EMC Test Report

Report No.: AGC05443241134ER01

PRODUCT DESIGNATION	:	3 in 1 wireless charger
BRAND NAME	:	N/A
MODEL NAME	:	MO2420
APPLICANT	:	MID OCEAN BRANDS B.V.
DATE OF ISSUE	:	Dec. 09, 2024
STANDARD(S)	:	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-3 V2.3.2 (2023-01)
REPORT VERSION	:	V1.0

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd*

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 09, 2024	Valid	Initial Release

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1. General Information

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	3 in 1 wireless charger
Brand Name	N/A
Test Model	MO2420
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Nov. 21, 2024
Date of Test	Nov. 21, 2024 to Dec. 09, 2024
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-EU-EMC_SRD-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By	Cici Li (Project Engineer)	Dec. 09, 2024
Reviewed By	Calvin Liu (Reviewer)	Dec. 09, 2024
Approved By	Angela Li Authorized Officer	Dec. 09, 2024

2. Product Information

2.1 Product Technical Description

Product Designation	3 in 1 wireless charger
Test Model	MO2420
Hardware Version	V1.0
Software Version	V1.0
EUT Input Rating	DC 5V, 2A; DC 9V, 2A
Wireless Charging Output Power	Wireless Output of charging pad: 15W Max Wireless Output for AirPods: 5W Max Wireless Output for Apple Watch: 1.5W Max
WPT Technical Parameters	
Operation Frequency Range	WPT Band 1: 110kHz-205kHz WPT Band 2: 325kHz-330kHz
Modulation Type	ASK
Antenna Designation	Coil Antenna
Antenna Gain	0dBi

Note: For more details, refer to the user's manual of the EUT.

2.2 Objective

Perform Electro Magnetic Interference (EMI) and Electro Magnetic Susceptibility (EMS) tests for CE Marking.

2.3 Test Items and The Results

The tests were performed according to following standards:

EN 301 489-1 V2.2.3 (2019-11)	Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonized Standard for Electro Magnetic Compatibility
EN 301 489-3 V2.3.2 (2023-01)	Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard for Electro Magnetic Compatibility

Test items are been completed as follows (ETSI EN 301489-1):

Phenomenon	Application	Equipment test requirement		
		fixed use	vehicular use	portable use
Radiated emission	enclosure of ancillary equipment	applicable for stand alone testing	applicable for stand alone testing	applicable for stand alone testing
Conducted emission	DC power input/output port	applicable	applicable	not applicable
	AC mains input/output port	applicable	not applicable	not applicable
	Telecommunication port	applicable	not applicable	not applicable
Harmonic current emissions	AC mains input port	applicable	not applicable	not applicable
Voltage fluctuations and flicker	AC mains input port	applicable	not applicable	not applicable
RF electromagnetic Field (80 MHz to 6000 MHz)	enclosure	applicable	applicable	applicable
Electrostatic discharge	enclosure	applicable	not applicable	applicable
Fast Transients Common mode	signal, Telecommunication and control ports,	applicable	not applicable	not applicable
	DC and AC power ports	applicable	not applicable	not applicable
RF common mode 0,15 MHz to 80 MHz	Signal telecommunication and control ports	applicable	applicable	not applicable
	DC and AC powerports	applicable	applicable	not applicable
transients and surges	DC power inputports	not applicable	applicable	not applicable
voltage dips and interruptions	AC mains powerinput ports	applicable	not applicable	not applicable
surges, line toline and line toground	AC mains power input ports, telecommunication ports	applicable	not applicable	not applicable

The EUT have been tested according to the applicable standards as referenced below:

EMISSION (EN 301 489-1 §7.1)		
Test items	Test Standard(s)	Verdict
Radiated Emission	EN 55032	Pass
Conducted Emission, DC ports	EN 55032	Not applicable
Conducted Emission, AC ports	EN 55032	Pass
Conducted Emission, Telecom ports	EN 55032	Not applicable
Harmonic Current Emissions	EN IEC 61000-3-2	Pass
Voltage Fluctuations & Flicker	EN 61000-3-3	Pass
IMMUNITY (EN 301 489-1 §7.2)		
Electrostatic Discharge	IEC 61000-4-2 [a]	Pass
Radiated RF Electromagnetic Field	IEC 61000-4-3 [a]	Pass
Electrical Fast Transient/Burst	IEC 61000-4-4 [a]	Pass
Transients and Surges, DC ports	ISO 7637-1, -2	Not applicable
Surge Immunity, AC ports	IEC 61000-4-5 [a]	Pass
Radio-Frequency Common mode	IEC 61000-4-6 [a]	Pass
Voltage dips and interruptions	IEC 61000-4-11 [a]	Pass

Note:
a. The applicable versions of the basic standards are defined in the standard which listed in the test specification.

2.4 General Performance Criteria

■ **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.

■ For a 0 % residual voltage dip tests the following performance criteria apply:
- The performance criteria for transient phenomena shall apply.

■ For a 70 % residual voltage dip and voltage interruption tests, the following performance criteria apply:
- in the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena shall apply;
- in the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator;
- no unintentional responses shall occur at the end of the test, when the voltage is restored to nominal;
- in the event of loss of function(s) or in the event of loss of user stored data, this fact shall be recorded.

◆ **Performance Table**

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

EN 301 489-3 Performance Criteria_SRD		
Criteria	During Test	After Test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
• performance criterion A applies for immunity tests with phenomena of a continuous nature; • performance criterion B applies for immunity tests with phenomena of a transient nature.		
Where "operate as intended" or "no loss of function" is specified, the EUT shall demonstrate correct functioning as described in EN 301 489-3 clause 5. Where the EUT has more than one mode of operation, an unplanned transition from one mode to another is considered as an unintentional response. The EUT shall be tested in sufficient modes to confirm there are no such unintentional responses.		

2.5 Description of Test Modes

No.	Test Mode Description	Worst Case
1	AC/DC Adapter + EUT + Wireless load (15W)	-
2	AC/DC Adapter + EUT + Wireless load (10W)	-
3	AC/DC Adapter + EUT + Wireless load (7.5W)	-
4	AC/DC Adapter + EUT + Wireless load (5W)	-
5	AC/DC Adapter + EUT + Wireless load (1.5W)	-
6	AC/DC Adapter + EUT (Null load)	-

Note: 1. All modes have been tested and only the worst mode test data recorded in the test report.

2.The EUT supports 15W, 10W, 7.5W, 5W , 1.5W"wireless output, and all modes have been tested at full load, half load and null load, only the worst mode(mode 1) is reflected in the report.

3. Setup of Equipment Under Test

3.1 Setup Configuration of EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

3.2 Support Equipment

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	Wireless Charging Load	HUAWEI	N/A	--	--
2	Adapter	HUAWEI	HW-200440C00	--	--

☐ Test Accessories Come From The Manufacturer

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	--	--	--	--	--

4. Test Environment

4.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

4.3 Environmental Conditions

	Normal Conditions
Temperature range (℃)	15 - 35
Relative humidity range	45 % - 85 %
Pressure range (kPa)	86 - 106

4.4 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, Uc = ±2.9dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.9dB

4.5 List of Equipment Used

● Radiated Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
☒	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
☒	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
☒	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
☒	AGC-EM-E102	Broadband Ridged Horn Antenna	ETS	3117	00154520	2023-06-03	2025-06-02
☒	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2024-08-03	2026-07-23
☒	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	N/A	N/A
☐	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	N/A	N/A

● AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2024-05-28	2025-05-27
☒	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2025-06-08
☒	AGC-EM-E023	AMN	R&S	ESH2-Z5	100086	2024-05-28	2025-05-27

● Harmonic Current & Voltage Fluctuations and Flicker							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E033	Signal Conditioning Unit	Schaffner	CCN1000-1	72431	2024-05-24	2025-05-23
☒	AGC-EM-E015	AC Source	Schaffner	NSG 1007	56825	2024-05-24	2025-05-23

● ESD (Electrostatic Discharge)							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E013	ESD Simulator	Schaffner	NSG 438	782	2024-11-12	2025-11-11

● EFT/Surge/DIPS (Fast Transients & Surges& Voltage dips and interruptions)							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E008	EFT/Surge/DIPS Generator	Schaffner	Modula 6150	34437	2024-05-24	2025-05-23
☒	AGC-EM-A002	Coupling Clamp	Schaffner	CDN 8014	N/A	2024-05-23	2026-05-22

● RS (Radio Frequency Electromagnetic Field)							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E029	Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
☒	AGC-EM-E115	Signal Generator	Aglient	N5182A	MY49060745	2024-02-01	2025-01-31
☒	AGC-EM-E041	Directional Coupler	Werlatone	C6026-10	99482	2024-02-01	2026-01-31
☒	AGC-EM-E040	Directional Coupler	Werlatone	C5571-10	99463	2024-02-01	2026-01-31
☒	AGC-EM-E080	Amplifer	Rflight	NTWPA-2560100	17063183	2024-10-12	2025-07-23
☒	AGC-EM-E016	Power Amplifier	KALMUS	7100LC	04-02/17-06-001	2024-09-20	2025-07-23
☒	AGC-EM-E005	Power Meter	R&S	NRVD	8323781027	2023-03-24	2025-03-23
☒	AGC-EM-E028	Biconilog Antenna	ETS	3142C	00060447	2024-03-31	2025-03-30
☒	AGC-EM-E160	Power Amplifier	TESEQ	CBA3G-100	T43913	2024-05-24	2025-05-23

