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# EMC Test Report

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Report No.: AGC00552200501EE02A

**PRODUCT DESIGNATION** : Smart Phone  
**BRAND NAME** : HAFURY  
**MODEL NAME** : M20  
**APPLICANT** : Shenzhen Huafurui Technology Co., Ltd.  
**DATE OF ISSUE** : Jul 22, 2020  
**STANDARD(S)** : EN 55032:2015/AC:2016  
EN 61000-3-2:2019  
EN 61000-3-3:2013/A1:2019  
EN 55035:2017  
**REPORT VERSION** : V1.0

## Attestation of Global Compliance (Shenzhen) Co., Ltd

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**Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 22, 2020	Valid	Re-certification

Note: The original test report Ref. No.( AGC00552200501EE02) (dated 2020-06-08), was modified on 2020-07-22 to include the following changes for:

- Updated brand name and model name;
- Updated battery brand name and model name;
- Changed software version. (It changes due to the change of the product model, does not affect the test result

For the above described changes, no further testing necessary.



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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Shenzhen Huafului Technology Co., Ltd.
<b>Address</b>	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China
<b>Manufacturer</b>	Shenzhen Huafului Technology Co., Ltd.
<b>Address</b>	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China
<b>Factory Name</b>	Shenzhen Huafului Technology Co., Ltd.
<b>Address</b>	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No. 4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen,P.R. China
<b>Product Designation</b>	Smart Phone
<b>Brand Name</b>	HAFURY
<b>Test Model</b>	M20
<b>Hardware Version</b>	TE647_MAIN_PCN_V1.0
<b>Software Version</b>	HAFURY_M20_A041CH_V03_20200713
<b>Date of test</b>	May 25, 2020~Jun 03, 2020
<b>Deviation</b>	None
<b>Test Result</b>	<b>Pass</b>
<b>Report Template</b>	AGCRT-EC-IT/AC

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in EU Directive and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

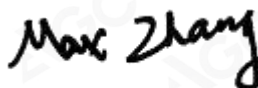
Prepared By



Calvin Liu  
(Project Engineer)

Jun. 08, 2020

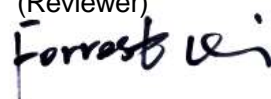
Reviewed By



Max Zhang  
(Reviewer)

Jul. 22, 2020

Approved By



Forrest Lei  
Authorized Officer

Jul. 22, 2020



## 2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION	
EMI TEST MODE	
Mode 1	Camera (By Adapter Charging+ Earphone )
Mode 2	Sound Recorder (By Adapter Charging+ Earphone)
Mode 3	Audio Play (By Adapter Charging+ Earphone)
Mode 4	Video Play (By Adapter Charging+ Earphone)
Mode 5	IDLE Mode (By Adapter Charging+ Earphone)
Mode 6	FM Mode (By Adapter Charging+ Earphone)
Mode 7	USB Mode (By PC data transferring)
Mode 8	Camera (By Battery + Earphone )
Mode 9	Sound Recorder (By Battery + Earphone )
Mode 10	Audio Play (By Battery + Earphone )
Mode 11	Video Play (By Battery + Earphone )
Mode 12	IDLE Mode (By Battery + Earphone )
Mode 13	FM Mode (By Battery + Earphone )
EMS TEST MODE	
Mode 1	Camera (By Adapter Charging+ Earphone)
Mode 2	Sound Recorder (By Adapter Charging+ Earphone)
Mode 3	Audio Play (By Adapter Charging+ Earphone)
Mode 4	Video Play (By Adapter Charging+ Earphone)
Mode 5	IDLE Mode (By Adapter Charging+ Earphone)
Mode 6	FM Mode (By Adapter Charging)
Mode 7	USB Mode (By PC data transferring)
Mode 8	Camera (By Battery + Earphone )
Mode 9	Sound Recorder (By Battery + Earphone)
Mode 10	Audio Play (By Battery + Earphone)
Mode 11	Video Play (By Battery + Earphone)
Mode 12	IDLE Mode (By Battery+ Earphone)
Mode 13	FM Mode (By Battery + Earphone)
Note: 1. The above test modes in list items were carried out for all operation modes, only the worst test data recorded in the test report.	



- 2.The EUT can be operated during charging via USB(adaptor or PC connection)
- 3. The USB port can be used for charging and also can be used to transfer data with PC.



### 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.2\text{dB}$
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 3.9\text{dB}$
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8\text{dB}$





#### 4. PRODUCT INFORMATION

<b>Adapter Test Model Name</b>	TPA-97050100VU
<b>Housing Type</b>	Plastic
<b>Power Supply</b>	DC5.0V,1000mA

#### I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB Port	1	0.8m, Unshielded	1
Earphone	1	-	1

#### Performance Criteria for EMS

All the test data has been collected, reduced, and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:

- The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.
- The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
- Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.



## 5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
--	--	--	--	--	--



## 6. TEST FACILITY

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao 'an District, Shenzhen, Guangdong, China
<b>Description</b>	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The chamber and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	June 12, 2019	June 11, 2020
AMN	R&S	ESH2-Z5	100086	Aug.26, 2019	Aug.25, 2020
TEST SOFTWARE	FR	EZ-EMC	AGC-CON03 A	--	--

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	June 12, 2019	June 11, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021
POSITIONING CONTROLLER	MF	MF-7802	MF78020828 5	--	--
HORN ANTENNA	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
TEST SOFTWARE	FR	EZ-EMC	Ver.RA-03A	--	--
CHAMBER	ETS	---	---	Feb. 27, 2020	Feb. 26, 2021

### TEST EQUIPMENT OF POWER HARMONICS / VOLTAGE FLUCTUATION / FLICKER TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Conditioning Unit	Schaffner	CCN1000-1	72431	Aug.27, 2019	Aug.26, 2020
AC Source	Schaffner	NSG1007	56825	Aug.27, 2019	Aug.26, 2020

### SURGE/EFT/DIPS

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Lightning Surge/EFT/DIPS Generator	Schaffner	Modula 6150	34437	Aug.2, 2019	Aug.26, 2020



### TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	EM	DITO	P1527160053	Oct. 29, 2019	Oct. 28, 2020

### TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Signal Generator	AGILENT	E8257D	MY45141029	Sep. 18, 2019	Sep. 17, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 20, 2019	Sep. 19, 2020
Power Probe	R&S	URV5-Z4	100124	May 22, 2020	May 21, 2022
POWER METER	R&S	NRVD	8323781027	May 22, 2020	May 21, 2022
POWER AMPLIFIER	KALMUS	7100LC	04-02/17-06-001	June 12, 2019	June 11, 2020
RF AMPLIFIER	Milmega	AS0104-55_55	1004793	June 12, 2019	June 11, 2020
HORN ANTENNA	ETS LINDGREN	3117	00034609	May 17, 2020	May 16, 2022
Power Amplifier	RF Light	NTWPAS-2560 100	2016051406	Oct. 15, 2019	Oct. 14, 2020

### TEST EQUIPMENT OF CS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	AR	75A250	18464	June 12, 2019	June 11, 2020
CDN	Schaffner	M016	21264	Aug.17, 2019	Aug.16, 2020
6dB attenuator	JWF	50FHC-006-50	5N-20	June 12, 2019	June 11, 2020
Electromagnetic Injection Clamp	Luthi	EM101	35773	Sep. 27, 2019	Sep. 26, 2020
Power Probe	R&S	URV5-Z4	100124	May 22, 2020	May 21, 2022
POWER METER	R&S	NRVD	8323781027	May 22, 2020	May 21, 2022
Power Amplifier	KALMUS	7100LC	04-02/17-06-001	-	-
Signal Generator	Aglient	E4421B	MY43351603	June 12, 2019	June 11, 2020

### PFMF IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
PFMF Test apparatus	HTEC	HPFMF	161701	Aug.26, 2019	Aug.25, 2020
Magnetic field coil	HTEC	HPFMF	161701	Aug.26, 2019	Aug.25, 2020





## 7. EN 55032 LINE CONDUCTED EMISSION TEST

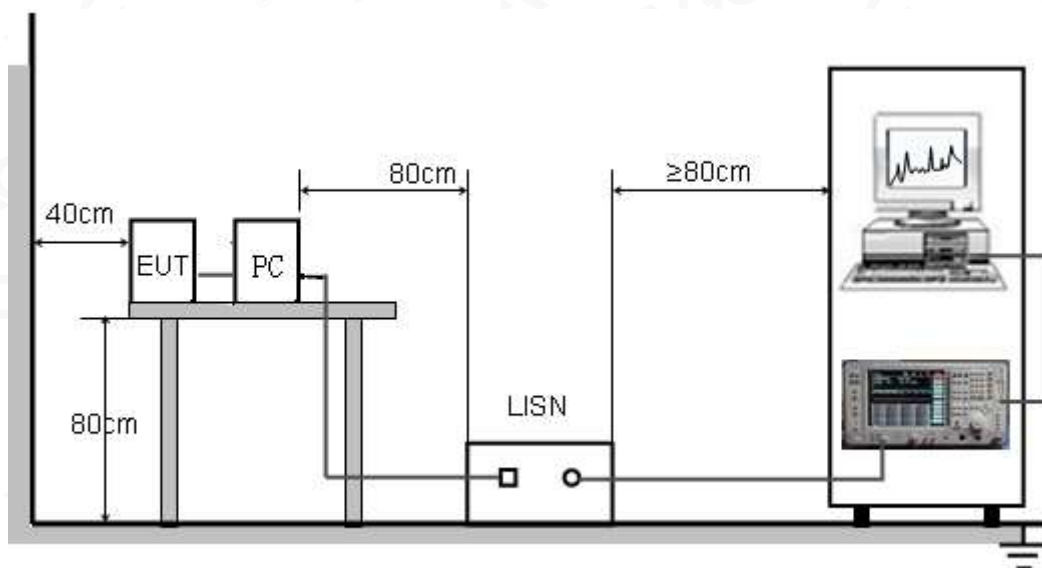
### 7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

EN 55032 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class B limits (dBuV)
A10.1	0.15 - 0.5	AMN/LISN	Quasi-peak / 9kHz	66 - 56
	0.5 - 5			56
	5 - 30.0			60
A10.1	0.15 - 0.5		Average / 9kHz	56 - 46
	0.5 - 5			46
	5 - 30.0			50

**Note:**

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

### 7.2. BLOCK DIAGRAM OF TEST SETUP



**Note: 1. Support units were connected to second LISN/AMN.**

- 2. The distance specified between EUT/AE and other metallic objects is  $\geq 0.8$  m in the measurement arrangement for table-top EUT.**

