



# TEST REPORT

Product Name: charger

Trademark: **hoco.**

Model Number: C45  
AC1, C37A, C38A, C39A, C40A, C41A, C42A, C43A, C45, C46, C47, C47A, C48, C51, C51A, C52, C52A, C53, C53A, C55, C55A, C56, C56A, C57, C57A, C58, C58A, C59, C59A, C60, C60A, C61A, C62, C62A, C63, C63A, C18A

Prepared For: HOCO TECHNOLOGY DEVELOPMENT ( SHENZHEN ) CO., LTD

Address: Room 408, 4/F, Building A, Weidonglong Business Building, Meilong Road, Longhua New District, Shenzhen City, P.R.China

Manufacturer: HOCO TECHNOLOGY DEVELOPMENT ( SHENZHEN ) CO., LTD

Address: Room 408, 4/F, Building A, Weidonglong Business Building, Meilong Road, Longhua New District, Shenzhen City, P.R.China

Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

Sample Received Date: Oct. 22, 2018

Sample tested Date: Oct. 29, 2018 to Nov. 05, 2018

Issue Date: Nov. 05, 2018

Report No.: BCTC-FY181006053E

Test Standards: EN 55032:2015, EN 55035: 2017  
EN 61000-3-2: 2014, EN 61000-3-3: 2013

Test Results: PASS

Compiled by:

*Icey Chen*

Icey Chen

Reviewed by:

*Zhil Yang*

Eric Yang

Approved by:

*Carson Zhang*

Carson Zhang/Manager



The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.



## TABLE OF CONTENT

Test Report Declaration	Page
<b>1. VERSION</b> .....	4
<b>2. TEST SUMMARY</b> .....	5
<b>3. MEASUREMENT UNCERTAINTY</b> .....	6
<b>4. PRODUCT INFORMATION AND TEST SETUP</b> .....	7
4.1 Product Information .....	7
4.2 Test Setup Configuration .....	7
4.3 Support Equipment .....	7
4.4 Test Mode .....	8
<b>5. TEST FACILITY AND TEST INSTRUMENT USED</b> .....	9
5.1 Test Facility .....	9
5.2 Test Instrument Used .....	9
<b>6. CONDUCTED EMISSIONS</b> .....	12
6.1 Block Diagram Of Test Setup .....	12
6.2 Limit .....	12
6.3 Test procedure .....	12
6.4 Test Result .....	13
<b>7. RADIATED EMISSIONS TEST</b> .....	15
7.1 Block Diagram Of Test Setup .....	15
7.2 Limits .....	15
7.3 Test Procedure .....	15
7.4 Test Results .....	16
<b>8. VOLTAGE FLUCTUATIONS &amp; FLICKER(F)</b> .....	18
9.1 Block Diagram of Test Setup .....	18
9.2 Limit .....	18
9.3 Test Procedure .....	18
9.4 Test Results .....	18
<b>9. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA</b> .....	20
<b>10. ELECTROSTATIC DISCHARGE (ESD)</b> .....	21
10.1 Test Specification .....	21
10.2 Block Diagram of Test Setup .....	21
10.3 Test Procedure .....	21
10.4 Test Results .....	22
<b>11. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES (RS)</b> .....	23
11.1 Test Specification .....	23
11.2 Block Diagram of Test Setup .....	23
11.3 Test Procedure .....	24
11.4 Test Results .....	24
<b>12. ELECTRICAL FAST TRANSIENTS/BURST (EFT)</b> .....	25
12.1 Test Specification .....	25
12.2 Block Diagram of EUT Test Setup .....	25



12.3	Test Procedure	25
12.4	Test Results	25
<b>13.</b>	<b>SURGES IMMUNITY TEST</b>	<b>26</b>
13.1	Test Specification	26
13.2	Block Diagram of EUT Test Setup	26
13.3	Test Procedure	26
13.4	Test Result	26
<b>14.</b>	<b>CONTINUOUS INDUCED RF DISTURBANCES (CS)</b>	<b>27</b>
14.1	Test Specification	27
14.2	Block Diagram of EUT Test Setup	27
14.3	Test Procedure	27
14.4	Test Result	27
<b>15.</b>	<b>VOLTAGE DIPS AND INTERRUPTIONS (DIPS)</b>	<b>28</b>
15.2	Block Diagram of EUT Test Setup	28
15.3	Test Procedure	28
15.4	Test Result	28
<b>16.</b>	<b>EUT PHOTOGRAPHS</b>	<b>29</b>
<b>17.</b>	<b>EUT TEST SETUP PHOTOGRAPHS</b>	<b>31</b>

(Note: N/A means not applicable)



## 1. VERSION

Report No.	Issue Date	Description	Approved
BCTC-FY181006053E	Nov. 05, 2018	Original	Valid



## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

EMISSION		
Standard	Test Item	Test result
EN 55032	Conducted emissions from the AC mains power ports	Pass
EN 55032	Asymmetric mode conducted emissions	N/A <sup>1</sup>
EN 55032	Conducted differential voltage emissions	N/A <sup>2</sup>
EN 55032	Radiated emissions	Pass
EN 61000-3-2	Harmonic current emission(H)	N/A <sup>3</sup>
EN 61000-3-3	Voltage fluctuations & flicker(F)	Pass

IMMUNITY (EN 55035)		
Standard	Test Item	Test result
IEC 61000-4-2	Electrostatic discharge (ESD)	Pass
IEC 61000-4-3	Continuous RF electromagnetic field disturbances(RS)	Pass
IEC 61000-4-4	Electrical fast transients/burst (EFT)	Pass
IEC 61000-4-5	Surges	Pass
IEC 61000-4-6	Continuous induced RF disturbances (CS)	Pass
IEC 61000-4-6	Broadband impulse noise disturbances, repetitive	N/A <sup>4</sup>
IEC 61000-4-6	Broadband impulse noise disturbances, isolated	N/A <sup>4</sup>
IEC 61000-4-8	Power frequency magnetic field (PFMF)	N/A <sup>5</sup>
IEC 61000-4-11	Voltage dips and interruptions (DIPS)	Pass

Remark:

1. Applicable to ports listed above and intended to connect to cables longer than 3 m.
2. The Product has no antenna port.
3. The Product belongs to Class A, and its power is less than 75W, so it deems to fulfil this standard without testing.
4. Applicable only to CPE xDSL ports.
5. The Product doesn't contain any device susceptible to magnetic fields.



### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Test item	Value (dB)
Conducted Emission (150kHz-30MHz)	3.20
Radiated Emission(30MHz~1GHz)	4.80
Radiated Emission(1GHz~6GHz)	4.90



## 4. PRODUCT INFORMATION AND TEST SETUP

### 4.1 Product Information

**Ratings:**

Input: AC220-240V 50/60Hz,0.4A

Output:DC5V 2.4A

**The highest frequency of the internal sources of the EUT is (less than 108)MHz:**  less than 108 MHz, the measurement shall only be made up to 1 GHz.

between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

**Model difference:**

All models are identical except for the appearance color, the test model is C45 and the test results are applicable to other tests.

### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

### 4.3 Support Equipment

No	Device Type	Brand	Model	Series No.	Data Cable	Power
1.	---	---	---	---	---	---

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



#### 4.4 Test Mode

Test item	Test Mode	Test Voltage
Conducted emissions from the AC mains power ports (150KHz-30MHz) Class B	Full load	AC 230V/50Hz
Radiated emissions(30MHz-1GHz) Class B	Full load	AC 230V/50Hz
Voltage fluctuations & flicker(F)	Full load	AC 230V/50Hz
Electrostatic discharge (ESD) B <input checked="" type="checkbox"/> Air Discharge: ±8kV <input checked="" type="checkbox"/> Contact Discharge: ±4kV <input checked="" type="checkbox"/> HCP & VCP: ±4kV	Full load	AC 230V/50Hz
Continuous RF electromagnetic field disturbances(RS) A 80MHz-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, 3V/m, 80% Front, Rear, Left, Right H/V	Full load	AC 230V/50Hz
Electrical fast transients/burst (EFT) B <input checked="" type="checkbox"/> 1kV AC(Input) <input type="checkbox"/> 0.5kV DC(Input) <input type="checkbox"/> 0.5kV signal, Telec, control	Full load	AC 230V/50Hz
Surges <input checked="" type="checkbox"/> 1kV Line-Line, B <input type="checkbox"/> 2kV Line-PE, N-PE B <input type="checkbox"/> 0.5kVDC(Input) B <input type="checkbox"/> 1kV, <input type="checkbox"/> 4kV signal, Telec, control C Line-Line: 90°+1kV, 270°-1kV Line-PE: 90°+2kV, 270°-2kV N-PE: 90°-2kV, 270°+2kV	Full load	AC 230V/50Hz
Continuous induced RF disturbances (CS) A 0.15MHz to 10MHz 3V, 10MHz-30MHz 3 to 1V, 30MHz-80MHz 1V <input checked="" type="checkbox"/> AC( Input) <input type="checkbox"/> DC(Input) <input type="checkbox"/> signal, control	Full load	AC 230V/50Hz
Voltage dips and interruptions (DIPS) Less 5% 0.5P B 70% 500ms C Voltage Interruptions less 5% 5000ms C	Full load	AC 230V/50Hz
All test mode were tested and passed, only Conducted Emissions, Radiated Emissions Harmonic Current Emissions and Voltage Fluctuations and Flicker shows (*) is the worst case mode which were recorded in this report.		





## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

Conducted emissions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Receiver	R&S	ESR	102075	Jun. 20, 2018	Jun.19, 2019
LISN	R&S	ENV216	101375	Jun. 20, 2018	Jun.19, 2019
ISN	HPX	ISN T800	S1509001	Jun. 20, 2018	Jun.19, 2019
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

Radiated emissions Test (966 chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Mar. 03, 2016	Mar. 02, 2019
Receiver	R&S	ESR	102075	Jun. 20, 2018	Jun.19, 2019
Amplifier	Schwarzbeck	BBV9718	9718-309	Jun. 20, 2018	Jun.19, 2019
Amplifier	Schwarzbeck	BBV9744	9744-0037	Jun. 20, 2018	Jun.19, 2019
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163-942	Jun. 23, 2018	Jun.22, 2019
Horn Antenna	SCHWARZBECK	BBHA9120 D	1201	Jun. 23, 2018	Jun.22, 2021
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Harmonic / Flicker Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Harmonic & Flicker Tester	LAPLAEC	AC2000 A	439263	Jun. 20, 2018	Jun.19, 2019
AC Power Supply	LAPLAEC	PCR400 0M	631589	Jun. 20, 2018	Jun.19, 2019
Software	TTI	HA-PC Link	3.01	\	\



Electrostatic discharge Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
ESD Tester	KIKISUI	KES4201A	UH002321	Jun. 22, 2018	Jun. 21, 2019

Radio frequency electromagnetic fields Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Power meter	Keysight	E4419	GB42421440	Apr. 15, 2018	Apr. 14, 2019
Power sensor	Keysight	E9300A	US39211305	Apr. 15, 2018	Apr. 14, 2019
Power sensor	Keysight	E9300A	US39211659	Apr. 15, 2018	Apr. 14, 2019
Amplifier	SKET	HAP-8010 00M-250W	/	Aug. 13, 2018	Aug. 12, 2019
Amplifier	SKET	HAP-8010 00M-75W	/	Aug. 13, 2018	Aug. 12, 2019
Amplifier	SKET	HAP-8010 00M-50W	/	Aug. 12, 2018	Aug. 11, 2019
Stacked double Log.-Per. Antenna	Schwarzbeck	STLP 9129	077	Apr. 15, 2018	Apr. 14, 2019
Field Probe	Narda	EP-601	80256	Jun. 23, 2018	Jun. 22, 2019
Signal Generator	Agilent	N5181A	MY50143748	Jun. 20, 2018	Jun. 19, 2019
Software	SKET	EMC-S	1.2.0.18	\	\

EFT and Surge and Voltage dips and interruptions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Compact Generator	TRANSIENT	TRA2000	646	Jul. 11, 2018	Jul. 10, 2019
Coupling Clamp	PARTNER	CN-EFT100 0	CN-EFT100 0-1624	Aug. 14, 2018	Aug. 13, 2019

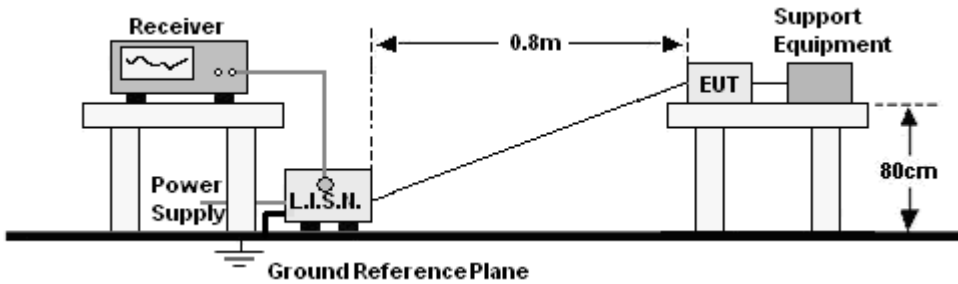


Continuous induced RF disturbances Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
C/S Test System	SCHLODER	CDG-600 0-75	126B1405/ 2016	Jul. 11, 2018	Jul. 10, 2019
Attenuator	SCHLODER	6DB DC-1G	HA1630	Jul. 09, 2018	Jul. 08, 2019
CDN	SCHLODER	CDN M2/M3	A2210389/ 2016	Jul. 09, 2018	Jul. 08, 2019
Injection Clamp	SCHLOBER	EMCL-20	132A1272/ 2016	Aug. 14, 2017	Aug. 13, 2020
Software	HUBERT	HUBERT EN 61000-4-6	1.4.1.0	\	\

## 6. CONDUCTED EMISSIONS

### 6.1 Block Diagram Of Test Setup

For mains ports:



### 6.2 Limit

Limits for Conducted emissions at the mains ports of Class B MME

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56*	56 to 46*
0,50 to 5	56	46
5 to 30	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The lower limit shall apply at the transition frequencies.

