

Keysight Technologies

T5510S Cellular + Wi-Fi Emulation System:
Validate and Model Multi-Mode Devices
in a Cellular and Wi-Fi Ecosystem to Deliver
Better User Experience

Solution Brief

Deployment Scenario: Multi-Mode Devices in a Cellular and Wi-Fi (Unified) Ecosystem

The continued explosive growth of wireless data and applications is leading to the introduction of billions of new, multi-mode devices that can operate at higher bandwidth and lower latency. These devices are compatible with the latest cellular and Wi-Fi standards. They are essential for the consumption of services offered through high-scale Gigabit Long-Term Evolution (LTE), Internet of Things (IoT), connected car and 5G implementations. Wi-Fi and cellular are increasingly being used together as a unified communication ecosystem to address users growing bandwidth needs, support denser deployments at scale with new multi-mode devices (Hot Spot, AP, CPE, Smart Phone), and deliver seamless real-time communications.

Historically, end user and networking wireless devices were tested separately in either a Wi-Fi or a cellular environment. However, in a unified communication system, it is harder to detect real-world problems, perform comprehensive testing, and verify the interoperability of these devices in licensed and unlicensed spectrums across multiple cellular bands. Ad-hoc tests with commercial Wi-Fi set ups are incomplete, unreliable, unrepeatable, and slow; “golden radio”¹ approaches are inflexible and static.

To solve this type of challenge, Keysight has developed a powerful test system, T5510S, that works on both cellular and Wi-Fi air interfaces. In addition, this solution employs a comprehensive test automation platform (TAP) with emulation that can rapidly simulate, program, and monitor the unified ecosystem for rapid verification of new test scenarios. The T5510S Cellular + Wi-Fi Emulation System helps find complex protocol implementation errors under repeatable real-world traffic and interference conditions for faster troubleshooting, benchmarking, and calibration of multi-mode devices to improve user experience.

T5510S Solution Components

- Keysight UXM Wireless Test Set
- Ixia Wave Test System Wi-Fi Emulation
- Keysight Cellular & Wi-Fi Emulation Plugins
- Keysight TAP

Benefits

- Measure user experience in realistic diverse interoperable test environments
- Improve productivity by finding issues rapidly before end-users find them
- Reduce costs by eliminating the need for a life-sized Wi-Fi and cellular test bed
- Accelerate time-to-market by testing multi-mode devices in unified ecosystem

T5510S Solution Overview

A cellular and Wi-Fi test automation and emulation system allows you to simultaneously:

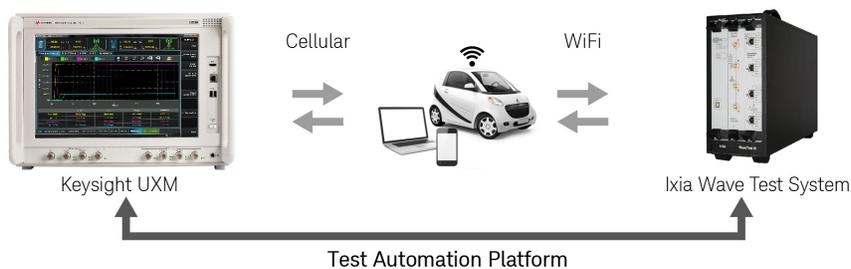
- Emulate complex unified ecosystems that complement, compete, and co-exist for exhaustive testing
- Test, assess the performance, and model the user experience of multi-mode devices in interoperable environments in an automated, repeatable, and real-world RF, cellular, and Wi-Fi conditions
- Gain new insights for design validation by enabling multiple cells, 8x4 MIMO and CA
- Test multi-format 2G/3G/4G/4.5G/5G and beyond up to 5CC, including NB-IoT/Cat-M
- Generate bi-directional line rate realistic traffic (Layer 2-7) with integrated fading
- Support LTE/LTE-Advanced/NB-IoT/Cat-M/LAA/LTE-U/CA and 802.11a/b/g/n/ac and more

The Value of Emulating Interoperable Environments for Multi-Mode Device Tests

Equipment and chip-set makers, network operators, and enterprises deploying these new multi-mode devices need to test for proper operation in a unified ecosystem. The ability to test for the conformance, performance, and functionality of these devices under realistic conditions is critical to any successful deployment.

Test automation with a cellular and Wi-Fi emulation system sets up network scenarios by eliminating the need for real-world equipment to:

- Validate Wi-Fi performance when roaming between base stations
- Test performance in the presence of Wi-Fi and LTE channel impairments
- Create accurate Wi-Fi medium utilization and expected fairness between other wireless networks
- Simulate fading flexibly in the unified ecosystem and test for the correct operation of devices
- Implement new and custom tests rapidly across combinations of frequencies and features
- Perform Wi-Fi and LTE co-existence analysis for understanding the impact of interfering networks



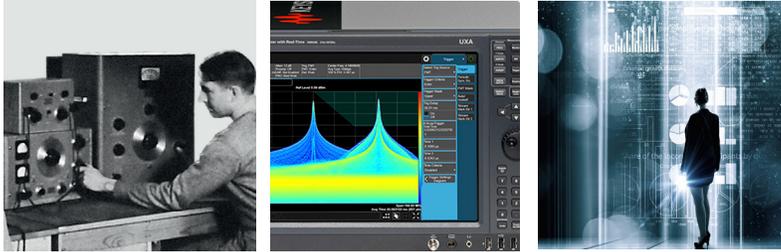
Summary

The Keysight T5510S Cellular + Wi-Fi Emulation System allows validation of multi-mode device behavior in a complex realistic unified ecosystem. This solution reduces design cycles and maximizes productivity of the development organization by launching more releases, enables performance benchmarking, and delivers faster time-to-market by automating the testing of devices in Wi-Fi and cellular ecosystems, enhancing the quality of user experience.

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