ETSI EN 301 489-1 V1.9.2 (2011-09), ETSI EN 301 489-3 V1.4.1 (2002-08) AND ETSI EN 301 489-17 V2.1.1 (2009-05)

On Behalf of

FINGERTEC WORLDWIDE SDN BHD

NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

Model: Face ID4d, Face ID4

August 28, 2013

This Report Concerns:	Equipment Type:
☒ Original Report	Face + RFID T&A and Access control

Test Engineer:	Jiankuai.Li/ Jiankuai.Li
Report Number:	**BCT13HR-1419E**
Test Date:	August 8-28, 2013
Reviewed By:	Kevin Chi / kevin chi
Approved By:	Kendy Wang / Kendy Wang
Prepared By:	**Shenzhen Bontek Compliance Testing Laboratory Co., Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: +86-755-86337020 Fax: +86-755-86337028

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**FINGERTEC WORLDWIDE SDN BHD**
Address of Applicant:	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA
Manufacturer:	**FINGERTEC WORLDWIDE SDN BHD**
Address of Manufacturer:	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

General Description of E.U.T

Items	Description
EUT Description:	Face + RFID T&A and Access control
Model No.:	Face ID4d
Trade Name:	FINGERTEC
Supplementary Model:	Face ID4
Power Supply:	Input: 12VDC 3.0A from AC/DC adapter
Adapter Information:	Model:ADS-45NP-12-3 12036G Input: 100-240V~50/60Hz 1.2A Output: 12V 3.0A

Remark: ** The test data gathered are from the production sample provided by the manufacturer.*
** Supplementary models have the same circuit, but with different appearance*

1.2 Test Standards

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

ETSI EN 301 489-1 V1.9.2 (2011-09)

ETSI EN 301 489-3 V1.4.1 (2002-08)

ETSI EN 301 489-17 V2.1.1 (2009-05)

1.3 Objective

The following Declaration of Conformity report of a radio equipment and system (RES), short range device were performed to demonstrate compliance with the standards of ETSI EN 301 489-1 V1.9.2 (2011-09) plus provisions of ETSI EN 301 489-3 V1.4.1 (2002-08)， Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements and ETSI EN 301 489-17 V2.1.1 (2009-05),

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Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for 2.4 GHz wideband transmission systems and High Performance Radio Local Area Network (HIPERLAN) equipment.

Currently, the Emission test carried out in ETSI EN 301 489-1 V1.9.2 plus provisions of ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 references the following specific Ratified Standard tests to be performed:

1. Conducted Emission (150KHz to 30MHz) in accordance with EN 55022.
2. Radiated Emission (30MHz to 6000MHz) 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 V1.9.2 plus provisions of ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1references two specific Ratified Standard tests to be performed. They are as follows:

1. Electrostatic discharge (ESD) in accordance with EN 61000-4-2.
2. Radio frequency electromagnetic field (RS) in accordance with EN 61000-4-3.
3. Fast transients, common mode (EFT) in accordance with EN 61000-4-4.
4. Surge in accordance with EN 61000-4-5.
5. Radio frequency, common mode (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 V1.9.2 plus provisions of ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 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 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.
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.).

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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 BCT can exercise the EUT as data transferring between the EUT and the host.

2.3 Equipment Modifications

BCT has not done any modification on the EUT.

2.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

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2.5 List of Measuring Equipments Used

Test equipments list of Shenzhen Bontek Compliance Testing LaboratoryCo., Ltd.

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2013-4-25	2014-4-25
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2012-11-1	2013-10-31
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2013-4-25	2014-4-25
4	BCT-EMC004	Single Power Conductor Module	R&S	NNBM 8124	242	2013-4-25	2014-4-25
5	BCT-EMC005	Single Power Conductor Module	R&S	NNBM 8124	243	2013-4-25	2014-4-25
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-11-5	2013-11-4
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	`Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-11-2	2013-11-1
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2013-4-25	2014-4-25
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2013-6-26	2014-6-25
11	BCT-EMC011	Color TV Pattern Genenator	PHILIPS	PM5418	TM209947	N/A	N/A
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2013-4-25	2014-4-25
14	BCT-EMC014	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2013-4-25	2014-4-25
15	BCT-EMC015	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2012-11-28	2013-11-27
16	BCT-EMC016	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2012-11-28	2013-11-27
17	BCT-EMC017	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2012-11-28	2013-11-27
18	BCT-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2013-4-25	2014-4-25
19	BCT-EMC019	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2012-11-28	2013-11-27
20	BCT-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2012-11-1	2013-10-31
21	BCT-EMC021	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-11-15	2013-11-14
22	BCT-EMC022	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	BCT-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2013-4-25	2014-4-25
24	BCT-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2013-4-25	2014-4-25

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25	BCT-EMC029	6DB Attenuator	FRANKONIA	N/A	1001698	2013-4-25	2014-4-25
26	BCT-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2013-4-25	2014-4-25
27	BCT-EMC031	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2013-4-25	2014-4-25
28	BCT-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2013-4-25	2014-4-25
29	BCT-EMC033	ISN	TESEQ	ISN-T800	30301	2012-11-15	2013-11-14
30	BCT-EMC034	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2012-11-01	2013-10-31
31	BCT-EMC035	HRMONICS&FLICK RE ANALYSER	VOLTECH	PM6000	200006700433	2012-11-20	2013-11-19
32	BCT-EMC036	Spectrum Analyzer	R&S	FSP	100397	2012-11-1	2013-10-31
33	BCT-EMC037	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2013-4-25	2014-4-25

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3 Test Summary

Tests Carried out under ETSI EN 301 489-1 V1.9.2 , ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1		
EMI TEST		
Radiated Emission	EN 301489-1 V1.9.2 clause 8.2, EN55022	√
Conducted Emission	EN 301489-1 V1.9.2 clause 8.3/8.4/8.7, EN55022	√
Harmonic Current	EN 301489-1 V1.9.2 clause 8.5, EN61000-3-2	×
Voltage Fluctuation& Flicker	EN 301489-1 V1.9.2 clause 8.6, EN61000-3-3	√
EMS TEST		
Radio Frequency Electromagnetic Field	EN 301489-1 V1.9.2 clause 9.2 EN61000-4-3	√
Electrostatic Discharge	EN 301489-1 V1.9.2 clause 9.3, EN61000-4-2	√
Fast Transients, Common Mode	EN 301489-1 V1.9.2 clause 9.4, EN61000-4-4	√
Radio Frequency, Common Mode	EN 301489-1 V1.9.2 clause 9.5, EN61000-4-6	√
Transient & Surge in Vehicular	EN 301489-1 V1.9.2 clause 9.6, ISO7637-1/-2	×
Voltage Dips & Interruptions	EN 301489-1 V1.9.2 clause 9.7, EN61000-4-11	√
Surges	EN 301489-1 V1.9.2 clause 9.8, EN61000-4-5	√

×: Indicates that the test is not applicable.
√: Indicates that the test is applicable.

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4 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

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, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ±2.3 dB.

4.2 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.

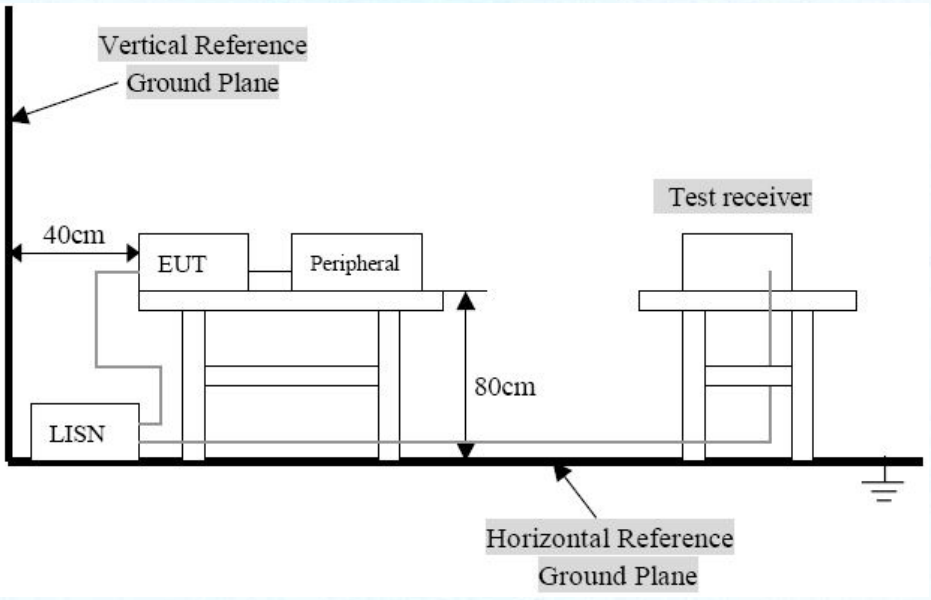
4.3 EUT Setup

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.

4.4 Test Setup Diagram



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4.5 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

4.6 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 dBμV of specification limits). Quasi-peak readings are distinguished with a "**QP**". Average readings are distinguished with a "**AV**".

4.7 Disturbance Voltage Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

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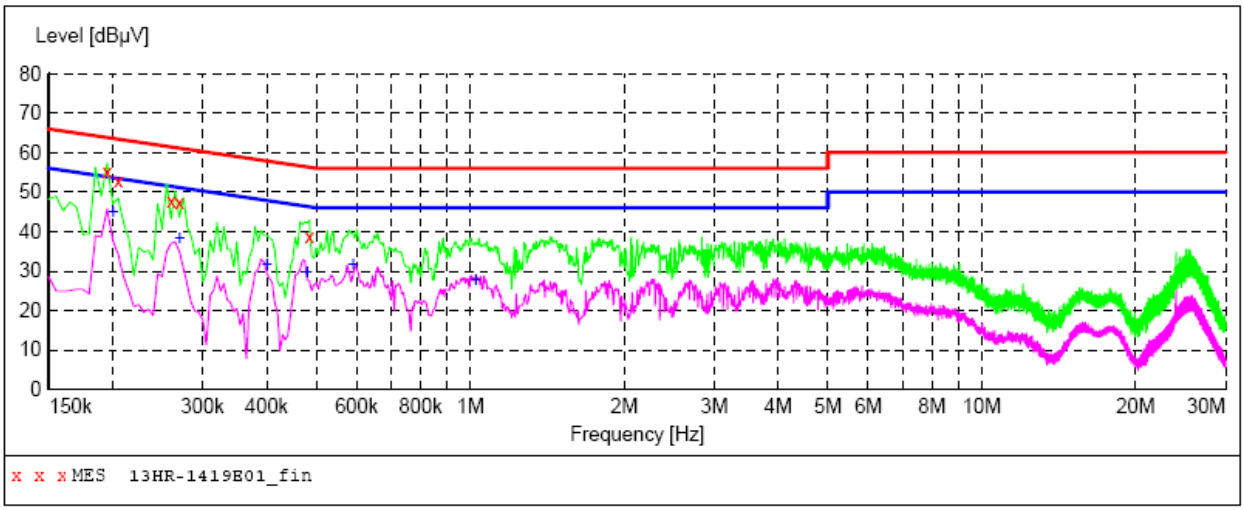
CONDUCTED EMISSION TEST DATA

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Normal Operation
Test Site:	Shielded Room
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Live Line

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "13HR-1419E01_fin"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	55.00	11.5	64	8.8	QP	L1	GND
0.205000	53.00	11.3	63	10.4	QP	L1	GND
0.260000	47.60	11.1	61	13.8	QP	L1	GND
0.270000	47.40	11.1	61	13.7	QP	L1	GND
0.485000	38.60	10.5	56	17.7	QP	L1	GND

MEASUREMENT RESULT: "13HR-1419E01_fin2"

8/18/2013 16:49

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.200000	44.90	11.3	54	8.7	AV	L1	GND
0.270000	38.30	11.1	51	12.8	AV	L1	GND
0.400000	31.70	10.7	48	16.2	AV	L1	GND
0.480000	29.90	10.5	46	16.4	AV	L1	GND
0.590000	31.70	10.4	46	14.3	AV	L1	GND
1.025000	27.80	10.5	46	18.2	AV	L1	GND

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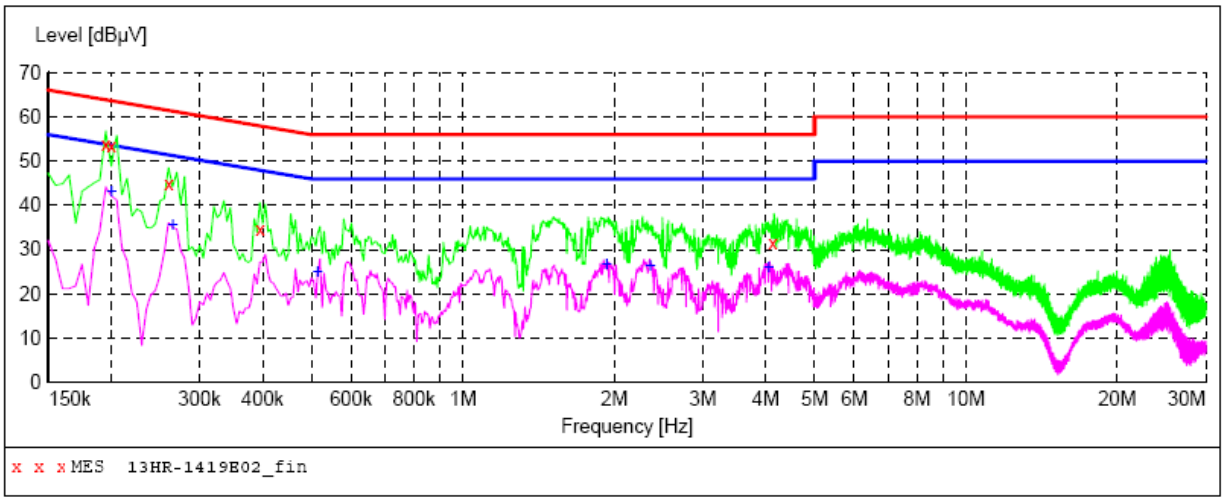
CONDUCTED EMISSION TEST DATA

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Normal Operation
Test Site:	Shielded Room
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Neutral Line

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



MEASUREMENT RESULT: "13HR-1419E02_fin"

8/18/2013 16:52

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	53.80	11.5	64	10.0	QP	N	GND
0.200000	53.50	11.3	64	10.1	QP	N	GND
0.260000	45.00	11.1	61	16.4	QP	N	GND
0.395000	34.60	10.7	58	23.4	QP	N	GND
4.130000	31.50	10.4	56	24.5	QP	N	GND

MEASUREMENT RESULT: "13HR-1419E02_fin2"

8/18/2013 16:52

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.200000	43.20	11.3	54	10.4	AV	N	GND
0.265000	35.60	11.1	51	15.7	AV	N	GND
0.515000	25.20	10.5	46	20.8	AV	N	GND
1.930000	26.80	10.4	46	19.2	AV	N	GND
2.360000	26.50	10.4	46	19.5	AV	N	GND
4.055000	26.20	10.4	46	19.8	AV	N	GND

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5- RADIATED DISTURBANCES

5.1 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 ±3.4 dB.

5.2 Limit of Radiated Disturbances (Class B)

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

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

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

5.3 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.

5.4 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 6000MHz
Turntable Rotated……0 to 360 degrees

Antenna Position:

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

5.5 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.

5.6 Corrected Amplitude & Margin Calculation

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

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

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

Margin = Class B Limit – Corr. Ampl.

5.7 Radiated Emissions Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

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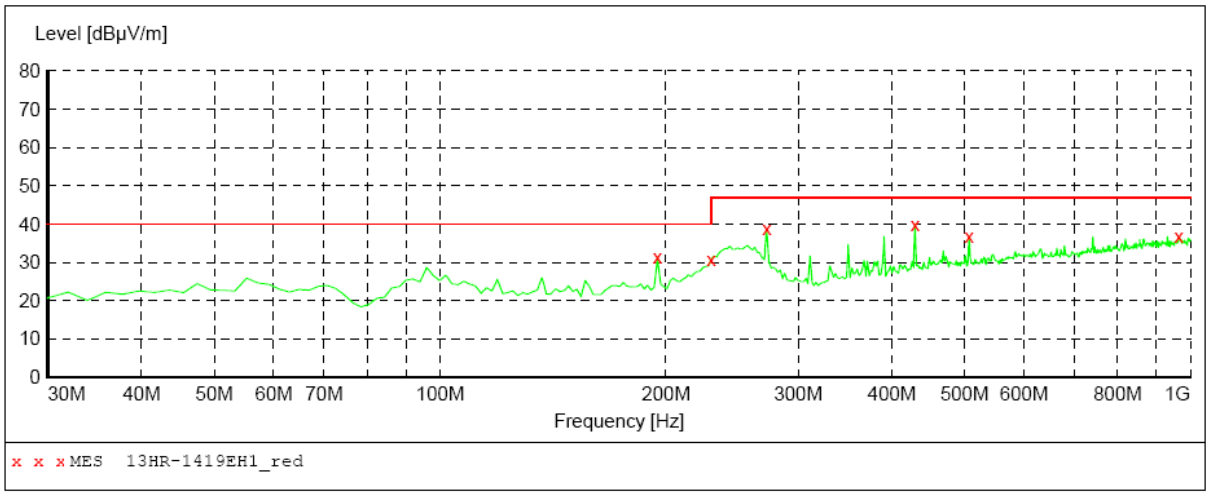
RADIATED EMISSION TEST DATA OF BELOW 1GHz

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
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 Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "13HR-1419EH1_red"

8/19/2013 08:41

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
194.900000	31.40	14.8	40.0	8.6	QP	300.0	0.00	HORIZONTAL
229.820000	30.90	16.1	40.0	9.1	QP	100.0	0.00	HORIZONTAL
272.500000	38.90	17.9	47.0	8.1	QP	100.0	0.00	HORIZONTAL
429.640000	40.00	22.0	47.0	7.0	QP	100.0	0.00	HORIZONTAL
507.240000	36.90	24.0	47.0	10.1	QP	100.0	0.00	HORIZONTAL
965.080000	36.80	29.7	47.0	10.2	QP	300.0	0.00	HORIZONTAL

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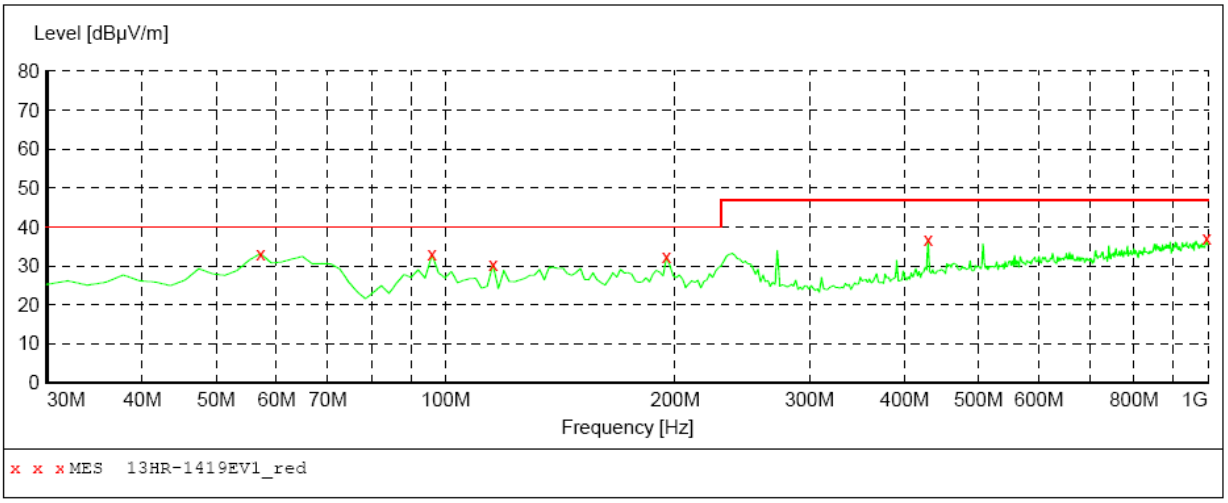
RADIATED EMISSION TEST DATA OF BELOW 1GHz

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
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 Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT: "13HR-1419EV1_red"

8/19/2013 08:37

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
57.160000	33.20	15.1	40.0	6.8	QP	100.0	0.00	VERTICAL
95.960000	33.00	17.2	40.0	7.0	QP	100.0	0.00	VERTICAL
115.360000	30.50	15.5	40.0	9.5	QP	100.0	0.00	VERTICAL
194.900000	32.40	14.8	40.0	7.6	QP	100.0	0.00	VERTICAL
429.640000	36.90	22.0	47.0	10.1	QP	100.0	0.00	VERTICAL
996.120000	37.10	29.9	47.0	9.9	QP	100.0	0.00	VERTICAL

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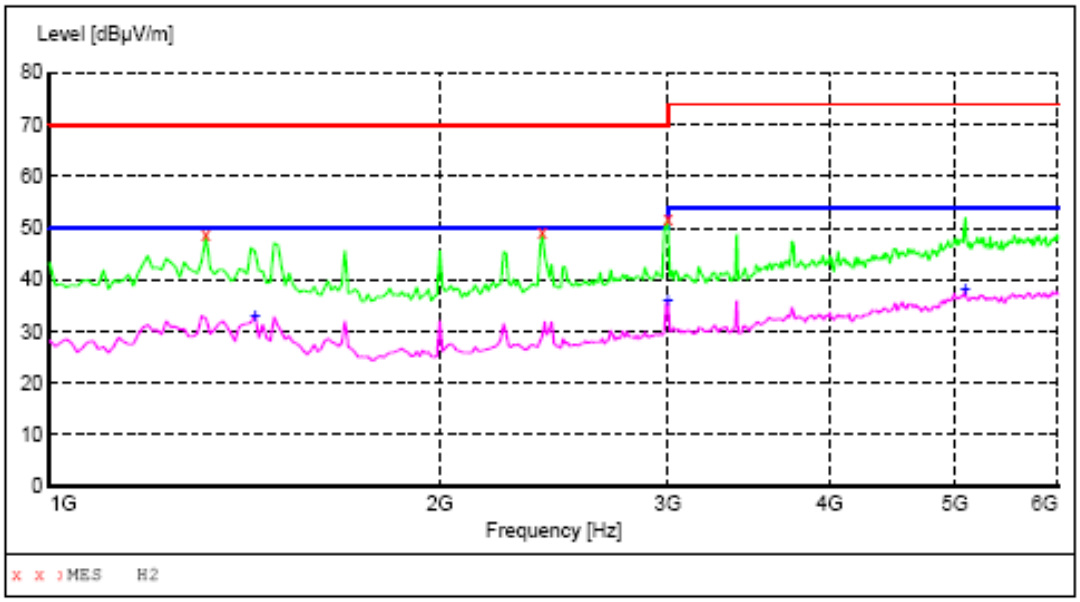
RADIATED EMISSION TEST DATA OF ABOVE 1GHz

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Yang
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Polarization: Horizontal
Test date:	2013/5/29 time: 20:21

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

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



MEASUREMENT RESULT: " H2_red"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarisation
1320.000000	48.60	-11.4	70.0	21.4	PK	100.0	0.00	HORIZONTAL
2400.000000	49.00	-7.6	70.0	21.0	PK	100.0	0.00	HORIZONTAL
3000.000000	51.60	-5.9	70.0	18.4	PK	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "H2_red2"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarisation
1440.000000	33.40	-11.1	50.0	16.6	AV	100.0	0.00	HORIZONTAL
3000.000000	36.20	-5.9	50.0	13.8	AV	100.0	0.00	HORIZONTAL
5090.000000	38.30	2.9	54.0	15.7	AV	100.0	0.00	HORIZONTAL

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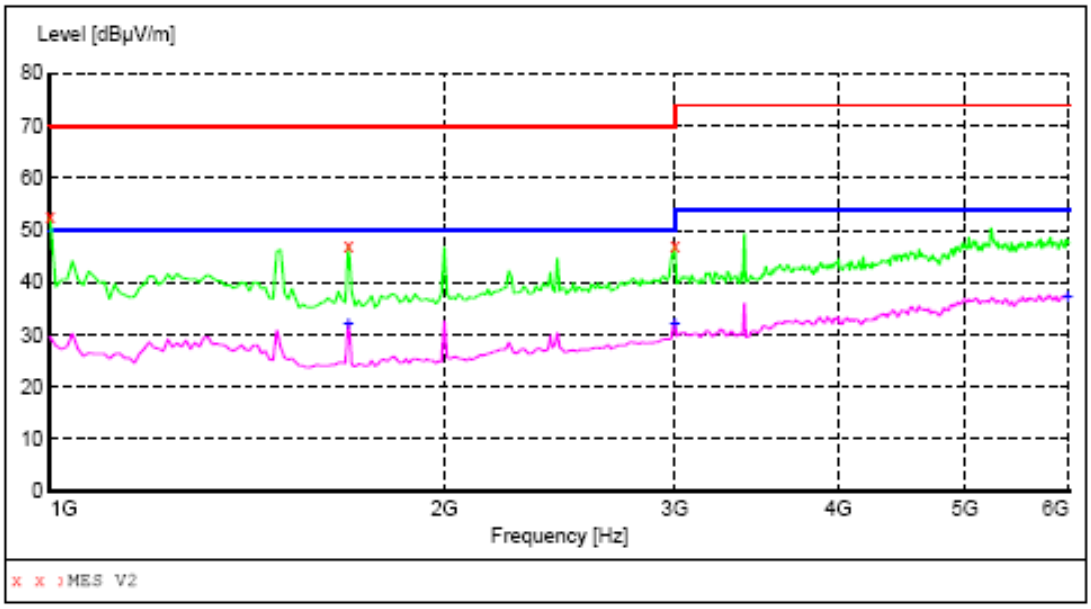
RADIATED EMISSION TEST DATA OF ABOVE 1GHz

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Yang
Test Specification:	AC 230V/50Hz for Adapter
Comment:	Polarization: Vertical
Test date:	2013/5/29 time: 20:22

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

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



MEASUREMENT RESULT: "V2_red"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1000.000000	52.50	-12.8	70.0	17.5	PK	100.0	0.00	VERTICAL
1690.000000	47.00	-10.7	70.0	23.0	PK	100.0	0.00	VERTICAL
3000.000000	46.90	-5.9	70.0	23.1	PK	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "V2_red2"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1690.000000	32.50	-10.7	50.0	17.5	AV	100.0	0.00	VERTICAL
3000.000000	32.40	-5.9	50.0	17.6	AV	100.0	0.00	VERTICAL
5980.000000	37.60	4.2	54.0	16.4	AV	100.0	0.00	VERTICAL

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

6.1 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.