### 6.3 Test procedure

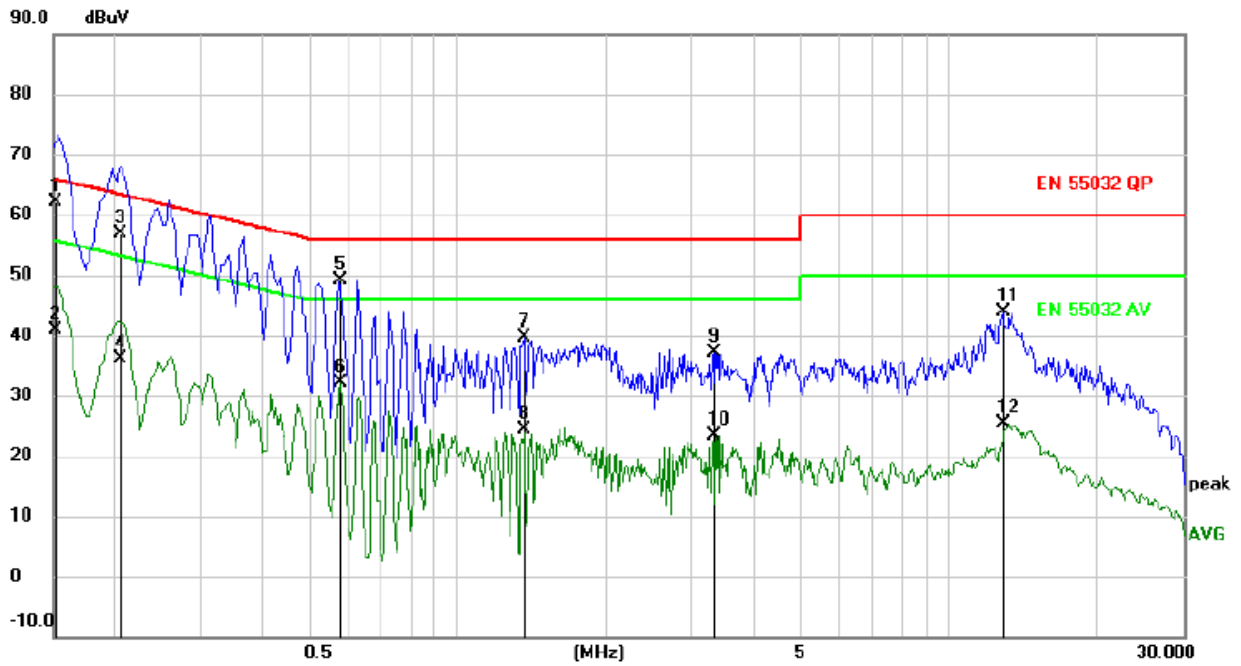
For mains ports:

- The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.



### 6.4 Test Result

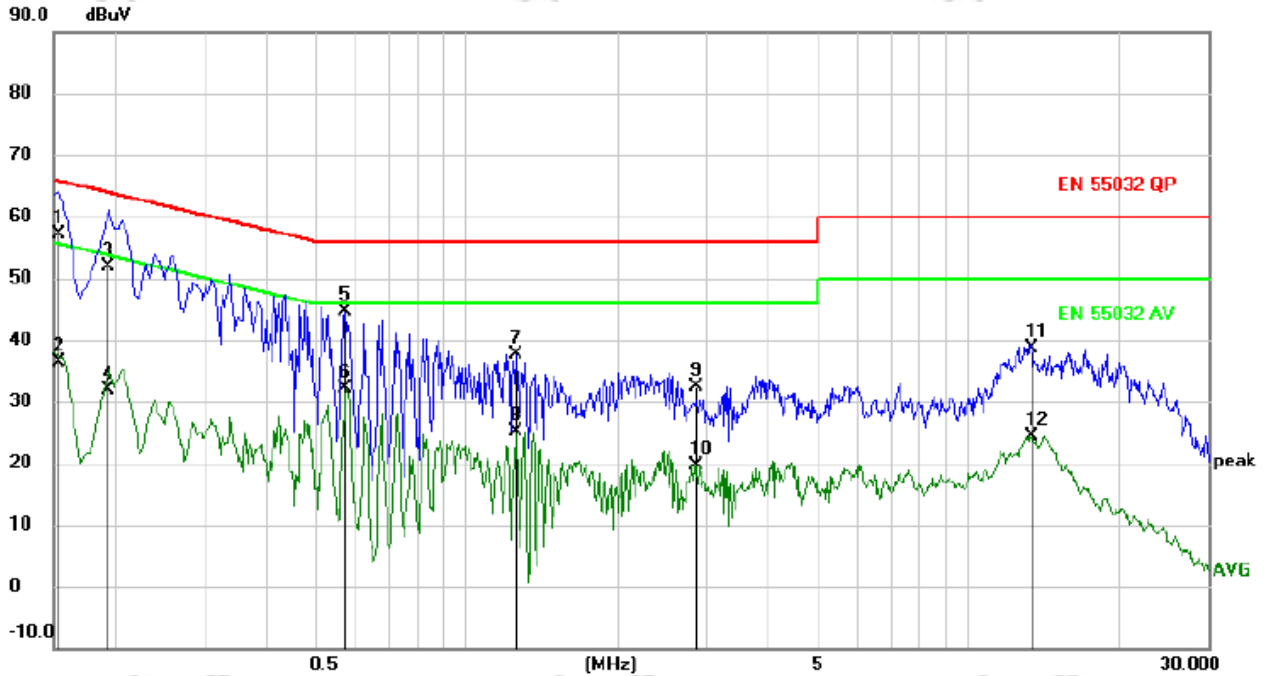
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	Full load



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1510	52.55	9.52	62.07	65.94	-3.87	QP	
2		0.1510	31.37	9.52	40.89	55.94	-15.05	AVG	
3		0.2060	47.48	9.47	56.95	63.37	-6.42	QP	
4		0.2060	26.54	9.47	36.01	53.37	-17.36	AVG	
5		0.5780	39.14	9.91	49.05	56.00	-6.95	QP	
6		0.5780	22.14	9.91	32.05	46.00	-13.95	AVG	
7		1.3619	29.96	9.58	39.54	56.00	-16.46	QP	
8		1.3619	14.91	9.58	24.49	46.00	-21.51	AVG	
9		3.3140	27.43	9.68	37.11	56.00	-18.89	QP	
10		3.3140	13.58	9.68	23.26	46.00	-22.74	AVG	
11		12.8820	34.18	9.70	43.88	60.00	-16.12	QP	
12		12.8820	15.77	9.70	25.47	50.00	-24.53	AVG	



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Full load



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1539	47.65	9.52	57.17	65.79	-8.62	QP	
2		0.1539	26.94	9.52	36.46	55.79	-19.33	AVG	
3		0.1920	42.50	9.47	51.97	63.95	-11.98	QP	
4		0.1920	22.50	9.47	31.97	53.95	-21.98	AVG	
5		0.5740	34.80	9.89	44.69	56.00	-11.31	QP	
6		0.5740	22.29	9.89	32.18	46.00	-13.82	AVG	
7		1.2540	28.13	9.58	37.71	56.00	-18.29	QP	
8		1.2540	15.56	9.58	25.14	46.00	-20.86	AVG	
9		2.8620	22.84	9.65	32.49	56.00	-23.51	QP	
10		2.8620	9.94	9.65	19.59	46.00	-26.41	AVG	
11		13.3540	28.99	9.70	38.69	60.00	-21.31	QP	
12		13.3540	14.66	9.70	24.36	50.00	-25.64	AVG	

Remark:

