TEST REPORT

Reference No.	:	WTU19N12088773E
Applicant	:	LUMATEK LTD.
Address	:	Ewropa Business centre Level 3 – 701 Dun Karm Street Birkirkara BKR 9034 MALTA
Manufacturer	:	LUMATEK LTD.
Address	:	Ewropa Business centre Level 3 – 701 Dun Karm Street Birkirkara BKR 9034 MALTA
Product Name	:	LED Luminaires
Model No	:	Refer to section 3.2
Standards	:	EN 55015:2013+A1:2015 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013
Date of Receipt sample	:	2019-12-20
Date of Test	:	2019-12-20 to 2019-12-24
Date of Issue	:	2019-12-25
Test Report Form No.	:	WEL-55015A-01A
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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Compiled by:

Shouyin Wang / Project Engineer

Approved by:

Jianzhong Mao / Manager

1 Test Summary

EMISSION			
Test Item	**Test Standard**	**Class / Severity**	**Result**
Mains Terminal Disturbance Voltage, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.3.1	Pass
Radiated electromagnetic disturbance, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.4.1	Pass
Radiated Emission, 30MHz to 300MHz	EN 55015:2013+A1:2015	Clause 4.4.2	Pass
Harmonic Current emission	EN 61000-3-2:2014	Clause 7	Pass
Voltage Fluctuation and Flicker	EN 61000-3-3:2013	Clause 5	Pass
IMMUNITY（EN 61547:2009）			
Test Item	**Test Method**	**Performance Criteria**	**Result**
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	B	Pass
Radio-frequency electromagnetic fields (80MHz to 1GHz)	IEC 61000-4-3:2006+A1:2007+A2:2010	A	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4:2012	B	Pass
Surge	IEC 61000-4-5:2014+A1:2017	C	Pass
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2013	A	Pass
Power-frequency magnetic field	IEC 61000-4-8:2009	A	N/A
Voltage Dips	IEC 61000-4-11:2004+A1:2017	C	Pass
Voltage short interruptions		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

2 Contents

3 General Information

3.1 General Description of E.U.T.

Product Name ..... : LED Luminaires

Model No. ..... : Refer to section 3.2

Protection Class ..... : Class I

Remark..... :
1. The EUT (equipment under test) is an ordinary LED Luminaires for Lighting and similar use. For the further information, refer to the user's manual.
2. In electrical characteristics, there are three series of products, including No.1~No.2, No.3, No.4, and they have different drive, appearance and power. For detailed information, refer to section 3.2.
3. For the test results, the EUT had been tested with the rated input range. But only the worst case was shown in test report.

3.2 Details of E.U.T.

Technical Data..... :

No.	Model	Rated Input	Input Power	Note
1	ZEUS 600W	220-240V~, 50/60Hz	600W	Different lamp beads
2	ZEUS 600W PRO	220-240V~, 50/60Hz	600W	
3	ATTIS 300W	220-240V~, 50/60Hz	300W	---
4	ATTIS 200W	220-240V~, 50/60Hz	200W	---

3.3 Description of Support Units

The EUT has been tested as an independent unit. ZEUS 600W , ATTIS 300W and ATTIS 200W are the test samples. All tests were performed in the condition of 230Va.c., 50Hz input.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN 55015:2013+A1:2015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547:2009	Equipment for general lightingpurposes — EMC immunity requirements
EN 61000-3-2:2014	Electromagnetic compatibility (EMC) Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3:2013	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 conditionalconnection.

3.5 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: Radio-frequency electromagnetic fields (80MHz to 1GHz)

Lab information: Waltek Services (Foshan) Co., Ltd.

3.6 Abnormalities from Standard Conditions

None.

4 Equipment Used during Test

Mains Terminal Disturbance Voltage (Conducted Emission)					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	TWO-LINE V-NETWORK	R&S	ENV216	101208	Valid
Radiated electromagnetic disturbance(9kHz to 30MHz)					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	3-dimensional large loop antenna	SCHWARZBECK	HXYZ9170	256	Valid
3m Semi-anechoic Chamber for Radiated Emission					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	EMI Test Receiver	R&S	ESR7	101777	Valid
2	TRILOG Biconic logarithmic periodic broadband antenna	SCHWARZBECK	VULB9163	01025	Valid
Harmonics and Flicker Measuring System					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	Harmonics /Flicker Analyzer	KIKUSUI	KHA1000	TL002966	Valid
2	line Power Supply	KIKUSUI	PCR4000LE	TL003094	Valid
3	Line Impedance Network	KIKUSUI	LIN40MA-PCR-LE	TM001297	Valid
ESD					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	electrostatic discharge generator	TESEQ	NSG437	699	Valid
Radio-frequency electromagnetic fields					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	Generator	Agilent	SMB100A-B106	MY48080720	Valid
2	RF- amplifier	OPHIR	BLWA 0830	1015/171	Valid
3	Power meter	RS	NRP2	101134	Valid
4	Gestockte Breitband (S tacked) Log.-per.Antenna	SCHWARZBECK	STLP 9128D	STLP 9128E	Valid
EFT & Voltage Dips and Interruptions					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	Multifunction Generator Systems	TESEQ	NSG3040	2094	Valid

2	Single way manual Step regulator	TESEQ	INA 6501	243	Valid
Surge					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1.	Multifunction Generator Systems	TESEQ	NSG3060	1654	Valid
2	coupling-Decoupling Network	TESEQ	CDN3061	1485	Valid
Injected Currents					
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Status**
1	Test System for Conducted and Radiated Immunity	TESEQ	NSG4070	37519	Valid
2	Coupling and Decoupling Network	TESEQ	CDN M016	37358	Valid
3	Attenuator	TESEQ	ATN6075	36917	Valid

4.1 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Mains Terminal Disturbance Voltage	9kHz~30MHz	±2.66dB	(1)
Radiated electromagnetic disturbance	9kHz ~30MHz	±3.00dB	(1)
Radiated Emission	30MHz~300MHz	±5.03dB	(1)

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

5 Emission Test Results

5.1 Mains Terminals Disturbance Voltage, 9kHz to 30MHz

Test Requirement..... : EN 55015

Test Method..... : EN 55015

Test Result..... : Pass

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

Class/Severity..... : Table 2a of EN 55015

5.1.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 20.7~21.5°C

Humidity..... : 54~57%RH

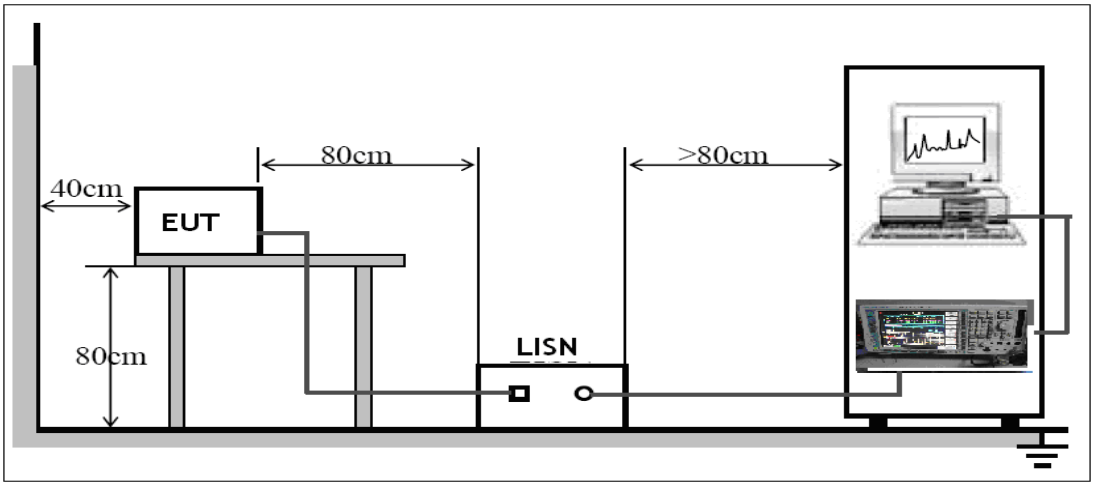
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 20% power mode for Attis 300W
100% power mode for Attis 200W, Zeus 600W

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the EN 55015.

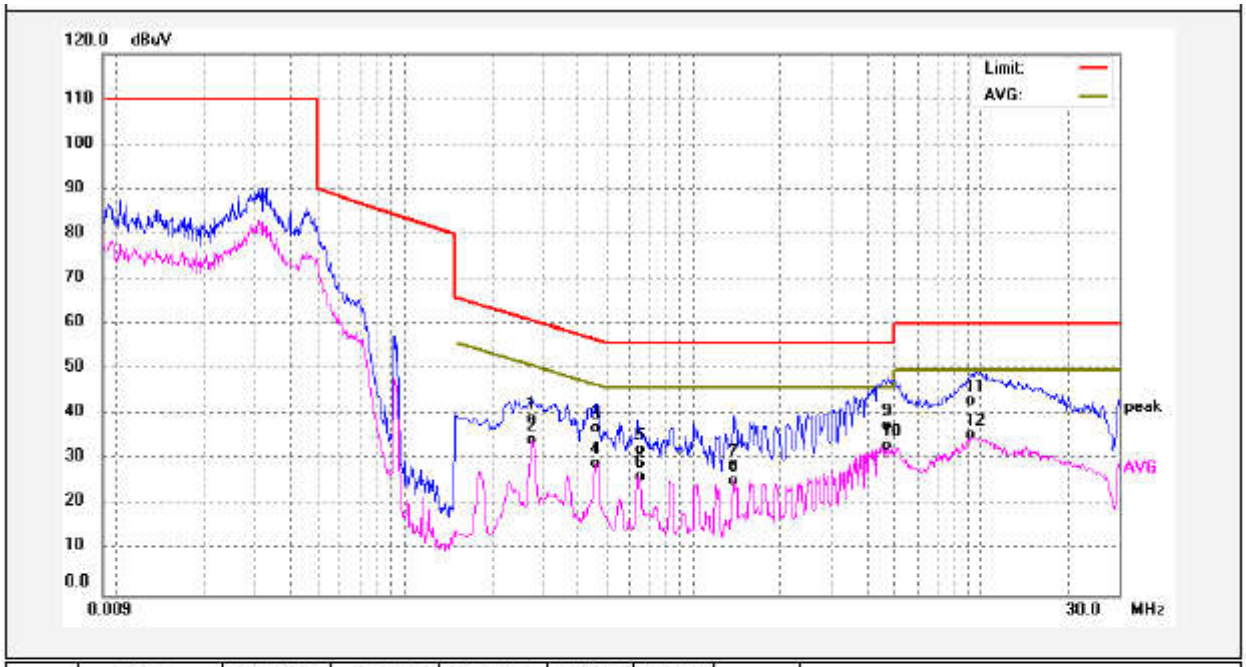


5.1.3 Measurement Data

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.

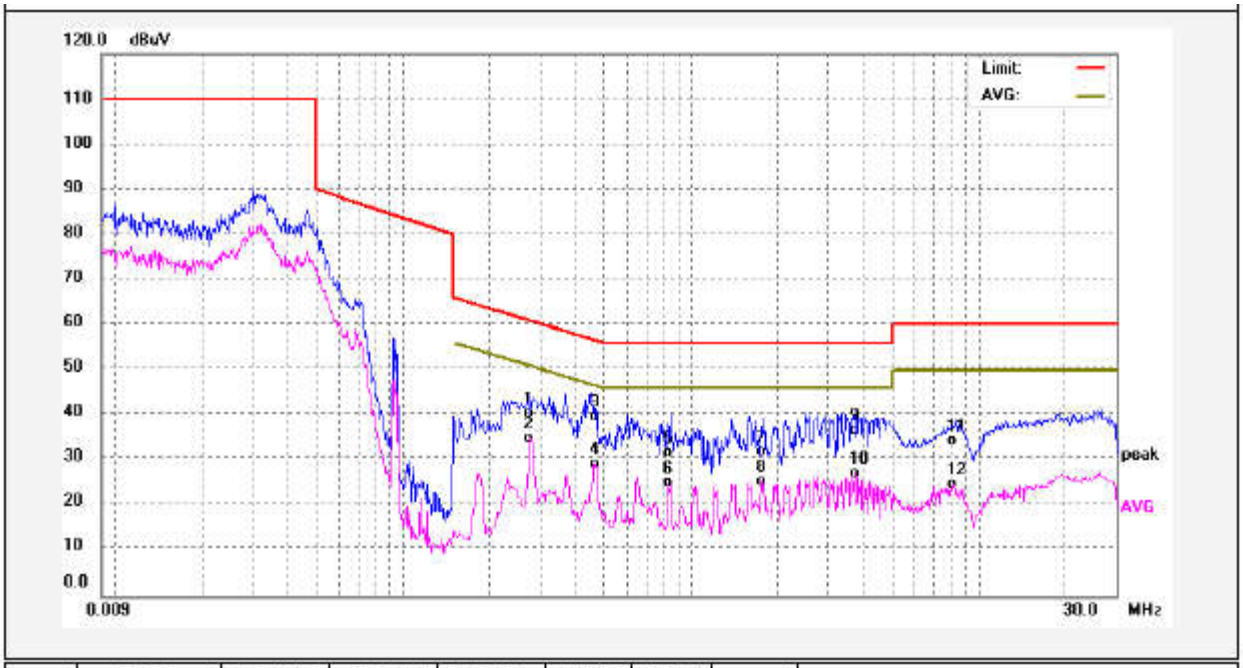
5.1.4 Mains Terminals Disturbance Voltage Test Data

Live Line, ZEUS 600W



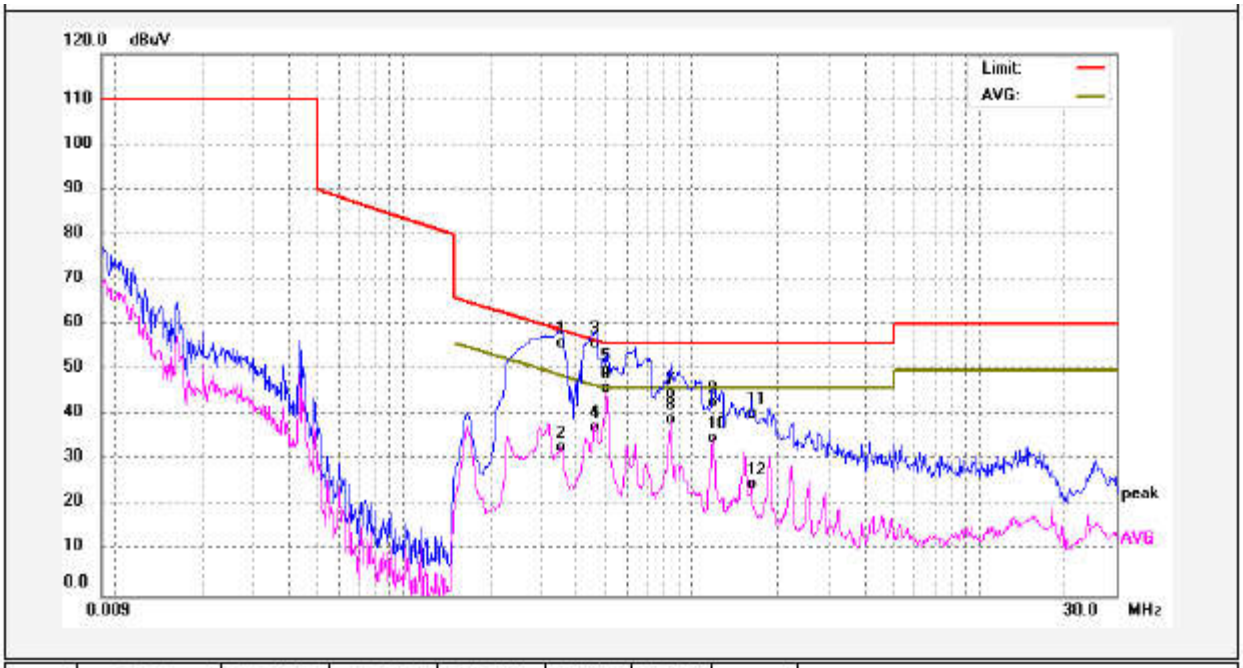
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2781	29.57	9.67	39.24	60.87	-21.63	QP	
2	0.2781	24.61	9.67	34.28	50.87	-16.59	AVG	
3	0.4581	27.50	9.67	37.17	56.73	-19.56	QP	
4	0.4581	19.64	9.67	29.31	46.73	-17.42	AVG	
5	0.6580	22.73	9.67	32.40	56.00	-23.60	QP	
6	0.6580	16.59	9.67	26.26	46.00	-19.74	AVG	
7	1.3821	18.94	9.71	28.65	56.00	-27.35	QP	
8	1.3821	15.54	9.71	25.25	46.00	-20.75	AVG	
9	4.7101	27.69	9.83	37.52	56.00	-18.48	QP	
10	4.7101	23.36	9.83	33.19	46.00	-12.81	AVG	
11	9.2461	33.18	9.95	43.13	60.00	-16.87	QP	
12	9.2461	25.62	9.95	35.57	50.00	-14.43	AVG	

