



## WiMAX Radio and Protocol Conformance Test Systems, Testing Services and Training

Provided by AT4 Wireless (formerly CETECOM Spain)



AT4 Wireless, a worldwide engineering services firm headquartered in Málaga, Spain is the lead WiMAX Forum Designated Certification Laboratory. An Agilent channel partner in WiMAX and other wireless connectivity technologies such as *Bluetooth*<sup>®</sup>, RFID and UWB, AT4 Wireless Labs Division provides testing and related support services including project management, testing services, consulting and training. AT4 Wireless Systems Division offers complete conformance test systems to manufacturers and users of IEEE 802.16-compliant products.

### AT4 Wireless Labs Division

AT4 Wireless Labs works with a network of accredited testing laboratories in different regions to test WiMAX products for conformance to the 802.16-2004 and 802.16e-2005 standards. This includes RF conformance testing as well as protocol conformance. AT4 Wireless Labs also provides interoperability testing and assists the WiMAX Forum in hosting PlugFests as part of the multi-vendor interoperability testing that is promoted by the WiMAX Forum.

For companies that wish to market their WiMAX products with the “WiMAX Forum Certified” seal applied, AT4 Wireless Labs helps them fulfill the two processes needed to go to market. First, AT4 Wireless Labs checks products against national or regional requirements using its proprietary spectrum database to determine if they will be allowed to operate in the defined geographic region. Second, AT4 Wireless Labs checks products to ensure that they will pass the technical conformance requirements that serve to help guarantee interoperability with other WiMAX Forum Certified products.



Agilent Technologies

# AT4 Wireless and Agilent Technologies, Inc.



**MINT T2110 IEEE 802.16-2004 and 802.16e-2005 conformance test system**

## AT4 Wireless Systems Division

The Agilent/AT4 Wireless partnership combines Agilent's advanced measurement science and AT4 Wireless application and system engineering expertise to provide manufacturers with qualification testing solutions that reduce or eliminate the risk of failure and the possible need to re-engineer products. The test systems also are used in research and development and to perform quality assurance in manufacturing.

## MINT T2110 WiMAX RCT/PCT System

MINT T2110 is the official radio conformance test system for WiMAX certification of IEEE 802.16-2004 and ETSI HiperMAN-based devices. Combining AT4 Wireless technology with the Agilent E4440A Series PSA high-performance signal analyzer and E4438C ESG vector signal generator, MINT T2110 covers the transmitter and receiver test cases for base stations and subscriber stations according to the WiMAX CS 103 001 test specification. Some of the key features of MINT T2110 are the full coverage of RF and protocol test cases for WiMAX certification in the five profiles defined by the WiMAX Forum for 3.5 and 5.8 GHz radio frequency spectrum, the use of AT4 Wireless test manager to automate the testing process and its upgradeability to mobile WiMAX. MINT T2110 is available now and will be supplied to test laboratories and equipment vendors in Europe, Asia and North America. MINT T2110 will in the near future also be expanded to support IEEE 802.16e-2005 conformance testing and will be capable of testing both subscribers and base stations in the 2.3, 2.5, 3.4-3.6 and 3.6-3.8 GHz bands.

## Key Components of MINT T2110 RCT/PCT System



**E4440A Series PSA  
high-performance signal analyzer  
with VSA software**



**E4438C ESG vector signal generator**



**E4419B peak power meter**

Agilent test equipment in the MINT T2110 system includes:

- E4440A PSA Series high-performance signal analyzer  
The Agilent PSA Series offers the highest performance signal and spectrum analysis. Coupled with an 80 MHz wideband digitizer, the PSA Series offers industry-leading transmitter modulation quality measurements with highest linearity and extremely low residual EVM.
- 89600A vector signal analysis (VSA) software for WiMAX  
The Agilent VSA software is a flexible and comprehensive set of optional modulation analysis suites which can use a wide variety of hardware acquisition devices including the PSA Series. The 89601A Option B7S and B7Y provide detailed signal analysis for fixed and mobile WiMAX (802.16-2004 OFDM and 802.16e-2005 OFDMA respectively).
- E4438C ESG vector signal generator  
The Agilent ESG vector signal generator is used for stimulating the unit-under-test, and as an interference generator for receiver testing. Real-time channel emulation can be added when required using additional equipment.
- N7615A/B Signal Studio for 802.16 OFDMA  
The Agilent Signal Studio software is used in conjunction with the ESG vector signal generator to create pre-configured WiMAX test signals for receiver sensitivity testing.
- E4419B peak power meter and power sensor  
The Agilent E4419B peak power meter and sensor provide highly accurate reference power measurements for calibrating the system and verifying output power of the unit-under-test.

In addition to the Agilent test instruments, the MINT T2110 includes the following:

- Test manager 2.0 software
- MINT T2230/2231 protocol conformance tester (wireless signaling unit)
- DUT interface unit (RF and signal switching)
- Consulting and training in the operation of the system
- Maintenance support agreement

MINT T2110 systems can be tailored to meet customer needs, and in addition to the Agilent instruments can include some or all of the following, depending on configuration:

- Support for RF conformance test only
- Support for protocol conformance test only
- Support for 802.16-2004, fixed WiMAX only
- Support for 802.16e-2005, mobile WiMAX only

# WiMAX Certification Testing Services

## Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to

[www.agilent.com/find/removealldoubt](http://www.agilent.com/find/removealldoubt)

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## About AT4 Wireless

AT4 Wireless operates as an independent company with its main facility located in Málaga, Spain. The company's mission is to assist companies that manufacture products incorporating WiMAX and other wireless technologies. AT4 Wireless, previously known as CETECOM Spain was founded in 1991 and has 250 employees, 80% of whom are engineers. The company has three divisions:

- AT4 Wireless Labs -- an independent test lab for wireless telecommunications technologies and products
- AT4 Wireless Systems -- develops conformance and interoperability test systems for various wireless technologies, including WiMAX
- AT4 Wireless Engineering and Solutions -- develops software applications and offers professional services to telecom network operators

In 2003, AT4 Wireless was chosen and commissioned by the WiMAX Forum, which today numbers over 400 members, to develop a WiMAX testing and interoperability assurance program. That program is now in place and manufacturers are using it to prove conformance to the 802.16-2004 standard. Over twenty-eight products have already been certified under this program, with many more in process. Similarly, conformance testing for 802.16e-2005, mobile WiMAX, is set to begin by the end of 2006, with initial products to be WiMAX Forum Certified in early 2007.

Information about AT4 Wireless is available on the web at [www.at4wireless.com](http://www.at4wireless.com)

## About Agilent Technologies, Inc.

Agilent Technologies Inc. (NYSE: A) is the world's premier measurement company and a technology leader in communications, electronics, life sciences and chemical analysis. The company's 20,000 employees serve customers in more than 110 countries. Agilent had net revenue of \$5.1 billion in fiscal 2005.

Information about Agilent is available on the Web at [www.agilent.com](http://www.agilent.com)