: The test procedure used was ANSI C63.4-2003 using an Agilent spectrum analyzer with a pre-selector. In the frequency range 10 kHz to 30 MHz the RBW was 10 kHz and from 30-1000 MHz the RBW of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Occupied Bandwidth: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 100kHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

Formula Of Conversion Factors: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBuV	+ 10.36 dB/m	+0.40 dB	=30.76 dBuV/m @ 3m

ANSI C63.4-2003 Section 8.2.1 Measurement Procedures: The DUT was placed on a non-conducting table 80 cm above the ground plane with the DUT located in the center of the table. With the antenna vertical a preliminary scan was done at 1 meters distance, the DUT was moved to a 3.0-meter distance and the antenna height varied and also placed in a horizontal position. The frequency was scanned from 9.0 kHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The DUT was measured in three (3) orthogonal planes.

RADIATION INTERFERENCE

Rules Part No.: 15.209

Requirements: Out-of-band emissions shall not exceed the level of the fundamental.

Frequency	Limits
9 to 490 kHz	2400/F (kHz) µV/m measured @ 300 meters
490 to 1705 kHz	24000/F (kHz) µV/m measured @ 30 meters
1705 kHz to 30 MHz	29.54 dBµV/m measured @ 30 meters
30 – 88 MHz	40.0 dBµV/m measured @ 3 meters
80 – 216 MHz	43.5 dBµV/m measured @ 3 meters
216 – 960 MHz	46.0 dBµV/m measured @ 3 meters
Above 960 MHz	54.0 dBµV/m measured @ 3 meters

Fundamental Limit:
2400/125= 19.2 uV/m @ 300 meters= 20 log(19.2) dBuV/m= 25.66
40 dB/ decade correction factor on the distance
65.66 dBuV/m @ 30 meters
105.66 dBuV/m @ 3 meters

Test Data:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
0.125	0.13	44.6	V	0.00	10.95	55.55	50.15
0.125	0.13	45.4	H	0.00	10.95	56.35	49.35

30 – 1000 MHz

Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
92.10	11.0	H	0.63	8.65	20.28	23.22
92.10	14.0	V	0.63	9.69	24.32	19.18
93.90	11.0	H	0.63	9.11	20.74	22.76
93.90	13.6	V	0.63	10.19	24.42	19.08
99.50	12.1	V	0.65	11.58	24.33	19.17
99.50	16.8	H	0.65	11.11	28.56	14.94
110.50	14.5	H	0.66	13.16	28.32	15.18
110.50	15.0	V	0.66	13.72	29.38	14.12
116.10	13.2	H	0.67	14.29	28.16	15.34
116.10	15.1	V	0.67	14.47	30.24	13.26
121.60	16.5	H	0.67	13.10	30.27	13.23
121.60	16.9	V	0.67	13.17	30.74	12.76
127.20	15.0	V	0.68	12.86	28.54	14.96
127.20	21.8	H	0.68	12.90	35.38	8.12
132.70	20.6	V	0.68	12.75	34.03	9.47
132.70	21.2	H	0.68	12.90	34.78	8.72
138.30	15.4	V	0.69	12.90	28.99	14.51
138.30	16.9	H	0.69	12.97	30.56	12.94
141.90	13.2	H	0.69	13.19	27.08	16.42
141.90	18.5	V	0.69	13.23	32.42	11.08
145.60	14.6	H	0.70	13.55	28.85	14.65
145.60	16.1	V	0.70	13.68	30.48	13.02

