

# Marstech Limited

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## TEST REPORT

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                          |              |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------|----------------|
| REPORT DATE:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 28 August 2002                                                                                           | REPORT NO:   | 22266D         |
| CONTENTS:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | See Table of Contents                                                                                    |              |                |
| SUBMITTOR:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Smarthome Products Limited<br>Rm B-812, 8/F, Sea View Estate, 2-8 Watson Road<br>North Point, Hong Kong  |              |                |
| SUBJECT:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Model Nos: WC801P and WC802P<br>FCC ID: LQP-R01                                                          |              |                |
| TEST SPECIFICATION:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FCC 47 CFR Part 15 Subpart "B" for and Unintentional Radiator<br>NOTE: Tests Conducted Are "Type" Tests. |              |                |
| DATE SAMPLE RECEIVED:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 23 August 2002                                                                                           | DATE TESTED: | 23 August 2002 |
| RESULTS:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Equipment tested complies with referenced specification.                                                 |              |                |
| ALTERATIONS:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TC1 coil is 1.5 Turns.                                                                                   |              |                |
| Date:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sept 10/02                                                                                               |              |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tested and approved by:<br>R. G. MARSHALL                                                                |              |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Robert G. Marshall, P. Eng.                                                                              |              |                |
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Authorized by:

Professional Engineer

Ontario

Engineering & Administrative



Testing For FCC

Submissions/Verifications

Approved Test Facility



**MARSTECH LIMITED**

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**TECHNICAL REPORT - FCC 2.1033(b)**

**Applicant**

Smarthome Products Ltd.  
Rm B-812, 8/F, Sea View Estate, 2-8 Watson Road  
North Point, Hong Kong

**FCC Identifier**

LQP-R01

**Manufacturer**

Smarthome Products (Shenzhen) Co. Ltd.  
6 Shi Long Da Dao, Shui Tian Chuen  
Shiyan, Baoan, Shenzhen, PRC

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| <b><u>Exhibit</u></b> | <b><u>Description</u></b>                                        | <b><u>FCC Ref.</u></b> | <b><u>Page</u></b>                                        |
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| A                     | Installation and Operating Instructions<br>Furnished to the User | 2.1033(b)(3)           | Exhibit A<br>Exhibit A(1)                                 |
| B                     | Description of Circuit Functions                                 | 2.1033(b)(4)           | Exhibit B<br>Exhibit B(1)-1 to -2                         |
| C                     | Block Diagram<br>Schematic Diagram                               | 2.1033(b)(5)           | Exhibit C<br>Exhibit C(1)<br>Exhibit C(2)                 |
| D                     | Report of Measurements                                           | 2.1033(b)(6)           | Exhibit D                                                 |
| E                     | Photographs<br>Label<br>Equipment                                | 2.1033(b)(7)           | Exhibit E<br>Exhibit E(1)-1 to -2<br>Exhibit E(2)-1 to -4 |

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**TEST REPORT CONTAINING:**

Exhibit D(1)-2  
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Exhibit D(1)-9 to -10  
Exhibit D(2)  
Exhibit D(3)

Product Description  
Test Facility and Equipment List  
Power Line Conducted Interference  
Field Strength of Emissions  
Test Set-Up Photo  
Test Set-up Diagram for AC Conducted Line Testing

**PRODUCT DESCRIPTION**

The Smarthome Products Ltd. Models WC801P and WC802P are wireless door chime receivers operating at 315MHz. These models are identical except for housing.

## **TEST FACILITY AND EQUIPMENT LIST**

### **FACILITIES:**

**Radiated:** ANSI C63.4 (FCC OET/55) open field 3 metre test range. This test range is protected from the cold and moisture by a non-conductive enclosure.

