Brings 5G to The Rugged Edge

Full 5G Spectrum Coverage from the Rugged Edge

Premio's Dual-SIM 5G module supports Sub-6 GHz spectrum bands, bringing ultra-fast and comprehensive 5G networks to your industrial IoT deployments. In addition, the ruggedized 5G module supports global 5G coverage with optional mmWave coverage. The 5G module is compatible across multiple spectrums from Low-Band to Mid-Band (Sub-6 GHz) 5G networks. Mid-Band 5G NR (new radio) is around six times faster than 4G LTE with a potential speed up to 900Mbps to 1Gbps. This allows even the most remote industrial applications to enable targeted use of bandwidth in mission-critical applications that require high-frequency spectrum bands.

Network Redundancy – Never Lose Connection

Ensuring your systems are highly reliable is absolutely crucial for mission-critical industrial applications. The Dual-SIM 5G module is designed with a toggle switch for dual-carrier support and Dual SIM Single Standby for the best network redundancy, flexible network usage, and multi-national coverage. Network redundancy is essential to determine the success of time-sensitive technologies like real-time machine systems in autonomous vehicles or smart robotics. For instance, you can use the toggle switch to select different carriers for better coverage or international compatibility. In addition, the 5G module also supports LTE Cat. 20 fallbacks, allowing edge computers to automatically search and switch from 5G, 4G LTE, 3G, and even WIFI signals for the most stable connection.

Just Plug and Play! Expandable Modular Designs

Premio's Dual-SIM 5G module is designed to be integrated directly into Premio industrial fanless computers. The 5G module acts as a carrier board that supports 5G modems in the M.2 form factor and communicates via the PCIe 3.0 / USB 3.1 Gen.2 SuperSpeed interface. The modular design provides an easy plug and play option for immediate 5G connectivity on Premio computers. Additionally, the 5G module does not require any additional setup when integrated into Windows or Linux operating systems.

Pinpoint Satellite Navigation

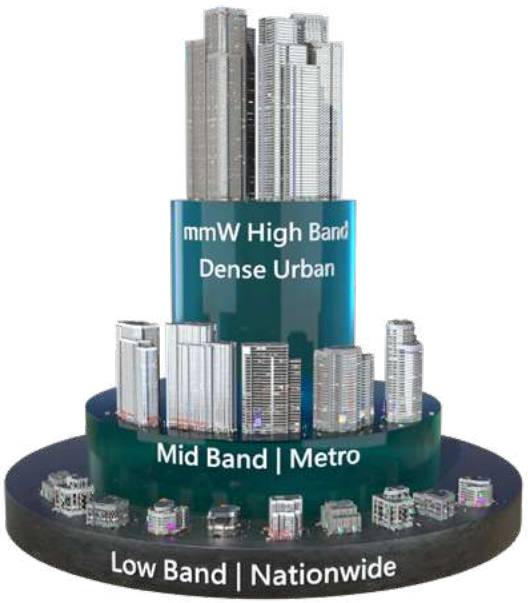
In addition to location tracking, some complex industrial applications often require tracking and positioning, such as a telemetric vehicle system. Therefore, the 5G modems can also support dual-frequency GNSS (Global Navigation Satellite System) with GPS, Glonass, Beidou, and Galileo for position tracking anywhere in the world.

Advanced Thermal Design for Extended Temperatures

The 5G modules have a unique industrial design for performance and thermal efficiency. Premio's industrial 5G modules allow extreme temperature industrial deployments ranging from -25° up to 70° for the modules for extremely cold and hot environments. To control the module's temperature amid industrial deployments effectively, Premio utilizes highly conductive multi-layers thermal pads and heatsinks to cool down the internal components. The heatsinks are made from aluminum and copper heat pipes to dissipate heat away from the 5G module to the extruded heavy-metal external chassis of the rugged edge computers.

5G Spectrums: Not All Bands are Created Equal

5G network has a broad EMF spectrum which divides 5G connectivity into three main types based on their radio wave spectrum, coverage, and latency.



Low-band Spectrum

5G networks with frequencies under 1 GHz and can reach hundreds of square miles for nationwide coverage. Low-band 5G networks are 20% faster than 4G LTE with a download speed of around 250 Mbps.

Mid-band Spectrum

5G networks with a frequency spectrum of 1-6 GHz or what is known as Sub-6 GHz. Mid-band 5G networks focus around metropolitan areas with speed around six times faster than 4G LTE, ranging from 125-900 Mbps.

High-band Spectrum (mmWave)

5G mmWave frequency bands are ten times faster than 4G LTE. With a spectrum range of 24-50 GHz, 5G mmWave low-latency speed can reach up to 10Gbps of data rates. High-band 5G networks have coverage just over a kilometer which are centered around dense urban areas.

