

Date: 2001-03-19

## TEST REPORT

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No.: HM104169

**APPLICANT:** (Code: MGE001)

MGA ENTERTAINMENT (HK) LTD.

Room 1001 Empire Centre, 68 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

**DATE OF SAMPLES RECEIVED:** 2001-02-22

**SUBMITTED SAMPLE(S):** 4 samples per model

**DATE OF TESTING:** 2001-03-16

**DESCRIPTION OF SAMPLE(S):**

A sample of product said to be:

Product: POWER INVADERS NIGHT VISION COMMUNICATOR

Manufacturer: MILLION INDUSTRIAL LTD.

Model Number: 248859

Brand Name: MGA

Rating: 9V d.c. ("6F22" size battery x 1)

Origin: CHINA

**INVESTIGATIONS REQUESTED:**

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

**REMARK :**

The low power unlicensed transmitters, are permitted under F.C.C. Part 15 (and subsequent section for higher frequency and specialty device) for rules on the RF limits of emissions. 15.235 lists the frequencies that are prohibited for this type of use. If it can not meet the conditions of any of the other special provisions mentioned above then it must comply with the general emission limits of 15.209.

**RESULTS:** Please see attached sheet(s).

**CONCLUSION:**

From the measurement data obtained, the tested sample (sample 1 of 1) 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 15.209 of Federal Communications Commission Rules and Regulations Part 15.

**TEST EQUIPMENT AUDIT:**

Appendix A: List of test equipment.

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Testing Engineer

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Verify by

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Patrick Wong  
for Managing Director

TEST SUMMARY

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

- (A) Measurement of Radiated Emissions .....Satisfactory
- (B) Line Conducted Voltage Test .....Not Applicable

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

- (1) Measurement of Emission of RF energy on the carrier frequency.....Satisfactory
- (2) Measurement of the out-of band emissions including harmonics.....Satisfactory
- (3) Measurement of Emission Within Band Edges.....Satisfactory
- (4) Measurement of Line-Conducted Voltage onto AC Power Line.....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: 2001-03-16

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			
49.830	49.8	<	1.0	+	15.0	<	16.0	<	6.3	100
	99.7	<	1.0	+	12.2	<	13.2	<	4.6	150
	149.5	<	1.0	+	9.8	<	10.8	<	3.5	150
	199.3	<	1.0	+	11.5	<	12.5	<	4.2	150
	249.2	<	1.0	+	15.9	<	16.9	<	7.0	200
	299.0	<	1.0	+	17.0	<	18.0	<	7.9	200
	348.8	<	1.0	+	17.2	<	18.2	<	8.1	200
	398.6	<	1.0	+	18.8	<	19.8	<	9.8	200
	448.5	<	1.0	+	19.7	<	20.7	<	10.8	200
	498.3	<	1.0	+	20.6	<	21.6	<	12.0	200
	548.1	<	1.0	+	22.2	<	23.2	<	14.5	200
	598.0	<	1.0	+	23.4	<	24.4	<	16.6	200
	647.8	<	1.0	+	23.5	<	24.5	<	16.8	200
	697.6	<	1.0	+	25.0	<	26.0	<	20.0	200
	747.5	<	1.0	+	26.3	<	27.3	<	23.2	200
	797.3	<	1.0	+	27.2	<	28.2	<	25.7	200
	847.1	<	1.0	+	26.6	<	27.6	<	24.0	200
	896.9	<	1.0	+	27.1	<	28.1	<	25.4	200
	946.8	<	1.0	+	28.0	<	29.0	<	28.2	200
	996.6	<	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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**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 wave (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 = ± 3.7dB, 300MHz to 1000MHz = + 3.0dB/-2.7dB.

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.

