



BCT
Bontek Compliance Testing

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

ETSI EN 301 489-1 V1.8.1: 2008
ETSI EN 301 489-3 V1.4.1: 2002
MEASUREMENT AND TEST REPORT

For

FINGERTEC WORLDWIDE SDN BHD

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

Model: M-Kadex

April 27, 2012

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: RFID Access Control
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Report Number:	BCT12CR-0306E-2
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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 SDN BHD**
Address of manufacturer: NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47100 PUCHONG, SELANGOR, MALAYSIA

General Description of E.U.T

EUT Description: **RFID Access Control**
Model NO.: **M-Kadex**
Trademark: 
Rated Voltage: DC 12V
Adapter specification: Switch mode power supply
Model: KSAFH1200300T1M3
Input: AC100-240V 50/60Hz 1.2A
Output: DC12V 3.0A
Antenna Type: Built-in Antenna
Classification of Equipment: The Transmitter is a narrow-band and without voice application.
The Transmitter is ranged into Category I.

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

Category of Equipment

Category I General
Category II Portable Equipment
Category III Equipment for normal indoor use

1.2 Test Standards

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

ETSI EN 301 489-3 V1.4.1: 2002

The objective of the manufacturer is to demonstrate compliance with the described standards above.
In this report, all the test method used was reference to the standard of

ETSI EN 301 489-1 V1.8.1: 2008

Currently, the Emission test carried out in ETSI EN 301 489-1 V1.8.1 refer to the following specific ratified standard tests to be performed:

1. Disturbance Voltage at The Mains Terminals (150KHz to 30MHz) in accordance with EN 55022.
2. Radiated Disturbances (30MHz To 1000MHz) in accordance with EN 55022.
3. Harmonic Current in accordance with EN 61000-3-2.
4. Voltage Fluctuation& Flicker in accordance with EN 61000-3-3.

Also, the Immunity test carried out in ETSI EN 301 489-1 V1.8.1 refer to the specific ratified standard tests to be performed. They are as follows:

1. Electrostatic discharge immunity (ESD) in accordance with EN 61000-4-2.
2. Radiated RF-electromagnetic field immunity in accordance with EN 61000-4-3.
3. Electrical Fast Transient/Burst (EFT) in accordance with EN 61000-4-4.
4. Surge in accordance with EN 61000-4-5.
5. Conducted Susceptibility (CS) in accordance with EN 61000-4-6.
6. Voltage Dips & Interruption in accordance with EN 61000-4-11.

Data has been collected, reduced, and analyzed within this report in accordance with ETSI EN 301 489-1 V1.8.1. Immunity requires the following as specific performance criteria:

- 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 of 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.

In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

For the tests carried out under ETSI EN 301 489-3 V1.8.1: 2008, see the following table.

Table1: Tests Carried Out Under ETSI EN 301489-3 V1.4.1 (2002- 8).	
EMI TEST	
Clause 7.1 Radiated Emission	ETSI EN 301489-1: 2008 clause 8.2, EN 55022
Clause 7.1 Conducted Emission	ETSI EN 301489-1: 2008 clause 8.3/8.4/8.7, EN 55022
Clause 7.1 Harmonic Current	ETSI EN 301489-1: 2008 clause 8.5, EN 61000-3-2
Clause 7.1 Voltage Fluctuation& Flicker	ETSI EN 301489-1: 2008 clause 8.6, EN 61000-3-3
EMS TEST	
Clause 7.2 RF Field Strength Susceptibility (RS)	ETSI EN 301489-1: 2008 clause 9.2, EN 61000-4-3
Clause 7.2 Electrostatic Discharge (ESD)	ETSI EN 301489-1: 2008 clause 9.3, EN 61000-4-2
Clause 7.2 Electrical Fast Transient/Burst (EFT)	ETSI EN 301489-1: 2008 clause 9.4, EN 61000-4-4
Clause 7.2 Conducted Susceptibility (CS)	ETSI EN 301489-1: 2008 clause 9.5, EN 61000-4-6
Clause 7.2 Transient & Surge in Vehicular	ETSI EN 301489-1: 2008 clause 9.6, ISO7637-1/-2
Clause 7.2 Voltage Dips & Interruption	ETSI EN 301489-1: 2008 clause 9.7, EN 61000-4-11
Clause 7.2 Surge	ETSI EN 301489-1: 2008 clause 9.8, EN 61000-4-5

1.3 Test Summary

Radio Spectrum Matter (RSM) Part				
The EUT belong to Type 1 in table 1 and class 3 of table 3 (Refer to Annex B) in ETSI EN 301 489-3:2002				
EMI TEST				
Test	Test Requirement	Test Method	Limit/Severity	Result
Conducted Emission 150K~30MHz	ETSI EN 301489-3: 2002 V1.4.1clause 7.1	ETSI EN 301489-1: 2008 V1.8.1 clause 8 EN 55022	Table 4	PASS*
Radiated Emission 30M~1GHz	ETSI EN 301489-3: 2002 V1.4.1clause 7.1	ETSI EN 301489-1: 2008 V1.8.1 clause 8 EN 55022	Table 5	PASS*
Harmonic Current	ETSI EN 301489-3: 2002 V1.4.1clause 7.1	ETSI EN 301489-1: 2008 V1.8.1 clause 8 EN 61000-3-2	Refer to EN 61000-3-2	N/A
Voltage Fluctuation & Flicker	ETSI EN 301489-3: 2002 V1.4.1clause 7.1	ETSI EN 301489-1: 2008 V1.8.1 clause 8 EN 61000-3-3	Refer to EN 61000-3-3	PASS*
EMS TEST				
Radio Frequency Electromagnetic Field (80~1000MHz and 1000~1400MHz)	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1 clause 9.2 EN 61000-4-3	3V/m,80% 1kHz,A.M.	PASS*
Electrostatic Discharge (ESD)	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2003 V1.5.1 clause 9.3 EN 61000-4-2	±4kV, Contact ±8kV, Air	PASS*
Fast Transient, Common Mode (EFT)	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1clause 9.4 EN 61000-4-3	1 kV, 2 min	PASS*
Radio Frequency Common Mode (CS)	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1clause 9.5 EN 61000-4-6	3V, 80% 1kHz,A.M	PASS*
Transient & Surge in Vehicular	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1clause 9.6	Refer to ETSI EN 301489-1: 2003 V1.5.1 clause 9.6	N/A
Voltage Dips & Interruption	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1 clause 9.7 EN 61000-4-11	Refer to clause 9.7	PASS*
Surge	ETSI EN 301489-3: 2002 V1.4.1clause 7.2	ETSI EN 301489-1: 2008 V1.8.1 clause 9.8 EN 61000-4-5	1kV, Line to Line	PASS*

* No ancillary equipment is with Tx

Tx: In this whole report Tx means Transmitter.

RF: In this whole report RF means Radio Frequency.

1.4 EMC requirements specification in ETSI EN 301489-3

Type of SRD Equipment In ETSI EN 301489-3, Subclause 4.1 Table 1

Equipment Type	Technical Nature of Primary Function
1	Transfer of messages (digital or analogue signal)
2	Transfer of audio (speech or music)
3	Others

Classification of SRD Equipment in EN301489-3, Subclause 6.1 Table 3

Class of SRD Equipment	Risk assessment of Rx performance
1	Highly reliable SRD communication media; e.g. serving human life inherent system (may result in a physical risk to a person)
2	Medium reliable SRD communication media; e.g. causing inconvenience to persons, which cannot simply overcome by other means
3	Standard reliable SRD communication media; e.g. inconvenience to persons, which can simply overcome by other means (e.g. manual)

Remark: The EUT belong to Type 1, class 3

1.5 Test Methodology

All measurements contained in this report were conducted with CISPR 16-1-1: 2006, radio disturbance and immunity measuring apparatus, and CISPR16-2-3: 2010, Method of measurement of disturbances and immunity.

1.6 Test Facility

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

FCC – Registration No.: 338263

Shenzhen Bontek Compliance Testing Laboratory Co., 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 03, 2011.

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 25, 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 Electronic Technology 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 22, 2012.

