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Ways to Get the Most Out of Your 5G Network



New frequencies and technologies have recently become available, opening new possibilities for filling connectivity gaps in rural and urban areas. The communications industry is leveraging these developments, quickly moving toward 5G to meet capacity demand. Yet recognizing the opportunities and putting them into practice are two different things. New technology often comes with a learning curve that can drastically erode your network's return on investment (ROI).

Upgrading a network to 5G presents tremendous growth opportunities. With 100 times the capacity of 4G, 5G delivers the service needed for today's bandwidth-consuming applications. Users want five-bar cellular service

wherever they go, on any device, including the many Internet of Things (IoT) devices that are quickly emerging.

Knowing a few critical things makes the difference in optimizing network performance as you transition to 5G. Moving ahead without understanding them could make the successful installation you visualize fall short of expectations.

Read on for five things to keep in mind to maximize performance and minimize costs.



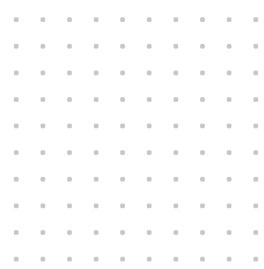
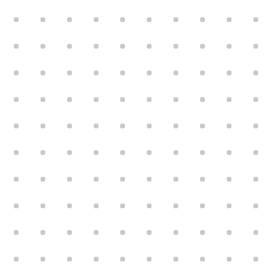


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Choose the Right Antennas



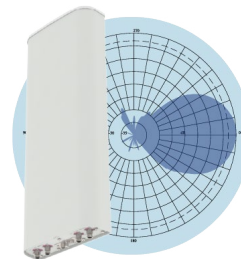
While antennas may be only 2% of the network's total cost, they can have a much more significant impact on the overall performance of the network. Using the correct antenna for your network topology and the sector you're targeting can drastically reduce the number of nodes required, saving on rent, equipment, installation, and maintenance.

While midband 3.5 GHz frequency have been available for years globally, the C-band spectrum has only recently been allocated in the U.S. These frequencies are ideal for quickly establishing or updating to 5G service. Several new technologies optimize spectrum use and node performance for 5G expansion.

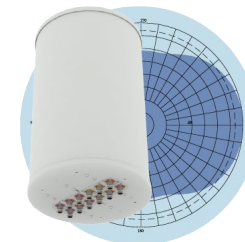
One new technology that reduces costs and delivers excellent performance is dual-band antennas that transmit two separate frequencies. This strategy reduces the number of antennas you need along with associated costs. Multiband antennas are not entirely new, but the ability to achieve optimum performance with multiple frequencies in a discreet form factor is here now.

For instance, in utility applications, deploying antennas to transmit 900 MHz Anterix and 3.5 GHz signals in one compact antenna enables you to address multiple use cases with fewer antennas and commensurately lower costs.

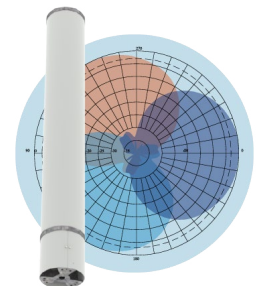
The antennas that successfully reduce nodes and associated costs depend on particular recent technology advancements. We'll outline the details later in this eBook, but reducing sidelobe interference and successfully transmitting two different frequencies side-by-side in a small enclosure are two developments that make a tremendous difference in overall network cost.



**Multi-Frequency
Base Station Solutions**



**Small Cell
Solutions**



**Tri-Sector
Solutions**



Think Multi-Sector Deployments for Greater Capacity and Lower Costs

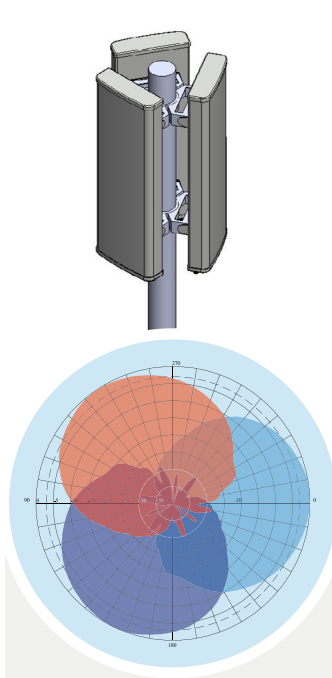
Tri-sector antenna solutions deployed at the ground or roof level are an excellent option for 5G coverage. Concentrating three sectors in one antenna delivers a great deal of coverage and capacity with a single node, saving on rent, installation, maintenance, jurisdictional approvals, and other costs.

