

Deploying a MeshCore Repeater

A repeater is a MeshCore device configured to run headlessly - no phone attached - whose sole job is to receive and forward messages. Repeaters are the backbone of good network coverage.

Why deploy a repeater?

Direct device-to-device range at ground level in an urban area may be only a few hundred meters. A repeater placed at elevation (rooftop, hilltop, tower) with a clear view of the surrounding area can extend the effective range of the network substantially - potentially tens of miles to other elevated or clear-line-of-sight sites. Obstructed or ground-level users in the area will see much less. Survey your actual coverage rather than assuming a fixed mileage for everyone.

What makes a good repeater location?

- **High elevation** - the single most important factor. Every meter of height extends radio horizon.
- **Clear sky view** - minimal obstruction from buildings, trees, or terrain in all directions.
- **Power access** - reliable power (mains, solar, or large battery) for continuous operation.
- **Weather protection** - a weatherproof enclosure if the device will be outdoors.

Flashing repeater firmware

To configure a device as a repeater, flash the **Repeater** firmware variant instead of BLE Companion. The device will operate without a connected phone, automatically relaying messages it receives.

See [Flashing repeater firmware](#) and the MeshCore documentation for device-specific flashing instructions.

Antenna considerations

For a fixed repeater, invest in a quality external antenna. A higher-gain vertical antenna (5-9 dBi) mounted as high as possible will generally outperform the stock antenna included with most devices. Be aware that higher-gain antennas narrow the vertical beamwidth, which can reduce coverage to nearby nodes that are much higher or lower than the repeater. Use low-loss coax cable and keep cable runs short.

Power limit caveat (US 902-928 MHz): Under FCC Part 15.247, conducted power must be reduced 1 dB for every dB of antenna gain above 6 dBi, holding EIRP at 36 dBm (4 W). With a 9 dBi antenna, keep conducted power at or below roughly 27 dBm to stay within the limit. Mesh (point-to-multipoint) deployments cannot use the fixed point-to-point exemption.

Solar-powered repeaters

Repeater firmware is optimized for low power consumption, making solar deployment practical. A modest solar panel (10-30W) paired with a LiPo or LiFePO4 battery pack can sustain a low-power repeater long-term - but only if sized for your worst-case conditions: winter sun-hours, storms, smoke, and snow or soot on the panel, plus battery aging over time. Size for several days of autonomy at your site's worst-case insolation; do not assume indefinite operation.

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