Agilent Technologies
E7475A GSM Drive-Test System
Product Overview

Do more than just detect problems on your GSM network, solve them with a combination phone- and receiver-based drive-test system

Agilent Technologies
Innovating the HP Way

Drive-testing shouldn't just uncover problems on your GSM network – it should allow you to fix them quickly.

Your GSM business is growing rapidly. You may be rolling out a brand new GSM network, in the process of migrating it to newer data services and air-interface formats, or expanding your current network capacity to keep up with the number of new subscribers—adding new cell sites and re-using frequencies to accommodate service demands.

In any case, keeping your network optimized is vital. Changes in the environment continually affect network performance. You can't afford to have unhappy subscribers because there are holes in your coverage or because interference is causing dropped or blocked calls.

To migrate to new technologies and applications you need a drive-test system that will expand with your needs. The E7475A allows complete scalability on current formats (GSM, TDMA, CDMA) and future formats (check for availability). It has features for site selection, optimization, troubleshooting, indoor analysis, benchmarking, etc.

Drive-testing plays an important role in creating and maintaining a robust GSM network. But you need a system that does more than just tell you that your network has problems!

Our drive-test system provides a fast, easy way to solve them.

Your customers expect high quality of service.

Manage the complete network life cycle

With the E7475A drive-test system, you'll be able to detect and resolve network problems quickly before minor annoyances turn into major sources of customer churn.

Our unique system combines the power of an integrated digital receiver and advanced test mobile phone to assess the service coverage of GSM networks. It allows you to quickly evaluate RF signal strength and quality, detect co-channel and spurious interfering signals, and diagnose complex RF problems on your GSM900, DCS1800, GSM1900 or Railway GSM (GSM-R) network.

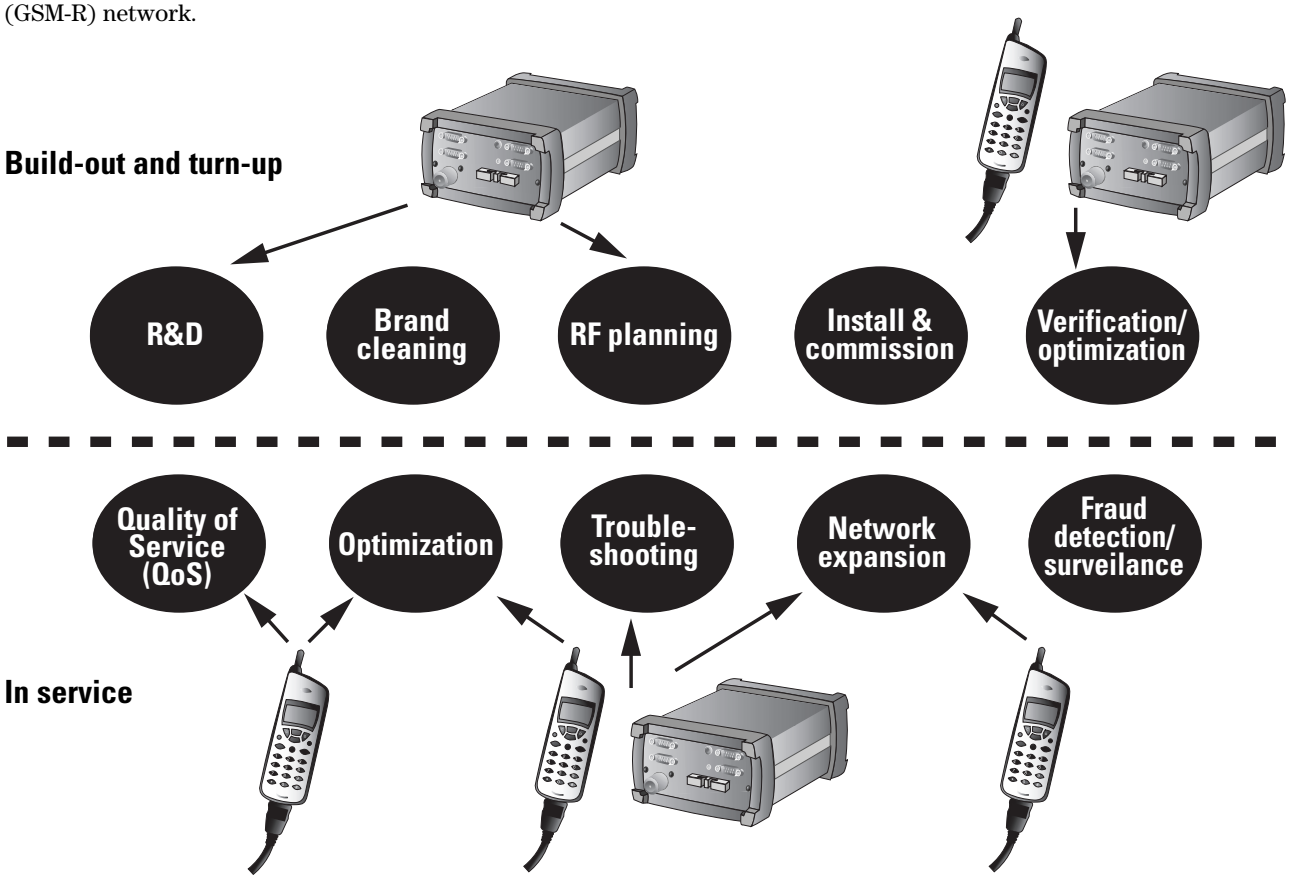
Now, you'll know why you have a problem, not just where.

