

# NetTek® BTS Transmitter and Interference Analyzer

▶ YBT250



## ▶ Features & Benefits

Handheld, Multi-standard  
BTS Transmitter Field Tester

Verifies the Most Important  
RF Transmitter Functions of  
W-CDMA/UMTS, cdmaOne,  
CDMA2000 1x RTT,  
CDMA2000 1x EV-DO, GSM,  
TDMA, and Analog Base  
Stations; Continuing  
Expandability for 3G

Interference Analyst with  
High Sensitivity, Including  
AM and FM Demodulation,  
Helps Identify Interference  
Problems

Modular Instrument for  
Handheld NetTek® Y350C,  
Which Allows for Easy  
Future Expansion for  
New Functions

## ▶ Applications

BTS Transmitter  
Troubleshooting  
in the Field

Resolve Interference  
Problems

Maintenance and  
Installation Checks

RF QoS Monitoring

## Affordable, Portable, Ready for the Field

### Digital and Analog Transmitter Verification with Outstanding Interference Resolution Capabilities

The Tektronix NetTek® analyzer is a revolutionary portable field tool. The YBT250 test module tailors this system for fast trouble resolution and easy transmitter verification of cellular, DCS/PCS and 3G base stations and Node Bs.

The NetTek analyzer with the YBT250 test module is not an expensive, do-everything solution; instead, the YBT250 test module is optimized to perform the day-to-day RF and demodulation measurement tasks that occupy the majority of a technician's time. Further, the YBT250 test module offers this capability at a surprisingly low price, in a rugged, easy-to-use package, suitable for all field environments.

### Multi-standard

Now, only one tool is needed for RF transmitter maintenance, with specific measurements for W-CDMA/UMTS, CDMA, GSM, TDMA, and analog.

RF measurements are available for:  
W-CDMA/UMTS, cdmaOne (IS-95),  
CDMA2000 1x RTT, CDMA2000 1x EV-DO,  
GSM, IS-136, and AMPS.

### Easy to Use

The NetTek BTS field tool is based around the familiar Windows CE operating system. As a result, users will spend less time learning the instrument and more time troubleshooting the network. The YBT250 test module puts measurement functions just a point of the finger away. Furthermore, built-in help guides speed the measurement process.

COMPUTING

COMMUNICATIONS

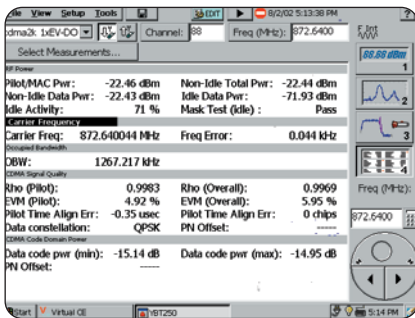
VIDEO

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Common measurements have been optimized for quick, repeatable results. For example, novice users can display spectrum analyzer results with straightforward Windows-like zoom and resize controls.

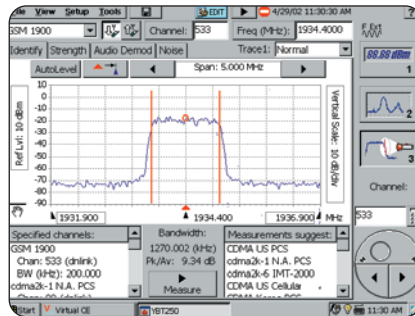
The Sequencer allows users to do a customized selection of the RF Power Carrier Frequency, Occupied Bandwidth, Code Domain Signal Quality, and Code Domain Power measurements.



## Interference Analyst Option

The YBT250 test module helps locate and identify stray signals that cause dropped calls and poor quality service. To better see what signals may be polluting a BTS receiver, the optional interference package allows measurements to  $-135$  dBm. This sensitivity also makes the unit ideal for site surveys.

The YBT250 test module also includes a spectrogram display, allowing the user to capture spectrum activity while displaying frequency, power level, and time information. This translates to easier identification of hard to find, periodic interference problems.



