



中国认可
国际互认
检测
TESTING
CNAS L4062



TEST REPORT

Reference No. : WTF22X09190530W003
Manufacturer : Mid Ocean Brands B.V.
Address : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Factory : 109979
Product Name : Light and wireless charger
Model No. : MO6816
Standards : ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-3 V2.1.1 (2019-03)
Date of Receipt sample : 2022-09-20
Date of Test : 2022-09-20 to 2022-10-25
Date of Issue : 2022-10-25
Test Report Form No. : WTX_ETSI EN 301 489_1_2019W
Test Result : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

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Report version

Version No.	Date of issue	Description
Rev.00	2022-10-25	Original
/	/	/

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Light and wireless charger
Trade Name:	/
Model No.:	MO6816
Adding Model(s):	/
Rate Power:	Wireless Output power: 10W Max.
Software Version:	leader.2021.11
Hardware Version:	wirelesscharging-AB0359
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
EN 303417	
Frequency Range:	100-205kHz
Radiated H-Field:	36.69dBuA/m(@3m)
Type of Antenna:	Coil Antenna
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	



1.2 Test Standards

The tests were performed according to following standards:

ETSI EN 301 489-1 V2.2.3 (2019-11): Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility.

ETSI EN 301 489-3 V2.1.1 (2019-03): Electromagnetic 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 covering the essential requirements of article 3.1(b) of Directive 2014/53/EU.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standard ETSI EN 301489-1, Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (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. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.



1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Wireless Charging	Connect to the adapter; AC230V/50Hz for adapter; Wireless charging: output 5W
TM2	Wireless Charging	Connect to the adapter; AC230V/50Hz for adapter; Wireless charging: output 10W
TM3	Wireless Charging	TT,CT for EMS testing

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB-C Cable	1.00	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
wireless charging tester	YBZ	YBZ wireless charging tester	/
Adapter	Xiaomi	MDY-08-ES	/



1.6 Performance Criteria for EMS

➤ EN 301 489-3, The performance criteria are:

In the table below:

- 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.

NOTE: Whether a phenomenon is considered transient, continuous or otherwise is indicated in the test procedures for the phenomenon in ETSI EN 301 489-1 [1], clause 9.

Table 2: Performance Requirements

Criterion	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

Where "operate as intended" or "no loss of function" is specified, the EUT shall demonstrate correct functioning as described in ETSI EN 301 489-3 [1], clause 5.

Where the EUT has more than one mode of operation (see clause 4.5.2), 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.



1.7 Measurement Uncertainty

Measurement uncertainty	
Parameter	Uncertainty
Uncertainty for Radiated Emission in 3m chamber	@30-200MHz $\pm 4.52\text{dB}$ @0.2-1GHz $\pm 5.56\text{dB}$ @1-6GHz $\pm 3.84\text{dB}$ @6-18GHz $\pm 3.92\text{dB}$
Uncertainty for Conducted Emission	@9-150kHz $\pm 3.74\text{dB}$ @0.15-30MHz $\pm 3.34\text{dB}$
Uncertainty for Harmonic test	3.26%
Uncertainty for Flicker test	4.76%
Uncertainty for RS test	21%, k=2
Uncertainty for CS test	29%, k=2
Uncertainty for ESD test	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
Uncertainty for EFT test	
Uncertainty for Surges test	
Uncertainty for Voltage Dips, Voltage Variations and Short Interruptions Test	
Uncertainty for PFMF test	



1.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
☒ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
Amplifier	Agilent	8447F	3113A06717	2022-01-07	2023-01-06
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
☒ Chamber A: Above 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
Amplifier	C&D	PAP-1G18	2002	2022-03-22	2023-03-21
Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
Pre-amplifier	Schwarz beck	BBV 9721	9721-031	2022-03-25	2023-03-24
☐ Chamber B:Below 1GHz					
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
Amplifier	Agilent	8447D	2944A10179	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-25	2023-03-24
☐ Chamber C:Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
Amplifier	HP	8447F	2944A03869	2022-03-22	2023-03-21
☒ Conducted Room 1#					
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-22	2023-03-21
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24
AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-22	2023-03-21
8-WIRE LISN	Schwarz beck	8158	CAT3-8158-0059	2022-03-22	2023-03-21
8-WIRE LISN	Schwarz beck	8158	CAT5-8158-0117	2022-03-22	2023-03-21
☐ Conducted Room 2#					
EMI Test Receiver	Rohde & Schwarz	ESPI	10129	2022-03-22	2023-03-21
LISN	Rohde & Schwarz	ENV 216	100097	2022-03-22	2023-03-21
EMF					
VDH Test Head	AFJ	VDH 30	SC022Z	2022-03-25	2023-03-24
3 Loop Antenna					
Loop Antenna	ZHINAN	ZN30401	19037	2021-04-26	2023-04-25



Clamp					
Clamp	Luthi	MDS21	3809	2022-03-28	2023-03-27
PFMF					
PMF Generator	LIONCEL	PMF-801C-C	0171101	2022-03-22	2023-03-21
PMF Antenna	LIONCEL	PMF-801C-A	0180302	2022-03-22	2023-03-21
Instantaneous PMF Generator Module	LIONCEL	PMF-801C-T	0171001	2022-03-22	2023-03-21
H/F					
Digital Power Analyzer	California Instrument	CTS	72831	2022-03-22	2023-03-21
Power Source	California Instrument	5001IX-CTS-400	25965	2022-03-22	2023-03-21
ESD					
ESD Generator	LIONCEL	ESD-203B	0170901	2022-03-28	2023-03-27
EFT/SURGE/DIPS					
Transient 2000	EMC PARTNER	TRA2000	863	2022-03-22	2023-03-21
Couple Clamp	EMC PARTNER	CN-EFT1000	513	2022-03-22	2023-03-21
CS					
CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10/75	126B1247/2013	2022-01-07	2023-01-06
Attenuator	EMTEST	MA-5100/6BF2	1009	2022-03-22	2023-03-21
CDN	Luthi	L-801M2/M3	2665	2022-03-22	2023-03-21
CDN	LIONCEL	CDN-T8	0210401	2022-03-25	2023-03-24
EM Clamp	TESEQ	KEMZ801A	45028	2022-03-25	2023-03-24
RS					
Signal Generator	HP	8688B	3438A00604	2022-03-22	2023-03-21
Power Meter	KEITHLEY	3500	1162591	2022-03-22	2023-03-21
Power Meter	KEITHLEY	3500	1121428	2022-03-22	2023-03-21
RF Power Amplifier	MicoTop	MPA-80-1000-250	MPA1906239	2022-03-22	2023-03-21
RF Power Amplifier	MicoTop	MPA-80-6000-100	MPA1906238	2022-03-22	2023-03-21
Antenna	SCHWARZBECK	STLP 9129	9129 114	N/A	N/A
Power Meter	Agilent	E4419B	GB42420578	2022-03-22	2023-03-21



Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

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2. SUMMARY OF TEST RESULTS

Standards	Reference	Description of Test Item	Result
ETSI EN 301 489-1	8.2	Radiated Emissions	Pass
	8.3	Conducted Emissions for DC Power Port	N/A
	8.4	Conducted Emissions for AC Power Port	Pass
	8.5	Harmonic Current Emissions	Pass
	8.6	Voltage Fluctuations and Flicker	Pass
	8.7	Telecommunication Ports	N/A
	9.2	Radio Frequency Electromagnetic Field	Pass
	9.3	Electrostatic Discharge	Pass
	9.4	Fast Transients, Common Mode	Pass
	9.5	Radio Frequency, Common Mode	Pass
	9.6	Transient and Surges in the Vehicular Environment	N/A
	9.7	Voltage Dips and Interruptions	Pass
	9.8	Surges	Pass
Pass: The EUT complies with the essential requirements in the standard. Fail: The EUT does not comply with the essential requirements in the standard. N/A: Not applicable.			

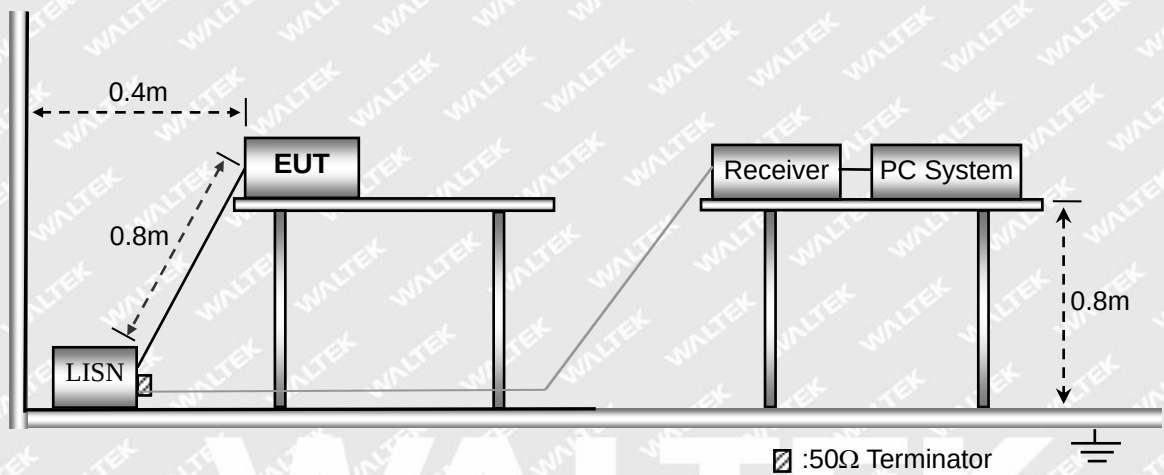


3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

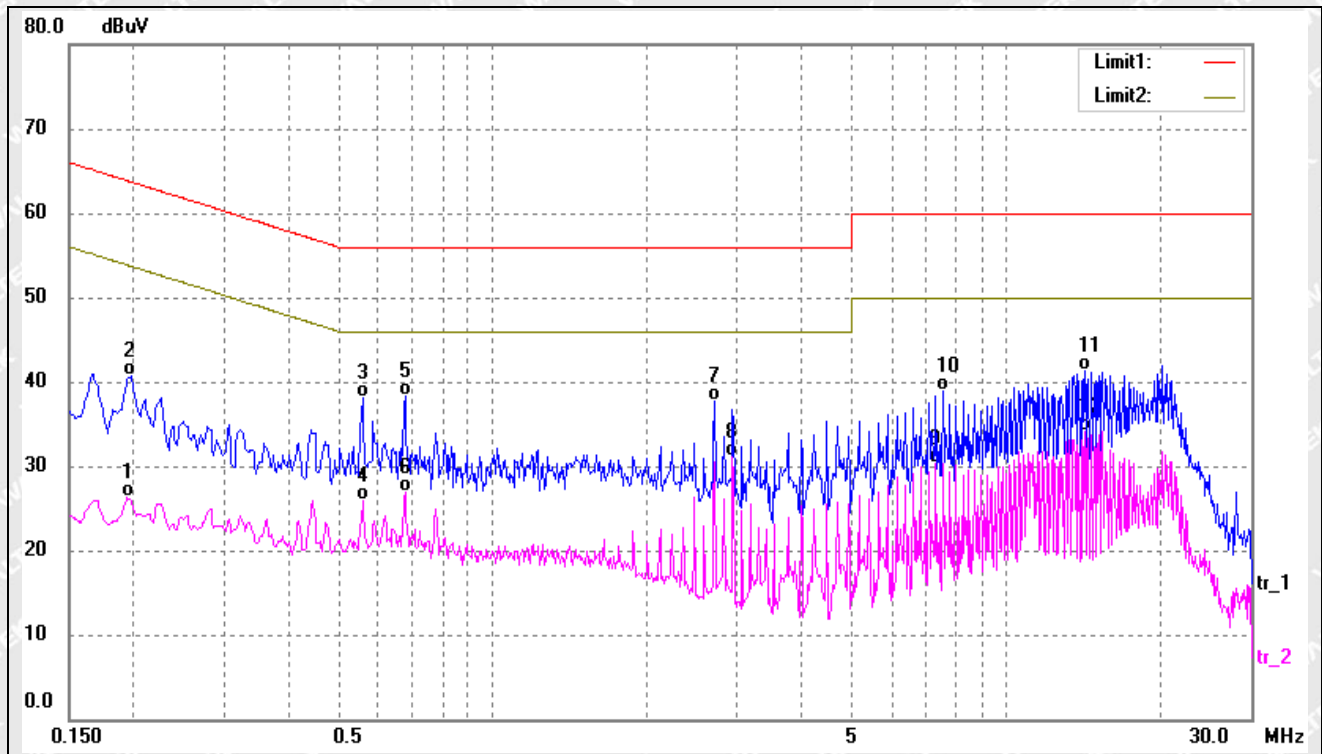
Temperature:	23.5 ° C
Relative Humidity:	54 %
ATM Pressure:	1015 mbar

3.4 Conducted Emissions Test Data

Note: Only show the worst case in the test report.



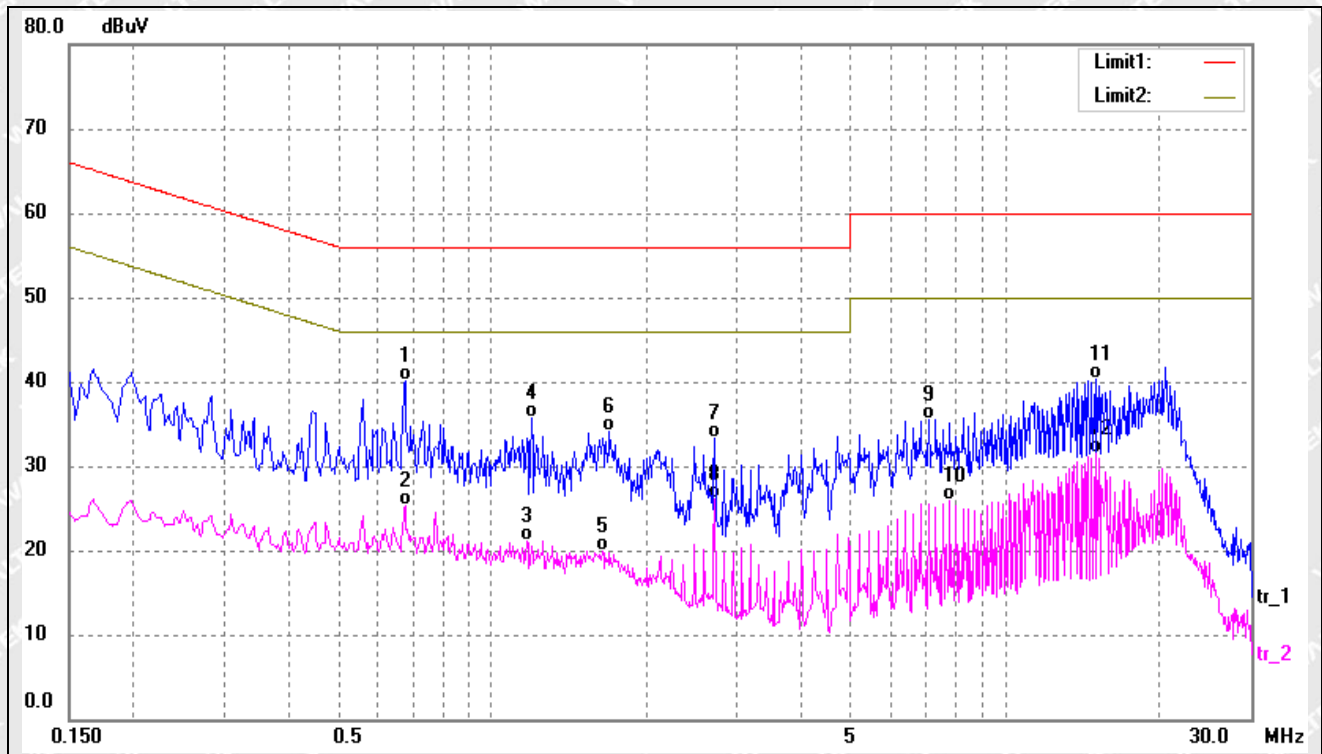
Test mode:	TM1	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	15.99	10.30	26.29	53.86	-27.57	AVG
2	0.1980	30.36	10.30	40.66	63.69	-23.03	QP
3	0.5580	27.98	10.21	38.19	56.00	-17.81	QP
4	0.5580	15.79	10.21	26.00	46.00	-20.00	AVG
5	0.6780	28.05	10.20	38.25	56.00	-17.75	QP
6	0.6780	16.61	10.20	26.81	46.00	-19.19	AVG
7	2.7100	27.37	10.27	37.64	56.00	-18.36	QP
8*	2.9460	20.73	10.28	31.01	46.00	-14.99	AVG
9	7.3060	19.96	10.34	30.30	50.00	-19.70	AVG
10	7.5420	28.64	10.34	38.98	60.00	-21.02	QP
11	14.2580	30.98	10.25	41.23	60.00	-18.77	QP
12	14.2580	23.76	10.25	34.01	50.00	-15.99	AVG



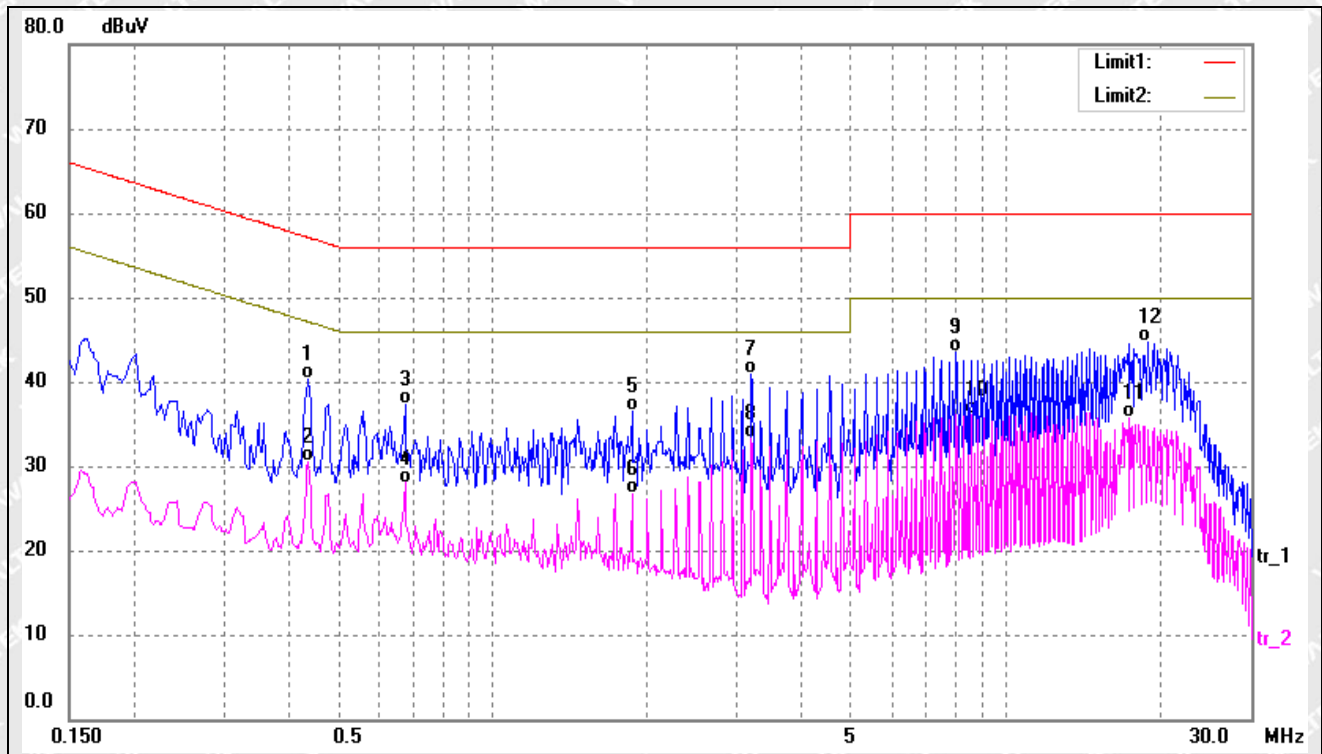
Test mode:	TM1	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.6780	29.81	10.20	40.01	56.00	-15.99	QP
2	0.6780	15.12	10.20	25.32	46.00	-20.68	AVG
3	1.1700	10.94	10.16	21.10	46.00	-24.90	AVG
4	1.1940	25.57	10.16	35.73	56.00	-20.27	QP
5	1.6380	9.62	10.21	19.83	46.00	-26.17	AVG
6	1.6940	23.97	10.22	34.19	56.00	-21.81	QP
7	2.7100	22.95	10.27	33.22	56.00	-22.78	QP
8	2.7100	15.78	10.27	26.05	46.00	-19.95	AVG
9	7.0700	25.24	10.34	35.58	60.00	-24.42	QP
10	7.7780	15.49	10.34	25.83	50.00	-24.17	AVG
11	14.9580	30.12	10.24	40.36	60.00	-19.64	QP
12	14.9580	21.17	10.24	31.41	50.00	-18.59	AVG