Municipalities have become increasingly sensitive to the visual impact of telecommunications equipment deployed in urban and rural areas. Planning and zoning approval has become a serious roadblock to establishing new network nodes for 5G, particularly in urban areas. Concealing all electronics for three antennas in one form factor reduces planning and zoning challenges since the antenna and electronics occupy one location instead of three. Choosing antennas that encase all electronics in a single, aesthetically-pleasing form factor gives the low visual impact that typically passes through zoning approvals quickly.



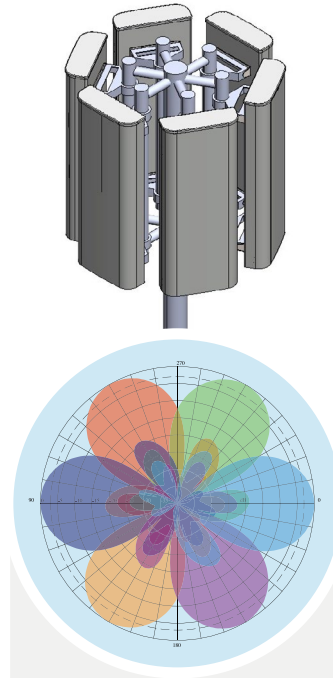
In another example of multi-sector scenarios, six-sector deployments expand capacity without adding expensive poles or towers. The key to successfully deploying the solution is reducing interference among antennas deployed close together. Using six-sector antennas with a narrow 33-degree beamwidth and azimuth side lobe suppression virtually eliminates beam spill into other sectors and thus interference, improving performance.

High-quality six-sector deployments most often use panel antennas. Configuring six antennas on one tower in a horizontally-spaced array enables you to increase capacity to six sectors without adding the cost of additional sites. Using multiple input, multiple-output (MIMO) technology improves reliability and boosts speed. Variable electrical tilt enables you to shape the radiation pattern, optimize the signal, improve gain and achieve optimal service levels.



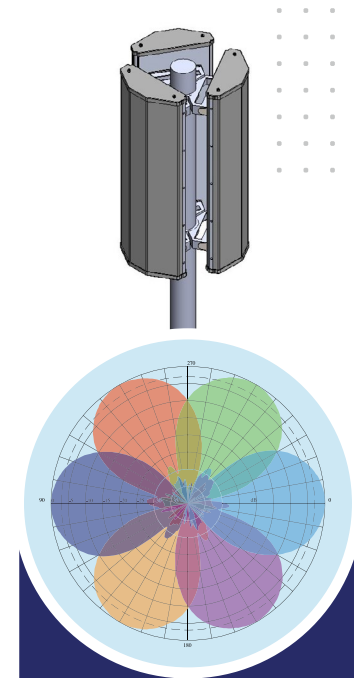
Traditional three-sector

A common deployment is three sectors using 65-degree antennas. In fixed wireless networks, the overlap area can reduce CINR levels and limit download speeds.



Conversion to a six-sector site

This is a six-sector site where the 65-degree sector is split into two 33-degree sectors. In theory this format doubles users compared to the 65-degree sector. The overlap is much less, which is good for FWA. Typical 33-degree antennas have issues with the azimuth sidelobes. For a house located within an unwanted sidelobe, CINR declines, limiting downloads.



Alpha Wireless' solution

A six-sector site has the advantages of 33-degree beamwidths with the removal of the azimuth side lobes. This enables the operator to offer high download rates no matter where customers are located around the cell tower.