(A) Measurement of Radiated Interference

TEST REFERENCE : FCC Rules Part 15 Subpart C Section 15.209 (49.40MHz)  
 TEST CONDITION : Normal  
 TEST DATE : 2001-03-16

Emission Frequency	Polarization	Meter reading (at 3m)	Antenna factor	Field Strength (at 3m)		FCC Limit	
				dB	dB(μV)	@	
MHz	H-V					μV/m	
49.4	V	13.5	+	15.0	28.5	26.6	100
98.8		< 1.0	+	12.2	< 13.2	< 4.6	150
148.2		< 1.0	+	9.8	< 10.8	< 3.5	150
197.6		< 1.0	+	11.5	< 12.5	< 4.2	150
247.0		< 1.0	+	15.9	< 16.9	< 7.0	200
296.4		< 1.0	+	17.0	< 18.0	< 7.9	200
345.8		< 1.0	+	17.2	< 18.2	< 8.1	200
395.2		< 1.0	+	18.8	< 19.8	< 9.8	200
444.6		< 1.0	+	19.7	< 20.7	< 10.8	200
494.0		< 1.0	+	20.6	< 21.6	< 12.0	200

- End -

===== 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

Quasi-peak measurements were performed if the maximised measurements were less than 6dB below the quasi-peak limit line. Quasi-peak measurements are denoted by \* in the table above

(A) Measurement of Radiated Interference

TEST REFERENCE : FCC Rules Part 15 Subpart C Section 15.209 (49.83MHz)  
 TEST CONDITION : Normal  
 TEST DATE : 2001-03-16

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
49.8	V	15.6 +	15.0	30.6	33.9	100
99.7		< 1.0 +	12.2	< 13.2	< 4.6	150
149.5		< 1.0 +	9.8	< 10.8	< 3.5	150
199.3		< 1.0 +	11.5	< 12.5	< 4.2	150
249.2		< 1.0 +	15.9	< 16.9	< 7.0	200
299.0		< 1.0 +	17.0	< 18.0	< 7.9	200
348.8		< 1.0 +	17.2	< 18.2	< 8.1	200
398.6		< 1.0 +	18.8	< 19.8	< 9.8	200
448.5		< 1.0 +	19.7	< 20.7	< 10.8	200
498.3		< 1.0 +	20.6	< 21.6	< 12.0	200

- End -

===== 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

Quasi-peak measurements were performed if the maximised measurements were less than 6dB below the quasi-peak limit line.  
 Quasi-peak measurements are denoted by \* in the table above

**NOTES FOR THE RADIATION MEASUREMENT**

(1) Test site facility:

Open field test site located at Taipo (Hong Kong) with a metal ground plane in compliance with the requirements of ANSI C63.4:1992.

(2) Test Equipment:

HP 8572A EMI receiver was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100KHz or 1MHz depending on the type of signal. A biconical log-Periodic antenna was used for frequency range from 30MHz to 1000MHz.

(3) Test Set-Up:

The EUT and support equipment are placed in accordance with ANSI C63.4.

(4) Measuring Procedure:

An initial pre-scan measurement was performed in a semi-anechoic chamber using a 25dB gain pre-amplifier. The receive antenna in the chamber was 1.5m above the groundplane and 3m from the sample. The sample was placed 0.8m above the groundplane.

Measurements in both horizontal and vertical polarities were performed. All emissions recorded during the prescan were subsequently remeasured on the open field test site (described in 1 above) using the following procedure: The ambient noise scanning was made before powering on the EUT and support equipment to identify the emissions from the environment. During the test, each emission was maximized by: having the EUT continuously working, arranging, rotating turntable and manipulating interconnecting cables, rotating turntable and varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The frequency range tested is from 30MHz to 1000MHz and the worst-case emissions are shown in Test Results.

(5) 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.

(6) Address of test site facility:

The Hong Kong Standards & Testing Centre Ltd.  
10 Dai Wang Street, Taipo Industrial Estate, Taipo, N.T., Hong Kong

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's Equipment Authorization Program. This test itself is not an Approval Test.

\*\*\* End of Document \*\*\*

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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