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CNAS L3163

CE&UKCA EMC Test Report

Project No.	:	2302C096A
Equipment	:	Handheld Inkjet Printer
Brand Name	:	BENTSAI
Test Model	:	BT-HH6205 B
Series Model	:	BT-HH6205 D(2), BT-HH6205 A(2), BT-HH6205 C(2), BT-HH6205 E, BT-HH6210 B, BT-HH6210 E, BT-HH6210 A(2), BT-HH6210 C(2), BT-HH6210 D(2), BT-HH6205 F, BT-HH6210 F, BT-HH6205 G, BT-HH6210 G, BT-HH6205 K, BT-HH6210 K, BT-HH6205 Z, BT-HH6210 Z, BT-HH6205 V, BT-HH6210 V, BT-HH6205 P, BT-HH6210 P, BT-HH6205 L, BT-HH6210 L
Applicant	:	Zhuhai Bentsai Electronics Co., Ltd.
Address	:	2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District, Zhuhai
Manufacturer	:	Zhuhai Bentsai Electronics Co., Ltd.
Address	:	2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District, Zhuhai
Factory	:	Zhuhai Bentsai Electronics Co., Ltd.
Address	:	2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District, Zhuhai
Date of Receipt	:	May 12, 2023
Date of Test	:	May 15, 2023 ~ May 26, 2023
Issued Date	:	Jun. 30, 2023
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG2023051223
Standard(s)	:	EN 55032:2015+A11:2020 EN 55035:2017+A11:2020 BS EN 55032:2015+A11:2020 BS EN 55035:2017+A11:2020

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.(Dongguan).

Prepared by : Jason Liang

Jason Liang

Approved by : Kang Zhang

Kang Zhang

No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong, China.
Tel: +86-769-8318-3000 Web: www.newbtl.com Service mail: btl_qa@newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any other agency.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-EMC-1-2302C096A	R00	This is a supplementary report to the original test report (BTL-EMC-1-2302C096). 1. Update the applicant, manufacturer and factory address. 2. Changed the PCB board, so all test items used original worst case to tested and recorded. In this report only recorded the new test results. The original test results please refer to original report.	Jun. 30, 2023	Valid

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission			
Standard(s)	Test Item		Result
EN 55032:2015+A11:2020 BS EN 55032:2015+A11:2020	Radiated emissions up to 1 GHz		PASS
	Radiated emissions above 1 GHz		PASS
	Radiated emissions from FM receivers		N/A
	Conducted emissions AC mains power port		N/A
	Asymmetric mode conducted emissions	AAN	N/A
		Current Probe	N/A
		CP+CVP	N/A
	Conducted differential voltage emissions		N/A

Immunity			
Standard(s)	Ref Standard(s)	Test Item	Result
EN 55035:2017+A11:2020 BS EN 55035: 2017+A11:2020	IEC 61000-4-2:2008	ESD	PASS
	IEC 61000-4-3:2020	RS	PASS
	IEC 61000-4-4:2012	EFT	N/A
	IEC 61000-4-5:2014+AMD1:2017	Surge	N/A
	IEC 61000-4-6:2013	CS	N/A
	IEC 61000-4-8:2009	PFMF	PASS
	IEC 61000-4-11:2020	Dips	N/A

Standard(s)	Section	Test Item	Result
EN 55035:2017+A11:2020 BS EN 55035: 2017+A11:2020	4.2.7	BIN-R	N/A
	4.2.7	BIN-I	N/A

NOTE:
(1) “N/A” denotes test is not applicable to this device.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong, China.

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2, The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

The reported uncertainty of measurement **y** ± **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**%.

A. Radiated emissions up to 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB08 (10m)	CISPR	30MHz ~ 200MHz	V	4.72
		30MHz ~ 200MHz	H	4.40
		200MHz ~ 1,000MHz	V	4.58
		200MHz ~ 1,000MHz	H	3.70

B. Radiated emissions above 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB08 (3m)	CISPR	1GHz ~ 6GHz	3.94

C. Immunity Measurement:

Test Site	Method	Item	U
DG-SR02	IEC 61000-4-2	Rise time tr	6.30%
		Peak current Ip	6.70%
		Current at 30 ns	6.40%
		Current at 60 ns	6.90%
DG-CB05	IEC 61000-4-3 (80MHz~6GHz)	Electromagnetic field immunity test	2.00dB
DG-SR05	IEC 61000-4-8	Magnetic Field Strength	2.38%

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Tested By
Radiated emissions up to 1 GHz	30°C	55%	Karpin Zhong
Radiated emissions above 1 GHz	26°C	53%	Karpin Zhong

Test Item	Temperature	Humidity	Pressure	Tested By
ESD	25°C	47%	1009hPa	Chien Li
RS	23°C	54%	/	Luther Lai
PFMF	24°C	40%	/	Meers Zhang

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Handheld Inkjet Printer
Brand Name	BENTSAI
Test Model	BT-HH6205 B
Series Model	BT-HH6205 D(2), BT-HH6205 A(2), BT-HH6205 C(2), BT-HH6205 E, BT-HH6210 B, BT-HH6210 E, BT-HH6210 A(2), BT-HH6210 C(2), BT-HH6210 D(2), BT-HH6205 F, BT-HH6210 F, BT-HH6205 G, BT-HH6210 G, BT-HH6205 K, BT-HH6210 K, BT-HH6205 Z, BT-HH6210 Z, BT-HH6205 V, BT-HH6210 V, BT-HH6205 P, BT-HH6210 P, BT-HH6205 L, BT-HH6210 L
Model Difference(s)	The upper cover of the product appearance, the front roller seat of the product and the model name are different.
Power Source	1# DC voltage supplied from AC adapter. (Support unit) 2# Supplied from battery.
Power Rating	1# DC 5V 2A 2# DC 3.7V
Connecting I/O Port(s)	1* DC port 1* USB port
Classification of EUT	Class A
Highest Internal Frequency(Fx)	192MHz

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the user's manual.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible 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

Radiated emissions up to 1 GHz Test	
Final Test Mode	Description
Mode 1	Charging

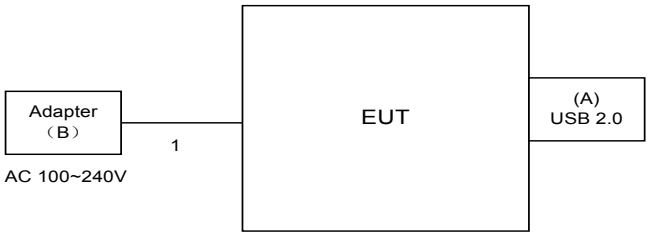
Radiated emissions Above 1 GHz Test	
Final Test Mode	Description
Mode 1	Charging

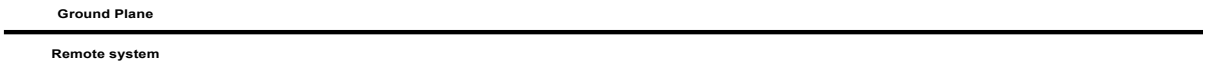
ESD, RS, PFMF Test	
Final Test Mode	Description
Mode 1	Charging

2.3 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The standard test signals and output signal as following:
1. EUT connected to Adapter via USB Cable.
2. The USB 2.0 is plugged into EUT.

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





2.5 DESCRIPTION OF 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	USB 2.0	N/A	N/A	N/A
B	Adapter	Huawei	N/A	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	YES	NO	1m

3. EMC EMISSION TEST

3.1 RADIATED EMISSIONS UP TO 1 GHZ

3.1.1 LIMITS

Class A equipment up to 1 GHz

Frequency Range MHz	Measurement			Class A limits dB(μV/m)
	Facility	Distance m	Detector type/ bandwidth	
30 - 230	SAC	10	Quasi peak / 120 kHz	40
230 - 1000				47

Notes:

(1) The limit for radiated test was performed according to as following: EN 55032
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Receiver	Keysight	N9038A	MY54450004	Jul. 03, 2023
2	MXE EMI Receiver	KEYSIGHT	N9038B	MY62210123	Nov. 28, 2023
3	Pre-Amplifier	EMC INSTRUMENT	EMC 9135	980284	Jul. 03, 2023
4	Pre-Amplifier	EMC INSTRUMENT	EMC 9135	980283	Jul. 03, 2023
5	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	947	Nov. 02, 2023
6	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	946	Sep. 30, 2023
7	Measurement Software	Farad	EZ-EMC Ver.BTL-2ANT-1	N/A	N/A
8	Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
9	Controller	MF	MF-7802	MF780208159	N/A
10	Attenuator	EMCI	EMCI-N-6-06	AT-N0671	Sep. 30, 2023
11	Attenuator	EMCI	EMCI-N-6-06	AT-N0670	Nov. 02, 2023
12	Cable	RW	LMR400-NMNM-10M	N/A	Dec. 06, 2023
13	Cable	RW	LMR400-NMNM-7M	N/A	Dec. 06, 2023
14	Cable	RW	LMR400-NMNM-3.5M	N/A	Dec. 06, 2023
15	Cable	RW	LMR400-NMNM-8M	N/A	Dec. 06, 2023
16	Cable	RW	LMR400-NMNM-7M	N/A	Dec. 06, 2023
17	Cable	RW	LMR400-NMNM-3.5M	N/A	Dec. 06, 2023

