

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 Indoor LoRa Gateway / Nebra HNT Indoor
Hotspot Miner

Model No.: HNTIN-470-G, HNTIN-868-G, HNTIN-915-G, HNTIN-433-G,
HNTIN-470, HNTIN-868, HNTIN-915, HNTIN-433

FCC ID: 2AZDM-HNTIN

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

Date of sample receipt: 12 Mar., 2021

Date of Test: 13 Mar., to 19 Apr., 2021

Date of report issue: 23 Apr., 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	23 Apr., 2021	Original

Tested by: _____

Test Engineer

Date: 23 Apr., 2021

Reviewed by: _____

Project Engineer

Date: 23 Apr., 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 Indoor LoRa Gateway / Nebra HNT Indoor Hotspot Miner
Model No.:	HNTIN-470-G, HNTIN-868-G, HNTIN-915-G, HNTIN-433-G, HNTIN-470, HNTIN-868, HNTIN-915, HNTIN-433
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz BLE: 2402MHz~2480MHz Lora: 923.3MHz~927.5MHz
Modulation technology:	802.11b: DSSS, 802.11g/n: OFDM BLE: GFSK Lora: FSK
Antenna Type:	BLE/Wi-Fi: Internal antenna Lora: External Antenna
Antenna gain:	BLE: 1.0 dBi; Wi-Fi: 0 dBi; LoRa: 3 dBi
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Remark:	<p>Model No.: Model: HNTIN-470-G, HNTIN-868-G, HNTIN-915-G, HNTIN-433-G, HNTIN-470, HNTIN-868, HNTIN-915, HNTIN-433 has the same internal circuit design, layout, components and internal wiring. The difference is that the ones with the -G suffix have GPS function, while those without the suffix do not. Each model has two appearances, except for the appearance, the interior is exactly the same. In addition, the corresponding frequency of each model of LoRa module is different, as follows:</p> <p>The Nebra HNT Indoor Hotspot is available in 4 variants to support multiple regions.</p> <p>It is available in the following frequency variants:</p> <ul style="list-style-type: none"> • 433 MHz (HNTIN-433) • 470 Mhz (HNTIN-470) • 868 Mhz (HNTIN-868) • 915 Mhz (HNTIN-915)

4.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
Lora mode	Keep the EUT in continuously transmitting in Lora mode
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI mode

4.4 Additions to, deviations, or exclusions from the method

No

4.5 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>

4.6 Laboratory Location

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@ccis-cb.com, Website: <http://www.ccis-cb.com>

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							
2462	12.51	17.82	0	1.00	20.00	0.0035	1.0
BT & BLE							
2402	-0.85	0.82	1	1.26	20.00	0.0002	1.0
LoRa							
925.7	17.50	56.23	3	2.00	20.00	0.0223	0.617

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

Simultaneous transmission assessment(Worst mode):

WiFi Result/Limits + BLE Result/Limit + Lora Result/Limit < 0.617

$0.0035/1 + 0.0002/1 + 0.0223/0.617 = 0.0398 < 0.617$

5.4 Conclusion

The device is exempt from the RF exposure evaluation.

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