



Test Verification of Conformity

On the basis of the referenced test report(s), sample(s) of the below product have been found to comply with the harmonized standards and Directives listed on this verification at the time the tests were carried out. Other standards and Directives may be relevant to the product.

Once all product relevant  mark directives are verified in compliance, the manufacturer may indicate compliance by signing a Declaration of Conformity themselves and applying the mark to product identical to the test sample(s) if the product complies with all relevant CE mark Directives requirements.

Applicant Name & Address:	GUANGDONG BE-TECH SECURITY SYSTEMS LIMITED . NO. 17, Keyuan 3 Road, Ronggui, Shunde High-Tech Zone, Foshan, Guangdong, P.R.China
Product Description: Ratings & Principle Characteristics:	Handheld Service Unit DC 6V
Models:	RD-08
Brand Name:	
Relevant Standards/ Specifications/Directives:	EN 55022: 2010/ Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement EN 55024: 2010/ Information technology equipment — Immunity characteristics — Limits and methods of measurement EMC Directive 2004/108/EC
Verification Issuing Office:	Same as Legal Entity
Date of Tests:	07 May 2014-21 May 2014
Test Report Number(s):	140324103GZU-001: 30 May 2014
Note 1: This verification is part of the full test report(s) and should be read in conjunction with them.	

Signature: Helen Ma
 Name: Helen Ma
 Position: Sr. Project Engineer
 Date: 30 May 2014

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TEST REPORT

Applicant Name & Address : GUANGDONG BE-TECH SECURITY SYSTEMS LIMITED .
NO. 17, Keyuan 3 Road, Ronggui, Shunde High-Tech Zone, Foshan,
Guangdong, P.R.China

Manufacturing Site : Same as applicant

Sample Description

Product : Handheld Service Unit
Model No. : RD-08
Electrical Rating : DC 6V

Date Received : 07 May 2014

Date Test Conducted : 07 May 2014-21 May 2014

Test standards : EN 55022: 2010
EN 55024: 2010

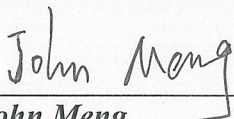
Test Result : Pass

Conclusion : The submitted samples complied with the above EMC standards.

Remark : None.

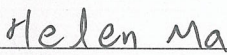
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Prepared and Checked By:



John Meng
Engineer
Intertek Guangzhou

Approved By:



Helen Ma
Sr. Project Engineer
Intertek Guangzhou

30 May 2014 **Date**

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Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China
Tel / Fax: 86-20-8213 9688/86-20-3205 7538

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EMC Results Conclusion
(with Justification)

RE: EMC Testing Pursuant to EMC Directive 2004/108/EC Performed On the Handheld Service Unit, Models: RD-08.

We tested the Handheld Service Unit, Models: RD-08, to determine if it was in compliance with the relevant EN standards as marked on the Test Results Summary. We found that the unit met the requirement of EN 55022, EN 55024 (EN 61000-4-2), EN 55024 (EN 61000-4-3) standards when tested as received. The worst case's test data was presented in this test report. The test item Radiated EM Field Immunity was subcontracted.

The production units are required to conform to the initial sample as received when the units are placed on the market.

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LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT):	Handheld Service Unit
Model:	RD-08
Serial No.	Not Labeled
Support Equipment:	Laptop supplied by Intertek and Lock supplied by client
Rated Voltage:	DC 6V
Condition of Environment:	Temperature : 22~28°C Relative Humidity: 35~60% Atmosphere Pressure 86~106kPa

Notes:

1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications.

An attempt had been made to maximize the emission by varying the configuration of the EUT.

2. The EMS measurements had been made in the frequency bands being investigated, with the EUT in the most susceptible operating mode consistent with normal applications. The configuration of the test sample had been varied to achieve maximum susceptibility.