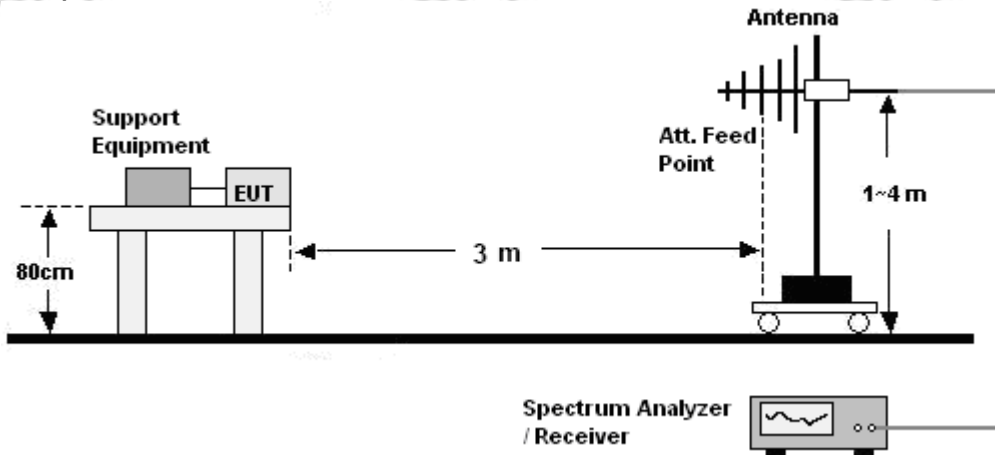
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

## 7. RADIATED EMISSIONS TEST

### 7.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:

(Floor Stand):



### 7.2 Limits

Limits for radiated disturbance of Class B MME

Frequency (MHz)	Quasi-peak limits at 3m dB( $\mu$ V/m)
30-230	40
230-1000	47

### 7.3 Test Procedure

30MHz ~ 1GHz:

- The Product was placed on the nonconductive turntable 0.8 m above the ground in a semi anechoic chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.



### 7.4 Test Results

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Full load

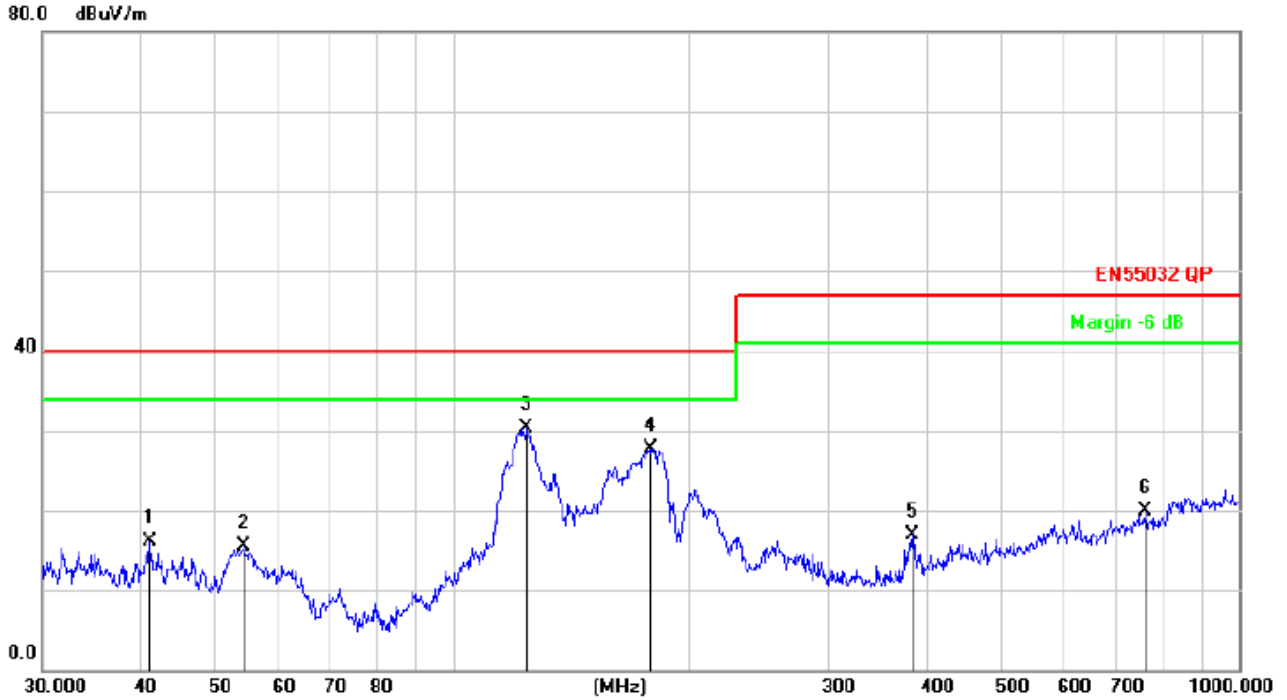


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		45.3755	28.92	-15.11	13.81	40.00	-26.19	QP		
2		124.1330	38.42	-17.83	20.59	40.00	-19.41	QP		
3	*	182.5592	48.36	-17.42	30.94	40.00	-9.06	QP		
4		199.9856	44.63	-16.30	28.33	40.00	-11.67	QP		
5		256.5211	36.32	-14.95	21.37	47.00	-25.63	QP		
6		533.8321	24.95	-8.09	16.86	47.00	-30.14	QP		





Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Full load

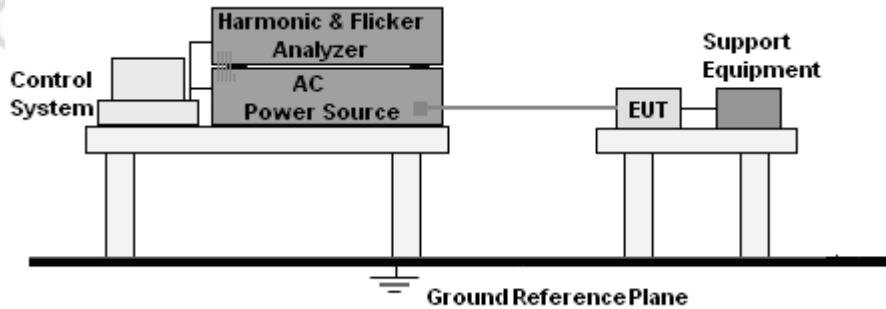


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		41.1320	31.52	-15.35	16.17	40.00	-23.83	QP		
2		54.2610	30.86	-15.30	15.56	40.00	-24.44	QP		
3	*	124.1330	48.20	-17.83	30.37	40.00	-9.63	QP		
4		178.1327	45.42	-17.70	27.72	40.00	-12.28	QP		
5		383.9318	28.46	-11.46	17.00	47.00	-30.00	QP		
6		760.7036	24.11	-4.19	19.92	47.00	-27.08	QP		

