First Impressions of the

Think Node M6

Dated: 2023-07-31

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Image:1.

According to advertising, the **ThinkNode M6 (Elecrow) in the European 868 MHz version** is a ready-to-deploy outdoor solar-powered Meshtastic node (nRF52840 + SX1262, L76K GPS, 6 W monocrystalline solar panel with MPPT, dual 18650s totalling ~7000 mAh, IP65 enclosure); and is sold in region-specific frequency variants.

2

Image:3.

The various features are clearly label. However, the USB port has a poorly designed rubber cover that does not hold fast. Concern is that with some wind over a little time this may release, allowing moisture to enter.

Functionality

Pros

- Pre-installed Meshtastic. Works out of the box as client, router/repeater, or base station.
- Dual-mode (Bluetooth 5.4 for phone config + LoRa). External RP-SMA LoRa and GPS antennas. Waterproof SP11 aviation connectors for UART/I2C sensors.
- 868 MHz is the most popular Meshtastic band in Europe and South Africa, so one has a better chance of joining existing meshes.
- Legal power limit is higher than on 433 MHz (+27 dBm ERP / 500 mW with 10 % duty cycle on the 869.4 to 869.65 MHz segment; default LongFast centre ~869.525 MHz).

Cons

- Some units ship with Bluetooth disabled or need a firmware flash/USB configuration (client. meshtastic.org) before they appear. Occasional QC issues reported (won't power on, no BLE discovery).

  No display. Sealed design makes diagnostics harder. Frequency is fixed to the ordered band.

Image:4.

The device was marked as the property of the Midlands Amateur Radio Club (M.A.R.C) and given the identity MARC EST-1. For the town of Estcourt where it is installed.

Changing batteries

Pros

- Large 7000 mAh capacity (two 18650s) plus efficient MPPT solar keeps it running for long periods; users report charge staying ~80–90 % even in cloudy/rainy weather.
- USB-C for backup charging.

Cons

Enclosure is well sealed (IP65). Multiple users have reported their frustration that it is near impossible to the point of destructive to attempt to open the node for battery replacement. So in essence, battery replacement is not an option or possible without damaging the node beyond usability.

- You are effectively locked into the factory cells for the life of the unit (or until solar/USB can no longer sustain it).

Image:5.

Weather-proofing

Pros

- Official IP65 rating, operating range –20 °C to +60 °C. Designed for permanent outdoor deployment (wall, bracket, pole mounts). Solar panel and connectors are weather-resistant.

Cons

- IP65 is good against rain and dust but not full submersion or prolonged high-pressure water (something I imagine you will not put this node through). Long-term seal integrity around the antenna connectors and any mounting hardware depends on installation quality. The sealed design that helps weather-proofing also hinders servicing.

- SX1262 + external antenna + higher legal ERP on EU 868 MHz gives solid real-world performance. Review tests claim roughly 1.6 km one-way (≈3.2 km diameter coverage) in mixed conditions; manufacturer line-of-sight claims exceed 6 km. 868 MHz is an adequate compromise of range, penetration, and antenna size.

- Range is still highly dependent on height, line-of-sight, antenna quality, and local interference. Stock antennas are not high-gain; performance drops if they are not vertical or become detuned. Urban or heavily wooded environments will be much shorter range than in the open countryside.

