

Parallel Wireless BYOC

Case Study



Introduction

Consumers tolerate gaps in coverage every day, but this is unacceptable for Public Safety and Emergency Services. Bring Your Own Coverage (BYOC) is the solution that solves coverage issues by either extending a nearby macro's coverage area and/or creating an instant "coverage bubble" via a Network-in-a-Box capability. Parallel Wireless, a US-based company, has designed a Public Safety LTE 3GPP-compliant solution that integrates with P25 and Tetra systems to deliver instant coverage, control and network resilience for emergency services networks with BYOC technology.

Overview

The United Kingdom Home Office is driving the UK Emergency Services Network (ESN) that will use British mobile operator EE's (BT's) commercial LTE RAN and a dedicated mobile core to eventually replace the country's existing nationwide TETRA system. To meet the emergency network requirements of resilient coverage everywhere, Emergency Services Network (ESN) in the UK needed a solution to provide instant and resilient coverage and flexibility, so first responders are able to communicate anywhere.

The Solution: Parallel Wireless Bring Your Own Coverage (BYOC)

This solution provided a unified, resilient LTE network across police, fire, and ambulance in tactical operations, in emergencies, and during natural disasters – all at a much lower cost. The technology can was deployed in various tactical and multi-cast environments from the police station/military base to deployable/man portable in ad hoc scenarios. The solution delivers reliable coverage across urban and rural areas, local organizational control, and resilience with self-healing features and flexible backhaul capabilities, including backhaul mesh or LTE backhaul. It provides secure LTE communications consisting of voice, high throughput video, data, Push-to-Talk, MMS, and/or SMS for multiple users in daily operations or in emergency/tactical operations with these components:

- In-vehicle ruggedized eNodeB that is built using commodity components. It can instantly extend network coverage or create coverage via a portable/ad hoc network capability delivering the high capacity, throughput and reliable coverage required by the most demanding applications, even in harsh environments.
- The CWS nodes are managed via the Parallel Wireless Open RAN controller as it manages node configuration and mitigates traffic among neighboring nodes. It provides node aggregation, S1 Gateway, X2 Gateway and Security gateway functionality, MOCN, real-time ICIC, resource configuration and optimization with real-time dynamic SON. It helps create an instant ad hoc network in minutes versus hours.
- By bringing an embedded EPC as a part of the NIB configuration, an instant portable local network can be created. Public Safety personnel can communicate with each other without having the communications backhauled to the network. A direct connection is provided via the in-vehicle eNodeB. The network can then be extended even further by creating a mesh through the use of additional CWS nodes.

ESN
Emergency Services Network

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Benefits to First Responders

BYOC delivers the following benefits:

- Coverage anywhere: BYOC enables emergency responders to have reliable voice and data communication within indoor locations such as multi-level car parks or outdoor spaces such as valleys where geographical limitations exist such as terrain, building construction, power outage, remoteness, etc. or where crowd density might otherwise prevent a good wireless experience.
- Mobile Broadband and Voice: The in-vehicle LTE base station allows Public Safety personnel to use standard or ruggedized commodity handsets within a 1000+ meter radius to get reliable coverage to receive high-quality voice, data, and multi-media based on per-user policy.
- Compact: The in-vehicle system from Parallel Wireless that was used in this first operational testing (image above) is lightweight so first responders can bring coverage with them wherever they go (can easily fit in a backpack or a trunk of a car) allows them to fill coverage holes or tactical areas where there is no existing commercial network infrastructure available.
- Meshing and self-optimization: Additional vehicles can arrive and leave the operational area and the BYOC LTE cells will mesh together, extending the coverage area with full self-organizing network capability. The vehicles can cluster or daisy chain into tunnels or valleys extending the coverage into those areas. Hand-offs to and from in-vehicle cells



to available macro cell coverage are seamless and secure.

- Easy to deploy: These in-vehicle nodes are also self-configured by software from Parallel Wireless, so installation is easy and almost instant. This saves precious time in emergency response. Not only is the installation made simpler, but ongoing network maintenance and optimization are also improved as Parallel Wireless solution provides self-healing and self-optimization. As a result, public safety networks experience the best performance without any human intervention to provide network resilience to allow first responders to save lives and do their jobs.

Summary

As it isn't feasible to cover every inch of the country as doing so would require building expensive towers in every remote corner of the country, the BYOC capabilities allow public safety users to bring the coverage with them regardless of how remote or rural the location may be. By using resilient wireless mesh backhaul, public safety vehicles equipped with Parallel Wireless hardware can daisy chain together to extend coverage from the macro network to any backhaul-challenged location. BYOC for autonomous operations during disasters or incident-response operations meets critical communications service demands while maintaining the necessary security of information. SON mitigates interference and enables dynamic traffic routing to make this ad hoc network self-configuring, self-optimizing, and self-healing.

For more information: [the 3G4G Blog](#): update on UK's Emergency Services Network (ESN) from BAPCO 2019; [video](#) from ESN demo at BAPCO 2019, and [customer testimonial](#)



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