



EMC TEST REPORT

Product Name: 5G Smart phone

Model Name: TANK 3s, SHARK

Issued For : Shenzhen OBLUE Communication Technology Co., Ltd.
Room 702, Hepingdayou industrial and trade industrial park, No.
41, Yonghe Road, Heping Community, Fuhai Street, Baoan District,
Shenzhen City, China

Issued By : Shenzhen LGT Test Service Co., Ltd.
Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177,
Renmin West Road, Jinsha, Kengzi Street, Pingshan District,
Shenzhen, Guangdong, China.

Report Number: LGT24E036EM01

Sample Received Date: Feb. 26, 2024

Date of Test: Feb. 26, 2024 – Jun. 17, 2024

Date of Issue: Jun. 17, 2024

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Revision History

Rev.	Issue Date	Report Number	Revisions
00	Mar. 29, 2024	LGT24B027EM01	Initial Issue
01	Jun. 17 2024	LGT24E036EM01	Please see below change information and retest all test

Change information

1. Replace the battery 10500mAh (7.74V) Change to 7750mAh (7.7V) and 7500 mAh (7.74V) -----2 battery manufacturers)
2. Replace charger (120W Change to 66W)
3. The memory configuration is increased by 12GB+256GB
4. The antenna wiring has changed and the gain has been updated
5. Add warm camping lights
6. The main camera has been reduced in pixels and a wide-angle camera has been removed
7. Because of the replacement of a smaller battery capacity, the machine became thinner



TEST REPORT CERTIFICATION

Applicant: Shenzhen OBLUE Communication Technology Co., Ltd.
Address: Room 702, Hepingdayou industrial and trade industrial park, No. 41, Yonghe Road, Heping Community, Fuhai Street, Baoan District, Shenzhen City, China

Manufacture: Shenzhen OBLUE Communication Technology Co., Ltd.
Address: Room 702, Hepingdayou industrial and trade industrial park, No. 41, Yonghe Road, Heping Community, Fuhai Street, Baoan District, Shenzhen City, China

Product Name: 5G Smart phone

Trademark: 8849, Unihertz, iHunt

Model Name: TANK 3s, SHARK

Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.3.2 (2023-01) ETSI EN 301 489-17 V3.2.4 (2020-09) ETSI EN 301 489-19 V2.2.1 (2022-09) ETSI EN 301 489-52 V1.2.1 (2021-11)	PASS

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Technical Director





1. TEST SUMMARY

Test procedures according to the technical standards:

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-3 V2.3.2 (2023-01)

ETSI EN 301 489-17 V3.2.4 (2020-09)

ETSI EN 301 489-19 V2.2.1 (2022-09)

ETSI EN 301 489-52 V1.2.1 (2021-11)

EMC Emission				
Standard	Test Item	Limit	Judgement	Remark
EN 55032:2015/A11:2020	Conducted Emission on AC And Telecom Port 150kHz to 30MHz	Class B	PASS	
	Radiated Emission 30MHz to 1000MHz	Class B	PASS	
	Radiated Emission 1GHz to 6GHz	Class B	PASS	NOTE (1)
EN IEC 61000-3-2:2019+A1:2021	Harmonic Current Emission	Class A	N/A	NOTE (2)
EN 61000-3-3:2013+A1:2019+A2: 2021	Voltage Fluctuations & Flicker	-----	PASS	
EMC Immunity				
Section	Test Item	Performance Criteria	Judgement	Remark
EN 61000-4-2:2009	Electrostatic discharges	B	PASS	
EN IEC 61000-4-3:2020	Continuous RF electromagnetic field disturbances	A	PASS	
EN 61000-4-4:2012	Electrical fast transients/burst	B	PASS	
EN 61000-4-5:2014/A1:2017	Surges	B	PASS	
EN 61000-4-6:2014+AC:2015	Continuous induced RF disturbances	A	PASS	
EN IEC 61000-4-11:2020	Voltage dips and interruptions	B / C / C	PASS	NOTE (3)

Note:

- (1) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
 If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
 If the highest frequency of the internal sources of the EUT is between 500 MHz and 1GHz, the measurement shall only be made up to 5 GHz.
 If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times of the highest frequency or 6 GHz, whichever is less.
- (2) The power consumption of EUT is less than 75W and no Limits apply.
- (3) Voltage Dip: 100% reduction (0.5/1 cycle)– Performance Criteria B
 Voltage Dip: 40% reduction – Performance Criteria C
 Voltage Interruption: 100% Interruption – Performance Criteria C



1.1 TEST FACTORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China
Accreditation Certificate	A2LA Certificate No.: 6727.01
	FCC Registration No.: 746540
	CAB ID: CN0136

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

Test Item	Measurement Frequency Range	Uncertainty
Conducted Emissions	0.009MHz ~ 0.15MHz	3.18
Conducted Emissions	0.15MHz ~ 30MHz	2.70
Radiated Emissions	9KHz ~ 30MHz	2.50
Radiated Emissions	30MHz ~ 1000MHz	4.40
Radiated Emissions	1GHz ~ 6 GHz	5.10
Radiated Emissions	6GHz ~ 18GHz	5.49

Note: The measurement uncertainty is not included in the test result.



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	5G Smart phone	
Trademark:	8849, Unihertz, iHunt	
Model Name:	TANK 3s	
Series Model:	SHARK	
Model Difference:	Models correspond to different trademarks	
Maximum Operating Frequency:	>108MHz	
Frequency Bands:	GSM	GSM 900: 880 ~ 915 MHz GSM 1800: 1710 ~ 1785 MHz
	WCDMA	WCDMA2100: 1920-1980 MHz WCDMA900: 880-915 MHz
	LTE	FDD LTE Band 1: 1920-1980 MHz FDD LTE Band 3: 1710-1785 MHz FDD LTE Band 7: 2500-2570 MHz FDD LTE Band 8: 880-915 MHz FDD LTE Band 20: 832-862 MHz FDD LTE Band 28: 703-748 MHz FDD LTE Band 34: 2010-2025 MHz FDD LTE Band 38: 2570-2620 MHz FDD LTE Band 40: 2300-2400 MHz FDD LTE Band 42: 3400-3600 MHz
	Bluetooth	2402-2480MHz
	2.4G WLAN	802.11b/g/n/ax(20MHz): 2412~2472MHz 802.11n/ax(40MHz): 2422~2462MHz
	5G WLAN	802.11a/n/ac/ax(20MHz): 5180~5700MHz 802.11n/ac/ax(40MHz): 5190~5670MHz 802.11ac/ax(80MHz): 5210~5610MHz
	5.8G WLAN	802.11a/n/ac/ax(20MHz): 5745~5825MHz 802.11n/ac/ax(40MHz): 5755~5795MHz 802.11ac/ax(80MHz): 5775MHz
	GPS	Receiver Only
	GLONASS	
	BDS	
	Galileo	
	FM	87.5MHz to 108MHz
Modulation Mode:	GSM	GMSK for GSM
	WCDMA	WCDMA: QPSK; HSDPA: QPSK/16QAM; HSUPA: BPSK



	LTE	QPSK/16QAM/64QAM
	Bluetooth	GFSK, $\pi/4$ -DQPSK, 8DPSK
	2.4G WLAN	802.11b(DSSS): CCK, DQPSK, DBPSK 802.11g(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11n(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11ax(OFDM,OFDMA): BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
	5G WLAN	802.11a(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11n(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11ac(OFDM): BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM 802.11ax(OFDM): BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM
	5.8G WLAN	802.11a(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11n(OFDM): BPSK, QPSK, 16-QAM, 64-QAM 802.11ac(OFDM): BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM 802.11ax(OFDM): BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM
	GPS	BPSK/BOC
	GLONASS	
	BDS	
	Galileo	
	FM	FM
Adapter:	Model: HJ-PD66W-EU Input: 100-240V, 50/60Hz, 1.5A Output: 5V, 3A 15W, OR 9V, 3A 27W OR 12V, 3A 36W, OR 15V, 3A 45W, OR 20V, 3.25A 65W, OR 11V, 6A 66W MAX	
Battery:	Model: PBA97155B Capacity: 7750mAh Rated Voltage: 7.7V Model: PBA97155C Capacity: 7500mAh Rated Voltage: 7.74V	
Hardware Version:	G91_V3.3	
Software Version:	TANK3 PRO_EEA_20240216	



2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Charging+GSM link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 2	Charging+WCDMA link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 3	Charging+LTE link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 4	USB Data Transmission
Mode 5	FM 98MHz

For Conducted Test	
Final Test Mode	Description
Mode 1	Charging+GSM link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 2	Charging+WCDMA link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 3	Charging+LTE link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 4	USB Data Transmission
Mode 5	FM 98MHz

For Radiated Test	
Final Test Mode	Description
Mode 1	Charging+GSM link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 2	Charging+WCDMA link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 3	Charging+LTE link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 4	USB Data Transmission
Mode 5	FM 98MHz

For EMS Test	
Final Test Mode	Description
Mode 1	Charging+GSM link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 2	Charging+WCDMA link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 3	Charging+LTE link+BT+Wi-Fi+GPS+NFC+Camera recording+Earphone
Mode 4	USB Data Transmission
Mode 5	FM 98MHz

Note:

1. For conducted emission test, Only show the worst case in this report.
2. For radiated emission test, Only show the worst case in this report.



2.3 DESCRIPTION OF THE SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Accessories Equipment

Description	Manufacturer	Model	S/N	Rating
Adapter	Shenzhen Huajin Electronics Co.,Ltd	HJ-PD66W-EU	N/A	Input: 100-240V ~ 50/60Hz 1.5A Output: 5V, 3A 15W, OR 9V,3A 27W, OR 12V,3A 36W, OR 15V,3A 45W, OR 20V,3.25A 65W, OR 11V,6A 66W MAX
USB-C to USB-C Cable	N/A	N/A	N/A	1m, shielded, without ferrite core

Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	HKF-16	N/A	N/A
Earphone	VESAFE	39630078	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” means “with core”; “NO” means “without core”.



2.4 MEASUREMENT INSTRUMENTS LIST

Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU8	100372	2024.03.09	2025.03.08
LISN	COM-POWER	LI-115	02032	2024.03.09	2025.03.08
LISN	SCHWARZBECK	NNLK 8122	00160	2024.03.09	2025.03.08
Transient Limiter	CYBERTEK	EM5010A	E2250100049	2024.03.09	2025.03.08
Temperature & Humidity	KTJ	TA218B	N.A	2024.03.09	2025.03.08
Testing Software	EMC-I_V1.4.0.3_SKET				
Radiated Emission					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU8	100372	2024.03.09	2025.03.08
Spectrum Analyzer	Keysight	N9020A	MY50530994	2024.03.09	2025.03.08
Spectrum Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13
Active loop Antenna	ETS	6502	00049544	2023.10.13	2025.10.12
Bilog Antenna	SCHWARZBECK	VULB 9168	01447	2022.12.12	2025.12.11
Horn Antenna	SCHWARZBECK	3115	10SL0060	2022.06.02	2025.06.01
Pre-amplifier (9kHz-1GHz)	EMtrace	RP01A	02017	2024.03.09	2025.03.08
Pre-amplifier (1-26.5G)	Agilent	8449B	3008A4722	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Testing Software	EMC-I_V1.4.0.3_SKET				
Harmonic & Flick					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Harmonic Voltage & Flicker	AMETEK	100-CTS-230	2229A00121	2024.03.09	2025.03.08
AC Power Source	AMETEK	3001iX-208-413	2236A00794	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Wireless Communications Test Set	R&S	CMW 500	137737	2024.03.09	2025.03.08
Electrostatic Discharge (ESD)					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
ESD TEST GENERATOR	PRIMA	ESD61002TA	PR230725090	2024.03.09	2025.03.08
Temperature & Humidity	SuWei	ST-W2318	N.A	2024.03.11	2025.03.10
Radio Frequency Electromagnetic Fields (RS)					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Power Sensor	R&S	Z11	116655	2024.03.09	2025.03.08
Power Sensor	R&S	Z11	121896	2024.03.09	2025.03.08
Signal Generator	Agilent	N5181A	MY47070409	2024.03.09	2025.03.08
Power Amplifier	SKET	HAP_80M01G-250W	S202211402	2024.03.09	2025.03.08
Power Amplifier	SKET	HAP_010G060G-80W	S202211403	2024.03.09	2025.03.08
RS Test Antenna	SKET	STLP 9129 Plus	SK20221012006	N.A	N.A
audio analyzer	R&S	UPL	100689	2023.10.12	2024.10.11
Audio Breakthrough Shielding Box	SKET	SB_AB/C35	N/A	2024.03.09	2025.03.08
1KHz Standard	SKET	MSC_AB/C35	N/A	2024.03.09	2025.03.08



