

TEST REPORT

Applicant Name & Address : Uni-Trend Technology (China) Ltd
No. 6, Gong Ye Bei 1st Road, Songshan Lake National High-Tech Industrial
Development Zone, Dongguan, Guangdong Province 523808, CHINA

Manufacturing Site : The same as applicant

Sample Description
Product : Clamp Digital Multimeter
Model No. : UT205A, UT206A
Electrical Rating : Power supply: 1 x 9V 6F22 battery;
CAT III 300V, CAT II 600V, Class II

Date Received : 07 July 2014
Date Test Conducted : 07 July 2014-10 July 2014

Test standards : EN 61326-1: 2013
EN 61326-2-2:2013

Test Result : Pass

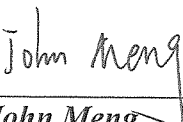
Conclusion : The submitted samples complied with the above EMC standards.

Remark : None.


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Prepared and Checked By:

Approved By:



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11 July 2014 *Date*

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CONTENT

TEST REPORT	1
CONTENT	2
1 TEST RESULTS SUMMARY	3
2 EMC RESULTS CONCLUSION	4
3 LABORATORY MEASUREMENTS	5
4 EMI TEST	6
4.1 RADIATED EMISSION	6
4.1.1 <i>Used Test Equipment</i>	6
4.1.2 <i>Block Diagram of Test Setup</i>	6
4.1.3 <i>Test Setup and Procedure</i>	7
4.1.4 <i>Test Data</i>	7
4.1.5 <i>Test Curve</i>	8
4.1.6 <i>Measurement uncertainty</i>	8
5 EMS TEST	9
5.1 EN 61000-4-2(PURSUANT TO EN 61326-1) ELECTROSTATIC DISCHARGE IMMUNITY	9
5.1.1 <i>Used Test Equipment</i>	9
5.1.2 <i>Block Diagram of Test Setup</i>	10
5.1.3 <i>Test Setup and Procedure</i>	10
5.1.4 <i>Test Result</i>	12
5.2 EN 61000-4-3(PURSUANT TO EN 61326-1) RADIATED ELECTROMAGNETIC FIELD IMMUNITY	13
5.2.1 <i>Used Test Equipment</i>	13
5.2.2 <i>Block Diagram of Test Setup</i>	13
5.2.3 <i>Test Setup and Procedure</i>	14
5.2.4 <i>Test Result</i>	15
5.3 EN 61000-4-8(PURSUANT TO EN 61326-1) POWER FREQUENCY MAGNETIC FIELD IMMUNITY	16
5.3.1 <i>Used Test Equipment</i>	16
5.3.2 <i>Block Diagram of Test Setup</i>	16
5.3.3 <i>Test Setup and Procedure</i>	16
5.3.4 <i>Test Result</i>	17
6 APPENDIX I - PHOTOS OF TEST SETUP	18
7 APPENDIX II - PHOTOS OF EUT	20

1

TEST RESULTS SUMMARY

Test Item	Standard	Result
Continuous Conducted Disturbance Voltage	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 55011:2009+A1:2010	N/A
Radiated Emission	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 55011: 2009+A1:2010	Pass
Harmonic of Current	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-3-2: 2006+A1:2009+A2:2009	N/A
Flicker	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-3-3: 2008	N/A
ESD Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-2:2009	Pass
Radiated Electromagnetic Field Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-3:2006+A1:2008+A2:2010	Pass
EFT Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-4:2004+A1:2010	N/A
Surge Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-5:2006	N/A
Inject Current Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-6: 2009	N/A
Power Frequency Magnetic Field Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-8:2010	Pass
Voltage Dips and Interruption Immunity	EN 61326-1: 2013, EN 61326-2-2 Reference: EN 61000-4-11: 2004	N/A

Remark: 1. The symbol “N/A” in above table means Not Applicable.

