



# TEST REPORT

**Reference No.** : WTS17S0990780E  
**Applicant** : ADVANCE DIMMING TECHNOLOGY LTD.  
**Address** : Unit 15, 6/F Kenning Industrial Building, 19 Wang Hoi Road, Kowloon Bay, Hong Kong  
**Manufacturer** : ADVANCE DIMMING TECHNOLOGY LTD.  
**Address** : Unit 15, 6/F Kenning Industrial Building, 19 Wang Hoi Road, Kowloon Bay, Hong Kong  
**Product** : Universal Dimmer  
**Model(s)** : ATE-TS300AU  
**Standards** : IEC 60669-2-1:2002+A1:2008+A2:2015  
**Date of Receipt sample** : 2017-09-20  
**Date of Test** : 2017-09-21 to 2017-09-26  
**Date of Issue** : 2017-09-27  
**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 compiler and approver.

**Prepared By:**

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## 1 Laboratories Introduction

**Waltek Services Test Group Ltd.** is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

**Waltek Services (Shenzhen) Co., Ltd.**

### A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	<b>CNAS</b> <b>(Registration No.: L3110)</b> <b>A2LA</b> <b>(Certificate No.: 4243.01)</b>	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand	<b>International Services</b>	NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. IC Canada Registration No.: 7760A			

### B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681





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### 3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS17S0990780E	2017-09-20	2017-09-21 to 2017-09-26	2017-09-27	original	-	Valid



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## 4 General Information

### 4.1 General Description of E.U.T.

Product..... : Universal Dimmer  
Model(s)..... : ATE-TS300AU  
Remark..... : N/A.

### 4.2 Details of E.U.T.

Ratings..... : 230-240V~, 50Hz, 5-300W

### 4.3 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 Lab: N/A

Lab address: N/A

Test items: N/A

### 4.4 Abnormalities from Standard Conditions

None.

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## 5 Test Summary

EMISSION (IEC 60669-2-1)		
Test Item	Test Standard	Result
Conducted Disturbance at Mains Terminal, 9kHz to 30MHz	CISPR 15	Pass
Radiation electromagnetic disturbance, 9kHz to 30MHz	CISPR 15	Pass
Radiation Emission, 30MHz to 300MHz	CISPR 15	Pass
Harmonic Current emission	IEC 61000-3-2	Pass
Voltage Fluctuation and Flicker	IEC 61000-3-3	Pass
IMMUNITY (IEC 60669-2-1)		
Test Item	Test Method	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2	Pass
Radio-frequency electromagnetic fields (80MHz to 1GHz)	IEC 61000-4-3	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4	Pass
Surges	IEC 61000-4-5	Pass
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6	Pass
Voltage Dips and Interruptions	IEC 61000-4-11	Pass
Power-frequency magnetic field	IEC 61000-4-8	N/A*

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

\*

This test is applicable only to electronic switches containing devices susceptible to magnetic fields, for example, Hall elements, electrodynamic microphones, etc.



## 6 Equipment Used during Test

### 6.1 Equipment List

Conducted Emissions at Mains Terminals Disturbance Voltage						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12, 2017	Sep.11, 2018
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12, 2017	Sep.11, 2018
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12, 2017	Sep.11, 2018
4.	Cable	LARGE	RF300	-	Sep.12, 2017	Sep.11, 2018
Radiation electromagnetic disturbance(9kHz to 30MHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12, 2017	Sep.11, 2018
2.	LARGE LOOP ANTENNA	Laplace	RF300	9057	Jul.19, 2017	Jul.18, 2018
3.	Cable	LARGE	RF300	-	Sep.12, 2017	Sep.11, 2018
3m Semi-anechoic Chamber for Radiation						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Apr. 06, 2017	Apr.05, 2018
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr. 07, 2017	Apr.06, 2018
3	Amplifier	ANRITSU	MH648A	M43381	Apr. 07, 2017	Apr.06, 2018
4	Cable	HUBER+SUHNER	CBL2	525178	Apr. 07, 2017	Apr.06, 2018
Harmonics and Flicker Measuring System						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Digital Power Analyzer	SCHAFFNER	CCN 1000-1	72625	Apr. 10, 2017	Apr. 09, 2018
2	Power Source	SCHAFFNER	NSG 1007	58477	Apr. 10, 2017	Apr. 09, 2018
Electrostatic Discharge						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Electrostatic Discharge Simulator	SCHLODER	SESD 216	606144	Nov. 14, 2016	Nov. 13, 2017



Radio-frequency electromagnetic fields						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Signal Generator	R&S	SMB100A	105942	Sep.12, 2017	Sep.11, 2018
2	RF Power Amplifier	R&S	BLWA0830-160/100/40D	128740	Sep.12, 2017	Sep.11, 2018
3	Gestockte Breitband (S tacked ) Log.-per.Antenna	R&S	STLP9128D	043	Sep.12, 2017	Sep.11, 2018
4	Power Meter	R&S	NRP2	102031	Sep.12, 2017	Sep.11, 2018
Surge, EFT, Voltage dips and Interruption						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	All Modules Generator	SCHAFFNER	6150	34579	Dec.08, 2015	Dec.07, 2016
2	Capacitive Coupling Clamp	SCHAFFNER	CDN 8014	25311	Sep.12, 2017	Sep.11, 2018
3	Signal and Data Line Coupling Network	SCHAFFNER	CDN 117	25627	Sep.12, 2017	Sep.11, 2018
4	AC Power Supply	TONGYUN	DTDGC-4	-	Sep.12, 2017	Sep.11, 2018
Conducted Immunity						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	RF Generator	TESEQ	NSG4070	25781	Sep.12, 2017	Sep.11, 2018
2	CDN M-Type	TESEQ	CDN M016	25112	Sep.12, 2017	Sep.11, 2018
3	EM-Clamp	TESEQ	KEMZ 801	25453	Sep.12, 2017	Sep.11, 2018
4	Attenuator 6dB	TESEQ	ATN6050	25365	Sep.12, 2017	Sep.11, 2018

## 6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

## 6.3 Measurement Uncertainty

Parameter	Uncertainty (Note 1)
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emission (9kHz-30MHz)	±3.64dB
Radiation electromagnetic disturbance (9kHz-30MHz)	±3.00dB
Radiated Emission(30MHz-300MHz)	±5.03dB

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





## 6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD.  
address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

## 6.5 Test Mode

Test Item	Test Mode	Test Voltage
<b>EMISSION (IEC 60669-2-1)</b>		
Conducted Emission (9kHz-30MHz)	Brightest mode*	AC 225V/50Hz AC 245V/50Hz*
	Darkest mode	AC 225V/50Hz AC 245V/50Hz
Radiation electromagnetic disturbance (9kHz- 30MHz)	Brightest mode*	AC 225V/50Hz AC 245V/50Hz*
	Darkest mode	AC 225V/50Hz AC 245V/50Hz
Radiated Emission (30MHz~300MHz)	Brightest mode*	AC 225V/50Hz AC 245V/50Hz*
	Darkest mode	AC 225V/50Hz AC 245V/50Hz
Harmonic Current emission	Brightest mode*	AC 230V/50Hz
Voltage Fluctuation and Flicker	Brightest mode*	AC 230V/50Hz
<b>IMMUNITY (IEC 60669-2-1)</b>		
Electrostatic Discharge (ESD)	Brightest mode*	AC 230V/50Hz
Radio-frequency electromagnetic fields (80MHz to 1GHz)	Brightest mode*	AC 230V/50Hz
AC mains power ports (EFT)	Brightest mode*	AC 230V/50Hz
Surges from the AC mains power ports	Brightest mode*	AC 230V/50Hz
Injected Currents from the telecom port 0.15MHz to 80MHz	Brightest mode*	AC 230V/50Hz
Voltage Dips and Interruptions	Brightest mode*	AC 230V/50Hz
*** shows the worst case mode which were recorded in this report.		



## 7 Emission Test Results

### 7.1 Conducted Disturbance at Mains Terminal

Test Requirement.....	: CISPR 15
Test Method .....	: CISPR 15
Test Result .....	: Pass
Frequency Range.....	: 9kHz to 30MHz
Class/Severity .....	: Table 2a of CISPR 15

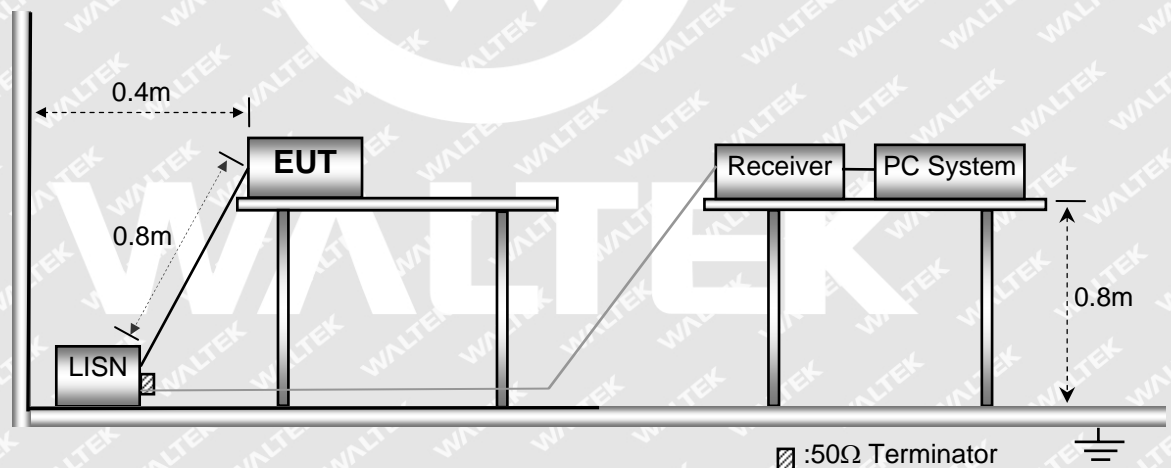
#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature.....	: 21.5°C
Humidity.....	: 52.6%RH
Atmospheric Pressure.....	: 101.2kPa
EUT Operation .....	: Refer to section 6.5.