Source					
Audio conditioner	SKET	PM_ABT/C35	N/A	2024.03.09	2025.03.08
Mouth Simulator	SKET	AM_ABT/C35	N/A	2024.03.09	2025.03.08
Ear Simulator	SKET	AE_ABT/C35	N/A	2024.03.09	2025.03.08
Free field microphone	SKET	MP_ABT/C35	N/A	2024.03.09	2025.03.08
Testing Software	EMC-S_V2.1.2.28_SKET				
Radio Frequency Continuous Conducted (CS)					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Conducted Radio-frequency Test System	PRIMA	CRF61006A	PR211281052	2024.03.09	2025.03.08
CDN	PRIMA	CRF-CDN-M216	PR220281070	2024.03.09	2025.03.08
CDN	PRIMA	CRF-CDN-M316	PR220281074	2024.03.09	2025.03.08
Attenuator	PRIMA	ATT-6DB-100	W2198770001	2024.03.09	2025.03.08
Electromagnetic Injection Clamp	ZHINAN	ZN23203	PR211281055	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
audio analyzer	R&S	UPL	100689	2023.10.12	2024.10.11
Audio Breakthrough Shielding Box	SKET	SB_ABT/C35	N/A	2024.03.09	2025.03.08
1KHz Standard Source	SKET	MSC_ABT/C35	N/A	2024.03.09	2025.03.08
Audio conditioner	SKET	PM_ABT/C35	N/A	2024.03.09	2025.03.08
Mouth Simulator	SKET	AM_ABT/C35	N/A	2024.03.09	2025.03.08
Ear Simulator	SKET	AE_ABT/C35	N/A	2024.03.09	2025.03.08
Free field microphone	SKET	MP_ABT/C35	N/A	2024.03.09	2025.03.08
Testing Software	EMC-S_V2.1.2.28_SKET				
Fast Transients Common Mode (EFT)					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Fast Transient Burst Simulator	PRIMA	EFT61004TA	PR220243451	2024.03.09	2025.03.08
EFT CAPACITIVE COUPLING CLAMP	PRIMA	EFT-CLAMP	457	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Surge					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Lightning Surge Generator (1.2us.50us)	PRIMA	SUG61005TAX	PR211155290	2024.03.09	2025.03.08
Lightning Surge Generator (10us.700us)	PRIMA	SUG10/700TA	PR211255516	2024.03.09	2025.03.08
Signal line decoupling network	PRIMA	DATA-CDN-8B	PR211255479	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Voltage Dips and Interruptions					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Cycle Sag Simulator	PRIMA	DRP61011TA	PR21126644	2024.03.09	2025.03.08



Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
PFMF					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Power Frequency Magnetic Field Generator	PRIMA	PFM61008TG	PR211281444	2024.03.09	2025.03.08
Temperature & Humidity	KTJ	TA218B	N.A	2024.03.11	2025.03.10



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION

(Frequency Range 150KHz-30MHz)

DC power input/output ports:

FREQUENCY (MHz)	Quasi-peak	Average
0.15 ~ 0.5	79.00	66.00
0.5 ~ 30	73.00	60.00

Note: According to EN 301489-3/-19 section 7.1.2 special conditions for EMC emission tests, the requirements of ETSI EN 301 489-1 [1], clause 8.3 shall be applied where the cable length exceeds 3 m or is connected to a vehicle power supply.

AC Power port used for power supply only:

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.5 ~ 5	73.00	60.00	56.00	46.00
5 ~ 30	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

Telecommunications/network Port

FREQUENCY (MHz)	Voltage limits Class A(dBuV)		Voltage limits Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 to 87	84 to 74	84 to 74	74 to 64
0.5 ~ 30	87	74	74	64

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150 / I = 44$ dB).



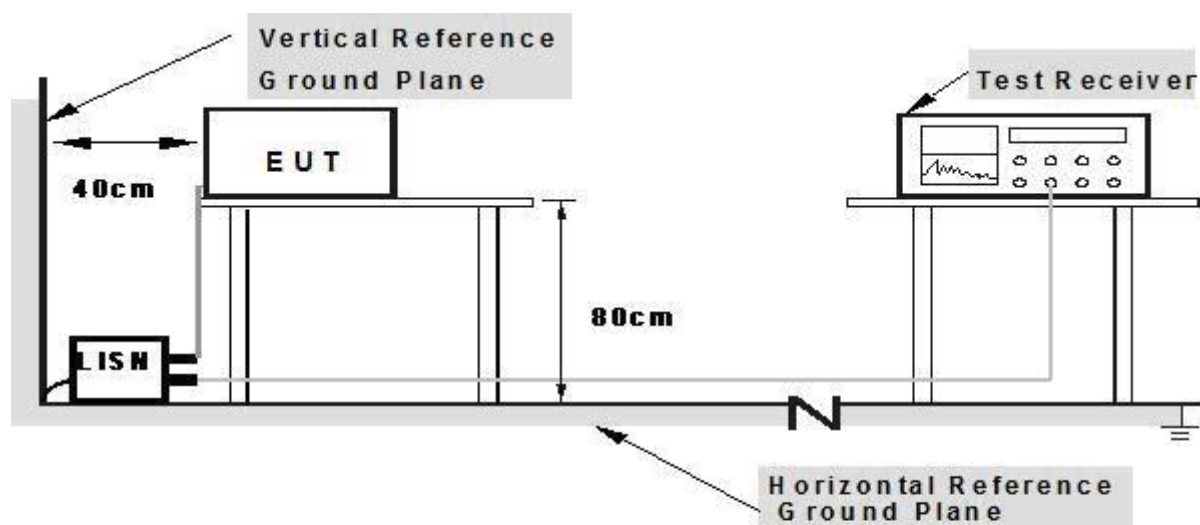
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



- Note: 1. Support units were connected to second LISN.**
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

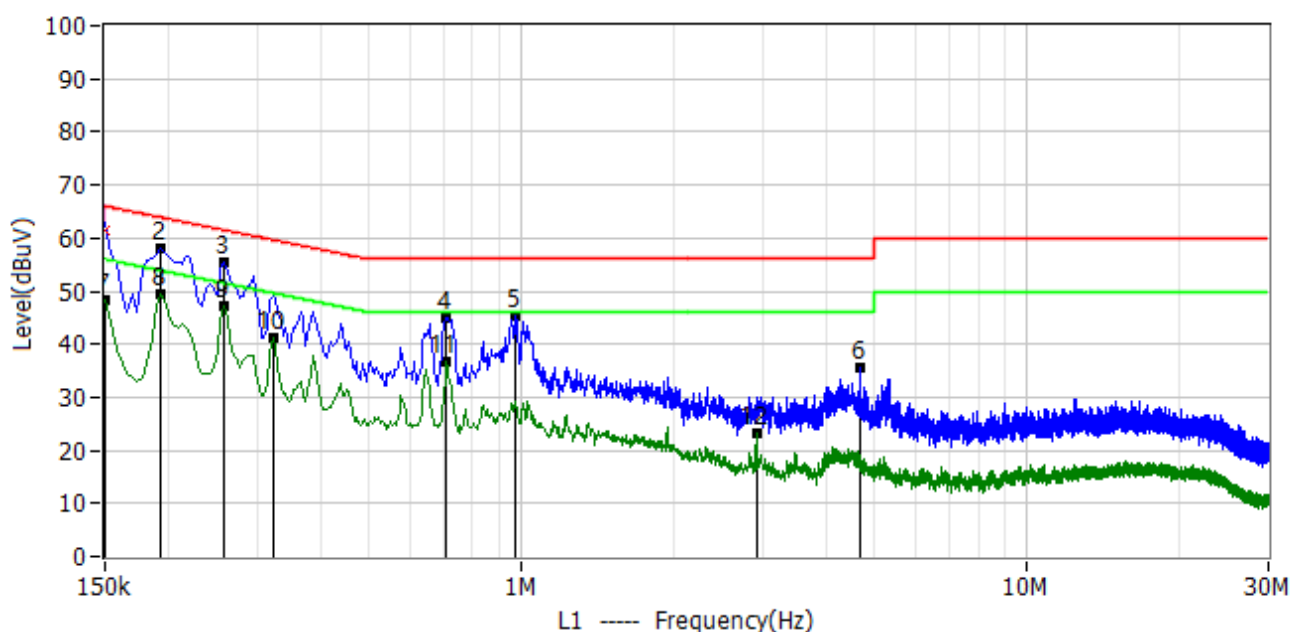
3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 described unless otherwise a special operating condition is specified in the following during the testing.



3.1.5 TEST RESULTS

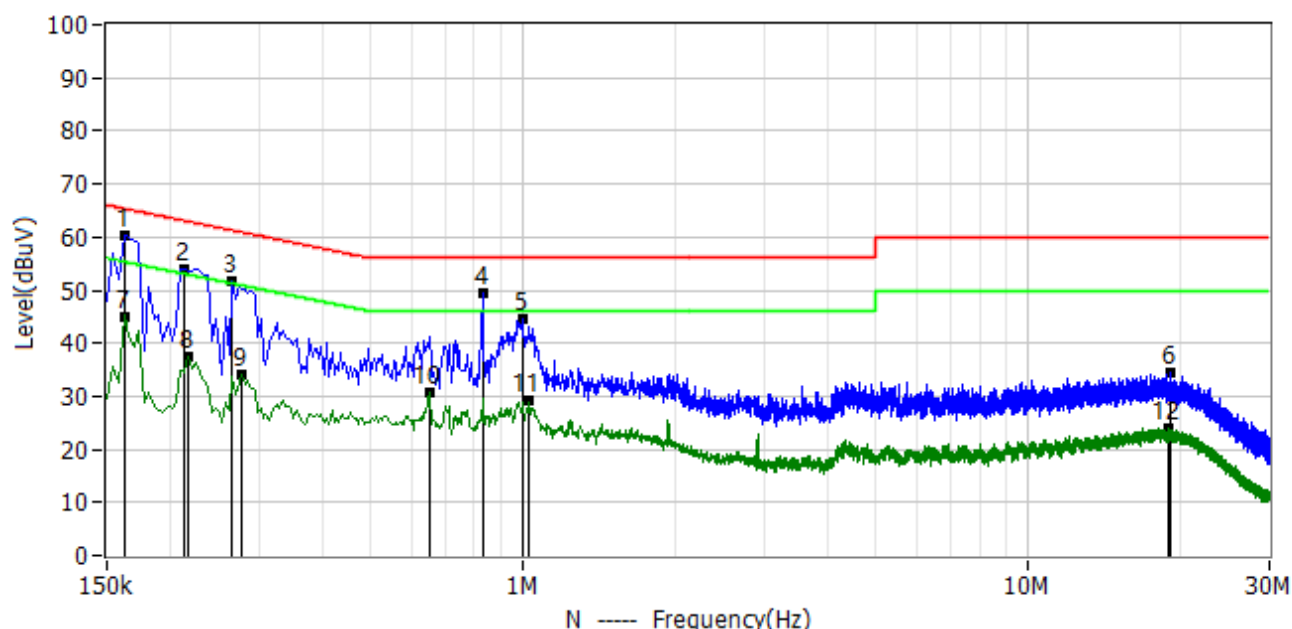
Project: LGT24E036	Test Engineer: LiuH
EUT: 5G Smart phone	Temperature: 25.4°C
M/N: TANK 3s	Humidity: 52%RH
Test Voltage: AC 230V/50Hz	Test Data: 2024-05-29
Test Mode: Charging+GSM link+BT+Wi-Fi+GPS+Camera recording+Earphones	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1	0.150	50.82	10.60	61.42	66.00	-4.58	QP	L1
2*	0.194	47.52	10.62	58.14	63.86	-5.72	QP	L1
3*	0.258	44.70	10.60	55.30	61.50	-6.20	QP	L1
4*	0.710	34.29	10.57	44.86	56.00	-11.14	QP	L1
5*	0.974	34.69	10.68	45.37	56.00	-10.63	QP	L1
6*	4.662	24.39	11.10	35.49	56.00	-20.51	QP	L1
7*	0.150	37.67	10.58	48.25	56.00	-7.75	AV	L1
8*	0.194	38.73	10.62	49.35	53.86	-4.51	AV	L1
9*	0.258	36.43	10.60	47.03	51.50	-4.47	AV	L1
10*	0.322	30.73	10.57	41.30	49.66	-8.36	AV	L1
11*	0.710	26.09	10.57	36.66	46.00	-9.34	AV	L1
12*	2.910	11.93	11.18	23.11	46.00	-22.89	AV	L1



Project: LGT24E036	Test Engineer: LiuH
EUT: 5G Smart phone	Temperature: 25.4°C
M/N: TANK 3s	Humidity: 52%RH
Test Voltage: AC 230V/50Hz	Test Data: 2024-05-29
Test Mode: Charging+GSM link+BT+Wi-Fi+GPS+Camera recording+Earphones	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1*	0.162	49.75	10.57	60.32	65.36	-5.04	QP	N
2*	0.214	43.45	10.57	54.02	63.05	-9.03	QP	N
3*	0.266	41.08	10.58	51.66	61.24	-9.58	QP	N
4*	0.830	38.83	10.55	49.38	56.00	-6.62	QP	N
5*	0.994	33.93	10.54	44.47	56.00	-11.53	QP	N
6*	19.186	22.85	11.59	34.44	60.00	-25.56	QP	N
7*	0.162	34.56	10.57	45.13	55.36	-10.23	AV	N
8*	0.218	27.06	10.57	37.63	52.89	-15.27	AV	N
9*	0.278	23.39	10.58	33.97	50.88	-16.91	AV	N
10*	0.654	20.14	10.56	30.70	46.00	-15.30	AV	N
11*	1.030	18.48	10.55	29.03	46.00	-16.97	AV	N
12*	18.870	12.27	11.57	23.84	50.00	-26.16	AV	N



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF THE RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A		Class B	
	At 10m	At 3m	At 10m	At 3m
	dBuV/m	dBuV/m	dBuV/m	dBuV/m
30 ~ 230	40	50	30	40
230 ~ 1000	47	57	37	47

3.2.2 LIMITS OF THE RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 3m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	AVG	Peak	AVG
1000 ~ 3000	76	56	70	50
3000 ~ 6000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed in the following: CISPR 32.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m) = $20\log$ Emission level (uV/m).
- (4) For EN 301489-52 section 7.2.2 special conditions for EMC emission tests, according to typical of intended use of radio equipment, ancillary equipment can also be measured in combination with the radio equipment under test. When the ancillary equipment is measured in combination with the radio equipment, radiated emissions from the transmitter/transceiver shall be ignored, but recorded in the test report.

