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Antenna Installation Scenarios for the IR1800

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Overview

Audience: This guide is intended for people who have a high level of technical ability, although they may not have experience with Cisco software.

This guide is intended to help with antenna installation for various transportation scenarios. It uses graphics with examples of assumed possible use cases, but cannot cover every possible scenario.

Scenarios described in this guide use both the Pluggable P-LTE-xx Module as well as the P-LTEAP18-GL Category 18 Pluggable Module.
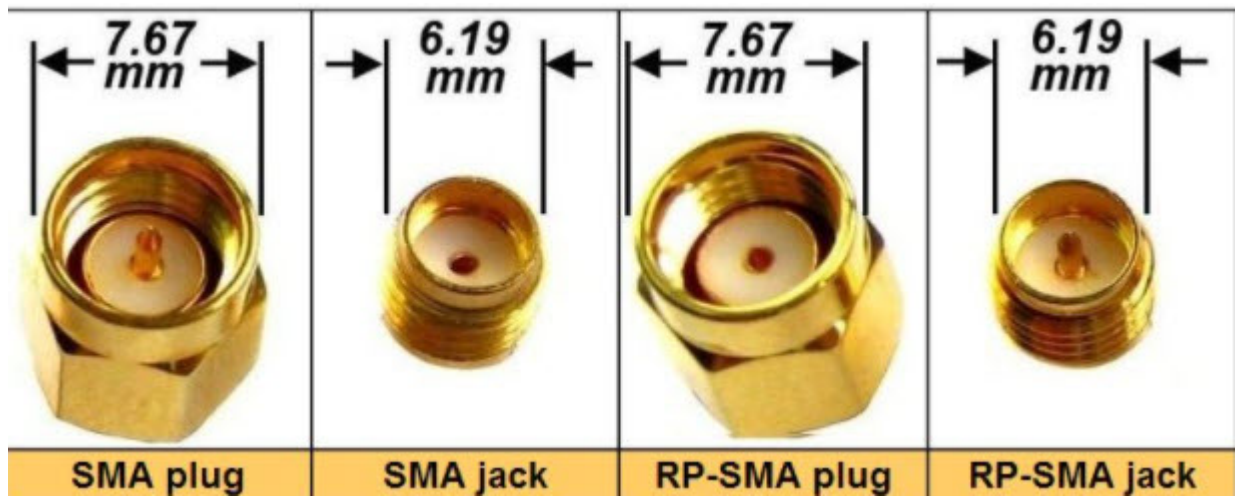
The P-LTE-xx offers 3 antenna ports:

- LTE-Main (SMA)

- LTE-Div (SMA)

- GPS (SMA)

The P-LTEAP18-GL offers 4 antenna ports:

- Main 0 Antenna (SMA)

- Main 1 Antenna (SMA)

- Diversity 0 Antenna (SMA)

- Diversity 1 Antenna (SMA)

Throughout this guide you will see references to the different types of plugs and jacks used as connectors. The following figure shows the different types:

Transportation Antennas

The supported transportation antennas are:

- 2-in-1 (Wi-Fi) ANT-2-WLAN-D-O
- 2-in-1 (Cellular) ANT-2-4G2-O
- 3-in-1 (LTE, GPS) 4G-LTE-ANTM-O-3-B
- 3-in-1 (LTE, GPS) ANT-3-4G2G1-O
- 5-in-1 (LTE, Wi-Fi, and GPS) ANT-5-4G2WL2G1-O
- 7-in-1 (LTE, GPS) ANT-7-5G4WL2G1-O
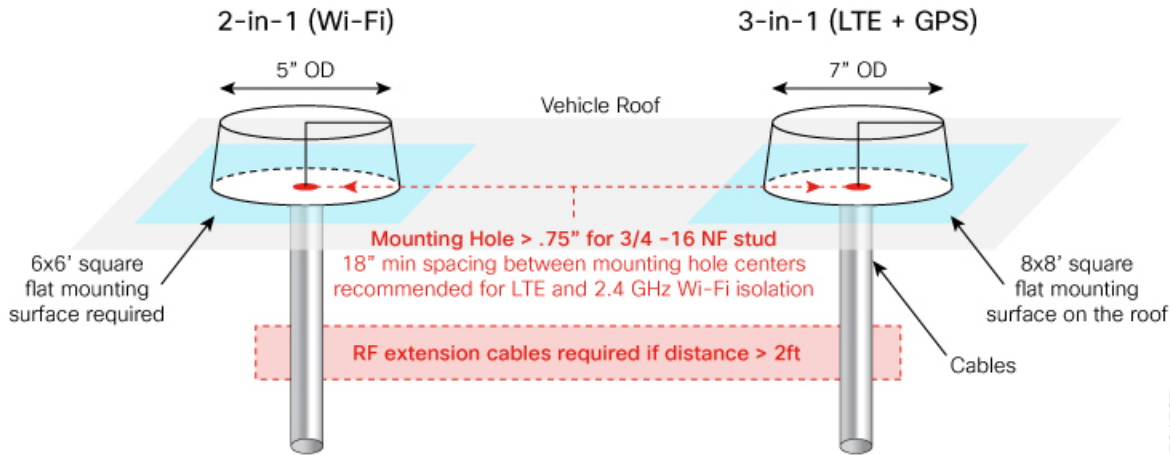- 9-in-1 (LTE, GPS) 5G-ANTM-O-4-B

