CBRS networks & shared spectrum for events

By Dean Bubley, Founder & Director of Disruptive Analysis

Discussion of private networks, based on shared CBRS spectrum, often focuses on manufacturing, logistics, education and transport sectors. But another important and sometimes overlooked domain is for live events, especially those operating on a temporary or "pop-up" basis.

While there is rightly a lot of attention on top-tier events and premier sports venues for CBRS, such as NFL games, it is also worth considering the opportunities for running private networks at the many smaller locations and lower-profile in-person venues.

Music festivals, agricultural fairs, lower-tier sports events, community or religious celebrations, political rallies, seasonal parades, business conventions and many other types of temporary gathering all have important needs for enhanced communications.

With better connectivity, organizers can benefit from better safety, lower running costs and new business opportunities. These events can also add significantly to local economic development and regional growth or renewal, involving municipalities, local businesses and other groups.

What is an event private network? What are they used for?

A private network, based on 4G or 5G wireless technology, allows localized dedicated wireless connections to be set up for human or device communications at a particular site, or across a wider area.

For example, they can be used for handheld communications devices, point of sale terminals, screens or cameras. Private wireless differs from the normal mobile carriers' public networks, because these private wireless networks can be designed specifically for high-priority users, or specific requirements.

Examples relevant for events include:

- Handheld communications systems for organizers, security staff, parking-area marshals and others
- Ticketing systems and entry / check-in turnstiles
- Reliable connections for merchants' payment terminals, running on a network separate from those used by the public
- Digital display sign-boards or advertising screens
- High-performance connectivity for broadcasters, social media streamers / influencers and on-staff photographers and videographers
- Connections for wireless security cameras on-site
- Backhaul connections for public or private Wi-Fi access points across the venue, without the need for running ethernet cables
- Connected infrastructure systems such as EV chargers and solar panels
- Sensors and environmental monitoring systems

- Connections and asset-tracking for on-site vehicles such as food trucks, golf carts and mobility scooters
- Additional capacity / coverage for public safety officials
- Connectivity for the "build" teams setting up the stages and other event structures, and breaking them down afterwards in the strike process

How does a CBRS private network work for events?

Event / venue private networks can either be permanently installed – perhaps at a showground that has regular events – or set up especially for a particular festival or fair, on a temporary basis.

Such a private wireless network typically uses:

- On-site base stations on structures or towers (called CBSDs for CBRS networks)
- Special SIM cards issued to the devices that are to be connected (e.g. cameras, gateways and handhelds)
- A software control platform called a core network, either located onsite "in a box" or hosted remotely in the cloud
- Some way to connect the base stations to a central hub and then to the Internet (backhaul), which can be wireless, or fiber if available
- Power supplies for the system, which could use conventional generators, batteries or solar cells for the most-efficient setups

The system also connects online to a Spectrum Access System (SAS), which provides "grants" for it to use particular slices of the radio spectrum designated for this type of purpose.

Typically, most event sites will use CBRS private networks alongside various other wireless systems, such as:

- Dedicated connectivity for audiovisual systems such as wireless microphones.
- Wi-Fi, used for attendees or on-site systems, especially in indoor areas but also maybe with outdoor coverage as well.
- Public mobile networks, especially for attendees' smartphones as well as use by crew and onsite merchants. Often, there may be limited coverage or capacity on public wireless, especially when one-off or sporadic events take place and the carriers don't provide dedicated "cells on wheels" for the occasion.
- Wireless connections between the CBSDs and main hub node.
- High capacity fixed wireless connections, for "backhaul" to the site from a nearby town or main network route, if there is no fiber run nearby. In some cases, a satellite connection is the only viable option.

