

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

UN-INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART B REQUIREMENT

OF

Product Name: CDMA 1900MHz FIXED WIRELESS TERMINAL

Model Name: S1810EC

Report No.: EK/2008/30011

Issue Date: Apr. 10, 2008

FCC Rule Part: Part 15 B

Prepared for Guangzhou Gaoke Communications Technology Co., Ltd
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County, Taiwan.



CERTIFICATION OF COMPLIANCE

Applicant: Guangzhou Gaoke Communications Technology Co., Ltd
Product Description: CDMA 1900MHz FIXED WIRELESS TERMINAL
Model No.: S1810EC
File Number: EK/2008/30011
Date of test: Mar. 28, 2008
Date of EUT Receive: Mar. 28, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15B.

The test results of this report relate only to the tested sample identified in this report.

Test By:		Date	Apr. 10, 2008
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Prepared By:		Date	Apr. 10, 2008
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	(Clerk : Sara Wu)		
Approved By:		Date	Apr. 10, 2008
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Version

Version No.	Date
00	Apr. 10, 2008

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1. GENERAL INFORMATION

1.1 Product Description

Product	CDMA 1900MHz FIXED WIRELESS TERMINAL
Model No.	S1810EC
Model Difference:	N/A
Power Supply:	Batteries supplied: 7.2 DC(Ni-MH 1200mAh rechargeable battery) or AC/DC adapter
Adapter:	Model no.:GM-120100; Input :AC 100V~240V, 50-60Hz ; Output: DC 12,1A; Adapter DC output cable: 1.5m x 2 wires unscreened cable.
Trade mark:	N/A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC Part15 Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Both OATS and Anechoic chamber (3 meters) was accredited by CNLA (0513).

1.5 Special Accessories

No Special Accessories.

1.6 Equipment Modifications

No modification by SGS Taiwan Electronics & Communication Laboratory.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

Test in PC connection mode with telephone connected.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 7 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.4-2003.

2.4 Limitation

(1) Conducted Emission

According to section 15.107(a) Conducted Emission Limits is as following.

Frequency range MHz	Class B Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

(2) Radiated Emission

According to section 15.109(a) Radiated Emission Class B Limits is as following:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in $\text{dB}\mu\text{V/m}=20 \log (\mu\text{V/m})$
 2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.

Configuration of Tested System

Fig. 2-1 Configuration of Tested System

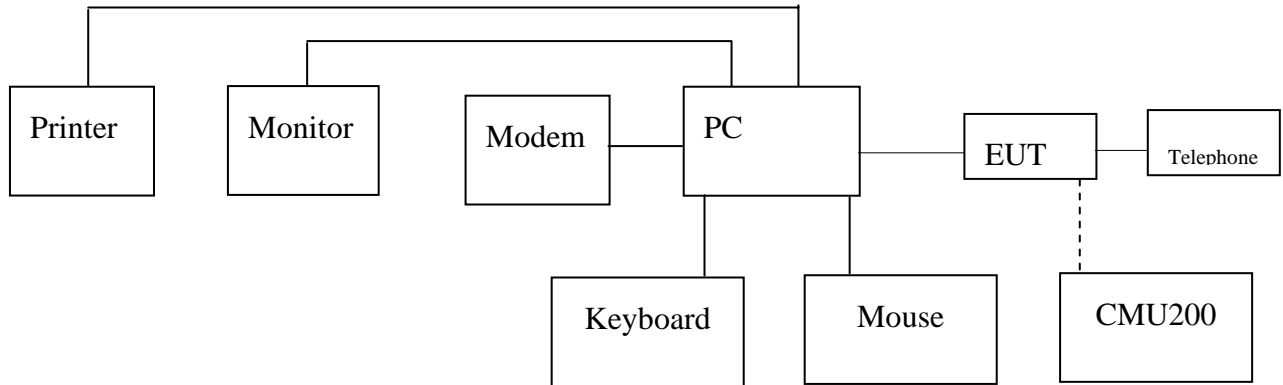


Table 2-1 Equipment Used in Tested System

PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
PC	HP	dc7700	SGH7290L9J
Monitor	HP	HSTND-2F02	N/A
Printer	HP	Deskjet 3820	N/A
Keyboard	HP	KB-0316	N/A
Mouse	HP	M-UAE96	N/A
Telephone	SIEMENS	HA8000(22)	1040052
CDMA Signal Simulator	ROHDE&SCHWARZ	CMU200	101724

2.6 Cable List

Cable Type	Length	Shield
Power cable	1.5m	Unshielded
RS232 cable	1.5m	Unshielded
RJ-11 Cable	5m	Unshielded

3. Summary of Test Results

Highest Emission					
Standard	FCC Rules	Result	Phase/Polar.	Frequency(MHz)	Margin(dB)
FCC Part 15 Subpart B Class B	§15.107 (Conducted Emission)	PASS	Line	11.317	-22.03(QP)
			Neutral	11.683	-15.34(AV)
	§15.109 (Radiated Emission)	PASS	Ver.	31.882	-10.53(QP)

4. Description of test modes

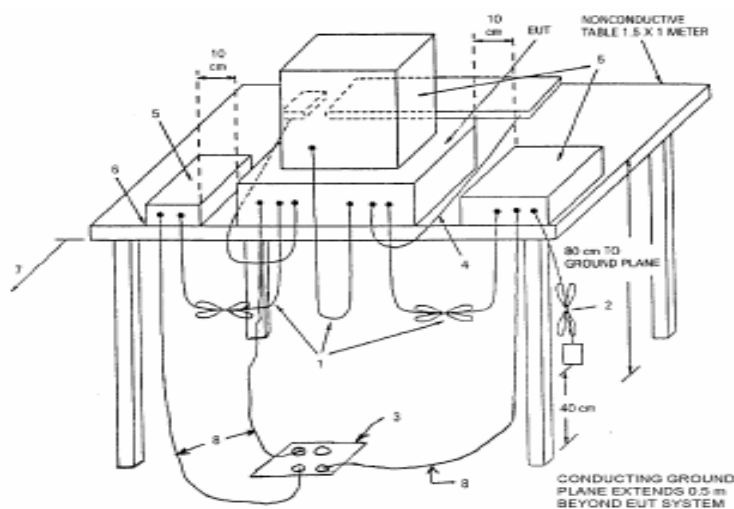
Test in PC connect mode with telephone connected.

5. Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

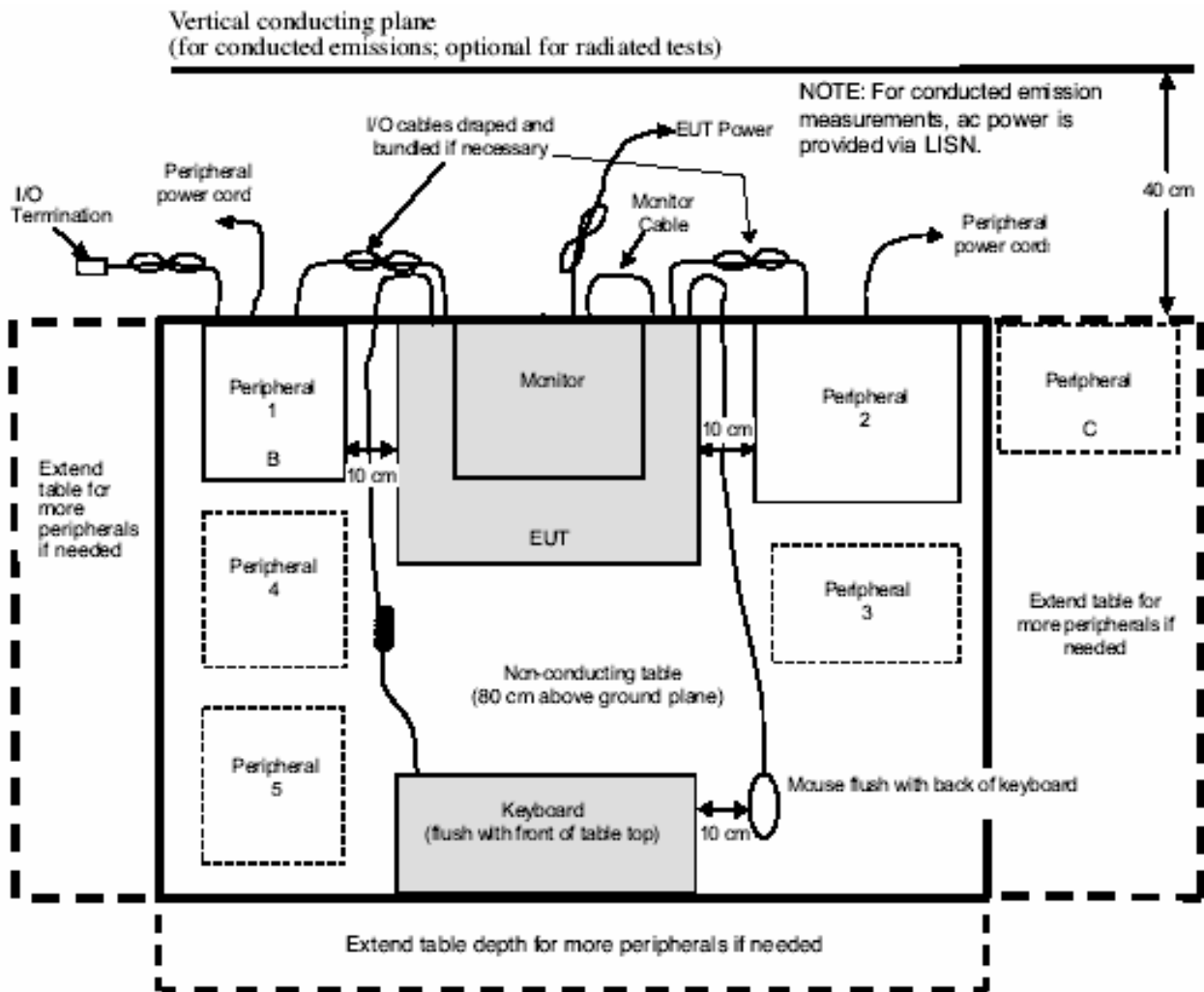
5.2 Test SET-UP (Block Diagram of Configuration)



LEGEND:

- 1) Interconnecting cables that hang closer than 40 cm to the groundplane shall be folded back and forth in the center, forming a bundle 30 to 40 cm long (see 6.1.4 and 11.2.4).
- 2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated if required using the correct terminating impedance. The total length shall not exceed 1 m (see 6.1.4).
- 3) If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the groundplane with the receptacle flush with the groundplane (see 6.1.4).
- 4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use (see 6.2.1.3 and 11.2.4).
- 5) Non-EUT components of EUT system being tested (see also Figure 13).
- 6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop (see 6.2.1.1 and 6.2.1.2).
- 7) No vertical conducting plane used (see 5.2.2).
- 8) Power cords drape to the floor and are routed over to receptacle (see 6.1.4).

Figure 11a—Test arrangement for radiated emissions tabletop equipment



5.3 Measurement Equipment Used:

Description	Manufacturer	Model No.	Serial No.	Cal. Due Date
EMI Test Receiver	ROHDE&SCHWARZ	ESCS 30	828985/004	Sep. 14, 2008
Coaxial Cables	N/A	WK CE Cable	N/A	Nov. 29, 2008
L.I.S.N	Rolf-Heine	NNB-2/16Z	99013	Apr. 29, 2008
L.I.S.N	FCC	FCC-LISN-50/250-25-2-01	04035	Apr. 29, 2008

5.4 Measurement Result:

Test Mode: PC connection mode with telephone connected Test Date: Mar. 28, 2008

Detector Function: Quasi-Peak + Average

Test By: Joker

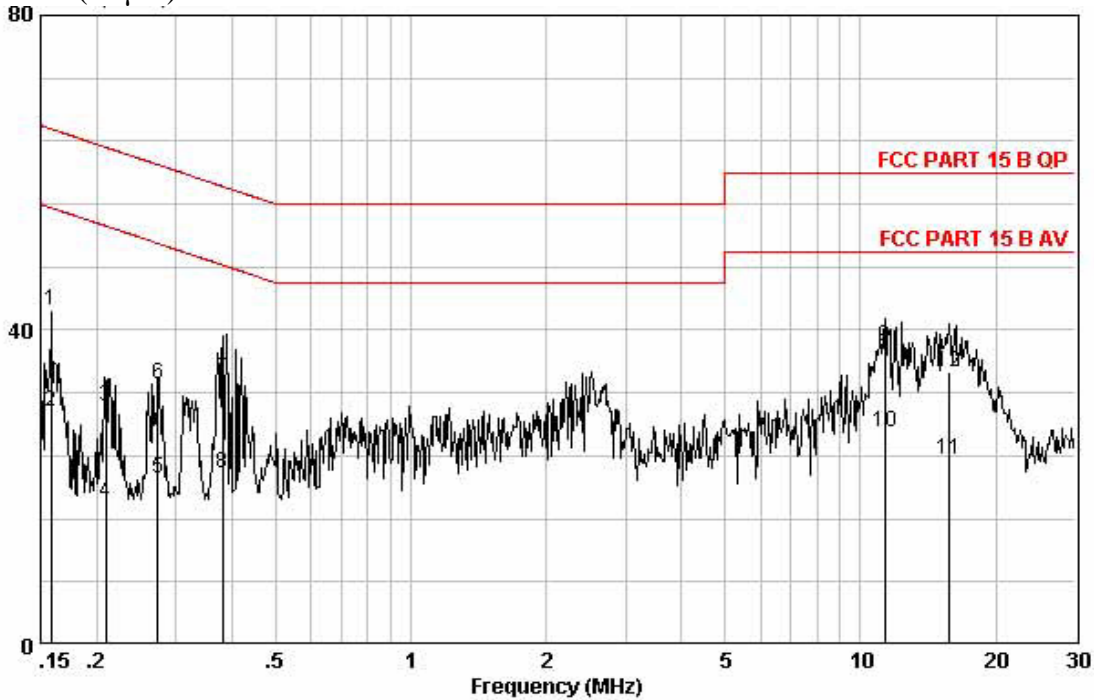
Frequency Range: 150kHz-30MHz

Temperature : 26.0 °C Humidity : 43 %

Line

Peak Scan:

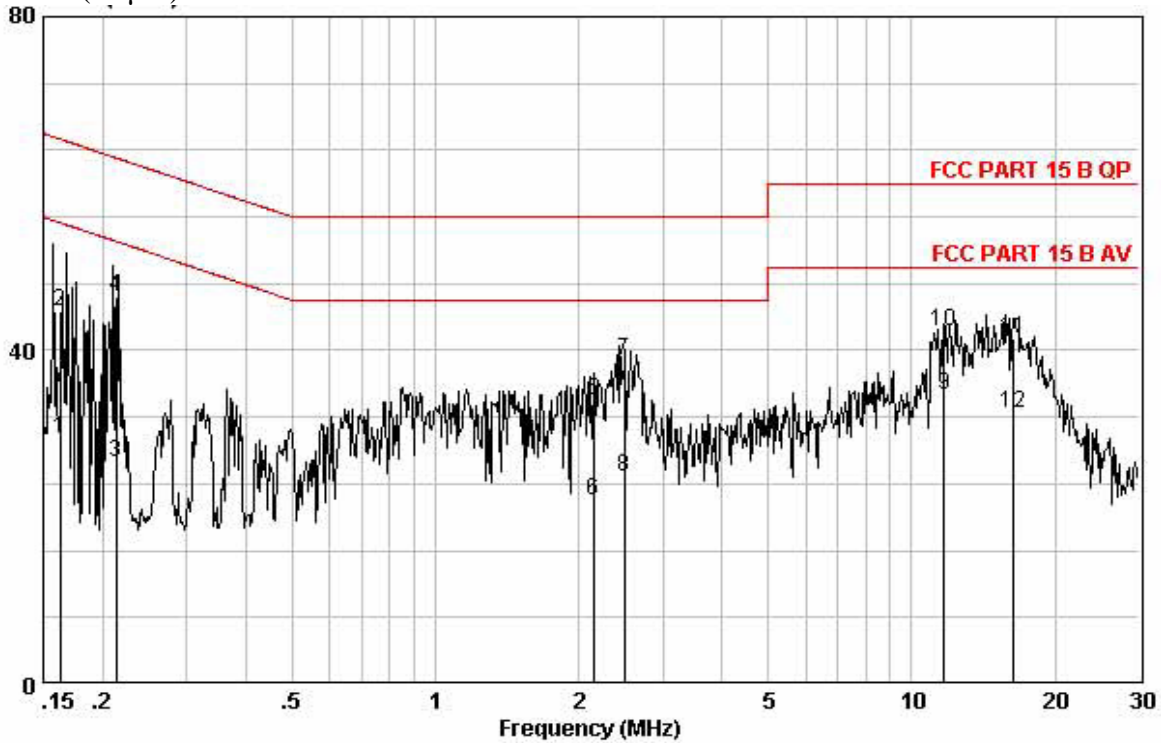
Level (dBμV)



Quasi-peak measurement

Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBμV	dB	dB	dBμV	dBμV	dB	
0.158	32.52	0.00	9.97	42.49	65.56	-23.07	QP
0.158	19.58	0.00	9.97	29.55	55.56	-26.01	AVERAGE
0.209	20.48	0.00	9.86	30.34	63.23	-32.88	QP
0.209	8.32	0.00	9.86	18.18	53.23	-35.04	AVERAGE
0.273	11.34	0.00	9.89	21.23	51.03	-29.80	AVERAGE
0.273	23.32	0.00	9.89	33.21	61.03	-27.82	QP
0.381	23.78	0.00	9.92	33.70	58.25	-24.55	QP
0.381	11.93	0.00	9.92	21.85	48.25	-26.40	AVERAGE
11.317	28.06	0.12	9.79	37.97	60.00	-22.03	QP
11.317	17.06	0.12	9.79	26.97	50.00	-23.03	AVERAGE
15.801	13.49	0.18	9.89	23.56	50.00	-26.44	AVERAGE
15.801	24.60	0.18	9.89	34.67	60.00	-25.33	QP

Neutral :
 Peak Scan:
 Level (dBµV)