Possible Use Cases

This document covers 5 possible Use Cases for Single LTE Modem with Wi-Fi and GPS, and 2 possible Use Cases for Dual LTE Modem with Wi Fi and GPS.

Single LTE Modem with Wi-Fi and GPS

1-Single LTE Modem (Cat 6 or below) + Wi-Fi Module + GPS Module

Figure 1: Use Case 1

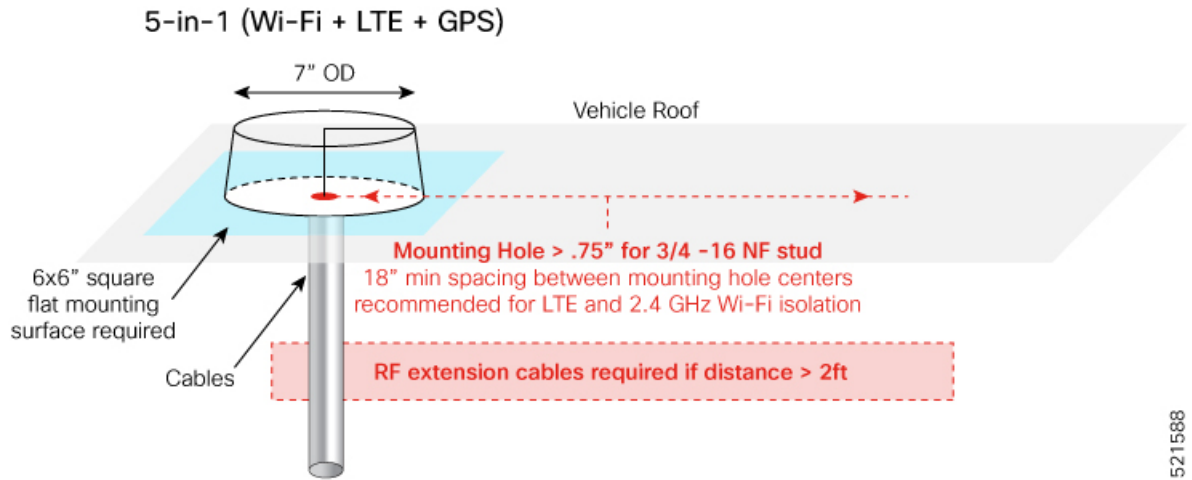In Use Case 1, Antenna 1 is a 2-in-1 with Wi-Fi, and Antenna 2 is a 3-in-1 with LTE and GPS.

Connections are made to the Router ports as follows:

Table 1:

Antenna	Where Connected	Cables and Accessories
2-in-1 ANT-2-WLAN-D-O 3 ft cables (X2) with RP-TNC connectors.	Both cables attached to Wi-Fi module in required mode (single or dual-band, see port assignment).	CAB-L195-10RSPRTJ cables (X2) TNC extension cables for LTE (X2)
3-in-1 4G-LTE-ANTM-O-3-B 4 ft cables (X3) with SMA Male connectors.	One port to Main, One to Div, one to GPS Pluggable Module.	LTE-ADPT-SM-TF (X2)

