

EN 55022: 2006+A1: 2007
EN 55024: 1998+A1: 2001+A2: 2003
EN 61000-3-2: 2006
EN 61000-3-3: 1995+A1: 2001+A2: 2005
MEASUREMENT AND TEST REPORT

For
FINGERTEC WORLDWIDE SDN BHD
NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA,
47100 PUCHONG, SELANGOR, MALAYSIA

MODEL: R2i

September 08, 2009

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Fingerprint Slave Reader
Test By: Euphone Liu/ <i>Euphone Liu</i>	
Report Number: BCT09IR-859E	
Test Date: September 03 ~07, 2009	
Reviewed By: Thom Chen / <i>Thom Chen</i>	
Approved By: Kendy Wang/ <i>Kendy Wang</i>	
Prepared By: Bontek Compliance Testing Laboratory Ltd 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: +86-755-86337020 Fax: +86-755-86337028	

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Bontek Compliance Testing Laboratory Ltd.

TABLE OF CONTENTS

1 - GENERAL INFORMATION	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2 TEST STANDARDS	4
1.3 TEST SUMMARY	5
1.4 TEST METHODOLOGY	5
1.5 TEST FACILITY	6
1.6 TEST EQUIPMENT LIST AND DETAILS	7
2 - SYSTEM TEST CONFIGURATION	8
2.1 JUSTIFICATION	8
2.2 EUT EXERCISE SOFTWARE	8
2.3 SPECIAL ACCESSORIES	8
2.4 EQUIPMENT MODIFICATIONS	8
2.5 TEST SETUP DIAGRAM	8
3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS	9
3.1 MEASUREMENT UNCERTAINTY	9
3.2 LIMIT OF DISTURBANCE VOLTAGE AT THE MAINS TERMINALS (CLASS B)	9
3.3 EUT SETUP	9
3.4 INSTRUMENT SETUP	9
3.5 TEST PROCEDURE	10
3.6 SUMMARY OF TEST RESULTS	10
3.7 DISTURBANCE VOLTAGE TEST DATA	10
3.8 TEST RESULT	10
4 - RADIATED DISTURBANCES	13
4.1 MEASUREMENT UNCERTAINTY	13
4.2 LIMIT OF RADIATED DISTURBANCES (CLASS B)	13
4.3 EUT SETUP	13
4.4 TEST RECEIVER SETUP	14
4.5 TEST PROCEDURE	14
4.6 CORRECTED AMPLITUDE & MARGIN CALCULATION	14
4.7 RADIATED EMISSIONS TEST RESULT	14
4.8 TEST RESULT	14
5 - HARMONIC CURRENT TEST (EN 61000-3-2)	17
5.1 APPLICATION OF HARMONIC CURRENT EMISSION	17
5.2 MEASUREMENT DATA	17
5.3 TEST RESULTS	17
6 - VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3)	18
6.1 APPLICATION OF VOLTAGE FLUCTUATIONS AND FLICKER TEST	18
6.2 MEASUREMENT DATA	18
6.3 TEST RESULTS	18
7 - ELECTROSTATIC DISCHARGE IMMUNITY TEST (IEC 61000-4-2)	19
7.1 BLOCK DIAGRAM OF TEST SETUP	19
7.2 TEST STANDARD	19
7.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	19
7.4 OPERATING CONDITION OF EUT	19
7.5 TEST PROCEDURE	20
7.6 TEST RESULTS	20
8 - RF FIELD STRENGTH SUSCEPTIBILITY TEST (IEC 61000-4-3)	22
8.1 BLOCK DIAGRAM OF TEST	22
8.2 TEST STANDARD	22
8.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	22
8.4 OPERATING CONDITION OF EUT	23
8.5 TEST PROCEDURE	23
8.6 TEST RESULTS	23

9 - ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (IEC 61000-4-4)	24
9.1 BLOCK DIAGRAM OF TEST SETUP	24
9.2 TEST STANDARD	24
9.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	24
9.4 OPERATING CONDITION OF EUT	24
9.5 TEST PROCEDURE.....	25
9.6 TEST RESULT	25
10 - SURGE IMMUNITY TEST (IEC 61000-4-5)	26
10.1 BLOCK DIAGRAM OF TEST SETUP	26
10.2 TEST STANDARD	26
10.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	26
10.4 OPERATING CONDITION OF EUT	26
10.5 TEST PROCEDURE.....	26
10.6 TEST RESULT	27
11 - CONDUCTED SUSCEPTIBILITY TEST (IEC 61000-4-6)	28
11.1 BLOCK DIAGRAM OF TEST SETUP	28
11.2 TEST STANDARD	28
11.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	28
11.4 OPERATING CONDITION OF EUT	28
11.5 TEST PROCEDURE.....	28
11.6 TEST RESULTS	29
12 - VOLTAGE DIPS, SHORT INTERRUPTIONS IMMUNITY TESTS (IEC 61000-4-11)	30
12.1 BLOCK DIAGRAM OF TEST SETUP	30
12.2 TEST STANDARD	30
12.3 SEVERITY LEVELS AND PERFORMANCE CRITERION	30
12.4 EUT CONFIGURATION	30
12.5 OPERATING CONDITION OF EUT	30
12.6 TEST PROCEDURE.....	31
12.7 TEST RESULT	31
13 - TEST RESULTS	32
13.1 IEC 61000-4-2 ELECTROSTATIC DISCHARGE IMMUNITY TEST CONFIGURATION	32
13.2 IEC 61000-4-3 RADIATED SUSCEPTIBILITY TEST CONFIGURATION	32
13.3 IEC 61000-4-4 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST CONFIGURATION.....	32
13.4 IEC 61000-4-5 SURGE IMMUNITY TEST CONFIGURATION	32
13.5 IEC 61000-4-6 CONDUCTED SUSCEPTIBILITY TEST CONFIGURATION	32
13.6 IEC 61000-4-11 VOLTAGE DIPS, SHORT INTERRUPTIONS IMMUNITY TESTS CONFIGURATION.....	32
APPENDIX A - PRODUCT LABELING	33
CE MARKING LABEL SPECIFICATION	33
PROPOSED LABEL LOCATION ON EUT.....	33
APPENDIX B - EUT PHOTOGRAPHS	34
EUT – FRONT VIEW	34
EUT –REAR VIEW	34
EUT –UNCOVERED VIEW	34
EUT –PCB VIEW	35
EUT – FRONT VIEW OF FINGERPRINT FACILITY.....	35
EUT –REAR VIEW OF FINGERPRINT FACILITY	36
EUT –SIDE VIEW OF FINGERPRINT FACILITY	36
APPENDIX C - TEST SETUP PHOTOGRAPHS	37
CONDUCTED EMISSION.....	37
RADIATED EMISSION	37
ELECTROSTATIC DISCHARGE IMMUNITY TEST (IEC 61000-4-2)	37
RADIATED SUSCEPTIBILITY TEST (IEC 61000-4-3)	38
ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (IEC 61000-4-4/5).....	38
VOLTAGE DIPS, SHORT INTERRUPTIONS IMMUNITY TEST (IEC 61000-4-11).....	38

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **FINGERTEC WORLDWIDE SDN BHD**
Address of applicant: NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47100 PUCHONG, SELANGOR, MALAYSIA
Manufacturer: **FINGERTEC WORLDWIDE LIMITED**
Address of manufacturer: Peking University Founder Shiyuan Science Park, Bao'an, Shenzhen, China. 518108

General Description of E.U.T

EUT Description: **Fingerprint Slave Reader**
Trade Name: **FINGERTEC**
Model No.: **R2i**
Controller Model NO: R2
Power Rating: Input: 12VDC 1.5A
Adapter/Charger: SWITCHING ADAPTER
Specification: Brand: MOSO
M/N: XKD-C1500IC12.0-18E-ZZ
Input: 100-240VAC 50/60Hz 0.7A Max
Output: 12VDC 1.5A
Output Line Length: 1.8M

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

EN 55022: 2006+A1: 2007

EN 55024: 1998+ A1: 2001+A2: 2003

EN 61000-3-2: 2006

EN 61000-3-3: 1995+A1: 2001+A2: 2005

The objective of the manufacturer is to demonstrate compliance with the described standards above.

