# Remote 5G Quad MIMO Antenna

## Accessory Kit

***Installation Guide***

# Table of Contents



**NOTE:** 5G radio cards and antennas are available in two versions:

- mmWave (millimeter-wave) + Sub-6
- Sub-6 only

This antenna is 5G Sub-6 only and the document will hereafter refer to it simply as “5G”.

**NOTE:** This antenna covers both LTE and 5G bands. It can be used to connect to either type of cellular basestation (tower).

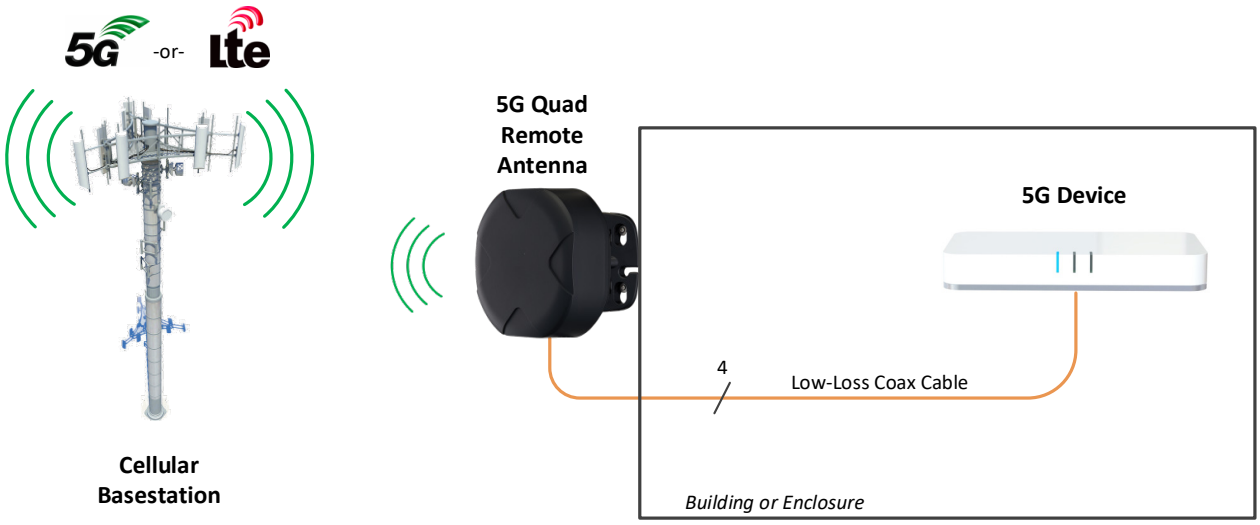
# 1 KIT CONTENTS

The accessory kit ships with the following accessories.

| Item | Qty | Description |
|---|---|---|
| 1 | 1 | Remote 5G quad antenna with 3 m coax leads |
| 2 | 4 | Cable, low-loss coax SMA(F) to SMA(M) connectors, various length options |
| 3 | 1 | Wall mount parts bag |
| 4 | 1 | Pole-mount parts bag |
| 5 | 1 | Window-mount parts bag |

# 2 OVERVIEW

This accessory kit consists of an quad antenna housing and coax extension cables. It is used for extending the cellular antennas to an exterior location when cellular reception inside of a building or enclosure is insufficient.



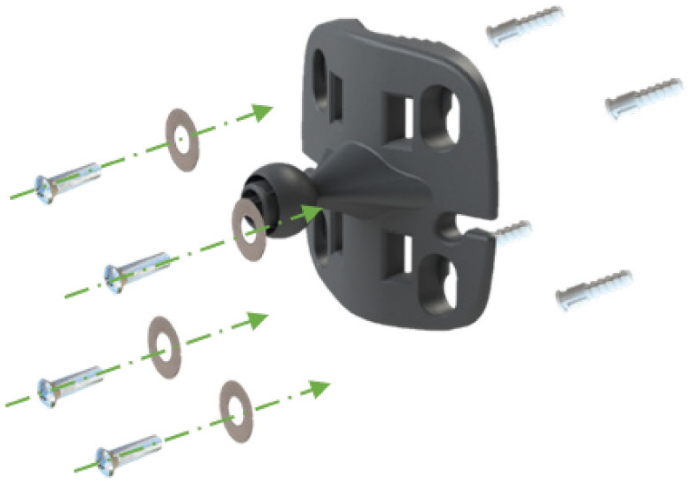
# 3 BASE MOUNTING OPTIONS

The antenna housing and mount are IP65 weatherproof, so they can be attached to the outside of a building or enclosure for optimal signal strength.

Hardware is included for mounting the quad antenna housing base to a wall, pole, or window.

