



TEST REPORT

Reference No...... : WTD19S08053605E
Applicant..... : Barebones Living
Address..... : 1215 East Wilmington Avenue – Ste. 140, Salt Lake City, UT 84106, USA.
Manufacturer : DONGGUAN PROTRONIC ELECTRONICS LTD
Address..... : Protronic Building, Xiangxi Village, Shipai Town, Dongguan City, Guangdong Province, P. R. China.
Product..... : RailRoad Lantern
Model(s)..... : LIV-280, LIV-281, LIV-28xxxxx ('x' may be '0-9', 'a-z' or omitted)
Standards..... : FCC PART15 SUBPART B: 2017
Date of Receipt sample : 2019-08-07
Date of Test : 2019-08-08 to 2019-08-12
Date of Issue..... : 2019-08-13
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:

Approved by:

Wally wang



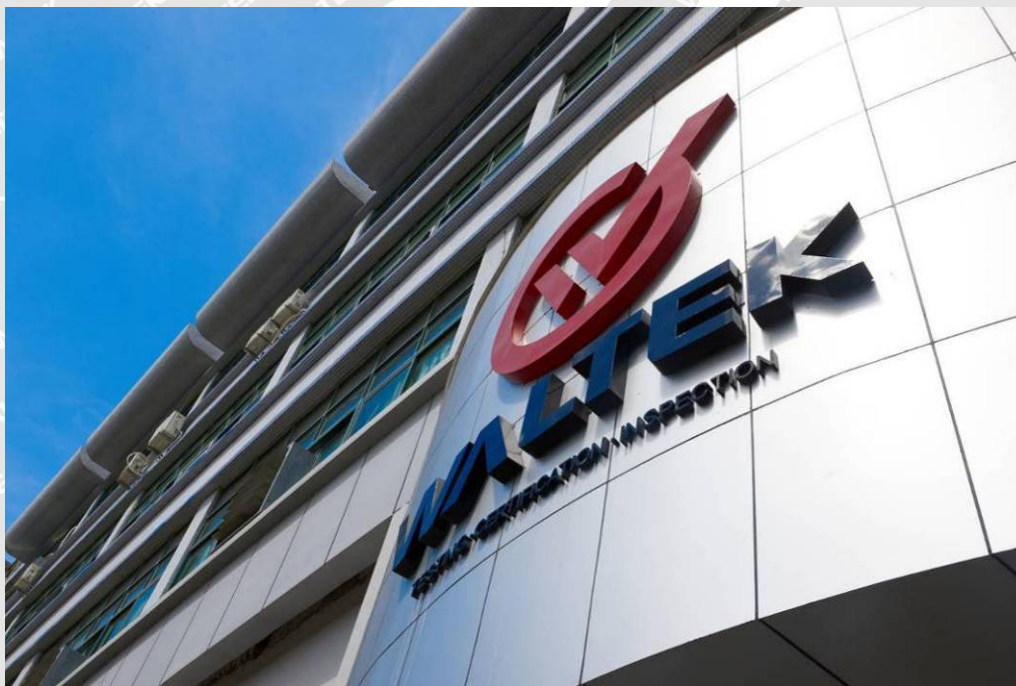
Wally Wang / Project Engineer

Philo Zhong / Manager



1 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. 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), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. 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.



1.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ SDOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. ISED CAB identifier: CN0013. Test Firm 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