1.3 Test Summary

For the EUT described above. The standards used were EN 55022 Class B for Emissions & EN 55024 for Immunity.

Table 1 : Tests Carried Out Under EN 55022: 2006+A1: 2007

Standard	Test Items	Status
EN 55022: 2006+A1: 2007	Disturbance Voltage at The Mains Terminals (150KHz To 30MHz)	√
	Radiated Disturbances (30MHz To 1000MHz)	√

- √ Indicates that the test is applicable
- × Indicates that the test is not applicable

Table 2 : Tests Carried Out Under EN 61000-3-2: 2006/ EN 61000-3-3: 1995+A1:2001+A2: 2005

Standard	Test Items	Status
EN 61000-3-2: 2006	Harmonic Current Test	√
EN 61000-3-3: 1995+A1: 2001 +A2: 2005	Voltage Fluctuations and Flicker Test	√

- √ Indicates that the test is applicable
- × Indicates that the test is not applicable

Table 3 : Tests Carried Out Under EN 55024: 1998+ A1: 2001+A2: 2003

Standard	Test Items	Status
EN61000-4-2: 2001	Electrostatic discharge Immunity	√
EN61000-4-3: 2006	Radiated Susceptibility (80MHz to 1GHz)	√
EN61000-4-4: 2004	Electrical Fast Transient/Burst Immunity	√
EN61000-4-5: 2005	Surge Immunity	√
EN61000-4-6: 2006	Conducted Susceptibility (150kHz to 80MHz)	√
EN61000-4-8: 2001	Power Frequency Magnetic Field Immunity (50/60Hz)	X
EN61000-4-11: 2004	Voltage Dips, Short Interruptions Immunity	√

- √ Indicates that the test is applicable
- × Indicates that the test is not applicable

1.4 Test Methodology

All measurements contained in this report were conducted with CISPR 16-1: 2002, radio disturbance and immunity measuring apparatus, and CISPR16-2: 2002, Method of measurement of disturbances and immunity.

All measurement required was performed at Bontek Compliance Testing Laboratory Ltd at 1/F,Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March, 2008.

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on August 2009.

The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

1.6 Test Equipment List and Details

Test equipments list of Bontek Compliance Testing Laboratory Ltd.

Equipment	Manufacturer	Model No.	calibration date	calibration date
EMI Test Receiver	R&S	ESCI	2009-2-22	2010-2-21
EMI Test Receiver	R&S	ESPI	2009-2-22	2010-2-21
Amplifier	HP	8447D	2009-2-22	2010-2-21
Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	2009-2-22	2010-2-21
Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	2009-2-22	2010-2-21
Power Clamp	SCHWARZBECK	MDS-21	2009-2-22	2010-2-21
Positioning Controller	C&C	CC-C-1F	2009-2-22	2010-2-21
Electrostatic Discharge Simulator	TESEQ	NSG437	2009-3-31	2010-3-30
Fast Transient Burst Generator	SCHAFFNER	MODULA6150	2009-2-22	2010-2-21
Fast Transient Noise Simulator	Noiseken	FNS-105AX	2009-2-22	2010-2-21
Color TV Pattern Generator	PHILIPS	PM5418	N/A	N/A
Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	2009-2-22	2010-2-21
Capacitive Coupling Clamp	TESEQ	CDN8014	2009-2-22	2010-2-21
High Field Bucolical Antenna	ELECTRO-METRICS	EM-6913	2009-09-04	2010-09-03
Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2009-09-04	2010-09-03
Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	2009-09-04	2010-09-03
TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	2009-2-22	2010-2-21
Horn Antenna	SCHWARZBECK	BBHA9120A	2009-2-27	2010-2-26
Toe Line Single Phase Module	SCHWARZBECK	NSLK8128	2009-3-31	2010-3-30
10dB attenuator	SCHWARZBECK	MTAIMP-136	2009-2-22	2010-2-21
Electric Bridge	Zentech	100 LCR METER	N/A	N/A
RF Current Probe	FCC	F-33-4	2008-10-22	2009-10-21
SIGNAL GENERATOR	HP	8647A	2008-11-10	2009-11-9
MICROWAVE AMPLIFIER	HP	8349B	2008-11-10	2009-11-9
Triple-Loop Antenna	EVERFINE	LLA-2	2009-2-27	2010-2-26

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

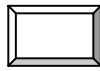
The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **FINGERTEC WORLDWIDE SDN BHD** and its respective support equipment manufacturers.

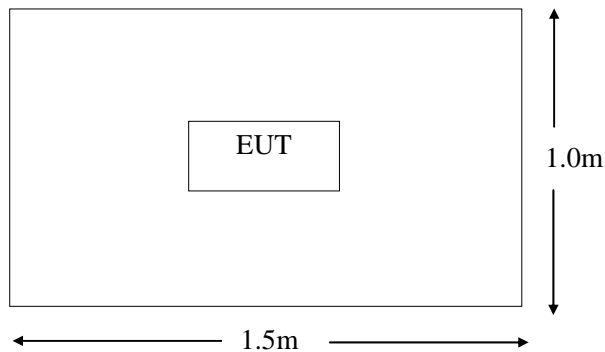
2.4 Equipment Modifications

The EUT tested was not modified by BCT.



EUT

2.5 Test Setup Diagram



3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 3.4 dB.

3.2 Limit of Disturbance Voltage At The Mains Terminals (Class B)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

3.3 EUT Setup

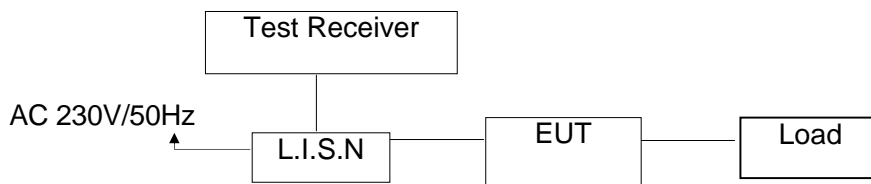
The setup of EUT is according with CISPR 16-1: 2002, CISPR16-2: 2002 measurement procedure. The specification used was the EN 55022 limits.

The EUT was placed center and the back edge of the test table.

The AV cables were draped along the test table and bundled to 30-40cm in the middle.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.



