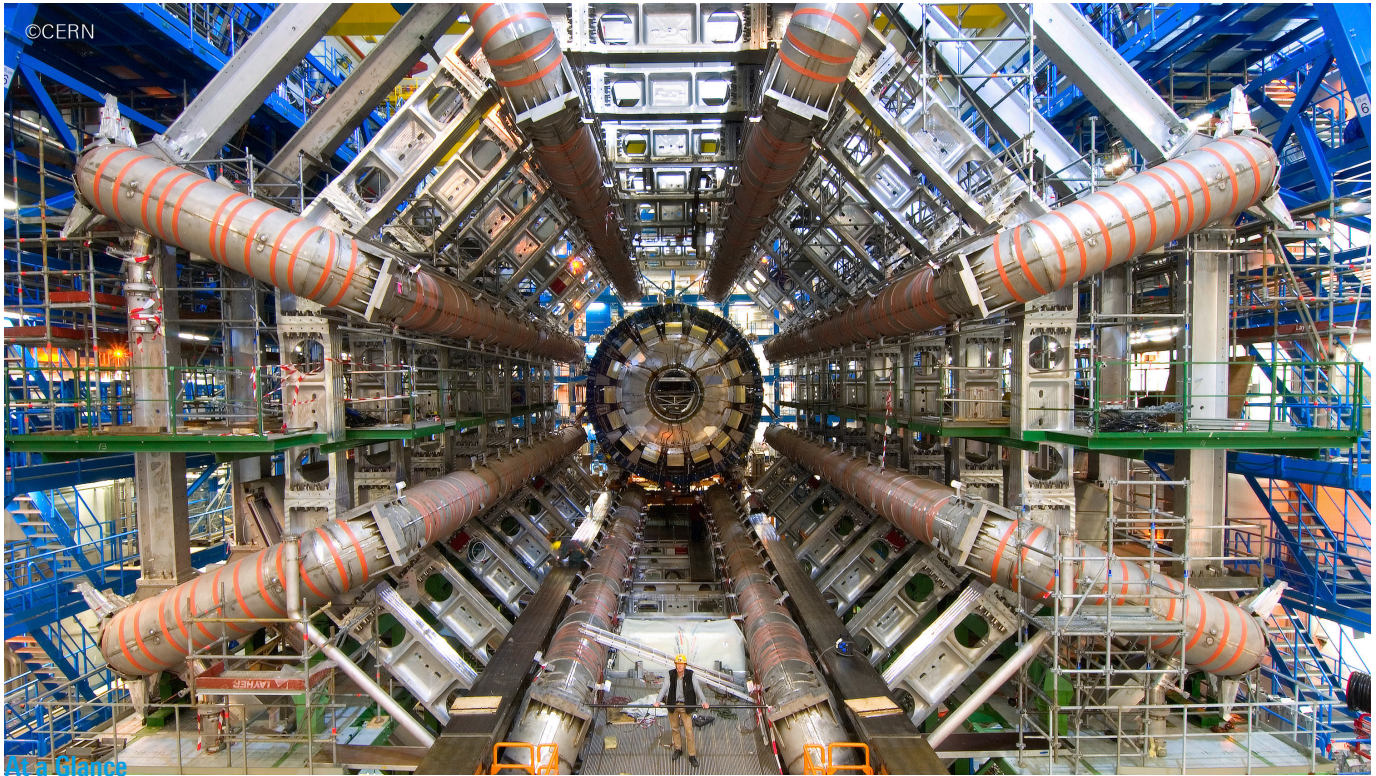


LARGE-SCALE, 24/7 MOBILE QUALITY MONITORING AND SERVICE LEVEL VERIFICATION



View of ATLAS, the largest detector of the Large Hadron Collider (construction phase). CERN runs an area-wide mobile network that also covers this cavern 100 meters underground.

At a glance

At CERN, the European Organization for Nuclear Research, physicists and engineers probe the fundamental structure of the universe. CERN's flagship, the Large Hadron Collider (LHC), has a massive underground infrastructure that consists of a 27-kilometer ring of superconducting magnets at an average depth of 100 meters. A mobile network designed for CERN's needs, with a mix of above-ground and underground infrastructure, ensures area-wide communications. To monitor and measure communications services in line with service level agreements (SLA), an extensive network of QualiPoc Android Probes from Rohde&Schwarz mobile network testing (MNT) has been installed below and above ground.

