

Keysight Umetrix Data | 5G

Assuring the User Experience of Wireless Data Services at Challenging New Thresholds

Make Way for Ultra-Fast Data Speeds

The telecom industry faces many complex challenges as wireless network infrastructure and devices approach new fifth-generation (5G) standards, which assume much loftier goals than fourth-generation Long Term Evolution (4G LTE).

The International Telecommunication Union Radiocommunication Sector (ITU-R) has an ongoing program that develops guidance for International Mobile Telecommunications for 2020 and Beyond, known as IMT-2020. IMT-2020 broadly categorizes 5G application and usage scenarios into the following fields:

1. Ultra-reliable and low latency communications (URLLC)
2. Massive machine type communications (mMTC)
3. Enhanced Mobile Broadband (eMBB)

The third category is what most consumers think of when they talk about 5G. Assuring 5G meets the 20 gigabits per second (Gbps)+ data rates for eMBB requires more than just file transfer protocol (FTP) and a fast server. That's why Keysight has been working with key industry partners to design a high-speed test bench that allows a 5G cellular data system to be benchmarked, measured, and tuned for maximum performance while minimizing the user's exposure to its underlying complexity.

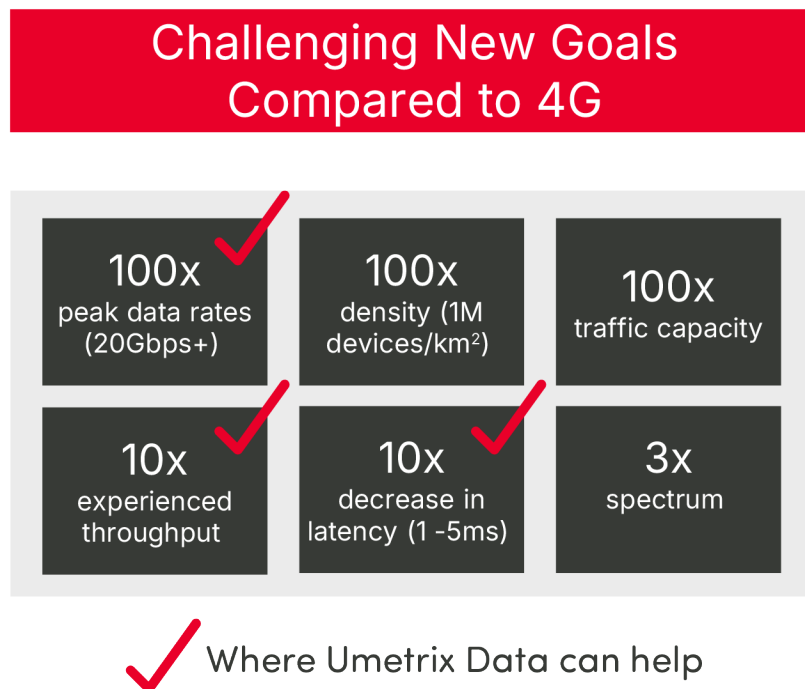


Figure 1. Keysight's Umetrix Data provides the high-performance testing required to validate critical 5G benchmarks

Solution Benefits

- Capture application throughput and latency measurements across the mobile edge and public internet to assess the true customer experience.
- Ensure test methodology consistency across lab and field to easily correlate lab and field test results for faster root-cause analysis.
- Access daily packet capture logs on media endpoints for in-depth network logging analysis.
- Reduce research and development (R&D) laboratory test costs via easy 5G test setup and configuration compared to other systems.

Evaluating 5G Data Throughput and Latency Performance

The Umetrix Data 5G platform **enables mobile application data throughput testing in both the lab and the live network** across a common solution to support eMBB requirements and speeds. Users can compare and evaluate user experience for any data service over 5G, Wi-Fi, or LTE. Test scenarios mimic real-world user activities — such as uploading, downloading, browsing, and streaming — as well as latency test cases.

The Umetrix Data client is a mobile application for iOS, Android, or Windows devices that coordinates critical multiservice voice and data tests. It establishes data sessions and initiates voice calls during data transfer in conjunction with Umetrix Voice.

