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: R2i

September 08, 2009

This Report Concerns:	**Equipment Type:**
☒ Original Report	Fingerprint Slave Reader

Test By:	Euphone Liu / Euphone Liu
Report Number:	**BCT09IR-860E**
Test Date:	September 03 ~07, 2009
Reviewed By:	Thom Chen/ Thom Chen
Approved By:	Kendy Wang/ Kendy Wang
Prepared By:	**Bontek Compliance Testing Laboratory Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: +86-755-86337020 Fax: +86-755-86337028

TABLE OF CONTENTS

1 - GENERAL INFORMATION 3

1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
1.2 TEST STANDARDS 3
1.3 TEST SUMMARY 3
1.4 TEST METHODOLOGY 4
1.5 TEST FACILITY 4
1.6 TEST EQUIPMENT LIST AND DETAILS 5

2 - SYSTEM TEST CONFIGURATION 6

2.1 JUSTIFICATION 6
2.2 EUT EXERCISE SOFTWARE 6
2.3 SPECIAL ACCESSORIES 6
2.4 EQUIPMENT MODIFICATIONS 6
2.5 CONFIGURATION OF TEST SYSTEM 6
2.6 TEST SETUP DIAGRAM 6

3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS 7

3.1 MEASUREMENT UNCERTAINTY 7
3.2 LIMIT OF DISTURBANCE VOLTAGE AT THE MAINS TERMINALS (CLASS B) 7
3.3 EUT SETUP 7
3.4 INSTRUMENT SETUP 7
3.5 TEST PROCEDURE 8
3.6 SUMMARY OF TEST RESULTS 8
3.7 DISTURBANCE VOLTAGE TEST DATA 8
3.8 TEST RESULT 8

4 - RADIATED DISTURBANCES 11

4.1 MEASUREMENT UNCERTAINTY 11
4.2 LIMIT OF RADIATED DISTURBANCES (CLASS B) 11
4.3 EUT SETUP 11
4.4 TEST RECEIVER SETUP 12
4.5 TEST PROCEDURE 12
4.6 CORRECTED AMPLITUDE & MARGIN CALCULATION 12
4.7 RADIATED EMISSIONS TEST RESULT 12
4.8 TEST RESULT 12

APPENDIX A- EUT PHOTOGRAPHS 15

EUT – FRONT VIEW 15
EUT –REAR VIEW 15
EUT –UNCOVERED VIEW 15
EUT –PCB VIEW 16
EUT – FRONT VIEW OF FINGERPRINT FACILITY 16
EUT –REAR VIEW OF FINGERPRINT FACILITY 17
EUT –SIDE VIEW OF FINGERPRINT FACILITY 17

APPENDIX B - TEST SETUP PHOTOGRAPHS 18

CONDUCTED EMISSION 18
RADIATED EMISSION 18

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:	**Fingerprint Slave Reader**
Trade Name:	**FINGERTEC**
Model No.:	**R2i**
Controller Model NO:	R2
Power Rating:	Input: 12VDC 1.5A
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.*

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 Class B 2006

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

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 C63.4-2001, 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 Class A 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 Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

1.5 Test Facility

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

FCC – Registration No.: 338263
Bontek Compliance Testing Laboratory Ltd, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March, 2008.

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

1.6 Test Equipment List and Details

Test equipments list of Bontek Compliance Testing Laboratory Ltd.

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

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

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

2.2 EUT Exercise Software

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

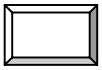
2.3 Special Accessories

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

2.4 Equipment Modifications

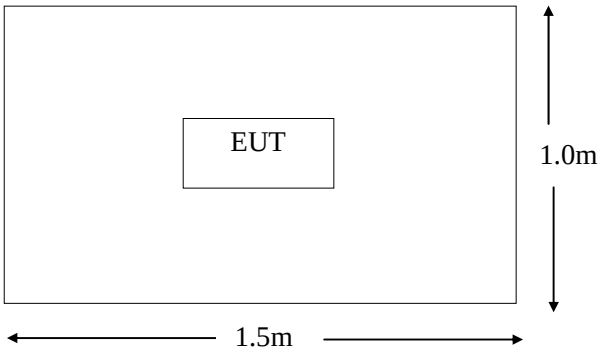
The EUT tested was not modified by BCT.

