

# Test Report

for

Electromagnetic Interference

of

E.U.T. : Speedzone Te am Wireless

Trade Name : Dayton

Model Number : SP10506

Prepared for

Dayton Industrial Co., Ltd.

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Prepared by

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## Caution :

1. No Single part of this report may be reproduced without written permission from Interocean EMC Technology Corp.
2. This test data is traceable to National or International Standards.

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## Verification of Compliance

**Applicant :** Dayton Industrial Co., Ltd.  
**Manufacturer :** Kendy Enterprise Ltd.  
**EUT Description :** Speedzone Team Wireless  
**Model No. :** SP10506  
**Serial No. :** N/A  
**Tested Power Supply :** DC 12V, 3V  
**Date of Final Test :** June 13, 2000  
**Measurement Procedures and Standards Used :** ☒ CFR 47, Part 15, Subpart C  
☒ ANSI C63.4: 1992

The device described above was tested by Interocean EMC Technology Corporation to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Interocean EMC Technology Corp assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliant with the Part 15 subpart C and ANSI C63.4 official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of Interocean EMC Technology Corporation.

Report Issued: July 4, 2000

Project Engineer:

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Jacky Yeh

Checked:

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Approved:

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Kent J.K. Hsu

# 1 General Information

## 1.1 Description of Equipment Under Test

**Equipment Under Test** : Speedzone Team Wireless

**Model Number** : SP10506

**Serial Number** : N/A

**Type of Sample Tested** : Mass Production

**Applicant** : Dayton Industrial Co., Ltd.  
2-12 Kwai Fat Road, 11/F., A, Kwai Chung, N.T., Hong Kong

**Manufacturer** : Kendy Enterprise Ltd.  
2-12 Kwai Fat Road, 11/F., A, Kwai Chung, N.T., Hong Kong

**Power Supply** : Battery: 12V for Trasmitter, 3V for Speedzone Team Meter

**Date of Receipt of Sample** : May 18, 2000

**Date of Test** : June 13, 2000

**Description of E.U.T.** :

The EUT is wireless transmitter speed meter for bicycle. It is mount on the right or the left side of the fork blade. The optimal distance between the computer and the transmitter is 24 inches (610mm). The distance may need to be less then 24 inches (610mm).

## 1.2 Test Facility

|                    |   |   |
|--------------------|---|---|
| Site Description   | : | Anechic Chamber   |
| Name of Firm       | : | Interocean EMC Technology Corp.   |
| Site Location      | : | No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,<br>Taipei County, Taiwan, R.O.C.  |
| Site Filing        | : | <ul style="list-style-type: none"><li>● Federal Communication Commissions – USA<br/>Registration No.: 96399</li><li>● Voluntary Control Council for Interference by<br/>Information Technology Equipment (VCCI) – Japan<br/>Registration No. (Conducted Room): C-1094<br/>Registration No. (OATS 1): R-1040<br/>Registration No. (OATS 2): R-1041</li></ul> |
| Site Accreditation | : | <ul style="list-style-type: none"><li>● Bureau of Standards and Metrology and Inspection<br/>(BSMI) – Taiwan, R.O.C.<br/>Accreditation No.:<br/>SL2-IN-E-0026 for CNS13438 / CISPR22<br/>SL2-A1-E-0026 for CNS13783-1 / CISPR14</li><li>● National Voluntary Laboratory Accreditation<br/>Program (NVLAP) - USA<br/>Lab Code: 200458-0</li></ul>            |

### 1.2.1 Test Methodology

Both conducted and Radiated Emission Measurement was performed according to the procedures in CFR 47 Part 15 Subpart C and ANSI C63.4: 1992. Radiated Emission Measurement was performed at 3 meters distance from antenna to EUT.

## **2 Power Line Conducted Emission Measurement**

The EUT is a battery-operated equipment; do not need to perform the Power Line Conducted Emission Measurement.

