

# Keysight Technologies

Move Forward to What's Possible  
with Keysight's LTE Solutions in  
Network Deployment and Optimization

Technical Overview

Drive Test Solution (E6474A)  
FieldFox RF Analyzer (N9912A)



## Introduction

### Tackle the challenges of LTE deployment on foot or behind the wheel.

LTE (4G) is the most promising next generation mobile wireless broadband technology being deployed today. There are many trials under way in all major technology markets, such as Europe, Asia and the Americas.

There are two major arenas in Radio Access Network (RAN) deployment beginning with hardware installation; such as cables and antennas, filters, TMA, diplexer, duplexer, eNode B and backhaul. The other is over the air performance verification and evaluation: band clearing to make sure the channel to be used is interference free, site acquisition, coverage testing, neighbor list optimization, iRAT test, end to end delay and throughput evaluation, KPI testing, air interface optimization and interference management to minimize internal, external and inter-modulation interference.

In order to facilitate LTE technology trials and its deployment, Keysight Technologies, Inc. has developed an LTE receiver drive test system for air interface troubleshooting and optimization, and a handheld RF analyzer for cell site test and interference hunting to help you tackle the challenges of LTE deployment.

# Network Deployment and Optimization

## E6474A network optimization solution

The Keysight Technologies, Inc. E6474A network optimization solution enables wireless service providers and network equipment manufacturers to efficiently deploy and optimize today's increasingly complex wireless voice and data networks. A single flexible user interface spans all the most popular wireless technologies used globally.

Keysight's market leading drive test solution encompasses the key measurements you need to optimize and troubleshoot your LTE networks. This gives you the ultimate toolkit to solve your LTE network problems.



Figure 1. The Keysight E6474A network optimization platform quickly and accurately measures network performance.

Keysight's W1314A multi-band wireless measurement receiver is the most flexible and versatile scanning receiver on the market today. The W1314A supports multiple technologies simultaneously, for example you can have up to eight frequency bands in a single scanner supporting multiple technologies (ie. GSM, UMTS, HSDPA, HSUPA, WiMAX and LTE).

Keysight's drive test software also supports IP data test, VOIP and video streaming on any phone or data card.

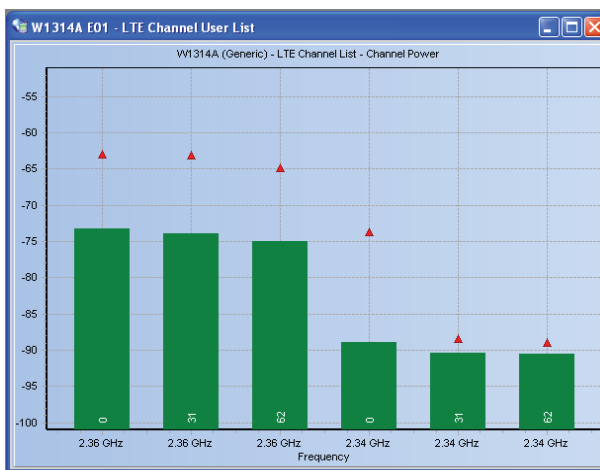


Figure 2. LTE Channel List

## Network Deployment and Optimization (continued)

### Key Features

- LTE channel power measurement
- LTE RF spectrum and CW measurement
- Network timing: Sync Frame = Yes/No
- Note: Sync Frame = “Yes”, assumes that LTE signals are close to the frame boundaries established by a GPS 1 PPS.
- Supported frequencies: 700 / 850 / 900 / 1700/ 1800 / 1900 MHz; 2.1 / 2.6 / 3.5 GHz
- LTE top N channel and channel list:
  - P-SCH RSSI and Physical Layer Identity NID [0, 2]
  - S-SCH RSSI and Physical Layer Cell Identity NID [0, 503]
  - Delay

### Meets current and future network troubleshooting and optimization

- Supports GSM, WCDMA and LTE technologies and multiple frequency bands at same time, this allows you to compare and benchmark each service area, test potential handover (iRAT) between technologies and frequencies.
- Combined with test mobile protocol messages you can monitor what happens in the network and why it happens, this approach makes troubleshooting and optimization much easier.
- Generic data, VOIP, and video streaming tests allow you to integrate any pre-commercial LTE trial phones with drive test system to gain insight into network performance without waiting for engineering test mobile to become available.

# Network Deployment and Optimization (continued)

## FieldFox RF analyzer

The Keysight FieldFox RF analyzer (4 GHz/ 6 GHz) is the world's most integrated, fast, and rugged handheld RF analyzer for wireless network installation and maintenance. This six-in-one RF tester combines cable and antenna analysis, spectrum analysis, interference analysis, power meter measurement, vector network analysis, and a vector voltmeter into one rugged, compact, lightweight, and weather-resistant package.

FieldFox supports power suite measurements for GSM, WCDMA and LTE.