#### 7.1.2 Block Diagram of Test Setup

The Conducted Disturbance at Mains Terminal tests were performed in accordance with the CISPR 15.



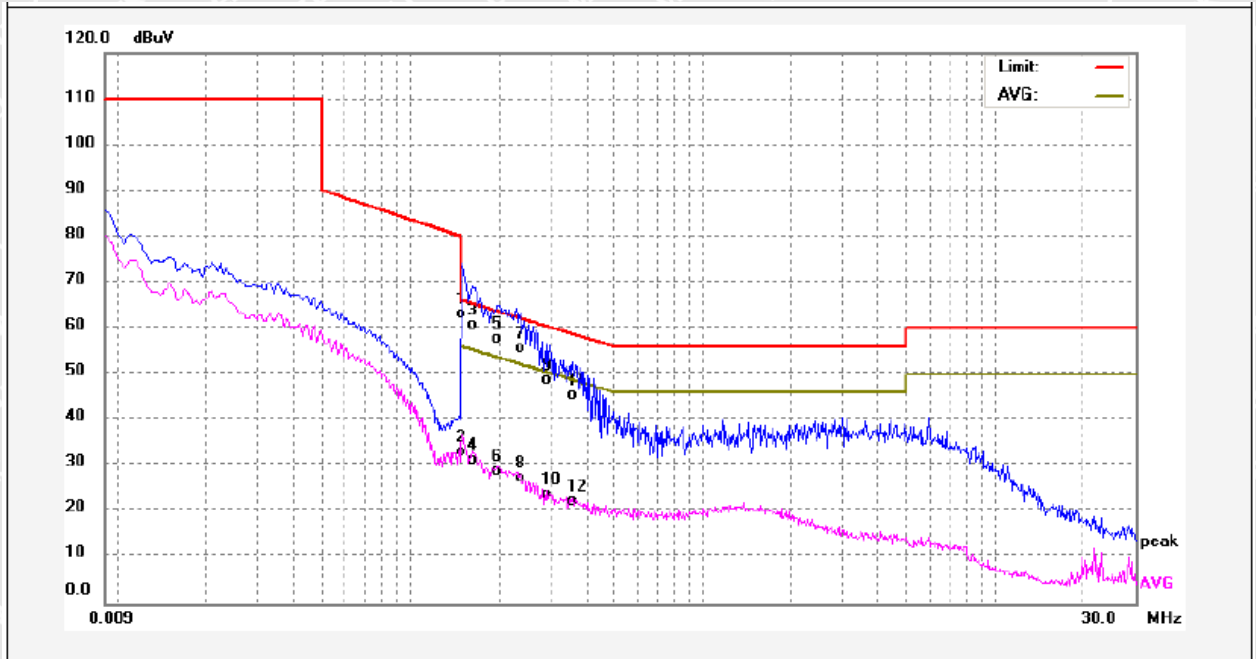
#### 7.1.3 Measurement Data

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.



### 7.1.4 Conducted Disturbance at Mains Terminal Test Data

Live Line :

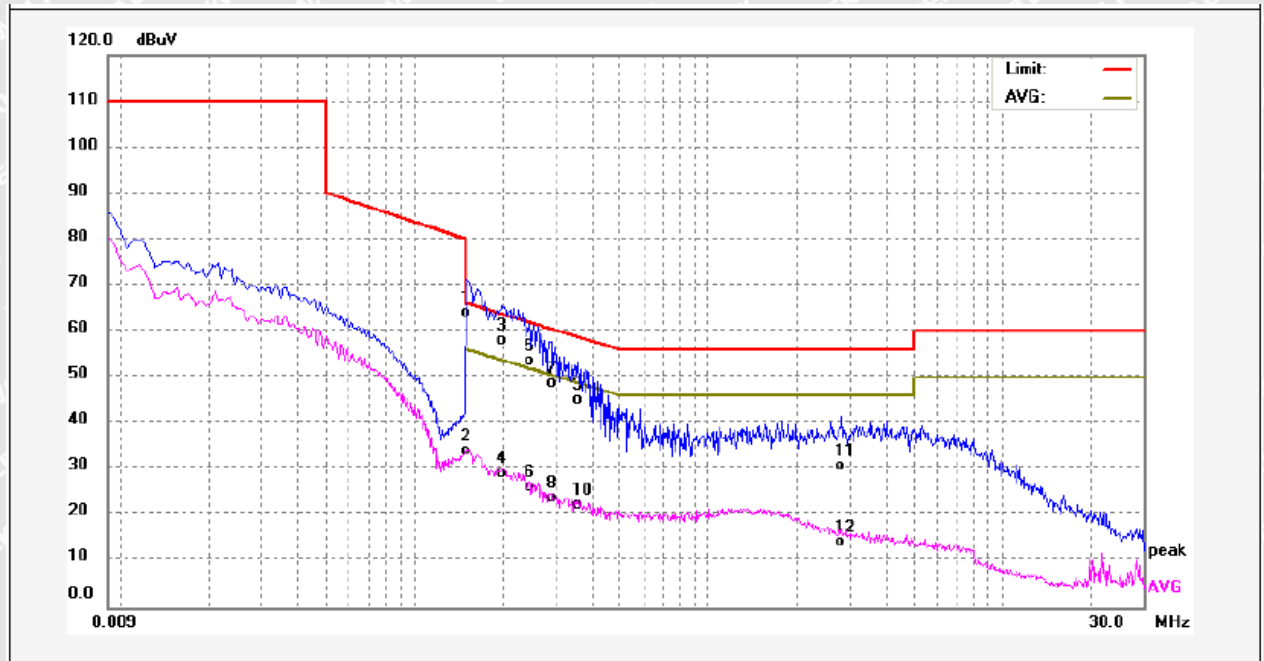


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	53.03	10.06	63.09	65.99	-2.90	QP	
2	0.1500	23.06	10.06	33.12	55.99	-22.87	AVG	
3	0.1620	50.69	9.94	60.63	65.36	-4.73	QP	
4	0.1620	21.56	9.94	31.50	55.36	-23.86	AVG	
5	0.2020	47.84	9.92	57.76	63.52	-5.76	QP	
6	0.2020	19.12	9.92	29.04	53.52	-24.48	AVG	
7	0.2380	45.55	9.99	55.54	62.16	-6.62	QP	
8	0.2380	17.37	9.99	27.36	52.16	-24.80	AVG	
9	0.2900	38.87	9.99	48.86	60.52	-11.66	QP	
10	0.2900	13.73	9.99	23.72	50.52	-26.80	AVG	
11	0.3580	35.51	10.06	45.57	58.77	-13.20	QP	
12	0.3580	12.21	10.06	22.27	48.77	-26.50	AVG	





Neutral Line :



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	53.96	10.06	64.02	65.99	-1.97	QP	
2	0.1500	23.93	10.06	33.99	55.99	-22.00	AVG	
3	0.1980	48.14	9.91	58.05	63.69	-5.64	QP	
4	0.1980	19.45	9.91	29.36	53.69	-24.33	AVG	
5	0.2460	43.50	10.00	53.50	61.89	-8.39	QP	
6	0.2460	16.27	10.00	26.27	51.89	-25.62	AVG	
7	0.2900	38.74	9.99	48.73	60.52	-11.79	QP	
8	0.2900	13.74	9.99	23.73	50.52	-26.79	AVG	
9	0.3580	34.97	10.06	45.03	58.77	-13.74	QP	
10	0.3580	12.15	10.06	22.21	48.77	-26.56	AVG	
11	2.8500	20.60	10.24	30.84	56.00	-25.16	QP	
12	2.8500	4.09	10.24	14.33	46.00	-31.67	AVG	



## 7.2 Radiation Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement.....	: CISPR 15
Test Method.....	: CISPR 15
Test Result .....	: Pass
Frequency Range.....	: 9kHz to 30MHz
Class/Severity.....	: Table 3a of CISPR 15

### 7.2.1 E.U.T. Operation

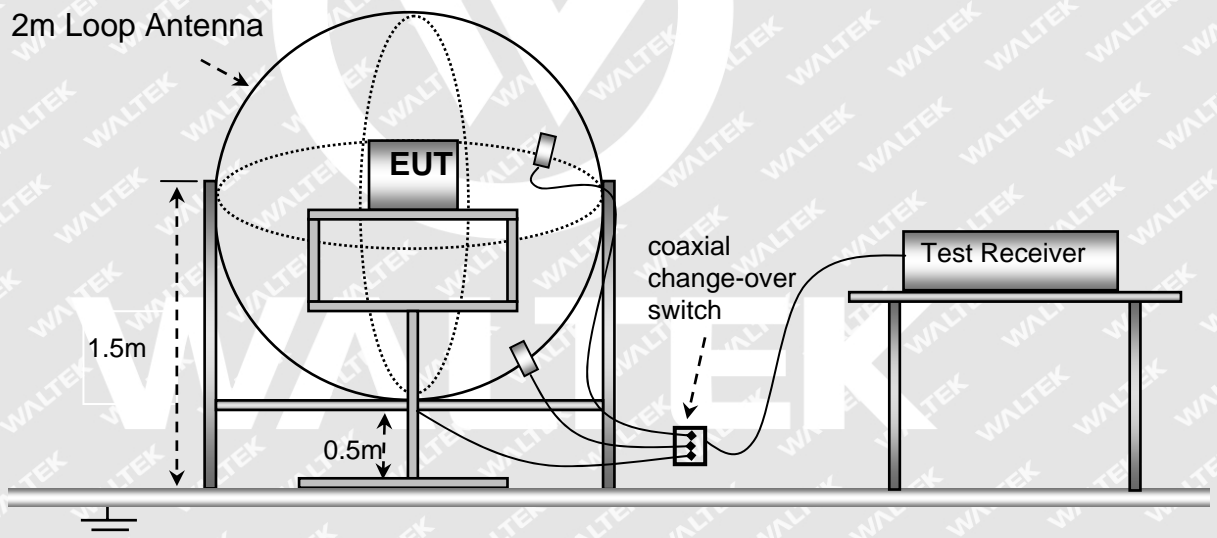
Operating Environment:

Temperature .....	: 21.8°C
Humidity .....	: 53.3%RH
Barometric Pressure .....	: 101.3kPa
EUT Operation .....	: Refer to section 6.5.