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

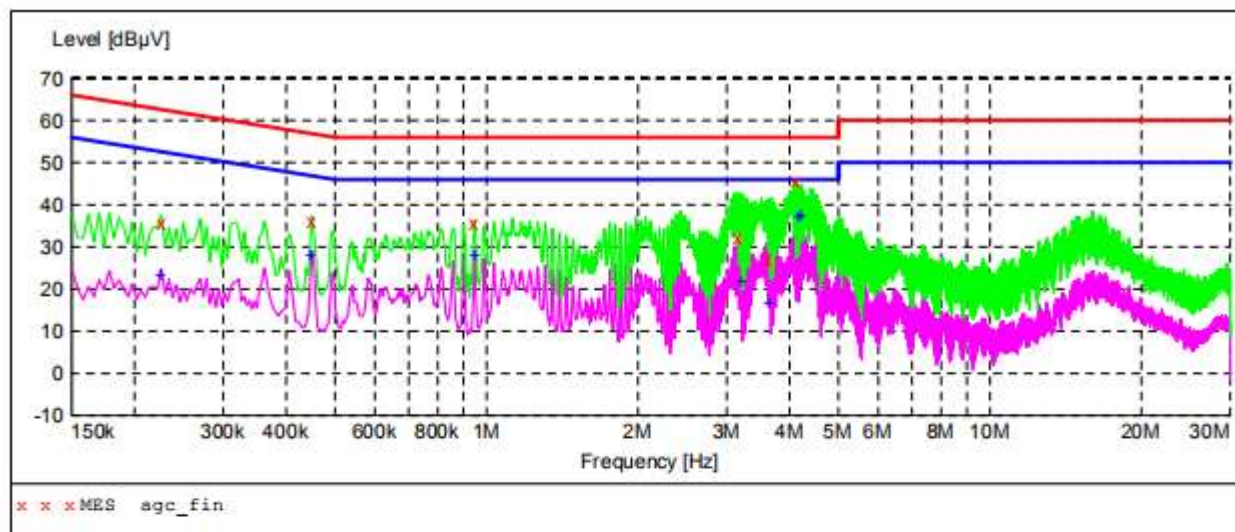
- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN55032.
- (4) The EUT received AC230V/50Hz power through a Line Impedance Stabilization Network (LISN/AMN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received power from a second LISN supplying power of AC 230V/50Hz, if any.
- (6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- (8) During the above scans, the emissions were maximized by cable manipulation.
- (9) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (10) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

**Note:** The test modes were carried out for all operation modes  
The worst case (Mode 4) was showed as the follow:



## 7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

### LINE CONDUCTED EMISSION TEST-L



#### MEASUREMENT RESULT: "agc\_fin"

2020/5/25 11:15

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.226000	35.50	10.3	63	27.1	QP	L1	GND
0.450000	35.90	10.3	57	21.0	QP	L1	GND
0.946000	35.80	10.3	56	20.2	QP	L1	GND
3.150000	32.20	10.4	56	23.8	QP	L1	GND
3.642000	27.10	10.4	56	28.9	QP	L1	GND
4.146000	45.80	10.4	56	10.2	QP	L1	GND

#### MEASUREMENT RESULT: "agc\_fin2"

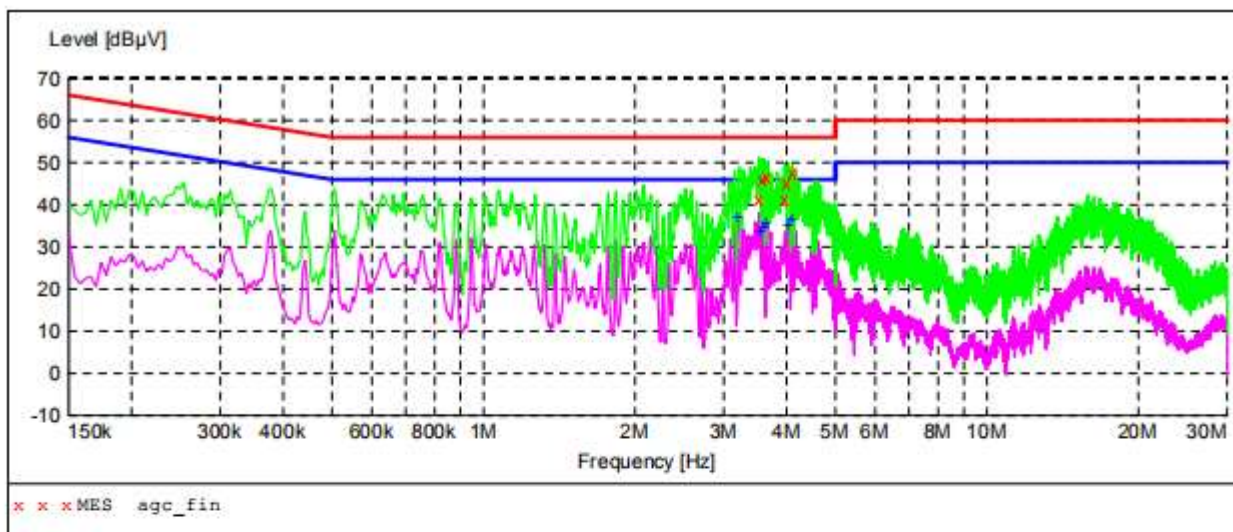
2020/5/25 11:15

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.226000	23.30	10.3	53	29.3	AV	L1	GND
0.450000	28.20	10.3	47	18.7	AV	L1	GND
0.946000	28.00	10.3	46	18.0	AV	L1	GND
3.202000	22.00	10.4	46	24.0	AV	L1	GND
3.646000	16.70	10.4	46	29.3	AV	L1	GND
4.190000	36.90	10.4	46	9.1	AV	L1	GND
4.230000	37.60	10.4	46	8.4	AV	L1	GND





# LINE CONDUCTED EMISSION TEST-N



## MEASUREMENT RESULT: "agc\_fin"

2020/5/25 10:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
3.526000	41.20	10.4	56	14.8	QP	N	GND
3.602000	45.90	10.4	56	10.1	QP	N	GND
3.666000	46.70	10.4	56	9.3	QP	N	GND
3.966000	41.10	10.4	56	14.9	QP	N	GND
4.034000	45.00	10.4	56	11.0	QP	N	GND
4.110000	47.40	10.4	56	8.6	QP	N	GND

## MEASUREMENT RESULT: "agc\_fin2"

2020/5/25 10:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
3.222000	37.10	10.4	46	8.9	AV	N	GND
3.534000	33.60	10.4	46	12.4	AV	N	GND
3.598000	34.40	10.4	46	11.6	AV	N	GND
3.662000	35.50	10.4	46	10.5	AV	N	GND
4.042000	35.30	10.4	46	10.7	AV	N	GND
4.106000	36.50	10.4	46	9.5	AV	N	GND





## 8. EN 55032 RADIATED EMISSION TEST

### 8.1. LIMITS OF RADIATED DISTURBANCES

Radiated Emission at Frequencies up to 1GHz

For Class B Equipment SAC/OATS

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
A4.1	30 - 230	10	Quasi Peak	30
	230 - 1000			37
A4.2	30 - 230	3	Quasi Peak	40
	230 - 1000			47

Radiated Emission at Frequencies above 1GHz

For Class B Equipment FSOATS

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Detector type	Limits (dBuV/m)
A5.1	1000 - 3000	3	Average	50
	3000 - 6000			54
A5.2	1000 - 3000		Peak	70
	3000 - 6000			74

Note: The lower limit shall apply at the transition frequency.

#### Required highest frequency for radiated measurement

EN 55032 Table clause	Highest internal frequency (Fx)	Highest measured frequency
1	$F_x \leq 108 \text{ MHz}$	1 GHz
	$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz
	$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz
	$F_x > 1$	5 x Fx up to a maximum of 6 GHz

NOTE 1 For TV and FM broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.

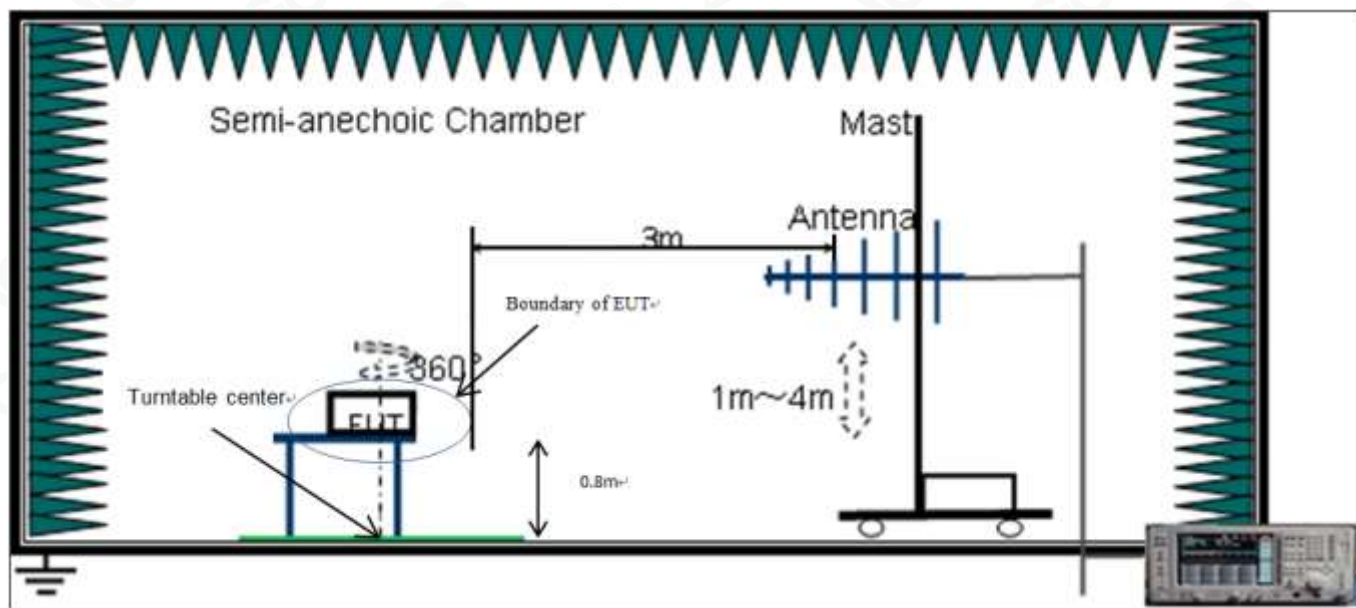
NOTE 2 Fx is highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.

Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz.



