

Date: 1999-10-13  
No.: HM101552

## **TEST REPORT**

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**APPLICANT:** (CODE : GRI004)

GREATRICH INDUSTRIAL LTD.  
ROOM 278, SINO INDUSTRIAL PLAZA,  
9 KAI CHEUNG ROAD,  
KOWLOON BAY, KOWLOON, HONG KONG.

**DATE OF SAMPLES RECEIVED:**

1999-09-20

**TEST DURATION**

1999-09-21 TO 1999-10-09

**DESCRIPTION OF SAMPLE(S):**

A sample of product said to be:

Product: Receiver Unit for Parking Alert  
Manufacturer: GREATRICH INDUSTRIAL LTD.  
Model Number: 0589-2  
Brand Name: Brookstone  
Rating: 3Vd.c. ("AA" size battery × 2)  
Origin: China

**INVESTIGATIONS REQUESTED:**

Measurement to the relevant clauses of F.C.C. Rules and Regulations Part 15 Subpart B - Unintentional Radiator and Subpart C - Intentional Radiator.

**RESULT/ REMARK:**

Please see attached sheet(s).

**CONCLUSION:**

From the measurement data obtained, the tested sample was considered to have COMPLIED with the clause 15.231 for the Transmitter Section of Federal Communications Commission Rules. Clause 15.231 (1),(2) & (3) and clause 15.109(9) for the Receiver Section of Part 15 and ANSI C63.4-1992 Section 12.1.1.1-2.

**TEST EQUIPMENT AUDIT:**

Please see Appendix A

\_\_\_\_\_  
Testing Engineer

\_\_\_\_\_  
Verify by

\_\_\_\_\_  
Patrick Wong  
for Managing Director

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### TEST SUMMARY

- (1) Measurement of Emission of RF energy on the carrier frequency.....Satisfactory  
Measurement of Field strength of supurious emissions..... Satisfactory
- (2) Measurement of Emission Within Band Edges.....Satisfactory
- (3) Measurement of Radiated Emissions..... Satisfactory
- (4) Measurement of Line-Conducted Voltage onto AC Power Line..... Not applicable
- (5) FCC rule clause 15.231 (1),(2) and (3) subpart C-Intentional-radiator..... Satisfactory

### TEST DATA

Please refer to the attached result sheets.

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### **(1) Measurement of Radiated Interference**

TEST REFERENCE: FCC Rules Part 15 Subpart Section 15.231(433.6 MHz)

TEST CONDITION : Normal

TEST DATE : 1999.10.09

#### **Emission of RF energy on the carrier frequency -- 433.6 MHz (PEAK VALUE)**

| Emission Frequency | Meter Reading | Polarization | Antenna Factor | Field Strength (at 3m) |        | FCC Limit |
|--------------------|---------------|--------------|----------------|------------------------|--------|-----------|
| MHz                | dB(μV)        | H-V          | dB             | dB(μV/m)               | μV/m   | μV/m      |
| 433.6              | 59.2          | H +          | 19.5           | 78.7                   | 8609.9 | 109647    |

#### **Emission of RF energy on the carrier frequency -- 433.6 MHz (AVERAGE VALUE)**

| Emission Frequency | Meter Reading | Polarization | Antenna Factor | Field Strength (at 3m) |       | FCC Limit |
|--------------------|---------------|--------------|----------------|------------------------|-------|-----------|
| MHz                | dB(μV)        | H-V          | dB             | dB(μV/m)               | μV/m  | μV/m      |
| 433.6              | 30.8          | H +          | 19.5           | 50.3                   | 327.3 | 10965     |

... to be continued

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE: FCC Rules Part 15 Section 15.231(433.6 MHz)

TEST CONDITION : Normal

TEST DATE : 1999.10.09

### Field strength of spurious emissions (PEAK VALUE)

| Emission<br>Frequency | Meter<br>Reading | Polarization | Antenna<br>Factor | Field Strength<br>(at 3m) |        | FCC Limit |
|-----------------------|------------------|--------------|-------------------|---------------------------|--------|-----------|
| MHz                   | dB(μV)           | H-V          | dB                | dB(μV/m)                  | μV/m   | μV/m      |
| 867.2                 | 28.7             | V +          | 27.7              | 56.4                      | 660.7  | 10965     |
| *1300.8               | 26.4             | H +          | 32.1              | 58.5                      | 841.4  | 5000      |
| 1734.4                | < 1.0            | +            | 26.2              | <27.2                     | < 22.9 | 10965     |
| 2168.0                | < 1.0            | +            | 28.0              | <29.0                     | < 28.2 | 10965     |
| 2601.6                | < 1.0            | +            | 28.5              | <29.5                     | < 29.9 | 10965     |
| 3035.2                | < 1.0            | +            | 30.6              | <31.6                     | < 38.0 | 10965     |
| 3468.8                | < 1.0            | +            | 32.0              | <33.0                     | < 44.7 | 10965     |
| *3902.4               | < 1.0            | +            | 33.2              | <34.2                     | < 51.2 | 5000      |
| *4336.0               | < 1.0            | +            | 33.3              | <34.3                     | < 51.9 | 5000      |

Remark : \* - Denotes restricted band of operation.