Of course, you can perform all the traditional call processing tests and log protocol data. A built-in GPS receiver tracks your vehicle's position, so that you can characterize network performance as it relates to a user's location. The system expands transparently from outdoor to indoor measurement capability via a software license, battery pack, optional pen-based tablet computer and customized backpack.

Easy-to-use software lets you set up automatic measurement routines complete with alerts and alarms.

An optional dual-band phone lets you seamlessly track handoffs between GSM and DCS bands. Using multiple phones with one or more receivers, you can quickly benchmark your competitors' networks, whether they are using GSM, CDMA or other formats.

With the E7475A drive-test system, you'll make your installation and maintenance teams more efficient and you'll deliver a better quality of service to your customers.



The E7475A covers the complete network life cycle.

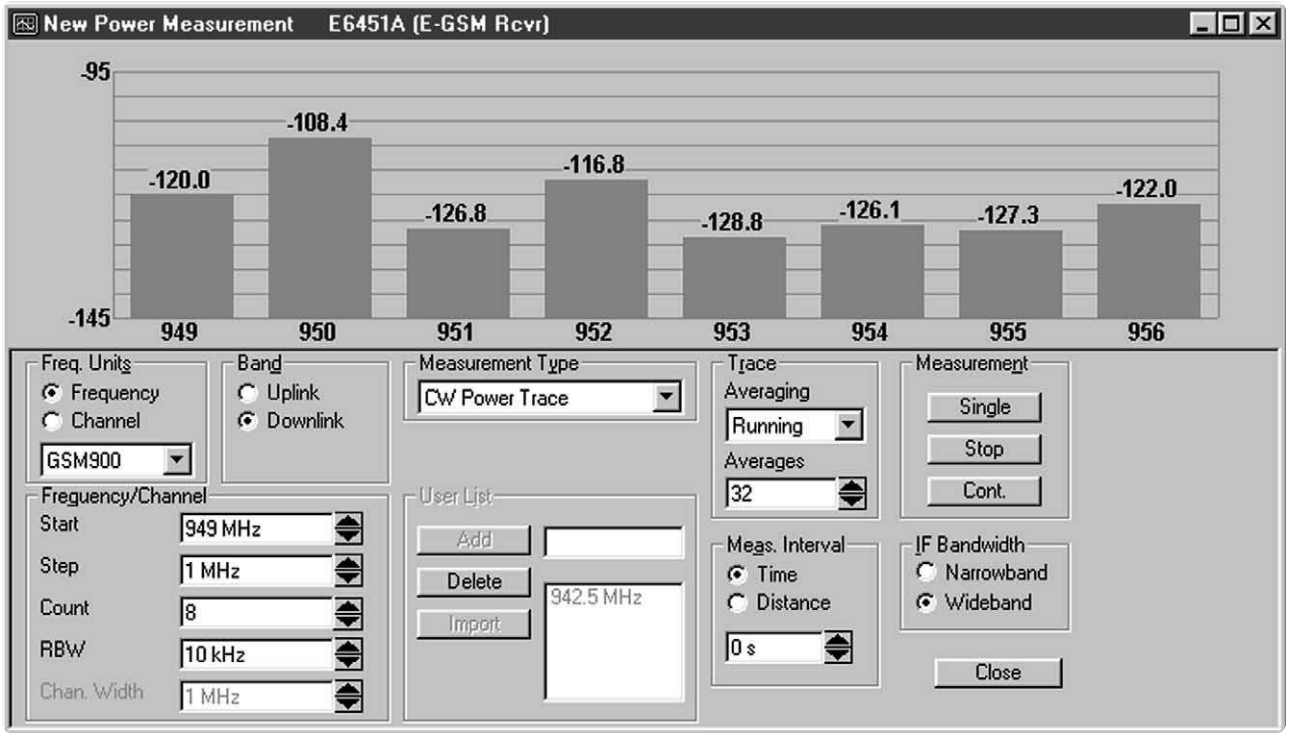
Deploy your network and meet acceptance criteria more quickly

