

WiMAX Forum Certification of Broadband Wireless Systems

**Prepared by
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on behalf of the
WiMAX Forum**





WiMAX Forum Certification of Broadband Wireless Systems

The WiMAX Forum™ drives a common global standard for certification of interoperable high performance IP-based broadband wireless equipment supporting stationary, portable, and mobile applications. Certification will promote interoperability and mass production, which in turn will lower the price and ensure a widespread adoption of WIMAX Forum Certified™ equipment.

To achieve official WiMAX certification, the equipment, which includes the base station and the subscriber unit, must demonstrate both conformance and interoperability. Conformance ensures the broadband wireless equipment complies with the IEEE 802.16-2004 and ETSI HiperMAN standards and supports the profiles set by the WiMAX Forum. Interoperability ensures the compliant equipment is interoperable with all other standardized equipment.

Certification will address both stationary (based on the IEEE 802.16 2004 and current ETSI HiperMAN standards) and portable/mobile platforms (based on the IEEE802.16e). The WiMAX certification process for stationary began in July of 2005, as scheduled. Initial profiles for testing will include the 3.5 GHz FDD and TDD systems for 3.5 MHz channel bandwidth. WiMAX Forum Certified™ equipment from multiple vendors is expected for commercial availability towards the end of 2005. Certification of additional profiles, including the 5.8 GHz profile, is expected to begin in 2006. Profiles for portable/mobile equipment will be established in 2005, with certification scheduled to begin in the second half of 2006.

WiMAX Certification FAQ for IEEE 802.16-2004/ETSI HyperMAN Systems

Q: When does the WiMAX lab open and what does the certification process entail?

A: The certification lab at Cetecom in Malaga, Spain, officially opened in July of 2005, as scheduled. The test process includes the development of test scripts, lab preparation, validation of the test scripts and certification testing, as described in more detail below:

i) **Development of Test Scripts for Validation**

The first step in the process is the development of test scripts, which describe individual tests to be performed on the vendor's product to ensure it meets the mandatory functionality requirements for certification. The test scripts were jointly developed by ETSI (European Telecommunications Standards Institute) and the WiMAX Forum in May of 2005. The features to be tested are based on IEEE 802.16-2004 and ETSI HyperMAN specifications.

ii) **Lab Preparation**

The lab preparation process involves validating test scripts, sourcing relevant test tools, opening the lab, preparing test hardware, integrating test scripts into the test hardware and finally, accepting vendor equipment.

iii) **Validation testing of Test Scripts and Test Bed**

Validation of the test scripts is a necessary process in the certification program. Before a test script is released for use in the lab (test bed), it must be tested with a minimum of three (3) vendor products for a given profile. A profile describes a set of operational parameters over which the equipment operates including frequency band, duplexing scheme (TDD or FDD), channel size, etc. Currently, the WiMAX Forum has selected two (2) specific profiles, described below, with additional profiles planned for 2006. If all three vendors successfully pass validation testing, then the script is considered valid.

iv) **Certification Testing**

The final step in the test process is certification testing, which involves two key components: conformance and interoperability testing:

Conformance testing – Test activity to verify a vendor's implementation of the standard is compliant to a set of 802.16-2004/HyperMAN specifications selected by the WiMAX Forum.

Interoperability testing – Testing activity to verify a vendor's subscriber unit is able to establish a link and communicate with two other vendor's base stations, or a vendor's base station is able to establish a link and communicate with two other vendor's subscriber units.

Certification testing will be performed in multiple releases and waves. Multiple releases are necessary to test products as they evolve over time with new features/specifications. For each release, the procedure will test all new features as well as all previously tested features. Note that each release will be backward compatible with the previous release (e.g. Release 2 products will operate with Release 1 products and support all Release 1 features). For each release, there will also be



different waves of testing, which will involve the same tests but at different times with different vendors. For example Vendors A, B and C perform Release 1 Wave 1 testing in Month 1 while Vendors D, E and F perform Release 1 Wave 2 testing in Month 3.

Q: Which system profiles are expected to be certified first?

A: The first two system profiles to be certified are FDD systems in the 3.5 GHz band with a 2x3.5 MHz channel bandwidth and TDD systems in the 3.5 GHz band with 3.5 and 7 MHz channel bandwidth. In the first half of 2006, we expect to certify products in the 5.8 GHz band.

Q: Will the certification tests change over time?

A: The certification testing like in many other technologies is an evolving process. As test scripts are developed and validated, the WiMAX Forum will continue to add testing capabilities into the certification test bed. In order to do this in an efficient manner, testing capabilities are introduced in individual releases (as discussed above) to allow vendors to incorporate firmware and software changes that support required testing capabilities of the test bed

Q: What features and functionality will we get with each release of certification?

A: During the first two certification releases network entry, dynamic services and bandwidth allocation functionality is tested along with interoperability for these capabilities. In subsequent releases we will test additional features such as QoS, ARQ, AES, etc.

Q: Will a product with an advanced release certification be compatible with products that were certified with a prior release?

A: Yes, release 2 testing includes testing for all requirements in release 1. Release 3 testing includes testing of all requirements from release 1 and release 2.

Q: What guaranty do I have that a product I purchase with release 1 certification will be compatible with future WiMAX releases?

A: Vendors are actively involved in the identification of testing requirements for each release of certification and thereby will plan to upgrade equipment via software and firmware releases. Products that are tested to a later certification release must be backwards compatible to earlier released certified products.

Q: What if a vendor, from whom I bought release 1 products, cannot support release 3 certification. What are my options?

A: Since WiMAX Forum certified products are tested for interoperability and are backward compatible; you have the option of purchasing newly released products from other vendors with the assurance that it will support the release 1 products you already deployed in your network.

Q: Is there a chance that specs for future releases can change?

A: No. The current specifications were approved in Sep '04 with no new requirements permitted.

Q: Is WiMAX Forum going to certify other bands?

A: The Forum currently has two spectral bands that have been approved for 802.16-2004 (3.5 and 5.8 GHz). Bands for certification are typically introduced into the Certification Working Group (CWG) by WiMAX Forum members through a formal call for Certification Profiles process. Once a band is approved by the WiMAX Forum Board, the CWG works with vendor members in introducing a new band and certification profiles through the certification lab.



Q: What is PICS?

A: PICS stands for Protocol Implementation Conformance Specification. It is a questionnaire the vendor completes to specify which features have been implemented in the product for conformance testing.

Q: When the WiMAX Forum certifies product, what does it mean?

A: Award of the certificate implies that a product was tested for and successfully passed conformance testing and interoperability testing with a minimum of two other vendors for a specific profile. A vendor's product must pass both conformance and interoperability testing to be awarded a WiMAX Certification Certificate.