
EMC Test Report

Report No.: AGC05443230709EE01

PRODUCT DESIGNATION : 10000mAh Power bank
BRAND NAME : N/A
MODEL NAME : M06863
APPLICANT : MID OCEAN BRANDS B.V
DATE OF ISSUE : Aug. 02, 2023
STANDARD(S) : EN 55032:2015/A11:2020
EN IEC 61000-3-2:2019/A1:2021
EN 61000-3-3:2013/A2:2021
EN 55035:2017/A11:2020
REPORT VERSION : V1.0

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 02, 2023	Valid	Initial release

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1. VERIFICATION OF CONFORMITY

Applicant	MID OCEAN BRANDS B.V
Address	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Manufacturer	MID OCEAN BRANDS B.V
Address	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Factory	MID OCEAN BRANDS B.V
Address	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Product Designation	10000mAh Power bank
Brand Name	N/A
Test Model	MO6863
Date of receipt of test item	Jul. 13, 2023
Date of test	Jul. 13, 2023 to Aug. 02, 2023
Deviation	No deviation from the test method.
Condition of Test Sample	Normal
Test Result	Pass

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in 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



Cici Li
(Project Engineer)

Aug. 02, 2023

Reviewed By



Calvin Liu
(Reviewer)

Aug. 02, 2023

Approved By



Max Zhang
(Authorized Officer)

Aug. 02, 2023

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Full load output mode with charging by Micro USB	V
2	Full load output mode with charging by USB	--
3	USB-A output mode with charging by Micro USB	--
4	USB-A output mode with charging by USB	--
Note: 1. V means EMI worst mode. 2. All modes have been tested and only the worst mode test data recorded in the test report.		

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, $U_c = \pm 2.9$ dB
- Uncertainty of Radiated Emission (Below 1G), $U_c = \pm 3.9$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.9$ dB

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4. PRODUCT INFORMATION

Housing Type	Plastic and metal
Hardware Version	N/A
Software Version	N/A
EUT Input Rating	Micro USB Input: DC 5V/2A Cable with USB Input::DC 5V/2A
EUT Output Rating	USB-A Output: DC 5V/2A Cable with Type-C Output: DC5V/2A Cable with Micro Output: DC5V/2A Cable with 2 in 1 Output: DC5V/2A Capacity: 10000mAh/37Wh Total output: 5V 2A

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

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB Input	1	0.45m Unshielded	1
Micro-B Input	1	--	1
Type-C Output	1	--	1
Micro-B Output	1	--	1
USB-A Output	1	--	1
2 in 1 Output	1	--	1

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5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
iPod	APPLE	MGG82ZP/A	--	--	0.12m,unshielded
Xiaomi phone	Xiaomi	Mi 10	--	--	0.09m,unshielded
OPPO phone	OPPO	A9	OPPO	OPPO	0.09m,unshielded
Adapter	jinbaotong	K-T10E050200 0E	--	--	AC100-240V,50-60Hz,0.35A,DC5 V/2A

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

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6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao 'an District, Shenzhen, Guangdong, China

7. TEST EQUIPMENT LIST

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESPI	101206	Aug. 04, 2022	Aug. 03, 2023
Artificial power network	R&S	ESH2-Z5	100086	Jun. 03, 2023	Jun. 02, 2024
Test software	R&S	ES-K1	Ver.V1.7.1	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
Antenna	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025
Double-Ridged Waveguide Horn	ETS	3117	00034609	Mar. 23, 2023	Mar. 22, 2024
Preamplifier Assembly	ETS	3117PA	00225134	Sep. 02, 2022	Sep. 01, 2024
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
Test software	Tonscend	JS32-RE(Ver.2.5)	N/A	N/A	N/A

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	Jun. 08, 2023	Jun. 07, 2024
AC Source	Schaffner	NSG1007	56825	Jun. 02, 2023	Jun. 01, 2024

TEST EQUIPMENT OF SURGE/EFT/DIPS TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
EFT/Surge Generator	Schaffner	Modula 6150	34437	Jun. 08, 2023	Jun. 07, 2024

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TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	Schaffner	NSG 438	782	Dec. 30, 2022	Dec. 29, 2023

TEST EQUIPMENT OF RS IMMUNITY TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Generator	R&S	E4421B	MY43351603	Feb. 17, 2023	Feb. 16, 2024
Power Sensor	R&S	URV5-Z4	100124	Mar. 24, 2023	Mar. 23, 2025
Power Meter	R&S	NRVD	8323781027	Mar. 24, 2023	Mar. 23, 2025
Power Amplifier	KALMUS	7100LC	04-02/17-06-001	N/A	N/A
Power Amplifier	Milmega	AS0104-55_55	1004793	N/A	N/A
Double-Ridged Waveguide Horn	ETS	3117	00034609	Mar. 23, 2023	Mar. 22, 2024
Power Amplifier	rflight	NTWPA-2560100	17063183	N/A	N/A
Antenna	ETS	3142C	00060447	N/A	N/A

TEST EQUIPMENT OF CS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	AR	75A250	18464	N/A	N/A
CDN	ZHINAN	ZN3751	15004	Aug. 03, 2022	Aug. 02, 2024
6dB attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Power Sensor	R&S	URV5-Z4	100124	Mar. 24, 2023	Mar. 23, 2025
Power Meter	R&S	NRVD	8323781027	Mar. 24, 2023	Mar. 23, 2025
Signal Generator	R&S	E4421B	MY43351603	Feb. 17, 2023	Feb. 16, 2024

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8. TESTSUMMARY LIST

Test item	Test Requirement	Test Method	Class/Severity	Result
Conducted emission	EN 55032	EN 55032	Class B	Pass
Radiated emission	EN 55032	EN 55032	Class B	Pass
Harmonic current emission	EN IEC 61000-3-2	EN IEC 61000-3-2	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3	EN 61000-3-3	§5 of EN 61000-3-3	Pass
Electrostatic discharge immunity	EN 55035	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated electromagnetic field immunity	EN 55035	EN 61000-4-3	3V/m with 80% AM. 1kHz Modulation.	Pass
Electrical fast transient/burst Immunity	EN 55035	EN 61000-4-4	+/- 1kV for Power Supply Lines	Pass
Surge immunity	EN 55035	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	Pass
Immunity to Conducted Disturbances Induced by RF fields	EN 55035	EN 61000-4-6	3V(0.15MHz-10MHz) 3V-1V(10MHz-30MHz) 1V(30MHz-80MHz) with 80% AM. 1 kHz Modulation	Pass
Power frequency magnetic field	EN 55035	EN 61000-4-8	1A/m 50Hz or 60Hz	N/A
Voltage dips and short interruptions immunity	EN 55035	EN 61000-4-11	0degrees	Pass

Note: N/A means not applicable.

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9. EN 55032 LINE CONDUCTED EMISSION TEST

9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

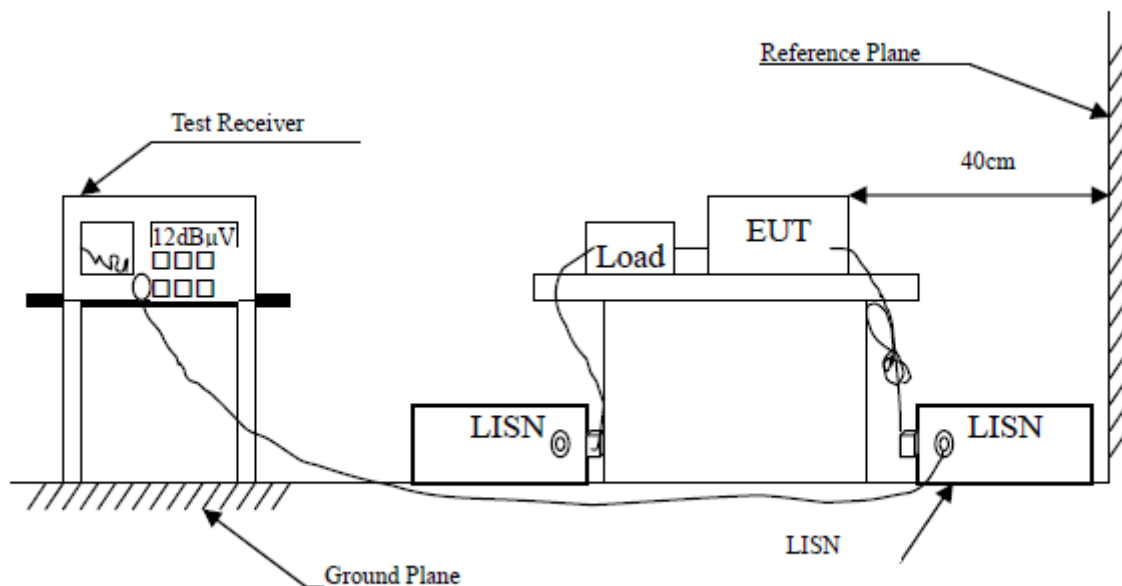
AT AC MAINS POWER PORT

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	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.