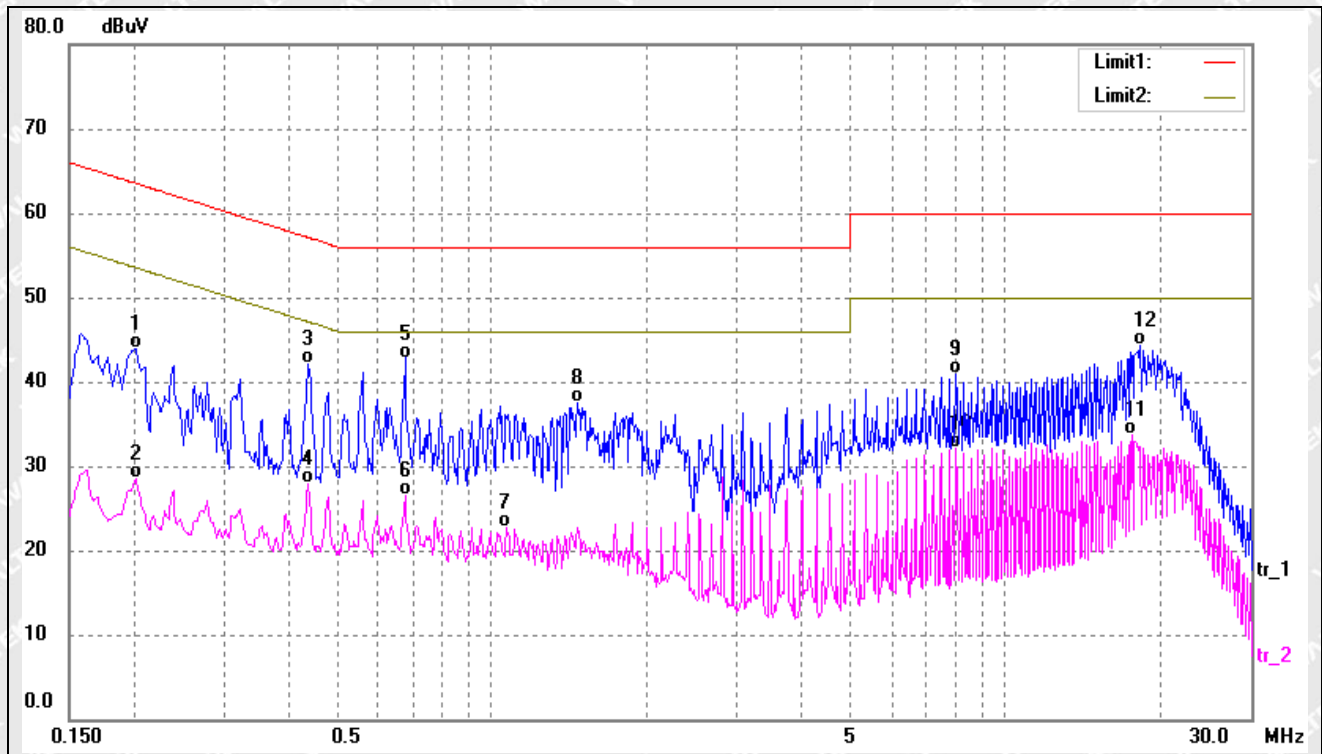
Test mode:	TM2	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4380	30.15	10.23	40.38	57.10	-16.72	QP
2	0.4380	20.22	10.23	30.45	47.10	-16.65	AVG
3	0.6780	27.14	10.20	37.34	56.00	-18.66	QP
4	0.6780	17.80	10.20	28.00	46.00	-18.00	AVG
5	1.8700	26.32	10.24	36.56	56.00	-19.44	QP
6	1.8700	16.47	10.24	26.71	46.00	-19.29	AVG
7	3.2060	30.72	10.28	41.00	56.00	-15.00	QP
8*	3.2060	22.97	10.28	33.25	46.00	-12.75	AVG
9	8.0180	33.13	10.34	43.47	60.00	-16.53	QP
10	8.5540	25.72	10.34	36.06	50.00	-13.94	AVG
11	17.3740	25.36	10.30	35.66	50.00	-14.34	AVG
12	18.8420	34.28	10.34	44.62	60.00	-15.38	QP



Test mode:	TM2	Polarity:	Line
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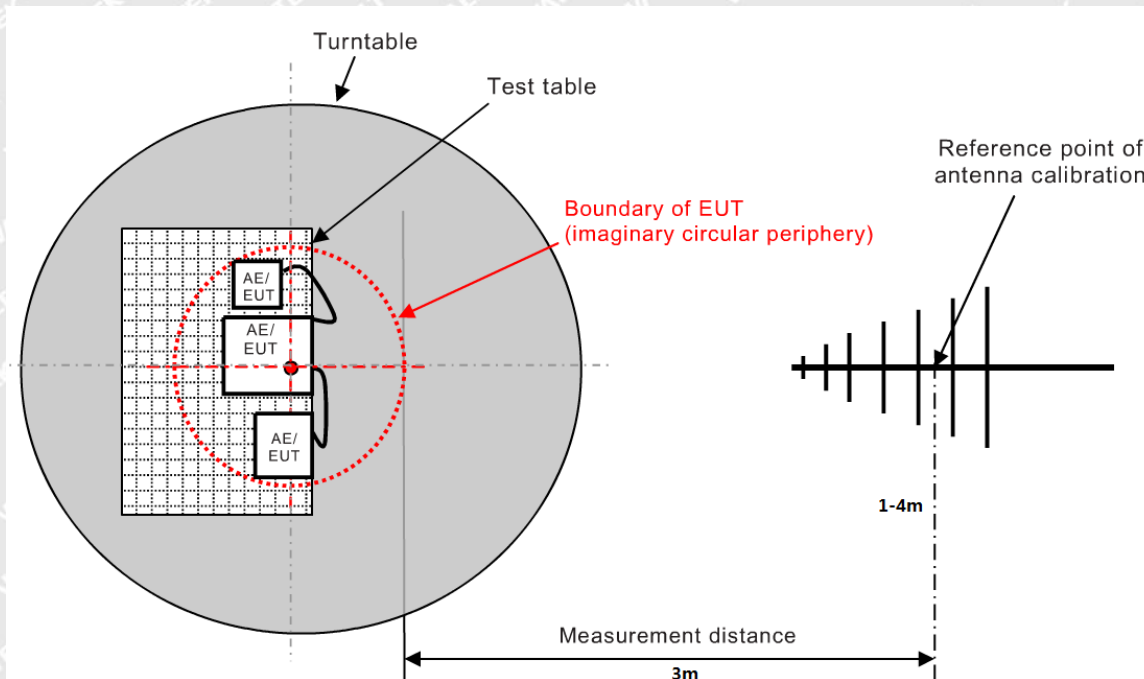
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2020	33.66	10.30	43.96	63.52	-19.56	QP
2	0.2020	18.23	10.30	28.53	53.52	-24.99	AVG
3	0.4380	31.80	10.23	42.03	57.10	-15.07	QP
4	0.4380	17.66	10.23	27.89	47.10	-19.21	AVG
5*	0.6780	32.60	10.20	42.80	56.00	-13.20	QP
6	0.6780	16.28	10.20	26.48	46.00	-19.52	AVG
7	1.0700	12.55	10.15	22.70	46.00	-23.30	AVG
8	1.4700	27.22	10.19	37.41	56.00	-18.59	QP
9	8.0180	30.59	10.34	40.93	60.00	-19.07	QP
10	8.0180	21.67	10.34	32.01	50.00	-17.99	AVG
11	17.6340	23.34	10.31	33.65	50.00	-16.35	AVG
12	18.3060	33.92	10.33	44.25	60.00	-15.75	QP



4. Radiated Emissions

4.2 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.



4.2 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $-6\text{dB}\mu\text{V}$ means the emission is $6\text{dB}\mu\text{V}$ below the maximum limit for Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{EN 301489 Class B Limit}$$



4.3 Environmental Conditions

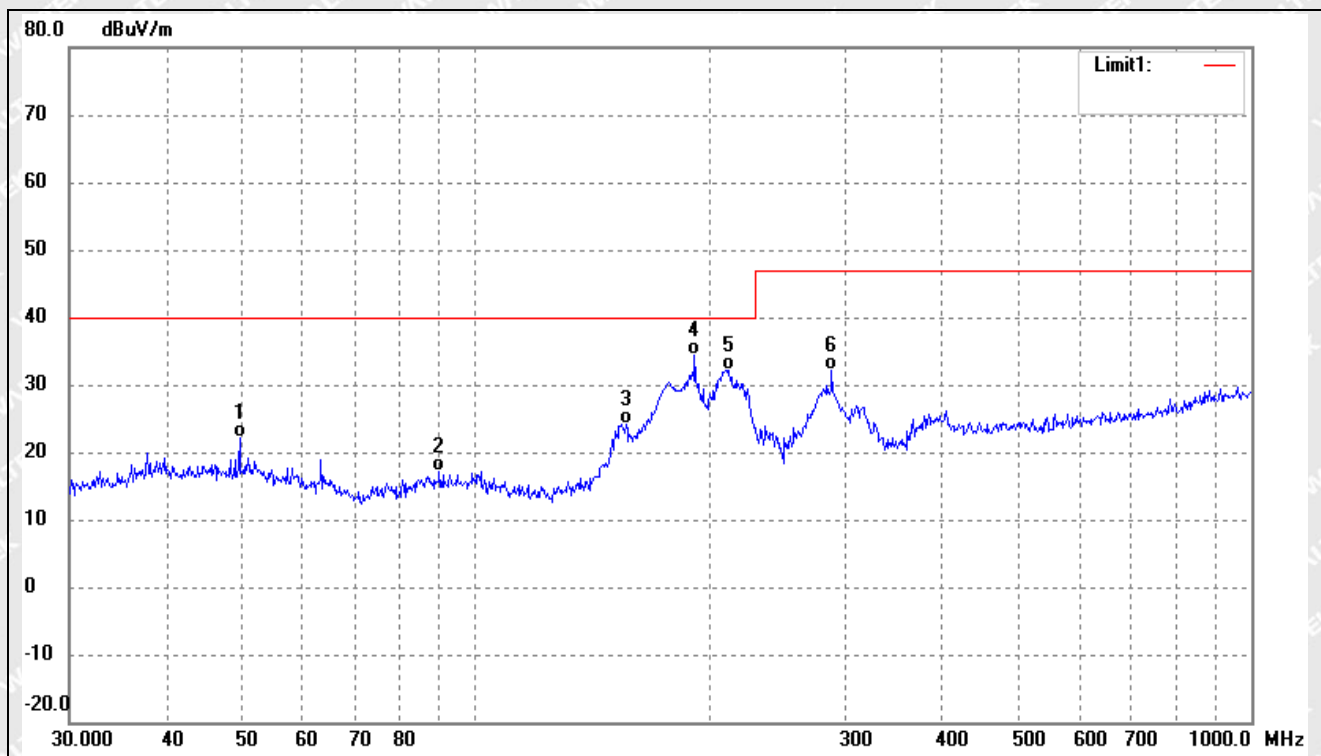
Temperature:	22° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

Note: Only show the worst case in the test report

➤ 30MHz to 1GHz

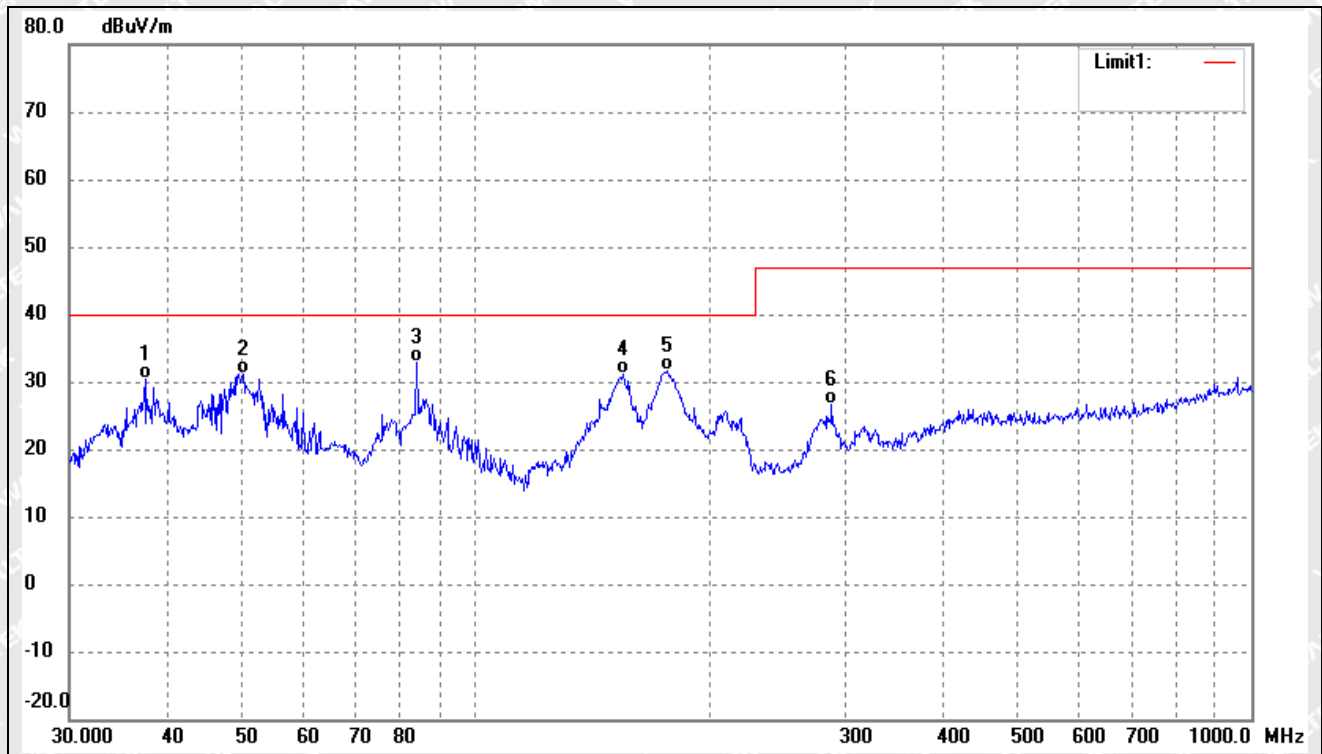
Test mode:	TM1	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	49.7068	31.78	-9.66	22.12	40.00	-17.88	-	-	QP
2	89.9047	28.64	-11.63	17.01	40.00	-22.99	-	-	QP
3	156.4578	38.04	-13.84	24.20	40.00	-15.80	-	-	QP
4	191.7450	46.06	-11.63	34.43	40.00	-5.57	-	-	QP
5	212.2695	43.15	-10.94	32.21	40.00	-7.79	-	-	QP
6	287.9904	40.66	-8.54	32.12	47.00	-14.88	-	-	QP



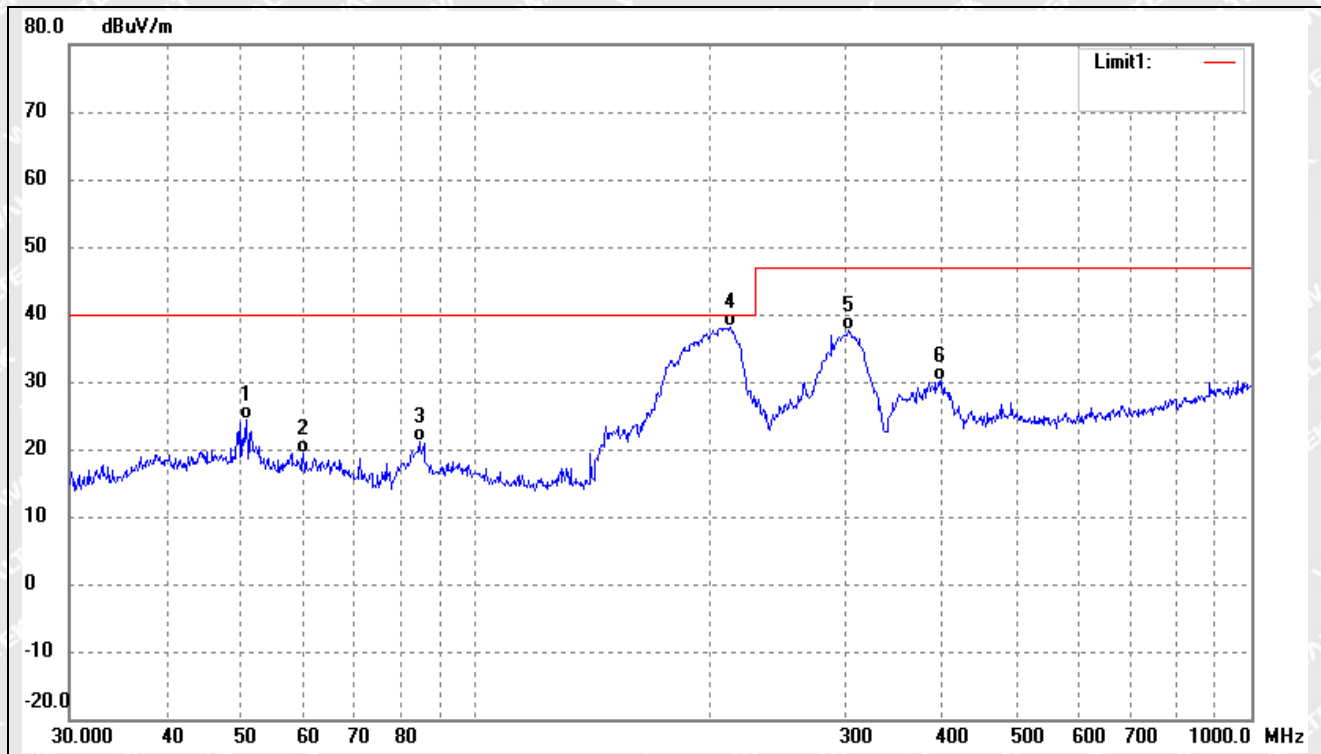
Test mode:	TM1	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	37.5479	40.42	-10.04	30.38	40.00	-9.62	-	-	QP
2	50.2324	40.90	-9.70	31.20	40.00	-8.80	-	-	QP
3	84.1100	45.86	-12.99	32.87	40.00	-7.13	-	-	QP
4	155.3644	45.05	-13.91	31.14	40.00	-8.86	-	-	QP
5	176.8878	44.53	-13.01	31.52	40.00	-8.48	-	-	QP
6	287.9904	35.22	-8.54	26.68	47.00	-20.32	-	-	QP



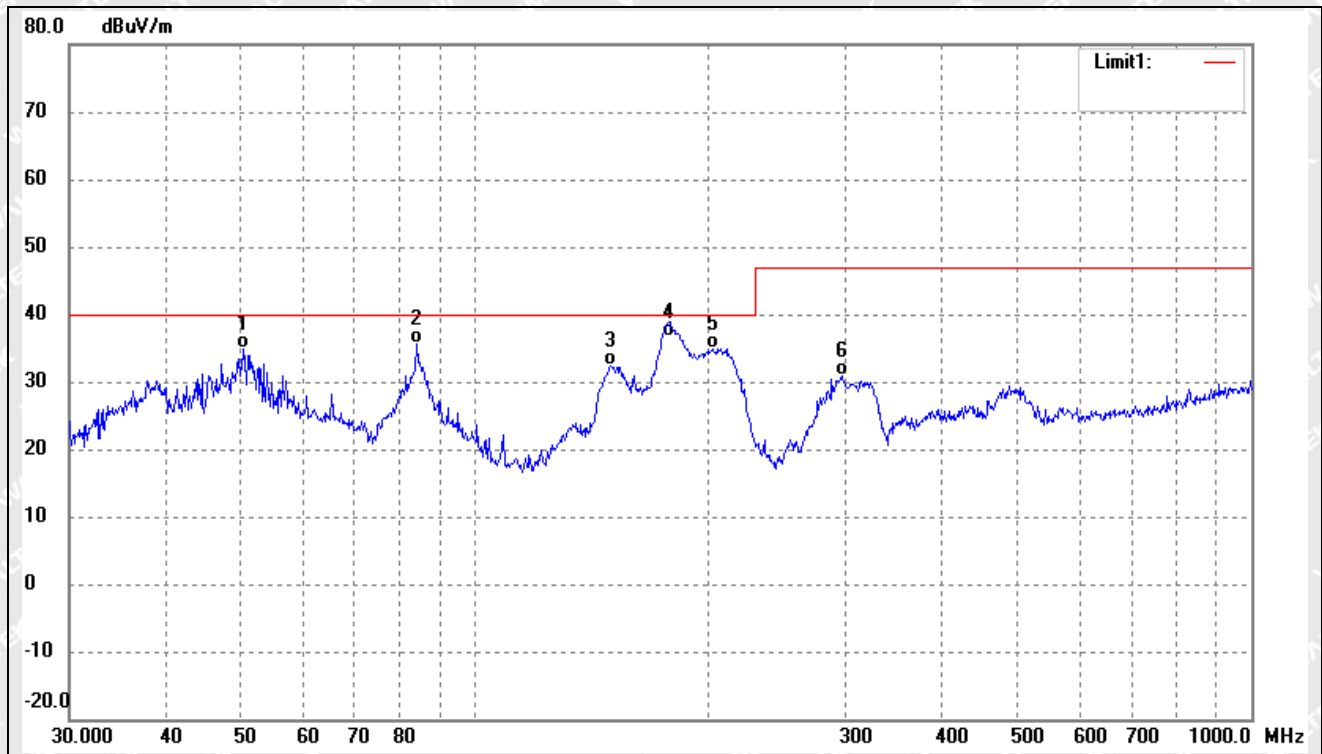
Test mode:	TM2	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.7637	34.15	-9.81	24.34	40.00	-15.66	-	-	QP
2	60.0691	31.05	-11.57	19.48	40.00	-20.52	-	-	QP
3	84.7019	33.93	-12.85	21.08	40.00	-18.92	-	-	QP
4	213.0149	49.02	-10.91	38.11	40.00	-1.89	-	-	QP
5	302.4812	45.60	-8.05	37.55	47.00	-9.45	-	-	QP
6	396.2415	35.17	-4.98	30.19	47.00	-16.81	-	-	QP