TUV - Registration No.: UA 50203122-0001

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. An assessment of the laboratory was conducted according to the "Procedures and Conditions for EMC Test Laboratories" with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-002

1.7 Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date	Calculator due date
1	EMI Test Receiver	R&S	ESCI	100687	2012-4-6	2013-4-5
2	EMI Test Receiver	R&S	ESPI	100097	2011-7-25	2012-7-24
3	Amplifier	HP	8447D	1937A02492	2012-4-6	2013-4-5
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2012-4-6	2013-4-5
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2012-4-6	2013-4-5
6	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-4-6	2013-4-5
7	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-4-10	2013-4-9
9	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2012-4-6	2013-4-5
10	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2011-6-16	2012-6-15
11	Color TV Pattern generator	PHILIPS	PM5418	TM209947	N/A	N/A
12	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2012-4-6	2013-4-5
14	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2012-4-6	2013-4-5
15	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2011-11-28	2012-11-27
16	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2011-11-28	2012-11-27
17	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2011-11-28	2012-11-27
18	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-4-10	2013-4-9
19	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2011-11-28	2012-11-27
20	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2011-10-24	2012-10-23
21	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-4-6	2013-4-5
22	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2012-4-6	2013-4-5
24	CDN	FRANKONIA	CDN M2+M3	A3027019	2012-4-6	2013-4-5
25	6DB Attenuator	FRANKONIA	N/A	1001698	2012-4-6	2013-4-5
26	EM Injection clamp	FCC	F-203I-23mm	091536	2012-4-6	2013-4-5
27	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-6	2013-4-5

28	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2012-4-6	2013-4-5
29	ISN	TESEQ	ISN-T800	30301	2011-6-23	2012-6-22
30	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2011-11-14	2012-11-13
31	HRMONICS&FLICKRE ANALYSER	VOLTECH	PM6000	200006700433	2011-6-27	2012-6-26
32	Spectrum Analyzer	R&S	FSP	100397	2011-11-2	2012-11-1
33	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2012-4-6	2013-4-5
34	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2012-4-6	2013-4-5



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 ON.

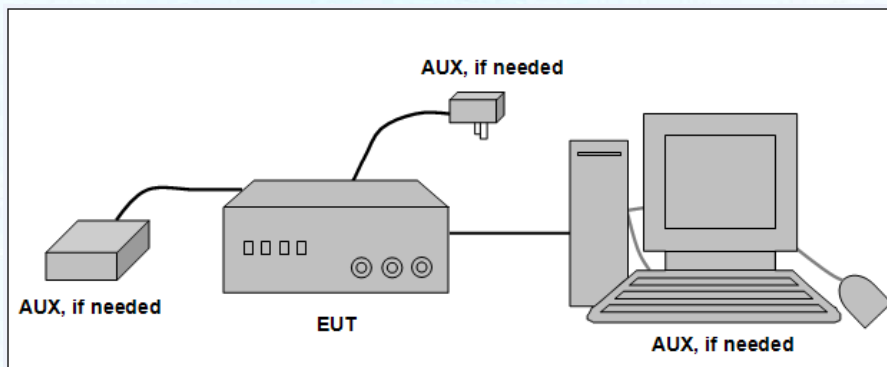
2.3 Special Accessories

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 Bontek.

2.5 Basic Configuration of Test System



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 ± 2.4 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.

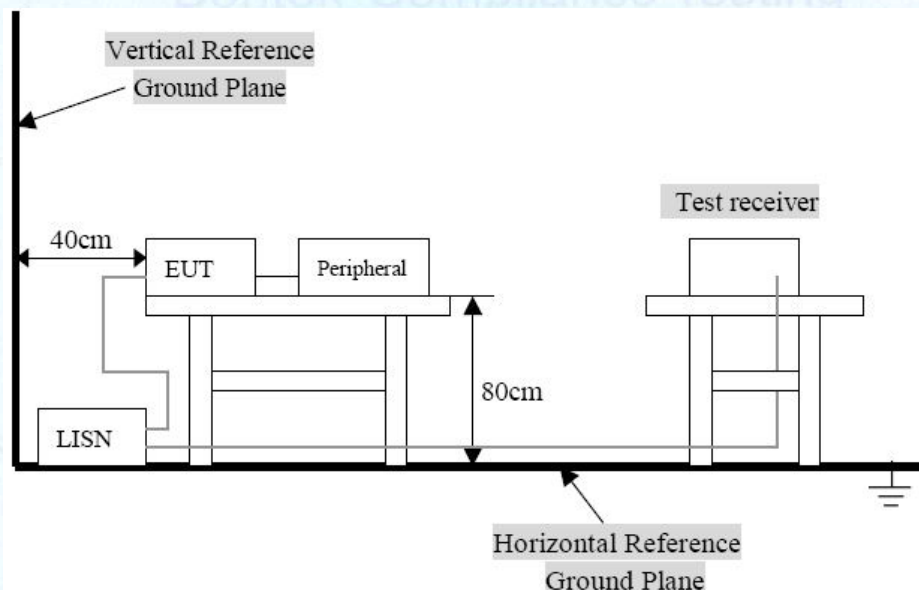
3.3 EUT Setup

The setup of EUT is according with CISPR 16-1-1: 2006, CISPR16-2-3: 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.

3.4 Test Setup Diagram



3.5 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

3.6 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".

3.7 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:

3.8 Disturbance Voltage Test Data

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

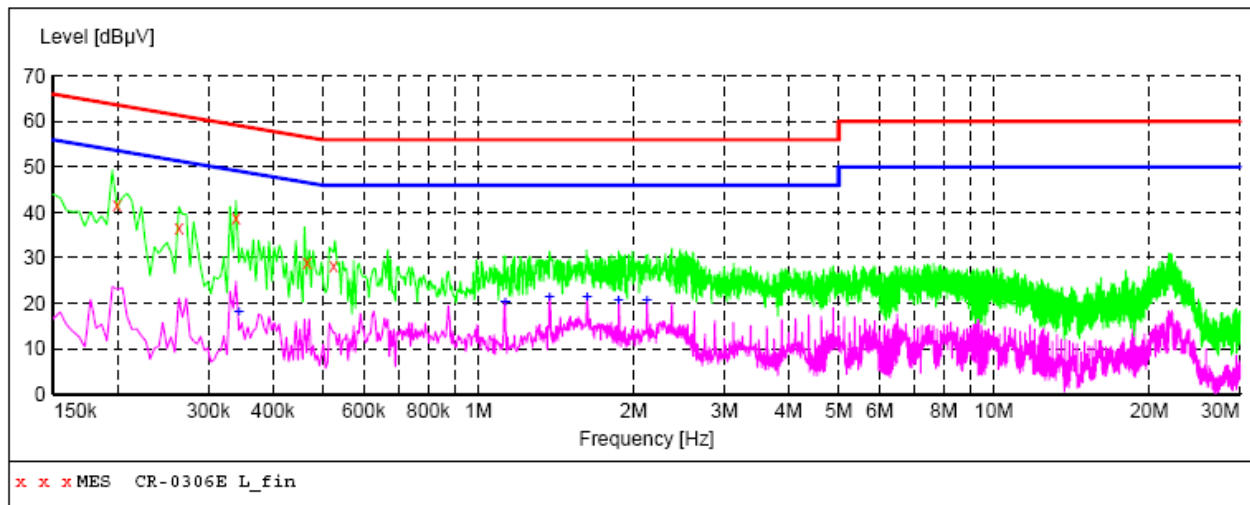
3.9 Test Result

Pass

CONDUCTED EMISSION TEST DATA

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: Shielded Room
 Operator: Chen
 Test Specification: AC 230V/50Hz for adapter
 Comment: Live Line

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



MEASUREMENT RESULT: "CR-0306E L_fin"

3/28/2012 17:54

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.199500	41.80	10.1	64	21.8	QP	L1	GND
0.262500	36.70	10.1	61	24.7	QP	L1	GND
0.339000	38.60	10.2	59	20.6	QP	L1	GND
0.465000	29.00	10.2	57	27.6	QP	L1	GND
0.523500	28.20	10.2	56	27.8	QP	L1	GND

MEASUREMENT RESULT: "CR-0306E L_fin2"

