

WHITE PAPER

Next-Generation Fixed Wireless Access: Built to Last



While it is true that nothing lasts forever, no one wants to upgrade a network more often than necessary. Tarana's Gigabit 1 (G1) is an advanced next-generation fixed wireless access (ngFWA) platform designed specifically to address the challenges of FWA over a long service lifetime. By investing in G1, operators can build a network that meets both current and future needs, with a lifespan that far exceeds that of other FWA technologies. This is made possible by G1's cutting-edge technology, including multidimensional signal processing, sophisticated antenna arrays, custom hardware, and intelligent algorithms. These innovations give G1 capabilities far beyond those of legacy FWA products, which use technology not originally designed for FWA. Moreover, ngFWA's lifetime cost can match or even be lower than that of fiber infrastructure. By choosing G1, operators benefit from longer infrastructure lifetimes, which translates directly into lower total cost of ownership and greater return on investment.

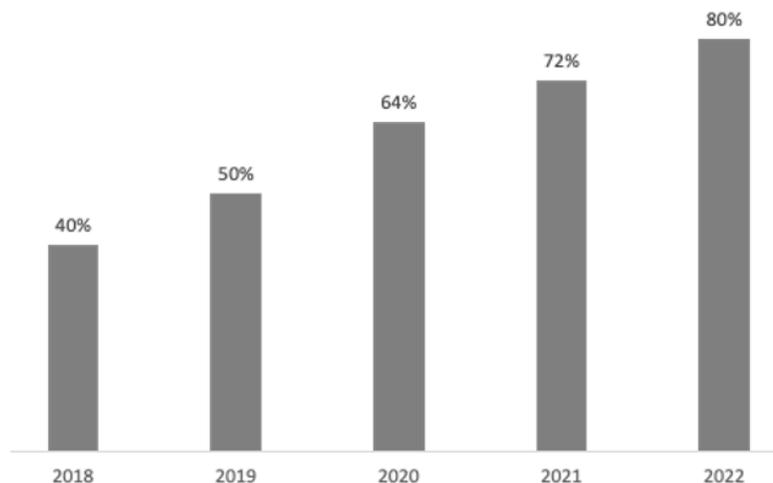
When operators consider the longevity of their network equipment, several factors drive the upgrade cycle:

- › Faster speeds
- › Higher capacity and scalability
- › Better reliability
- › Backward compatibility with new equipment
- › Total cost of ownership

Speed

Operators often upgrade their network equipment to offer faster service plans. In many cases, legacy FWA networks were originally designed for 25/3 Mbps, however, subscriber preferences are changing. According to the NTCA 2022 Broadband Survey Report, 80% of subscribers are choosing plans greater than 25 Mbps. Faster speeds are necessary to increase competitiveness and drive higher average revenue per user (ARPU).

Percentage of Subscribers with Speeds > 25 Mbps
(According to the NTCA 2022 Broadband Survey Report)



Over the last two decades, broadband speeds have increased from 1 Mbps to 100/20 Mbps or even faster. This is driven, in part, by federally-funded broadband initiatives that are mandating a minimum of 100 Mbps. Based on this growth rate, a fixed-wireless network put into service today would need to be capable of delivering 500 Mbps service in 10 years. Tarana's G1 platform is already capable of delivering speeds of up to 600 Mbps today (800 Mbps aggregate) and will support up to 1.6 Gbps aggregate capacity with an upcoming software update, making it suitable to deliver both today's and tomorrow's speed requirements. Legacy fixed wireless access (FWA) networks may not have the same capability, forcing operators to upgrade every 2-5 years to remain competitive and capable in changing market conditions.



Capacity and Scalability

A typical household in 2022 used approximately 4 Mbps of peak busy hour throughput, a number that has been growing by 20% year-over-year for the last decade. If this growth rate continues, a legacy FWA network sector capable of supporting 30-50 subscribers today will struggle to handle more than 10 subscribers over the next decade. As a result, legacy FWA networks will require an upgrade in the next 5 years or even sooner, depending on the technology's capabilities. In fact, multiple upgrades may be necessary to meet rising bandwidth demands.

With a sector capacity of 2.4 Gbps, G1 has enough capacity to support up to 256 subscribers at the current 4 Mbps rate and up to 96 subscribers in 10 years when the projected peak busy hour throughput rises to 25 Mbps. Indeed, if it wasn't for the 256 subscriber limit, G1 has enough capacity to handle up to 600 subscribers at 4 Mbps. These numbers are far beyond what is possible with legacy FWA and are illustrative of the thinking that went into G1's design to ensure there was plenty of capacity for future needs.