9.2. BLOCK DIAGRAM OF TEST SETUP



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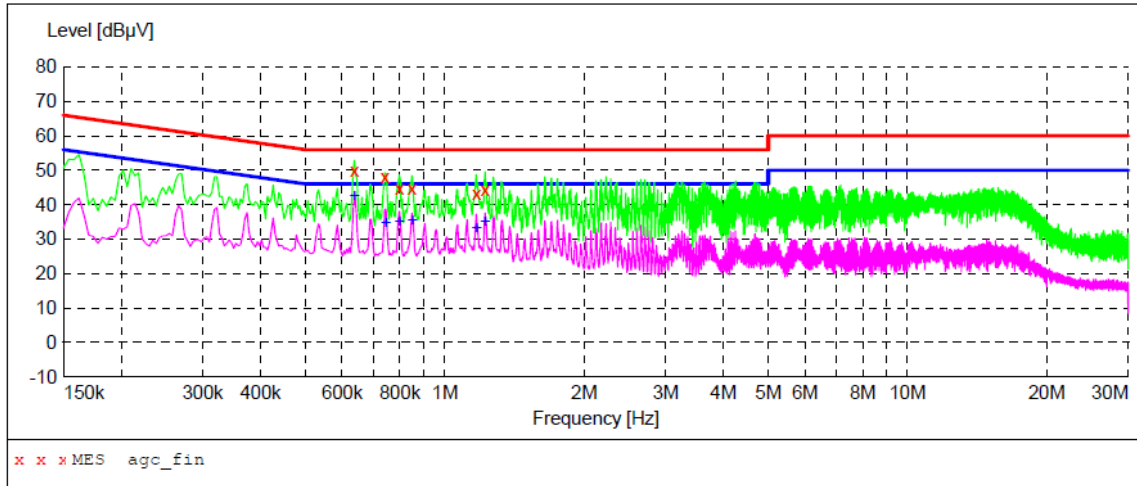
9.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (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 10cm 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 DC 5V power from adapter which received AC 230V 50Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received power from a second LISN supplying power of AC230V and 110V/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 150kHz to 30MHz 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.

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9.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT: "agc_fin"

2023/7/31 11:13

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.638000	49.90	6.2	56	6.1	QP	L1
0.742000	48.00	6.2	56	8.0	QP	L1
0.798000	44.50	6.2	56	11.5	QP	L1
0.850000	44.70	6.2	56	11.3	QP	L1
1.170000	43.10	6.2	56	12.9	QP	L1
1.222000	44.30	6.2	56	11.7	QP	L1

MEASUREMENT RESULT: "agc_fin2"

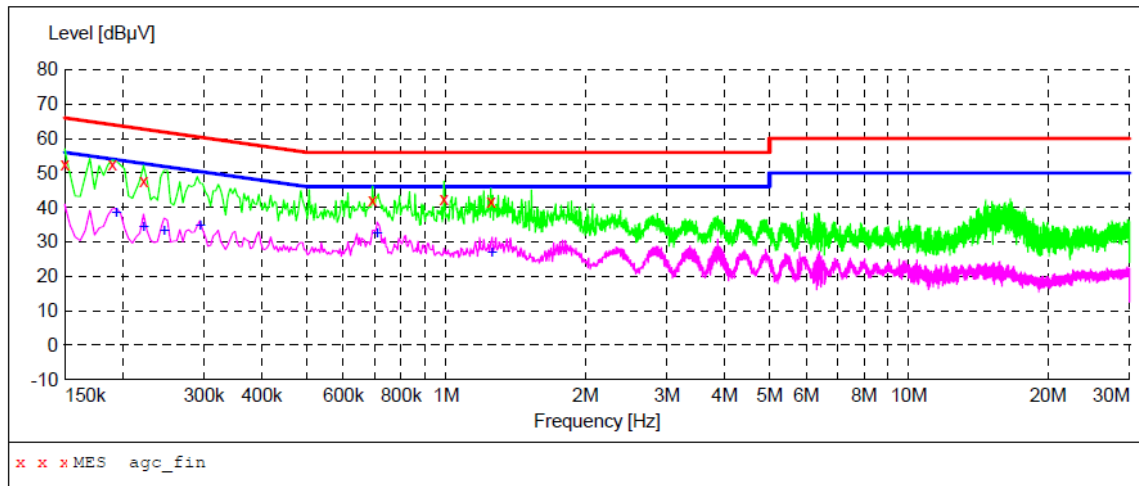
2023/7/31 11:13

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.638000	42.30	6.2	46	3.7	AV	L1
0.746000	34.70	6.2	46	11.3	AV	L1
0.798000	35.10	6.2	46	10.9	AV	L1
0.850000	35.20	6.2	46	10.8	AV	L1
1.170000	33.00	6.2	46	13.0	AV	L1
1.222000	35.00	6.2	46	11.0	AV	L1

RESULT: PASS

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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "agc_fin"

2023/7/31 11:09

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	52.40	6.1	66	13.6	QP	N
0.190000	52.50	6.1	64	11.5	QP	N
0.222000	47.60	6.1	63	15.1	QP	N
0.694000	41.90	6.2	56	14.1	QP	N
0.990000	42.30	6.2	56	13.7	QP	N
1.250000	41.70	6.2	56	14.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

2023/7/31 11:10

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.194000	38.20	6.1	54	15.7	AV	N
0.222000	34.30	6.1	53	18.4	AV	N
0.246000	33.20	6.1	52	18.7	AV	N
0.294000	34.60	6.1	50	15.8	AV	N
0.710000	32.50	6.2	46	13.5	AV	N
1.258000	26.70	6.2	46	19.3	AV	N

RESULT: PASS

Note:

Measurement Level(dBuV) = Receiver reading(dBuV)+Tansd(dB)

Transd(dB)=AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB) for Attenuator

Margin= Limit-Level

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10. EN 55032 RADIATED EMISSION TEST

10.1. LIMITS OF RADIATED DISTURBANCES

Limits for radiated disturbance 30M to1 GHz at a measurement distance of 3 m

Frequency range (MHz)	Quasi peak limits(dBuV/m), for Class B ITE, at 3m measurement distance
30 - 230	40
230 - 1000	47

Limits for radiated disturbance above 1 GHz at a measurement distance of 3 m

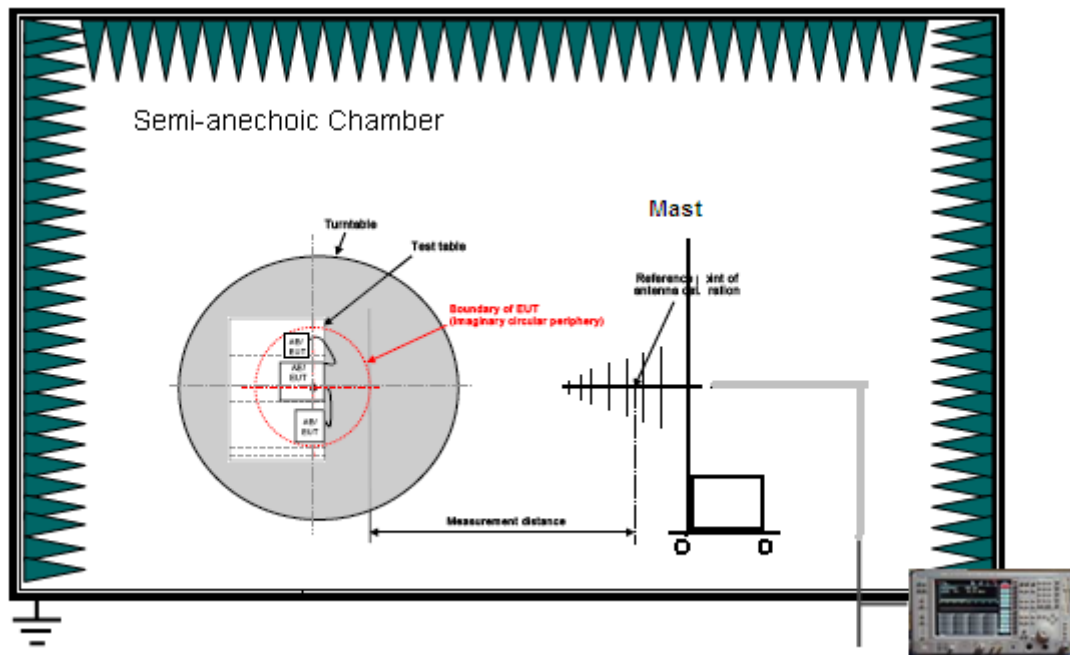
Frequency range (MHz)	Limits (dBuV/m), Class B ITE	
	Peak	Average
1000-3000	70	50
3000-6000	74	54

Notes:

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

10.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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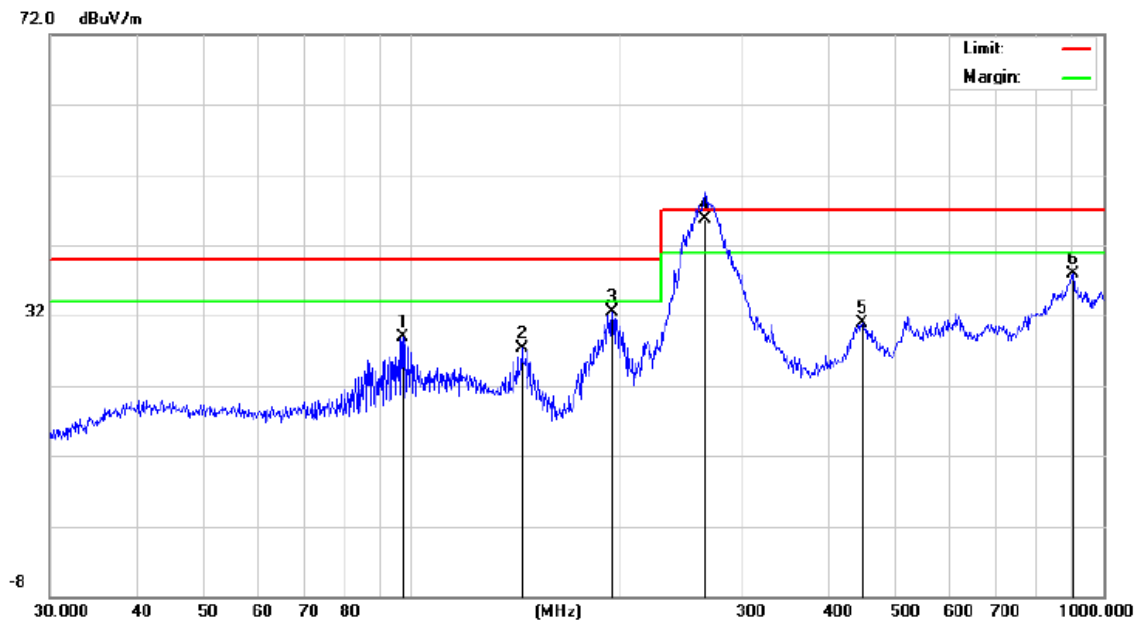
10.3. PROCEDURE OF RADIATED EMISSION TEST

- (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 10cm 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 charging voltage by adapter which got 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.
- (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.

