



## Your Antenna Partner

We advise, design and deliver

**eMagazine**

August 2021



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## Dear Reader,

Welcome to the inaugural Alpha Wireless E-Magazine – we will be publishing these twice a year to keep you up to date on our business and projects.

I am delighted to say that Alpha Wireless has achieved solid growth in 2021; for example, we are seeing over 50% increase in the Fixed Wireless (FWA) markets where many of our customers are building out rural networks to help bridge the digital divide. Several projects that were due to be completed in 2020 have moved into 2021, but our team has stepped up to the challenges of working through this pandemic. We are delighted that some things returning to normal; it's great to be back on the road meeting people face-to-face and being able to attend live events once more.

We are well positioned to continue this growth for the second half of the year with good business performance expected in our key markets. We are exhibiting strong capabilities within the Private Networks space, and the addition of the new 3.5 GHz spectrum is driving new investments in this area. We have released and continue to release new products to help Alpha Wireless stay ahead in this sector.

In the coming year, we will take advantage of a number of new innovations around the 3.5 GHz/C-Band spectrum, including our next generation Stadium Antennas for 5G and upgrading our Tri-Sector portfolio for 5G. Our commitment to build long lasting partnerships with our customers is stronger than ever, and we are looking forward to continued success together.

This magazine includes information about our latest products, plus a whitepaper and press release that documents solutions that Alpha Wireless have deployed globally, including Ireland, Australia, Canada and the US. These stories are testament to Alpha Wireless' commitment to partnership, innovation and being a global expert in 3.5/CBRS technology.



**Fergal Lawlor**  
CEO



## + Breakthrough Antenna Delivers 3.5 GHz and 900 MHz Signals for Utility Network Modernization

CBRS/3.5 GHz and Anterix 900 MHz spectrum are being heralded as the go-to bands for updating utility communications networks. Their characteristics make them ideal for utilities to modernize aging communications infrastructure.

It's a tall order. Most utilities have disparate infrastructure systems that leave network reliability at the mercy of legacy equipment and multiple mobile network operators. Private LTE delivered by fixed wireless systems in the 3.5 GHz and 900 MHz frequencies delivers licensed, secure control of network coverage areas and operations.

Alpha Wireless has innovated a patented-pending Frequency Transparent Dipole Technology™ (FTDT) that enables delivery of high-performance signals in both frequency ranges through a single, discreet, compact antenna. Start with both frequencies or start with 900MHz and grow into CBRS for particular use cases, establishing your growth path to the future. This antenna complements Alpha Wireless' large portfolio of antennas solutions that also address utility private network applications.

### Widespread Need for Infrastructure Modernization

New spectrum and technology are awakening utilities to the many opportunities modern digital infrastructure affords:

- Consolidate multiple networks under one technology
- Provide broadband to underserved communities
- Enable a new smart grid
- Realize multiple use cases
- Enhance network security

These possibilities have created such an impetus for utility communications modernization that there is now a non-profit organization dedicated to this purpose – the Utility Broadband Alliance (UBBA). The group, made up of a broad range of industry stakeholders, is dedicated to “...advancing and developing private LTE broadband as a key communications infrastructure for a secure, resilient, digital grid.”

As utilities engage in modernization, the two recent developments in spectrum availability mentioned earlier are facilitating the creation of private LTE wireless networks. In the U.S., the CBRS 3.5 GHz band and the 900 MHz band open the field for utilities to upgrade legacy communications infrastructure and create a secure, modern, wireless network.

## Communication Is Critical for Modernization

Digital transformation is happening globally, and flexible, reliable broadband is at its foundation. Reliable connectivity opens opportunities for analytics, monitoring, automation and artificial intelligence applications.

That's where the new generation of private LTE networks comes in. CBRS and 900 MHz spectrum enable these private networks and open an entire new world of capabilities that set the stage for a connected future.

- Upgrade AMI/AMR applications
- Monitor remotely
- Protect sensitive data
- Keep employees connected in the field
- Gain critical business insights
- Stay agile as the environment, legislation and technology change

## Private LTE Delivers Control, Security and Performance

With private LTE, you have complete control over your network, yet you operate within the standard to enable interconnection. LTE is the global standard for cellular communication. It is a tried and trusted technology and many devices are compatible.

