5G Sub-6 GHz Pluggable Interface Module

This chapter contains the following sections:

5G Sub-6 GHz Support on IoT Routing

The 5G Sub-6 GHz Pluggable Interface Modules offer 5G capability to the IoT Industrial Router family. The product IDs for the pluggable modules are P-5GS6-GL and P-5GS6-R16SA. The P-5GS6-GL uses the FN980 Telit modem, and P-5GS6-R16SA uses the EM9293 modem.

Note

- IOS XE release 17.7.1 is the first software release to provide support for the P-5GS6-GL.
- IOS XE release 17.15.1a is the first software release to provide support for the P-5GS6-R16SA.

Features and Limitations

The following features and limitations apply across all IoT routing platforms unless specifically mentioned:

- IoT routing platforms support a maximum of two pluggable modules, with a combination of 5G and 4G PIMs.
- The pluggable module can be started or stopped through the CLI under exec mode. Also, it can be configured to power off the module to reduce power consumption as needed.
- The capability to disable FDD Band 30 for vehicular applications is available.

The following are product specific:

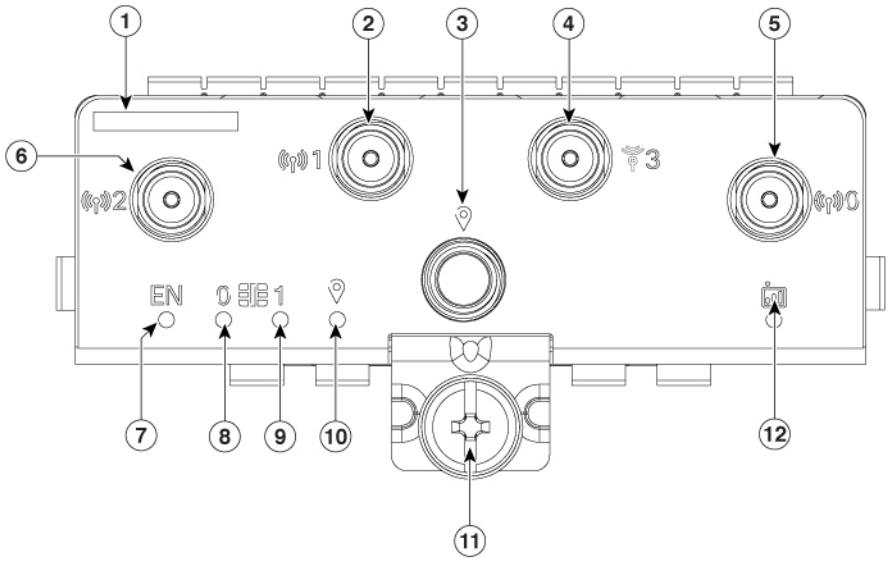
- On the IR1101 with P-5GS6-GL module:
  - When plugged into the base, the module is accessible via Cellular 0/1/0, 0/1/1.
  - The module is not supported on the expansion module.

- On the IR1101 with the P-5GS6-R16SA module:
  - The module is software and hardware supported on both, base and expansion module.
- On the IR1800
  - The cellular modems are accessible via Cellular 0/4/0, 0/4/1, 0/5/0, 0/5/1.

5G Pluggable Interface Module Overview

The following figure shows the face plate of P-5GS6-GL and P-5GS6-R16SA pluggable modules:

Figure 1: 5G Pluggable Interface Module - P-5GS6-GL, P-5GS6-R16SA



1	The printed PID **Note** Modules P-5GS6-GL, P-5GS6-R16SA share the same face plate.
2	Antenna 1 (SMA)
3	GPS (SMA)
4	Antenna 3 (SMA)
5	Antenna 0 (SMA)
6	Antenna 2 (SMA)
7	Enable LED
8	SIM 0 LED
9	SIM 1 LED

10	GPS LED
11	M3.5 thumb-screw
12	Service LED

LED Behaviors

The following table lists the LED indicators and their behavior. The LEDs provide a visual indication of the status and the currently selected services.