2.5 Configuration of Test System



EUT

2.6 Test Setup Diagram



3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

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

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

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

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

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

3.3 EUT Setup

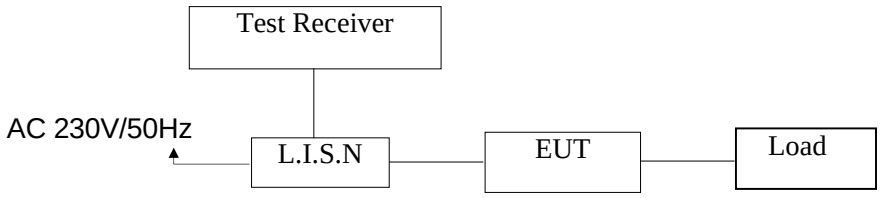
The setup of EUT is according with ANSI C63.4-2001 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B Class Blimits.

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

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

The spacing between the peripherals was 10 cm.

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



(EUT: Fingerprint Slave Reader)

3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

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

3.5 Test Procedure

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

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

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 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	Fingerprint Slave Reader
M/N	R2i
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

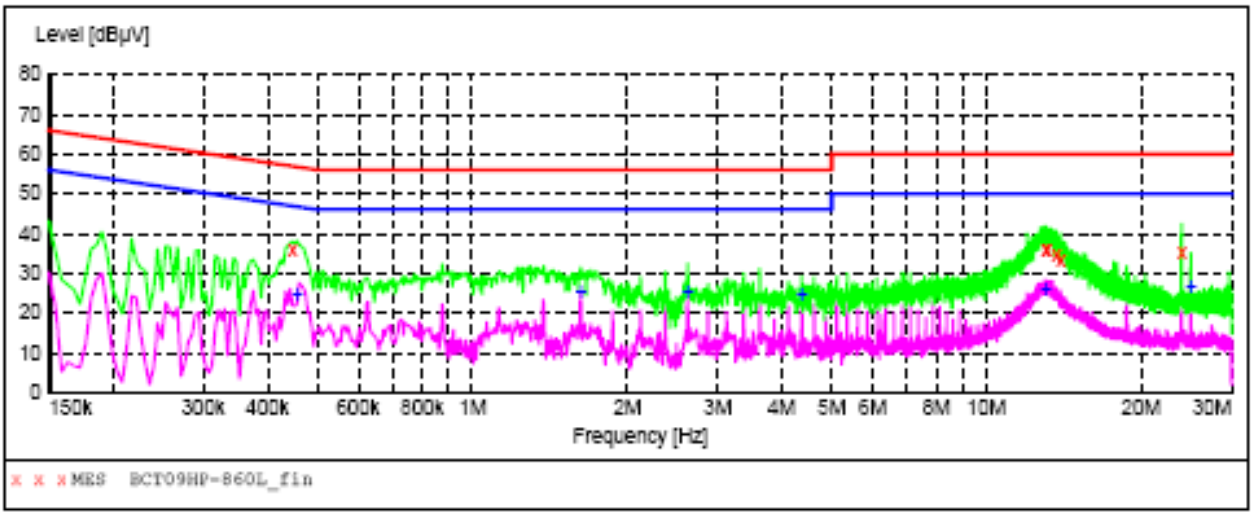
PASS

Conducted Emission Test Data

EUT:	Fingerprint Slave Reader	M/N: R2i
Operating Condition:	ON	
Test Site:	Shielded Room	
Operator:	Yang	
Test Specification:	AC 120V/60Hz for Adapter	
Comment:	Live Line	
Start of Test:	09/03/09/ 21:54 Tem:24℃ Hum:55%	

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "BCT09HP-860L_fin"

9/3/2009 21:54

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.447000	36.10	10.3	57	20.8	QP	L1	GND
13.038000	36.20	10.5	60	23.8	QP	L1	GND
13.132500	36.20	10.5	60	23.8	QP	L1	GND
13.663500	34.80	10.5	60	25.2	QP	L1	GND
13.960500	33.50	10.5	60	26.5	QP	L1	GND
23.995500	35.20	10.9	60	24.8	QP	L1	GND

MEASUREMENT RESULT: "BCT09HP-860L_fin2"

