

# Breaking the Fixed Wireless Gigabit Barrier

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*mimosa*  
by Airspan

Meet the Mimosa by Airspan Gigabit  
6-Series Wi-Fi 6E Platform



The Mimosa by Airspan 6-series platform introduces the first gigabit subscriber speed, fixed wireless, PTMP (point-to-multipoint) solution, with the scalability to leap far ahead of the deployment time and cost limitations of fiber. As an incredibly affordable and scalable fiber-fast wireless solution, the 6-series is ready to tackle any rural, suburban, and even the densest underserved cities.

## Wireless First

Fixed wireless access (FWA) has led the way in providing affordable broadband in remote areas, where fiber and cable could not be deployed affordably or rapidly. Whether it is in hard-to-reach rural areas, or in underserved cities and developing countries where demand is at an all-time high, wireless PTMP is often the only option to rapidly provide connectivity when no existing wired infrastructure exists or can be affordably deployed.

## The Scaling Challenge

The first generation of FWA technologies was comprised of costly proprietary technologies, as well as affordable 802.11n/802.11ac OFDM-based solutions, both of which were limited in spectral efficiency, scalability, and subscriber speed. With these limited wireless technologies, and even more limited spectrum availability, scaling FWA networks with future-proof fiber-fast speeds has been an impossibility. Until now.

## Mimosa Wi-Fi 6E FWA Delivers Fiber Speeds and Massive Scale

The Mimosa by Airspan A6 access point (AP) and C6x client, part of the 6-series platform, introduce the next generation of FWA, delivering up to 7 Gbps of capacity, support for a massive 200+ subscribers at speeds of up to 1.75 Gbps, and high-reliability interference management so that unlicensed spectrum can confidently be used in almost any environment.

The 6-series incorporates the highest performance Wi-Fi 6E chip technology available today, with 60 bps/Hz, 8x8 multi-user MIMO spectral efficiency, low-latency OFDMA, new 1024-QAM modulation, noise reducing antenna beamforming, and support for new, wider 160 MHz channels in the new 6 GHz band. Together with unique Mimosa by Airspan chip source code technologies for channel reuse, outdoor deployment scaling, and new noise-elimination technologies, the 6-series delivers gigabit services in the high-propagation unlicensed mid-band spectrum for the first time ever.



## Gigabit Rural Broadband

With new funding programs like the Rural Development Opportunity Fund (RDOF) driving gigabit and fiber competitive speeds into unserved and underserved areas, the Mimosa 6-series is the perfect fit with up to 7 Gbps of AP capacity and 1.75 Gbps subscriber speeds at distances of 2+ miles.



## Gigabit Residential MicroPoP

MicroPoPs are all the rage, taking affordable competitive broadband speeds into dense residential neighborhoods. Mimosa innovated the trend with low-power, compact hub home and utility pole solutions to reach through nearby foliage out to 500 m, and synchronize base stations throughout the area. The 6-series now introduces gigabit speeds at an incredibly affordable cost per home, and improves reliability with the most advanced noise fighting technology, and new 6 GHz channels to fend off unlicensed neighborhood Wi-Fi noise.



## High-Density Tower Capacity

Let's face it, managing large numbers of low-subscriber scaling APs at sites is incredibly frustrating, and even more difficult to manage finding clean channels. With over 5x the subscriber client and AP capacity, advanced new noise OFDMA and 8x8 MIMO beamforming noise fighting technologies, and up to 500 MHz new spectrum in the 6 GHz band, the 6-series can handle increased tower capacity needs with ease.



## Affordable Urban Density

Dense developing urban areas are always the most cost-sensitive, and to date, nearly impossible to scale due to technology limits and noise. What if the highest capacity solution, with the most advanced noise fighting technologies that could scale at a citywide level, is also the most affordable option? It is now! The new A6 delivers super subscriber scale at only \$5-6/subscriber. And with the affordable C6x client starting with a low-cost 100 Mbps option, and license keys to support up to gigabit applications, the 6-series is ready to fuel affordable, scalable growth globally.