Utilities cannot afford the best-efforts service mobile operators offer. Connectivity must be utility-grade. Establishing a private LTE network means you are not dependent on an operator to establish the capacity and performance you need. You are also able to implement security protocols at the level you need to protect your data. With ransomware hacking of utilities in the news, this is a critical and growing issue.

Performance is paramount. Surrounding geography and features, other buildings, competing signals and even signals from your own network can impact wireless network performance. In addition, zoning and concealment considerations are increasingly an issue. Careful engineering at the outset goes a long way toward avoiding zoning and concealment holdups and establishing the carrier-grade performance that is critical to digitizing and modernizing your infrastructure.

## Optimizing Your Wireless Network

Each antenna you add to your network adds cost. You pay per node for the antenna and radio, rooftop or pole rent, installation and maintenance. You also add wind load and congestion to an already-congested RF environment. To reduce the cost of establishing private LTE wireless networks, Alpha Wireless has developed its multiport AW3874 antenna solution, an interleaved antenna that effectively delivers 900 MHz and 3.5 GHz frequencies in a single compact housing without compromising performance.

As an industry leader in advanced antenna solutions, Alpha Wireless' new FTDT antennas are designed especially for utility applications. They enable utilities to use one antenna to deliver multiple applications with a high degree of reliability and give you the lowest possible total cost of ownership.

Alpha Wireless also offers a broad range of single-band antennas that utilities can use to modernize. Here are a few examples:

Antenna	Frequency (band)	Gain	Beamwidth	Tilt	CBRS	Low
<b>AW3874</b> Dual-band panel	869-960/3300-3800 MHz	12/18	65°	T2°-T10°/ T0°-T10°	4	4
<b>AW3711</b> Reduced azimuth side lobes	3400-3800 MHz	20.1	33°	T0°-T10°	4	0
<b>AW3795</b> Six-sector panel	3400-3800 MHz	20.2	33°	T0°-T10°	4	0
<b>AW3161</b> 4x4 MIMO	3300-3800 MHz	17.9	65°	T0°-T10°	4	0
<b>AW3822</b> 2-Port 65° Panel	698-960 MHz	17.5	65°	T2°-T12°	0	2

## Enjoy the Benefits, Overcome the Challenges

Choosing private LTE as the new strategy for your communications infrastructure delivers a great many benefits. It also has challenges that are easily surmounted with careful engineering by an experienced partner. Building the initial network plan to minimize those challenges is critical to success.

Choosing your antenna partner wisely can make the difference between a robust network with durability and longevity while making expensive mistakes that cause poor performance and can lead to early rip and replacement.

Alpha Wireless has been designing and delivering antennas throughout the world for more than 15 years. While the CBRS/3.5 GHz and Anterix 900 MHz frequencies have recently become interesting for wireless broadband in the U.S., they have been available globally for years. We have the experience to guide you around the pitfalls of a new network venture using these frequencies, and a broad portfolio of antennas to choose from.

## Custom Solutions for Unique Networks

Every network has its own characteristics. It is our standard business practice to listen to your particular challenges and recommend solutions. Sometimes Alpha Wireless core products are exactly what you need, and sometimes you need a solution designed specifically for your network. This is why we carefully evaluate your requirements. If we don't have a ready solution for your network, we create one. Innovation, problem-solving and agility are some of our core strengths.

We also realize that in a network installation scenario, time is money. When we create a custom solution for you, we do it on your build schedule. We take a custom project from whiteboard to prototype in 90 days.

Contact us today to get started modernizing your communications infrastructure.



# AW3874

896-960 MHz and 3300-3800 MHz

## 900 MHz-CBRS Dual-Band Panel Antenna

Ultra-Compact, high-efficiency dual-band 8-port 900 MHz and 3.5 GHz sector antenna. Expertly designed using patent-pending frequency transparent dipole technology™ (FTDT), this antenna solution offers a reduced footprint without sacrificing performance.

