Total Quality. Assured.

ShenZhen ZONSAN Innovation Technology Co., Ltd.

TEST REPORT

SCOPE OF WORK
EMC TESTING–ZX-1U13

REPORT NUMBER
180608067GZU-001

ISSUE DATE **[REVISED DATE]**

27-June-2018 [----------]

PAGES
39

DOCUMENT CONTROL NUMBER
EN 55032:2015, EN 55024:2010+A1:2015-c

Total Quality. Assured.

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

Telephone: 86-20-8213 9688
Facsimile: 86-20-3205 7538
www.intertek.com

TEST REPORT

Applicant Name & Address : [redacted]

Manufacturing Site :

Intertek Report No:

Test standards

EN 55032:2015
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 55024:2010+A1:2015

Sample Description

Product	:	Smart Charger
Model No.	:	[redacted]
Electrical Rating	:	Input: 100-240V~, 50/60Hz, 0.5A Max., Class II Output: 5V⎓, 2.4A
Serial No.		Not Labeled
Date Received	:	08 June 2018
Date Test Conducted	:	08 June 2018-26 June 2018

Prepared and Checked By

Daniel He

Project Engineer

Intertek Guangzhou

Approved By:

Helen Ma

Team Leader

Intertek Guangzhou

TEST REPORT

CONTENT

TEST REPORT

1. TEST RESULTS SUMMARY

Classification of EUT: Class B

Test Item	Standard	Result
Conducted disturbance voltage at mains ports	EN 55032:2015	Pass
Conducted Disturbance at wired network ports	EN 55032:2015	N/A
Radiated emission (30 MHz–1000 MHz)	EN 55032:2015	Pass
Radiated emission (1 GHz–6 GHz)	EN 55032:2015	N/A
Harmonic of current	EN 61000-3-2:2014	Pass
Flicker	EN 61000-3-3:2013	Pass
ESD immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-2:2009	Pass
Radiated EM field immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-3:2006+A1:2008+A2:2010	Pass
EFT immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-4:2004	Pass
Surge immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-5:2006	Pass
Inject current immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-6:2009	Pass
Power frequency magnetic field immunity	EN 55024:2010+A1:2015 Reference: EN 61000-4-8:2010	N/A
Voltage dips and interruption immunity	EN 55024:2010+A1:2015 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.

2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU performed on the Smart Charger, Model: ZX-1U13

We tested the Smart Charger, Model: ZX-1U13, 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:	Load supplied by Intertek
Rated Voltage and frequency under test:	Input: 100-240V~, 50/60Hz, 0.5A Max., Class II, Output: 5V⎓, 2.4A
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.

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	06/06/2019	1Y
SA047-112	Digital Temperature-Humidity Recorder	RS210	YIJIE	03/11/2018	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	07/01/2019	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	06/05/2019	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	03/11/2019	1Y
EM033-01	TRILOG Super Broadband test Antenna（30 MHz-3 GHz）	VULB 9163	SCHWARZBECK	19/09/2018	1Y
EM031-02-01	Coaxial cable	/	R&S	06/05/2019	1Y
EM036-01	Common-mode absorbing clamp	CMAD 20B	TESEQ	31/07/2018	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	16/04/2019	1Y
SA047-143	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	23/09/2018	1Y

TEST REPORT

Electrical Fast Transient/Burst(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-12	EFT Generator	NX5 b-1-300-16	EM TEST	03/04/2019	1Y
EM005-10-01	Capacitive Coupling Clamp	CDN8014	TESEQ	27/04/2019	1Y
SA047-140	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	30/01/2019	1Y

Surge(3)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	07/05/2019	1Y
SA047-140	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	30/01/2019	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	14/09/2018	1Y
EM003-01-04	Coupling&Decoupling Network	CDN M2+M3	Dr.Hubert GmbH	14/09/2018	1Y
EM003-01-05	Attenuator	6dB	Dr.Hubert GmbH	14/09/2018	1Y
EM087-01	Current Electromagnetic injection clamp	EM 101	Swiss PTT	16/01/2019	1Y
EM019-03	Current Clamp	CIP 9136A	Teseq GmbH	30/07/2018	1Y
SA047-140	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	30/01/2019	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	07/05/2019	1Y
EM005-09-01	Voltage Regulator	INA6501	TESEQ	07/05/2019	1Y
SA047-140	Digital Temperature-Humidity Recorder	AW5145Y	ASAIR	30/01/2019	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^3	ETS LINDGREN	06/05/2019	1Y
EM031-01	Signal generator	SMB100A	R&S	01/08/2018	1Y
EM086-11	Power meter	NRP2	R&S	03/12/2018	1Y
EM086-11-01	Power sensor	NRP-Z91	R&S	03/12/2018	1Y
EM046-01	Power Amplifier	80RF1000-300	MILMEGA	11/03/2019	1Y
EM046-03	Power Amplifier	AS0860-75-45	MILMEGA	08/10/2018	1Y
EM061-05	Log. - Per. Broadband Antenna	VULP 9118 E	SCHWARZBECK	16/10/2019	2Y
EM061-07	Stacked Log.-Per. Broadband Antenna	STLP 9149	SCHWARZBECK	25/10/2019	2Y
EM034-01	Open Switch and Control Platform	OSP120/1505.3009K12	R&S	/	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	/	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	10/07/2018	1Y

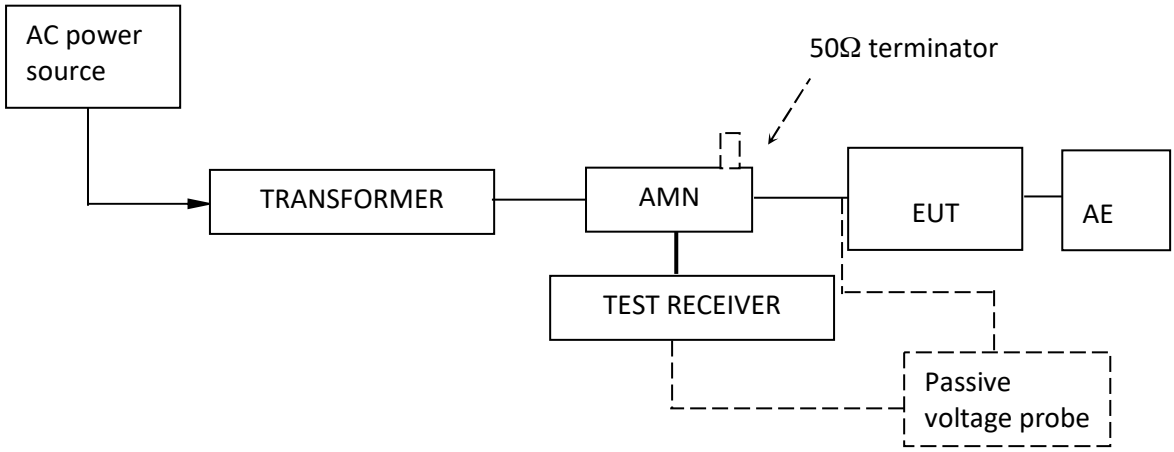
TEST REPORT

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.