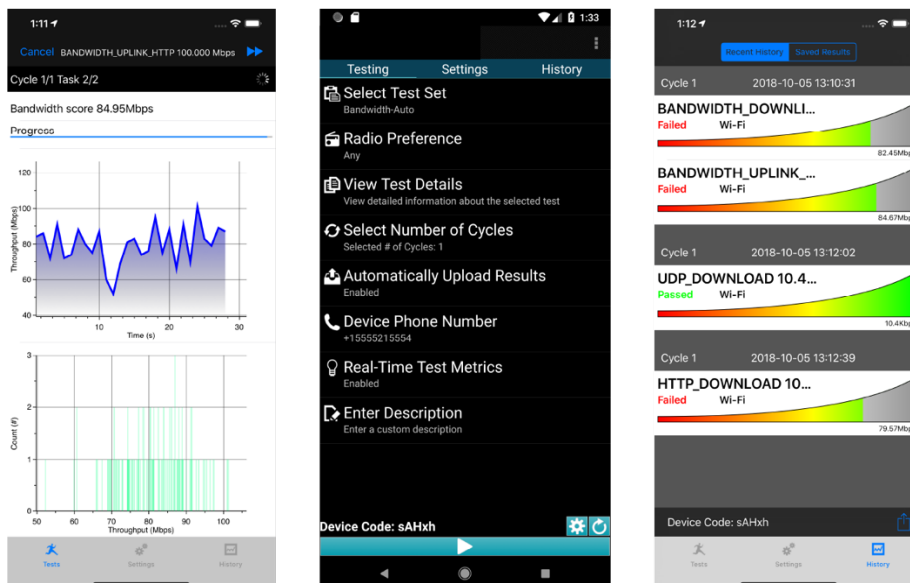


Figure 2. Umetrix Data performance results

Umetrix Data 5G evaluates:

- Web browsing
- File transfer
- Multiservice capabilities
- Radio frequency (RF) status
- Diagnostics

Use Case | Android Automation and Monitoring to Assure 5G Networks in the Field

Vehicular field performance testing traditionally requires a skilled engineer to operate complex test equipment alongside a driver. Most of the collected data typically falls into acceptable performance ranges, so the engineers performing the tests are hunting for anomalies. This is not the best use of valuable company engineering resources. Device automation and monitoring capabilities can be used to ensure that a company's most valuable engineering assets are spent analyzing performance issues, not collecting them.

Maximize Resources with Remote Automation

Umetrix Data options streamline your device and network performance field testing. With Umetrix Data Automation and Monitoring, a single driver with racks of devices can be managed via a remote operator from a centralized location. Cost savings and efficiency benefits are realized as testing can be rigorously controlled and standardized across every vehicle. Instead of sending engineers out on the road, their valuable skills are used for remote monitoring and analysis.

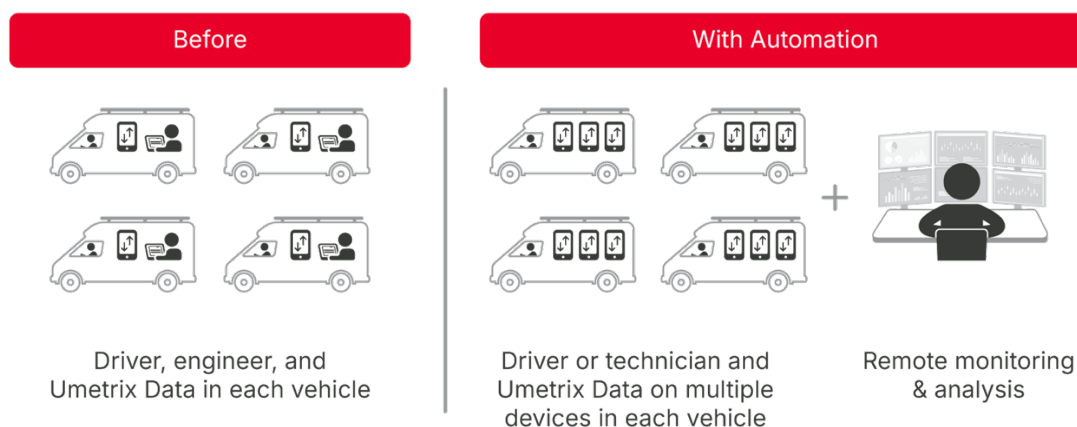


Figure 3. Umetrix Data automation and monitoring transforms field operations by replacing the need for on-site engineers with a single remote operator who can manage multiple vehicles and devices

Use Case | 5G Low Latency and Throughput Application Testing in the Field

For new services and devices: A new generation of services and products is entering the market with 5G that requires low latency to deliver an exceptional user experience. Umetrix Data 5G measures one-way latency and throughput to the mobile edge and the public internet, offering a true measure of the customer experience for new service and device launches using Keysight media endpoints.