### 7.2.2 Block Diagram of Test Setup

The Radiation Electromagnetic Disturbance (9kHz to 30MHz) test was performed in accordance with the CISPR 15.

2m Loop Antenna



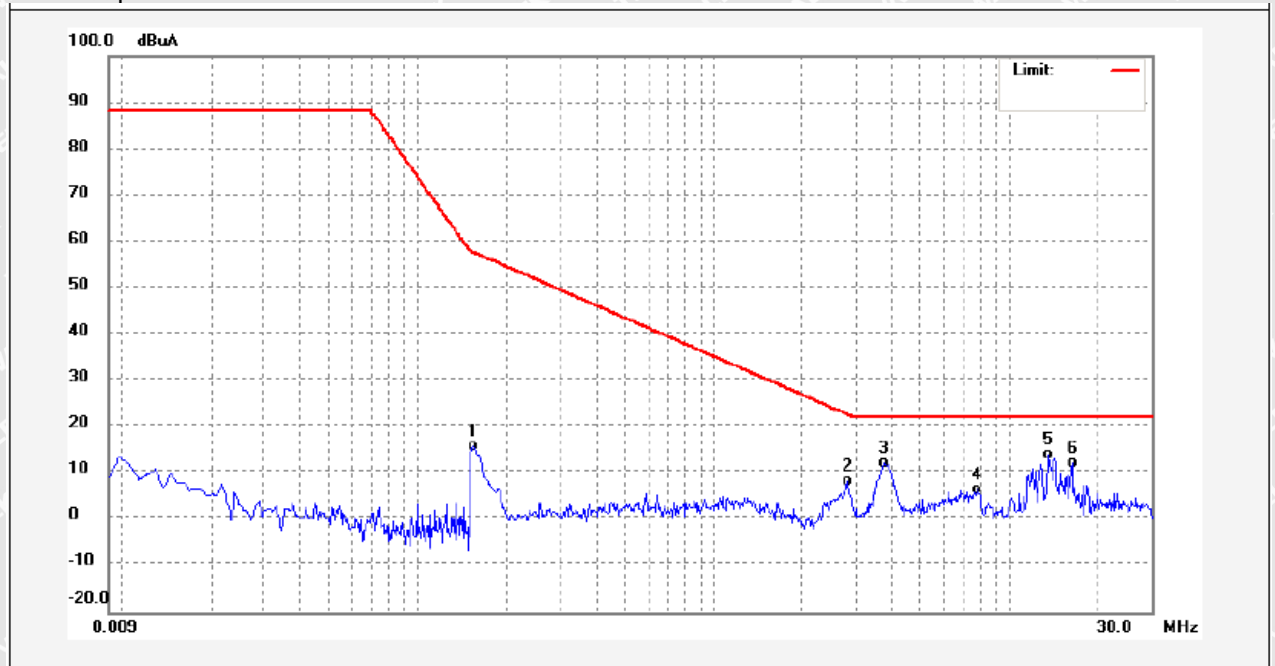
### 7.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for the loop antenna three directions. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.



## 7.2.4 Radiation Electromagnetic Disturbance Test Data, 9kHz to 30MHz

Loop X:



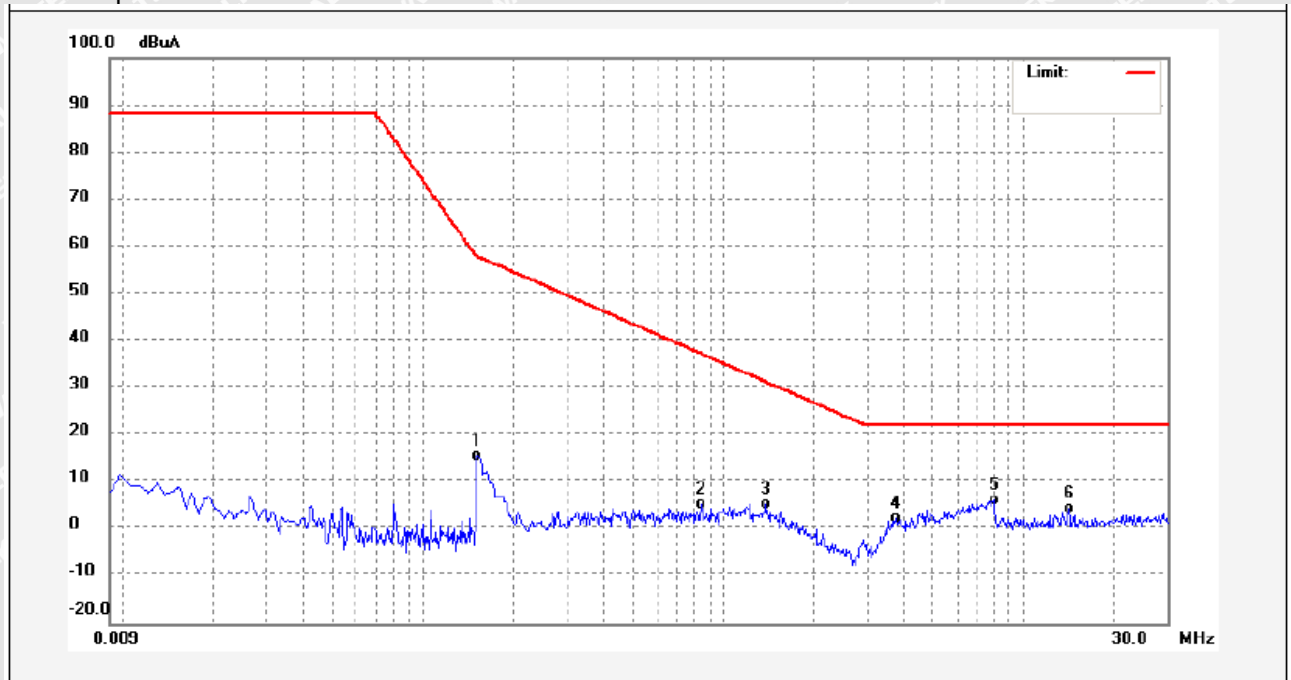
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit (dBuA)	Margin (dB)	Detector	Remark
1	0.1546	2.02	13.77	15.79	57.63	-41.84	QP	
2	2.8226	-17.49	25.96	8.47	22.73	-14.26	QP	
3	3.7586	-14.02	26.15	12.13	22.00	-9.87	QP	
4	7.7466	-19.26	25.91	6.65	22.00	-15.35	QP	
5	13.3586	-11.59	25.73	14.14	22.00	-7.86	QP	
6	16.2306	-13.53	25.76	12.23	22.00	-9.77	QP	

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Loop Y:

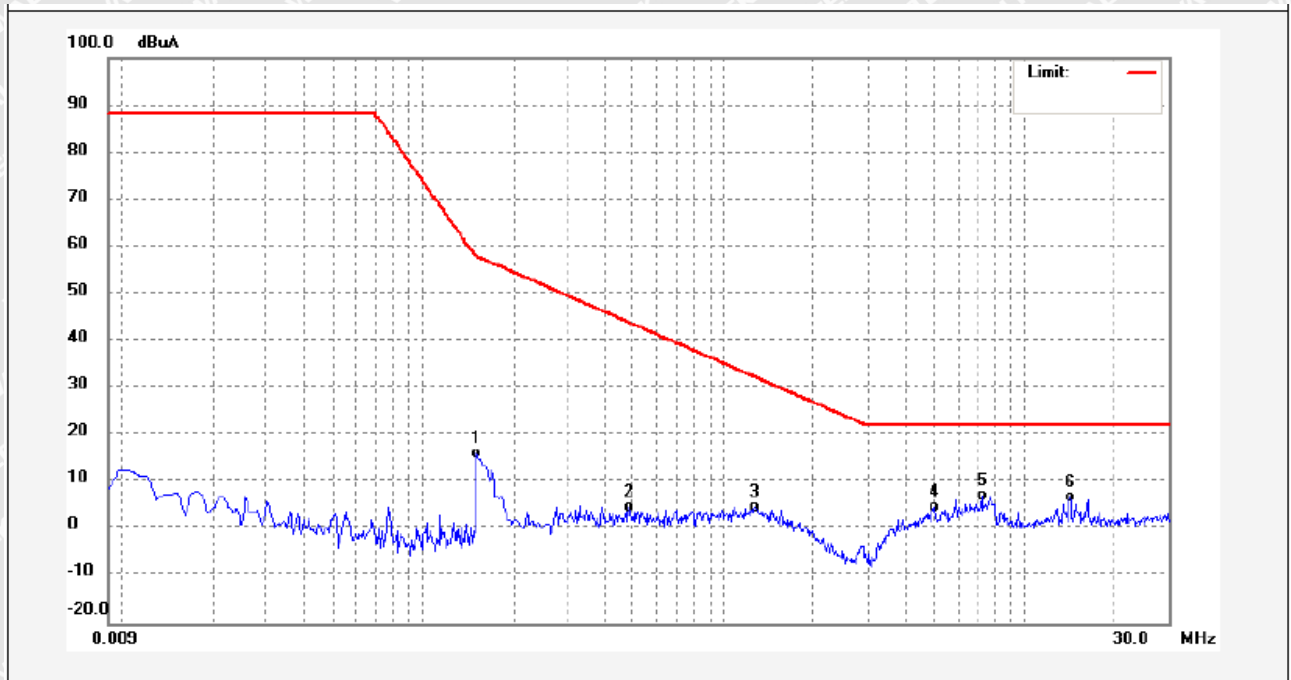


No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	0.1505	2.15	13.53	15.68	57.95	-42.27	QP	
2	0.8386	-19.34	24.62	5.28	37.31	-32.03	QP	
3	1.3866	-19.91	25.37	5.46	31.27	-25.81	QP	
4	3.7426	-23.91	26.15	2.24	22.00	-19.76	QP	
5	7.9506	-19.73	25.90	6.17	22.00	-15.83	QP	
6	14.2146	-21.36	25.74	4.38	22.00	-17.62	QP	