Summary

- **Customer:** CERN (European Organization for Nuclear Research), Geneva, Switzerland
- **Task:** Large-scale monitoring system for SLA verification
- **Challenge:** Remotely controlled, 24/7 wide-spread network monitoring below and above ground
- **Solution/product:** Rohde&Schwarz MNT QualiPoc Android Probe, NetQual suite
- **Key benefits:** Fully compliant with specifications, cost-efficient, highly reliable

Case Study | Version 03.00

ROHDE & SCHWARZ

Make ideas real



"QualiPoc Android Probe meets our technical requirements and offers the most flexible and cost-effective solution"

Frederic Chapron, CERN

Use case details

The European Organization for Nuclear Research (CERN), financed by 21 Member States ([CERN convention](#)), is located outside Geneva, Switzerland, and operates the largest particle physics laboratory worldwide. The most important and impressive part of the lab is "invisible", located some 100 meters underground. A circular tunnel system with a circumference of 27 kilometers includes a particle accelerator ring called the Large Hadron Collider, which is considered the largest and most complex machine in the world. Thousands of scientists, researchers and engineers work in this sprawling area and must be reachable by mobile phone 24/7, also when they are underground.

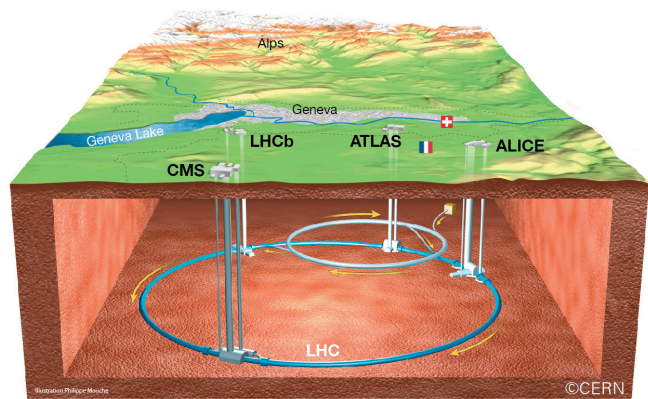
CERN commissioned a leading Swiss mobile network operator to provide infrastructure and services to run a mobile network specifically designed to meet CERN's needs. It comprises several surface radio base stations and 46 underground repeater sites. To offer mobile telephony and data services in underground tunnels and caverns, CERN set up a leaky feeder infrastructure covering 60 km to support 2G/3G/4G technologies. To monitor realtime service quality (QoS/QoE) in line with SLAs, CERN selected the QualiPoc Android Probe from Rohde&Schwarz MNT, a Rohde&Schwarz subsidiary based in Zuchwil, Switzerland.

Solution

Back in 2013, CERN evaluated QualiPoc Android Probe based on comprehensive technical specifications. The solution won the competitive call for tenders and met CERN's stringent criteria in terms of compactness, reliability, energy consumption, flexibility and cost.

QualiPoc Android Probe use-case-specific benefits:

- Standard smartphone-based network probe enabling economical, remotely controlled, large-scale deployments
- Compact, robust hardware offers active ventilation, backup battery and wall-mounting options
- Supports all mobile network technologies used worldwide and provides information about the full network status – from the application layer down to layer 1
- Provides extensive test functions for voice (incl. voice and video MOS), data, video streaming and messaging tests to assess and reflect the real QoS/QoE end-user experience



Tunnel system hosting the Large Hadron Collider (LHC), located some 100 meters underground.