The E7475A has a wide range of features that make it useful throughout the entire life cycle of a GSM network including cell-site selection, network turn-up, expansion of cell sites, network optimization and troubleshooting.

When you first roll out your network and when you later expand the number of cell sites to accommodate more subscribers, you will probably use sophisticated computer modeling tools to help you determine the best location for your base stations. But you also need to take live measurements to verify and refine your network plan.

The specialized receiver in the drive-test system has, amongst others, a CW analyzer to measure the signal of your test transmitter. Because this receiver makes measurements and logs data faster than a phone can, you get a more accurate picture of potential coverage as you drive around a prospective site. With this more accurate site survey, you'll be able to easily determine just how many cells you need for complete RF coverage and how to best tune the network for optimal performance.

By completing the work quickly and accurately with the integrated system, you'll reduce your costs too.



Measure CW signals accurately with the E7475A.

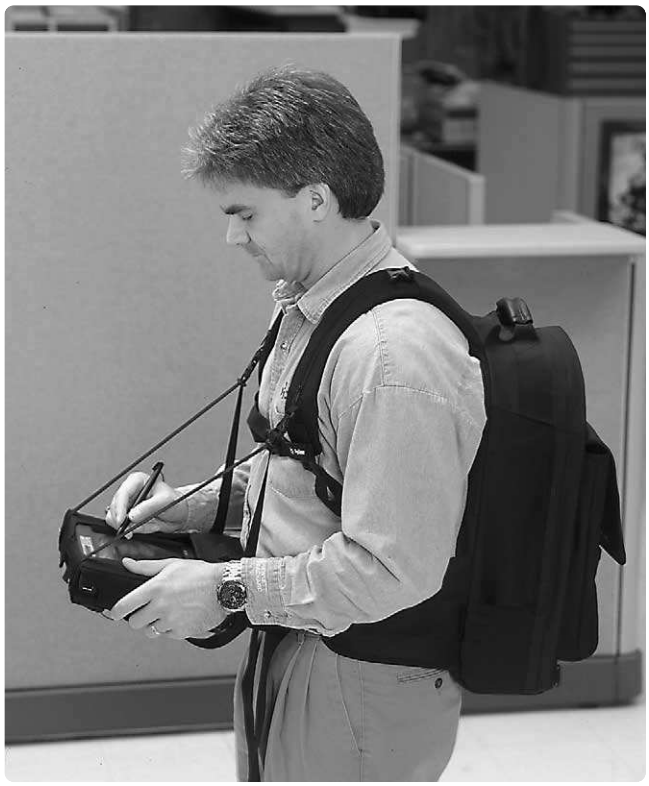
Maximize the return on your test-equipment budget

Large revenue potential exists for network operators at airports (international roaming customers), shopping malls, subways and office blocks. Its is crucial to properly optimize these indoor environments to maximize performance and revenue.

The E7475A systems easily converts from an outdoor to indoor system with complete reuse of your investments in receiver and phone hardware. By adding an indoor software license, receiver battery packs, an optional pen-based tablet computer and a specially designed backpack, the system can be transparently reused for both applications.

The backpack uses an internal antenna to make indoor test as unobtrusive as possible. The system uses scanned maps for ease-of-use and allows absolute positioning to be able to merge indoor and outdoor data in post-processing. This allows verification of the complete subscriber experience in your network.