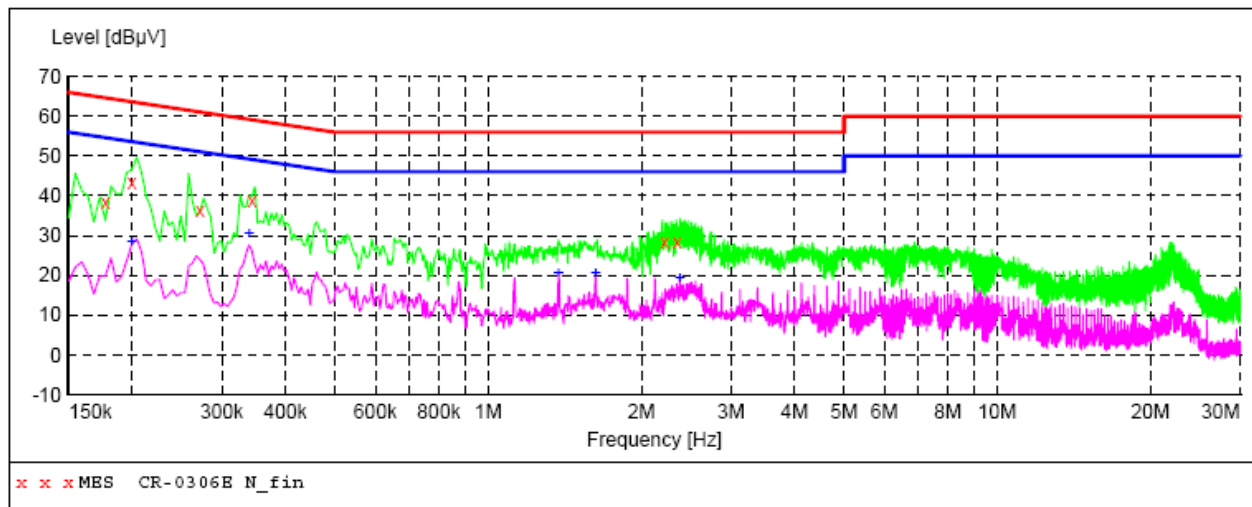
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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.343500	18.20	10.2	49	30.9	AV	L1	GND
1.126500	20.20	10.1	46	25.8	AV	L1	GND
1.374000	21.30	10.1	46	24.7	AV	L1	GND
1.626000	21.30	10.1	46	24.7	AV	L1	GND
1.873500	20.70	10.0	46	25.3	AV	L1	GND
2.125500	20.60	10.1	46	25.4	AV	L1	GND

CONDUCTED EMISSION TEST DATA

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: Shielded Room
 Operator: Chen
 Test Specification: AC 230V/50Hz for adapter
 Comment: Neutral Line

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



MEASUREMENT RESULT: "CR-0306E N_fin"

3/28/2012 17:50

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.177000	38.60	10.1	65	26.0	QP	N	GND
0.199500	43.60	10.1	64	20.0	QP	N	GND
0.271500	36.40	10.1	61	24.7	QP	N	GND
0.343500	38.80	10.2	59	20.3	QP	N	GND
2.220000	28.30	10.1	56	27.7	QP	N	GND
2.350500	28.50	10.1	56	27.5	QP	N	GND

MEASUREMENT RESULT: "CR-0306E N_fin2"

3/28/2012 17:50

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.199500	28.60	10.1	54	25.0	AV	N	GND
0.339000	30.50	10.2	49	18.7	AV	N	GND
1.374000	20.70	10.1	46	25.3	AV	N	GND
1.626000	20.70	10.1	46	25.3	AV	N	GND
2.377500	19.50	10.1	46	26.5	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

Frequency (MHz)	Distance (Meters)	Field Strengths Limits AV(dB μ V/m)	Field Strengths Limits PK(dB μ V/m)
1000~3000	3	50	70
3000-6000	3	54	74

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, CISPR16-2-3: 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.

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 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) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

4.8 Test Result

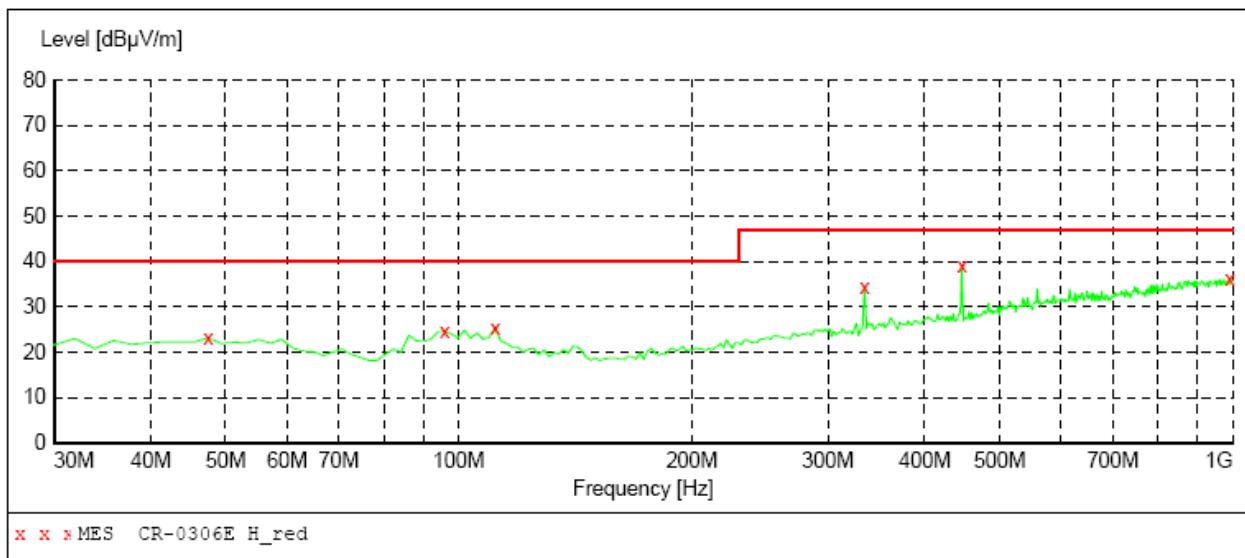
Pass

RADIATED EMISSION TEST DATA OF BELOW 1GHz

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for adapter
 Comment: Polarization: Horizontal

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

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



MEASUREMENT RESULT: "CR-0306E H_red"

3/29/2012 02:27

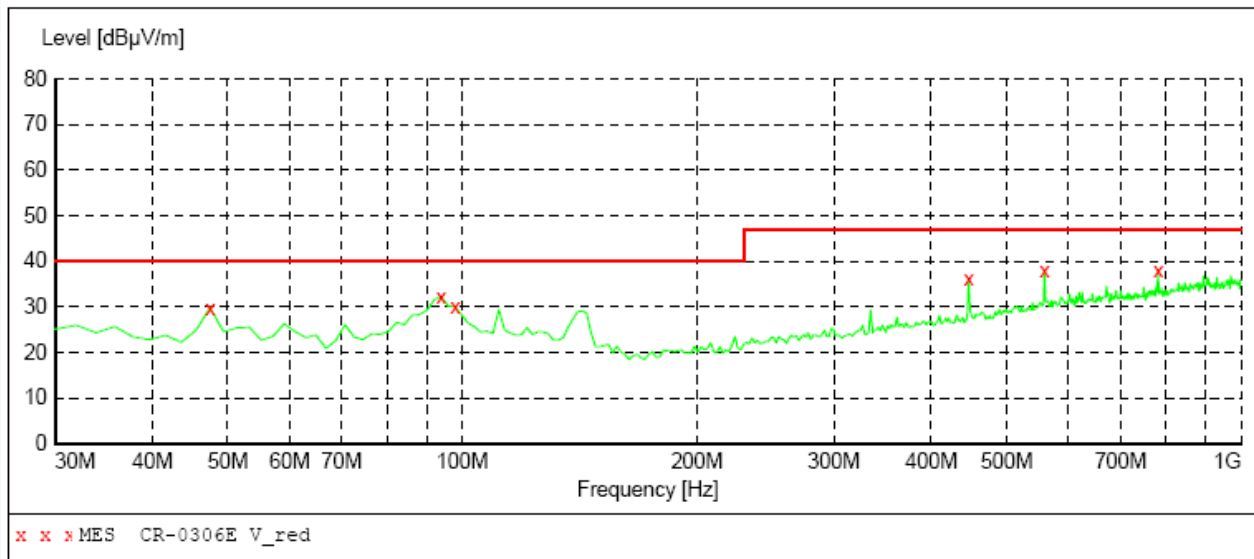
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	23.10	15.8	40.0	16.9	QP	100.0	0.00	HORIZONTAL
95.960000	24.50	17.2	40.0	15.5	QP	100.0	0.00	HORIZONTAL
111.480000	25.50	16.2	40.0	14.5	QP	300.0	0.00	HORIZONTAL
334.580000	34.40	19.9	47.0	12.6	QP	100.0	0.00	HORIZONTAL
447.100000	39.20	22.1	47.0	7.8	QP	100.0	0.00	HORIZONTAL
992.240000	36.20	29.9	47.0	10.8	QP	100.0	0.00	HORIZONTAL

RADIATED EMISSION TEST DATA OF BELOW 1GHz

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for adapter
 Comment: Polarization: Vertical

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

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



MEASUREMENT RESULT: "CR-0306E V_red"