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

3.1.3 TEST PROCEDURE

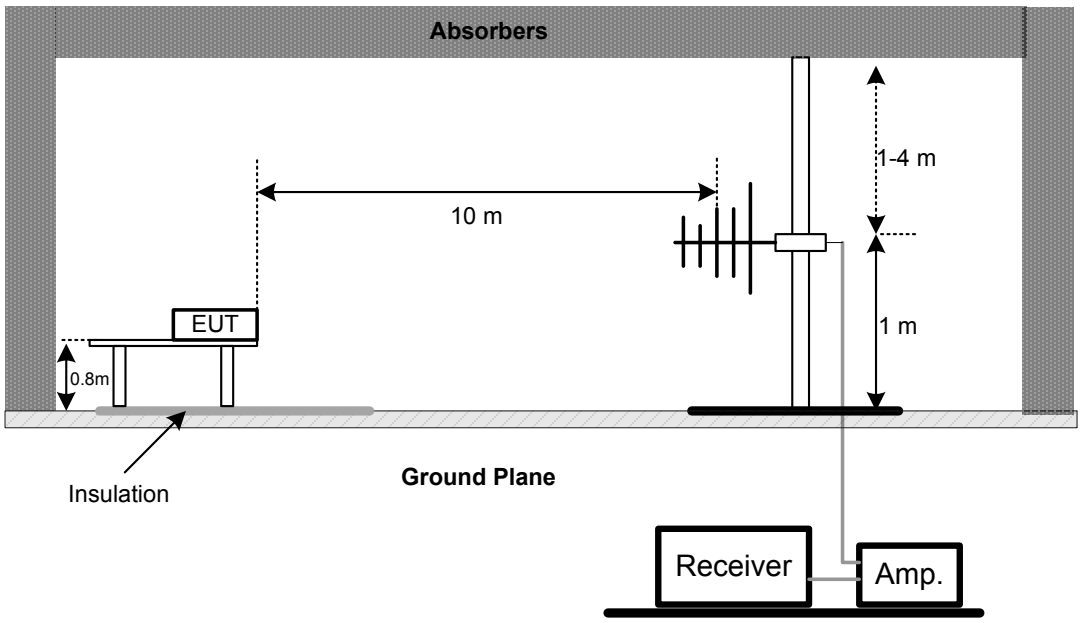
a. The measuring distance of 10 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
d. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform.
e. For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation

3.1.5 TEST SETUP

UP TO 1 GHZ



3.1.6 MEASUREMENT DISTANCE

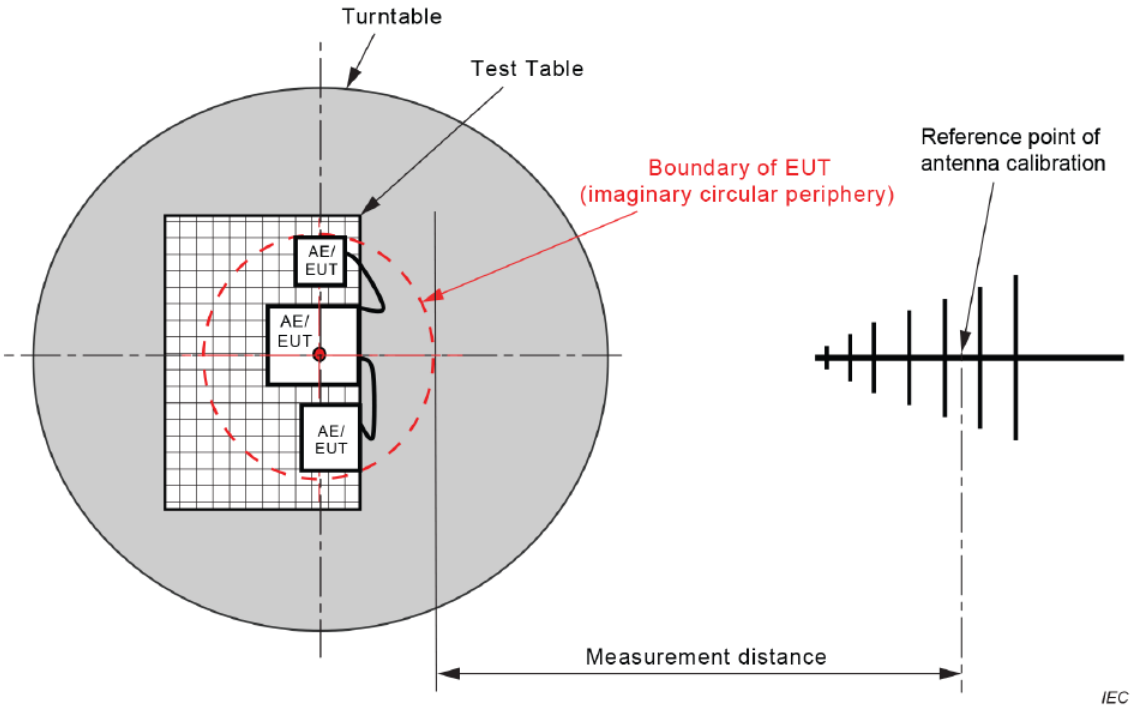


Figure C.1 – Measurement distance

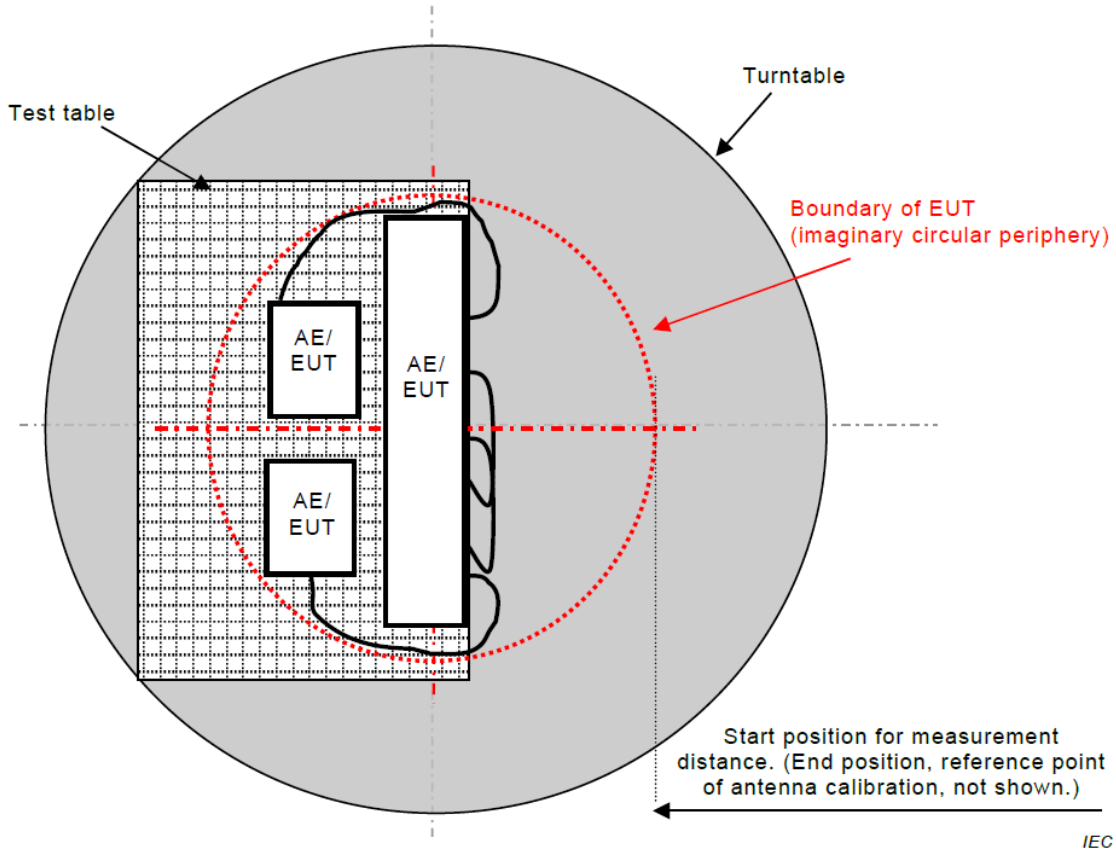
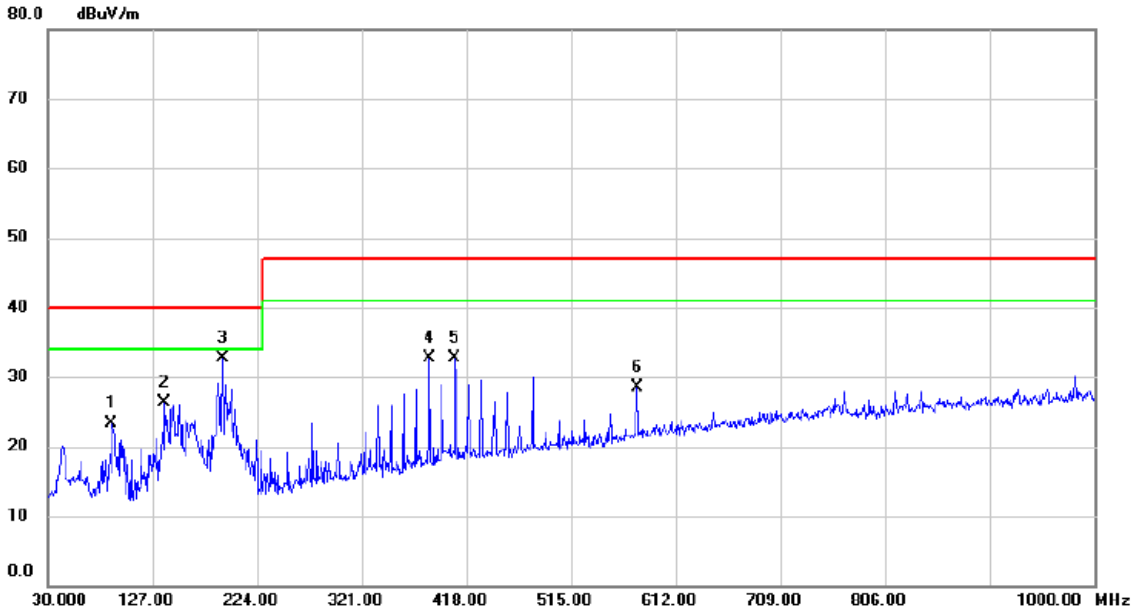


