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**FCC Part 15  
Subpart B and Subpart C  
Measurement Report**

**For**

**Miller Edge**

**Gate Edge Transmitters**

**March 2000**

**Report Number: MEI000327**

**This report is prepared by:**

**Yong Park  
International Technologies**

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**SUMMARY OF MEASUREMENT REPORT****Purpose**

This measurement report describes the electromagnetic emissions tests performed and the results obtained on the Equipment Units Tested (EUT) described herein. It is based on the emission data measured by International Technologies personnel according to the ANSI C63.4-1992 procedure to determine whether the electromagnetic emissions from the EUT are within the Class B specification limits defined by FCC Part 15 Subpart B and C Rules and Regulations Vol. II.

EUT: Miller Edge, Inc.  
Model No.: MWT A01 and MWT01  
Serial No.: #2 (FCC unit)

Manufacture: Miller Edge, Inc.  
P.O. Box 159  
West Grove, PA 19390

Test Location: International Technologies  
3 Adelpia Lane  
Chester Springs, PA 19425

Test Date: March 24, 2000

**Result**

The measurement result, provided with this report, indicate that the electromagnetic emissions from the EUT are within the class B specification limits defined by FCC Part 15 Subpart B and C Rules and Regulations Vol. II

The measurement data and conclusions are a true and accurate representation of the electromagnetic emissions characteristics of the test sample described in this report.

Report prepared by \_\_\_\_\_ Date \_\_\_\_\_  
*Yong Park, EMC Certified Engineer*

The results contained within this report relate only to the sample provided. This report shall not be reproduced or modified without written approval by a member of International Technologies.

## **1. General Information**

### **1.1 Equipment Units Tested (EUT) Description**

The Miller Edge gate transmitters are designed to provide obstacle sensing protection for a variety of motorized gate and doors. They easily mounted and wired to the gate or door edge sensor. When the sensing edge comes into contact with an obstruction a closed circuit signal is created and is sent to the transmitter. The transmitter relays the information to the receiver and the receiver passes the message along to the operator motor. The gate or door stops movement instantaneously and will then reverse the direction of travel. The Model MWTA01 is with an audible alarm feature that activates when the battery has only 25% of its life remaining, indicating the battery should be replaced while the Model MWT01 is not available for the audio alarm feature.

The Model MWTA01 has three major sections: Transmitter board, Cut-off board, Alarm board. The transmitter board is generating a 318MHz of encoded RF signal. The Cut-off board is automatically cut off the 318 MHz of encoded RF signal to a two(2) seconds after transmitting. The Alarm board is giving an audible alarm when a battery becomes low which is only available for Model MWTA01. There are no microprocessor or crystal/oscillator and it is utilizing a 9 volts lithium battery for both models.

Both models of the transmitter comes with an NEMA 4 weather-proof polycarbonate enclosure. The overall dimension of enclosure is 2 3/8" H x 5 1/2" L x 4 1/8" W.

### **1.2 Related Submittal(s) / Grant(s)**

This submission is not related to any other grants or submissions.

### **1.3 Tested System Details**

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

Note: More detail for cable description in Sec. 3.5.

<b>Model &amp; Serial No.</b>	<b>FCC ID:</b>	<b>Description</b>	<b>Cable Descriptions</b>
Miller Edge Mode: MWTA01 Model:MWT01 Ser. No.: #2	Not available	Transmitter for gate or door (EUT)	*No I/O cables are utilizing

### **1.4 Applicable Standard**

Radiated testing were performed according to the procedures in ANSI C63.4-1992. Radiated testing was performed at an antenna distance of 3 meters. The frequency range of the test was 30.0 MHz to 3.2 GHz for the radiated test. No conducted testing was performed because of the EUT utilizes a battery for its own power.

### **1.5 Location of Test Site**

The open area test site used to collect the radiated data is located at International Technologies in Pennsylvania. This site meet the requirements in Section 5 of ANSI C63.4-1992 and has been fully described in a report filed to the FCC. A copy of accredited certifications document is in Appendix G.

## **2 EUT Labeling**

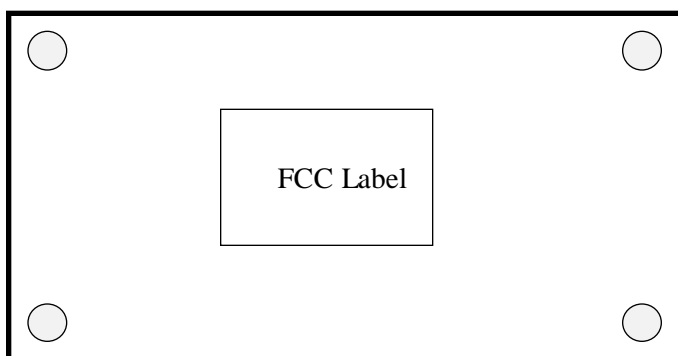
### **2.1 FCC ID Label**

The following is a sample of the FCC ID label to be used on the EUT.