2-Single LTE Modem (Cat 6 or below) + Wi-Fi Module + GPS Module

Figure 2: Use Case 2

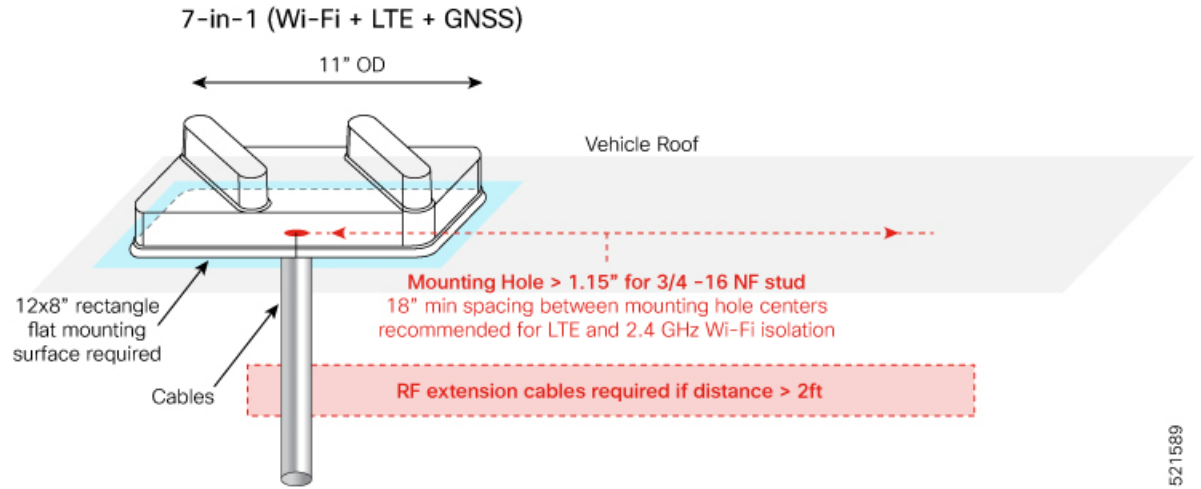In Use Case 2, there is a single 5-in-1 Antenna with Wi-Fi, LTE, and GPS.

Connections are made to the Router ports as follows:

Table 2:

Antenna	Where Connected	Cables and Accessories
5-in-1 ANT-5-4G2WL2G1-O Cellular has 2 ft cables with TNC male connectors. WLAN has 2 ft cables with RP-TNC plug connectors. GPS has 17 ft cable with SMA male connector.	One port to Main, One to Div, one to GPS Pluggable Module. Both cables RP-TNC ports to Wi-Fi module connectors in chosen mode.	CAB-L195-10RSPRTJ cables (X2) TNC extension cables for LTE (X2) LTE-ADPT-SM-TF (X2)

3-Single LTE Modem (Cat 6 or below) + Wi-Fi Module + GPS Module

Figure 3: Use Case 3

7-in-1 (Wi-Fi + LTE + GNSS)

11" OD

Vehicle Roof

12x8" rectangle flat mounting surface required

Cables

Mounting Hole > 1.15" for 3/4 -16 NF stud
18" min spacing between mounting hole centers recommended for LTE and 2.4 GHz Wi-Fi isolation

RF extension cables required if distance > 2ft

In Use Case 3, there is a single 7-in-1 Antenna with Wi-Fi, LTE, and GPS.

Connections are made to the Router ports as follows:

Table 3:

Antenna	Where Connected	Cables and Accessories
7-in-1 ANT-7-5G4WL2G1-O 2ft cable with SMA(m) connectors (X4) for LTE & 5G. 2ft cable with RPSMA(m) connectors (X2) for Wi-Fi. 17 ft cable with SMA(m) connector (X1) for GPS.	One SMA(m) port to Main, One to Div, one to GPS FRU card. Both RPSMA(m) ports to Wi-Fi module connectors in chosen mode. The antenna has labels showing which antennas are recommended for Main and Div.	No cables needed if the connection to modem is <2ft. All cables are SMA and RP-SMA. Two SMA LTE antenna ports are left unused.