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Loop Z:



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	0.1505	2.58	13.53	16.11	57.95	-41.84	QP	
2	0.4866	-17.46	22.21	4.75	43.85	-39.10	QP	
3	1.2706	-20.47	25.29	4.82	32.32	-27.50	QP	
4	4.9985	-21.47	26.10	4.63	22.00	-17.37	QP	
5	7.2346	-18.86	25.94	7.08	22.00	-14.92	QP	
6	14.2146	-18.76	25.74	6.98	22.00	-15.02	QP	

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### 7.3 Radiation Emission, 30MHz to 300MHz

Test Requirement .....	: CISPR 15
Test Method .....	: CISPR 15
Test Result .....	: Pass
Frequency Range .....	: 30MHz to 300MHz
Class/Severity .....	: Table B.1 of CISPR 15
Antenna polarisation .....	: Horizontal & Vertical

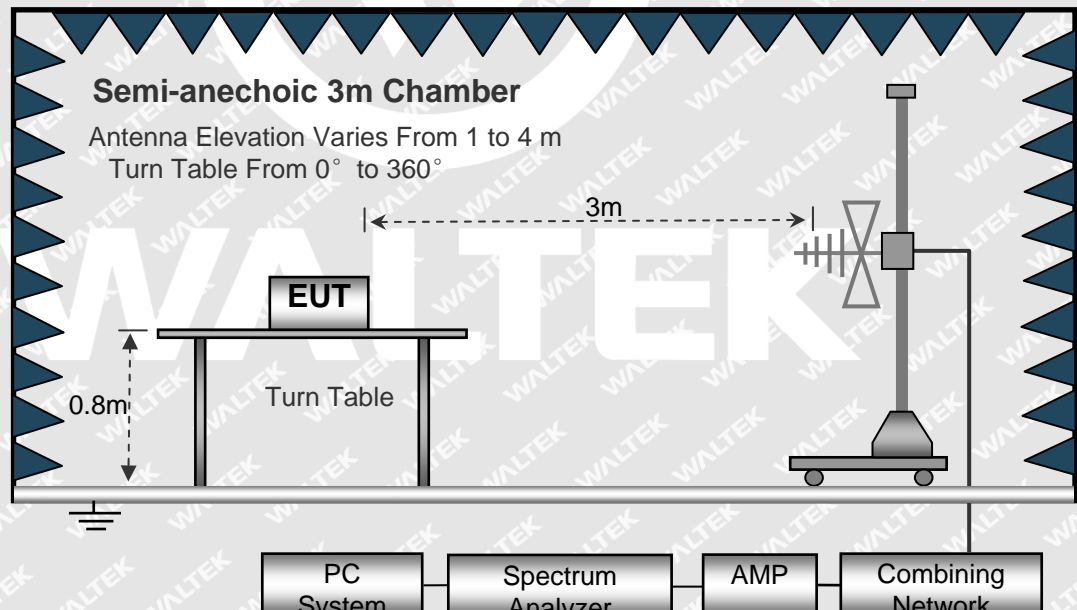
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature .....	: 21.7°C
Humidity .....	: 54.3%RH
Atmospheric Pressure .....	: 101.5kPa
EUT Operation .....	: Refer to section 6.5.

#### 7.3.2 Block Diagram of Setup

The Radiation Emission test was performed in accordance with CISPR 15 Annex B.



#### 7.3.3 Measurement Data

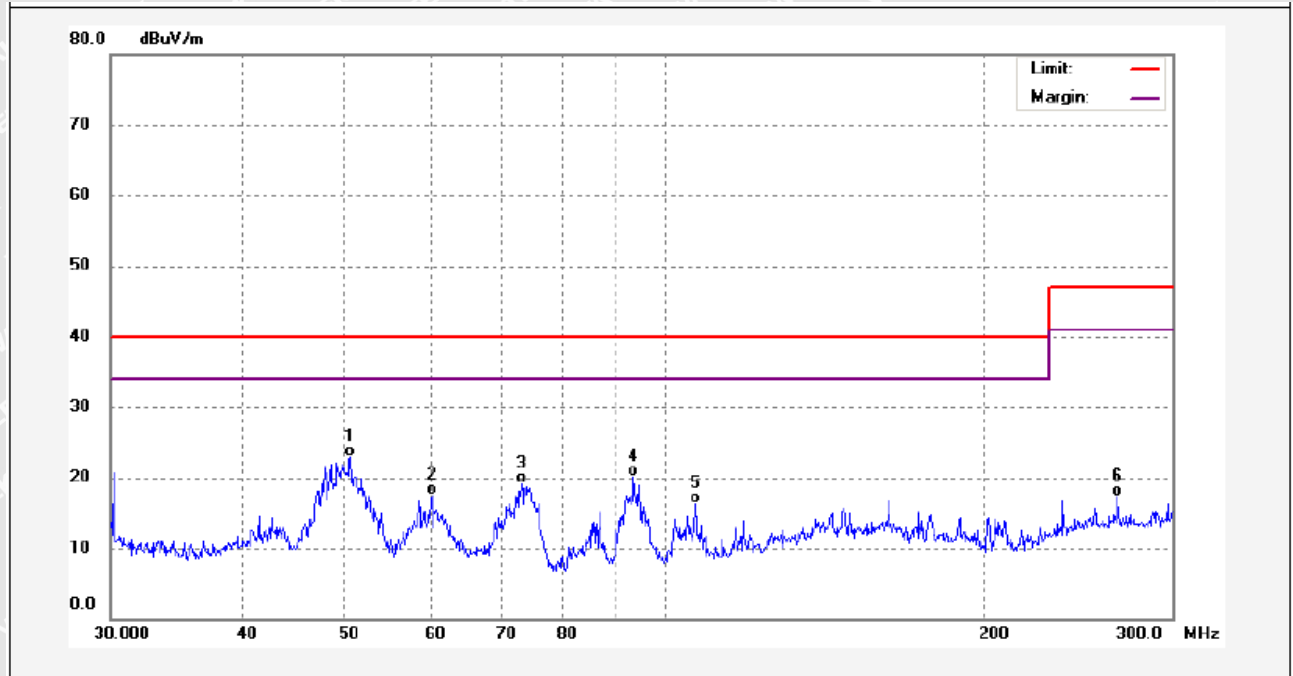
The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.





### 7.3.4 Radiation Emission Test Data, 30MHz to 300MHz

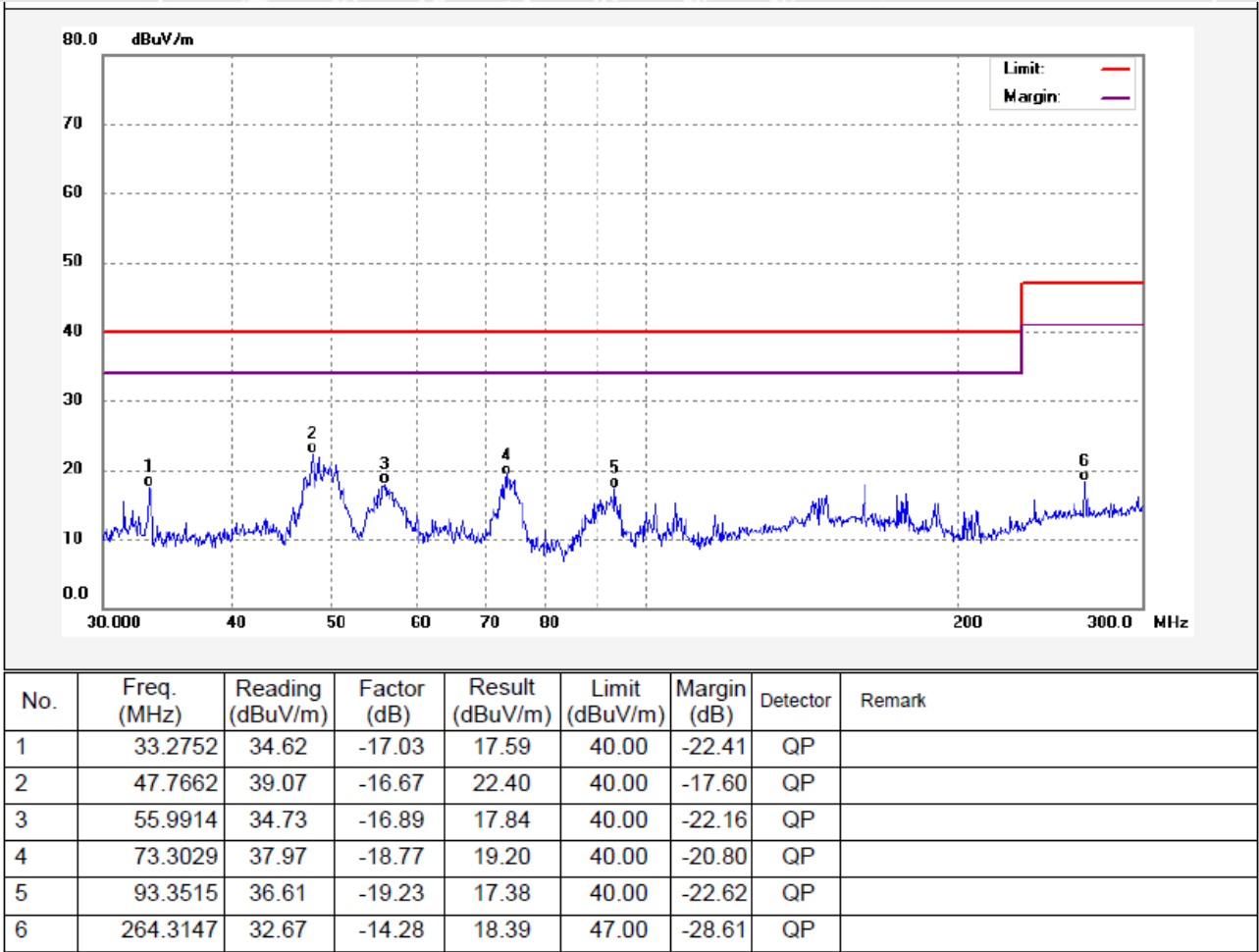
Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	50.4801	39.74	-16.85	22.89	40.00	-17.11	QP	
2	60.2728	33.99	-16.58	17.41	40.00	-22.59	QP	
3	73.1343	37.93	-18.75	19.18	40.00	-20.82	QP	
4	93.3515	39.42	-19.23	20.19	40.00	-19.81	QP	
5	106.6894	34.46	-18.17	16.29	40.00	-23.71	QP	
6	266.7603	31.59	-14.24	17.35	47.00	-29.65	QP	