### APPLICATION

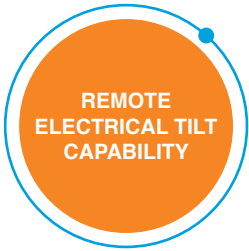
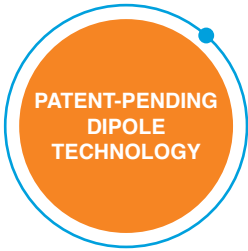
- Anterix (896-901/935-940 MHz) band
- 3.5 GHz Citizens Broadband Radio Service (CBRS)
- Ideal for utilities using AMR/AMI systems and remote monitoring
- Point to multi point (PtMP) and Non line of site (NLoS)
- Fixed wireless broadband access
- 900 MHz ISM and cellular bands
- LPWAN, LoRA, IoT, M2M, GSM, SCADA applications
- Wireless LAN systems & IEEE 802.16e applications

### FEATURES AND BENEFITS

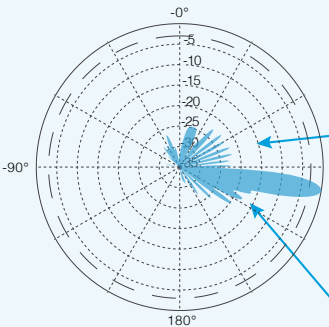
- Two bands, one antenna; reduced rent, install costs, and wind loading
- Independent remote electrical tilt with one controller on 900 MHz and one controller on CBRS
- Stable pattern and gain performance across all 900 MHz and 3.5 GHz ports
- Null fill with high gain provide consistent near and far field RF coverage while minimizing dead zones
- Compact and lightweight – 40"H x 19"W, net weight of antenna 11.1kg (25.5lb)

### ADDITIONAL FEATURES

- Four 896-960 MHz ports and four 3300-3800 MHz CBRS ports
- Enhanced MIMO performance with full 4x4 operation
- Heavy-duty UV-resistant radome and rugged galvanized brackets designed and tested for all-weather operation



### ALPHA WIRELESS' INNOVATIVE DESIGN

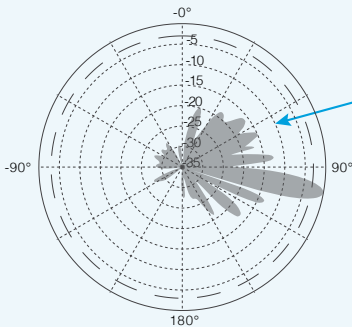


3.5 GHz Pattern

#### Alpha Wireless' 1:10 Phase Shifter – phase shifting each element in the array.

- Innovative design components minimize side lobe impact.
- Upper side lobes <20dB across the full tilt range and dual bandwidths
- Avoids beam spill in unwanted directions to minimize site interference
- Highly focused radiation and high antenna gain provides stronger signal levels to improve network throughput and reliability.
- Stable null fill applied for coverage close to the tower
- Frequency-agile pattern control

### STANDARD PANEL ANTENNA WITH SIDE LOBES



3.5 GHz Pattern

#### Typical Competitors 1:5 Phase Shifter – Phase Shifting in pairs of elements in the array.

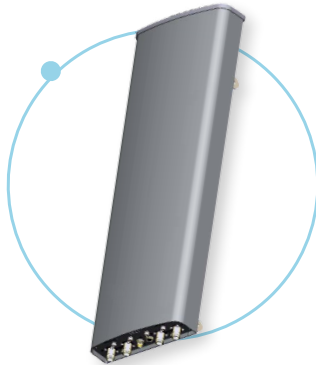
- Increases side lobes and radiation at off angles outside the main beam which degrades signal to interference
- All upper side lobes are inconsistent across the tilt range; normally optimized for mid-tilt
- Inconsistent and/or non-existent null fill across the band causing gaps in coverage near the tower.

## + Best Selling Products



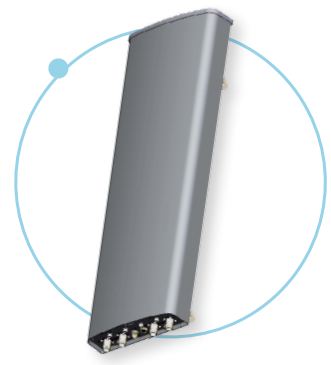
**AW3874**

Frequency (MHz)	896-960 (4P) 3300-3800 (4P)
Ports	8
Beamwidth	65°
Gain (dBi)	12 / 18
Tilt	eRET
Family	Panel