Remark:  
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

## 8. VOLTAGE FLUCTUATIONS & FLICKER(F)

### 9.1 Block Diagram of Test Setup



### 9.2 Limit

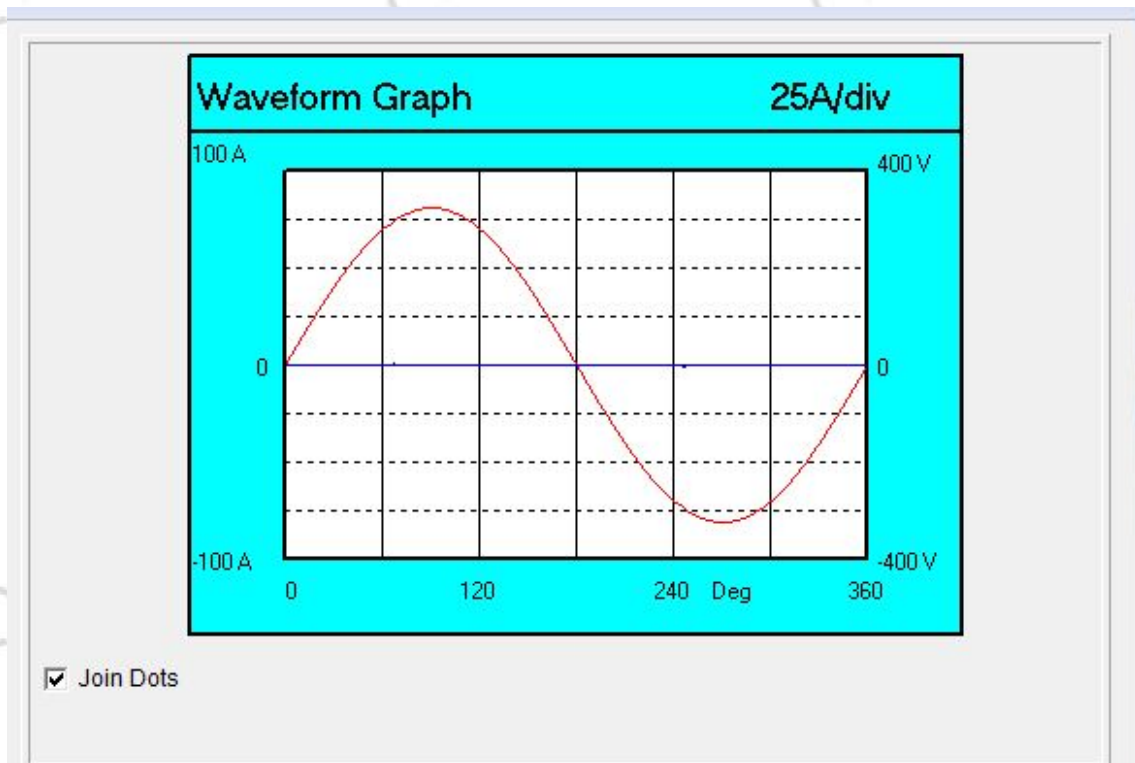
EN 61000-3-3:2013 Clause 5.

### 9.3 Test Procedure

- a. The Product was placed on the top of a non-conductive table above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- b. During the flick test, the measure time shall include that part of whole operation cycle in which the Product produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

### 9.4 Test Results

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		



voltage variations		
Variation over last 1000ms:	+0.42%	
within:	+0.03% and -0.03%	
Extreme levels:	+0.54% and -0.53%	
Tolerance band centre:	+0.42%	
Present state:	Steady	
Duration:	302.623 Seconds	
d(max):	-0.61%	PASS
Last duration of d(t) over 3.3%:	0.00 Seconds	
t(max) over 3.3%:	0.00 Seconds	PASS
Greatest d(c) upward:	-0.03%	
Greatest d(c) downward:	0.00%	
Last d(c) difference:	-0.03%	
Maximun d(c):	-0.03%	PASS
Short Term Flicker Pst:	0.00	PASS



## 9. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

Product Standard	EN 55035:2017 clause 5
<p><b>CRITERION A</b></p>	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state 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.</p>
<p><b>CRITERION B</b></p>	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, 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.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, 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.</p>
<p><b>CRITERION C</b></p>	<p>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. A reboot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

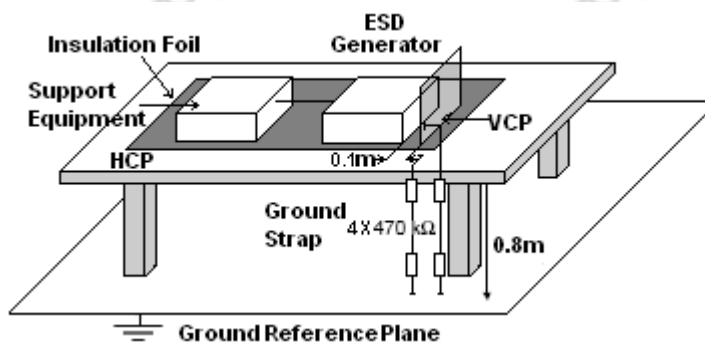
## 10. ELECTROSTATIC DISCHARGE (ESD)

### 10.1 Test Specification

<b>Test Port</b>	: Enclosure port
<b>Discharge Impedance</b>	: 330 ohm / 150 pF
<b>Discharge Mode</b>	: Single Discharge
<b>Discharge Period</b>	: one second between each discharge

### 10.2 Block Diagram of Test Setup

For Floor Stand:



### 10.3 Test Procedure

- Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.



g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the Product. The ESD generator was positioned vertically at a distance of 0.1 meters from the Product with the discharge electrode touching the HCP.

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

#### 10.4 Test Results

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Performance Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note: N/A					

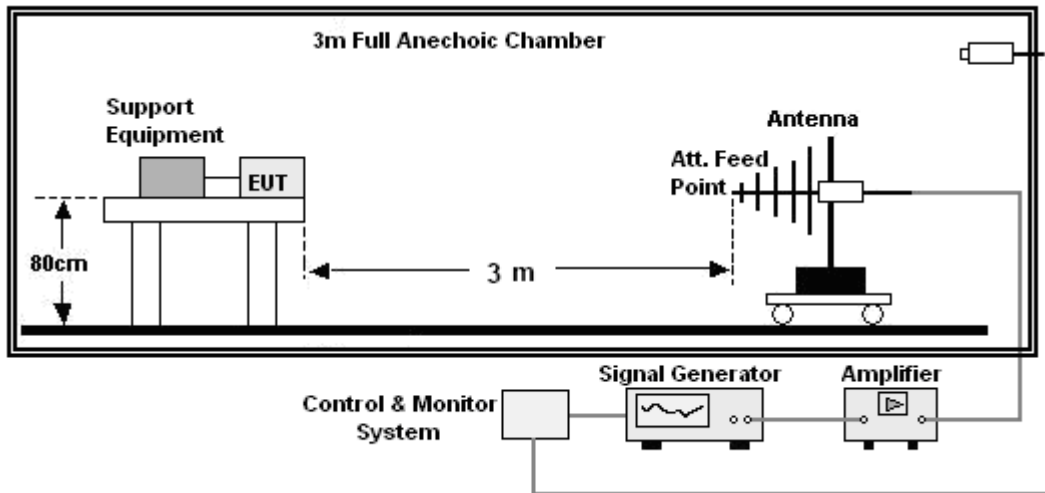
## 11. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES (RS)