## 8.2. BLOCK DIAGRAM OF TEST SETUP

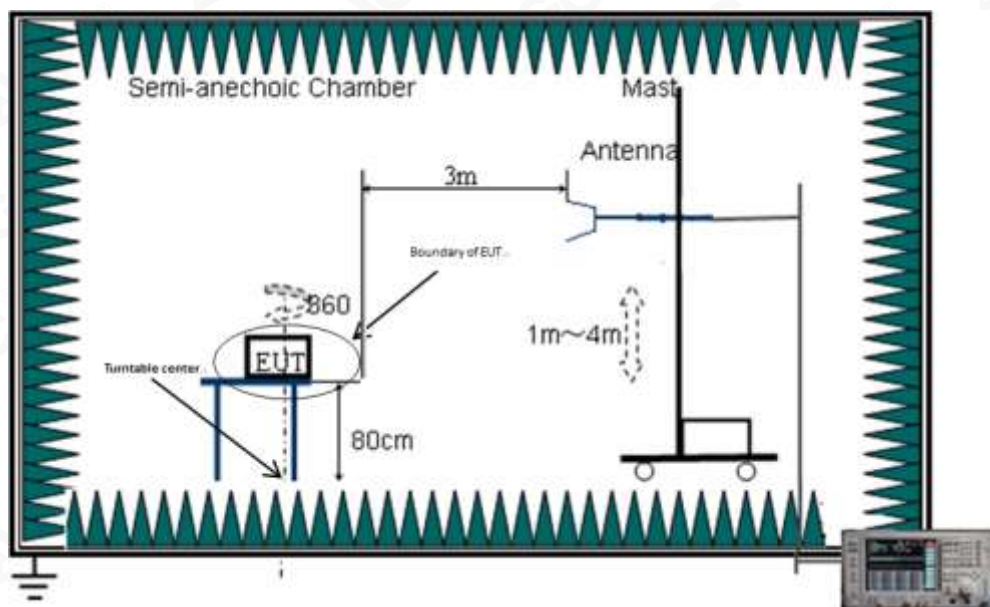
### Radiated Disturbance 30M to1 GHz



Receiver

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.

### Radiated Disturbance above 1 GHz



Receiver

Note: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum

analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



### 8.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
- (4) The EUT received AC230V/50Hz power through the outlet socket under the turntable. All support equipments received AC230V/50Hz power from socket under the turntable, if any.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (6) The Analyzer / Receiver quickly scanned from 1GHz to 6000MHz. The EUT test program was started.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

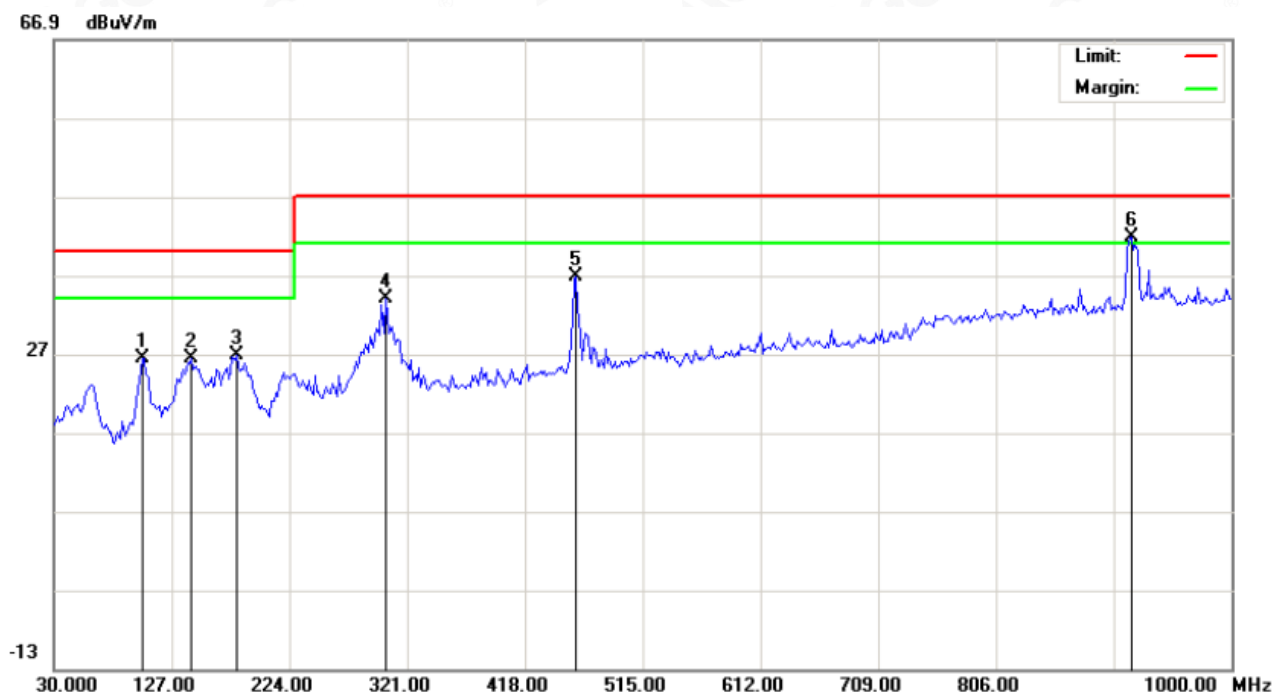
**Note:** The test modes were carried out for all operation modes  
The worst case (Mode 4) was showed as the follow:





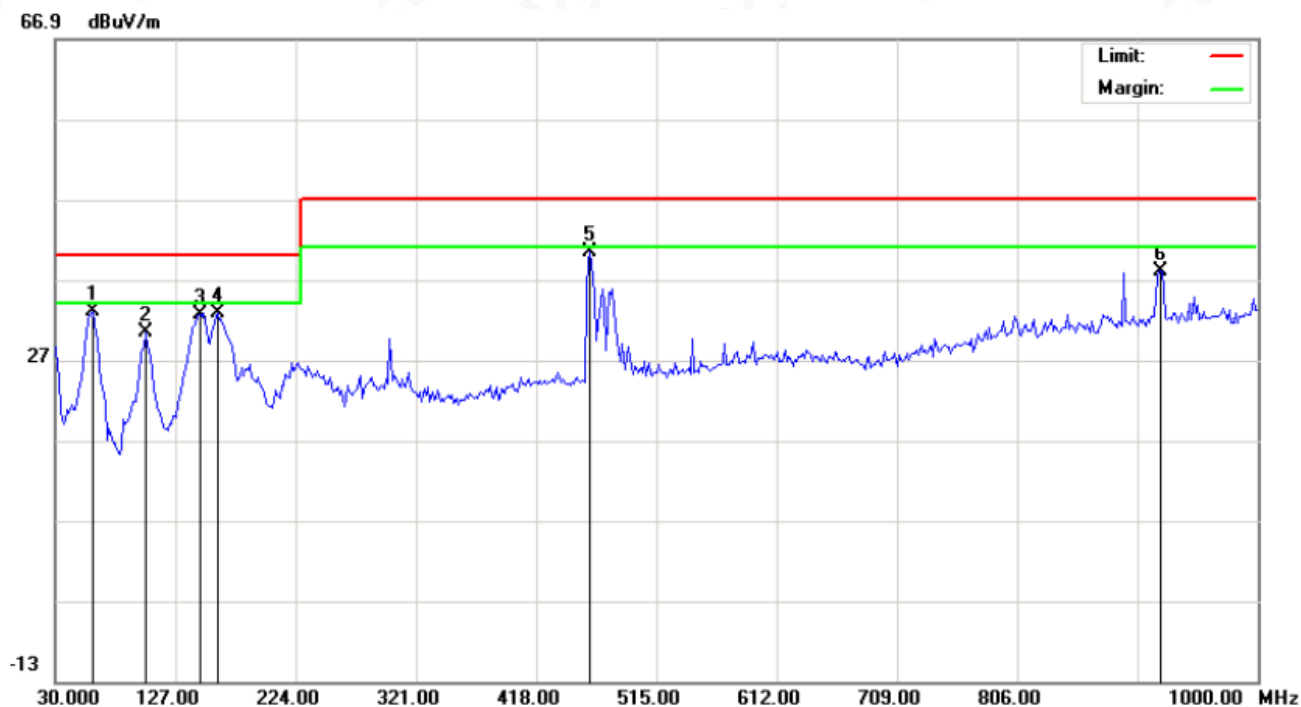
#### 8.4. TEST RESULT OF RADIATED EMISSION TEST

##### RADIATED EMISSION BELOW 1GHZ- HORIZONTAL



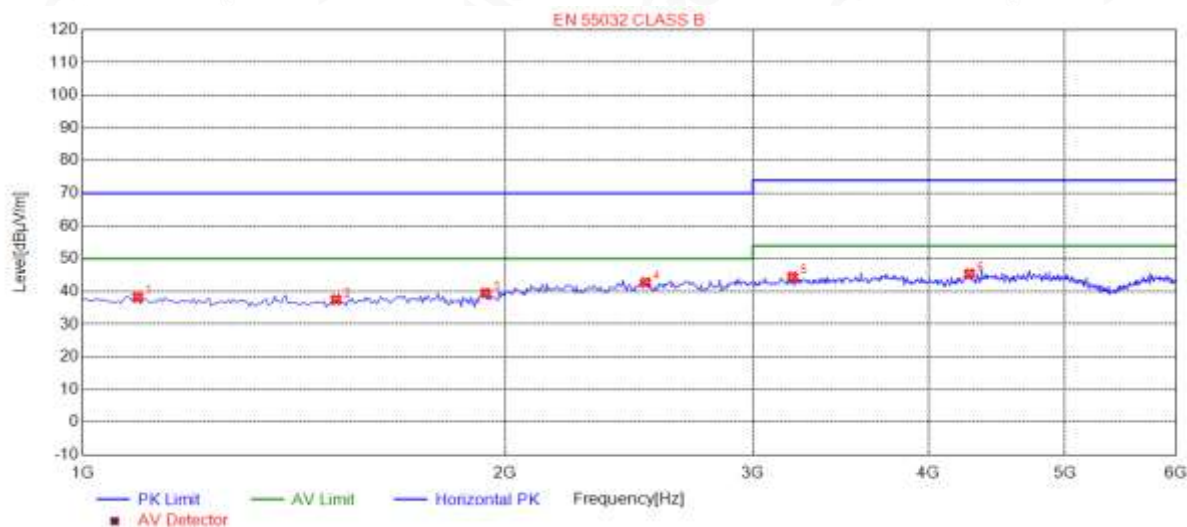
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		102.7500	10.13	16.28	26.41	40.00	-13.59	peak			
2		143.1666	7.18	19.22	26.40	40.00	-13.60	peak			
3		180.3499	9.63	17.11	26.74	40.00	-13.26	peak			
4		303.2167	14.39	19.58	33.97	47.00	-13.03	peak			
5		460.0332	12.64	24.19	36.83	47.00	-10.17	peak			
6	*	917.5499	10.00	31.85	41.85	47.00	-5.15	peak			