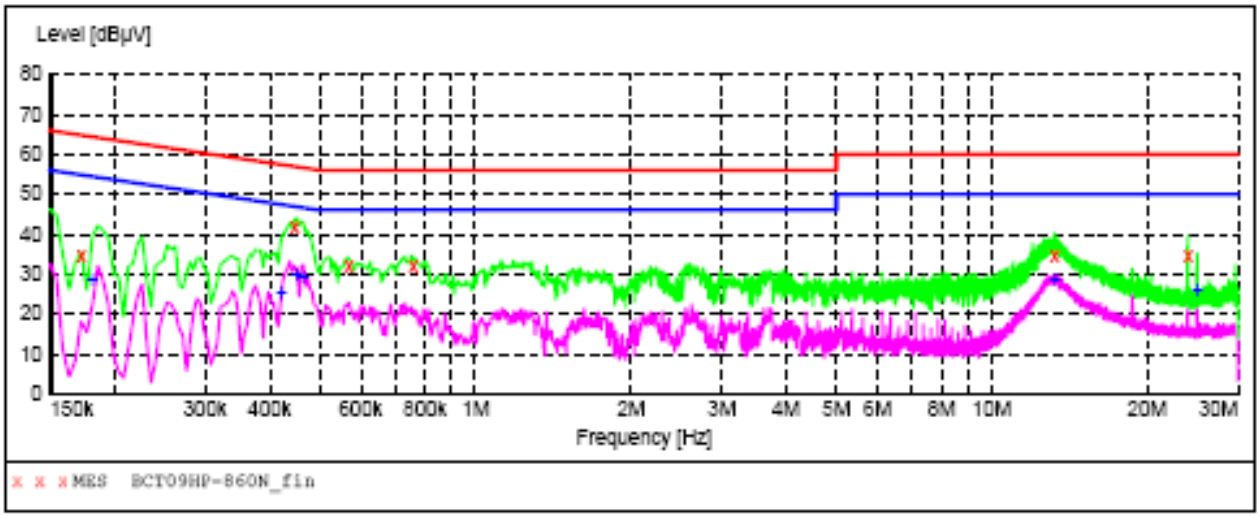
9/3/2009 21:54

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.456000	24.80	10.3	47	22.0	AV	L1	GND
1.626000	25.20	10.2	46	20.8	AV	L1	GND
2.625000	25.30	10.2	46	20.7	AV	L1	GND
4.375500	24.70	10.3	46	21.3	AV	L1	GND
13.060500	26.30	10.5	50	23.7	AV	L1	GND
25.003500	26.90	10.9	50	23.1	AV	L1	GND

Conducted Emission Test Data

EUT:	Fingerprint Slave Reader	M/N: R2i
Operating Condition:	ON	
Test Site:	Shielded Room	
Operator:	Yang	
Test Specification:	AC 120V/60Hz for Adapter	
Comment:	Neutral Line	
Start of Test:	09/03/09/ 21:50 Tem:24℃ Hum:55%	

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



MEASUREMENT RESULT: "BCT09HP-860N_fin"

9/3/2009 21:50

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.172500	34.60	11.1	65	30.2	QP	N	GND
0.447000	41.80	10.3	57	15.1	QP	N	GND
0.568500	32.00	10.2	56	24.0	QP	N	GND
0.757500	32.30	10.2	56	23.7	QP	N	GND
13.236000	34.30	10.5	60	25.7	QP	N	GND
23.995500	34.50	10.9	60	25.5	QP	N	GND

MEASUREMENT RESULT: "BCT09HP-860N_fin2"

9/3/2009 21:50

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	28.50	11.0	54	25.9	AV	N	GND
0.420000	25.80	10.4	47	21.6	AV	N	GND
0.451500	30.10	10.3	47	16.7	AV	N	GND
0.465000	29.50	10.3	47	17.1	AV	N	GND
13.231500	28.80	10.5	50	21.2	AV	N	GND
25.003500	26.40	10.9	50	23.6	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 (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.