● CS (Radio Frequency Common Mode)							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E040	Directional Coupler	Werlatone	C5571-10	99463	2024-02-01	2026-01-31
☒	AGC-EM-E047	Signal Generator	Aglient	E4421B	MY43351603	2024-02-01	2025-01-31
☒	AGC-EM-E035	Power Probe	R&S	URV5-Z4	100124	2023-03-24	2025-03-23
☒	AGC-EM-A048	6dB attenuator	ZHINAN	E-002	N/A	2024-08-03	2026-07-23
☒	AGC-EM-E017	Power Amplifier	AR	75A250	18464	2024-10-12	2025-07-23
☒	AGC-EM-E092	CDN	ZHINAN	ZN3751	15004	2024-08-03	2026-07-23
☒	AGC-EM-E005	Power Meter	R&S	NRVD	8323781027	2023-03-24	2025-03-23

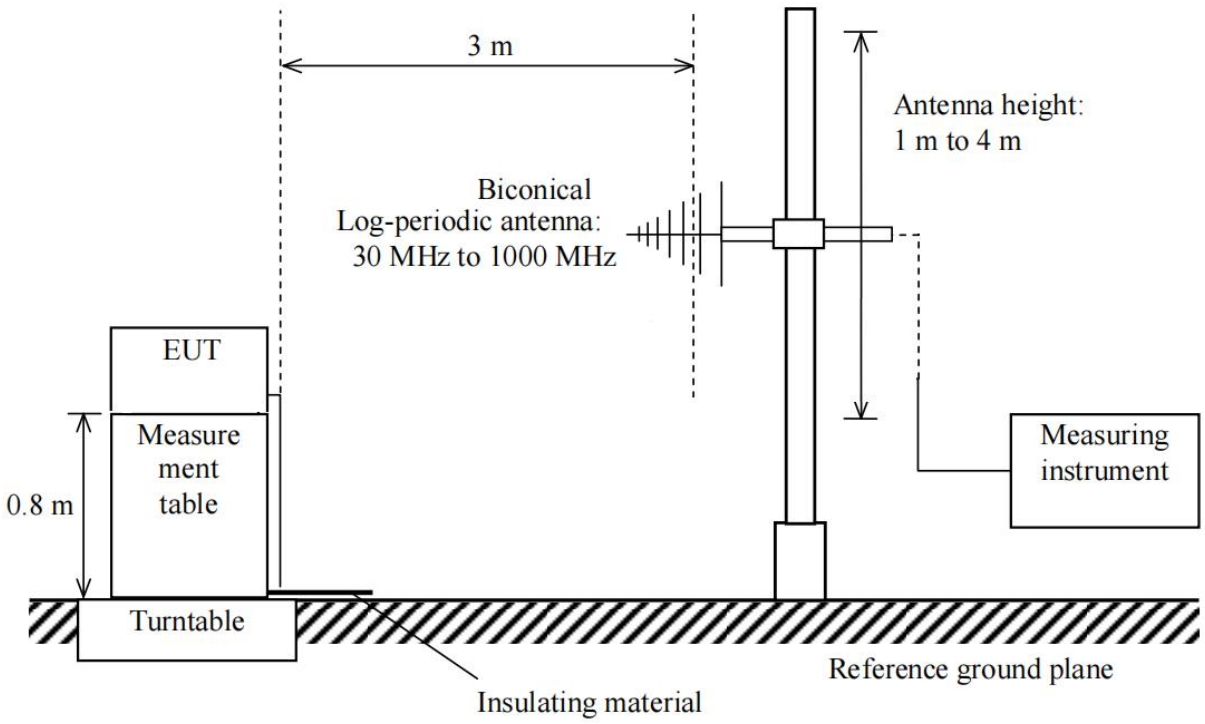
● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☒	AGC-EM-S004	RE Test System	Tonscend	TS$^+$ Ver2.1(JS32-RE)	4.0.0.0
☒	AGC-EM-S003	RE Test System	FARA	EZ-EMC	V.RA-03A
☒	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
☒	AGC-EM-S005	Harmonic/Flicker Test System	TCTEST	CTS 4	4.29.0
☒	AGC-EM-S006	RS Test System	Tonscend	TS$^+$ Ver2.1(JS35-RS)	2.0.1.8
☒	AGC-EM-S007	CS Test System	Tonscend	TS$^+$ Ver2.1(JS35-CS)	2.0.1.7
☒	AGC-EM-S009	EFT/Surge/Dips 3 in 1 Test System	TCTEST	WinModula	2.31c

5. Measurement of Radiated Emissions at Frequencies up to 1GHz

5.1. Requirements

Test facility	Detector type/ bandwidth	Frequency Range (MHz)	Limits dB(μV/m)	Measurement specifications
SAC	Quasi-peak/ 120kHz	30 to 230	40	Instrumentation: CISPR 16-1-1, Clauses 4, 5 Antennas: CISPR 16-1-4, Clause 4.5 Test Site: CISPR 16-1-4, Clause 6 Method: CISPR 16-2-3, Clause 7.6
		230 to 1000	47	
Note: The lower limit shall apply at the transition frequency.				

5.2. Block Diagram of Test Setup



5.3. Configuration of the EUT and method of measurement

a. The EUT 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, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.

b. Support equipment, if needed, was placed as per CISPR 16-2-3.

c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-3.

d. The maximum receiving level of radiated emissions from the EUT was measured while the turntable was rotated from 0° to 360° and the antenna height was scanned between 1 m and 4 m. The cables were laid out to attain the maximum level of radiated emissions.

e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.

f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.

g. A radiated emission is calculated by the following equation:

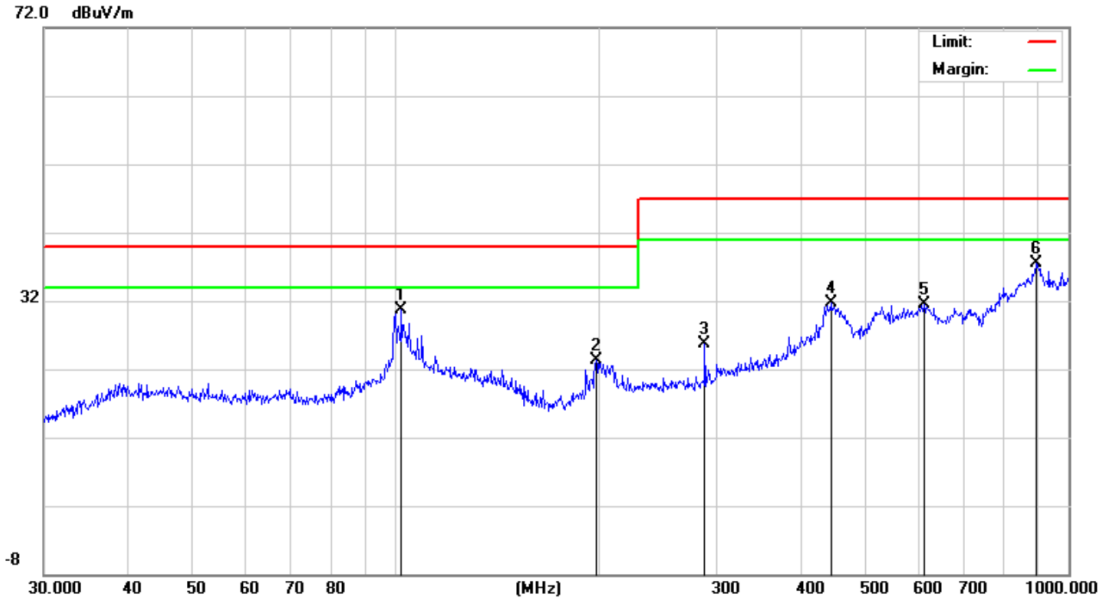
- Measurement Level dB(μV/m) = Receiver reading dB(μV) + Factor(dB/m)
- Factor(dB/m) = Antenna Factor(dB/m) + Cable Loss(dB)
- Margin= Limit-Level