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10.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance – Horizontal

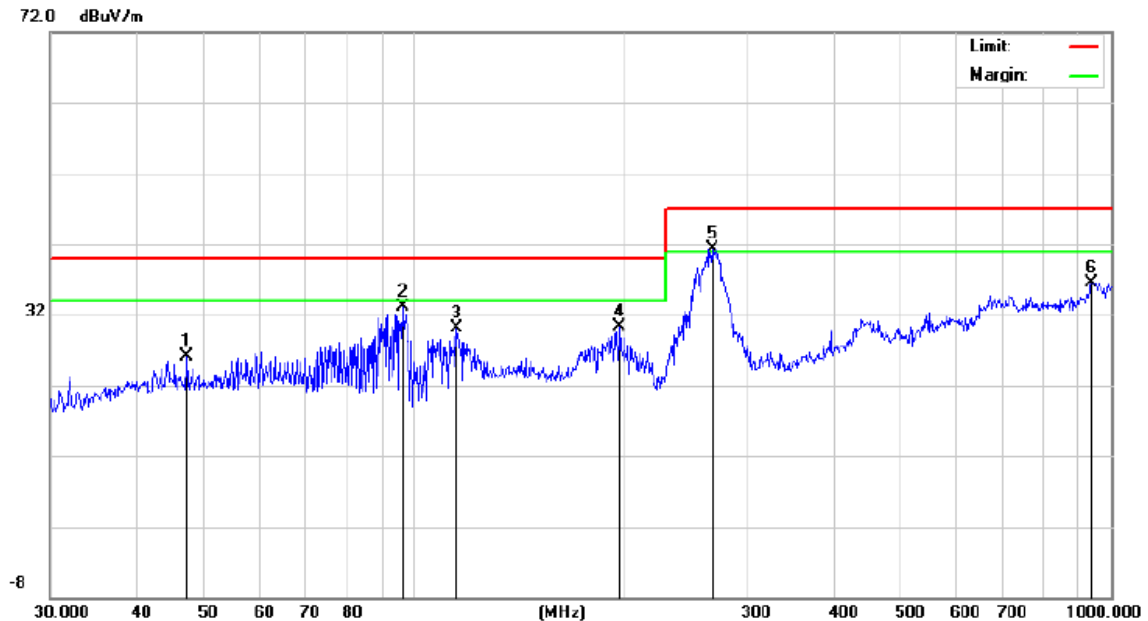


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		97.1148	13.18	15.75	28.93	40.00	-11.07	peak
2		144.3348	12.70	14.55	27.25	40.00	-12.75	peak
3		195.1365	18.59	13.94	32.53	40.00	-7.47	peak
4	*	265.6757	31.22	14.54	45.76	47.00	-1.24	QP
5		447.9822	6.17	24.82	30.99	47.00	-16.01	peak
6		903.3094	6.48	31.34	37.82	47.00	-9.18	peak

RESULT: PASS

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Radiated Emission Test at 3m Distance –Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		47.1599	9.08	16.97	26.05	40.00	-13.95	peak
2		96.0986	18.40	14.73	33.13	40.00	-6.87	peak
3		114.9169	13.20	16.81	30.01	40.00	-9.99	peak
4		197.2001	12.39	17.98	30.37	40.00	-9.63	peak
5	*	267.5455	23.23	18.09	41.32	47.00	-5.68	peak
6		938.8326	5.68	30.84	36.52	47.00	-10.48	peak

RESULT: PASS

Note:

Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

Over= Measurement- Limit

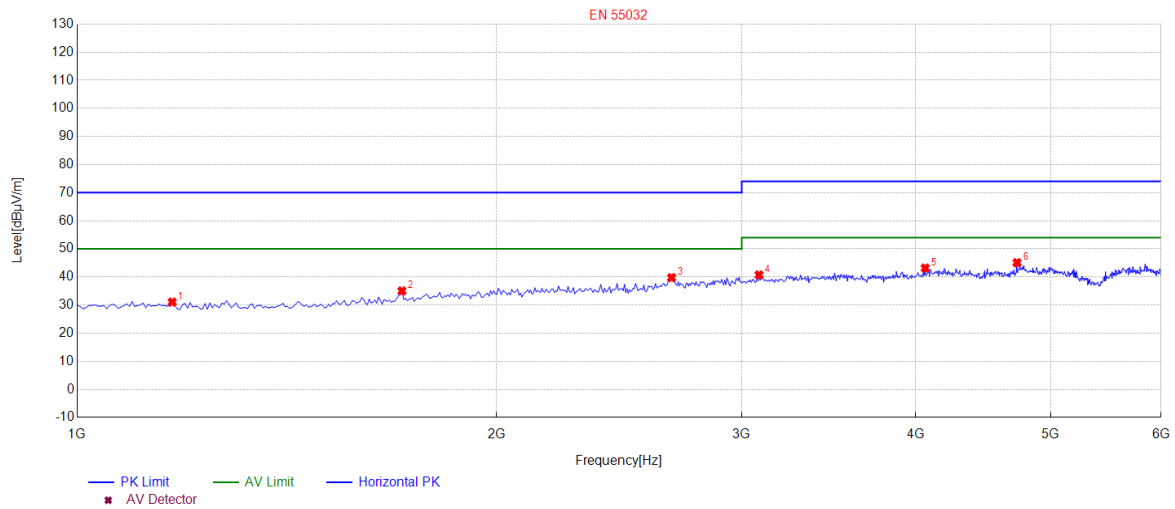
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Radiated Emission Test at 3m Distance-Above 1G –Horizontal



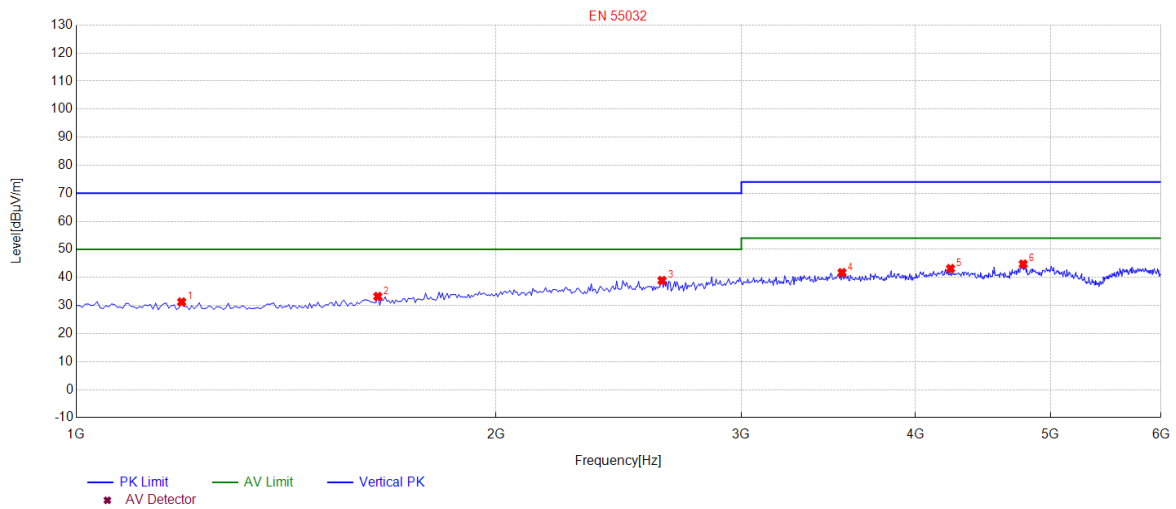
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1170.1702	31.06	-19.87	70.00	38.94	100	50	Horizontal
2	1710.7107	35.02	-18.28	70.00	34.98	100	170	Horizontal
3	2671.6717	39.77	-12.47	70.00	30.23	100	210	Horizontal
4	3087.0871	40.74	-10.96	74.00	33.26	100	280	Horizontal
5	4063.0631	43.16	-8.02	74.00	30.84	100	40	Horizontal
6	4728.7287	45.07	-6.96	74.00	28.93	100	210	Horizontal

RESULT: PASS

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Radiated Emission Test at 3m Distance Above 1G –Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1190.1902	31.25	-19.87	70.00	38.75	100	100	Vertical
2	1645.6456	33.21	-18.79	70.00	36.79	100	150	Vertical
3	2631.6316	38.90	-12.62	70.00	31.10	100	200	Vertical
4	3542.5425	41.71	-9.56	74.00	32.29	100	310	Vertical
5	4238.2382	43.16	-7.81	74.00	30.84	100	310	Vertical
6	4778.7788	44.76	-6.84	74.00	29.24	100	170	Vertical

RESULT: PASS

Note:

Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

Margin= Limit-Level

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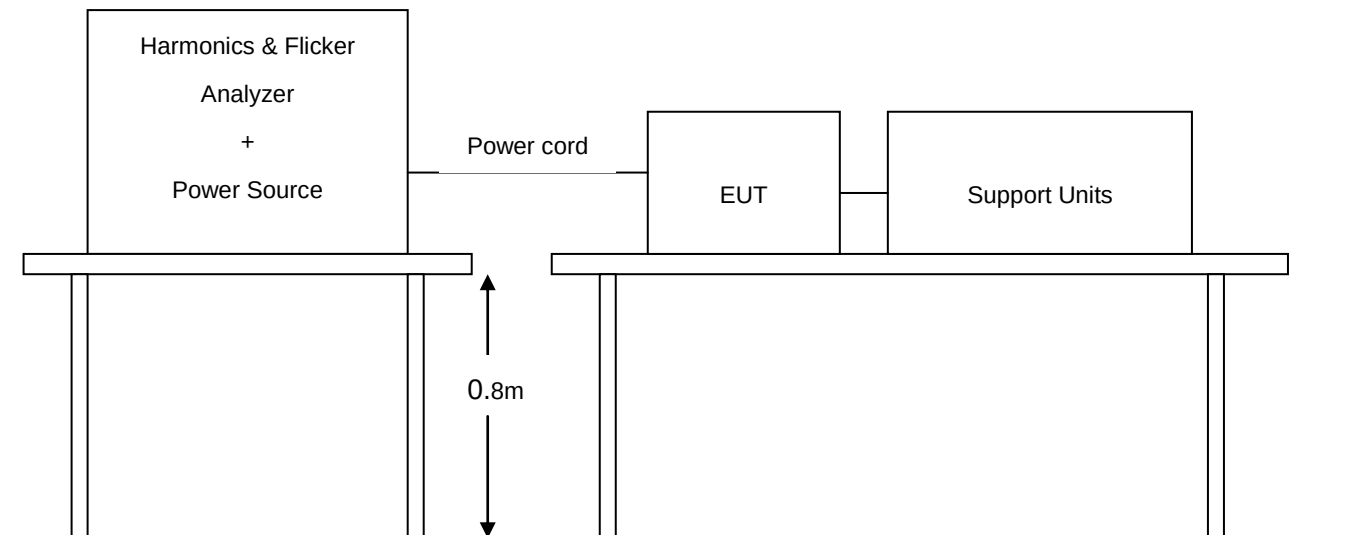
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11. EN IEC 61000-3-2 POWER HARMONICS TEST

POWER HARMONICS MEASUREMENT

Port	AC mains
Basic Standard	EN IEC 61000-3-2
Limits	☒ CLASS A; ☐ CLASS B; ☐ CLASS C; ☐ CLASS D
Temperature	23.1°C
Humidity	58.5% RH

11.1. BLOCK DIAGRAM OF TEST SETUP



11.2. RESULT

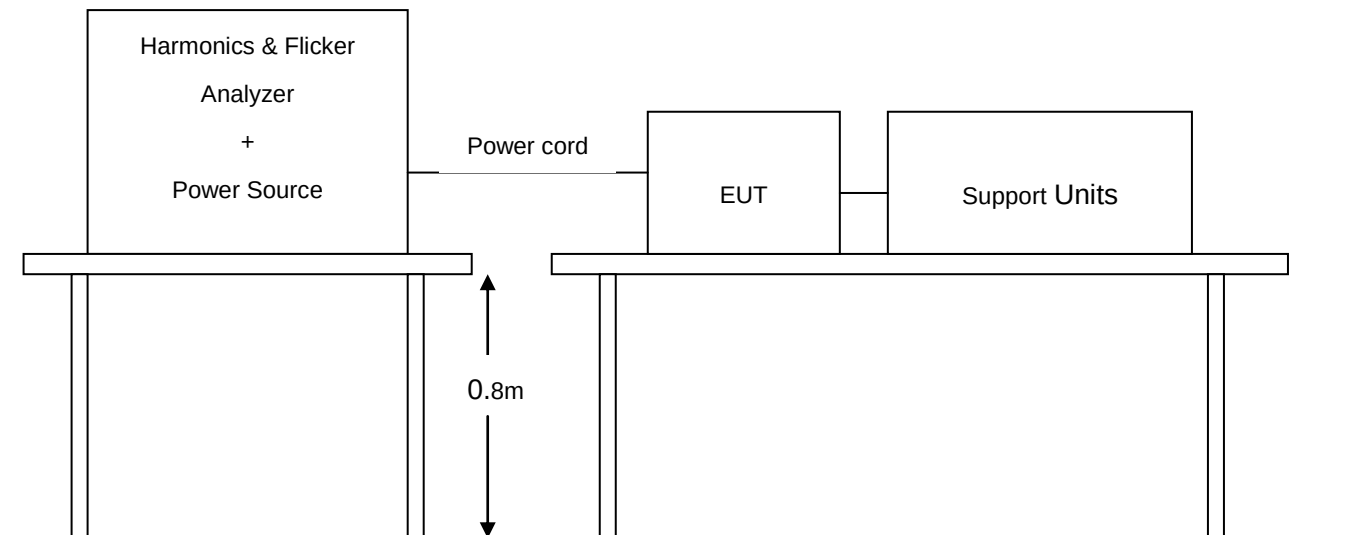
Note: Owing to the power of EUT is less than 75W, so test is not applicable.

12. EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port	AC mains
Basic Standard	EN 61000-3-3
Limits	§5 of EN 61000-3-3
Temperature	23.1°C
Humidity	58.5% RH

12.1. BLOCK DIAGRAM OF TEST SETUP



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12.2. RESULT**Flicker Test Summary per EN/IEC61000-3-3 (Run time)**

Test Parameter	Measurement Value	Limit	Remarks
Time(mS) > dt:	0.0	500.0	Pass
Highest dc (%):	0.00	3.30	Pass
Highest dmax (%):	0.00	4.00	Pass
Highest Pst (10 min. period):	0.273	1.0	Pass
Highest Plt (2 hr. period):	0.119	0.65	Pass

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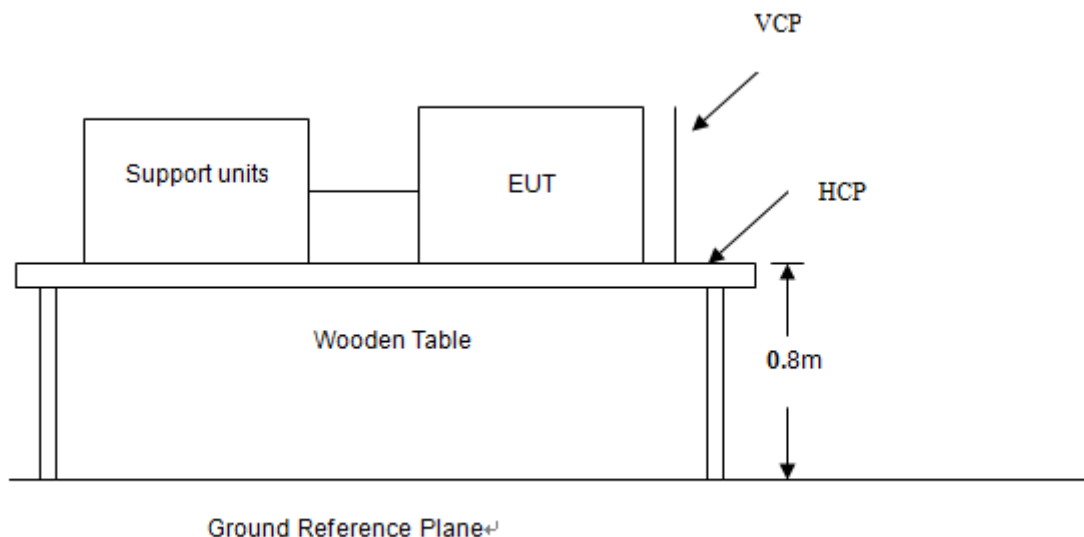
13. EN 61000-4-2 ESD IMMUNITY TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Temperature	24.0°C
Humidity	50.0% RH

13.1. BLOCK DIAGRAM OF TEST SETUP

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

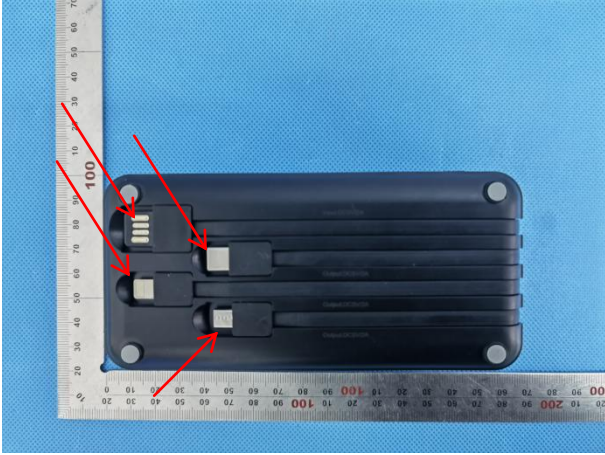


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ESD LOCATION:

Red line: Contact discharge

Blue line: Air discharge



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13.2. TEST PROCEDURE

The test procedure shall be in accordance with EN 61000-4-2. Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation, including user access operations specified in the user manual, for example cleaning or adding consumables when the EUT is powered. The application of discharges to the contacts of open connectors is not required.

The number of test points is EUT dependent. Sub clause 8.3.1 and Clause A.5 of EN 61000-4-2 shall be taken into consideration when selecting test points, paying particular attention to keyboards, dialling pads, power switches, mice, drive slots, card slots, the areas around communication ports, etc.

When applying direct discharges 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 this test, the EUT may be mounted vertically using non-metallic supports.