2. When determining the test results, measurement uncertainty of tests has been considered.

2

EMC Results Conclusion
(with Justification)

RE: EMC Testing Pursuant to EMC Directive 2004/108/EC Performed On the Clamp Digital Multimeter, Models: UT205A, UT206A.

We tested the Clamp Digital Multimeter, Models: UT206A, 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 61326-1: 2013 and EN 61326-2-2: 2013 standards when tested as received. The worst case's test data was presented in this test report. Test items Power Frequency Magnetic Field Immunity and Radiated Electromagnetic Field Immunity were subcontracted.

Remark: This report is based on the version JGZ0605104-1 dated 06 June 2006, this report is issued because the test standard is updated and will replace the old version.

Model UT205A is declared to be identical to model UT206A in terms of electrical and mechanical design. Their difference lies in the function of measurement temperature. So select UT206A to perform full test.

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

3 LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT):	Clamp Digital Multimeter
Model:	UT206A
Serial No.	Not Labeled
Support Equipment:	N/A
Rated Voltage:	1 x 9V 6F22 battery
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 producing the largest emission in the frequency band being investigated consistent with normal applications.
An attempt had be 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.

3. Test Sites:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

All tests were performed at:

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD
Guangzhou, China

Except Radiated Disturbance was performed at:

Room 101, Block A, No.11 Jing Ye San Street, Yu Shu Industrial Park, Guangzhou Science City,
GETDD Guangzhou

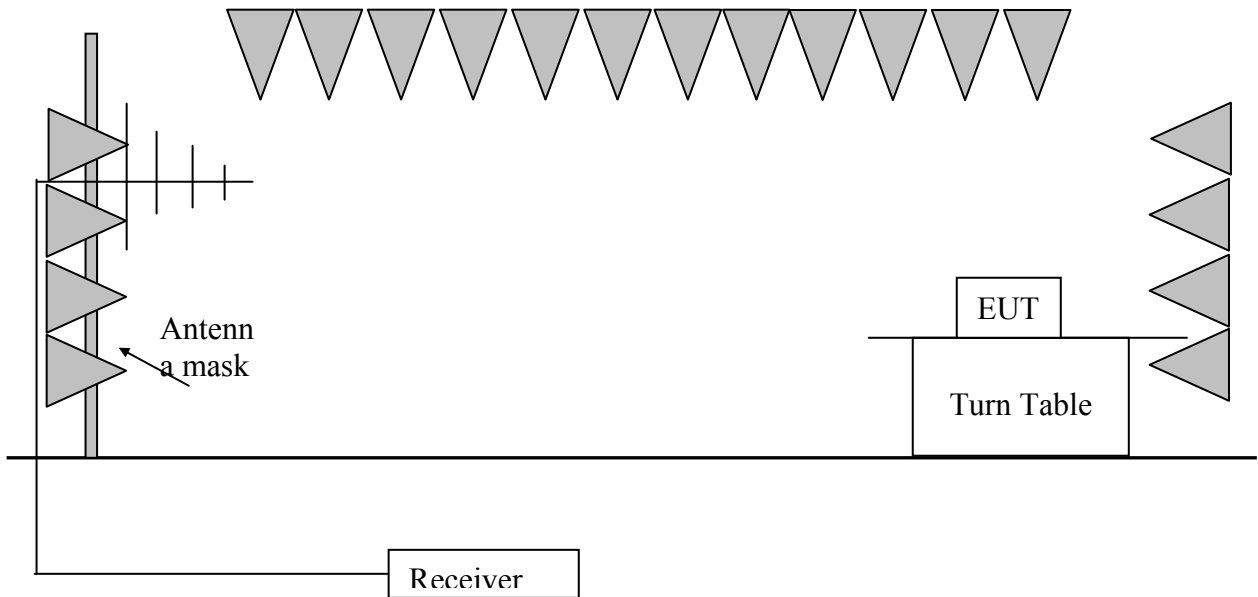
4 EMI TEST

4.1 Radiated Emission Test Result: Pass

4.1.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
SB3436	EMI	receiver	ESIB
SB3440	Bilog	Antenna	CBL6112B
SB3450	3	m	SAC
SB3436	EMI	receiver	ESIB
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 turn table 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 1meter 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 EN55011 requirement during radiated test.