Hide Antennas in Plain Sight for Faster Zoning Approvals

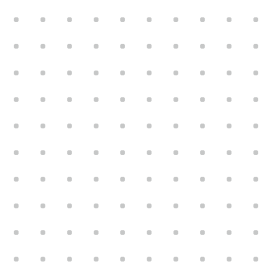
As mentioned in the previous section, zoning approvals have often deterred operators seeking to increase coverage and capacity for 5G networks. Moving antennas closer to the customer for improved service has proven challenging, particularly in dense urban areas where zoning restrictions are tight.

The most efficient antenna for urban 5G applications is a compact, all-in-one antenna solution with an attractive form factor. Antennas of this type are particularly suited to small cell network densification. These ultra-compact solutions contain radios, backhaul options, GPS, cables, power protection, and power distribution in a single small enclosure.

Discreet all-in-one solutions usually pass zoning reviews quickly, tidily fitting into

locations that were previously out of reach for operators. Since these solutions are so visually innocuous, they are suited for sites as sensitive as historic locations and neighborhoods with strict planning regulations. You can install these small antennas virtually anywhere – on a utility pole, rooftop, wall using a sidearm, or on nearly any vertical streetwork structure.

Moreover, look for pre-assembly from your antenna provider. When your antenna provider tests, assembles, and wires your all-in-one solution before delivery, your installers need only put the all-in-one antenna system in place and connect it to the power source. Using pre-configured, all-in-one, small cell antenna solutions saves on equipment cost, labor and installation time, rent, backhaul, and power costs.





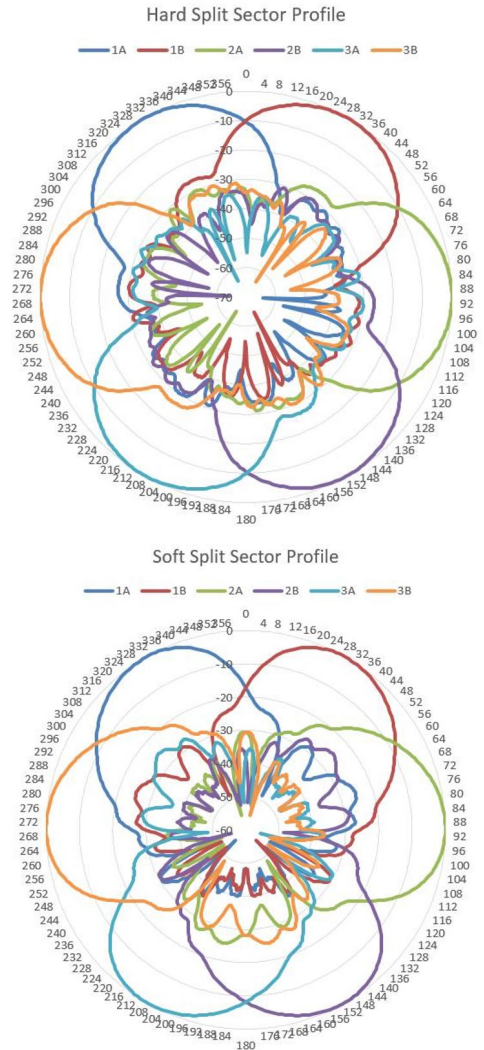
Leverage Innovative Technology to Optimize Performance

It is crucial to keep up with the rapid changes in the telecommunications ecosystem and to have at your disposal the latest developments in antenna technology. Antenna designers develop antennas and adjust heritage designs to solve emerging challenges. Ensure that the antennas you choose for your network build contain the latest technological advancements. Using the newest technology equips you to achieve the greatest possible network performance.

