



Custom Signal Strength Measurement Systems



Typical Custom System Capabilities:

Measurement and Documentation of Digital and Analog Signals

Spectrum Display of Analog and Wideband Digital Signals

Optimized for customer's signal format and environment

Color-Coded GPS Mapping of signal strength on commercial maps

Standard Frequency Coverage: 5 MHz to 1000 MHz

Extended ranges for 300 kHz to 3 MHz and from 1750 to 2500 MHz

Standard Signal Measurement Range: -10 dBuV to +90 dBuV

+/-2 dB accuracy over Full Temperature and Frequency Range

Standard internal Preamp with Auto-Selection of RF Input Filters

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

12V DC operation available, Rugged and Highly Portable

Document and plot up to 50 frequencies in one Drive Test

Airline Hand-Carry and Pop-Up Hard Cases

Systems for Special RF Measurement Applications:

Z Technology manufactures NIST traceable instrumentation for the measurement of receive-level RF signal strength over a basic frequency range of 5 to 1000 MHz. Systems can be tailored to meet specific customer requirements and for measurement of specific transmission formats and extended frequency ranges. As an example, custom configurations can be provided with both wideband measurement and GPS mapping capabilities. With such a system, a television broadcaster could survey and document the service area for signal availability, then analyze the received RF signal in a problem location for power level and spectral characteristics.

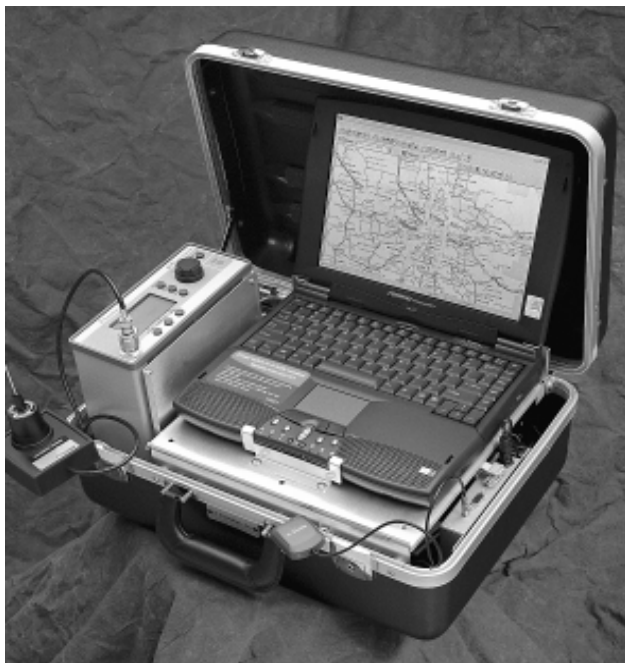
The example system would be factory integrated and tested for the customer's application, taking advantage of the precision and flexibility of the R-507 Field Strength Meter. The R-507 provides accurate, high speed measurement under PC control for both wide and narrow band signals. The custom system would offer accuracy and features for standard field strength measurements; plus the ability to plot signal strength on computer generated maps. The system would provide the ability to display on a PC screen, total power in a user defined bandwidth, peak power in the band, and signal strength versus frequency over spans of 5, 10, or 20 MHz. The system would identify signal problem locations, then provide the tools for precision measurement and documentation of analog or digital television signal strength and spectral characteristics.

Similar custom systems have been configured for the wireless communications industry; for special narrowband, 220 MHz applications; for analog and digital voice and data system measurement; and for critical, public safety communications reliability prediction.

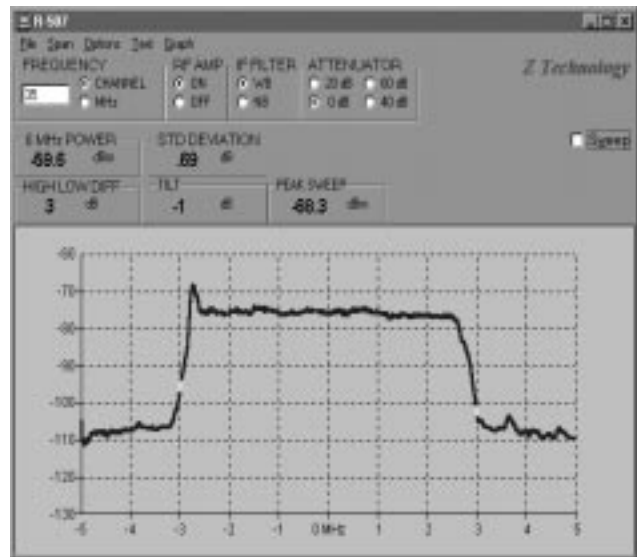
Z Technology engineers specialize in real-world measurement and documentation of RF signals. A custom system can combine the functions of off-air field strength metering, accurate RF signal strength measurement, GPS position identification, and PC based automatic data collection and storage in one convenient light weight system. Our engineers are ready to work with you to provide a measurement solution and help you maximize the efficiency of your transmission system.

