



# **ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION**

**Test Report No.** : E057R-059

**Applicant** : OH SUNG ELECTRONICS CO., LTD.

**Address** : #181 Gongdan-dong, Gumi, Gyeong Buk, Korea

**Manufacturer** : OH SUNG ELECTRONICS CO., LTD.

**Address** : #181 Gongdan-dong, Gumi, Gyeong Buk, Korea

**Type of Equipment** : REMOTE CONTROLLER

**FCC ID** : OZ5URCMX-950

**Model Name** : MX-950

**Serial number** : N/A

**Total page of Report** : 11 pages (including this page)

**Date of Incoming** : March 21, 2005

**Date of issuing** : July 19, 2005

## **SUMMARY**

The equipment complies with the requirements of FCC CFR 47 PART 15 SUBPART B, SECTION 15.101.

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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**1. VERIFICATION OF COMPLIANCE**

APPLICANT : OH SUNG ELECTRONICS CO., LTD.  
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TELEPHONE NO : +82-54-468-0831  
FCC ID : OZ5URCMX-950  
MODEL NO/NAME : MX-950  
SERIAL NUMBER : N/A  
DATE : July 19, 2005

|                                                         |                                                   |
|---------------------------------------------------------|---------------------------------------------------|
| EQUIPMENT CLASS                                         | JBP – Part 15 Class B Computing Device Peripheral |
| E.U.T. DESCRIPTION                                      | REMOTE CONTROLLER                                 |
| THIS REPORT CONCERNS                                    | ORIGINAL GRANT                                    |
| MEASUREMENT PROCEDURES                                  | ANSI C63.4/2003                                   |
| TYPE OF EQUIPMENT TESTED                                | PRE-PRODUCTION                                    |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | CERTIFICATION                                     |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC PART 15, SECTION 15.101                       |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE | No                                                |
| FINAL TEST WAS CONDUCTED ON                             | 3 METER OPEN AREA TEST SITE                       |

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The OH SUNG ELECTRONICS CO., LTD., Model MX-950 (referred to as the EUT in this report) is a remote controller. The EUT consists of cradle for charging and receiver, Model MFR-250. The EUT sends radio signal to the receiver and then the receiver converts the signal to the infrared signals that control audio and/or video components. Also the EUT can be programmed via a windows PC equipped with a USB port using supplied software, MX-3000 Editor. The associated receiver is manufactured by OH SUNG ELECTRONICS CO., LTD., Model No: MRF-250, FCC ID: OZ5URCMRF250. The product specification described herein was obtained from product data sheet or user's manual.

|                                                 |                                                           |
|-------------------------------------------------|-----------------------------------------------------------|
| CHASSIS TYPE                                    | Plastic                                                   |
| TX FREQUENCY                                    | 418.00 MHz                                                |
| MODULATION                                      | ASK                                                       |
| USED MICROPROCESSOR                             | 206MHz RISC                                               |
| LIST OF EACH OSC. OR<br>CRY. FREQ.(FREQ.>=1MHz) | 12.0 and 418.0 MHz                                        |
| ANTENNA TYPE                                    | Built-in on the PCB in the EUT                            |
| TRANSMISSION TIME                               | Not longer than 1 sec                                     |
| RATED SUPPLY VOLTAGE                            | DC 5V, 2A from AC/DC Adapter or Lithium Ion Battery       |
| NUMBER OF LAYERS                                | 6 LAYERS                                                  |
| USED AC/DC ADAPTER                              | Model: 061-052000-UF, MFR: Xiang Fa Electronics Co., Ltd. |
| EXTERNAL CONNECTOR                              | DC Input, Charger Signal, and USB Port                    |

\* Remark: This equipment automatically deactivates the transmitter within not more than 1 second of being released.