Quasi-peak measurement

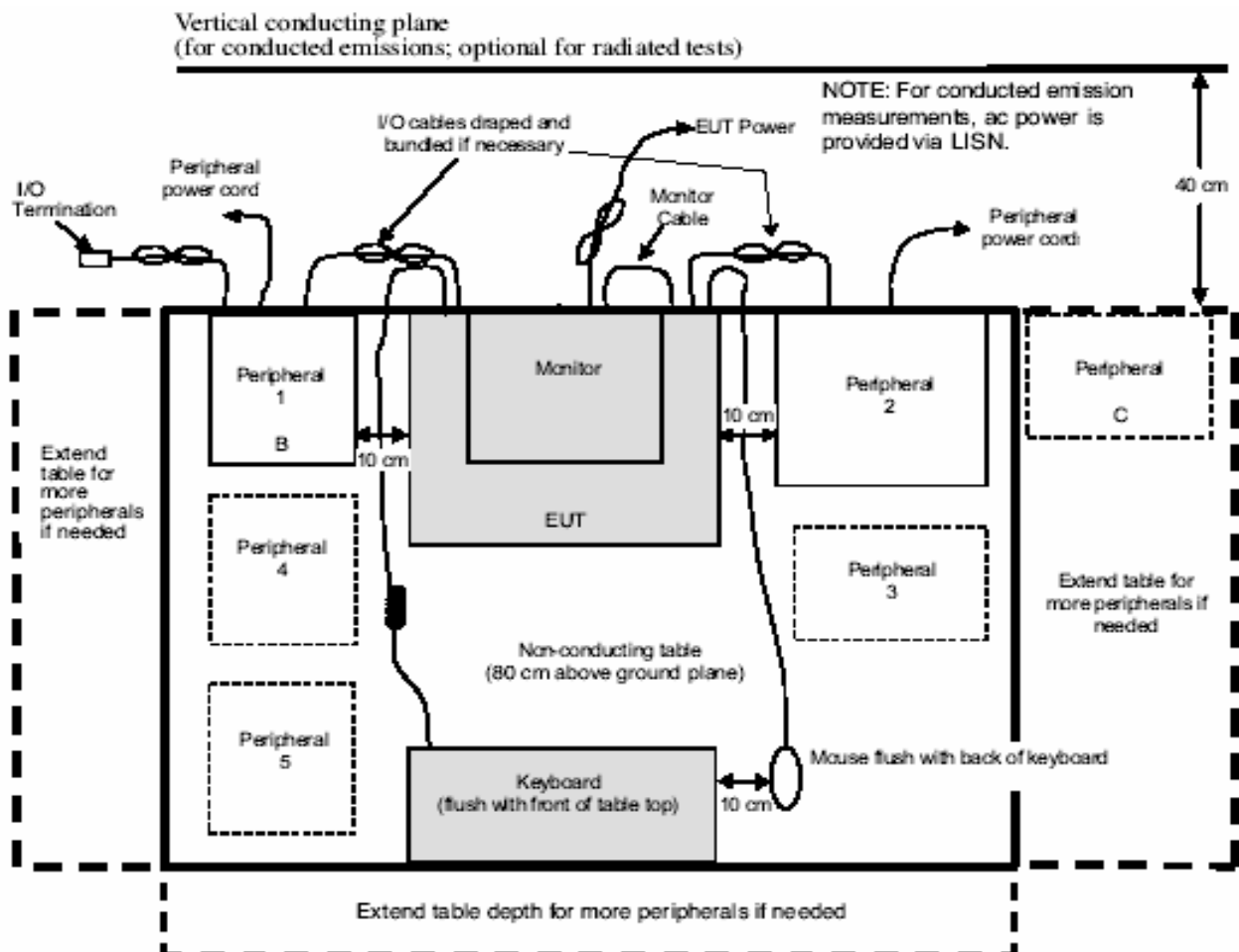
Freq MHz	Read Level dBµV	Cable Loss dB	LISN Factor dB	Level dBµV	Limit Line dBµV	Over Limit dB	Remark
0.163	19.39	0.00	10.06	29.45	55.31	-25.86	AVERAGE
0.163	34.68	0.00	10.06	44.74	65.31	-20.57	QP
0.213	16.81	0.00	9.88	26.69	53.08	-26.39	AVERAGE
0.213	36.54	0.00	9.88	46.42	63.08	-16.66	QP
2.144	24.22	0.03	9.77	34.02	56.00	-21.98	QP
2.144	12.11	0.03	9.77	21.91	46.00	-24.09	AVERAGE
2.487	28.90	0.04	9.76	38.70	56.00	-17.30	QP
2.487	15.12	0.04	9.76	24.92	46.00	-21.08	AVERAGE
11.683	24.72	0.13	9.81	34.66	50.00	-15.34	AVERAGE
11.683	32.42	0.13	9.81	42.36	60.00	-17.64	QP
16.398	31.42	0.18	9.91	41.51	60.00	-18.49	QP
16.398	22.33	0.18	9.91	32.42	50.00	-17.58	AVERAGE

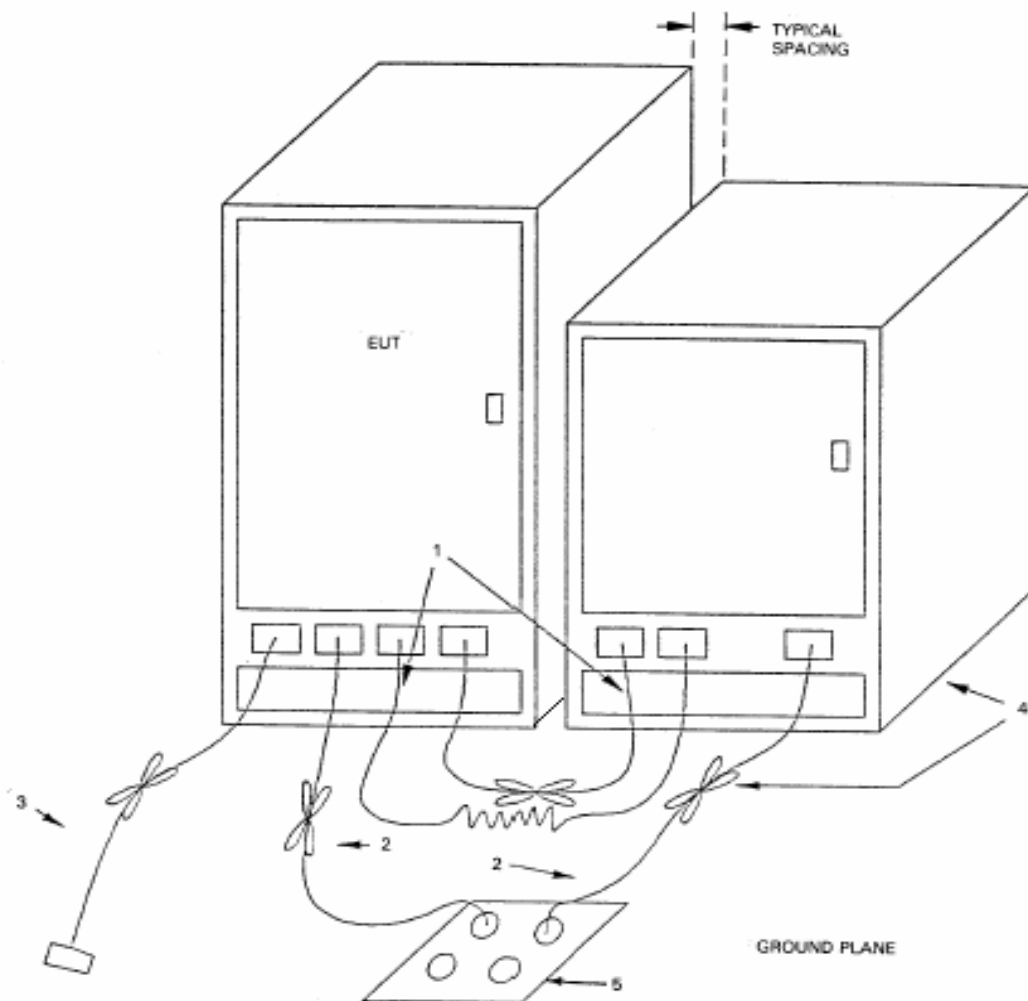
6. Radiated Emission Test

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)



**LEGEND:**

- 1) Excess I/O cables shall be bundled in center. If bundling is not possible, the cables shall be arranged in serpentine fashion. Bundling not to exceed 40 cm in length (see 6.1.4).
- 2) Excess power cords shall be bundled in the center or shortened to appropriate length (see 7.2.1).
- 3) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. If bundling is not possible, the cable shall be arranged in a serpentine fashion (see 6.1.4).
- 4) EUT and all cables shall be insulated, if required, from the groundplane by up to 12 mm of insulating material (see 6.1.4 and 6.2.2).
- 5) If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the groundplane with the receptacle flush with the ground plane (see 5.2.3 and 8.1).