### 3 Radiated Emission Measurement (0.009MHz~0.490MHz)

#### 3.1 Instrument

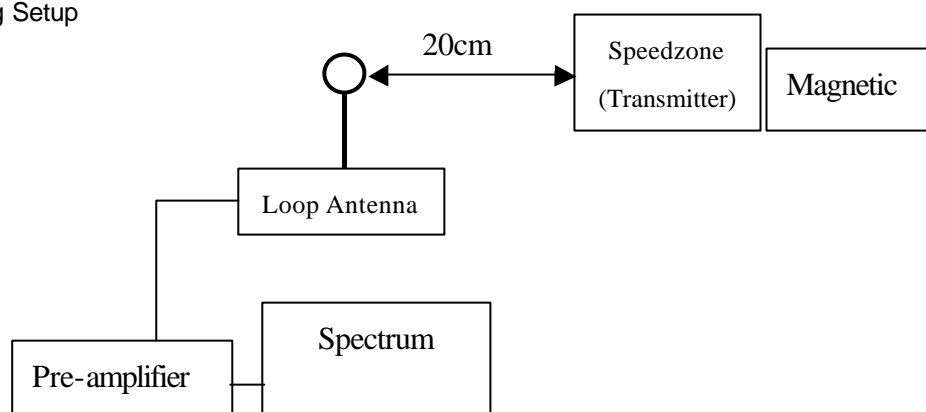
##### Anechoic Chamber

| Instrument     | Manufacturer | Model      | Serial No. | Last Calibration |
|----------------|--------------|------------|------------|------------------|
| Spectrum       | HP           | 8591E      | 3543A04838 | 2000.01.24       |
| Loop Antenna   | EMCO         | 7405       | 9011-1836  | N/A              |
| Pre-amplifier  | Schaffner    | CPA9231A/4 | 3350       | 1999.12.30       |
| Coaxial Switch | Anritsu      | MP59B      | 6100034527 | 2000/06/26       |

Note: All instrument upon which need to calibrated are with calibration period of 1 year.

#### 3.2 Block Diagram of Test Configuration

##### Configuration of Testing Setup



### 3.3 Radiated Limit

FCC Part 15 Subpart C

| Frequency (MHz) | Distance | Field Strength (uV/m)        | Average (dBuV/m) |
|-----------------|----------|------------------------------|------------------|
| 0.009~0.490     | 300      | $2400/F(\text{kHz}) = 19.84$ | 25.95            |

### 3.4 Instrument configuration

- 3.4.1 The EMI test spectrum frequency range set from 100 kHz to 150 kHz.
- 3.4.2 The EMI test spectrum resolution bandwidth set at 100 kHz.
- 3.4.3 The EMI test spectrum video bandwidth set at 300 kHz.
- 3.4.4 The EMI test spectrum detector set as Peak.

### 3.5 Measured Mode

- 3.5.1 The test mode for preliminary test as following:
  - Mode 1: Tx & Rx
- 3.5.2 Selected the worst case mode when after preliminary test for final test, the mode as following:
  - Mode 1: Tx & Rx

### 3.6 Configuration of Measurement

- 3.6.1 The EUT was place on a non-conductive table whose total height equaled 80cm.
- 3.6.2 EUT was set 20 cm away from the receiving antenna. Because of the distance between the speed meter (Receiver) and the Transmitter is only 24 inches (610cm). Therefore performed the test at normal test room. And set up the distance between the receiver and transmitter in 20cm.
- 3.6.3 The limit transfer into 20cm is 29760uV/m (89.47 dBuV/m).

### 3.7 Configuration of EUT

- 3.7.1 Setup the EUT and simulators as shown section 3.2.
- 3.7.2 Trigger the transmitter with magnetic and record the curve with maxim hold of spectrum.

### 3.8 Test Result

The final tests data as shown on following page.





