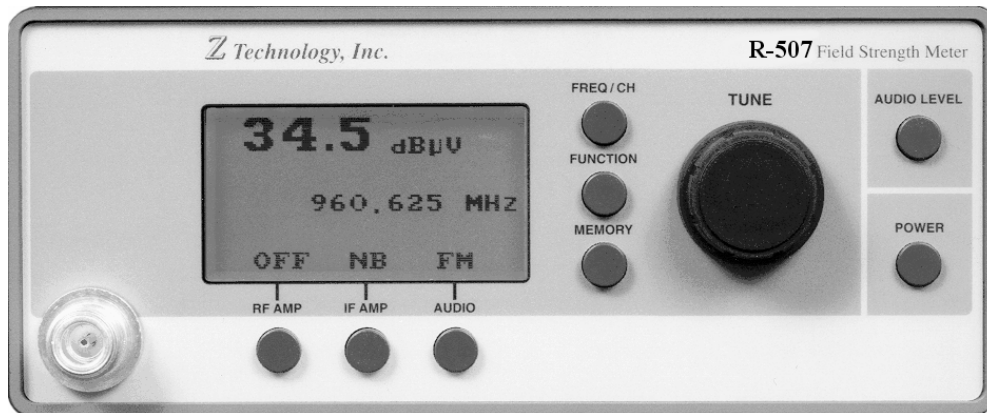




R-507 Field Strength Meter



R-507 Field Strength Meter

Swept Frequency Display for Analog and Digital Measurements

**Broad Frequency Coverage:
5 MHz to 1000 MHz**

**Wide Signal Measurement Range:
-10 dBuV to +90 dBuV**

**Excellent Measurement Accuracy:
+/- 2 dB**

RS-232 Serial Interface Control Port

Internal Preamp with Auto-Selection of RF Input Filters

Fast Front Panel Recall of 100 User-Programmed Frequencies

Front Panel Frequency or TV Channel Tuning Steps

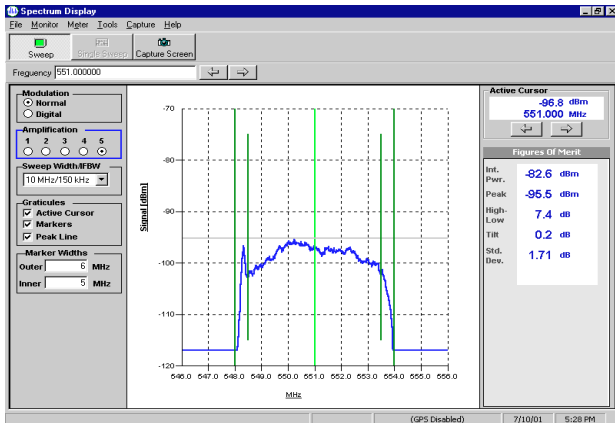
Direct Readout in dBm, dBuV, or dBuV/m with User-Provided Antenna Factors

**Battery or AC Operated;
Rugged and Highly Portable**

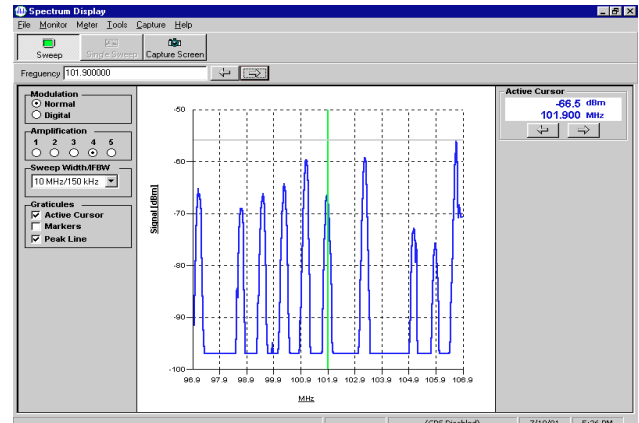
The R-507 features precision measurement design and user-friendly features in one quality, rugged instrument. It offers all the accuracy and features for standard field strength measurements, with the added ability to display on a PC screen, signal strength versus frequency for any 5 MHz, 10 MHz or 20 MHz band between 5 and 1000 MHz.

