



**Traditionally mission-critical communications are based on using dedicated, closed radio networks. They are governed by large national contracts, which stipulate certain technical KPIs such as coverage, capacity, and latency. Even today most networks are built on narrowband technologies, such as TETRA and P25, and therefore only support voice and short messaging capabilities.**

**Modern broadband IP networks such as LTE and 5G can support data intensive applications and services, such as real-time video. This expands their usage and enables new use cases, but achieving the basic KPIs (availability, reliability, performance) for voice and group communications is still of primary interest to the mission-critical users. However, the equation is now more complex due to high number of different user devices, applications, OS versions and reliance on commercial LTE/5G networks that are shared with consumers and business customers. Hence the question is - how do you measure those KPIs?**

Network measurements are often done by drive or walk testing - using expensive specialist equipment and software tools that allow technicians to analyze hundreds of parameters. They are useful especially for network planning purposes, but not designed for everyday use, or to be shared with the end customers. Also, they don't really measure how the network is

performing on day-to-day basis, from the average user perspective, or how different devices compare to each other. In other words, many such tools fail to capture the true user experience.

There may also be situations when the user organizations would like to run these measurements by themselves - e.g. to make

### POST Luxembourg

POST Luxembourg was founded in 1842 as a public service and has been a wholly state-owned company since 1992. It is the country's largest provider of postal and telecommunications services. Owner of its fixed and mobile infrastructures, POST offers high-speed secure connectivity solutions as well as voice and data management services for individuals and professional customers.

### UK Power Networks

UK Power Networks is a Distribution Networks Operator (DNO) providing power to a quarter of the UK's population. UK Power Networks owns and maintains the regulated electricity distribution networks serving London, the South East and East of England, and commercial business, UK Power Networks Services, provides energy consulting, project delivery, operations and asset management services to businesses across the UK.

### Ericsson

Ericsson is a world leader in the rapidly changing environment of communications technology - by providing hardware, software, and services to enable the full value of connectivity. The company's portfolio spans the business areas Networks, Digital Services, Managed Services and Emerging Business, powered by 5G and IoT. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally.

# Case Study

## Bittium SafeMove® Analytics

sure important geo-locations and selected device models are covered in the tests. Here the product from Bittium called SafeMove® Analytics is particularly useful. It is a software solution that can be hosted by the network operator, and in which the user organizations can monitor their own device pool. Customers install the SafeMove client application on all or selected devices, after which they can select the parameters, make their own dashboards and visualize the measurement results in selected format. With the application programming interface (API) provided by SafeMove Analytics, the organizations can also integrate the data from SafeMove Analytics and use it with their other databases and software tools.

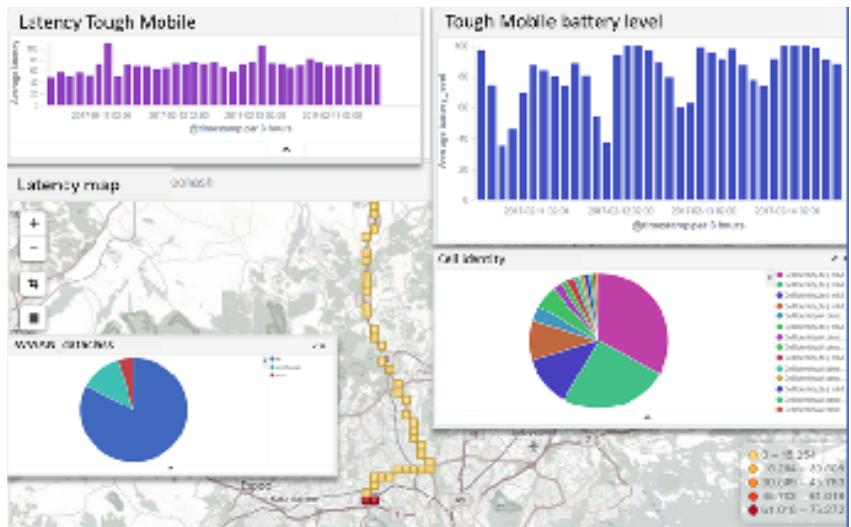


Photo ©Bittium

### Case: POST Luxembourg

Our partner POST Luxembourg recently told us about an incident that happened a few years ago. During a large rock concert held at one of the leading event venues in Luxembourg, customers complained about the network performance. In the after-analysis POST found out that due to a recent network parameter change they only had 25% throughput in the local area. After this incident POST decided to perform continuous radio network measurements that now cover the whole country through drive tests on weekly basis.

ports to the service provider, and require corrective actions if needed. According to POST Luxembourg, Bittium SafeMove Analytics works reliably and is very cost-efficient method to collect important data. They are currently demonstrating the SafeMove Analytics solution and showing the results also to key customers, which include government entities, public safety organizations and major corporations in Luxembourg.

about the device fleet's whereabouts, performance and connectivity status helps you understand where, when and how your devices are being used. Relevant, accurate data allows making fact-based decisions to improve business efficiency and user experience. In fact, SafeMove Analytics users have taken advantage these capabilities to systemically define, improve and measure the connectivity KPIs. This is important especially for organizations that rely on efficient field operations in their business.