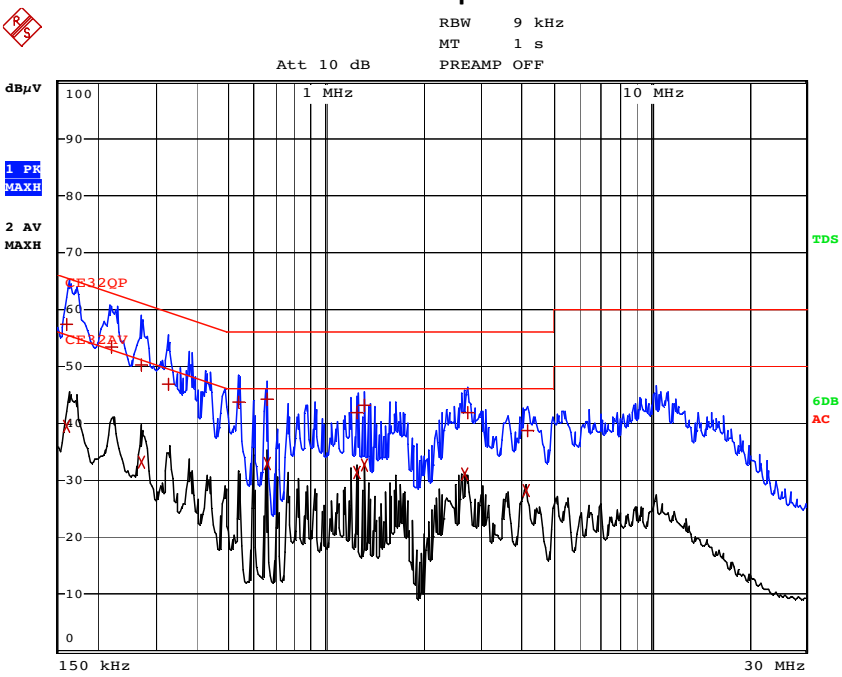
The bandwidth of test receiver was set at 9kHz. The frequency range from 150kHz to 30MHz was checked.

TEST REPORT

5.1.3 Test Data and curve

At mains terminal:

Tested Wire: Live **Operation Mode: EUT on with full load**

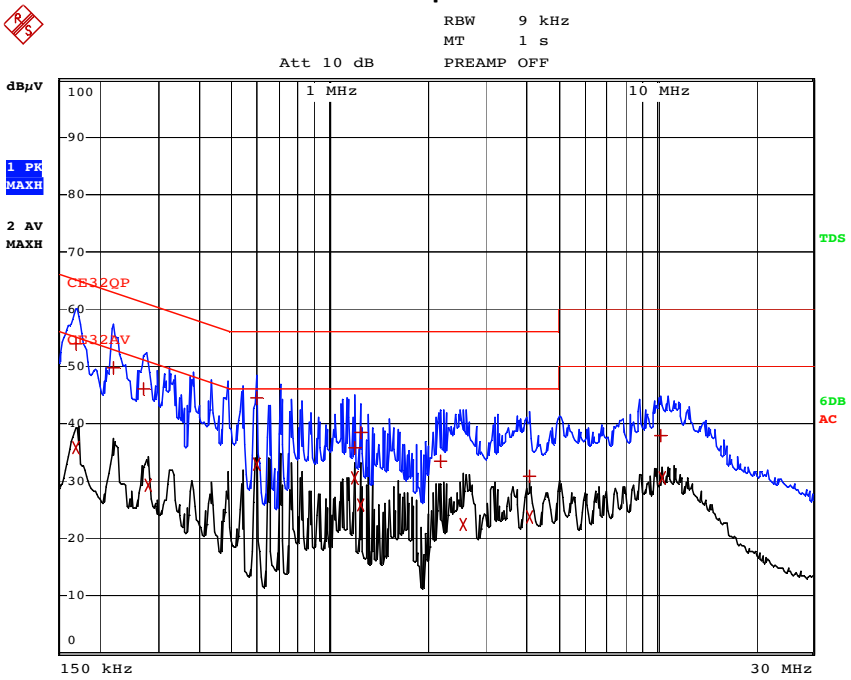


EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE32QP			
Trace2:	CE32AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1 Quasi Peak	162 kHz	57.47	L1	-7.88
2 Average	162 kHz	39.53	L1	-15.82
1 Quasi Peak	218 kHz	53.32	L1	-9.56
1 Quasi Peak	270 kHz	50.35	L1	-10.76
2 Average	270 kHz	33.32	L1	-17.78
1 Quasi Peak	326 kHz	46.84	L1	-12.71
1 Quasi Peak	538 kHz	43.63	L1	-12.36
2 Average	654 kHz	32.98	L1	-13.01
1 Quasi Peak	654 kHz	44.20	L1	-11.79
1 Quasi Peak	1.246 MHz	41.74	L1	-14.25
2 Average	1.246 MHz	31.35	L1	-14.64
1 Quasi Peak	1.306 MHz	43.19	L1	-12.80
2 Average	1.306 MHz	32.77	L1	-13.22
2 Average	2.67 MHz	31.20	L1	-14.79
1 Quasi Peak	2.722 MHz	41.91	L1	-14.08
2 Average	4.13 MHz	28.21	L1	-17.78
1 Quasi Peak	4.194 MHz	38.79	L1	-17.21

Remark:
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBµV) = Corr. (dB) + Read Level (dBµV)
3. Delta Limit (dB) = Level (dBµV)-Limit (dBµV)

TEST REPORT

Tested Wire: Neutral **Operation Mode: EUT on with full load**



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	CE32QP		
Trace2:	CE32AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	170 kHz	54.03 L1	-10.92
2 Average	170 kHz	35.86 L1	-19.10
1 Quasi Peak	218 kHz	49.73 L1	-13.15
1 Quasi Peak	274 kHz	46.06 L1	-14.93
2 Average	278 kHz	29.33 L1	-21.54
1 Quasi Peak	598 kHz	44.44 L1	-11.55
2 Average	598 kHz	32.95 L1	-13.04
2 Average	1.19 MHz	30.60 L1	-15.39
1 Quasi Peak	1.198 MHz	35.71 L1	-20.28
1 Quasi Peak	1.25 MHz	38.33 L1	-17.66
2 Average	1.25 MHz	25.76 L1	-20.23
1 Quasi Peak	2.178 MHz	33.47 L1	-22.52
2 Average	2.558 MHz	22.33 L1	-23.66
2 Average	4.074 MHz	23.76 L1	-22.23
1 Quasi Peak	4.082 MHz	30.83 L1	-25.16
1 Quasi Peak	10.282 MHz	37.91 L1	-22.08
2 Average	10.366 MHz	30.67 L1	-19.32

