5G

5G Non-Signaling Manufacturing Solution

Optimizing 5G NR Mobile Device Test in FR1 & FR2

The Keysight 5G non-signaling manufacturing solution uses an industry-proven platform to support multi-device and multi-format test in a single compact configuration. Integrated state-of-the-art automation and efficient sequencing for optimized speed of execution help reduce 5G device manufacturing cost of test and time-to-market.

Navigating the Transition to 5G

The wireless communications industry is adopting 5G at an accelerating pace to realize more efficient mobile networks that support lower latencies and faster data rates. 5G networks rely on both new sub-6GHz (FR1) and mmWave frequency bands (FR2) to deliver the enhanced performance that new 5G use cases require. Successful roll-outs of new wireless technologies depend on mobile operators' ability to manage the transition from 4G to 5G.

3GPP and other standards developing organizations (SDOs) are in the process of finalizing the 5G new radio (NR) standards, while adding new millimeter-wave (mmWave) frequency bands to support higher data rates and network capacity. The 5G NR standards are maturing in an industry that is witnessing a rapid pace of 5G deployment in many places around the world. New 5G mobile devices need to support a greater number of frequency bands, leading to increased complexity in the test, calibration and interoperability processes.

Key Benefits

- Quickly test up to four devices in parallel using fast sequencing
- Test 5G confidently with a solution approved by Qualcomm in QDART
- Verify device performance in all sub-6GHz and mmWave frequency bands for 5G NR along with legacy technologies like LTE and 802.11ax using a single solution
- Improve time to market by developing test plans quickly on an industry-proven platform
- Utilize Keysight M1740A remote radio head across the Keysight 5G portfolio

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Highly integrated and connectorless 5G mmWave devices need to be validated in over-the-air (OTA) test environments. OTA testing introduces new costs and technical challenges across the entire workflow, from R&D to manufacturing. To achieve accurate measurement results, it is important for mmWave performance validation to take place in controlled OTA chambers, many of which require a significant amount of manufacturing floor space. The complex nature of OTA tests implies longer execution times, which also leads to increased costs.

Reducing The Cost of Testing Devices in Manufacturing

Keysight's 5G non-signaling manufacturing test solution leverages Keysight's E6640A EXM Wireless Test Platform to enable users to verify up to four devices in parallel across any 5G NR 3GPP-defined band. The industry-proven platform supports both FR1 and FR2 as well as legacy and parallel technologies, including LTE and 802.11ax. Its integrated waveform and measurement software, based on Keysight's trusted algorithms, ensures accurate, traceable test results from R&D to manufacturing. Keysight's PathWave test and fast sequencing automation capabilities produce efficient test plans, enabling device manufacturers and their suppliers bring 5G devices to market quickly.

The seamless integration of Keysight's 5G non-signaling manufacturing test solution with Keysight's OTA chambers simplifies calibration and ensures reliable measurements. Appropriate integration of test equipment in an OTA test environment improves users' confidence in generated test results.

Figure 1: EXM mmWave configuration with E7770A and M1740A

Solution Components

- Keysight EXM Wireless Test Set
- Keysight M1740A mmWave Transceivers for 5G
- Keysight E7770A Common Interface Unit
- Keysight PathWave for test automation
- Keysight waveform and measurement integrated software
- Keysight source and analyzer sequencer

Solution Overview

The E6640A EXM wireless test set is a multi-channel platform that supports sub-6 GHz and mmWave 5G NR device manufacturing testing of up to four devices in parallel. The versatile test solution supports both 5G NR and legacy wireless and connectivity technologies, including LTE-A, 802.11ac/ ax, Bluetooth® 5.0, 2G and 3G. Verification of multi-format device RF performance is possible without the need for additional test equipment.

Integrated Keysight waveform and measurement software ensures accurate device performance. A single software application provides waveforms for device receiver verification that enables the user to perform a wide range of measurements, including error vector magnitude (EVM), adjacent channel power (ACP), spectrum emission mask (SEM), power and occupied bandwidth (OBW).

Source and analyzer sequencing techniques deliver fast test capability by enabling the users to optimize test plans by selecting the most efficient sequence for the device under test. Automation based on the Keysight PathWave test platform provides quick and simple test plan execution as well as OTA chamber control with software that is easily maintained over time.

Summary

The Keysight 5G non-signaling manufacturing solution reduces the cost of 5G device manufacturing through using an industry-proven platform to test multiple devices in multiple formants. The solution implements streamlined automation and sequencing to optimize test speed and bring devices to market faster.

For more information, please see Keysight's website:
5G Non-Signaling Manufacturing Test Solution

Learn more at: www.keysight.com

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