香 港 標 準 及 檢 定 中 心
Hong Kong Standards and Testing Centre

Date : 2005-03-04
No. : HM151413

TEST REPORT

Applicant: SHENZHEN HAIS ELECTRONICS CO., LTD
14 Building, Chentian Industrial Zone,
Baomin 2/R, Bao'an, Shenzhen, China

Description of Samples:

Model name:	2.4G Game Controller
Model no.:	HS-2303B
Brand name:	N/A
FCC ID:	SSL2303BR

Date Samples Received: 2004-06-08

Date Tested: 2004-07-02 to 2004-11-18

Investigation Requested: FCC Part 15 Subpart C

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

K C Lee, EMC
for Chief Executive

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10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
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Appendix A

Appendix B

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

SHENZHEN HAIS ELECTRONIC CO., LTD
14 Building, Chentian Industrial Zone,
Baomin 2/R, Bao'an, Shenzhen, China

HKSTC Code Number for Applicant **SZH001**

Manufacturer

SHENZHEN HAIS ELECTRONIC CO., LTD
14 Building, Chentian Industrial Zone,
Baomin 2/R, Bao'an, Shenzhen, China

1.3 Equipment Under Test [EUT]

Description of Sample

Product:	2.4G Game Controller
Manufacturer:	Shenzhen Hais Electronic Co., Ltd.
Brand Name:	N/A
Model Number:	HS-2303B
Input Voltage:	The product draws power from the signal port of the console.

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a 2.4G Game Controller, the transmission signal is frequency hopping of channels frequency range 2.402-2.480 GHz.

1.4 Date of Order

2004-06-08

1.5 Submitted Sample(s):

1 Sample per model

1.6 Test Duration

2004-07-02 to 2004-11-18

1.7 Country of Origin

China

1.8 Additional Information of EUT

	Submitted	Not Available
User Manual	☒	☐
Part List	☒	☐
Circuit Diagram	☒	☐
Printed Circuit Board [PCB] Layout	☒	☐
Block diagram	☒	☐
FCC ID Label	☒	☐

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 Regulations and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	Class B	☒	☐	☐
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2003
Test Date:	2004-11-18
Mode of Operation:	Tx mode

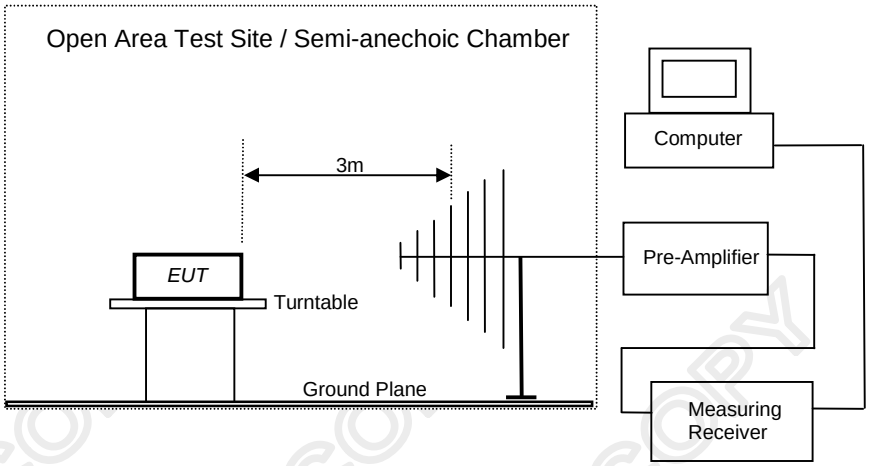
Test Method:

The sample was placed 0.8m above the ground plane on the *OATS / **Semi-anechoic Chamber, measurements in both horizontal and vertical antenna polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The worst case(s) of emission is/are shown in Test Results of the following pages.

* OATS [Open Area Test Site] located at HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90657.