Remark:
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBµV) = Corr. (dB) + Read Level (dBµV)
3. Delta Limit (dB) = Level (dBµV)-Limit (dBµV)

TEST REPORT

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

Test Result: Not Applicable

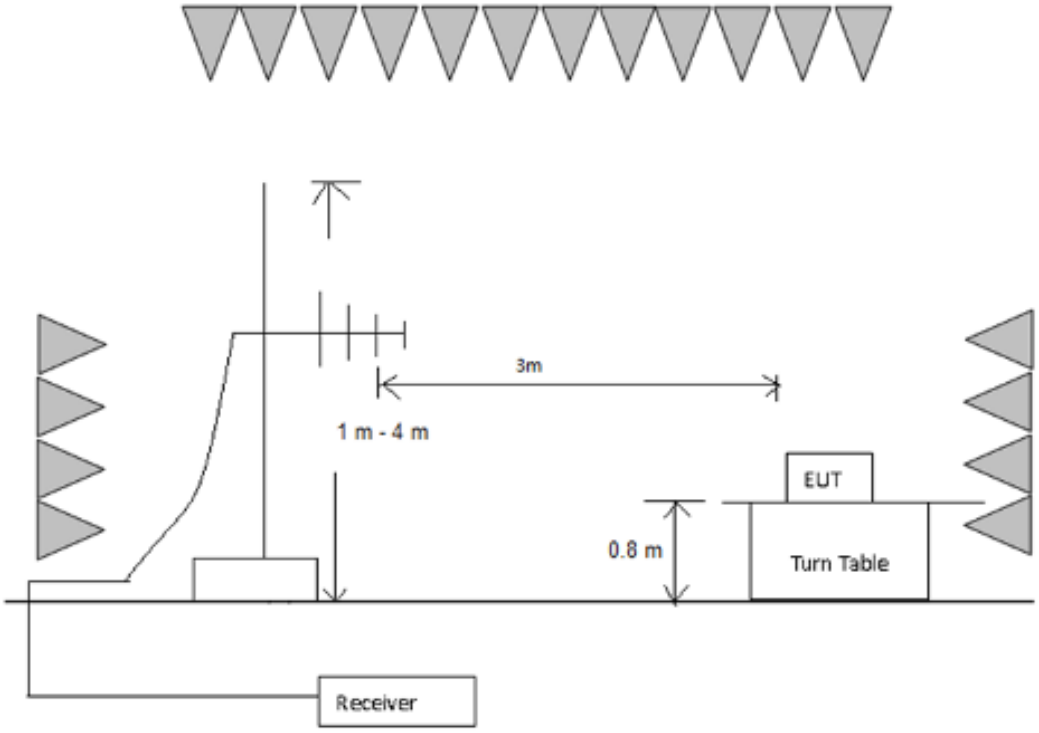
Remark: The test only applys to balanced unscreened ports intended for connection to unscreened balanced pairs

TEST REPORT

5.3 EN 55032 Radiated Emission below 1 GHz

Test Result: Pass

5.3.1 Block Diagram of Test Setup



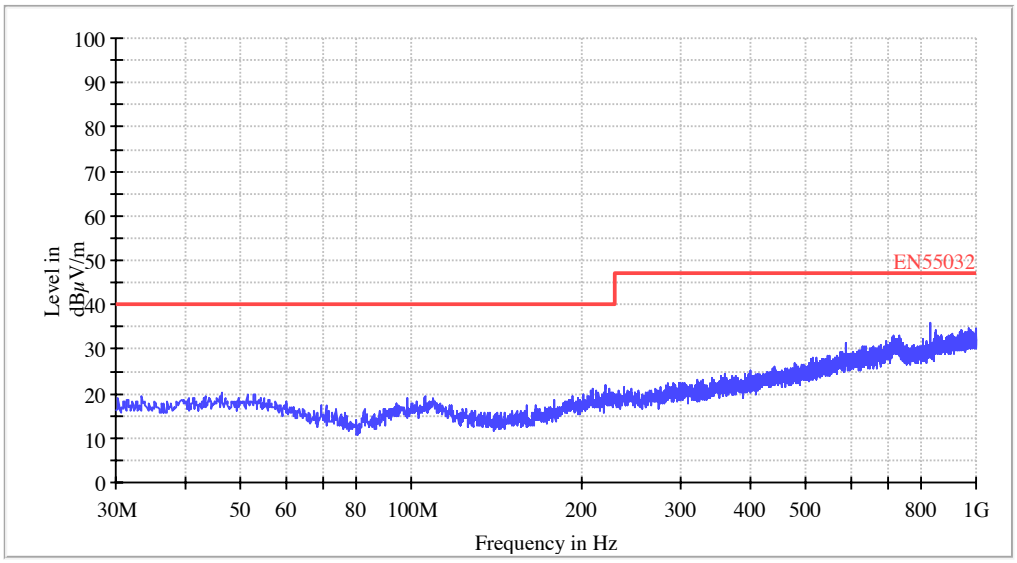
5.3.2 Test Setup and Procedure

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.

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

5.3.3 Test Data and Curve

Operation Mode: EUT on with full load
Horizontal

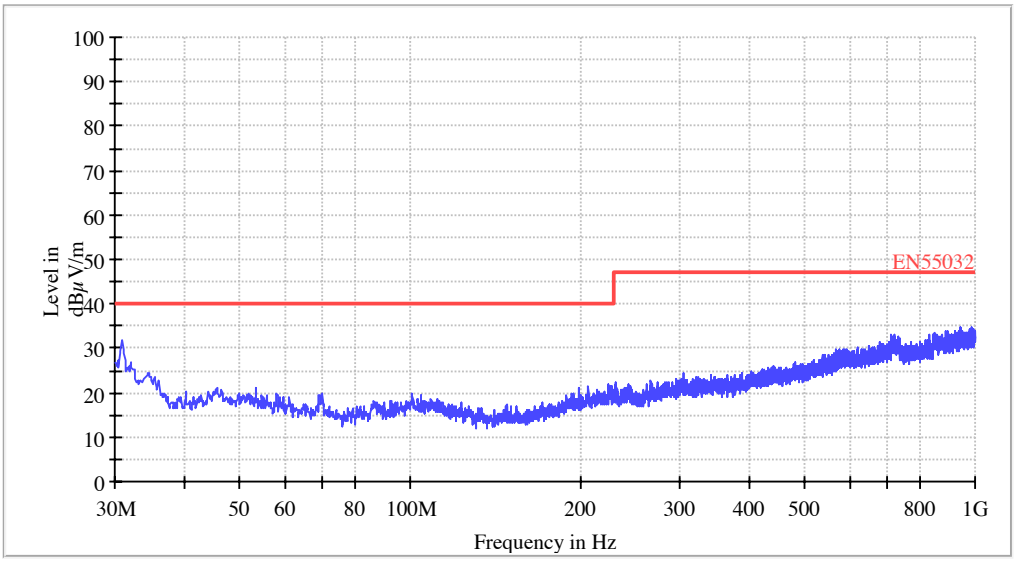


All emission levels are more than 6 dB below the limit.