## Interocean EMC Technology Corp.

DATE: 06-13-2000

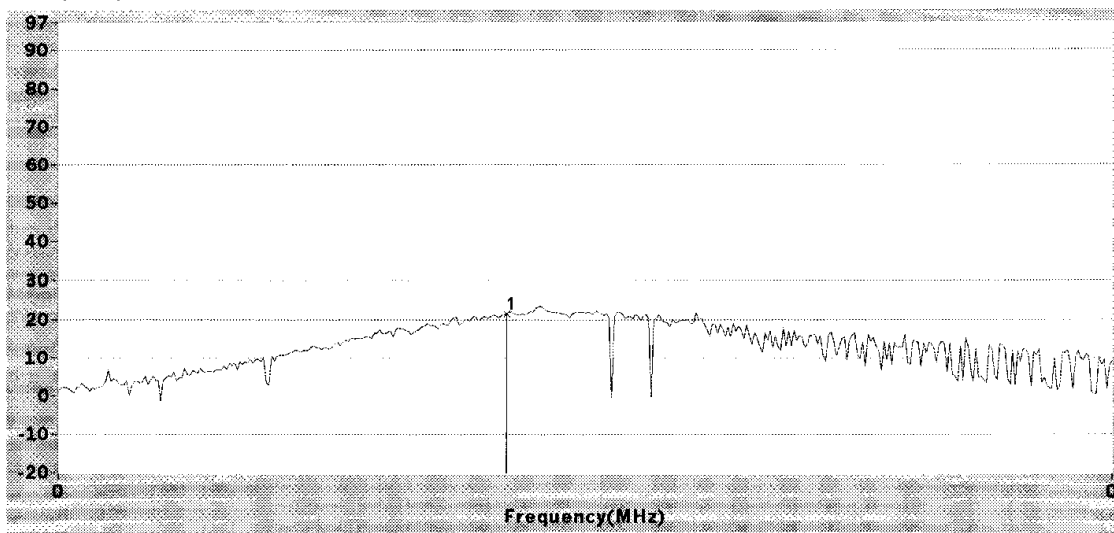
## EMI TESTING DATA

TIME: 12:38:32

EUT : Cyclocomputer  
CLIENT: Dayton  
MODEL: Speedzone Team Wireless  
RATING: 12Vdc  
Ser#:  
TRACE:

POLARIZATION: Horizontal  
TEST DISTANCE: 3 M  
PROJECT ID: 0A051803  
FILE/DATA#: Dayton.emi/5  
OPERATOR: Kent Hsu  
TEST SITE: Chamber 1  
LIMIT :

Level(dBuV)



COMMENT:

|     | Freq  | Level | Over  | Limit | Read  | Antenna | Cable  | Other  | Remark |
|-----|-------|-------|-------|-------|-------|---------|--------|--------|--------|
|     | ----- | ----- | Limit | Line  | Level | Factor  | Factor | Factor | -----  |
|     | MHz   | dB    | dB    | dB    | dB    | dB      | dB     | dB     |        |
| * 1 | 0.121 | 21.56 | 21.56 | 0.00  | 51.41 | 0.00    | 0.00   | 29.85  |        |

Dayton.emi/5

1/1

## 4 Radiated Emission Measurement (30MHz~1000MHz)

### 4.1 Instrument

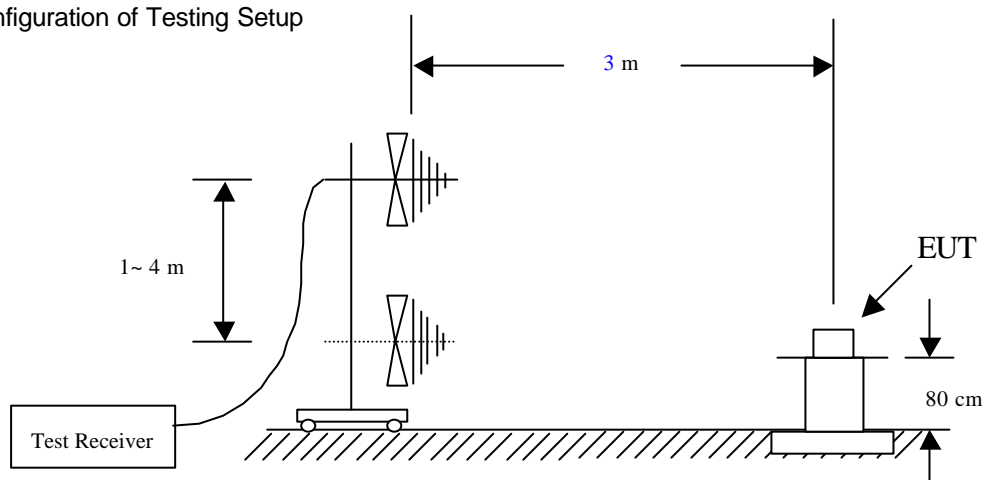
#### Anechoic Chamber

| Instrument     | Manufacturer | Model      | Serial No. | Last Calibration |
|----------------|--------------|------------|------------|------------------|
| Spectrum       | HP           | 8591E      | 3543A04838 | 2000.01.24       |
| Bilog Antenna  | Schwarzbeck  | VULB9161   | 4023       | 1999.09.16       |
| Pre-amplifier  | Schaffner    | CPA9231A/4 | 3350       | 1999.12.30       |
| Coaxial Switch | Anritsu      | MP59B      | 6100034527 | 2000/06/26       |

