

47 CFR FCC Part 15 Subpart C

Test Report

Product : PL270 Charger

Trade Name : N/A

Model Number : PL-270-C

FCC ID : 2AZRO-PL270C

Prepared for

LED POWER, Inc.

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The test result in this report is only subjected to the test sample.

Table of Contents

1	General Information	4
1.1	Description of Equipment Under Test	4
1.2	Test Facility	5
1.3	Test Equipment	6
1.4	Measurement Uncertainty	7
1.5	Summary of Measurement	8
2	Test Specifications	9
2.1	Test Standard	9
2.2	Operation Mode	9
2.3	Test Step of EUT	9
3	AC Power Line Conducted Emission	10
3.1	Limit	10
3.2	Configuration of Measurement	10
3.3	Test Procedures	10
3.4	Test Result	10
4	Antenna Requirements	13
4.1	Limit	13
4.2	Test Result	13
5	20dB Bandwidth test	14
5.1	Limit	14
5.2	Test Procedure	14
5.3	Test Result	14
6	RF Radiated spurious emission test	15
6.1	Limit	15
6.2	Configuration of Measurement	15
6.3	Test Procedure	16
6.4	The description of operation mode	16
6.5	Test Result	16
7	Photographs of Test	20
7.1	AC Power Line Conducted Emission Measurement	20
7.2	Radiated Emission Measurement (Below 30 MHz)	21
7.3	Radiated Emission Measurement (Below 1 GHz)	21
8	Photographs of EUT	22
8.1	Model No.: PL-270-C	22

Statement of Compliance

Applicant: LED POWER, Inc.
Manufacturer: ARTLED TECHNOLOGY CORP.
Product: PL270 Charger
Model No.: PL-270-C
Tested Power Voltage: 120 Vac, 60 Hz
Date of Final Test: Jun. 04, 2021
Revision of Report: Rev. 01

Configuration of Measurements and Standards Used :

FCC Rules and Regulations Part 15 Subpart C

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.10, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

- Note:**
1. The result of the testing report relate only to the item tested.
 2. This report shall not be partial reproduced without written approval by Interocean EMC Technology Corporation.
 3. Judgment of conformity is based on test result, regardless of measurement uncertainty.

Report Issued: 2021/06/18

Prepared by: Ivan Wang Approved: Jerry Chang
Ivan Wang Jerry Chang

1 General Information

1.1 Description of Equipment Under Test

Product	: PL270 Charger
Model Number	: PL-270-C
Applicant	: LED POWER, Inc. 1731 KAISER AVENUE, IRVINE, California, United States of America 92614
Manufacturer	: ARTLED TECHNOLOGY CORP. 3F.-2, NO.611, SEC. 1, WANSHOU RD., GUISHAN DIST., TAOYUAN CITY 33350, TAIWAN (R.O.C.)
Power Supply	: <u>EUT:</u> Input: DC 12V <u>Adapter:</u> Model Number: ZF120A-1202000 Input: 100-240Vac, 50/60Hz, 2.0A Output: 12Vdc, 2.0A
Operating Frequency	: 120 kHz – 135 kHz
Output Power	: 73.45 dBμV/m
Type of Modulation	: ASK
Antenna Description	: Inductive Loop Coil Antenna
Measurement Software	: e3; Ver: 8.120803a7-2
Receipt Date of EUT	: May 19, 2021
Date of Test	: May 19 ~ Jun. 04, 2021
Additional Description	: 1) The test model is “ PL-270-C ” and included in this report. 2) For more detailed specification about EUT, please refer to the user’s manual.

1.2 Test Facility

- Site Description** : ☒Conducted 1 ☒Chamber 3
- Name of Firm** : Interocean EMC Technology Corp.
- Company web** : <http://www.ietc.com.tw>
- Location** : No. 5-2, Lin 1, Tin-Fu, Lin-Kou Dist., New Taipei City,
Taiwan 244, R.O.C.
- Site Filing** :
 - Federal Communication Commissions – USA
Designation No.: TW1020 (Test Firm Registration #: 651092)
Designation No.: TW1113 (Test Firm Registration #: 959554)
 - Innovation, Science and Economic Development Canada (ISED)
CAB identifier: TW1113 (Ref. No 14962756)
 - Voluntary Control Council for Interference by Information
Technology Equipment (VCCI) – Japan
Member No.: 1349
Registration No. (Conducted Room): C-11094
Registration No. (Conducted Room): T-11562
Registration No. (OATS 1): R-11040
Registration No. (Chamber 3): G-20080
- Site Accreditation** :
 - Bureau of Standards and Metrology and Inspection (BSMI) –
Taiwan, R.O.C.
Accreditation No.:
SL2-IN-E-0026 for CNS 13438 / CISPR 22
SL2-R1-E-0026 for CNS 13439 / CISPR 13
SL2-R2-E-0026 for CNS 13439 / CISPR 13
SL2-L1-E-0026 for CNS 14115 / CISPR 15
 - Taiwan Accreditation Foundation (TAF)
Accreditation No.: 1113
 - American Association for Laboratory Accreditation (A2LA)
Certificate Number: 4891.01
 - Vehicle Safety Certification Center (VSCC)
Approval No.: TW16-11