3.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. EUT as the center to the edge of the auxiliary device, the distance from the maximum edge to the center of the antenna is 3 meter.
- c. The height of antenna is varied from 1 meter to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meter and the rotatable table was turned from 0 degrees to 360 degree to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Setup Frequency Below 1 GHz

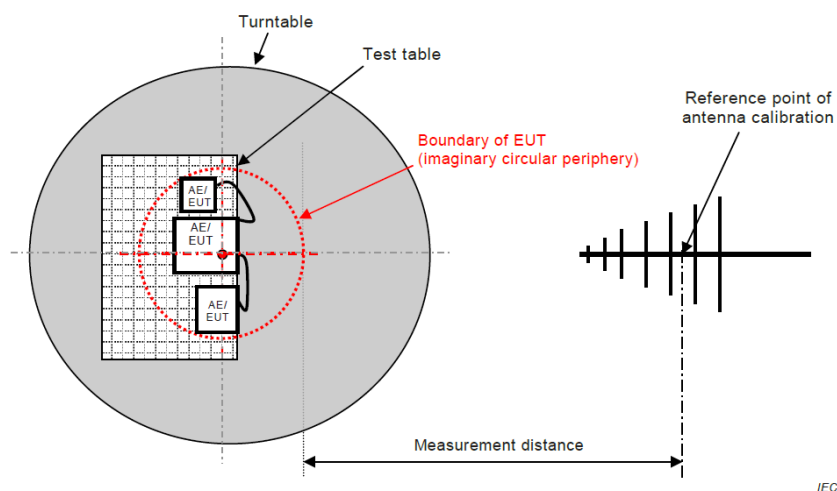


Figure C.1 – Measurement distance

(B) Radiated Emission Test Setup Frequency Above 1GHz

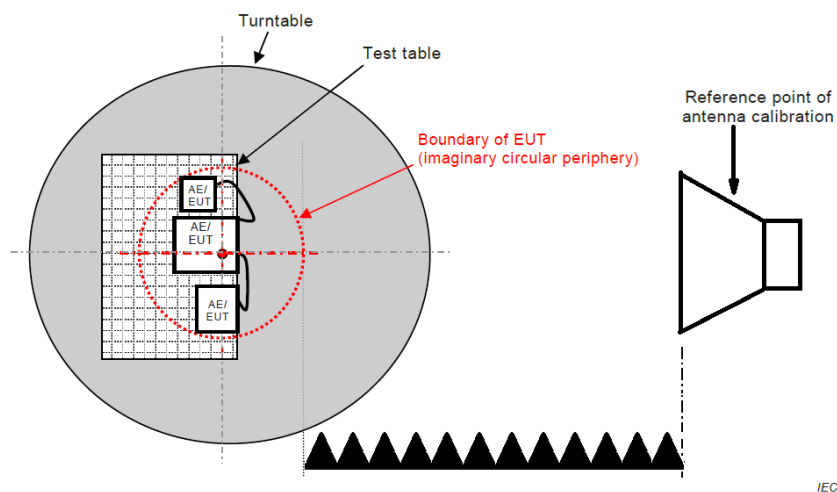


Figure C.1 – Measurement distance

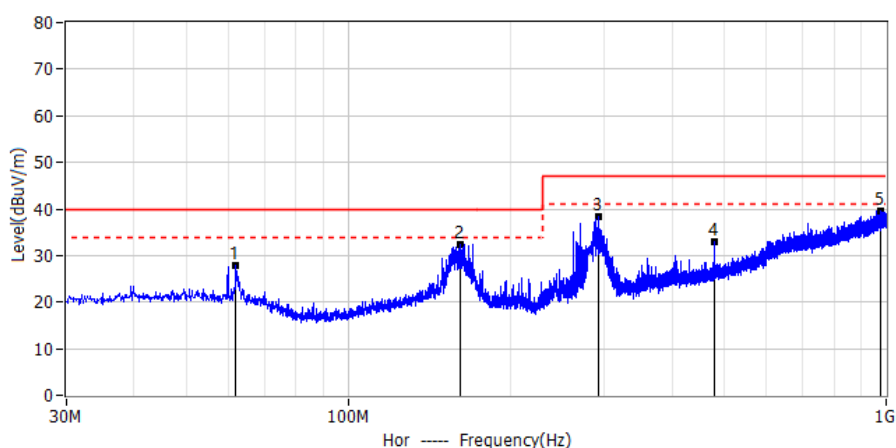
3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** described unless otherwise a special operating condition is specified in the following during the testing.

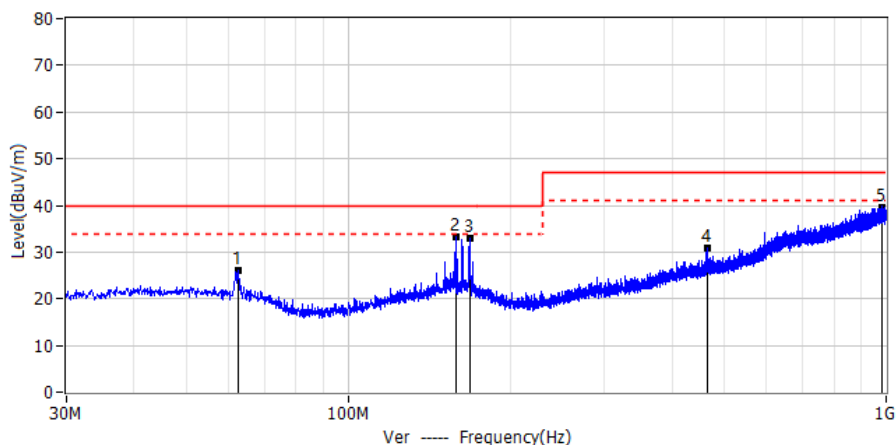


3.2.6 TEST RESULTS (30 - 1000 MHz)

Project: LGT24E036	Test Engineer: Xiangdong Ma
EUT: 5G Smart phone	Temperature: 29.4°C
M/N: TANK 3s	Humidity: 45%RH
Test Voltage: Battery	Test Data: 2024-06-03
Test Mode: USB Data Transmission	
Note:	



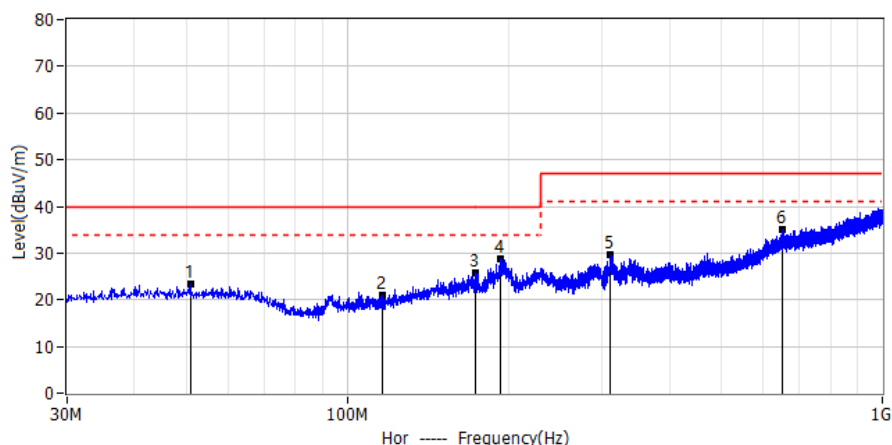
No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	61.889	9.35	18.52	27.87	40.00	-12.13	QP	Hor
2*	161.799	12.65	19.83	32.48	40.00	-7.52	QP	Hor
3*	292.506	18.47	19.77	38.24	47.00	-8.76	QP	Hor
4*	480.080	8.50	24.55	33.05	47.00	-13.95	QP	Hor
5*	974.416	5.20	34.43	39.63	47.00	-7.37	QP	Hor



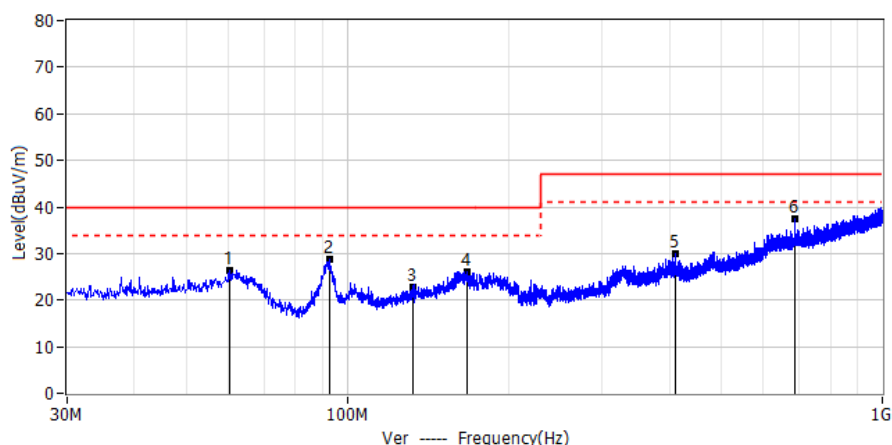
No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	62.495	7.51	18.49	26.00	40.00	-14.00	QP	Ver
2*	159.253	13.38	19.85	33.23	40.00	-6.77	QP	Ver
3*	168.953	13.07	19.79	32.86	40.00	-7.14	QP	Ver
4*	465.773	6.69	24.22	30.91	47.00	-16.09	QP	Ver
5*	980.964	5.22	34.48	39.70	47.00	-7.30	QP	Ver



Project: LGT24E036	Test Engineer: Xiangdong Ma
EUT: 5G Smart phone	Temperature: 29.4°C
M/N: TANK 3s	Humidity: 45%RH
Test Voltage: AC 230V/50Hz	Test Data: 2024-05-30
Test Mode: Charging+GSM link+BT+Wi-Fi+GPS+Camera recording+Earphone	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	50.976	4.01	19.29	23.30	40.00	-16.70	QP	Hor
2*	116.209	3.71	17.31	21.02	40.00	-18.98	QP	Hor
3*	173.924	6.37	19.41	25.78	40.00	-14.22	QP	Hor
4*	193.930	11.20	17.46	28.66	40.00	-11.34	QP	Hor
5*	310.694	9.38	20.25	29.63	47.00	-17.37	QP	Hor
6*	651.528	5.91	29.26	35.17	47.00	-11.83	QP	Hor

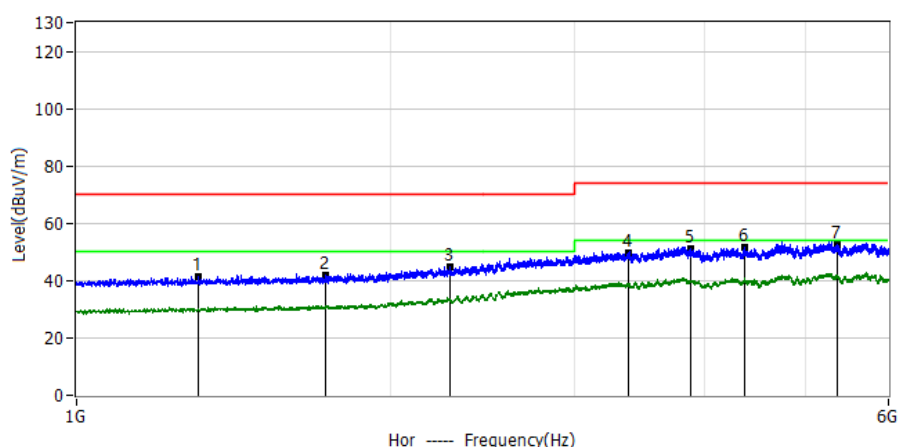


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	60.191	7.74	18.63	26.37	40.00	-13.63	QP	Ver
2*	93.050	13.40	15.23	28.63	40.00	-11.37	QP	Ver
3*	133.063	4.25	18.67	22.92	40.00	-17.08	QP	Ver
4*	167.861	6.37	19.80	26.17	40.00	-13.83	QP	Ver
5*	410.725	6.90	23.00	29.90	47.00	-17.10	QP	Ver
6*	687.539	7.76	29.69	37.45	47.00	-9.55	QP	Ver

