



Agilent E6476A/E6478A Air Interface Remote Monitoring System

Product Overview



**Maximize your engineer's efficiency
by proactively pinpointing network problems**

- Reduce operating expenses by autonomously collecting drive test data
- Increase work force efficiency up to 60% by reducing unnecessary manual drive tests
- Improve network performance by finding and solving network problems in hours rather than days



Agilent Technologies

Today's environment requires service providers to improve optimization processes

A wireless network is an evolving system that undergoes dynamic changes on an ongoing basis. With new cell site additions for capacity and coverage and a continuous need to troubleshoot existing network problems, today's engineering staff is always on the verge of falling behind.

Staffs are further stretched with new 2.5 and 3G technology deployments, data service offerings, expectations of higher quality service, technology change-outs, and the many new measurements needed to test these capabilities and the network. With more work to do and more measurements to monitor, it becomes harder to spot network problems, resulting in longer periods of time between when problems occur, when they are found, and when they can be fixed.

The challenge is many service providers are trying to grow their networks and remain competitive with current optimization methods. However, some of the current processes service providers have are inefficient in terms of how they do

their work. And now more than ever before, there is the need to maintain the bottom line while still staying competitive in the marketplace, which means added pressure on the operating and capital budget. Today's environment requires service providers to take a look at improved optimization methods that improve efficiency and help reduce operational expenses.

Network optimization challenges

- Cycle time to solve problems with manual drive test is long and inefficient
- More testing is required with the introduction of new services such as data service
- Better quality in residential areas is expected as more customers use wireless at home
- Increased pressure on bottom line and operational expenses

Expand wireless networks without additional resources

The Agilent Technologies Air Interface Remote Monitoring System (RMS) enables wireless service providers to manage, expand, and deploy wireless networks without increasing workloads or adding resources.

Agilent's Air Interface RMS allows you to access the necessary RF performance data to solve problems through a simple Web browser, often even before subscribers notice an interruption in service on the network. It provides essential functionality to give an understanding of the network that doesn't exist with traditional manual drive tests. In fact, it's the perfect compliment to traditional manual drive testing.

This solution can reduce the time it takes to find and fix problems from days or weeks to hours. By accessing the collected data through an intuitive Web browser, users can find answers immediately instead of first dispatching someone to perform a drive test.

Agilent's Air Interface Remote Monitoring System:

- Increases work force efficiency up to 60% by reducing the number of manual drive tests
- Complements vendor switch statistics by providing an accurate picture of network performance that is independent of vendor-specific switch statistics, provides monitoring on a bin by bin basis as opposed to a macroscopic sector basis, and provides "drill-down" (more detailed) RF data to immediately troubleshoot problems
- Provides centralized storage across multiple collection probes, data aggregation, and binning of RF performance data
- Allows enterprise-wide connectivity to monitor performance data and network alarms across the entire network
- Allows full collection of all parameters including Layer 3 messaging when triggered by an alarm condition

Reduce operating expenses

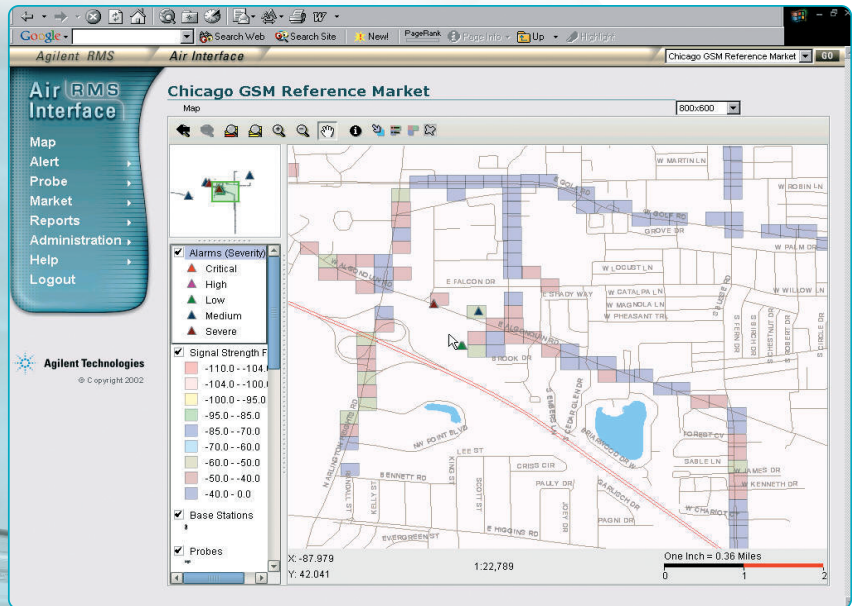
Grow your network without continuously growing your operating budget. By reducing unnecessary drive tests and data processing time, and by understanding the network on a geographically binned basis, work force efficiency can increase by up to 60% to save time and money.