Neutral Line, ZEUS 600W



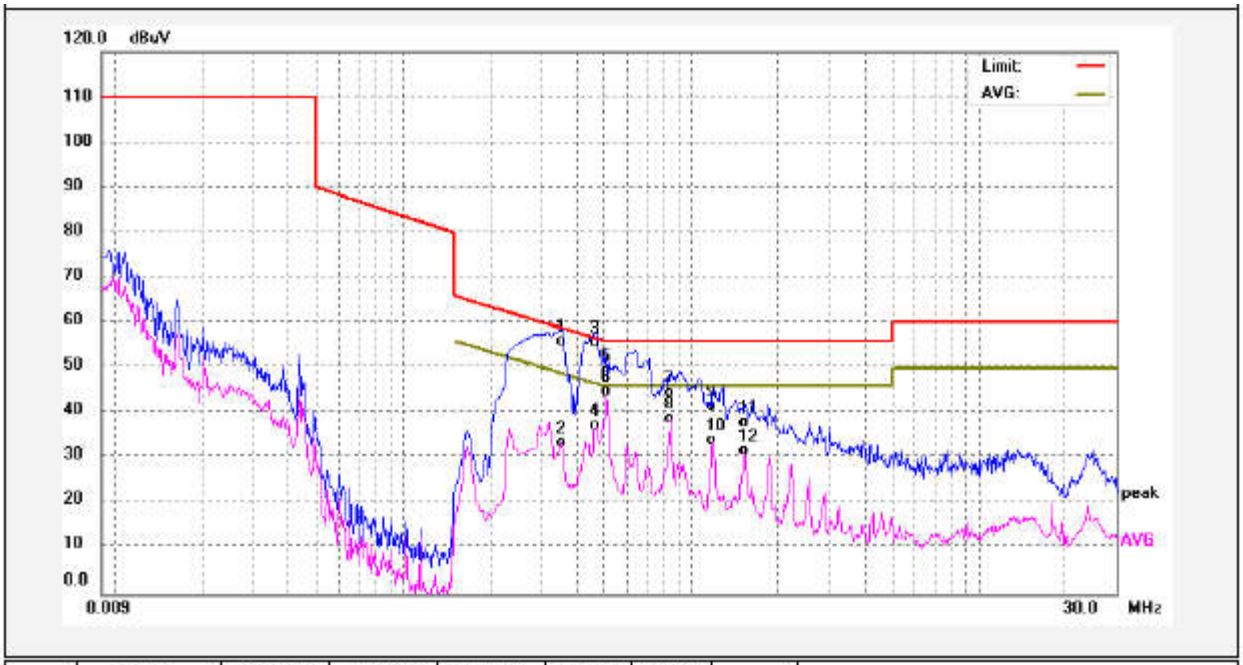
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2781	30.74	9.67	40.41	60.87	-20.46	QP	
2	0.2781	25.24	9.67	34.91	50.87	-15.96	AVG	
3	0.4661	30.04	9.67	39.71	56.58	-16.87	QP	
4	0.4661	19.68	9.67	29.35	46.58	-17.23	AVG	
5	0.8341	21.83	9.68	31.51	56.00	-24.49	QP	
6	0.8341	15.27	9.68	24.95	46.00	-21.05	AVG	
7	1.7621	22.18	9.73	31.91	56.00	-24.09	QP	
8	1.7621	15.52	9.73	25.25	46.00	-20.75	AVG	
9	3.7101	26.81	9.79	36.60	56.00	-19.40	QP	
10	3.7101	17.38	9.79	27.17	46.00	-18.83	AVG	
11	8.1701	24.28	9.92	34.20	60.00	-25.80	QP	
12	8.1701	14.78	9.92	24.70	50.00	-25.30	AVG	

Live Line, ATTIS 300W



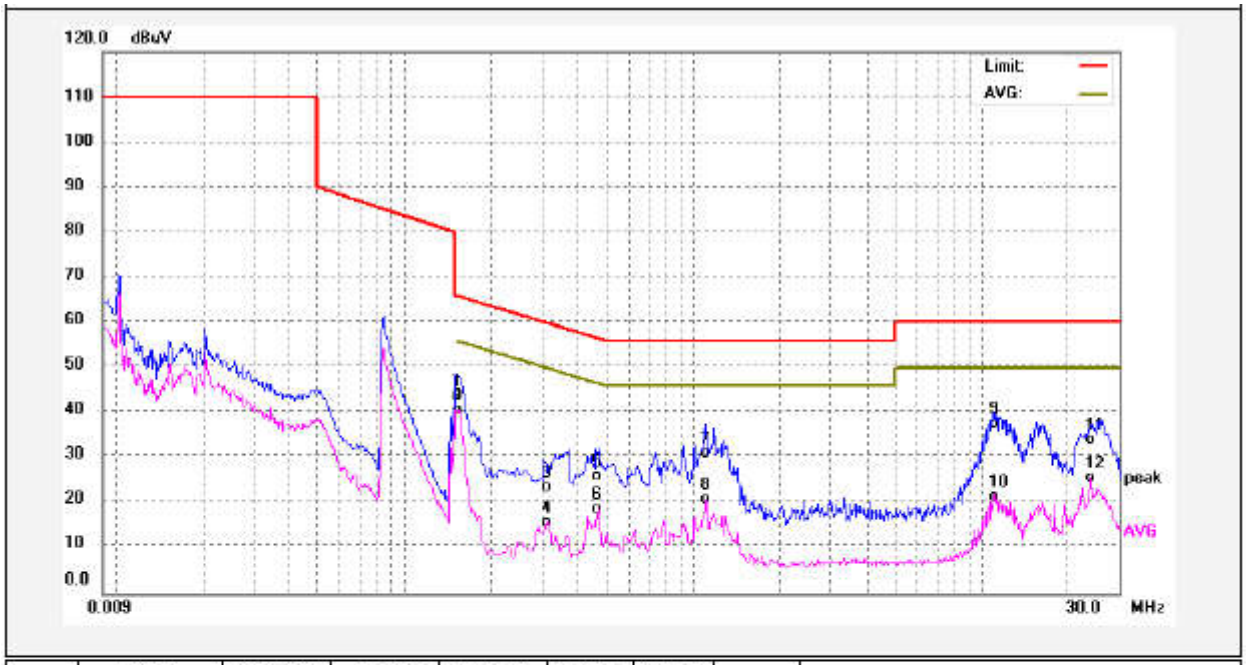
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.3604	46.31	9.65	55.96	58.72	-2.76	QP	
2	0.3604	23.25	9.65	32.90	48.72	-15.82	AVG	
3	0.4705	46.26	9.66	55.92	56.50	-0.58	QP	
4	0.4705	27.58	9.66	37.24	46.50	-9.26	AVG	
5	0.5118	40.21	9.66	49.87	56.00	-6.13	QP	
6	0.5118	36.31	9.66	45.97	46.00	-0.03	AVG	
7	0.8501	35.20	9.67	44.87	56.00	-11.13	QP	
8	0.8501	29.59	9.67	39.26	46.00	-6.74	AVG	
9	1.1941	32.99	9.68	42.67	56.00	-13.33	QP	
10	1.1941	25.34	9.68	35.02	46.00	-10.98	AVG	
11	1.6181	30.51	9.71	40.22	56.00	-15.78	QP	
12	1.6181	15.01	9.71	24.72	46.00	-21.28	AVG	

Neutral Line, ATTIS 300W



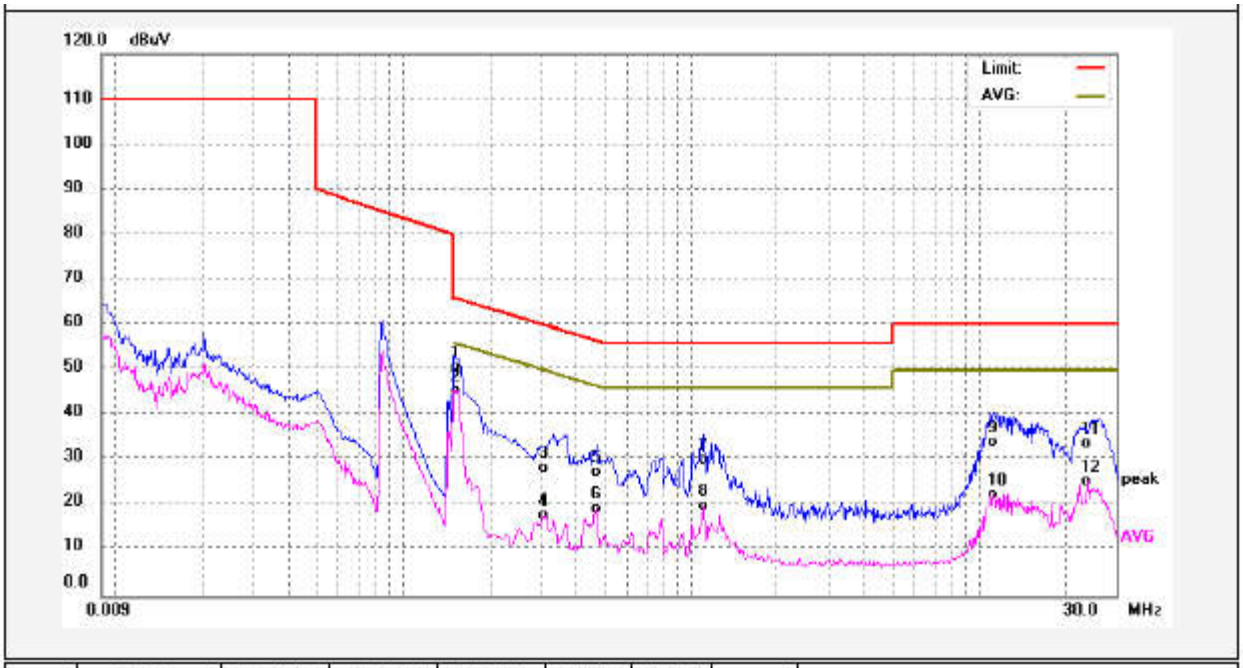
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.3581	46.24	9.65	55.89	58.77	-2.88	QP	
2	0.3581	23.68	9.65	33.33	48.77	-15.44	AVG	
3	0.4741	45.90	9.66	55.56	56.44	-0.88	QP	
4	0.4741	27.62	9.66	37.28	46.44	-9.16	AVG	
5	0.5123	39.60	9.66	49.26	56.00	-6.74	QP	
6	0.5123	35.18	9.66	44.84	46.00	-1.16	AVG	
7	0.8501	34.84	9.67	44.51	56.00	-11.49	QP	
8	0.8501	29.05	9.67	38.72	46.00	-7.28	AVG	
9	1.1941	31.96	9.68	41.64	56.00	-14.36	QP	
10	1.1941	24.43	9.68	34.11	46.00	-11.89	AVG	
11	1.5341	28.33	9.70	38.03	56.00	-17.97	QP	
12	1.5341	21.86	9.70	31.56	46.00	-14.44	AVG	

Live Line, ATTIS 200W



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1541	34.27	9.67	43.94	65.77	-21.83	QP	
2	0.1541	30.95	9.67	40.62	55.77	-15.15	AVG	
3	0.3141	13.75	9.67	23.42	59.86	-36.44	QP	
4	0.3141	6.14	9.67	15.81	49.86	-34.05	AVG	
5	0.4701	16.32	9.67	25.99	56.51	-30.52	QP	
6	0.4701	8.95	9.67	18.62	46.51	-27.89	AVG	
7	1.1100	21.35	9.69	31.04	56.00	-24.96	QP	
8	1.1100	11.24	9.69	20.93	46.00	-25.07	AVG	
9	11.0200	27.72	10.01	37.73	60.00	-22.27	QP	
10	11.0200	11.51	10.01	21.52	50.00	-28.48	AVG	
11	23.8821	23.59	10.42	34.01	60.00	-25.99	QP	
12	23.8821	15.12	10.42	25.54	50.00	-24.46	AVG	

Neutral Line, ATTIS 200W



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1541	40.96	9.67	50.63	65.77	-15.14	QP	
2	0.1541	35.69	9.67	45.36	55.77	-10.41	AVG	
3	0.3101	18.68	9.67	28.35	59.97	-31.62	QP	
4	0.3101	8.12	9.67	17.79	49.97	-32.18	AVG	
5	0.4701	17.83	9.67	27.50	56.51	-29.01	QP	
6	0.4701	9.57	9.67	19.24	46.51	-27.27	AVG	
7	1.1061	20.33	9.69	30.02	56.00	-25.98	QP	
8	1.1061	10.40	9.69	20.09	46.00	-25.91	AVG	
9	11.2261	24.16	10.01	34.17	60.00	-25.83	QP	
10	11.2261	12.41	10.01	22.42	50.00	-27.58	AVG	
11	23.8141	23.38	10.41	33.79	60.00	-26.21	QP	
12	23.8141	14.91	10.41	25.32	50.00	-24.68	AVG	

5.2 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement..... : EN 55015

Test Method..... : EN 55015

Test Result..... : Pass

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

Class/Severity..... : Table 3a of EN 55015

5.2.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 20.9~21.5°C

Humidity..... : 53~54%RH

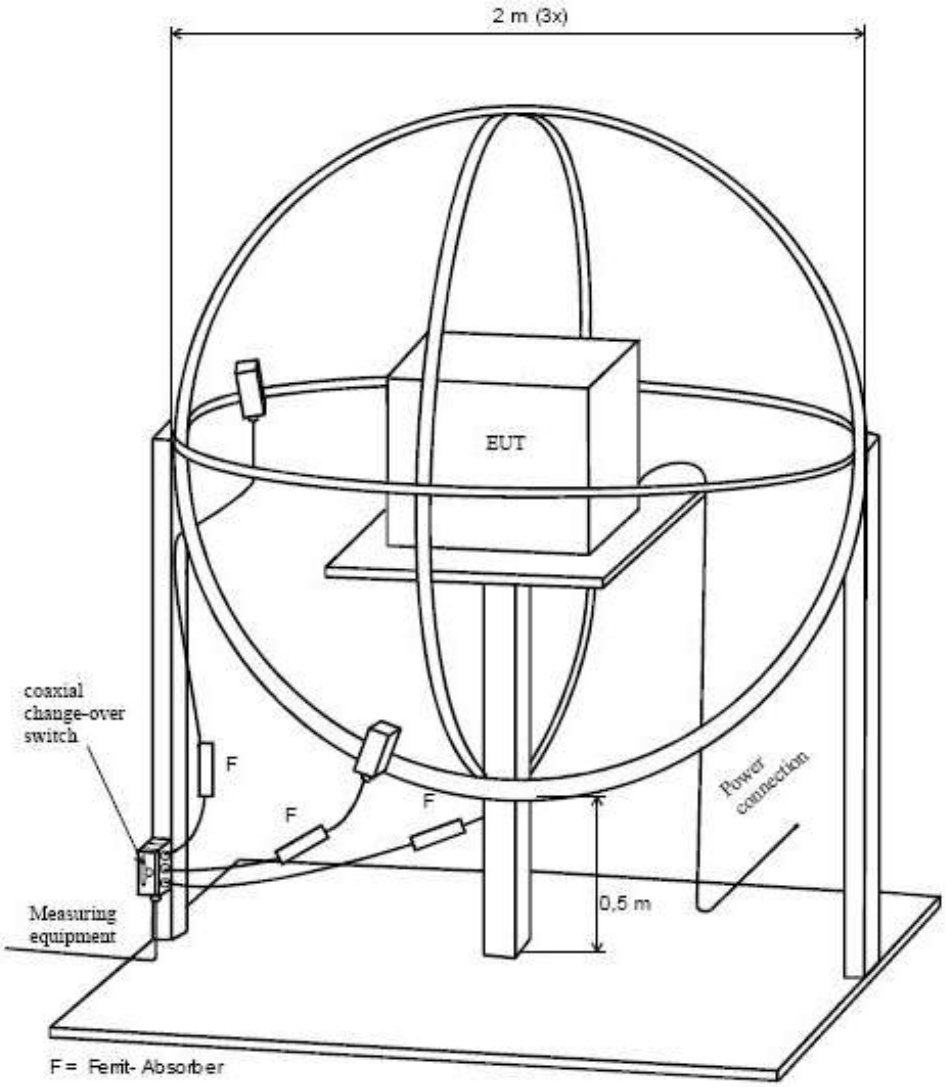
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 20％ power mode for Attis 200W
100％ power mode for Attis 300W, ZEUS 600W

