FCC PART 15 B

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/
Report Number:	BCT14HR-1246E
Test Date:	August 07 ~11, 2009
Reviewed By:	Jiankuai.Li/
Approved By:	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

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 Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

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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: Specification:	SWITCHING ADAPTER 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-1246E is produced on the basis of BCT09HR-726E. The report is just for standard upgrade.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with
FCC Rules and Regulations Part 15 Subpart B

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

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1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart B for Emissions

Table 1 : Tests Carried Out Under FCC Part 15 Subpart B

Standard	Test Items	Status
FCC Part 15 Subpart B	Conduction Emission, 0.15MHz to 30MHz	√
FCC Part 15 Subpart B	Radiation Emission, 30MHz to 1000MHz	√

√ 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 ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 15 Subpart B limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

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

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.

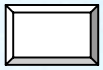
2.3 Special Accessories

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

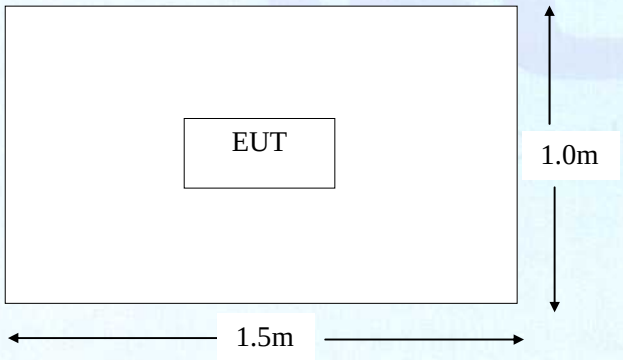
The EUT tested was not modified by BCT.

2.5 Configuration of Test System



EUT

2.6 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

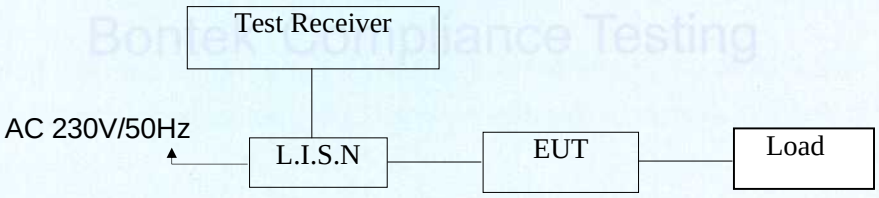
The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B Class B limits.

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 FCC Part 15 B Conducted margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

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

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

3.8 Test Result

PASS

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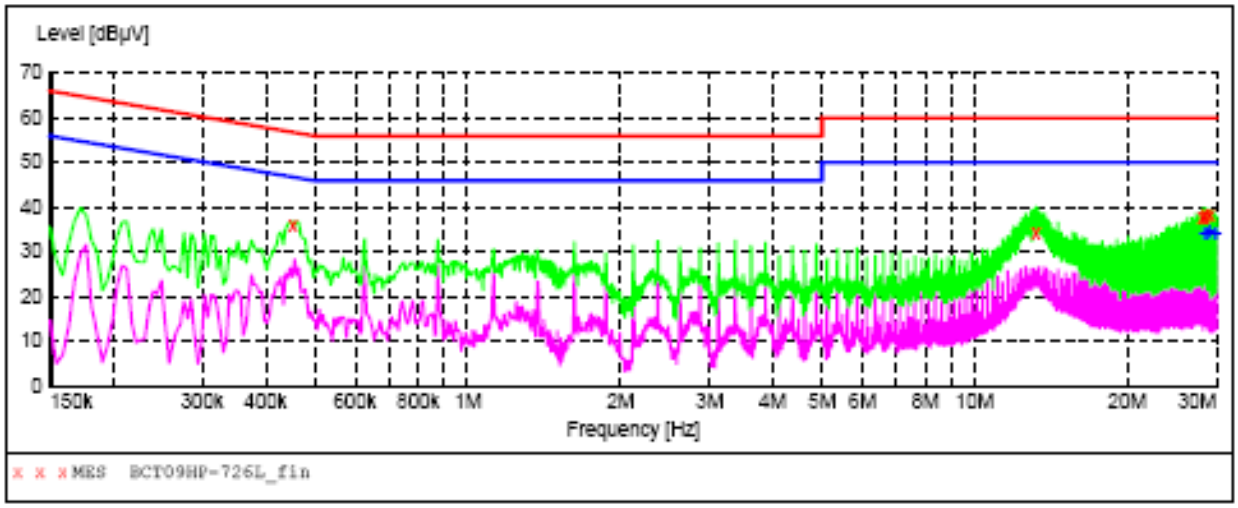
Conducted Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Live Line
Start of Test:	08/07/2009/ 19:38 Tem:24℃ Hum:55%