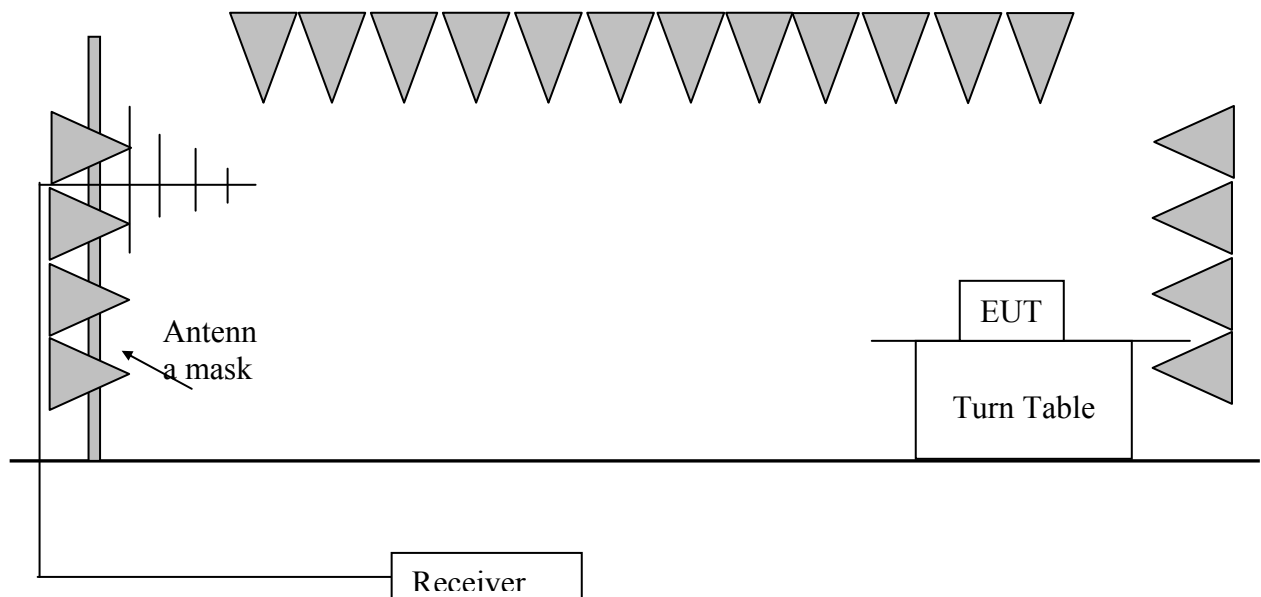
4 EMI TEST

4.1 EN 55022 Radiated Emission below 1 GHz Test Result: Pass

4.1.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM030-01	3m Semi-Anechoic Chamber	9×6×6 m3	ETS•LINDGREN
EM030-02	Control room for 3m Semi-Anechoic Chamber	4×4×3 m3	ETS•LINDGREN
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz)	VULB 9161	SCHWARZBECK
EM031-02-01	Coaxial cable	/	R&S

4.1.2 Block Diagram of Test Setup



4.1.3 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask.

The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN55022 requirement during radiated test. The bandwidth setting on R&S Test Receiver was 120 kHz. The frequency range from 30MHz to 1000MHz was checked

4.1.4 Test Data

Mode: Communication with PC

Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μ V/m)]	Limit at 3m [dB(μ V/m)]
Horizontal	162.8	35.7	40.0
Horizontal	168.1	35.9	40.0
Horizontal	800.0	<37.0	47.0
Vertical	96.0	32.8	40.0
Vertical	158.4	37.3	40.0
Vertical	162.6	37.0	40.0