The bandwidth setting on R&S Test Receiver was 120 kHz.

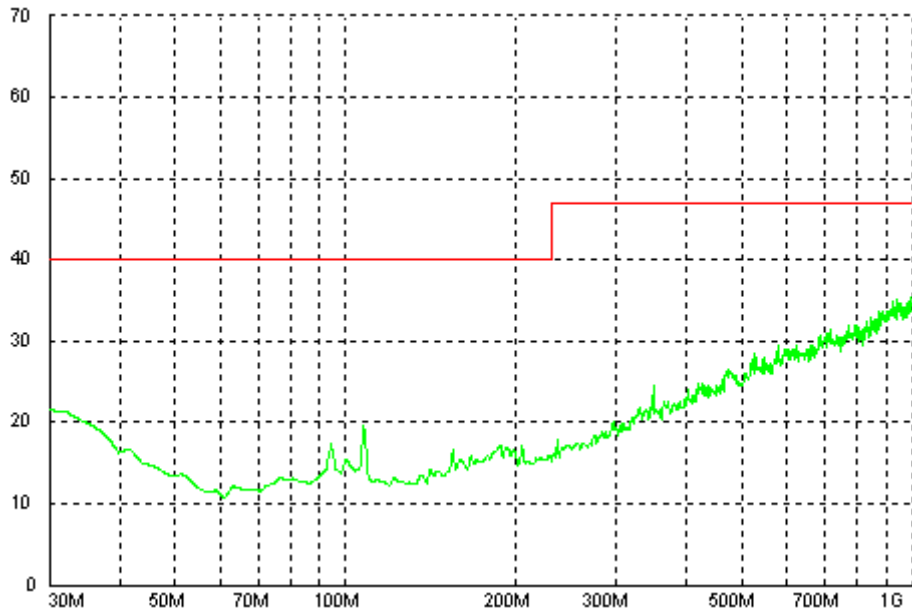
The frequency range from 30MHz to 1000MHz was checked

4.1.4 Test Data

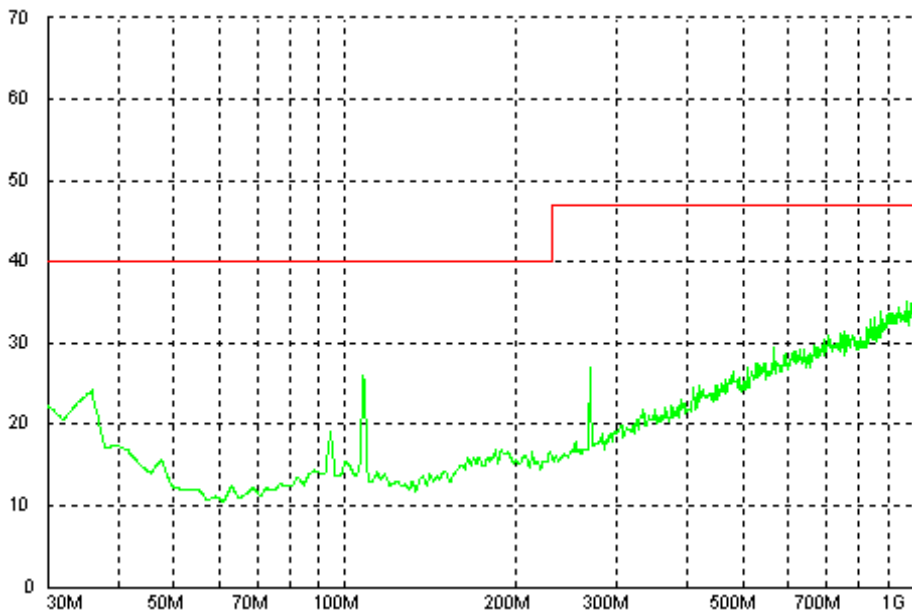
Antenna Polarization	Frequency [MHz]	Measured Net at 3m [dB(μV/m)]	Limit at 3m [dB(μV/m)]
Horizontal	200.0	<30.0	40.0
Horizontal	400.0	<37.0	47.0
Horizontal	800.0	<37.0	47.0
Vertical	200.0	<30.0	40.0
Vertical	400.0	<37.0	47.0
Vertical	800.0	<37.0	47.0