Accessories designed for comfort and portability.



Optimize the indoor performance of your wireless network.

Powerful components in a compact package

To best measure the performance of the air interface of your GSM network, Agilent has combined a series of powerful instrument and computing capabilities in a highly portable package.

- Compact digital receiver with specialized GSM measurements and optional, built-in GPS
- Single or dual-band GSM test mobile phone
- Powerful co-channel interference measurement
- Powerful software that logs data and integrates receiver and phone measurements
- Easy-to-use Windows® 95, 98 or Windows NT®, interface
- Ability to integrate up to four receivers and four phones into a single system and user interface
- Flexible export capability to mapping software for easy post-processing
- Compatibility with many third-party post-processing packages
- Scalability between indoor and outdoor capability

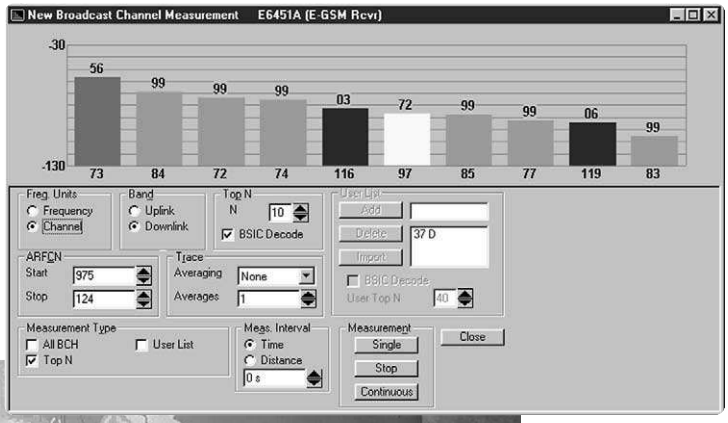
Don't just find problems—solve them!

Optimize your network on an ongoing basis to ensure customer satisfaction

The E7475A will help ensure that your GSM network is performing efficiently. Traditional phone tools are largely dependent on network settings to guide their data collection and measurement. The E7475A drive-test system can measure the power and quality of all GSM broadcast channels. Different from a phone-only-based system, it looks at all the signals present in the RF environment, not just the signals that it has been told are there. Unlike a phone, the receiver is network independent. A measurement of the top N broadcast channels helps you find the true optimal neighbor for handovers.

Operation of the receiver and test phone can be linked, so that the receiver automatically tracks the phone's serving cell as you move from cell to cell. The test phone logs critical call performance indicators, including dropped calls and blocked calls, while the receiver decodes the base station identity code (BSIC) and measures the power of the GSM channels.

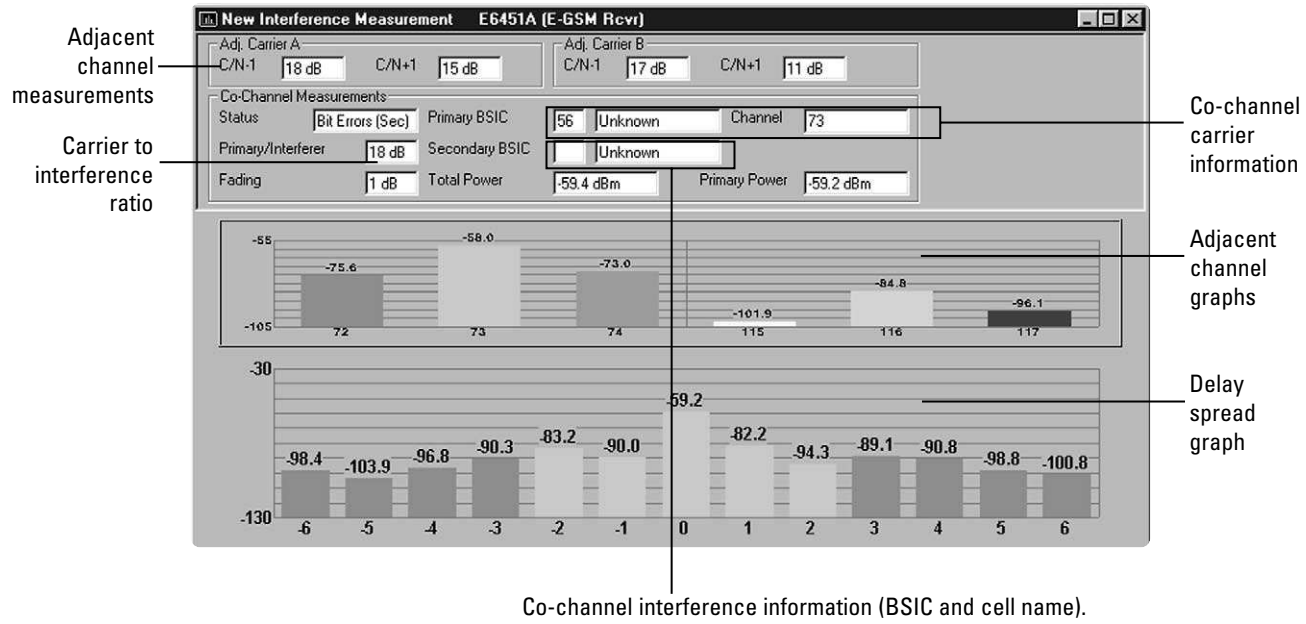
The GSM receiver also provides real-time, non-intrusive interference measurements and interferer identification so that you can detect and troubleshoot interfering signals promptly and improve network performance without impacting normal operation.