**Conducted:** 2.5m Anechoic Chamber

### **EQUIPMENT**

Anritsu 2601A Spectrum Analyzer  
Advantest R3261A Spectrum Analyzer  
Hewlett-Packard RF generator # 8640 B with an 002 doubler  
A.H. Systems biconical antenna; ..... 20 MHz to 330 MHz  
A.H. Systems log periodic antenna; ..... 300 MHz to 1.8 GHz  
Eaton dipole antennas; T1, T2, T3 ..... 25 MHz to 1.0 GHz  
Roberts dipole antennas; T1, T2, T3 & T4 25 MHz to 1.0 GHz  
Compliance Design P950 Preamp (16 dB) ... 25 MHz to 1.0 GHz

### **NOTE:**

The Anritsu 2601A Spectrum Analyzer and the Advantest R3261A Spectrum Analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada. (NRC) This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three metre test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

**ADDITIONAL TEST EQUIPMENT LIST**

1. Spectrum Analyzer: HP 8591EM, S/N 3639A00995, Calibrated April 2002
2. Spectrum Analyzer: ANRITSU 2601A, S/N MT64544, Calibrated May 2002
3. Spectrum Analyzer: IFR AN940, S/N 635001039, Calibrated March 2002
4. Preamp: HP 8449B, S/N 3008A00378, Calibrated August 2002
5. Horn Antenna: Q-PAR 6878/24, S/N 1721, 1.5-18GHz
6. Line Impedance Stabilization Network.: Marstech, Cal. July 2002

J, OCT-05-00 11:13AM

COM-SERVE

519 748 0155

P.01

FEDERAL COMMUNICATIONS COMMISSION  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD. 21046

September 20, 2000

Electrohome Electronics Ltd.  
809 Wellington St. N.  
Kitchener, Ontario N2G 4J6  
Canada

Registration Number: 90578

Attention: Gerry Gallagher

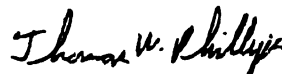
Re: Measurement facility located at Roseville  
3 meter-site  
Date of Listing: September 20, 2000

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.

If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.

Sincerely,



Thomas W Phillips  
Electronics Engineer

**15.107 (a) POWER LINE CONDUCTED INTERFERENCE**

**Requirements:**            0.45 - 30MHz            250 $\mu$ V or 47.96dB $\mu$ V

**Test Procedure:**        ANSI STANDARD C63.4-1992.  
The spectrum was scanned from 0.45 to 30MHz.

**Test Data:**

The highest emission read for LINE was 23.08 dB $\mu$ V@ 0.15 MHz.  
The highest emission read for NEUTRAL was 23.76 dB $\mu$ V@ 0.15 MHz.

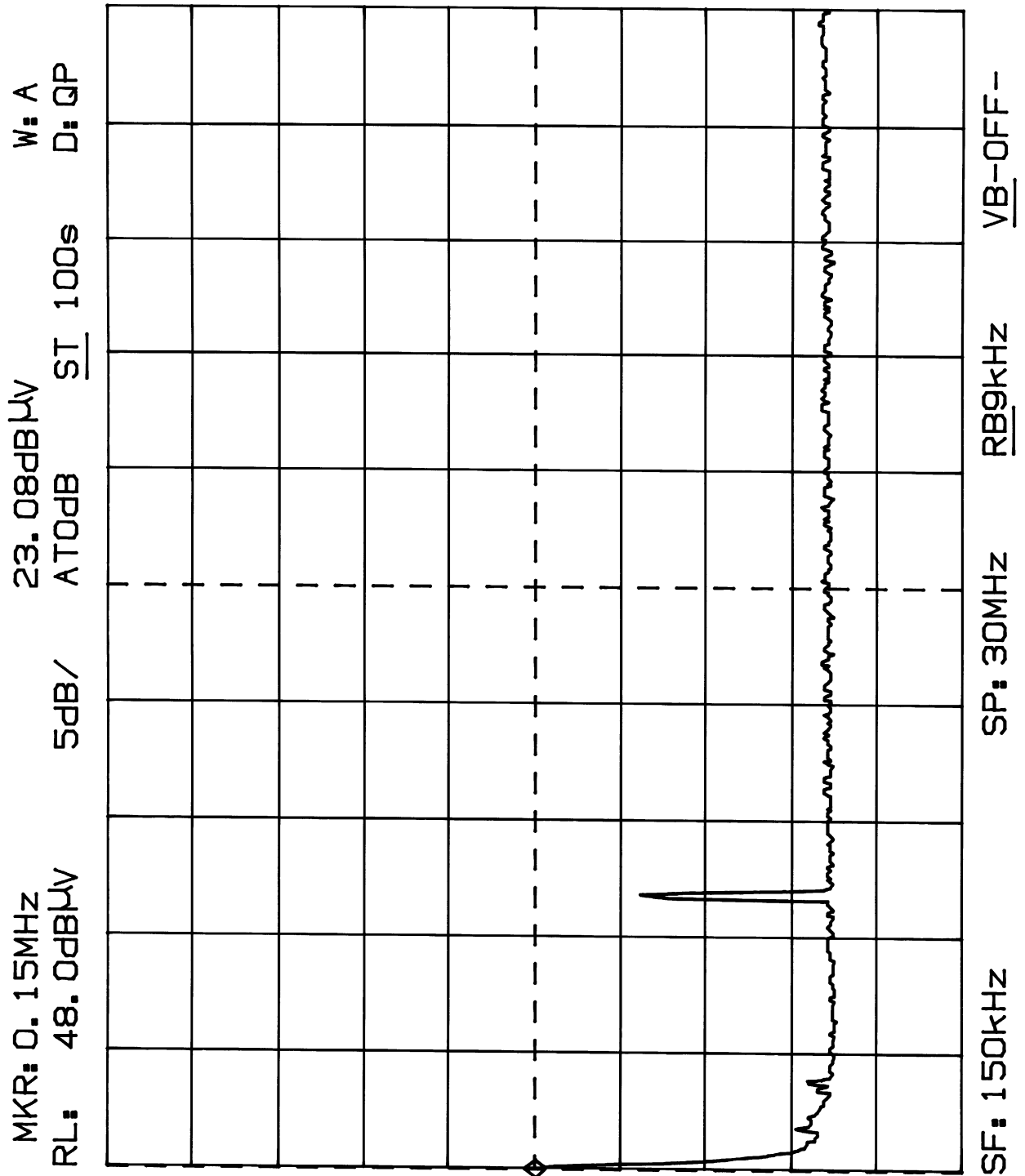
The graphs on Exhibit D(1)-7 to -8 represent the emissions taken for this device.

