

Date: 2003-12-18

TEST REPORT

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No.: HM112057

FCC PART 15 SUBPART C CERTIFICATION REPORT

FOR LOW POWER TRANSMITTER

TEST REPORT No.: HM112057

Equipment Under Test [EUT]:

Wireless System for POS and Kitchen
Printer

Model Number:

RFI-001-P-US

Applicant:

RFI Technology Company Ltd.

FCC ID :

RPH-RFI-001

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List of Measurement Equipment

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CONCLUSION

The submitted product was deemed to have 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.

Verified by
Ivan Toa

K C Lee
for Chief Executive

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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 **Applicant**

RFI Technology Company Limited.
Flat B1, 6/F., Block B, Yee Lim Industrial Centre,
2-28 Kwai Lok Street, Kwai Chung, N.T., Hong Kong.

HKSTC Code Number for Applicant

RFT001

Manufacturer

RFI Technology Company Limited.
Flat B1, 6/F., Block B, Yee Lim Industrial Centre,
2-28 Kwai Lok Street, Kwai Chung, N.T., Hong Kong.

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1.3 Equipment Under Test [EUT]

Description of Sample

Product: Wireless System for POS and Kitchen Printer
Manufacturer: RFI Technology Company Ltd.
Brand Name: N/A
Model Number: RFI-001-P-US
Input Voltage: 5Vd.c. 100mA

The AC/DC Adaptor used for the tests was provided by the applicant.
Model: 0500100DB, Input: 230VAC 50Hz, Output: 5.0VDC 100mA

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a RFI Technology Company Ltd., Wireless System for POS and Kitchen Printer. The transmitter is a 2 button transmitter. The EUT continues to transmit while button is being pressed, Modulation by IC. and tape is pulses modulation.

1.4 Date of Order

2003-11-05

1.5 Submitted Sample(s):

4 Samples per model

1.6 Test Duration

2003-12-02

1.7 Country of Origin

China

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1.8 Additional Information of EUT

	Submitted	Not Available
User Manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Part List	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Circuit Diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Printed Circuit Board [PCB] Layout	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Block diagram	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC ID Label	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4:2000 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	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.249	ANSI C63.4:2000	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions, 30MHz to 18GHz	FCC 47CFR 15.109	ANSI C63.4:2000	Class B	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2000	Class B	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Note: N/A - Not Applicable

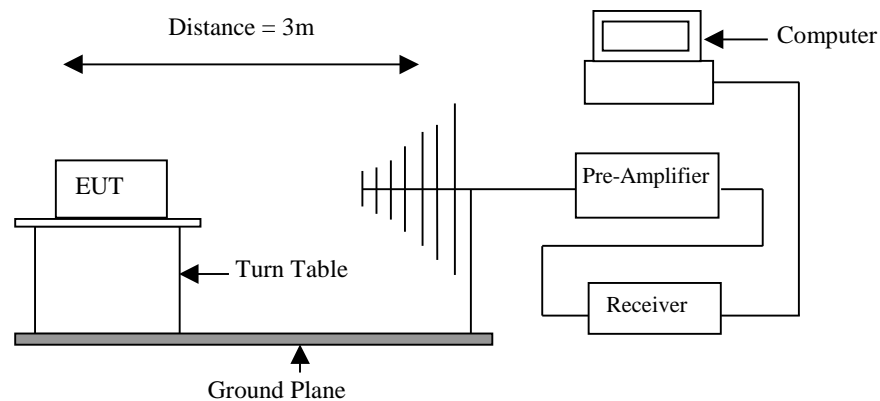
3.0 Test Results**3.1 Emission****3.1.1 Radiated Emissions (30 – 18GHz)**

Test Requirement:	FCC 47CFR 15.109 Class A
Test Method:	ANSI C63.4: 2000
Test Date:	2003-12-02
Mode of Operation:	On mode

Test Method:

The sample was placed 0.8m above the ground plane on the OATS *. Measurements in both horizontal and vertical 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 emissions worst-case 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.

Test Setup:

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

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Millivolts/meter]	Field Strength of Fundamental Emission [microvolts/meter]
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-22500	250	2500

Results:

Field Strength of Fundamental Emissions						
Peak Detection						
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
916.70	56.2	30.3	86.5	21134.9	50,000	Horizontal

Field Strength of Spurious Emissions						
Average Detection						
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
1833.40	No Emission Detected Within 20dB of the FCC Limit				500	Vertical
+ 2750.10					500	Vertical
+ 3666.80					500	Vertical
+ 4583.50					500	Vertical
5500.20					500	Vertical
6416.90					500	Vertical
+ 7333.60					500	Vertical
+ 8250.30					500	Vertical
+ 9167.00					500	Vertical

Remarks:

+: 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 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±5.7dB
1GHz to 18GHz ±6.0dB

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

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Millivolts/meter]	Field Strength of Fundamental Emission [microvolts/meter]
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-22500	250	2500

