EN 55022:2010
EN 55024:2010
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2013
MEASUREMENT AND TEST REPORT

For

FINGERTEC WORLDWIDE SDN BHD

NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47100

PUCHONG, SELANGOR, MALAYSIA

MODEL: i-Kadex

August 27, 2014

This Report Concerns:	Equipment Type:
☐ Original Report	RFID Card Reader

Test By:	Lv yi/ Lv yi
Report Number:	BCT14HR-1244E
Test Date:	August 07 ~11, 2009
Reviewed By:	Jiankuai.Li/ Jiankuai.Li
Approved By:	Owen Yang/ Owen Yang
Prepared By:	**Shenzhen Bontek Compliance Testing Laboratory Co., 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

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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 Shiyan Science Park, Bao'an, Shenzhen, China. 518108

General Description of E.U.T

EUT Description:	**RFID Card Reader**
Trade Name:	**FINGERTEC**
Model No.:	**i-Kadex**
Controller Model NO:	Kadex
Power Rating:	Input: 12VDC
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.*
** BCT14HR-1244E is produced on the basis of BCT09HR-725E. The report is just for standard upgrade.*

1.2 Test Standards

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

EN 55022:2010

EN 55024:2010

EN 61000-3-2:2006+A1:2009+A2:2009

EN 61000-3-3:2013

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

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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 55022:2010

Standard	Test Items	Status
EN 55022:2010	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+A1:2009+A2:2009/ EN 61000-3-3:2013

Standard	Test Items	Status
EN 61000-3-2:2006+A1:2009+A2:2009	Harmonic Current Test	√
EN 61000-3-3:2013	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 55024:2010

Standard	Test Items	Status
EN 61000-4-2:2009	Electrostatic discharge Immunity	√
EN 61000-4-3:2006+A2:2010	Radiated Susceptibility (80MHz to 1GHz)	√
EN 61000-4-4:2012	Electrical Fast Transient/Burst Immunity	√
EN 61000-4-5:2006	Surge Immunity	√
EN 61000-4-6:2009	Conducted Susceptibility (150kHz to 80MHz)	√
EN 61000-4-8:2010	Power Frequency Magnetic Field Immunity (50/60Hz)	X
EN 61000-4-11:2004	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 16-1-1: 2006, radio disturbance and immunity measuring apparatus, and CISPR 16-2-3: 2010, Method of measurement of disturbances and immunity.
All measurement required was performed at Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. at 1/F,Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

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1.5 Test Facility

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

IC Registration No.: 7631A

The 3m alternate test site of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January 2011.
The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

CNAS - Registration No.: L3923

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.
The acceptance letter from the CNAS is maintained in our files: Registration: L3923, March, 2012.

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1.6 Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., 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	2008-9-04	2009-9-03
Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2008-9-04	2009-9-03
Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	2008-9-04	2009-9-03
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	2008-9-22	2009-9-21
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

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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

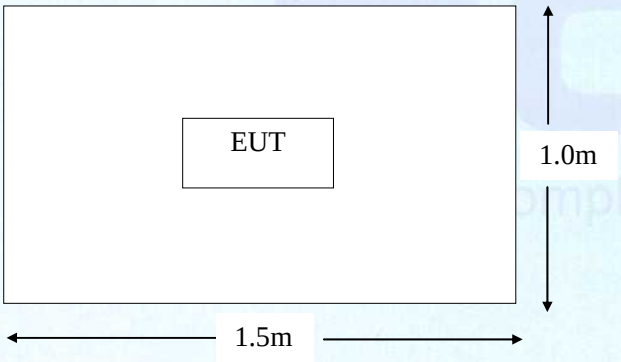
As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **FINGERTEC WORLDWIDE SDN BHD** and its respective support equipment manufacturers.

2.4 Equipment Modifications

The EUT tested was not modified by BCT.

EUT

2.5 Test Setup Diagram



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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

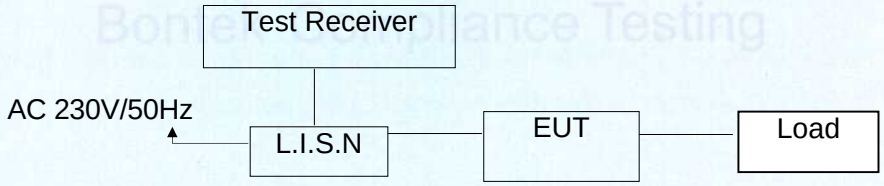
The setup of EUT is according with CISPR 16-1-1: 2006, CISPR 16-2-3: 2010 measurement procedure. The specification used was the EN 55022 limits.