Remark:
1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB) + Read Level (dBµV)
3. Margin (dB) = Limit QPK (dBµV/m) –Quasi Peak (dBµV/m)

TEST REPORT

Vertical



All emission levels are more than 6 dB below the limit.

Remark:
1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB) + Read Level (dBµV)
3. Margin (dB) = Limit QPK (dBµV/m) –Quasi Peak (dBµV/m)

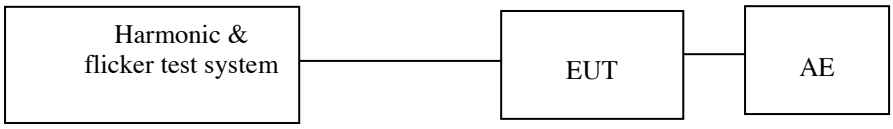
5.4 EN 55032 Radiated Emission above 1 GHz

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.

6. Harmonics of current

Test Result: Pass

6.1 Block Diagram of Test Setup



6.2 Test Setup and Procedure

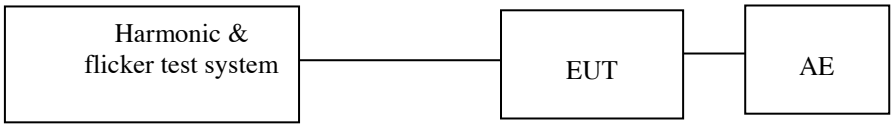
Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyzer which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

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.

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 hous). 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.

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.

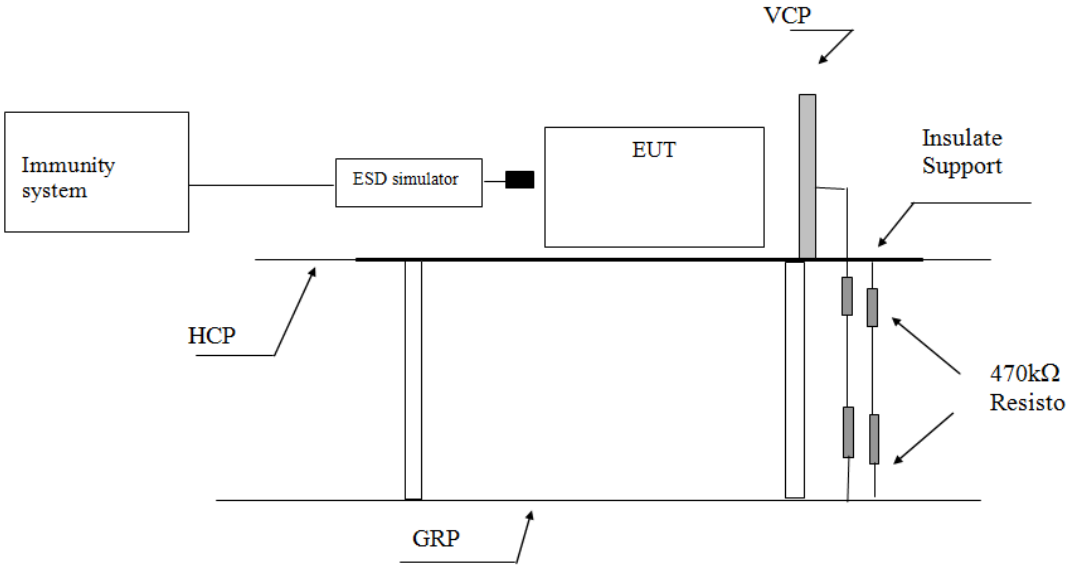
TEST REPORT

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.

TEST REPORT

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	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

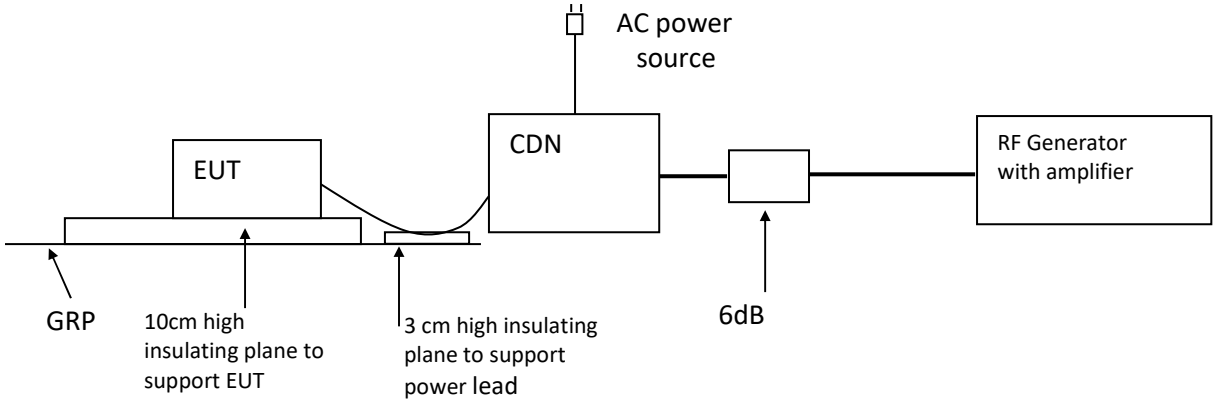
8.2 EN 61000-4-6(Pursuant to EN 55024) Injected Current (0.15 MHz to 80 MHz)

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 (±1 %).