1.3 Test Equipment

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100127	2021/11/17
RF Cable	IETC	CBL68	CBL68	2022/01/22
Pulse Limiter	R&S	ESH3-Z2	8360836/026	2022/01/22
L.I.S.N.	Schwarzbeck	NNLK8121	8121417	2022/03/08
L.I.S.N.	Schaffner	MN2050D	1598	2021/08/04
Spectrum Analyzer	R&S	FSP30	100002	2022/05/17
Loop Antenna	Electro-Metrics	EM-6879	261	2021/09/16
Bilog Antenna with 5 dB Pad	ETC & JYEBAO	MCTD 2786B & FAT-NM5NF5T3G2W5	BLB17S04020 & JB-5-020	2022/05/13
Horn Antenna	Schwarzbeck	BBHA9120	9120D-1051	2021/08/03
Pre-Amplifier	EMCI	EMC001150	980130	2021/08/02
Pre-Amplifier	EMCI	EMC051845	980110	2021/07/02
RF Cable	HARBOUR	27478LL142	CBL65	2022/01/22
RF Cable	Marvelous Microwave	MCBL-LL266.50	CBL70	2022/01/22
Measurement Software	AUDIX-e3			

Note: The above equipments are within the valid calibration period.

1.4 Measurement Uncertainty

Items	Measurement Items	Expanded Uncertainty					Estimation
		Frequency 9 kHz to 30 MHz	Frequency 30 MHz to 1000 MHz	Frequency 1 GHz to 18 GHz	Frequency 18 GHz to 26.5 GHz	Frequency 26.5 GHz to 40 GHz	
1.	Power-line Conducted Emissions (dBμV)	±2.120	-----	-----	-----	-----	LAB34
2.	Radiation Power (dBμV/m)	±3.336	±3.170	±2.284	±2.140	±2.140	LAB34
3.	Output Power (dB)	±1.109	±1.109	±1.970	±1.970	±1.970	ETSI TR 100 028
4.	E.I.R.P (dB)	±4.319	±4.319	±4.319	±4.319	±4.319	
5.	Spurious emissions (dB)	±4.090	±4.090	±4.111	±4.111	±4.111	
6.	Coducted RF badege (dB)	±4.090	±4.090	±4.111	±4.111	±4.111	
7.	Conducted Spurious Emissions (dB)	±4.090	±4.090	±4.111	±4.111	±4.111	
8.	Radiation Spurious Emissions (dB)	±2.125	±3.419	±3.419	±3.419	±3.419	
9.	Operating Frequency (Hz)	±1.36*10 ⁻⁸	±1.36*10 ⁻⁸	±7.55*10 ⁻⁸	±6.60*10 ⁻⁸	±6.60*10 ⁻⁸	
10.	Frequency Stability (Hz)	±33.965	±48.779	±631.398	±928.835	±928.835	
11.	Frequency stability of input voltage (Hz)	±33.965	±48.779	±631.398	±928.835	±928.835	
12.	Frequency Deviation (%)	±1.296	±1.296	±1.296	±1.296	±1.296	
13.	Channel Bandwidth (Hz)	±33.951	±35.786	±206.505	±301.800	±301.800	
14.	6dB Channel bandeidth (Hz)	±33.951	-----	±206.505	-----	-----	
15.	20dB Channel bandeidth (Hz)	-----	±35.786	±206.505	-----	-----	
16.	Output Peak Power (dB)	±0.654	±0.654	±0.654	±0.654	±0.654	
17.	Power Density (dB)	±1.109	±1.109	±0.105	±1.970	±1.970	
18.	Number of Hopping Channel	-----	-----	-----	-----	-----	
19.	Hopping Channel Separation (Hz)	-----	-----	±206.505	-----	-----	
20.	Dwell Tiom (ms)	±2.225	±2.225	±2.225	±2.225	±2.225	
21.	ACLR (Adjacent Channel Leakage Ratio) (dB)	±1.442	±1.442	±1.442	±1.443	±1.443	
22.	Frequency Response (%)	±5.246	±5.246	±5.246	±5.246	±5.246	
23.	Max Modulation (%)	±1.296	±1.296	±1.296	±1.296	±1.296	
24.	Hormonic attenuation (dB)	±4.090	±4.090	±4.111	±4.111	±4.111	

1.5 Summary of Measurement

Test Parameter	Reference Document CFR47 Part15	Results
AC Power Line Conducted Emission test	§15.207(a)	Pass
RF Radiated spurious emission test	§15.205, §15.209	Pass
20 dB Bandwidth	§15.215(c)	Pass
Antenna Requirement	§15.203	Pass

2 Test Specifications

2.1 Test Standard

The EUT was performed according to FCC Part 15 Subpart C Section 15.205 & 15.209 procedure and setup followed by ANSI C63.10-2013 requirements.