5.4. Test Result

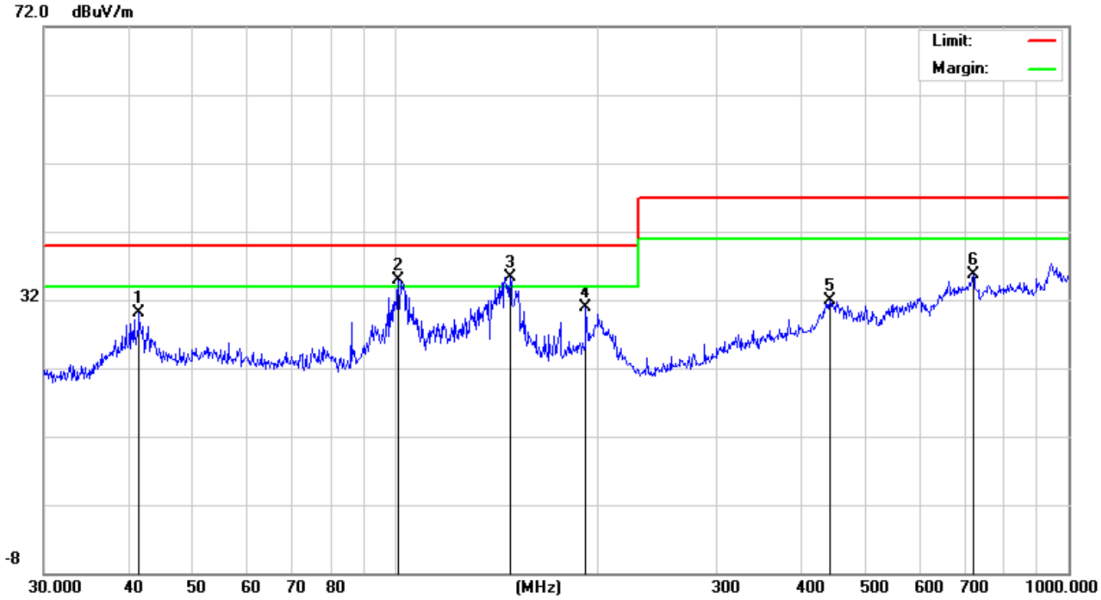
Test Equipment	3 in 1 wireless charger	Model Name	MO2420
Test Engineer	Carpe Lin	Temperature	22.9℃
Relative Humidity	56.8 %	Air Pressure	985 Mbar
Worst Mode	Mode 1	Power supply	Normal Voltage
Test Date	2024-12-04	Verdict	Pass

Test graph and data for Radiated Emission up to 1GHz

Test Mode: Mode 1



No.	Frequency [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	102.0014	30.63	16.22	40.00	9.37	Peak	Horizontal
2	198.5880	23.24	14.34	40.00	16.76	Peak	Horizontal
3	287.9904	25.73	15.54	47.00	21.27	Peak	Horizontal
4	443.2943	31.72	24.98	47.00	15.28	Peak	Horizontal
5	609.9217	31.44	25.15	47.00	15.56	Peak	Horizontal
6	893.8567	37.41	31.03	47.00	9.59	Peak	Horizontal

Test graph and data for Radiated Emission up to 1GHz							
Test Mode: Mode 1							
							
No.	Frequency [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	41.5670	30.04	16.92	40.00	9.96	Peak	Vertical
2	100.9339	34.87	14.36	40.00	5.13	Peak	Vertical
3	147.9214	35.26	18.20	40.00	4.74	Peak	Vertical
4	191.7450	30.84	18.15	40.00	9.16	Peak	Vertical
5	441.7426	31.93	26.02	47.00	15.07	Peak	Vertical
6	721.7259	35.65	28.64	47.00	11.35	Peak	Vertical

6. Measurement of Conducted Emissions from the AC Mains Power Ports

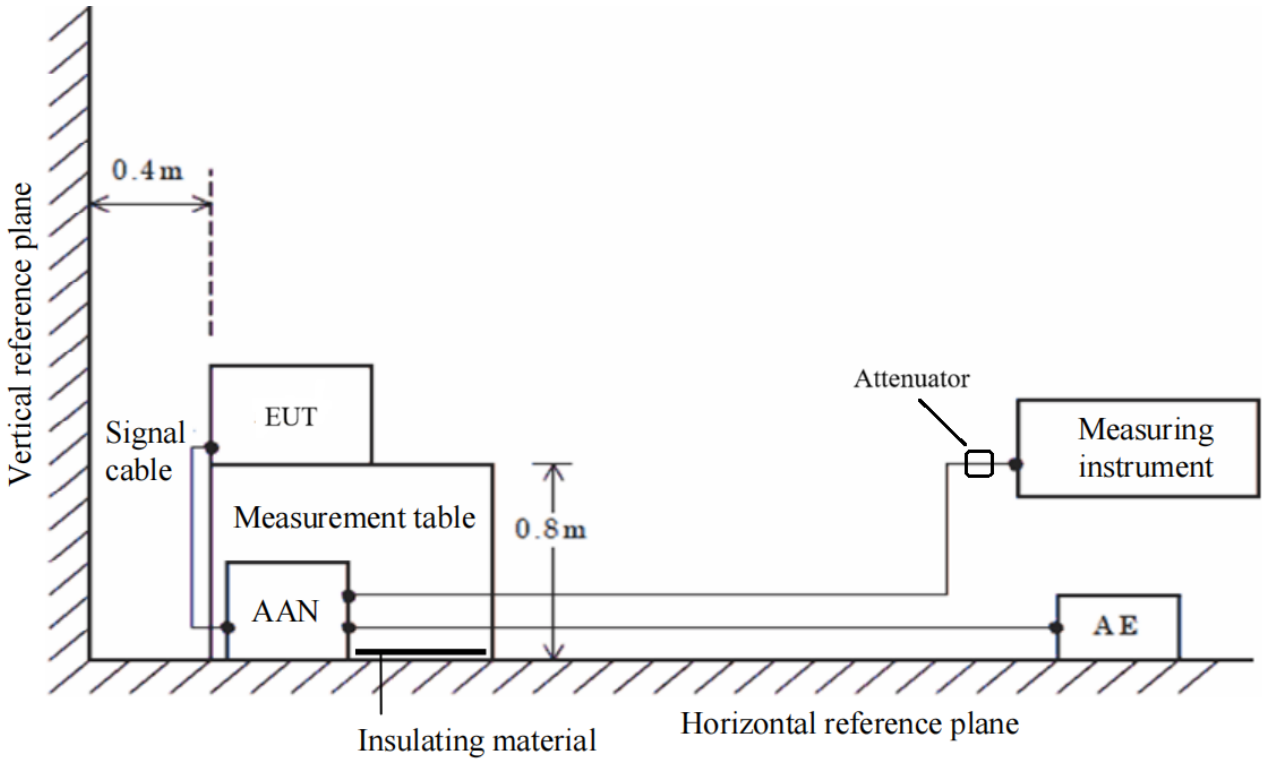
6.1. Requirements

Requirements for conducted emissions, low voltage AC mains port

Network device	Detector type/ bandwidth	Frequency Range (MHz)	Limits dB(μV)	Measurement specifications
AMN	Quasi-peak/ 9kHz	0.15 to 0.5	66 to 56	Instrumentation: CISPR 16-1-1, Clauses 4, 5 and 7 Networks: CISPR 16-1-2, Clause 4 Method: CISPR 16-2-1, Clause 7 Set-up: CISPR 16-2-1, Clause 7
		0.5 to 5	56	
		5 to 30	60	
	Average/ 9kHz	0.15 to 0.5	56 to 46	
		0.5 to 5	46	
		5 to 30	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 to 0.5MHz.

6.2. Block Diagram of Test Setup



6.3. Configuration of the EUT and method of measurement

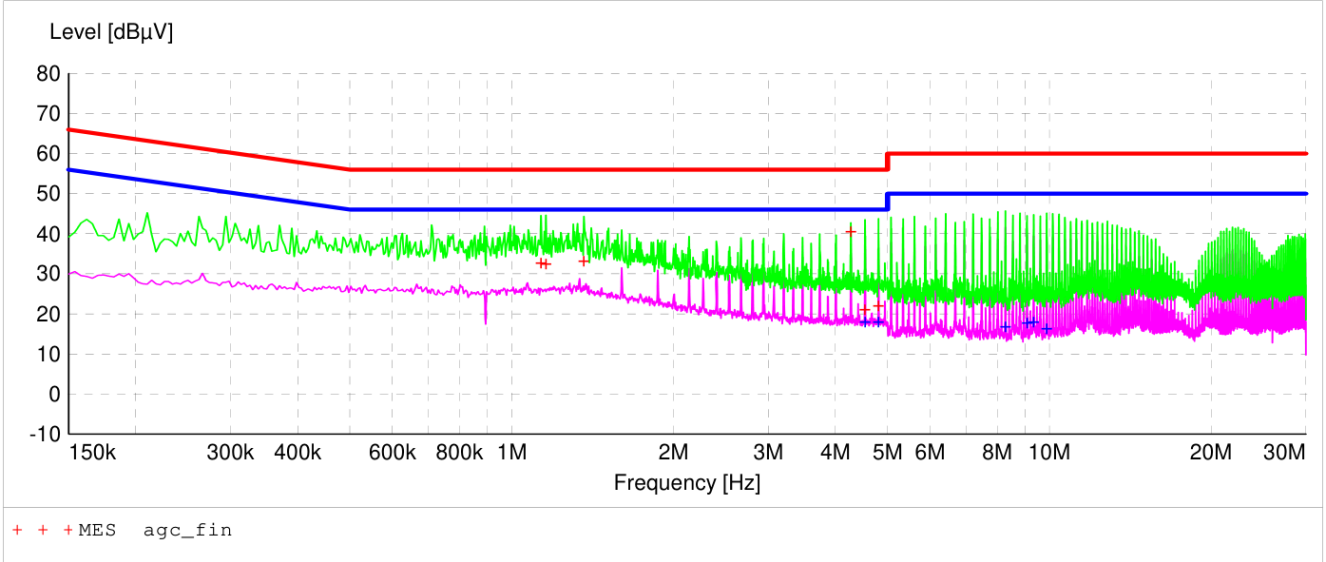
a. The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, the EUT was placed on the top surface of a measurement table, 0.8 m high from the horizontal reference plane, and was positioned at a distance of 0.4 m away from the vertical reference plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10 cm non-conductive covering to insulate the EUT from the ground plane.
b. Support equipment, if needed, was placed as per CISPR 16-2-1.
c. All I/O cables were positioned to simulate typical actual usage as per CISPR 16-2-1.
d. The EMI receiver measured the emission levels emanating from the EUT into the AC Mains through an Artificial Mains Network (AMN) and an attenuator used on the front end of the EMI receiver. Testing included measurements on all live and neutral lines.
e. The more description of the tests, the test methods, and the test set-ups are given in the applicable test standard.
f. Record at least six highest emissions relative to the limits at each frequency of interest unless the emission is 10 dB or greater below the limit.
g. A conducted emission is calculated by the following equation:
   - Measurement Level (dBμV) = Receiver reading (dBμV) + Tansd (dB)
   - Transd(dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
   - Margin= Limit-Level

