

RF Exposure Evaluation Report

Applicant: NLU Products, L.L.C.
Address of Applicant: 2801 N Thanksgiving Way #300, Lehi, UT 84043 USA

Equipment Under Test (EUT)

Product Name: Lantern
Model No.: Boulder
Trade mark: Lander

FCC ID: 2ALQR-BLDCTT20

Applicable standards: FCC CFR Title 47 Part 2 Subpart J Section 2.1091

Date of sample receipt: 30 Nov., 2020

Date of Test: 01 Dec., to 09 Dec., 2020

Date of report issue: 30 Dec., 2020

Test Result: PASS*

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	10 Dec., 2020	Original
01	30 Dec., 2020	Update test photos

Tested by: YT Yang
Test Engineer

Date: 30 Dec., 2020

Reviewed by: Winner Zhang
Project Engineer

Date: 30 Dec., 2020

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4 General Information

4.1 Client Information

Applicant:	NLU Products, L.L.C.
Address:	2801 N Thanksgiving Way #300, Lehi, UT 84043 USA
Manufacturer:	NLU Products, L.L.C.
Address:	2801 N Thanksgiving Way #300, Lehi, UT 84043 USA
Factory:	CTT Co., Ltd
Address:	Building 2 of Industrial park, No. 197, Xinhua Blvd, Tongqiao town, Zhongkai High-tech zone, Huizhou, Guangdong, China 516032.

4.2 General Description of E.U.T.

Product Name:	Lantern
Model No.:	Boulder
Operation Frequency:	110kHz ~ 205kHz
Modulation technology:	ASK
Antenna Type:	Coil Antenna
Power supply	Input: 5V, 3A / 9V, 2A /12V, 1.5A Output: 5W, 7.5W
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Operating Modes

Operating mode	Detail description
Full mode	Keep the EUT in Full mode

4.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Skytek	Wireless charging match load	N/A	N/A	N/A

4.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Field Strength (9kHz ~ 30MHz)	± 2% (k=2)

4.6 Additions to, deviations, or exclusions from the method

No

4.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**
JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.
- **ISED – CAB identifier.: CN0021**
The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.
- **A2LA - Registration No.: 4346.01**
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

4.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
 Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road,
 Bao'an District, Shenzhen, Guangdong, China
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

4.9 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Electromagnetic field strength analyzer	Coliy Technology GmbH	E300	13945	12-25-2019	12-24-2020

5 Technical Requirements Specification in FCC CFR Title 47 Part 2.1091

5.1 Limits

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

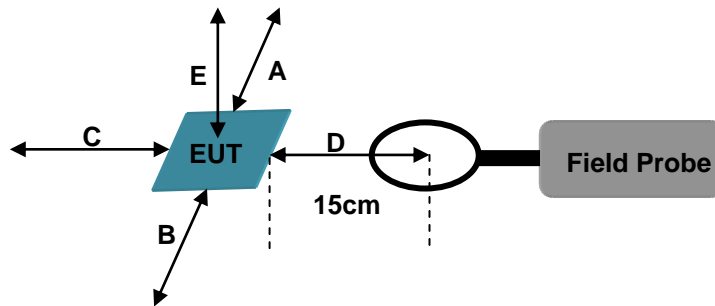
According to KDB 680106 D01 RF Exposure Wireless Charging Apps, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm for devices designed for typical desktop applications. E and H field strength measurements or numerical modelling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}

Note: f is frequency in MHz.
 *Based on nerve stimulation (NS).
 ** Based on specific absorption rate (SAR).

5.2 Test Setup Block



Remrak: The E300 probe antenna diameter is 11.5cm.

5.3 Limits For General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW /cm ²)	Averaging Time (minutes)
0.3 ~ 3.0	614	1.63	(100)*	30
3.0 ~ 30	824/f	2.19/f	(180/f ₂)*	30
30 ~ 300	27.5	0.073	0.2	30
300~1500	-	-	f/1500	30
1500~100000	-	-	1.0	30

5.4 Test Procedure

KDB 680106 D01 Section 5(b):

- (1) Power transfer frequency is less than 1 MHz.
-- Yes, the device operate in the frequency 174.9kHz.
- (2) Output power from each primary coil is less than or equal to 15 watts.
-- Yes, the maximum output power of the primary coil is 7.5W.
- (3) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.
--Yes, the transfer system includes only single primary and secondary coils.
- (4) Client device is placed directly in contact with the transmitter.
-- Yes, client device is placed directly in contact with the transmitter.
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
-- Yes, the DUT is a Wireless Charging mobile.
- (6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.
--Yes the EUT field strength levels are less than 50% of the MPE limit.

1. Installing the magnetic field probe and turn on the E300 power switch, select the magnetic field test mode and the A/m unit, select the peak detection mode, select the Max-Hold display.
2. Measured the ambient noise at this time and record.
3. Make DUT work at maximum transmit power.
4. During the measurement, the magnetic field probe centre of the E300 is kept in 15cm distance from each test surface of the wireless charging base, and recorded the measured values of the A, B, C, D, and E side are separately.
5. After all the measured values of the A, B, C, D, and E side are subtracted the background noise separately, they are the true magnetic field strength values at that point.
6. Replace the electric field test probe and select the electric field test mode and the V/m unit, select the peak detection mode, select the Max-Hold display.
7. Repeat step 3 to 5 and then get the strength of the electric field.

5.5 Result

a) Magnetic Field Strength Measurement

Measured Side	Distance (cm)	Measured Value (A/m)	50 % of Limit (A/m)	Limit (A/m)
A	15	0.179	0.815	1.63
B	15	0.171	0.815	1.63
C	15	0.168	0.815	1.63
D	15	0.160	0.815	1.63
E	20	0.155	0.815	1.63

b) Electric Field Strength Measurement

Measured Side	Distance (cm)	Measured Value (V/m)	50 % of Limit (V/m)	Limit (V/m)
A	15	67.275	307.00	614
B	15	64.268	307.00	614
C	15	63.141	307.00	614
D	15	60.134	307.00	614
E	20	58.255	307.00	614

Note: 1. We use the worst test distance with 15cm for all side.

2. For the top side, we test with distance 15cm and 20cm, cuz the test distance with 15cm is the worst mode, this report only shows the worst mode.

6 Test setup photo

-----End of report-----