2 Contents

	Page
COVER PAGE	1
1 LABORATORIES INTRODUCTION	2
1.1 TEST FACILITY	3
2 CONTENTS	4
3 REVISION HISTORY	5
4 GENERAL INFORMATION	6
4.1 GENERAL DESCRIPTION OF E.U.T.	6
4.2 DETAILS OF E.U.T.	6
4.3 SUBCONTRACTED	6
4.4 ABNORMALITIES FROM STANDARD CONDITIONS	6
5 TEST SUMMARY	7
6 EQUIPMENT USED DURING TEST	8
6.1 EQUIPMENT LIST	8
6.2 DESCRIPTION OF SUPPORT UNITS	8
6.3 MEASUREMENT UNCERTAINTY	8
6.4 TEST EQUIPMENT CALIBRATION	8
6.5 TEST MODE	9
7 EMISSION TEST RESULTS	10
7.1 AC POWER LINE CONDUCTED EMISSION, 150kHz TO 30MHz	10
7.2 RADIATION EMISSION, 30MHz TO 1000MHz	13
8 PHOTOGRAPHS – TEST SETUP	16
8.1 PHOTOGRAPH –AC POWER LINE CONDUCTED EMISSION TEST SETUP	16
8.2 PHOTOGRAPH – RADIATED EMISSION TEST SETUP FOR 30MHz-1000MHz	16
9 PHOTOGRAPHS – CONSTRUCTIONAL DETAILS	17
9.1 EUT – APPEARANCE VIEW	17



3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD19S08053605E	2019-08-07	2019-08-08 to 2019-08-12	2019-08-13	Original	-	Valid



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4 General Information

4.1 General Description of E.U.T.

Product..... : RailRoad Lantern
Model(s) : LIV-280, LIV-281, LIV-28xxxxx ("x" may be "0-9", "a-z" or omitted)
Model Difference..... : Only the model name are different.
Remark..... : The model LIV280 is the tested sample.

4.2 Details of E.U.T.

Ratings..... : Input: DC 5V
Li-ion battery 2×18650 4400mAh 3.7V 16.28Wh

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

Test Item	Test Requirement	Test Result
AC Power Line Conducted Emission (150kHz to 30MHz)	FCC PART 15, SUBPART B	Pass
Disturbance voltage at the antenna terminals (30MHz to 2150MHz)	FCC PART 15, SUBPART B	N/A
Radiated Emission (30MHz to 1GHz)	FCC PART 15, SUBPART B	Pass
Radiated Emission (Above 1GHz)	FCC PART 15, SUBPART B	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

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6 Equipment Used during Test

6.1 Equipment List

AC Power Line Conducted Emission						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2018.09.11	2019.09.10
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2018.09.11	2019.09.10
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2018.09.11	2019.09.10
4.	Cable	LARGE	RF300	-	2019.07.19	2020.07.18
3m Semi-anechoic Chamber for Radiation(TDK)						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2019.04.06	2020.04.05
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019.04.07	2020.04.06
3	Amplifier	ANRITSU	MH648A	M43381	2019.04.07	2020.04.06
4	Cable	HUBER+SUHNER	CBL2	525178	2019.04.07	2020.04.06

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 (150kHz-30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±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
AC Power Line Conducted Emission (150KHz-30MHz)	Charging mode*	DC 5V by PC
Radiated Emissions (30MHz-1GHz)	Charging mode*	DC 5V by PC
	Brightest mode	3.7V Li-ion battery
	Darkest mode	3.7V Li-ion battery
* shows the worst case mode which were recorded in this report.		



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7 Emission Test Results

7.1 AC Power Line Conducted Emission, 150kHz to 30MHz

Test Requirement : FCC PART 15, SUBPART B

Test Method : ANSI C63.4

Test Result : Pass

Frequency Range : 150kHz to 30MHz

Class : Class B

Limit :

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

7.1.1 E.U.T. Operation

Operating Environment:

Temperature : 23.1°C

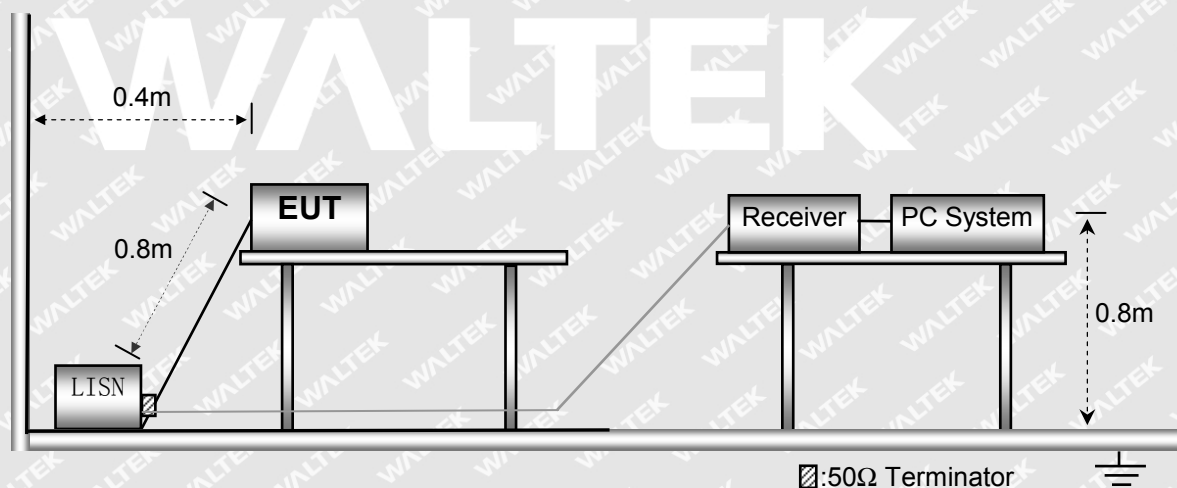
Humidity : 52.6%RH

Atmospheric Pressure : 101.2kPa

EUT Operation : Refer to section 6.5.

7.1.2 Block Diagram of Test Setup

The AC Power Line Conducted Emissions tests were performed in accordance with the ANSI C63.4 .