6.4. Test Result

Test Equipment	3 in 1 wireless charger	Model Name	MO2420
Test Engineer	Jimu Lao	Temperature	22.6℃
Relative Humidity	51.7 %	Air Pressure	985 Mbar
Worst Mode	Mode 1	Power supply	Normal Voltage
Test Date	2024-12-02	Verdict	Pass

Test graph and data for Conducted Emission

Test Mode: Mode 1

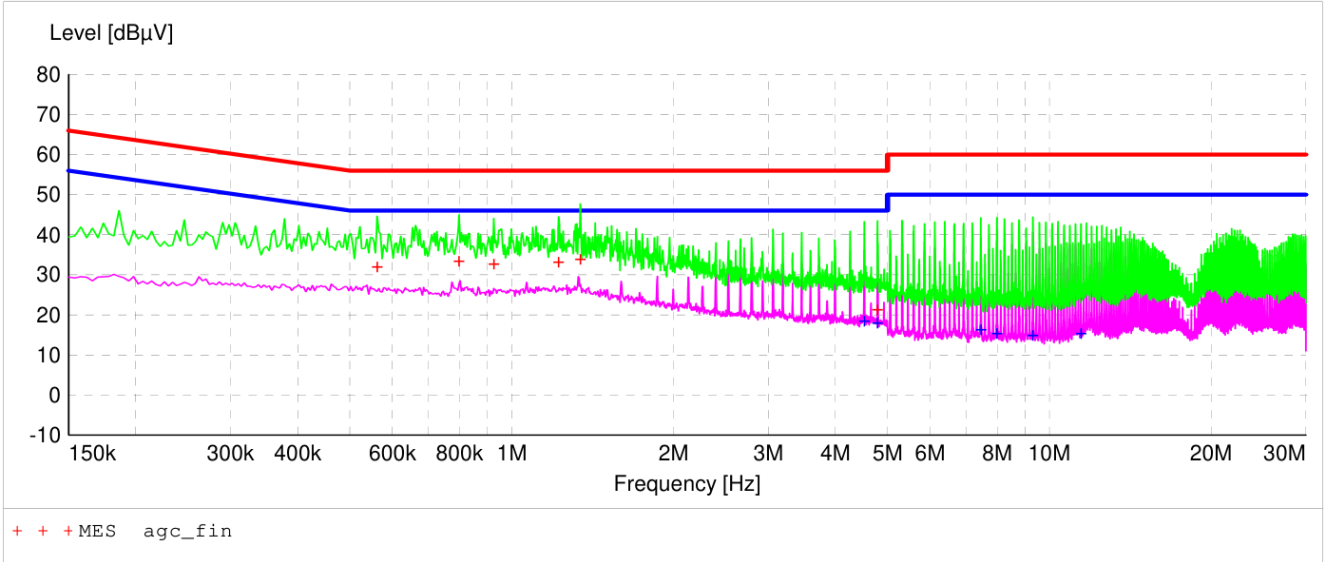


Frequency [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector	Line
1.134000	33.3	6.2	56.0	22.7	QP	L1
1.158000	33.1	6.2	56.0	22.9	QP	L1
1.362000	33.7	6.2	56.0	22.3	QP	L1
4.274000	41.0	6.3	56.0	15.0	QP	L1
4.538000	21.7	6.3	56.0	34.3	QP	L1
4.810000	22.6	6.3	56.0	33.4	QP	L1
4.542000	18.4	6.3	46.0	27.6	AV	L1
4.810000	18.6	6.3	46.0	27.4	AV	L1
8.282000	17.3	6.6	50.0	32.7	AV	L1
9.086000	18.2	6.6	50.0	31.8	AV	L1
9.350000	18.6	6.6	50.0	31.4	AV	L1
9.886000	16.7	6.7	50.0	33.3	AV	L1

Test Equipment	3 in 1 wireless charger	Model Name	MO2420
Test Engineer	Jimu Lao	Temperature	22.6℃
Relative Humidity	51.7 %	Air Pressure	985 Mbar
Worst Mode	Mode 1	Power supply	Normal Voltage
Test Date	2024-12-02	Verdict	Pass

Test graph and data for Conducted Emission

Test Mode: Mode 1



Frequency [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector	Line
0.562000	32.4	6.2	56.0	23.6	QP	N
0.798000	33.8	6.2	56.0	22.2	QP	N
0.926000	33.3	6.2	56.0	22.7	QP	N
1.222000	33.7	6.2	56.0	22.3	QP	N
1.342000	34.3	6.2	56.0	21.7	QP	N
4.790000	21.8	6.3	56.0	34.2	QP	N
4.526000	18.9	6.3	46.0	27.1	AV	N
4.790000	18.5	6.3	46.0	27.5	AV	N
7.454000	16.8	6.5	50.0	33.2	AV	N
7.986000	15.9	6.6	50.0	34.1	AV	N
9.318000	15.4	6.6	50.0	34.6	AV	N
11.450000	16.0	6.7	50.0	34.0	AV	N

7. Measurement of Harmonic Current Emissions

7.1. Requirements

Applicable test standard(s): EN IEC 61000-3-2:2019+A1:2021

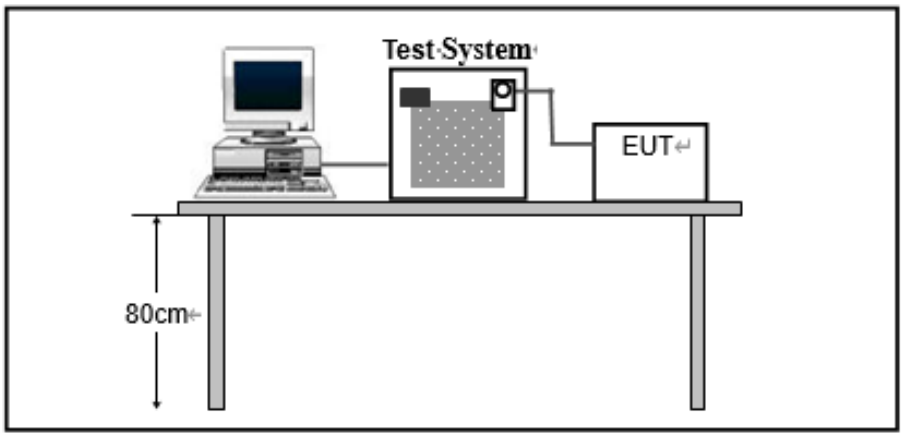
Limits of Harmonic Current Emissions

Harmonic order *h*	Limits				
	Class A	Class B	Class C[a]	Class D	
	Maximum permissible harmonic current (A)		Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency (%)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	2.30	3.45	27[b]	3.4	2.30
5	1.14	1.71	10	1.9	1.14
7	0.77	1.155	7	1.0	0.77
9	0.40	0.6	5	0.5	0.40
11	0.33	0.495	3	0.35	0.33
13	0.21	0.315	3	3.85/13	0.21
15≤*h*≤39(odd harmonics only)	2.25/*h*	3.375/*h*	3	3.85/*h*	2.25/*h*
2	1.08	1.62	2	Not applicable	Not applicable
4	0.43	0.645	Not applicable		
6	0.30	0.45			
8≤*h*≤40(even harmonics only)	1.84/*h*	2.76/*h*			

Note:
(a) For some Class C products, other emission limits apply.
(b) The limit is determined based on the assumption of modern lighting technologies having power factors of 0.90 or higher.

The application of limits had been as defined in the applicable test standard.