2.2 Operation Mode

The final test was executed the worst condition and test data were recorded in this report.

2.3 Test Step of EUT

- 2.3.1 Set the fixture to EUT for power supplying.
- 2.3.2 Turn on the power of all equipments.
- 2.3.3 Let the EUT continuous transmission.
- 2.3.4 Execute the test.
- 2.3.5 Both 120 Vac, 50/60 Hz and 240 Vac, 50/60 Hz power supply have been tested, only the worst result of 120 Vac, 60 Hz was reported as below.

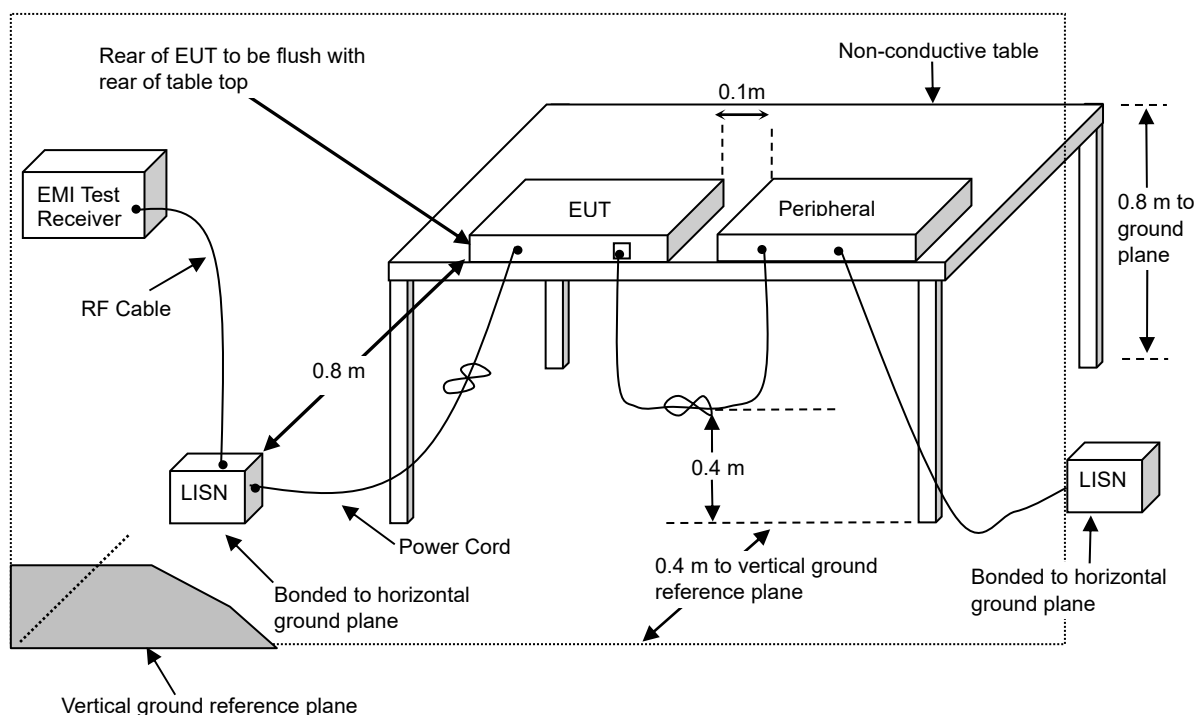
3 AC Power Line Conducted Emission

3.1 Limit

Frequency (MHz)	Quasi-Peak (dB μ V)	Average (dB μ V)
0.15 to 0.5	66 to 56	56 to 46
> 0.5 to 5	56	46
> 5 to 30	60	50

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 30 MHz.

3.2 Configuration of Measurement



3.3 Test Procedures

- 1.) The EUT was placed 80cm height above ground on a non-conductive table and vertical conducting plane located 40cm to the rear of the EUT.
- 2.) The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm/50mH coupling impedance for the measuring equipment. The auxiliary equipment will place in secondary LISN.
- 3.) Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4, 2014 on conducted measurement.

3.4 Test Result

PASS.

The final test data is shown as following pages.