### RADIATED EMISSION BELOW 1GHZ- VERTICAL



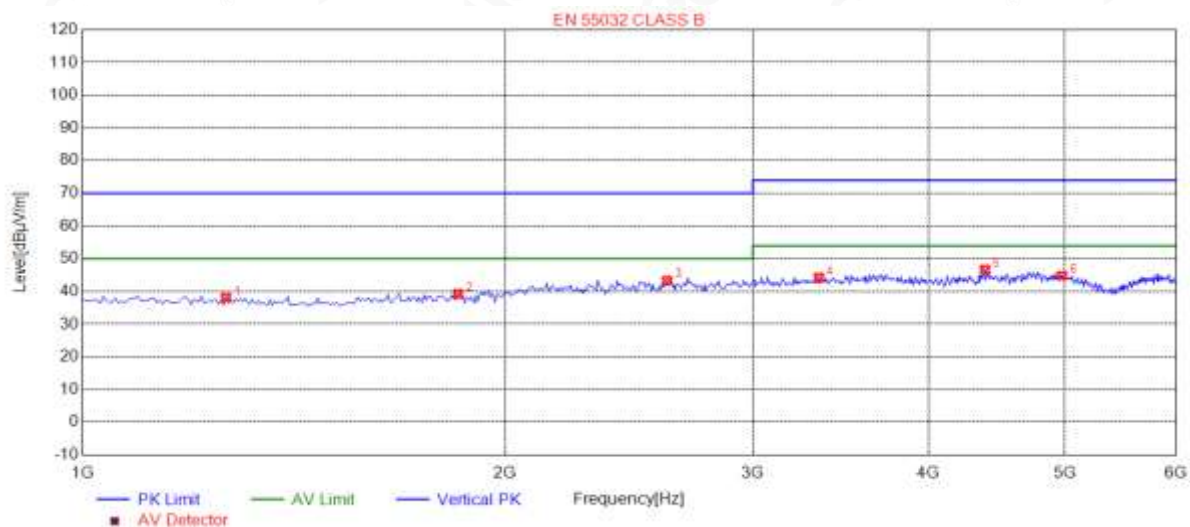
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		60.7167	14.25	18.74	32.99	40.00	-7.01	peak			
2		102.7500	14.22	16.28	30.50	40.00	-9.50	peak			
3		146.4000	13.46	19.22	32.68	40.00	-7.32	peak			
4		160.9499	13.77	19.09	32.86	40.00	-7.14	peak			
5	*	461.6499	16.15	24.22	40.37	47.00	-6.63	peak			
6		922.3999	6.14	31.89	38.03	47.00	-8.97	peak			

### RADIATED EMISSION ABOVE 1GHZ – HORIZONTAL



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1095.0951	38.17	-16.73	70.00	31.83	100	14	Horizontal
2	1515.5155	37.49	-16.97	70.00	32.51	100	155	Horizontal
3	1935.9359	39.49	-12.50	70.00	30.51	100	1	Horizontal
4	2516.5165	42.71	-9.71	70.00	27.29	100	224	Horizontal
5	3202.2022	44.48	-8.63	74.00	29.52	100	199	Horizontal
6	4278.2783	45.45	-5.78	74.00	28.55	100	321	Horizontal

## RADIATED EMISSION ABOVE 1GHZ - VERTICAL



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1265.2653	38.06	-16.90	70.00	31.94	100	200	Vertical
2	1850.8509	39.28	-13.40	70.00	30.72	100	75	Vertical
3	2606.6066	43.29	-9.64	70.00	26.71	100	2	Vertical
4	3342.3423	44.27	-8.15	74.00	29.73	100	281	Vertical
5	4388.3884	46.67	-5.49	74.00	27.33	100	96	Vertical
6	4978.9790	44.83	-4.74	74.00	29.17	100	342	Vertical

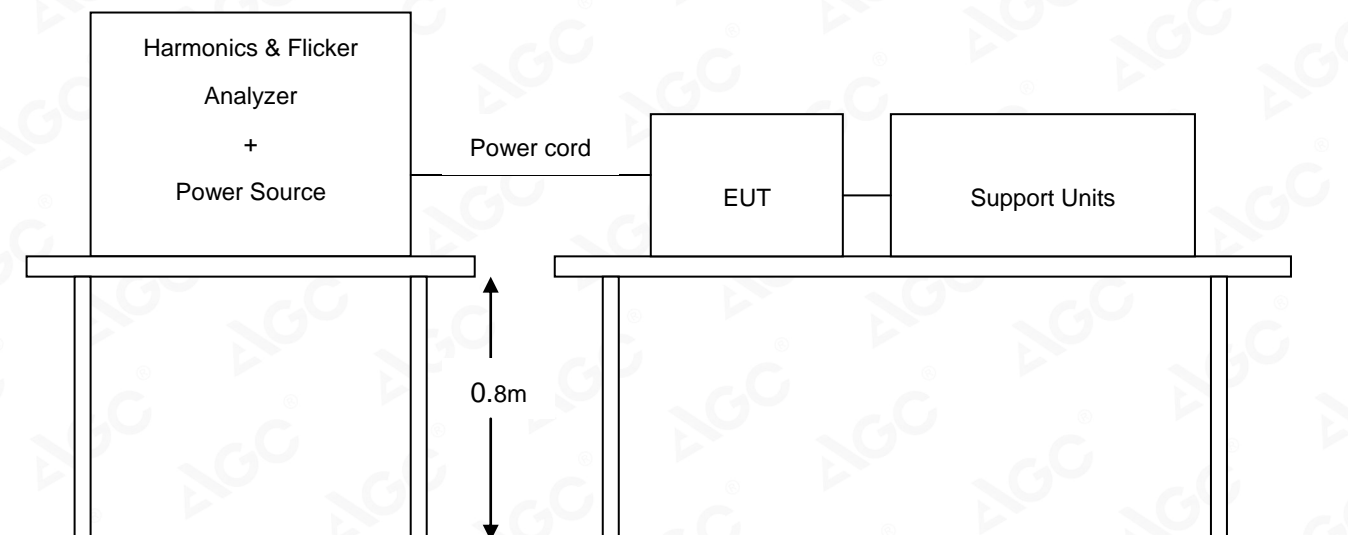


## 9. EN 61000-3-2 POWER HARMONICS TEST

### POWER HARMONICS MEASUREMENT

Port	AC mains
Basic Standard	EN 61000-3-2
Product Standard	EN 55035
Limits	<input checked="" type="checkbox"/> CLASS A ; <input type="checkbox"/> CLASS B ; <input type="checkbox"/> CLASS C; <input type="checkbox"/> CLASS D
Tester	Calvin
Temperature	20.5°C
Humidity	52.5%

#### 9.1. BLOCK DIAGRAM OF TEST SETUP



#### 9.2. RESULT

**Note:** Owing to the power of EUT is less than 75W, so test is not applicable.

## 10. EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port	AC mains
Basic Standard	EN 61000-3-3
Product Standard	EN 55035
Limits	§5 of EN 61000-3-3
Tester:	Calvin
Temperature	23.5°C
Humidity	54.5%

#### 10.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKER

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-3	
Pst	≤ 1.0, Tp= 10 min.	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3%	≤ 3.3%	Relative Steady-State V-Chang
dmax	≤ 4%	≤ 4%	Maximum Relative V-change
d (t)	N/A	≤ 3.3% for > 500 ms	Relative V-change characteristic

#### 10.2. TEST PROCEDURE

##### a. Harmonic Current Test:

Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

##### b. Fluctuation and Flickers Test:

Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

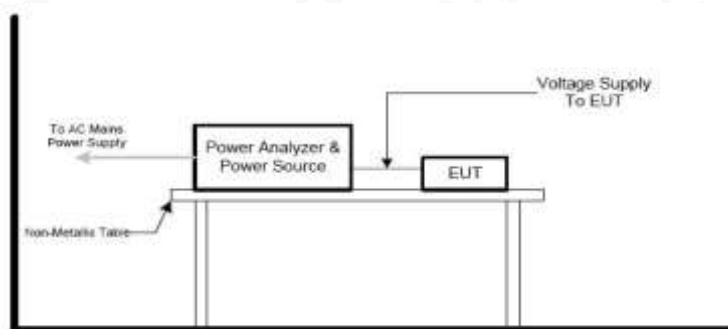
c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 10.3. EUT OPERATING CONDITION

The EUT tested system was configured as the statements of 2.2 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 10.4. BLOCK DIAGRAM OF TEST SETUP



## 10.5. THE RESULT

**Note:** The test modes were carried out for all operation modes

The worst case \_ MODE 4(By Adapter Charging) was showed as the follow:

### Flicker Test Summary per EN/EN 61000-3-3 (Run time)

EUT: Smart Phone

Tested by: Calvin

Test category: All parameters (European limits)

Test Margin: 100

Test date: May 25, 2020

Start time: 20:09:56

End time: 20:20:18

Test duration (min): 10

Data file name: unnamed

Comment: On

Time is too short for Plt plot

Parameter values recorded during the test:

Test Parameter	Measurement Value	Limit	Remarks
$P_{st}$	0.05	1.0	Pass
$P_{It}$	0.04	0.65	--
$T_{dt(s)}$	0.001	0.5	Pass
$d_{max}(\%)$	0.23%	4%	Pass
$d_c(\%)$	0.11%	3.3%	Pass



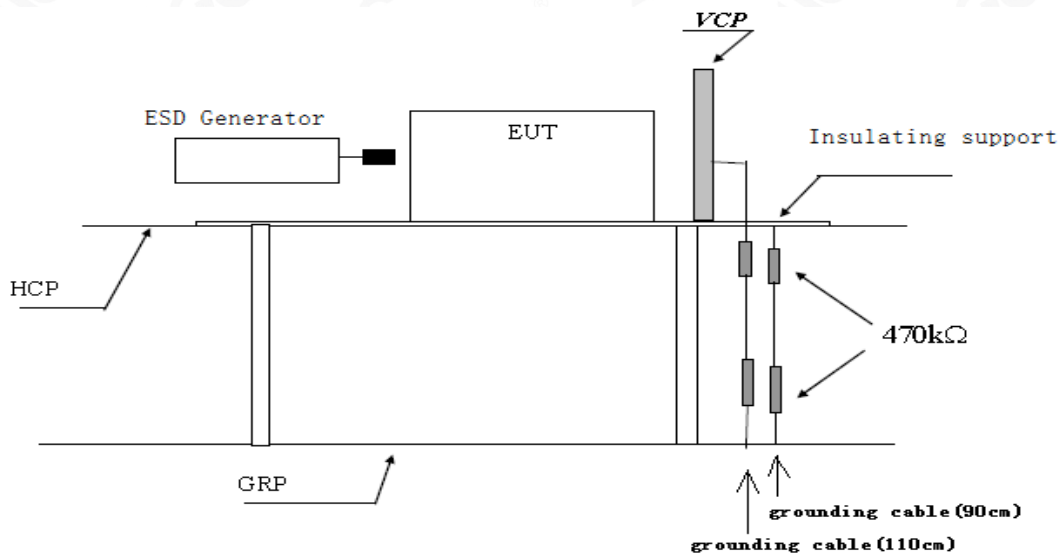
## 11. EN 61000-4-2 ESD IMMUNITY TEST

### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-2
Product Standard	EN 55035
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Calvin
Temperature	24.4°C
Humidity	57.4%

#### 11.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)





## 11.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.

The support units were located 1 m minimum away from the EUT.

EUT worked with resistance load, and make sure EUT worked normally.

Active the communication function if the EUT with such port(s).

As per the requirement of EN 55035; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.

Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.

The application of ESD to the contact of open connectors is not required.