7.2. Block Diagram of Test Setup



7.3. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration had been as defined in the applicable test standard.

b. The measurement of harmonic currents shall be performed as follows:

- for each harmonic order, measure the 1.5 s smoothed RMS harmonic current in each discrete Fourier transform (DFT) time window;
- calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period.

c. The value of the active input power to be used for the calculation of limits shall be determined as follows:

- measure the 1.5 s smoothed active input power in each DFT time window;
- determine the maximum of the measured values of active power from the DFT time windows over the entire duration of the test.

d. The harmonic currents and the active input power shall be measured under the same test conditions but need not be measured simultaneously.

7.4. Test Result

Equipment with a rated power less than or equal to 75W is deemed to fulfil all relevant requirements of this standard without testing.

8. Measurement of Voltage Fluctuations and Flicker

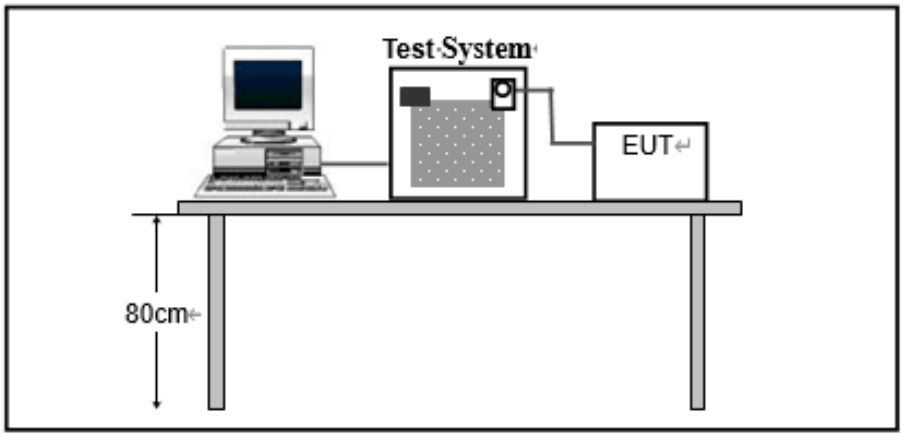
8.1. Requirements

Applicable test standard(s): EN 61000-3-3:2013+A2:2021

Limits of Voltage Fluctuations and Flicker

Parameters	Definitions	Limits
T_{max}	the accumulated time value of *d(t)* with a deviation exceeding 3.3 % during a single voltage change at the EUT terminals	⩽500 ms
d_c	the maximum relative steady-state voltage change	⩽3.3%
d_{max}	the maximum relative voltage change	☒⩽4% ☐⩽6% ☐⩽7%
☒P_{st}	short-term flicker severity	⩽1.0
☐P_{lt}	long-term flicker severity	⩽0.65

8.2. Block Diagram of Test Setup



8.3. Configuration of the EUT and method of measurement

a. The test shall be conducted according to the general requirements given in the applicable test standard. The test duration and test condition had been as defined in the applicable test standard.

b. All types of voltage fluctuations would been assessed by direct measurement using a flicker meter which complies with the specification given in IEC 61000-4-15:2010.

8.4. Test Result

Test Engineer	Jimu Lao	Temperature	22.6℃
Test Date	2024-12-02	Air Pressure	985 Mbar
Worst Mode	Mode 1-6	Relative Humidity	51.7 %
Verdict	Pass		

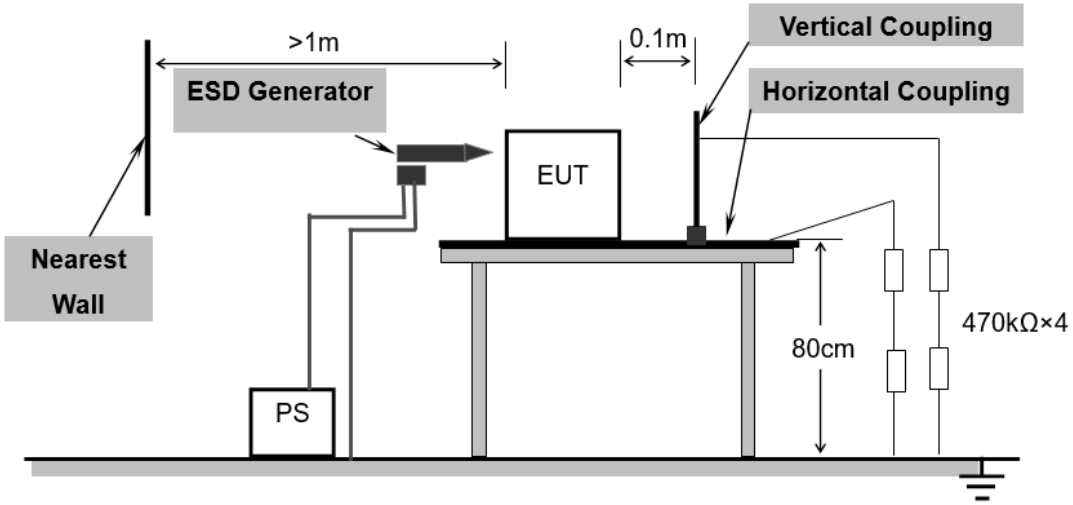
Parameters	Measurement Value	Limits
T_{max}	0	⩽500 ms
d_c	0.00	⩽3.3%
d_{max}	0.00	⩽4%
P_{st}	0.263	⩽1.0

9. Measurement of Electrostatic Discharge

9.1. Requirements

Port	Enclosure
Basic Standard	IEC 61000-4-2
Test Level	±8.0 kV (Air Discharge) ±4.0 kV (Contact Discharge) ±4.0 kV (Indirect Discharge)
Required Performance Criterion	B
Time Between Each Discharge:	1 second
Number of Discharge for Each Applied Voltage	10

9.2. Block Diagram of Test Setup



9.3. Configuration of the EUT and method of measurement

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. 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 completed.
g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.
i. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

9.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.1℃
Test Date	2024-12-06	Air Pressure	985 Mbar
Test Mode	Mode 1-6	Relative Humidity	56.3 %
Verdict	Pass		

Voltage	Coupling	Observation	Performance
±4kV	Contact Discharge	N/A	N/A
±2KV, ±4kV, ±8kV	Air Discharge	No degradation of performance	A
±4kV	Indirect Discharge HCP	No degradation of performance	A
±4kV	Indirect Discharge VCP	No degradation of performance	A

Note: No Contact Discharge

Discharge Point:	
Red line: Contact discharge	Blue line: Air Discharge
/	

10. Measurement of Radio-Frequency Electromagnetic Field

10.1. Requirements

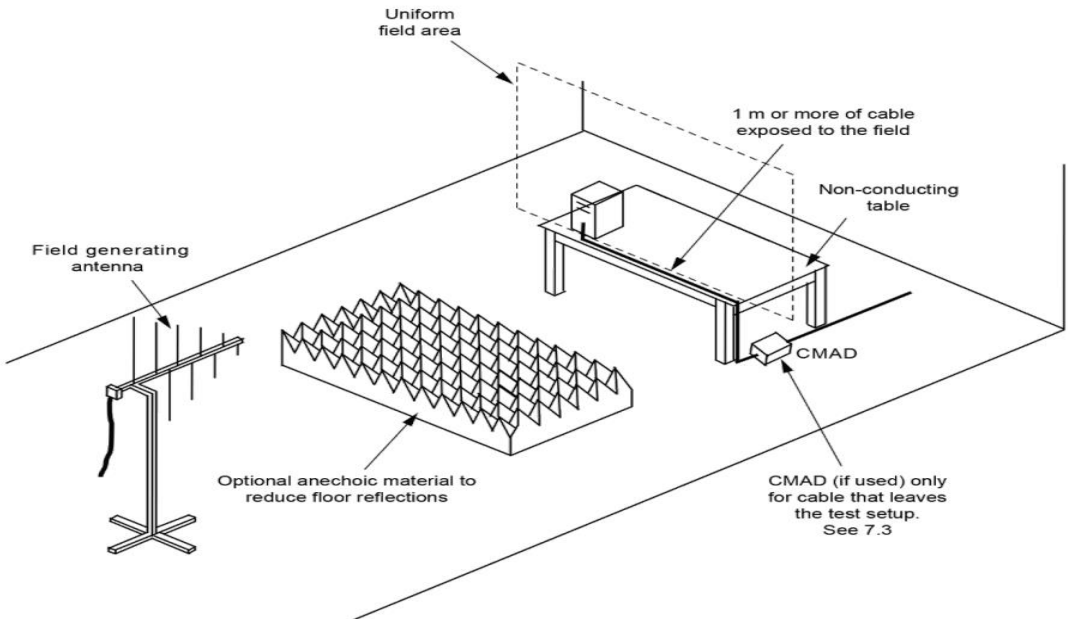
Port	Enclosure
Basic Standard	IEC 61000-4-3
Test Level	3V/m with 80% AM. 1kHz Modulation at 80 to 6000MHz
Required Performance Criterion	A
Antenna polarization	Vertical and Horizontal
Step size increment [a]	1%
Dwell time [b]	≤5 seconds
Test Distance	3m
EUT position facing antenna	Front side, back side, left side and right side

Notes:

a. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.

b. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

10.2. Block Diagram of Test Setup



10.3. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) was positioned within the Uniform Field Area (UFA) on a supporting table, ensuring a 3-meter separation from the transmitting antenna. This setup aligns with the calibrated square area, guaranteeing field uniformity during testing. The supporting units were strategically located outside the UFA to avoid any potential interference. Nonetheless, the cables connected to the EUT were intentionally exposed to the precisely calibrated field within the UFA.

b. Before testing, it will verify the proper operation of the test equipment/system. This verification will involve measuring the field strength at one point within the Uniform Field Area (UFA) at various frequencies.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

10.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.9℃
Test Date	2024-12-04	Air Pressure	985 Mbar
Test Mode(s)	Mode 1-6	Relative Humidity	56.8%
Verdict	Pass		

Frequency (MHz)	Polarity	Exposed Side	Field Strength (V/m)	Observation	Performance
80-6000	Vertical	Front	3V/m (rms)	No performance degradation	A
80-6000		Left	3V/m (rms)	No performance degradation	A
80-6000		Rear	3V/m (rms)	No performance degradation	A
80-6000		Right	3V/m (rms)	No performance degradation	A
80-6000	Horizontal	Front	3V/m (rms)	No performance degradation	A
80-6000		Left	3V/m (rms)	No performance degradation	A
80-6000		Rear	3V/m (rms)	No performance degradation	A
80-6000		Right	3V/m (rms)	No performance degradation	A

11. Measurement of Radio-Frequency Common Mode

11.1. Requirements

Port	☒AC mains power ports	☐signal, wired network and control ports [a]
	☐DC power ports [a]	
Basic Standard	IEC 61000-4-6	
Required Performance Criterion	A	
Test Level	0.15 to 80 MHz, 3V RMS (unmodulated), 80 % AM (1 kHz)	
Step size increment [b]	1%	
Dwell time [c]	≤5 seconds	

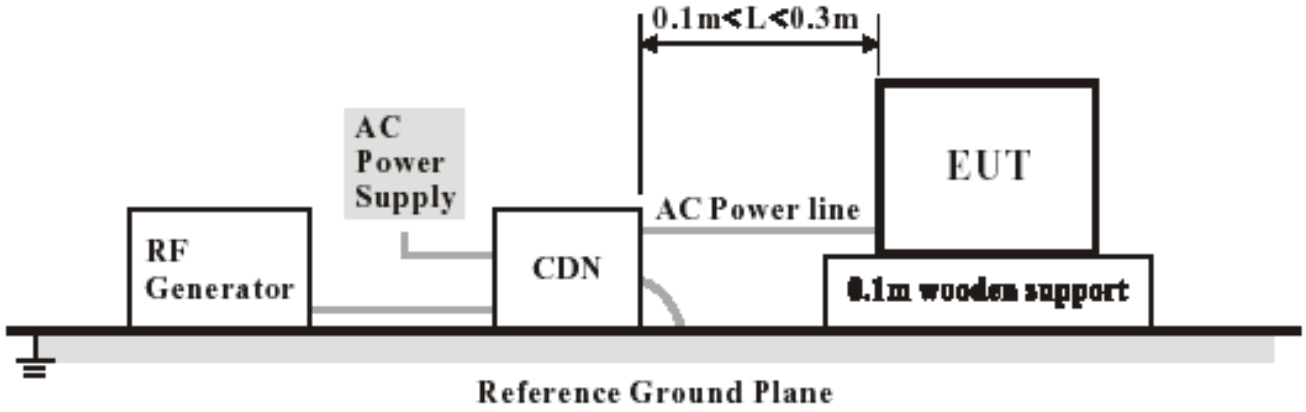
Notes:

a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

b. Recognizing that a 1% step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4% of the previous frequency with a test level of twice the value of the specified test level in order to reduce the testing time for equipment requiring testing in multiple configurations and/or long cycle times.

c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time shall not exceed 5 seconds at each of the frequencies during the scan. The time to exercise the EUT is not interpreted as a total time of a program or a cycle but related to the reaction time in case of failure of the EUT.

11.2. Block Diagram of Test Setup



11.3. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT) shall be tested within its intended operating and climatic conditions.

b. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane. The test shall be performed with the test generator connected to each of the coupling devices (CDN, EM clamp, current clamp) in turn. All other cables not under test shall either be disconnected (when functionally allowed) or provided with decoupling networks or unterminated CDNs only.

c. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

d. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

11.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.1℃
Test Date	2024-12-06	Air Pressure	985 Mbar
Test Mode(s)	Mode 1-6	Relative Humidity	56.3%
Verdict	Pass		

Test port	Test Level	Coupling method	Observation	Performance
AC Power Input	3V	CDN	No performance degradation	A

12. Measurement of Electrical Fast Transient/Burst

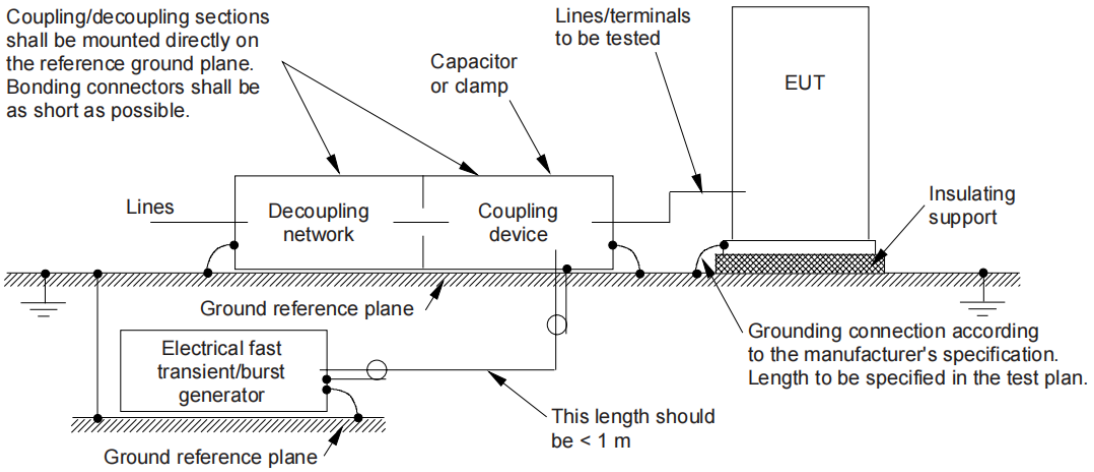
12.1. Requirements

Port	☒AC mains power ports	☐signal, wired network and control ports [a]
	☐DC power ports [a]	
Basic Standard	IEC 61000-4-4	
Required Performance Criterion	B	
Test Level	AC mains power ports 1 kV (peak)	
	signal, wired network and control ports: 0.5 kV (peak)	
	DC power ports: 0.5 kV (peak)	
Polarity	Positive/Negative	
Impulse Frequency	5kHz	
Impulse wave shape	5/50ns	
Burst Duration	15ms	
Burst Period	300ms	

Notes:

a. Applicable only to ports which, according to the manufacturer's specification, supports cable lengths greater than 3 m.

12.2. Block Diagram of Test Setup



12.3. Configuration of the EUT and method of measurement

a. The Equipment Under Test (EUT), whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be placed on a ground reference plane and shall be insulated
b. from it by an insulating support 0,1 m ± 0,01 m thick.
c. The test generator and the coupling/decoupling network shall be placed directly on, and bonded to, the ground reference plane.
d. The EUT shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications. The minimum distance between the EUT and all other conductive structures (e.g. the walls of a shielded room), except the ground reference plane shall be more than 0,5 m. All cables to the EUT shall be placed on the insulation support 0,1 m 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.
e. The test voltages shall be coupled to all of the EUT ports including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.
f. Either a direct coupling network or a capacitive clamp shall be used for the application of the test voltages.
g. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

12.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.9℃
Test Date	2024-12-06	Air Pressure	985 Mbar
Test Mode(s)	Mode 1-6	Relative Humidity	57.6 %
Verdict	Pass		

Inject Line	Voltage(kV)	Inject Method	Observation	Performance
AC Lines	0.5, 1	Direct	No degradation of performance	A

13. Measurement of Surges

13.1. Requirements

Port	☒AC mains power ports [a]
Basic Standard	IEC 61000-4-5
Required Performance Criterion	B
Test Level	Line to line: 1 kV; Line to ground: 2 kV
Tr/Th	1.2/50 (8/20) μs
Number of impulses	Five positive and five negative impulses
Time between successive impulses	1 min

Notes:

a. The number of pulses applied shall be as follows:

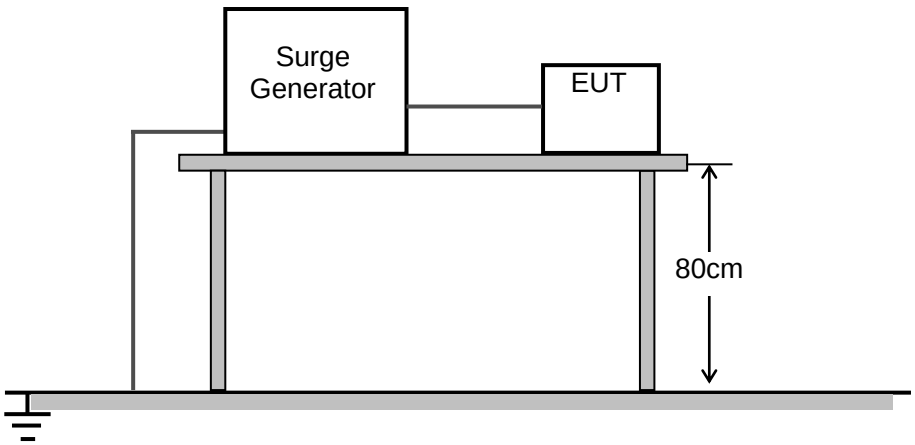
- Five positive pulses line-to-neutral at 90° phase.
- Five negative pulses line-to-neutral at 270° phase.