6.2 Test Results

Standard used:	EN/IEC 61000-3-2 A14 (2000) Quasi-stationary - Equipment class A
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2000)
E. U. T.:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operation Mode	Normal Operation

Note:This EUT is deemed to comply with the requirements of EN61000-3-2:2000 without test since the power of EUT is less than 75W (Rated Power:10W Max)

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

7.1 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.

7.2 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.:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operation Mode	Normal Operation

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.086	0.005	0.175	0

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8 - IMMUNITY TEST PROCEDURES

8.1 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.

8.2 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.

8.3 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

8.4 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.

8.5 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.

8.6 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.

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8.7 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.

8.8 Deviations from the Standard

No deviations from ETSI EN 301 489-1 V1.9.2 and ETSI EN 301 489-17 V2.1.1 were made when performing the tests described in this report.

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9 - IMMUNITY TEST DATA

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

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
Crust	A	A	A	A	A	A	A	A	/	/
LED	A	A	A	A	A	A	A	A	/	/
Screen	A	A	A	A	A	A	A	A	/	/
Gap	A	A	A	A	A	A	A	A	/	/
Port	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC61000-4-2 Test Points	Test Levels									
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	-15 kV	+15 kV
LAN Port	A	A	A	A	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

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

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

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

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9.2 Radio Frequency Electromagnetic Field Test (IEC 61000-4-3)

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

Frequency Range (MHz): 80~1000MHz and 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)	
80-1000	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
	A	A	A	A	A	A	A	A
1400~2700	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
	A	A	A	A	A	A	A	A

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9.3 Fast Transients, Common Mode Test (IEC 61000-4-4)

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
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	A	A	A	A	/	/	/	/
	L1+L2	A	A	A	A	/	/	/	/
	L1 + Earth	A	A	A	A	/	/	/	/
	L2 + Earth	A	A	A	A	/	/	/	/
	L1+L2+Earth	A	A	A	A	/	/	/	/

9.4 Radio Frequency, Common Mode Test (IEC 61000-4-6)

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

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

Level	Frequency. Range (MHz)	Voltage Level (e.m.f.) U_0	Pass	Fail
1	0.15-80	1	/	/
2		3	A	/
3		10	/	/
X		Special	/	/

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9.5 Voltage Dips & Interruptions Tests (IEC 61000-4-11)

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

Level	Amplitude	td	Phase Angle	Pass	Fail
Voltage Dip	0%	10ms	0/90/180/270	B	/
Voltage Dip	0%	20ms	0/90/180/270	B	/
Voltage Dip	70%	500 ms	0/90/180/270	B	/
Voltage Interruption	0%	5000ms	N/A	C	/

9.6 Surge Test (IEC 61000-4-5)

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal Operation

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

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10 - IMMUNITY TEST RESULTS

10.1 IEC 61000-4-2 Electrostatic Discharge Test Results

The EUT was subjected to the electrostatic discharge tests required by ETSI EN 301 489-1 V1.9.2 plus ETSI EN 301 489-3 V1.4.1and ETSI EN 301 489-17 V2.1.1 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. .

10.2 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 V1.9.2 plus ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 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.

10.3 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 V1.9.2 plus ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 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.

10.4 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 V1.9.2 plus ETSI EN 301 489-3 V1.4.1and ETSI EN 301 489-17 V2.1.1 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.

10.5 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 V1.9.2 plus ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 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.

10.6 IEC 61000-4-5 Surge Test Results

The EUT was subjected to the Surge tests required by ETSI EN 301 489-1 V1.9.2 plus ETSI EN 301 489-3 V1.4.1 and ETSI EN 301 489-17 V2.1.1 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.

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APPENDIX A - PRODUCT LABELING

CE Marking Label Specification

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

Proposed Label Location on EUT

EUT Rear View/Proposed CE Marking Location

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APPENDIX B – EUT PHOTOGRAPHS

B.1- EUT EXTERNAL PHOTOGRAPHS

EUT –View

EUT –Front View

EUT –Rear View

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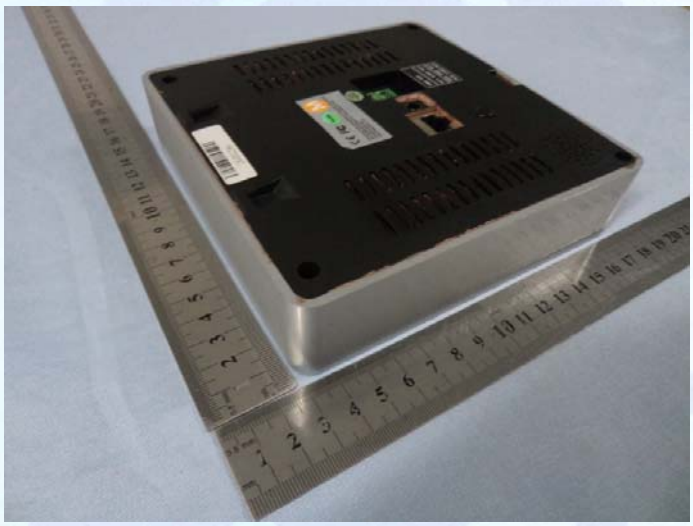
EUT –Side View



EUT –Adapter View

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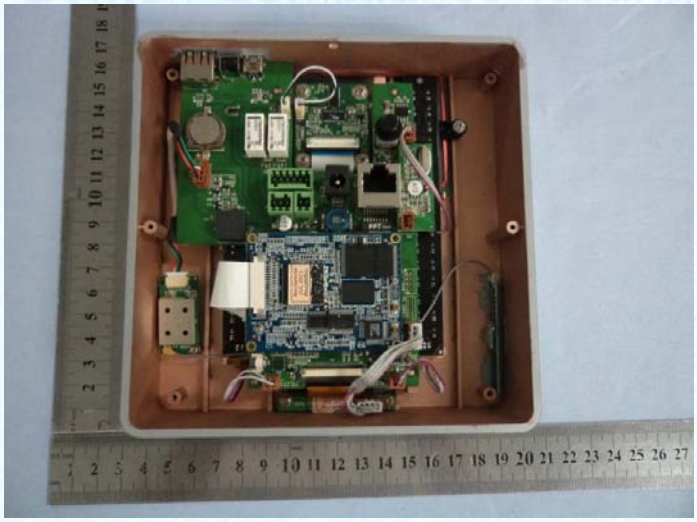
B.2- EUT INTERNAL PHOTOGRAPHS

EUT –Uncovered View



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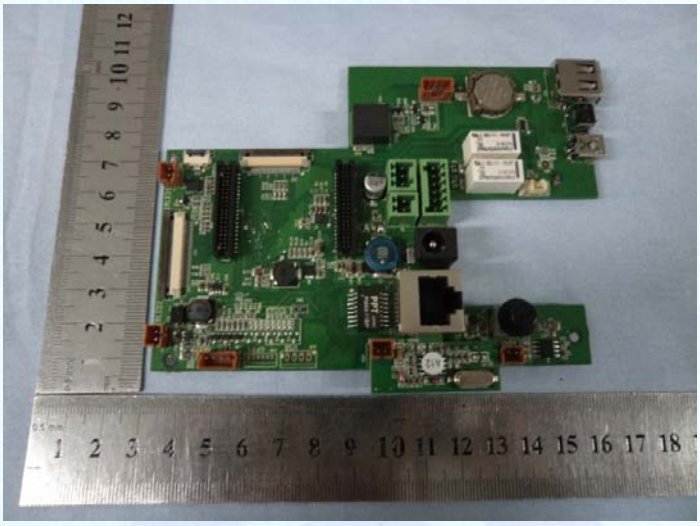
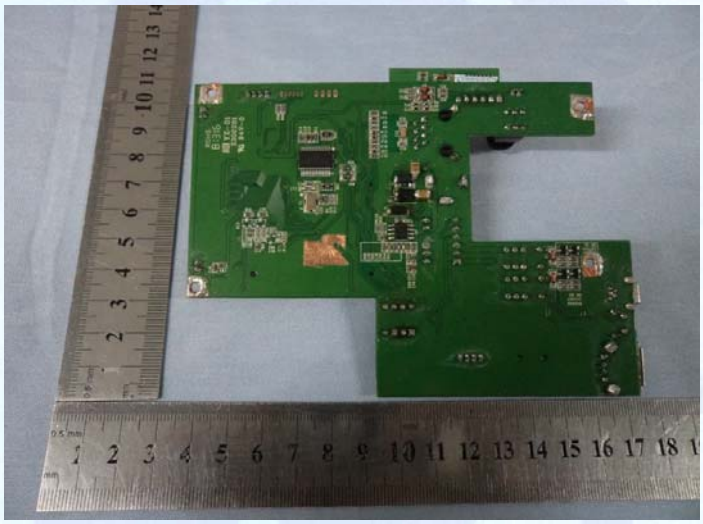
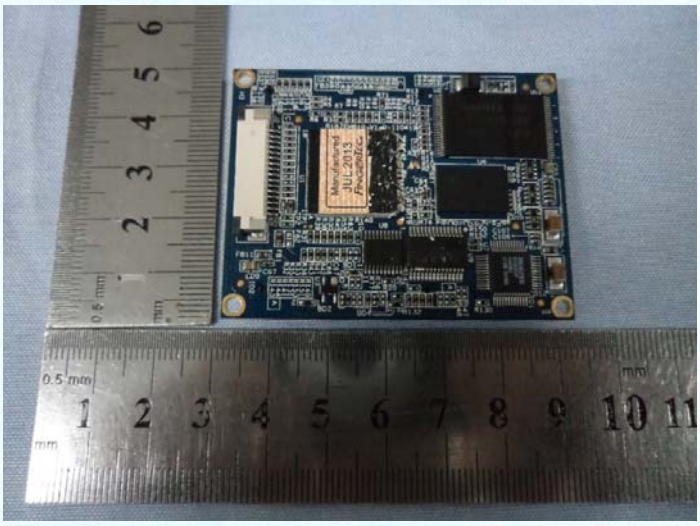
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.bontek.com.cn

EUT –Mainboard View





EUT PCB Board



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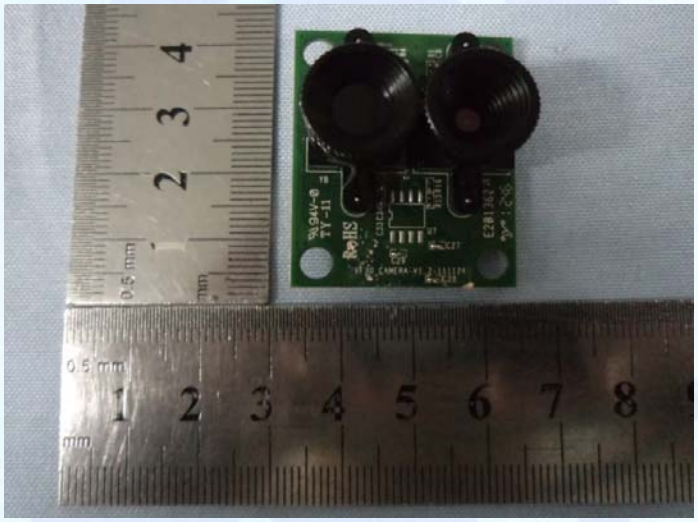
EUT PCB Board



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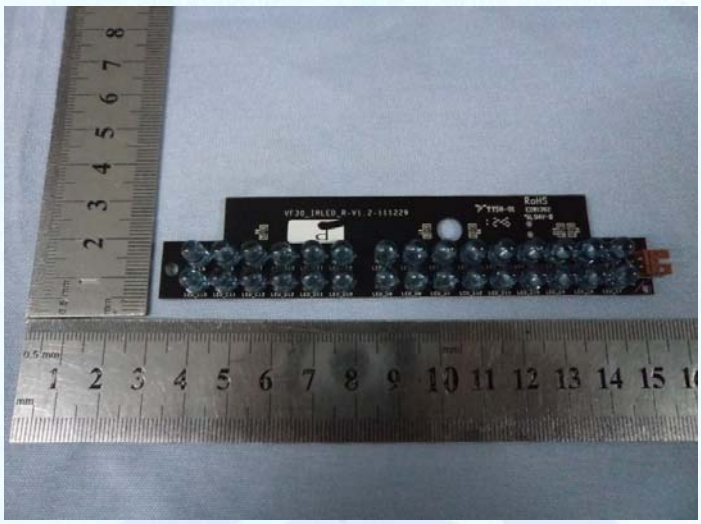
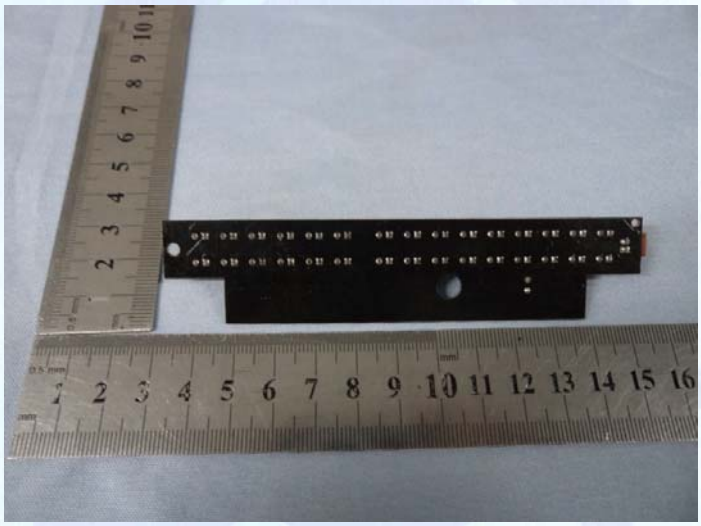
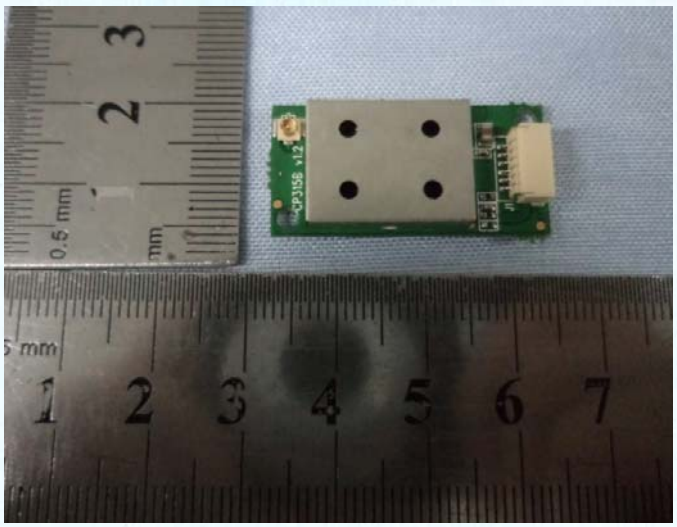
EUT PCB Board





EUT-Module PCB VIEW



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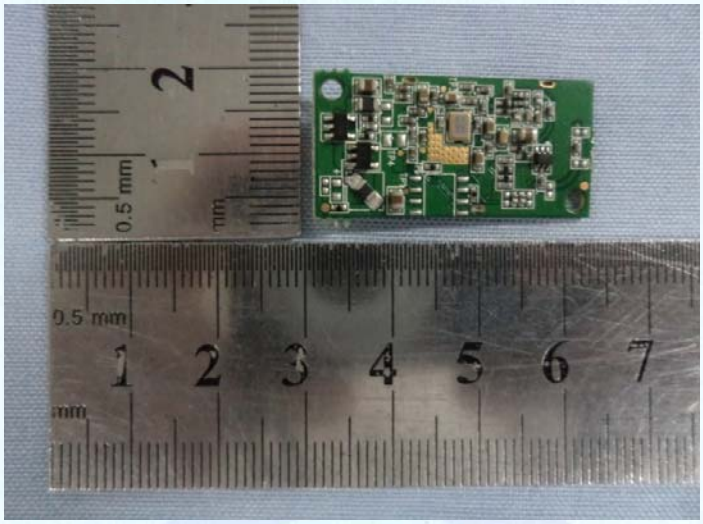

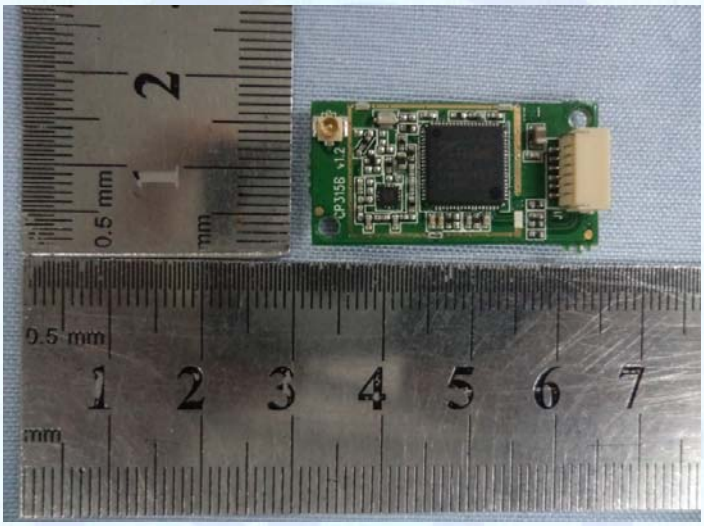

EUT-Antenna VIEW

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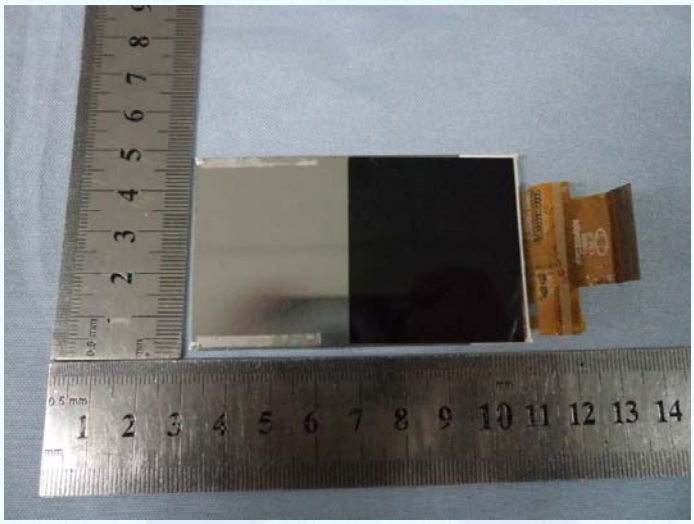
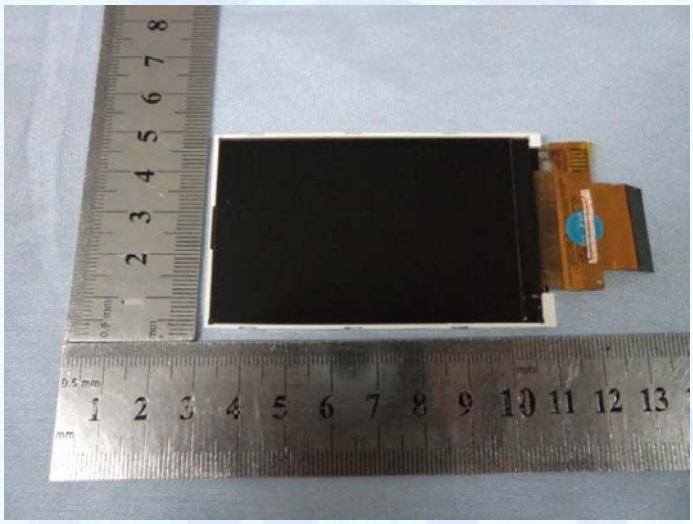
EUT-LCD VIEW





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APPENDIX C – TEST SETUP PHOTOGRAPHS

Conducted Emission

Radiated Emission

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

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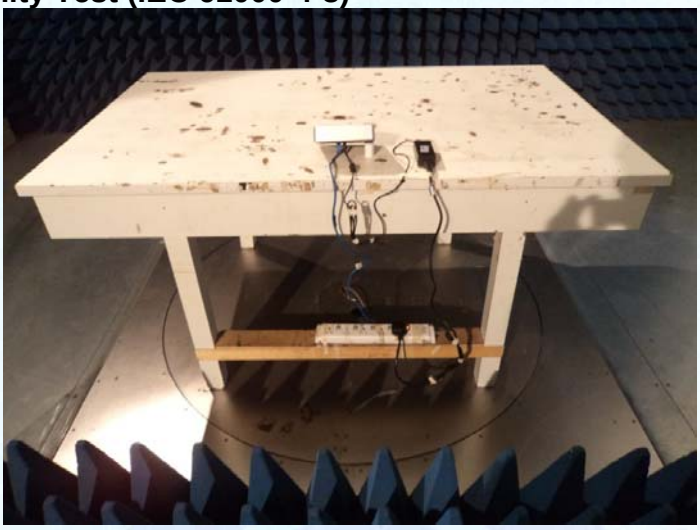
Radiated Susceptibility Test (IEC 61000-4-3)



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

Conducted Susceptibility Test (IEC 61000-4-6)

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.
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Harmonic Current Test / Voltage Fluctuations And Flicker Test

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APPENDIX D – BONTEK ACCREDITATION CERTIFICATES

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L3923)

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

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

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

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

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

Date of Issue: 2012-03-22

Date of Expiry: 2015-03-21

Date of Initial Accreditation: 2009-02-27

Date of Update: 2012-03-22

Signed on behalf of China National Accreditation Service for Conformity Assessment

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

No.CNAS AL 2

0003595

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.
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TÜVRheinland®

Certificate of Appointment

No. UA 50242657-0001

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. 17010783-003
This certificate is valid until the next scheduled audit or up to 18 months, at the discretion of TÜV Rheinland.

Date of issue: 05.12.2012

Certification Body

TÜV Rheinland / CCIC (Qingdao) Co., Ltd. TÜVRheinland Certification Body

Dipl.-Ing. (FH) C. Nasca

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

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FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

March 20, 2008

Registration Number: 338263

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone,
Qiaocheng East Road, Nanshan,
Shenzhen, 518055
China

Attention: Tony Wu

Re: Measurement facility located at Hua Qiao Cheng East Ind. Area,Shenzhen,China
Anechoic chamber (3 meter)
Date of Listing: March 20, 2008

Dear Sir or Madam:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to 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,

Katie Hawkins

Katie Hawkins
Electronics Engineer

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Test Report of
ETSI EN 300 330-1 V1.7.1 (2010-02)
ETSI EN 300 330-2 V1.5.1 (2010-02)

On Behalf of

FINGERTEC WORLDWIDE SDN BHD

NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

Model: Face ID4d, Face ID4

August 28, 2013

This Report Concerns:	Equipment Type:
☒ Original Report	Face + RFID T&A and Access control

Test Engineer:	Jiankuai.Li/ Jiankuai.Li
Report Number:	**BCT13HR-1419E-1**
Test Date:	August 8-28, 2013
Reviewed By:	Kevin Chi / kevin chi
Approved By:	Kendy Wang / Kendy Wang
Prepared By:	**Shenzhen Bontek Compliance Testing Laboratory Co., Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: +86-755-86337020 Fax: +86-755-86337028

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Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.
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Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.bontek.com.cn

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, 47180 PUCHONG, SELANGOR, MALAYSIA
Manufacturer:	**FINGERTEC WORLDWIDE SDN BHD**
Address of manufacturer:	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

General Description of E.U.T

Items	Description
EUT Description:	Face + RFID T&A and Access control
Model No.:	Face ID4d
Supplementary Model:	Face ID4
Trademark:	FINGERTEC
Transmit Frequency:	125KHz
RF Output Power:	37.86dBuA/m 3 meters
Number of Channels:	1
Emission designation:	22K4F2D
Duty cycle:	100%
Antenna Type:	Built-in Antenna
Rated Voltage:	Input: 12VDC 3.0A from AC/DC adapter
Adapter Information:	Model:ADS-45NP-12-3 12036G Input: 100-240V~50/60Hz 1.2A Output: 12V 3.0A
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.*
** Supplementary models have the same circuit, but with different appearance*

Category of Equipment

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

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1.2 Test Standards

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

ETSI EN 300 330-1 V1.7.1 (2010-02)

ETSI EN 300 330-2 V1.5.1 (2010-02)

1.3 Objective

The following Declaration of Conformity report of an ITE device is in accordance with ETSI EN 300 330-1 V1.7.1 (2010-02), Electromagnetic compatibility and Radio spectrum Matters (ERM);Short Range Devices (SRD);Radio equipment in the frequency range 9kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 1: Technical characteristics and test methods; and Electromagnetic compatibility and Radio spectrum Matters (ERM);Short Range Devices (SRD);Radio equipment in the frequency range9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.

