



STL™ (SATELLITE TIME AND LOCATION)

ANTENNA PLACEMENT GUIDE



STL™ (Satellite Time and Location) from Satelles is a robust, secure, and accurate timing synchronization service for customers that need an alternative to the Global Positioning System (GPS) or Global Navigation Satellite Systems (GNSS).

How to use this Guide

The purpose of this guide is to help you optimize your STL antenna placement.

The STL antenna needs to “collect” radio signals from STL broadcasting satellites which are orbiting the Earth, the same way a GPS/GNSS antenna collects radio signals from GPS/GNSS satellites. In this way the GPS/GNSS and STL signals are similar.

The difference is STL radio signals are broadcasting from Iridium® L-band satellites much closer to the earth compared to GPS/GNSS, which makes them 1000X stronger. This allows Iridium frequency antennas to collect STL signals not just outdoors – but also indoors where GPS/GNSS doesn’t reach.

STL has been installed in many indoor environments, including various levels of multi-level buildings, interior spaces, and basements. However, there will be indoor spaces where the radio signal does not penetrate because of the limitations of physics.

Before you start—Know your ABCs

A ANTENNA

Tested and approved STL antennas are listed at this website link:
<https://satelles.com/antennas>

If not using STL tested and approved antennas, review antenna vendors specification sheet for these criteria:

- Designed to receive STL signals broadcasting in the Iridium L-band spectrum
- Active antenna with 25-30 dB low-noise amplifier (LNA) gain
- Drawing no more than 35 mA at 3.3 VDC or per specific STL receiver requirements
- Operates in receive-only mode
- Pre-filter to prevent harmonic interference from nearby transmitters
- Helical design (does not require a ground plane)

While some antennas are designed to receive both STL and GPS/GNSS signals (dual-band), STL-only antennas are required for indoor installations. Dual-band antennas work well for outdoor antenna installations.

B BUILDING Indoor Installations

The type of building materials will impact the radio signal path.

These types of construction materials are more likely to enable successful indoor installations:

- Drywall or wood walls and ceilings
- Single-block construction
- Windows or skylights

These types of construction materials are likely to be more challenging and may require relocating the antenna to a different indoor location:

- Walls with double-block construction
- Walls with foil backed insulation
- Construction with metal studs
- Construction of poured concrete with rebar
- Multiple offices or floors between the outside signal and the antenna
- Floors below grade
- Low-E glass or other coatings designed to reduce penetration

C CABLING

As the RF signal travels indoors and through cables, it experiences loss. Therefore, it is important to use the appropriately sized cable for the length required.

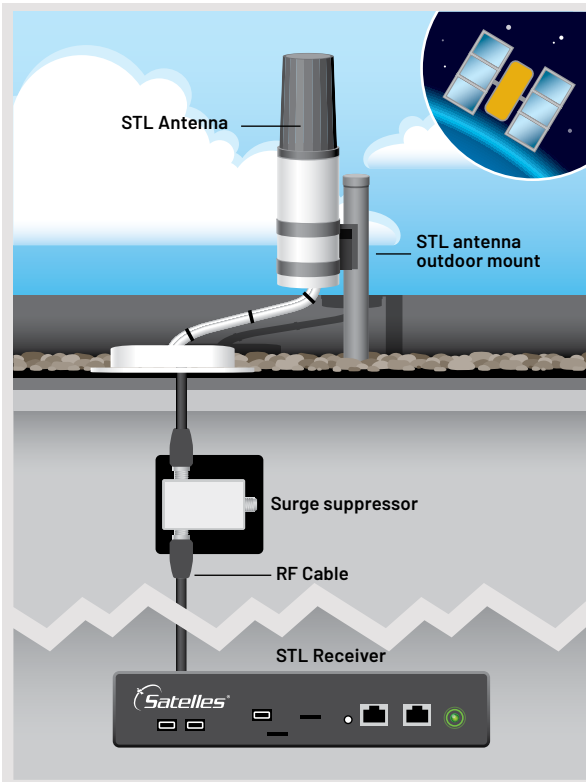
The following types of cables are required to ensure adequate STL performance:

- 50-ohm impedance
- Low or Very Low loss RF Cable (such as LMR-400)
- Manufactured for the intended installation location (plenum, non-plenum, indoor, outdoor, or underground rated)
- It is recommended for best performance to choose a cable with the least amount of loss over distance
- Optimally less than 10 dB loss at 1625 MHz

