



S5007GPS Field Strength Measurement System



S5007GPS Measurement System with Survey software, plotting an analog signal

Digital and Analog Signal Measurements:

The new S5007GPS is an RF measurement system for digital and analog coverage testing. With this system, a user can survey and document the service area for signal availability and analyze the received RF signal in a problem location for power level and spectral characteristics.

This factory integrated system is optimized to the user'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 system offers accuracy and features for standard field strength measurements; plus the ability to plot signal strength on computer generated maps. The system provides the added 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 provides precision measurement and documentation of signals in a frequency range of 5 to 1000 MHz.

This system includes a factory installed Automated Drive Test Measurement Software Program, a single-windows based program that uniquely integrates three separate yet related applications: Data Collection, Dot Plotting, and Swept Spectrum Analysis. An operator can easily switch between the three applications, or can use the R-507 in

System for Field Measurement and Documentation of narrow and wide-band Digital and Analog Signals

Spectrum Display for Analog and Wideband Digital Signals

Color-Coded GPS Mapping of signal strength

Broad Frequency Coverage: 5 MHz to 1000 MHz

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

Excellent Measurement Accuracy: +/- 2 dB over Full Temperature and Frequency Range

Internal Preamp with Auto-Selection of RF Input Filters

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

12V DC or AC Operated; Rugged and Highly Portable

Document and plot up to 50 frequencies in one Drive Test

Factory Integrated into Airline Hand-Carry Pop-Up Hard Case

a stand-alone mode for individual precision field strength measurements. In the Data Collection and Dot Plotting modes, 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 field strength measurements. The Swept Spectrum Spectrum Analysis 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, 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.

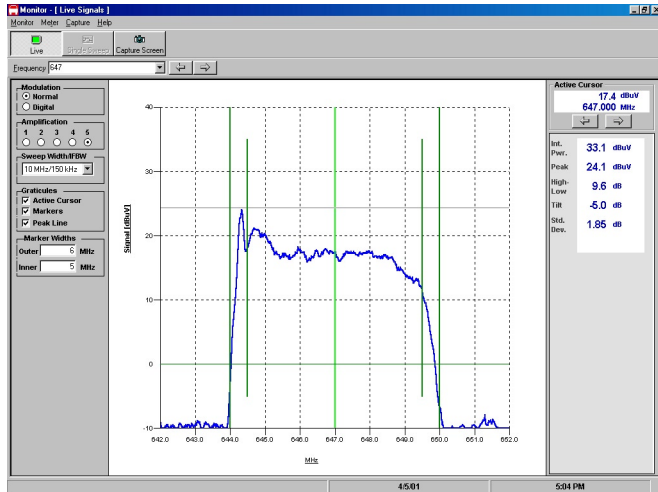
The S5007GPS expands the Z Technology product line of cost effective test instrumentation with a rugged, portable system designed for the professional user. It combines the functions of off-air field strength metering, accurate RF signal strength measurement, GPS position identification, and PC based automatic data collection and storage in one convenient light weight system.

Field Strength Measurement:

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 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 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 up to 100 user defined frequencies. The display can be back-lit for operating in low ambient light.



S5007GPS Spectrum Display of an off-air DTV signal

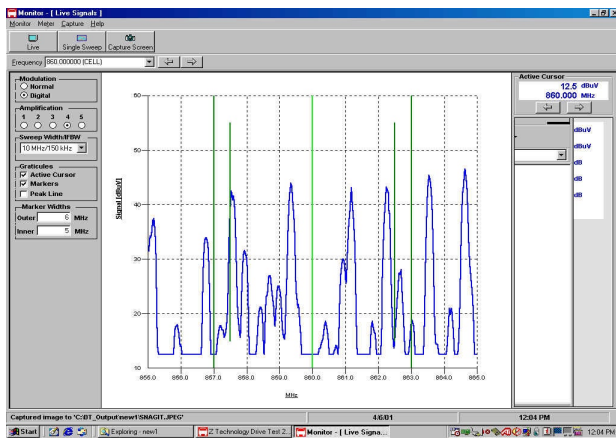
Using the FUNCTION button to make a selection, signal strength can be displayed in dBuV or dBm. When using a calibrated and traceable antenna with manufacturer provided Antenna Factors, these Factors can be loaded into the R-507. In Direct Readout mode, the LCD displays signal level in dBuV/meter, the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

Spectrum Evaluation:

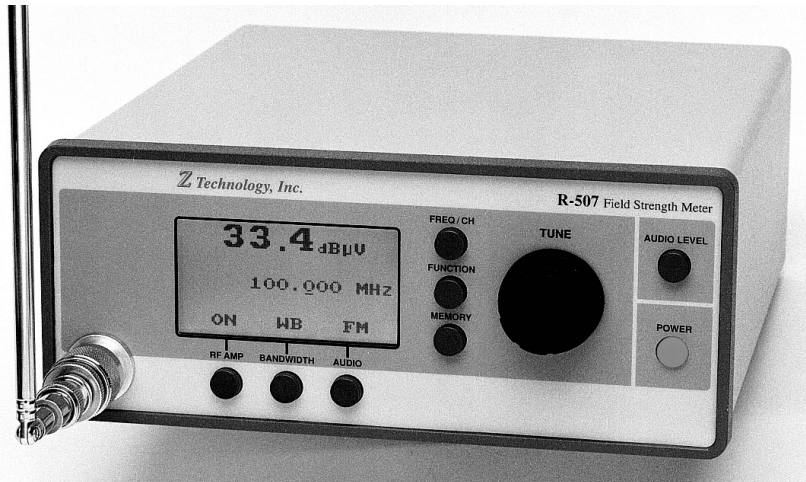
The S5007GPS is configured with a unique interactive software program to allow the system PC to synchronously control the R-507's swept spectrum feature and display measured signal levels on the PC screen. The PC display refreshes up to 2 times per second offering a near-real-time display of spectrum 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 R507 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.