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



MEASUREMENT RESULT: "BCT09HP-726L_fin"

8/7/2009 19:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.451500	35.80	10.3	57	21.0	QP	L1	GND
13.222500	34.00	10.5	60	26.0	QP	L1	GND
28.126500	37.80	11.0	60	22.2	QP	L1	GND
28.374000	38.00	11.0	60	22.0	QP	L1	GND
28.626000	38.10	11.1	60	21.9	QP	L1	GND
29.125500	38.40	11.1	60	21.6	QP	L1	GND

MEASUREMENT RESULT: "BCT09HP-726L_fin2"

8/7/2009 19:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
28.374000	34.30	11.0	50	15.7	AV	L1	GND
28.626000	34.40	11.1	50	15.6	AV	L1	GND
28.873500	34.10	11.1	50	15.9	AV	L1	GND
29.125500	34.80	11.1	50	15.2	AV	L1	GND
29.751000	34.10	11.1	50	15.9	AV	L1	GND
29.998500	34.30	11.1	50	15.7	AV	L1	GND

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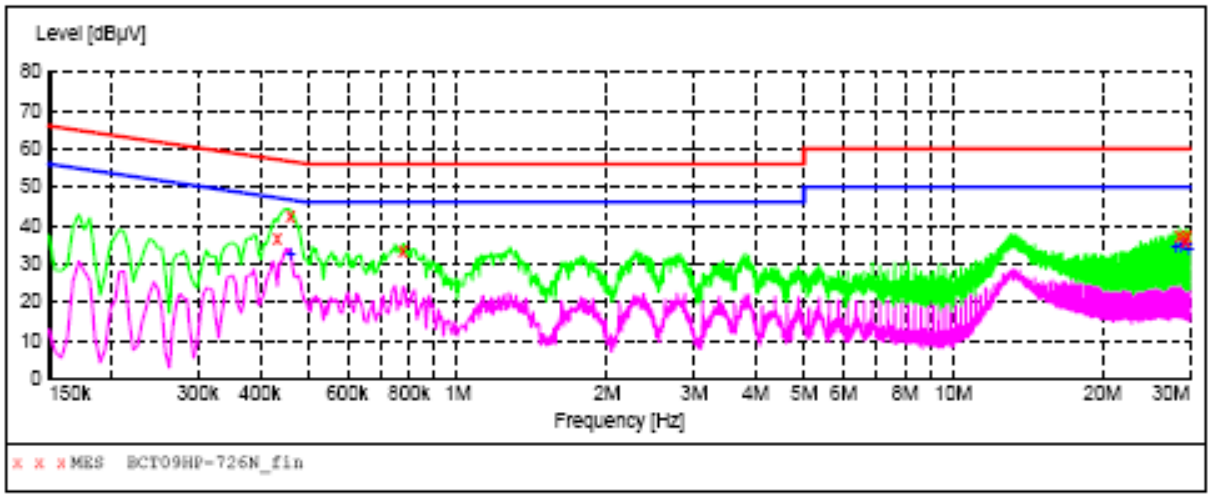
Conducted Emission Test Data

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	Shielded Room
Operator:	Yang
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Neutral Line
Start of Test:	08/07/2009/ 19:35 Tem:24℃ Hum:55%