Figure C.2 – Boundary of EUT, Local AE and associated cabling

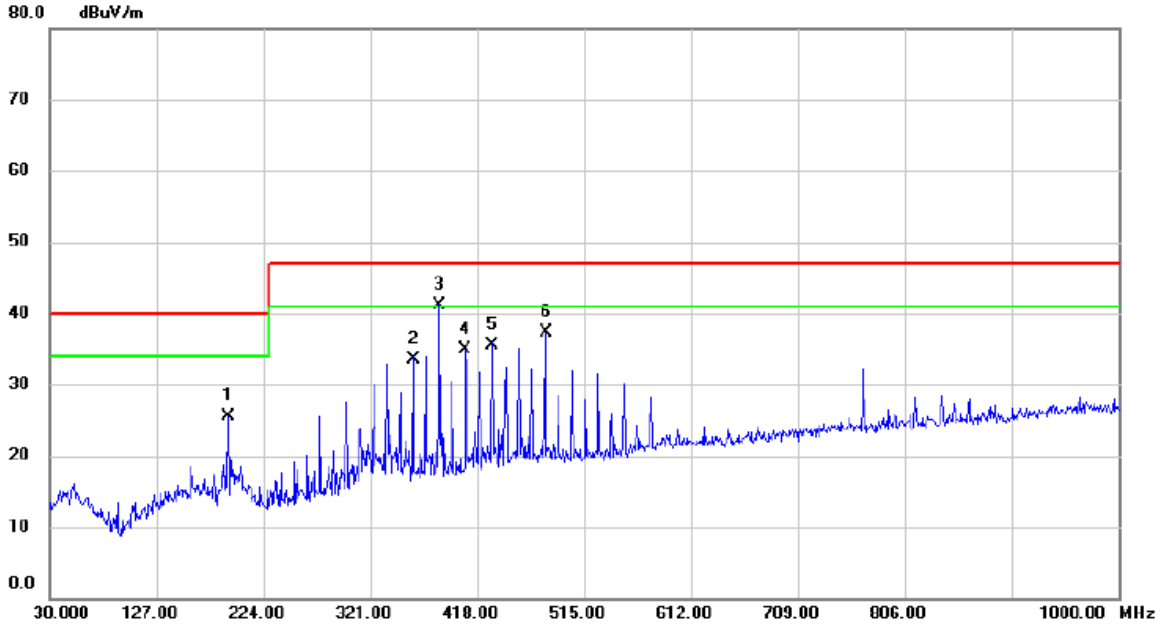
3.1.7 TEST RESULTS

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		89.1700	45.41	-22.09	23.32	40.00	-16.68	QP	
2		138.6400	43.92	-17.70	26.22	40.00	-13.78	QP	
3	*	191.9900	51.35	-18.67	32.68	40.00	-7.32	QP	
4		384.0500	46.35	-13.59	32.76	47.00	-14.24	QP	
5		407.3300	45.66	-13.04	32.62	47.00	-14.38	QP	
6		576.1100	38.42	-9.91	28.51	47.00	-18.49	QP	

Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		191.9900	44.01	-18.45	25.56	40.00	-14.44	QP	
2		359.8000	47.80	-14.24	33.56	47.00	-13.44	QP	
3	*	384.0500	54.68	-13.67	41.01	47.00	-5.99	QP	
4		407.3300	47.87	-13.04	34.83	47.00	-12.17	QP	
5		431.5800	48.00	-12.43	35.57	47.00	-11.43	QP	
6		480.0800	48.80	-11.53	37.27	47.00	-9.73	QP	

3.2 RADIATED EMISSIONS ABOVE 1 GHZ

3.2.1 LIMITS

Class A equipment above 1 GHz

Frequency Range MHz	Measurement			Class A limits dB(μV/m)
	Facility	Distance m	Detector type/bandwidth	
1000 - 3000	FSOATS	3	Average / 1 MHz	56
3000 - 6000				60
1000 - 3000			Peak / 1 MHz	76
3000 - 6000				80

Notes:

(1) The limit for radiated test was performed according to as following: EN 55032

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
$108 < F_x \leq 500$ MHz	2 GHz
$500 < F_x \leq 1000$ MHz	5 GHz
$F_x > 1$ GHz	5 x F_x up to a maximum of 6 GHz

3.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Horn Antenna	EMCO	3115(3m)	9605-4803	Jun. 16, 2023
2	Amplifier	Agilent	8449B	3008A02333	Jan. 08, 2024
3	MXE EMI Receiver	KEYSIGHT	N9038B	MY62210123	Nov. 28, 2023
4	Measurement Software	Farad	EZ-EMC Ver.BTL-2ANT-1	N/A	N/A
5	Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
6	Controller	MF	MF-7802	MF780208159	N/A
7	Cable	Micable	RWLP50-4.0A-S MSM-12M-KJ	20191107 002	Mar. 02, 2024

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

3.2.3 TEST PROCEDURE

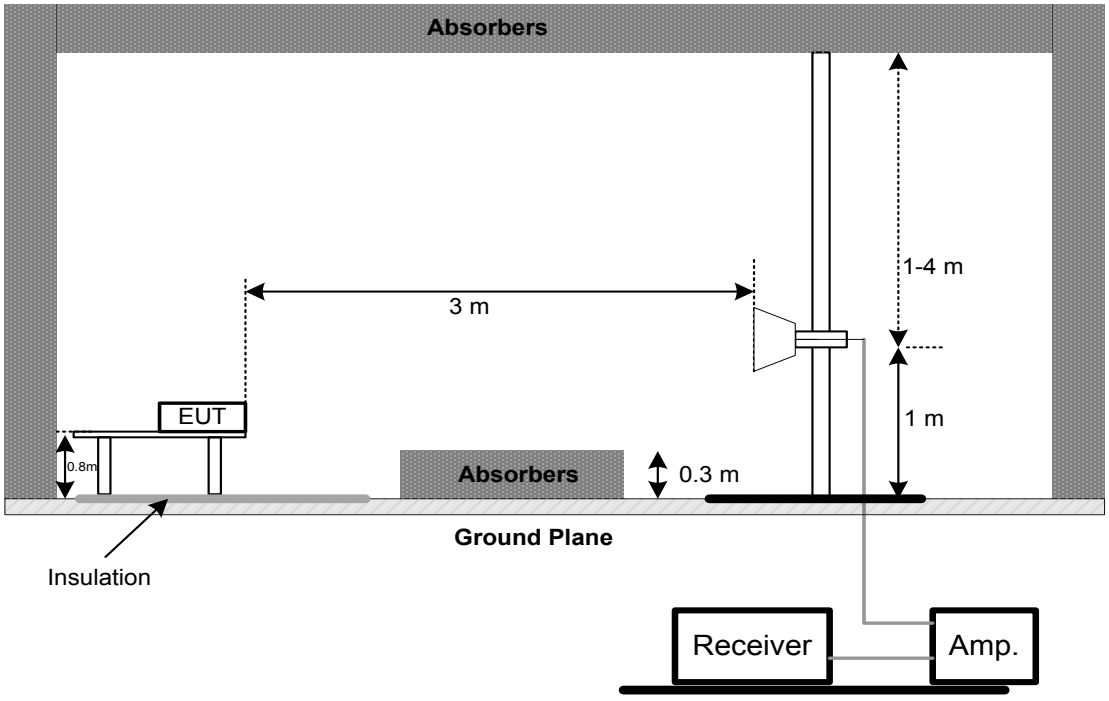
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then AVG detector mode re-measured.
d. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform.
e. For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP

ABOVE 1 GHZ



3.2.6 MEASUREMENT DISTANCE

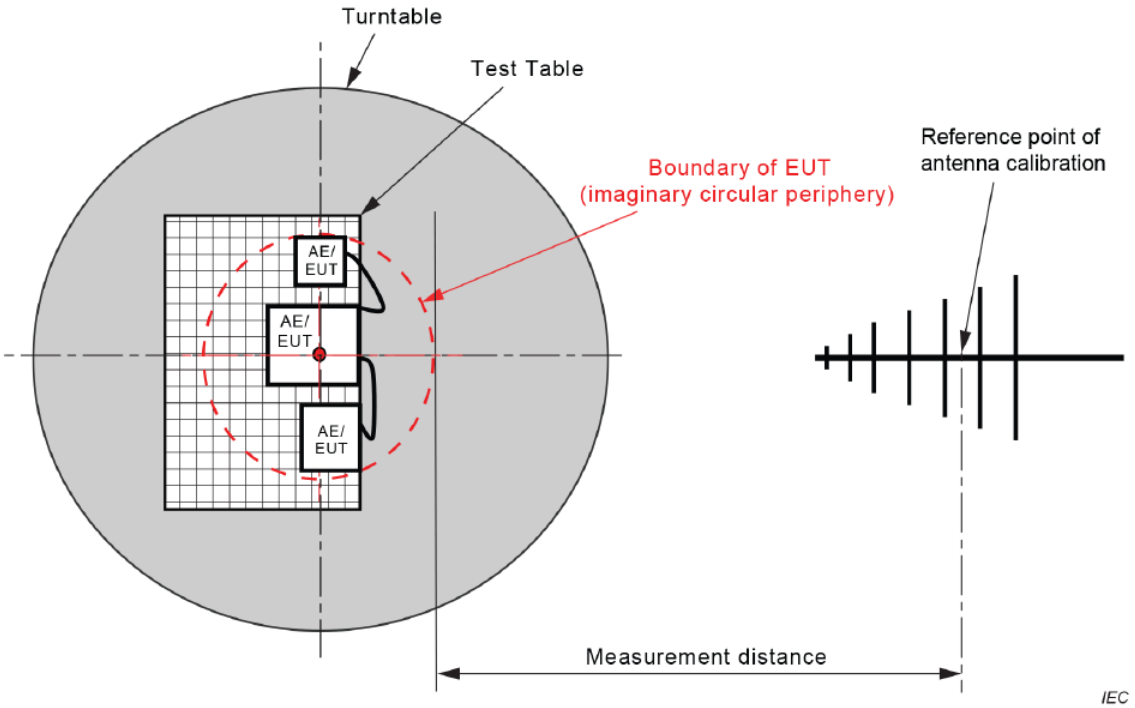


Figure C.1 – Measurement distance

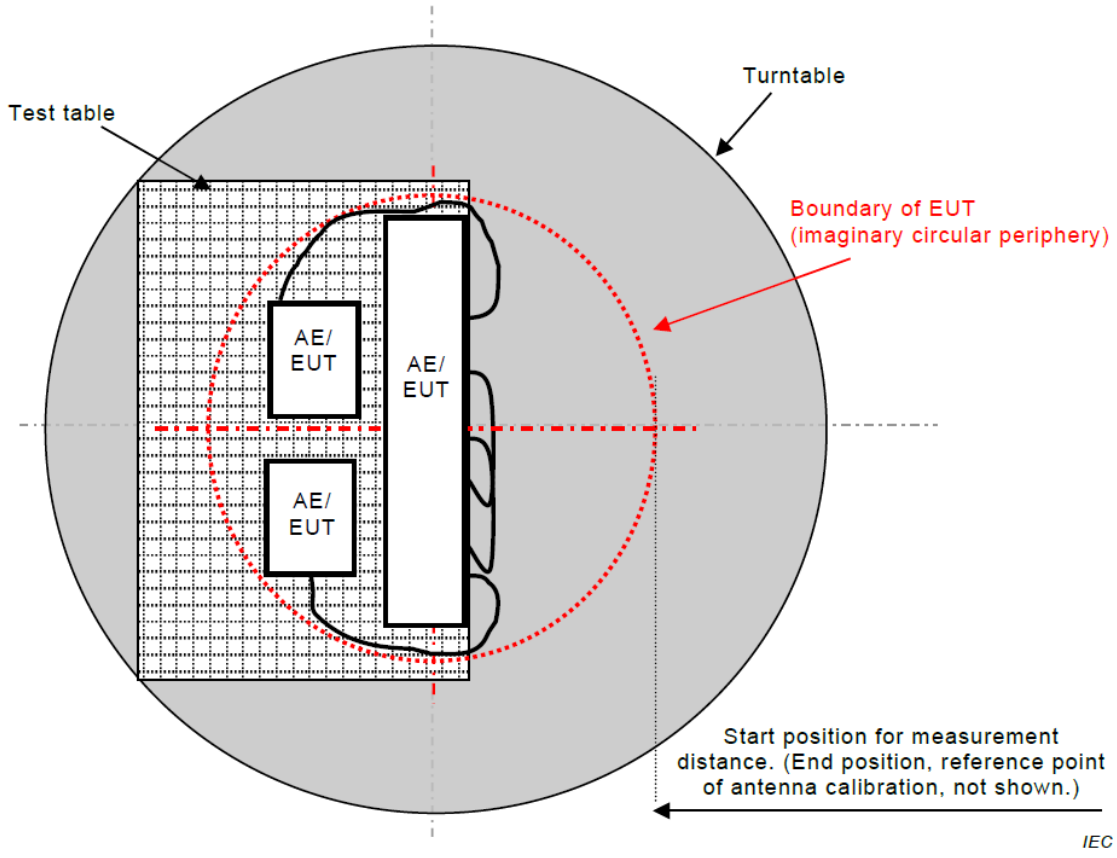
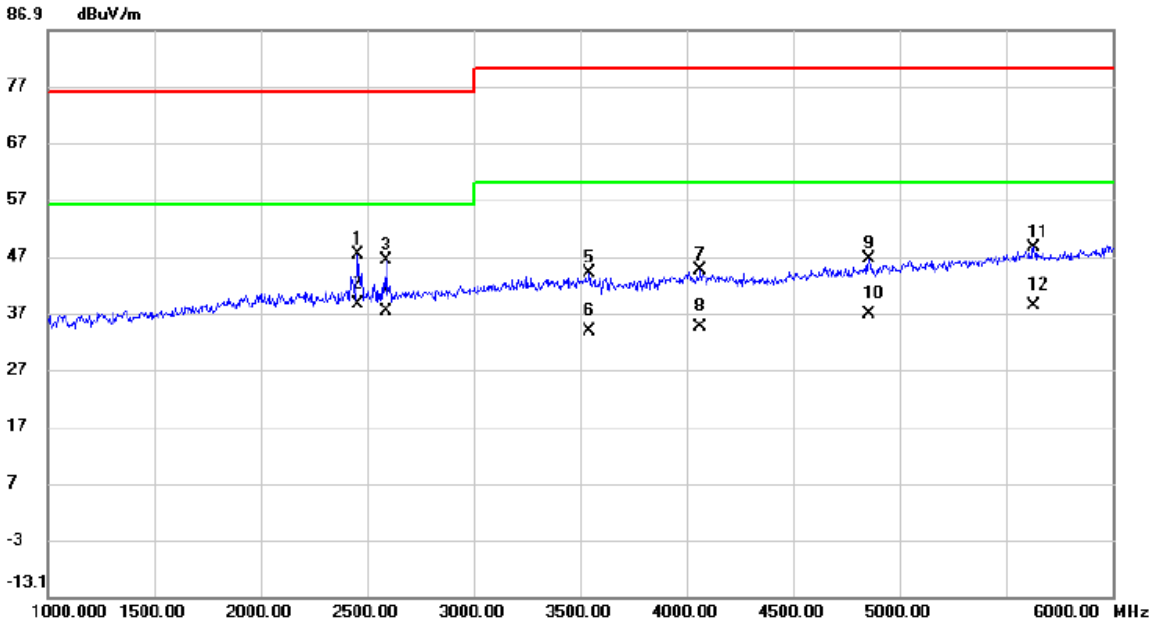


Figure C.2 – Boundary of EUT, Local AE and associated cabling

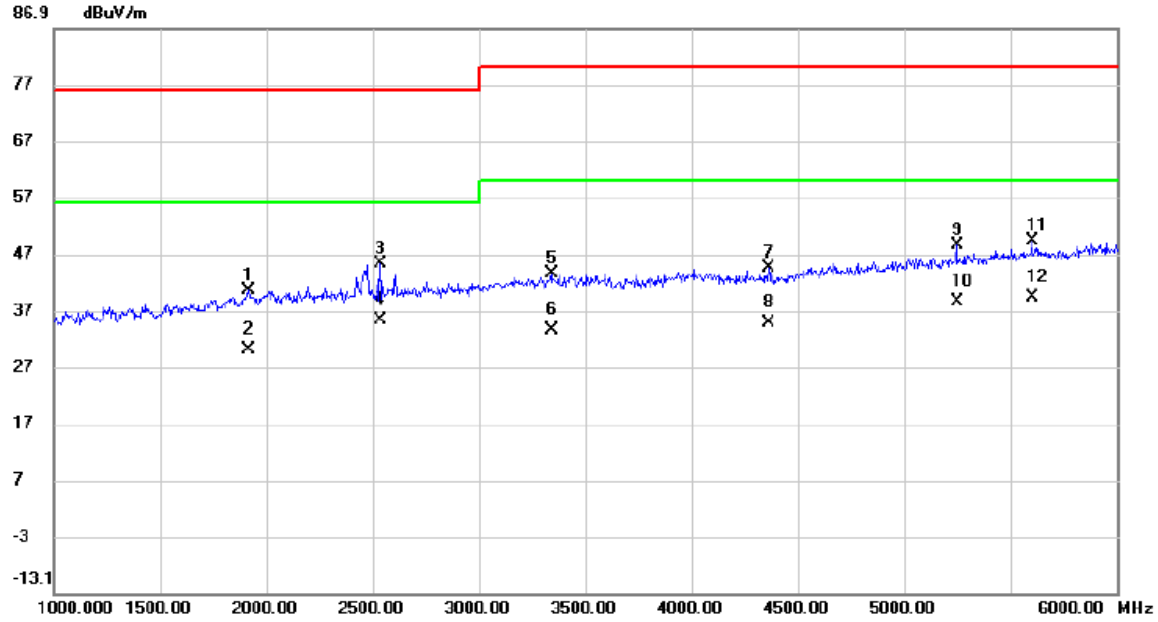
3.2.7 TEST RESULTS

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2455.000	43.47	3.87	47.34	76.00	-28.66	peak	
2	*	2455.000	34.58	3.87	38.45	56.00	-17.55	AVG	
3		2592.500	41.88	4.31	46.19	76.00	-29.81	peak	
4		2592.500	32.98	4.31	37.29	56.00	-18.71	AVG	
5		3545.000	35.50	8.44	43.94	80.00	-36.06	peak	
6		3545.000	25.27	8.44	33.71	60.00	-26.29	AVG	
7		4065.000	34.92	9.59	44.51	80.00	-35.49	peak	
8		4065.000	24.99	9.59	34.58	60.00	-25.42	AVG	
9		4857.500	34.24	12.24	46.48	80.00	-33.52	peak	
10		4857.500	24.53	12.24	36.77	60.00	-23.23	AVG	
11		5630.000	33.31	15.30	48.61	80.00	-31.39	peak	
12		5630.000	22.92	15.30	38.22	60.00	-21.78	AVG	

Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		1915.000	38.44	2.16	40.60	76.00	-35.40	peak	
2		1915.000	27.94	2.16	30.10	56.00	-25.90	AVG	
3		2537.500	41.22	4.10	45.32	76.00	-30.68	peak	
4	*	2537.500	31.13	4.10	35.23	56.00	-20.77	AVG	
5		3342.500	36.10	7.55	43.65	80.00	-36.35	peak	
6		3342.500	26.04	7.55	33.59	60.00	-26.41	AVG	
7		4360.000	34.22	10.36	44.58	80.00	-35.42	peak	
8		4360.000	24.47	10.36	34.83	60.00	-25.17	AVG	
9		5247.500	34.60	13.84	48.44	80.00	-31.56	peak	
10		5247.500	24.57	13.84	38.41	60.00	-21.59	AVG	
11		5602.500	34.06	15.21	49.27	80.00	-30.73	peak	
12		5602.500	23.96	15.21	39.17	60.00	-20.83	AVG	

