



# MeshTower

*Solar-Powered Outdoor Mesh Hub*



## Document Version

Version	Time	Description	Remark
Rev. 1.0	2025-6-16	Preliminary version	Richard

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# 1 Description

## 1.1 Overview

MeshTower is a solar-powered outdoor communication system built on MeshSolar technology, featuring an integrated 18V solar panel and 3 × 3000mAh lithium battery for sustained operation. With Bluetooth + LoRa dual-mode connectivity and SMA antenna support, it ensures robust signal coverage. Housed in an IP65-rated waterproof metal enclosure and designed for -20°C to 60°C environments, it thrives in harsh conditions. Offering pole/wall-mount flexibility, it's ideal for remote monitoring and off-grid communication — delivering solar endurance and industrial resilience.

## 1.2 Features

- Developed based on the MeshSolar board, integrated with 3×3000mAh high-capacity lithium batteries.
- Professional BMS Performance, features comprehensive protection including overcharge/over-discharge/short-circuit/over-temperature safeguards etc.
- 18V solar input, adjustable panel angle.
- Supports DC 18-25V and USB-C PD3.0 input.
- Dual Support for LoRa & Bluetooth.
- External SMA antenna compatible.
- Excellent Low-Power Efficiency.



- Wide-Temperature Battery (-20°C to 60°C).
- IP65-rated metal enclosure, waterproof & flame-retardant.
- Easy installation, supports pole mounting and wall mounting.

### **1.3 Typical Applications**

- Environmental Monitoring Systems
- Smart Agriculture & Livestock Farming
- Asset Management and Tracking
- Outdoor Emergency Solutions
- Solar Street Lighting Systems
- Industrial Infrastructure Monitoring
- Open-source projects like such as Meshtastic

## 3 Specifications

### 3.1 General Specification

Table3.1: General specification

Parameters	Description
BMS chip	BQ4050, CN3795
RF chip	nRF52840(BLE) SX1262(LoRa)
GNSS Module	L76K(GPS、GLONASS、BDS、Galileo、QZSS)
Battery Capacity	3*3000mAh
Battery Type	Li-ion battery
Operating Temperature Range	-20~60°C
Voltage Input	18V
Voltage Output	12.6V
LoRa TX Power	21±1dBm
Interface	SMA (RP-SMA) female jack antenna connector, USB-C, XT30 Panel Interface
Protection Rating	IP66
Dimensions	Enclosure: 125 (+40) * 125 * 52 mm Panel: 320 * 230 mm
Weight	



## 3.2 Main Control Module Specification

Table3.2: Main Control Module specification

Parameters	Description
Processor	Nordic nRF52840
LoRa Chip	SX1262
Chip Memory	1M ROM; 256kB SRAM
Wireless	BLE, LoRa
Transmit Power	21±1dBm
Operating temperature	-40~85℃
Operating Humidity	90%(No condensing)
Power Supply	3.3V
Power Consumption	<a href="#">Table5.1</a>
Hardware Resource	3*SPI, 2*I2C, 2*UART, 4*PWM, QPSI, I2S, PDM, QDEC, Etc.
Interface	2*IPEX(UF.L)1.0, M.2 male plug



## 4 Electrical Characteristics

### 4.1 Voltage Input

The Solar/DC input supports both solar panel and DC power sources, with a requirement that the **Voc**(open-circuit voltage) must exceed 18V not exceed 25V. The USB-C port only enables charging functionality when it detects a PD3.0 protocol with a 20V input voltage; a 5V input is solely for powering the MCU.

Table4.1: Voltage Input

Parameter	Voc Min	Vmp	Voc Max	Unit
Solar(Voc)	18	18	25	V
DC	18		25	V
USB-C(Charging)		20		V
USB-C(MCU)	4.5	5	5.5	V

### 4.2 Charging Current

Table4.2: Changing Current

Method	Current	Description
Solar(Voc)@18V/10W	0.55A	Depends on the solar panel's power and voltage. The minimum is >0, while the maximum = $P_{solar} / V_{solar}$
DC@18V	1.5A	Constant-current charging at 1.5A, tapering down when battery voltage reaches 4.2V
USB-C(PD3.0)	1.5A	Constant-current charging at 1.5A, tapering down when battery voltage reaches 4V



## 5 RF Characteristics

### 5.1 RF module power consumption

The test data comes from the standalone test results of the HT-N5262M, using the sample code from the official [Heltec nRF5240 library](#).

Table5.1: Transmit power

Mode	Condition	470MHz	868MHz	915MHz
LoRa_TX	5dBm		83mA	93mA
	10dBm		108mA	122mA
	15dBm		136mA	151mA
	20dBm		157mA	164mA
BT	UART	93mA		
	Scan	132mA		
Sleep		8uA		

### 5.2 LoRa Transmit Power

Table5.2: Transmit power

Operating frequency band	Maximum power value/[dBm]
863~870	21 ± 1
902~928	21 ± 1

### 5.3 LoRa Receiving Sensitivity

The following table gives typically sensitivity level.

