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# FORTUNE

An aerial night view of a city skyline, likely New York City, featuring prominent skyscrapers like the Empire State Building. The image is overlaid with a glowing blue network of lines and nodes, symbolizing 5G connectivity and spectrum innovation.

**UNLEASHING THE  
POWER OF 5G THROUGH  
SPECTRUM INNOVATION**

As wireless technology continues to evolve, 5G holds the promise of blistering-fast download speeds and unparalleled performance.

**Featuring Ben Cardwell, senior  
vice president and segment leader  
CommScope Mobility Solutions**

**5G****Fifth-generation (5G) wireless technology will make it possible to**

connect billions of smart devices and sensors. Features such as lightning-fast download speeds, greater capacity, and lower latencies will spur futuristic innovations—from autonomous vehicles and smart cities to telesurgery, virtual reality, and the Internet of Things (IoT).

However, for this to happen the right infrastructure must be in place.

That means building geographically dense small cells to relay radio signals, boosting network efficiency and the radio spectrum. The right frequency ranges will ensure consistent coverage across urban, suburban, and rural areas at ultra-high speeds.

5G will deliver previously unseen performance levels in three critical areas: enhanced mobile broadband, ultrareliable communications, and massive machine-type communications. As wireless technology evolves, it will be important to define and allocate the ranges of spectrum—waves consisting of fast-moving high frequencies and low frequencies that move more slowly. The spectrum allows radios, televisions, smartphones, satellites, and all other devices to send information in wave signals beamed across long distances, utilizing discrete slices at different frequencies.

In terms of the Internet, these spectrum slices, or bands, can be compared to roads with data passing back and forth, where each type of signal travels in its own lane. Regulatory authorities such as the FCC designate which part of the spectrum can be used for which type of service, ensuring efficiency for businesses, consumers, and society at large.

But the spectrum is a limited resource, and the bands used by earlier wireless generations (2G, 3G, and 4G) are fully occupied. 5G is like a superhighway above a traffic-congested tangle of two-lane roads.

**Freeing Up Radio Spectrum for 5G**

While millimeter-wave bands offer the potential of increased capacity, they also have certain limitations, including limited coverage areas, weather-

related vulnerabilities, and line-of-sight restrictions. Overcoming these challenges requires deploying small physical cells across neighborhoods to relay signals.

Telecom carriers, OEMs, academic institutions, and international standards-making bodies are driving the research and development of 5G technologies. However, the success of 5G services will also depend on the cooperation of federal governments and regulators, who need to litigate issues related to spectrum allocation, interoperability between hardware



## UNLEASHING THE POWER OF 5G THROUGH SPECTRUM INNOVATION

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devices, and the physical 5G infrastructure.

In November 2018, the U.S. federal government will begin auctioning the high-band millimeter-wave spectrum. Auctions like these are designed to foster competition among carriers, promoting innovation. Once agreement on spectrum use is in place, the 5G-device ecosystem can flourish, enabling all manner of wireless-use cases.

As a global leader in radio access technologies, Ericsson is also well positioned to lead the development of the next-generation 5G networks to better address emerging consumer and IoT demand.

One of the wireless industry's key success factors has been global standardization and scale. "The larger the vol-

Ericsson. "In a few years, 5G will offer both consumer and business sectors the possibility of an immersive entertainment experience, enabled by a combination of distributed cloud computing, augmented/virtual reality, and very high resolution video."

### Companies Vie for a Slice of the Spectrum Pie

5G technology is currently limited to pockets of certain U.S. cities. Yet, in the same way that a previous generation of companies, such as Uber, Spotify, and Facebook, capitalized on the innovations of 4G technology, organizations are poised to take advantage of the possibilities inherent in 5G. They see the potential for new capabilities, such as greater 5G standardization through innovations such as the Open Radio Access Network initiative and spectrum sharing.

For example, the Citizen's Band Radio Spectrum (CBRS) reassigns a portion of radio-wave bands that were once owned and operated by the U.S. federal government. As a dynamic spectrum-sharing system, CBRS offers a unique method for repurposing the spectrum and making it available to a variety of players and applications.