Measure all the broadcast channels in your network.

Get the best performance from your network.

Identify co-channel interference non-intrusively.



Troubleshoot problems and manage interference with minimal time and effort

Interference is recognized as a major cause of poor quality and dropped calls. As the subscriber density on your network increases, you may find that you are being forced to reuse a limited number of available channels. Using these channels in close proximity can cause co-channel and adjacent channel interference, which reduces the quality of the signal received by a subscriber's phone and degrades the quality of the call.

Multi-path problems can also occur in the network when a carrier signal is reflected off buildings or other physical obstructions. In other cases, interfering signals may arise outside the network, such as from faulty transmitters, pirate radio and television stations, repeaters or other radiating sources.

Whatever the source, interference can be hard to identify. Traditional tools based on test phones and simple receivers usually require that you turn off your cell-site while you try to uncover the interfering signal. You may have to move your equipment from point to point to take stationary measurements. Such methods are tedious and costly to perform.

The digital receiver in the Agilent drive-test system saves you this time and expense by enabling you to characterize interference during normal cell-site operation. Non-intrusive co-channel carrier-to-interference, adjacent-channel and multi-path measurements are made while you drive, helping you quickly identify any sources of internal network interference.

Specialized measurement algorithms allow the BSIC of the primary signal and that of the strongest interfering signal to be decoded.

To help you further identify sources of interference, the drive system includes a built-in spectrum analyzer that can help distinguish externally generated noise.

Benchmark the competition

With competition intensifying, you are probably interested in how well your network compares with the networks of other cellular operators in your region. In the past, collecting competitive data probably meant owning multiple sets of instruments or doing multiple drives of the coverage area.

The E7475A drive-test system can be configured to handle up to four phones, all controlled by the same software on your laptop. It is possible to configure a system to support CDMA as well as GSM measurement hardware. Up to four receivers and four test mobile phones can be run from a single laptop controller. So now it is possible to collect data simultaneously from several networks in one drive, using one system.

Control up to four test mobile phones for competitive comparisons.

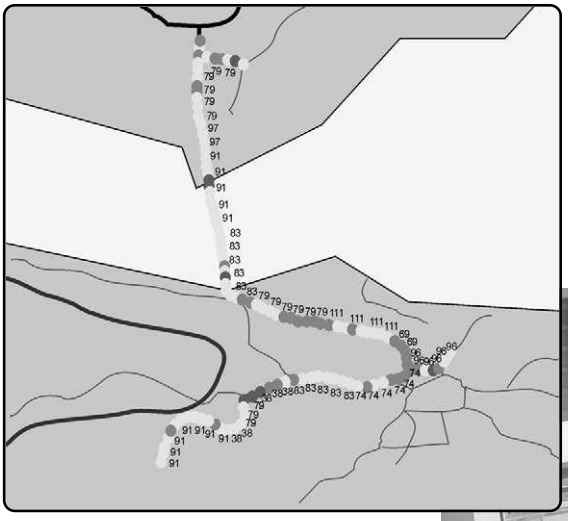
Put measurement data to work immediately

With highly automated measurements and flexible alert and alarm functions, many more of your technicians can perform drive-tests and gather data. The alerts and alarms can be set to trigger on almost any combination of complex measurement conditions, or they can simply be set to warn the driver when the laptop battery is running low, or if the GPS antenna is taken out.