Factor = Insertion Loss + Cable Loss

Level = Reading + Factor

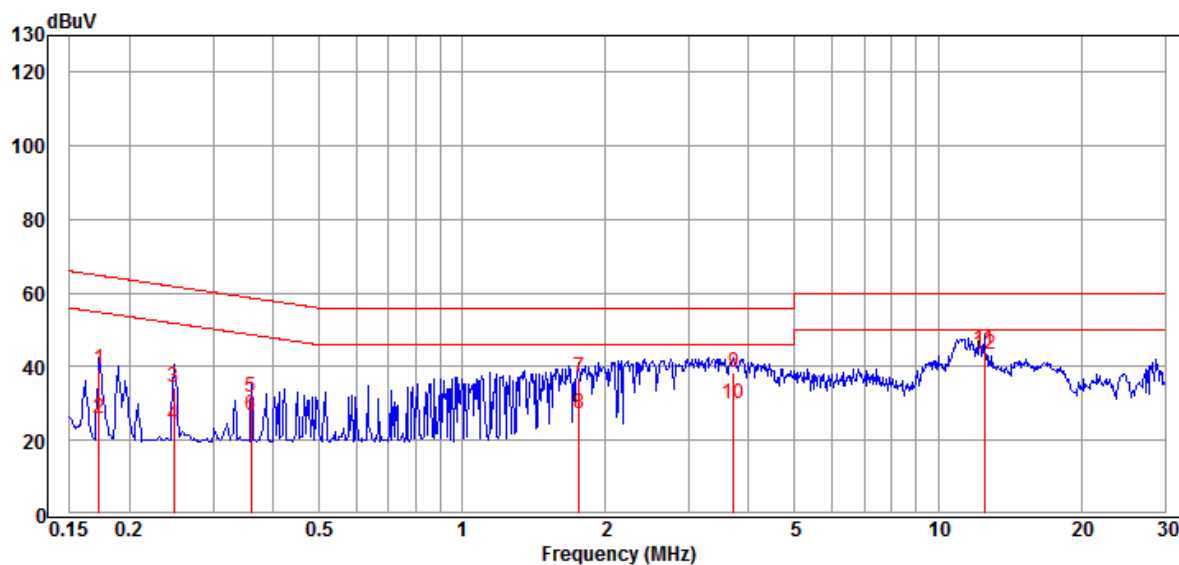
Margin = Level - Limit

CLIENT: LED POWER, Inc.
EUT: PL270 Charger
MODEL: PL-270-C
RATING: 120 Vac / 60 Hz
COMMENT: Worst Mode

OPERATOR: Ivan
TEST SITE: Conducted 1
POLARIZATION: Line
TEMP/HUM: 23.3°C / 47%

Data:5

2021-05-19



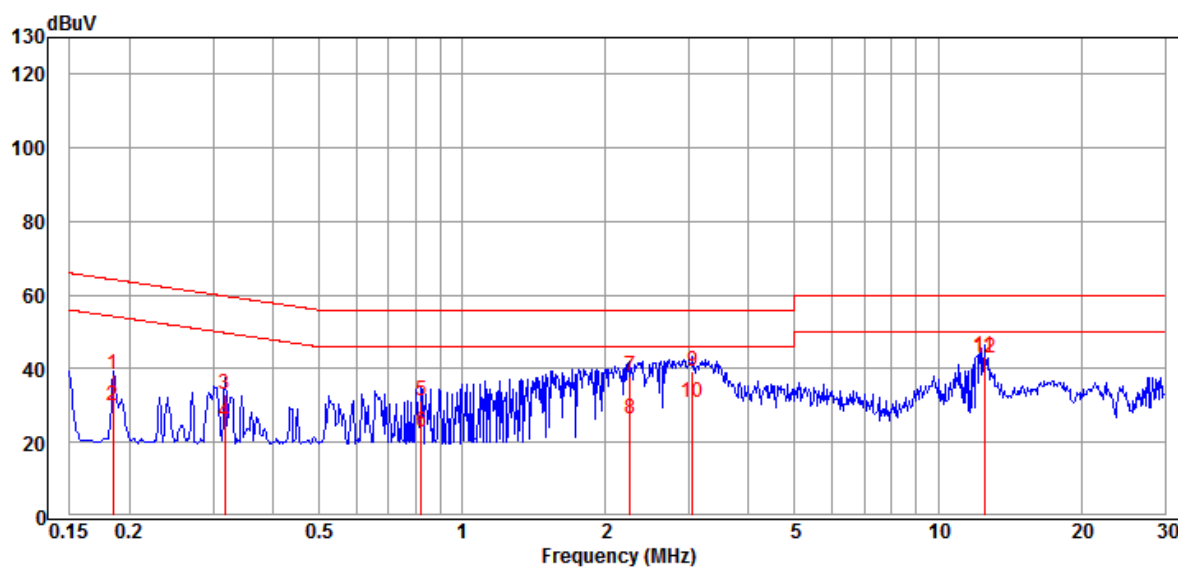
Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.1731	29.38	9.89	39.27	64.81	-25.54	QP
2	0.1731	16.08	9.89	25.97	54.81	-28.84	Average
3	0.2481	24.28	9.90	34.18	61.82	-27.64	QP
4	0.2481	14.16	9.90	24.06	51.82	-27.76	Average
5	0.3615	21.66	9.91	31.57	58.69	-27.12	QP
6	0.3615	16.68	9.91	26.59	48.69	-22.10	Average
7	1.7620	27.37	9.93	37.30	56.00	-18.70	QP
8	1.7620	17.29	9.93	27.22	46.00	-18.78	Average
9	3.7200	28.31	10.02	38.33	56.00	-17.67	QP
10	3.7200	19.83	10.02	29.85	46.00	-16.15	Average
11	12.5160	34.39	10.44	44.83	60.00	-15.17	QP
12	12.5160	32.74	10.44	43.18	50.00	-6.82	Average