5.2.2 Block Diagram of Test Setup

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

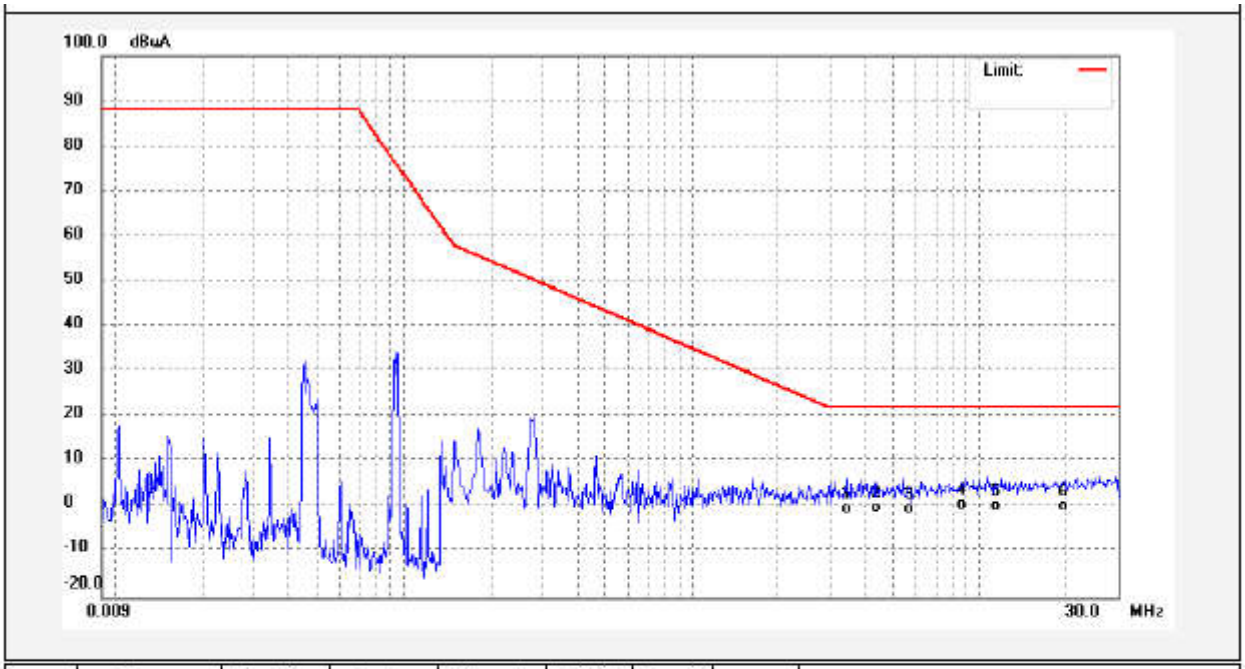


5.2.3 Measurement Data

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

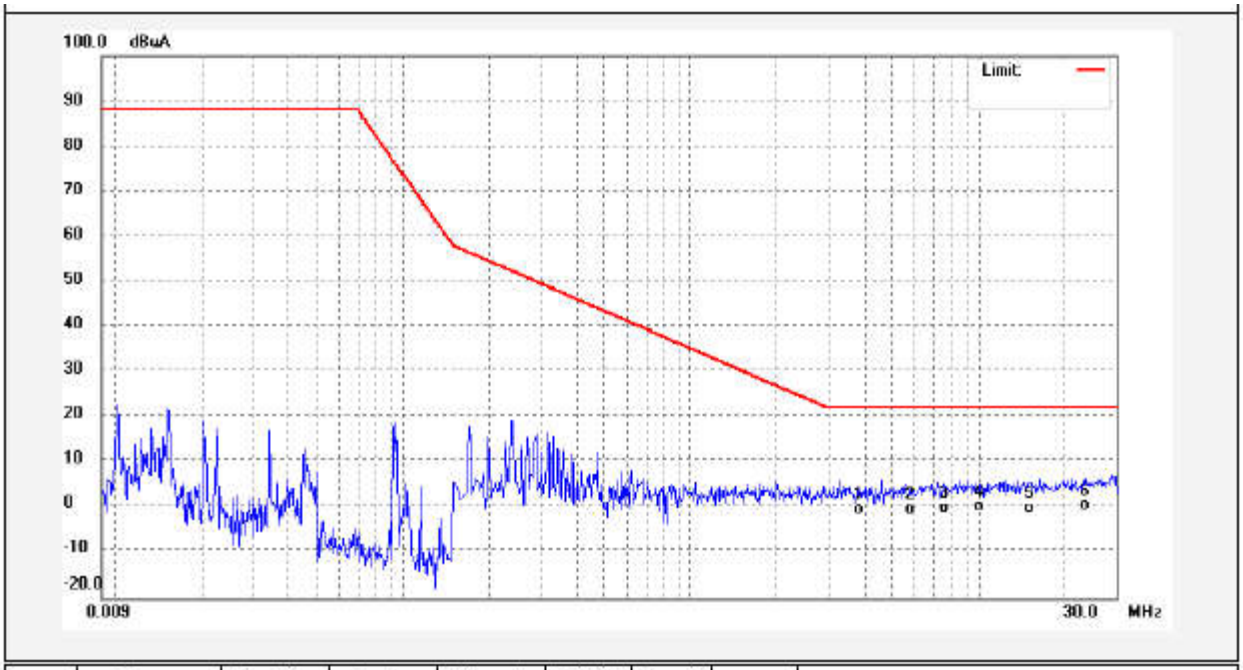
5.2.4 Radiated Electromagnetic Disturbance test data, 9kHz to 30MHz

Loop X, ZEUS 600W



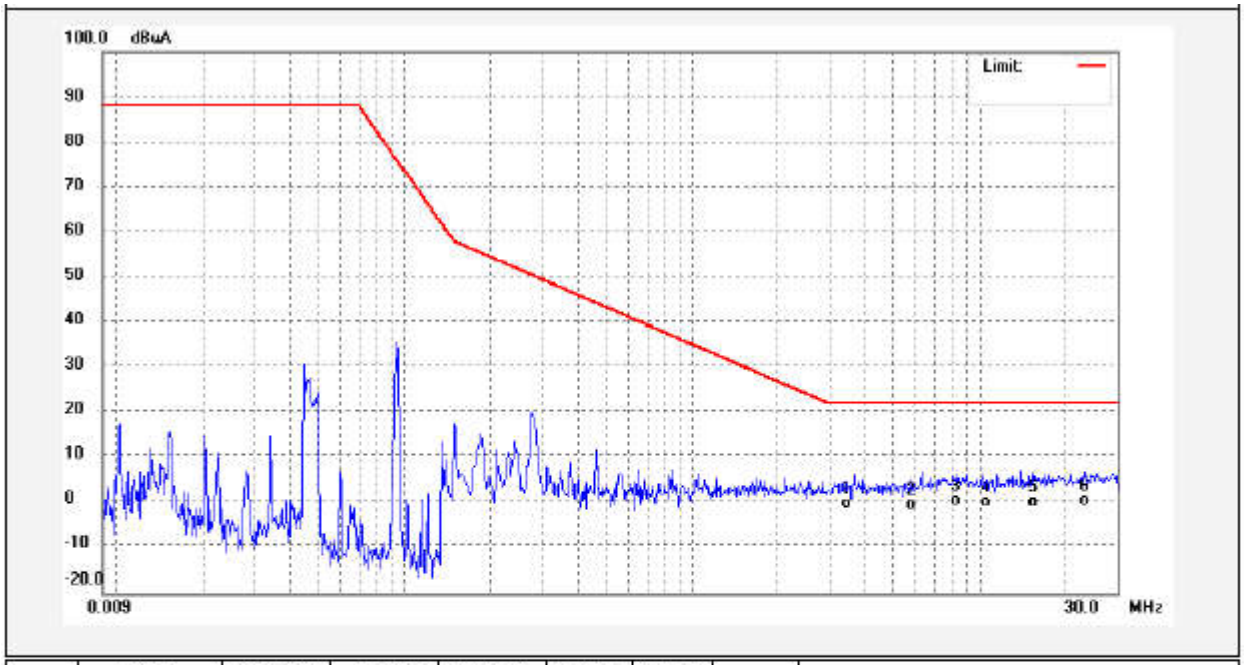
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.4381	-34.47	34.24	-0.23	22.00	-22.23	QP	
2	4.3781	-34.41	34.29	-0.12	22.00	-22.12	QP	
3	5.6860	-34.57	34.34	-0.23	22.00	-22.23	QP	
4	8.6301	-33.97	34.41	0.44	22.00	-21.56	QP	
5	11.2661	-34.33	34.48	0.15	22.00	-21.85	QP	
6	19.5101	-34.45	34.63	0.18	22.00	-21.82	QP	

Loop Y, ZEUS 600W



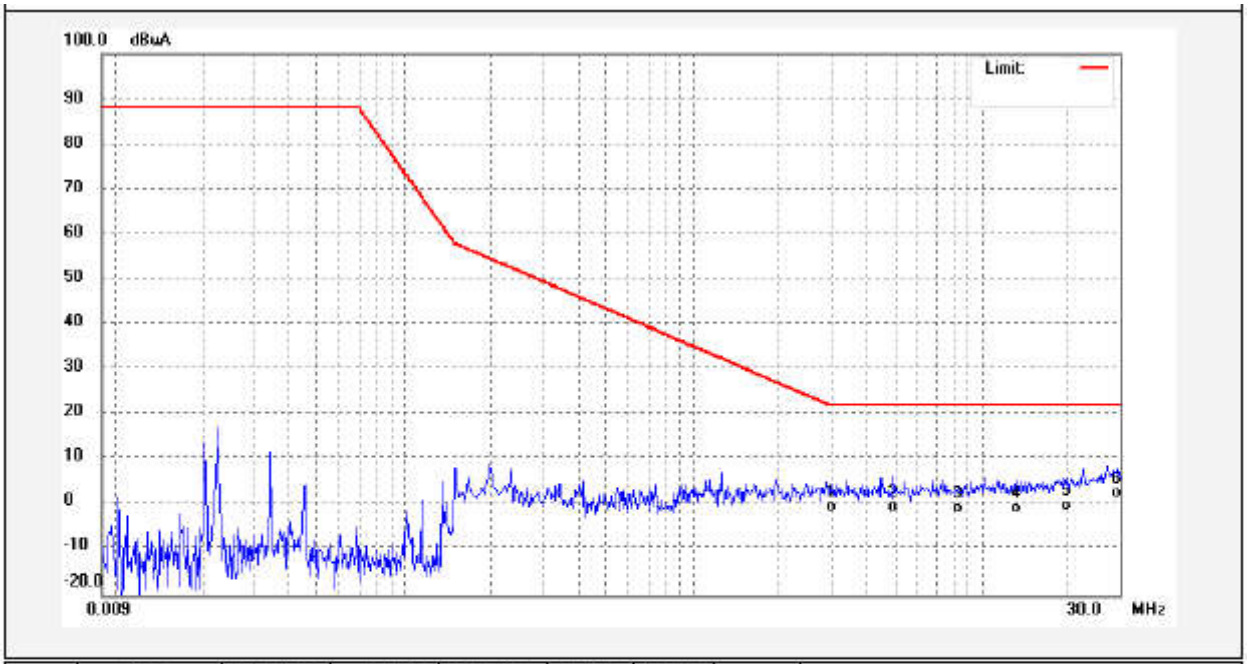
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.8301	-34.62	34.26	-0.36	22.00	-22.36	QP	
2	5.7621	-34.66	34.34	-0.32	22.00	-22.32	QP	
3	7.5581	-34.32	34.38	0.06	22.00	-21.94	QP	
4	10.0500	-34.34	34.45	0.11	22.00	-21.89	QP	
5	15.0181	-34.46	34.55	0.09	22.00	-21.91	QP	
6	23.4341	-34.18	34.69	0.51	22.00	-21.49	QP	

Loop Z, ZEUS 600W



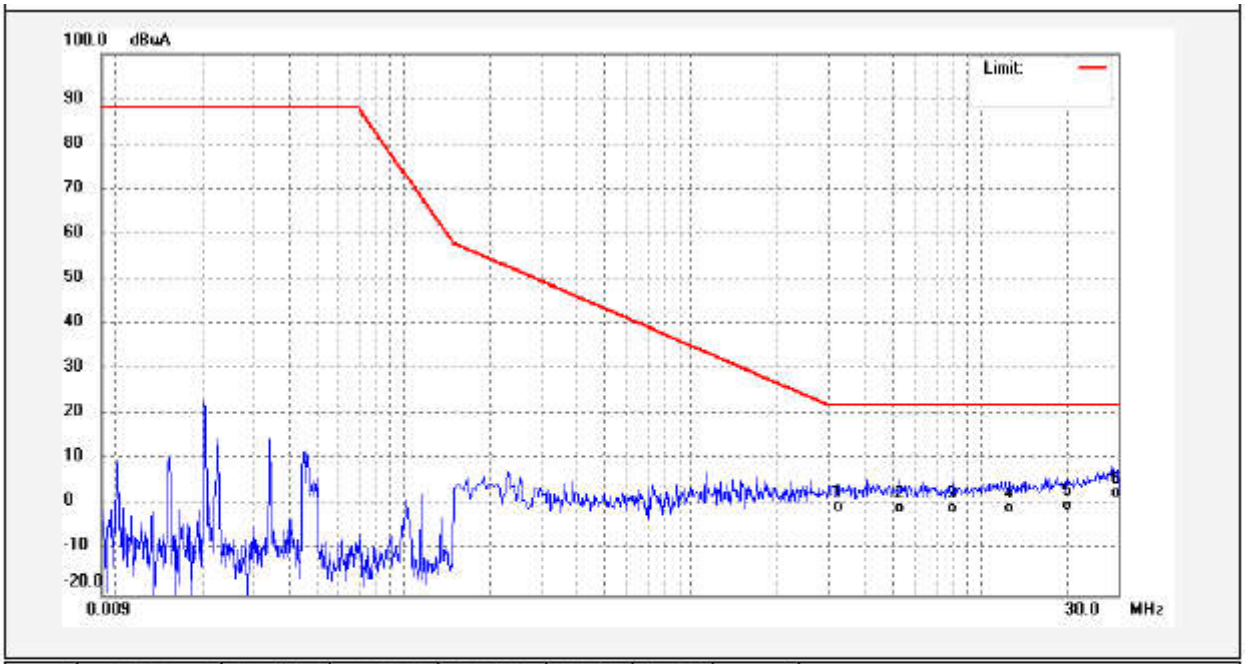
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.4621	-34.36	34.24	-0.12	22.00	-22.12	QP	
2	5.7781	-34.67	34.34	-0.33	22.00	-22.33	QP	
3	8.2861	-33.76	34.40	0.64	22.00	-21.36	QP	
4	10.5141	-34.33	34.46	0.13	22.00	-21.87	QP	
5	15.2141	-34.38	34.55	0.17	22.00	-21.83	QP	
6	23.0621	-34.26	34.68	0.42	22.00	-21.58	QP	