8.2.3 Test Result

Test Mode: full load

Port	Frequency (MHz)	Level	Result
A.C. Power Lines	0.15 to 80	3V (r.m.s.)	Pass
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

Test Mode:N/A

On selected frequencies (only for Telecommunication Terminal Equipment)

Port	Frequency (MHz)	Level	Result
A.C. Power Lines	0.2,1,7.1,13.56,21,27.12,40.68	3V (r.m.s.)	N/A
D.C. Power Lines	0.2,1,7.1,13.56,21,27.12,40.68	3V (r.m.s.)	N/A
Signal Lines	0.2,1,7.1,13.56,21,27.12,40.68	3V (r.m.s.)	N/A
Telecommunication	0.2,1,7.1,13.56,21,27.12,40.68	3V (r.m.s.)	N/A

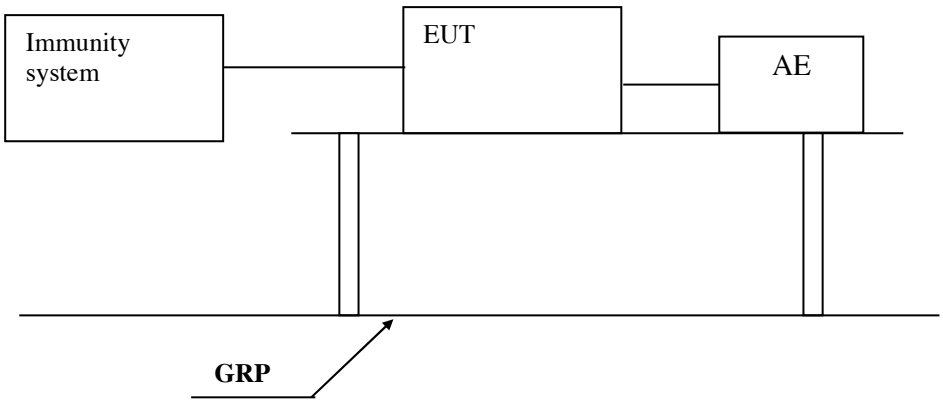
8.3 EN 61000-4-4(Pursuant to EN 55024) Electrical Fast Transient/Burst

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	+	Pass	N/A
1 kV	-	Pass	N/A

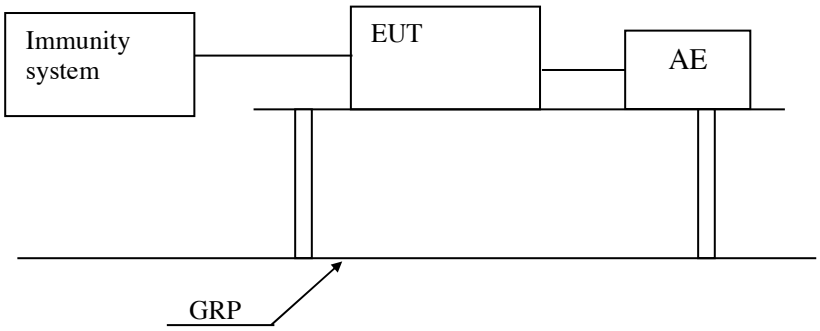
TEST REPORT

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

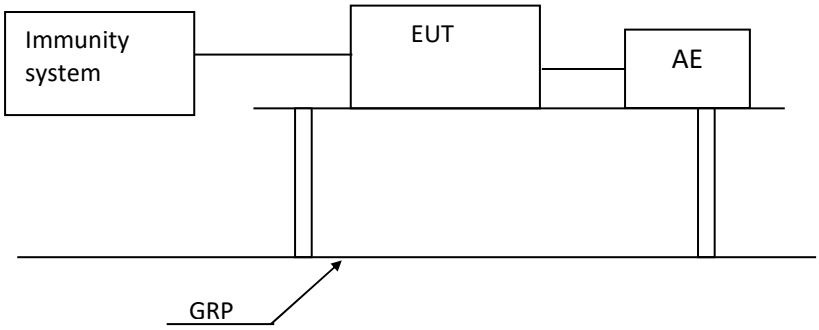
Tested Port	Level	Result
AC power	Line to line±0.5kV, ±1kV	Pass
AC power	Line to earth ±0.5kV, ±1kV,±2kV	N/A
Signal/ Telecommunication	Line to earth ±1kV	N/A
DC power	Line to earth ±0.5kV	N/A

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

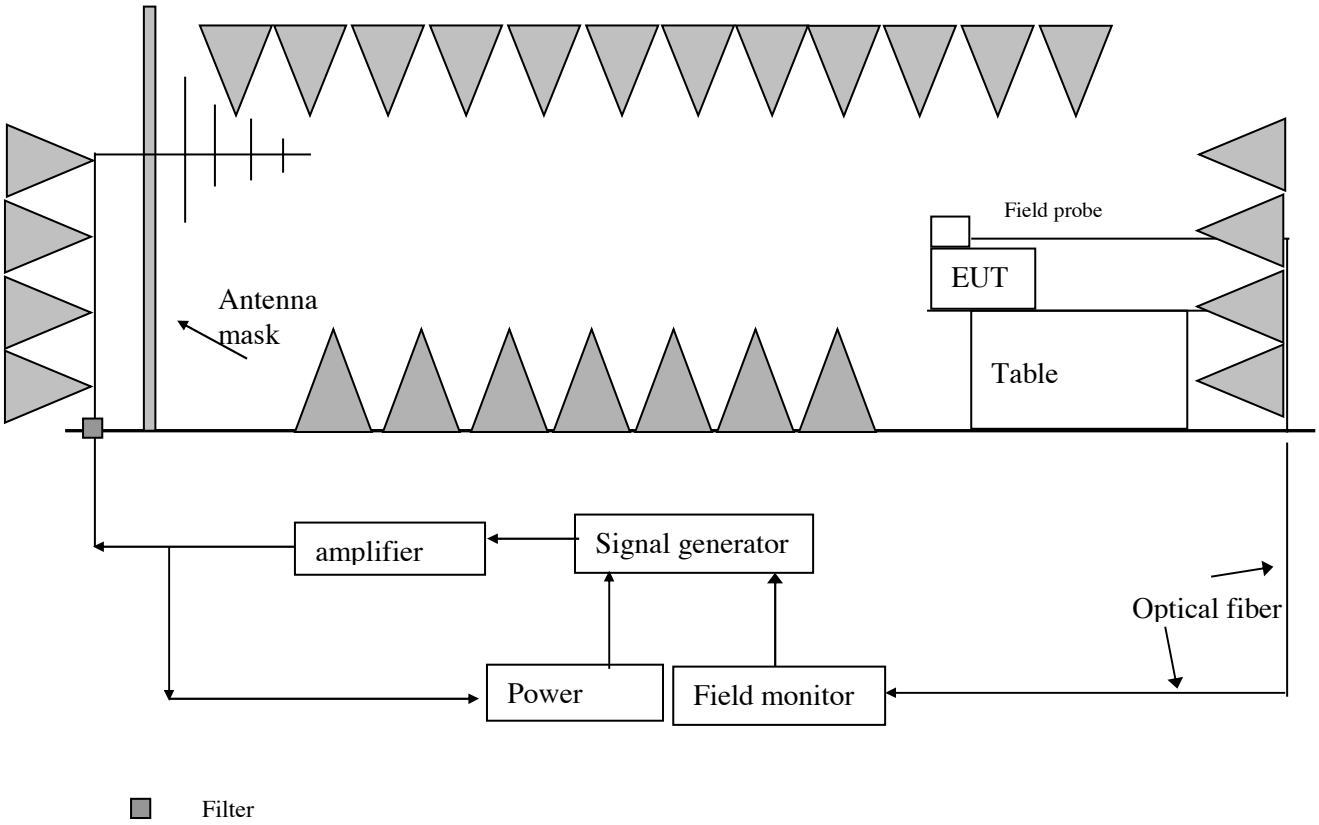
Test condition		Result
Test Level in %UT	Duration (in period of the rated frequency)	
0	0.5	Pass
70	25	Pass
0	250	Pass

Remark: UT is the rated voltage for the equipment.