Work force efficiency can increase up to 60% by reducing the number of manual drive tests.

Manage increasingly larger geographic areas

Wireless networks are expanding in terms of capacity and coverage areas. Wouldn't you like to take advantage of every competitive edge you can? How well do you know your network problems in non-urban, yet potentially high traffic areas, where coverage is expanding tens or hundreds of miles from the office?

With the Agilent Air Interface RMS, you can measure RF and data performance of the wireless network, from a user's perspective, without spending a full day or more, hundreds of miles away from the office. You can improve efficiency, solve problems faster, and reduce engineering costs through automated remote collection measurements - all managed through a central Web site.



Manage large networks efficiently with geographical binning of network data.

Improve network performance and reduce churn by proactively and efficiently understanding network problems – in hours rather than days

Have you ever unexpectedly dropped your wireless call on the way to the office, a client meeting, or cell site? What do you do - let the problem go? Wait until others experience the problem and escalate the issue? Have an engineer go out to the same location to perform a drive test? Call a cell technician to go to the site to check things out - only to find out that it's an RF problem and RF engineering needs to drive the area? Sounds like a lot of redundant driving and wasted time.

Now with the Agilent Air Interface RMS, you can maximize the efficiency of your engineering staff by allowing engineers to analyze, understand, and fix problems before they become customer-affecting. No longer remain inefficient by spending time driving to find the problem, driving back to the office, analyzing the data, driving back out to the site, and starting the process all over again. Proactively manage network problems and reduce churn by finding the hidden problems before your customers do.

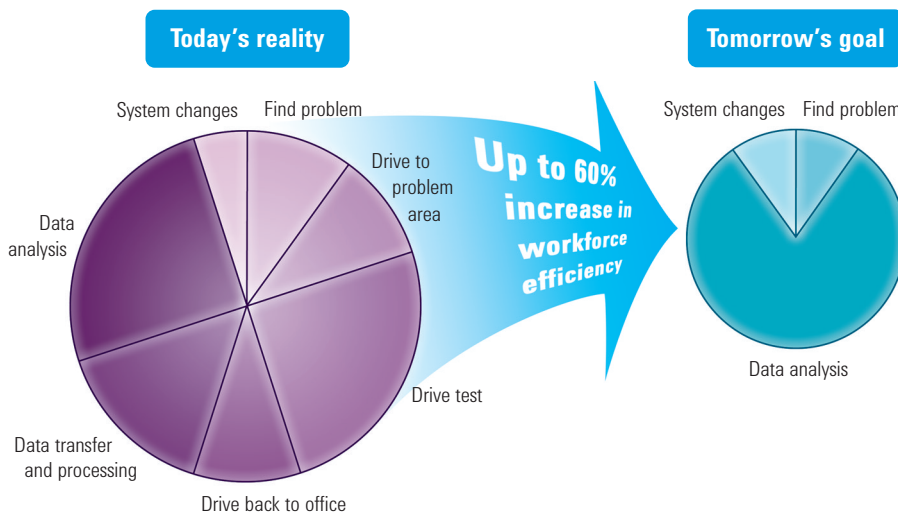
Proactively manage network problems and reduce churn by finding the hidden problems before your customers do.

Minimize capital expenses by monitoring base stations and repeaters

In some situations, a coverage hole warrants installation of a repeater only – especially in the more rural areas of the network that require essential coverage. But there are times where a costly and underutilized base station is deployed instead of a repeater. Why? Because of the remote location, a T1 may be required for alarming capability anyway, and in some cases, if a repeater goes down, due to the potential missing alarming functionality, the problem would go unknown for days or weeks.

With the Agilent Air Interface RMS, you no longer have to worry about a repeater going down and not knowing for days or weeks that you have a problem. Using the remote data collection capabilities and network trending, it's easy to determine if coverage capacity has changed from a strong reading a week ago to a weak reading (or even a “no service” reading) today. Save money by using repeaters where necessary and gain confidence by monitoring their performance.