### Key Features

- Spectrum analyzer frequency: 100 kHz to 4 GHz /6 GHz
- Resolution bandwidth: 10 Hz to 2 MHz
- DANL (sensitivity): -148 dBm
- TOI: better than -96 dBc, +18 dBm
- Sweep speed: 7 updates per second with 20 MHz span
- LTE channel standard and power suite support: channel power, ACPR and OBW
- Cable and antenna test: 2 MHz to 4 GHz or 6 GHz
- USB power sensor support
- Network analyzer
- Interference analyzer: spectrogram and waterfall displays, record and playback

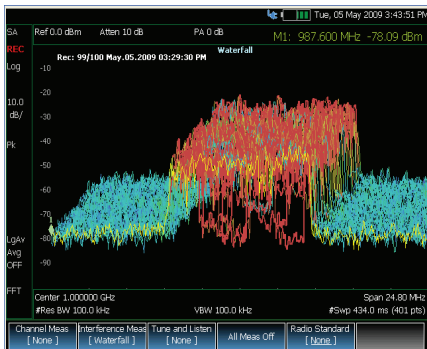
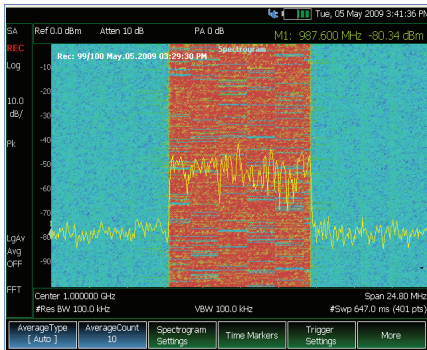


Figure 3. Spectrogram and waterfall displays allow you to detect and monitor intermittent interference signals.

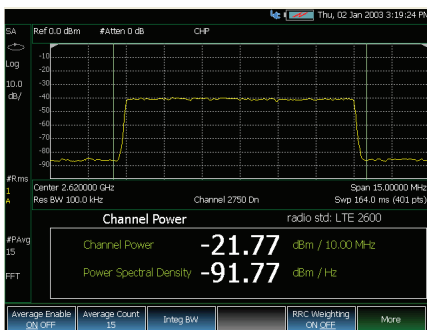
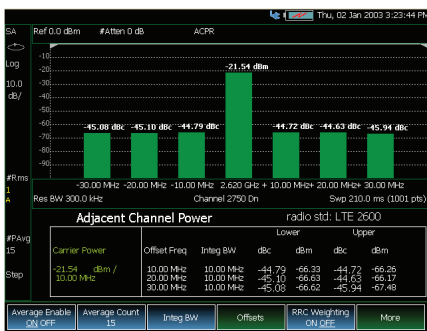


Figure 4. One button channel measurements

## Network Deployment and Optimization (continued)

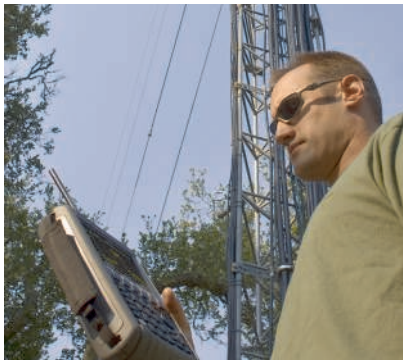


Figure 5. Interference hunting



Figure 6. Cable and antenna analyzer

### Meets current and future wireless network installation and maintenance challenges

- Perform various measurements using FieldFox's six modes - cable and antenna, network, spectrum, and interference analyzer, power meter and vector voltmeter.
- Detect intermittent signals using the built-in spectrogram and waterfall display, and record and playback functions.
- Easily locate interfering signals in a complex signal environment with FieldFox's best-in class dynamic range of 96 dBc, combined with fast sweep-times under narrow resolution bandwidths.
- Verify Node-B transmitter performance easier than before using one-button GSM/WCDMA/LTE power measurements.
- Identify uplink interference during network operation using the LTE TDD spectrum analyzer power measurement function.
- Identify problematic components in the cell site easily and quickly. CalReady and QuickCal reduce the need for calibration, providing you with worry-free accuracy and consistent measurement results.
- Sweep transmission lines faster and easier by viewing return loss and distance-to-fault results simultaneously.
- Measure long cables or antenna systems under high-interference conditions using FieldFox's high output power and Keysight's proprietary measurement algorithm.

### Field-ready

- Rugged and compact
- Easy-to-use, task-driven user interface
- Long-life (4 hr) removable battery
- Bright display and simple data transfer in the field

## Configuration:

### LTE Drive test

- W1314A choose the option to cover the interested band or bands
- E6474A-645 LTE receiver measurements license
- E6474A-030 Indoor mapping license
- E6474A-040 MapX mapping license
- E6474A-060 1 Year Software and Support
- Update Service (SUS)

### FieldFox RF Analyzer

- FieldFox RF Analyzer N9912A
- Option 106: 6 GHz cable and antenna analyzer
- Option 110: Transmission measurement
- Option 111: QuickCal
- Option 231: 6 GHz spectrum analyzer
- Option 235: Preamplifier for spectrum analysis capability
- Option 236: Interference analyzer

For a complete list of FieldFox accessories visit:

[www.keysight.com/find/N9912A](http://www.keysight.com/find/N9912A)



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(BP-07-10-14)

