



2021: What's Next for Outdoor Wireless Networks?

Written by CommScope's Michael Wolfe

As an eventful 2020 draws to a close, the telecommunications industry is looking forward to building a future in which connectivity is truly ubiquitous and accessible for all. To help achieve this goal, operators will continue to accelerate their rollouts of 5G networks across the globe in 2021, while governments clear additional spectrum to accommodate more users and data. Concurrently, disaggregation of the RAN will continue as Open RAN deployments gain serious traction and usher in a new generation of products and innovative technology. Let's take a closer look at these three trends.

5G & Massive MIMO

Although the COVID-19 pandemic and resulting shutdowns have noticeably impacted the global deployment of 5G networks in certain countries and regions, rollouts will continue apace in 2021 as 5G smartphones like Samsung's Galaxy S20 and Apple's iPhone 12 hit the market. To support these new devices, we expect operators to focus on pragmatic implementations of 5G networks by assessing which deployments can benefit from active massive MIMO (multiple input/multiple output) deployments.

Massive MIMO substantially increases spectral efficiency to deliver more network capacity and wider coverage. However, operators will have to determine if the extra costs and real-world power requirements associated with active MIMO deployments are justified, or if a passive antenna configuration will suffice. Indeed, initial higher-end massive MIMO deployments in certain geographic locations have reportedly struggled to keep up with power demands and are routinely shut down for hours at a time to conserve energy.

From our perspective, massive MIMO deployments are optimally suited for dense urban deployments, while suburban deployments can benefit from passive antenna solutions. However, massive MIMO deployments face challenges even in urban environments, where upper floors of tall buildings may not be adequately covered if the most appropriate solution isn't selected.

Choosing the optimal antenna technology for each deployment will therefore be a priority for MNOs in 2021. For high data traffic, operators will look toward 64T64R for dense urban high-rises, 32T32R for urban low-rise structures, 32T32R or 16T16R for suburban locations, and 32T32R (FWA) for rural areas. For sites with moderate traffic requirements, MNOs will deploy 8T8R solutions to adequately cover urban low-rise buildings, as well as suburban and rural areas.

Clearing the Spectrum

Clearing the spectrum to accommodate more users and data is essential to building a future in which connectivity is truly ubiquitous and accessible for all. However, most of the low and mid-band spectrum across the globe has historically been used by the military, commercial satellite operators, wireless internet service providers (WISPs), and utilities. Efforts to repurpose or share these bands for next-generation services typically require the active involvement of



incumbent users and government regulators, as well as extensive discussions about mitigating the impact to existing services.

Despite the above-mentioned challenges, we expect governments in 2021 to continue taking the initiative to clear the spectrum for 5G and beyond. In the United States, for example, the Federal Communications Commission (FCC) recently finished auctioning Priority Access Licenses (PAL) in the 3.5 GHz band and is poised to begin the auction of 280 MHz of mid-band (C-band) spectrum for flexible use (including 5G) within the 3.7–3.98 GHz portion of the band. With regards to the latter, operators will continue scoping out sites during 2021, with the first use of C-band slated to begin in late 2021 or early 2022 in urban areas. For many suburban locales, C-band won't be accessible to MNOs and their subscribers until June 2023. In addition to CBRS and C-band, 100 MHz of contiguous mid-band spectrum in the 3.45-3.55 GHz band is planned to be made available for 5G over the next 18 months.

In CALA, Colombia and Puerto Rico recently completed a number of spectrum auctions. In 2021 and beyond, Colombia will be rolling out a low-band LTE network to serve rural areas, while the CBRS auction in Puerto Rico will enable MNOs and WISPs to deploy additional LTE networks. As well, Chile recently announced the start of a new 5G spectrum auction—with a total of 1800 MHz distributed across four bands: 700 MHz, AWS, 3.5 GHz, and millimeter-wave (in 26 GHz).





Additional auctions across CALA may kick off faster than initially anticipated in 2021. This is because spectrum auctions are a lucrative source of revenue for governments struggling with the economic fallout of COVID-19. However, there are also countries that have postponed planned auctions, such as Brazil, which is eyeing a May or June 2021 end date for an auction that includes 5G spectrum in four different bands: 700 MHz, 2.3 GHz, 3.5 GHz and 26 GHz. 3.5 GHz is also gaining interest with various CALA MNOs, while the 600 MHz band has already been announced by Mexico and Uruguay. In terms of the former, Mexico is slated to auction this band, bundled with 3.5 GHz in the second half of 2021 (both for 5G), with other countries likely to follow.