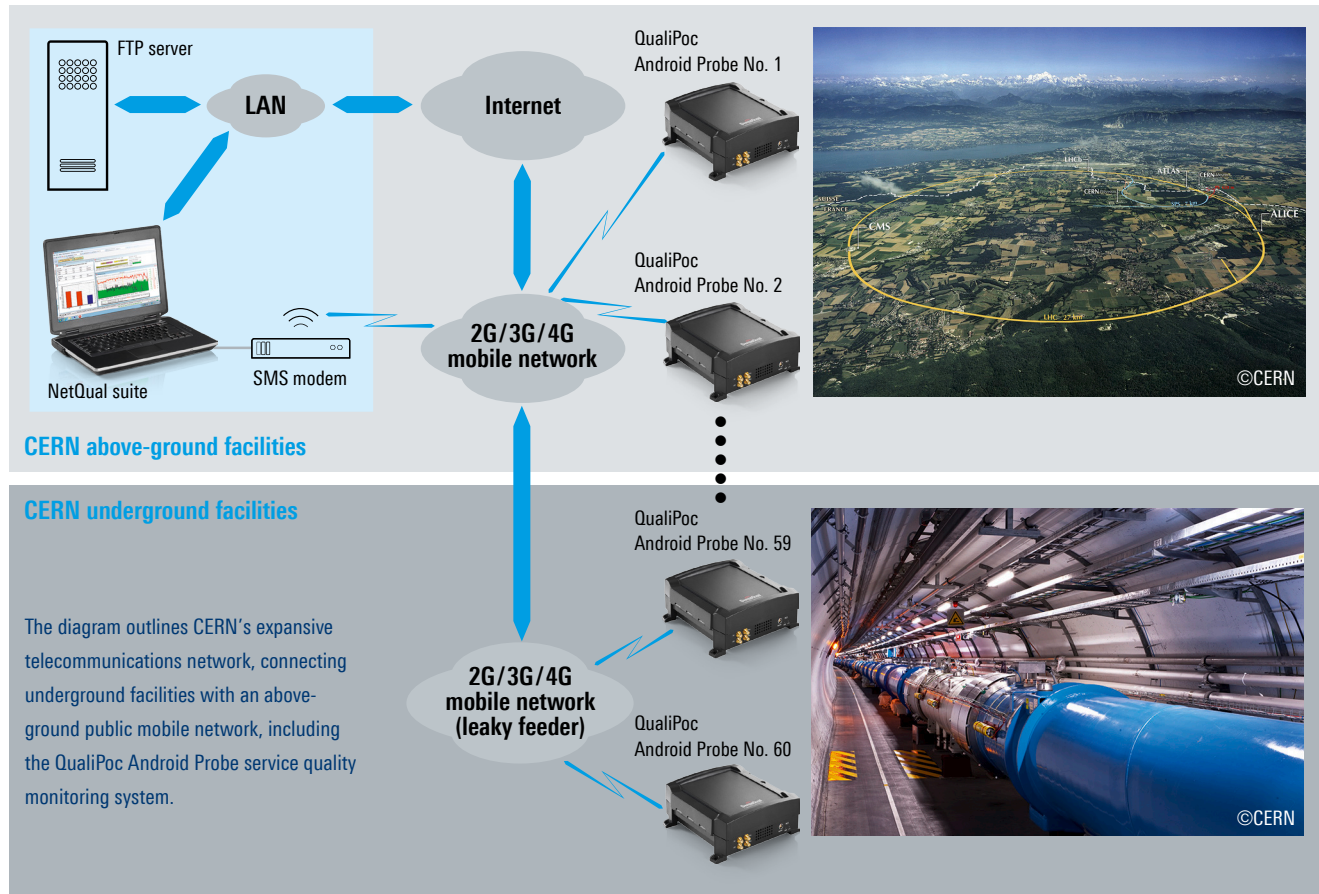


The network monitoring solution QualiPoc Android Probe from Rohde & Schwarz MNT.

- Fully featured backend application for remote configuration, realtime monitoring and alarming, post-processing and reporting

The 60 probes deployed networkwide continuously measure multiple RF parameters (KPIs, signaling, layer 3) and run scheduled QoS/QoE tests to verify SLAs and monitor communications services. The data is reported to a central server unit via http/ftp. A fully featured backend provides a realtime network overview and allows remote configuration, alarming, data analysis and reporting.

CERN telecommunications infrastructure



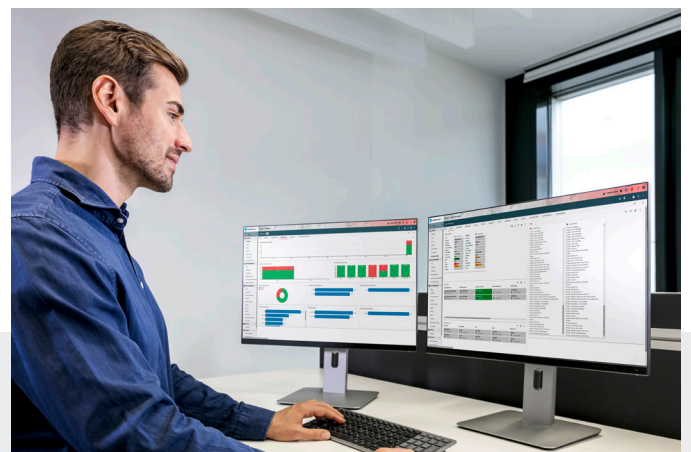
QualiPoc Android Probe

The smart and simple product concept is based on standard Android-based smartphones and equipped with extra safety features (backup battery, automatic reset, ventilation) to maximize system stability. Power is only needed for remote control and configuration.



SmartMonitor - real time monitoring and alarming

The web-based SmartMonitor provides easy probe management and real time monitoring. Based on configurable alarms, users are immediately notified when a service outage occurs.



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- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Mobile network testing

The company's broad and diverse product portfolio for mobile network testing addresses every test scenario in the network lifecycle – from base station installation to network acceptance and network benchmarking, from optimization and troubleshooting to interference hunting and spectrum analysis, from IP application awareness to QoS and QoE of voice, data, video and app based services.

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