Loop X, ATTIS 300W



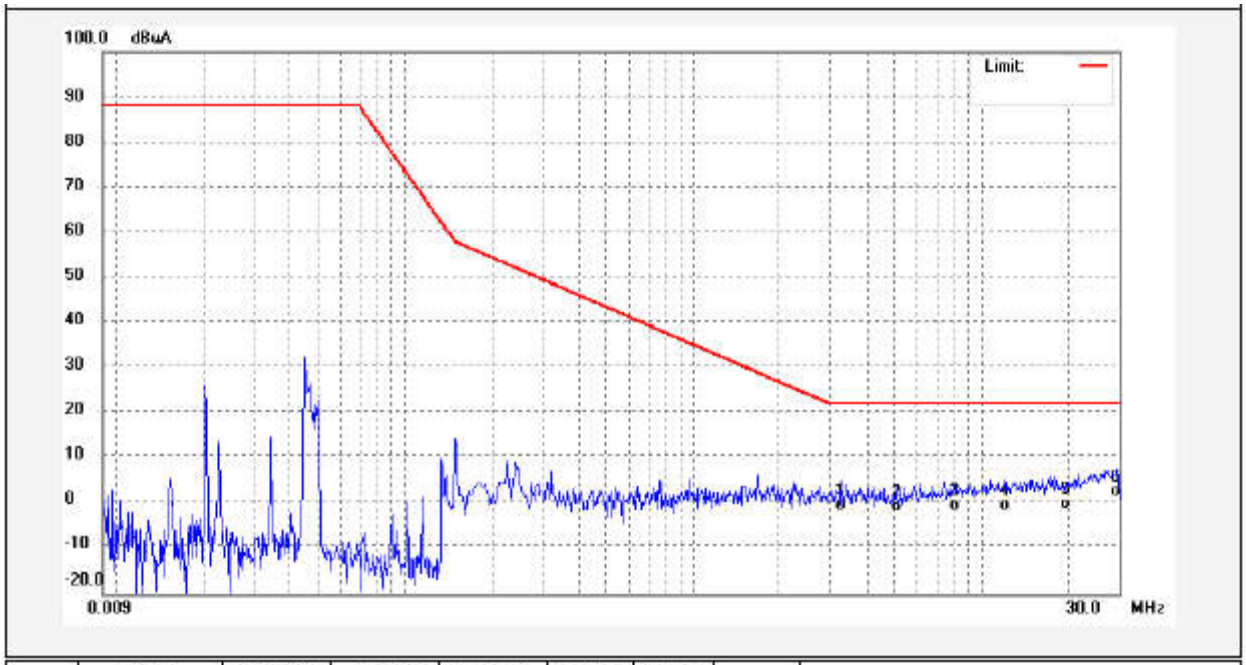
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.0140	-34.56	34.07	-0.49	22.00	-22.49	QP	
2	4.9541	-34.42	34.11	-0.31	22.00	-22.31	QP	
3	8.3101	-33.40	32.69	-0.71	22.00	-22.71	QP	
4	13.1261	-34.46	33.94	-0.52	22.00	-22.52	QP	
5	19.5541	-34.43	34.31	-0.12	22.00	-22.12	QP	
6	29.3941	-33.68	36.36	2.68	22.00	-19.32	QP	

Loop Y, ATTIS 300W



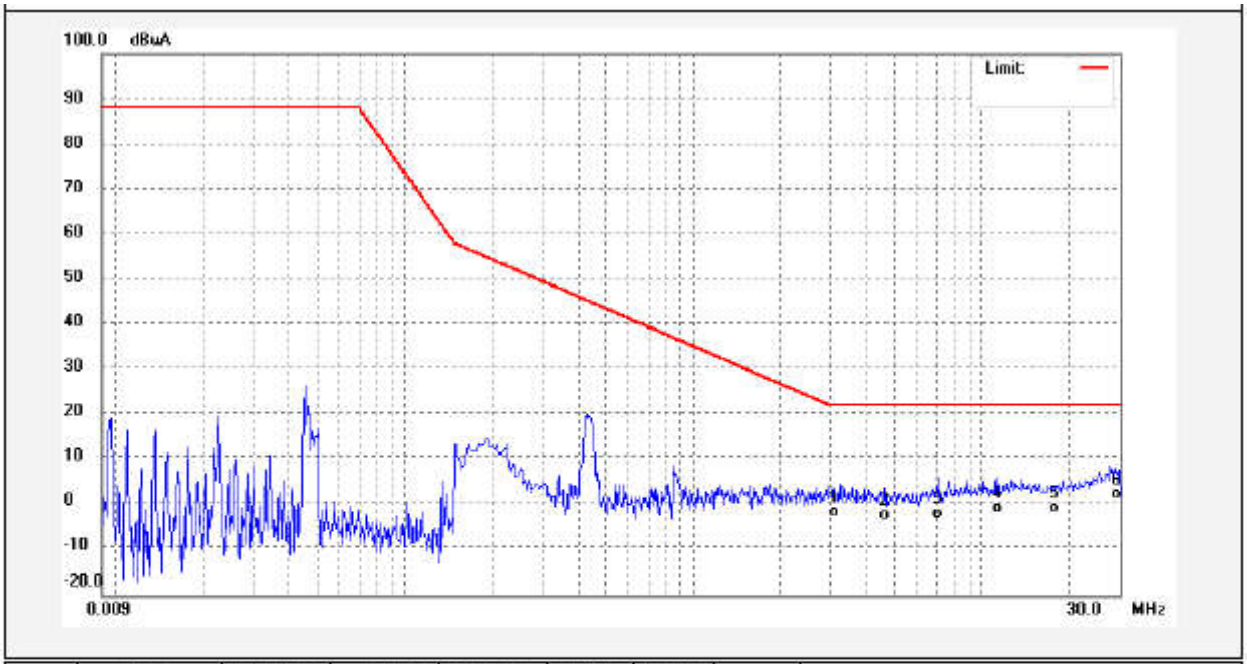
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.2381	-34.40	34.00	-0.40	22.00	-22.40	QP	
2	5.2821	-34.88	34.21	-0.67	22.00	-22.67	QP	
3	8.0021	-33.06	32.49	-0.57	22.00	-22.57	QP	
4	12.6421	-34.63	33.91	-0.72	22.00	-22.72	QP	
5	20.1221	-34.49	34.36	-0.13	22.00	-22.13	QP	
6	29.7821	-33.79	36.45	2.66	22.00	-19.34	QP	

Loop Z, ATTIS 300W



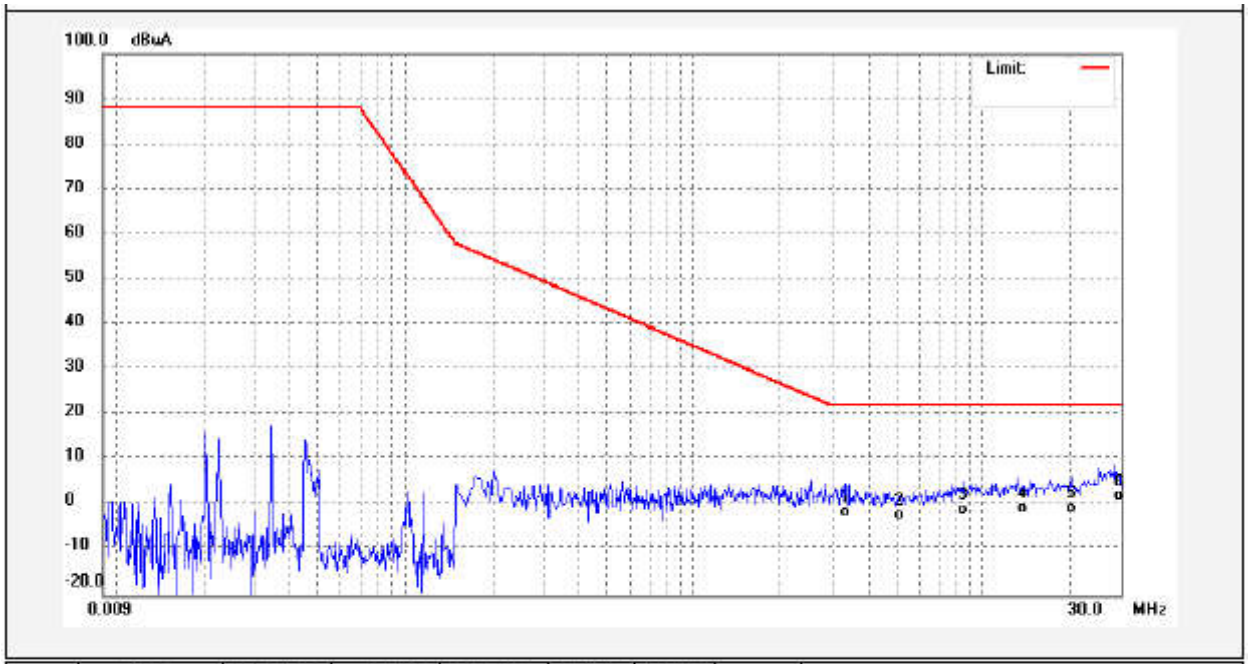
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.2621	-34.37	33.99	-0.38	22.00	-22.38	QP	
2	5.0540	-34.70	34.14	-0.56	22.00	-22.56	QP	
3	8.0780	-33.04	32.55	-0.49	22.00	-22.49	QP	
4	12.0620	-34.30	33.87	-0.43	22.00	-22.43	QP	
5	19.5900	-34.33	34.31	-0.02	22.00	-22.02	QP	
6	29.4661	-33.73	36.37	2.64	22.00	-19.36	QP	

Loop X, ATTIS 200W



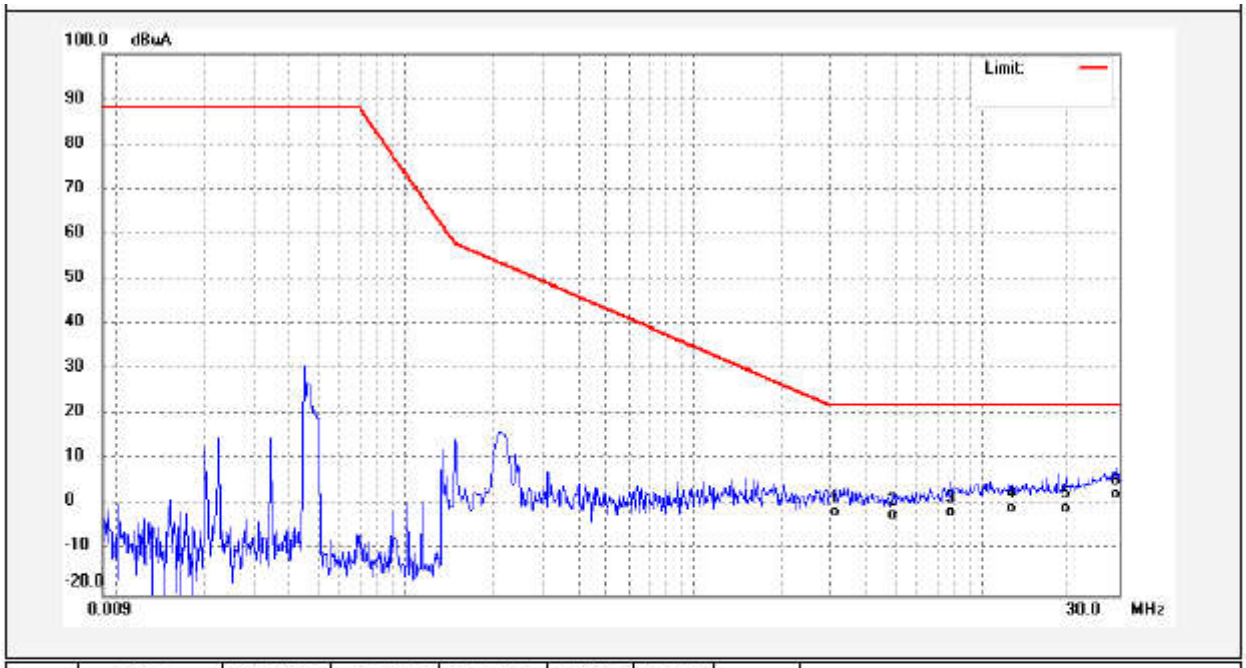
No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.0901	-34.53	33.09	-1.44	22.00	-23.44	QP	
2	4.6301	-34.48	32.46	-2.02	22.00	-24.02	QP	
3	7.0581	-34.41	32.51	-1.90	22.00	-23.90	QP	
4	11.2861	-34.45	33.75	-0.70	22.00	-22.70	QP	
5	17.7981	-34.48	33.74	-0.74	22.00	-22.74	QP	
6	29.9341	-33.87	36.08	2.21	22.00	-19.79	QP	

Loop Y, ATTIS 200W



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.3341	-34.38	32.91	-1.47	22.00	-23.47	QP	
2	5.1221	-34.81	32.53	-2.28	22.00	-24.28	QP	
3	8.5341	-33.85	32.76	-1.09	22.00	-23.09	QP	
4	13.7061	-34.53	33.75	-0.78	22.00	-22.78	QP	
5	20.2861	-34.45	33.80	-0.65	22.00	-22.65	QP	
6	29.5941	-33.81	35.99	2.18	22.00	-19.82	QP	

Loop Z, ATTIS 200W



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.1141	-34.58	33.08	-1.50	22.00	-23.50	QP	
2	4.9221	-34.75	32.51	-2.24	22.00	-24.24	QP	
3	7.8581	-33.85	32.41	-1.44	22.00	-23.44	QP	
4	12.7301	-34.50	33.75	-0.75	22.00	-22.75	QP	
5	19.5981	-34.35	33.74	-0.61	22.00	-22.61	QP	
6	29.8221	-33.75	36.05	2.30	22.00	-19.70	QP	

5.3 Radiated Emission, 30MHz to 300MHz

Test Requirement..... : EN 55015

Test Method..... : CISPR 32

Test Result..... : Pass

Frequency Range..... : 30MHz to 300MHz

Class/Severity..... : Table 3b of EN 55015

5.3.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 20.9~22.6°C

Humidity..... : 53~58%RH

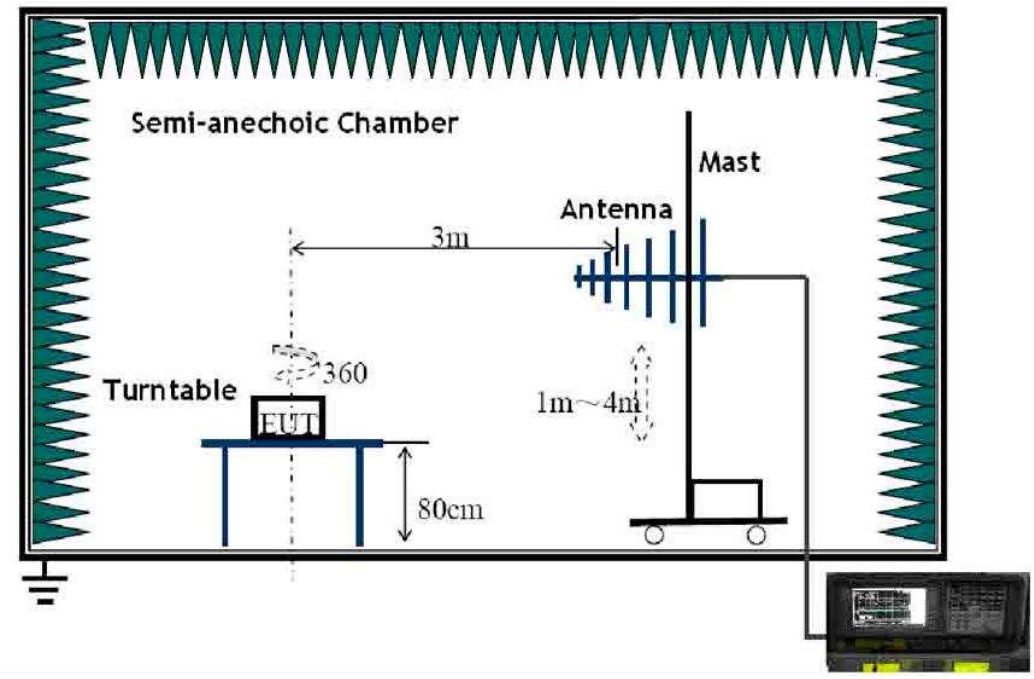
EUT Operation :

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 20% power mode for Attis 200W
100% power mode for Attis 300W, Zeus 600W

5.3.2 Block Diagram of Setup

The Radiated Emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the CISPR 32.

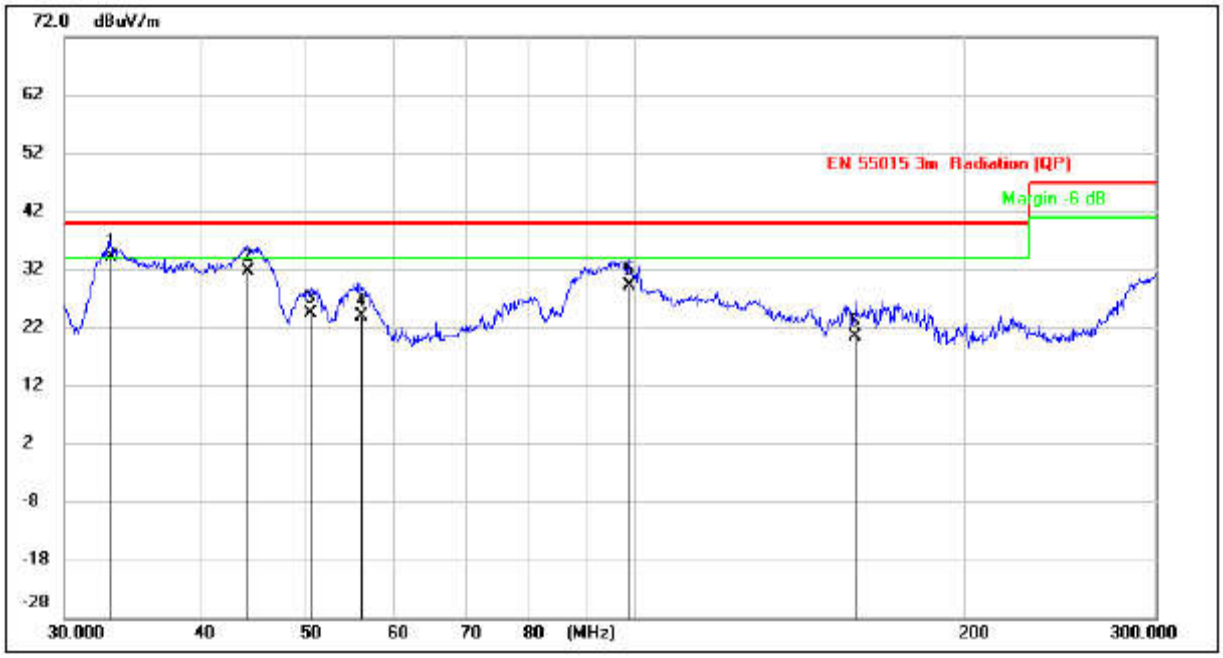


5.3.3 Measurement Data

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. According to the data in section 5.3.4, the EUT complied with the EN 55015 standards.

