COMMSCOPE®

Private Wireless for Higher Education

RUCKUS® CBRS use cases on campus

Key benefits

- **Deliver seamless coverage across the campus**
- **Maintain high QoS connections, even on fast-moving vehicles**
- **Enable new applications to streamline workflows**
- **Ensure strong end-to-end security**

Key requirements

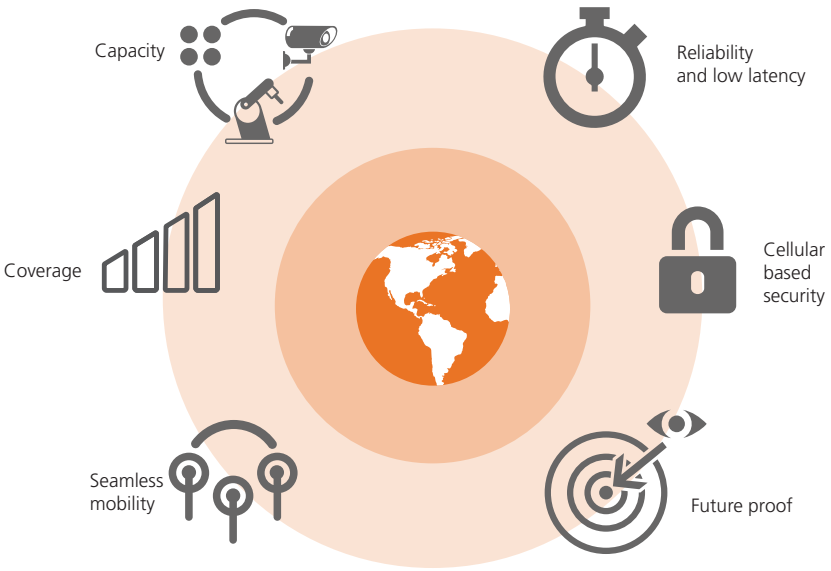
- **Indoor and outdoor access points with self-organizing network capabilities**
- **Simple enough to be owned and operated by the enterprise**
- **Future proof solution with a path to 5G**
- **Proven, standards-based protocol**

Today's forward-thinking CIO is planning to start or accelerate their journey to create a Smart Campus to attract and retain students while lowering operational spending. At the same time, expectations are growing for campus IT to manage all manner of campus connectivity – from IoT sensors to student and faculty internet access, to in-building cellular, to eSports venues, to stadium operations and fan engagement, to campus vehicles, and more! IT Directors and staff understand it's getting harder to do more with less while trying to reach these goals.

Ethernet switching and Wi-Fi can address many of these use cases, and DAS or in-building small cell wireless can address some others; however, there is a burgeoning class of connectivity that bridges Wi-Fi and cellular that promises campus IT and facilities teams more visibility and control of their networks and devices while offering a better student experience, improved campus safety and reduce operational costs – it is called CBRS Private Wireless, which includes 4G and 5G networks using Citizen's Broadband Radio Service spectrum.

RUCKUS CBRS Private Wireless offers a new alternative ideally suited for use cases requiring highly relia-ble connections with solid mobility, coverage, and security capabilities.

RUCKUS®



Colleges and universities have an ever-growing set of wireless connection challenges to serve their mobile faculty, staff, and administration. Faculty may be walking to classrooms or working in lab facilities, and maintenance crews could be on the golf course or in the basement of a building. New IP Video security or Internet of Things applications may need to be deployed in locations where there is no existing network access. Even campus vehicles may need better or lower-cost connectivity to ensure responsiveness and efficiency or to enable new services.

New CBRS spectrum rules enable specific entities such as a campus to reserve dedicated spectrum to deploy 4G and 5G private wireless networks. Campuses no longer have to choose between the cost of mobile operator connections vs. the lower range and variable performance of Wi-Fi. They can deploy private wireless networks to ensure coverage is available wherever required, deliver the highest quality connections with fewer access points (each covering a much larger area), provide robust security, and even support fully mobile use cases.