LED Indicators:

LED	Color	Function
EN	Green, Yellow	**Enable LED** • Pluggable enable LED • Off: System power is off • Yellow: Module power is not functioning correctly • Green: Module power is on
SIM0	Green, Yellow	**SIM0 LED/Activity** • SIM0 LED status and WWAN activity • Off: SIM0 is not installed • Yellow: SIM0 is installed, but not active • Green: SIM0 installed and active • Green Flash: LTE data activity
SIM1	Green, Yellow	**SIM1 LED/Activity** • SIM1 LED status and WWAN activity • Off: SIM1 is not installed • Yellow: SIM1 is installed, but not active • Green: SIM1 installed and active • Green Flash: LTE data activity
GPS	Green, Yellow	**GPS LED** • Off: GPS not configured • Yellow: Software defined

LED	Color	Function
		• Green: GPS configured • Green Flash: GPS acquiring (flashing done by SW)
Service	Green, Yellow, Blue	**Service Indication LED** • Yellow: 3G • Green: 4G LTE • Blue: 5G

RF Band and Port Mapping for the P-5GS6-GL and P-5GS6-R16SA Antenna

The following table lists the RF band mapping for antenna ports.

RF Band Mapping for Antenna Ports:

Table 1: RF Band Mapping for P-5GS6-GL Module

Antenna Port	Technology	TX	RX
ANT 0	3G WCDMA	B1, B2, B3, B4, B5, B6, B8, B9, B19	B1, B2, B3, B4, B5, B6, B8, B9, B19
	4G LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B30, B34, B38, B39, B40, B41, B66, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR FR1	n1, n2, n3, n5, n7, n8, n12, n20, n28, n38, n40, n41, n66, n71	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79
ANT 1	3G WCDMA	—	B1, B2, B3, B4, B5, B6, B8, B9, B19
	4G LTE	B5, B20, B42, B43, B48, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR FR1	n5, n48, n77, n78, n79	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79

Antenna Port	Technology	TX	RX
ANT 2	3G WCDMA	—	—
	4G LTE	B1, B2, B3, B4, B7, B41, B66	B1, B2, B3, B4, B7, B25, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR FR1	n1, n2, n3, n7, n25, n41, n66, n77, n78, n79	n1, n2, n3, n7, n25, n38, n40, n41, n48, n66, n77, n78, n79
ANT 3	3G WCDMA	—	—
	4G LTE	—	B1, B2, B3, B4, B7, B25, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR FR1	—	n1, n2, n3, n7, n25, n38, n40, n41, n48, n66, n77, n78, n79

Table 2: RF Band Mapping for P-5GS6-R16SA Module

Antenna Port	Technology	TX	RX
ANT 0 (Filtered)	3G WCDMA	B1, B2, B4, B5, B8, B19	B1, B2, B4, B5, B8, B19
	4G LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B32, B34, B38, B39, B40, B41, B66, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR Sub-6G	n1, n2, n3, n5, n7, n8, n12, n13, n14, n17, n18, n20, n25, n26, n28, n30, (n38), n39, n40, (n41), n66, n70, n71	n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79
ANT 1	3G WCDMA	—	—
	4G LTE	(B42), (B43), (B48)	B1, B2, B3, B4, B7, B25, B30, B32, B38, B39, B40, B41, B42, B43, B48, B66
	5G NR Sub-6G	(n48), (n77), (n78), (n79)	n1, n2, n3, n4, n7, n25, n30, n38, n40, n41, n48, n66, n70, n75, n76, n77, n78, n79

Antenna Port	Technology	TX	RX
ANT 2 (Filtered)	3G WCDMA	—	B1, B2, B4, B5, B8, B19
	4G LTE	(B41)	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66, B71
	5G NR Sub-6G	n38, n41, (n77), (n78)	n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79
ANT 3	3G WCDMA	—	—
	4G LTE	B42, B43, B48	B1, B2, B3, B4, B7, B25, B30, B32, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR Sub-6G	n48, n77, n78, n79	n1, n2, n3, n4, n7, n25, n30, n38, n40, n41, n48, n66, n70, n75, n76, n77, n78, n79

Note Bands in parenthesis are used for EN-DC or CA.

Port Mappings for 5G-ANTM-0-4-B on the P-5GS6-GL and P-5GS6-R16SA PIMs

The following table lists the port mappings using the 5G-ANTM-O-4-B antenna as an example, mapping to the ports on the P-5GS6-GL and P-5GS6-R16SA pluggable module.