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	Test Specification Level / Test Mode	Test Ports	Criteria
Electrostatic discharge IEC 61000-4-2 (ESD)	±8kV air discharge ±4kV contact discharge (Direct Mode)	Enclosure	B
	±4kV HCP discharge ±4kV VCP discharge (Indirect Mode)	Enclosure	B
Continuous RF electromagnetic field disturbances,swept test IEC 61000-4-3 (RS)	80 MHz to 1000 MHz 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure	A
Continuous RF electromagnetic field disturbances,spot test IEC 61000-4-3 (RS)	1800 MHz, 2600MHz, 3500 MHz, 5000MHz(±1 %) 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure	A
Electrical fast transient/burst immunity IEC 61000-4-4 (EFT)	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency (100kHz Repetition Frequency for xDSL port)	Analogue/digital data ports **(NOTE 2)**	B
	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	DC network power ports **(NOTE 2)**	B
	±1 kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	AC mains power ports	B

Surge immunity IEC 61000-4-5 (Surge)	**Port Type: unshielded symmetrical** **Apply: lines to ground**		
	Primary protection is Intended ±1 kV and ±4 kV 10/700(5/320)Tr/Th μs	Analogue/digital data ports **(NOTE 1) & (NOTE 2)**	C
	Primary protection is not Intended ±1 kV 10/700(5/320) Tr/Th μs		C
	Port type: coaxial or shielded **Apply: shield to ground**		
	±0.5 kV 1.2/50(8/20) Tr/Th μs	Analogue/digital data ports **(NOTE 1) & (NOTE 2)**	B
	line to reference ground for each individual line: ±0.5 kV(peak) 1.2/50(8/20) Tr/Th μs	DC network power ports **(NOTE 2)**	B
	±1 kV(peak) 1.2/50(8/20) Tr/Th μs (line to line) ±2 kV(peak) 1.2/50(8/20) Tr/Th μs (line to earth or ground)	AC mains power ports	B
Continuous induced RF disturbances IEC 61000-4-6 (CS)	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	Analogue/digital data ports **(NOTE 2)**	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	DC network power ports **(NOTE 2)**	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	AC mains power ports	A

Power frequency magnetic field immunity IEC 61000-4-8 (PFMF)	50 Hz or 60Hz, 1A/m(r.m.s)□	Enclosure	A
Voltage dips, short interruptions and voltage variations immunity IEC 61000-4-11 (Dips)	Voltage dips: Residual voltage＜5% 0.5 cycle Residual voltage＜70% 25 cycle(50Hz), 30 cycle (60Hz) Voltage interruptions: Residual voltage＜5% 250 cycle (50Hz), 300 cycle (60Hz)	AC Power Ports	B C C
Broadband impulse noise disturbances,repetitive (BIN-R)	0.15MHz to 0.5 MHz 107dBuV 0.5 MHz to 10 MHz 107dBuV to 36dBuV 10 MHz to 30 MHz 36dBuV to 30 dBuV	Analogue/digital data ports **(Applicable only to CPE xDSL ports)**	A
	0.70 ms 8.3 ms(for 60Hz) 10 ms(for 50Hz)	Analogue/digital data ports **(Apply period based on the AC mains frequency)**	A
Broadband impulse noise disturbances,isolated (BIN-I)	0.15MHz to 30 MHz 110dBuV	Analogue/digital data ports **(Applicable only to CPE xDSL ports)**	B
	0.24 ms 10 ms 300 ms	Analogue/digital data ports **(Apply all burst durations)**	B

Note.
1) Applicable only to ports which, according to the manufacturer's specification, may connect directly to outdoor cables.
2) Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 55035** standards, the general performance criteria as following:

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended.The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 ANNEX B (NORMATIVE) - PRINT FUNCTION

4.3.1 PERFORMANCE CRITERIA

Performance criterion A:

Apply criterion A as defined in GENERAL PERFORMANCE CRITERIA . Additionally, the following shall not occur as a consequence of the application of the disturbance:

- change of operating state;
- unintended pausing of the print operation;
- a change of print quality or legibility, as appropriate to the test pattern;
- change of character font;
- unintended line feed;
- unintended page feed;
- paper feed failure.

Performance criterion B:

Apply criterion B as defined in GENERAL PERFORMANCE CRITERIA with the following specifics and additional limitations.

Paper feed failures are allowed only if, after removal of the jammed sheets, the job is automatically recovered and there is no loss of printed information.

Any low-quality print output caused by the application of the disturbance shall not continue beyond the sheet of media being printed, or beyond the typical length of a finished page or sheet printed from continuous roll media.

False indicators are permitted during the test provided that a normal operator response to that false indicator is simple (such as pressing a button). False indicators are not acceptable if they would cause the user to discard printing supplies such as ink, toner or paper, when those supplies are actually not empty or faulty. Any false indicator shall either clear automatically or after the operator's response.

After the disturbance, the print function may print the remainder of the print job at a quality

level within the manufacturer's specifications. Alternately, the print function may halt processing of a print job as a result of the disturbance, but only if the operator is capable of reprinting the job (for example, a fax printing job where the image to be printed still resides in local memory). Automatically restarting the print job from the beginning is also acceptable. In any scenario, the pairing of front and back images during double-sided printing shall be correct.

Performance criterion C:

Apply criterion C as defined in GENERAL PERFORMANCE CRITERIA.

4.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.4.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Required Performance	B
Discharge Voltage	Air Discharge: ±2kV, ±4kV, ±8kV Contact Discharge: ±2kV, ±4kV
Polarity	Positive & Negative
Number of Discharge	20 times at each test point
Discharge Mode	Single Discharge
Discharge Period	1 second

4.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Generator	TESEQ AG	NSG 437	450	Nov. 14, 2023

Remark: “N/A” denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.4.3 TEST PROCEDURE

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

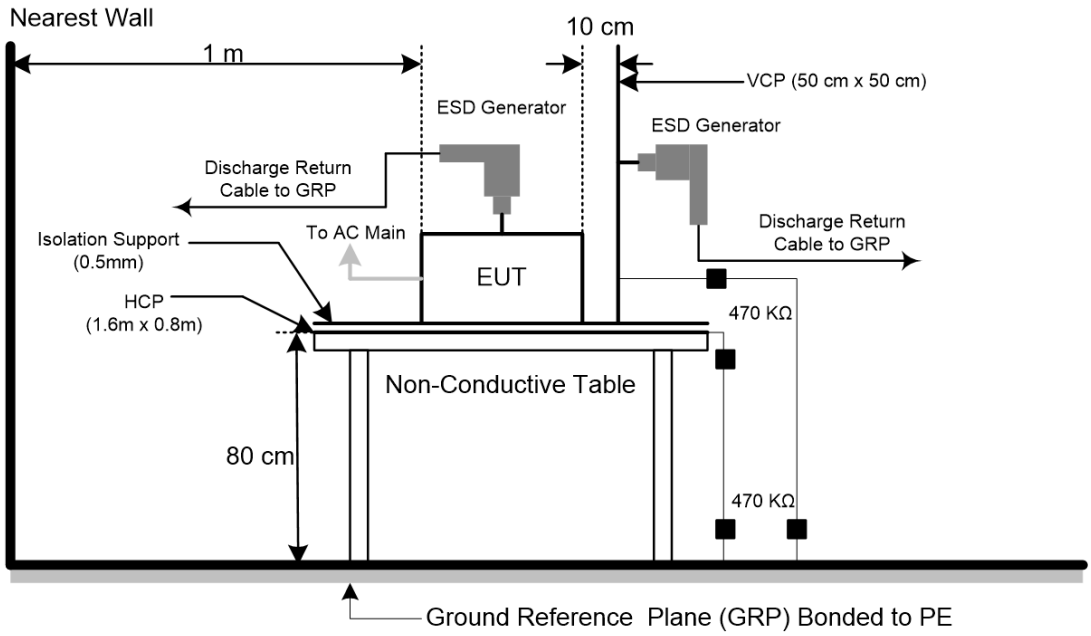
a. The test shall be performed with single discharges. On each pre-selected point at least 10single discharges (in the most sensitive polarity) shall be applied.
NOTE 1 The minimum number of discharges applied is depending on the EUT; for products with synchronized circuits the number of discharges should be larger.
For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
NOTE 2 The points to which the discharges should be applied may be selected by means of an explor ation carried out at a repetition rate of 20 discharges per second, or more.
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. For TABLE-TOP equipment:
The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. 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 total impedance. The equipment under test was installed in a representative system as described in IEC 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Mode	Air Discharge								Contact Discharge					
	2kV		4kV		8kV		- kV		- kV		- kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	B	B	B	B	-	-	-	-	-	-	-	-
2	A	A	B	B	B	B	-	-	-	-	-	-	-	-
3	A	A	B	B	B	B	-	-	-	-	-	-	-	-
4	A	A	B	B	B	B	-	-	-	-	-	-	-	-
Criteria	B						-		B				-	
Result	B						-		N/A				-	