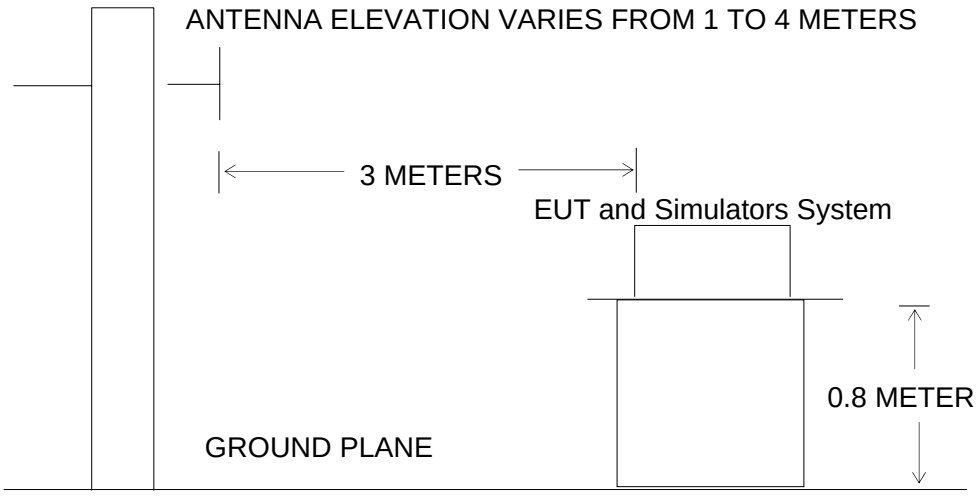
4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2001. 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: Fingerprint Slave Reader)

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	Fingerprint Slave Reader
M/N	R2i
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

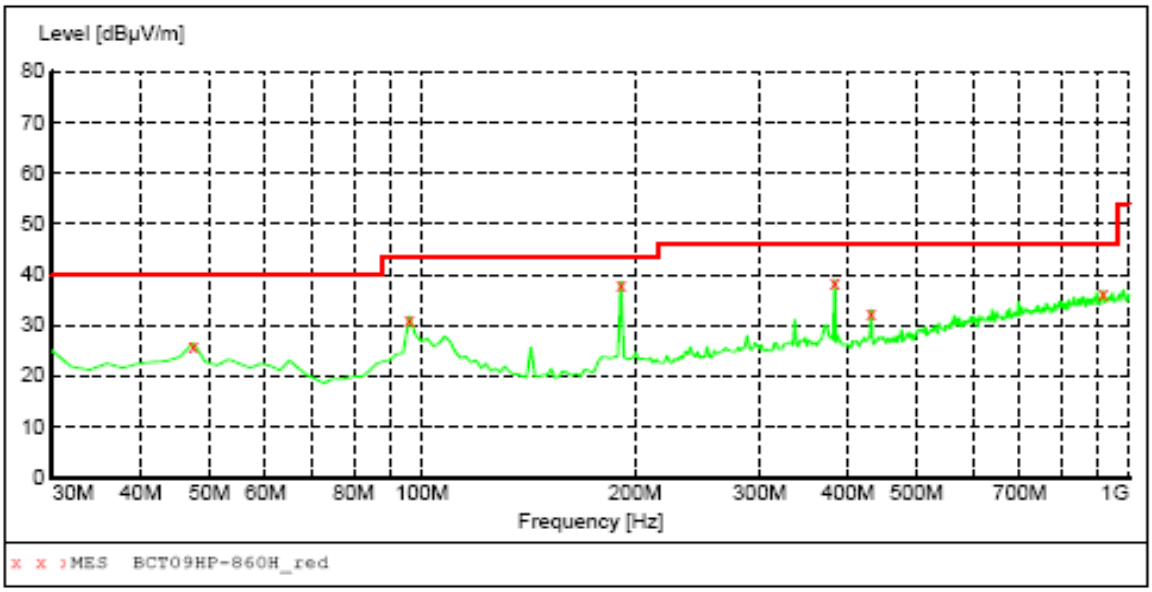
PASS

Radiated Emission Test Data:

EUT:	Fingerprint Slave Reader	M/N: R2i
Operating Condition:	ON	
Test Site:	3m CHAMBER	
Operator:	Chen	
Test Specification:	AC 120V/60Hz for Adapter	
Comment:	Polarization: Horizontal	
Start of Test:	09/06/09/ 09:49 Tem:25℃ Hum:50%	

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

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



MEASUREMENT RESULT: "BCT09HP-860H_red"