**AW3795**

Frequency (MHz)	3400-3800 (4P)
Ports	4
Beamwidth	33°
Gain (dBi)	20.1
Tilt	eRET
Family	Panel



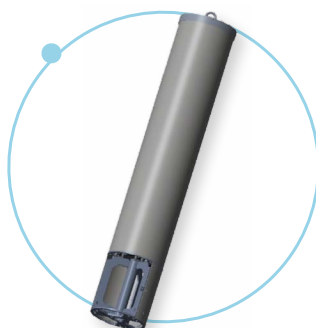
**AW3711**

Frequency (MHz)	3400-3800 (4P)
Ports	4
Beamwidth	33°
Gain (dBi)	20.1
Tilt	T0°-T10° (RET)
Family	Panel



**AW3872**

Frequency (MHz)	1695-2690 (6P) 3300-4200 (4P)
Ports	10
Beamwidth	360°
Gain (dBi)	8/5
Tilt	Fixed
Family	Small Cell



**AW3836**

Frequency (MHz)	698-960 (6P) 1710-2690 (12P) 3400-3800 (27P)
Ports	45
Beamwidth	65°/65°/90°
Gain (dBi)	14.5/17.0/16.0
Tilt	eRET
Family	Canister

Contact your expert Alpha Wireless advisors today for more information at [sales@alphawireless.com](mailto:sales@alphawireless.com)



## **Maximizing Performance using 3.5 GHz Fixed Wireless Broadband — Three Global Case Studies**

How to optimize antenna beamwidth and sidelobe management

## Closing the digital divide with 3.5 GHz

The gold standard in wireless communications today is to provide fast, quality broadband service to everyone, especially in preparation for 5G and the continuing explosion of IoT devices. However, interference has emerged as a limiting factor in congested areas that have competing signals from a large number of overlapping sectors and competing operators. Interference can also be an issue in thinly-covered areas within a single carrier's network.

With the availability of 3.5 GHz spectrum worldwide, and more recently CBRS in the U.S., operators have an unprecedented opportunity to deliver broadband to previously underserved areas. New operators are building networks in the 3.5 GHz spectrum, and existing operators are expanding networks in rural locations as well as congested urban areas.

## New technology calls for innovative solutions

Wireless operators constantly face the challenge of reducing costs, improving performance and increasing capacity. This is especially true with 5G fixed wireless broadband. It presents unique challenges. You likely deal with multiple carriers, geographic and manmade obstacles, concealment issues, and the interference concerns that greater RF density can cause due to unwanted RF coverage overlap.

There are a number of ways to build an effective 3.5 GHz network business case, from cell splitting and frequency reuse changes, to deploying additional spectrum and creating sector splits. Each solution has benefits and drawbacks. Cost is typically critical in fixed wireless access (FWA) networks, so building smart is important for profitability.

Building a new site is more expensive than upgrading an existing site, but not all enhanced technologies are economically viable. Some technology features are better suited for mobile wireless applications, while others work best for FWA. Some costs are up-front and others emerge during operation.

The decisions you're making now have a tremendous effect on your initial costs, but also affect the ongoing operational costs that impact your network's profitability.

**The decisions you're making now have a tremendous effect on your initial costs, but also affect the ongoing operational costs that impact your network's profitability.**

## Reducing interference is the key to higher performance

A major issue for wireless operators is combatting RF interference to enable faster and better-quality broadband. Fast, reliable service drives customer satisfaction, a larger customer base and higher profitability. Yet modern networks involve increased node density, a greater overlap in signals and unwanted interference that erodes service levels.

One of the best ways to control interference is using high-performance antennas that minimize side lobe RF energy and reduce beamwidth. Most FWA networks are extremely cost-sensitive, so expert network engineering is critical for selecting optimum configurations, minimizing costs and maximizing profitability.