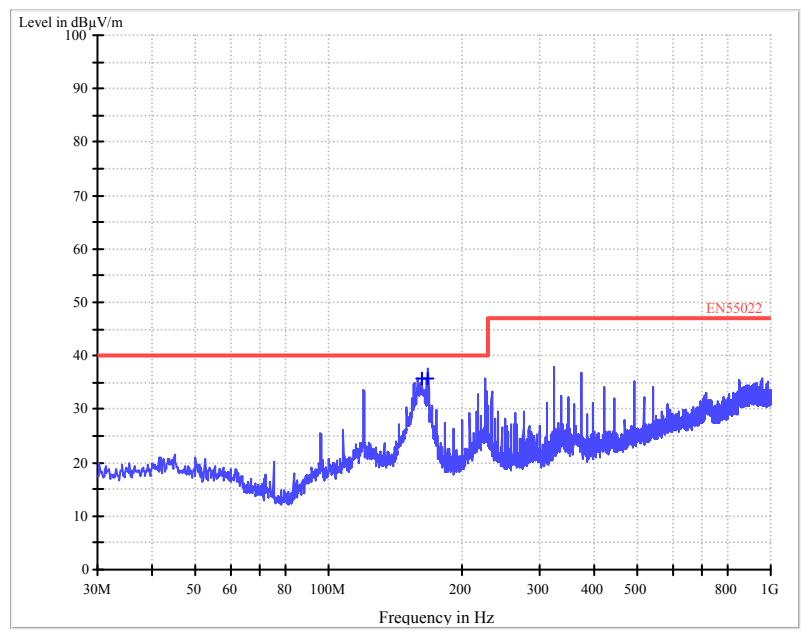
Mode: Communication with Lock

Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μ V/m)]	Limit at 3m [dB(μ V/m)]
Horizontal	214.7	32.4	40.0
Horizontal	372.0	37.0	47.0
Horizontal	800.0	<37.0	47.0
Vertical	181.6	31.4	40.0
Vertical	400.0	<37.0	47.0
Vertical	800.0	<37.0	47.0