1.4 Test Methodology

The measurement required was performed at laboratory of Shenzhen Bontek Compliance Testing Laboratory Co., Ltdat 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China and ACCURATE TECHNOLOGY CO., LTD. at F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China

1.5 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.

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 22,2012.

TUV - Registration No.: UA 50242657-0001
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. 17010783-003.

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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 BCT can exercise the EUT as data transferring between the EUT and the host.

2.3 Equipment Modifications

BCT has not done any modification on the EUT.

2.4 Test Equipment List and Details

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

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2013-4-16	2014-4-15
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2012-11-1	2013-10-31
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2013-4-19	2014-4-18
4	BCT-EMC004	Single Power Conductor Module	R&S	NNBM 8124	242	2013-4-19	2014-4-18
5	BCT-EMC005	Single Power Conductor Module	R&S	NNBM 8124	243	2013-4-19	2014-4-18
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-11-5	2013-11-4
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	`Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-11-2	2013-11-1
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2013-4-16	2014-4-15
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2013-6-26	2014-6-25
11	BCT-EMC011	Color TV Pattern Genenator	PHILIPS	PM5418	TM209947	N/A	N/A
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2013-4-16	2014-4-15
14	BCT-EMC014	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2013-4-16	2014-4-15
15	BCT-EMC015	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2012-11-28	2013-11-27
16	BCT-EMC016	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2012-11-28	2013-11-27

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17	BCT-EMC017	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2012-11-28	2013-11-27
18	BCT-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2013-5-19	2014-5-18
19	BCT-EMC019	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2012-11-28	2013-11-27
20	BCT-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2012-11-1	2013-10-31
21	BCT-EMC021	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-11-15	2013-11-14
22	BCT-EMC022	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	BCT-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2013-4-16	2014-4-15
24	BCT-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2013-4-16	2014-4-15
25	BCT-EMC029	6DB Attenuator	FRANKONIA	N/A	1001698	2013-4-16	2014-4-15
26	BCT-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2013-4-16	2014-4-15
27	BCT-EMC031	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2013-4-16	2014-4-15
28	BCT-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2013-4-16	2014-4-15
29	BCT-EMC033	ISN	TESEQ	ISN-T800	30301	2012-11-15	2013-11-14
30	BCT-EMC034	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2012-11-01	2013-10-31
31	BCT-EMC035	HRMONICS&FLICK RE ANALYSER	VOLTECH	PM6000	200006700433	2012-11-20	2013-11-19
32	BCT-EMC036	Spectrum Analyzer	R&S	FSP	100397	2012-11-1	2013-10-31
33	BCT-EMC037	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2013-4-19	2014-4-18

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3. SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

ETSI EN 300 330-2 V1.3.1	Description of Test	Limit		Results
Section 4.2.1.2	Transmitter carrier output levels	Radiated H-field	See Section 7.2.1.3	Pass
		Radiated E-field	not applicable	
		RF Carrierr current	not applicable	
Section 4.2.1.1	Permitted range of operating frequencies	See Section 7.3.3		Pass
Section 4.2.1.3	Permitted frequency range of the modulation bandwidth	See Section 7.4.3		Pass
Section 4.2.1.4	Spurious domain emission limits	Conducted spurious emission	not applicable	Pass
		Radiated spurious emission	See Section 7.5.3.2	
		Effective radiated power	See Section 7.5.4.2	
Section 4.2.2.1	Adjacent channel selectivity - in band	See Section 8.1.3		N/A
Section 4.2.2.2	Blocking or desensitization (Receiver category 1 and 2 only)	See Section 8.2.3		N/A
Section 4.2.2.3	Receiver spurious radiation	See Section 8.3.3		N/A

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4. ETSI EN 300 330-2 V1.5.1 (2010- 02)§4.2.1.2 –Transmitter carrier output levels

4.1 Standard Applicable

The limits presented in the present document are the required field strengths to allow satisfactory operation of inductive systems.

The limit for a low level generic H-field strength is given in annex H.

The maximum H-field strengths for certain frequency bands are given in table 5.

Field-strength limits of National Radio Interfaces (NRI) apply. Regulatory information is available in CEPT/ERC/REC 70-03 [i.1] and where applicable ERC or ECC Decisions as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.

Table 5: H-field limits at 10 m

Frequency range (MHz)	H-field strength limit (H_f) dBµA/m at 10 m
0,009 ≤ f < 0,090	72 descending 3 dB/oct above 0,03 MHz or according to note 1 (see note 5)
0,09 ≤ f < 0,119	42
0,119 ≤ f < 0,135	66 descending 3 dB/oct above 0,119 MHz or according to note 1 (see notes 3 and 5)
0,135 ≤ f < 0,140	42
0,140 ≤ f < 0,1485	37,7
0,1485 ≤ f < 30	-5 (see note 4)
0,315 ≤ f < 0,600	-5
3,155≤ f < 3,400	13,5
4,234	9
4,516	7
7,400 ≤ f < 8,800	9
10,2 ≤ f < 11,00	9
12,5 ≤ f ≤ 20	-7
6,765 ≤ f ≤ 6,795 13,553 ≤ f ≤ 13,567 26,957 ≤ f ≤ 27,283	42 (see note 3)
13,553 ≤ f ≤ 13,567	60 (see notes 2 and 3)
27,095	42
NOTE 1: For the frequency ranges 9 kHz to 135 kHz, the following additional restrictions apply to limits above 42 dBµA/m: - for loop coil antennas with an area ≥ 0,16 m^2 table 5 applies directly; - for loop coil antennas with an area between 0,05 m^2 and 0,16 m^2 table 5 applies with a correction factor. The limit is: table value + 10 × log (area/0,16 m^2); - for loop coil antennas with an area < 0,05 m^2 the limit is 10 dB below table 5. NOTE 2: For RFID and EAS applications only. NOTE 3: Spectrum mask limit, see annex G. NOTE 4: For further information see annex H. NOTE 5: Limit is 42 dBµA/m for the following spot frequencies: 60 kHz ± 250 Hz, 66,6 kHz ± 750 Hz, 75 kHz ± 250 Hz, 77,5 kHz ± 250 Hz, and 129,1 kHz ± 500 Hz.	

For calculation rules for limits at other measurement distances, see annex A.

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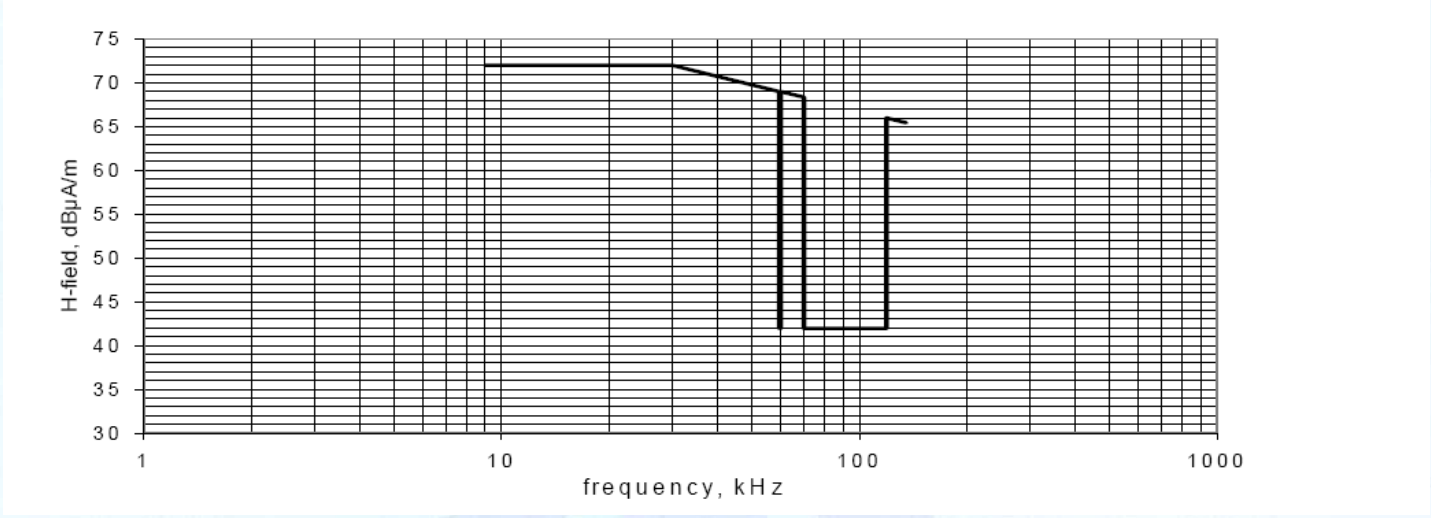

9-135 kHz magnetic field strength limits overview at 10-metre measurement distance

4.2 Methods of Measurement

The measurements of the transmitter radiated H-field shall be made on an open field test site as specified in clause A.1.3. Any measured values shall be at least 6 dB above the ambient noise level.

The H-field produced by the equipment shall be measured at standard distance of 10 m. Where this is not practical, e.g. due to physical size of the equipment including the antenna or with use of special field cancelling antenna, then other distances may be used. When another distance is used, the distance used and the field strength value measured shall be stated in the test report.

In this case, the measured value at actual test distance shall be extrapolated to 10 m according to annex F and these calculations shall be stated in the test report. The H-field is measured with a shielded loop antenna connected to a measurement receiver. The measuring bandwidth and detector type of the measurement receiver shall be in accordance with clause 6.6.

The equipment under test shall operate where possible, with modulation. Where this is not possible, it shall be stated in the test report.

For transmitters using a continuous wideband swept carrier, the measurement shall be made with the sweep off. When it is not possible to turn the sweep off the measurements shall be made with the sweep on and this shall be stated in the test report.

The measurements are made under normal and extreme conditions. However, measurements at extreme temperatures are not required when tests can only made at an open test site due to size constraints of the loop antenna, see clause A.1.3.

For measuring equipment calibrated in dBµV/m, the reading should be reduced by 51,5 dB to be converted to dBµA/m.

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4.3 Basic Test Setup Block Diagram

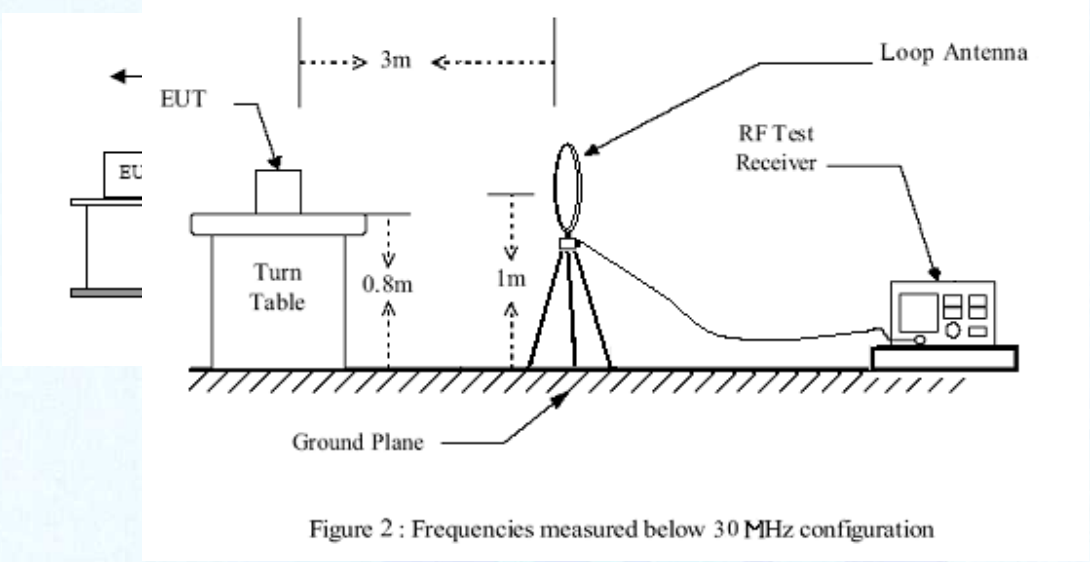

Figure 2 : Frequencies measured below 30 MHz configuration

4.4 Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: continue transmitting Mode

Indicated		Transfer	Table	Test Antenna	Convert Level dBuA/m	Limit dBuA/m	Margin dB
Frequency MHz	Ampl./ dBuV	dB	Angle Degree	Height Meter			
0.125	80.61	18.75	150	1.5	38.75	70	-31.25

Note: The limit in above table is at 3 m measurement distance, and comply with table 3 note 1.

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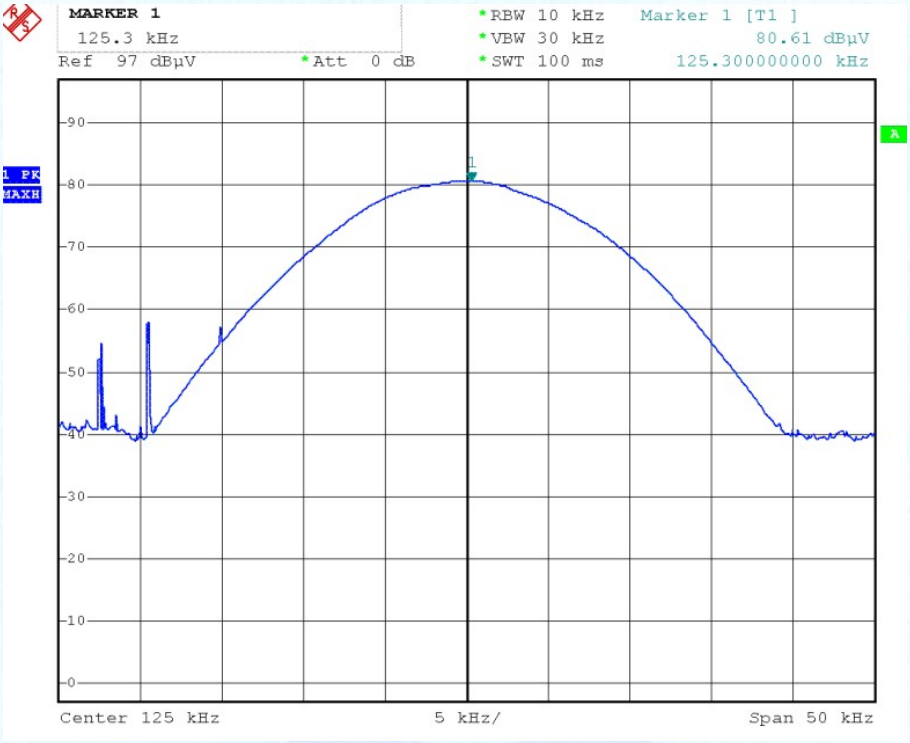
EUT Antenna horizontal



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5. ETSI EN 300 330-2 V1.5.1 (2010- 02)§4.2.1.1 –Permitted range of operating frequencies

5.1 Standard Application

According to ETSI EN 300 330-1 V1.7.1, This clause refers to clause 7.3.

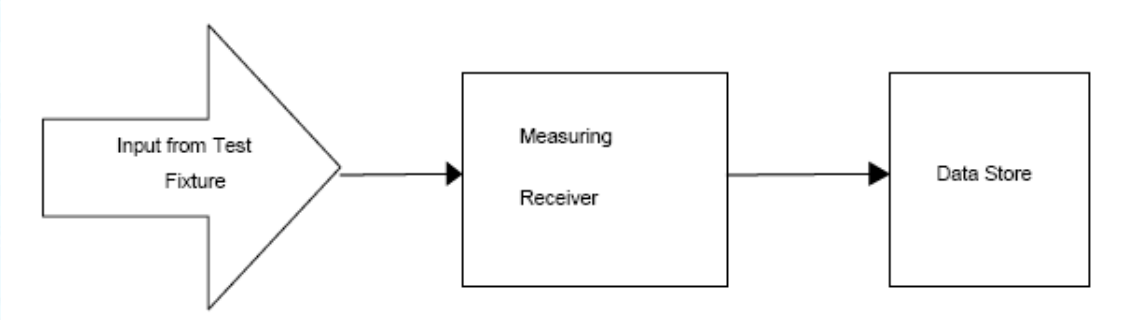
5.2 Limits

The permitted range of operating frequency for intentional emissions shall be from 9 kHz to 30 MHz. Outside the permitted range of operating frequencies the unintentional emissions shall be reduced to the limits given in clause 7.5.

5.3 Methods of Measurement

The occupied bandwidth of the EUT, e.g. the minimum and maximum output frequencies at which the permitted spurious and out-of-band emission levels as specified in clause 7.5 are exceeded due to intentional emission from the radio transmitter shall be measured using the method shown in figure 1. If more than one modulation scheme can be generated by the EUT, then for each modulation scheme and one typical set of modulation parameters the maximum and minimum frequencies shall be measured and recorded separately.

The measuring receiver may be a spectrum analyser, oscilloscope, selective power meter or any measuring receiver which is appropriate to perform the intended measurement of the EUT.



5.4 Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: continue transmitting Mode

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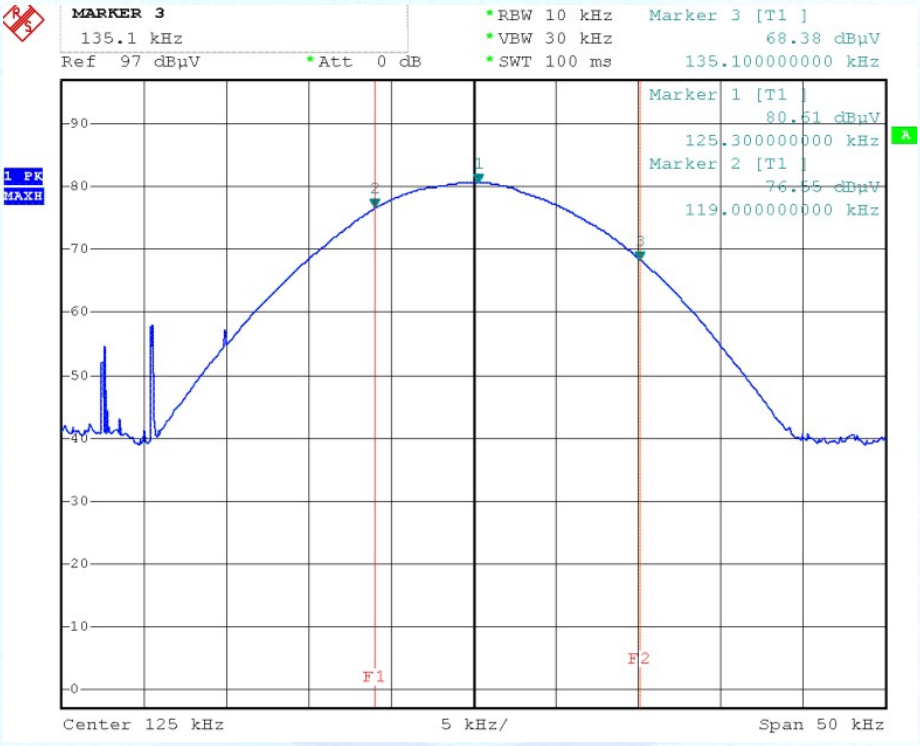

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6. ETSI EN 300 330-2 V1.5.1 (2010- 02)§4.2.1.3 –Permitted frequency range of the modulation bandwidth

6.1 Standard Application

According to ETSI EN 300 330-1 V1.7.1, This clause refers to clause 7.4.

6.2 Limits

The permitted range of the modulation bandwidth shall be within the assigned frequency band see table 1 or ±7,5 % of the carrier frequency whichever is the smallest. For RFID and EAS Systems, the permitted modulation bandwidth shall be within the transmitter emission boundary of figure G.1, respectively the spectrum mask of figure G.2. For further information, see CEPT/ERC/REC 70-03 [i.1] or ERC/ECC/CEPT Decisions as implemented through National Radio Interfaces (NRI) and additional NRI as relevant.

6.3 Methods of Measurement

The transmitter shall be connected to an artificial antenna or if the transmitter has an integral antenna a test fixture shall be used (see clause 6.3). The RF output of the equipment shall be connected to a spectrum analyser via a 50 Ω variable attenuator.

The transmitter shall be operated at the nominal carrier power or field strength measured under normal test conditions in clause 7.2. The attenuator shall be adjusted to an appropriate level displayed at the spectrum analyser screen.

The transmitter shall be modulated with standard test modulation (see clauses 6.1.1 and 6.1.2). If the equipment cannot be modulated externally, the internal modulation shall be used.

For transmitters using a continuous wideband swept carrier the measurement shall be made with the sweep on.

The output of the transmitter, with or without test fixture, shall be measured by using a spectrum analyser with a resolution bandwidth appropriate to accept all major side bands. The power level calibration of the spectrum analyser shall then be related to the power level or field strength measured in clause 7.2. The calculation will be used to calculate the absolute level of the sideband power.

The test laboratory shall ensure that the spectrum analyser's span is sufficiently wide enough to ensure that the carrier and all its major side bands are captured.

The frequency of the upper and lower points, where the displayed power envelope of the modulation including frequency drift is equal to the appropriate level defined in clause 7.3.1 is recorded as the modulation bandwidth.

The measurements shall be made during normal and extreme test conditions. During extreme test conditions, both extreme temperature and voltage apply simultaneously, (clauses 5.4.1 and 5.4.2 applied simultaneously).

6.4 Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: continue transmitting Mode

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Test Condition		Frequency(MHz)	
Temperature (° C)	Voltage (V)		
T Normal:25	AC 230V	0.12530	
T Min:-20	AC 207V	0.12520	
	AC 253V	0.12500	
T Max:55	AC 207V	0.12520	
	AC 253V	0.12530	
Limit		fL ＞0.119	fH ＜0.135
Result		Complies	

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7. ETSI EN 300 330-2 V1.5.1 (2010- 02)§4.2.1.4 – Spurious emissions

7.1 Standard Application

According to ETSI EN 300 330-1 V1.7.1, This clause refers to clause 7.5.

7.2 Limit of Spurious Emissions

7.2.1 Limit of Radiated Field Strength

The radiated field strength of the spurious domain emissions below 30 MHz shall not exceed the generated H-field dBµA/m at 10 m given in table 8.

State	Frequency 9 kHz ≤ f < 10 MHz	Frequency 10 MHz ≤ f < 30 MHz
Operating	27 dBµA/m at 9 kHz descending 3 dB/oct	-3,5 dBµA/m
Standby	5,5 dBµA/m at 9 kHz descending 3 dB/oct	-25 dBµA/m

Note:The limit be given in below test data is at 10m ,is converted value(see Annex A).

7.2.2 Limit of Effective Radiated Power

State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies between 30 MHz to 1 000 MHz
Operating	4 nW	250 nW
Standby	2 nW	2 nW

Note:The limit be given in below test data is at 3 m. 10*Log(XmW)=(Y)dBm,

7.3 Methods of measurement

7.3.1 Methods of measurement of Radiated Field Strength (< 30 MHz)

The field strength shall be measured for frequencies below 30 MHz. The equipment under test shall be measured at a distance of 10 m on an outdoor test site. The test antenna shall be a calibrated shielded magnetic field antenna. The equipment under test and test antenna shall be arranged as stated in clause A.1.

For Product Class 3 the transmitter antenna connector of the equipment under test shall be connected to an artificial antenna (see clause 6.2) and the output connector terminated.

The equipment under test shall be switched on with normal modulation. The characteristics of the modulation signal used shall be stated on the test report. The measuring receiver shall be tuned over the frequency range 9 kHz to 30 MHz, except for the frequency band on which the transmitter is intended to operate.

At each frequency at which a relevant spurious signal is detected the equipment under test and the test antenna shall be rotated until maximum field strength is indicated on the measuring receiver. This level shall be noted.

If the transmitter can be operated in the standby mode, then the measurements shall be repeated in the standby mode. For measuring equipment calibrated in dBµV/m, the reading should be reduced by 51,5 dB to be converted to dBµA/m.

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7.3.2 Methods of Measurement of Effective Radiated Power (> 30 MHz)

On an appropriate test site selected from annex A, the equipment shall be placed at the specified height on a non-conducting support and in the position closest to normal use as declared by the provider.

For Product Class 3 the transmitter antenna connector shall be connected to an artificial antenna (see clause 6.2).

The test antenna shall be oriented for vertical polarization. The output of the test antenna shall be connected to a measuring receiver.

The transmitter shall be switched on with normal modulation, and the measuring receiver shall be tuned over the frequency range 30 MHz to 1 000 MHz.

At each frequency at which a relevant spurious component is detected, the test antenna shall be raised and lowered through the specified range of heights until a maximum signal level is detected on the measuring receiver.

The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

The maximum signal level detected by the measuring receiver shall be noted.

The substitution antenna shall be oriented for vertical polarization and calibrated for the frequency of the spurious component detected.

The frequency of the calibrated signal generator shall be set to the frequency of the spurious component detected. The input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver, if necessary.

The test antenna shall be raised and lowered through the specified range of heights to ensure that the maximum signal is received.

When a test site according to clause A.1.1 is used, there is no need to vary the height of the antenna.

The input signal to the substitution antenna shall be adjusted until an equal or a known related level to that detected from the transmitter is obtained on the measuring receiver.