Measurement Software Applications:

Two major software applications are available; Survey software for evaluation of signal coverage using either the R-506 or R-507 Field Strength Meters, and Spectrum Display software for wideband and digital spectral measurements with the R-507. The R-506 supports all of the basic field strength measurement modes of the instrument family, and is intended for use with signals up to 150 kHz modulated bandwidth. The R-507 may be used for both narrowband and wideband, analog and digital signals, and provides spectrum displays and wideband integrated power measurements in conjunction with an attached PC. With the R-507, an operator can easily switch between applications, or use either model in a stand-alone mode for individual precision field strength measurements. In the Survey application, the system evaluates signal coverage across an entire service area, analyzing signal strengths at a GPS identified locations, surveying sites for new antenna construction and making precise industry required NIST traceable field strength measure-



Custom Z Technology Measurement System with Survey and DeLorme mapping software plotting an analog signal



Custom television systems provide a spectrum display of off-air digital signals

ments. The Spectrum Display application, and an R-507 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, 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.

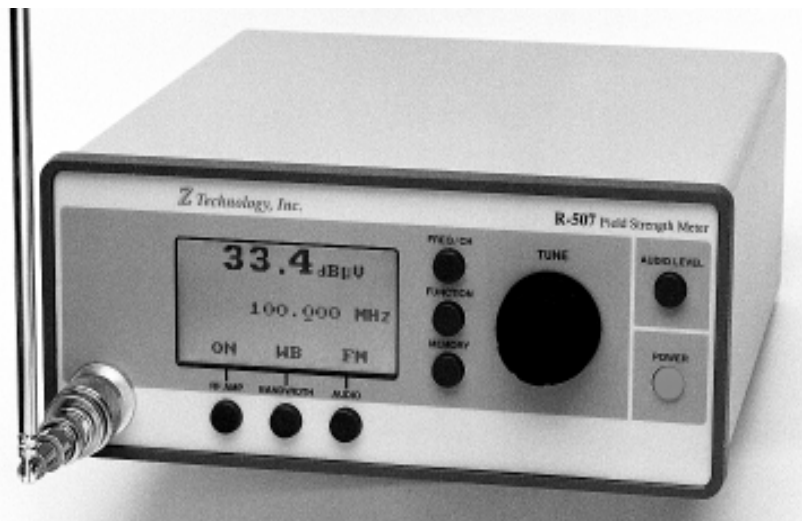
Both the R-506 and R-507 field strength meters are provided with basic control software, which provides extensive control and reporting capabilities.

Field Strength Measurement:

Frequency coverage is from 5 to 1000 MHz. The R-506 and R-507 utilize 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-506 and R-507 accurately measure 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 integral part of the instrument providing a typical noise figure of 7 dB. 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 instruments feature digital readout of field strength, frequency being monitored, and front panel button sta-



R-507 Field Strength Meter with DTV capability, typical of Field Strength Meters forming the basis of custom Z Technology Measurement Systems

tus, all on one large LCD display. The units offers internal memory recall and LCD display of up to 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, these Factors can be loaded into the Field Strength Meter. In Direct Readout mode, the LCD displays signal level in dBuV/meter, the critical measurement unit best suited for transmission testing.

Spectrum Evaluation:

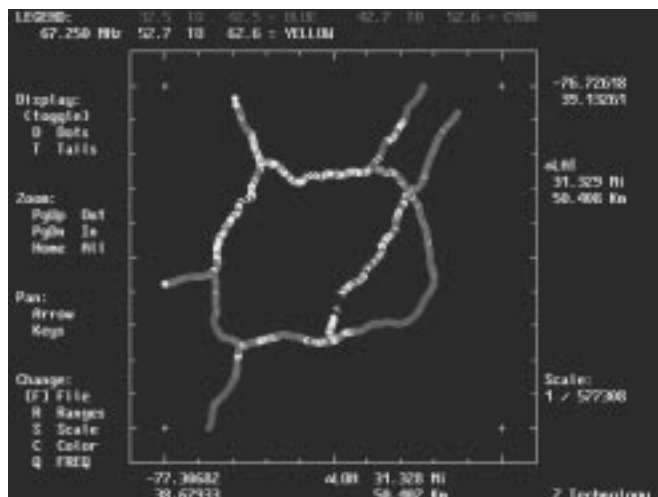
Custom systems utilizing the R-507 may be configured with a unique interactive software program to allow the system PC to synchronously control the R-507's swept spectrum feature and display measured signal levels on the PC screen. The PC display refreshes up to 2 times per second offering a near-real-time 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 or dBuV, while the horizontal axis is calibrated in frequency around the selected center frequency.

Using an interactive Windows-based applications program, the system PC communicates with the R-507 through its serial port. From the PC, a user can easily control basic features for the instrument including: operating frequency, RF AMP, 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 measured. 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 Swept Spectrum applications program allows a user to record measured parameters such as frequency, channel number, total power and in-band peak power readings, tilt and notches to a data file. If a GPS receiver is included in the custom system, 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. An operator can easily capture to the Windows clipboard any swept display image and paste it into a Windows application such as PowerPoint for future viewing and analysis.



SURVEY plot of Washington, D.C. drive test. Systems can be supplied to plot directly on commercial maps.