5G-ANTM-O-4-B	P-5GS6-GL, P-5GS6-R16SA
MAIN 0 (LTE1)	ANT 0
MAIN 1 (LTE3)	ANT 1
DIV 0 (LTE2)	ANT 2
DIV 1 (LTE4)	ANT 3
GNSS	GPS

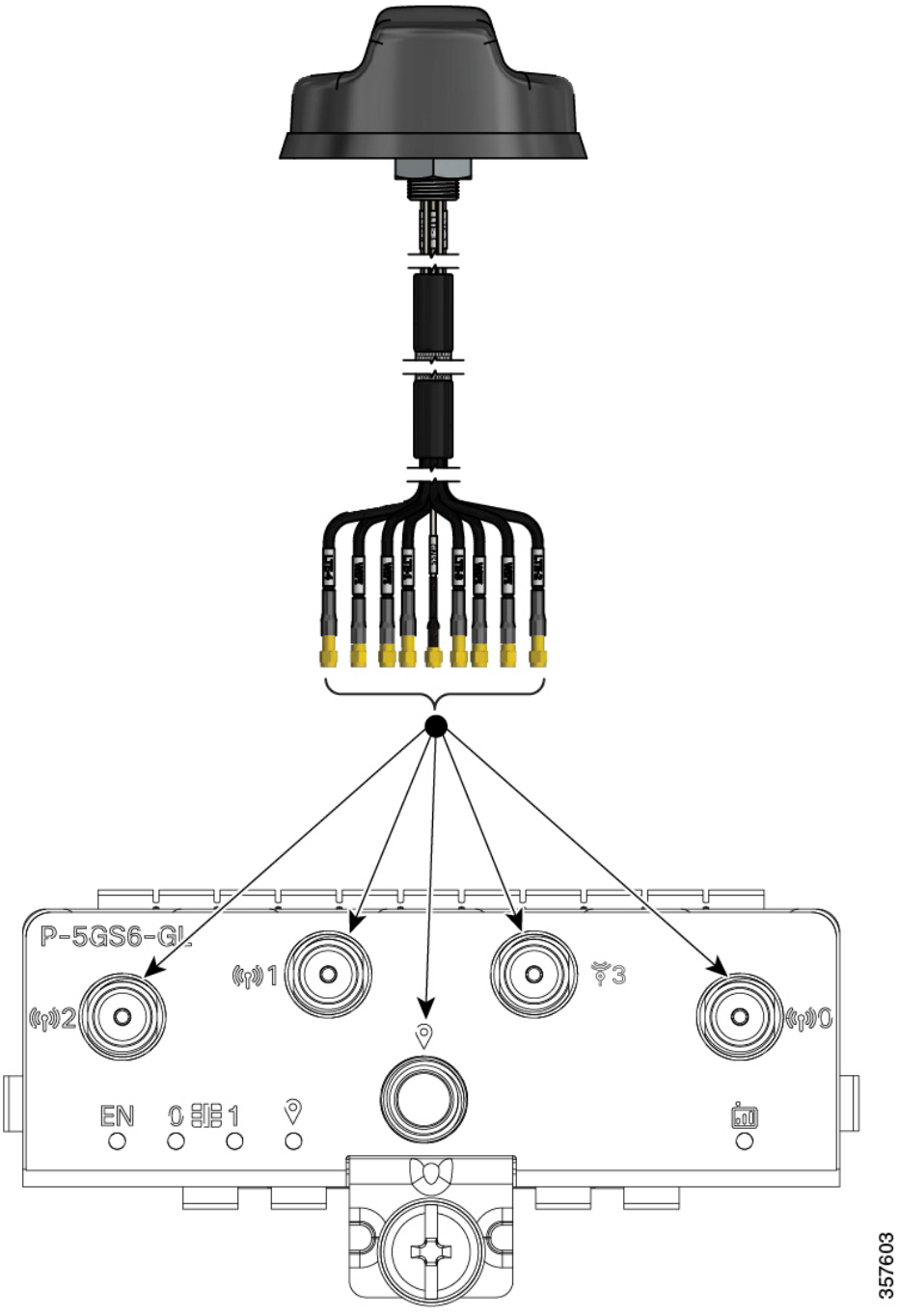
The following link contains the antenna specifications and installation instructions for 5G NR (5G-ANTM-O-4-B):

https://www.cisco.com/c/en/us/td/docs/routers/connectedgrid/antennas/installing-combined/b-cisco-industrial-routers-and-industrial-wireless-access-points-antenna-guide/m-5g-antm-04b.html#Cisco_Generic_Topic.dita_e780a6fe-fa46-4a00-bd9d-1c6a98b7bcb9

Attaching an Antenna

To attach the antenna in the Pluggable Interface Module, perform the below steps:

Figure 2: Attaching 5G NR Antenna (5G-ANTM-O4-B) to P-5GS6-GL, P-5GS6-R16SA PIM



1. Attach each SMA cable to the ports as indicated in the table mappings.

2. Ensure that you tighten and secure each SMA cable into the SMA connector on the PIM.