3/29/2012 02:23

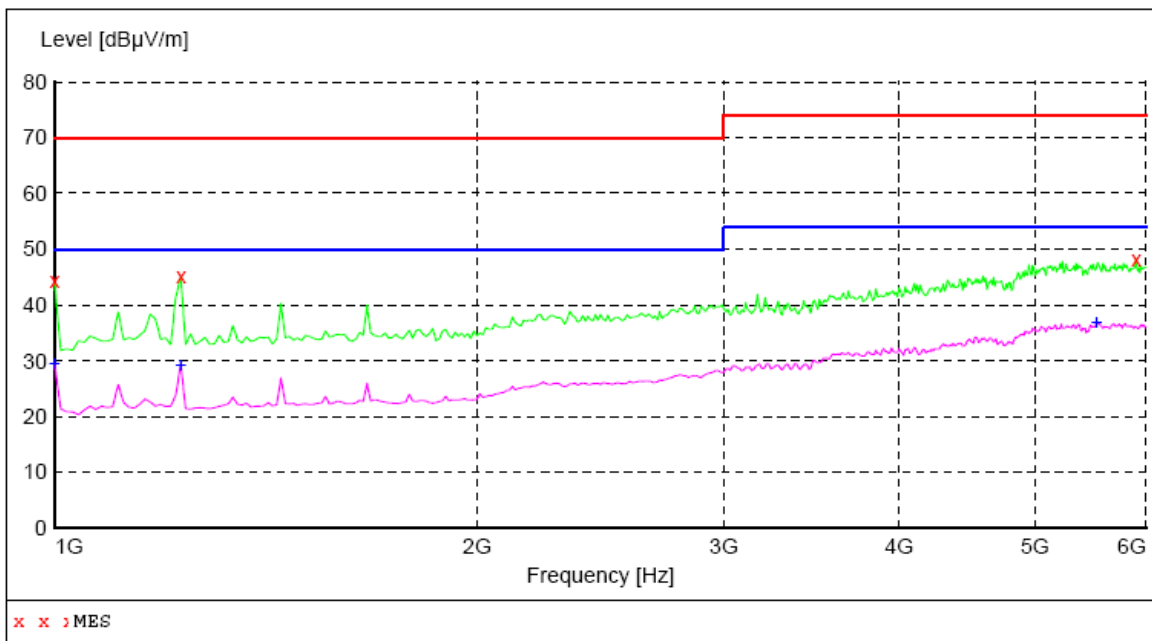
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	29.80	15.8	40.0	10.2	QP	100.0	0.00	VERTICAL
94.020000	32.30	16.9	40.0	7.7	QP	100.0	0.00	VERTICAL
97.900000	30.10	17.4	40.0	9.9	QP	100.0	0.00	VERTICAL
447.100000	36.20	22.1	47.0	10.8	QP	100.0	0.00	VERTICAL
559.620000	37.90	25.2	47.0	9.1	QP	100.0	0.00	VERTICAL
782.720000	37.90	27.7	47.0	9.1	QP	100.0	0.00	VERTICAL

RADIATED EMISSION TEST DATA Above 1G

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for adapter
 Comment: Polarization: Horizontal

SWEEP TABLE: "test (1G-6G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 1.0 GHz	Frequency 6.0 GHz	MaxPeak Average	Coupled	1 MHz	BBHA 9120 A



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1000.000000	44.30	-12.8	70.0	25.7	PK	100.0	0.00	HORIZONTAL
1230.000000	45.10	-11.7	70.0	24.9	PK	100.0	0.00	HORIZONTAL
5900.000000	48.30	4.1	74.0	25.7	PK	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT:

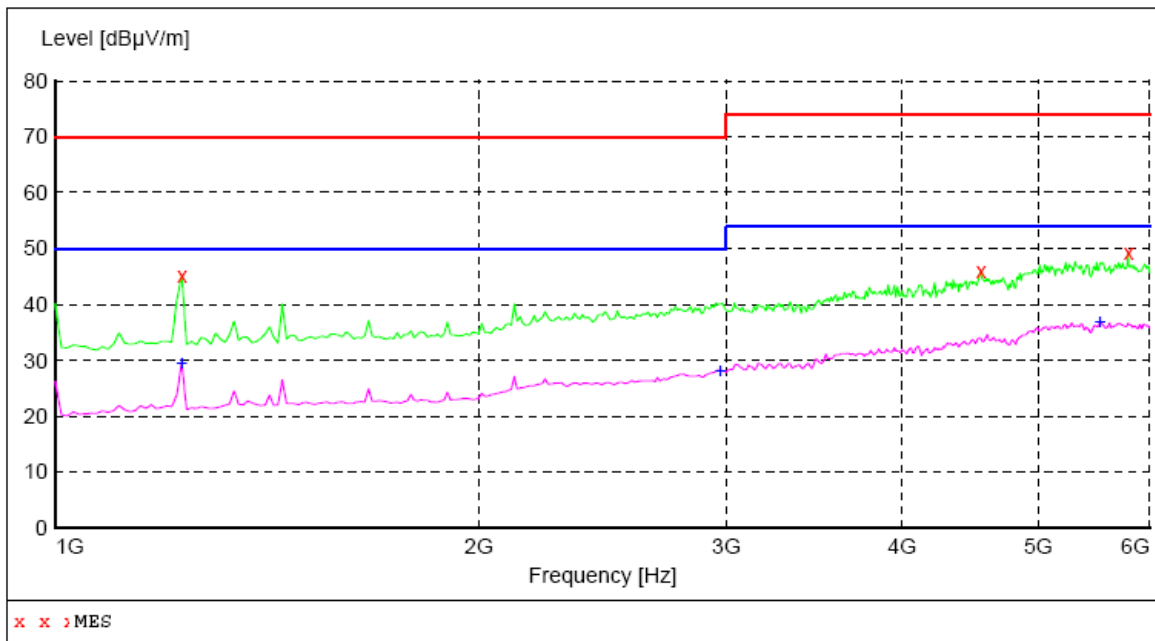
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1000.000000	29.50	-12.8	50.0	20.5	AV	100.0	0.00	HORIZONTAL
1230.000000	29.40	-11.7	50.0	20.6	AV	100.0	0.00	HORIZONTAL
5530.000000	36.90	3.6	54.0	17.1	AV	100.0	0.00	HORIZONTAL

RADIATED EMISSION TEST DATA Above 1G

EUT: RFID Access Control
 M/N: M-Kadex
 Operating Condition: Normal operation
 Test Site: 3m CHAMBER
 Operator: Yang
 Test Specification: AC 230V/50Hz for adapter
 Comment: Polarization: Vertical

SWEEP TABLE: "test (1G-6G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 1.0 GHz	Frequency 6.0 GHz	MaxPeak Average	Coupled	1 MHz	BBHA 9120 A



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1230.000000	45.10	-11.7	70.0	24.9	PK	100.0	0.00	VERTICAL
4550.000000	46.10	0.2	74.0	27.9	PK	100.0	0.00	VERTICAL
5790.000000	49.20	3.9	74.0	24.8	PK	100.0	0.00	VERTICAL

MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1230.000000	29.50	-11.7	50.0	20.5	AV	100.0	0.00	VERTICAL
2970.000000	28.30	-6.0	50.0	21.7	AV	100.0	0.00	VERTICAL
5530.000000	37.00	3.6	54.0	17.0	AV	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 Test Results

Standard used:	EN/IEC 61000-3-2 A14 (2006+2009) Quasi-stationary - Equipment class A
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2000)
E. U. T.:	RFID Access Control
M/N:	M-Kadex
Operation Mode	Normal operation

Note: This EUT is deemed to comply with the requirements of EN61000-3-2:2006+2009 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 Test Results

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	AC 230V / 50Hz
E. U. T.:	RFID Access Control
M/N:	M-Kadex
Operation Mode	Normal operation
Test Result	PASS

6.3 Test Date

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.086	0.005	0.179	0

7 – IMMUNITY TEST PROCEDURES

7.1 EUT and Cable Placement

The EUT and any peripherals are located at the center of the table for tabletop devices and in the center of the ground plane with the insulating support for floor-standing devices. The standards require that interconnecting cables to be connected to available ports of the unit and that the placement of the unit and the attached cables simulate a typical installation so far as to be practical.