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: RFID Card 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

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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 dBμV 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 (℃)	22~25
Humidity (%RH)	50~60
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
Operating Mode	ON

Test data see following pages

3.8 Test Result

PASS

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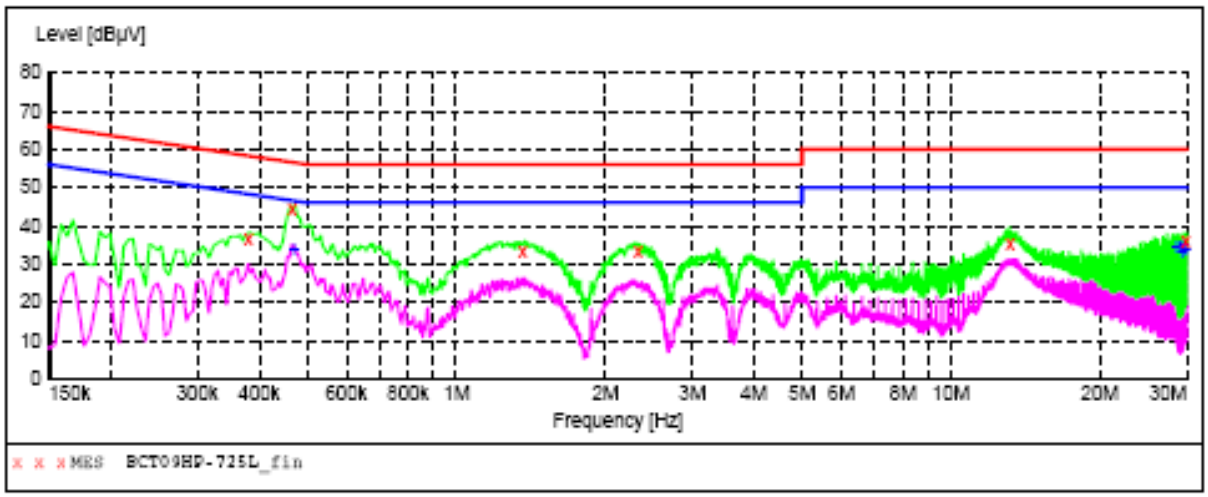
Conducted Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	Shielded Room
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Live Line
Start of Test:	08/07/2009/ 19:27 Tem:24℃ Hum:60%

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



MEASUREMENT RESULT: "BCT09HP-725L_fin"

8/7/2009 19:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.379500	36.80	10.4	58	21.5	QP	L1	GND
0.465000	44.10	10.3	57	12.5	QP	L1	GND
1.360500	33.50	10.2	56	22.5	QP	L1	GND
2.332500	33.10	10.2	56	22.9	QP	L1	GND
13.173000	35.40	10.5	60	24.6	QP	L1	GND
29.877000	36.20	11.1	60	23.8	QP	L1	GND

MEASUREMENT RESULT: "BCT09HP-725L_fin2"

8/7/2009 19:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.469500	34.10	10.3	47	12.4	AV	L1	GND
28.626000	34.30	11.1	50	15.7	AV	L1	GND
29.125500	34.80	11.1	50	15.2	AV	L1	GND
29.377500	33.10	11.1	50	16.9	AV	L1	GND
29.625000	35.10	11.1	50	14.9	AV	L1	GND
29.877000	33.90	11.1	50	16.1	AV	L1	GND

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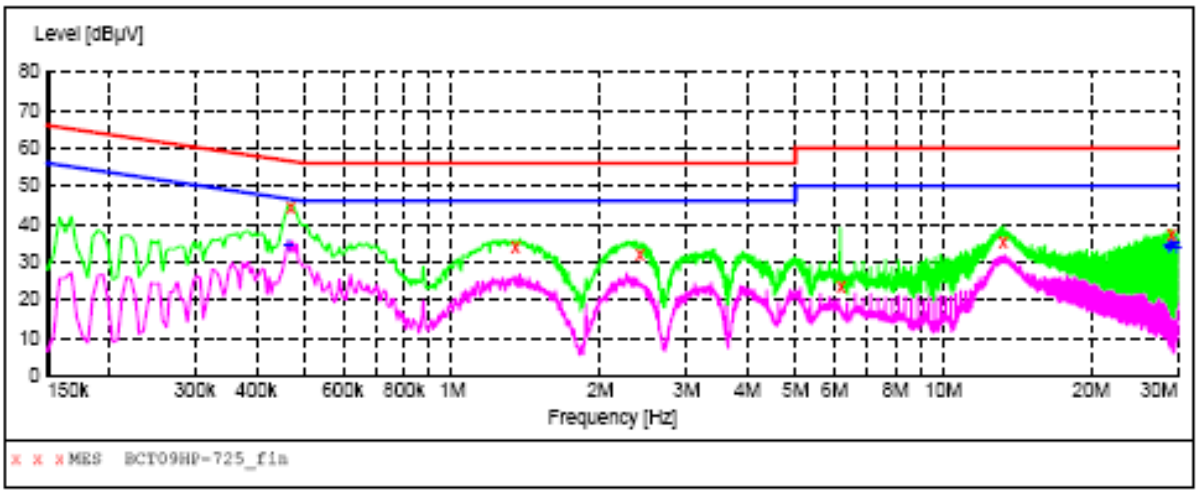
Conducted Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	Shielded Room
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Neutral Line
Start of Test:	08/07/2009/ 19:24 Tem:24℃ Hum:60%

