

**Date: 2001-04-09**

## **TEST REPORT**

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**No.: HM104374**

**APPLICANT:** (Code : MAI016)  
MAXBRIGHT INDUSTRIAL CO., LTD.  
172, Kunming Road, Tao Yuan City, Taiwan.

**DATE OF SAMPLE(S) RECEIVED:** 2001-03-22

**SUBMITTED SAMPLE(S):** 2 samples

**DATE OF TESTING:** 2001-03-22 to 2001-04-02

**DESCRIPTION OF SAMPLE(S):**

A sample of product said to be:

Product: WALKIE TALKIE  
Manufacturer: SHENGFEI ELECTRONIC FACTORY  
Model Number: AK-2  
Brand Name: MIKONA  
Rating: 9Vd.c. ("6F22" size battery × 1)  
Origin: CHINA

**INVESTIGATIONS REQUESTED:**

Measurement to the relevant clauses of F.C.C. Rules and Regulations Part 15 Subpart B - Unintentional Radiator and Subpart C - Intentional Radiator.

**RESULT/ REMARK:** Please see attached sheet(s).

**CONCLUSION:**

From the measurement data obtained, the tested sample (sample 1 of 2) was considered to have COMPLIED with the clause 15.109(a) and ANSI C63.4-1992 Section 12.1.1.1-2 for the Receiver Section and for the Transmitter Section with the clause 15.235 of Federal Communications Commission Rules and Regulations Part 15.

**TEST EQUIPMENT AUDIT:** Please see Appendix A.

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Testing Engineer

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Verify by

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Patrick Wong  
for Managing Director

Date: 2001-04-09

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### **TEST SUMMARY**

#### **\*\*\*UNINTENTIONAL RADIATOR\*\*\***

(A) <u>Measurement of Radiated Emissions</u> .....	Satisfactory
(B) <u>Line Conducted Voltage Test.</u> .....	Not Applicable

#### **\*\*\* INTENTIONAL RADIATOR\*\*\***

(1) <u>Measurement of Emission of RF energy on the carrier frequency</u> .....	Satisfactory
(2) <u>Measurement of the out-of band emissions including harmonics</u> .....	Satisfactory
(3) <u>Measurement of Emission Within Band Edges</u> .....	Satisfactory
(4) <u>Measurement of Line-Conducted Voltage onto AC Power Line</u> .....	Not Applicable

### **TEST DATA**

Please refer to the attached result sheets.

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\*\*\*UNINTENTIONAL RADIATOR\*\*\*

### (A) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Subpart B section 15.109(a)

TEST CONDITION: Normal

TEST DATE: 2001-04-02

Freq. to which tuned	Freq. of the emission	Polarization	Meter reading (at 3m)	Antenna factor	Field Strength (at 3m)		FCC Limit @
MHz	MHz	H-V		dB	dB(µV)	µV/m	µV/m
49.857	49.9	V	20.1	+	15.0	35.1	56.9
	99.7		<	1.0	+	12.2	< 4.6
	149.6		<	1.0	+	9.8	< 3.5
	199.4		<	1.0	+	11.5	< 4.2
	249.3		<	1.0	+	15.9	< 7.0
	299.1		<	1.0	+	17.0	< 7.9
	349.0		<	1.0	+	17.2	< 8.1
	398.9		<	1.0	+	18.8	< 9.8
	448.7		<	1.0	+	19.7	< 10.8
	498.6		<	1.0	+	20.6	< 12.0
	548.4		<	1.0	+	22.2	< 14.5
	598.3		<	1.0	+	23.4	< 16.6
	648.1		<	1.0	+	23.5	< 16.8
	698.0		<	1.0	+	25.0	< 20.0
	747.9		<	1.0	+	26.3	< 23.2
	797.7		<	1.0	+	27.2	< 25.7
	847.6		<	1.0	+	26.6	< 24.0
	897.4		<	1.0	+	27.1	< 25.4
	947.3		<	1.0	+	28.0	< 28.2
	997.1		<	1.0	+	28.5	< 29.9

### SUMMARY

All data is within limits

Broad-band Antennas were used and both polarizations of emissions were measured

Polarizations at highest reading indicated as:

H -- Horizontal      V -- Vertical

**NOTES FOR THE RADIATION MEASUREMENT**

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC Rules.

(2) Distance between the EUT and measuring antenna:

3 meters.

(3) Measuring instrumentation:

CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz.). 6 dB bandwidth set at 120 KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.35(b) of the FCC new Rules.

(4) Measuring antenna:

Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.

(5) Frequency range scanned:

The frequency range from 25 MHz to 1000 MHz had been searched. Readings of the highest emissions relating to the limit were reported as above.

(6) Arrangement of EUT:

During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.

(7) Measuring Procedure:

In accordance with the relevant clauses of the FCC Rules Part 15 section 15.109(a) and ANSI C63.4:1992 section 12.1.1.1-2. For superregenerative receivers, an independent signal generator had been used to radiated an unmodulated were (cw) signal to the receiver at its operating frequency in order to "cohere" or resolve the individual components of the characteristic broadband emission from such a receiver. The level of such signal may need to be adjusted in order to accomplish this.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-  
30MHz to 300MHz =  $\pm 3.7\text{dB}$ , 300MHz to 1000MHz =  $+ 3.0\text{dB}/-2.7\text{dB}$ .

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC Equipment Authorization Program. This test itself is not an Approval Test.

