FCC ID PER PART 15.239
EMI MEASUREMENT AND TEST REPORT

For

May King Industrial Company Ltd.

8/F, Room K, Block 2, WahFung Ind. Building 33-39
KwaiFung Path, KwaiChung, HongKong

FCC ID: QF81168

June 26, 2002

This Report Concerns:	Equipment Type:
☒ Original Report	Hands Free

Test Engineer:	Jeff Lee
Report No.:	R0205202
Test Date:	June 4, 2002
Reviewed By:	Benjamin Jing
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TABLE OF CONTENTS

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *May King Industrial Company Ltd.*'s product, model *1168* or the "EUT" as referred to in this report is a hands free which measures approximately 5.0" L x 3.4" W x 5.0" H.

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

1.2 Objective

This Type approval report is prepared on behalf of *May King Industrial Company Ltd.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules, Part 15, sec 239 for conducted and radiated margin.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2000, 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 and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Suite 2, Sunnyvale, California, 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 C63.4-2000.

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, IEC/CISPR 22: 1998, 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	Cal. Due Data
HP	Spectrum Analyzer	8564E	08303	12/6/02
HP	Spectrum Analyzer	8593B	2919A00242	12/20/02
HP	Amplifier	8349B	2644A02662	12/20/02
HP	Quasi-Peak Adapter	85650A	917059	12/6/02
HP	Amplifier	8447E	1937A01046	12/6/02
A.H. System	Horn Antenna	SAS0200/571	261	12/27/02
Com-Power	Log Periodic Antenna	AL-100	16005	11/2/02
Com-Power	Biconical Antenna	AB-100	14012	11/2/02
Solar Electronics	LISN	8012-50-R-24-BNC	968447	12/28/02
Com-Power	LISN	LI-200	12208	12/20/02
Com-Power	LISN	LI-200	12005	12/20/02
BACL	Data Entry Software	DES1	0001	12/20/02

1.7 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
BK Precision	DC Power Supply	1740	26502000233	DOC

1.8 External I/O Cables List and Details

Manufacturer	Description	From	To
Shielded Power Cable	0.5	DC IN/EUT	DC Power Supply

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing in a typical fashion (as normally used in a typical application).

The final qualification test was performed with the EUT operating at normal mode for the purpose of measurement.

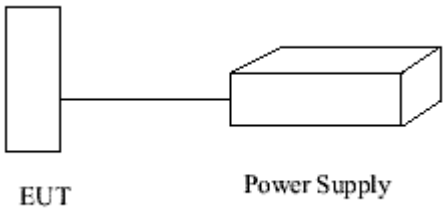
2.2 Block Diagram

Please refer to Appendix D.

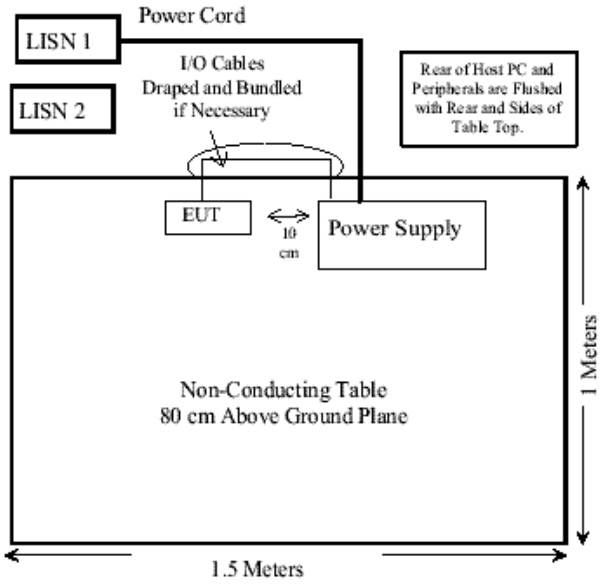
2.3 Equipment Modifications

No modification(s) was (were) made by BACL to make sure the EUT compliant with the applicable limits and requirements.

2.4 Configuration of Test System



2.5 Test Setup Block Diagram



3 - CONDUCTED EMISSIONS TEST

Not applicable because of battery operation.

4 - RADIATED EMISSION TEST

4.1 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.

4.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4-2000. The specification used was the FCC Class B limits.