9/6/2009 09:49

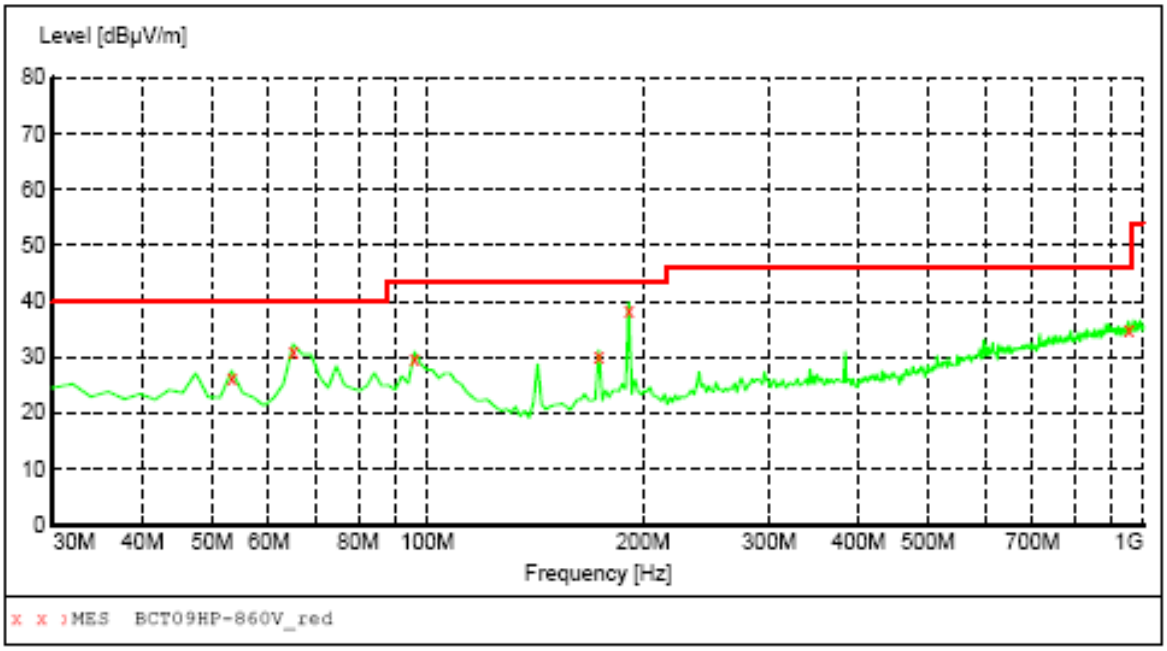
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	25.60	16.7	40.0	14.4	QP	100.0	0.00	HORIZONTAL
95.960000	30.80	18.0	43.5	12.7	QP	300.0	0.00	HORIZONTAL
191.020000	37.60	16.8	43.5	5.9	QP	100.0	0.00	HORIZONTAL
383.080000	39.10	20.6	46.0	7.9	QP	100.0	0.00	HORIZONTAL
431.580000	32.10	21.3	46.0	13.9	QP	100.0	0.00	HORIZONTAL
918.520000	35.90	29.4	46.0	10.1	QP	100.0	0.00	HORIZONTAL

Radiated Emission Test Data:

EUT:	Fingerprint Slave Reader	M/N: R2i
Operating Condition:	ON	
Test Site:	3m CHAMBER	
Operator:	Chen	
Test Specification:	AC 120V/60Hz for Adapter	
Comment:	Polarization: Vertical	
Start of Test:	09/06/09/ 09:44 Tem:25℃ Hum:50%	

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

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



MEASUREMENT RESULT: "BCT09HP-860V_red"

9/6/2009 09:44

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarisation
53.280000	26.60	16.6	40.0	13.4	QP	100.0	0.00	VERTICAL
64.920000	31.40	14.4	40.0	8.6	QP	100.0	0.00	VERTICAL
95.960000	30.00	18.0	43.5	13.5	QP	100.0	0.00	VERTICAL
173.560000	30.30	15.3	43.5	13.2	QP	100.0	0.00	VERTICAL
191.020000	39.70	16.8	43.5	4.8	QP	100.0	0.00	VERTICAL
953.440000	35.40	29.7	46.0	10.6	QP	100.0	0.00	VERTICAL