Save money by using repeaters where necessary and gain confidence by monitoring their performance.



Increase workforce efficiency up to 60% with Agilent's Air Interface RMS.

Enterprise wide availability of data through a simple Web browser

Details of RF performance data and higher level network summaries are provided through the same Web interface so multiple people in different departments across the market and corporation all can have quick access to view the performance of the network. Different levels of security can be configured to allow certain departments or personnel the ability to view results only.

Security and reliability

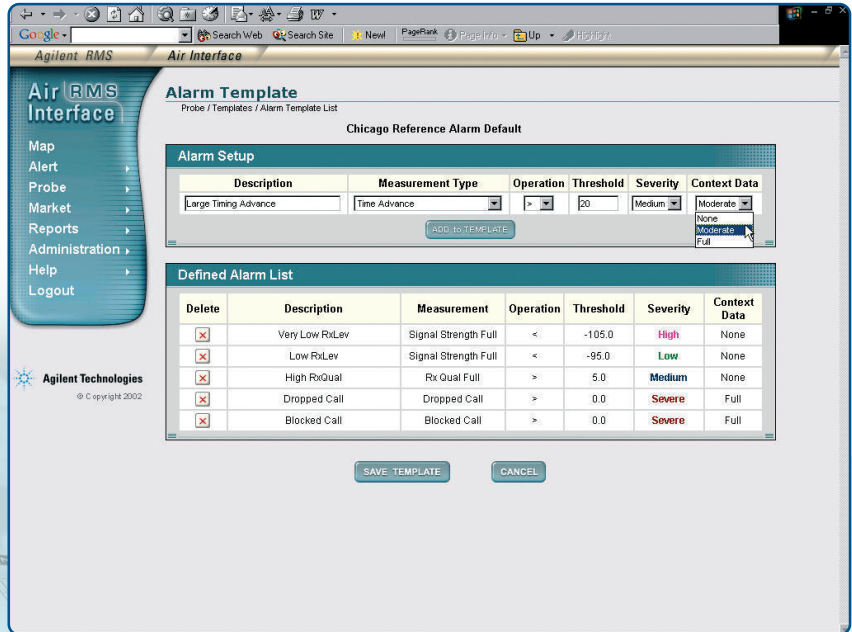
Agilent knows that security, reliability, and product viability are key concerns when making purchasing decisions. The Agilent Air Interface RMS utilizes components developed by Agilent Labs to ensure that these concerns are addressed. With innovations such as Distributed Measurement and Control technology from Agilent Labs, communication between probes and servers is highly secure. IT issues are also minimized as this technology safely and reliably pierces through firewalls and proxy servers. The system allows probes to be configured even if they are in a "no service" state. When the probe enters a service state, it checks in and automatically receives updates from the server.

The Agilent Air Interface RMS provides highly reliable automated data collection that minimizes the need for human interaction with the probe. Agilent reliability and robustness allows you to install the probe and go. There is no need to configure the hardware and firmware as upgrades are done automatically – transmitted to the probe from a simple Web client in the home or office.

Context data on alarm conditions

Agilent's intelligent probes allow you to collect and transmit the data you want when you need it. Key measurements such as FER, signal strength, mobile transmit power, and throughput can be continuously collected, binned and transmitted to the server to provide an overview of the health of the network through binned measurements. When an alarm

condition occurs - such as a dropped call alarm, blocked call alarm, or high FER alarm, the system immediately transmits all the raw data including layer 3 messages to understand why the alarm occurred. Now you can reduce system complexity and processing time by transmitting raw data only when you need it.



Alarm reporting parameters are set remotely using a Web browser.



The Air Interface RMS probe mounts securely in any vehicle.

Collect and transmit the data you want only when you need it.

Reports and statistics

Networks are not arranged in nice square grids. Networks are a collection of clusters grouped into circles, ovals, or some other polygon. The Agilent Air Interface RMS allows users to generate reports on network statistics for different regions (regions are a collection of networks), networks, and zones within a network. When reporting statistics, zones can be defined as circles, rectangles, or any other polygon shape. You can generate reports based on how you define your network.