### 11.1 Test Specification

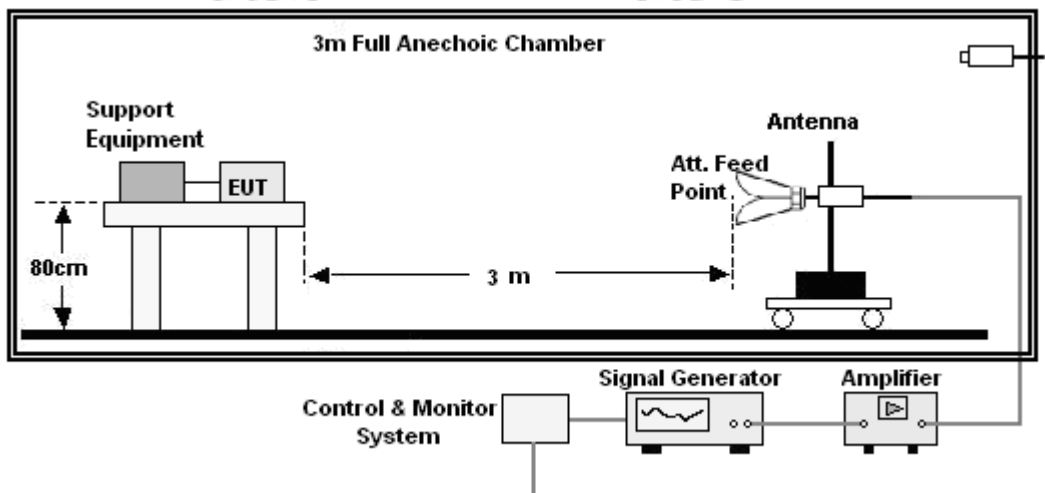
<b>Test Port</b>	: Enclosure port
<b>Step Size</b>	: 1%
<b>Modulation</b>	: 1kHz, 80% AM
<b>Dwell Time</b>	: 1 second
<b>Polarization</b>	: Horizontal & Vertical

### 11.2 Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:





### 11.3 Test Procedure

- a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
- b. The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1%.
- c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond, but should not exceed 5 s at each of the frequencies during the scan.
- d. The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.
- e. For Broadcast reception function: Group 2 not apply in this test.

### 11.4 Test Results

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

Frequency	Position	Field Strength (V/m)	Required Level	Performance Criterion
80 - 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	Front, Right, Back, Left	3	A	A
Note: N/A				



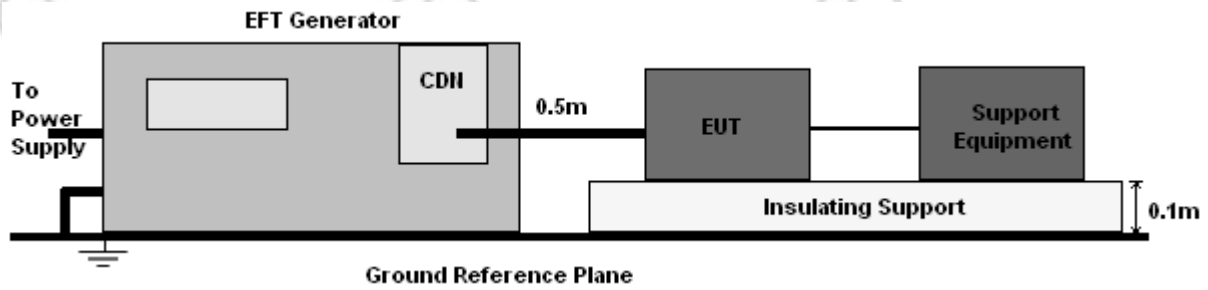
## 12. ELECTRICAL FAST TRANSIENTS/BURST (EFT)

### 12.1 Test Specification

<b>Test Port</b>	: input a.c. power port
<b>Impulse Frequency</b>	: 5 kHz
<b>Impulse Wave-shape</b>	: 5/50 ns
<b>Burst Duration</b>	: 15 ms
<b>Burst Period</b>	: 300 ms
<b>Test Duration</b>	: 2 minutes per polarity

### 12.2 Block Diagram of EUT Test Setup

For input a.c. power port:



### 12.3 Test Procedure

- The Product and support units were located on a non-conductive table above ground reference plane.
- A 0.5m-long power cord was attached to Product during the test.

### 12.4 Test Results

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

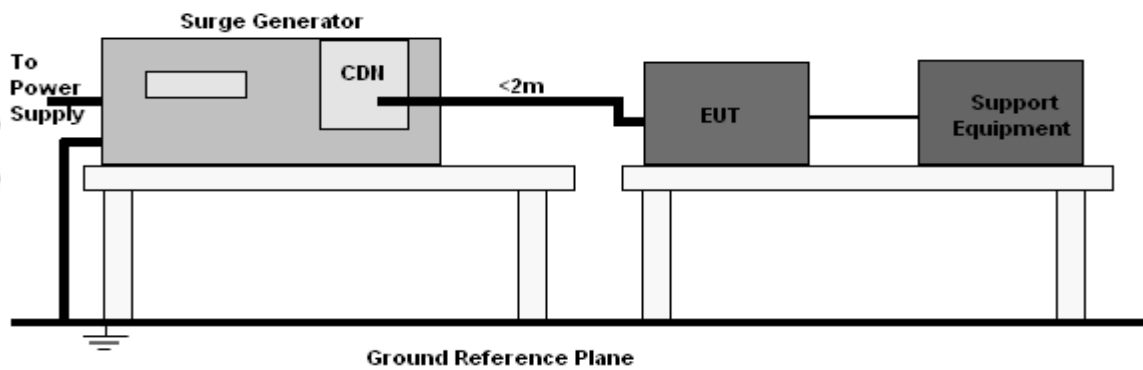
Coupling	Voltage (kV)	Polarity	Required Level	Performance Criterion
AC MainsL-N	1.0	±	B	A
Note: N/A				

### 13. SURGES IMMUNITY TEST

#### 13.1 Test Specification

<b>Test Port</b>	: input a.c. power port
<b>Wave-Shape</b>	: Open Circuit Voltage - 1.2 / 50 us Short Circuit Current - 8 / 20 us
<b>Pulse Repetition Rate</b>	: 1 pulse / min.
<b>Phase Angle</b>	: 0° / 90° / 180° / 270°
<b>Test Events</b>	: 5 pulses (positive & negative) for each polarity

#### 13.2 Block Diagram of EUT Test Setup



#### 13.3 Test Procedure

- The surge is to be applied to the Product power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave.
- The power cord between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter). Interconnection line between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter).

#### 13.4 Test Result

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

Coupling Line	Voltage (kV)	Phase Angle	Required Level	Performance Criterion
L - N	+1	90°	B	A
	-1	270°	B	A
Note: N/A				

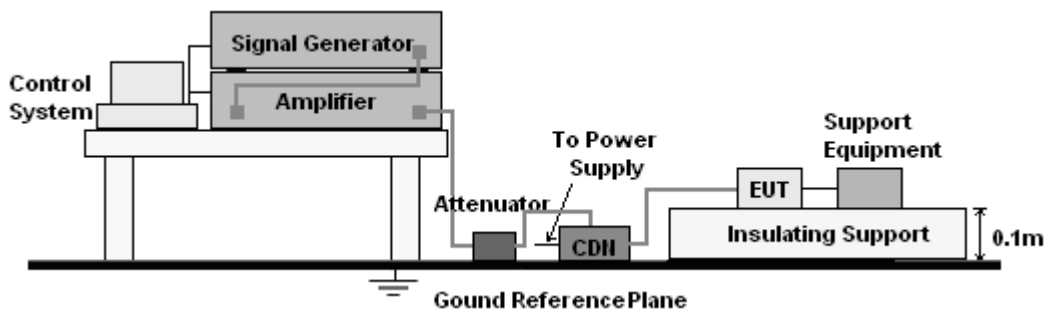
## 14. CONTINUOUS INDUCED RF DISTURBANCES (CS)

### 14.1 Test Specification

<b>Test Port</b>	: input a.c. power port
<b>Step Size</b>	: 1%
<b>Modulation</b>	: 1kHz, 80% AM
<b>Dwell Time</b>	: 1 second

### 14.2 Block Diagram of EUT Test Setup

For input a.c. power port:



### 14.3 Test Procedure

For input a.c. power port:

- The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
- The frequency range is swept from 150 kHz to 10MHz, 10MHz to 30MHz, 30MHz to 80MHz with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

### 14.4 Test Result

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

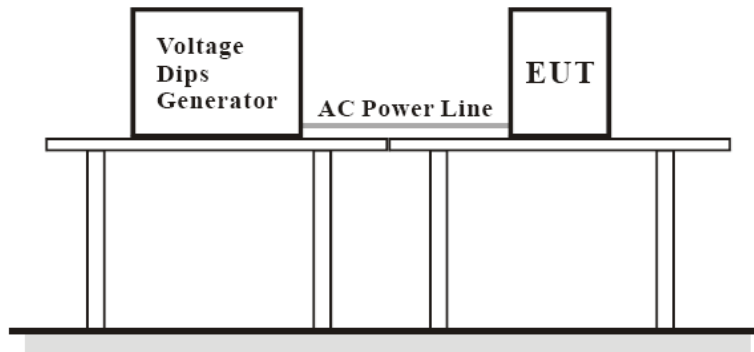
Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Required Level	Performance Criterion
a.c. port	0.15 - 10	3	A	A
	10 to 30	3 to 1	A	A
	30 to 80	1	A	A
Note: N/A				

## 15. VOLTAGE DIPS AND INTERRUPTIONS (DIPS)

### 15.1 Test Specification

**Test Port** : input a.c. power port  
**Phase Angle** : 0°, 180°  
**Test cycle** : 3 times

### 15.2 Block Diagram of EUT Test Setup



### 15.3 Test Procedure

- The Product and support units were located on a non-conductive table above ground floor.
- Set the parameter of tests and then perform the test software of test simulator.
- Conditions changes to occur at 0 degree crossover point of the voltage waveform.

### 15.4 Test Result

Temperature:	23 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Full load
Test Voltage :	AC 230V/50Hz		

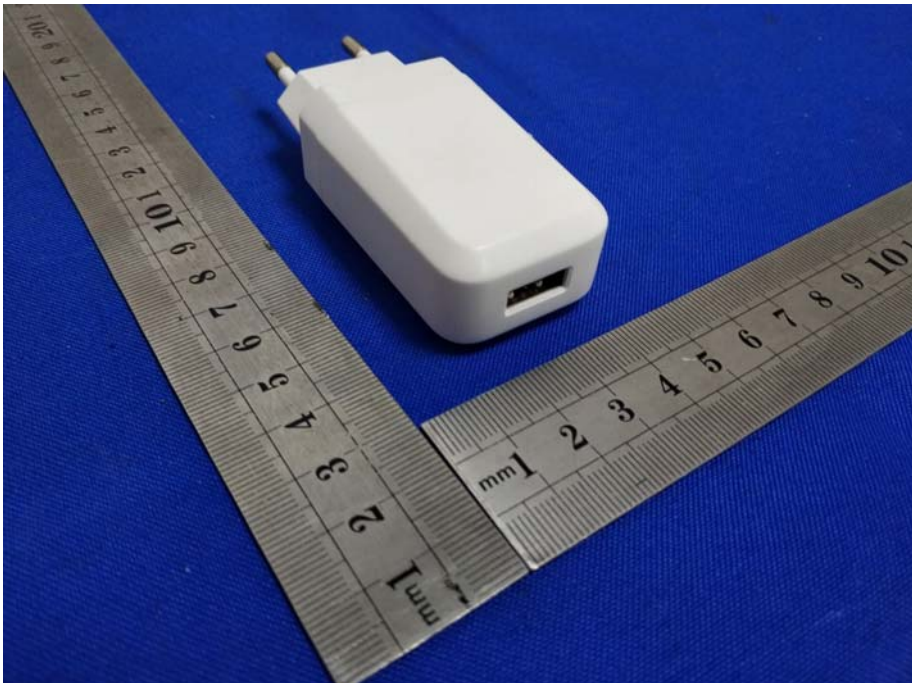
Test Level % $U_T$	Voltage dips in % $U_T$	Duration ( ms)	Required Level	Performance Criterion
< 5	≥95	10	B	A
70	30	500	C	A
<b>Voltage Interruptions:</b>				
< 5	≥95	5000	C	C*
Note: The EUT Unable to working during testing, and it need manually connect after test.				