**Note:** As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

## TEST RESULT:

Note: The test modes were carried out for all operation modes

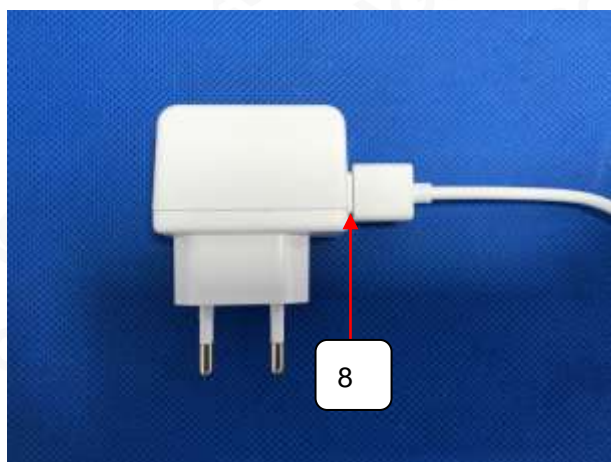
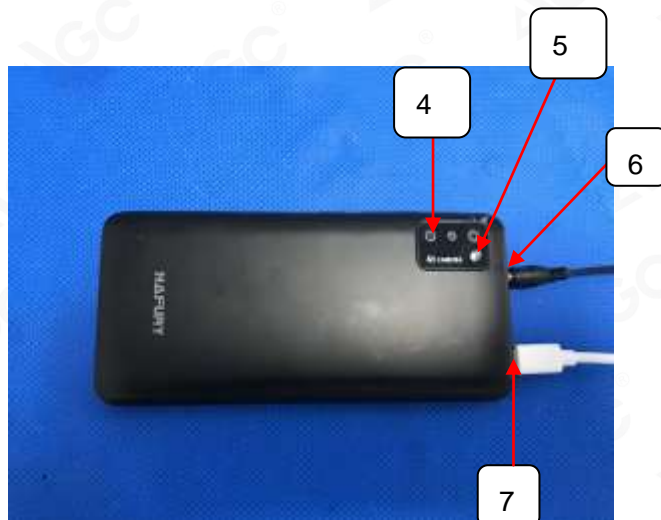
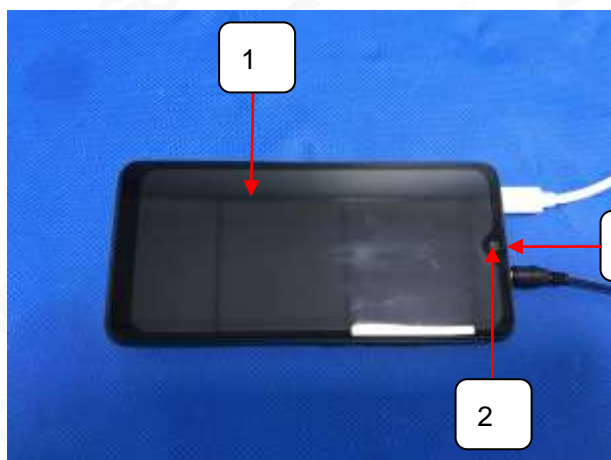
The worst case \_Mode 2 (by adapter charging) was showed as the follow:

The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Performance Result	Result (Pass/Fail)
±2kV; ±4kV	Contact Discharge	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge HCP (Front)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge HCP (Left)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge HCP (Back)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge HCP (Right)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge VCP (Front)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge VCP (Left)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge VCP (Back)	No function loss	A	Pass
±2kV; ±4kV	Indirect Discharge VCP (Right)	No function loss	A	Pass
±2kV; ±4kV; ±8kV	Air Discharge	No function loss	A	Pass



**Discharge points:**



**Note:** The air discharge points are 1~5. The contact discharge points are 6~8.

### 11.3. PERFORMANCE

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

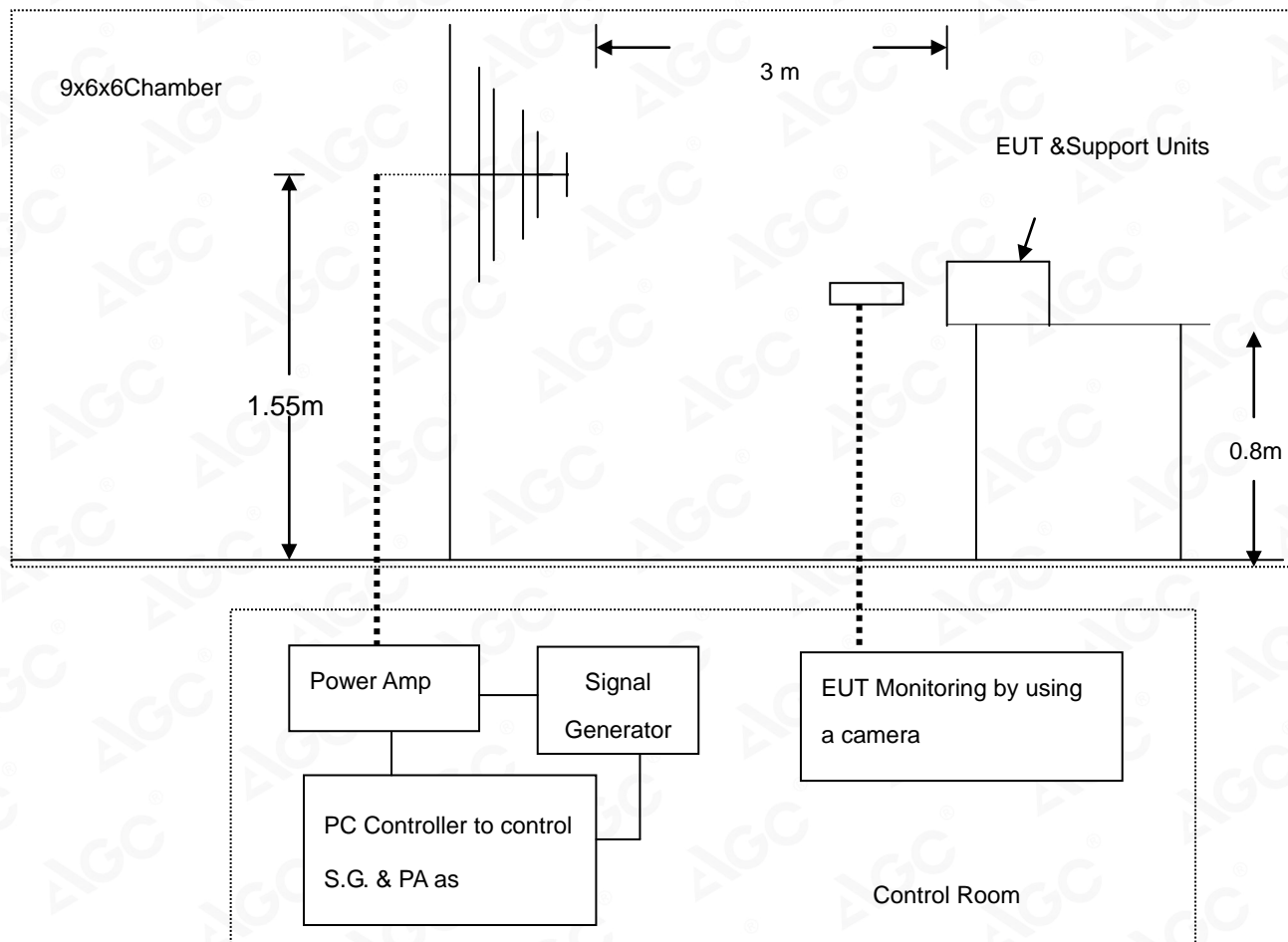


## 12. EN 61000-4-3 RS IMMUNITY TEST

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-3
Product Standard	EN 55035
Test Level:	3V/m with 80% AM. 1kHz Modulation.
Standard require	A
Tester	Calvin
Temperature	20.4°C
Humidity	58.5%

#### 12.1. BLOCK DIAGRAM OF TEST SETUP





## 12.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per EN 61000-4-3.

EUT worked with resistance load, and make sure EUT worked normally.

Setting the testing parameters of RS test software per EN 61000-4-3.

Performing the test at each side of with specified level (3V/m) at 1% steps and test frequency from 80MHz to 1000MHz , 1,8 GHz, 2,6 GHz, 3,5 GHz, 5 GHz.

Recording the test result in following table.

### EN 61000-4-3 Final test conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

## TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ Mode 4(by adapter charging) was showed as the follow:

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Performance Result	Result (Pass/Fail)
80-1000	3V/m	AM	H	Front	No function loss	A	Pass
80-1000	3V/m	AM	H	Left	No function loss	A	Pass
80-1000	3V/m	AM	H	Back	No function loss	A	Pass
80-1000	3V/m	AM	H	Right	No function loss	A	Pass
80-1000	3V/m	AM	V	Front	No function loss	A	Pass
80-1000	3V/m	AM	V	Left	No function loss	A	Pass
80-1000	3V/m	AM	V	Back	No function loss	A	Pass
80-1000	3V/m	AM	V	Right	No function loss	A	Pass
1800	3V/m	AM	H	Front	No function loss	A	Pass
1800	3V/m	AM	H	Left	No function loss	A	Pass
1800	3V/m	AM	H	Back	No function loss	A	Pass
1800	3V/m	AM	H	Right	No function loss	A	Pass
1800	3V/m	AM	V	Front	No function loss	A	Pass
1800	3V/m	AM	V	Left	No function loss	A	Pass
1800	3V/m	AM	V	Back	No function loss	A	Pass
1800	3V/m	AM	V	Right	No function loss	A	Pass
2600	3V/m	AM	H	Front	No function loss	A	Pass



2600	3V/m	AM	H	Left	No function loss	A	Pass
2600	3V/m	AM	H	Back	No function loss	A	Pass
2600	3V/m	AM	H	Right	No function loss	A	Pass
2600	3V/m	AM	V	Front	No function loss	A	Pass
2600	3V/m	AM	V	Left	No function loss	A	Pass
2600	3V/m	AM	V	Back	No function loss	A	Pass
2600	3V/m	AM	V	Right	No function loss	A	Pass
3500	3V/m	AM	H	Front	No function loss	A	Pass
3500	3V/m	AM	H	Left	No function loss	A	Pass
3500	3V/m	AM	H	Back	No function loss	A	Pass
3500	3V/m	AM	H	Right	No function loss	A	Pass
3500	3V/m	AM	V	Front	No function loss	A	Pass
3500	3V/m	AM	V	Left	No function loss	A	Pass
3500	3V/m	AM	V	Back	No function loss	A	Pass
3500	3V/m	AM	V	Right	No function loss	A	Pass
5000	3V/m	AM	H	Front	No function loss	A	Pass
5000	3V/m	AM	H	Left	No function loss	A	Pass
5000	3V/m	AM	H	Back	No function loss	A	Pass
5000	3V/m	AM	H	Right	No function loss	A	Pass
5000	3V/m	AM	V	Front	No function loss	A	Pass
5000	3V/m	AM	V	Left	No function loss	A	Pass
5000	3V/m	AM	V	Back	No function loss	A	Pass
5000	3V/m	AM	V	Right	No function loss	A	Pass



