



香港標準及檢定中心
The Hong Kong Standards and Testing Centre Ltd

Date : July 13, 1998

FCC ID: LU9-MGA921B

TECHNICAL REPORT

- 1) Full Name of the Manufacturer of the Device
SUPERSONICS ELECTRIC COMPANY
- 2) Mailing Address of the Manufacturer of the Device
Guan Lan Industrial Area
Bao An
CHINA
- 3) Trade Name
MGA
- 4) Model Number
233404
- 5) Additional Model Numbers under which the Device will be Marketed
NIL
- 6) Copy of the Operating Instruction Furnished to the User
As enclosed





The Hong Kong Standards and Testing Centre Ltd.

Date: 1998-06-29

TEST REPORT

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No.: HM1074/504

APPLICANT: (CODE : 018309)

MGA Entertainment (H.K.) Ltd.

Unit 704-706, Energy Plaza, 92 Granville Road, Tsimshatsui East, Kowloon, HONG KONG.

DATE OF SAMPLES RECEIVED: 1998.06.13

DATE OF TESTING: 1998.06.28, 1998-06.30

DESCRIPTION OF SAMPLE(S):

A sample of product said to be:

Product: Walkie Talkie 49.860MHz and Radio Control 27.145MHz

Manufacturer: Supersonics Electric Company

Model Number: 233404

Brand Name: MGA

Rating: DC 9.0V ("6F22" size battery x 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).

MODIFICATION: Change C23 to 0.1 μ F.

CONCLUSION:

From the measurement data obtained, the tested sample was considered to have COMPLIED after modifications with the clause 15.109(a) and ANSI C63.4-1992 Section 12.1.1.1-2 for the Receiver and with the clauses 15.235 and 15.227 for the Transmitter Section of Federal Communications Commission Rules and Regulations Part 15.

TEST EQUIPMENT AUDIT: Please see Appendix A

Testing Engineer

Verify by

Patrick Wong
for Managing Director

Conditions in issuance of Test Report

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TEST SUMMARY

RECEIVER SECTION: (49.82 - 49.90 MHz)

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

(INTENTIONAL RADIATOR) TRANSMITTER SECTION

49.82 -49.90MHz:

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

26.96-27.28MHz:

- (I) Measurement of Emission of RF energy on the carrier frequency..... Satisfactory
- Measurement of the out-of band emissions including harmonics..... Satisfactory
- (II) Measurement of Emission Within Band Edges..... Satisfactory
- (III) Measurement of Line-Conducted Voltage onto AC Power Line..... Not applicable

TEST DATA

Please refer to the attached result sheets.



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** RECEIVER SECTION **

(A) Measurement of Radiated Interference

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

TEST CONDITION : Normal

TEST DATE : 1998.06.28

Freq. to which tuned	Freq of the emission	Polarization H-V	Meter reading (at 3m)		Antenna factor	Field Strength (at 3m)		FCC limit @
MHz	MHz		dB(μ V)	dB		dB(μ V/m)	μ V/m	μ V/m
49.860	49.9	<	1.0	+	15.0	<	16.0	< 6
	99.7	<	1.0	+	12.2	<	13.2	< 5
	149.6	<	1.0	+	9.8	<	10.8	< 3
	199.4	<	1.0	+	11.5	<	12.5	< 4
	249.3	<	1.0	+	15.9	<	16.9	< 7
	299.1	<	1.0	+	17.0	<	18.0	< 8
	349.0	<	1.0	+	17.2	<	18.2	< 8
	398.8	<	1.0	+	18.8	<	19.8	<10
	448.7	<	1.0	+	19.7	<	20.7	<11
	498.6	<	1.0	+	20.6	<	21.6	<12
	548.4	<	1.0	+	22.2	<	23.2	<14
	598.3	<	1.0	+	23.4	<	24.4	<17
	648.1	<	1.0	+	23.5	<	24.5	<17
	698.0	<	1.0	+	25.0	<	26.0	<20
	747.8	<	1.0	+	26.2	<	27.2	<25
	797.7	<	1.0	+	27.2	<	28.2	<25
	847.5	<	1.0	+	27.2	<	28.2	<25
	897.5	<	1.0	+	27.2	<	28.2	<25
	947.2	<	1.0	+	27.8	<	28.8	<27
	997.1	<	1.0	+	28.5	<	29.5	<27

=====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 ET and measuring antenna:

3 meters.