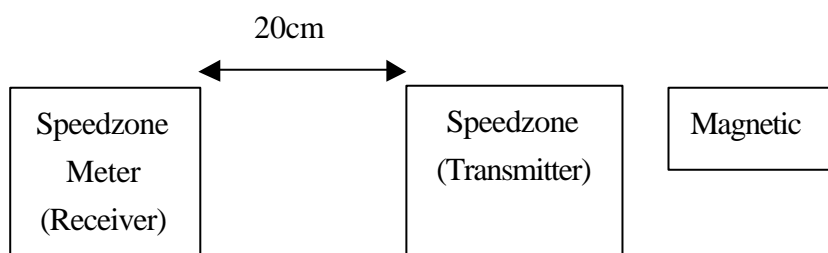
Note: All instrument upon which need to calibrated are with calibration period of 1 year.

### 4.2 Block Diagram of Test Configuration

Configuration of Testing Setup



Configuration of EUT Setup



### 4.3 Radiated Limit

#### FCC Part 15 Subpart C

| Frequency (MHz) | Distance | Field Strength (uV/m) | Quasi-Peak (dBuV/m) |
|-----------------|----------|-----------------------|---------------------|
| 30 ~ 88         | 3        | 100                   | 40.00               |
| 88 ~ 216        | 3        | 150                   | 43.52               |
| 216 ~ 960       | 3        | 200                   | 46.02               |
| 960 above       | 3        | 500                   | 53.98               |

### 4.4 Instrument configuration

- 4.4.1 The EMI test receiver frequency range set from 30 MHz to 1000 MHz.
- 4.4.2 The EMI test receiver bandwidth set at 120 kHz.
- 4.4.3 The EMI test receiver detector set as Quasi-Peak (Q.P.) and Average (AV).

### 4.5 Measured Mode

- 4.5.1 The test mode for preliminary test as following:
  - Mode 1: Tx & Rx
- 4.5.2 Selected the worst case mode when after preliminary test for final test, the mode as following:
  - Mode 1: Tx & Rx

### 4.6 Configuration of Measurement

- 4.6.1 The EUT was place on a non-conductive table whose total height equaled 80cm. The turntable can rotate 360 degree to determine the position of the maximum emission level.
- 4.6.2 EUT was set 3 meters away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

### 4.7 Configuration of EUT

- 4.7.1 Setup the EUT and simulators as shown section 3.2.
- 4.7.2 Turn on the power of all equipment.
- 4.7.3 Rotated the magnetic to trigger the Transmitter and emanating the signal.
- 4.7.4 Measured the horizontal polarization and record.
- 4.7.5 Changed into vertical polarization, repeat the procedure as section 3.7.6.

### 4.8 Test Result

The final tests data as shown on following page.

## Radiated Emission Measurement Data

|                |                        |              |                     |
|----------------|------------------------|--------------|---------------------|
| Date of Tested | : <u>June 13, 2000</u> | Polarization | : <u>Horizontal</u> |
| Temperature    | : <u>26</u>            | Humidity     | : <u>49%</u>        |
| Tested Mode    | : Tx & Rx              |              |                     |

[illegible]

Remark :

1. All readings are Peak values. Because all emission are too low. Therefore performed the test in anechoic chamber.

## Radiated Emission Measurement Data

|                |                 |              |            |
|----------------|-----------------|--------------|------------|
| Date of Tested | : June 13, 2000 | Polarization | : Vertical |
| Temperature    | : 26            | Humidity     | : 49%      |
| Tested Mode    | : Tx & Rx       |              |            |

