

# User Manual

Product Name: Indoor LoRaWAN Light Hotspot  
 Model Name: DSGW-090B

## Revision History

| Specification |            | Sect. | Update Description  | By |
|---------------|------------|-------|---------------------|----|
| Rev           | Date       |       |                     |    |
| 1.0           | 2022-03-03 |       | New version release |    |
| 2.0           | 2022-03-26 |       | Add SD card slot    |    |
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## Approvals

| Organization | Name | Title | Date |
|--------------|------|-------|------|
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## 1 Introduction

### 1.1 Purpose& Description

DSGW-090B is a robust 8-channel indoor LoRaWAN® light hotspot, which is compatible with Helium LongFi technology. Adopting SX1302 LoRa chip and secure crypto chip, DSGW-090B provide high-efficiency and reliable connection.

DSGW-090B has line of sight up to 15 km can cover about 2 km in urbanized environment, which can cover larger areas and provide connectivity to more than 2000 nodes.

### 1.2 Product Feature Summary

- 5V/2A type-C Power supply
- Support IEEE802.11n,IEEE802.11g,IEEE 802.11b Protocol
- Base on the LoRa Concentrator Engine: Semtech SX1302
- TX power up to 27dBm, RX sensitivity down to -125dBm @SF7, RX sensitivity down to -139dBm @SF12, BW125kHz
- Build-in ECC608 crypto chip for high security authentication and reliable Helium network connectivity
- LoRa Frequency band support: CN470, RU864, IN865, EU868, US915, AU915, KR920, AS923
- Support BLE5.0
- Set up Helium network with easy steps
- One WAN/LAN variable network port

### 1.3 LongFi™ Technology

Helium LongFi™ is a technology architecture that combines a leading wireless technology, LoRaWAN, and the Helium Blockchain. LongFi™ is optimised for miles of range, and long battery life for IoT devices.

### 1.4 Proof of Coverage

The HNT Indoor Hotspot Miner earns HNT Helium tokens when devices connect, and for validating wireless coverage delivered by peers. Using a system called Proof-of-Coverage, Hotspot Miners earn more HNT when they're in range of other miners, but need to be at least 300 meters apart.

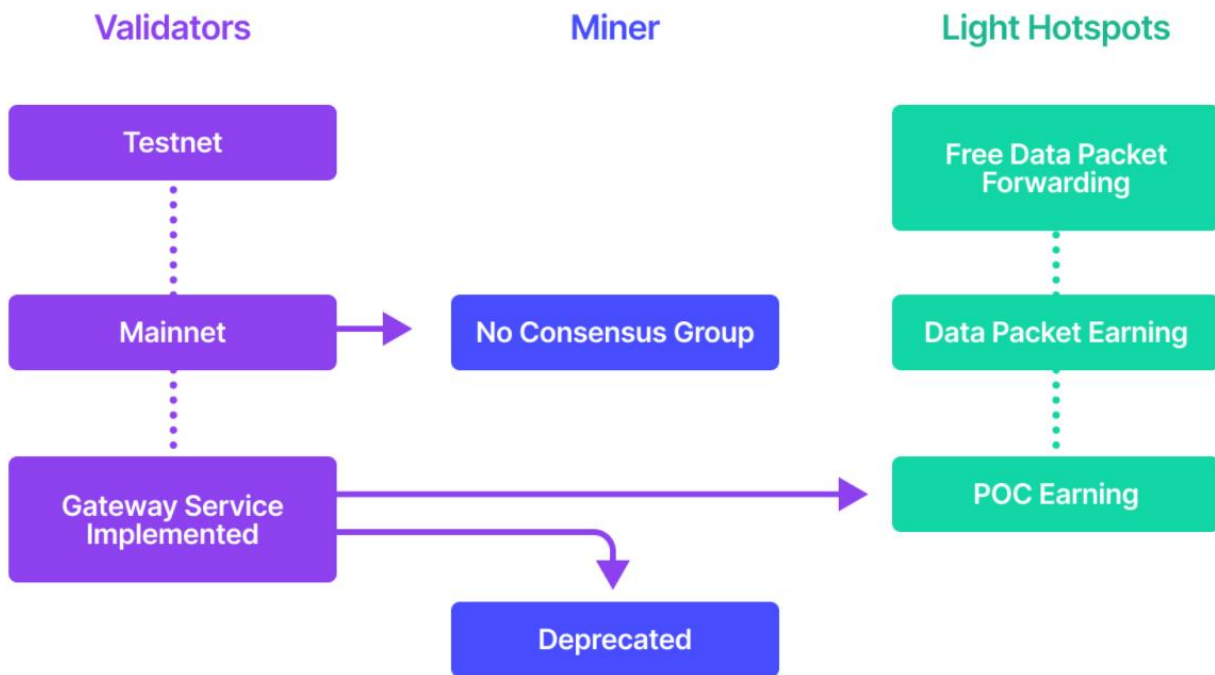
The range depends on the environment:

Rural areas: ~10 miles or more.

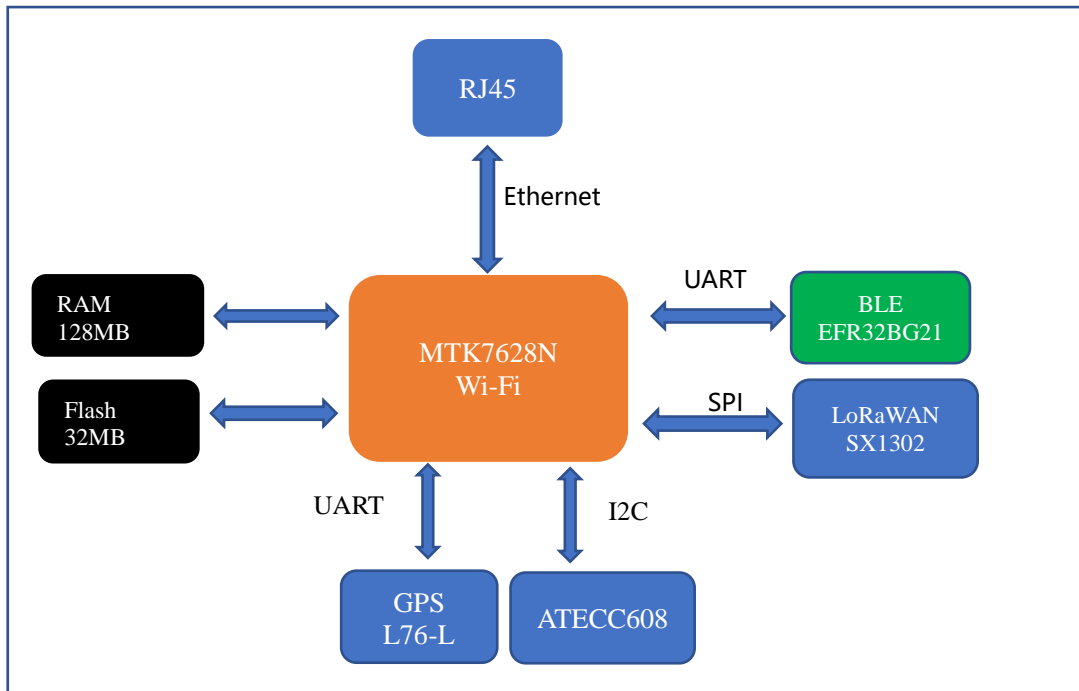
Dense areas: ~ 1 mile.

Single HNT Hotspot Miners earn less as they can only issue Challenges over the internet, and can't participate in Proof-of-Coverage.

1.5 Light Hotspots Architecture



1.6 Hardware block diagram



## 2 Mechanical Requirement

### 2.1 Drawings



## 3 Specifications

### 3.1 Technical Specification

|                       |   |
|-----------------------|---|
| CPU                   | MT7628AN, MIPS24KEc, 580MHZ   |
| RAM                   | 128MB   |
| Flash                 | 32MB  |
| Encryption chip       | ECC608A/B   |
| Power Adapter         | Input:100V~240V AC/50~60HZ Output:5V/2A, USB type-C   |
| Ethernet              | RJ45  |
| Indicator LEDs        | Power LED normally on when powered on<br>LoRaWAN LED is flash when the signal come<br>Internet LED normally on after connecting to cloud        |
| Reset Button          | The reset button is hole button, After pressing the reset button for more than 5 seconds, the Gateway will be restored to the factory settings. |
| SD card slot          | 1   |
| Antenna               | 1*external antenna (Lora), 3* internal Antenna (Wi-Fi,BLE,GPS)  |
| Operating Temperature | -10°C~60°C  |