(EUT: Fingerprint Slave Reader)

3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....150 KHz to 30 MHz
 Detector.....Peak & Quasi-Peak & Average
 Sweep Speed.....Auto
 IF Band Width.....9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB μ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AV".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the EN 55022 Conducted margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

Temperature (°C)	22~25
Humidity (%RH)	50~60
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

Test data see following pages

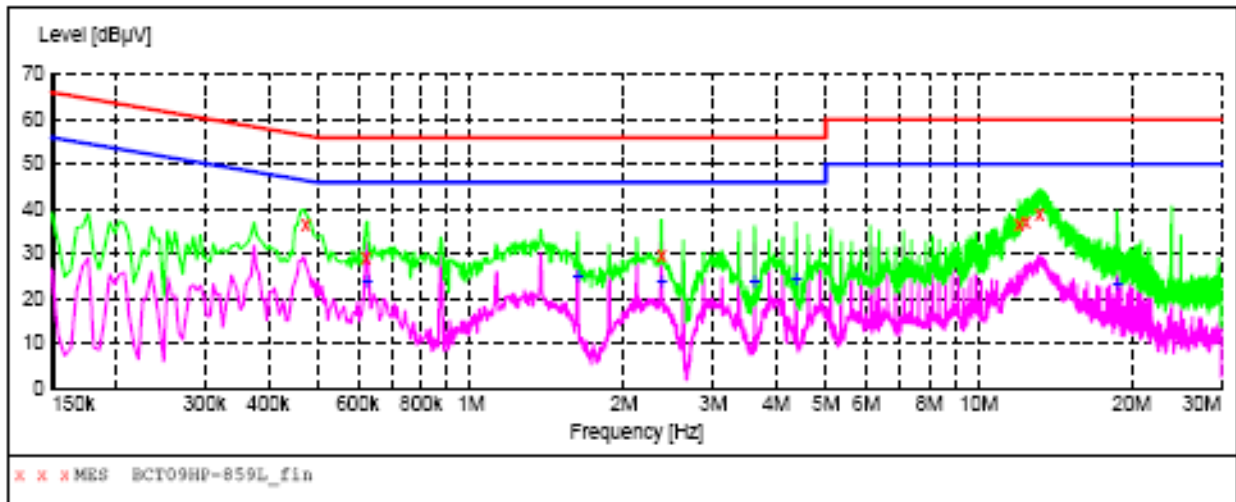
3.8 Test Result

PASS

Conducted Emission Test Data

EUT: Fingerprint Slave Reader M/N: R2i
 Operating Condition: ON
 Test Site: Shielded Room
 Operator: Chen
 Test Specification: AC 230V/50Hz for Adapter
 Comment: Live Line
 Start of Test: 09/03/09/ 21:40 Tem:24°C Hum:60%

SCAN TABLE: "Voltage (9K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "BCT09HP-859L_fin"

9/3/2009 21:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.474000	36.80	10.3	56	19.6	QP	L1	GND
0.622500	29.40	10.2	56	26.6	QP	L1	GND
2.373000	29.90	10.2	56	26.1	QP	L1	GND
11.998500	36.40	10.5	60	23.6	QP	L1	GND
12.367500	37.00	10.5	60	23.0	QP	L1	GND
13.173000	39.00	10.5	60	21.0	QP	L1	GND

MEASUREMENT RESULT: "BCT09HP-859L_fin2"

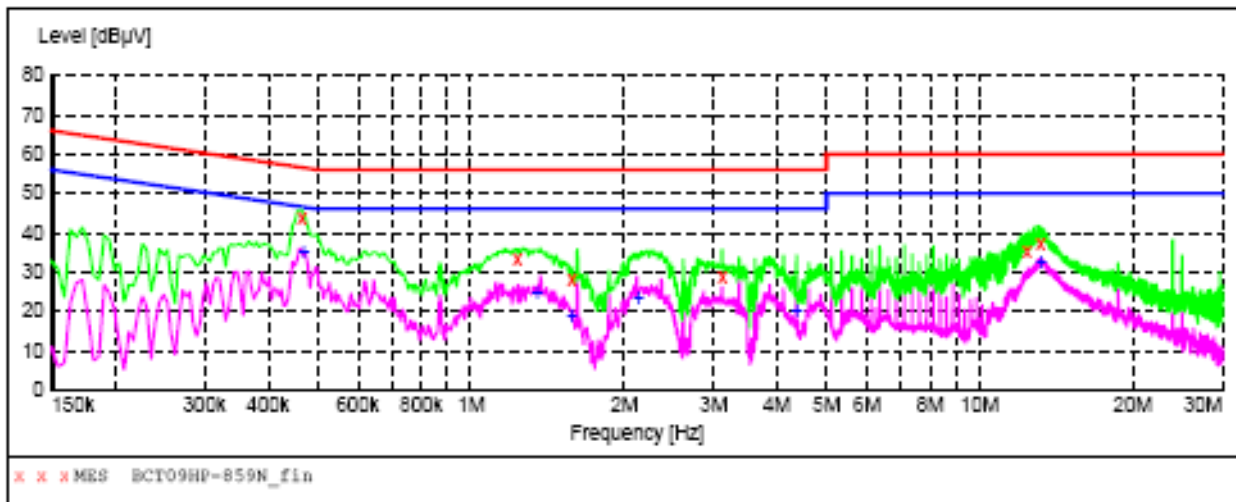
9/3/2009 21:40

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.627000	24.10	10.2	46	21.9	AV	L1	GND
1.626000	24.90	10.2	46	21.1	AV	L1	GND
2.377500	23.90	10.2	46	22.1	AV	L1	GND
3.624000	24.20	10.3	46	21.8	AV	L1	GND
4.375500	24.60	10.3	46	21.4	AV	L1	GND
18.753000	23.40	10.6	50	26.6	AV	L1	GND

Conducted Emission Test Data

EUT: Fingerprint Slave Reader M/N: R2i
 Operating Condition: ON
 Test Site: Shielded Room
 Operator: Chen
 Test Specification: AC 230V/50Hz for Adapter
 Comment: Neutral Line
 Start of Test: 09/03/09/ 21:47 Tem:24°C Hum:60%

SCAN TABLE: "Voltage (9K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "BCT09HP-859N_fin"

9/3/2009 21:47

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.465000	43.70	10.3	57	12.9	QP	N	GND
1.234500	33.30	10.3	56	22.7	QP	N	GND
1.581000	28.00	10.2	56	28.0	QP	N	GND
3.120000	28.60	10.3	56	27.4	QP	N	GND
12.381000	35.40	10.5	60	24.6	QP	N	GND
13.150500	37.30	10.5	60	22.7	QP	N	GND

MEASUREMENT RESULT: "BCT09HP-859N_fin2"

9/3/2009 21:47

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.469500	35.20	10.3	47	11.3	AV	N	GND
1.251500	24.50	10.2	46	21.5	AV	N	GND
1.581000	19.00	10.2	46	27.0	AV	N	GND
2.139000	23.40	10.2	46	22.6	AV	N	GND
4.275500	20.30	10.3	46	25.7	AV	N	GND
13.213500	32.50	10.5	50	17.5	AV	N	GND

4 - RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 4.0 dB.