## Carrier Urban Hybrid Broadband + Wi-Fi Offloading

Taking urban broadband one step further, as MNOs in "mobile-first" economies realize additional capacity is now needed in dense cities, it's important to offload unconnected homes, as well as handsets on Wi-Fi opportunistically, to keep 4G and 5G networks operating under capacity. The A6 enables a unique dual-SSID or dual-channel capability for fixed clients, as well as hybrid Wi-Fi 5/6/6E connections to handsets. This simple approach allows a unified offload platform for massive amounts of capacities at buildings and dwellings, and individual smartphone subscribers in urban areas.



## Business Grade Broadband

Vast numbers of small businesses and buildings are still out of reach in fiber and cable operator footprints, and wireless presents a unique opportunity to rapidly accelerate footprint growth to reach unconnected businesses. While previous generations of fixed wireless equipment lacked speeds equivalent to fiber and cable operator's services, the 6-series levels the playing field to deliver equivalent gigabit speeds, and options for guaranteed bit rate services and QoS prioritization. Businesses also looking for the lowest-cost options, to incorporate in their SD-WAN managed broadband connectivity and cloud hosted services strategies, will enjoy the affordability and value operators can deliver with the 6-series.

## Technology that Breaks All the Barriers

Building a high-scale network to handle large scale subscriber growth, and maintain fiber-fast broadband performance over time is a complicated, multi-faceted problem:

- **Subscriber Capacity:** Individual AP capacity and efficiency is the cornerstone of scale. The more subscriber capacity per AP, the fewer the number of APs that are needed to be deployed, occupying channels, and introducing self-interference.
- **Spectrum Capacity:** To achieve gigabit speeds, wider channels are needed especially in longer distance, rural areas. The availability of the new 6 GHz band is an incredible opportunity to expand scale and performance with new clean, coordinated spectrum.
- **Interference Mitigation:** To take advantage of broad channels and unlicensed spectrum, it's critical to enable clean channel operation for each subscriber with differing noise conditions connected to an AP. Improved handling of unique subscriber noise conditions eliminates the need for additional APs on different channels in the same coverage area and increases overall scaling by reducing unnecessary additional spectrum use.
- **Network-Wide Coordination:** GPS transmission synchronization at sites and across the network enables high-efficiency spectrum reuse, and coordinates transmissions to avoid self-interference.

## Scaling the Old Way

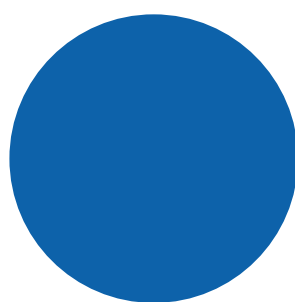
To date, the only way to scale networks with legacy OFDM/TDMA based APs has been to add a new AP for each 30-40 subscribers to limit high latencies and provide 50-100 Mbps subscriber speeds. With low spectral efficiency, and limited spectrum available in 5 GHz, this rapidly exhausts the band, pushing operators to reduce channel sizes (which limits subscriber speeds), and “wedge-in” more APs using very narrow beamwidth antennas to gain more subscribers in a coverage area. Even with AP synchronization, and new spectrum coming available in the 6 GHz, it is an unwieldy complex, constantly changing, costly approach to add scale and manage extensive noise and self-interference from the operator's own APs.



200-400 Subscribers,  
12 x APs on 3 Channels

## Scaling With the Mimosa 6-Series

The 6-series completely redefines scalability, enabling massive subscriber scale per AP in order to support even the densest environments. By leveraging “massive MU-MIMO”, new OFDMA low-latency scheduling technologies, expanded channel sizes in new low-noise spectrum, and extensive new interference mitigation approaches, the 6-series seamlessly handles the complexities of managing a large base of subscribers across the network. This greatly reduces the number of sites, as well as the number of APs per site, by up to 12x—while taking advantage of low-cost, high-performance subscriber client unit devices.



