

# ShenZhen ZONSAN Innovation Technology Co., Ltd.

## TEST REPORT

**SCOPE OF WORK**

EMC TESTING–ZX-1U08

**REPORT NUMBER**

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**DOCUMENT CONTROL NUMBER**

EN 55032:2012, EN 55024:2010-b

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## TEST REPORT

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Applicant Name &  
Address

Manufacturing Site  
Intertek Report No:

## Test standards

**EN 55032:2012**

**EN 61000-3-2:2014**

**EN 61000-3-3:2013**

**EN 55024:2010**

## Sample Description

Product : Smart Charger  
Model No. : ZX-1U08  
Electrical Rating : Input: 100-240V~, 50/60Hz, 0.5A max., Class II  
Output: 5Vdc, 1A  
Serial No. : Not Labeled  
Date Received : 09 August 2017  
Date Test : 09 August 2017-03 September 2017  
Conducted

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**TEST REPORT**

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## TEST REPORT

### 1. TEST RESULTS SUMMARY

Classification of EUT: Class B

Test Item	Standard	Result
Conducted disturbance voltage at mains ports	EN 55032:2012	Pass
Conducted Disturbance at wired network ports	EN 55032:2012	N/A
Radiated emission (30 MHz–1000 MHz)	EN 55032:2012	Pass
Radiated emission (1 GHz–6 GHz)	EN 55032:2012	N/A
Harmonic of current	EN 61000-3-2:2014	Pass
Flicker	EN 61000-3-3:2013	Pass
ESD immunity	EN 55024:2010 Reference: EN 61000-4-2:2009	Pass
Radiated EM field immunity	EN 55024: 2010 Reference: EN 61000-4-3:2006+A1: 2008+A2:2010	Pass
EFT immunity	EN 55024: 2010 Reference: EN 61000-4-4:2004	Pass
Surge immunity	EN 55024: 2010 Reference: EN 61000-4-5:2006	Pass
Inject current immunity	EN 55024: 2010 Reference: EN 61000-4-6:2009	Pass
Power frequency magnetic field immunity	EN 55024: 2010 Reference: EN 61000-4-8:2010	N/A
Voltage dips and interruption immunity	EN 55024: 2010 Reference: EN 61000-4-11:2004	Pass

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.

## TEST REPORT

### 2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU performed on the Smart Charger,  
Models:ZX-1U08.

We tested the Smart Charger, Model: ZX-1U08, 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 61000-3-2, EN 61000-3-3, EN 55032, EN 55024 (EN 61000-4-2), EN 55024 (EN 61000-4-4), EN 55024 (EN 61000-4-6), EN 55024 (EN 61000-4-5), EN 55024 (EN 61000-4-3), & EN 55024 (EN 61000-4-11) standards when tested as received. The worst case's test data was presented in this test report.

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

## TEST REPORT

### 3. LABORATORY MEASUREMENTS

#### Configuration Information

Support Equipment:	N/A
Rated Voltage and frequency under test:	100-240 V~; 50/60 Hz
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.

#### 3. Test Location:

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 and Radiated Susceptibility were performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

#### 4. Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission (9 kHz-150 kHz)	2.51 dB
2	Conduction Emission (150 kHz-30 MHz)	2.69 dB
3	Disturbance Power (30 MHz-300 MHz)	3.21 dB
4	Radiated Emission (30 MHz-1 GHz)	4.79 dB
5	Radiated Emission (1 GHz-6 GHz)	5.02 dB
6	Radiated Emission (6 GHz-18 GHz)	5.17 dB

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 CISPR16-4-2:2011

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

**TEST REPORT**

**4. EQUIPMENT USED DURING TEST**

**Conducted Disturbance-Mains Terminal (1)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	24/07/2018	1Y
EM006-05	LISN	ENV216	R&S	04/06/2018	1Y
SA047-79	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	23/01/2018	1Y

**Radiated Disturbance (30 MHz-1 GHz)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m3	ETS-LINDGREN	01/05/2018	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	27/03/2018	1Y
EM033-01	TRILOG Super Broadband test Antenna (30 MHz-3 GHz)	VULB 9163	SCHWARZBECK	08/09/2017	1Y
EM031-02-01	Coaxial cable	/	R&S	18/05/2018	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	10/07/2018	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A

**Electrostatic Discharge (1)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM077-04	ESD Simulator	NSG437	TESEQ	17/04/2018	1Y
SA047-110	Digital Temperature-Humidity Recorder	RS210	YIJIE	30/10/2017	1Y

**Electrical Fast Transient/Burst (2)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-10	EFT Generator	NSG3025	TESEQ	12/12/2017	1Y
EM005-10-01	Capacitive Coupling Clamp	CDN8014	TESEQ	06/04/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

**TEST REPORT**

**Surge (3)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	25/05/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

**Conducted Susceptibility (1)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM003-01	Conducted Disturbance Generator	CDG_1020	Dr.Hubert GmbH	18/09/2017	1Y
EM003-01-04	Coupling&Decoupling Network	CDN M2+M3	Dr.Hubert GmbH	18/09/2017	1Y
EM003-01-05	Attenuator	6dB	Dr.Hubert GmbH	18/09/2017	1Y
EM087-01	Current Electromagnetic injection clamp	EM 101	Swiss PTT	15/01/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y

**Voltage Dips and Interruptions (2)**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	25/05/2018	1Y
EM005-09-01	Voltage Regulator	INA6501	TESEQ	25/05/2018	1Y
SA047-77	Digital Temperature-Humidity Recorder	RC-HT601A	HATAIKE	07/06/2018	1Y



**TEST REPORT**

**Radiated Susceptibility**

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS LINDGREN	01/05/2018	1Y
EM084-02	Signal generator	SML02	R&S	18/05/2018	1Y
EM031-01	Signal generator	SMB100A	R&S	01/08/2018	1Y
EM086-11	Power meter	NRP2	R&S	05/01/2018	1Y
EM086-11-01	Power sensor	NRP-Z91	R&S	05/01/2018	1Y
EM046-01	Power Amplifier	80RF1000- 300	MILMEGA	23/03/2018	1Y
EM046-02	Power Amplifier	AS0860-75- 45	MILMEGA	23/03/2018	1Y
EM061-05	Log. - Per. Broadband Antenna	VULP 9118 E	SCHWARZBE CK	15/10/2017	2Y
EM061-06	Stacked Log.-Per. Broadband Antenna	STLP 9149	SCHWARZBE CK	15/10/2017	2Y
EM034-01	Open Switch and Control Platform	OSP120/1505 .3009K12	R&S	/	1Y
-	Test software	EMC 32-S	R&S	/	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	10/07/2018	1Y