Antenna Polarization: Horizontal



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## 7.4 Harmonics Current Emission

Test Requirement ..... : IEC 61000-3-2

Test Method ..... : IEC 61000-4-7

Test Result ..... : Pass

Class/Severity ..... : Class A

### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 25°C

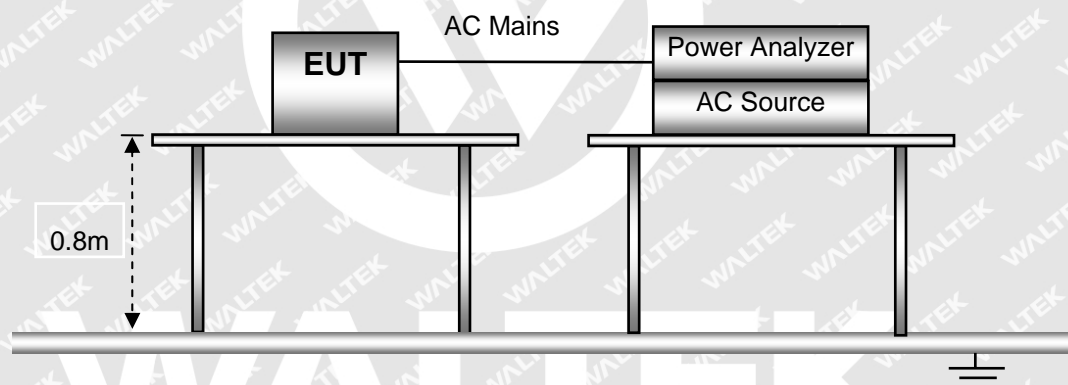
Humidity ..... : 52.6%RH

Barometric Pressure ..... : 101.4kPa

EUT Operation ..... : Refer to section 6.5.

### 7.4.2 Block Diagram of Setup

The Harmonics Current emission test was performed in accordance with the IEC 61000-4-7.







### 7.4.1 Harmonics Current Test Data

#### Harmonics – Class-A per Ed. 4.0 (2014)(Run time)

EUT: Universsal Dimmer

Test category: Class-A per Ed. 4.0 (2014) (European limits)

Test date: 2017/9/23

Start time: 9:14:08

Tested by: lht

Test Margin: 100

End time: 9:16:49

Test duration (min): 2.5

Data file name: H-000423.cts\_data

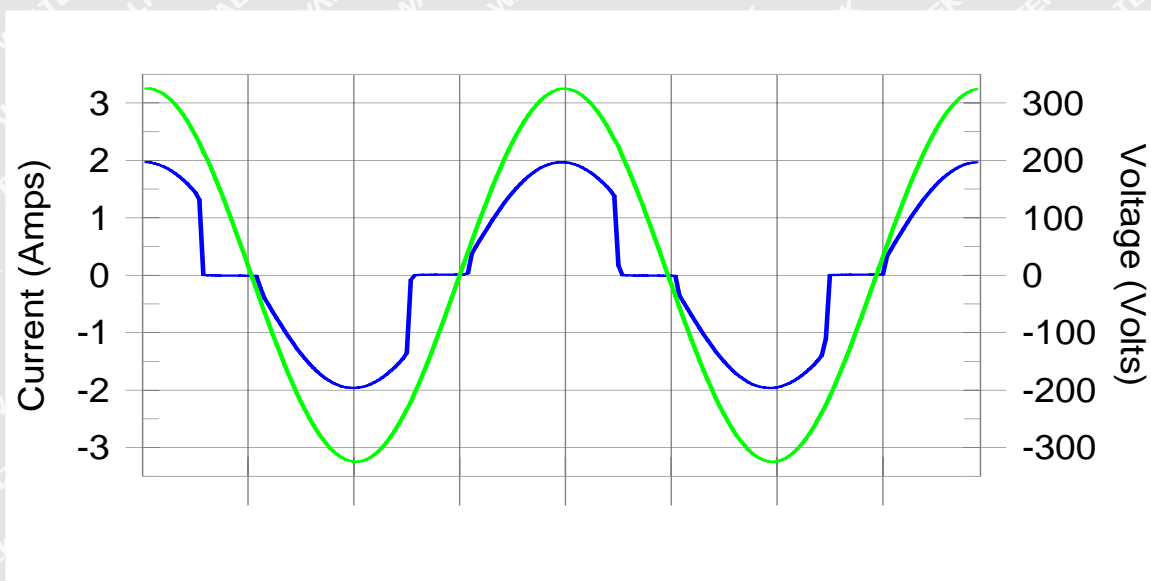
Comment: Brightest mode

Customer: ATE-TS300AU

Test Result: Pass

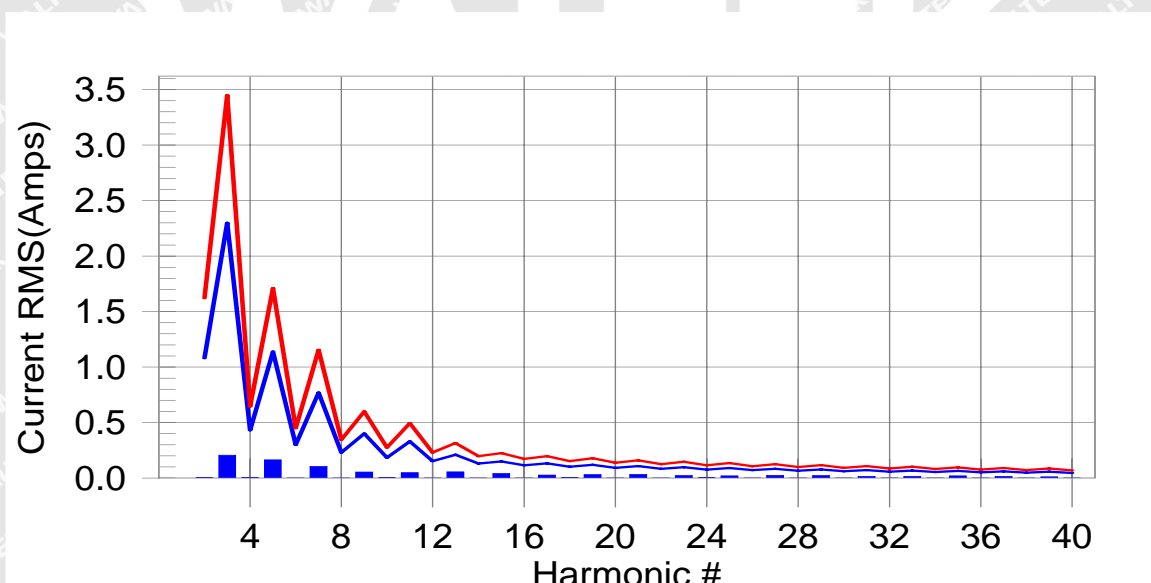
Source qualification: Normal

#### Current & voltage waveforms



#### Harmonics and Class A limit line

#### European Limits



**Test result: Pass** Worst harmonics H21-20.6% of 150% limit, H21-30.9% of 100% limit



### Current Test Result Summary (Run time)

EUT: Universsal Dimmer

Tested by: lht

Test category: Class-A per Ed. 4.0 (2014) (European limits)

Test Margin: 100

Test date: 2017/9/23

Start time: 9:14:08

End time: 9:16:49

Test duration (min): 2.5

Data file name: H-000423.cts\_data

Comment: Brightest mode

Customer: ATE-TS300AU

Test Result: Pass

Source qualification: Normal

THC(A): 0.310

I-THD(%): 23.9

POHC(A): 0.065

POHC Limit(A): 0.251

Highest parameter values during test:

V\_RMS (Volts): 229.94

Frequency(Hz): 50.00

I\_Peak (Amps): 1.974

I\_RMS (Amps): 1.335

I\_Fund (Amps): 1.298

Crest Factor: 1.480

Power (Watts): 294.1

Power Factor: 0.958

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.003	1.080	N/A	0.003	1.620	N/A	Pass
3	0.206	2.300	8.9	0.207	3.450	6.0	Pass
4	0.002	0.430	N/A	0.003	0.645	N/A	Pass
5	0.164	1.140	14.4	0.164	1.710	9.6	Pass
6	0.002	0.300	N/A	0.002	0.450	N/A	Pass
7	0.105	0.770	13.6	0.105	1.155	9.1	Pass
8	0.002	0.230	N/A	0.002	0.345	N/A	Pass
9	0.054	0.400	13.5	0.054	0.600	9.0	Pass
10	0.002	0.184	N/A	0.002	0.276	N/A	Pass
11	0.049	0.330	14.9	0.049	0.495	10.0	Pass
12	0.002	0.153	N/A	0.002	0.230	N/A	Pass
13	0.055	0.210	26.2	0.055	0.315	17.6	Pass
14	0.002	0.131	N/A	0.002	0.197	N/A	Pass
15	0.042	0.150	28.3	0.043	0.225	18.9	Pass
16	0.002	0.115	N/A	0.002	0.173	N/A	Pass
17	0.027	0.132	20.5	0.027	0.198	13.7	Pass
18	0.002	0.102	N/A	0.002	0.153	N/A	Pass
19	0.031	0.118	26.5	0.032	0.178	17.7	Pass
20	0.002	0.092	N/A	0.002	0.138	N/A	Pass
21	0.033	0.107	30.9	0.033	0.161	20.6	Pass
22	0.002	0.084	N/A	0.002	0.125	N/A	Pass
23	0.024	0.098	24.0	0.024	0.147	16.1	Pass
24	0.002	0.077	N/A	0.002	0.115	N/A	Pass
25	0.019	0.090	20.8	0.019	0.135	13.9	Pass
26	0.002	0.071	N/A	0.002	0.107	N/A	Pass
27	0.024	0.083	28.7	0.024	0.125	19.2	Pass
28	0.002	0.066	N/A	0.002	0.099	N/A	Pass
29	0.022	0.078	28.4	0.022	0.116	19.0	Pass
30	0.002	0.061	N/A	0.002	0.092	N/A	Pass
31	0.015	0.073	20.2	0.015	0.109	13.5	Pass
32	0.002	0.058	N/A	0.002	0.086	N/A	Pass
33	0.016	0.068	23.3	0.016	0.102	15.7	Pass
34	0.002	0.054	N/A	0.002	0.081	N/A	Pass
35	0.019	0.064	29.3	0.019	0.096	19.6	Pass
36	0.002	0.051	N/A	0.002	0.077	N/A	Pass
37	0.015	0.061	24.3	0.015	0.091	16.3	Pass
38	0.002	0.048	N/A	0.002	0.073	N/A	Pass
39	0.011	0.058	18.8	0.011	0.087	12.7	Pass
40	0.002	0.046	N/A	0.002	0.069	N/A	Pass



### Voltage Source Verification Data (Run time)

EUT: Universsal Dimmer

Tested by: lht

Test category: Class-A per Ed. 4.0 (2014) (European limits)

Test Margin: 100

Test date: 2017/9/23

Start time: 9:14:08

End time: 9:16:49

Test duration (min): 2.5

Data file name: H-000423.cts\_data

Comment: Brightest mode

Customer: ATE-TS300AU

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 229.94

Frequency(Hz): 50.00

I\_Peak (Amps): 1.974

I\_RMS (Amps): 1.335

I\_Fund (Amps): 1.298

Crest Factor: 1.480

Power (Watts): 294.1

Power Factor: 0.958

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.057	0.460	12.37	OK
3	0.484	2.069	23.40	OK
4	0.056	0.460	12.17	OK
5	0.053	0.920	5.77	OK
6	0.033	0.460	7.12	OK
7	0.020	0.690	2.96	OK
8	0.010	0.460	2.07	OK
9	0.029	0.460	6.20	OK
10	0.007	0.460	1.44	OK
11	0.028	0.230	12.29	OK
12	0.012	0.230	5.23	OK
13	0.027	0.230	11.55	OK
14	0.006	0.230	2.79	OK
15	0.019	0.230	8.17	OK
16	0.007	0.230	2.87	OK
17	0.020	0.230	8.60	OK
18	0.009	0.230	3.71	OK
19	0.026	0.230	11.31	OK
20	0.023	0.230	10.05	OK
21	0.030	0.230	12.87	OK
22	0.003	0.230	1.09	OK
23	0.021	0.230	9.23	OK
24	0.003	0.230	1.18	OK
25	0.019	0.230	8.06	OK
26	0.003	0.230	1.43	OK
27	0.028	0.230	12.08	OK
28	0.005	0.230	2.09	OK
29	0.025	0.230	10.79	OK
30	0.004	0.230	1.53	OK
31	0.019	0.230	8.34	OK
32	0.003	0.230	1.36	OK
33	0.020	0.230	8.68	OK
34	0.004	0.230	1.59	OK
35	0.023	0.230	9.93	OK
36	0.003	0.230	1.23	OK
37	0.023	0.230	9.87	OK
38	0.004	0.230	1.54	OK
39	0.021	0.230	9.22	OK
40	0.012	0.230	5.28	OK





## 7.5 Voltage Fluctuation and Flicker

Test Requirement ..... : IEC 61000-3-3  
Test Method ..... : IEC 61000-4-15  
Test Result ..... : Pass

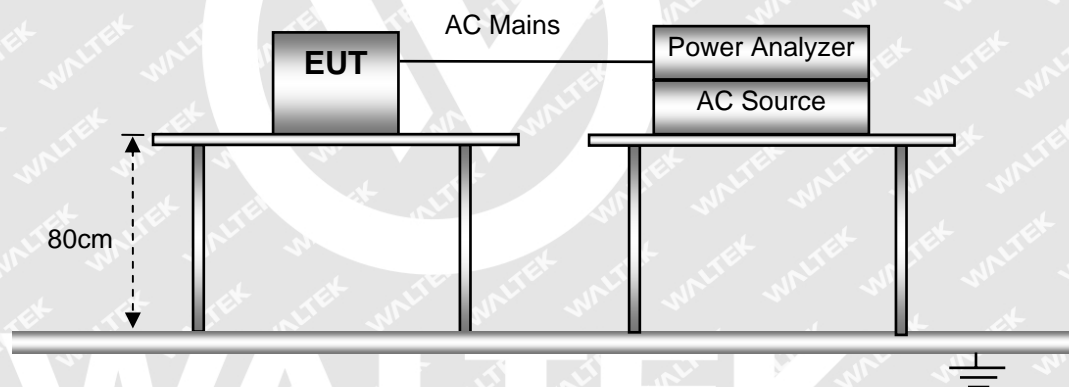
### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 23.1°C  
Humidity ..... : 53.4%RH  
Barometric Pressure ..... : 101.4kPa  
EUT Operation ..... : Refer to section 6.5.

### 7.5.2 Block Diagram of Setup

The Voltage Fluctuation and Flicker test was performed in accordance with the IEC 61000-4-15.





### 7.5.3 Voltage Fluctuation and Flicker Test Data

#### Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: Universal Dimmer

Test category: All parameters (European limits)

Test date: 2017/9/23

Test duration (min): 10

Comment: Brightest mode

Customer: ATE-TS300AU

Tested by: LHT

Test Margin: 100

End time: 9:28:59

Start time: 9:18:31

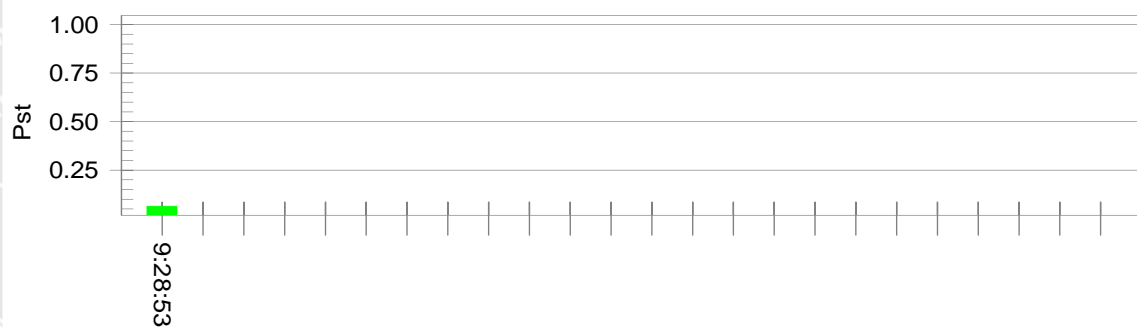
Data file name: F-000424.cts\_data

Test Result: Pass

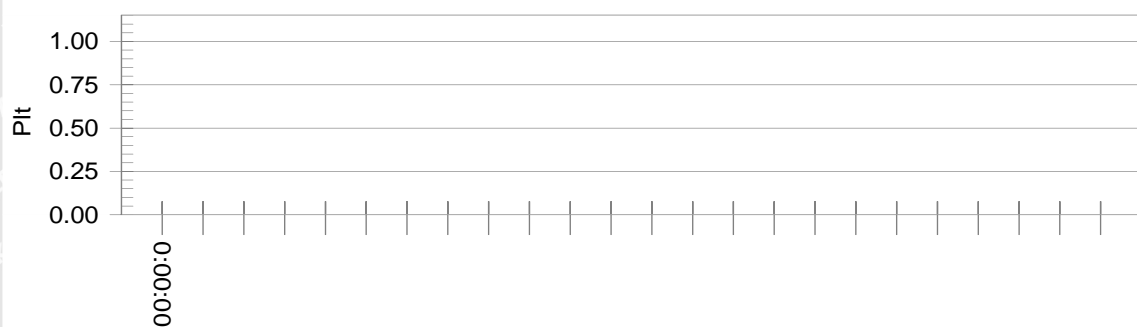
Status: Test Completed

Pst<sub>i</sub> and limit line

European Limits



Plt and limit line



#### Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.42

Highest dt (%): 0.00

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.064

Highest Plt (2 hr. period): 0.028

Test limit (%): N/A

Test limit (mS): 500.0

Test limit (%): 3.30

Test limit (%): 4.00

Test limit: 1.000

Test limit: 0.650

N/A

Pass

Pass

Pass

Pass

Pass



## 8 Immunity Test Results

### 8.1 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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## 8.2 Electrostatic Discharge(ESD)

Test Requirement.....	:	IEC 60669-2-1
Test Method .....	:	IEC 61000-4-2
Test Result .....	:	Pass
Discharge Impedance .....	:	330Ω / 150pF
Discharge Voltage.....	:	Air Discharge: ±8kV Contact Discharge: ±4kV HCP & VCP: ±4kV
Polarity .....	:	Positive & Negative
Number of Discharge .....	:	Minimum 10 times at each test point
Discharge Mode .....	:	Single Discharge
Discharge Period .....	:	1 second minimum