Measurement were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

#### =====SUMMARY=====

data is within limits

=====

Broad-band Antennas were used and both polarizations of emissions were measured.

polarizations at highest reading indicated as:

H -- Horizontal

V -- Vertical

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE: FCC Rules Part 15 Section 15.231(433.6 MHz)

TEST CONDITION : Normal

TEST DATE : 1999.10.09

### Field strength of spurious emissions (AVERAGE VALUE)

| Emission<br>Frequency | Meter<br>Reading | Polarization | Antenna<br>Factor | Field Strength<br>(at 3m) |        | FCC Limit |
|-----------------------|------------------|--------------|-------------------|---------------------------|--------|-----------|
| MHz                   | dB(μV)           | H-V          | dB                | dB(μV/m)                  | μV/m   | μV/m      |
| 867.2                 | 11.4             | V +          | 27.7              | 39.1                      | 90.15  | 1097      |
| *1300.8               | 8.0              | H +          | 32.1              | 40.1                      | 101.2  | 500       |
| 1734.4                | < 1.0            | + +          | 26.2              | < 27.2                    | < 22.9 | 1097      |
| 2168.0                | < 1.0            | + +          | 28.0              | < 29.0                    | < 28.2 | 1097      |
| 2601.6                | < 1.0            | + +          | 28.5              | < 29.5                    | < 29.9 | 1097      |
| 3035.2                | < 1.0            | + +          | 30.6              | < 31.6                    | < 38.0 | 1097      |
| 3468.8                | < 1.0            | + +          | 32.0              | < 33.0                    | < 44.7 | 1097      |
| *3902.4               | < 1.0            | + +          | 33.2              | < 34.2                    | < 51.2 | 500       |
| *4336.0               | < 1.0            | + +          | 33.3              | < 34.3                    | < 51.9 | 500       |

Remark : \* - Denotes restricted band of operation.

Measurement were made using a peak detector. Any emission less than 1000 Mhz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

=====SUMMARY=====

data is within limits

=====

Broad-band Antennas were used and both polarizations of emissions were measured.

polarizations at highest reading indicated as:

H -- Horizontal

V -- Vertical

=====

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### **(2) Measurement of Emissions Within Band Edges.**

TEST REFERENCE: FCC Rules Part 15 section 15.231(433.6 MHz)  
TEST CONDITION: Normal  
TEST DATE : 1999.10.09

Please see exhibit report of bandwidth

### **RESULTS AND NOTES**

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz . The bandwidth is determined at the points 20dB down from the modulated carrier.

@433.6 MHz

$433.6 \text{ MHz} \times 0.0025 = 1.084 \text{ MHz}$

$1.084 \text{ MHz} / 2 = 542.0 \text{ KHz}$

The bandwidth at 20dB down is 7.6 kHz which is within the allowable limit of 542KHz at 433.6MHz.

### **SPECTRUM ANALYZER SETTINGS**

Resolution bandwidth : 1.0KHz

Frequency span : 10.0KHz/div

No. of dB/div : 10.0dB/div

=====SUMMARY=====

All data is within limits

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\*\*\* RECEIVER SECTION \*\*\*

### (3) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Subpart B section 15.109(a)

TEST CONDITION : Normal

TEST DATE : 1999.10.09.

| Emission<br>Frequency | Meter<br>Reading | Polarization | Antenna<br>Factor | Field Strength<br>(at 3m) | FCC Limit              |
|-----------------------|------------------|--------------|-------------------|---------------------------|------------------------|
| MHz                   | dB(μV)           | H-V          | dB                | dB(μV/m)    μV/m          | μV/m                   |
| 433.6                 | 19.9             | H            | +                 | 19.5                      | 39.4    93.3    200    |
| 867.2                 | < 1.0            |              | +                 | 28.5                      | <29.5    < 29.9    200 |
| 1300.8                | < 1.0            |              | +                 | 25.8                      | <26.8    < 21.8    500 |
| 1734.4                | < 1.0            |              | +                 | 26.2                      | <27.2    < 22.9    500 |
| 2168.0                | < 1.0            |              | +                 | 28.0                      | <29.0    < 28.2    500 |
| 2601.6                | < 1.0            |              | +                 | 28.5                      | <29.5    < 29.9    500 |
| 3035.2                | < 1.0            |              | +                 | 30.6                      | <31.6    < 38.0    500 |
| 3468.8                | < 1.0            |              | +                 | 32.0                      | <33.0    < 44.7    500 |
| 3902.4                | < 1.0            |              | +                 | 33.2                      | <34.2    < 51.2    500 |
| 4336.0                | < 1.0            |              | +                 | 33.3                      | <34.3    < 51.9    500 |

=====SUMMARY=====

data is within limits

=====

Broad-band Antennas were used and both polarizations of emissions were measured.  
polarizations at highest reading indicated as:

H -- Horizontal                      V -- Vertical

=====

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### **NOTES FOR THE RADIATION MEASUREMENT**

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules.

(2) Distance between the EUT and measuring antenna:

3 meters.

(3) Measuring instrumentations:

CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz and 1GHz-18GHz ). 6 dB bandwidth set at 120KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.231 of the FCC new Rules.

(4) Measuring antenna:

Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Horn antenna for the frequency range 1-18 GHz, connected with high frequency coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.

(5) Frequency range scanned:

The frequency range from 25 MHz to 1000 MHz and 1GHz to 18GHz had been searched. Readings of the highest emissions relating to the limit were reported as above.

(6) Arrangement of EUT:

During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.

(7) Measuring Procedure:

In accordance with the relevant clauses of the FCC Rules Part 15 section 15.231.

In accordance with the relevant clauses of FCC Rules Part Section 15.109(a) and ANSI C63.4:1992 Section 12.1.1.1.2.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-

30MHz to 300MHz =  $\pm 3.7\text{dB}$ , 300MHz to 1000MHz =  $\pm 3.0\text{dB}/-2.7\text{dB}$ .

1GHz to 18GHz =  $\pm 3.3\text{dB}/-3.4\text{dB}$ .

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC's Equipment Authorization Program. This test itself is not an Approval Test.

\*\*\*\*\*End of Document\*\*\*\*\*