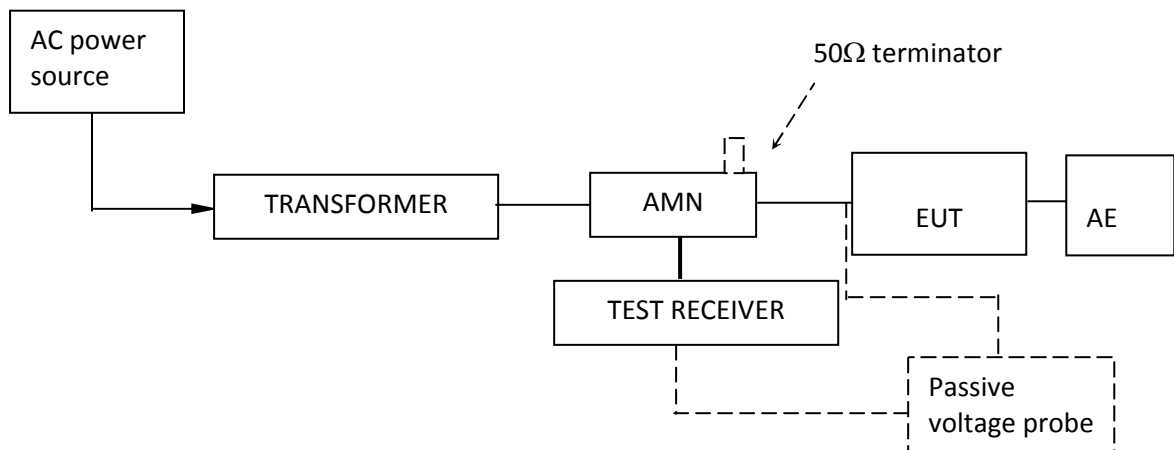
## TEST REPORT

### 5. EMI TEST

#### 5.1 EN 55032 Continuous Conducted Disturbance Voltage Test

**Test Result: Pass**

##### 5.1.1 Block Diagram of Test Setup



##### 5.1.2 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provide a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane(Ground Reference Plane).And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.4m from a vertical metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9kHz. The frequency range from 150kHz to 30MHz was checked.

**TEST REPORT**

**5.1.3 Test Data and curve**

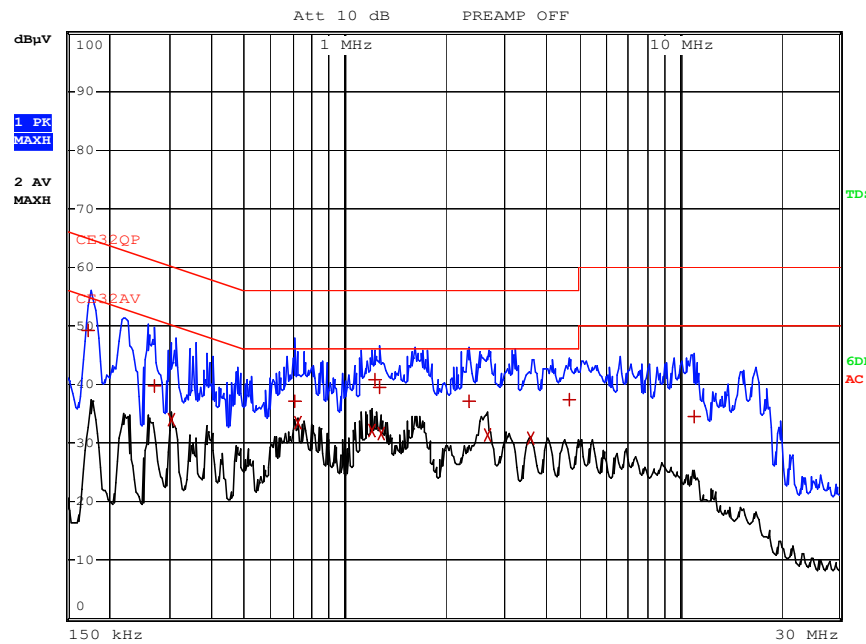
**At mains terminal:**

**Tested Wire: Live**

**Operation Mode: EUT on with full load**



RBW 9 kHz  
MT 1 s  
PREAMP OFF



EDIT PEAK LIST (Final Measurement Results)				
Trace1:		CE32QP		
Trace2:		CE32AV		
Trace3:		---		
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	174 kHz	49.15 L1	-15.61
1	Quasi Peak	270 kHz	39.83 L1	-21.28
2	Average	302 kHz	34.06 L1	-16.12
1	Quasi Peak	710 kHz	37.21 L1	-18.78
2	Average	726 kHz	33.34 L1	-12.65
2	Average	1.202 MHz	32.19 L1	-13.80
1	Quasi Peak	1.23 MHz	40.84 L1	-15.15
1	Quasi Peak	1.27 MHz	39.51 L1	-16.48
2	Average	1.286 MHz	31.68 L1	-14.31
1	Quasi Peak	2.358 MHz	37.14 L1	-18.85
2	Average	2.662 MHz	31.35 L1	-14.64
2	Average	3.614 MHz	30.75 L1	-15.24
1	Quasi Peak	4.69 MHz	37.50 L1	-18.49
1	Quasi Peak	11.066 MHz	34.58 L1	-25.41