There are already some public examples of event-based private networks leveraging CBRS spectrum and its broad network equipment / end-user device ecosystem:

- The 2023 Lightning in a Bottle music and arts festival[1] used a CBRS network run by AWS, and deployed by event management company DDR.Live
- Comcast Business and Celona provided a CBRS network for the Sonoma County Fairgrounds[2]
- Both Republican and Democratic Party national conventions involved CBRS-based connectivity[3], primarily for broadcasters and media teams. The networks were installed and run by a specialist video solutions provider, LiveU
- Innovative vendors and individual engineers are trialling CBRS for small-scale events such as famers' markets in local city parks[4]

Event-oriented use of private networks is happening internationally as well. In the UK, a business called Virtuser has a setup with a portable private 5G network in the back of a Land Rover, which it provides to venues and local authorities such as Worcestershire County Council[5]. And in France, the 2024 Paris Olympics featured various private network deployments, particularly for broadcasters[6].

New business and operational models

One of the most interesting aspects of the events market for CBRS private wireless is that it brings a wide variety of new business models and opportunities. This aligns with the FCC's objectives of promoting investment and diverse stakeholders in the 3.55-3.70GHz spectrum "innovation band."

Some of the participants involved in building and operating such networks include:

- Event management companies
- Specialist broadcast service providers
- Venue owners
- Local ISPs and WISPs
- Municipal and regional authorities
- Conventional carriers and cablecos
- IT companies such as systems integrators and cloud providers
- Niche suppliers of wireless network equipment, software and devices, including US-based specialists

For instance, a local event-management business could obtain its own portable wireless setup, and deploy it around its area at multiple sites over the course of a year. It could either generate rental revenues directly from venue-owners and event organizers, collaborate with city or county authorities, or use it to improve provision of security. This could also help local businesses such as food trucks or farms, as well as reducing the costs and complexity of holding civic or community events.

[1] https://aws.amazon.com/blogs/networking-and-content-delivery/lightning-in-a-bottle-festival-2023-ddr-live-deploys-aws-private-5g/
[2] https://www.rcrwireless.com/20230119/5g/comcast-and-celona-supply-cbrs-private-4g-5g-system-to-california-fairgrounds
[3] https://ongoalliance.org/resource/cbrs-powers-seamless-broadcasting/
[4] https://markhoutz.com/2024/08/26/burgers-shakes-and-cbrs-with-gxc/
[5] https://www.worcestershire.gov.uk/news/network-wheels-boosts-mobile-connectivity-rural-shows
[6] https://www.fierce-network.com/wireless/olympic-5g-private-networking-city-lights

Summary and policy implications

The use of private wireless systems, based on dynamic, shared and locally-authorized CBRS spectrum, has the potential to benefit smaller gatherings, as well as larger top-tier events. From music festivals to agricultural fairs, there is always a need for better security, reliable payment systems and good wireless connections for broadcasters or social media influencers, as well as many other use-cases.

While public networks may provide basic coverage of such venues, their networks are typically poorly suited to deliver extra capacity during occasional events, and may well be uneconomic for some important use-cases. Private networks are simply more effective.

In short, anywhere that needs localized and temporary spectrum for wireless microphones or cameras *also* needs spectrum for other private on-site communications and connectivity use-cases. CBRS is typically the idea solution in the US, given that Band 48 is supported in a wide range of end-devices and radios.

This type of application is a perfect example of the innovation enabled by shared, democratized spectrum access. Such networks can use both CBRS's protected PAL tier of license (especially for critical use-cases such as security staff), or its more freely available GAA tier of access for a broader set of applications.

Looking to the future, it may be helpful for regulatory authorities and SAS providers to enable some form of spectrum "booking system" so that temporary events can obtain short-term licenses in areas where CBRS bands are not otherwise in use, allowing event organizers to proceed with the assurance that their private networks will always work as planned.

Policymakers should also be aware of the complexity of engaging with this type of dispersed and heterogeneous user group, which does not always have the resources to contribute to industry advocacy directly, especially on themes such as spectrum. That is especially important to consider when some market participants wish to increase power levels for their CBRS deployments, which could cause interference or restrict available capacity for local users such as these.

###

~Dean Bubley (@disruptivedean) is the Founder of Disruptive Analysis. He is one of the leading analysts covering 5G, 6G, Wi-Fi, telco business models & regulation, and the emergence of technologies such as quantum networking and AI.