Figure 11b— Test arrangement for radiated emissions floor-standing equipment

6.3 Measurement Equipment Used:

Description	Manufacturer	Model No.	Serial No.	Cal. Due Date
EMI Test Receiver	ROHDE&SCHWARZ	ESCS 30	828985/004	Sep. 14, 2008
Spectrum Analyzer	ROHDE&SCHWARZ	FSP 40	100034	Feb. 22, 2009
Broadband Antenna	SCHWAZBECK	VULB9160	3068	Oct. 28, 2008
RF-Amplifier	Agilent	8447D	1937A02834	Nov. 30, 2008
Antenna Master	HD GmbH	MA240-N	240/657	N/A
Turn Table	HD GmbH	DS420	420/542	N/A
Controller	HD GmbH	HD 100	100/803	N/A
CCD Video Camera System	N/A	VCS-04	N/A	N/A
Color Monitor	N/A	CM-314DH	N/A	N/A

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

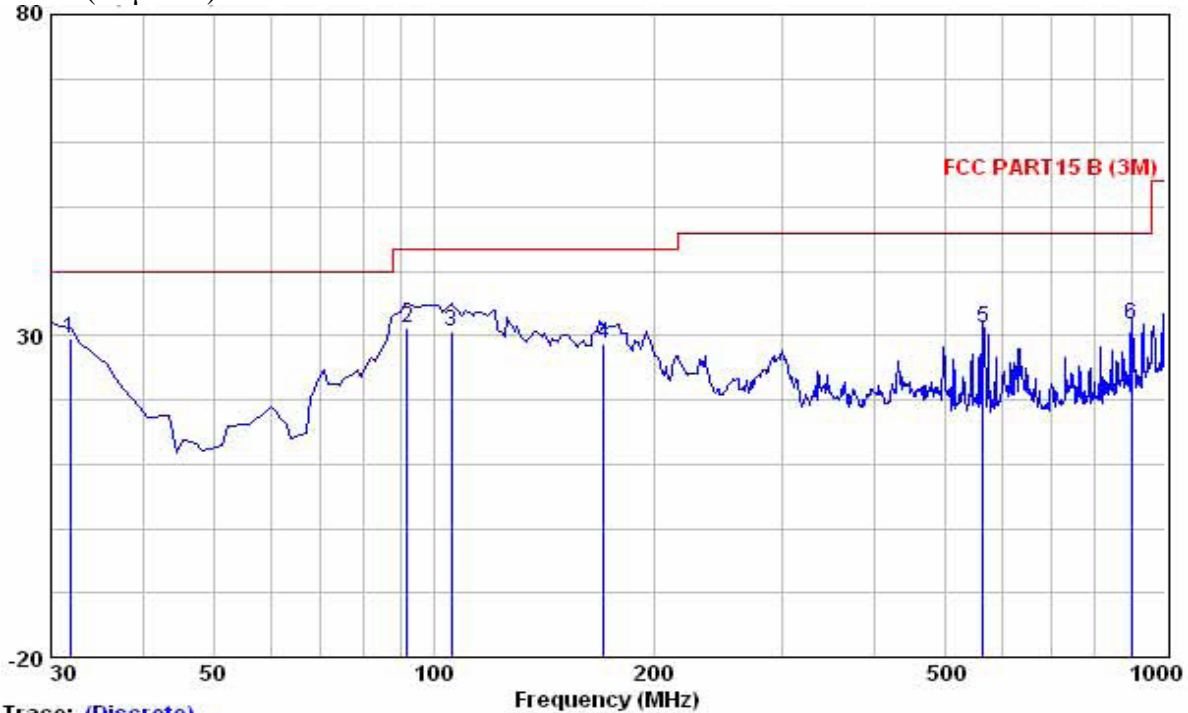
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Test Mode: PC connection mode with telephone connected. Test Date : Mar. 28, 2008
 Detector Function: Quasi-Peak Test By: Joker
 Frequency Range: 30MHz-1000MHz Temperature : 26.0 °C Humidity : 43 %
 Vertical

Peak scan

Level (dBμV/m)



Trace: (Discrete)

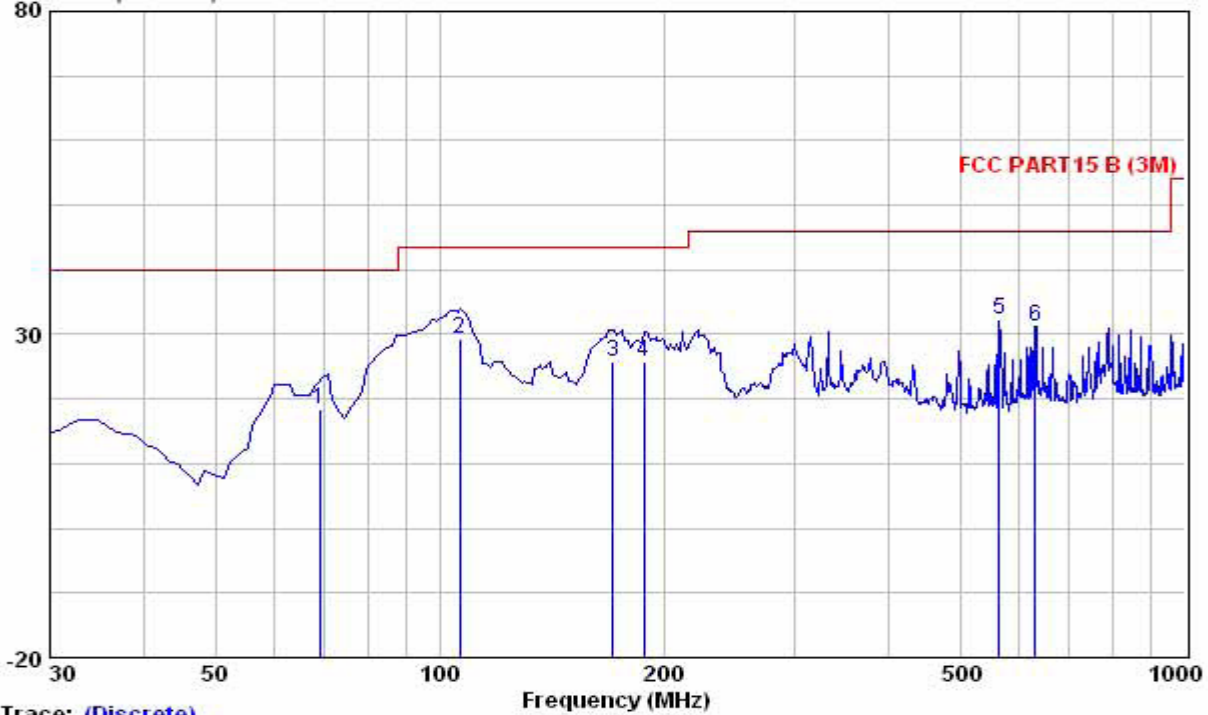
Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBμV	dB/m	dB	dB	dBμV/m	dBμV/m	dB	
31.882	42.97	16.90	0.80	31.20	29.47	40.00	-10.53	QP
92.080	51.87	9.40	1.20	31.20	31.27	43.50	-12.23	QP
105.660	49.66	10.95	1.40	31.20	30.81	43.50	-12.69	QP
170.747	49.07	9.10	1.80	31.11	28.86	43.50	-14.64	QP
564.160	40.58	18.50	3.40	31.14	31.34	46.00	-14.66	QP
899.566	38.24	20.31	4.20	30.90	31.85	46.00	-14.15	QP