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



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

TEST REPORT

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 (±1 %).

TEST REPORT

8.6.3 Test Result

Test Mode: full load

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

Test Mode: On selected frequencies (only for Telecommunication Terminal Equipment)

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80,120,160,230,434,460,600,863,900	Front	3V/m (r.m.s.)	N/A
80,120,160,230,434,460,600,863,900	Left	3V/m (r.m.s.)	N/A
80,120,160,230,434,460,600,863,900	Rear	3V/m (r.m.s.)	N/A
80,120,160,230,434,460,600,863,900	Right	3V/m (r.m.s.)	N/A

TEST REPORT

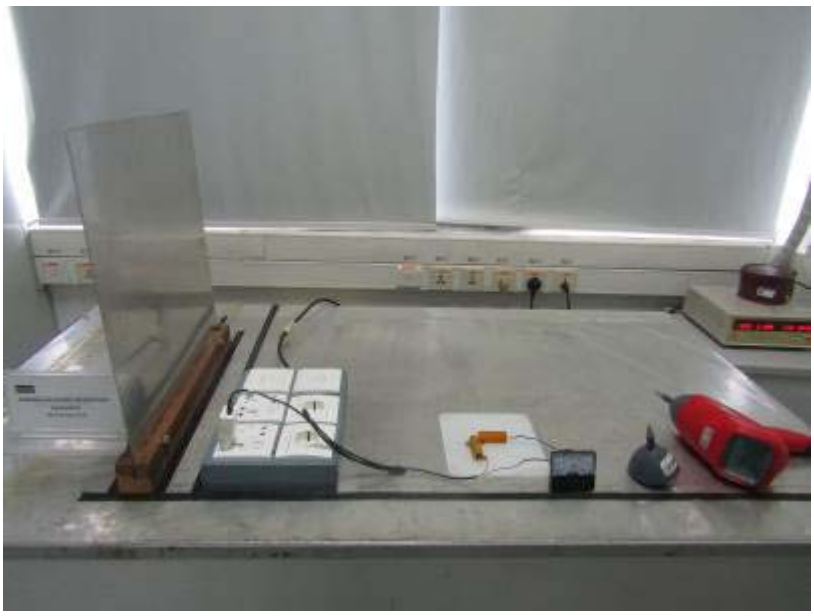
8.7 EN 61000-4-8(Pursuant to EN 55024) Power Frequency Magnetic Field Immunity

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.

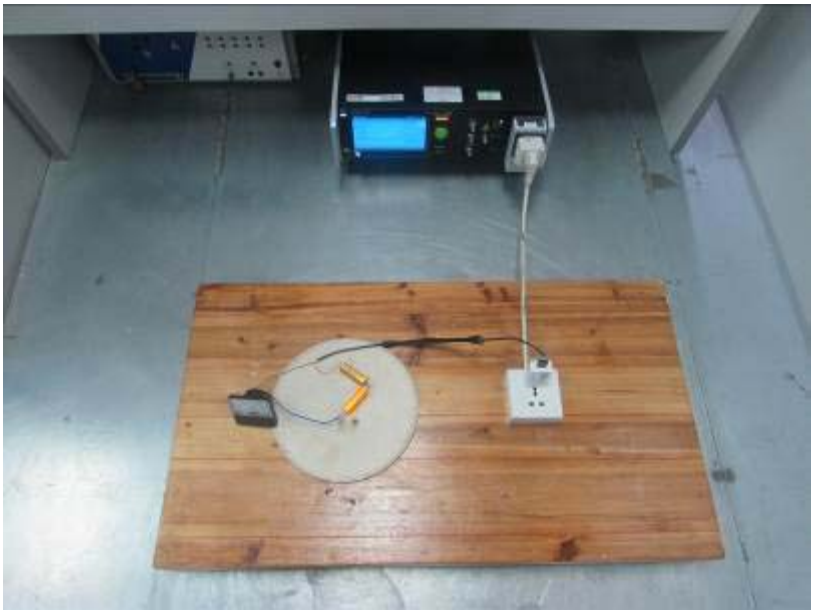
9. APPENDIX I - PHOTOS OF TEST SETUP

Conducted disturbance voltage at mains ports

Radiated emission (30 MHz–1000 MHz)