### 12.3. PERFORMANCE

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAIL</b>
--

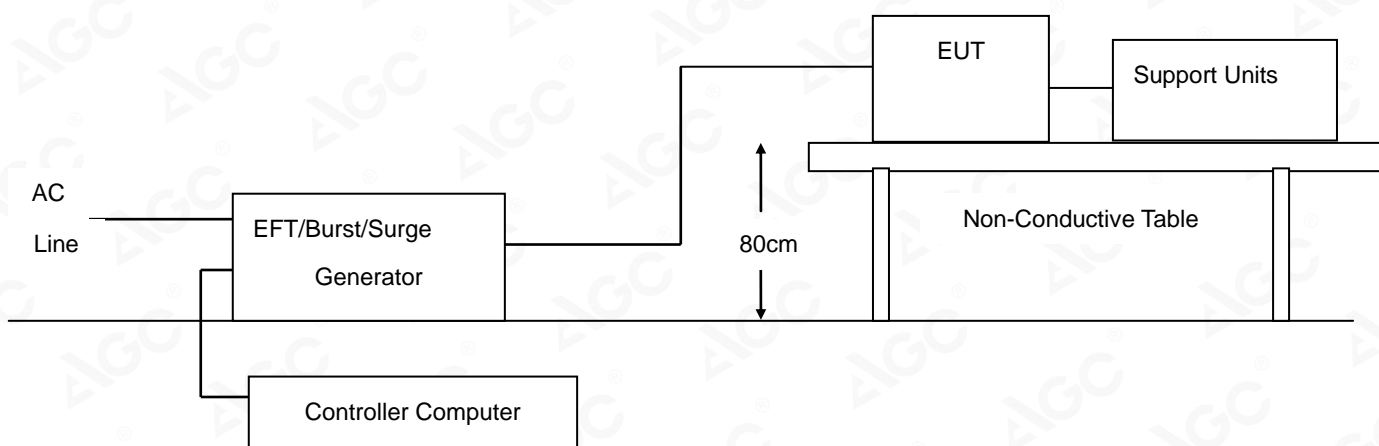


### 13. EN 61000-4-4 EFT IMMUNITY TEST

#### ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-4
Product Standard	EN 55035
Test Level	+/- 1kV for Power Supply Lines
Standard require	B
Tester	Calvin
Temperature	23.3°C
Humidity	57%

#### 13.1. BLOCK DIAGRAM OF TEST SETUP





### 13.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8m away from ground reference plane.  
A 1.0 meter long power cord was attached to EUT during the test.  
The length of communication cable between communication port and clamp was keeping within 1 meter.  
EUT worked with resistance load, and make sure EUT worked normally.  
Related peripherals work during the test.  
Recording the test result as shown in following table.

#### Test conditions:

Impulse Frequency: 5 kHz  
Tr/Th: 5/50ns  
Burst Duration: 15ms  
Burst Period: 300ms

### TEST RESULT:

Note: The test modes were carried out for all operation modes  
The worst case \_ Mode 4(By Adapter Charging) was showed as the follow:

Inject Line	Voltage kV	Inject Method	Test Performance	Performance Result	Result (Pass/Fail)
L+N	+/- 1	Indirect	No function loss	A	Pass

### 13.3. PERFORMANCE

EN 55035

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

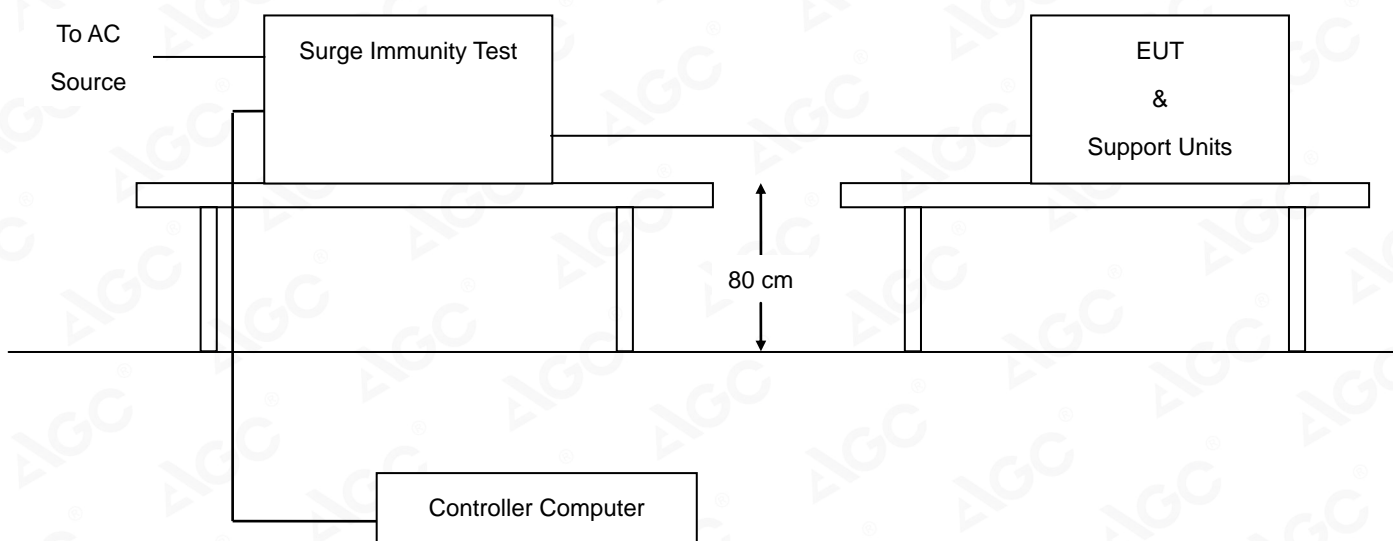
<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>
---	--------------------------------------



#### 14. EN 61000-4-5 SURGE IMMUNITY TEST SURGE IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-5
Product Standard	EN 55035
Requirements	+/- 1kV (Line to Line)
Standard require	B
Tester	Calvin
Temperature	23.3°C
Humidity	57%

##### 14.1. BLOCK DIAGRAM OF TEST SETUP



## 14.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8 m away from ground floor.

EUT worked with resistance load, and make sure EUT worked normally.

Recording the test result as shown in following table.

### Test conditions:

Voltage Waveform	1.2/50 $\mu$ s
Current Waveform	8/20 $\mu$ s
Polarity	Positive/Negative
Phase angle	0°, 180°, 90°, 270°
Number of Test	5

## TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ Mode 4(By Adapter Charging) was showed as the follow:

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Test Performance	Performance Result	Result (Pass/Fail)
L1-N	1	Positive	Capacitive	No function loss	A	Pass
L1-N	1	Negative	Capacitive	No function loss	A	Pass

## 14.3. PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

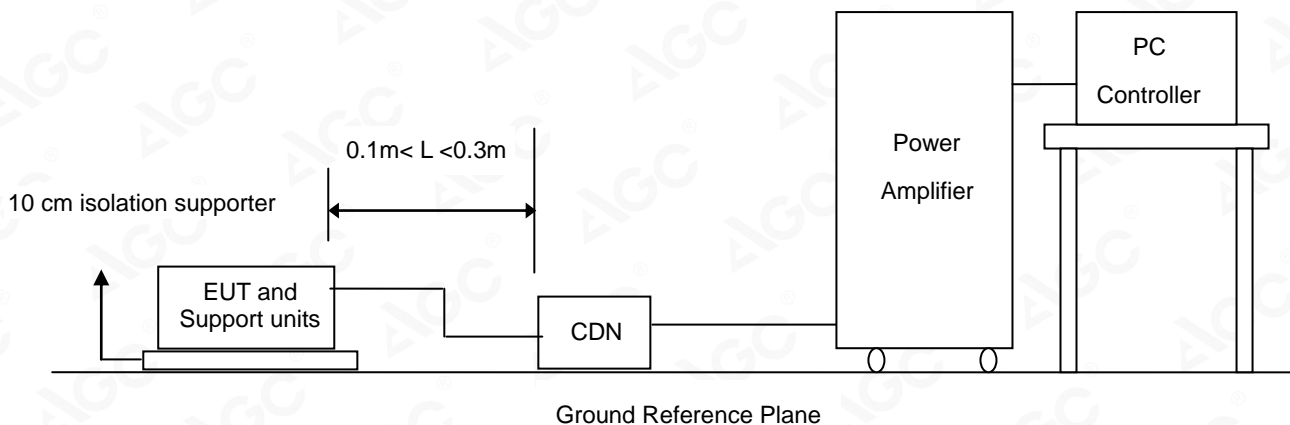
☒ PASS

☐ FAIL


## 15. EN 61000-4-6 CS IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-6
Product Standard	EN 55035
Requirements	0.15 MHz ~10MHz 3V with 80% AM. 1 kHz Modulation 10 MHz ~30MHz 3V to 1V with 80% AM. 1 kHz Modulation 30 MHz ~80MHz 1V with 80% AM. 1 kHz Modulation
Standard require	A
Tester	Calvin
Temperature	23.6°C
Humidity	56.9%

### 15.1. BLOCK DIAGRAM OF TEST SETUP





## 15.2. TEST PROCEDURE

The EUT 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.

EUT worked with resistance load, and make sure EUT worked normally.

Related peripherals work during the test.

Setting the testing parameters of CS test software per EN 61000-4-6.

Recording the test result in following table.