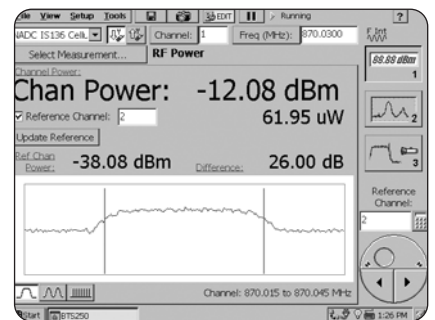
The Interference option includes a built-in modulation ID function. Simply touch a signal, and the instrument will offer information on the likely modulation type, differentiating between 3G CDMA, cdmaOne, GSM, IS-136, and analog transmissions. A strength meter can then help find the location of the interferer.

## Power Measurement

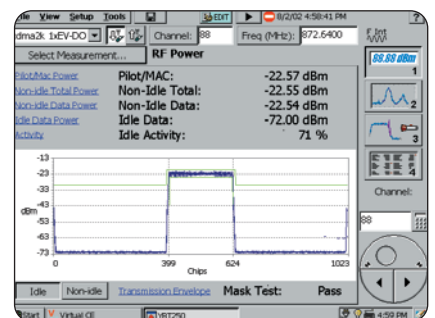
This portable instrument does not sacrifice accuracy. The YBT250 test module allows you to measure channel power for common CDMA, GSM, TDMA, and analog systems. Measurement accuracy is  $\pm 0.75$  dB.

Furthermore, peak-to-average power characteristics can be reported for digital carriers.

Burst power can also be measured automatically with the YBT250 test module for GSM systems.



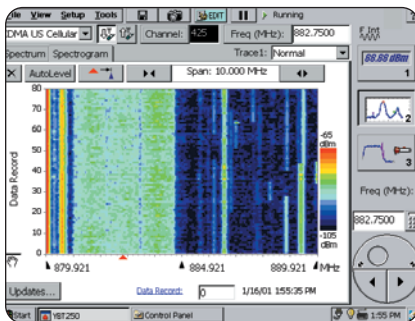
For CDMA2000 1x EV-DO systems, the YBT250 provides an idle and non-idle time domain mask as well as Pilot and Idle Activity.



### Maintenance Tx Checks

The YBT250 test module's combination of measurements means the unit is up to the task of performance monitoring and troubleshooting.

Measurement results can be saved into Windows-compatible formats, and results can be overlaid on the instrument to yield insight into system degradation. Furthermore, the spectrogram formats allow the user to easily monitor transmitter performance over time, with user defined sample intervals.

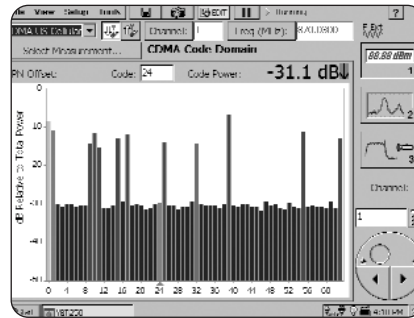


Channel power and frequency error measurements can be performed on multiple radios with just a few taps.

### Optional cdmaOne Demodulation

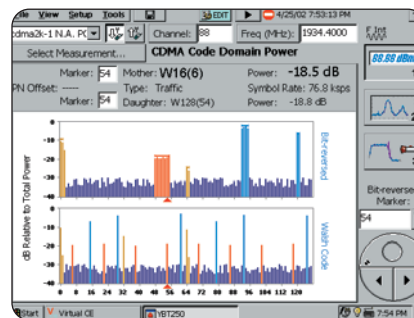
The cdmaOne test suite adds to the extensive capabilities of the YBT250 test module to include cdmaOne operators. With this option, the instrument can perform code domain power, pilot, PN offset, CDMA Carrier Frequency,  $\rho$ , and carrier feedthrough measurements.

For performance monitoring of cdmaOne systems, the spectrogram functions have been broadened to include cdmaOne Walsh codes. As a result, code performance can be graphically monitored over time.



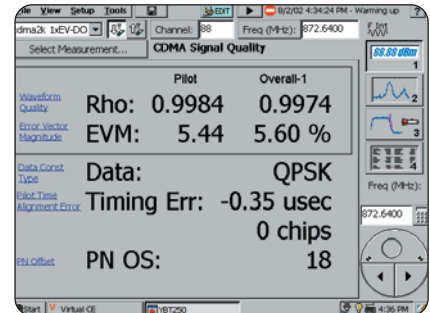
### Optional CDMA2000 Demodulation

This CDMA2000 option adds 1x (RC1-RC5) demodulation capabilities to the YBT250. Like option CD1 for cdmaOne, this option provides the user with code domain power, pilot, PN offset,  $\rho$ , and other CDMA2000 specific measurements.