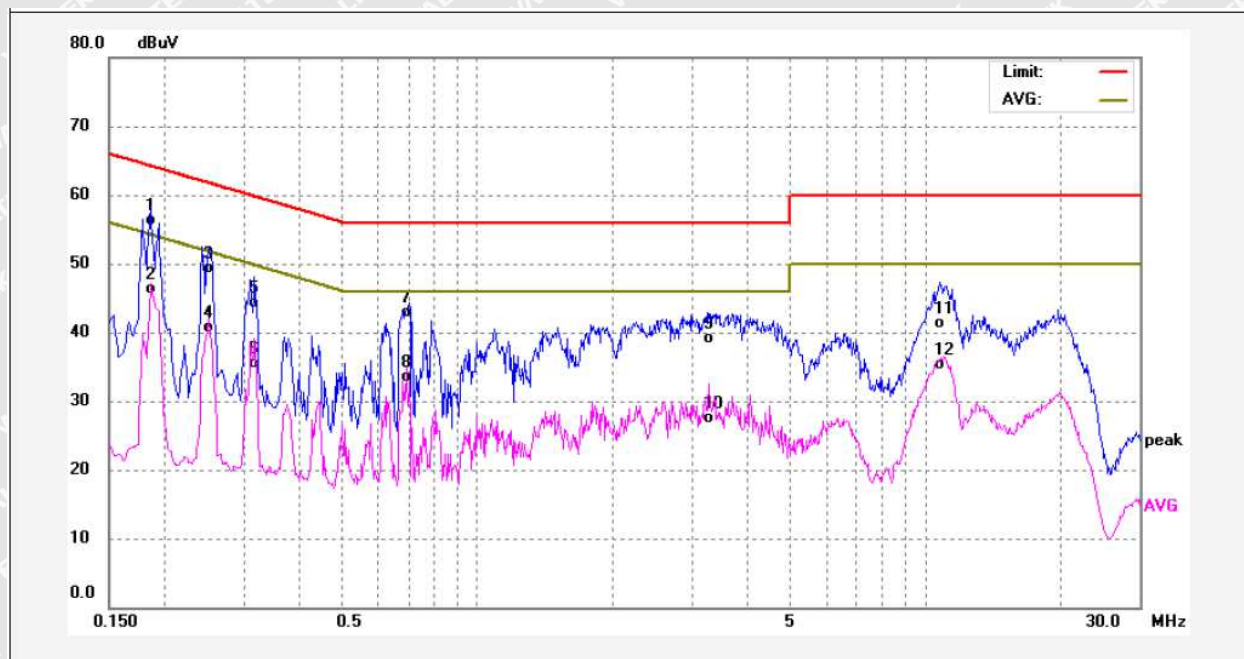


7.1.3 Measurement Data

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. According to the data in section 5.1.4, the EUT complied with the FCC PART 15, SUBPART B standards.

7.1.4 AC Power Line Conducted Emission Test Data

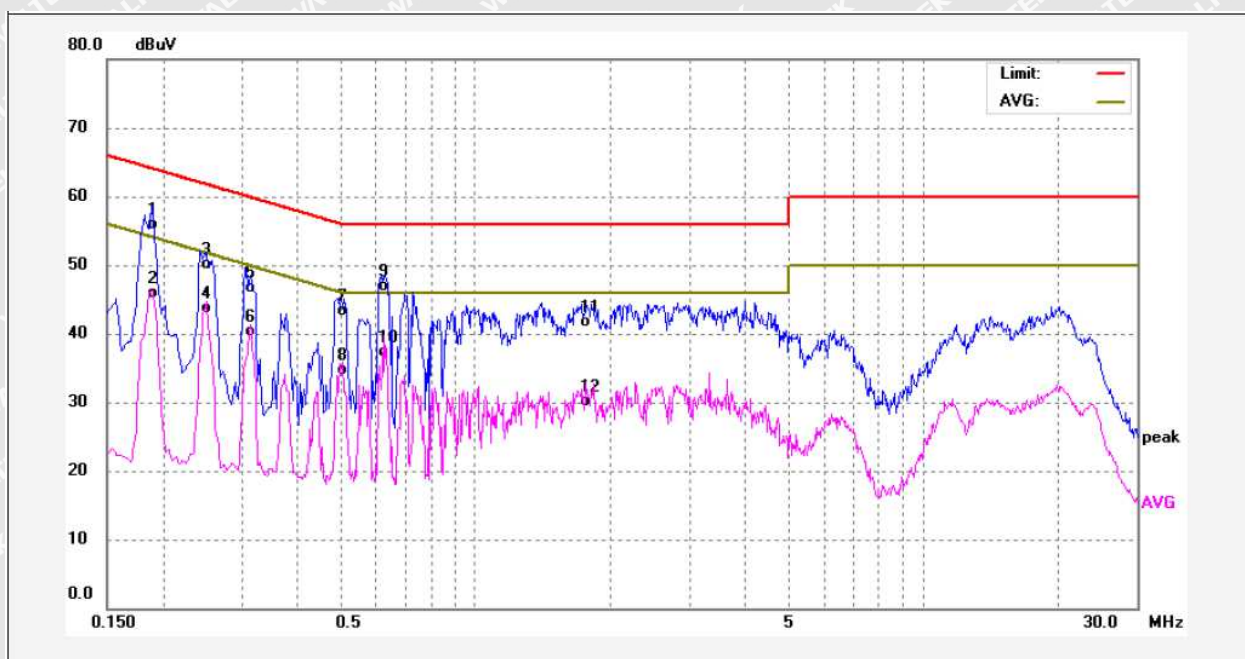
Live Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1860	45.91	10.31	56.22	64.21	-7.99	QP	
2	0.1860	35.92	10.31	46.23	54.21	-7.98	AVG	
3	0.2500	38.82	10.39	49.21	61.75	-12.54	QP	
4	0.2500	30.36	10.39	40.75	51.75	-11.00	AVG	
5	0.3180	33.81	10.41	44.22	59.76	-15.54	QP	
6	0.3180	25.00	10.41	35.41	49.76	-14.35	AVG	
7	0.6900	32.41	10.44	42.85	56.00	-13.15	QP	
8	0.6900	23.07	10.44	33.51	46.00	-12.49	AVG	
9	3.2900	28.47	10.72	39.19	56.00	-16.81	QP	
10	3.2900	16.87	10.72	27.59	46.00	-18.41	AVG	
11	10.7340	30.16	11.18	41.34	60.00	-18.66	QP	
12	10.7340	24.13	11.18	35.31	50.00	-14.69	AVG	