7.2 Application of Electrostatic Discharge Test

The test is conducted in the following order according to the basic standard IEC 61000-4-2: Air Discharge, Direct Contact Discharge, Indirect Contact Horizontal Coupling Plane Discharge, and Indirect Contact Vertical Coupling Plane Discharge. The Electrostatic Discharge test levels are set and discharges for the different test modes are set appropriately. The Electrostatic Discharge is applied to the conductive surface of the computer in which the EUT is enclosed, and along all seams and control surfaces on the computer. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

7.3 Application of Radio Frequency Electromagnetic Field Test

The electromagnetic field is established at the front edge of the EUT. The frequency range is swept from 80 to 1000 MHz and 1400 to 2000MHz using a power level necessary to obtain a 3 volt/meter and 80% amplitude of a 1 kHz sine wave modulated field Strength is directed at the EUT. The test is performed with each of four sides of EUT facing the transmitting antenna. If an error is detected when the susceptible side of the EUT facing the transmitting antenna, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing. Both horizontal and vertical polarization of the antenna are set on test and measured individually

7.4 Application of Fast Transients, Common Mode Test

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

7.5 Application of Radio Frequency, Common Mode Test

The EUT was setup according to the IEC 61000-4-6 and the test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor. The frequency range is 150kHz to 80 MHz.

7.6 Application of Voltage Dips & Interruptions Tests

The EUT was setup according to the IEC 61000-4-11 and the test shall be done as the procedure described in the standard.

7.7 Application of Surge Test

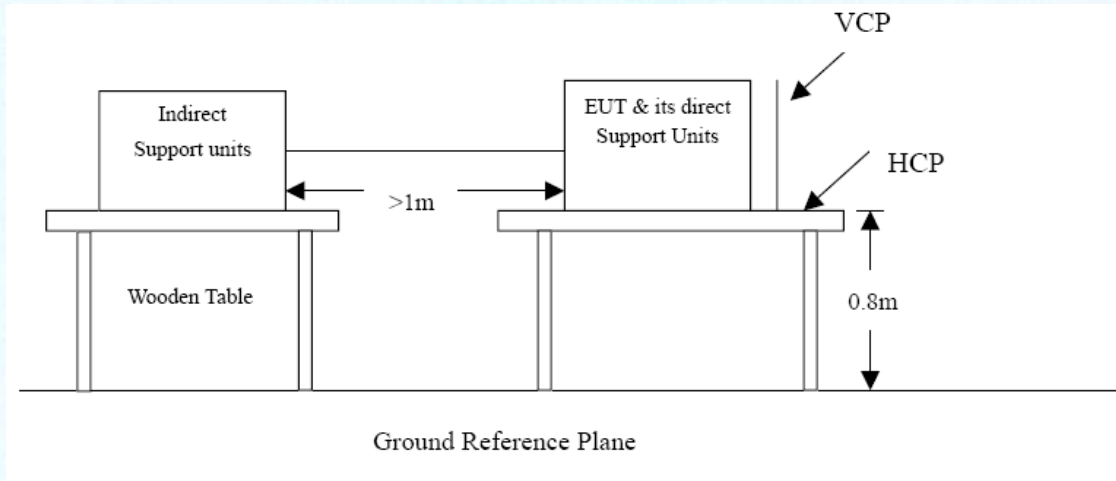
The EUT was setup as described in IEC 61000-4-5 and the test shall be performed according to the test plan.

7.8 Deviations from the Standard

No deviations from ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 were made when performing the tests described in this report.

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

8.1 Block Diagram of Test Setup



8.2 Test Standard

EN301489, (EN61000-4-2: 2001 Severity Level: 3 / Air Discharge: $\pm 8\text{KV}$ Level: 2 / Contact Discharge: $\pm 4\text{KV}$)

8.3 Severity Levels and Performance Criterion

9.3.1 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

8.3.2 Performance criterion : B

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 (Normal operation) and measure it.

8.5 Test Procedure

8.5.1 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.

8.5.2 Contact Discharge:

All the procedure shall be same as Section 8.5.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

8.5.3 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.

8.5.4 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.

8.6 Test Results

PASS

Please refer to the following pages

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Table 1: Electrostatic Discharge (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
Gap	A	A	A	A	A	A	A	A	/	/
Shell	A	A	A	A	A	A	A	A	/	/
DC port	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge (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 (Indirect Contact HCP)

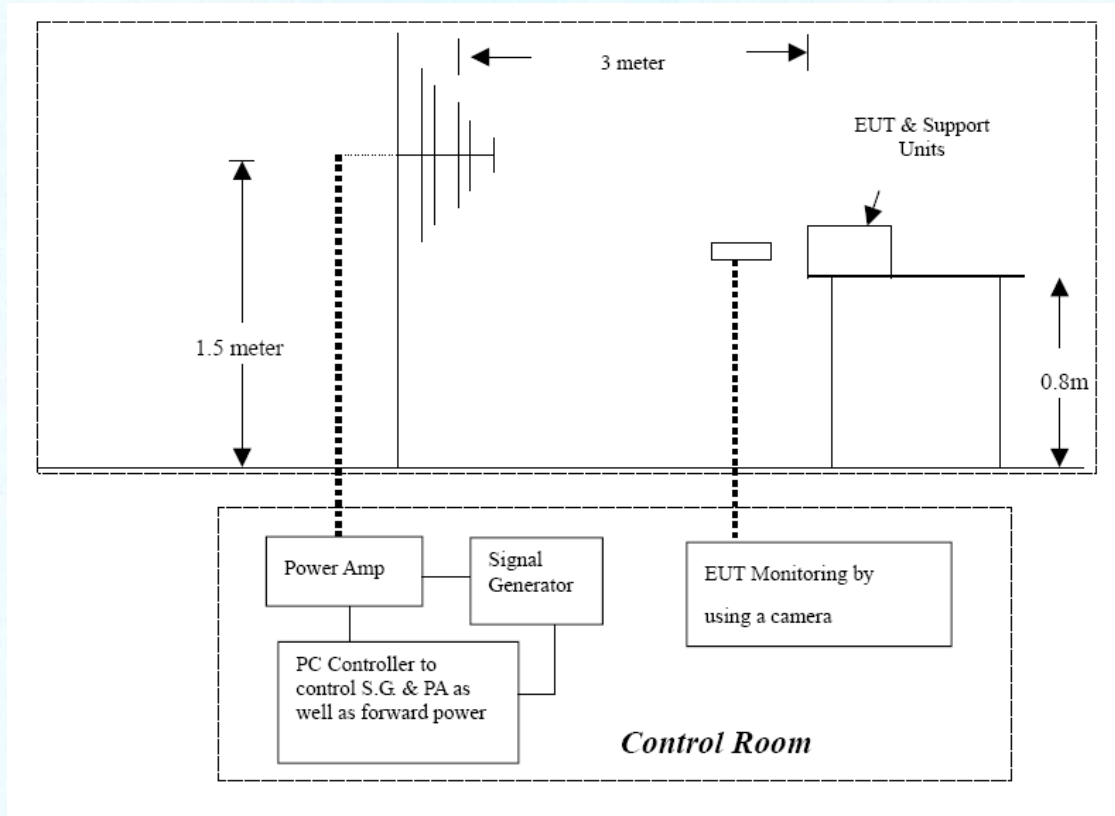
IEC 61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Table 4: Electrostatic Discharge (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	/	/	/	/	/	/

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

9.1 Block Diagram of Test



9.2 Test Standard

EN301489, (EN61000-4-3: 2006, Severity Level: 2, 3V / m)

9.3 Severity Levels and Performance Criterion

9.3.1 Severity Levels

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

9.3.2 Performance Criterion: A

9.4 Operating Condition of EUT

9.4.1 Setup the EUT as shown on Section 9.1.

9.4.2 Turn on the power of all equipments.

9.4.3 Let the EUT work in measuring mode (Normal operation) and measure it.

9.5 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 1400-2700MHz
4. Sweep time of radiated	0.0015 Decade/s
5. Dwell Time	1 Sec.

9.6 Test Results

PASS

Please refer to the following page.

