

# TEST AND IMPROVE CELLULAR NETWORK COVERAGE FOR MISSION CRITICAL COMMUNICATIONS



## Optimize Efficiency and Reduce Costs

Traditional private networks require costly resources to build, operate and maintain. With cellular networks becoming more reliable and ubiquitous regarding coverage, as well as less costly, industries that once relied on low bandwidth private networks are now migrating over to commercial cellular networks for mission critical communications with a communications service provider (CSP) or to private LTE or 5G networks.

Historically, electric utilities built one-way networks to distribute electricity to end users. In today's world, smart grids are required to accommodate new intermittent sources of renewable electricity and increased demand from electrified transportation. Hence the need for reliable, low latency, mission critical communications to support on-demand electricity needs of a modern functional society. These networks can sense breaks in power lines which enables utilities to cut power before the wire hits the ground preventing forest fires and reducing potential injuries.

CSPs are a viable alternative to private networks for several reasons. They support higher bandwidth for monitoring and switching, which prevents cascading shutdowns that can result in catastrophic failures of the grid. They lower

the operational costs of mission critical communications. Furthermore, they allow reliable communications dispatch with utility workers on networks that can include either cellular or P25 technologies. The ability to test both P25 and cellular signals along the power grid and employ advanced antennas to ensure cellular connectivity is essential. Determining whether a site has cellular coverage can eliminate the need for costly satellite connectivity.

Utilities and other industrial users require additional capacity to keep pace with the need for enhanced broadband connectivity. Private LTE and Private 5G are cellular-based networks that are capable of reaching a wider area to provide secure, reliable and flexible wireless connectivity for mission critical communications. They allow expanded data capacity, increased speeds and greater security.

The 900 MHz band (896-901/935-940 MHz) was recently realigned by the FCC to create three MHz paired channels (uplink/downlink) in the 897.5-900.5/936.5-939.5 MHz portion that are compliant with the 3rd Generation Partnership Project (3GPP) FD-LTE. In January 2025, the FCC proposed expanding this broadband allocation to include the full 5/5 MHz paired channels, providing better support for 5G networks and higher bandwidth applications. In addition, the CBRS (3.55-3.7 GHz) band provides additional licensed and unlicensed spectrum available for private LTE or 5G networks.

# Enable Business Connectivity and Transform Operations

PCTEL® has two complementary portfolios that can help utilities maximize wireless connectivity: test & measurement solutions and wireless antenna solutions. With accurate test data, you can locate base stations and analyze operator coverage. Our experts can help you select the best antenna configuration and placement to optimize connectivity for your fixed sites.