7.4 Test Result

Temperature (℃) : 22~23	EUT: Face + RFID T&A and Access control
Humidity (%RH): 50~54	M/N: Face ID4d
Barometric Pressure (mbar): 950~1000	Operation Condition: continue transmitting Mode

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The worst date of Spurious Emission below 30MHz Tx

EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Continuous transmitting
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
	Tem:25℃ Hum:50%

No.	Frequency (MHz)	Reading (dBuA)	Correction factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	0.0090	-18.04	34.49	16.45	27.00	-10.55	---	---	peak
2	0.0357	-10.99	24.00	13.01	21.05	-8.04	---	---	peak
3	0.0685	-12.19	19.03	6.84	18.29	-11.45	---	---	peak

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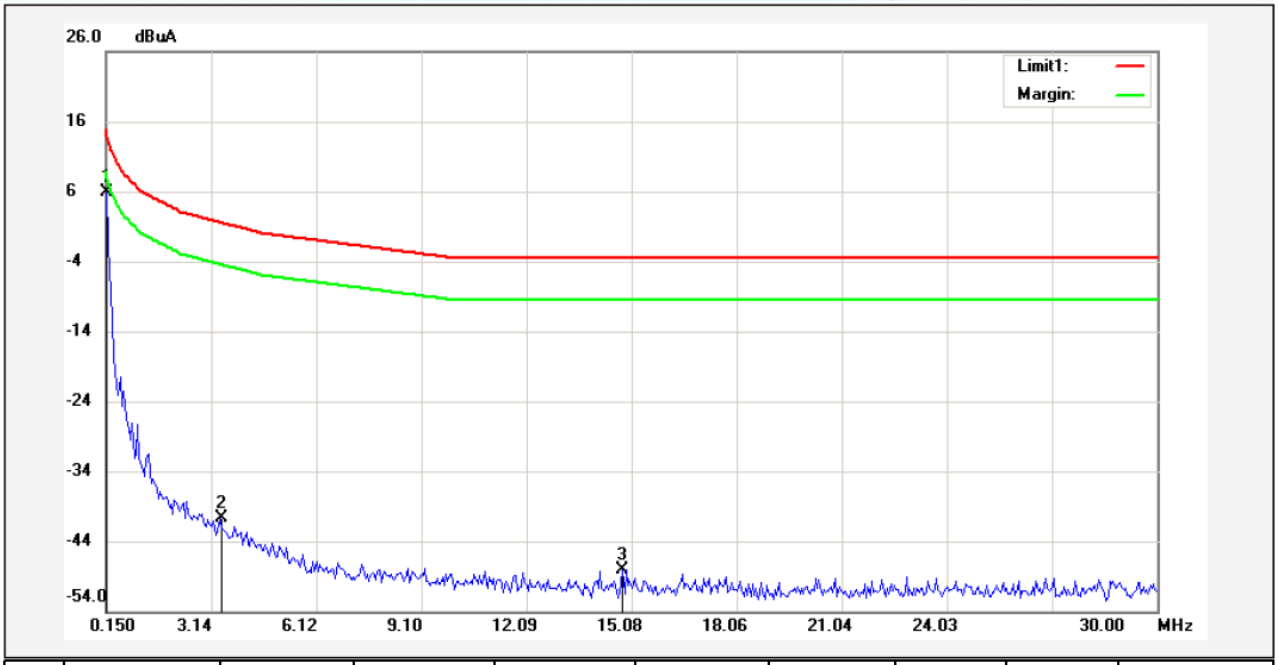
EUT:	Face + RFID T&A and Access control
M/N:	Face ID4d
Operating Condition:	Continuous transmitting
Test Site:	3m CHAMBER
Operator:	Chen
Test Specification:	AC 230V/50Hz for Adapter
	Tem:25℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuA)	Correction factor(dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	0.1500	-5.21	11.20	5.99	14.88	-8.89	---	---	peak
2	3.3838	-29.63	-11.12	-40.75	1.59	-42.34	---	---	peak
3	14.8262	-29.37	-18.65	-48.02	-3.50	-44.52	---	---	peak

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Spurious Emission test data above 30MHz Tx

Antenna horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Emission Levels (dBm)	Limit (dBm)	Margin (dB)	Detector Mode
58.34	32.8	15.8	-68.5	-54	-14.5	QP
360.8	35.3	17.9	-68.9	-36	-32.9	QP
796.22	37.6	27.7	-61.4	-54	-7.4	QP

Antenna vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Emission Levels (dBm)	Limit (dBm)	Margin (dB)	Detector Mode
68	33.7	14.2	-71	-54	-17	QP
588.82	38.2	25.6	-64.1	-54	-10.1	QP
780.12	40.1	27.7	-63.9	-54	-9.9	QP

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Annex A: H-field measurements and limits at 3 m

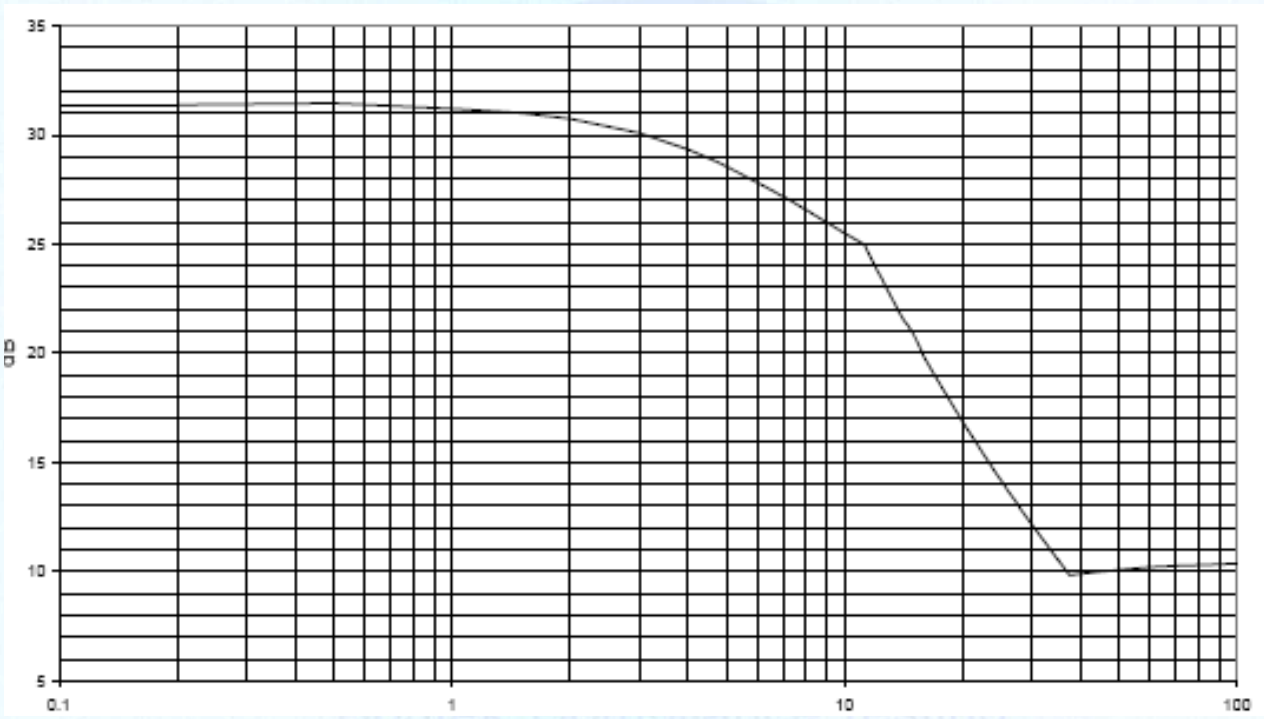
The H-field limit in dBµA/m at 3 m, H_{3m}, is determined by the following equation:

$$H_{3m} = H_{10m} + C_3$$

where:

H_{10m} is the H-field limit in dBµA/m at 10m distance according to the present document; and
C_3 is a conversion factor in dB determined from figure A..

Correction factor, C_3, for limits at 3 m distance, dB



Frequency , MHz

Figure A: Conversion factor C3 versus frequency

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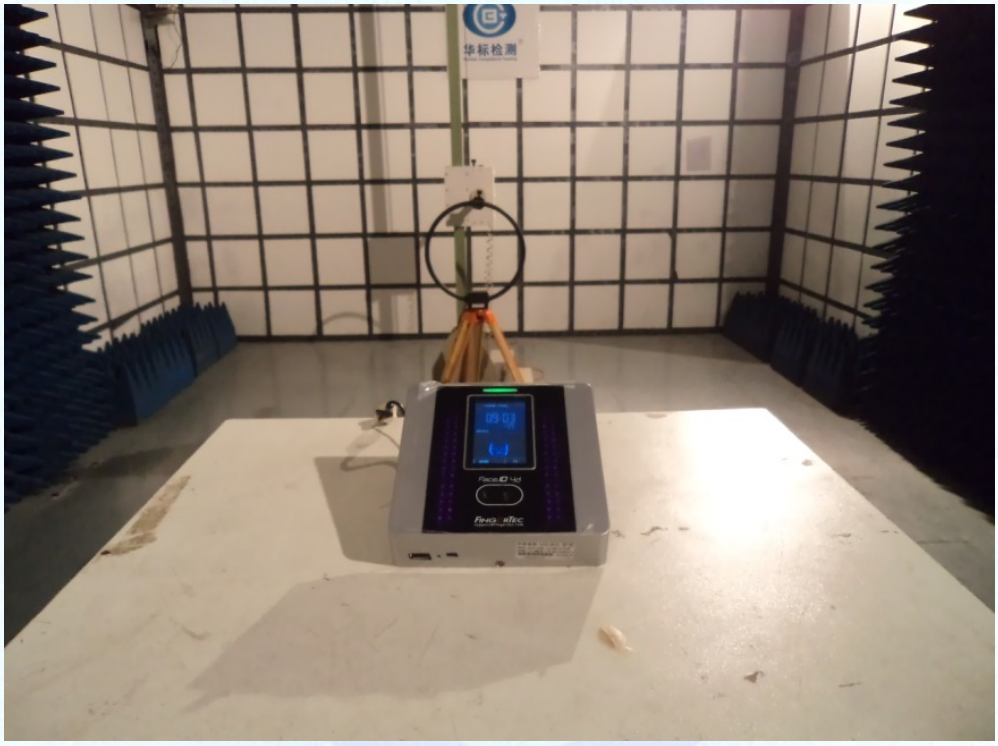
Annex B: EUT-Setup photo



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ETSI EN 300 328 V1.7.1
MEASUREMENT AND TEST REPORT

On Behalf of

FINGERTEC WORLDWIDE SDN BHD

NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

Model: Face ID4d, Face ID4

August 28, 2013

This Report Concerns:	Equipment Type:
☒ Original Report	Face + RFID T&A and Access control

Test Engineer:	Jiankuai.Li / Jiankuai · Li
Report Number:	**BCT13HR-1419E-2**
Test Date:	August 8-21, 2013
Reviewed By:	Kevin Chi / kevin chi
Approved By:	Kendy Wang / Kendy Wang
Prepared By:	**Shenzhen Bontek Compliance Testing Laboratory Co., Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: +86-755-86337020 Fax: +86-755-86337028

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**FINGERTEC WORLDWIDE SDN BHD**
Addressof applicant:	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA
Manufacturer:	**FINGERTEC WORLDWIDE SDN BHD**
Address of manufacturer:	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA
Equipment Under Test:	Face + RFID T&A and Access control
Test Model:	Face ID4d
Supplementary Model No.:	Face ID4
Trade Name:	FINGERTEC
Operation mode:	IEEE 802.11b /IEEE 802.11g /IEEE 802.11n
Frequency Range:	IEEE 802.11b/g: 2412 ~ 2472 MHz IEEE 802.11n HT20 : 2412 ~ 2472 MHz IEEE 802.11n HT40 : 2422 ~ 2462 MHz
Number ofChannels:	IEEE 802.11b/g: 13 Channels IEEE 802.11n HT20: 13 Channels IEEE 802.11n HT40: 9 Channels
Channels Spacing:	5MHz
Modulation Technique:	IEEE 802.11b mode: CCK,DQPSK, DBPSK IEEE 802.11g mode: OFDM IEEE 802.11n MHz mode: PSK,QPSK,16-QAM,64-QAM
Type of Antenna:	Built-in Antenna
Antenna Gain	1dBi
Power Supply:	Input: 12VDC 3.0A from AC/DC adapter
Adapter Information:	Model:ADS-45NP-12-3 12036G Input: 100-240V~50/60Hz 1.2A Output: 12V 3.0A

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*
* *Supplementary models have the same circuit, but with different appearance*

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1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with
ETSI EN 300 328 V1.7.1: 2006

1.3 Objective

The following Declaration of Conformity report of an ITE device is prepared in accordance with ETSI EN 300 328 V1.7.1 (2006-10), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques.
The objective of the manufacturer is to determine compliance with ETSI EN 300 328 V1.7.1 Electromagnetic compatibility and Radio spectrum Matters (ERM).

1.4 Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 328 V1.7.1.

1.5 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, 2008.

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 August, 2009.

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, February, 2009.

TUV - Registration No.: UA 50242657-0001
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. 17010783-003

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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 BCT can exercise the EUT as data transferring between the EUT and the host.

2.3 Special Accessories

N/A

2.4 Block Diagram/Schematics

Please refer to the relevant Exhibit.

2.5 Equipment Modifications

BCT has not done any modification on the EUT.

2.6 List of Measuring Equipments Used

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

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2013-4-16	2014-4-17
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2012-11-1	2013-10-31
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2013-4-19	2014-4-18
4	BCT-EMC004	Single Power Conductor Module	R&S	NNBM 8124	242	2013-4-19	2014-4-18
5	BCT-EMC005	Single Power Conductor Module	R&S	NNBM 8124	243	2013-4-19	2014-4-18
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-11-5	2013-11-4
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	`Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-11-2	2013-11-1
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2013-4-16	2014-4-17
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2013-6-26	2014-6-25
11	BCT-EMC011	Color TV Pattern	PHILIPS	PM5418	TM209947	N/A	N/A

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		Genenator					
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2013-4-16	2014-4-17
14	BCT-EMC014	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2013-4-16	2014-4-17
15	BCT-EMC015	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2012-11-28	2013-11-27
16	BCT-EMC016	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2012-11-28	2013-11-27
17	BCT-EMC017	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2012-11-28	2013-11-27
18	BCT-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-5-19	2014-5-18
19	BCT-EMC019	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2012-11-28	2013-11-27
20	BCT-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2012-11-1	2013-10-31
21	BCT-EMC021	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-11-15	2013-11-14
22	BCT-EMC022	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	BCT-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2013-4-16	2014-4-17
24	BCT-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2013-4-16	2014-4-17
25	BCT-EMC029	6DB Attenuator	FRANKONIA	N/A	1001698	2013-4-16	2014-4-17
26	BCT-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2013-4-16	2014-4-17
27	BCT-EMC031	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2013-4-16	2014-4-17
28	BCT-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2013-4-16	2014-4-17
29	BCT-EMC033	ISN	TESEQ	ISN-T800	30301	2012-11-15	2013-11-14
30	BCT-EMC034	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2012-11-01	2013-10-31
31	BCT-EMC035	HRMONICS&FLICK RE ANALYSER	VOLTECH	PM6000	200006700433	2012-11-20	2013-11-19
32	BCT-EMC036	Spectrum Analyzer	R&S	FSP	100397	2012-11-1	2013-10-31
33	BCT-EMC037	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2013-4-19	2014-4-18

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3. SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

ETSI EN 300 328-1 V1.7.1	Description of Test	Limit	Results
General Requirement	CE Labeling Requirement	/	Pass
General Requirement	Test Setup Photos	/	Pass
General Requirement	EUT Photos	/	Pass
General Requirement	Block Diagram, Schematics	/	Pass
Section 4.3.1	Equivalent Isotropic Radiated Power (Conducted)	≤ 100mW e.i.r.p	Pass
Section 4.3.2	Maximum e.i.r.p. Spectral Density	10mW/MHz	Pass
Section 4.3.3	Frequency range	FL>2.4GHz, FH<2.4835GHz	Pass
Section 4.3.5	Medium access protocol	Refer to section 4.3.5 .2	Pass
Section 4.3.6	Transmitter spurious emission	Refer to section 4.3.6.2	Pass
Section 4.3.7	Receiver Spurious Emission	Refer to section 4.3.7.2	Pass

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4. ETSI EN 300 328 V1.7.1 (2006-10)§4.3.1 – EQUIVALENT ISOTROPIC RADIATED POWER

4.1 Standard Applicable

According to ETSI EN 300 328 V1.7.1, the effective radiated power shall be equal to or less than –10 dBW (100 mW) e.i.r.p. This limit shall apply for any combination of power level and intended antenna assembly.

4.2 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
EMI Test Receiver	R&S	ESCI	100687	2013/04	1 Year
EMI Test Receiver	R&S	ESPI	100097	2013/04	1 Year
Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2013/04	1 Year

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4.3 Test Procedure

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.2 for the measurement methods.

4.4 Test Result

Temperature (℃)	23~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Face + RFID T&A and Access control
M/N	Face ID4d
Assigned Frequency Band	2412 ~ 2472MHz
Testing Mode	IEEE 802.11b , IEEE 802.11g and IEEE 802.11n

TEST DATA

Test mode:IEEE802.11b

Test Condition		**Effective Radiated Power(dBm e.i.r.p)**		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2442MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	12.62dBm	12.87dBm	12.90dBm
T Min:-20	AC 207V	12.58dBm	12.74dBm	12.79dBm
	AC 253V	12.63dBm	12.63dBm	12.92dBm
T Max:55	AC 207V	12.59dBm	12.58dBm	12.78dBm
	AC 230V	12.70dBm	12.36dBm	12.69dBm
Limit		**limit =20dBm**		
Measurement Uncertainty		**±1.5dB**		

Test mode:IEEE802.11g

Test Condition		**Effective Radiated Power(dBm e.i.r.p)**		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2442MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	11.26dBm	11.28dBm	11.15dBm
T Min:-20	AC 207V	11.19dBm	11.21dBm	11.15dBm
	AC 253V	11.32dBm	11.12dBm	11.16dBm
T Max:55	AC 207V	11.20dBm	11.23dBm	11.06dBm
	AC 230V	11.18dBm	11.15dBm	11.12dBm
Limit		**limit =20dBm**		
Measurement Uncertainty		**±1.5dB**		

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Test mode:IEEE802.11n HT20

Test Condition		Effective Radiated Power(dBm e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2442MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	10.07dBm	10.24dBm	10.41dBm
T Min:-20	AC 207V	10.08dBm	10.14dBm	10.29dBm
	AC 253V	10.02dBm	10.08dBm	10.34dBm
T Max:55	AC 207V	10.12dBm	10.06dBm	10.22dBm
	AC 230V	10.09dBm	10.14dBm	10.34dBm
Limit		**limit =20dBm**		
Measurement Uncertainty		**±1.5dB**		

Test mode:IEEE802.11n HT40

Test Condition		Effective Radiated Power(dBm e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2422MHz)	**CH7** (2442MHz)	**CH13** (2462MHz)
T Normal:25	AC 230V	9.02dBm	8.92dBm	9.10dBm
T Min:-20	AC 207V	9.10dBm	9.00dBm	9.11dBm
	AC 253V	9.04dBm	8.96dBm	9.18dBm
T Max:55	AC 207V	9.06dBm	8.84dBm	9.15dBm
	AC 230V	9.08dBm	9.06dBm	9.06dBm
Limit		**limit =20dBm**		
Measurement Uncertainty		**±1.5dB**		

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5. ETSI EN 300 328 V1.7.1 (2006-10) §4.3.2- MAXIMUM E.I.R.P. SPECTRAL DENSITY

5.1 Standard Application

According to ETSI EN 300 328 V1.7.1, the maximum e.i.r.p. spectral density is defined as the highest e.i.r.p. level in Watts per Herz generated by the transmitter within the power envelope. For wide band modulation other then FHSS(e.g. DSSS,OFDM,etc.), the maximum e.i.r.p. spectral density is limited to 10mW.

5.2 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Spectrum Analyzer	Agilent	E4446A	US44300399	2013/04	1 year
Receiver/ Spectrum Analyzer	R/S	ESCI	100106	2013/04	1 year
Signal Generator	IFR	2032	203002/100	2013/04	1 year
HP	Modulation Analyzer	8901B	3438A05208	2013/04	1 year

5.3 Test Procedure

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.3 for the measurement methods.

5.4 Test Result

Temperature (℃)	23~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Face + RFID T&A and Access control
M/N	Face ID4d
Assigned Frequency Band	2412 ~ 2472MHz
Testing Mode	IEEE 802.11b , IEEE 802.11g and IEEE 802.11n

Test result see following:

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TEST DATA

Test Mode:IEEE 802.11b

Test Condition		MAXIMUM E.I.R.P. SPECTRAL DENSITY (dBm/1MHz e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2442MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	3.44dBm	3.88Bm	4.33dBm
Limit	**10dBm/MHz**			

Test Mode:IEEE 802.11g

Test Condition		MAXIMUM E.I.R.P. SPECTRAL DENSITY (dBm/1MHz e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2442MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	-0.94dBm	-1.66dBm	-1.09dBm
Limit	**10dBm/MHz**			

Test Mode:IEEE 802.11n HT20

Test Condition		MAXIMUM E.I.R.P. SPECTRAL DENSITY (dBm/1MHz e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2412MHz)	**CH7** (2441MHz)	**CH13** (2472MHz)
T Normal:25	AC 230V	-3.23dBm	-2.69dBm	-3. 14dBm
Limit	**10dBm/MHz**			

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Test Mode:IEEE 802.11n HT40

Test Condition		MAXIMUM E.I.R.P. SPECTRAL DENSITY (dBm/1MHz e.i.r.p)		
Temperature (°C)	**Voltage** (V)	**CH1** (2422MHz)	**CH7** (2442MHz)	**CH13** (2462MHz)
T Normal:25	AC 230V	-7.23dBm	-8.12dBm	-6.96dBm
Limit	**10dBm/MHz**			

Remarks:

1. *Steps for determining the MAXIMUM E.I.R.P. SPECTRAL DENSITY*
2. *Remove the EUT's antenna and the directly to the spectrum analuyer with appropriate cable with connector and attenuator/DC block.*
3. *Observation is made under the continue operation by the Average detector mode , by taking all the factor into account and yield the MAXIMUM E.I.R.P. SPECTRAL DENSITY.*

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6. ETSI EN 300 328 V1.7.1 (2006-10) §4.3.3 - FREQUENCY RANGE

6.1 Standard Application

The permitted range of operating frequencies includes all frequencies on which the equipment may operate within an assigned frequency band. The operating frequency range shall be declared by the manufacturer.

The frequency range of the equipment is determined by the lowest and highest frequencies occupied by the power envelope.

FH is the highest frequency of the power envelope, it is the frequency furthest above the frequency of maximum power where the output power drops below the level of –80dBm/Hz spectral power density (-30dBm if measured in a 100kHz bandwidth) eirp.

FL is the lowest frequency of the power envelope; it is the frequency furthest below the frequency of maximum power where the output power drops below the level of –80dBm/Hz spectral lower density (-30dBm if measured in a 100kHz bandwidth) eirp.

6.2 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Spectrum Analyzer	ADVANTEST	R3263	MNS-C8592B001B	2013/04	1 year
Signal Generator	IFR	2032	203002/100	2013/04	1 year
Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2013/04	1 year

6.3 Test Procedure

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.4 for the measurement methods.

6.4 Test Result

Temperature (℃)	23~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Face + RFID T&A and Access control
M/N	Face ID4d
Assigned Frequency Band	2412 ~ 2472MHz
Testing Mode	IEEE 802.11b , IEEE 802.11g and IEEE 802.11n

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TEST DATA

Test mode:IEEE 802.11b

Test Condition		Frequency(GHz)	
Temperature (° C)	Voltage (V)	Lowest	Highest
T Normal:25	AC 230V	2.40352	2.4804
T Min:-20	AC 207V	2.40356	2.4808
	AC 253V	2.40350	2.4808
T Max:55	AC 207V	2.40358	2.4804
	AC 253V	2.40354	2.4806
Measured Frequencies (Lowest and Highest)		FL=2.40350	FH=2.4808
Limit		FL>2.4	FH<2.4835

Test mode:IEEE802.11g

Test Condition		Frequency(GHz)	
Temperature (° C)	Voltage (V)	Lowest	Highest
T Normal:25	AC 230V	2.403120	2.48064
T Min:-20	AC 207V	2.403124	2.48068
	AC 253V	2.403118	2.48068
T Max:55	AC 207V	2.403126	2.48066
	AC 253V	2.403128	2.48063
Measured Frequencies (Lowest and Highest)		FL=2.403118	FH=2.48068
Value(Under All test Conditions)		FL>2.4	FH<2.4835

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TEST DATA

Test mode:IEEE802.11n HT20

Test Condition		Frequency(GHz)	
Temperature (° C)	Voltage (V)	Lowest	Highest
T Normal:25	AC 230V	2.402720	2.481200
T Min:-20	AC 207V	2.402718	2.481203
	AC 253V	2.402732	2.481189
T Max:55	AC 207V	2.402721	2.481193
	AC 253V	2.402718	2.481125
Measured Frequencies (Lowest and Highest)		FL=2.402718	FH=2.481125
Value(Under All test Conditions)		FL>2.4	FH<2.4835

Test mode:IEEE802.11n HT40

Test Condition		Frequency(GHz)	
Temperature (° C)	Voltage (V)	Lowest	Highest
T Normal:25	AC 230V	2.4036	2.4804
T Min:-20	AC 207V	2.4036	2.4808
	AC 253V	2.4038	2.4806
T Max:55	AC 207V	2.4032	2.4806
	AC 253V	2.4032	2.4804
Measured Frequencies (Lowest and Highest)		FL=2.4032	FH=2.4808
Value(Under All test Conditions)		FL>2.4	FH<2.4835

During the test, the frequencies were within the band 2.4GHz to 2.4835GHz and complied with ETSI EN 300 328V1.7.1§4.3.3

Test Result: Pass

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7. ETSI EN 300 328 V1.7.1 (2006-10) §4.3.5 – Medium access protocal

7.1 Standard Application

A medium access protocol is a mechanism designed to facilitate spectrum sharing with other devices in a wireless network.