** Semi-anechoic chamber located at HKSTC filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756. (This has been used in the report)

Test Setup:



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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
2400-2483.5	50,000 [average]	500 [Average]

Results of Lowest Channel Frequency : Pass

	Field Strength of Fundamental & Harmonics Emissions Peak Value							
Frequency MHz	EMI Receiver Reading dBuV	Antenna factor dB/m	Cable Loss dB	Preamplifier Gain dB	Field Strength dBuV/m	Field Strength uV/m	Limit @ 3meter µV/m	E-Field Polarity
2402	82.5	30.6	3.3	34.9	81.5	11,885.0	50,000	Horizontal
* 4804	32.1	35.3	5.3	34.2	38.5	699.8	5,000	H & V
7206	30.8	38.2	7.4	33.6	42.8	138.0	500	H & V
9608	30.4	40.1	8.2	33.6	45.1	179.9	500	H & V
* 12010	32.6	40.5	10	32.5	50.6	338.8	500	H & V
14412	31.7	42.4	9.6	30.6	53.1	451.8	500	H & V
16814	30.6	41.1	10.2	31.6	50.3	327.3	500	H & V
* 19216	30.4	42.3	11.3	31.5	52.5	398.1	500	H & V
21618	30.5	42.6	12.5	32.3	53.3	462.3	500	H & V
24020	30.5	42.8	12.9	32.5	53.7	484.1	500	H & V

Remarks:

Field Strength (dBuV/m) = EMI receiver reading (dbuV)+Antenna factor (dB/m)+cable loss (dB)-Preamplifier.

*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB
1GHz to 18GHz ±4.4dB

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Results of Middle Channel Frequency: Pass

Field Strength of Fundamental & Harmonics Emissions Peak Value								
Frequency MHz	EMI Receiver Reading dBuV	Antenna factor dB/m	Cable Loss dB	Preamplifier Gain dB	Field Strength dBuV/m	Field Strength uV/m	Limit @ 3meter µV/m	E-Field Polarity
2440	87.2	30.6	3.3	34.9	86.2	12,161.0	50,000	Horizontal
* 4880	48.6	35.3	5.3	33.8	55.4	85.1	5,000	H & V
* 7320	30.7	38.2	7.4	33.8	42.5	133.4	500	H & V
9760	30.4	40.1	8.2	33.4	45.3	184.1	500	H & V
* 12200	31.9	40.5	10	32.9	49.5	298.5	500	H & V
14640	31.5	42.4	9.6	31.3	52.2	398.1	500	H & V
17080	30.3	41.1	10.2	31.6	50.0	316.2	500	H & V
* 19520	30.1	42.3	11.3	31.5	52.2	407.3	500	H & V
21960	30.3	42.6	12.5	32.3	53.1	451.3	500	H & V
24400	30.2	42.8	12.9	32.5	53.4	467.7	500	H & V

Remarks:

Field Strength (dBuV/m) = EMI receiver reading (dbuV)+Antenna factor (dB/m)+cable loss (dB)-Preamplifier.

*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB
1GHz to 18GHz ±4.4dB

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Results of Highest Channel Frequency: Pass

Field Strength of Fundamental & Harmonics Emissions Peak Value								
Frequency MHz	EMI Receiver Reading dBuV	Antenna factor dB/m	Cable Loss dB	Preamplifier Gain dB	Field Strength dBuV/m	Field Strength uV/m	Limit @ 3meter µV/m	E-Field Polarity
2480	80.3	30.6	3.3	34.6	79.6	9,549.9	50,000	Horizontal
* 4960	30.9	35.9	5.4	33.7	38.5	84.1	5,000	H & V
* 7440	30.8	39.1	7.4	33.8	43.5	149.6	500	H & V
9920	30.5	40.6	8.2	33.3	46.0	199.5	500	H & V
* 12400	30.8	41.0	10.1	32.2	49.7	316.2	500	H & V
14880	31.4	42.9	9.7	30.8	53.2	457.1	500	H & V
17360	30.6	44.0	10.3	31.0	53.9	495.5	500	H & V
* 19840	30.3	42.3	11.3	31.5	52.4	416.8	500	H & V
* 22320	29.8	42.6	12.5	32.3	52.6	426.5	500	H & V
24800	30.3	42.8	12.9	32.5	53.5	473.1	500	H & V

