



中国认可
国际互认
检测
TESTING
CNAS L6478



TEST REPORT

Reference No...... : WTF24F04098968E
Applicant..... : Mid Ocean Brands B.V.
Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon,
Hong Kong
Manufacturer : 112015
Address..... : ---
Product Name..... : 1200 mAh retractable desk lamp
Model No...... : MO2339
Test specification..... : EN IEC 55015:2019+A11:2020
EN IEC 61547:2023
Date of Receipt sample : 2024-05-08
Date of Test : 2024-05-08 to 2024-06-03
Date of Issue..... : 2024-06-07
Test Report Form No...... : WEL-55015A-02B
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.

Prepared By:

Waltek Testing Group (Foshan) Co., Ltd.

Address: 1/F., Building 19, Sunlink Machinery City, Xingye 4 Road,
Guanglong Industrial Park, Chihua Neighborhood Committee, Chencun Town,
Shunde District, Foshan, Guangdong, China

Tel:+86-757-23811398

Fax:+86-757-23811381

E-mail:info@waltek.com.cn

Tested by:

Leo Feng

Leo Feng

Approved by:

Danny Zhou

Danny Zhou



1 Test Summary

EMISSION				
Test Item	Test Standard	Class / Severity	Result	
Conducted Disturbance for Wired Network Port, 9kHz to 30MHz	EN IEC 55015:2019+A11:2020	Clause 4.3.1	Pass	
Conducted Disturbance for Local Wired Port,150kHz to 30MHz	EN IEC 55015:2019+A11:2020	Clause 4.4	N/A	
Radiated Electromagnetic Disturbance, 9kHz to 30MHz	EN IEC 55015:2019+A11:2020	Clause 4.5.2	Pass	
Radiated Disturbance, 30MHz to 1000MHz	EN IEC 55015:2019+A11:2020	Clause 4.5.3	Pass	
IMMUNITY (EN IEC 61547:2023)				
Test Item	Test Method	Class / Severity	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	±4 kV Contact ±8 kV Air	B	Pass
Radio-Frequency Electromagnetic Fields (80MHz to 1GHz)	IEC 61000-4-3: 2006+A1+A2	3V/m, 80%, 1kHz, Amp. Mod.	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2012	AC ±1.0kV DC ±0.5kV	B	Pass
Surge	IEC 61000-4-5: 2014+A1	±1kV D.M.† ±2kV C.M.‡	C	Pass
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2013	3Vr.m.s.(emf), 80%, 1kHz Amp. Mod.	A	Pass
Power-Frequency Magnetic Field	IEC 61000-4-8:2009	3A/m	A	N/A
Voltage Dips and Interruptions	IEC 61000-4-11: 2004+A1	0 % UT* for 0.5per	B	Pass
		70 % UT* for 10per	B	Pass

Remark:

- Pass Test item meets the requirement
- Fail Test item does not meet the requirement
- N/A Test case does not apply to the test object
- A.M Amplitude Modulation
- † Differential Mode
- ‡ Common Mode
- * UT is the nominal supply voltage



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3 General Information

3.1 General Description of E.U.T.

Product Name : 1200 mAh retractable desk lamp

Model No. : MO2339

Remark : ---

3.2 Details of E.U.T.

Technical Data : 5Vdc input by USB port, Battery 3.7V

3.3 Description of Support Units

The EUT has been tested as an independent unit. MO2339 is the test sample.

The DV&RE tests were performed in the condition of AC 245V/50Hz input. The other tests were performed in the condition of AC 230V/50Hz input. All AC input tests were carried out with an adapter specified by laboratory. And the RE,ESD&RS tests were performed in the additional condition of battery 3.7V.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN IEC 55015:2019+A11:2020 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

EN IEC 61547:2023 Equipment for general lighting purposes — EMC immunity requirements



3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Testing Group (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science and Economic Development Canada (ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number: 21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Testing Group (Foshan) 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. Registration 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

3.6 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test items: ---

Lab information: ---

3.7 Abnormalities from Standard Conditions

None.



4 Equipment Used during Test

☒ Conducted Disturbance for Wired Network Port (9kHz to 30MHz) 1#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESR3	102423	Valid
2.	LISN	R&S	ENV216	101343	Valid
3.	Cable 7	HUBER+SUHNER	CBL2-NN-6M	223NN624	Valid
4.	Switch	CD	RSU-A4 18G	RSUA4008	Valid
☐ Conducted Disturbance for Wired Network Port (9kHz to 30MHz) 2#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2.	LISN	R&S	ENV216	101215	Valid
3.	Cable 1	HUBER+SUHNER	CBL2-NN-6M	6102701	Valid
4.	Switch	ESE	RSU/M2	---	Valid
☐ Conducted Disturbance for Wired Network Port (9kHz to 30MHz) 3#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESR3	102842	Valid
2.	LISN	R&S	ENV216	101542	Valid
3.	Cable 12	YIHENG	LMR195UF-NMNM-2.5	---	Valid
4.	Manual RF Switch	YIHENG	SW-2	RSU0402	Valid
☒ Radiated Electromagnetic Disturbance (9kHz to 30MHz)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2.	Three Loops Antenna	SCHWARZBECK	HXYZ9170	213	Valid
☒ Radiated Disturbance (30MHz to 1GHz) 1#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	3m Semi-anechoic Chamber	CHANGCHUANG	9m×6m×6m	---	Valid
2.	EMI Test Receiver	R&S	ESR7	101566	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9162	9162-117	Valid
4.	Coaxial Cable (below 1GHz)	HUBER+SUHNER	CBL3-NN-12+3m	214NN320	Valid
5.	CDNE	SCHWARZBECK	CDNE M3	00083	Valid
6.	CDNE	SCHWARZBECK	CDNE M2	00092	Valid
☐ Radiated Disturbance (30MHz to 1GHz) 2#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	3m Semi-anechoic Chamber	YIHENG	9m×6m×6m	YH2021071801	Valid
2.	EMI Test Receiver	R&S	ESR7	102454	Valid
3.	Trilog Broadband	SCHWARZBECK	VULB 9163	01418	Valid



	Antenna				
4.	Coaxial Cable (below 1GHz)	YIHENG	LMR240UF-NMSM-7.5	---	Valid
5.	CDNE	SCHWARZBECK	CDNE M3	00083	Valid
6.	CDNE	SCHWARZBECK	CDNE M2	00092	Valid
☒ ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	ESD Simulator	TESEQ	NSG437	521	Valid
☒ EFT & Voltage Dips and Interruptions					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMS test system	TESEQ	NSG3040	1858	Valid
☒ Surge					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Surge Simulator	TESEQ	NSG3060	1395	Valid
☒ Injected Currents					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	Conducted Immunity test system	TESEQ	NSG4070	45345	Valid
2.	CDN	TESEQ	CDN M016	31586	Valid
3.	6dB Attenuator	TESEQ	ATN6075	32122	Valid
☒ Radio-frequency Electromagnetic Fields					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	RF Power Amplifier	OPHIR	5225R	1051/1712	Valid
2.	RF Power Amplifier	OPHIR	5293RE	1051/171	Valid
3.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	Valid
4.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP 9149	476	Valid
5.	Analog signal generator	RS	SMB100A	105566	Valid
6.	Power meter	RS	NRP6A	101133	Valid
7.	Power meter	RS	NRP6A	101134	Valid

☐: Not Used

☒: Used



4.1 Software List

Description	Manufacturer	Model	Version
EMI Test Software (Conducted Disturbance 1#)	FARATRONIC	EZ-EMC	EMEC-3A1
EMI Test Software (Conducted Disturbance 2#)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (Conducted Disturbance 3#)	FARATRONIC	EZ-EMC	COM 3A1.1
EMI Test Software (LOOP)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (Radiated Disturbance 1#)	FARATRONIC	EZ-EMC	RA-03A1-1
EMI Test Software (Radiated Disturbance 2#)	FARATRONIC	EZ-EMC	RA-03A1-1
Radiated Immunity Test Software	TONSCEND	JS35-RS	V2.0.1.7

4.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Disturbance	9kHz~150kHz	$\pm 2.6\text{dB}$	(1)
Conducted Disturbance	150kHz~30MHz	$\pm 2.6\text{dB}$	(1)
Radiated Electromagnetic Disturbance	9kHz~30MHz	$\pm 3.0\text{dB}$	(1)
Radiated Disturbance	30MHz~1GHz	$\pm 4.5\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



4.3 Special Accessories and Auxiliary Equipment

Item	Equipment	Technical Data	Manufacturer	Model No.
1.	Adaptor	Input:100-240V~50/60Hz, 0.75A Output: 5Vdc/2A, 9Vdc/2A, 10Vdc/2.25A Max	HUAWEI	HW-100225C00

4.4 Decision Rule

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If U_{LAB} is less than or equal to U_{cispr} , then

- Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{LAB} is greater than U_{cispr} , then

- Compliance is deemed to occur if no measured disturbance level, increased by $(U_{LAB} - U_{cispr})$, exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{LAB} - U_{cispr})$, exceeds the disturbance limit.

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5 Emission Test Results

5.1 Conducted Disturbance for Wired Network Port, 9kHz to 30MHz

Test Requirement..... : EN IEC 55015 Clause 4.3.1

Test Method..... : EN IEC 55015 Clause 8

Test Result..... : Pass

Frequency Range..... : 9kHz to 30MHz

Class/Severity..... : Table 1 of EN IEC 55015

5.1.1 E.U.T. Operation

Operating Environment:

Temperature : 26°C

Humidity..... : 60%RH

Atmospheric Pressure : 101.2kPa

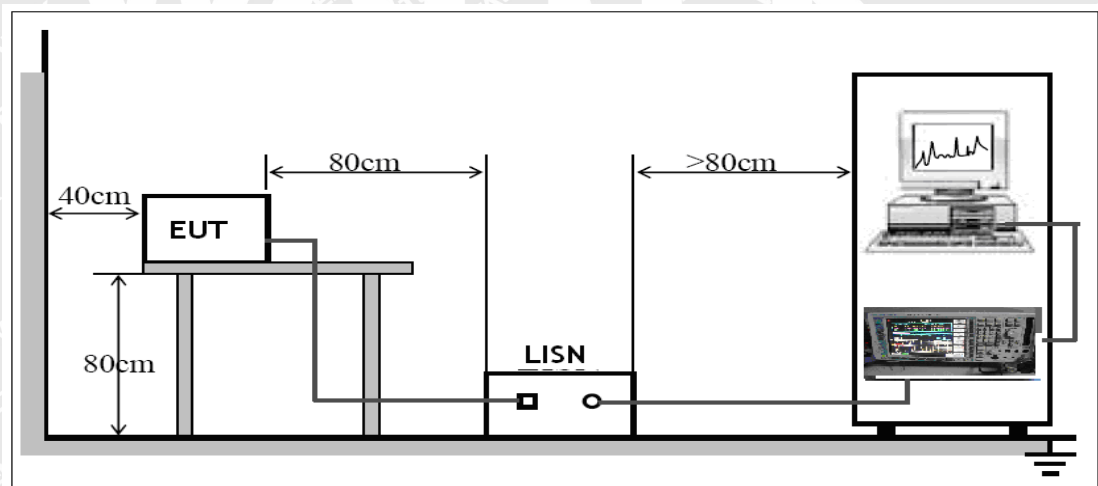
EUT Operation:

Input Voltage : AC 245V/50Hz

Operating Mode..... : Specified Adapter Powered Mode

5.1.2 Block Diagram of Test Setup

The Conducted Disturbance for Wired Network Port test was performed in accordance with the EN IEC 55015.