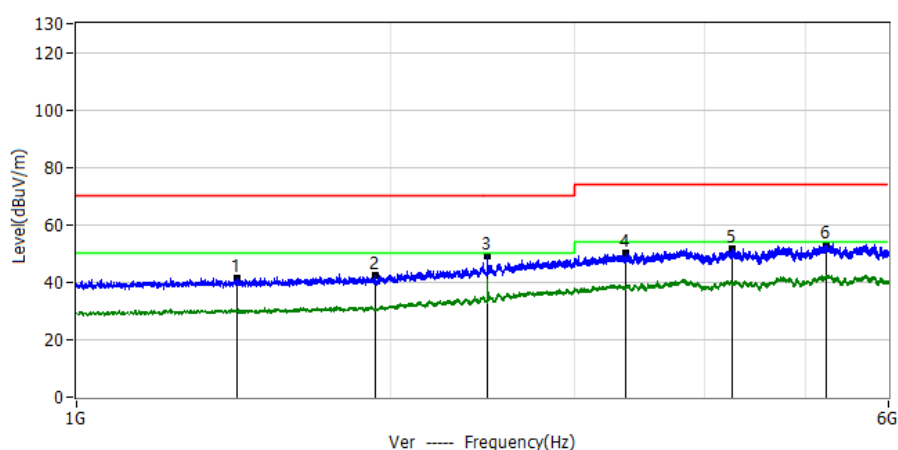


3.2.7 TEST RESULT (1000 - 6000MHz)

Project: LGT24E036	Test Engineer: Xiangdong Ma
EUT: 5G Smart phone	Temperature: 29.4°C
M/N: TANK 3s	Humidity: 45%RH
Test Voltage: AC 230V/50Hz	Test Data: 2024-05-30
Test Mode: Charging+GSM link+BT+Wi-Fi+GPS+Camera recording+Earphone	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1.308GHz	63.79	-22.57	41.22	70.00	-28.78	PK	Hor
2*	1.734GHz	61.71	-19.86	41.85	70.00	-28.15	PK	Hor
3*	2.278GHz	59.33	-14.51	44.82	70.00	-25.18	PK	Hor
4*	3.383GHz	56.07	-6.25	49.82	74.00	-24.18	PK	Hor
5*	3.882GHz	56.44	-5.25	51.19	74.00	-22.81	PK	Hor
6*	4.369GHz	56.95	-5.52	51.43	74.00	-22.57	PK	Hor
7*	5.360GHz	58.12	-5.64	52.48	74.00	-21.52	PK	Hor



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1.426GHz	63.33	-21.97	41.36	70.00	-28.64	PK	Ver
2*	1.933GHz	60.96	-18.41	42.55	70.00	-27.45	PK	Ver
3*	2.479GHz	61.33	-12.00	49.33	70.00	-20.67	PK	Ver
4*	3.364GHz	56.23	-6.29	49.94	74.00	-24.06	PK	Ver
5*	4.244GHz	57.06	-5.57	51.49	74.00	-22.51	PK	Ver
6*	5.236GHz	58.55	-5.34	53.21	74.00	-20.79	PK	Ver



3.3 HARMONICS CURRENT

3.3.1 LIMITS OF THE HARMONICS CURRENT

IEC 555-2					
Table - I			Table - II		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)
Non Portable Tools or TV Receivers	Odd Harmonics		TV Receivers	Odd Harmonics	
	3	2.30		3	0.80
	5	1.14		5	0.60
	7	0.77		7	0.45
	9	0.40		9	0.30
	11	0.33		11	0.17
	13	0.21		13	0.12
	15≤n≤39	0.15 · 15/n		15≤n≤39	0.10 · 15/n
	Even Harmonics			Even Harmonics	
	2	1.08		2	0.30
4	0.43	4	0.15		
8	0.30				
8≤n≤40	0.23 · 8/n		DC	0.05	

EN 61000-3-2/IEC 61000-3-2					
Equipment Category	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in A) (mA/w)	
Class A	Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required	Class D	3	2.30	3.4
			5	1.14	1.9
			7	0.77	1.0
			9	0.40	0.5
			11	0.33	0.35
			13≤n≤39	see Table I	3.85/n
			only odd harmonics required		

3.3.2 TEST PROCEDURE

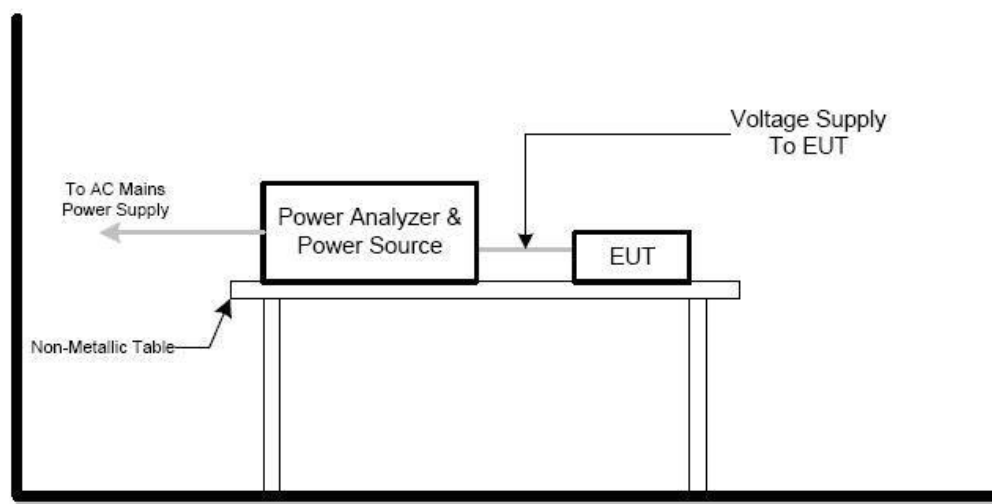
- The EUT was placed on the top of a wooden table 0.8 meter above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- The classification of EUT is according to section 5 of EN IEC 61000-3-2. The EUT is classified as follows:
 - Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
 - Class B: Portable tools. Portable tools; Arc welding equipment which is not professional equipment.
 - Class C: Lighting equipment.
 - Class D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.



3.3.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** described unless otherwise a special operating condition is specified in the following during the testing.

3.3.4 TEST SETUP



3.3.5 TEST RESULTS

N/A

According to the electrical characteristics and usage of the equipment, the rated power of the EUTs is less than 75W, according to the standard EN 61000-3-2:2019+A1, clause 7: "Equipment with a rated power of 75W or less are not specified on this edition of the standard." Therefore the requirements deem to be skipped without further testing.



3.4 VOLTAGE FLUCTUATION AND FLICKERS

3.4.1 LIMITS OF THE VOLTAGE FLUCTUATION AND FLICKERS

Tests	Measurement Value	Limit	Descriptions
	IEC555-3	IEC/EN 61000-3-3	
P_{st}	$\leq 1.0, T_p = 10 \text{ min.}$	$\leq 1.0, T_p = 10 \text{ min.}$	Short Term Flicker Indicator
P_{lt}	N/A	$\leq 0.65, T_p = 2 \text{ hr.}$	Long Term Flicker Indicator
$T_{dt(s)}$	$\leq 3\%$	$\leq 3.3\%$	Relative Steady-State V-Chang
$d_{max}(\%)$	$\leq 4\%$	$\leq 4\%$	Maximum Relative V-Chang
$d_c(\%)$	N/A	$\leq 3.3\%$ for $> 500\text{ms}$	Relative V-change Characteristic

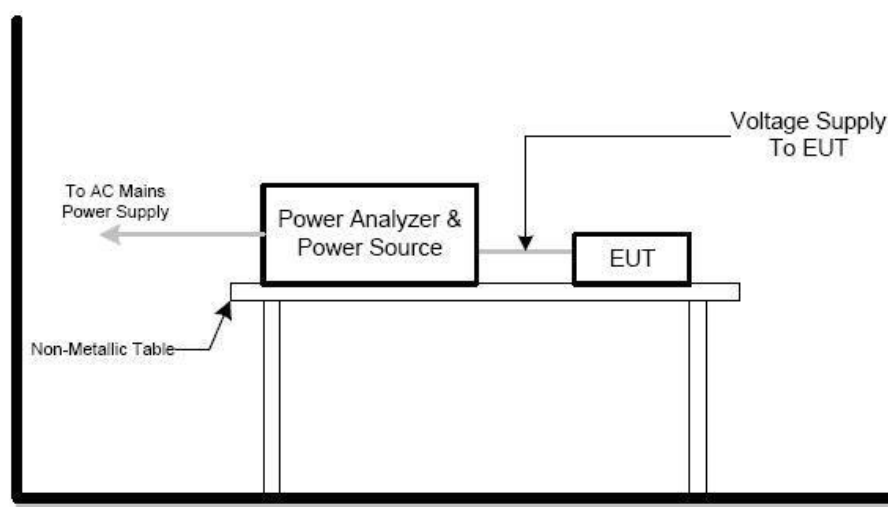
3.4.2 TEST PROCEDURE

- 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.
- All types of voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.4.3 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** described unless otherwise a special operating condition is specified in the following during the testing.

3.4.4 TEST SETUP





3.4.5 TEST RESULTS

Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)

EUT: 5G Smart phone
Test category: All parameters (European limits)
Test date: 2024/5/31
Test duration (min): 10
Comment: TANK 3s
Customer: LGT24E036

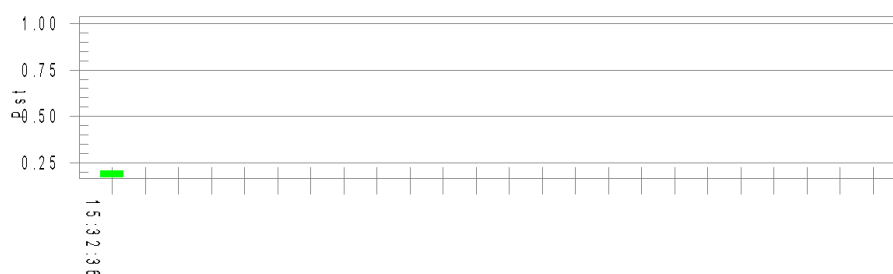
Tested by: ChengLi
Test Margin: 100
Start time: 15:22:15
End time: 15:32:42
Data file name: F-000044.cts_data

Test Result: Pass

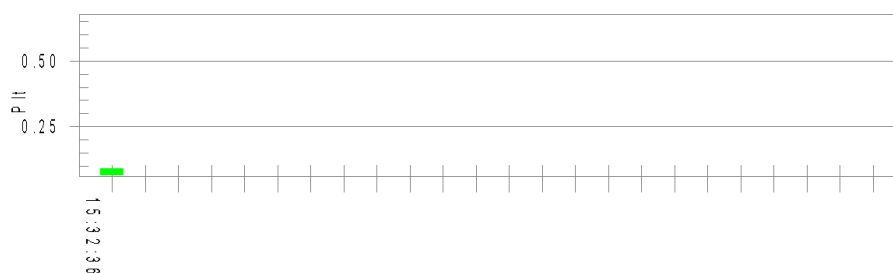
Status: Test Completed

Pst_t and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.69

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.207

Highest Plt (2 hr. period): 0.090

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass



4. EMC IMMUNITY TEST

4.1 GENERAL PERFORMANCE CRITERIA

4.1.1 PERFORMANCE CRITERIA (ETSI EN 301 489-3)

According to **ETSI EN 301 489-3** standard, the general performance criteria are as follows:

For the purpose of the present document two categories of performance criteria apply:

- Performance criteria for continuous phenomena.
- Performance criteria for transient phenomena.

Performance criteria for continuous phenomena

During the test, the equipment shall:

- continue to operate as intended;
- not unintentionally transmit;
- not unintentionally change its operating state;
- not unintentionally change critical stored data.

Performance criteria for transient phenomena

For all ports and transient phenomena with the exception described below, the following applies:

- The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data.
- After application of the transient phenomena, the equipment shall operate as intended.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

- For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
- For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



4.1.2 PERFORMANCE CRITERIA (ETSI EN 301 489-17)

According to **ETSI EN 301 489-17** standard, the general performance criteria are as follows:

Criteria	During the test	After the test
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.

NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.

Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

Performance for Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.



4.1.3 PERFORMANCE CRITERIA (GPS)

According to **ETSI EN 301 489-19** standard, the general performance criteria are as follows:
For the purpose of the present document two categories of performance criteria apply:

- Performance criteria for continuous phenomena.
- Performance criteria for transient phenomena.

Performance criteria for Continuous phenomena

During the test, the equipment shall operate as intended, e.g. not unintentionally change its operating state and not unintentionally change critical stored data.

After the test, the equipment shall operate as intended, e.g. have no loss of function and have no loss of critical stored data.

Performance criteria for Transient phenomena

After the test, functions shall be self-recoverable and the equipment shall operate as intended and the equipment shall have no loss of critical stored data.