4.2 Limit of Radiated Disturbances (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

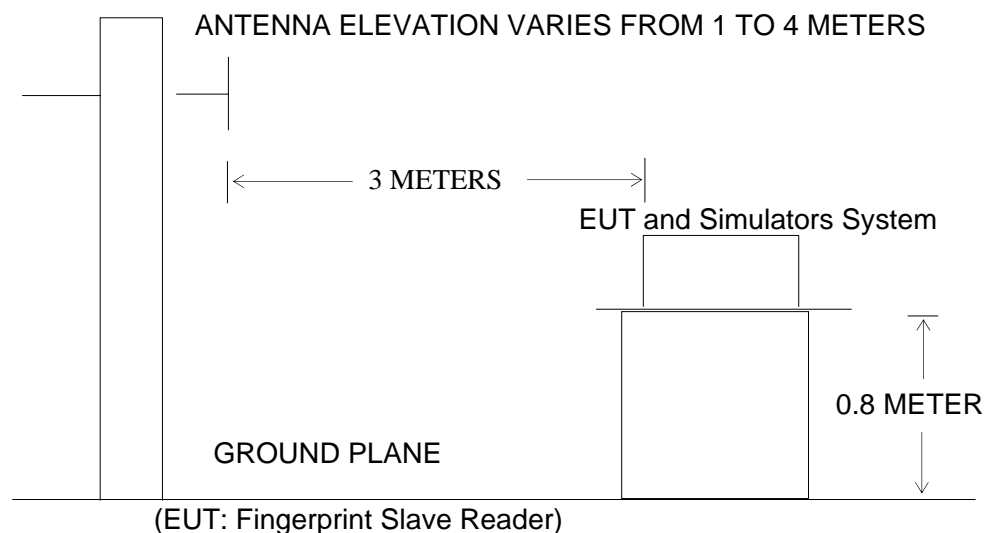
4.3 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the CISPR 16-1: 2002, CISPR16-2: 2002. The specification used was EN 55022 Class B limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

Block diagram of test setup (In chamber)



4.4 Test Receiver Setup

According to EN 55013 rules, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak
IF Band Width.....120KHz
Frequency Range.....30MHz to 1000MHz
Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m
Polarity.....Horizontal and Vertical

4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dB μ V of specification limits), and are distinguished with a "QP" in the data table.

4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Class B Limit} - \text{Corr. Ampl.}$$

4.7 Radiated Emissions Test Result

Temperature (°C)	22~25
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

4.8 Test Result

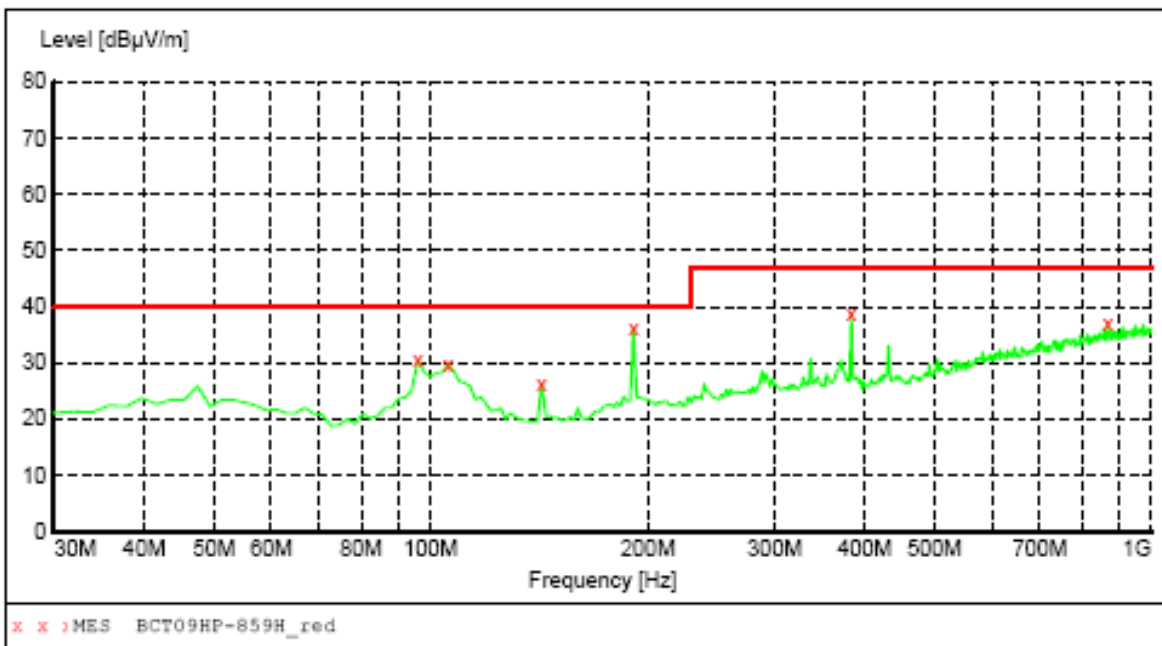
PASS

Radiated Emission Test Data

EUT: Fingerprint Slave Reader M/N: R2i
 Operating Condition: ON
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for Adapter
 Comment: Polarization: Horizontal
 Start of Test: 09/06/09/ 09:40 Tem:25°C Hum:50%

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency				
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "BCT09HP-859H_red"

9/6/2009 09:40

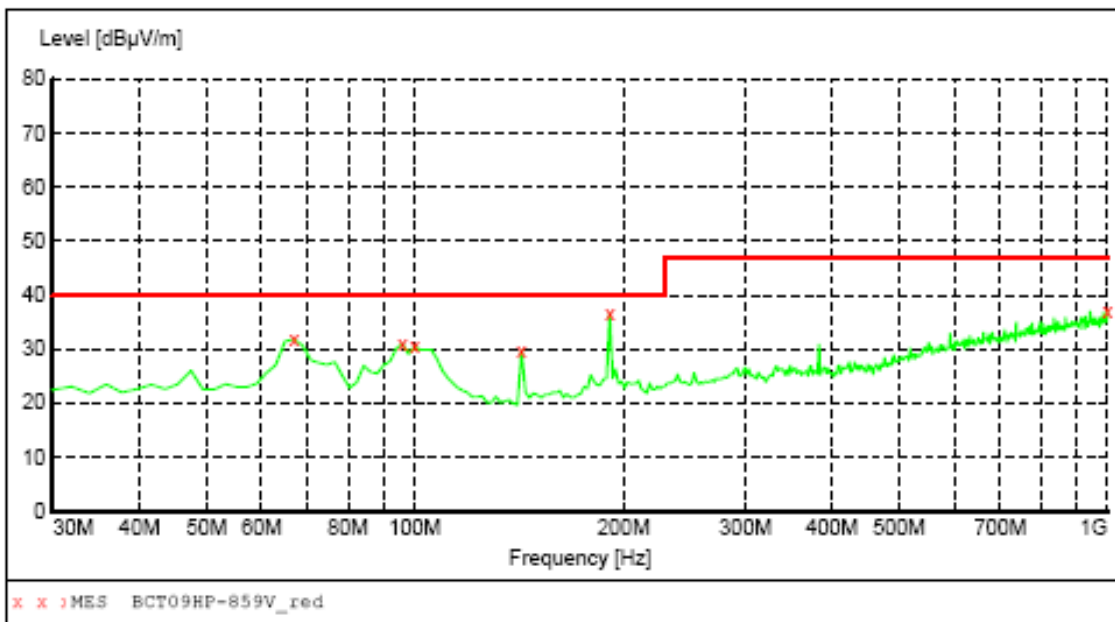
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
95.960000	30.50	18.0	40.0	9.5	QP	300.0	0.00	HORIZONTAL
105.660000	29.90	17.9	40.0	10.1	QP	300.0	0.00	HORIZONTAL
142.520000	26.40	14.0	40.0	13.6	QP	300.0	0.00	HORIZONTAL
191.020000	36.30	16.8	40.0	3.7	QP	100.0	0.00	HORIZONTAL
383.080000	38.80	20.6	47.0	8.2	QP	100.0	0.00	HORIZONTAL
870.020000	37.20	28.9	47.0	9.8	QP	100.0	0.00	HORIZONTAL