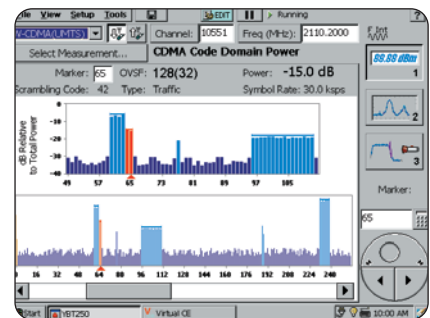
### Optional W-CDMA/UMTS Demodulation

#### Optional CDMA2000 1x EV-DO Demodulation



With this CDMA2000 1x EV-DO option, the instrument can perform MAC code domain power, pilot and overall  $\rho$ , PN offset, data modulation type identification, and other CDMA2000 1x EV-DO measurements.

This W-CDMA/UMTS option adds IMT-2000 demodulation capabilities to the YBT250. It provides the user with code domain power, pilot and sync power, scrambling code, EVM, and other W-CDMA/UMTS specific measurements.





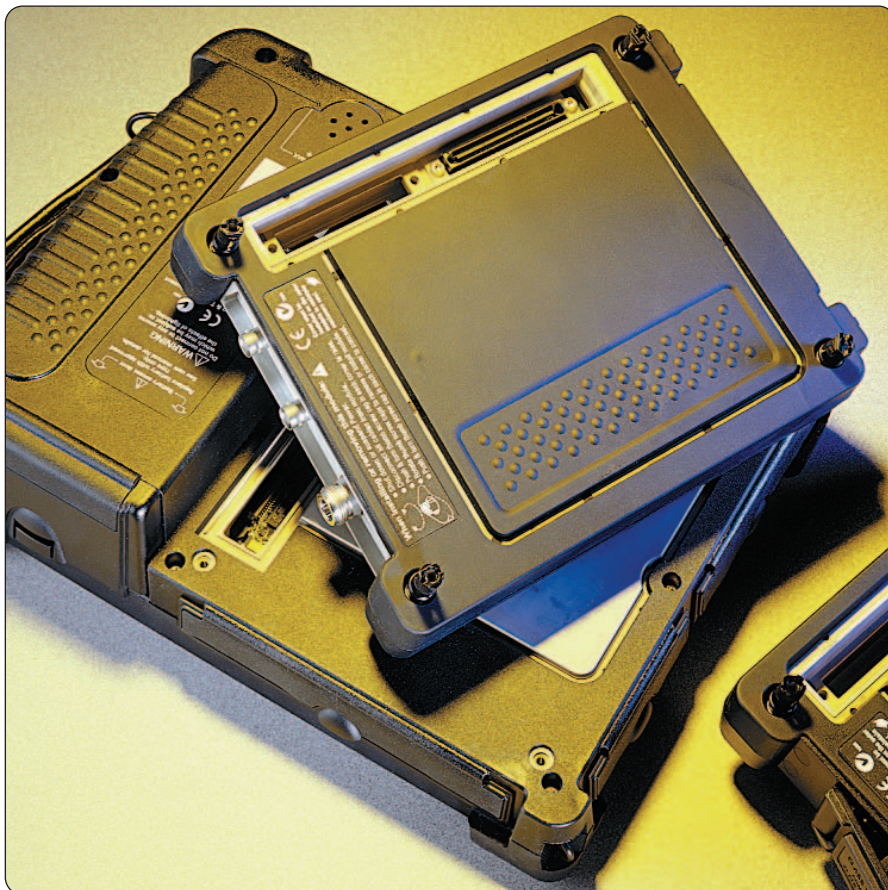
## NetTek® BTS Transmitter and Interference Analyzer

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### The Modules and the Platform

The Tektronix NetTek Y350C analyzer platform is required for using NetTek modules and cards. The Y350C platform includes the display, power supply, CPU and battery compartments. Modules can then be attached to the back. Up to four modules can be attached at once. A variety of modules and options allows you to tailor the instrument to service the standards and interfaces in use in your network.