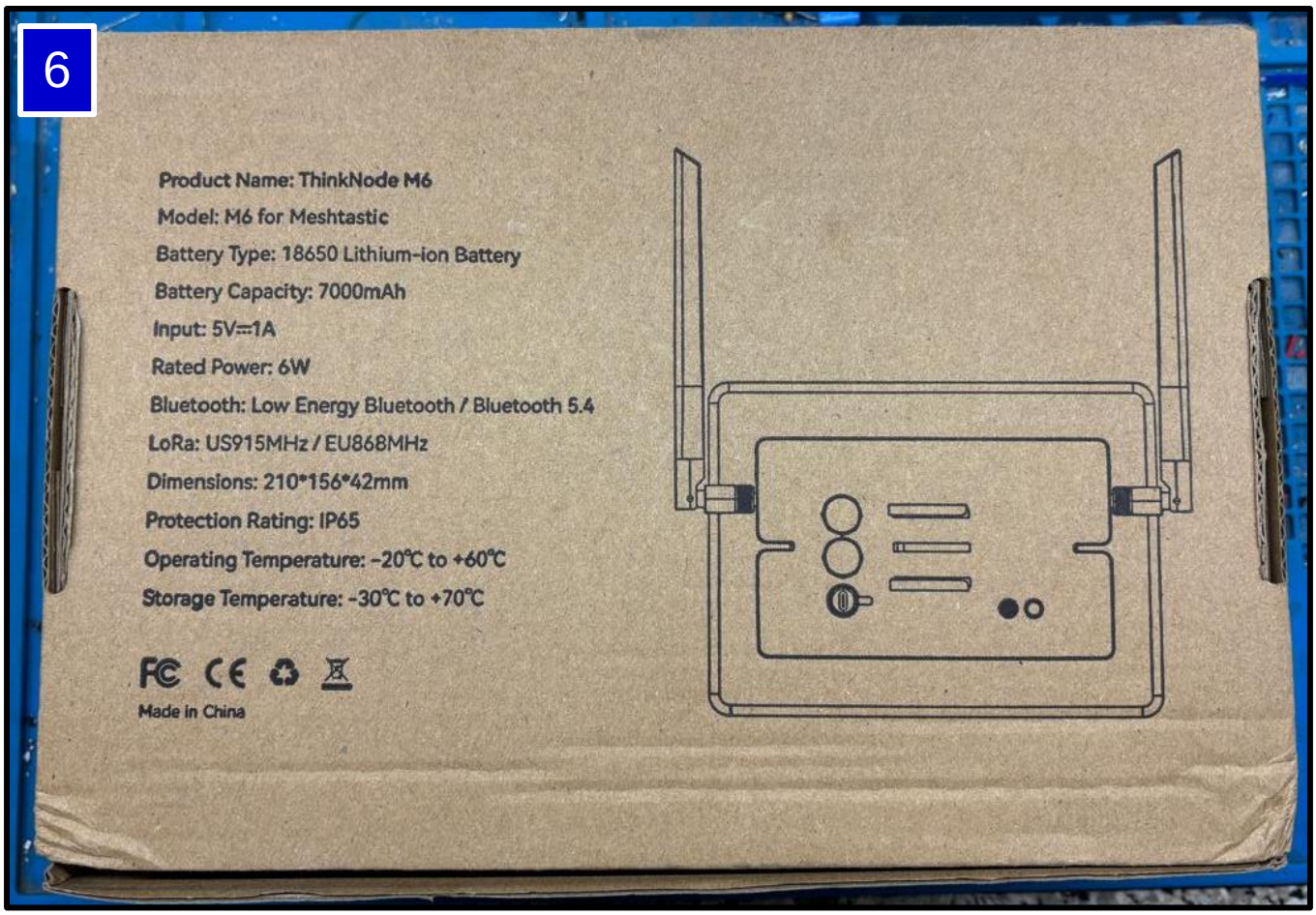


Image:6.

Range

Pros

- The manufactures claims that the SX1262 + external antenna + higher legal ERP fitted on EU 868 MHz gives solid real-world performance.

  Manufactures further claim that tests as a router showed roughly 1.6 km one-way (≈3.2 km diameter coverage) in mixed conditions; line-of-sight **claims exceed 6 km. 868 MHz** and is a good compromise of range, penetration, and antenna size compared to **433 MHz** (better penetration but lower legal power) or higher bands.

Cons

- Range is still highly dependent on height, line-of-sight, antenna quality, and local interference.

  Stock antennas are not high-gain. When the antenna is not vertical or vertically polarised, performance drops become it becomes detuned.

  In urban or heavily wooded environments the transmission and reception range is expected to be much shorter than in areas of open countryside.

Image:7.

UV Protection

- It is unclear whether or not the plastic housing is UV protected. It would be unfortunate if we see the housing crack, split and fracture as a result of the harsh African sun. Given that theses nodes were manufactured for the European market, where their environmental conditions are rather different it is not expected that African conditions received much consideration, however this is **untested speculation**. We will know in time.

Compactness

Pros

- Relatively compact for a solar outdoor node: ~210 × 156 × 42 mm (excluding antennas and mount), ~530 g net. All-in-one design (solar + battery + radio + GPS) reduces the need for separate boxes and wiring.

Cons

- Larger and heavier than pocket/portable nodes (M1/M5). The fixed solar panel and dual external antennas make it bulkier for temporary or backpack use; it is clearly intended for fixed deployment.

Image:8.

GPS Antenna

- The results of the GPS Antenna test can be seen above.