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE:

- Five positive pulses line-to-earth at 90° phase.
- Five negative pulses line-to-earth at 270° phase.
- Five negative pulses neutral-to-earth at 90° phase.
- Five positive pulses neutral-to-earth at 270° phase.
- Defined as an antenna port, a wired network port, or a broadcast receiver tuner port.

Typical ports covered include xDSL, PSTN, CATV, antenna and similar. Excluded ports are LAN and similar.

13.2. Block Diagram of Test Setup



13.3. Configuration of the EUT and method of measurement

a. Verification shall be performed. It is preferable to perform the verification prior to the test.

b. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

c. When testing line-to-ground, the lines are tested individually in sequence, if there is no other specification.

d. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore, all lower test levels including the selected test level shall be tested.

e. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

13.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.9℃
Test Date	2024-12-06	Air Pressure	985 Mbar
Test Mode(s)	Mode 1-6	Relative Humidity	57.6 %
Verdict	Pass		

Test port	Coupling	Voltage(kV)	Observation	Performance
AC Mains Input	line-to-neutral	0.5, 1	No degradation of performance	A
	line-to-earth	0.5, 1, 2	No degradation of performance	A
	neutral-to-earth	0.5, 1, 2	No degradation of performance	A

14. Measurement of Voltage Dips and Interruptions

14.1. Requirements

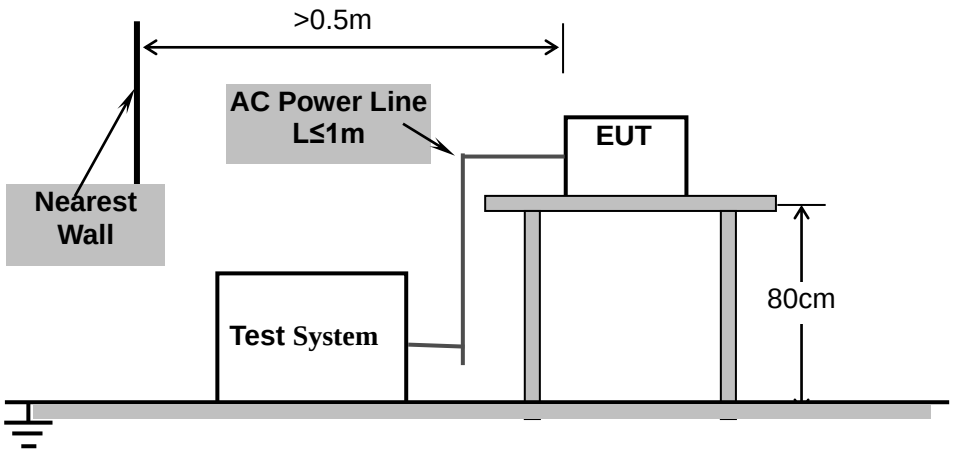
Port	AC mains power ports		
Basic Standard	IEC 61000-4-11		
Required Performance Criterion	B	B	C
Residual voltage [a]	< 5 %	70 %	< 5 %
Number of cycles [b]	0.5	25 for 50 Hz 30 for 60 Hz	250 for 50 Hz 300 for 60 Hz
Variation/dip repetition	Sequence of three dips/interruptions with an interval of 10 seconds between each test		

Notes:

a. Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements.

b. Apply at only one supply frequency of the EUT.

14.2. Block Diagram of Test Setup



14.3. Configuration of the EUT and method of measurement

a. The test shall be performed according to the above requirements and block diagram which shall specify the test setup.

b. The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance criterion defined in the report.

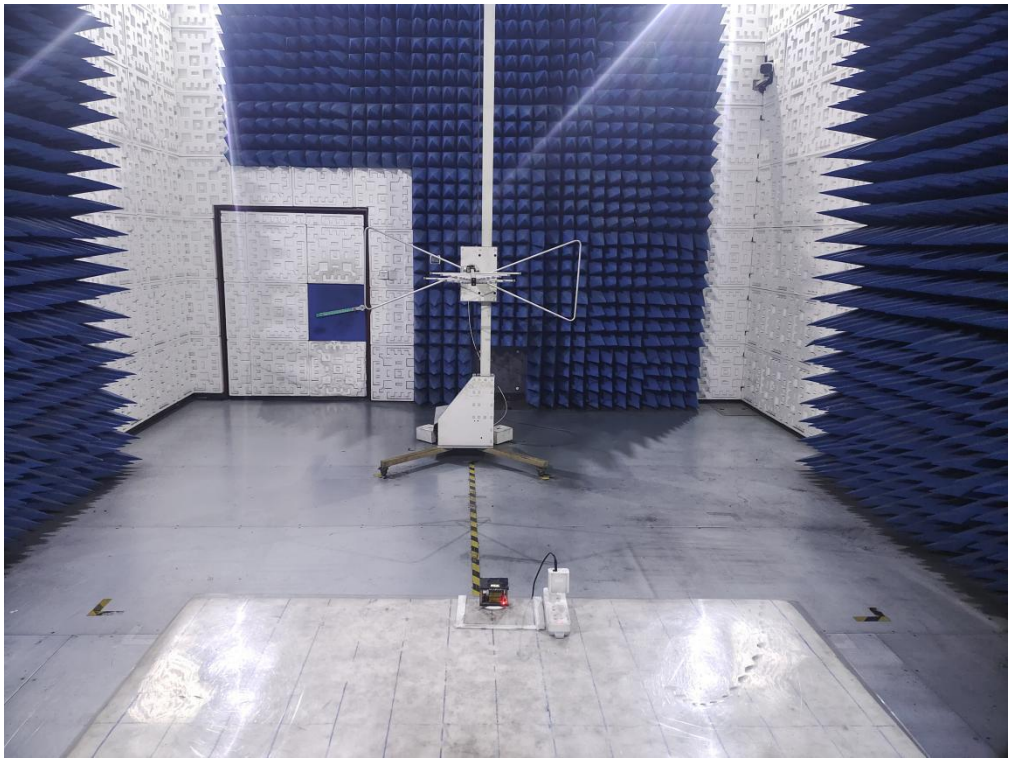
14.4. Test Result

Test Engineer	Carpe Lin	Temperature	22.9℃
Test Date	2024-12-06	Air Pressure	985 Mbar
Test Mode(s)	Mode 1-6	Relative Humidity	57.6 %
Verdict	Pass		

Test port	Residual voltage (%)	Cycles	Observation	Performance
AC Mains Input	< 5	0.5	No degradation of performance	A
	70	25	No degradation of performance	A
	< 5	250	EUT power cycled	B

Appendix I: Photographs of Test Setup

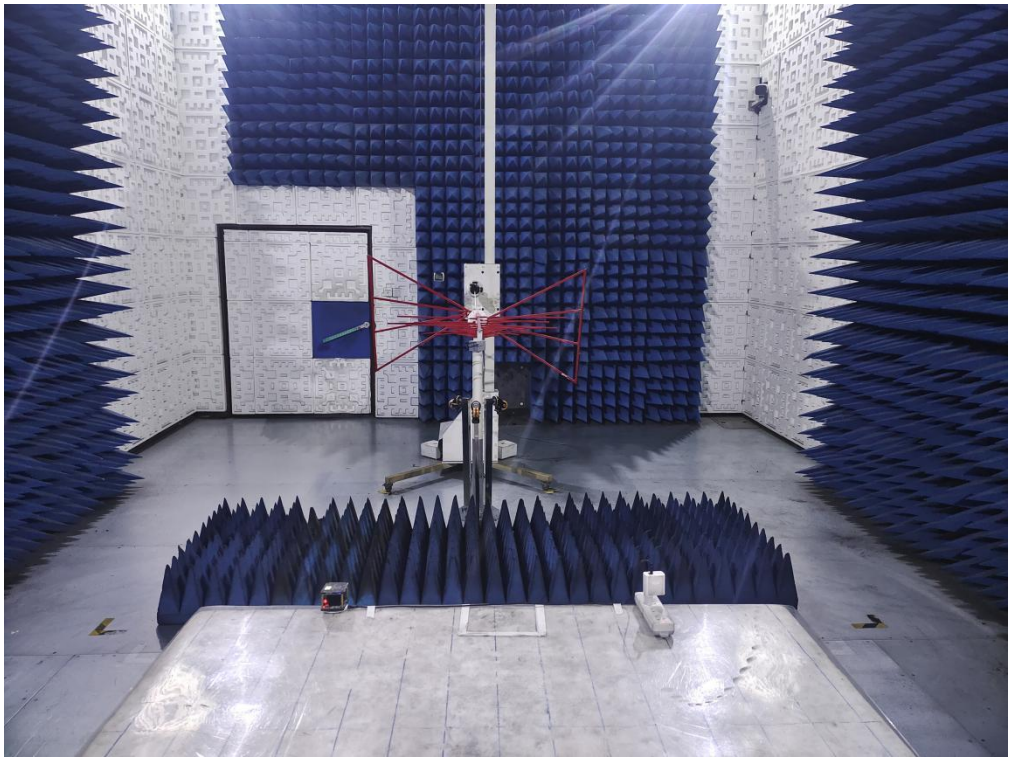
Conducted emissions from the AC mains power ports