For instance, with the densification of cell sites, interference between sectors has become a more significant problem for operators. The ability to narrow a

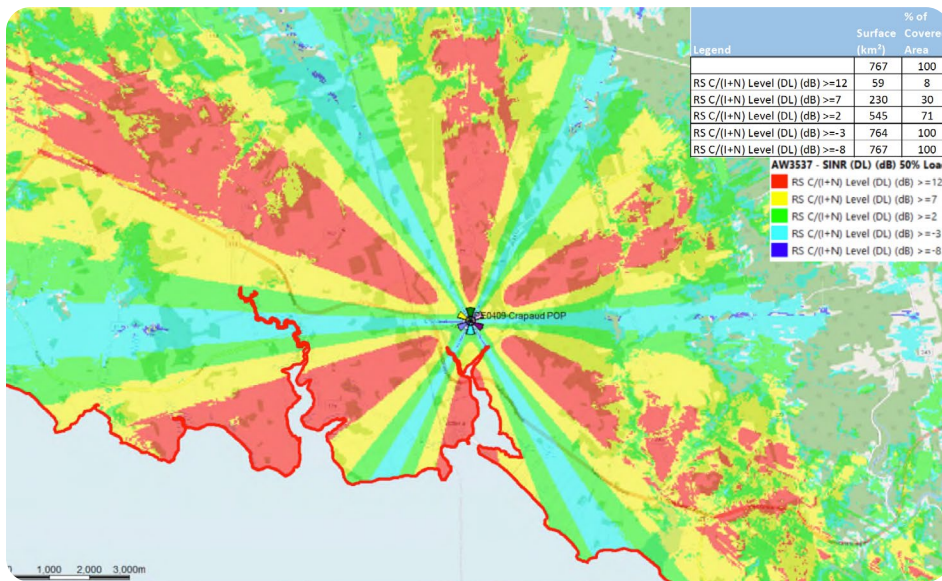
beam and suppress side lobe radiation reduces signal overlap and the resultant interference between sectors.

With less interference, network performance is considerably maximized. Using antennas with a narrow beam and azimuth side lobe suppression has proven in practice to enhance network and end user performance metrics quickly. This antenna design improves frequency use efficiency and signal-to-noise ratios while enhancing cell edge performance.

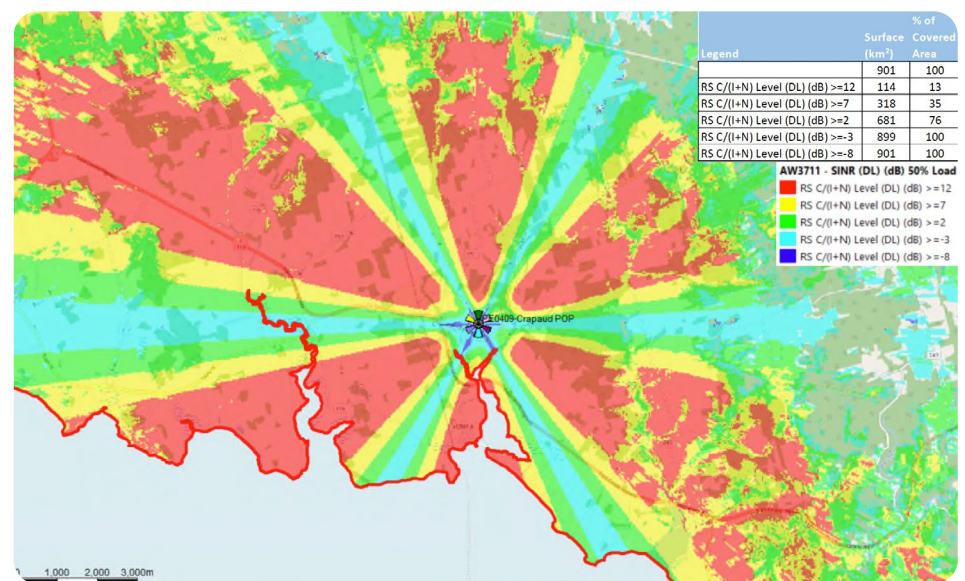


In another current challenge, the industry is demanding more discreet antennas that compress a larger volume of electronics into ever-smaller enclosures. Reducing antenna size and expanding capacity gives you the greatest return on your investment. This scenario presents additional challenges antenna designers need to solve.