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



MEASUREMENT RESULT: "BCT09HP-726N_fin"

8/7/2009 19:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.433500	36.80	10.3	57	20.4	QP	N	GND
0.460500	42.60	10.3	57	14.1	QP	N	GND
0.775500	33.00	10.2	56	23.0	QP	N	GND
28.626000	37.20	11.1	60	22.8	QP	N	GND
29.377500	35.70	11.1	60	24.3	QP	N	GND
29.625000	37.40	11.1	60	22.6	QP	N	GND

MEASUREMENT RESULT: "BCT09HP-726N_fin2"

8/7/2009 19:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.460500	32.80	10.3	47	13.9	AV	N	GND
28.126500	34.30	11.0	50	15.7	AV	N	GND
28.626000	34.70	11.1	50	15.3	AV	N	GND
29.125500	35.10	11.1	50	14.9	AV	N	GND
29.625000	35.40	11.1	50	14.6	AV	N	GND
29.877000	34.20	11.1	50	15.8	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 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

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.

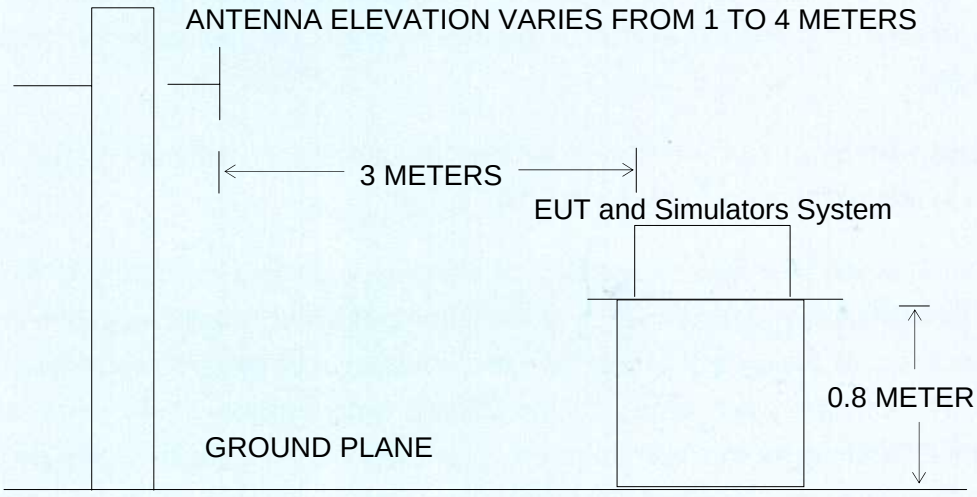
4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 Subpart 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 FCC Part 15 rule, 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 = Corr. Ampl. –Class B Limit

4.7 Radiated Emissions Test Result

Temperature (℃)	22~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	RFID Card Reader
M/N	i-Kadex
Operating Mode	ON