CLIENT: LED POWER, Inc.
EUT: PL270 Charger
MODEL: PL-270-C
RATING: 120 Vac / 60 Hz
COMMENT: Worst Mode

OPERATOR: Ivan
TEST SITE: Conducted 1
POLARIZATION: Neutral
TEMP/HUM: 23.3°C / 47%

Data:6

2021-05-19



Item Mark	Freq. MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Remark
1	0.1854	28.48	9.89	38.37	64.24	-25.87	QP
2	0.1854	20.18	9.89	30.07	54.24	-24.17	Average
3	0.3183	23.37	9.90	33.27	59.75	-26.48	QP
4	0.3183	15.49	9.90	25.39	49.75	-24.36	Average
5	0.8217	21.41	9.87	31.28	56.00	-24.72	QP
6	0.8217	13.04	9.87	22.91	46.00	-23.09	Average
7	2.2610	27.97	9.90	37.87	56.00	-18.13	QP
8	2.2610	16.61	9.90	26.51	46.00	-19.49	Average
9	3.0580	29.31	9.93	39.24	56.00	-16.76	QP
10	3.0580	20.72	9.93	30.65	46.00	-15.35	Average
11	12.5160	32.98	10.14	43.12	60.00	-16.88	QP
12	12.5160	32.84	10.14	42.98	50.00	-7.02	Average

4 Antenna Requirements

4.1 Limit

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Test Result

PASS.

This product has an integral antenna, fulfill the requirement of this section.

5 20dB Bandwidth test

5.1 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.2 Test Procedure

The 20dB bandwidth per FCC §15.215 was measured using spectrum analyzer with the resolutions bandwidth set at 10 kHz, the video bandwidth \geq RBW, and the SPAN may equal to approximately 2 to 3 time the 20 dB bandwidth.

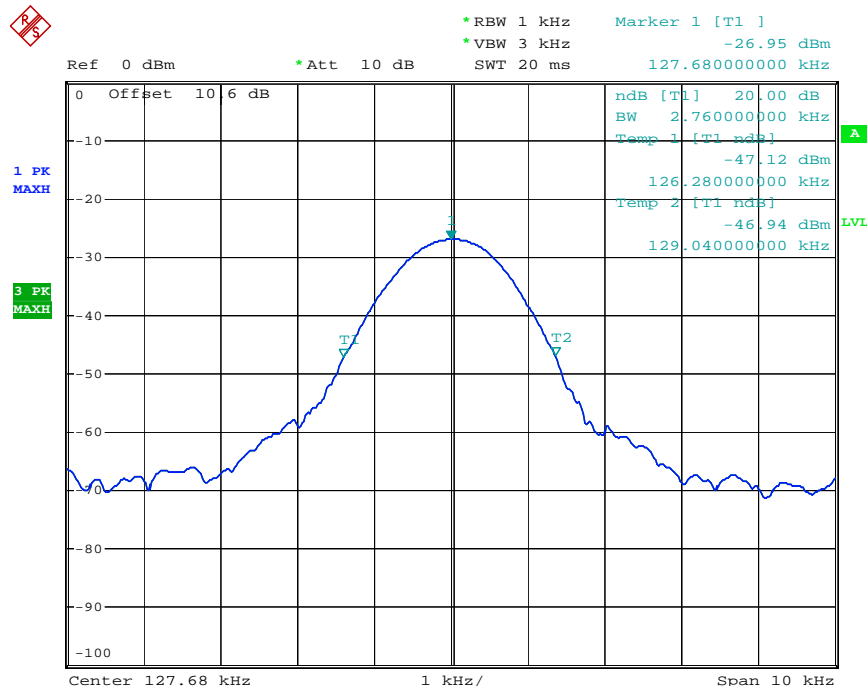
5.3 Test Result

PASS.

The final test data is shown as following pages.