### Model Differences:

-. No other model differences have been mentioned

### 2.2 Related Submittal(s) / Grant(s)

-. None



## 2.3 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

| Model         | Manufacturer                       | FCC ID       | Description   | Connected to |
|---------------|------------------------------------|--------------|---------------|--------------|
| MX-950        | OH SUNG ELECTRONICS CO., LTD.      | OZ5URCMX-950 | Transmitter   | Notebook PC  |
| N/A           | N/A                                | N/A          | Charger       | EUT          |
| 061-052000-UF | Xiang Fa Electronics(D.G.)Co., Ltd | N/A          | AC/DC Adapter | Charger      |
| PP05LC        | DELL Computer Corp.                | DoC          | Notebook PC   | -            |
| 2225C         | HP                                 | DSI6XU2225   | Printer       | Notebook PC  |
| 020-0470      | Cardinal                           | GDE0196      | Modem         | Notebook PC  |

## 2.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

## 2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do 464-080, Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

# 3. SYSTEM TEST CONFIGURATION

## 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE   | MANUFACTURER | MODEL/PART NUMBER | FCC ID |
|---------------|--------------|-------------------|--------|
| Main Board    | N/A          | PNCCA0653A        | N/A    |
| LCD Panel     | N/A          | N/A               | N/A    |
| Keypad Board  | N/A          | PFFFA0655B        | N/A    |
| Charger Board | N/A          | PBAFA0678B        | N/A    |

## 3.2 EUT exercise Software

After connecting the EUT to the USB port of personal computer, data were continuously read and written from the HDD of the PC to the EUT.

### 3.3 Cable Description

|                         | <b>Power Cord<br/>Shielded (Y/N)</b> | <b>I/O cable Shielded<br/>(Y/N)</b> | <b>Length (M)</b> |
|-------------------------|--------------------------------------|-------------------------------------|-------------------|
| REMOTE CONTROLLER (EUT) | -                                    | -                                   | -                 |
| Charger                 | N                                    | -                                   | 1.5(P)            |
| AC/DC Adapter           | N                                    | N                                   | 1.5(P), 1.0(D)    |
| Notebook PC             | N                                    | -                                   | 1.5(P)            |
| Printer                 | N                                    | Y                                   | 1.5(P), 1.5(D)    |
| Modem                   | N                                    | Y                                   | 1.5(P), 1.5(D)    |

\* The marked “(P)” means the Power Cable and “(D)” means the I/O Cable.

### 3.4 Noise Suppression Parts on Cable

|                         | <b>Ferrite Bead<br/>(Y/N)</b> | <b>Location</b> | <b>Metal Hood<br/>(Y/N)</b> | <b>Location</b> |
|-------------------------|-------------------------------|-----------------|-----------------------------|-----------------|
| REMOTE CONTROLLER (EUT) | Y                             | BOTH END        | Y                           | BOTH END        |
| Charger                 | N                             | N/A             | N/A                         | -               |
| AC/DC Adapter           | N                             | N/A             | Y                           | BOTH END        |
| Notebook PC             | -                             | -               | -                           | -               |
| Printer                 | N                             | N/A             | Y                           | BOTH END        |
| Modem                   | N                             | N/A             | Y                           | BOTH END        |

### 3.5 Equipment Modifications

-. None

### 3.6 Configuration of Test System

**Line Conducted Test:** The battery in the EUT was charged and the power line of the charger was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2003 7.2.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/2003 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site. The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

| Operation Mode                                  | The Worse operating condition (Please check one only) |
|-------------------------------------------------|-------------------------------------------------------|
| Data were continuously read and written via USB | X                                                     |
| Charging mode                                   |                                                       |

### 4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

| Operation Mode                                  | The Worse operating condition (Please check one only) |
|-------------------------------------------------|-------------------------------------------------------|
| Data were continuously read and written via USB | X                                                     |
| Charging mode                                   |                                                       |



## 5. FINAL RESULT OF MEASUREMENT

### 5.1 Conducted Emission Test

Humidity Level : 40 %

Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, Subpart B

Result : PASSED BY -14.41 dB at 0.17 MHz under peak detector mode.