Test mode:	TM2	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.2324	44.47	-9.70	34.77	40.00	-5.23	-	-	QP
2	84.1100	48.63	-12.99	35.64	40.00	-4.36	-	-	QP
3	149.4857	46.47	-14.15	32.32	40.00	-7.68	-	-	QP
4	177.5092	49.58	-12.98	36.60	40.00	-3.40	-	-	QP
5	202.1005	46.16	-11.24	34.92	40.00	-5.08	-	-	QP
6	297.2241	39.16	-8.21	30.95	47.00	-16.05	-	-	QP

Remark: '-' Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

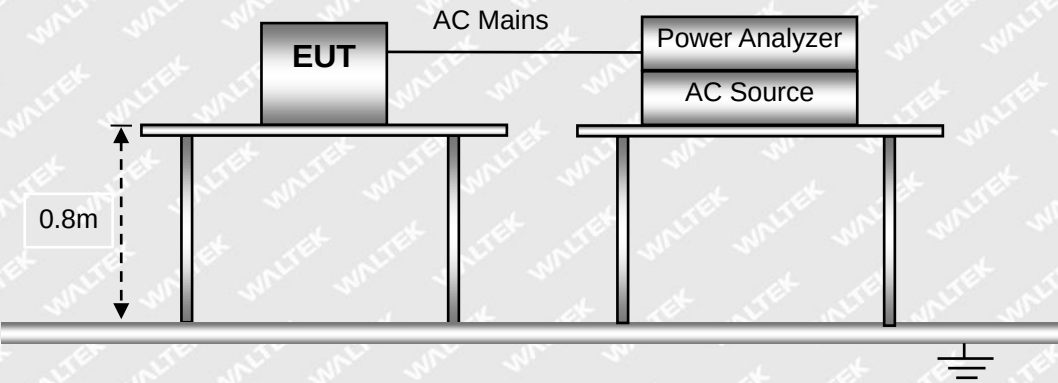


5. Harmonic Current Emissions

5.1 Test Procedure

Test is conducting under the description of EN 61000-3-2.

5.2 Test Setup Block Diagram



5.3 Test Standards

EN61000-3-2, Clause 7.1 Limits for Class A equipment.

5.4 Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

5.5 Harmonic Current Emissions Test Data



Harmonics – Class-A

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

End time: 15:01:44

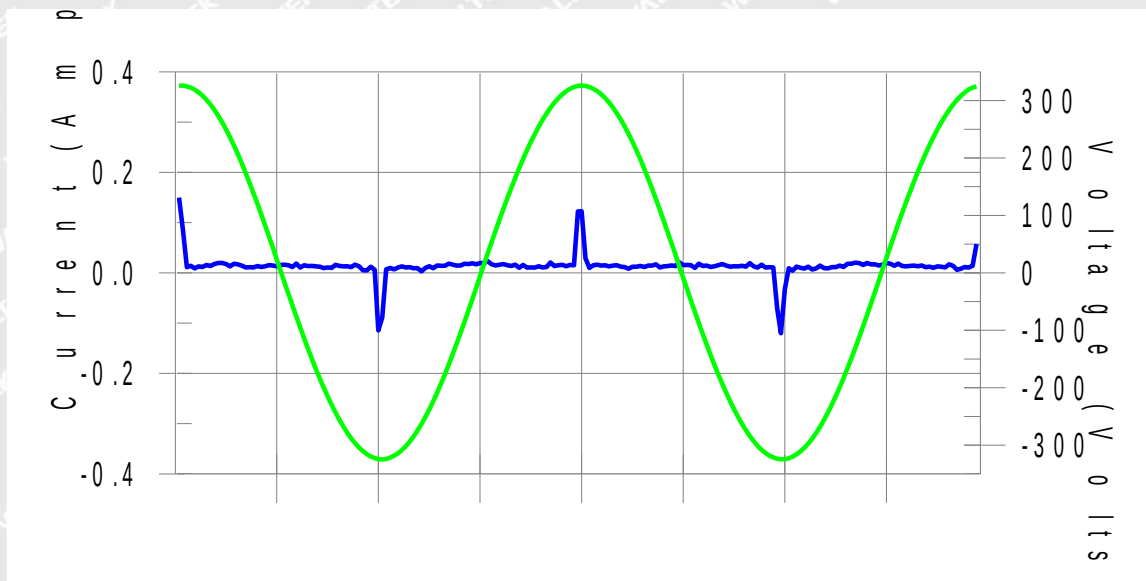
Test duration (min): 2.5

Data file name: H-000504.cts_data

Test Result: Pass

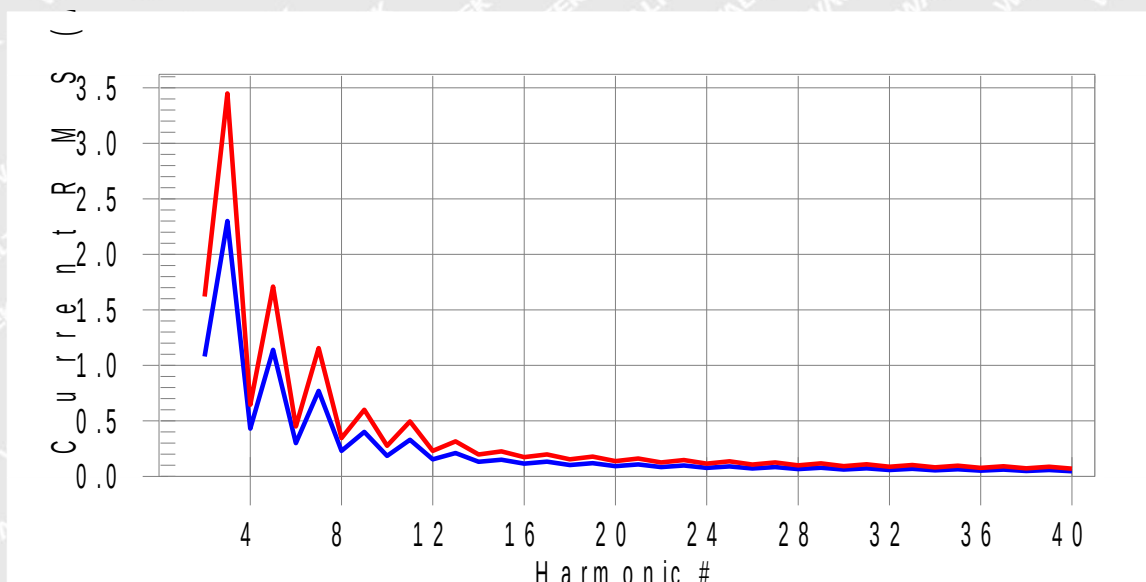
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits

**Test result: Pass Worst harmonics H5-0.3% of 150% limit, H5-.4% of 100% limit**



Current Test Result Summary (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

End time: 15:01:44

Test duration (min): 2.5

Data file name: H-000504.cts_data

Test Result: Pass

Source qualification: Normal

THC(A): 0.017

I-THD(%): 287.3

POHC(A): 0.009

POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.13

Frequency(Hz): 50.00

I_Peak (Amps): 0.159

I_RMS (Amps): 0.024

I_Fund (Amps): 0.006

Crest Factor: 7.023

Power (Watts): 1.3

Power Factor: 0.268

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.005	2.300	0.2	0.006	3.450	0.2	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.005	1.140	0.4	0.005	1.710	0.3	Pass
6	0.000	0.300	N/A	0.001	0.450	N/A	Pass
7	0.005	0.770	N/A	0.005	1.155	N/A	Pass
8	0.000	0.230	N/A	0.001	0.345	N/A	Pass
9	0.005	0.400	N/A	0.005	0.600	N/A	Pass
10	0.000	0.184	N/A	0.001	0.276	N/A	Pass
11	0.005	0.330	N/A	0.005	0.495	N/A	Pass
12	0.000	0.153	N/A	0.001	0.230	N/A	Pass
13	0.005	0.210	N/A	0.005	0.315	N/A	Pass
14	0.000	0.131	N/A	0.001	0.197	N/A	Pass
15	0.004	0.150	N/A	0.004	0.225	N/A	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.004	0.132	N/A	0.004	0.198	N/A	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.004	0.118	N/A	0.004	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.004	0.107	N/A	0.004	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.004	0.098	N/A	0.004	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.003	0.090	N/A	0.003	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.003	0.083	N/A	0.003	0.125	N/A	Pass



Reference No.: WTF22X09190530W003

28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.003	0.078	N/A	0.003	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.003	0.073	N/A	0.003	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.002	0.061	N/A	0.002	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.002	0.058	N/A	0.002	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

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Voltage Source Verification Data (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

End time: 15:01:44

Test duration (min): 2.5

Data file name: H-000504.cts_data

Comment: Comments

Customer: Customer information

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 230.13

Frequency(Hz): 50.00

I_Peak (Amps): 0.159

I_RMS (Amps): 0.024

I_Fund (Amps): 0.006

Crest Factor: 7.023

Power (Watts): 1.3

Power Factor: 0.268

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.063	0.460	13.76	OK
3	0.511	2.071	24.68	OK
4	0.080	0.460	17.43	OK
5	0.060	0.920	6.57	OK
6	0.031	0.460	6.72	OK
7	0.025	0.690	3.58	OK
8	0.013	0.460	2.75	OK
9	0.012	0.460	2.67	OK
10	0.011	0.460	2.32	OK
11	0.010	0.230	4.15	OK
12	0.009	0.230	4.01	OK
13	0.016	0.230	7.08	OK
14	0.006	0.230	2.63	OK
15	0.009	0.230	4.05	OK
16	0.007	0.230	3.21	OK
17	0.015	0.230	6.61	OK
18	0.012	0.230	5.09	OK
19	0.010	0.230	4.53	OK
20	0.015	0.230	6.32	OK
21	0.010	0.230	4.41	OK
22	0.003	0.230	1.39	OK
23	0.006	0.230	2.71	OK
24	0.003	0.230	1.36	OK
25	0.008	0.230	3.52	OK
26	0.004	0.230	1.75	OK



Reference No.: WTF22X09190530W003

27	0.008	0.230	3.29	OK
28	0.004	0.230	1.78	OK
29	0.008	0.230	3.48	OK
30	0.004	0.230	1.52	OK
31	0.006	0.230	2.62	OK
32	0.003	0.230	1.15	OK
33	0.006	0.230	2.68	OK
34	0.002	0.230	1.00	OK
35	0.005	0.230	2.17	OK
36	0.003	0.230	1.14	OK
37	0.006	0.230	2.52	OK
38	0.002	0.230	0.92	OK
39	0.007	0.230	2.85	OK
40	0.007	0.230	3.26	OK

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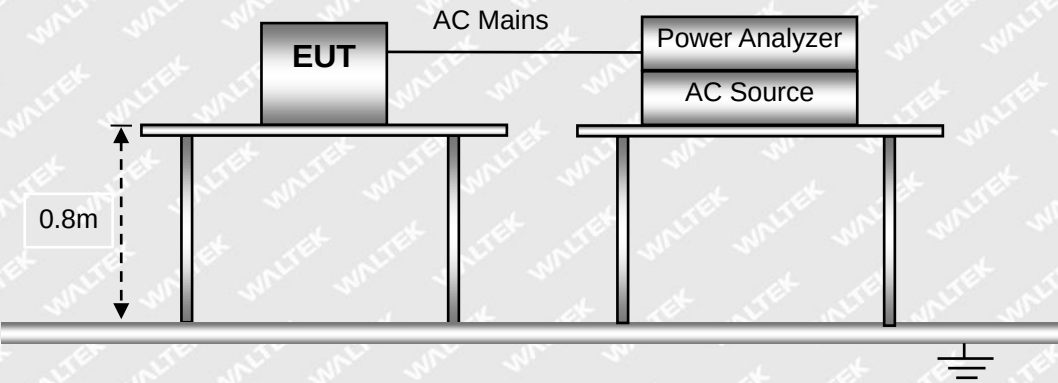


6. Voltage Fluctuation and Flicker

6.1 Test Procedure

Test is conducting under the description of EN 61000-3-3.

6.2 Test Setup Block Diagram



6.3 Test Standards

EN61000-3-3, Limit: Clause 5.

6.4 Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

6.5 Voltage Fluctuation and Flicker Test Data

Result: The EUT is compliance with the requirements of this section.



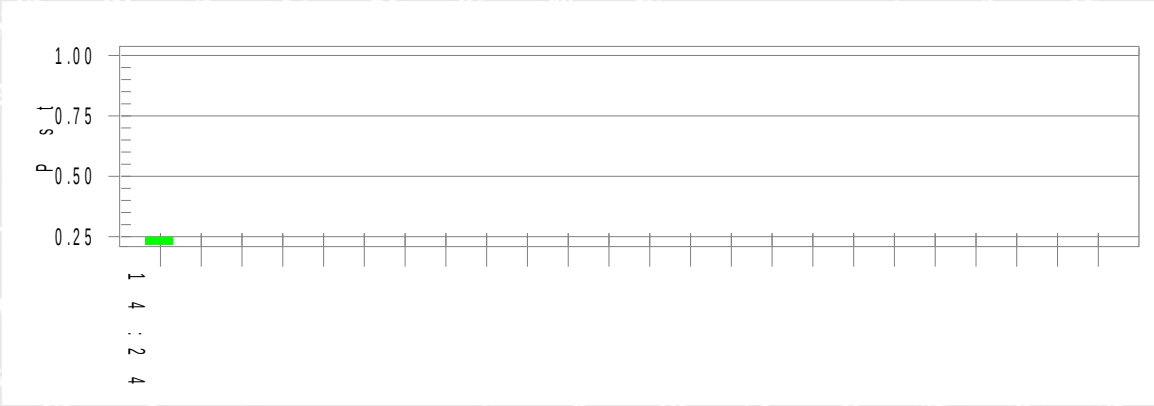
Test mode:	TM1
------------	-----

Test Result: Pass

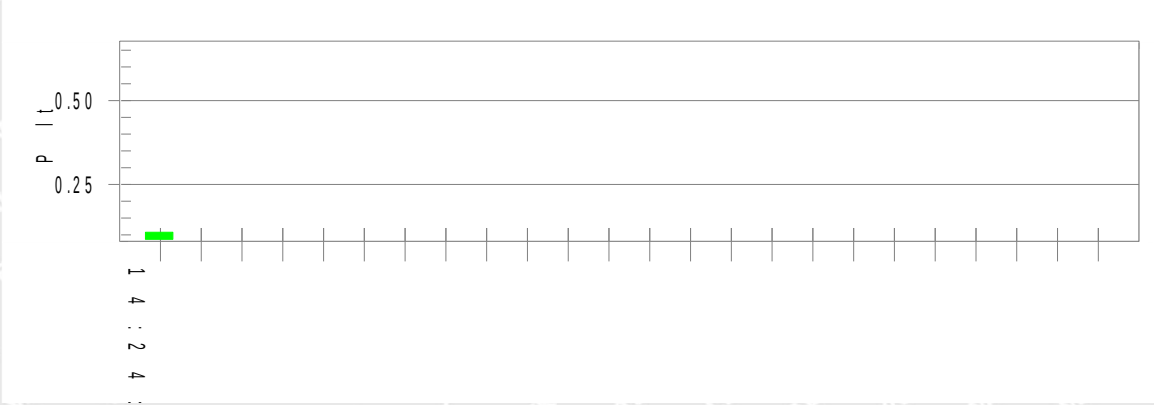
Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.07

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.247

Highest Plt (2 hr. period): 0.108

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

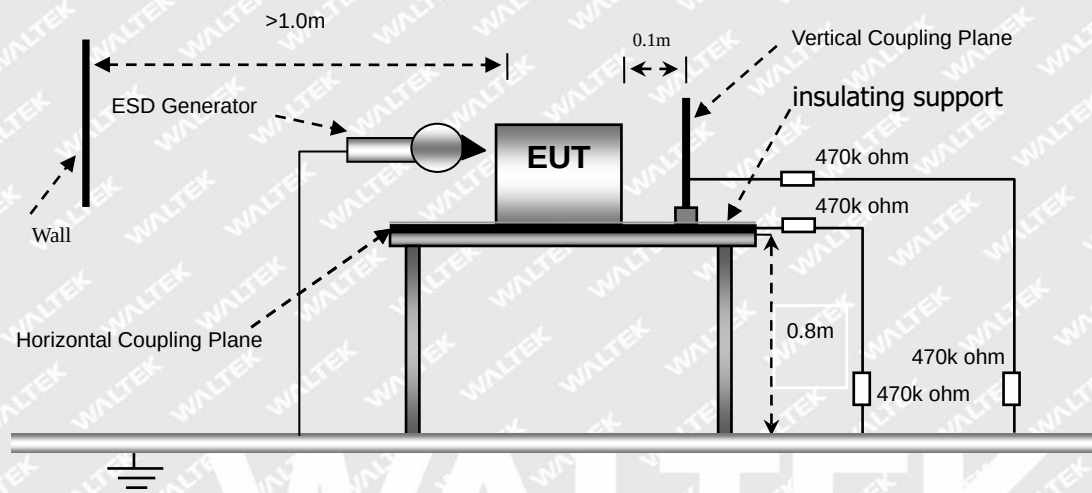


7. Electrostatic Discharge (ESD)

7.1 Test Procedure

Test is conducting under the description of EN 61000-4-2.

7.2 Test Setup Block Diagram



7.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	B
Note: TM3 for TT,TR		

7.4 Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

7.5 Electrostatic Discharge Immunity Test Data



Test mode	TM1-TM3							
EN 61000-4-2 Test Points	Test Levels (kV)							
	-2	+2	-4	+4	-6	+6	-8	+8
Air Discharge								
DC Charging port	B	B	B	B	B	B	B	B
Enclosure	B	B	B	B	B	B	B	B
Direct Contact Discharge								
/	/	/	/	/	/	/	/	/
Indirect Contact Discharge								
HCP (6 Sides)	A	A	A	A	/	/	/	/
VCP (4 Sides)	A	A	A	A	/	/	/	/

Test Result: Pass

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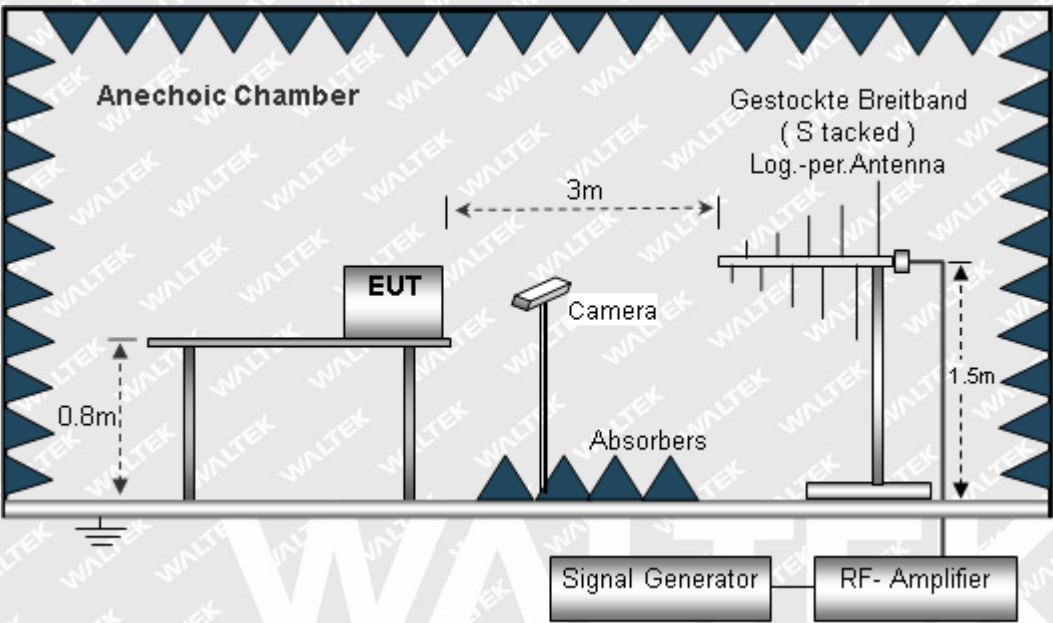


8. Radio Frequency Electromagnetic Field (R/S)

8.1 Test Procedure

Test is conducting under the description of EN 61000-4-3.