4.1.5 Test Curve

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 apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. 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 from what the user may reasonably expect from the apparatus if used as intended.

Criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permission loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. 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 from what the user may reasonably expect from the apparatus if used as intended.

Criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instruction for use.

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 61326-1) Electrostatic Discharge Immunity

Tested Port: Enclosure

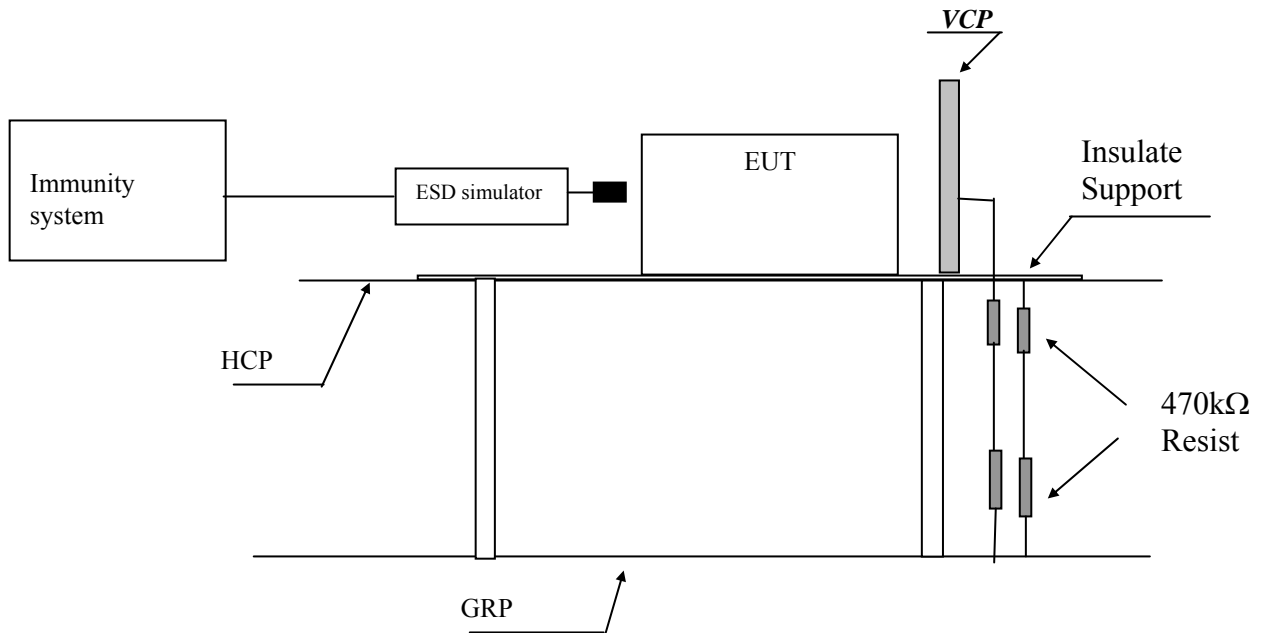
Performance criterion: B

Test Result: Pass

5.1.1 Used Test Equipment

Equip. No.	Equipment	Model	Manufacturer
EM077-02	ESD Simulator	NSG435	SCHAFFNER

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.