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



MEASUREMENT RESULT: "BCT09HP-725_fin"

8/7/2009 19:24

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.469500	44.20	10.3	57	12.3	QP	N	GND
1.347000	33.80	10.2	56	22.2	QP	N	GND
2.413500	32.10	10.2	56	23.9	QP	N	GND
6.193500	23.40	10.4	60	36.6	QP	N	GND
13.263000	35.40	10.5	60	24.6	QP	N	GND
29.125500	37.10	11.1	60	22.9	QP	N	GND

MEASUREMENT RESULT: "BCT09HP-725_fin2"

8/7/2009 19:24

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.465000	34.60	10.3	47	12.0	AV	N	GND
28.626000	34.30	11.1	50	15.7	AV	N	GND
28.873500	34.10	11.1	50	15.9	AV	N	GND
29.125500	34.80	11.1	50	15.2	AV	N	GND
29.625000	35.10	11.1	50	14.9	AV	N	GND
29.877000	33.90	11.1	50	16.1	AV	N	GND

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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 (dBμV/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.

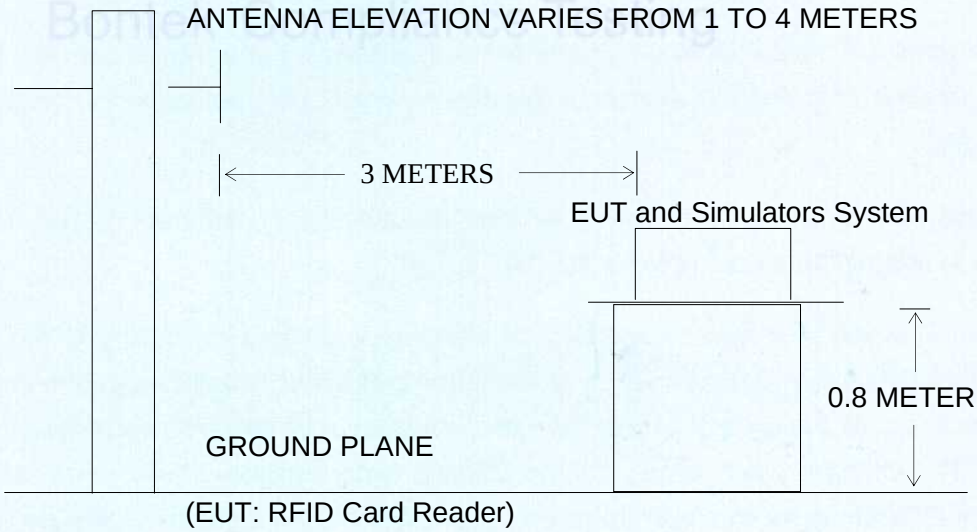
4.3 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the CISPR 16-1-1: 2006, CISPR 16-2-3: 2010. 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)



(EUT: RFID Card Reader)

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4.4 Test Receiver Setup

According to EN 55022 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 dBμV 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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

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

Margin = Class B Limit – Corr. Ampl.