8.2 Test Setup Block Diagram



8.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	A
Note: TM3 for CT,CR		

8.4 Environmental Conditions

Temperature:	25°C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

8.5 Continuous Radiated Disturbances Test Data

Frequency step: 1% of fundamental

Dwell time: 1 second

Modulation: AM by 1kHz sine wave with 80% modulation depth



Test mode		TM1-TM3							
Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A
1000-3000	3	A	A	A	A	A	A	A	A
3000-6000	3	A	A	A	A	A	A	A	A

Test Result: Pass

WALTEK



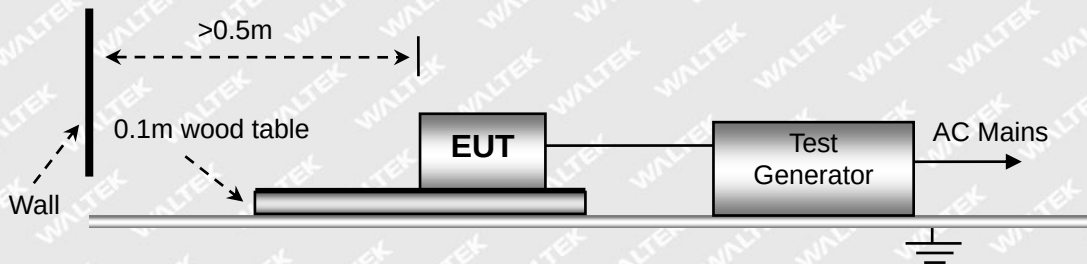
9. Fast Transients, Common Mode (EFT)

9.1 Test Procedure

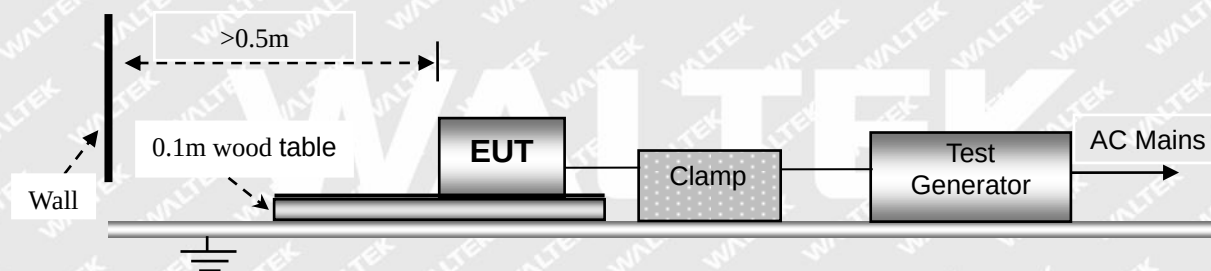
Test is conducting under the description of EN 61000-4-4.

9.2 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



9.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	B
Note: TM3 for TT,TR		

9.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

9.5 Electrical Fast Transients Test Data



Test Mode		TM1-TM3							
EN 61000-4-4 Test Line		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Main Power port	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	PE	/	/	/	/	/	/	/	/
	L-N	A	A	A	A	/	/	/	/
	L-PE	/	/	/	/	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
	L-N-PE	/	/	/	/	/	/	/	/
Signal ports	/	/	/	/	/	/	/	/	/

Test Result: Pass

WALTEK



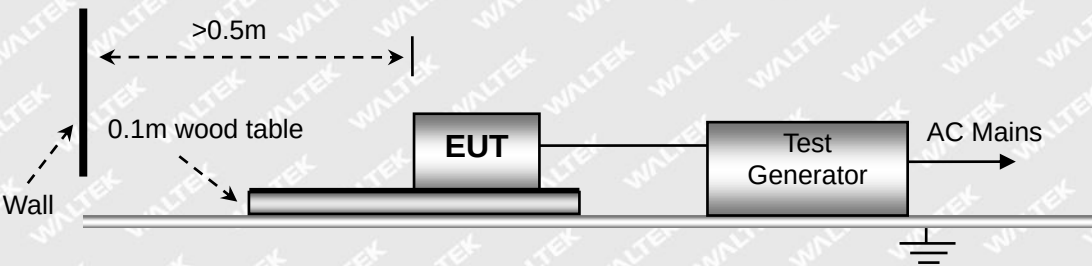
10. Surges

10.1 Test Procedure

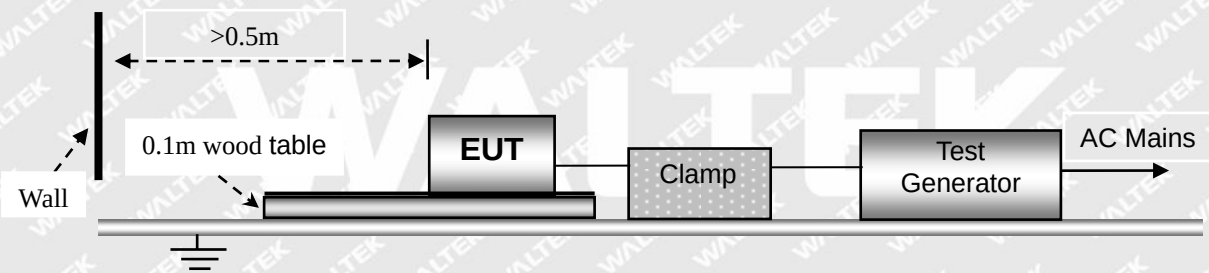
Test is conducting under the description of EN 61000-4-5.

10.2 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



10.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	
Note: TM3 for TT,TR		

10.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

10.5 Surge Test Data



Test Mode	TM1-TM3			
Voltage	Poll	Path	Pass	Fail
0.5kV	±	L-N	A	/
1kV	±	L-N	A	/
2kV	±	L-N, L-PE, N-PE	/	/
4kV	±	L-N, L-PE, N-PE	/	/

Test Result: Pass

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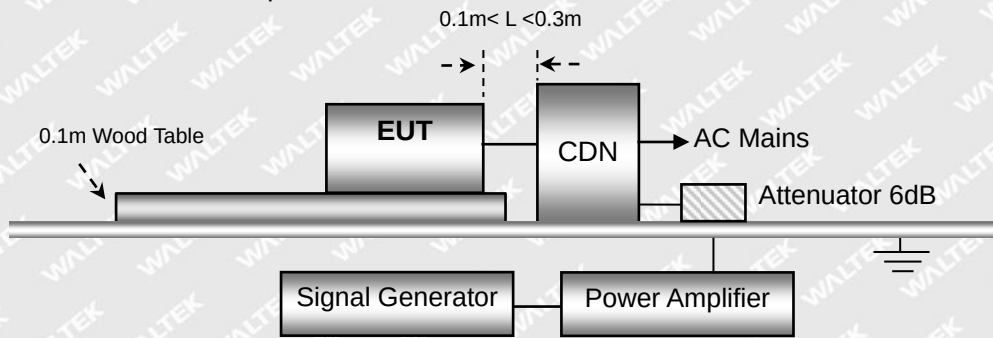
11. Radio Frequency, Common Mode (C/S)

11.1 Test Procedure

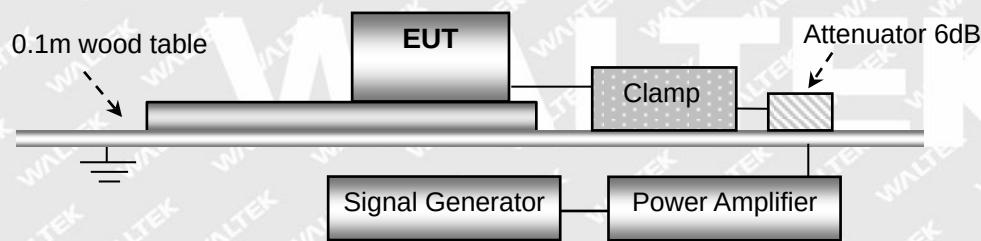
Test is conducting under the description of EN 61000-4-6.

11.2 Test Setup Block Diagram

For AC Mains or DC Input:



For Signal or Telecommunication Ports:



11.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	A
Note: TM3 for CT,CR		

11.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

11.5 Continuous Conducted Disturbances Test Data

Sweep frequency range: 150kHz~80MHz

Frequency step: 1% of fundamental

Dwell time: 1 second



Test Mode		TM1-TM3		
Level	Voltage (V) (rms, unmodulated)	Modulation:	Pass	Fail
1	1	AM 80%, 1kHz sinewave	/	/
2	3	AM 80%, 1kHz sinewave	A	/
3	10	AM 80%, 1kHz sinewave	/	/
X	Special	/	/	/

Test Result: Pass

WALTEK

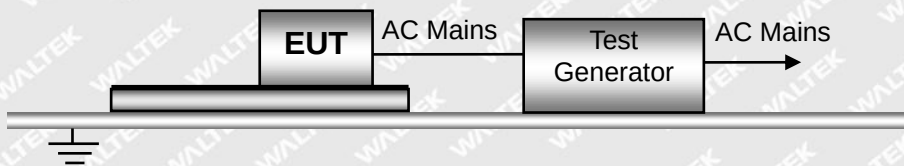


12. Voltage Dips and Interruptions

12.1 Test Procedure

Test is conducting under the description of EN 61000-4-11.

12.2 Test Setup Block Diagram



12.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM3	B for voltage dip/ C for voltage interruption
Note: TM3 for TT,TR		

12.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

12.5 Voltage Dips And Interruptions Test Data

U: Voltage dips in % U_T (U_T is rated voltage for the EUT)

T: Test duration

Level	U	T	Phase Angle	N	Pass	Fail
1	100%	10ms	0/90/180/270	3	A	/
2	100%	20ms	0/90/180/270	3	B	/
3	30%	500ms	0/90/180/270	3	B	/
4	100%	5000ms	0/90/180/270	3	B	/

Test Result: Pass



EXHIBIT 1 - EUT PHOTOGRAPHS

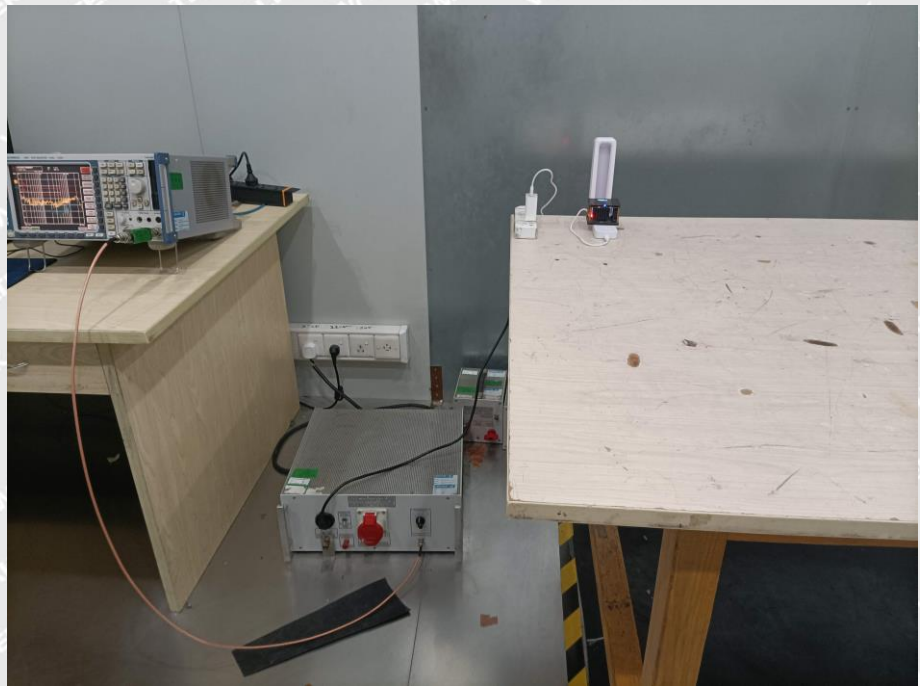
Please refer to “ANNEX”.

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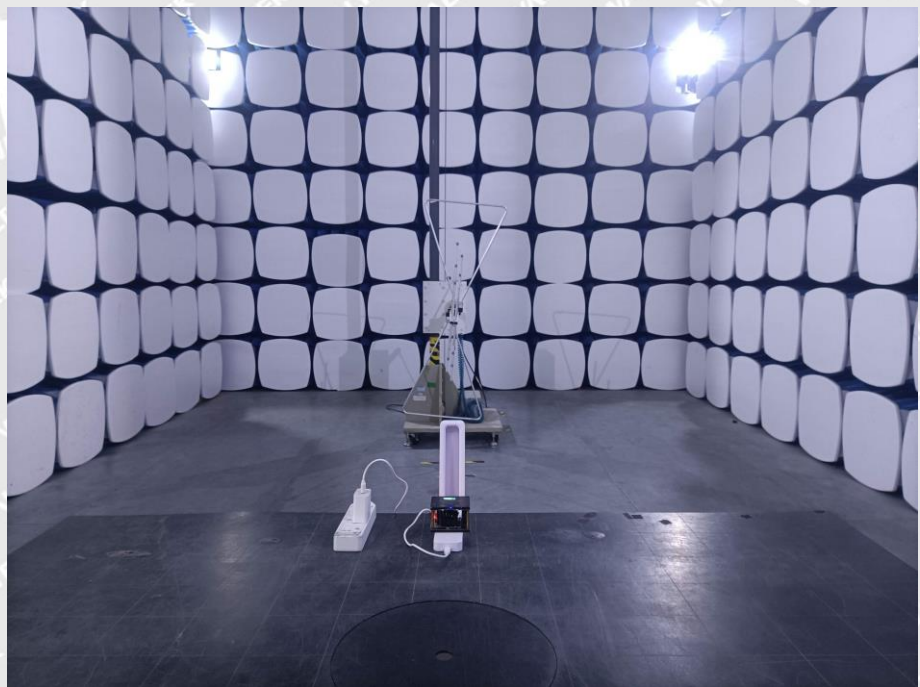


EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

**Conducted Emission
Test Setup**



**Radiation Emission
Test View(30MHz to
1GHz)**

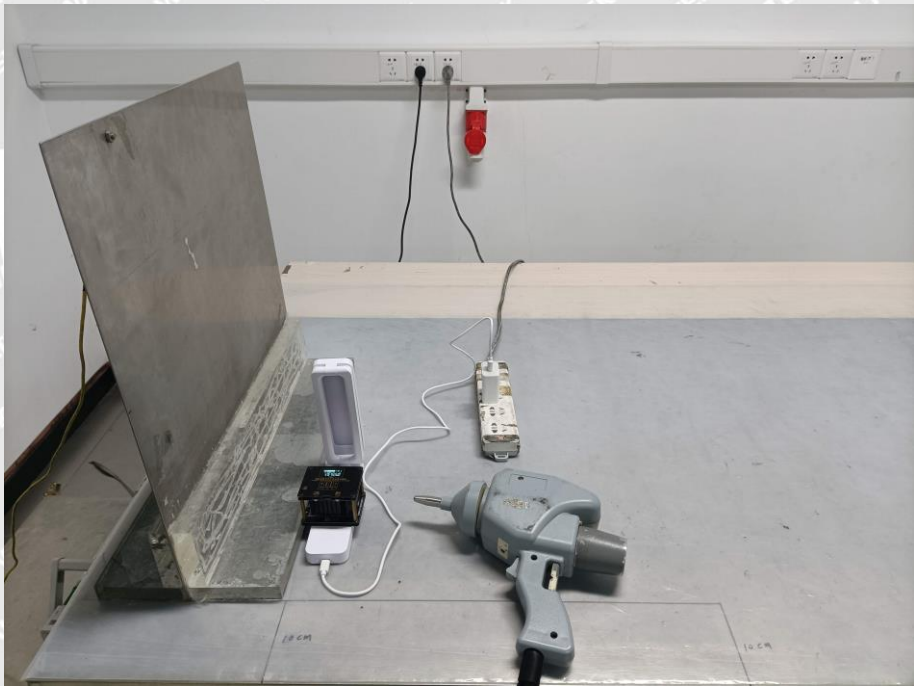




Harmonic/Flicker Test
View

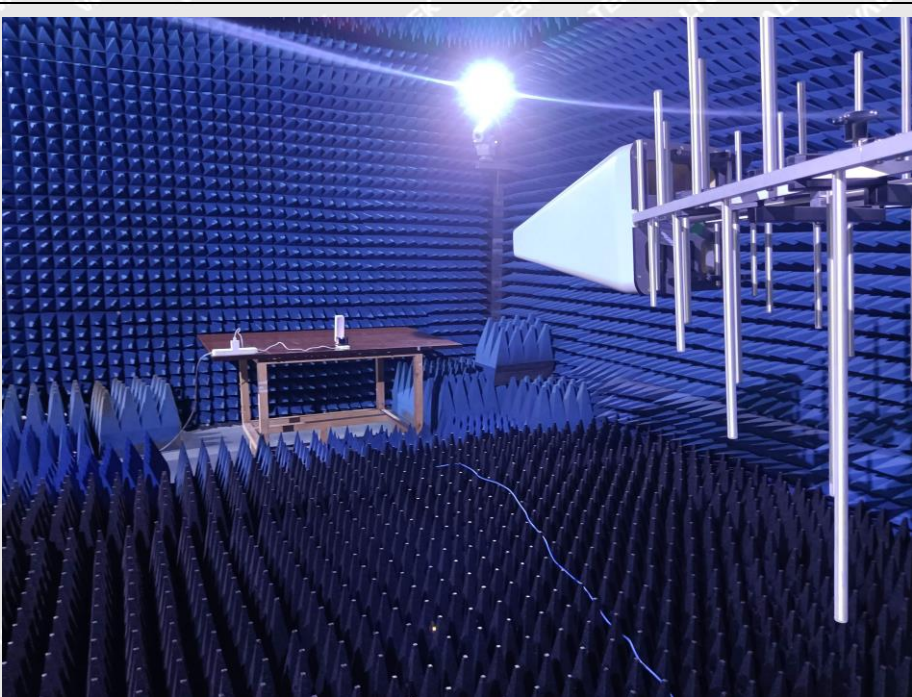


EN 61000-4-2 Test View





EN 61000-4-3 Test View

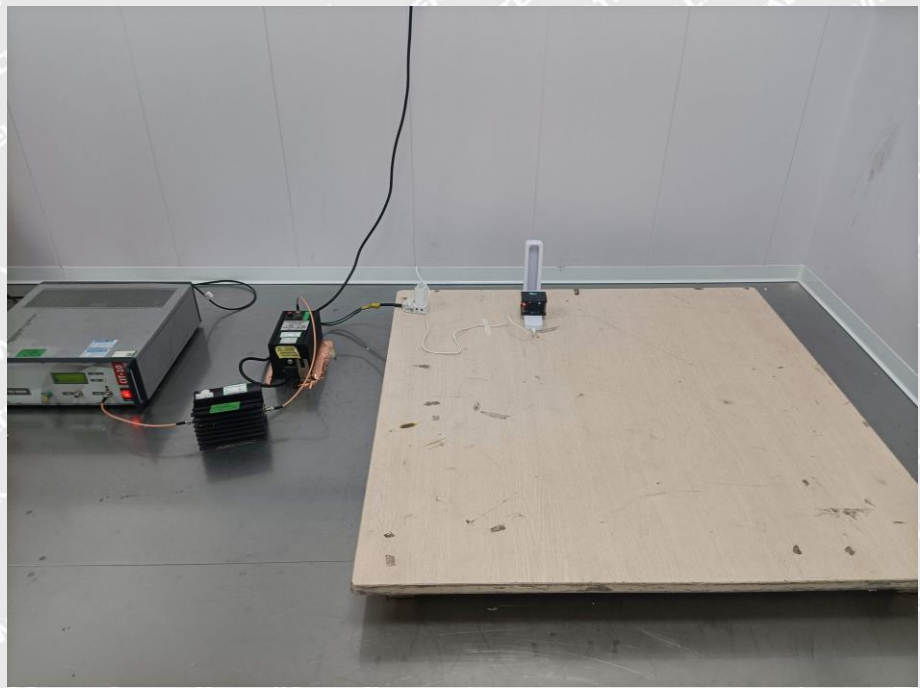


EN 61000-4-4/5/11 Test
View





EN 61000-4-6 Test View



***** END OF REPORT *****

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中国认可
国际互认
检测
TESTING
CNAS L4062



TEST REPORT

Reference No..... : WTF22X09190530W004
Manufacturer..... : Mid Ocean Brands B.V.
Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Factory..... : 109979
Product Name..... : Light and wireless charger
Model No..... : MO6816
Standards..... : EN IEC 55015:2019
EN 61547:2009
EN IEC 61000-3-2:2019
EN 61000-3-3:2013+A1:2019
Date of Receipt sample.... : 2022-09-20
Date of Test..... : 2022-09-20 to 2022-10-25
Date of Issue..... : 2022-10-25
Test Report Form No. : WTX_EN IEC 55015_2019_B
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

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**Report version**

Version No.	Date of issue	Description
Rev.00	2022-10-25	Original
/	/	/

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Light and wireless charger
Trade Name:	/
Model No.:	MO6816
Adding Model(s):	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	Input: 5V / 9V
Rated Current:	Output: 1A / 1.1V
Rate Power:	Wireless Output power: 10W Max.
Power Adaptor Model:	/
Highest Internal Frequency:	Below 108MHz



1.2 Test Standards

The tests were performed according to following standards:

EN IEC 55015:2019:Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.