Test voltage was increased from the minimum to the selected test level and with single discharge.

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

10 times of each polarity single discharge were applied to HCP and VCP. The detail selected points are listed in the following table.

5.1.4 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result (Pursuant to EN 61326-1, criterion B)	Discharged Points
4	20	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 (Pursuant to EN 61326-1, criterion B)	Discharged Points
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 (pursuant to EN 61326-1, criterion B)	Discharged Point
4	20	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 (pursuant to EN 61326-1, criterion B)	Discharged Point
4	20	Pass	The centre of the vertical edge of the coupling plane

5.2 EN 61000-4-3(Pursuant to EN 61326-1) Radiated Electromagnetic Field Immunity

Tested Port: Enclosure

Performance criterion: A

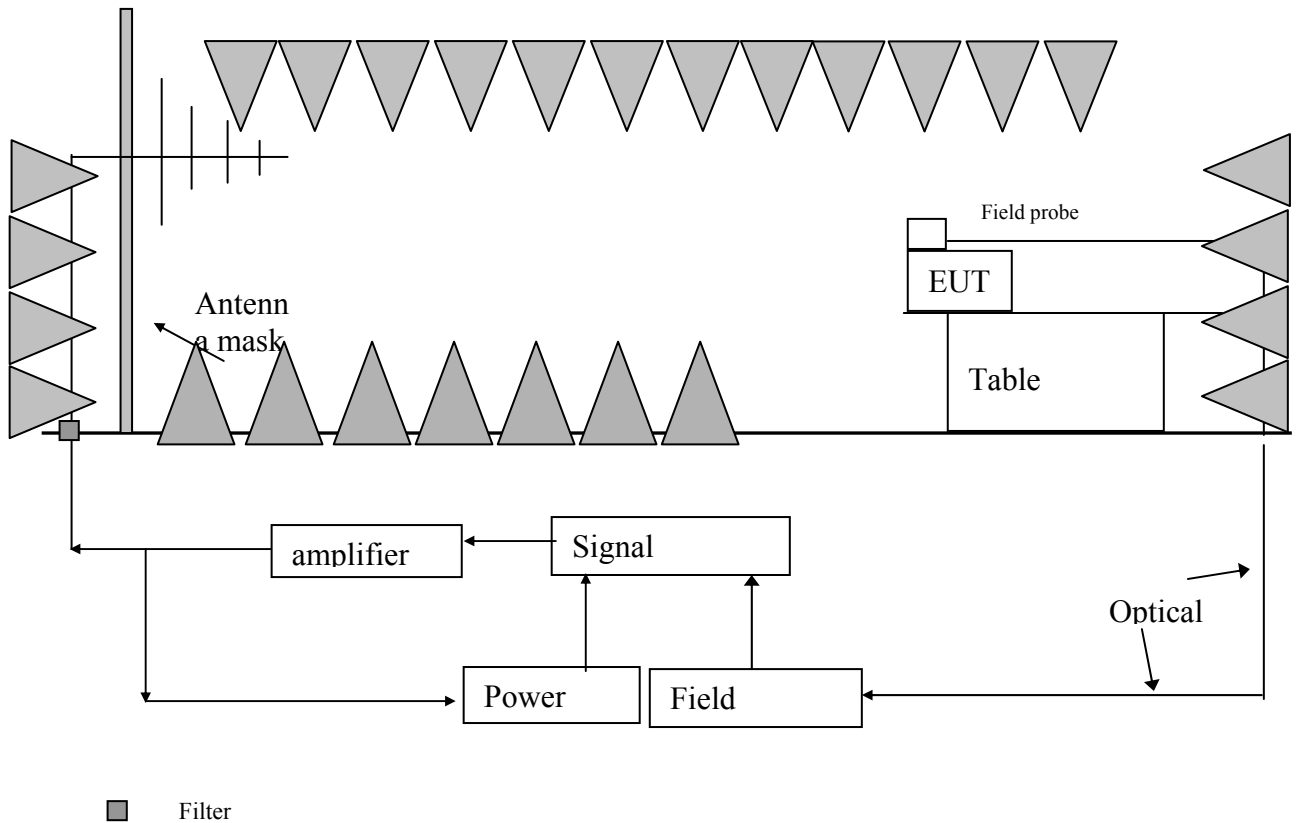
Test Result: Under the influence of Radio-Frequency Electromagnetic field phenomenon, the captioned model may malfunction and can self-recover after the test.