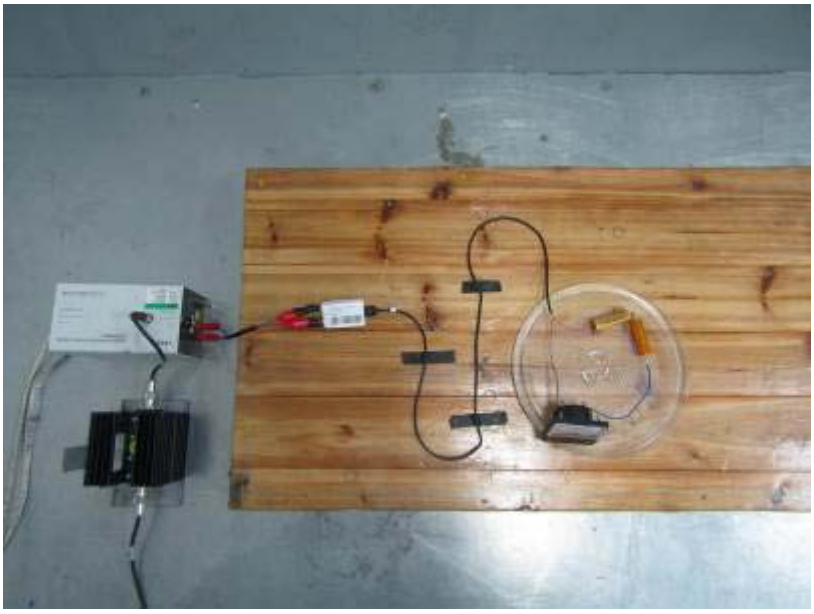
ESD Immunity



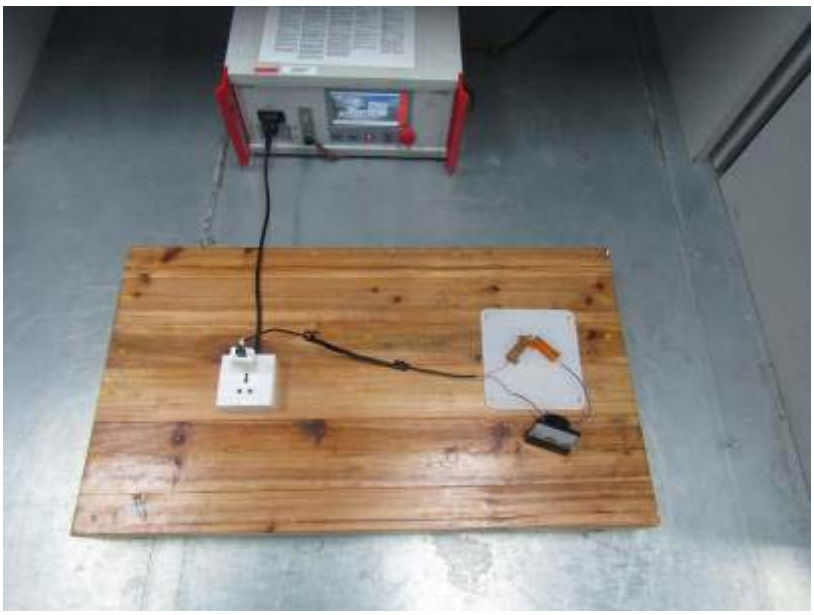
EFT immunity

TEST REPORT

Radiated EM field immunity

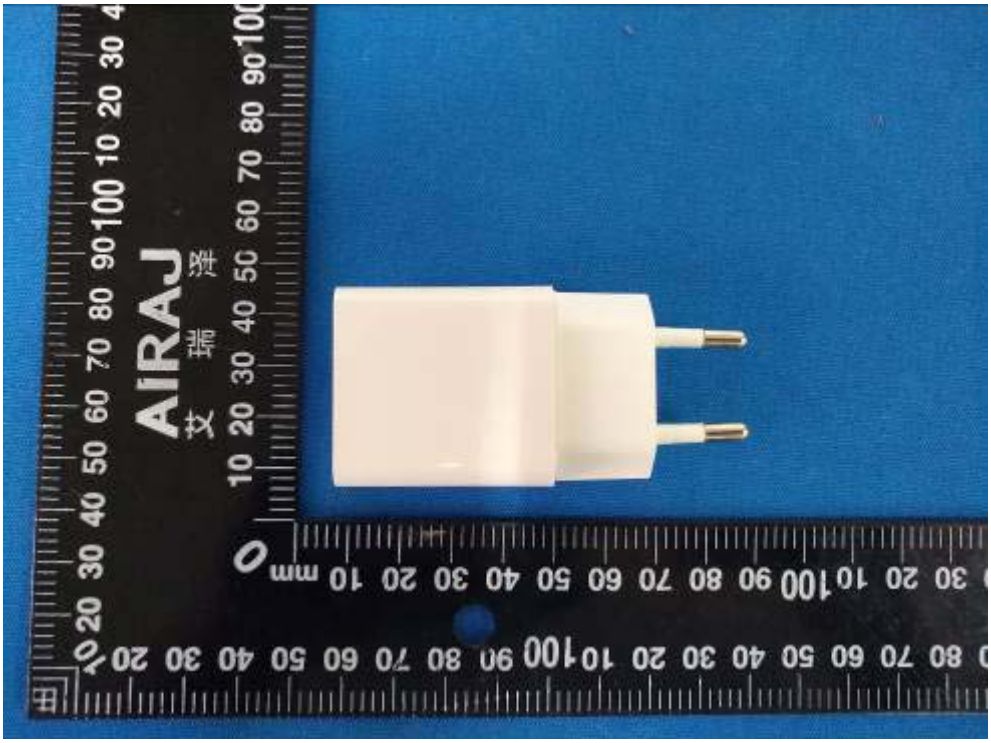


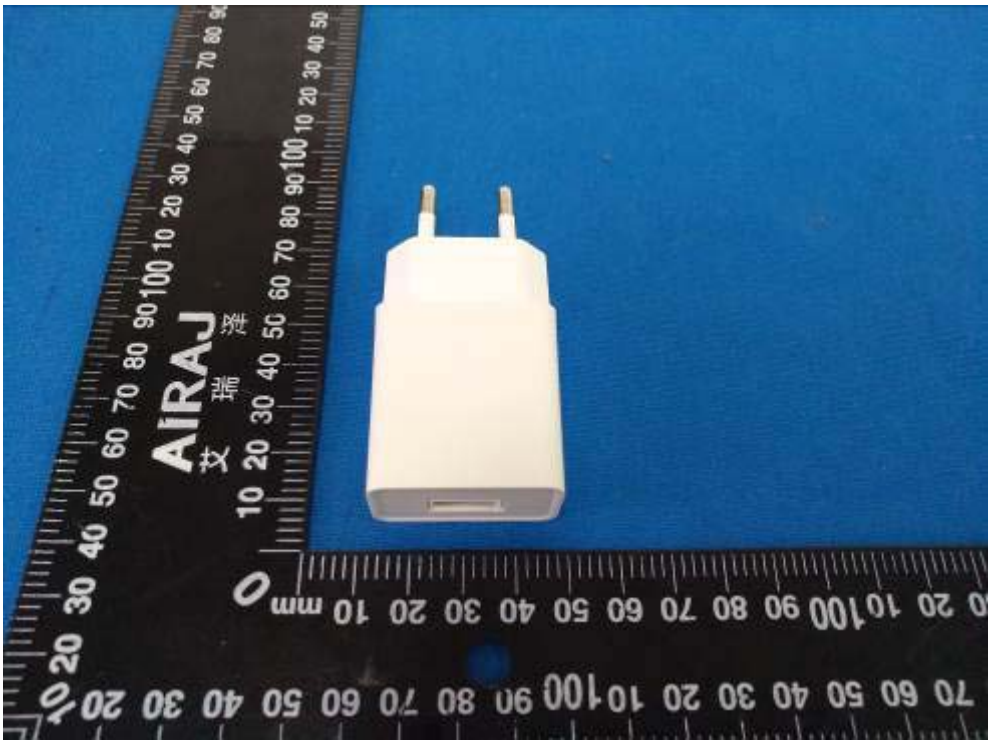
Inject current immunity



