NetTek® BTS Antenna and Transmission Line Analyzer

▶ YBA250

▶ Features & Benefits

Improve Quality of Service Through Preventative Maintenance Activities on Antennas, Before they Become Service-affecting

Quickly Analyze the Most Important Antenna and Transmission Line Problems

Easy-to-Use Distance-to-Fault (DTF) Measurements for Locating Antenna and Transmission Line Trouble

Advanced Calibration Technique Speeds and Simplifies Your Measurements by Allowing a Single Calibration for Use Across Entire Frequency Range

Modular Instrument for Handheld NetTek® Y400, Which Allows for Easy Future Expansion for New Functions

▶ Applications

Return Loss/VSWR/Cable Loss Measurements for Antenna and Transmission Line Analysis

Distance-to-Fault (DTF) Measurements for Locating Problems

Maintenance and Installation Checks

Insertion Gain/Insertion Loss Measurements

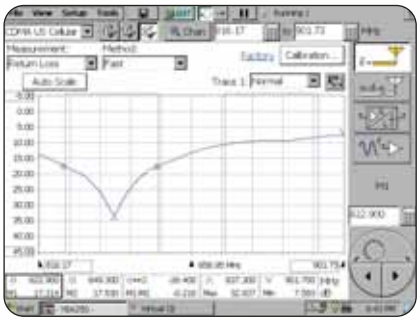
Affordable, Portable, Ready for the Field

Antenna and transmission line analyzer for wireless communications systems

The Tektronix NetTek Analyzer is a revolutionary portable BTS field tool. The YBA250 test module tailors this system for fast identification of base station antenna and transmission line trouble, and easy location of those faults. The YBA250 test module offers this capability at a surprisingly low price, in a rugged, easy-to-use package, suitable for all field environments.

Return Loss/VSWR

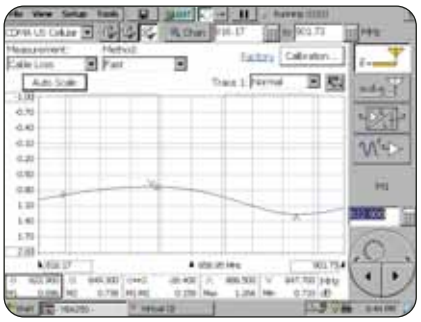
The YBA250 antenna test module allows you to quickly analyze the system using either Return Loss or VSWR. Comparisons against initial conformance tests enable



users to easily identify degradation in system performance. Viewing the frequency response vs. channel tables for various standards provides easier interpretation of how the problem may be affecting performance.

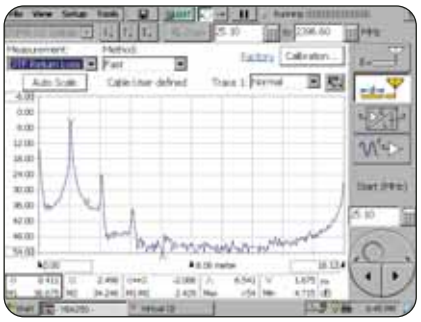
Tektronix

Enabling Innovation



Cable Loss

Cable loss can be measured using a simple, single port technique. This makes use of the Cable Loss feature of the YBA250. This feature allows measuring cable loss while connected to only one end of the cable. This is useful when access to the other end of the cable is difficult.

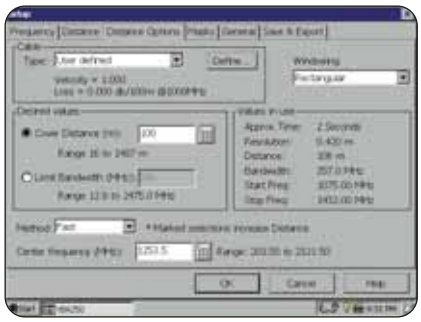


Distance-to-Fault (DTF)

The YBA250 test module helps locate antenna and transmission line faults quickly and easily. Using the Distance-to-Fault (DTF) capability, users are able to identify problem areas and their location. The YBA250's interface provides access to multiple cable types and easier setup of DTF parameters for faster troubleshooting.

CW Mode

The YBAS250 can be used as a sine wave, or continuous wave (CW) source. This is useful for many different trouble shooting applications.