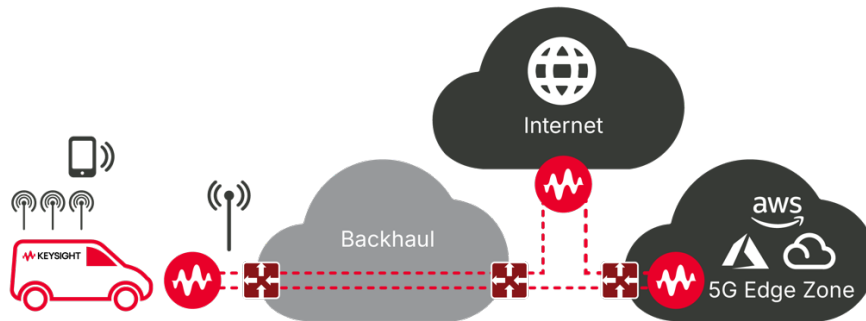


Figure 4. Keysight's Umetrix Data 5G measures one-way latency and throughput across the backhaul, public internet, and 5G edge zone

Use Case | 5G Application Testing in the Laboratory

For networks: Connecting a 5G network between two instances of Umetrix Data 5G test servers allows users to adjust network settings, observe the impact on data throughput performance and user experience, and inspect the logged packets to determine the root cause of any issues.

For devices: A 5G device can be inserted in place of one of the test servers to evaluate the data throughput performance of the device while streaming multiple applications.

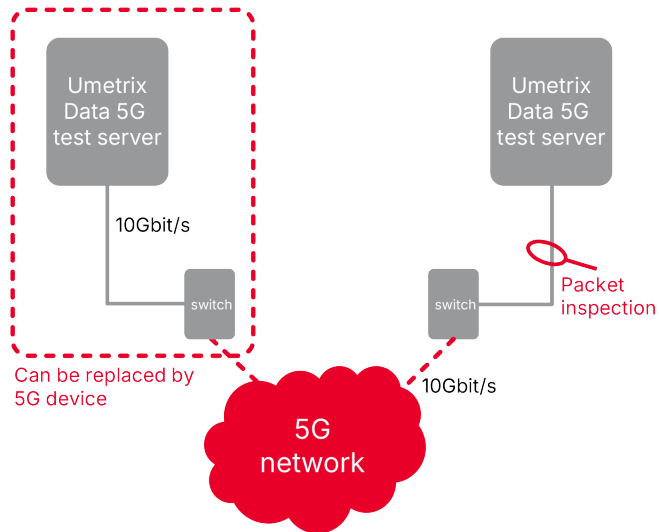


Figure 5. Umetrix Data 5G use case

Practical Observations for Testing 5G Apps

Through performance evaluations with key industry partners, our Keysight experts recommend these considerations when designing a high-speed test bench:

- Test **multiple application protocols** to account for **differences in network routing**.
- Test application data in **multistream scenarios** to measure **maximum network bandwidth**.
- Ensure all nodes in the 5G test environment support a **maximum transmission unit (MTU) of 9000 bytes** to achieve the highest possible throughput.
- **Deploy media endpoints at the mobile edge and on the public internet** to benchmark low-latency applications for end-to-end performance.

Designed for Meeting 5G Requirements

High-performance data demands mean 5G application testing requires not only high-speed throughput, but also massive amounts of storage for packet logging. A 10 Gbps network at full capacity can generate over 100 TB of log data per day, while a 20 Gbps network can generate twice that.

To support these new requirements, Umetrix Data 5G supports 10 Gbps+ capacity and packet capture storage arrays for the best combination of redundancy and input/output (I/O) performance, which is critical for network logging to ensure all data is captured. The solution includes hosted public endpoints, private multi-access edge computing (MEC) endpoints, mobile endpoints, and lab endpoints. The lab solutions allow organizations to experiment with new 5G application requirements and use components of the same platform to measure results in the live network.

To learn about 5G data throughput test setups, trials, and performance evaluation, [contact our Keysight experts](#).



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