**TEST REPORT**

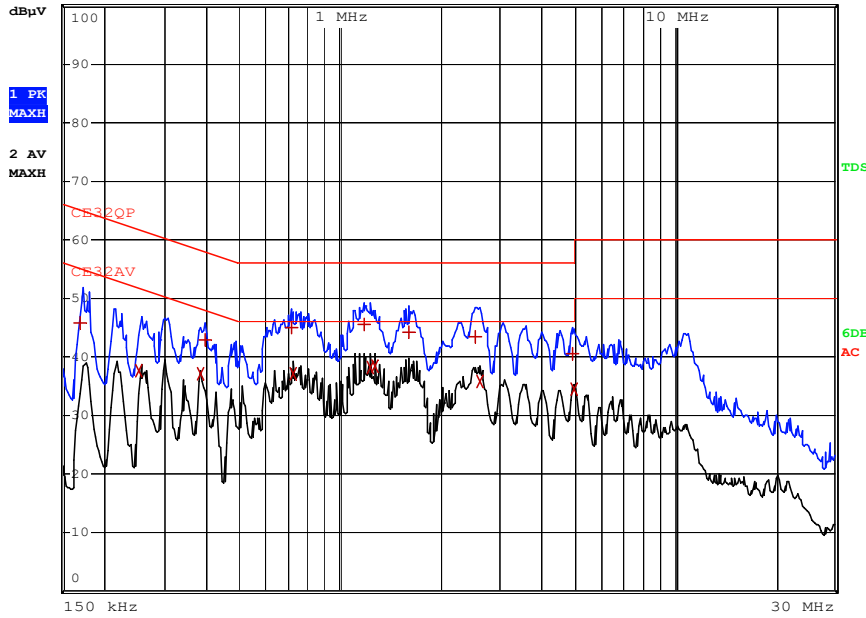
**Tested Wire: Neutral**

**Operation Mode: EUT on with full load**



RBW 9 kHz  
MT 1 s  
PREAMP OFF

Att 10 dB



EDIT PEAK LIST (Final Measurement Results)					
Trace1:		CE32QP			
Trace2:		CE32AV			
Trace3:		---			
	TRACE	FREQUENCY	LEVEL	dBµV	DELTA LIMIT dB
1	Quasi Peak	170 kHz	45.88	L1	-19.07
2	Average	254 kHz	37.77	L1	-13.85
2	Average	382 kHz	37.12	L1	-11.10
1	Quasi Peak	394 kHz	42.83	L1	-15.14
1	Quasi Peak	714 kHz	45.06	L1	-10.93
2	Average	722 kHz	37.03	L1	-8.96
1	Quasi Peak	1.186 MHz	45.63	L1	-10.36
2	Average	1.23 MHz	38.09	L1	-7.90
2	Average	1.27 MHz	38.34	L1	-7.65
1	Quasi Peak	1.61 MHz	44.25	L1	-11.74
1	Quasi Peak	2.546 MHz	43.55	L1	-12.44
2	Average	2.626 MHz	35.91	L1	-10.08
1	Quasi Peak	4.93 MHz	40.48	L1	-15.51
2	Average	4.998 MHz	34.38	L1	-11.61

## TEST REPORT

### 5.2 EN 55032 Conducted Common Mode (Asymmetric Mode) Disturbance at wired network Ports

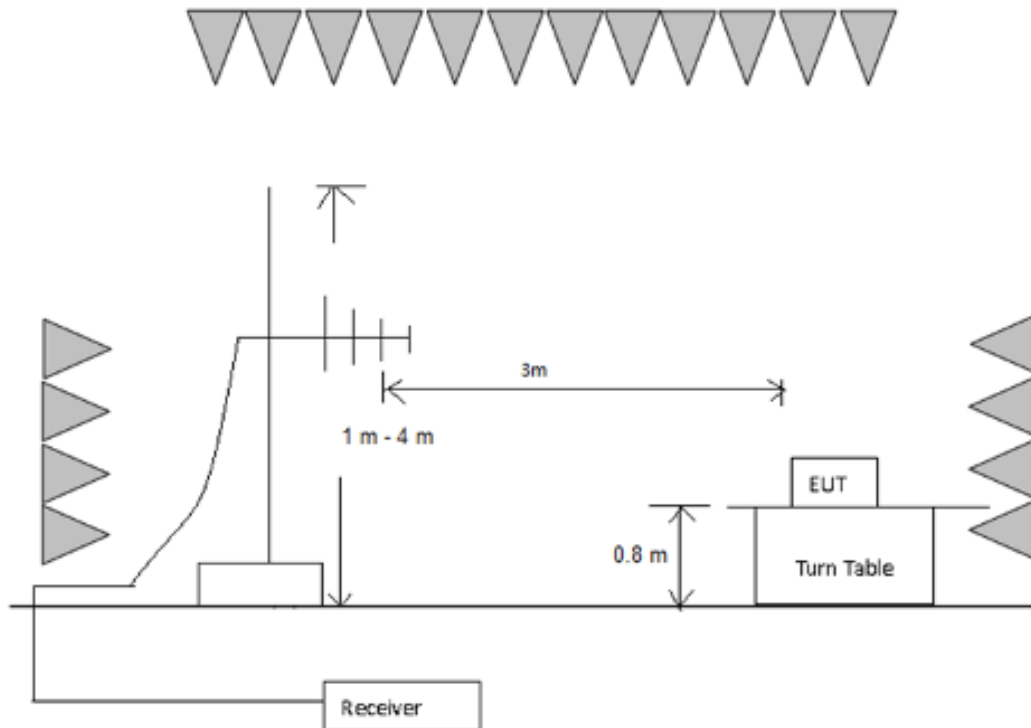
**Test Result: Not Applicable**

Remark: The test only apply to balanced unscreened ports intended for connection to unscreened balanced pairs

### 5.3 EN 55032 Radiated Emission below 1 GHz

**Test Result: Pass**

#### 5.3.1 Block Diagram of Test Setup



#### 5.3.2 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.

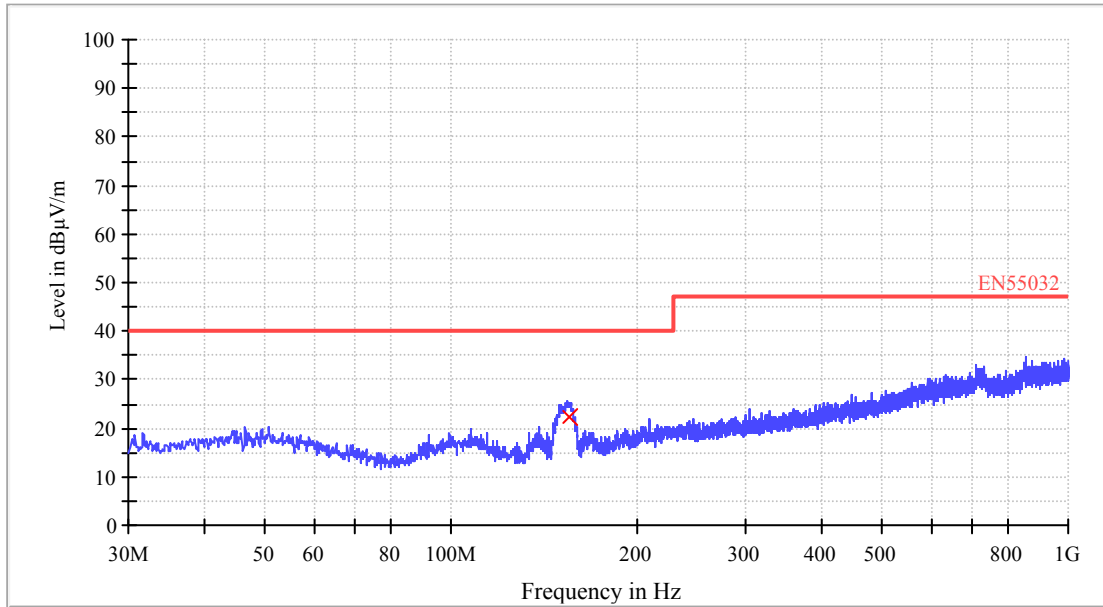
## **TEST REPORT**

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 EN55032 requirement during radiated test. The bandwidth setting on R&S Test Receiver was 120 kHz. The frequency range from 30MHz to 1000MHz was checked