Horizontal

Peak scan

Level (dB μ V/m)



Trace: (Discrete)

Quasi-peak measurement

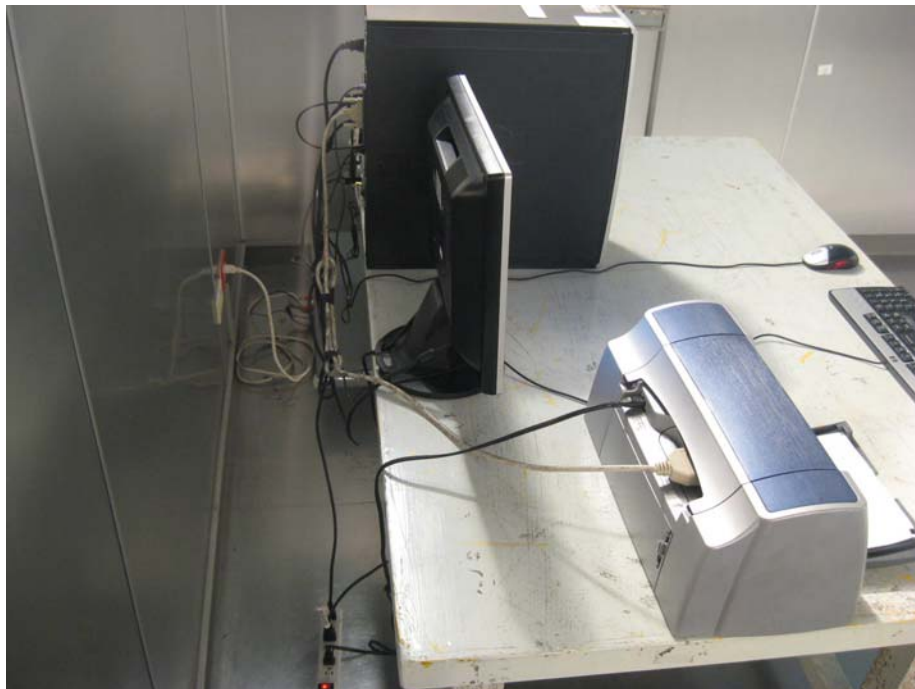
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
69.013	43.35	5.30	1.10	31.20	18.55	40.00	-21.45	QP
106.300	48.01	11.07	1.40	31.20	29.28	43.50	-14.22	QP
170.689	46.00	9.10	1.80	31.11	25.79	43.50	-17.71	QP
188.110	46.60	8.38	1.90	31.13	25.75	43.50	-17.75	QP
564.178	41.42	18.50	3.40	31.14	32.18	46.00	-13.82	QP
630.605	40.40	18.63	3.50	31.30	31.23	46.00	-14.77	QP

Remark :

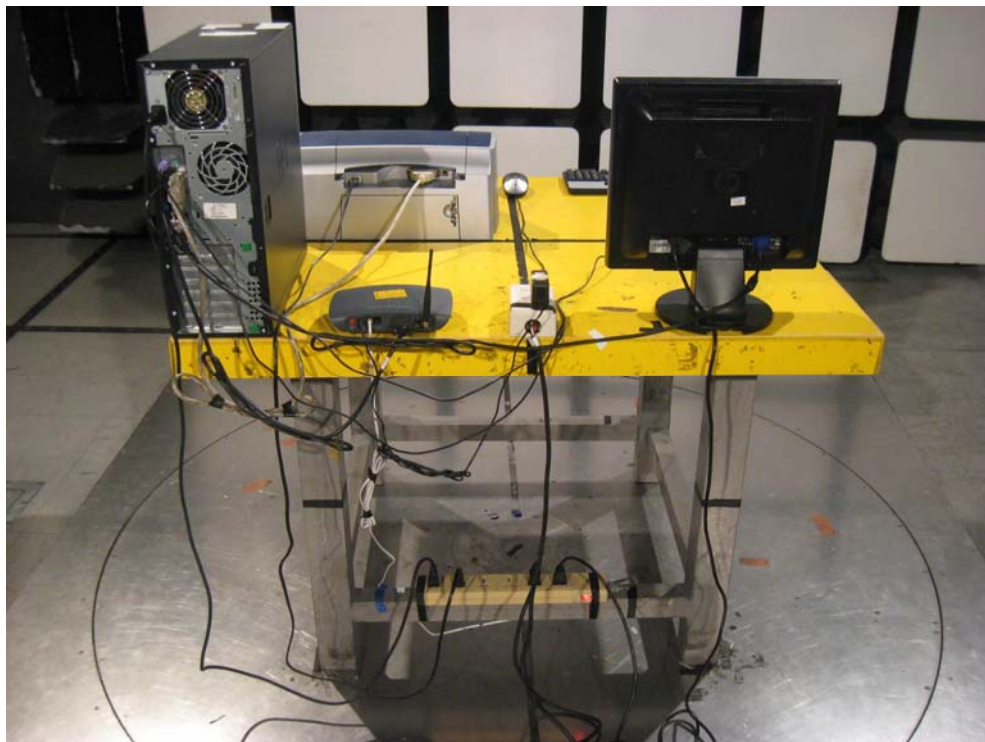
- (1) Measuring frequencies from 30 MHz to the 1000MHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of Receiver 30MHz to 1000MHz was 100KHz.