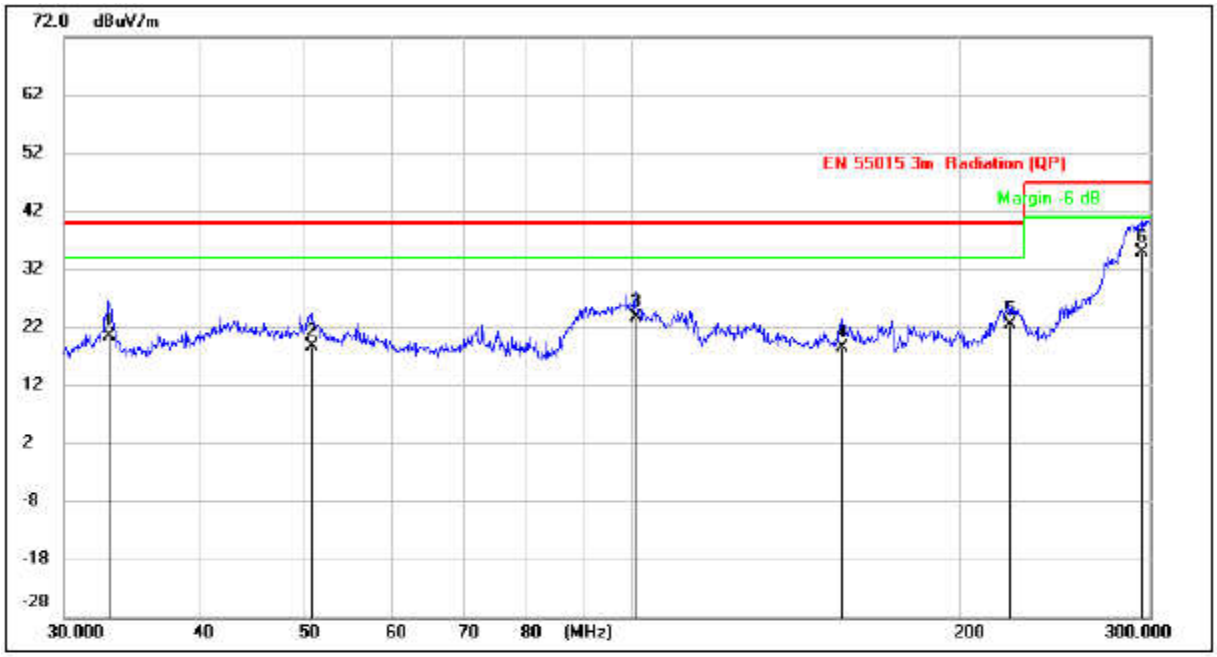
5.3.4 Radiated Emission test data,30MHz to 300MHz

Vertical, ZEUS 600W



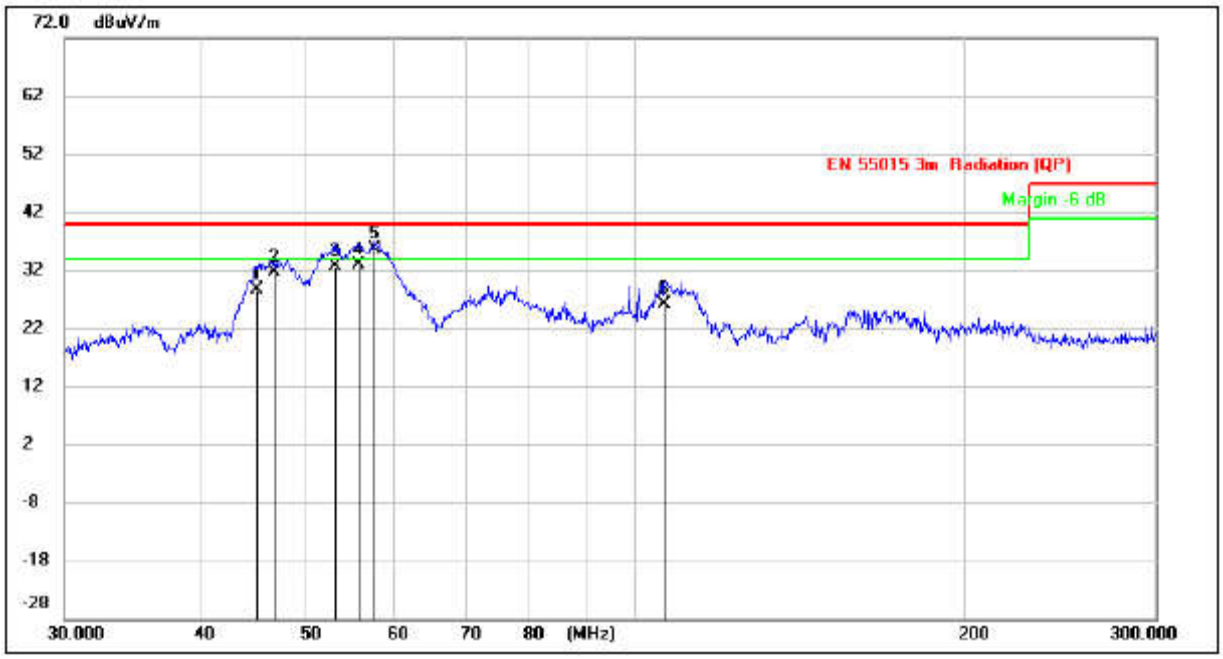
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	33.1223	21.64	12.43	34.07	40.00	-5.93	QP
2	44.0678	17.06	14.56	31.62	40.00	-8.38	QP
3	50.4801	9.43	15.05	24.48	40.00	-15.52	QP
4	55.9914	9.72	14.19	23.91	40.00	-16.09	QP
5	98.6555	16.13	12.88	29.01	40.00	-10.99	QP
6	159.2652	10.08	10.26	20.34	40.00	-19.66	QP

Horizontal, ZEUS 600W



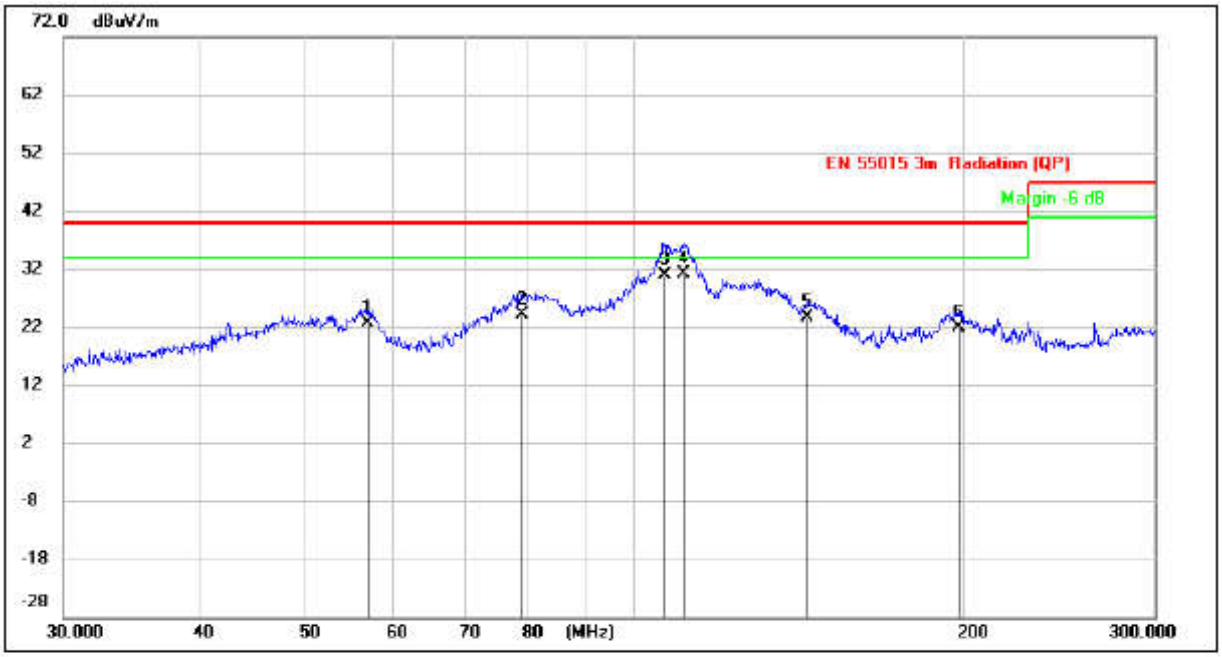
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	32.9701	7.74	12.73	20.47	40.00	-19.53	QP
2	50.7132	2.18	16.48	18.66	40.00	-21.34	QP
3	100.7212	9.26	14.49	23.75	40.00	-16.25	QP
4	155.9987	7.99	10.39	18.38	40.00	-21.62	QP
5	222.3931	8.67	13.79	22.46	40.00	-17.54	QP
6	294.5244	18.09	16.83	34.92	47.00	-12.08	QP

Vertical, ATTIS 300W



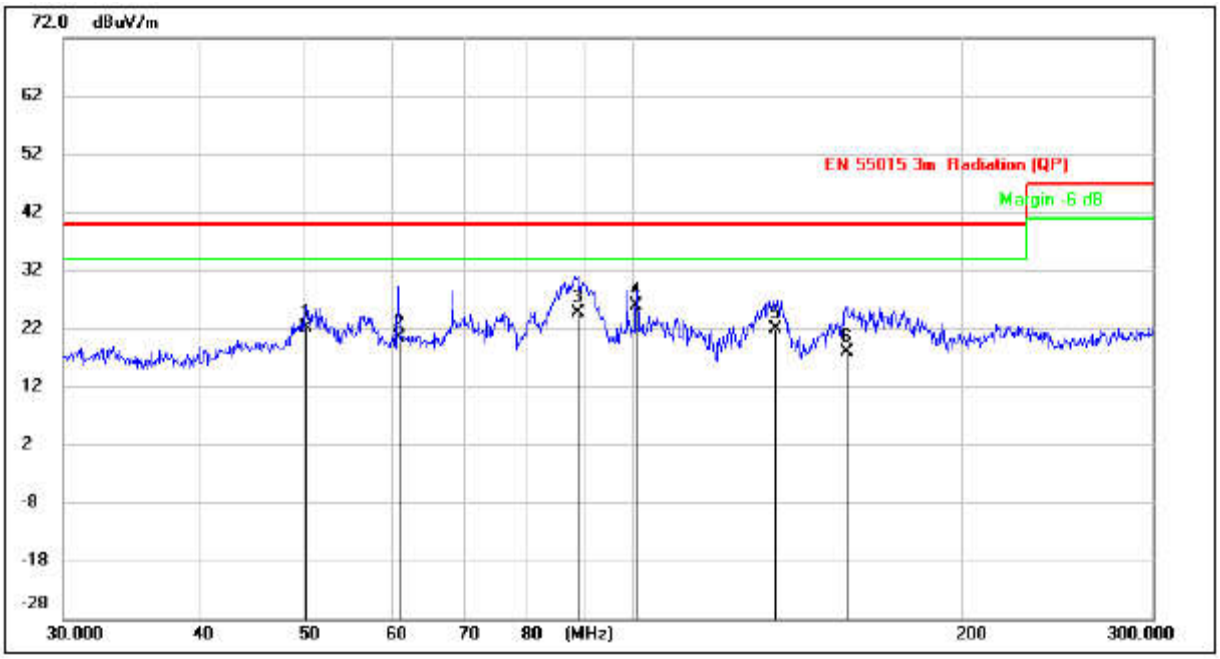
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	44.8871	13.63	15.05	28.68	40.00	-11.32	QP
2	46.6790	16.41	15.12	31.53	40.00	-8.47	QP
3	53.1033	17.87	14.64	32.51	40.00	-7.49	QP
4	55.8626	18.69	14.21	32.90	40.00	-7.10	QP
5	57.8257	21.63	13.91	35.54	40.00	-4.46	QP
6	106.4440	13.12	13.07	26.19	40.00	-13.81	QP

Horizontal, ATTIS 300W



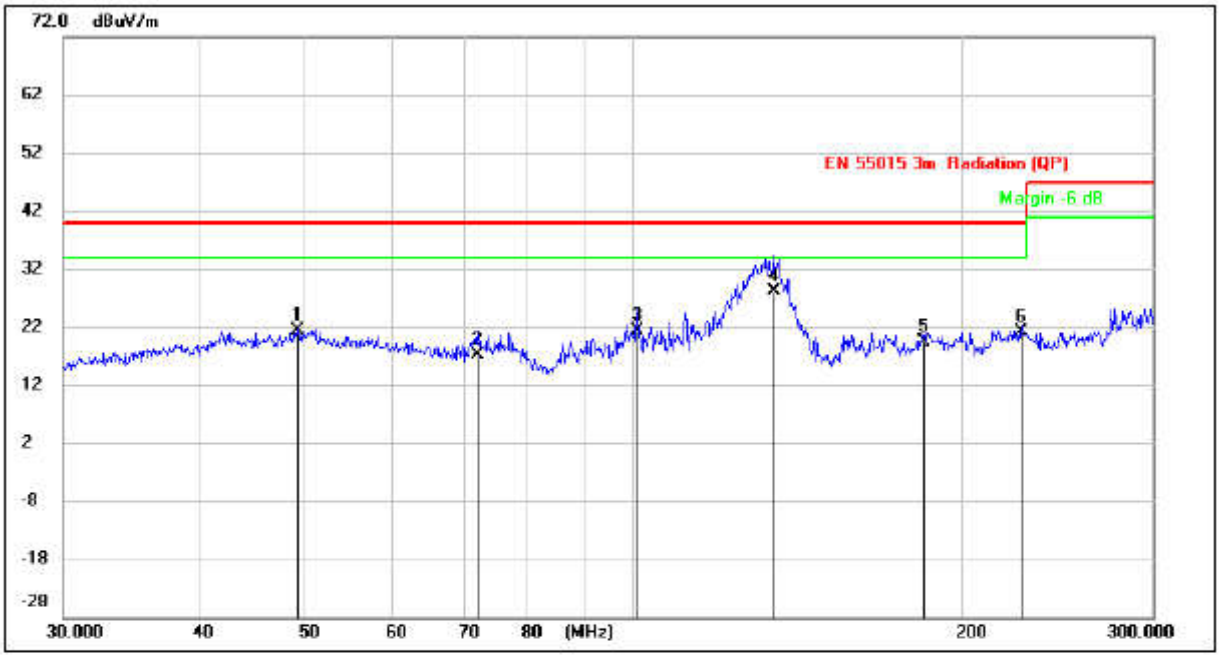
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	57.0322	7.39	15.29	22.68	40.00	-17.32	QP
2	79.0899	14.13	10.07	24.20	40.00	-15.80	QP
3	106.6894	17.08	13.92	31.00	40.00	-9.00	QP
4	110.9484	17.48	13.71	31.19	40.00	-8.81	QP
5	144.2518	13.90	9.72	23.62	40.00	-16.38	QP
6	198.2079	8.33	13.48	21.81	40.00	-18.19	QP

Vertical, ATTIS 200W



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	50.1326	7.08	15.11	22.19	40.00	-17.81	QP
2	60.8305	7.01	13.35	20.36	40.00	-19.64	QP
3	88.9448	13.53	11.21	24.74	40.00	-15.26	QP
4	100.7212	12.76	13.09	25.85	40.00	-14.15	QP
5	134.9340	12.19	9.70	21.89	40.00	-18.11	QP
6	157.0801	7.78	10.18	17.96	40.00	-22.04	QP