7.2 Requirement

A medium access protocol shall be implemented by the equipment.

7.3 Result

The medium access protocol has been implemented and the EUT is accord with this medium access protocol

8. ETSI EN 300 328 V1.7.1 (2006-10)§4.3.6 – TRANSMITTER SPURIOUS EMISSIONS

8.1 Standard Application

According to ETSI EN 300 328 V1.7.1, spurious emissions are emissions outside the frequency range as defined in frequency range. The level of spurious emissions shall be measured as:

Either: a. Their power in a specified load (conducted spurious emissions);
and b. Their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation);
or c. Their effective radiated power when radiated by cabinet and antenna.

The spurious emissions of the transmitter shall not exceed the values in following tables

Table 1: Transmitter limits for narrowband spurious emissions

Frequency Range	Limit when Operating	Limit when Standby
30 MHz to 1 GHz	-36 dBm	-57 dBm
Above 1 GHz to 12.75 GHz	-30 dBm	-47 dBm
1.8 GHz to 1.9 GHz, 5.15 GHz to 5.3 GHz	-47 dBm	-47 dBm

Table 2: Transmitter limits for wideband spurious emissions

Frequency Range	Limit when Operating	Limit when Standby
30 MHz to 1 GHz	-86 dBm/Hz	-107 dBm/Hz
Above 1 GHz to 12.75 GHz	-80 dBm/Hz	-97 dBm/Hz
1.8 GHz to 1.9 GHz, 5.15 GHz to 5.3 GHz	-97 dBm/Hz	-97 dBm/Hz

8.2 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.

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Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±4.0 dB.

8.3 Test Equipment List and Details

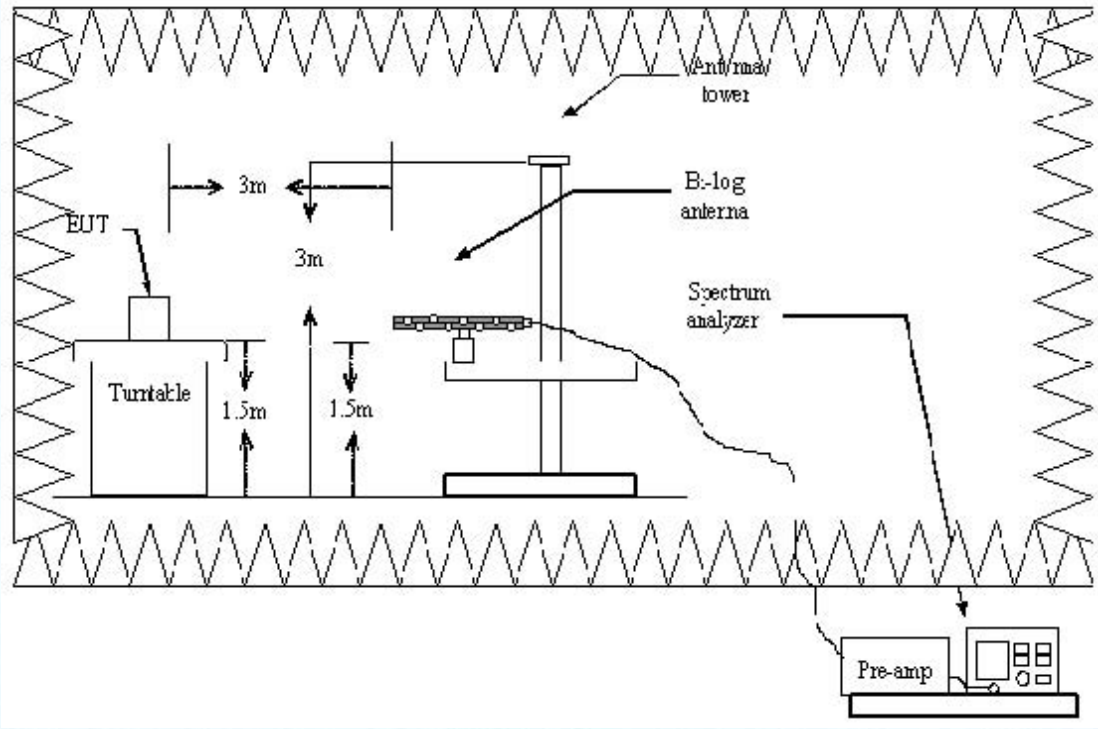
Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Spectrum Analyzer	Agilent	E4446A	US44300399	2013/04	1 year
EMI Test Receiver	R&S	ESCI	1166.595K03	2013/04	1 year
Pre Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	2013/04	1 year
Bilog Antenna	EMCO	3142C	920250	2013/04	1 year
Horn Antenna	R/S	HF906	100039	2013/04	1 year
Dipole Antenna	Com-Power	AD-100	041000	2013/04	1 year
Signal Generator	IFR	2032	203002/100	2013/04	1 Year

8.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.5 for the measurement methods.

8.5 Test Configuration

Below 1GHz



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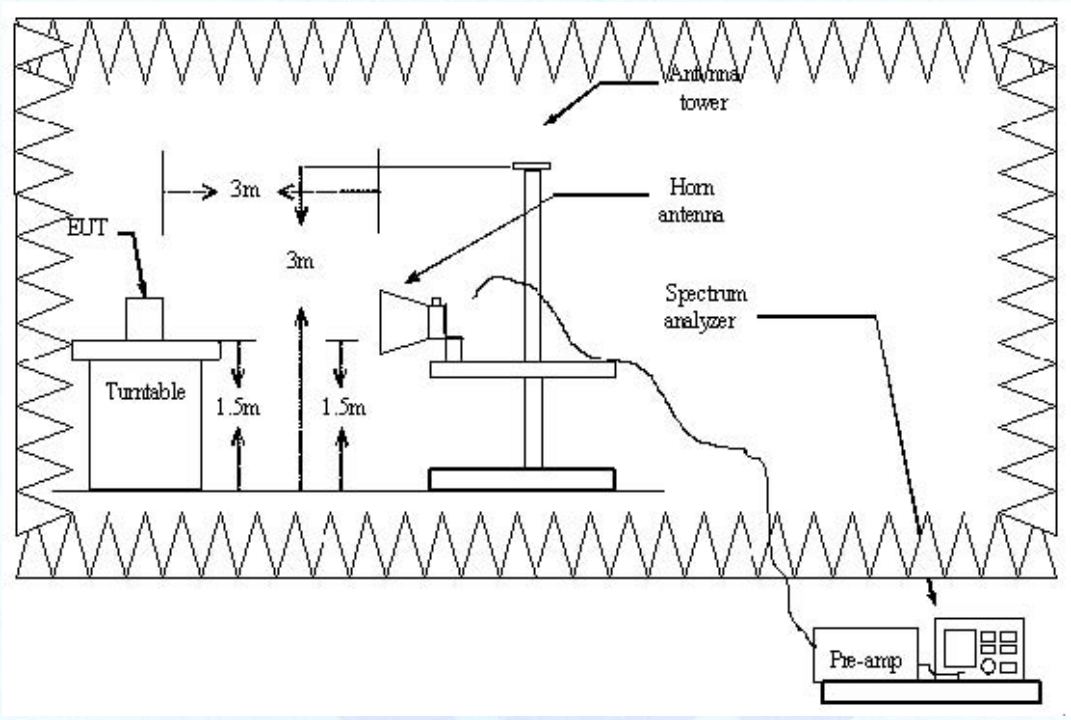
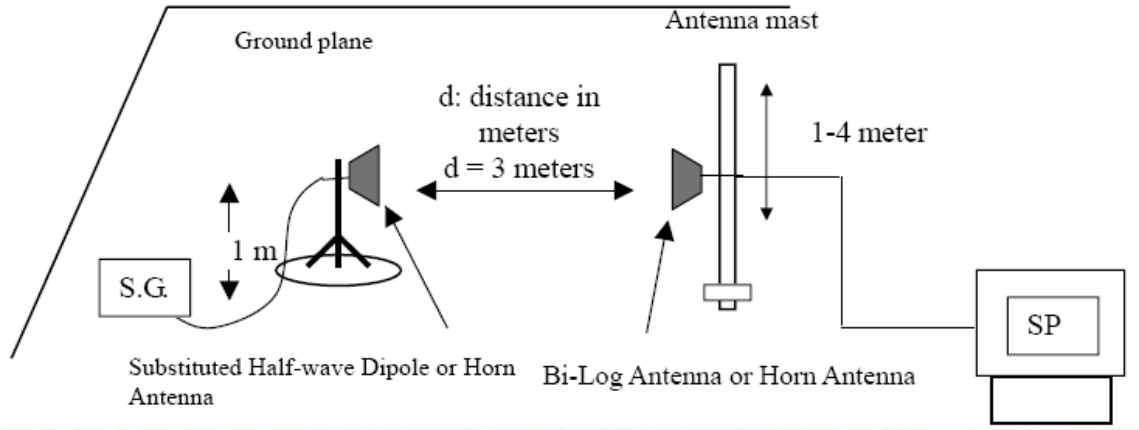
Above 1GHz



Substituted Method Test Set-up



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8.6 Test Result

Temperature (℃)	23~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Face + RFID T&A and Access control
M/N	Face ID4d
Assigned Frequency Band	2412 ~ 2472MHz
Testing Mode	IEEE 802.11b , IEEE 802.11g , IEEE 802.11n and stand by

TEST DATA

Test Mode:IEEE 802.11b(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
120.53	H	-27.31	-18.81	-46.12	-36	-10.12
240.16	H	-36.3	-12.25	-48.55	-36	-12.55
359.8	H	-32.4	-10.22	-42.62	-36	-6.62
479.43	H	-36.53	-6.81	-43.34	-36	-7.34
600.68	H	-42.3	-4.8	-47.1	-36	-11.1
720.31	H	-43.38	-2.5	-45.88	-36	-9.88
120.53	V	-31.67	-14.62	-46.29	-36	-10.29
240.16	V	-38.01	-11.64	-49.65	-36	-13.65
359.8	V	-43.31	-8.17	-51.48	-36	-15.48
479.43	V	-39.27	-5.08	-44.35	-36	-8.35
600.68	V	-46.6	-2.81	-49.41	-36	-13.41
720.31	V	-50.4	-0.6	-51	-36	-15
4818.75	H	-51.47	9.06	-42.41	-30	-12.41
6189.53	H	-61.61	14.41	-47.2	-30	-17.2
7462.5	H	-61.62	16.02	-45.6	-30	-15.6
8852.66	H	-61.26	17.27	-43.99	-30	-13.99
9401	H	-61.24	18.34	-42.9	-30	-12.9
11222.5	H	-60.61	18.89	-41.72	-30	-11.72
4818.75	V	-55.39	10.64	-44.75	-30	-14.75
6228.7	V	-61.96	15.48	-46.48	-30	-16.48
7619.16	V	-60.82	15.82	-45	-30	-15
8578.7	V	-60.63	16.93	-43.7	-30	-13.7
9342.5	V	-61.34	17.91	-43.43	-30	-13.43
11242.08	V	-60.06	19.59	-40.47	-30	-10.47

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11b(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
240.17	H	-37.21	-12.25	-49.46	-36	-13.46
359.9	H	-36.86	-10.22	-47.08	-36	-11.08
479.43	H	-35.88	-6.81	-42.69	-36	-6.69
600.68	H	-44.29	-4.8	-49.09	-36	-13.09
720.37	H	-43.89	-2.5	-46.39	-36	-10.39
959.53	H	-49.73	0.74	-48.99	-36	-12.99
120.33	V	-32.12	-14.62	-46.74	-36	-10.74
240.17	V	-38.13	-11.64	-49.77	-36	-13.77
359.8	V	-44.66	-8.17	-52.83	-36	-16.83
479.43	V	-41.02	-5.08	-46.1	-36	-10.1
720.37	V	-52.42	-0.6	-53.02	-36	-17.02
959.53	V	-50.95	2.55	-48.4	-36	-12.4
4936.25	H	-57.54	9.51	-48.03	-30	-18.03
6189.58	H	-62.27	14.41	-47.86	-30	-17.86
7051.25	H	-61.06	15.27	-45.79	-30	-15.79
7580	H	-61.01	15.99	-45.02	-30	-15.02
8539.58	H	-60.83	16.87	-43.96	-30	-13.96
9264.16	H	-61.12	18.38	-42.74	-30	-12.74
3624.17	V	-61.1	9.78	-51.32	-30	-21.32
4936.25	V	-55.67	10.73	-44.94	-30	-14.94
6228.75	V	-61.43	15.48	-45.95	-30	-15.95
8422.08	V	-61.3	16.5	-44.8	-30	-14.8
9401.25	V	-61.36	17.97	-43.39	-30	-13.39
11379.16	V	-60.43	19.36	-41.07	-30	-11.07

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11g(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
120.53	H	-31.82	-14.62	-46.44	-36	-10.44
240.16	H	-37.58	-11.64	-49.22	-36	-13.22
359.8	H	-43.24	-8.17	-51.41	-36	-15.41
479.43	H	-38.21	-5.08	-43.29	-36	-7.29
600.63	H	-46.98	-2.81	-49.79	-36	-13.79
959.33	H	-51.26	2.55	-48.71	-36	-12.71
120.33	V	-33.94	-18.81	-52.75	-36	-16.75
240.67	V	-34.34	-12.25	-46.59	-36	-10.59
359	V	-32.79	-10.22	-43.01	-36	-7.01
479.33	V	-34.18	-6.81	-40.99	-36	-4.99
600.63	V	-42.09	-4.8	-46.89	-36	-10.89
720.37	V	-43.95	-2.5	-46.45	-36	-10.45
3722.03	H	-60.12	6.76	-53.36	-30	-23.36
6248.33	H	-61.54	14.13	-47.41	-30	-17.41
7207.97	H	-61.34	15.42	-45.92	-30	-15.92
7795.47	H	-60.36	15.51	-44.85	-30	-14.85
9479.53	H	-60.93	17.89	-43.04	-30	-13.04
11437.91	H	-60.03	18.52	-41.51	-30	-11.51
3839.58	V	-60.27	9.73	-50.54	-30	-20.54
4936.2	V	-61.14	10.73	-50.41	-30	-20.41
6248.33	V	-61.93	15.25	-46.68	-30	-16.68
7775.83	V	-61	15.69	-45.31	-30	-15.31
8833.33	V	-60.31	17.25	-43.06	-30	-13.06
11242.03	V	-60.63	19.59	-41.04	-30	-11.04

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11g(High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
240.67	H	-35.33	-12.25	-47.58	-36	-11.58
359.8	H	-32.68	-10.22	-42.9	-36	-6.9
479.43	H	-35.34	-6.81	-42.15	-36	-6.15
600.63	H	-42.92	-4.8	-47.72	-36	-11.72
720.37	H	-43.89	-2.5	-46.39	-36	-10.39
959.53	H	-49.83	0.74	-49.09	-36	-13.09
120.53	V	-32.26	-14.62	-46.88	-36	-10.88
240.16	V	-37.56	-11.64	-49.2	-36	-13.2
359.8	V	-44.34	-8.17	-52.51	-36	-16.51
479.43	V	-38.73	-5.08	-43.81	-36	-7.81
600.68	V	-48.82	-2.81	-51.63	-36	-15.63
959.58	V	-51.39	2.55	-48.84	-36	-12.84
4446.67	H	-61.05	8.22	-52.83	-30	-22.83
6307.08	H	-61.32	13.63	-47.69	-30	-17.69
7188.33	H	-60.68	15.38	-45.3	-30	-15.3
7756.25	H	-60.47	15.61	-44.86	-30	-14.86
8755	H	-60.81	17.17	-43.64	-30	-13.64
9303.33	H	-61.17	18.37	-42.8	-30	-12.8
3839.53	V	-60.46	9.73	-50.73	-30	-20.73
4740.41	V	-61.12	10.43	-50.69	-30	-20.69
6228.75	V	-61.75	15.48	-46.27	-30	-16.27
7364.58	V	-61.14	16.1	-45.04	-30	-15.04
8892.08	V	-61.13	17.14	-43.99	-30	-13.99
11359.53	V	-60.44	19.39	-41.05	-30	-11.05

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11n HT20(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
372.41	H	-32.93	-14.62	-47.55	-36	-11.55
545	H	-38.69	-11.64	-50.33	-36	-14.33
689.13	H	-44.35	-8.17	-52.52	-36	-16.52
724.987	H	-39.32	-5.08	-44.4	-36	-8.4
836.41	H	-48.09	-2.81	-50.9	-36	-14.9
905.06	H	-52.37	2.55	-49.82	-36	-13.82
268.13	V	-35.05	-18.81	-53.86	-36	-17.86
374.05	V	-35.45	-12.25	-47.7	-36	-11.7
420.95	V	-33.9	-10.22	-44.12	-36	-8.12
604.12	V	-35.29	-6.81	-42.1	-36	-6.1
752.35	V	-43.2	-4.8	-48	-36	-12
876.222	V	-45.06	-2.5	-47.56	-36	-11.56
4073.42	H	-61.23	6.76	-54.47	-30	-24.47
6247.22	H	-62.65	14.13	-48.52	-30	-18.52
6893.42	H	-62.45	15.42	-47.03	-30	-17.03
7715.92	H	-61.47	15.51	-45.96	-30	-15.96
8714.72	H	-62.04	17.89	-44.15	-30	-14.15
9341.39	H	-61.14	18.52	-42.62	-30	-12.62
1214.36	V	-61.38	9.73	-51.65	-30	-21.65
1743.06	V	-62.25	10.73	-51.52	-30	-21.52
3662.22	V	-63.04	15.25	-47.79	-30	-17.79
4582.64	V	-62.11	15.69	-46.42	-30	-16.42
6168.89	V	-61.42	17.25	-44.17	-30	-14.17
7735.56	V	-61.74	19.59	-42.15	-30	-12.15

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11n HT20(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
295.63	H	-36.44	-12.25	-48.69	-36	-12.69
488.55	H	-33.79	-10.22	-44.01	-36	-8.01
587.32	H	-36.45	-6.81	-43.26	-36	-7.26
751.52	H	-44.03	-4.8	-48.83	-36	-12.83
843.15	H	-45	-2.5	-47.5	-36	-11.5
909.18	H	-50.94	0.74	-50.2	-36	-14.2
273.05	V	-33.37	-14.62	-47.99	-36	-11.99
357.05	V	-38.67	-11.64	-50.31	-36	-14.31
451.72	V	-45.45	-8.17	-53.62	-36	-17.62
624.38	V	-39.84	-5.08	-44.92	-36	-8.92
780.95	V	-49.93	-2.81	-52.74	-36	-16.74
896.13	V	-52.5	2.55	-49.95	-36	-13.95
1743.06	H	-62.16	8.22	-53.94	-30	-23.94
4073.42	H	-62.43	13.63	-48.8	-30	-18.8
6227.64	H	-61.79	15.38	-46.41	-30	-16.41
6932.64	H	-61.58	15.61	-45.97	-30	-15.97
9263.06	H	-61.92	17.17	-44.75	-30	-14.75
11162.64	H	-62.28	18.37	-43.91	-30	-13.91
1743.56	V	-61.57	9.73	-51.84	-30	-21.84
3662.22	V	-62.23	10.43	-51.8	-30	-21.8
6247.22	V	-62.86	15.48	-47.38	-30	-17.38
7696.39	V	-62.25	16.1	-46.15	-30	-16.15
9106.39	V	-62.24	17.14	-45.1	-30	-15.1
11240.97	V	-61.55	19.39	-42.16	-30	-12.16

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11n HT40(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
307.01	H	-28.42	-18.81	-47.23	-36	-11.23
497.45	H	-37.41	-12.25	-49.66	-36	-13.66
562.92	H	-33.51	-10.22	-43.73	-36	-7.73
738.16	H	-37.64	-6.81	-44.45	-36	-8.45
850.98	H	-43.41	-4.8	-48.21	-36	-12.21
911.23	H	-44.49	-2.5	-46.99	-36	-10.99
258.01	V	-32.78	-14.62	-47.4	-36	-11.4
323.07	V	-39.12	-11.64	-50.76	-36	-14.76
455.18	V	-44.42	-8.17	-52.59	-36	-16.59
624.06	V	-40.38	-5.08	-45.46	-36	-9.46
737.34	V	-47.71	-2.81	-50.52	-36	-14.52
905.13	V	-51.51	-0.6	-52.11	-36	-16.11
4034.1	H	-52.58	9.06	-43.52	-30	-13.52
6351.36	H	-62.72	14.41	-48.31	-30	-18.31
6902.11	H	-62.73	16.02	-46.71	-30	-16.71
7830.98	H	-62.37	17.27	-45.1	-30	-15.1
8525.31	H	-62.35	18.34	-44.01	-30	-14.01
9423.67	H	-61.72	18.89	-42.83	-30	-12.83
1245.22	V	-56.5	10.64	-45.86	-30	-15.86
1808.14	V	-63.07	15.48	-47.59	-30	-17.59
3451.63	V	-61.93	15.82	-46.11	-30	-16.11
4628.06	V	-61.74	16.93	-44.81	-30	-14.81
6252.89	V	-62.45	17.91	-44.54	-30	-14.54
7851.13	V	-61.17	19.59	-41.58	-30	-11.58

Note:

4. The emission behavior belongs to narrowband spurious emission.

5. Remark"---""means that the emission level is too low to be measured.

6. Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)

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Test Mode:IEEE 802.11n HT40(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
334.13	H	-38.32	-12.25	-50.57	-36	-14.57
458.72	H	-37.97	-10.22	-48.19	-36	-12.19
606.002	H	-36.99	-6.81	-43.8	-36	-7.8
779.98	H	-45.4	-4.8	-50.2	-36	-14.2
857.95	H	-45	-2.5	-47.5	-36	-11.5
903.12	H	-50.84	0.74	-50.1	-36	-14.1
292.04	V	-33.23	-14.62	-47.85	-36	-11.85
373.15	V	-39.24	-11.64	-50.88	-36	-14.88
476.94	V	-45.77	-8.17	-53.94	-36	-17.94
636.17	V	-42.13	-5.08	-47.21	-36	-11.21
742	V	-53.53	-0.6	-54.13	-36	-18.13
902.13	V	-52.06	2.55	-49.51	-36	-13.51
1761.4	H	-58.65	9.51	-49.14	-30	-19.14
4321.51	H	-63.38	14.41	-48.97	-30	-18.97
6033.66	H	-62.17	15.27	-46.9	-30	-16.9
7432	H	-62.12	15.99	-46.13	-30	-16.13
9373.44	H	-61.94	16.87	-45.07	-30	-15.07
11243.95	H	-62.23	18.38	-43.85	-30	-13.85
1691.26	V	-62.21	9.78	-52.43	-30	-22.43
4223.97	V	-56.78	10.73	-46.05	-30	-16.05
6972.34	V	-62.54	15.48	-47.06	-30	-17.06
8064.13	V	-62.41	16.5	-45.91	-30	-15.91
9244.56	V	-62.47	17.97	-44.5	-30	-14.5
11323.97	V	-61.54	19.36	-42.18	-30	-12.18

Note:

4. The emission behavior belongs to narrowband spurious emission.

5. Remark"---""means that the emission level is too low to be measured.

6. Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)

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TEST DATA (Stand by)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
338.13	H	-63.58	-7.05	-70.63	-57	-13.63
525.07	H	-64.39	-5.31	-69.7	-57	-12.7
683.935	H	-66.34	-3.08	-69.42	-57	-12.42
784.11	H	-65.88	-1.06	-66.94	-57	-9.94
843.257	H	-67.3	-0.55	-67.85	-57	-10.85
950.56	H	-68.19	1.07	-67.12	-57	-10.12
304.03	V	-64.58	-10.23	-74.81	-57	-17.81
425.27	V	-65.19	-10.37	-75.56	-57	-18.56
555.682	V	-67.33	-5.28	-72.61	-57	-15.61
733.41	V	-66.26	-3.47	-69.73	-57	-12.73
954.13	V	-68.48	1.52	-66.96	-57	-9.96
3623.4	H	-64.66	5.17	-59.49	-47	-12.49
6507.02	H	-66.39	10.08	-56.31	-47	-9.31
7451.07	H	-67.84	11.22	-56.62	-47	-9.62
8352.96	H	-68.35	13.16	-55.19	-47	-8.19
9472.11	H	-69.18	14.23	-54.95	-47	-7.95
11424.49	H	-68.6	13.07	-55.53	-47	-8.53
2425.26	V	-64.84	0.28	-64.56	-47	-17.56
4455.95	V	-66.33	4.27	-62.06	-47	-15.06
5216.53	V	-65.48	9.53	-55.95	-47	-8.95
6316.94	V	-67.2	10.27	-56.93	-47	-9.93
8805.4	V	-68.25	10.46	-57.79	-47	-10.79
9526.08	V	-70.52	12.08	-58.44	-47	-11.44

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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9. ETSI EN 300 328 V1.7.1 (2006-10)§4.3.7 – RECEIVER SPURIOUS EMISSION

9.1 Standard Application

According to ETSI EN 300 328-1 V1.3.1

The spurious emissions of the receiver shall not exceed the values in following tables

Table 1: Receiver limits for narrowband spurious emissions

Frequency Range	Limit when Standby
30 MHz to 1GHz	-57 dBm
Above 1 GHz to 12,75 GHz	-47 dBm

Table 2: Receiver limits for wideband spurious emissions

Frequency Range	Limit when Standby
30 MHz to 1GHz	-107 dBm/Hz
Above 1 GHz to 12,75 GHz	-97 dBm/Hz

9.2 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.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±4.0 dB.

