Setting Up a Family Mesh Network Before Disaster Strikes

Most emergency communications guides are written for trained responders or amateur radio operators. This guide is for families — no amateur license required, no technical background assumed.

> ⚠ **Read this first — mesh is a supplement, not a lifeline.** LoRa mesh (Meshtastic and MeshCore) is **best-effort: messages may not get through.** There is no guaranteed delivery, coverage depends on nodes being in range and powered, and a delivered/ACK indicator is only a best-effort radio acknowledgment — not proof a person received or will act on your message. It is **NOT a replacement for 911, NWS/official alerts, or licensed voice radio.** For any life-threatening emergency, use 911 or voice first; use your family mesh as a fallback when those are unavailable, and always have a non-radio backup plan (a meeting place and an out-of-area contact).
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> **No amateur license is required** because these devices operate on the 915 MHz ISM band under FCC Part 15 — but use only FCC-certified hardware on the default US/Canada preset, and do not modify the frequency or power beyond the certified configuration.

What You Need

You need at least two nodes to communicate at all — one for you and one for each person you need to reach. Each node is a self-contained device that communicates directly with other nodes without any cellular or internet infrastructure — but only when the two nodes are within radio range of each other or of a relaying node.

Minimum kit per family member

- **One MeshCore-compatible LoRa node flashed with MeshCore firmware** — T-Echo, Heltec T114, or similar. Make sure the device's firmware matches the app you'll use (the MeshCore app for MeshCore firmware). See the Getting Started guide for current recommendations.
- **A USB charging cable** and a small battery bank. Runtime depends on the device and settings: a 10,000 mAh bank can run a low-power nRF52 node (T-Echo, T114) for a week or more, while a power-hungry ESP32 node with a screen may only last a few days.
- **A phone or tablet** with the MeshCore app installed to send and read messages.

For a family of four, four nodes. You don't need one for every household member — prioritize whoever is most likely to be separated from the group (commuters, college students, elderly relatives in another home).

Realistic Range Expectations

LoRa range varies significantly with terrain and environment. The figures below are approximate, observed values and vary widely — always test your own coverage. Plan conservatively:

- **Dense urban/suburban (buildings, trees):** roughly 0.5–1.5 miles between handhelds at ground level (approximate, observed)
- **Suburban with one node elevated** (rooftop, second-floor window): roughly 1–3 miles (approximate, observed)
- **Open terrain** (parks, fields, rural): 3–10+ miles *with clear line of sight*
- **Elevated repeater node** (hilltop, tall building): can cover an entire neighborhood or small town, depending on height, antenna, and terrain — not guaranteed

If your family lives within direct radio range, node-to-node messaging usually works well — but LoRa mesh is best-effort with no guaranteed delivery, and obstacles can cut range to under a mile in cities, so "a few miles" may not connect in a dense area. Larger separations require intermediate nodes to relay messages. Always have a non-radio backup plan, and test your actual coverage before you need it.

Setting Up a Private Family Channel

MeshCore supports encrypted private channels. Set up a dedicated family channel before a disaster — do not rely on the default public channel for family communications. (Encryption is permitted here because the network operates under Part 15 on the ISM band; encryption would be prohibited if these messages were sent on amateur radio frequencies.)

1. In the MeshCore app, create a new channel with a name your family will recognize (your last name, "HOME", or a short codeword).
2. Set a channel key/password and share the channel to each family member's app *in person* ahead of time — use the channel QR code or share link, and do not send the link by text message or email.
3. All family nodes must use the same channel name and key to communicate privately. Verify every device shows the same channel name before you finish, then send a test message on it.
4. Keep the default public channel enabled as a secondary — it lets you communicate with neighbors and community responders.

Test Before You Need It

Equipment you have never tested will fail you in an emergency. Run a family mesh drill at least once:

1. **Configure all devices together.** Verify each node appears on every other node's list.
2. **Send a test message** from each node to each other node. Confirm receipt both ways.
3. **Test at realistic distances** — walk or drive to where family members would actually be (workplace, school, a neighbor's house) and verify the link holds.
4. **Test on battery** — disconnect from USB and confirm each node runs for its expected battery life.
5. **Update firmware if you are comfortable doing so** before storing nodes — but only with the device plugged in and following the official flashing guide, because an interrupted update can disable (brick) the node. Outdated firmware is a common silent failure point, but a working older version is far better than a bricked node; if you are not comfortable, have someone experienced help.

Storage and Readiness

- For long-term storage, store lithium cells at roughly 40–60% state of charge (not full) — prolonged storage at 100% accelerates battery aging. Recharge to full 24–48 hours before you expect to deploy. Check every 2–3 months and top up if a cell has self-discharged below this range.
- Keep a charging cable and battery bank with each node. Label each device with the owner's name.
- Consider a 5–10W folding solar panel for extended operations beyond 2–3 days.
- Write your family channel name on a card stored with the node — not the key/password, but the name, so whoever picks it up knows which channel to join.

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