

## Case Study: The Power of Next-Generation FWA

One of the most significant contributors to FWA cost is infrastructure, both in dollars spent as well as time and effort to install and manage. Saavy operators know the value of a wise investment requires evaluating the sum-total of all costs to support a given set of subscribers. In this real-life example we use an actual operator's experience to contrast and compare costs and complexity associated with traditional FWA systems versus Tarana's Next-Generation FWA (ngFWA) G1 platform.

Overall, G1's field-proven innovations and ease of use resulted in:

- Over 3x fewer radios (13 reduced to 4)
- Improved coverage, reaching subscribers unreachable before
- Up to 16x more subscribers per radio
- Higher speed tiers: Up to 600Mbps+
- Higher ARPU
- Simpler radio planning (k=1)

### Traditional Equipment, Traditional Challenges

Mountain Broadband serves communities in the mountain areas near Denver, Colorado. They previously offered service to their customers using a wide variety of equipment. In the picture to the right, a tower is shown with 13 radios from 4 different FWA vendors (Baicells, Mimoso, Ubiquiti, Cambium). Why so many vendors? Because in an effort to serve customer demand they needed to add new systems as each platform exhausted its capabilities.

Having so many different vendors led to 4 different management systems – an additional level of complexity that made both deployment and troubleshooting difficult and complex. The multiple management systems also made it hard to coordinate spectrum use between the different platforms which meant high levels of self-interference – reducing achievable link speeds and sector capacity. This had the knock-on effect of fewer subscribers per radio at slower speeds. In Mountain Broadband's case, their highest level of service was 30 Mbps with a range of 15 - 50 subscribers per radio.



### The Next Generation of FWA

As an operator invested in getting the most out of their assets, they found the old way of doing things put a brake on expansion in a big way. To fix this, they turned to the Tarana G1 platform.

G1's innovative breakthroughs create an entirely new paradigm for building and growing fixed wireless access networks. G1 features field-proven technology such as interference and noise cancellation, fine grain Tx and Rx digital beamforming distributed massive MIMO at both ends of the link, and perfect multipath integration for excellent NLoS and nLoS link performance, and k=1 spectrum reuse.

Armed with this technology, Mountain Broadband was able to expand their capabilities and, at the same time, reduce complexity and costs. The same tower shown above, with 13 different radios, was replaced by just 4 G1 Base Nodes (BNs), all managed by a single platform, Tarana Cloud Suite (TCS). This resulted in an immediate cost savings in terms of total radios and complexity (deployment as well as monitoring and troubleshooting). They also found that, with better coverage, they were able to reach new customers that had previously not been possible to connect.

In addition to these significant benefits, G1's interference and noise cancellation made RF planning much simpler. The same tower with 4 BNs is able to use full (k=1) spectrum reuse, i.e. all 4 radios are using the same frequencies with minimal performance impact. This is in sharp contrast with their legacy equipment



that relied on k=2. Though this system is operating in unlicensed 5GHz spectrum, k=1 has an even more profound impact for CBRS where moving from k=2 means they only need to purchase half the spectrum, another significant cost saving.

Tarana's Asynchronous Burst Interference Cancellation (ABIC) technology also reduces the impact of bursty interference such as from nearby Wi-Fi transmitters. Less interference creates more reliable, higher-speed connections. Less interference also means greater capacity and the ability to support more subscribers per radio.

These cost savings and benefits do not come at the price of less scale. With support for 250 subscribers per radio, G1 scales well beyond the legacy FWA equipment: each 4-sector site supports a total of 1,000 subscribers instead of a best case of 300. Additionally, these benefits do not come at the sacrifice of speed. Where their old system supported a maximum speed tier of 30 Mbps, with G1 they are offering all their customers tiered packages with plans to add a new 100Mbps tier. For future growth, G1 can support services well beyond these packages – up to 600Mbps tiers are possible.

	<b># of Radios</b>	<b>Highest Speed Tier</b>	<b>Tower Capacity</b>	<b>Max Subscribers</b>	<b># Mgmt Systems</b>	<b>Propagation</b>	<b>Radio Planning</b>
<b>Legacy</b>	13	30 Mbps	~1 Gbps	300	4	LoS	k = 2
<b>G1</b>	4	100 Mbps	9.6 Gbps	1,000	1	LoS, NLoS	k = 1

## Summary

The increasing demand for high-speed broadband presents wireless operators with a fantastic opportunity to grow their business both in number of subscribers and ARPU which directly drives profitability. However, this opportunity only exists if the operator is able to reliably handle the additional scale and capacity required.

G1 turns opportunity into reality through:

- Reliable, high performance: 2.4 Gbps sector capacity
- Up to 800 Mbps combined UL/DL per-link rate with resulting higher speed service tiers
- High number of subscribers (up to 250 per sector/radio)
- Superior coverage, especially in NLoS and nLoS conditions
- Interference and noise cancellation enabling full (k=1 spectrum) reuse
- Near licensed spectrum performance with unlicensed spectrum
- Simplified radio planning, installation, and management
- Less hardware (radios, switching ports, etc.)

These features were crucial for Mountain Broadband and represent a new paradigm for designing and operating large scale fixed-wireless networks. “Our footprint will be entirely different with Tarana,” says Benjamin Hammond, CTO. “And our customers will be much happier.”

The difference between legacy FWA and G1 is striking. Unlike legacy systems that use repurposed technology, G1 was designed from the ground up specifically for large-scale FWA. This enables G1 to deliver better performance with less equipment (and less cost) than legacy solutions. G1's results are field-proven with operators like Mountain Broadband as they expand their network, subscriber base, and offerings while simultaneously reducing overall costs and complexity. With G1 from Tarana, Mountain Broadband is deploying transformative, Next-Generation FWA that takes their business to an entirely new level of performance and economics.

## About Tarana

Tarana Wireless, Inc. is the performance leader in next-generation fixed wireless access network solutions. The company is headquartered in Milpitas, California, with additional research and development in Pune, India. For more information, visit [taranawireless.com](http://taranawireless.com).