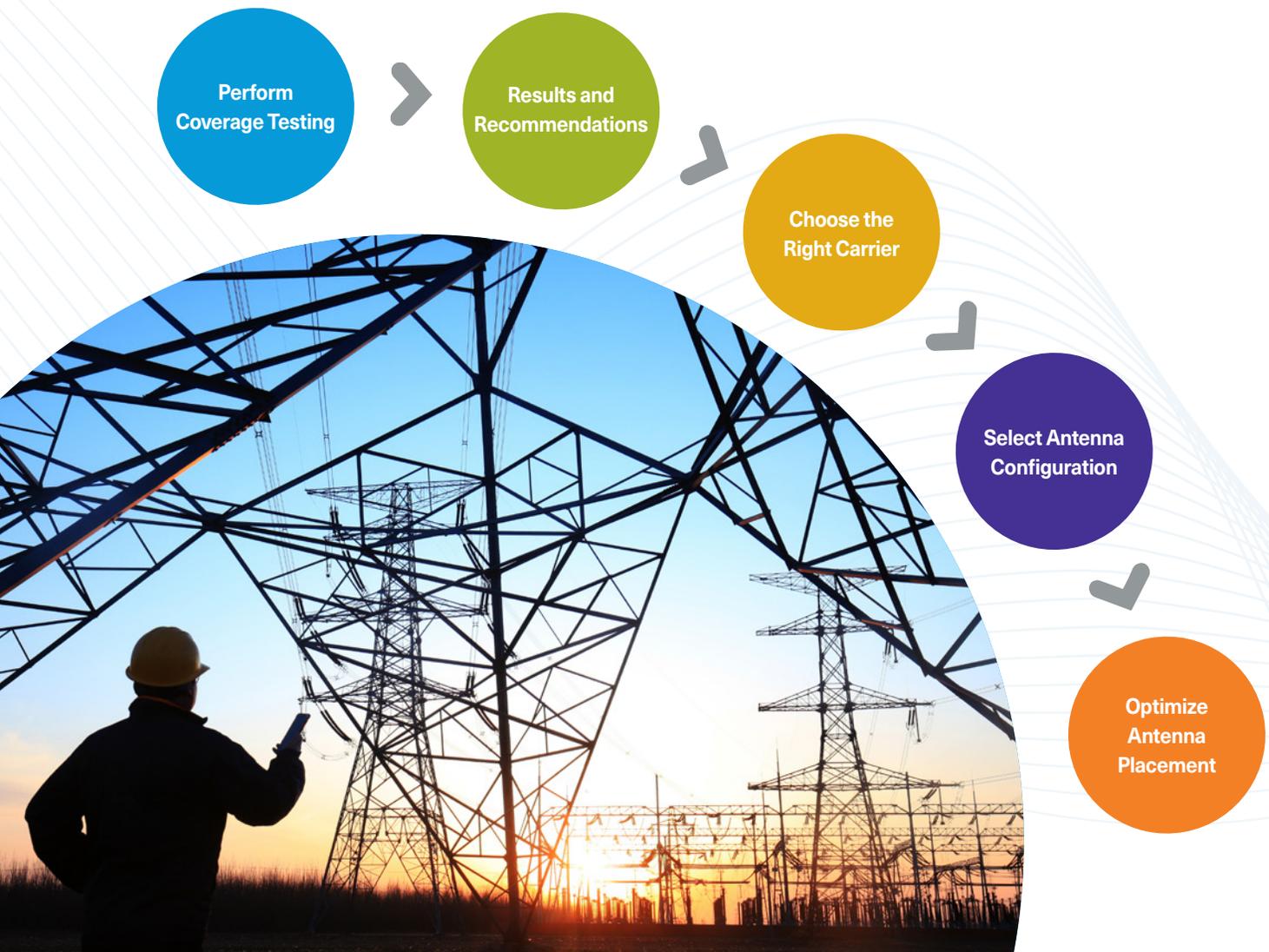
## Wireless Antenna Solutions

4G LTE and stand-alone 5G NR can meet the requirements for robust mission critical communications. LTE wireless cellular routers enable connectivity to the monitoring points and actionable devices. For enhanced reliability, a cellular router with dual mobile operator connectivity can be employed in the event that a network without a private backup goes down. To maximize signal strength, advanced directional antennas aimed at the cell towers or highly efficient omnidirectional antennas enhance connectivity and network availability.

## Test & Measurement Solutions

CSP subscribers and private LTE or 5G network users must verify coverage in the proximity of the remote cellular routers to determine which signals are strongest. LTE or 5G signals can be carried over private networks or by more than a dozen bands with numerous CSP channels. Consequently, a cellular scanning receiver that decodes cellular signals on every channel (as well as narrowband P25, DMR and TETRA signals as needed) is an ideal solution for planning and deploying cellular routers on location. Omnidirectional antennas identify the strongest CSP channel on each band at a specific location and can also identify the cellular operator via Layer 3 messaging.

Whether using a private LTE/5G or a CSP network, the antenna must be properly aimed at the cell tower to obtain maximum signal strength and reliability. A scanning receiver enables the user to find the optimum mounting angle to permanently connect the antenna to the cellular router. This is a typical outdoor application for PCTEL scanners.