Note: As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test. The electrostatic discharges were applied as follows:

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

13.3. PERFORMANCE & RESULT

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ PASS ☐ FAIL
--

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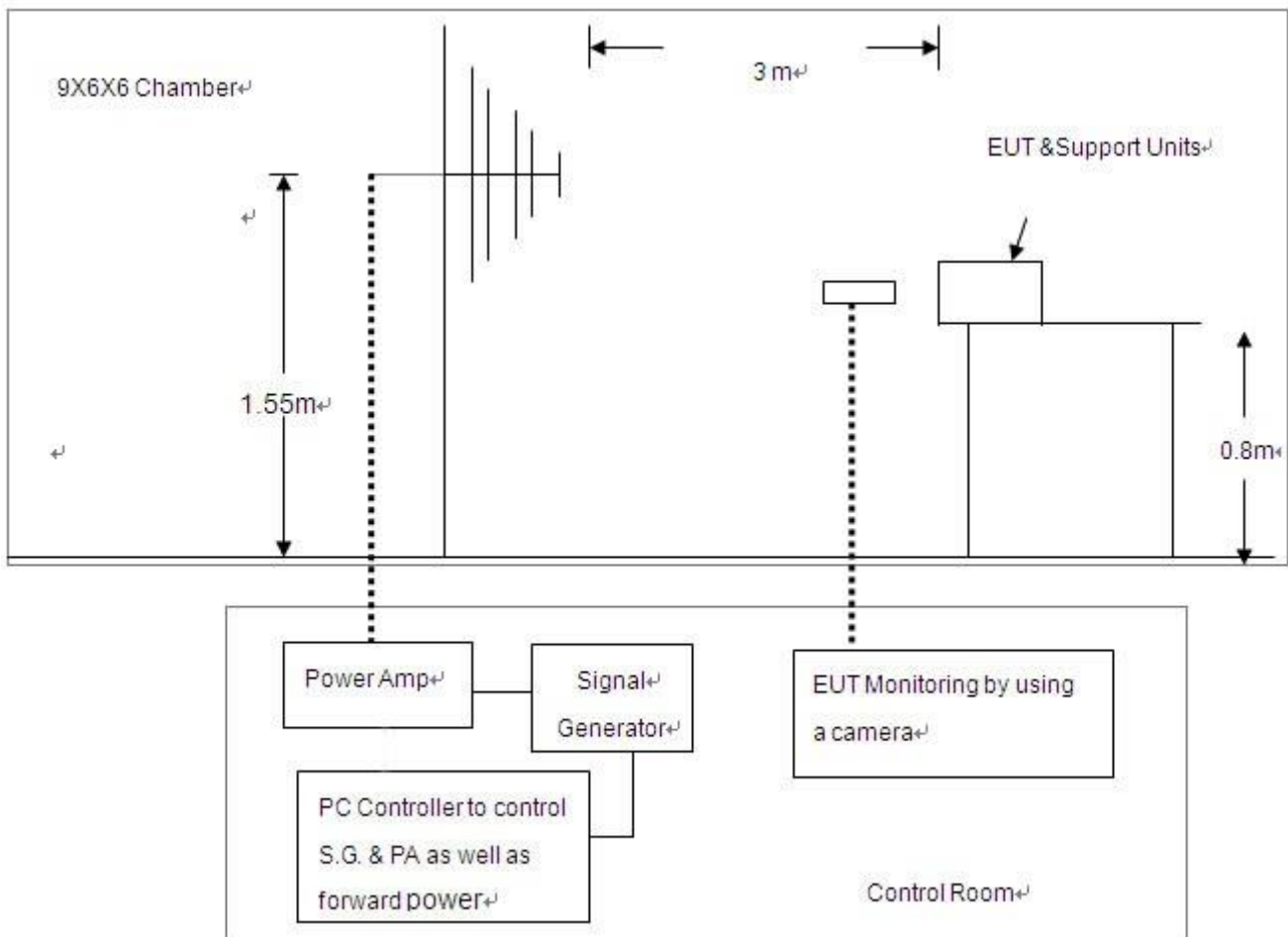
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14. EN 61000-4-3 RS IMMUNITY TEST

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-3
Test Level:	3V/m with 80% AM. 1kHz Modulation.
Standard require	A
Temperature	22.7°C
Humidity	59.4% RH

14.1. BLOCK DIAGRAM OF TEST SETUP



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14.2. 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

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

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result
80-1000	3V/m	AM	H/V	Front	No function loss	A
80-1000	3V/m	AM	H/V	Left	No function loss	A
80-1000	3V/m	AM	H/V	Back	No function loss	A
80-1000	3V/m	AM	H/V	Right	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Front	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Left	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Back	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Right	No function loss	A

Frequency (± 1 %) for Spot test.

14.3. PERFORMANCE & RESULT

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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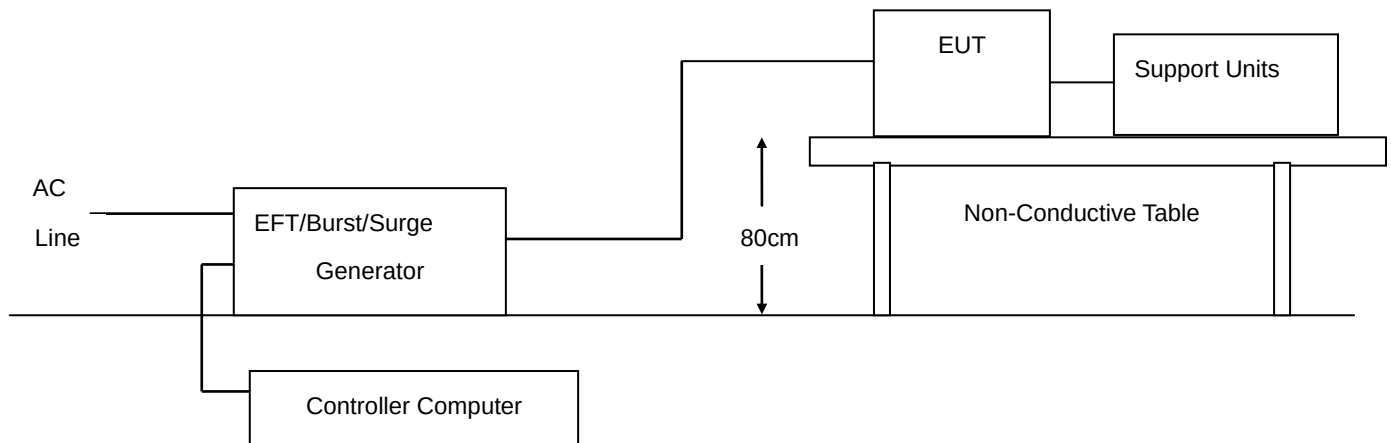
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15. EN 61000-4-4 EFT IMMUNITY TEST

ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-4
Test Level	+/- 1kV for Power Supply Lines
Standard require	B
Temperature	24°C
Humidity	59% RH

15.1. BLOCK DIAGRAM OF TEST SETUP



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15.2. 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: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 300ms

Inject Line	Voltage kV	Inject Method	Test Performance	Result
L+N	+/- 1	Direct	No function loss	A

15.3. PERFORMANCE & RESULT

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ PASS ☐ FAIL
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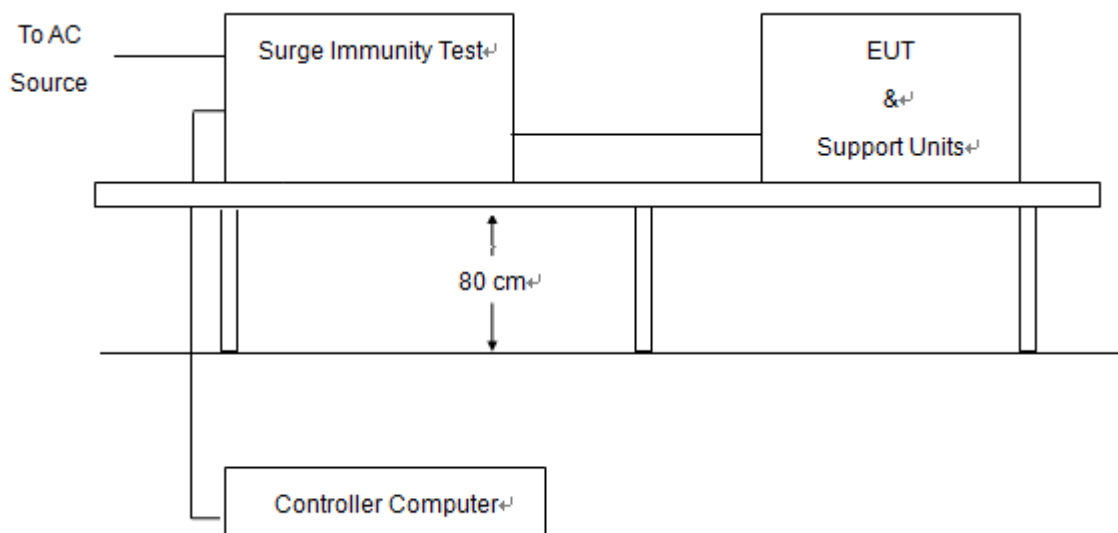
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16. EN 61000-4-5 SURGE IMMUNITY TEST

SURGE IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-5
Requirements	+/- 1kV (Line to Line)
Standard require	B
Temperature	24°C
Humidity	59% RH

16.1. BLOCK DIAGRAM OF TEST SETUP



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16.2. 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 <i>us</i>
Current Waveform	8/20 <i>us</i>
Polarity	Positive/Negative
Phase angle	90°, 270°
Number of Test	5