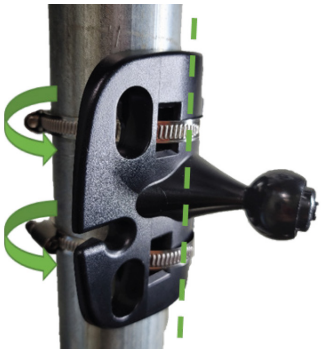
## 3.1 Wall

The base can be mounted to a wall using the supplied screws, washers, and anchor inserts.



## 3.2 Pole

The base can be mounted to a pole using the supplied metal clamp straps. Insert the straps through the inner slots of the base, loop the straps around the pole, and tighten the straps. The base is self-centering on the pole.



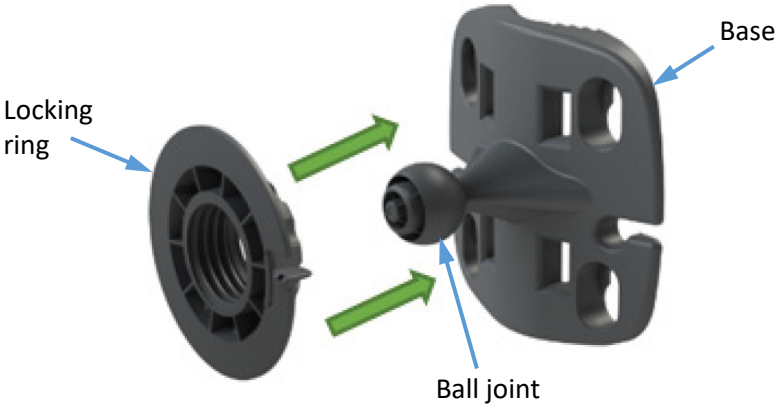
### 3.3 Window

The base can be mounted to a window using the supplied suction cups. Thoroughly clean and dry glass surface before mounting the base. Insert ends of suction cups through the base mounting holes and press firmly against the glass surface.

**NOTE:** If window mounting is used, it is recommended to locate the antenna inside the building and attach base suction cups to the inside of the window for more reliable/stable mounting. Antenna housing, base, and suction cups are weatherproof, but suction cups are more reliable when protected from heat, cold, and moisture.

## 4 ATTACH ANTENNA HOUSING TO BASE

Once the base is mounted, insert the locking ring onto the ball joint of the base with the flat surface of the locking ring facing away from the base. Insert ball joint firmly into hole on the back of antenna housing. Turn locking ring clockwise to secure the antenna housing in place.




# 5 CABLE CONNECTIONS

The main housing contains 4 separate 5G antennas. They are used for SMA connectors Main, Aux, MIMO1, and MIMO2 functions on the 5G unit.

There are 4 separate 3-meter length coax cables protruding from the underside of the antenna housing.

**NOTE:** The antenna coax cables can be attached to the 5G device connectors in any order. For example, there is no designated cable on the housing for the Aux function.

**WARNING:** Route coax cables away from power cables and other signal cables. RF interference with other cabling can reduce cellular signal strength and data throughput (speed).

# 6 TUNING ADJUSTMENTS (OPTIONAL)

The quad antenna is omnidirectional; it does not need to be “aimed” at a specific cellular basestation (tower). The swivel ball attachment allows for flexible mounting locations and can be used to optimize antenna angle if there is interference from other nearby antennas.

**NOTE:** The antenna is omnidirectional, but it will perform best if it is on the same side of the building/enclosure as the cellular basestation (fewer obstructions in the signal path).

If interference is suspected or if cellular speeds are low, the installer can optionally “tune” the antenna mounting angle. This is done by rotating the antenna on the ball joint while watching signal strength readings on the 5G device. Once optimal signal strength has been achieved, the locking ring can be tightened to lock the antenna housing at the desired angle.

Cellular signal strength can be monitored in real time on the 5G device by using the `mmcli` utility from the Linux command line. The mmcli utility is part of the Linux `ModemManager` package, which must be installed first.

Assuming that the 5G device has an established network connection with a cellular basestation (tower), enter the following Linux commands to display signal strength readings to the console at a rate of once per second.

```
mmcli -m any --signal-setup=1

watch -n 1 mmcli -m any --signal-get
```

A table of cellular connection signal strengths will be displayed once per second. Ctrl-C at any time to end the test.

**NOTE:** In the table, higher numbers are better. In the case of rssi, rsrq, and rsrp, “higher” numbers mean “less negative” and closer to 0 dBm. For example, rssi of -63 dBm is better signal strength than rssi of -67 dBm.

```
----------------------
Signal | refresh rate: 1 seconds
----------------------
LTE    |         rssi: -67.00 dBm
       |         rsrq: -13.00 dB
       |         rsrp: -99.00 dBm
       |          s/n: 8.00 dB
```

Ctrl-C to end the test. Then set mmcli display update back to the default value of zero.

```
mmcli -m any --signal-setup=0
```

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