# High Performance 5G Ready Antenna Options for Cellular Networks

## Yagi Antennas



<b>PCTEL Part #</b>	<b>BMVD806K-DP</b>	<b>BMVD8900</b>	<b>BMVD890K</b>
<b>Frequency</b>	814-863 MHz	890-960 MHz	890-960 MHz
<b>Description</b>	High gain, premium quality with excellent port to port isolation in harsh conditions. Dual-polarized antenna manufactured using high strength aluminum to withstand heavy ice, high wind and other extremes.	Engineered to meet the requirements of a high gain, broadband, premium quality antenna. The antenna is manufactured using high strength 6061-T6 aluminum, and all elements are welded to the boom.	Durable optimum strength antenna anodized for corrosion resistance and aesthetic appearance. Ease of connection and designed to withstand extreme weather conditions.



<b>PCTEL Part #</b>	<b>BMVD890M</b>	<b>BMVD210G</b>	<b>MYA9306</b>	<b>BMOY8905</b>
<b>Frequency</b>	890-960 MHz	215-225 MHz	902-928 MHz	890-960 MHz
<b>Description</b>	Engineered to meet the requirements of a high gain, broadband, premium quality antenna. The dipole design has an integral feed line welded to the boom for extra strength and electrical conductivity, and to eliminate misalignment or fastener problems.	Manufactured using high strength 6061-T6 aluminum to withstand heavy ice, high wind and other harsh conditions. The innovative dipole design has an integral feed line and is welded to the boom for extra strength and electrical conductivity.	Integrated connector antenna that provides a simple and cost effective solution for the ISM band.	With solid 3/8" elements welded to a seamless aluminum boom and finished with polyester powder coating, these antennas offer complete protection in extreme conditions. The aluminum mounting bracket allows for vertical or horizontal polarization.

## Omnidirectional Base Station Antennas



<b>PCTEL Part #</b>	<b>BOA90211</b>	<b>BOA9025</b>
<b>Frequency</b>	902-928 MHz	902-928 MHz
<b>Description</b>	Heavy duty, omnidirectional base station antenna ideal for deployment in harsh environments. It features a linear array, encapsulated in a heavy-duty fiberglass radome.	Heavy duty, omnidirectional base station antenna ideal for deployment in harsh environments. It features a linear array, encapsulated in a heavy-duty fiberglass radome.

# High Performance 5G Ready Antenna Options for Cellular Networks

## Whip Antennas



<b>PCTEL Part #</b>	<b>BMAX9155S</b>	<b>MN9155</b>	<b>MUF8103</b>
<b>Frequency</b>	890-945 MHz	902-928 MHz	806-896 MHz
<b>Description</b>	Rugged molded polymer base antenna with plated springloaded contact pin and .100" diameter stainless steel whip. This antenna is designed to deliver long-lasting, trouble-free operation in multiple wireless applications.	Integrated connector antenna that provides a simple and cost effective solution for the ISM band.	Features a heavy-duty low profile base with tapered loading coil jacket, chrome plated brass fittings and an optional heavy-duty stainless steel spring. Available with either an open coil rod or our "quiet" closed coil rod design.

## Low Profile Antennas



## GPS Antenna



<b>PCTEL Part #</b>	<b>BMLPVDB700/2500</b>	<b>BMLPV800</b>	<b>3977D</b>
<b>Frequency</b>	698-960/1710-2500 MHz	806-960 MHz	1575.42 MHz ± 10 MHz
<b>Description</b>	This antenna delivers industry leading wideband performance and reliability, with minimum loss and no tuning required. It offers superior pattern coverage for mobile and fixed applications across a wide range of frequencies. It can be purchased separately, or as a kit assembly.	Low profile, industry leading wideband performance and reliability, with minimum loss and no tuning required. Antennas can be purchased separately, or as a kit assembly. Multiband models available.	Permanent mount GPS antenna, provides high gain and features a precision tuned custom ceramic patch element for maximum signal reception, along with 15KV ESD circuit protection. This serves to minimize loss-of-lock, even when conditions are less than ideal.