EUT : REMOTE CONTROLLER

Date: March 25, 2005

Operating Condition : Data were continuously read and written via USB.

| Frequency (MHz) | Line | Quasi-Peak (dBuV) |               |        | Margin (dB) | Average (dBuV) |        | Margin (dB) |
|-----------------|------|-------------------|---------------|--------|-------------|----------------|--------|-------------|
|                 |      | Emission Level    | Detector Mode | Limits |             | Emission level | Limits |             |
| 0.17            | N    | 50.80             | P             | 65.21  | -14.41      | -              | -      | -           |
| 0.39            | H    | 35.28             | P             | 58.17  | -22.89      |                |        |             |
| 1.21            | H    | 30.18             | P             | 56.00  | -25.82      | -              | -      | -           |
| 1.23            | N    | 31.84             | P             | 56.00  | -24.16      | -              | -      | -           |
| 2.56            | N    | 27.95             | P             | 56.00  | -28.05      | -              | -      | -           |
| 4.54            | N    | 27.56             | P             | 56.00  | -28.44      | -              | -      | -           |

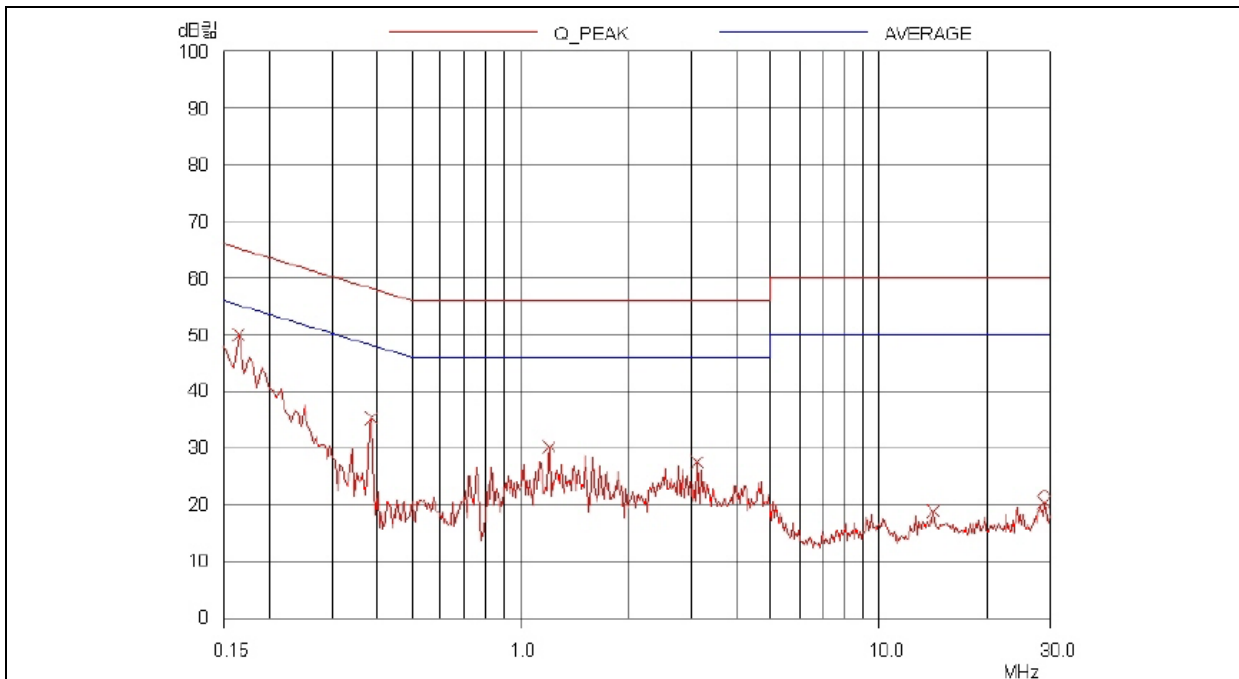
Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral Line. "P": Peak Detector mode, "Q.P": Quasi-Peak Detector mode

