

 ESTECH Co., Ltd. Rm 1015, World Venture Center II, 426-5 Gasan-dong, Guncheon-gu, Seoul, 158-803, Korea	   	Electromagnetic Interference Test Report
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Test Report for FCC

FCC ID:TKWBEPHTC

Report Number		ESTF150904-013			
Applicant	Company name	Suprema Inc.			
	Address	16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea			
	Telephone	82-31-783-4505			
Product	Product name	BioEntry Plus			
	Model No.	BEPH-TC	Manufacturer	Suprema Inc.	
	Serial No.	NONE	Country of origin	KOREA	
Test date	2009-04-22		Date of issue	27-Apr-09	
Testing location	ESTECH. Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea				
Standard	FCC PART 15 2007 , ANSI C 63.4 2003				
Test item	☒ Conducted Emission	☐ Class A	☒ Class B	Test result	OK
	☒ Radiated Emission	☐ Class A	☒ Class B	Test result	OK
Measurement facility registration number		94696			
Tested by	Senior Engineer J.H.Kim 				
Reviewed by	Engineering Manager J.M.Yang 				
Abbreviation	OK, Pass = Passed, Fail = Failed, N/A = not applicable				
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned					

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report.

ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co. Ltd

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea
(Safety & Telecom. Test Lab)

EMC Test Lab : 58-1 Osan-Ri, GaNam-Myon, Yeoju-Gun, KyungKi-Do, Korea
97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Product Name : BioEntry Plus
 Model Number : BEPH - TC
 Serial Number : NONE
 Manufacturer : Suprema Inc.
 Country of origin : KOREA
 Rating : Adapter AC input (100-240)Va.c.,1.0A, (50-60)Hz,DC output 12Vd.c., 2.5A
 Receipt Date : 24 - Mar - 09
 X-tal lists : 25MHz x 2ea

2.2 General descriptions of EUT

Item	Specification
CPU	400MHz DSP
Fingerprint Sensor	OC Model : Optical Sensor TC Model : Capacitive Sensor
IN/OUT	Relay Out x 1, Switch Input x 2, Wiegand In/Out x 1 RS-485 x 1, Ethernet x 1
Power Input Rate	DC12V, Max 250mA
Support Cards	BioEntry Plus OC/TC Model (BEPL-OC/TC) : - 125KHz EM4100 Compatible Card Read BioEntry Plus HID OC/TC Model (BEPH-OC/TC) - 125KHz HID Prox Compatible Card Read BioEntry Plus Mifare OC/TC Model (BEPM-OC/TC) - 13.56MHz Mifare Card Read/Write - 13.56MHz ISO14443A Card CSN Read
Size	50 x 160 x 38 (Width x Height x Depth)
Certified	KCC, CE, FCC

3. Test Standards

Test Standard : FCC PART 15 (2007)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2003)