Horizontal, ATTIS 200W



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	49.2177	5.04	16.39	21.43	40.00	-18.57	QP
2	71.9649	5.71	11.44	17.15	40.00	-22.85	QP
3	100.7212	6.80	14.49	21.29	40.00	-18.71	QP
4	134.6236	18.01	10.21	28.22	40.00	-11.78	QP
5	184.5531	7.16	12.32	19.48	40.00	-20.52	QP
6	227.0500	6.98	14.07	21.05	40.00	-18.95	QP

5.4 Harmonics Current Emission

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

Test Method..... : EN 61000-3-2

Test Result..... : Pass

Class/Severity..... : Class C

5.4.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 21.6~22.2°C

Humidity..... : 53.0~53.6%RH

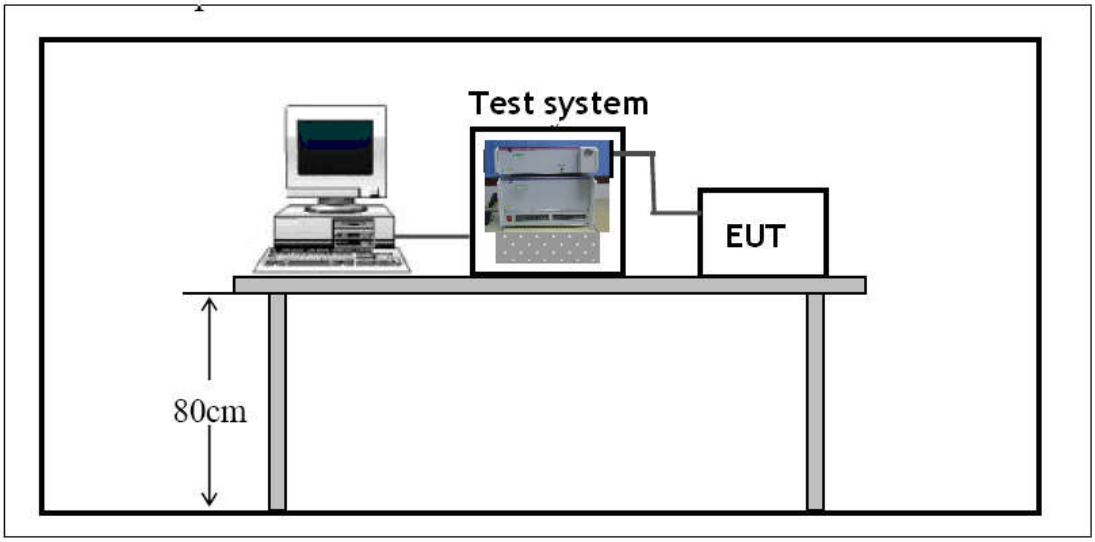
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 100% power mode

5.4.2 Block Diagram of Setup

The Harmonics Current emission test was performed in accordance with the EN 61000-3-2.



5.4.3 Harmonic Current EmissionTest Data, ZEUS 600W

Final Test Result	Pass	Tobs	Quasi-Stationary
Voltage	230.00 V	THC	0.3817 A
Current	2.8879 A	POHC/Limit	0.0561 A / 0.2716 A *3
Power	628.56 W	Nominal	230 V / 50 Hz
Power Factor	0.9463	Fundamental Current	2.8621 A
Apparent Power	664.2 VA	Measuring Period	150 s
THD (max)	13.36 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	-----	-----	2.8569	2.8621	N/A
2	0.0572	0.0859	0.0026	0.0031	N/A
3	0.8125	1.2188	0.3592	0.3598	Pass
4	-----	-----	0.0036	0.0042	N/A
5	0.2862	0.4293	0.0794	0.0809	Pass
6	-----	-----	0.0036	0.0040	N/A
7	0.2003	0.3005	0.0509	0.0514	Pass
8	-----	-----	0.0036	0.0041	N/A
9	0.1431	0.2147	0.0173	0.0182	Pass
10	-----	-----	0.0036	0.0040	N/A
11	0.0859	0.1288	0.0237	0.0247	Pass
12	-----	-----	0.0036	0.0041	N/A
13	0.0859	0.1288	0.0268	0.0275	Pass
14	-----	-----	0.0036	0.0041	N/A
15	0.0859	0.1288	0.0298	0.0306	Pass
16	-----	-----	0.0036	0.0040	N/A
17	0.0859	0.1288	0.0273	0.0280	Pass
18	-----	-----	0.0036	0.0040	N/A
19	0.0859	0.1288	0.0284	0.0292	Pass
20	-----	-----	0.0036	0.0041	N/A
21	0.1288	0.1288	0.0261	0.0268	Pass
22	-----	-----	0.0036	0.0041	N/A
23	0.1288	0.1288	0.0217	0.0225	Pass
24	-----	-----	0.0036	0.0040	N/A
25	0.1288	0.1288	0.0242	0.0251	Pass
26	-----	-----	0.0036	0.0041	N/A
27	0.1288	0.1288	0.0142	0.0149	N/A
28	-----	-----	0.0036	0.0041	N/A
29	0.1288	0.1288	0.0218	0.0226	Pass
30	-----	-----	0.0037	0.0041	N/A
31	0.1288	0.1288	0.0134	0.0140	N/A
32	-----	-----	0.0037	0.0041	N/A
33	0.1288	0.1288	0.0068	0.0074	N/A
34	-----	-----	0.0037	0.0041	N/A
35	0.1288	0.1288	0.0149	0.0157	N/A
36	-----	-----	0.0037	0.0042	N/A
37	0.1288	0.1288	0.0107	0.0115	N/A
38	-----	-----	0.0037	0.0040	N/A
39	0.1288	0.1288	0.0107	0.0113	N/A
40	-----	-----	0.0037	0.0042	N/A

N/A : Not Apply

5.4.4 Harmonic Current EmissionTest Data, ATTIS 300W

Final Test Result	Pass	Tobs	Quasi-Stationary
Voltage	230.06 V	THC	0.0657 A
Current	1.3594 A	POHC/Limit	0.0068 A / 0.1287 A *3
Power	308.69 W	Nominal	230 V / 50 Hz
Power Factor	0.9870	Fundamental Current	1.3577 A
Apparent Power	312.8 VA	Measuring Period	150 s
THD (max)	4.85 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	-----	-----	1.3557	1.3577	N/A
2	0.0272	0.0407	0.0016	0.0017	N/A
3	0.4020	0.6030	0.0057	0.0059	N/A
4	-----	-----	0.0003	0.0004	N/A
5	0.1358	0.2037	0.0345	0.0347	Pass
6	-----	-----	0.0003	0.0005	N/A
7	0.0950	0.1426	0.0384	0.0386	Pass
8	-----	-----	0.0003	0.0004	N/A
9	0.0679	0.1018	0.0257	0.0258	Pass
10	-----	-----	0.0003	0.0004	N/A
11	0.0407	0.0611	0.0186	0.0188	Pass
12	-----	-----	0.0003	0.0005	N/A
13	0.0407	0.0611	0.0160	0.0162	Pass
14	-----	-----	0.0003	0.0004	N/A
15	0.0407	0.0611	0.0132	0.0134	Pass
16	-----	-----	0.0003	0.0004	N/A
17	0.0407	0.0611	0.0093	0.0095	Pass
18	-----	-----	0.0003	0.0004	N/A
19	0.0407	0.0611	0.0059	0.0060	N/A
20	-----	-----	0.0003	0.0004	N/A
21	0.0611	0.0611	0.0040	0.0041	N/A
22	-----	-----	0.0003	0.0004	N/A
23	0.0611	0.0611	0.0030	0.0031	N/A
24	-----	-----	0.0003	0.0004	N/A
25	0.0611	0.0611	0.0020	0.0021	N/A
26	-----	-----	0.0003	0.0004	N/A
27	0.0611	0.0611	0.0007	0.0008	N/A
28	-----	-----	0.0003	0.0004	N/A
29	0.0611	0.0611	0.0006	0.0007	N/A
30	-----	-----	0.0003	0.0004	N/A
31	0.0611	0.0611	0.0010	0.0012	N/A
32	-----	-----	0.0003	0.0004	N/A
33	0.0611	0.0611	0.0014	0.0015	N/A
34	-----	-----	0.0003	0.0004	N/A
35	0.0611	0.0611	0.0021	0.0021	N/A
36	-----	-----	0.0003	0.0004	N/A
37	0.0611	0.0611	0.0020	0.0022	N/A
38	-----	-----	0.0003	0.0004	N/A
39	0.0611	0.0611	0.0020	0.0021	N/A
40	-----	-----	0.0003	0.0004	N/A

N/A : Not Apply

5.4.5 Harmonic Current EmissionTest Data, ATTIS 200W

Final Test Result	Pass	Tobs	Quasi-Stationary
Voltage	230.06 V	THC	0.1228 A
Current	0.9668 A	POHC/Limit	0.0075 A / 0.0910 A *3
Power	216.62 W	Nominal	230 V / 50 Hz
Power Factor	0.9740	Fundamental Current	0.9589 A
Apparent Power	222.4 VA	Measuring Period	150 s
THD (max)	12.81 %	Margin	100 %

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Judge
1	-----	-----	0.9577	0.9589	N/A
2	0.0192	0.0288	0.0003	0.0003	N/A
3	0.2802	0.4203	0.1203	0.1205	Pass
4	-----	-----	0.0001	0.0001	N/A
5	0.0959	0.1438	0.0117	0.0117	Pass
6	-----	-----	0.0001	0.0001	N/A
7	0.0671	0.1007	0.0111	0.0112	Pass
8	-----	-----	0.0001	0.0001	N/A
9	0.0479	0.0719	0.0089	0.0090	Pass
10	-----	-----	0.0001	0.0001	N/A
11	0.0288	0.0432	0.0075	0.0076	Pass
12	-----	-----	0.0001	0.0001	N/A
13	0.0288	0.0432	0.0065	0.0065	Pass
14	-----	-----	0.0001	0.0001	N/A
15	0.0288	0.0432	0.0058	0.0059	Pass
16	-----	-----	0.0001	0.0001	N/A
17	0.0288	0.0432	0.0052	0.0052	N/A
18	-----	-----	0.0001	0.0001	N/A
19	0.0288	0.0432	0.0046	0.0046	N/A
20	-----	-----	0.0001	0.0001	N/A
21	0.0432	0.0432	0.0040	0.0040	N/A
22	-----	-----	0.0001	0.0001	N/A
23	0.0432	0.0432	0.0034	0.0034	N/A
24	-----	-----	0.0001	0.0001	N/A
25	0.0432	0.0432	0.0029	0.0029	N/A
26	-----	-----	0.0001	0.0001	N/A
27	0.0432	0.0432	0.0024	0.0025	N/A
28	-----	-----	0.0001	0.0001	N/A
29	0.0432	0.0432	0.0020	0.0021	N/A
30	-----	-----	0.0001	0.0001	N/A
31	0.0432	0.0432	0.0017	0.0017	N/A
32	-----	-----	0.0001	0.0001	N/A
33	0.0432	0.0432	0.0015	0.0015	N/A
34	-----	-----	0.0001	0.0001	N/A
35	0.0432	0.0432	0.0014	0.0014	N/A
36	-----	-----	0.0001	0.0001	N/A
37	0.0432	0.0432	0.0014	0.0014	N/A
38	-----	-----	0.0001	0.0001	N/A
39	0.0432	0.0432	0.0014	0.0015	N/A
40	-----	-----	0.0001	0.0001	N/A

N/A : Not Apply

5.5 Voltage Fluctuation and Flicker

Test Requirement ..... : EN 61000-3-3

Test Method ..... : EN 61000-3-3

Test Result..... : Pass

5.5.1 E.U.T. Operation

Operating Environment:

Temperature ..... : 21.6°C

Humidity..... : 53.6%RH

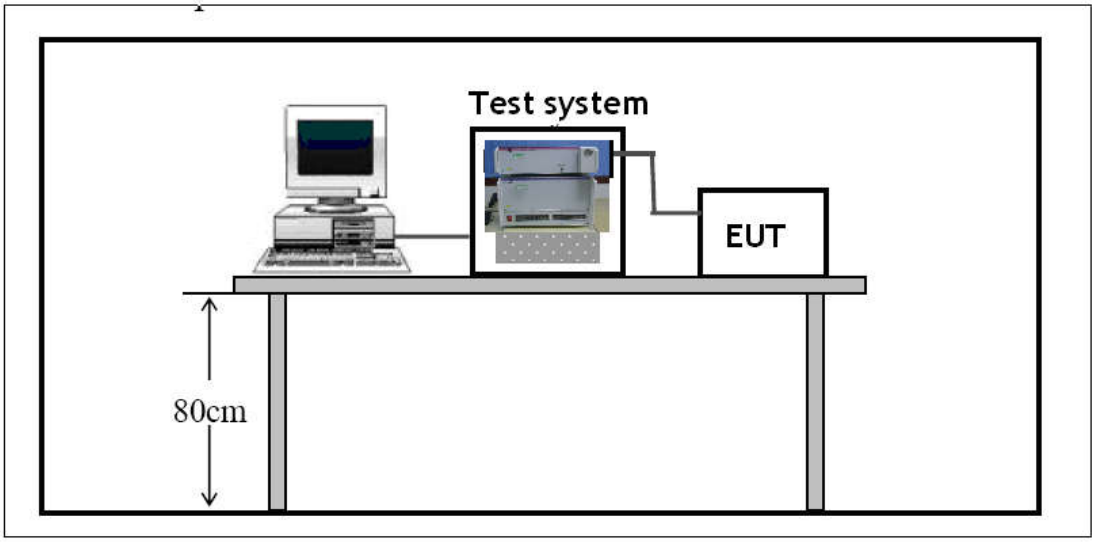
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 100％ power mode

5.5.2 Block Diagram of Setup

The Harmonics test was performed in accordance with the EN 61000-3-3.



5.5.3 Voltage Fluctuation and Flicker Test Data, ZEUS 600W

	d_c（%）	d_{max} (%)	d(t)	P_{st}	P_{lt}
Limits	3.3	4	3.3%/500ms	N/A	N/A
Result	0.004	0.043	0	N/A	N/A

5.5.4 Voltage Fluctuation and Flicker Test Data, ATTIS 300W

	d_c（%）	d_{max} (%)	d(t)	P_{st}	P_{lt}
Limits	3.3	4	3.3%/500ms	N/A	N/A
Result	0.004	0.035	0	N/A	N/A

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.