Overview

4-Single LTE Modem (Cat 6 or below) + Wi-Fi Module + GPS Module

4-Single LTE Modem (Cat 6 or below) + Wi-Fi Module + GPS Module
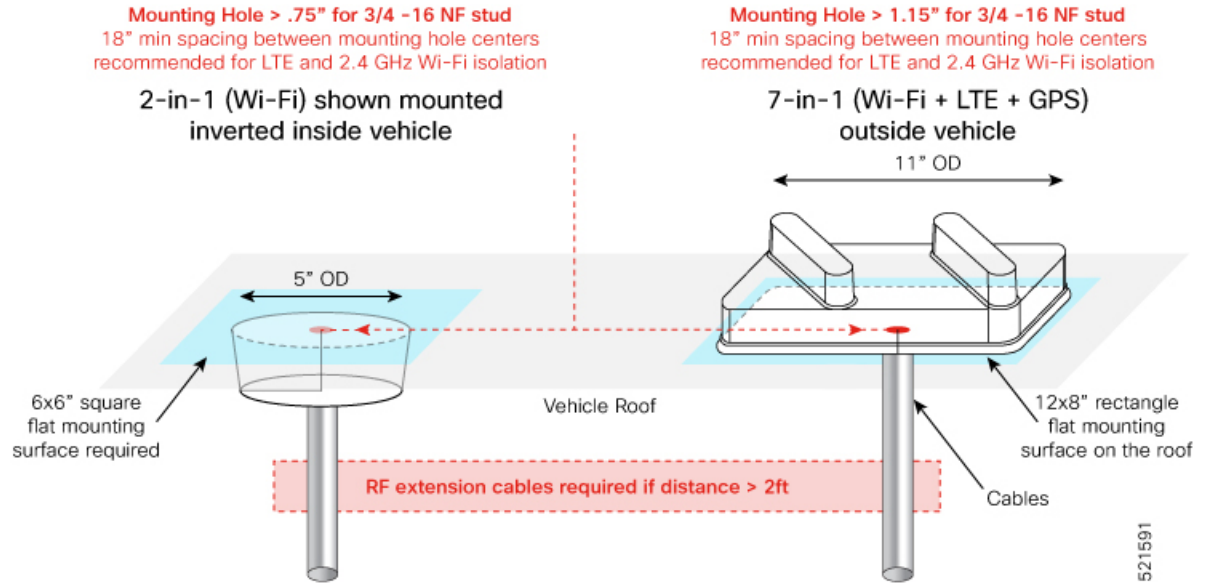
Figure 4: Use Case 4
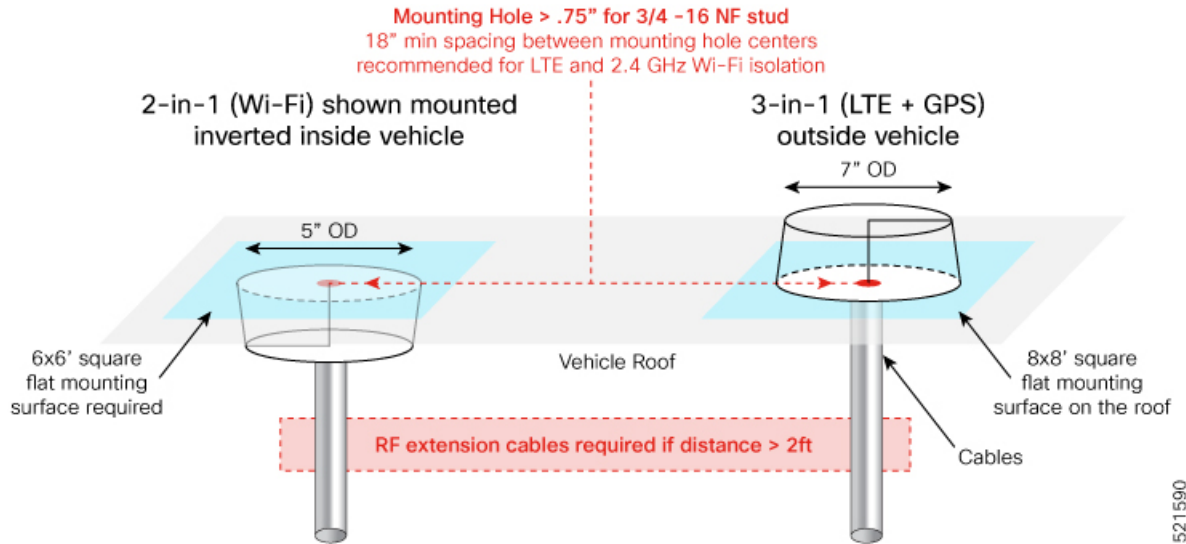
In Use Case 4, Antenna 1 is a 2-in-1 with Wi-Fi, and Antenna 2 is a 3-in-1 with LTE and GPS.