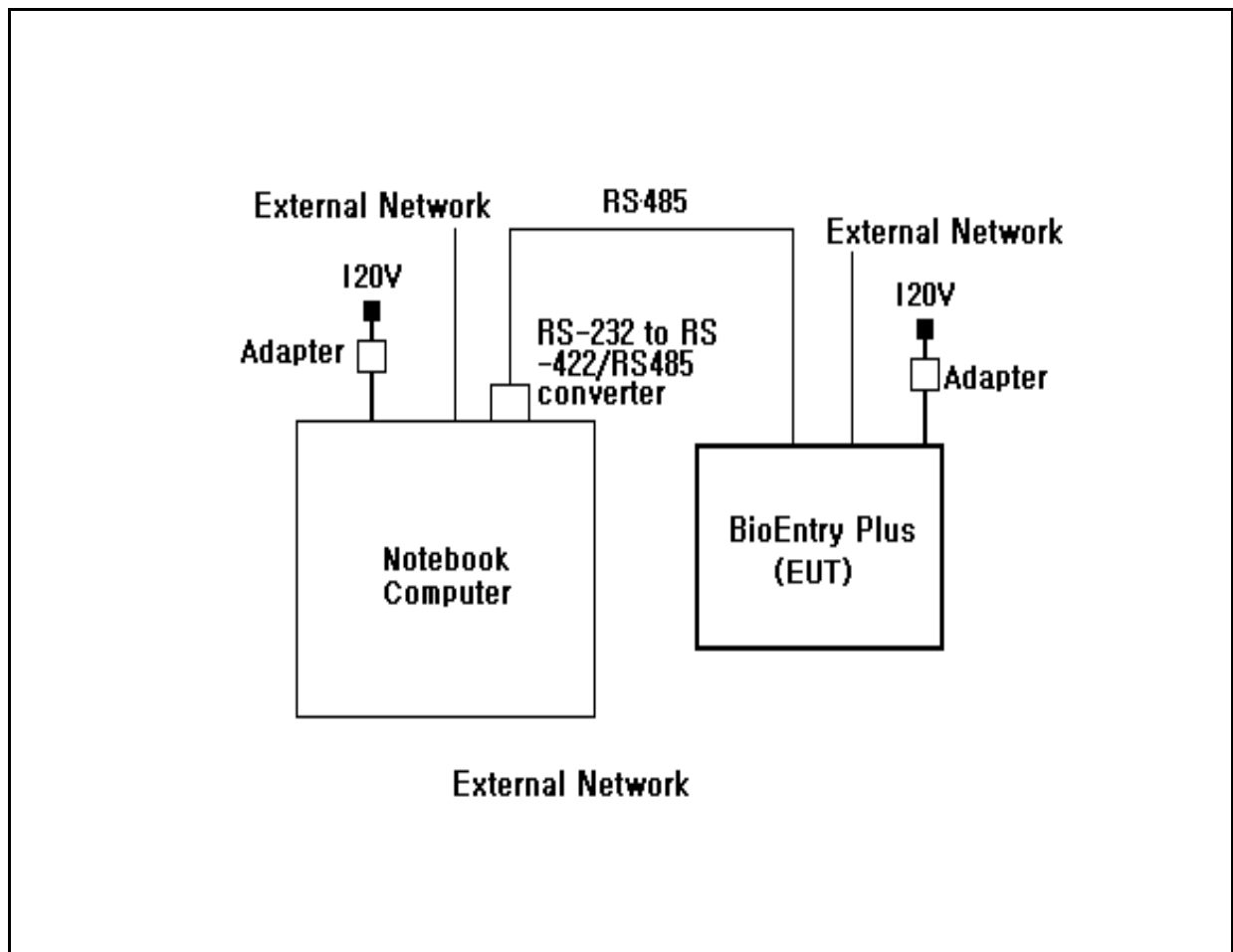
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

4. Measurement Condition

4.1 EUT Operation.

1. Check to normal mode operation
2. The operational conditions of the EUT was determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission.
3. Connect fingerprint system to Note PC, Local Lan
4. Put hand to fingerprint system and check action availability from Note PC.
5. Check fingerprint system under continuous sending and receiving packet data between external network.

4.2 Configuration and Peripherals



4.3 EUT and Support equipment

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
BioEntry Plus	BEPH-TC	NONE	Suprema Inc.	EUT
Adapter	JPW128	NONE	AULT KOREA Corp.	
Notebook Computer	PPT	326-30BH	Dell Asia Pacific Sdn.	
Adapter	PA-1650-05DK	71615-52P-0475	Dongguang Lite Power 2nd Plant	
RS-232 to RS-422/RS485 converter	TCC-80	NH0400488	Moxa Technologies Co.,Ltd.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
BioEntry Plus	LAN	External Network	LAN	20	No	
BioEntry Plus	RS485	RS-232 to RS-422/RS485 converter	RS-485	4	Yes	
BioEntry Plus	POWER	Adapter	-	2	No	
Notebook Computer	LAN	External Network	LAN	20	No	
Notebook Computer	POWER	Adapter	-	2	No	
RS-232 to RS-422/RS485 converter	Serial	Notebook Computer	Serial	-	-	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & ANSI C 63.4 (2003) on an open test site, which allows a 3m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receive	ESVS10	Rohde & Schwarz	838562/002	2010. 1. 29
Spectrum Analyzer	R3273	ADVANTEST	110600592	2009. 6. 09
LogBicon Antenna	VULB 9160	Schwarzbeck	3142	2009. 5. 15
Amplifier	8447F	HP	2805A02972	2009. 6. 26
Turn Table	2087	EMCO	2129	-
Antenna Mast	2070-01	EMCO	9702-203	-
ANT Mast Controller	2090	EMCO	1535	-
Turn Table Controller	2090	EMCO	1535	-