Results:

Field Strength of Fundamental Emissions						
Peak Detection						
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
916.07	55.5	30.3	85.8	19498.4	50,000	Horizontal

Field Strength of Spurious Emissions						
Average Detection						
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
1832.14	No Emission Detected Within 20dB of the FCC Limit				500	Vertical
+ 2748.21					500	Vertical
+ 3664.28					500	Vertical
+ 4580.35					500	Vertical
5496.42					500	Vertical
6412.49					500	Vertical
+ 7328.56					500	Vertical
+ 8244.63					500	Vertical
+ 9160.70					500	Vertical

Remarks:

+: 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 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±5.7dB
1GHz to 18GHz ±6.0dB

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

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Millivolts/meter]	Field Strength of Fundamental Emission [microvolts/meter]
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-22500	250	2500

Results:

Field Strength of Fundamental Emissions						
Peak Detection						
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
915.40	55.8	30.3	86.1	20183.7	50,000	Horizontal

Field Strength of Spurious Emissions						
Average Detection						
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
1830.80	No Emission Detected Within 20dB of the FCC Limit				500	Vertical
+ 2746.20					500	Vertical
+ 3661.60					500	Vertical
+ 4577.00					500	Vertical
5492.40					500	Vertical
6407.80					500	Vertical
+ 7323.20					500	Vertical
+ 8238.60					500	Vertical
+ 9154.00					500	Vertical

Remarks:

+: 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 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±5.7dB
1GHz to 18GHz ±6.0dB

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

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Millivolts/meter]	Field Strength of Fundamental Emission [microvolts/meter]
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-22500	250	2500

Results:

Field Strength of Fundamental Emissions						
Peak Detection						
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
914.70	55.6	30.3	85.9	19724.2	50,000	Horizontal

Field Strength of Spurious Emissions						
Average Detection						
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
1829.40	No Emission Detected Within 20dB of the FCC Limit				500	Vertical
+ 2744.10					500	Vertical
+ 3658.80					500	Vertical
+ 4573.50					500	Vertical
5488.20					500	Vertical
6402.90					500	Vertical
+ 7317.60					500	Vertical
+ 8232.30					500	Vertical
+ 9147.00					500	Vertical

Remarks:

+: 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 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±5.7dB
1GHz to 18GHz ±6.0dB

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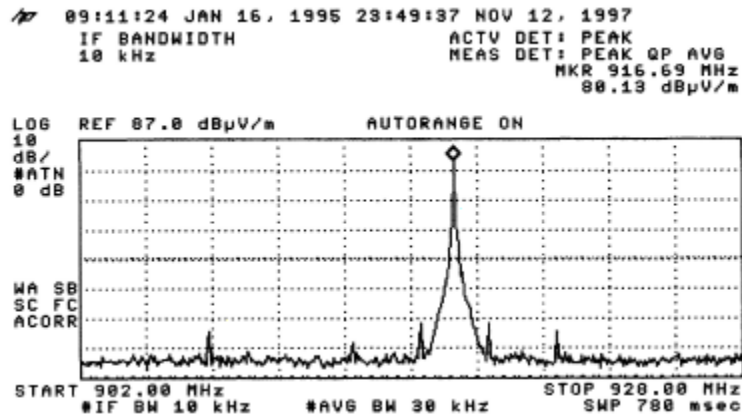
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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.249]:

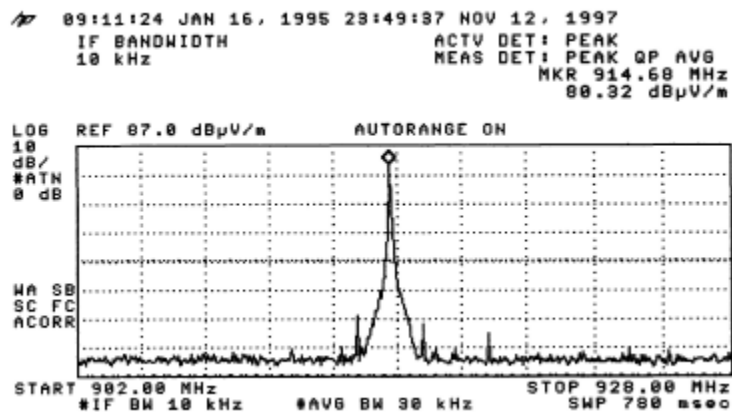
Frequency Range of
Fundamental
[MHz]

914.7-916.7

Upper Frequency of Fundamental



Lower Frequency of Fundamental



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Limits for Radiated Emissions [FCC 47 CFR 15.109 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V}/\text{m}$]
30-88	100
88-216	150
216-960	200
Above 960	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					
Emission Frequency MHz	E-Field Polarity	Level @3m $\text{dB}\mu\text{V}/\text{m}$	Limit @3m $\text{dB}\mu\text{V}/\text{m}$	Level @3m @3m $\mu\text{V}/\text{m}$	Limit @3m $\mu\text{V}/\text{m}$
NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS.					