5.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



5.1.4 Corrected Amplitude & Margin Calculation

The Corrected factor is calculated by adding LISN VDF(Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Measurement} = \text{Reading Level} + \text{Correct Factor}$$

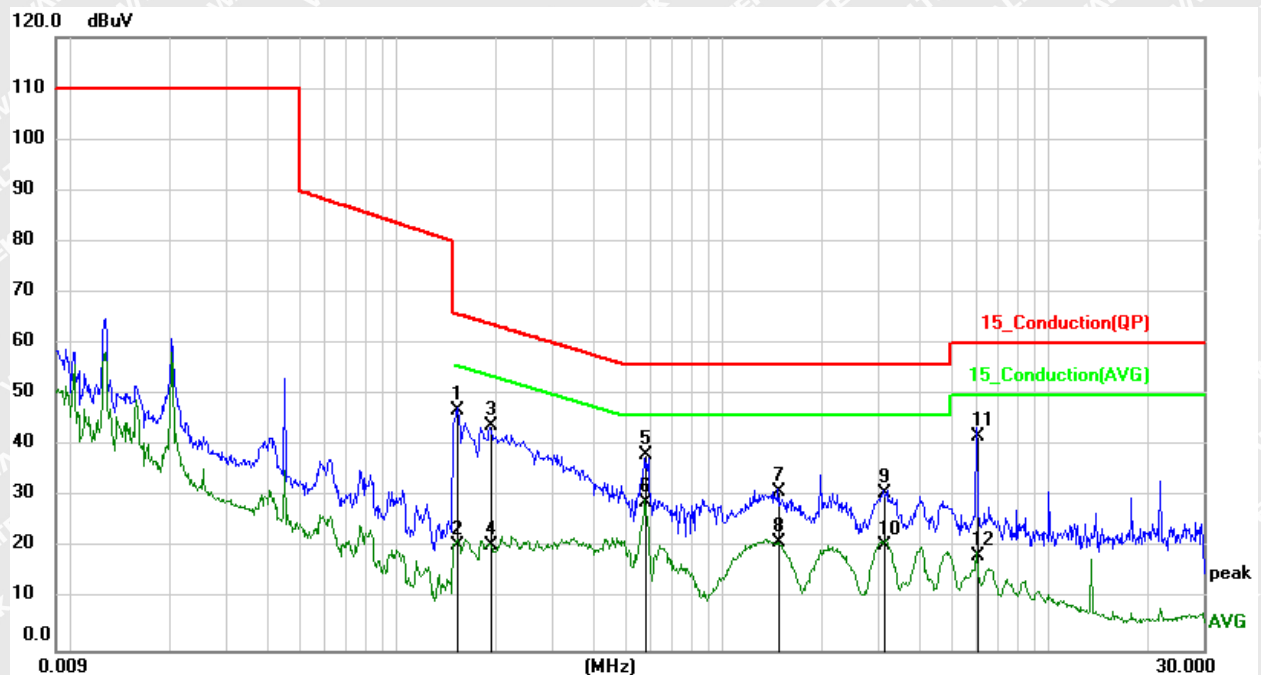
$$\text{Correct Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Measurement} - \text{Limit}$$

5.1.5 Conducted Disturbance for Wired Network Port Test Data

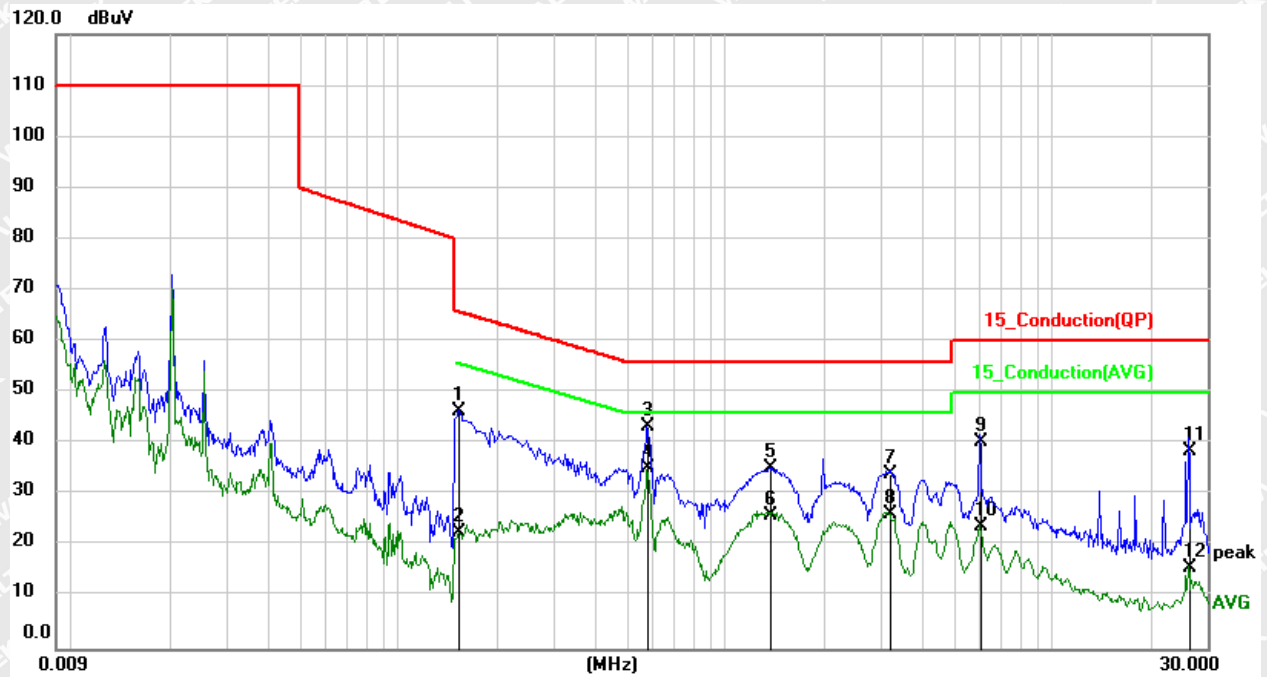
Live Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1539	37.15	9.71	46.86	65.79	-18.93	QP	
2		0.1539	10.96	9.71	20.67	55.79	-35.12	AVG	
3		0.1940	34.24	9.72	43.96	63.86	-19.90	QP	
4		0.1940	10.91	9.72	20.63	53.86	-33.23	AVG	
5		0.5780	28.39	9.76	38.15	56.00	-17.85	QP	
6	*	0.5780	19.10	9.76	28.86	46.00	-17.14	AVG	
7		1.4819	21.28	9.79	31.07	56.00	-24.93	QP	
8		1.4819	11.43	9.79	21.22	46.00	-24.78	AVG	
9		3.1220	20.78	9.84	30.62	56.00	-25.38	QP	
10		3.1220	10.72	9.84	20.56	46.00	-25.44	AVG	
11		6.0300	31.99	9.96	41.95	60.00	-18.05	QP	
12		6.0300	8.53	9.96	18.49	50.00	-31.51	AVG	



Neutral Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1539	36.55	9.65	46.20	65.79	-19.59	QP	
2		0.1539	12.92	9.65	22.57	55.79	-33.22	AVG	
3		0.5820	33.54	9.71	43.25	56.00	-12.75	QP	
4	*	0.5820	25.47	9.71	35.18	46.00	-10.82	AVG	
5		1.3740	25.64	9.75	35.39	56.00	-20.61	QP	
6		1.3740	16.15	9.75	25.90	46.00	-20.10	AVG	
7		3.2020	24.14	9.81	33.95	56.00	-22.05	QP	
8		3.2020	16.37	9.81	26.18	46.00	-19.82	AVG	
9		6.0380	30.29	9.94	40.23	60.00	-19.77	QP	
10		6.0380	13.91	9.94	23.85	50.00	-26.15	AVG	
11		26.1540	28.08	10.49	38.57	60.00	-21.43	QP	
12		26.1540	5.41	10.49	15.90	50.00	-34.10	AVG	



5.2 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement.....	: EN IEC 55015 Clause 4.4.1
Test Method.....	: EN IEC 55015 Clause 9.1
Test Result.....	: Pass
Frequency Range.....	: 9kHz to 30MHz
Class/Severity.....	: Table 8 of EN IEC 55015

5.2.1 E.U.T. Operation

Operating Environment:

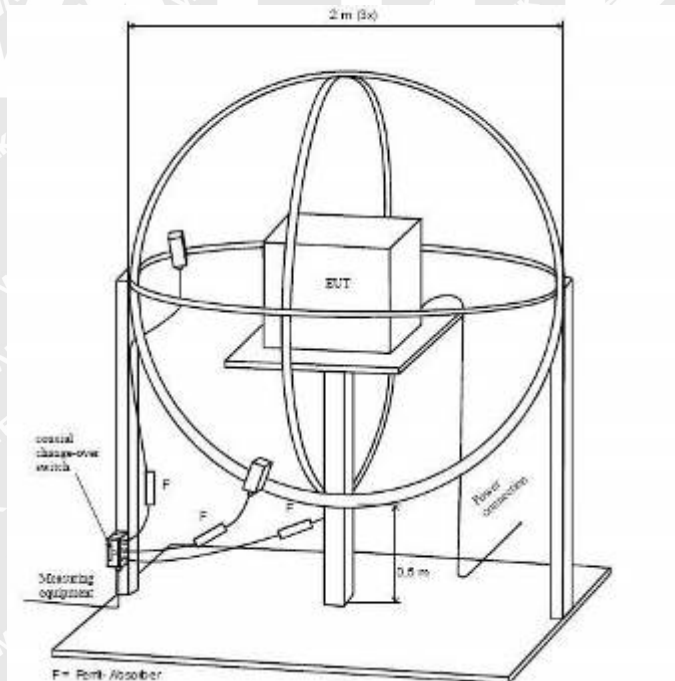
Temperature	: 24.8°C
Humidity.....	: 49.3%RH
Barometric Pressure.....	: 101.2kPa

EUT Operation:

Input Voltage	: Refer to section 5.2.4
Operating Mode.....	: Refer to section 5.2.4

5.2.2 Block Diagram of Test Setup

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



5.2.3 Measurement Data

According to the data in section 5.2.4, the EUT complied with the EN IEC 55015 standards.