5.2 Environmental Condition

Test Place : Open site(3m)
 Temperature (°C) : 17 °C
 Humidity (%) : 43 %

5.3 Test data

Test Date : 22-Apr-09

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
66.86	10.20	V	1.0	10.36	1.3	40.0	21.82	-18.18
110.36	8.60	H	4.0	10.26	1.6	43.5	20.48	-23.02
113.25	14.30	V	1.0	10.54	1.7	43.5	26.50	-17.00
139.12	9.60	V	1.0	12.70	2.0	43.5	24.28	-19.22
164.14	9.70	V	1.0	12.39	2.1	43.5	24.20	-19.30
177.44	8.00	V	1.0	11.30	2.2	43.5	21.49	-22.01
224.00	20.10	V	1.0	10.50	2.6	46.0	33.16	-12.84
255.21	13.40	H	1.5	11.56	2.8	46.0	27.78	-18.22
258.82	20.20	H	1.0	11.67	2.8	46.0	34.71	-11.29
267.84	11.40	H	1.0	11.95	3.0	46.0	26.32	-19.68
299.97	13.10	H	1.2	12.95	3.2	46.0	29.23	-16.77
343.73	12.60	H	1.1	13.87	3.6	46.0	30.09	-15.91
359.80	14.80	H	1.1	14.22	3.7	46.0	32.71	-13.29
388.20	17.10	V	1.0	14.87	3.9	46.0	35.89	-10.11
500.05	14.20	V	1.2	17.10	4.8	46.0	36.05	-9.95
600.05	16.10	V	1.2	19.44	5.5	46.0	41.00	-5.00
Remark		H : Horizontal, V : Vertical *There is no detected Radiated Emission above 1GHz *CL = Cable Loss-Amplifier Gain(In case of above1000MHz) *CL = Cable Loss(In case of below1000MHz) *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120KHz for Quasi-peak detection at frequency below 1GHz. *The resolution bandwidth and video bandwidth of spectrum analyzer is 1MHz and 10Hz for average detection at frequency above 1GHz.						

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 to 30 MHz was measured in accordance to FCC Part 15 (2007) & ANSI C 63.4 (2003). The test setup was made according to FCC Part 15 (2007) & ANSI C 63.4 (2003) in a shielded Room. The EUT was placed on a non-conductive table at least 80 above the ground plan. A grounded vertical reference plane was positioned in a distance of 40cm from the EUT. The distance from the EUT to other metal surfaces was at least 0.8m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0m.. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
LISN	ESH3-Z5	Schwarzbeck	838979/010	2010. 2. 21
LISN	NNLA8120A	Schwarzbeck	8120161	2010. 2. 21
TEST Receiver	ESPI7	Rohde & Schwarz	100185	2009. 8. 27
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	-

6.2 Environmental Condition

Test Place : Shielded Room
 Temperature (°C) : 23 °C
 Humidity (%) : 42 %

6.3 Test data

Test Date : 22-Apr-09

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dBμV)	Reading (dBμV)	Result (dBμV)	Limit (dBμV)	Reading (dBμV)	Result (dB)
0.20	0.09	0.2	N	63.65	39.30	39.62	53.65	33.51	33.83
0.26	0.09	0.2	N	61.30	35.67	35.99	51.30	29.16	29.48
0.27	0.09	0.2	H	61.27	32.19	32.51	51.27	26.11	26.43
0.33	0.09	0.2	N	59.48	31.58	31.92	49.48	25.23	25.57
0.39	0.09	0.3	H	57.98	29.79	30.18	47.98	24.55	24.94
0.46	0.10	0.3	H	56.66	31.93	32.36	46.66	25.44	25.87
0.53	0.10	0.4	N	56.00	34.05	34.51	46.00	26.83	27.29
0.59	0.10	0.4	H	56.00	35.92	36.40	46.00	30.09	30.57
0.60	0.10	0.4	N	56.00	35.84	36.32	46.00	30.01	30.49
0.66	0.11	0.4	N	56.00	39.80	40.29	46.00	33.90	34.39
0.79	0.11	0.4	H	56.00	33.26	33.77	46.00	26.72	27.23
1.52	0.13	0.5	H	56.00	33.53	34.12	46.00	26.17	26.76
6.65	0.30	0.7	N	60.00	34.55	35.58	50.00	29.31	30.34
7.77	0.32	0.8	H	60.00	37.65	38.77	50.00	30.53	31.65
8.63	0.34	0.8	H	60.00	38.28	39.45	50.00	34.12	35.29
8.82	0.34	0.8	N	60.00	37.34	38.52	50.00	31.00	32.18
9.15	0.35	0.9	N	60.00	36.53	37.73	50.00	30.37	31.57
9.28	0.35	0.9	H	60.00	37.12	38.33	50.00	28.32	29.53
Remark	H : Hot Line, N : Neutral Line								