6.2 Electrostatic Discharge (ESD)

Test Requirement.....	:	EN 61547
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

6.2.1 E.U.T. Operation

Operating Environment:

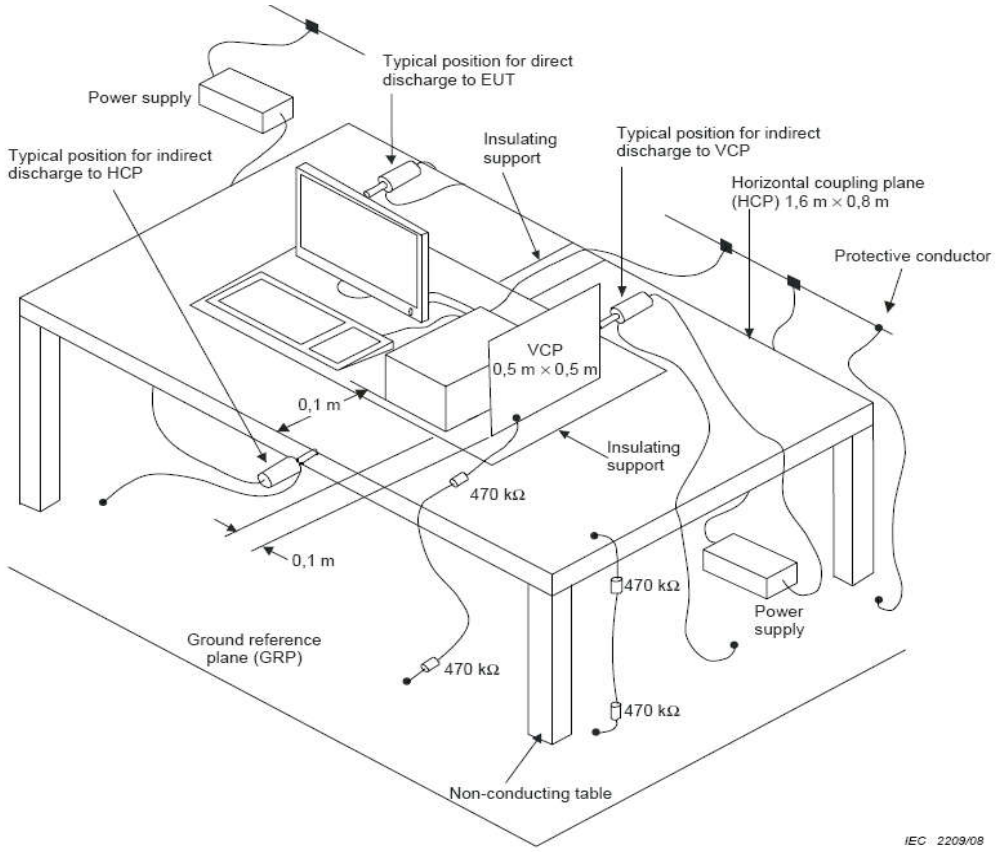
Temperature.....	:	21.2~21.4°C
Humidity.....	:	51.4~53.8%RH
Barometric Pressure.....	:	102.4~103.2kPa

EUT Operation:

Input Voltage.....	:	230V~, 50Hz
Operating Mode.....	:	100％ power mode

6.2.2 Block Diagram of Setup

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



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 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

6.3.1E.U.T. Operation

Operating Environment:

Temperature ..... : 22.7°C

Humidity..... : 54.1%RH

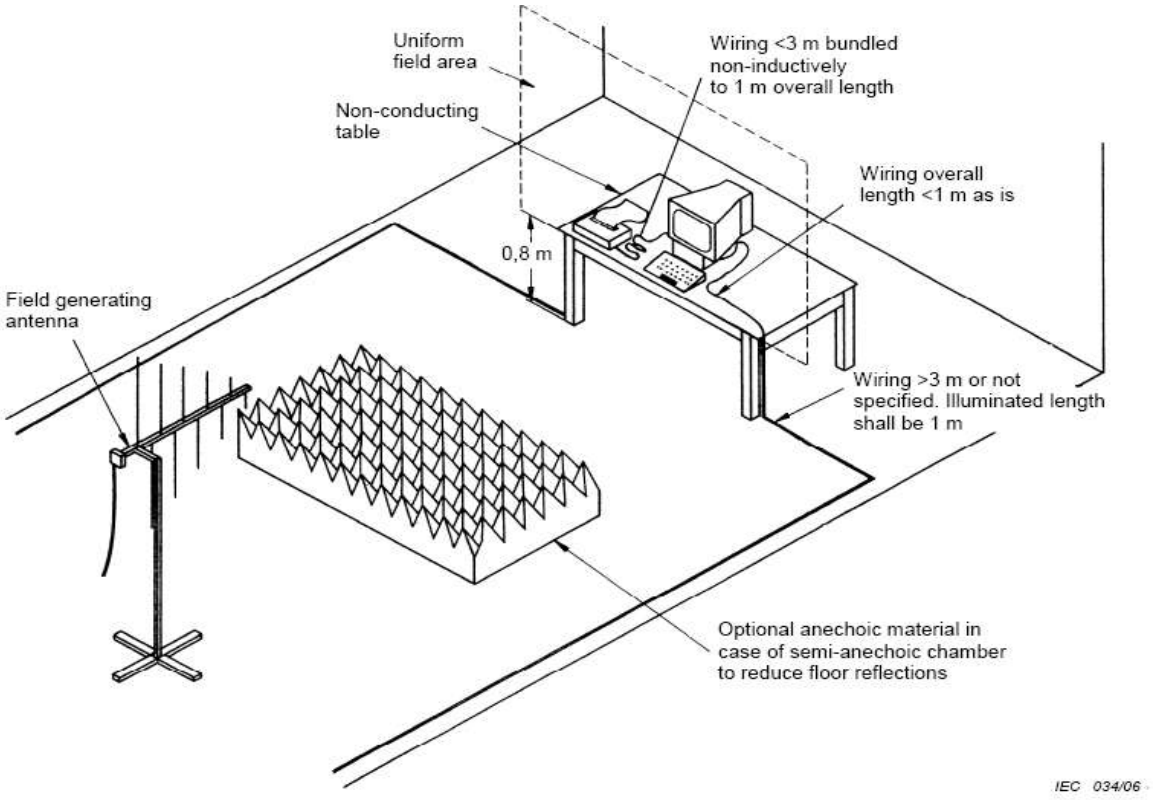
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 100％ power 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%	3s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	3s	A	Pass*

Remark:

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

6.4 Electrical Fast Transients (EFT)

Test Requirement..... : EN 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

6.4.1E.U.T. Operation

Operating Environment:

Temperature ..... : 21.2~21.4°C

Humidity..... : 51.4~53.8%RH

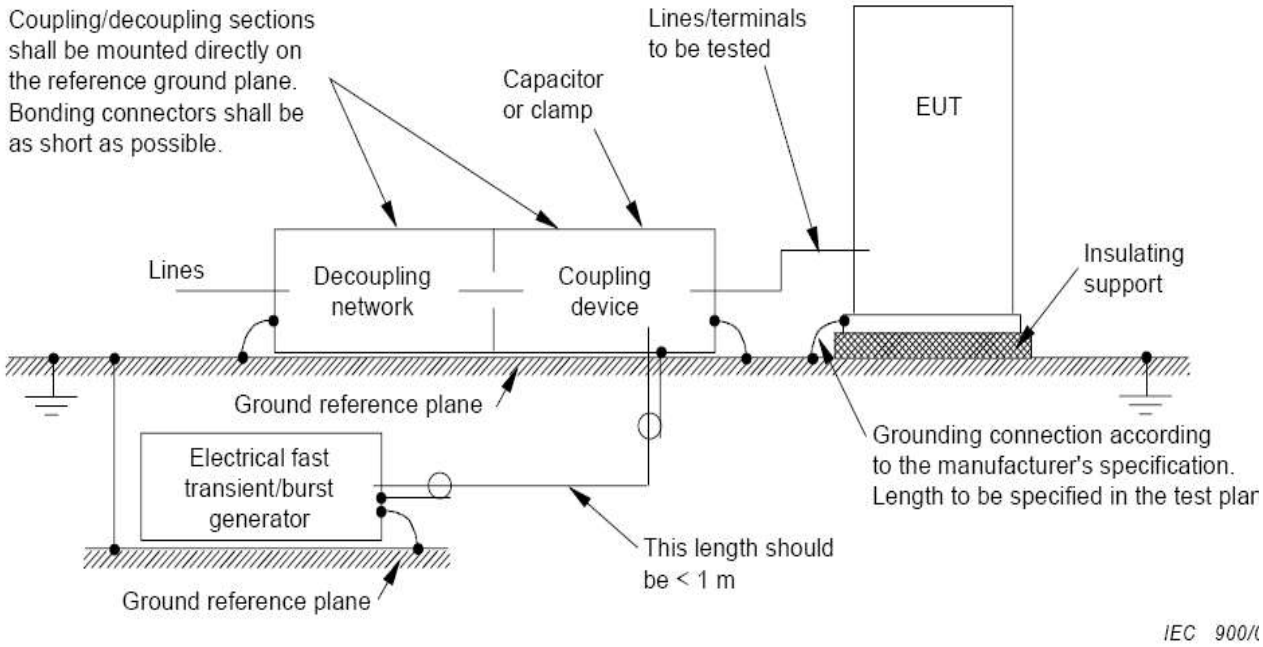
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 100％ power 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-PE	±1.0	B	Pass*

Remark:

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

6.5 Surge

Test Requirement..... : EN 61547

Test Method..... : IEC 61000-4-5

Test Result..... : Pass

Test level..... : Table 10 of EN 61547

Interval ..... : 60s between each surge

No. of surges ..... : 5 positive at 90°, 5 negative at 270°.

6.5.1E.U.T. Operation

Operating Environment:

Temperature ..... : 21.2~21.4°C

Humidity..... : 51.4~53.8%RH

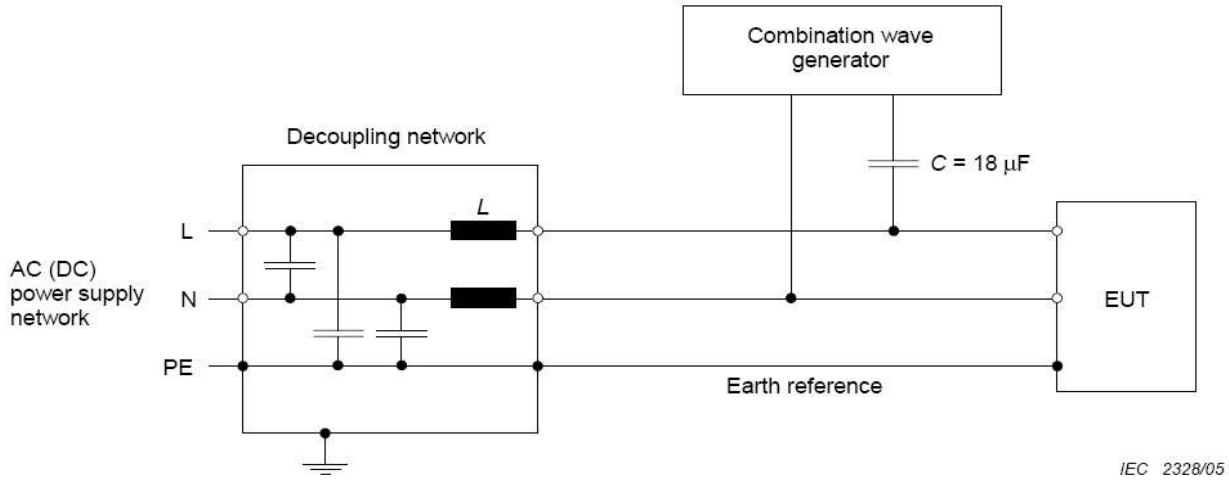
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode..... : 100％ power mode

6.5.2Block Diagram of Setup

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



6.5.3Test Results

Test Port	Applied Voltage (kV)	Performance criterion	Result
Between Live And Neutral	±1	C	Pass*
Between Live And Earth	±2	C	Pass*
Between Neutral And Earth	±2	C	Pass*

Remark:

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

6.6 Injected Currents Immunity 0.15MHz to 80MHz

Test Requirement ..... : EN 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.

6.6.1E.U.T. Operation

Operating Environment:

Temperature ..... : 21.2~21.4°C

Humidity ..... : 51.4~53.8%RH

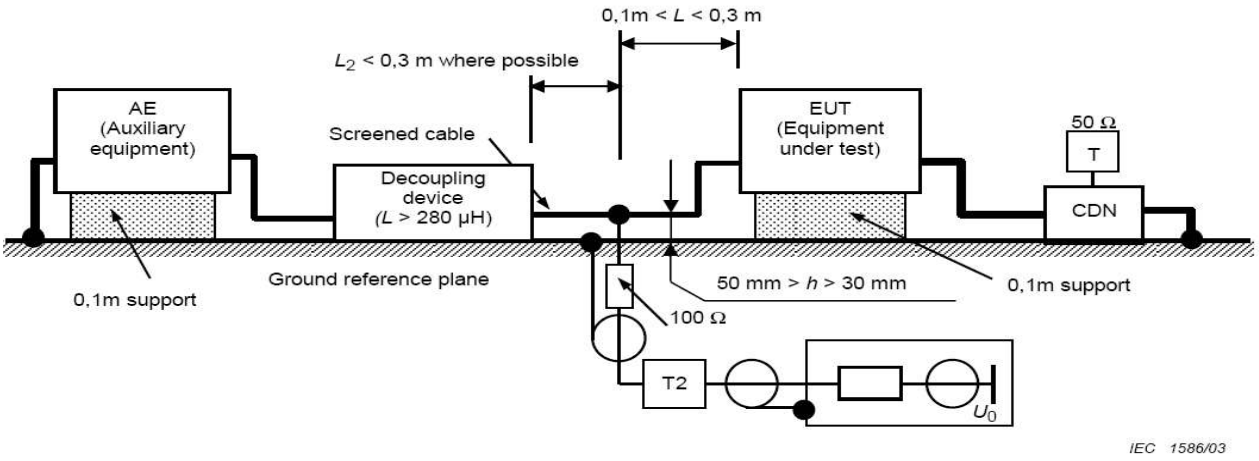
EUT Operation:

Input Voltage ..... : 230V~, 50Hz

Operating Mode ..... : 100% power mode

6.6.2 Block Diagram of Setup

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



6.6.3Test Results

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

Remark:

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

6.7 Voltage Dips and Interruptions

Test Requirement..... EN 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

6.7.1E.U.T. Operation

Operating Environment:

Temperature ..... 21.2~21.4°C

Humidity..... 51.4~53.8%RH

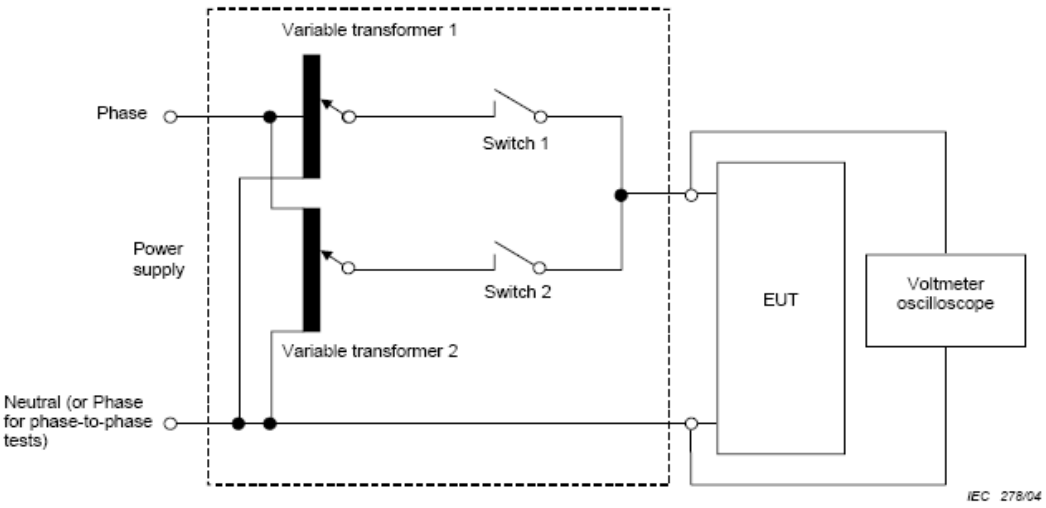
EUT Operation:

Input Voltage ..... 230V~, 50Hz

Operating Mode..... 100％ power 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.