The screenshot shows the 'Air RMS Interface' web application. The main content area is titled 'Time and Event' and contains a 'Time Window' section with a dropdown menu set to 'This Week' and a 'FILTER' button. Below this are two tables:

| 24 Hour | | | | | | |
|--------------|---------------|---------------|--------------|-----------|------|-----------------|
| Zones | Unique Probes | Call Attempts | % Successful | % Blocked | MOU | ERLANG (MOU/60) |
| Healdsburg | 3 | 270 | 95 | 3 | 540 | 9 |
| Windsor | 5 | 455 | 89 | 4 | 1047 | 17.45 |
| Santa Rosa | 8 | 700 | 92 | 2 | 1420 | 23.67 |
| Rohnert Park | 6 | 560 | 88 | 7 | 1232 | 20.53 |
| Cotati | 4 | 350 | 90 | 5 | 840 | 14 |

| Busy Hour | | | | | | |
|--------------|---------------|---------------|--------------|-----------|-----|-----------------|
| Zones | Unique Probes | Call Attempts | % Successful | % Blocked | MOU | ERLANG (MOU/60) |
| Healdsburg | 3 | 30 | 93 | 4 | 127 | 2.1 |
| Windsor | 5 | 77 | 87 | 6 | 258 | 4.32 |
| Santa Rosa | 8 | 140 | 90 | 3 | 387 | 6.45 |
| Rohnert Park | 6 | 82 | 84 | 6 | 329 | 5.48 |
| Cotati | 3 | 89 | 88 | 6 | 179 | 2.98 |

View reports based on user-generated zones.

Monitor the whole network on a geographical and time basis

Current monitoring solutions, such as vendor service statistics, only provide details on a cell or sector level. Sectors can cover a very large geographic area and dominant servers can spill over into intended coverage

areas of other sectors and cells. Monitoring the network based on these sectors by sector statistics alone can provide a poor picture of what your subscriber is actually experiencing.

The Agilent Air Interface RMS provides the best of two worlds: time-based statistics as well as geographical-based performance data. It monitors RF performance on a 100-meter by 100-meter bin basis and provides continuous monitoring so statistics in the busy hour and non-busy hour can be observed.

This provides much greater resolution of problems within the network. So the next time you determine a sector is in trouble, you can find out – with better resolution – where the actual problem is. And with the Agilent Air Interface RMS, you can proactively collect data based on alarm conditions so you can view RF performance statistics at a moment's notice. Analysis and troubleshooting can be performed faster than ever before.

System measurements and architecture

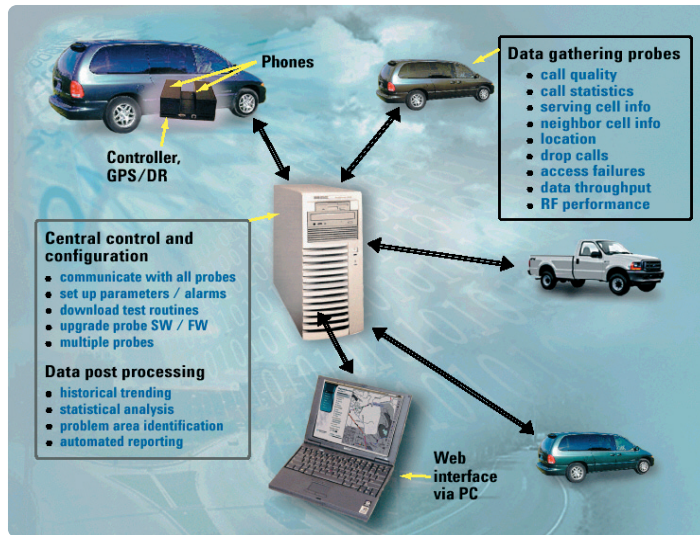
The Agilent Air Interface RMS utilizes multiple measurement probes in the network which continuously collect RF performance data including:

- Location information
- Dropped calls
- Blocked calls
- Access failures
- Layer 3 messaging
- Signal strength
- Mobile transmit power
- FER
- Data throughput
- Channel information

The probes are configured via a remote Web client in the office. Data can be collected and configured to report binned measurements only, binned measurements with alarms (such as dropped call and pilot pollution alarms), or both. All measurements from a selectable window of time are available for “drill-down” (more detailed) analysis if an alarm occurs.

Multiple probes in the system report back to the application server and store data in the database server.

