

RF Exposure Evaluation Report

Applicant: Nebra LTD.

Address of Applicant: Unit 4 Bells Yew Green Business Court, Bells Yew Green,
Tunbridge Wells TN3 9BJ

Equipment Under Test (EUT)

Product Name: Nebra Smart Outdoor LoRa Gateway / Nebra HNT Outdoor Hotspot Miner

Model No.: HNTOUT-915-G-LT+, HNTOUT-915-G-LT, HNTOUT-915-LT+, HNTOUT-915 -LT, HNTOUT-915-G-LT+, HNTOUT-915-G, HNTOUT-915

Trade mark: Nebra

FCC ID: 2AZDM-HNTOUT

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

Date of sample receipt: 01 Jun., 2021

Date of Test: 01 Jun., to 08 Jul., 2021

Date of report issue: 09 Jul., 2021

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	09 Jul., 2021	Original

Tested by: Carrey Chen
Test Engineer

Date: 09 Jul., 2021

Reviewed by: Winner Zhang
Project Engineer

Date: 09 Jul., 2021

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4 General Information

4.1 Client Information

Applicant:	Nebra LTD.
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells TN3 9BJ
Manufacturer:	Nebra LTD.
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells TN3 9BJ
Factory:	SUNSOAR TECH CO., LIMITED
Address:	4/F, Block E, Fengze Building, Huafeng No.2 Industrial Park, Hangkong Road, XiXiang Town, BaoAn District, Shenzhen, China

4.2 General Description of E.U.T.

Product Name:	Nebra Smart Outdoor LoRa Gateway / Nebra HNT Outdoor Hotspot Miner
Model No.:	HNTOUT-915-G-LT+, HNTOUT-915-G-LT, HNTOUT-915-LT+, HNTOUT-915-LT, HNTOUT-915-G-LT+, HNTOUT-915-G, HNTOUT-915
Operation Frequency:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz WCDMA Band V: 826.4MHz-846.6MHz WCDMA Band II: 1852.4 MHz-1907.6 MHz WCDMA Band IV: 1712.4 MHz-1752.6 MHz LTE Band 2: TX: 1850MHz-1910MHz, RX: 1930MHz-1990MHz LTE Band 4: TX: 1710MHz-1755MHz, RX: 2110MHz-2155MHz LTE Band 5: TX: 824MHz-849MHz, RX: 869MHz-894MHz LTE Band 7: TX: 2500MHz-2570MHz, RX: 2620MHz-2690MHz LTE Band 12: TX: 699MHz-716MHz, RX: 729MHz-746MHz LTE Band 13: TX: 777MHz-787MHz, RX: 746MHz-756MHz LTE Band 25: TX: 1850MHz-1915MHz, RX: 1930MHz-1995MHz LTE Band 26: TX: 814MHz-894MHz, RX: 859MHz-894MHz LTE Band 38: TX: 2570MHz-2620MHz, RX: 2570MHz-2620MHz LTE Band 41: TX: 2496MHz-2690MHz, RX: 2496MHz-2690MHz 2.4G Wi-Fi: 2412MHz~2462MHz, BLE: 2402MHz~2480MHz Lora: 923.3MHz~927.5MHz
Modulation technology:	GSM: GMSK, 8PSK, WCDMA: QPSK, 16QAM, LTE: QPSK, 16QAM 802.11b: DSSS, 802.11g/n: OFDM, BLE: GFSK, Lora: FSK
Antenna Type:	External Antenna
Antenna gain:	GSM 850: 1.75dBi, PCS 1900: 2.39 dBi, WCDMA Band V: 1.75 dBi, WCDMA Band II: 2.39 dBi, WCDMA Band IV: 2.31 dBi LTE Band 2: 2.39 dBi, LTE Band 4: 2.31 dBi, LTE Band 5: 1.75 dBi, LTE Band 7: 2.78 dBi, LTE Band 12: 1.75 dBi, LTE Band 13: 1.75 dBi, LTE Band 25: 2.39 dBi, LTE Band 26: 1.75 dBi, LTE Band 38: 2.78 dBi, LTE Band 41: 2.78 dBi BLE: 2.0 dBi, Wi-Fi: 0.5 dBi, Lora: 3.0 dBi
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

4.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
BT mode	Keep the EUT in continuously transmitting in BT mode
GSM mode	Keep the EUT in continuously transmitting in GSM mode
WCDMA mode	Keep the EUT in continuously transmitting in WCDMA mode
LTE mode	Keep the EUT in continuously transmitting in LTE mode

4.4 Additions to, deviations, or exclusions from the method

No

4.5 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● 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
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4.6 Laboratory Location

<p>JianYan Testing Group Shenzhen Co., Ltd. Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info-JYTee@lets.com, Website: http://www.ccis-cb.com</p>

5 Technical Requirements Specification in FCC CFR Title 47 Part 2.1091

5.1 Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

5.2 Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

5.3 Result

Frequency (MHz)	Maximum Output power (dBm)	Maximum Output power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm ²)	Limits for General Population/ Uncontrolled Exposure (mW/cm ²)
2.4G Wi-Fi							
2412	8.387	6.90	12.0	15.85	20.00	0.0217	1.0
GSM850							
824.2	25.81	381.07	1.75	1.50	20.00	0.1134	0.5495
GSM1900							
1850.2	22.81	190.99	2.39	1.73	20.00	0.0659	1.0
WCDMA B2							
1852.4	25.00	316.23	2.39	1.73	20.00	0.1091	1.0
WCDMA B4							
1712.4	25.00	316.23	2.31	1.70	20.00	0.1071	1.0
WCDMA B5							
826.4	25.00	316.23	1.75	1.50	20.00	0.0941	0.5509
LTE B2							
1850.7	25.00	316.23	2.39	1.73	20.00	0.1091	1.0
LTE B4							
1710.7	25.00	316.23	2.31	1.70	20.00	0.1071	1.0
LTE B5							
824.7	25.00	316.23	1.75	1.50	20.00	0.0941	0.5498
LTE B7							
2502.5	25.00	316.23	2.78	1.90	20.00	0.1193	1.0
LTE B12							
699.7	25.00	316.23	1.75	1.50	20.00	0.0941	0.4665
LTE B13							
779.5	25.00	316.23	1.75	1.50	20.00	0.0941	0.5197
LTE B25							
1850.7	25.00	316.23	2.39	1.73	20.00	0.1091	1.0
LTE B26(814MHz-824MHz)							
814.7	25.00	316.23	1.75	1.50	20.00	0.0941	0.5431
LTE B26(824MHz-849MHz)							
824.7	25.00	316.23	1.75	1.50	20.00	0.0941	0.5498
LTE B38							
2572.5	25.00	316.23	2.78	1.90	20.00	0.1193	1.0
LTE B41							
2498.5	25.00	316.23	2.78	1.90	20.00	0.1193	1.0
Lora							
925.7	17.50	56.23	3.0	2.00	20.00	0.0223	0.6171

Note: Just the worst case mode was shown in report.

5.4 Conclusion

The device is exempt from the RF exposure evaluation.

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