EN 61547:2009:Electromagnetic for general lighting purposes - EMC immunity requirements.

EN IEC 61000-3-2:2019:Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3:2013+A1:2019:Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standards EN IEC 55015 , EN IEC 61000-3-2, EN 61000-3-3 and EN 61547 for general lighting purposes equipment, and all related testing and measurement techniques intentional standards.



1.4 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List			
Test Mode	Description	Remark	Power Supply Mode
TM1	Normal Working	Connect to the adapter;	AC230V/50Hz for adapter

EUT Cable List and Details				
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite	With / Without Chip
USB-C Cable	1.00	Unshielded	Without Ferrite	/

Special Cable List and Details				
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite	With / Without Chip
/	/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
wireless charging tester	YBZ	YBZ wireless charging tester	/
Adapter	Xiaomi	MDY-08-ES	/



1.5 Performance Criteria for EMS

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

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

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1.6 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
☐ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-22	2023-03-21
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
Amplifier	HP	8447F	2805A03475	2022-01-07	2023-01-06
☒ Chamber A: Above 1GHz					
Amplifier	C&D	PAP-1G18	2002	2022-03-22	2023-03-21
Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
☒ Chamber B: Below 1GHz					
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
Amplifier	Agilent	8447D	2944A10179	2022-03-22	2023-03-21
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-25	2023-03-24
☐ Chamber C: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
Amplifier	HP	8447F	2944A03869	2022-03-22	2023-03-21
☒ Conducted Room 1#					
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-22	2023-03-21
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24
AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-22	2023-03-21
8-WIRE LISN	Schwarz beck	8158	CAT3-8158-0059	2022-03-22	2023-03-21
8-WIRE LISN	Schwarz beck	8158	CAT5-8158-0117	2022-03-22	2023-03-21
☐ Conducted Room 2#					
EMI Test Receiver	Rohde & Schwarz	ESPI	10129	2022-03-22	2023-03-21
LISN	Rohde & Schwarz	ENV 216	100097	2022-03-22	2023-03-21
☒ Radiated Electromagnetic Disturbances (9KHz-30MHz)					
Loop Antenna	ZHINAN	ZN30401	19037	2021-04-26	2023-04-25
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-22	2023-03-21
☒ Harmonics & Flicker					
Digital Power Analyzer	California Instrument	CTS	72831	2022-03-22	2023-03-21
Power Source	California Instrument	5001IX-CTS-400	25965	2022-03-22	2023-03-21
☒ Electrostatic discharges					
ESD Generator	LIONCEL	ESD-203B	0170901	2022-03-28	2023-03-27



☒ Power-frequency magnetic field (PFMF)					
PMF Generator	LIONCEL	PMF-801C-C	0171101	2022-03-22	2023-03-21
PMF Antenna	LIONCEL	PMF-801C-A	0180302	2022-03-22	2023-03-21
Instantaneous PMF Generator Module	LIONCEL	PMF-801C-T	0171001	2022-03-22	2023-03-21
☒ Electronic fast transient(EFT)/Surges/Dips					
Transient 2000	EMC PARTNER	TRA2000	863	2022-03-22	2023-03-21
Couple Clamp	EMC PARTNER	CN-EFT1000	513	2022-03-22	2023-03-21
☒ Radio frequency, continuous conducted (C/S)					
CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10/75	126B1247/2013	2022-01-07	2023-01-06
Attenuator	EMTEST	MA-5100/6BF2	1009	2022-03-22	2023-03-21
CDN	Luthi	L-801M2/M3	2665	2022-03-22	2023-03-21
CDN	LIONCEL	CDN-T8	0210401	2022-03-25	2023-03-24
EM Clamp	TESEQ	KEMZ801A	45028	2022-03-25	2023-03-24
☒ Radio frequency electromagnetic Field (R/S)					
Signal Generator	HP	8688B	3438A00604	2022-03-22	2023-03-21
Power Sensor	Agilent	E9301A	MY52450001	2022-03-25	2023-03-24
Power Sensor	Agilent	E9304A	MY55081055	2022-03-25	2023-03-24
RF Power Amplifier	MicoTop	MPA-80-1000-250	MPA1906239	2022-03-22	2023-03-21
RF Power Amplifier	MicoTop	MPA-1000-6000-100	MPA1906238	2022-03-22	2023-03-21
Antenna	SCHWARZBECK	STLP 9129	9129 114	N/A	N/A
Power Meter	Agilent	E4419B	GB42420578	2022-03-22	2023-03-21



2. SUMMARY OF TEST RESULTS

Standards	Description of Test Item	Result
EN IEC55015	Disturbance Voltages	Compliant
	Radiated Electromagnetic Disturbances (Frequency range 9kHz to 30MHz)	Compliant
	Radiated Electromagnetic Disturbances (Frequency range 30MHz to 1000MHz)	Compliant
EN IEC 61000-3-2	Harmonic Current Emission	Compliant
EN 61000-3-3	Voltage Fluctuation And Flicker	Compliant
EN 61547	Electrostatic Discharge Immunity in accordance with EN 61000-4-2	Compliant
	Radio-Frequency Electromagnetic Field Immunity in accordance with EN 61000-4-3	Compliant
	Electrical Fast Transient/Burst Immunity in accordance with EN 61000-4-4	Compliant
	Surges Immunity in accordance with EN 61000-4-5	Compliant
	Injected Currents Immunity in accordance with EN 61000-4-6	Compliant
	Power-frequency Magnetic Field Immunity in accordance with EN 61000-4-8	Compliant
	Voltage Dips/Interruptions Immunity in accordance with EN 61000-4-11	Compliant

N/A: not applicable



3. Conducted Emission

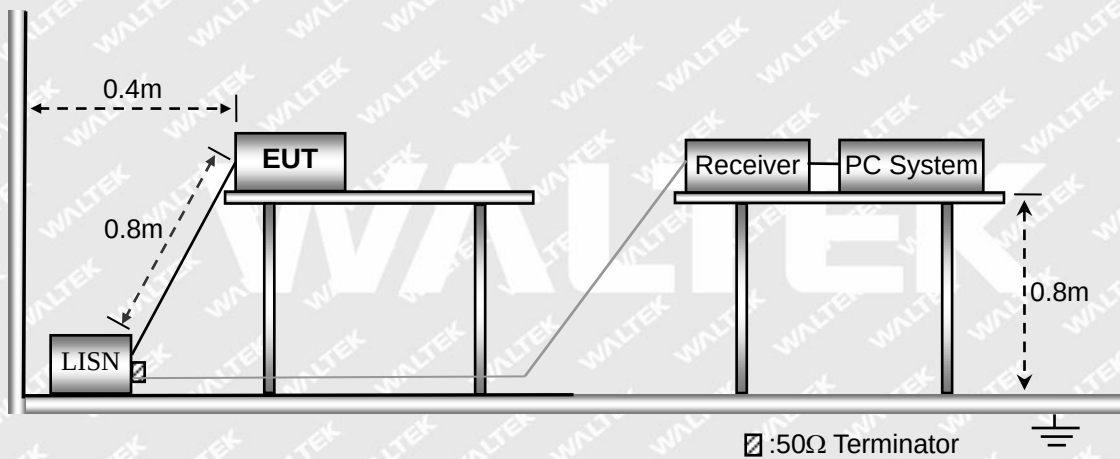
3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement:

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB

3.2 Basic Test Setup Block Diagram

AC port



3.3 Environmental Conditions

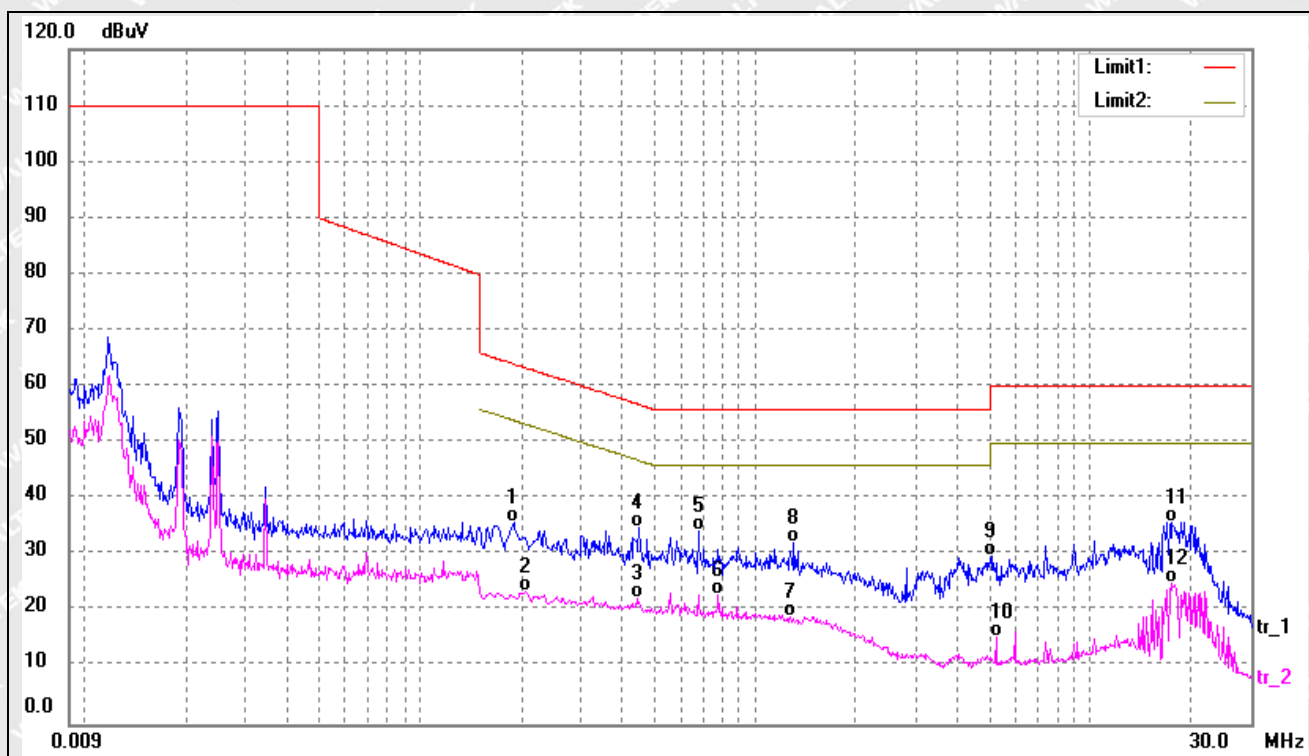
Temperature:	23.5 ° C
Relative Humidity:	54 %
ATM Pressure:	1015 mbar

3.4 Summary of Test Results

Please find the results below:



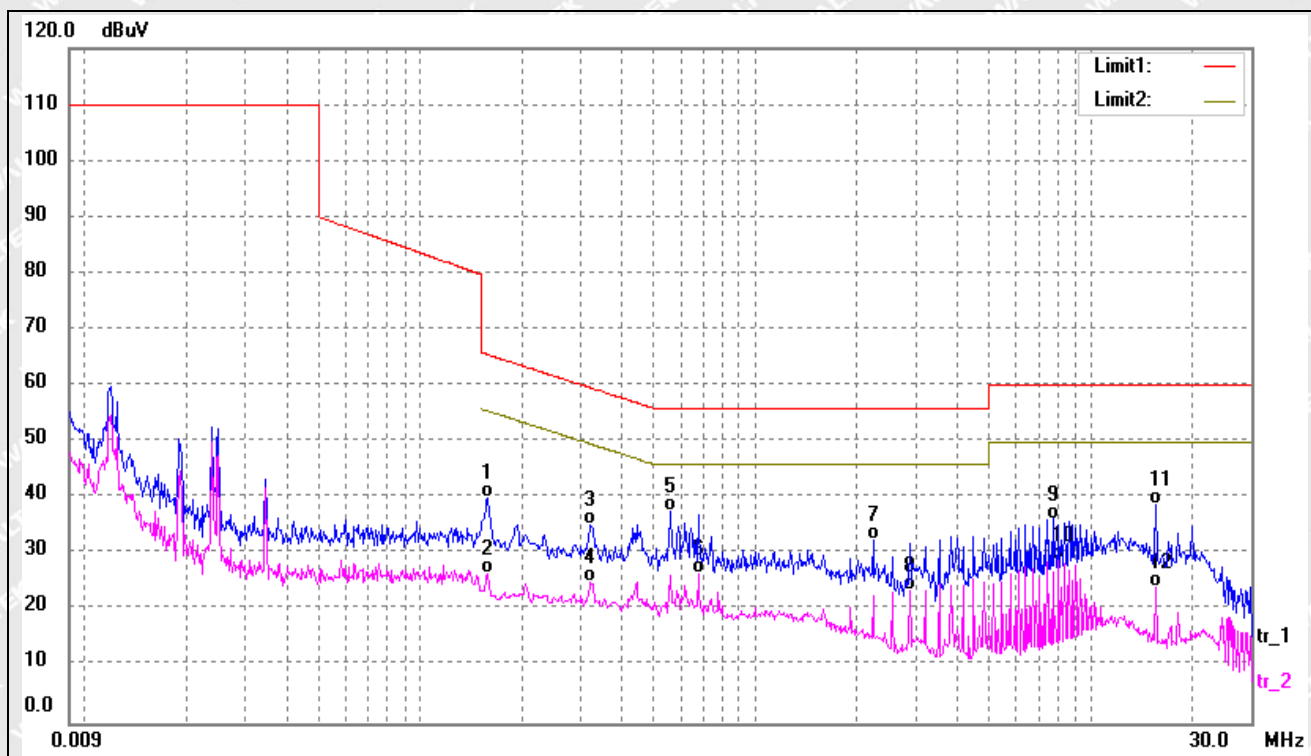
Test mode:	TM1	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1900	25.40	10.30	35.70	64.04	-28.34	QP
2	0.2059	13.24	10.29	23.53	53.37	-29.84	AVG
3	0.4420	12.22	10.23	22.45	47.02	-24.57	AVG
4	0.4500	24.68	10.23	34.91	56.88	-21.97	QP
5*	0.6780	24.03	10.20	34.23	56.00	-21.77	QP
6	0.7780	12.91	10.17	23.08	46.00	-22.92	AVG
7	1.2700	8.83	10.17	19.00	46.00	-27.00	AVG
8	1.3020	22.00	10.17	32.17	56.00	-23.83	QP
9	5.0899	19.42	10.33	29.75	60.00	-30.25	QP
10	5.2380	5.12	10.33	15.45	50.00	-34.55	AVG
11	17.4819	25.69	10.30	35.99	60.00	-24.01	QP
12	17.4819	14.76	10.30	25.06	50.00	-24.94	AVG



Test mode:	TM1	Polarity:	Neutral
------------	-----	-----------	---------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	29.71	10.31	40.02	65.56	-25.54	QP
2	0.1580	16.31	10.31	26.62	55.56	-28.94	AVG
3	0.3220	24.96	10.24	35.20	59.65	-24.45	QP
4	0.3220	14.76	10.24	25.00	49.65	-24.65	AVG
5*	0.5620	27.50	10.21	37.71	56.00	-18.29	QP
6	0.6780	16.42	10.20	26.62	46.00	-19.38	AVG
7	2.2460	22.27	10.26	32.53	56.00	-23.47	QP
8	2.8860	13.29	10.27	23.56	46.00	-22.44	AVG
9	7.6980	25.96	10.34	36.30	60.00	-23.70	QP
10	8.0180	18.60	10.34	28.94	50.00	-21.06	AVG
11	15.5780	28.48	10.25	38.73	60.00	-21.27	QP
12	15.5780	13.86	10.25	24.11	50.00	-25.89	AVG



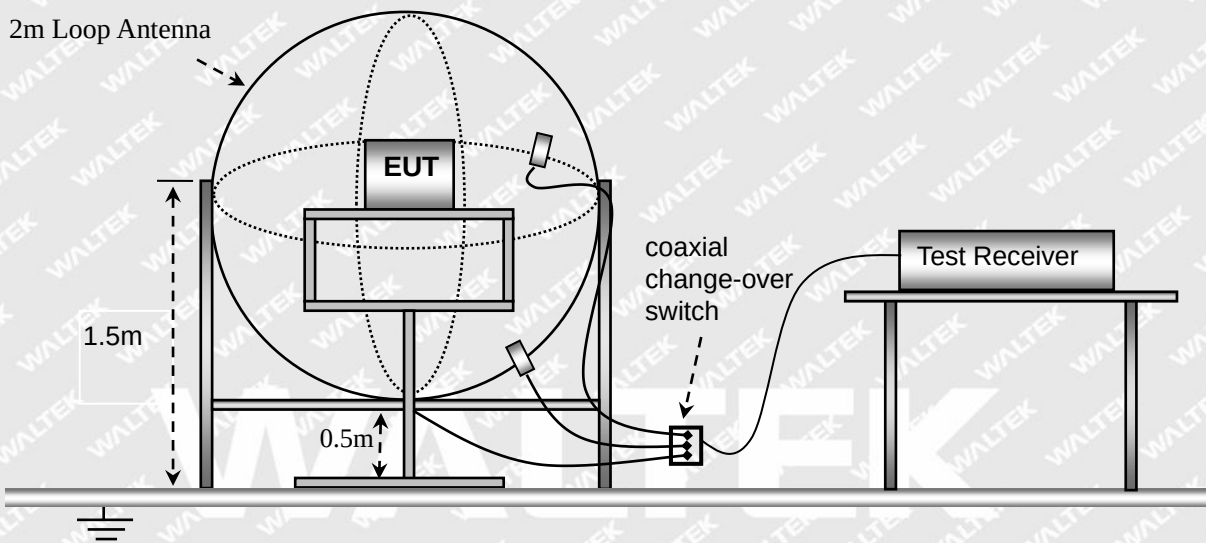
4. Radiated Electromagnetic Disturbances (9kHz to 30MHz)

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 3.6 dB.