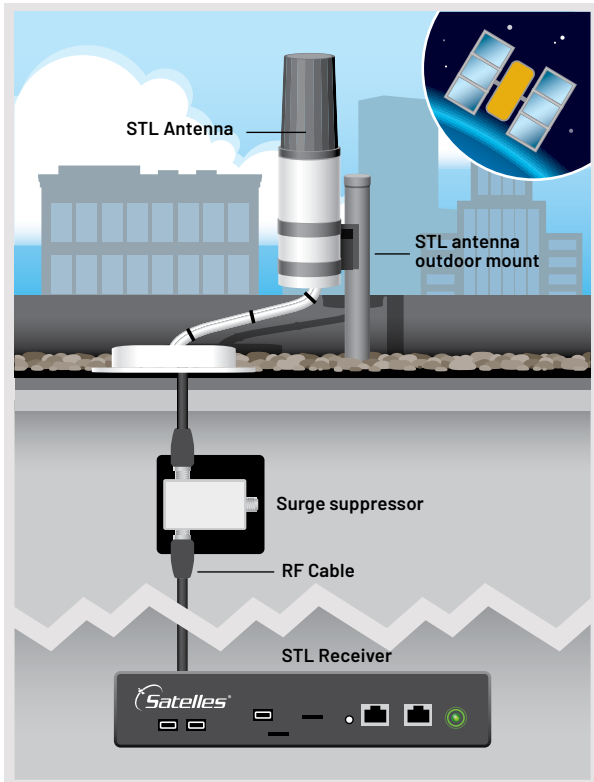
Note: LMR 400 and similar “stiff” cables, while ideal, usually require a flexible RF “tail” extension to prevent stressing the SMA connection.

Best Locations for Antenna Placement

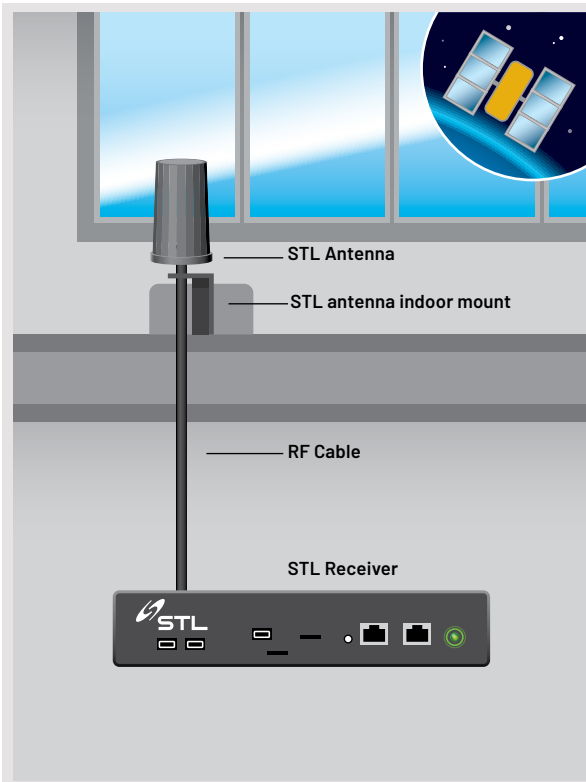
(in Ranked Order)



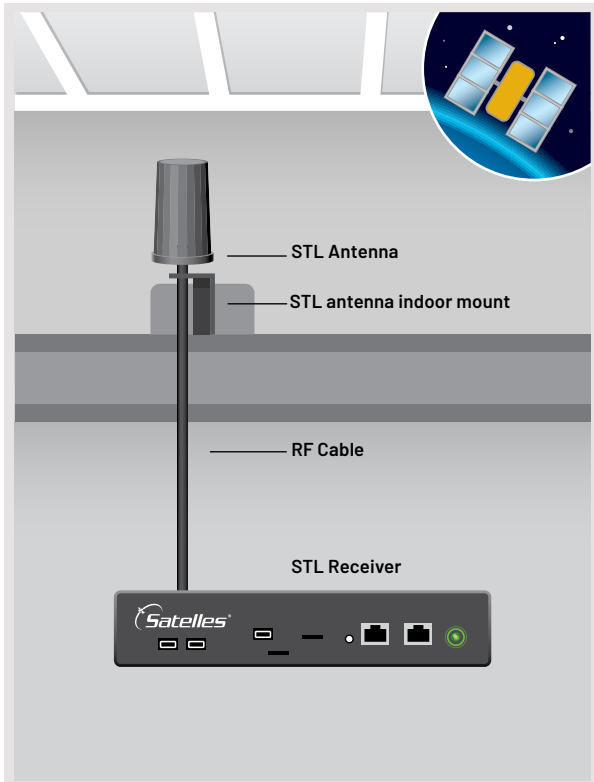
1. Outdoor - unobstructed view of sky 360°