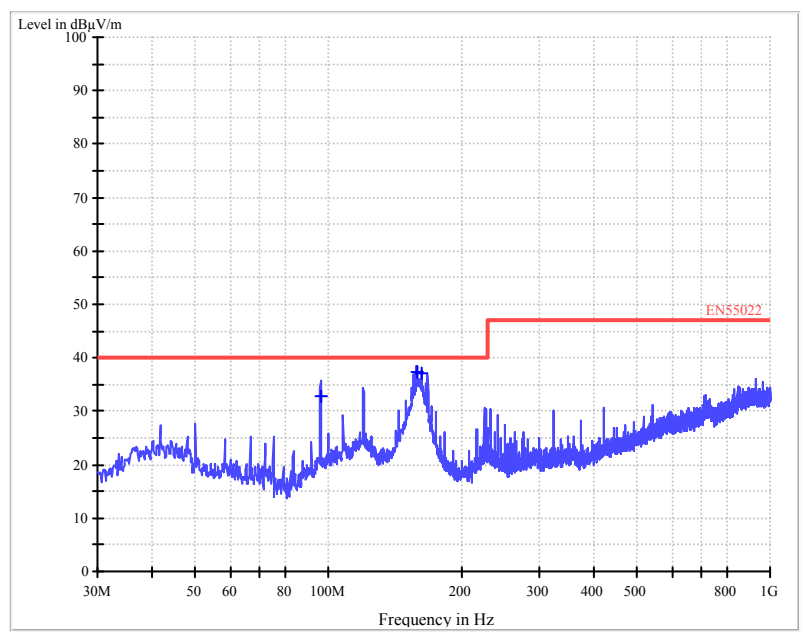


4.1.5 Test Curve

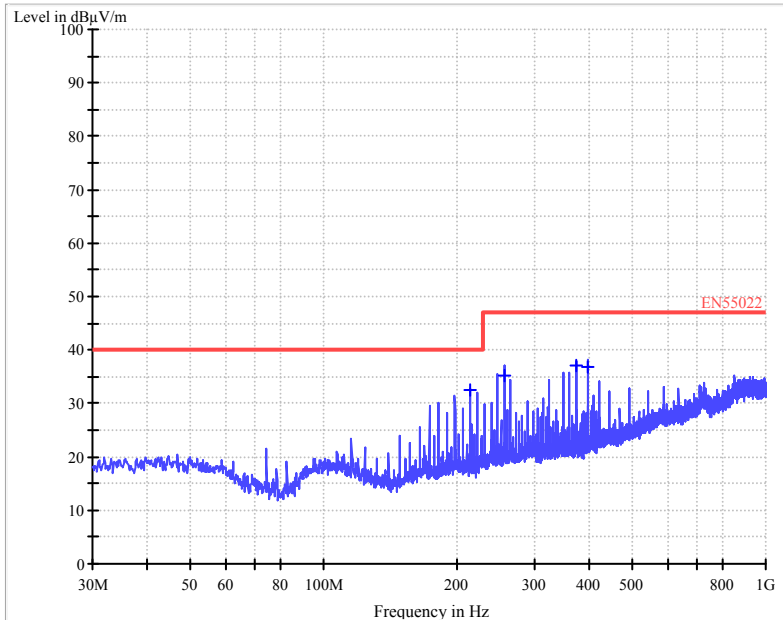
Mode: Communication with PC
Horizontal



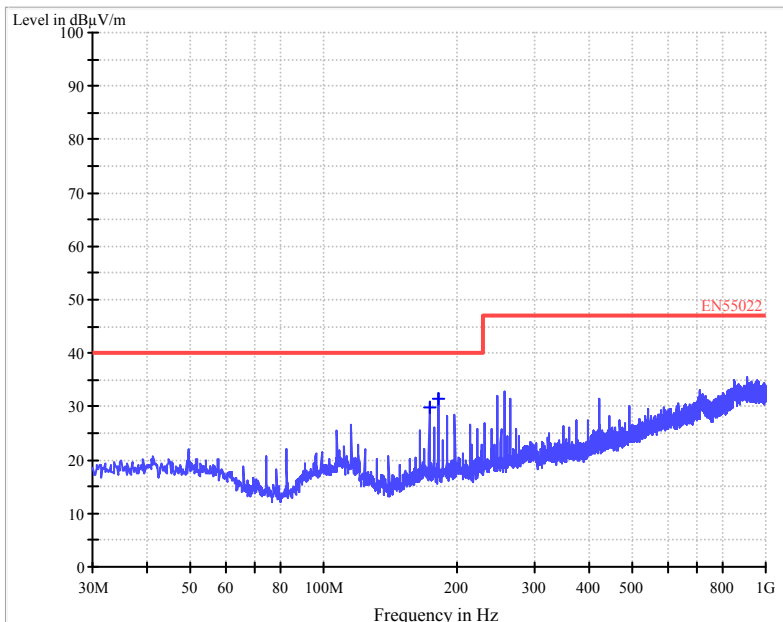
Vertical



Mode: Communication with Lock
 Horizontal



Vertical



4.1.6 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2003.

Measurement uncertainty of radiated emission: 4.48 dB.

The measurement uncertainty is given with a confidence of 95%, k=2.

5 EMS TEST

Performance Criteria:

- Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended
- Criterion B: After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Measurement Uncertainty

According to CISPR 16-4-2:2003, measurement uncertainty to immunity test is under consideration.

5.1 EN 61000-4-2(Pursuant to EN 55024) Electrostatic Discharge Immunity

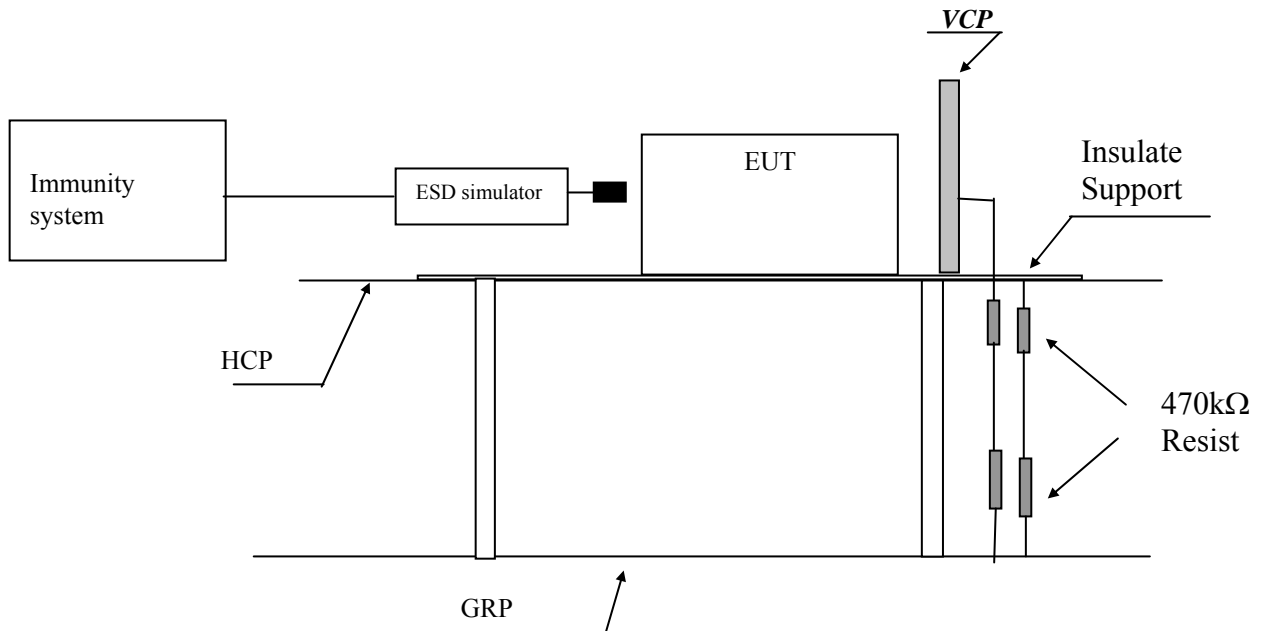
Performance criterion: B

Test Result: Pass

5.1.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM077-04	ESD Simulator	NSG437	TESEQ