The modular design also means that the instrument can easily be upgraded. New measurements or standards can be added with software upgrades, or with additional modules.



► Y350C platform combined with test modules.

## ► Characteristics

### YBT250 Test Module

**Operation Modes –**  
 Transmitter Testing.  
 Interference Analysis.  
 Spectrum Monitoring.

### Measurement Packages

**Interference Option IN1 –**  
 AM/FM Demodulation.  
 Interference Identification.  
 Spectrogram with Variable Duration.  
 Signal Strength.  
 Noise Floor Measurement.

**RF Measurement Options GR1, CR1, CRE, WR1, IR1, AR1 –** (Specified for 0 °C to 50 °C)\*1.

**RF Carrier Frequency –** ±10 Hz + Time base Error, 99% Confidence Interval.

**Occupied Bandwidth (OBW) –** Bandwidth within which 99% of the power transmitted on a single channel lies.

**FM Deviation (Applicable to AR1) –**  
 ±10% typical.

For deviations 2 to 10 kHz; usable range to 15 kHz.  
 Audio Frequency = maximum 3 kHz.

\*1 Applies if temperature is between 5 °C of last normalization.

**RF Channel Power (CW or Peak Envelope Power) –**

±0.75 dB for -20 dBm to +30 dBm [±0.5 dB typ.].  
 ±1.25 dB for -80 dBm to -20 dBm [±1.0 dB typ.].

**Burst Power Measurement (Applicable to GR1 and CRE) –**

±1.0 dB for -20 dBm to +30 dBm [±0.75 dB typ.].  
 ±1.5 dB for -80 dBm to -20 dBm [±1.25 dB typ.].

**cdmaOne, CDMA2000 1x RTT, and CDMA2000 1x EV-DO Demodulation Options CD1, CD2, CDE –** (Specified for 0 °C to 50 °C).

**Waveform Quality –** ±0.005 for  $0.9 < \rho < 1.0$ .

**Code Domain Power –**

±1 dB when >-20 dB relative to Tx power.  
 Code Domain Power display update: 1 sec (typical).

**Timing Error –** ±250 ns, typical.

**Carrier Feedthrough –** ±2 dB, -50 dBc residual floor (applicable to CD1 and CD2).

**Other Measurements –** Codogram, Pilot Power, Error Vector Magnitude.

**PN Offset –**

Identification from BTS.

*Off the air measurement requires an external GPS with 1ppes.*

**W-CDMA/UMTS Demodulation Option WD1**

**Error Vector Magnitude –** Resolution 0.01%.

**Code Domain Power –**

±1 dB when > -20 dB relative to Tx power.  
 Code Domain Power display update: 1 sec (typical).

**Scrambling Code –** Determination 2 seconds.

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## General Specifications

### Frequency Characteristics

**Input Range** – 30 MHz to 2500 MHz.

**Internal Frequency Accuracy (Time Base Error)** – ±0.5 ppm.

**Internal Frequency Aging (Time Base Error)** – ±1 ppm/yr.

**Available Spans (in Spectrum Monitoring)** – 10 kHz to 2470 MHz.

**Resolution Bandwidths (automatically set in Spectrum Monitoring Mode)** – 100 Hz to 6 MHz.

**Phase Noise** – ≤ -70 dBc/Hz at 20 kHz offset.

### Amplitude Characteristics (CW or Peak Envelope, Measured in 100 kHz Span)

**Amplitude Range** –

-114 dBm to +30 dBm.

-134 dBm to +30 dBm (100 MHz to 2 GHz) with Interference Option IN1.

-132 dBm to +30 dBm (2 GHz to 2.2 GHz) with Interference Option IN1.

**RF Input Overload Protection** – +30 dBm to 50 W.

**Signal Related Spurious Response** –

IM3 better than -70 dBc, typical.

Second harmonic better than -60 dBc, typical.

**Amplitude Display** – 10 Divisions; 1 to 10 dB per division.

**Spectrum Display Modes** – Max., min., norm., avg., dual trace.

### Inputs

**RF** – 50 Ω, type N.

**Frequency Reference** –

50 Ω, type BNC (f).

freq<sub>in</sub> = 2, 4.8, 10, 13, 15, or 19.6608 MHz and others. Automatically detected.