**Test Results:**

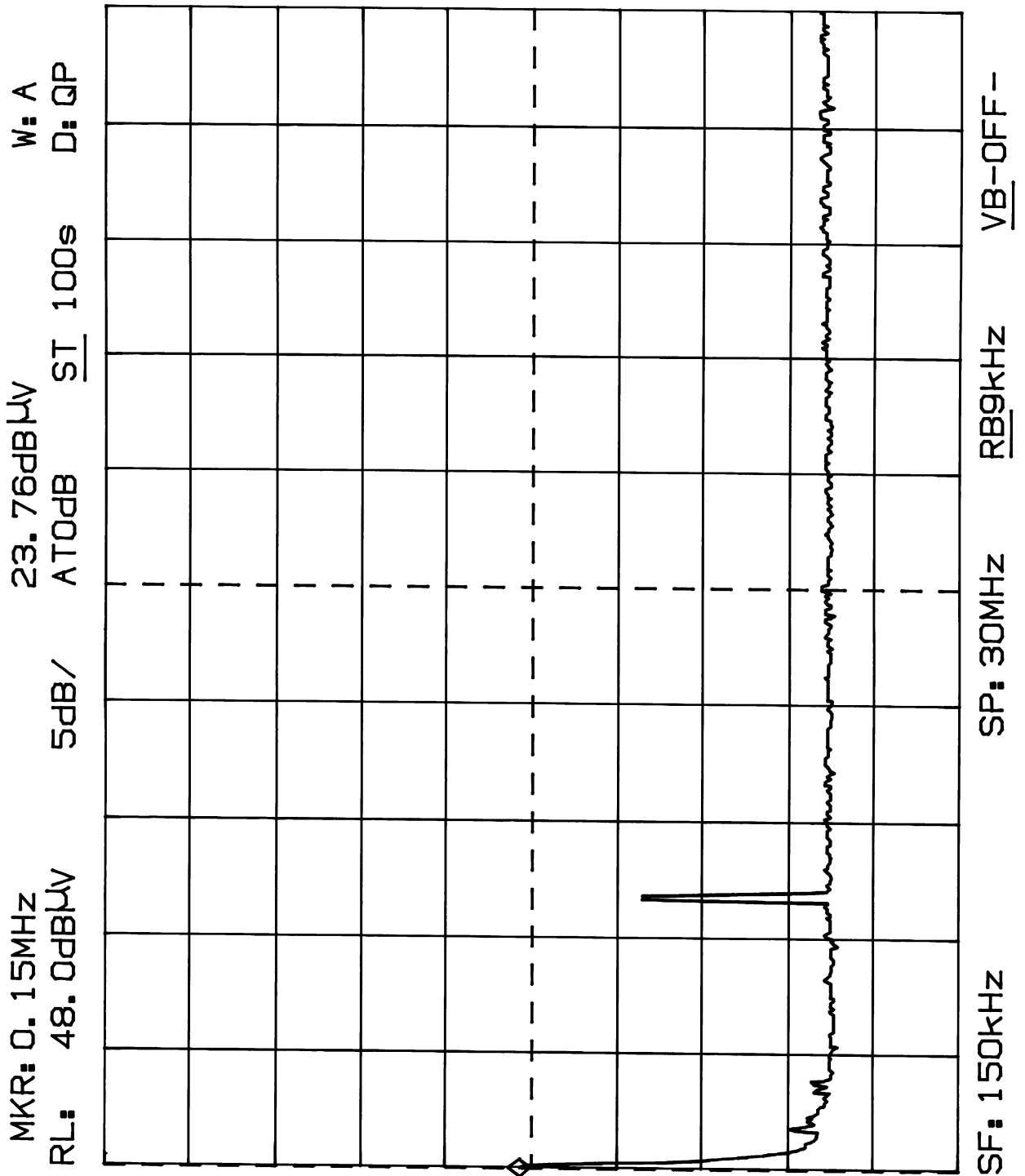
Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.