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

4.8 Test Result

PASS

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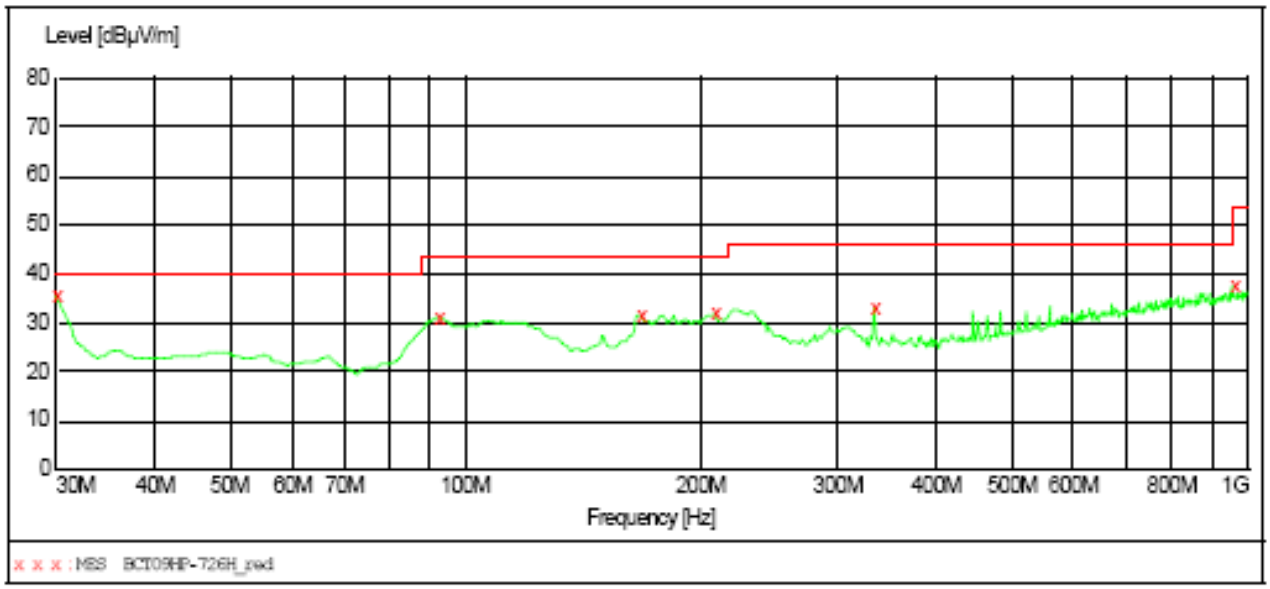
Radiated Emission Test Data:

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Polarization: Horizontal
Start of Test:	08/07/2009/ 16:36 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-726H_red"

8/7/2009 16:36

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	35.30	15.3	40.0	4.7	QP	100.0	0.00	HORIZONTAL
92.080000	31.00	17.4	43.5	12.5	QP	100.0	0.00	HORIZONTAL
167.740000	31.60	14.9	43.5	11.9	QP	300.0	0.00	HORIZONTAL
208.480000	31.80	16.9	43.5	11.7	QP	300.0	0.00	HORIZONTAL
334.580000	32.80	20.7	46.0	13.2	QP	100.0	0.00	HORIZONTAL
957.320000	37.40	29.7	46.0	8.6	QP	300.0	0.00	HORIZONTAL

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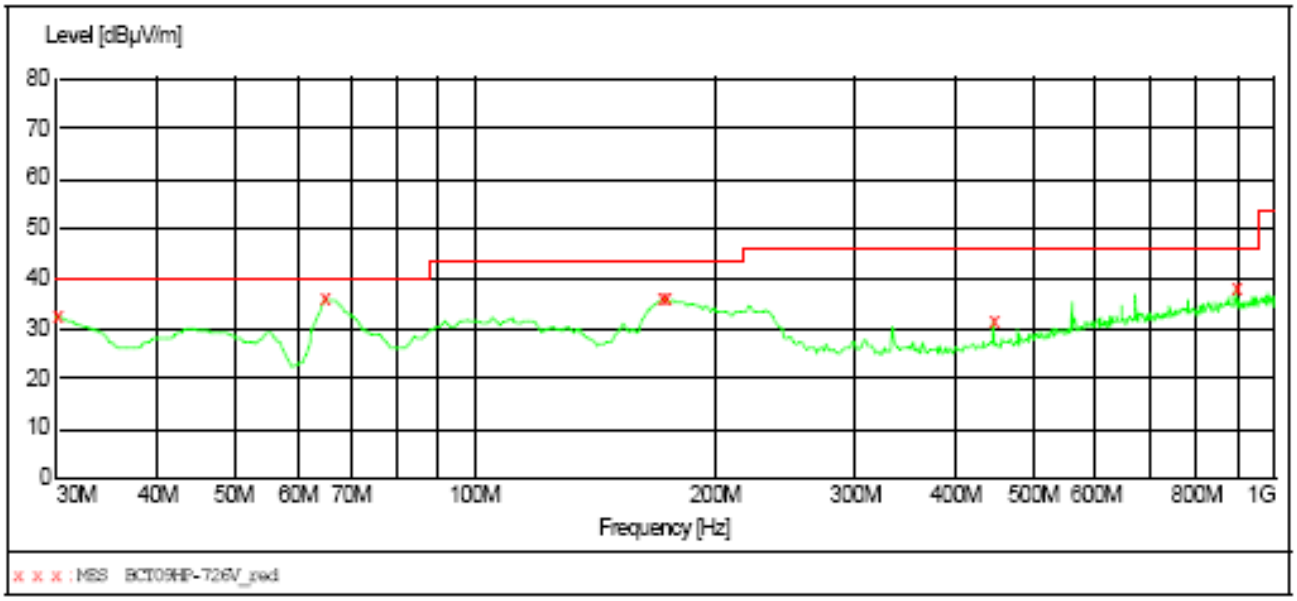
Radiated Emission Test Data:

EUT:	RFID Card Reader
M/N:	i-Kadex
Operating Condition:	ON
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 120V/60Hz for Adapter
Comment:	Polarization: Vertical
Start of Test:	08/07/2009/ 16:34 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-726V_red"

8/7/2009 16:34

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	32.50	15.3	40.0	7.5	QP	100.0	0.00	VERTICAL
64.920000	35.80	14.4	40.0	4.2	QP	100.0	0.00	VERTICAL
171.620000	35.60	15.2	43.5	7.9	QP	100.0	0.00	VERTICAL
173.560000	35.90	15.3	43.5	7.6	QP	100.0	0.00	VERTICAL
447.100000	31.50	21.4	46.0	14.5	QP	100.0	0.00	VERTICAL
895.240000	37.90	29.2	46.0	8.1	QP	100.0	0.00	VERTICAL

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APPENDIX A- EUT PHOTOGRAPHS

EUT – Front View

EUT –Rear View

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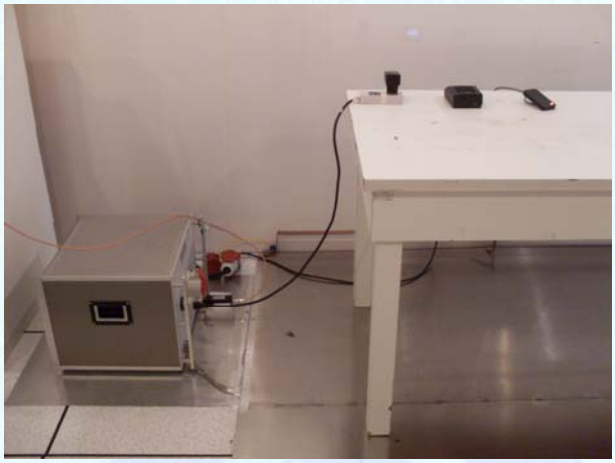
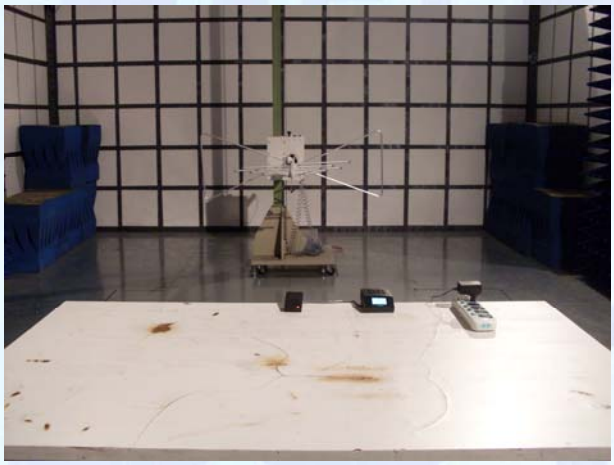
APPENDIX B - TEST SETUP PHOTOGRAPHS

Conducted Emission



Radiated Emission



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APPENDIX C - 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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