The R-507 is designed to allow a user to quickly switch between standard field strength meter operation and the swept spectrum display feature. The spectrum mode allows visual identification of channel occupancy throughout a band. This feature is also very useful in analyzing digitally-modulated signals such as DTV, DVB-T, DAB and GSM. An operator can directly measure total received power across an occupied channel. Simply enter the bandwidth to be measured and read the power being received, in dBm or dBuV, directly on the PC.

In standard mode, the instrument may be used to evaluate signal coverage across a service area, analyzing signal strengths at a specific location, surveying sites for new antenna construction and making precise industry required NIST traceable field strength measurements. The R-507 is an excellent unit for those needing to characterize or maintain both analog and digital RF wireless communications and Broadcast systems.



R-507 Spectrum Display of off-air DTV signal



R-507 Spectrum Display of analog signals

The R-507 expands the Z Technology product line of cost effective test instrumentation with a rugged, portable unit designed for the professional user. It is a state-of-the-art instrument combining the functions of off-air field strength metering and accurate RF signal strength measurement. In combination with a laptop PC and included software, the R-507 becomes an integral part of a convenient, automatic data collection and storage system.

Spectrum Display Mode:

The R-507 is available with a unique interactive software program (Opt. SW) to allow a PC to synchronously control the instrument's swept spectrum feature and display measured signal levels on the PC screen. The PC display refreshes up to 2 times per second offering a *near-real-time display* of spectrum over the swept frequency. A 5 MHz, 10 MHz, or 20 MHz band can be viewed at any one time. The vertical axis is calibrated and can be displayed in dBm, dBuV or dBuV/meter when antenna factors are entered for a calibrated antenna. The horizontal axis is calibrated in frequency around the selected center frequency.

Using the interactive Windows™ based *R-507 Spectrum Display* application, a PC communicates with the R-507 through its serial port. From the PC, a user can easily control basic setup features for the instrument including operating frequency, RF AMP on/off, IF Bandwidth, and attenuator settings. Through a point-and-click process and using pull-down menus, the R-507 is initialized and the spectrum sweep mode is activated.

Cursors marking the measurement band edges can be set by the user. This defines the band over which power is integrated. Received power in this band is then calculated and resulting total average power is displayed on the PC. Tilt and notches for the same band can also be measured and displayed.

The R-507 applications program allows a user to record measured parameters such as frequency, R-507 Spectrum Display of an off-air DTV signal, channel number, power readings, tilt and notches to a data file. The same program will record GPS Latitude/Longitude fixes and tag power readings with this location information. In the spectrum display mode, the R-507 provides accurate measurements for digitally modulated signals plus the ability to visually analyze signals being received over a band of interest.

Standard Field Strength Meter Mode:

Frequency coverage is from 5 to 1000 MHz. The R-507 utilizes a digitally encoded TUNE knob for front panel frequency selection. Step sizes available are 100, 10, and 1 MHz, and 100, 10, and 1 kHz. The frequency of operation is continuously displayed while the digit under control of the TUNE knob is highlighted. The system is fully synthesized and highly stable using a precise TCXO crystal reference.

The R-507 accurately measures signals from -10 dBuV to +90 dBuV. The full dynamic range of 100 dB is available through a combination of the front panel RF AMP control and an internal auto-ranging function. The RF AMP (internal preamp) is an



R-507 Test Package

integral part of the instrument. It is preceded by one of a series of internal RF Filters that are automatically controlled to minimize out-of-band signal interference. This allows measurement of weak signals while protecting against unwanted strong signal overload.