9.3 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Spectrum Analyzer	Agilent	E4446A	US44300399	2013/04	1 year
EMI Test Receiver	R&S	ESCI	1166.595K03	2013/04	1 year
Pre Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	2013/04	1 year
Bilog Antenna	EMCO	3142C	920250	2013/04	1 year
Horn Antenna	R/S	HF906	100039	2013/04	1 year
Dipole Antenna	Com-Power	AD-100	041000	2013/04	1 year
Signal Generator	IFR	2032	203002/100	2013/04	1 Year

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9.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.7.1) clause 5.7.6 for the measurement methods.

9.5 Test Configuration

(Same as section 8.5 in this test report)

9.6 Test Result

Temperature (℃)	23~25
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Face + RFID T&A and Access control
M/N	Face ID4d
Assigned Frequency Band	2412 ~ 2472MHz
Testing Mode	IEEE 802.11b , IEEE 802.11g and IEEE 802.11n

TEST DATA

Test Mode:IEEE 802.11b(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
426.27	H	-64.59	-9.22	-73.81	-57	-16.81
733.86	H	-65.26	-4.56	-69.82	-57	-12.82
956.6	H	-67.48	0.98	-66.5	-57	-9.5
406.2	V	-67.27	-9.37	-76.64	-57	-19.64
660.53	V	-66.28	-3.56	-69.84	-57	-12.84
942.95	V	-66.88	1.97	-64.91	-57	-7.91
2356.56	H	-66.74	2.46	-64.28	-47	-17.28
3125.41	H	-67.48	3.17	-64.31	-47	-17.31
4226.3	H	-66.15	3.25	-62.9	-47	-15.9
6328.73	H	-66.5	4.37	-62.13	-47	-15.13
8524.5	H	-69.42	5.23	-64.19	-47	-17.19
11257.47	H	-70.12	5.67	-64.45	-47	-17.45
2543.48	V	-63.99	3.29	-60.7	-47	-13.7
3752.41	V	-64.17	4.83	-59.34	-47	-12.34
6354.55	V	-67.72	5.42	-62.3	-47	-15.3
7725.39	V	-68.35	5.37	-62.98	-47	-15.98
9526.79	V	-66.56	6.54	-60.02	-47	-13.02
11306.79	V	-67.46	7.09	-60.37	-47	-13.37

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11b(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
452.56	H	-62.38	-9.72	-72.1	-57	-15.1
677.95	H	-63.18	-9.68	-72.86	-57	-15.86
952.56	H	-65.62	1.08	-64.54	-57	-7.54
538.13	V	-65.92	-7.46	-73.38	-57	-16.38
727.02	V	-62.97	0.26	-62.71	-57	-5.71
937.97	V	-64.91	1.37	-63.54	-57	-6.54
2451.82	H	-64.58	2.44	-62.14	-47	-15.14
3352.42	H	-65.13	3.19	-61.94	-47	-14.94
4358.31	H	-63.13	3.28	-59.85	-47	-12.85
6524.73	H	-64.55	4.29	-60.26	-47	-13.26
8773.41	H	-66.66	5.09	-61.57	-47	-14.57
11258.65	H	-67.37	5.43	-61.94	-47	-14.94
2524.92	V	-62.06	3.19	-58.87	-47	-11.87
4331.63	V	-63.54	4.23	-59.31	-47	-12.31
5873.11	V	-66.04	5.07	-60.97	-47	-13.97
7753.3	V	-66.34	6.13	-60.21	-47	-13.21
9557.28	V	-64.44	6.24	-58.2	-47	-11.2
1129.41	V	-65.03	7.08	-57.95	-47	-10.95

Test Mode:IEEE 802.11g(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
356.17	H	-64.27	-9.28	-73.55	-57	-16.55
495.02	H	-65.39	-9.07	-74.46	-57	-17.46
972.95	H	-67.48	1.25	-66.23	-57	-9.23
424.52	V	-65.55	-7.43	-72.98	-57	-15.98
793.98	V	-66.9	0.44	-66.46	-57	-9.46
943.14	V	-67.63	1.94	-65.69	-57	-8.69
2461.65	H	-65.57	2.57	-63	-47	-16
3425.06	H	-66.98	3.52	-63.46	-47	-16.46
4692.94	H	-67.2	3.69	-63.51	-47	-16.51
6377.03	H	-67.54	4.83	-62.71	-47	-15.71
8391.54	H	-68.02	5.47	-62.55	-47	-15.55
11296.04	H	-68.19	5.91	-62.28	-47	-15.28
2434.42	V	-65.36	3.22	-62.14	-47	-15.14
3950.92	V	-66.48	4.72	-61.76	-47	-14.76
6427.58	V	-67.16	5.46	-61.7	-47	-14.7
7923.22	V	-67.61	5.33	-62.28	-47	-15.28
9353.17	V	-67.88	6.49	-61.39	-47	-14.39
11291.31	V	-68.24	7.43	-60.81	-47	-13.81

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11g(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
377.58	H	-64.63	-9.13	-73.76	-57	-16.76
650.17	H	-65.38	-8.47	-73.85	-57	-16.85
942.06	H	-67.3	1.28	-66.02	-57	-9.02
407.11	V	-65.18	-7.22	-72.4	-57	-15.4
621.02	V	-65.99	0.65	-65.34	-57	-8.34
951.35	V	-68.03	1.54	-66.49	-57	-9.49
2255.26	H	-65.44	2.56	-62.88	-47	-15.88
3451.6	H	-66.39	3.44	-62.95	-47	-15.95
4732.41	H	-66.84	3.87	-62.97	-47	-15.97
6523	H	-67.38	4.69	-62.69	-47	-15.69
8841.94	H	-67.85	5.73	-62.12	-47	-15.12
11286.04	H	-68.15	5.68	-62.47	-47	-15.47
2244.25	V	-65.63	3.55	-62.08	-47	-15.08
3787.13	V	-66.3	4.83	-61.47	-47	-14.47
6523.26	V	-66.79	5.69	-61.1	-47	-14.1
7833.11	V	-67.54	6.22	-61.32	-47	-14.32
9353.26	V	-68.27	6.43	-61.84	-47	-14.84
11227.03	V	-69.07	7.25	-61.82	-47	-14.82

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11n HT20(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
424.26	H	-63.42	-9.47	-72.89	-57	-15.89
633.15	H	-64.3	-9.28	-73.58	-57	-16.58
971.3	H	-66.23	1.25	-64.98	-57	-7.98
457.1	V	-64.17	-7.83	-72	-57	-15
758.52	V	-65.13	1.08	-64.05	-57	-7.05
954.13	V	-66.04	2.51	-63.53	-57	-6.53
2563.77	H	-63.16	2.77	-60.39	-47	-13.39
3520.95	H	-64.37	3.62	-60.75	-47	-13.75
4526.39	H	-63.22	4.21	-59.01	-47	-12.01
7533.55	H	-64.65	4.73	-59.92	-47	-12.92
9134.51	H	-65.36	5.09	-60.27	-47	-13.27
11292.53	H	-66.02	5.82	-60.2	-47	-13.2
2542.61	V	-63.41	3.64	-59.77	-47	-12.77
3740.47	V	-64.22	5.26	-58.96	-47	-11.96
6535.64	V	-64.38	5.73	-58.65	-47	-11.65
8153.58	V	-64.67	6.58	-58.09	-47	-11.09
9331.04	V	-65.86	7.44	-58.42	-47	-11.42
11295.13	V	-66.04	7.67	-58.37	-47	-11.37

Test Mode:IEEE 802.11n HT20(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
335.3	H	-64.36	-9.17	-73.53	-57	-16.53
587.06	H	-65.29	-9.08	-74.37	-57	-17.37
924.32	H	-66.33	0.56	-65.77	-57	-8.77
364.17	V	-65.34	-7.28	-72.62	-57	-15.62
722.43	V	-66.82	0.17	-66.65	-57	-9.65
923.97	V	-67.15	1.34	-65.81	-57	-8.81
2455.66	H	-66.32	2.55	-63.77	-47	-16.77
4407.46	H	-66.85	3.06	-63.79	-47	-16.79
5327.55	H	-65.39	4.19	-61.2	-47	-14.2
7488.05	H	-66.24	4.58	-61.66	-47	-14.66
9252.96	H	-67.39	5.27	-62.12	-47	-15.12
11322.95	H	-66.23	5.69	-60.54	-47	-13.54
2353.01	V	-64.55	3.22	-61.33	-47	-14.33
3469.94	V	-66.32	5.07	-61.25	-47	-14.25
5242.57	V	-65.68	5.46	-60.22	-47	-13.22
8411.95	V	-66.24	6.58	-59.66	-47	-12.66
9704.11	V	-67.18	7.13	-60.05	-47	-13.05
11349.16	V	-67.4	7.58	-59.82	-47	-12.82

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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Test Mode:IEEE 802.11n HT40(CH Low)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
446.89	H	-64.15	-9.26	-73.41	-57	-16.41
673.15	H	-66.25	-9.07	-75.32	-57	-18.32
957.47	H	-69.47	0.87	-68.6	-57	-11.6
426.6	V	-65.62	-7.23	-72.85	-57	-15.85
734.34	V	-66.39	0.52	-65.87	-57	-8.87
944.53	V	-67.09	2.33	-64.76	-57	-7.76
2453.19	H	-65.84	3.14	-62.7	-47	-15.7
4018.48	H	-66.56	3.28	-63.28	-47	-16.28
5327.64	H	-64.88	4.15	-60.73	-47	-13.73
7312.55	H	-65.3	4.68	-60.62	-47	-13.62
9250.85	H	-67.79	5.51	-62.28	-47	-15.28
11250.75	H	-69.54	5.84	-63.7	-47	-16.7
2547.15	V	-64.5	3.52	-60.98	-47	-13.98
3985.6	V	-64.87	5.27	-59.6	-47	-12.6
5508.68	V	-67.89	5.69	-62.2	-47	-15.2
7392.7	V	-68.46	6.41	-62.05	-47	-15.05
9347.43	V	-66.9	7.35	-59.55	-47	-12.55
11290.59	V	-67.44	7.84	-59.6	-47	-12.6

Test Mode:IEEE 802.11n HT40(CH High)

Frequency (MHz)	Antenna Polarization	Reading (dBm)	Correction Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)
466.91	H	-63.35	-8.93	-72.28	-57	-15.28
640.02	H	-64.83	-8.54	-73.37	-57	-16.37
926.56	H	-68.33	-2.5	-70.83	-57	-13.83
447.32	V	-65.76	-7.44	-73.2	-57	-16.2
753.88	V	-65.11	-1.55	-66.66	-57	-9.66
935.75	V	-66.27	1.25	-65.02	-57	-8.02
2452.29	H	-65.88	2.31	-63.57	-47	-16.57
3270.46	H	-66.53	3.47	-63.06	-47	-16.06
4572.27	H	-65.28	4.56	-60.72	-47	-13.72
7426.79	H	-66.51	4.87	-61.64	-47	-14.64
9255.45	H	-69.48	5.46	-64.02	-47	-17.02
11275.01	H	-69.72	5.89	-63.83	-47	-16.83
2520.85	V	-63.96	3.21	-60.75	-47	-13.75
6487.85	V	-64.39	5.13	-59.26	-47	-12.26
7453.34	V	-67.71	5.42	-62.29	-47	-15.29
8399.45	V	-68.07	6.5	-61.57	-47	-14.57
9421.44	V	-66.8	7.33	-59.47	-47	-12.47
11256.39	V	-67.29	7.59	-59.7	-47	-12.7

Note:

1. *The emission behavior belongs to narrowband spurious emission.*
2. *Remark"---""means that the emission level is too low to be measured.*
3. *Calculation of result is: Emission Level (dBm)=Reading level (dBm) + Correction Factor (dB)*

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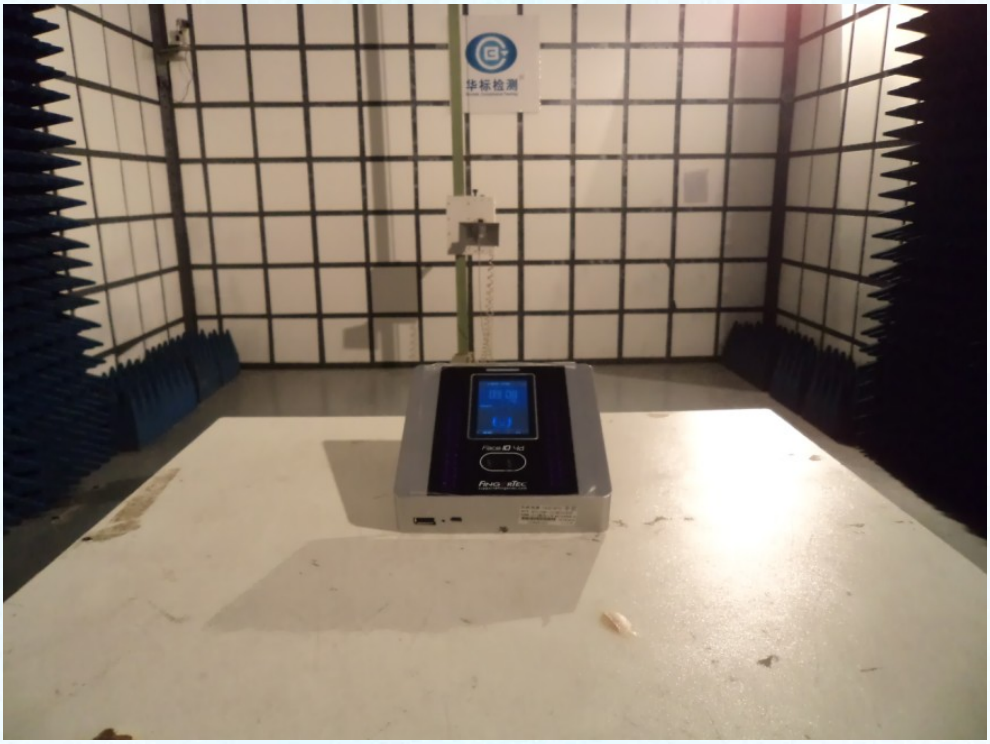
APPENDIX A – TEST SETUP PHOTOGRAPHS

Radiation Emission:



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EN 60950-1:2006+A11:2009+A1:2010+A12:2011

Information technology equipment – Safety – Part 1: General requirements

MEASUREMENT AND TEST REPORT

For

FINGERTEC WORLDWIDE SDN BHD

NO.6, 8 & 10, JALAN BK 3/2, BANDAR
KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA

Model: Face ID4d, Face ID4

August 28, 2013

This Report Concerns:	**Equipment Type:**
☒ Original Report	**Face+RFID T&A and Access control**

Test Engineer:	Daisy Fu/ Daisy Fu
Report Number:	BCT13HR-1419S
Test Date:	August 21, 2013 to August 28, 2013
Reviewed By:	Andy Zheng/ Andy Zheng
Approved By:	Kendy Wang/ Kendy Wang
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

TEST REPORT
EN 60950-1
Information technology equipment – Safety – Part 1: General requirements

Report Reference No. ..... :	**BCT13HR-1419S**
Tested by (name + signature) ..... :	Daisy Fu
Reviewed by (name + signature)..... :	Andy Zheng
Date of issue ..... :	August 28, 2013
Testing Laboratory ..... :	**Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.**
Address ..... :	1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China
Applicant's name ..... :	**FINGERTEC WORLDWIDE SDN BHD**
Address :	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA
Test specification:	
Standard ..... :	EN 60950-1:2006+A11:2009+A1:2010+A12:2011
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC60950_1B
Test Report Form(s) Originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2010-04

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description ..... :	**Face+RFID T&A and Access control**
Trade Mark ..... :	FINGERTEC
Manufacturer ..... :	FINGERTEC WORLDWIDE SDN BHD
Address ..... :	NO.6, 8 & 10, JALAN BK 3/2, BANDAR KINRARA, 47180 PUCHONG, SELANGOR, MALAYSIA
Model/Type reference ..... :	Face ID4d, Face ID4
Ratings ..... :	CH MODE POWER SUPPLY Input: 100-240V~50/60Hz 1.2A Output: 12V ⎓ 3.0A The EUT Input: 12V ⎓ 3.0A

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General product information

The EUT supplied by an approved adapter;

Manufacturer declared the product max. operating temperature is 40°C;

The unit is a Face+RFID T&A and Access control, class III equipment. This unit is intended for use in pollution degree 2 environments, connected to SELV. All components were mounted on the PCB and housed in plastic enclosure.

The difference of the model is just the model name. If no otherwise special instructions, all the test are performed on Face ID4d.

Copy of marking plate:

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Test item particulars ..... :	
Equipment mobility ..... :	☐ movable ☐ hand-held ☒ transportable ☒ stationary ☐ for building-in ☐ direct plug-in
Connection to the mains..... :	☐ pluggable equipment ☐ type A ☐ type B ☐ permanent connection ☐ detachable power supply cord ☐ non-detachable power supply cord ☒ not directly connected to the mains
Operating condition ..... :	☒ continuous ☐ rated operating / resting time:
Access location ..... :	☒ operator accessible ☐ restricted access location
Over voltage category (OVC) ..... :	☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV ☒ other: not directly connected to the mains
Mains supply tolerance (%) or absolute mains supply values ..... :	N/A
Tested for IT power systems ..... :	☐ Yes(only for Norway) ☒ No
IT testing, phase-phase voltage (V) ..... :	N/A
Class of equipment ..... :	☐ Class I ☐ Class II ☒ Class III ☐ Not classified
Considered current rating of protective device as part of the building installlation (A) ..... :	N/A
Pollution degree (PD) ..... :	☐ PD 1 ☒ PD 2 ☐ PD 3
IP protection class ..... :	--
Altitude during operation (m) ..... :	<2000m
Altitude of test laboratory (m) ..... :	<2000m
Mass of equipment (kg) ..... :	See user manual for details
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N (Not apply)
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item..... :	August 21, 2013
Date(s) of performance of tests..... :	August 21, 2013 to August 28, 2013
General remarks:	

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Note: This TRF includes EN Group Differences together with National Differences and Special National Conditions, if any. All Differences are located in the Appendix to the main body of this TRF.

Throughout this report a comma (point) is used as the decimal separator.

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EN 60950-1			
Clause	Requirement	Remark	Result
1	GENERAL		P
1.5	Components		P
1.5.1	General		P
	Comply with IEC60950-1 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Components which are certified according to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.3	Thermal controls		N
1.5.4	Transformers		N
1.5.5	Interconnecting cables		P
1.5.6	Capacitors bridging insulation		N
1.5.7	Resistors bridging insulation		N
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		N
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits		N
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N
1.5.8	Components in equipment for IT power systems		N
1.5.9	Surge suppressors	No surge suppressors used.	N
1.5.9.1	General	Refer bellow:	—
1.5.9.2	Protection of VDRs	No VDRs used.	N
1.5.9.3	Bridging of functional insulation by a VDR		N
1.5.9.4	Bridging of basic insulation by a VDR		N
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N
1.6	Power interface		N
1.6.1	AC power distribution systems		N
1.6.2	Input current		N
1.6.3	Voltage limit of hand-held equipment	The equirement is not hand-held equirement	N
1.6.4	Neutral conductor		N

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EN 60950-1			
Clause	Requirement	Remark	Result
1.7	Marking and instructions		P
1.7.1	Power rating and identification markings	Refer bellow:	—
1.7.1.1	Power rating marking		P
	Multiple mains supply connections.....:		N
	Rated voltage(s) or voltage range(s) (V) .....:	See Copy of marking plate	P
	Symbol for nature of supply, for d.c.only.....:	⎓	P
	Rated frequency or rated frequency range (Hz) ....:	DC power supply	N
	Rated current (mA or A).....:	See Copy of marking plate	P
1.7.1.2	Identification markings		P
	Manufacturer's name or trade-mark or identification mark .....:	See Copy of marking plate	P
	Model identificationor type reference .....:	See Copy of marking plate	P
	Symbol for ClassII equipment only .....:	Class III	N
	Other markings and symbols .....:		P
1.7.2	Safety instructions and marking	English user manual provided	P
1.7.2.1	General		P
1.7.2.2	Disconnect devices		P
1.7.2.3	Overcurrent protective device		N
1.7.2.4	IT power distribution systems		N
1.7.2.5	Operator access with a tool		N
1.2.7.6	Ozone	No ozone occur.	N
1.7.3	Short duty cycles	Continuous operation	N
1.7.4	Supply voltage adjustment .....:	No this device	N
	Methods and means of adjustment; reference to installation instructions .....:		—
1.7.5	Power outlets on the equipment .....:		N
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference) .....:		N
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals .....:	Class III equipment without earth connection	N
1.7.7.2	Terminals for a.c. mains supply conductors		N
1.7.7.3	Terminals for d.c. mains supply conductors		P
1.7.8	Controls and indicators		N
1.7.8.1	Identification, location and marking.....:		N

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EN 60950-1			
Clause	Requirement	Remark	Result
1.7.8.2	Colours .....:		N
1.7.8.3	Symbols according to IEC 60417.....:		N
1.7.8.4	Markings using figures .....:		N
1.7.9	Isolation of multiple power sources.....:		N
1.7.10	Thermostats and other regulating devices .....:	No such regulating devices	N
1.7.11	Durability	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15 sec. And then again for 15 sec. With the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking on the label did not fade.	P
1.7.12	Removable parts	Marking not placed on removable part.	P
1.7.13	Replaceable batteries .....:		P
	Language(s) .....:		—
1.7.14	Equipment for restricted access locations .....:		N

2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas	See below	P
2.1.1.1	Access to energized parts	Only with max. 12Vd.c. No hazardous voltage inside. Class III product	P
	Test by inspection .....:		N
	Test with test finger (Figure 2A) .....:		N
	Test with test pin (Figure 2B) .....:		N
	Test with test probe (Figure 2C) .....:		N
2.1.1.2	Battery compartments		P
2.1.1.3	Access to ELV wiring	No ELV wiring	N
	Working voltage (Vpeak or Vrms); minimum distance through insulation (mm)		—
2.1.1.4	Access to hazardous voltage circuit wiring	No hazardous voltage circuit wiring	N
2.1.1.5	Energy hazards .....:	No hazardous energy, supplied by max. 12Vd.c. only	P
2.1.1.6	Manual controls	No manual controls	N

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EN 60950-1			
Clause	Requirement	Remark	Result
2.1.1.7	Discharge of capacitors in equipment	No such capacitors	N
	Measured voltage (V); time-constant (s).....:		—
2.1.1.8	Energy hazards – d.c. mains supply		N
	a) Capacitor connected to the d.c. mains supply :		N
	b) Internal battery connected to the d.c. mains supply .....:		N
2.1.1.9	Audio amplifiers .....:		N
2.1.2	Protection in service access areas		N
2.1.3	Protection in restricted access locations		N
2.2	SELV circuits		P
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V) .....:	All accessible voltage are less than 42.4Vp or 60Vdc and are classified as SELV.	P
2.2.3	Voltages under fault conditions (V) .....:	Under fault conditions voltages never exceed 71V peak and 120Vdc and do not exceed 42.4V peak or 60 Vdc	P
2.2.4	Connection of SELV circuits to other circuits .....:		N
2.3	TNV circuits		N
2.3.1	Limits	No TNV circuits	N
	Type of TNV circuits.....:		—
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions .....:		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed .....:		—
2.3.4	Connection of TNV circuits to other circuits	No connection of TNV circuits to other circuits	N
	Insulation employed .....:		—
2.3.5	Test for operating voltages generated externally		N
2.4	Limited current circuits		N
2.4.1	General requirements		N

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EN 60950-1			
Clause	Requirement	Remark	Result
2.4.2	Limit values		N
	Frequency (Hz) ..... :		—
	Measured current (mA) ..... :		—
	Measured voltage (V) ..... :		—
	Measured circuit capacitance (nF or μF) ..... :		—
2.4.3	Connection of limited current circuits to other circuits		N
2.5	Limited power sources		N
	a) Inherently limited output		N
	b) Impedance limited output		N
	c) Regulating network limited output under normal operating and single fault condition		N
	d) Overcurrent protective device limited output		N
	Max. output voltage (V), max. output current (A), max. apparent power (VA) ..... :		—
	Current rating of overcurrent protective device (A) .:		—
	Use of integrated circuit (IC) current limiters		N
2.6	Provisions for earthing and bonding		N
2.6.1	Protective earthing	Class III equipment	N
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors		N
2.6.3.1	General		N
2.6.3.2	Size of protective earthing conductors		N
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		—
2.6.3.3	Size of protective bonding conductors		N
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		—
	Protective current rating (A), cross-sectional area (mm^2), AWG ..... :		—
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min) ..... :		N
2.6.3.5	Colour of insulation ..... :		N
2.6.4	Terminals		N
2.6.4.1	General		N

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EN 60950-1			
Clause	Requirement	Remark	Result
2.6.4.2	Protective earthing and bonding terminals		N
	Rated current (A), type, nominal thread diameter (mm) ..... :		—
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment		N
2.6.5.2	Components in protective earthing conductors and protective bonding conductors		N
2.6.5.3	Disconnection of protective earth		N
2.6.5.4	Parts that can be removed by an operator		N
2.6.5.5	Parts removed during servicing		N
2.6.5.6	Corrosion resistance		N
2.6.5.7	Screws for protective bonding		N
2.6.5.8	Reliance on telecommunication network or cable distribution system		N
2.7	Overcurrent and earth fault protection in primary circuits		N
2.7.1	Basic requirements		N
	Instructions when protection relies on building installation		N
2.7.2	Faults not simulated in 5.3.7		N
2.7.3	Short-circuit backup protection		N
2.7.4	Number and location of protective devices..... :		N
2.7.5	Protection by several devices		N
2.7.6	Warning to service personnel ..... :		N
2.8	Safety interlocks		N
2.8.1	General principles	No saftey interlocks.	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N
2.8.7.1	Contact gaps (mm) ..... :		N
2.8.7.2	Overload test		N