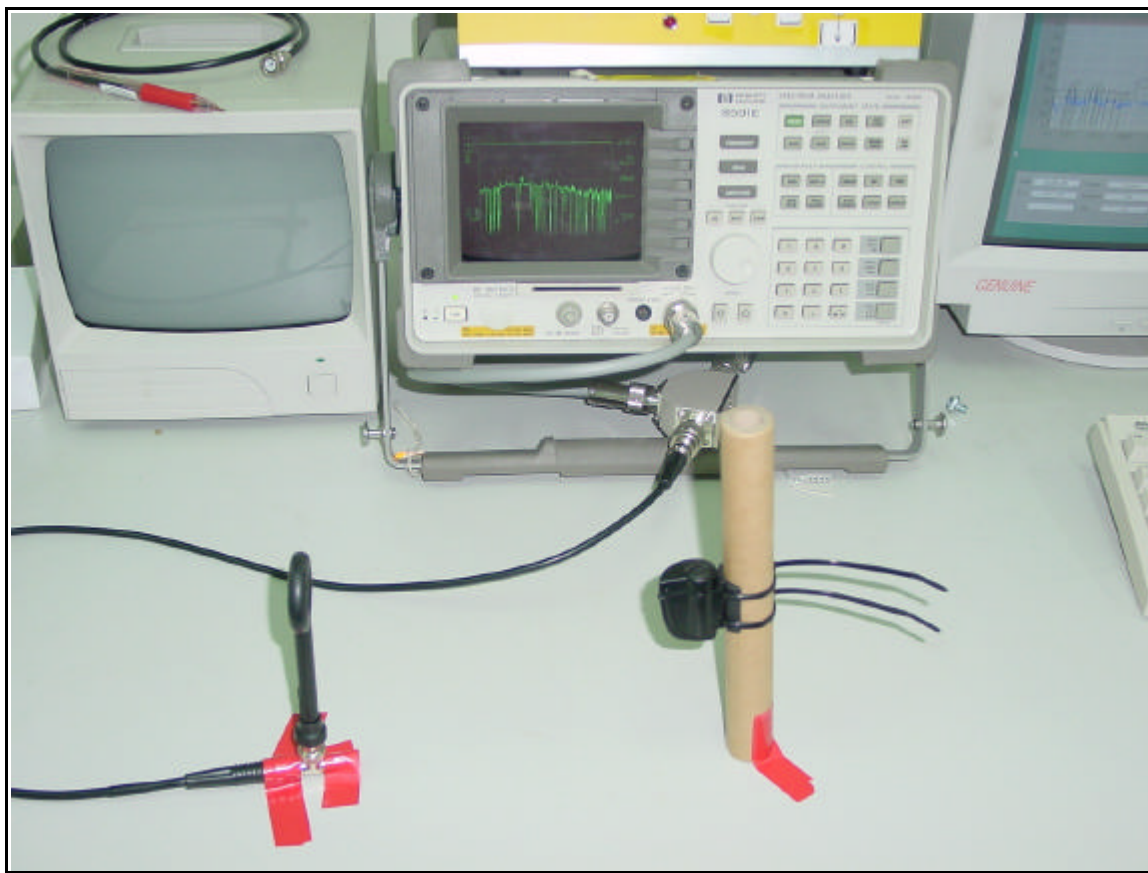
[illegible]

Remark :