4.1.4 PERFORMANCE CRITERIA

According to **ETSI EN 301 489-52** standard, the general performance criteria are as follows:

GSM and voice call
Performance criteria for Continuous phenomena applied to Transmitters (CT) With a link established, during the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz. In idle mode, the transmitter shall not operate unintentionally. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.
Performance criteria for Continuous phenomena applied to Receivers (CR) During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence. In the case of narrow band responses, the procedure in clause 4.4.1 shall be followed. During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.



UTRA

In the data transfer mode, the performance criteria can be one of the following:

- if the BER (as referred in clause 5.3.1 of ETSI TS 134 109 [4]) is used, it shall not exceed 0,001 during the test sequence;
- if the BLER (as referred in ETSI TS 134 109 [4]) is used, it shall not exceed 0,01 during the test sequence.

The BLER calculation shall be based on evaluating the CRC on each transport block. Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.2.1 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

E-UTRA, E-UTRA with LAA, inband or guard band NB-IoT, Standalone NB-IoT

In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput.

Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.2.2 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

NR

In data transfer mode, the data throughput of the EUT shall not fall below 95 % of the maximum data throughput.

Details are specified in annex C.

In the case of narrow band responses, the procedure in clause 4.4.3 shall be followed.

When testing a voice call, the performance criteria in clause 6.1.1 shall apply.

Performance criteria for Transient phenomena

At the conclusion of each exposure of the transient phenomena, the EUT shall operate without loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended without loss of user control functions or critical stored data.

In addition where the EUT supports idle mode it should be verified that the transmitter shall not unintentionally operate when transient phenomena are applied.

4.1.5 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** or **2.3** unless otherwise a special operating condition is specified in the following during the testing.



4.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.2.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance:	B
Discharge Voltage:	Air Discharge: 2KV/4KV/8KV (Direct) Contact Discharge: 4KV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: at least 10 times on each point Contact Discharge: at least 10 times on each point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Special conditions:	For EN 301489-52 section 7.3.2 special conditions, When applying direct discharge to a portable or handheld battery powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during the test, the EUT may be mounted vertically using non-metallic supports as specified in the last paragraph of clause 4.2.1 of EN 55035

4.2.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manners:

- Electrostatic discharges were applied only to those points and surfaces of the EUT 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 meter from the EUT.

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 EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

Vertical Coupling Plane (VCP):

The coupling plane of dimensions 0.5m x 0.5m, is placed parallel to and positioned at a distance 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

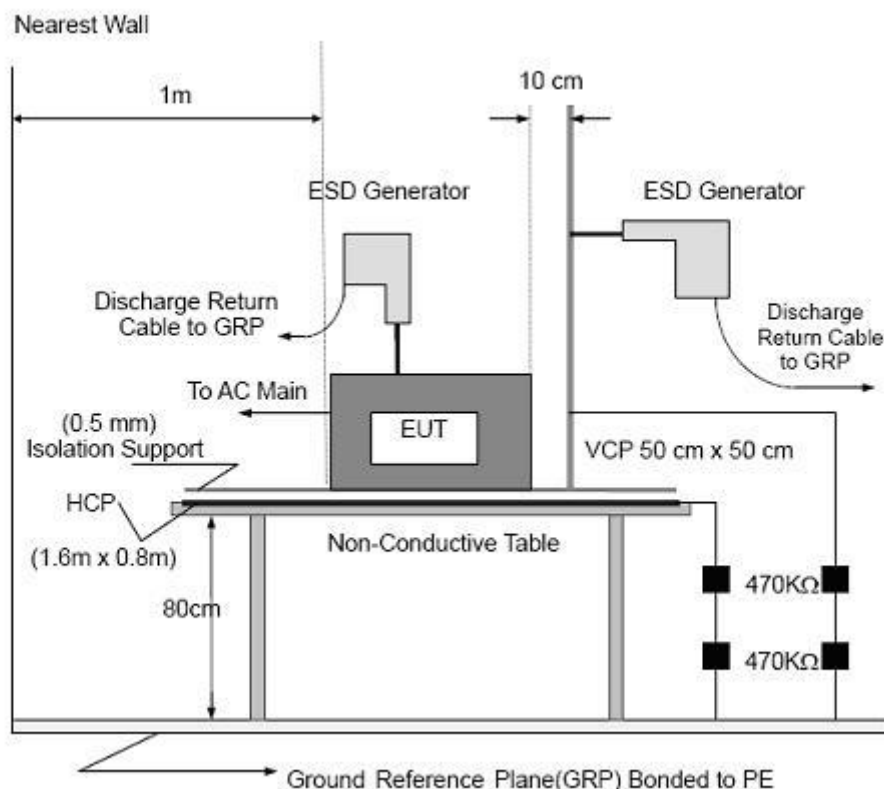
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.



- b. Air discharges at insulation surfaces of the EUT.
It was at least ten single discharges with positive and negative at the same selected point.

4.2.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meter high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k Ω total impedance. The equipment under test was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 0.8-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

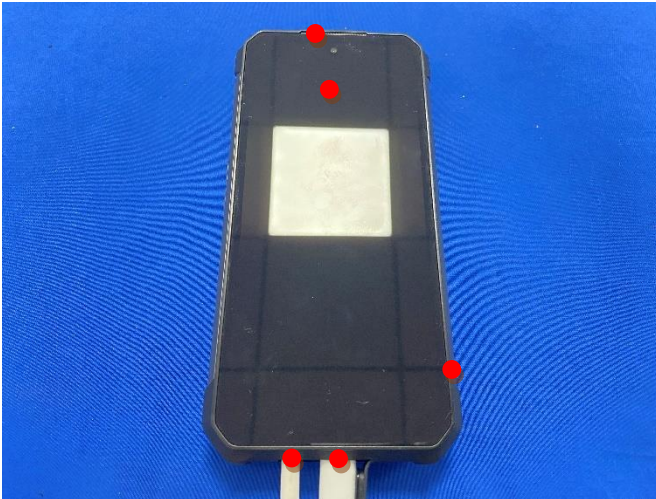
The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP was consisted of a sheet of aluminum that is at least 0.25mm thick, and extended at least 0.5 meter from the EUT on all sides.



4.2.4 TEST RESULT

Temperature:	24.1 °C	Relative Humidity:	56%
Pressure:	1017.8hPa	Test Date:	2024.05.31

Discharge times	Contact discharge: minimum 10 times (+/-respectively) at each point Air discharge: minimum 10 times (+/- respectively) at each point					
Discharge Level/KV	Polarity	Test Points	Contact Discharge	Air Discharge	Criterion	Test Result
2,4	+/-	HCP/VCP	A	N/A	B	Pass
2,4,	+/-	Green Dot	A	N/A	B	Pass
2,4,8	+/-	Red Dot	N/A	A	B	Pass
Note 1: EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser.						
Note 2: ● Red Dot_Air Discharged, ● Green Dot_Contact Discharged						





4.3 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz - 6000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s.
Special conditions:	For EN 301489-3 section 7.2.2 special conditions, Where the EUT is subject to EMC Immunity testing under a Harmonised Standard of a Directive other than the Directive 2014/53/EU [i.2] then the modulating signal frequency specified in that Harmonised Standard may be used. If this alternative modulating frequency is used, then the applicable Directive, Harmonised Standard & modulating frequency shall be noted in the test report.

4.3.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

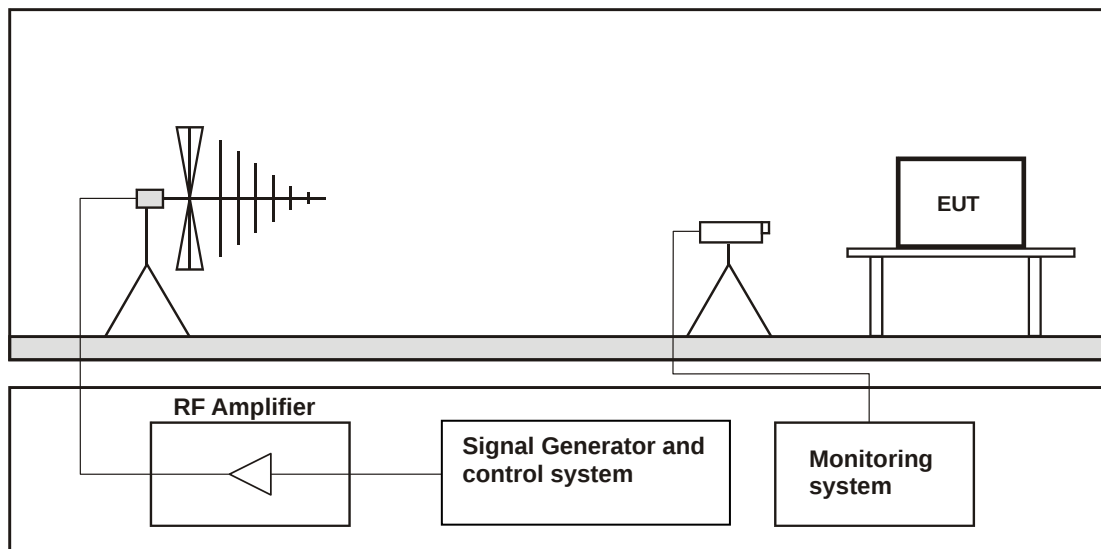
The testing distance from antenna to the EUT was 3 meters.

The other conditions required in the following manners:

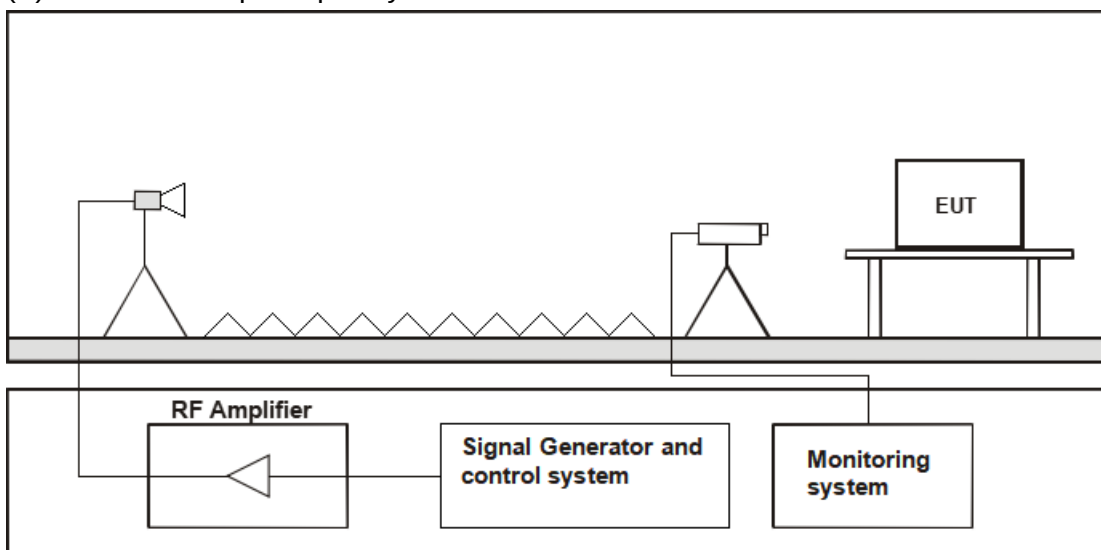
- The frequency range is swept from 80 MHz to 6000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.3.3 TEST SETUP

(A) RS Test Set-Up Frequency Below 1GHz



(B) RS Test Set-Up Frequency Above 1GHz



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meter in height. The system under test was connected to the power and signal wire according to the relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meter in height. The system under test was connected to the power and signal wire according to the relevant installation instructions.



4.3.4 TEST RESULTS

Temperature:	24.1 °C	Relative Humidity:	56%
Test Power:	AC 230V/50Hz	Test Date:	2024.05.31

Frequency Range (MHz)	Antenna polarity	Modulation	EUT position	Criterion	Result
80MHz-1000MHz	Horizontal Vertical	3 V/m 1KHz, 80% AM	Front	A	A
			Rear	A	A
			Left	A	A
			Right	A	A
1000MHz-6000MHz	Horizontal Vertical	3 V/m 1KHz, 80% AM	Front	A	A
			Rear	A	A
			Left	A	A
			Right	A	A

Note: EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser.



GPS TEST RESULTS

Test Level	3 V r.m.s. (unmodulated) 1 kHz, 80 % AM, sine wave		Criterion	A
Frequency Range (MHz)	Antenna polarity	Modulation	EUT position	Result
80-6000	Horizontal/ Vertical	1KHz, 80% AM	Front	PASS
			Rear	PASS
			Left	PASS
			Right	PASS
80, 104, 136, 165, 200, 260, 330, 430, 560, 715	Horizontal/ Vertical	1KHz, 80% AM	Front	PASS
			Rear	PASS
			Left	PASS
			Right	PASS
920	Horizontal/ Vertical	1KHz, 80% AM	Front	PASS
			Rear	PASS
			Left	PASS
			Right	PASS

Note: EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser

Spot frequency test:

A spot frequency test shall additionally be performed at:

- 80 MHz;
- 104 MHz;
- 136 MHz;
- 165 MHz;
- 200 MHz;
- 260 MHz;
- 330 MHz;
- 430 MHz;
- 560 MHz;
- 715 MHz $\pm$ 1 MHz;
- a spot frequency test shall be performed at 920 MHz $\pm$ 1 MHz using a test level of 3 V/m (measured unmodulated) 100 % modulated by 200 Hz pulses of equal mark to space ratio.