Neutral Line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1900	45.61	10.31	55.92	64.03	-8.11	QP	
2	0.1900	35.65	10.31	45.96	54.03	-8.07	AVG	
3	0.2500	39.69	10.39	50.08	61.75	-11.67	QP	
4	0.2500	33.35	10.39	43.74	51.75	-8.01	AVG	
5	0.3140	36.35	10.41	46.76	59.86	-13.10	QP	
6	0.3140	29.88	10.41	40.29	49.86	-9.57	AVG	
7	0.5060	32.93	10.42	43.35	56.00	-12.65	QP	
8	0.5060	24.19	10.42	34.61	46.00	-11.39	AVG	
9	0.6220	36.35	10.48	46.83	56.00	-9.17	QP	
10	0.6220	26.81	10.48	37.29	46.00	-8.71	AVG	
11	1.7660	31.18	10.52	41.70	56.00	-14.30	QP	
12	1.7660	19.65	10.52	30.17	46.00	-15.83	AVG	



7.2 Radiation Emission, 30MHz to 1000MHz

Test Requirement..... : FCC PART 15, SUBPART B
 Test Method : ANSI C63.4
 Test Result : Pass
 Frequency Range..... : 30MHz to 1000MHz
 Class. : Class B
 Limit..... :

Frequency (MHz)	Distance (Meter)	Limit (dB μ V/m)
		Quasi-peak
30 to 88	3	40
88 to 216	3	43.5
216 to 960	3	46
960 to 1000	3	54

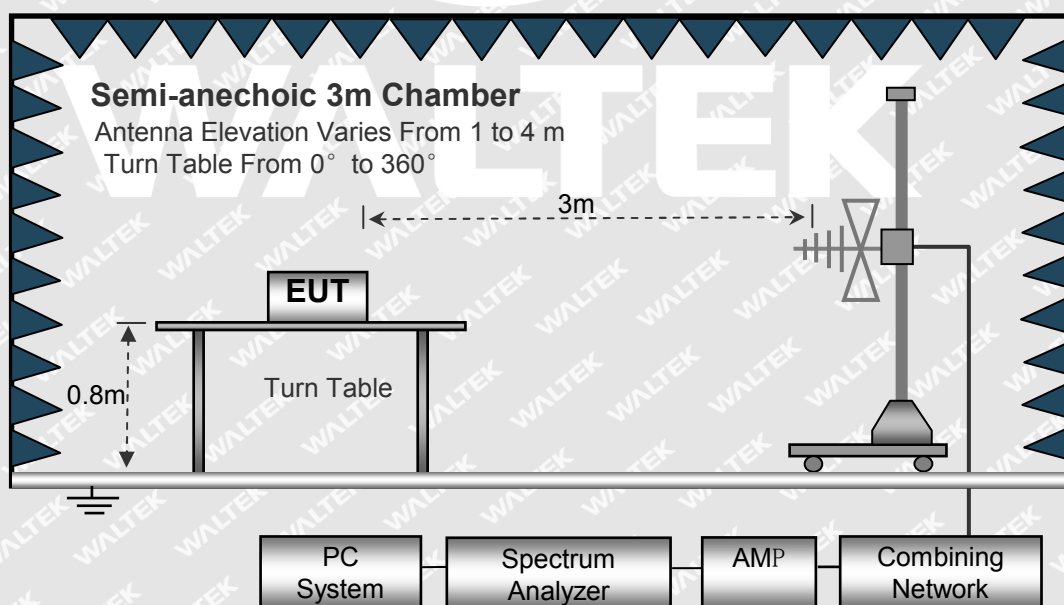
7.2.1 E.U.T. Operation

Operating Environment:

Temperature : 22.5°C
 Humidity : 52.6%RH
 Atmospheric Pressure : 101.8kPa
 EUT Operation..... : Refer to section 6.5.

7.2.2 Block Diagram of Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.



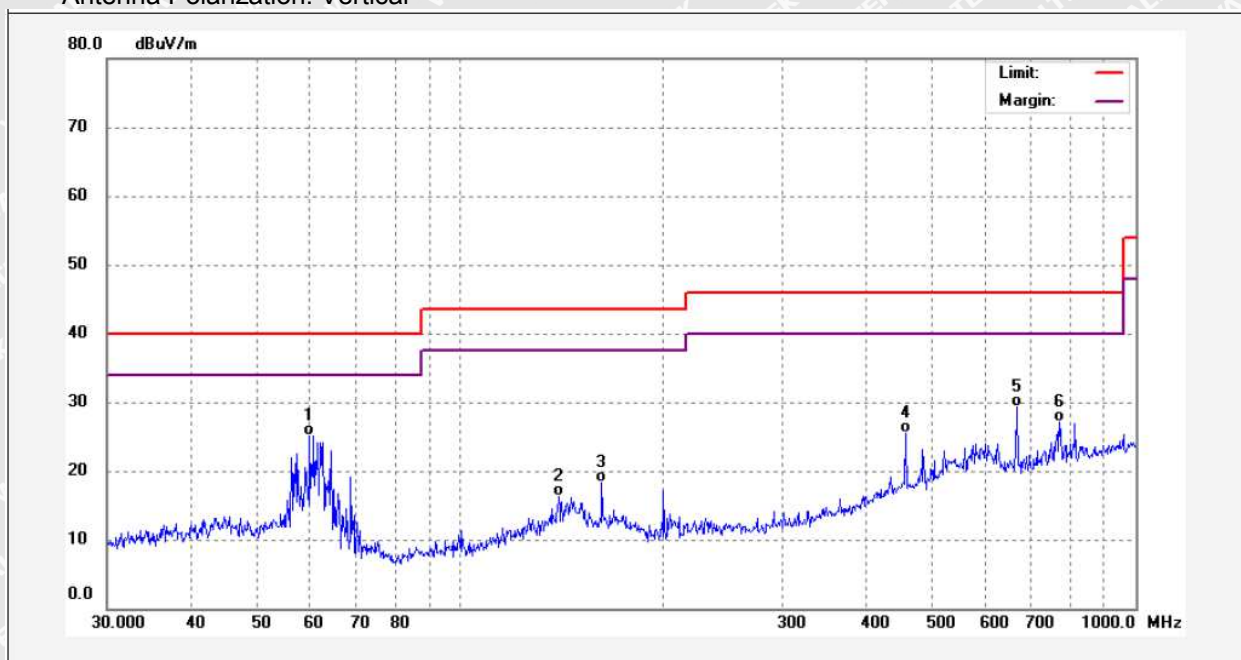


7.2.3 Measurement Data

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.