Test CH		20dB Bandwidth (kHz)
Modulation	Frq. (kHz)	
ASK	127.68	2.76

Plot:



Date: 4.JUN.2021 11:36:23

6 RF Radiated spurious emission test

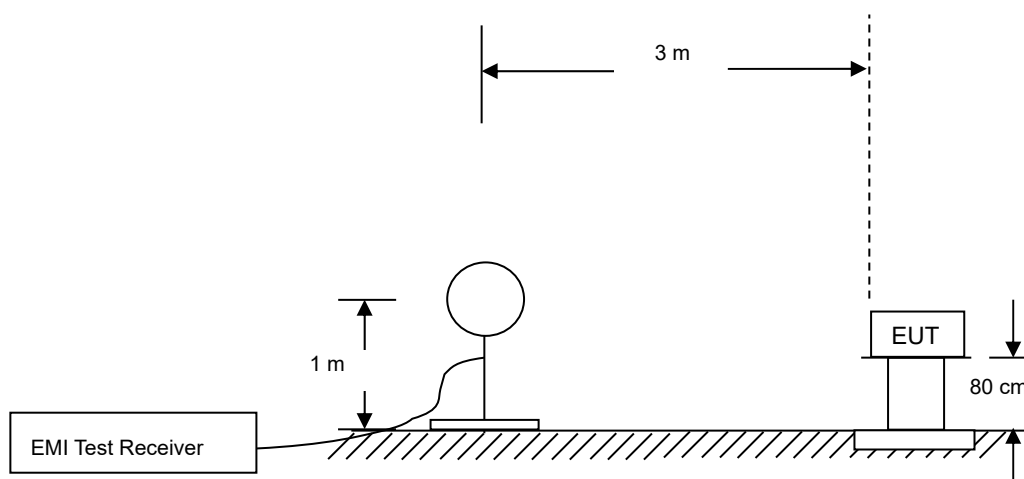
6.1 Limit

For intentional radiator, the radiated emission shall comply with §15.209(a).

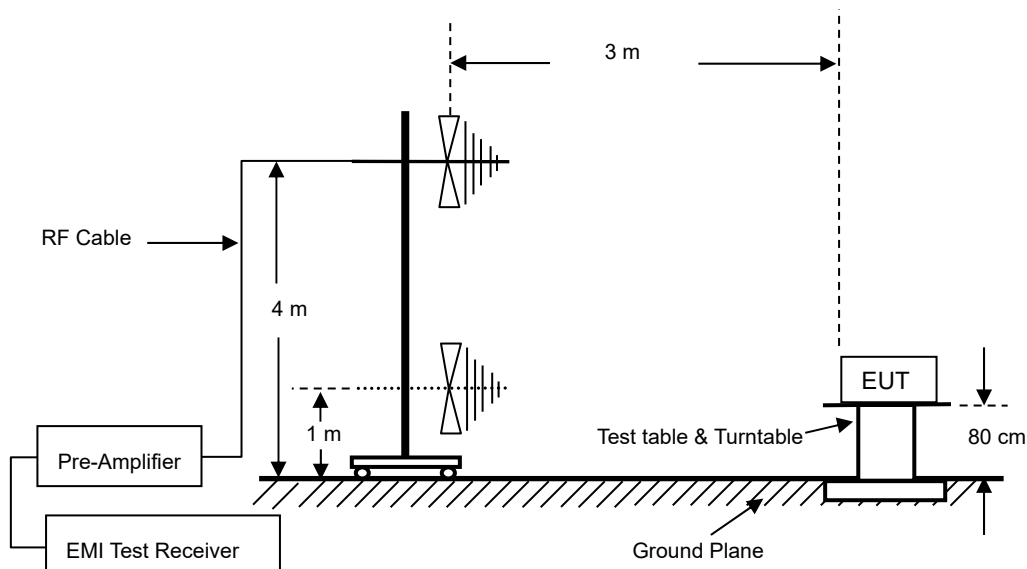
Frequency (MHz)	Field strength dB(μ V/m)	Measurement distance (meters)
1.705 - 30.0	29.5	30
30 - 88	40	3
88 - 216	43.5	3
216 - 960	46	3
Above 960	54	3

6.2 Configuration of Measurement

Measurement Frequency Below 9 kHz to 30 MHz



Measurement Frequency below 1 GHz



6.3 Test Procedure

The EUT was setup to ANSI C63.10-2013.

Radiated emission measurements were performed from 30 MHz to 25 GHz. Spectrum Analyzer set as below: For frequency range from 30 MHz to 1 GHz: RBW=100 kHz or greater. For frequencies above 1 GHz: set RBW=VBW=1 MHz for peak detector and RBW=1 MHz, VBW=10 Hz for average detector.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meter and down to 1 meter.

6.4 The description of operation mode

Setup EUT to continuously transmit signal with 100% duty cycle during the test period.

6.5 Test Result

PASS.

The frequency range from 9 kHz to 30 MHz was pre-scanned and the results were 20 dB lower than the limit line which according to FCC 15.31(o) needs not be recorded.

The final test emission data is shown as following tables.

Radiated Emission Below 30 MHz

CLIENT: LED POWER, Inc.