	Low-band 5G	Mid-band 5G (Sub-6 GHz)	High-band 5G (mmWave)
EMF Spectrum	< 1GHz	1-6 GHz	24-50 GHz
Latency Speed	≈ 250 Mbps	125-900 Mbps	Up to 10 Gbps
Coverage	Nationwide Hundreds of Miles[2]	Metropolitan Areas Several Miles[2]	Dense Urban Areas Less than a Mile
Comparison to 4G LTE	20% Faster	6x Faster	10x Faster

Advanced Industrial Connectivity

Premio Dual-SIM 5G module improves industrial automation with advanced 5G connectivity. Upgrading your industrial applications from 4G to 5G networks will benefit from optimized connectivity that covers five key functional drivers:

1. Enhanced mobile broadband (eMBB), Superfast Broadband

5G enhanced mobile broadband refers to faster data rates (up to 10 Gbps), higher throughput, more capacity, and wide coverage areas. In addition, 5G network eMBB will be instrumental in improving various functions, including ultra-HD and 360° video streaming, AR, and VR.

2. Ultra-reliable low latency communication (uRLLC)

Ultra-reliable, low-latency communication refers to the increased speed and quality of the network for mission-critical applications that require uninterrupted, real-time data exchange without compromising the connection reliability. For instance, compared to 4G, 5G network's uRLLC reduced the latency time from 20ms down to <1ms with 99.999% reliability. This provides a crucial real-time experience for applications such as autonomous driving, robot-enabled remote surgery, and factory automation.

3. Massive machine-type communications (mMTC)

5G also supports massive machine-to-machine-type communications that enable the connection to a large number of machines and devices in a wide area that involves the generation, transmission, and processing of data with zero human intervention. With massive multiple-input multiple-output (MIMO) and beamforming, mid Band to high Band 5G network will benefit from a big boost with a 100-fold increase in the number of connections at once. This key 5G benefit provides a huge potential for industrial IoT applications where sensors, devices, and robotics can communicate together for autonomous actions. As a result, some of the most promising applications that will benefit from 5G networks will begin from manufacturing and factory automation, where sensors and devices communicate in real-time in a closed private network environment. Premio's 5G modules support 4x4 MIMO with 4x MHF4 on-board connectors for Sub-6 GHz frequencies antennas (shared with GNSS).

4. Security

Another critical driver that increases companies' interest in 5G is the improved privacy and security of the 5G network. Companies can build private 5G networks for their own applications. For instance, by creating a private network in a smart factory, companies can take full advantage of 5G network eMBB, uRLLC, and mMTC. While having more precise network controls of their connected assets and applications can help increase the security from an external attacker that targets and exploits the vulnerability of the public network.

5. Power Efficiency

Despite the robust performance of 5G networks, it will offer better energy consumption and lower costs compared to previous cellular network generations. Connected 5G devices will intelligently detect how to control their energy usage during the active or idle state. 5G is capable of decreasing 90% of the core network consumption by allocating energy usage in an efficient manner. Premio's 5G module is equipped with Dynamic Power Reduction (DPR) feature with control over software to reduce power consumption.

We Design, Manufacture, and Service customers around the world

Premio Rugged Edge Computers with 5G Compatibility

RCO-6000-CFL SERIES

- RCO-6000-CFL
- RCO-6000-CFL-2C (RCO-6122PE)
- RCO-6000-CFL-4N-2060S
- RCO-6000-CFL-4NH
- RCO-6000-CFL-8NS

Coming Soon

RCO-6000-CML SERIES

- RCO-6000-CML
- RCO-6000-CML-2C
- RCO-6000-2C-2PWR
- RCO-6000-2C-4B7M
- RCO-6000-20-2060S

Global Coverage with Trusted Modules

Premio supports the following 5G module modems in order to provide maximum worldwide coverage:

5G Module		Thales	SIMCom
Series		MV31-W	SIM8202G-M2
Form Factor		M.2 (PCIe 3.0/USB 3.1)	M.2 (PCIe 3.0/USB 3.1)
Frequency Bands	mmWave (optional)	n257, n258, n260, n261	-
	Sub-6G	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n41, n66, n71, n77, n78, n79	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n40, n41, n66, n71, n77, n78, n79
	LTE-FDD	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71
	LTE-TDD	B34, B38, B39, B40, B41, B42, B48	B34, B38, B39, B40, B41, B42, B43, B48
	LTE-LAA	B46 (DL only)	-
Satellite Navigation		GNSS	GNSS
Operating Systems		Microsoft Windows and Linux	Microsoft Windows and Linux
Special Features		- LTE Cat. 20 Fallback - Optional eSIM on module	LTE Cat. 20 Fallback