**3.2 Performance Requirement**

|                     |  |
|---------------------|--|
| Wi-Fi Performance   | <ul style="list-style-type: none"> <li>• IEEE wireless LAN standard:</li> <li>• IEEE802.11n; IEEE802.11g; IEEE 802.11b</li> <li>• Data Rate:<br/>IEEE 802.11b Standard Mode:1,2,5.5,11Mbps<br/>IEEE 802.11g Standard Mode:6,9,12,18,24,36,48,54 Mbps<br/>IEEE 802.11n: MCS0~MCS7 @ HT20/ 2.4GHz band</li> <li>• Sensitivity:<br/>HT40 MCS7 : -70dBm@10% PER(MCS7) /2.4GHz band<br/>HT20 MCS7 : -71dBm@10% PER(MCS7) /2.4GHz band</li> <li>• Transmit Power:<br/>IEEE 802.11n: 16dBm @HT20/40 MCS7 /2.4GHz band<br/>IEEE 802.11g: 16dBm @54MHz<br/>IEEE 802.11b: 18dBm @11MHz</li> <li>• Wireless Security: WPA/WPA2, WEP, TKIP, and AES</li> <li>• Working mode : Bridge、 Gateway、 AP Client</li> <li>• Range: 50 meters minimum, open field</li> <li>• Transmit Power:17dBm</li> <li>• Highest Transmission Rate: 300Mbps</li> <li>• Frequency offset: +/- 50KHZ</li> <li>• Frequency Range (MHz): 2412.0~2483.5</li> <li>• Low Frequency (MHz):2400</li> <li>• High Frequency (MHz):2483.5</li> <li>• E.i.r.p (Equivalent Isotopically Radiated power) (mW)&lt;100mW</li> <li>• Bandwidth (MHz):20MHz/40MHz</li> <li>• Modulation: BPSK/QPSK, FHSSCK/DSSS, 64QAM/OFDM</li> </ul> |
| LoRaWAN performance | <ul style="list-style-type: none"> <li>• 8 channels</li> <li>• -140dBm Sensitivity @292bps</li> <li>• Output power: up to 27dBm</li> </ul>   |
| BLE Performance     | <ul style="list-style-type: none"> <li>• TX Power: 6 dBm</li> <li>• Range: 50 meters minimum, open filed</li> <li>• Receiving Sensibility: -80dBm@0.1%BER</li> <li>• Frequency offset: +/-20KHZ</li> <li>• Frequency Range (MHz):2401.0~2483.5</li> <li>• Low Frequency (MHz):2400</li> <li>• High Frequency (MHz):2483.5</li> <li>• E.i.r.p (Equivalent Isotopically Radiated power) (mW)&lt;10mW</li> <li>• Bandwidth (MHz):2MHz</li> <li>• Modulation: GFSK</li> </ul>  |
| GPS Performance     | <ul style="list-style-type: none"> <li>• -167dBm@Tracking, -149dBm@Acquisition, -161dBm@Re-acquisition</li> </ul>  |
| Ethernet            | 10/100Mbps   |

## 4 QA Requirements

### 4.1 Quality & Testing Information

| Information Description | Standard (Yes) custom(No)     |
|-------------------------|-------------------------------|
| ESD Testing             | YES                           |
| RF Antenna Analysis     | YES                           |
| Environmental Testing   | YES                           |
| Reliability Testing     | YES                           |
| Certification           | FCC,CE ,IC, Z-wave plus, RoHs |

## 5 Reference document

[Light Hotspots | Helium Documentation](#)

**FCC Statement**

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTE:**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

To comply with RF exposure requirements, a minimum separation distance of 20cm must be maintained between the user's body and the device, including the antenna.

**IC STATEMENT**

Operation is subject to the following two conditions:

(1) This device may not cause interference, and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le

brouillage est susceptible d'en compromettre le fonctionnement. Cet équipement

est conforme avec l'exposition aux radiations IC définies pour un environnement

non contrôlé. L'utilisateur final doit respecter les instructions de fonctionnement spécifiques pour satisfaire la

conformité aux expositions RF. Cet émetteur ne doit pas être co-localisés

ou opérant en conjonction avec une autre antenne ou transmetteur. Ces exigences définissent