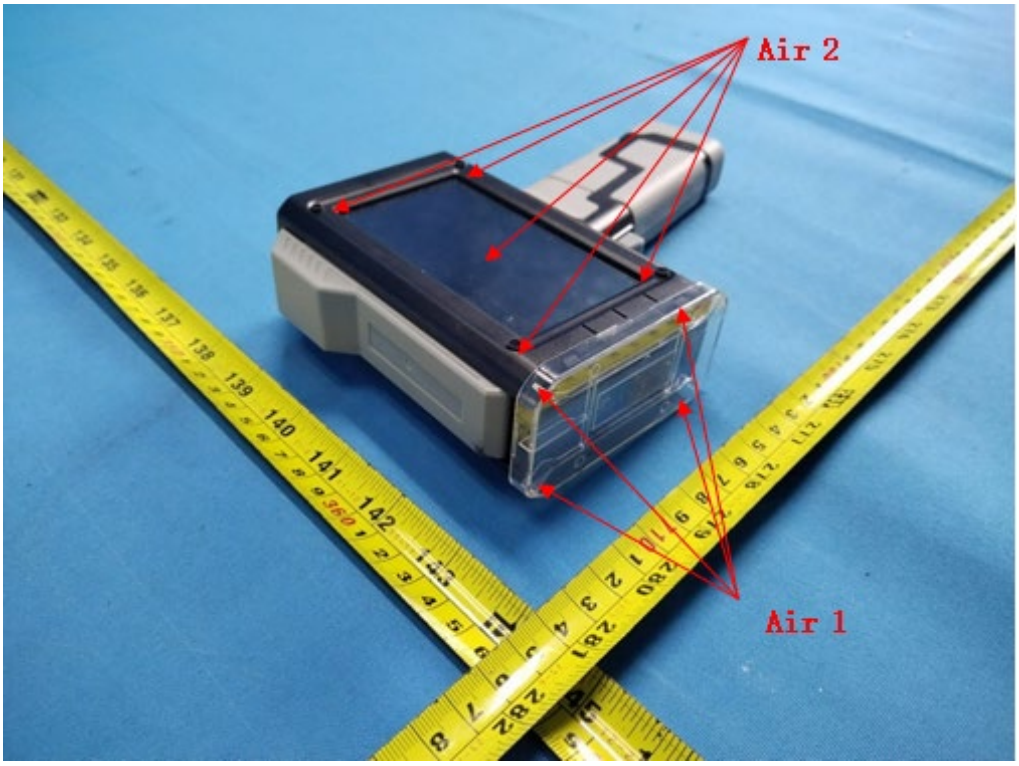
Mode	HCP Contact Discharge						VCP Contact Discharge					
	2kV		4kV		- kV		2kV		4kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N
Left side	A	A	A	A	-	-	A	A	A	A	-	-
Right side	A	A	A	A	-	-	A	A	A	A	-	-
Front side	A	A	A	A	-	-	A	A	A	A	-	-
Rear side	A	A	A	A	-	-	A	A	A	A	-	-
Criteria	B				-		B				-	
Result	A				-		A				-	

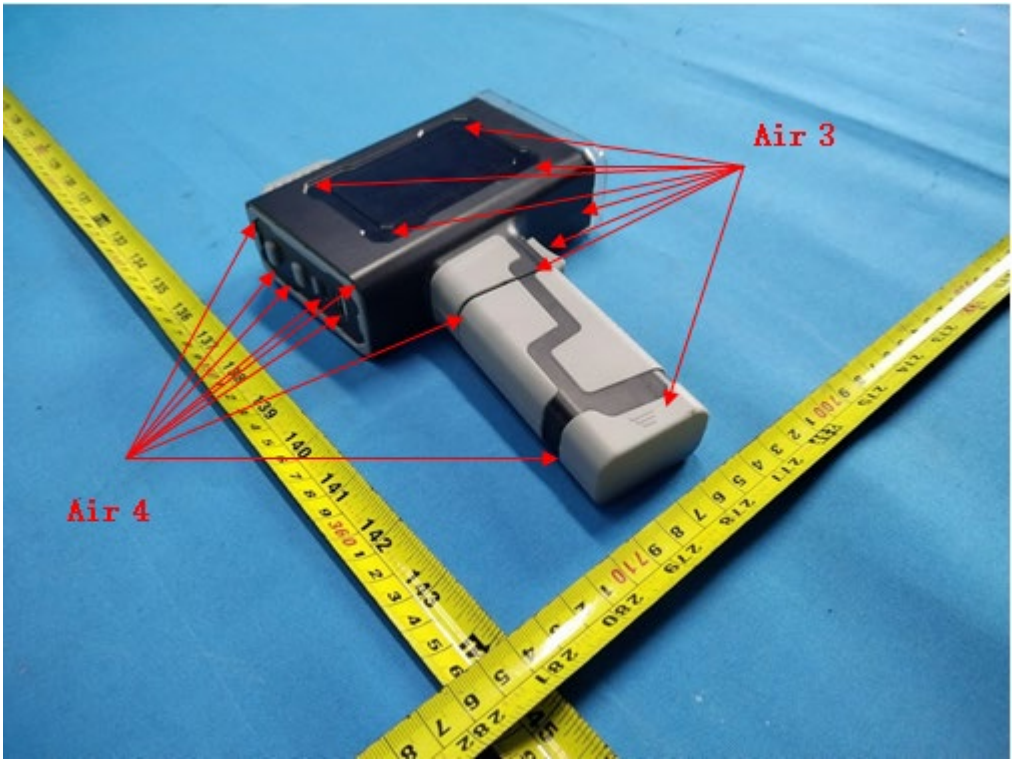
Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.

2) N/A - denotes test is not applicable in this test report

PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED





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

4.5.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-3
Required Performance	A
Frequency Range	80 MHz - 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000MHz (±1 %)
Field Strength	3 V/m(unmodulated, r.m.s)
Modulation	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55 m
Dwell Time	3 seconds

4.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	ETS	3142B	26419	Dec. 06, 2023
2	Amplifier	AR	50S1G4A	326720	Jan. 08, 2024
3	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Jul. 03, 2023
4	Power amplifier	MILMEGA	AS1860-50	1064834	Jan. 08, 2024
5	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	9149-277	Apr. 15, 2024
6	Power amplifier	MILMEGA	80RF1000-250	1064833	Jan. 08, 2024
7	Measurement Software	Farad	(EZ-RS)V2.0.1.3	N/A	N/A

Remark: “N/A” denotes no model name, no serial No. or no calibration specified.
All calibration period of equipment list is one year.

4.5.3 TEST PROCEDURE

The EUT and support equipment are in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
For TABLE-TOP equipment:
The EUT installed in a representative system as described in IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

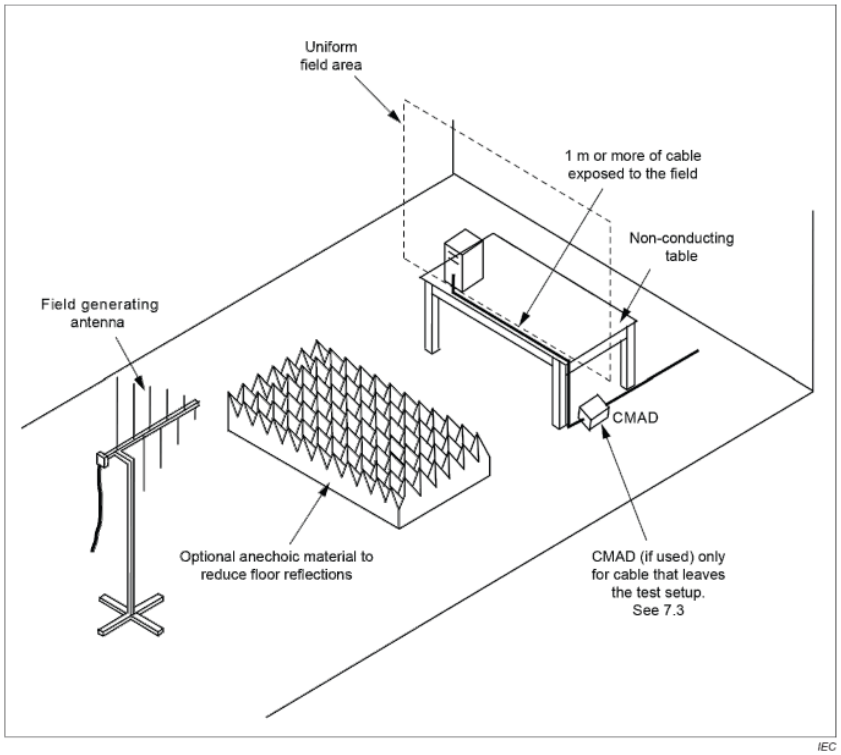
a. The field strength level was 3 V/m(unmodulated, r.m.s).
b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80%amplitude modulated with a 1 kHz sine wave. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

a) For Continuous induced RF disturbances



4.5.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Modulation	Azimuth	Criterion	Result
80 - 1000	H / V	3V/m	AM Modulated 1000Hz, 80%	0	A	A
				90		
				180		
				270		
1800, 2600, 3500, 5000 (±1%)	H / V	3V/m	AM Modulated 1000Hz, 80%	0	A	A
				90		
				180		
				270		

4.6 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST (PFMF)

4.6.1TEST SPECIFICATION

Basic Standard	IEC 61000-4-8
Required Performance	A
Frequency Range	50/60Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

4.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic Field test Generator	FCC	F-1000-4-8-G-125A	4032	Jan. 08, 2024
2	Magnetic Field immunity loop	Thermo KeyTek	F-1000-4-8/9/10-L-1M	4024	Jan. 08, 2024

Remark: “N/A” denotes no model name, no serial No. or no calibration specified.
All calibration period of equipment list is one year.