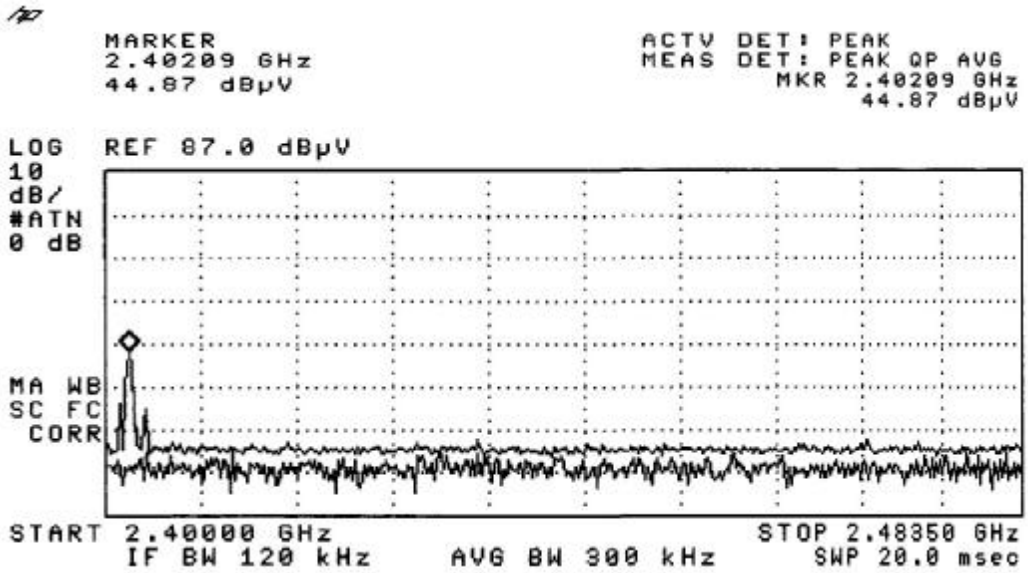
Remarks:

Field Strength (dBuV/m) = EMI receiver reading (dbuV)+Antenna factor (dB/m)+cable loss (dB)-Preamplifier.

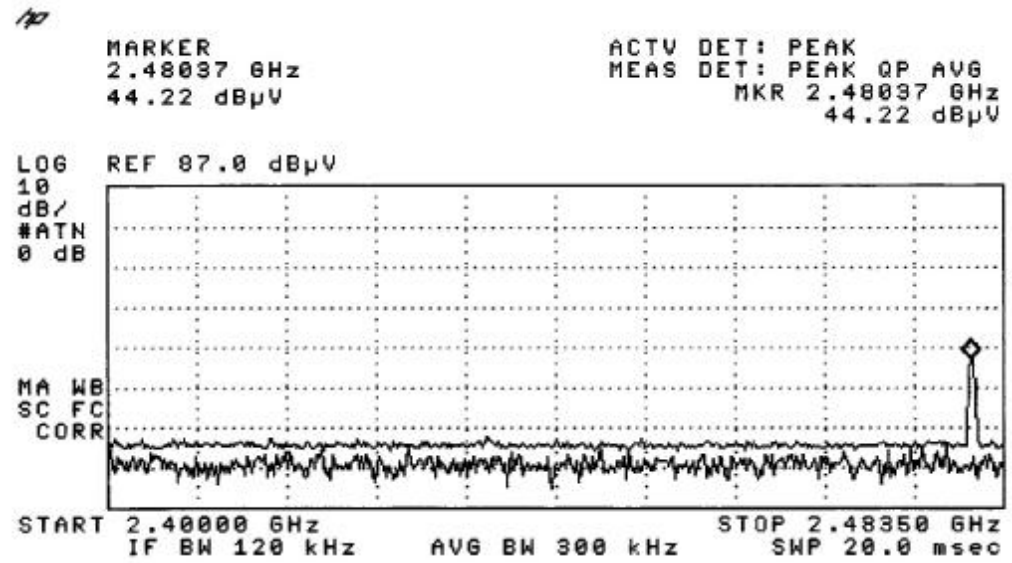
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB
1GHz to 18GHz ±4.4dB