4.7 Radiated Emissions Test Result

Temperature (℃)	22~25
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
Operating Mode	ON

4.8 Test Result

PASS

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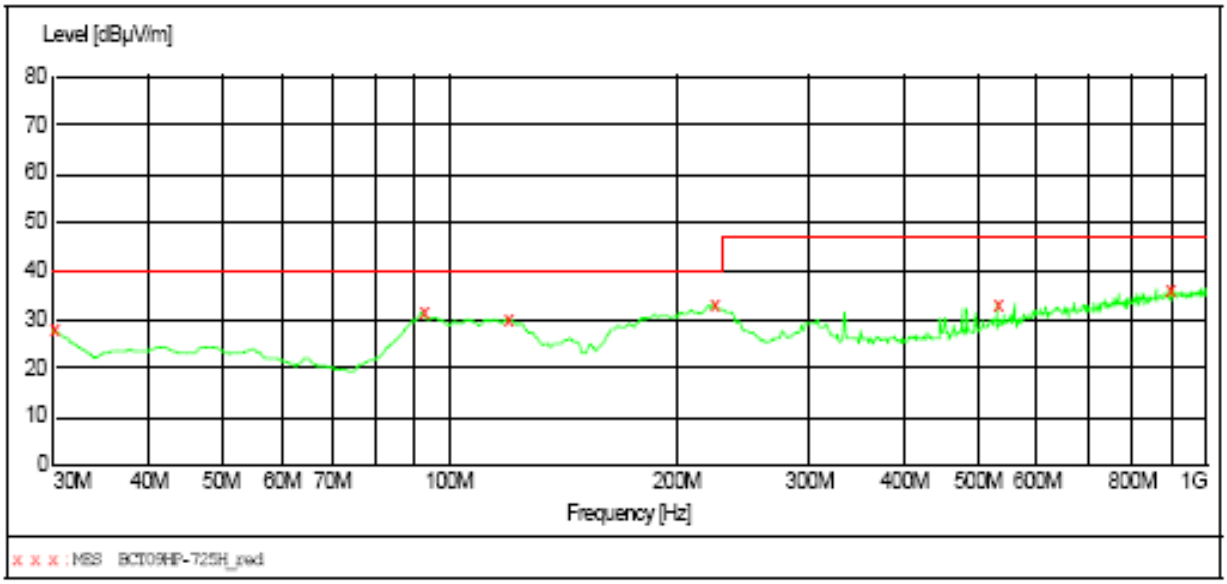
Radiated Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	3m CHAMBER
Operator:	Yang
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Polarization: Horizontal
Start of Test:	08/07/2009/ 16:31 Tem:25℃ Hum:50%

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

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



MEASUREMENT RESULT: "BCT09HP-725H_red"

8/7/2009 16:31

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	27.70	15.3	40.0	12.3	QP	100.0	0.00	HORIZONTAL
92.080000	31.30	17.4	40.0	8.7	QP	100.0	0.00	HORIZONTAL
119.240000	30.10	16.1	40.0	9.9	QP	100.0	0.00	HORIZONTAL
224.000000	33.20	17.2	40.0	6.8	QP	100.0	0.00	HORIZONTAL
530.520000	33.20	23.5	47.0	13.8	QP	100.0	0.00	HORIZONTAL
895.240000	36.30	29.2	47.0	10.7	QP	100.0	0.00	HORIZONTAL

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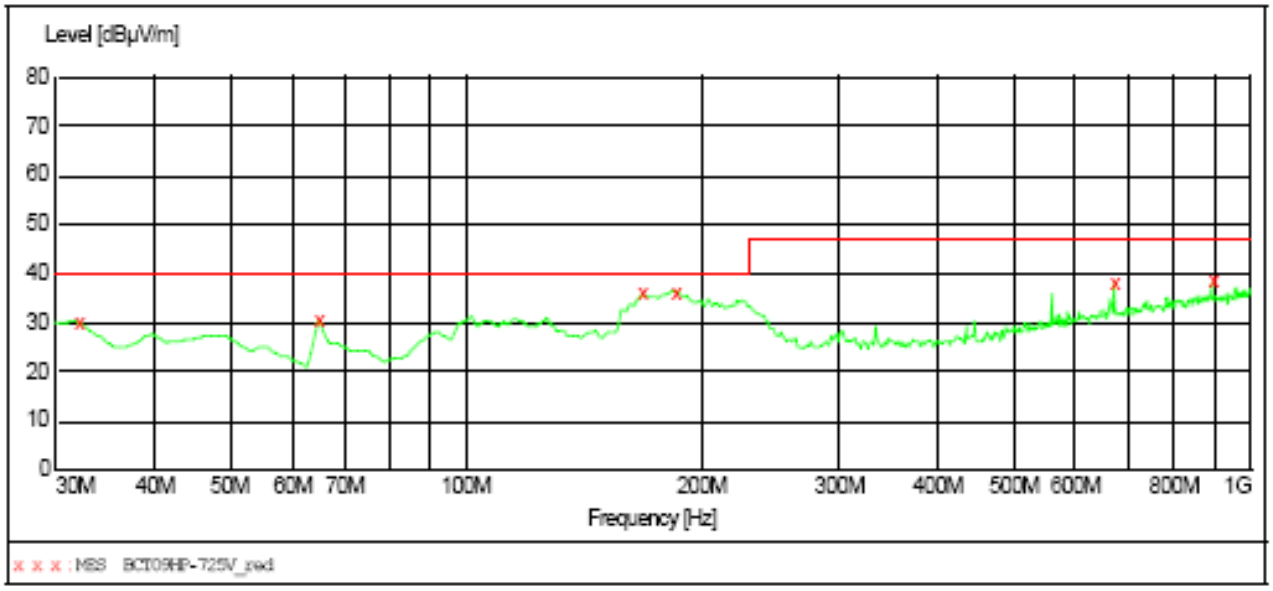
Radiated Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	3m CHAMBER
Operator:	Yang
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Polarization: Vertical
Start of Test:	08/07/2009/ 16:26 Tem:25℃ Hum:50%

