MOSAIC® ANTENNA PLATFORM: THE SHORTEST ROUTE TO INTEGRATED 4G/5G

Mobile network operators are racing to add more capacity and capability to their networks by adding new bands and advanced architectures like massive MIMO (mMIMO). These additions also mean towers need to accommodate more radios and antennas, which introduce wind, weight and appearance challenges. To add capacity without overloading tower tops, operators need an integrated, compact solution to support 4G and 5G networks. The ANDREW® MOSAIC antenna platform is just the answer operators need.

ANDREW, CTO addresses a few frequently asked questions.

Q. WHAT IS THE MAIN DRIVER FOR THE MOSAIC ANTENNA PLATFORM?

A. 5G network deployments present civil engineering challenges for mobile operators, especially in urban sites where mMIMO radios are the preferred solution. Site limitations complicate the addition of active antennas (and upgrading of the support infrastructure). This increases deployment time and cost and even makes some deployments impossible. Likewise, restrictions on site sharing and higher lease costs also limit economical options for operators.

ANDREW's answer is a modular, compact, upgradable solution that is customizable for band, length, port count and more, while also supporting all legacy sub-6 GHz bands for a complete 4G/5G solution.

Q. IS MOSAIC A PROPRIETARY TECHNOLOGY?

A. Yes, MOSAIC features our patented interleaved technology to provide excellent 4G and 5G performance while providing the flexibility to integrate with a variety of mMIMO radio types from different manufacturers.

Q. WHAT ARE THE MOST COMPELLING BENEFITS OF THE MOSAIC PLATFORM?

A. First, there's the advantage of simplification. The MOSAIC® platform's agile, plug-and-play design enables operators to deploy active, passive or combined solutions as needed, where needed, quickly and without the need to re-zone the site.

Second, there's the added network planning flexibility afforded by MOSAIC. It hosts the radio(s) that best suit your network (whether from a traditional OEM or an Open RAN supplier, 32T32R or 64T64R), with the ability to upgrade without expanding footprint or degrading network performance.

Third, there's the big benefit of reduced total cost of ownership (TCO) with MOSAIC, thanks to its many deployment and operational efficiencies. MOSAIC platform installations do not require re-optimization of existing network coverage, and MOSAIC also reduces incremental site maintenance and troubleshooting costs by managing PIM effectively.

Last, there's the ease of deployment, which is built on three simple steps: lift, slide, and tighten. It speeds up installations and accelerates 5G rollouts. (see Figure 1)

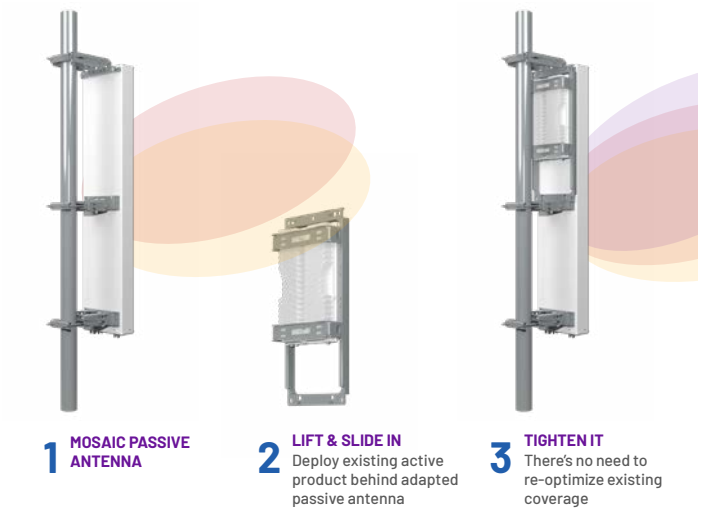

Figure 1

Q. HOW DOES THE MOSAIC PLATFORM AFFECT THE PERFORMANCE OF AN ACTIVE ANTENNA SYSTEM (AAS)?

A. MOSAIC isolates the 5G signal from the low-band 4G signal—enabling the 5G signal to go through passive antennas. A special window in the reflector enables RF energy at 3.5 GHz to pass, while reflecting energy from the lower frequency 4G signal. MOSAIC supports both 3.5 GHz and 2.6 GHz 5G frequencies with virtually no drop-off in performance. So, operators can deploy their 5G spectrum—3.5 GHz or 2.6 GHz—alongside their 4G spectrum and realize nearly the same 5G performance of a standalone 5G AAS.

Q. DOES MOSAIC WORK DIFFERENTLY WITH AND WITHOUT THE AAS IN POSITION?

A. Since the window in the MOSAIC reflector reflects all the FDD frequencies at which the MOSAIC arrays are operating, the performance is identical regardless of whether the AAS is present. That means the MOSAIC antenna can be installed prior to availability of the AAS and that the AAS can be removed in the field without any degradation in performance.

Q. WHAT ARE THE MOST COMMON USE CASES FOR THE MOSAIC ANTENNA PLATFORM?

A. There are several common use cases. One such use case is working with a limited number of antenna mounting poles. With MOSAIC, all FDD/TDD as well as 5G NR TDD bands can be deployed on a single pole, driving both operational efficiency and lease savings. In cases where operators must contend with sector width constraints, MOSAIC supports the creation of configurations with smaller sector widths to work within those limitations. In many cases, all FDD/TDD as well as 5G NR TDD bands can be deployed on a single pole.