**TEST REPORT**

**5.3.3 Test Data and Curve**

Operation Mode: Full load  
Horizontal

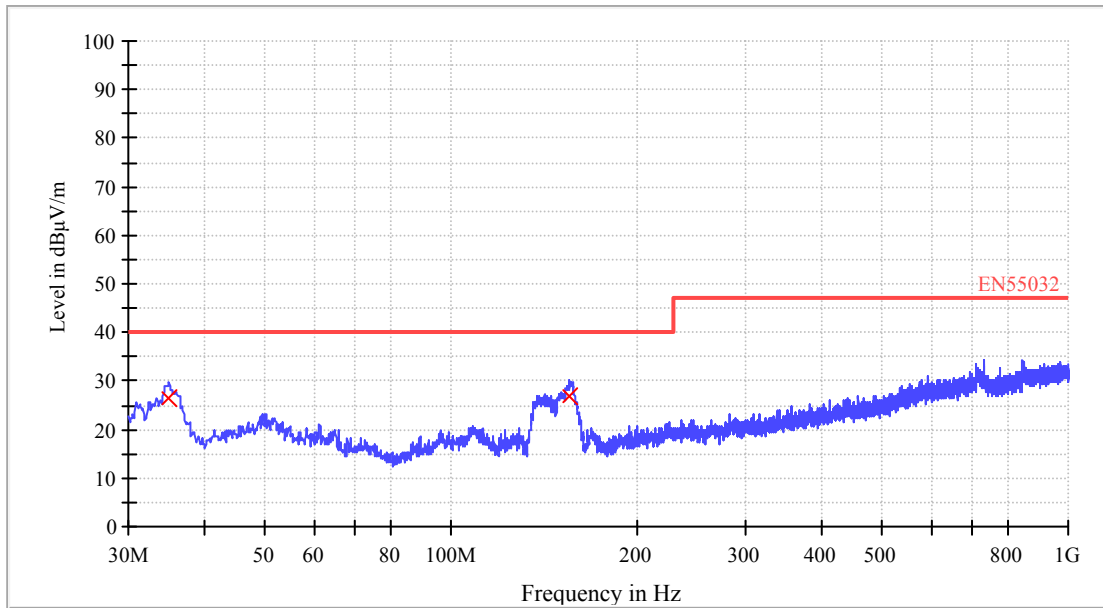


**QP**

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
154.880000	22.4	120.000	H	9.4	17.7	40.0

**TEST REPORT**

Vertical



**QP**

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
34.720000	26.3	120.000	V	11.6	13.7	40.0
155.720000	26.9	120.000	V	9.4	13.1	40.0

**5.4 EN 55032 Radiated Emission above 1 GHz**

**Test Result: Not Applicable**

**Remark:**

The highest internal source of the EUT is not more than 108 MHz, so the measurement above 1000 MHz is not applicable.

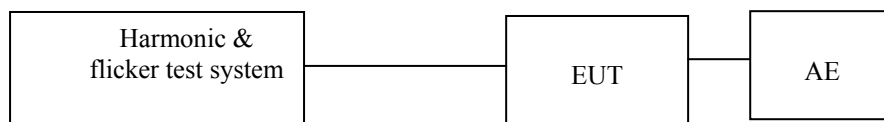


## TEST REPORT

### 6. Harmonics of current

**Test Result: Pass**

#### 6.1 Block Diagram of Test Setup



#### 6.2 Test Setup and Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyzer which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

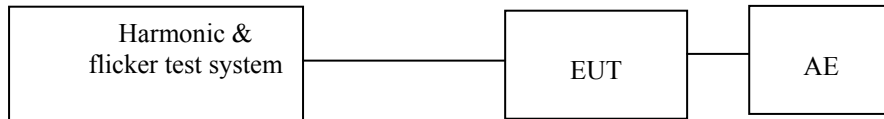
**Remarks:** This product is not defined as lighting equipment, and has rated power less than 75W, therefore, no limit apply according to EN 61000-3-2.

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### 7. Flicker

**Test Result: Pass**

#### 7.1 Block Diagram of Test Setup



#### 7.2 Test Setup and Procedure

##### 7.2.1 Definition

Flicker:	impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.
Pst:	Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability
Plt:	long-term flicker indicator; the flicker severity evaluated over a long period (a few hours). Using successive Pst valuse.
dc:	the relative steady-state voltage change
dmax:	the maximum relative voltage change
d(t):	the value during a voltage change

##### 7.2.2 Test condition

**Remarks:** This apparatus is unlikely to produce significant voltage fluctuations and flicker by examination of the circuit diagram and specification of it. Therefore, it is deemed to fulfill the relevant standard without testing according to clause 6.1 of EN 61000-3-3.

## TEST REPORT

### 8. 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.

*Note: "N/A" means Not Applicable in below text.*

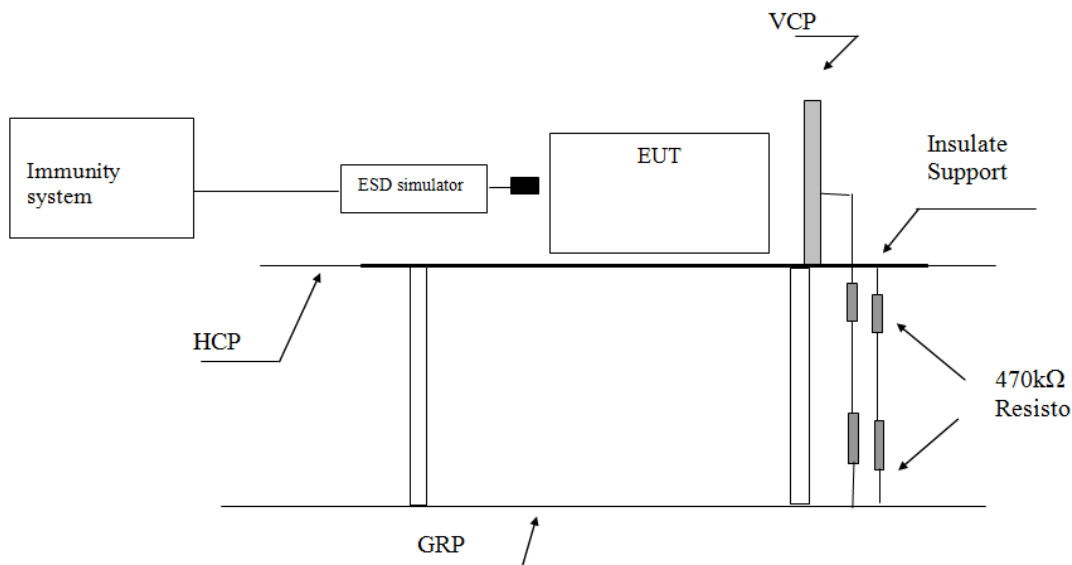
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### 8.1 EN 61000-4-2(Pursuant to EN 55024) Electrostatic Discharge Immunity

Performance criterion: B

Test Result: Pass

#### 8.1.1 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,

VCP means Vertical Coupling Plane

GRP means Ground Reference Plane

#### 8.1.2 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.

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

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

The ESD generator was held perpendicular to the surface to which the discharge was applied. The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge was being applied. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch was 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 was then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors (2×470 kΩ) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

For contact discharge, the EUT was exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four points. One of the test points was subjected to at least 50 indirect discharges (contact) to the centre of the front edge of the horizontal coupling plane. The remaining three points each receive at least 50 direct contact discharges. If no direct contact test points were available, then at least 200 indirect discharges should 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 were applied to the selected test point for each such area.