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

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



MEASUREMENT RESULT: "BCT09HP-725V_red"

8/7/2009 16:26

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	30.20	15.4	40.0	9.8	QP	100.0	0.00	VERTICAL
64.920000	30.50	14.4	40.0	9.5	QP	100.0	0.00	VERTICAL
167.740000	35.80	14.9	40.0	4.2	QP	100.0	0.00	VERTICAL
185.200000	36.40	16.3	40.0	3.6	QP	100.0	0.00	VERTICAL
672.140000	38.00	26.3	47.0	9.0	QP	100.0	0.00	VERTICAL
895.240000	38.50	29.2	47.0	8.5	QP	100.0	0.00	VERTICAL

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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 (2006+A1:2009+A2:2009) Quasi-stationary - Equipment class A
Observation time:	150s
E. U. T.:	RFID Card Reader
M/N	i-Kadex
Operation Mode	ON

5.3 Test Results

This EUT is deemed to comply with the requirements of EN61000-3-2:2006+A1:2009+A2:2009 without test since the power of EUT is less than 75W.

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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.:	RFID Card Reader
M/N	i-Kadex
Operation Mode	ON

6.3 Test Results

PASS

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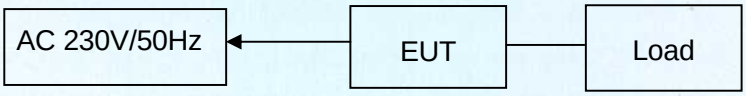
7 - Electrostatic Discharge immunity Test (IEC 61000-4-2)

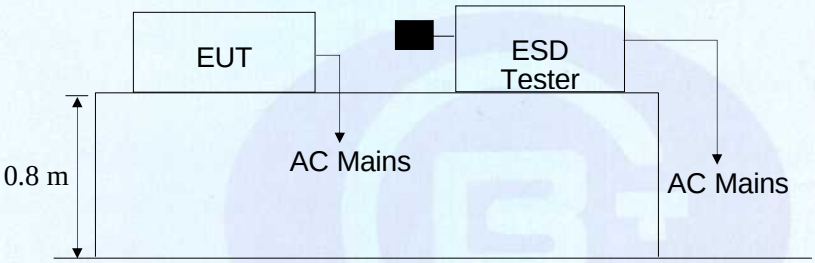
7.1 Block Diagram of Test Setup

7.1.1 Block diagram of connection between the EUT and Load



(EUT: RFID Card Reader)

7.1.2 Block diagram of ESD test setup



(EUT: RFID Card Reader)

7.2 Test Standard

EN 55024:2010, EN 61000-4-2:2009 (EN 61000-4-2:2009 Severity Level: 3 / Air Discharge: ±8KV Level: 2 / Contact Discharge: ±4KV)

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 7.1.