The EUT was put on the center of the turntable and connected to DC power supply

The DC power supply was connected to 120Vac/60Hz power source.

The spacing between the peripherals was 10 cm.

External I/O cables are draped over edge of test table or bundled when necessary.

4.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33, the EUT was tested to 1000 MHz.

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

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	1MHz

4.4 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -4 dBμV of specified limitation), and are distinguished with a "**QP**" in the data table.

The EUT was operating at normal to represent worst-case results during final qualification test. Therefore, this configuration was used for final test data recorded in the table(s) listed under section 4.7 of this report.

4.5 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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Limit

4.6 Summary of Test Results

According to the final data in section 4.6, the EUT complied with the FCC 15.239 (b) standards, and had the worst margin of:

- 4.9 dBμV at 96.11 MHz in the Horizontal polarization

4.6 Radiated Emissions Test Result Data

Indicated		Table	Antenna		Correction Factor			Corrected Amplitude	FCC Class B	
Frequency MHz	Ampl. dBμV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
96.11 *	57.2	270	1.2	v3	10.4	3.0	27.5	43.1	48	-4.9
368.40	47.8	135	1.0	H	14.9	5.5	27.7	40.5	46	-5.5
288.31	46.2	90	1.2	H	12.6	4.9	27.2	36.5	46	-9.5
352.36	42.9	180	1.2	H	14.9	5.3	27.7	35.4	46	-10.6
48.06	42.6	225	1.0	V	11.3	2.2	26.9	29.2	40	-10.8
400.42	40.3	135	1.0	H	15.8	5.8	28.0	33.9	46	-12.1
384.39	40.5	135	1.0	H	15.2	5.6	27.7	33.6	46	-12.4
192.20	39.0	315	1.8	V	14.4	4.3	27.1	30.6	43.5	-12.9
304.32	40.3	90	1.0	H	13.9	5.0	27.3	31.9	46	-14.1
416.43	36.8	315	1.5	H	15.8	5.8	28.0	30.4	46	-15.6
80.00	37.7	225	1.2	V	9.6	2.7	27.5	22.5	40	-17.5
432.45	33.5	270	1.3	H	16.2	6.1	28.0	27.8	46	-18.2
144.17	35.5	180	1.2	V	13.2	3.6	27.5	24.8	43.5	-18.7
272.28	37.5	270	1.0	H	11.7	4.9	27.4	26.7	46	-19.3