Radiated Emission Test Data

EUT: Fingerprint Slave Reader M/N: R2i
 Operating Condition: ON
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for Adapter
 Comment: Polarization: Vertical
 Start of Test: 09/06/09/ 09:39 Tem:25°C Hum:50%

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "BCT09HP-859V_red"

9/6/2009 09:39

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Asimuth deg	Polarisation
66.860000	31.90	14.0	40.0	8.1	QP	100.0	0.00	VERTICAL
95.960000	31.00	18.0	40.0	9.0	QP	100.0	0.00	VERTICAL
99.840000	30.40	18.3	40.0	9.6	QP	100.0	0.00	VERTICAL
142.520000	29.70	14.0	40.0	10.3	QP	100.0	0.00	VERTICAL
191.020000	36.60	16.8	40.0	3.4	QP	100.0	0.00	VERTICAL
1000.000000	37.20	30.1	47.0	9.8	QP	100.0	0.00	VERTICAL

5 - HARMONIC CURRENT TEST (EN 61000-3-2)

5.1 Application of Harmonic Current Emission

Compliance to these standards ensures that tested equipment will not generate harmonic currents at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

5.2 Measurement Data

Note: For detailed test data, refer to the following pages:

Standard used:	EN/IEC 61000-3-2 A14 (2000+A2:2005) Quasi-stationary - Equipment class A
Observation time:	150s
E. U. T.:	Fingerprint Slave Reader
M/N	R2i
Operation Mode	ON

5.3 Test Results

This EUT is deemed to comply with the requirements of EN61000-3-2: 2006 without test since the power of EUT is less than 75W.

6 - VOLTAGE FLUCTUATIONS AND FLICKER TEST (EN 61000-3-3)

6.1 Application of Voltage Fluctuations and Flicker Test

Compliance to these standards ensures that tested equipment will not generate flickers and voltage change at levels that cause unacceptable degradation of the main environment. This directly contributes to meeting compatibility levels established in other EMC standards, which defines compatibility levels for low-frequency conducted disturbances in low-voltage supply systems.

6.2 Measurement Data

Note: For detailed test data, refer to the following pages:

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	230V/50Hz
E. U. T.:	Fingerprint Slave Reader
M/N	R2i
Operation Mode	ON

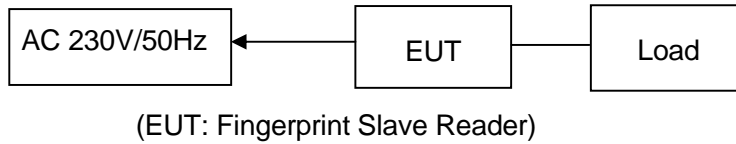
6.3 Test Results

PASS

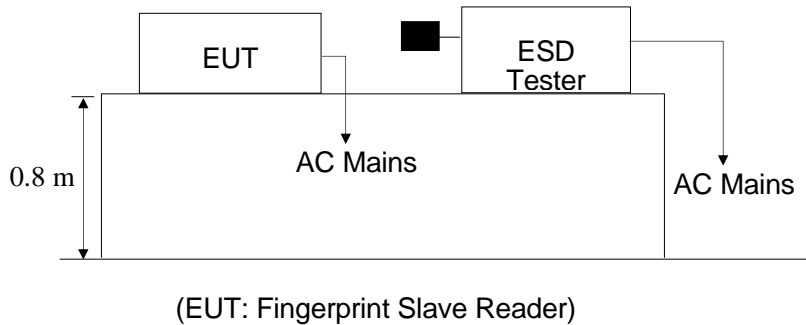
7 - Electrostatic Discharge immunity Test (IEC 61000-4-2)

7.1 Block Diagram of Test Setup

7.1.1 Block diagram of connection between the EUT and Load



7.1.2 Block diagram of ESD test setup



7.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003, EN61000-4-2: 2001 (EN61000-4-2: 2001 Severity Level: 3 / Air Discharge: ± 8 KV Level: 2 / Contact Discharge: ± 4 KV)

7.3 Severity Levels and Performance Criterion

7.3.1 Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	± 2	± 2
2.	± 4	± 4
3.	± 6	± 8
4.	± 8	± 15
X	Special	Special

7.3.2 Performance criterion : B

7.4 Operating Condition of EUT

7.4.1 Setup the EUT as shown on Section 9.1.

7.4.2 Turn on the power of all equipments.

7.4.3 Let the EUT work in measuring mode (Full load) and measure it.

7.5 Test Procedure

7.5.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

7.5.2 Contact Discharge:

All the procedure shall be same as Section 5.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.5.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

7.5.4 Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.6 Test Results

PASS

Please refer to the following pages

Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Light	A	A	A	A	A	A	A	A	/	/
Gap	A	A	A	A	A	A	A	A	/	/
Touch Point	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Bolt	A	A	A	A	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

8 - RF Field Strength susceptibility TEST (IEC 61000-4-3)

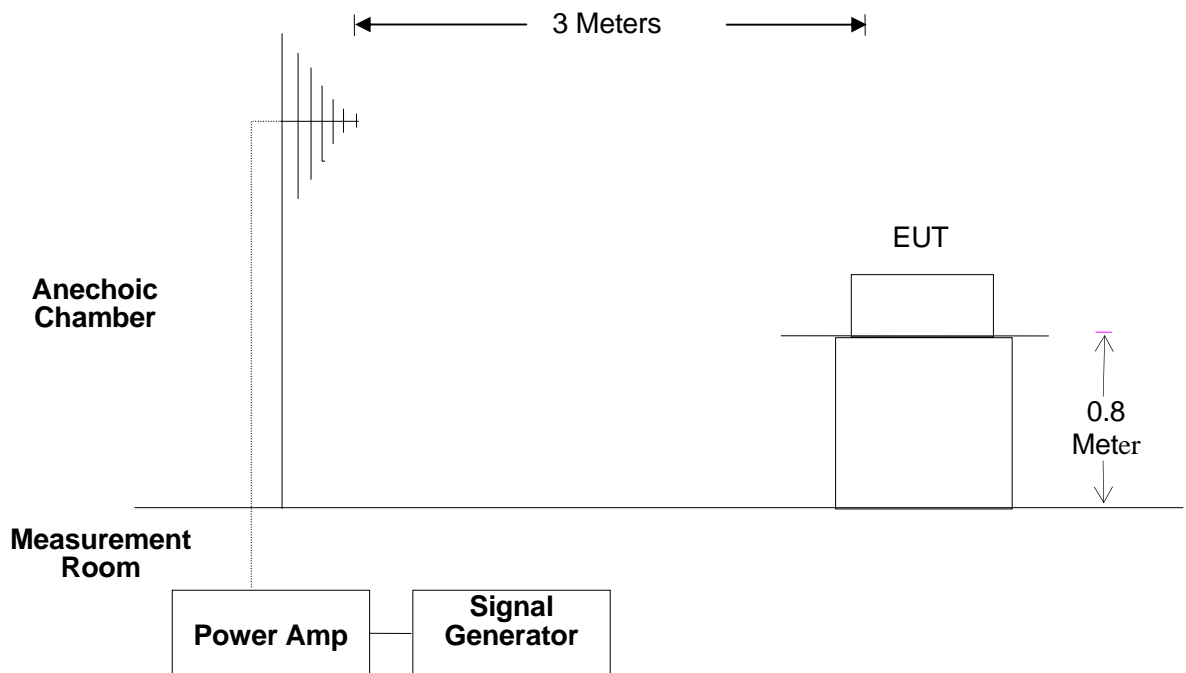
8.1 Block Diagram of Test

8.1.1 Block diagram of connection between the EUT and Load



(EUT: Fingerprint Slave Reader)