7. Photographs of test setup

7.1 Setup for Radiated Test : 30 ~ 2000 MHz

[Front]



[Rear]



7.2 Setup for Conducted Test : 0.15 ~ 30 MHz

[Front]



[Rear]



8. Photographs of EUT

[Front]



[Rear]



8.1 Photographs of EUT

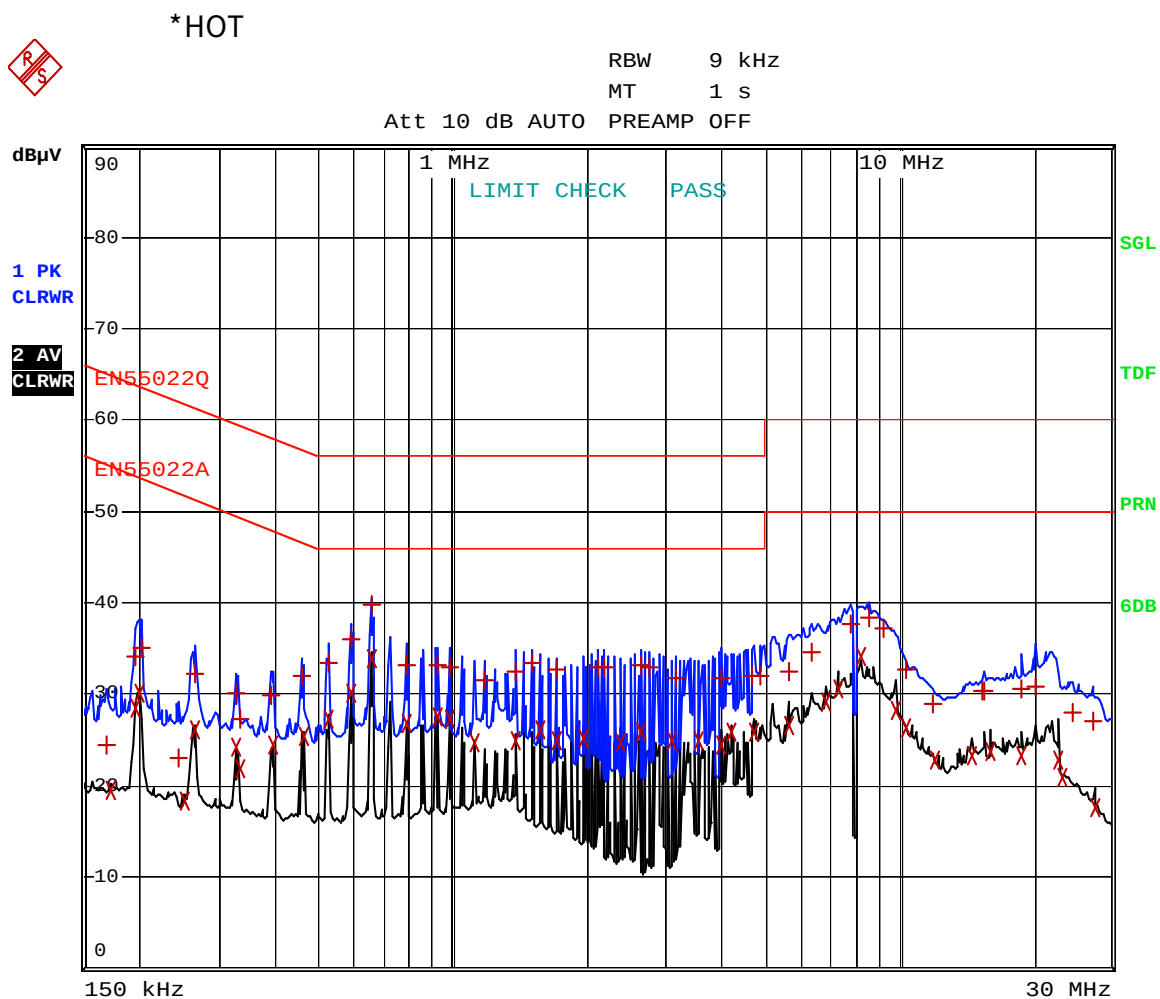
[Front]