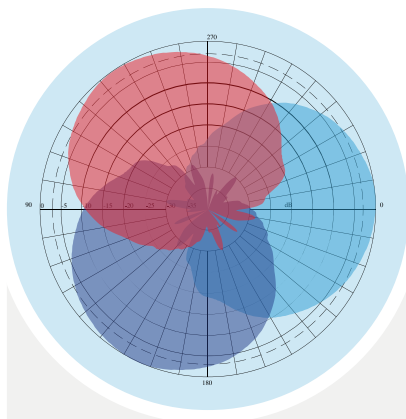
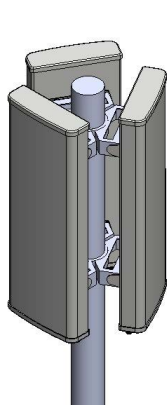
## The solution explained

Traditionally, cell sites are constructed using three sectors of antennas that have a horizontal beamwidth of 65 degrees. This provides for broad effective coverage, but because of the large energy overlap from one antenna to others, capacity efficiency drops.

Converting from 65-degree beamwidths to 33-degree beamwidths greatly reduces the energy overlap (Sector Power Ratio). However, this type of implementation requires installation of three additional antennas, adding cost and weight to already heavily loaded towers or rooftops.

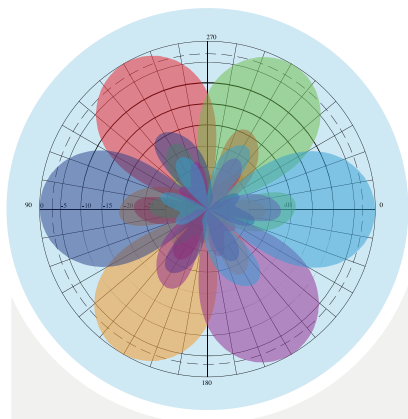
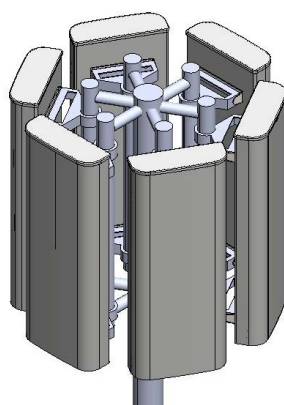
Alpha Wireless' innovative advanced antenna technology provides maximum capacity efficiency and often antenna count reduction. These technologies decrease interference. They also provide options for single-beam 4x4 MIMO per sector face and dual-beam support of 2x2 MIMO per beam.

Dual-beam support enables operators to increase capacity while lowering or zeroing leasing costs.



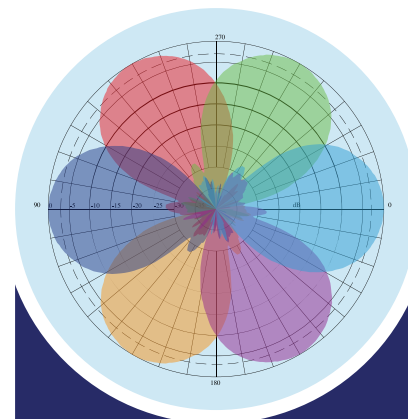
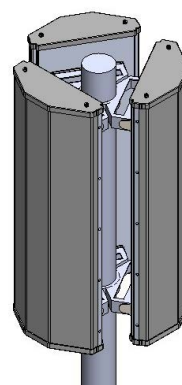
### Traditional three-sector

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.

## Choosing the right antenna makes all the difference

For operators to cost-effectively provide fast, high-quality broadband service, it is important to design the network for the 3.5 GHz environment. Reducing beamwidth and using the proper antenna configuration will limit sidelobe interference, which may reduce installation costs by decreasing node count. Doing this may avoid early rip and replacement of costly equipment.

In this white paper, we evaluate three recent 3.5 GHz installations. Each faced similar challenges, and each resolved them in collaboration with Alpha Wireless experts using the company's innovative antenna designs. Beyond solving a single issue on a particular network segment, the experience changed the operators' operations going forward.



**An Australian operator** achieved an 18-20 percent increase in downlink speeds and 2.7 dB to nearly 6 dB gain in carrier-to-noise and interference ratio (CINR) across three different trial markets.



**An Irish operator** improved network performance more than 15.5 percent across customer premise equipment (CPE) metrics, and overall signal strength increased by 5.1 dB when compared to the soft split design.



**A Canadian operator** increased average CINR by 3.2 dB, and 42 percent of user equipment (UE) experienced 3 dB to more than 6 dB CINR in performance gains.