In addition to network performance, the user organization can also use SafeMove Analytics to measure their device utilization. Real-time and historical information

POST Luxembourg is now using SafeMove Analytics to measure two basic KPIs: latency and signal strength. As a third element they added a diagram to show amount of time the user is on 2G, 3G and 4G. Test results are combined into a view, which is monitored in their network supervision center. In case of anomalies or problems visible at these basic indicators, they do trigger in depth analysis by use of their own diagnostic tools to resolve a potential issue.

For POST Luxembourg these ongoing measurements are part of continuous service improvement. It helps them to identify deviations and patterns, and plan ahead, not just react to issues like temporary service outages.

Similarly, if the user organization (such as police or rescue services) is doing their own measurements, they can create re-

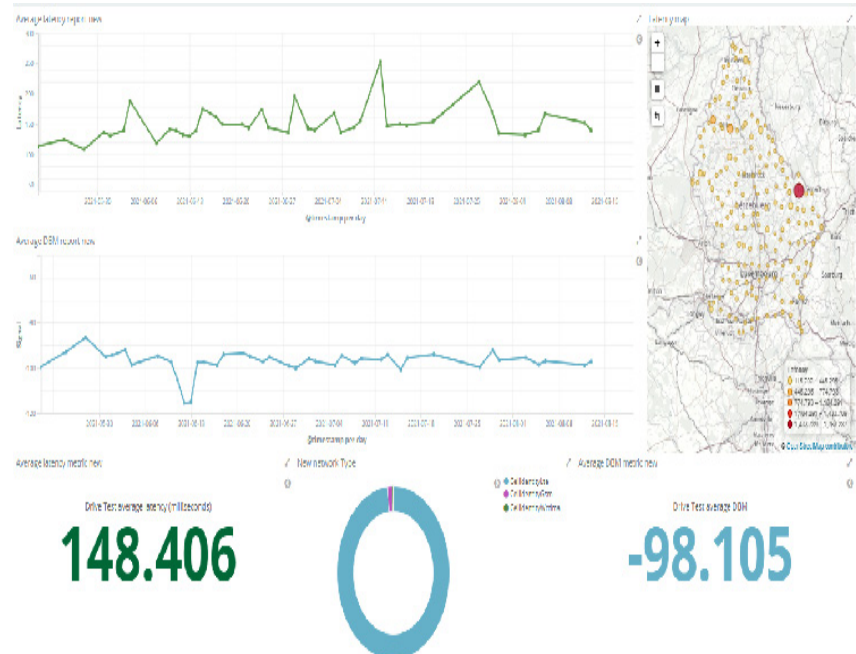


Photo ©POST Luxembourg

# Case Study

## Bittium SafeMove® Analytics



Photo ©UK Power Networks

### Case: UK Power Networks

One such example is UK Power Networks, who runs the electricity network for more than 8 million homes and businesses in London and South East Anglia. UK Power Networks, a long time user of SafeMove Analytics and SafeMove Mobile VPN defined 95% connectivity as their field force target. With SafeMove Analytics they were able to establish a baseline connectivity KPIs and to accurately measure, how each and every improvement impacted connectivity experience of their mobile workforce. With the clear goal in mind, and with the help of SafeMove Analytics, they reached their target and have used SafeMove Analytics ever since to validate the performance on an ongoing basis. This highlights one of the additional benefits of using SafeMove Analytics: after having the measured baseline connectivity KPIs in place, one can easily measure new device models or test new accessories such as car-kits to see how they impact the overall user experience.

Using SafeMove Analytics in closed, private cellular and WiFi networks is also possible. This will require installation of a SafeMove server in the customer premises, or somewhere else within the private network infrastructure. While SafeMove Analytics relies on big data storage and

processing, the system can be setup quickly for an on-premise environment by using one or more middle range servers or virtual machines that are dimensioned based on the anticipated data volumes. Quick set up makes SafeMove Analytics ideal for project-based measurements also in private networks.

### Case: Ericsson

Bittium SafeMove Analytics has been used for example in rescue helicopter drive tests in Sweden, where it was used to measure the functionality and performance of Tera-com-Ericsson AGA (air-ground-air) LTE/4G network. The objective of the AGA measurement project was to design, build, test and analyze vertical and horizontal coverage and performance of LTE/4G network

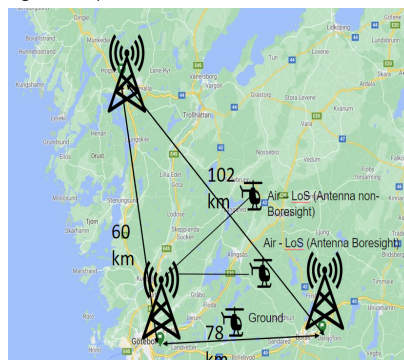


Photo ©Ericsson

and terminals in an aircraft. The project involved real life measurements from Bittium Tough Mobile 2 smartphones and other end user devices, showing various technical and quality parameters from the individual cell towers. Measurements were repeated several times, and in various speeds and altitudes. Given the successful results, the project was extended to also cover measurements from border patrol airplanes.

Right now the mission-critical communications in Europe are transitioning from TETRA to LTE, and the need for measuring the actual device and network quality, performance and KPIs is growing. In the future, when standalone and private 5G networks become more commonplace, and have built-in support for mission critical services, the associated KPIs need to be defined and measured again. Bittium SafeMove Analytics will be supporting this evolution.