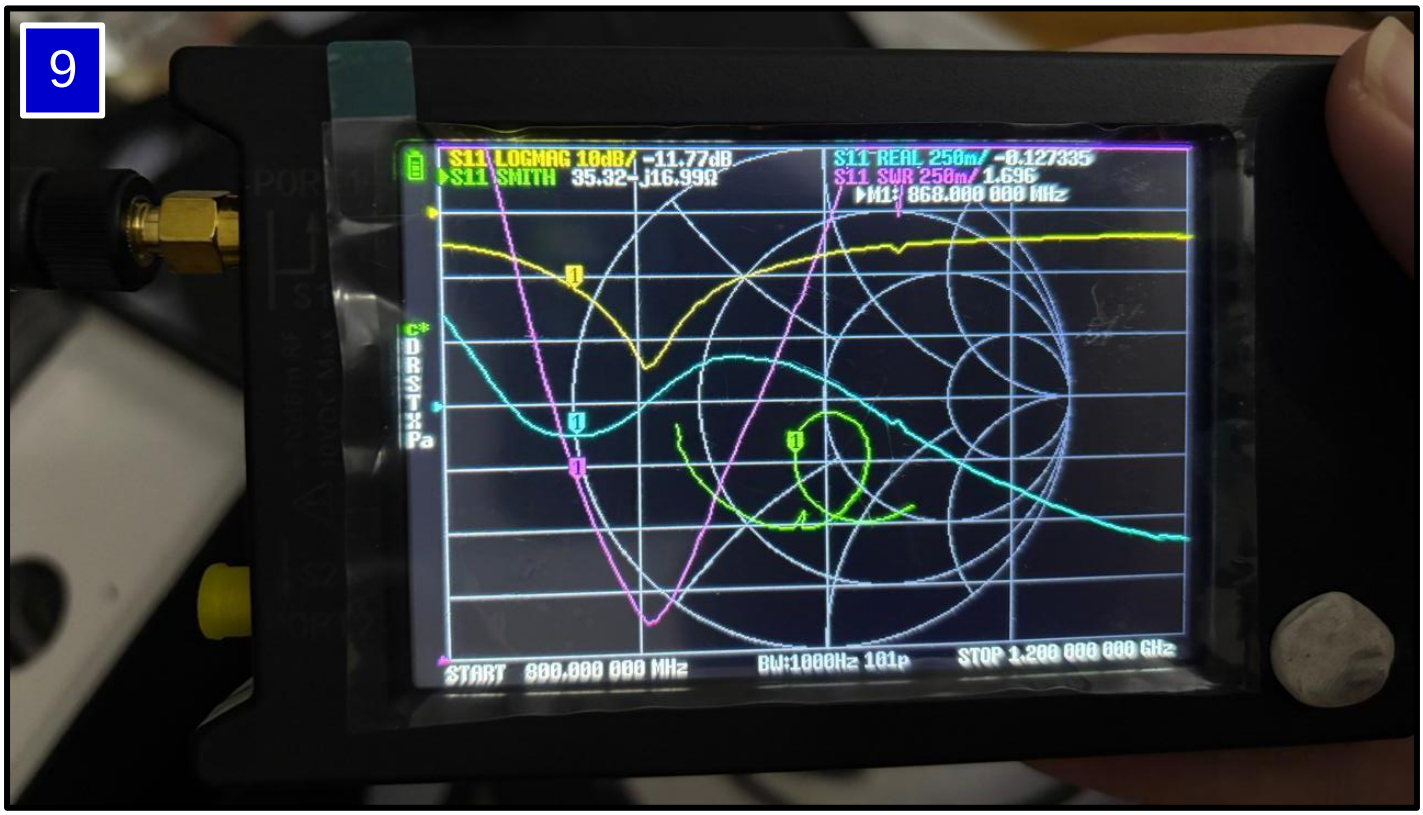


Image:9.

LoRa Antenna

- The results of the LoRa Antenna test can be seen above.

Image:10.

The image above shows where generous blobs of glue were applied to secure the antennas and mounting bracket.

Images:11, 12 & 13.

Using self-fusing-tape over the glue in an attempt to neaten things up. Image (13) indicates where the mounting bracket failed and broke off during the mounting process. See image (16).

Images:14 and 15.

Mounting the node onto the pole.

Image:16.

The fragile mounting connector

This was a major point of failure and is probably the biggest reason why I personally would not purchase this device, especially if suitable more convenient alternatives are available. But then I am a little particular with my choices.

Image:17.

Fragile mounting connectors and flimsy antennas (bird / wind risk)

Pros

- External RP-SMA connectors allow antenna upgrades.

Cons (this is the most frequently criticised area)

- Multiple mounting options are not available out of the box (wall, bracket, pole, U-clamp). Flexibility for solid installation is not provided.

- The stock antennas were loose and had to be fixed in place using a glue gun or using self- fusing-tape. Without this step, the antennas could easily rotate off from their intended vertical polarisation in wind or when a bird sat on them.