**TEST REPORT**

**8.1.3 Test Result**

**Direct Application of ESD**

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
4	50	N/A	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	A	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	A	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	A	The centre of the vertical edge of the coupling plane

**TEST REPORT**

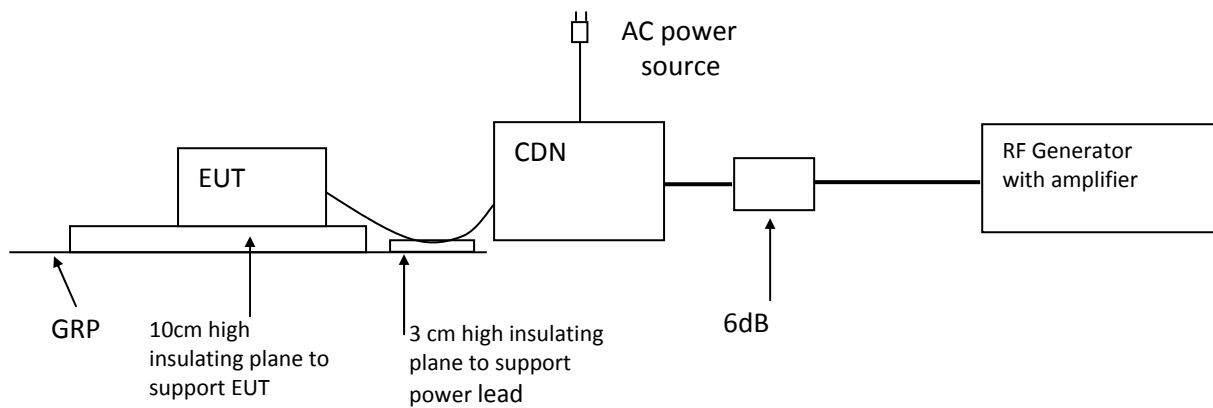
**8.2 EN 61000-4-6(Pursuant to EN 55024) Injected Current (0.15 MHz to 80 MHz)**

Tested Port:  AC power     DC power     Signal/Telecommunication

Performance criterion: A

**Test Result: Pass**

**8.2.1 Block Diagram of Test Setup**



**8.2.2 Test Setup and Procedure**

The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement.

All relevant cables were provided with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on an insulating support of 0.03m height above the ground reference plane.

Test voltage was verified before each testing though power meter combined in the RF generator with AMP.

Dwell time was set to 3s and step was set as 1% to keep sufficient response time for EUT. The frequency from 0.15MHz to 80MHz was checked.

The frequency range is scanned as specified. However, when specified in Annex A of EN 55024, an additional comprehensive functional test shall be carried out at a limited number of frequencies. The selected frequencies for conducted test are: 0,2; 1; 7,1; 13,56; 21; 27,12 and 40,68 MHz ( $\pm 1\%$ ).

**8.2.3 Test Result**

Port	Frequency (MHz)	Level	Result
A.C. Power Lines	0.15 to 80	3V (r.m.s.)	A
D.C. Power Lines	0.15 to 80	1V (r.m.s.)	N/A
Signal Lines	0.15 to 80	1V (r.m.s.)	N/A
Control Lines	0.15 to 80	1V (r.m.s.)	N/A

**TEST REPORT**

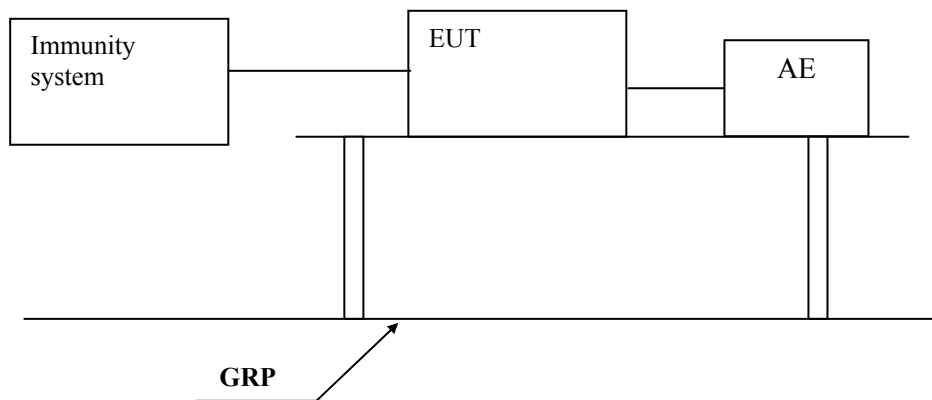
**8.3 EN 61000-4-4(Pursuant to EN 55024) Electrical Fast Transient/Burst**

Tested Port:  AC power     DC power     Signal/Telecommunication

Performance criterion: B

**Test Result: Pass**

**8.3.1 Block Diagram of Test Setup**



**8.3.2 Test Setup and Procedure**

The EUT was placed on a 0.1m high wooden table, standing on the ground reference plane 3m by 2m in size, made by steel 1mm thick.

The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m.

The mains lead excess than 0.5m was folded to avoid a flat coil and situated at a distance of 0.1m above the ground reference plane to insure the distance between the coupling device and the EUT was 0.5m.

The EUT was arranged and connected to satisfy its functional requirement and supplied by the coupling-decoupling network. Repetition Frequency is 5 kHz.

**8.3.3 Test Result**

Level (Pursuant to EN 55024)	Polarity	A.C. Power supply line and protective earth terminal	D.C. Power Lines, Signal Line & Control Line
0.5 kV	+	N/A	N/A
0.5 kV	-	N/A	N/A
1 kV	+	A	N/A
1 kV	-	A	N/A



## TEST REPORT

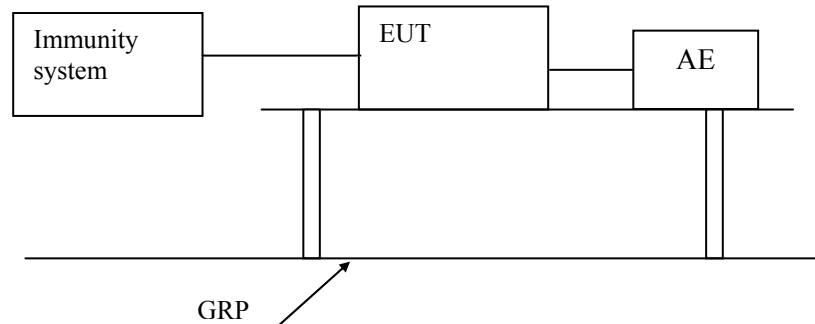
### 8.4 EN 61000-4-5(Pursuant to EN 55024) Surge Immunity

Tested Port:  AC power     DC power     Signal/Telecommunication

Performance criterion: B

**Test Result: Pass**

#### 8.4.1 Block Diagram of Test Setup



#### 8.4.2 Test Setup and Procedure

The surge was applied to the EUT power supply terminals via the capacitive coupling network.

Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that might be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave might be developed on the lines under test.