The R-507 features digital readout of field strength measurements, the frequency being monitored and front panel button status all on one large LCD display. The unit offers internal memory recall and LCD display of 100 user defined frequencies. The display can be backlit for operating in low ambient light.

Using the FUNCTION button to make a selection, signal strength can be displayed in dBuV or dBm. When using a calibrated and traceable antenna with manufacturer provided Antenna Factors (supplied separately), these Factors can be loaded into the R-507. In Direct Readout mode, the LCD displays signal level in dBuV/meter, the critical measurement units best suited for transmission testing.

Operating at rates up to 9600 baud, the standard RS-232 serial port allows computer controlled measurements of analog signals in stationary or mobile environments. Z Technology provides ready-to-use computer programs for RF measurement and data storage.

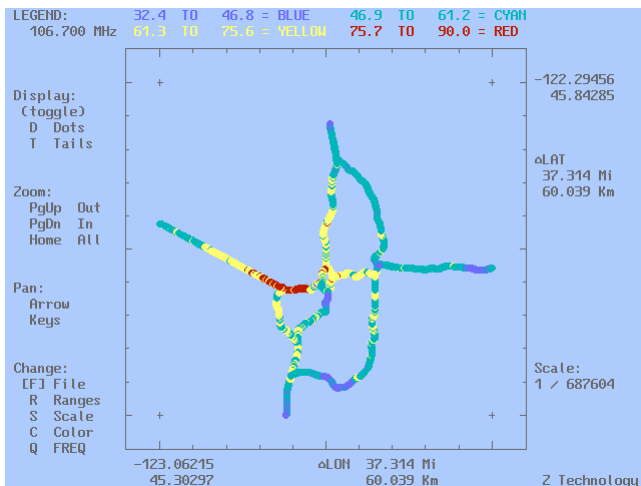
Test and Measurement Package

The Z Technology R-507 *Field Strength Meter* and the *R-507 Spectrum Display Application* gives a user the unique ability to create a specialized test “package” or measurement system.

The R-507 Spectrum Display Software can be loaded and run on most Windows based PCs. A measurement “package” is created using a PC, the R-507, a GPS receiver and appropriate antennas. The user’s PC becomes a controller communicating through two standard RS-232 serial ports. One serial port controls the R-507 Field Strength Meter while the second port communicates with a user supplied GPS receiver to accurately determine latitude and longitude locations.

With the resulting test package, digital or analog signals can be measured and signal parameters recorded to data files for both stationary testing and for mobile drive test measurements.

The complete test package is especially designed for automatically measuring digital signal parameters including integrated power, peak power, bandpass tilt and in-band notches. These parameters can be stored to data files along with date, time, frequency and latitude & longitude.



Results of DOS PLOT PROGRAM Drive Test

Data Analysis and Plotting

Once a drive test is complete and data files have been recorded, signal coverage information can be analyzed directly from the data files. The data is stored in industry standard open format files. The data is available for the user to review or export into reports and presentations.

Drive test data can also be viewed as a spatial plot of signal coverage versus GPS locations. This is possible through use of a *Z Technology DOS Plot Program* provided as a separate Application. When data is viewed in this way, results are plotted as a colored dot trail showing signal strength (or integrated power) along a driven route. The intensity of measured signal power is divided into four groups of levels. Each level is assigned a unique color. The plot is created off-line after a drive test is complete.

Most PC screen displays created using the *Z Technology R-507 Spectrum Display Application* can easily be captured in .jpg or .bmp image files. Clicking the correct menu button within the Application creates a screen capture.

Colored dot trail plots generated from the *DOS Plot Application* can be captured to the Windows clipboard and pasted into other Windows applications such as Microsoft PowerPoint™.