- Without these modifications, a bird landing on an antenna, strong wind, or vibration can easily misalign or loosen the antennas, degrading range and GPS lock. The connectors themselves are not particularly robust for repeated adjustment or high-wind sites.

  Better antennas are recommended. In addition, the placement of the two (2) side mounted SMA connectors are in themselves a poor design choice that leads to many issues.

  The use of a thread-locking compound is another option one can use to prevent the antennas from unwinding over time.

  All this effort to make something function the way it is expected too, adds additional cost all because of the designer the lack of foresight. Expect to add an additional R150 – R300 to the overall cost of the unit if you want to ensure it is marginally functional.

Image:18.

CONCLUSION & RECOMMENDATION

- The EU 868 MHz ThinkNode M6 may be a convenient “set-and-forget” solar outdoor node when you want something ready-made rather than building your own.

  Strengths are the:

  - 6v solar panel
  - Advertised large battery,
  - Weather proofing rated at IP65 rating,
  - Relative ease of deployment, and
  - Legal/compatibility of 868 MHz in South Africa.

  Weaknesses are the

  - Sealed and cannot be serviced without destroying the housing holding the electronics.
  - mediocre stock antennas/connectors that are vulnerable to wind or birds,
  - and occasional firmware/QC quirks.
  - Poor mounting option. It is fragile, not robust and does not keep its set position in high wind or when a bird lands on the node.
  - The additional costs incurred to secure the antennas and mounting bracket orientation, encourage seeking alternative options.

- For a permanent high site it is workable if you upgrade the antennas, secure them properly, and accept that battery replacement later **will be difficult if not impossible**.

- If you prioritise serviceability, higher-gain antennas out of the box, or easier battery access, a DIY build (or other commercial solar node) is often preferred by experienced users.

Image:19.

Would I purchase the EU 868 MHz ThinkNode M6 for personal use?

- **No**, the EU 868 MHz Think Node M6 will not suite my personal requirements and needs. My residential environment is a rural one, requiring longer range, thus an antenna with gain is preferable. Unlike those residing in the city, I do not have many high sites at which to add additional nodes thus, sites if available are spread out and further apart, more one may experience in the city or a built up area.

  To satisfy the need to tinker, I want an enclosure that will facilitate easy access. Changing out batteries, upgrading electronics and troubleshooting problems, these are all a must.

  A rugged robust mounting solution with an enclosure providing great weather protection is a must have requirement. But they will all come at additional cost; time and effort to construct.

  Images **20** and **21** below are more in line with what my personal preference would be.

Do I think the EU 868 MHz ThinkNode M6 meets the requirements of the MARC LoRa project?

Yes, for the cost the two (2) test units MARC purchased appear to be doing an excellent job.

But time will ultimately tell. Without a medium (six (6) month) to long term (twelve (12) month) test and evaluation, I am reluctant to die on this hill. Never the less I am happy to say that to date, from what I have seen and experienced, these nodes are adequate. I would recommend their purchase in our efforts to expand the MARC LoRa project.