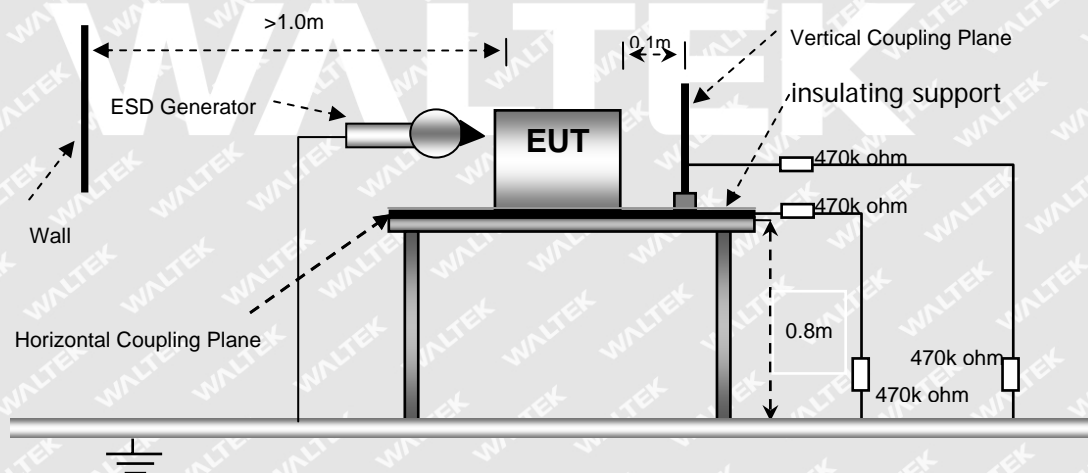
### 8.2.1 E.U.T. Operation

Operating Environment:

Temperature.....	:	22.3°C
Humidity .....	:	52.4%RH
Atmospheric Pressure.....	:	101.6kPa
EUT Operation	:	Refer to section 6.5.

### 8.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.





### 8.2.3 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

### 8.2.4 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



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### 8.3 Radio-frequency electromagnetic fields, 80MHz to 1GHz

Test Requirement .....	: IEC 60669-2-1
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

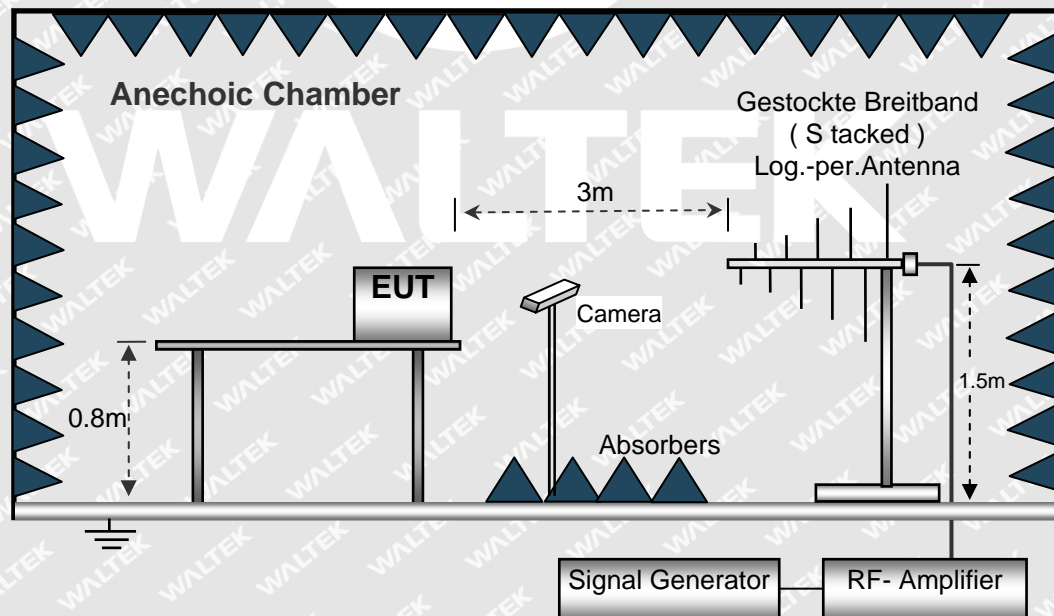
#### 8.3.1 E.U.T. Operation

Operating Environment:

Temperature .....	: 21.7°C
Humidity .....	: 52.4% RH
Barometric Pressure .....	: 102.4kPa
EUT Operation .....	: Refer to section 6.5.

#### 8.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.







### 8.3.3 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



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## 8.4 Electrical Fast Transients (EFT)

Test Requirement.....	: IEC 60669-2-1
Test Method .....	: IEC 61000-4-4
Test Result .....	: Pass
Polarity.....	: Positive & Negative
Repetition Frequency .....	: 5kHz
Burst Duration .....	: 300ms
Test Duration.....	: 2 minutes per level & polarity

### 8.4.1 E.U.T. Operation

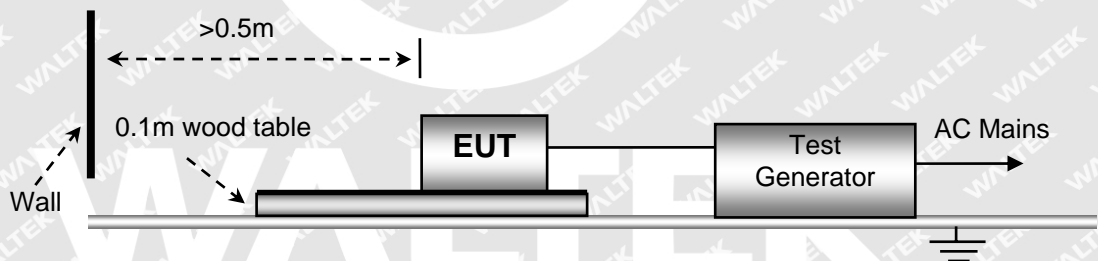
Operating Environment:

Temperature.....	: 21.9°C
Humidity.....	: 53.5%RH
Barometric Pressure .....	: 102.3kPa
EUT Operation .....	: Refer to section 6.5.

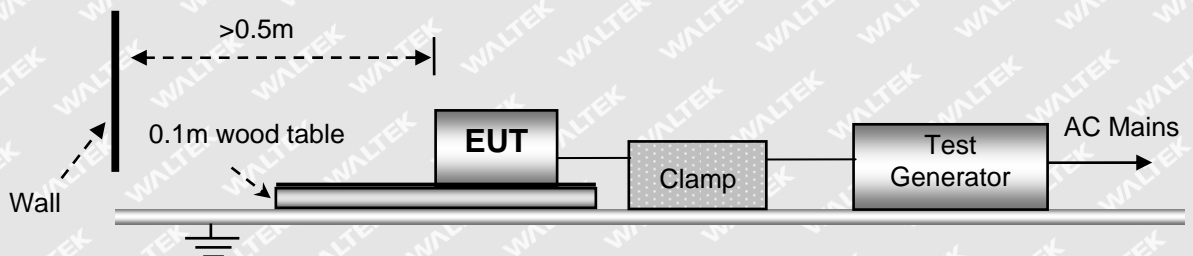
### 8.4.2 Block Diagram of Setup

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

For AC Mains or DC Ports:



For Signal and Control Ports:





### 8.4.3 Test Results

Test Ports	Test Level(kV)	Performance Criterion	Result
AC Mains	$\pm 1.0$	B	PASS
Signal	$\pm 0.5$	B	N/A <sup>a</sup>
DC Ports	$\pm 0.5$	B	N/A

Remark:

- a Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.



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### 8.5.1 E.U.T. Operation

Operating Environment:

### 8.5.2 Block Diagram of Setup

Diagram illustrating the test setup for the EUT (Equipment Under Test). The EUT is placed on a 0.1m wood table. A wall is located to the left of the table, with a distance of  $>0.5\text{m}$  between the wall and the EUT. The EUT is connected to AC Mains, which is connected to a Test Generator. The Test Generator is also connected to AC Mains. A ground symbol is shown at the bottom right.

Test Port	Applied Voltage (kV)	Performance criterion	Result
AC Mains (Between Live And Neutral)	±1	B	PASS
AC Mains (Between Live And Earth)	±2	B	N/A
AC Mains (Between Neutral And Earth)	±2	B	N/A



## 8.6 Injected Currents Immunity 0.15MHz to 80MHz

Test Requirement ..... : IEC 60669-2-1  
 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  $\Omega$ )  
 Modulation ..... : 80%, 1kHz Amplitude Modulation.

### 8.6.1 E.U.T. Operation

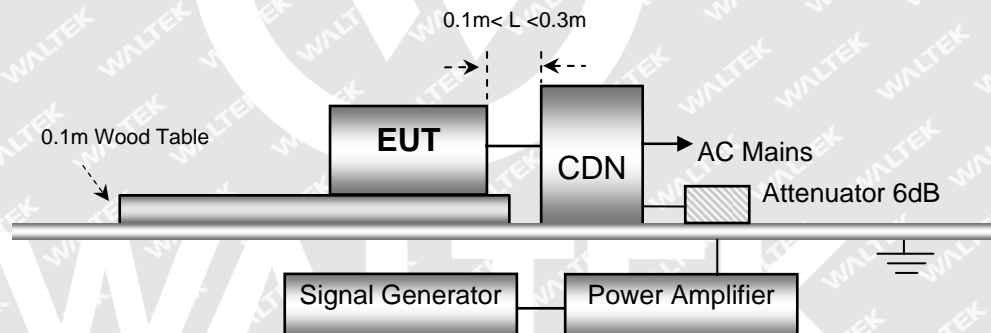
Operating Environment:

Temperature ..... : 23.4°C  
 Humidity ..... : 51.2% RH  
 Barometric Pressure : 103.2kPa  
 EUT Operation ..... : Refer to section 6.5.