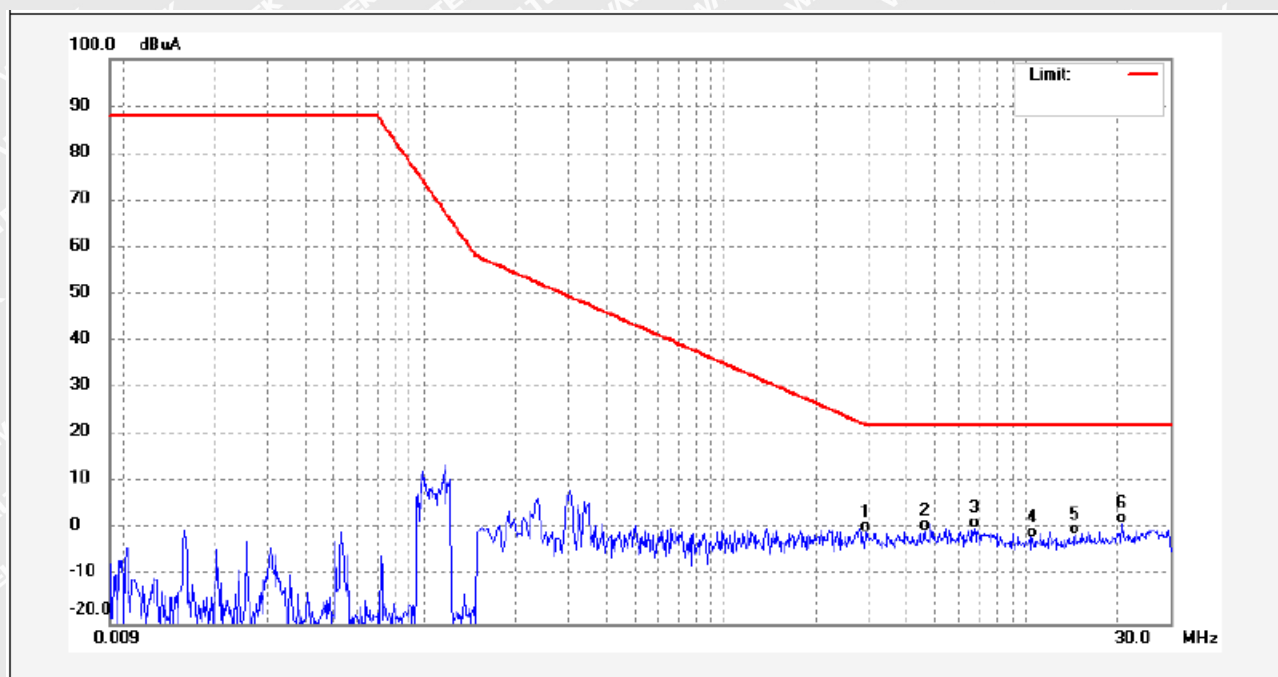


5.2.4 Radiated Electromagnetic Disturbance Test Data, 9kHz to 30MHz

Test Mode: Specified Adapter Powered Mode

Input Voltage: AC 245V/50Hz input

Loop X:



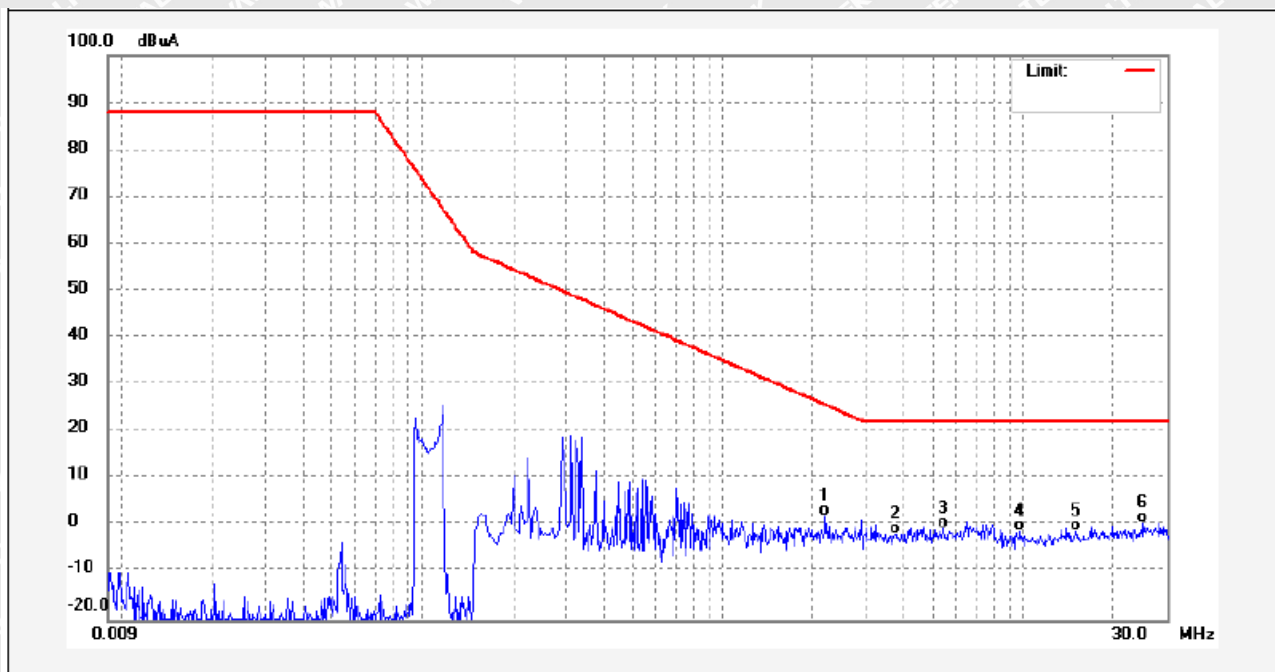
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	2.9219	-0.89	0.12	-0.77	22.32	-23.09	QP	
2	4.6060	-0.64	0.17	-0.47	22.00	-22.47	QP	
3	6.7420	-0.04	0.21	0.17	22.00	-21.83	QP	
4	10.5340	-2.17	0.25	-1.92	22.00	-23.92	QP	
5	14.5740	-1.61	0.29	-1.32	22.00	-23.32	QP	
6	20.8220	0.67	0.36	1.03	22.00	-20.97	QP	



Test Mode: Specified Adapter Powered Mode

Input Voltage: AC 245V/50Hz input

Loop Y:



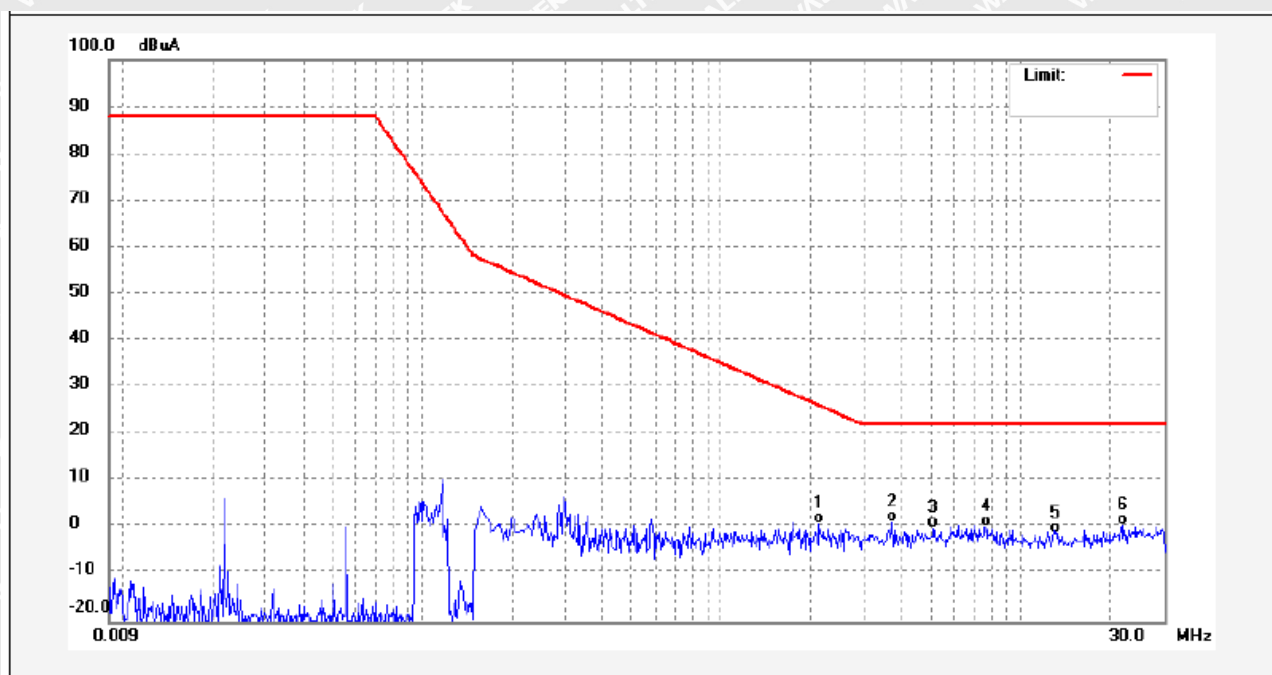
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	2.1980	2.02	0.10	2.12	25.74	-23.62	QP	
2	3.7580	-2.09	0.14	-1.95	22.00	-23.95	QP	
3	5.4580	-0.94	0.19	-0.75	22.00	-22.75	QP	
4	9.7940	-1.61	0.24	-1.37	22.00	-23.37	QP	
5	15.0540	-1.45	0.30	-1.15	22.00	-23.15	QP	
6	25.0940	0.21	0.39	0.60	22.00	-21.40	QP	



Test Mode: Specified Adapter Powered Mode

Input Voltage: AC 245V/50Hz input

Loop Z:



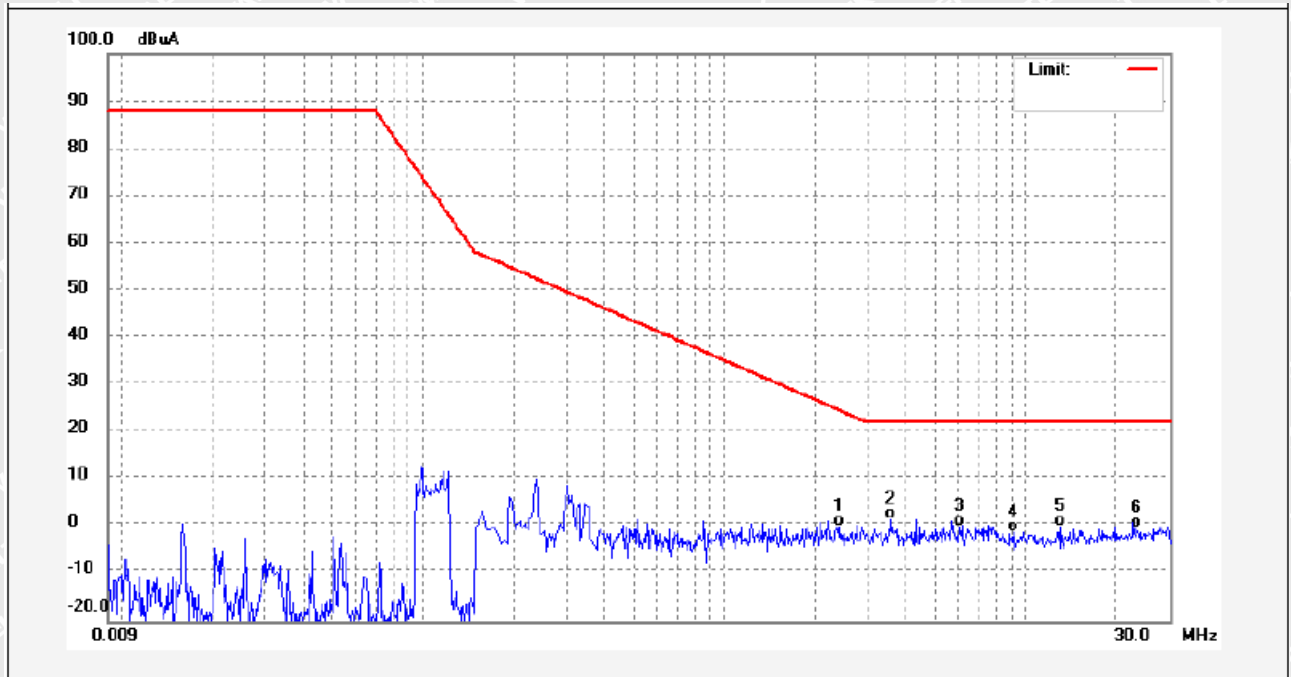
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	2.1300	0.70	0.09	0.79	26.11	-25.32	QP	
2	3.7300	0.93	0.14	1.07	22.00	-20.93	QP	
3	5.1180	-0.08	0.18	0.10	22.00	-21.90	QP	
4	7.6780	-0.06	0.22	0.16	22.00	-21.84	QP	
5	13.2220	-1.65	0.28	-1.37	22.00	-23.37	QP	
6	22.0380	0.29	0.37	0.66	22.00	-21.34	QP	



Test Mode: Battery Powered Mode

Input Voltage: Battery 3.7V

Loop X:



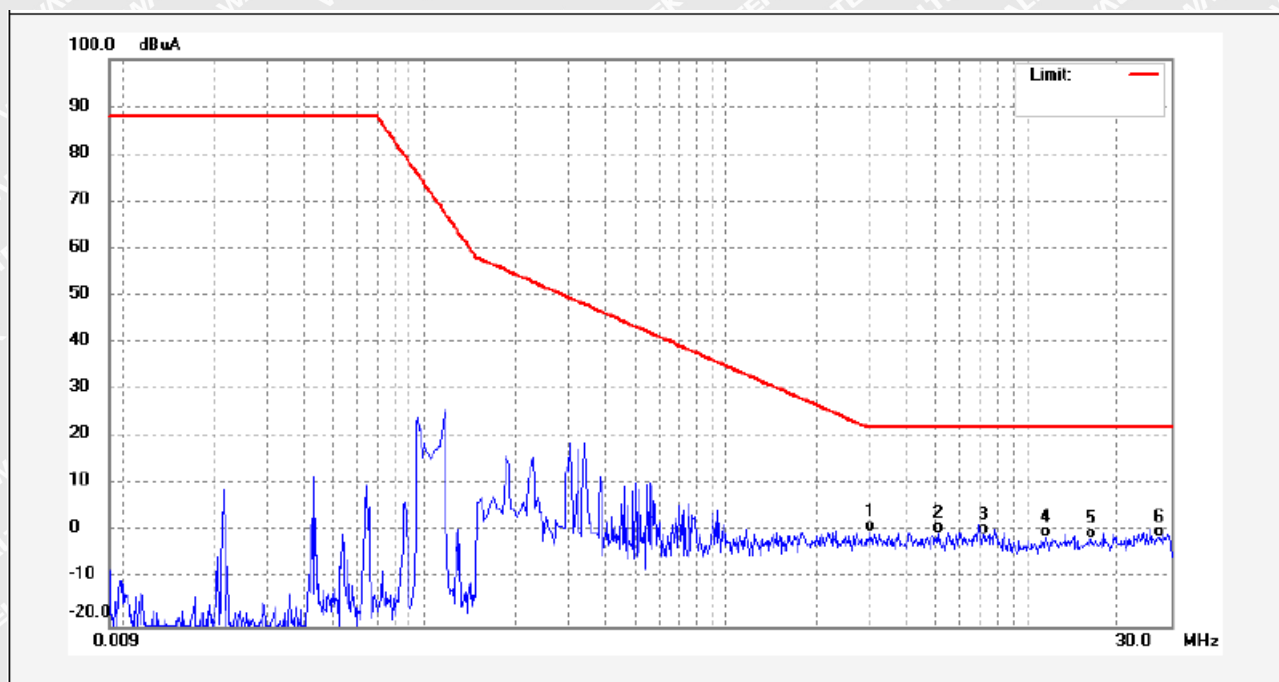
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	2.4260	-0.19	0.10	-0.09	24.55	-24.64	QP	
2	3.5780	1.35	0.14	1.49	22.00	-20.51	QP	
3	6.0660	-0.36	0.20	-0.16	22.00	-22.16	QP	
4	9.1780	-1.52	0.23	-1.29	22.00	-23.29	QP	
5	13.1140	-0.45	0.28	-0.17	22.00	-22.17	QP	
6	23.5180	-0.60	0.38	-0.22	22.00	-22.22	QP	



Test Mode: Battery Powered Mode

Input Voltage: Battery 3.7V

Loop Y:



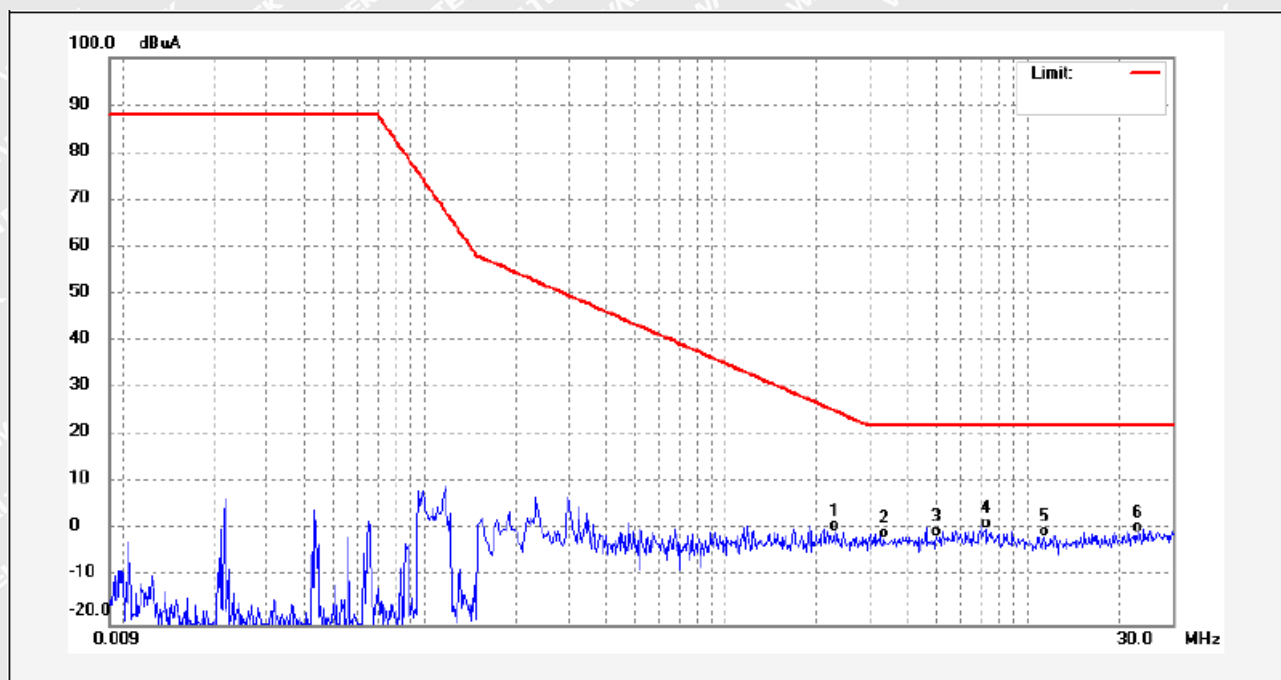
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	3.0180	-0.25	0.12	-0.13	22.00	-22.13	QP	
2	5.0739	-0.50	0.18	-0.32	22.00	-22.32	QP	
3	7.1940	-0.71	0.21	-0.50	22.00	-22.50	QP	
4	11.6100	-1.38	0.26	-1.12	22.00	-23.12	QP	
5	16.3260	-1.82	0.31	-1.51	22.00	-23.51	QP	
6	27.4380	-1.56	0.41	-1.15	22.00	-23.15	QP	



Test Mode: Battery Powered Mode

Input Voltage: Battery 3.7V

Loop Z:



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	2.2900	-0.57	0.10	-0.47	25.24	-25.71	QP	
2	3.3540	-2.10	0.13	-1.97	22.00	-23.97	QP	
3	4.9940	-1.72	0.18	-1.54	22.00	-23.54	QP	
4	7.2540	0.14	0.21	0.35	22.00	-21.65	QP	
5	11.3300	-1.82	0.26	-1.56	22.00	-23.56	QP	
6	23.1380	-1.01	0.38	-0.63	22.00	-22.63	QP	



5.3 Radiated Disturbance, 30MHz to 1000MHz

Test Requirement.....	: EN IEC 55015 Clause 4.5.3
Test Method.....	: EN IEC 55015 Clause 9.3
Test Result.....	: Pass
Frequency Range.....	: 30MHz to 1000MHz
Class/Severity.....	: Table 10 of EN IEC 55015