Lower Frequency



Highest Frequency



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [µV/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results :

Radiated Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS						

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB
1GHz to 18GHz ±4.4dB

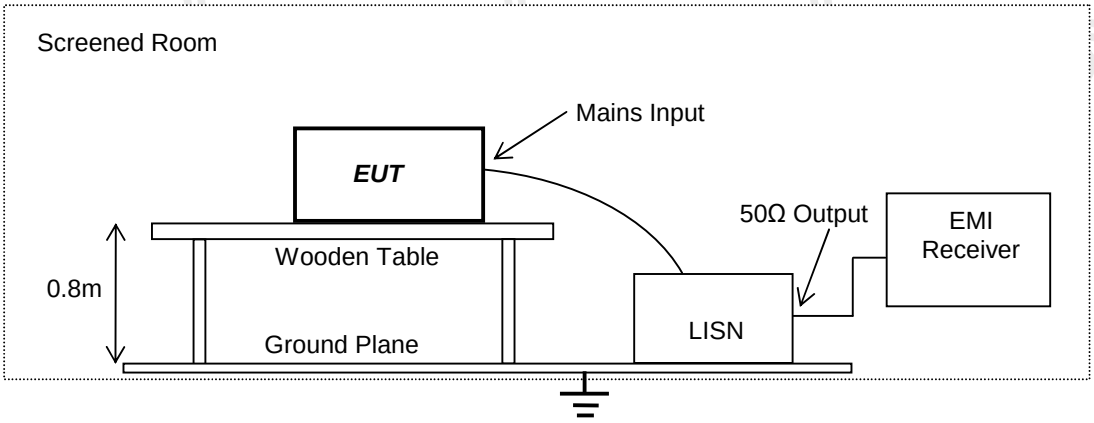
3.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2003
Test Date:	2004-07-03
Mode of Operation:	On Mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2003. An initial measurement was performed in peak and average detection modes on the live line. Any emission(s) recorded exceeded 30dB below the relevant limit line were re-measured using quasi-peak and average detections on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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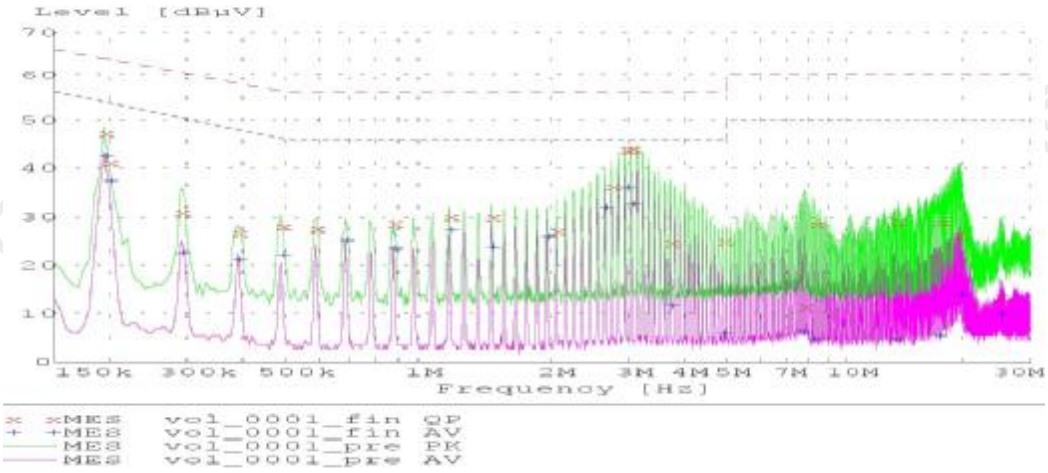
Limits for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average Limits [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results: On Mode