Note: The EUT was tested under manufacturer’s declaration in the User’s instructions for this item.

5.2.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
SB3433	Signal Generator	SMT03	R&S
SB3437/01	Voltage Probe	URV5-Z2	R&S
SB3173	Power Amplifier	150W100	AR
SB3938	Power Amplifier	25S1G4AM1	AR
SB2622	Bilog Antenna	CBL6111C	Chase
SB3450/02	FAC	MCDC	Albatross Pro.
-----	Power Meter	NRVS	R&S

5.2.2 Block Diagram of Test Setup



5.2.3 Test Setup and Procedure

The test was conducted in a 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).

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.

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

The frequency range is swept from 80MHz to 1000MHz at 3V/m EM field, 1.4 GHz to 2 GHz at 3V/m EM field and 2.0 GHz to 2.7 GHz at 1V/m EM field, with the signal 80% amplitude modulated with a 1 kHz sine-wave, 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.

5.2.4 Test Result

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

Frequency (GHz)	Exposed Side	Field Strength (V/m)	Result
1.4 to 2.0	Front	3V/m (r.m.s.)	Pass
1.4 to 2.0	Left	3V/m (r.m.s.)	Pass
1.4 to 2.0	Rear	3V/m (r.m.s.)	Pass
1.4 to 2.0	Right	3V/m (r.m.s.)	Pass

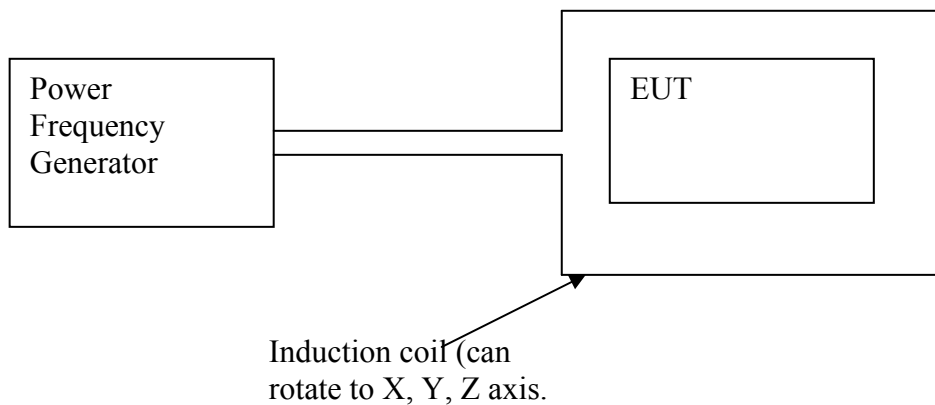
Frequency (GHz)	Exposed Side	Field Strength (V/m)	Result
2.0 to 2.7	Front	1V/m (r.m.s.)	Pass
2.0 to 2.7	Left	1V/m (r.m.s.)	Pass
2.0 to 2.7	Rear	1V/m (r.m.s.)	Pass
2.0 to 2.7	Right	1V/m (r.m.s.)	Pass

5.3 EN 61000-4-8(Pursuant to EN 61326-1) Power Frequency Magnetic Field Immunity
Tested Port: Enclosure
Performance criterion: A
Test Result: Pass

5.3.1 Used Test Equipment

Equipment No.	Equipment	Model	Manufacturer
SB3070	Simulator	UCS500M4	EM Test
SB3070/04	Motorised variac	MV 2616	EM Test
SB3070/05	Current transformer	MC 2630	EM Test
SB3070/03	Magnetic field coil	MS 100N	EM Test

5.3.2 Block Diagram of Test Setup



5.3.3 Test Setup and Procedure

Put EUT into center of induction coil(with suitable dimensions) in the testing.