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EN 60950-1			
Clause	Requirement	Remark	Result
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N
2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	No natural rubber hygroscopic materials or asbestos are used	P
2.9.2	Humidity conditioning		N
	Relative humidity (%), temperature (°C) .....:		—
2.9.3	Grade of insulation	Functional insulation only	P
2.9.4	Separation from hazardous voltages		N
	Method(s) used .....:		—
2.10	Clearances, creepage distances and distances through insulation		N
2.10.1	General	Class III product	N
2.10.1.1	Frequency .....:		N
2.10.1.2	Pollution degrees .....:		N
2.10.1.3	Reduced values for functional insualtion		N
2.10.1.4	Intervening unconnected conductive parts		N
2.10.1.5	Insulation with varying dimensions		N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage		N
2.10.2.1	General		N
2.10.2.2	RMS working voltage		N
2.10.2.3	Peak working voltage		N
2.10.3	Clearances		N
2.10.3.1	General		N
2.10.3.2	Mains transient voltages		N
	a) AC mains supply .....:		N
	b) Earthed d.c. mains supplies .....:		N
	c) Unearthed d.c. mains supplies .....:		N
	d) Battery operation .....:		N
2.10.3.3	Clearances in primary circuits		N
2.10.3.4	Clearances in secondary circuits		N

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EN 60950-1			
Clause	Requirement	Remark	Result
2.10.3.5	Clearances in circuits having starting pulses		N
2.10.3.6	Transients from a.c. mains supply .....:		N
2.10.3.7	Transients from d.c. mains supply .....:		N
2.10.3.8	Transients from telecommunication networks and cable distribution systems .....:		N
2.10.3.9	Measurement of transient voltage levels		N
	a) Transients from a mains suplply		N
	For an a.c. mains supply .....:		N
	For a d.c. mains supply .....:		N
	b) Transients from a telecommunication network :		N
2.10.4	Creepage distances		N
2.10.4.1	General		N
2.10.4.2	Material group and caomparative tracking index		N
	CTI tests .....:		—
2.10.4.3	Minimum creepage distances		N
2.10.5	Solid insulation		N
2.10.5.1	General		N
2.10.5.2	Distances through insulation		N
2.10.5.3	Insulating compound as solid insulation		N
2.10.5.4	Semiconductor devices		N
2.10.5.5.	Cemented joints		N
2.10.5.6	Thin sheet material – General		N
2.10.5.7	Separable thin sheet material		N
	Number of layers (pcs).....:		—
2.10.5.8	Non-separable thin sheet material		N
2.10.5.9	Thin sheet material – standard test procedure		N
	Electric strength test		—
2.10.5.10	Thin sheet material – alternative test procedure		N
	Electric strength test		—
2.10.5.11	Insulation in wound components		N
2.10.5.12	Wire in wound components		N
	Working voltage .....:		N
	a) Basic insulation not under stress .....:		N
	b) Basic, supplemetary, reinforced insulation .....:		N
	c) Compliance with Annex U .....:		N

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EN 60950-1			
Clause	Requirement	Remark	Result
	Two wires in contact inside wound component; angle between 45° and 90° .....:		N
2.10.5.13	Wire with solvent-based enamel in wound components		N
	Electric strength test		—
	Routine test		—
2.10.5.14	Additional insulation in wound components		N
	Working voltage .....:		—
	- Basic insulation not under stress .....:		—
	- Supplemetary, reinforced insulation .....:		—
2.10.6	Construction of printed boards		N
2.10.6.1	Uncoated printed boards		N
2.10.6.2	Coated printed boards	No coated printed boards	N
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4	Insulation between conductors on different layers of a printed board		N
	Distance through insulation		N
	Number of insulation layers (pcs).....:		N
2.10.7	Component external terminations		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Sample preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning		N
2.10.8.3	Electric strength test		N
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling		N
2.10.10	Test for Pollution Degree 1 environment and insulating compound		N
2.10.11	Tests for semiconductor devices and cemented joints		N
2.10.12	Enclosed and sealed parts		N
3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection	Internal wires are UL recognized and having gauge suitable for current intended to be carried	P

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EN 60950-1			
Clause	Requirement	Remark	Result
3.1.2	Protection against mechanical damage	Wireways are smooth and free from edges.	P
3.1.3	Securing of internal wiring	Wires are secured by soldering method and additionally fixed by enough glue	P
3.1.4	Insulation of conductors		N
3.1.5	Beads and ceramic insulators		N
3.1.6	Screws for electrical contact pressure		N
3.1.7	Insulating materials in electrical connections		N
3.1.8	Self-tapping and spaced thread screws		N
3.1.9	Termination of conductors	All conductors are reliable secured.	P
	10 N pull test	Force of 10 N applied to the termination points of the conductors.	P
3.1.10	Sleeving on wiring		N
3.2	Connection to a mains supply		N
3.2.1	Means of connection	Not directly connected to mains.	N
3.2.1.1	Connection to an a.c. mains supply		N
3.2.1.2	Connection to a d.c. mains supply		N
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter of cable and conduits (mm) .....:		—
3.2.4	Appliance inlets		N
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords		N
	Type .....:		—
	Rated current (A), cross-sectional area (mm^2), AWG .....:		—
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N) .....:		—
	Longitudinal displacement (mm) .....:		—
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N

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EN 60950-1			
Clause	Requirement	Remark	Result
	Diameter or minor dimension D (mm); test mass (g) .....:		—
	Radius of curvature of cord (mm) .....:		—
3.2.9	Supply wiring space		N
3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals		N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm^2) .....:		—
3.3.5	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm) .....:		—
3.3.6	Wiring terminal design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N
3.4	Disconnection from the mains supply		N
3.4.1	General requirement		N
3.4.2	Disconnect devices		N
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Number of poles – single-phase and d.c. equipment		N
3.4.7	Number of poles – three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N
3.5	Interconnection of equipment		P
3.5.1	General requirements		P
3.5.2	Types of interconnection circuits .....:	Connected to SELV circuit	P
3.5.3	ELV circuits as interconnection circuits		N

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Clause	Requirement	Remark	Result
3.5.4	Data ports for additional equipment		N
4	PHYSICAL REQUIREMENTS		P
4.1	Stability		N
	Angle of 10°		N
	Test force (N) .....:		N
4.2	Mechanical strength		P
4.2.1	General	Class III product, no hazards voltage inside	P
	Rack-mounted equipment.		N
4.2.2	Steady force test, 10 N		N
4.2.3	Steady force test, 30 N		N
4.2.4	Steady force test, 250 N		N
4.2.5	Impact test		N
	Fall test		N
	Swing test		N
4.2.6	Drop test; height (mm) .....:		N
4.2.7	Stress relief test		N
4.2.8	Cathode ray tubes	No CRT	N
	Picture tube separately certified .....:		N
4.2.9	High pressure lamps	No such lamps	N
4.2.10	Wall or ceiling mounted equipment; force (N) .....:		N
4.2.11	Rotating solid media		N
	Test to cover on the door……..:		N
4.3	Design and construction		P
4.3.1	Edges and corners	Edges and corners are smooth	P
4.3.2	Handles and manual controls; force (N)..... :		N
4.3.3	Adjustable controls		N
4.3.4	Securing of parts		N
4.3.5	Connection by plugs and sockets		N
4.3.6	Direct plug-in equipment		N
	Torque .....:		—
	Compliance with the relevant mains plug standard .....:		N

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Clause	Requirement	Remark	Result
4.3.7	Heating elements in earthed equipment	No heating elements	N
4.3.8	Batteries		N
	- Overcharging of a rechargeable battery		N
	- Unintentional charging of a non-rechargeable battery		N
	- Reverse charging of a rechargeable battery	(see appended table 4.3.8)	P
	- Excessive discharging rate for any battery		N
4.3.9	Oil and grease		N
4.3.10	Dust, powders, liquids and gases		N
4.3.11	Containers for liquids or gases		N
4.3.12	Flammable liquids .....:		N
	Quantity of liquid (l) .....:		N
	Flash point (°C) .....:		N
4.3.13	Radiation		P
4.3.13.1	General		P
4.3.13.2	Ionizing radiation		N
	Measured radiation(pA/kg) .....:		—
	Measured high-voltage (kV) .....:		—
	Measured focus voltage (kV).....:		—
	CRT markings.....:		—
4.3.13.3	Effect of ultraviolet (UV) radiation on materials		N
	Part, property, retention after test, flammability classification .....:		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation .....:		N
4.3.13.5	Lasers (including laser diodes) and LEDs		P
4.3.13.5.1	Lasers (including laser diodes)		P
	Laser class .....:	Class I	—
4.3.13.5.2	Light emitting diodes (LEDs)		N
4.3.13.6	Other types .....:		N

4.4	Protection against hazardous moving parts		N
4.4.1	General		N
4.4.2	Protection in operator access areas .....:		N
	Household and home/office document/media shredders		N
4.4.3	Protection in restricted access locations .....:		N

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Clause	Requirement	Remark	Result
4.4.4	Protection in service access areas		N
4.4.5	Protection against moving fan blades		N
4.4.5.1	General		N
	Not considered to cause pain or injury. A)…….:		N
	Is considered to cause pain, not injury. B) ……:		N
	Considered to cause injury. C) ……:		N
4.4.5.2	Protection for users		N
	Use of symbol or warning ……:		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning ……:		N
4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature tests	(see appended table 4.5)	P
	Normal load condition per Annex L .....:	(see appended table 4.5)	—
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat .....:		N
4.6	Openings in enclosures		N
4.6.1	Top and side openings		N
	Dimensions (mm) .....:		—
4.6.2	Bottoms of fire enclosures		N
	Construction of the bottomm, dimensions (mm) ..:		—
4.6.3	Doors or covers in fire enclosures	No such parts	N
4.6.4	Openings in transportable equipment		N
4.6.4.1	Constructional design measures		N
	Dimensions (mm) .....:		—
4.6.4.2	Evaluation measures for larger openings		N
4.6.4.3	Use of metallized parts		N
4.6.5	Adhesives for constructional purposes		N
	Conditioning temperature (°C), time (weeks).....:		—
4.7	Resistance to fire		P

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Clause	Requirement	Remark	Result
4.7.1	Reducing the risk of ignition and spread of flame	No excessive temperatures. No easily burning materials employed. Fire enclosure provided.	P
	Method 1, selection and application of components wiring and materials		N
	Method 2, application of all of simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure		N
4.7.2.1	Parts requiring a fire enclosure		N
4.7.2.2	Parts not requiring a fire enclosure		P
4.7.3	Materials		P
4.7.3.1	General	See table 1.5.1	P
4.7.3.2	Materials for fire enclosures		P
4.7.3.3	Materials for components and other parts outside fire enclosures		N
4.7.3.4	Materials for components and other parts inside fire enclosures		N
4.7.3.5	Materials for air filter assemblies		N
4.7.3.6	Materials used in high-voltage components		N
5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		N
5.1.1	General		N
5.1.2	Configuration of equipment under test (EUT)		N
5.1.2.1	Single connection to an a.c. mains supply		N
5.1.2.2	Redundant multiple connections to an a.c. mains supply		N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply		N
5.1.3	Test circuit		N
5.1.4	Application of measuring instrument		N
5.1.5	Test procedure		N
5.1.6	Test measurements		N
	Supply voltage (V) .....:		—
	Measured touch current (mA) .....:		—
	Max. allowed touch current (mA) .....:		—
	Measured protective conductor current (mA) .....:		—

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Clause	Requirement	Remark	Result
	Max. allowed protective conductor current (mA)...:		—
5.1.7	Equipment with touch current exceeding 3,5mA		N
5.1.7.1	General .....:		N
5.1.7.2	Simultaneous multiple connections to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system		N
	Supply voltage (V) .....:		—
	Measured touch current (mA) .....:		—
	Max. allowed touch current (mA) .....:		—
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports .....:		N
	b) EUT whose telecommunication ports have no reference to protective earth		N
5.2	Electric strength		N
5.2.1	General		N
5.2.2	Test procedure		N
5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation		P
5.3.2	Motors		N
5.3.3	Transformers		N
5.3.4	Functional insulation.....:		N
5.3.5	Electromechanical components	No electromechanical component.	N
5.3.6	Audio amplifiers in ITE .....:	No audio amplifiers.	N
5.3.7	Simulation of faults		P
5.3.8	Unattended equipment		N
5.3.9	Compliance criteria for abnormal operating and fault conditions	No fire propagated beyond the equipment. No molten metal was emitted.	P
5.3.9.1	During the tests	No hazard	P
5.3.9.2	After the tests		P

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Clause	Requirement	Remark	Result
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V) .....:		—
	Current in the test circuit (mA) .....:		—
6.1.2.2	Exclusions .....:		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria		N
6.3	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A) .....:		—
	Current limiting method .....:		—
7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
7.1	General		N
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N
7.3	Protection of equipment users from overvoltages on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N
A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		

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Clause	Requirement	Remark	Result
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples .....:		—
	Wall thickness (mm).....:		—
A.1.2	Conditioning of samples; temperature (°C) .....:		N
A.1.3	Mounting of samples .....:		N
A.1.4	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D .....:		—
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s).....:		—
	Sample 2 burning time (s).....:		—
	Sample 3 burning time (s).....:		—
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1	Samples, material .....:	No tests required.	—
	Wall thickness (mm).....:		—
A.2.2	Conditioning of samples; temperature (°C) .....:		N
A.2.3	Mounting of samples .....:		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C .....:		—
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s).....:		—
	Sample 2 burning time (s).....:		—
	Sample 3 burning time (s).....:		—
A.2.7	Alternative test acc. To IEC 60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s).....:		—
	Sample 2 burning time (s).....:		—
	Sample 3 burning time (s).....:		—
A.3	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

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EN 60950-1			
Clause	Requirement	Remark	Result
B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		
B.1	General requirements		N
	Position ..... :		—
	Manufacturer ..... :		—
	Type ..... :		—
	Rated values ..... :		—
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days) ..... :		—
	Electric strength test: test voltage (V) ..... :		—
B.6	Running overload test for d.c. motors in secondary circuits		N
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test; test voltage (V) ..... :		N
B.7	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1	General		N
B.7.2	Test procedure		N
B.7.3	Alternative test procedure		N
B.7.4	Electric strength test; test voltage (V) ..... :		N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Operating voltage (V) ..... :		—
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		N
	Position ..... :		—
	Manufacturer ..... :	(See appended 1.5.1)	—
	Type ..... :	(See appended 1.5.1)	—
	Rated values ..... :	(See appended 1.5.1)	—
	Method of protection ..... :	Inherent	—

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Clause	Requirement	Remark	Result
C.1	Overload test		N
C.2	Insulation		N
	Protection from displacement of windings .....:		N
D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see5.1.4)		
D.1	Measuring instrument		N
D.2	Alternative measuring instrument		N
E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		N
F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see2.10 and Annex G)		N
G	ANNEXG, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Clearances		N
G.1.1	General		N
G.1.2	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply .....:		N
G.2.2	Earthed d.c. mains supplies .....:		N
G.2.3	Unearthed d.c. mains supplies .....:		N
G.2.4	Battery operation .....:		N
G.3	Determination of telecommunication network transient voltage (V) .....:		N
G.4	Determination of required withstand voltage (V)		N
G.4.1	Mains transients and internal repetitive peaks .....:		N
G.4.2	Transients from telecommunication networks .....:		N
G.4.3	Combination of transients		N
G.4.4	Transients from cable distribution systems		N
G.5	Measurement of transient voltages (V)		N
	a) Transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network		N

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Clause	Requirement	Remark	Result
G.6	Determination of minimum clearances .....:		N
H	ANNEXH, IONIZING RADIATION (see 4.3.13)		N
J	ANNEXJ, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal(s) used .....:		—
K	ANNEXK, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V) .....:		N
K.3	Thermostat endurance test; operating voltage (V):		N
K.4	Temperature limiter endurance; operating voltage (V) .....:		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation		N
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N
M	ANNEXM, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (Hz) .....:		—
M.3.1.2	Voltage (V) .....:		—
M.3.1.3	Cadence; time (s), voltage (V) .....:		—
M.3.1.4	Single fault current (mA) .....:		—
M.3.2	Tripping device and monitoring voltage .....:		N

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Clause	Requirement	Remark	Result
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V) .....:		N
N	ANNEX N, IMPULSE TEST GENERATORS (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.3.2, 7.4.3 and ClauseG.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
P	ANNEX P, NORMATIVE REFERENCES		—
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		N
	a) Preferred climatic categories .....:		N
	b) Maximum continuous voltage .....:		N
	c) Pulse current .....:		N
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see1.1.2)		N
			—
U	ANNEXU, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N
			—
V	ANNEXV, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		N

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Clause	Requirement	Remark	Result
V.1	Introduction		N
V.2	TN power distribution systems		N
W	ANNEXW, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.1	Floating circuits		N
W.1.2	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		N
X.1	Determination of maximum input current		N
X.2	Overload test procedure		N
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N
Y.1	Test apparatus .....:		N
Y.2	Mounting of test samples .....:		N
Y.3	Carbon-arc light-exposure apparatus .....:		N
Y.4	Xenon-arc light exposure apparatus .....:		N
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)		N
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N
BB	ANNEX BB, CHANGES IN THE SECOND EDITION		—
CC	**Annex CC, Evaluation of integrated circuit (IC) current limiters**		N
CC.1	General		N
CC.2	Test program 1……:		N
CC.3	Test program 2……:		N
DD	**ANNEX DD, Requirements for the mounting means of rack-mounted equipment**		N
DD.1	General		N

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Clause	Requirement	Remark	Result
DD.2	Mechanical strength test, variable N……..:		N
DD.3	Mechanical strength test, 250N, including end stops……:		N
DD.4	Compliance……:		N
EE	**ANNEX EE, Household and home/office document/media shredders**		N
EE.1	General		N
EE.2	Markings and instructions		N
	Use of markings or symbols……:		N
	Information of user instructions, maintenance and/or servicing instructions……:		N
EE.3	Inadvertent reactivation test……:		N
EE.4	Disconnection of power to hazardous moving parts:		N
	Use of markings or symbols……:		N
EE.5	Protection against hazardous moving parts		N
	Test with test finger (Figure 2A) ……...:		N
	Test with wedge probe (Figure EE1 and EE2) ……:		N

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NATIONAL DIFFERENCES			
Clause	Requirement	Remark	Result

ATTACHMENT TO TEST REPORT IEC 60950-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Information technology equipment – Safety –
PART 1: GENERAL REQUIREMENTS

Differences according to.....:	EN 60950-1:2006/A11:2009/A1:2010/A12:2011
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EN 60950-1:2006/A11:2009/A1:2010/A12:2011 – CENELEC COMMON MODIFICATIONS

IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirement + Test	Result - Remark	Verdict
Contents	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions		P
General	Delete all the "country" notes in the reference document (IEC 60950-1:2005) according to the following list: 1.4.8 Note 2; 1.5.1 Note 2 & 3; 1.5.7.1 Note 1.5.8 Note 2; 1.5.9.4 Note; 1.7.2.1 Note 4, 5 & 6 2.2.3 Note; 2.2.4 Note; 2.3.2 Note 2.3.2.1 Note 2; 2.3.4 Note 2; 2.6.3.3 Note 2 & 3 2.7.1 Note; 2.10.3.2 Note 2; 2.10.5.13 Note 3 3.2.1.1 Note; 3.2.4 Note 3.; 2.5.1 Note 2 4.3.6 Note 1 & 2; 4.7 Note 4; 4.7.2.2 Note 4.7.3.1Note 2; 5.1.7.1 Note 3 & 4; 5.3.7 Note 1 6 Note 2 & 5; 6.1.2.1 Note 2; 6.1.2.2 Note 6.2.2 Note; 6.2.2.1 Note 2; 6.2.2.2 Note 7.1 Note 3; 7.2 Note; 7.3 Note 1 & 2 G.2.1 Note 2; Annex H Note 2		P
General (A1:2010)	Delete all the "country" notes in the reference document (IEC 60950-1:2005/A1:2010) according to the following list: 1.5.7.1 Note; 6.1.2.1 Note 2 6.2.2.1 Note 2; EE.3 Note		P

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IEC 60950-1, GROUP DIFFERENCES (CENELEC common modifications EN)			
Clause	Requirement + Test	Result - Remark	Verdict
1.3.Z1	Add the following subclause: 1.3.Z1 Exposure to excessive sound pressure The apparatus shall be so designed and constructed as to present no danger when used for its intended purpose, either in normal operating conditions or under fault conditions, particularly providing protection against exposure to excessive sound pressures from headphones or earphones. NOTE Z1 A new method of measurement is described in EN 50332-1, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for "one package equipment", and in EN 50332-2, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Guidelines to associate sets with headphones coming from different manufacturers.	No headphones or earphones	N
(A12:2011)	In EN 60950-1:2006/A12:2011 Delete the addition of 1.3.Z1 / EN 60950-1:2006 Delete the definition 1.2.3.Z1 / EN 60950-1:2006 /A1:2010		N
1.5.1	Add the following NOTE: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2002/95/EC		P
1.7.2.1 (A1:2010)	In addition, for a PORTABLE SOUND SYSTEM, the instructions shall include a warning that excessive sound pressure from earphones and headphones can cause hearing loss.		N
1.7.2.1 (A12.2011)	In EN 60950-1:2006/A12:2011 Delete NOTE Z1 and the addition for Portable Sound System. Add the following clause and annex to the existing standard and amendments.		N
	Zx Protection against excessive sound pressure from personal music players		N

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	Zx.1 General This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players. A personal music player is a portable equipment for personal use, that: is designed to allow the user to listen to recorded or broadcast sound or video; and primarily uses headphones or earphones that can be worn in or on or around the ears; and allows the user to walk around while in use. NOTE 1 Examples are hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment. A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause. The requirements in this sub-clause are valid for music or video mode only. The requirements do not apply: while the personal music player is connected to an external amplifier; or while the headphones or earphones are not used. NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player. The requirements do not apply to: hearing aid equipment and professional equipment; NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment.		N
	analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015. NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.		N

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	Zx.2 Equipment requirements No safety provision is required for equipment that complies with the following: equipment provided as a package (personal music player with its listening device), where the acoustic output $L_{Aeq,T}$ is ≤ 85 dBA measured while playing the fixed "programme simulation noise" as described in EN 50332-1; and a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed "programme simulation noise" as described in EN 50332-1. NOTE 1 Wherever the term acoustic output is used in this clause, the 30 s A-weighted equivalent sound pressure level $L_{Aeq,T}$ is meant. See also Zx.5 and Annex Zx. All other equipment shall: a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and		N

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	c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and NOTE 2 Examples of means include visual or audible signals. Action from the user is always required. NOTE 3 The 20 h listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off. d) have a warning as specified in Zx.3; and e) not exceed the following: 1) equipment provided as a package (player with Its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed “programme simulation noise” described in EN 50332-1; and 2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed “programme simulation noise” described in EN 50332-1. For music where the average sound pressure (long term $L_{Aeq,T}$) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song. NOTE 4 Classical music typically has an average sound pressure (long term $L_{Aeq,T}$) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA.		N

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	Zx.3 Warning The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following: the symbol of Figure 1 with a minimum height of 5 mm; and the following wording, or similar: "To prevent possible hearing damage, do not listen at high volume levels for long periods."  **Figure 1 – Warning label (IEC 60417-6044)** Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.		N
	Zx.4 Requirements for listening devices (headphones and earphones)		N
	Zx.4.1 Wired listening devices with analogue input With 94 dBA sound pressure output $L_{Aeq,T}$, the input voltage of the fixed "programme simulation noise" described in EN 50332-2 shall be ≥ 75 mV. This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for example built-in volume level control). NOTE The values of 94 dBA – 75 mV correspond with 85dBA – 27 mV and 100 dBA – 150 mV.		N

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	Zx.4.2 Wired listening devices with digital input With any playing device playing the fixed "programme simulation noise" described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.). NOTE An example of a wired listening device with digital input is a USB headphone.		N
	Zx.4.3 Wireless listening devices In wireless mode: with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the abovementioned programme simulation noise, the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. NOTE An example of a wireless listening device is a Bluetooth headphone.		N
	Zx.5 Measurement methods Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s. NOTE Test method for wireless equipment provided without listening device should be defined.		N

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2.7.1	Replace the subclause as follows: Basic requirements To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation;		N
	c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		N
2.7.2	This subclause has been declared ‘void’.		N
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.		N

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3.2.5.1	Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: Up to and including 6 | 0,75 [a] | Over 6 up to and including 10| (0,75) [b] 1,0 | Over 10 up to and including 16| (1,0) [c] 1,5 | In the conditions applicable to Table 3B delete the words "in some countries" in condition [a]. In NOTE 1, applicable to Table 3B, delete the second sentence.		N
3.3.4	In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: Over 10 up to and including 16 | 1,5 to 2,5 | 1,5 to 4 | Delete the fifth line: conductor sizes for 13 to 16 A		N
4.3.13.6 (A1:2010)	Replace the existing NOTE by the following: NOTE Z1 Attention is drawn to: 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz, and 2006/25/EC: Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artifical optical radiation).		N
	Standards taking into account mentioned Recommendation and Directive which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.		--
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 µSv/h (0,1 mR/h) (see NOTE). Account is taken of the background level. Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom. Delete NOTE 2.		N
Bibliography	Additional EN standards.		—

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ZA	**NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**		—

ZB ANNEX (normative) **SPECIAL NATIONAL CONDITIONS (EN)**			
Clause	Requirement + Test	Result - Remark	Verdict
1.2.4.1	In **Denmark**, certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.		N
1.2.13.14	In **Norway** and **Sweden**, for requirements see 1.7.2.1 and 7.3 of this annex.		N
1.5.7.1	In **Finland, Norway** and **Sweden**, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2.		N
1.5.8	In **Norway**, due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N
1.5.9.4	In **Finland**, **Norway** and **Sweden**, the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.		N
1.7.2.1	In **Finland**, **Norway** and **Sweden**, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway: “Apparatet må tilkoples jordet stikkontakt” In Sweden: “Apparaten skall anslutas till jordat uttag” In **Norway** and **Sweden**, the screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building		N

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	installation need to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by e.g. a retailer. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).”		
	NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel- TV nettet.” Translation to Swedish: ”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”		N

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ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
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1.7.5	In **Denmark**, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment. For STATIONARY EQUIPMENT the socket-outlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a. For **CLASS II EQUIPMENT** the socket outlet shall be in accordance with Standard Sheet DKA 1-4a.		N
2.2.4	In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N
2.3.2	In **Finland**, **Norway** and **Sweden** there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.		N
2.3.4	In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.		N
2.6.3.3	In the **United Kingdom**, the current rating of the circuit shall be taken as 13 A, not 16 A.		N
2.7.1	In the **United Kingdom**, to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met.		N
2.10.5.13	In **Finland**, **Norway** and **Sweden**, there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.		N
3.2.1.1	In **Switzerland**, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets: SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A		N

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ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
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	SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998: SEV 5932-2.1998: Plug Type 25 , 3L+N+PE 230/400 V, 16 A SEV 5933-2.1998:Plug Type 21, L+N, 250 V, 16A SEV 5934-2.1998: Plug Type 23, L+N+PE 250 V, 16 A		
3.2.1.1	In **Denmark**, supply cords of single-phase equipment having a rated current not exceeding13 A shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2.		N

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ZB ANNEX (normative) **SPECIAL NATIONAL CONDITIONS (EN)**			
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3.2.1.1	In **Spain**, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994. Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994. If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.		N
3.2.1.1	In the **United Kingdom**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations. NOTE 'Standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N
3.2.1.1	In **Ireland**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 - National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.		N
3.2.4	In **Switzerland**, for requirements see 3.2.1.1 of this annex.		N
3.2.5.1	In the **United Kingdom**, a power supply cord with conductor of 1,25 mm2 is allowed for equipment with a rated current over 10 A and up to and including 13 A.		N

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ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
3.3.4	In the **United Kingdom**, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: • 1,25 mm^2 to 1,5 mm^2 nominal cross-sectional area.		N
4.3.6	In the **United Kingdom**, the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		N
4.3.6	In **Ireland**, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.		N
5.1.7.1	In **Finland**, **Norway** and **Sweden** TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: • STATIONARY PLUGGABLE EQUIPMENT TYPE A that is intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, for example, in a telecommunication centre; and has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT.		N
6.1.2.1 (A1:2010)	In **Finland**, **Norway** and **Sweden**, add the following text between the first and second		N

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NATIONAL DIFFERENCES			
Clause	Requirement	Remark	Result

ZB ANNEX (normative) SPECIAL NATIONAL CONDITIONS (EN)			
Clause	Requirement + Test	Result - Remark	Verdict
	paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. Alternatively for components, there is no distance through insulation requirements for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and - is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV.		