Many operators have successfully demonstrated G1's scalability, with more than 150 subscribers on a single sector, and the platform has the potential to support even more. Additionally, future base nodes are planned to increase site capacity (4 sectors) from 9.6 Gbps to 25.6 Gbps per site without requiring any modifications to existing links. This enhanced scalability can be achieved without the need to replace the entire infrastructure, as new assets will only be required at the tower end rather than at both ends of the link.

Reliability

The speed and capacity of a link are meaningless if the link is unreliable. The leading cause of link degradation is interference, which can originate from external sources, such as other operators or Wi-Fi networks, or from self-interference within an operator's cell. With wireless systems becoming increasingly popular, the expected growth in interference is also increasing. A link that is free of interference today may not remain so in the future when new and more significant sources of interference appear.

The G1 platform incorporates numerous pioneering optimizations that eliminate the impact of RF interference, isolating the signal of interest and providing immunity from all but the most severe RF environments. This design approach not only protects links from current interference sources but also future proofs them against potential sources of interference that may arise years from now, thereby extending the network's service life.

Backward Compatibility

Another common challenge is maintaining backward compatibility while installing new equipment. Tarana is committed to innovating and improving its technology, but with G1, backward compatibility is ensured for the next generation of equipment when it is shipped. This reduces the need to upgrade the existing network to maintain compatibility. Operators can choose to keep existing equipment in place or replace it with new hardware if greater performance is required, while the old equipment can be repurposed elsewhere.

An example of this is the upcoming 6 GHz base nodes, which will maintain compatibility with the current 5 GHz remote nodes in the field, avoiding the need for costly upgrades and truck rolls and further prolonging service life. Moreover, the new base nodes that support 1.6 Gbps operation will be backward compatible with all current remote nodes. This enables operators to upgrade their network's speed and capacity with new base nodes while continuing to support previously installed remote nodes.

Total Cost of Ownership

Although fiber is often considered the ultimate solution for low total cost of ownership over the long term, this is not necessarily the case. Next-generation wireless technologies such as Tarana's ngFWA G1 platform have been designed to meet or exceed fiber in terms of economic feasibility. In fact, an [analysis](#) of the G1 platform shows that the capital expenditure (capex) for a G1 deployment is 60% more cost effective than an all-fiber solution over a 50-year period.

Operators seeking to quickly expand their service coverage with gigabit service while keeping the total cost of ownership low should carefully consider G1. G1 has demonstrated its ability to deploy fiber-class service at a fraction of the time and cost required by fiber.

Summary

If you are an operator looking for long-term performance and reliability, G1 is the ideal choice to future-proof your network. It provides unmatched speeds, capacity, scalability, and backward compatibility, along with a low total cost of ownership that can meet today's needs and those that may arise in the next 10, or even 50 years. By considering G1, you can ensure that your network stays ahead of the competition, without any compromise on quality and affordability.

- › 8-10% the total cost of fiber capex for first 10 years of deployment; 40% of the cost of fiber over 50 years
- › Aggregate link speed of 800 Mbps, with upcoming 1.6 Gbps operation (available as a software only upgrade), amply meets needs for multi-hundred-megabit and gigabit service
- › 2.4 Gbps sector capacity, with planned future base nodes that will nearly triple capacity; easily servicing the next decade of peak busy hour growth (from 4 Mbps to 25 Mbps)
- › Each base node is scalable up to 256 subscribers/sector
- › Cancels RF interference that would severely impact legacy wireless links
- › Backward compatibility across multiple models and modes of operation

Upgrading a network is always challenging, and this is true for all broadband technologies including fiber, wireless, and cable. No operator wants to experience the downtime or incur the costs associated with truck rolls required to increase the speed or capacity of their network. However, with Tarana, operators can be confident that the network they deploy today will continue to deliver the performance they need a decade or more from now. Next-generation fixed wireless is endgame broadband — not a stopgap technology — that will serve operators and subscribers well for years to come.

Interested in learning more about our innovative solutions? Get in touch with us at taranawireless.com/how-to-buy

Tarana is on a mission to accelerate the deployment of fast, affordable internet access around the world. With a decade of research and more than \$400M of investment, the Tarana engineering team has created a unique next-generation fixed wireless access (ngFWA) technology instantiated in its first commercial platform, Gigabit 1 (G1). G1 delivers a game-changing advance in broadband economics in both mainstream and underserved markets, using both licensed and unlicensed spectrum. G1 started production in mid-2021 and has been sold to more than 200 service providers globally. Tarana is headquartered in Milpitas, California, with additional research and development in Pune, India. Visit taranawireless.com for more on G1.

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