Base Station & Outdoor Antennas

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Outdoor and base station antennas are designed for permanent weatherproof installation at height. They use larger radomes and N-connector interfaces, and are tuned more precisely than portable whips.

ALFA 5 dBi Mini - ~$18

A compact 7" outdoor omni antenna with an N-Male connector (ALFA AOA-915-5ACM). Good starting point for a first outdoor installation or for sites where a larger antenna would cause wind loading concerns. The 5 dBi gain provides a noticeable improvement over portable whips while keeping the beam angle wide enough to cover nearby nodes at varying elevations. Price ~$18 as of 2026-06-08 (Rokland); prices are volatile, so verify before ordering.

- **Gain:** 5 dBi
- **Height:** 7"
- **Connector:** N-Male
- **Mounting:** Mast or wall mount

RAK 5.8 dBi Fiberglass - ~$30 - $40

A full-size fiberglass outdoor omni antenna from RAK Wireless. Weatherproof and includes U-bolt mounting hardware. Note there are two regional SKUs: the US/915 MHz variant (RAKARG14, ~902-928 MHz) and the EU/868 MHz variant (RAKARG13, 863-870 MHz) - choose the RAKARG14 for North American 902-928 MHz use; a single antenna is not tuned for both bands. The community's most commonly recommended base station antenna for solar repeater builds. The 5.8 dBi gain is a good balance between range and beam width for typical community mesh deployments. Price ~$30-$40 as of 2026-06-08; treat as approximate and confirm at the RAK/Rokland store.

- **Gain:** 5.8 dBi
- **Weatherproof:** Yes

- **Mounting:** U-bolt included
- **Connector:** N-Male (antenna terminates in an N-male; use an N-female cable to connect it)

8 dBi Low Profile Outdoor - ~$38

A 25" outdoor fiberglass antenna with 8 dBi gain and an N-Female connector. Specifications and price (~$38 as of 2026-06-08) are approximate - identify the exact SKU and confirm its datasheet before buying. Appropriate for flat terrain where the mesh coverage area is entirely at a similar elevation to the antenna. Avoid in hilly terrain or when nearby nodes are at significantly different elevations - the narrow beam creates dead zones above and below the antenna.

- **Gain:** 8 dBi
- **Height:** 25"
- **Connector:** N-Female

FCC note: Antennas above 6 dBi (like this 8 dBi model) require a dB-for-dB conducted power reduction under FCC 15.247(b)(4) if your node runs near the 1 W (30 dBm) limit. At typical LoRa power (≤20 dBm) you remain well within limits, but verify if you raise TX power. There is no point-to-point gain allowance at 902-928 MHz.

Antenna Selection for Different Scenarios

Scenario	Recommended Antenna	Why
First outdoor fixed node	ALFA 5 dBi Mini	Affordable, forgiving beam pattern
Solar repeater in mixed terrain	RAK 5.8 dBi Fiberglass	Good gain, wide enough beam, weatherproof
High-site node, flat terrain	8 dBi Low Profile	Maximum horizontal range
High-site node, hilly terrain	RAK 5.8 dBi Fiberglass	Beam pattern covers elevation variation
Point-to-point backbone link	~12 dBi 900 MHz Yagi	Directional, maximum link budget

Mounting Tips

Safety first: Mounting outdoor antennas at height involves fall and power-line electrocution hazards - keep the mast's full fall-radius clear of overhead power lines and use fall protection when working at height. All permanent outdoor antennas must be grounded and surge-protected; see Grounding and Lightning Protection.

- Always mount antennas with the element vertical for standard LoRa mesh use. A horizontal-to-vertical polarization mismatch causes a large loss (commonly cited at

roughly 20 dB for well-matched antennas, though real-world multipath often reduces the penalty).

- Keep the antenna away from metal surfaces. Metal nearby detunes the antenna and creates reflection patterns. As a tiered rule of thumb at 915 MHz (wavelength ≈ 33 cm): keep at least a quarter-wavelength (~8 cm) clearance as a minimum, a half-wavelength (~16 cm) preferred, and a full wavelength (~33 cm) for a conservative install.
- Higher is almost always better. Even 2 - 3 meters of extra height can make a significant difference in real-world conditions.
- Weatherproof outdoor N-connector connections with self-amalgamating tape.

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