4.2 Basic Test Setup Block Diagram

The Radiation Electromagnetic Disturbance (9kHz to 30MHz) test was performed in accordance with the EN IEC 55015



4.3 Environmental Conditions

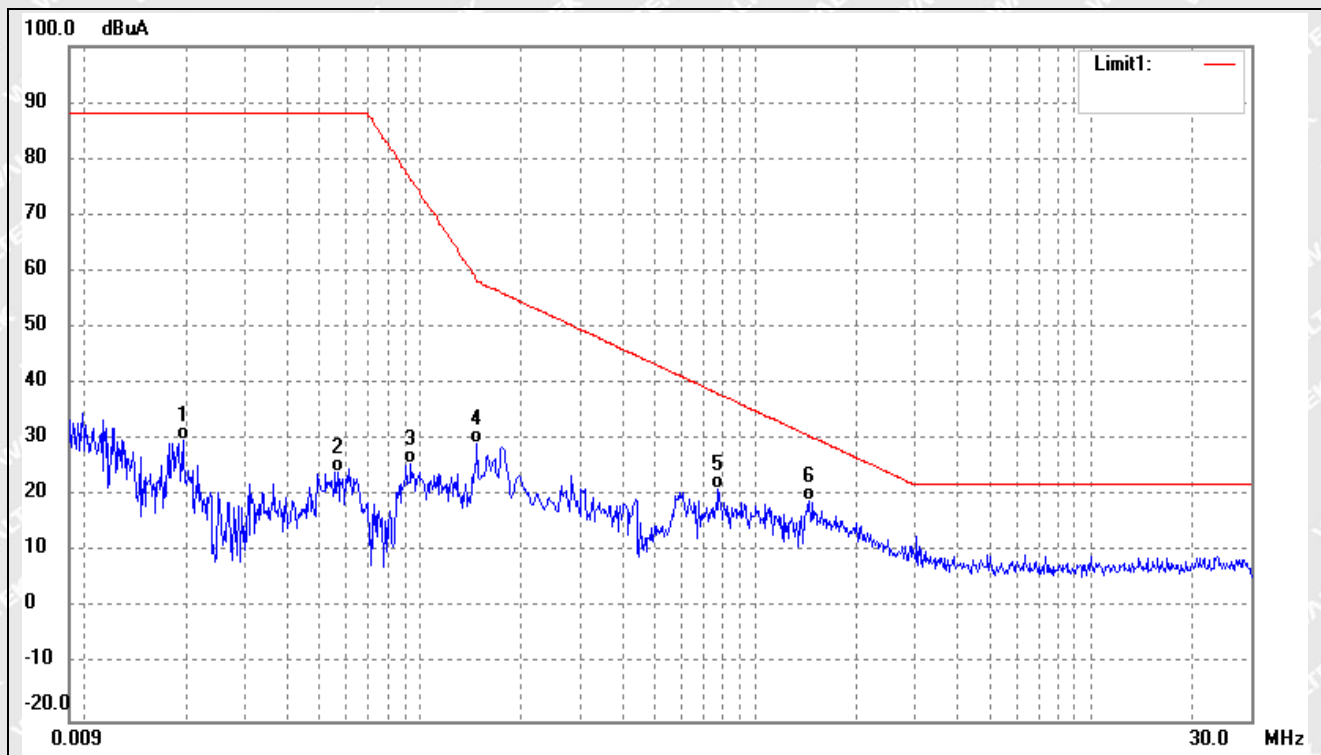
Temperature:	23.5 °C
Relative Humidity:	54 %
ATM Pressure:	1015 mbar

4.4 Summary of Test Results

Please find the results below:



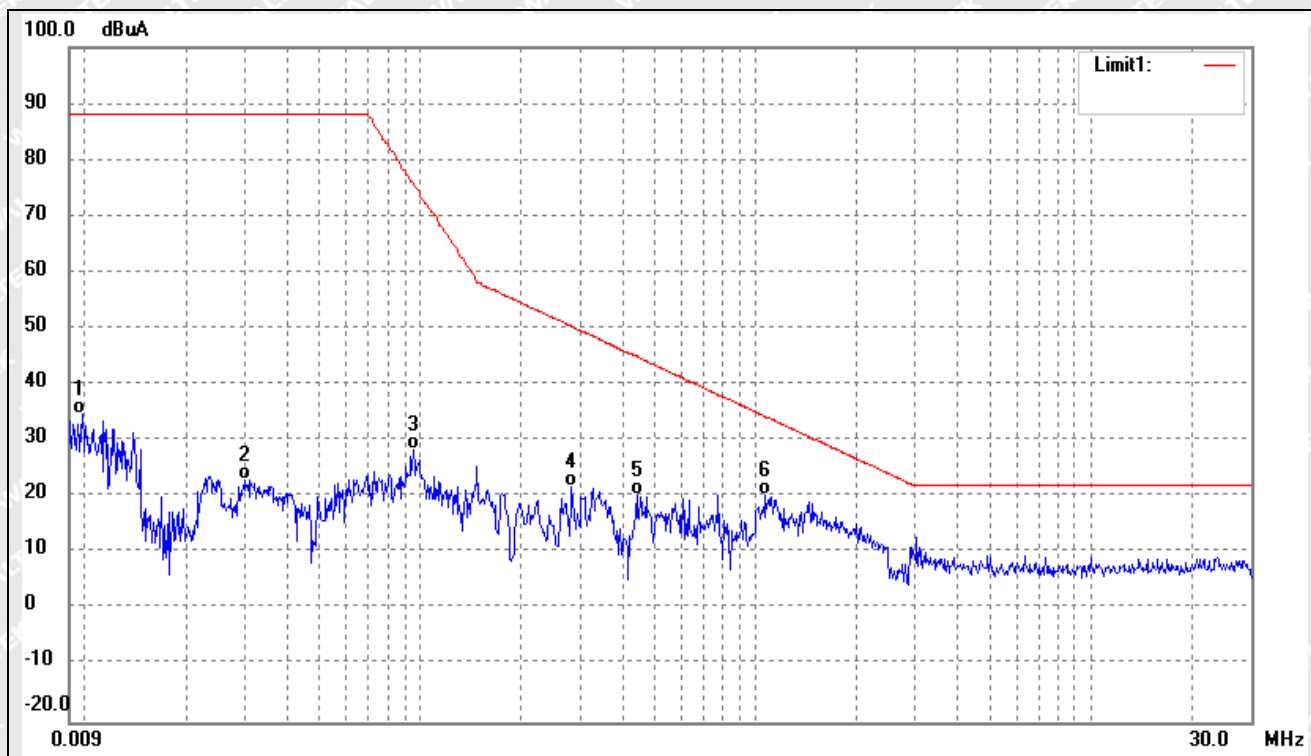
Test mode:	TM1	Polarity:	X
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No.	Frequency (MHz)	Reading (dBuA)	Correct (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.0196	29.24	0.76	30.00	88.00	-58.00	QP
2	0.0567	23.61	0.76	24.37	88.00	-63.63	QP
3	0.0942	24.97	0.76	25.73	76.30	-50.57	QP
4	0.1481	28.65	0.76	29.41	58.48	-29.07	QP
5	0.7780	20.45	0.76	21.21	38.22	-17.01	QP
6*	1.4458	18.49	0.76	19.25	30.77	-11.52	QP



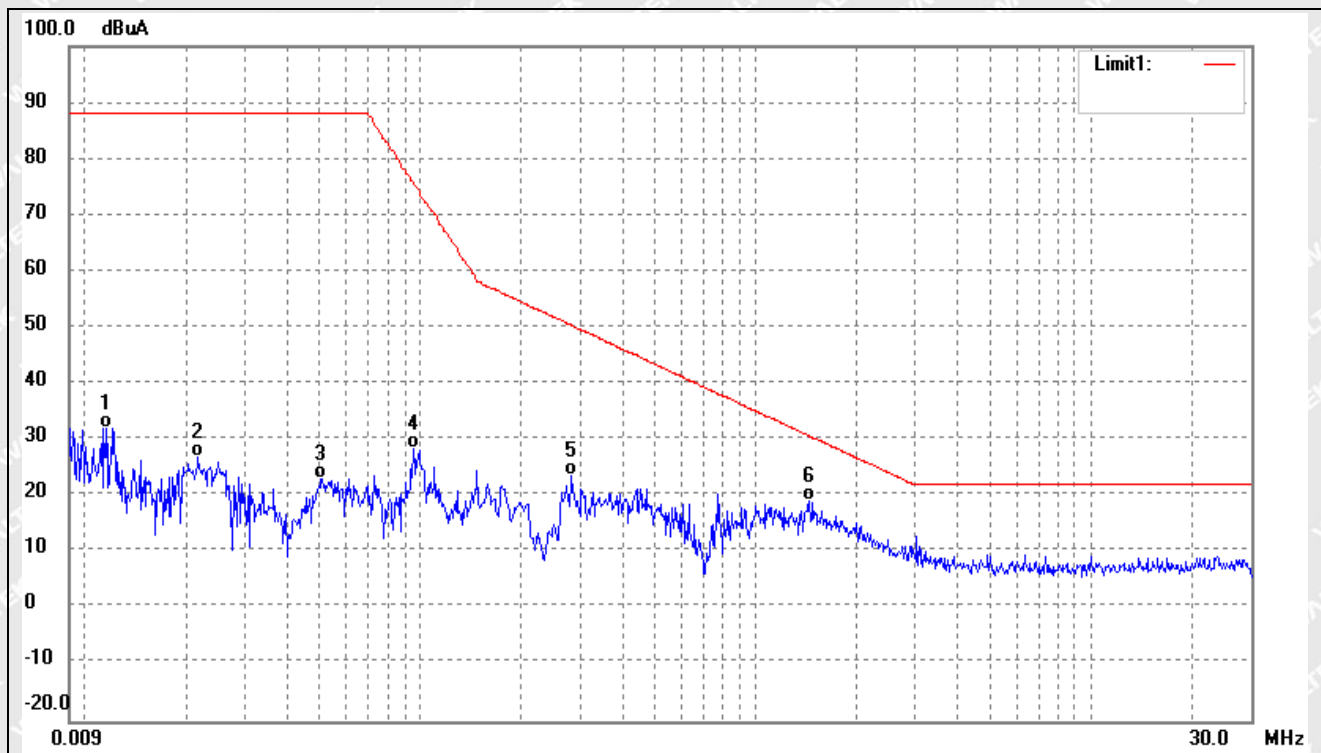
Test mode:	TM1	Polarity:	Y
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No.	Frequency (MHz)	Reading (dBuA)	Correct (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.0097	33.95	0.76	34.71	88.00	-53.29	QP
2	0.0299	22.43	0.76	23.19	88.00	-64.81	QP
3	0.0956	27.80	0.76	28.56	75.72	-47.16	QP
4	0.2818	21.03	0.76	21.79	50.42	-28.63	QP
5	0.4420	19.49	0.76	20.25	45.01	-24.76	QP
6*	1.0780	19.66	0.76	20.42	34.30	-13.88	QP



Test mode:	TM1	Polarity:	Z
------------	-----	-----------	---



No.	Frequency (MHz)	Reading (dBuA)	Correct (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector
1	0.0115	31.23	0.76	31.99	88.00	-56.01	QP
2	0.0217	26.06	0.76	26.82	88.00	-61.18	QP
3	0.0509	22.39	0.76	23.15	88.00	-64.85	QP
4	0.0956	27.80	0.76	28.56	75.72	-47.16	QP
5	0.2818	23.03	0.76	23.79	50.42	-26.63	QP
6*	1.4458	18.49	0.76	19.25	30.77	-11.52	QP



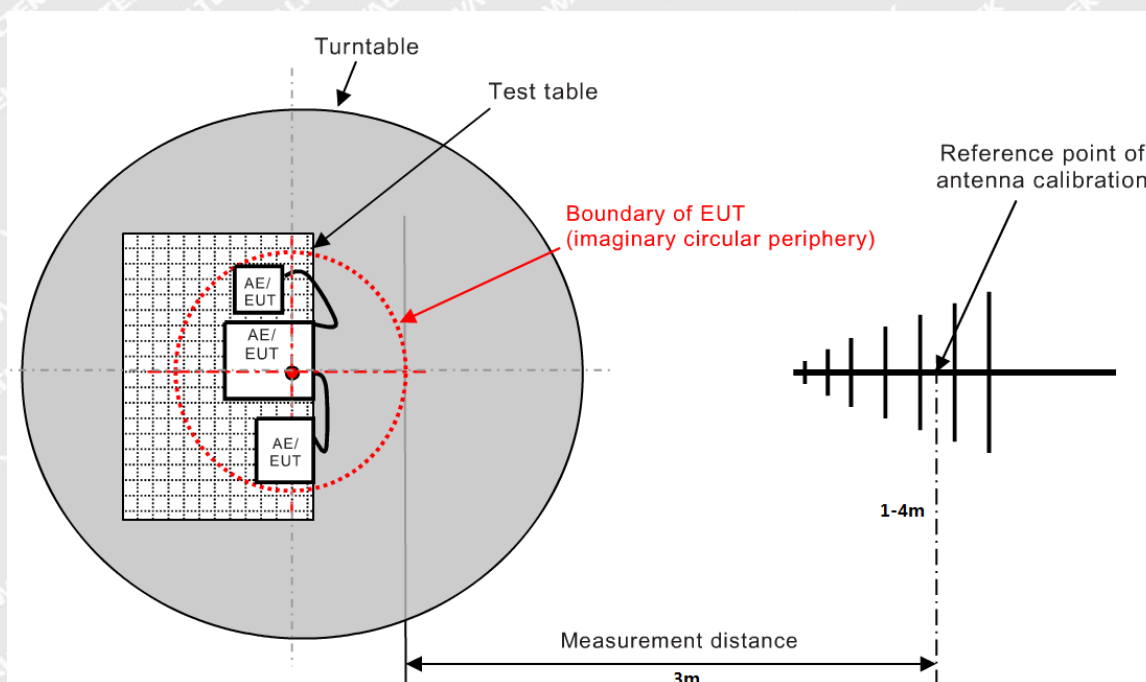
5. Radiated Electromagnetic Disturbances (30MHz to 1000MHz)

5.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement:

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Radiated Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

5.2 Basic Test Setup Block Diagram





5.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Correct} \\ \text{Correct} = \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a lighting device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{EN IEC 55015 Limit}$$

5.4 Environmental Conditions

Temperature:	23.5 ° C
Relative Humidity:	54 %
ATM Pressure:	1011 mbar

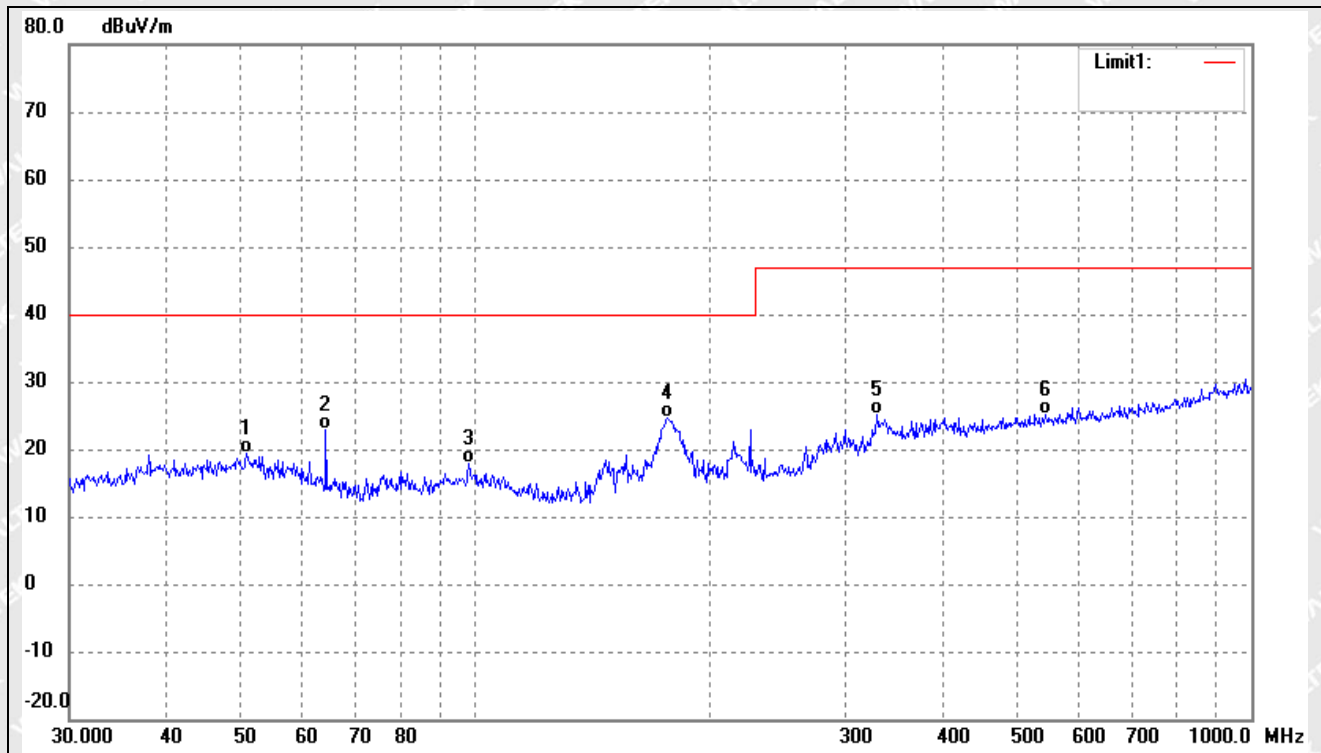
5.5 Summary of Test Results

Please find the results below:

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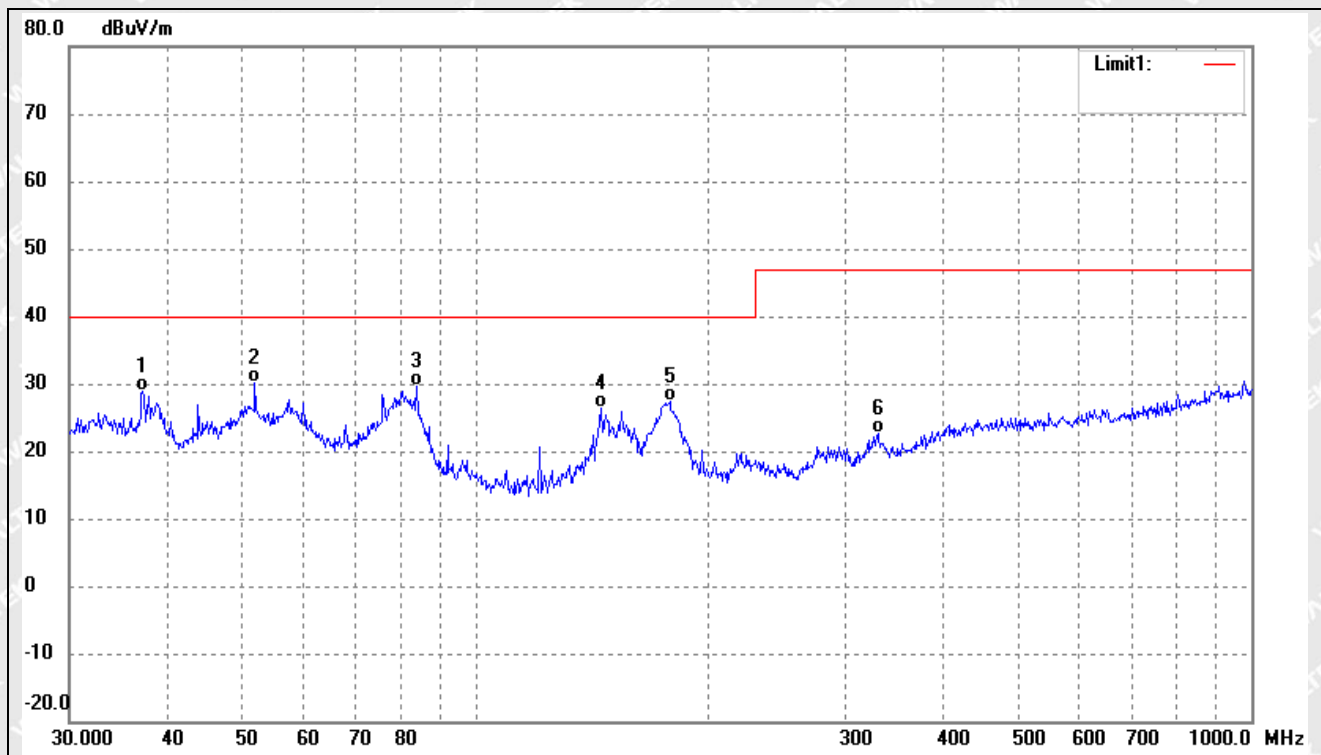
Test mode:	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.7637	29.18	-9.81	19.37	40.00	-20.63	-	-	QP
2	64.2074	35.67	-12.67	23.00	40.00	-17.00	-	-	QP
3	98.1419	28.96	-11.01	17.95	40.00	-22.05	-	-	QP
4	176.8878	37.71	-13.01	24.70	40.00	-15.30	-	-	QP
5	329.0390	32.70	-7.50	25.20	47.00	-21.80	-	-	QP
6	543.2742	28.59	-3.42	25.17	47.00	-21.83	-	-	QP



Test mode:	TM1	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	37.2855	38.92	-10.09	28.83	40.00	-11.17	-	-	QP
2	52.0251	40.17	-10.04	30.13	40.00	-9.87	-	-	QP
3	84.1100	42.57	-12.99	29.58	40.00	-10.42	-	-	QP
4	145.3506	40.49	-14.10	26.39	40.00	-13.61	-	-	QP
5	178.1327	40.24	-12.97	27.27	40.00	-12.73	-	-	QP
6	330.1949	30.12	-7.50	22.62	47.00	-24.38	-	-	QP

Remark: '-' Means the test Degree and Height are not recorded by the test software and only show the worst case in the test report.



6. Harmonic Current Emissions

6.1 Test Procedure

Test is conducted under the description of EN IEC 61000-3-2.

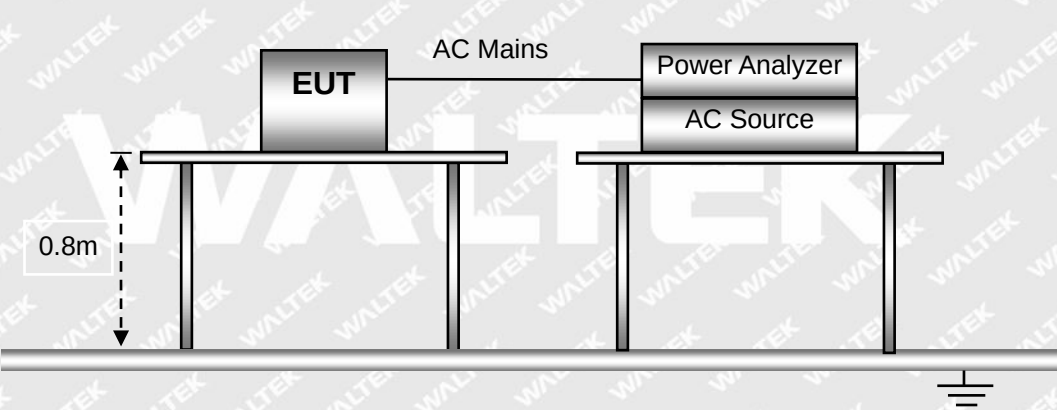
6.2 Test Standards

EN IEC 61000-3-2, Clause 7.4 Limits for Class C equipment.