EUT: PL270 Charger

MODEL: PL-270-C

RATING: 120 Vac / 60 Hz

COMMENT: Transmission Mode

OPERATOR : Scott

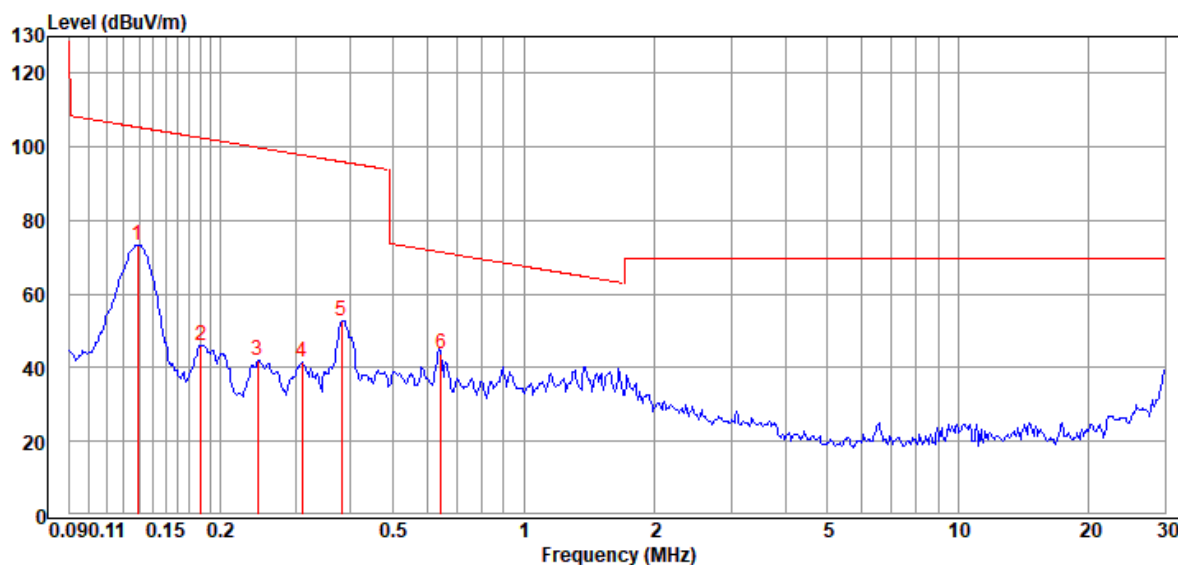
TEST SITE : Chamber 3

TEST DISTANCE : 3 m

TEMP/HUM : 25.1°C/54%

Data:13

2021-06-04



Item Mark	Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	0.129	70.44	3.01	73.45	105.39	-31.94	Peak
2	0.181	45.40	0.51	45.91	102.46	-56.55	Peak
3	0.244	43.78	-1.72	42.06	99.84	-57.78	Peak
4	0.308	44.78	-3.45	41.33	97.82	-56.49	Peak
5	0.380	57.84	-4.95	52.89	96.01	-43.12	Peak
6	0.645	52.38	-8.38	44.00	71.41	-27.41	Peak

Remark : Corrected Level = Reading + Correction Factor – Preamp

Correction Factor = Antenna Factor + Cable Loss

Margin = Corrected Level – Limits

“ * ” Mark indicated Background Noise Level

Radiated Emission Below 1 GHz

CLIENT: LED POWER, Inc.