Connections are made to the Router ports as follows:

Table 4:

Antenna	Where Connected	Cables and Accessories
2-in-1 ANT-2-WLAN-D-O 3 ft cables (X2) with RP-TNC connectors.	Both cables attached to Wi-Fi module in required mode (single or dual-band, see port assignment).	CAB-L195-10RSPRTJ cables (X2) TNC extension cables for LTE (X2) LTE-ADPT-SM-TF (X2)
3-in-1 4G-LTE-ANTM-O-3-B 4 ft cables (X3) with SMA Male connectors and	One port to Main, One to Div, one to GPS Pluggable Module.	

5-Single LTE Modem (Cat 18) + Wi-Fi Module + GPS Module

Figure 5: Use Case 5

In Use Case 5, Antenna 1 is a 2-in-1 with Wi-Fi, and Antenna 2 is a 7-in-1 with Wi-Fi, LTE and GPS.
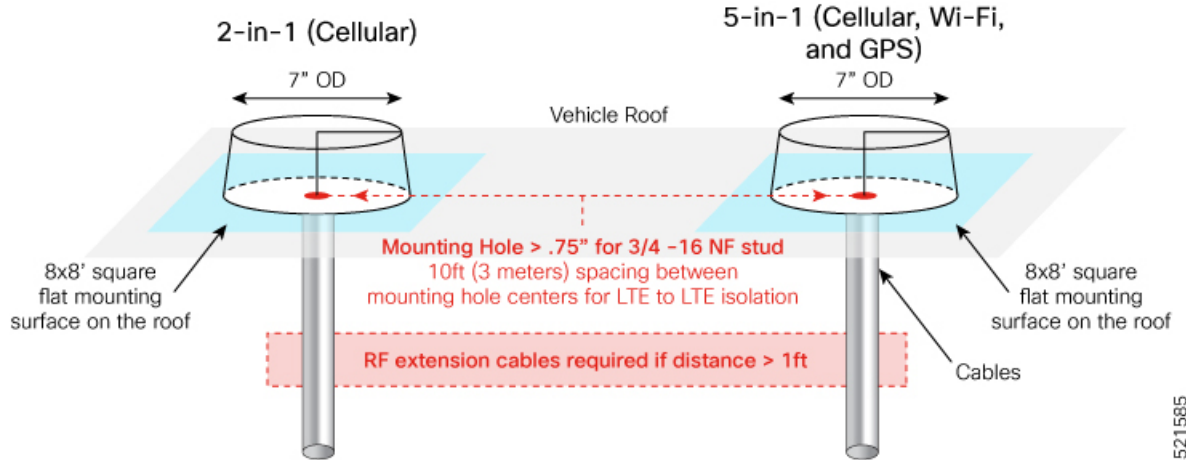
Connections are made to the Router ports as follows:

Antenna	Where Connected	Cables and Accessories
2-in-1 ANT-2-WLAN-D-O 3 ft cables (X2) with RP-TNC connectors.	Both cables attached to Wi-Fi module in required mode (single or dual-band, see port assignment).	CAB-L195-10RSPRTJ cables (X2)
7-in-1 ANT-7-5G4WL2G1-O 2ft cable with SMA(m) connectors (X4) for LTE & 5G. 2ft cable with RPSMA(m) connectors (X2) for Wi-Fi. 17 ft cable with SMA(m) connector (X1) for GPS.	One port to Main, One to Div, one to GPS FRU card. Both RP-SMA ports to Wi-Fi module connectors in chosen mode. The antenna has labels showing which antennas are recommended for Main and Div.	No cables needed if the connection to the modem is <2ft. All cables are SMA and RP-SMA. Two SMA LTE antenna ports are left unused.