7.2.4 Radiated Emission Test Data, 30MHz to 1000MHz

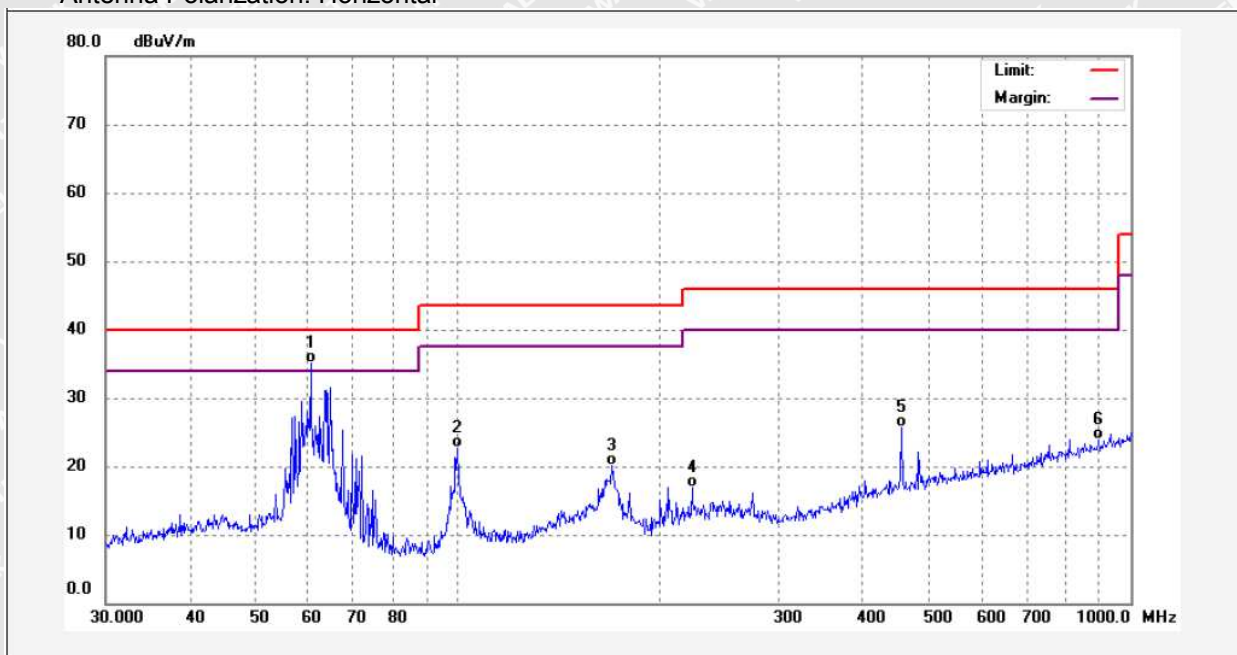
Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	59.8588	42.29	-17.13	25.16	40.00	-14.84	QP	
2	139.8508	32.72	-16.48	16.24	43.50	-27.26	QP	
3	162.0414	34.87	-16.54	18.33	43.50	-25.17	QP	
4	455.9058	38.30	-12.83	25.47	46.00	-20.53	QP	
5	668.1423	38.64	-9.43	29.21	46.00	-16.79	QP	
6	771.4486	34.88	-7.78	27.10	46.00	-18.90	QP	



Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	60.4919	52.28	-17.24	35.04	40.00	-4.96	QP	
2	99.8777	42.89	-20.17	22.72	43.50	-20.78	QP	
3	169.5990	36.55	-16.46	20.09	43.50	-23.41	QP	
4	222.9502	35.51	-18.61	16.90	46.00	-29.10	QP	
5	455.9058	38.45	-12.83	25.62	46.00	-20.38	QP	
6	896.9965	30.19	-6.31	23.88	46.00	-22.12	QP	