S5007GPS Spectrum Display of an off-air multi-carrier service



R-507 Field Strength Meter with DTV capability; heart of the S5007GPS system

The R-507 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. 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.

GPS Location Signal Strength Plotting

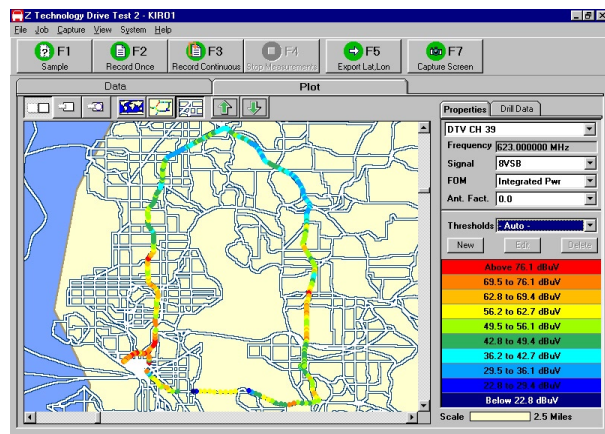
Operating at rates up to 9600 baud, the standard RS-232 serial port allows computer controlled measurements of analog or digital signals in stationary or mobile environments. The Z Technology S5007GPS is provided with a laptop PC and a PCMCIA serial port card allowing connection of both the R-507 field strength meter and a GPS receiver, and ready-to-use computer programs for RF measurement and data storage with GPS Latitude/Longitude tagging. An operator can survey up to 50 discrete frequencies in a single drive test. The S5007GPS system is placed into operation under 12V vehicle power, and will operate unattended as the driver covers a route of interest.

The system automatically measures signal strength and stores the signal level, time, frequency, and position information into a data file. No operator attention is required while the measurement system is in motion, and it is recommended the system be installed out of view of the driver. Once the drive test is completed, the data can be analyzed directly from

the data file, or plotted as a colored dot trail showing signal strength in color along the drive route. Where DeLorme Street Atlas maps are available, Option 01 allows plotting signal strength along the driven route directly onto commercial maps. Off-line, the display can be reproduced on a PC screen or exported into reports and presentations.

System Integration

The Z Technology S5007GPS system is a self-contained, lightweight system suitable for transport as hand-carry airline baggage. Its small size permits easy, temporary installation in a vehicle; quick setup for field locations with or without power; and even hand-carry portability for measurement to characterize existing receive antennas at remote sites. The system includes necessary hardware and software for NIST traceable RF signal measurement, and when used with optional calibrated antennas, provides a complete system for the measurement and documentation of signal coverage.



*SURVEY map plot of Seattle, WA.
drive test*

S5007GPS System Specifications:

Frequency Coverage:

5 MHz to 1000 MHz Contiguous Coverage.

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

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.

GPS Rx:

L1 frequency (1575.42 MHz), C/A code (standard positioning service), 6-channel, continuous tracking, Memory backup battery.

GPS Position Accuracy:

Selective availability, 100 meters 99% of the time..

Laptop Computer:

Pentium class, 233 MHz, 32 Mb Memory, 3.2 Gb Hard Drive, or better.

Power Inverter:

12V DC input, 120V AC output, 150 watts.

Operating Temperature:

0°C to +50°C (R-507 & GPS Rx)

System Weight:

13.9 Kg (25 lbs).

System Dimensions:

216 mm (8.5 in) High

375 mm (14.75 in) Deep

470 mm (18.5 in) Wide

Ordering Information:

S5007GPS Field Strength Measurement System.

System includes:

R-507 Field Strength Meter

Laptop Computer

Installed Survey Software

Installed Spectrum Display Software

GPS Receiver

GPS Active Antenna

12VDC-to-120VAC Inverter

Hand-Carry Pop-Up System Case

Supplied Accessories:

Internal NiCad battery

AC power supply/charger

Soft carrying case

Extendable antenna

Instruction manual

Quick-Start instructions

Options:

Option 01: DeLorme Street Atlas

USA Software with Z Technology

R500 Translator

Option 02: 220 MHz Linear

Modulation Application

Option NB1: 13 kHz @ 6 dB NB

IF Filter

Option NB3: 30 kHz @ 3 dB NB

IF Filter

Option WB1: 300 kHz @ 3 dB

WB IF Filter

Accessories:

BC-BCB: 0.3 to 3.0 MHz

Block Converter

BC-PCS: 1750 to 1980 MHz

Block Converter

AA1-B1: Calibrated tuned dipole

antenna 30 - 70 MHz

AA1-B2: Calibrated tuned dipole

antenna 65 - 180 MHz

AA1-B3: Calibrated tuned dipole

antenna 170 - 340 MHz

AA1-B4: Calibrated tuned dipole

antenna 325 - 1000 MHz

AA1-SET: Calibrated tuned dipole

antenna set 30 - 1000 MHz;

includes case, antennas B1, B2,

B3, B4

AA-2 Active monopole antenna

system, battery power, 100

kHz - 60 MHz

AA-3 Biconical antenna system

20 MHz - 330 MHz

AA-4 Log Periodic antenna

system 290 MHz - 1000 MHz

AA-6 Log Periodic antenna

system 150 MHz - 1000 MHz

AA-7 Bi-Log Periodic antenna

system 25 MHz - 1000 MHz

AA-8 Log Periodic antenna

system 800 MHz - 2600

MHzCAB214-3N Calibrated Cable

3 meter RG214U, N connectors