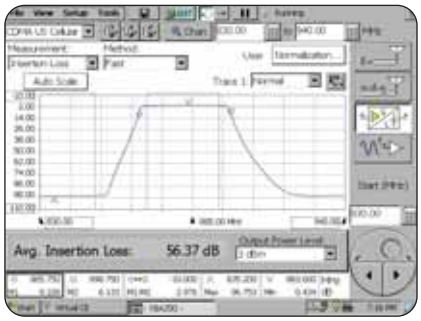
Easy to Use

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 YBA250 test module puts measurement functions just a point of the finger away. Furthermore, built-in help guides speed the measurement process.

Common measurements have been optimized for quick, repeatable results. For example, novice users can display Distance-to-Fault results with straightforward Windows-like zoom and resize controls. To further minimize troubleshooting time and improve effectiveness, users can control the YBA250's accuracy and resolution to optimize measurement results. For easier interpretation of these results, the YBA250 also enables user-defined masks to qualify antenna performance. This provides faster analysis and allows users to share masks and results.

Advanced Calibration

By using Tektronix' expert factory calibration program, the YBA250 speeds up and simplifies the troubleshooting process. By enabling users to reference a single calibration across the entire frequency range, we have eliminated antiquated calibration procedures each time the frequency or display range is changed.



Insertion Loss and Insertion Gain

System and RF component performance can be easily analyzed with the two port insertion loss or insertion gain capability of the YBA250, when used in combination with a YBT250. This capability allows measurements of cable, connector and attenuator loss. It also allows measurements of filters, duplexers, RF path gain, amplifiers, antenna isolation and many other general-purpose RF measurements. The Insertion Loss and/or Insertion Gain capability also allows measurements of Tower Mounted Amplifiers (TMAs, or receiver preamplifiers) while the TMA is still on the tower. Caution: Please check your country's laws regarding transmitters before using the NetTek to transmit a test signal.

► Y400 platform combined with test modules.

The Modules and the Platform

The Tektronix NetTek® Y400 analyzer platform is required for using NetTek modules and cards. The Y400 platform includes the display, power supply, CPU and battery compartments. Modules such as the YBA250 can then be attached to the back. Several types of modules can be attached at once. A variety of modules and options allows you to tailor the instrument to service the standards and interfaces for 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.

► Characteristics

YBA250 Antenna and Transmission Line Analyzer Module

Operation Modes –
Return Loss/VSWR/Cable Loss.
Distance-to-Fault (DTF).

Measurement Characteristics

Return Loss/VSWR –
Range:
Return Loss – 0.00 to 54.00 dB.
VSWR – 1.00 to 65.00.
Resolution:
Return Loss – 0.01 dB.
VSWR – 0.01.
Accuracy:
Factory Calibration –
≤1.2 dB, typical (from 0 ºC to 40 ºC up to 2.5 GHz, measuring a 17 dB return loss).
User Calibration –
$<0.05 + |20 \log (1 \pm 10^{[(RLrel)/20]})|$ dB, typical. Where RL_{rel} is the measured return loss value minus the calibration return loss value. Return loss measurement accuracy is dependent on the quality of the calibration standards used. Tektronix recommends the use of a YBAC1 calibration kit or equivalent.

CW Mode –
The YBA250 can be used as a sine wave or continuous wave (CW) source, which is useful for many different troubleshooting applications.

Distance-To-Fault (DTF) –
Vertical Range:
Return Loss – 0.00 to 54.00 dB.
VSWR – 1.00 to 65.00.
Distance Range: 0 to $1486 * V_{rel}$ m. Where V_{rel} is the signal velocity in the line with respect to the speed of light.
Resolution: $\leq 6.1 * V_{rel}$ cm at a distance of 200 meters, across frequency range up to 2.5 GHz.
Accuracy: Timing accuracy is equal to ±75 ppm. Distance accuracy varies with uncertainty in the velocity of propagation of the measured cable, along with the uncertainty of the timing accuracy.

Inputs/Outputs –
Frequency Range: 25 MHz to 2.5 GHz.
Signal Source Setting: +3 dBm, –20 dBm, –30 dBm, –40 dBm, –50 dBm, –60 dBm.
Input Level: +20 dBm (maximum safe input).
Interference Immunity: +11 dBm.
RF Connector: 50 Ω, type N.