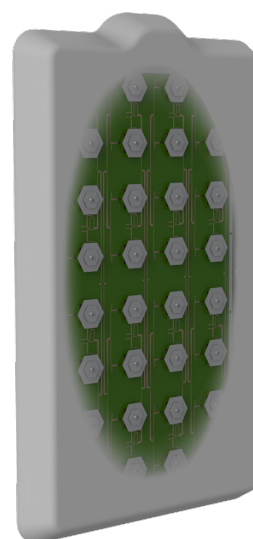
200+ Subscribers,  
1 x AP on 1 Channel



800+ Subscribers,  
4 x APs on 2 Channels

## Radically Increasing Bandwidth Capacity

As subscribers are added to expand scalability, downstream capacity demand at the AP increases linearly. Current generation FWA PTMP systems typically only accommodate 1 Gbps, making scaling for high-speed gigabit subscribers, or high scale of lower speed subscribers, nearly impossible. To meet this new capacity demand, Mimosa has introduced the industry's most powerful multi-user MIMO silicon technology, with 8x8 (8-stream) beamforming to up to four simultaneous subscribers. Together with new 6 GHz spectrum to achieve 160 MHz channels, and improved 1024-QAM modulation, the A6 AP delivers up to 7 Gbps simultaneous capacity—plenty of capacity for gigabit deployment requirements, as well as massive client scale applications in developing dense markets. At over the 60 bps/Hz spectral efficiency, and up to 120 bps/Hz with channel reuse, the A6 delivers up 6x the performance of previous FWA solutions.

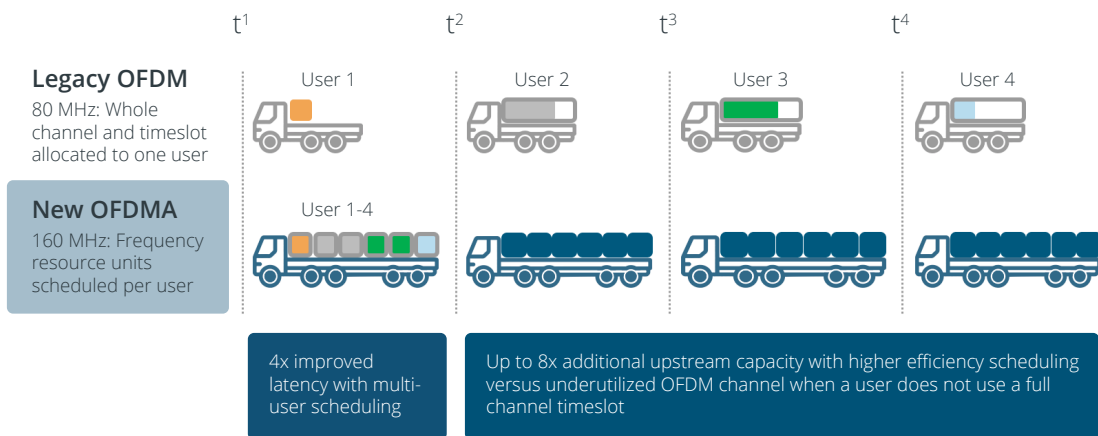




## New OFDMA Scheduling

Legacy FWA systems limit subscriber traffic to one scheduled subscriber at a time using the full channel in the upstream direction. This more limited TDMA sequential scheduled approach allocates the use of the full channel bandwidth to only one user at a time, and typically leads to 40 ms latencies and substantial unusable capacity as subscribers increased on the AP.

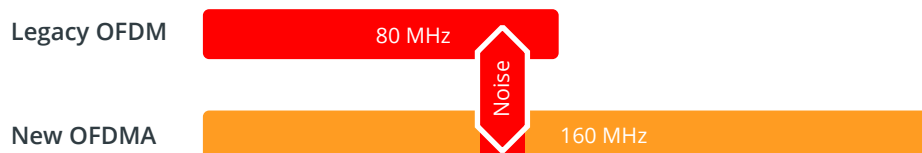
The 6-series introduces a new Wi-Fi 6E based OFDMA scheduling approach which allows for the channel to be sub-divided simultaneously for up to four subscribers, allocating a portion of the resource units of the channel to each subscriber dynamically. This eliminates significant unused portions of previous single user timeslots, and dramatically reduces subscriber wait times to transmit data. This translates to a fraction of the latency, and dramatic increase of the channel efficiency and capacity for additional subscribers per AP by more than 5x.



## Handling In-Channel Interference

In OFDM based systems, handling in-channel noise in unlicensed bands is extremely challenging, as the whole channel is handled as a single resource unit (RU), unable to tolerate noise in just a portion of the channel. While some FWA systems employ beamforming to attempt to adjust the antenna transmit and receive patterns to null some noise, the effect was limited in 4x4 MIMO systems. With limited in-channel noise mitigation options, most noise mitigation approaches used expensive adjacent-channel filters, which unfortunately had no impact to in-channel noise.