For detailed information about each of these deployments, [download the full white paper](#)



## Alpha Wireless Equips Nextlink to Accelerate Broadband Internet Access Across American Midwest

*Proven 3.5 GHz Antenna Solutions Boost Capacity, Coverage for Efficient Use of CBRS Spectrum, Paving the Way to 5G*

Alpha Wireless, a global leader in antenna solutions, is supplying 3.5 GHz-capable antennas to Nextlink Internet to enable delivery of broadband internet to underserved communities throughout the Midwestern U.S. The large-scale, private LTE network deployment using the Citizens Broadband Radio Service (CBRS) spectrum helps Nextlink reduce the costs of rural broadband provision while increasing performance and preparing for tomorrow's 5G networks.

Nextlink selected the Alpha Wireless family of antenna solutions to meet the stringent technical requirements of delivering high-speed, fixed wireless internet connectivity to families and businesses across largely rural areas in 11 states. With more than 15 years' experience designing and manufacturing 3.5 GHz-capable antennas, Alpha Wireless was able to quickly customize an antenna solution to support Nextlink's commitment to help close the digital divide, as a top winner in the Connect America Fund (CAF) II auction.

The multi-year Nextlink deployment includes the Alpha Wireless AW3161 3.5 GHz antenna working with Nokia radios in an LTE network that can be easily upgraded to 5G. The comprehensive Alpha Wireless family of CBRS-ready antenna solutions includes pseudo-omni, small cell, beamforming, concealment and tri-sector antennas proven to increase capacity and coverage over the past decade in existing deployments in the U.S., Canada, Ireland and Australia. With an innovative design that enables reduced tower footprint, faster roll-out, increased capacity and maximum coverage, the Alpha Wireless antenna solutions allow Nextlink to optimize performance and deployment speed while cutting operational costs.

"At Nextlink, we are focused on delivering high-quality service to more than 70,000 customers. Our 5G-ready LTE network upgrade will extend access to essential high-speed internet services for remote work, online learning, telehealth services, agricultural IoT, and digital entertainment across America's heartland," said Cameron Kilton, Chief Technology Officer, Nextlink. "The Alpha Wireless team has a breadth of experience in 3 GHz-capable antenna design and deployment is critical to our ability to successfully build and deploy the best possible network from our \$28.4 million investment in more than 1,000 CBRS Priority Access Licenses which provides our platform for future growth."

"As a global leader in 3.5 GHz-capable antenna technology, and an active participant in the OnGo Alliance, Alpha Wireless offers the most comprehensive portfolio of antenna solutions for high-capacity LTE and 5G mobile and fixed wireless networks operating in the CBRS band," said Fergal Lawlor, Chief Executive Officer, Alpha Wireless. "Having worked with Nextlink on previous deployments, it is gratifying to bring our innovation and expertise in 3.5 GHz antenna solutions to support their CAF II expansion project, delivering low-cost solutions optimized for broad coverage to allow more efficient service delivery in rural areas."



## **Alpha Wireless Unveils Antenna Solutions to Enable Utility Network Modernization**

### ***Alpha Wireless AW3874 Dual-Band 900 MHz and 3.5 GHz Antenna Fuels Digital Transformation for Critical Utility Infrastructure***

Alpha Wireless, a global leader in antenna solutions, today introduced the Alpha Wireless AW3874 dual-band antenna, engineered to empower utilities to modernize and digitize their communications infrastructure. With support for both 900 MHz and 3.5 GHz / Citizens Broadband Radio Service (CBRS) spectrum in a single antenna, the AW3874 provides a smooth upgrade path to smarter, more secure network infrastructure and optimal operational efficiency.

Escalating threats from cyber-attacks, vandalism and severe weather have highlighted the urgency for utilities to upgrade critical communications infrastructure for more modernized operations, thereby increasing scalability, performance and efficiency. Secure, private LTE broadband connectivity delivered with fixed wireless technology provides a reliable and effective method to upgrade device security, improve real-time monitoring, enable active control of energy distribution systems, and collect business-critical data from automated meter reading (AMR) systems and advanced metering infrastructure (AMI).