For tabletop equipment:

The EUT was placed on a big enough wooden desk with height of 0.8m and operating as intended.

The equipment shall be subjected to the test magnetic field by using the induction coil of standards(1m*1m).

The induction coil shall be rotated by 90⁰ in order to expose the EUT to the test field with different orientations.

For Floor-standing equipment:

The EUT was placed on big enough wooden desk with height of 0.1m and operating as intended.

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions; the test shall be repeated by moving and shifting the induction coils, in order to test

the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different position along the side of the EUT, in steps corresponding to 50% of the shortest side of the coil.

The induction coil shall then be rotated by 90⁰ in order to expose the EUT to the test field with different orientations and the same procedure followed.

5.3.4 Test Result

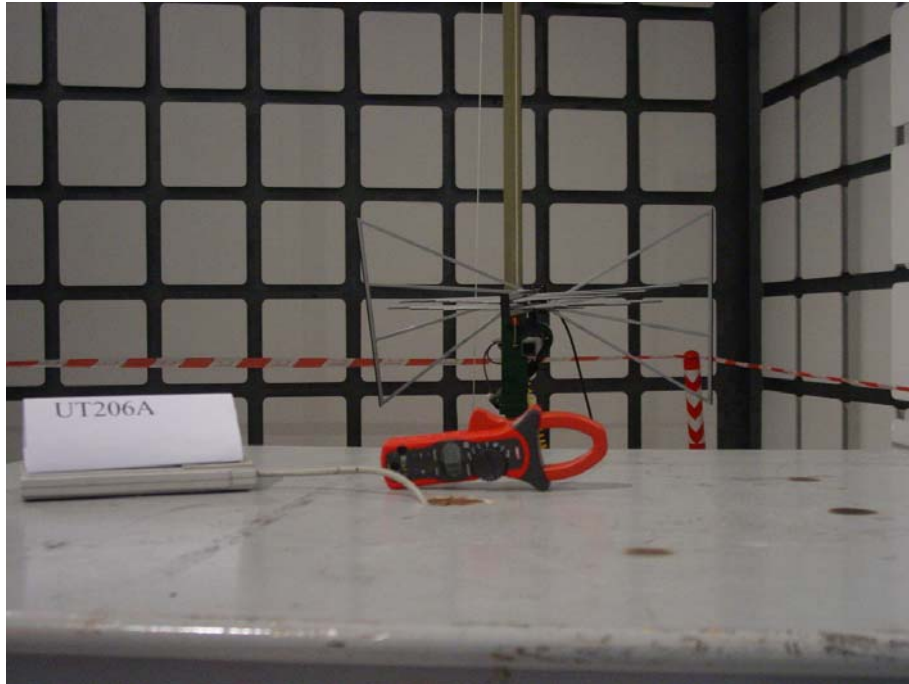
Mains frequency: 50Hz

60Hz

Orientations of induction coil	Magnetic Field Strength (A/m)	Result
X	3A/m	Pass
Y	3A/m	Pass
Z	3A/m	Pass