With the new Wi-Fi 6E OFDMA implementation, the RU of the channel is now a tiny 2 MHz, versus the previous 80 MHz channel RU in OFDM 802.11ac. This change alone can improve SNR by 10-20 dB and, for the first time, aggressively takes on in-channel noise. Mimosa pairs this improvement with even more narrow 8x8 antenna beamforming for finer grained directional noise nulling, and field-proven automatic gain control (AGC) which monitors signal levels per subscriber during their scheduled transmission slots, only listening for their specific directional transmission at the expected signal level.



This comprehensive noise management approach enables significant scaling of subscribers, by enabling AP capabilities to monitor and adjust to the unique interference profile at each subscriber location, reduce impact to noise in the operating channel, along with industry leading 40 dB front-to-back antenna isolation on the flexible C6x client radio N5-X25 antenna.



## Network Wide Coordination

With limited spectrum resources available, each channel used must be carefully coordinated to avoid unnecessarily using additional channels. Channel reuse schemes using GPS synchronization have been the hallmark of TDMA systems to coordinate transmissions, and eliminate self-interference—reducing the number of channels needed at each site and intrasite across the network.

With the 6-series, Mimosa has evolved the GPS synchronization channel reuse capabilities to expand to synchronized OFDMA upstream scheduled timeslots. This now can enable up to four subscribers to transmit simultaneously upstream to the AP in a scheduled fashion on different OFDMA carriers—each assigned a portion of the channel by the AP during the synchronized transmission timeslot. In addition, MU-MIMO in the downstream

direction simultaneously can transmit to up to four clients at the same time due to unique subscriber beamform patterns, allowing each subscriber to gain full access to the operating channel.

As always, the GPS modules are fully integrated into the A6 AP with no additional unreliable GPS antenna cables or costly external sync power modules required.

### **Expanding Into the New 6 GHz Outdoor Bands**

In 2022, certain countries are introducing new regulations to allow use of the vast 6 GHz band (5.925–7.125 GHz), directly adjacent to the current unlicensed 5 GHz band. In some markets, such as the USA, portions of the band will be allocated for unlicensed use with the assistance of an Automated Frequency Coordinator (AFC) database to ensure zero interference to incumbent 6 GHz PTP (point-to-point) licensed backhaul users. Mimosa will be supporting the FCC in first the half of 2022 and is hardware-ready for up to 6.425 GHz initially.

Based on the typical usage locations of 6 GHz incumbent PTP users, it presents an exciting opportunity in suburban residential, urban, and rural areas to take advantage of new large 160 MHz channels, which can enable up to 1.75 Gbps subscriber aggregate performance.



### **Carrier Grade Management for the New Scalable Fixed Wireless Network**

While operators typically demand a complete management solution from each supplier, managing a large-scale fixed wireless network together with their other core infrastructure, subscriber management and billing services, is even more critical.



Mimosa recently introduced the new Mimosa Management Platform (MMP) as a single pane of glass solution for Mimosa equipment and subscriber provisioning, but also as an integral open API system that can integrate both with overarching monitoring solutions and modern controller orchestration platforms. MMP expands on the Mimosa hosted, free cloud solution with a suite of new management capabilities, and now, dedicated resource abilities for operators to scale, control, and maintain their Mimosa management servers.

MMP is a highly-scalable, cluster-based cloud native architecture, designed for private network, private cloud, or public cloud deployment environments, allowing total operator control of the system hosting, as well as data privacy. With advanced northbound API integration options, the 6-series equipment can also easily be controlled and monitored by 3<sup>rd</sup> party orchestration platforms, supporting SNMPv3, as well OpenConfig (NETCONF/YANG).

The 6-series is also directly integratable into IPv4 and IPv6 DHCP option-based configuration services, as well as RADIUS/802.1x for subscriber services provisioning.

**Interested in learning more? Please get in touch with us on our website at [mimosa.co/contact-us](https://mimosa.co/contact-us)**

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Mimosa, a product division of Airspan, is the global technology leader in wireless broadband solutions, enabling service providers to connect dense urban and hard-to-reach rural homes at a fraction of the cost of fiber. Mimosa was acquired in 2018 by Airspan Networks Holdings Inc. (NYSE American: MIMO), the award-winning, leading vendor of 5G software and hardware.