(3) Measuring instrumentation's:

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.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-
30MHz to 200MHz = $\pm 3.7\text{dB}$, 200MHz 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's 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 Subpart Section 15.235 (49.82-49.90 MHz)

TEST CONDITION : Normal

TEST DATE : 1998.06.28

Emission of RF energy on the carrier frequency -- 49.860 MHz
(PEAK VALUE)

Emission Frequency	Meter Reading	Polarization	Antenna Factor	Field Strength (at 3m)	FCC Limit
MHz	dB(μ V)	H-V	dB	dB(μ V/m) μ V/m	μ V/m
49.90	48.2	V +	15.0	+ 63.2 1445.4	100000

Emission of RF energy on the carrier frequency -- 49.860 MHz
(AVERAGE VALUE)

Emission Frequency	Meter Reading	Polarization	Antenna Factor	Field Strength (at 3m)	FCC Limit
MHz	dB(μ V)	H-V	dB	dB(μ V/m) μ V/m	μ V/m
49.90	46.1	V +	15.0	+ 61.1 1135.0	10000

... 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 : 1998.06.20

The out-of-band emissions, including harmonics (25-1000 MHz)

(CISPR VALUE)

Emission Frequency MHz	Meter Reading dB(μV)	Polarization H-V	Antenna Factor dB	Field Strength (at 3m) dB(μV/m) μV/m	FCC Limit μV/m
99.7	12.8	H	+ 12.2	25.0 17.8	150
149.6	10.5	H	+ 9.8	20.3 10.4	150
199.4	27.4	H	+ 11.5	38.9 88.1	150
249.3	18.1	H	+ 15.9	34.0 50.1	200
299.1	16.1	H	+ 17.0	33.1 45.2	200
348.8	23.4	H	+ 17.2	40.6 107.2	200
398.6	12.2	H	+ 18.8	31.0 35.5	200
448.5	13.4	H	+ 19.7	33.1 45.2	200
498.3	16.5	H	+ 20.6	37.1 71.6	200
543.1	< 1.0		+ 22.2	< 23.2 < 14.5	200
598.1	< 1.0		+ 23.4	< 24.4 < 16.6	200
647.8	< 1.0		+ 23.5	< 24.5 < 16.8	200
697.4	< 1.0		+ 25.0	< 26.0 < 20.0	200
747.8	< 1.0		+ 26.2	< 27.2 < 22.9	200
797.7	< 1.0		+ 27.2	< 28.2 < 25.7	200
847.5	< 1.0		+ 27.2	< 28.2 < 25.7	200
897.4	< 1.0		+ 27.2	< 28.2 < 25.7	200
947.2	< 1.0		+ 27.8	< 28.8 < 27.5	200
997.1	< 1.0		+ 28.5	< 29.5 < 29.9	500

=====SUMMARY=====

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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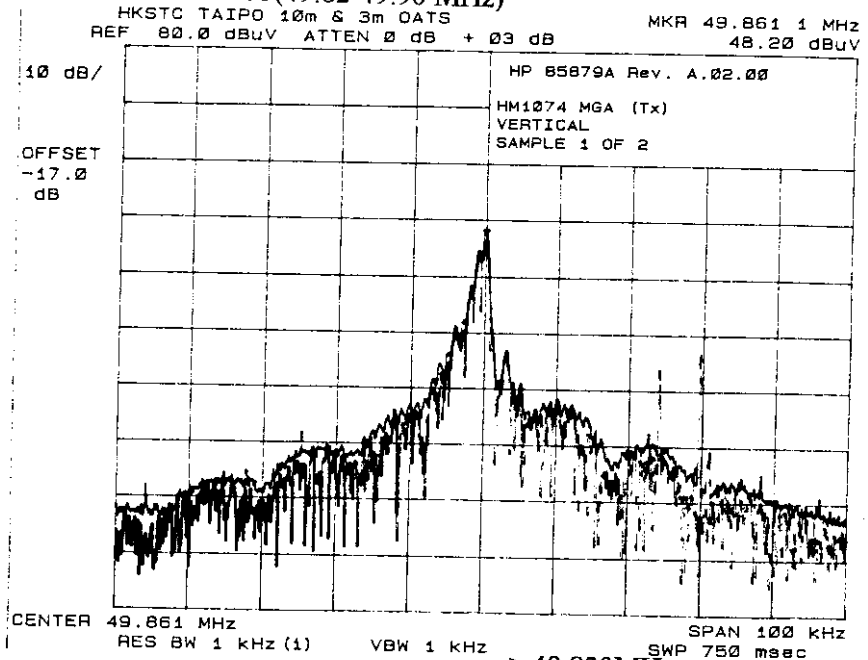
*** INTENTIONAL RADIATOR ***