4.6.3 TEST PROCEDURE

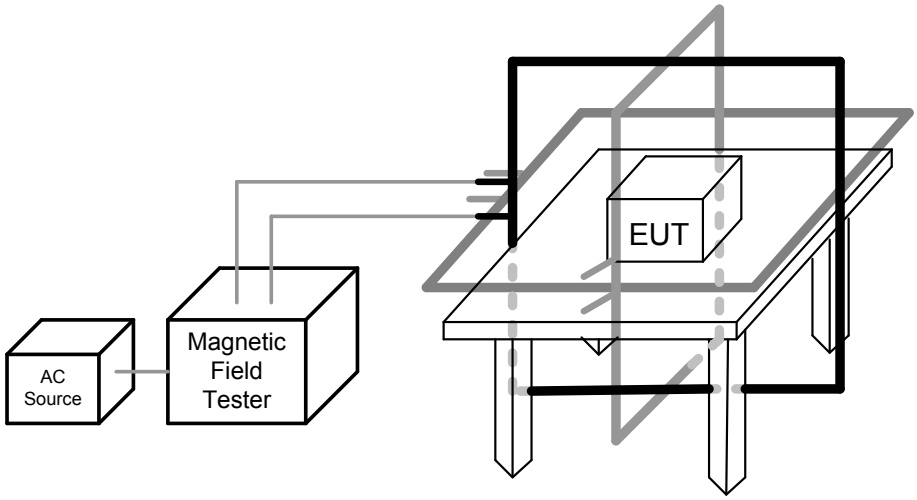
For TABLE-TOP equipment:
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.
The other condition as following manner:

a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

50Hz

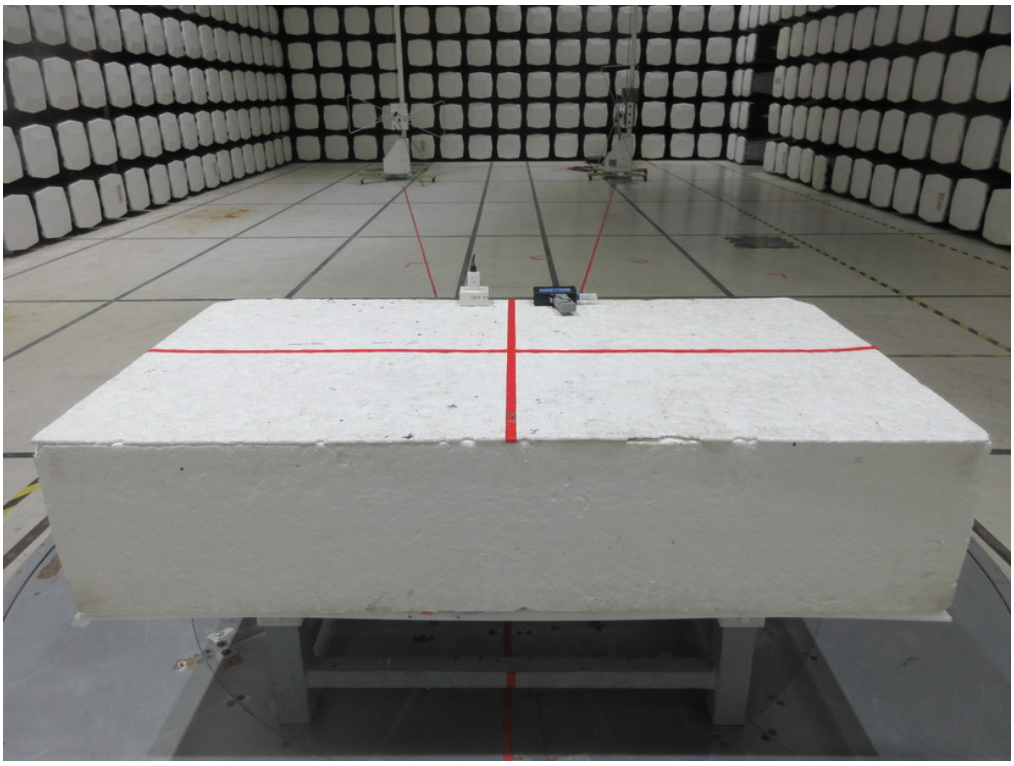
Test Mode	Test Level	Antenna aspect	Duration	Criteria	Results
Enclosure	1 A/m	X	60s	A	A
Enclosure	1 A/m	Y	60s	A	A
Enclosure	1 A/m	Z	60s	A	A

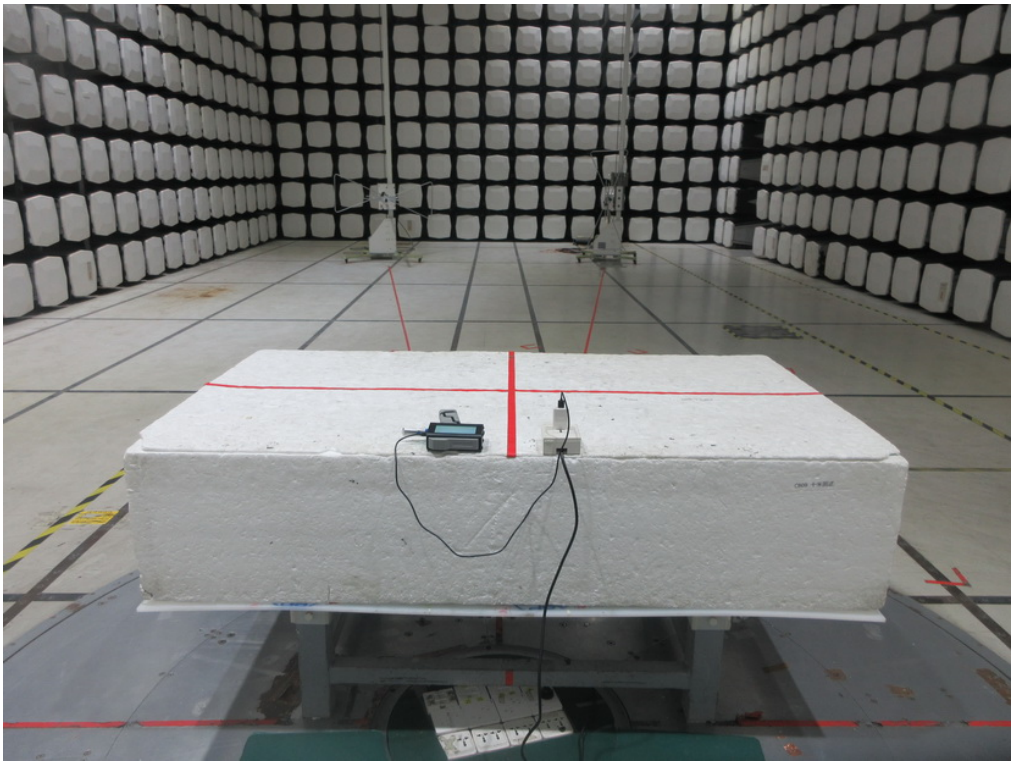
60Hz

Test Mode	Test Level	Antenna aspect	Duration	Criteria	Results
Enclosure	1 A/m	X	60s	A	A
Enclosure	1 A/m	Y	60s	A	A
Enclosure	1 A/m	Z	60s	A	A