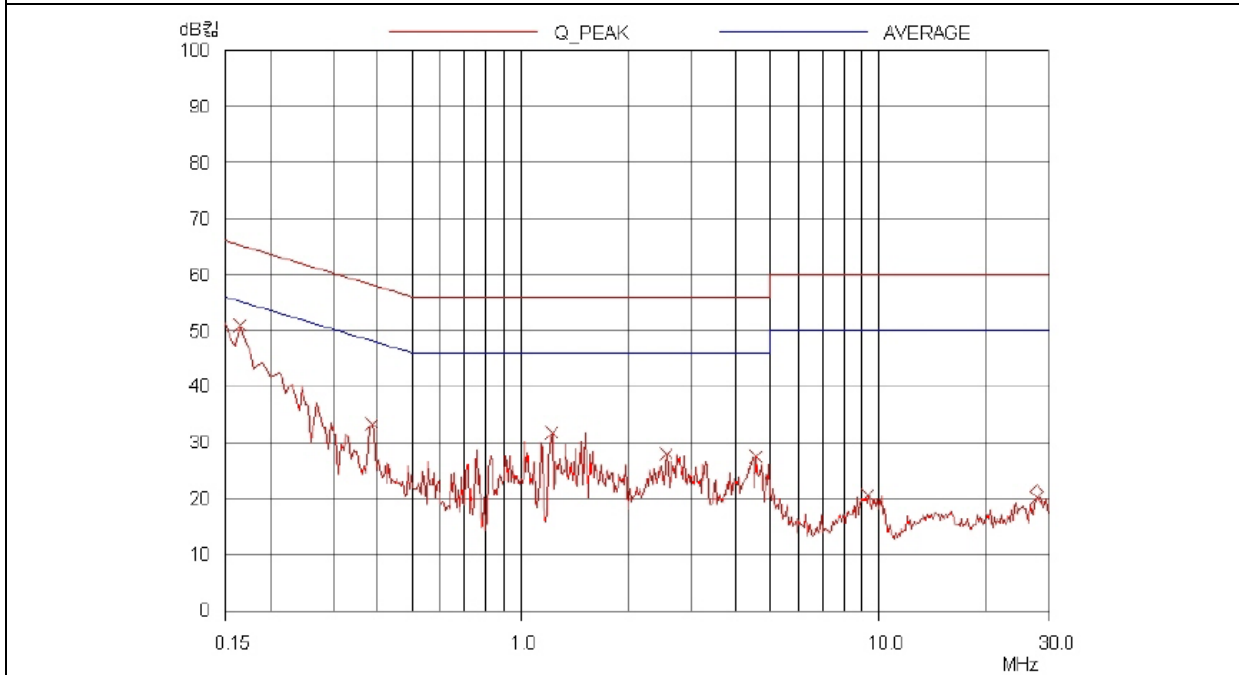
See next page for an overview sweep performed with peak and average detector.

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Tested by: Ki-Hong, Nam / Test Engineer



## HOT LINE



## NEUTRAL LINE



## 5.2 Radiated Emission Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 45 % Temperature: 19°C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B  
 Type of Test : Intentional Radiator  
 Result : PASSED BY -3.52 dB at 559.09 MHz

