

**FCC PART 15 Subpart C**  
**EMI MEASUREMENT AND TEST REPORT**  
For  
**Million Industrial Ltd.**

9/FL., FLAT A, RODEO CENTRE, 73-79 LARCH STREET, TAI KOK TSUI, KOWLOON, HONG KONG

**FCC ID: MQDMILWT-358**

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|                                                                                                                                                                                                                                  |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report                                                                                                                                              | <b>Equipment Type:</b><br>Walkie- Talkie |
| <b>Test Engineer:</b> Jandy Su                                                                                                                                                                                                   |                                          |
| <b>Report No.:</b> RSZ04010201                                                                                                                                                                                                   |                                          |
| <b>Test Date:</b> January 10,2003                                                                                                                                                                                                |                                          |
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## 1 - GENERAL INFORMATION

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### 1.1 Product Description for Equipment Under Test (EUT)

The *Million Industrial Ltd.*'s product, model name: *WT-358*, Serial number: 040104 or the "EUT" as referred to in this report is a Walkie- Talkie. The EUT is a Transmitter, which measures approximately 11.5cmL x 5.5cmW x 3.0cmH.

The EUT power: DC 6V battery.

*\* The test data was good for test sample Serial: 040104 only. It may have deviation for other product samples.*

### 1.2 Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2001.

The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by FCC Title 47, Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, and 15.235.

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

No Related Submittals

### 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2001, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### 1.5 Test Facility

The open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated electromagnetic disturbance and disturbance voltage measurement data is located in the No. 3 building JingHua Courtyard, Shennanzhong Rd ShenZhen, Guandong 518031, P.R. C, and 230 Commercial Street, Sunnyvale, CA 94085 USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4 - 2001.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22:1997 and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

## 1.6 Test Equipment List

| Manufacturer      | Description                    | Model                 | Serial Number  | Calibration Date | Calibration Due Date |
|-------------------|--------------------------------|-----------------------|----------------|------------------|----------------------|
| R/S               | Spectrum Analyzer              | FSEM                  | 849720/019     | 08/05/2003       | 1 year               |
| HP                | Amplifier                      | 8447D                 | 2944A0979<br>5 | 08/05/2003       | 1 year               |
| ETS               | Log Periodic Antenna           | 3146                  | 9603-4421      | 09/05/2003       | 1 year               |
| ETS               | Biconical Antenna              | 3110B                 | 3360           | 08/05/2003       | 1 year               |
| Solar Electronics | LISN                           | TYPE 8012-50-R-24-BNC | 21162          | 09/05/2003       | 1 year               |
| Solar Electronics | LISN                           | TYPE 8012-50-R-25-BNC | 21163          | 10/05/2003       | 1 year               |
| COM Power         | LISN                           | LI-200                | 12208          | 10/30/2003       | 1 year               |
| COM Power         | LISN                           | LI-200                | 12005          | 10/30/2003       | 1 year               |
| HP                | Spectrum Analyzer              | 8568B                 | 2517A0161<br>0 | 10/30/2003       | 1 year               |
| HP                | Spectrum Analyzer Display Unit | 8568B                 | 2517A1003<br>9 | 10/30/2003       | 1 year               |
| HP                | Quasi-Peak Adapter             | 8565A                 | 3107A0157<br>2 | 10/30/2003       | 1 year               |
| FCC               | Absorbing Clamp                | F-201-23mm            | 90             | 10/30/2003       | 1 year               |
| FLUKE             | True RMS Multimeter            | 187                   | 78540402       | 03/24/2003       | 1 year               |

**\*Statement of Traceability: Bay Area Compliance Laboratory Corp.** Certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY.

## 1.7 External I/O Cabling

| Cable Description                  | Length (M) | From/Port | To        | Core |
|------------------------------------|------------|-----------|-----------|------|
| Shielded Detachable Earphone Cable | 0.5        | EUT       | Headphone | No   |

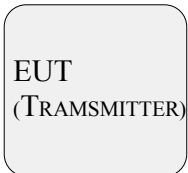
## 2 - SYSTEM TEST CONFIGURATION

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### 2.1 Description of Test Configuration

The EUT was lie, stand, and side for testing.

### 2.2 Configuration of Test System



### 2.3 Test Configuration Photos

lie configuration



Stand Configuration



## Side Configuration



## 2.4 Equipment Modifications

The EUT tested was not modified by BACL.

### 3 - SUMMARY OF TEST RESULTS

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| FCC RULES | DESCRIPTION OF TEST           | RESULT |
|-----------|-------------------------------|--------|
| § 15.203  | Antenna requirement           | Pass   |
| § 15.205  | Restricted bands of operation | Pass   |
| § 15.207  | Conduct requirement           | Pass   |
| § 15.209  | Radiated requirement          | Pass   |
| § 15.235  | Radiated requirement          | Pass   |

## **4 – ANTENNA REQUIREMENT**

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The antenna of the EUT is permanent attached, fulfilled requirement of section 15.203.

Test result: pass

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## **5 - CONDUCTED EMISSIONS TEST DATA**

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The EUT unit is battery powered so AC conducted emissions testing are not applicable.

## 6 - RADIATED EMISSION DATA

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### 6.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

### 6.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4 - 2001. The specification used was the FCC 15 Subpart C limits for transmitter.

The test configure were lie, stand, and side. Stand is the worst configure, and the worst configure test data was included in the test report.

The EUT was placed center of the test table.