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Frequency Range (MHz): 80~1000MHz, 1400~2700MHz

Modulation: Amplitude 80%, 1kHz sinewave

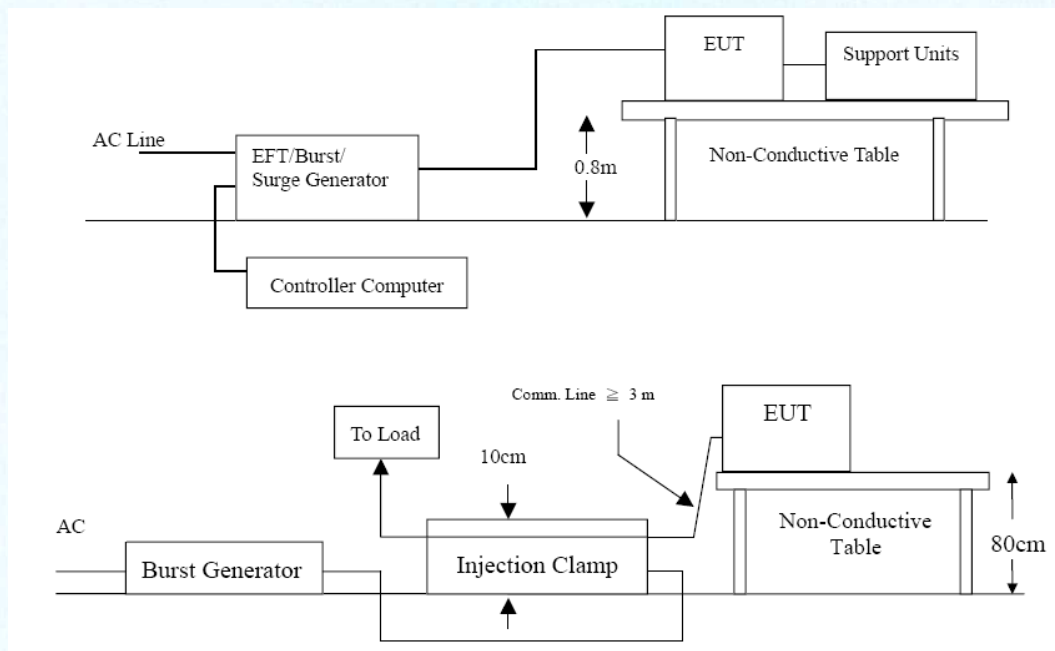
Severity Level: 3V/m

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

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
1400-2700	A	A	A	A	A	A	A	A

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

10.1 Block Diagram of Test Setup



10.2 Test Standard

EN301489, (EN61000-4-4: 2004, Severity Level, Level 2: 1KV)

10.3 Severity Levels and Performance Criterion

10.3.1 Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On RFID Access Control 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

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 (Normal operation) and measure it.

10.5 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.

10.5.1 For input and output DC power ports:
It's unnecessary to test

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

10.5.3 For AC 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.

10.6 Test Result

PASS

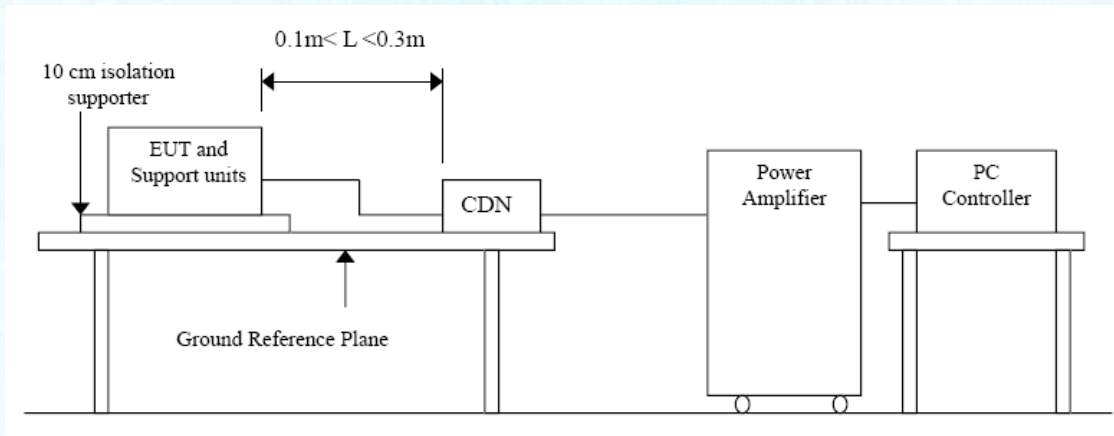
Please refer to the following page.

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

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	/	/	/	/	/	/	/	/

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

11.1 Block Diagram of Test Setup



11.2 Test Standard

EN301489 (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 11.1.

11.4.2 Turn on the power of all equipments.

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

11.5 Test Procedure

11.5.1 For DC 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 AC Input line ports:

- 1) Set up the EUT, CDN and test generators as shown on Section 12.1.
- 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.

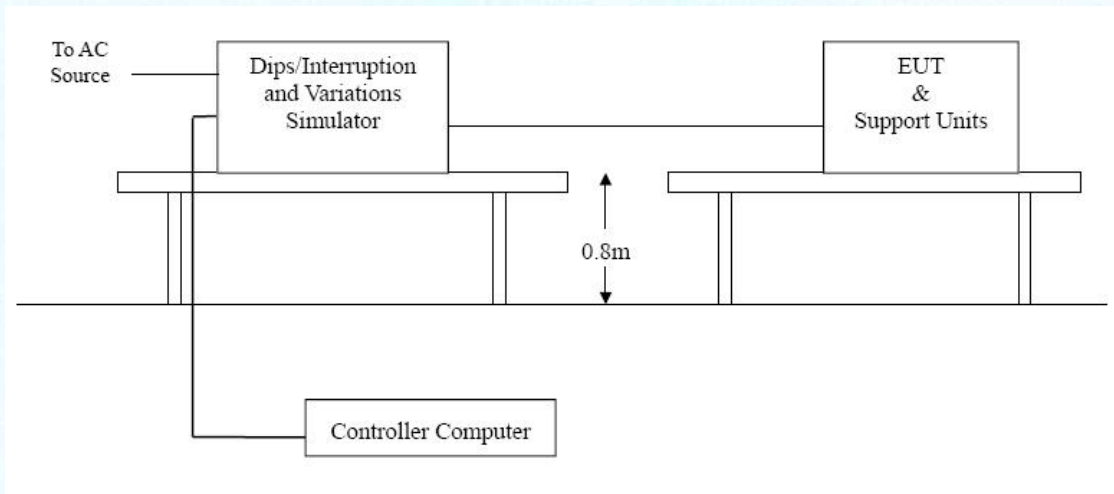
Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Table 1: Power Line

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



12.2 Test Standard

EN301489, (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
		5
		10
70	30	25
		50
		*

12.3.2 Performance criterion : B&C

12.4 EUT Configuration

The configuration of EUT is listed in Section 12.1

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 (Normal operation) and measure it.

12.6 Test Procedure

- 1) Set up the EUT and test generator as shown on Section 12.1.
- 2) The interruption is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

12.7 Test Result

PASS

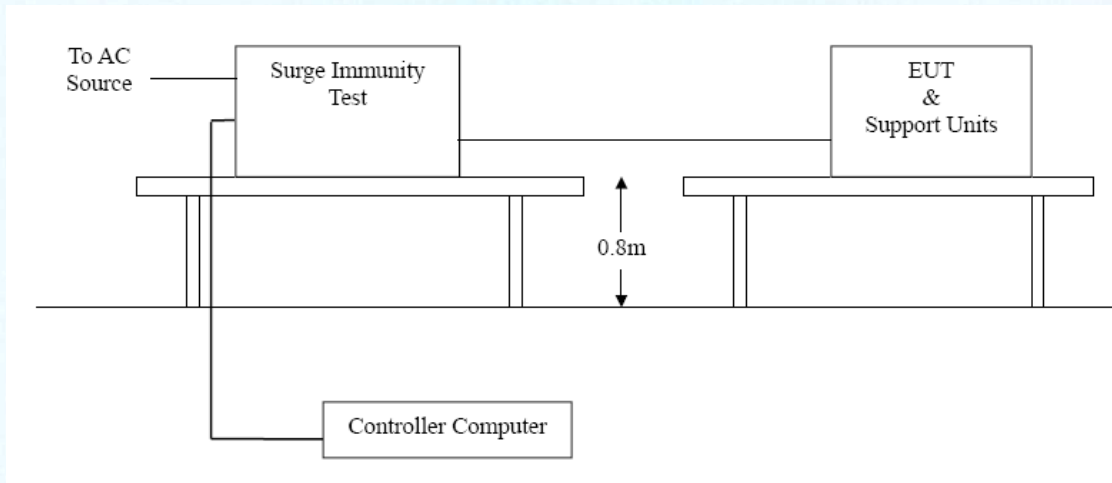
Please refer to the following page.

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Level	U2	td	Phase Angle	N	Pass	Fail
1	100%	10ms	0/90/180/270	3	B	/
2	100%	20ms	0/90/180/270	3	C	/
3	30%	500ms	0/90/180/270	3	C	/
4	100%	5000ms	0/90/180/270	3	C	/

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

13.1 Block Diagram of Test Setup



13.2 Test Standard

EN301489, (EN61000-4-5: 2005 Severity Level: Line to Line, Level 2: 1KV, Line to Earth, Level 3: 2KV)

13.3 Severity Levels and Performance Criterion

13.3.1. Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

13.3.2 Performance criterion : B

13.4 Operating Condition of EUT

13.4.1 Setup the EUT as shown in Section 13.1.

13.4.2. Turn on the power of all equipments.

13.4.3. Let the EUT work in test mode (Normal operation) and measure it.

13.5 Test Procedure

- 1) Set up the EUT and test generator as shown on Section 13.1.2.
- 2) For AC 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.