5.1.2 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,
 VCP means Vertical Coupling Plane
 GRP means Ground Reference Plane

5.1.3 Test Setup and Procedure

The EUT was put on a 0.8m high wooden table/0.1m high for floor standing equipment standing on the ground reference plane (GRP) 3m by 2m in size, made by iron 1.0 mm thick.

A horizontal coupling plane (HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end.

The distance between EUT and any of the other metallic surface excepted the GRP, HCP & VCP was greater than 1m.

The EUT was arranged and connected according to its functional requirements.
 The EUT was arranged and connected according to its functional requirements

Direct static electricity discharges was applied only to those points and surface which are accessible to personnel during normal usage.

On each preselected points 10 times of each polarity single discharge were applied. The time interval between successive single discharges is at least 1s.

The ESD generator was held perpendicular to the surface to which the discharge is applied. The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge is being applied. During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.

Indirect discharge was conducted to objects placed near the EUT, simulated by applying the discharges of the ESD generator to a coupling plane, in the contact discharge mode.

After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors ($2 \times 470 \text{ k}\Omega$) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

For contact discharge, the EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four points. One of the test points shall be subjected to at least 50 indirect discharges(contact) to the centre of the front edge of the horizontal coupling plane. The remaining three points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode(see EN 61000-4-2 for use of Vertical Conducting Plane(VCP)).

For air discharge, a minimum of 10 single air discharges shall be applied to the selected test point for each such area.

5.1.4 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
4	50	Pass	Accessible metal parts of the EUT Conductive substrate with coating which is not declared to be insulating

Direct Air Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
2, 4, 8	20	Pass	All accessible points where contact discharge cannot be applied such as Displays, Indicators light, Keyboard, Button, Switch, Knob, Air gap, Slots, Hole and so on

Indirect Application of ESD

Horizontal Coupling Plane under the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	50	Pass	At the front edge of each HCP opposite the centre point of each unit of the EUT

Vertical Coupling Plane beside the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	50	Pass	The centre of the vertical edge of the coupling plane