6.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1022 mbar

6.4 Basic Test Setup Block Diagram



6.5 Harmonic Current Emissions Test Data

**Harmonics – Class-A per IEC 61000-3-2:2018/AMD1:2020(Run time)**

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

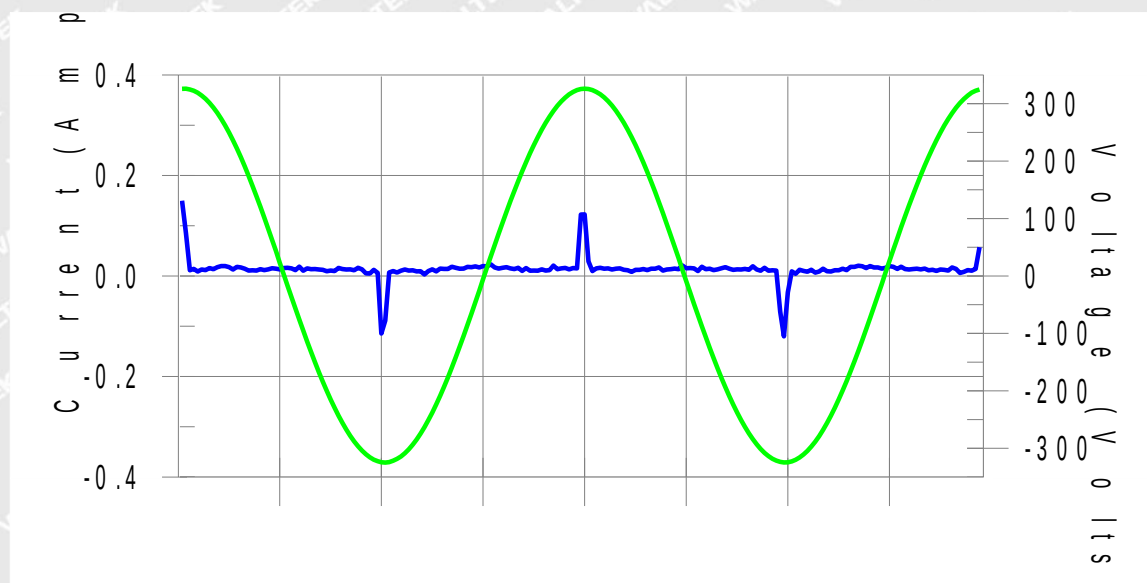
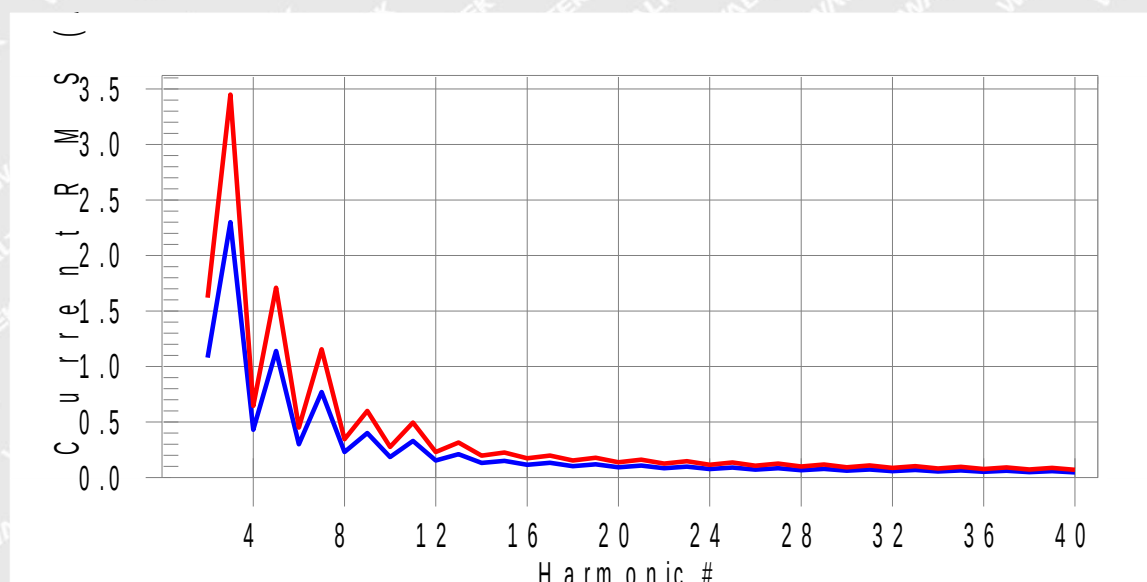
End time: 15:01:44

Test duration (min): 2.5

Data file name: H-000504.cts_data

Test Result: Pass

Source qualification: Normal

Current & voltage waveforms**Harmonics and Class A limit line****European Limits****Test result: Pass Worst harmonics H5-0.3% of 150% limit, H5-.4% of 100% limit**



Current Test Result Summary (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

End time: 15:01:44

Test duration (min): 2.5

Data file name: H-000504.cts_data

Test Result: Pass

Source qualification: Normal

THC(A): 0.017

I-THD(%): 287.3

POHC(A): 0.009

POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.13

Frequency(Hz): 50.00

I_Peak (Amps): 0.159

I_RMS (Amps): 0.024

I_Fund (Amps): 0.006

Crest Factor: 7.023

Power (Watts): 1.3

Power Factor: 0.268

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.005	2.300	0.2	0.006	3.450	0.2	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.005	1.140	0.4	0.005	1.710	0.3	Pass
6	0.000	0.300	N/A	0.001	0.450	N/A	Pass
7	0.005	0.770	N/A	0.005	1.155	N/A	Pass
8	0.000	0.230	N/A	0.001	0.345	N/A	Pass
9	0.005	0.400	N/A	0.005	0.600	N/A	Pass
10	0.000	0.184	N/A	0.001	0.276	N/A	Pass
11	0.005	0.330	N/A	0.005	0.495	N/A	Pass
12	0.000	0.153	N/A	0.001	0.230	N/A	Pass
13	0.005	0.210	N/A	0.005	0.315	N/A	Pass
14	0.000	0.131	N/A	0.001	0.197	N/A	Pass
15	0.004	0.150	N/A	0.004	0.225	N/A	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.004	0.132	N/A	0.004	0.198	N/A	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.004	0.118	N/A	0.004	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.004	0.107	N/A	0.004	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.004	0.098	N/A	0.004	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.003	0.090	N/A	0.003	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.003	0.083	N/A	0.003	0.125	N/A	Pass



Reference No.: WTF22X09190530W004

28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.003	0.078	N/A	0.003	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.003	0.073	N/A	0.003	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.002	0.061	N/A	0.002	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.002	0.058	N/A	0.002	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

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Voltage Source Verification Data (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2022/10/18

Start time: 14:59:03

End time: 15:01:44

Test duration (min): 2.5

Data file name: H-000504.cts_data

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 230.13

Frequency(Hz): 50.00

I_Peak (Amps): 0.159

I_RMS (Amps): 0.024

I_Fund (Amps): 0.006

Crest Factor: 7.023

Power (Watts): 1.3

Power Factor: 0.268

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.063	0.460	13.76	OK
3	0.511	2.071	24.68	OK
4	0.080	0.460	17.43	OK
5	0.060	0.920	6.57	OK
6	0.031	0.460	6.72	OK
7	0.025	0.690	3.58	OK
8	0.013	0.460	2.75	OK
9	0.012	0.460	2.67	OK
10	0.011	0.460	2.32	OK
11	0.010	0.230	4.15	OK
12	0.009	0.230	4.01	OK
13	0.016	0.230	7.08	OK
14	0.006	0.230	2.63	OK
15	0.009	0.230	4.05	OK
16	0.007	0.230	3.21	OK
17	0.015	0.230	6.61	OK
18	0.012	0.230	5.09	OK
19	0.010	0.230	4.53	OK
20	0.015	0.230	6.32	OK
21	0.010	0.230	4.41	OK
22	0.003	0.230	1.39	OK
23	0.006	0.230	2.71	OK
24	0.003	0.230	1.36	OK
25	0.008	0.230	3.52	OK
26	0.004	0.230	1.75	OK
27	0.008	0.230	3.29	OK
28	0.004	0.230	1.78	OK



Reference No.: WTF22X09190530W004

29	0.008	0.230	3.48	OK
30	0.004	0.230	1.52	OK
31	0.006	0.230	2.62	OK
32	0.003	0.230	1.15	OK
33	0.006	0.230	2.68	OK
34	0.002	0.230	1.00	OK
35	0.005	0.230	2.17	OK
36	0.003	0.230	1.14	OK
37	0.006	0.230	2.52	OK
38	0.002	0.230	0.92	OK
39	0.007	0.230	2.85	OK
40	0.007	0.230	3.26	OK

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7. Voltage Fluctuation Flicker

7.1 Test Procedure

Test is conducted under the description of EN 61000-3-3.

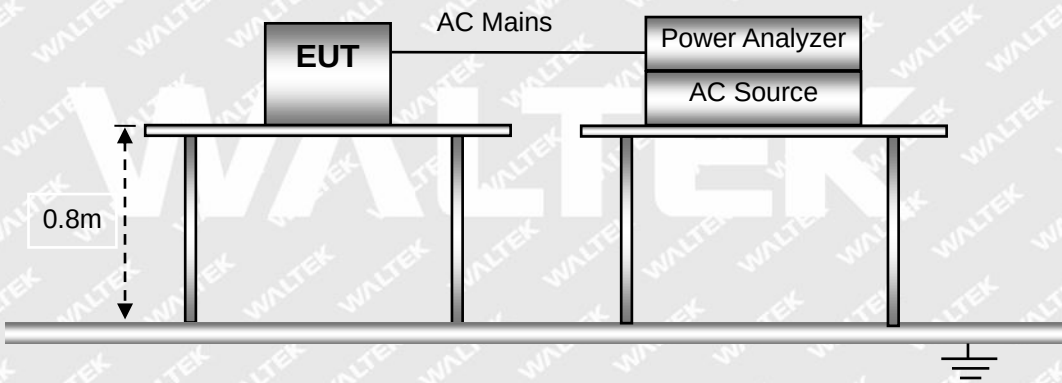
7.2 Test Standards

EN 61000-3-3, Limit: Clause 5.

7.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1022 mbar

7.4 Basic Test Setup Block Diagram



7.5 Voltage Fluctuation and Flicker Test Data



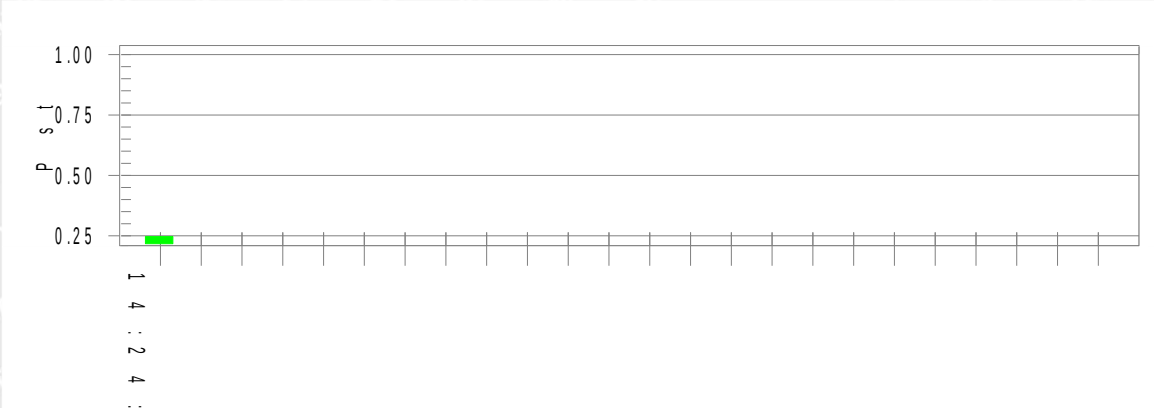
Test mode:	TM1
------------	-----

Test Result: Pass

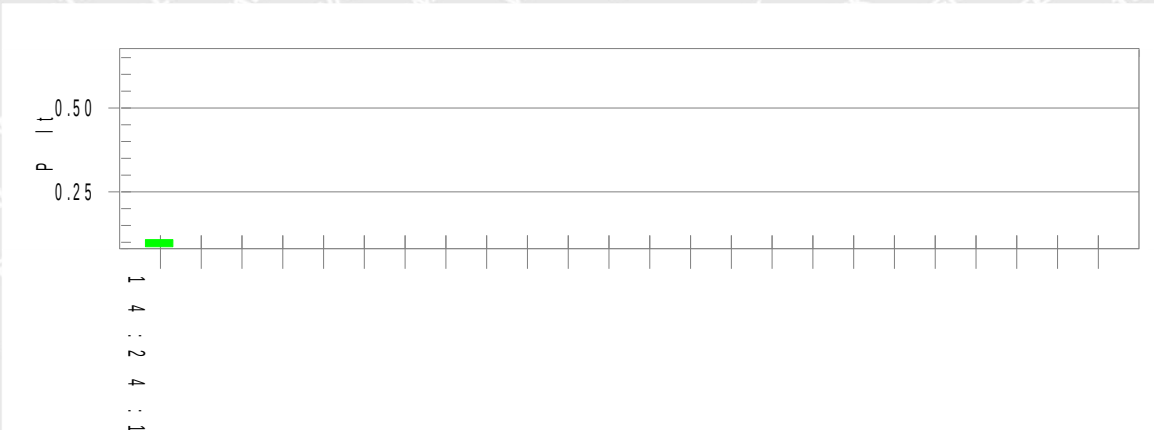
Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.07

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.247

Highest Plt (2 hr. period): 0.108

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

8. Electrostatic Discharges (ESD)

8.1 Test Procedure

Test is conducted under the description of EN 61000-4-2.

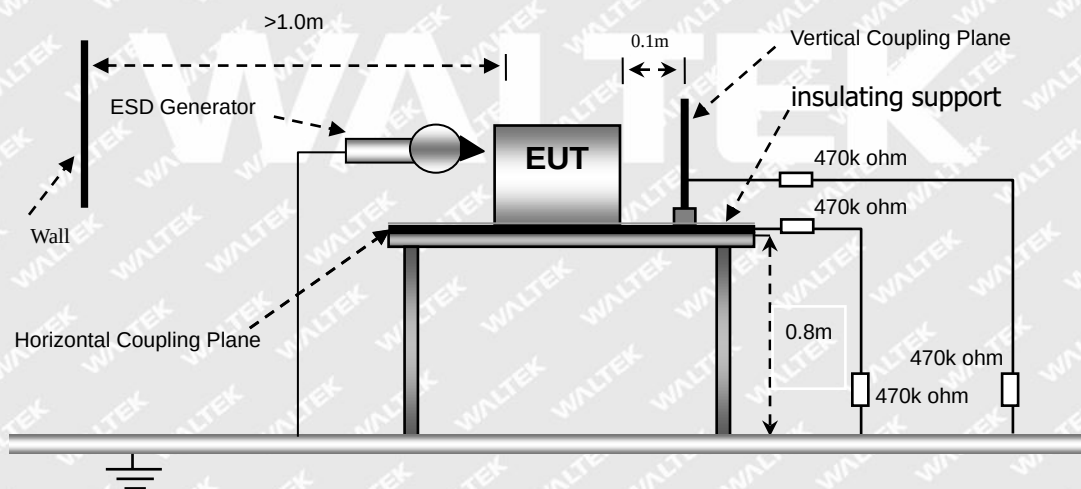
8.2 Test Performance

Performance Criterion: B

8.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

8.4 Basic Test Setup Block Diagram





8.5 Electrostatic Discharge Immunity Test Data

Test Mode: TM1

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test Points	Test Voltage (kV)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
DC Charging port	B	B	B	B	B	B	B	B	/	/
Enclosure	B	B	B	B	B	B	B	B	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test Points	Test Voltage (kV)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
/	/	/	/	/	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP & VCP)

EN 61000-4-2 Test Points	Test Voltage (kV)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
HCP (6 Sides)	A	A	A	A	/	/	/	/	/	/
VCP (4 Sides)	A	A	A	A	/	/	/	/	/	/

Test Result: Pass



9. Continuous RF electromagnetic field Disturbances (RS)

9.1 Test Procedure

Test is conducted under the description of EN 61000-4-3.

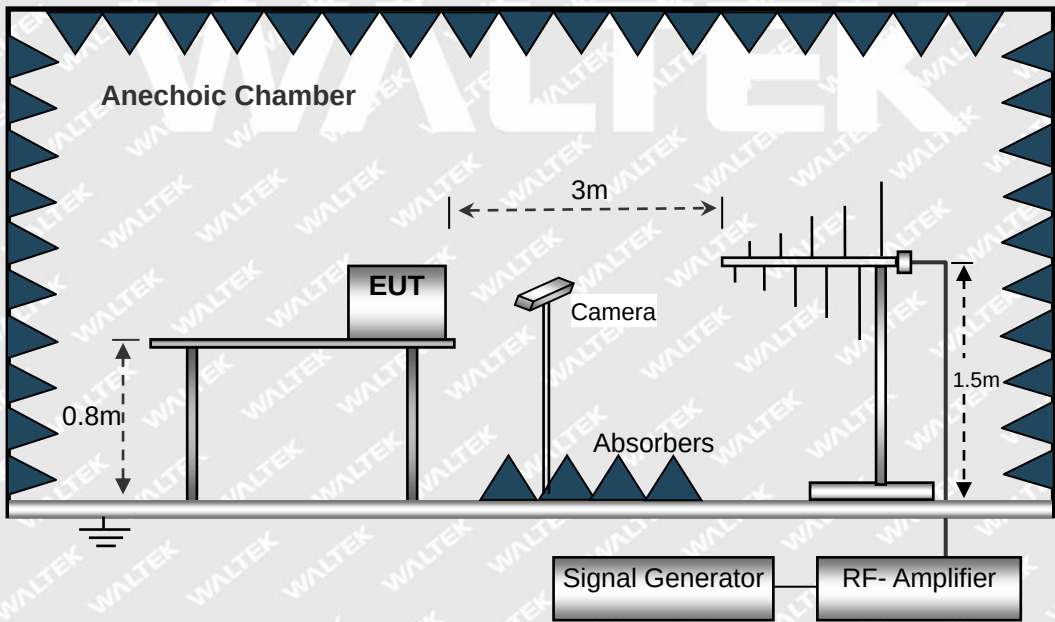
9.2 Test Performance

Performance Criterion: A

9.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1010 mbar

9.4 Basic Test Setup Block Diagram





9.5 Continuous Radiated Disturbances Test Data

Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth
Test Mode: TM1

Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A
1400-6000	3	A	A	A	A	A	A	A	A

Test Result: Pass





10. Electrical Fast Transients (EFT)

10.1 Test Procedure

Test is conducted under the description of EN 61000-4-4.

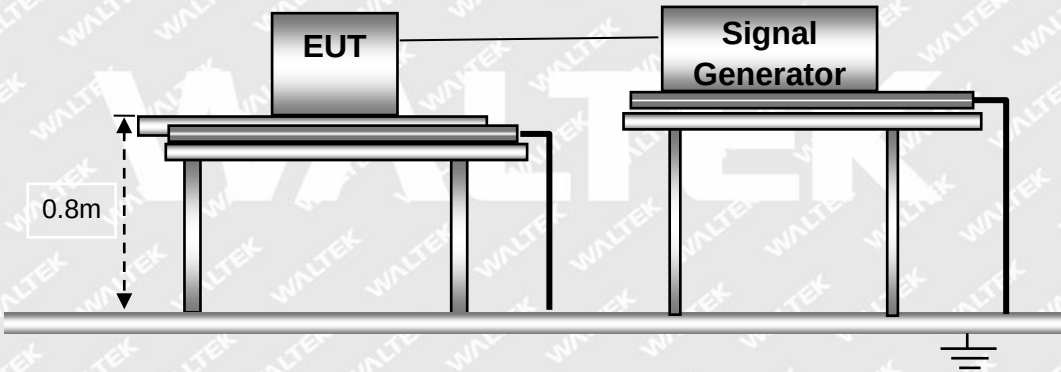
10.2 Test Performance

Performance Criterion: B

10.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

10.4 Basic Test Setup Block Diagram





10.5 Electrical Fast Transients Test Data

Test Mode: TM1

EN 61000-4-4 Test Points		Test Voltage (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply Power Port of EUT	L1	A	A	A	A	/	/	/	/
	L2	A	A	A	A	/	/	/	/
	PE	/	/	/	/	/	/	/	/
	L1+L2	A	A	A	A	/	/	/	/
	L1 + PE	/	/	/	/	/	/	/	/
	L2 + PE	/	/	/	/	/	/	/	/
	L1+L2+PE	/	/	/	/	/	/	/	/
Signal ports	RJ45	/	/	/	/	/	/	/	/

Test Result: Pass

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11. Surges

11.1 Test Procedure

Test is conducted under the description of EN 61000-4-5.