8.1.2 Block diagram of RS test setup



(EUT: Fingerprint Slave Reader)

8.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003, EN61000-6-2: 2001 (EN61000-4-3: 2006, Severity Level: 2, 3V / m)

8.3 Severity Levels and Performance Criterion

8.3.1 Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

8.3.2 Performance Criterion: A

8.4 Operating Condition of EUT

8.4.1 Setup the EUT as shown on Section 10.1.

8.4.2 Turn on the power of all equipments.

8.4.3 Let the EUT work in measuring mode (Full load) and measure it..

8.5 Test Procedure

The EUT are placed on a table which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor its screen . All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	3V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80-1000MHz
4. Sweep time of radiated	0.0015 Decade/s
5. Dwell Time	1 Sec.

8.6 Test Results

PASS

Please refer to the following page.

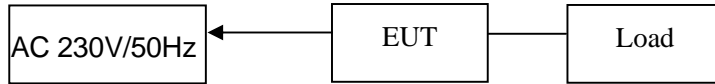
Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

Frequency Range (MHz)	Front (3 V/m)		Rear (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A

9 - Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)

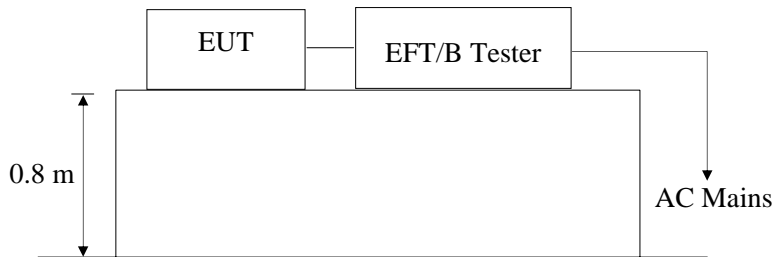
9.1 Block Diagram of Test Setup

9.1.1. Block Diagram of the EUT



(EUT: Fingerprint Slave Reader)

9.1.2. Block Diagram of the AC Mains



(EUT: Fingerprint Slave Reader)

9.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003, EN61000-6-2: 2005 (EN61000-4-4: 2004, Severity Level, Level 3: 2KV)

9.3 Severity Levels and Performance Criterion

9.3.1 Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Fingerprint Slave Reader Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

9.3.2 Performance criterion : B

9.4 Operating Condition of EUT

9.4.1 Setup the EUT as shown in Section 11.1.

9.4.2 Turn on the power of all equipments.

9.4.3 Let the EUT work in test mode (Full load) and measure it.

9.5 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

9.5.1 For input and output AC power ports:
It's unnecessary to test

9.5.2 For signal lines and control lines ports:
It's unnecessary to test.

9.5.3 For DC Input line ports:
The EUT is connected to the DC power mains by using a coupling device which couples the EFT interference signal to DC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

9.6 Test Result

PASS

Please refer to the following page.

Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

IEC 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply	L1	A	A	A	A	/	/	/	/
	L2	A	A	A	A	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
Power Line of EUT	L1+L2	A	A	A	A	/	/	/	/
	L1 + Earth	/	/	/	/	/	/	/	/
	L2 + Earth	/	/	/	/	/	/	/	/
	L1+L2+Earth	/	/	/	/	/	/	/	/

10 - Surge Immunity Test (IEC 61000-4-5)

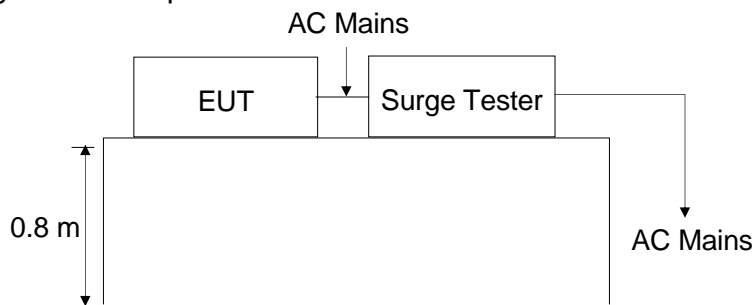
10.1 Block Diagram of Test Setup

10.1.1 Block Diagram of the EUT



(EUT: Fingerprint Slave Reader)

10.1.2. Surge Test Setup



10.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003, EN61000-6-2: 2005 (EN61000-4-5: 2005 Severity Level: Line to Line, Level 2: 1KV, Line to Earth , Level 3: 2KV)

10.3 Severity Levels and Performance Criterion

10.3.1 Severity level

Severity Level	Open-Circuit Test Voltage KV
1	5
2	0
3	0
4	4.0
*	Special

10.3.2 Performance criterion: B

10.4 Operating Condition of EUT

10.4.1 Setup the EUT as shown in Section 12.1.

10.4.2. Turn on the power of all equipments.

10.4.3. Let the EUT work in test mode (Full load) and measure it.

10.5 Test Procedure

1) Set up the EUT and test generator as shown on Section 12.1.2.

2) For DC port coupling mode, provide a 1 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

4)Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.6 Test Result

PASS

Please refer to the following page.

Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

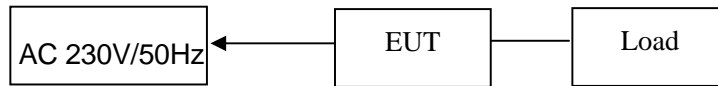
Table 1: Surge Power Supply

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N	A	/
2	1kV	±	L-N	A	/
3	2kV	±	L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

11 - Conducted Susceptibility Test (IEC 61000-4-6)

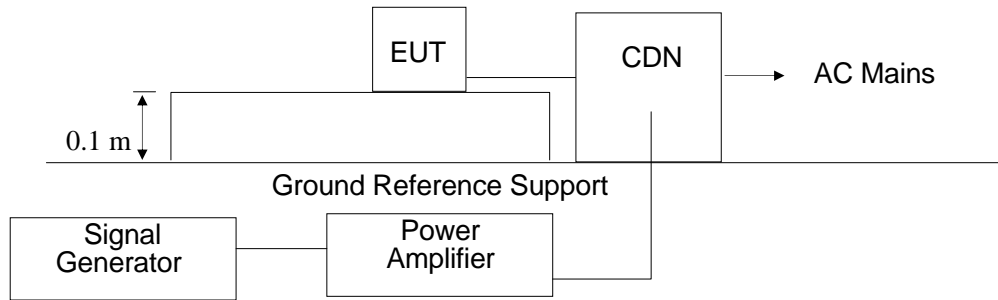
11.1 Block Diagram of Test Setup

11.1.1 Block Diagram of the EUT



(EUT: Fingerprint Slave Reader)