6.7.3Test Results

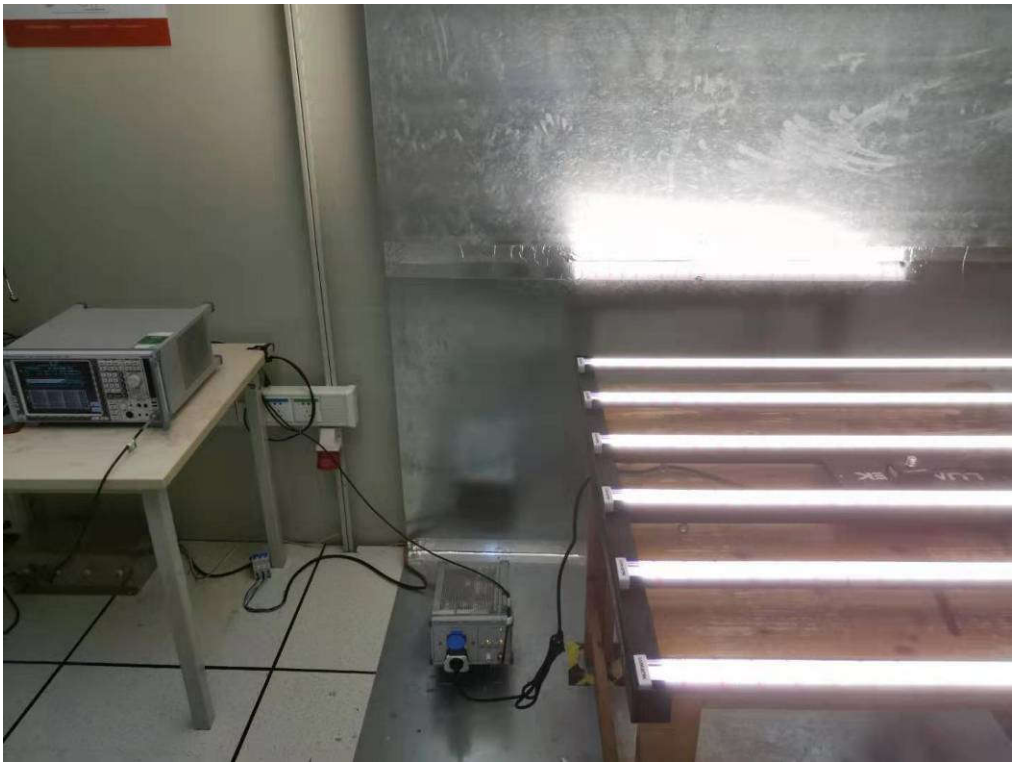
Test Level in %U_T	Phase	Performance criterion	Duration	Result
0	0° & 180°	B	0.5	Pass*
70	0° & 180°	C	10	Pass*

Remark:

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

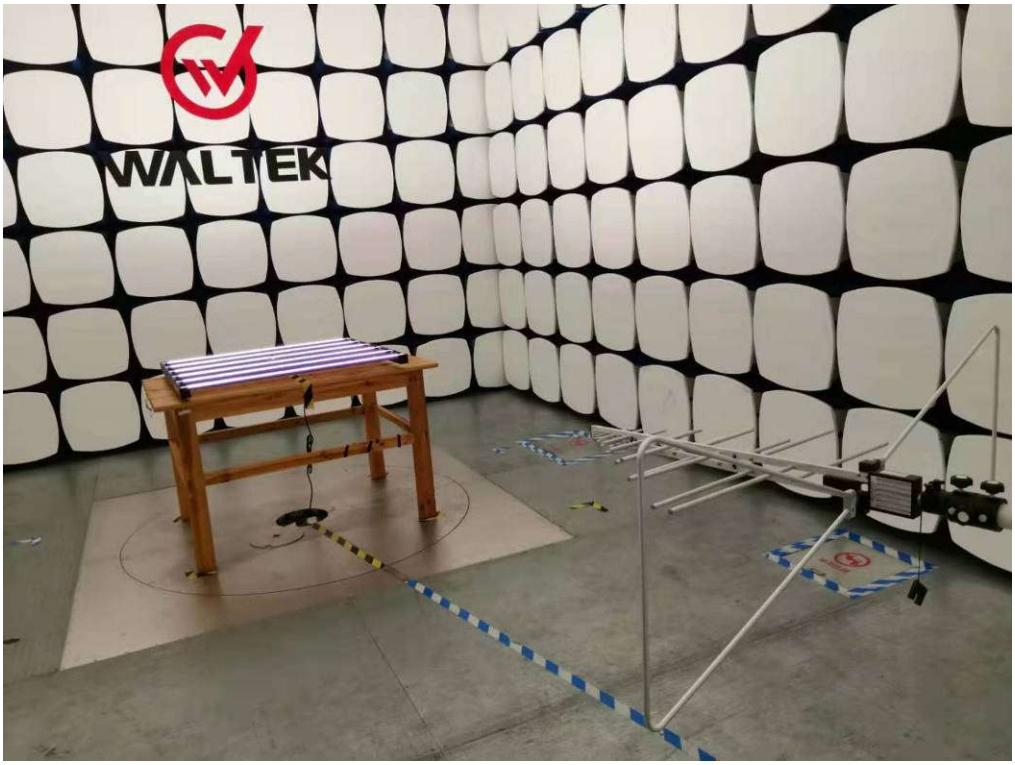
7 Photographs – Test Setup

7.1 Photograph – Mains Terminal Disturbance Voltage Test Setup

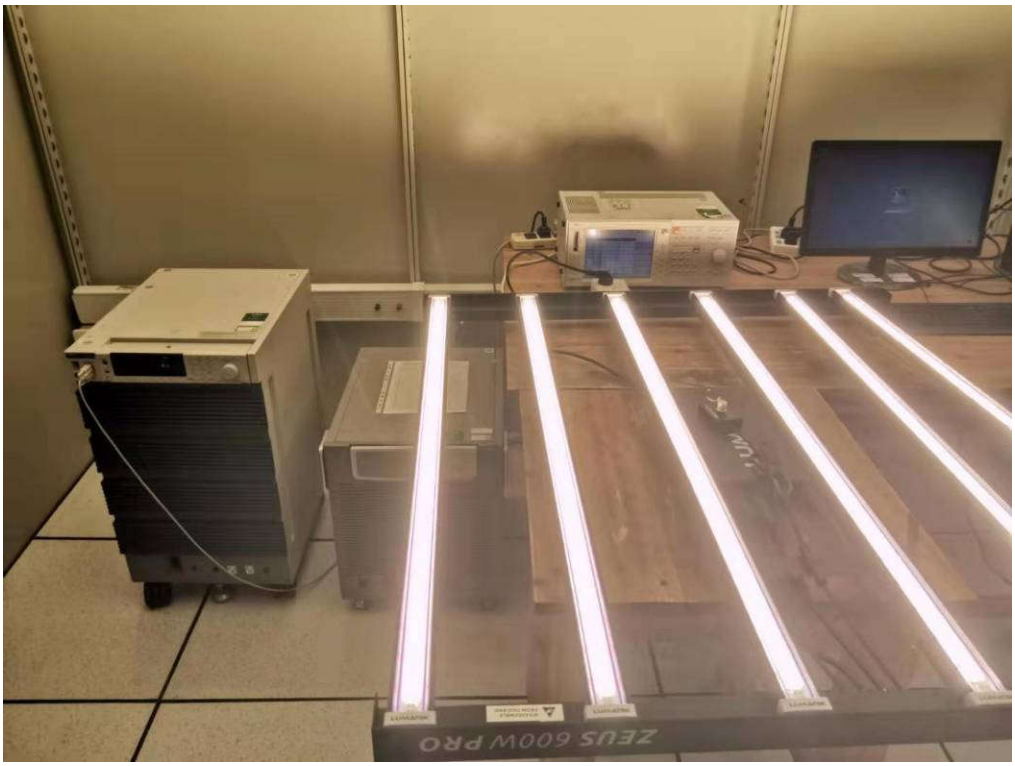


7.2 Photograph – Radiated electromagnetic disturbance Test Setup, 9kHz to 30MHz

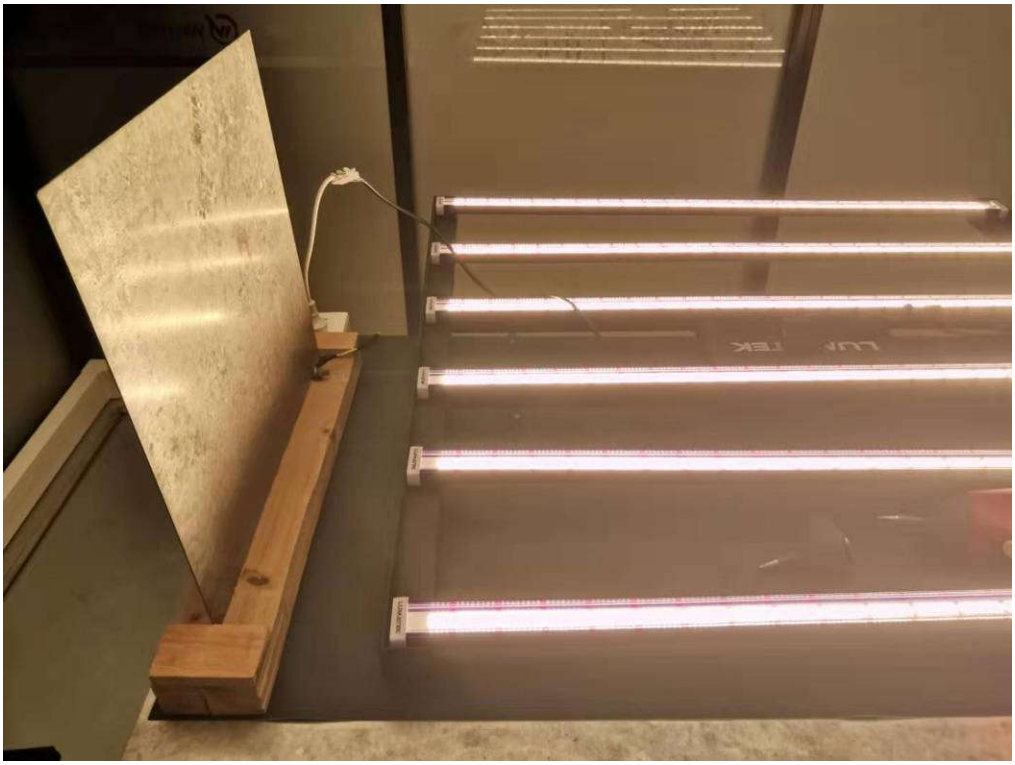
7.3 Photograph – Radiated Emission Test Setup, 30MHz to 300MHz



7.4 Photograph – Harmonic Current and Flicker Test Setup



7.5 Photograph – ESD Immunity Test Setup



7.6 Photograph – Radio-frequency electromagnetic fields Immunity Test Setup

7.7 Photograph – EFT & Voltage Dips and Interruptions Immunity Test Setup

7.8 Photograph – Surge Immunity Test Setup

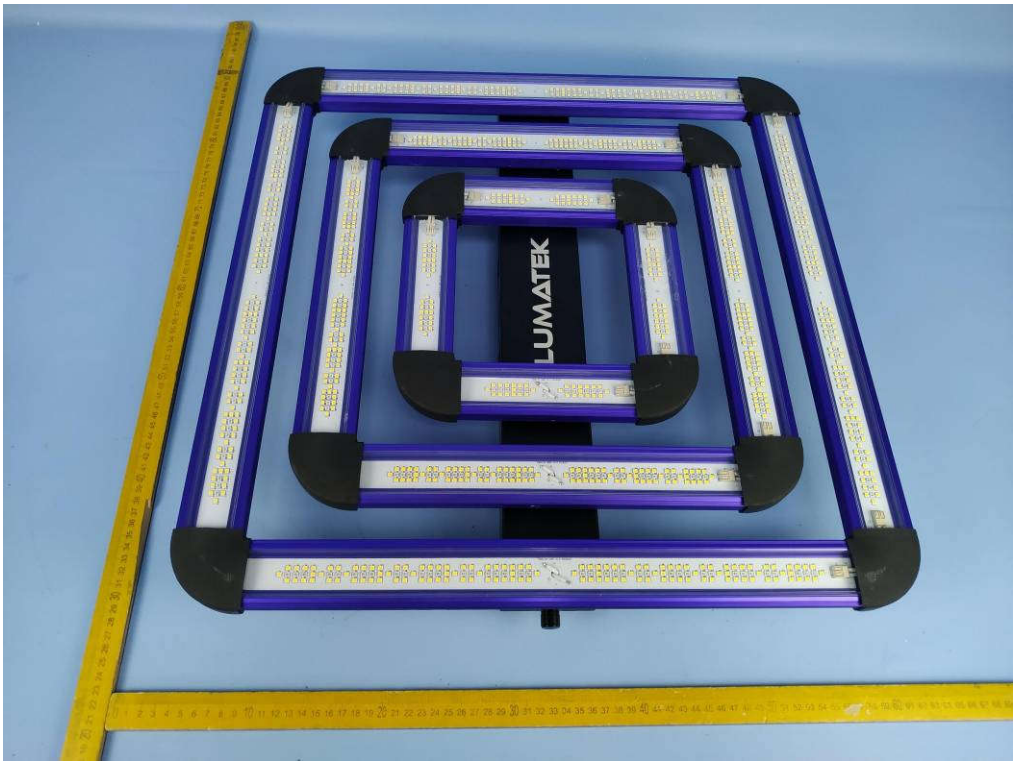
7.9 Photograph – Injected Currents Immunity Test Setup

8 Photographs – Constructional Details

8.1 EUT – Front View, ZEUS 600W

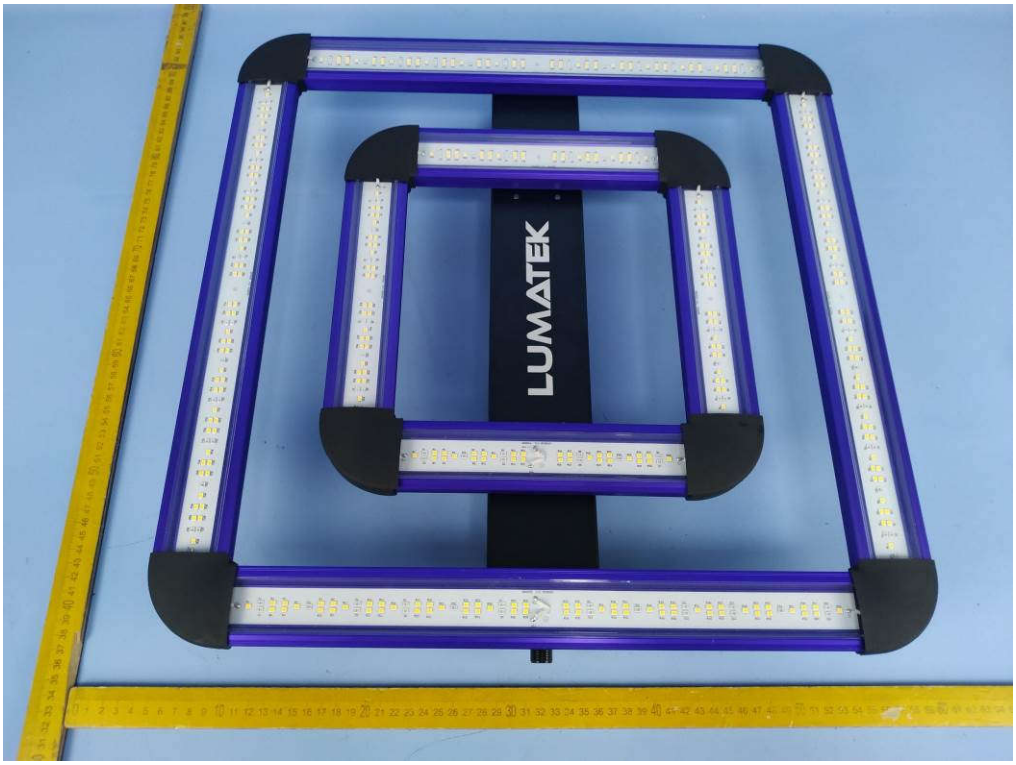
8.2 EUT – Back View, ZEUS 600W

8.3 EUT – Front View, ATTIS 300W

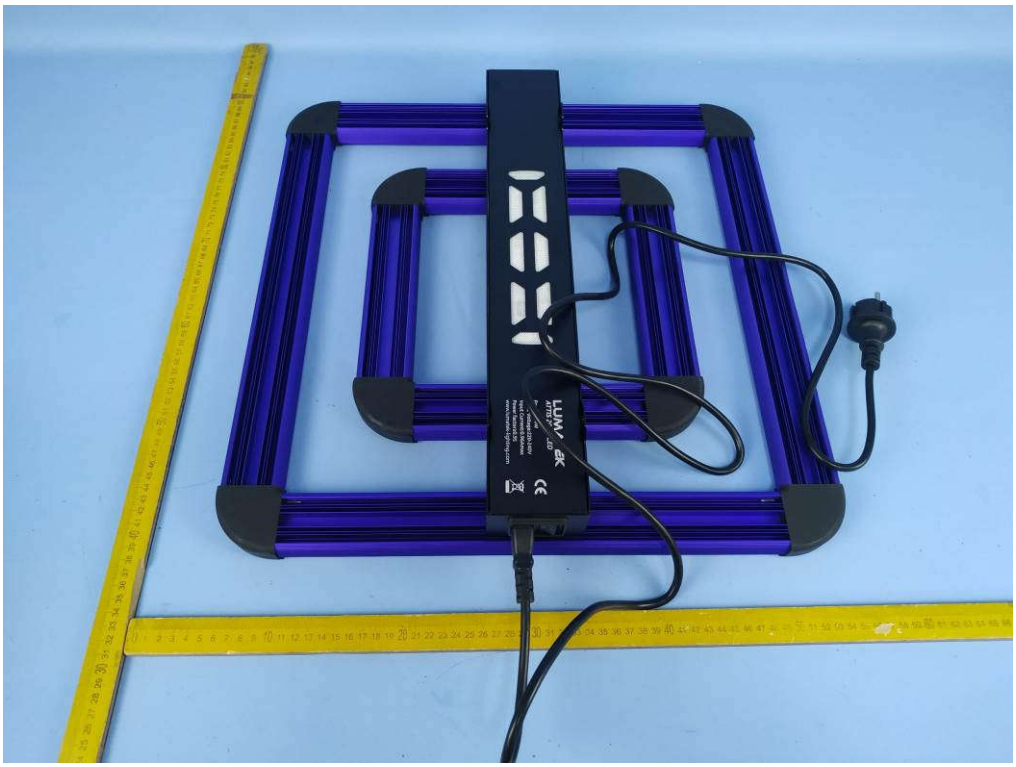


8.4 EUT – Back View, ATTIS 300W

8.5 EUT – Front View, ATTIS 200W



8.6 EUT – Back View, ATTIS 200W



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