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 1GHz $\pm 5.7\text{dB}$

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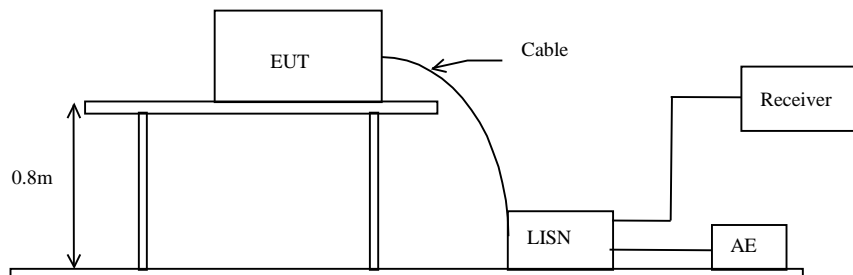
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2000
Test Date:	2003-12-02
Mode of Operation:	On mode

Test Method:

The test was performed in accordance with ANSI C63.4:2000, with the following: an initial measurement was performed in peak and average detection mode on the live line. Any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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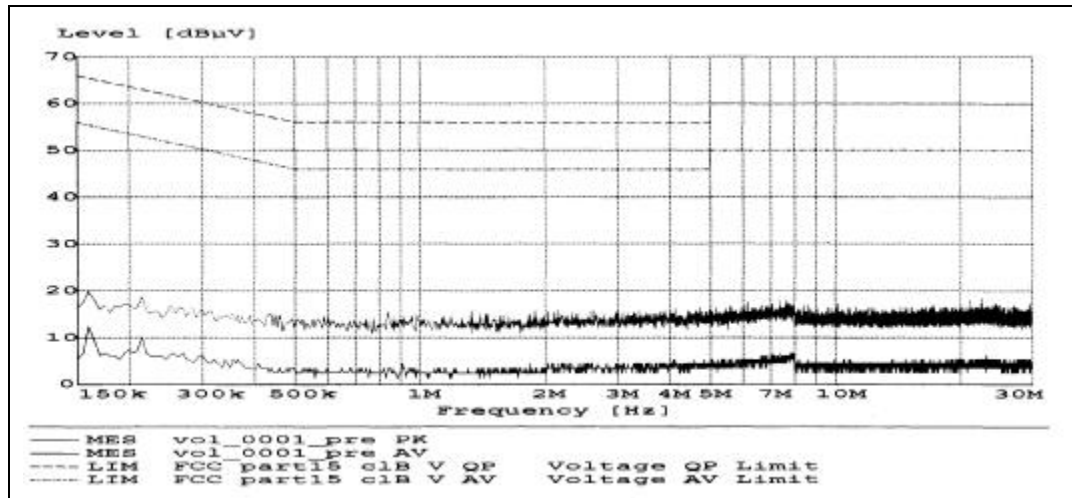
Limits for Conducted Emissions (FCC 47 CFR 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
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 labelled as (QP and AV).

Results: On Mode



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
NO EMISSION DETECTED WITHIN 20dB OF THE FCC LIMITS.					

Remarks:

Calculated measurement uncertainty: ± 3.9 dB

-*- Emission greater than 30dB below limit line.

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Appendix A

Test Equipment Audit

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	14/03/03
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	14/03/03
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	14/03/03
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	14/03/03
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	14/03/03
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	14/03/03
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM020	HORN ANTENNA	EMCO	3115	4032	19/07/00
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	04/08/00
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	08/11/02
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	18/12/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	02/08/03
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	14/05/02
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A

Conducted Emission

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	18/10/02
EM119	LISN	R & S	ESH3-Z5	0831.5518.5 2	01/10/02
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	CM
EM142	PULSES LIMITER	R & S	ESH3Z2	357.8810.52	03/07/02
EM181	EMI TEST RECEIVER	R & S	ESIB7	100072	28/11/01
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	18/10/02
EM197	LISN	EMCO	4825/2	1193	08/04/03

Remarks:

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

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Appendix B

Photographs of EUT

Front View of the product



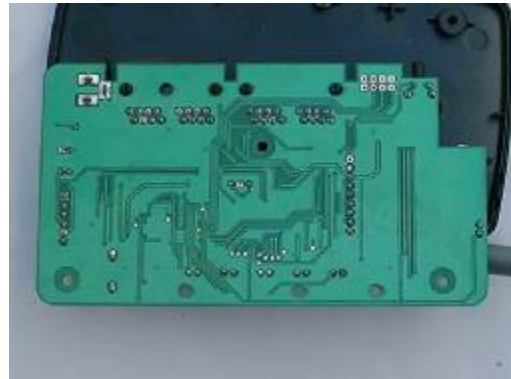
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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Photographs of EUT

Measurement of Conducted Emission Test Set Up



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