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NATIONAL DIFFERENCES			
Clause	Requirement	Remark	Result

ZB ANNEX (normative) **SPECIAL NATIONAL CONDITIONS (EN)**			
Clause	Requirement + Test	Result - Remark	Verdict
	It is permitted to bridge this insulation with an optocoupler complying with 2.10.5.4 b). It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 60384-14: - the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		N
6.1.2.2	In **Finland**, **Norway** and **Sweden**, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.		N
7.2	In **Finland**, **Norway** and **Sweden**, for requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.		N
7.3	In **Norway** and **Sweden**, for requirements see 1.2.13.14 and 1.7.2.1 of this annex.		N
7.3	In **Norway**, for installation conditions see EN 60728-11:2005.		N

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1.5.1	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
SWITCH MODE POWER SUPPLY	Kuantech(Beihai) Co.,Ltd	KSAFH12003 00T1M3	I/P:100-240V~ 50/60Hz 1.2A O/P:12V ⎓ 3.0A	IEC/EN 60950-1	TUV-GS
Plastic Enclosure	Various	Various	HB, 80℃ 1.5 mm thickness	UL94	UL
PCB	Various	Various	V-1 or better, 105℃.	UL94	UL
Internal wire	Various	Various	Rated minimum 80℃, minimum 60 V, VW-1 or FT-1	UL 758	UL
Supplementary information:					

1.6.2	TABLE: Electrical data (in normal conditions)					P
Fuse #	Irated (A)	U (V)	P (W)	I (A)	Ifuse (A)	Condition/status
--	3.0	12Vdc	5.40	0.45	--	Normal working
Supplementary information:						

2.1.1.5 c) 1)	TABLE: max. V, A, VA test				N
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)	
--	--	--	--	--	
supplementary information:					

2.1.1.5 c) 2)	TABLE: stored energy	N
Capacitance C (µF)	Voltage U (V)	Energy E (J)
—	—	—
supplementary information:		

2.2	TABLE: evaluation of voltage limiting components in SELV circuits			N
Component (measured between)	max. voltage (V) (normal operation)		Voltage Limiting Components	
	V peak	V d.c.		
--	--	--	—	
--	--	--	—	

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Fault test performed on voltage limiting components	Voltage measured (V) in SELV circuits (V peak or V d.c.)
—	—
supplementary information:	
- Under highest Rated Voltage:	

2.4.2	TABLE: limited current circuit measurement					N
Location	Voltage (V)	Current (mA)	Freq. (Hz)	Limit (mA)	Comments	
--	--	--	--	--	--	
Supplementary information: Test voltage:						

2.5	TABLE: limited power sources				N
Measured Uoc (V) with all load circuits disconnected:					
	I_{sc} (A)		VA		
	Meas.	Limit	Meas.	Limit	
--	--	--	--	--	
--	--	--	--	--	
supplementary information: Above tests all in normal condition					

2.10.2	Table: working voltage measurement			N
Location	RMS voltage (V)	Peak voltage (V)	Comments	
--	--	--	--	
supplementary information:				

2.10.3 and 2.10.4	TABLE: Clearance and creepage distance measurements						N
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)	
--	-	--	--	--	--	--	
Supplementary information:							

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2.10.5	TABLE: Distance through insulation measurements				N
Distance through insulation (DTI) at/of:	U peak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
--	--	--	--	--	--
Supplementary information:					

4.3.8	TABLE: Batteries								P
The tests of 4.3.8 are applicable only when appropriate battery data is not available				--					--
Is it possible to install the battery in a reverse polarity position?				--					--
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.
Max. current during normal condition	—	—	—	—	—	—	—	2.98mA	300mA
Max. current during fault condition	—	—	—	—	—	—	—	3.45mA	300mA
Test results:									Verdict
- Chemical leaks							—		—
- Explosion of the battery							—		—
- Emission of flame or expulsion of molten metal							—		—
- Electric strength tests of equipment after completion of tests							—		—
Supplementary information:									

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4.5	TABLE: Thermal requirements			P
	Supply voltage (V)	12Vdc	12Vdc	—
Maximum measured temperature T of part/at::		T (°C)	Tmax (40°C)	Allowed T_{max} (°C)
DC jack inside		39.3	54.0	80
PCB near U4		49.1	63.8	105
PCB near U2		45.7	60.4	105
Internal wire		40.9	55.6	80
Enclosure inside		39.4	54.1	Ref.
Bottom enclosure outside		35.0	49.7	95
Ambient		25.3	40.0	--
Supplementary information:				

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
—	—	—	—	—	—	—	—

Supplementary information

Manufactrurer declared the product operating temperature is 40°C

4.7	TABLE: Resistance to fire					P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence	
--	--	--	--	--	--	

Supplementary information:

See appended table 1.5.1

5.1	TABLE: touch current measurement			N
Measured between:		Measured (mA)	Limit (mA)	Comments/conditions
--		--	--	—
supplementary information:				

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			N
Test voltage applied between:		Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No
--		--	--	--
Supplementary information:				

5.3	TABLE: Fault condition tests	P

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	Ambient temperature (°C).....:	--	—
	Power source for EUT: Manufacturer, model/type, output rating .....:	--	—

Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (mA)	Observation
U1 (pin 2-3)	S-C	12Vdc	10 mins	--	0.45→ 0.94→ 0.023	The EUT didn't work and input current changed periodically. No hazard. Recoverable when fault removed.
USB	S-C	12Vdc	10mins	--	0.020	The unit normal working,no hazard, no damaged
USB	O-L	12Vdc	6hours35mins	--	0.45→0.96→1.23→0.021	The unit shut down, no damaged, no hazard. no high temperature exceeding it's limit
Supplementary information:						

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Attachment I Photos of Product

Photo 1

[√] Overview

[ ] front

[ ] rear

[ ] right side

[ ] left side

[ ] top

[ ] bottom

[ ] internal

Photo 2

[ ] Overview

[ ] front

[ ] rear

[ ] right side

[√] left side

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Photo 3

[ ] Overview

[ ] front

[ ] rear

[ ] right side

[ ] left side

[ ] top

[√] bottom

[ ] internal

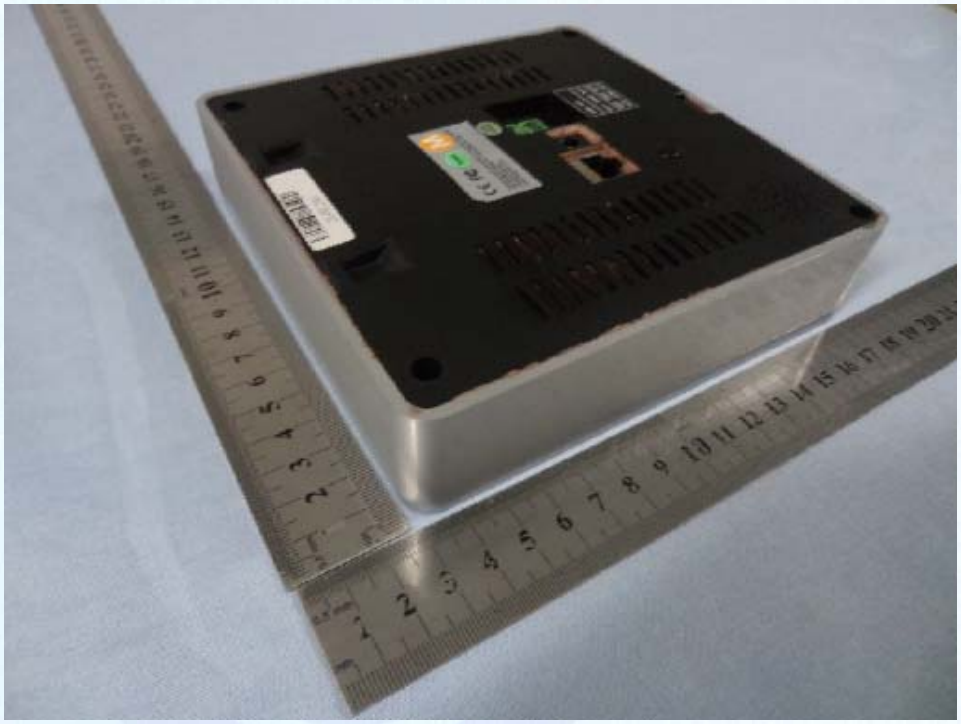

Photo 4
PCB

[ ] Overview

[ ] front

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Photo 5
PCB

[ ] Overview

[ ] front

[ ] rear

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[√] internal

Photo 6
PCB

[ ] Overview

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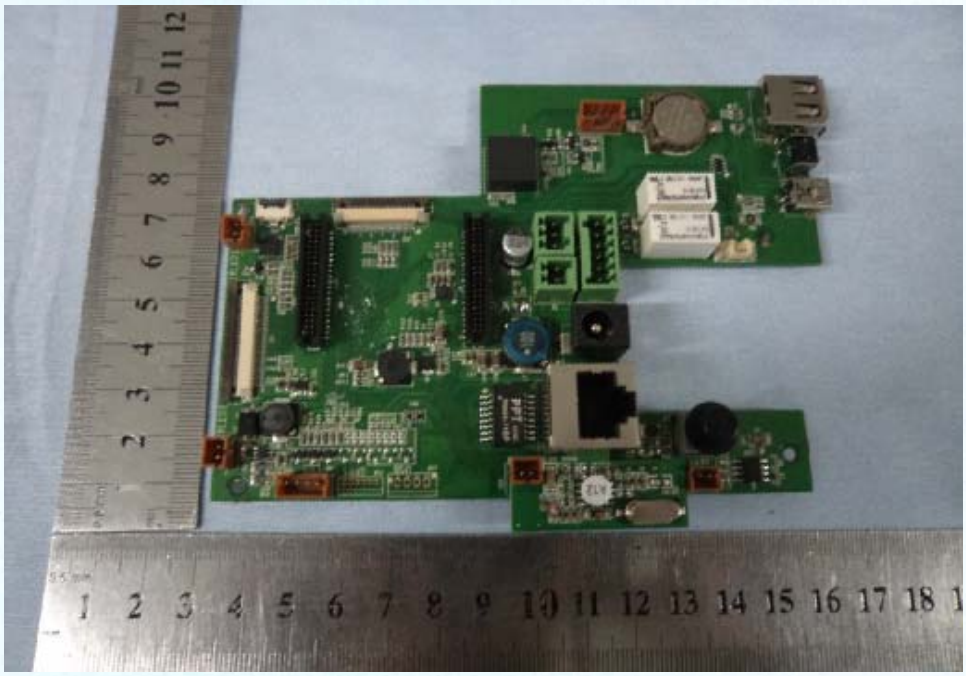

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Photo 7
PCB

[ ] Overview

[ ] front

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[ ] left side

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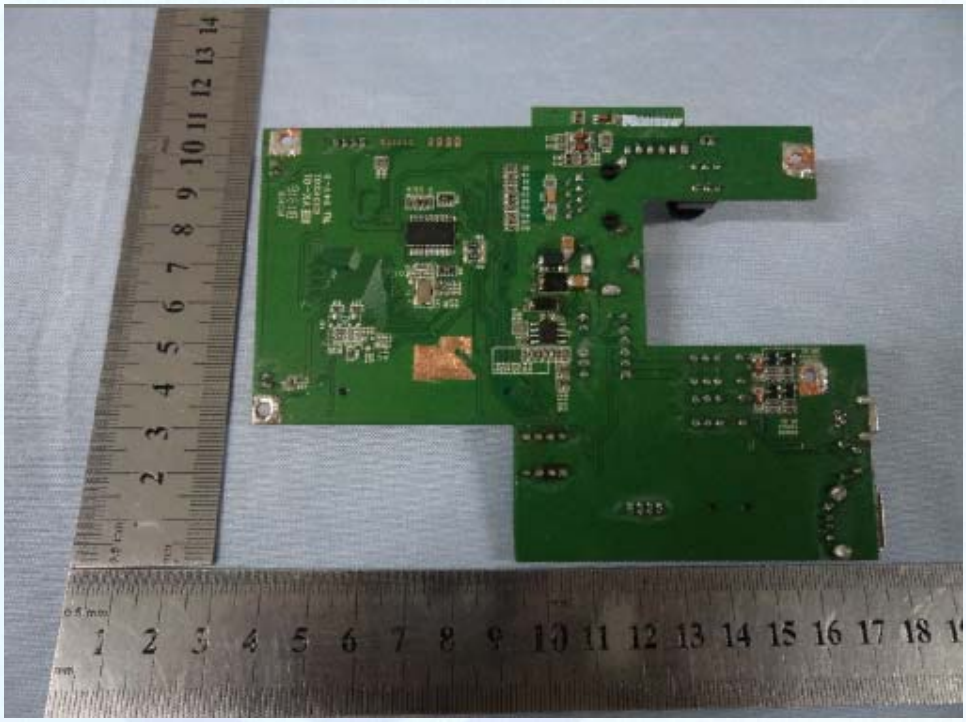

Photo 8
PCB

[ ] Overview

[ ] front

[ ] rear

[ ] right side

[ ] left side

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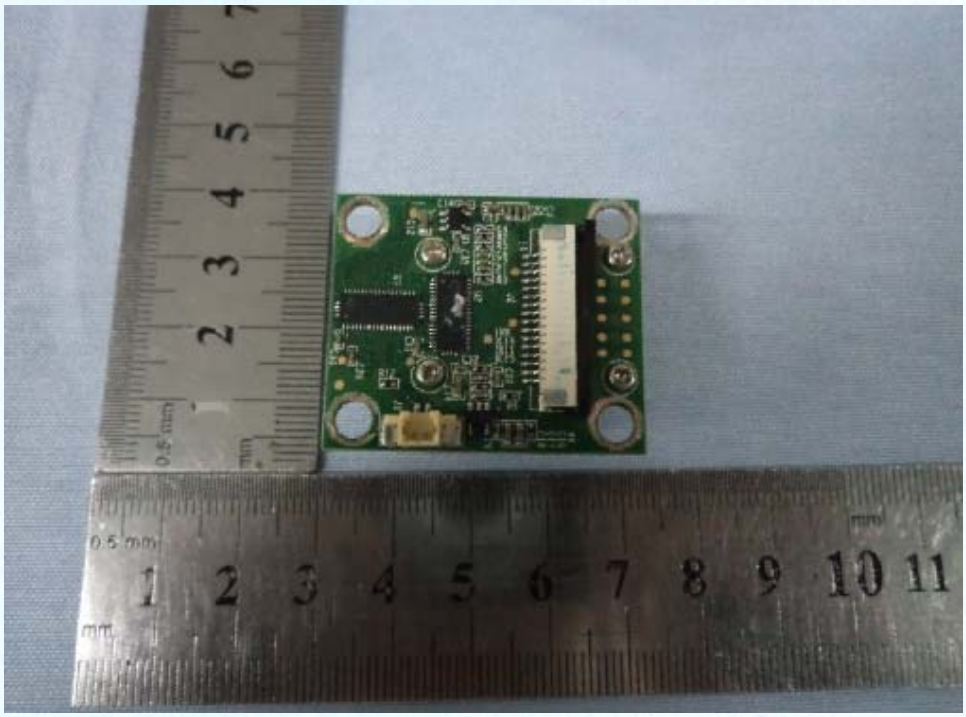

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Photo 9
PCB

[ ] Overview

[ ] front

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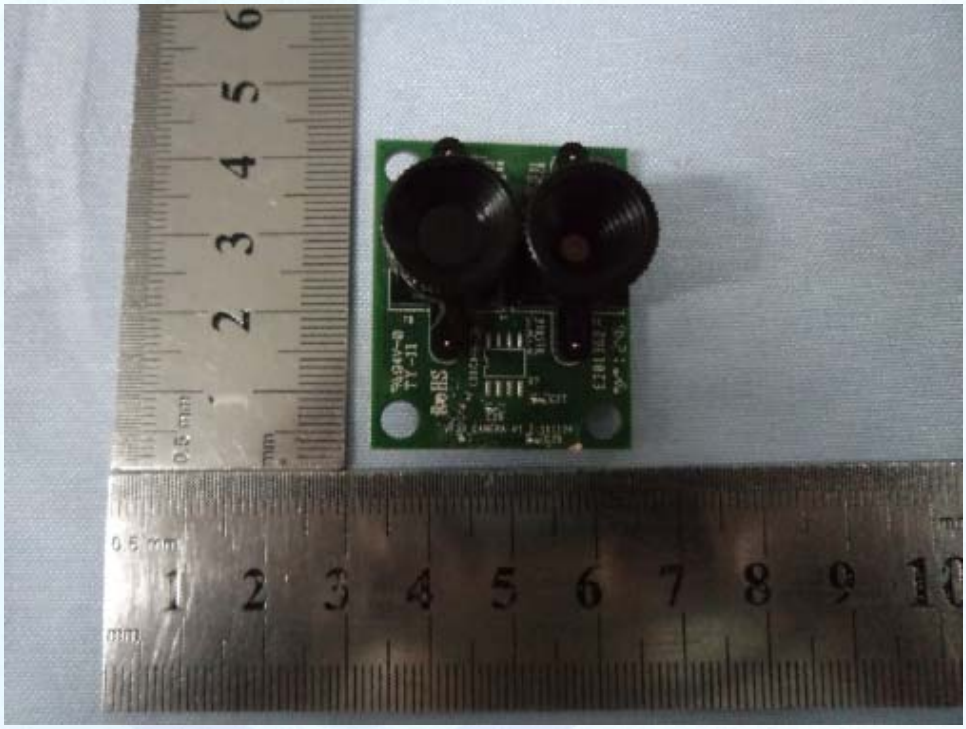

Photo 10
PCB

[ ] Overview

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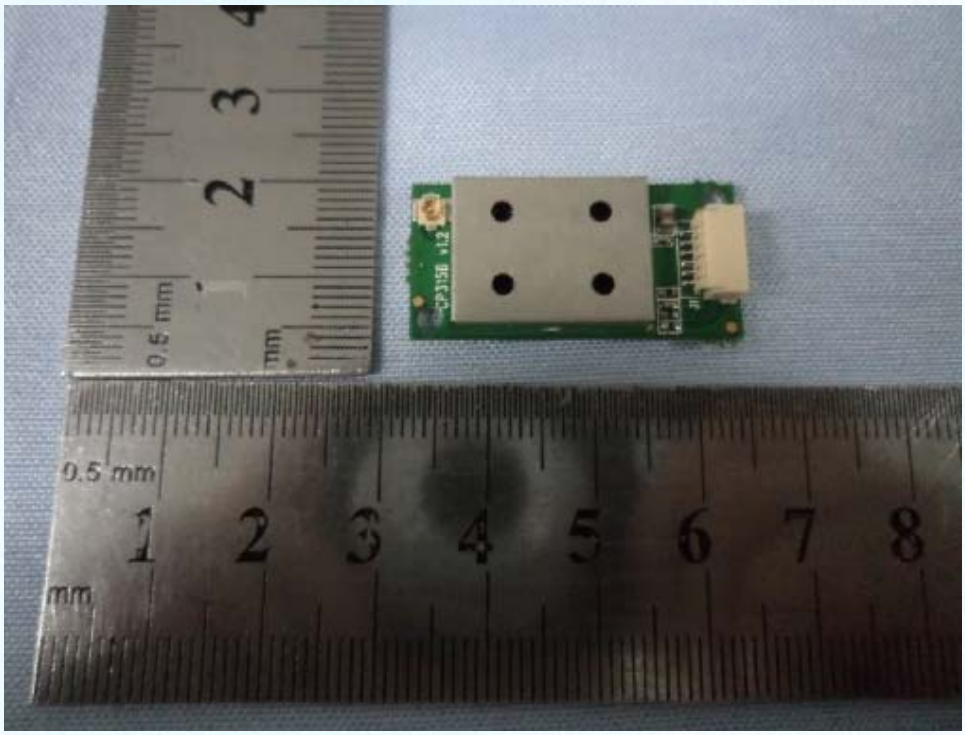

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Photo 11
PCB

[ ] Overview

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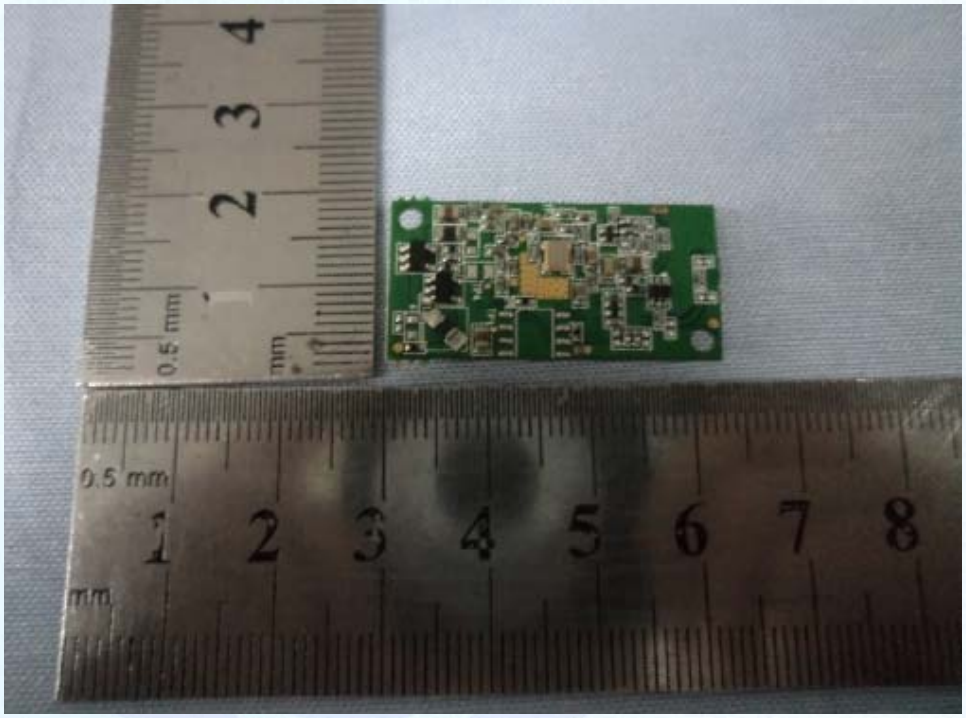

Photo 12
SWITCH MODE
POWER SUPPLY

[ ] Overview

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------ End of Report ------

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