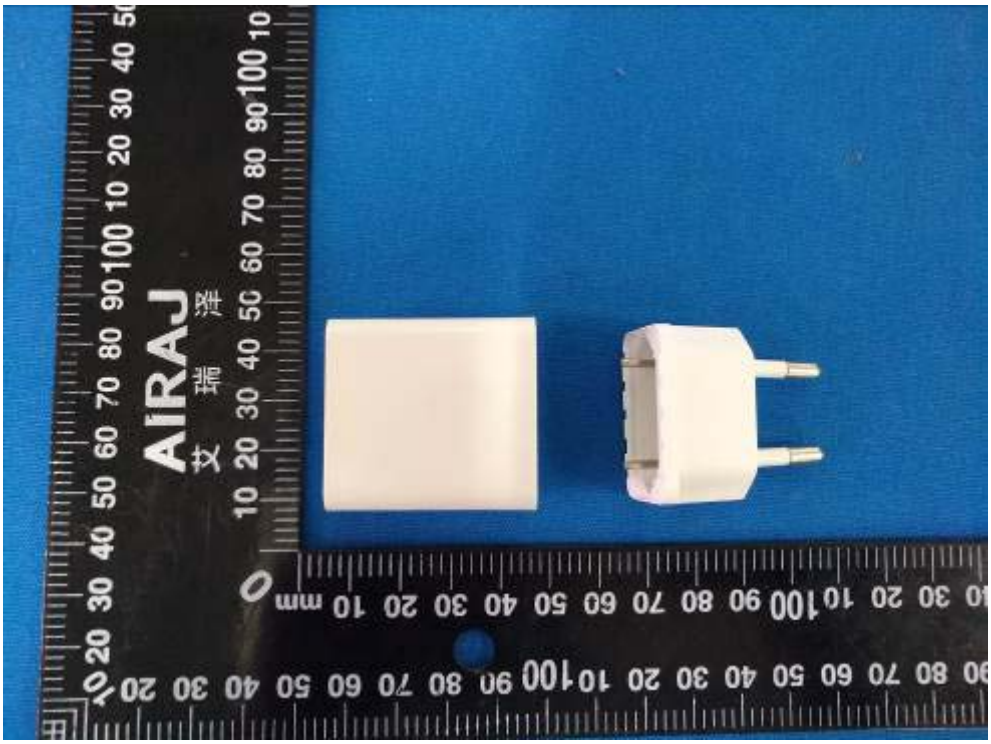
Surge immunity, Voltage dips and interruption immunity

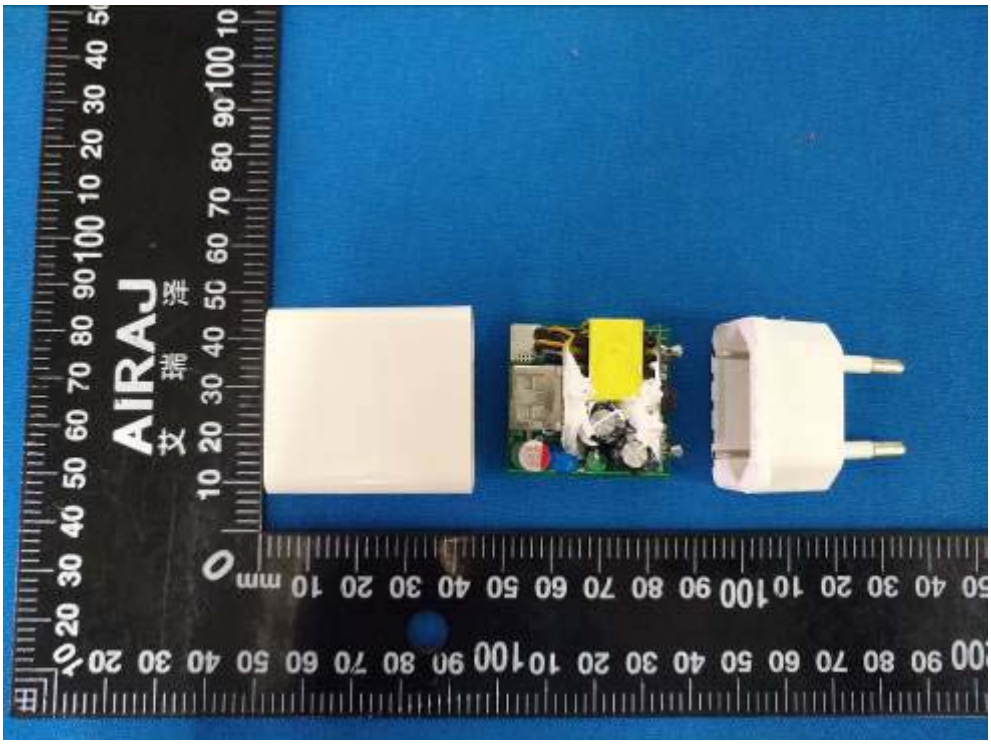
10. APPENDIX II – PHOTOS OF EUT



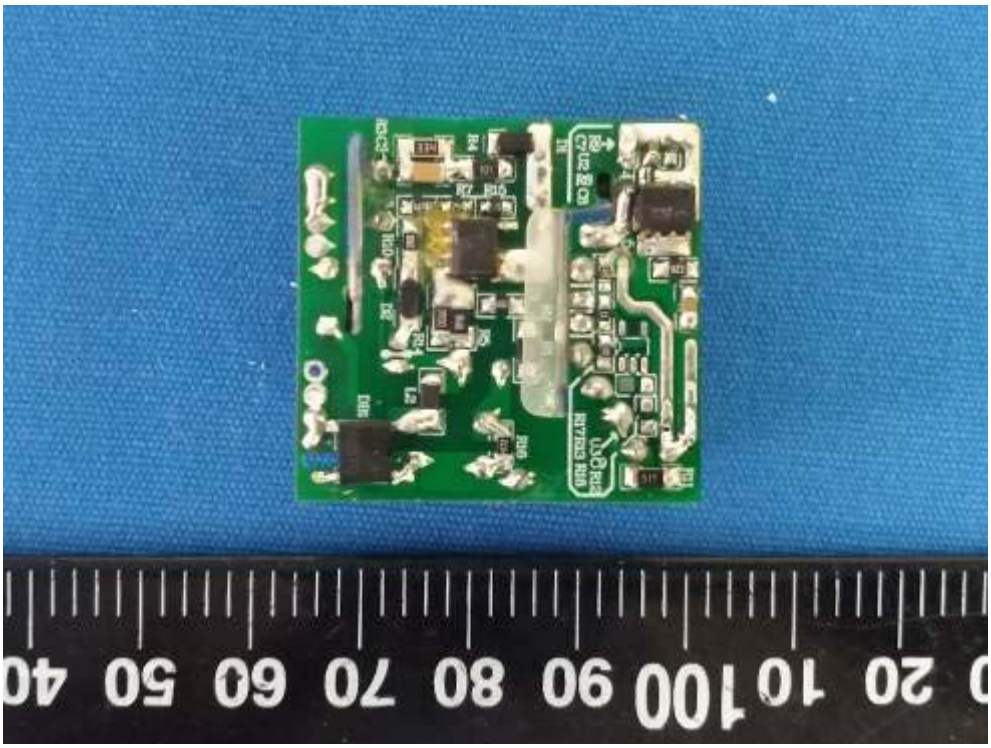


TEST REPORT





TEST REPORT



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