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

16.3. PERFORMANCE & RESULT

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ PASS ☐ FAIL
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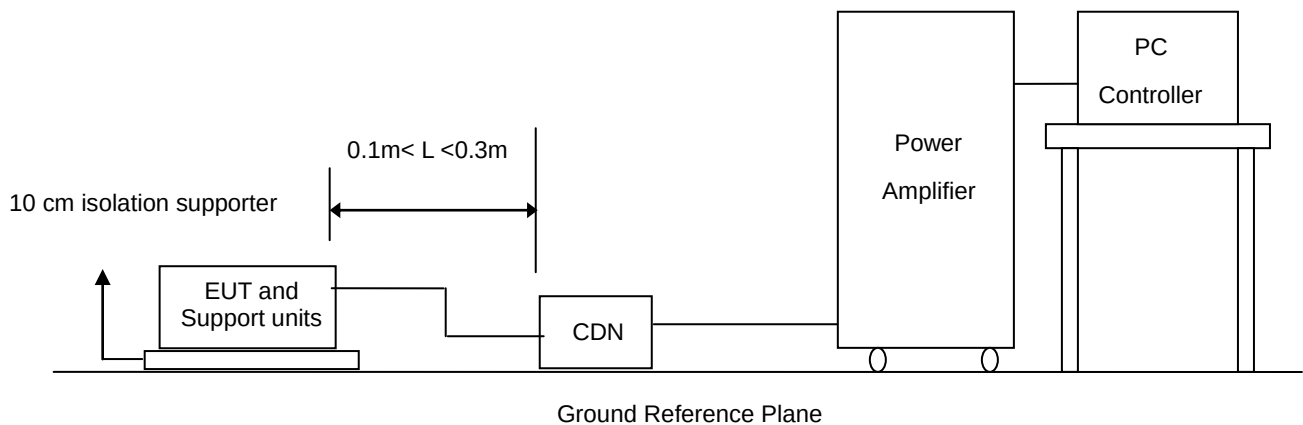
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17. EN 61000-4-6 CS IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-6
Requirements	3V(0.15MHz-10MHz) 3V-1V(10MHz-30MHz) 1V(30MHz-80MHz) with 80% AM. 1 kHz Modulation
Standard require	A
Temperature	24°C
Humidity	50% RH

17.1. BLOCK DIAGRAM OF TEST SETUP



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17.2. 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	3 sec

Range (MHz)	Strength	Modulation	Result
0.15-10	3V	AM	A
10-30	3V-1V	AM	A
30-80	1V	AM	A

17.3. PERFORMANCE & RESULT

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ PASS ☐ FAIL
--

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18. EN 61000-4-11 DIPS IMMUNITY TEST

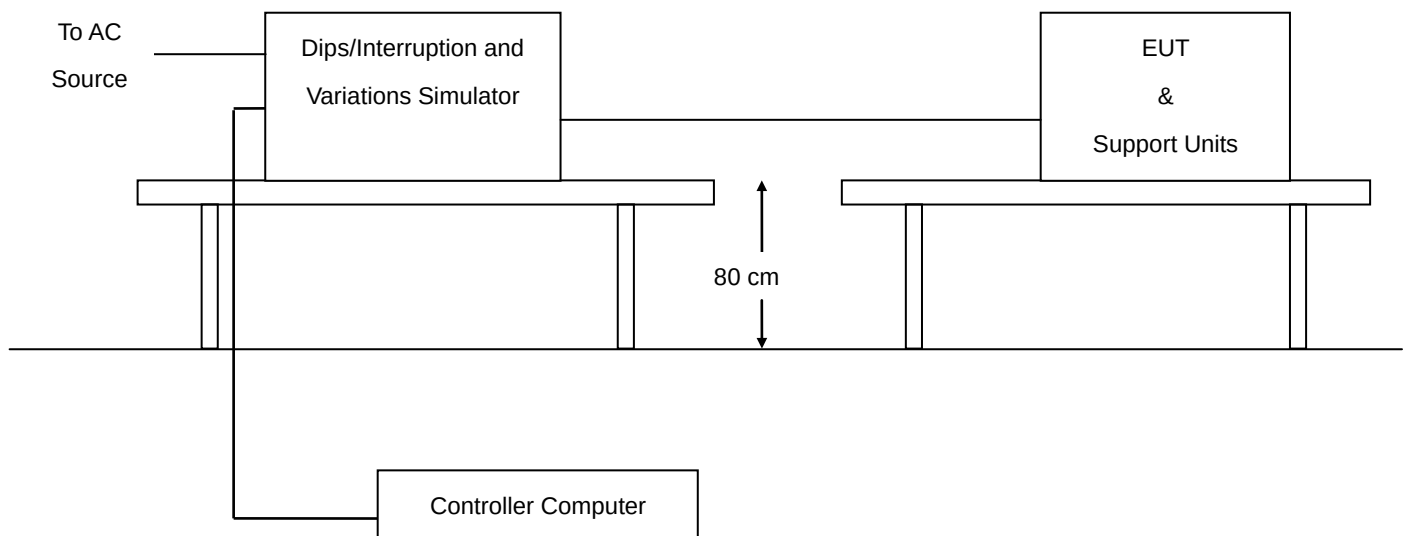
VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-11
Requirements	0degrees
Test Interval	Min. 10 sec.
Temperature	24°C
Humidity	59% RH

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

Voltage Interruptions	Test Level % U_T	Reduction (%)	Duration (periods)	Performance Criteria
	<5	>95	250	C

18.1. BLOCK DIAGRAM OF TEST SETUP



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18.2. 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)

Voltage Dips:

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

Voltage Interruptions:

Test Level % U_T	Reduction (%)	Duration (periods)	Observation	Performance Result
<5	>95	250	EUT stopped working During testing, it was restored after a manual reboot.	B

18.3. INTERPRETATION

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.
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.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

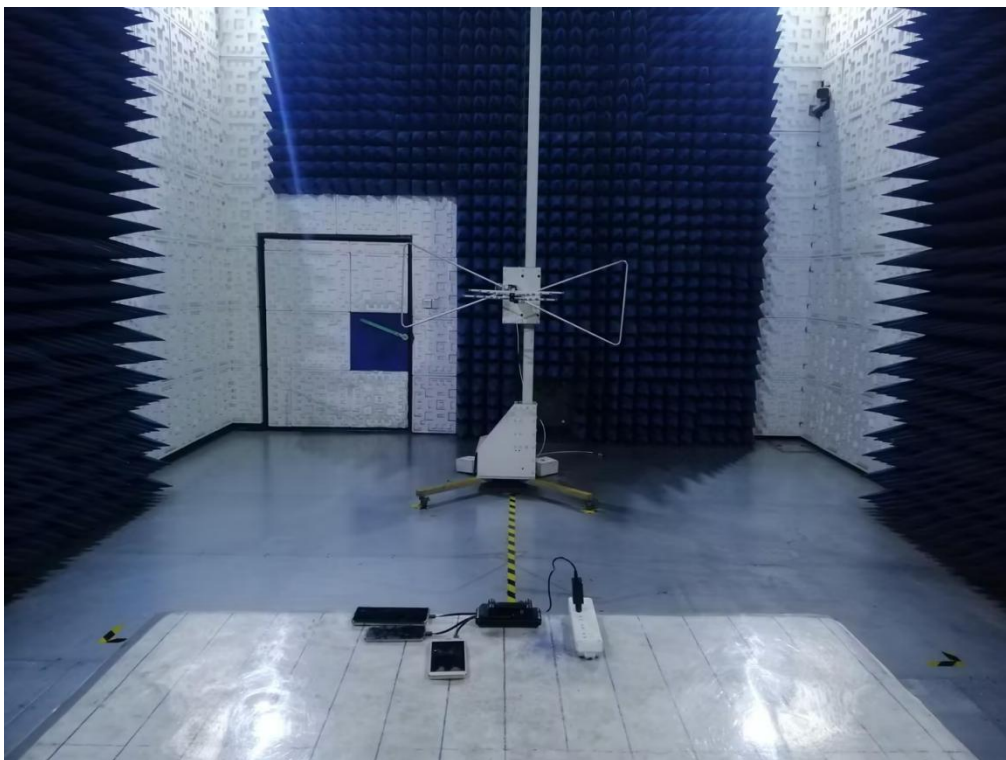
☒ **PASS**
☐ **FAIL**

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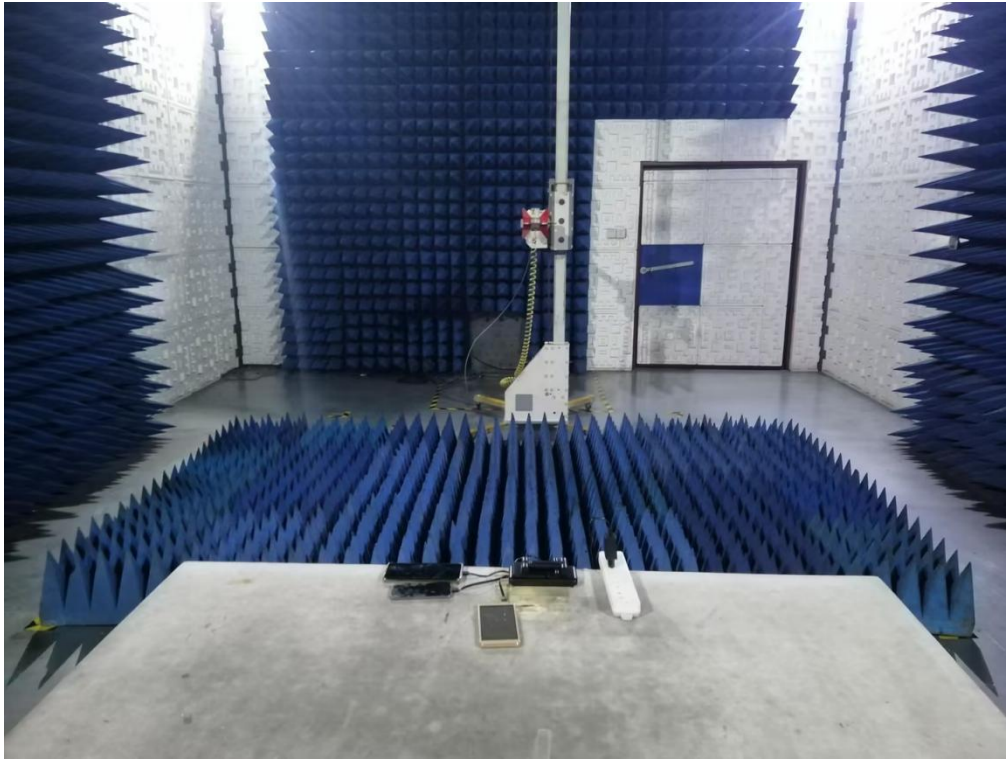
APPENDIX A: PHOTOGRAPHS OF TEST SETUP**EN 55032 CONDUCTED EMISSION TEST SETUP****EN 55032 RADIATED EMISSION TEST SETUP- Below 1GHz**