[Label]



Appendix 1. Spectral diagram



Comment: BEPH-TC_HOT

Date: 23.APR.2009 16:22:31

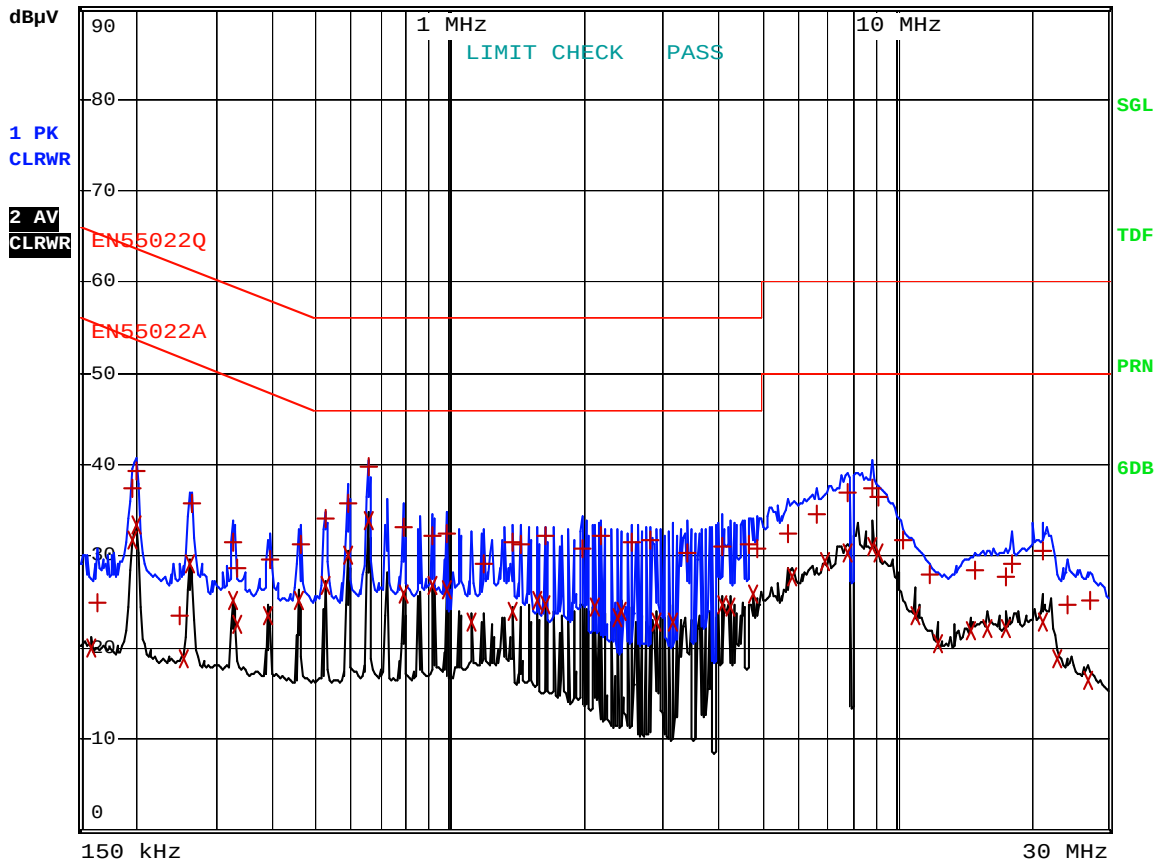
*NEUTRAL



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Comment: BEPH-TC_NEUTRAL

Date: 23.APR.2009 16:18:06

Appendix 2. Photographs of EUT in side PCB