13.6 Test Result

PASS

Please refer to the following page.

Temperature (°C) : 22~23	EUT: RFID Access Control
Humidity (%RH) : 50~54	M/N: M-Kadex
Barometric Pressure (mbar) : 950~1000	Operation Condition: Normal operation

Table 1: Surge Power Supply

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

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.

14 – IMMUNITY TEST RESULTS

14.1 IEC 61000-4-2 Electrostatic Discharge Test Results

The EUT was subjected to the electrostatic discharge tests required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 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. .

14.2 IEC 61000-4-3 Radio Frequency Electromagnetic Field Test Results

The EUT was subjected to a 3-volt/meter, 80% Amplitude, 1 kHz Sine wave field as required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 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.

14.3 IEC 61000-4-4 Fast Transients, Common Mode Test Results

The EUT was subjected to the electrical fast transient tests required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 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.

14.4 IEC 61000-4-6 Radio Frequency, Common Mode Test Results

The EUT was subjected to the Conducted Susceptibility tests required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 and all lower levels specified in IEC 61000-4-6.

The EUT continued to perform as intended during and after the application of the Radio Frequency, Common Mode Test.

14.5 IEC 61000-4-11 Voltage Dips & Interruptions Test Results

The EUT was subjected to the Voltage Dips & Interruptions tests required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 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.

14.6 IEC 61000-4-5 Surge Test Results

The EUT was subjected to the Surge tests required by ETSI EN 301 489-1 V1.8.1 plus ETSI EN 301 489-3 V1.4.1 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 Test.

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

B.1- EUT EXTERNAL PHOTOGRAPHS

EUT – Front View



EUT – Rear View



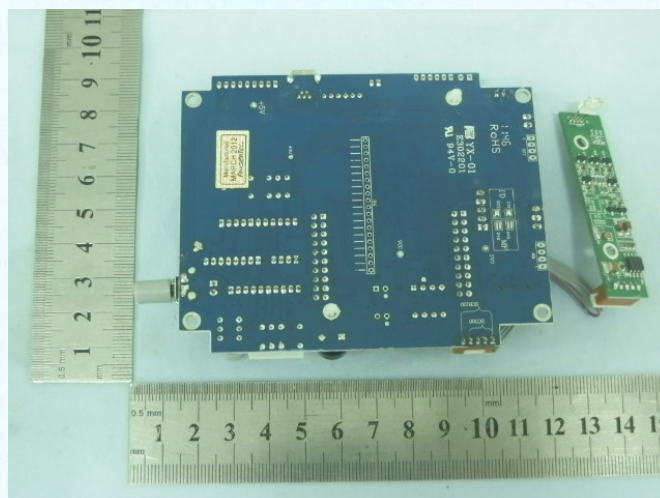
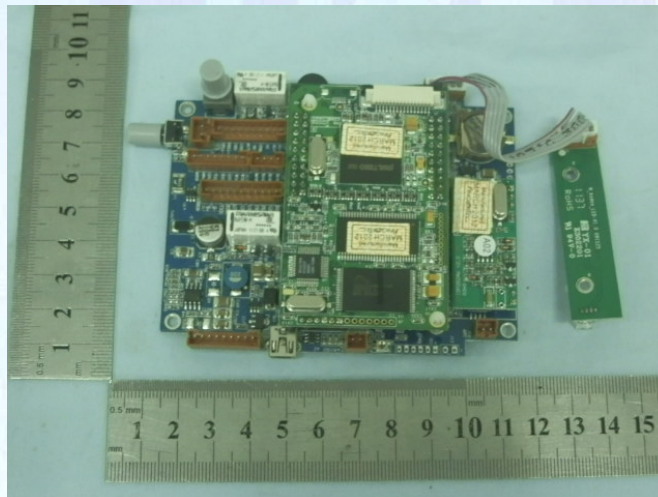
EUT – Side View



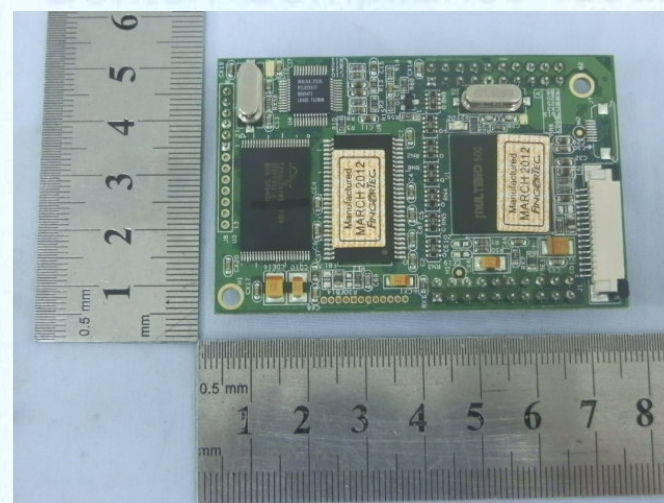
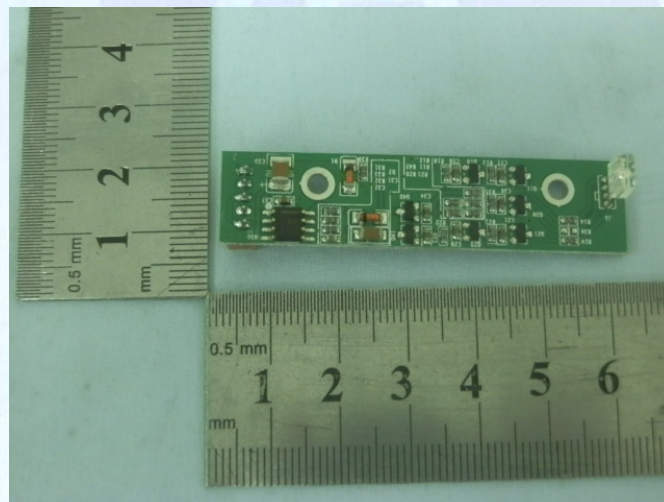
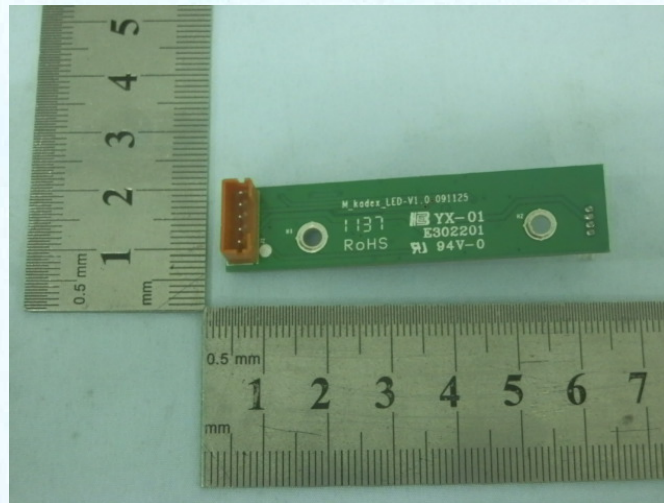
EUT –Open View