The system records measurements to a disk file that can be played back using VCR-type controls. You can jump forward or backward in the file to the location of recorded alarms and notes.

Data recorded by the drive system can easily be exported to post-processing tools such as Map Info, spreadsheets or many third-party post-processing tools.

An optional real-time line trace map is included that can show the base station positions and plot a single measurement result. The system will update the map plotting line data from the GPS coordinates taken during the drive.



Easy export to popular post-processing tools.

Flexible export capabilities allow for easy post-processing.

Key features and specifications

GSM test mobile phone

The E7475A test mobiles cover the E-GSM900, DCS1800, GSM1900 and dual-mode GSM/DCS frequency bands.

Use them to:

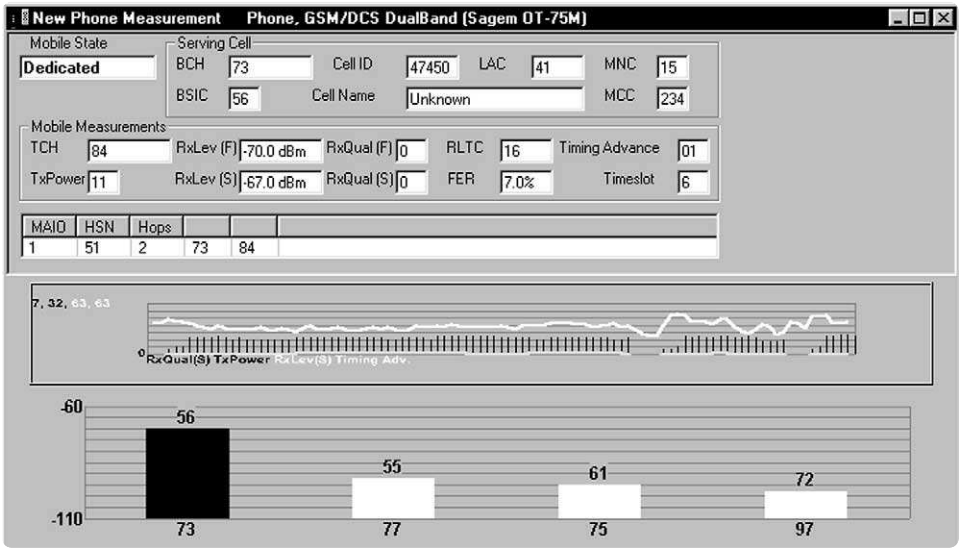
- Get a user's point-of-view of network performance
- Evaluate call-processing operations
- Perform selected call processing functions
- Measure and report the amplitude of the received base station
- Measure and report the signal quality of the received base station
- Read and report the neighbor cell list from the broadcast messages
- Report the amplitude of neighbor list base stations
- Log Layer II and Layer III protocol messages in decoded form for easy interpretation

GSM digital receiver

The E7475A digital receivers cover the E-GSM900, DCS1800, GSM1900 and GSM-R frequency bands.

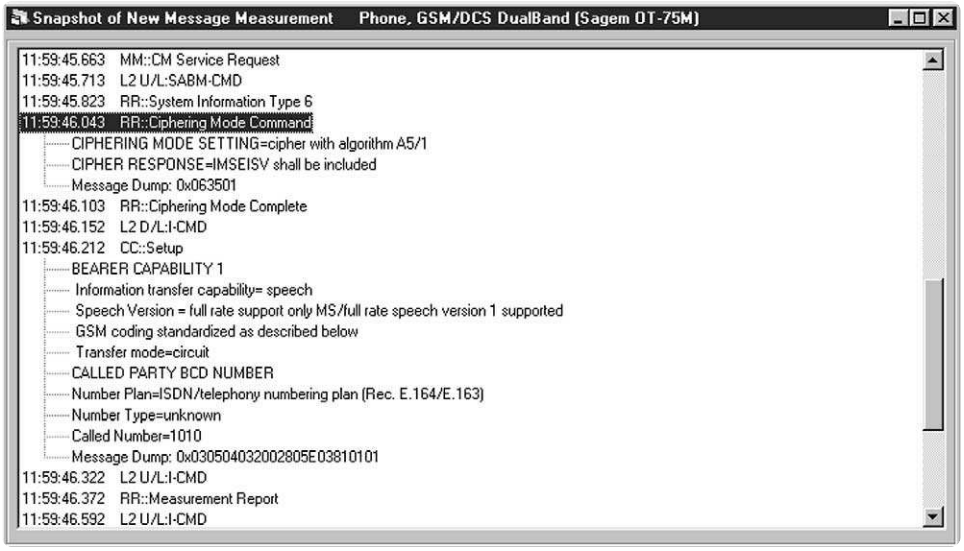
Use them to:

- Manage interference with co-channel and adjacent channel measurements and detection of other spurious signals
- Find network problems faster through network independent measurements
- Reduce network downtime by identifying interfering signals while the network is live
- Identify the BSIC of received base stations
- Measure power and signal quality on any BCH as the receiver is not restricted to the network neighbor list
- Perform spectrum analysis, covering both the downlink and uplink bands
- Measure CW channel power

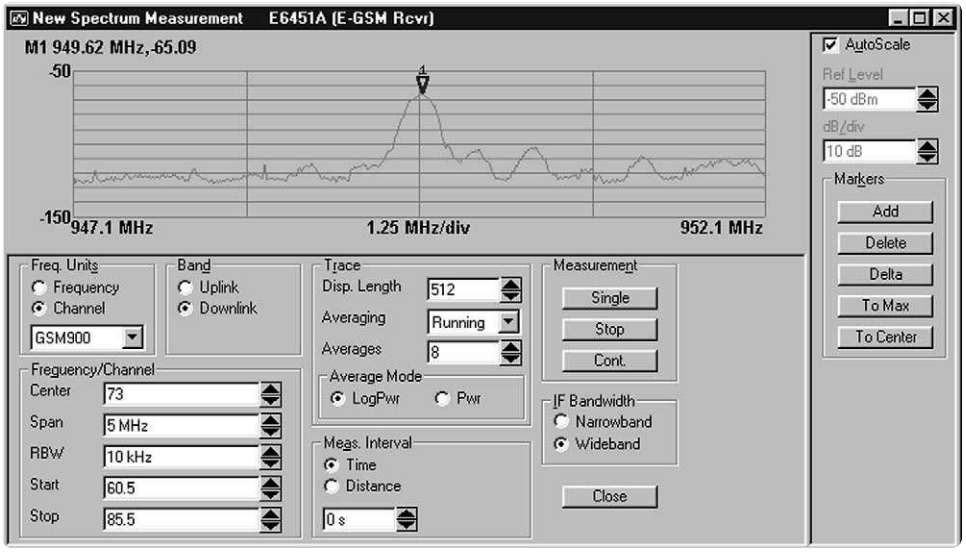


Measure serving and neighbor cells with the test mobile phone.

Key features and specifications (continued)



Decode layer II and III protocol from the test mobile phone.

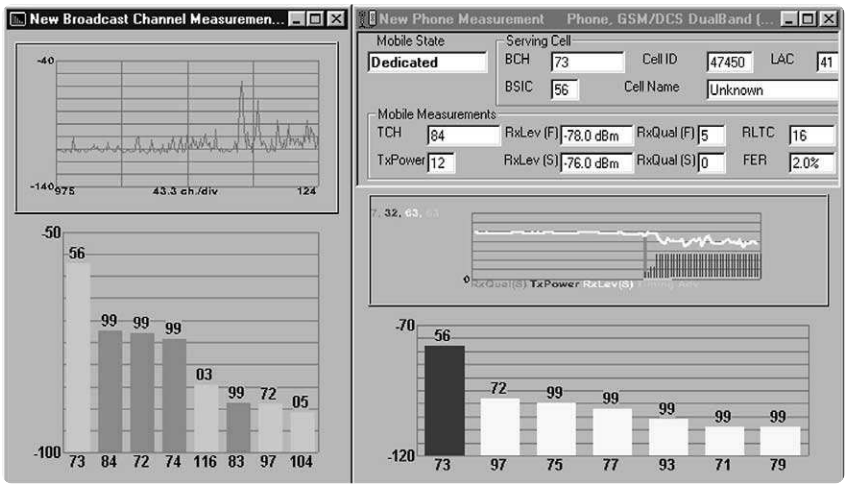


A spectrum analyzer assists with interference management.