(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 : 1998.06.28



RESULTS AND NOTES

L: FCC Lower Band Edge.....-> 49.820MHz
H: FCC Higher Band Edge.....-> 49.900MHz
C: Unmodulated carrier at frequency.....-> 49.860MHz
D: No. of dB from unmodulated carrier.....-> 48.2dB

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:

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 200MHz = $\pm 3.7\text{dB}$, 200MHz to 1000MHz = $\pm 3.0\text{dB}/-2.7\text{dB}$.

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



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*** INTENTIONAL RADIATOR ***

(I) Measurement of Radiated Interference

TEST REFERENCE: FCC Rules Part 15 Section 15.227 (26.96-27.28 MHz)

TEST CONDITION : Normal

TEST DATE : 1998.06.30

Emission of RF energy on the carrier frequency -- 27.145 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
27.1	47.5	V +	18.6	+ 65.8 1949.8	100000

Emission of RF energy on the carrier frequency -- 27.145 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
27.1	43.1	V +	18.6	+ 61.7 1216.2	10000

... to be continued



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*** INTENTIONAL RADIATOR ***

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

TEST REFERENCE: FCC Rules Part 15 Section 15.227 (26.96-27.28 MHz)

TEST CONDITION : Normal

TEST DATE : 1998.06.30

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

Emission Frequency	Meter Reading	Polarization		Antenna Factor	Field Strength (at 3m)		FCC Limit
MHz	dB(μ V)	H	V	dB	dB(μ V/m)	μ V/m	μ V/m
54.3	15.4	V	+	13.2	28.6	26.9	100
81.4	11.6	V	+	9.3	20.9	11.1	100
108.6	10.1	V	+	12.6	22.7	13.6	150
135.7	8.2	H	+	11.2	19.4	9.3	150
162.9	18.8	H	+	9.8	28.6	26.9	150
190.0	15.2	H	+	11.5	26.7	21.6	150
217.2	< 1.0		+	12.6	< 13.6	< 4.8	200
244.3	< 1.0		+	13.9	< 14.9	< 5.6	200
271.5	< 1.0		+	16.5	< 17.5	< 7.5	200
298.6	< 1.0		+	17.1	< 18.1	< 8.0	200
325.7	< 1.0		+	17.1	< 18.1	< 8.0	200
352.9	< 1.0		+	17.3	< 18.3	< 8.2	200
380.0	< 1.0		+	18.0	< 19.0	< 8.9	200
407.2	< 1.0		+	18.8	< 19.8	< 9.8	200
434.3	< 1.0		+	19.5	< 20.5	< 10.6	200
461.5	< 1.0		+	20.1	< 21.1	< 11.4	200
488.6	< 1.0		+	20.3	< 21.3	< 11.6	200
515.8	< 1.0		+	20.9	< 21.9	< 12.4	200
542.9	< 1.0		+	22.1	< 23.1	< 14.3	200
570.0	< 1.0		+	22.8	< 23.8	< 15.5	200
597.2	< 1.0		+	23.3	< 24.3	< 16.4	200
624.3	< 1.0		+	23.4	< 24.4	< 16.6	200
651.5	< 1.0		+	23.6	< 24.6	< 17.0	200
678.6	< 1.0		+	24.9	< 25.9	< 19.7	200
705.8	< 1.0		+	25.1	< 26.1	< 20.2	200
732.9	< 1.0		+	25.4	< 26.4	< 20.9	200
760.1	< 1.0		+	26.4	< 27.4	< 23.4	200
787.2	< 1.0		+	26.8	< 27.8	< 24.5	200

... to be continued



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*** INTENTIONAL RADIATOR ***

(I) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE: FCC Rules Part 15 Section 15.227 (26.96-27.28 MHz)

TEST CONDITION : Normal

TEST DATE : 1998.06.30

The out-of-band emissions, including harmonics (25-1000 MHz)

(CISPR VALUE)