The Test Package described can be made from the following Z Technology orderable items:

- 1) R-507 Field Strength Meter
 Includes: Control Software for analog data collection
 DOS Plot Program Software for Plotting collected data.
- 2) R-507 Option SW
 R-507 Spectrum Display Application Software (for Digital Signal Measurements)
- 3) AA-TV Set
 Tuned Dipole Antenna Set for 54 – 210 MHz & 470 – 810 MHz

These additional items must be supplied by the user:

- 1) GPS Receiver with Antenna
 Supplied with NEMA Serial communication protocol.
- 2) Laptop PC
 Windows Based Pentium Class Computer with at least
 500MHz speed, 4GB Hard Drive, 64M Memory

This product is manufactured in the USA by Z Technology, Inc., and carries a 1 year warranty. For additional information please contact the factory.

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R-507 Field Strength Meter Specifications:

Frequency Coverage:

5 MHz to 1000 MHz
Contiguous Coverage.

Tuning Method:

Detent TUNE knob controls precise phase locked loop synthesized tuning.

Pushing TUNE knob changes tuning steps from 100 MHz/step down to 1 kHz/step.

Front Panel Display:

Large 64 x 128 pixel graphics LC display with controlled back lighting. Active display area of 1.3 x 2.6 inches.

Internal User Memory:

TUNE knob controlled
a) MEMORY button recalls 100 user selectable frequencies.
b) FREQ/CH allows fast tuning to local television channels.

Measurement Range:

dBuV Mode:

-10 dBuV to +90 dBuV

dBm Mode:

-117 dBm to -17 dBm

Utilizes auto-ranging plus front panel RF AMP controlled gain setting.

Standard Measurement Accuracy:

+/-2 dB @ 25 ° C +/-10 ° C

Typical: Swept Mode and Temperature = 0 to +50 ° C

IF Bandwidth:

15 kHz (6 pole) and 150 kHz.

See Options for other bandwidths.

RF Input Filters:

Automatically Selected

- 1) 400 to 1000 MHz
- 2) 5.0 to 400 MHz
- 3) 5.0 to 30 MHz

Type of Conversion:

Triple conversion system
1st LO frequency: 1 to 2 GHz.

Reference Oscillator

Stability:

Internal TCXO Reference;
1st and 2nd LO typically stable +/-1ppm over temperature.

Image Rejection:

60 dB typical, High Sensitivity mode.

Detuning Characteristics:

40 dB typical; for undesired signal 2x IF BW away from center frequency.

Third Order Intercept:

Preamp ON typ. 0 dBm
Preamp OFF +20 dBm.

Noise Figure:

Preamplifier NF = 7 dB typical when RF AMP is selected.

Input Impedance:

50 ohms.

Audio Detection:

AM or FM to internal speaker selected from front panel.
Rear panel connection for remote speaker or headphone.
BW is 300 Hz to 3 kHz.

Sensitivity:

FM detection: 1 uV for 12 dB SINAD typical.

AM detection: 1 uV for 12 dB S/N typical.

Measurement Resolution:

0.1 dB.

Output Linearity Range:

Continuous measurement range of 80 dB.

Serial Port Control:

Primary Use: For interface with a PC allowing R-507 to be used in swept spectrum mode.

Secondary Use: Baud rates up to 9600. Used for external data logging features as in all R-500 series instruments.

Operating Temperature:

0 ° C to +50 ° C

Weight:

4.5 Kg (10 lbs).

Dimensions:

89 mm (3.5 in) High

229 mm (9.0 in) Deep

213 mm (8.4 in) Wide

Ordering Information

R-507 Field Strength Meter

Supplied Accessories:

Internal NiCad battery
AC power supply/charger

Soft carrying case

Utility antenna (without A. Factors)

Instruction manual

RS-232 cable

Standard FSM Control software

DOS Plot Program Software

Options:

Opt. SW: R-507 Spectrum Display Software

Opt. NB1: 13 kHz @ 6 dB NB IF

Opt. NB3: 30 kHz @ 3 dB NB IF

Accessories:

BC-BCB: 0.3 to 3.0 MHz

Block Converter

BC-PCS: 1750 to 1980 MHz

Block Converter



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