## 16. EUT PHOTOGRAPHS

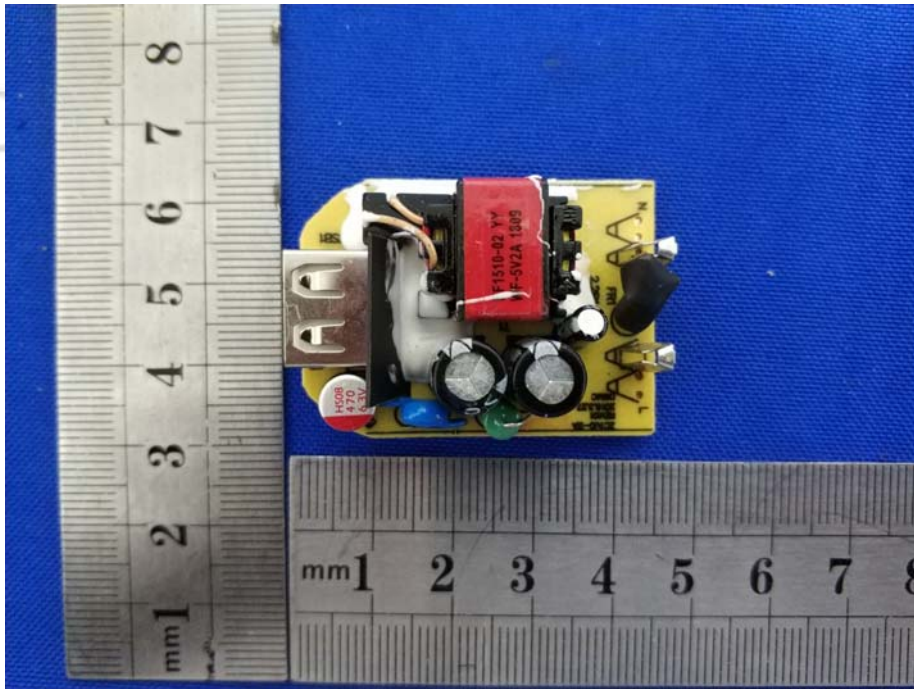
EUT Photo 1



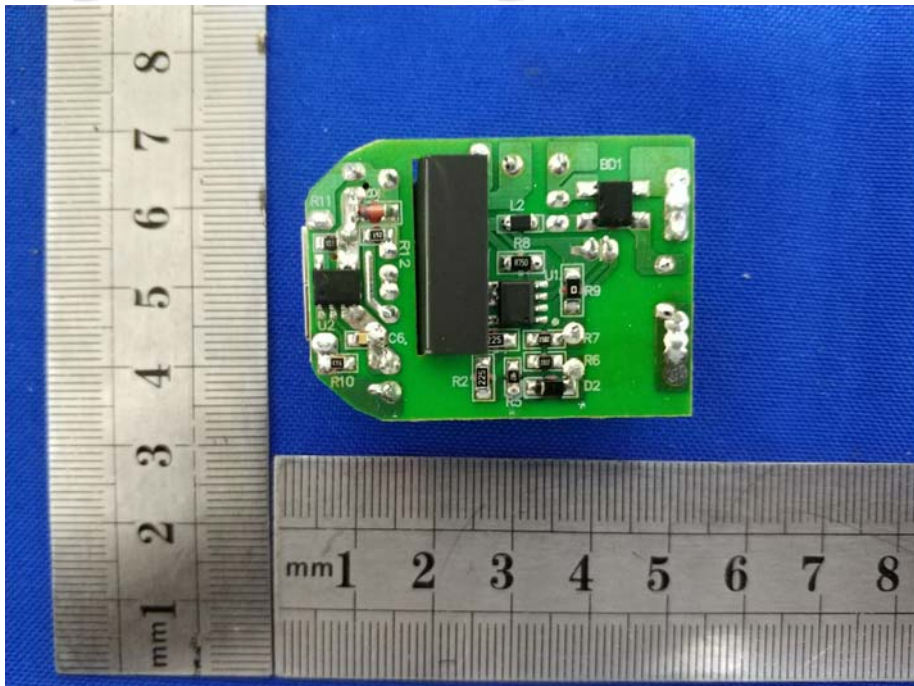
EUT Photo 2



EUT Photo 3

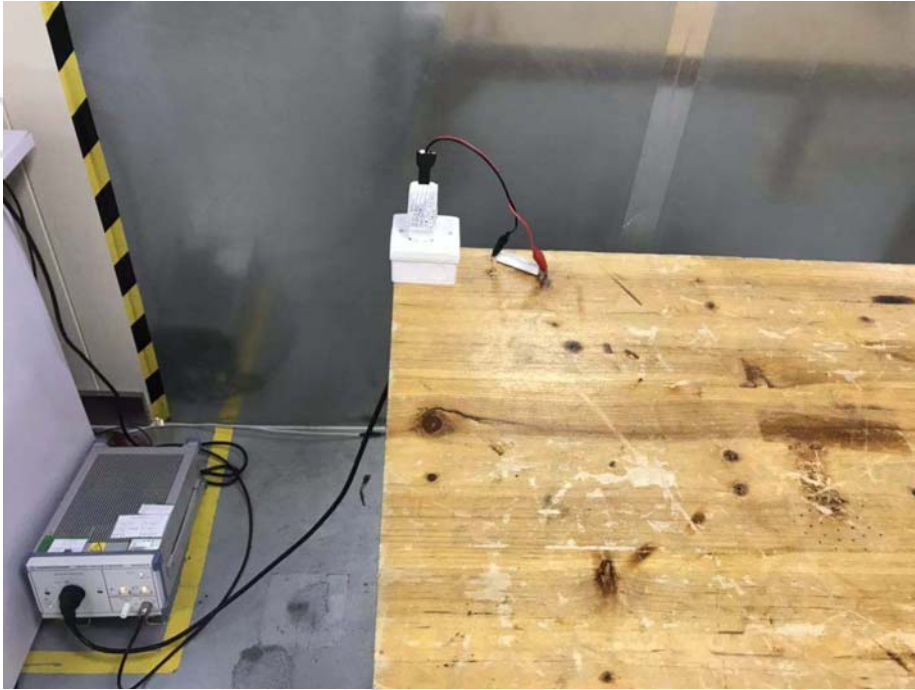


EUT Photo 4



## 17. EUT TEST SETUP PHOTOGRAPHS

Conducted emissions



Radiated emissions





F



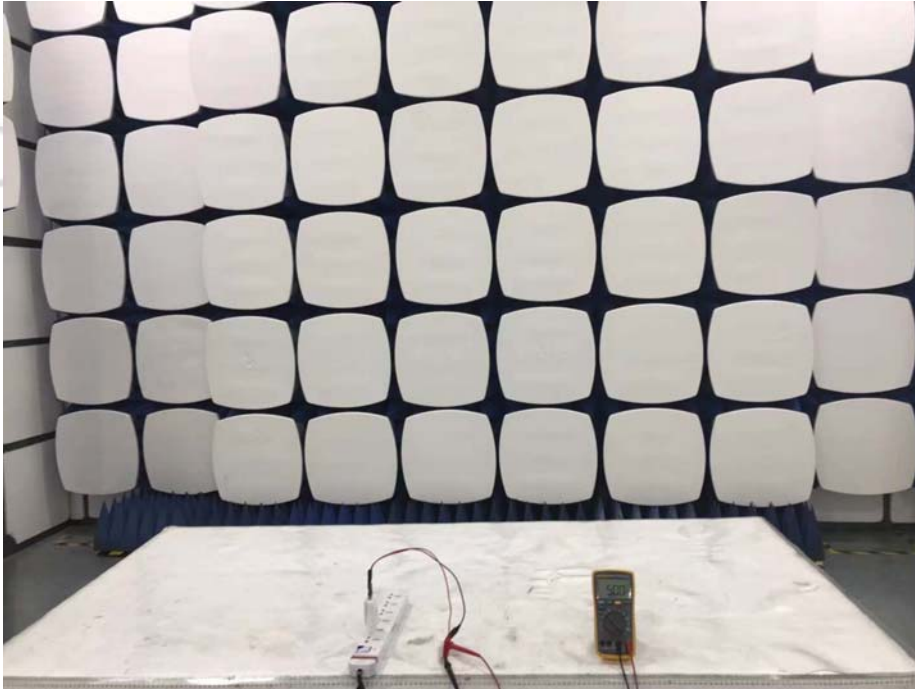
ESD







RS

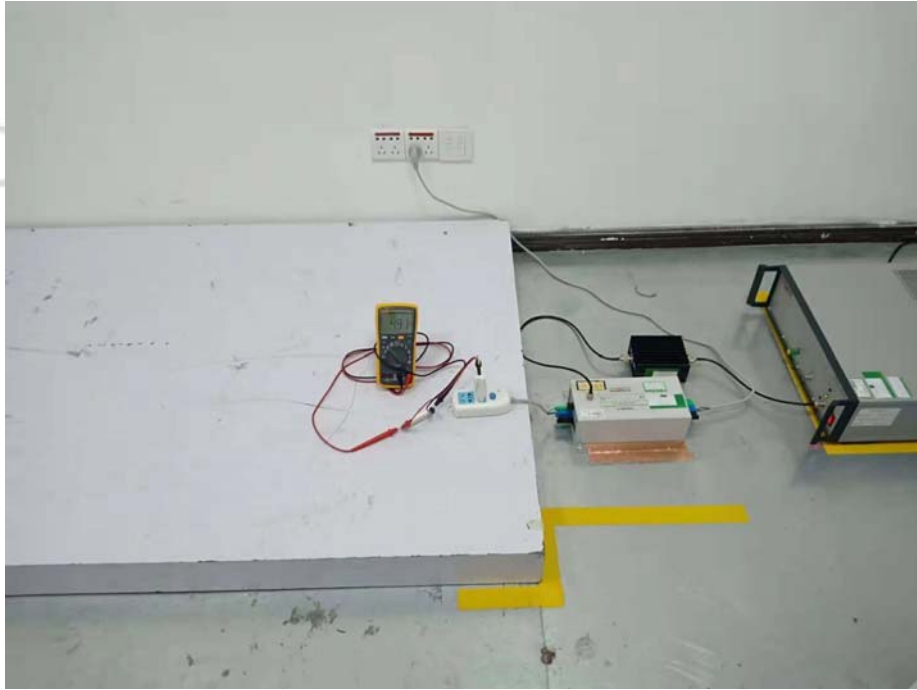


EFT&Surge&Dips





CS



\*\*\*\*\* END OF REPORT \*\*\*\*\*