Omni Antennas for Industrial Networks

Application Note

The wireless communications industry is rapidly advancing connecting people and machines on a global scale like never seen before. Increasing demand for breathtakingly high-data-rate services along with the evolution of the Industrial Internet of Things (IIoT) and Industry 4.0 applications is exposing novel technical challenges in wireless communications networks.

New services and applications call for exploring even more frequency bands and stretching for even greater spectral efficiency. Future wireless systems are challenged with simultaneously supporting communications requirements of advanced IoT devices and the demands of mission-critical networks found in industries including electric utilities, oil & gas, mining, wind, and solar power generation and more.

As mission critical industrial wireless networks continue to grow, there is an increasing demand for greater bandwidth, wider coverage and zero tolerance for downtime.

There are several different types of wireless network architectures being employed today to address industrial applications including mesh networks. A wireless mesh network provides both redundancy and self-healing as each node in the mesh network is connected to at least one other node and uses intelligent routing to find other nodes in the network should its primary connection be disabled. Mesh networks are ad-hoc networks in that nodes in the network forward data from other nodes. Manufacturers such as Rajant have developed intelligent dual-band radios and technologies including the Rajant Kinetic Mesh® network that addresses the complex connectivity issues facing mission critical industrial networks.

In addition to mesh networks, traditional point to point (PtP) and point to multipoint (PtMP)networks are also being deployed in industrial settings. These include ISM networks operating in the 400-900 MHz range and Wi-Fi networks operating in the 2.4 -5 GHz frequency range.

Not only are the protocols and network architectures that are chosen for these networks of the utmost importance, but the hardware used in an industrial network must be able to provide high mean time between failure (MTBF), the ability to stand up to environmental extremes, and provide the highest levels of performance to guarantee network uptime.

KP Performance Antennas has manufactured high-quality antennas for over 10 years and offers omni directional antennas that exceed the requirements of mission critical network operators.

When choosing omni antennas for use in industrial networks one needs to consider the materials used in the construction of the antennas and the operational parameters of the omni antenna.

KP Performance has developed both 2.4 GHz omni antennas as well as 5 GHz omni antennas that were purpose built to address mission critical networks. The KP-xVOMNI-6 series antennas feature fully sealed brass elements housed inside a durable yet lightweight UV-stable fiberglass radome to ensure long service life even when exposed to the elements. Other features of these omni antennas include maximum voltage standing wave ratio (VSWR) of 1.5:1, vertical polarization, maximum wind loading up to 150 MPH, and strong 6 dBi gain and vertical beamwidth of 28° providing maximum signal reach and coverage.

Center Fed Colinear Array

The integrated Type-N male connectors on these omni antennas allows them to be mounted to various types of N-Female bulkhead connectors and adapters as well as N-Female type magnetic mounts which offers greater installation flexibility. Additionally, each omni antenna ships with rugged mast mounting hardware allowing the antenna to be easily mounted on a mast up to 2.0 inches in circumference.

Achieving ultra-reliable, low-latency data transfer is key to fully leveraging the possibilities of IIoT and Industry 4.0. In this age where the wireless communications industry is rapidly accelerating, and the next industrial revolution is peaking over the horizon. Industrial wireless networks are being optimized and enhanced to meet today's requirements with consideration for future needs. Suppliers and manufacturers of hardware used to build these industrial wireless networks must maintain a level of quality and performance that exceeds industry standards to address mission critical networks.