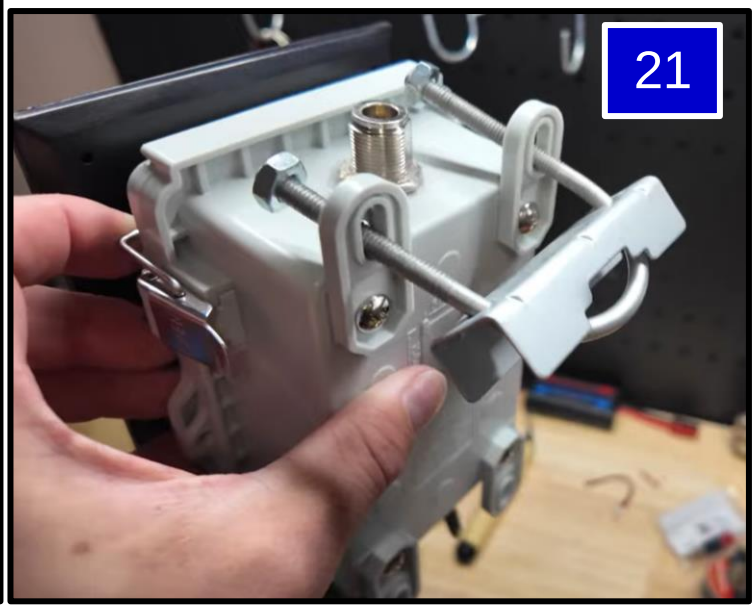
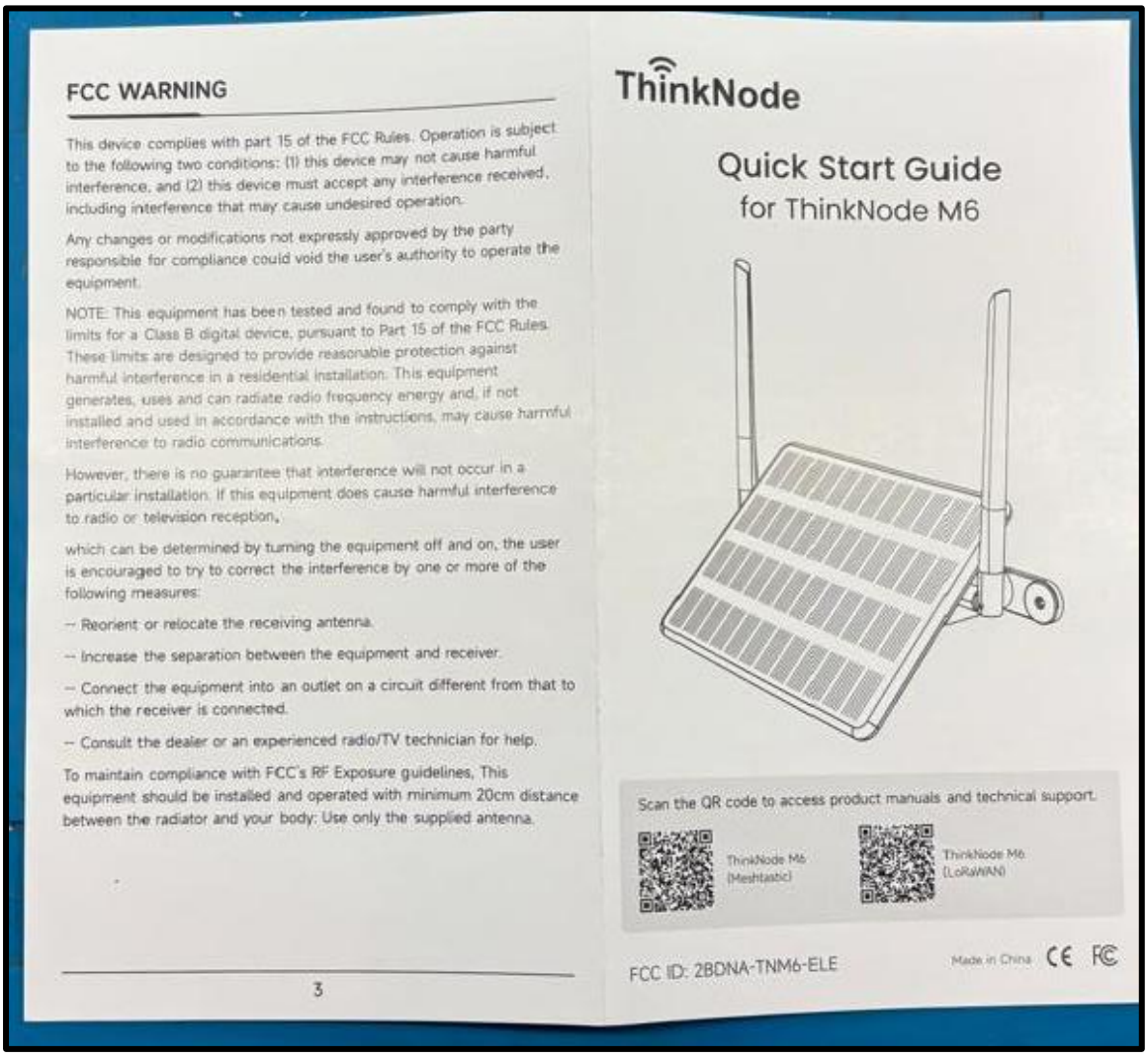


Image: 20 & 21.

The above images are screen grabs from the YouTube Channel, Ham Radio DX. Belonging to Hayden holding amateur radio call sign VK7HH.Personally this is more in line with my personal preference. However may cost a little more in time, effort and money.



FCC WARNING

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

Any 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 maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.

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ThinkNode

Quick Start Guide
for ThinkNode M6

Scan the QR code to access product manuals and technical support.

ThinkNode M6 (Meshtastic)

ThinkNode M6 (LoRaWAN)

FCC ID: 2BDNA-TNM6-ELE

Made in China

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Image:22.

Quick Start Guide.

THANKS & APPRECIATION

Thanks and appreciation goes to :

(1) Shaun : ZS5CAT.
(2) Bruce : ZS5TG
(3) Cale : ZR5CA.
(4) Tony : ZR5CAT.
(5) Mo : ZS5MO.

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