* Fundamental Frequency

5 - EMISSION FROM THE INTENTIONAL RADIATOR

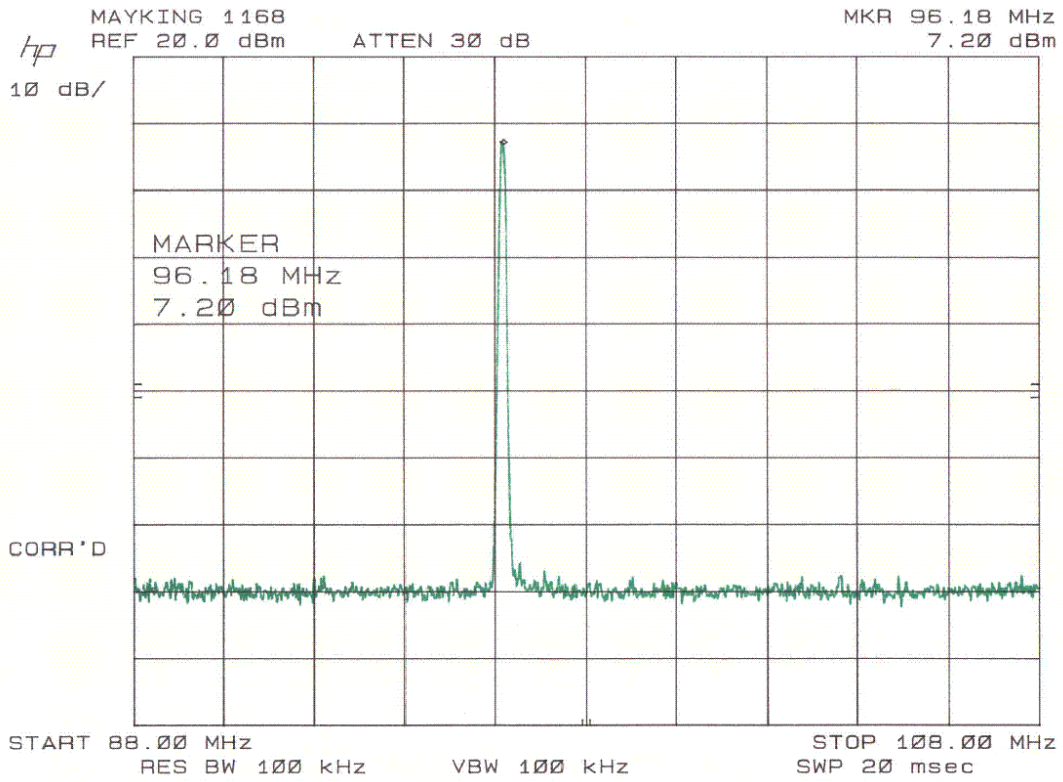
5.1 Applicable Requirements

Per FCC 15.239 (a), emission from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.2 Test Results

Result: Pass.

Please refer the attached plots for more details.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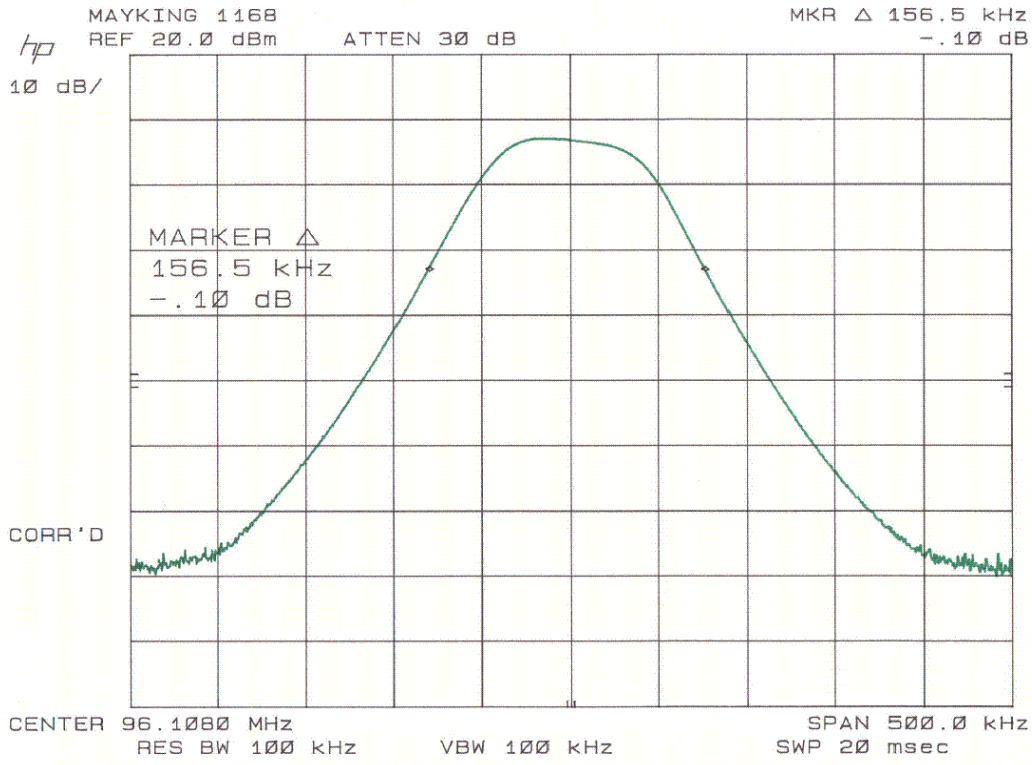
REF 20.0 dBm
ATTEN 30 dB
MKR 96.18 MHz
7.20 dBm
10 dB/
MARKER
96.18 MHz
7.20 dBm
CORR'D
START 88.00 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 108.00 MHz
SWP 20 msec


MAYKING 1168
REF 20.0 dBm
ATTEN 30 dB
MKR Δ 156.5 kHz
-.10 dB
10 dB/
MARKER Δ
156.5 kHz
-.10 dB
CORR'D
CENTER 96.1080 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 500.0 kHz
SWP 20 msec