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

The EUT was placed on a 0.1m high wooden support above the GRP), supplied by the coupling-decoupling network, and arranged and connected to satisfy its functional requirement. The power cord between the EUT and the coupling/decoupling network was less than 2 meters.

#### 8.4.3 Test Result

Tested Port	Level	Result
AC power	Line to line $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$	A
AC power	Line to earth $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , $\pm 2\text{kV}$	N/A
Signal/ Telecommunication	Line to earth $\pm 1\text{kV}$	N/A
DC power	Line to earth $\pm 0.5\text{kV}$	N/A

**TEST REPORT**

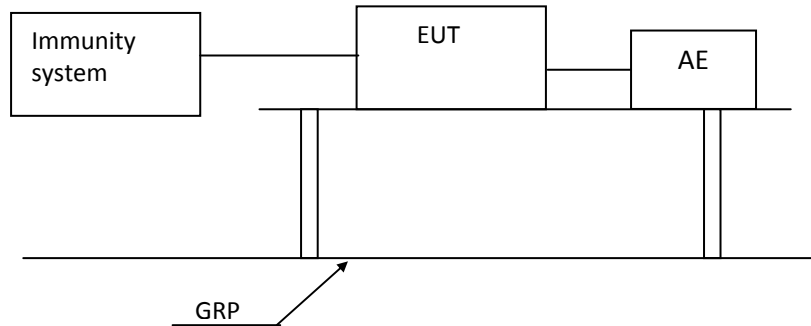
**8.5 EN 61000-4-11(Pursuant to EN 55024) Voltage Dips and Interruptions**

Tested Port: AC power

Performance criterion: B (only for test level of 0%Ut with 0.5 cycle), C

**Test Result: Pass**

**8.5.1 Block Diagram of Test Setup**



**8.5.2 Test Setup and Procedure**

The EUT was placed on an insulating support of 0.8m height, standing on a ground reference plane, and arranged and connected to satisfy its functional requirement

The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

The EUT was tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.

Abrupt changes in supply voltage occurred at zero crossings of the voltage.

**8.5.3 Test Result**

Test condition		Result
Test Level in %UT	Duration (in period of the rated frequency)	
0	0.5	A
70	25	A
0	250	B

Remark: UT is the rated voltage for the equipment.

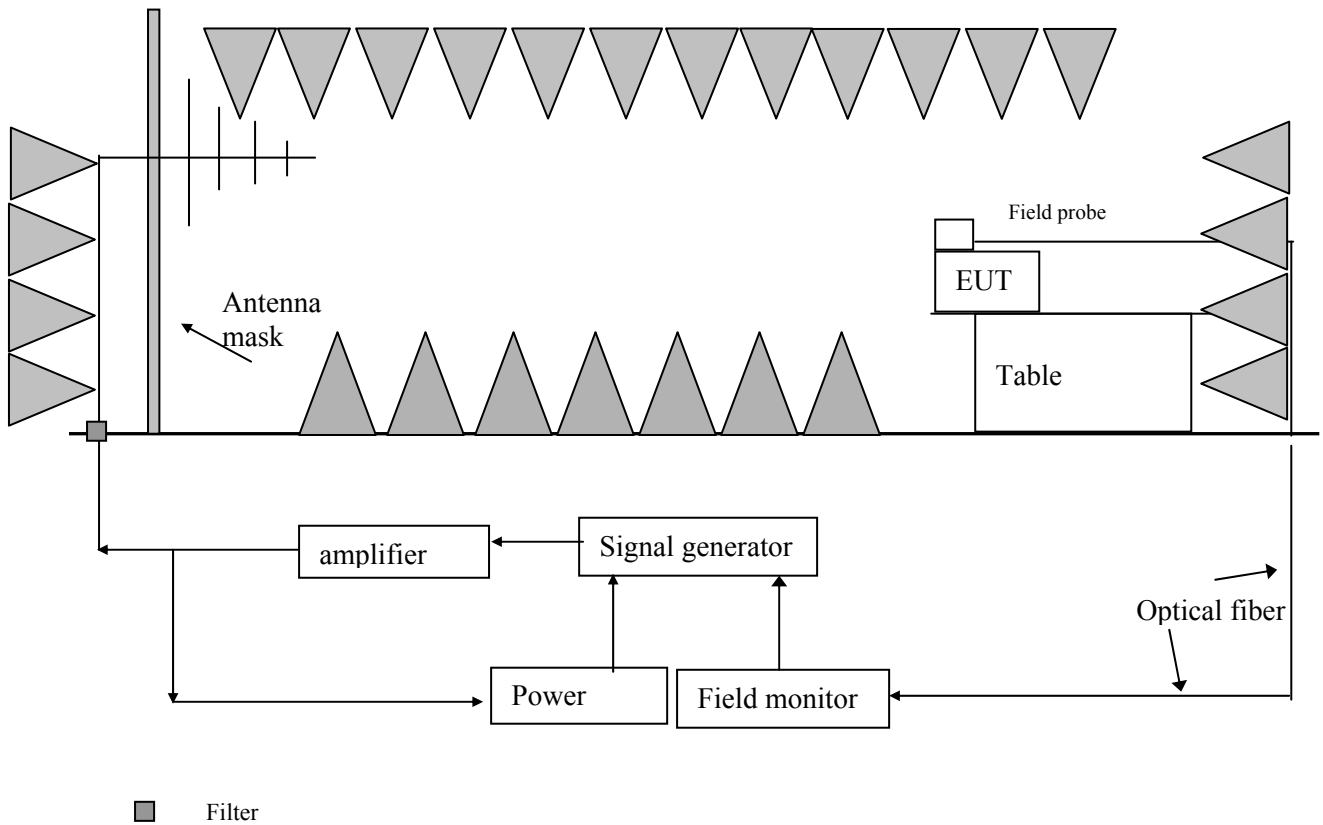
## TEST REPORT

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

Performance criterion: A

Test Result: Pass

#### 8.6.1 Block Diagram of Test Setup



## TEST REPORT

### 8.6.2 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 was 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 had 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 was initially placed with one face coincident with the calibration plane.

The frequency range was swept from 80 MHz to 1000 MHz, 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 was scanned as specified. However, when specified in Annex A, an additional comprehensive functional test should be carried out at a limited number of frequencies. The selected frequencies were: 80, 120, 160, 230, 434, 460, 600, 863 and 900 MHz ( $\pm 1\%$ ).

### 8.6.3 Test Result

Test Mode: Scan

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

## TEST REPORT

### **8.7 EN 61000-4-8(Pursuant to EN 55024) Power Frequency Magnetic Field Immunity**

Tested Port: Enclosure

Performance criterion: A

Test Result: Not Applicable

Remark: Equipment containing no Hall elements or magnetic field sensors is not susceptible to magnetic field. Hence, this equipment is deemed to fulfil the magnetic field test.