EUT : REMOTE CONTROLLER Date: June 30, 2005  
 Operating Condition : Data were continuously read and written via USB.  
 Frequency range : 30MHz – 2000MHz  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Distance : 3 Meter

| Radiated Emission |                     | Ant. | Correction Factors |               | Total                 | FCC LIMIT         |                |
|-------------------|---------------------|------|--------------------|---------------|-----------------------|-------------------|----------------|
| Freq.<br>(MHz)    | Amplitude<br>(dBuV) | Pol. | Antenna<br>(dB/m)  | Cable<br>(dB) | Amplitude<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
| 152.10            | 17.60               | H    | 15.10              | 2.32          | 35.02                 | 43.52             | -8.50          |
| 203.46            | 16.62               | H    | 15.97              | 2.83          | 35.42                 | 43.52             | -8.10          |
| 253.85            | 20.96               | V    | 17.06              | 3.42          | 41.44                 | 46.02             | -4.58          |
| 305.21            | 21.67               | V    | 13.81              | 3.84          | 39.32                 | 46.02             | -6.70          |
| 406.95            | 17.80               | V    | 15.64              | 4.41          | 37.85                 | 46.02             | -8.17          |
| 457.34            | 19.94               | H    | 16.83              | 4.65          | 41.42                 | 46.02             | -4.60          |
| 508.70            | 17.82               | H    | 17.43              | 5.47          | 40.72                 | 46.02             | -5.30          |
| 559.09            | 18.70               | V    | 18.50              | 5.30          | 42.50                 | 46.02             | -3.52          |
| 660.84            | 15.92               | H    | 19.55              | 5.85          | 41.32                 | 46.02             | -4.70          |

\*Remark: "H": Horizontal Polarization, "V": Vertical Polarization

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Tested by: Gi-Hong, Nam / Test Engineer



# ONETECH

*Testing & Evaluation Lab.*

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## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

| No. | EQUIPMENTS               | MFR.        | MODEL       | SER. NO.     | LAST CAL | DUE CAL | USE |
|-----|--------------------------|-------------|-------------|--------------|----------|---------|-----|
| 1.  | Test receiver            | R/S         | ESVS 10     | 827864/005   | DEC/04   | 12MONTH | ■   |
| 2.  | Test receiver            | R/S         | ESHS 10     | 834467/007   | MAY/05   | 12MONTH | ■   |
| 3.  | Spectrum analyzer        | HP          | 85680B      | 3001A04955   | APR/05   | 12MONTH |     |
| 4.  | Spectrum analyzer        | HP          | 8568B       | 3109A05456   | MAR/05   | 12MONTH | ■   |
| 5.  | RF preselector           | HP          | 85685A      | 3107A01264   | MAR/05   | 12MONTH | ■   |
| 6.  | Quasi-Peak Adapter       | HP          | 85650A      | 3107A01542   | MAR/05   | 12MONTH | ■   |
| 7.  | TRILOG Broadband Antenna | Schwarzbeck | VULB9163    | VULB9163 166 | APR/05   | 12MONTH |     |
| 8.  | Biconical antenna        | EMCO        | 3110        | 9003-1121    | FEB/05   | 12MONTH |     |
|     |                          | Schwarzbeck | VHA9103     | 91031852     | JAN/05   |         | ■   |
| 9.  | Log Periodic antenna     | EMCO        | 3146        | 9001-2614    | FEB/05   | 12MONTH |     |
|     |                          |             |             | 9109-3217    | MAY/05   |         |     |
|     |                          | Schwarzbeck | 9108-A(494) | 62281001     | FEB/05   |         | ■   |
| 10. | LISN                     | EMCO        | 3825/2      | 9109-1867    | JUL/05   | 12MONTH |     |
|     |                          |             |             | 9109-1869    | JUL/05   |         | ■   |
|     |                          | Schwarzbeck | NSLK 8128   | 8128-216     | JUN/05   |         | ■   |
| 11. | Position Controller      | HP GmbH     | HD100       | N/A          | N/A      | N/A     | ■   |
| 12. | Turn Table               | HP GmbH     | DS420S      | N/A          | N/A      | N/A     | ■   |
| 13. | Antenna Master           | HP GmbH     | MA240       | N/A          | N/A      | N/A     | ■   |