POWER LINE CONDUCTED EMISSIONS  
MODEL WC801P  
LINE



POWER LINE CONDUCTED EMISSIONS  
MODEL WC801P  
NEUTRAL



## **15.109 SPURIOUS RADIATED EMISSIONS**

### **RESULTS**

#### **Model WC801P:**

Receiver:      **Maximum field strength:**      **39.2 dB $\mu$ V/M at 314.46 MHz**

#### **Model WC802P:**

Receiver:      **Maximum field strength:**      **37.7 dB $\mu$ V/M at 314.59 MHz**

### **TEST CONDITIONS**

#### **Equipment Positioning:**

Receiver:                      Vertical  
Transmitter:                  N/A

**Antenna Polarization:**      Horizontal

**Measurement Bandwidth:**      120KHz

#### **Supply Voltage:**

Transmitter:                  N/A  
Receiver:                      120VAC

### **METHODS OF MEASUREMENT**

#### **Receiver:**

The EUT was placed on a one meter high non-metallic turntable. The EUT was an unmodified sample, as supplied by the manufacturer. The EUT was set in the receive mode, and the entire spectrum up to 2,000MHz was searched for spurious emissions. All emissions were measured and recorded.

The receive frequency, 315MHz, was measured using an external unmodulated ambient RF carrier signal, tuned across the wideband of the receiver noise. The unmodulated carrier was emanating from an antenna in the proximity of the receiver. The unit was powered by 120VAC extension cord. Care was taken so as not to overload the receiver, however the carrier level was varied in amplitude and frequency to obtain the highest level of spurious emissions from the receiver. This external signal was set to cause receiver "quieting" or to cohere the superregenerative receiver and cause single discrete noise components to appear. At this point, the largest emission or single frequency component within this band was measured and recorded.

For each of the above conditions, the turntable was rotated through 360 degrees, while the receiving antenna, at three (3) meters from the EUT, was varied in height from 1 to 4 meters, to find the maximum signal strength. The measured level was converted to a field strength using the antenna correction factors and cable losses.

## FIELD STRENGTH OF EMISSIONS

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Test Data:

Pre-Amp: 20 dB

| Emission<br>Frequency<br>MHz | Meter<br>Reading<br>@3m dB $\mu$ V | Antenna | Cable and<br>ACF<br>dB | Field<br>Strength<br>dB $\mu$ V/M | FCC<br>Limit<br>dB $\mu$ V/M | Margin<br>dB | Detector &<br>BW KHz |
|------------------------------|------------------------------------|---------|------------------------|-----------------------------------|------------------------------|--------------|----------------------|
| WC801P                       |                                    |         |                        |                                   |                              |              |                      |
| 314.46                       | 17.8                               | T3 H    | 21.4                   | 39.2                              | 46                           | -6.8         | QP 120               |
| WC802P                       |                                    |         |                        |                                   |                              |              |                      |
| 314.59                       | 16.3                               | T3 H    | 21.4                   | 37.7                              | 46                           | -8.3         | QP 120               |