5.3.1 E.U.T. Operation

Operating Environment:

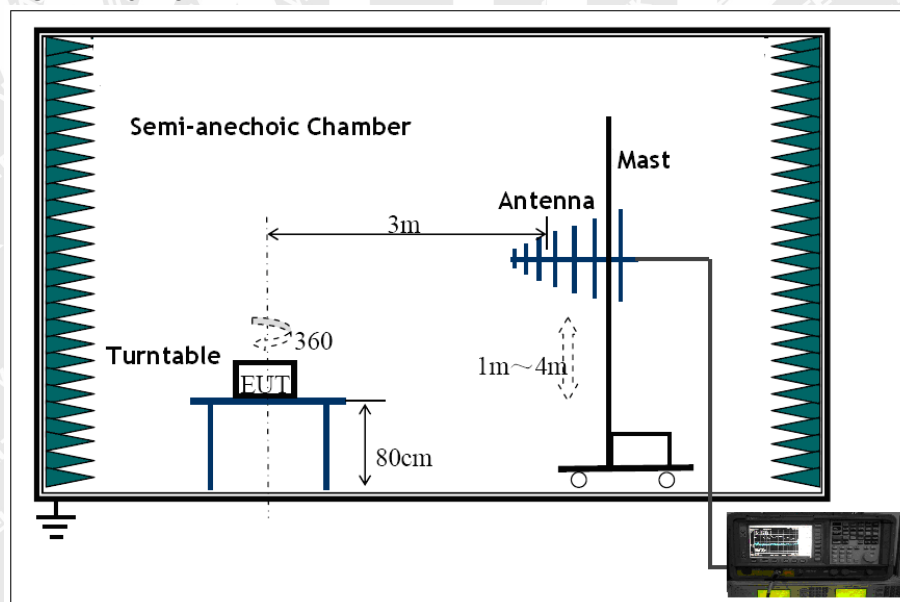
Temperature	: 23.3°C
Humidity.....	: 51.3%RH
Atmospheric Pressure.....	: 101.2kPa

EUT Operation:

Input Voltage	: Refer to section 5.3.5
Operating Mode.....	: Refer to section 5.3.5

5.3.2 Block Diagram of Test Setup

The Radiated Disturbance test was performed in the 3m Semi- Anechoic Chamber test site and accordance with CISPR16-2-3.



5.3.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for Horizontal & Vertical polarisation. Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line.



5.3.4 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Corr. Factor}$$

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

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.

The equation for margin calculation is as follows:

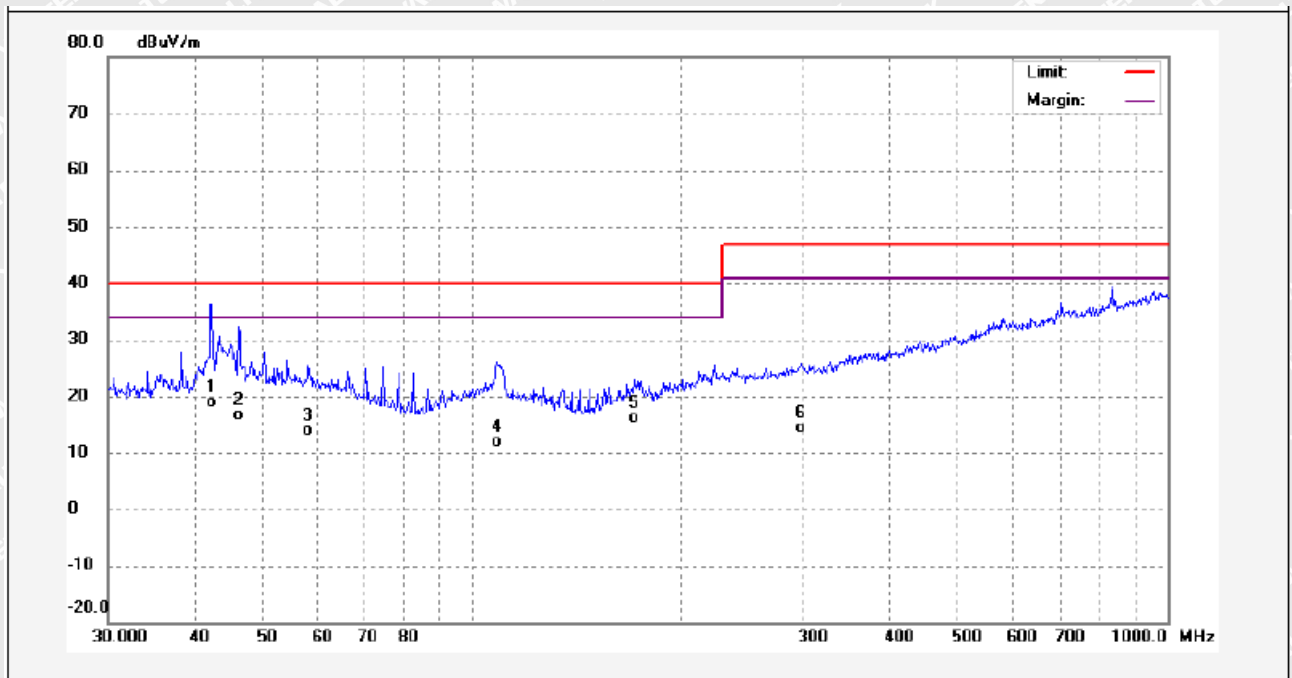
$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

5.3.5 Radiated Disturbance Test Data

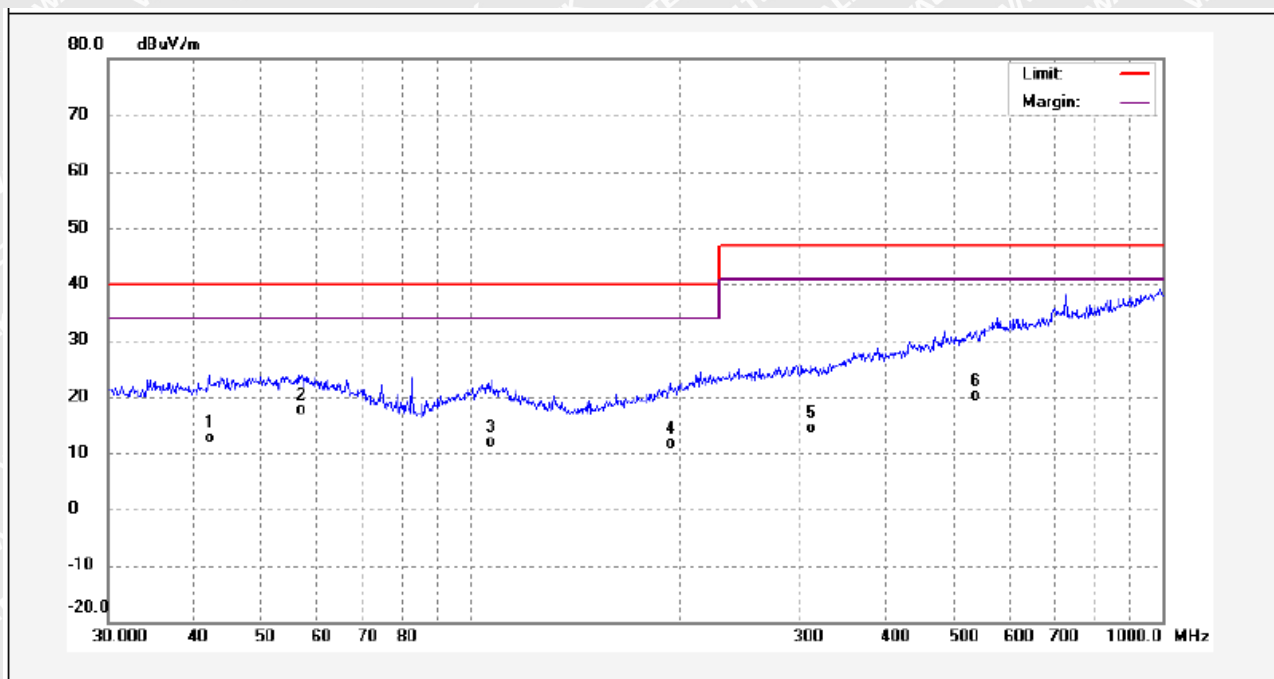
Specified Adapter Powered Mode

AC 245V/50Hz input

Vertical Polarization



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.3022	5.16	13.78	18.94	40.00	-21.06	QP	
2	46.1779	2.68	14.06	16.74	40.00	-23.26	QP	
3	58.2030	-0.52	14.28	13.76	40.00	-26.24	QP	
4	108.6470	-0.83	12.83	12.00	40.00	-28.00	QP	
5	170.7926	5.32	10.73	16.05	40.00	-23.95	QP	
6	297.2241	-1.27	15.72	14.45	47.00	-32.55	QP	

**Specified Adapter Powered Mode****AC 245V/50Hz input****Horizontal Polarization:**

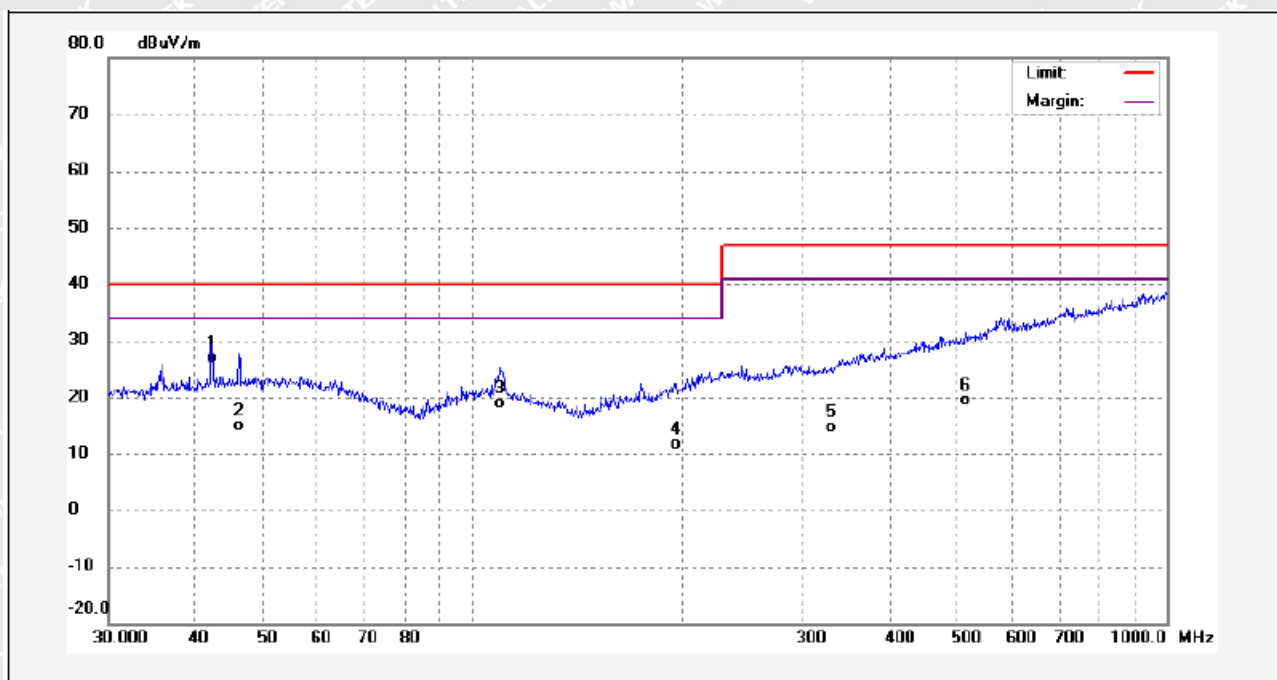
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.0065	-1.12	13.70	12.58	40.00	-27.42	QP	
2	56.9911	3.21	14.37	17.58	40.00	-22.42	QP	
3	107.1337	-0.98	12.94	11.96	40.00	-28.04	QP	
4	194.4533	-0.61	12.35	11.74	40.00	-28.26	QP	
5	311.0867	-1.46	15.82	14.36	47.00	-32.64	QP	
6	535.7073	-1.12	21.27	20.15	47.00	-26.85	QP	