Note:

- 1) N/A - denotes test is not applicable in this test report.
- 2) Criteria A: There was no change operated with initial operating during the test.
- 3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 4) Criteria C: The system shut down during the test.



Mode	RXQUAL	Result
GSM 900	0	PASS
GSM 1800	0	PASS
Mode	BER	Result
WCDMA 2100	< 0.001	PASS
WCDMA 900	< 0.001	PASS
Mode	Throughput	Result
LTE Band1	> 95%	PASS
LTE Band3	> 95%	PASS
LTE Band7	> 95%	PASS
LTE Band8	> 95%	PASS
LTE Band20	> 95%	PASS
LTE Band28	> 95%	PASS
LTE Band34	> 95%	PASS
LTE Band38	> 95%	PASS
LTE Band40	> 95%	PASS
LTE Band42	> 95%	PASS

Note: For channelized equipment the exclusion band shall extend 250% of the channel width either side of the transmitter centre frequency.

Mode	PER	Result
Bluetooth	Less than 10%	PASS
BLE	Less than 10%	PASS
2.4GWIFI	Less than 10%	PASS
5GWIFI	Less than 10%	PASS



4.4 ELECTRICAL FAST TRANSIENT (EFT)

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance:	B
Test Voltage:	Power Line: 1 KV Signal/Control Line: 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5kHz
Impulse Wave shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	Not less than 1 min
Special conditions:	According to EN 301489-3 section 7.2.2 special conditions, The requirements of ETSI EN 301 489-1 [1], clauses 9.4.1 and 9.4.2 shall be applied with the exception of clause 7.4 of EN 61000-4-4 [4].

4.4.2 TEST PROCEDURE

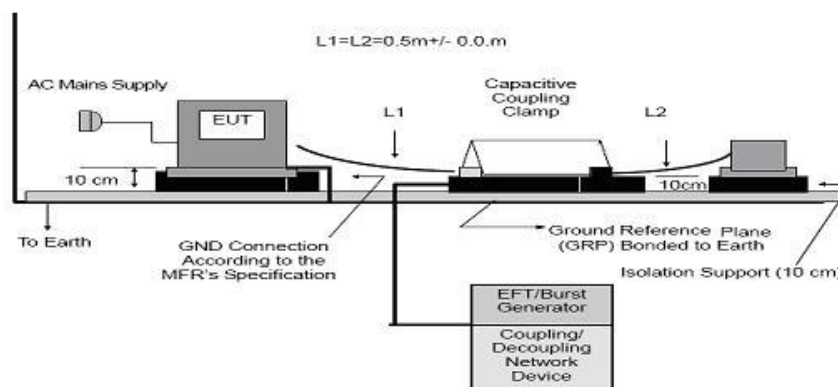
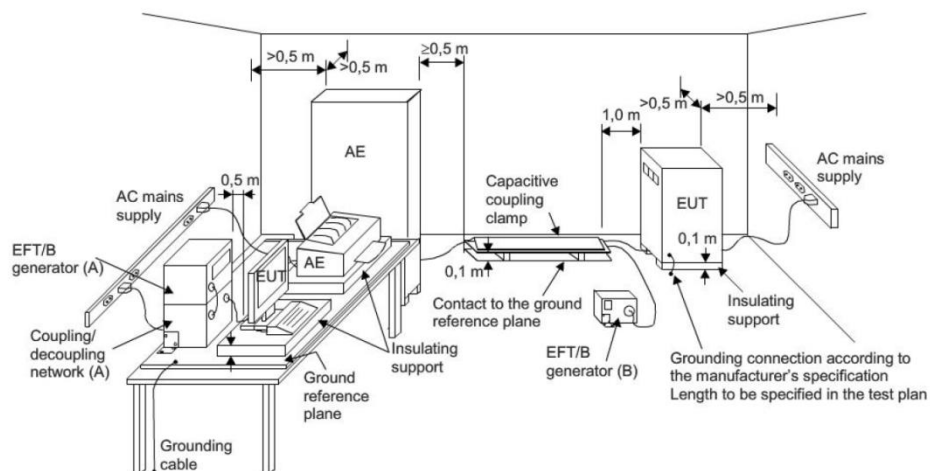
The EUT and support equipment, are placed on a table that is 0.8 meter&0.1 meter above a metal ground plane measured 1m*1m min.

The ground reference plane shall be a metallic sheet (copper or aluminum) of 0.25 mm minimum thickness; other metallic materials may be used, but they shall have at least 0.65 mm minimum thickness.

The other conditions required in the following manners:

- The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- Both positive and negative polarity discharges were applied.
- The duration time of each test sequential was 1 minutes.

4.4.3 TEST SETUP





Note:

TABLE-TOP EQUIPMENT

- a. Table-top equipment and equipment normally mounted on ceilings or walls as well as built-in equipment shall be tested with the EUT located (0.1 ± 0.01) m above the ground reference plane.
- b. Testing of large table-top equipment or multiple systems can be performed on the floor; maintaining the same distances as for the test setup of table-top equipment.
- c. The test generator and the coupling/decoupling network shall be bonded to the ground reference plane.
- d. The ground reference plane shall be a metallic sheet (copper or aluminum) of 0.25mm minimum thickness; other metallic materials may be used, but they shall have at least 0.65 mm minimum thickness.
- e. The minimum size of the ground reference plane is 0.8m x 1m. The actual size depends on the dimension of the EUT.
- f. The ground reference plane shall project beyond the EUT by at least 0.1m on all sides.
- g. The ground reference plane shall be connected to the earth (PE) for safety reasons.
- h. The EUT shall be arranged and connected to satisfy its functional requirements according to the equipment installation specifications.
- i. The minimum distance between the EUT and all other conductive structures (including the generator, AE and the walls of a shielded room), except the ground reference plane, shall be more than 0.5m.
- j. All cables to the EUT shall be placed on the insulation support 0.1m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.
- k. The EUT shall be connected to the earth system in accordance with the manufacturer's installation specifications; no additional earth connections are allowed.
- l. The connection impedance of the coupling/decoupling network earth cables to the ground reference plane and all connectors shall provide a low inductance.
- m. Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages. The test voltages shall be coupled to all of the EUT ports in turn including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.

FLOOR-STANDING EQUIPMENT

When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces (including the generator), except the ground reference plane beneath the coupling clamp and beneath the EUT, shall be at least 0.5m.

The distance between any coupling devices and the EUT shall be ($0.5 - 0/+0.1$) m for tabletop equipment testing, and (1.0 ± 0.1) m for floor standing equipment, unless otherwise specified in product standards. When it is not physically possible to apply the distances mentioned above, other distances can be used and shall be recorded in the test report.

The cable between the EUT and the coupling device, if detachable, shall be as short as possible to comply with the requirements of this clause. If the manufacturer provides a cable exceeding the distance between the coupling device and the point of entry of the EUT, the excess length of this cable shall be bundled and situated at a distance of 0.1m above the ground reference plane. When a capacitive clamp is used as a coupling device, the excess cable length shall be bundled at the AE side. Parts of the EUT with interconnecting cables of a length less than 3m, which are not tested, shall be placed on the insulating support. The parts of the EUT shall have a distance of 0.5m between them. Excess cable length shall be bundled.



4.4.4 TEST RESULTS

Temperature:	24.1℃	Relative Humidity:	56%
Test Power:	AC 230V/50Hz	Test Date:	2024.05.31

Coupling Line		Test level (kV)								Performance Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
I/O AC power ports	L	/	/	A	A	/	/	/	/	B	PASS
	N	/	/	A	A	/	/	/	/		PASS
	PE	/	/	/	/	/	/	/	/		N/A
	L+N	/	/	A	A	/	/	/	/		PASS
	L+PE	/	/	/	/	/	/	/	/		N/A
	N+PE	/	/	/	/	/	/	/	/		N/A
	L+N+PE	/	/	/	/	/	/	/	/		N/A
I/O DC Power ports		/	/	/	/	/	/	/	/	B	N/A
analogue/digital data ports		/	/	/	/	/	/	/	/	B	N/A

Note:

1. EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser
2. B: EUT There is abnormal sound in the headphones during the test, which will automatically resume after the test.



4.5 SURGE TESTING

4.5.1 TEST SPECIFICATION

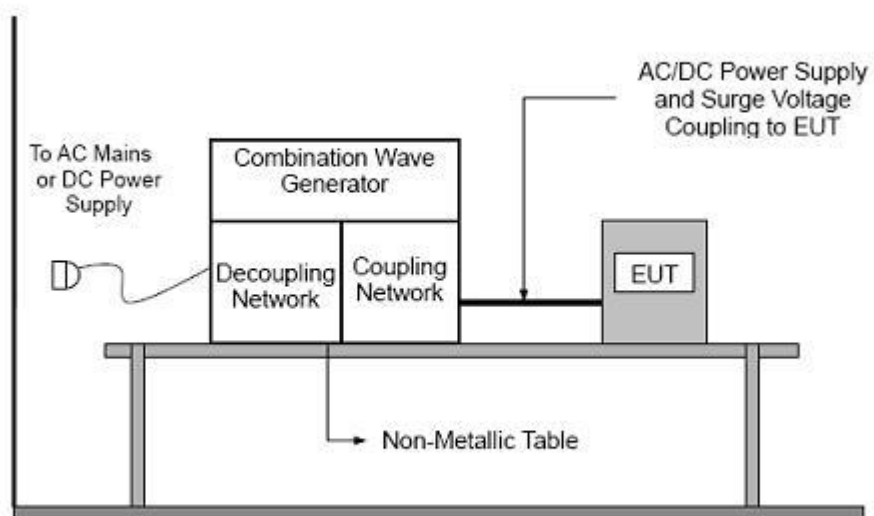
Basic Standard:	IEC/EN 61000-4-5
Required Performance:	B
Wave-Shape:	Combination Wave 1.2/50us Open Circuit Voltage
Test Voltage:	Power line ~ line to line: 1 KV line to ground: 2KV Telecommunication line: 1 KV
Surge Input/Output:	L-N, L-PE, N-PE
Generator Source:	(L-N)2 ohm between networks
Impedance:	(L-PE, N-PE)12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	90°/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.5.2 TEST PROCEDURE

- For EUT power supply:
The surge is to be applied to the EUT 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 EUT and the coupling/decoupling networks shall be 2meter in length (or shorter).
- For test applied to unshielded unsymmetrically operated interconnection lines of EUT:
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meter in length (or shorter).
- For test applied to unshielded symmetrically operated interconnection/telecommunication lines of EUT.
The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor was not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meter in length.



4.5.3 TEST SETUP





4.5.4 TEST RESULTS

Temperature:	24.1 °C	Relative Humidity:	56%
Test Power:	AC 230V/50Hz	Test Date:	2024.05.31

Coupling Line			Test level								Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV			
			+	-	+	-	+	-	+	-		
Input AC power ports	L-N	0°	A	A	A	A	/	/	/	/	B	PASS
		90°	A	A	A	A	/	/	/	/		PASS
		180°	A	A	A	A	/	/	/	/		PASS
		270°	A	A	A	A	/	/	/	/		PASS
	L-PE	0°	/	/	/	/	/	/	/	/		N/A
		90°	/	/	/	/	/	/	/	/		N/A
		180°	/	/	/	/	/	/	/	/		N/A
		270°	/	/	/	/	/	/	/	/		N/A
	N-PE	0°	/	/	/	/	/	/	/	/		N/A
		90°	/	/	/	/	/	/	/	/		N/A
		180°	/	/	/	/	/	/	/	/		N/A
		270°	/	/	/	/	/	/	/	/		N/A
Input DC power ports			/	/	/	/	/	/	/	/		N/A
Analogue/digital data ports	lines to PE	unshielded symmetrical	/	/	/	/	/	/	/	/	B	N/A
			/	/	/	/	/	/	/	/		N/A
			/	/	/	/	/	/	/	/		N/A
			/	/	/	/	/	/	/	/		N/A
Analogue/digital data ports	lines to PE	coaxial or shielded	/	/	/	/	/	/	/	/	B	N/A
			/	/	/	/	/	/	/	/		N/A
			/	/	/	/	/	/	/	/		N/A
Note: EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser.												



