

# RF Propagation Planning Tools

Several free tools can help you model coverage and plan repeater placement before deploying hardware. Using these tools can save wasted trips and help you choose between candidate sites.

## HeyWhatsThat ([heywhatsthat.com](http://heywhatsthat.com))

The fastest tool for estimating radio horizon from a specific point.

- Enter a location (address, coordinates, or click on map)
- Set the antenna height
- Get a visualization of the radio horizon: which areas have line-of-sight from that point

### How to use for repeater site selection:

1. Go to [heywhatsthat.com](http://heywhatsthat.com)
2. Click on your candidate repeater site on the map
3. Set height to your intended antenna mounting height
4. Click "Submit" and examine the color-coded visibility map
5. Compare multiple candidate sites by opening each in a new tab

**Limitations:** HeyWhatsThat uses terrain elevation data (SRTM) but does not include buildings or vegetation. Actual coverage will be lower than predicted in areas with tall buildings or forest.

## Radio Mobile Online ([radiomobile.ca](http://radiomobile.ca))

More sophisticated link analysis tool with full path profile and link budget integration.

- Enter transmitter and receiver coordinates, heights, antenna gain, TX power, and frequency
- Generates a path profile showing terrain elevation along the path
- Calculates predicted received signal level
- Shows Fresnel zone clearance along the path

Radio Mobile is best for detailed analysis of specific point-to-point paths, not area coverage visualization.

## CloudRF ([cloudrf.com](http://cloudrf.com))

Professional-grade coverage prediction with a free tier. Features:

- SRTM + LIDAR terrain data (more accurate than basic tools)
- Can include clutter data (buildings, vegetation) for urban environments
- Overlay predicted coverage on Google Maps or OpenStreetMap
- Free tier: limited calculations per month; paid plans for heavy use

Best for: precise coverage maps for presentations, permitting, or professional deployments. Overkill for casual site selection.

## Splat! (free, offline)

Open-source RF propagation tool that runs locally on Linux/Mac. Uses SRTM terrain data.

```
# Install on Debian/Ubuntu
sudo apt install splat

# Download SRTM data for your region from usgs.gov
# Generate coverage map
splat -t transmitter.qth -r receiver.qth -f 915 -erp 0.5 -d /path/to/srtm/data
```

Splat! is overkill for most community mesh deployments but valuable when building professional-grade coverage documentation or integrating with GIS workflows.

## Practical planning workflow

For most community mesh network planning, this workflow is sufficient:

### 1. **Identify candidate sites**

Use topographic maps (USGS topo viewer, CalTopo) to identify hilltops, ridgelines, water towers, and tall buildings in your coverage area.

### 2. **Quick horizon check**

For each candidate site, run HeyWhatsThat at the proposed antenna height. Immediately discard sites with poor visibility to your target coverage area.

### 3. **Link budget for remaining candidates**

For the 2 - 3 best candidates, calculate link budgets to your target coverage area edges (farthest points). Compare margin values.

### 4. **On-site test before permanent install**

Set up a temporary antenna and node at the candidate site. Walk/drive your coverage area while monitoring RSSI/SNR. Real-world testing always beats prediction tools.

## 5. Document the result

Record the actual coverage performance after deployment. This data helps plan future expansion nodes.

# Interpreting RSSI and SNR from field tests

RSSI	SNR	Link quality assessment
>−90 dBm	>+10 dB	Excellent - reliable at all data rates
−90 to −105 dBm	+5 to +10 dB	Good - reliable for all normal use
−105 to −115 dBm	0 to +5 dB	Marginal - may see occasional packet loss
−115 to −120 dBm	−5 to 0 dB	Weak - intermittent; not suitable for infrastructure
<−120 dBm	<−5 dB	Very weak - expect frequent failure

**Key insight:** SNR matters more than RSSI for LoRa. A signal at −125 dBm with +5 dB SNR is more reliable than one at −100 dBm with −5 dB SNR (which is being swamped by noise). When diagnosing a marginal link, prioritize improving SNR over increasing RSSI.

Revision #2

Created 2026-05-03 03:58:46 UTC by Mesh America Admin

Updated 2026-05-03 13:01:36 UTC by Mesh America Admin