7.4.2 Turn on the power of all equipments.

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

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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 7.6.1. 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

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Temperature (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
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
LED	A	A	A	A	A	A	A	A	/	/
Gap	A	A	A	A	A	A	A	A	/	/
Others	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
N.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	/	/	/	/	/	/

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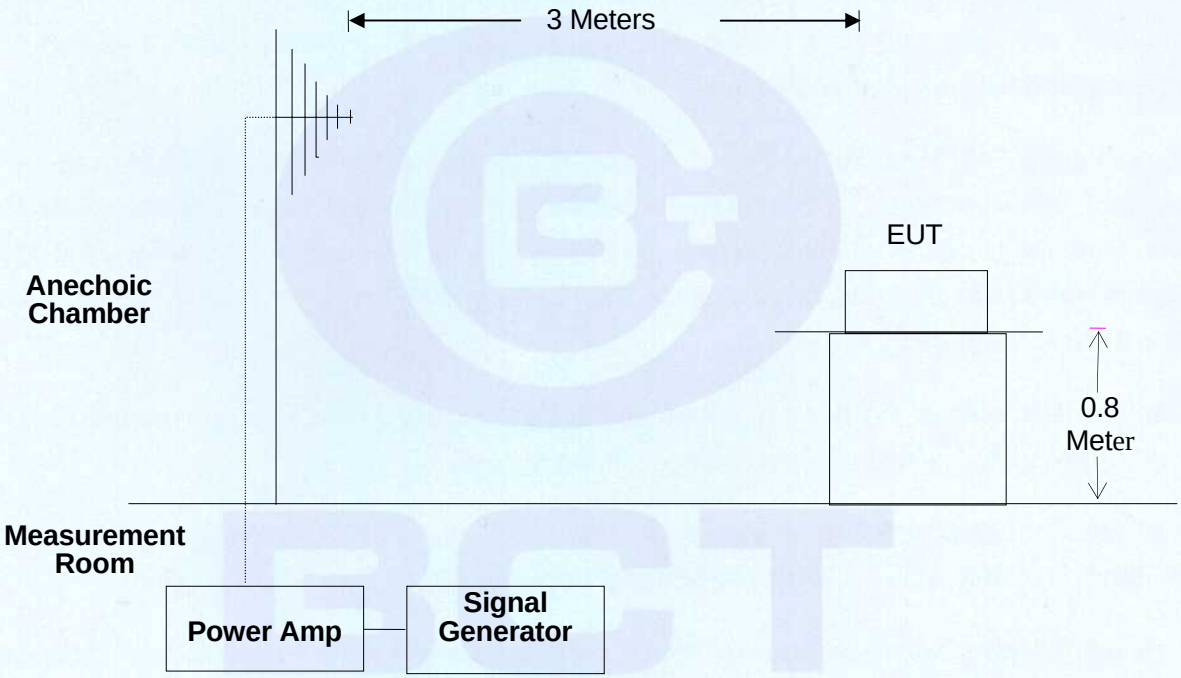
8 - RF Field Strength susceptibility TEST (IEC 61000-4-3)

8.1 Block Diagram of Test

8.1.1 Block diagram of connection between the EUT and Load

(EUT: RFID Card Reader)

8.1.2 Block diagram of RS test setup



(EUT: RFID Card Reader)

8.2 Test Standard

EN 55024:2010, EN 61000-4-3:2006+A2:2010 (EN 61000-4-3:2006+A2:2010, Severity Level: 3, 10V / 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

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8.3.2 Performance Criterion: A

8.4 Operating Condition of EUT

8.4.1 Setup the EUT as shown on Section 8.1.

8.4.2 Turn on the power of all equipments.

8.4.3 Let the EUT work in measuring mode (ON) 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	10V/m (Severity Level 3)
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 (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
Operating Mode	ON

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

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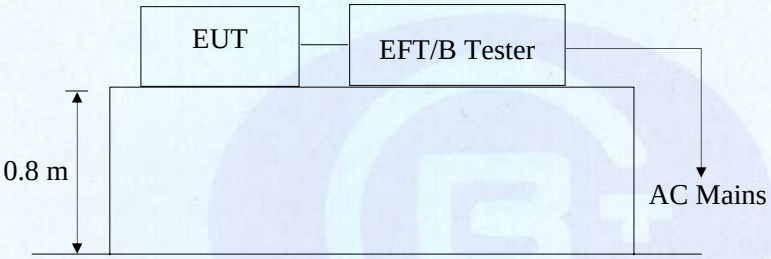
9 - Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)

9.1 Block Diagram of Test Setup

9.1.1.Block Diagram of the EUT

(EUT: RFID Card Reader)

9.1.2. Block Diagram of the AC Mains



(EUT: RFID Card Reader)

9.2 Test Standard

EN 55024:2010, EN 61000-4-4:2012 (EN 61000-4-4:2012, Severity Level, Level 2: 1KV)

9.3 Severity Levels and Performance Criterion

9.3.1 Severity level

Open Circuit Output Test Voltage ±10%		
Level	On RFID Card 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 9.1.