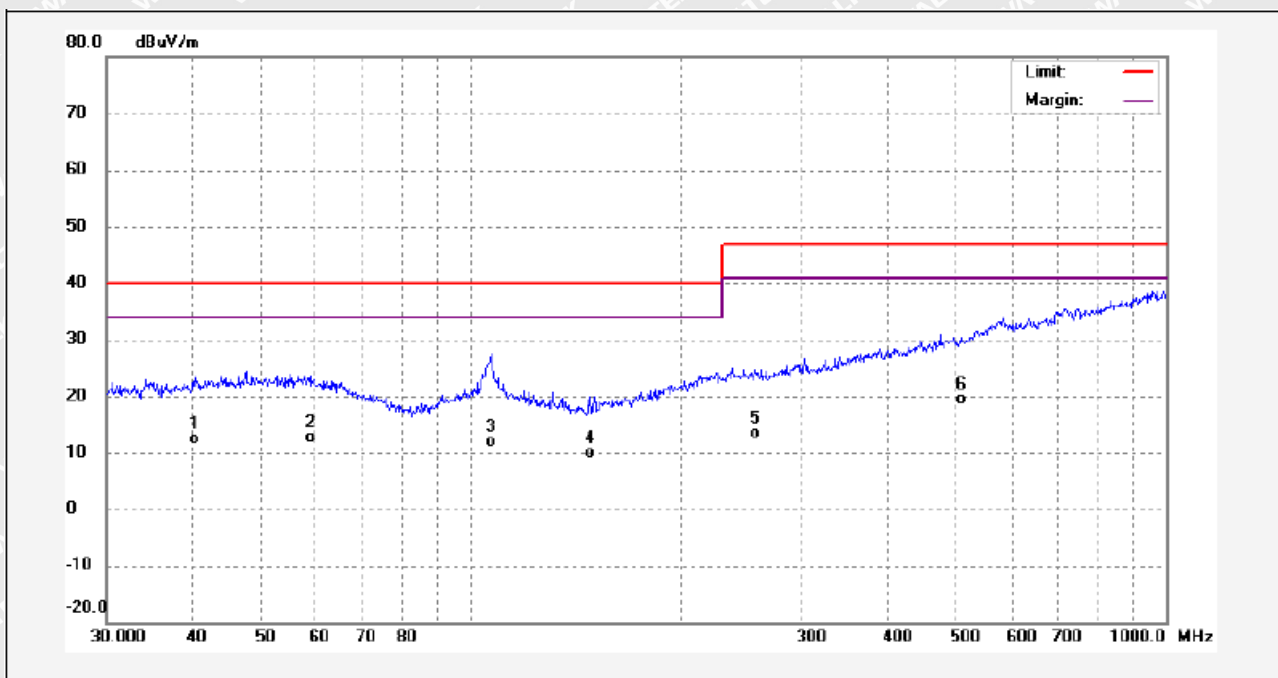
Battery Powered Mode

Battery 3.7V

Vertical Polarization



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.3022	13.19	13.78	26.97	40.00	-13.03	QP	
2	46.1779	0.71	14.06	14.77	40.00	-25.23	QP	
3	109.7960	6.06	12.74	18.80	40.00	-21.20	QP	
4	196.5098	-0.85	12.47	11.62	40.00	-28.38	QP	
5	329.0390	-1.40	16.15	14.75	47.00	-32.25	QP	
6	511.8352	-0.85	20.24	19.39	47.00	-27.61	QP	

**Battery Powered Mode****Battery 3.7V****Horizontal Polarization:**

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	40.1347	-0.96	13.32	12.36	40.00	-27.64	QP	
2	58.8185	-1.52	14.15	12.63	40.00	-27.37	QP	
3	107.1337	-1.15	12.94	11.79	40.00	-28.21	QP	
4	148.4410	0.68	9.23	9.91	40.00	-30.09	QP	
5	256.5210	-1.26	14.55	13.29	47.00	-33.71	QP	
6	506.4791	-0.96	20.23	19.27	47.00	-27.73	QP	



6 Immunity Test Results

6.1 Performance Criteria

Performance criterion A: During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Performance criterion B: During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criterion C: During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.

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6.2.3 Direct Discharge Test Results

Observations:**Test points:**

1. All Exposed Surface & Seams;
2. All metallic part

Direct Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
±8	B	1	N/A	Pass*
±4	B	2	Pass*	N/A

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

6.2.4 Indirect Discharge Test Results

Observations:**Test points:**

1. All sides.

Indirect Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
±4	B	1	Pass*	Pass*

Remark:

- * During the test no deviation was detected to the selected operation mode(s)



6.3 Radio-Frequency Electromagnetic Fields, 80MHz to 1GHz

Test Requirement.....	: EN IEC 61547
Test Method	: IEC 61000-4-3
Test Result	: Pass
Frequency Range	: 80MHz to 1GHz
Test level	: 3V/m
Modulation	: 80%, 1kHz Amplitude Modulation.
Face of EUT	: Front, Back, Left, Right
Antenna polarisation	: Horizontal & Vertical
Test Distance	: 3m

6.3.1 E.U.T. Operation

Operating Environment:

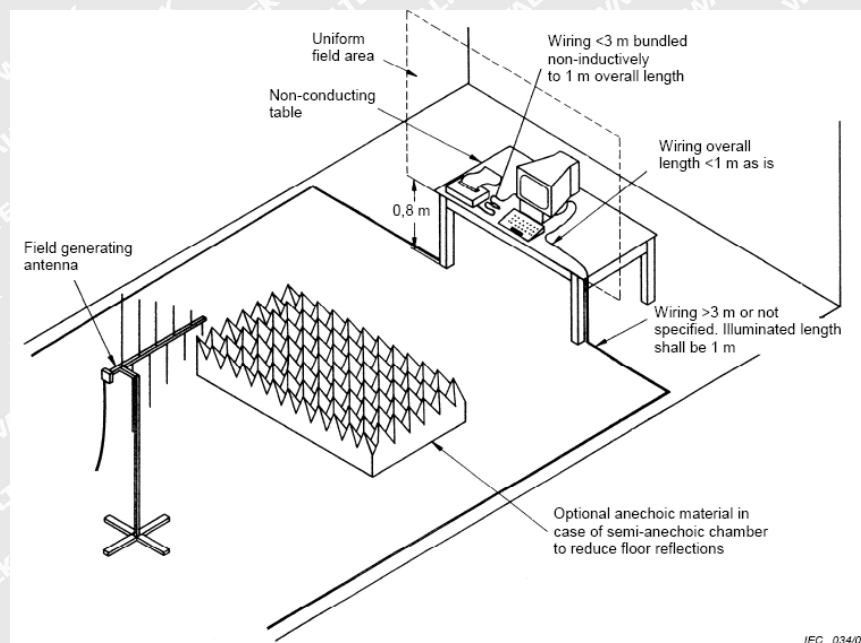
Temperature	: 23.3°C
Humidity	: 51.4%RH
Barometric Pressure.....	: 101.5kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz, Battery 3.7V
Operating Mode	: On mode

6.3.2 Block Diagram of Setup

The Radio-Frequency Electromagnetic Fields Immunity test was performed in accordance with the IEC 61000-4-3.





6.3.3 Test Results

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

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6.4 Electrical Fast Transients (EFT)

Test Requirement	: EN IEC 61547
Test Method	: IEC 61000-4-4
Test Result	: Pass
Test Level	: 1.0kV on AC Mains
Polarity	: Positive & Negative
Repetition Frequency	: 5kHz
Burst Duration	: 300ms
Test Duration	: 2 minutes per level & polarity

6.4.1 E.U.T. Operation

Operating Environment:

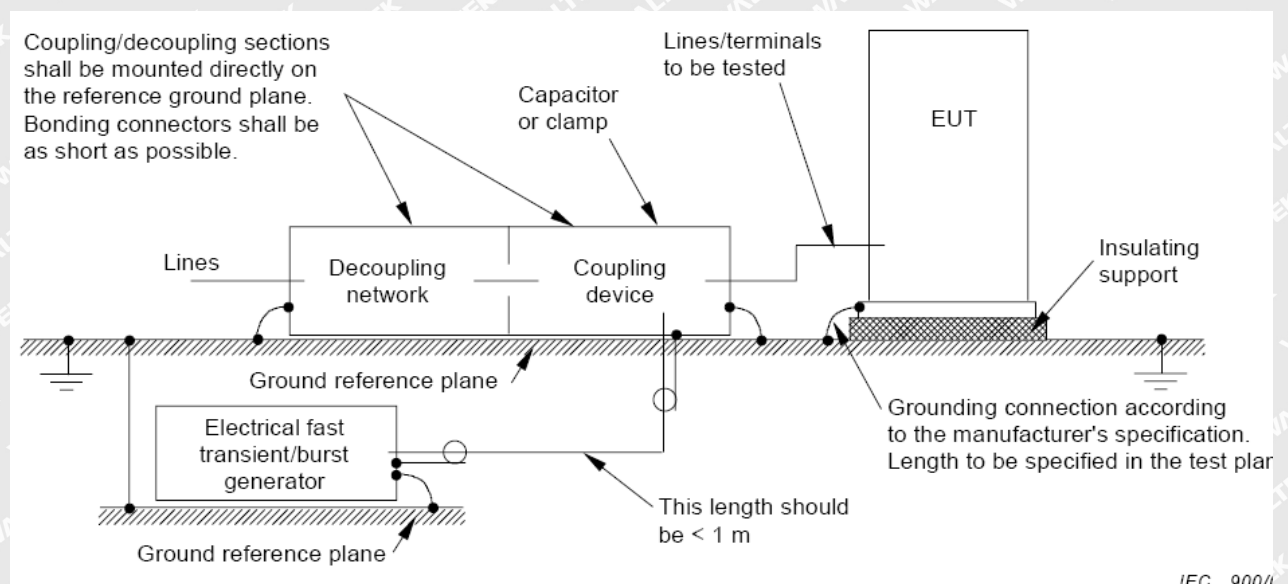
Temperature	: 20.3°C
Humidity	: 51.9%RH
Barometric Pressure	: 100.9kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode	: On mode

6.4.2 Block Diagram of Setup

The Electrical Fast Transients Immunity test was performed in accordance with the IEC 61000-4-4.