In Europe, the European Union (EU) is working to open new bands and bandwidths for 5G across all EU countries. These include the following bands: 700 MHz–30 MHz, 3.5 GHz–400 MHz and 26 GHz ~3 GHz. As well, a number of European operators are already leveraging 1800 MHz or 2100 MHz for 5G in Dynamic Spectrum Sharing mode. In the Middle East and Africa, multiple operators have been allocated spectrum within the C-band, including in the UAE, Saudi Arabia, Qatar, Oman, and South Africa.

The ongoing clearing of the spectrum for 5G and beyond is a global trend that we expect to accelerate in 2021.

Open RAN

In 2021, Open RAN deployments will gain serious traction and usher in a new generation of products and innovative technology. This is because Open RAN supports truly open and interoperable interfaces within and between the various subcomponents of the RAN: the radio, hardware, or baseband unit and software. This paradigm drives innovation by encouraging the growth of an expanded supply ecosystem—while reducing capital costs and single vendor “lock-in” through open interfaces and commodity hardware platforms.

According to [Mobile Experts chief analyst Joe Madden](#), almost every company in the Radio Access market is “looking into” Open RAN, which he expects will be the “choice solution” for coverage issues. As Madden notes, Open RAN hardware and software can be cheaper while still achieving coverage similar to traditional architectures.

Open RAN offers several advantages for mobile operators. Firstly, Open RAN helps lower costs with commercial off-the-shelf (COTS) processing equipment for the baseband unit (BBU) and commoditization of the RU hardware. In addition, Open RAN supports the disaggregation of software from proprietary hardware, thereby facilitating the creation and rapid deployment of new services and operational solutions. As we note above, Open RAN supports a more robust supply chain ecosystem as new vendors enter the market. We therefore see disaggregation of the RAN continuing in 2021 as Open RAN deployments gain significant traction and usher in a new generation of products and innovation such as the tighter integration of radios and antennas.



Moreover, Open RAN will continue to play a significant role in accelerating the rollout of 5G infrastructure by enabling equipment interoperability. Indeed, DISH has selected Open RAN technology for its 5G rollout across the United States—and has committed to covering 70 percent of the population by June 2023 with its 5G network. In Japan, Rakuten's 5G network is based on Open RAN architecture, which allows for mixing and matching of the most appropriate technology for subscribers. Meanwhile, Vodafone has confirmed plans to start Open RAN trials in Europe and Africa,

with initial trials expected to focus on mobile calls and data services across 2G, 3G and 4G. Additional Vodafone Open RAN trials involving 5G are expected in the future. It should be noted that Vodafone recently became the first mobile operator to activate a live Open RAN 4G site in the U.K.

Conclusion

As the final weeks of an eventful 2020 draw to a close, the telecommunications industry is looking forward to 2021 and building a better future in which connectivity is truly ubiquitous and accessible for all. Although the COVID-19 pandemic has impacted the global deployment of 5G networks, rollouts will continue apace in 2021 as 5G smartphones like Apple's iPhone 12 hit the market. To support these new devices, MNOs will focus on pragmatic implementations of 5G networks by assessing which deployments can benefit from active massive MIMO deployments. Governments across the globe will also continue to clear additional spectrum to accommodate more users and data, while Open RAN deployments will gain serious traction—ushering in a new generation of products and accelerating 5G rollouts.

CommScope pushes the boundaries of communications technology with game-changing ideas and ground-breaking discoveries that spark profound human achievement. We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow. Discover more at [commscope.com](https://www.commscope.com)

COMMSCOPE®

[commscope.com](https://www.commscope.com)

Visit our website or contact your local CommScope representative for more information.

© 2020 CommScope, Inc. All rights reserved.

Unless otherwise noted, all trademarks identified by ® or ™ are registered trademarks, respectively, of CommScope, Inc. This document is for planning purposes only and is not intended to modify or supplement any specifications or warranties relating to CommScope products or services. CommScope is committed to the highest standards of business integrity and environmental sustainability with a number of CommScope's facilities across the globe certified in accordance with international standards, including ISO 9001, TL 9000, and ISO 14001. Further information regarding CommScope's commitment can be found at www.commscope.com/About-Us/Corporate-Responsibility-and-Sustainability.

MC-115233-EN (12/20)