### 6.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the system was investigated from 30 MHz to 1000 MHz.

The spectrum analyzer was set with the following configurations during the radiated emission test:

|                                    |          |
|------------------------------------|----------|
| Start Frequency .....              | 30 MHz   |
| Stop Frequency .....               | 1000 MHz |
| Sweep Speed .....                  | Auto     |
| IF Bandwidth .....                 | 100 KHz  |
| Video Bandwidth .....              | 1 MHz    |
| Quasi-Peak Adapter Bandwidth ..... | 120 KHz  |
| Quasi-Peak Adapter Mode .....      | Normal   |
| Resolution Bandwidth .....         | 100 KHz  |

### 6.4 Test Procedure

For the radiated emissions test, since the EUT does not have AC power source, there was no connection to AC outlets.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "Qp" in the data table.

## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for applicable limits. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Applicable Limit}$$

## 6.6 Summary of Test Results

According to the data in section 5.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, 15.209 and 15.235(a) after tested to 10<sup>th</sup> harmonics as required by FCC and had the worst margin of:

**-11.4 dBuV at 99.7 MHz in the Vertical polarization, 30 to 1000 MHz, 3Meters.**

## 6.7 Radiated Emissions Test Result Data

|              |   |                 |                |   |              |
|--------------|---|-----------------|----------------|---|--------------|
| Date of Test | : | January 10,2003 | Temperature    | : | 25°C         |
| EUT          | : | Walkie- Talkie  | Humidity       | : | 70%          |
| M/N          | : | WT-358          | Operating Mode | : | Transmitting |
| S/N          | : | 040104          | Test Engineer: | : | Jandy Su     |

| Indicated     |                    |                  | Table        | Antenna   |                      | Correction Factor       |         |                          | FCC 15 Subpart C   |           |            |
|---------------|--------------------|------------------|--------------|-----------|----------------------|-------------------------|---------|--------------------------|--------------------|-----------|------------|
| Frequency MHz | Ampl. dB $\mu$ V/m | Direction Degree | Height Meter | Polar H/V | Antenna dB $\mu$ V/m | Cable Loss dB $\mu$ V/m | Amp. dB | Corr. Ampl. dB $\mu$ V/m | Limit dB $\mu$ V/m | Margin dB | Mode       |
| 99.7          | 46.83              | 45               | 1            | v         | 10.4                 | 0.9                     | 26      | 32.1                     | 43.5               | -11.4     | Peak       |
| 99.7          | 44.7               | 180              | 1.2          | h         | 10.4                 | 0.9                     | 25      | 31.0                     | 43.5               | -12.5     | Peak       |
| 199.44        | 39.99              | 60               | 1.2          | h         | 14.4                 | 1.2                     | 25      | 30.6                     | 43.5               | -12.9     | Peak       |
| 299.12        | 40.42              | 180              | 1.2          | h         | 12.6                 | 1.1                     | 25      | 29.1                     | 46                 | -16.9     | Peak       |
| 149.61        | 37.11              | 45               | 1            | h         | 13.4                 | 0.8                     | 25      | 26.3                     | 43.5               | -17.2     | Peak       |
| 149.61        | 36.83              | 180              | 1.2          | v         | 13.4                 | 0.8                     | 27      | 24.0                     | 43.5               | -19.5     | Peak       |
| 299.12        | 42.24              | 90               | 1.2          | v         | 12.6                 | 1.1                     | 30      | 25.9                     | 46                 | -20.1     | Peak       |
| 199.44        | 35.47              | 270              | 1            | v         | 14.4                 | 1.2                     | 28      | 23.1                     | 43.5               | -20.4     | Peak       |
| 249.31        | 40.44              | 45               | 1.2          | v         | 11.3                 | 0.9                     | 29      | 23.6                     | 46                 | -22.4     | Peak       |
| 249.31        | 34.46              | 45               | 1            | h         | 11.3                 | 0.9                     | 25      | 21.7                     | 46                 | -24.3     | Peak       |
| 49.86         | 65.08              | 180              | 1.2          | v         | 11.3                 | 0.4                     | 25      | 51.8                     | 80                 | -28.2     | Fund(AV)   |
| 49.86         | 65.04              | 45               | 1            | h         | 11.3                 | 0.4                     | 25      | 51.7                     | 80                 | -28.3     | Fund(AV)   |
| 49.86         | 66.20              | 180              | 1.2          | v         | 11.3                 | 0.4                     | 25      | 52.92                    | 100                | -47.08    | Fund(Peak) |
| 49.86         | 65.84              | 45               | 1            | h         | 11.3                 | 0.4                     | 25      | 52.5                     | 100                | -47.5     | Fund(Peak) |

**6.8 Test Result: Pass****7 – BAND EDGES TESTING**

Requirements: The field strength of any emissions appearing between the band edges and up to 10KHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209.

**7.1 Spectrum Analyzer Setup**

The spectrum analyzer was set with the following configurations during the band edges testing:

Start Frequency ..... 49.80 MHz  
Stop Frequency ..... 49.92 MHz  
Sweep Speed ..... 300 ms  
Video Bandwidth ..... 10 KHz  
Resolution Bandwidth..... 10 KHz

**7.2 Test Data**

According to the data, the EUT complied with the FCC Title 47, Part 15, Subpart C, section , 15.235(b)

|              |   |                 |                |   |              |
|--------------|---|-----------------|----------------|---|--------------|
| Date of Test | : | January 10,2003 | Temperature    | : | 25°C         |
| EUT          | : | Walkie- Talkie  | Humidity       | : | 70 %         |
| M/N          | : | WT-358          | Operating Mode | : | Transmitting |
| S/N          | : | 040104          | Test Engineer: |   | Jandy Su     |

| Frequency | Emission Attenuation Level | Limit |
|-----------|----------------------------|-------|
| MHz       | dBμV                       | dBμV  |
| 49.81     | 53.35                      | 26    |
| 49.91     | 53.83                      | 26    |

**7.3 Test Result**

PASS