1. All readings are Peak values. All emissions are too low. Therefore performed the test in anechoic chamber.

## 5 Photographs of Measurement

### 5.1 Radiated Emission Measurement (0.009MHz~0.490MHz)



### 5.2 Radiated Emission Measurement (30MHz~1000MHz)



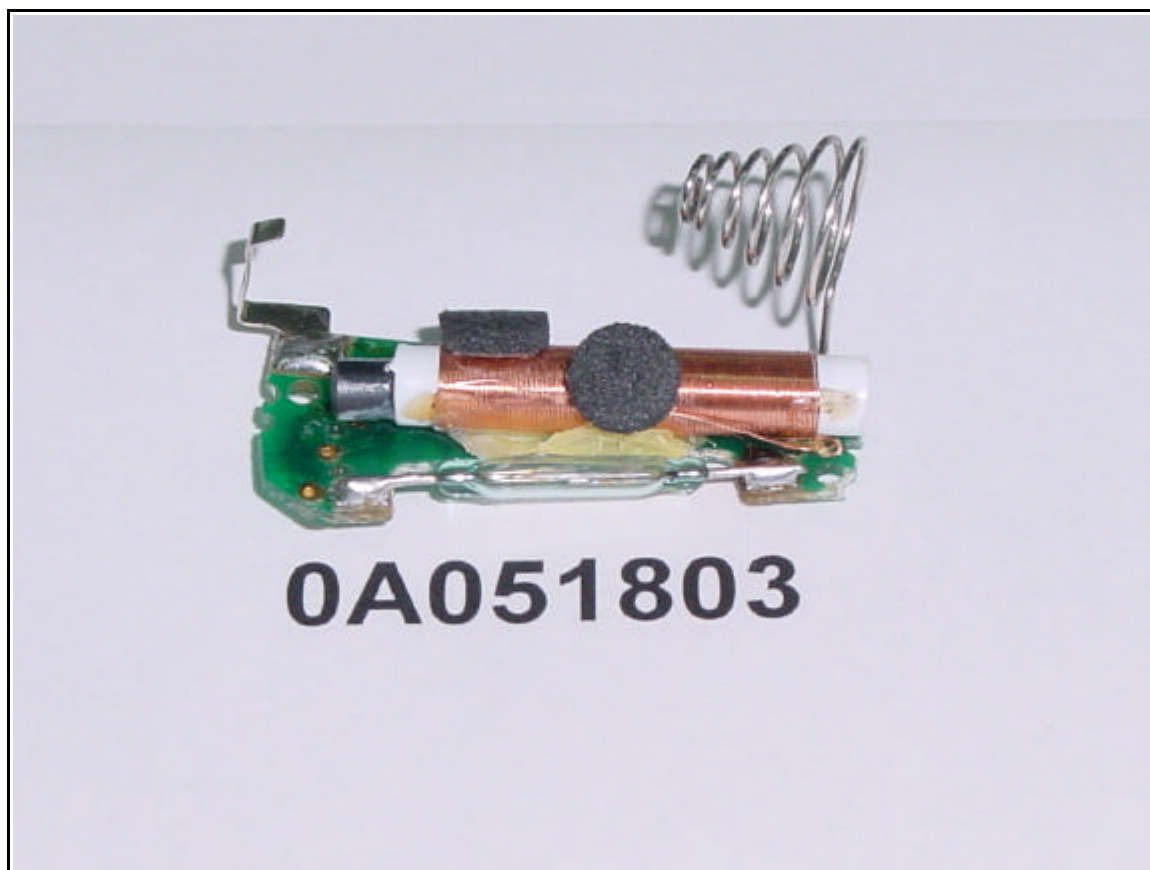
## 6 Photographs of EUT Inside



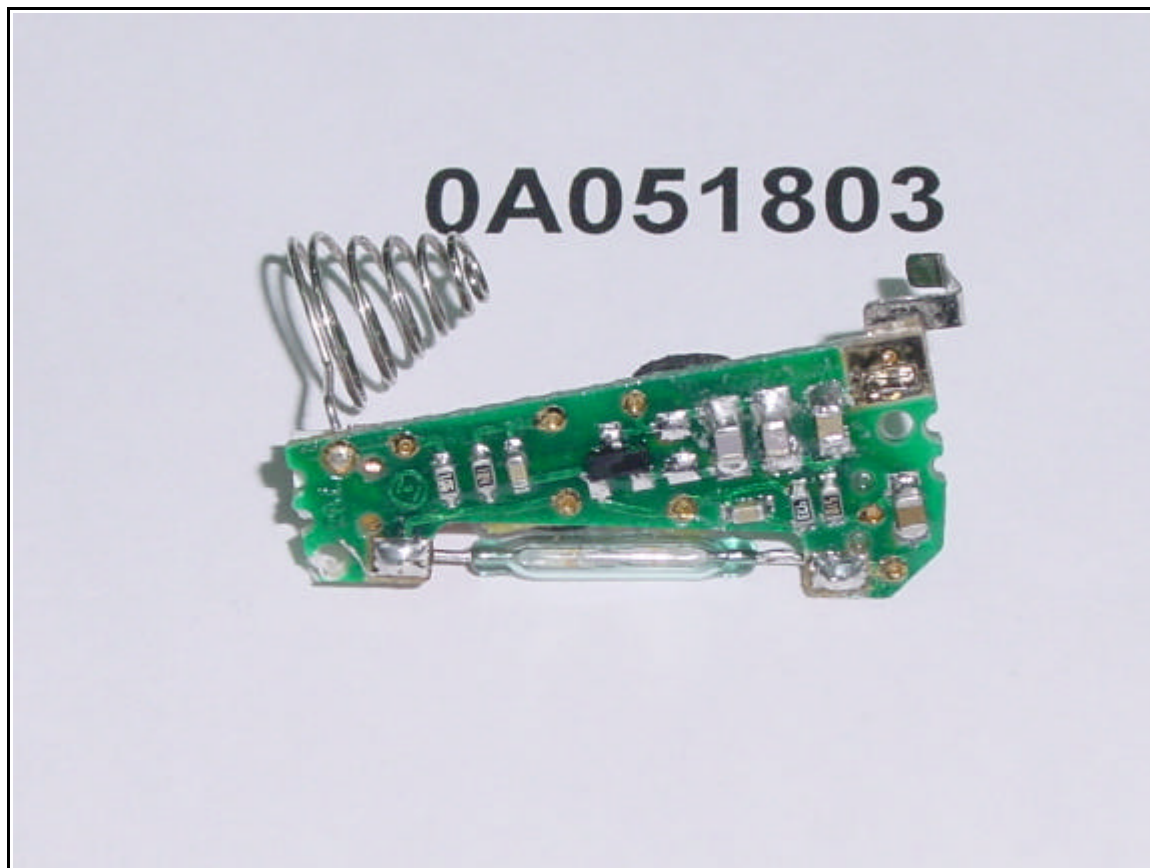
Front View of Appearance (Transmitter)