## Multiband Antennas



## Panel Antenna



<b>PCTEL Part #</b>	<b>GL9X1AX-SF</b>	<b>LP702</b>	<b>PLTE7027M</b>
<b>Frequency</b>	600 MHz - 6 GHz 2.4 - 2.5 GHz 4.9 - 5.9 GHz 1565 -1608 MHz	698 - 760 MHz 790 - 960 MHz 1710 - 2690 MHz	698-960 MHz 1710-2700 MHz
<b>Description</b>	Rugged design multiband combination antenna, configurable up to 9x1ports (4x4 Cellular, 4x4 WiFi 7 and GNSS). The Cellular 4x4 MIMO ports cover the LTE/5G sub 6 GHz bands down to 600 MHz. The WiFi 6E 4x4 MIMO ports up to 7150 MHz. This antenna platform can also be equipped with a pre-filtered GNSS antenna.	Low profile multiband antenna that operates simultaneously in the 698-960 MHz and 1710-2700 MHz bands with omnidirectional performance. It is designed to be a surface mount that performs well on metallic or non-metallic surfaces.	This dual polarization 4G/5G MIMO directional panel antenna offers multiband coverage, high gain, and a rugged housing design with a heavy duty mounting bracket, for mast or wall mount installations. It is ideal for small cells, indoor/outdoor DAS systems, and Oil and Gas utility sites.

# Scanning Receiver Packages, Options and Accessories for Cellular, LMR and WiFi Coverage Testing



Kits	IBflex® Scanning Receiver	SeeHawk® Touch Software	Accessories
	Lightweight multiband, multi-technology precision radio receiver with Bluetooth® connectivity	Data collection, spectrum analysis reporting tools on an Android™ tablet	
<b>Utility</b> (includes SeeHawk® Touch Software and Accessories)	<ul style="list-style-type: none"> <li>Decode all 4G LTE North American cellular bands 10 MHz to 6 GHz and the CBRS/900 MHz band</li> <li>LTE Layer 3</li> <li>Spectrum Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Outdoor Mode</li> <li>Signal Analyzer</li> <li>Collect Reporting</li> </ul>	<ul style="list-style-type: none"> <li>Android™ tablet</li> <li>Battery pack</li> <li>Back or side pack</li> <li>Walk test antennas</li> <li>Carrying case</li> <li>A/C charger</li> </ul>
<b>DMR, P25, or TETRA add-on option</b>	<ul style="list-style-type: none"> <li>P25</li> <li>DMR</li> <li>TETRA</li> </ul>	<ul style="list-style-type: none"> <li>RSSI, SINR and BER measurements</li> </ul>	
<b>WiFi add-on option</b>	<ul style="list-style-type: none"> <li>2.4 and 5 GHz WiFi bands</li> <li>WiFi Technology</li> <li>WiFi Adapter</li> </ul>	<ul style="list-style-type: none"> <li>WiFi RSSI</li> </ul>	
<b>Additional options</b>	<ul style="list-style-type: none"> <li>5G NR Technology</li> <li>LTE-MIMO</li> </ul>		SeeWave® Host Platform requires one or more of the antennas below: <ul style="list-style-type: none"> <li>617 MHz - 6 GHz Log Periodic Antenna</li> <li>450 MHz Yagi Antenna</li> </ul> Other Accessories <ul style="list-style-type: none"> <li>SeeWave® Interference Location SW</li> <li>Additional battery(s)</li> </ul>

PCTEL test & measurement and wireless antenna solutions optimize connectivity to gain efficiency, safety and security. Even if you have already selected a carrier, optimal antenna selection and placement can dramatically improve coverage and reliability at remote sites. Combining both solutions provides the best results for long-term operational success.

# Learn about our complete portfolio of test & measurement and purpose-built antenna solutions for leading carrier networks.

> [pctel.com/products](https://pctel.com/products)

## Solving Complex Wireless Challenges

PCTEL, an Amphenol company, is a leading global wireless technology solutions provider, including purpose-built Industrial IoT devices, antenna systems, and test and measurement products. Trusted by our customers for over decades, we solve complex wireless challenges to help organizations stay connected, transform, and grow.



**PCTEL, Inc.**

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