APPENDIX 1 PHOTOGRAPHS OF SET UP

Conducted Emission Test Setup Photo



Radiated Emission Test Setup Photo



APPENDIX 2 PHOTOGRAPHS OF EUT

Front View of EUT





Back View of EUT





Internal of EUT – 1



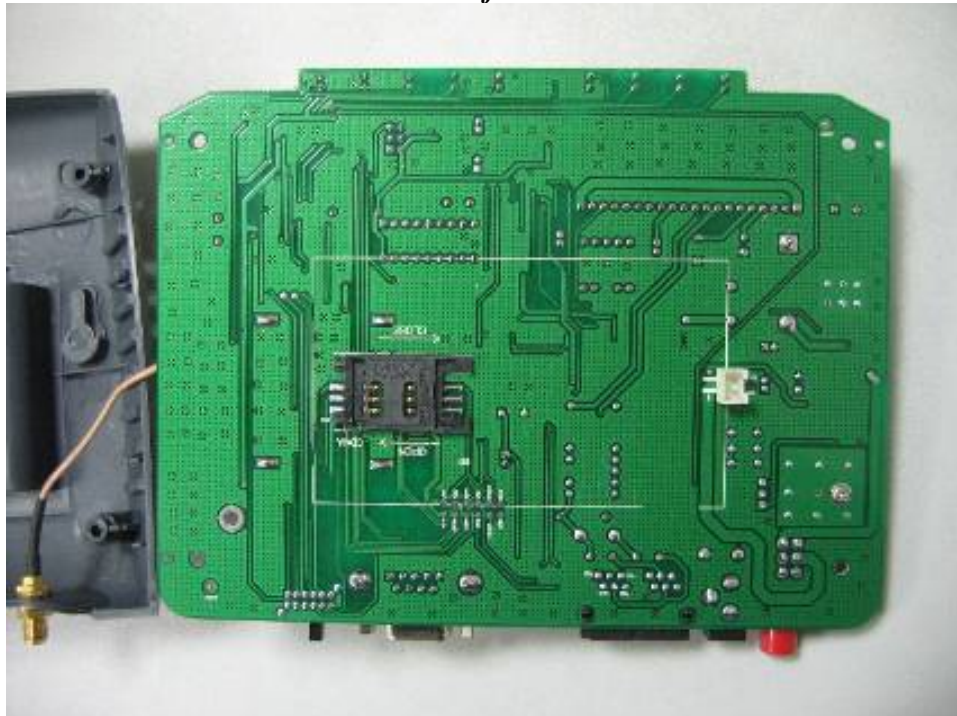
Internal of EUT – 2



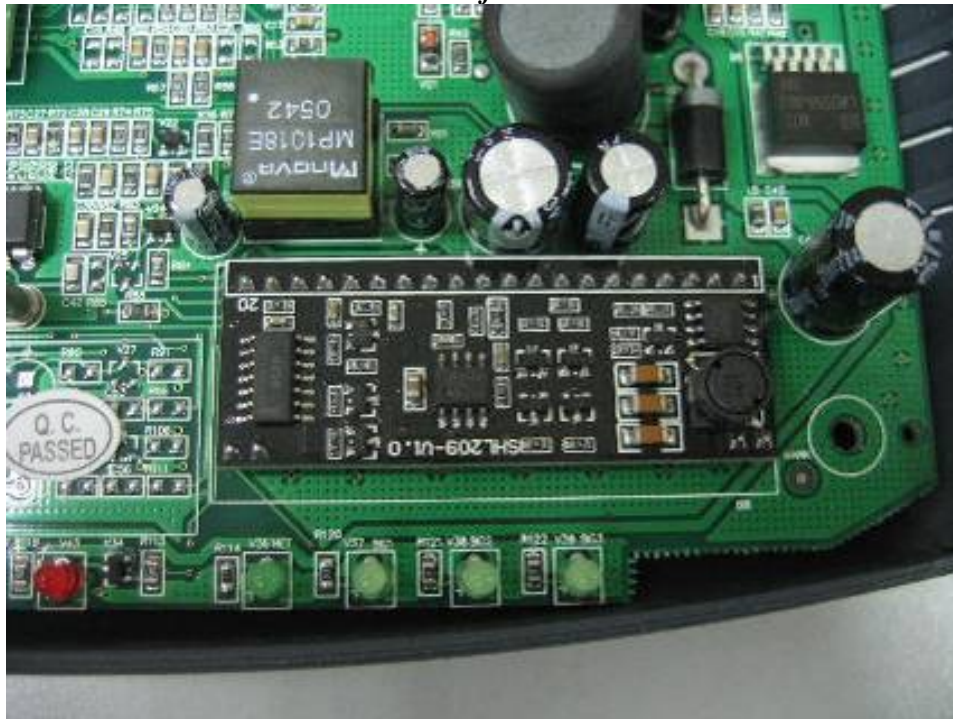
Internal of EUT - 3



Internal of EUT - 4



Internal of EUT – 5



Internal of EUT – 6



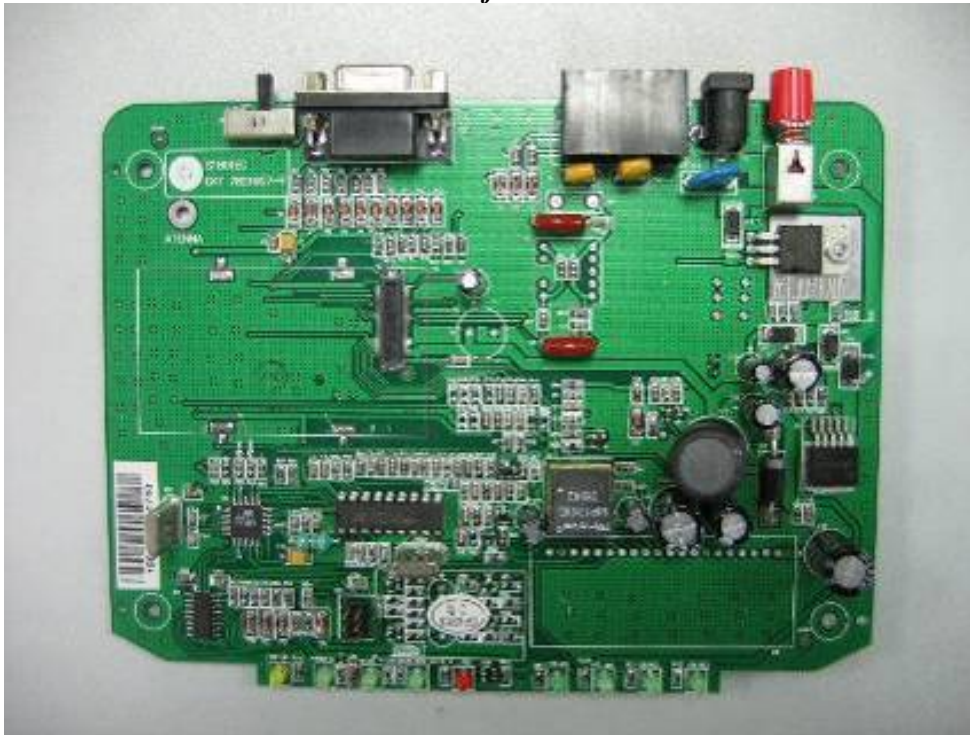
Internal of EUT – 7



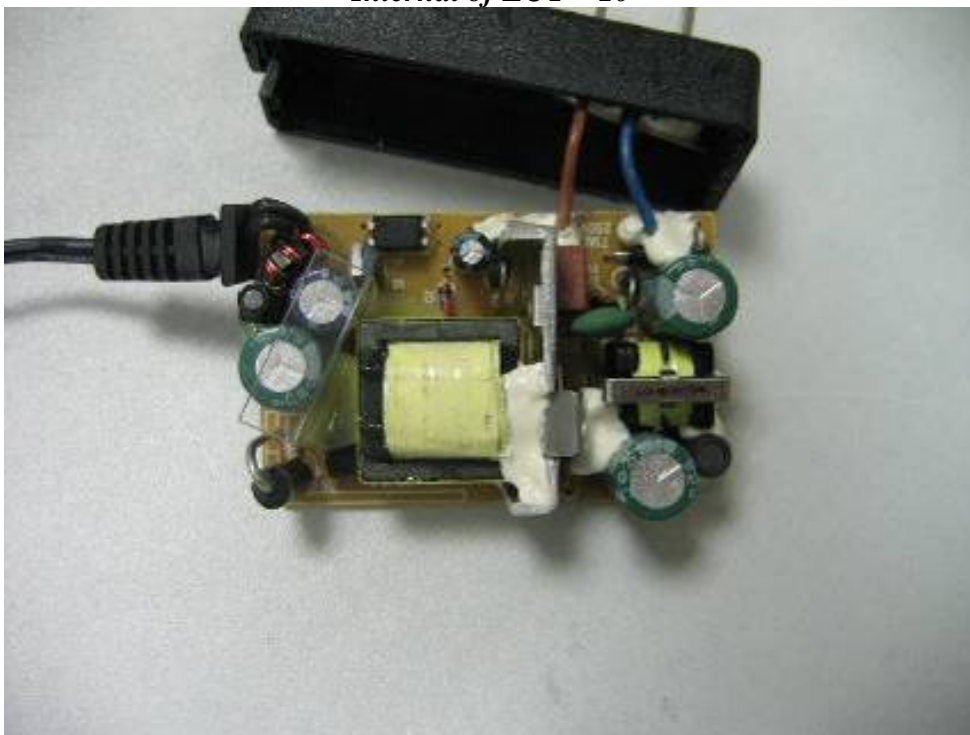
Internal of EUT – 8



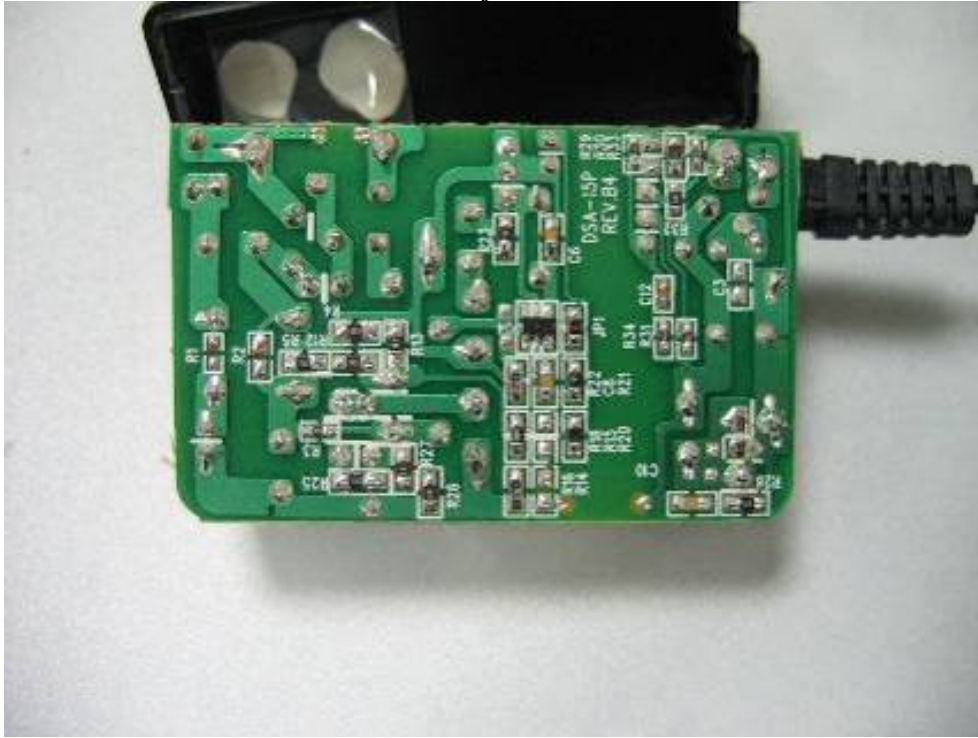
Internal of EUT - 9



Internal of EUT - 10



Internal of EUT - 11



APPENDIX 3 LABELING REQUIREMENTS

§15.19 Labeling requirements.

(a) In addition to the requirements in part 2of this chapter, a device subject to certification, or verification, or verification shall be labeled as follows:

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90,etc., shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with the part15of the FCC Rules for use with cable television service.

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

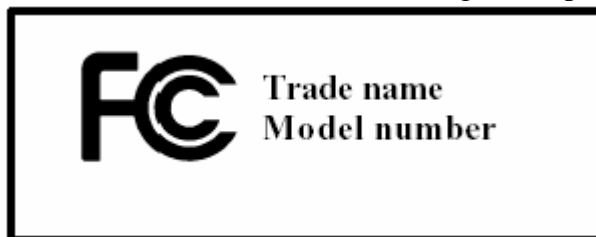
- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it , the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

(b) Products subject to authorization under a Declaration of Conformity shall be labeled as follows:

- (1) The label shall be located in a conspicuous location on the device and shall contain the unique identification described in §2.1074of this chapter and the following logo:

- (i) If the product is authorized based on testing of the product or system; or



- (ii) If a personal computer is authorized based on assembly using separately authorized components, in accordance with §15.101(c) (2) or (c)(3), and the resulting product is not separately tested:



- (2) Label text information should be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and the label. However, the type size for the text is not required to be larger than eight points.
- (3) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (b)(1) of this section on it, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instruction manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.
- (4) The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as described in §2.925(d) of this chapter. "Permanently affixed" means that the label is etched, engraved, stamped, silk screen, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.