COMMSCOPE®

Private LTE 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

- **Complete end to end solution including SIM and subscriber management**
- **Simple enough to be owned and operated by the enterprise**
- **Future proof solution with 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 spend. At the same time, expectations are growing higher for campus IT to manage all manner of campus connectivity—from IoT sensors to students 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-call wireless can address some others, however there is a burgeoning class of connectivity which 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 LTE, short for Citizen's Broadband Radio Service.

Ruckus CBRS LTE offers a new alternative that is ideally suited for use cases requiring highly reliable connections with strong mobility, coverage and security capabilities.

RUCKUS®

Colleges and universities have an ever-growing set of wireless connection challenges to serve their highly mobile faculty, staff and administration. Faculty may be walking to classrooms or in lab facilities, 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 connections solutions to ensure responsiveness and efficiency or to enable new services.

New CBRS spectrum rules for the first time enable specific entities such as a campus to reserve their own dedicated spectrum to deploy LTE networks. Campuses no longer must choose between the cost of mobile operator connections vs the lower range and variable performance of Wi-Fi. They can deploy their own private LTE networks to ensure coverage is available wherever it is needed, deliver the highest quality connections with fewer access points that each cover a much larger area, provide proven LTE security and even support fully mobile use cases.

Even better, CBRS LTE will soon provide a neutral host indoor wireless option so that schools can ensure optimal mobile wireless connections everywhere on campus. This is a growing concern as schools deploy energy efficient windows that block cellular signals from the outdoor macro-towers. School-owned CBRS LTE networks can easily interconnect to mobile operator networks to provide a seamless connection. To make this practical, first end-user phones must be able to connect on CBRS band 48. Since nearly all new phones being sold are band 48 capable, this capability should be feasible by late 2020. Examples include Apple iPhone 11, Samsung Galaxy S10 and Note 10, Pixel 3 and 4, and other premium phones.

Monetize your network: Using either an anchor tenant solution (from a willing MSP), or a true neutral host, your campus IT could deliver a campus LTE solution to your students for indoors and out, whereby they can receive subsidized handsets and calling plans which deliver 5 bars of signal on campus (at your control) and unlimited data, with a portion of their monthly service fee going back to your institution (to be negotiated). So, students enjoy better connectivity while the campus may offset some of their costs by generating revenue. That's a Smart Campus approach.