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EN 55032 RADIATED EMISSION TEST SETUP (Above 1GHz)**EN 61000-3-3 VOLTAGE FLUCTUATION / FLICKER TEST SETUP**

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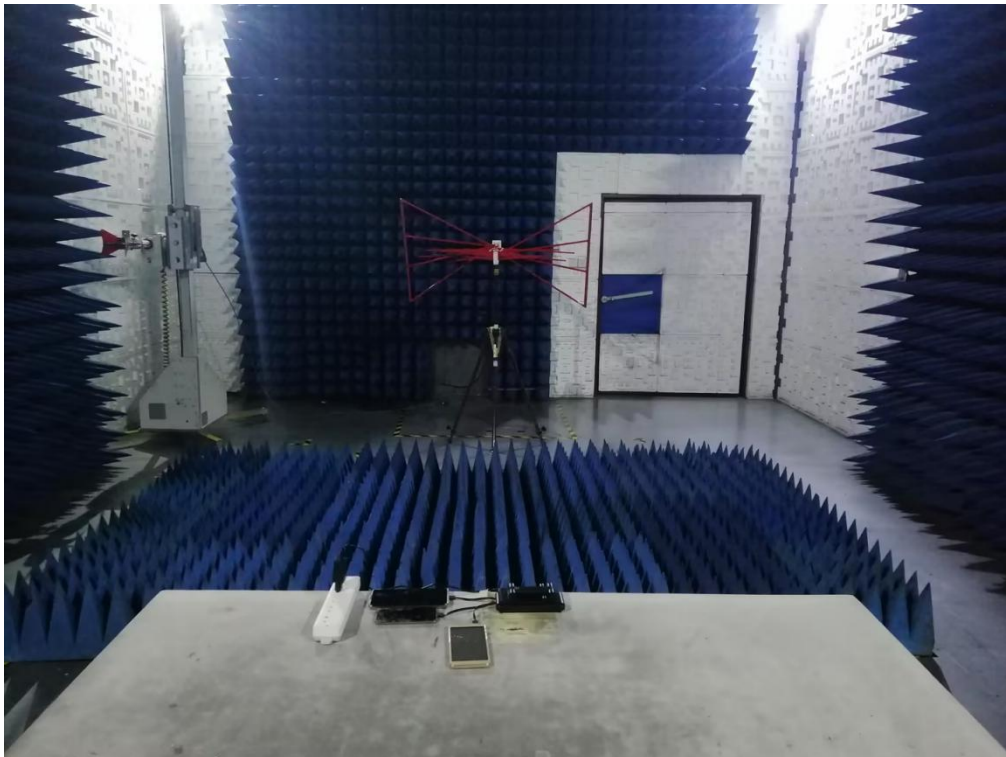
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EN 61000-4-2 ESD IMMUNITY TEST SETUP



EN 61000-4-3 RS IMMUNITY TEST SETUP- Below 1GHz



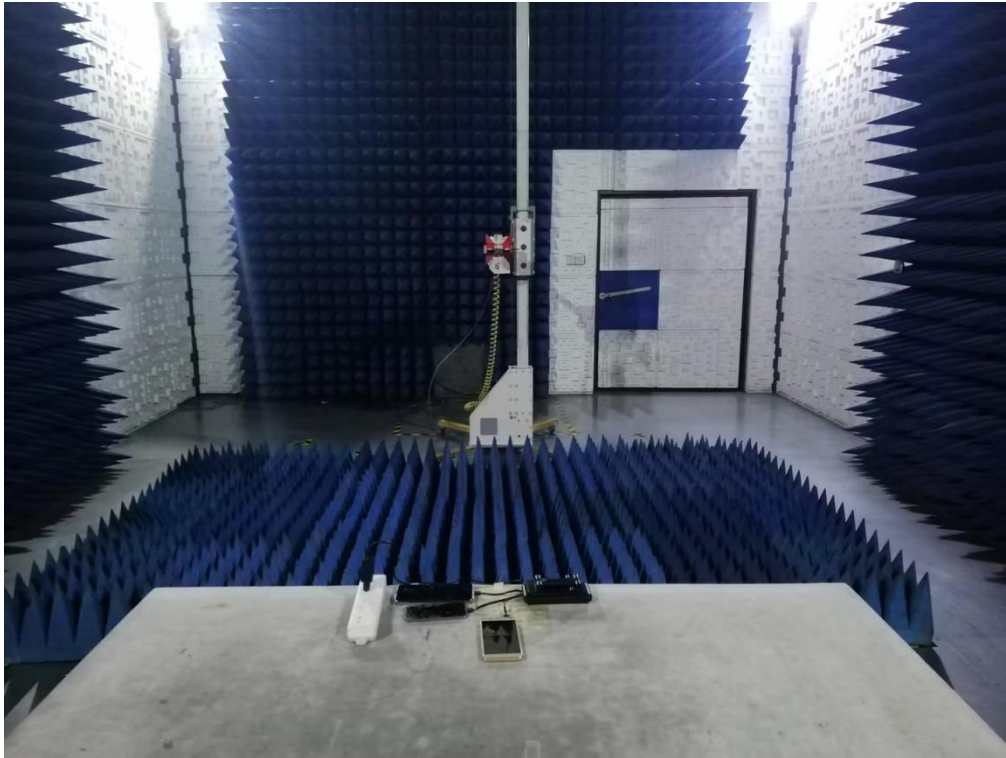
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EN 61000-4-3 RS IMMUNITY TEST SETUP (Above 1GHz)

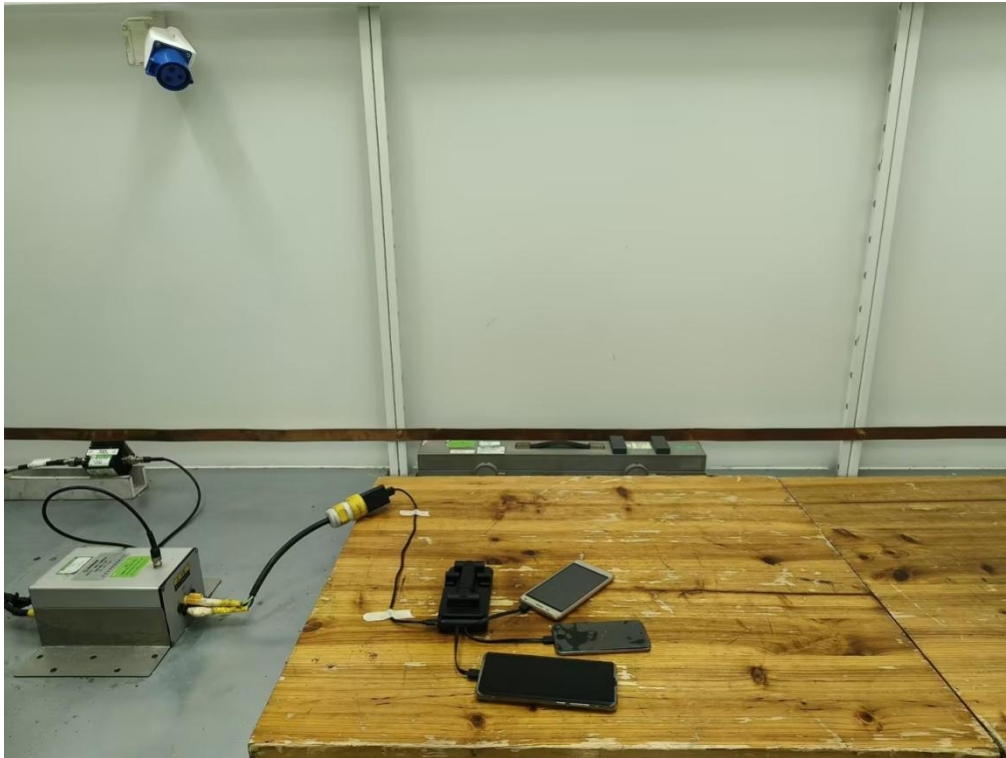


EN 61000-4-4/-5/-11 EFT/SURGE/DIPS IMMUNITY TEST SETUP



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EN 61000-4-6 CS IMMUNITY TEST SETUP

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APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



TOP VIEW OF EUT



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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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BACK VIEW OF EUT