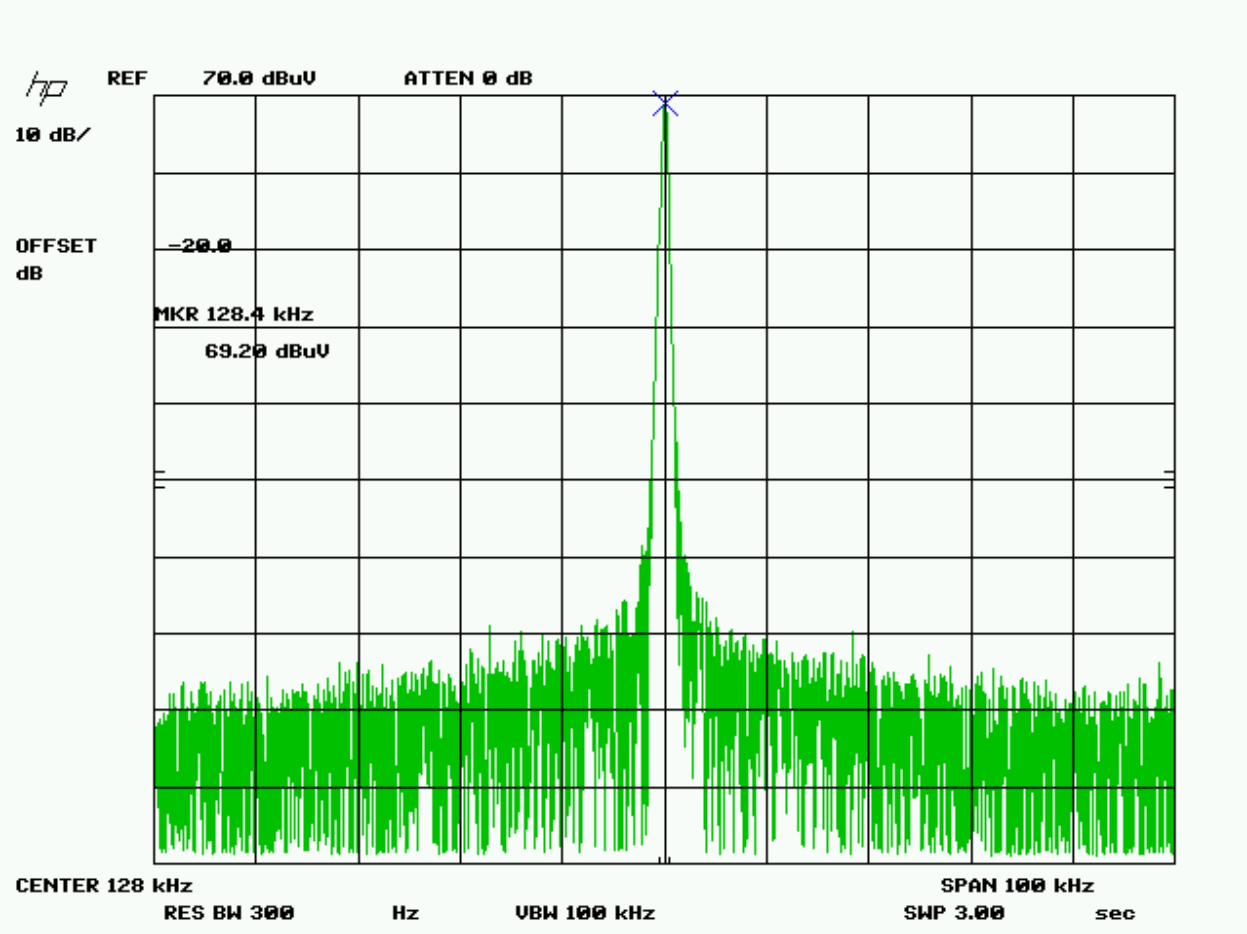
Note: No significant emissions were found after 146 MHz.

OCCUPIED BANDWIDTH

Rules Part No.: FCC Part 2.1049

Requirements: The field strength of any emissions appearing between the band edges below the level of the un-modulated carrier or to the general limits of 15.209, whichever permits the higher emission levels.

Test Data:



POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207 Class B

Requirements:

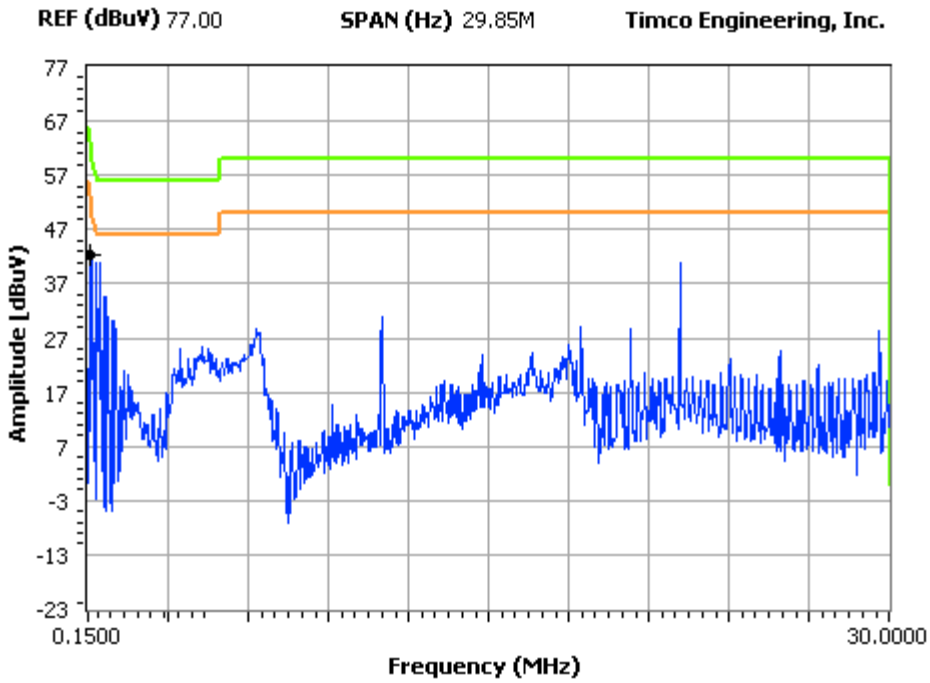
Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: The attached plots represent the power line conducted emissions. Both sides of the line were observed.

POWERLINE CONDUCTED EMISSIONS – LINE 1

NOTES:
ac line conducted line 1

FCC 15.107 Mask Class B



RBW	VBW	ST (sec)
10 kHz	10 kHz	895m

Center Frequency (Hz) 15.075M

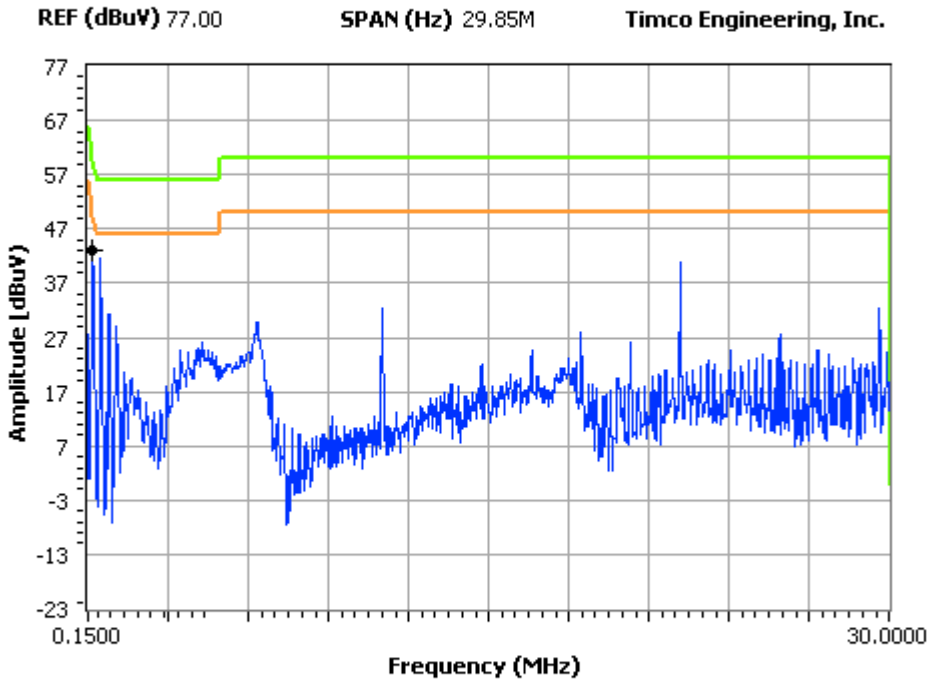
Marker Delta (Hz) 0.00

Peak	0.210	42.20
MKR2	0.000	0.00
MKR3	0.000	0.00
HWMK	23.076	6.27

POWERLINE CONDUCTED EMISSIONS – LINE 2

NOTES:
ac line conducted line 2

FCC 15.107 Mask Class B



RBW	VBW	ST (sec)
10 kHz	10 kHz	895m

Center Frequency (Hz) 15.075M

Marker Delta (Hz) 0.00

Peak	0.299	43.10
MKR2	0.000	0.00
MKR3	0.000	0.00
HWMK	23.076	6.27