6.4.3 Test Results

Test Port	Test Level(kV)	Performance Criterion	Result
Line-Neutral	± 1.0	B	Pass*

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

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6.5 Surge

Test Requirement	: EN IEC 61547
Test Method	: IEC 61000-4-5
Test Result	: Pass
Test level	: Table 10 of EN IEC 61547
Interval	: 60s between each surge
No. of surges	: 5 positive at 90°, 5 negative at 270°.

6.5.1 E.U.T. Operation

Operating Environment:

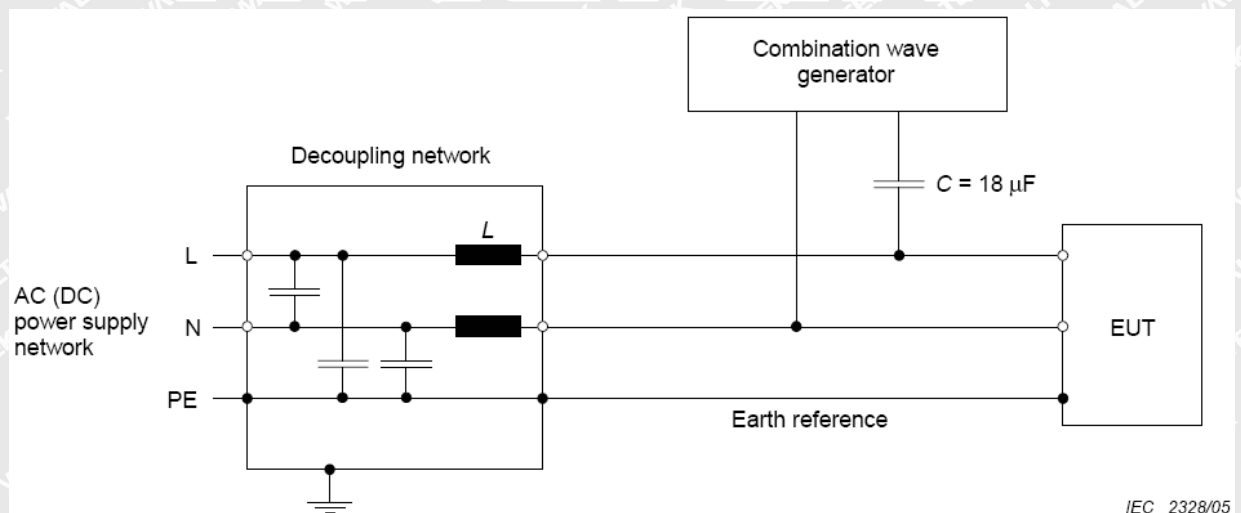
Temperature	: 20.5°C
Humidity	: 51.7%RH
Barometric Pressure	: 100.9kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode	: On mode

6.5.2 Block Diagram of Setup

The Surge Immunity test was performed in accordance with the IEC 61000-4-5.





6.5.3 Test Results

Test Port	Applied Voltage (kV)	Performance criterion	Result
Between Phase And Phase	± 1	C	N/A
Between Live And Neutral	± 1	C	Pass*
Between Live And Earth	$\pm 1, \pm 2$	C	N/A
Between Neutral And Earth	$\pm 1, \pm 2$	C	N/A

Remark:

* During the test no deviation was detected to the selected operation mode(s)

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6.6 Injected Currents Immunity, 0.15MHz to 80MHz

Test Requirement.....	: EN IEC 61547
Test Method	: IEC 61000-4-6
Test Result	: Pass
Frequency Range	: 0.15MHz to 80MHz
Test level	: 3V r.m.s. (unmodulated emf into 150 Ω)
Modulation	: 80%, 1kHz Amplitude Modulation.

6.6.1 E.U.T. Operation

Operating Environment:

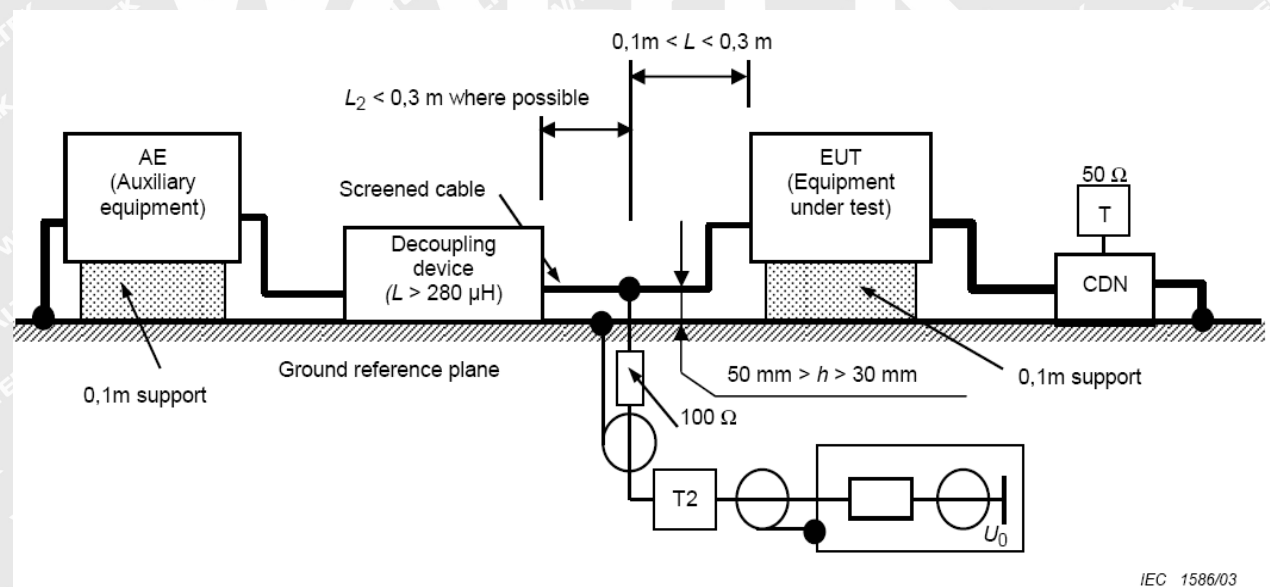
Temperature	: 20.7°C
Humidity	: 51.5%RH
Barometric Pressure.....	: 100.9kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode.....	: On mode

6.6.2 Block Diagram of Setup

The Injected Currents Immunity test was performed in accordance with the IEC 61000-4-6.





6.6.3 Test Results

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Performance Criterion	Result
0.15MHz to 80MHz	2 Wire AC Supply Cables	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

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6.7 Voltage Dips and Interruptions

Test Requirement.....	: EN IEC 61547
Test Method.....	: IEC 61000-4-11
Test Result.....	: Pass
Test Level(Voltage reduction) :	0%&70 % of U_T (Supply Voltage)
No. of Dips / Interruptions.....	: 1 per Level at 20ms intervals

6.7.1 E.U.T. Operation

Operating Environment:

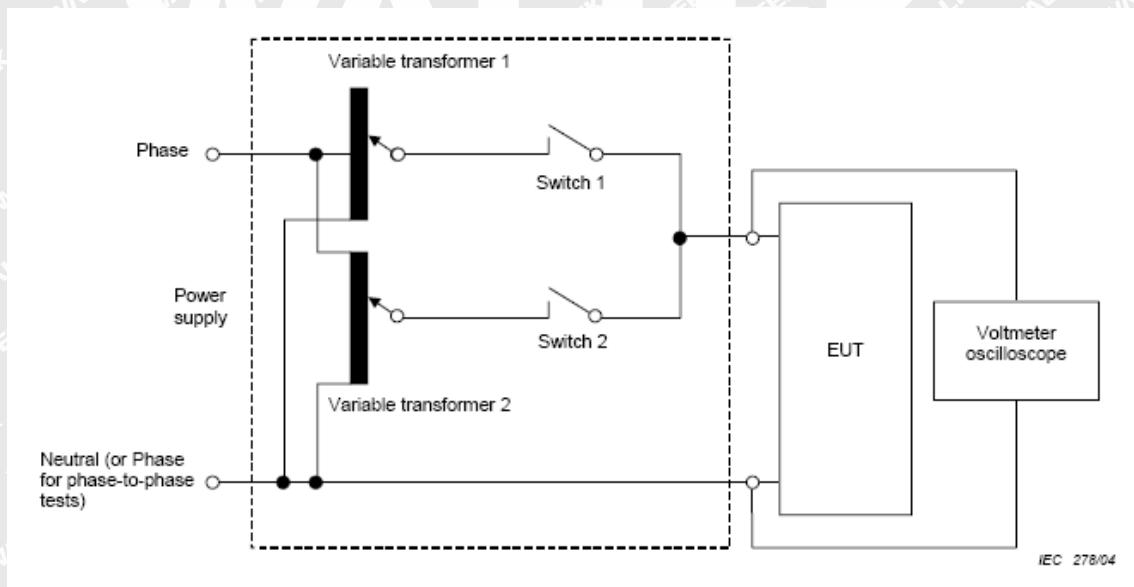
Temperature	: 21.1°C
Humidity.....	: 51.2%RH
Barometric Pressure.....	: 100.9kPa

EUT Operation:

Input Voltage	: AC 230V/50Hz
Operating Mode.....	: On mode

6.7.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the IEC 61000-4-11.