11.1.2 Block Diagram of Test Setup



(EUT: Fingerprint Slave Reader)

11.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003 EN61000-6-2: 2001 (EN61000-4-6: 2006, Severity Level 2: 3V (rms)).(0.15MHz ~ 80MHz)

11.3 Severity Levels and Performance Criterion

11.3.1 Severity level

Level	Field Strength V(rms)
1.	1
2.	3
3.	10
X	Special

11.3.2 Performance criterion: A

11.4 Operating Condition of EUT

11.4.1 Setup the EUT as shown in Section 13.1.

11.4.2 Turn on the power of all equipments.

11.4.3 Let the EUT work in test mode (Full load) and measure it.

11.5 Test Procedure

11.5.1 For AC Mains
It's unnecessary to test.

11.5.2 For signal lines and control lines ports:
It's unnecessary to test.

11.5.3 For DC Input line ports:

- 1) Set up the EUT, CDN and test generators as shown on Section 13.1.
- 2) Let the EUT work in test mode and measure it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling network) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- 7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.6 Test Results

PASS

Please refer to the following page.

Frequency Range (MHz): 0.15~80MHz
Modulation: Amplitude 80%, 1kHz sinewave
Severity Level: 3Vr.m.s.

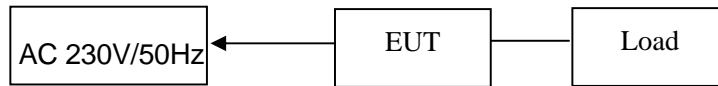
Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

12 - Voltage Dips, Short Interruptions Immunity Tests (IEC 61000-4-11)

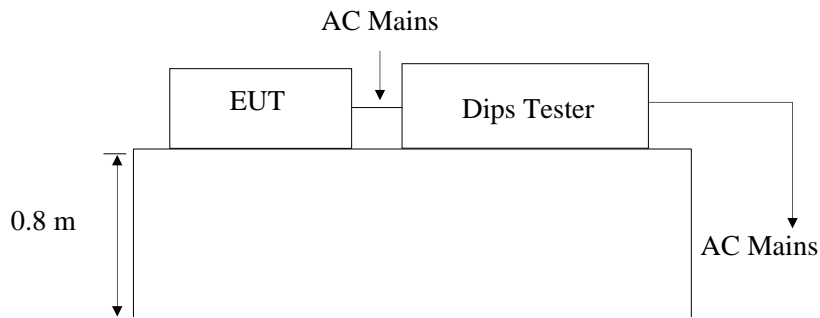
12.1 Block Diagram of Test Setup

12.1.1 Block Diagram of the EUT



(EUT: Fingerprint Slave Reader)

12.1.2 Dips Test Setup



12.2 Test Standard

EN55024: 1998+A1: 2001+A2: 2003, EN61000-6-2: 2005 (EN61000-4-11: 2004)

12.3 Severity Levels and Performance Criterion

12.3.1 Severity level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
40	60	1
70	30	5
		10
		25
		50
		*

12.3.2 Performance criterion: A&B

12.4 EUT Configuration

The configuration of EUT is listed in Section 3.4.

12.5 Operating Condition of EUT

12.5.1 Turn on the power of all equipments.

12.5.2 Let the EUT work in test mode (Full Load) and measure it.

12.6 Test Procedure

- 1)Set up the EUT and test generator as shown on Section 14.1.2.
- 2)The interruption is introduced at selected phase angles with specified duration.
- 3)Record any degradation of performance.

12.7 Test Result

PASS

Please refer to the following page.

Temperature (°C)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	Fingerprint Slave Reader
M/N	R2i
Operating Mode	ON

Level	U2	td	Phase Angle	N	Pass	Fail
1	>95%	10ms	0/90/180/270	3	B	/
2	30%	500ms	N/A	3	C	/
3	>95%	5000ms	N/A	3	C	/

Note:

- A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.
- B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
- C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

13 - TEST RESULTS

The following tests were performed on the **FINGERTEC WORLDWIDE SDN BHD** 's product; model: **R2i**; the actual test results are contained within the Test Data section of this report.

13.1 IEC 61000-4-2 Electrostatic Discharge Immunity Test Configuration

The EUT was subjected to the electrostatic discharge tests required by EN 55024 and all lower levels specified in IEC 61000-4-2.

The EUT continued to perform as intended during and after the application of the ESD. Test setup photographs presented in Appendix C.

13.2 IEC 61000-4-3 Radiated Susceptibility Test Configuration

The EUT was subjected to a 3-volt/meter, 80% Amplitude, 1 kHz Sine wave field as required by EN 55024 and all lower levels specified in IEC 61000-4-3.

The EUT continued to perform as intended during and after the application of the electromagnetic field. Test setup photographs presented in Appendix C.

13.3 IEC 61000-4-4 Electrical Fast Transient/Burst Immunity Test Configuration

The EUT was subjected to the electrical fast transient tests required by EN 55024 and all lower levels specified in IEC 61000-4-4.

The EUT continued to perform as intended during and after the application of the EFT/B. Test setup photographs presented in Appendix C.

13.4 IEC 61000-4-5 Surge Immunity Test Configuration

The EUT was subjected to the Surge Immunity tests required by EN 55024 and all lower levels specified in IEC 61000-4-5.

The EUT continued to perform as intended during and after the application of the Surge Immunity Test. Test setup photographs presented in Appendix C.

13.5 IEC 61000-4-6 Conducted Susceptibility Test Configuration

The EUT was subjected to the Conducted Susceptibility tests required by EN 55024 and all lower levels specified in IEC 61000-4-6.

The EUT continued to perform as intended during and after the application of the Conducted Susceptibility Test.

13.6 IEC 61000-4-11 Voltage Dips, Short Interruptions Immunity Tests Configuration

The EUT was subjected to the Voltage Dips/Interruptions tests required by EN 55024 and all lower levels specified in IEC 61000-4-11.

The EUT continued to perform as intended during and after the application of the Voltage Dips/Interruptions Test. Test setup photographs presented in Appendix C.