Table5.3: Receiving sensitivity

Signal Bandwidth/[KHz]	Spreading Factor	Sensitivity/[dBm]
125	SF12	-135



125	SF10	-130
125	SF7	-124

### 5.4 LoRaWAN Operation Frequencies

HT-N5262M supports LoRaWAN frequency channels and models corresponding table.

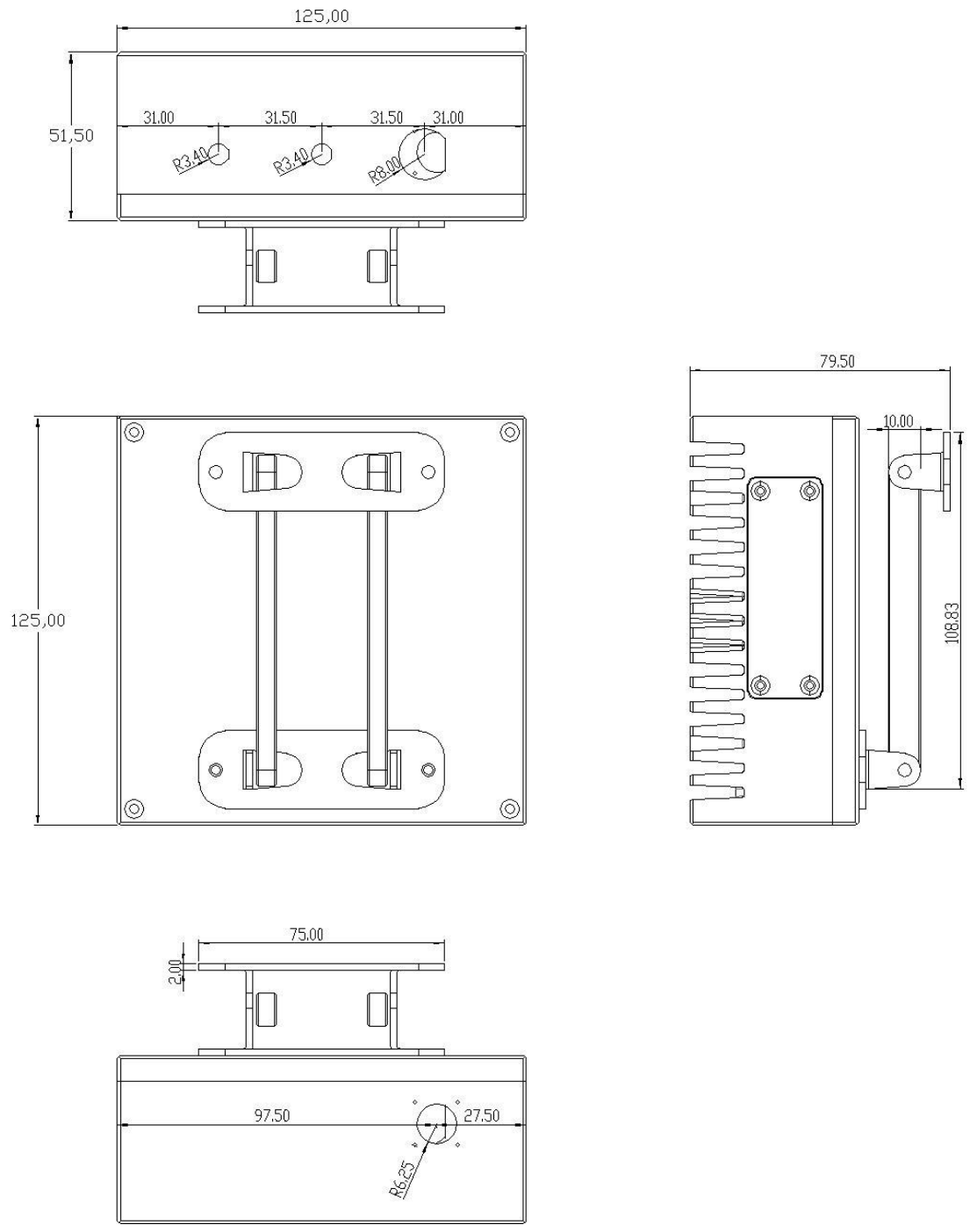
Table5.4: Operation Frequencies

Region	Frequency (MHz)	Model
IN868	865~867	HT-N5262M-HF
EU868	863~870	HT-N5262M-HF
US915	902~928	HT-N5262M-HF
AU915	915~928	HT-N5262M-HF
KR920	920~923	HT-N5262M-HF
AS923	920~925	HT-N5262M-HF



# 5 Physical Dimensions

## 5.1





## 6 Resource

6.1 [BMS Board Schematic](#)

6.2 [HT-N5262M Schematic](#)

6.3 [Resource Station](#)

6.4 [Heltec nRF52840 Framework](#)

## 7 Heltec Contact Information

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