LEFT VIEW OF EUT



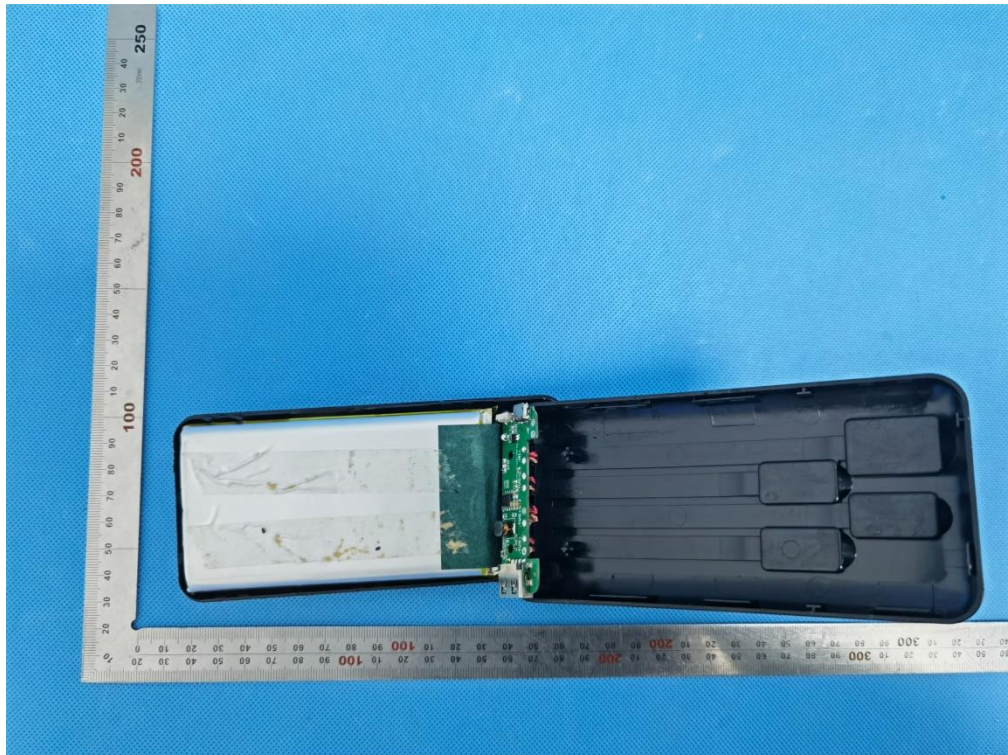
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RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1



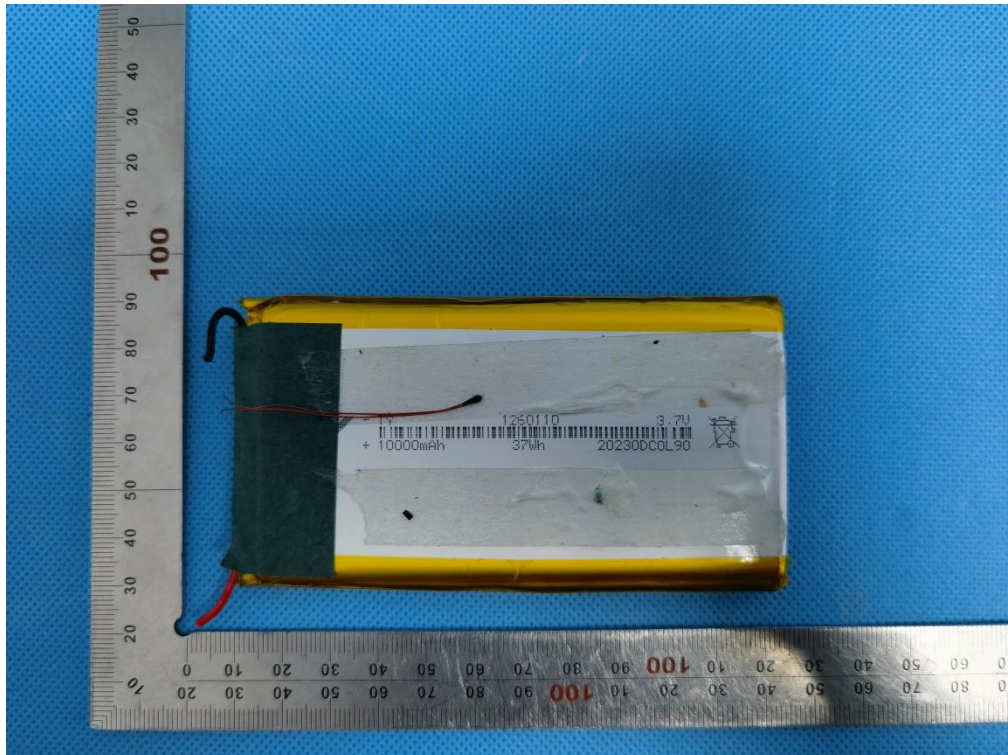
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OPEN VIEW OF EUT-2



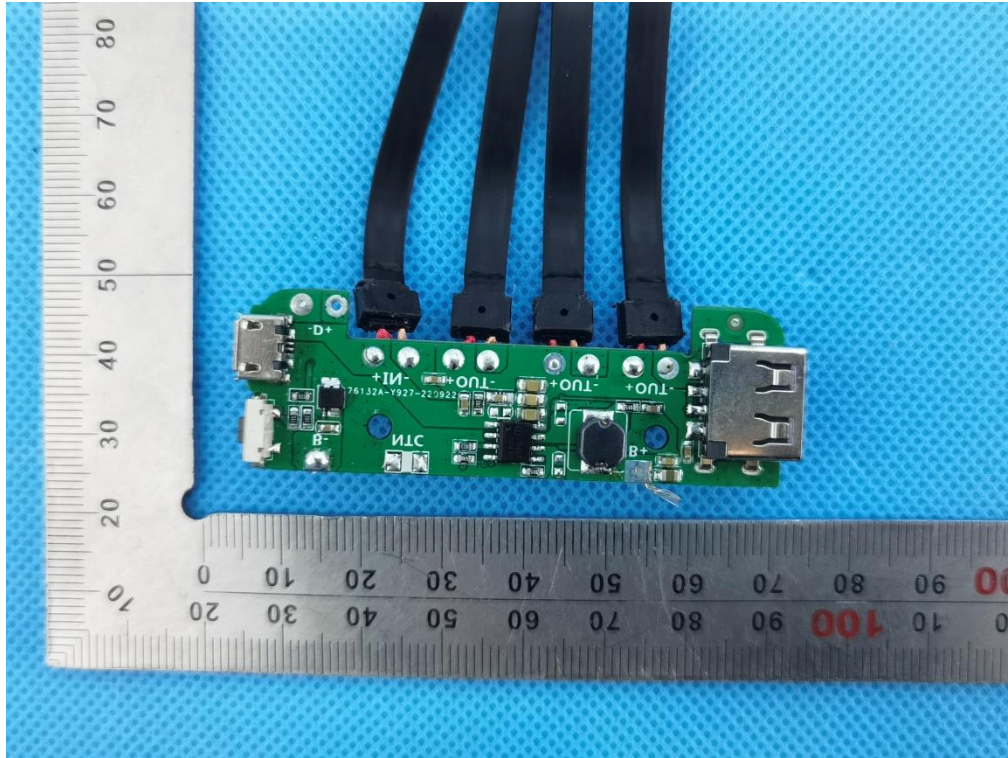
BATTERY VIEW OF EUT



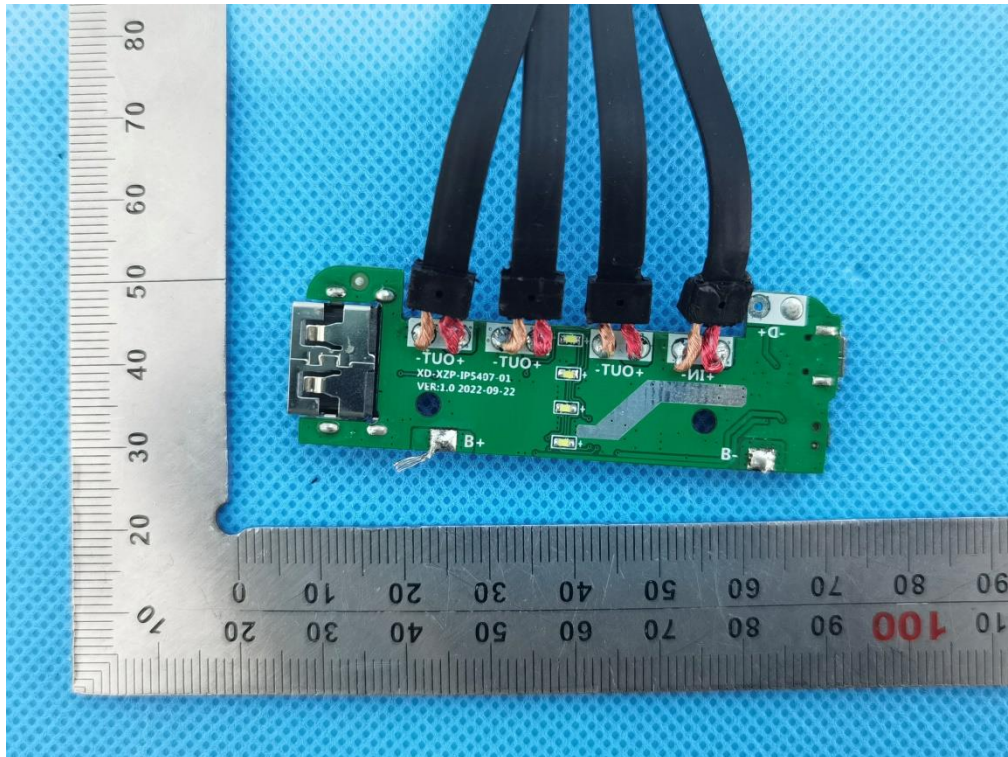
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INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



-----END OF REPORT-----

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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