Each probe houses two phones and a separate dedicated data modem to communicate and send data to the server. Due to the advanced design of the Air Interface RMS and “always on” data connections, the system maintains a high level of measurement capability while maximizing the amount of network capacity for your customers, not the measurement equipment.



Agilent Air Interface Remote Monitoring System.

Remote measurement probes

- Rugged controller-based measurement probe with dedicated measurement phone(s)
- Small (approximately 12" x 12" x 6"), rugged, yet flexible probe for permanent mounting with the ability to change or upgrade phones inside one housing
- Essential data services measurements
- Layer 3 messaging



The Agilent Air Interface RMS measurement probe is rugged and compact.

Web client and application server

- Multiple Web-based reports for busy hour and non-busy hour
- Network-wide probe configuration via a standard Web browser
- Historical trending analysis
- Hosted solution eliminates IT resource and integration issues
- Binned statistics and analysis for busy hour or non-busy hour analysis
- Record and analyze measurements based in a variety of modes including all collected data and only triggered data meeting specific criteria
- Open architecture with database server

System requirements and security

Client

Web browser: Internet Explorer 5.0 and above
 Operating system: Windows® 9x, NT, 2000, XP
 Memory: 128 MB RAM

Server

The server is initially hosted by Agilent. There are no customer minimum requirements for the server when hosted by Agilent.

Data hosting security

The data server is located in a secure Agilent IT data facility. The server operating system is UNIX® to provide highly reliable access. Agilent is committed to maintaining high reliability and uptime for the hosting service.

Your data is protected in the server by separate secure and fully-encrypted passwords and is connected behind a firewall.

Additional reliability is maintained through redundant application servers.

Ordering information

Air Interface RMS - Probes

E6476A

Phone connection kit

E6476A-100 - cdma2000

Kyocera 2235

E6476A-101 - cdma2000

Kyocera 2255

E6476A-115 - GSM Nokia 6340

E6476A-116 - GSM/GPRS

SAGEM OT19x

Air Interface RMS - Server

E6478A

Mid range probes

E6478A-110 - Display and configuration software for E6476A - cdma2000

technology only

E6478A-120 - Display and configuration software for E6476A-GSM/GPRS technology only

Additional Agilent literature

Brochures

Accelerate cdma2000 Performance with Agilent's Wireless Network Solutions
literature number 5988-4423EN

Photo Cards

Agilent E6476A/E6478A Air Interface Remote Monitoring System Photo Card
literature number 5988-5640EN

Data Sheets

Agilent E6476A/E6478A Air Interface Remote Monitoring System Data Sheet
literature number 5988-8447EN

For more information about Agilent's solutions for the communications industry, visit our Web site at:
www.agilent.com

For more information about Agilent's Remote Monitoring Systems, go to:
www.agilent.com/find/RMS

You can also contact one of the following centers and ask for a communication solution representative:

| | |
|----------------|-----------------------|
| Australia | 1800 629 485 |
| Austria | 0820 87 44 11 |
| Belgium | +32 (0) 2 404 9340 |
| Brazil | +55 11 4197 3600 |
| Canada | 877 894 4414 |
| China | 800 810 0189 |
| Denmark | +45 70 13 15 15 |
| Finland | +358 (0) 10 855 2100 |
| France | +33 (0) 825 010 700 |
| Germany | +49 (0) 1805 24 6333 |
| Hong Kong | 800 930 871 |
| India | 1600 112 929 |
| Ireland | +353 (0)1 890 924 204 |
| Israel | +972 3 6892 500 |
| Italy | +39 (0)2 9260 8484 |
| Japan | 0120 421 345 |
| Luxembourg | +32 (0) 2 404 9340 |
| Malaysia | 1800 888 848 |
| Mexico | +52 55 5081 9469 |
| Netherlands | +31 (0) 20 547 2111 |
| Philippines | 1800 1651 0170 |
| Russia | +7 095 797 3963 |
| Singapore | 1800 375 8100 |
| South Korea | 080 769 0800 |
| Spain | +34 91 631 3300 |
| Sweden | 0200 88 22 55 |
| Switzerland | Italian 0800 80 5353 |
| Switzerland | German 0800 80 5353 |
| Switzerland | French 0800 80 5353 |
| Taiwan | 0800 047 866 |
| Thailand | 1800 226 008 |
| United Kingdom | +44 (0) 7004 666666 |
| USA | 800 452 4844 |

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