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Not every deployment calls for a weatherproof solar installation. For indoor sites - offices, community centers, apartment building hallways, or any location with reliable mains power - a minimal MeshCore repeater built around the RAK WisBlock platform delivers excellent performance at a fraction of the cost of a full outdoor build.

Bill of Materials

Prices below are approximate and as of early 2026; they vary by retailer, variant, and import tariffs, so treat the total as an estimate rather than a fixed figure. Check the linked vendors for current pricing.

Component	Purpose	Approx. Cost (early 2026)
RAK4631 WisBlock Core	nRF52840 + SX1262 LoRa SoC	~\$18-24 (store.rakwireless.com)
RAK19007 WisBlock Base Board (2nd Gen, USB-C)	USB-C power, slot carrier	~\$9.99 MSRP (~\$15 via US distributor)
915 MHz 5 dBi Fiberglass Antenna	Omni coverage	~\$15-25 depending on vendor
u.FL (IPEX)-to-N Pigtail (15 cm)	Antenna connection	~\$5
Total		~\$50-70

Assembly Walkthrough

Start by seating the RAK4631 into Slot A of the RAK19007 base board. The module locks with a satisfying click; verify it is fully seated and the gold contacts are flush. The RAK4631 LoRa antenna port is a u.FL/IPEX (MHF) press-fit connector, not a threaded SMA jack - so use a u.FL(IPEX)-to-N

pigtail. Snap the u.FL end straight down onto the port with gentle finger pressure until it clicks; do NOT twist or screw it, and never use pliers. Thread the N-type end through your chosen mounting point (a simple shelf bracket works well indoors) and attach the 5 dBi fiberglass antenna. Position the antenna vertically for best omni radiation.

Connect a standard USB-C cable to any 5 V / 1 A USB adapter or powered hub. The RAK19007 includes onboard power regulation; no additional circuitry is required for indoor mains-powered operation.

Firmware Flashing (REPEATER Variant)

1. Flash the RAK4631 using the MeshCore Web Flasher at flasher.meshcore.io, which serves prebuilt firmware releases (the underlying binaries are published on the official MeshCore GitHub releases).
2. Select the `REPEATER` build variant - not CLIENT or ROOM_SERVER.
3. Put the RAK4631 into bootloader mode by double-tapping the reset button; the board appears as a USB mass-storage drive (the volume name varies by bootloader, e.g. **RAK4631** or a BOOT-style name).
4. Drag the `.uf2` firmware file onto the drive. The board reboots automatically.
5. Confirm operation by connecting via the MeshCore companion app and verifying the device advertises as a repeater.

Configuration Notes

For a purely indoor repeater with AC power, no power-management tuning is required. Leave TX power at the firmware default (about 22 dBm - the SX1262 hardware maximum, well under the 30 dBm / 1 W conducted limit of 47 CFR 15.247). Your effective radiated power is TX power plus antenna gain minus cable loss; with the 5 dBi antenna here (under the 6 dBi threshold, so no power reduction is required) that is roughly 27 dBm EIRP. If you later fit a higher-gain antenna (above 6 dBi), 15.247(b)(4) requires you to reduce conducted power dB-for-dB above 6 dBi to stay compliant. Set a meaningful node name that identifies the location (e.g., `BLDG-A-3F-RPT`) so network operators can read topology at a glance.

Expected Performance

These are rough, order-of-magnitude estimates that vary dramatically with building materials, height, spreading factor, and antenna - not guarantees, so field-test in your specific building. With a 5 dBi antenna at mid-floor height, this build typically reaches roughly 300-600 m in urban environments with mixed building penetration. Clear line-of-sight across open office floors can extend to around 1-2 km. The raw LoRa PHY data rate is identical regardless of firmware role (it is set by SF/BW/CR); the REPEATER role changes forwarding and airtime behavior, not the per-packet bitrate.

Best Use Cases

- Indoor floor-by-floor mesh coverage in multi-story buildings
- Gap-fill repeaters at sites that already have AC power
- Rapid deployment for events or temporary activations
- Lab/test environments for firmware development

For outdoor, weatherproof, or off-grid deployments, see the *Pro MeshCore Solar Repeater* page in this chapter.

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