9.4.2 Turn on the power of all equipments.

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

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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 (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
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 Power Line of EUT	L1	A	A	A	A	/	/	/	/
	L2	A	A	A	A	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
	L1+L2	A	A	A	A	/	/	/	/
	L1 + Earth	/	/	/	/	/	/	/	/
	L2 + Earth	/	/	/	/	/	/	/	/
	L1+L2+Earth	/	/	/	/	/	/	/	/

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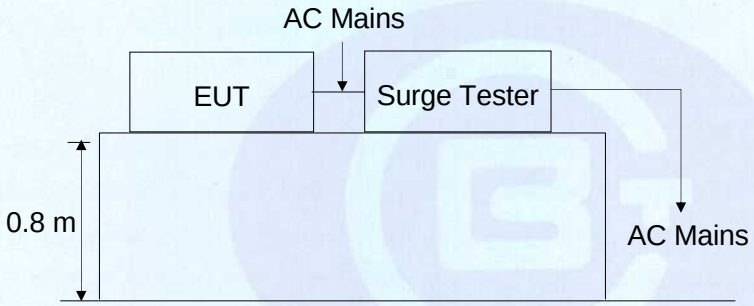
10 - Surge Immunity Test (IEC 61000-4-5)

10.1 Block Diagram of Test Setup

10.1.1 Block Diagram of the EUT

(EUT: RFID Card Reader)

10.1.2. Surge Test Setup



10.2 Test Standard

EN 55024:2010, EN 61000-4-5:2006 (EN 61000-4-5:2006 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 10.1.

10.4.2.Turn on the power of all equipments.

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

10.5 Test Procedure

1)Set up the EUT and test generator as shown on Section 10.1.2.
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.

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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 (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
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	/	/

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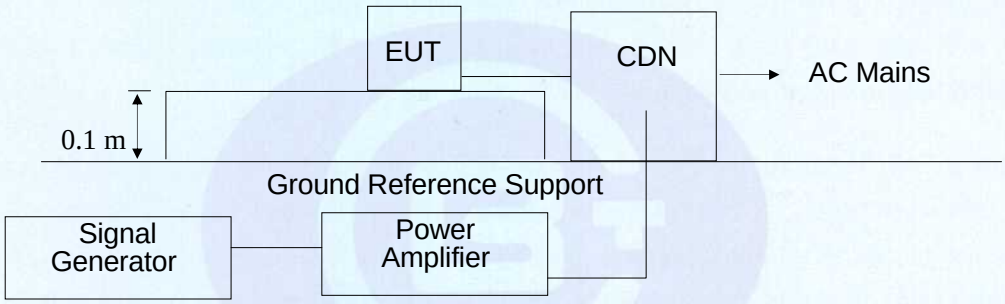
11 - Conducted Susceptibility Test (IEC 61000-4-6)

11.1 Block Diagram of Test Setup

11.1.1 Block Diagram of the EUT

(EUT: RFID Card Reader)

11.1.2 Block Diagram of Test Setup



(EUT: RFID Card Reader)

11.2 Test Standard

EN 55024:2010, EN 61000-4-6:2009 (EN 61000-4-6:2009, Severity Level 3: 10V (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 11.1.

11.4.2 Turn on the power of all equipments.

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

11.5 Test Procedure

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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 11.1.
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*10-3decades/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 (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
Operating Mode	ON

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

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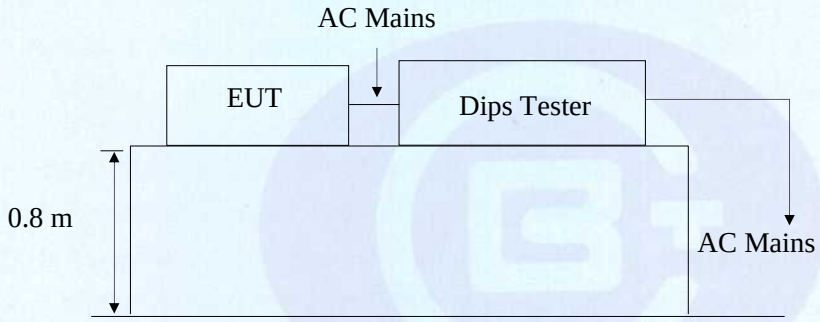
12 - Voltage Dips, Short Interruptions Immunity Tests (IEC 61000-4-11)

12.1 Block Diagram of Test Setup

12.1.1 Block Diagram of the EUT

(EUT: RFID Card Reader)

12.1.2 Dips Test Setup



12.2 Test Standard

EN 55024:2010, EN 61000-4-11:2004 (EN 61000-4-11:2004)

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 1 5 10 25 50 *
40	60	
70	30	

12.3.2 Performance criterion: A&B

12.4 EUT Configuration

The configuration of EUT is listed in Section 12.1.2.