Emission Frequency MHz	Meter Reading dB(μ V)	Polarization H-V	Antenna Factor dB	Field Strength (at 3m) dB(μ V/m) μ V/m		FCC Limit μ V/m
841.5	<1.0	+	26.1	<27.1	<22.6	200
868.6	<1.0	+	26.8	<27.8	<24.5	200
895.8	<1.0	+	27.1	<28.1	<25.4	200
922.9	<1.0	+	27.5	<28.5	<26.6	200
950.1	<1.0	+	28.1	<29.1	<28.5	200
977.2	<1.0	+	28.2	<29.2	<28.8	500
999.5	<1.0	+	28.5	<29.5	<29.9	500

=====SUMMARY=====

data is within limits

Broad-band Antennas were used both polarizations of emissions were measured.
polarizations at highest reading indicated as:

H -- Horizontal V -- Vertical



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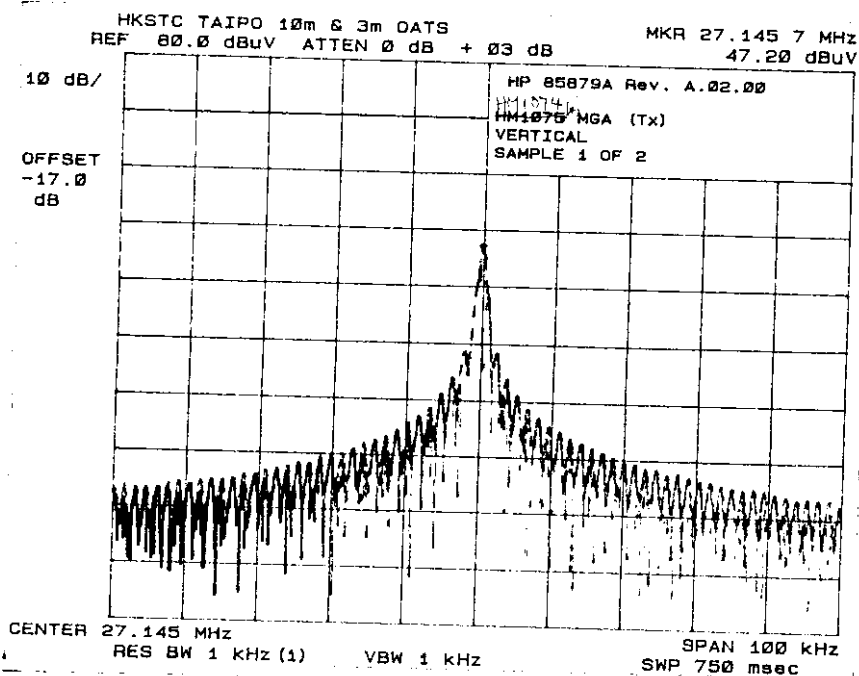
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*** INTENTIONAL RADIATOR ***

(II) Measurement of Emissions Within Band Edges.

TEST REFERENCE: FCC Rules Part 15 section 15.227 (26.96-27.28 MHz)
TEST CONDITION: Normal
TEST DATE : 1998.06.30



RESULTS AND NOTES

L: FCC Lower Band Edge.....-> 26.960MHz
H: FCC Higher Band Edge.....-> 27.280MHz
C: Unmodulated carrier at frequency.....-> 27.145MHz
D: No. of dB from unmodulated carrier.....-> 47.20dB

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:

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(2) Distance between the EUT and measuring antenna:
3 meters.

(3) Measuring instrumentations:

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(4) Measuring antenna:

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(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 15.227.

(8) Measuring Uncertainty:

The calculated uncertainty for measurement performed at 3M test distance are:-
30MHz to 200MHz = $\pm 3.7\text{dB}$, 200MHz 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's Equipment Authorization Program. This test itself is not an Approval Test.

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



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APPENDIX A

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TEST EQUIPMENT AUDIT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HP	HP85660B	3144A21192	28/05/98
EM008	SPECTRUM ANALYZER DISPLAY	HP	HP85662A	3144A20514	28/05/98
EM009	QUASI PEAK ADAPTOR	HP	HP85650A	3303A01702	28/05/98
EM010	RF PRESECTOR	HP	HP85685A	3221A01410	28/05/98
EM011	ATTENUATOR/SWITCH	HP	HP11713A	2508A10595	28/05/98
EM012	PRE-AMPLIFIER	HP	HP8449B	3008A00262	28/05/98
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HP HP HP	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM017	ANTENNA	ARA INC.	LPB-2513/A	1069	31/12/97
EM072	SIGNAL GENERATOR	HP	8640B	1948A11892	30/03/98
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	16/02/98

ABBREVIATIONS:

CM = Corrective Maintenance

N/A = Not Applicable