5.2 EN 61000-4-3(Pursuant to EN 55024) Radiated Electromagnetic Field Immunity

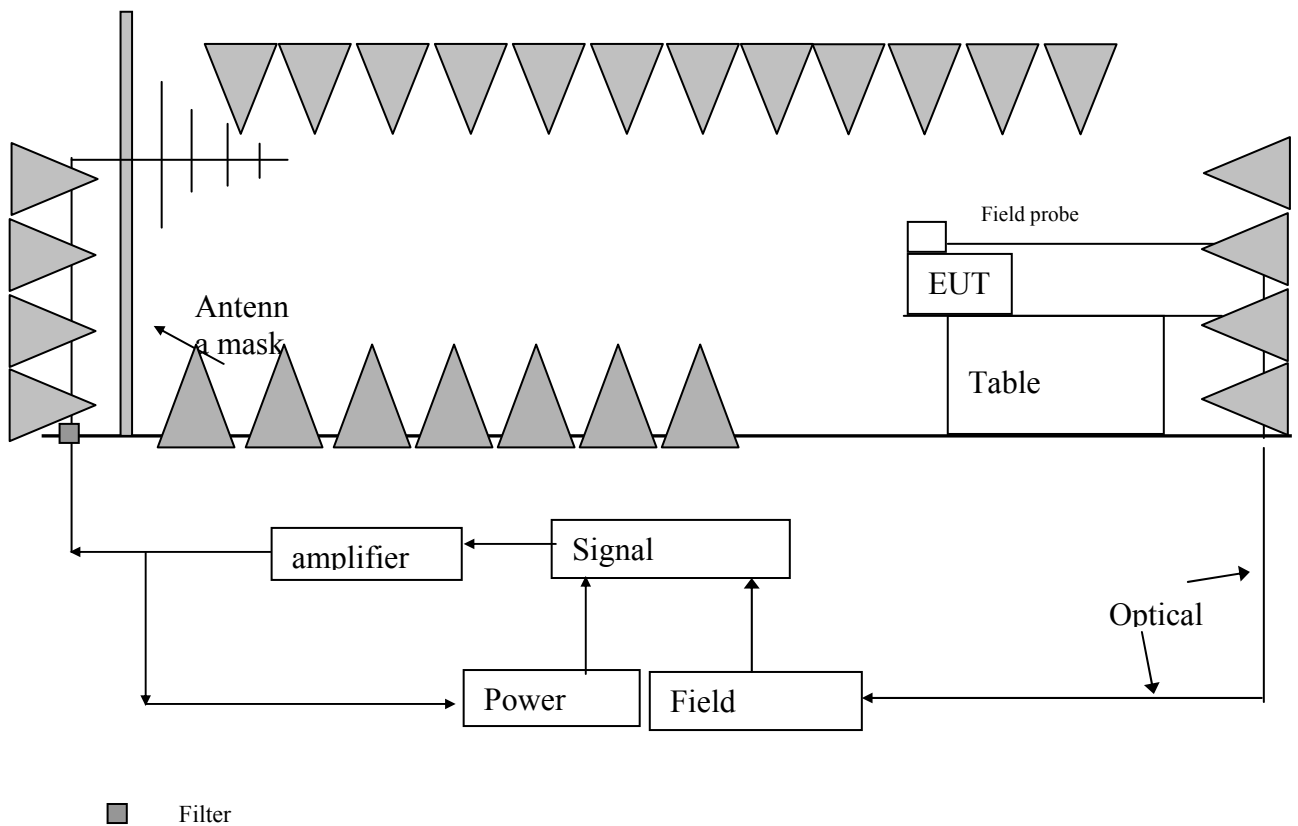
Performance criterion: A

Test Result: Pass

5.2.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
NTC-E-015	Signal Generator	N5181A	Agilent
NTC-E-016	Antenna Log-Periodic	ATR80M6G	CORAD
NTC-E-018	Switch Controller	SC1000	CORAD
NTC-E-021	RF Power Meter	4242	ESE
NTC-E-022	Power Sensor	51011EMC	ESE
NTC-E-019	Power Amplifier	CBA 1G-150	TESEQ
NTC-E-025	Dual Directional Coupler	CPH-274F	TESEQ
NTC-E-013	Horn Antenna	AH-118	COM-Power

5.2.2 Block Diagram of Test Setup



5.2.3 Test Setup and Procedure

The test was conducted in an fully anechoic chamber to maintain a uniform field of sufficient dimensions with respect to the EUT, and also in order to comply with various national and international laws prohibiting interference to radio communications.

The equipment is placed in the test facility on a non-conducting table 0.8m high (for floor standing EUT, is placed on a non-conducting support 0.1m height).

The EUT was placed on the uniform calibrated plane which is 3V/m EM field.

For all ports connected to EUT, manufacturer specified cable type and length was used, for those cables no specification, unshielded cable applied.

Wire is left exposed to the electromagnetic field for a distance of 1m from the EUT.

The EUT was arranged and connected according to its functional requirements

Before testing, the intensity of the established field strength have been checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward power needed to give the calibrated field strength was measured.

Spot checks was made at a number of calibration grid points over the frequency range 80MHz to 1000MHz, both polarizations was checked.

After calibration, the EUT is initially placed with one face coincident with the calibration plane.

The frequency range is swept from 80MHz to 1000MHz, with the signal 80% amplitude modulated with a 1 kHz sinewave, pausing to adjust the r.f. signal level.

The dwell time at each frequency was 3s so as that the EUT to be exercised and be able to respond.

The step size was 1% of the fundamental with linear interpolation between calibrated points. Test was performed with the generating antenna facing each of the four sides of the EUT.

The frequency range is scanned as specified. However, when specified in Annex A, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies are: 80, 120, 160, 230, 434, 460, 600, 863 and 900 MHz ($\pm 1\%$).

