

Can I use my node inside my house or vehicle?

Short Answer

Yes, with significant range reduction. Interior use is practical for connecting to a nearby outdoor repeater or for testing. It's not suitable as a repeater location.

What Signal Loss to Expect

The figures below are rough, environment-dependent estimates at ~900 MHz, not precise measurements - actual building and vehicle penetration loss varies widely with construction, materials, frequency, and geometry. Published 900 MHz studies (e.g., NTIA Report 94-306 and vendor app notes) report mean building-penetration losses broadly in line with these ranges (for example ~4 dB for a single wood/drywall wall and ~10-12 dB for a typical interior or single concrete wall), but treat any single number as illustrative.

Location	Typical Signal Loss (estimate)	Notes
Near a window, wood frame house	~3-6 dB	Manageable; roughly equivalent to halving your range
Interior room, wood frame	~6-15 dB	Significant; may still reach nearby repeaters
Concrete/brick building	~10-25 dB	Severe; the low end reflects a single wall, the high end multiple walls or whole-building paths; may not reach anything without a nearby repeater
Metal building, basement	~20-40+ dB	Qualitative estimate (Faraday-cage effect); effectively unusable for mesh
Vehicle (windshield path)	~3-8 dB (rough estimate)	Acceptable for personal use; mount near windshield
Vehicle (metal roof path)	~20-30 dB (rough estimate)	Much worse; magnetic mount external antenna required

Improving Indoor Performance

- **Windowsill placement** - Even 6 inches from a window vs deep in a room makes a measurable difference. Place the node as close to a window facing the direction of the nearest repeater as possible.
- **External antenna on a cable** - Many setups run the node indoors with a short coax to a small external antenna mounted outside or near a window. With genuine low-loss cable (LMR-240/400 class), 3-5 meters costs under 1 dB of loss and puts the antenna in a dramatically better RF environment. Note that thin/cheap coax such as RG-58, RG-174, or RG-316 will lose considerably more than 1 dB over 5 meters at 915 MHz - use good cable.
- **Higher floor** - Upper floors have less obstruction from building materials and more line-of-sight above street-level clutter. A third-floor window is significantly better than a ground-floor window.

Vehicle Use

A node placed on the dashboard or near the windshield can typically receive and send to nearby repeaters. For best vehicle performance:

- Mount near the windshield on the upper dash, antenna pointing up. **Safety:** position the device so it does not obstruct your view of the road and is clear of airbag deployment areas, and secure it so it cannot become a projectile in a collision.
- For dedicated vehicle installations, use a magnetic mount external antenna on the roof. NMO or SMA-compatible magnetic mounts are available, but confirm the antenna *element itself* is tuned for 902-928 MHz - many magnetic-mount/NMO antennas are cut for cellular or VHF/UHF and will present a poor SWR at 915 MHz even though the connector fits.
- Power from the 12V accessory port via a USB adapter

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