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 (ON) and measure it.

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12.6 Test Procedure

1)Set up the EUT and test generator as shown on Section 12.1.2.
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 (℃)	22~24
Humidity (%RH)	50~55
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
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.

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13 - TEST RESULTS

The following tests were performed on the **FINGERTEC WORLDWIDE SDN BHD**'s product; model: **i-Kadex** ; 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.

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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.

CE

Proposed Label Location on EUT

EUT Rear View/Proposed CE Marking Location

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APPENDIX B - EUT PHOTOGRAPHS

EUT – Front View

EUT –Rear View

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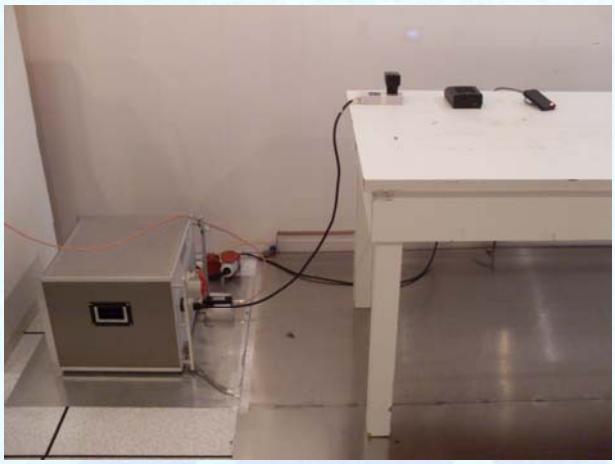
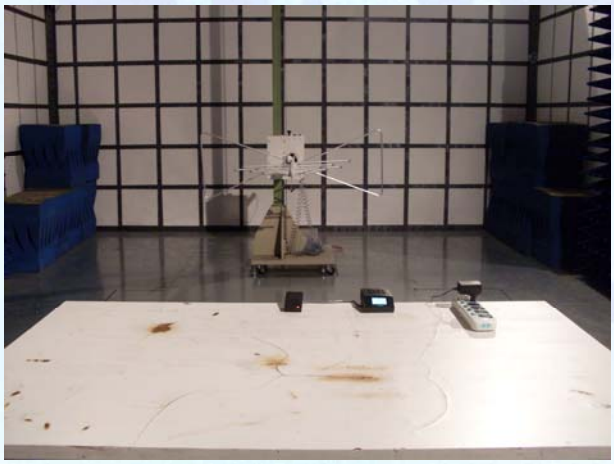
APPENDIX C - TEST SETUP PHOTOGRAPHS

Conducted Emission



Radiated Emission



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

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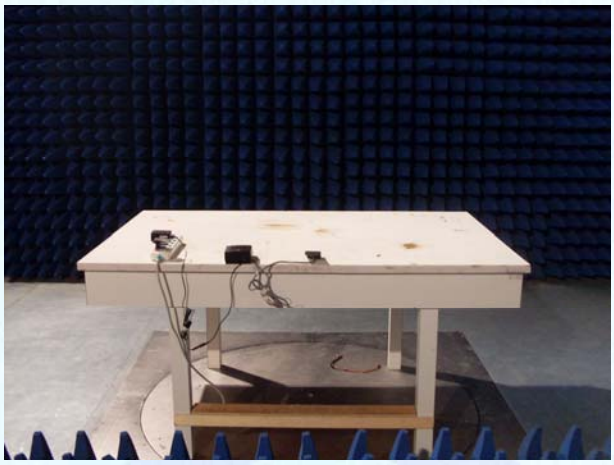
Radiated Susceptibility Test (IEC 61000-4-3)



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

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

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APPENDIX D - BONTEK ACCREDITATION CERTIFICATES

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L3923)

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

1/F., Block East H-3, OCT Eastern Ind. Zone, the 1st Road,

Xiangshan East Street, Nanshan District, Shenzhen, Guangdong, China

is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence of testing.

The scope of accreditation is detailed in the attached appendices bearing the same registration number as above. The appendices form an integral part of this certificate.

Date of Issue: 2012-03-22

Date of Expiry: 2015-03-21

Date of Initial Accreditation: 2009-02-27

Date of Update: 2012-03-22

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).

No.CNAS AL 2

0003595

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