2. Outdoor - partially obstructed view of sky



3. Indoor - with a partial view of the sky
(e.g., within 10 feet of a window or skylight)

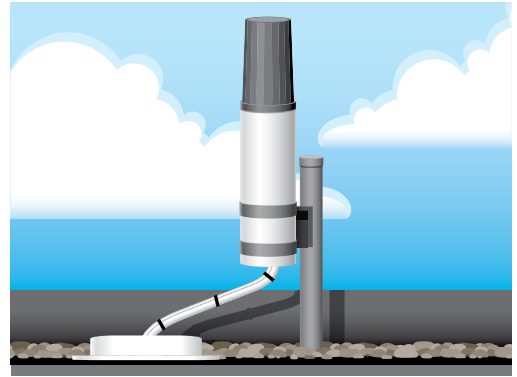


4. Indoor - with minimal obstructions

Note: Use the STL Receiver GUI Guide to help locate the optimal placement.
Visit our [Resources](#) page for more information.

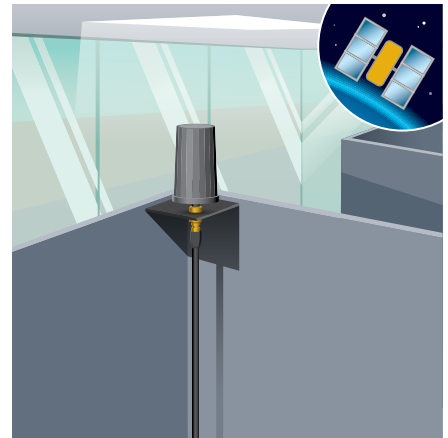
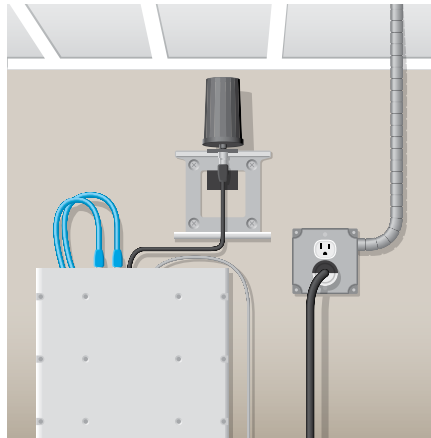
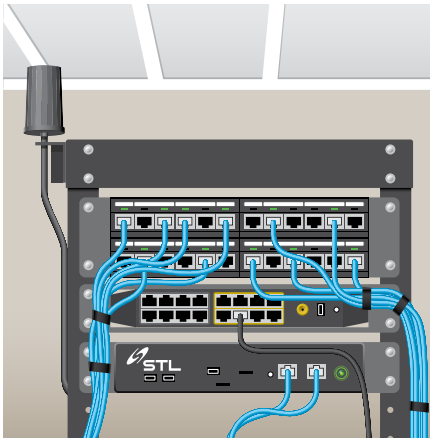
Exterior STL Antenna Installation Notes

- Similar to GPS/GNSS outdoor antenna installation
- Non-obstructed roof or wall location that can be stabilized to maintain the antenna in an upright position
- Use a PVC pipe or similar conduit to protect the cable connection from weather
- Seal the antenna and cable connection, as well as where the cable conduit connects to the roof and/or enters the building



Interior STL Antenna Installation Notes

- Locate the antenna for the least amount of interference between antenna and the outside for maximum performance.
- Do not install in a location where local traffic or activities may damage or move the antenna
- Use L-bracket to mount to rack or wall for stability
- Secure cable against wall (with cable clips) or window (with mounting tape)
- Do not overtighten cable connection
- The antenna can also be mounted directly on an equipment rack



Note: It is also important to avoid placement near equipment with potential to interfere with the antenna such as Wi-Fi or wireless transmitters, wireless alarm systems, 2-way radios, electric (magnetic) motors, HVAC systems, older lights with ballasts, fan motors, or high-power transmission equipment.



TROUBLESHOOTING



Use the STL Receiver GUI Guide to help locate the optimal placement of the antenna.
Visit our [Resources](#) page for more information.

Troubleshooting Questions

1. Is your antenna designed to receive STL signals (Iridium® frequency antenna)?
2. Are the cable connections secure but not overtightened?
3. Are you using low or very low loss cable?
4. Are you using an active (not passive) antenna?
5. Have you confirmed your active antenna is receiving DC bias voltage through the cable?
6. Is the antenna oriented per antenna design?
7. Is the antenna damaged?
8. If you still don't have signal, do you have access to the STL Receiver GUI Guide to verify reception of bursts?
9. Are you experiencing RF interference by other nearby devices?
10. Is the cable length as short as practical?
11. Is your device's STL subscription activated?

Key Resources

Visit our [Resources](#) page for more information.



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