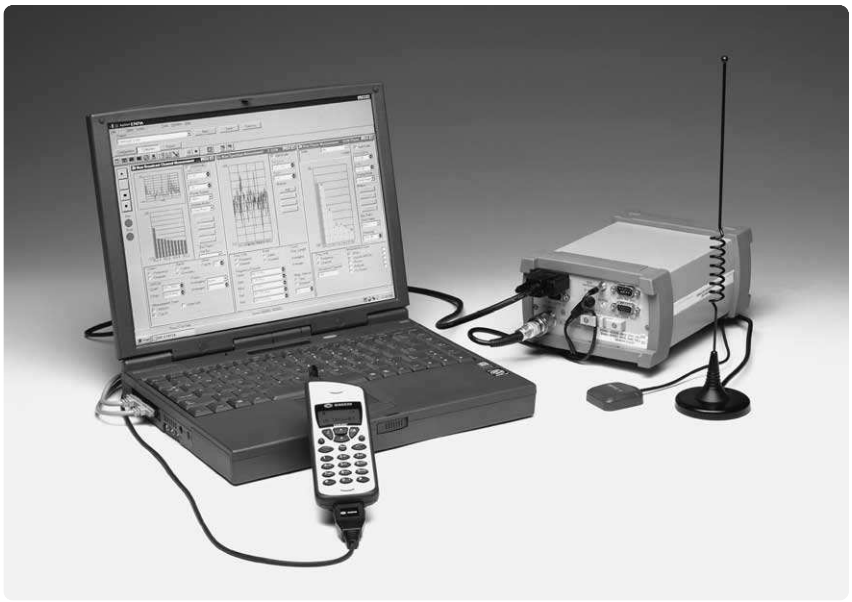
Combined test mobile phone and digital receiver

The E7475A is an integrated phone- and receiver-based solution that will help you:

- Monitor the RF uplink and downlink bands while on a call
- Perform integrated analysis using the phone and receiver at the same time
- Correlate call drops within the RF environment
- Compare network neighbor list with the actual strongest neighbor list
- Save training and support costs with a single-vendor, single-interface phone and receiver system
- Manage your network life cycle measurement needs with one integrated solution



Combining receiver and phone gives powerful troubleshooting capabilities.



E7475A drive-test system.

Notes

Notes

Increase the value of your investment

Caring for your GSM network requires more than good test equipment. Agilent has the products, knowledge and services to help you and your team do the job. The range of services we offer includes productivity assistance, start-up assistance, training and education programs for RF technicians and engineers, on-site product and application consulting, product assistance and more! We can help you easily deploy, optimize and support your wireless network.

More information

We offer application notes that span many of today's RF network issues:

- *Optimizing Your Wireless Network Today and Tomorrow. Solutions for CDMA Networks*, *Application Note 1345* (literature number 5968-9916E)
- *Optimizing Your Wireless Network Today and Tomorrow. Identifying Interference for IS-136 TDMA Networks*, *Application Note 1342* (literature number 5980-0219E)
- *Optimizing your GSM Network Today and Tomorrow. Troubleshoot Network Problems: Coverage*, *Interference*, *Handover*, *Margin and Neighbor Lists*, *Application Note 1344* (literature number 5980-0218E)

For specific examples of how the Agilent Technologies drive-test solutions are used to solve optimization problems:

- *Spectrum and Power Measurements Using the Agilent CDMA, TDMA and GSM Drive-Test Systems Product Note* (literature number 5968-8598E)

For additional Agilent Technologies GSM drive-test information:

- *E7475A GSM Drive-Test Configuration Guide* (literature number 5968-5563E)
- *E7475A GSM Drive-Test Technical Specifications* (literature number 5968-5564E)
- *Indoor Wireless Measurement System Product Overview* (literature number 5968-8691E)

Web-based information:

- Visit our website at **www.agilent.com/find/wireless**

Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlay Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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