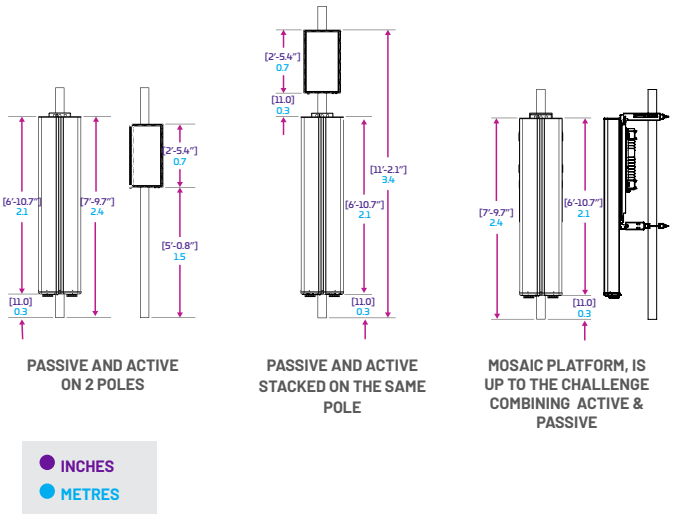

Figure 2—All FDD/TDD as well as 5G NR TDD bands can be deployed on a single pole

There are also cases with sector height constraints. A standard configuration is to vertically stack the active antenna and the passive one on a single pipe, but this design may exceed the maximum height allowance for some sites. MOSAIC antennas are available from 1.5 meters (5 feet) to 2.7 m (8 ft), giving operators the flexibility to deploy even where antenna height is severely restricted (see Figure 3).

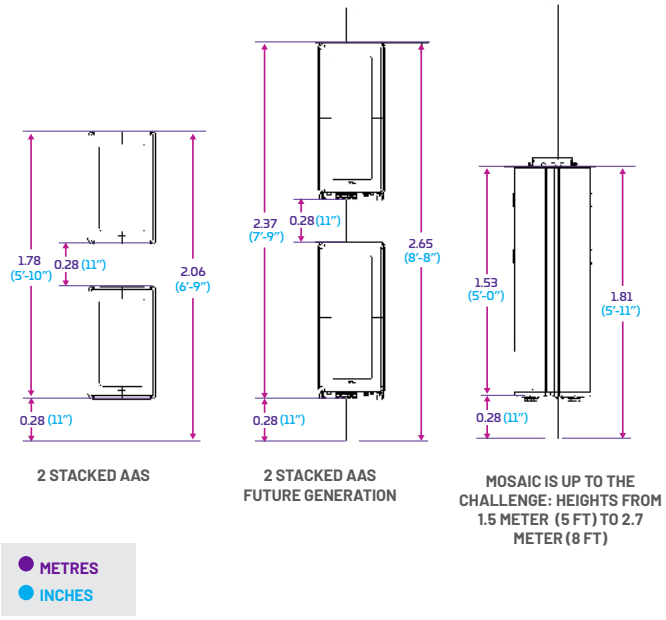

Figure 2—All FDD/TDD as well as 5G NR TDD bands can be deployed on a single pole

In all these common use cases, the MOSAIC® platform enables operators to deploy in ways and places that were not available before. Subscribers maintain their coverage levels, and operators reduce deployment and site costs in 5G New Radio (NR) rollouts.

Q. WHICH RADIOS DOES MOSAIC WORK WITH?

A. MOSAIC is designed to be band agnostic and compatible with certified active antenna systems from traditional OEM and Open RAN manufacturers. Because MOSAIC's design decouples the active and passive antennas, hardware from different vendors can coexist and be upgraded independently as needed. This is particularly valuable to operators because it protects the existing passive antenna investment if a change in vendors becomes necessary or if the operator wishes to begin or expand a smooth Open RAN rollout. This evolutionary design prolongs the lifespan and increases the value potential for every MOSAIC deployment.

Another advantage is that MOSAIC can be deployed separately and in advance of the radios themselves. This is useful for operators who are dealing with radio delivery delays and the ongoing semiconductor shortage problem. Not only does MOSAIC broaden the operator's choice of radio, but it also makes it easy to slide the radio into place on an otherwise fully deployed site.

Q. WHAT BENEFITS DOES MOSAIC OFFER IN TERMS OF SITE MANAGEMENT

A. Managing passive intermodulation (PIM) in complex and crowded sites can be challenging, especially with the addition of 5G radios, which can be a significant source of PIM. Several factors contribute to PIM issues, including the close proximity of antennas and radios, antenna shadowing, and the mixing of 4G and 5G broadband frequencies.

MOSAIC offers several benefits in managing site PIM:

1. **Reduced components and antenna positions:** By minimizing the number of components on the tower and the number of required antenna positions, the MOSAIC antenna platform creates more space between antennas. This increased spacing enhances antenna-to-antenna isolation, thereby reducing the risk and severity of harmful PIM interactions.
2. **Optimized placement of mMIMO AAS:** Hosting an mMIMO AAS behind MOSAIC positions it in an area specifically designed to eliminate its physical contribution to site PIM.
3. **RF matching layer:** MOSAIC is equipped with an RF matching layer that effectively improves the isolation of the antenna from certain external PIM sources, further enhancing the overall performance and reliability of the site.

By addressing these critical aspects, MOSAIC significantly improves site PIM management, ensuring better performance and reliability for your site.

Mike Wolfe
CTO
ANDREW®

Mike is responsible for strategy, marketing, and technical support at ANDREW an Amphenol company. He has over 28 years of experience in wireless technology and focuses on making ANDREW a valuable partner to customers as they evolve their networks towards 5G technology and beyond.

Since 1937, ANDREW, an Amphenol company, has driven the evolution of wireless technology. Trusted by mobile network operators and enterprises globally, we work closely with our customers to deliver innovative solutions that enhance connectivity experiences both outdoors and indoors. Our dedicated global team is committed to advancing the industry, fueled by the vision that a better-connected future is possible.

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