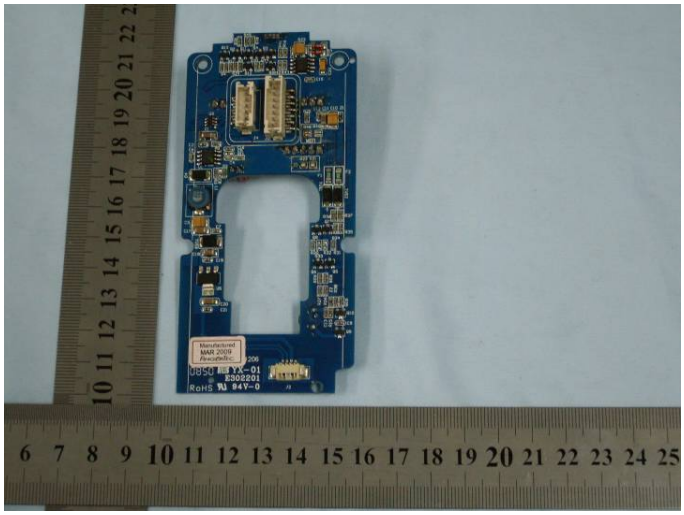
APPENDIX A- EUT PHOTOGRAPHS

EUT – Front View

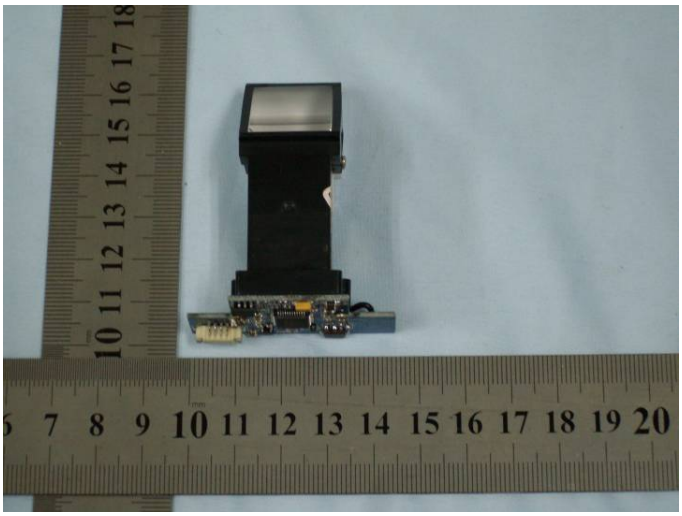
EUT –Rear View

EUT –Uncovered View

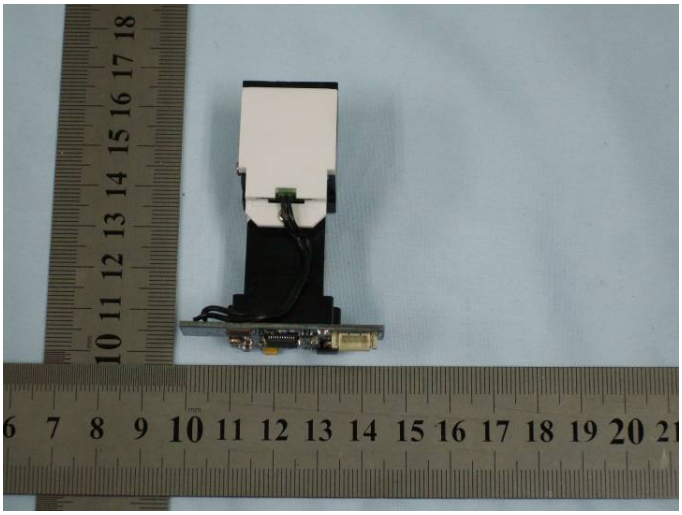
EUT –PCB View



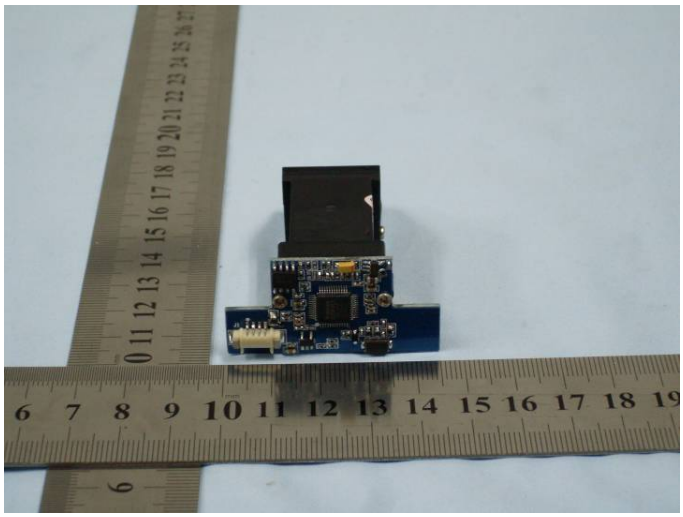
EUT – Front View of Fingerprint Facility



EUT –Rear View of Fingerprint Facility



EUT –Side View of Fingerprint Facility



APPENDIX B - TEST SETUP PHOTOGRAPHS

Conducted Emission

Radiated Emission