Model No.: MWTA01 Part No.: Ser. No. ;  This device is complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.  Complies with Part 15, FCC Rules. FCC ID:
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### **2.2 Location of Label on EUT**

The location of the label will be placed on the bottom of EUT.



### **3 System Test Configuration and Justification**

#### **3.1 EUT Operation Mode**

The EUT was configured with a continues transmitting mode instead of two seconds period transmitting in order to test.

#### **3.2 EUT Exercise Software**

No software or exerciser equipment were used for the test.

#### **3.3 General and Special Conditions**

No alternate test method or special accessories were used to achieve compliance.

#### **3.4 Test Justification**

No conducted emissions test was performed since the EUT utilizes a 9 volts battery.

#### **3.5 EUT Modifications**

No modification was required to achieve compliance.

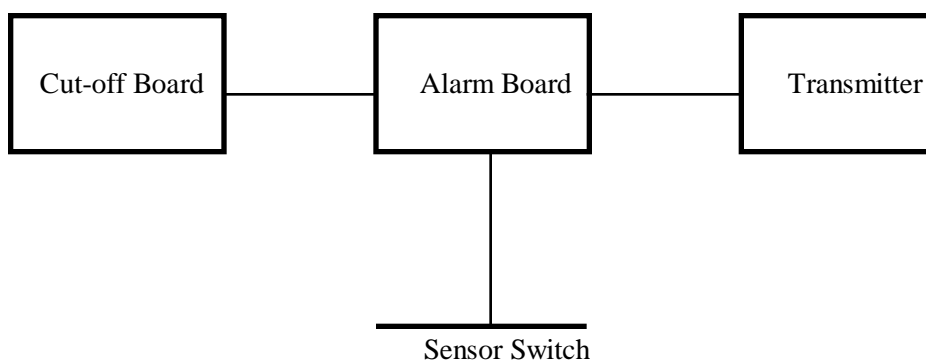
#### **3.6 Equipment and Cable Configuration**

The EUT does not need I/O cables since the EUT is a potable door/gate opener.

### **4 Block Diagram of EUT**

#### **4.1 Block Diagram Description**

The following is a block diagram of EUT. The schematic is also provided in Appendix B.



### **5 Conducted Measurement Procedures**

No conducted emission measurement was performed since the EUT power comes from a 9 volts battery.

## **6. Radiated Measurement Procedures**

### **6.1 Radiated Test Set-up**

The HP 8546A EMI receiver was used as a measuring meter. The EMI receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI receiver records the highest measured reading over all the sweeps. The quasi-peak mode was used only for those readings which are marked accordingly in the data table. The effective measurement bandwidth used for the radiated emissions test was 120 kHz.

Broadband biconical, log periodic and double ridged antennas were used as transducers during the measurement. The frequency spans were wide to 30 - 88 MHz, 88 - 216 MHz, 216 - 300 MHz, 300 - 1000 MHz and 1 - 4 GHz during preliminary investigations, however, the final data was taken with a frequency span of 1 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary. The EUT was mounted on the 0.8 m high wooden table which stand on the turntable. The turntable is remote controlled using a motor and supporting the EUT permits EUT rotation over 360 degrees to determine the highest emission levels. The antenna mast allowed height variation of the antenna at to maximize the emissions.

### **6.2 Preliminary Radiated Test**

Preliminary testing was done at a distance of 1 meter, to determine the predominant frequencies from the system and to investigate the EUT configuration that produced the maximum levels of emissions.

Broadband antennas were used to scan large frequency bands. If and when any frequency was found to be within 20 dB of the limits level, this frequency was recorded as a significant frequency. All significant frequencies were further examined carefully at a reduced frequency span on the EMI receiver, while optimizing EUT orientation.

### **6.3 Final Radiated Test**

The open field test site was used for radiated emission testing. This test site is setup according to the ANSI C63.4-1992 and the site attenuation data has been filed with the FCC.

The EUT was tested at a 3 meter distance. The receiving antenna was mounted on the antenna mast, which has a motor allowing antenna height control and polarization. The antenna height was then varied from 1 to 4 meter to find the highest level of radiated emission at each frequency found during the preliminary test described above.

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal is detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide emission frequency from the EUT.

The EMI receiver was manually operated and the manual scan techniques were used to collect final data. The six highest emission readings and the corresponding frequencies are listed in Section 8.

## **7 Conducted Emissions Data**

No conducted data was collected since the EUT is using a 9 volts battery.

### 8 Radiated Emissions Data

The following data was collected using a HP 8546A EMI receiver with 120 kHz bandwidth. The six highest emissions are listed in the table. All signals were captured using max-hold in peak mode unless specified in the comment. The correction factor is included cable, antenna, and pre-amplifier corrections. The full data sheet is provided in Appendix F.