4.6 CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

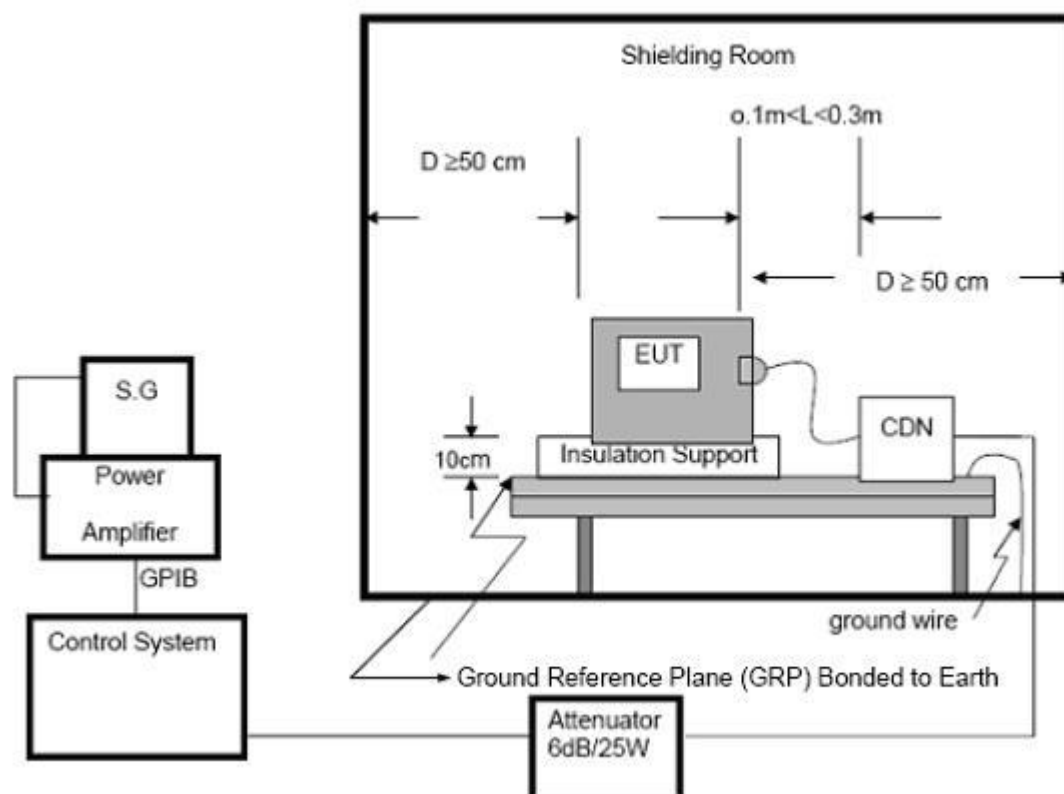
4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance:	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5 s.
Special conditions:	According to EN 301489-3 section 7.2.2 special conditions, Where the EUT is subject to EMC Immunity testing under a Harmonised Standard of a Directive other than the Directive 2014/53/EU [i.2] then the modulating signal frequency specified in that Harmonised Standard may be used. If this alternative modulating frequency is used, then the applicable Directive, Harmonised Standard & modulating frequency shall be noted in the test report.

4.6.2 TEST PROCEDURE

- The EUT shall be tested within its intended operating and climatic conditions.
- An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- One of the CDNs not used for injection was terminated with 50Ω, providing only one return path. All other CDNs were coupled as decoupling networks.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1% of the preceding frequency value.
- The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

4.6.3 TEST SETUP



NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meter height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meter and 0.3 meter from the projected geometry of the EUT on the ground reference plane.



4.6.4 TEST RESULTS

Temperature:	24.1 °C	Relative Humidity:	56%
Test Power:	AC 230V/50Hz	Test Date:	2024.05.31

Frequency Step:	1%		Dwell Time:	2000 ms	
Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Result
Input / Output AC Power Port	0.15~80	3V r.m.s.	A	A	PASS
Input / Output DC Power Port	0.15~80	3V r.m.s.	A	N/A	N/A
Analogue/digital data ports	0.15~80	3V r.m.s.	A	N/A	N/A
Note: EUT operate as intended during the test Normal performance within limits specified by the manufacturer, request or purchaser					



Mode	RXQUAL	Result
GSM 900	0	PASS
GSM 1800	0	PASS
Mode	BER	Result
WCDMA 2100	< 0.001	PASS
WCDMA 900	< 0.001	PASS
Mode	Throughput	Result
LTE Band1	> 95%	PASS
LTE Band3	> 95%	PASS
LTE Band7	> 95%	PASS
LTE Band8	> 95%	PASS
LTE Band20	> 95%	PASS
LTE Band28	> 95%	PASS
LTE Band34	> 95%	PASS
LTE Band38	> 95%	PASS
LTE Band40	> 95%	PASS
LTE Band42	> 95%	PASS

Note: For channelized equipment the exclusion band shall extend 250% of the channel width either side of the transmitter centre frequency.

Mode	PER	Result
Bluetooth	Less than 10%	PASS
BLE	Less than 10%	PASS
2.4GWIFI	Less than 10%	PASS
5GWIFI	Less than 10%	PASS



4.7 VOLTAGE INTERRUPTION/DIPS TESTING (DIPS)

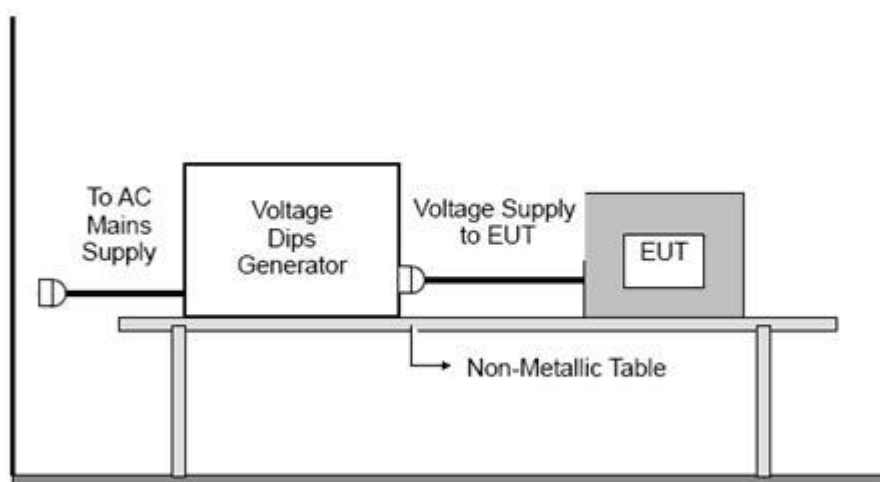
4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance:	B (For 100% Voltage Dips, 0.5 Cycle) B (For 100% Voltage Dips, 1 Cycle) C (For 30% Voltage Dips, 25 Cycles) C (For 100% Voltage Interruptions, 250 Cycles)
Test Duration Time:	Minimum 3 test events in sequence
Interval between Event:	Minimum 10 seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

4.7.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.7.3 TEST SETUP





4.7.4 TEST RESULTS

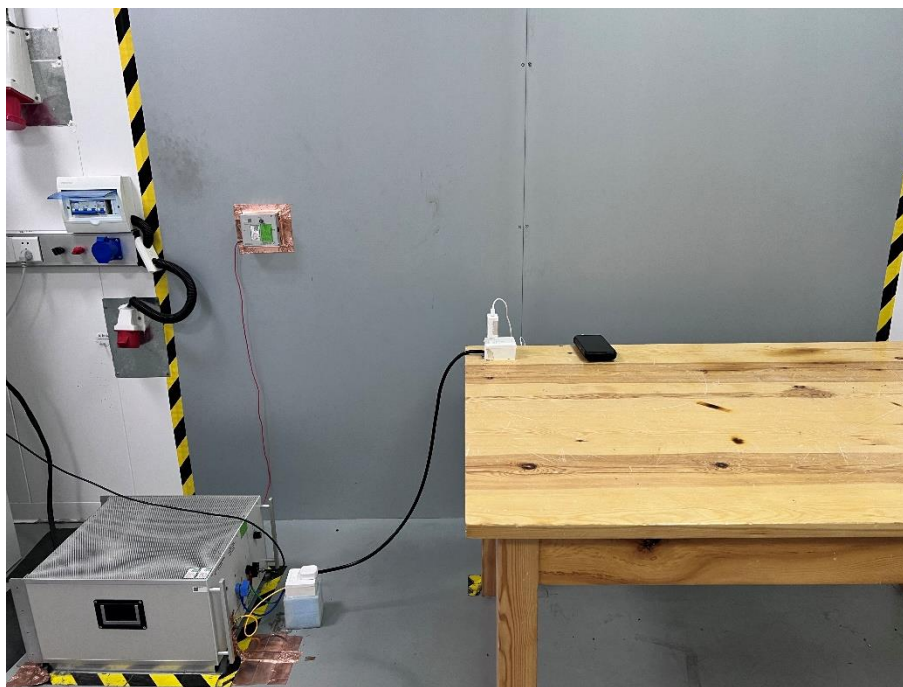
Temperature:	24.1°C	Relative Humidity:	56%
Test Power:	AC 230V/50Hz	Test Date:	2024.05.31

Interruption & Dips	Duration (T)	Perform Criteria	Results	Judgment
Voltage dip 70%	25	C	A	PASS
Voltage dip 0%	0.5	B	A	PASS
Voltage dip 0%	1	B	A	PASS
Interruption 0%	250	C	B	PASS
The charge is interrupted during the test, and will be automatically restored during the test.				

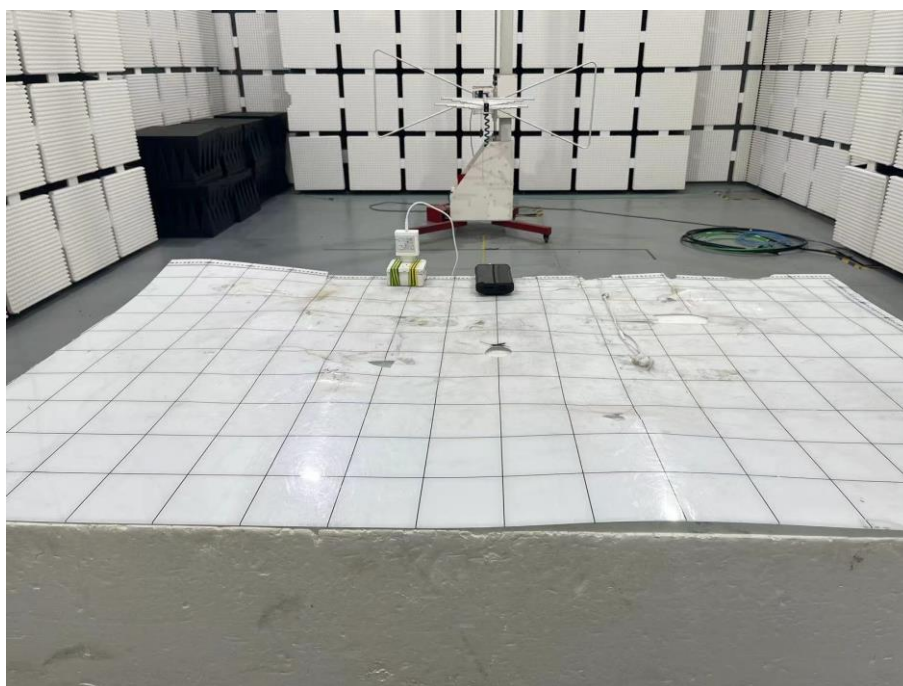


APPENDIX I - TEST SETUP

Set-up for Conducted Emission on AC Mains (CE)