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Results: On Mode

Conductor	Frequency	Quasi-Peak		Average	
Live or Neutral	MHz	Level dBµV	Limit dBµV	Level dBµV	Limit dBµV
Live	0.200	41.2	64	37.5	54
Live	0.290	30.8	61	-*-	-*-
Live	0.390	26.6	58	-*-	-*-
Live	0.490	28.6	56	22.2	46
Live	1.175	30.0	56	-*-	-*-
Live	2.950	43.9	56	-*-	-*-
Live	3.035	44.0	56	-*-	-*-
Live	19.590	26.2	60	-*-	-*-
Live	25.080	13.4	60	-*-	-*-

To Be Continued…

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Results: On Mode

Conductor	Frequency	Quasi-Peak		Average	
Live or Neutral	MHz	Level dBµV	Limit dBµV	Level dBµV	Limit dBµV
Neutral	0.195	47.3	64	-*-	-*-
Neutral	0.585	27.6	56	-*-	-*-
Neutral	0.880	28.6	56	-*-	-*-
Neutral	0.195	-*-	-*-	42.6	54
Neutral	0.290	-*-	-*-	22.6	51
Neutral	0.390	-*-	-*-	21.2	48
Neutral	0.685	-*-	-*-	25.1	46
Neutral	0.880	-*-	-*-	23.5	46
Neutral	1.175	-*-	-*-	27.2	46
Neutral	1.465	29.8	56	23.8	46
Neutral	1.955	-*-	-*-	26.0	46
Neutral	2.050	27.0	56	-*-	-*-
Neutral	2.640	-*-	-*-	32.0	46
Neutral	2.735	36.2	56	-*-	-*-
Neutral	2.950	-*-	-*-	36.0	46
Neutral	3.030	-*-	-*-	32.7	46
Neutral	3.710	24.6	56	11.6	46
Neutral	4.885	-*-	-*-	5.9	46
Neutral	4.895	24.9	56	-*-	-*-
Neutral	7.715	-*-	-*-	6.2	50
Neutral	7.810	11.3	60	-*-	-*-
Neutral	8.205	-*-	-*-	4.5	50
Neutral	8.320	28.4	60	-*-	-*-
Neutral	13.385	-*-	-*-	4.6	50
Neutral	13.515	29.1	60	-*-	-*-
Neutral	17.395	-*-	-*-	5.4	50
Neutral	17.630	28.8	60	-*-	-*-
Neutral	19.740	-*-	-*-	14.0	50
Neutral	25.080	-*-	-*-	9.9	50

Remarks:
Calculated measurement uncertainty: ±2.8dB
-*- Emissions exceeded 30dB below limit line

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	15/06/04
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	15/06/04
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	15/06/04
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	15/06/04
EM011	ATTENNUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	15/06/04
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	15/06/04
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	15/06/04
EM020	HORN ANTENNA	EMCO	3115	4032	30/07/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	30/07/03
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	08/02/03
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	13/01/04
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	04/10/04
EM219	BICONILOG ANTENNA	EMCO	3142C	00029071	28/10/03
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A
EM223	HORN ANTENNA	EMCO	3160-09	08163126	18/06/04
EM224	HORN ANTENNA	EMCO	3160-09	08198430	20/06/04