**TEST REPORT**

**9. APPENDIX I - PHOTOS OF TEST SETUP**

Conducted disturbance voltage at mains ports



Radiated emission (30 MHz–1000 MHz)

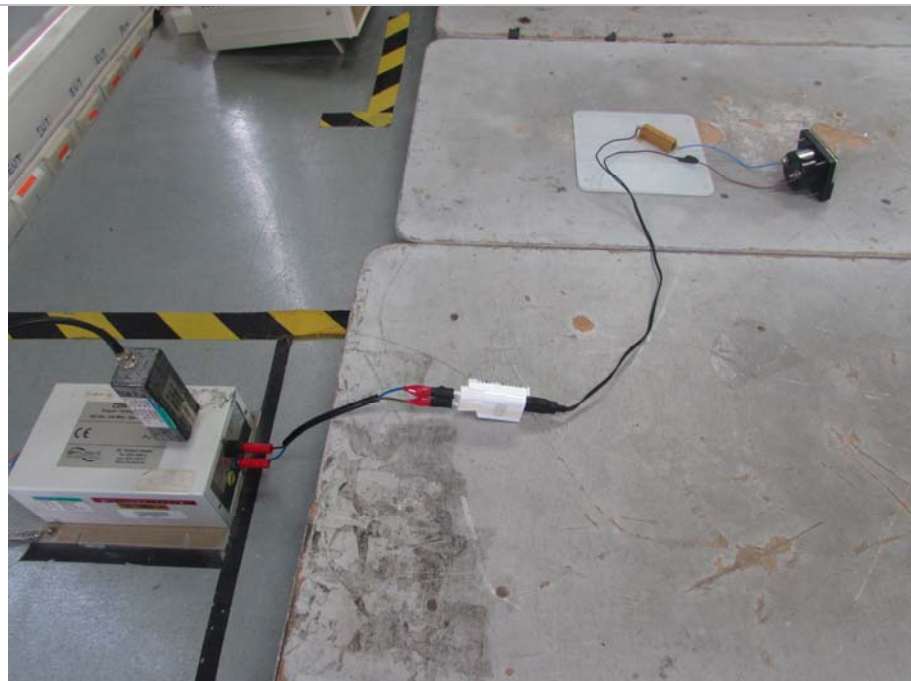


**TEST REPORT**

ESD Immunity

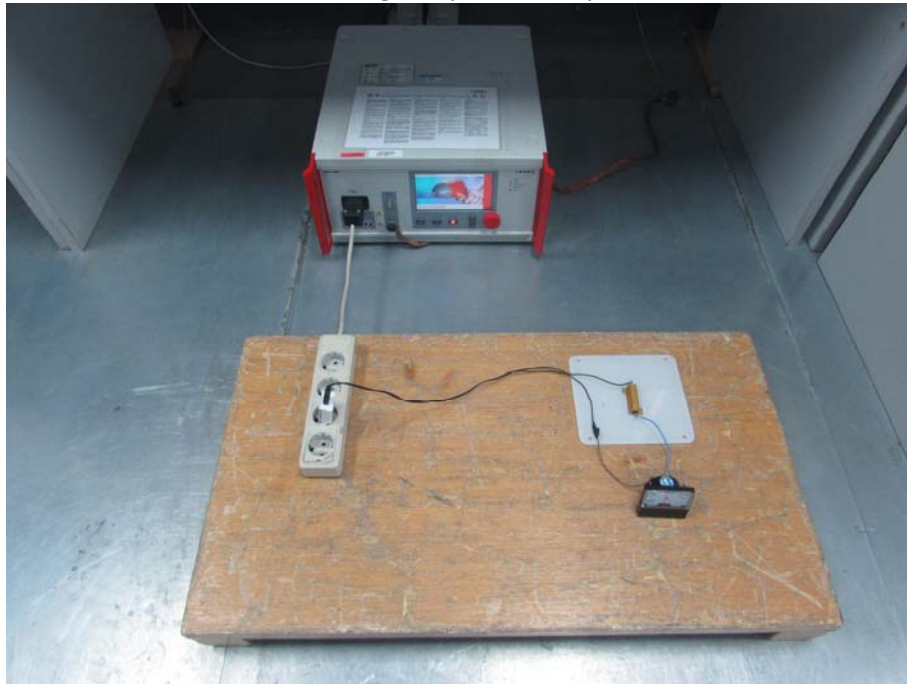


Inject current immunity



**TEST REPORT**

Surge/ Dips Immunity



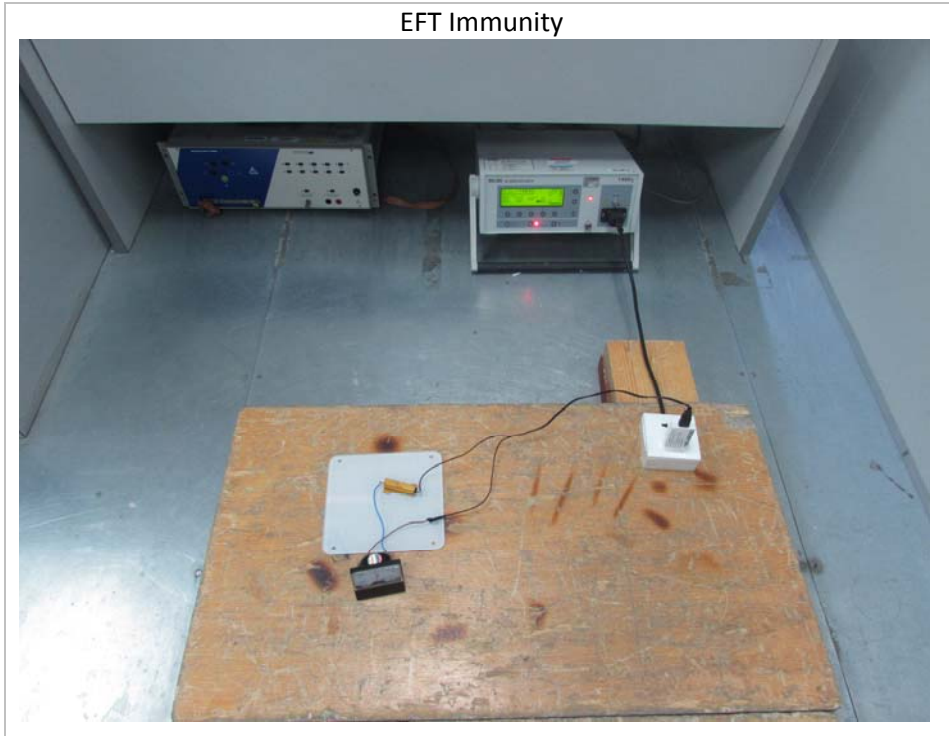
