

# FCC PART 15.235

## 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-632**

August 25, 2004

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Transceiver, PTT, Handheld
<b>Test Engineer:</b> Lisa Zhu	
<b>Report Number:</b> RSZ04081102	
<b>Test Date:</b> August 19, 2004	
<b>Reviewed By:</b> Chris Zeng	
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**Note:** The test report is specially limited to the use of the above client company and the product model. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government

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## GENERAL INFORMATION

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

The *MILLION INDUSTRIAL LTD* 's product, model *WT-632* or the "EUT" as referred to in this report was a Walkie-Talkie which measures approximately 12.5cm L x 4.8cm W x 3.0cm H. rated input voltage: DC 3V Battery, Antenna: 4.5cm.

*\* The test data gathered are from production sample, serial number:0408004, provided by the manufacturer.*

### 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

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

No related submittal(s).

### 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 Corporation. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

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 1400F2 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.

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## SYSTEM TEST CONFIGURATION

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### Justification

The system was configured for testing according ANSI C63.4-2001.

### EUT Exercise Software

N/A

### Special Accessories

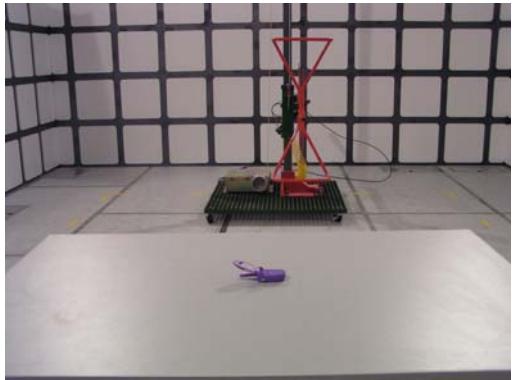
Interface cable used for compliance testing is shielded as normally supplied by *MILLION INDUSTRIAL LTD*, and its respective support equipment manufacturers.

### Equipment Modifications

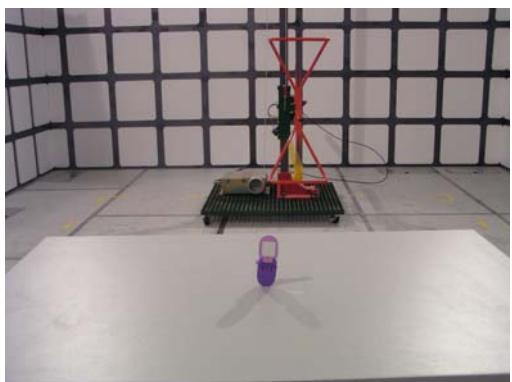
The EUT tested was not modified by BACL.

**Configuration of EUT**

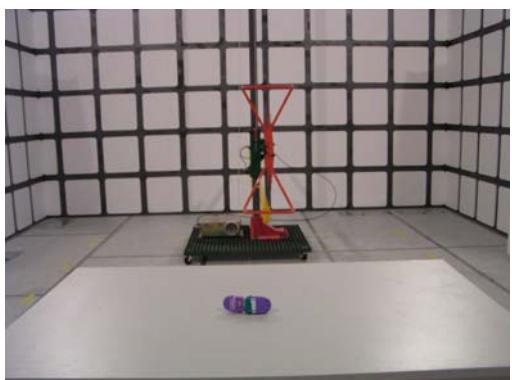
Lie Configuration:

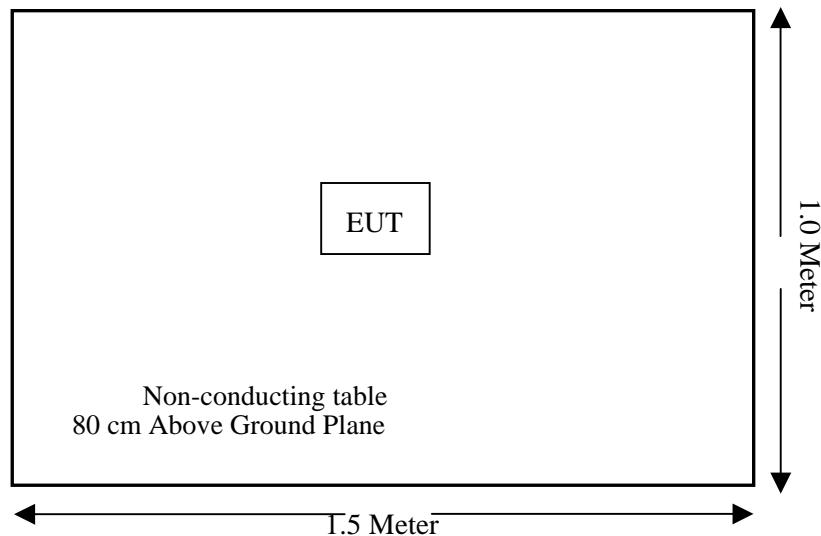


Stand Configuration



Side Configuration



**Test Setup Block Diagram**

**SUMMARY OF TEST RESULTS**

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 (a)	Field Strength	Pass
§ 15.235 (b)	Band Edge	Pass

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**§ 15.203 -ANTENNA REQUIREMENT**

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

Test result: pass

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## §15.207 - CONDUCTED EMISSIONS