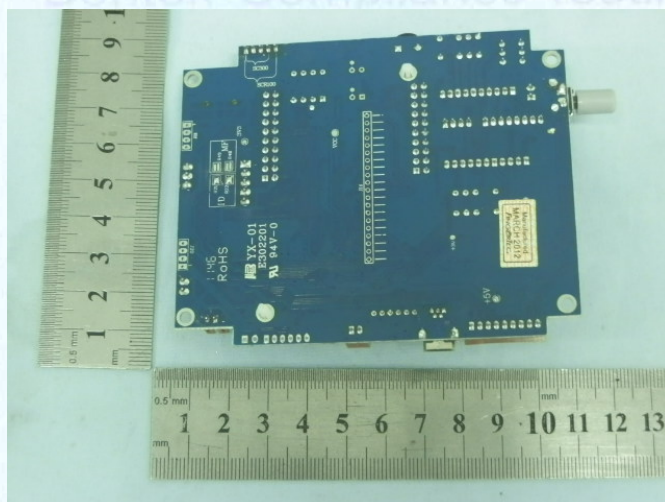
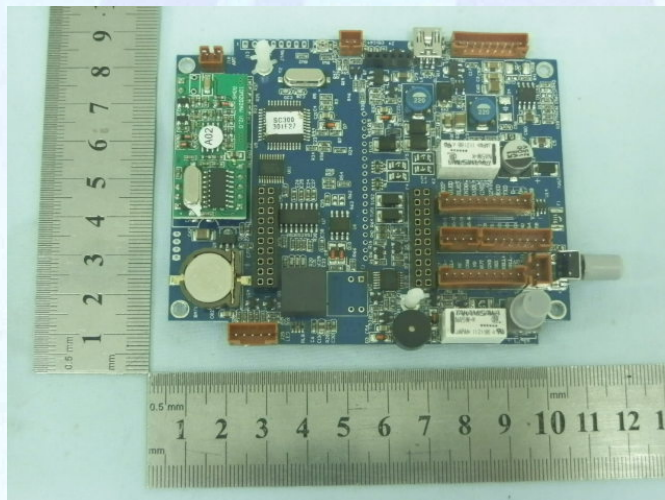
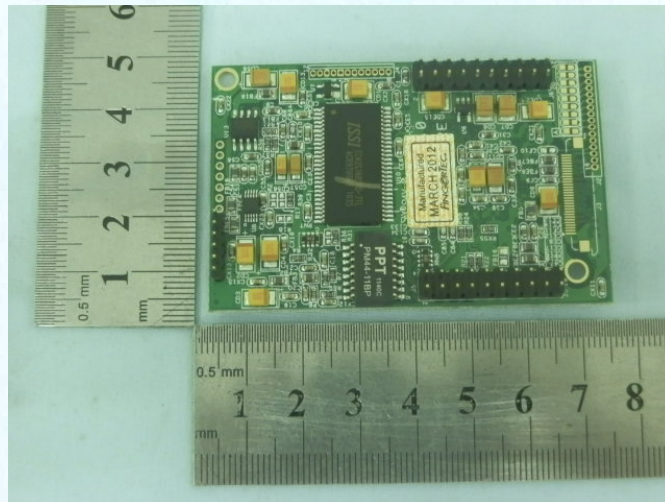
EUT –PCB View



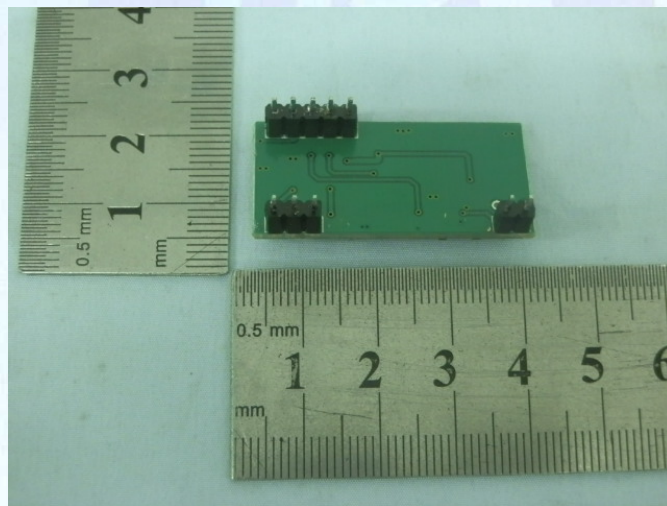
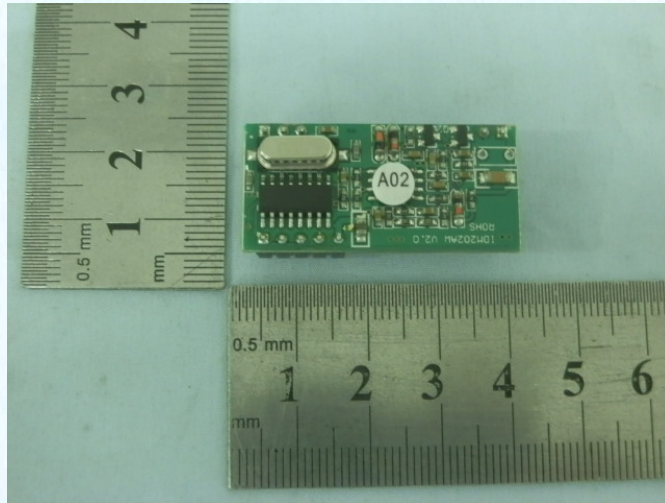
EUT –PCB View



EUT –PCB View



EUT –PCB View



APPENDIX C - TEST SETUP PHOTOGRAPHS

Conducted Emission



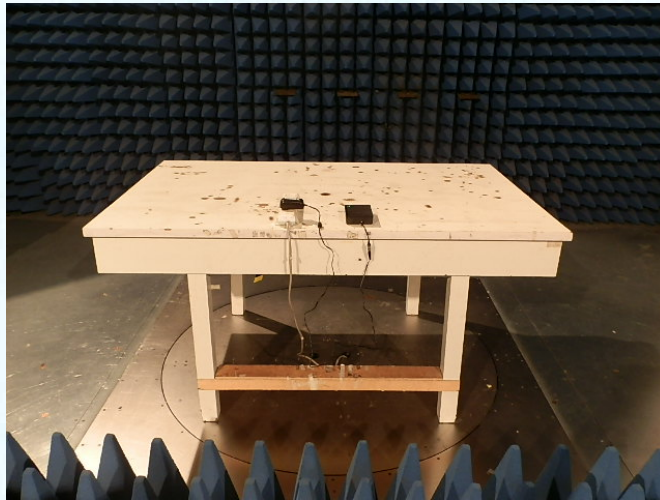
Radiated Emission



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



Radiated Susceptibility Test (IEC 61000-4-3)



Electrical Fast Transient/Surge Immunity (IEC 61000-4-4/IEC 61000-4-5) Voltage Dips, Short Interruptions Immunity Test (IEC 61000-4-11)



Conducted Susceptibility Test (IEC 61000-4-6)



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



APPENDIX D - BONTEK ACCREDITATION CERTIFICATES

 		
<p>China National Accreditation Service for Conformity Assessment</p> <p>LABORATORY ACCREDITATION CERTIFICATE</p> <p>(Registration No. CNAS L3923)</p> <p>Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. <u>1/F., Block East H-3, OCT Eastern Ind. Zone, the 1st Road,</u> <u>Xiangshan East Street, Nanshan District, Shenzhen, Guangdong, China</u></p> <p><i>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.</i></p> <p><i>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.</i></p> <p>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</p> <p></p> <p>Signed on behalf of China National Accreditation Service for Conformity Assessment</p> <p><small>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).</small></p> <tr><td><p>No.CNAS AL 2</p></td><td><p>0003595</p></td></tr>	<p>No.CNAS AL 2</p>	<p>0003595</p>
<p>No.CNAS AL 2</p>	<p>0003595</p>	

Certificate

of

Appointment

No. UA 50203122-0001

The Applicant

**Bontek Compliance Testing
Laboratory Ltd**
1/F, Block East H-3, OCT Eastern
Industrial Zone, Qiaocheng East Rd.
Nanshan, Shenzhen, Guangdong
P.R. China

has been authorized to carry out EMC tests
by order and under supervision of TÜV Rheinland according to .
EN55011, EN55012, EN55013, EN55014-1, EN55014-2, EN55015, EN55020
CISPR11, CISPR12, CISPR13, CISPR14-1, CISPR14-2, CISPR15, EN55022
EN55024, EN55025, CISPR20, CISPR22, CISPR24, CISPR25
EN/IEC61000-3-2/-3, EN/IEC61000-4-2/-4/-5/-6/-8/-11
EN/IEC61547, EN/IEC62040-2, EN/IEC61000-6-1
EN/IEC61000-6-2, EN/IEC61000-6-3, EN/IEC61000-6-4
EN/IEC60601-1-2, EN/IEC61326-1, EN/IEC61326-x(x=2,3,4, or 5)

An assessment of the laboratory was conducted according to the "Procedures and
Conditions for Appointments of EMC Test Laboratories" with reference to
EN ISO/IEC 17025 by a TÜV Rheinland auditor.


Audit Report No. 17010783-002

This certificate is valid until the next scheduled audit or up to 18 months,
at the discretion of TÜV Rheinland.

Date of issue: 06.05.2011

TÜV Rheinland/CCIC (Qingdao) Co., Ltd.
18 Hong Kong Middle Road, Qingdao 266071, P.R.China
Tel: +86-532-8578-1778
Fax: +86-532-8578-1079 <http://www.chn.tuv.com>

Certification Body


Shawn Peng



FEDERAL COMMUNICATIONS COMMISSION

**Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046**

March 03, 2011

Registration Number: 338263

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

Attention: Tony Wu, General Manager

Re: Measurement facility located at Hua Qiao Cheng East Ind. Area, Shenzhen, China
Anechoic chamber (3 meter)
Date of Renewal: March 03, 2011

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,



Phyllis Parrish
Industry Analyst