With an ultra-compact, high-efficiency design using a patent-pending frequency-transparent dipole technology™ (FTDT), the AW3874 reliably delivers single band like performance from a multi-band antenna in a compact form factor. The antenna's small footprint reduces wind load, as well as saving on site lease, installation, equipment and maintenance costs, without sacrificing performance or signal quality.

“As a powerful ally for network modernization, we bring deployment expertise and the performance of carrier-grade antennas to utilities to help them navigate the digital transformation landscape toward smarter and more secure infrastructure,” said Tim Sill, Vice President of Technology and Business Development, Alpha Wireless. “Industry-leading Alpha Wireless antenna solutions are uniquely positioned to meet the exacting requirements of secure, private LTE network deployments for today’s utility operations.”

In addition to the AW3874 antenna, Alpha offers a broad portfolio of dual-band and single-band antenna solutions designed to allow utilities to leverage the latest communications technologies. To learn more about the Alpha Wireless industry-leading antenna solutions for utilities, visit: <https://alphawireless.com/utility-network-solutions/>

# ANTENNA PRODUCTS

FLEXIBILITY INNOVATIVE

# CUSTOMER-DRIVEN

AGILE SERVICE

Recently we received our NPS Score from our loyal customers. Read what exactly they have to say about us...

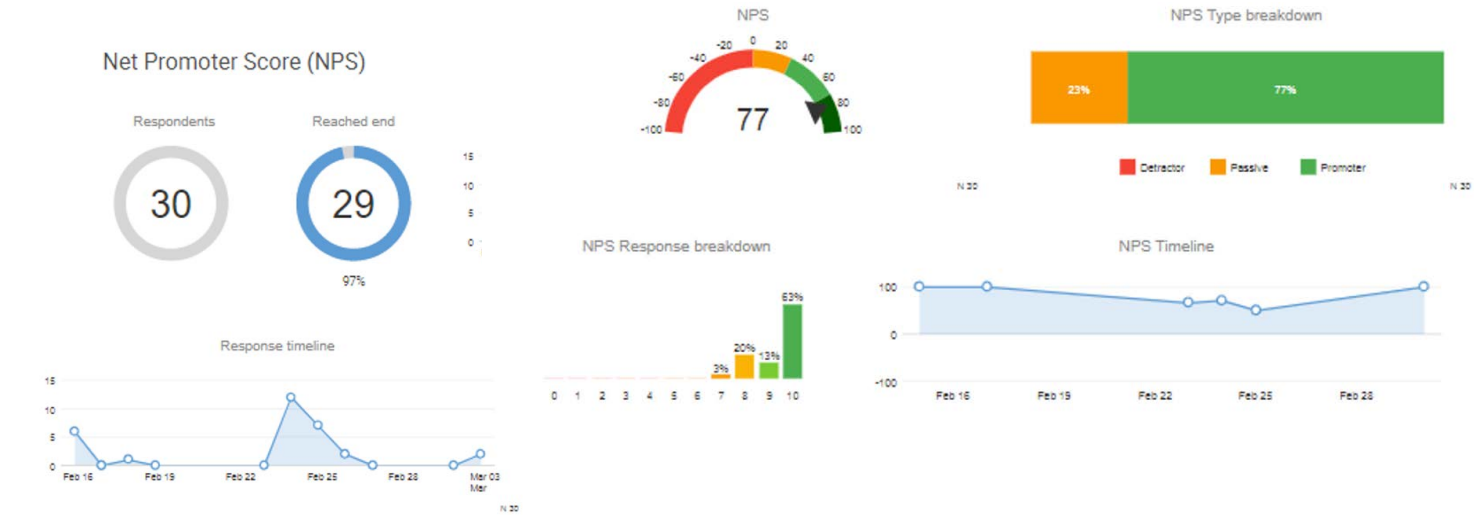
We asked our customers what they liked best about Alpha Wireless. They said our antenna products, our flexibility and our service. Others said we're agile, innovative and customer-driven. Aw, thanks! Find out what they're talking about.

*"Alpha Wireless 5G antenna customers have spoken, and 92% are highly satisfied with our support, communication and responsiveness."*

*"Very good equipment, accessible company, easy to work with."*

*"Our Alpha Wireless salesperson was very helpful, offering antenna options and finding devices that fit our needs."*

Need antennas for your 5G network? We'll listen. A lot. Our customers are glad they did.





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