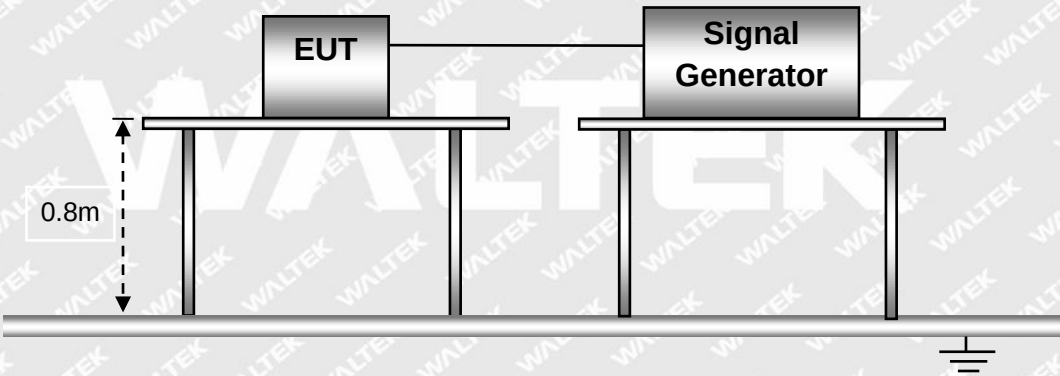
11.2 Test Performance

Performance Criterion: C

11.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

11.4 Basic Test Setup Block Diagram



11.5 Surge Test Data

Test Mode: TM1

Test Voltage	Poll	Path	Pass	Fail
0.5kV	±	L-N	A	/
1kV	±	L-N	A	/
2kV	±	L-PE, N-PE	/	/
4kV	±	L-N, L-PE, N-PE	/	/

Test Result: Pass



12. Continuous Induced RF Disturbances (C/S)

12.1 Test Procedure

Test is conducted under the description of EN 61000-4-6.

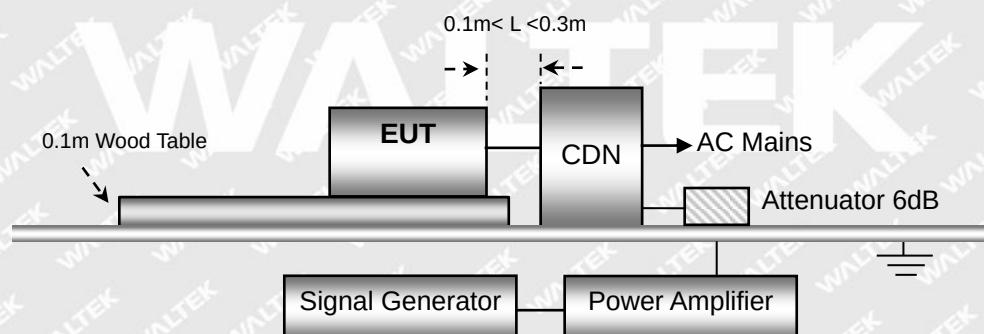
12.2 Test Performance

Performance Criterion: A

12.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

12.4 Basic Test Setup Block Diagram





12.5 Continuous Conducted Disturbances Test Data

Sweep frequency range: 0.15 MHz to 80 MHz
Frequency step: 1% of fundamental
Dwell time: 1 second
Test Mode: TM1
AC Port

Frequency MHz	Injected Position	Voltage level (e.m.f.)	Observations (Performance Criterion)	Result
0.15-80	AC Mains	1V	/	/
0.15-80	AC Mains	3V	A	Pass
0.15-80	AC Mains	10V	/	/

Test Result: Pass

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13. Power-Frequency Magnetic Fields (PFMF)

13.1 Test Procedure

Test is conducted under the description of EN 61000-4-8.

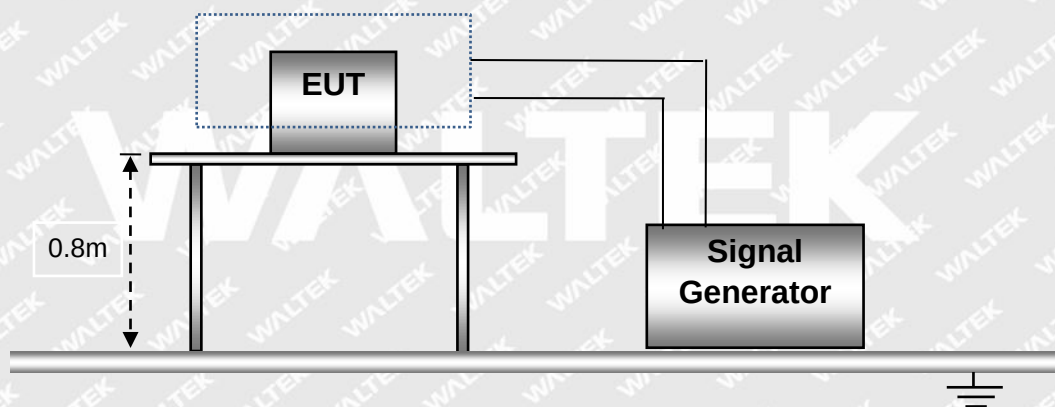
13.2 Test Performance

Performance Criterion: A

13.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

13.4 Basic Test Setup Block Diagram



13.5 Power-Frequency Magnetic Field Test Data

Test Mode: TM1

Level	Magnetic Field Strength (r.m.s) A/m	Frequency Hz	Induction Coil Position	Pass	Fail
1	1	50	X, Y, Z	/	/
2	3	50	X, Y, Z	A	/
3	10	50	X, Y, Z	/	/
X	Special	/	/	/	/

Test Result: Pass

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14. Voltage Dips and Interruptions

14.1 Test Procedure

Test is conducted under the description of EN 61000-4-11.

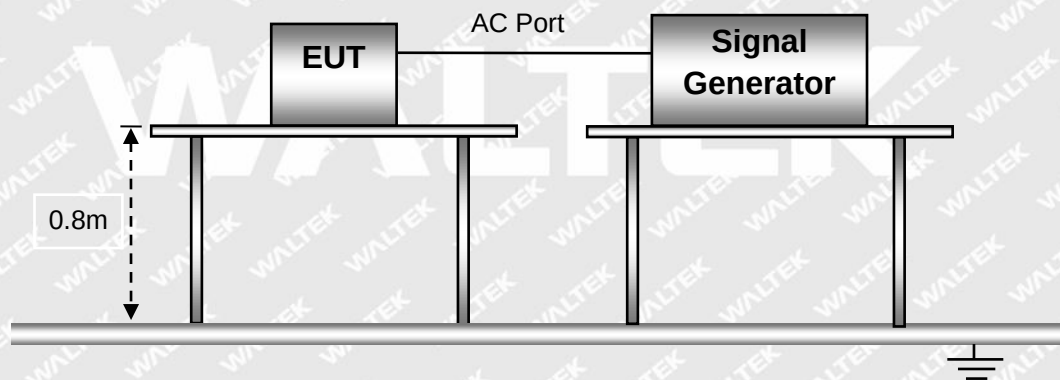
14.2 Test Performance

Performance Criterion: B/C

14.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	1011 mbar

14.4 Basic Test Setup Block Diagram



14.5 Voltage Dips And Interruptions Test Data

Test Mode: TM1

U: Voltage dips in % U_T (U_T is rated voltage for the EUT)

T: Test duration

Level	U	T	Phase Angle	N	Pass	Fail
1	100%	10ms	0/90/180/270	3	A	/
2	100%	20ms	0/90/180/270	3	B	/
3	30%	500ms	0/90/180/270	3	B	/
4	100%	5000ms	0/90/180/270	3	B	/

Test Result: Pass



EXHIBIT 1 - EUT PHOTOGRAPHS

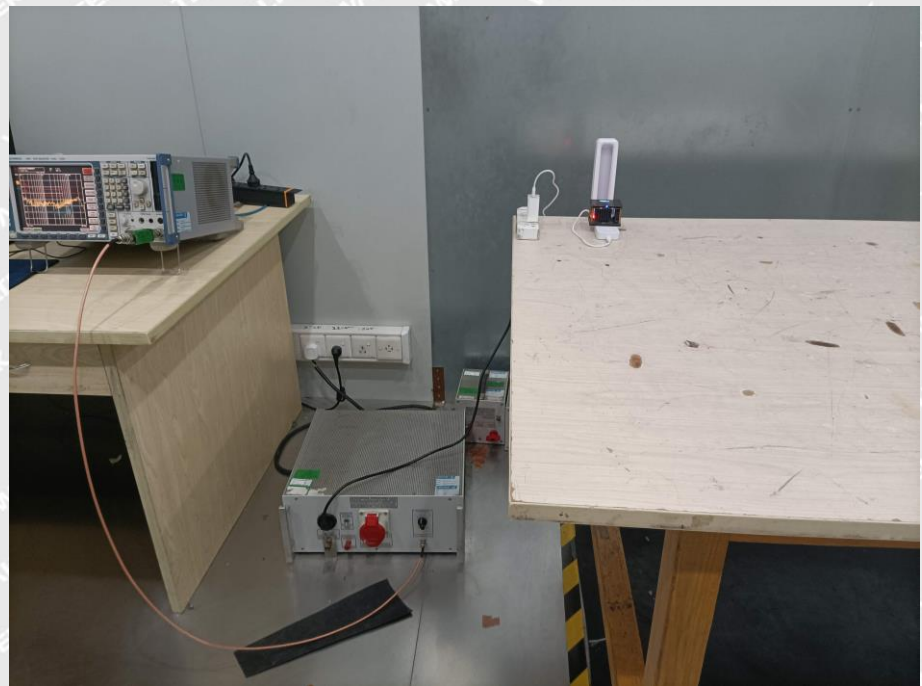
Please refer to “ANNEX”.

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EXHIBIT 3 - TEST SETUP PHOTOGRAPHS

**Conducted Emission
Test Setup**

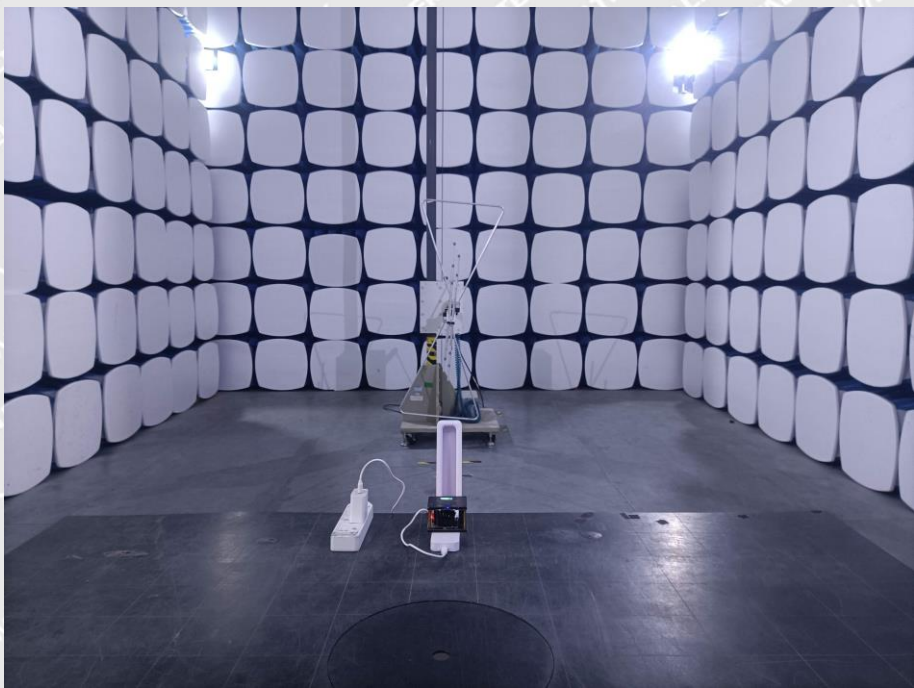


**Radiation Emission
Test View
(9kHz~30MHz)**





**Radiation Emission
Test View
(30MHz~1000MHz)**

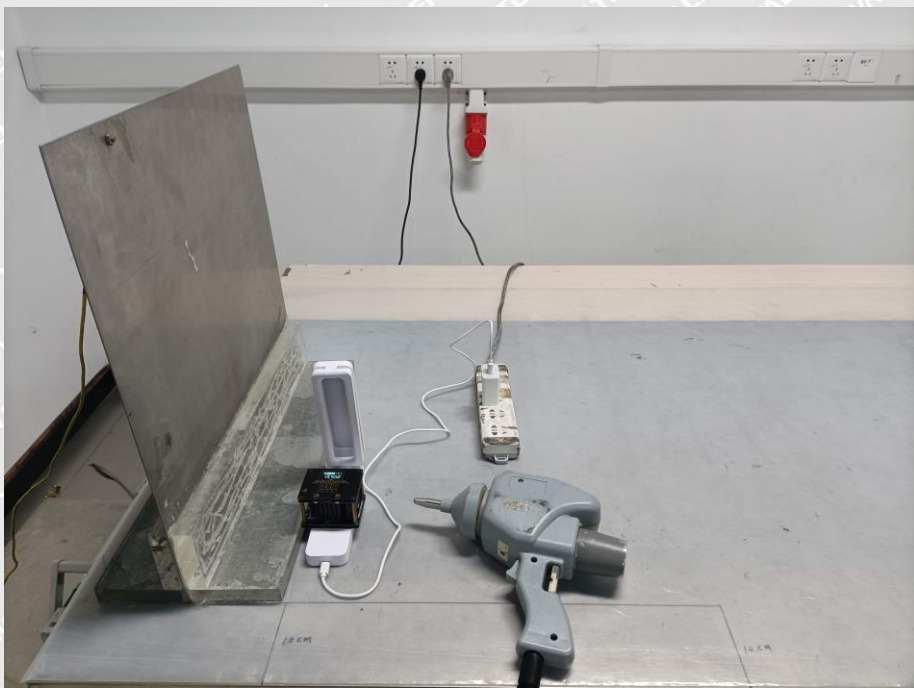


**Harmonic/Flicker Test
View**

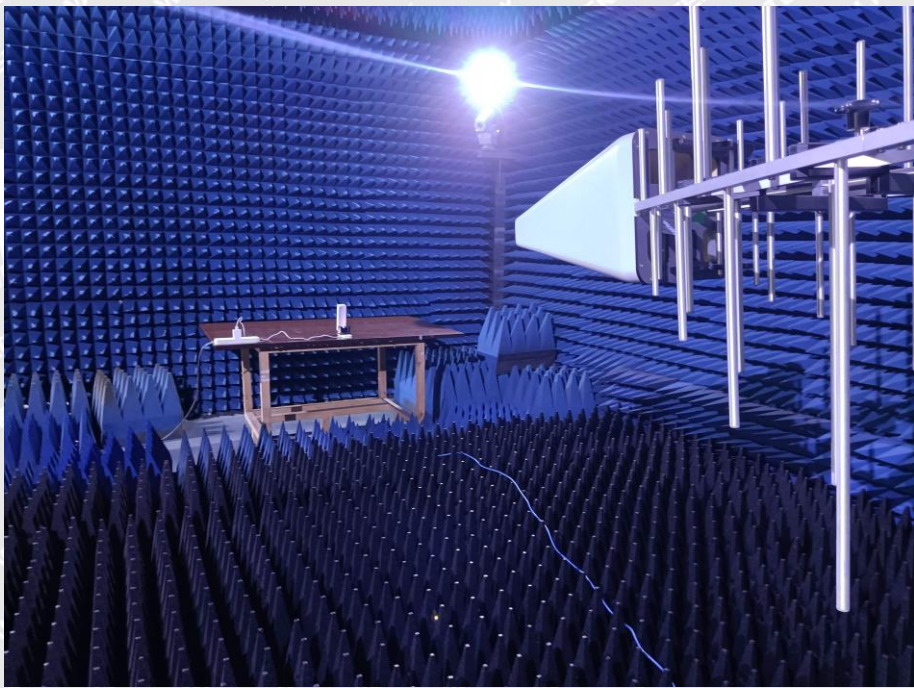




EN 61000-4-2 Test View



EN 61000-4-3 Test View

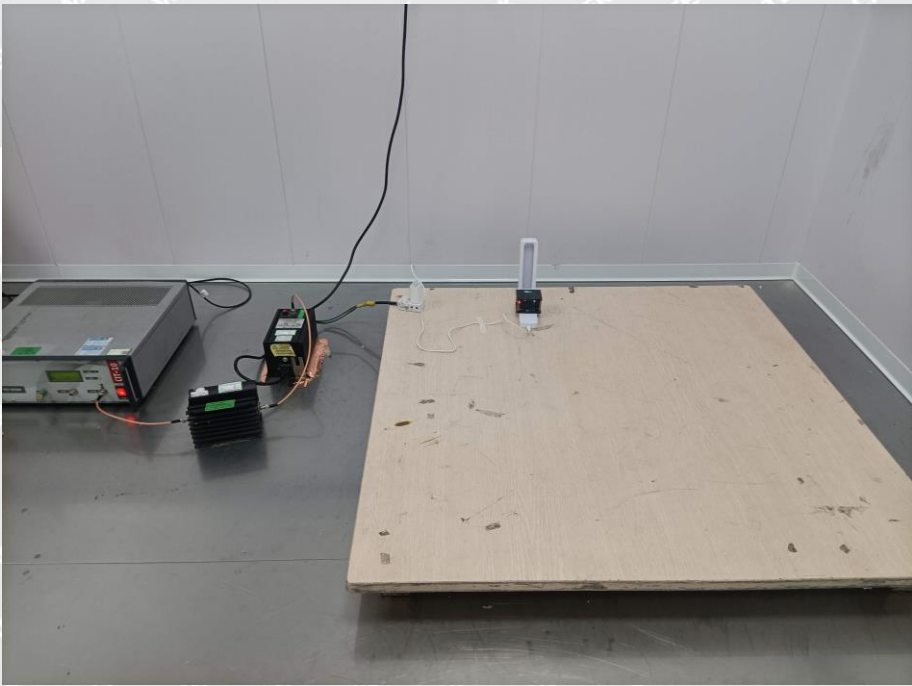




**EN 61000-4-4/5/11 Test
View**

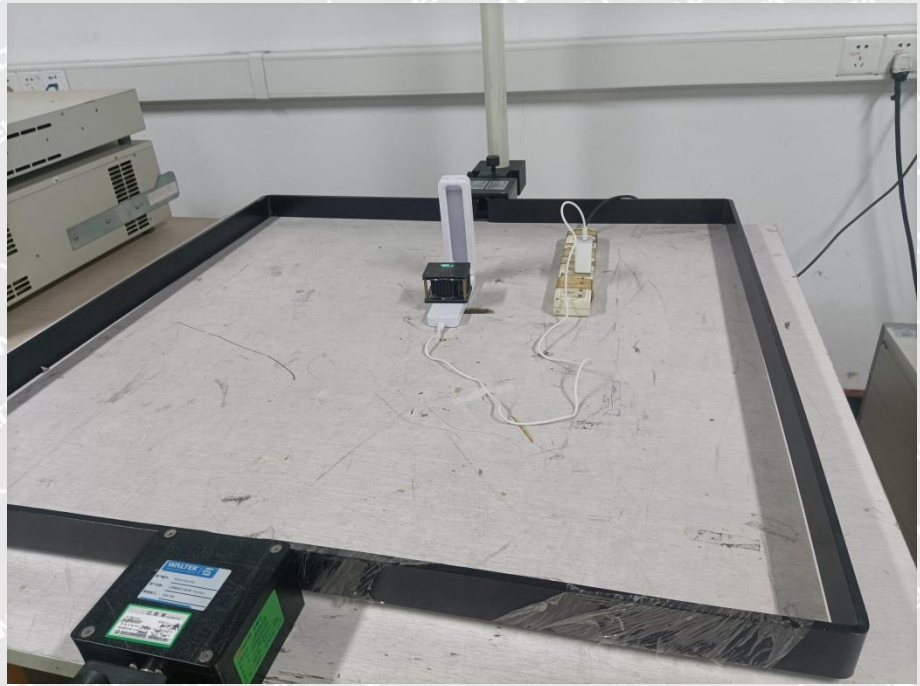


EN 61000-4-6 Test View





EN 61000-4-8 Test View



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***** END OF REPORT *****