6 Appendix I - Photos of test setup

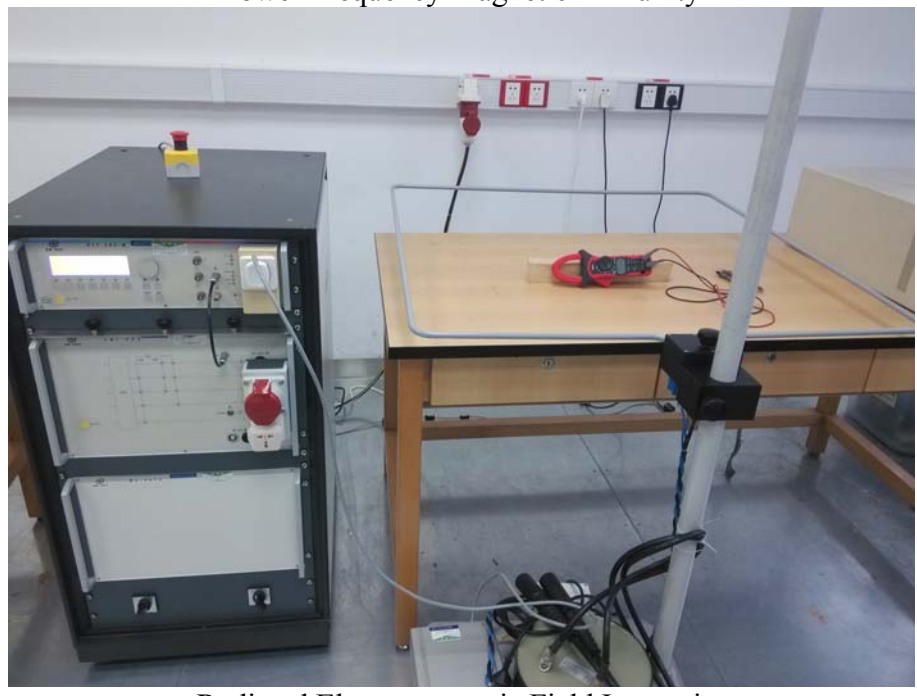
Radiated Emission



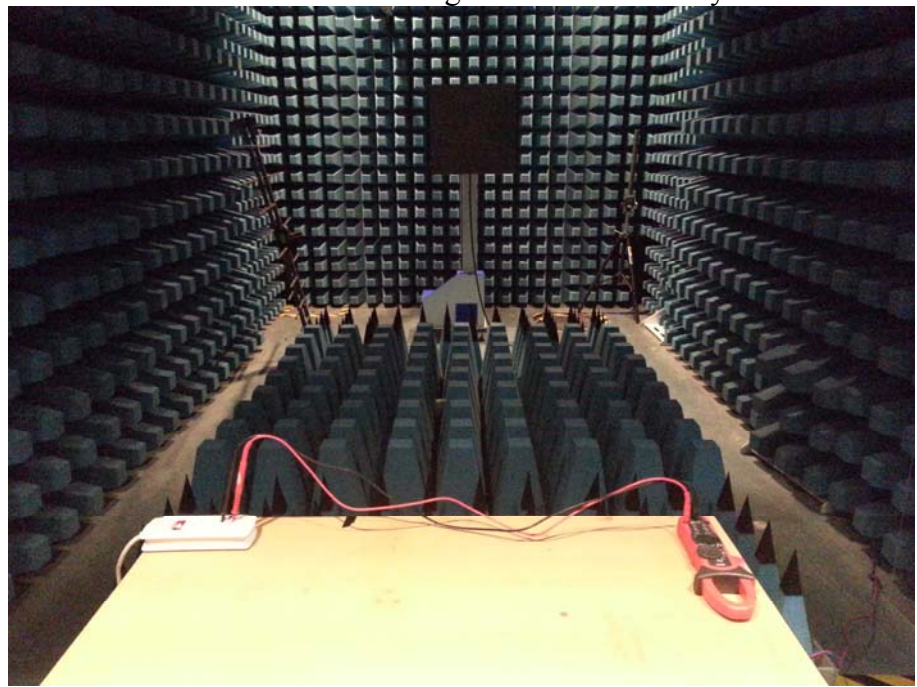
ESD Immunity



Power Frequency Magnetic Immunity



Radiated Electromagnetic Field Immunity



7 Appendix II - Photos of EUT

Outside



Inside



PCB View