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

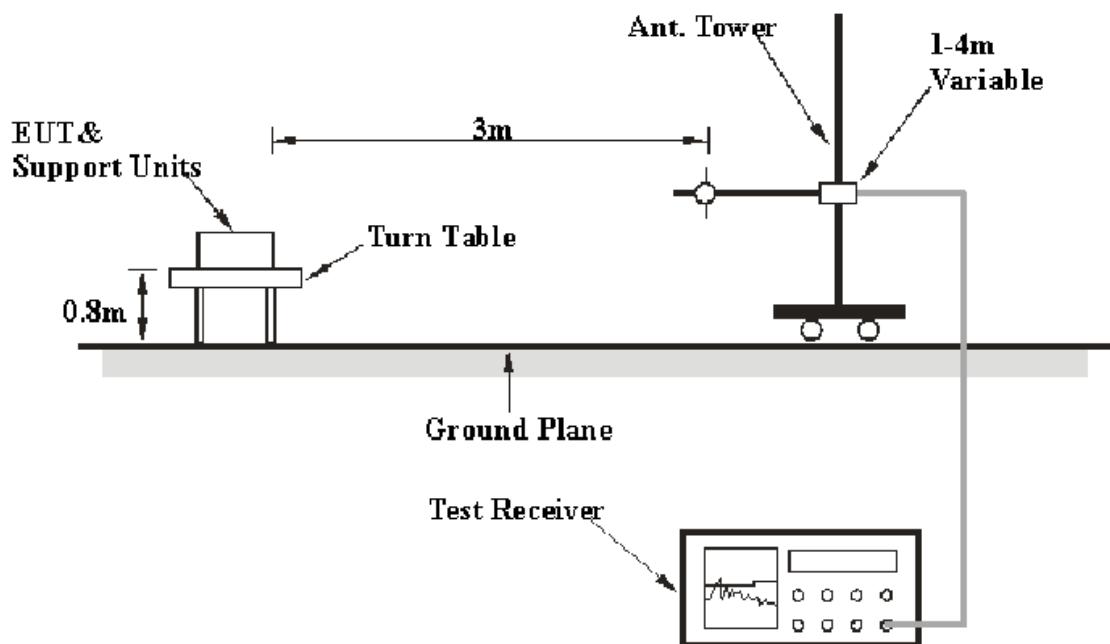
## §15.209 - RADIATED EMISSION

### 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.

### EUT Setup



The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4-2001. The specification used was the FCC Part 15.209 and 15.235 limits.

## Spectrum Analyzer Setup

The system was investigated from 30MHz to 1000MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

<b><u>Frequency Range</u></b>	<b><u>RBW</u></b>	<b><u>Video B/W</u></b>
30 – 1000MHz	100KHz	100KHz

## Test Equipment List and Details

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
R/S	Spectrum Analyzer	FSEM	849720/019	2003-10-30	2004-10-29
HP	Amplifier	8447D	2944A09795	2004-8-5	2005-8-4
ETS	Log Periodic Antenna	3146	9603-4421	2004-8-5	2005-8-4
ETS	Biconical Antenna	3110B	3360	2004-8-5	2005-8-4
FLUKE	True RMS Multimeter	187	78540402	2004-3-23	2005-3-22
HP	Amplifier (1-26.5GHz)	8449B	3147A00400	2003-11-5	2004-11-4
A.H.System	Horn Antenna (700MHz-18GHz)	SAS-200/571	261	2003-11-5	2004-11-4
YOKOROWA	Coaxial Cable 1#	N/A	NO: 001	2004-8-5	2005-8-4
YOKOROWA	Coaxial Cable 1#	N/A	NO: 002	2004-8-5	2005-8-4

**\* Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

## 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 Class B. The equation for margin calculation is as follows:

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

## Test Data

Date of Test:	August 19, 2004	Temperature:	25°C
EUT:	Walkie-Talkie	Humidity:	45%
M/N:	WT-632	Operating Mode:	Transmitting
S/N:	0408004	Test Engineer:	Lisa Zhu

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15	
Frequency MHz	Ampl. dB $\mu$ V/m		Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB		Corr. Ampl. dB $\mu$ V/m	Limit dB $\mu$ V/m
149.54	39.31	60	1.2	h	13.4	1.1	25.6	28.2	43.5	-15.3
149.54	39.08	60	1.0	v	13.4	1.1	25.6	28.0	43.5	-15.5
199.44	31.68	270	1.0	h	14.4	1.3	25.15	22.2	43.5	-21.3
199.44	31.45	45	1.2	v	14.4	1.3	25.15	22.0	43.5	-21.5
99.7	36.16	45	1.0	h	10.4	0.9	25.99	21.5	43.5	-22.0
99.7	33.1	45	1.0	v	10.4	0.9	25.99	18.4	43.5	-25.1
49.86 (Fund)	58.29	180	1.2	h	11.3	0.6	26.2	44.0	80	-36.1
49.86 (Fund)	53.44	45	1.0	v	11.3	0.6	26.2	39.1	80	-40.9

Note:

1. Fund: Fundamental
2. The EUT was tested with fresh battery.
3. The EUT was tested in all three orthogonal planes.

Test Result: Pass

## §15.235- BAND EDGES TESTING

### Standard Applicable

Requirements: The field strength of any emissions appearing between the band edges and up to 10 kHz 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 Section 15.209.

### Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R/S	Spectrum Analyzer	FSEM	849720/019	2004-5-8	2005-5-7
HP	Amplifier	8447D	2944A09795	2004-5-8	2005-5-8
ETS	Log Periodic Antenna	3146	9603-4421	2004-5-9	2005-5-7
ETS	Biconical Antenna	3110B	3360	2004-5-8	2005-5-7
FLUKE	True RMS Multimeter	187	78540402	2004-3-24	2005-3-23
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A.H.System	Horn Antenna (700MHz-18GHz)	SAS-200/571	261	2003-11-5	2004-11-4

\* **Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Environmental Conditions

Temperature:	24 °C
Relative Humidity:	59%
ATM Pressure:	1178mbar

Test Result: Pass

Refer to the attached plots.