5.2.4 Test Result

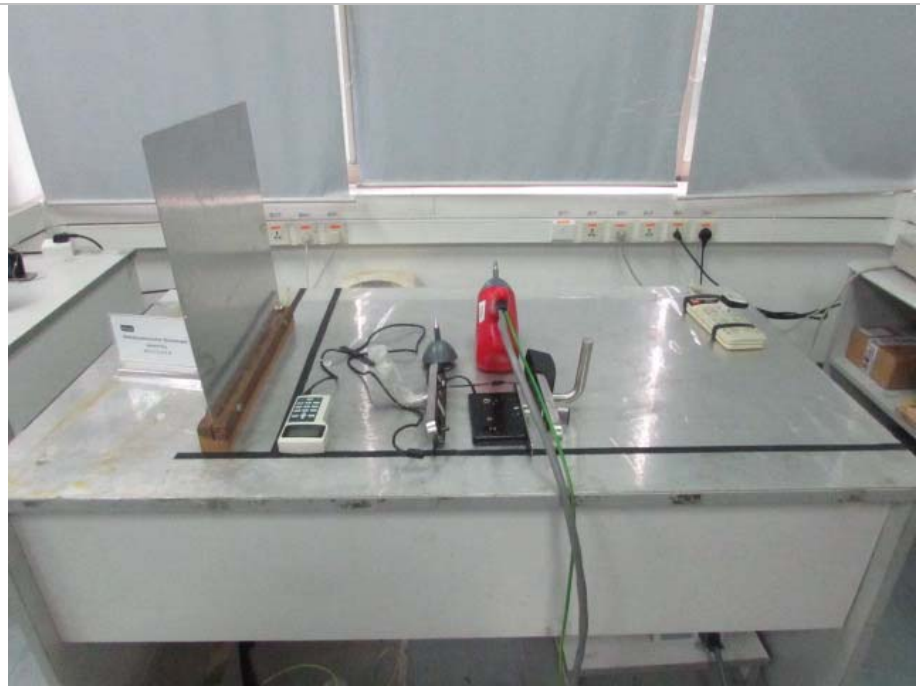
Test Mode: Scan

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80 to 1000	Front	3V/m (r.m.s.)	Pass
80 to 1000	Left	3V/m (r.m.s.)	Pass
80 to 1000	Rear	3V/m (r.m.s.)	Pass
80 to 1000	Right	3V/m (r.m.s.)	Pass

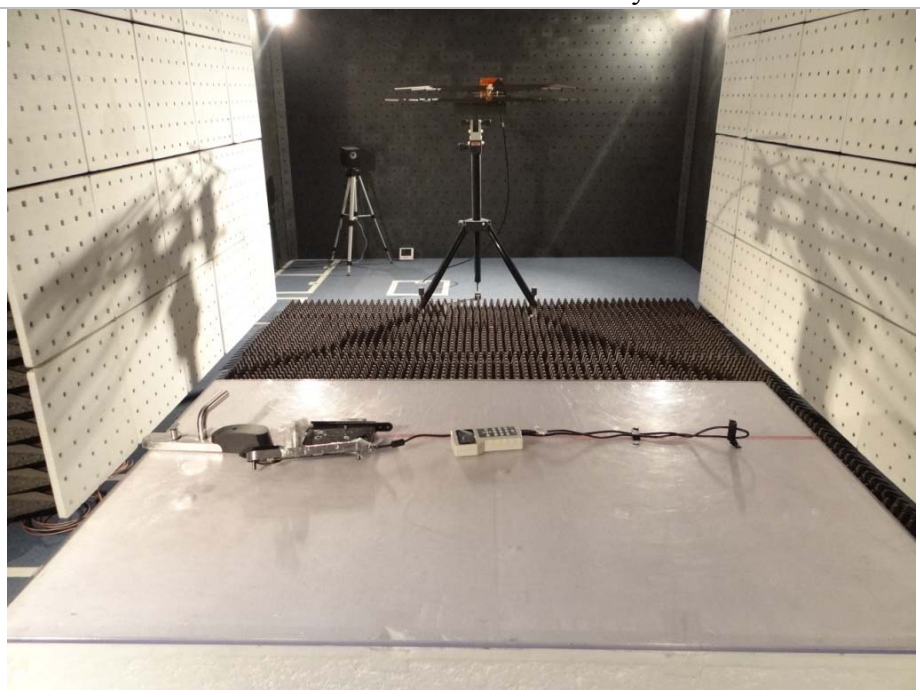
6 Appendix I - Photos of test setup



ESD Immunity



Radiated EM Field Immunity



7 Appendix II - Photos of EUT

Outside



Inside



PCB View