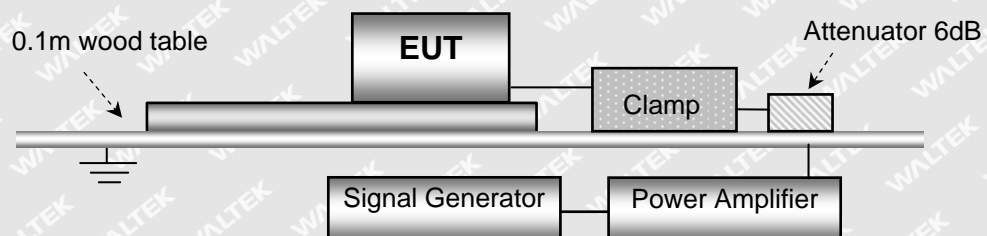
### 8.6.2 Block Diagram of Setup

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

For AC Mains or DC Port:



For Signal or Control Ports:



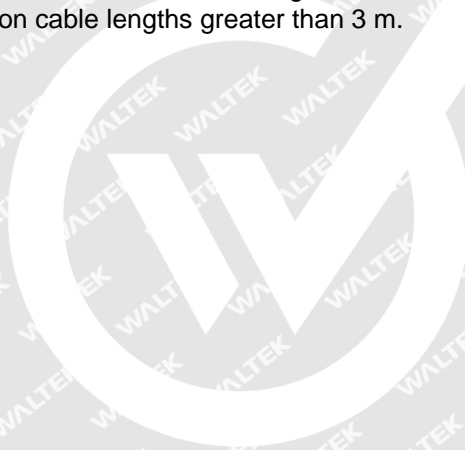


### 8.6.3 Test Results

Line	Test Level	Modulation	Step Size	Dwell Time	Criterion Required	Observations
AC mains	3Vrms	80%, 1kHz Amp. Mod.	1%	1s	A	A
DC Line	3Vrms	80%, 1kHz Amp. Mod.	1%	1s	A	N/A
Signal Line	3Vrms	80%, 1kHz Amp. Mod.	1%	1s	A	N/A <sup>a</sup>
Control Line	3Vrms	80%, 1kHz Amp. Mod.	1%	1s	A	N/A <sup>a</sup>

Remark:

- a Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.



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## 8.7 Voltage Dips and Interruptions

Test Requirement..... : IEC 60669-2-1  
 Test Method ..... : IEC 61000-4-11  
 Test Result ..... : Pass  
 Test Level ..... :  
 (Voltage dips and short interruptions) 0%&40%&70 % of  $U_T$  (Supply Voltage)  
 No. of Dips / Interruptions .... : 1 per Level at 20ms intervals

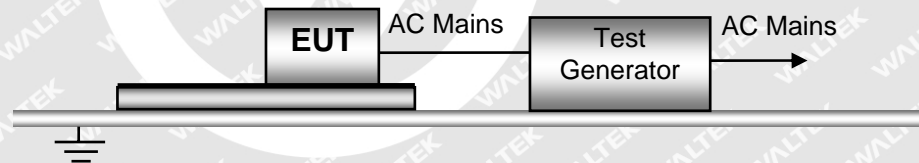
### 8.7.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.5°C  
 Humidity..... : 53.8%RH  
 Barometric Pressure ..... : 102.4kPa  
 EUT Operation ..... : Refer to section 6.5.

### 8.7.2 Block Diagram of Setup

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



### 8.7.3 Test Results

Test Level % $U_T$	Voltage dip/interruptions % $U_T$	Duration (number of cycles at rated frequency)	Result
0	100	10	Pass
40	60	10	Pass
70	30	10	Pass



## 9 Photographs – Test Setup

### 9.1 Photograph – Conducted Disturbance at Mains Terminal Test Setup



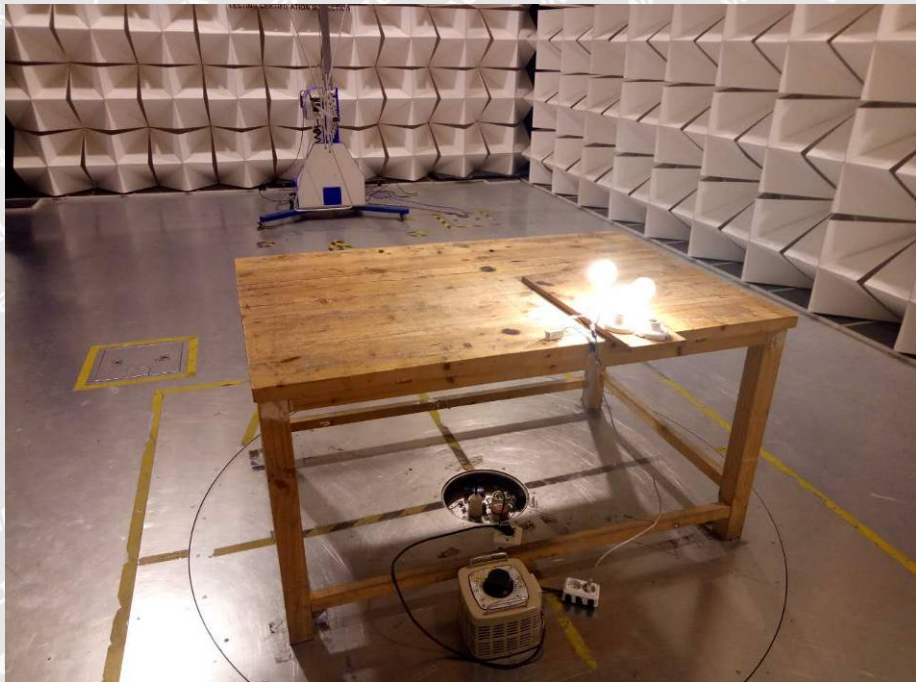
### 9.2 Photograph – Radiation electromagnetic disturbance Test Setup 9kHz to 30MHz







### 9.3 Photograph – Radiation Emission Test Setup, 30MHz to 300MHz



### 9.4 Photograph – Harmonics Current&Voltage Fluctuation and Flicker Test Setup







### 9.5 Photograph – ESD Immunity Test Setup



### 9.6 Photograph – Radio-frequency electromagnetic fields Immunity Test Setup





### 9.7 Photograph–EFT&Surges& Voltage Dips and Interruptions Immunity Test Setup



### 9.8 Photograph – Injected Currents Immunity Test Setup





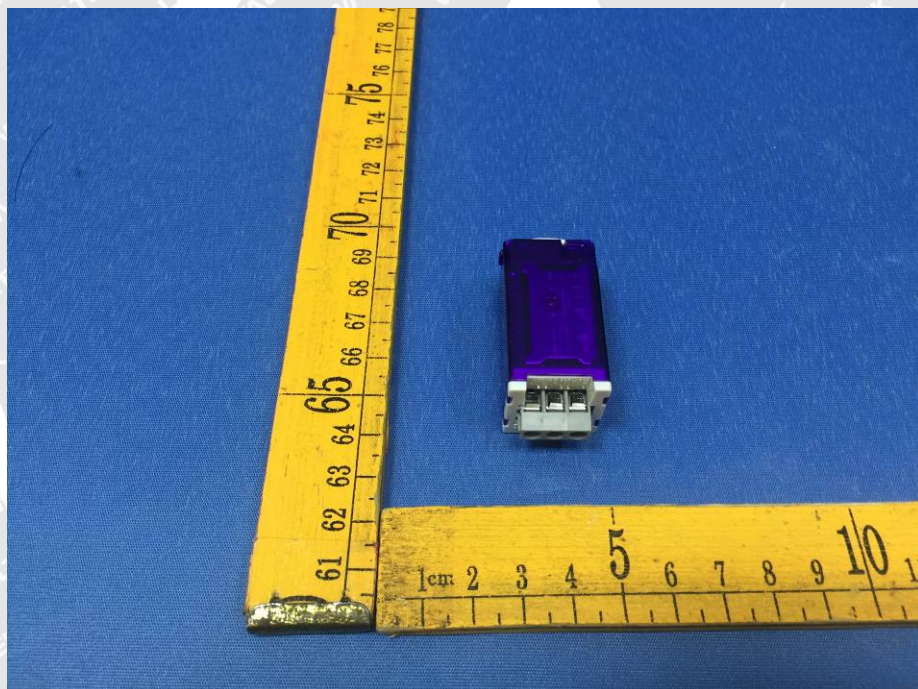


## 10 Photographs – Constructional Details

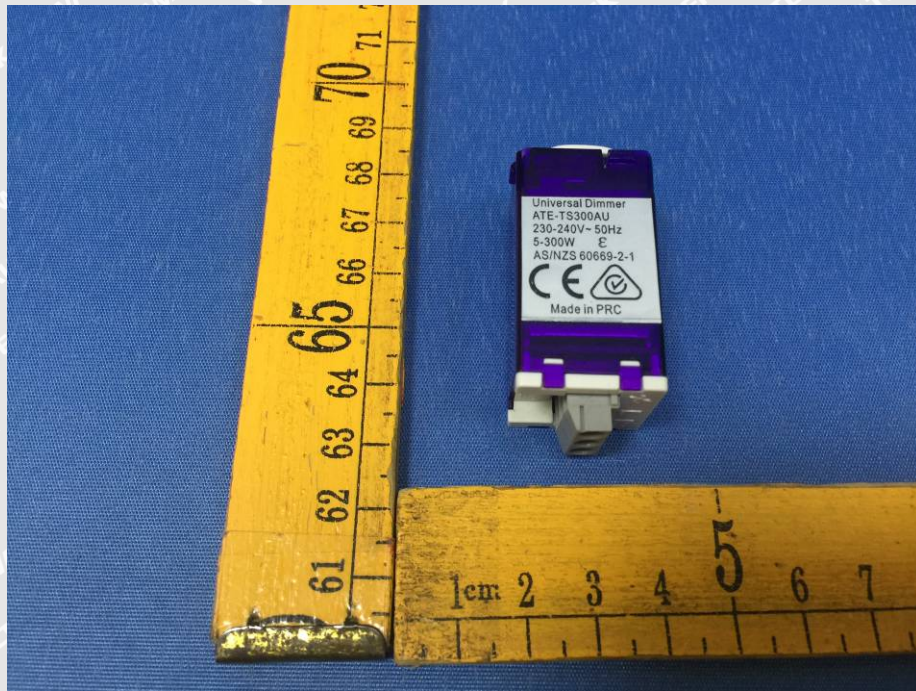
### 10.1 EUT – Appearance View











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

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