# WiMAX Theory and Measurements Training Course

## WiMAX Theory and Measurements Using the Anritsu BTS/Spectrum Master

An intense two-day instructor led training course focusing on measurement of WiMAX signals and verification of base station performance compliant with the IEEE 802.16 specification. Students will learn how to use the Anritsu BTS Master and Spectrum Master handheld test equipment to ensure WiMAX RF infrastructure is providing expected capacity, throughput and reliability.

- **Hands-on:** Learn by doing! 50% of the course is hands-on lab work.
- **Thorough Emphasis:** Fine tune the points and techniques that are of particular importance to your operations. Our skilled instructors and staff can tailor the modules to meet your requirements.
- **Cost Savings & Convenience:** Eliminate or significantly reduce your travel expenses because training sessions are offered at a location close to you (or even at your location).
- **Schedule:** Training sessions can be easily scheduled months in advance. Get more specific details regarding class location, including information about discounts or having a dedicated training session at your company site by contacting us directly at us-training@anritsu.com.
- **Contact us directly:**

Email us at **us-training@anritsu.com**
Register on-line at **www.us.anritsu.com/training**


BTSMaster


SpectrumMaster

## Who Should Attend Anritsu's WiMAX Training?

- WiMAX service providers
- WiMAX Base Station OEMs
- Base Station OEMs
- Field Engineers
- Wireless System Performance Engineers
- WiMAX RF Network Design Engineers
- Spectrum Managers and Frequency Planners
- Base Station Installers

### You Will Learn

- Review of RF Basics–A thorough understanding of Handheld Spectrum Analyzer operation. How to make measurements such as Channel Power, Occupied Bandwidth, Adjacent Channel Power, Field Strength, and Carrier to Interference Ratio, Spectrum Monitoring and data logging for interference analysis
- WiMAX OFDM Digital Modulation Theory–RF propagation and effects of frequency reuse on WiMAX capacity and throughput.
- IEEE 802.16 WiMax Specification–key performance measurements Fixed WiMAX time and frequency domain theory and measurements Building and running WiMAX pass/fail, scripted measurements for verifying spec compliance Over-the-Air measurements for quick WiMAX base station performance evaluation

Anritsu

# Yes! Sign up now for WiMAX Theory and Measurements Training Course...

## What You Get:

- Course Manual
- Certificate of Completion

**Course Fees (call for pricing):**

WiMAX Theory and Measurements Using the Anritsu BTS/Spectrum Master Course
(at Anritsu specified location)
WiMAX Theory and Measurements Using the Anritsu BTS/Spectrum Master Course (at your location)

**Course Outline (Day 1):**

Spectrum Analysis Using the Anritsu BTS Master
**Lecture 1:** Modulation Fundamentals
Amplitude Modulation, Frequency Modulation, Phase Modulation
**Lecture 2:** Spectrum Analyzers
Basic Operation, Block Diagram, Characteristics

- Frequency Range
- Frequency Resolution
- Sensitivity and Noise Figure
- Video Filtering
- Signal Display Range
- Dynamic Range
- Resolution – Bandwidth

**Lab 1:** Basic Spectrum Analyzer Operation
**Lab 2:** Modulation Measurements
**Lecture 3:** Measurement Fundamentals
Effect of Resolution Bandwidth, Effect of Video Bandwidth, Sweep Limitations, Attenuation, Resolving Closely Spaced Signals, Harmonic Distortion, Creating a Spectral Mask
**Lab 3:** Advanced Measurements
**Lecture 4:** Field Measurements
Occupied Bandwidth, Channel Power, Adjacent Channel Power, Out of Band Spurious Emissions, Field Strength, C/I Ratio
**Lab 4:** WiMAX Base Station Measurements
**Lecture 5:** Spectrum monitoring and data logging using Anritsu Master Software Tools spectrograms

**Course Outline (Day 2):**

**WiMAX**
**Lecture 1:** Orthogonal Frequency Division Multiplexing – Theory and key measurements
**Lecture 2:** Path Loss, Link Budgets and Frequency Re-use Fundamentals
**Lecture 3:** WiMAX Standards and History
**Lecture 4:** Fixed WiMAX Physical Layer
**Lecture 5:** WiMAX Measurements using the Anritsu BTS/Spectrum Master
**Lecture 6:** Testing WiMAX Antennas and Feedlines using the BTS/Spectrum Master
**Lab 1:** WiMAX RF Measurements Occupied Bandwidth, ACPR, Spectrum, Preamble and Data Burst Time Domain Power, Channel Power, Crest Factor
**Lab 2:** WiMAX Demodulator Measurements, Constellation Measurements, Spectral Flatness, Relative Constellation Error (RCE), OFDM Modulation Quality in Time and Frequency Domain, Frequency Error
**Lab 3:** Building and Running Pass/Fail Test Scripts
**Lecture 7:** Mobile WiMAX OFDMA Physical Layer

**For the most recent training schedule visit:**
**www.us.anritsu.com/training**

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