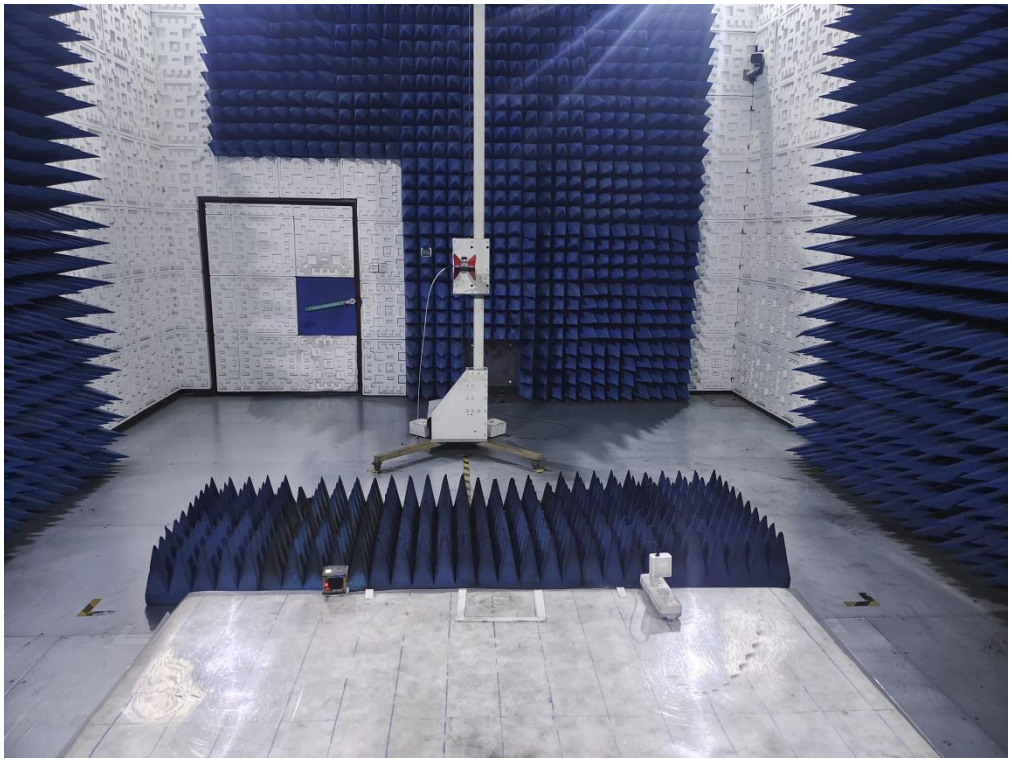
Radiated emissions at frequencies up to 1GHz

Harmonic Current Emissions & Voltage Fluctuations and Flicker

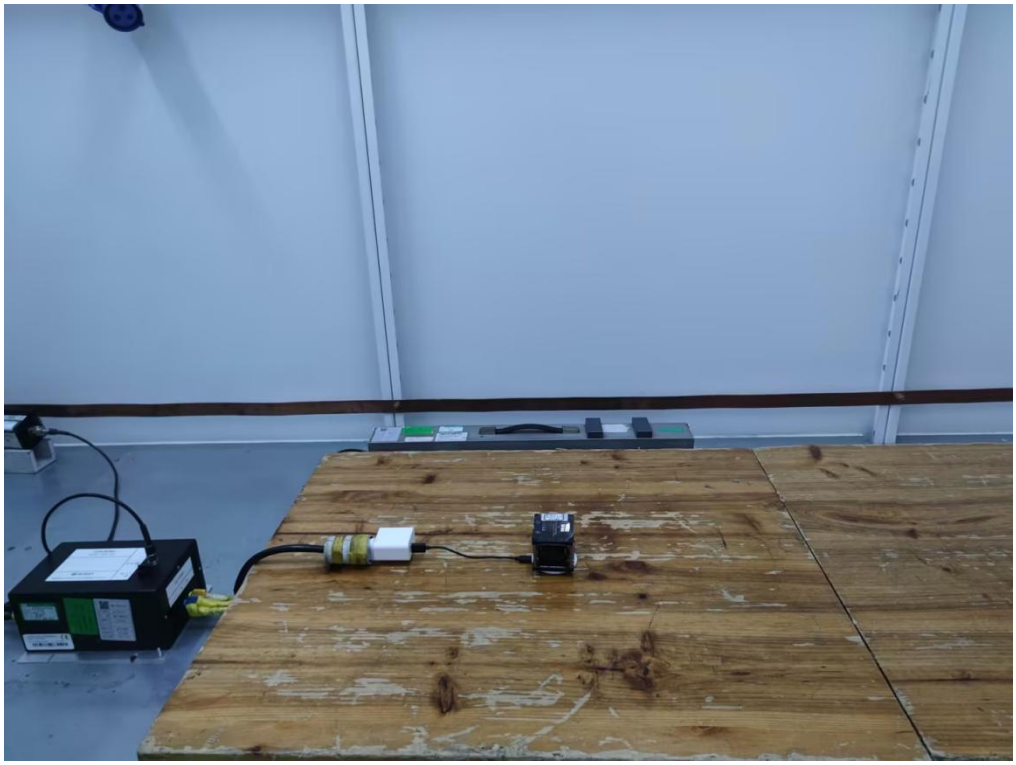
Electrostatic Discharge



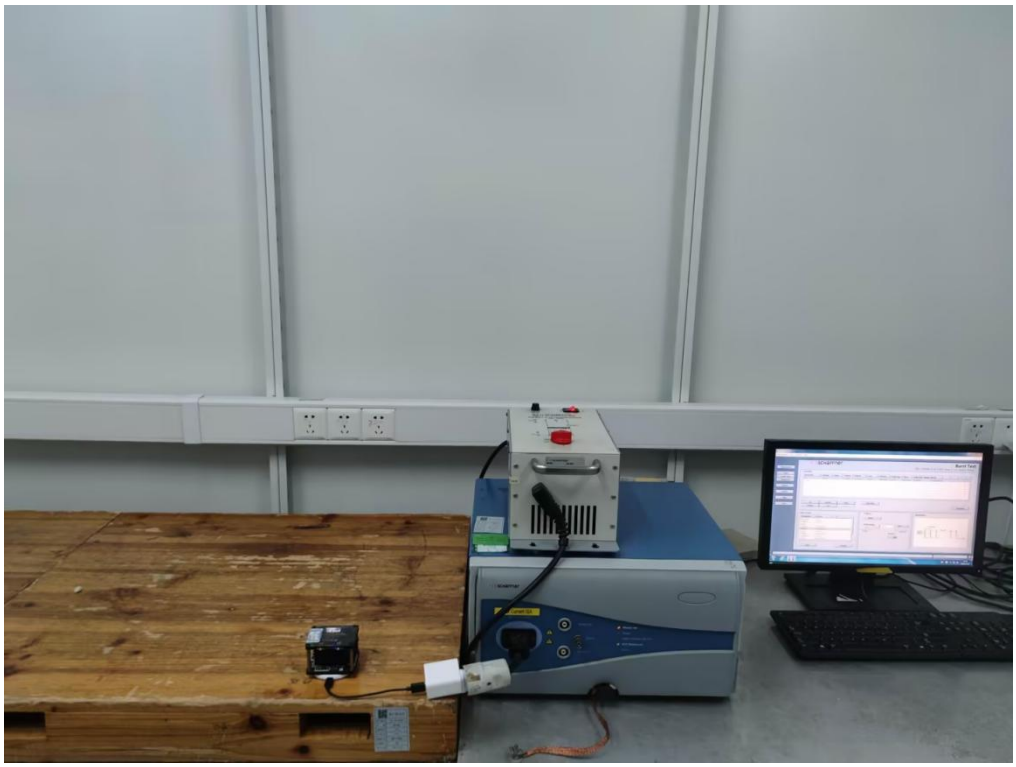
Radio-Frequency Electromagnetic Field up to 1 GHz



Radio-Frequency Electromagnetic Field Above 1 GHz



Radio-Frequency Common Mode at the AC Mains Power Ports



Fast Transients/Surges/ Voltage dips at the AC mains power ports

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC05443241134AP01

-----End of Report-----

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.