Rear View of Appearance (Transmitter)



Transmitter Inside 1



Transmitter Inside 2

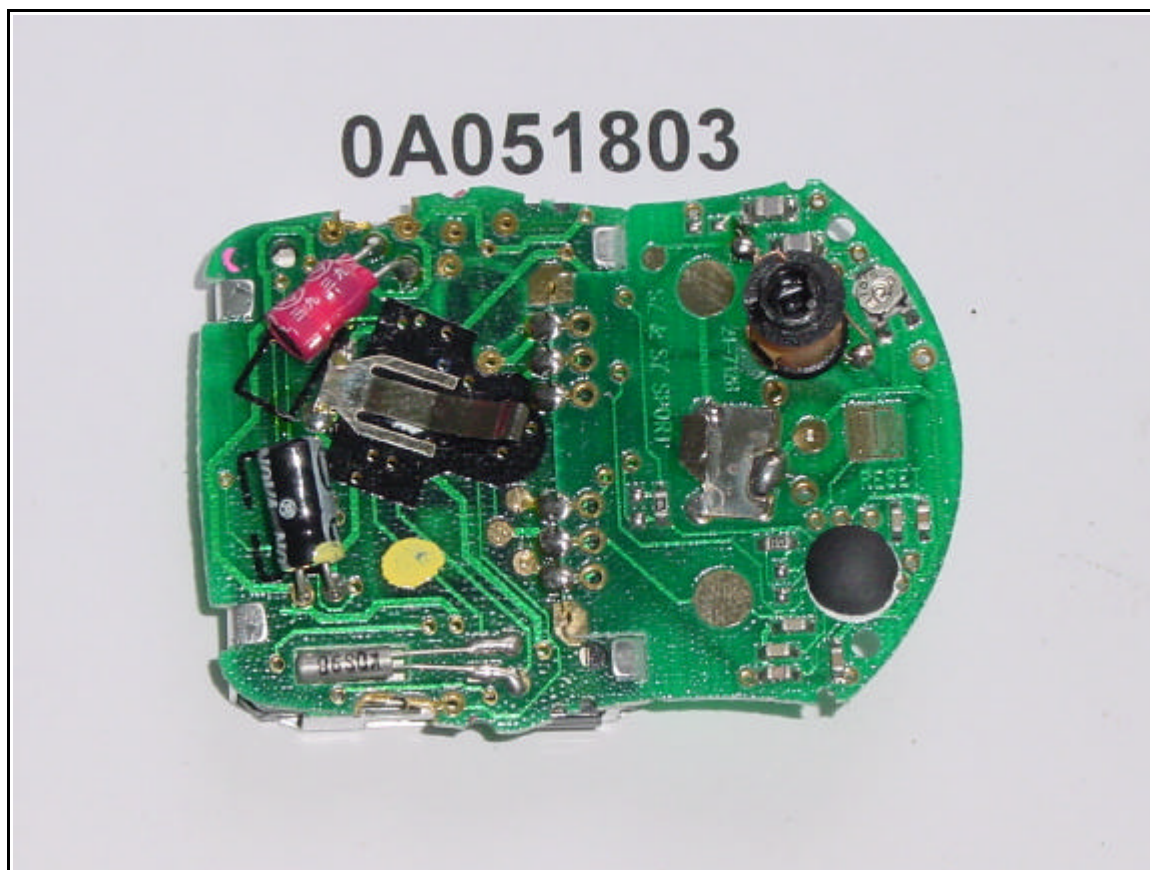




Front View of Appearance (Receiver)



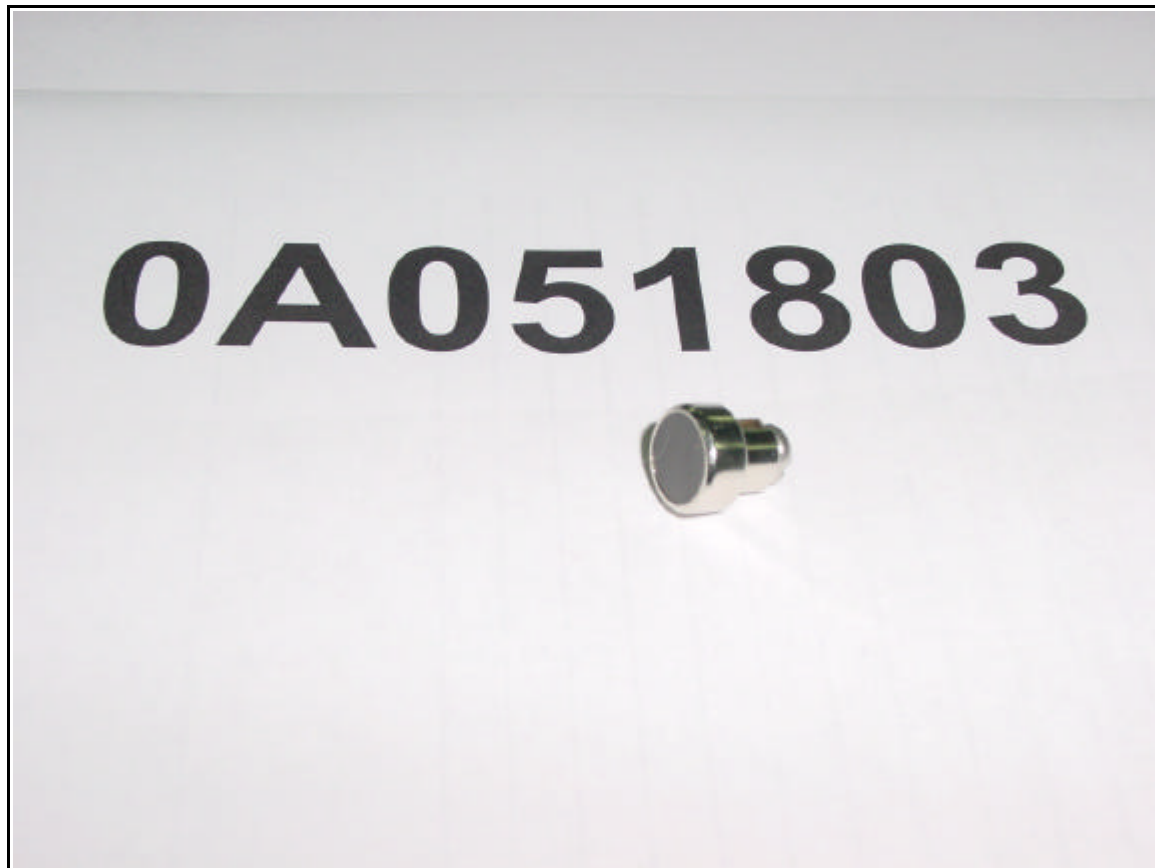
Front View of Appearance (Receiver)



Receiver inside 1



Receiver inside 2



Magnetic