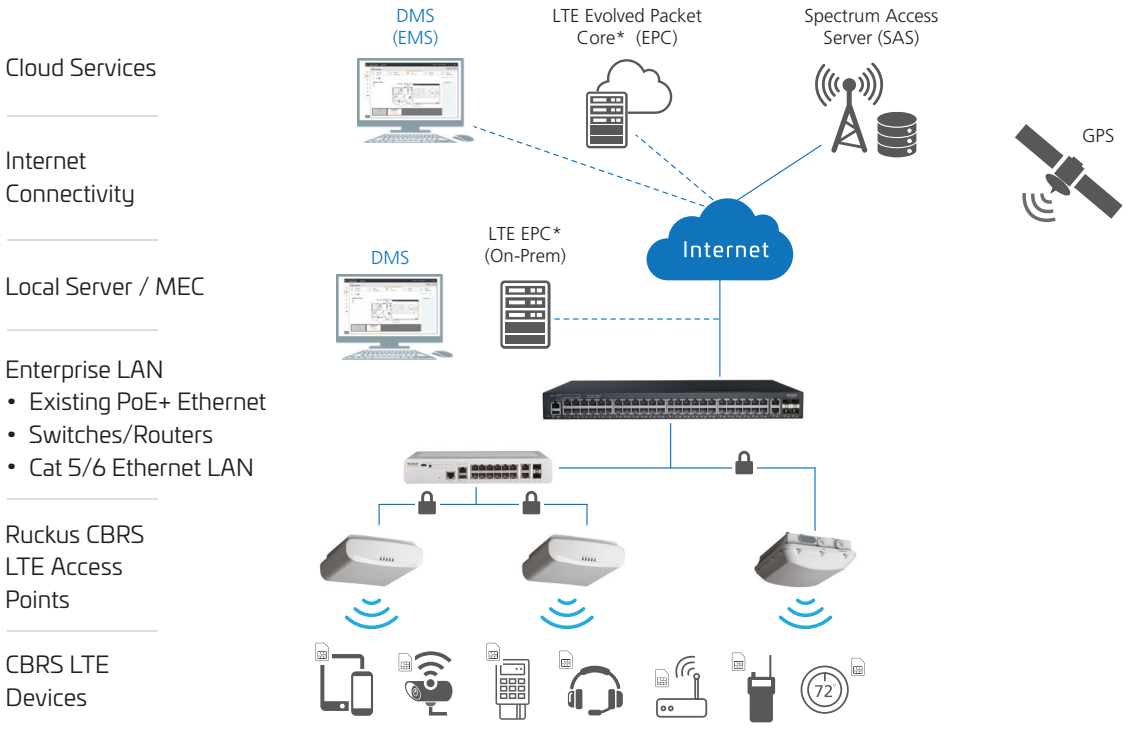
The Solution: RUCKUS CBRS Private Wireless

RUCKUS' legacy of delivering high-quality networks that are easy to deploy and manage, coupled with the new performance of LTE, provides an ideal solution to tackle connectivity challenges that Wi-Fi and the public wireless networks cannot address. These include:

- **Distance**—RUCKUS CBRS deployments' coverage range is as much as six times the range of a typical 5Ghz Wi-Fi access point. This is advantageous for delivering wireless coverage in low-density areas that are not covered by mobile networks and challenging to serve via Wi-Fi, such as connecting IP Video cameras that need to be deployed across campus.
- **Quality of Service**—LTE's centralized management and dedicated spectrum ensure the best possible and most consistent connections.
- **Network security**—RUCKUS CBRS private LTE brings a zero-trust level of security with the ease of a typical Wi-Fi deployment.
- **Better roaming**—Decisions concerning roaming are handled at the network level instead of the client as they are in Wi-Fi deployments. So RUCKUS CBRS networks can maintain connections even in vehicles driving across campus.
- **Access to Network Data**—Typically, schools have no visibility to who connects to a mobile network. With RUCKUS CBRS LTE, schools can fully see network usage trends and activity.

By developing a Private Wireless solution that can be as simple as Wi-Fi, RUCKUS enables superior wireless connections for an entirely new class of applications and helps campuses address their ever-increasing performance challenges.