EUT: PL270 Charger

MODEL: PL-270-C

RATING: 120 Vac / 60 Hz

COMMENT: Transmission Mode

OPERATOR : Scott

TEST SITE : Chamber 3

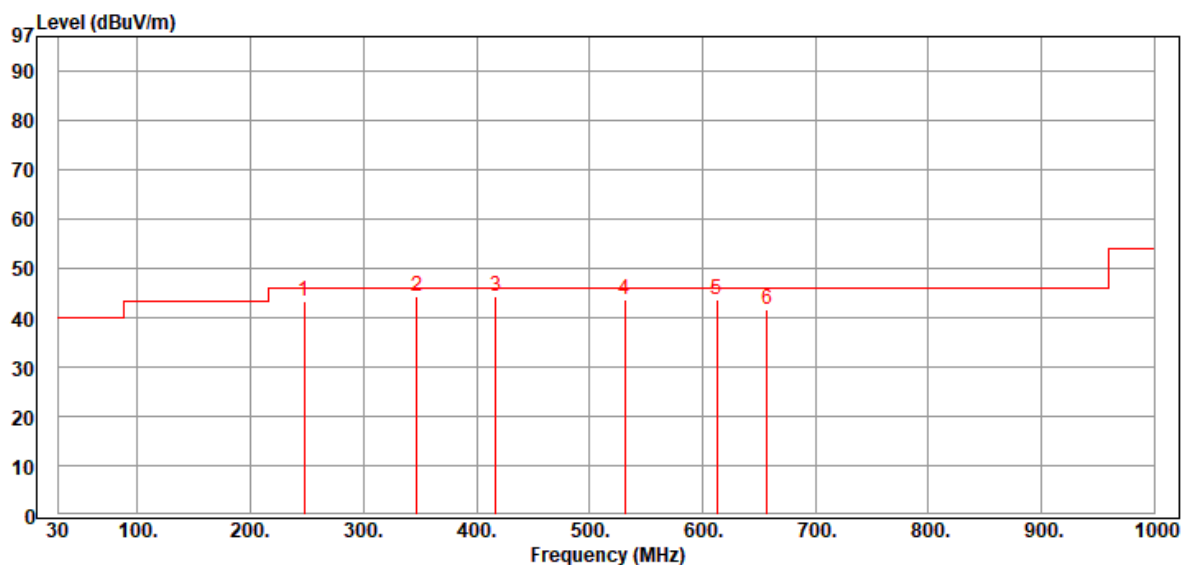
TEST DISTANCE : 3 m

POLARIZATION : HORIZONTAL

TEMP/HUM : 25.1°C/54%

Data:11

2021-06-04



Item	Freq.	Reading	Factor	Level	Limit	Margin	Remark
Mark	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	247.280	75.19	-32.02	43.17	46.00	-2.83	QP
2	347.190	73.00	-28.80	44.20	46.00	-1.80	QP
3	417.030	71.51	-27.27	44.24	46.00	-1.76	QP
4	531.490	69.79	-26.21	43.58	46.00	-2.42	QP
5	612.970	68.68	-25.06	43.62	46.00	-2.38	QP
6	657.590	66.28	-24.58	41.70	46.00	-4.30	QP

Remark : Corrected Level = Reading + Correction Factor – Preamp

Correction Factor = Antenna Factor + Cable Loss

Margin = Corrected Level – Limits

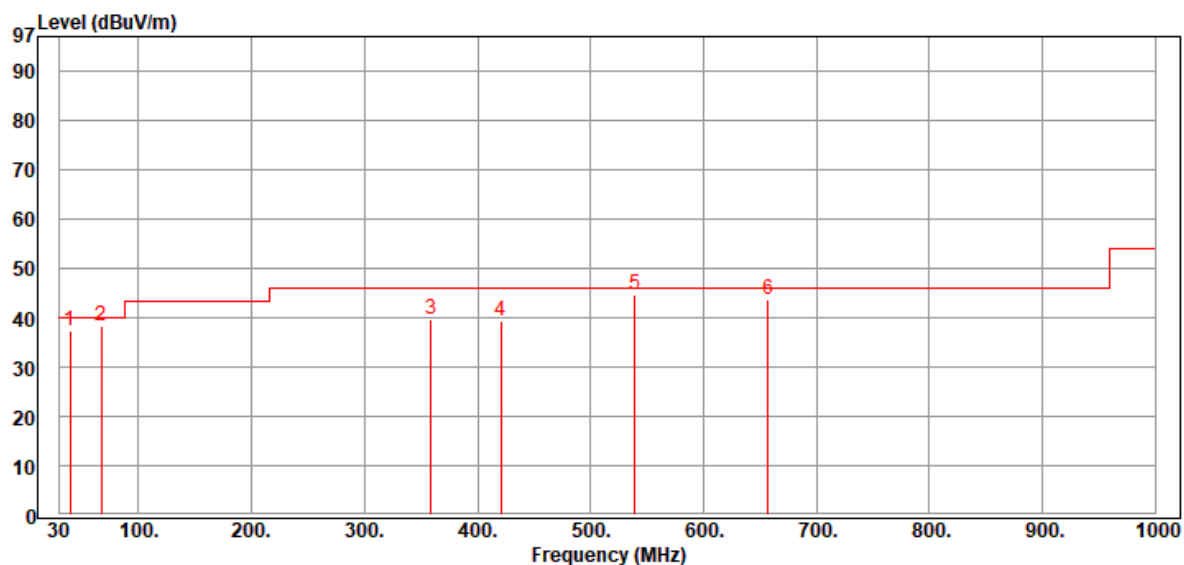
“ * ” Mark indicated Background Noise Level

CLIENT: LED POWER, Inc.
EUT: PL270 Charger
MODEL: PL-270-C
RATING: 120 Vac / 60 Hz
COMMENT: Transmission Mode

OPERATOR : Scott
TEST SITE : Chamber 3
TEST DISTANCE : 3 m
POLARIZATION : VERTICAL
TEMP/HUM : 25.1°C/54%

Data:12

2021-06-04



Item Mark	Freq. MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark
1	39.700	70.00	-32.66	37.34	40.00	-2.66	QP
2	66.860	75.81	-37.63	38.18	40.00	-1.82	QP
3	358.830	68.36	-28.74	39.62	46.00	-6.38	QP
4	420.910	66.57	-27.29	39.28	46.00	-6.72	QP
5	539.250	70.60	-26.03	44.57	46.00	-1.43	QP
6	657.590	68.20	-24.58	43.62	46.00	-2.38	QP

Remark : Corrected Level = Reading + Correction Factor – Preamp
Correction Factor = Antenna Factor + Cable Loss
Margin = Corrected Level – Limits
“ * ” Mark indicated Background Noise Level