# NTN SATCOM ANTENNAS DIRECT-TO-DEVICE (D2D) READY

Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN)
Dual-Mode Satellite IoT Communications

**www.te.com/NTN-satcom**

# NTN SATCOM ANTENNAS

The NTN SatCom family offers a wide range of antennas for dual-mode Terrestrial Network (TN) and Non-Terrestrial Network (NTN) communications.

With proven performance in L and S-bands for Low Earth Orbit (LEO) Satellite Direct-to-Device plus traditional terrestrial cellular applications.


## Benefits

- L-band, S-band and terrestrial network antennas
- Dual-mode terrestrial (TN) and non-terrestrial (NTN) network capable from a single antenna
- Wide range of options for variety of use cases and applications
- Single band and MIMO options
- Static or mobile options
- Proven Reference Signal Received Power (RSRP) performance

## What is NTN SatCom, Direct-To-Device (D2D) or Direct-to-Cell (D2C)?

Low Earth Orbit (LEO) satellites, positioned 300-1200 km's above Earth, orbit rapidly and are ideal for IoT networks. A LEO satellite constellation can now support low data rate communications through specific LTE frequencies.

TE Connectivity's (TE) dual mode Terrestrial (TN) and Non-Terrestrial Network (NTN) satellite IoT antennas can offer functionality for traditional terrestrial coverage through cell towers, L-Band, S-Band and other frequency bands for LEO satellite coverage. This is commonly known as NTN SatCom, Direct-To-Device (D2D) or Direct-To-Cell (D2C) communications.

- Dual-mode capable - Supporting Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN) from a single antenna
  - TN – Two-way 5G/4G/LTE cellular coverage using existing cell tower and other cellular infrastructure.
  - NTN – Two-way communications directly with LEO satellites using LTE frequency bands.
- Enabling IoT devices via dual-mode communications
  - Prioritizing terrestrial networks but capable of automatically switching to satellite when the signal is weak or unavailable
  - Satellite communications can also be set as the primary communication mode in areas where no cellular coverage is available using an appropriate cellular router, gateway or radio

# REFERENCE SIGNAL RECEIVED POWER (RSRP) EXPLAINED

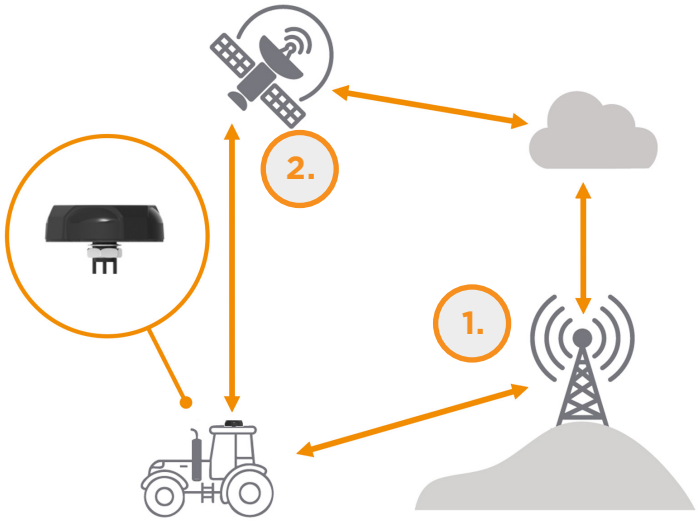
RSRP is a measure of the antenna's connection strength relative to the receive point. The closer to zero the RSRP value, the more reliable the connection.

RSRP can be susceptible to fluctuations for a variety of reasons. These can include satellite elevation angle; antenna radiation patterns; solar flares; atmospheric conditions, and more. Therefore, a value of zero is not likely in a real-world scenario.

An RSRP value of -120 dBm is generally the recognized minimum requirement suitable for the data rates of SMS, CAT-1, CAT-1 Bis connectivity. This is the baseline benchmark that many of TE's NTN SatCom antennas have been tested against.

## NTN SatCom Antennas – How They Work

As an example of a real-world D2D application, picture the antenna mounted on a tractor or vehicle as shown in the diagram below:




1. While the vehicle is in range of cell towers the D2D antenna on the vehicle's roof allows for traditional two-way 5G/4G/LTE connectivity to and from cell towers or cellular infrastructure and up to the cloud.

   - This is Terrestrial Network (TN) connectivity

2. As the vehicle moves into fields or areas where cell towers are not in range of the antenna the frequency can be switched to two-way satellite IoT LTE communications. This allows for communications to and from LEO satellites and eventually out to the cloud through satellite to ground station communication.

   - This is Non-Terrestrial Network (NTN) connectivity.

The dual-mode nature of the antennas means two-way communication is significantly more available in both urban and remote locations.

# DIRECT-TO-DEVICE ANTENNA TYPES AVAILABLE

| | |
|---|---|
|  | **Embedded/Internal Antennas**<br>Ideal for smaller IoT devices that have a need for antennas that are installed inside the device |
|  | **Terminal Mount Antennas**<br>Versatile and easy to install terminal mount antennas are available in straight, right angle and hinged formats which means an easy fit for your device is easy to find. |
|  | **Low-Profile External Antennas**<br>Rugged and low-profile these antennas are ideal for situations where performance plus form is important. |
|  | **Puck/Dome External Antennas**<br>The dome or puck format of these antennas makes them ideal for scenarios where a low-height is important or where impacts on the antenna may be possible |
|  | **Vehicular/Mobile Antennas**<br>Designed for installation on a vehicle or mobile platform these antennas are generally more thoroughly tested for various environmental and mechanical aspects. |
|  | **Infrastructure Antennas**<br>Infrastructure or base station antennas are generally sited in a fixed location and used to provide greater reach to terrestrial network (cell towers). |

## Find Out More

We make it easy to connect with our experts and are ready to provide all the support you need.

Go to **te.com/support** to chat with a Product Information Specialist. Or visit **te.com/ntn-satcom** to learn more.

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