RUCKUS CBRS LTE Deploys Like Wi-Fi



CommScope offers a range of RUCKUS CBRS LTE access points for indoor and outdoor coverage and a fully featured, intuitive management platform for enterprise network managers. This solution is ideal for stadiums, cities, manufacturing and retail, as well as schools and universities. It offers an important new alternative to solve wireless challenges alongside Wi-Fi and macro LTE networks.

Emerging Higher Education Use Cases

On-campus communications

- **Push to Talk:** Push to Talk (PTT) phones are popular on many campuses as a relatively low-cost and effective means of work-group communications. Most traditional PTT solutions run over a dedicated LMR (land mobile radio) network, which delivers low-quality narrowband voice and cannot be used for any other application. Some PTT solutions can be operated over mobile phone networks, but this can be costly due to incurring monthly service and data charges. New PTT over CBRS provides all the cost advantages of running over a campus-owned radio network, with the high quality of a broadband voice network. CBRS PTT solutions have full LTE mobility and security and can act as Wi-Fi hotspots so that campus staff can easily access other online resources.
- **Mobile cellular:** Many colleges and universities offer stipends to offset the cost of mobile phones and phone service to employees, including faculty, staff, security, and operations, in recognition of the fact that these employees are often mobile across the campus and need to be connected to do their jobs. Campuses that deploy CBRS networks can offer over-the-top calling with full LTE quality or can work with a specialized MNO such as Geoverse to offer very low-cost plans since most of their calls and data use would be over the campus network.

Fixed Wireless Connectivity

- **IP Video:** Campuses are deploying more and more IP Video cameras to ensure safety and security across campus. Many outdoor camera locations, and some indoor sites, can be costly to deploy due to challenges in delivering network connectivity. In these situations, CBRS LTE provides an ideal solution that offers baked-in security and 3-4 times the range of a comparable Wi-Fi link. The CBRS network even works with a limited line of sight. You need a small CBRS router or bridge to be placed next to the camera, and it can provide a wireless link back to the campus network via CBRS. With CBRS, you can quickly deploy IP Video cameras anywhere you have power, for both permanent and temporary installations.

- **Remote campus buildings:** While most buildings are likely fully connected to the campus network, there may be some small or temporary facilities that don't have connectivity. This can be easily solved with CBRS by placing a band 48-capable LTE router in the space. These are widely available and very easy to connect.

Mobile Connectivity

- **Campus vehicles:** Since LTE technology seamlessly manages roaming handoffs between APs, even at vehicle speeds, RUCKUS CBRS networks can efficiently deliver connectivity to campus vehicles, including police cars, buses, and maintenance vehicles. This can provide superior coverage and reliability at a much lower cost than relying on the macro LTE networks.

Internet of Things (IoT)

- **Facilities/Building Management:** The Internet of Things is rapidly transitioning from an industry buzzword to a real ecosystem of proven solutions to many use cases. Low-cost sensors, powerful cloud, edge compute capabilities, and new management platforms to enable data-driven insights and automated decision-making makes IoT solutions critical to a well-managed campus. IoT sensors and devices may use a wide range of wireless protocols to meet specific requirements. Many of these, such as BLE or Zigbee, are short-range technologies requiring a gateway in the same room or very close by. CBRS LTE is an ideal platform to link the gateways to streamline deployments and enable placements almost anywhere on campus. With CBRS, a single network can backhaul all your IoT traffic, even if different buildings/schools run their own IT networks.

Conclusion

With campus IT expected to manage and provide reliable wired, wireless, mobile, and IoT connectivity, more spectrum and a new ecosystem of infrastructure and client devices provide the freedom to address more use cases and provide new campus services. Solutions for campus safety, building automation, and basic connectivity like video backhaul or simply 'phoning home' from previously unreachable locations. With so many use cases, it is little wonder there is strong interest in CBRS as a bridge between Wi-Fi and 5G or as a unique way to monetize a campus network.

To learn more, visit www.commscope.com/solutions/5g-mobile/citizens-broadband-radio-service-cbrs/ or contact your local CommScope representative.

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