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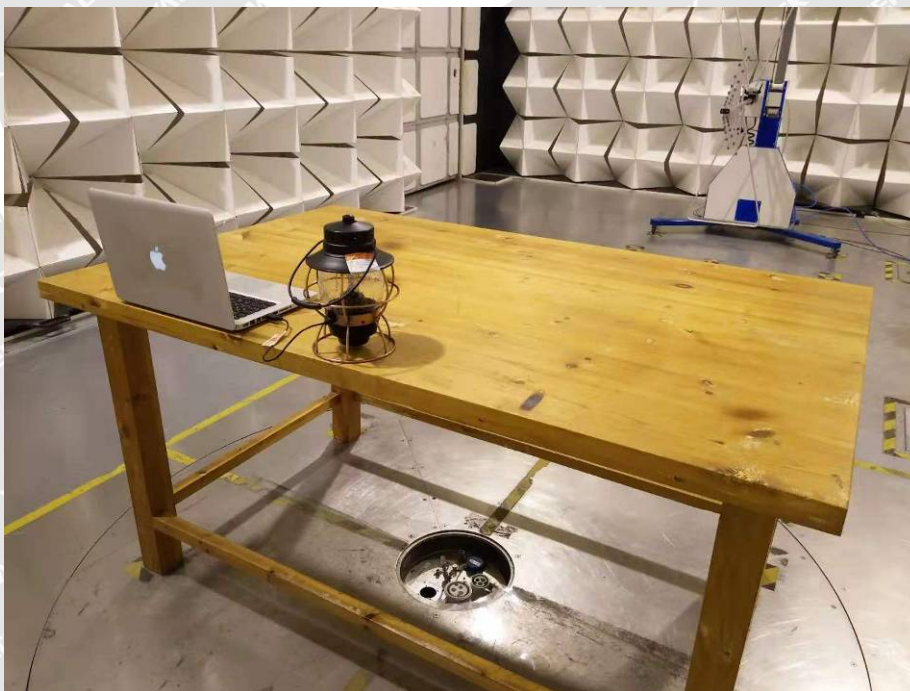


8 Photographs – Test Setup

8.1 Photograph –AC Power Line Conducted Emission Test Setup



8.2 Photograph – Radiated Emission Test Setup For 30MHz-1000MHz

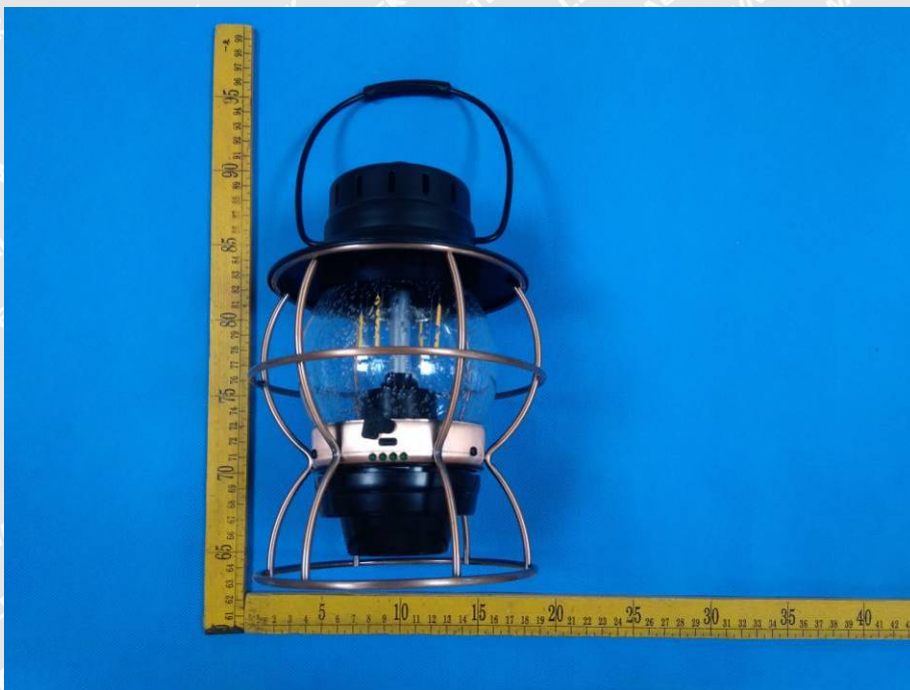




9 Photographs – Constructional Details

9.1 EUT – Appearance View







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

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