**Demodulation Trigger** – 10 kΩ, type BNC (f).

**YBT250 Test Module Weight** – 1.4 kg/3.1 lbs.

**NetTek Mainframe Weight** – 4.1 kg/9.04 lbs.

**Operating Temperature** –

Specified Temperature Range: 0 °C to 50 °C.

Functional Temperature Range: -10 °C to +50 °C.

**Storage Temperature** – -40 °C to +60 °C.

**Calibration** – 2 year cycle.

**Warranty** – 1 year.

### Physical Characteristics

Dimensions	mm	in.
Height	187	7.375
Width	241	9.5
Depth	32	1.25
<b>Weight</b>	<b>kg</b>	<b>lbs.</b>
Net	1.4	3.1

## ► Ordering Information

### YBT250

Module without platform. Module must be ordered with 1 standard RF Measurement package. NetTek Y350C analyzer platform is required for using NetTek modules and cards.

### Options

**Opt. CR1\*<sup>1</sup>** – RF measurements for cdmaOne.

**Opt. CRE\*<sup>1</sup>** – RF measurements for CDMA2000 1x EV-DO.

**Opt. GR1\*<sup>1</sup>** – RF measurements for GSM.

**Opt. WR1\*<sup>1</sup>** – RF measurements for W-CDMA/UMTS.

**Opt. IR1\*<sup>1</sup>** – RF measurements for IS-136.

**Opt. AR1\*<sup>1</sup>** – RF measurements for Analog.

**Opt. CD1** – Demodulation for cdmaOne.

**Opt. CD2\*<sup>2</sup>** – Demodulation for CDMA2000.

**Opt. CDE** – Demodulation for CDMA2000 1x EV-DO.

**Opt. WD1** – Demodulation for W-CDMA/UMTS.

**Opt. IN1** – Interference Analyst.

<sup>1</sup>RF measurement packages. Multiple RF measurement packages can be added as options; one RF package is required.

<sup>2</sup>YBT250 CD1 is required.

### Service

**Opt. C3** – Calibration Service 3 Years.

**Opt. C5** – Calibration Service 5 Years.

**Opt. D1** – Calibration Data Report.

**Opt. D3** – Calibration Data Report 3 Years (with Option C3).

**Opt. D5** – Calibration Data Report 5 Years (with Option C5).

**Opt. R3** – Repair Service 3 Years.

**Opt. R5** – Repair Service 5 Years.

### Suggested YBT250 Test Module Accessories

**Sniffer Antenna** – Order 119-6609-00.

**Beam Antenna 824 to 896 MHz** – Order 119-6594-00.

**Beam Antenna 896 to 960 MHz** – Order 119-6595-00.

**Beam Antenna 1710 to 1880 MHz** – Order 119-6596-00.

**Beam Antenna 1850 to 1990 MHz** – Order 119-6597-00.

**DC Block Type N** – Order 119-6598-00.

**Calibrated Coupler “N” 500 to 1000 MHz** – Order 119-6600-00.

**Directional Coupler “N” 920 to 2200 MHz** – Order 119-6601-00.

**50 Ω BNC 3 foot cable (91 cm)** – Order 012-0482-00.

**Low-precision “N” 6 foot Cable (1.83 m)** – Order 012-0114-00.

**Calibrated Precision “N” 10 foot Cable** – Order 012-1619-00.

**N(F) to N(M) Attenuator 50 W, 20 dB** – Order 119-6599-00.

**Universal Adapter Kit, 30 pcs** – Order 119-6602-00.

**“N” Male to BNC Female Adapter** – Order 103-0045-00.

**“N” Male to “N” Male Adapter** – Order 103-0430-00.

**Barrel “N” Female** – Order 103-0429-00.

**7 to 16(F) to N(F) Adapter** – Order 103-0431-00.

**7 to 16(M) to N(F) Adapter** – Order 103-0432-00.

**SMB Female to BNC Male** – Order 174-3578-00.

**BNC Metal Cap** – Order 200-0678-00.

**“N” Metal Cap** – Order 200-4696-00.

# NetTek® BTS Transmitter and Interference Analyzer

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Our most up-to-date product information is available at:  
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