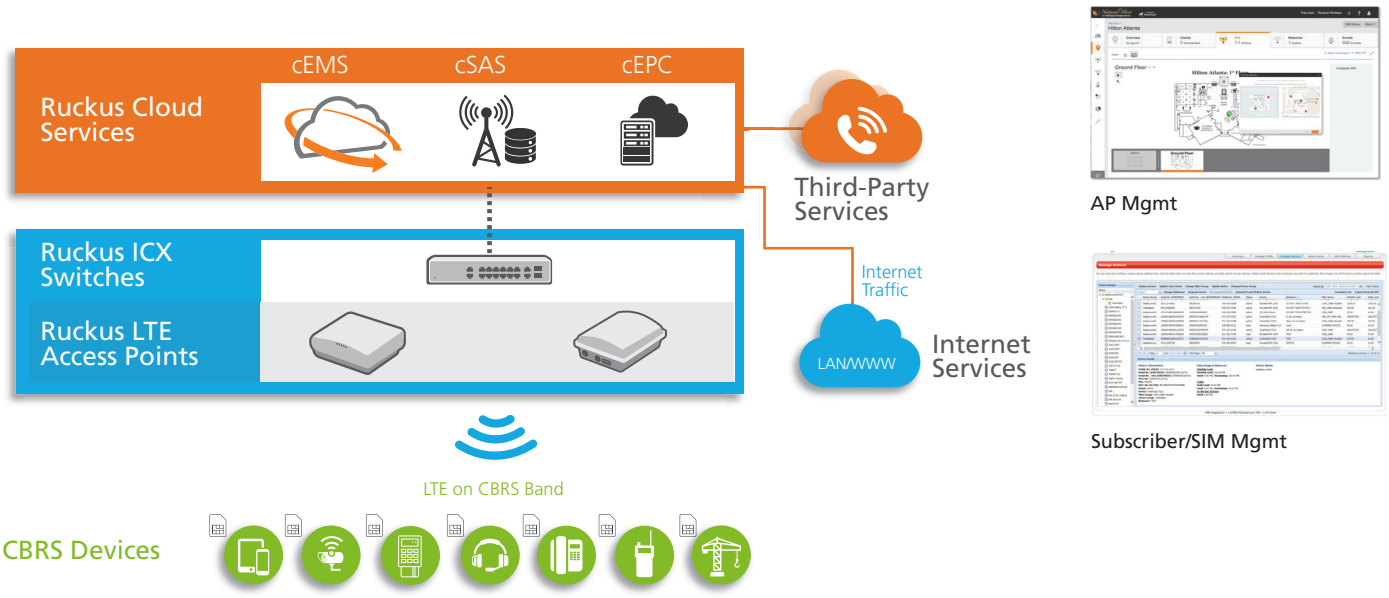
The Solution: Ruckus CBRS Private LTE

Ruckus' legacy of delivering high quality networks that are easy to deploy and manage coupled with the new performance of LTE delivers an ideal solution to tackle the hardest connectivity challenges that Wi-Fi or macro-LTE cannot address. These include:

- **Distance**—The range of coverage for Ruckus CBRS deployments is as much as 4 times the range of a typical 5Ghz cell. This is advantageous for things delivering wireless coverage in low density are-as that are not covered by mobile networks and difficult to serve via Wi-Fi and connecting IP Video cameras that need to be deployed across campus.
- **Quality of Service**—LTEs 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 that are 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 have full visibility to network usage trends and activity.

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

Ruckus CBRS LTE deploys like Wi-Fi



CommScope offers a complete CBRS network portfolio including full cloud-based management as well as a range of Ruckus CBRS LTE access points for indoor and outdoor coverage. As a founding member of the CBRS Alliance, Ruckus (now part of CommScope through acquisition) has focused on delivering a high-performance LTE solution coupled with a full featured, intuitive management platform targeted for enterprise network managers. This solution is being widely deployed in stadiums, cities, ports and warehouses, as well as schools and universities. It offers an important new alternative to solve wireless challenges along-side 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 narrow band voice and can not 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 solutions provide 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 also 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 the majority of their calls and data use would be over the campus network.
- **Augmented in-building mobile coverage**—Colleges are typically highly connected environments, where students, faculty and staff are heavy users of the latest technologies and applications and are often inventing the next generation of solutions. These users need always-on connectivity, but there are increasing challenges in ensuring mobile connectivity, especially indoors. Mobile operators can no longer afford to invest in in-building coverage, windows with better-insulating low-e glass tend to deflect the outdoor macro signal, and new 5G deployments in higher spectrum bands will have limited outside-in penetration for most building types. CBRS LTE can serve as a neutral-host wireless network that can connect subscribers of any mobile operator if their home operator's service is not available indoors or on any area of the campus. CBRS allows the campus itself to ensure great wireless connectivity even where mobile operators can not or will not deliver it.

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 very expensive to deploy due to challenges 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 limited line of sight. You simply 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 easily deliver connectivity to campus vehicles, including police cars, buses, maintenance vehicles. This can deliver 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 a multitude of use cases. Low cost sensors, powerful cloud and edge compute capabilities, and new management platforms to enable data driven insights and automated decision making are making IoT solutions critical to a well-managed campus. Different IoT sensors and devices may use a wide range of wireless protocols to meet specific requirements, and many of these such as BLE or Zigbee are very short-range technologies that require a gateway in the same room or very close by. CBRS LTE is an ideal plat-form 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 provides the freedom to address more use cases and provide new campus services. Solutions for campus safety, or 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.ruckuswireless.com/solutions/private-LTE or contact your local CommScope representative.

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