Dual LTE Modem with Wi Fi and GPS

6-Dual LTE Modem (Two Cat 6 or below) + Wi-Fi Module + GPS Module
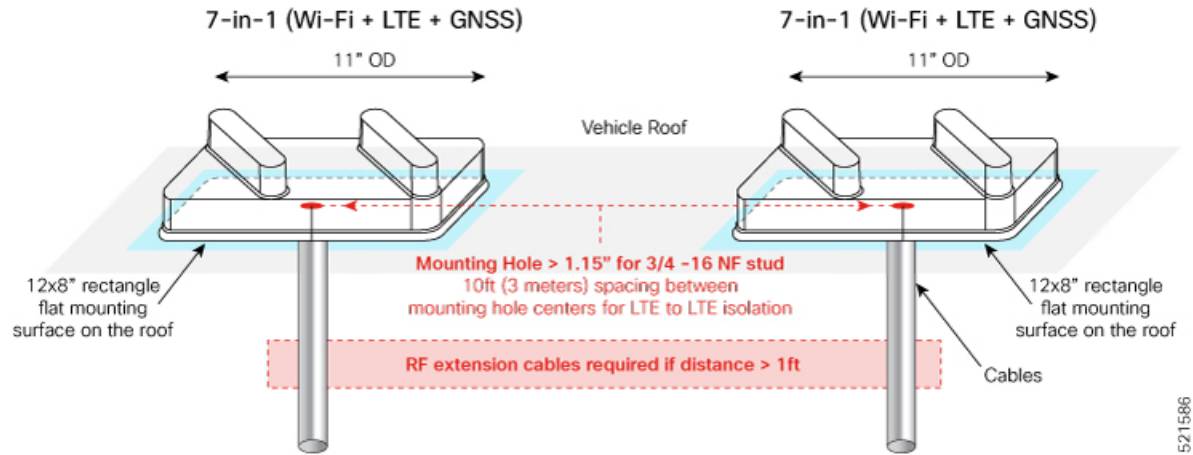
Figure 6: Use Case 6

In Use Case 6, Antenna 1 is a 2-in-1 Cellular and Antenna 2 is a 5-in-1 with Wi-Fi, LTE and GPS.

Connections are made to the Router ports as follows:

Antenna	Where Connected	Cables and Accessories
2-in-1 ANT-2-4G2-O 2 ft cables (X2) with TNC male connectors.	Both cables attached to Wi-Fi module in required mode (single or dual-band, see port assignment).	CAB-L195-10RSPRTJ cables (X2)
5-in-1 ANT-5-4G2WL2G1-O Cellular has Integrated 2 ft cables with TNC male connectors. WLAN has 2 ft cables with RP-TNC plug connectors. GPS has 17 ft cable with SMA male connector.	One port to Main, One to Div, one to GPS FRU card. Both RP-TNC ports to Wi-Fi module connectors in chosen mode. The antenna has labels showing which antennas are recommended for Main and Div.	CAB-L195-10RSPRTJ cables (X2) TNC extension cables for LTE (X2) LTE-ADPT-SM-TF (X2)

7-Dual LTE Modem (Two Cat 18) + Wi-Fi Module + GPS Module

Figure 7: Use Case 7

In Use Case 7, Antenna 1 is a 7-in-1 with Wi-Fi, and Antenna 2 is a 7-in-1 with LTE and GPS.

Connections are made to the Router ports as follows:

Antenna	Where Connected	Cables and Accessories
7-in-1 ANT-7-5G4WL2G1-O 2ft cable with SMA(m) connectors (X4) for LTE & 5G. 2ft cable with RPSMA(m) connectors (X2) for Wi-Fi. 17 ft cable with SMA(m) connector (X1) for GPS.	Antenna 1 does not use Wi-Fi or GPS Ports in this use case.	No cables needed if the connection to the modem is <2ft. All cables are SMA and RP-SMA. Two SMA LTE antenna ports are left unused in Antenna 1.
7-in-1 ANT-7-5G4WL2G1-O 2ft cable with SMA(m) connectors (X4) for LTE & 5G. 2ft cable with RPSMA(m) connectors (X2) for Wi-Fi. 17 ft cable with SMA(m) connector (X1) for GPS.	One port to Main, One to Div, one to GPS FRU card. Both RP-SMA ports to Wi-Fi module connectors in chosen mode. The antenna has labels showing which antennas are recommended for Main and Div.	

Important Note Concerning the ANT-7-5G4WL2G1-O (7-in-1) Antenna

When using the 7-in-1 antenna, Cisco recommends operating the Band 14 transmitter on the LTE-1 element. Using the LTE-4 element could cause interference with GPS performance. Refer to the following graphic:

Important Note Concerning the ANT-7-5G4WL2G1-O (7-in-1) Antenna