### Test conditions:

Frequency Range	0.15MHz-80MHz
Frequency Step	1% of fundamental
Dwell Time	1 sec

## TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ MODE 4(By Adapter Charging) was showed as the follow:

Range (MHz)	Strength	Modulation	Performance Result	Result (Pass/Fail)
0.15-10	3V	AM	A	Pass
10-30	3V to 1V	AM	A	Pass
30-80	1V	AM	A	Pass

## 15.3. PERFORMANCE

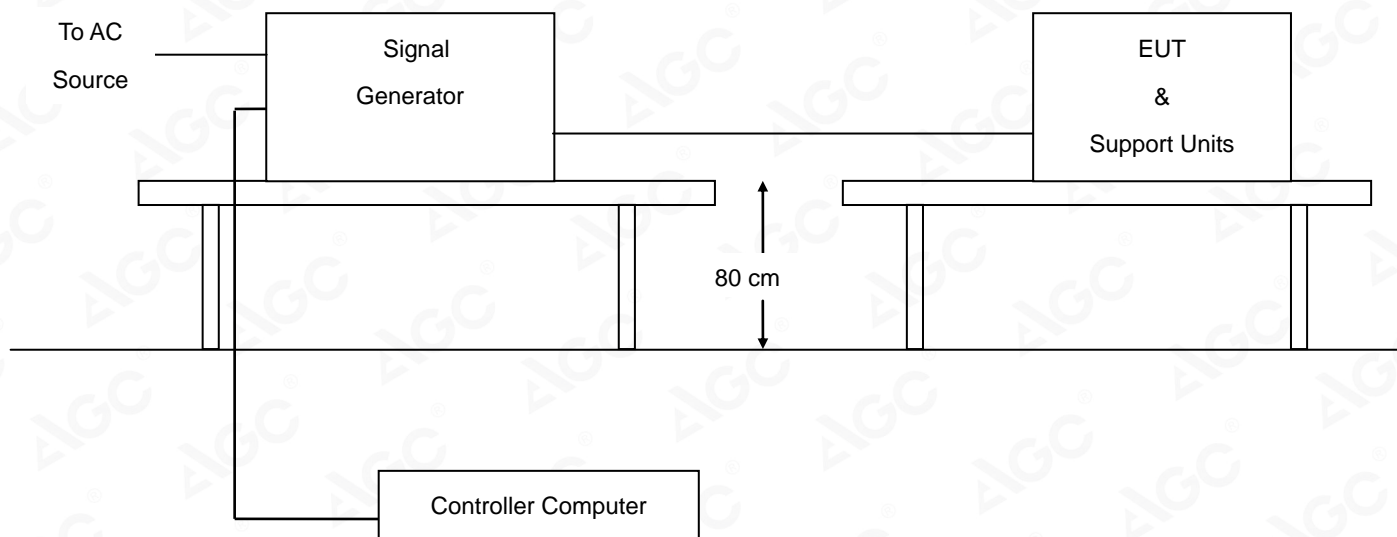
<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**


## 16. EN 61000-4-8 PFMF TEST POWER FREQUENCY MAGNETIC FIELDS IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-8
Product Standard	EN 55035
Requirements	50/60 Hz, 1A/m
Standard require	A
Tester	Calvin
Temperature	25.3 °C
Humidity	55.9%

### 16.1. BLOCK DIAGRAM OF TEST SETUP



## 16.2. TEST PROCEDURE

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m × 1m). The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

### Test Conditions:

Frequency	Polarity	Level	Test Performance	Performance Result	Result (Pass/Fail)
50 Hz	X	1 A/m	No function loss	A	Pass
50 Hz	Y	1 A/m	No function loss	A	Pass
50 Hz	Z	1 A/m	No function loss	A	Pass

### TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ MODE 4(By Adapter Charging) was showed as the follow:

## 16.3. PERFORMANCE & RESULT

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**


## 17. EN 61000-4-11 DIPS IMMUNITY TEST

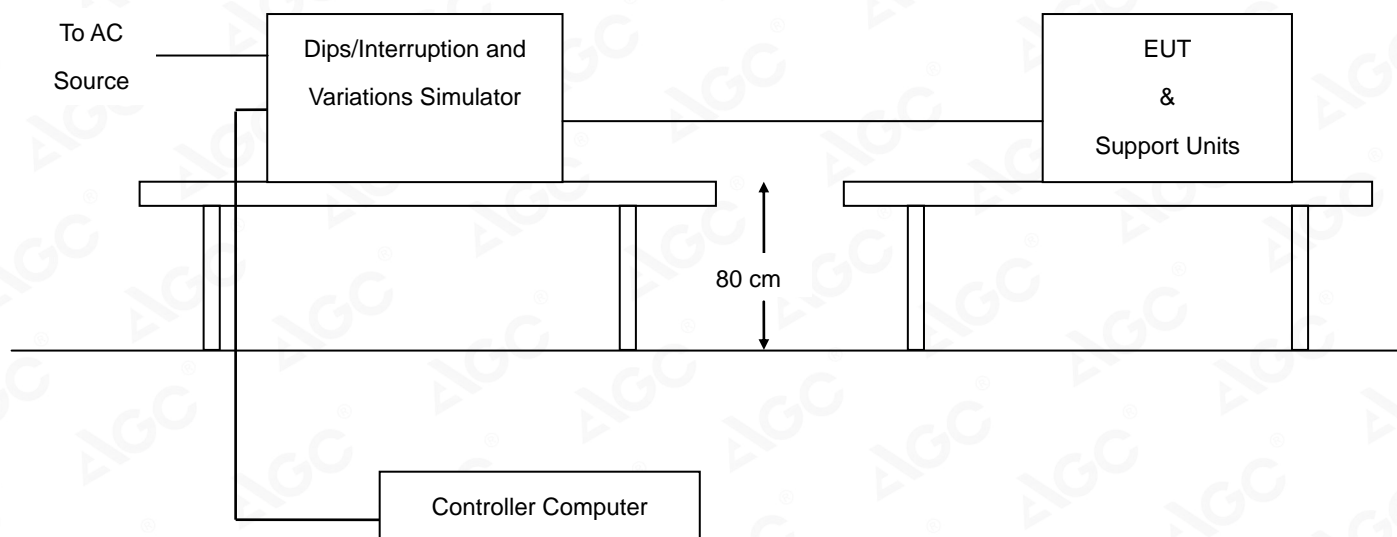
### VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-11
Product Standard	EN 55035
Requirements	0, 45, 90, 135, 180, 225, 270, 315 degrees
Test Interval	Min. 10 sec.
Tester	Calvin
Temperature	23.3°C
Humidity	57%

Voltage Dips	Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Interruptions	Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	250	C

### 17.1. BLOCK DIAGRAM OF TEST SETUP





## 17.2. TEST PROCEDURE

The EUT and support units were located on a wooden table, 0.8 m away from ground floor.

EUT worked with resistance load, and make sure EUT worked normally.

Setting 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.

Recording the test result in test record form.

### Test conditions:

The duration with a sequence of three dips/interruptions with interval of 10 s minimum  
(Between each test event)

## TEST RESULT:

Note: The test modes were carried out for all operation modes

The worst case \_ MODE 4(By Adapter Charging) was showed as the follow:

### Voltage Dips:

Test Level % $U_T$	Reduction (%)	Duration ( periods)	Observation	Performance Result	Result (Pass/Fail)
<5	>95	0.5	Normal	A	Pass
70	30	25	Normal	A	Pass

### Voltage Interruptions:

Test Level % $U_T$	Reduction (%)	Duration ( periods)	Observation	Performance Result	Result (Pass/Fail)
<5	>95	250	Stop charging	B	Pass

## 17.3. INTERPRETATION

<input checked="" type="checkbox"/> <b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
<input checked="" type="checkbox"/> <b>Criteria B:</b>	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> <b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

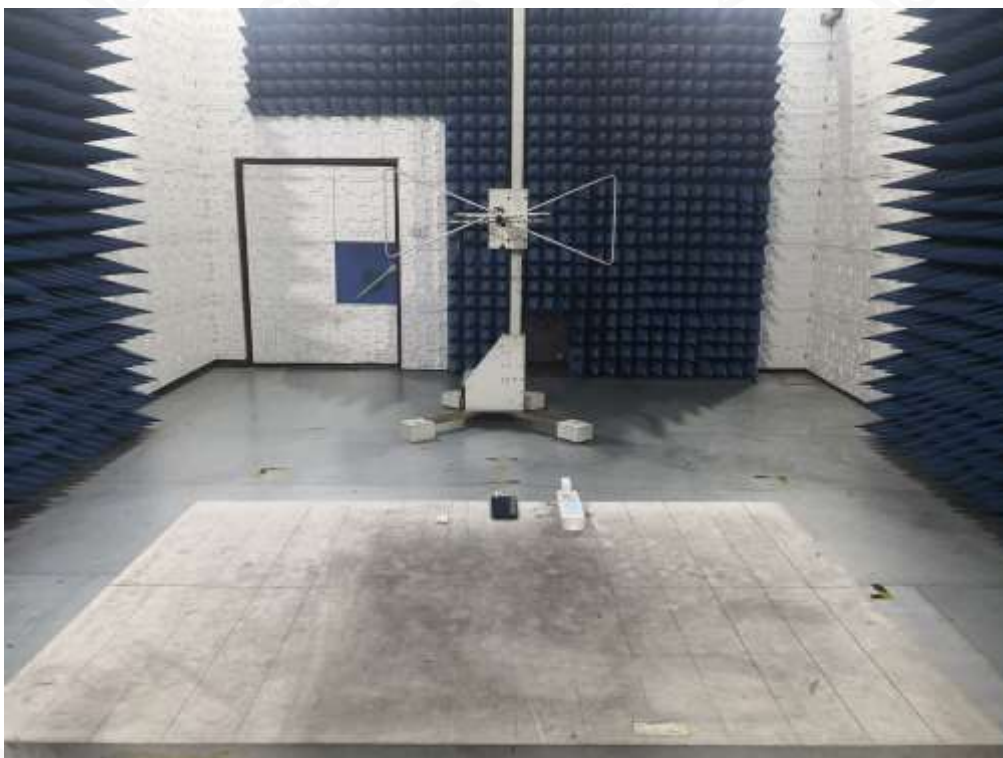
☒ **PASS**
☐ **FAIL**


## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

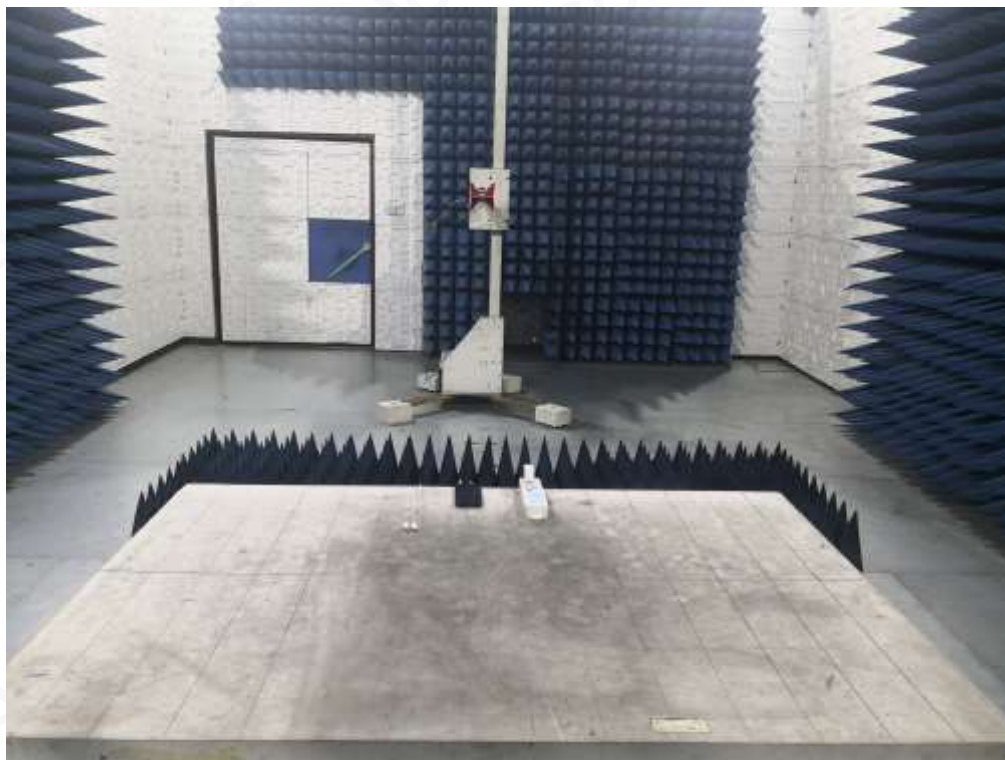
### EN 55032 CONDUCTED EMISSION TEST SETUP