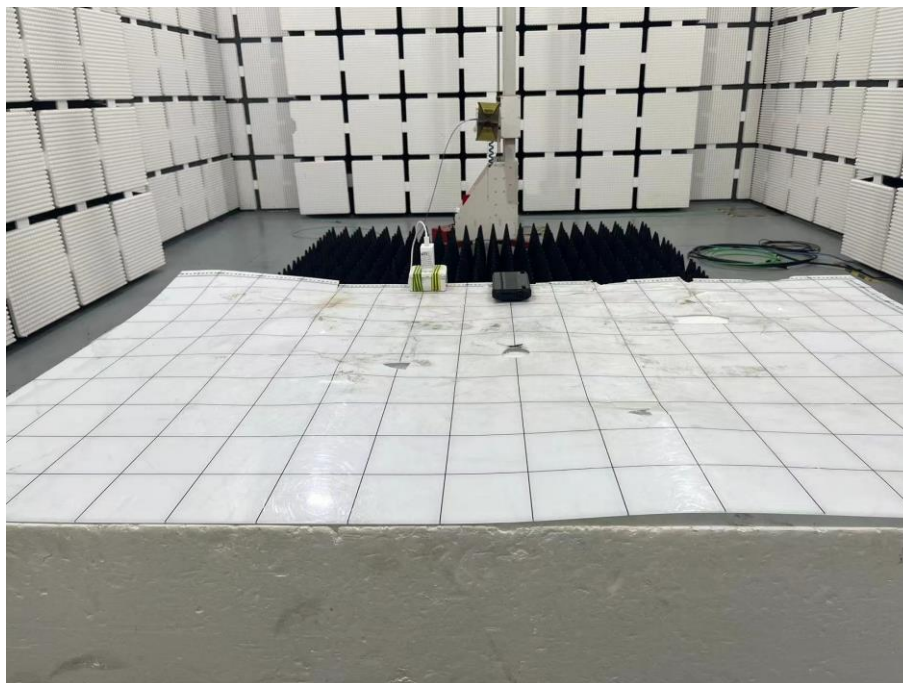


Set-up for Radiated Emission (RE), Below 1GHz

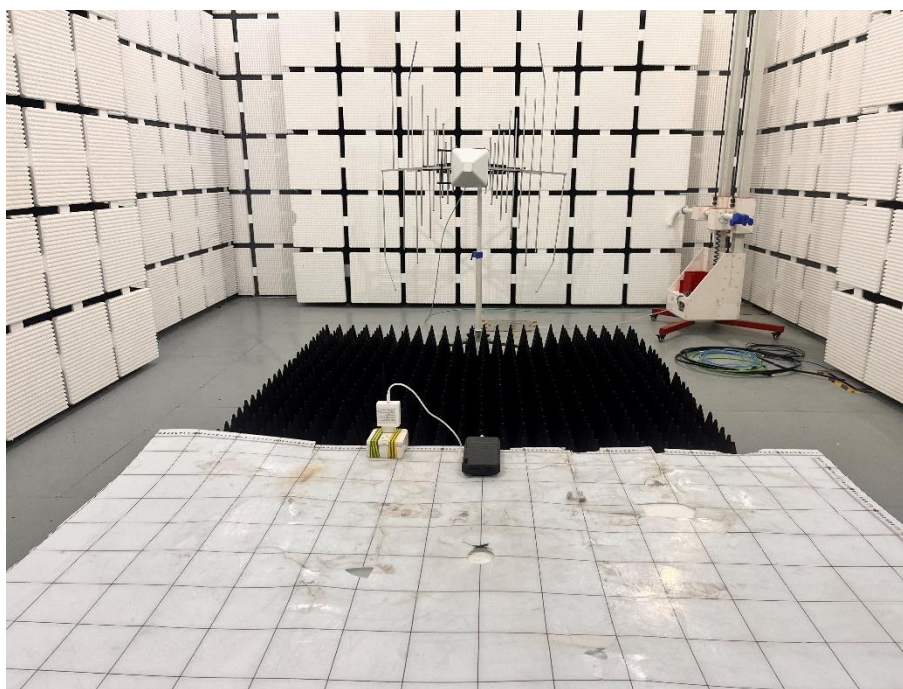




Set-up for Radiated Emission (RE), Above 1GHz

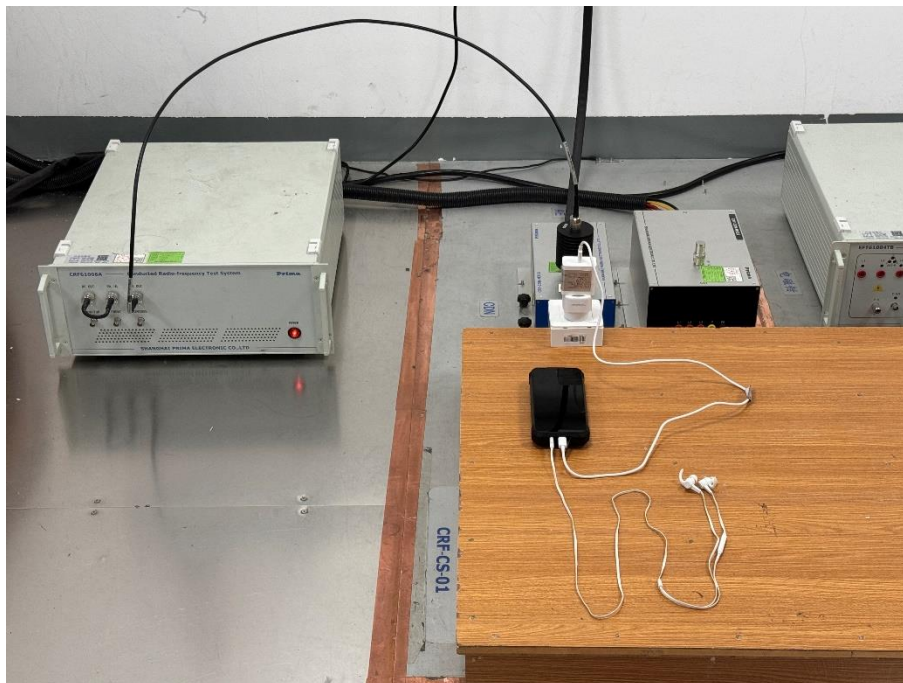


Set-up for Radio Frequency Electromagnetic Fields (RS)

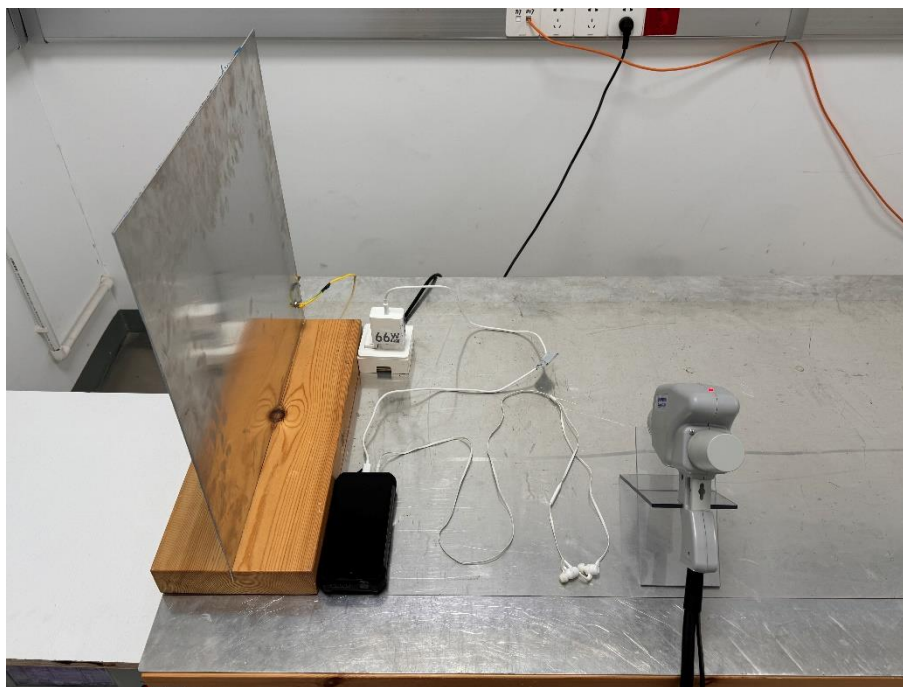




Set-up for Radio Frequency Continuous Conducted (CS)



Set-up for Electrostatic Discharges (ESD)

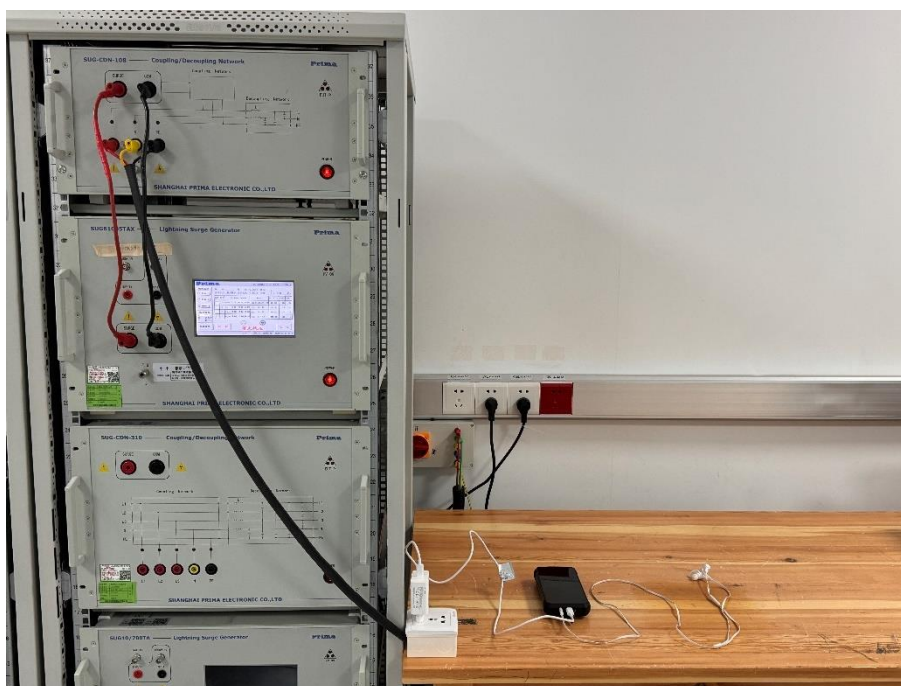




Set-up for Electrical Fast Transients (EFT)

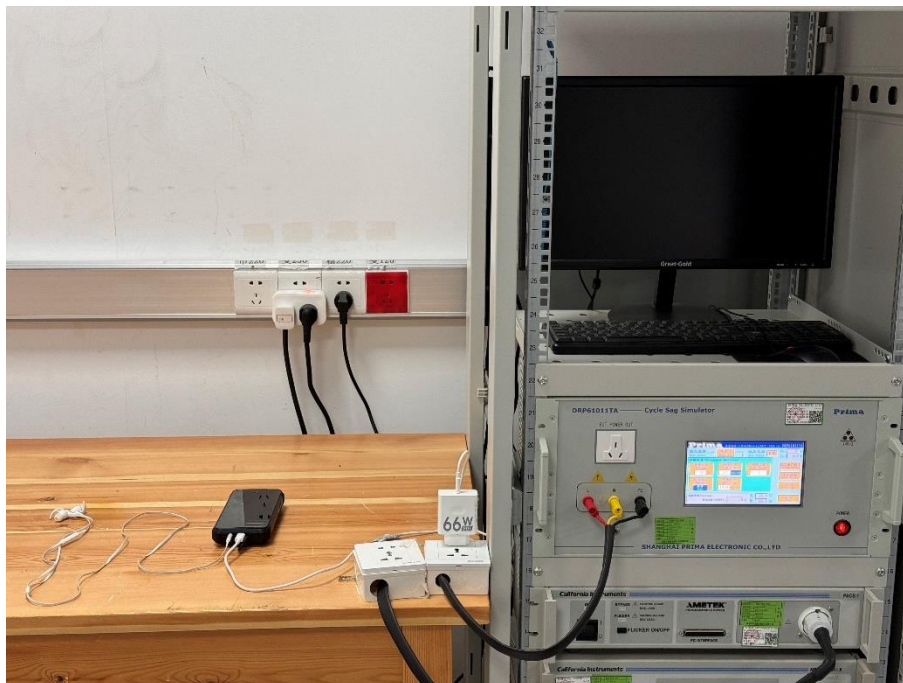


Set-up for Surge

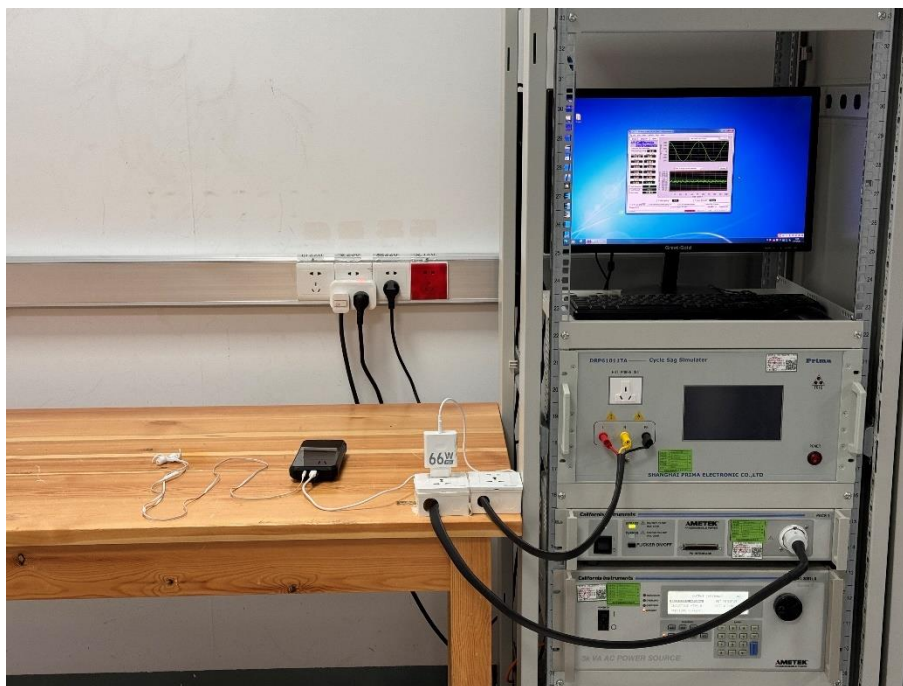




Set-up for Voltage Dips and Interruptions



Set-up for Harmonic Current & Voltage Fluctuations and Flicker (HF)





APPENDIX II - PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Note: Please see the attached TANK 3s_External Photos and TANK 3s_Internal Photos.

※※※※※END OF THE REPORT※※※※※