Alpha Wireless developed our patent-pending Frequency Transparent Dipole Technology™ (FTDT) to answer this challenge. This innovation enables an antenna to transmit and receive in a small enclosure without interference while maximizing coverage, optimizing network investment budgets and expanding use case possibilities.



Canadian operator CINR for non-optimized coverage plots



Canadian operator shows marked CINR Improvement in optimized coverage plots



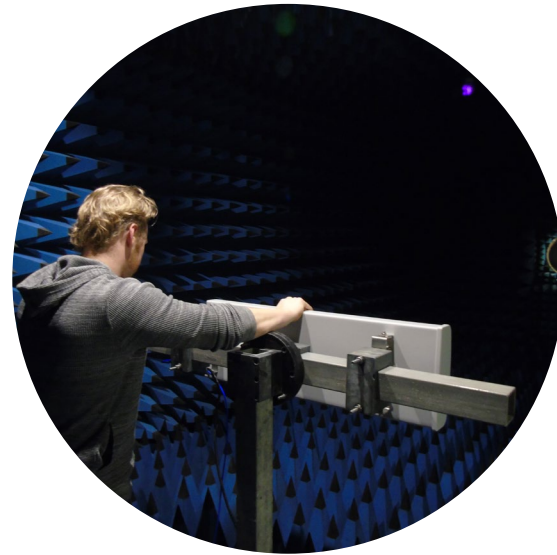
Time is Money – Fast Delivery Saves Costs

Each network is different, and every operator has a separate set of priorities and network goals. What is common to all operators is the need to deliver high-quality service to customers in a timely fashion at a reasonable cost. This common goal applies whether the network is run by a large mobile network operator for millions of users or by a single enterprise for a private network.

As you research antenna vendors, make sure the supplier you choose can deliver on your timetable. Do they stock a core set of antennas for immediate

delivery? Delays in network installation have financial consequences resulting from direct cost overruns, lost revenue opportunities and reduced customer satisfaction.

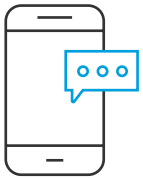
Since every network is different, customization is often needed to deliver the exact configuration that will optimize your network build. Ensure the vendor you select can provide a custom solution within a reasonable timeframe.



For example, in one case a network operator needed to establish 5G throughout a stadium before the beginning of a quickly approaching season. Fans, teams, broadcasters, and vendors demanded improved service to accommodate new immersive sports experiences.

Other global vendors were unable to meet the customer's timetable for antenna delivery. Without a high-performance antenna solution readily available,

the stadium owner would miss the opportunity to upgrade to 5G and improve customer satisfaction for the season. Alpha Wireless delivered the custom solution the operator needed in time for the first game. The stadium also gained bragging rights as the first premium league stadium to offer ubiquitous 5G service.



Sharing Venue Experiences

- Live video
- Social Media
- Texting



eTicketing

- Entrance to venue
- Booking events
- Ticket Selling & Transferring



Enhancing Venue Experience

- Personal Jumbotron
- TV-like graphic access
- Alternative Audio



Take an Experienced Partner with You as You Grow

Alpha Wireless has been designing and delivering antennas globally since 2007, and our engineering team collectively has decades of experience designing antennas to overcome the most complex network challenges. We have the expertise, responsiveness and flexibility to provide the optimal antenna configuration for your specific network and needs.

We respond to industry changes and our customers' unique requirements by deploying innovative technology that delivers the quality service users expect. If your requirements don't match our core product line, talk to us, and we'll

build the antenna you need with a quick turnaround. Our antenna platforms are designed to enable our engineers to often develop new models from whiteboard to prototype within 90 days.

Partnership means listening to your objectives and collaborating closely to deliver the highest performance available at the lowest total cost of ownership (TCO). Alpha Wireless antennas limit interference, improve aesthetics, reduce planning approval time, and can consolidate multiple frequencies in one antenna, reducing nodes while saving time and money.

We collaborate with you to ensure that the antenna you're deploying is the exact one to give you the highest performance at the lowest TCO. We then deliver the information and support you need for a successful installation.



Contact our experts today for more information.



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