Radiated EM field immunity





**TEST REPORT**

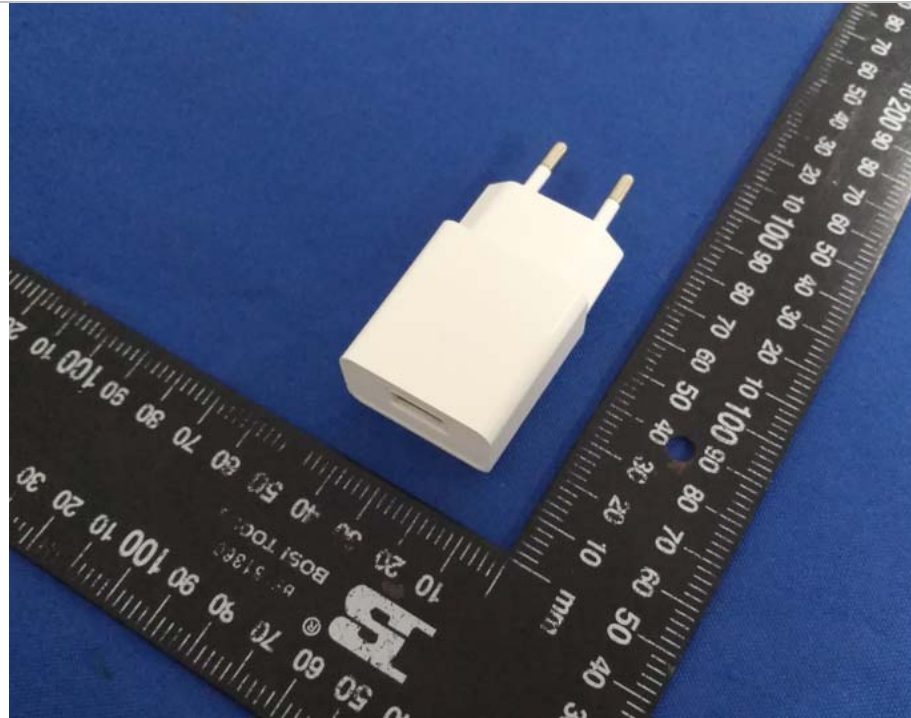
EFT Immunity



**TEST REPORT**

**10. APPENDIX II – PHOTOS OF EUT**

Outside view



Outside view

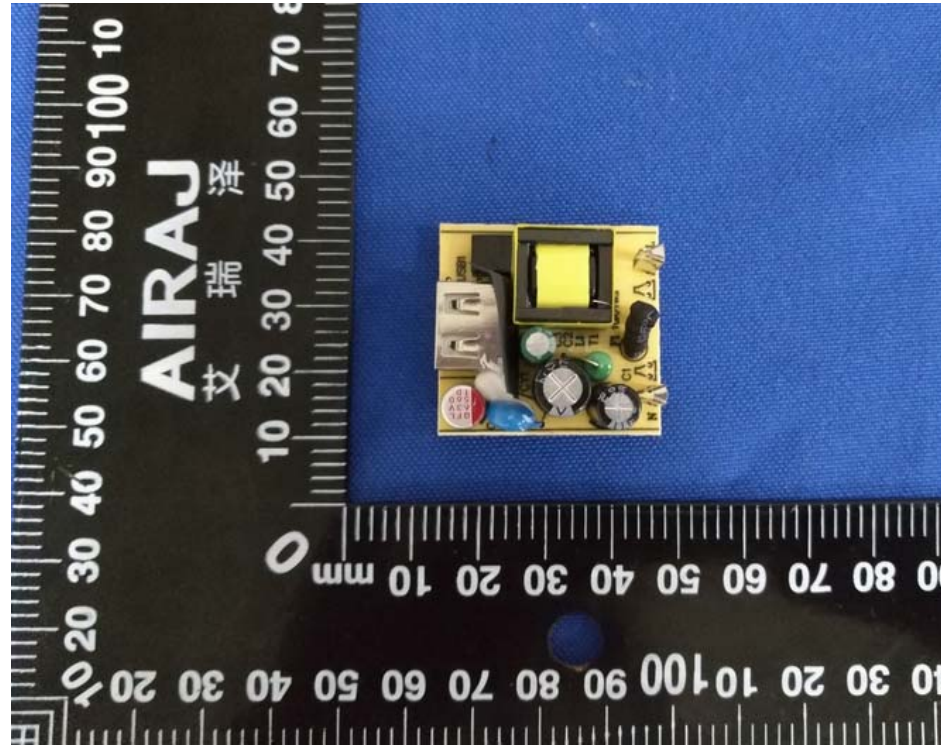


**TEST REPORT**

Inside view

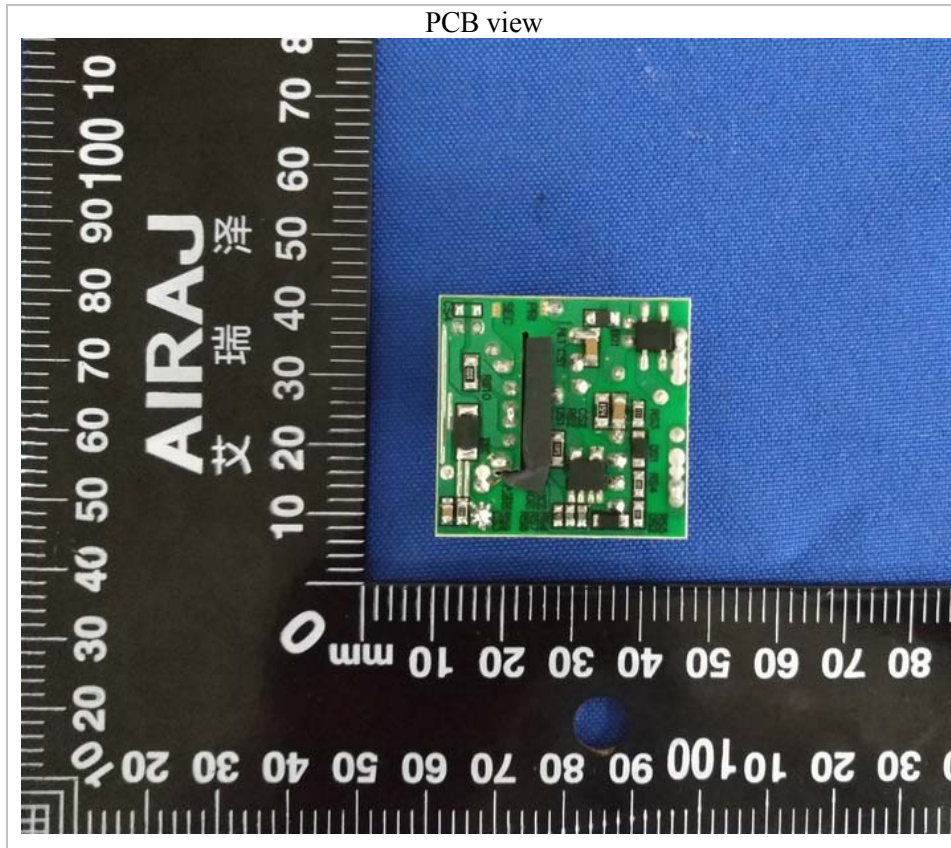


PCB view





**TEST REPORT**



\*\*\*\*\*End of Report\*\*\*\*\*