EN 55032 RADIATED EMISSION TEST SETUP



EN 55032 RADIATED EMISSION-ABOVE 1G TEST SETUP



EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST

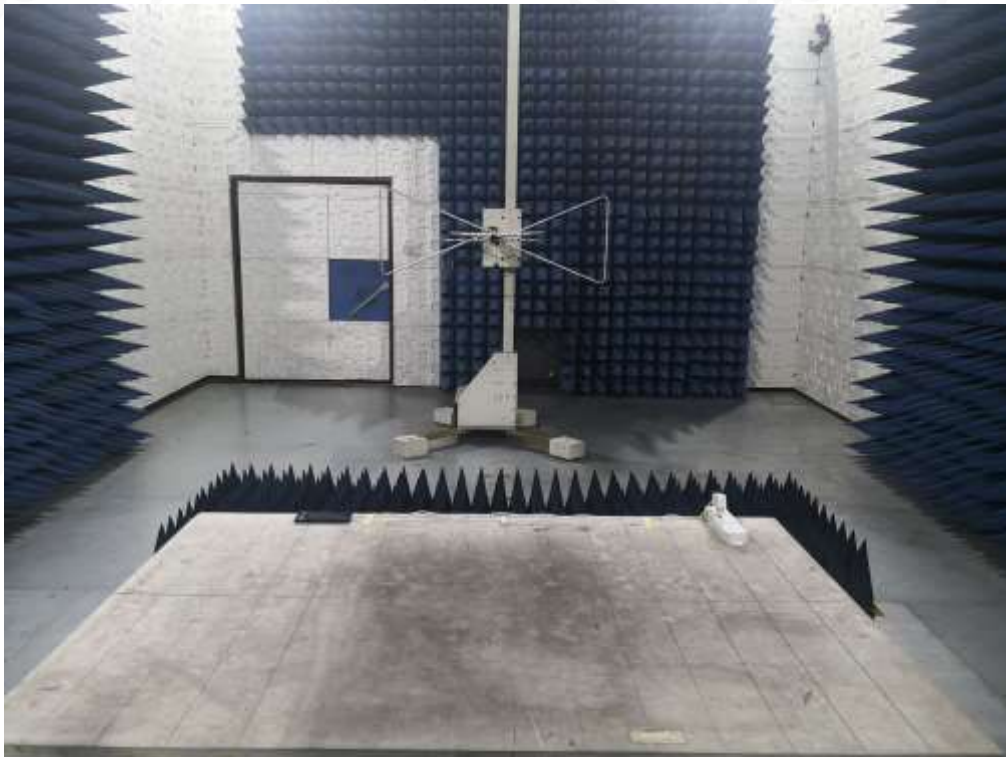




EN 61000-4-2 ESD IMMUNITY TEST SETUP

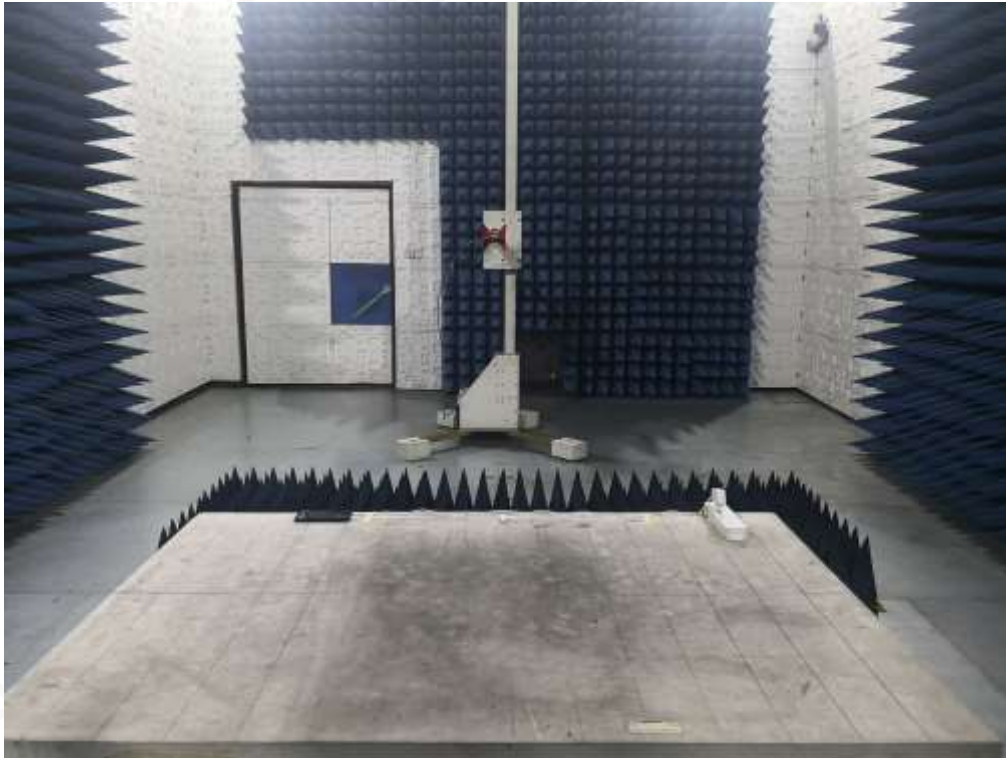


EN 61000-4-3 RS IMMUNITY TEST SETUP





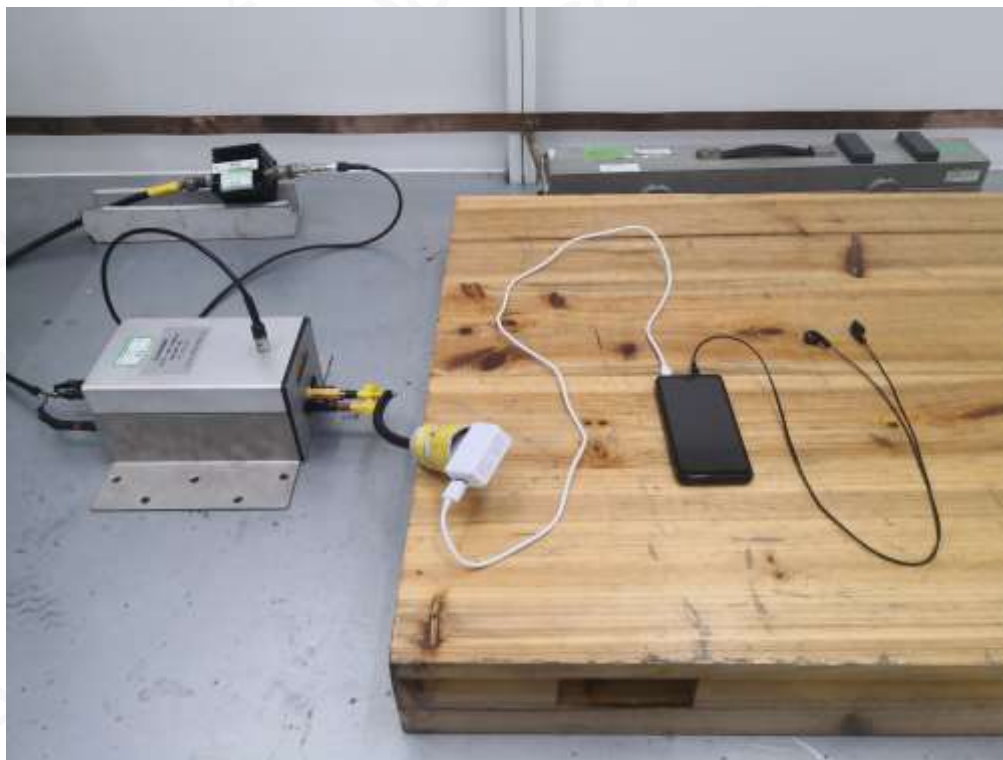
RS IMMUNITY ABOVE 1G TEST SETUP



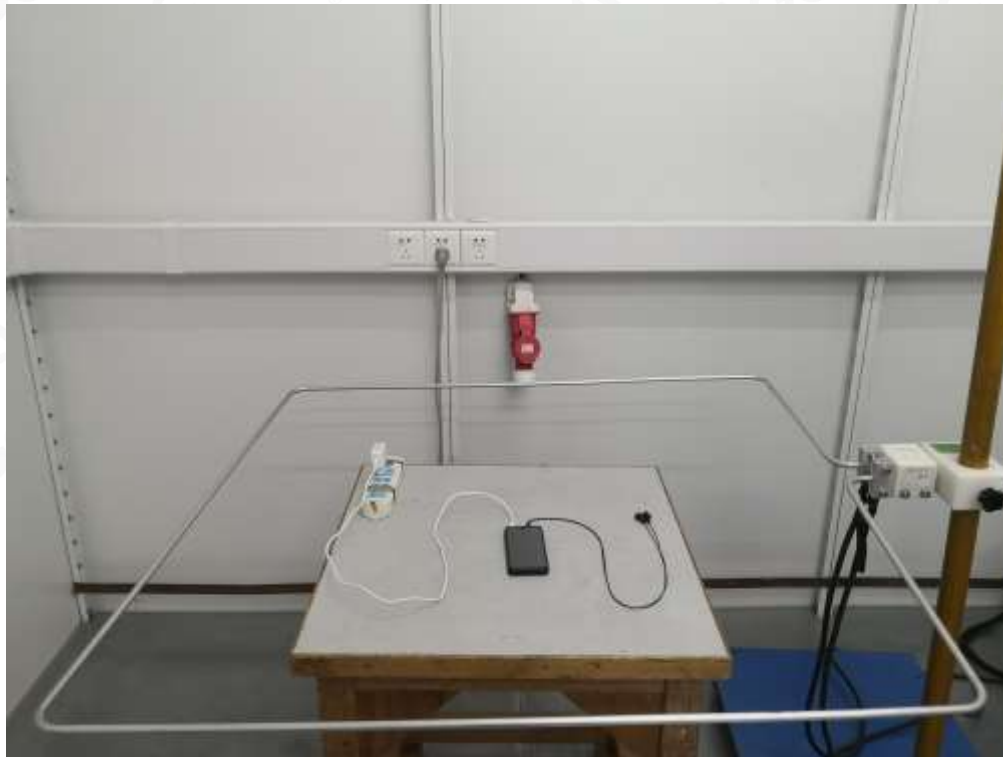
EFT SURGE and DIPS IMMUNITY TEST SETUP



EN 61000-4-6 CS IMMUNITY TSET SETUP



EN 61000-4-8 PFM IMMUNITY TSET SETUP



----END OF REPORT----