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\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Section 15.235(49.82-49.90 MHz)  
TEST CONDITION: Normal  
TEST DATE: 2001-03-22

#### **Emission of RF energy on the carrier frequency -- 49.857 MHz (PEAK VALUE)**

Emission Frequency	Meter Reading	Polarization	Antenna Factor	Field Strength (at 3m)		FCC Limit	
MHz	dB(µV)	H-V	dB	dB(µV/m)	µV/m	µV/m	
49.9	59.9	V	+	15.0	74.9	5559.0	100000.0

#### **Emission of RF energy on the carrier frequency -- 49.857 MHz (AVERAGE VALUE)**

Emission Frequency	Meter Reading	Polarization	Antenna Factor	Field Strength (at 3m)		FCC Limit	
MHz	dB(µV)	H-V	dB	dB(µV/m)	µV/m	µV/m	
49.9	40.7	V	+	15.0	55.7	609.5	10000.0

... to be continued

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference .. Continued ..

TEST REFERENCE: FCC Rules Part 15 Section 15.235(49.82-49.90 MHz)

TEST CONDITION: Normal

TEST DATE: 2001-03-22

#### **The out-of-band emissions, including harmonics (25-1000 MHz) (CISPR VALUE)**

Emission Frequency		Polarization	Meter reading (at 3m)	Antenna factor	Field Strength (at 3m)		FCC Limit @	
MHz	H-V				dB	dB(µV)	µV/m	µV/m
99.7	H		20.3	+	12.2	32.5	42.2	150
149.6	H		22.4	+	9.8	32.2	40.7	150
199.4	H		25.2	+	11.5	36.7	68.4	150
249.3	H		17.6	+	15.9	33.5	47.3	200
299.1	H		20.3	+	17.0	37.3	73.3	200
349.0	H		18.0	+	17.2	35.2	57.5	200
398.9	H		16.6	+	18.8	35.4	58.9	200
448.7	<	1.0	+	19.7	< 20.7	< 10.8	200	
498.6	<	1.0	+	20.6	< 21.6	< 12.0	200	
548.4	<	1.0	+	22.2	< 23.2	< 14.5	200	
598.3	<	1.0	+	23.4	< 24.4	< 16.6	200	
648.1	<	1.0	+	23.5	< 24.5	< 16.8	200	
698.0	<	1.0	+	25.0	< 26.0	< 20.0	200	
747.9	<	1.0	+	26.3	< 27.3	< 23.2	200	
797.7	<	1.0	+	27.2	< 28.2	< 25.7	200	
847.6	<	1.0	+	26.6	< 27.6	< 24.0	200	
897.4	<	1.0	+	27.1	< 28.1	< 25.4	200	
947.3	<	1.0	+	28.0	< 29.0	< 28.2	200	
997.1	<	1.0	+	28.5	< 29.5	< 29.9	500	

#### **=====SUMMARY=====**

All data is within limits

Broad-band Antennas were used and both polarizations of emissions were measured.

polarizations at highest reading indicated as:

H -- Horizontal      V -- Vertical

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### **(2) Measurement of Emissions Within Band Edges.**

TEST REFERENCE: FCC Rules Part 15 Section 15.235(49.82-49.90 MHz)  
TEST CONDITION: Normal  
TEST DATE: 2001-03-22

### **RESULTS AND NOTES**

L: FCC Lower Band Edge..... -> 49.820MHz  
H: FCC Higher Band Edge..... -> 49.900MHz  
C: Unmodulated carrier at frequency..... -> 49.857MHz  
D: No. of dB from unmodulated carrier..... -> 56.09dB $\mu$ V

### **SPECTRUM ANALYZER SETTINGS**

Resolution bandwidth : 1.0KHz  
Frequency span : 10.0KHz/div  
No. of dB/div : 10.0dB/div

### **FCC Limit**

Minimum No. of dB from unmodulated carrier required : 26.0dB

### **=====SUMMARY=====**

All data is within limits

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**NOTES FOR THE RADIATION MEASUREMENT**

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules.

(2) Distance between the EUT and measuring antenna:

3 meters.

(3) Measuring instrumentations:

CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz). 6 dB bandwidth set at 120KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.35(b) of the FCC new Rules.

(4) Measuring antenna:

Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.

(5) Frequency range scanned:

The frequency range from 25 MHz to 1000 MHz had been searched. Readings of the highest emissions relating to the limit were reported as above.

(6) Arrangement of EUT:

During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.

(7) Measuring Procedure:

The procedure used was based on ANSI STANDARD C63.4-1992. The spectrum was scanned from 30MHz to 1000MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical plane and the worse case emissions were reported. The EUT was tested in vertical and cylindrical dimension, thus the orthogonal plane in X, Y and Z axis were covered and in accordance with the relevant clauses of the FCC Rules Part 15 section 15.235.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-  
30MHz to 300MHz =  $\pm 3.7$ dB, 300MHz to 1000MHz =  $+ 3.0$ dB/- $2.7$ dB.

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC Equipment Authorization Program. This test itself is not an Approval Test.

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### TEST EQUIPMENT AUDIT

#### Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL.
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	18/07/00
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	18/07/00
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	18/07/00
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	18/07/00
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	18/07/00
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	18/07/00
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	10/07/00
EM017	ANTENNA	ARA INC.	LPB-2513/A	1069	17/02/00
EM020	HORN ANTENNA	EMCO	3115	4032	09/08/00
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	30/03/98
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	15/02/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	31/05/00

#### Remarks:-

CM      Corrective Maintenance  
N/A     Not Applicable or Not Available  
TBD    To Be Determined