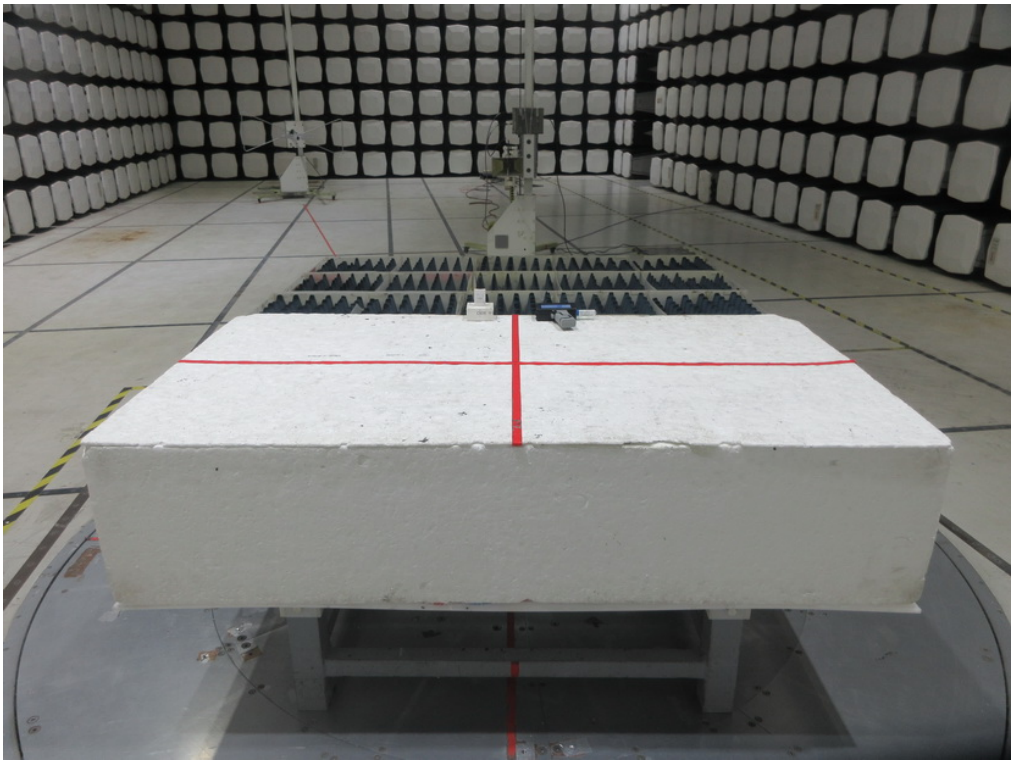
5. EUT TEST PHOTO

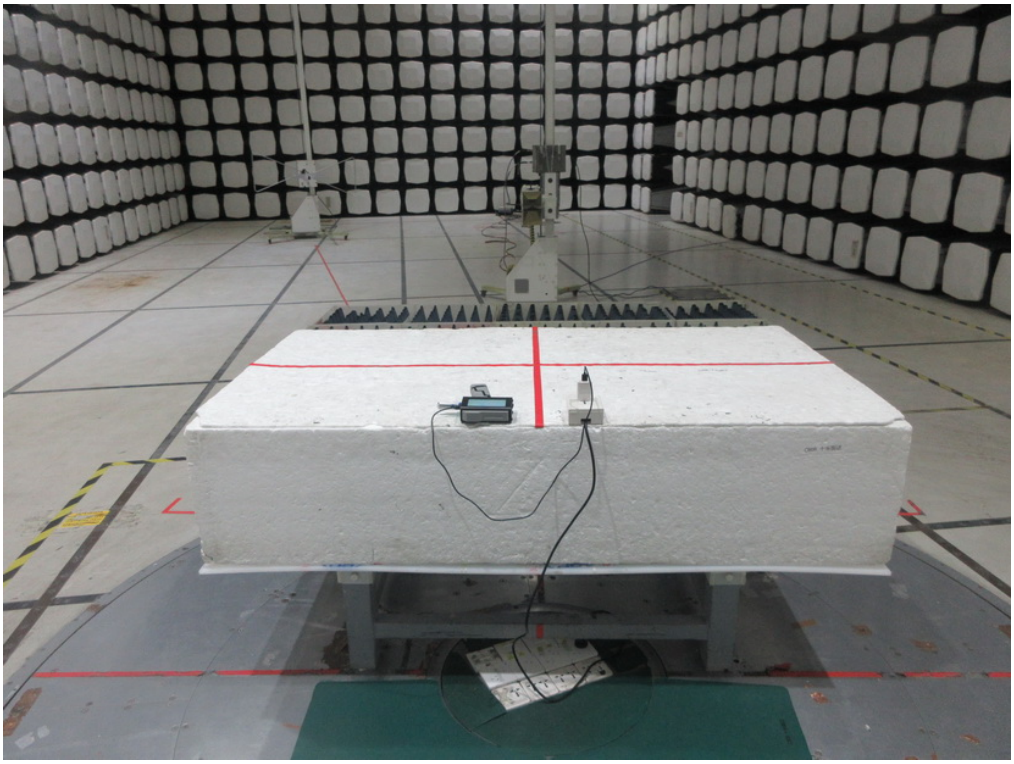
Radiated emissions up to 1 GHz



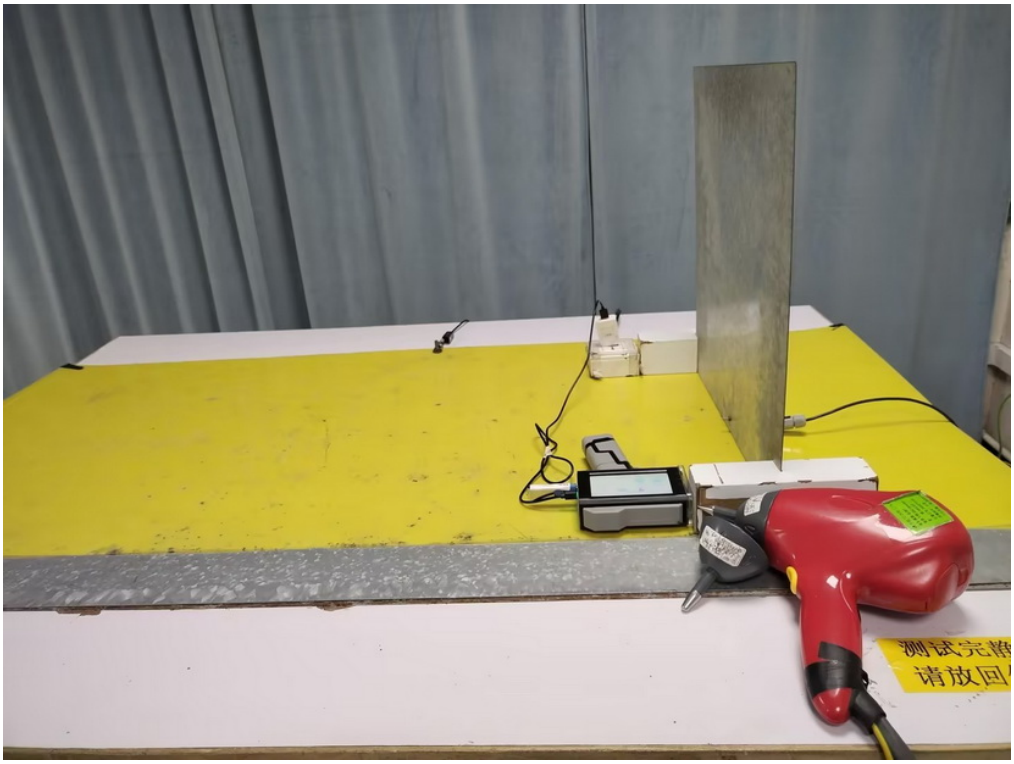


Radiated emissions above 1 GHz



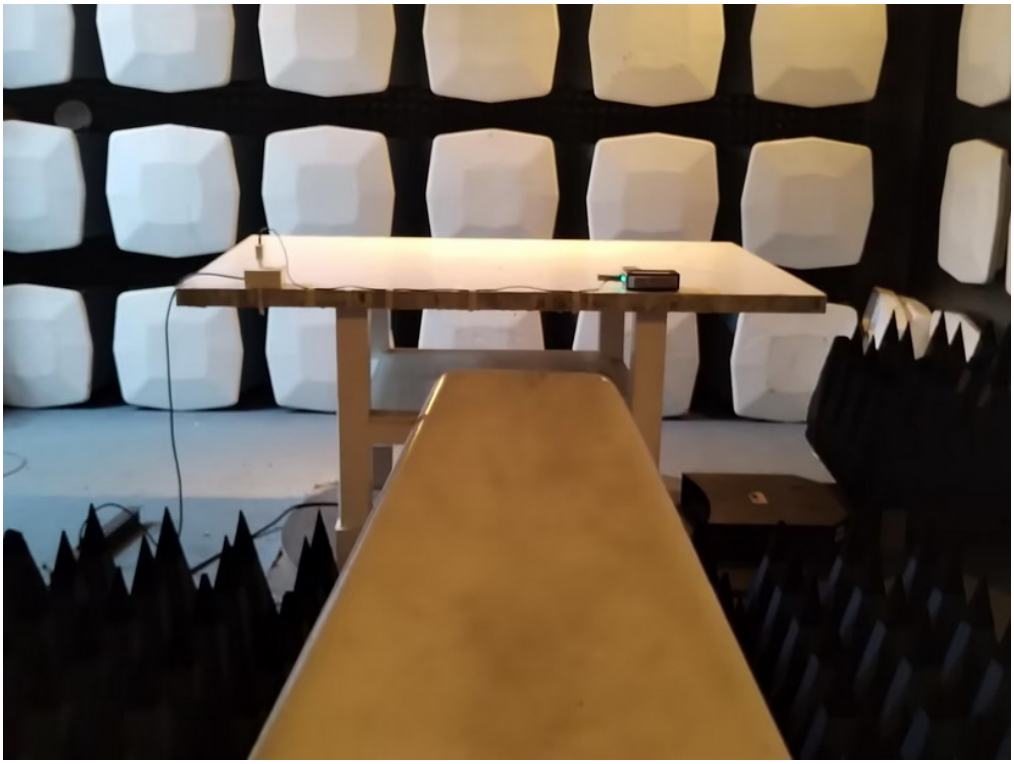


Electrostatic discharge immunity

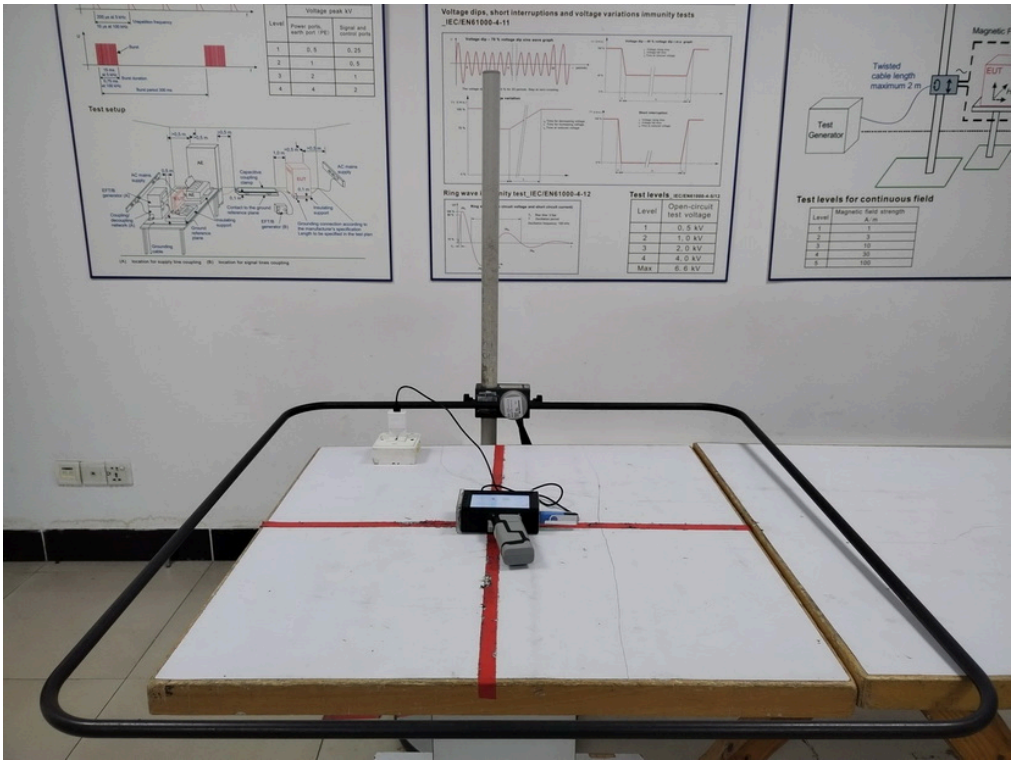


Radiated, radio-frequency, electromagnetic field immunity – Up to 1GHz

Radiated, radio-frequency, electromagnetic field immunity – Above 1GHz



Power frequency magnetic field immunity



End of Test Report