6.7.3 Test Results

Test Level in %U _T	Phase	Performance criterion	Duration	Result
0	0°	B	0.5	Pass*
	180°			Pass*
70	0°	B	10	Pass*
	180°			Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

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7 Photographs – Test Setup

7.1 Photograph – Conducted Disturbance for Wired Network Port Test Setup

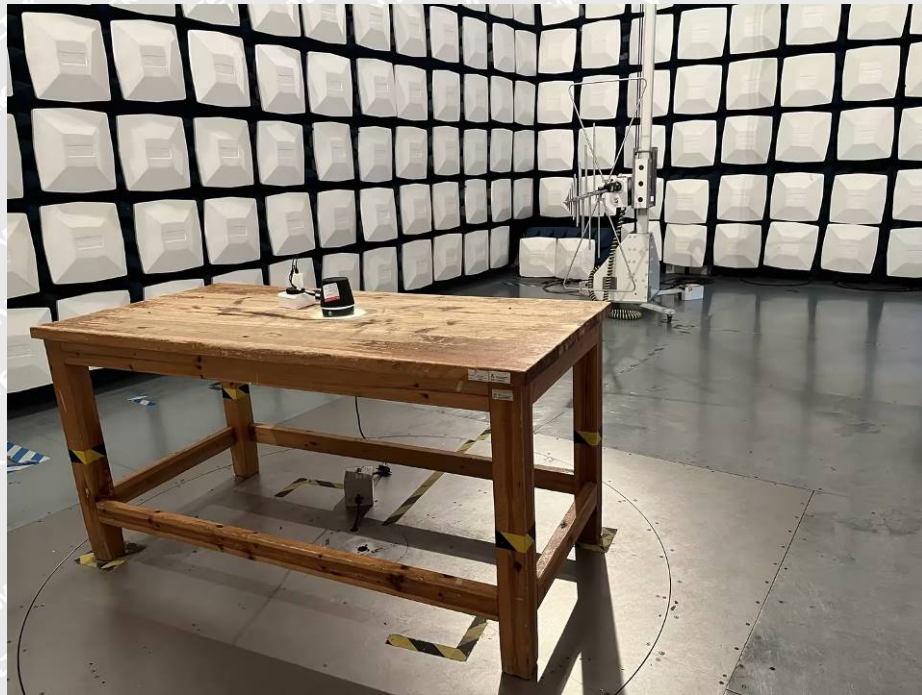


7.2 Photograph – Radiated Electromagnetic Disturbance Test Setup

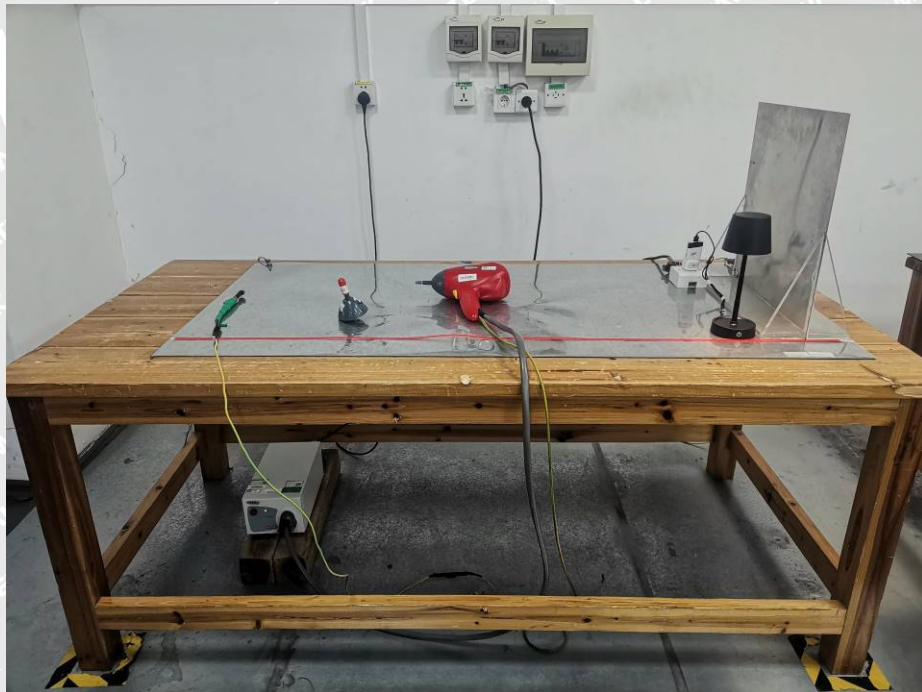




7.3 Photograph – Radiated Disturbance Test Setup, 30MHz to 1000MHz

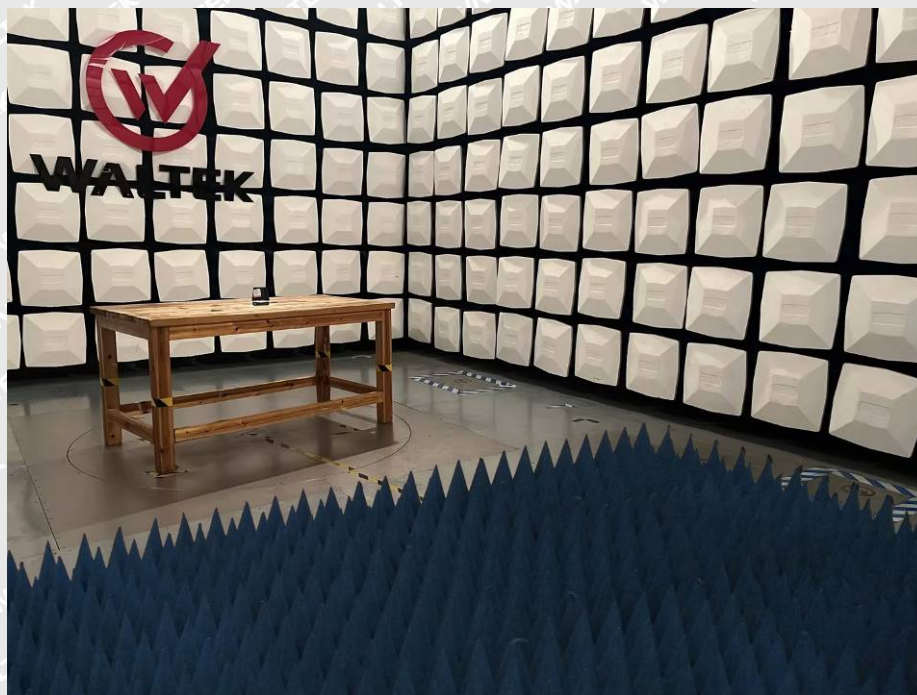


7.4 Photograph – ESD Immunity Test Setup





7.5 Photograph – Radio-Frequency Electromagnetic Fields Immunity Test Setup



7.6 Photograph – EFT Immunity Test Setup





7.7 Photograph – Surge Immunity Test Setup



7.8 Photograph – Injected Currents Immunity Test Setup





7.9 Photograph – Voltage Dips and Interruptions Immunity Test Setup



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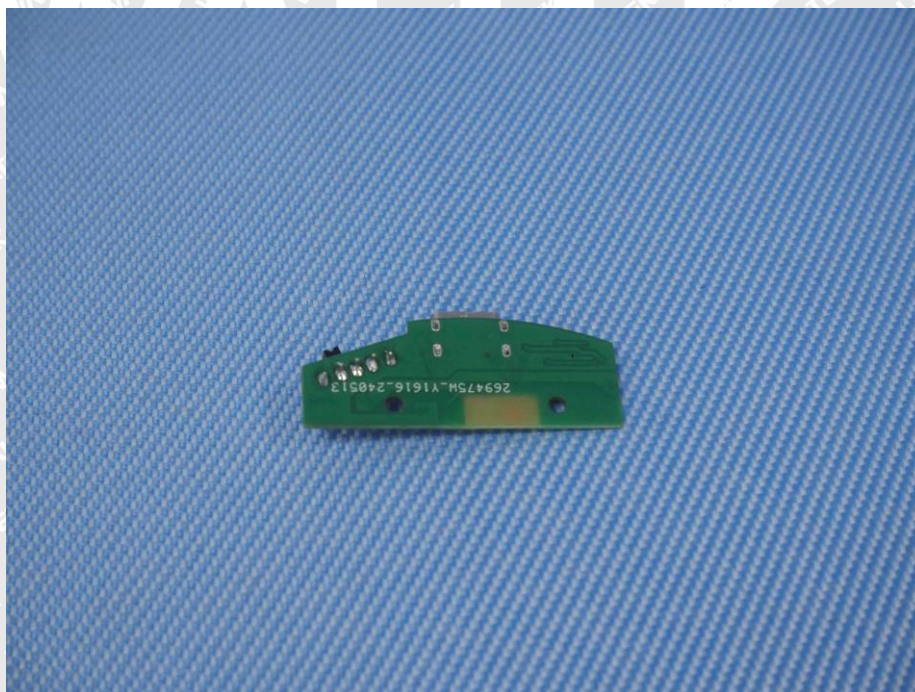


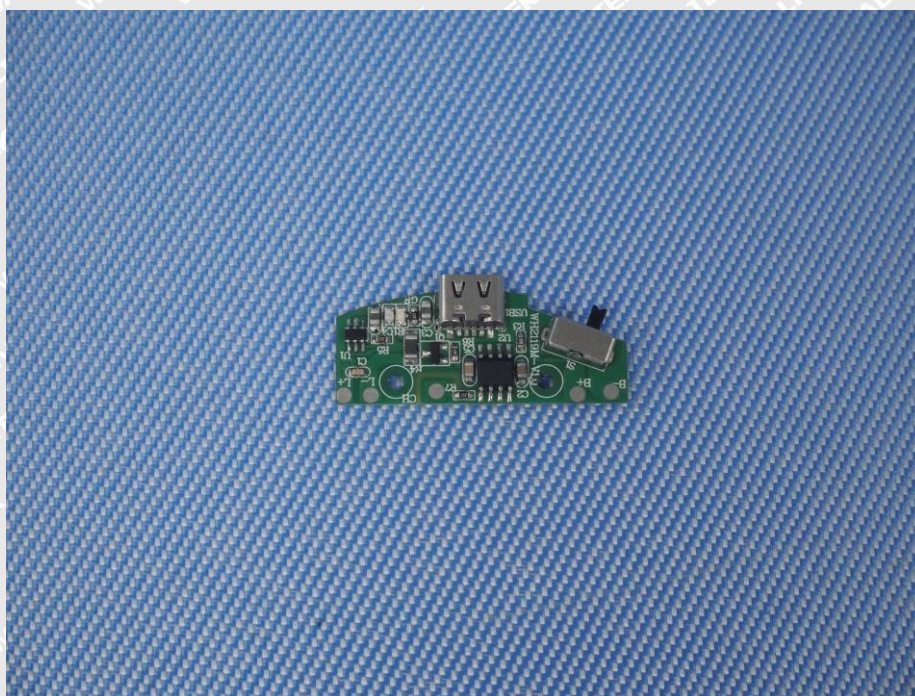
8 Photographs – Constructional Details

8.1 EUT – External View



8.2 EUT – Internal View





===== End of Report =====

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