APPENDIX A - PRODUCT LABELING

CE Marking Label Specification

Specification: Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



Proposed Label Location on EUT

EUT Rear View/Proposed CE Marking Location



APPENDIX B - EUT PHOTOGRAPHS

EUT – Front View



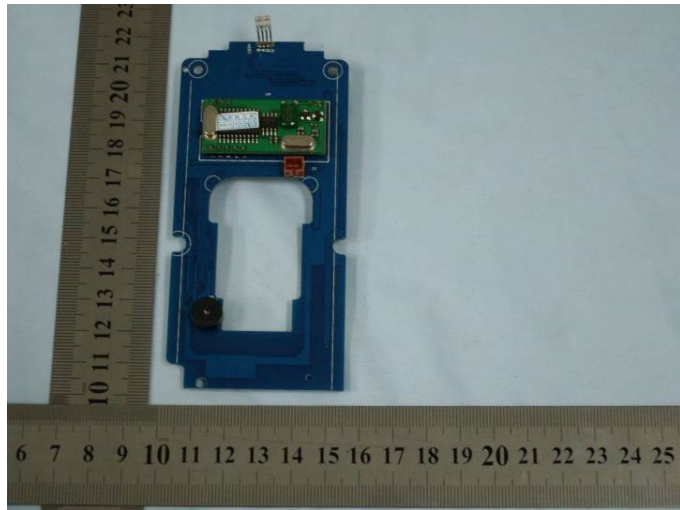
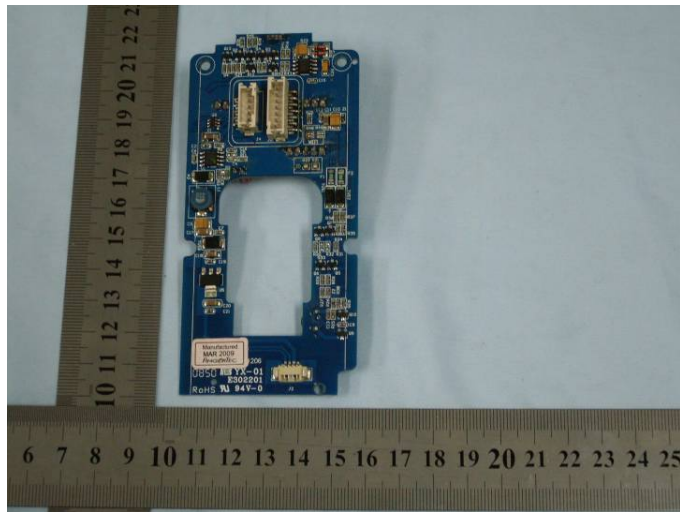
EUT –Rear View



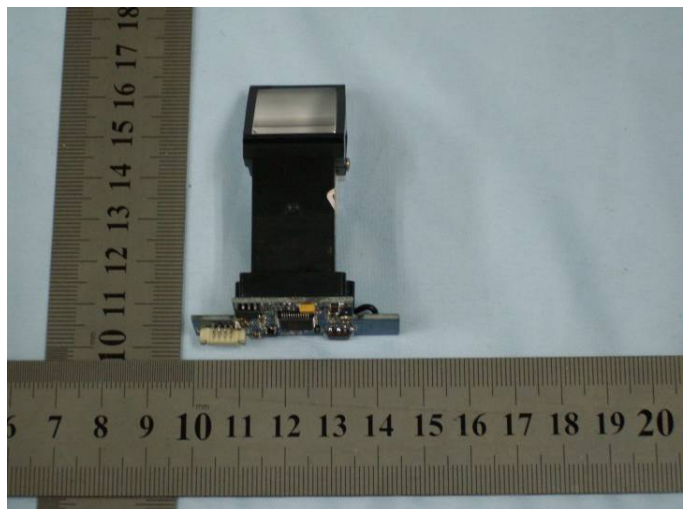
EUT –Uncovered View



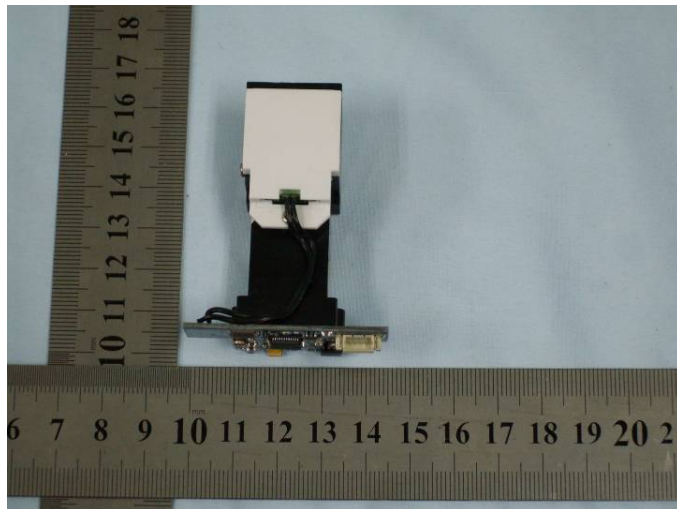
EUT –PCB View



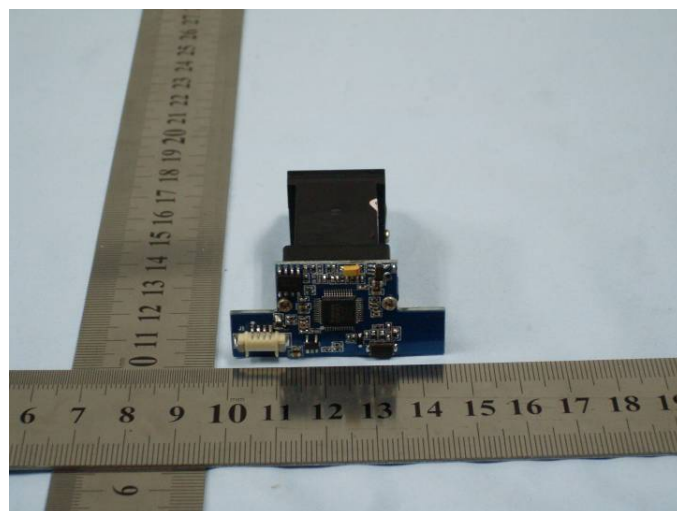
EUT – Front View of Fingerprint Facility



EUT –Rear View of Fingerprint Facility



EUT –Side View of Fingerprint Facility

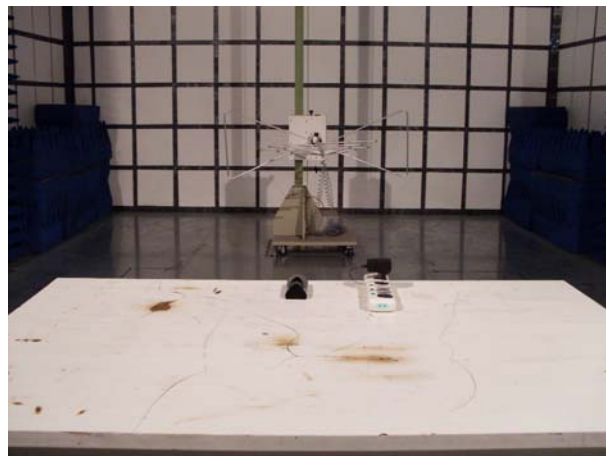


APPENDIX C - TEST SETUP PHOTOGRAPHS

Conducted Emission



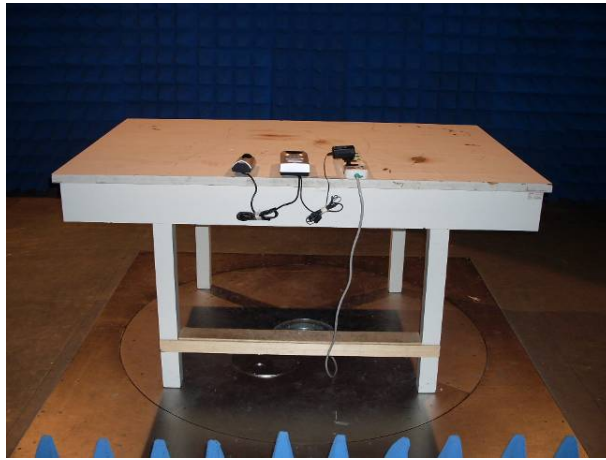
Radiated Emission



Electrostatic Discharge Immunity Test (IEC 61000-4-2)



Radiated Susceptibility Test (IEC 61000-4-3)



Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4/5)



Voltage Dips, Short Interruptions Immunity Test (IEC 61000-4-11)