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	17/10/03
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	14/10/04
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	CM
EM142	PULES LIMITER	R & S	ESH3Z2	357.8810.52	04/08/04
EM181	EMI TEST RECEIVER	R & S	ESIB7	100072	06/01/04
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A	17/10/03
EM197	LISN	EMCO	4825/2	1193	05/06/04

Remarks:-

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

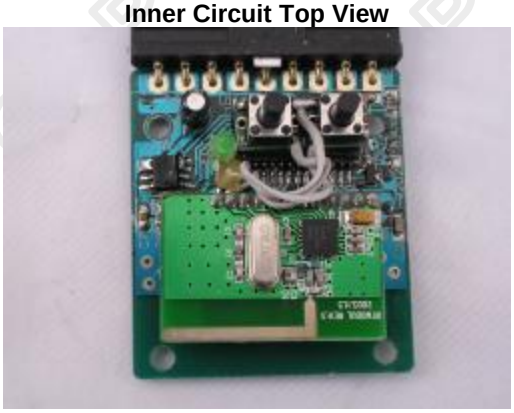
Appendix B

Photographs of EUT

Front View of the product

Rear View of the product

Inner Circuit Top View



Inner Circuit Bottom View

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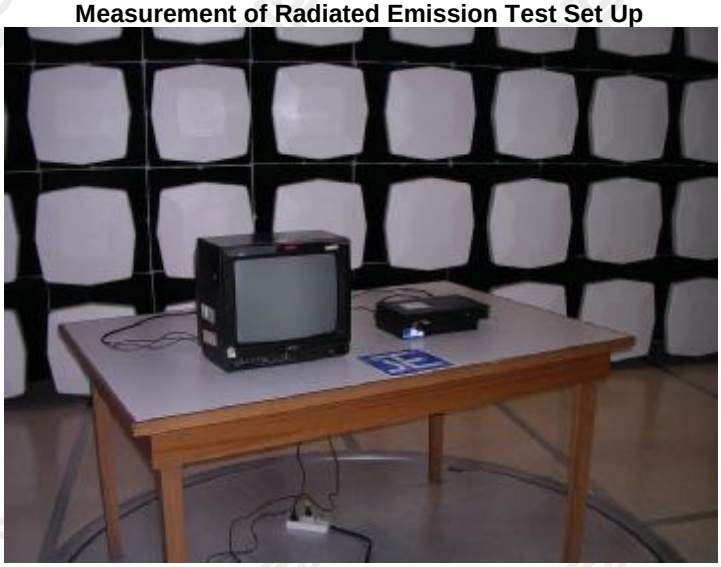
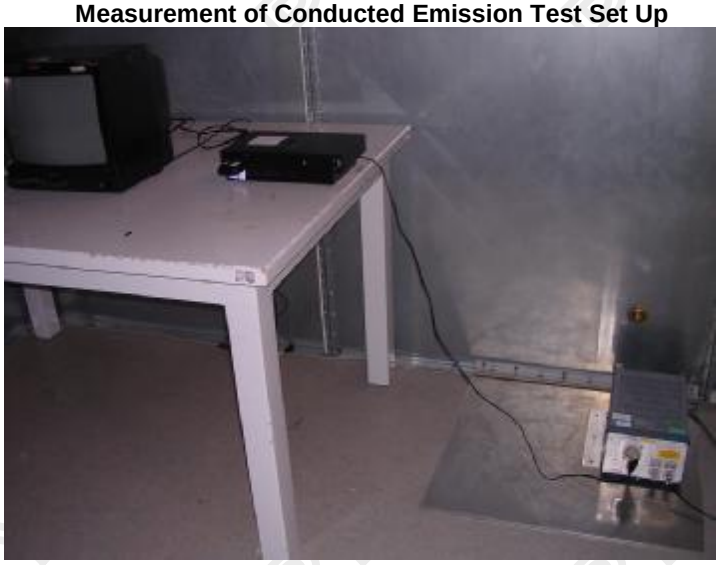
Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



******* End of Test Report *******