Insertion Loss/Insertion Gain*1 –
Frequency Range: 30 MHz to 2.5 GHz.
Signal Source settings +3 dBm, –20 dBm, –30 dBm, –40 dBm, –50 dBm, –60 dBm.
Accuracy (Typical):
User Normalization.
1.0 dB when VSWR of device being tested is below 1.5.
0.5 dB when cable VSWR is below 1.15.
Valid when YBAC2 Normalization kit (or equivalent) is used.
Resolution: 0.01 dBm

*1 A YBT250 is required for Insertion Loss or Insertion Gain measurements.

General Characteristics

Temperature –
Operating: 0 ºC to 50 ºC.
Nonoperating: –40 ºC to +60 ºC.
Altitude –
Operating: Up to 15,000 ft. (4,550 m).
Nonoperating: Up to 50,000 ft. (12,192 m).
Humidity – 5% to 95% up to 30 ºC.
Calibration – 1-year cycle.
Warranty – 1 year.

Physical Characteristics

YBA250

Dimensions	**mm**	**in.**
Height	187	7.375
Width	241	9.5
Depth	32	1.25
Weight	**kg**	**lbs.**
Net	1.0	2.2

YBAC1 Calibration Kit

General Characteristics

Precision Open –
Connector: Type N.
Frequency Range: 0.1 to 18.0 GHz.
Phase Accuracy: ±2.0 degrees.
Reflection Coefficient: 0.99 (minimum).
Precision Short –
Connector: Type N.
Frequency Range: DC to 18.0 GHz.
Precision Load –
Connector: Type N.
Impedance: 50 Ω (nominal).
Frequency Range: DC to 18.0 GHz.
VSWR: 1.02 – From DC to 2.5 GHz.
Calibration – 1-year cycle.
Warranty – 1 year.
Weight – 1.1 lb (0.5 kg).

YBAC2 Normalization Kit

General Characteristics

Connectors – Type N.
Impedance – 50 Ω nominal.
Frequency Range – DC to 2.5 GHz.
VSWR – Below 1.15 (typical).

▸ Ordering Information

YBA250

Module without platform. NetTek® Y400 analyzer platform is required for using NetTek modules and cards.

Options

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 Opt. C3).

Opt. D5 – Calibration data report 5 years (with Opt. C5).

Opt. R3 – Repair service 3 years.

Opt. R5 – Repair service 5 years.

Suggested YBA250 Test Module Accessories

YBAC1 – Calibration kit.

Precision Cable – Order 012-1619-00.

"N" Male to BNC Female Adapter – Order 103-0045-00.

Barrel "N" Female – Order 103-0429-00.

Type N Male to Type N Male Adapter – Order 103-0430-00.

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

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

YBAC2 – Normalization kit.

YBAC1

Calibration kit for YBA250.

Options

Service

Opt. R3 – Repair service 3 years.

Opt. R5 – Repair service 5 years.

Suggested YBAC1 Calibration Kit Accessories

Precision Cable – Order 012-1619-00.

"N" Male to BNC Female Adapter – Order 103-0045-00.

Barrel "N" Female – Order 103-0429-00.

Type N Male to Type N Male Adapter – Order 103-0430-00.

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

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

YBAC2

Normalization kit for YBA250.

Includes: Two barrel connectors, two 6-foot cables and two 10 dB attenuators.

Suggested Insertion Loss/ Insertion Gain Accessories

Bias Tee Power Supply – 12 VDC 4.1 A OUT, 90 to 254 VAC (UL, CSA). Order 119-7017-00.

Bias Tee Power Supply Adapter – Order 012-1686-00.

Bias Tee – 2.5 to 6000 MHz, N type RF Connectors. Order 015-0718-00.

YBT1

Circuit tester.

PC Card without platform. NetTek Y400 analyzer platform is required for using NetTek modules and cards.

Includes: YBT1 PC Card, User Manual, Software CD-ROM, RJ48CT1 Dongle, Loopback Plug, RJ48C-to-Bantam Y Cable.

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Our most up-to-date product information is available at:
www.tektronix.com

Product(s) are manufactured in ISO registered facilities.

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