Ant Pol.	Freq.	Raw Read	Corr. Factor	Net Read	FCC B Limit	Margin	Azimuth	Antenna Height	Remarks
H/V	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Degree	Meter	
H	318.1	50.5	21.9	72.4	74.5	-2.1	270	1.0	Fundamental
H	636.2	15.8	29.8	45.6	54.5	-8.9	270	1.0	2 <sup>nd</sup> harmonic
H	954.3	8.4	36.1	44.5	54.5	-10.0	270	1.0	3 <sup>rd</sup> harmonic
V	318.1	43.2	21.9	65.1	74.5	-9.4	220	1.0	Fundamental
V	636.2	12.3	29.8	42.1	54.5	-12.4	220	1.0	2 <sup>nd</sup> harmonic
V	954.3	7.5	36.1	43.6	54.5	-10.9	220	1.0	3 <sup>rd</sup> harmonic

Judgment: Passed by 2.1dB at 318.1 MHz.

Test Personnel Signature \_\_\_\_\_ Date \_\_\_\_\_  
*Yong Park, Certified EMC Engineer*

#### 8.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF + (-AG)$$

Where:

FS = Field Strength  
 RA = Receiver Amplitude  
 AF = Antenna Factor  
 CF = Cable Attenuation Factor  
 AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain if 29 dB is subtracted, giving a field strength of 32 dBuV/M. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} \{ (32 \text{ dBuV/m})/20 \} = 39.8 \text{ uV/m}$$

This is done in the data tables by lumping the cable, antenna and pre-amp into one factor called "Corr" and adding it to the "raw" reading from the receiver.



## 8.2 Table of Correction Factors

Frequency in MHz	Cable CF in dB	Antenna CF in dB	Total CF in dB
30.00	1.7	14.4	16.1
35.00	1.8	12.6	14.4
40.00	1.9	12.0	13.9
45.00	2.0	12.4	14.4
50.00	2.2	12.1	14.3
60.00	2.6	10.5	13.1
70.00	2.8	8.0	10.8
80.00	3.0	7.5	10.5
90.00	3.2	9.6	12.8
100.00	3.4	12.3	15.7
120.00	3.8	14.7	18.5
140.00	4.2	13.0	17.2
160.00	4.5	15.1	19.6
180.00	4.8	16.7	21.5
200.00	5.0	17.2	22.2
200.00	5.0	12.5	17.5
225.00	5.4	12.1	17.5
250.00	5.7	13.2	18.9
275.00	6.0	14.1	20.1
300.00	6.3	15.4	21.7
350.00	6.9	15.4	22.3
400.00	7.5	16.9	24.4
450.00	7.8	17.9	25.7
500.00	8.3	18.9	27.2
550.00	8.7	19.4	28.1
600.00	9.1	19.8	28.9
650.00	9.5	20.7	30.2
700.00	10.0	22.0	32.0
750.00	10.3	22.0	32.3
800.00	11.0	22.2	33.2
850.00	10.8	23.7	34.5
900.00	11.4	24.1	35.5
950.00	11.4	24.6	36.0
990.00	11.8	25.4	37.2

**9. List of Test Equipment**

<b>Equipment</b>	<b>Manufacture</b>	<b>Model</b>	<b>Serial No.</b>	<b>Last Cal. Date</b>	<b>Calibration Interval</b>
EMI Receiver RF Section	Hewlett Packard	85462A	3325A00158	04/15/99	1 year
RF Filter Section	Hewlett Packard	85460A	3330A00163	04/15/99	1 year
LISN	Solar	8012-50-R-24-BNC	0905	08/30/99	1 year
Antenna Double Ridged Guide	EMCO	3115	3950	02/28/00	1 year
Antenna Biconical	EMCO	3104	3454	06/10/99	1 year
Antenna Log Periodic	EMCO	3146	1932	06/10/99	1 year
Antenna Mast	Pacific Arepco	DAPM4/6	N/A	N/A	N/A
Turntable	Pacific Arepco	TT1000	N/A	N/A	N/A

## **10 Label and Manual Information**

### **10.1 Labeling Requirement**

In accordance with the Section 15.19 of FCC Rules, a permanently attached label shall be affixed to the every product in a conspicuous location with the following statement:

“This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

“Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which cause the user will be required to correct the interference at his own expense.”

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

“Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.”

### **10.2 Information to User**

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

**Appendix A**  
**Product Literature**

**Appendix B**  
**EUT Schematics**

## **Appendix C**

### **Photographs of Equipment and Cable Configuration**

## **Appendix D**

### **Photographs of EUT**

**Appendix E**  
**User Manual**



**Appendix F**  
**Measurement Data Sheet**

**Appendix G**  
**Test Site File Document**