CommScope, a global leader in infrastructure solutions for communications networks, is a member of the Wireless Innovation Forum and the CBRS Alliance and a Spectrum Access System (SAS) provider. The company recently demonstrated the interoperability of its SAS product as part of product development for future CBRS networks. CommScope is also evolving its leading antenna, in-building wireless, and connectivity portfolios for the 5G future.

"Going forward, you'll also see many other organizations like us developing radio points for these 5G networks, versus just three or four large OEMs," says Ben Cardwell, senior vice president and segment leader of CommScope Mobility Solutions. For example, CommScope's millimeter-wave antenna technology can be integrated with third-party platforms to create a highly flexible 5G fixed wireless access network.

"5G will have to serve a tremendous number of vertical markets that will require customized solutions designed to meet a specific need, whether it's in manufacturing, heavy industry, retail, or health care," says Cardwell. "These will be network solutions that handle their data or users in a specific way, as well as connect millions of devices together." ●

umes—launched in similar spectrum bands—the better for the global device ecosystem to support the amazing variety of new use cases enabled by 5G," says Niklas Heuvelod, senior vice president and head of market North America at Ericsson.

Ericsson has spearheaded efforts in implementing the 5G New Radio (NR) standard and in introducing 5G NR technology, which uses the millimeter-wave spectrum. Ericsson's commercial 5G Radio Access Network (RAN) portfolio enables operators to launch 5G deployments with a high degree of flexibility while also providing remote software upgrades for legacy radio.

"Network providers are really excited about the possibilities," says Erik Ekudden, senior vice president and CTO at



**PROVIDING WIRELESS NETWORK OPERATORS WITH INNOVATIVE SOLUTIONS EXPANDS THE POSSIBILITIES FOR 5G.**



# DEMAND FOR INNOVATION PROPELS 5G LEADERS

## EFFICIENTLY HARNESSING THE CAPABILITIES

of every hertz of wireless spectrum is a key objective for fifth-generation (5G) cellular technology. The 5G spectrum will be particularly important in managing the explosion in wireless data plus enabling the Internet of Things (IoT) and fixed wireless applications. In 5G, unfettered wireless access will give rise to innovations of our futuristic dreams—from autonomous vehicles and smart cities to nearly instantaneous video downloads, wearables, and augmented reality.

Yet achieving these dynamic, fluid connections depends on consistent standardization that will encompass all aspects of 5G, including network hardware and interfaces. In the previous cellular-network cycles (2G, 3G, and 4G), operators and networks were relatively limited by a select group of large vendors. The Open RAN initiative promoted by the ORAN Alliance effectively levels the playing field for 5G-network-equipment vendors. In general, the Open RAN concept is about standardizing network interfaces so that carriers can uti-

lize the best and most innovative solutions in their networks.

CommScope, a preeminent global communications infrastructure leader, supports the Open RAN vision for 5G and is already incorporating it into product designs. The company recently introduced a fixed wireless antenna for millimeter-wave frequencies, one of the first 5G applications being deployed now. The antenna is designed to deliver gigabit-per-second broadband directly to homes, effectively replacing the physical wires that traditionally have been used to relay broadband.

“Open RAN enables organizations of all sizes to develop pioneering solutions that more quickly and robustly deliver all that 5G has to offer: high speed, superior reliability, extreme bandwidth capacity, and ultralow latencies,” says Ben Cardwell, senior vice president and segment leader of CommScope Mobility Solutions. “With Open RAN, it becomes that much easier to put up more radio points. It’s a less-expensive solution for network operators to cover all the various demands across a particular

geographic region.”

CommScope’s vision for a 5G future incorporates its history as a key technology-agnostic supplier in every previous generation of wireless networks. A key challenge for 5G has been allocating sufficient radio spectrum to meet demand. The Citizen’s Broadband Radio Service (CBRS) initiative in the U.S. will broaden access for new 5G services by sharing licensed and unlicensed radio waves. CommScope’s new small-cell antenna and Spectrum Access System (SAS) will help operators prepare for and utilize CBRS.

“Opening the traditional demarcation points of the network enables networks to be much more flexible and drive innovation faster,” says Cardwell. “All the investments we’re making at CommScope today—in advanced antenna technology, small-cell solutions, spectrum management, and more—are really creating the foundation on which to build 5G.” ●

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